

**TRANSISTOR RADIO
SECTION**

Firestone

7 TRANSISTOR PORTABLE RADIO

STOCK NO. 4-C-40
 CODE NO. 1-8-71/483

CUSTOMER OPERATING INSTRUCTIONS SERVICE MANUAL AND PARTS CATALOG

TO OPERATE SET

To turn the set on, turn the on-off volume control clockwise (to right) until the switch click is heard. Turn the tuning control slowly to the desired station. Then turn volume control to the desired volume. For the more distant stations you may rotate the radio for clearer reception. To turn radio off, turn the on-off volume control counter clockwise (to left) until switch click is heard.

BATTERY INFORMATION

This unit is designed to operate on 6 1/2 volts ordinary penlite cells such as Eveready type 915 or 1015 or Burgess type "Z". For longer life, Mallory Mercury Cells Type ZM-9 or equivalent may be used.

TO INSTALL BATTERIES

1. Move handle to rear of set.
 2. Release clip on each side of cabinet.
 3. Remove rear cover.
 4. Slide battery holder out.
 5. Be sure to observe correct polarity (see battery diagram) when inserting batteries so as to avoid possible damage to transistors.
 6. Replace cover and close clips.
- IMPORTANT: WHEN REINSERTING BATTERY HOLDER THE CUTOFF MUST BE FACING UP. (SEE DIAGRAM INSIDE)**

Also it is recommended that all batteries be removed from case if receiver is to be out of use for lengthy periods.

EARPHONE ATTACHMENT

For private listening pleasure earphone attachment Stock No. 4-C-39 may be plugged into jack located on right hand side of receiver case. Speakers are automatically disconnected when earphone is in use permitting you to enjoy private listening.

For Civil Defense broadcasts on the Conelrad plan tune to 640 KC or 1240 KC marked on tuning knob with Δ

Valuable Technical Information is contained inside this booklet.
 Be sure to keep for future reference.

STOCK NO. 4-C-40

TECHNICAL SERVICE INFORMATION

CODE NO. 1-8-71/483

SPECIFICATIONS

Cabinet Dimensions Width 6-5/8", Height 4-1/8",
 Depth 2"
 Shipping Weight 2 pounds
 Power Supply 6 - 1 1/2 volt penlight cells
 Battery Type Eveready 915 or 1015
 Loud Speakers Two 3" P.M.

Voice Coil Impedance 3.2 ohms at 400 cycles
 Power Output 120 Milliwatts
 Tuning Range Standard Broadcast Band
 540KC-1620KC
 Intermediate Frequency 455KC
 Transistor Complement 1 - 2N411 Converter
 2 - 2N409 IF Amplifier
 1 - R-67 Det. AVC
 1 - 2N405 Audio Driver
 2 - 2N306 Power Amplifier

TO REMOVE CHASSIS

1. Remove volume control knob by pulling away from case.
2. Move handle to rear.
3. Release spring clips on each side of cabinet and remove back.
4. Remove battery holder.
5. Unscrew the four chassis corner mounting screws
6. Remove one screw holding volume control bracket.
7. Slide down to bottom of case and out to clear tuning knob from case.

CAUTION: BE SURE TUNING KNOB IS COMPLETELY CLEAR OF CASE BEFORE REMOVING CHASSIS.

ALIGNMENT

ALIGNMENT INSTRUCTIONS - READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

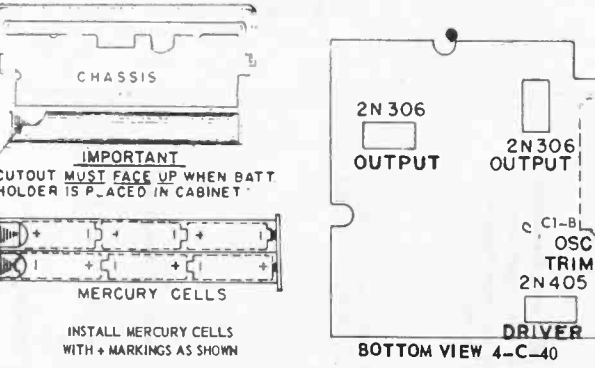
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting. Use battery power. Connect Output Meter across Voice Coil of Speaker.

Function	Generator Frequency	Dummy Antenna	Generator Conn.	Adjust	Remarks
1. I.F.	455KC	.1 Mfd Condenser in series with Gen. Lead	On Converter Base	T1, T2, T3	Adjust for Max. Output
2. Osc. Trimmer	1620KC		*Test Loop	C1-B	Variable Condenser Set for Minimum capacity
3. Osc. Slug	540KC		*Test Loop	L-2 Slug	Variable Condenser Set for maximum Capacity Adjust for Maximum Output Repeat steps 2 & 3 Tune 1400 Kc on Variable Condenser
4. Ant. Trimmer	1400KC		*Test Loop	C1-A	Tune 1400 Kc on Var Cds. Adjust for Maximum Output

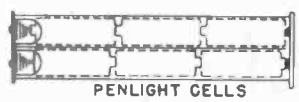
* Standard Hazeltine Loop Model 1150 or 3 turns of wire about 6" diameter placed one foot from set.
IMPORTANT: DO NOT make resistance measurements in transistor circuits unless all transistors are first removed from their sockets. Failure to do this will result in false indications and possible damage to transistors.

CODE 1-8-TW6

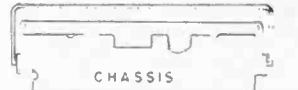
PART NO.	DESCRIPTION	FIRESTONE PRICE
250320	Plastic Cabinet Front	\$1.30
250251	Plastic Cabinet Cover	.70
272256	Volume Knob	.10
272253	Tuning Knob	.20
760967	Handle	.05
678030	Cabinet Clips	.30
368028	Battery Holder Assembly Complete	1.00
450024	Volume Control	1.85
450025	First and Second IF Input Transformer	1.85
430490	Third IF Output Transformer	1.85
430500	Interstage Audio Transformer	1.85
409008	Output Audio Transformer 1.6 ohm Sec.	3.30
455076	Speakers 3", .68 oz.	.75
464029	Oscillator Coil	1.05
552025	Ferrite Loop	.15
515039	.002 Mfd. Cer. Disc. GMV	.30
515340	.05 Mfd. Cer. Disc. 80-20% RMC 50V	.20
515010	.02 Mfd. Cer. Disc. 80-20% 75V CRL	.05
581033	4.7 MMF Cer. Disc. -10%	.55
581034	5 Mfd Elect. 10V	.55
581031	10 Mfd Elect. 7V	.55
359011	Transistor 2N411	4.40
359010	Transistor 2N409	4.20
359008	Transistor 2N405	2.80
359015	Transistor 2N306	3.60
359017	Transistor (R-67)	1.60



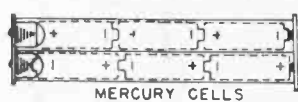
BATTERIES
EVEREADY 915 or 1015
BURGESS TYPE "Z"
or equivalent
For Longer Life
MALLORY MERCURY CELLS
ZM - 9



INSTALL ORDINARY PENLITE
CELLS WITH CENTER POSTS
AS SHOWN

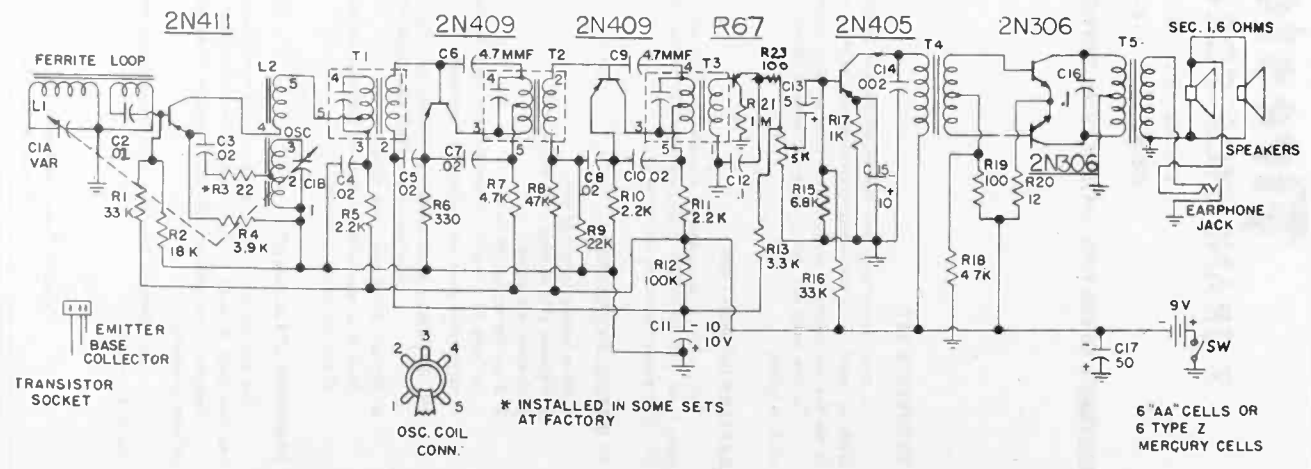


IMPORTANT
CUTOUT MUST FACE UP WHEN BATT
HOLDER IS PLACED IN CABINET



INSTALL MERCURY CELLS
WITH + MARKINGS AS SHOWN

CHASSIS LAYOUT



NOTE: All resistors are carbon 1/2W ± 10%

TRANSISTORS ARE R.C.A. TYPE EXCEPT
2N306 SYLV. & R67 TEX. INST.

960103

©John F. Rider



PRELIMINARY SERVICE DATA

S-P745A
COVERS
MODELS
P745A
P746A

SPECIFICATIONS

CABINET:	Plastic, P745A, Ebony P746A, Ant. White and Turquoise
ELECTRICAL RATING:	4.5 Volts D. C.
BATTERIES:	Carbon Pen-light Cells: (1) Eveready #1015, #915, or (2) Mallory Z #930, or (3) Mallory M15 Mercury Cells: (1) Eveready E9, or (2) Mallory Z89
OPERATING FREQUENCIES:	Tuning Range 540 - 1600KC. IF Frequency 455KC
TRANSISTOR COMPONENTS:	TR1 Osc. Conv. 2N168A or 2N168A 2N94 TR2 1st. I. F. 2N169 TR3 2nd. I. F. 2N265 TR4 Audio Ampl. 2N265 TR5 Audio Output 2N261A
GERMANYUM DIODES:	D1 AVC 1N87 D2 Audio Bias Rectifier 1N87

GENERAL INFORMATION

The models P745A and P746A are all transistor battery operated pocket portable radios.
An earphone jack for private listening is provided on the speaker end of the receiver. When the earphone is plugged in, the speaker is automatically silenced.

- TO REMOVE CIRCUIT BOARD**
1. Remove cabinet back by twisting a coin in the two slots provided along bottom of the cabinet.
 2. Remove the four screws that secure the circuit board to cabinet bosses. (SEE COMPONENT WIRING DIAGRAM FOR MOUNTING SCREW POSITIONS).
 3. Remove the two screws that secure circuit board to speaker. (SEE COMPONENT WIRING DIAGRAM FOR MOUNTING SCREW POSITIONS).
 4. Swing circuit board out of cabinet front. Leave all connecting leads attached to volume control and tuning capacitor.

TO REMOVE TUNING CAPACITOR

1. Follow steps 1 and 2 as above.
2. Remove tuning knob by unscrewing the thumbscrew in its center in a counterclockwise direction.
3. Remove the flat head screws located under tuning knob.

TO REMOVE VOLUME CONTROL

1. Follow steps 1 through 3 as above.
2. Remove on-off volume knob by unscrewing the screw in the center of the knob.
3. Remove hex nut from volume control shaft.
4. Move tuning capacitor slightly and lift out volume control.

TROUBLESHOOTING

A check of the battery condition and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control set maximum, tuning gang closed, and with no signal conditions.

The total receiver current drain is 15 to 20 mA. This is measured by inserting a milliammeter in series with the batteries.
If an excessive total current drain is recorded, the individual collector current readings of each transistor should be checked. An excessive current reading may mean a shorted transistor; no current will indicate that a transistor or associated circuit components are defective.

A single-edge razor blade is a satisfactory tool for cutting the copper circuit wiring, so that a milliammeter can be inserted in series with the break to measure the current flow. After each current check is completed, solder the cut carefully to complete the circuit again.

NO RECEPTION:

1. Check battery voltage and battery contacts.
2. Check on-off switch.
3. Check all antenna lead connections.
4. Check coil L2.

WEAK AUDIO:

1. Check battery voltage for 4.5 volts.
2. Check battery current.
3. Check transistor collector currents.
4. Check alignment.

1. Check battery contacts for corrosion.
2. Check solder connections on dip-soldered side of circuit board.
3. Insufficient audio, motorboating, and poor reception is frequently caused by poor battery contact. The battery terminals should be cleaned with emery cloth to insure positive electrical contact.

TRANSISTOR REPLACEMENT

When replacing a defective transistor, be sure to observe correct lead positions, as shown on the schematic diagram in outline form. It is important that the "heat sink" remain insulated from any contact with ground and all component leads.

REPLACEMENT OF COMPONENTS

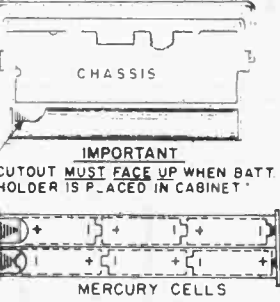
After removing a defective part, clean the mounting holes of all solder; replacement part can then be inserted more easily and a better solder connection can be accomplished. Apply a soldering iron just long enough to heat the terminal to remove the component. Too much heat may damage a component.

CONTINUED

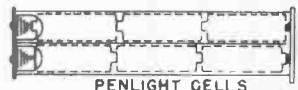
CAT. NO.	SYMBOL	DESCRIPTION	PRICE	CAT. NO.	DESCRIPTION	PRICE
n-RS-1379	R12, S1	POTENTIOMETER	2.75	n-RB-1058	CABINET FRONT, (Ebony) P745A.	3.30
n-RS-1372	T4	VOLUME TRANSFORMER	3.00	(Assemb.)	Cabinet Back, (Ebony) P745A.	3.30
n-RS-1373	L2	Coil, Inducto. 0.4 mH	1.20		Insert, Decorative.	
n-RS-1374	T1	Coil, Oscillator	2.10		Strip, Decorative.	
n-RS-1375	T2	Transformer, 1st. I. F.	2.10		Plate, Grille.	
n-RS-1376	T3	Transformer, 2nd. I. F.	2.10		Cabinet Front (Ant. White), P746A	3.30
n-RS-1380	L1	Transformer, 3rd. I. F.	1.40	(Assemb.)	Cabinet Back (Turquoise).	3.30
					Insert, Decorative.	
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55
					Insert, Decorative.	.15
					Strip, Decorative.	.15
					Knob, Volume, Ebony, P745A.	.15
					Knob, Volume, Turq., P746A.	.15
					Strip, Decorative.	
					Knob (Tuning).	.30
					Thumbcrew (Tuning Knob).	.55

CODE 1-8-TW6

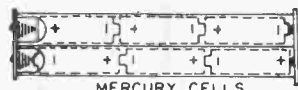
PART NO.	DESCRIPTION	FIRESTONE PRICE
250320	Plastic Cabinet Front	\$1.30
250251	Plastic Cabinet Cover	.70
272256	Volume Knob	.10
272253	Tuning Knob	.10
760967	Handle	.20
678030	Cabinet Clips	.05
	Battery Holder Assembly Complete	.30
368028	Volume Control	1.00
450024	First and Second IF Input Transformer	1.85
450025	Third IF Output Transformer	1.85
430490	Interstage Audio Transformer	1.85
409008	Output Audio Transformer 1.6 ohm Sec.	1.85
455076	Speakers 3" .68 oz.	3.30
464029	Oscillator Coil	.75
552025	Ferrite Loop	1.05
515039	.002 Mfd. Cer. Disc. GMV	.15
515040	.05 Mfd. Cer. Disc. 80-20% RMC 50V	.30
515010	.02 Mfd. Cer. Disc. 80-20% 75V CRL	.20
581033	4.7 MMF Cer. Disc. -10%	.05
581034	50 Mfd Elect. 10V	.55
581031	5 Mfd Elect. 10V	.55
359011	10 Mfd Elect. 7V	.55
359010	Transistor 2N411	4.40
359008	Transistor 2N409	4.20
359015	Transistor 2N405	2.80
359017	Transistor 2N306	3.60
	Transistor (R-67)	1.60



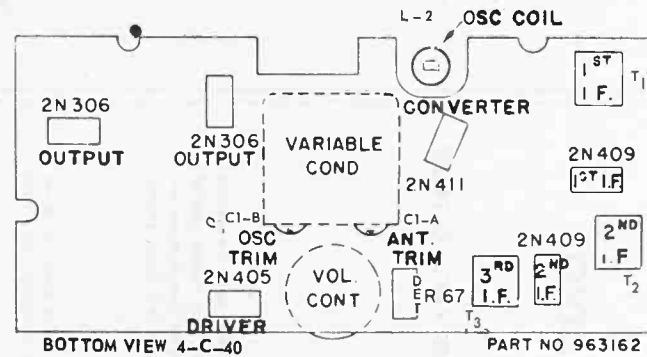
BATTERIES
 EVEREADY 915 or 1015
 BURGESS TYPE "Z"
 or equivalent
 For Longer Life
 MALLORY MERCURY CELLS
 ZM-9



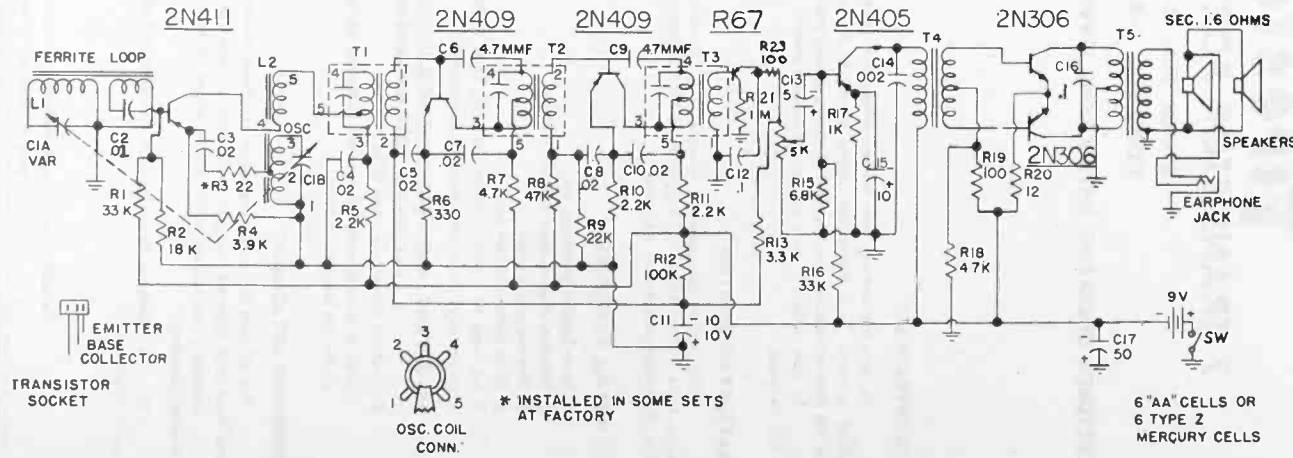
INSTALL ORDINARY PENLITE CELLS WITH CENTER POSTS AS SHOWN



INSTALL MERCURY CELLS WITH + MARKINGS AS SHOWN



CHASSIS LAYOUT



NOTE: All resistors are carbon 1/2W ±10%

TRANSISTORS ARE R.C.A. TYPE EXCEPT 2N306 SYLV. & R67 TEX. INST.

960103

John F. Rider



PRELIMINARY SERVICE DATA

S-P745A
COVERS
MODELS
P745A
P746A

SPECIFICATIONS

CABINET:	Plastic, P745A, Ebony P746A, Ant. White and Turquoise
ELECTRICAL RATING:	4.5 Volts D. C.
BATTERIES:	Carbon Pen-Light Cells: (3) Eveready #1015, #915, or (3) Burgess 2, #930, or (3) Mallory M15 Mercury Cells: (3) Eveready E9, or (3) Mallory Z89
OPERATING FREQUENCIES:	Tuning Range 540 - 1600KC. IF Frequency 455KC
TRANSISTOR COMPONENT:	TR1 Osc. Conv. 2N166A or 2N168A 2N904 TR2 1st. I.F. 2N169 TR3 2nd. I.F. 2N169 TR4 Audio Amp. 2N265 TR5 Audio Output 2N261A
GERMANYUM DIODES:	D1 AVC 1N87 D2 Audio Bias Rectifier 1N187

The models P745A and P746A are all transistor battery operated pocket radios. An earphone jack for private listening is provided on the speaker end of the receiver. When the earphone is plugged in, the speaker is automatically silenced.

GENERAL INFORMATION

TO REMOVE CABINET BOARD:
1. Remove cabinet back by twisting a coin in the two slots provided along bottom of the cabinet.
2. Remove the four screws which hold the circuit board in place. (SEE COMPONENT WIRING DIAGRAM FOR MOUNTING SCREW POSITIONS)
3. Remove the two screws that secure circuit board MOUNTING SCREW POSITIONS)
4. Swing circuit board out of cabinet front. Leave all connecting leads attached to volume control and tuning capacitor.

TO REMOVE TUNING CAPACITOR

1. Follow steps 1 and 2 as above.
2. Remove tuning knob by unscrewing the thumbscrew in its center in a counterclockwise direction.
3. Remove the flat head screws located under tuning knob.

TO REMOVE VOLUME CONTROL

1. Follow steps 1 through 3 as above.
2. Remove on-off volume knob by unscrewing the screw in the center of the knob.
3. Remove hex nut from volume control shaft.
4. Move tuning capacitor slightly and lift out volume control.

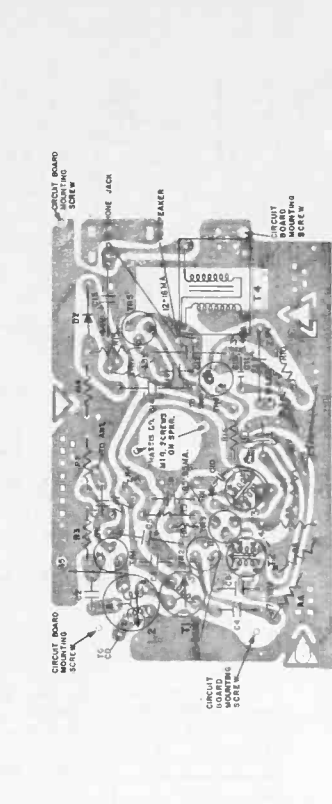
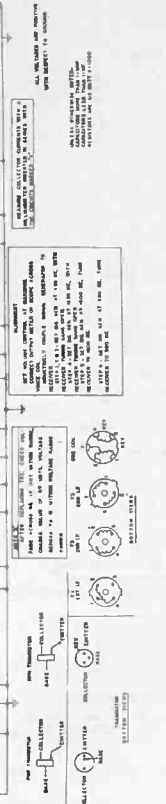
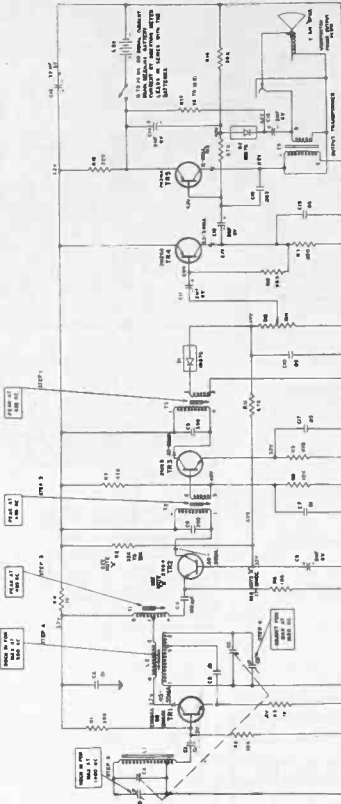
TROUBLESHOOTING

A check of the battery condition and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control at maximum, tuning gang closed, and with no signal conditions.

PRELIMINARY REPLACEMENT PARTS LIST - P745A, P746A CONTINUED

CAT. NO.	SYMBOL	DESCRIPTION	PRICE	CAT. NO.	DESCRIPTION	PRICE
n-RS-1379	R1Z S1	Volume Control 10K. & Sv.	2.75	n-RB-1058	Cabinet Front, (Ebony), P745A, (Assemb.)	3.30
n-RS-1372	T6	Transformer, Output	3.00	n-RS-1362	Cabinet Back, (Ebony), P745A, (Assemb.)	3.30
n-RS-1373	L2	Coil, Oscillator	1.20	n-RS-1363	Strip, Decorative	3.30
n-RS-1374	T1	Transformer, 1st. I.F.	2.10	n-RS-1364	Strip, Decorative	3.30
n-RS-1375	T2	Transformer, 2nd. I.F.	2.10	n-RS-1365	Strip, Decorative	3.30
n-RS-1376	T3	Transformer, 3rd. I.F.	2.10	n-RS-1366	Knob, Volume, Ebony, P745A	1.15
n-RS-1380	L1	Antenna	1.40	n-RS-1358	Knob, Volume, Turq., P746A	1.15
RS-1385		Earphone, reeceptor and mut.	.90	n-RS-1362	Knob, Volume, Turq., P746A	1.15
RS-1387		Base, Support	.45	n-RS-1363	Thumb screw (Tuning Knob)	.30
(Assemb.)		Barrel, Spring	.85	n-RS-1364	Insert, Decorative	.55
n-RS-1368		Contact Spring	.15	n-RS-1365	Strip, Decorative	.15
n-RS-1369		Retainer, Spring Contact	.15	n-RS-1366	Knob, Volume, Ebony, P745A	1.15
n-RS-1377		Washer, Plain	.15	n-RS-1358	Knob, Volume, Turq., P746A	1.15
		Screws, (2) #x3/8, Type 25	.15			
		Cover, Battery Compartment	.45			
		Speaker, 2 3/4"	.45			

"n" Denotes Items Not Previously Catalogued.
All Parts Not Listed by Catalog Number Are Custom Items, Obtainable From Radio Parts Jobbers. Prices are Suggested List Prices and Subject To Change Without Notice.



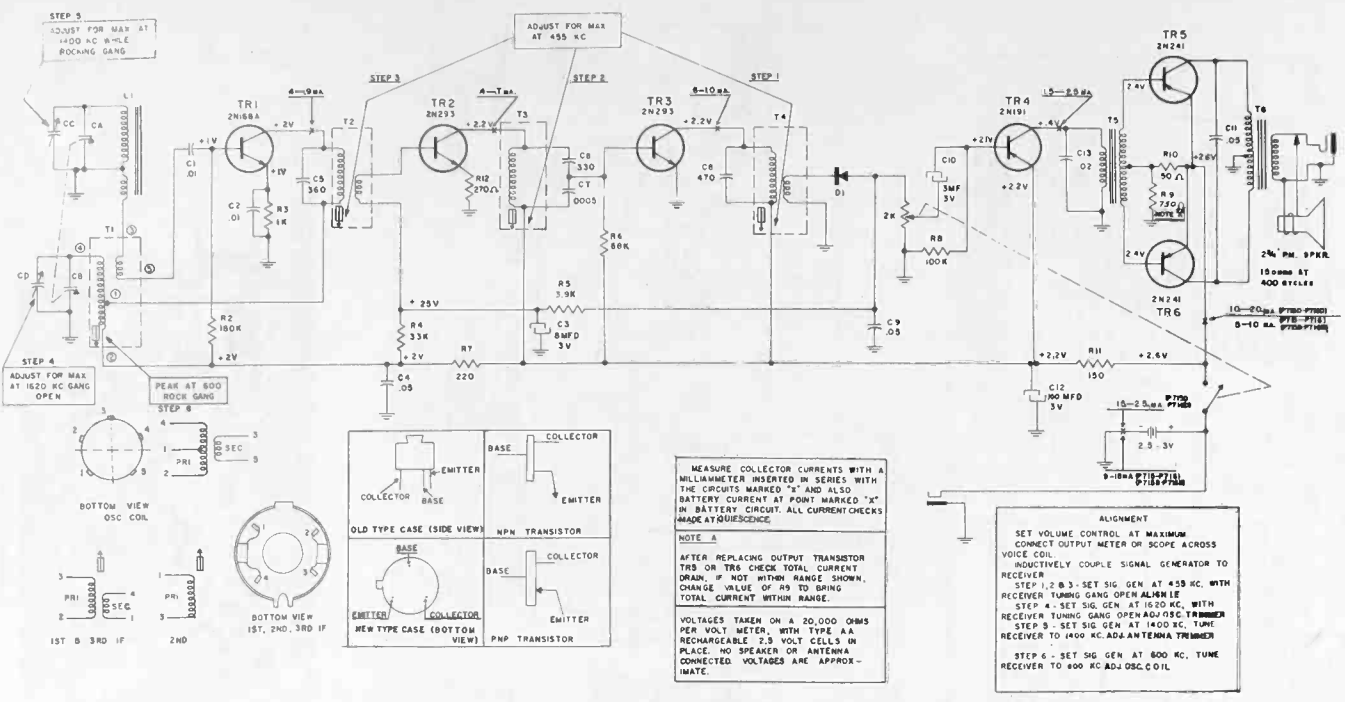
COMPONENT WIRING DIAGRAM

REPLACEMENT OF COMPONENTS

After removing a defective part, clean the mounting holes of all solder; replacement part can then be inserted more easily and a better solder connection can be accomplished. Apply a soldering iron just long enough to heat the terminal to remove the component. Too much heat may damage a component.

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
n-RS-1378	CA, B, C, D	Tuning Capacitor	4.15
RS-1022	C1, 3	.01mf., 450V.	.30
	C2, 7	.01mf., 50V.	
	C4	150mf., 300V.	1.65
n-RS-1462	C5	8mf., 6V.	.50
	C6, 9	390mf., 300V.	
RS-1024	C10, 17, 19	.05mf., 50V.	.50
n-RS-1463	C18	.003mf., 100V	1.15
n-RS-1460	C11, 12, 14, 15	3mf., 6V.	1.10

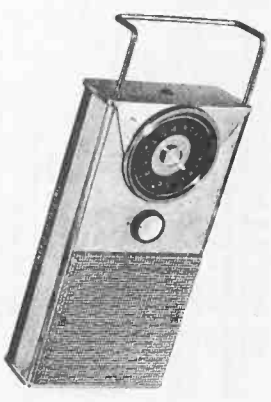
P715D-P716D



All components in the above schematic were used in Models P715D-P716D. Components used in other receivers in this series, that differ from the P715D-P716D, are listed below.

	R4	R5	R8	R9	R10	R11	R12	C5	C6	C7
P715-P716	120K	4.7K	2 0K	1800	120	100	330	200	200	.001
P715B-P716B	120K	4.7K	68K	1000	68	100	220	200	200	.001

ERS-P715
COVERS
MODELS
P715-P716
P715B-P716B
P715D-P716D



GENERAL ELECTRIC

SERVICE MANUAL

FOR
TRANSISTOR RADIO RECEIVERS
(840-1600 KC., 455 KC., 1-F.)

SPECIFICATIONS	
BATTERIES:	(a) Carbon Pen-light cells; 2 Eveready #915 or 2 Mallory M15, or 2 Burgess #2 (b) Mercury Cells; 2 Eveready #E9 or Mallory #289 (c) Rechargeable Cells; 2 Gould-National nickel-cadmium, AA cells, supplied with GE charger kit.
TUNING RANGE:	540 - 1620 KC
IF FREQUENCY:	455 KC
POWER OUTPUT:	Undistorted 100 Milliwatts Maximum 130 Milliwatts with 3 volts input.

TO REMOVE CHASSIS FROM CASE

1. Remove the end cap on the speaker end of the radio the same as you would to change the batteries. Do not unsolder the wire attached to the end cap, but unsolder the wire from the chassis bracket to the case. With a pair of longnose pliers, straighten the metal tab holding the speaker grille in place.
2. Remove the speaker grille by folding it toward the handle end of the case.
3. Using care, pull out the speaker and unsolder the two leads.
4. Remove the volume knob by pulling it off. Turn the screw in the center of the tuning knob in a counterclockwise direction to remove it, then pull off the tuning knob.
5. Remove the two screws by the speaker hole and pull out the handle.
6. Take out the screw near the tuning shaft hole, also the screw on the end cap, handle end.
7. Slide the chassis toward the handle end about 1/2 inch to gain access to the loop connections.
8. Unsolder the 3 loop connections. Be sure to observe lead color coding.
9. Continue to slide the chassis out in this direction. Let the end cap with the wire attached follow the chassis through the case.

NOTE: Do not remove the loop unless it is found to be defective as this will affect the alignment of the receiver.

Earphone jack catalogue number RJS-230 has a small mounting stud and RS-1195 has a large mounting stud. If it becomes necessary to replace the earphone jack, replace with jack having the same size mounting stud. Jack RS-1195 also has a third terminal which is ground, cut this terminal off to prevent it from shorting out any adjacent components. Intermittent battery contacts will cause motor-boating, intermittent audio and poor reception. Check the positive battery contact spring to be certain it is making firm contact with the battery. If the set contains Gould National rechargeable batteries, examine the positive battery caps for corrosion; if corrosion is evident, polish battery contacts with emery cloth. Some rechargeable batteries have a brass cap over the positive contact. Discard this cap and check for corrosion on the positive battery contact.

REPLACEMENT PARTS LIST

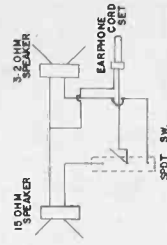
CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
n-RCE-260	C3	Elect. Cap. 8MFD 3V	1.45
n-RCE-261	C10	Elect. Cap. 3MFD 3V	1.45
n-RS-1459	C12	Elect. Cap. 100MFD 3V	1.10
n-RCT-105	C4, B, C, D	Tuning Gang	5.15
n-RG-318	C2, 5	0.1 MFD	.20
n-RG-320	C4-5, 11	0.05MFD	.50
n-RG-330	C13	0.02MFD	.35
n-RG-331	C5, 6	200MFD	.40
n-RS-1335	C5	.360MFD P715D, P716D	.55
n-RS-1336	C6	.330MFD P715D, P716D	.55
n-RS-1337	C7	.001MFD	.20
n-RS-1337	C7	.0005MFD P715D, P716D	.25
n-RS-1337	C7	.0005MFD P715D, P716D	.70
RESISTORS			
n-RS-1194	R-10	120 ohms. Cur. Var.	.35
n-RS-1355	R-10	50 ohms. Cur. Var.	.50
COILS & TRANSFORMERS			
n-RLC147	T1	Oscillator Coil	1.30
n-RLL-072	L1	Loop	1.40
n-RTL-211	T2	I. F. Trans. 1st.	1.65
n-RS-1334	T2	I. F. Trans. 2nd.	2.15
n-RTL-212	T3	I. F. Trans. 2nd.	1.35
n-RS-1333	T3	I. F. Trans. 2nd.	1.75
n-RTL-213	T4	I. F. Trans. 3rd.	3.65
n-RTL-210	T5	Driver Transformer	3.70
n-RTL-206	T6	Output Transformer	3.70

©John F. Rider

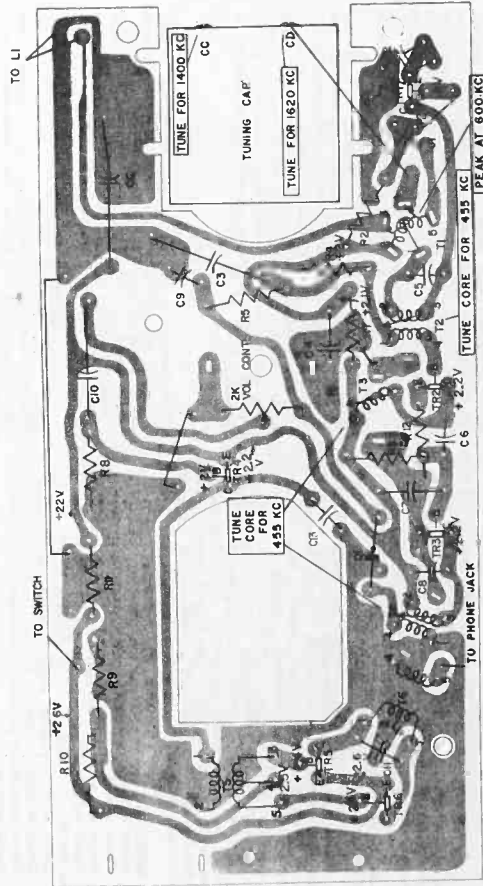
REPLACEMENT PARTS LIST (CONT'D.)

CAT. NO.	DESCRIPTION	LIST PRICE	CAT. NO.	DESCRIPTION	LIST PRICE
	CABINET & APPEARANCE ITEMS			MISCELLANEOUS ITEMS	
n-RAC-213	Right End Cap.....	1.05	n-RAD-231	Bracket, Right End.....	.10
n-RAC-214	Loop Cove.....	.75	n-RAD-232	Bracket, Phone & Chrg. Jack.....	.20
n-RAC-215	End Cap. Assem.....	1.05	n-RAD-233	Bracket, Batt. W/Bush. & Spring.....	.22
n-RAG-102	Speaker Cover, Gold, P715A, B, D.....	1.30	n-RS-1227	Battery Holder Tube.....	.04
n-RAG-103	Speaker Cover, Plaid, P716A, B, D.....	1.30	n-RHS-194	Screw, Dial Tuning.....	.15
n-RAV-1040	Cabinet W/Leatherette (Beige) P715A, B, D.....	5.40	n-RHS-195	Screw, Left End Fastener.....	.25
n-RAV-1041	Cabinet W/Leatherette (Black) P716A, B, D.....	5.40	n-RJJ-019	Jack, Charging.....	.20
n-RDK-635	Tuning Dial.....	.80	RJS-230	Jack, Earphone, Small Mfg. Stud.....	.90
n-RS-1009	Leatherette P715A, B, D (Beige).....	.10	n-RMS-398	Spring, Battery Contact.....	.05
n-RS-1010	Leatherette P716A, B, D (Black).....	.10	n-RMS-399	Ring, Compression.....	.04
n-RRV-087	Handle.....	.45	n-RS-1195	Jack, Earphone, Large Mfg. Stud.....	.90
n-RIC-018	Speaker Gasket.....	.20	RED-001	1N87 Diode (DI).....	1.90
n-RDK-636	Volume Control Knob.....	.35			
n-RDP-043	Speaker.....	7.25			
	POTENTIOMETER				
n-RR-420	2K Volume Control & Sw.....	1.90			

Use the following test hook-up for P715 series, and all models with earphone jacks, to eliminate soldering and unsoldering of external speaker.



All resistors not cataloged are common carbon types obtainable from radio parts jobbers. Refer to schematic for symbols and values.



TRANSISTOR SUBSTITUTIONS

Column 1 lists all transistors originally used in G. E. Models P715A, B, D series radios. Column 2 lists substitutions for all these transistors by stage. Some transistors in Column 2 are marked with asterisks have a higher beta; they must be treated as regular replacements were in the past, that is, special attention should be given to correct biasing for satisfactory performance.

Model P715B - 2N217 (RCA) units in driver and output stages can be replaced by 2N192 or 2N324* as driver and 2N241 or 2N321 as output, only if resistance values in receiver are as follows:

- R8-240K ohms
- R9-1800 ohms
- R10-120 ohms

	COLUMN 1	COLUMN 2
OSC.	2N168A 2N164A	2N168A or 2N164A*
I. F.	2N165 2N169 2N292 2N293	2N169 or 2N165* 2N313* 2N314*
DRIVER	2N191 2N192 2N324* 2N323	2N192 or 2N324* 2N324* 2N323
OUTPUT	2N241 2N321*	2N241A or 2N321*

GENERAL ELECTRIC

ER-S-P750A
COVERS
MODEL
P750A

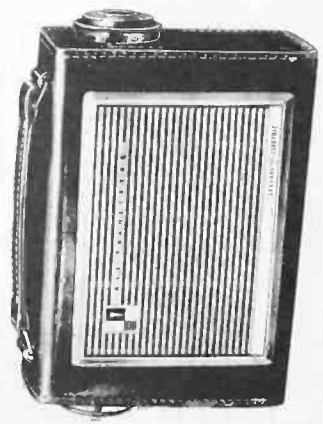
SERVICE MANUAL

FOR
TRANSISTOR RADIO RECEIVERS
(540-1600 KC., 455 KC., I-F.)
Supersedes Service Note S-P750A

SPECIFICATIONS	
CABINET:	Leather - P750A, Ginger
ELECTRICAL RATING:	3 Batteries: Eveready #50, or A100, Burgess #2R, or equivalent
POWER OUTPUT:	Undistorted: 225 milliwatts Maximum: 350 milliwatts

The model P750A, is an all transistor battery operated portable radio with leather cabinet. The B+ is supplied by three 1 1/2 volt flashlight type batteries producing the total B+ of 4.5 volts. Use saddle soap to clean the leather portion of the cabinet.

- CHASSIS REMOVAL**
1. Remove knobs.
 2. Remove the batteries.
 3. Remove the 5 screws holding chassis to the cabinet.
 4. Lift circuit board out from circuit board springs. (When replacing chassis, slide the antenna edge of circuit board under circuit board holder retaining clips.)



TROUBLESHOOTING

A check of battery condition and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control at maximum, tuning knob closed, and with no signal conditions. The total receiver current drain is 16 to 18 mAs. This is measured by inserting a milliammeter in series with the batteries.

If an excessive total current drain is recorded, the individual collector currents of each transistor should be checked. An excessive current reading may mean a shorted transistor; no current will indicate that a transistor or associated circuit component is defective.

A single-edge razor blade is a satisfactory tool for cutting the copper circuit wiring so that a milliammeter can be inserted in series with the break to measure the current flow. After each current check is completed, solder the cut carefully to complete the circuit again.

- NO RECEPTION:**
1. Check battery voltage and battery contacts.
 2. Check on-off switch.
 3. Check all antenna lead connections.
 4. Check coil L2.
- WEAK AUDIO:**
1. Check battery voltage for 4.5 volts.
 2. Check battery current.
 3. Check transistor collector currents.
 4. Check alignment.

- INTERMITTENT:**
1. Check battery contacts for corrosion.
 2. Check solder connections on dip-soldered side of circuit board.
- Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact.

R15 is a thermistor (temperature compensating resistor) and regulates the current flow to the output transistors. After replacing R15, allow it to reach ambient temperature before turning the radio on.

P750A

Remove batteries and bend both the contact springs and holding springs inward to increase their tension. Oxidation may occur on the contacts of the batteries themselves. This tends to insulate the batteries from the battery contact springs, and increase electrical resistance. The terminals on the positive batteries should be cleaned to insure electrical contact.

After the set has been aligned and placed in the cabinet, recheck the antenna trimmer at 1500 KC. Due to the inductance effect caused by the proximity of the speaker when the cabinet is closed, a change in the peak operating condition will be noticed. Open the cabinet and slightly adjust the trimmer, then close the cabinet and recheck again, continue the procedure until the proper operating performance is attained.

TRANSISTOR REPLACEMENT

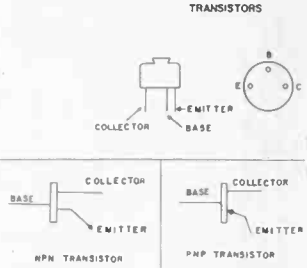
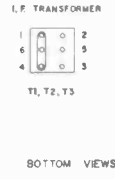
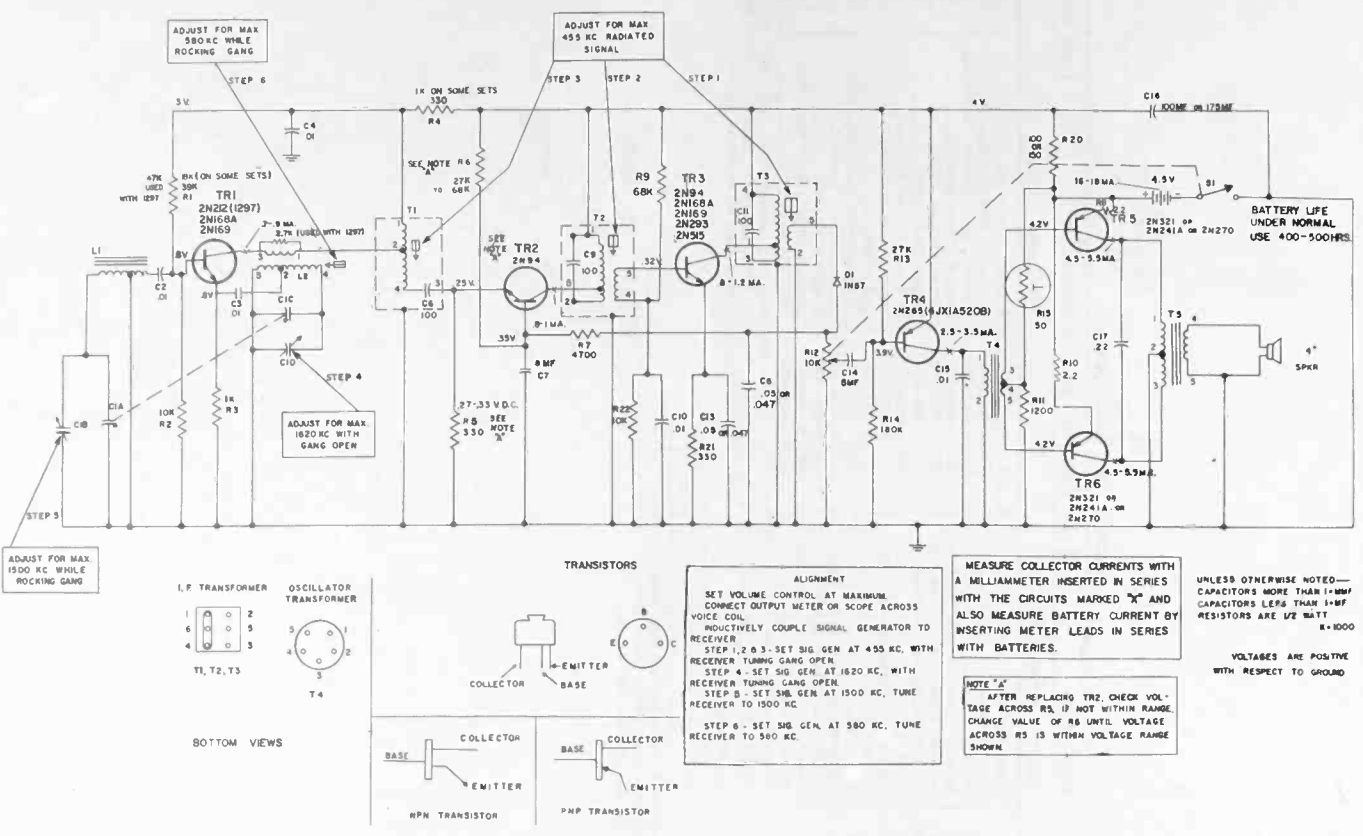
When measuring voltages at the transistor lead terminals, be sure to observe correct voltage polarities, as shown on the schematic.

When replacing a defective transistor, be sure to observe correct lead positions, as shown on schematic diagram in outline form.

REPLACEMENT OF COMPONENTS

After removing a defective part, clean the mounting holes of all solder; the replacement part can then be inserted more easily and a better solder connection can be accomplished. Apply a soldering iron just long enough to heat the terminal to remove the component. Too much heat may damage a component.

R15 is a thermistor (temperature compensating resistor) and regulates the current flow to the output transistors. After replacing R15, allow it to reach ambient temperature before turning the radio on.



ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM. CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL. POSITIVELY COUPLE SIGNAL GENERATOR TO RECEIVER.

STEP 1 - SET SIG. GEN. AT 455 KC. WITH RECEIVER TUNING GANG OPEN.

STEP 2 - SET SIG. GEN. AT 1620 KC. WITH RECEIVER TUNING GANG OPEN.

STEP 3 - SET SIG. GEN. AT 1500 KC. TUNE RECEIVER TO 1500 KC.

STEP 4 - SET SIG. GEN. AT 580 KC. TUNE RECEIVER TO 580 KC.

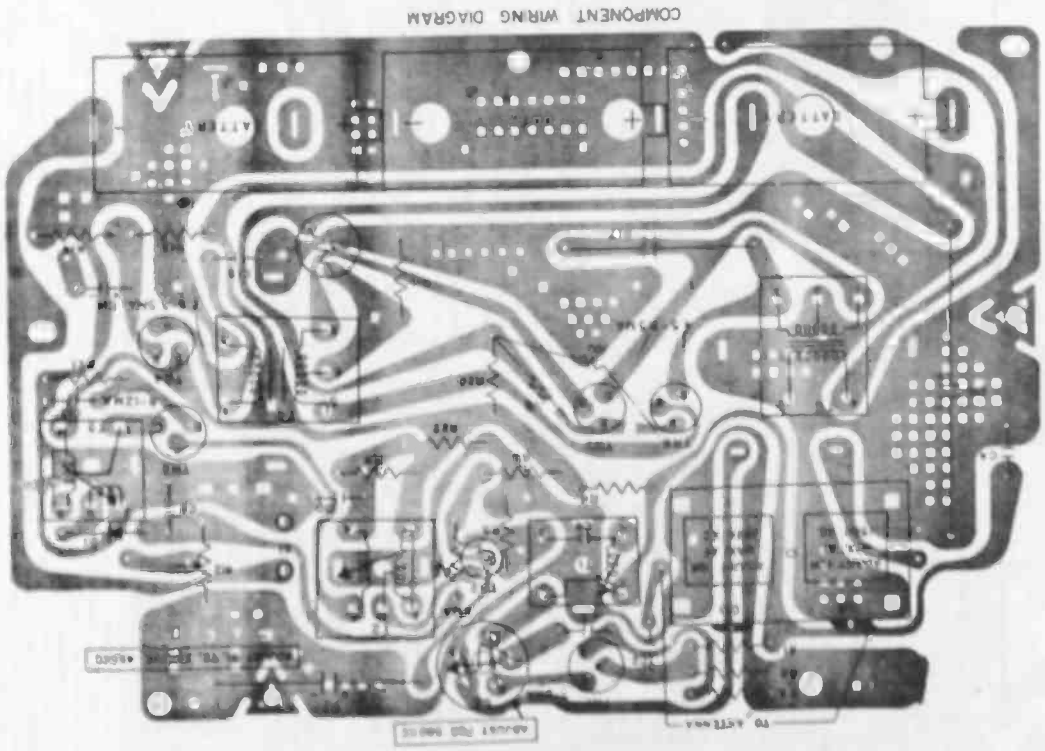
MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "X" AND ALSO MEASURE BATTERY CURRENT BY INSERTING METER LEADS IN SERIES WITH BATTERIES.

NOTE "A"

AFTER REPLACING TR4 CHECK VOLTAGE ACROSS R4. IF NOT WITHIN RANGE, CHANGE VALUE OF R6 UNTIL VOLTAGE ACROSS R5 IS WITHIN VOLTAGE RANGE SHOWN.

UNLESS OTHERWISE NOTED—CAPACITORS MORE THAN 1-µF CAPACITORS LESS THAN 1-µF CAPACITORS ARE µF WATT

VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND



COMPONENT WIRING DIAGRAM

REPLACEMENT PARTS LIST			
CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
•-RS-1623	C1	Capacitor, Tuning.....	4.45
RS-1022	C2, 3, 4	.01mf., 450V.....	.30
RS-223	C7	5mf., 10V.....	1.65
RS-1026	C8, 13	.05mf., 50V.....	.50
	C14	5mf., 10V.....	
	C16	100mf., 10V. or 175mf., 6V.....	
	C17	.22mf., 100V.....	
RESISTORS			
•-RS-1355	R15	50 ohms, thermistor.....	.50
POTENTIOMETER			
•-RS-1347	B12, B1	Control, Volume 10K & 5K.....	1.85
COILS & TRANSFORMERS			
•-RS-1348	T1	Transformer, 1st. I.F.....	1.75
•-RS-1349	T2	Transformer, 2nd. I.F.....	1.95
•-RS-1350	T3	Transformer, 3rd. I.F.....	1.95
•-RS-1351	L2	Coil, Oscillator.....	1.20
•-RS-1352	T4	Transformer, Input.....	2.75
•-RS-1353	T5	Transformer, Output.....	2.40
•-RS-1386	L1	Antenna.....	1.90
TRANSISTORS & DIODES			
RS-1531	TR1	2N212/1297 (on some sets).....	3.55
RS-1533	TR1, TR3	2N166A (on some sets).....	3.20
RS-1538	TR1, TR3	2N169 (on some sets).....	3.05
RS-1547	TR2, TR3	2N94 (TR3 on some sets).....	3.15
RS-1536	TR3	2N515 (on some sets).....	3.15
RS-1537	TR3	2N293 (on some sets).....	3.15
RS-1546	TR4	2N265/4JELAS20B.....	2.95
RS-1542	TR5, TR6	2N251A, 2N270, or 2N221.....	3.20
RS-001	D1	1N87, Diode Detector.....	1.90
MISCELLANEOUS			
RS-1037		Speaker, 4".....	3.45
RS-1186		Clamp, Antenna.....	.15
RS-1380		Clip, 17 Mtg.....	.06
RS-1341		Clip, Battery (Pos. End) with Clamp & Rivet.....	.30
RS-1342		Clip, Battery (Neg. End), with Clamp & Rivet.....	.30
RS-1343		Battery Clamp Holder, with Clamps & Rivets.....	.60
RS-1344		Bracket, Antenna (P.N.).....	.90
RS-1345		Bracket, Antenna (L.R.).....	.70
RS-095		Ring, Tubular.....	.10
RS-272		Ring, Compression (for knobs).....	.05
CABINET & APPLIANCE ITEMS			
RS-1056		Cabinet (last year).....	18.30
RS-1381		Grille, Rampplate, & Medallion.....	1.65
RS-1382		Headliner.....	.25
RS-1383		Knob, Direct Tuning.....	.85
RS-1384		Knob, Volume.....	.85
RS-1419		Knob, Variable Tuning.....	.85

* - Denotes Parts Not Previously Cataloged,
 All Parts Not Listed by Catalog Numbers Are Common
 Items, Obtainable From Radio Parts Jobbers.
 Prices Are Suggested List Prices And Subject To
 Change Without Notice.

MODEL P755A

GENERAL ELECTRIC ER-S-P755
COVERS
MODEL
P755A

SERVICE MANUAL
FOR
TRANSISTOR RADIO RECEIVERS
(840-1400 KC., 450 KC., I.F.)
SUPER SIDES 5-P755

SPECIFICATIONS	
CABINET:	P755 Gray
ELECTRICAL RATING:	9 Volts D. C. (Battery Pack)
BATTERIES:	Hallory N1605, Eveready 266 or Burgess M6
OPERATING FREQUENCIES:	540 - 1800 KC. 455 KC I. F.
POWER OUTPUT:	Undistorted 50 mW Maximum 80 mW



TO REMOVE CIRCUIT BOARD

1. Remove screw from the cabinet back.
2. Insert a coin in either slot on the bottom and twist to remove the cabinet back.
3. Remove screw holding tuning dial.
4. Remove 3 screws under tuning dial to release tuning gang from cabinet front.
5. Remove 3 hexhead screws and one 11/32" nut (bottom center of circuit board) holding circuit board to bases on cabinet front.
6. Hold tuning gang and circuit board out of cabinet front toward the volume control end. It is not necessary to remove volume control to repair the circuit board.

TO REMOVE VOLUME CONTROL

1. Remove cabinet back.
2. Control knob.
3. Remove chassis.
4. Remove nut holding volume control to cabinet front base.

TO REMOVE SPEAKER

1. Remove cabinet back.
2. Remove chassis.
3. Unsolder speaker wires.
4. Remove clips holding speaker to cabinet front.

TROUBLE SHOOTING

A check of battery current drain will indicate if a receiver is operating properly. To measure the current drain, remove cabinet back, unsnap ground section of battery terminal and swing away from battery. Connect milliammeter between battery terminal and battery contact.

The total current drain should be between 19.0 and 24.0 ma. The current drain is measured with no signal-conditions (tuning gang closed) and volume control at maximum.

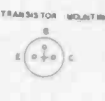
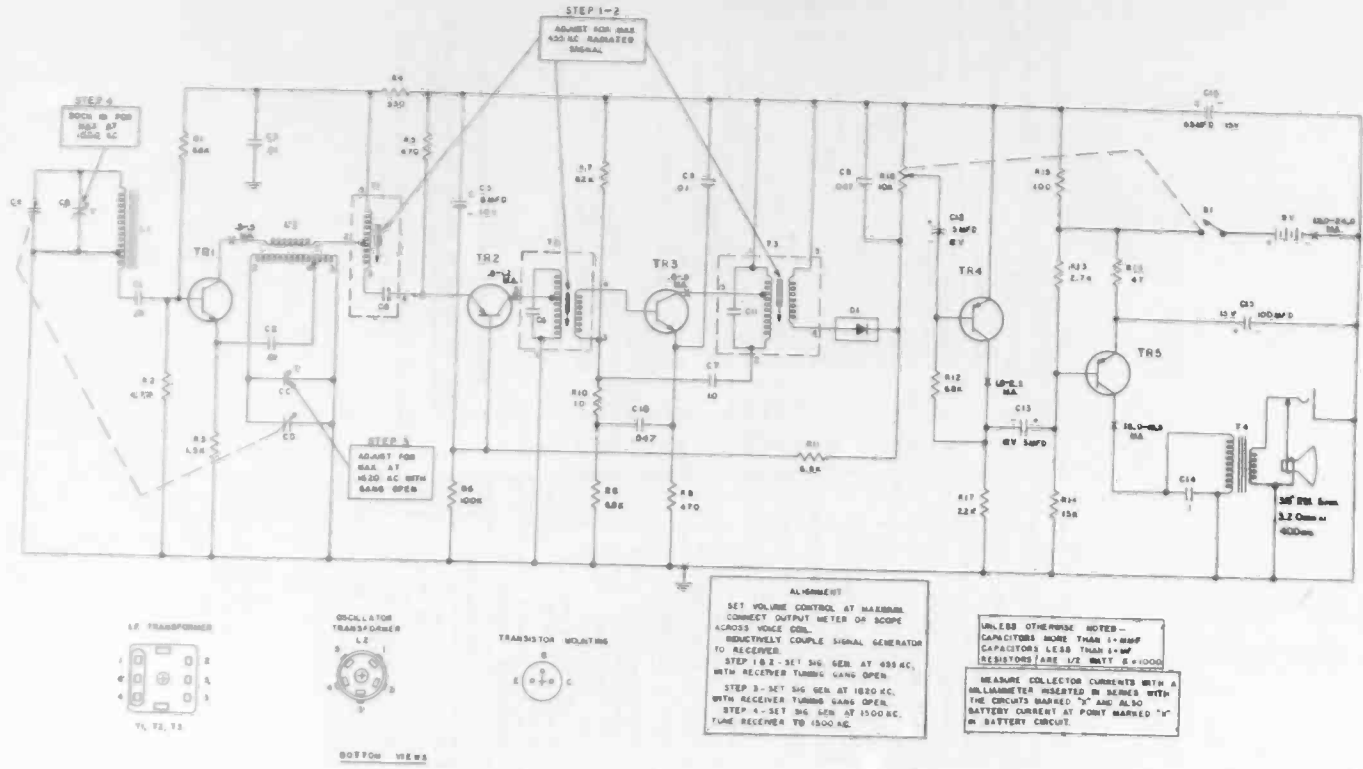
If an excessive current drain is recorded, the individual collector current readings should be checked on each transistor. Current drain is an important indication of the transistor operating conditions. The proper current values for each transistor are shown on the schematic. An excessive current reading may mean a shorted transistor and no current will indicate that the transistor is open.

A "heat sink" is placed around the output transistor (TR5) and the heat is transferred to the output transformer case via the flexible shield. It is important that this "heat sink" be in place at all times. If it becomes necessary to replace TR5 remove it from the circuit board and slide the "heat sink" off of the top of the transistor. When installing a new transistor slide the "heat sink" over the top of the new transistor. Do not try to snap the "heat sink" around the transistor body as this will spring it out of shape.

Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact. This may be caused by oxidation or corrosion of the battery contacts. To effectively correct this problem, remove the oxidation with fine emery cloth.

REPLACEMENT PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
*RS-1590	C16	65MF @ 15V. Electrolytic...	1.10
*RS-1591	C15	100MF @ 15V. Electrolytic...	1.25
*RS-1592	C5	8MF @ 10V. Electrolytic...	1.10
*RS-1593	C12, 13	5mf @ 12V. Electrolytic...	1.10
*RS-1596	CA, B, C, D	Tuning Capacitor.....	3.85
POTENTIOMETER			
*RS-1587	R18	Vol. Cont. 10K & Sm.....	1.80
COILS & TRANSFORMERS			
*RS-1581	T4	Output Transformer.....	2.55
*RS-1582	T1	IF Transformer 1st.....	2.05
*RS-1583	T2	IF Transformer 2nd.....	2.30
*RS-1584	T3	IF Transformer 3rd.....	2.15
*RS-1585	L2	Oscillator Coil.....	.90
*RS-1588	L1	Antenna.....	2.35
TRANSISTORS			
RS-1530	TR1	2N194A (Sylvania).....	3.20
RS-1539	TR2	2N135 (General Electric).....	3.30
RS-1532	TR3	2N235A (Sylvania).....	1.95
RS-1543	TR4	2N406 (RCA).....	2.35
RS-1548	TR5	2N408 (RCA).....	2.40



BOTTOM VIEWS

ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM. CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL. INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER.
STEP 1 & 2 - SET SW GEN AT 455 KC. WITH RECEIVER TUNING GANG OPEN.
STEP 3 - SET SW GEN AT 1820 KC. WITH RECEIVER TUNING GANG OPEN.
STEP 4 - SET SW GEN AT 1500 KC. TUNE RECEIVER TO 1500 KC.

UNLESS OTHERWISE NOTED - CAPACITORS MORE THAN 1.0µF CAPACITORS LEAR THAN 1.0µF RESISTORS ARE 1/2 WATT @ 100°C

MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "Y" AND ALSO BATTERY CURRENT AT POINT MARKED "X" IN BATTERY CIRCUIT.

PARTS LIST (CONT'D)

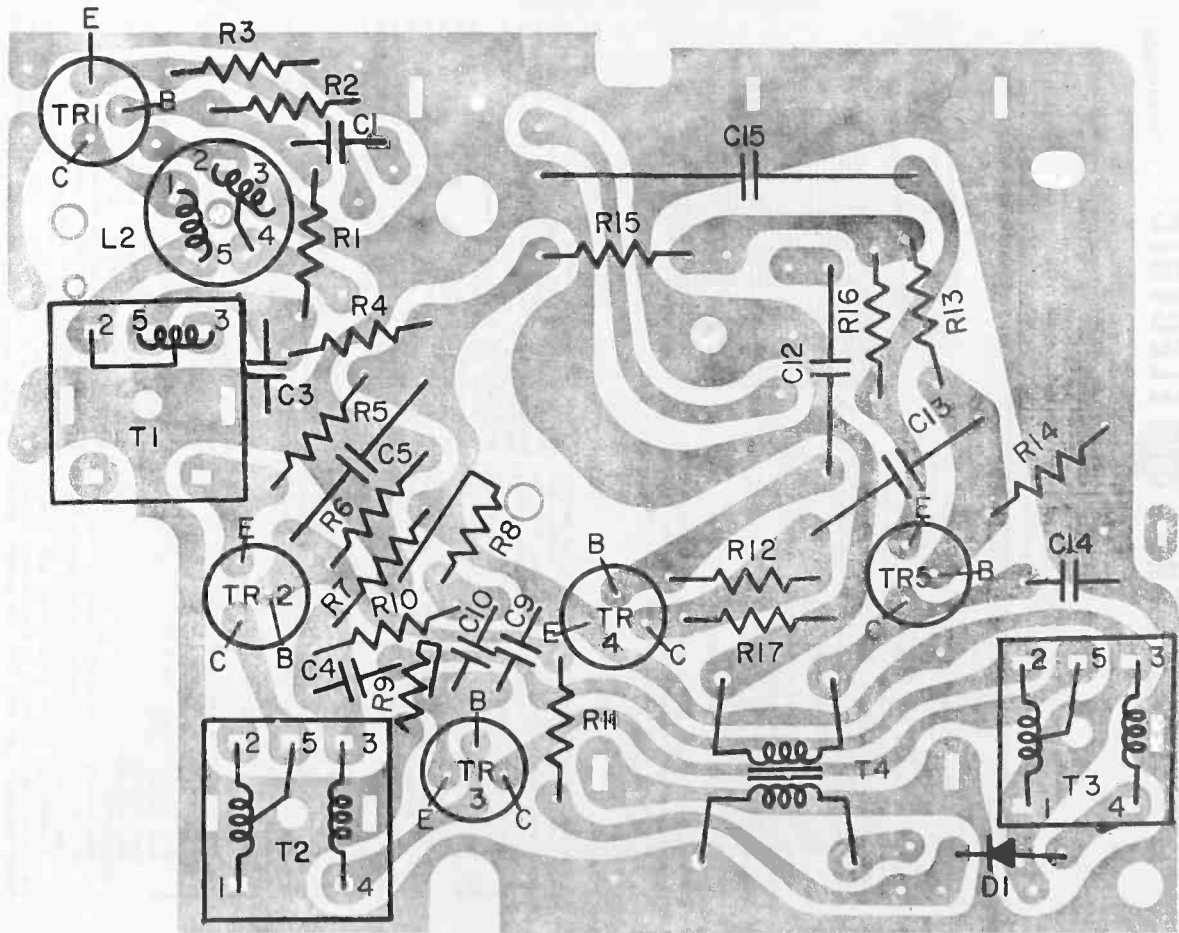
CAT. NO.	DESCRIPTION	PRICE	CAT. NO.	DESCRIPTION	PRICE
Δ-RS-1811	Crystal Diode, (was RED001)	1.90			
RS-1195	Jack, Earphone	.90			
RS-1193	Screw, Tuning Knob	.40	*-RB-1082	Cabinet Front, Back, Grille, Insert	4.95
*-RS-1576	Ball, Handle	.05	*-RS-1573	Knob, Tuning	.50
*-RS-1580	Screw, Cabinet Lock	.10	*-RS-1574	Insert	.35
*-RS-1582	Battery Contact Assem.	.35	*-RS-1575	Grille Assem.	1.20
*-RS-1584	Clip, U Type	.05	*-RS-1576	Knob, Volume	.35
*-RB-1083	Speaker, 3.2 ohms 3 1/2"	4.95	*-RS-1577	Handle	.60

* Denotes Parts Not Previously Cataloged.

Prices Are Suggested List Prices And Are Subject To Change Without Notice.

All Parts Not Cataloged Are Common Items, Obtainable From Radio Parts Jobbers.

"Δ" Denotes part used in former radio/phonograph models. You may have it stocked under number shown in parenthesis. Please change your records to the new number with two-letter prefix.



MODELS P760A, P761A

GENERAL ELECTRIC

SERVICE MANUAL
FOR

TRANSISTOR RADIO RECEIVERS
P760A, P761A
(340-1600 KC, 455 KC, I-F-J)
Superheterodyne Service Mode S-P760A

ER-S-P760A
COVERS
MODELS
P760A
P761A

SPECIFICATIONS	
CABINET:	Plastic - Beige, P760A; Green, P761A
ELECTRICAL RATING:	4 Batteries; Eveready #950 or A100, Burgess #28, or equivalent
POWER OUTPUT:	Undistorted: 80 milliwatts Maximum: 150 milliwatts

GENERAL INFORMATION

The models P760A and P761A are all transistor battery operated portable radios. The B+ is supplied by four 1 1/2 volt flash-light type batteries producing the total B+ of 6 volts.

CHASSIS REMOVAL

1. Remove both knobs.
2. Remove the 4 batteries.
3. Remove cabinet retainer strap.
4. Unsolder the two leads on the speaker.
5. Unscrew the 7 screws holding chassis to cabinet.

TROUBLESHOOTING

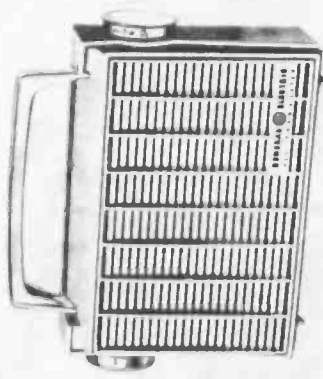
A check of battery conditions and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control at maximum, tuning gang closed, and with no-signal conditions. The total receiver current drain is 28 to 87 mA. This is measured by inserting a milliammeter in series with the batteries. If an excessive total current drain is recorded, the individual collector currents of each transistor should be checked. An excessive current reading may mean a shorted transistor; no current will indicate that a transistor or associated circuit components are defective.

A single-edge razor blade is a satisfactory tool for cutting the copper circuit wiring so that a milliammeter can be inserted in series with the break to measure the current flow. After each current check is completed, solder the cut carefully to complete the circuit again.

1. Check battery voltage and battery contacts.
 2. Check on-off switch.
 3. Check all antenna lead connections.
 4. Check coil L2.
- WEAK AUDIO:**
1. Check battery voltage for 6 volts.
 2. Check battery current.
 3. Check transistor collector currents.
 4. Check alignment.

INTERMITTENT:

1. Check battery contacts for corrosion.
 2. Check solder connections on dip-soldered side of circuit board.
- Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact. Remove batteries and bend both the contact springs



P760A, P761A

and holding springs inward to increase their tension. Distortion may occur on the contacts of the batteries. This tends to insulate the batteries from the battery contact springs, and increase electrical resistance. The terminals on the batteries should be cleaned with emery cloth to insure positive electrical contact. After the set has been aligned and placed in the cabinet, recheck the antenna trimmer at 1500 KC. Due to the inductance effect caused by the proximity of the speaker when the cabinet is closed, a change in the peak operating condition will be noticed. Open the cabinet and slightly adjust the trimmer, then close the cabinet and recheck again, continue the procedure until the proper operating performance is attained.

TRANSISTOR REPLACEMENT

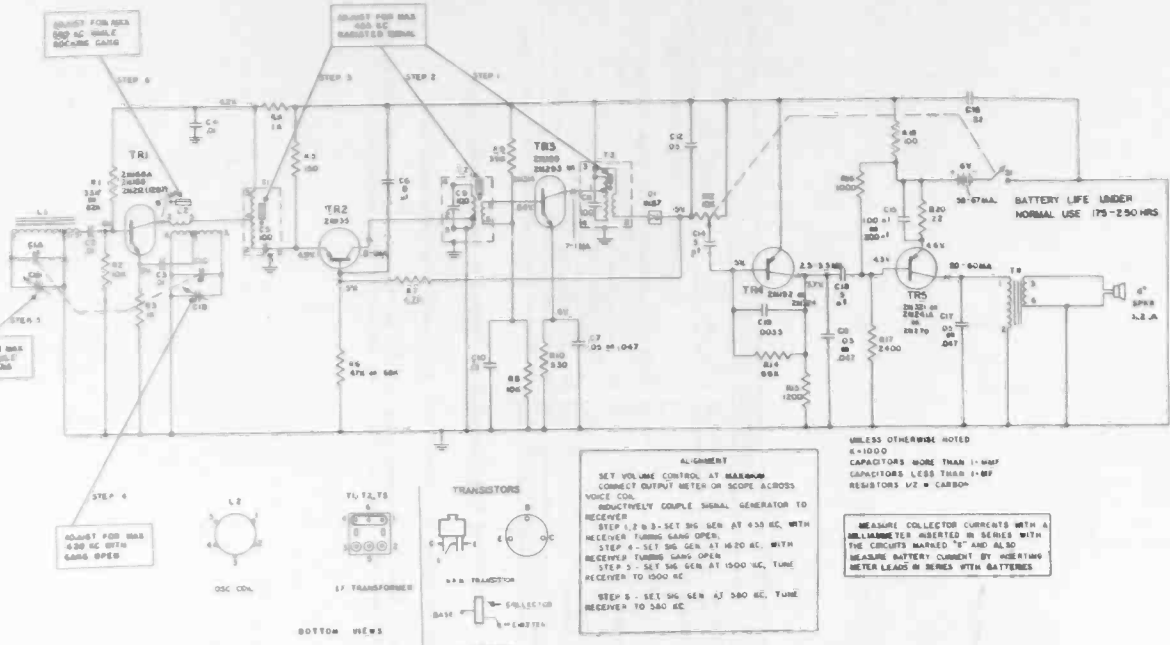
When measuring voltages at the transistor lead terminals, be sure to observe correct voltage polarities as shown on the schematic.

When replacing a defective transistor, be sure to observe correct lead positions, as shown on the schematic diagram in outline form. When replacing TR2, mount carefully so that the transistor casing does not touch other circuit components.

REPLACEMENT OF COMPONENTS

After removing a defective part, clean the mounting holes of all solder; the replacement part can be inserted more easily and a better solder connection can be accomplished. Apply a soldering iron just long enough to heat the terminal to remove the components. Too much heat will damage a component.

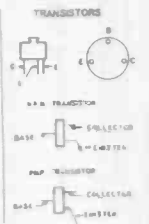
After completing a component replacement, inspect and clean the plated circuit of any excess solder that may short or bridge across nearby copper plated wiring. After replacing C12, "greasy" capacitor so that it is parallel to the chassis board.



ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPES ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1 - P.B. - SET SIG GEN AT 455 KC, WITH RECEIVER TUNING GANG OPEN
STEP 2 - SET SIG GEN AT 1620 KC, WITH RECEIVER TUNING GANG OPEN
STEP 3 - SET SIG GEN AT 1500 KC, TUNE RECEIVER TO 1500 KC
STEP 4 - SET SIG GEN AT 380 KC, TUNE RECEIVER TO 380 KC

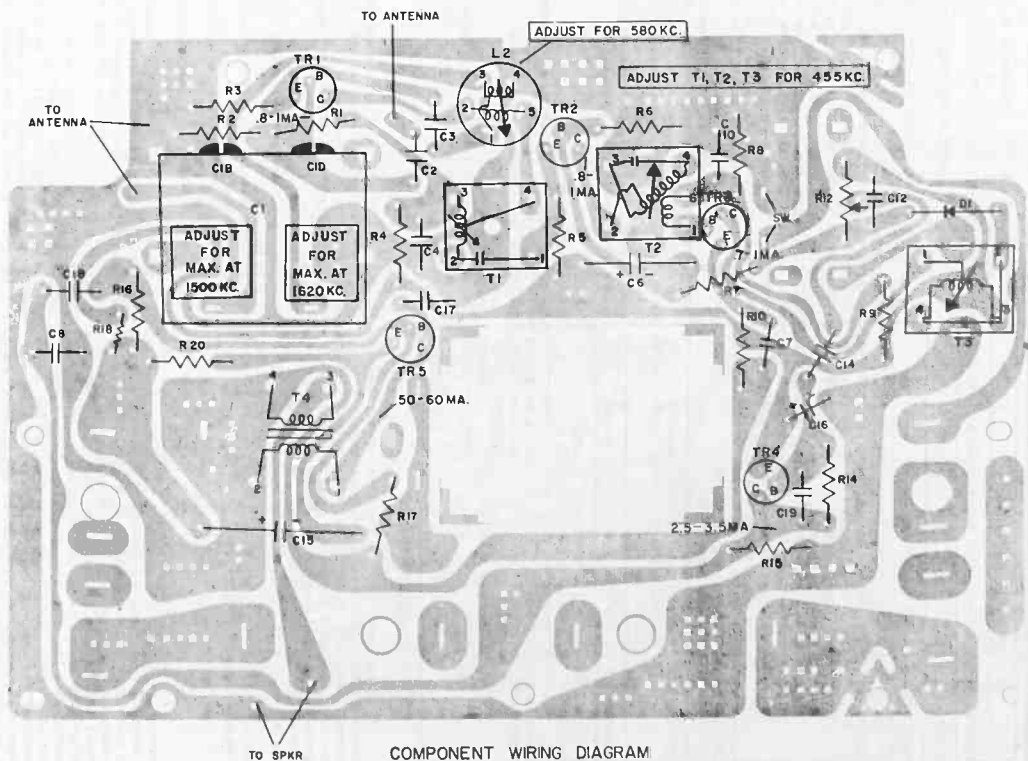
UNLESS OTHERWISE NOTED
K=1000
CAPACITORS MORE THAN 1-100P
CAPACITORS LESS THAN 1-10P
RESISTORS 1/2 W CARBON

MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "I" AND ALSO MEASURE BATTERY CURRENT BY INSERTING METER LEAD IN SERIES WITH BATTERIES



REPLACEMENT PARTS LIST			
CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
*-RS-1346	C1	Capacitor, Tuning.....	3.55
	C2, 3, 4, 10	01mf., 450V.	
	C6, 7, 12	8mf., 10V.	
	C7, 12	.05mf., 450V.	
	C8, 17	.047mf., 50V.	
	C14, 18	5mf., 10V.	
	C15	100mf. or 200mf., 3V.	
	C16	.22mf., 100V.	
	C19	.0033mf., 450V.	
COILS AND TRANSFORMERS			
*-RS-1424	T1	Transformer, 1st. I.F.....	2.00
*-RS-1425	T2	Transformer, 2nd. I.F.....	1.95
*-RS-1426	T3	Transformer, 3rd. I.F.....	2.10
*-RS-1427	L2	Coil, Oscillator.....	1.20
*-RS-1428	T4	Transformer, Output.....	2.85
*-RS-1429	L1	Antenna.....	1.85
POTENTIOMETER			
RS-1347	R12, S1	Control, Volume, 10K & Sw.	1.85
TRANSISTORS AND DIODES			
RS-1533	TR1	2N168A (on some sets)....	3.20
RS-1538	TR1, TR3	2N169 (TR1 on some sets)....	3.05
RS-1531	TR1	2N212/1297 (on some sets)....	3.55
RS-1539	TR2	2N135 or 4JX1A813.....	3.30
RS-1537	TR3	2N293 or 2N314.....	3.15
RS-1541	TR4	2N192 or 2N324.....	2.90
RS-1542	TR5	2N270, 2N321 or 2N261A.....	3.20
RED-001	DL	1N87, Diode Detector.....	1.90
MISCELLANEOUS			
RS-1188		Clamp, Antenna.....	.15
RS-1320		Clip, I.F.....	.04
*-RS-1341		Battery Clip & Clamp (Pos.)	.30
		(Right Cent. Batt.).....	
*-RS-1342		Battery Clip & Clamp (Neg.)	.30
		(Left Cent. Batt.).....	
*-RS-1344		Bracket, Antenna (R.H.).....	.90
*-RS-1345		Bracket, Antenna (L.H.).....	.70
*-RS-1393		Clip (Pos.) (Left Battery).....	.20
*-RS-1394		Clip & Clamp (Pos.) (Right Batt.)	.30
*-RS-1395		Clip (Neg.) (Right Battery).....	.15
*-RS-1396		Clip & Clamp (Neg.) (Left Batt.)	.30
*-RS-1456		Button, Wall Hanger.....	.10
RHC-095		Speaker 4".....	5.45
RMS-272		Ring, Tubular (Speaker Mfg.)....	.10
		Compression (For Knobs).....	.05
CABINET AND APPEARANCE ITEMS			
*-RB-1060		Cabinet Front, Beige (P760A)....	4.50
		Cabinet Back, Beige.....	
		Grille Pad.....	
		Grille.....	
*-RB-1061		Cabinet Clasp (2).....	4.50
		Cabinet Hinge (2).....	
		Cabinet Front, Green (P761A)....	
		Cabinet Back, Green.....	
		Grille Pad.....	
		Grille.....	
RS-1069		Cabinet Clasp (2).....	.75
RS-1071		Knob, Tuning.....	.85
RS-1075		Knob, Volume.....	.05
*-RS-1390		Cabinet Clasp.....	.70
*-RS-1391		Grille.....	1.00
*-RS-1392		Handle & Decorative Strip.....	.30

* Denotes Parts Not Previously Cataloged.
 All Parts Not Listed By Catalog Numbers Are Common Items, Obtainable From Parts Jobbers.



COMPONENT WIRING DIAGRAM

PRELIMINARY SERVICE DATA

S-P765
COVERS
MODELS
P765A, B
P766A, B

SPECIFICATIONS	P765A, B Gold/ Beige-P766A, B PlaId/Black
DIMENSIONS:	6 21/32" x 3 15/32" x 1 7/32"
ELECTRICAL RATING:	2 1/2 to 3 Volts DC
BATTERIES:	(a) Carbon Pen-light cells: 2 Eveready #915, or 2 Burgess #2 or 2 Mallory M15 #915, or 2 Mercury Cells: 2 Eveready #E9, or 2 Mallory #2M9 (b) Mercury Cells: 2 Eveready #E9, or 2 Mallory #2M9 (c) Nickel Cadmium Cells: RECHARGEABLE CELLS 2 Gould #AA. The rechargeable cells are packed with the recharger carrying case accessory.
OPERATING FREQUENCIES:	Tuning range 540-1620KC IF Amplifier 455 KC.
POWER OUTPUT:	Undistorted - 100 Milliwatts Maximum - 130 Milliwatts, with 3 volts Input.
SPEAKER:	2 3/4" PM 15 Ohms @ 400 Cycles
CHARGER:	Input 110 Volts AC 2.5 Watts Output: See diagram page 2
TRANSISTOR COMPLIMENT:	2N1664 or 2N168A I.F.F. 2N293 or 2N314 I.F.F. 2N293 or 2N314 Germanium Diode Det. 2N191 or 2N323 Driver 2N241 Audio Output 2N241

GENERAL INFORMATION

This receiver is of standard superheterodyne design, using a ferrite-core antenna loop. Conventional IF circuitry is used except in the second stage where a capacity divider is employed. A germanium diode is used as a detector ahead of the driver stage. Two 2N241 transistors are used in a Class B push-pull circuit in the output stage. The charging unit uses a step-down transformer and a diode in a half wave rectifier circuit to charge the nickel cadmium batteries.

TRANSISTORS REPLACEMENT

Transistors are hermetically sealed and relatively stable, it is advisable to make a complete component check before a transistor is replaced. If a transistor is suspected to be at fault, it can be removed and checked on the G. E. transistor tester, Model #71A1 which is available from your G. E. tube distributor. Use care when replacing the transistor, making sure its leads are in the correct holes on the circuit board. See the phantom diagram for correct positioning. Use care when soldering as excessive heat will damage the transistors and printed board. A 35 watt soldering iron is recommended.

ALIGNMENT:

To effect a proper alignment on this receiver, the same procedure is used as an ordinary superheterodyne electron tube set. It is advisable to check also the tuning dial end.

battery voltage before alignment in order to obtain maximum sensitivity. The RF signal input should be kept at a minimum to avoid AVC action.

TROUBLE SHOOTING HINTS

Total battery drain used by the receiver will give an indication of whether the transistors are operating normally. This current check is made at quiescence. This means the volume control should be all the way open, the tuning gang all the way closed, and with no signal or noise being picked up. With the radio controls set accordingly, a current flow check between the battery end cap and the negative end of the battery should indicate properly operating transistors. If excessive total current is noted when this check is made, individual current checks should be made at the collector section of the suspected transistors. We are including in the schematic of this radio the proper current ranges found at the various check points. A properly operating stage should not vary from these readings. An excessive current reading will likely mean a shorted transistor. If no current can be read, this will indicate an open transistor or other component in the circuit.

DEAD:

1. Check batteries.
2. Check speaker by substituting earphones.
3. Check earphone jack.
4. Check for broken antenna leads.

WEAK:

1. Check battery voltage-Gould batteries 2.5 volts; Carbon or Mercury batteries 3 volts.
2. Check R. F. alignment.
3. Check I. F. alignment.

DISTORTION:

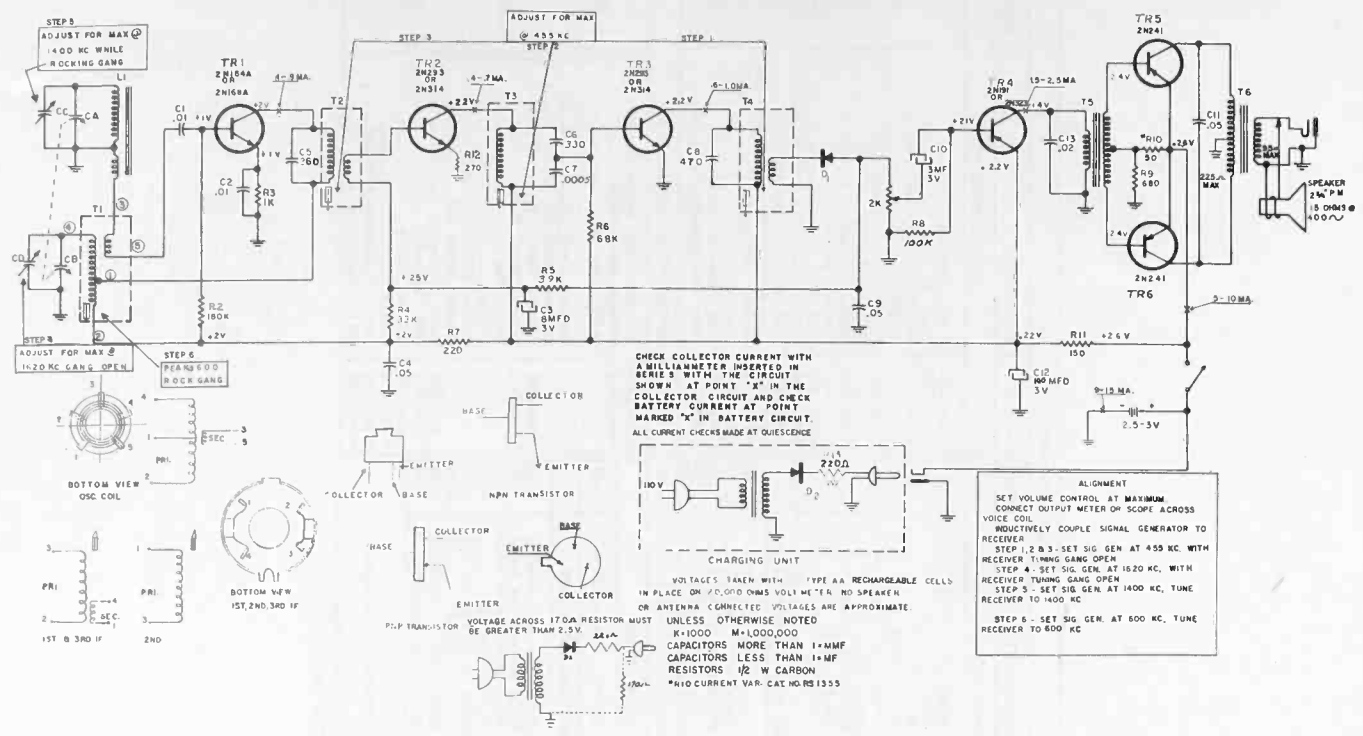
1. Check battery connection on end cap for corrosion.
2. Check battery voltages (same as for weak).
3. Check I. F. alignment.
4. Check output transistors for proper match.

INTERMITTENT:

1. Check positive battery contact for good contact to battery.
2. Check Phillips screw holding tuning gang to circuit board.
3. Check solder connections on circuit board.

TO REMOVE CHASSIS FROM CASE

1. Remove the end cap on the speaker end of the radio the same as you would to change the batteries. Do not unsolder the wire attached to the end cap, but unsolder the wire from the chassis bracket to the case.
2. With a pair of longnose pliers, straighten the metal tab holding the speaker grille in place.
3. Remove the speaker grille by folding it up and toward the opposite end of the case.
4. Using care, pull out the speaker and unsolder the two leads.
5. Remove the volume knob by pulling it off. Turn the screw in the center of the tuning dial in a counterclockwise direction to remove it, then pull off the tuning knob.
6. Take out the screw near the tuning shaft hole, also the screw on the end cap tuning dial end.



CAT. NO.	DESCRIPTION	PRICE
MISCELLANEOUS ITEMS		
RAD-231	Bracket, Rt. end P765A, P766A.....	.10
RHM-043	"C" Washer P765B, P766B.....	.01
RS-1227	Tube, Battery.....	.15
RAD-232	Bracket, Phone & Charging Jack P765A	.20
RAD-233	Bracket, Battery.....	.20
RAD-234	Strap, Battery Tube.....	.04
RHS-194	Screw, Tuning Dial.....	.45
RHS-195	Screw, Left End Cap P765A, P766A.....	.25
RHS-196	Screw, Right End Cap P765A, P766A.....	.25
RHM-043	"C" Washer.....	.01
RJS-230	Jack, Phone.....	.90
RMS-1231	Ring, Retaining P765A, P766A.....	.05
RMS-399	Ring, Compression.....	.04
n-RS-1420	Screw, Left End Cap P765B, P766B.....	.25
n-RS-1421	Screw, Right End Cap P765B, P766B.....	.25
n-RS-1422	Ring, Retaining P765B, P766B.....	.05
CABINET & APPEARANCE ITEMS		
n-RS-1357	Right End Cap.....	.60
RAC-214	Loop Cover B.....	.75
n-RS-1356	End Cap Assembly.....	1.60
RAG-102	Speaker Cover P765, A, B.....	1.30
RAG-103	Speaker Cover P766A, B.....	1.30
RAV-104	Cabinet, W/Leatherette, P765A, B.....	5.40
RAV-104	Cabinet, W/Leatherette, P766A, B.....	5.40
n-RS-1358	Tuning Dial.....	.70
RS-1009	Leatherette P765A, P765B.....	.10
RS-1010	Leatherette P766A, P766B.....	.10
n-RS-1359	Strap, Carrying Assem.....	1.05
RIG-018	Gasket, Speaker.....	.20
RDK-636	Knob, Volume Control.....	.35
RS-1039	Speaker.....	7.65
n-RS-1433	Bracket, Phone & Charging Jack P765B	.35
Battery chargers, model P15A & P715C, are available for use with this receiver, as an accessory.		
CHARGING BOX PARTS		
RAF-009	Trim Strip P715C.....	.50
RAH-007	Charger Housing P715C.....	.60
RB-1035	Case, Charging P15A.....	17.85
RAU-475	Case, Charger P715C.....	4.50
RJB-083	Terminal Strip, P715C & P15A.....	.05
RJP-068	Charging Plug P715C & P15A.....	1.10
RTC-006	Transformer, P715C & P15A.....	2.80
RWL-043	Power Cord P715C & P15A.....	.90
RS-1008	1 Nickel Cad. Battery.....	4.25
RS-1199	Charging Plug Assem. P715C & P15A.....	1.00
RS-1111	Identification Plate P715C.....	.30
RS-1198	Charger Housing P15A.....	.70
RS-1200	Identification Plate P15A.....	.30

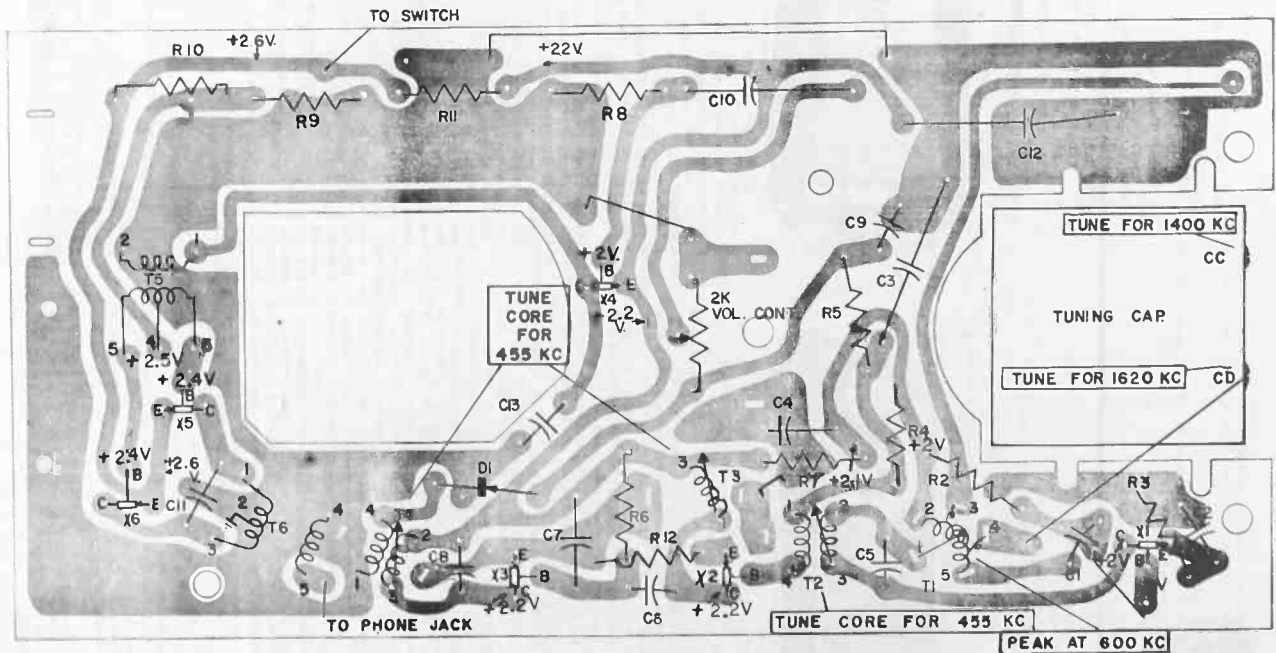
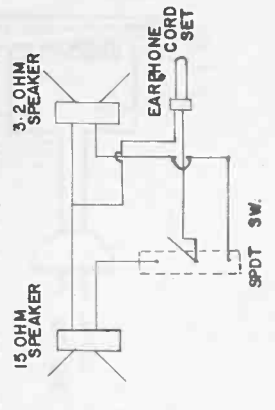
"n" DENOTES ITEMS NOT PREVIOUSLY CATALOGUED

PRICES ARE SUGGESTED LIST PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

7. Slide the chassis toward the tuning dial end about 1/2 inch to gain access to the loop connections.
 8. Unsolder the 3 loop connections. Be sure to observe lead color coding.
 9. Continue to slide the chassis out in this direction. Let the end cap with the wire attached follow the chassis through the case.
 NOTE: Do not remove the loop unless it is found to be defective, as this will affect the alignment of the receiver.
 When repairing the chassis out of the cabinet, there is a jig available from the service center. It has a loop attached which eliminates the removal of the loop from the cabinet.
 The diagram below shows a convenient means of testing any of the various receivers models, including the P765 series, using earphone jacks. This arrangement provides a means of checking the audio output without soldering and unsoldering speakers.

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
C3		Elect. 8MFD @3V	
C10		Elect. 3MFD @3V	
C12		Elect. 50MFD @3V	
n-RS-1361	CA, B, C, D	Tuning Condenser 765B, 766B	4.20
	C1, 2	.01 MFD 50V	
	C4, 9, 11	.05MFD 50V	
	C13	.02 MFD 100V	
	C5	360 MFD 300V	
	C6	330 MFD 300V	
	C7	.0005 MFD 50V	
	C8	470 MFD 30V	
n-RS-1434	CA, B, C, D	Tuning Cap. P765A, P766A	4.20
POTENTIOMETER			
RRG-420	2K	Vol. Con. & Sw.....	1.90
COILS & TRANSFORMERS			
RLC-147	T1	Oscillator Coil.....	1.30
RLI-072	L1	Loop.....	1.40
RS-1334	T2	I. F. Transformer 1st.....	2.15
RS-1333	T3	I. F. Transformer 2nd.....	1.75
RTL-213	T4	I. F. Transformer 3rd.....	1.65
RTL-210	T5	Driver Transformer.....	3.65
RTD-206	T6	Output Transformer.....	3.70
RESISTORS			
RS-1355	R10	50 OHMS Current Var.....	.50

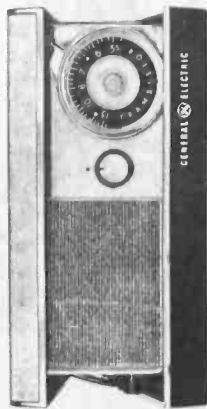
All resistors and capacitors not cataloged are common types obtainable from radio parts jobbers. Refer to schematic for symbols and values.



ER-S-P15A
COVERS
MODELS
P715C
P15A



P15A



P715C

These charging units can be used with all G. E. transistor radios having a recharging jack and using 2 rechargeable 1.2 volt batteries.

In the early production of the P715C charger units, the charging transformer had an output of 2.7 volts A.C. However, in the later production P715C and all of the P15A chargers, this transformer has an output of 12 volts A.C. and uses a 220 ohm 1 watt series dropping resistor.

If it becomes necessary to replace the charging transformer, only the type catalog number RTC-006 with the 12 volt A.C. output, should be used. All RTC-006 transformers will be supplied with the 220ohm dropping resistor. The resistor should be connected in the circuit as shown in the schematic diagram.

For quickly checking the output of the charger a simple test item can be constructed in a couple of minutes. Take a charging jack-and-bracket assembly (cat. no. RS-1433) and solder a 170 or 180 ohm resistor between the jack terminal and the bracket frame.) With the charger plugged into the jack and connected to a 105 to 120 volt AC supply the voltage across the 170 to 180 ohm resistor must be greater than 2.5 volts D.C.

Rechargeable cells that remain in a discharged condition may accumulate corrosion on the terminals. This corrosion acts as a high resistance in series with the charger when attempting to recharge the batteries.

Batteries in this condition may never become fully charged creating the illusion of a faulty charger. It is necessary therefore, to clean the terminals with fine emery cloth before attempting to recharge the batteries.

Normal recharging time for a set of rechargeable batteries is 14 to 16 hours. However, this time may vary depending upon the condition of the batteries when the recharge begins.

CAUTION

Make sure the batteries are installed in the correct position. IF RECHARGEABLE BATTERIES ARE INSTALLED IN THE REVERSE POSITION THEY WILL BE RUINED DURING RECHARGE.

TROUBLE SHOOTING

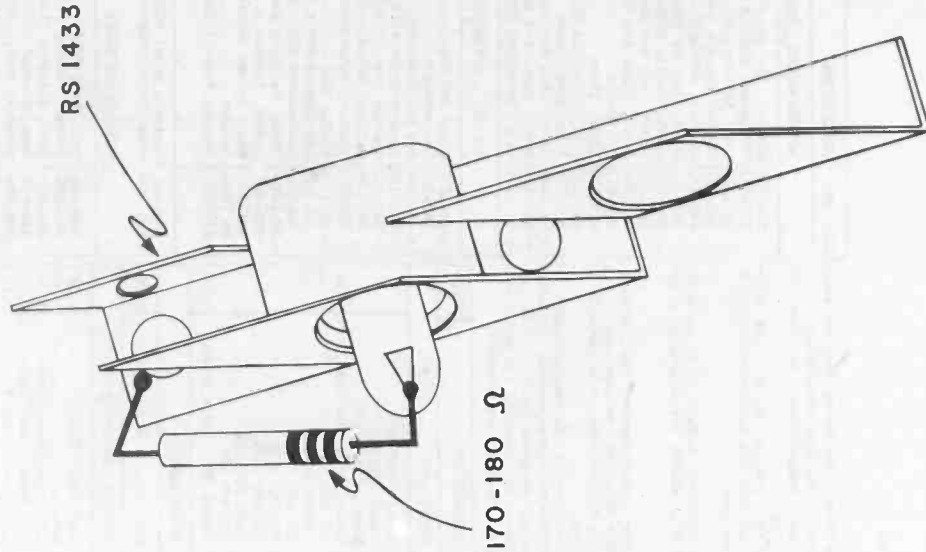
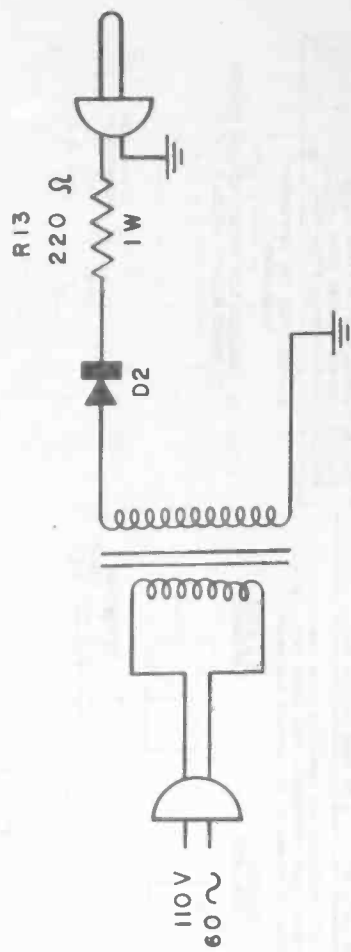
When checking the charger output as previously described, if less than 2.5 Volts D. C. make the following checks:

1. Check output voltage of the transformer.
(a) If the charging unit uses the 220 ohm resistor, the transformer output should be 12 Volts A. C.
(b) If the 220 ohm resistor is not used in unit the transformer output should be 2.7 Volts A. C.
2. Check solder connections on terminal board and at charger plug.
3. Check the 220 ohm resistor by unsoldering one end and substituting one of proper resistance.
4. Check diode D2 also by substitution.

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
RAF-009		Trim Strip P715C.....	.50
RAH-007		Charger Housing P715C.....	.60
EAU-475		Charger Case Assem. P715C.....	4.50
RJB-083		Terminal Strip.....	.05
RTC-006		Transformer.....	2.80
RWL-043		Cord, Power.....	.90
RS-1008		Battery, 1 Nickel Cad.....	4.25
RS-1111		Plate, Identification P715C.....	.30
RS-1198		Housing, Charger P15A.....	.70
RS-1200		Plug, Charger Assembly.....	1.00
RB-1035		Plate, Identification P15A.....	.30
RS-1653	D2	Case, Charger P15A.....	7.85
		1892 Diode.....	2.00

All components not cataloged are common types obtainable from radio parts jobbers. Refer to schematic for symbols and values.

PRICES ARE SUGGESTED LIST PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

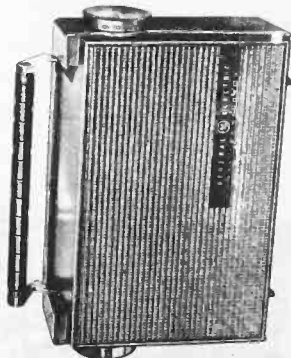


GENERAL ELECTRIC

SERVICE MANUAL

FOR
TRANSISTOR RADIO RECEIVERS
(940-1600 KC., 455 KC., I-F.)
Supersedes Service Note S-P725B

ER-S-P725B
COVERS
MODELS
P725B
P726B



SPECIFICATIONS	
CABINET:	Plastic - Brown, P725B; Turquoise, P726B
ELECTRICAL RATING:	3 Batteries: Eveready #950, or AL100, Burgess #2R, or equivalent
POWER OUTPUT:	Undistorted: 225 milliwatts Maximum: 350 milliwatts

GENERAL INFORMATION

The models P725B and P726B are all transistor battery operated portable radios. The B- is supplied by three 1 1/2 volt flashlight type batteries producing the total B- of 4.5 volts.

CHASSIS REMOVAL

1. Remove both knobs.
2. Remove the 3 batteries.
3. Remove cabinet retainer strap.
4. Unsolder the two leads on the speaker.
5. Unscrew the 5 screws holding chassis to cabinet.

TROUBLESHOOTING

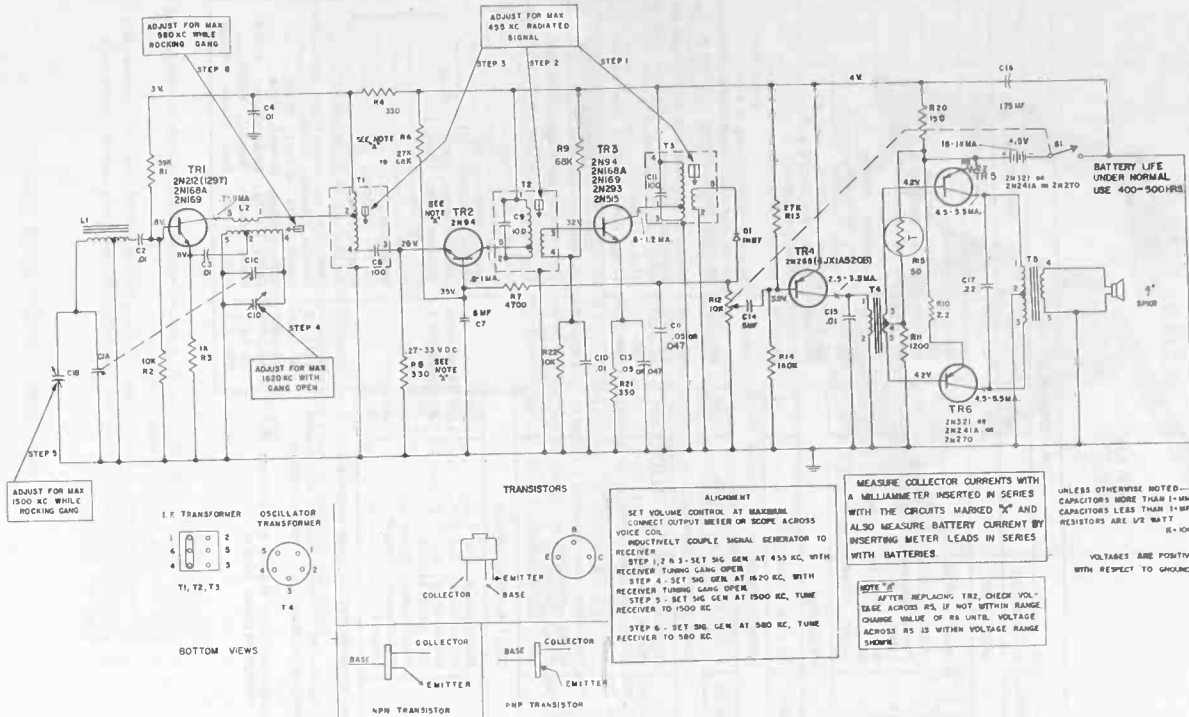
A check of battery condition and total current drain of the receiver should be made first. All contact measurements are made at quiescence with the receiver turned on volume control at maximum, tuning gang closed, and with no signal conditions. The total receiver current drain is 16 to 18 ma. This is measured by inserting a milliammeter in series with the batteries. If an excessive total current drain is recorded, the individual collector currents of each transistor should be checked. An excessive current reading may mean a shorted transistor; no current will indicate that a transistor or associated circuit component is defective. A single-edge razor blade is a satisfactory tool for cutting the copper circuit wiring so that a milliammeter can be inserted in series with the break to measure the current flow. After each current check is completed, solder the cut carefully to complete the circuit again.

NO RECEPTION:
1. Check battery voltage and battery contacts.
2. Check on-off switch.
3. Check all antenna lead connections.
4. Check coil L2.

WEAK AUDIO:
1. Check battery voltage for 4.5 volts.
2. Check battery current.
3. Check transistor collector currents.
4. Check alignment.

INTERMITTENT:
1. Check battery contacts for corrosion.
2. Check solder connections on dip-soldered side of circuit board.

Intermittent audio, motorboating, and poor reception is frequently caused by poor battery contact.



TRANSISTORS
SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
STEP 1 - SET SMC GEN AT 455 KC. WITH RECEIVER TUNING GANG OPEN
STEP 4 - SET SMC GEN AT 1620 KC. WITH RECEIVER TUNING GANG OPEN
STEP 5 - SET SMC GEN AT 1500 KC. TUNE RECEIVER TO 1500 KC
STEP 6 - SET SMC GEN AT 580 KC. TUNE RECEIVER TO 580 KC

MEASURE COLLECTOR CURRENTS WITH A MILLIAMMETER INSERTED IN SERIES WITH THE CIRCUITS MARKED "X" AND ALSO MEASURE BATTERY CURRENT BY INSERTING METER LEADS IN SERIES WITH BATTERIES

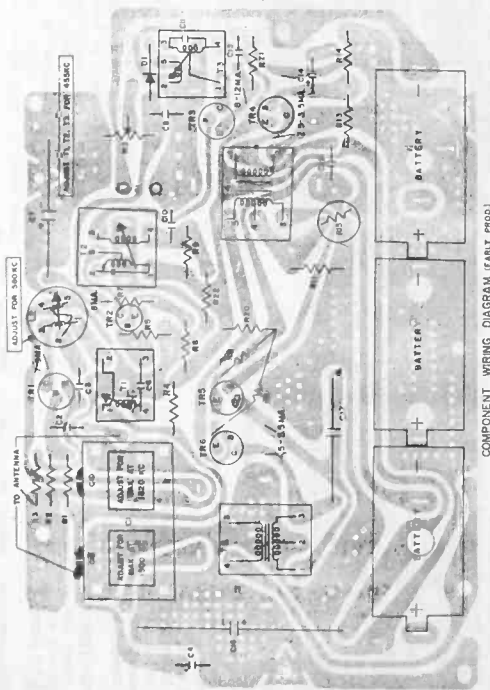
NOTE:
AFTER REPLACING TR2, CHECK VOLTAGE ACROSS R4. IF NOT WITHIN RANGE, CHANGE VALUE OF R4 UNTIL VOLTAGE ACROSS R5 IS WITHIN VOLTAGE RANGE SHOWN

UNLESS OTHERWISE NOTED—
CAPACITORS MORE THAN 1-MF
RESISTORS ARE 1/2 WATT

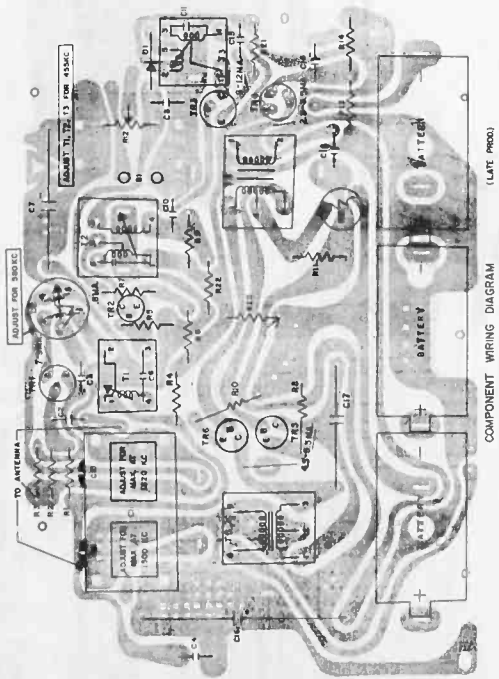
VOLTS ARE POSITIVE
WITH RESPECT TO GROUND

BATTERY LIFE
UNDER NORMAL
USE 400-500 HRS

REPLACEMENT PARTS LIST			
CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
RS-1022	C2, 3, 4	.01mf., 450V.	.30
RS-1024	C8, 13	.05mf., 50V.	.50
RS-1346	C1	Tuning Capacitor	3.55
*RS-1458	C16	175mf. 6V.	1.55
RCE-225	C7	8mf., 10V.	1.65
	C14	5mf., 10V.	.05
	C17	.22mf., 100V.	.03
RESISTORS			
RS-1355	R15	50 ohms, thermistor.	.50
POTENTIOMETER			
RS-1347	R12, S1	Volume Control, 10K & Sw.	1.85
TRANSISTORS & DIODES			
RS-1531	TR1	2N212/1297 (on some sets)	3.55
RS-1533	TR1, TR3	2N168A (on some sets)	3.20
RS-1538	TR1, TR3	2N169 (on some sets)	3.05
RS-1547	TR2, TR3	2N94, (TR3 on some sets)	3.15
RS-1554	TR3	2N515 (on some sets)	3.15
RS-1557	TR3	2N293 (on some sets)	3.15
RS-1546	TR6	2N265/4JX1A520B	2.95
RS-1342	TR5, TR6	2N244A, 2N270, or 2N321	3.20
RED-001	D1	1N87, Diode Detector	1.90
COILS & TRANSFORMERS			
RS-1348	T1	Transformer, 1st I.F.	1.75
RS-1349	T2	Transformer, 2nd I.F.	1.95
RS-1350	T3	Transformer, 3rd I.F.	1.95
RS-1351	L2	Coil, Oscillator	1.20
RS-1352	T4	Transformer, Input	2.75
RS-1353	T5	Transformer, Output	2.40
*RS-1354	L1	Antenna	2.10
* - Denotes Parts Not Previously Cataloged.			
All Parts Not Listed By Catalog Numbers Are Common Items, Obtainable From Radio Parts Jobbers.			
Prices Are Suggested List Prices And Subject To Change Without Notice.			
MISCELLANEOUS			
RB-1057		Speaker, 4"	5.45
RS-1065		Brace, Handle, L.H.	.75
RS-1066		Brace, Handle, R.H.	.75
RS-1067		Screw, Handle	.10
RS-1072		Pad, Grille, (Black Paper)	.05
RS-1073		Retainer, Handle	.05
RS-1074		Clip, Friction	.03
RS-1075		Clip, Cabinet	.05
RS-1088		Screw, #6x5/16, type 25	.03
RS-1089		Screw, #6-32x1/8 P.H.	.05
RS-1188		Lamp, Antenna	.15
RS-1341		Battery Clip, Clamp & Rivet	.30
RS-1342		Battery Clip, Clamp & Rivet, (Pos. End)	.30
RS-1343		Battery Clamp Holder, Clamps & Rivets	.40
RS-1344		Bracket, Antenna, (R.H.)	.90
RS-1345		Bracket, Antenna, (L.H.)	.70
RS-1456		Wall Hanger Burton	.10
RHC-095		Ring, Tubular	.10
RMS-272		Ring, (Compression) (for knobs)	.05
CABINET & APPEARANCE ITEMS			
*RB-1055 (Assemb.)		Cabinet Front, (Tan), P725B	6.45
		Cabinet Back, (Tan)	6.45
		Grille	2.10
		Nameplate	.25
		Catch, Cabinet (2)	.95
		Hinges, Cabinet (2)	.95
		Cabinet Front, (Turq.), P726B	.75
		Cabinet Back, (Turq.)	.75
		Pad, Grille	.05
		Grille	.03
		Nameplate	.05
		Catch, Cabinet (2)	.03
		Hinges, Cabinet (2)	.03
RS-1061		Nameplate	2.10
RS-1062		Handle, (Brown), P725B	.25
RS-1063		Handle, (Ant. White), P726B	.95
RS-1064		Knob, Tuning, (Brown), P725B	.95
RS-1068		Knob, Tuning, (Ant. White), P726B	.75
RS-1069		Knob, Volume, (Brown), P725B	.85
RS-1070		Knob, Volume, (Ant. White), P726B	.85



COMPONENT WIRING DIAGRAM (EARLY PROD)



COMPONENT WIRING DIAGRAM (LATE PROD)

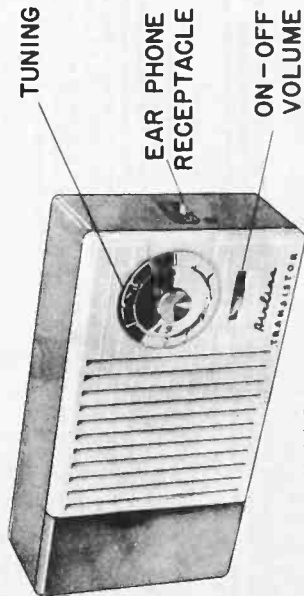
SERVICE MANUAL

AND REPAIR PARTS
FOR REPAIR SERVICE DEPARTMENT

MANUAL 572A

AirLine
TRANSISTOR
RADIO
MODEL BR-1102A
SERIAL No. 75X
62Z-5149B*

WARDS TRANSISTOR RADIO



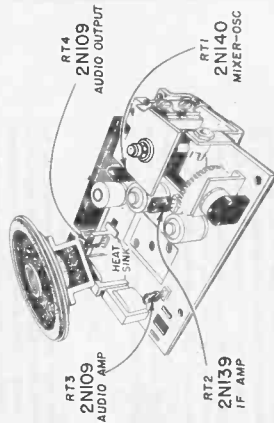
Model BR-1102A
Turquoise and White

SPECIFICATIONS

- Power Supply 9 volts D.C.
- Frequency Range 540 to 1600 KC
- Intermediate Frequency 455 KC
- Selectivity At 1000 KC, 70 KC at 1000 X signal
- Sensitivity (2 mw ref) 800 u.v. per meter
- Power Output 20 m. w.
- Speaker 2-3/4" PM, V.C. impedance-15 ohms
- Cabinet 6-1/4" width, 1-3/4" depth, 3-3/8" height

TRANSISTOR COMPLEMENT

- RT1 2N140 Oscillator-Mixer
- RT2 2N139 1st. IF Amplifier
- RT3 2N109 Audio Amplifier
- RT4 2N109 Audio Output
- CK-706A Crystal Detector



Top Chassis View

SERVICE LETTER REMINDER

Record number of Service Letters below that apply to models listed in this manual.

REMOVING CHASSIS FROM CASE

1. Remove battery.
2. Remove tuning knob stud by turning counterclockwise and remove tuning knob.
3. Remove case cover mounting screw located behind tuning knob and remove case cover.
4. Remove three chassis mounting screws.
5. Carefully remove chassis from case allowing battery cable to slip through battery compartment hole.

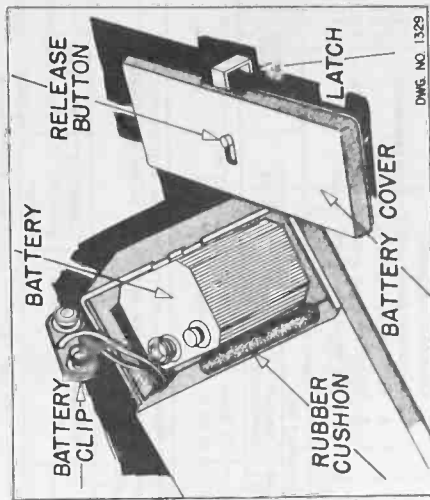
BATTERY REPLACEMENT

Since the receiver is small and compact, not every 9 volt battery will fit in the space provided. Listed below are five available types to be used for replacement.

- | | |
|----------|---------|
| WARDS | NO-92 |
| BURGESS | NO-2N6 |
| EVEREADY | NO-246 |
| OLIN | NO-1707 |
| RCA | VS-305 |

Approximately 100 hours performance can be experienced with the above batteries before replacement is required. Battery replacement should be performed when the sound output is noticed to be muffled or distorted with a decrease in total output or if a voltage measurement shows less than 6 volts. The battery voltage should be measured with the receiver turned on after at least 5 minutes of operation.

When battery replacement is necessary, remove battery cover by pushing release button upward, grasp latch and pull up and away from case. Remove old battery and un-snap battery cable. Snap battery cable on replacement battery and insert into case. Be sure rubber cushion is between battery and side wall of case to prevent battery movement. Insert battery cover in place and push latch down.



BATTERY LOCATION

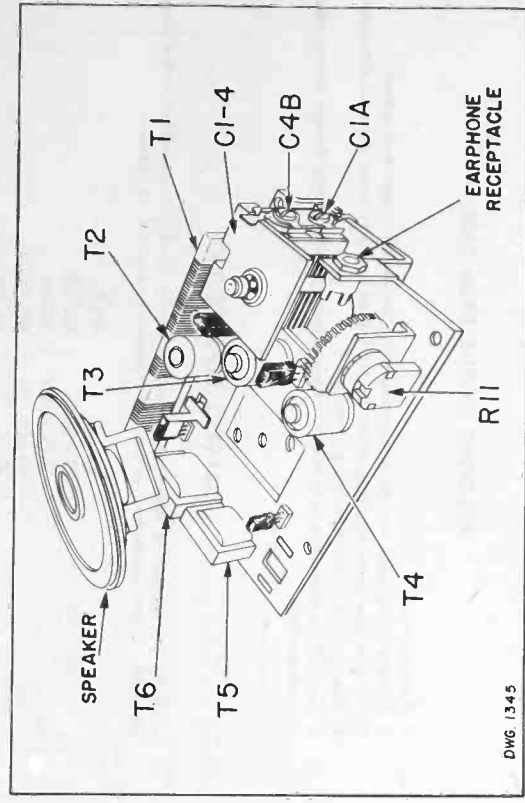
M O N T G O M E R Y W A R D

ALIGNMENT PROCEDURE

- NOTES:**
1. Remove chassis from case.
 2. Connect 9 volt battery.
 3. Use output meter with 15 ohms impedance.
 4. Turn volume control to maximum.
 5. Signal generator output at 100 microvolts, 30% modulation at 400 cycles.

CIRCUIT	FREQUENCY	SIGNAL GENERATOR		OUTPUT METER	GANGED CAPACITY	ADJUST FOR MAXIMUM OUTPUT ON METER
		COUPLING CAPACITY	CIRCUIT CONNECTION			
I.F.	455KC	.5MF	To Base of RT1	Connect in place of speaker	.....	T3, T4
Repeat above step two or three times for best results, keeping generator output in all cases as low as possible to prevent overloading of audio.						
Osc.	1620KC	.5MF	To Base of RT1	Connect in place of speaker	Open Gang (Fully clockwise)	C4B
Caution: Too high an output from signal generator may cause setting of trimmer on a spurious response.						
Osc.	535KC	.5MF	To Base of RT1	Connect in place of speaker	Closed Gang (Fully counter-clockwise)	T2
Osc.	1620KC	.5MF	To Base of RT1	Connect in place of speaker	Open Gang (Fully clockwise)	C4B
Ant.	1400KC	Connect 3 turn loop to generator and place near T1.		Connect in place of speaker	Ganged Condenser should be rocked	C1A

Check for alignment and dial calibration at 1000KC and 600KC.



DWG. 1345

TRANSISTOR SERVICING

The following information is presented as a guide to servicing transistor radios:

VOLTAGE READINGS

Because of the low battery potential, it is suggested that a VTVM be used to measure all circuit voltages. Voltage readings will vary with the strength of the signal being received, the battery voltage, and the type voltmeter being used. The voltage readings indicated on the schematic diagram were measured with a VTVM, no signal input, and with a battery voltage of 9 volts. Voltage readings will also vary with a change of transistors. The transistors conductivity varies to one transistor to another, therefore, voltage readings will differ. All voltage readings will be negative with respect to chassis due to the PNP type transistor employed.

BATTERY REPLACEMENT

The battery should be the first component checked when the radio is presented for service, since the battery voltage decreases with use and age. The battery voltage should be checked at the battery cable connections with the receiver turned on, and after at least five minutes of operation. Batteries have a tendency to reactivate (recharge) when not in use, and a true test of the battery's capabilities can not be determined until sufficient current has been drawn from the battery. If the battery is found to be dead, the receiver should be checked for a short circuit before the replacement battery is installed. Disconnect battery and measure resistance with an ohmmeter at the battery cable connections. Ohmmeter will indicate approximately 1700 ohms with positive lead to chassis, approximately 400 ohms with negative lead to chassis and approximately 4000 ohms with all transistors out of circuit with either meter lead to chassis. Battery replacement should be performed when the sound output is noticed to be muffled or distorted with a decrease in total output.

OHMMETER READINGS

When using an ohmmeter to check continuity and resistance readings, caution must be observed. It is important to know the internal battery voltage of the ohmmeter as damage could result due to excessive voltage being applied to the ohmmeter. It is also important to know the battery polarity of the meter leads. Incorrectly placing the ohmmeter leads across a lyric capacitor with a low working voltage may damage the capacitor due to excessive reverse current. If the meter battery voltage is greater than 12 volts, the high frequency transistor rating will be exceeded and may be damaged. A diode action will be experienced when attempting to check the resistance readings with the transistors in the circuit. It is advisable to remove all transistors from their sockets before making ohmmeter checks.

SOLDERING

Caution must be observed when using a soldering iron as excessive heat may easily damage a transistor. The transistors must be removed from their sockets before soldering at the socket pins. Heat may also damage other components such as 1/4 watt resistors. Therefore, dissipate the heat to the component by grasping the component lead with a pair of long nose pliers. A low wattage small diameter tip iron is suggested.

TRANSISTORS

If a transistor is suspected of being defective, substitution will be the only reliable check. Checking resistance readings of a transistor with an ohmmeter will indicate only a shorted or open transistor. When inserting a transistor in its socket, make sure the transistor's leads line up with the socket holes. Illustrations on the schematic diagram show the spacing between transistor's leads and the transistor sockets. Audio transistors have a red dot on the body of the transistor adjacent to the collector lead for identifying purposes. The red dot must line up with a paint dot on the chassis when the transistor is inserted into the socket. If a transistor substitution is made in the RF or IF circuit, realignment may be necessary. This is due to the difference in operating characteristics from one transistor to another.

COMPONENT REPLACEMENT

An important consideration is component replacement. Miniature as well as close tolerance components are used throughout the radio, therefore, all components must be replaced with exact duplicate parts.

TROUBLE SHOOTING

Trouble in a transistor radio can easily be isolated by using a signal generator and listening to the speaker. Circuit tracing from the base of the output stage back through the receiver to the antenna, should quickly reveal which stage is not functioning properly. When injecting the signal, use a 50 mfd lyric, negative to base, in the audio circuit; a .5 mfd capacitor in the IF or RF stages and inductive coupling to the antenna.

Caution must be observed not to accidentally short the collector circuit to the chassis, as damage to the transistor may result. Also, the practice of deliberately shorting a circuit to chassis to determine if voltage is present or to listen for a click in the speaker, must be avoided for the same reason.

REPLACEMENT PARTS LISTS

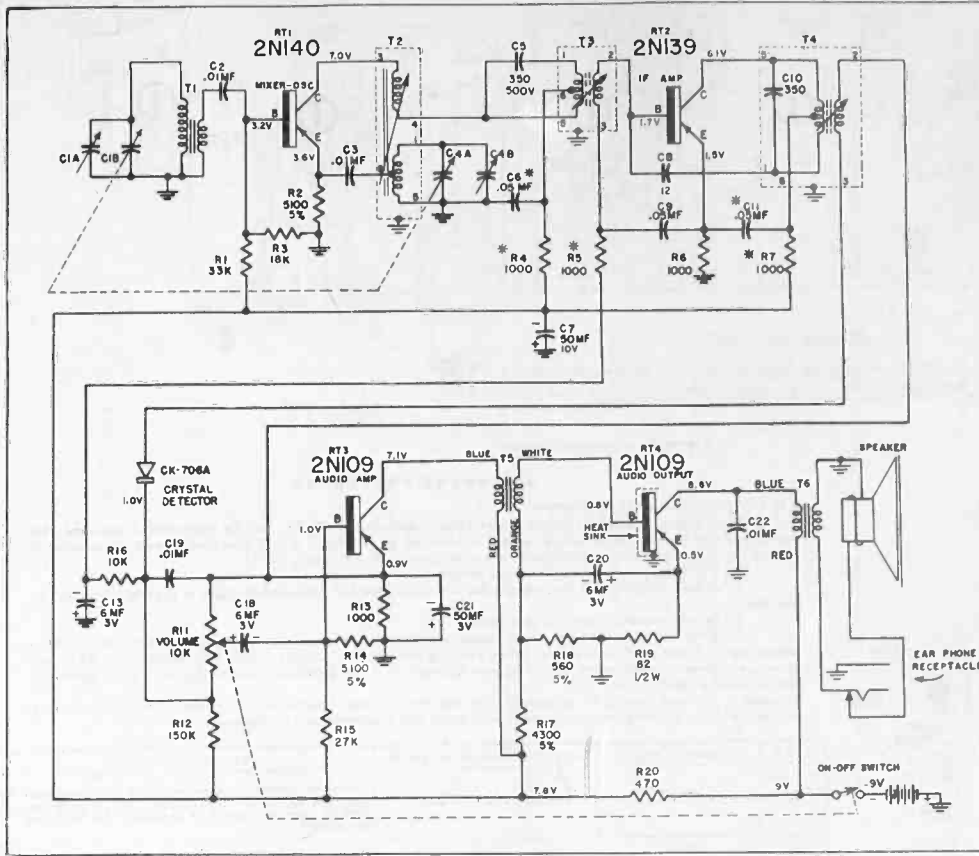
REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
R1		33K ohm, 1/4 watt, 10%	T4		2nd IF Transformer
R2		5100 ohm, 1/4 watt, 5%	T5		Input Transformer
R3		18K ohm, 1/4 watt, 10%	T6		Output Transformer
R4-5-6-7	10A-26383	On-off Volume control, 100K ohm			TRANSFORMERS
R8		1000 ohm, 1/4 watt, 10%			4A-26374 Earphone receptacle
R9		1000 ohm, 1/4 watt, 10%			2M-26377 Volume control bracket
R10		27K ohm, 1/4 watt, 5%			39F-26445 VOLUME CONTROL
R11		10K ohm, 1/4 watt, 10%			18A-26777 2-3/4" P.W. Speaker
R12		10K ohm, 1/4 watt, 10%			14A-26469 Battery Cable
R13		10K ohm, 1/4 watt, 10%			2M-26376 Antenna spring clip
R14		10K ohm, 1/4 watt, 10%			15B-24912 Transistor socket-large
R15		27K ohm, 1/4 watt, 5%			43D-27661 Heat sink clip
R16		4300 ohm, 1/4 watt, 5%			A2M-24947 Mounting clip
R17		560 ohm, 1/4 watt, 5%			(Transistor sockets)
R18		82 ohm, 1/2 watt, 10%			insul. coils
R19		470 ohm, 1/4 watt, 10%			B48A-26593 Osc. coils
R20					
C1AB-C4AB		CAPACITORS			CABINET PARTS
C2-3		Tuning condenser			Case
C4		.01 mfd, 25 volt, ceramic			Handle Plate
C5		350 mfd, 500 volt, 5% mica			Retainer, P in
C6		.05 mfd, 25 volt, ceramic			Battery cover
C7		50 mfd, 0 volt, lytic			Battery cover Assy
C8		.05 mfd, 25 volt, ceramic			Tuning knob
C9		.05 mfd, 25 volt, ceramic			Tuning knob stud
C10		350 mfd (incl. In T4)			On-off volume knob
C11		.05 mfd, 25 volt, ceramic			Rubber cushion
C12		6 mfd, 3 volt, lytic			* TRANSISTOR
C13		6 mfd, 3 volt, lytic			2N-140
C14		.01 mfd, 25 volt, ceramic			2N-139
C15		6 mfd, 3 volt, lytic			2N-109
C16		6 mfd, 3 volt, lytic			19C1980
C17		.01 mfd, 25 volt, ceramic			
C18		6 mfd, 3 volt, lytic			
C19		6 mfd, 3 volt, lytic			
C20		50 mfd, 5 volt, lytic			
C21		.01 mfd, 25 volt, ceramic			
C22					
T1	13E-26452	Red Antenna	RT1	2N-140	Crystal detector
T2	11B-22609	Oscillator coil	RT2	2N-139	(CK706 or IN295)
T3	13A-26380	1st, IF Transformer	RT3	2N-109	
			RT4	19C1980	

NOTE: All chassis marked "Run 2" include the following changes:

Ref. No.	Part No.	Description	Change
R-4,5,7		Resistor (1000 Ohm 10% 1/4 Watt)	Delete these resistors and replace with jumper wire.
C-6,11	8G-26459	Capacitor (.05 mfd, 25V, Ceramic)	Omit, no connection

Some Run 2 chassis used 1/2 watt resistors in place of 1/4 watt. In all Run 2 chassis for replacement parts either 1/2 or 1/4 watt resistors may be used.

Use universal parts where part numbers are not shown. Order from (LRS).



SCHEMATIC DIAGRAM

NOTES

RESISTOR VALUES ARE IN OHMS, 1/4 WATT, 10% TOLERANCE, UNLESS OTHERWISE SHOWN *

CAPACITOR VALUES ARE IN MICRO-MICROFARADS UNLESS OTHERWISE SHOWN DC WORKING VOLTAGE IS 25V UNLESS OTHERWISE SHOWN DC VOLTAGE READINGS TAKEN WITH VTVM, NO SIGNAL IN INPUT AND BATTERY VOLTAGE = POS. VOLTAGES WILL VARY WITH TRANSISTOR CHANGES. ALL VOLTAGES ARE NEGATIVE.

TYPE 2N109, 2N139 AND 2N140

EMITTER
BASE
COLLECTOR

DOT

1P COIL
DOT

5
3
OBC COIL

TRANSISTOR SOCKET

BASE
COLLECTOR
EMITTER

(BOTTOM VIEW)

* REVISIONS FOR CHASSIS MARKED RUN 2
R-4,5,7 REPLACED WITH JUMPER WIRE
C-6 B.II. OMIT-NO CONNECTION
RUN 2 CHASSIS USE 1/4 WATT OR 1/2 WATT RESISTORS.

DWG. NO. 1341-D
89C789

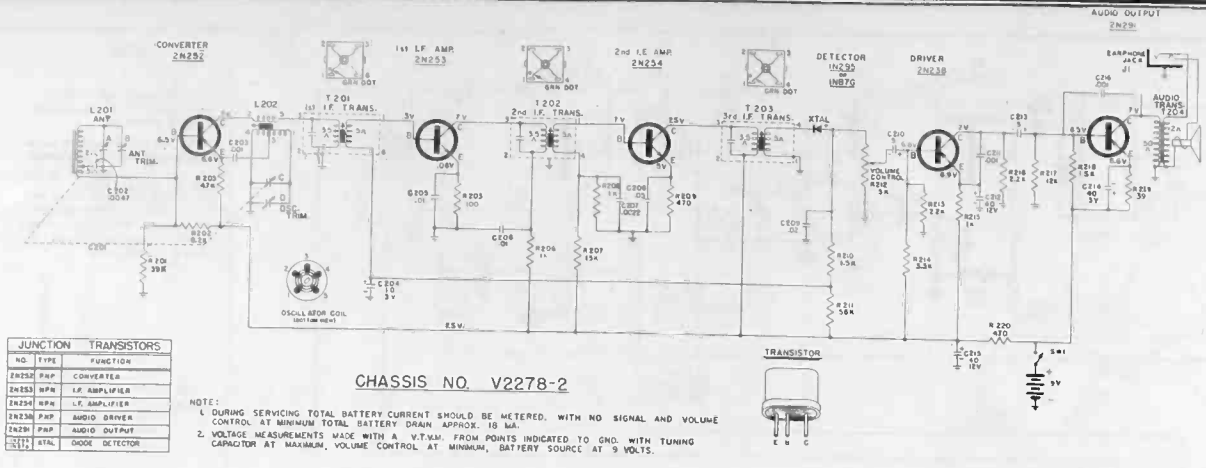


Figure 1 - Schematic Diagram

ALIGNMENT PROCEDURE

The following is required for aligning:

1. A signal generator capable of covering frequencies of 455 KC and the entire broadcast band with provisions for modulation. The test signal is injected by forming a 4 or 5 turn loop of wire, connecting it across the signal generator output cable and placing near antenna loop L201
 2. VTVM or output meter connected across voice coil.
 3. A fiber aligning tool that snugly fits the slot in the I.F. transformer cores to prevent chipping of the slot.
 4. Set the volume control to maximum.
 5. Keep the output of the signal generator low enough to just give an indication on the VTVM or output meter. If the peak is broad or double peaking occurs when rocking the IF slug adjustment, the signal generator output is excessive. Either further decoupling of the generator loop or decreasing the generator output is necessary.
- Caution - Be sure during IF alignment that the hand or any objects on the bench do not come in close contact with the antenna loop or detuning will occur and alignment will be incorrect.

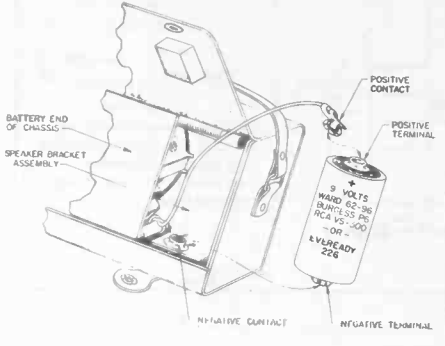


Figure 4 Battery Installation

STEP	Frequency Setting	Connect Generator Output to:	Adjust for maximum
(1)	455 KC	loosely couple to L201	Remove speaker bracket assy. Set gang condenser fully open and adjust T203, T202, and T201 in order indicated. Reduce generator output if necessary for T202 and T201 adjustments.
(2)	1625 KC	loosely couple to L201	Replace speaker bracket assy. Adjust oscillator trimmer "D".
(3)	1400 KC	loosely couple to L201	Set gang condenser to 1400 KC and adjust antenna trimmer "B".
(4)	600 KC	loosely couple to L201	Set gang to 600 KC and adjust oscillator slug.
(5)	Repeat steps 2 & 3. Check the frequency range to insure that receiver will receive the full broadcast band		

MANUAL 575A
 Airline
 TRANSISTOR RADIO
 MODEL
 GTM 1108A
 SERIAL NO.
 75X
 Form No. 622-576B

SERVICE MANUAL

AND REPAIR PARTS
 FOR REPAIR SERVICE DEPARTMENT



MODEL GTM 1108A
 TAN

ELECTRICAL SPECIFICATIONS

Frequency range	540 to 1600 KC
Intermediate Frequency	455 KC
Transistor Complement	
1 2N252	Converter
1 2N253	1st IF Amp.
1 2N254	2nd IF Amp.
1 1N87G or 1N295	Diode Detector
1 2N238	Audio Driver
1 2N291	Audio Output
Power Output	
Undistorted	.035 watts
Maximum	.060 watts
Loudspeaker	2 1/2" PM
Power Supply:	
Wards - 62-96	RCA-VS-300
Eveready - 226	Burgess P6
Average current Drain	17 ma.

GENERAL DESCRIPTION

This Airline transistor radio is a five transistor portable broadcast superhetrodyne receiver. A jack is provided for private earphone connection. It replaces the loudspeaker when a miniature plug is inserted through the hole in the back of the cabinet. This silences the speaker and allows the user to listen under conditions of high ambient noise, or situations in which operation of the speaker is undesirable. The receiver is housed in a leatherette case with carrying strap.

The receiver employs five junction type transistors: the converter, audio driver, and audio output transistors are of the PNP type, while the IF amplifiers employ NPN type transistors. The converter stage is an autodyne type mixer-oscillator. A tuned, high Q ferrite-core coil is used as an antenna. Two stages of IF amplification are used. The gain of the 1st IF amplifier is controlled by an Automatic Gain Control circuit.

A crystal diode functions as a detector and AGC source. The driver amplifies the audio signal and capacity couples it to the audio signal transistor. The audio output stage is operated Class "A". The speaker is a 2 1/2" PM type.

BOARD REMOVAL

1. Remove the screw located in the center of the tuning knob. Turn dial to the high frequency end and remove the screw by turning it in a counter clockwise direction while gripping knob.
2. Open the back cover and remove battery.
3. Remove the mounting screw located at the tuning condenser end of the printed board.

4. Hold the radio in the palm of the hand with the open side up. Grip the printed board with the other hand and slide it down towards the tuning capacitor end of the cabinet, until the speaker bracket is free of the metal lip. Now raise this end of the board over metal lip and slide it out of the cabinet.
5. When replacing screw/dial knob, do not strain tuning condenser. Turn knob to low frequency end and grip knob while tightening screw.

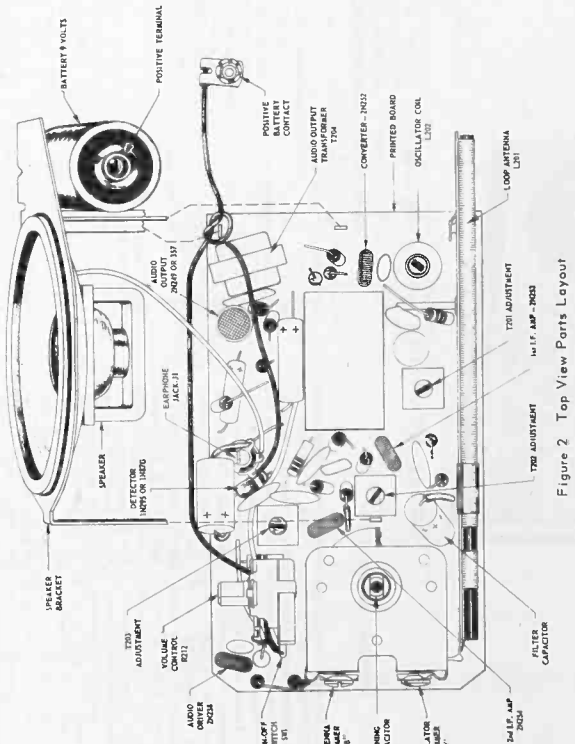


Figure 2 Top View Parts Layout

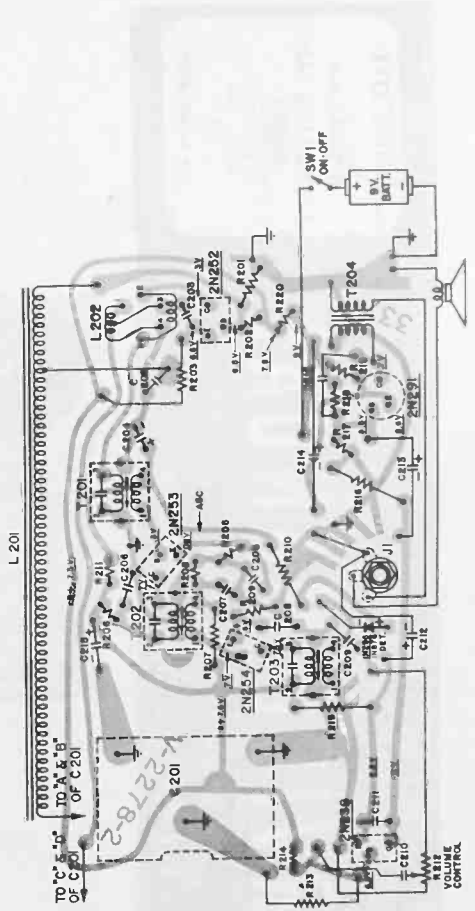


Figure 3 Bottom View of Printed Board Showing Top Components Symbolically

PARTS LIST

Ref. No.	Part No.	Description
CAPACITORS:		
C201	330V005M01	Variable gang condenser
C202	.0047 mf 500 v. Ceramic	
C203	.001 mf 30 v. Ceramic	
C204	10 mf 3 v. Electrolytic	
C205	.01 mf 30 v. Ceramic	
C206	.01 mf 30 v. Ceramic	
C207	.0022 mf 500 v. Ceramic	
C208	.05 mf 25 v. Ceramic	
C209	.02 mf 25 v. Ceramic	
C210	5 mf 12 v. Electrolytic	
C211	.001 mf 30 v. GNV Ceramic	
C212	40 mf 12 v. Electrolytic	
C213	5 mf 12 v. Electrolytic	
C214	40 mf 3 v. Electrolytic	
C215	40 mf 12 v. Electrolytic	
C216	.001 mf 30 v. GNV Ceramic	
RESISTORS:		
	OHMS	WATTS
R201	39 k	0.5
R202	8.2 k	0.5
R203	4.7 k	0.5
R204	100	0.5
R205	1.0	0.5
R206	1.5 k	0.5
R207	1 k	0.5
R208	1 k	0.5
R209	470	0.5
R210	1.5 k	0.5
R211	56 k	0.5
R212	22 k	0.5
R213	3.3 k	0.5
R214	1 k	0.5
R215	2.2 k	0.5
R216	12 k	0.5
R217	1.5 k	0.5
R218	1.5 k	0.5
TRANSFORMERS AND COILS		
L201	310V012M02	Antenna - Iron Core loop
L202	230V026M01	Oscillator coil
T201	255V014M01	1st IF transformer
T202	255V014M01	2nd IF transformer
T203	255V014M02	3rd IF transformer
T204	430V034M01	Output transformer
TRANSISTORS AND DIODES		
297V008M01	2N232 Transistor - converter	
297V002M04	2N253 Transistor - 1st IF	
297V002M05	2N254 Transistor - 2nd IF	
297V004M01	2N236 Transistor - audio driver	
297V009M01	2N291 Transistor - audio output	
296V002M01	1N295 or 1N87G crystal diode - detector	
MISCELLANEOUS		
JACK (J1) - for earphone		
Switch on-off (SW1) - part of R212		
Bracket - Volume control mounting		
Bracket - Speaker mounting (includes battery negative terminal - less speaker)		
Cabinet - leatherette		
Connector assembly - battery positive terminal		
Knob - tuning		
Knob - on/off/volume		
Screw - dial knob		
Speaker - 2 1/2" PM		
Washer - tuning knob		

NOTE: USE UNIVERSAL PARTS WHERE PART NUMBERS ARE NOT LISTED. ORDER FROM (LRS)

SUGGESTED SERVICING HINTS

Make all voltage measurements with a VTVM and with tuning capacitor set for maximum capacity and the volume control at minimum. Battery current should be monitored at all times and should be approximately 17 milliamperes. Battery voltage should be at nine volts. The battery should be the first component checked when servicing. A weak battery can cause a decrease in gain and distortion. Check the battery potential with battery in receiver and set turned on. If all other circuit components have been checked and a faulty transistor is suspected, replacement of the transistor

is the safest check. It is not advisable to check transistors which show excessive damage to them can result. Transistors which may be soldered or unsoldered in the circuit when voltage is applied to the circuit. When removing components from the printed board, including transistors, care must be taken to avoid damaging the board. Replacement of an IF transistor usually will have no effect on the overall alignment. In some cases IF alignment may be affected. For proper IF alignment procedure refer to the section on alignment.

BOARD REMOVAL

1. Remove the screw located in center of the tuning knob. Turn the dial to the high frequency end and grip the tuning knob with one hand. Remove the screw by turning it in a counter clockwise direction. Do not cause any undue strain on the tuning capacitor.
2. Remove back of cabinet by loosening coin-slot screw on back. Remove the 1/4" self tapping screw located at tuning condenser end of board.
3. Hold radio in the palm of the hand with the open back side up. Grip the board with the other hand and slide it down toward the tuning capacitor end of the cabinet, until the upper end of the speaker bracket is free of the plastic lip. Now raise this end of the bracket over lip and slide it out of the cabinet.
4. To insert the board into the cabinet, use the reverse procedure, being careful to lock the speaker bracket under both recesses provided in the cabinet front.

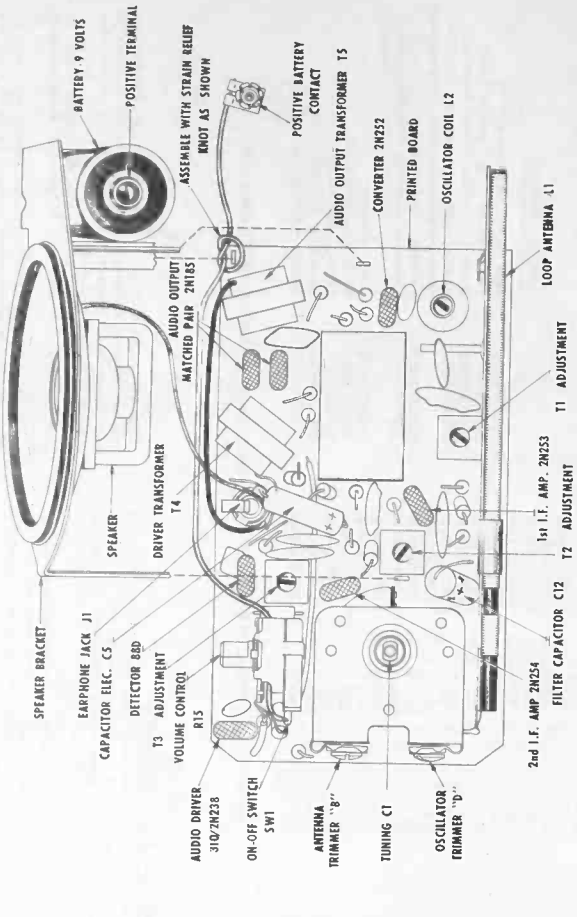


Figure 3 Top View Ports Layout

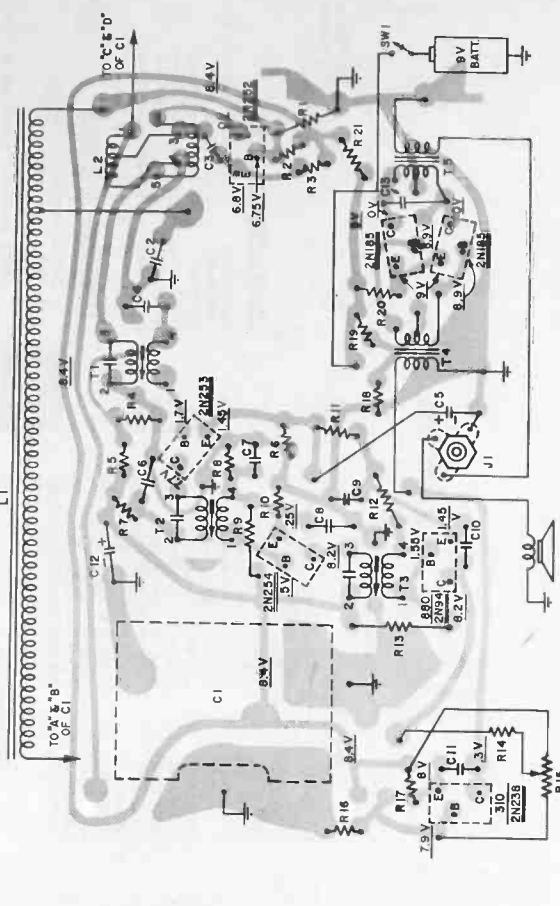
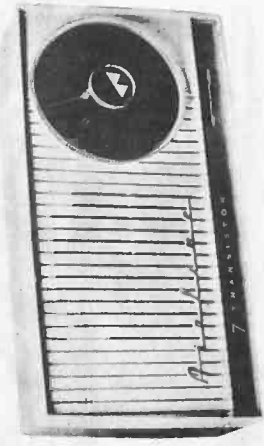


Figure 4 Bottom View of Printed Board Showing Top Components Symbolically

MANUAL 577A
Airline
 TRANSISTOR RADIO
 MODEL
 GTM 1109A
 SERIAL NO.
 75X
 Form No. 62-Z-578B*

SERVICE MANUAL

AND REPAIR PARTS
 FOR REPAIR SERVICE DEPARTMENT



MODEL GTM 1109A white - turquoise

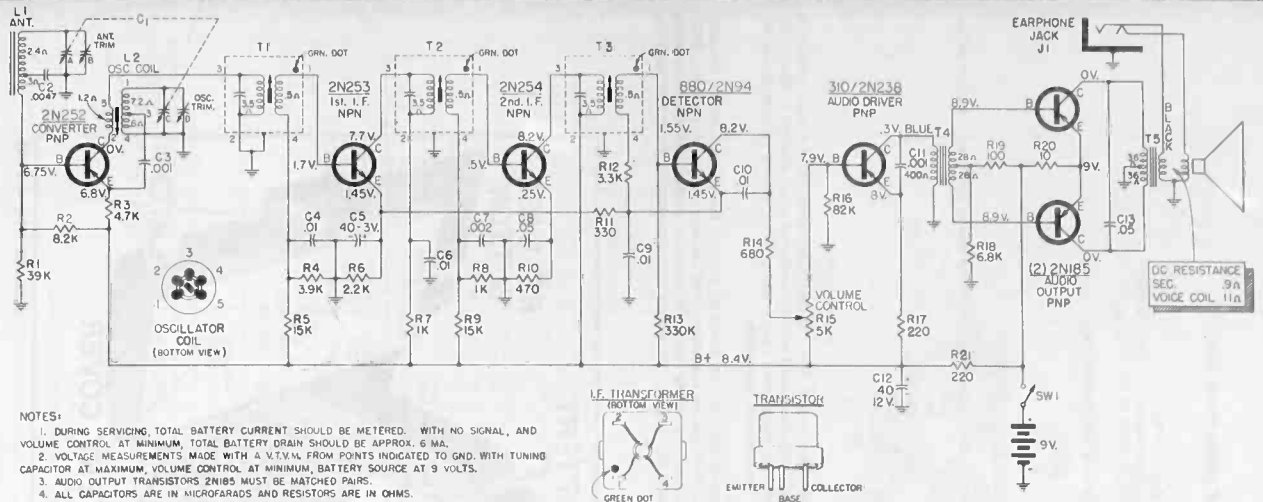
GENERAL DESCRIPTION

This Airline transistor radio is a seven transistor portable broadcast superheterodyne receiver. A jack is provided for private earphone connection. It replaces the loudspeaker when a miniature plug is inserted through the hole in the back of the receiver. This silences the speaker and allows the user to listen under noisy conditions, or situations in which operation of the speaker is undesirable. The receiver is housed in an unbreakable plastic case and the back cover is removed by loosening the coin-slot screw on the back. The receiver employs seven junction type transistors. The converter, audio driver and audio output transistors are of the PNP type, while the IF amplifiers and detector employ NPN type transistors. The converter stage is an autodyne type mixer-oscillator. A tuned, high Q₀ ferrite core coil is used as an antenna. Two stages of IF amplification are used. The gain of the 1st IF amplifier is controlled by an Automatic Gain Control circuit.

A transistor functions as a power detector and AGC source. In addition to detecting the IF signal it also provides gain at audio frequencies. The driver stage amplifies the audio signal and transformer couples it to the two audio output transistors. These transistors are operated in push-pull with out-of-phase audio signals fed to the base of each transistor. Each transistor is operated class "B" and the alternate halves of the audio signal are combined in the output transformer and coupled to the 2 1/2" PM speaker.

ELECTRICAL SPECIFICATIONS

Frequency range	.....540 to 1600 KC
Intermediate Frequency	.....455 KC
Sensitivity	.....200uv per meter, 50mw output approx.
Selectivity	......8 KC at 6db bandwidth
Transistor Complement	.....Converter
1 2N252	.....1st IF Amp.
1 2N254	.....2nd IF Amp.
1 880 or 2N94	.....Transistor Detector
1 2N238 or 310	.....Audio Driver
2 2N185 (matched pair)	.....Audio Output
Power Output	......075 watts
Undistorted	......140 watts
Maximum	.....2 1/2" PM Round
Loudspeaker	.....12 ohms
Voice Coil Impedance	.....
Power Supply:	.....
Wards - 62-96	RCA-VS - 300
Eveready - 226	Burgess P6
Average current Drain (no signal)	.....6.5ma.
Approximate Battery Life	.....75 hours



NOTES:
 1. DURING SERVICING, TOTAL BATTERY CURRENT SHOULD BE MEASURED, WITH NO SIGNAL, AND VOLUME CONTROL AT MINIMUM. TOTAL BATTERY DRAIN SHOULD BE APPROX. 6 MA.
 2. VOLTAGE MEASUREMENTS MADE WITH A VTVM FROM POINTS INDICATED TO GND, WITH TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM, BATTERY SOURCE AT 9 VOLTS.
 3. AUDIO OUTPUT TRANSISTORS 2N185 MUST BE MATCHED PAIRS.
 4. ALL CAPACITORS ARE IN MICROFARADS AND RESISTORS ARE IN OHMS.

Figure 1 Schematic Diagram

ALIGNMENT PROCEDURE

- The following is required for aligning:
1. A signal generator capable of covering frequencies of 455 KC and the entire broadcast band with provisions for modulation. The test signal is injected by forming a 4 or 5 turn loop of wire, connecting it across the signal generator output cable and placing near antenna loop L1.
 2. VTVM or output meter connected across voice coil.
 3. A fiber aligning tool that snugly fits the slot in the I.F. transformer cores to prevent chipping of the slot.
 4. Set the volume control to maximum.
 5. Keep the output of the signal generator low enough to

just give an indication on the VTVM or output meter. If the peak is broad or double peaking occurs when rocking the IF slug adjustment, the signal generator output is excessive. Either further decoupling of the generator loop or decreasing the generator output is necessary.

CAUTION: Be sure during RF alignment that the hand, or any objects on the bench, do not come in close contact with the antenna loop, or detuning will occur and alignment will be incorrect.

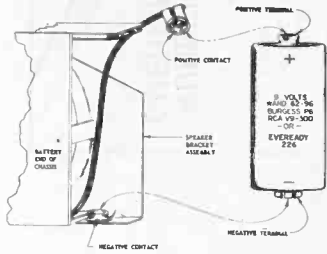


FIGURE 2 BATTERY INSTALLATION

STEP	Frequency Setting	Connect Generator Output to:	Adjust for maximum
(1)	455 KC	loosely couple to L1	Remove speaker bracket assy. Set gang condenser fully open and adjust T3, T2, and T1 in order indicated. Reduce generator output if necessary for T2 and T1 adjustments.
(2)	1625 KC	loosely couple to L1	Replace speaker bracket assy. Adjust oscillator trimmer "D"
(3)	1400 KC	loosely couple to L1	Set gang condenser to 1400 KC and adjust antenna trimmer "B"
(4)	600 KC	loosely couple to L1	Set gang to 600 KC and adjust oscillator trimmer.
(5)	Repeat steps 2 & 3. Check the frequency range, to insure that receiver will receive the full broadcast band.		

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
TRANSFORMERS AND COILS					
L1	310V012H03	Antenna - Iron Core Loop			
L2	230V026H01	Oscillator Coil			
T1	235V014H01	1st I.F. Transformer			
T2	235V014H01	2nd I.F. Transformer			
T3	235V014H02	3rd I.F. Transformer			
T4	430V024H01	Audio Driver Transformer			
T5	430V025H01	Audio Output Transformer			
TRANSISTORS					
	2N252	Transistor - converter			
	297V002H04	Transistor - 1st IF			
	2N254	Transistor - 2nd IF			
	880/2N94	Transistor - detector			
	310/2N238	Transistor - audio driver			
	2N185 (2)	Transistors (Matched Pair - audio output)			
MISCELLANEOUS					
		Bracket - Volume control mounting			
		Bracket - Speaker mounting (includes battery negative terminal, less speaker)			
		Cabinet - (Includes back cover; less dial and escutchion)			
		Connector assembly - Battery positive terminal			
		Dial - calibration			
		Escutchion			
		Jack (J1) - for earphone			
		Knob - dial			
		Knob - On/off volume			
		Screw - dial knob			
		Screw - 8/32" Cabinet back cover			
		Speaker - 2 1/2" PM (magnet weight .53 oz.) Round.			
		Switch on-off (SW1 - part of R15)			
		Case, carrying			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CAPACITORS					
C1A,B,C,D	330V005H01	Variable Gang Condenser			
C2	.0047 mf 500V	Ceramic			
C3	215V300H15	.001 mf 30V Ceramic			
C4	215V300H12	.01 mf 30V Ceramic			
C5	218V012H02	40 mf 3V Electrolytic			
C6	215V300H12	.01 mf 30V Ceramic			
C7	215V102A22	.002 mf 30V Ceramic			
C8	215V303H03	.05 mf 30V Ceramic			
C9	215V300H12	.01 mf 30V Ceramic			
C10	215V300H15	.01 mf 30V Ceramic			
C11	218V012H01	.001 mf 12V Electrolytic			
C12	40 mf 30V	Ceramic			
C13	215V303H03	.05 mf 30V Ceramic			
RESISTORS					
		Ohms			Watts
R1	39K	0.5			10% Carbon
R2	8.2K	0.5			10% Carbon
R3	4.7K	0.5			10% Carbon
R4	3.9K	0.5			10% Carbon
R5	15K	0.5			10% Carbon
R6	2.2K	0.5			10% Carbon
R7	1K	0.5			20% Carbon
R8	1K	0.5			10% Carbon
R9	15K	0.5			10% Carbon
R10	470	0.5			10% Carbon
R11	330	0.5			20% Carbon
R12	3.3K	0.5			10% Carbon
R13	330K	0.5			10% Carbon
R14	680	0.5			20% Carbon
R15	5K	0.5			Volume Control and Switch
R16	82K	0.5			10% Carbon
R17	220	0.5			10% Carbon
R18	6.8K	0.5			10% Carbon
R19	100	0.5			10% Carbon
R20	10	0.5			10% Carbon
R21	220	0.5			20% Carbon

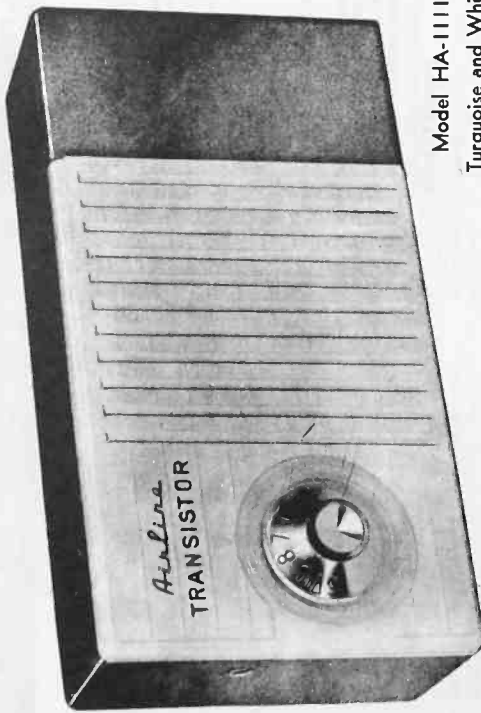
NOTE: USE UNIVERSAL PARTS WHERE PART NUMBERS ARE NOT LISTED. ORDER FROM (LRS).

SUGGESTED SERVICING HINTS

Make all voltage measurements with a VTVM and with tuning capacitor set for maximum capacity and the volume control at minimum. Battery current should be monitored at all times and should be approximately 6 milliamperes. Battery voltage should be at nine volts. The battery should be the first component checked when servicing. A weak battery can cause a decrease in gain and distortion. Check the battery potential with battery in receiver and set turned on. If all other circuit components have been checked and a faulty transistor is suspected, replacement of the transistor is the surest check. It is not advisable to check transistors with an ohmmeter as damage to them can result. Transistors should not be soldered or unsoldered in the circuit when voltage is applied to the circuit. When removing components from the printed board, including transistors, care must be taken to avoid damaging the board. Replacement of an IF transistor usually will have no effect on the overall alignment. In some cases IF alignment may be affected. For proper IF alignment procedure refer to the section on alignment.

MANUAL 580A
Arlene
TRANSISTOR RADIO
MODEL HA-1111A
 SERIAL No. 75X
 Form No. 628-582B*

SERVICE MANUAL
 AND REPAIR PARTS
 FOR REPAIR SERVICE DEPARTMENT



Model HA-1111A
 Turquoise and White

SPECIFICATIONS

- Power Supply 9 volts D.C.
- Frequency Range 540 to 1620 KC
- Intermediate Frequency 455 KC
- Sensitivity . . . Avg. 1500 uv per meter
- Selectivity At 1000 KC, 30 KC at 10 X signal
- Power Output Maximum 50 m.w.
- Undistorted 20 m.w.
- Speaker Round 2 3/4" PM, V.C. impedance-15 ohms magnet weight 0.65 oz. Alnico 5
- Cabinet 6 1/4" width, 1 3/4" depth, 3 3/8" height

TRANSISTOR COMPLEMENT

- 2N252 Oscillator-Mixer
- 2N308 1st IF Amplifier
- 2N238 Audio Amplifier
- 2N185 Audio Output

SERVICE LETTER REMINDER
 Record number of Service Letters below that apply to models listed in this manual.

REMOVING CHASSIS FROM CASE

1. Remove the battery.
2. Remove tuning knob by pulling straight out from the case.
3. Remove the screw located at the end of the case and remove the case cover.
4. Remove the two screws located one each side at the base of the volume on-off control.
5. Carefully remove the chassis from the case allowing the battery cable to slip through the battery compartment hole.

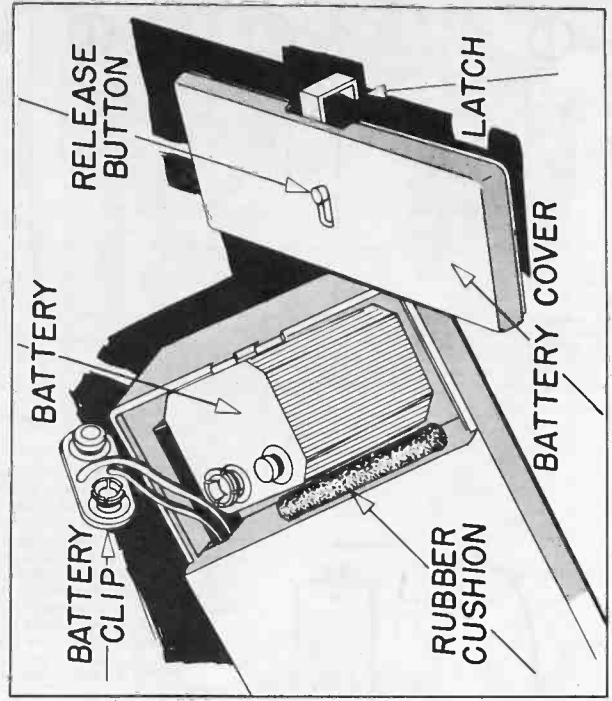
BATTERY REPLACEMENT

Since the receiver is small and compact, not every 9 volt battery will fit in the space provided. Listed below are four available types to be used for replacement.

- WARDS NO-92
- BURGESS NO-2N6
- EVEREADY NO-246
- RCA VS-305

Approximately 100 hours performance can be experienced with the above batteries before replacement is required. Battery replacement should be performed when the sound output is noticed to be muffled or distorted with a decrease in total output or if a voltage measurement shows less than 6 volts. The battery voltage should be measured with the receiver turned on after at least 5 minutes of operation.

When battery replacement is necessary, remove the battery cover by pushing the release button upward, grasp the latch and pull up and away from the case. Remove the old battery and un-snap the battery cable. Snap the battery cable on to the replacement battery and insert it into the case. Be sure the rubber cushion is between the battery and side wall of the case to prevent battery movement. Insert the battery cover in place and push the latch down.



DWG. NO. 092-102765

FIG. 1 BATTERY LOCATION

M O N T G O M E R Y W A R D

TRANSISTOR SERVICING

VOLTAGE READINGS

Because of the low battery potential, it is suggested that a VTVM be used to measure all circuit voltages. Voltage readings will vary with the strength of the signal being received, the battery voltage, and the type voltmeter being used. The voltage readings indicated on the schematic diagram were measured with a VTVM, no signal input, and with a battery voltage of 9 volts. Voltage readings will also vary with a change of transistors. The transistors conductivity varies from one transistor to another; therefore, voltage readings will differ. All voltage readings will be positive with respect to the negative terminal.

BATTERY REPLACEMENT

The battery should be the first component checked when the radio is presented for service, since the battery voltage decreases with use and age. The battery voltage should be checked at the battery cable connections with the receiver turned on, and after at least five minutes of operation. Batteries have a tendency to reactivate (recharge) when not in use, and a true test of the battery's capabilities can not be determined until sufficient current has been drawn from the battery. If the battery is found to be dead, the receiver should be checked for a short circuit before the replacement battery is installed. Disconnect the battery and measure resistance with an ohmmeter at the battery cable connections. The ohmmeter will indicate approximately 1700 ohms with positive lead to chassis, approximately 400 ohms with negative lead to chassis and approximately 4000 ohms with all transistors out of the circuit with either meter lead to chassis. Battery replacement should be performed when the sound output is noticed to be muffled or distorted with a decrease in total output.

OHMMETER READINGS

When using an ohmmeter to check continuity and resistance readings, caution must be observed. It is important to know the internal battery voltage of the ohmmeter as damage could result due to excessive voltage being applied to the ohmmeter. It is also important to know the battery polarity of the meter leads. Incorrectly placing the ohmmeter leads across a lytic capacitor with a low working voltage may damage the capacitor due to excessive reverse current. If the meter battery voltage is greater than 12 volts, the high frequency transistor rating will be exceeded and may be damaged. A diode action will be experienced when attempting to check the resistance readings with the transistors in the circuit. It is advisable to remove all transistors from their sockets before making ohmmeter checks.

SOLDERING

Caution must be observed when using a soldering iron as excessive heat may easily damage a transistor. If a component is replaced which must be soldered to the transistor socket, remove the transistor. When attempting any soldering, a low wattage small diameter tip iron is suggested. Heat may also damage other components, therefore, dissipate the heat by grasping the component lead with a long nose pliers.

TRANSISTORS

If a transistor is suspected of being defective, substitution will be the only reliable check. Checking resistance readings of a transistor with an ohmmeter will indicate only a shorted or open transistor. When inserting a transistor in its socket, make sure the transistor's leads line up with the socket holes. Illustrations on the schematic diagram show the spacing between transistor leads and the transistor sockets. If a transistor substitution is made in the RF or IF circuit, realignment may be necessary. This is due to the difference in operating characteristics from one transistor to another.

COMPONENT REPLACEMENT

An important consideration is component replacement. Miniature as well as close tolerance components are used throughout the radio; therefore, all components must be replaced with exact duplicate parts.

TROUBLE SHOOTING

Trouble in a transistor radio can easily be isolated by using a signal generator and listening to the speaker. Circuit tracing from the base of the output stage back through the receiver to the antenna, should quickly reveal which stage is not functioning properly. When injecting the signal, use a 50 mfd lytic, negative to base, in the audio circuit; a .5 mfd capacitor in the IF or RF stages and inductive coupling to the antenna.

Caution must be observed not to accidentally short the collector circuit to the chassis, as damage to the transistor may result. Also, the practice of deliberately shorting a circuit to chassis to determine if voltage is present or to listen for a click in the speaker, must be avoided for the same reason.

ALIGNMENT PROCEDURE

- NOTES:
1. Remove chassis from case.
 2. Connect 9 volt battery.
 3. Use output meter with 15 ohms impedance.
 4. Turn volume control to maximum.
 5. Signal generator output at 100 microvolts, 30% modulation at 400 cycles.

CIRCUIT	SIGNAL GENERATOR		GROUND SIDE	OUTPUT METER	GANGED CAPACITY	ADJUST FOR MAXIMUM OUTPUT ON METER
	FREQUENCY	COUPLING CAPACITY					CIRCUIT CONNECTION
I. F.	455KC	.5MFD	To Base of Q1	Connect in place of speaker	-----	T3, T4
Repeat above step two or three times for best results keeping generator output in all cases as low as possible to prevent overloading of audio.						
Osc.	1620KC	.5MFD	To Base of Q1	Connect in place of speaker	Open Gang (Fully clockwise)	C12A
Caution: Too high an output from signal generator may cause setting of trimmer on a spurious response.						
Osc.	535KC	.5MFD	To Base of Q1	Connect in place of speaker	Closed Gang (Fully counter-clockwise)	T2
Osc.	1620KC	.5MFD	To Base of Q1	Connect in place of speaker	Open Gang (Fully clockwise)	C12A
Ant.	1400KC	Connect 3 turn loop to generator and place near T1.		Connect in place of speaker	Ganged Condenser should be rocked	C1A

Check for alignment and dial calibration at 1000KC and 600KC.

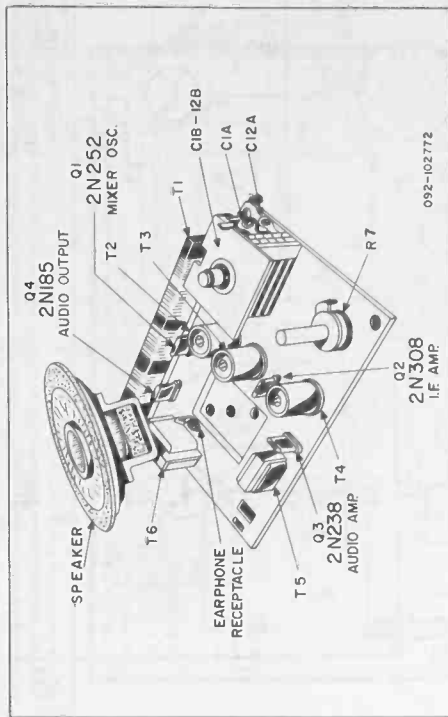
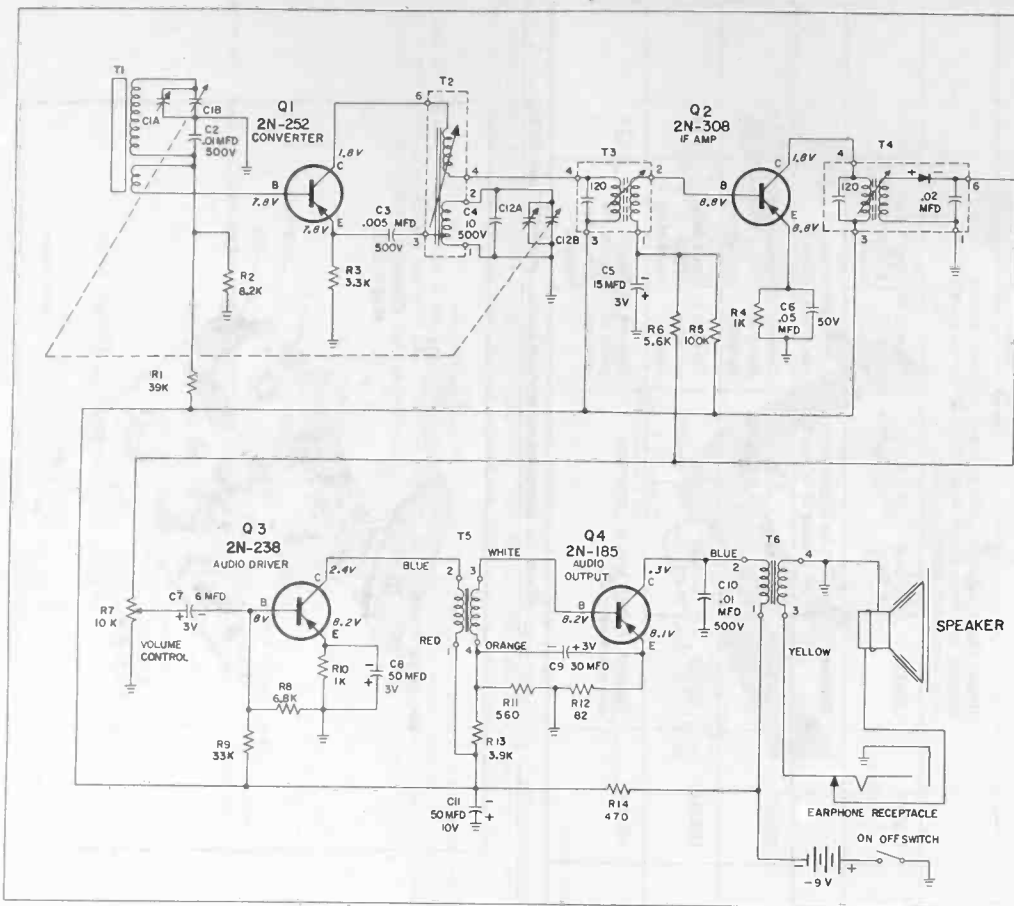
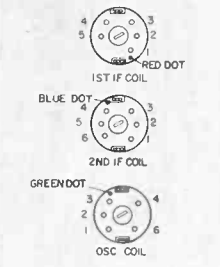


FIG. 2 CHASSIS VIEW



NOTES
 RESISTOR VALUES ARE IN OHMS, 1/2 WATT 10% TOLERANCE, UNLESS OTHERWISE SHOWN.
 CAPACITOR VALUES ARE IN MICRO-MICROFARADS UNLESS OTHERWISE SHOWN.
 DC VOLTAGE READINGS TAKEN WITH VTVM, NO SIGNAL IN INPUT AND BATTERY VOLTAGE -9V DC, VOLTAGES WILL VARY WITH TRANSISTOR CHANGES. ALL VOLTAGES ARE POSITIVE WITH RESPECT TO THE NEGATIVE TERMINAL OF BATTERY.



TYPE 2N-185, 2N-238, 2N-252, 2N-308
 EMITTER
 BASE
 COLLECTOR
 TRANSISTOR SOCKET (BOTTOM VIEW)

DWG. NO 089-400935-B

SCHEMATIC DIAGRAM MODEL HA 1111A

PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
T1	257-300002	TRANSFORMERS	R8		RESISTORS (CONT)
T2	251-200007	Antenna Rod Assembly	R9		6,800 ohm
T3	250-200002	Oscillator Coil	R11		33,000 ohm
T4	250-200003	Transformer, I. F.	R12		560 ohm
T5	255-300009	Transformer, Diode	R13		82 ohm
T6	255-300010	Transformer, Audio Input Output	R14		3,900 ohm
CIAB, 12AB, C2, 10	248-300001	CAPACITORS			470 ohm
C3		Variable (Gang)			MISCELLANEOUS
C4		01 mfd 20% 500V.	206-300007		Socket, Sub-Min. (3 Prong)
C5		Cer. Disc.	036-200085		Receptacle, Earphone
C6		.005 mfd. 20% 500V.	285-200006		Speaker 2-3/4" P. M.
C7		Cer. Disc.	287-200007		Battery Cable Ass'y.
C8		10 mmf 10% 500V.	329-400001		Printed Circuit Board
C9		Cer. Tub.	276-200018		Clip, Antenna Mounting
C11		15 mfd +100-20% 3V., lytic			CABINET PARTS
		.05 mfd +80-20% 50V., lytic	316-400004		Portable Case (Tourquoise)
		6 mfd +100-20% 3V., lytic	215-300059		Knob, Indicator
		50 mfd. +100-20% 3V., lytic	215-200058		Knob, (Vol. ON-OFF)
		30 mfd. +100-20% 3V., lytic	241-940016		Battery Cover Heat Seal Assembly
		50 mfd. +100-20% 10V., lytic	316-300005		Case, Cover (White)
		RESISTORS (All resistors 10% 1/2W composition unless otherwise specified.)	216-100004		Sponge Rubber Filler (1" x 5/8 Dia.)
R1		39,000 ohm	216-100003		Sponge Rubber Filler (2" x 3/8 Dia.)
R2		8,200 ohm	116-100066		Battery Cover (White)
R3		3,300 ohm	241-940017		Clip & Stud Staking Assembly
R4, 10		1,000 ohm			*TRANSISTORS
R5		100,000 ohm	312-300002		Converter (2N252)
R6		5,600 ohm	312-300003		I. F. Amplifier (2N308)
R7	225-200011	Volume Control and switch, 10,000 ohms	312-300004		Audio Driver (2N238)
			312-300005		Audio Output (2N185)

Use Universal Parts where part numbers are not shown. Order from (LRS).

SERVICE MANUAL

AND REPAIR PARTS
FOR REPAIR SERVICE DEPARTMENT

MANUAL 582A

Airline

TRANSISTOR RADIO
MODEL

GEN-1106A

SERIAL NO. 75X

FORM NO. 622-5838



MODEL GEN-1106A TAN

ELECTRICAL SPECIFICATIONS

FREQUENCY RANGE.....540 to 1600 KC
INTERMEDIATE FREQUENCY.....455 KC

TRANSISTOR AND DIODE COMPLEMENT

1 2N140..... Converter
 1 2N139..... 1st IF Amp.
 1 2N139..... 2nd IF Amp.
 1 1N295..... Diode Detector
 1 2N109..... Audio Driver
 2 2N109 (Matched Pair)..... Audio Output

POWER OUTPUT
 Undistorted..... .08 Watts
 Maximum..... .12 Watts

LOUDSPEAKER..... 2 3/4" PM
VOICE COIL IMPEDANCE..... 16 Ohms at 400 Cycles

POWER SUPPLY—USE ONE OF THE FOLLOWING BATTERIES:

Wards—62-96
 Eveready—226
 RCA-V5—300
 Burgess P6

SENSITIVITY—500 microvolts per meter for .025 watt output.

AUDIO OUTPUT
 .010 Watts
 .025 Watts
 .050 Watts
 .100 Watts
 .135 Watts

CURRENT DRAIN
 6.6 Milliamperes
 16.0 Milliamperes
 20.0 Milliamperes
 26.0 Milliamperes
 29.0 Milliamperes

SERVICE LETTER REMINDER

Record numbers of Service Letters below that apply to models listed in this manual.

ALIGNMENT PROCEDURE

The following is required for aligning:

1. A signal generator capable of covering frequencies of 455 KC and the entire broadcast band with provisions for modulation. The test signal is injected by forming a 4 or 5 turn loop of wire, connecting it across the signal generator output cable and placing near antenna loop T1.

2. VTVM or output meter connected across voice coil.

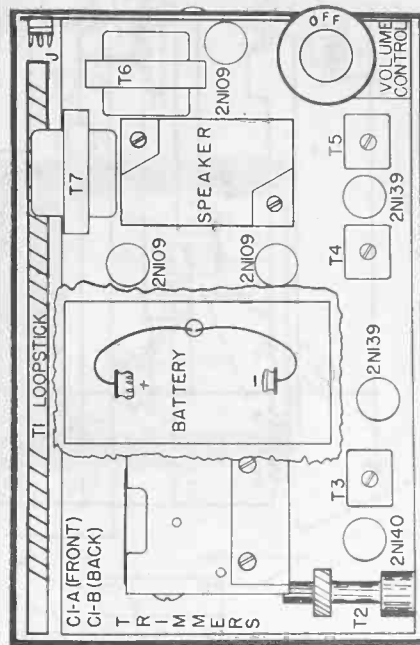
3. A fiber aligning tool that snugly fits the slot in the I.F. transformer cores to prevent chipping of the slot.

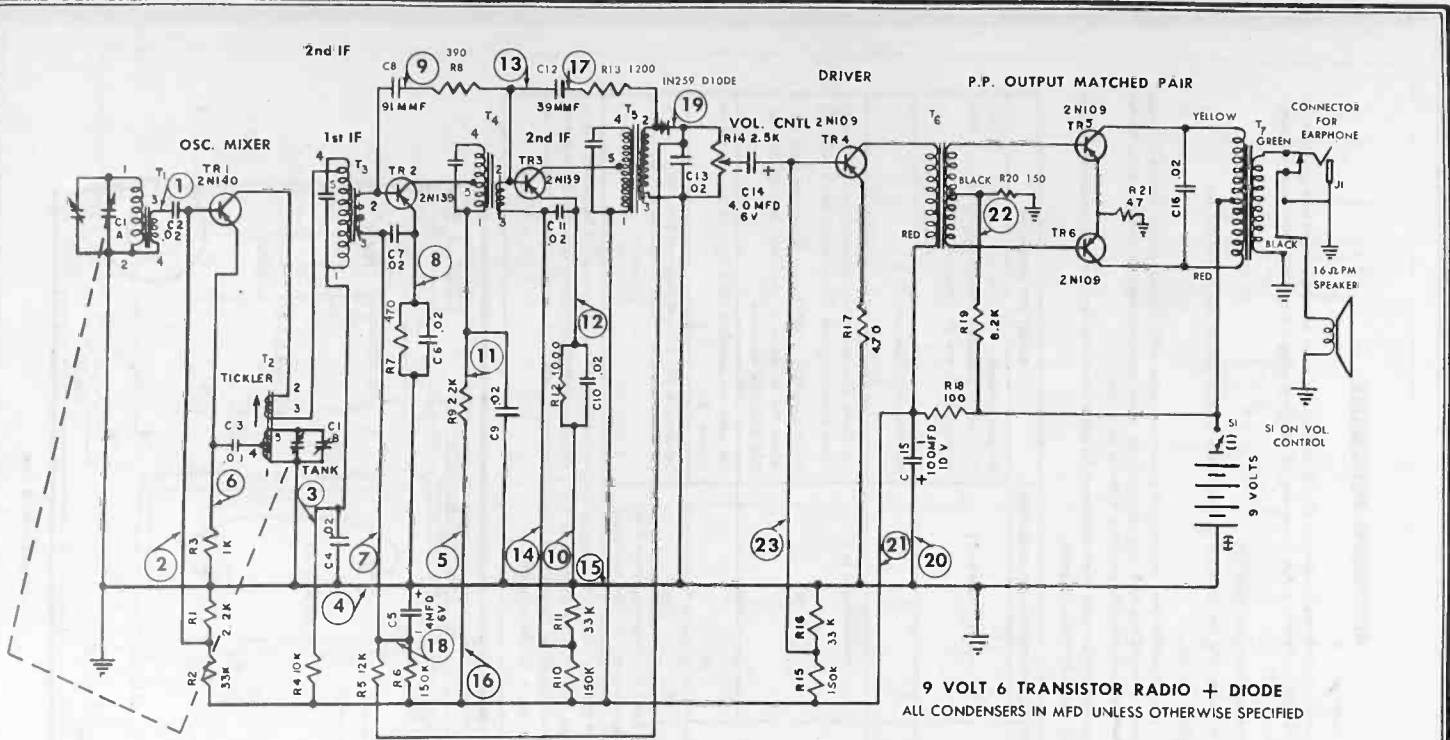
4. Set the volume control to maximum.

5. Keep the output of the signal generator low enough to just give an indication on the VTVM or output meter. If the peak is broad or double peaking occurs when rocking the IF slug adjustment, the signal generator output is excessive. Either further decoupling of the generator loop or decreasing the generator output is necessary.

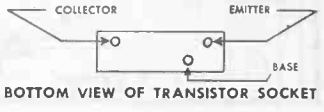
Caution—Be sure during IF alignment that the hand or any objects on the bench do not come in close contact with the antenna loop or detuning will occur and alignment will be incorrect.

STEP	FREQUENCY SETTING	CONNECT GENERATOR OUTPUT TO:	ADJUST FOR MAXIMUM
(1)	455 KC	loosely couple to T1	Set gang condenser fully open and adjust T5, T4 and T3 in order indicated. Reduce generator output if necessary for T5 and T4 adjustments.
(2)	1640 KC		Adjust oscillator trimmer "C1-B."
(3)	535 KC	loosely couple to T1	Set Gang Condenser fully closed. Adjust T2 Slug to locate generator signal. The low end should be 535 KC. If off more than 5 KC, it may be adjusting the slug within the oscillator. If oscillator slug is adjusted, step 2 must be repeated.
(4)	1400 KC		Set gang condenser to 1400 KC and adjust antenna trimmer "B."
(5)	600 KC		Set gang to 600 KC and adjust oscillator slug.
(6)	Repeat steps 2 & 3.	Check the frequency range to insure that receiver will receive the full broadcast band.	
(7)			Tracking is checked at 600 and 1000 KC by bringing into close proximity of the loop a piece of ferrite rod, then a piece of brass. In either case, the output meter should show a decrease. An increase in output meter reading indicates a mistrack condition, which may be corrected by adjusting the turns of wire on the antenna rod. If adjustment on antenna rod is made, step 4 must be repeated.





9 VOLT 6 TRANSISTOR RADIO + DIODE
ALL CONDENSERS IN MFD UNLESS OTHERWISE SPECIFIED



RESISTANCE MEASUREMENTS

T1 LOOP	1-2	.1Ω	T4 I.F.	PRI	.7Ω
	3-4	.1Ω		SEC	.6Ω
T2 OSC	1-4	.4Ω	T5 I.F.	PRI	1.4Ω
	1-5	4Ω		SEC	.8Ω
	2-3	.7Ω	T6 DRIVER	PRI	50.0Ω
				SEC	80ΩCT
T3 I.F.	PRI	.7Ω		PRI	35ΩCT
	SEC	.6Ω	T7 OUTPUT	SEC	1Ω

MODEL GEN-1106A

TERM #	RESISTANCE	VOLTAGE
1	0	0
2	2K	.52
3	17K	1.9
4	0	0
5	6K	8.5
6	1K	.65
7	14K	.5
8	47Ω	.4
9	26K	7
10	0	0
11	8K	7.0
12	1K	.6

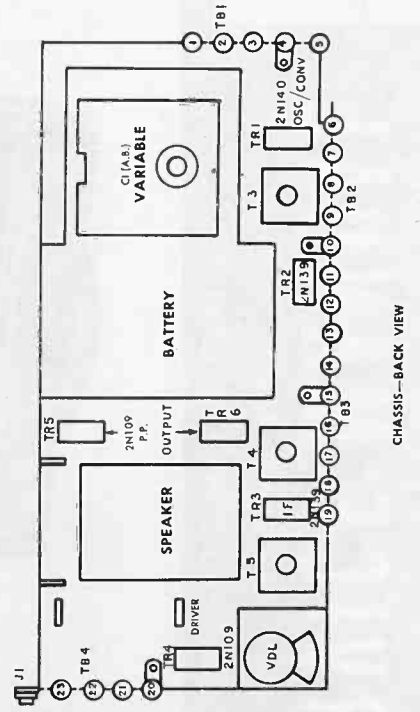
TERM #	RESISTANCE	VOLTAGE
13	29K	7
14	29K	7
15	0	0
16	6K	8.5
17	12K	0
18	14K	.55
19	1	0
20	0	0
21	5K	8.5
22	15Ω	.15
23	20K	.85

VOLTAGE READING TAKEN WITH 9.0 VOLTS IN RCA 5.R.V.T.V.M.

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
TRANSFORMERS AND COILS		
T1	E6019	Antenna Loop (Ferrite Core)
T2	E6128	Oscillator Coil (with C-3, .01 mfd. Condenser)
T3	E6215	1st. I.F. Transformer
T4	E6216	2nd. I.F. Transformer
T5	E6217	3rd. I.F. Transformer
T6	E1116	Interstage Audio Transformer
T7	E1115	Output Transformer
MISCELLANEOUS		
J1	E1019	Speaker, P.M., 2 3/4"
	E636	Phone Jack
	E4924	Hex Nut for Phone Jack
	E189	Battery Clip, Female
	E1810	Battery Clip, Male
	E5053	Knob, Tuning
	E5054	Knob, Volume
	E7032	Cabinet with Handle
	E7613	Insulator, Battery
	E7614	Shield, Fishpaper
	E2628	Transistor Sockets, 3 pin.
	E4317	Socket Retaining Ring
	E4316	Loop Retainer Clip
RESISTORS		
R1,R9		2.2 K Ohms 1/2 Watt
R2,R11,R16		33 K Ohms 1/2 Watt
R3,R12		1 K Ohms 1/2 Watt
R4		10 K Ohms 1/2 Watt
R5		12 K Ohms 1/2 Watt
R6,R10,R15		150 K Ohms 1/2 Watt
R7,R17		470 Ohms 1/2 Watt
R8		390 Ohms 1/2 Watt
R13		1200 Ohms 1/2 Watt
R14,SW1	E2520	2.5 K Ohm Volume Control w/SPST Switch
R18		100 Ohms 1/2 Watt
R19		8.2 K Ohms 1/2 Watt
CONDENSERS		
C1A,C1B	E3520	Tuning Gang
C2,C4,C6		.02 mfd. GMV Discap
C7,C9,C10		.01 mfd. Condenser
C11,C13,C16		See Ref. No. T2 - Part No. E6128
C3		No. E6128
C5,C14		4 mfd. 6 Volts
C8		E3331 91 mmf. 5% Discap
C12		E3332 39 mmf. 5% Discap
C15		E3215 100 mfd. 10 Volts

NOTE: USE UNIVERSAL PARTS WHERE PART NUMBERS ARE NOT SHOWN. ORDER FROM (LRS).



SERVICE MANUAL

AND REPAIR PARTS
FOR REPAIR SERVICE DEPARTMENT

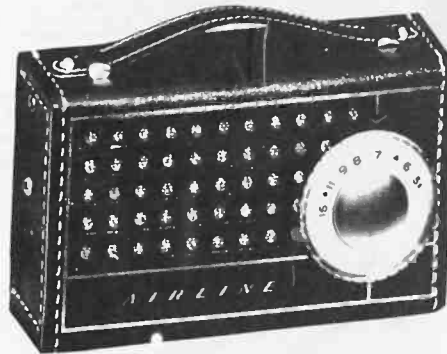
MANUAL 582B

Airline

TRANSISTOR RADIO
MODEL

GEN-1112A

FORM NO. 62Z-5182S*



MODEL GEN-1112A TAN TEXON

Service information on Model GEN-1112A is identical to that of Model GEN-1106A (covered in Service Manual 582A) with the exception of the transistors and cabinet. These parts are listed below.

The cabinet part number is E7032—Texon Cabinet.

The following transistors are being used in Model GEN-1112A: 2N405, 2N407, 2N109, and 2N411.

M O N T G O M E R Y W A R D



SERVICE MANUAL



Faint, illegible text block located below the central image, possibly containing technical specifications or a description.





UPERSEDES 8X26 SERIES PRELIMINARY SERVICE MANUAL PART NO. 68P643065

GENERAL INFORMATION

TYPE - Pocket portable superheterodyne radio using a plated panel chassis, eight transistors, and two diodes. An earphone jack is provided on bottom of radio; insertion of earphone automatically disconnects speaker for private listening. A 2000 ohm accessory earphone (Motorola Part No. 50K640710 or 50K641488) is available through Motorola Dealers or Distributors.

TUNING RANGE - 535 to 1620 Kc **IF** - 455 Kc
POWER SUPPLY - Operates from four 1-1/2 volt batteries; use four of the following or equivalent:

Standard Flashlight Types - Eveready 1015, Ray-O-Vac 7LP or 7R, Burgess 930

Mercury Type - Mallory ZM-9
 Battery Drain - 18 ma (max) - With no input signal.

HOME RADIO
MODELS CHASSIS
 8X26E HS-679
 8X26S HS-679

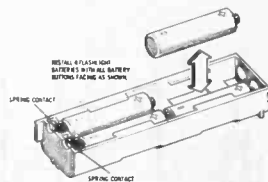
POWER-10 SERIES



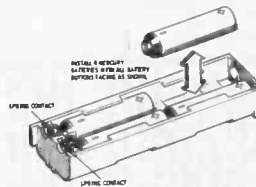
8X26 SERIES

TRANSISTOR COMPLEMENT -

Ref. No.	Type	Function
V-1	2N544	RF amp
V-2	2N411	Converter
V-3	2N409	1st IF amp
V-4	2N409	2nd IF amp
V-5	4315	AF amp
V-6	4315	Driver
V-7	2N407	Power amp
V-8	2N407	Power amp



FLASHLIGHT BATTERY INSTALLATION



MERCURY BATTERY INSTALLATION

SERVICE NOTES

CIRCUIT DESCRIPTION

1. The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.

2. The metal plating extends through all the holes on the chassis, connecting circuits on the top with those on the bottom.

3. Reference to the chassis photographs, plated panel wiring diagrams, schematic diagram, and to chassis will permit the circuit to be traced easily.

NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This is done in two ways; the chassis as viewed from the top (component side) and the chassis as viewed from the bottom with components as they would appear on opposite side. To further aid servicing, the plated panel bottom locates the emitters of V-1 through V-8 by use of the letter "E" on the panel (see PLATED PANEL WIRING AS VIEWED FROM BOTTOM).

SERVICING PRECAUTIONS

1. When servicing this radio, probing with a screwdriver

(checking for "clicks" from various points) must be avoided, because the transistors are susceptible to damage from this type of check. If the transistor BASE electrode is shorted to ground (either directly or through any other path) the BASE bias will be altered, allowing excessive current to flow through the transistor, causing permanent damage.

2. Do not service the chassis on a metal plate because of the possibility of a short circuit.

3. When making circuit resistance checks, transistor shunting paths may exist, which can, in some cases, cause erroneous readings or possible damage to transistors. Therefore, when checking resistances, it may be necessary to remove one or more transistors from associated circuits.

COMPONENT REPLACEMENT

Refer to "Plated Circuit Chassis Servicing Techniques" Manual (Motorola Part No. 68P636536) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

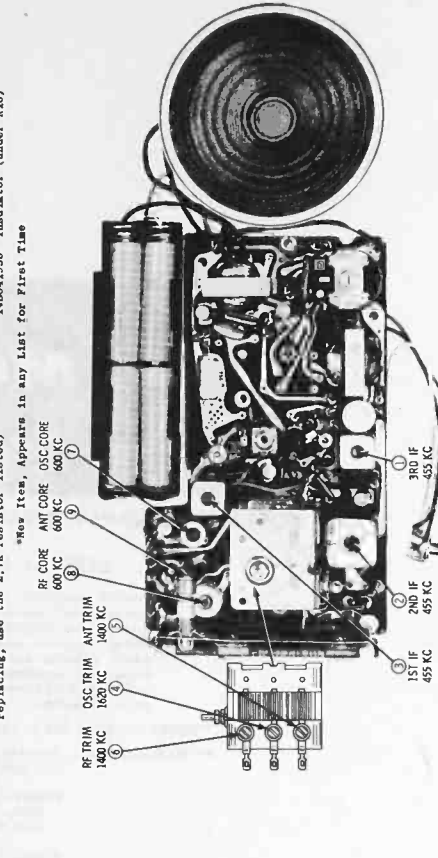
TRANSISTOR CHECK

Substituting a known good transistor for a suspected one is the simplest and most positive method of checking transistors.

REPLACEMENT PARTS LIST

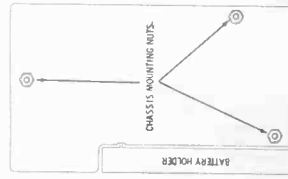
NOTE: When ordering parts, specify model number of set in addition to part number and description of part. Electronic parts or equivalent rating are not necessarily of equivalent standards. The components listed in this Service Manual have been chosen for reliability and applicability to the specific chassis. To insure maximum customer satisfaction and minimize call-backs, use the exact Motorola parts replacement.

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
ELECTRICAL PARTS					
R-29	6R2039	68 10% 1/2W	R-29	6R2039	68 10% 1/2W
R-30	6E124668	10 10% 1/2W	R-30	6E124668	10 10% 1/2W
T-1	24643231	Transformer, 1st IF: 455 Kc	T-1	24643231	Transformer, 1st IF: 455 Kc
T-2	24642333	Transformer, 2nd IF: 455 Kc	T-2	24642333	Transformer, 2nd IF: 455 Kc
T-3	24641236	Transformer, 3rd IF: 455 Kc	T-3	24641236	Transformer, 3rd IF: 455 Kc
T-4	24641236	Transformer, 3rd IF: 455 Kc	T-4	24641236	Transformer, 3rd IF: 455 Kc
T-5	259841395	Transformer, output	T-5	259841395	Transformer, output
V-1	48A124286	Transistor, type 2N4441: PNP (2nd asp)	V-1	48A124286	Transistor, type 2N4441: PNP (2nd asp)
V-2	48A124310	Transistor, type 2N4449: PNP (1st IF asp)	V-2	48A124310	Transistor, type 2N4449: PNP (1st IF asp)
V-3	48A124310	Transistor, type 2N4449: PNP (2nd IF asp)	V-3	48A124310	Transistor, type 2N4449: PNP (2nd IF asp)
V-4	48A124310	Transistor, type 2N4449: PNP (3rd IF asp)	V-4	48A124310	Transistor, type 2N4449: PNP (3rd IF asp)
V-5	48A124310	Transistor, type 2N4449: PNP (AP asp)	V-5	48A124310	Transistor, type 2N4449: PNP (AP asp)
V-6	48A124310	Transistor, type 2N4449: PNP (1st IF asp)	V-6	48A124310	Transistor, type 2N4449: PNP (1st IF asp)
V-7	48A124309	Transistor, type 2N4407: PNP (1st IF asp)	V-7	48A124309	Transistor, type 2N4407: PNP (1st IF asp)
V-8	48A124309	Transistor, type 2N4407: PNP (2nd IF asp)	V-8	48A124309	Transistor, type 2N4407: PNP (2nd IF asp)
MECHANICAL PARTS					
IV642777	Battery Holder Assembly: incl spring		IV642777	Battery Holder Assembly: incl spring	
5A642718	Eyelet (battery contact)		5A642718	Eyelet (battery contact)	
24641729	Nut, retainer (mounts cab back to chassis)		24641729	Nut, retainer (mounts cab back to chassis)	
84643264	Plated Panel board: less all components		84643264	Plated Panel board: less all components	
84643264	Plated Panel board: less all components		84643264	Plated Panel board: less all components	
Note: When ordering, specify part number and letter - if any found on original board, and mention model number in this part list, order by complete part number found on board and mention model number of this set.					
38712549	Screw, machine: 6-32 x 3/8 (Cl set)		38712549	Screw, machine: 6-32 x 3/8 (Cl set)	
9K642734	Socket, 3-pin (V2, V3, V4, V5, V6, V7, V8 etc)		9K642734	Socket, 3-pin (V2, V3, V4, V5, V6, V7, V8 etc)	
9B642737	Socket, 4-pin (V1 etc)		9B642737	Socket, 4-pin (V1 etc)	
414637460	Spring (battery contact)		414637460	Spring (battery contact)	
CABINET PARTS					
IV642791	Cabinet Back: charcoal (8X26)		IV642791	Cabinet Back: charcoal (8X26)	
IV642792	Cabinet Front: charcoal (8X26)		IV642792	Cabinet Front: charcoal (8X26)	
16264286	Cabinet Front: maple sugar (8X26)		16264286	Cabinet Front: maple sugar (8X26)	
55641724	Bandic cabinet		55641724	Bandic cabinet	
36641717	Knob, on-off & vol		36641717	Knob, on-off & vol	
528641719	Knob, pointer		528641719	Knob, pointer	
139635573	Modulation		139635573	Modulation	
24640134	Nut, hex: 6-22 (plated panel mtg)		24640134	Nut, hex: 6-22 (plated panel mtg)	
257005	Screw, cab back mtg		257005	Screw, cab back mtg	
34642077	Screw, cab back mtg		34642077	Screw, cab back mtg	
46641700	Stud, plated panel mtg: long (top of cab)		46641700	Stud, plated panel mtg: long (top of cab)	
46641701	Stud, plated panel mtg: short (bot of cab)		46641701	Stud, plated panel mtg: short (bot of cab)	
41762926	Washer (under pointer knob)		41762926	Washer (under pointer knob)	
LIMITED REPLACEMENT PARTS					
Note: The volume of replacement on the following parts is small, consequently, it is suggested that ordering be done only when necessary.					
14641959	Insulator (under 5)		14641959	Insulator (under 5)	
14641938	Insulator (under 118)		14641938	Insulator (under 118)	



ALIGNMENT POINTS

Point No.	Component	Value
1	RF CORE	ANT CORE
2	OSC TRIM	100 KC
3	ANT TRIM	100 KC
4	OSC TRIM	100 KC
5	OSC TRIM	100 KC
6	OSC TRIM	100 KC
7	OSC TRIM	100 KC
8	OSC TRIM	100 KC
9	OSC TRIM	100 KC
10	OSC TRIM	100 KC
11	OSC TRIM	100 KC
12	OSC TRIM	100 KC
13	OSC TRIM	100 KC



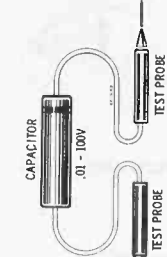
CHASSIS MOUNTING NUT LOCATION

- Unacrew earphone jack mounting nut.
- Remove battery holder and chassis from cabinet by pulling straight out.

TRANSISTOR SERVICING INFORMATION

With a 400 cycle output can be used for this purpose as it has a source of RF and audio signals for checking the respective stages. Signals are injected between the transistor base electrode of each stage and ground until the defective stage is located. Then the defective component is located by resistance measurements. This method will locate defects in stages caused by faults in the signal path in cases where the defect does not show up as a voltage reading difference. To facilitate servicing, a noise generator (see December, 1957 issue of Motorola Service News or Part Number 68P641210 Noise Generator Information sheet) has been devised to replace the signal generator as a signal source. The advantage of its use is the elimination of the need for the RF signal when checking the audio output waveform of each characteristic that the fundamental frequency falls in the audio range, but contains strong harmonics usable in the RF stages.

One of the causes of weak receivers is open by-pass capacitors. To speed the checking of by-passes, a capacitor checker (shown in illustration) can be constructed. When using this aid, parallel the suspected by-pass capacitor. If by-pass is open, the output level will increase. When checking in the audio section, an increase may not occur but the pitch of the sound will change.



BY-PASS CAPACITOR CHECKER

Align alignment

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
1	Ant section of gang thru .1 mf & ground	455 Kc	Fully open	1, 2 & 3	Adjust for maximum.
2	Radiation loop*	1620 Kc	Fully open	4	Adjust for maximum.
3	"	1400 Kc	Tune for max	5 & 6	"
4	"	600 Kc	"	7, 8 & 9	"
5	Repeat steps 2 and 3, RF trimmer adjustment (6) should be the last adjustment.				

*Connect generator output across 5" diameter, 5-turn loop and couple inductively to receiver antenna. Keep radiation loop at least 12" from receiver antenna.

EMITTER RESISTOR VOLTAGES
Voltages across the emitter resistors are provided on the schematic as an additional aid in servicing this receiver. A check of these voltages will indicate whether or not a transistor stage is functioning normally.

CARE OF CABINET

Cabinet may be cleaned by using a soft, dry cloth; do not use any polishes.

PLATED PANEL CHASSIS REMOVAL

- Remove volume, tuning, and pointer knobs to avoid scratching cabinet or earphone, place a piece of string under the knobs and pull straight out.
- Loosen cabinet back mounting screw and remove cabinet back by inserting a coin into the cover opening slot and twisting until cabinet back is free.
- Remove 3 chassis mounting nuts (see CHASSIS MOUNTING NUT LOCATION detail).

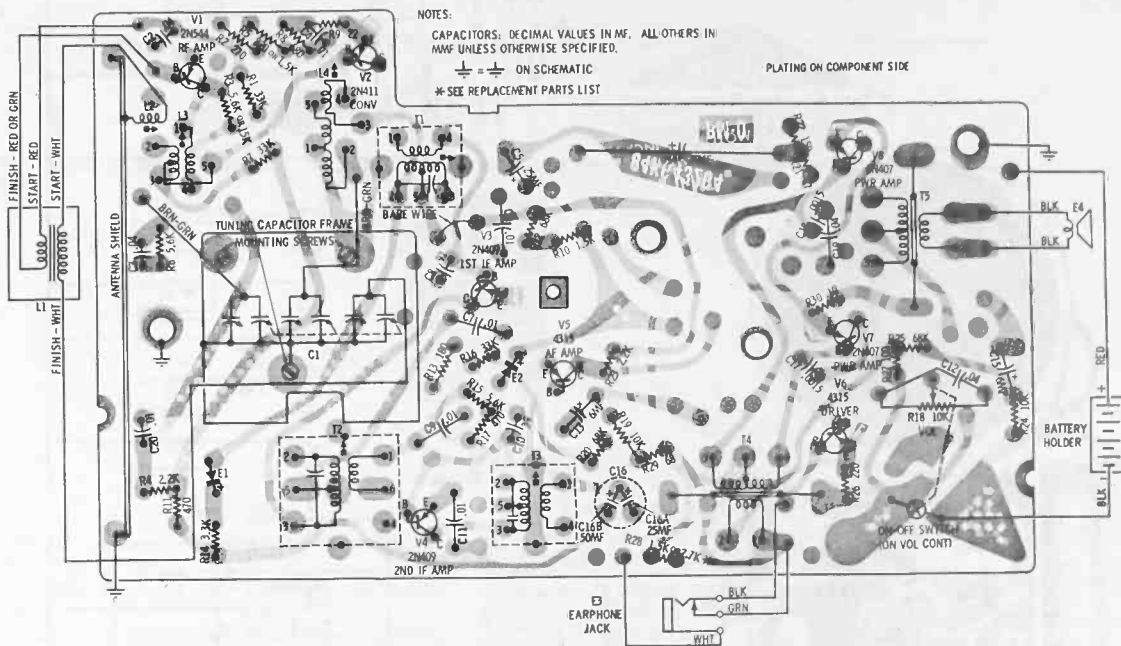
In transistor receiver servicing, it will be found that the cause of failure can usually be divided into two categories; the bias networks and the signal paths. These can be checked with equipment now being used to service tube type receivers. The transistors can be checked by substitution or elimination.

When a receiver is defective, the first step is to locate the defective stage. This is accomplished by checking the emitter resistor voltage drops or by injecting a signal from stage to stage. Measuring the emitter resistor voltage drops will locate defects in the bias network or transistor. Signal injection will locate defects in the signal paths.

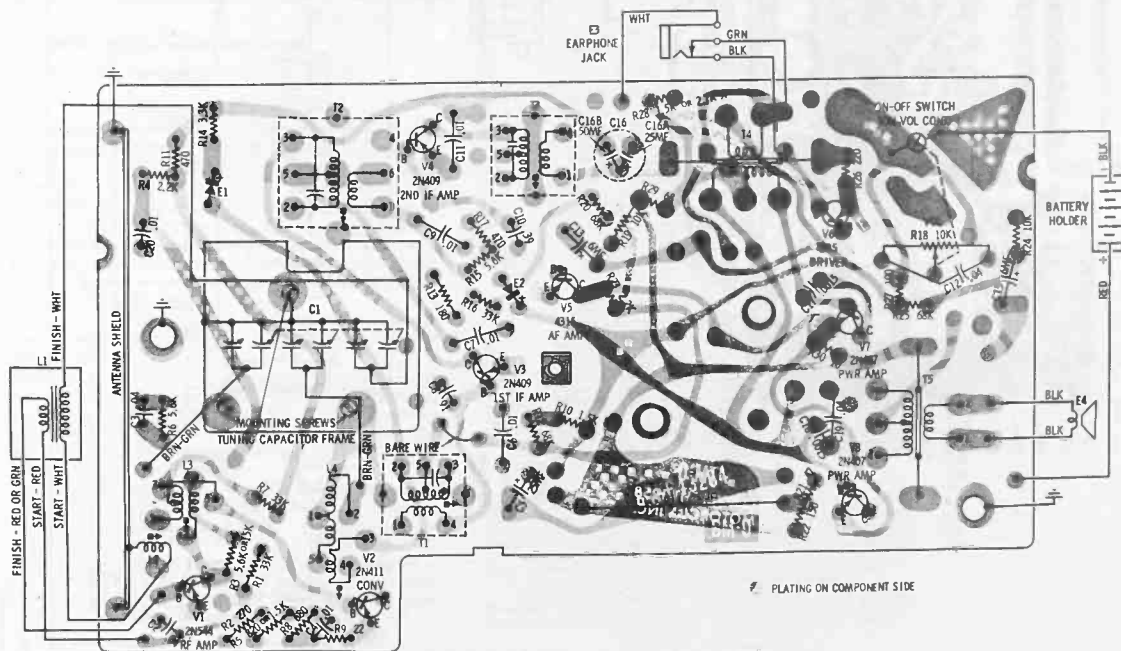
A defective stage can be located by checking the voltage drops across the emitter resistor against those values shown on the schematic. These voltage drops give an indication of the current flowing through the stage when it is properly biased. A defective component in the bias network or a defective transistor will change the bias voltages causing the current to change, which in turn will cause the emitter resistor voltage drops to change. Therefore, a voltage drop that is not in the order of that shown on the schematic will indicate a defective stage. The next step is to determine if the defect is in the bias network or the transistor. The most rapid way of checking this is to substitute a known good transistor in the defective stage. If the emitter resistor voltage drop remains the same, the original transistor is OK and the defect is in the bias network. When a transistor is not available for substitution, make a resistance check on the bias network to make sure the tolerance rating, the bias network can be eliminated as a source of defect and the transistor safely suspected. Bias network defects can be located by resistance checks.

An alternate process of locating a defective stage is by injecting a signal from stage to stage. A signal generator

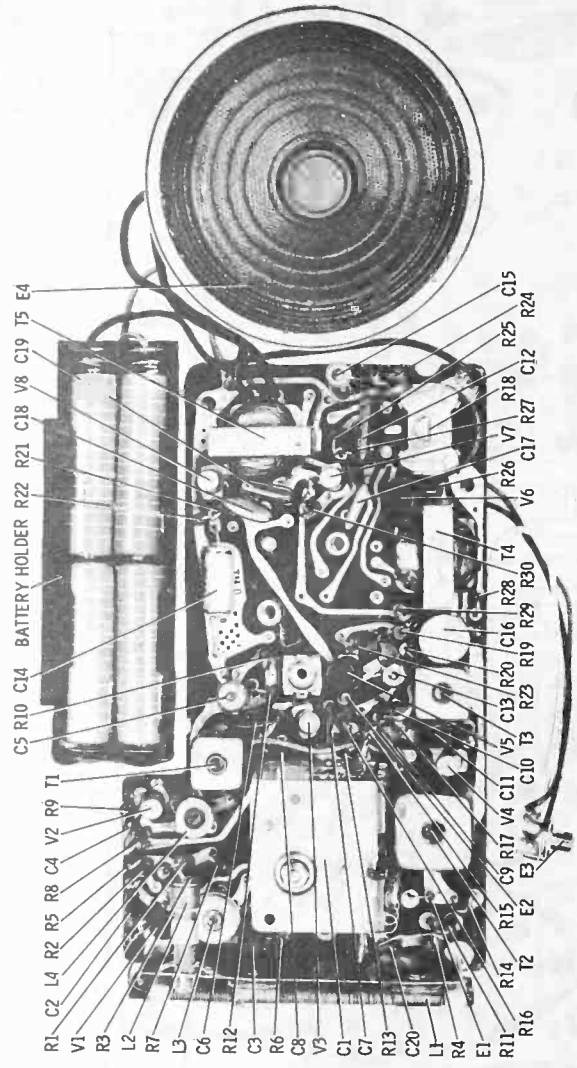
Connect an output meter across the speaker. Set volume to maximum. Attenuate signal generator output to maintain .6 volts on output meter at all times to prevent overloading.



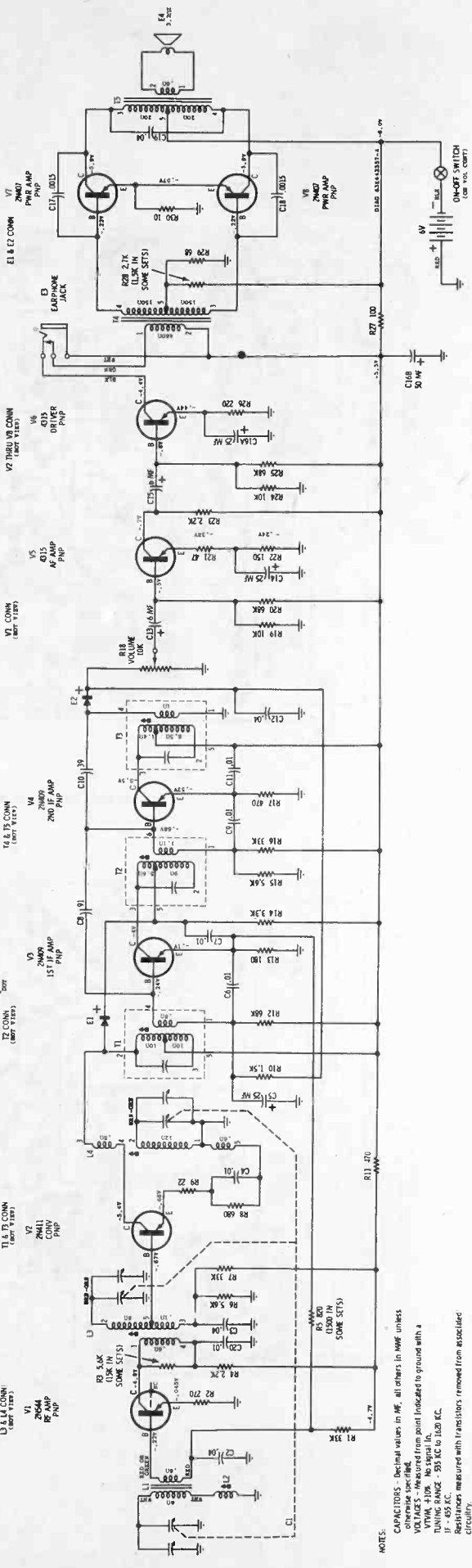
PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



PLATED PANEL WIRING AS VIEWED FROM BOTTOM



PARTS LOCATIONS



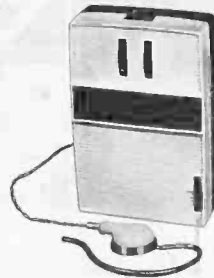
SCHEMATIC DIAGRAM

NOTES:
 CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to ground with a 100K resistor in series with the meter.
 TUNING RANGE - 555 KC to 1620 KC.
 IF - 655 KC.
 Resistances measured with transistors removed from associated circuitry.

John F. Rider

— PHILCO TRANSISTOR RADIO —
SERVICE MANUAL

MODEL T-3 — CODES 132, 134, 136 & 138



MODEL T-3

SPECIFICATIONS

CIRCUIT—Three transistor T.R.F. with reflexed audio and crystal detector.

BATTERY VOLTAGE AND TYPE—2.6 volts from 2 type P-630 mercury cells.

FREQUENCY MINIMUM COVERAGE—550 to 1550 KC.

ANTENNA—Self-contained magnecor, high-impedance loop.

CABINET—Plastic, shirt-pocket type.

EARPHONE—Private listening unit only.

ALIGNMENT PROCEDURE

GENERAL—Allow the test equipment to warm up for fifteen minutes before starting the alignment procedure.

OUTPUT INDICATOR—Connect the output indicator (a V.T.V.M. using the low voltage AC range or a calibrated oscilloscope) across the ear phone terminals.

SIGNAL GENERATOR—Use an AM r-f signal generator. Radiate the signal to the radio antenna. Use a 6 to 8 turn, 6-inch diameter loop made up of insulated wire. Connect to generator terminals and place about one foot from the radio antenna.

OUTPUT LEVEL—During alignment, attenuate the signal-generator output so as to maintain the output level at 0.63 volts.

RADIO CONTROLS—Set the volume control to maximum. Set the antenna tuning knob (the right-hand knob with the dial scale) to 600 KC. Without moving the antenna tuning, adjust the RF tuning knob to the mid-position of its fine-tuning range. **DO NOT DISTURB** the radio tuning once it is set.

Step #1—Set generator to 600 KC. Adjust the core of T1 (the 1st RF transformer) for peak. Rock the generator — NOT the radio tuning — and adjust for maximum.

Step #2—Set generator to 600 KC. Adjust the core of T2 (the 2nd RF transformer) for maximum. This transformer is very broad; there will be only a slight peak. The core may not extend above the top of the can.

REPLACEMENT PARTS LIST

NOTE: Part numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Resistors are 1/2 watt, 10%, carbon unless otherwise noted.

Reference Symbol	Description	Service Part No.
C1	Condenser, antenna tuning, 13-170 uuf. — Part of 78-10539	30-1272-1
C2	Condenser, 1st r-f tuning, 13-170 uuf. — Part of 78-10539	30-1272-2
C3	Condenser, antenna shunt, 4.7 uuf, ceramic	30-1272-3
C4	Condenser, 1st r-f signal return, .01 ufd., disk	30-1272-4
C5	Condenser, neutralization, 22 uuf., ceramic	62-022409011
C6	Condenser, 1st r-f emitter, .01 ufd., disk	30-1272-5
C7	Condenser, 2nd r-f emitter, .47 ufd., disk	30-1274-3
C8	Condenser, diode bypass, .02 ufd., disk	30-1274-3
C9	Condenser, reflex coupling, .47 ufd., disk	30-1274-3
C10	Condenser, audio coupling, 1 ufd., 6VDC, electrolytic	30-2591-5
C11	Condenser, output collector, .005 ufd., disk	30-1272-1
LA1	Antenna coil, magnecor	32-4764-1
R1	Resistor, 1st r-f base return, 33,000 ohms	66-1338340
R2	Resistor, reflex collector, 1800 ohms	66-1288340
R3	Resistor, 2nd r-f bias, 100,000 ohms	66-4108340
R4	Resistor, 2nd r-f bias, 22,000 ohms	66-1338340
R5	Volume control, 5000 ohms	33-5583-4
R6	Resistor, audio base, 1 megohm with transistor T-0038, code 132, 470,000 ohms with transistor T-0039, code 134, with transistor T-0040, code 136, 220,000 ohms with transistor T-0041, code 138, 120,000 ohms	66-5108340 66-4478340 66-4226340 66-4128340
S1	Switch, off-on	Part of R5
T1	Transformer, 1st r-f	32-4763-1
T2	Transformer, 2nd r-f	32-4763-2
T-1305	Transistor, 1st r-f	34-8000-18
T-1306	Transistor, 2nd r-f	34-8000-17
T-0038	Transistor, audio, code 132 only	34-8001-18
T-0039	Transistor, audio, code 134 only	34-8001-19
T-0040	Transistor, audio, code 136 only	34-8001-20
T-0041	Transistor, audio, code 138 only	34-8001-21
XTAL	Crystal diode, 2nd detector, type 1N60A	34-8022-3
	Printed Panel	54-6881

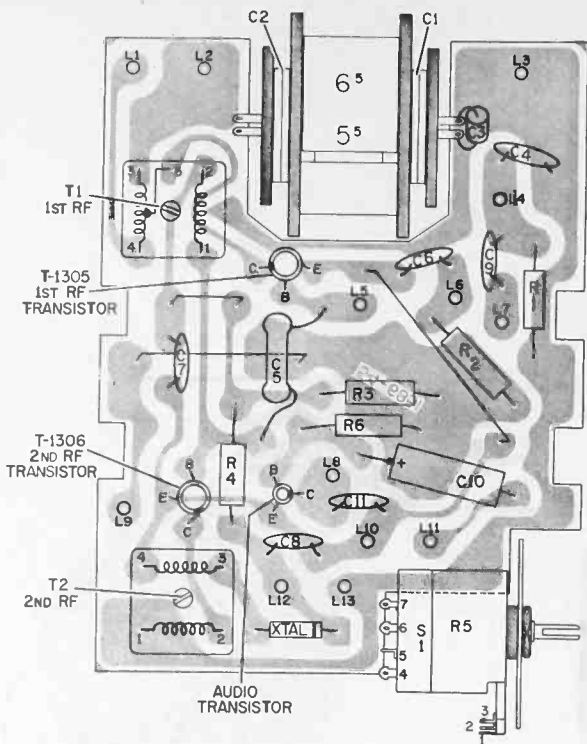
MISCELLANEOUS PARTS

Description	Service Part No.
Cabinet	51-0007
Contact battery	39-12377
Ear phone and cord assy.	328-8007
Cord and plug only	41-4278
Knob, volume	54-6682-1
Knob and capacitor assy., includes C1, C2 and the two tuning knobs in a matched assy.	78-10539
Nameplate	54-5364-1
Spring, battery, 2 used	28-12370

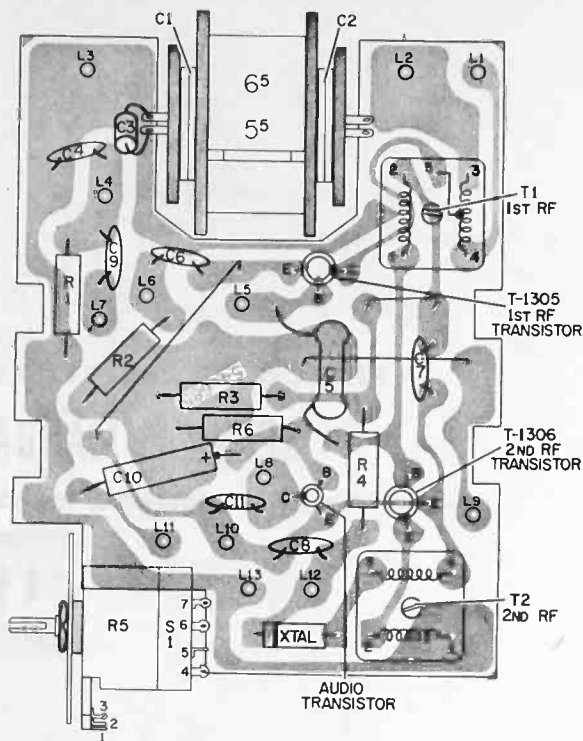
PHILCO TRANSISTOR RADIO MODEL T-3 — CODES 132, 134, 136 & 138

PR-3296

CODES 132, 134, 136, 138



Composite Panel View, Component Side, Showing Parts Placement.



Composite Panel View, Foil Side, Showing Parts Placement.

PANEL-WIRE TERMINAL IDENTIFICATION

- L1 Orange lead from r-f tuning, C2, to T1 lug 4.
- L2 Black lead from r-f tuning, C2, to T1 lug 3 and red jumper in terminal 6.
- L3 Orange lead from ant. tuning, C1, and plain lead from bottom of ant. pri. (LA1) to panel ground.
- L4 Red lead from bottom of ant. sec. (LA1) to junction of R1, C4 and C5.
- L5 Red lead from top of ant. sec. (LA1) to 1st r-f base.
- L6 Red jumper from terminal 2, black jumper to terminal 11 and junction of C6 and R2.
- L7 Yellow lead to arm of volume control (R5).
- L8 Earphone lead to audio collector.
- L9 Black lead from battery, -1.3 volts.
- L10 Red lead from switch S1 lug 7, +1.3 volts.
- L11 Black jumper from terminal 6 to C10, the 1ufd audio coupling.
- L12 Orange lead to top of volume control, R5 lug 1.
- L13 Black lead from switch, S1, lug 6 to panel ground.

AUDIO TRANSISTOR - CODE VARIATIONS

The only differences between the four codes are the audio transistor type and the value of the audio base resistor. These value differences are indicated in the chart above.

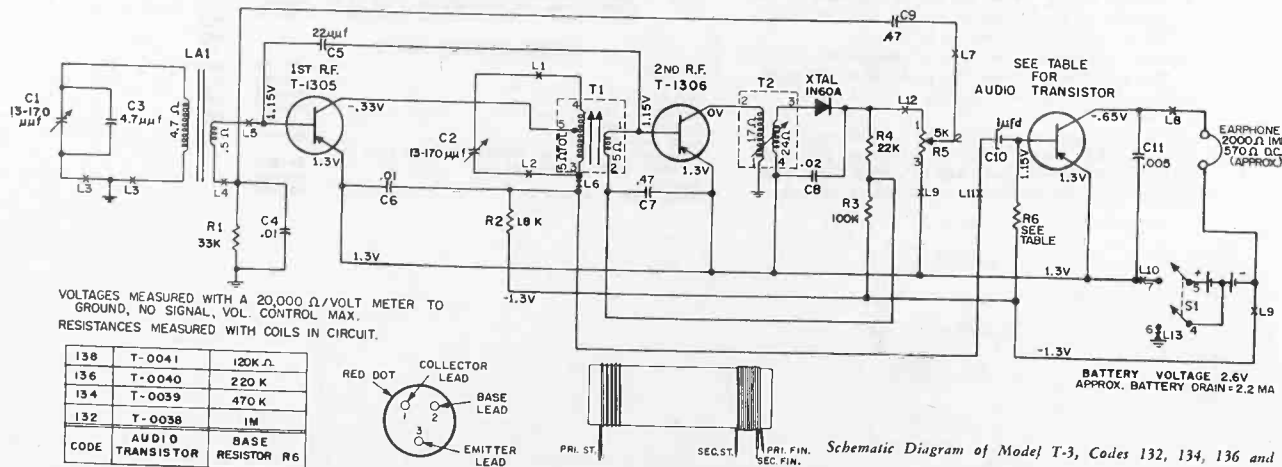
SHIELDING

To suppress possible regeneration, the leads of T1 are shielded by wrapping a small piece of aluminum tape around the can so as to cover the cut-outs. When replacing be careful not to cause shorts.

NOTES

All resistors 1/2 watt, carbon.
All condenser values in ufd unless otherwise stated.
Voltages measured with a V.T.V.M. from point indicated to ground, under "No Signal" condition, with volume control

at minimum and 2.6 volts from the battery supply.
*Audio collector voltage may vary between -0.6 and -1.0 volt depending upon the transistor.
Coil resistances measured with coil in the circuit.



528.53400

MODEL
NUMBER

9222

PARTS LIST
for
Silvertone[®]

TRANSISTOR
PORTABLE RADIO

SILVERTONE RADIO RECEIVER CHASSIS NUMBER 528.53400

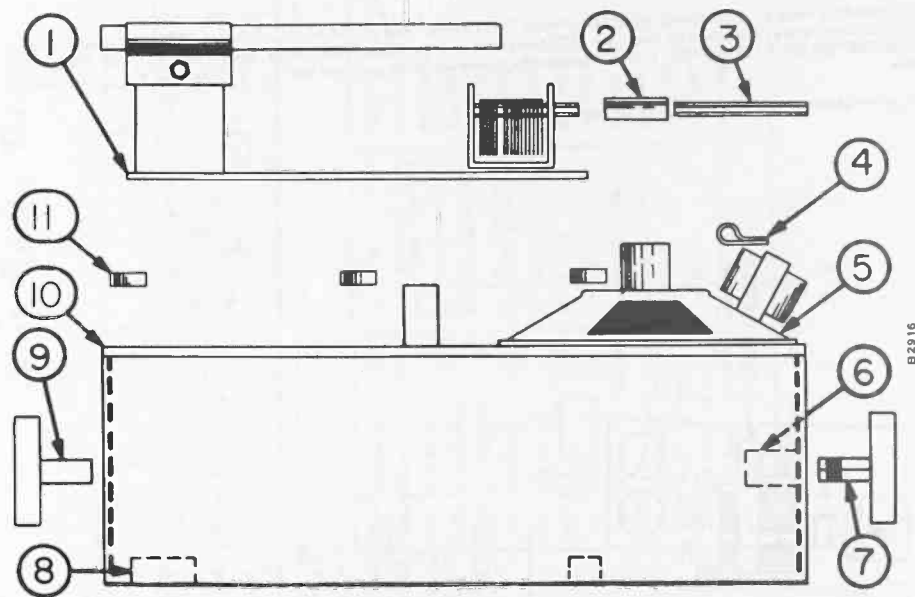


Fig. 1. Exploded View of Cabinet Parts

CABINET PARTS LIST

Key No.	Part No.	Description
1.	*	Chassis, Radio
2.	39-25-0	Coupling, Tuning Shaft
3.	39-153-3	Shaft, Tuning
4.	22-102-3	Retainer, Cable Clamp
5.	33-377-4	Speaker (Inc. T5)
6.	11-1380	Bracket, Shaft Support
7.	52-1117-0	Knob, Tuning
8.	28-175-1	Pad, Rubber (4)
9.	52-1118-0	Knob, Off/On-Volume
10.	42-64-1	Cabinet, Leather
11.	77-29-0	Spacer, Chassis (3)
	33-2660	Book, Instruction

*Not supplied as a Repair Part. See page 3 for complete breakdown of parts.

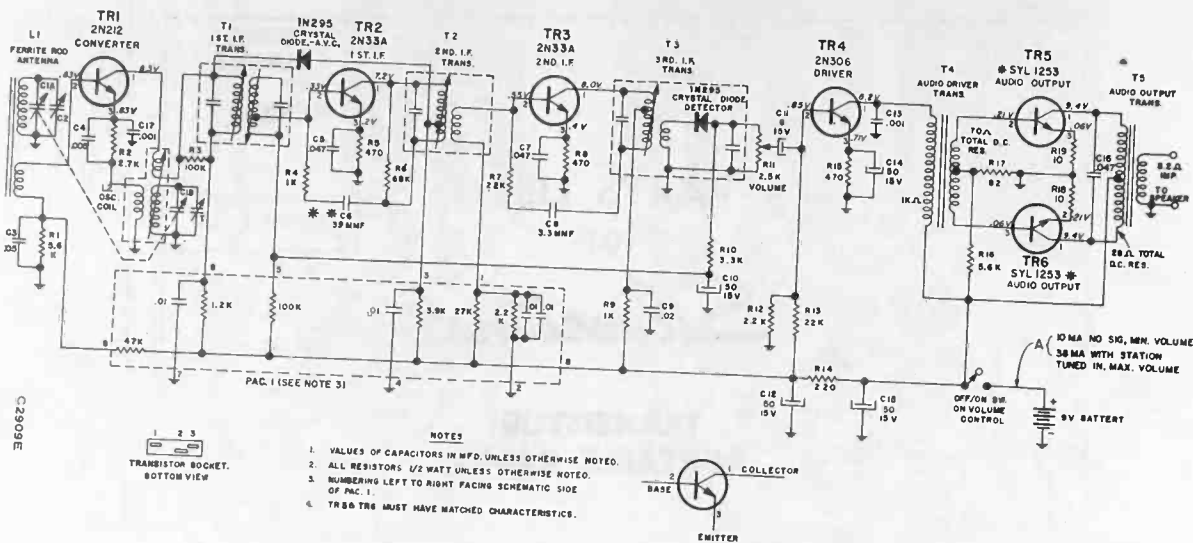
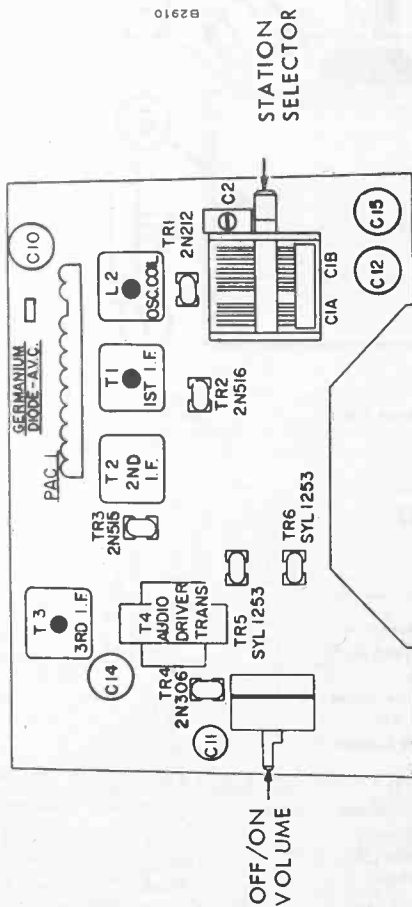


Fig. 3. Schematic Diagram for Silvertone Chassis 528.53400

*Some models have been produced using two Output Transistors, type 2N214 in place of type 1253. When replacing Output Transistors, replace with two type 1253 transistors, or two type 2N214 transistors. DO NOT USE ONE type of EACH TYPE. It is not necessary to replace with matched pairs of a given type but do not mix type.

**On some chassis, the value of C6 is 33 mmfd. (15-330114).

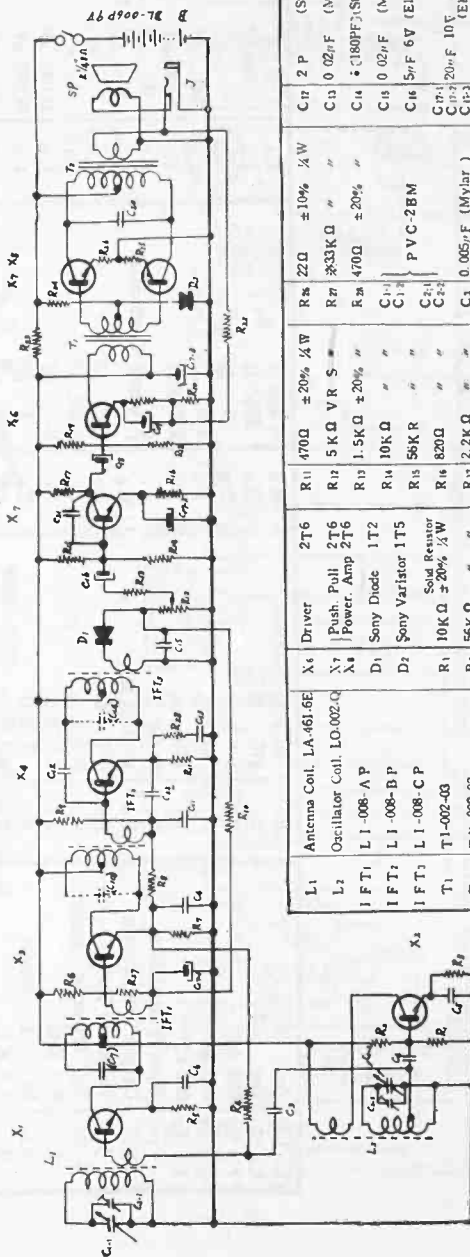
SILVERTONE RADIO RECEIVER CHASSIS NUMBER 528.53400



CHASSIS PARTS LIST

Schematic Location	Part No.	Description
C1, A&B	19-76-2	Variable Tuning (inc. C2)
C2	19-187-0	Trimmer, Antenna (Part of C1)
C3	20-57-1	Tubular, .05 mfd., 12 v.
C4	15-50216	Disc, .005 mfd., 500 v., GP
C5, C7, C16	20-56-1	Tubular, .047 mfd., 200 v.
C6	15-390114	Disc, 39 mmfd., 10%, 500 v., N750
C6	15-330114	33 mmfd. (See note on Page 4)
C8	15-339141	Disc, 3.3 mmfd., ±1 mmfd., 500 v., NPO
C9	15-20316	Disc, .02 mfd., 500 v.
C10, C12, C14, C15	18-61-5	Electrolytic, 50 mfd., 15 v.
C11	18-60-5	Electrolytic, 6 mfd., 15 v.
C13, C17	15-10216	Disc, .001 mfd., 500 v., GP
RESISTORS		
(All resistors 1/2 w., 10% unless otherwise noted)		
R1, R16	60-56201	5-6K ohm
R2	60-27201	2-7K ohm
R3	60-10401	100K ohm
R4, R9	60-10201	1K ohm
R5, R8, R15	60-47101	470 ohm
R6	60-68301	68K ohm
R7, R13	60-22301	22K ohm
R10	60-33201	3-3K ohm
R11	24-331-0	2-5K ohm, Volume-Off/On Switch
R12	60-22201	2-2K ohm
R14	60-22101	220 ohm
R17	60-82001	82 ohm
R18	60-56901	5-6 ohm
PAC1	13-14-5	Pac unit
TRANSFORMERS AND COILS		
T1	10-78-2	Transformer, 1st I.F.
T2	10-79-2	Transformer, 2nd I.F.
T3	10-80-2	Transformer, 3rd I.F.
T4	80-23-1	Transformer, Audio Driver
T5	80-70-1	Transformer, Audio Output (Mounted on Speaker)
L1	82-147-0	Antenna, Ferrite Rod
L2	10-48-4	Coil, Oscillator
MISCELLANEOUS CHASSIS PARTS		
45-15-3		Socket, Transistor (6)
45-16-0		Plug, Battery Connector
11-1402		Bracket, Antenna Mounting
		Battery, 9 Volt (Cat. No. 57-6420)

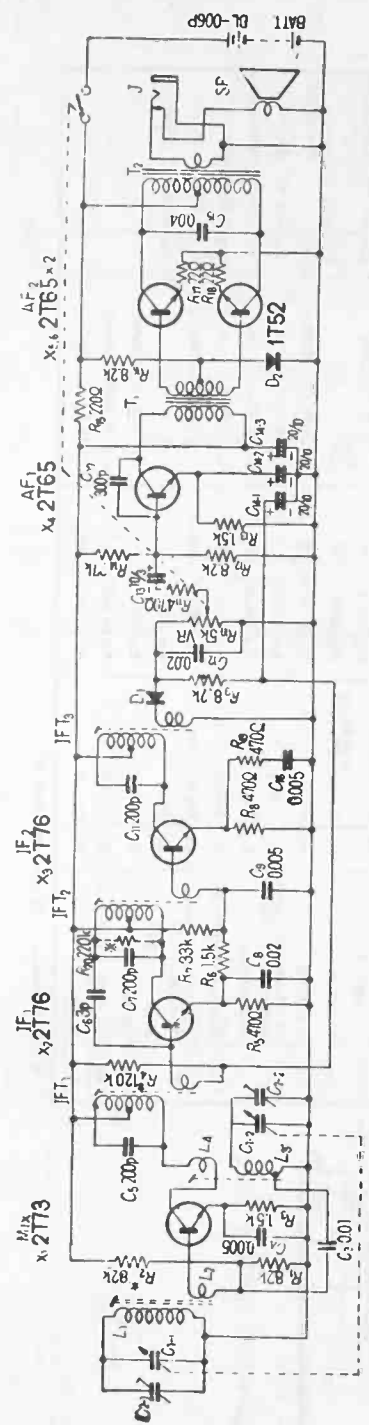
Sony Radio TR-86



L1	Antenna Coil. LA-461/6E	X4	Driver	2T6	R11	470Ω	±20% 1/4W	R22	22Ω	±10% 1/4W	C17	2P	(Styrol.)
L2	Oscillator Coil. LO-002-Q	X7	Push-Pull	2T6	R12	5KΩ	VRS	R21	33KΩ	"	C18	0.02μF	(Mylar)
IFT1	L1-008-A P	X8	Power Amp	2T6	R13	1.5KΩ	±20%	R20	470Ω	±20%	C14	5(180PF)	(Styrol.)
IFT2	L1-008-B P	D1	Sony Diode	1T2	R14	10KΩ	"	C11	P.V.C-2BM		C15	0.02μF	(Mylar)
IFT3	L1-008-C P	D2	Sony Variator	1T5	R15	50KΩ	"	C12	"	"	C16	5μF	6V (Electrolytic)
T1	TX-002-03	R1	Solid Resistor	"	R16	820Ω	"	C13	"	"	C19	20μF	10V (Electrolytic)
T2	TX-002-03	R2	10KΩ	"	R17	2.2KΩ	"	C1	0.005μF	(Mylar)	C18	5μF	6V (Electrolytic)
SP	2K" Permanent Dynamic Speaker. V.C 8Ω	R3	2.2KΩ	"	R18	10KΩ	"	C2	0.01μF	"	C19	30μF	3V (Electrolytic)
J	Earphone Jack.	R4	2.2KΩ	"	R19	56KΩ	"	C3	0.005μF	"	C20	0.05μF	4MP S1
B	Battery. B.L-006 P (9V)	R5	820Ω	±10%	R20	5Ω	±10%	C4	0.01μF	"	C21	0.001μF	(Mylar)
X1	Sony Transistor	R6	82KΩ	±20%	R21	680Ω	±20%	C5	5(180PF)	(Styrol.)	C22	0.02μF	(Mylar)
X2	Vixer. 2T7	R7	470Ω	"	R22	220Ω	"	C6	0.02μF	(Mylar.)			
X3	IF Amp. 2T7	R8	820Ω	"	R23	220Ω	"	C7	5(180PF)	(Styrol.)			
X4	IF Amp. 2T7	K9	22KΩ	"	R24	5.6KΩ	"	C8	0.02μF	(Mylar.)			
X5	AF Amp. 2T6	K10	7.5KΩ	"	R25	22Ω	±10%	C9	5(180PF)	(Styrol.)			

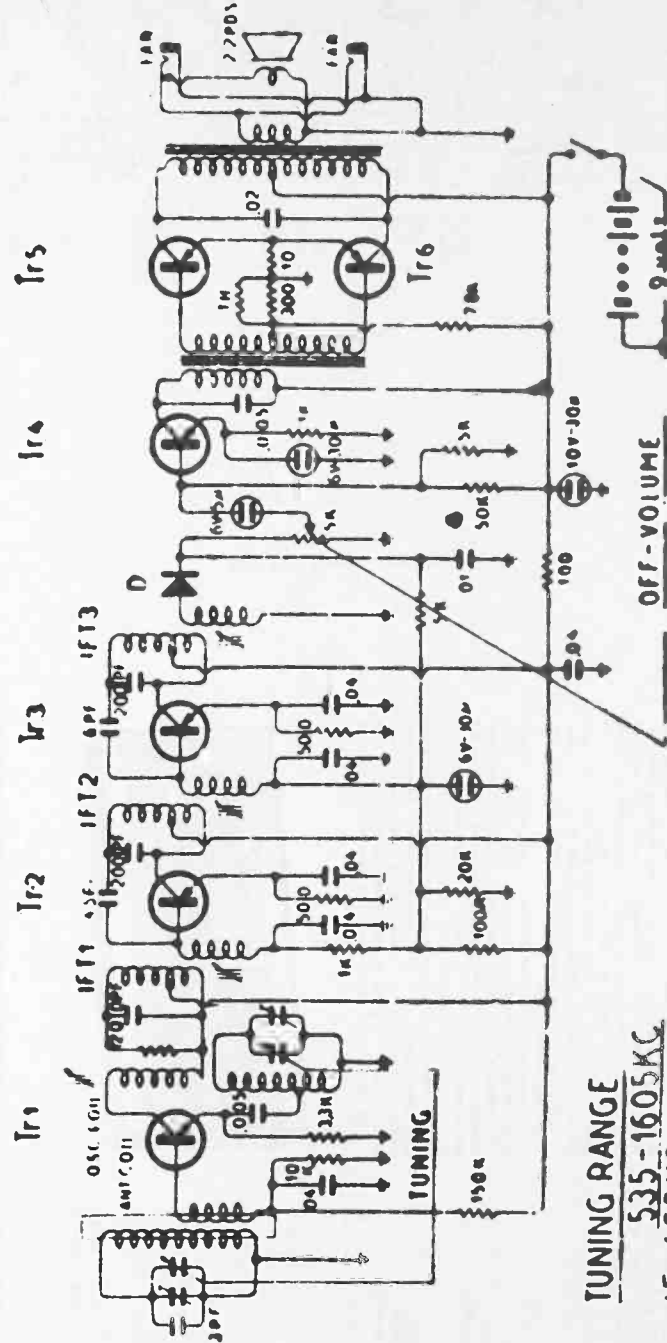
⊗ - Mounted inside IF I.

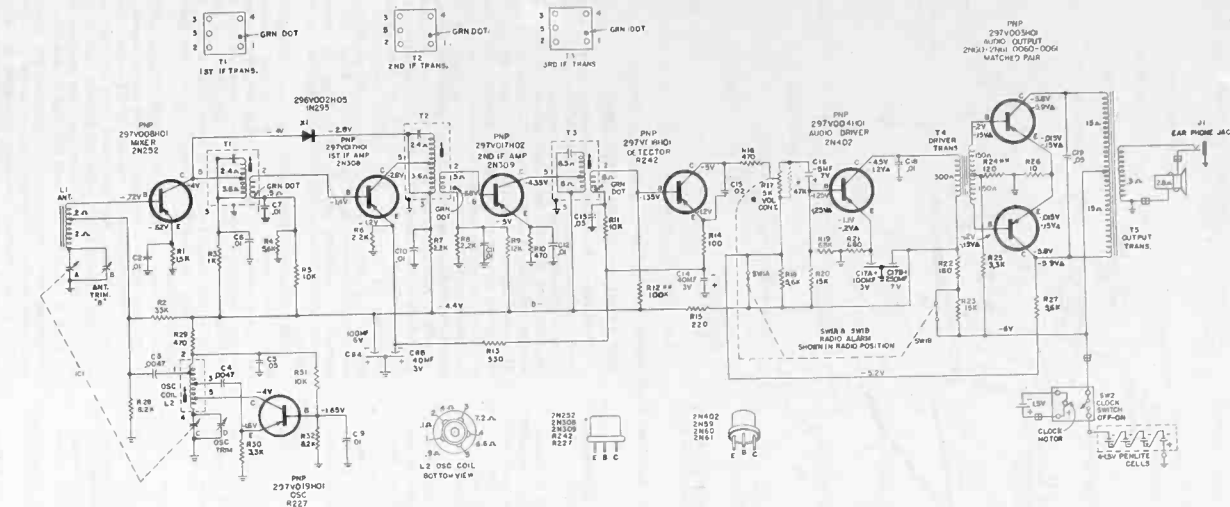
SONY TR-610



L ₁ L ₂	Ant. coil	R ₁₆	8.2 K Ω	C ₈	0.02 μF
L ₃ L ₄	Osc. coil	R ₁₇	22 Ω	C ₉	0.005 μF
I.F.T ₁	002-AP	R ₁₈	22 Ω	C ₁₀	200 pF
I.F.T ₂	002-BP	R ₁₉	470 Ω	C ₁₁	0.02 μF
I.F.T ₃	002-CP	R ₂₀	220 K Ω	C ₁₂	10 μF
T ₁	Input Transformer	C ₁	} Tuning Condenser	C ₁₁₋₁	20 μF
T ₂	Output Transformer	C ₂		C ₁₁₋₂	"
J	Earphone Jack	C ₃		C ₁₁₋₃	"
S.P.	2 1/4" Dynamic Speaker	C ₄	0.01 μF	C ₁₅	0.04 μF
R ₁	8.2 K Ω	C ₅	0.005 μF	C ₁₆	0.005 μF
R ₂	82 K Ω	C ₆	200 pF	C ₁₇	300 pF
R ₃	1.5 K Ω	C ₇	200 pF		

SCHEMATIC DIAGRAM MODEL 6-TRS







NOTES:
 1. VOLTAGES TAKEN WITH VTVM, BATTERY AT 6 VOLTS, TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM.
 2. DURING SERVICING, TOTAL CURRENT DRAIN SHOULD BE MEASURED, WITH NO SIGNAL APPLIED, AND VOLUME CONTROL AT MINIMUM. TOTAL BATTERY CURRENT SHOULD BE 9MA. APPROX.
 3. VOLTAGES SHOWN WITH 4 ARE TAKEN IN ALARM POSITION. TOTAL CURRENT DRAIN SHOULD READ APPROX. 17 MA.
 * EARLY PRODUCTION R17 WAS 5000 OHMS WITH 4.7K OHMS RESISTOR IN PARALLEL. LATER PRODUCTION R17 IS 2.3K OHMS AND THE 4.7K OHMS IS DELETED.
 ** EARLY PRODUCTION R12 WAS 220K OHMS AND R24 WAS 100 OHMS.

V 2396-1

Figure 1 - Schematic Diagram



Westinghouse
RADIO
 SERVICE MANUAL

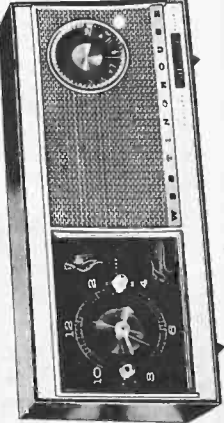


MODELS

H-685P8
(White & Brown)

H-686P8
(White & Pink)

CHASSIS V-2396-1



SPECIFICATIONS

Frequency Range 540 to 1600KC
 Intermediate Frequency 455KC
 Transistor Complement:
 1 2N252 Mixer
 1 R-227 Oscillator
 1 2N308 1st IF Amp.
 1 2N309 2nd IF Amp.
 1 R-242 Detector
 1 2N402 Audio Driver
 2 2N60, 2N61, 0060 or 0061 Audio Output
 Power Output:
 Undistorted 0.120 Watts
 Maximum 0.200 Watts
 Loudspeaker 3" PM
 Radio Battery Current Drain (no signal) 9ma.
 Clock Battery Current Drain 1ma.
 Radio Batteries: (four 1½ Volt Batteries)
 Eveready 915 or 1015
 Mallory ZM-9
 Ray-O-Vac 7LP or 7R
 Burgess Z or 930
 Mallory M15
 Clock Batteries: (one 1½ Volt Battery) "D" size
 Eveready 950
 Burgess 2R
 Ray-O-Vac 2LP

BATTERY INFORMATION

This receiver can use either four 1½ volt flashlight or mercury type batteries. The Mercury batteries give much longer life and are placed in the holder with buttons in opposite direction to those of flashlight type batteries. It is important that batteries be in holder correctly before turning radio on. Refer to label on the battery holder for correct battery installation.

BATTERY INSTALLATION

This receiver utilizes four pen-light size batteries for radio operation and one flashlight "D" size battery for clock operation. The radio will normally operate up to 400 hours on one set of batteries (Mercury type) and clock will operate up to 1 year on one flashlight battery.

To replace radio batteries: insert a coin into slot between battery cover (see figure 4, page 4) and receiver case. Turn coin in slot and pull cover down and out from receiver case. Pull battery holder out from its compartment. Install four 1½ volt pen-light batteries into holder. Use either flashlight or mercury type batteries. Mercury batteries give much longer battery life and are placed in holder with buttons in opposite direction to those of flashlight type batteries. Be sure batteries are in holder correctly before turning radio on. Refer to sketch and label on battery holder. Slide battery holder back into its original position as indicated on battery holder and replace cover.

To replace clock battery: insert a coin into slot (on bottom of receiver case) between battery cover and case. Turn coin in slot and pull cover out from receiver case. Install 1½ volt flashlight type battery into battery holder with battery button (positive terminal) contacting the spring contact. If battery is not in holder correctly clock will not operate. Slide battery cover back into original position.
IMPORTANT: Worn-out batteries should be removed as soon as they become defective. Otherwise radio may be damaged by worn out battery swelling or corroding. Also remove batteries before starting radio for long period of time.

CLOCK SERVICE INFORMATION

All service on the clock used in these receivers should be referred to one of the Westclox authorized clock service stations listed at the end of this service manual. Do not forward the complete radio receiver to the clock service station. The clock should be removed from the receiver as described under "Clock Removal" and forwarded to the authorized service station.

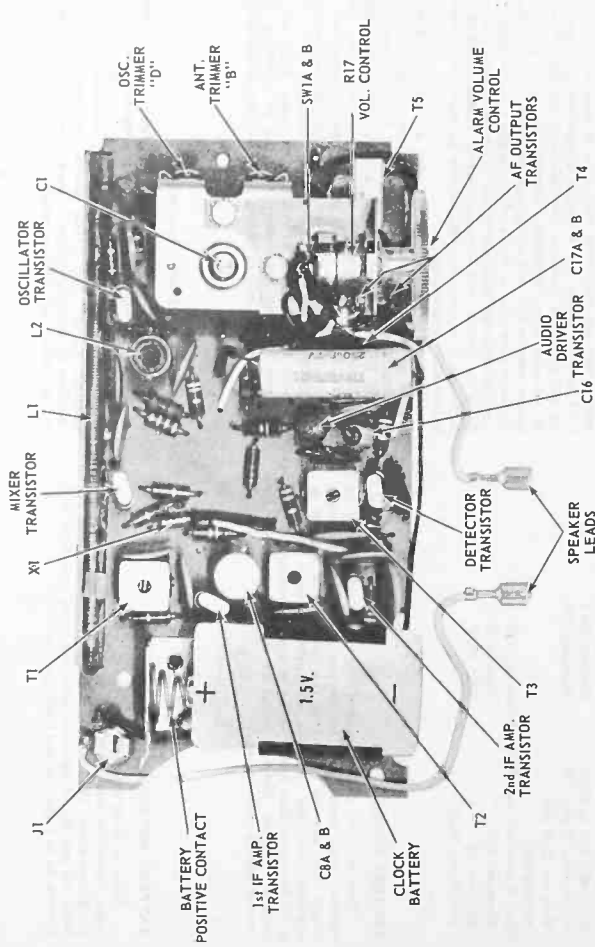


Figure 2 - Top view of printed circuit board.

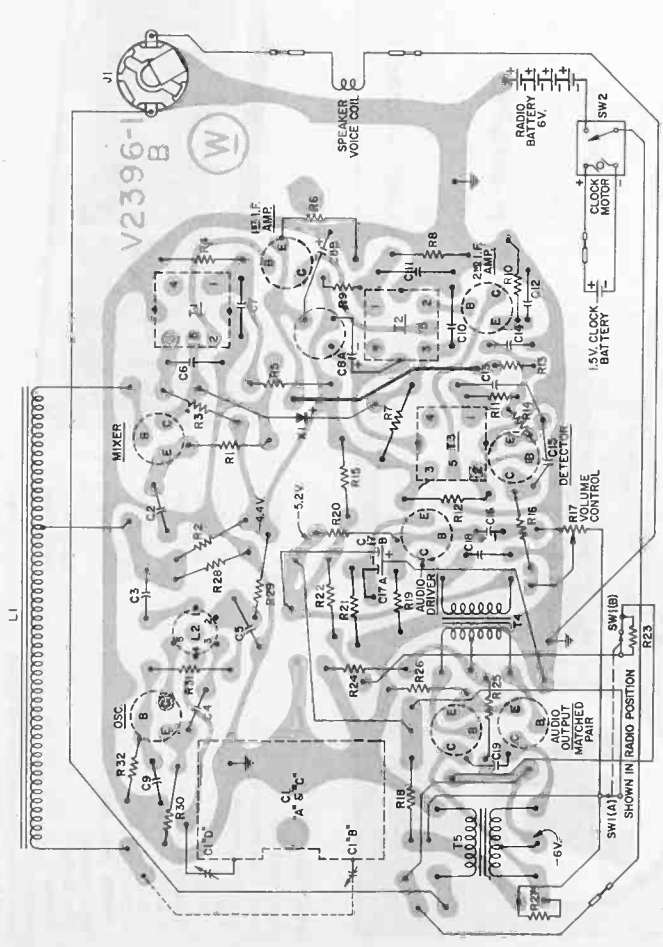


Figure 3 - Bottom view of printed circuit board with components shown symbolically.

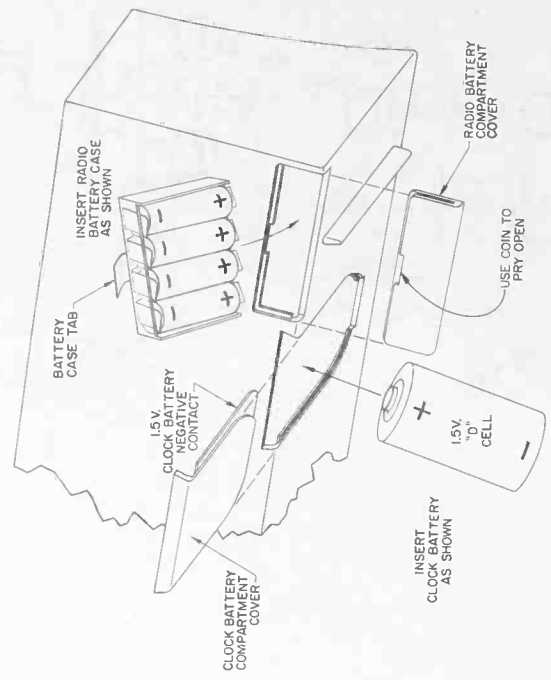


Figure 4 - Radio and Clock battery installation

CHASSIS REMOVAL

1. Remove the screw located in the center of the cabinet rear. Remove the two screws on the underside of the cabinet.
2. Separate the cabinet front from the cabinet back to expose the radio chassis for servicing. If it is necessary to have complete access to all the components then proceed with steps 3 through 7.
3. Remove the three 1/4" hex head screws which mount the printed circuit board to the cabinet front (through fiber stand-offs).
4. Unsolder the black wire going from the radio battery holder contact (under clock case) to the printed circuit board chassis ground at the printed circuit board connection.
5. Remove the spade connector leads from the speaker, clock battery contact (positive side) and the printed circuit board terminal next to the audio output transformer (T5).
6. Remove the tuning knob and dial as follows. Slip a loop of string under the tuning dial and pull the dial and tuning knob up and out of the cabinet front.
7. Separate the printed circuit board chassis from the cabinet front. To operate the chassis it will be necessary to reconnect the speaker and radio battery leads. To replace the chassis into the cabinet follow the reverse of the above procedure.

CLOCK REMOVAL

1. Remove the printed circuit board from the cabinet as described under "Chassis Removal". NOTE: It is necessary to remove the printed circuit board to provide clearance for removal of the two clock mounting nuts located under the edge of the printed circuit board.
2. Unsolder the four wires from the terminals on the underside of the clock case.
3. Remove the four 5/16" nuts securing the clock to the cabinet front.
4. Remove the clock control knobs. Remove the clock from the cabinet front. To replace the clock use the reverse of this procedure (solder wires to clock terminals as shown in figure 5).

NEW RADIO CIRCUITRY OPERATION

Oscillator - A separate transistor is used to develop the local oscillator signal. Oscillations are developed by in-phase signal feedback from the collector to emitter through capacitor C4. The tap on the oscillator coil determines the amount of feedback. The base of the transistor is placed at RF ground through capacitor C9. Resistors R31 and R32 form the divider network to develop the correct base voltage. The oscillator injection voltage is obtained from a tap on the oscillator coil (L2) and coupled to the base of the mixer transistor through capacitor C3 and part of the antenna (L1).

AGC - The gain of the first IF amplifier is controlled by AGC. Part of the emitter bias current for this transistor (see figure 1) flows from the -4.4 volt B- line through R12, secondary of T3, R11, R13 and R6 to ground. A fixed negative 1.2 volts bias appears on the emitter of the first IF amplifier transistor (with no signal). When the detector transistor conducts, current flows from the collector to emitter of the detector transistor, through R14, R15, R6 to ground.

The detector current is in the same direction as the emitter bias current of the first IF amplifier transistor. As the signal level at the detector increases, the detector conduction increases and the emitter bias on the first IF amplifier becomes less positive with respect to the base. Hence as the signal level at the detector increases, the first IF amplifier forward bias is reduced and the gain of the stage is decreased.

To increase the range of the AGC control voltage and prevent possible overloading on a very strong signal, a diode (X1) is connected from the low side of T2 to the collector of the mixer transistor. With no signal being received the diode is reverse biased (-2.8 volts on cathode and -4 volts on anode provides 1.2 volts reverse bias) and does not conduct. When a signal is received, the first IF amplifier emitter voltage becomes more negative, reducing the gain of the transistor. As the emitter-collector current decreases, the voltage on the collector increases toward the B- line voltage (-4.4 volts). If it were possible to completely cut off the transistor, -4.4 volts would appear on the collector.

As the signal received increases in strength, the diode reverse bias becomes less. As the diode approaches zero

AUTHORIZED (Westclox) CLOCK SERVICE REPAIR STATIONS (see page 1 - Clock Service Information)

- ALABAMA**
 Birmingham ... Cliff's Watch Repair ... 244-45 Brown-Marx Bldg.
ARIZONA
 Phoenix ... Smith's Clock & Watch Shop ... 1512 N. 7th Ave.
CALIFORNIA
 Los Angeles 15, Rayco Electric ... 947 So. Grand Ave.
 San Francisco 5, Schloss Mfg. Co. ... 540 Mission St.
CONNECTICUT
 Hartford 3 ... Armin's Swiss-American Watch Hospital ... 6 American Row
 Bridgeport ... Bridgeport Watch Hospital, Inc. ... 918 Main St.
 Fairfield ... Fairfield Center Jewelers ... 1498 Post Road
COLORADO
 Denver 2, Denver Dial Company, Inc. ... 235 University Bldg.
DISTRICT OF COLUMBIA
 Washington D.C. Auto Clock Shop ... 1105 21st St. N.W.
FLORIDA
 Miami 37, Electric Clock ... 3101 N.W. 7th Ave. - Box 263
 Tampa ... Brodie-Edwards, Inc. ... 3123 E. Broadway
GEORGIA
 Rossville ... Dayle May Inc. ... 101 Chickamauga Ave.
 Atlanta ... Bowers Watch & Clock Repair ... 1584 Piedmont Ave. N.E.
ILLINOIS
 Elgin ... M.J. Silbert & Co. ... Stewart & Duande Aves.
 Chicago 2, M.J. Silbert & Co. ... 55 E. Washington St.
IOWA
 Cedar Rapids ... Schaefer Clock Service ... 216 3rd St. S.E.
NEW JERSEY
 Newark ... Robert Halpern ... 368 Washington St.
KENTUCKY
 Louisville ... H.C. Korfhage Co. ... 412 Norton Bldg.
LOUISIANA
 Shreveport ... Leonard's ... 326-322 Ward Bldg.
 New Orleans ... Southern Time Service ... 931 Canal St.
MAINE
 Portland ... The Watch Shop ... 298 Cumberland Ave.
MARYLAND
 Baltimore 1, Jewelers Service Co. ... 108 W. Fayette St.
MASSACHUSETTS
 Boston 8, Boston Clock Service ... 44 Bromfield St.
MICHIGAN
 Detroit 5, Henning Clock Service ... 13417 Gration Avenue Center
MINNESOTA
 St. Paul ... Empire Clock Co., Inc. ... 492 N. Robert St.
MISSOURI
 Kansas City ... Thompson Clock Service ... 4416 Main St.
NEW YORK
 Albany 6, Julien's Clock Shop, Inc. ... 114 Bradford St.
 Brooklyn 17, Electime Corporation ... 306 Livingston St.
 New York 22, Greenhill & Rogers ... 670 Lexington St.
 Brooklyn 15, The Clock Repair People ... 299 7th Ave.
 Buffalo 9, Shields Bros. ... 1410 Main St.
NEBRASKA
 Omaha 2, Harry A. Hansen Co. ... 807 Kilpatrick Bldg.
NORTH CAROLINA
 Charlotte 5, J.F. Collins ... 1611 Central Ave.
OHIO
 Cincinnati ... Ken-Hav Elec. Clock Service ... 408 Main St.
 Cleveland 15, Hoag's Shop ... 2123 E. 9th St.
 Columbus 15, DeMers Authorized Service ... 102 E. Broad St.
 Dayton 3, Cron Time Shop ... 1700 E. 3rd St.
OKLAHOMA
 Tulsa 3, Tick of Time ... 220 E. Fourth St.
 Oklahoma City ... House of Time ... 1326 N.W. 23rd St.
OREGON
 Portland ... Alder Street Clock Shop ... 251 S.W. Alder St.
PENNSYLVANIA
 Philadelphia 6, The Precision Instrument Service ... 106-08 S. 7th St.
 Pittsburgh 19, Time Service Co. ... 504 Court Place
RHODE ISLAND
 Providence ... Mr. Edwin Olson ... 7 Dyer St.
TENNESSEE
 Memphis 14, Tolbert Auto Clock & Speedometer Service ... 1791 Lamar Ave.
 Nashville ... Young-Neal Company ... 315 4th Ave. N.
TEXAS
 Amarillo ... Harris Clock Service ... 1409 S. Harrison St.
 Dallas 1, Long's Automobile Clock Service ... 2304 Cedar Spring Ave.
 Houston 6, Arnold Elec. Co. ... 1827 W. Alabama St.
 Fort Worth ... Walton's Speedometer Repair ... 1515 W. 7th
 Dallas ... Durham Watch Repair Service ... 512 S. Akard
 San Antonio ... Aztec Jewelry Company ... 241 W. Commerce St.
VIRGINIA
 Richmond 19, George S. Richardson ... 304 E. Main St.
WASHINGTON
 Spokane ... Harry's Elec. Clock Hospital ... 175 S. Post St.
WISCONSIN
 Oshkosh ... Miller Clock Service ... 431 Bowen St.
 Milwaukee 6, Schreiber Clock Service ... 623 N. 2nd St. Rm. 730 OR 1612 Center St.

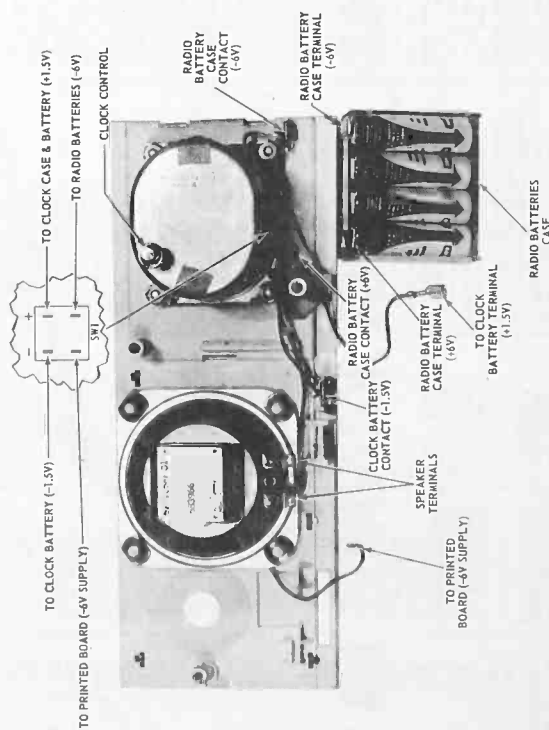


Figure 5 - Rear view of cabinet front with printed circuit chassis removed.

bias the high back resistance of the diode will decrease. On very strong signals the collector voltage will exceed -4 volts and forward bias the diode. The diode then becomes a low resistance in series with capacitor C10. The resistance of diode X1 and capacity of C10 will now be in shunt with the primary of T1, lowering its "Q" and reducing the amount of IF signal coupled to the first amplifier stage.

Alarm Operation - When the user of this radio rotates the radio-volume control to the extreme left until a click is heard (SW1A and SW1B open) the radio operates as an alarm

ALIGNMENT REQUIREMENTS

Signal Generator - Use a generator providing modulated 455KC and AM broadcast frequencies. Connect a 4 or 5 turn loop of wire across output cable. Place the loop near the ferrite core antenna of the receiver. To increase or decrease the amount of signal, coupled to the receiver move the loop closer or further from the antenna. Keep the output of the generator low enough to just give an indication on the VTVM or output meter to avoid AVC action. Keep the volume control set at maximum.

Indicator - Connect a VTVM or output meter across the voice coil.

Receiver - Set the volume control to maximum. During step 1 the chassis must be removed from the cabinet front. During steps 2, 3, 4 and 5 the chassis must be attached to the cabinet front. Also during the last four steps, be sure that the hand or any objects on the bench do not come in close contact with the antenna loop or detuning will occur and alignment will be incorrect.

Alignment Tool - Use a fiber aligning tool that snugly fits the slot in the ferrite cores of the IF transformers to prevent chipping of the slot.

ALIGNMENT PROCEDURE CHART

Step	Loosely couple modulated signal to:	Generator Frequency	C1 Setting	Adjust for maximum:
1.	Loop L1	455KC	Maximum	T3, T2 and T1 in order. Reduce generator output if necessary for T2 and T1 adjustments.
2.	Loop L1	1625KC	Minimum	Oscillator trimmer "D"
3.	Loop L1	1400KC	1400KC	RF trimmer "B"
4.	Loop L1	600KC	600KC	Oscillator coil, L2, if necessary
5.	Repeat steps 2, 3 & 4 until no further change is noted			

PARTS LIST

When ordering parts, specify part number, description of part and model number. Do not order by model number alone. Where applicable, prices include Federal Excise Tax. Prices are subject to change without notice.

MODEL PARTS

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
†		513V037H01		Cabinet shell, back, brown, H-685P8	2.95
†		513V037H02		Cabinet shell, back, pink, H-686P8	2.95
†		650V014H01		Clock	.15
†		558V197H01		Cover, radio batteries, brown, H-685P8	.15
†		558V197H02		Cover, radio batteries, pink, H-686P8	.15
†		787V156H01		Cover, clock battery, brown, H-685P8	.48
†		787V157H01		Cover, clock battery, pink, H-686P8	.48
†		528V198H01		Dial, clock	.40
†		528V198H02		Dial, clock	.40
†		555V037H01		Escutchion	1.30
†		558V199H01		Front, cabinet	2.10
†		787V159H01		Holder Assy., radio batteries (includes battery contacts)	1.15
†		781V277H01		Holder, clock battery support	.30
†		754V008H01		Jack, earphone	.72
†		550V107H01		Knob, clock	.25
†		550V104H01		Knob, volume	.25
†		559V044H01		Knob Assy., tuning (includes compression spring)	.50
†		559V045H01		Knob Assy., AM dial (includes compression spring)	.50
†		761V009H28		Screw, self-tapping hex head (mounts chassis to cabinet front)	.05
†		793V074H02		Spacer (mounts chassis to cabinet front)	.10
†		570V058H01		Speaker, 3" PM	5.25

CHASSIS PARTS

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
†	C1	330V026H01		Capacitor, variable	Tuning	3.75
†	C2	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	Mixer emitter	.20
†	C3	215V300H04	R2CC62Y5Y472M	Capacitor, .0047 mf, ceramic	Ant. coupling	.25
†	C4	215V303H03	R2CC62Y5Y472M	Capacitor, .0047 mf, ceramic	Osc. collector	.40
†	C5	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	1st IF amp.	.20
†	C6	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	1st IF amp.	.20
†	C7	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	Supply filter	1.75
†	C8A	218V025H29		Capacitor, 100 mf, 5V., elect.	1st IF amp.	.20
†	C8B	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	Osc. base	.20
†	C9	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	2nd IF amp.	.20
†	C10	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	2nd IF amp.	.20
†	C11	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	2nd IF amp.	.20
†	C12	R2CC63Z5Z103P	215V111A03	Capacitor, .01 mf, ceramic	Detector base	.40
†	C13	215V303H03		Capacitor, .05 mf, ceramic	Detector	1.35
†	C14	218V012H02		Capacitor, 40 mf, 3V., elect.	Detector	.22
†	C15	215V303H04		Capacitor, .02 mf, 30V., ceramic	Audio driver	.95
†	C16	218V012H14		Capacitor, 100 mf, 3V., elect.	Audio driver	1.75
†	C17A	218V025H28		Capacitor, 250 mf, 7V., elect.	Audio driver	.15
†	C17B	218V025H28		Capacitor, .05 mf, ceramic	Audio driver	.40
†	C18	215V308H05		Loop	Oscillator	2.15
†	C19	215V303H03		Loop	Oscillator	1.05
†	L1	310V046H01		Loop	Antenna	.40
†	L2	230V046H01		Loop	Oscillator	1.05
†	R1	R20AE133K	250V221A52	Resistor, 1.5K ohms	Mixer circuit	.05
†	R2	R20AE133K	250V223A33	Resistor, 33K ohms	Mixer circuit	.05
†	R3	R20AE133K	250V221A02	Resistor, 1K ohms	1st IF amp.	.05
†	R4	250V225A62	RC20AE562K	Resistor, 5.6K ohms	1st IF amp.	.06
†	R5	RC20AE103K	250V221A03	Resistor, 10K ohms	1st IF amp.	.05
†	R6	RC20AE222K	250V222A22	Resistor, 2.2K ohms	1st IF amp.	.05
†	R7	RC20AE222K	250V222A22	Resistor, 2.2K ohms	1st IF amp.	.05
†	R8	RC20AE222K	250V222A22	Resistor, 2.2K ohms	2nd IF amp.	.05
†	R9	RC20AE123K	250V221A23	Resistor, 12K ohms	2nd IF amp.	.05
†	R10	RC20AE123K	250V221A23	Resistor, 12K ohms	2nd IF amp.	.06
†	R11	RC20AE102K	250V221A03	Resistor, 10K ohms	Detector base	.05
†	R12	250V222A24	RC20AE224K	Resistor, 220K ohms	Detector base	.12
†	R13	RC20AE331K	250V223A31	Resistor, 330 ohms	1st IF amp.	.05
†	R14	RC20AE133K	250V223A31	Resistor, 130 ohms	1st IF amp.	.05
†	R15	RC20AE133K	250V223A31	Resistor, 130 ohms	Detector filter	.05
†	R16	RC20AE133K	250V223A31	Resistor, 130 ohms	Detector	.05
†	R17	270V066H02	250V221A23	Control, 2.5K ohms (includes SW1A & B)	Volume control	2.00
†	R18	250V225A62	RC20AE562K	Resistor, 5.6K ohms	Alarm circuit	.06
†	R19	RC20AE682J	250V216A82	Resistor, 6.8K ohms	Audio driver	.10

Resistors are 1/2 watt, 10% unless otherwise specified.
 † New part listed for the first time in Westinghouse Television or Radio service information.
 * Price furnished on request.

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
†	R20	RC20AE153J	250V221A53	Resistor, 15K ohms	Audio driver	.11
†	R21	RC20AE681J	250V216A81	Resistor, 680 ohms	Audio driver	.11
†	R22	RC20AE181K	RC20AE181K	Resistor, 180 ohms	Audio driver	.17
†	R23	250V221A53	250V221A53	Resistor, 15K ohms	Alarm circuit	.11
†	R24	RC20AE123K	250V221A23	Resistor, 120 ohms	Audio output	.06
†	R25	RC20AE333K	250V225A33	Resistor, 3.3K ohms	Audio output	.05
†	R26	RC20AE100K	250V225A02	Resistor, 100 ohms	Audio output	.06
†	R27	250V225A62	RC20AE562K	Resistor, 5.6K ohms	Audio output	.06
†	R28	RC20AE822K	250V228A22	Resistor, 8.2K ohms	Mixer base	.05
†	R29	250V224A71	RC20AE471K	Resistor, 470 ohms	Oscillator	.06
†	R30	RC20AE332K	250V223A32	Resistor, 3.3K ohms	Oscillator	.05
†	R31	RC20AE103K	250V221A03	Resistor, 10K ohms	Oscillator	.05
†	R32	RC20AE822K	250V228A22	Resistor, 8.2K ohms	Oscillator	.05
†	SW1A	270V066H02		{Switch (part of R17)}	Radio-Alarm switch	2.00
†	T1	235V045H01		Transformer	1st IF	2.25
†	T2	235V045H01		Transformer	2nd IF	2.25
†	T3	430V041H02		Transformer	3rd IF	2.45
†	T4	430V041H02		Transformer	Audio driver	2.80
†	T5	430V023H01		Transformer	Audio output	2.70
†	X1	266V002H01		Crystal diode, 1N295 or 1N87G	AGC overload	1.25
†		297V017H02		Transistor, 2N308	1st IF amp.	5.60
†		297V008H01		Transistor, 2N305	2nd IF amp.	8.15
†		297V019H01		Transistor, 2N252	Mixer	5.20
†		297V018H01		Transistor, R-227	Oscillator	4.70
†		297V004H01		Transistor, R-242	Detector	6.75
†		297V003H01		Transistor, 310, 2N238 or 2N402	Audio driver	13.50
†				Transistors, matched pair, 2N60, 2N61, 00G60 or 00G1	Audio output	

ZENITH

SERVICE MANUAL MODEL "ROYAL 200" ALL TRANSISTOR PORTABLE RADIO

CHASSIS 7AT48Z, 7AT48Z2 & 7AT48Z4

GENERAL

These transistor portable chassis are conventional superheterodyne receivers using an individual mixer and oscillator to produce the 455 Kc intermediate frequency. The first and second intermediate frequency amplifiers are conventional. It is necessary to use neutralization in the I.F. amplifier stages as in circuits using a triode in the A. 1N87 germanium diode is used as the diode detector, and AVC voltage source. This is then followed by a driver stage and a class "B" push-pull output stage. As you can see from the chart, the chassis use selected transistor pairs in the final output stage and therefore should one transistor fail, both transistors must be replaced simultaneously as chances are they will not perform properly unless so matched.

Power Supply..... Carbon Penlite Batteries 6 volts D.C. approx. life 100 hrs.
Mercury Batteries..... 5.36 volts D.C. approx. life 400 hrs.

Frequency Range..... 540 to 1600 KC
Intermediate Frequency..... 455 KC
Sensitivity..... Approximately 500 microvolts/meter for 50 milliwatts output
Power Output Undistorted..... 100 milliwatts
Speaker..... 150 milliwatts
Speaker..... 3 1/2 inch P.M.
Alnico V Voice Coil Impedance 3.2 ohms at 400 cycles
Accessory Earphone..... B39-24 (impedance 15 ohms at 400 cycles)

CHASSIS IDENTIFICATION

The "Royal 200" seven transistor portable has been produced with three basic chassis. This expedient was necessary to enable us to produce sufficient quantities by using transistors from many sources.

Chassis 7AT48Z, 7AT48Z2 and 7AT48Z4 use identical circuitry, however, they use transistors from different sources. The transistor and trimmer layout and schematic illustrate chassis 7AT48Z. The chassis information chart supplies the necessary information on transistors used in chassis 7AT48Z2 and 7AT48Z4. Transistors for specific functions are interchangeable, for example in chassis 7AT48Z the mixer transistor is 121-92 but 121-62 or 121-93 can also be used.

The output transistors are also interchangeable but only as matched pairs. Chassis 7AT48Z uses a matched pair of (121-96) transistors, which can be replaced with a matched pair of (121-61) or a matched pair of (121-84).

PRINTED CIRCUIT SERVICING

Servicing "printed" circuit sets is, in general, much the same as servicing ordinary receivers. However, certain tools and techniques are well suited for this type of work. The following items are especially useful:

1. Good pair of long-nose pliers.
2. Sharp wire cutters.
3. Small stiff glue brush (for solder removal).
4. Pencil type soldering iron with a small tip (25 watts or less).

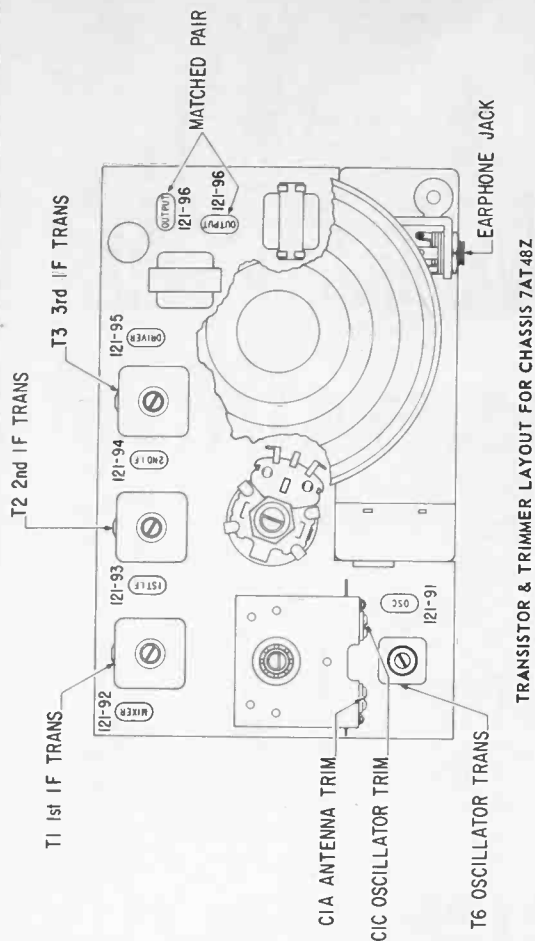
WARNING: Excessive heat may damage the "printed" circuit during component replacement if a soldering pencil, iron or gun of higher wattage rating is used.

5. Tin leads on component before soldering.
6. Use only EUTECTIC solder 63% tin 37% lead.
7. This solder has an extremely low melting point.

COMPONENT REPLACEMENT

Resistors and capacitors should be replaced by clipping out the defective part and neatly soldering in the new part. If a unit, such as the oscillator coil or IF transformer, is to be removed heat the mounting lugs with the pencil type soldering iron and move them away from the soldered connection with a long-nose pliers or metal pick. Continue heating the lugs and brush away the molten solder with a small stiff glue brush. Remove the defective unit by lifting it off the chassis. Before inserting the new unit, be certain that the lug holes are open and free from solder. Forcing a lug against a solder filled lug hole may break the bond between the chassis base and the "printed" wiring. It is, therefore, necessary to exercise care when replacing units.

An open or damaged section of "printed" circuit wiring can be replaced by soldering a short jumper wire across the points to be connected.



TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 7AT48Z

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC	LOOSELY COUPLED TO	—	Gang wide open.	C1C	Set Oscillator to dial scale.
3	535 KC	TO	—	Gang Closed	Adjust slug in T0	Set Oscillator to dial scale.
4	REPEAT STEPS 2 & 3	WAVEMAGNET	—	—	—	—
5	1260 KC	—	—	1260 KC	C1A	Align loop ant.

CHASSIS INFORMATION CHART

Chassis	Transistor Layout Label Color	Mixer	Osc.	1st I.F., 2nd I.F., Detector	Crystal Diode	Driver	Output-Output	Supplier
7AT48Z	Red 102-4234 or 102-4861	121-92 Zemith RETMA Type	121-91 121-93 2N483 PNP	121-94 2N482 PNP	103-19 1N87G	121-95 2N362 PNP	121-96 2N632 Matched Pair PNP	Raytheon
7AT48Z2	Black 102-4007 102-4862	121-62 Zemith RETMA Type	121-55 121-73 2N409 PNP	121-74 2N409 PNP	103-19 1N87G	121-64 PNP	121-61 Matched Pair PNP	R.C.A.
7AT48Z4	Green 102-4235	121-83 Zemith RETMA Type	121-82 121-13 2N413 PNP	121-79 2N413A PNP	103-19 1N87G	121-81 2N383 PNP	121-84 2N383 Matched Pair PNP	Tung Sol

CHASSIS PARTS

PART NO.	DESCRIPTION	PRICE
12-2659	Volume control mtg. bracket	.30
22-3	.01 mfd. ceramic disc - 500V	.30
22-17	.001 mfd. ceramic disc capacitor - 1000V (2 used)	.25
22-2381	6 mfd. ceramic capacitor - 500V	.25
22-2728	C2,6,7, 10,16, 25V (6 used)	.60
22-2729	C19, .001 mfd. ceramic disc capacitor - 25V	.25
22-2871	C17, 3 mfd. electrolytic capacitor - 3V1.50	1.50
22-2884	C12, 3 mid. electrolytic capacitor - 12V 1.50	1.50
22-2885	C3,4,8, .02 mfd. ceramic disc - 25V	.25
22-3035	C5, 12 mmd. ceramic disc capacitor	.25
22-3091	C13,A,B, Electrolytic capacitor - 2x50 mfd. - 6V	.25
22-3092	C14,B, Two section variable capacitor	2.00
44-34	J1, Miniature jack	3.75
49-859	3 1/2" PM speaker	.90
54-139	3/8-32x9/16 palnut	4.75
54-417	1/4-32x3/8 hex. nut - brass (mts. 44-34)	.10
63-1701	10 ohm resistor 1/2W ins. 10%	.17
63-1715	22 ohm resistor 1/2W ins. 10%	.17
63-1744	100 ohm resistor 1/2W ins. 20%	.17
63-1765	330 ohm resistor 1/2W ins. 20%	.17
63-1772	470 ohm resistor 1/2W ins. 20%	.17
63-1775	560 ohm resistor 1/2W ins. 10%	.17
63-1786	1 K ohm resistor 1/2W ins. 20%	.17
63-1792	1500 ohm resistor 1/2W ins. 10%	.17
63-1799	2200 ohm resistor 1/2W ins. 10%	.17
63-1803	2700 ohm resistor 1/2W ins. 10%	.17
63-1806	3300 ohm resistor 1/2W ins. 10%	.17
63-1810	3900 ohm resistor 1/2W ins. 10%	.17
63-1813	4700 ohm resistor 1/2W ins. 10%	.17
63-1817	5600 ohm resistor 1/2W ins. 10%	.17
63-1824	8200 ohm resistor 1/2W ins. 10%	.17
63-1827	10 K ohm resistor 1/2W ins. 10%	.17
63-1834	15 K ohm resistor 1/2W ins. 10%	.17
63-1845	27 K ohm resistor 1/2W ins. 10%	.17
63-1859	56 K ohm resistor 1/2W ins. 10%	.17
63-1869	100 K ohm resistor 1/2W ins. 10%	.17
63-4392	Volume control & switch	2.05
78-1067	Three contact socket (1 mts. ea. 121-61 & 96)	.30
93-1257	Washer	.30
95-1589	Oscillator transformer	3.00
95-1628	1st I.F. transformer	
95-1629	2nd I.F. transformer	
95-1631	3rd I.F. transformer	
95-1631	Driver transformer	
95-1632	Audio output transformer	
103-139	Crystal diode	.75
114-48	6-32x1/4x1/4 AF hex. hd. mach. screw (2 used on 22-3092 & 3 on 49-859)	.03
114-641	6-32x1/4 hex. hd. mach. screw - flat washer att.	.03
114-642	4-40x1/8x1/4 hex. hd. mach. screw (mts. S-44217)	.03
121-61	Transistor (output) 7AT48Z2 (2 used)	4.50

CHASSIS PARTS

PART NO.	DESCRIPTION	PRICE
121-62	Transistor (mixer) 7AT48Z2	2.75
121-64	Transistor (driver) 7AT48Z2	2.25
121-65	Transistor (oscillator) 7AT48Z2	2.65
121-73	Transistor (1st I.F.) 7AT48Z2	2.65
121-74	Transistor (2nd I.F.) 7AT48Z2	2.65
121-79	Transistor (1st I.F.) 7AT48Z4	
121-80	Transistor (2nd I.F.) 7AT48Z4	
121-81	Transistor (driver) 7AT48Z4	
121-82	Transistor (oscillator) 7AT48Z4	
121-83	Transistor (mixer) 7AT48Z4	
121-84	Transistor (output) 7AT48Z4 (2 used)	
121-91	Transistor (oscillator) 7AT48Z	
121-92	Transistor (mixer) 7AT48Z	
121-93	Transistor (1st I.F.) 7AT48Z	
121-94	Transistor (2nd I.F.) 7AT48Z	
121-95	Transistor (driver) 7AT48Z	
121-96	Transistor (output) 7AT48Z (2 used)	
S-44217	Antenna Housing & spring assembly	
S-44218	L1	

CABINET PARTS

PART NO.	DESCRIPTION	PRICE
Z-8	1 1/2 volt battery (use 4)	.50
12-2662	Screw retaining bracket	
14-2443	Plastic cabinet - front - Royal 200K 3.00	3.00
14-2444	Plastic cabinet - front - Royal 200V	3.00
14-2445	Plastic cabinet - front - Royal 200F	3.00
14-2446	Plastic cabinet - rear - Royal 200K 3.00	3.00
14-2448	Plastic cabinet - rear - Royal 200V	3.00
14-2449	Plastic cabinet - rear - Royal 200F	3.00
14-2450	Plastic cabinet - rear - Royal 200W 3.00	3.00
14-2451	Plastic cabinet - rear - Royal 200V	3.00
16-1474	Packing carton	
36-218	Cabinet handle	
46-2008	Volume control knob	
46-2009	Tuning control knob	
54-79	6-32x1/4 AF hex. nut (2 used on chassis)	
54-460	6-32x1/6 hex. nut (3 used on chassis)	
57-2498	Emblem plate	35
57-2565	Escutcheon pull-out strip	1.25
83-3031	Battery pull-out strip	
110-320	Grille cloth - Royal 200K	.10
110-321	Grille cloth - Royal 200V	.10
110-322	Grille cloth - Royal 200W	
110-323	Grille cloth - Royal 200F	
112-901	6-20x3/8 phils. rd. hd. screw (used on chassis)	.03
112-1171	6-32x3/8 special hd. mach. screw - brass (2 used on 14-2448 & 2451)	.03
114-253	6-20x3/8x1/4 AF hex. hd. self-tapping screw	.01
114-639	6-32x1 1/2x1/4 AF hex. hd. mach. screw (3 used)	.05
188-120	Knob clamping ring (used on 46-2009)	
188-192	Knob clamping ring (used on 46-2008)	
199-259	Spacer sleeve	.03
199-260	Spacer sleeve (2 used)	.03
202-1383	Instruction book	

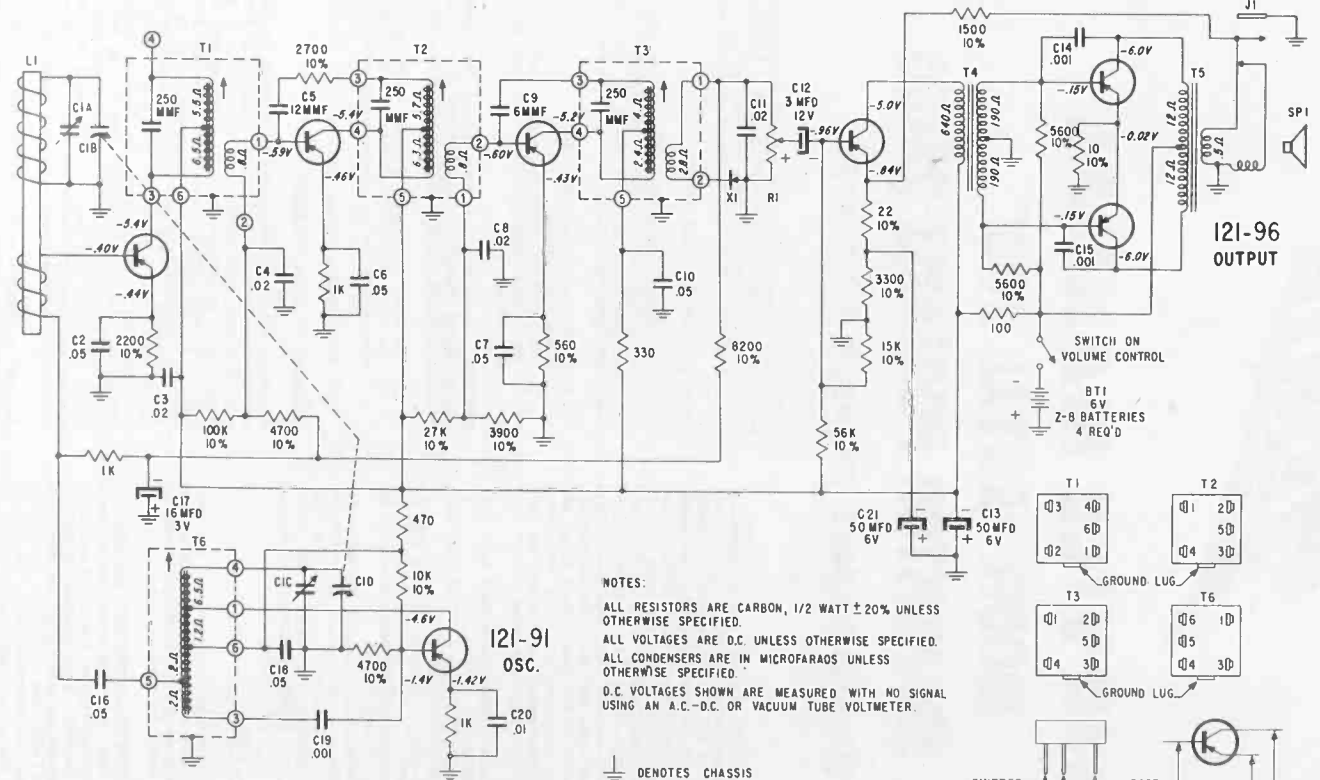
121-92 MIXER

121-93 1ST I.F.

121-94 2ND I.F.

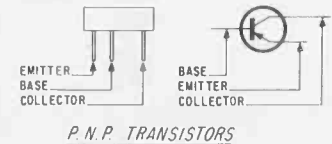
121-95 DRIVER

121-96 OUTPUT



NOTES:
 ALL RESISTORS ARE CARBON, 1/2 WATT ± 20% UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE MEASURED WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.

⊥ DENOTES CHASSIS

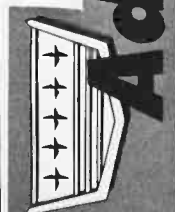


SCHMATIC DIAGRAM FOR 7AT48Z

**HOME RADIO
SECTION**

AMERICAN RADIO HISTORY.COM

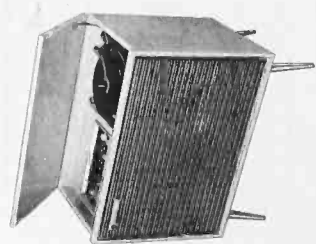
WWW.AMERICANRADIOHISTORY.COM



High-Fidelity
FM-AM Radio
Phonograph

7N1 FM-AM TUNER and 4S2 HI-FI AMPLIFIER

For complete Record Changer servicing information, see SERVICE MANUAL S800.



SPECIFICATIONS

FREQUENCY RESPONSE:

AMPLIFIER—Amplifier section flat from 50 to 20,000 cycles within 1 db at 10 watts output.

PRE-AMPLIFIER—At 1 watt level, Bass control gives 31 db change at 100 cycles and Treble control gives 26 db change at 10,000 cycles.

DISTORTION—3% at 12 watts.

POWER OUTPUT—17 watts maximum.

POWER CONSUMPTION—100 watts.

POWER SUPPLY—117 volts AC, 60 cycle only. (Phonograph can be converted to 50 cycle operation. See "RECORD CHANGER PARTS", "Kit, 50 Cycle Conversion".)

SPEAKER SYSTEM—Woofer, 12" PM; Tweeter, 3 1/2" PM.



Figure 1. Operating Controls.

HI-FI FM-AM CONSOLE
PHONOGRAPH

MODEL	COLOR	CHASSIS	RECORD CHANGER
392	Mahogany	7N1 and 4S2	RC 637-8
393	Blond		

CHASSIS REMOVAL

To remove amplifier chassis from cabinet:

1. Disconnect line cord from power source.
2. Disconnect record changer power plug (M611), speaker plug (M615), tuner audio output plug (M604), and power input plug (M606) from tuner chassis.
3. Remove screws that hold chassis to cabinet.

To remove FM-AM tuner from cabinet:

1. Remove control knobs from tuner front panel and phono output plug (M608) from tuner chassis.
2. Disconnect FM antenna from terminal board and remove terminal board from cabinet.
3. Support tuner from bottom and remove 4 hex nuts and lock washers that hold tuner chassis to cabinet. Carefully remove tuner chassis from cabinet.

To remove FM RF tuner sub-chassis:

1. Remove four screws that hold sub-chassis and disconnect wires from antenna terminals.
2. Disconnect cable from pin 8 on S601.
3. Lift sub-chassis up for servicing. DO NOT disconnect FM tuner dial cord.

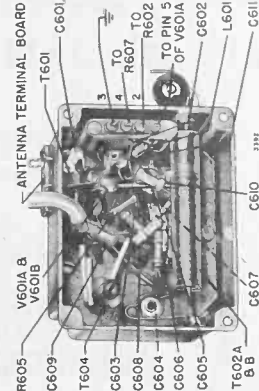


Figure 2. Bottom View of FM Tuner Sub-chassis. Location of components shown.

TROUBLE SHOOTING HINTS

Tube locations for the tuner and amplifier are shown on figures 6 and 7. Alignment points for the tuner are shown on figure 6.

Tubes may be reached from rear of cabinet for servicing purposes.

B+ voltages and filament voltages for tuner are furnished by power supply on amplifier chassis.

By placing a jumper wire between lugs 4 and 8 of M606, the amplifier may be serviced separately. NOTE: When amplifier is serviced separately, voltage readings will be higher due to the reduced load on the power supply.

HUM LEVEL: Excessive hum can often be minimized by reversing line cord plug in wall outlet. Move Rej-On-Off pointer to "ON". Touch record changer centerpost and note hum level. Reverse line cord in wall outlet; touch centerpost again and again note hum level. Leave line cord in position giving least hum.

A Hum Level control is located on the tuner chassis, see figure 6. Hum may be further reduced, if necessary, by adjusting this control.

RECORD CHANGER SERVICING

For complete record changer service information, see Service Manual S800.

If it becomes necessary to remove record changer from its mounting board, remove the three large washer-head screws extending through bottom of the mounting board. With these screws removed, the three springs which "float" the record changer may be loose. Lift record changer from the mounting board, being careful to retain mounting screws for installation.

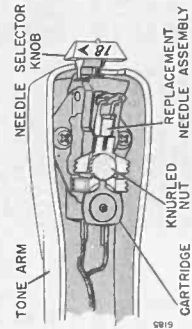


Figure 3. Needle Replacement.

NEEDLE REPLACEMENT

A worn needle causes "scratch" and a harshness of high tones in the output. Damage to records may be caused by worn needles.

To replace needle assembly, refer to figure 3 and loosen the knurled nut that is located under the cartridge. Slip the worm needle assembly out and insert the new needle assembly in the exact same position. Tighten the knurled nut.

See "RECORD CHANGER PARTS" for replacement cartridge and needles.

AMPLIFIER CHECKS		
CONTROL SETTINGS FOR AMPLIFIER CHECKS		Fully Clockwise
Loudness Control		Mid Position
Bass Control		Mid Position
Treble Control		Mid Position
AMPLIFICATION CHECK		
AUDIO GENERATOR OUTPUT	Frequency	Volts In
	1000 Cycles	0.34 Volts
AMPLIFIER OUTPUT	Volts	Watts
	5.6 Volts	10 Watts
FREQUENCY RESPONSE CHECK		
AUDIO GENERATOR OUTPUT	Frequency	Volts In
	In steps between 50 to 20,000 Cycles	0.34 Volts
AMPLIFIER OUTPUT	Volts	Db
	5.6 Volts	±1 Db

AMPLIFICATION AND RESPONSE CHECK

The amplifier may be checked for gain and frequency response by using the tests outlined below.

TEST EQUIPMENT:

Audio Oscillator, preferably with flat output from 50 cycles to 20 kilocycles.
Vacuum Tube Voltmeter, preferably with decibel scale.

PROCEDURE: Disconnect phono power plug (M611). Disconnect phono output plug (M608) from socket (M603) on tuner chassis. The oscillator signal is to be injected into socket (M603) on tuner chassis. This enables the checking of the preamplifier and amplifier for amplification and frequency response. Measurements taken with FM-AM-Phono switch in "PHONO" position.

Connect audio oscillator ground to chassis. Connect signal lead to phono input (M603). Allow several minutes warm-up for oscillator and amplifier. Set Loudness, Bass, and Treble controls as shown in "AMPLIFIER CHECKS" table.

To check amplification, adjust audio oscillator output to 0.34 volts at 1,000 cycles, measured from M603 to ground with a vacuum tube voltmeter. Connect a 3.2 ohm resistive load across secondary of T609 (audio output transformer). Measure output voltages across the load.

To check frequency response, adjust audio oscillator output to 0.34 volts. Change oscillator frequency in steps between 50 cycles and 20,000 cycles, readjusting oscillator output to 0.34 volts each time a new frequency setting is made.

Compare amplifier output voltage with readings given in "AMPLIFIER CHECKS" table.

PARTS LIST
FM-AM TUNER CHASSIS
(7N1)

RESISTORS

- R601 2.2 megohms, 1/2 watt..... 60B 8-225
- R602 10,000 ohms, 2 watts..... 60B 20-103
- R603 1 megohm, 1/2 watt..... 60B 8-105
- R604 2.2 megohms, 1/2 watt..... 60B 8-225
- R605 1 megohm, 1/2 watt..... 60B 8-105
- R606 15,000 ohms, 1/2 watt..... 60B 8-105
- R607 10,000 ohms, 1/2 watt..... 60B 8-105
- R608 150 ohms, 1/2 watt..... 60B 14-103
- R609 100 ohms, 1/2 watt..... 60B 8-151
- R610 800 ohms, 1/2 watt..... 60B 8-101
- R611 100 ohms, 1/2 watt, 5%..... 60B 7-660
- R612 88,000 ohms, 1/2 watt, 5%..... 60B 7-683
- R613 1,500 ohms, 1/2 watt, 5%..... 60B 7-152
- R614 10,000 ohms, 1/2 watt, 5%..... 60B 8-225
- R615 2.2 megohms, 1/2 watt..... 60B 8-225
- R616 6,800 ohms, 1/2 watt, 5%..... 60B 7-682
- R617 6,800 ohms, 1/2 watt, 5%..... 60B 8-105
- R618 10,000 ohms, 1/2 watt, 5%..... 60B 8-105
- R622 1.8 megohms, 1/2 watt, 5%..... 60B 7-103
- R624 6.8KΩ potentiometer control..... 75C 20-107
- R625 2,200 ohms, 1/2 watt..... 60B 8-222
- R626 1 megohm, TREBLE..... 75D 1-105
- R627 1 megohm, BASS..... 75D 1-105
- R628 100,000 ohms, 1/2 watt..... 75D 1-105
- R629 5% (used in prod. runs 10 and 11 only)..... 60B 8-104
- R630 100,000 ohms, 1/2 watt..... 60B 7-473
- R631 100,000 ohms, 1/2 watt..... 60B 8-104
- R632 5% (used in prod. runs 10 and 11 only)..... 60B 7-472
- R633 100,000 ohms, 1/2 watt..... 60B 8-103
- R634 470 ohms, 1/2 watt..... 60B 8-474
- R635 470 ohms, 1/2 watt..... 60B 8-471
- R636 22,000 ohms, 1/2 watt..... 60B 8-223
- R637 220,000 ohms, 1/2 watt..... 60B 8-224
- R638 390,000 ohms, 1/2 watt..... 60B 8-394
- R639 51,000 ohms, 1/2 watt, 5%..... 60B 7-513
- R640 51,000 ohms, 1/2 watt, 5%..... 60B 7-513
- R641 250,000 ohms, 1/2 watt..... 60B 8-105
- R642 1,000 ohms, 1/2 watt..... 60B 8-102
- R643 1,000 ohms, 1/2 watt..... 60B 8-102

NOTE: Symbol numbers R618, R619 and R620 not used.

CAPACITORS

- C601 10 mmf, 500 volts, N470 temp. coeff..... 53C 2-52
- C602 .001 mf, 500 volts..... 53C 2-53
- C603 .001 mf, 500 volts, +50 -20% cer..... 53C 2-53
- C604 Ceramic trimmer..... 53C 2-55
- C605 20 mmf, 500 volts, NPO temp. coeff..... 53C 2-56
- C606 20 mmf, 500 volts, NPO temp. coeff..... 53C 2-56
- C607 Ceramic trimmer..... 53C 2-56
- C608 8.2 mmf, 500 volts..... 53C 2-58
- C609 68 mmf, 500 volts, 5% ceramic..... 53C 2-59
- C610 10 mmf, 500 volts, N470 temp. coeff..... 53C 2-60
- C611 15 N470 temp. coeff..... 53C 2-52
- C612 10% ceramic..... 53C 2-52
- C613 10% ceramic..... 53C 2-52
- C614 NPO temp. coeff..... 53C 2-61
- C615 NPO temp. coeff..... 53C 2-61
- C616 Tuning capacitor, AM..... 86C 69
- C617 33 mmf, 500 volts, 5% cer. disc..... 86A 10-11
- C618 N1400 temp. coeff..... 85D 10-119

- †Dial Scale Window, Plastic, White Lettering (used with BROWN background and Dial Scale Window, Plastic, Black Lettering (used with ALUMINUM background..... 21C 108-1
- †Dial Scale Window, Plastic, Black Lettering (used with ALUMINUM background..... 21C 108-5
- †Dial Background, Dark Brown..... 23C 33-5
- †Dial Background, Aluminum..... 23C 33-5
- †Dial Background Extension, Dark Brown..... 15B 1757
- †Dial Background Extension, 15B 1757-2
- Dial Pointer and Carriage..... 23A 83
- Pullley, Single Groove..... 17C 1-34
- Pullley, Double Groove..... 17C 1-50
- Roller, Dial String..... 17C 1-50
- Roller, Dial String, FM tuner..... 53C 2-65
- Screw, (holds circuit board to chassis)..... 3 required
- Shield, 9 pin tube..... 53C 2-62
- Socket, Octal, Magic Eye..... 87C 7-20
- Socket, 9 pin miniature..... 87A 20-3
- Socket, 9 pin miniature, shielded..... 87B 23-2
- Spring, Contact (fits under FM tuner roller)..... 19D 1-45
- Spring, Dial String..... 19D 1-5
- Spring, Dial String, Core Return (FM tuner)..... 53C 2-57
- †Indicates matching parts.

AMPLIFIER CHASSIS (4S2)

RESISTORS

- R661 1 megohm, 1/2 watt..... 60B 8-105
- R662 4,700 ohms, 1/2 watt..... 60B 8-472
- R663 330,000 ohms, 1/2 watt..... 60B 8-334
- R664 10,000 ohms, 1/2 watt, 5%..... 60B 7-103
- R665 47,000 ohms, 1/2 watt, 5%..... 60B 7-473
- R666 470,000 ohms, 1/2 watt, 5%..... 60B 7-474
- R667 47,000 ohms, 1/2 watt, 5%..... 60B 7-474
- R668 270 ohms, 4 watts..... 60B 7-474
- R669 3,900 ohms, 2 watts, non-inductive..... 61B 20-22
- R670 100 ohms, 2 watts..... 60B 20-101
- R671 100 ohms, 2 watts..... 60B 20-101
- R672 1,000 ohms, 1/2 watt..... 60B 14-102
- R673 1,000 ohms, 1/2 watt..... 60B 14-102
- R674 1,000 ohms, 2 watts..... 60B 20-102

CAPACITORS

- C661 .022 mf, 400 volts..... 64C 24-36
- C662 .022 mf, 400 volts, mylar dielec..... 64C 24-36
- C663 50 mf, 25 volts, cer..... 65D 6-80
- C664 50 mf, 25 volts..... 67A 4-31
- C665A electrolytic..... 67D 7-33
- C665B 80 mf, 400 v..... electro-lytic
- C665C 40 mf, 300 v..... (early type)
- C665D 40 mf, 300 v..... (early type)
- C665E 50 mf, 150 v..... (later type)
- C665F 50 mf, 150 v..... (later type)
- C666A 10 mf, 250 v, electro-lytic (later paper)..... 67D 4-38
- C666B 10 mf, 250 v, electro-lytic (later paper)..... 67D 4-38
- C666C 50 mf, 150 v..... (later type)
- C666D 50 mf, 150 v..... (later type)
- C667 .047 mf, 600 volts..... 63B 12-1
- C668 4 mf, 10 volts..... 64B 13-1

TRANSFORMERS

- T608 Power Transformer..... 80B 59-1
- T609 Output Transformer..... 79C 56-8

MISCELLANEOUS CHASSIS PARTS

- CR601 Rectifier, Selenium..... 93B 1-6
- M606 Socket, Power Supply..... 88A 20-2
- M607 Socket, Audio from tuner..... 88A 1
- M612 Socket, Photo Matic P.C.C..... 88B 8-6
- M613 Socket, Speaker..... 88B 5-3
- Line Cord, 8 ft..... 87A 5-1
- Socket, Octal, Tube..... 87A 5-1

†PARTS LIST continued on next page.

COILS AND TRANSFORMERS

- L601 Choke, Filament..... 53C 2-54
- L602 Antenna, Rod..... 69B 229-1
- L603 AM Oscillator Coil..... 69A 227-1
- L604 Heater Choke..... 73A 2-3
- L605 Heater Choke..... 73A 2-3
- L606 Heater Choke..... 73A 2-12
- T601 Antenna Trans-former..... 53C 2-63
- *T602A Tuning Coil, with winding..... 53C 2-66
- T603 Tuning Core..... 53C 2-67
- T604 Former, 455 KC..... 72D 28-70
- T605 FM 1st IF Trans-former, 10.7 MC..... 53C 2-64
- T606 FM 2nd IF Trans-former, 10.7 MC..... 72D 28-68
- T607 AM 2nd IF Trans-former, 455 KC..... 72D 28-71
- *Part numbers S3C2-66 and S3C2-67 together make up T602A and T602B.

MISCELLANEOUS CHASSIS PARTS

- M601 Pilot Lamp..... 847
- M602 Pilot Lamp..... 81A 1-8
- M603 Socket, Photo Input..... 88A 1
- M604 Plug, Audio Output..... 86A 2-3
- M605 Photo Input, Power Supply..... 88A 20-1
- S601A Switch, FM-AM Photo..... 77B 76-1
- S602 Switch, ON-OFF..... 77B 77-1
- Bracket, Light Mtg..... 15A 1901
- Bracket, Pointer Slide..... 15A 1717
- Cover, for M605..... 86A 20-12

FM IF AND RF ALIGNMENT PROCEDURE USING VTVM AND AM SIGNAL GENERATOR

NOTE: For FM alignment, use a signal generator that has crystal calibration. Signal generator settings are critical for FM alignment.

- Turn receiver and amplifier on and allow 15 minutes warm-up.
- Set Volume control at minimum, Bass and Treble controls at mid-rotation.
- Rotate Selector switch to FM position.
- Use DC VTVM as output indicator. Set generator output so that indication on VTVM is 1 volt above noise level for maximum adjustments.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENT
Connect DC VTVM from "S" to ground. Voltage reading will be negative.				
1	To FM antenna terminals on FM RF sub-chassis.	107 MC	Fully open	"A", "B", "C", "D" and "E" for maximum.
Disconnect VTVM and connect between point "B" and ground.				
2	Same as "STEP 1".	107 MC	Fully open	"F" for zero reading.
Disconnect VTVM and connect between point "S" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D", "E" and "F".				
3	Same as "STEP 1". Insert a 150 ohm resistor in series with each lead.	109 MC	Fully open	"G" for maximum.
4	Same as "STEP 3".	108.4 MC	Fully open	**
5	Same as "STEP 3".	96 MC	Tune in on generator signal	***"Back" generator setting slightly and adjust "H" for maximum.

Remove signal generator and VTVM. Insert tuner into cabinet and check tracking between dial pointer and scale. It is possible to adjust RF trimmer "H" on a false peak. RF trimmer "H" may have to be readjusted if tuner is not tracked properly.

*Loosen Phillips screw that is located on tuning gang shaft. See figure 5. Loosen FM tuner string until it is slack. Perform instruction listed under "Adjustment". Remove slack in FM tuner string by rotating the washer, to which it is attached, clockwise when viewed from front of chassis. Tighten screw.

**FM tuner should be calibrated to 108.4 mc. If tension adjustment on FM tuner string is incorrect, loosen Phillips screw and change tension slightly until 108.4 MC is being received strongest. Tighten screw.

***When receiver is tuned on 96 MC, the dial pointer will be positioned at approximately mid-band (center point of dial pointer travel). Perform instructions under "Adjustment".

Remove signal generator and VTVM. Insert tuner into cabinet and check tracking between dial pointer and scale. It is possible to adjust RF trimmer "H" on a false peak. RF trimmer "H" may have to be readjusted if tuner is not tracked properly.

*Loosen Phillips screw that is located on tuning gang shaft. See figure 5. Loosen FM tuner string until it is slack. Perform instruction listed under "Adjustment". Remove slack in FM tuner string by rotating the washer, to which it is attached, clockwise when viewed from front of chassis. Tighten screw.

**FM tuner should be calibrated to 108.4 mc. If tension adjustment on FM tuner string is incorrect, loosen Phillips screw and change tension slightly until 108.4 MC is being received strongest. Tighten screw.

***When receiver is tuned on 96 MC, the dial pointer will be positioned at approximately mid-band (center point of dial pointer travel). Perform instructions under "Adjustment".

PARTS LIST (cont.)

CABINET PARTS LIST Models 392 and 393

- M614 Terminal Board, 10B 13-2
- M615 External Speaker, 8B 5-2
- M616 Speaker, Woofer, 12" (32 ohm voice coil), 7B 112-1
- M617. Sp. (32 ohm voice coil), 7B 88 91-2
- Boat, "U", tuner mounting, 28A 111
- Blond (392), 135E 411-10
- Mahogany (393), 135E 411-13
- Cover, Speaker P., Mounting, 2A 31-1
- Cover, Sub-chassis, 2A 31-1
- Escutecheon, Dial Gold finish, 23C 294-2
- Escutecheon, "Hi Fidelity", 23D 303
- G for Mahogany cabinet (392), 36D 86-39
- G for Blond cabinet (393), 36D 86-40
- Knobs and Associated Parts, 37A 106-2
- Tuning, Beige, 33C 254-6
- Speaker, AMI-PM-Phono, 33C 254-7
- Gold, 33C 254-1

- On-Off Volume, Loudness, and Compensator, Beige**
- 33C 254-8
 - 33C 254-9
 - 37B 132-4
 - 37C 170-5
 - Leg, Cabinet Brass, 37C 170-5
 - Lid Support, Brass Plated, 80D 64-3
 - Order for cabinets and certain parts will not be filled unless full details are given with the order and the damaged part cannot be repaired economically.

RECORD CHANGER PARTS RC637-8

- For complete record changer service info, see "Parts List" under "Changer" in this manual.
- M608 Plug, Phono Output, 88A 2-3
 - M609 Cartridge, Pick-up assembly with twin sapphire-tipped needles, 409B 20
 - M610 Motor, Record Changer, 407C 24
 - M611 Plug, Phono Motor AC, 88A 8-5
 - M604 Switch, OFF-ON, 408A 1
 - Adapter, 45 RPM Record (envelope of 3), 48A 8-2

AM IF AND RF ALIGNMENT PROCEDURE

- Turn receiver and amplifier on and allow 15 minutes warm-up.
- Use lowest setting of signal generator capable of producing adequate indication on lowest scale of output meter.
- Set Volume control at maximum, Bass and Treble controls at mid-rotation.
- Rotate Selector switch to AM position.
- Connect output meter across speaker voice coil.
- Repeat adjustments to insure good results.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENT
To aitor planes, antenna section of gang tuning capacitor.				
1	Same as "STEP 1".	455 KC	Fully open	"J", "K", "L" and "M" for maximum.
Disconnect VTVM and connect between point "S" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D", "E" and "F".				
2	Same as "STEP 1".	1620 KC	Fully open	"N" for maximum.
Disconnect VTVM and connect between point "S" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D", "E" and "F".				
3	Radiated signal. Loop of several turns of wire or place generator lead close to receiver for signal pickup.	1400 KC	Tune in on generator signal	"P" for maximum.

*Adjustments "K" and "M" are made from bottom of chassis.

VOLTAGE DATA

Voltages shown on schematic diagram. All measurements, except some filament voltages, are taken with respect to chassis ground.

- Measured on 117 volts AC, 60 cycle line.

DIAL STRINGING

To accomplish dial stringing, remove the dial background bracket and string the dial in accordance with figure 4 or 5, whichever is proper.

- 413A 11-5 Cable, Shielded Pick-up, 20" (Type AMB)
- 413A 13-2 Shielded Lead
- G000B 601 Centerpoint Assembly
- 403D 63-3 Escutechon, Phono, Gold (fits around turntable)
- 403D 64-5 K (fits around turntable)
- 98C 15-72 Needle Assembly (001" standard sapphire-tipped needles)
- 98C 15-43 Needle Assembly (001" and .003" standard sapphires)
- 98C 15-45 Tipped needles
- 98C 15-15 Replacement Parts for 98C 15-43
- 98C 15-47 Idler Wheel, Molded
- 98C 15-58 Drive Bell, 16 and 32 RPM
- 98C 15-59 Drive Spring, 16 RPM
- 98C 15-61 Drive Spring, 32 RPM
- 4003B 645-2 Spindle, 45 RPM Adapter
- 403A 136-2 Spinning Ring
- 403D 65-3 Tone Arm Rest (Corn)

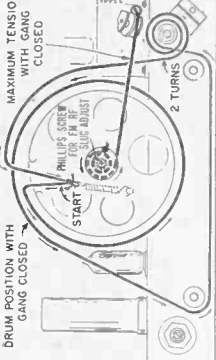


Figure 4. Dial Stringing (Early Production).

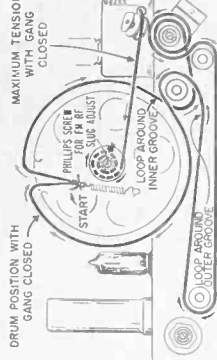


Figure 5. Dial Stringing (Present Production).

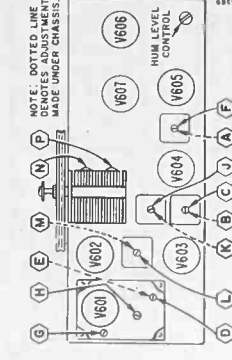


Figure 6. Top View of Tuner Chassis. Tube locations and alignment points shown.

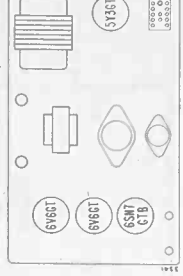
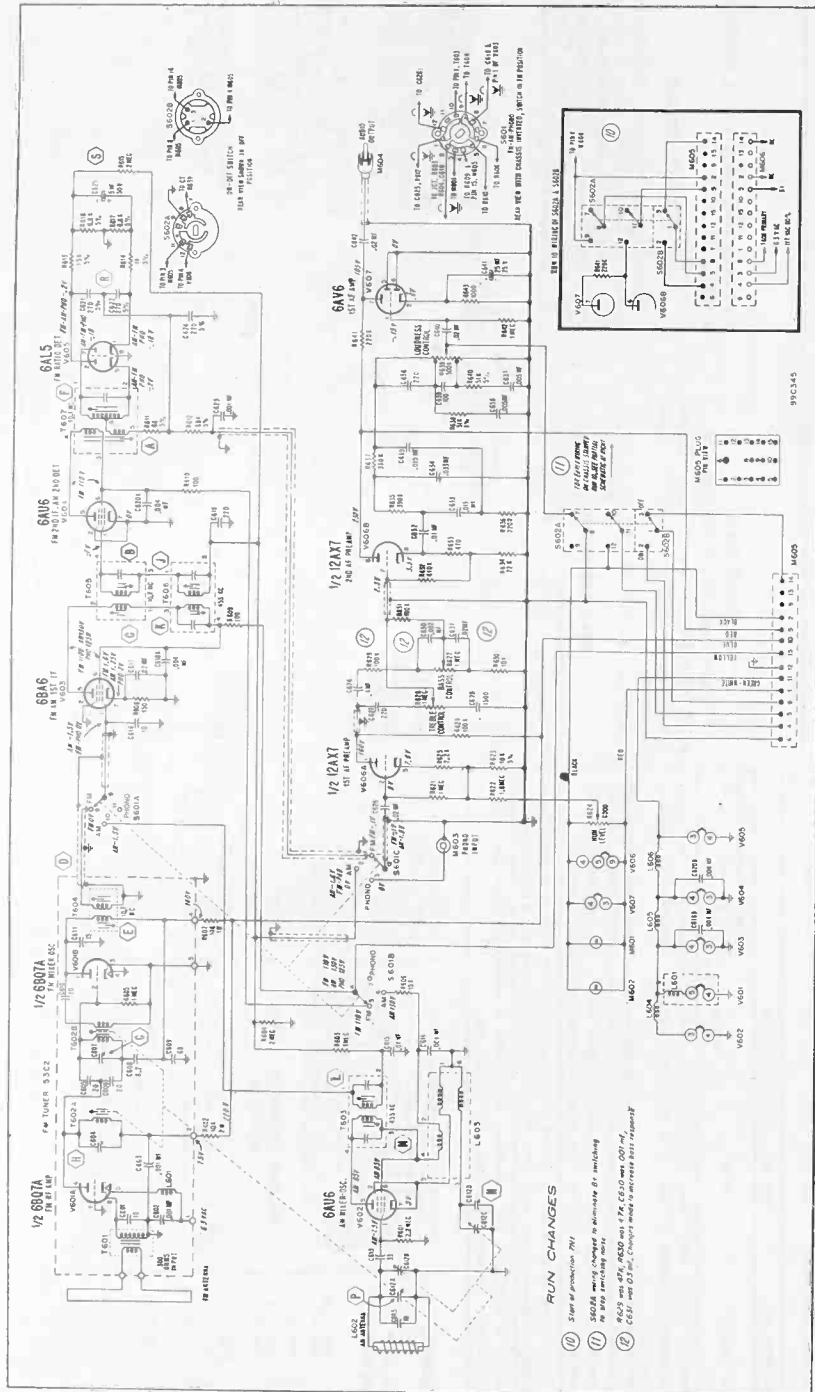
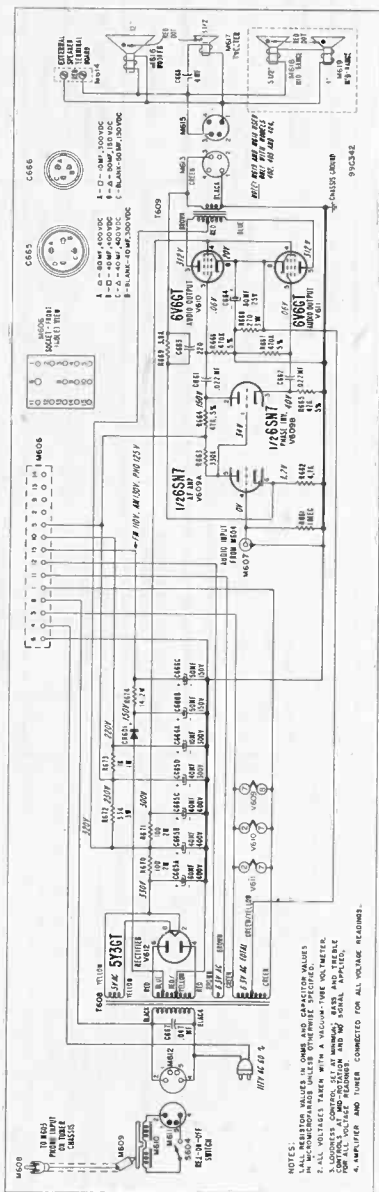


Figure 7. Top View of Amplifier Chassis. Tube locations shown.



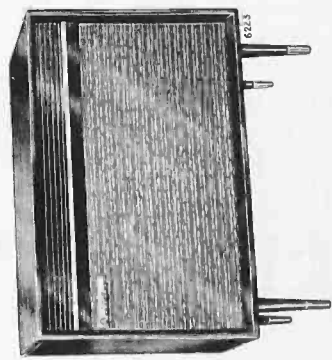
4S2



High-Fidelity FM-AM Radio Phonograph

8H1 FM-AM TUNER and 4S2 HI-FI AMPLIFIER

For complete Record Changer servicing information, see SERVICE MANUAL S800.



HI-FI FM-AM CONSOLE PHONOGRAPH

MODEL	COLOR	CHASSIS	RECORD CHANGER
402	Mahogany	8H1	RC 637-2
403	Blond	and	
404	Sierra	4S2	

CHASSIS REMOVAL

- To remove amplifier chassis from cabinet:
1. Disconnect line cord from power source.
 2. Disconnect record changer power plug (M611), speaker plug (M615), tuner audio output plug (M604), and power input plug (M606) from tuner chassis.
 3. Remove screws that hold chassis to cabinet.
- To remove FM-AM tuner from cabinet:
1. Remove control knobs from tuner front panel and phono output plug (M608) from tuner chassis.
 2. Disconnect FM antenna from terminal board and remove terminal board from cabinet.
 3. Support tuner from bottom and remove 4 hex nuts and lock washers that hold tuner chassis to cabinet. Carefully remove tuner chassis from cabinet.
- To remove FM RF tuner sub-chassis:
1. Remove four screws that hold sub-chassis and disconnect wires from antenna terminals.
 2. Disconnect cable from pin 8 on S601.
 3. Lift sub-chassis up for servicing. DO NOT disconnect FM tuner dial cord.

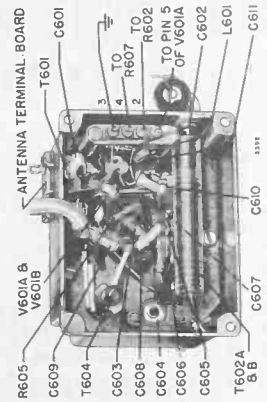


Figure 2. Bottom View of FM Tuner Sub-chassis. Location of components shown.

SPECIFICATIONS

- FREQUENCY RESPONSE:**
AMPLIFIER—Amplifier section flat from 50 to 20,000 cycles within 1 db at 10 watts output.
PRE-AMPLIFIER—At 1 watt level, Bass control gives 31 db change at 100 cycles and Treble control gives 26 db change at 10,000 cycles.
DISTORTION—3% at 12 watts.
POWER OUTPUT—17 watts maximum.
POWER CONSUMPTION—100 watts.
POWER SUPPLY—117 volts AC, 60 cycle only. (Phonograph can be converted to 50 cycle operation. See "RECORD CHANGER PARTS", "Kit, 50 Cycle Conversion".)
SPEAKER SYSTEM—Woofer, 12" PM; Mid-range, 5 3/4" PM; Mid-range, 4" PM; Tweeter, 3 1/2" PM.

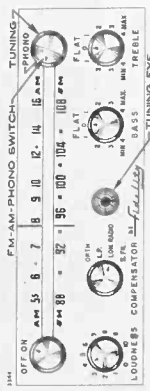


Figure 1. Operating Controls.

TROUBLE SHOOTING HINTS

- Tube locations for the tuner and amplifier are shown on figures 6 and 7. Alignment pointers for the tuner are shown on figure 6.
- Tubes may be reached from rear of cabinet for replacement purposes.
- B+ voltages and filament voltages for tuner are furnished by power supply on amplifier chassis.
- By placing a jumper wire between lugs 4 and 8 of M606, the amplifier may be serviced separately.
- NOTE:** When amplifier is serviced separately, voltage readings will be higher due to the reduced load on the power supply.
- Tuning** Eye tube is mounted vertically on front of chassis. To remove tube, grasp at base and work downward, out of its clip, until it is free.
- HUM LEVEL:** Excessive hum can often be minimized by reversing line cord plug in wall outlet. Move Rej-On-Off pointer to "ON". Touch record changer centerpost and note hum level. Reverse line cord in wall outlet; touch centerpost again, and again note hum level. Leave line cord in position giving least hum.
- A Hum Level control is located on the tuner chassis, see figure 6. Hum may be further reduced, if necessary, by adjusting this control.

RECORD CHANGER SERVICING

- For complete record changer service information, see Service Manual S800.
- If it becomes necessary to remove record changer from its mounting board, remove the three large washer-head screws extending through bottom of the mounting board. With these screws removed, the three springs which "float" the record changer may be loose. Lift record changer from the mounting board, being careful to retain mounting screws for installation.

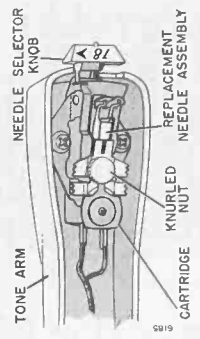


Figure 3. Needle Replacement.

NEEDLE REPLACEMENT

A worn needle causes "scratch" and a harshness of high tones in the output. Damage to records may be caused by worn needles.

To replace needle assembly, refer to figure 3 and loosen the knurled nut that is located under the eartridge. Slip the worn needle assembly out and insert the new needle assembly in the exact same position. Tighten the knurled nut.

See "RECORD CHANGER PARTS" for replacement cartridge and needles.

AMPLIFIER CHECKS	
LOADING CONTROL	Fully Clockwise
TABLE CONTROL	Mid Rotation
AMPLIFICATION CHECK	
AUDIO GENERATOR OUTPUT	Frequency 1000 Cycles Volts 0.34 Volts
AMPLIFIER OUTPUT	Watts 10 Watts 5.6 Volts
FREQUENCY RESPONSE CHECK	
AUDIO GENERATOR OUTPUT	Frequency In steps from 50 to 20,000 Cycles Volts 0.34 Volts
AMPLIFIER OUTPUT	Volts 5.6 Volts ±0.5 V.
	Db ±1 Db

AMPLIFICATION AND RESPONSE CHECK

The amplifier may be checked for gain and frequency response by using the tests outlined below.

TEST EQUIPMENT:
 Audio Oscillator, preferably with flat output from 50 cycles to 20 kilocycles.
 Vacuum Tube Voltmeter, preferably with decibel scale.

PROCEDURE: Disconnect phono power plug (M611). Disconnect phono output plug (M608) from socket (M603) on tuner chassis. The oscillator signal is to be injected into socket (M603) on tuner chassis. This enables the checking of the preamplifier and amplifier for amplification and frequency response. Measurements taken with FM-AM Phono switch in "PHONO" position.

Connect audio oscillator ground to chassis. Connect signal lead to phono input (M603). Allow several minutes warm-up for oscillator and amplifier. Set Loudness, Bass, and Treble controls as shown in "AMPLIFIER CHECKS" table.

To check amplification, adjust audio oscillator output to 0.34 volts at 1,000 cycles, measured from M603 to ground with a vacuum tube voltmeter. Connect a 3.2 ohm resistive load across secondary of T609 (audio output transformer). Measure output voltages across the load.

To check frequency response, set "Compensator" control to "LOW RADIO" and adjust oscillator output to 0.34 volts. Change oscillator frequency in steps between 50 cycles and 20,000 cycles. Readjust oscillator output to 0.34 volts each time a new setting is made.

Compare amplifier output voltage with readings given in "AMPLIFIER CHECKS" table.

PARTS LIST FM-AM TUNER CHASSIS (8HT1)

RESISTORS

- R601 2.2 megohms, 1/2 watt, 60B 8-225
R602 10,000 ohms, 1/2 watt, 60B 20-103
R603 1 megohm, 1/2 watt, 53C 2-51
R604 22 megohms, 1/2 watt, 53C 2-51
R605 15,000 ohms, 1/2 watt, 60B 8-105
R606 15,000 ohms, 1/2 watt, 60B 8-153
R607 10,000 ohms, 1 watt, 60B 14-103
R608 100 ohms, 1/2 watt, 60B 8-101
R609 100 ohms, 1/2 watt, 60B 8-101
R610 88 ohms, 1/2 watt, 5% 60B 8-101
R611 68 ohms, 1/2 watt, 5% 60B 7-683
R612 1,500 ohms, 1/2 watt, 5% 60B 7-152
R613 1,500 ohms, 1/2 watt, 5% 60B 7-102
R614 1,000 ohms, 1/2 watt, 5% 60B 7-102
R615 800 ohms, 1/2 watt, 5% 60B 7-682
R616 800 ohms, 1/2 watt, 5% 60B 7-682
R617 6,800 ohms, 1/2 watt, 5% 60B 7-682
R618 1 megohm, 1/2 watt, 60B 8-105
R619 1 megohm, 1/2 watt, 60B 8-105
R620 33,000 ohms, 1/2 watt, 60B 8-333
R621 1 megohm, 1/2 watt, 60B 8-105
R622 10,000 ohms, 1/2 watt, 5% 60B 8-105
R623 10,000 ohms, 1/2 watt, 5% 60B 7-103
R624 6,000 ohms, HUM 60B 7-103
R625 1 megohm, 1/2 watt, 75C 20-107
R626 1 megohm, 1/2 watt, 60B 8-222
R627 1 megohm, TREBLE 75D 1-105
R628 1 megohm, BASS 75D 1-105
R629 100,000 ohms, 1/2 watt, 60B 8-104
R630 47,000 ohms, 1/2 watt, 60B 8-104
R631 5% (used in prod. runs 10 and 11 only), 60B 7-473
R632 100,000 ohms, 1/2 watt (used in prod. runs 10 and 11 only), 60B 8-104
R633 4,700 ohms, 1/2 watt, 60B 8-104
R634 5% (used in prod. runs 10 and 11 only), 60B 7-472
R635 10,000 ohms, 1/2 watt (used in prod. run 12 and later), 60B 8-103
R636 100,000 ohms, 1/2 watt, 60B 8-104
R637 470,000 ohms, 1/2 watt, 60B 8-474
R638 220,000 ohms, 1/2 watt, 60B 8-223
R639 330,000 ohms, 1/2 watt, 60B 8-334
R640 220,000 ohms, 1/2 watt, 60B 8-224
R641 180,000 ohms, 1/2 watt, 60B 8-184
R642 82,000 ohms, 1/2 watt, 60B 8-823
R643 120,000 ohms, 1/2 watt, 60B 8-124
R644 120,000 ohms, 1/2 watt, 60B 8-124
R645 120,000 ohms, 1/2 watt, 60B 8-124
R646 120,000 ohms, 1/2 watt, 60B 8-124
R647 120,000 ohms, 1/2 watt, 60B 8-124

CAPACITORS

- C601 10 mf, 500 volts, 10% ceramic, 64C 24-36
C602 10 mf, 500 volts, 5% cer. disc, 64C 24-36
C603 10 mf, 500 volts, 5% cer. disc, 64C 24-36
C604 10 mf, 500 volts, 5% cer. disc, 64C 24-36
C605 20 mf, 500 volts, 5% ceramic, 64C 24-36
C606 20 mf, 500 volts, 5% ceramic, 64C 24-36
C607 NPO temp. coeff., 64C 24-36
C608 8.2 mf, 500 volts, 10% cer. P100, 64C 24-36
C609 68 mf, 500 volts, N750 temp. coeff., 64C 24-36
C610 10 mf, 500 volts, 5% ceramic, 64C 24-36
C611 15 mf, 500 volts, N470 temp. coeff., 64C 24-36
C612 15 mf, 500 volts, NPO temp. coeff., 64C 24-36
C613 33 mf, 500 volts, 5% cer. disc, 64C 24-36
C614 33 mf, 500 volts, 5% cer. disc, 64C 24-36
C615 33 mf, 500 volts, 5% cer. disc, 64C 24-36
C616 10 mf, 500 volts, 10% cer. disc, 64C 24-36
C617 .02 mf, 500 volts, NPO temp. coeff., 64C 24-36
C618 10 mf, 500 volts, 10% cer. disc, 64C 24-36
C619 220 mf, 500 volts, cer. 65D 6-80
C620 220 mf, 500 volts, cer. 65D 6-80
C621 270 mf, 500 volts, 5% mica, 65B 1-4
C622 270 mf, 500 volts, 5% mica, 65B 1-4
C623 .001 mf, 500 volts, 65D 10-43
C624 270 mf, 500 volts, 5% mica, 65B 1-4
C625 5 mf, 50 volts, 65B 1-4
C626 .02 mf, 500 volts, 67B 4-37
C627 GMV, ceramic disc, 65D 10-28
C628 220 mf, 500 volts, cer. 65D 6-80
C629 .0015 mf, 500 volts, mylar dielec., 64C 24-32
C630 .001 mf, 500 volts, cer. disc (used in prod. runs 10 and 11 only), 65D 10-53
C631 10 mf, 500 volts, paper run 12 and later, 65D 10-125
C632 10 mf, 500 volts, paper run 10 and 11 only, 64B 1-23
C633 01 mf, 400 volts, paper 64B 1-25
C634 015 mf, 200 volts, 64B 1-25
C635 033 mf, 600 volts, 64B 2-26
C636 01 mf, 500 volts, ceramic disc, 64C 25-10
C637 005 mf, 500 volts, ceramic disc, 64B 2-26
C638 220 mf, 500 volts, cer. 65D 6-80
C639 100 mf, 500 volts, cer. 65D 6-3
C640 25 mf, 15 volts, paper, 64B 1-24
C641 .02 mf, 500 volts, electrolytic, 67B 4-30
C642 220 mf, 500 volts, 65D 10-28
C643 220 mf, 500 volts, ceramic disc, 65D 6-80
C644 680 mf, 1000 volts, 10% ceramic disc, 65D 10-43
C645 880 mf, 1000 volts, 10% ceramic disc, 65D 10-43
C646 680 mf, 1000 volts, 10% ceramic disc, 65D 10-43
C647 10 mf, 500 volts, 10% ceramic disc, 65D 6-44

COILS AND TRANSFORMERS

- L601 Choke, Filament, 53C 2-54
L602 Antenna, Rod, 68B 229-1
L603 Resistor Coil, 73A 2-1
L604 Heater Choke, 73A 2-13
L605 Heater Choke, 73A 2-12
L606 Heater Choke, 73A 2-12
L607 Tuning Coil, with former, complete, 53C 2-63
T601 Tuning Coil, with winding, 53C 2-66
T602 AM 1st LF Trans., 53C 2-67
T603 FM 2nd IF Trans., 53C 2-66
T604 FM 1st IF Trans., 72D 28-70
T605 former, 10.7 MC, 72D 28-68
T606 FM 2nd IF Trans., 72D 28-71
T607 FM Ratio Detector, 72D 28-69
*Part numbers and 53C2-67 together make up T602A and T602B

MISCELLANEOUS CHASSIS PARTS

- M601 Pilot Lamp, #47, 81A 1-8
M602 Socket, Photo Input, 88A 1-8
M603 Socket, Photo Input, 88A 1-8
M604 Plug, Audio Output, 88A 2-3
M605 Plug, Photo Input, 88A 2-1
M606 Supply, 88A 20-1
S601A Switch, FM-AM Photo 7B 76-1
S601B Switch, C.C., 77B 77-1
S602 Switch, ON-OFF, 77B 77-1

- S603 Switch, Record Com- 77B 9c-4
Cover, for Magic Eye Socket, 88A 17
Bracket, Tuning Sleeve, 15A 1001
Bracket, Pilot Light, 15A 1717
Bracket, Pilot Light, 15A 1717-1
Cover, for M605, 88A 20-12
1 Dial Scale Window, Plastic, with BROWN background and extension, 21C 108-2
1 Dial Scale Window, Plastic, with BROWN background and extension, 21C 108-4
ALUMINUM background and extension, 21C 108-4
1 Dial Background, Aluminum, 22C 33-6
1 Dial Background Extension, 15B 1757
1 Dial Background Extension, 15B 1757-2
Aluminum, 15B 1757-2
Pulley, Slotted, Carriage, 27C 834
Pulley, Slotted, Carriage, 27C 834
Pulley, Double Groove, 17C 1-50
Roller (holds FM tuner socket), 87B 23-2
Socket, 7 pin miniature, 87B 23-2
Spring, Conical (file under Spring, Dial String), 10D 1-45
Spring, Tuning Core Return (for tuner), 10D 1-45
1 Indicator, Choking parts, 53C 2-57
1 Indicates matching parts.

AMPLIFIER CHASSIS (4S2)

- R661 1 megohm, 1/2 watt, 60B 8-105
R662 4,700 ohms, 1/2 watt, 60B 8-472
R663 47,000 ohms, 1/2 watt, 60B 9-474
R664 47,000 ohms, 1/2 watt, 5% 60B 7-474
R665 47,000 ohms, 1/2 watt, 5% 60B 7-473
R666 470,000 ohms, 1/2 watt, 60B 7-474
R667 470,000 ohms, 1/2 watt, 60B 7-474
R668 270 ohms, 4 watts, 60B 7-474
R669 3,900 ohms, 1/2 watt, 61B 20-22
R670 100 ohms, 2 watts, 60B 20-101
R671 330 ohms, 2 watts, 60B 20-101
R672 330 ohms, 2 watts, 60B 20-101
R673 1,000 ohms, 1 watt, 60B 14-102
R674 1,000 ohms, 2 watts, 60B 20-102

CAPACITORS

- C661 .022 mf, 400 volts, 64C 24-36
C662 220 mf, 500 volts, cer. 65D 6-80
C663 220 mf, 500 volts, cer. 65D 6-80
C664 50 mf, 25 volts, 67A 4-31
C665A 80 mf, 400 v, electro- 67D 7-33
C665B 40 mf, 400 v, lytic 67D 7-33
C665C 40 mf, 400 v, lytic 67D 7-33
C666A 10 mf, 300 v (early 67D 7-34
C666B 50 mf, 150 v, produc- 67D 7-34
C666C 50 mf, 350 v, (don't 67B 4-38
C666A 1 lytic (later prod.) 67B 4-38
C666B 50 mf, 150 v, (elect. 67D 7-31
C666C 50 mf, 150 v, (later 67D 7-31
C667 .047 mf, 600 volts, 63B 12-1
C668 4 mf, 10 volts, 64B 13-1

TRANSFORMERS

- T608 Power Transformer, 80B 59-1
T609 Output Transformer, 79C 56-8

MISCELLANEOUS CHASSIS PARTS

- C8601 Rectifier, Selenium, 93B 1-6
M606 Socket, Power Supply, 88A 20-2
M607 Socket, Audio from tuner, 88A 1
M612 Socket, Photo, 88B 8-6
M613 Socket, Speaker, 88B 5-3
Line Cord, 8 ft., 89B 1-1
Socket, Octal, Tube, 87A 1-1

PARTS LIST continued on next page.

FM IF AND RF ALIGNMENT PROCEDURE USING VTVM AND AM SIGNAL GENERATOR

NOTE: For FM alignment, use a signal generator that has crystal calibration. Signal generator settings are critical for FM alignment.

- Turn receiver and amplifier on and allow 15 minutes warm-up.
- Set Volume control at minimum, Bass and Treble at mid-rotation.
- Rotate Selector switch to FM position.
- Use DC VTVM as output indicator. Set generator output so that indication on VTVM is 1 volt above noise level for maximum adjustments.
- Use a non-metallic alignment tool with tip 3/32" wide for transformer adjustments.
- Refer to figure 6 for physical location of alignment points.
- Use unmodulated signal for alignment.
- Repeat adjustments to insure good results.
- Adjustments "A", "B", "C", "D", and "E" made from beneath chassis.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENT
Connect DC VTVM from "5" to ground. Voltage reading will be negative.				
1	To FM antenna terminals on RF sub-chassis.	10.7 MC	Fully open	"A", "B", "C", "D", and "E" for maximum.
Disconnect VTVM and connect between point "5" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D", and "E".				
2	Same as "STEP 1".	10.7 MC	Fully open	"F" for zero reading.
Disconnect VTVM and connect between point "5" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D", and "E".				
3	Same as "STEP 1". Insert a 150 ohm resistor in series with each lead.	109 MC	Fully open	"G" for maximum.
4	Same as "STEP 3".	108.4 MC	Fully open	**
5	Same as "STEP 3".	96 MC	Tune in on generator signal	***Rock* generator string slightly and adjust "H" for maximum.

Remove signal generator and VTVM. Insert tuner into cabinet and check tracking between dial pointer and scale. It is possible to adjust RF trimmer "H" on a false peak. RF trimmer "H" may have to be readjusted if tuner is not tracked properly.

- *Loosen Phillips screw that is located on tuning gang shaft. See figure 5. Loosen FM tuner string until it is slack. Perform instruction listed under "Adjustment". Remove slack in FM tuner string by rotating the washer, to which it is attached, clockwise when viewed from front of chassis. Tighten screw.
- **FM tuner should be calibrated to 108.4 mc. If tension adjustment on FM tuner string is incorrect, loosen Phillips screw and change tension slightly until 108.4 MC is being received strongest. Tighten screw.
- ***When receiver is tuned on 96 MC, the dial pointer will be positioned at approximately mid-band (center point of dial pointer travel). Perform instructions under "Adjustment".

PARTS LIST (cont.)

CABINET PARTS LIST

- Models 402, 403 and 404
- M614 Terminal Board, 10B 12-2
 - M615 Plug Speaker, 88B 5-2
 - M616 Speaker, Woofer, 12" 88B 112-1
 - M617 Speaker, Tweeter, 12" 78B 91-2
 - M618 Speaker, Mid-Range, 5 1/4" 78B 110-4
 - M619 Speaker, Mid-Range, 4" 78B 94-6
 - Bolt, "U", tuner mounting, 25A 111
 - Mahogany (402), 835E 112-12
 - Sierra (403), 535E 112-11
 - Clip, Eccutcheon Mounting, 2A 31-1
 - Speaker, Diaphragm, 16" (M615), 23E 289-2
 - Eccutcheon, "hi fidelity", 23D 303-2
 - Ferrule, Leg, 37B 123
 - Hinge, Lid, 36D 86-36
 - for Mahogany Cabinet (402), 36D 86-36
 - for Blond Cabinet (403), 36D 86-37
 - for Birch Cabinet (404), 36D 86-38
 - Hinge, Lid, 37A 106-2

RECORD CHANGER PARTS

- Knobs and Associated Parts, 33C 254-6
 - Selector, AM-FM-Phono, 33C 254-7
 - Gold Volume, Loudness, Bass, Treble or Compensator, Beige 18A 5-12
 - Comp. Cotton Ring, 18A 5-12
 - Legs, Cabinet, 33C 254-8
 - Mahogany, (Model 402) 33E 115-52
 - Monogram, "A" (Model 404) 33E 112-52
 - Lid Support, Brass Plated, 33E 403-62
 - Program, "A" (pins and cast) 26C 68-3
 - parts will not be filled unless full details are given with the order and the damaged part is returned with the order.
- For complete dealer service information, see Service Manual S800.
- M608 Plug, Phono Output, 88A 2-3
 - M609 Cartridge Pickup assembly, with twin sapphire-tipped 409B 27-2
 - M610 Motor, Record Changer, 407C 24
 - M611 Belt, Motor AC, 407C 24
 - M604 Switch, "REJ-ON-OFF", 408A 1

AM IF AND RF ALIGNMENT PROCEDURE

- Turn receiver and amplifier on and allow 15 minutes warm-up.
- Use lowest setting of signal generator capable of producing adequate indication on lowest scale of output meter.
- Set Volume control at maximum, Bass and Treble controls at mid-rotation.
- Rotate Selector switch to AM position.
- Connect output meter across speaker voice coil.
- Repeat adjustments to insure good results.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENT
To stator plates, antenna section of gang tuning capacitor.				
1	Same as "STEP 1".	455 KC	Fully open	"K", "L", "M" and "N" for maximum.
2	Same as "STEP 1".	1620 KC	Fully open	"N" for maximum.
Radiated signal. Loop of several turns of wire or plate generator lead close to receiver for signal pickup.				
3	Same as "STEP 1".	1400 KC	Tune in on generator signal	"P" for maximum.

*Adjustments "K" and "M" are made from bottom of chassis.

VOLTAGE DATA

- Voltages shown on schematic diagram.
- All measurements, except some filament voltages, are taken with respect to chassis ground.
- Measured on 117 volts AC, 60 cycle line.

DIAL STRINGING

To accomplish dial stringing, remove the dial background bracket and string the dial in

accordance with figure 4 or 5, whichever is proper.

POINTER SETTING

Set tuning gang fully open. With dial background bracket removed, place pointer carriage on top edge of pointer glide frame. Slide dial pointer to right until it is positioned at right edge of pointer glide frame. Place dial string in pointer carriage and fasten securely.

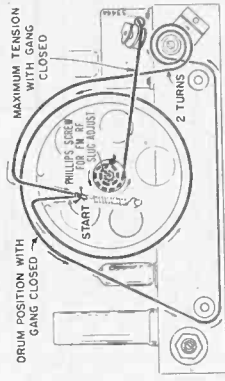


Figure 4. Dial Stringing (Early Production).

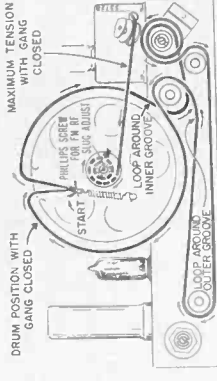


Figure 5. Dial Stringing (Present Production).

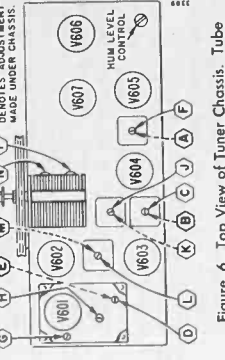


Figure 6. Top View of Tuner Chassis. Tube locations and alignment points shown.

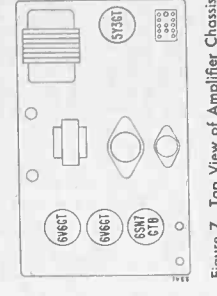
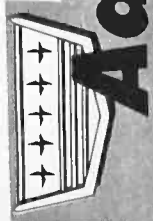


Figure 7. Top View of Amplifier Chassis. Tube locations shown.

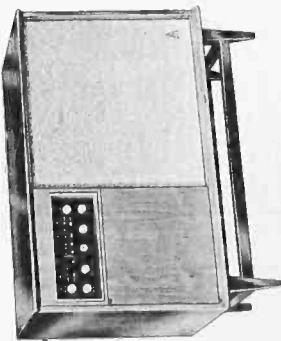


High-Fidelity FM-AM Radio Phonograph

Admiral

8H1 FM-AM TUNER and 6D3 HI-FI AMPLIFIER

HI-FI FM-AM CONSOLE PHONOGRAPH



MODEL	COLOR	CHASSIS	RECORD CHANGER
412	MAHOGANY	8H1 and 6D3	RC637 -3F
413	BLOND		
414	SIERRA		

- Disconnect FM antenna from terminal board and remove terminal board from cabinet.
- Remove four hex nuts that hold tuner in cabinet. Slide chassis out of cabinet and remove metal cover from chassis bottom to expose circuitry.

TO REMOVE FM RF TUNER SUB-CHASSIS:

- Remove four screws that hold sub-chassis and disconnect wires from antenna terminals.
- Disconnect cable from pin 8 on S601.
- Lift sub-chassis up for servicing. DO NOT disconnect FM tuner dial cord.

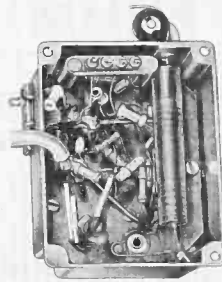


Figure 2. Bottom View of FM Tuner Sub-chassis. Location of components shown.

TROUBLE SHOOTING HINTS

Tube locations for the tuner and amplifier are shown on figures 6 and 7. Alignment points for the tuner are shown on figure 6.

Tubes may be reached from rear of cabinet for servicing purposes.

B+ voltages and filament voltages for tuner are furnished by power supply on amplifier chassis.

By placing a jumper wire between lugs 4 and 8 of M606, the amplifier may be serviced separately.

NOTE: When amplifier is serviced separately, voltage readings will be higher due to the reduced load on the power supply.

Tuning Eye tube is mounted horizontally under chassis. To remove tube, grasp at base and work backward, out of its clip, until it is free.

SPECIFICATIONS

FREQUENCY RESPONSE:

AMPLIFIER—Amplifier section flat from 30 to 20,000 cycles within 2 db at 10 watts output.

PRE-AMPLIFIER—At 1 watt level, Bass control gives 26.5 db change at 100 cycles and Treble gives 32 db change at 10,000 cycles.

DISTORTION—Less than 1% at 10 watts output.

POWER OUTPUT—38 watts maximum.

POWER CONSUMPTION—155 watts.

POWER SUPPLY—117 volts AC, 60 cycle only. (Phonograph can be converted to 50 cycle operation. See "RECORD CHANGER PARTS"; KIT, 50 cycle Conversion.)

SPEAKER SYSTEM—Woofer, 15" PM; Mid-Range, 8" PM; Mid-Range, 5 1/4" PM; Tweeter, 3 1/2" PM.

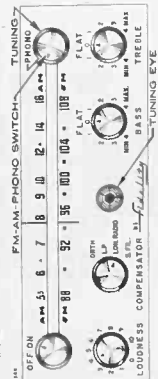


Figure 1. Operating Controls.

CHASSIS REMOVAL

To remove amplifier chassis from cabinet:

- Disconnect line cord from power source.
- Disconnect tuner power socket (M606), amplifier audio output plug (M619), record changer power plug (M614), tuner audio output plug (M604), and aux. input plug (M616).
- Remove screws that hold chassis to cabinet.

- To remove FM-AM tuner from cabinet:
 - Remove control knobs from tuner front panel and phono output plug (M611).

HUM LEVEL: Excessive hum can often be minimized by reversing line cord plug in wall outlet. Move **Ref-On-Off** pointer to "ON". Touch record changer centerpost and note hum level. Reverse line cord in wall outlet; touch centerpost again and again note hum level. Leave line cord in position giving least hum.

A **Hum Level** control is located on the tuner chassis, see figure 6. Hum may be further reduced, if necessary, by adjusting this control.

RECORD CHANGER SERVICING

For complete record changer service information, see Service Manual S800.

To remove record changer from its mounting board, remove the three large washer-head screws extending through bottom of the mounting board. With these screws removed, the three springs, which "float" the record changer may be loose. Lift record changer from the mounting board, being careful to retain mounting screws for installation.

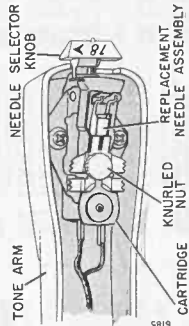


Figure 3. Needle Replacement.

NEEDLE REPLACEMENT

A worn needle causes "scratch" and a harshness of high tones in the output. Damage to records may be caused by worn needles.

To replace needle assembly, refer to figure 3 and loosen the knurled nut that is located under the cartridge. Slip the worn needle assembly out and insert the new needle assembly in the exact same position. Tighten the knurled nut.

See "RECORD CHANGER PARTS" for replacement cartridge and needles.

AMPLIFICATION AND RESPONSE CHECK

The pre-amplifier and amplifier may be checked for gain and frequency response by performing the tests outlined below and referring to the "AMPLIFIER CHECKS" table.

TEST EQUIPMENT:

Audio Oscillator, with flat frequency response across the audio range.

Vacuum Tube Voltmeter, preferably with decibel (db) scale.

PROCEDURE: Connect tuner and amplifier and allow time for warm-up. It is not necessary to connect the record changer at this time. Disconnect audio output plug (M619) and connect a 3.2 ohm, 30 watt resistive load across the secondary of audio output transformer (T609).

AMPLIFIER CHECKS

AMPLIFICATION CHECK	FREQUENCY	VOLTS
AUDIO GENERATOR OUTPUT	1,000 Cycles	0.2 Volts
AMPLIFIER OUTPUT	VOLTS OUT	WATTS OUT
	13.3 Volts	22 Watts

FREQUENCY RESPONSE CHECK	AMPLIFIER OUTPUT VOLTAGE	DB CHANGE		
Freq.	Voltage	Boost	Cut	
100 cycles	5.15 volts	21	+4	-21.5
1,000 cycles	5.035 volts	2.9	0	0
10,000 cycles	5.035 volts	31	+12.5	-19.5

*For .035 volts input to M603, refer to "FREQUENCY RESPONSE CHECK" portion of following text.

Connect audio oscillator output from phono input socket (M603) to ground. Before proceeding, adjust **HUM LEVEL** control for minimum hum.

TO CHECK AMPLIFICATION, set controls as shown in the table under "AMPLIFICATION CHECK". Adjust audio oscillator output to 0.2 volts at 1,000 cycles, as measured from phono input socket (M603) to ground. Measure output voltage across 3.2 ohm load and compare with the reading in the table.

FREQUENCY RESPONSE CHECK: Set controls to positions shown in "FREQUENCY RESPONSE CHECK" table. Leave the oscillator connected as shown previously.

If a vacuum-tube voltmeter, that can measure 0.035 volts, is not available, construct a series network consisting of a 100,000 ohm, 5% resistor and a 3,900 ohm, 5% resistor. Connect this network across the generator output and then connect the 3,900 ohm resistor between socket (M603) and ground. Apply 1 volt across this network and the proper input voltage for frequency response measurements will be applied to M603.

Apply 1 volt at 1,000 cycles to amplifier at M603 and vary the Bass and Treble controls. The output voltage, measured across the 3.2 ohm load, should not appreciably change.

Apply 1 volt at 100 cycles. Vary Bass control and measure output. At MAX (Boost), output voltage should be 5.15 volts and, at MIN (Cut), the output voltage should be 0.22 volts. The change of voltage in the output will give a 26.5 db change in bass response.

Apply 1 volt at 10,000 cycles. Vary Treble control to both extremes and measure the output. At MAX (Boost), output voltage should be 12.2 volts and at MIN (Cut), output voltage should be 0.31 volts. This change of output voltage gives a 32 db change in treble response.

NOTE: Voltage readings for the frequency response checks should compare favorable with those listed in the "FREQUENCY RESPONSE CHECK" table.

PARTS LIST FM-AM TUNER CHASSIS (8H1)

RESISTORS

- R601 2.2 megohms, 1/2 watt 60B 8-225
R602 10,000 ohms, 2 watts 60B 20-103
R603 1 megohm, 1/2 watt 53C 2-52
R604 1 megohm, 1/2 watt 53C 2-53
R605 1 megohm, 1/2 watt 53C 2-53
R606 15,000 ohms, 1/2 watt 60B 8-105
R607 10,000 ohms, 1/2 watt 60B 8-105
R608 100 ohms, 1/2 watt 60B 8-101
R609 100 ohms, 1/2 watt 60B 8-101
R610 100 ohms, 1/2 watt 60B 8-101
R611 68,000 ohms, 1/2 watt 5% 60B 7-683
R612 100,000 ohms, 1/2 watt 5% 60B 7-132
R613 1,500 ohms, 1/2 watt 5% 60B 7-132
R614 1,000 ohms, 1/2 watt 5% 60B 7-132
R615 1,000 ohms, 1/2 watt 5% 60B 7-132
R616 6,800 ohms, 1/2 watt 5% 60B 7-682
R617 6,800 ohms, 1/2 watt 5% 60B 7-682
R618 1 megohm, 1/2 watt 60B 8-105
R619 1 megohm, 1/2 watt 60B 8-105
R620 33,000 ohms, 1/2 watt 60B 8-333
R621 1 megohm, 1/2 watt 60B 8-105
R622 1 megohm, 1/2 watt 60B 8-105
R623 10,000 ohms, 1/2 watt 5% 60B 7-103
R624 6,000 ohms, HUM 75C 20-107
R625 2.2 MVEL control 60B 8-222
R626 1 megohm, TREBLE 75D 1-105
R627 1 megohm, BASS 75D 1-105
R628 100,000 ohms, 1/2 watt 60B 8-104
R629 47,000 ohms, 1/2 watt 60B 8-104
R630 10,000 ohms, 1/2 watt 60B 7-473
R631 10,000 ohms, 1/2 watt 60B 8-103
R632 470,000 ohms, 1/2 watt 60B 8-474
R633 22,000 ohms, 1/2 watt 60B 8-223
R634 22,000 ohms, 1/2 watt 60B 8-223
R635 390,000 ohms, 1/2 watt 60B 8-394
R636 220,000 ohms, 1/2 watt 60B 8-224
R637 51,000 ohms, 1/2 watt 5% 60B 7-513
R638 51,000 ohms, LOUD- 75D 1-105
R639 500,000 ohms, LOUD- 75D 1-105
R640 51,000 ohms, control, 1/2 watt 5% 60B 7-513
R641 220,000 ohms, 1/2 watt 60B 8-224
R642 1 megohm, 1/2 watt 60B 8-105
R643 100,000 ohms, 1/2 watt 60B 8-105
R644 180,000 ohms, 1/2 watt 60B 8-184
R645 82,000 ohms, 1/2 watt 60B 8-823
R646 120,000 ohms, 1/2 watt 60B 8-124
R647 120,000 ohms, 1/2 watt 60B 8-124

CAPACITORS

- C601 10 mmf, 500 volts, 10% ceramic, 65D 10-155
C602 .001 mf, 500 volts, NPO temp. coeff. 53C 2-52
C603 .01 mf, 500 volts, +50 -20% cer. 53C 2-53
C604 .01 mf, 500 volts, 53C 2-53
C605 Ceramic trimmer 53C 2-55
C606 20 mmf, 500 volts, NPO ceramic, 53C 2-56
C607 20 mmf, 500 volts, NPO temp. coeff. 53C 2-56
C608 8.2 mmf, 500 volts, 10% cer. P1000, 53C 2-56
C609 5% ceramic, 53C 2-59
C610 N750 temp. coeff. 53C 2-60
C611 15 mmf, 500 volts, N740 temp. coeff. 53C 2-52
C612 15 mmf, 500 volts, NPO ceramic, 53C 2-61
C613 33 mmf, 500 volts, NPO ceramic, 53C 2-61
C614 .001 mf, 500 volts, NPO temp. coeff. 65D 10-119
C615 .01 mf, 500 volts, cer. disc. 65D 10-6
C616 .01 mf, 500 volts, cer. disc. 65D 10-3

- C616 10 mmf, 500 volts, NPO temp. coeff. 65D 6-118
C617 .02 mf, 500 volts, 65D 10-28
C618A .001 mf, cer. disc. 65D 10-28
C618B dual cer. disc. 65A 17-1
C619 220 mmf, 500 volts, cer. 65D 6-80
C620 .01 mf, 500 volts, 65A 17-1
C621 270 mmf, 500 volts, 65A 17-1
C622 27% mica, 65B 1-4
C623 .001 mf, 500 volts, 65B 1-4
C624 27% mica, 65D 10-53
C625 5 mf, 50 volts, 65B 1-4
C626 5 mf, 50 volts, 65B 1-4
C627 220 mmf, 500 volts, cer. 65D 6-80
C628 1 mylar dielec. 64C 24-32
C629 .0015 mf, 500 volts, 65D 10-4
C630 .001 mf, cer. disc. runs 10 and 11 only 65D 10-53
C631 .001 mf, 400 volts, cer. disc. (used in prod. runs 12 and later) 65D 10-125
C632 .01 mf, 400 volts, paper 64B 1-23
C633 .015 mf, 200 volts, paper 64B 1-25
C634 .033% paper volts. 64B 2-26
C635 .015 mf, 200 volts, ceramic disc. 64C 25-10
C636 .005 mf, 500 volts, ceramic disc. 64B 2-26
C637 .005 mf, 500 volts, 65D 10-1
C638 220 mmf, 500 volts, cer. 65D 6-80
C639 100 mmf, 500 volts, cer. 65D 6-80
C640 25 mf, 400 volts, paper 64B 1-24
C641 electrolytic. 65B 4-30
C642 .02 mf, 500 volts, 65D 10-28
C643 220 mmf, 500 volts, ceramic disc. 65D 6-80
C644 680 mmf, 1000 volts, 65D 10-43
C645 680 mmf, 1000 volts, 65D 10-43
C646 680 mmf, 1000 volts, 10% ceramic disc. 65D 10-43
C647 10 mmf, 500 volts, 10% ceramic disc. 65D 6-44

COILS AND TRANSFORMERS

- L601 Choke Filter 53C 2-43
L602 Antenna Rod 65B 229-1
L603 AM Oscillator Coil. 69A 277-1
L604 Heater Choke 73A 2-8
L605 Heater Choke 73A 2-8
L606 Heater Choke 73A 2-12
T601 Antenna Trans- former, complete 53C 2-43
T602A Tuning Coil with winding 53C 2-46
T603 Tuning Core 53C 2-67
T604 FM 1st IF Trans- former, 455 KC 72D 28-70
T605 Former, 10.7 MC 53C 2-64
T606 AM 2nd IF Trans- former, 167 MC 72D 28-68
T607 FM Radio Detec- tor Transformer 72D 28-71
*Part numbers 53C2-66 and 53C2-67 together make up T602A and T602B.

MISCELLANEOUS CHASSIS PARTS

- M601 Pilot Lamp, 27 81A 1-8
M602 Pilot Lamp, 27 81A 1-8
M603 Socket, 27 81A 1-8
M604 Plug, Audio Output 88A 2-3
M605 Supply 88A 20-1
S601A Switch, FM-AM Phone 77B 76-1
S601C Switch, Record Com- pensator, 4 position. 77B 77-1
S603 Switch, Pilot Light Mfg. Bracket, Pilot Light Mfg. 15A 1713-1
S604 Bracket, Pilot Light Slide 15A 1717
Cover, for M605. 88A 20-12

- †Dial Scale Window, Plastic, White Lettering (used with background and extension) 21C 108-2
†Dial Scale Window, Plastic, Black Lettering (used with background and extension) 21C 108-4
†Dial Background, Dark Brown 25C 33-2
†Dial Background, Aluminum 25C 33-6
†Dial Background Extension, Dark Brown 15B 1757
†Dial Background Extension, Aluminum 15B 1757
†Aluminum Extension, 15B 1757-2
Dial Pointer and Carriage 25A 63
Pulley, Single Groove 17C 1-34
Pulley, Double Groove 17C 1-34
Roller (guide FM tuner dial string) 53C 2-65
Solder, radio circuit board 3 required 53C 2-62
Shield, 9 pin tube 87C 7-20
Socket, Pilot Light Eye 87A 20-3
Socket, Pilot Light Eye 87A 20-2
Socket, 9 pin miniature, shielded in miniature 87B 23-2
Spring, Conical (fits under FM tuner roller) 19D 1-45
Spring, Dual String 19D 1-5
Spring, Core Return 19D 1-5
(FM tuner) 53C 2-57
†Indicates matching parts.
† Indicates matching parts.

AMPLIFIER CHASSIS (6D3)

RESISTORS

- R661 150,000 ohms, 1/2 watt 60B 8-154
R662 150,000 ohms, 1/2 watt 60B 8-154
R663 270,000 ohms, 1/2 watt 60B 8-274
R664 1200 ohms, 1/2 watt 60B 8-122
R665 150,000 ohms, 1/2 watt 60B 8-352
R666 150,000 ohms, 1/2 watt 60B 8-352
R667 150,000 ohms, 1/2 watt 60B 7-154
R668 150,000 ohms, 1/2 watt 60B 8-154
R669 1,300 ohms, 1/2 watt 60B 8-332
R670 160,000 ohms, 1/2 watt 60B 8-332
R671 2% ohms, 1/2 watt 60B 7-164
R672 220,000 ohms, 1/2 watt 60B 8-222
R673 25,000 ohms, 1/2 watt 60B 7-224
R674 2,200 ohms, 1/2 watt 60B 8-224
R675 65 ohms, 5 watts, 5% 61B 20-18
R676 2,200 ohms, 1/2 watt 60B 8-222
R677 2,200 ohms, 1/2 watt 60B 8-222
R678 10,000 ohms, 1/2 watt 60B 8-103
R679 1,000 ohms, 1 watt 60B 14-102
R680 non-inductive, 61B 24-337
R681 1,000 ohms, 1 watt 60B 14-102
R682 10,000 ohms, 1 watt 60B 8-102
R683 10,000 ohms, 1 watt 60B 8-102
R684 10 ohms, 1/2 watt 60B 8-100

CAPACITORS

- C661 1 mf, 200 volts, 10% ceramic, 64C 25-57
C662 1 molded, mylar 64C 24-32
C663 1 mf, 400 volts, molded, mylar 64C 24-32
C664 1 mf, 400 volts, 64C 24-32
C665 50 mf, 25 volts, elect. 64C 24-32
C666 2,700 mmf, 500 volts, cer. disc. 67B 4-31
C667 2,700 mmf, 500 volts, ceramic disc. 68D 6-94
C668A 40 mf, 450 volts, N750 temp. coeff. 65D 10-155
C668B 40 mf, 450 volts, elect. 67D 7-32
C668C 40 mf, 450 volts, elect. 67D 7-32
C669 50 mf, 150 volts, 65D 10-155
C669A 50 mf, 150 volts, elect. (early 67D 7-34)
C669B 50 mf, 150 volts, elect. (early 67D 7-34)
C669C 50 mf, 150 volts, (prod.) 67D 7-31
C669D 50 mf, 150 volts, (prod.) 67D 7-31
C669E See C674; on later prod., C669C is separate elect.
C670 .047 mf, 600 volts, 64B 8-15
C671 4 mf, 10 volts (cross-over) 64B 13-1
C672 16 mf, 16 volts, 4 C, (cross-over) 67A 40-1
C673 .047 mf, 600 volts, elect. 63B 13-1
C674 10 mf, 250 volts, elect. 67B 4-38

PARTS LIST continued on next page.

CHASSIS 8111 & 8112 REPAIR KIT - 611 - 814

BEFORE USING THE GENERATOR

- 1. The generator must be tested before use. See test instructions.
- 2. The generator must be tested at 115 volts AC.
- 3. The generator must be tested at 60 cycles per second.
- 4. The generator must be tested at 100% relative humidity.
- 5. The generator must be tested at 100% relative humidity for 24 hours.
- 6. The generator must be tested at 100% relative humidity for 48 hours.
- 7. The generator must be tested at 100% relative humidity for 72 hours.
- 8. The generator must be tested at 100% relative humidity for 96 hours.

TEST	INSTRUCTIONS	ADJUSTMENT	REMARKS
1	Set generator to 115 volts AC.	Adjust 'V' and 'F' for 115 volts AC.	
2	Set generator to 60 cycles per second.	Adjust 'V' and 'F' for 60 cycles per second.	
3	Set generator to 100% relative humidity.	Adjust 'V' and 'F' for 100% relative humidity.	
4	Set generator to 100% relative humidity for 24 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
5	Set generator to 100% relative humidity for 48 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
6	Set generator to 100% relative humidity for 72 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
7	Set generator to 100% relative humidity for 96 hours.	Adjust 'V' and 'F' for 100% relative humidity.	

RECORD CHASSIS 8037-25

Parts list includes: 115V AC, 60 cycles per second, 100% relative humidity, 24 hours, 48 hours, 72 hours, 96 hours.

AIM OF AND BY ADJUSTMENT PROCEDURES

- 1. To ensure that the generator is tested at 115 volts AC.
- 2. To ensure that the generator is tested at 60 cycles per second.
- 3. To ensure that the generator is tested at 100% relative humidity.
- 4. To ensure that the generator is tested at 100% relative humidity for 24 hours.
- 5. To ensure that the generator is tested at 100% relative humidity for 48 hours.
- 6. To ensure that the generator is tested at 100% relative humidity for 72 hours.
- 7. To ensure that the generator is tested at 100% relative humidity for 96 hours.

TEST	INSTRUCTIONS	ADJUSTMENT	REMARKS
1	Set generator to 115 volts AC.	Adjust 'V' and 'F' for 115 volts AC.	
2	Set generator to 60 cycles per second.	Adjust 'V' and 'F' for 60 cycles per second.	
3	Set generator to 100% relative humidity.	Adjust 'V' and 'F' for 100% relative humidity.	
4	Set generator to 100% relative humidity for 24 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
5	Set generator to 100% relative humidity for 48 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
6	Set generator to 100% relative humidity for 72 hours.	Adjust 'V' and 'F' for 100% relative humidity.	
7	Set generator to 100% relative humidity for 96 hours.	Adjust 'V' and 'F' for 100% relative humidity.	

VOLTAGE DATA

Volts shown on schematic diagram. All measurements except where stated otherwise are taken with respect to chassis ground.

Mounted on 117 volts AC, 60 cycle line. Dial 61080-02560.

To accomplish dial adjustment, remove the dial background bracket and bring the dial to position.

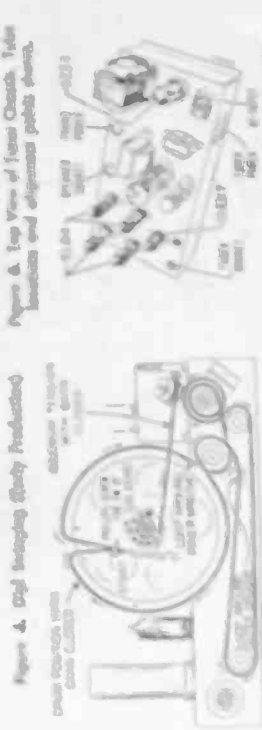
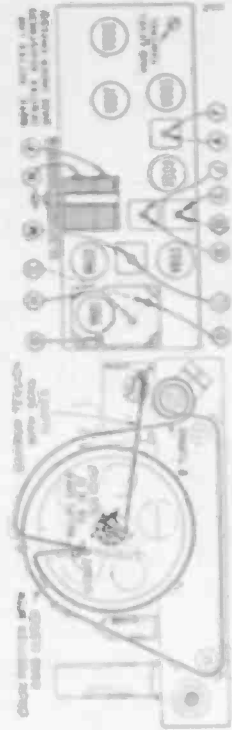


Fig. 5. Top View of Janssens Tube Location and alignment points shown.

PARTS LIST (8037)

COILS AND TRANSFORMERS

115V	115V 60 Hz	115V
117V	117V 60 Hz	117V
120V	120V 60 Hz	120V
125V	125V 60 Hz	125V
130V	130V 60 Hz	130V
135V	135V 60 Hz	135V
140V	140V 60 Hz	140V
145V	145V 60 Hz	145V
150V	150V 60 Hz	150V
155V	155V 60 Hz	155V
160V	160V 60 Hz	160V
165V	165V 60 Hz	165V
170V	170V 60 Hz	170V
175V	175V 60 Hz	175V
180V	180V 60 Hz	180V
185V	185V 60 Hz	185V
190V	190V 60 Hz	190V
195V	195V 60 Hz	195V
200V	200V 60 Hz	200V
205V	205V 60 Hz	205V
210V	210V 60 Hz	210V
215V	215V 60 Hz	215V
220V	220V 60 Hz	220V
225V	225V 60 Hz	225V
230V	230V 60 Hz	230V
235V	235V 60 Hz	235V
240V	240V 60 Hz	240V
245V	245V 60 Hz	245V
250V	250V 60 Hz	250V
255V	255V 60 Hz	255V
260V	260V 60 Hz	260V
265V	265V 60 Hz	265V
270V	270V 60 Hz	270V
275V	275V 60 Hz	275V
280V	280V 60 Hz	280V
285V	285V 60 Hz	285V
290V	290V 60 Hz	290V
295V	295V 60 Hz	295V
300V	300V 60 Hz	300V

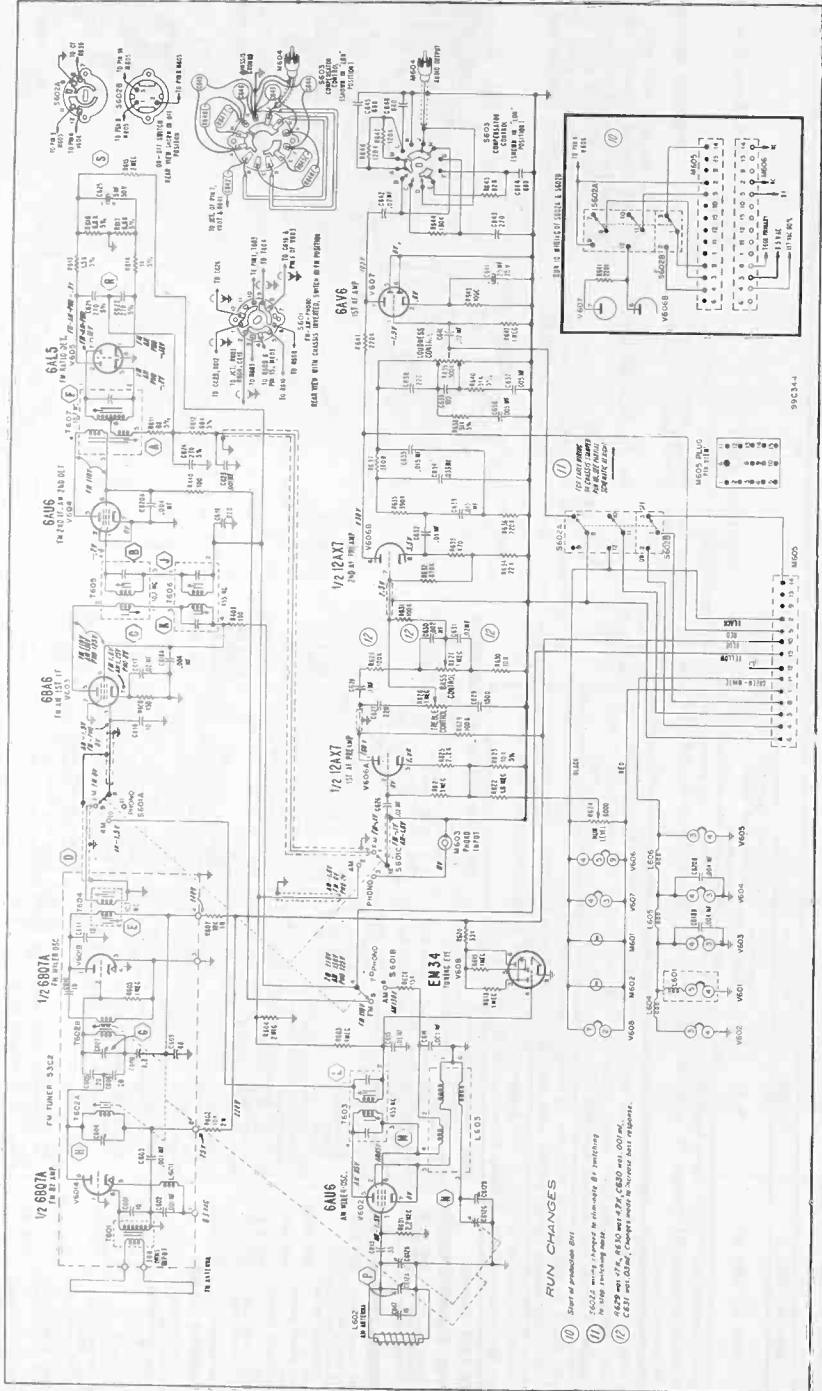
MISCELLANEOUS CHASSIS PARTS

1	115V	115V
2	117V	117V
3	120V	120V
4	125V	125V
5	130V	130V
6	135V	135V
7	140V	140V
8	145V	145V
9	150V	150V
10	155V	155V
11	160V	160V
12	165V	165V
13	170V	170V
14	175V	175V
15	180V	180V
16	185V	185V
17	190V	190V
18	195V	195V
19	200V	200V
20	205V	205V
21	210V	210V
22	215V	215V
23	220V	220V
24	225V	225V
25	230V	230V
26	235V	235V
27	240V	240V
28	245V	245V
29	250V	250V
30	255V	255V
31	260V	260V
32	265V	265V
33	270V	270V
34	275V	275V
35	280V	280V
36	285V	285V
37	290V	290V
38	295V	295V
39	300V	300V
40	305V	305V
41	310V	310V
42	315V	315V
43	320V	320V
44	325V	325V
45	330V	330V
46	335V	335V
47	340V	340V
48	345V	345V
49	350V	350V
50	355V	355V
51	360V	360V
52	365V	365V
53	370V	370V
54	375V	375V
55	380V	380V
56	385V	385V
57	390V	390V
58	395V	395V
59	400V	400V
60	405V	405V
61	410V	410V
62	415V	415V
63	420V	420V
64	425V	425V
65	430V	430V
66	435V	435V
67	440V	440V
68	445V	445V
69	450V	450V
70	455V	455V
71	460V	460V
72	465V	465V
73	470V	470V
74	475V	475V
75	480V	480V
76	485V	485V
77	490V	490V
78	495V	495V
79	500V	500V
80	505V	505V
81	510V	510V
82	515V	515V
83	520V	520V
84	525V	525V
85	530V	530V
86	535V	535V
87	540V	540V
88	545V	545V
89	550V	550V
90	555V	555V
91	560V	560V
92	565V	565V
93	570V	570V
94	575V	575V
95	580V	580V
96	585V	585V
97	590V	590V
98	595V	595V
99	600V	600V
100	605V	605V

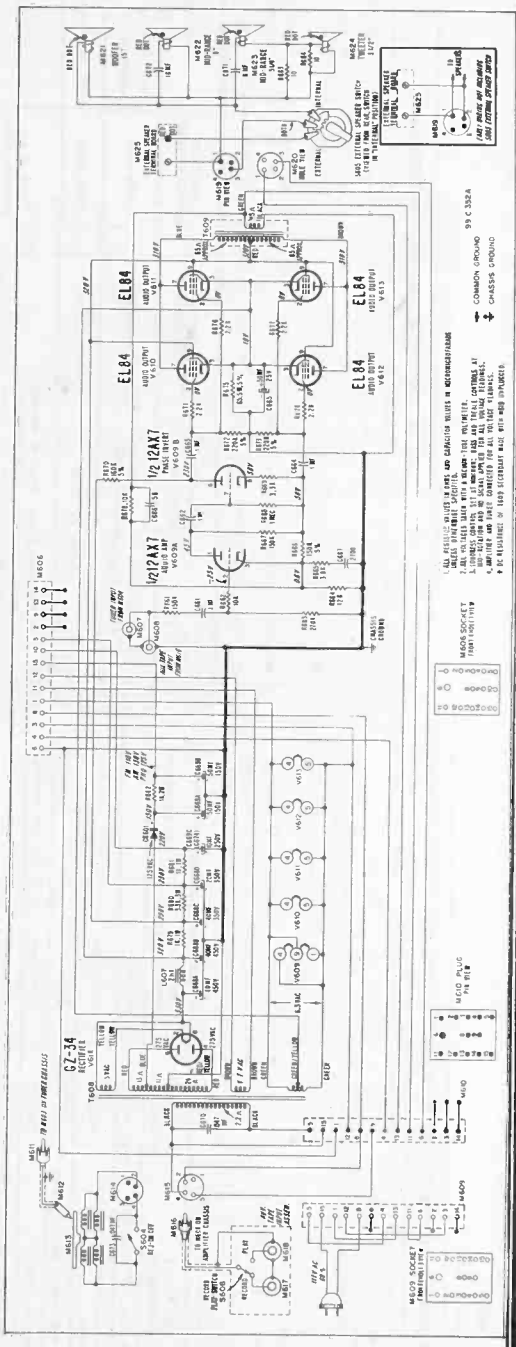
Fig. 6. Dial bracket (Study Production)

Fig. 7. Top View of Janssens Chassis Tube Location etc.

CHASSIS 8H1 & 6D3
MODELS 412 · 413 · 414



6D3



High-Fidelity
FM-AM Radio
Phonograph

Admiral

8H1B FM-AM TUNER and 4S2C HI-FI AMPLIFIER

For complete Record Changer servicing information, see SERVICE MANUALS 5800 and 5800A. This Service Manual Supplement is used with Service Manual 5812 to service Models 472, 473, 474, 484 and 489.

HI-FI FM-AM CONSOLE PHONOGRAPH

MODEL	COLOR	CHASSIS	RECORD CHANGER
472	Mahogany	8H1B	
473	Blond	and 4S2	
474	Sierra	4S2	BC 638-2
484	Grey Pimento	8H1B and 4S2C	
489	Firewood	4S2C	



Figure 1. Front View of Model 472.



Figure 2. Front View of Model 484. Indian Promotional style.



Figure 3. Front View of Model 489. French Promotional style.

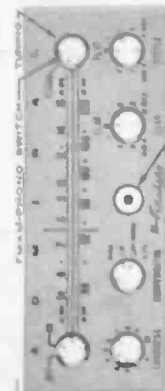


Figure 4. Operating Controls. All models.

AMPLIFIER CHASSIS REMOVAL

On Models 472, 473, 474 and 489, the cabinet back panel must be removed to service the amplifier. This panel is located on the rear of the cabinet behind the record changer. Remove the screws that hold the panel in place and lift the panel from the cabinet back.

Refer to AMPLIFIER CHASSIS REMOVAL in 5812 to complete removal of the amplifier chassis. For Model 484, the amplifier chassis removal procedure in 5812 is used.

TROUBLE SHOOTING HINTS

On some models, the Tuning Eye is mounted horizontally under the FM-AM Tuner chassis. To remove this tube, grasp it by the cover on the base and work it backwards out of its clamp.

CHASSIS 8H1B - 4S2C MODELS 472 • 473 • 474 • 484 • 489

CHASSIS DIFFERENCES 8H1 and 8H1B

All 8H1 chassis use 6AL5 (V602) for AM Mixer-Oscillator. All 8H1B chassis use 6BE6 (V602) AM Mixer-Oscillator. Refer to FM-AM Tuner schematic diagram, in this supplement for chassis differences.

CHASSIS DIFFERENCES 4S2 and 4S2C

The only difference between the 4S2 chassis and the 4S2C chassis is that the 4S2C uses a pilot lamp. See figure 5 (below) for connection of pilot lamp into circuit. Use the 4S2 schematic diagram in 5812 for servicing the 4S2C amplifier.

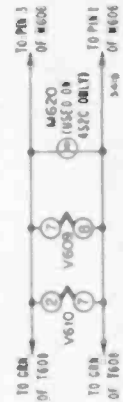


Figure 5. Partial schematic of 4S2C showing connection of pilot lamp.

SPEAKER SYSTEMS

Refer to figure 6 for speaker system complement and connection for all models covered by this supplement.

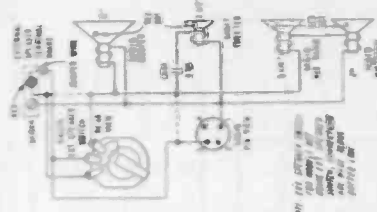


Figure 6. Speaker System. All Models.

PARTS LIST (8H1B)

NOTE: Some early production of the model covered by this supplement used the 8H1 FM-AM Tuner. To service these tuners, the 8H1-8H1B schematic diagram in this supplement and the "PARTS LIST" in 5812 are used.

To service the 8H1B, FM-AM Tuner, use the "PARTS LIST" in 5812 with the following changes:

Designation	Quantity	Part Number	Notes
Resistor	22	500 ohms, 1/2 watt	608 8-273
Resistor	10,000	ohms, 1/2 watt	608 8-173
Resistor	22,000	ohms, 1/2 watt	608 8-273
Resistor	1,000	ohms, 1/2 watt	608 8-102
Resistor	22,000	ohms, 1/2 watt	608 8-273
Resistor	120,000	ohms, 1/2 watt	608 8-174

RESISTORS

CAPACITORS

Designation	Quantity	Part Number	Notes
Capacitor	33	500 volts, 5%, var. disc.	650 10-119
Capacitor	100	500 volts, 5%, var. disc.	650 10-3
Capacitor	10	500 volts, 10%, var. disc.	650 6-44
Capacitor	47	500 volts, 10%, var. disc.	650 10-177
Capacitor	10	500 volts, 10%, var. disc.	650 10-3
Capacitor	10	500 volts, 10%, var. disc.	650 10-3

COILS AND TRANSFORMERS

Designation	Quantity	Part Number	Notes
Coil	1	AM Oscillator Coil	69A 277-1
Coil	1	AM Oscillator Coil	69A 22-12

MISCELLANEOUS CHASSIS PARTS

Diode	22C 23-6
Diode	22C 23-7
Diode	178 1787
Diode	21C 108-2
Diode	21C 108-4
Bracket, Chassis Mtg. (left)	138 1731-8
Bracket, Chassis Mtg. (right)	138 1731-4
Dial Background Illumination	22C 23-4
Dial Scale Window	See Chassis Parts
Drawer, Chassis Mounting	138 207-1
Drawer (for mp. chassis assembly)	138 210
10 Digit Background	29A 712-71

HI-FI AMPLIFIER 4S2C

NOTE: Use the "PARTS LIST" in 5812 with the following additions, for the 4S2C chassis:

8A290	Pilot Lamp, B 47	81A 14
		82A 11-4

RECORD CHANGER RC638-2

NOTE: Use "RECORD CHANGER" section of "PARTS LIST" in 5812, with the following changes, for RC638-2.

Diode	Q4008	601
Component assembly	4008	481

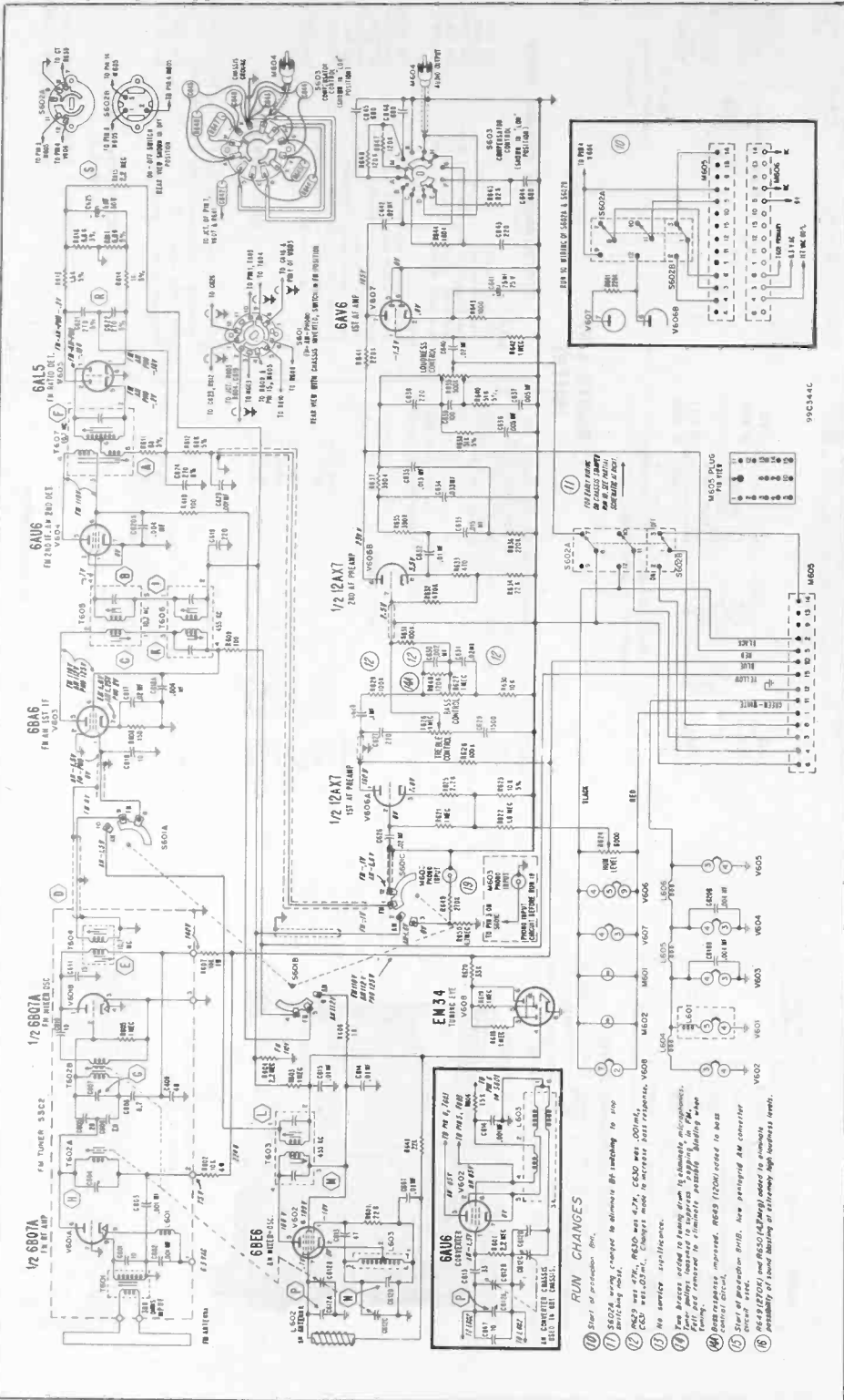
CHASSIS 8H1B - 4S2C
MODELS 472 - 473 - 474 - 484 - 489

**CABINET PARTS
MODELS 484 and 489**

Symbol	Description	Part No.
M614	Terminal Board, External Speaker	108 13-2
M615	Plug, Speaker, 4 Pin	888 5-2
M616	Speaker, Woofer, 12" PM (3.2 ohms voice coil impedance)	788 112-3
M617	Speaker, Tweeter, 3 1/2" PM (3.2 ohms voice coil impedance)	788 91-2
M618	Speaker, Mid-Range, 5 1/2" PM (8 ohms voice coil impedance)	788 110-4
M619	Speaker, Mid-Range, 4" PM (8 ohms voice coil impedance)	788 84-6
	Antenna Terminal Board	108 13-5
	Bezel, Chrome, with Threaded Studs (Model 484)	23C 299-3
	Bezel, Gold, with Threaded Studs (Model 489)	28A 111
	Bolt, "U" Type, Tuner Mounting	35E 432-55
	Bullet Catch, Record Compartment Door, Brass (Model 484)	
	*Cabinet	
	Model 484, Italian Provincial, Gray Pumice	35E 430-4
	Model 489, French Provincial, Fruitwood	35E 28-9
	Conc. Extension, Phono Motor Power, 12" (includes 4 pin plug and socket)	11A 20
	Model 489 only	
	Cover, Speaker Plug (M615)	89A 46-1
	Dial Scale Window, Plastic, White	888 5-12
	Lettering	21C 108-7
	Door Pull, Brass (Model 489)	37A 171-1
	Key Section	37A 171-2
	Escutcheon, External Speaker Switch	23A 311
	Grille Cloth	
	for Model 484	36D 86-46
	for Model 489	36D 86-28
	Hinge, Lid, 18" x 18" Long, Statuary Bronze (Model 484)	37D 173-3
	Hinge, Lid, 16" Long (Model 489)	37D 173-2
	Hinge, Record Compartment Door	37A 106-2
	Jewel, Pilot Light, Green	82A 10-8
	Keypad, #8-32 (speaker and tuner dial mounting)	2A 19-2-71
	Knobs	
	for Model 484	
	Tuning (Gray)	33C 254-2
	FM-AM-Phono Selector (Aluminum)	33C 254-4
	Loudness, Bass, Treble, On-Off and Compensator (Aluminum and Gray)	33C 254-5
	External Speaker Switch (Gold and Beige)	33C 254-8
	for Model 489	33C 254-6
	Tuning (Beige)	33C 254-6
	FM-AM-Phono Selector and External Speaker Switch (Gold)	33C 25-47
	Loudness, Bass, Treble, On-Off, Compensator (Gold and Beige)	33C 25-48
	Leg, Gray Pumice (Model 484 only)	35E 430-54
	Lid Support (Statuary Bronze)	37C 170-6
	Lid Supports (Brass Plate) for Model 489	37C 170-5
	Left Hand	37C 170-6
	Right Hand	28 6-43-71
	Panel, #6-32 (bezel mounting)	28 6-43-71
	Panel, #6-32 (bezel mounting) (one side covered with acoustical material)	28 6-38-71
	for Model 484	35E 308-3
	for Model 489	35E 308-4
	1-lot Light #47	81A 1-8
	Screw, #10-32 x 1 1/2" Washer Head Phillips (record changer mounting)	1A 153-30-71
	Spacer, Felt (for 1/2" tuner control shafts)	5A 12-1
	Speaker, Tuner Sleeve	32B 396-1
	Strike Plate, Record Compartment Door (Model 484)	35E 432-57
	Switch, External Speaker, 3 Position	77A 81-1

8H1-8H1B SCHEMATIC DIAGRAM

SERVICE MANUAL SUPPLEMENT 5812A



**CABINET PARTS
MODELS 472, 473 and 474**

Symbol	Description	Part No.
M614	Terminal Board, External Speaker	108 13-2
M615	Plug, Speaker, 4 Pin	888 5-2
M616	Speaker, Woofer, 12" PM (3.2 ohms voice coil impedance)	788 112-3
M617	Speaker, Tweeter, 3 1/2" PM (3.2 ohms voice coil impedance)	788 91-2
M618	Speaker, Mid-Range, 5 1/2" PM (8 ohms voice coil impedance)	788 110-4
M619	Speaker, Mid-Range, 4" PM (8 ohms voice coil impedance)	788 84-6
	Antenna Terminal Board	108 13-5
	Bezel, Chrome, with Threaded Studs	23C 299-3
	Bolt, "U" Type, Tuner Mounting	28A 111
	Bullet Catch, Record Compartment Door, Brass (Model 472)	35E 432-55
	*Cabinet	
	Model 472, Mahogany (Model 473)	35E 432-12
	Blond (Model 474)	35E 432-13

Symbol	Description	Part No.
Sierro (Model 474)		35E 432-14
Clip, 45 RPM Spindle		11A 20
Cover, Speaker Plug		888 5-12
Dial Scale Window, Plastic, White Lettering		21C 108-7
Door Pull, Brass		37A 172
Escutcheon, External Speaker Switch		23A 311
Grille Cloth		36D 86-29
for Model 472		36D 86-30
for Model 474		36D 86-31
Hinge, Lid		37A 106-2
Hinge, Record Compartment Door, Brass		35E 432-54
Keypad, #8-32 (speaker and tuner dial mounting)		2A 19-2-71
Knob, Tuning (Gray)		33C 254-2
Knob, FM-AM-Phono Selector (Aluminum)		33C 254-4
Knob, Loudness, Bass, Treble, On-Off, Compensator (Aluminum and Gray)		33C 254-5
Knob, External Speaker, 3 Position		77A 81-1
Knob, External Speaker Switch (Gold and Beige)		33C 254-8
Leg, Molded, with Ferrule and Anchor Bolt for Model 472 (Mahogany)		37D 168-2
Leg, Molded, with Ferrule and Anchor Bolt for Model 473 and 474 (Ebony)		37D 168-4
Leg Mounting Plate (straight mounting type)		15B 1813-3
Lid Support, Brass		37C 170-6
Lid Supports (Statuary Bronze)		37C 170-6
Panel, #6-32 (bezel mounting)		28 6-43-71
Panel, #6-32 (bezel mounting) (one side covered with acoustical material)		28 6-38-71
Screw, #10-32 x 1 1/2" WH Phillips (record changer mounting)		43D 308-2
Spacer, Felt (for 1/2" tuner control shafts)		1A 153-30-71
Speaker, Tuner Sleeve		5A 12-1
Strike Plate, Record Compartment Door, Brass		32B 396-1
Switch, External Speaker, 3 Position		77A 81-1

John F. Rider

*Orders for cabinets and certain mounting parts will not be filled unless accompanied by the order and the damaged parts cannot be repaired economically.

BASIC STEREOGRAPHIC DISC PRINCIPLES

For Stereophonic Disc Record Changer Servicing, Read The Entire Section. For General Understanding, Read First And Last Two Paragraphs.

Stereophonic sound differs from today's popular hi-fi sound in that it adds a new 3D presence dimension to listening. 3D Presence, in the ordinary sense, is the illusion of being at the place of the original sound. Until the introduction of stereo, hi-fi systems have attempted to sustain this illusion merely by keeping the recorded sounds as distortion-free as possible. However, this alone cannot introduce presence since the reproduced sound emanates only from one source, a single hi-fi speaker or speaker system. What is 3D presence? A simple explanation is demonstrated if one visualizes a person sitting in front of an orchestra, as shown in figure 3. Because of the physical locations of the members of the orchestra relative to the listener, sounds from the right side are heard primarily in the right ear and sounds from the left side are heard primarily in the left ear. Thus, to recreate 3D presence in the home, it is necessary to have this same relative division of sound on both sides of the listener.

Stereophonic disc recordings are made using two separate microphones, each corresponding to a listener's ear, placed in front of the sound-producing body, as at L and R in figure 3. The information from each microphone is recorded independently in a single groove on the disc. Basically, one side wall of the groove records the information from one microphone while the other side records the information from the other. For stereophonic reproduction, the sounds in each separate channel are separately and simultaneously amplified and applied to two independent, and properly-placed speaker systems, as shown in figure 4.

Until the advent of stereophonic discs, hi-fi sound was exclusively recorded on discs with a cutting stylus that moved laterally with the sound variations, as shown in figure 5A. The depth of the groove is constant. Therefore, sound variations are lateral and the recorded groove looks like the one shown in figure 5B. Many stereophonic disc ideas have been tried, such as the two parallel lateral-variation tracks method, the 90-degree vertical-horizontal

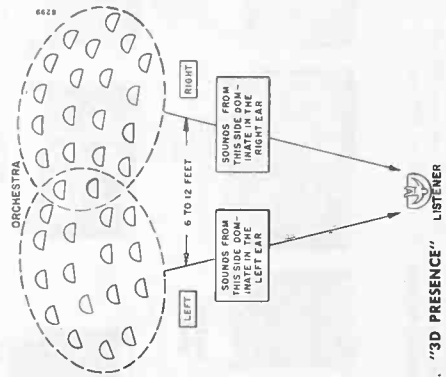


Figure 3. "3D PRESENCE" LISTENER

method, etc. These were discarded as unacceptable for a variety of reasons; incompatibility with present hi-fi systems, mechanical instability and critical alignment; high distortion levels, etc.

In the Westrex 45-45 stereophonic disc recording system, which is the accepted standard system of the industry, the two separate audio channels are recorded in a single groove. One channel is recorded by varying the cutting stylus position laterally as shown in figure 6A. The other channel is recorded by simultaneously moving the same stylus vertically as in figure 6B; this produces "hills and dales" in the track rather than the constant depth of monaural recordings. The resultant groove is a simultaneous combination of lateral and horizontal variations in one track. Basically, one wall varies correspondingly to one microphone while the other wall varies accordingly to the second microphone. Each wall variation is independent of the other. This independence is the basis of separation of sound which we call 3D presence in stereo. The resultant sound track of a single-

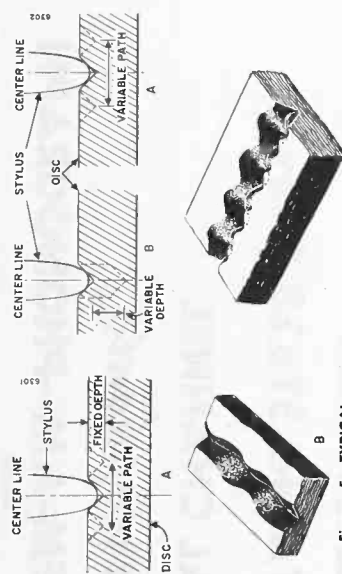


Figure 5. TYPICAL MONAURAL RECORDING TRACK.

Figure 6. TYPICAL STEREOGRAPHIC DISC TRACK.

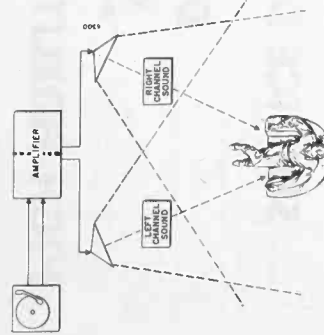


Figure 4. STEREOGRAPHIC HI-FI SOUND REPRODUCTION.

stylus stereophonic recording is illustrated in figure 6C. Figure 7 shows how a single tone in one channel only is stereophonically recorded on a disc. The stylus is mechanically coupled to two recording elements. The elements are positioned 90° apart with respect to each other; each forms an angle of 45° with the horizontal. No signal is applied to element A; the sine-wave signal coupled to element B alternately pushes and pulls on the stylus causing it to vibrate back and forth along the line with arrowheads on each end. The cutting stylus cuts the signal one side of the track only since there is no signal to cause variations in the direction of element A. The variations, therefore, on each side of the track correspond to the signals in each channel. Figure 8 shows how two different signals in each channel cause the cutting stylus to move at an angle other than 45° to the horizontal.

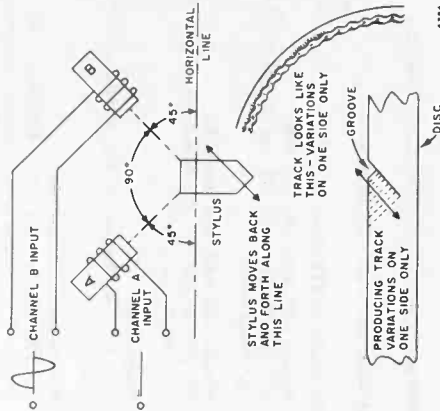


Figure 7. RECORDING A SINGLE CHANNEL SIGNAL.

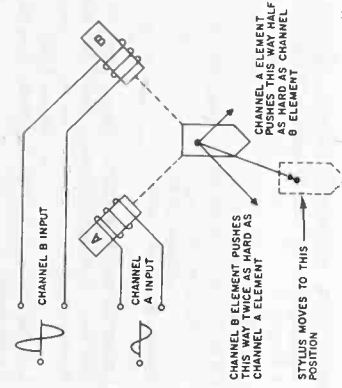


Figure 8. RESULTS OF DIFFERENT INPUTS TO BOTH CHANNELS.

The stereophonic reproducing head is similar in construction to the recording head, except that two styli are used and the elements may be ceramic, crystal or magnetic. One is .003" (3 mils) in diameter for use with 78 RPM discs; the other is .0007" (.7 mil) in diameter for LPS (Long Play Stereophonic) and regular LP disc reproduction. A 0.7-mil LPS stylus is used in place of the "standard" 1-mil LP stylus because, as a stereo sound track becomes shallower than a standard LP track, the 1-mil stylus would be forced out of the groove. In the reproducing head, the elements develop a voltage corresponding to stylus motions caused by track variations. See figure 9.

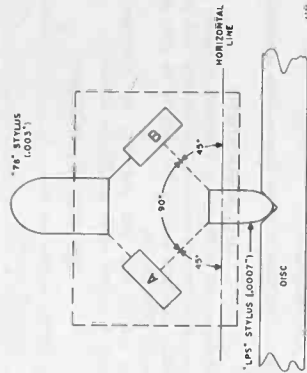


Figure 9. STEREOGRAPHIC REPRODUCING HEAD.

Figure 10 shows how a reproducing head translates a one-channel signal into an audio-frequency voltage. Note that only LATERAL FORCE on each element causes a signal to be produced; although the track variations cause stresses in both elements, a signal is developed only across element "A". This demonstrates the ability for one groove to selectively reproduce a signal into one amplifier channel.

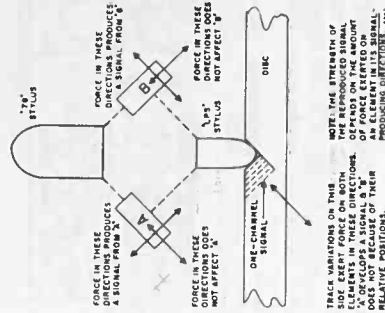


Figure 10. STEREOGRAPHIC REPRODUCTION OF A SINGLE CHANNEL SIGNAL.

In figure 8, two signals caused the cutting stylus to shift to an angle greater than 45° from the horizontal. Separation of this track variation into two signals by the reproducing head is shown in figure 11. Both elements are moved the same distance in the direction of the stylus, resulting in a small movement of element "A" in its signal-producing direction and a large movement of element "B" in its signal-producing direction. Thus, a small signal is developed across element "A", and a large signal is developed across element "B". Note that these signals correspond to the channel "A" and "B" input signals in figure 8.

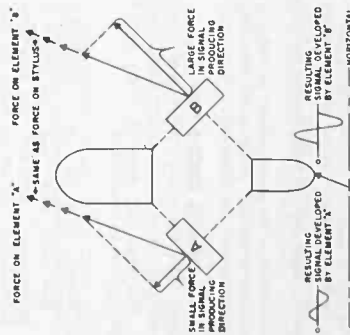


Figure 11. SEPARATION OF TRACK VARIATIONS INTO TWO SIGNALS.

OPERATING CONTROLS

MASTER CHANNEL CONTROLS

The operating controls for this set, excluding Auxiliary channel Balance, Bass and Treble controls, are located on radio tuning dial (figure 13) and operate as follows:

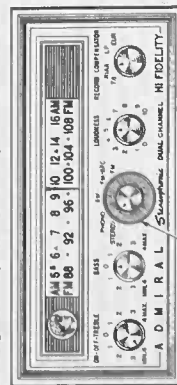


Figure 13. Operating Controls, 12B1.

ON-OFF-TREBLE: The ON-OFF function of this control acts as a master switch to turn both Master channel and Auxiliary channel on and off. To turn set on, rotate knob to right until switch clicks.

Further rotation of the knob controls treble (high note) response of master channel output. Rotation to the left of zero position decreases treble response. Rotation to the right of zero position increases treble response. The zero position will normally give truest reproduction.

Since channel separation depends on the angle of the track variations relative to the pick-up stylus, it is important that the record changer turntable be level and the pick-up stylus be perpendicular to the turntable, as illustrated in figure 12. If these relationships are not observed, both channel separation and stereophonic fidelity will be impaired.

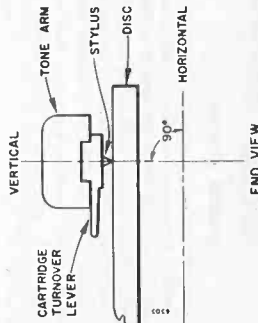


Figure 12. VERTICAL POSITIONING OF THE STEREOGRAPHIC STYLUS.

For operation with monaural 78 and LP discs, the outputs of the two reproducing elements are connected in parallel. This produces a high fidelity monaural signal comparable to the signals available from single-element hi-fi cartridges. The .00077 LPS stylus is used for standard microgroove records and the .00037 78 stylus is used for 78 RPM records.

SELECTOR

Used to select type of operation desired. Place control to position giving desired type of operation. STEREO—for playing Stereo Disks on the phonograph or for using an external Stereo tape recorder with the Master and Auxiliary channels.

PHONO—for playing regular single-channel records on the phonograph. For transferring regular records to tape or playing back single-channel tapes from external Monaural tape recorder.

AM—for AM radio reception or for recording AM broadcasts on external tape recorder.

FM-AFC—for drift-free reception of FM radio broadcasts. Gives optimum performance in good signal areas. Placing selector in this position after station has been tuned in will keep station sharply tuned. Also for recording FM broadcasts on external tape recorder.

FM—for FM radio tuning and reception. Provides increased sensitivity for FM reception in poor signal areas.

OPERATING CONTROLS (Cont.)

are located on right side of set and affect the Auxiliary channel only. They function as follows:



Figure 14. Operating Controls, 5T4A.

BALANCE: Used to "balance" the Auxiliary channel output to match the Master channel output. Adjust for desired level of loudness between channels.

BASS and TREBLE: These controls function the same as Treble and Bass controls for the Master channel.

LOUDNESS: Used to adjust to desired sound level. Acts as master control for both Master and Auxiliary channels.

TUNING: Large knob located behind Selector knob. Selects desired FM or AM stations.

RECORD COMPENSATOR: This control compensates for the different recording characteristics used by various record manufacturers. The left setting, "78", is a filter for standard 78 RPM records to minimize needle scratch. The RIAA, LP and EUR positions provide built-in equalization networks which assure truer reproduction of commercial recordings. (During FM or AM radio operation, the compensator circuits will not affect sound output.)

AUXILIARY CHANNEL CONTROLS

Auxiliary channel controls (Balance, Bass and Treble)

SERVICE HINTS

that hold the changer. These screws are accessible from beneath changer.

- On models 662, 663 and 664, slide changer out of cabinet to gain access to changer mounting screws.
- Disconnect Phono Output plugs (M5 and M6) and unplug Record Changer Power plug (M3).
- Lift record changer from inside cabinet. Retrieve changer "float" springs. They will be used when record changer is placed back into cabinet.
- To replace changer, reverse the above procedure.

CHASSIS REMOVAL

Master Chassis 12B1

Chassis 12B1 is located in the Master cabinet. To remove 12B1 chassis, proceed as follows:

- Disconnect line cord from power source.
- Disconnect FM Antenna terminal board from back of cabinet. Unplug Record Changer Power plug (M3). Disconnect two Phono Output plugs (M5 and M6). Disconnect Master Channel Speaker plug (M20).
- Disconnect Cabinet Pilot Light plug (M14).
- Remove control knobs on front of chassis and chassis mounting screws.
- Remove chassis from cabinet for servicing. To replace chassis in cabinet, perform the above procedure in reverse order.

Auxiliary Chassis 5T4A

The Auxiliary chassis is located in the Auxiliary cabinet except for models 662, 663 and 664. In these models, the Auxiliary chassis (5T4A) is located in the Master cabinet. To remove Auxiliary chassis, proceed as follows:

- Disconnect line cord from power source.
- Remove cabinet back panel on Auxiliary cabinet. For models 662, 663 and 664, remove cabinet back panel behind 5T4A chassis (right side of Master cabinet).
- Remove three Auxiliary chassis control knobs (outside of cabinet).
- Disconnect Auxiliary Channel Audio Input plug (M101) from Stereo Input socket (M13). Remove Speaker plug (M109) from Audio Output socket (M108). Disconnect Tape Output plug (M102) from Stereo Tape Input socket (M103).
- Remove chassis mounting screws. Remove chassis from cabinet for servicing. To replace chassis in cabinet, perform the above procedure in reverse order.

Record Changer

To remove the record changer, perform the following procedure:

- On all models except 662, 663 and 664, remove cabinet back panel behind changer. Also, remove panel under record changer. Remove three large washer head screws

POWER CONNECTION

AC line power, 60 cps, is supplied to the Master unit through the Master cabinet line cord and controlled by Off-On-Treble control R57.

The Auxiliary chassis has its separate line cord. The Off-On-Power relay (M106), located on the Auxiliary chassis, is energized by a direct current supplied by the Master chassis 12B1 through the Stereo Output socket (M13).

On Models 662, 663 and 664, the line cord to the Master cabinet is terminated in a duplex socket. Then, line cords from the radio chassis and auxiliary chassis are plugged into the duplex outlet to complete the power connection.

CONNECTING THE STEREO UNIT

Figure 15 shows the method of making power connections in all models except 662, 663 and 664. Refer to the illustration and perform the following procedure to make power connections:

- Make sure that both line cords are disconnected from wall outlet.
- Connect plug on black cable from the Auxiliary unit to "STEREO OUTPUT" socket on Master cabinet. On Model 649, connect plug to socket on Master chassis. Connect socket, on black cable, to plug on rear of Auxiliary cabinet.
- Connect both line cords in wall outlets and test the set. Turn the Master unit on and off. The Auxiliary unit should turn on and off at the same time.

that needle to be replaced is facing down. Grasp retaining clip and slip old needle from cartridge. See figure 18. To replace needle, reverse above procedure.

To replace cartridges, remove screws (one at each side) and three leads from cartridge. Fasten new cartridge in place. Red lead goes to terminal "R", white lead to terminal "L", shield to center terminal.

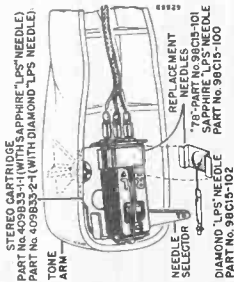


Figure 18. Needle Replacement.

RC688-18S

To replace needle assembly, move NEEDLE SELECTOR handle down till it is perpendicular with TONE ARM. See figure 18A. Open spring clip slightly and lift needle assembly. Make sure needle shaft clears centering notch. To replace needle assembly, open spring clip slightly and slip new assembly into position. Make sure that needle shaft is centered in notch.

Signal lead connections to cartridge are the same as above.

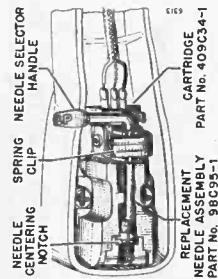


Figure 18A. Needle Replacement.

SPEAKER SYSTEMS

Speakers may be reached for servicing by removing cabinet back panels. Cross-over capacitor(s) are located on baffle boards adjacent their respective speaker systems.

Each speaker system is connected to its amplifier by a wiring harness. Plugs, sockets and capacitor(s) are replaceable. See "CABINET PARTS" for the particular model.

On model 654, baffle boards are located on front and rear of Master cabinet. To gain access to either speaker system, remove rear baffle board.

CONNECTING AN EXTERNAL SPEAKER SYSTEM

A 5-lug terminal board on the rear of the Master cabinet provides connections for using an external speaker system in addition to the speakers in the set. (Any external speaker system used with this set should have a 16 ohm voice coil impedance for proper operation.)

When using the internal speaker system, the shorting bar, on the terminal board, is to be connected between terminals 3 and 4. See figure 19.

When an external speaker system is to be used, connect external system leads to terminals 1 and 5. Adjust the position of the shorting bar so that terminals 2 and 3 are shorted together. When a 16 ohm external speaker system is connected properly and the shorting bar is placed between terminals 2 and 3, the external speaker systems' impedance will be matched to output transformer and internal speakers.

PHASING AN EXTERNAL SPEAKER SYSTEM

To insure best sound reproduction when making an external speaker installation, the external speaker voice coils must be phased with speaker voice coils in the Master cabinet so that the cones of all the speakers move in the same direction at the same time.

The action of each external speaker voice coil should be tested with a common 1.5 volt flashlight battery. Testing is necessary to determine which terminal on each speaker, when connected to the positive pole of the battery, causes the speaker cone to move forward.

To locate proper terminal, perform following procedure:

1. Connect battery, MOMENTARILY, across voice coil terminals. Observe whether speaker cone moves in or out. If necessary, reverse the momentary connection across the voice coil terminals. On each external speaker to be used, determine which terminal, when connected to the positive pole of a battery, causes the speaker cone to move outward.
2. Refer to instruction under "CONNECTING AN EXTERNAL SPEAKER SYSTEM" and be sure to connect external speaker terminal(s), which causes speaker cone to move forward when connected to positive pole of a battery, to terminal 5. The other external speaker lead to terminal 1.

PROVISION FOR EXTERNAL TAPE RECORDER

A metal bracket labeled "TAPE RECORDER" is used with each model. On models that are operated with an Auxiliary unit, one "TAPE BRACKET" is located on the Master cabinet back panel and the other on the Auxiliary cabinet back panel. On models 662, 663 and 664, two brackets are located on the cabinet back.

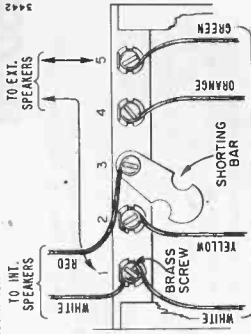


Figure 19. External Speaker Terminal Board.

Each bracket supplies input and output sockets for an external tape recorder. Brackets on Auxiliary units provide input and output sockets for stereo tape recorder recording or play-back. Each bracket looks like one in figure 20.

Connect input plug of tape recorder into left (RECORD) socket on the Master channel bracket—on Master cabinet—and the tape recorder output plug into the right (PLAY) socket on the bracket. When using a stereo tape recorder, make identical connections of the recorders second channel to the sockets on the Auxiliary channel tape recorder bracket.

TO RECORD: Move switch on Master channel bracket to left (RECORD) position. (See "Operating Controls" on page 6). For stereo recording, move switch on Auxiliary channel bracket to the left (RECORD) position also.

TO PLAY: Move switch to right (PLAY) position. Place Selector switch to "PHONO" position when playing single channel tapes. Move switch on Auxiliary channel tape bracket to right (PLAY) position and Selector switch to "STEREO" when playing stereo tapes.

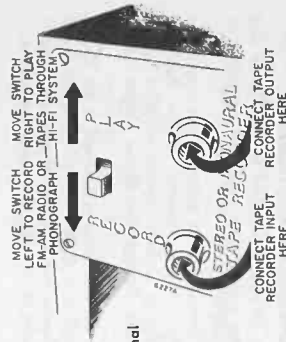


Figure 20. External Tape Recorder Bracket.

AMPLIFICATION AND RESPONSE CHECK

The pre-amplifiers and amplifiers may be checked for gain and frequency response by performing the tests outlined below and referring to the "AMPLIFIER CHECKS" table.

TEST EQUIPMENT:

Audio Oscillator, with flat frequency response across the audio range.

Vacuum Tube Voltmeter, preferably with decibel (db) scale.

Oscilloscope.

AMPLIFIER CHECKS

On 12B1 chassis, set Loudness, Bass and Treble controls to maximum (fully clockwise). Set Record Compensation to "EUP." and Function Switch to "STEREO" (On 5T4A chassis, set all controls to maximum (fully clockwise).)

AMPLIFICATION CHECK	FREQUENCY	VOITS
AUDIO OR OUTPUT	to 12B1	1000 Cycles
	to 5T4A	06 volts = 10% (27 volts = 10%)
AMPLIFIER OUTPUT	12B1	5 volts
	5T4A	7.8 watts
	12B1	7.8 watts
	5T4A	7.8 watts

Note: At 7.8 watts out, harmonic distortion is 2%.

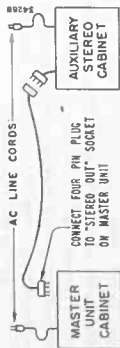


Figure 15. Stereo Unit Connections.

RIGHT AND LEFT CHANNEL CONNECTION

The Master unit and the Auxiliary unit have been constructed in production so that the "right" channel is heard through the Auxiliary unit and the "left" channel through the Master unit. In other words, the auxiliary cabinet should be placed to the right of Master unit. If it is desired to place the auxiliary cabinet to the left of the Master unit, the connections from the record changer pick-up arm must be changed to retain the original direction of the recorded sound.

When the auxiliary cabinet is placed to the right of the Master unit, the red plug from the record changer tone arm should be in the chassis socket labeled "AUX" and the other plug in the socket labeled "MASTER". If the auxiliary unit

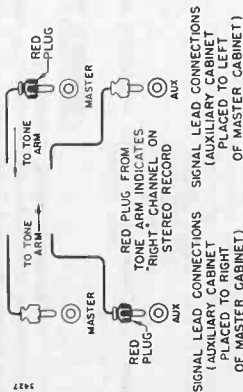


Figure 16. Right and Left Hand Channel Connections.

is moved to the left of the master cabinet, the red plug should be moved to the "MASTER" socket and the other plug moved to the "AUX" socket. See figure 16.

HEATER CIRCUIT FUSE

On chassis 12B1, the heater circuit is fused. Location of fuse is shown on figure 17. To replace fuse, connect a 2" piece of #27 gauge bare annealed copper wire between proper terminals on terminal board.



Figure 17. Heater Circuit Fuse, Chassis 12B1.

RECORD CHANGER SERVICING

For complete Record Changer servicing, refer to Service Manual No. 5800B.

NEEDLE AND CARTRIDGE REPLACEMENT

"For replacement part numbers, see page 16."

RC688-16S, -17S

To replace either needle, turn NEEDLE SELECTOR so

AMPLIFIER CHECKS (CONT.)

FREQUENCY RESPONSE CHECK	SIGNAL GENERATOR OUTPUT	OUTPUT VOLTAGE				DB CHANGE IN POSITION OF Bass or Treble control*	
		12B1		5T4A			
Freq.	Voltage	MAX.	MIN.	MAX.	MIN.	12B1	5T4A
100 cycles	5	5	0.5V or less	5	0.7	-20	-17
1,000 cycles	5	5	5	5	5	0	0
10,000 cycles	5	5	0.25V or less	5	5	-27	-27

*Set audio generator output so that 5 volts is indicated across 12B1 and 5T4A output. CAUTION: Do not exceed amplifier by overdriving with, undistorted waveform at 5 volt output readings.

PROCEDURE:

Master chassis and Auxiliary chassis may be checked for frequency response and amplification at the same time. If Auxiliary chassis is not available, Master chassis may be checked alone.
 Remove bottom covers from 12B1 and 5T4A chassis. Connect a 3.2 ohms, 15 watt resistive load across secondary windings of each Audio Output transformer (T9 and T101). Connect audio oscillator output to the junction of C54 and R40B on 12B1 chassis.

NOTE: Use an oscilloscope to check output voltage waveforms. At 5 volts output on each chassis, waveforms should be symmetrical.
TO CHECK AMPLIFICATION, set controls as shown in "AMPLIFICATION CHECK" table. Set generator output to 1,000 cycles and increase output amplitude until 5 volts appears across each chassis output load, as measured with a VTVM. Measure generator output voltage. See table for proper input voltage amplitude.
 Change generator connection to the junction of R40A and C42 on 12B1 chassis. Set generator output voltage so that 5 volts is indicated across 5T4A output load. See table for proper 5T4A input voltage amplitude.

FREQUENCY RESPONSE CHECK:
 For control settings, refer to "FREQUENCY RESPONSE CHECK" table. Connect generator "hot" lead to junction of R40B and C54 on 12B1 chassis. Set audio generator output at 100 cycles and adjust the amplitude so that 5 volts is indicated on VTVM connected across 12B1 output. Rotate Bass control to minimum. 12B1 output voltage should read 0.5 volts or less (20 db change). Return Bass control setting to maximum.
 Set generator output frequency to 10,000 cycles and adjust Treble control until 5 volts is indicated on VTVM. Rotate Treble control to minimum (maximum counterclockwise—DO NOT turn set off). 12B1 output voltage should read 0.225 volts or less (27 db change). Return Treble to maximum position.

Connect generator output to AUX. CHANNEL input socket (on 12B1 chassis). Connect VTVM across 5T4A load. Set generator frequency at 100 cycles. Set generator output so that 5 volts is indicated on VTVM. Rotate Bass control (on 5T4A chassis) maximum counterclockwise. The 5T4A output voltage should be 0.7 volts (17 db change). Return Bass control to maximum (fully clockwise) setting. Change generator output frequency to 10,000 cycles. Rotate Treble control to minimum (fully counterclockwise) position. Voltage reading at output of 5T4A should be 0.22

volts (27 db change).

DIAL STRINGING AND POINTER SETTING

Two stringing systems are used on the radio chassis. Two drums (2 3/4" and 1 3/8") and the tuning shaft are used to drive the FM-AM tuning yoke. Two pulleys (3/8" dia., brass) and drum (2") are employed to move dial pointer along dial pointer guide bracket.

The 1 3/8" drum and 2" drum are mounted on the same shaft; and coordinate the movement of the dial pointer and the tuning yoke.

If necessary, either system may be restrung separately. To accomplish dial stringing, perform the following procedure:

1. Remove dial scale.
2. Rotate drums until they are positioned as shown in figure 21. The AM tuning gang should be set fully open.
3. String front or rear pulley system or both according to figure 21 or 21A. Figure 21 shows dial stringing for early production.

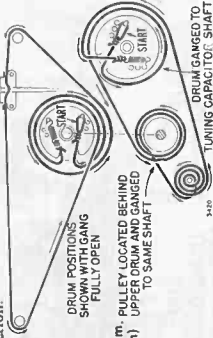


Figure 21. Dial Stringing Diagram (Early Production)
 UPPER DRUM AND GANGED TO SAME SHAFT

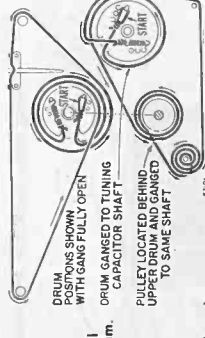


Figure 21A. Dial Stringing Diagram.

4. Replace dial scale.
5. With AM tuning gang fully open, place dial pointer on dial pointer guide bracket. Move dial pointer to line-up with the right hand calibration mark (below "AM" and "FM" on right hand side of dial scale—see figure 22). See figure 22 for method of inserting dial string on dial pointer.

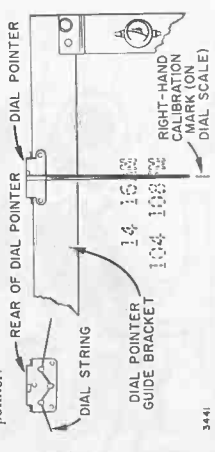


Figure 22. Dial Pointer Setting.
 Check dial pointer calibration at several points on dial by tuning on known stations. Dial pointer should coincide with calibration marks on each end of the dial when tuning yoke is fully open and fully closed.

AM IF AND RF ALIGNMENT

- Turn radio on and allow 15 minutes warm up.
- Set Loudness control fully clockwise, Bass and Treble controls at mid-rotation. Set Selector Switch to AM position.
- Connect output meter across voice coil (3.2Ω). If speakers are not to be used during alignment, connect a 3.2 ohm, 15 watt resistive load across the 3.2 ohm taps on Audio Output Transformer secondary winding (see schematic diagram).
- Repeat adjustments to insure best results.

Step	Generator Connection	Gen. Freq.	Receiver Gang Setting	Adjustment
1	To stator plates, antenna section of gang tuning capacitor.	455KC	Fully open	"L", "M", "N" and "P" for maximum.
2	Radiated signal. Feed "hot" generator lead to antenna through several loops of wire or place generator "hot" lead close to receiver for signal pickup.	1620KC	Fully open	"R" for maximum.
3		1400K	Tune in generator signal.	"S" for maximum.

*Adjustment "M" and "P" made from beneath chassis.

FM IF AND RF ALIGNMENT (using VTVM and Signal Generator)

NOTE: For FM alignment, a signal generator with facilities for crystal calibration should be used. Signal generator frequency settings are critical for FM alignment.

- Turn radio on and allow 15 minutes for warm up.
- Set Loudness control to minimum, Bass and Treble controls at mid-rotation and Selector switch to "FM" position (completely counterclockwise rotation).
- Use DC VTVM as output indicator. Set generator output so that indication on VTVM is approximately 1 1/2 volts above noise level during alignment (except "Step 2").
- Use a non-metallic alignment tool with tip 3/8" wide for transformer slug adjustments (Admiral part no. 98A30-10). Refer to figures 24 and 25 for physical location of alignment points.
- Use an unmodulated signal during alignment.
- Adjustment "A", "B", "D" and "G" made from under side of chassis. Remove chassis bottom cover to reach adjustments and to make VTVM connections.

Step	Signal Generator and VTVM Connections	Gen. Freq.	Receiver Gang Setting	Adjustment
1	Connect generator to antenna terminals with a 150 ohm resistor in series with each lead. Connect VTVM and decoupling network between "U" and ground (see schematic). Voltage reading will be negative. Adjust generator so that indication on VTVM is 1 1/2 volts above noise level.	10.7 MC	Set Tuning gang fully open	"A", "B", "C", "D", "E", "F" and "G" for maximum.
Increase signal generator output until VTVM reads -5 volts.				
2	No change in generator connection. Connect VTVM between alignment point "V" and ground (see schematic diagram). A center zero reading scale is recommended for "ADJUSTMENT" in this step.	10.7 MC	Same as "Step 1"	"H" for zero reading.
4	Same as "STEP 1"	98 MC	98 MC	Alternately adjust "J" and "K", several times, for maximum.

*Each slug adjustment ("J" and "K") is secured with a drop of wax on the FM tuning yoke. After making slug adjustments, use a soldering iron to remelt wax and secure adjustments "J" and "K" to yoke.

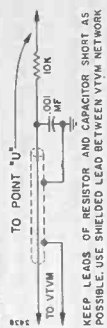


Figure 23. Decoupling Network.

PRODUCTION CHANGES

Production changes are coded RUN 10, RUN 11, etc., as given in the headings below: Run number (stamped on chassis indicates that this chassis has the change(s) incorporated which are explained under that particular run number heading below, as well as changes (lower run numbers) made prior to that time. At the start of production, all chassis were stamped RUN 10.

RUN 11: R25 (15K, 1W) changed to (22K, 1W) to permit full interchangeability of 6BE6 tubes. R33 changed to (390K, 1/2 W), R34 changed to (100K, 1/2 W) and C39 changed to (.002MF) to improve operation on AM. R70 (470K, 1/2 W) removed between M11 and M12 to minimize rumble.

RUN 12: R70 (470K, 1/2 W) removed to increase channel separation for "STEREO" operation.

12B1, 12B1A CHASSIS PARTS LIST

RESISTORS

Sym	Description	Part No.
R1	68 ohms, 1/2 watt	60B 8-680
R2	68,000 ohms, 1/2 watt	60B 8-683
R3	1,500 ohms, 1/2 watt	60B 8-152
R4	10,000 ohms, 1/2 watt	60B 8-103
R5	560 ohms, 1/2 watt	60B 8-561
R6	100 ohms, 1/2 watt	60B 8-101
R7	470,000 ohms, 1/2 watt	60B 8-474
R8	100 ohms, 1/2 watt	60B 8-101
R9	150 ohms, 1/2 watt	60B 8-151
R10	39,000 ohms, 1 watt	60B 14-393
R11	75,000 ohms, 1/2 watt, 5%	60B 7-753
R12	100 ohms, 1/2 watt	60B 8-101
R13	68 ohms, 1/2 watt	60B 8-680
R14	32,000 ohms, 1 watt	60B 14-323
R15	50,000 ohms, 1/2 watt, 5%	60B 7-503
R16	100 ohms, 1/2 watt	60B 8-101
R17	27,000 ohms, 1/2 watt	60B 14-273
R18	100,000 ohms, 1/2 watt, 5%	60B 7-104
R19	100,000 ohms, 1/2 watt, 5%	60B 7-104
R20	330,000 ohms, 1/2 watt	60B 8-334
R21	470,000 ohms, 1/2 watt	60B 8-473
R22	22,000 ohms, 1/2 watt	60B 8-223
R23	1 megohm, 1/2 watt	60B 8-105
R24	22,000 ohms, 1/2 watt	60B 8-223
R25	15,000 ohms, 1 watt (Run 10)	60B 14-153
R26	22,000 ohms, 1 watt (Run 11 and higher)	60B 14-223
R27	1,000 ohms, 1/2 watt	60B 8-102
R28	68,000 ohms, 1/2 watt	60B 8-683
R29	180,000 ohms, 1/2 watt	60B 8-184
R30	68,000 ohms, 1/2 watt	60B 8-683
R31	180,000 ohms, 1/2 watt	60B 8-184
R32A	7,000 ohms, 12 watts tapped, candohm	61A 5-17
R32B	5,000 ohms, 12 watts	60B 8-394
R33	390,000 ohms, 1/2 watt	60B 8-104
R34	100,000 ohms, 1/2 watt	60B 8-105
R35	1 megohm, 1/2 watt	60B 8-105
R36	390,000 ohms, 1/2 watt	60B 8-394
R37	390,000 ohms, 1/2 watt	60B 8-394
R38	47,000 ohms, 1/2 watt	60B 8-473
R39	47,000 ohms, 1/2 watt	60B 8-473
R40A	500,000 ohms, Loudness control	75B 46-1
R40B	500,000 ohms, Loudness control	60B 8-474
R41	470,000 ohms, Loudness control	60B 8-102
R42	100,000 ohms, 1/2 watt	60B 8-104
R43	100,000 ohms, 1/2 watt	60B 8-104
R44	680 ohms, 1/2 watt	60B 8-682
R45	39,000 ohms, 2 watts	60B 20-393
R46A	125 ohms, 5 watts tapped, candohm	61A 5-18
R46B	1,000 ohms, 7 watts	60B 8-473
R47	47,000 ohms, 1/2 watt	60B 8-473
R48	470,000 ohms, 1/2 watt	60B 8-474
R49	470,000 ohms, 1/2 watt	60B 8-474
R50	2,200 ohms, 1/2 watt	60B 8-222
R51	10,000 ohms, 1 watt	60B 14-153
R52	220,000 ohms, 1/2 watt	60B 8-224
R53	100,000 ohms, 1/2 watt	60B 8-104
R54	1 megohm, Bias control	75D 1-114
R55	10,000 ohms, 1/2 watt	60B 8-103

CAPACITORS

Sym	Description	Part No.
C1	.001 mf, 500 volts, cer. disc	65D 10-6
C2	47 mmf, 500 volts, ceramic	65D 6-79
C3	22 mmf, 500 volts, ceramic	65D 6-80
C4	17 mmf, 15%, NFO temp. coeff	Part of L2
C5	.001 mf, 500 volts, cer. disc	65D 10-3
C6	.01 mf, 500 volts, 12%, ceramic	65D 10-3
C7	2 N750 temp. coeff	65D 6-53
C8	20 mmf, 1.2%, NFO temp. coeff	Part of L3
C9	100 mmf, 500 volts, 10%, ceramic, N750 temp. coeff	65D 6-19
C10A	.001 mf, 450 volts	dual ceramic disc
C10B	.001 mf, 450 volts	dual ceramic disc
C11	10 mmf, 500 volts, 5%, cer. disc, N750 temp. coeff	65A 17-3
C12	10 mmf, 500 volts, 5%, cer. disc, N750 temp. coeff	65D 10-50
C13	.001 mf, 500 volts, cer. disc	65D 10-50
C14	.001 mf, 500 volts, cer. disc	65D 10-6
C15	.01 mf, 500 volts, feed-through	65B 26-5
C16	.01 mf, 500 volts, cer. disc	65D 10-3
C17	.001 mf, 500 volts, feed-through	65B 26-5
C18	.02 mf, 500 volts, cer. disc	65B 26-5
C19A	.004 mf, 450 volts	dual ceramic disc
C19B	.004 mf, 450 volts	dual ceramic disc
C20	.01 mf, 500 volts, cer. disc	65D 10-3
C21	.02 mf, 500 volts, cer. disc	65D 10-28
C22A	.004 mf, 450 volts	dual ceramic disc
C22B	.004 mf, 450 volts	dual ceramic disc
C23	.01 mf, 500 volts, cer. disc	65D 10-3
C24A	.004 mf, 450 volts	dual ceramic disc
C24B	.004 mf, 450 volts	dual ceramic disc
C25	.47 mmf, 500 volts, ceramic	65D 6-79
C26	220 mmf, 500 volts, ceramic	65D 6-80
C27	.005 mf, 500 volts, cer. disc	65D 10-1
C28A	356 mmf, max. ant.	68B 7-11
C28B	104.7 mmf, max. osc.	68B 7-11
C29	.47 mmf, 500 volts, 10%, cer. disc	65B 26-5
C30	.001 mf, 500 volts, feed-through, N750 temp. coeff	65D 10-177

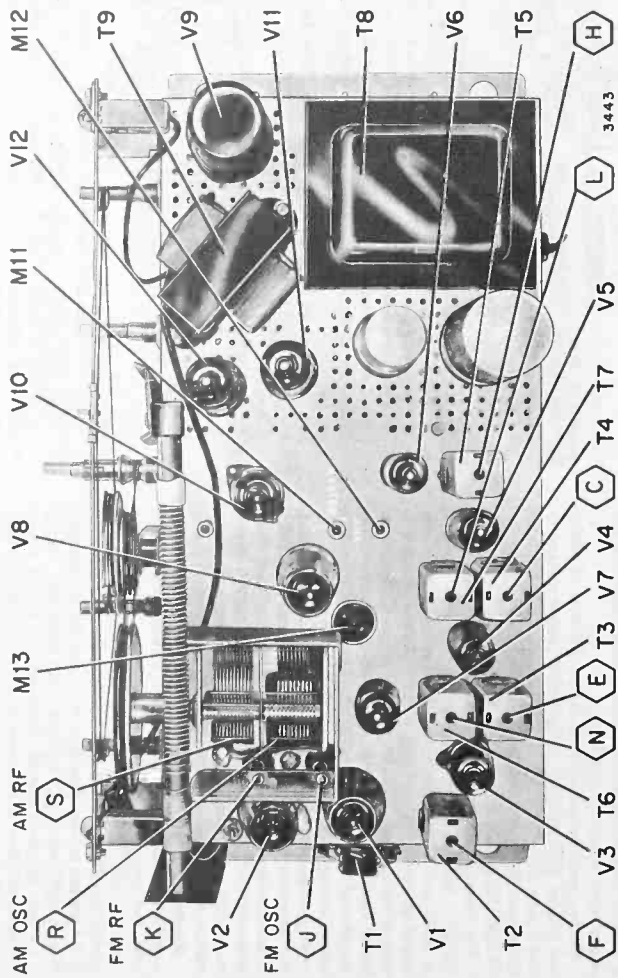


Figure 24. Top View of 12B1 Chassis. Input Connections, Output Connections and Alignment Points Shown.

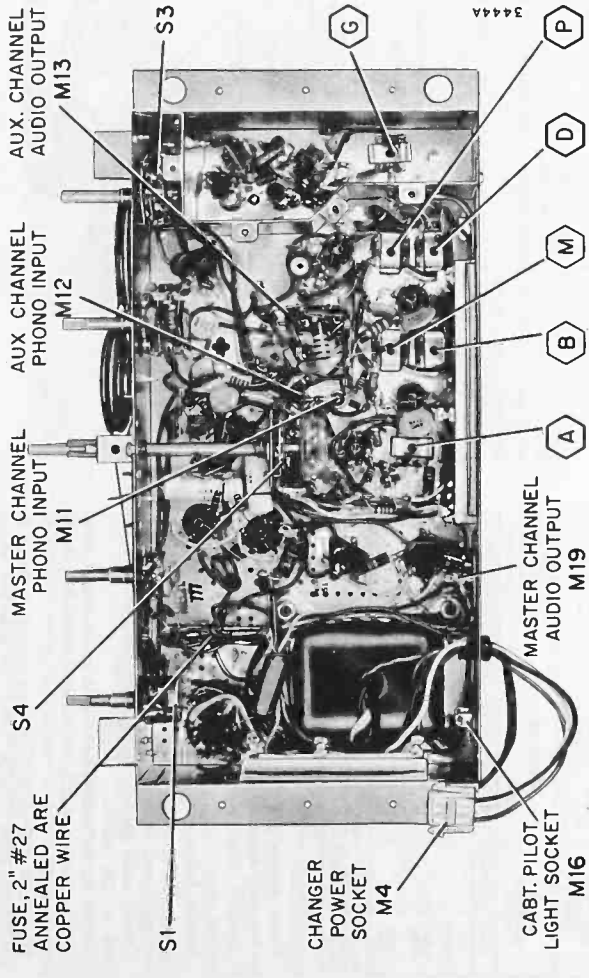


Figure 25. Bottom View of 12B1 Chassis. Input Connections, Output Connections and Alignment Points Shown.

PRODUCTION CHANGES

Production changes are coded RUN 10, RUN 11, etc., as given in the headings below: Run number (stamped on chassis indicates that this chassis has the change(s) incorporated which are explained under that particular run number heading below, as well as changes (lower run numbers) made prior to that time. At the start of production, all chassis were stamped RUN 10.

RUN 11: R25 (15K, 1W) changed to (22K, 1W) to permit full interchangeability of 6BE6 tubes. R33 changed to (390K, 1/2W), R34 changed to (100K, 1/2W) and C39 changed to (.002MF) to improve operation on AM. R70 (470K, 1/2W) added between M11 and M12 to minimize rumble.

RUN 12: R70 (470K, 1/2W) removed to increase channel separation for "STEREO" operation.

12B1, 12B1A CHASSIS PARTS LIST

RESISTORS

Sym	Description	Part No.
R1	68 ohms, 1/2 watt	60B 8-680
R2	68,000 ohms, 1/2 watt	60B 8-683
R3	1,500 ohms, 1/2 watt	60B 8-152
R4	10,000 ohms, 1/2 watt	60B 8-103
R5	560 ohms, 1/2 watt	60B 8-561
R6	100 ohms, 1/2 watt	60B 8-101
R7	470,000 ohms, 1/2 watt	60B 8-474
R8	100 ohms, 1/2 watt	60B 8-101
R9	150 ohms, 1/2 watt	60B 8-151
R10	39,000 ohms, 1 watt	60B 14-393
R11	75,000 ohms, 1/2 watt, 5%	60B 7-753
R12	100 ohms, 1/2 watt	60B 8-101
R13	68 ohms, 1/2 watt	60B 8-680
R14	32,000 ohms, 1 watt	60B 14-323
R15	50,000 ohms, 1/2 watt, 5%	60B 7-503
R16	100 ohms, 1/2 watt	60B 8-101
R17	27,000 ohms, 1/2 watt	60B 7-273
R18	27,000 ohms, 1/2 watt, 5%	60B 7-273
R19	100,000 ohms, 1/2 watt, 5%	60B 7-104
R20	100,000 ohms, 1/2 watt, 5%	60B 7-104
R21	470,000 ohms, 1/2 watt	60B 8-473
R22	330,000 ohms, 1/2 watt	60B 8-334
R23	22,000 ohms, 1/2 watt	60B 8-105
R24	22,000 ohms, 1/2 watt	60B 8-223
R25	15,000 ohms, 1 watt (Run 10)	60B 14-153
R26	22,000 ohms, 1 watt (Run 11 and higher)	60B 14-223
R27	1,000 ohms, 1/2 watt	60B 8-102
R28	68,000 ohms, 1/2 watt	60B 8-683
R29	180,000 ohms, 1/2 watt	60B 8-184
R30	68,000 ohms, 1/2 watt	60B 8-683
R31	180,000 ohms, 1/2 watt	60B 8-184
R32A	7,000 ohms, 8 watts	61A 5-17
R32B	5,000 ohms, 12 watts	tapped, candohm
R33	390,000 ohms, 1/2 watt	60B 8-394
R34	100,000 ohms, 1/2 watt	60B 8-104
R35	1 megohm, 1/2 watt	60B 8-105
R36	390,000 ohms, 1/2 watt	60B 8-394
R37	390,000 ohms, 1/2 watt	60B 8-394
R38	47,000 ohms, 1/2 watt	60B 8-473
R39	47,000 ohms, 1/2 watt	60B 8-473
R40A	500,000 ohms, Loudness control	75B 46-1
R40B	500,000 ohms, Loudness control	75B 46-1
R41	470,000 ohms, 1/2 watt	60B 8-474
R42	100,000 ohms, 1/2 watt	60B 8-102
R43	100,000 ohms, 1/2 watt	60B 8-104
R44	680 ohms, 1/2 watt	60B 8-682
R45	39,000 ohms, 2 watts	60B 20-393
R46A	125 ohms, 5 watts	61A 5-18
R46B	1,000 ohms, 7 watts	tapped, candohm
R47	47,000 ohms, 1/2 watt	60B 8-473
R48	470,000 ohms, 1/2 watt	60B 8-473
R49	470,000 ohms, 1/2 watt	60B 8-474
R50	2,200 ohms, 1/2 watt	60B 8-222
R51	10,000 ohms, 1 watt	60B 14-153
R52	220,000 ohms, 1/2 watt	60B 8-224
R53	100,000 ohms, 1/2 watt	60B 8-104
R54	1 megohm, Bass control	75D 1-114
R55	10,000 ohms, 1/2 watt	60B 8-103

CAPACITORS

Sym	Description	Part No.
C1	.001 mf, 500 volts, cer. disc	65D 10-6
C2	47 mmf, 500 volts, ceramic	65D 6-79
C3	220 mf, 500 volts, ceramic	65D 6-79
C4	17 mmf, 1.5%, NFO temp. coeff	Part of L2
C5	.001 mf, 500 volts, cer. disc	65D 10-6
C6	.01 mf, 500 volts, 12%, ceramic	65D 10-3
C7	2 N750 temp. coeff	65D 6-53
C8	20 mmf, 1.2%, NFO temp. coeff	Part of L3
C9	100 mmf, 500 volts, 10%, ceramic	65D 6-19
C10A	.001 mf, 450 volts	dual ceramic disc
C10B	.001 mf, 450 volts	dual ceramic disc
C11	10 mmf, 500 volts, 5%, cer. disc	65A 17-3
C12	10 mmf, 500 volts, 5%, cer. disc	65D 10-50
C13	N750 temp. coeff	65D 10-50
C14	.001 mf, 500 volts, cer. disc	65D 10-6
C15	.01 mf, 500 volts, feed-through	65B 26-5
C16	.01 mf, 500 volts, cer. disc	65D 10-3
C17	.001 mf, 500 volts, feed-through	65B 26-5
C18	.02 mf, 500 volts, cer. disc	65B 26-5
C19A	.004 mf, 450 volts	dual ceramic disc
C19B	.004 mf, 450 volts	dual ceramic disc
C20	.01 mf, 500 volts, cer. disc	65D 10-3
C21	.02 mf, 500 volts, cer. disc	65D 10-28
C22A	.004 mf, 450 volts	dual ceramic disc
C22B	.004 mf, 450 volts	dual ceramic disc
C23	.01 mf, 500 volts, cer. disc	65D 10-3
C24A	.004 mf, 450 volts	dual ceramic disc
C24B	.004 mf, 450 volts	dual ceramic disc
C25	47 mmf, 500 volts, ceramic	65D 6-79
C26	220 mmf, 500 volts, ceramic	65D 6-80
C27	.005 mf, 500 volts, cer. disc	65D 10-1
C28A	356 mmf, max. ant.	68B 71-1
C28B	104.7 mmf, max. osc.	68B 71-1
C29	47 mmf, 500 volts, 10%, cer. disc	65B 26-5
C30	.001 mf, 500 volts, feed-through	65D 10-177
	N750 temp. coeff	

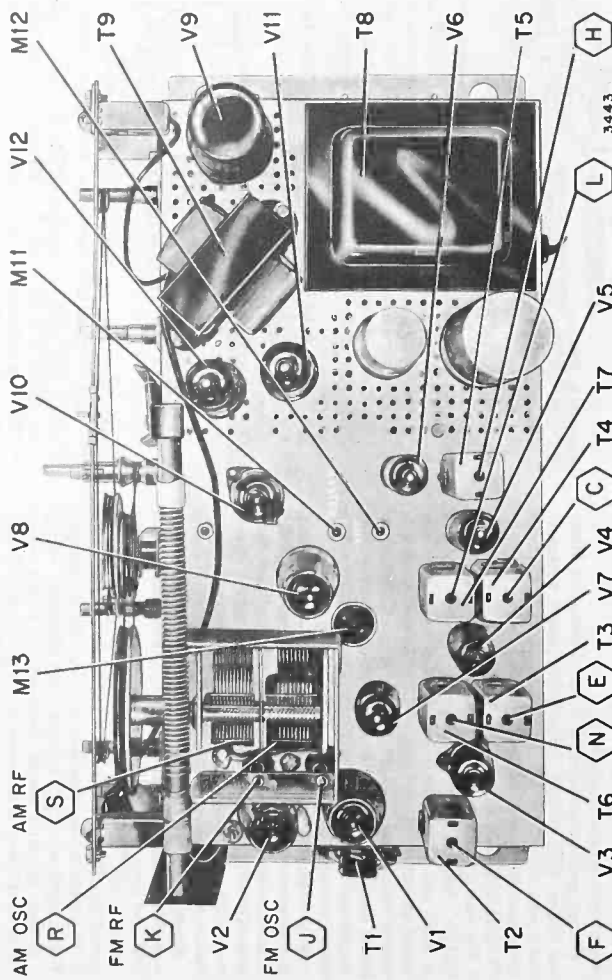


Figure 24. Top View of 12B1 Chassis. Input Connections and Alignment Points Shown.

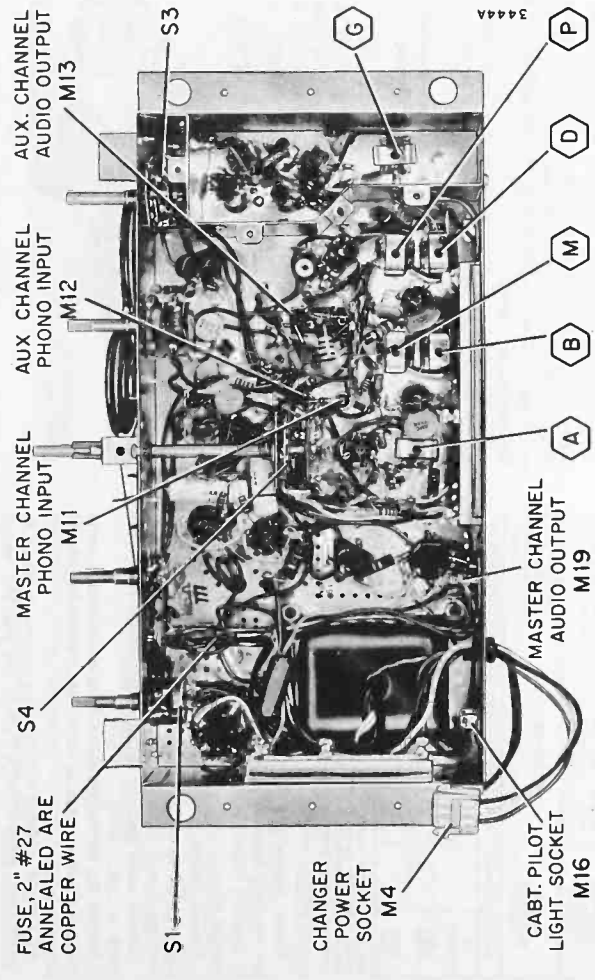


Figure 25. Bottom View of 12B1 Chassis. Input Connections, Output Connections and Alignment Points Shown.

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L101	Coll. Relay	80B 86-1
T101	Transformer, Audio Output	80B 86-1
T102	Transformer, Power	80B 86-1

MISCELLANEOUS CHASSIS PARTS

Part No.	Description	Part No.
M101	Socket, Stereo Input	80A 31-3
M102	Socket, Stereo Tape Input	80A 31-3
M103	Relay, AC Power	80B 22-1
M104	Line Card and Plug (8 ft.)	80B 1-1
M105	Bracket, Audio Output	87B 4-6
M106	Bracket, Tuning	87B 4-6
M107	Clamp, Line Card	87B 4-6
M108	Cover, Chassis Bottom	87B 4-6
M109	Insulator, Relay (fishpaper)	87B 4-6
M110	Relay (fishpaper)	87B 4-6
M111	Nut, Hex, #4-40 (for mtg. M106)	87B 4-6
M112	Nut, Hex, #4-40 (control mtg.)	87B 4-6
M113	Nut, Hex, #4-40 (control mtg.)	87B 4-6
M114	Socket, Dial (for V105)	87B 4-6
M115	Socket, Dial (for V105)	87B 4-6
M116	Socket, Dial (for V105)	87B 4-6
M117	Socket, Dial (for V105)	87B 4-6
M118	Socket, Dial (for V105)	87B 4-6
M119	Socket, Dial (for V105)	87B 4-6
M120	Socket, Dial (for V105)	87B 4-6

CABINET PARTS FOR MASTER UNITS

Models 632, 633, 634, 642, 643 and 644

Part No.	Description	Part No.
C103	100 mmf., 500 volts, ceramic	65D 63
C104	.002 mf., 400 volts, tubular	64B 8-30
C105	.002 mf., 500 volts, cer. disc	65D 10-49
C106	.002 mf., 500 volts, cer. disc	65D 10-137
C107	.002 mf., 500 volts, cer. disc	65D 10-137
C108	.002 mf., 500 volts, cer. disc	65D 6-80
C109	.002 mf., 500 volts, cer. disc	65D 6-80
C110	.022 mf., 400 volts, tubular	65D 10-188
C111	.1 mf., 400 volts, tubular	65D 10-188
C112	.1 mf., 400 volts, tubular	64B 8-26
C113	50 mf., 25 volts { electrolytic	64B 8-26
C114	35 mf., 500 volts, cer. disc	67D 7-36
C115	.047 mf., 350 volts, cer. disc	63B 12-1
C116	.047 mf., 350 volts, cer. disc	63B 12-1
C117	.047 mf., 350 volts, cer. disc	67D 7-37
C118	16 mf., 10 volts, paper (cross-over)	See C113B
C119	16 mf., 16 volts AC, non-polarized electrolytic (cross-over)	64B 13-5
		67A 40-1

Models 649, 654 and 671

Part No.	Description	Part No.
M7	Socket, Ext. Tape Input	88A 1
M8	Socket, Ext. Tape Input	88A 1
M9	Plug, Tape Output	88A 2-3
M20	Plug, Master Channel Speaker	88B 3-5
M21	Speaker	78C 153-1
M22	Speaker	78C 152-1
M23	Speaker	78C 149-1
M24	Speaker	78C 150-2
M25	Terminal Board, External Speaker (includes shorting bar)	78C 148-1
S2	Switch, Record-Play	78C 148-2
B2	Bezel and Inlay (all models)	10B 13-7
		77A 20-3
		23D 326-1

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1
L3	FM Osc. Coil (incl. C4)	69B 238-1
L4	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L5	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L6	Reductor Coil (M)	73B 31-5
L7	Flux Coupling Coil	69A 52-12
L8	Flux Coupling Coil	73A 2-14
L9	Flux Coupling Coil	73A 2-14
L10	Flux Coupling Coil	73B 31-5
L11	Flux Coupling Coil	700B 135
T1	1st FM IF Transformer (windings & core)	72D 28-72
T2	2nd FM IF Transformer	72D 28-68
T3	3rd FM IF Transformer	72D 28-68

5T4A CHASSIS PARTS LIST

Part No.	Description	Part No.
R101	500,000 ohms, resistance control	75D 1-119
R102	50,000 ohms, 1/2 watt	60B 8-563
R103	200,000 ohms, 1/2 watt	60B 8-474
R104	200,000 ohms, 1/2 watt	60B 8-222
R105	200,000 ohms, 1/2 watt	60B 8-224
R106	10,000 ohms, 1/2 watt	60B 8-104
R107	10,000 ohms, 1/2 watt	60B 8-110
R108	10,000 ohms, 1/2 watt	60B 8-104
R109	10,000 ohms, 1/2 watt	60B 8-104
R110	10,000 ohms, 1/2 watt	60B 8-104
R111	10,000 ohms, 1/2 watt	60B 8-104
R112	10,000 ohms, 1/2 watt	60B 8-104
R113	10,000 ohms, 1/2 watt	60B 8-104
R114	150,000 ohms, 1/2 watt	60B 8-122
		60B 8-154

CAPACITORS

Part No.	Description	Part No.
C101	.005 mf., 500 volts, cer. disc	65D 10-188
	10 mf., 6 volts, electrolytic	67B 35-7

RESISTORS

Part No.	Description	Part No.
R115	150,000 ohms, 1/2 watt	60B 8-154
R116	150,000 ohms, 1/2 watt	60B 8-154
R117	3,300 ohms, 1/2 watt	60B 8-332
R118	160,000 ohms, 1/2 watt, 5%	60B 7-164
R119	470,000 ohms, 1/2 watt	60B 8-474
R120	470,000 ohms, 1/2 watt	60B 8-474
R121	33,000 ohms, 1 watt, 5%	60B 13-131
R122	33,000 ohms, 1 watt, 5%	60B 8-333
R123	100,000 ohms, 1/2 watt	60B 8-104
R124	100,000 ohms, 1/2 watt	60B 8-104
R125	100,000 ohms, 1/2 watt	60B 8-104

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1
L3	FM Osc. Coil (incl. C4)	69B 238-1
L4	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L5	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L6	Reductor Coil (M)	73B 31-5
L7	Flux Coupling Coil	69A 52-12
L8	Flux Coupling Coil	73A 2-14
L9	Flux Coupling Coil	73A 2-14
L10	Flux Coupling Coil	73B 31-5
L11	Flux Coupling Coil	700B 135
T1	1st FM IF Transformer (windings & core)	72D 28-72
T2	2nd FM IF Transformer	72D 28-68
T3	3rd FM IF Transformer	72D 28-68

CAPACITORS

Part No.	Description	Part No.
C101	.005 mf., 500 volts, cer. disc	65D 10-188
	10 mf., 6 volts, electrolytic	67B 35-7

RESISTORS

Part No.	Description	Part No.
R115	150,000 ohms, 1/2 watt	60B 8-154
R116	150,000 ohms, 1/2 watt	60B 8-154
R117	3,300 ohms, 1/2 watt	60B 8-332
R118	160,000 ohms, 1/2 watt, 5%	60B 7-164
R119	470,000 ohms, 1/2 watt	60B 8-474
R120	470,000 ohms, 1/2 watt	60B 8-474
R121	33,000 ohms, 1 watt, 5%	60B 13-131
R122	33,000 ohms, 1 watt, 5%	60B 8-333
R123	100,000 ohms, 1/2 watt	60B 8-104
R124	100,000 ohms, 1/2 watt	60B 8-104
R125	100,000 ohms, 1/2 watt	60B 8-104

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1
L3	FM Osc. Coil (incl. C4)	69B 238-1
L4	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L5	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L6	Reductor Coil (M)	73B 31-5
L7	Flux Coupling Coil	69A 52-12
L8	Flux Coupling Coil	73A 2-14
L9	Flux Coupling Coil	73A 2-14
L10	Flux Coupling Coil	73B 31-5
L11	Flux Coupling Coil	700B 135
T1	1st FM IF Transformer (windings & core)	72D 28-72
T2	2nd FM IF Transformer	72D 28-68
T3	3rd FM IF Transformer	72D 28-68

CAPACITORS

Part No.	Description	Part No.
C101	.005 mf., 500 volts, cer. disc	65D 10-188
	10 mf., 6 volts, electrolytic	67B 35-7

RESISTORS

Part No.	Description	Part No.
R115	150,000 ohms, 1/2 watt	60B 8-154
R116	150,000 ohms, 1/2 watt	60B 8-154
R117	3,300 ohms, 1/2 watt	60B 8-332
R118	160,000 ohms, 1/2 watt, 5%	60B 7-164
R119	470,000 ohms, 1/2 watt	60B 8-474
R120	470,000 ohms, 1/2 watt	60B 8-474
R121	33,000 ohms, 1 watt, 5%	60B 13-131
R122	33,000 ohms, 1 watt, 5%	60B 8-333
R123	100,000 ohms, 1/2 watt	60B 8-104
R124	100,000 ohms, 1/2 watt	60B 8-104
R125	100,000 ohms, 1/2 watt	60B 8-104

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1
L3	FM Osc. Coil (incl. C4)	69B 238-1
L4	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L5	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L6	Reductor Coil (M)	73B 31-5
L7	Flux Coupling Coil	69A 52-12
L8	Flux Coupling Coil	73A 2-14
L9	Flux Coupling Coil	73A 2-14
L10	Flux Coupling Coil	73B 31-5
L11	Flux Coupling Coil	700B 135
T1	1st FM IF Transformer (windings & core)	72D 28-72
T2	2nd FM IF Transformer	72D 28-68
T3	3rd FM IF Transformer	72D 28-68

CAPACITORS

Part No.	Description	Part No.
C101	.005 mf., 500 volts, cer. disc	65D 10-188
	10 mf., 6 volts, electrolytic	67B 35-7

RESISTORS

Part No.	Description	Part No.
R115	150,000 ohms, 1/2 watt	60B 8-154
R116	150,000 ohms, 1/2 watt	60B 8-154
R117	3,300 ohms, 1/2 watt	60B 8-332
R118	160,000 ohms, 1/2 watt, 5%	60B 7-164
R119	470,000 ohms, 1/2 watt	60B 8-474
R120	470,000 ohms, 1/2 watt	60B 8-474
R121	33,000 ohms, 1 watt, 5%	60B 13-131
R122	33,000 ohms, 1 watt, 5%	60B 8-333
R123	100,000 ohms, 1/2 watt	60B 8-104
R124	100,000 ohms, 1/2 watt	60B 8-104
R125	100,000 ohms, 1/2 watt	60B 8-104

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1
L3	FM Osc. Coil (incl. C4)	69B 238-1
L4	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L5	RF Choke Coil (1 ohm green color dot; wound on 1 meg resistor)	73B 31-5
L6	Reductor Coil (M)	73B 31-5
L7	Flux Coupling Coil	69A 52-12
L8	Flux Coupling Coil	73A 2-14
L9	Flux Coupling Coil	73A 2-14
L10	Flux Coupling Coil	73B 31-5
L11	Flux Coupling Coil	700B 135
T1	1st FM IF Transformer (windings & core)	72D 28-72
T2	2nd FM IF Transformer	72D 28-68
T3	3rd FM IF Transformer	72D 28-68

CAPACITORS

Part No.	Description	Part No.
C101	.005 mf., 500 volts, cer. disc	65D 10-188
	10 mf., 6 volts, electrolytic	67B 35-7

RESISTORS

Part No.	Description	Part No.
R115	150,000 ohms, 1/2 watt	60B 8-154
R116	150,000 ohms, 1/2 watt	60B 8-154
R117	3,300 ohms, 1/2 watt	60B 8-332
R118	160,000 ohms, 1/2 watt, 5%	60B 7-164
R119	470,000 ohms, 1/2 watt	60B 8-474
R120	470,000 ohms, 1/2 watt	60B 8-474
R121	33,000 ohms, 1 watt, 5%	60B 13-131
R122	33,000 ohms, 1 watt, 5%	60B 8-333
R123	100,000 ohms, 1/2 watt	60B 8-104
R124	100,000 ohms, 1/2 watt	60B 8-104
R125	100,000 ohms, 1/2 watt	60B 8-104

COILS AND TRANSFORMERS

Part No.	Description	Part No.
L1	RF Choke Coil (1.3 ohm blue color dot, wound on 1 meg resistor)	73B 81-6
L2	FM Mixer Coil (incl. C4)	69B 239-1

CABINET PARTS FOR AUXILIARY UNITS

For Models *SS622, *SS623, *SS624, *SS642, *SS643, *SS644, *SS649, *SS654 and *SS671

*Models SS622, SS623 and SS624 are auxiliary units used with Models 632, 633 and 634 respectively.

Sym.	Description	Part No.
M23	Speaker 4" PM, Mid-Range, 8 ohms voice coil impedance, Model 649	78C 149-1
	4" PM, Mid-Range, 16 ohms voice coil impedance, Model 654	78C 149-2
	3 1/2" PM, Mid-Range, 3.2 ohms voice coil impedance, Model 671	78C 150-1
M24	Speaker 3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Model 649	78C 149-1
	3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Model 654	78C 149-2
	3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Model 671	78C 148-2
M25	Terminal Board, External Speaker (includes shorting bar)	10B 13-7
S2	Switch, Record-Play	77A 20-3
	Reel and Inlay (for radio)	23D 326-1
*Cabinet	Model 649, French Provincial, Cherry	*35E 459-9
	Model 654, Italian Provincial, Pine Cherry	*35E 460-4
	Model 671, Italian Provincial, Walnut	*35E 454-1
	Capacitor, Cross-over (4 mf, all models)	67A 18-1
	Catch, Bullet (brass; 16VAC; model 671)	67A 40-1
	Clip, 45 RPM Spindle	31E 454-53
	Cover, Speaker Plug	88B 3-4
	Dial Scale Window	22C 331-1
	Door Pull (Models 649 and 671)	37A 171-2
	Escutcheon, "Head of David"	23A 328
	Grille Cloth	37A 171-1
	Model 649	36D 86-28
	Model 654 (front)	36D 86-46
	Model 654 (rear)	36D 86-85
	Model 671	36D 86-35

CABINET PARTS FOR COMBINED UNITS

Models 662, 663 and 664

Sym.	Description	Part No.
M7	Socket, External Tape Input	88A 1
M8	Socket, External Tape Input	88A 1
M9	Plug, Tape Output	88A 2-3
M14	Plug, Cabinet Pilot Light	82A 5-4
M15	Socket, Cabinet Pilot Light (with leads)	82A 11-11
M20	Plug, Master Channel Speaker	88B 3-5
M21	Speaker, 12" PM, Woofer, 8.2 ohms voice coil impedance	78C 153-1
M22	Speaker, 3 1/2" PM, Mid-Range, 16 ohms voice coil impedance	78C 150-3
M25	Terminal Board, External Speaker (includes shorting bar)	78C 148-1
M102	Plug, Stereo Tape Output	10B 13-7
M104	Socket, Stereo Tape Input	88A 2-3
M105	Socket, Stereo Tape Input	88A 1
M109	Plug, Speaker (5 pin)	88B 3-5
M110	Speaker, 12" PM, Woofer, 8.2 ohms voice coil impedance	78C 153-1
M111	Speaker, 5 1/2" PM, Mid-Range, 16 ohms voice coil impedance	78C 150-3
M112	Speaker, 3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance	78C 148-1
S9	Switch, Record-Play	77A 20-3
	Reel and Inlay (for radio)	23D 326-1
	Bracket, Radio Chassis Mig	15B 1877
*Cabinet	Model 662, Mahogany	*35E 464-2
	Model 663, Blond	*35E 464-3
	Model 664, Sierra	*35E 464-4

For Models *SS622, *SS623, *SS624, *SS642, *SS643, *SS644, *SS649, *SS654 and *SS671

*Models SS622, SS623 and SS624 are auxiliary units used with Models 632, 633 and 634 respectively.

Sym.	Description	Part No.
M102	Plug, Stereo Tape Output	88A 2,3
M104	Socket, Stereo Tape Input	88A 1
M105	Socket, Stereo Tape Input	88A 1
M109	Plug, Speaker (5 pin)	88B 3-5
	12" PM, Woofer, 8.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 153-1
M110	Speaker	78C 153-1
	10" PM, Woofer, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 154-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 152-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 152-1
M111	Speaker	78C 152-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 151-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 150-2
	4" PM, Mid-Range, 8 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 149-1
M112	Speaker	78C 149-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 150-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 149-2
	10" PM, Woofer, 3.2 ohms voice coil impedance, Model SS644	78C 148-1
M113	Speaker	78C 148-1
	3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	77A 20-3
S101	Switch, Record-Play	89B 81-1
	Cable Assembly (15 feet long, shielded; includes plug and socket)	*35E 461-2
	Cabinet	*35E 461-3
	Model SS622, Mahogany	35E 461-4
	Model SS623, Blond	
	Model SS624, Sierra	

CABINET PARTS FOR COMBINED UNITS

Models 662, 663 and 664

Sym.	Description	Part No.
Capacitor	4 mf, Cross-over	64B 13-5
Clip	45 RPM Spindle	11A 20
Cover	Speaker Plug (for M20 or M109)	88B 3-4
Dial Scale Window		23C 331-1
Duplex Outlet and Line Cord Assembly		700B 157
Escutcheon, "Head of David"		23A 328
Grille Cloth		36D 86-91
Model 662		36D 86-92
Model 663		36D 86-93
Model 664		36D 86-94
Grille Cloth		12A 2-3
Level, Pilot Light (on mg)		21A 19-1
Level, Pilot Light (on mg)		21A 19-2
Keypad, #6,32 (brass mig.)		2A 19-2-71
Keypad, #8,32 (Aux. chassis mig.)		
Knobs (for radio, front of cabt.)		
Control (On-Off, Treble, Bass, Loudness or Record Compensator)		
Selector		33C 254-5
Tuning		33C 254-17
Knobs (for Aux. chassis; side of cabt.)		33B 299-1
Balance		33C 254-13
Treble		33C 254-14
Leg, Mahogany, Model 662		33C 254-15
Leg, Sierra, Model 663		35E 464-52
Leg, Blond, Model 664		35E 464-53
Line Cord		35E 464-54
Panel, Lx #8,32 (speaker mig.)		2A 19-1-71
Panel, Lx #8,32 (speaker mig.)		2A 19-2-71
See Duplex Outlet and Line Cord		
acoustical material)		
Screw, #6,32x1 1/2" (speaker mig.)		43D 306-8
Screw, #6,32x1 1/2" (speaker mig.)		1A 100-10-71
Screw, #10,32x1 1/2" (WHMS PH (chassis mig.))		1A 152-47-71
Screw, #10,32x1 1/2" (WH PH (radio chassis mig.))		
Socket, Speaker (2 pin; center of holes 1/2" apart)		1A 153-28-71
Socket, Speaker (2 pin; center of holes 1/2" apart)		87A 86-1
Spacer, Rubber (for mig, baffle board)		87A 86-2
Spring, Record Changer Flout.		12A 90
		405A 139-2

For Models *SS622, *SS623, *SS624, *SS642, *SS643, *SS644, *SS649, *SS654 and *SS671

*Models SS622, SS623 and SS624 are auxiliary units used with Models 632, 633 and 634 respectively.

Sym.	Description	Part No.
M102	Plug, Stereo Tape Output	88A 2,3
M104	Socket, Stereo Tape Input	88A 1
M105	Socket, Stereo Tape Input	88A 1
M109	Plug, Speaker (5 pin)	88B 3-5
	12" PM, Woofer, 8.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 153-1
M110	Speaker	78C 153-1
	10" PM, Woofer, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 154-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 152-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 152-1
M111	Speaker	78C 152-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 151-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 150-2
	4" PM, Mid-Range, 8 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 149-1
M112	Speaker	78C 149-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 150-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 149-2
	10" PM, Woofer, 3.2 ohms voice coil impedance, Model SS644	78C 148-1
M113	Speaker	78C 148-1
	3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	77A 20-3
S101	Switch, Record-Play	89B 81-1
	Cable Assembly (15 feet long, shielded; includes plug and socket)	*35E 461-2
	Cabinet	*35E 461-3
	Model SS622, Mahogany	35E 461-4
	Model SS623, Blond	
	Model SS624, Sierra	

CABINET PARTS FOR COMBINED UNITS

Models 662, 663 and 664

Sym.	Description	Part No.
M1	Cartridge, Stereo Pick-up (includes .0007" (7 mil) sapphire microgroove and .003" (3 mil) sapphire standard needles; used on RC688-165)	409B333-1-1
M1	Cartridge, Stereo Pick-up (includes .0007" (7 mil) diamond microgroove and .003" (3 mil) sapphire standard needles; used on RC688-175)	409B333-2-1
M1	Cartridge, Stereo Pick-up (includes .0007" (7 mil) sapphire microgroove and .003" (3 mil) sapphire standard needles; used on RC688-185)	409C 34-1
M2	Motor, Record Changer (4-speed, 4 pole)	407D29
M3	Plug, Record Changer Power (includes contacts and leads)	700B198-1
M5	Plug, Master Channel Phono Output (incl 35" shielded cable)	413C11-9
M6	Plug, Aux. Channel Phono Output (incl 35" shielded cable)	413C11-9-1
S5	Switch, Rej-On-Off (incl. cover)	408A1

For Models *SS622, *SS623, *SS624, *SS642, *SS643, *SS644, *SS649, *SS654 and *SS671

*Models SS622, SS623 and SS624 are auxiliary units used with Models 632, 633 and 634 respectively.

Sym.	Description	Part No.
M102	Plug, Stereo Tape Output	88A 2,3
M104	Socket, Stereo Tape Input	88A 1
M105	Socket, Stereo Tape Input	88A 1
M109	Plug, Speaker (5 pin)	88B 3-5
	12" PM, Woofer, 8.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 153-1
M110	Speaker	78C 153-1
	10" PM, Woofer, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 154-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 152-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 152-1
M111	Speaker	78C 152-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 151-1
	10" PM, Woofer, 8 ohms voice coil impedance, Model SS644	78C 150-2
	4" PM, Mid-Range, 8 ohms voice coil impedance, Models SS622, SS623, SS624 and SS649	78C 149-1
M112	Speaker	78C 149-1
	5 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 150-1
	8" PM, Mid-Range, 16 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	78C 149-2
	10" PM, Woofer, 3.2 ohms voice coil impedance, Model SS644	78C 148-1
M113	Speaker	78C 148-1
	3 1/2" PM, Tweeter, 3.2 ohms voice coil impedance, Models SS642, SS643, SS644 and SS671	77A 20-3
S101	Switch, Record-Play	89B 81-1
	Cable Assembly (15 feet long, shielded; includes plug and socket)	*35E 461-2
	Cabinet	*35E 461-3
	Model SS622, Mahogany	35E 461-4
	Model SS623, Blond	
	Model SS624, Sierra	

CABINET PARTS FOR COMBINED UNITS

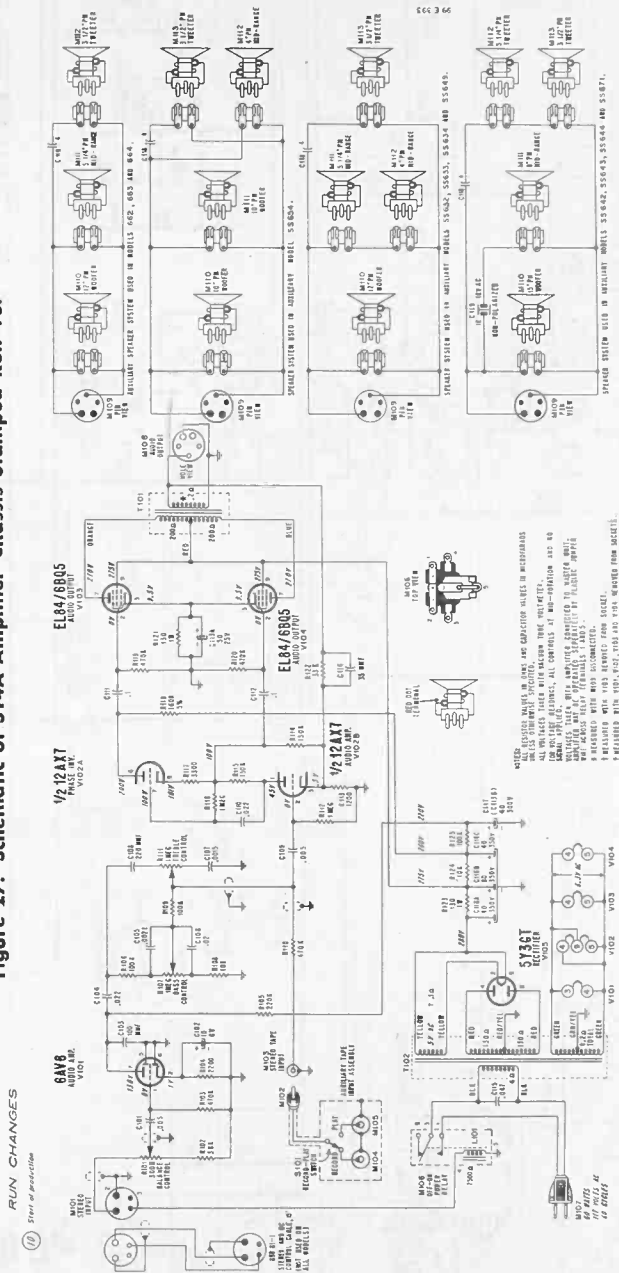
Models 662, 663 and 664

Sym.	Description	Part No.
Adapter	45 RPM Record (Envelope of 3)	46AB-2
Cable	One Arm, Shielded (2 wires and shield; for RC688-165)	413A 17-2
Cable	Two Arm, Shielded (2 wires and shield; for RC688-185)	413A 17-3
Centerpost Assembly		409B691
Control Knobs (Black)		403A63-4
Escutcheon, Phono, Silver (fits around turntable)		403D64-6
Mat, Turntable, Rubber (Black)		406C34
Needle, .0007" (7 mil) sapphire, microgroove (for 409B333-1-1 cartridge)		98C15-100
Needle, .003" (3 mil) sapphire, standard (for 409B333-1-1 or 409B333-2-1 cartridge)		98C15-101
Needle, .0007" (7 mil) diamond, microgroove (for 409B333-2-1 cartridge)		98C15-102
Needle Assembly, .0007" (7 mil) and .003" (3 mil) sapphire needles (for 409C34-1 cartridge)		98C 95-1
Needle Assembly, .0007" (7 mil) diamond and .003" (3 mil) sapphire needles (for 499C34-1 cartridge)		98C 95-2
Spring, 45 RPM Adapter		403C686-1
Spring, Phono (ringer mig.)		403A193-2
Tone Arm Rest (Black)		403A65-6

- VOLTAGE DATA**
- All voltages measured on 117 volts AC, 60 cycle line with a vacuum-tube voltmeter.
 - All voltages measured with respect to chassis ground except Y9 filament voltage, primary winding voltages on T8 and T102 and heater voltages for tubes on 5T4A chassis.
 - Set controls as shown on schematic diagrams.
 - All voltages measured with FM antenna terminals shorted together and tuning dial set at low frequency end.
 - For further notes regarding voltage readings, refer to schematic diagrams.

- SCHEMATIC NOTES**
- ②, ③, . . . etc. indicate production changes covered by a Run Number. Run numbers are stamped at rear of chassis. Brief description of Run changes given on schematic.
- ①, ②, . . . etc. indicate alignment points and connections.
- Important: Before making voltage measurements, see instructions below.
- Fixed resistor values in ohms \pm 10% tolerance, $\frac{1}{2}$ watt; capacitor values shown in microfarads \pm 20% tolerance unless otherwise specified.
- Note: K = x 1,000; MEC = x 1,000,000; MMF = micromicrofarad.

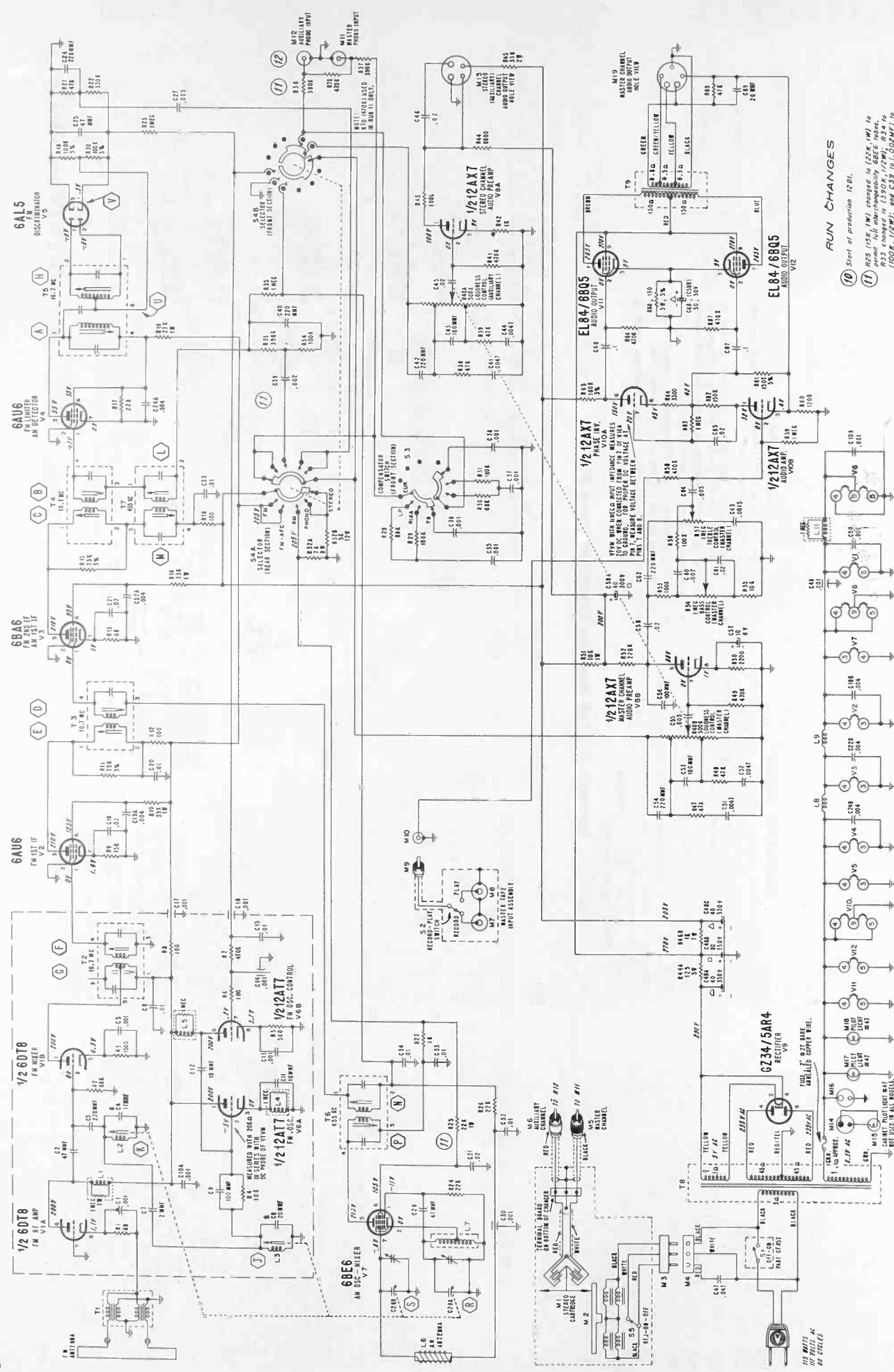
Figure 27. Schematic of 5T4A Amplifier Chassis Stamped Run 10.



RUN CHANGES
Start of production

W101, W102, W103, W104, W105, W106, W107, W108, W109, W110, W111, W112, W113, W114, W115, W116, W117, W118, W119, W120, W121, W122, W123, W124, W125, W126, W127, W128, W129, W130, W131, W132, W133, W134, W135, W136, W137, W138, W139, W140, W141, W142, W143, W144, W145, W146, W147, W148, W149, W150, W151, W152, W153, W154, W155, W156, W157, W158, W159, W160, W161, W162, W163, W164, W165, W166, W167, W168, W169, W170, W171, W172, W173, W174, W175, W176, W177, W178, W179, W180, W181, W182, W183, W184, W185, W186, W187, W188, W189, W190, W191, W192, W193, W194, W195, W196, W197, W198, W199, W200, W201, W202, W203, W204, W205, W206, W207, W208, W209, W210, W211, W212, W213, W214, W215, W216, W217, W218, W219, W220, W221, W222, W223, W224, W225, W226, W227, W228, W229, W230, W231, W232, W233, W234, W235, W236, W237, W238, W239, W240, W241, W242, W243, W244, W245, W246, W247, W248, W249, W250, W251, W252, W253, W254, W255, W256, W257, W258, W259, W260, W261, W262, W263, W264, W265, W266, W267, W268, W269, W270, W271, W272, W273, W274, W275, W276, W277, W278, W279, W280, W281, W282, W283, W284, W285, W286, W287, W288, W289, W290, W291, W292, W293, W294, W295, W296, W297, W298, W299, W300, W301, W302, W303, W304, W305, W306, W307, W308, W309, W310, W311, W312, W313, W314, W315, W316, W317, W318, W319, W320, W321, W322, W323, W324, W325, W326, W327, W328, W329, W330, W331, W332, W333, W334, W335, W336, W337, W338, W339, W340, W341, W342, W343, W344, W345, W346, W347, W348, W349, W350, W351, W352, W353, W354, W355, W356, W357, W358, W359, W360, W361, W362, W363, W364, W365, W366, W367, W368, W369, W370, W371, W372, W373, W374, W375, W376, W377, W378, W379, W380, W381, W382, W383, W384, W385, W386, W387, W388, W389, W390, W391, W392, W393, W394, W395, W396, W397, W398, W399, W400, W401, W402, W403, W404, W405, W406, W407, W408, W409, W410, W411, W412, W413, W414, W415, W416, W417, W418, W419, W420, W421, W422, W423, W424, W425, W426, W427, W428, W429, W430, W431, W432, W433, W434, W435, W436, W437, W438, W439, W440, W441, W442, W443, W444, W445, W446, W447, W448, W449, W450, W451, W452, W453, W454, W455, W456, W457, W458, W459, W460, W461, W462, W463, W464, W465, W466, W467, W468, W469, W470, W471, W472, W473, W474, W475, W476, W477, W478, W479, W480, W481, W482, W483, W484, W485, W486, W487, W488, W489, W490, W491, W492, W493, W494, W495, W496, W497, W498, W499, W500, W501, W502, W503, W504, W505, W506, W507, W508, W509, W510, W511, W512, W513, W514, W515, W516, W517, W518, W519, W520, W521, W522, W523, W524, W525, W526, W527, W528, W529, W530, W531, W532, W533, W534, W535, W536, W537, W538, W539, W540, W541, W542, W543, W544, W545, W546, W547, W548, W549, W550, W551, W552, W553, W554, W555, W556, W557, W558, W559, W560, W561, W562, W563, W564, W565, W566, W567, W568, W569, W570, W571, W572, W573, W574, W575, W576, W577, W578, W579, W580, W581, W582, W583, W584, W585, W586, W587, W588, W589, W590, W591, W592, W593, W594, W595, W596, W597, W598, W599, W600, W601, W602, W603, W604, W605, W606, W607, W608, W609, W610, W611, W612, W613, W614, W615, W616, W617, W618, W619, W620, W621, W622, W623, W624, W625, W626, W627, W628, W629, W630, W631, W632, W633, W634, W635, W636, W637, W638, W639, W640, W641, W642, W643, W644, W645, W646, W647, W648, W649, W650, W651, W652, W653, W654, W655, W656, W657, W658, W659, W660, W661, W662, W663, W664, W665, W666, W667, W668, W669, W670, W671, W672, W673, W674, W675, W676, W677, W678, W679, W680, W681, W682, W683, W684, W685, W686, W687, W688, W689, W690, W691, W692, W693, W694, W695, W696, W697, W698, W699, W700, W701, W702, W703, W704, W705, W706, W707, W708, W709, W710, W711, W712, W713, W714, W715, W716, W717, W718, W719, W720, W721, W722, W723, W724, W725, W726, W727, W728, W729, W730, W731, W732, W733, W734, W735, W736, W737, W738, W739, W740, W741, W742, W743, W744, W745, W746, W747, W748, W749, W750, W751, W752, W753, W754, W755, W756, W757, W758, W759, W760, W761, W762, W763, W764, W765, W766, W767, W768, W769, W770, W771, W772, W773, W774, W775, W776, W777, W778, W779, W780, W781, W782, W783, W784, W785, W786, W787, W788, W789, W790, W791, W792, W793, W794, W795, W796, W797, W798, W799, W800, W801, W802, W803, W804, W805, W806, W807, W808, W809, W810, W811, W812, W813, W814, W815, W816, W817, W818, W819, W820, W821, W822, W823, W824, W825, W826, W827, W828, W829, W830, W831, W832, W833, W834, W835, W836, W837, W838, W839, W840, W841, W842, W843, W844, W845, W846, W847, W848, W849, W850, W851, W852, W853, W854, W855, W856, W857, W858, W859, W860, W861, W862, W863, W864, W865, W866, W867, W868, W869, W870, W871, W872, W873, W874, W875, W876, W877, W878, W879, W880, W881, W882, W883, W884, W885, W886, W887, W888, W889, W890, W891, W892, W893, W894, W895, W896, W897, W898, W899, W900, W901, W902, W903, W904, W905, W906, W907, W908, W909, W910, W911, W912, W913, W914, W915, W916, W917, W918, W919, W920, W921, W922, W923, W924, W925, W926, W927, W928, W929, W930, W931, W932, W933, W934, W935, W936, W937, W938, W939, W940, W941, W942, W943, W944, W945, W946, W947, W948, W949, W950, W951, W952, W953, W954, W955, W956, W957, W958, W959, W960, W961, W962, W963, W964, W965, W966, W967, W968, W969, W970, W971, W972, W973, W974, W975, W976, W977, W978, W979, W980, W981, W982, W983, W984, W985, W986, W987, W988, W989, W990, W991, W992, W993, W994, W995, W996, W997, W998, W999, W1000.

Figure 26. Schematic of 12B1 Radio Chassis Stamped Run 10 through 12.



RUN CHANGES

(10) Start of production 12B1.
 (11) R25 (5K 1W) changed to (2K 1W) to permit full microphonically 6BE6 input.
 R33 changed to (150K, 1/2W). R34 to (100K, 1/2W) and C39 to (100, 100V) inboard. AM indicator M10 (470, 1/2W) added. Between M11 and M12 to minimize hum.
 (12) R70 (470K, 1/2W) removed to increase channel separation for stereo operation.

The first part of the report
 deals with the general
 conditions of the
 country and the
 progress of the
 work during the
 year. It is
 followed by a
 detailed account
 of the various
 projects and
 the results
 achieved. The
 report concludes
 with a summary
 of the work
 done and a
 list of the
 names of the
 persons who
 have assisted
 in the work.



Emerson Radio

SERVICE NOTE

SEPTEMBER, 1958

MODEL 896B

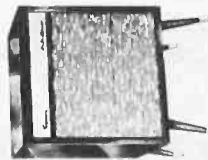
CHASSIS 120455B

MODELS 971, 971A, 970

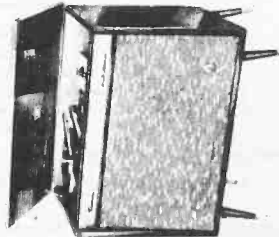


MODEL 970

*MODEL 971A (NOT SHOWN) DIFFERS FROM 971 ONLY IN CABINET DIMENSIONS.



MODEL 971*



MODEL 896B

SPECIFICATIONS

TYPE: Stereophonic High-Fidelity Radio Phonograph Combination (Model 896B).
External Speaker System Enclosures (Models 971, 971A, 970)

FREQUENCY RANGE: 540-1620KC

TUBE TYPES:
V1 - 12AX7 - Dual-Channel Audio Amplifier
V2 - 25EH5 - Beam-Power Output (Right Channel)

V3 - 25EH5 - Beam-Power Output (Left Channel)
V4 - 6BE6 - Converter (AM)
V5 - 6BA6 - I-F Amplifier (AM)
X1 - Selenium Diode (Detector)
S1-1 - Silicon Rectifier
POWER SUPPLY - 60 Cyc. AC only
VOLTAGE RATING - 115 Volts
POWER CONSUMPTION - AMPL/PHONO-85 watts
POWER CONSUMPTION - Radio Operation-60 watts

A BRIEF DESCRIPTION OF STEREO

The original recording was made as recreated and the stereophonic effect is produced.

The new "compatible" stereophonic records have two separate sound tracks in each groove. A stereo cartridge picks up individual impulses from both tracks in the record groove and feeds them separately through dual-channel amplifiers. (On one type of popular dual-channel amplifier, each channel has its own speaker.) The two channels are spaced so that the speaker placement distance is from 8 to 15 feet apart, depending upon listening preferences of the user.

GENERAL DESCRIPTION

MODEL 896B is a stereophonic high-fidelity radio-phonograph combination incorporating superheterodyne AM, dual-channel stereophonic/monaural amplifier, improved automatic A-speed intermix record changer for stereophonic and monaural recordings, and a speaker system consisting of one 12" woofer, three tweeters, and an electrical crossover network.

Since the Model 896B has a completely self-contained stereo dual-channel amplifier it is only necessary to obtain an external speaker or speaker system for complete stereo reproduction. The external speaker or speaker system should have a voice coil impedance of 6 to 8 ohms. The following external speaker system enclosures were specifically designed to match Model 896B.

Model 971 is a matching console speaker enclosure incorporating a 3-speaker system consisting of one 12" woofer, two tweeters, and an electrical crossover network. Model 970 is a table model speaker enclosure incorporating

maintain optimum stereo performance of this instrument, on-off-tone controls.

1. The Selector (function) switch has three settings: Stereo (for standard records) and (AM) radio.
Stereo (fully counter-clockwise) divides amplifier (dual-channel) into "right" and "left" channels to feed signals to "right" (internal) and "left" (external) speaker systems for stereophonic application (see schematic, page 3 of this note).

(b) Monaural - (center position) connects "right" and "left" channels of amplifier in parallel and permits conventional records of all four speeds to be played in standard fashion.
(note: Internal/external speaker system connections are found below).

(c) Radio - allows reception of all standard AM broadcasts.

2. Speaker Switch - (located rear of cabinet) has three positions:
(a) Internal (up) - (using only self-contained speaker system for monaural use).

(b) External (down) - When two leads from external speaker system (model 971, for example) are connected to the screw terminals on strip provided, and the lever switch is swung to External, only the external (remote) speaker system will function.

(c) Both - (Level) - Internal, external speaker systems will function. When the lever switch is swung to matching color-code notation on strip to lead. If no color code is found, connect speaker leads and check for correct phasing. Speaker phasing for stereo is more critical and speaker polarity may be checked in the following manner if color coding has not been used:

1. Connect external leads. 2. Place familiar record on turntable. 3. Swing lever to "Both" position (activating both speaker systems). 4. While record is playing, observe speaker response. A crisp, fuller sound indicates correct phasing of speakers.

*NOTE: Both speaker systems may also be used together or separately for monaural record application.

3. The Dual Loudness Control is used to balance the output of the two channels, so that neither predominates. When the speaker lever switch is in the "Both" (center) position, the inner knob controls volume of "right-hand" (internal) speakers and outer concentrically-mounted knob controls "left-hand" (external) speakers. The knobs are designed to turn simultaneously as a linked control. If speaker output balancing is required, the individual knob sections may be independently rotated as indicated below:

To balance the output, set the "selector" to "STEREO" and the rear lever-switch at "BOTH", and put a monaural record on the turntable. Turn the outer loudness knob fully

DISASSEMBLY PROCEDURE

AM Tuner and Amplifier Chassis
NOTE: To replace tubes, only masonite back cover need be removed.

1. Remove all knobs and remove masonite back. Remove fiber support bracket.
2. Remove four Phillips head screws securing AM tuner and amplifier chassis to cabinet. (On models 971 and 970, remove leads for speaker system and loop antenna.)
3. Remove two screws securing A.C. interlock and its bracket to base of cabinet. (Unstaple fish paper wire holder).
4. Remove screw holding AC interlock plug to chassis (chassis to record changer AC cord) and remove screws holding three position speaker-switching panel to back of cabinet.
5. Remove five screws holding masonite mounting board and chassis (Top of Cabinet).
6. Remove 4 screws holding masonite mounting board and control panel to chassis. In some isolated cases a metal

counter-clockwise and hold it firmly with one hand to prevent rotation. Turn up the inner loudness knob clockwise until the sound from the right-hand (internal) speaker is set for the desired volume level. Observe the dial scale number at which the knob indicator is set. Listen for a while to fix in mind the sound level and then turn the inner knob fully counter-clockwise, so that the right-hand speaker is silent. While preventing the turntable from rotating, turn the left-hand (auxiliary) speaker seems to be at the same volume level previously set for the right-hand speaker. Restrain the outer knob of this point and turn the inner knob to the previously noted scale number. The output from both speaker systems is now approximately the same. Overall loudness level can be adjusted by turning either knob without restraining the other, since both turn simultaneously normally. Any desired readjustment to volume is safe for individual listening preference. This can be made by restraining one knob and turning the other.

Record Changer 819126 (or 819129), used in Model 896B, is a stereophonic/monaural four-speed (33 1/3 RPM, 16, 45, and 78 RPM records) automatically or manually. With the turntable speed control knob in the Speed-Reminder (Changer 819126) or "Auto-Brain" (Changer 819129) position and the intermixer in the "Stereo" position, the changer will play stereophonic records and play 33 1/3 and 45 RPM records without regard to size or sequence. A total of ten records may be placed on the turntable.

The turntable automatically pauses during the changing cycle in order to eliminate record abrasion. When the last record has been played, the idler wheel is automatically disengaged to prevent "flats" from developing. **NOTE: The Auto-Brain (Changer 819129) has the following additional features: When Auto-Brain setting is used and the stylus selector lever is turned to the "78" (RPM) side, turntable speed will automatically be switched to 78 RPM and will remain at this speed as long as stylus selector lever is not changed to the L.P. position, even though a record of a different speed (33 1/3 for example) is dropped to the turntable. The resulting speed stylus is being used and is a method of preventing record wear.

A stereophonic high-fidelity dual-head turnover ceramic cartridge with integrated sapphire-tipped stylus is incorporated into a damped, acoustically shielded tone arm. This cartridge may also be used for monaural records without adaptation.

In order to play 45 RPM records (with large hole in center), 45 RPM spindle attachment, (part #962530) should be used and can be obtained from Emerson distributors. This diameter to accommodate this type of record and eliminate the need for separate center hole adaptors.

bracket will protrude thru the bottom of the chassis mounted masonite board. This bracket should be removed by unscrewing the protruding portion until it lines up with the slot in the chassis.

8. Remove masonite board/control panel from chassis.
NOTE: The metal bracket should be removed from chassis and discarded. Exercise care when removing it as it will scratch the chassis. The masonite board should be applied to etched printed circuit board chassis.

To reassemble, reverse procedure.

To Remove Changer:

1. Snap two toggle bolt spring clips into a vertical position. These spring clips secure changer hold-down toggle bolts to mounting board (which is part of cabinet).
2. Remove AC interlock plug from chassis.
3. Remove changer from cabinet.

NOTE: To reassemble, reverse procedure.

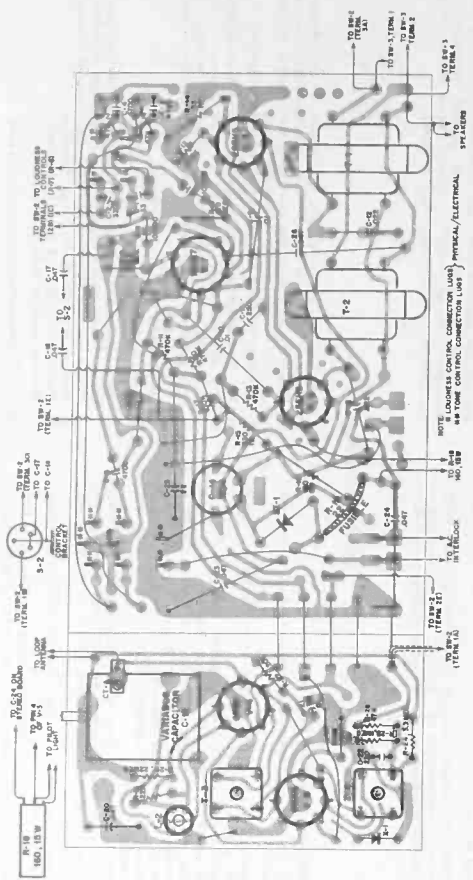


FIGURE 1 - PRINTED CIRCUIT CHASSIS 120455B

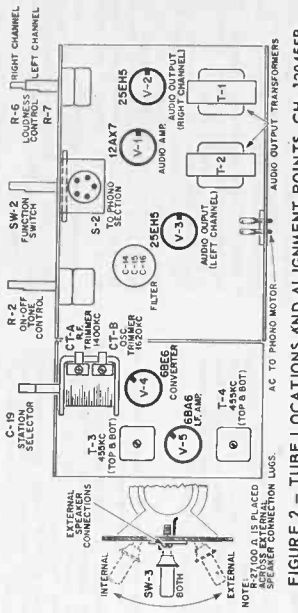


FIGURE 2 - TUBE LOCATIONS AND ALIGNMENT POINTS, CH. 120455B

ALIGNMENT INSTRUCTIONS

1. Use isolation transformer if available. If not, connect a .25 MFD condenser in series with low side of signal generator and B minus.
2. Loudness control should be backed off approximately 20% from maximum volume position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated screw driver for adjustment.
3. Speaker switch SW-3 should be in external position. Connect 6 Ω speaker (load) or resistor 6 Ω, 2 watt across external speaker terminal strip.

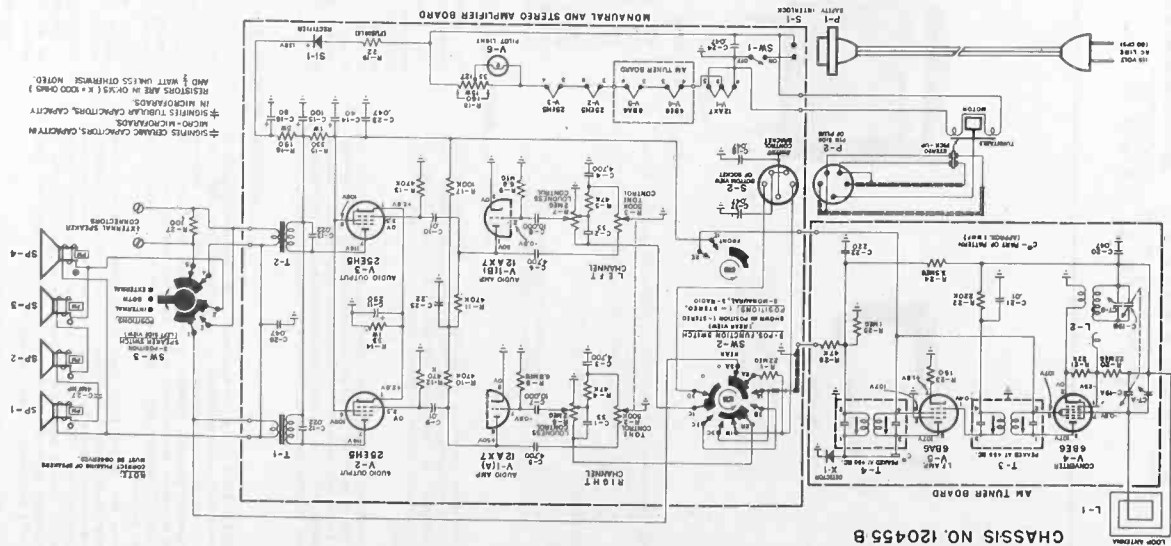
STEP	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.005 mfd	High side to grid (Pin 7) of V-4 (6BE6). Low side to B minus (See Alignment Note)	455 KC	Variable condenser fully opened	Across External Speaker Terminal Strip	T-4, T-3 Top and Bottom	Adjust for maximum output
2		Form loop of several turns and radiate signal into receiver	1620 KC	Variable condenser fully opened	Across External Speaker Terminal Strip	Trimmer C-1B (etc.)	Adjust for maximum output
3		Form loop of several turns and radiate signal into receiver	1400 KC	Tune for maximum output	Across External Speaker Terminal Strip	Trimmer CT-A (ent.)	Adjust for maximum output

RESISTANCE READING, CHASSIS 120455B

Symbol	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V-1	12AX7	570K	6.8 meg	0 Ω	0 Ω	570K	6.8 meg	0 Ω	4 Ω	-
V-2	25EH5	33 Ω	470K	20 Ω	30 Ω	470K	50 Ω	320 Ω	-	-
V-3	25EH5	33 Ω	470K	10 Ω	20 Ω	470K	50 Ω	320 Ω	-	-
V-4	6BE6	22K	3.5 meg	0 Ω	7 Ω	510 Ω	500 Ω	3 meg	-	-
V-5	6BA6	22K	3.5 meg	0 Ω	7 Ω	510 Ω	500 Ω	3 meg	-	-

1. Voltages indicated are positive d.c., resistances in ohms, unless otherwise indicated.
2. Measurements made with voltmyst or equivalent.
3. All measurements taken from pin to B minus unless otherwise indicated.
4. Voltage measurements taken with:
 - a) Line voltage maintained at 117 volts a.c.
 - b) Loudness control set for minimum volume.
 - c) Variable condenser fully closed and no signal applied.
 - d) Record changer in OFF position.
 - e) Selector switch in radio position.
5. Resistance measurements taken with:
 - a) Power line cord disconnected from outlet.
 - b) Loudness control set for minimum volume.
 - c) Selector switch in radio position.

CONDITIONS FOR TAKING VOLTAGE AND RESISTANCE READINGS CH 120455B



CHASSIS NO. 120455 B

CHASSIS 120455B PARTS LIST

SYMB.	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION		
R-1	341534	22 MEGOHM-CARB.	±10%	C-171	923554	0.047 MF-PAPER	±20%
R-2	390582	500,000 OHM-TONE CONTROL-RIGHT CH.	±10%	C-181	900188	VARIABLE CAPACITOR-R.F. SECTION	400V
R-3	340892	47,000 OHM-CARB.	±10%	C-19A	921354	VARIABLE CAPACITOR-OSC. SECTION	400V
R-4	390593	2 MEGOHM-LOUDNESS CONTROL-RIGHT CH.	±10%	C-20	923554	0.047 MF-DUREZ	±20%
R-5	351412	2 MEGOHM-LOUDNESS CONTROL-LEFT CH.	±10%	C-21	923554	0.047 MF-CERAMIC	±20%
R-6	351412	2 MEGOHM-LOUDNESS CONTROL-LEFT CH.	±10%	C-22	923554	0.047 MF-PAPER	±20%
R-7	351412	2 MEGOHM-LOUDNESS CONTROL-LEFT CH.	±10%	C-23	923554	0.047 MF-PAPER	±20%
R-8	351412	2 MEGOHM-LOUDNESS CONTROL-LEFT CH.	±10%	C-24	923554	0.047 MF-PAPER	±20%
R-9	351412	2 MEGOHM-LOUDNESS CONTROL-LEFT CH.	±10%	C-25	923554	0.047 MF-PAPER	±20%
R-10	341132	470,000 OHM-CARB.	±10%	C-26	923554	0.047 MF-PAPER	±20%
R-11	351032	470,000 OHM-CARB.	±10%	C-27	923554	0.047 MF-PAPER	±20%
R-12	351032	470,000 OHM-CARB.	±10%	C-28	923554	0.047 MF-PAPER	±20%
R-13	351032	470,000 OHM-CARB.	±10%	C-29	923554	0.047 MF-PAPER	±20%
R-14	351032	470,000 OHM-CARB.	±10%	C-30	923554	0.047 MF-PAPER	±20%
R-15	370372	330 OHM-W.W.	±10%	V-1	800218	VACUUM TUBE - 12AX7	400V
R-16	370372	330 OHM-W.W.	±10%	V-2	800219	VACUUM TUBE - 6X4	400V
R-17	350972	100,000 OHM-CARB.	±20%	V-3	800220	VACUUM TUBE - 6BE6	400V
R-18	350972	100,000 OHM-CARB.	±20%	V-4	800221	VACUUM TUBE - 6BE6	400V
R-19	350972	100,000 OHM-CARB.	±20%	V-5	800222	VACUUM TUBE - 6BE6	400V
R-20	350972	100,000 OHM-CARB.	±20%	V-6	800223	VACUUM TUBE - 6BE6	400V
R-21	350972	100,000 OHM-CARB.	±20%	V-7	800224	VACUUM TUBE - 6BE6	400V
R-22	350972	100,000 OHM-CARB.	±20%	V-8	800225	VACUUM TUBE - 6BE6	400V
R-23	350972	100,000 OHM-CARB.	±20%	V-9	800226	VACUUM TUBE - 6BE6	400V
R-24	351132	3.3 MEGOHM-CARB.	±20%	V-10	800227	VACUUM TUBE - 6BE6	400V
R-25	351132	3.3 MEGOHM-CARB.	±20%	V-11	800228	VACUUM TUBE - 6BE6	400V
R-26	350892	47,000 OHM-CARBON	±20%	V-12	800229	VACUUM TUBE - 6BE6	400V
R-27	350252	100 OHM-CARBON	±20%	V-13	800230	VACUUM TUBE - 6BE6	400V
CTA	Pl. of C19	TRIMMER R.F. SECTION		T-1	734181	AUDIO OUTPUT TRANSFORMER	
CTB	Pl. of C19	TRIMMER R.F. SECTION		T-2	734181	AUDIO OUTPUT TRANSFORMER	
C-1	928894	33 MMF CERAMIC N 750	±20%	T-3	734181	AUDIO OUTPUT TRANSFORMER	
C-2	928894	33 MMF CERAMIC N 750	±20%	T-4	734181	AUDIO OUTPUT TRANSFORMER	
C-3	928922	4,700 MMF CERAMIC	±20%	T-5	734181	AUDIO OUTPUT TRANSFORMER	
C-4	928922	4,700 MMF CERAMIC	±20%	T-6	734181	AUDIO OUTPUT TRANSFORMER	
C-5	928922	4,700 MMF CERAMIC	±20%	T-7	734181	AUDIO OUTPUT TRANSFORMER	
C-6	928922	4,700 MMF CERAMIC	±20%	T-8	734181	AUDIO OUTPUT TRANSFORMER	
C-7	928922	4,700 MMF CERAMIC	±20%	T-9	734181	AUDIO OUTPUT TRANSFORMER	
C-8	928922	4,700 MMF CERAMIC	±20%	T-10	734181	AUDIO OUTPUT TRANSFORMER	
C-9	928922	4,700 MMF CERAMIC	±20%	T-11	734181	AUDIO OUTPUT TRANSFORMER	
C-10	923514	.01 MF PAPER	±20%	T-12	734181	AUDIO OUTPUT TRANSFORMER	
C-11	925461	250 MF-ELECTROLYTIC	±20%	T-13	734181	AUDIO OUTPUT TRANSFORMER	
C-12	925461	250 MF-ELECTROLYTIC	±20%	T-14	734181	AUDIO OUTPUT TRANSFORMER	
C-13	925461	250 MF-ELECTROLYTIC	±20%	T-15	734181	AUDIO OUTPUT TRANSFORMER	
C-14	925461	250 MF-ELECTROLYTIC	±20%	T-16	734181	AUDIO OUTPUT TRANSFORMER	
C-15	925461	250 MF-ELECTROLYTIC	±20%	T-17	734181	AUDIO OUTPUT TRANSFORMER	
C-16	925461	250 MF-ELECTROLYTIC	±20%	T-18	734181	AUDIO OUTPUT TRANSFORMER	

SERVICING OF PRINTED BOARDS

To remove defective components one of several methods may be used. A recommended method is to cut close to the body of the defective component and solder the new part to the remaining leads. Another method is to apply heat at the junction point of the component wire lead and the printed board and lift out the component. If the wire is not broken, the component may be removed by using a pair of tweezers. A defective component may be removed by clipping into several parts and removing a small section at a time.

Use a low wattage (20 to 30 watts) soldering iron. Be careful not to apply too much heat. Excess heat may cause the printed foil to loosen. Be sure leads may be repaired by soldering a hookup wire across the break.

A small, stiff-bristled brush should be used to wipe away melted solder before it has a chance to accumulate or drip on adjacent parts or printed wiring.

ADDITIONAL SERVICE HINTS

- No sound or intermittent sound: Make certain electrical contacts to cartridge are clean. If tone arm is present on contact strips within cartridge holder, remove with alcohol.
 - This changer automatically disengages the rubber idler wheels when allowed to operate through its normal cycle. To avoid defeating this feature, do not operate the on-off lever when amplifier switch is in "off" position or line selector switch is in "VOLUME" position. Do not turn amplifier switch "off" until disconnect line cord from wall outlet while car is operating. Turn changer switch to "off" position first.
 - Failure to comply with above might result in damage to idler wheels or cause changer to fail to start when power is again applied.
- IF ABOVE IS OVERLOOKED AND CHANGER FAILS TO START WHEN TURNED ON, SEVERAL SLIGHT TAPS ON TURNABLE SHOULD CAUSE CHANGER TO COMMENCE OPERATION.

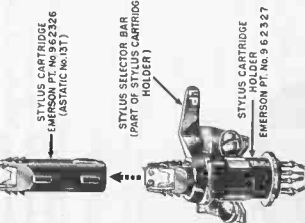


FIGURE 3 - STYLUS REMOVAL

STYLUS REMOVAL

- To Remove Stylus Cartridge:
- Lift tone arm and grasp cartridge with fingers.
 - Pull cartridge out (cartridge and stylus are an integrated unit and cannot be removed or replaced separately).
 - Reinsert new cartridge. Keying of cartridge is accomplished by lining up ridge on cartridge shaft to slot on holder (see Fig. 3, Stylus removal).

ADJUSTMENTS

Tone Arm Height Adjustment (See Figure 4)

Tone arm height should be set so that the top of tone arm clears the lowest record on the spindle shelf (When changer is in cycle), and the lower edge of tone arm clears the rest post. To lower tone arm, turn height adjustment screw (a) clockwise. To raise tone arm turn height adjustment screw (a) counter-clockwise.

Stylus Pressure Adjustment (See Figure 4)

With tone arm in horizontal position, adjust knurled nut (b) clockwise to increase pressure and counter-clockwise to reduce pressure. Stylus pressure should be adjusted for 6 grams.

Needle Set-Down Adjustment (See Figure 4)

Adjust set-down screw (c) so that the stylus comes to rest on the lead in groove of record. Adjust clockwise to move stylus away from center or counter-clockwise to move stylus towards center of record.

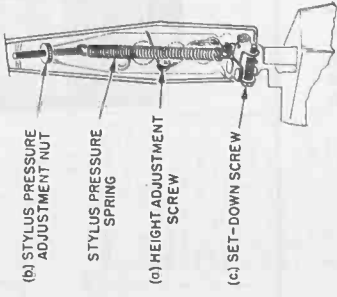


FIGURE 4 - UNDERSIDE VIEW, 819126 (819129) CHANGER TONE ARM, WITH ADJUSTMENT SETTINGS SHOWN

CABINET PARTS LIST, MODEL 896B

Part No.	Description	Part No.	Description
700146	Cabinet	700146	Loop Antenna
513246	Light	513246	Bracket, Pilot
592070	Grille Cloth	513246	Wastebasket Back
607139	Decal	580075	Control Panel
604042	Medallion	413375	Control Panel
461055	Emerson Script	461075	Knob, Volume (outer)
461088	Emerson Script	461075	Knob, Volume (inner)
604062	Name Plate	461082	Knob, Tuning
413348	45 RPM Adapter Holder	461076	Knob, Tone, On-Off (phone - radio)
180192	Speaker 12"	460935	Knob, Speaker Selector Switch
		342009	Turnerman Speednut

CABINET PARTS LIST, MODELS 970, 971, 971A

Part No.	Description	Part No.	Description
970	Specify Color	970	971, 971A
971, 971A	Cabinet	510141	Switch, Slide
604042	Emerson Script	412607A	Bracket, Switch
461055**	Emerson Script	180164A	Speaker, 3 1/2" (2)
607128	Emerson Script, Decal	925391	Capacitor, Electrolytic, 4 Mfd, Non-Polarized
560782	Hi-Fi Script, Decal	180192	Speaker, 8"
		592070	Grille Cloth
		461091†	Stylus, Stereo Hi-Fi
			Script, Stereo Hi-Fi

STEREO RECORD CHANGER 819126 (819129) PARTS LIST*

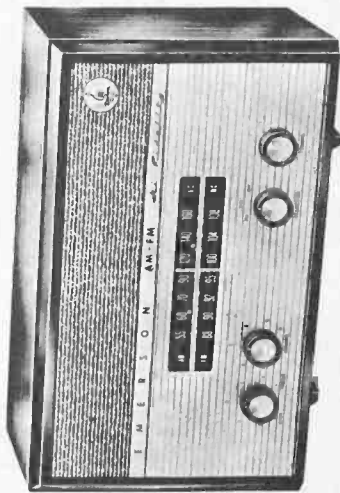
Part No.	Description	Part No.	Description
962326	Cartridge with Stylus (Astatic 13T)	962377	Nut, Adjustment, Stylus Pressure
962337	Cartridge Holder	962378	Screw, Adjustment, Stylus Pressure
962340	Tone Arm	962380	Spindle Assembly
962376	Spring, Stylus Pressure	962330	45 RPM Spindle Attachment (Optional Accessory)

*Refer to Record Changer 819126, 819129 Service Note for additional technical information.

Emerson Radio

SERVICE NOTE

JANUARY, 1958
MODEL 895B
CHASSIS 120431B



MODEL 895

Type: AM, FM Radio
Frequency Range: AM: 540 - 1620KC
FM: 88 - 108MC

SPECIFICATIONS

Power Supply: 105-125 V. AC OR DC.
Voltage Rating: 105 - 125 volts
Power Consumption: AM-FM - 35 watts

GENERAL INFORMATION

Model 895B is an AM-FM table model radio incorporating one woofer, one tweeter and a continuously variable tone control. Built-in antennas for both AM and FM are provided plus external FM antenna input terminals. A phono input jack that can be actuated by a front panel-mounted function switch is also provided.

In the "AM" position, function switch SW-2 connects B+ to the AM converter tube (V-3) and places the AM detector load network in the detector circuit (Pins 1 and 7 of V-5).

In the "FM" position, B+ is applied to the FM tuner and V-5.

(2nd FM I.F. amplifier). In addition, the ratio detector output is coupled to the high side of the volume control. In "Phono" position B+ is removed from both AM and FM I.F. sections and V-5 (2nd FM I.F. amplifier). The screen grid of V-7 (audio output tube) is connected to a different B+ source in this position and the audio input is connected to the phono jack output.

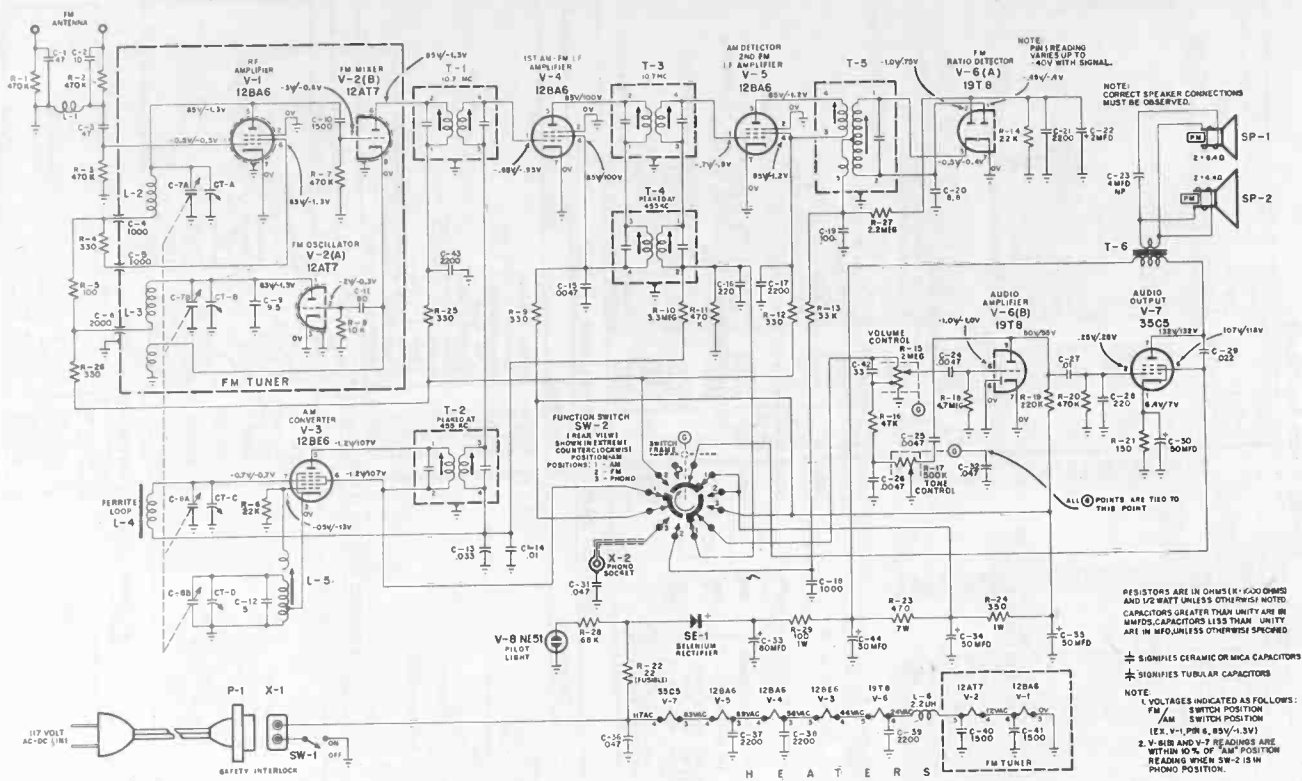
If replacements are made or the wiring disturbed in the R.F. section of the circuit, the receiver should be carefully realigned.

DISASSEMBLY INSTRUCTIONS

- To Replace Tubes:
1. Remove line plug from wall outlet.
 2. Remove screws from cabinet back.
 3. Grasp line cord at point where it is connected to back and pull free of interlock. Remove back.

To Remove AM-FM Chassis

1. Steps 1, 2 above.
2. Steps 1, 3 above; turn knobs and 1 tuning knob; disconnect built-in FM antenna and remove antenna terminal. Unsolder 2 speaker leads at chassis solder lug strip and unscrew chassis bolts from underside of cabinet. Unclip pilot light.



CHASSIS NO. 120431 - B

CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

1. Voltages indicated are positive d.c., resistances in ohms, unless otherwise indicated.
2. Measurements taken with voltmeter or equivalent.
3. All measurements taken from pin to chassis unless otherwise indicated.
4. Voltage measurements taken under the following conditions:
 - a) Line voltage maintained at 117 volts a.c. only.
 - b) Tuning capacitor fully closed with no signal.
 - c) Resistance measurements taken with:
 - a) Power Line and cord disconnected from outlet.
 - b) Loudness control set for maximum volume.
 5. Nominal tolerance on component values makes possible a variation of $\pm 15\%$ in voltage and resistance readings.
 6. W.C. denotes no connection, K is kilohms, M is megohms.
 7. Readings given in FM/AM positions.

RESISTANCE CHART CHASSIS 120431B

TUBE	SW-2 POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V1-12BA6	FM/AM	450K/450K	0/0	0/0	12/12	*450/INF	*800/INF	0/0	-	-
V2-12AT7	FM/AM	*350/INF	10K/10K	0/0	12/12	24/24	*330/INF	450K/450K	0/0	-
V3-12BE6	FM/AM	22K/22K	0/0	58/58	44/44	*INF/15	*INF/0*	4M/4M	-	-
V4-12BA6	FM/AM	4M/4M	0/0	58/58	70/70	*330/330	*330/330	0/0	-	-
V5-12BA6	FM/AM	470K/470K	0/0	70/70	82/82	*330/INF	*330/INF	0/0	-	-
V6-19T8	FM/AM	2M/INF	20K/20K	2M/INF	24/24	44/44	0/0	0/0	4.7M/4.7M	*250K/250K
V7-35C5	FM/AM	150/150	470K/470K	82/82	118/118	-	*300/300	*1M/1M	-	-

*Measured with low side of VTVM connected to Junction R24, C35 (B + point) measured to chassis - wait until meter settles (about 30 seconds)

GENERAL ALIGNMENT INSTRUCTIONS

Set Function Switch (SW-2) as indicated. Output of signal generator should be no higher than necessary to obtain an output reading with a 40% modulated R.F. signal. Use an insulated alignment screwdriver and plastic hex tool (for T-1, T-3). Volume control at maximum CW position.

AM ALIGNMENT INSTRUCTIONS - SW-2 IN "AM" POSITION

Step	Marker Gen. Coupling	Marker Gen. Frequency	Radio Dial Setting	Output Meter	Adjust	Remarks
1	High side to grid and low side to chassis thru 0.25 mfd. cap.	455KC	Tuning Cap fully open (no signal)	Across speaker voice coil	T-2 top and bottom	Adjust for maximum output
2	Form loop of several turns and radiate signal into receiver	600KC	600KC	Across speaker voice coil	L-5	Adjust for maximum output
3	"	1638KC	Tuning Cap fully open	Across speaker voice coil	CT-D osc. trimmer	Adjust for maximum output
4	"	1420KC	1420KC	Across speaker voice coil	CT-C.R.F. trimmer	Adjust for maximum output

FM ALIGNMENT INSTRUCTIONS - (Using AM GEN. & VTVM) - SW-2 IN "FM" POSITION

Step	Marker Gen. Coupling	Marker Gen. Frequency	Radio Dial Setting	VTVM Placement	Adjust	Remarks
1	Raise 12AT7 (V-2) shield slightly off ground and clip marker gen. high side to shield and low side to chassis thru 0.25 mfd. cap.	10.7 MC (no mod.)	Extreme CCW Position (no signal)	Across C-22 2 mfd. stabilizer capacitor (neg. scale)	T-1, T-3 top and bottom T-5 bottom	Adjust for maximum neg. voltage, keeping gen. output 2.5V.
2	Raise 12AT7 (V-2) shield slightly off ground and clip marker gen. high side to shield and low side to chassis thru 0.25 mfd. cap.	10.7 MC (no mod.)	Extreme CCW Position (no signal)	Connect two matched 100K ohm, 1/2 watt resistors in series across C-22. Then place junction high side to junction 13, C-18 and low side to junction of two 100K ohm resistors.	T-5 top	Adjust for 0 volts with \pm readings on either side.

FM ALIGNMENT INSTRUCTIONS (USING SWEEP AND MARKER GEN. AND SCOPE)

SW-2 in "FM" position. Sweep generator set for ± 300 KC frequency deviation and Marker injection level kept below point where distortion of response curve occurs.

Step	Gen. Coupling	Gen. Freq.	Radio Dial Setting	Scope	Adjust	Remarks
1	Raise 12AT7 (V-2) shield off ground and clip high side of marker gen. to shield low side to chassis thru 0.25 mfd. cap.	Sweep Center freq. 10.7 MC Marker set at 10.7 MC (no mod.)	Extreme CCW (no signal)	Highside to Pin 2 of V-5 low side to chassis (disconnect negative end of C22)	T-1 T-3 T-5 bot.	Adjust for max. gain and symmetry
2	Sweep & Marker high sides connected to pin 1 sides to chassis thru 0.25 mfd. cap.	Sweep center freq. 10.7 MC Marker set at 10.7 MC (no mod.)	Extreme CCW (no signal)	Connect C22 back in circuit. Highside to junction of R19 and C18, low side to chassis	T-5 Top	Adjust for response as per Fig. #2

AM - FM TUNING - TRACKING

With tuning shaft (drive shaft) completely CCW, AM tuning capacitor should be in maximum capacity position and FM tuning slugs should be in maximum "in" position. In this position, set screw in nylon worm gear is accessible for tightening through hole in plate and spring.

FM TRACKING (ELECTRICAL)

Ordinarily the only FM front end adjustment that might become necessary due to oscillator tube change would be CT-B, FM oscillator trimmer which is accessible through a hole provided in the tuner shield. This trimmer should be adjusted at 108MC with the tuning dial set at that frequency. This should be done only if the oscillator is off proper frequency.

Should components or wiring be changed, a complete FM front-end alignment might be necessary as follows:

Function Switch (SW-2) in "FM" position; tuner shield bent up for tuning purposes, but not removed (use a non-metallic screw driver).

Step	Marker Generator Coupling	Marker Generator Freq.	Radio Dial Setting	VTVM	Adjust	Remarks
1	FM Ant.	108 MC	108 MC (slugs out)	Across C-22	CT-B C1-A	Adjust for max. neg. reading, keeping gen. input level for voltage reading below 2.5V.
2	FM Ant.	88 MC	88 MC (slugs in)	Across C-22	L-3 L-2	Adjust for max. neg. reading by opening up compressing turns. Center Dr. after spacing between L-3 and mixer coupling loop.
3	Repeat Steps 1 and 2.					

PHYSICAL FM TRACKING

This is only possible to perform if and when a new slug assembly is installed. FM osc. slug (C-78) is fixed to a plastic bar, but FM-R.F. slug (C-7A) is on a threaded flexible shaft. For correct physical tracking, both slugs should just cover glass dielectric window section simultaneously. Then, crimp R.F. slug shaft as close to plastic bar as possible on front side (see Fig. 5), and cut all but 1/8" of excess shaft length.

CHASSIS PARTS LIST, CHASSIS 120431B

SYMB.	PT. NO.	DESCRIPTION	LIST PRICE	SYMB.	PT. NO.	DESCRIPTION	LIST PRICE
R-1	351132	470,000 OHM-CARBON	.14	C-26	928922	CAPACITORS (CONTINUED)	.20
R-2	351132	470,000 OHM-CARBON	.14	C-27	928922	.0047 MFD-CERAMIC DISK	.20
R-3	351132	470,000 OHM-CARBON	.14	C-28	928922	.01 MFD-CERAMIC DISK	.20
R-4	351132	470,000 OHM-CARBON	.14	C-29	928922	.022 MFD-PAPER	.20
R-5	351132	470,000 OHM-CARBON	.14	C-30	928922	.50 MFD-ELECTROLYTIC	.20
R-6	351132	470,000 OHM-CARBON	.14	C-31	928922	.047 MFD-PAPER	.20
R-7	351132	470,000 OHM-CARBON	.14	C-32	928922	.047 MFD-PAPER	.20
R-8	351132	470,000 OHM-CARBON	.14	C-33	928922	.80 MFD-ELECTROLYTIC	.20
R-9	351132	470,000 OHM-CARBON	.14	C-34	928922	.80 MFD-ELECTROLYTIC	.20
R-10	351132	470,000 OHM-CARBON	.14	C-35	928922	.50 MFD-ELECTROLYTIC	.20
R-11	351132	470,000 OHM-CARBON	.14	C-36	928922	.022 MFD-MOLDED (U.L. BYPASS)	.20
R-12	351132	470,000 OHM-CARBON	.14	C-37	928922	.0022 MFD-CERAMIC DISK	.20
R-13	351132	470,000 OHM-CARBON	.14	C-38	928922	.0022 MFD-CERAMIC DISK	.20
R-14	351132	470,000 OHM-CARBON	.14	C-39	928922	.0022 MFD-CERAMIC DISK	.20
R-15	351132	470,000 OHM-CARBON	.14	C-40	928922	.0022 MFD-CERAMIC DISK	.20
R-16	351132	470,000 OHM-CARBON	.14	C-41	928922	.0022 MFD-CERAMIC DISK	.20
R-17	351132	470,000 OHM-CARBON	.14	C-42	928922	.0022 MFD-CERAMIC DISK	.20
R-18	351132	470,000 OHM-CARBON	.14	C-43	928922	.0022 MFD-CERAMIC DISK	.20
R-19	351132	470,000 OHM-CARBON	.14	C-44	928922	.0022 MFD-CERAMIC DISK	.20
R-20	351132	470,000 OHM-CARBON	.14	C-45	928922	.0022 MFD-CERAMIC DISK	.20
R-21	351132	470,000 OHM-CARBON	.14	C-46	928922	.0022 MFD-CERAMIC DISK	.20
R-22	351132	470,000 OHM-CARBON	.14	C-47	928922	.0022 MFD-CERAMIC DISK	.20
R-23	351132	470,000 OHM-CARBON	.14	C-48	928922	.0022 MFD-CERAMIC DISK	.20
R-24	351132	470,000 OHM-CARBON	.14	C-49	928922	.0022 MFD-CERAMIC DISK	.20
R-25	351132	470,000 OHM-CARBON	.14	C-50	928922	.0022 MFD-CERAMIC DISK	.20
R-26	351132	470,000 OHM-CARBON	.14	C-51	928922	.0022 MFD-CERAMIC DISK	.20
R-27	351132	470,000 OHM-CARBON	.14	C-52	928922	.0022 MFD-CERAMIC DISK	.20
R-28	351132	470,000 OHM-CARBON	.14	C-53	928922	.0022 MFD-CERAMIC DISK	.20
R-29	351132	470,000 OHM-CARBON	.14	C-54	928922	.0022 MFD-CERAMIC DISK	.20
C-1	928929	47 MFM-CERAMIC U.L.	.20	V-1	800524	VACUUM TUBE 12BA6 (FM TUNER)	1.80
C-2	928929	47 MFM-CERAMIC U.L.	.20	V-2	800525	VACUUM TUBE 12BE6	21.00
C-3	928929	47 MFM-CERAMIC U.L.	.20	V-3	800526	VACUUM TUBE 12BE6	.15
C-4	962227	1,000 MMF-FEED-THRU	.16	V-4	800524	VACUUM TUBE 12BA6	.170
C-5	962227	1,000 MMF-FEED-THRU	.16	V-5	800524	VACUUM TUBE 12BA6	.70
C-6	962228	2,000 MMF-FEED-THRU	.16	V-6	800029	VACUUM TUBE 9T8	.15
C-7	962228	2,000 MMF-FEED-THRU	.16	V-7	800021	VACUUM TUBE 3C5	.15
C-8	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	SE-1	817072	SELENIUM RECTIFIER	1.60
C-9	900175	VARIABLE CAPACITOR-OSC. SECTION	3.05	FM	471064	FM TUNER ASSEMBLY	21.00
C-10	928967	5 MMF-CERAMIC DISK-N-100% 500V.	.20	L-1	710034	COILS & TRANSFORMERS	.15
C-11	928967	5 MMF-CERAMIC DISK-N-100% 500V.	.20	L-2	710034	FM ANTENNA COIL	.15
C-12	928967	5 MMF-CERAMIC DISK-N-100% 500V.	.20	L-3	710034	RF COIL (FM)	.15
C-13	928967	5 MMF-CERAMIC DISK-N-100% 500V.	.20	L-4	700134	OSC. COIL (FM)	.170
C-14	928924	.01 MFD-CERAMIC DISK 250 500V.	.20	L-5	716122	BARLOOP ANTENNA	.70
C-15	928924	.01 MFD-CERAMIC DISK 250 500V.	.20	L-6	705029	OSCILLATOR COIL	.15
C-16	928914	.022 MFD-CERAMIC DISK 200 500V.	.20	T-1	720307	FILAMENT CHOKE	.15
C-17	928914	.022 MFD-CERAMIC DISK 200 500V.	.20	T-2	720307	1ST FM I.F. TRANSFORMER	1.60
C-18	928914	.022 MFD-CERAMIC DISK 200 500V.	.20	T-3	720307	2ND FM I.F. TRANSFORMER	1.75
C-19	928914	.022 MFD-CERAMIC DISK 200 500V.	.20	T-4	720075	2ND AM I.F. TRANSFORMER	1.60
C-20	928914	.022 MFD-CERAMIC DISK 200 500V.	.20	T-5	708341	RATIO DETECTOR TRANSFORMER	1.75
C-21	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	T-6	734164	AUDIO OUTPUT TRANSFORMER	2.35
C-22	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	SP-1	180185	SPEAKER-PM-3-1/2"	1.60
C-23	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	SP-2	180184	SPEAKER-PM-10 X 2-1/2"	1.60
C-24	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	SW-1	510133	PT. OF R-15 ON-OFF SWITCH	.10
C-25	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	SW-2	510133	FUNCTION SWITCH	.10
C-26	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	P-1	593075	INTERLOCK SOCKET & LINE CORD	.10
C-27	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	P-2	585233	SOCKET & CABLE ASSEMBLY	.10
C-28	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	X-1	505014	INTERLOCK PLUG	.10
C-29	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	X-2	508100	PHONO SOCKET	.10
C-30	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	A13067	413067	TUBE SHIELD FOR 12BA6	.10
C-31	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	A13066	413066	TUBE SHIELD FOR 12AT7	.10
C-32	928921	6.8 MMF-CERAMIC DISK ± 5% 500V.	.20	B19107	819107	4-SPEED CHANGER	.10

CABINET PARTS LIST, MODEL 8958

PART NO.	DESCRIPTION
592064A	Cabinet - Specify color
413223	Grille Cloth
604054	Control Panel
562519	Medallion
180184	Felt Feet
180185	Speaker - 2 1/2" x 10"
925391	Speaker - 3 1/2"
413162	Electrolytic Capacitor, 4 MFD, NP
560612	Pilot Light Bracket
583075	Masonite back
460997A	Line cord
460997B	Knob - Vol. Tone
460997C	Knob - Tuning
460998A	Knob - Switch-Phono-Am-Fm

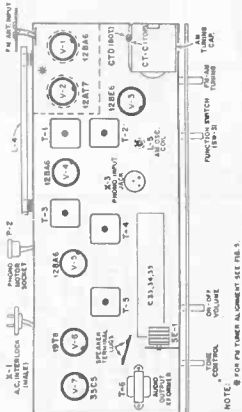


Fig. 2 - FM Ratio Detector Characteristics

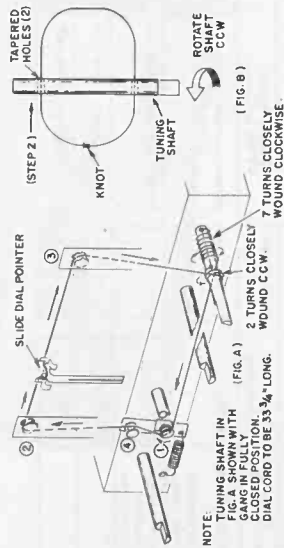


Fig. 3 - Tube and Trimmer Locations

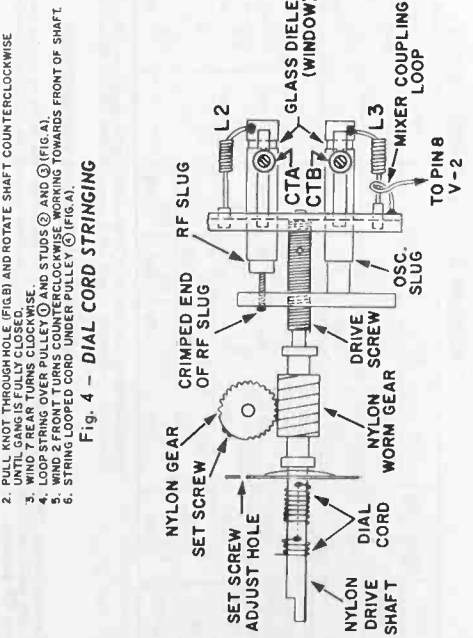


Fig. 4 - Dial Cord Stringing

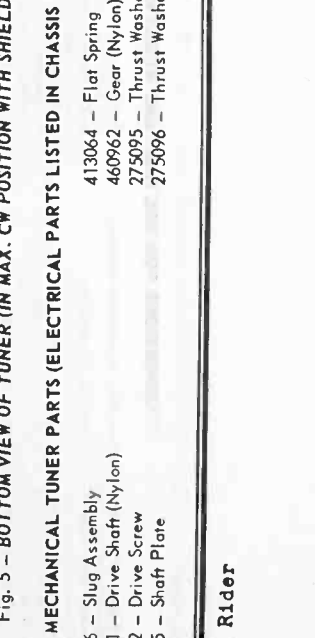


Fig. 5 - Bottom View of Tuner (in Max. CW Position with Shield Removed)

- MECHANICAL TUNER PARTS (ELECTRICAL PARTS LISTED IN CHASSIS PARTS LIST)**
- 471066 - Slug Assembly
 - 460961 - Drive Shaft (Nylon)
 - 265112 - Drive Screw
 - 413065 - Shaft Plate
 - 413064 - Flat Spring
 - 460962 - Gear (Nylon) with set screw
 - 275095 - Thrust Washer, Rear
 - 275096 - Thrust Washer, Front

STOCK NO. 4-V-17

MANUAL NO. 4-599

CODE NO. 1-8-3RP8

SPECIFICATIONS

- Cabinet Dimensions Width 12 in., Height 5 in., Length 10 in.
- Shipping Weight 8 lbs.
- Power Supply 105-125 volts AC 50/60 cycles
- Tuning Range Standard Broadcast Band
- Intermediate Frequency 455 KC
- Loud Speaker 4 in. P.M.
- Voice Coil Impedance 3.2 ohms at 400 cycles
- Power Output Maximum 1.8 watts
- Tube Complement 1 — 12AU6—Converter
- 1 — 12AV6—Detector—1st Audio
- 1 — 50CS—Power Amplifier
- 1 — 35W4—Rectifier

For alignment or repairs, remove motor board by unscrewing 4 Phillipshead motorboard bolts.

ALIGNMENT

A. Equipment

- The following equipment is necessary for proper alignment:
1. Signal Generator that will provide the test frequencies as listed, modulated 400 cycles 30%.
 2. Non-metallic screwdriver.
 3. Output Meter.

B. Test Set Up

- Volume control—maximum, all adjustments
- No signal applied to antenna.
- Connect .01 condenser in series with output lead of signal generator.
- Connect ground lead of signal generator to common ground above chassis.
- Connect Output Meter across Voice Coil.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER TO BE ADJUSTED	TRIMMER ADJUSTMENT
Fully open	455 KC	.1 MFD	12AU6 Grid	IF Top and Bottom	Maximum
Fully open	1620 KC		Loosely couple generator to "Loop Antenna"	Osc. section of tuning condenser	Maximum
Tune in signal 1400 KC from generator.			Loosely couple generator to "Loop Antenna"	Ant. section of tuning condenser	Maximum

TO CHANGE NEEDLE:

Raise tone arm to vertical position. Needle is held by small screw on cartridge. Loosen screw, remove defective needle and replace.

NOTE: For best results use exact replacement needle and cartridge.

IMPORTANT — Set Speed Selector lever to "OFF" position when unit is not in use. This will help to prevent flat spots from developing on idler wheel.

Firestone

PORTABLE RADIO PHONOGRAPH

STOCK NO. 4-V-17
CODE NO. 1-8-3RP8

OPERATING INSTRUCTIONS, SERVICE MANUAL AND PARTS CATALOG

IMPORTANT: Do not lose or destroy these instructions. Read them carefully and keep for future reference and correct needle replacement.

IMPORTANT: This instrument is designed to operate from a 105-125 volt 60 cycles AC power source only. If in doubt check with your local power company before connecting the instrument.

TO OPERATE RADIO

1. Turn ON-OFF VOLUME knob clockwise and wait until set warms up. Then push RADIO-PHONO SLIDE SWITCH to radio position. The turntable will not revolve with switch in this position. It will revolve with switch in phono position only.

2. Tune STATION SELECTOR DIAL knob so that arrow points to desired station, and adjust volume to your preference.

NOTE: This model has an external antenna connection for remote pickup.

TO OPERATE PHONOGRAPH

1. Place record on turntable. Move speed indicator to proper speed (33 1/3, 45, or 78).

NOTE: The wrong speed may cause damage to the record, so be SURE to use correct speed.

2. Then place pick up arm on start of record. Push RADIO-PHONO SLIDE SWITCH to PHONO. This will start the motor.

3. Adjust the volume control to your preference.

NOTE: If a 45 RPM record is used, twist adapter counterclockwise to raise it and fit record onto adapter.

4. To shut unit off turn ON-OFF VOLUME Knob counterclockwise until switch clicks off.

DO NOT DROP PICK UP ARM ON RECORD. This can cause damage to cartridge, needle or record.

Put pick up arm into arm rest before closing the cabinet.

CHASSIS PARTS LIST, CHASSIS 120431B

SYMB.	PT. NO.	DESCRIPTION	LIST PRICE	SYMB.	PT. NO.	DESCRIPTION	LIST PRICE
R-1	351132	470,000 OHM-CARBON	.14	C-26	928922	.007 MFD-CERAMIC DISK	.20
R-2	351132	470,000 OHM-CARBON	.14	C-27	928924	.01 MFD-CERAMIC DISK	.20
R-3	351132	470,000 OHM-CARBON	.14	C-28	928924	.02 MFD-CERAMIC DISK	.20
R-4	351132	470,000 OHM-CARBON	.14	C-29	928924	.03 MFD-CERAMIC DISK	.20
R-5	351132	470,000 OHM-CARBON	.14	C-30	928924	.04 MFD-CERAMIC DISK	.20
R-6	351132	470,000 OHM-CARBON	.14	C-31	928924	.05 MFD-CERAMIC DISK	.20
R-7	351132	470,000 OHM-CARBON	.14	C-32	928924	.06 MFD-CERAMIC DISK	.20
R-8	351132	470,000 OHM-CARBON	.14	C-33	928924	.07 MFD-CERAMIC DISK	.20
R-9	351132	470,000 OHM-CARBON	.14	C-34	928924	.08 MFD-CERAMIC DISK	.20
R-10	351132	470,000 OHM-CARBON	.14	C-35	928924	.09 MFD-CERAMIC DISK	.20
R-11	351132	470,000 OHM-CARBON	.14	C-36	928924	.10 MFD-CERAMIC DISK	.20
R-12	351132	470,000 OHM-CARBON	.14	C-37	928924	.12 MFD-CERAMIC DISK	.20
R-13	351132	470,000 OHM-CARBON	.14	C-38	928924	.15 MFD-CERAMIC DISK	.20
R-14	351132	470,000 OHM-CARBON	.14	C-39	928924	.18 MFD-CERAMIC DISK	.20
R-15	351132	470,000 OHM-CARBON	.14	C-40	928924	.22 MFD-CERAMIC DISK	.20
R-16	351132	470,000 OHM-CARBON	.14	C-41	928924	.27 MFD-CERAMIC DISK	.20
R-17	351132	470,000 OHM-CARBON	.14	C-42	928924	.33 MFD-CERAMIC DISK	.20
R-18	351132	470,000 OHM-CARBON	.14	C-43	928924	.42 MFD-CERAMIC DISK	.20
R-19	351132	470,000 OHM-CARBON	.14	C-44	928924	.55 MFD-CERAMIC DISK	.20
R-20	351132	470,000 OHM-CARBON	.14	C-45	928924	.75 MFD-CERAMIC DISK	.20
R-21	351132	470,000 OHM-CARBON	.14	C-46	928924	1.00 MFD-CERAMIC DISK	.20
R-22	351132	470,000 OHM-CARBON	.14	C-47	928924	1.50 MFD-CERAMIC DISK	.20
R-23	351132	470,000 OHM-CARBON	.14	C-48	928924	2.2 MFD-CERAMIC DISK	.20
R-24	351132	470,000 OHM-CARBON	.14	C-49	928924	3.3 MFD-CERAMIC DISK	.20
R-25	351132	470,000 OHM-CARBON	.14	C-50	928924	5.0 MFD-CERAMIC DISK	.20
R-26	351132	470,000 OHM-CARBON	.14	C-51	928924	7.5 MFD-CERAMIC DISK	.20
R-27	351132	470,000 OHM-CARBON	.14	C-52	928924	11.0 MFD-CERAMIC DISK	.20
R-28	351132	470,000 OHM-CARBON	.14	C-53	928924	16.5 MFD-CERAMIC DISK	.20
R-29	351132	470,000 OHM-CARBON	.14	C-54	928924	24.0 MFD-CERAMIC DISK	.20
C-1	928969	47 MMF-CERAMIC U.L.	.20	SE-1	817072	SELENIUM RECTIFIER	1.80
C-2	928969	10 MMF-CERAMIC U.L.	.10	FM TUNER ASSEMBLY	471064	FM TUNER ASSEMBLY	21.00
C-3	928969	1,000 MMF-CERAMIC	.20	L-1	710034	FM ANTENNA COIL	.15
C-4	928927	1,000 MMF-FEED-THRU	.20	L-2	710034	OSC. COIL (FM)	.15
C-5	962227	1,000 MMF-FEED-THRU	.20	L-3	700134	BARLOOP ANTENNA	1.70
C-6	962228	2,000 MMF-FEED-THRU	.20	L-4	715122	OSCILLATOR COIL	.70
C-7A	962228	2,000 MMF-FEED-THRU	.20	L-5	705029	FILAMENT CHoke	.15
C-7B	962228	2,000 MMF-FEED-THRU	.20	L-6	705029	FILAMENT CHoke	.15
C-7C	962228	2,000 MMF-FEED-THRU	.20	T-1	720307	1ST FM I.F. TRANSFORMER	1.60
C-7D	962228	2,000 MMF-FEED-THRU	.20	T-2	720075	1ST FM I.F. TRANSFORMER	1.75
C-8	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	T-3	720307	2ND FM I.F. TRANSFORMER	1.60
C-8A	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	T-4	720075	2ND FM I.F. TRANSFORMER	1.75
C-8B	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	T-5	708341	RATIO DETECTOR TRANSFORMER	2.35
C-8C	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	T-6	734164	AUDIO OUTPUT TRANSFORMER	1.60
C-8D	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	SP-1	180185	SPEAKER-PW-3-1/2"	1.50
C-8E	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	SP-2	180184	SPEAKER-PW-10 X 2-1/2"	1.60
C-8F	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	SW-1	510133	PT. OF R-15 ON-OFF SWITCH	.10
C-8G	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	SW-2	510133	PT. OF R-15 ON-OFF SWITCH	.10
C-8H	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	P-1	583075	INTERLOCK SOCKET & LINE CORD SOCKET & CABLE ASSEMBLY	.10
C-8I	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	P-2	585233	INTERLOCK SOCKET & CABLE ASSEMBLY	.10
C-8J	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-1	505014	PHONO SOCKET	.10
C-8K	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-2	508100	PHONO SOCKET	.10
C-8L	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-3	413067	TUBE SHIELD FOR 12BA6	.10
C-8M	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-4	413066	TUBE SHIELD FOR 12AT7	.10
C-8N	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-5	819107	4-SPEED CHANGER	.10
C-8O	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-6	819107	4-SPEED CHANGER	.10
C-8P	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-7	819107	4-SPEED CHANGER	.10
C-8Q	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-8	819107	4-SPEED CHANGER	.10
C-8R	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-9	819107	4-SPEED CHANGER	.10
C-8S	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-10	819107	4-SPEED CHANGER	.10
C-8T	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-11	819107	4-SPEED CHANGER	.10
C-8U	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-12	819107	4-SPEED CHANGER	.10
C-8V	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-13	819107	4-SPEED CHANGER	.10
C-8W	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-14	819107	4-SPEED CHANGER	.10
C-8X	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-15	819107	4-SPEED CHANGER	.10
C-8Y	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-16	819107	4-SPEED CHANGER	.10
C-8Z	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-17	819107	4-SPEED CHANGER	.10
C-8AA	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-18	819107	4-SPEED CHANGER	.10
C-8AB	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-19	819107	4-SPEED CHANGER	.10
C-8AC	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-20	819107	4-SPEED CHANGER	.10
C-8AD	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-21	819107	4-SPEED CHANGER	.10
C-8AE	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-22	819107	4-SPEED CHANGER	.10
C-8AF	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-23	819107	4-SPEED CHANGER	.10
C-8AG	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-24	819107	4-SPEED CHANGER	.10
C-8AH	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-25	819107	4-SPEED CHANGER	.10
C-8AI	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-26	819107	4-SPEED CHANGER	.10
C-8AJ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-27	819107	4-SPEED CHANGER	.10
C-8AK	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-28	819107	4-SPEED CHANGER	.10
C-8AL	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-29	819107	4-SPEED CHANGER	.10
C-8AM	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-30	819107	4-SPEED CHANGER	.10
C-8AN	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-31	819107	4-SPEED CHANGER	.10
C-8AO	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-32	819107	4-SPEED CHANGER	.10
C-8AP	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-33	819107	4-SPEED CHANGER	.10
C-8AQ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-34	819107	4-SPEED CHANGER	.10
C-8AR	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-35	819107	4-SPEED CHANGER	.10
C-8AS	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-36	819107	4-SPEED CHANGER	.10
C-8AT	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-37	819107	4-SPEED CHANGER	.10
C-8AU	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-38	819107	4-SPEED CHANGER	.10
C-8AV	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-39	819107	4-SPEED CHANGER	.10
C-8AW	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-40	819107	4-SPEED CHANGER	.10
C-8AX	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-41	819107	4-SPEED CHANGER	.10
C-8AY	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-42	819107	4-SPEED CHANGER	.10
C-8AZ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-43	819107	4-SPEED CHANGER	.10
C-8BA	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-44	819107	4-SPEED CHANGER	.10
C-8BB	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-45	819107	4-SPEED CHANGER	.10
C-8BC	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-46	819107	4-SPEED CHANGER	.10
C-8BD	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-47	819107	4-SPEED CHANGER	.10
C-8BE	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-48	819107	4-SPEED CHANGER	.10
C-8BF	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-49	819107	4-SPEED CHANGER	.10
C-8BG	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-50	819107	4-SPEED CHANGER	.10
C-8BH	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-51	819107	4-SPEED CHANGER	.10
C-8BI	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-52	819107	4-SPEED CHANGER	.10
C-8BJ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-53	819107	4-SPEED CHANGER	.10
C-8BK	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-54	819107	4-SPEED CHANGER	.10
C-8BL	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-55	819107	4-SPEED CHANGER	.10
C-8BM	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-56	819107	4-SPEED CHANGER	.10
C-8BN	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-57	819107	4-SPEED CHANGER	.10
C-8BO	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-58	819107	4-SPEED CHANGER	.10
C-8BP	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-59	819107	4-SPEED CHANGER	.10
C-8BQ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-60	819107	4-SPEED CHANGER	.10
C-8BR	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-61	819107	4-SPEED CHANGER	.10
C-8BS	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-62	819107	4-SPEED CHANGER	.10
C-8BT	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-63	819107	4-SPEED CHANGER	.10
C-8BU	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-64	819107	4-SPEED CHANGER	.10
C-8BV	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-65	819107	4-SPEED CHANGER	.10
C-8BW	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-66	819107	4-SPEED CHANGER	.10
C-8BX	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-67	819107	4-SPEED CHANGER	.10
C-8BY	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-68	819107	4-SPEED CHANGER	.10
C-8BZ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-69	819107	4-SPEED CHANGER	.10
C-8CA	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-70	819107	4-SPEED CHANGER	.10
C-8CB	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-71	819107	4-SPEED CHANGER	.10
C-8CC	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-72	819107	4-SPEED CHANGER	.10
C-8CD	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-73	819107	4-SPEED CHANGER	.10
C-8CE	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-74	819107	4-SPEED CHANGER	.10
C-8CF	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-75	819107	4-SPEED CHANGER	.10
C-8CG	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-76	819107	4-SPEED CHANGER	.10
C-8CH	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-77	819107	4-SPEED CHANGER	.10
C-8CI	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-78	819107	4-SPEED CHANGER	.10
C-8CJ	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05	X-79	819107	4-SPEED CHANGER	.10
C-8CK	900175	VARIABLE CAPACITOR-R.F. SECTION	3.05</				

STOCK NO. 4-V-17

MANUAL NO. 4-599

CODE NO. 1-8-3RP8

SPECIFICATIONS

- Cabinet Dimensions Width 12 in., Height 5 in., Length 10 in.
- Shipping Weight 8 lbs.
- Power Supply 105-125 volts AC 50/60 cycles
- Tuning Range Standard Broadcast Band
- Intermediate Frequency 455 KC
- Loud Speaker 4 in. P.M.
- Voice Coil Impedance 3.2 ohms at 400 cycles
- Power Output Maximum 1.8 watts
- Tube Complement
 - 12AU6—Converter
 - 12AV6—Detector—1st Audio
 - 50C5—Power Amplifier
 - 35W4—Rectifier

For alignment or repairs, remove motor board by unscrewing 4 Phillipshead motorboard bolts.

ALIGNMENT

A. Equipment

The following equipment is necessary for proper alignment:

1. Signal Generator that will provide the test frequencies as listed, modulated 400 cycles 30%.
2. Non-metallic screwdriver.
3. Output Meter.

B. Test Set Up

Volume control—maximum, all adjustments
 No signal applied to antenna.
 Connect .01 condenser in series with output lead of signal generator.
 Connect ground lead of signal generator to common ground above chassis.
 Connect Output Meter across Voice Coil.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER TO BE ADJUSTED	TRIMMER ADJUSTMENT
Fully open	455 KC	.1 MFD	12AU6 Grid	IF Top and Bottom	Maximum
Fully open	1620 KC		Loosely couple generator to "Loop Antenna"	Osc. section of tuning condenser	Maximum
Tune in signal 1400 KC from generator.			Loosely couple generator to "Loop Antenna"	Ant. section of tuning condenser	Maximum

TO CHANGE NEEDLE:

Raise tone arm to vertical position. Needle is held by small screw on cartridge. Loosen screw, remove defective needle and replace.

NOTE: For best results use exact replacement needle and cartridge.

IMPORTANT — Set Speed Selector lever to "OFF" position when unit is not in use. This will help to prevent flat spots from developing on idler wheel.

Firestone

PORTABLE RADIO PHONOGRAPH

STOCK NO. 4-V-17
 CODE NO. 1-8-3RP8

OPERATING INSTRUCTIONS, SERVICE MANUAL AND PARTS CATALOG

IMPORTANT: Do not lose or destroy these instructions. Read them carefully and keep for future reference and correct needle replacement.

IMPORTANT: This instrument is designed to operate from a 105-125 volt 60 cycles AC power source only. If in doubt check with your local power company before connecting the instrument.

TO OPERATE RADIO

1. Turn ON-OFF VOLUME knob clockwise and wait until set warms up. Then push RADIO-PHONO SLIDE SWITCH to radio position. The turntable will not revolve with switch in this position. It will revolve with switch in phono position only.
2. Tune STATION SELECTOR DIAL knob so that arrow points to desired station, and adjust volume to your preference.

NOTE: This model has an external antenna connection for remote pickup.

TO OPERATE PHONOGRAPH

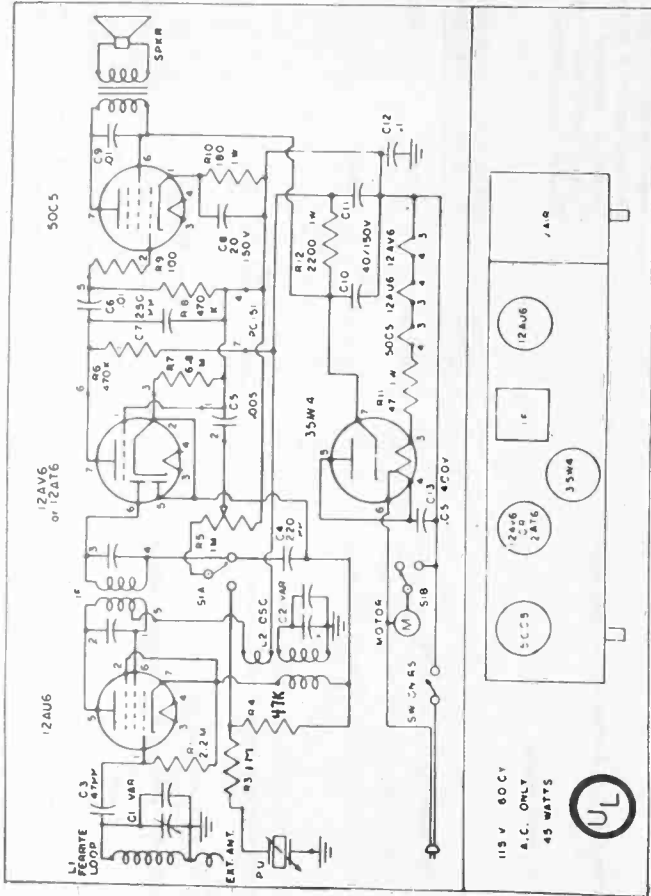
1. Place record on turntable. Move speed indicator to proper speed (33 1/3, 45, or 78).
- NOTE: The wrong speed may cause damage to the record, so be SURE to use correct speed.
2. Then place pick up arm on start of record. Push RADIO-PHONO SLIDE SWITCH to PHONO. This will start the motor.
3. Adjust the volume control to your preference.

NOTE: If a 45 RPM record is used, twist adapter counterclockwise to raise it and fit record onto adapter.

4. To shut unit off turn ON-OFF VOLUME Knob counter-clockwise until switch clicks off.

DO NOT DROP PICK UP ARM ON RECORD. This can cause damage to cartridge, needle or record.

Put pick up arm into arm rest before closing the cabinet.



PARTS LIST - STOCK NO. 4-V-17

Part No.	Description	List Price
231120	*Cabinet	6.00
229017	*Motorboard	1.20
270138	*Knob, with Arrow	.23
270112	*Knob, Plain	.08
310121	*8" 3 Speed 117V. Alliance Motor	10.88
315013	*8" Turntable, Rust, with White "45" Adapter	1.50
321017	Astatic Tone Arm	1.00
321510	Astatic Cartridge 16L3	6.20
329201	Astatic 2 Mil Straight Shank Needle #N4-2	1.00
414001	*4" Speaker	3.80
583020	40 x 40 x 20 MFD-150V. Elect. Cond. CE-1028	1.20
590020	*CV67 Variable Capacitor	2.33
420006	*PC 151 Printed Circuit	.66
360081	*VC 42 1.0 Megohm Vol. Control-with Switch	.85
450010	*LF 57 IF Transformer	1.16
455055	*LC 54-3 Osc. Coil	.72
464018	*LPFE-24 Ferrite Loop Antenna	1.24
370024	*Slide Switch DPDT Sw 44	.26
350002	12AU6 Tube	2.12
350005	12AV6 or 12AT6 Tube	1.64
350004	50C5 Tube	2.08
350003	35W4 Tube	1.32

NOTE - All parts not appearing on parts list may be replaced with any standard replacement part of similar type and value.

* Use genuine factory replacements for items marked with an asterisk. These parts may be ordered from your Firestone Parts Warehouse.

STOCK NO. 4-A-158

CODE NO. 1-8-51/284

SPECIFICATIONS

Cabinet Dimensions	Width 11 in., Height 8 in., Depth 7 in.
Shipping weight	7½ lbs.
Power supply	105-125 volts AC 50/60 cycle
Tuning Range	Standard Broadcast Band
Intermediate Frequency	455 KC
Loud Speaker	4 in. P.M.
Voice Coil Impedance	3.2 ohms at 400 cycles
Power Output	Maximum 1.8 watts
Tube Complement	1 - 12BE6-Converter 1 - 12BA6-LF. Amplifier 1 - 12AV6-Detector-AVC-1st Audio 1 - 50C5-Power Amplifier 1 - 35W4-Rectifier

To Remove Chassis:

1. Pull both knobs off front of cabinet
2. Remove 4 Phillips head screws tying back to front of cabinet.
3. Remove 4 hex-head chassis bolts on bottom of cabinet.
4. Pull chassis out.

To Remove Clock

1. Remove 2 clock knobs on face of clock by pulling away from cabinet.
2. Remove 4 hex-head nuts inside cabinet from clock mounting plate.
3. Remove clock by pulling towards rear of cabinet.

RESISTANCE-CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	22K	1.2	36	24	2.2*K	2.2*K	3.2Meg
12BA6	3.2Meg	0	24	12	2.2*K	2.2*K	180
12AV6	6.8Meg	0	0	12	1Meg	1Meg	472*K
50C5	150	470K	36	85	150	2.2*K	180*
35W4	NC	NC	85	120	115	115	∞†

Measurements taken with V I VM between B- and socket pins except for readings marked with *asterisk, which were taken between pin 7 of 35W4 and socket pin. All readings with set disconnected, volume control fully (CW) open, clock set to "Off".
 Readings may vary plus or minus 20%
 † This reading taken with filter cond. fully discharged.
 NC = No Connection
 ∞ = Infinite

ALIGNMENT

- A. Equipment**
 The following equipment is necessary for proper alignment:
 1. Signal Generator that will provide modulated test frequencies as listed.
 2. Non-metallic screwdriver.
 3. Output Meter.

- B. Test Set Up**
 Volume control—maximum, all adjustments.
 No signal applied to antenna.
 Connect .1 condenser in series with output lead of signal generator.
 Connect ground lead of signal generator to B-.
 Connect Output Meter across Voice Coil.
 Generator—output just sufficient to get reading.

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER TO BE ADJUSTED	ADJUSTMENT
Fully open	455 KC	.1 MFD	12BE6 Grid	1st IF Top and Bottom	Maximum
Fully open	455 KC	.1 MFD	12BE6 Grid	2nd IF Top and Bottom	Maximum
Fully open	1620 KC		Loosely couple generator to "Loop Antenna"	Osc. section of tuning condenser	Maximum
Tune in signal 1400 KC from generator.	1400 KC		As above	Ant. section of tuning condenser	Maximum

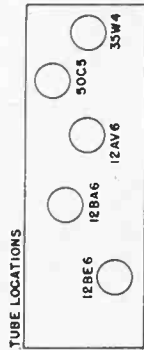
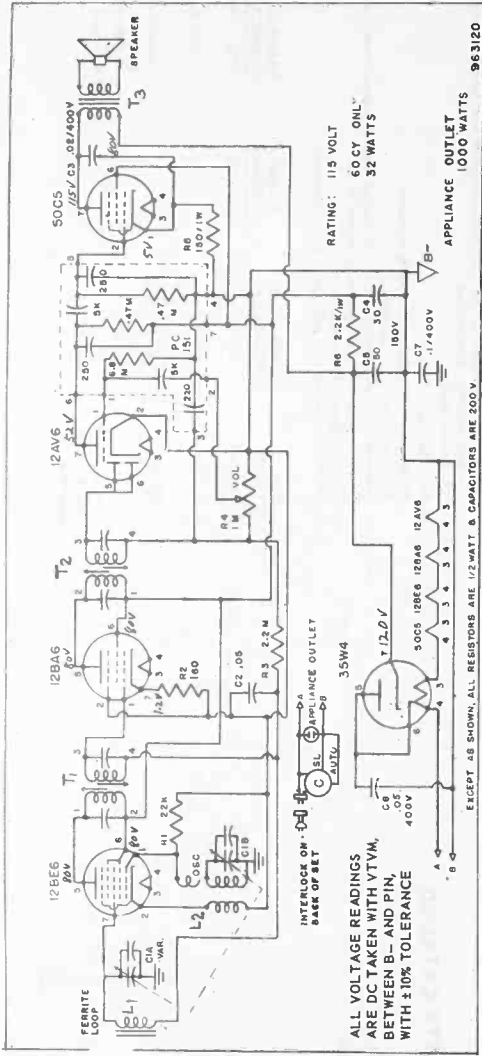
Firestone

CLOCK RADIO

SERVICE MANUAL AND PARTS CATALOG

STOCK NO. 4-A-158
 CODE NO. 1-8-51/284

CODE 1-8-51/284



PARTS LIST

PART NO.	DESCRIPTION	LIST PRICE
250370	*Plastic Cabinet, Front, White	\$2.20
250313	*Plastic Cabinet, Rear, Gold	1.84
272261	*Knob, Gold	.16
250312	*Plastic Cabinet, Rear, Blue	1.84
272260	*Knob, Blue	.16
404506	Speaker, 4" P.M.	2.48
451023	*I.F. Transformer T1 & T2	1.02
430330	*Output Transformer	.92
455075	*Oscillator Coil	1.00
368030	*Volume Control, 1 Meg.	.64
464028	*Ferrite Loop	.60
590054	*Variable Condenser w. drum	1.12
420006	PC 151 Couplate	2.45
260068	Dial Crystal	.62
384020	Clock	.10
272252	Clock Knobs	11.00
		.02

NOTE: - All parts not appearing on parts list may be replaced with any standard replacement part of similar type and value.

*Use Genuine factory replacements for items marked with an asterisk. These parts may be ordered from your Firestone Parts Warehouse.

STOCK NO. 4-A-157

CODE NO. 1-8-51/283

SPECIFICATIONS

- Cabinet Dimensions Width 11 in., Height 8 in., Depth 7 in.
- Shipping weight 7½ lbs.
- Power supply 105-125 volts AC 50/60 cycle
- Tuning Range Standard Broadcast Band
- Intermediate Frequency 455 KC
- Loud Speaker 4 in. P.M.
- Voice Coil Impedance 3.2 ohms at 400 cycles
- Power Output Maximum 1.8 watts
- Tube Complement
 - 1 - 12BE6-Converter
 - 1 - 12BA6-I.F. Amplifier
 - 1 - 12AV6-Detector-AVC-1st Audio
 - 1 - 50C5-Power Amplifier
 - 1 - 35W4-Rectifier

To Remove Chassis:

1. Pull both knobs off front of cabinet.
2. Remove 4 Phillips head screws tying back to front of cabinet.
3. Remove 4 hex-head chassis bolts on bottom of cabinet.
4. Pull chassis out.

To Remove Clock

1. Remove 2 clock knobs on face of clock by pulling away from cabinet.
2. Remove 4 hex-head nuts inside cabinet from clock mounting plate.
3. Remove clock by pulling towards rear of cabinet.

RESISTANCE-CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6	22K	1.2	36	24	2.2*K	2.2*K	3.2Meg
12BA6	3.2Meg	0	24	12	2.2*K	2.2*K	180
12AV6	6.8Meg	0	0	12	1Meg	1Meg	472*K
50C5	150	470K	36	85	150	2.2*K	180*
35W4	NC	NC	85	120	115	115	~+

Measurements taken with VTVM between B- and socket pins except for readings marked with *asterisk, which were taken between pin 7 of 35W4 and socket pin. All readings with set disconnected, volume control fully (CW) open, clock set to "Off".
 Readings may vary plus or minus 20%
 + This reading taken with filter cond. fully discharged.
 NC = No Connection
 ~ = Infinite

ALIGNMENT

- A. Equipment**
 The following equipment is necessary for proper alignment:
 1. Signal Generator that will provide modulated test frequencies as listed.
 2. Non-magnetic screwdriver.
 3. Output Meter.

- B. Test Set Up**
 Volume control—maximum, all adjustments.
 No signal applied to antenna.
 Connect .1 condenser in series with output lead of signal generator.
 Connect ground lead of signal generator to B-.
 Connect Output Meter across Voice Coil.
 Generator—output just sufficient to get reading.

STOCK NO. 4-A-157

CODE NO. 1-8-51/283

SERVICE MANUAL AND PARTS CATALOG

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER TO BE ADJUSTED	TRIMMER ADJUSTMENT
Fully open	455 KC	.1 MFD	12BE6 Grid	1st IF Top and Bottom	Maximum
Fully open	455 KC	.1 MFD	12BE6 Grid	2nd IF Top and Bottom	Maximum
Fully open	1620 KC		Loosely couple generator to "Loop Antenna"	Osc. section of tuning condenser	Maximum
Tune in signal 1400 KC from generator.	1400 KC	As above	As above	Ant. section of tuning condenser	Maximum

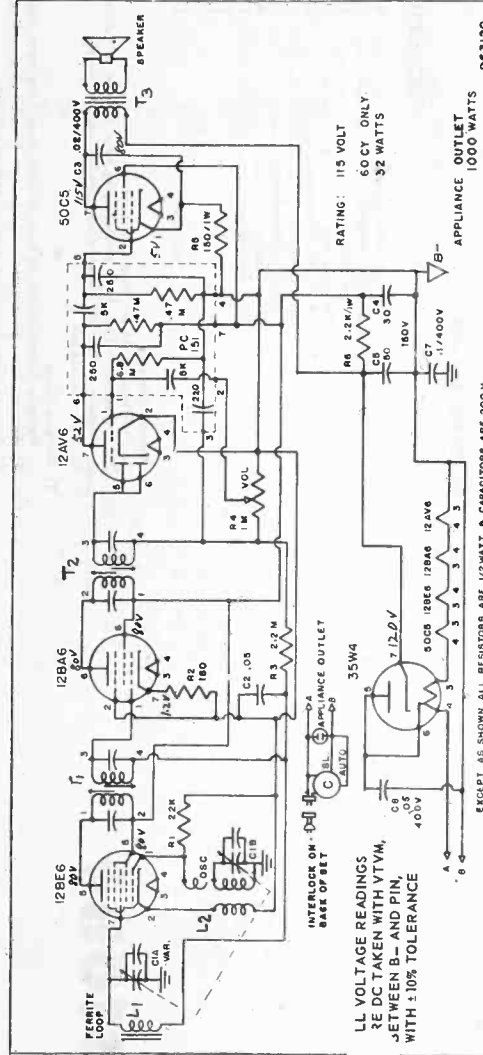
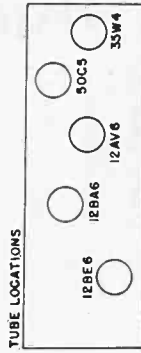
Firestone

CLOCK RADIO

PART NO.	DESCRIPTION	LIST PRICE
250360	*Plastic Cabinet, Front, White	\$2.20
250301	*Plastic Cabinet, Rear, Red	1.84
272262	*Knob, Tuning, Red	.24
272259	*Knob, Volume, Red	.16
250304	*Plastic Cabinet, Rear, Pink	1.84
272251	*Knob, Tuning, Pink	.24
272250	*Knob, Volume, Pink	.16
404006	Speaker, 4" P.M.	2.48
450023	*I.F. Transformer T1 & T2	1.02
582005	*Output Transformer	.92
430330	*Oscillator Coil	1.00
455075	*Volume Control, 1 Meg.	.64
368030	*Ferrite Loop	.60
464028	*Variable Condenser	1.12
590052	PC 151 Couplate	2.12
420006	*Clock Crystal	.62
260015	*Clock	.30
384019	*Clock Knobs	10.60
272224	*Clock Knobs	.02

NOTE - All parts not appearing on parts list may be replaced with any standard replacement part of similar type and value.

*Use Genuine factory replacements for items marked with an asterisk. These parts may be ordered from your Firestone Parts Warehouse.



STOCK NO. 4-A-156

CODE NO. 1-8-51/184

SPECIFICATIONS

- Cabinet Dimensions Width 11 in., Height 8 in., Depth 7 in.
- Shipping weight 7 lbs.
- Power supply 105-125 volts AC 50/60 cycle, or DC
- Tuning Range Standard Broadcast Band
- Intermediate Frequency 455 KC
- Loud Speaker 4 in. P.M.
- Voice Coil Impedance 3.2 ohms at 400 cycles
- Power Output..... Maximum 1.8 watts
- Tube Complement..... 1-12BE6-Converter
1-12AV6-Detector-AVC-1st Audio
1-50C5-Power Amplifier
1-35W4-Rectifier

- To Remove Chassis:**
1. Pull both knobs off front of cabinet.
 2. Remove 4 Phillips head screws tying back to front of cabinet.
 3. Remove 4 hex-head chassis bolts on bottom of cabinet.
 4. Pull chassis out.

RESISTANCE-CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6		1.2	36	24	2.2*K	2.2*K	3.2Meg
12BA6	3.2Meg	0	24	12	2.2*K	2.2*K	180
12AV6	6.8Meg	0	0	12	1Meg	1Meg	472*K
50C5	150	470K	36	85	150	2.2*K	180*
35W4	NC	NC	85	120	115	115	~+

Measurements taken with VTVM between B-and socket pins except for readings marked with * asterisk, which were taken between pin 7 of 35W4 and socket pin. All readings with set disconnected, volume control fully (CW) open.
 Readings may vary plus or minus 20%.
 *This reading taken with filter cond. fully discharged.
 NC = No Connection
 ~ = Infinite

ALIGNMENT

- A. Equipment**
- The following equipment is necessary for proper alignment:
1. Signal Generator that will provide modulated test frequencies as listed.
 2. Non-metallic screwdriver.
 3. Output Meter.

- B. Test Set Up**
- Volume control—maximum, all adjustments
 No signal applied to antenna.
 Connect .1 condenser in series with output lead of signal generator.
 Connect ground lead of signal generator to B-.
 Connect Output Meter across Voice Coil.
 Generator—output just sufficient to get reading.

SERVICE MANUAL AND PARTS CATALOG

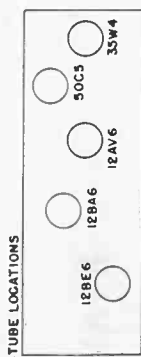
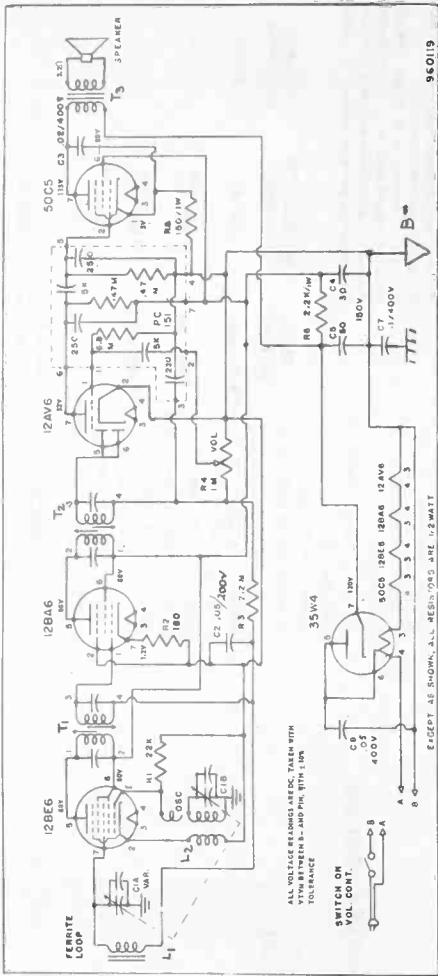
STOCK NO. 4-A-156
 CODE NO. 1-8-51/184

DIAL SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER TO BE ADJUSTED	TRIMMER ADJUSTMENT
Fully open	455 KC	.1 MFD	12BE6 Grid	1st IF Top and Bottom	Maximum
Fully open	455 KC	.1 MFD	12BE6 Grid	2nd IF Top and Bottom	Maximum
Fully open	1620 KC		Loosely couple generator to "Loop Antenna"	Osc. section of tuning condenser	Maximum
Tune in signal 1400 KC from generator.	1400 KC		As above	Ant. section of tuning condenser	Maximum

Firestone

5 TUBE AC-DC RADIO RECEIVER

CODE 1-8-51/184



PART NO.	DESCRIPTION	LIST PRICE
250340	*Plastic Cabinet, Front, White	\$2.20
250213	*Plastic Cabinet, Rear, Gold	1.84
272261	*Knob, Gold	.16
250214	*Plastic Cabinet, Rear, Pink	1.84
272250	*Knob, Pink	.16
404006	Speaker, 4" P.M.	2.48
450023	*I.F. Transformer T1 & T2	1.02
582005	Electrolytic 50 x 30/150V	.92
430330	*Output Transformer	1.00
455075	*Oscillator Coil	.64
368029	*Volume Control, 1 Meg., w/switch	.83
464028	*Ferrite Loop	1.12
590054	*Variable Capacitor w. drum	2.45
420006	PC 151 Couplate	.62

NOTE - All parts not appearing on parts list may be replaced with any standard replacement part of similar type and value.

*Use Genuine factory replacements for items marked with an asterisk. These parts may be ordered from your Firestone Parts Warehouse

MODELS C420A, C421A, B, C422B



PRELIMINARY SERVICE DATA

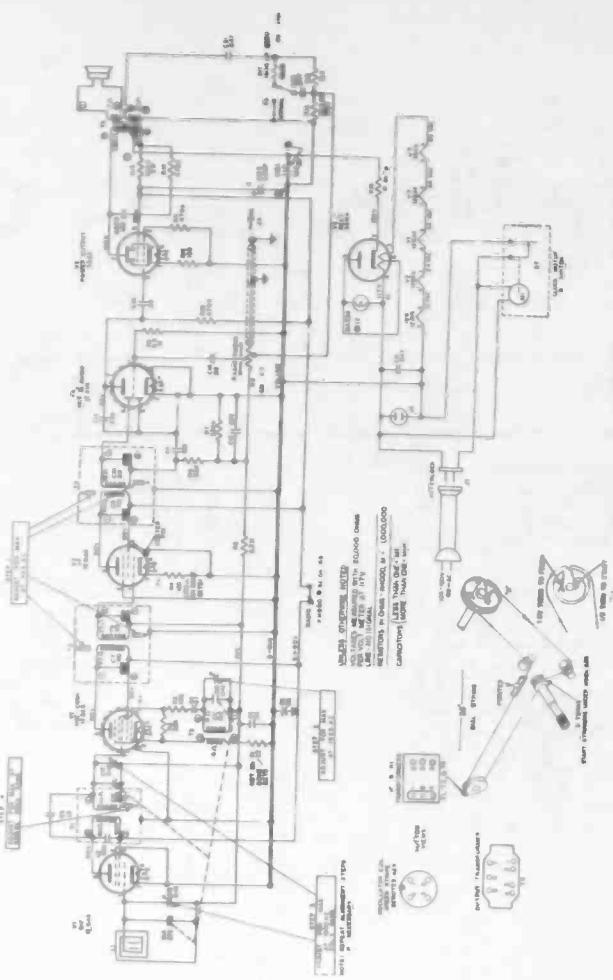
S-C420-I
COVERS
MODELS
C420A
C421A, B
C422B

SPECIFICATIONS		PARTS LIST CONT'D.																																																																																																																																		
CABINET:	C420A, Mahogany; C421A, B, Blue; C422B, Rose Beige	CATALOG NO.	SYMBOL																																																																																																																																	
ELECTRICAL RATING:	105-120 volts A. C. 60 cycles 30 Watts	DESCRIPTION	LIST PRICE																																																																																																																																	
POWER OUTPUT:	Undistorted: .75 Watts Maximum: 1.25 Watts	POTENTIOMETER																																																																																																																																		
SPEAKER:	5 1/4" 3.2ohms @ 400 cps.	COILS AND TRANSFORMERS																																																																																																																																		
TUBE COMPLIMENT:	12BA6 V1 R. F. Amplifier 12BE6 V2 Oke.-Converter 12BA6 V3 I. F. Amplifier 12AV6 V4 Det. & Audio Amplifier 35C5 V5 Power Output 35W4 V6 Rectifier	MISCELLANEOUS ELECTRICAL																																																																																																																																		
<p>GENERAL INFORMATION</p> <p>The models C420A, C421A, C421B, and C422B are 5 tube plus rectifier superheterodyne radio-timer receivers. A R. F. amplifier stage is used to provide increased sensitivity and selectivity. The volume control is used for both the radio and phono volume. A switch at the center position of the control eliminates any radio signal from being audible when listening to the phono. A slide switch for tone control is provided on the rear of the cabinet.</p> <p>No. C116C3 should be referred to the nearest G. E. Service Center or G. E. Service Station.</p> <p>TO REMOVE CHASSIS</p> <ol style="list-style-type: none"> Remove volume and tuning knobs. Unscrew alarm set indicator knob (Rear). Remove back of cabinet. Unsolder leads from speaker. Remove the cabinet top. Timer leads should remain connected as they are long enough to allow removal of radio for repair. <p>TO REMOVE SPEAKER</p> <ol style="list-style-type: none"> Follow steps 1 through 5 as above. Remove the 4 hexhead screws from around speaker. <p>NOTE: When servicing or aligning, always use an isolation transformer to protect test equipment and personnel. Always have the volume control set for maximum and reduce the signal input so AVC will not affect output.</p>																																																																																																																																				
CATALOG NO.	SYMBOL	DESCRIPTION	LIST PRICE																																																																																																																																	
PRELIMINARY REPLACEMENT PARTS LIST																																																																																																																																				
CAPACITORS																																																																																																																																				
RS-1134	C18A, B	100-.50mf., 150V.....	2.40																																																																																																																																	
RS-1191	C3	1.8mf., 500V.....	.15																																																																																																																																	
RS-1202	C19	6800mf., 450V.....	.25																																																																																																																																	
RS-1203	C12, 13	220mf., 450V.....	.15																																																																																																																																	
RS-1204	C14, B, C	150mf., 450V.....	.15																																																																																																																																	
RS-1218	D, E, F	Tuning Capacitor.....	6.60																																																																																																																																	
BCM-3075	C4	4.7mf., 500V, Paper..	.25																																																																																																																																	
<p>MISCELLANEOUS MECHANICAL</p> <table border="1"> <tr><td>n-RB-1046</td><td>Speaker, 5 1/4".....</td><td>6.25</td></tr> <tr><td>n-RS-1223</td><td>Appliance Receptacle.....</td><td>.60</td></tr> <tr><td>RJS-182</td><td>Phono Jack.....</td><td>.15</td></tr> <tr><td>RJS-232</td><td>Tube Socket with center pin, (V3).....</td><td>.25</td></tr> <tr><td>RJS-237</td><td>Tube Socket.....</td><td>.15</td></tr> <tr><td>RVL-039</td><td>Power Cord.....</td><td>.95</td></tr> <tr><td>RS-1128</td><td>Slide Switch (Tone Control).....</td><td>.35</td></tr> <tr><td>RS-1183</td><td>Terminal.....</td><td>.03</td></tr> <tr><td>RS-1100</td><td>U Type Nut.....</td><td>.05</td></tr> <tr><td>RS-1127</td><td>Pulley 1/4".....</td><td>.05</td></tr> <tr><td>RS-1168</td><td>Shoulder Blivet (power cord).....</td><td>.05</td></tr> <tr><td>RS-1174</td><td>Plate (power cord).....</td><td>.05</td></tr> <tr><td>n-RS-1213</td><td>Sockets, (pilot light).....</td><td>.55</td></tr> <tr><td>n-RS-1214</td><td>Lamp Hood.....</td><td>.10</td></tr> <tr><td>n-RS-1215</td><td>Tuning Shaft Assembly.....</td><td>.65</td></tr> <tr><td>n-RS-1216</td><td>Antenna Holder.....</td><td>.80</td></tr> <tr><td>n-RS-1222</td><td>Pilot Light #12.....</td><td>.80</td></tr> <tr><td>n-RS-1324</td><td>Rubber Grommet.....</td><td>.02</td></tr> <tr><td>RJJ-010</td><td>Power Cord Receptacle.....</td><td>.10</td></tr> <tr><td>RS-1330</td><td>Spring (tuning gang).....</td><td>.15</td></tr> <tr><td>RMS-374</td><td>Tube Shield Pin.....</td><td>.02</td></tr> <tr><td>RMB-038</td><td>Pulley, 1 1/16".....</td><td>.10</td></tr> </table> <p>CABINET AND APPEARANCE ITEMS</p> <table border="1"> <tr><td>n-RB-1037</td><td>Cabinet Top, Mahogany, C420A.....</td><td>4.70</td></tr> <tr><td>n-RB-1038</td><td>Cabinet Bottom, Blue, C421A.....</td><td>4.70</td></tr> <tr><td>n-RB-1039</td><td>Cabinet Bottom, Blue, C421A, B.....</td><td>3.55</td></tr> <tr><td>n-RB-1040</td><td>Cabinet Back, Mahogany, C420A.....</td><td>2.35</td></tr> <tr><td>n-RB-1041</td><td>Cabinet Back, Blue, C421A, B.....</td><td>2.35</td></tr> <tr><td>n-RB-1042</td><td>Grille, Mahogany, C420A.....</td><td>.80</td></tr> <tr><td>n-RB-1043</td><td>Grille, Blue, C421A, B.....</td><td>.80</td></tr> <tr><td>n-RB-1074</td><td>Cabinet Top, Blue, C421B.....</td><td>4.70</td></tr> <tr><td>n-RB-1075</td><td>Cabinet Top, Rose Beige, C422B.....</td><td>4.70</td></tr> <tr><td>n-RB-1076</td><td>Cabinet Bottom, Rose Beige, C422B.....</td><td>3.55</td></tr> <tr><td>n-RB-1077</td><td>Cabinet Back, Rose Beige, C422B.....</td><td>2.35</td></tr> <tr><td>n-RB-1078</td><td>Grille, Rose Beige, C422B.....</td><td>.80</td></tr> <tr><td>RS-1095</td><td>Clock Control Knob (Lever type).....</td><td>.10</td></tr> <tr><td>n-RS-1205</td><td>Window Dial Backing, C420A.....</td><td>.55</td></tr> <tr><td>n-RS-1206</td><td>Window Dial Backing, C421A, B.....</td><td>.55</td></tr> <tr><td>n-RS-1207</td><td>Snooze-Alarm Bar Knob, Blue, C421A, B.....</td><td>.20</td></tr> <tr><td>n-RS-1208</td><td>Clock Crystal, C420A.....</td><td>.20</td></tr> <tr><td>n-RS-1209</td><td>Pointer, C420A.....</td><td>.95</td></tr> <tr><td>n-RS-1210</td><td>Medallion.....</td><td>.35</td></tr> <tr><td>n-RS-1217</td><td>Window Dial Backing, C421A.....</td><td>.55</td></tr> <tr><td>n-RS-1474</td><td>Window Dial Backing, C422B.....</td><td>.55</td></tr> </table>				n-RB-1046	Speaker, 5 1/4".....	6.25	n-RS-1223	Appliance Receptacle.....	.60	RJS-182	Phono Jack.....	.15	RJS-232	Tube Socket with center pin, (V3).....	.25	RJS-237	Tube Socket.....	.15	RVL-039	Power Cord.....	.95	RS-1128	Slide Switch (Tone Control).....	.35	RS-1183	Terminal.....	.03	RS-1100	U Type Nut.....	.05	RS-1127	Pulley 1/4".....	.05	RS-1168	Shoulder Blivet (power cord).....	.05	RS-1174	Plate (power cord).....	.05	n-RS-1213	Sockets, (pilot light).....	.55	n-RS-1214	Lamp Hood.....	.10	n-RS-1215	Tuning Shaft Assembly.....	.65	n-RS-1216	Antenna Holder.....	.80	n-RS-1222	Pilot Light #12.....	.80	n-RS-1324	Rubber Grommet.....	.02	RJJ-010	Power Cord Receptacle.....	.10	RS-1330	Spring (tuning gang).....	.15	RMS-374	Tube Shield Pin.....	.02	RMB-038	Pulley, 1 1/16".....	.10	n-RB-1037	Cabinet Top, Mahogany, C420A.....	4.70	n-RB-1038	Cabinet Bottom, Blue, C421A.....	4.70	n-RB-1039	Cabinet Bottom, Blue, C421A, B.....	3.55	n-RB-1040	Cabinet Back, Mahogany, C420A.....	2.35	n-RB-1041	Cabinet Back, Blue, C421A, B.....	2.35	n-RB-1042	Grille, Mahogany, C420A.....	.80	n-RB-1043	Grille, Blue, C421A, B.....	.80	n-RB-1074	Cabinet Top, Blue, C421B.....	4.70	n-RB-1075	Cabinet Top, Rose Beige, C422B.....	4.70	n-RB-1076	Cabinet Bottom, Rose Beige, C422B.....	3.55	n-RB-1077	Cabinet Back, Rose Beige, C422B.....	2.35	n-RB-1078	Grille, Rose Beige, C422B.....	.80	RS-1095	Clock Control Knob (Lever type).....	.10	n-RS-1205	Window Dial Backing, C420A.....	.55	n-RS-1206	Window Dial Backing, C421A, B.....	.55	n-RS-1207	Snooze-Alarm Bar Knob, Blue, C421A, B.....	.20	n-RS-1208	Clock Crystal, C420A.....	.20	n-RS-1209	Pointer, C420A.....	.95	n-RS-1210	Medallion.....	.35	n-RS-1217	Window Dial Backing, C421A.....	.55	n-RS-1474	Window Dial Backing, C422B.....	.55
n-RB-1046	Speaker, 5 1/4".....	6.25																																																																																																																																		
n-RS-1223	Appliance Receptacle.....	.60																																																																																																																																		
RJS-182	Phono Jack.....	.15																																																																																																																																		
RJS-232	Tube Socket with center pin, (V3).....	.25																																																																																																																																		
RJS-237	Tube Socket.....	.15																																																																																																																																		
RVL-039	Power Cord.....	.95																																																																																																																																		
RS-1128	Slide Switch (Tone Control).....	.35																																																																																																																																		
RS-1183	Terminal.....	.03																																																																																																																																		
RS-1100	U Type Nut.....	.05																																																																																																																																		
RS-1127	Pulley 1/4".....	.05																																																																																																																																		
RS-1168	Shoulder Blivet (power cord).....	.05																																																																																																																																		
RS-1174	Plate (power cord).....	.05																																																																																																																																		
n-RS-1213	Sockets, (pilot light).....	.55																																																																																																																																		
n-RS-1214	Lamp Hood.....	.10																																																																																																																																		
n-RS-1215	Tuning Shaft Assembly.....	.65																																																																																																																																		
n-RS-1216	Antenna Holder.....	.80																																																																																																																																		
n-RS-1222	Pilot Light #12.....	.80																																																																																																																																		
n-RS-1324	Rubber Grommet.....	.02																																																																																																																																		
RJJ-010	Power Cord Receptacle.....	.10																																																																																																																																		
RS-1330	Spring (tuning gang).....	.15																																																																																																																																		
RMS-374	Tube Shield Pin.....	.02																																																																																																																																		
RMB-038	Pulley, 1 1/16".....	.10																																																																																																																																		
n-RB-1037	Cabinet Top, Mahogany, C420A.....	4.70																																																																																																																																		
n-RB-1038	Cabinet Bottom, Blue, C421A.....	4.70																																																																																																																																		
n-RB-1039	Cabinet Bottom, Blue, C421A, B.....	3.55																																																																																																																																		
n-RB-1040	Cabinet Back, Mahogany, C420A.....	2.35																																																																																																																																		
n-RB-1041	Cabinet Back, Blue, C421A, B.....	2.35																																																																																																																																		
n-RB-1042	Grille, Mahogany, C420A.....	.80																																																																																																																																		
n-RB-1043	Grille, Blue, C421A, B.....	.80																																																																																																																																		
n-RB-1074	Cabinet Top, Blue, C421B.....	4.70																																																																																																																																		
n-RB-1075	Cabinet Top, Rose Beige, C422B.....	4.70																																																																																																																																		
n-RB-1076	Cabinet Bottom, Rose Beige, C422B.....	3.55																																																																																																																																		
n-RB-1077	Cabinet Back, Rose Beige, C422B.....	2.35																																																																																																																																		
n-RB-1078	Grille, Rose Beige, C422B.....	.80																																																																																																																																		
RS-1095	Clock Control Knob (Lever type).....	.10																																																																																																																																		
n-RS-1205	Window Dial Backing, C420A.....	.55																																																																																																																																		
n-RS-1206	Window Dial Backing, C421A, B.....	.55																																																																																																																																		
n-RS-1207	Snooze-Alarm Bar Knob, Blue, C421A, B.....	.20																																																																																																																																		
n-RS-1208	Clock Crystal, C420A.....	.20																																																																																																																																		
n-RS-1209	Pointer, C420A.....	.95																																																																																																																																		
n-RS-1210	Medallion.....	.35																																																																																																																																		
n-RS-1217	Window Dial Backing, C421A.....	.55																																																																																																																																		
n-RS-1474	Window Dial Backing, C422B.....	.55																																																																																																																																		

PARTS LIST CONT'D.

CATALOG NO.	DESCRIPTION	LIST PRICE
n-RS-1475	Snooze-Alarm Bar Knob, C422B	.20
n-RS-1476	Clock Crystal, C421B, C422B	.95
n-RB-1478	Pointer, C422B.....	.95
RDX-425	Tuning & Volume Knob.....	1.33

n- Denotes Parts Not Previously Cataloged.
All Parts Not Listed by Cat. Nos. Are Common Items, Obtainable From Radio Parts Jobbers.
Prices Are Suggested List Prices And Subject To Change Without Notice.



ALIGNMENT CHART

Step	Test Oscillator	Test Oscillator Setting	Receiver Tuning	Adjust for Maximum Output
1.	12BA6, V3 grid (pin 1) in series with a .05 mf.	455KC.	Tuning Gang Open (minimum capacity)	Cores of 2nd I. F. Transformer T4
2.	12BE6, V2 grid (pin 7) in series with a .05 mf.			Cores of 1st I. F. Transformer T3
3.				Recheck adjustment of T3 and T4
4.	Inductively Coupled to Antenna L1	1620 KC	Tuning gang open	CID Oscillator Trimmer
5.		1500 KC	Tune for max. signal	CLF, R. F. Trimmer
6.		Approximately 600 KC.	Rock in with core of T1	CLB, Antenna trimmer
7.				cores of R. F. transformer, T1. Rock in with receiver tuning
8.	Repeat Steps 4, 5, 6, 7			

S-C435
COVERS
MODEL
C-435A

PRELIMINARY SERVICE DATA



SPECIFICATIONS	
CABINET:	CA35A, Antique White
OUTPUT:	.9 Watts Undistorted 1.8 Watts Maximum
CLOCK:	Telechron Model J261
OPERATING FREQUENCIES:	540 - 1600 KC 455 KC I. F.

TO REMOVE CABINET BACK:
Remove time set knob from shaft at back of cabinet. Hold time set shaft with long-nose pliers and turn knob clockwise to remove. Set cabinet on the clock end using a soft cloth to protect the finish. Hold the line cord interlock plug with one hand. Place other hand on cabinet bottom with fingers around bottom edge of cabinet front, and thumb on bottom edge of cabinet back in groove provided. Using the thumb, force the cabinet bottom away from the cabinet back to free the locking tabs on the bottom of the cabinet back. Remove back by pulling away, freeing interlock and locking tabs at top of cabinet back.
To replace cabinet back line the time set shaft in the hole and place locking tabs on top of cabinet back in slots on cabinet top. Push on bottom of cabinet back sliding locking tabs on the beveled side into the slots. Make certain the interlock terminals and plug engage. Replace time set knob by turning clockwise on shaft.

TO REMOVE CHASSIS FROM CABINET:
After removing cabinet back remove the screw on the cabinet bottom that holds the chassis board support. The tuning knob is a captive knob and remains in the cabinet front. Close the tuning gang to prevent any possible damage to the plates. Slide one hand under the printed chassis board placing the fingers over the front edge. Slide the board back out of the grooves on either end simultaneously removing the tuning gang shaft from the tuning knob.
When replacing the chassis, close the tuning gang and line the flar side of the tuning gang shaft up with the flat in the tuning knob. Place the ends of the board in the grooves and push on the edge of the board, not on the components. The tuning shaft will enter the tuning knob and the front edge of the board will seat itself in the grooved bosses inside the cabinet front. Replace the board support and self-tapping screw.

TO REMOVE VOLUME CONTROL:
The volume control is attached to the cabinet and may be removed by pulling the knob straight off and removing the panel. Volume control place the tab on the control in the groove provided.

TO REMOVE SPEAKER:
After removing the chassis board remove four tubular speaker clips and lift the speaker out of the cabinet.

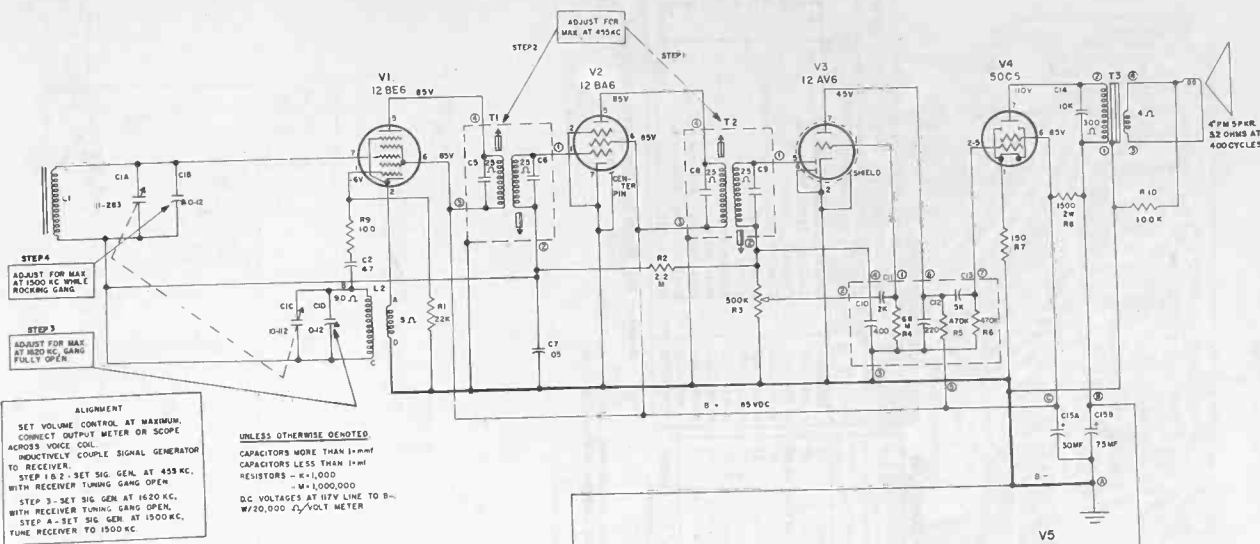
TO REMOVE CRYSTAL:

1. Remove control knob by pulling straight off; 2. Press down on the top of the crystal slightly to release the top locking tab; 3. Move crystal up from bottom releasing the bottom locking tab; 4. Lift crystal off carefully to prevent scratching on the control shaft.
To replace the crystal slide it over the control shaft and place bottom locking tab in position. Push on top face of crystal sliding top locking tab in position.

TO REMOVE CLOCK:

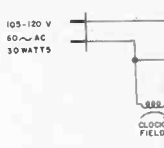
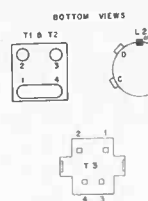
Turn time set knob so that all hands are at twelve o'clock. Remove time set knob by holding shaft with long-nose pliers and turn knob counter clockwise. Remove chassis, speaker and crystal as described previously. Remove each hand separately with a mended hand lift tool (KAC/DAL which is available from General Electric Servicemen). Remove the two tubular clips from inside the cabinet. Remove the two hands in the same position they were in before removal (twelve o'clock).

REPLACEMENT PARTS LIST		PRICE
CAT. NO.	SYMBOL DESCRIPTION	
RCE-215	C15A-B	2.00
n-RS-1413	C1C, 1B	3.60
REK-011	C10, 11, 12, 13	.80
POTENTIOMETER		
n-RS-1417	R3	1.00
COILS & TRANSFORMERS		
n-RS-1409	L1	1.15
n-RS-1437	L2	.65
n-RS-1415	T1, 2	1.55
n-RS-1416	T3	2.20



ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM. CORRECT OUTPUT METER OR SCOPE ACROSS VOICE COIL. INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER.
STEP 1-B-2-SET SIG. GEN. AT 455 KC. WITH RECEIVER TUNING GANG OPEN.
STEP 3-SET SIG. GEN. AT 1620 KC. WITH RECEIVER TUNING GANG OPEN.
STEP A-SET SIG. GEN. AT 1500 KC. TUNE RECEIVER TO 1500 KC.

UNLESS OTHERWISE DENOTED CAPACITORS MORE THAN 1-mmf SIGNAL GENERATOR TO RECEIVER. CAPACITORS LESS THAN 1-mmf RESISTORS - K=1,000 Ω = 1,000,000 Ω DC VOLTAGES AT HTV LINE TO B- W/20,000 Ω VOLT METER



Coil Specifications

Type	1	2	3	4	5	6	7
12AV6	4.0M	0	120ohm	0	500K	0	50700
12BA6	2.7M	0	25ohm	15ohm	1150ohm	1150ohm	0
12BE6	22K	0	3ohm	1ohm	1150ohm	1150ohm	2.7M
50C5	150ohm	170K	50ohm	45ohm	1150ohm	1150ohm	1000ohm
35W4	0	0	0	0	115ohm	115ohm	1000ohm

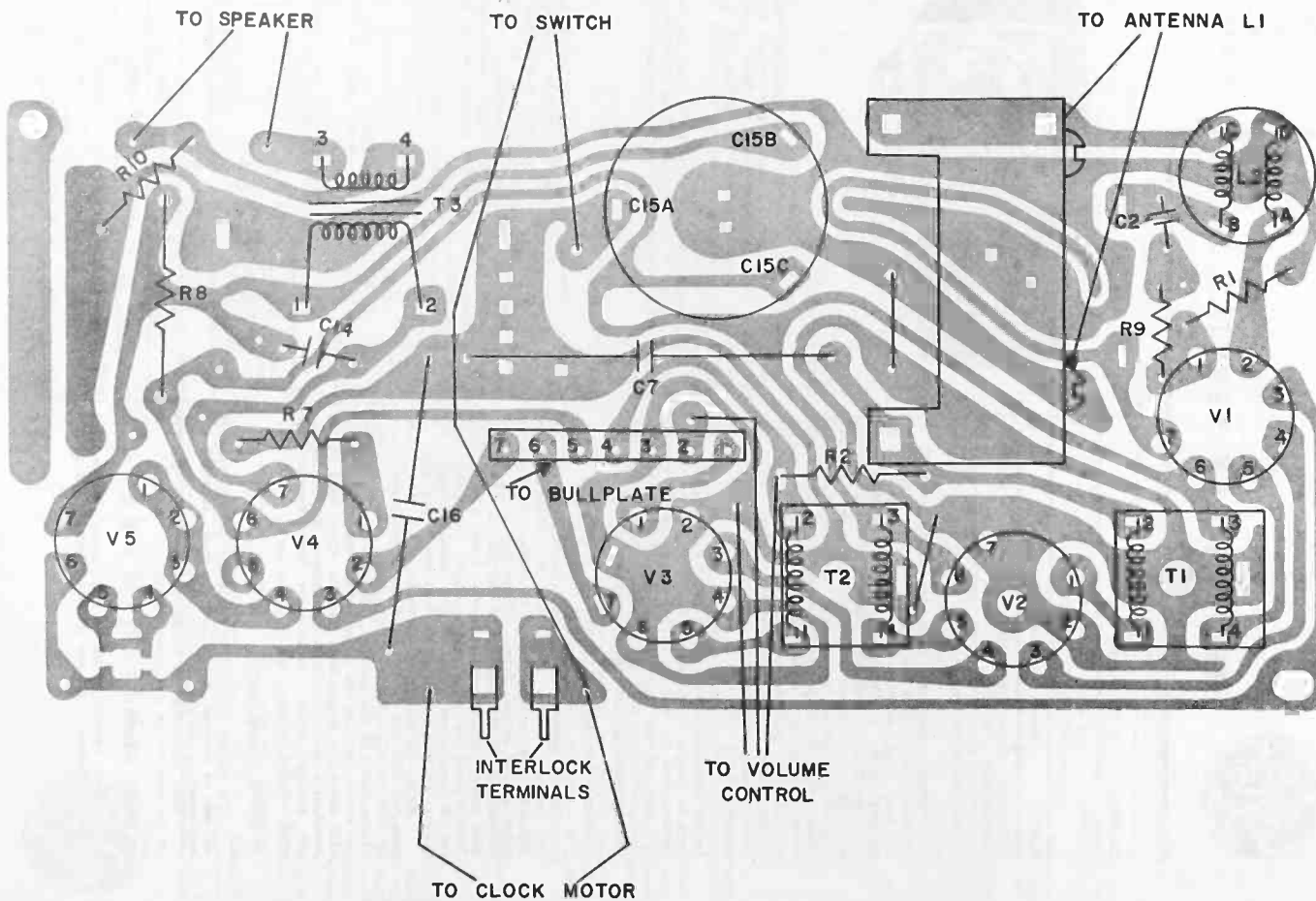
© 1935 Patent
* - Measurements from Fig. 7 of V5
All measurements made with switch S1 open

MODEL C435 (CONTINUED)

REPLACEMENT PARTS LIST		PRICE
CAT. NO.	DESCRIPTION	
MISCELLANEOUS		
RMS-356	Clip, Captive (Tuning Knob)	.05
RHC-095	Clip, Tubular (Speaker)	.05
RS-1093	Extension, Shaft (Clock)	.10
n-RS-1418	Terminals, Interlock	.03
RS-1188	Antenna, Clamp	.15
RB-1057	Speaker 4"	5.45
RS-1455	Power Cord	1.00
n-RS-1307	Tube Socket, 7Pin W/Center Pin	1.10
n-RS-1309	Tube Socket, 7Pin W/Center Pin	1.15
All Parts Not Listed By Catalog Number Are Common Items, Obtainable From Radio Parts Jobbers.		
CABINET & APPEARANCE ITEMS		
n-RB-1063	Cabinet, Antique White	3.25
n-RS-1404	Cabinet Back, Masonite	.25
n-RS-1401	Crystal, Clock	.50
n-RS-1402	Clock Face	.60
n-RS-1405	Second Hand	.10
n-RS-1406	Alarm Hand	.10
n-RS-1407	Minute Hand	.10
n-RS-1408	Hour Hand	.10
n-RS-1464	Knob, Tuning W/Insert	.85
RDK-425	Knob, Volume W/Insert	.35
RS-1005	Knob, Clock	.05

"n" - Denotes New Items Not Previously Cataloged.

Prices Are Suggested List Prices Subject To Change Without Notice.





PRELIMINARY SERVICE DATA

S-C440A
COVERS
MODELS
C440A
C441A

PRELIMINARY REPLACEMENT PARTS LIST (CONT'D.)

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
POTENTIOMETER			
**RS-1568	R3	Volume Control, 1 meg.....	1.10
COILS & TRANSFORMERS			
RS-1415	TL, 2	Transformer, I.F.....	1.55
RS-1437	L2	Coil, Oscillator.....	.65
**RS-1564	L1	Antenna.....	1.40
**RS-1567	T3	Transformer, Output.....	2.15
MISCELLANEOUS			
RB-1057		Speaker	5.45
**RS-1323		Light, Pilot #12 (Radio Dial)	.25
**RS-1522		Timing Shaft Assembly.....	.70
**RS-1557		Holder, Interlock.....	1.00
**RS-1559		Socket, Pilot Light (for #13)	.60
**RS-1561		Socket, Pilot Light (for #12)	.60
**RS-1562		Hook, Pilot Light (for #12)	.15
**RS-1563		Light Pilot #43 (Nite-Light)	.55
**RS-1569		Receptacle (Appliance)	.55
**RS-1570		Power Cord, (Ant. White).....	1.40
**RS-1571		Interlock.....	1.10
**RS-1656		Switch (Nite-Light).....	1.05
**RS-1657		Clip, Spring (Nite-Light).....	.80
RDC-032		Cord, Dial (25 yds. bulk).....	2.50
RHC-095		Clip, Tubular.....	.10
RJS-182		Connector, Phono.....	.15
RJS-232		Socket, (with center pin).....	.25
RJS-237		Socket, (w/o center pin).....	.15
RMS-130		Spring, (Tuning gang).....	.15
CABINET & APPEARANCE ITEMS			
**RB-1080		Cabinet Front, Blue, C440A	11.30
(Assem.)		Cabinet Back, White	
**RB-1081		Hinges (2).....	11.30
(Assem.)		Backing & Reflector	
RS-1096		Cabinet Front, Black & Gold	.10
**RS-1528		Cabinet Back, White	
**RS-1529		Backing & Reflector.....	3.05
**RS-1536		Crystal, Blue & Silver, C440A	3.05
**RS-1538		Crystal, Black & Gold, C441A	1.10
**RS-1560		Knob, Snooz-Alarm Bar.....	.50
RDK-425		Window, (Dial Backing).....	.35
		Pointer.....	.35
		Knob, (Vol. & Tune).....	.35

* - Denotes Parts Not Previously Cataloged.

All Parts Not Listed by Catalog Numbers Are Common Items, Obtainable From Radio Parts Jobbers.

Prices Are Suggested List Prices And Subject To Change Without Notice.

CABINET:	OPERATING FREQUENCIES:	POWER OUTPUT:	TUBE COMPONENT:
C440A - White, Blue, & Silver C441A - White, Black & Gold	540 - 1600 KC 455 - KC I. F.	Undistorted: 1 Watt Maximum: 1.5 WATTS	V1 V2 V3 V4 V5
			12BE6 12BA6 12AV6 50C3 35W4

TO REMOVE CABINET BACK

1. Remove timer time-set knob from shaft on cabinet back.
2. Remove two screws at top of cabinet back and one over appliance outlet.
3. Remove two screws from line cord interlock plate.
4. Pull line cord interlock out slightly to disengage.
5. Open cabinet back.

To replace pilot light, set dial at 55, then remove light.

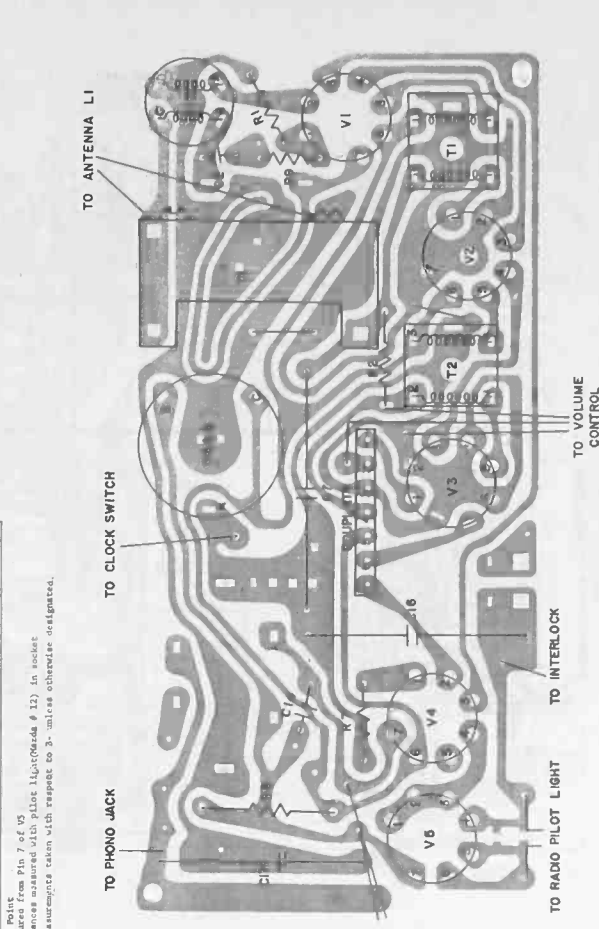
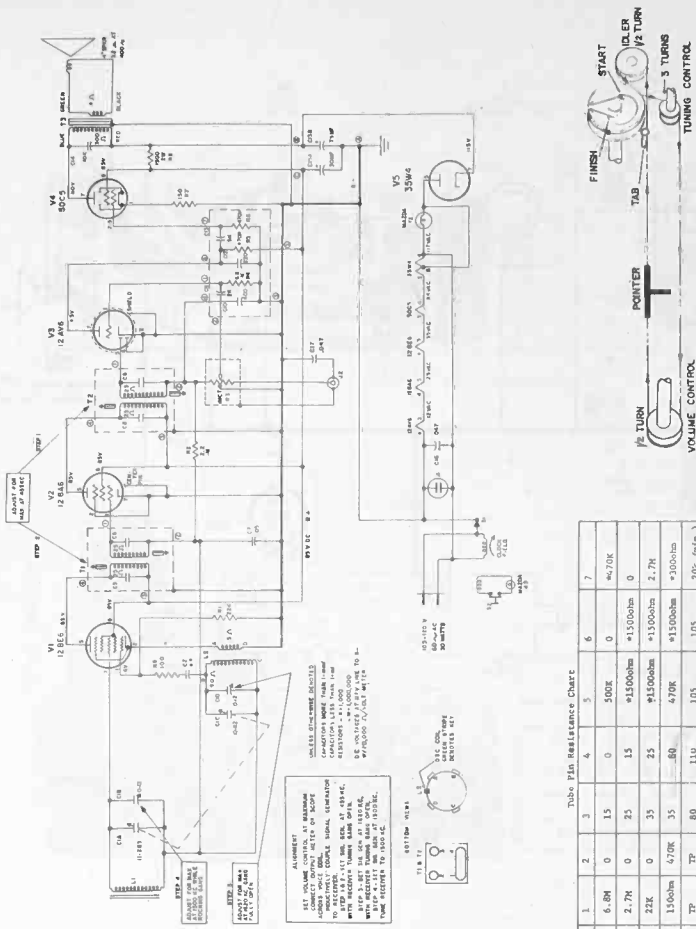
TO REMOVE CHASSIS

1. Follow steps one through six as above.
 2. Remove tuning and volume knobs.
 3. Unsolder green wire from top right side of timer. (Other end of wire enters circuit board near electrolytic capacitor.)
 4. Unsolder leads from speaker.
 5. Remove four screws from cabinet bottom.
- NOTE: When servicing or aligning this receiver, always use an isolation transformer to protect test equipment and personnel.
Always have volume control set for maximum, and reduce signal input so AVC will not affect output.

Service on defective timer units (Telechron Catalog Number C116G13 for Model C440A and C116G14 for Model C441A) should be referred to the nearest G. E. Servicenter or G. E. Service Station.

When removing and replacing timer, use extreme care not to scratch the cabinet front crystal with the timer shafts.

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
**RS-1565	C1	Capacitor, Tuning.....	3.90
RCE-215	C15A, B	30MF., 75 MF., @150V.....	2.00
REK-011	R4, 5, 6	Coil.....	1.00
	C10, 11, 12	Coil.....	
	C2	47MF., 500V.	
	C7	.05MF., 400V.	
	C4	.01MF., 450V.	
	C16, 17	.047MF., 600V.	



MODELS T105A, T106A, B, T107B

S-T105-2
COVERS
MODELS
T105A
T106A, B
T107B

PRELIMINARY SERVICE DATA

SUPERSEDES S-T105-1



SPECIFICATIONS	
CABINET:	Plastic, 6 3/4 x 6 x 12 1/8" Model T106B, Antique White Model T107B, Turquoise
ELECTRICAL RATING:	105-120 Volts A-C or D-C 24 Watts @ 117 Volts A-C
OUTPUT:	Undistorted 1.0 Watt Maximum 1.6 Watt
SPEAKER:	(2) 4 inch PM., 3.2 ohms @ 400 cps.
TUBE COMPLEMENT:	V1 Oscillator-Converter..... 12BE6 V2 I-F Amplifier..... 12BA6 V3 Detector, 1st Audio Amp..... 12AV6 V4 Audio Output..... 50C5 V5 Rectifier..... 35W4

GENERAL INFORMATION

The Models T106B and T107B are twin speaker and all-electron-tube radios. The circuitry is similar to the previous T105 radios.

TO REMOVE CHASSIS FROM CABINET

To remove chassis from cabinet, remove cabinet back. Unsolder the output transformer leads from the speaker. Remove the four self-tapping screws, (hex-heads) one on each corner of the chassis, and the single hex screw just below the tuning gang capacitor. Pull off the volume control knob. The chassis must be pulled out of the cabinet, at the same time pulling it off the tuning knob, which remains on the cabinet. When pulling out the chassis, it is best to grasp the tuning capacitor (C1) by the thumb and forefinger of one hand, the tuning knob by the other hand and pull.

PRELIMINARY PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
*RS-1607	C1A, B, C, D	Tun. Cap. T106B, T107B...	3.60
RS-1163	C1A, B, C, D	Tun. Cap. T105A, T106A...	4.15
RCV-3207	C9A, B, C, D	Bulbplate.....	1.00
RCV-3266	C2, 3	22mmf. ±20%, 500V.....	2.20
RCE-207	C11A, B	30-50MF @150V.....	2.15
POTENTIOMETER			
RS-1162	R3	Vol. Cont. (500K) & Sw....	2.30
COILS & TRANSFORMERS			
*RS-1606	L1	Loop Ant. T106B, T107B....	1.25
RS-1415	T1, 2	IF Transformer T106B, T107B	1.55
RS-1523	T3	Osc. Coil T106B, T107B....	1.00
RS-1161	T3	Output Transformer.....	2.55
RS-1156	L1	Loop Ant. T105A, T106A....	1.25
RLC-135	L2	IF Trans. T105A, T106A....	1.65
		Osc. Coil T105A, T106A....	1.00

*# - Denotes Parts Not Previously Cataloged.

CAUTION: It is important to use extreme care re-placing parts and/or soldering on this chassis. Too much heat on the chassis will cause the copper plating to become unbonded. Only apply the soldering iron long enough to melt the solder and pull out the part to be replaced.
A 35 watt soldering iron is recommended for all repairs on the circuit board to protect the copper pattern.

TO REPLACE THE VOLUME CONTROL

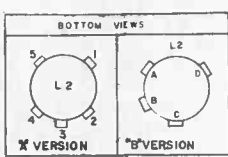
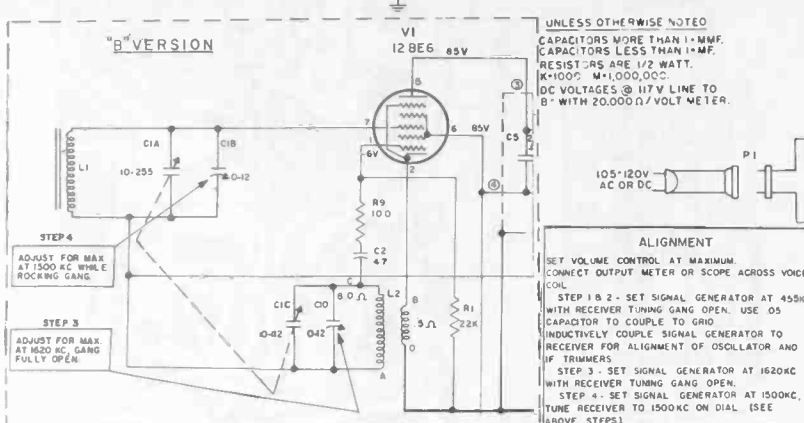
Remove the shaft nut and the fibre washer, then cut the center and lower terminals. Apply only enough heat to the upper terminal to pull out the control. Apply heat to the center and lower terminals so they may be pushed out. The new control may now be inserted into place and soldered. Make sure the fibre washer is in place before installing the shaft nut.

SPEAKERS

When connecting the speaker leads after repair, care must be taken to insure the speakers are in correct phase with one another. To do this, you must connect the two ground lugs together, as well as the two ungrounded lugs. For example, if one grounded lug and one ungrounded lug were connected together the speakers would be out of phase, which would result in distortion and loss of audio signal.

SERVICE HINT

Always use an isolation transformer when servicing or aligning this receiver to protect the service personnel and his equipment.



CAT. NO.	DESCRIPTION	PRICE
MISCELLANEOUS ITEMS		
RS-1157	Loop Mtg. Bracket.....	.10
RS-1158	Tube Shield.....	.10
RJS-232	Tube Socket w/Center Pin.....	.25
RJS-237	Tube Socket.....	.15
RS-1159	Heat Shield.....	.15
RS-1164	Vol. Cont. Washer.....	.05
RHS-161	Eyelet, Shield.....	.10
RHC-061	Clamp, Plastic.....	.20
RMS-356	Clip, Knob.....	.05
RHC-095	Clip, Speaker.....	.05
RWL-037	Power Cord.....	1.00
RJJ-014	Receptacle, Power Cord.....	.15
RB-1057	Speaker 4".....	5.45
RS-1190	Ground Strap.....	.05
CABINET & APPEARANCE ITEMS		
RB-1018	Cab. (Mah)w/Trim Strip & Dial Plate T105A....	5.70
RB-1019	Cab. (Ant. White)w/Trim Strip & Dial Plate T106A, T106B....	5.70
*RB-1085	Cab. (Turq.)w/Trim Strip & Dial Plate T107B....	5.70
RS-1155	Cab. Back (Triangle).....	.25
RS-1154	Dial Plate (Triangle).....	.20
RS-1153	Trim Strip T106A, B, Maroon.....	.70
RS-1139	Trim Strip T105A, T107B, Gold.....	.50
RS-1152	Knob, Tuning (Circular w/o Triangle).....	.85
RS-1186	Dial Plate (Circular w/o Triangle).....	.75
RDK-425	Knob, Volume.....	.35

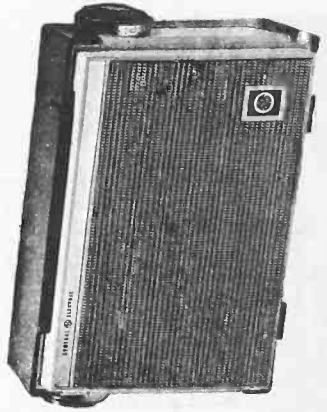
GENERAL ELECTRIC

ER-S-P735A
COVERS
MODELS
P735A
P736A

SERVICE MANUAL

FOR
PORTABLE RADIO RECEIVERS
(340-1600 KC., 455 KC., 1-F.)

SPECIFICATIONS	
CABINETS: (Plastic)	Model P735A - Turquoise and White Model P736A - White and Tan
ELECTRICAL RATING:	105-120 Volts A-C (50 to 60 Cycles) or DC, 10 Watts at 1 1/2 volts A-C. 1 "A" Battery - 7 1/2 volt Eveready No. 717 or equivalent 1 "B" Battery - 90 Volt Eveready No. 475 or equivalent
OPERATING FREQUENCIES:	Tuning range..... 540-1600 KC 1-F Amplifier..... 455 KC
POWER OUTPUT:	150 Milliwatts 10% distortion Maximum - 250-300 Milliwatts
TUBE COMPLEMENT:	V1 Oscillator-Converter..... 1R5 V2 1-F Amplifier..... 1U4 V3 Detector - Audio Amplifier..... 1U5 V4 Power Amplifier..... 3W4



GENERAL INFORMATION

The models P735A and P736A are four-tube super-heterodyne portable radio receivers. They operate on self-contained batteries or from a power line source of 105 to 120 volts A.C. or D. C.

These models are very compactly made and incorporate two plated circuit chassis, the smaller of which contains the power supply components. The front of the cabinet swings down and open, providing easy accessibility to tubes and batteries.

CHASSIS REMOVAL:

The chassis is easily removed by means of the following procedure:

1. Swing down cabinet front by grasping front at top edge under handle.
2. Remove tuning volume control knobs by pulling straight off their shafts.
3. Remove the two small Phillips-head screws from the top rear edge of the metal chassis mounting bracket.
4. Slide chassis and bracket out of cabinet.
5. Remove bracket from the chassis by removing the 1/4" mounting screw from center of bracket.

The power supply chassis is removed from the cabinet by removing the four small hex-head mounting screws.

The speaker is mounted on the cabinet front and may be removed by removing the four speaker mounting clips which secure the speaker to the four bosses on the inside of the cabinet front.

IMPORTANT: Use care when replacing defective parts. Apply as little heat to terminals and connections as possible.

possible to remove the parts, as excessive heat will damage the plated wiring on the chassis boards.

When replacing knobs, do not force them on, as too much pressure may cause circuit board to bend and crack.

VOLUME CONTROL REPLACEMENT:

The chassis must first be removed from the cabinet as described under CHASSIS REMOVAL and the control removed as follows:

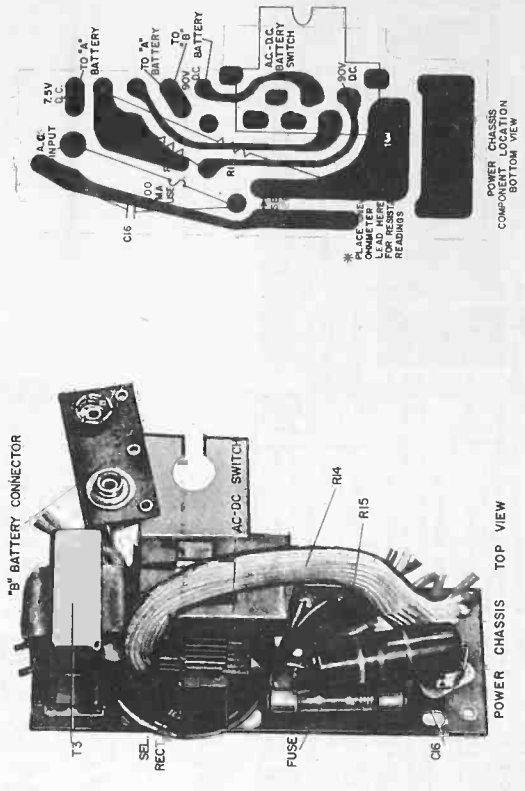
1. Cut off the three volume control lugs and the four switch lugs.
2. Individually remove the remaining parts of the lugs with a long-nose pliers while applying a soldering iron.
3. Clean all holes of excess solder.
4. Insert new control; then solder all lugs securely in place.

TO REPLACE A TUBE SOCKET:

Cut the socket free by cutting all of the socket terminals at the chassis. One socket (V2) has a center terminal which must be unsoldered. Now, heat the pieces of terminals remaining in the board only enough so they may be pushed out. The new socket can now be inserted into the holes left by the old one and soldered into place.

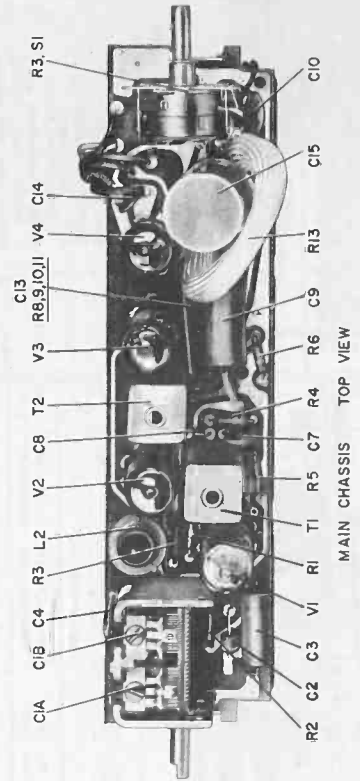
BATTERY INSTALLATION:

When placing the batteries into position, make sure the battery connections are well seated to make good contact between batteries and battery connections.

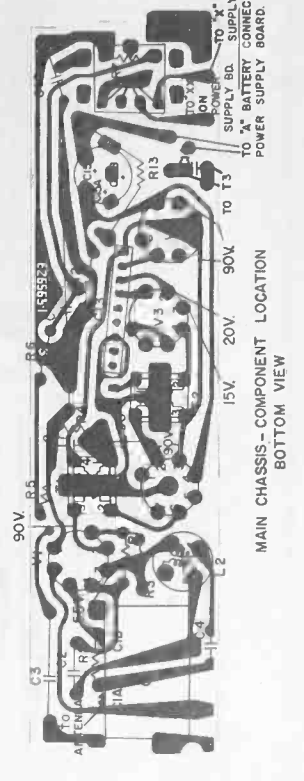


POWER CHASSIS TOP VIEW

POWER CHASSIS BOTTOM VIEW



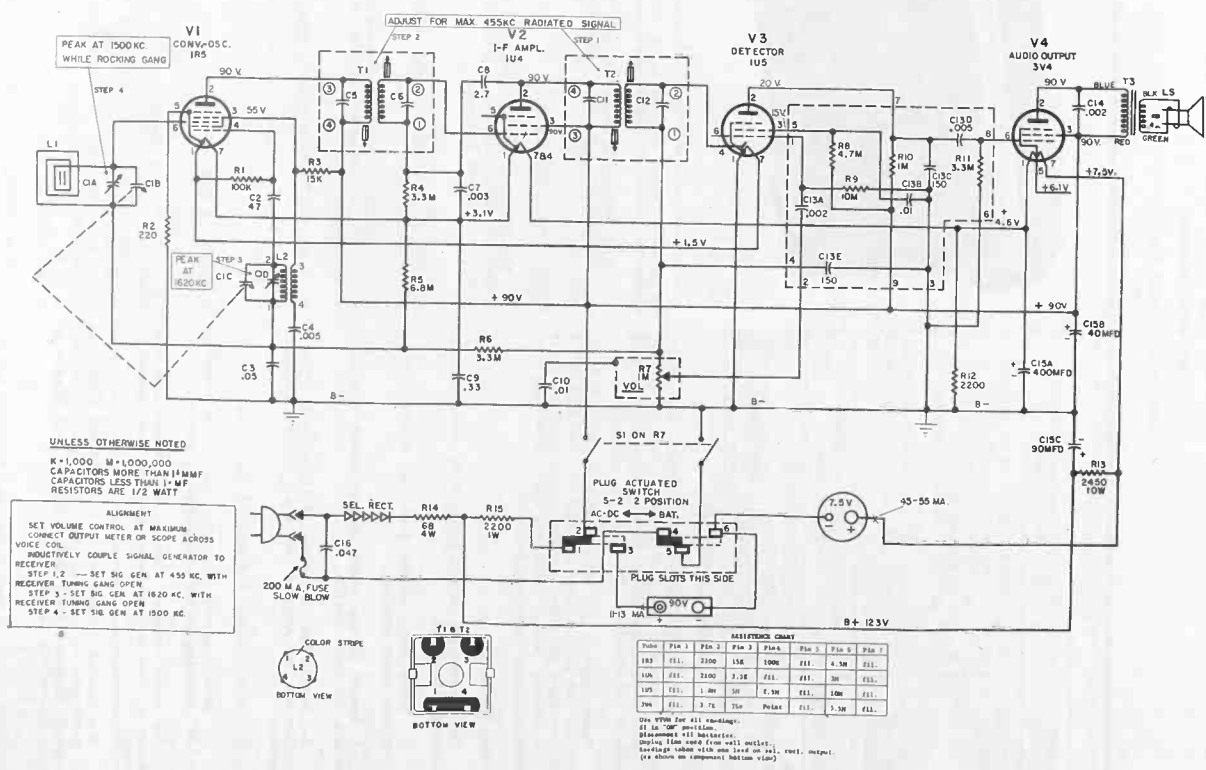
MAIN CHASSIS TOP VIEW



MAIN CHASSIS - COMPONENT LOCATION BOTTOM VIEW

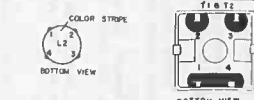
REPLACEMENT PARTS LIST - P735A, P736A			
CAT. NO.	SYMBOL	DESCRIPTION	PRICE
CAPACITORS			
n-RS-1247	C1	Capacitor Tuning.....	5.00
RCE-230	C15A, B, C	400mf., 10V., 40mf., 90mf., @150V.....	2.95
RCM-3014	C 4	.005mf., +150-07.450V.....	.25
RCM-3118	C 7	.002mf., +200-100V.....	.25
RCM-3119	C14	.002mf., +100-07.450V.....	.25
RCM-3250	C10	.01mf., +150-07.100V.....	.30
	C2	47mf., +20V, 500V.....	
	C3	.05mf., +20V, 400V.....	
	C8	2.7mf., +10V, 500V.....	
	C9	33mf., +20V, 100V.....	
	C16	.047mf., +20V, 600V.....	
RESISTOR-CAPACITOR NETWORK			
REK-010	R8, 9, 10, L1, L2, L3, B, C, D, E	4.7meg., 10meg., 1meg., 3.3meg., .01mf., .220mf., .005mf., 150mf.....	1.10
POTENTIOMETER			
n-RS-1469	R7, S1	Vol. Control & Sw. 1 Meg.	1.75
RESISTORS			
RRW-143	R14	68ohms, 4 Watt, Wirewound	.30
RRW-144	R13	2450ohms, 10W. Wirewound	1.05
COILS AND TRANSFORMERS			
RLC-139	L2	Coil, Oscillator.....	.75
RLI-069	L1	Antenna Assem.....	.95
RTL-193	T1, 2	Transformer, I.F.....	1.50
RTO-186	T3	Transformer, Output.....	2.40
MISCELLANEOUS ELECTRICAL			
REF-026	Fuse	2/10A. slo-blo.....	.60
REB-020	Selenium Rectifier	65 ma.....	2.60
RJC-035	Connector for "n" Battery	.....	.40
RJS-232	Tube Socket for "n" Battery	.....	.15
RJS-237	Tube Socket w/center pin, (VZ)	.....	.25
ROP-036	Speaker, 4"	.....	.15
RSW-114	Switch, AC-DC.....	5.00	
RMI-027	Power Cord.....	1.05	
n-RS-1332	Compression Ring (knob)	.....	1.20
		.....	.04
MISCELLANEOUS MECHANICAL			
RHC-095	Clip, Speaker Mounting.....		.05
RHC-111	Clamp, (Antenna).....		.10
RRI-017	Strain Relief, For Power Cord.....		.17
RHC-018	Grmet.....		.05
RMC-070	Latch, (Cord Comp. Door).....		.05
RMS-007	Spacer, (Power Cord).....		.15
RS-1320	Clip, I.F. Mounting.....		.04
CABINET & APPEARANCE ITEMS			
n-RB-1047 (assemb.)		Cabinet Front, White, P735A... Cabinet Back, Turquoise... Hinge..... Grille..... Medallion..... Decorative Strip..... Cabinet Front, White, P736A... Cabinet Back, Tan..... Hinge..... Grille..... Medallion..... Decorative Strip..... Door (Cord Comp.) P735A... (Turquoise) P735A... Handle, Ball, P735A... Handle (Tan) and Handle Ball, P736A... Door (Cord Comp.) (Tan) P736A... Catch (Cabinet Front)..... Grille..... Decorative Strip..... Tuning Knob Outer (Turquoise), P735A... Tuning Knob, Outer, Tan, P736A... Volume Knob, Turquoise, P735A... Volume Knob, Tan, P736A... Vernier Tuning Knob, Inner, (Turquoise), P735A... Vernier Tuning Knob, Inner, (Tan), P736A... Medallion.....	9.80 9.80 .30 .60 .60 .30 .05 2.60 .35 .90 .90 1.10 1.10 .50 .50 .40

"n" Denotes Parts Not Previously Cataloged.
All Parts Not Listed By Catalog Numbers Are Common Items, Obtainable From Radio Parts Jobbers.



UNLESS OTHERWISE NOTED
K=1,000 M=1,000,000
CAPACITORS MORE THAN 10MMF
CAPACITORS LESS THAN 1MMF
RESISTORS ARE 1/2 WATT

ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS
VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO
RECEIVER
STEP 1, 2 — SET SIG GEN AT 455 KC WITH
RECEIVER TUNING GANG OPEN
STEP 3 — SET SIG GEN AT 1620 KC WITH
RECEIVER TUNING GANG OPEN
STEP 4 — SET SIG GEN AT 1500 KC



Value	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
10K	REL.	2300	15K	100K	111	4.7M
10K	REL.	3300	1.2K	REL.	W	REL.
10K	REL.	1.5M	5K	F.1M	REL.	10M
20K	REL.	3.7K	15K	Potax	REL.	1.5M

On 970M for all mountings.
22 to 100 pF by default.
Resistances in K Ohms.
Capacitors in pF unless otherwise noted.
Schematic labels with same level on rel. resp. output.
(44 shows no component bottom view)

HOFFMAN HI-FI INSTRUMENTS

MODEL SERIES 8003, 8005

GENERAL INFORMATION

MODEL SERIES 8003

The Model Series 8003 are high quality High Fidelity instruments which incorporate a Garrard Mark II Record Changer with Reluctance Pickup Cartridge (DIAMOND NEEDLE), preamp and Record Equalizer Control. The preamp is a transistor stage for low noise and hum factors.

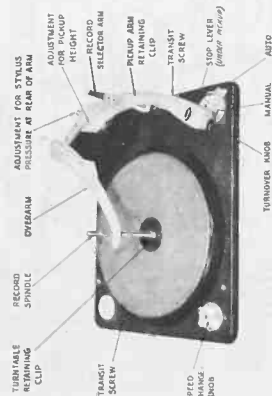
Each component of these instruments is a high quality precision unit, and exact replacement components should be used for replacement purposes to insure original performance.

FLOATING SOUND SPEAKER CHAMBER

This unit should be free to float on its mounting springs with no adjacent units touching the enclosure if rumble-free operation is to be maintained.

RECORD CHANGER

The Garrard Mark II Changer Unit may be operated manually for special records, as well as automatically for 7, 10 or 12 inch records at speeds of 16 2/3, 33 1/3, 45 or 78 RPM. The changer must be floating free on its springs to prevent rumble.



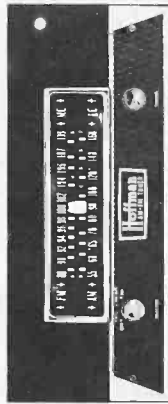
GARRARD MARK II RECORD CHANGER

HUM CONTROL

The HUM control is a variable control used to balance the filament circuits to ground. This control is factory adjusted with the amplifier installed in the cabinet with all components connected. Balance may be checked with all LOUDNESS control full clockwise and audio being fed into the amplifier. Adjust to minimum hum, preferably with an AC meter across the speaker Voice Coil terminals.

AM-FM TUNER

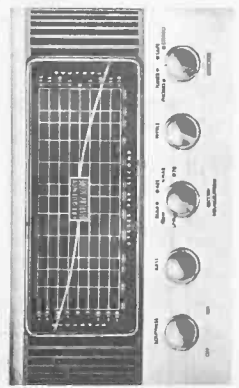
Extremely sensitive with a cascade RF stage the FM band. Built in FM antenna should be replaced with a lead from the customer's outside TV antenna if possible. This arrangement results in the ultimate in FM reception. FM-AFC permits the FM oscillator to pull the FM station into perfect tune even when the dial setting is considerably off the exact station frequency, which allows for human error in tuning at the high FM frequencies.



FREQUENCY DISPLAY SCOPE

The Frequency Display Scope is actuated by the settings of the tone controls. This results in a visual display of tone control settings which may be logged for future playings of individual records.

To avoid accidental damage to the Frequency Display Scope Indicators, keep the Bass and Treble controls adjusted either in their extreme right or left position while removing the amplifier chassis from the cabinet, and while it is outside of the cabinet. This will place the tips of the indicators inside the protective edge of the dial plate and prevent breakage.



MODEL SERIES 8005

The Model Series 8005 are high quality High Fidelity instruments which incorporate a 4 speed VM Deluxe Record Changer with a ceramic cartridge.

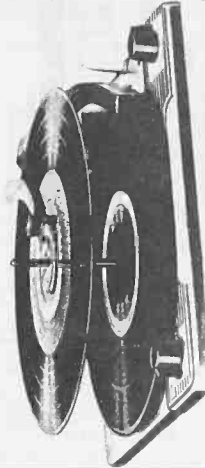
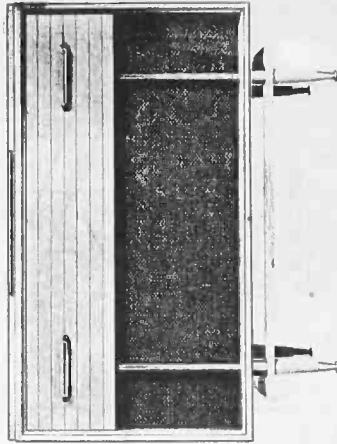
FLOATING SOUND SPEAKER CHAMBER

This complete speaker enclosure chamber, with its 3 matched speakers should be free to float on its 4 mounting springs if rumble-free operation is to be achieved.

RECORD CHANGER

The detailed Service Data on the VM 1200A Record Changer is available in VM Booklets #6004 and 1017, both of which may be ordered through your Hoffman Distributor. Two machine screws mount the changer to its base board. These screws allow the changer to float on its mounting springs when they are turned IN until flush with the surface of the changer. When the entire instrument is to be moved any distance, these screws should be turned OUT until the changer is drawn down tight against the mounting board.

MODELS M8003
B8003
SP8003



VM 120-A RECORD CHANGER

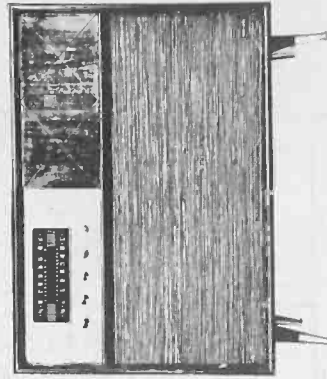
ELECTRICAL POWER

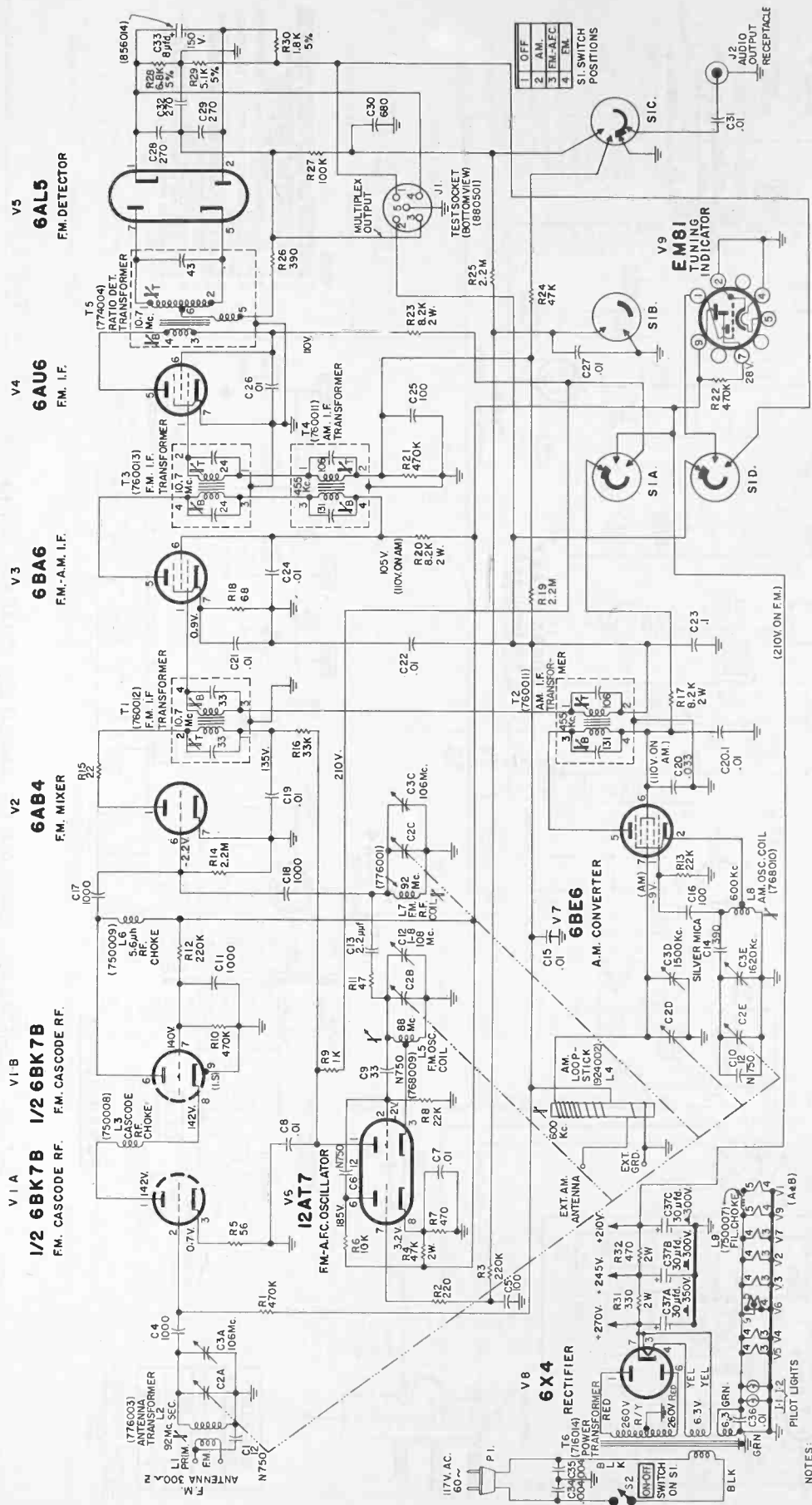
110 to 120 volts 60 cycle AC power. Do not connect to DC or AC of any other frequency.

AC LINE PLUG POLARIZING

Plug in the power cord, after amplifier warms up advance the loudness control full clockwise with no audio being fed to the amplifier. Reverse the power plug and choose the polarity which gives the least hum.

MODELS M8005
B8005
SP8005
W8005

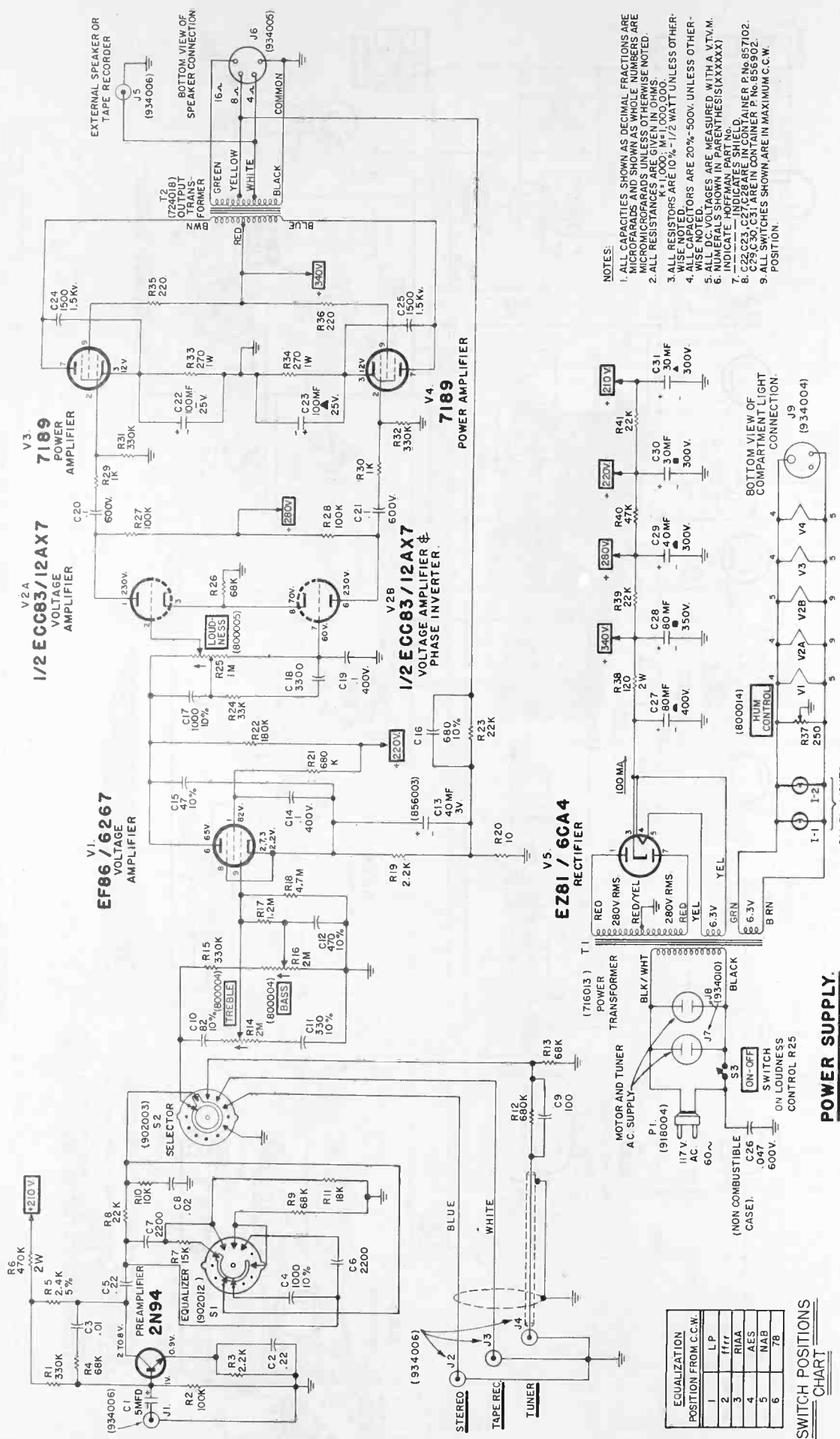




8 NUMBERS SHOWN IN PARENTHESIS INDICATE HOFFMAN PART NO.
 9 C2A, C2B, C2C, C2D, C2E - TUNING CONDENSER, PART NO. 872008.
 C3A, C3C, C3D, C3E - TRIMMERS ON TUNING CONDENSER.
 C37A, C37B, C37C - IN CAN PART NO. 856908.

NOTES:
 1 ALL CAPACITIES GIVEN AS DECIMAL FRACTIONS ARE MICROFARADS AND GIVEN AS WHOLE NUMBERS ARE MICROMICROFARADS UNLESS OTHERWISE SPECIFIED.
 2 ALL RESISTANCES GIVEN IN OHMS: K=1,000; M=1,000,000.
 3 ----- INDICATES SHIELDED.
 4 UNLESS OTHERWISE INDICATED ALL RESISTORS ARE 1/2 WATT 10%.
 5 VOLTAGES MEASURED AT 100 MC. A.F.C. WITH V.T.V.M.
 7, S1 SWITCH SHOWN IN No. 1 POSITION (EXTREME C.C. WISE) = OFF.

SCHEMATIC DIAGRAM OF TUNER CHASSIS 1124 (8003)



- NOTES:
1. ALL CAPACITORS SHOWN AS DECIMAL FRACTIONS ARE MICROFARADS AND SHOWN AS WHOLE NUMBERS ARE MICROMICROFARADS UNLESS OTHERWISE NOTED.
 2. ALL RESISTANCES ARE GIVEN IN OHMS.
 3. ALL RESISTORS ARE 10% - 1/2 WATT UNLESS OTHERWISE NOTED.
 4. ALL CAPACITORS ARE 20% - 500V UNLESS OTHERWISE NOTED.
 5. NUMERALS SHOWN IN PARENTHESES (XXXX) INDICATE HOFFMAN PART NO.
 6. NUMERALS SHOWN IN PARENTHESES (XXXXX) INDICATE SHIELD.
 7. C23, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100.
 8. C23, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100.
 9. ALL SWITCHES SHOWN ARE IN MAXIMUM C.C.W. POSITION.

EQUALIZATION POSITION FROM C.C.W.

1	L.P.
2	frr
3	RIAA
4	AES
5	NAB
6	78

SWITCH POSITIONS CHART

SCHEMATIC DIAGRAM OF AMPLIFIER CHASSIS 1121 (8003)

REPLACEMENT PARTS LIST - MODEL SERIES 8003

TUNER CHASSIS 1124

AMPLIFIER CHASSIS 1121

CAPACITORS		DESCRIPTION	
SYMBOL	PART NO.	SYMBOL	PART NO.
C1	847205	R13	814208
C2A		R14	814232
C2B		R15	814172
C2C		R16	814210
C2D		R17	816203
C2E		R18	814178
C3A		R19	814232
C3C		R20	816203
C3D		R21	814224
C3E		R22	814224
C4		R23	816203
C5		R24	814212
C6		R25	814232
C7		R26	814187
C8		R27	814216
C9		R28	814083
C10		R29	814080
C11		R30	814069
C12		R31	818186
C13		R32	818188
C14			
C15			
C16			
C17			
C18			
C19			
C20			
C21			
C22			
C23			
C24			
C25			
C26			
C27			
C28			
C29			
C30			
C31			
C32			
C33			
C34			
C35			
C36			
C37A			
C37B			
C37C			

TRANSFORMERS AND COILS		DESCRIPTION	
SYMBOL	PART NO.	SYMBOL	PART NO.
T1	760012	T1	760012
T2	760013	T2	760013
T3	760014	T3	760014
T4	760015	T4	760015
T5	760016	T5	760016
T6	760017	T6	760017
T7	760018	T7	760018
T8	760019	T8	760019
T9	760020	T9	760020
T10	760021	T10	760021
T11	760022	T11	760022
T12	760023	T12	760023
T13	760024	T13	760024
T14	760025	T14	760025
T15	760026	T15	760026
T16	760027	T16	760027
T17	760028	T17	760028
T18	760029	T18	760029
T19	760030	T19	760030
T20	760031	T20	760031
T21	760032	T21	760032
T22	760033	T22	760033
T23	760034	T23	760034
T24	760035	T24	760035
T25	760036	T25	760036
T26	760037	T26	760037
T27	760038	T27	760038
T28	760039	T28	760039
T29	760040	T29	760040
T30	760041	T30	760041
T31	760042	T31	760042
T32	760043	T32	760043
T33	760044	T33	760044
T34	760045	T34	760045
T35	760046	T35	760046
T36	760047	T36	760047
T37	760048	T37	760048
T38	760049	T38	760049
T39	760050	T39	760050
T40	760051	T40	760051
T41	760052	T41	760052
T42	760053	T42	760053
T43	760054	T43	760054
T44	760055	T44	760055
T45	760056	T45	760056
T46	760057	T46	760057
T47	760058	T47	760058
T48	760059	T48	760059
T49	760060	T49	760060
T50	760061	T50	760061
T51	760062	T51	760062
T52	760063	T52	760063
T53	760064	T53	760064
T54	760065	T54	760065
T55	760066	T55	760066
T56	760067	T56	760067
T57	760068	T57	760068
T58	760069	T58	760069
T59	760070	T59	760070
T60	760071	T60	760071
T61	760072	T61	760072
T62	760073	T62	760073
T63	760074	T63	760074
T64	760075	T64	760075
T65	760076	T65	760076
T66	760077	T66	760077
T67	760078	T67	760078
T68	760079	T68	760079
T69	760080	T69	760080
T70	760081	T70	760081
T71	760082	T71	760082
T72	760083	T72	760083
T73	760084	T73	760084
T74	760085	T74	760085
T75	760086	T75	760086
T76	760087	T76	760087
T77	760088	T77	760088
T78	760089	T78	760089
T79	760090	T79	760090
T80	760091	T80	760091
T81	760092	T81	760092
T82	760093	T82	760093
T83	760094	T83	760094
T84	760095	T84	760095
T85	760096	T85	760096
T86	760097	T86	760097
T87	760098	T87	760098
T88	760099	T88	760099
T89	760100	T89	760100
T90	760101	T90	760101
T91	760102	T91	760102
T92	760103	T92	760103
T93	760104	T93	760104
T94	760105	T94	760105
T95	760106	T95	760106
T96	760107	T96	760107
T97	760108	T97	760108
T98	760109	T98	760109
T99	760110	T99	760110
T100	760111	T100	760111
T101	760112	T101	760112
T102	760113	T102	760113
T103	760114	T103	760114
T104	760115	T104	760115
T105	760116	T105	760116
T106	760117	T106	760117
T107	760118	T107	760118
T108	760119	T108	760119
T109	760120	T109	760120
T110	760121	T110	760121
T111	760122	T111	760122
T112	760123	T112	760123
T113	760124	T113	760124
T114	760125	T114	760125
T115	760126	T115	760126
T116	760127	T116	760127
T117	760128	T117	760128
T118	760129	T118	760129
T119	760130	T119	760130
T120	760131	T120	760131
T121	760132	T121	760132
T122	760133	T122	760133
T123	760134	T123	760134
T124	760135	T124	760135
T125	760136	T125	760136
T126	760137	T126	760137
T127	760138	T127	760138
T128	760139	T128	760139
T129	760140	T129	760140
T130	760141	T130	760141
T131	760142	T131	760142
T132	760143	T132	760143
T133	760144	T133	760144
T134	760145	T134	760145
T135	760146	T135	760146
T136	760147	T136	760147
T137	760148	T137	760148
T138	760149	T138	760149
T139	760150	T139	760150
T140	760151	T140	760151
T141	760152	T141	760152
T142	760153	T142	760153
T143	760154	T143	760154
T144	760155	T144	760155
T145	760156	T145	760156
T146	760157	T146	760157
T147	760158	T147	760158
T148	760159	T148	760159
T149	760160	T149	760160
T150	760161	T150	760161
T151	760162	T151	760162
T152	760163	T152	760163
T153	760164	T153	760164
T154	760165	T154	760165
T155	760166	T155	760166
T156	760167	T156	760167
T157	760168	T157	760168
T158	760169	T158	760169
T159	760170	T159	760170
T160	760171	T160	760171
T161	760172	T161	760172
T162	760173	T162	760173
T163	760174	T163	760174
T164	760175	T164	760175
T165	760176	T165	760176
T166	760177	T166	760177
T167	760178	T167	760178
T168	760179	T168	760179
T169	760180	T169	760180
T170	760181	T170	760181
T171	760182	T171	760182
T172	760183	T172	760183
T173	760184	T173	760184
T174	760185	T174	760185
T175	760186	T175	760186
T176	760187	T176	760187
T177	760188	T177	760188
T178	760189	T178	760189
T179	760190	T179	760190
T180	760191	T180	760191
T181	760192	T181	760192
T182	760193	T182	760193
T183	760194	T183	760194
T184	760195	T184	760195
T185	760196	T185	760196
T186	760197	T186	760197
T187	760198	T187	760198
T188	760199	T188	760199
T189	760200	T189	760200
T190	760201	T190	760201
T191	760202	T191	760202
T192	760203	T192	760203
T193	760204	T193	760204
T194	760205	T194	760205
T195	760206	T195	760206
T196	760207	T196	760207
T197	760208	T197	760208
T198	760209	T198	760209
T199	760210	T199	760210
T200	760211	T200	760211
T201	760212	T201	760212
T202	760213	T202	760213
T203	760214	T203	760214
T204	760215	T204	760215
T205	760216	T205	760216
T206	760217	T206	760217
T207	760218	T207	760218
T208	760219	T208	760219
T209	760220	T209	760220
T210	760221	T210	760221
T211	760222	T211	760222
T212	760223	T212	760223
T213	760224	T213	760224
T214	760225	T214	760225
T215	760226	T215	760226
T216	760227	T216	760227

EASY SERVICE GUIDE ALIGNMENT CHART

AM-FM TUNER 1124 & 1126

ALIGNMENT PROCEDURE FOR HOFFMAN AM-FM TUNER

EQUIPMENT REQUIRED:

- A) VTVM
- B) AM signal generator with 30% modulation at 400 CPS. The generator should have outputs at frequencies of 455 KC, 600 KC, 1400 KC, and 1620 KC.
- C) CW signal generator with output at frequencies of 10.7 MC, 90 MC, 98 MC and 107 MC.

PROCEDURE:

Remove the tuner from the cabinet. Remove the bottom chassis plate and connect the power cord to a 117 volt 60 CPS AC power outlet.

Alignment adjustment points are identified by frequency on the tuner chassis illustrations and in this alignment procedure to simplify their location.

- IF ALIGNMENT FOR AM
1. Set the tuner selector switch to AM.
 2. Apply a 455 KC, 30% AM at 400 CPS signal to pin #7 of the 6BE6 AM converter. Use a .01 MF capacitor in series with the high side lead from the generator. Connect the low side lead from the generator to the tuner chassis.
 3. Set the tuning condenser to minimum capacity (wide open or with the pointer to the high end of the dial).
 4. Set the VTVM to read AC and connect to the output cable of the tuner. Use the high side of the Loudness control on chassis #1126. Use a low reading scale, one volt would be ideal.
 5. Adjust the four (4) 455 KC IF cores for maximum output. Reduce the inputs necessary to keep the output below 0.3 VAC. The four IF cores, or slugs, are in the two 455 KC transformers (one at the top and bottom of each can) on the back edge of the chassis pan.

ANTENNA AND OSCILLATOR ADJUSTMENTS - AM

1. Tighten the two AM trimmers on the tuning capacitor. 1500 KC is the antenna trimmer. 1620 KC is the oscillator trimmer. Then back off each of the two trimmers 1/4 turn to the left.
2. Turn the tuning condenser to maximum capacity (fully meshed). The dial pointer should now be one pointer thickness to the left of the last dial marker. Adjust the pointer as required if it is not correctly positioned.
3. Apply a 600 KC 30% AM signal through a 150 MMF condenser to the AM antenna terminal. Connect the low side to the tuner chassis. Connect the VTVM across the tuner output cable and set the meter to read AC. Tune the dial pointer to 60 on the AM position of the dial.
4. Adjust 600 KC (the oscillator coil L8) for maximum. Keep the generator output reduced to the point giving an output voltage of less than 0.3 VAC.
5. Change the generator output to 1620 KC and tune to 162 on the tuner dial. Adjust 1620 KC (the oscillator

1. Connect the hot lead of the CW generator through a 100 ohm resistor to the #1 FM antenna terminal. Connect the low side of the generator to the #2 FM antenna terminal through a 150 ohm resistor. Use 1/2 watt composition resistors.
2. Set the VTVM to read 5 VDC scale and connect the meter between pin #2 of the 6AL5 tube and chassis.
3. Turn the tuning condenser to a reading of 90 MC on the FM section of the dial. Turn the tuner selector switch to FM.
4. Set the 108 MC adjustment (FM oscillator trimmer, adjacent to the tuning condenser) with the bottom of the screw head about 1/2 inch above the chassis. Loosen 106 MC (FM RF trimmer on the center section of tuning condenser) 1/8 turn from maximum clockwise. Loosen 106 MC (FM antenna trimmer on the first section of tuning condenser) 5/8 turn from the maximum clockwise position.
5. With an input signal of 90 MC, adjust 88 MC (FM oscillator coil) and the two 92 MC coils (antenna coil and mixer coil located beneath the chassis) for maximum. Reduce the generator output as required to keep the meter at 2 volts or less.
6. Turn the tuning condenser to a reading of 107 MC on the FM section of the dial. Change the generator signal to 107 MC. Then adjust 106 MC, 107 MC, and 108 MC for maximum output.

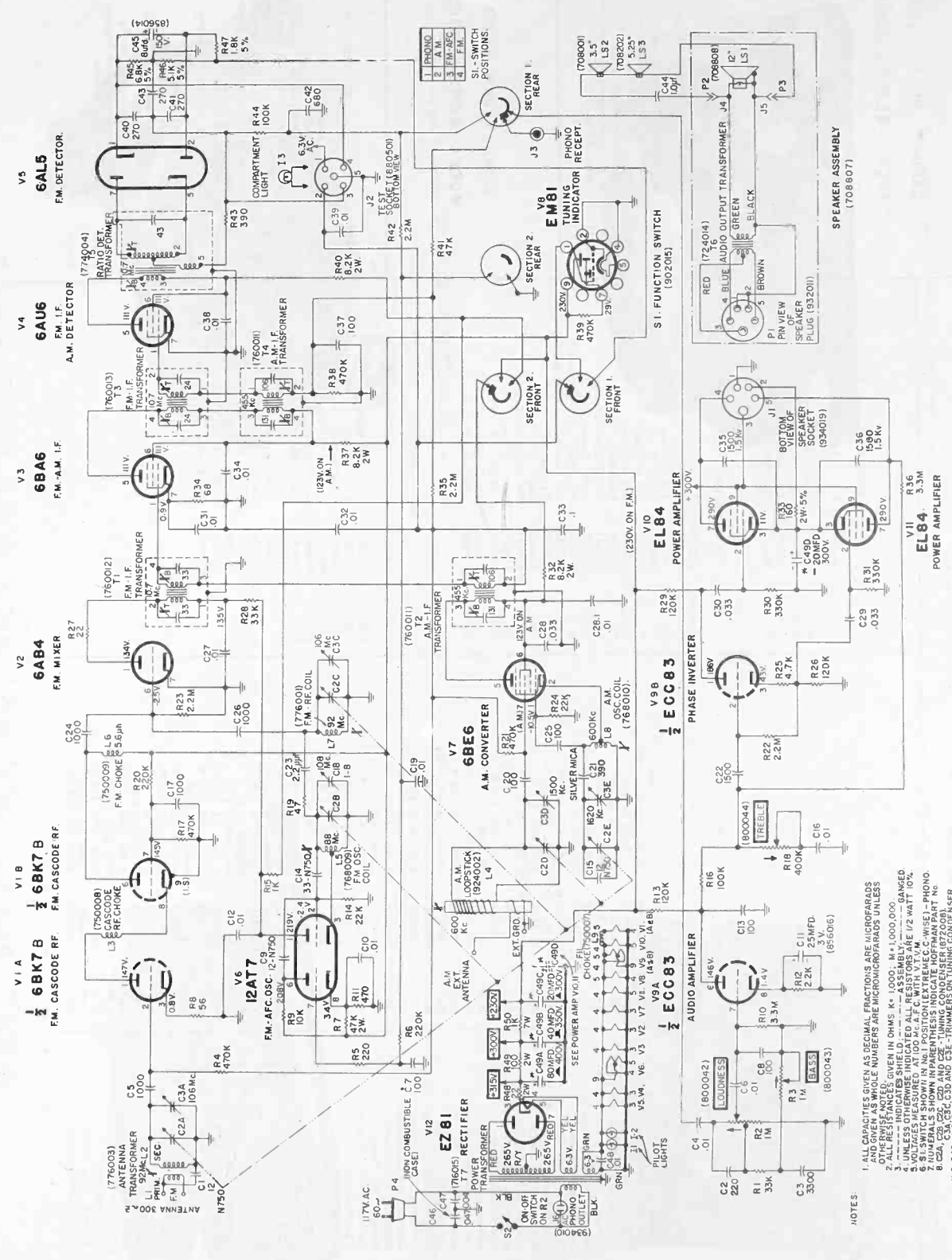
The signal generator output should be no higher than necessary to produce 0.3 VAC during AM alignment and 2VDC during FM alignment. To set the dial pointer, turn the tuning condenser fully closed. Then set the pointer about 1/16 inch beyond the left end of the center horizontal line on the dial plate. Use an insulated alignment screwdriver and hex head alignment tool for adjusting trimmers and coils in the tuner.

AM ALIGNMENT					
TUNER SELECTOR SWITCH	SIGNAL GENERATOR FREQUENCY	INPUT POINT	RADIO DIAL SETTING	CONNECT VTVM	REMARKS
1. AM	455 KC AM at 400 CPS	High side to pin #7 of V7. Low side to chassis. .01 MF isolation	High end of dial	Across tuner output cable	Adjust for maximum. Keep the generator output low. Maximum of 0.3 VAC at tuner output.
2. "	600 KC AM	High side to AM antenna terminal through 150MMF. Low side to chassis	600 KC	"	"
3. "	1620 KC	"	1620 KC	"	"
4. "	1400 KC	"	1400 KC	"	"

Repeat step #2. If adjustment of 600 KC (L8) is required, repeat step #3 and 4 also.

FM ALIGNMENT					
TUNER SELECTOR SWITCH	SIGNAL GENERATOR FREQUENCY	INPUT POINT	RADIO DIAL SETTING	CONNECT VTVM	REMARKS
1. FM	10.7 MC	High side to FM RF stator lug on tuning condenser. Low side to chassis. Use .01 MF for isolation.	High end of dial	Between pin #2 of the 6AL5 and chassis. Use 5 VDC scale.	Adjust for maximum. Keep the generator output low. Do not exceed 2 VDC on the VTVM.
2. "	"	"	"	"	Attenuate the generator to get a 1 VDC reading on the VTVM.
3. "	"	"	"	Move high side lead to terminal #3 of test socket.	Adjust for zero VDC
4. "	90 MC CW	High side to the #1 Fm antenna terminal through 100 ohm. Low side to #2 Fm antenna terminal through 150 ohm.	90 MC	Same as step #1	Same as step #1
5. "	107 MC	"	107 MC	"	"

Repeat step #4. If any adjustments are required, repeat step #5 also.



SCHEMATIC DIAGRAM OF TUNER/AMP CHASSIS 1126 (8005)

- NOTES:
1. ALL CAPACITORS GIVEN AS NOMINAL VALUES UNLESS OTHERWISE SPECIFIED AND GIVEN AS WHOLE NUMBERS ARE MICROFARADS UNLESS OTHERWISE NOTED.
 2. ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
 3. --- INDICATES SHIELDING.
 4. --- INDICATES 50% DUTY CYCLE.
 5. --- INDICATES OTHERWISE INDICATED ALL RESISTORS ARE 1/2 WATT 10%.
 6. S1 SWITCH SHOWN IN NOT POSITION EXTREME CC (WISE) - PHONO.
 7. C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100.
 8. C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100.
 9. C49 - A, B, C AND D - IN CAN PART NO. 857605.

MODELS 8003, 8005

REPLACEMENT PARTS LIST - MODEL SERIES 8005

CABINET PARTS LIST
MODEL SERIES 8005

PART NO.	DESCRIPTION
381029	Cabinet - Walnut
381030	Cabinet - Mahogany
381031	Cabinet - Oak
381032	Cabinet - Salem Maple
311012	Floating Sound Chamber
990004	Record Changer - VM 4 Speed
990502	45 RPM Adapter
500039	Knob-Control with Indicator
500038	Knob-Control without Indicator
529003	Bezel-Dial
286004	Compartment Light Cover
223333	Screw for Compartment Light Cover
452037	Control Panel

CABINET PARTS LIST
MODEL SERIES 8003

PART NO.	DESCRIPTION
381026	Cabinet - Mahogany
381027	Cabinet - Oak
381028	Cabinet - Salem Maple
990006	4 Speed Garrard RC121 - Mark 2 Record Changer
990516	45 RPM Spindle Adapter Post #LRS4
981004	G.E. Reluctance Cartridge, Diamond LP.
286005	Jewel-Indicator Light
286004	Compartment Light Cover
223333	Compartment Light Cover Screw
452031	Amplifier Control Panel
452032	Tuner Control Panel
500035	Knob - Control with Indicator
500036	Knob - Control without Indicator
599034	Pad - Spindle Cup
603017	Floating Sound Chamber Spring
529002	Bezel-Tuner Dial & Tone Display
640015	Catalogue - Record Index
940044	Pilot Light
926004	FM Antenna

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R47	814069	1.8K, 5%, 1/2 W
R48	818172	22, 10%, 2 W
R49	818180	100, 10%, 2 W
R50	824425	1K, 10%, 7W-WW

TRANSFORMERS AND COILS

SYMBOL	PART NO.	DESCRIPTION
T1	760012	FM IF Trans
T2	760011	AM IF Trans
T3	760013	FM IF Trans
T4	760011	AM IF Trans
T5	774004	Ratio Detector Trans
T6	724014	Audio Output Trans
T7	716015	Power Trans
L1	776003	FM Antenna Coil (Primary)
L2	776003	FM Antenna Coil (Secondary)
L3	750008	Cascade RF Choke
L4	924002	AM Loopstick Antenna
L5	768009	FM Oscillator Coil
L6	750009	FM RF Choke
L7	776001	FM RF Coil
L8	768010	AM Oscillator Coil
L9	750007	Filament RF Choke

MISCELLANEOUS

SYMBOL	PART NO.	DESCRIPTION
LS1	708808	12" Round Speaker
LS2	708201	3 1/2" Round - 8 ohm Speaker
LS3	708202	5 1/4" Round - 4 Position
S1	902015	Function Switch - 4 Position
I1	940047	Dial Light #47, 6, 3V
I2	940047	Dial Light #47, 6, 3V
I3	940044	Compartment Light #44
	565004	Flywheel, Tuning
	577034	Tuning Eye Bracket
	594002	Pulley, Idler
	603004	Spring, Dial Cord
	619018	Tuner, Dial
	623005	Dial, Pointer

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C49A	857105	80mfd @400V
C49B		40mfd @350V
C49C		20mfd @300V
C49D		20mfd @300V

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R1	814210	33K, 10%, 1/2 W
R2	800042	Loudness Control & ON/OFF
R3	800044	BASS Control, 1 meg
R4	814224	470K, 10%, 1/2 W
R5	814184	220, 10%, 1/2 W
R6	814220	220K, 10%, 1/2 W
R7	818212	47K, 10%, 2 W
R8	814177	56, 10%, 1/2 W
R9	814204	10K, 10%, 1/2 W
R10	814234	3.3M, 10%, 1/2 W
R11	814188	470, 10%, 1/2 W
R12	814196	2.2K, 10%, 1/2 W
R13	814217	120K, 10%, 1/2 W
R14	814208	22K, 10%, 1/2 W
R15	814192	1K, 10%, 1/2 W
R16	814216	100K, 10%, 1/2 W
R17	814224	470K, 10%, 1/2 W
R18	800044	Treble Control, 400K
R19	814176	47, 10%, 1/2 W
R20	814220	220K, 10%, 1/2 W
R21	814224	470K, 10%, 1/2 W
R22	814232	2.2M, 10%, 1/2 W
R23	814232	2.2M, 10%, 1/2 W
R24	814208	22K, 10%, 1/2 W
R25	814200	4.7K, 10%, 1/2 W
R26	814217	120K, 10%, 1/2 W
R27	814172	22, 10%, 1/2 W
R28	814210	33K, 10%, 1/2 W
R29	814217	120K, 10%, 1/2 W
R30	814222	330K, 10%, 1/2 W
R31	814222	330K, 10%, 1/2 W
R32	818203	8.2K, 10%, 2 W
R33	818044	160, 5%, 2 W
R34	814178	68, 10%, 1/2 W
R35	814232	2.2M, 10%, 1/2 W
R36	814234	3.3M, 10%, 1/2 W
R37	818203	8.2K, 10%, 2 W
R38	814224	470K, 10%, 1/2 W
R39	814224	470K, 10%, 1/2 W
R40	818203	8.2K, 10%, 2 W
R41	814212	47K, 10%, 1/2 W
R42	814232	2.2M, 10%, 1/2 W
R43	814187	390, 10%, 1/2 W
R44	814216	100K, 10%, 1/2 W
R45	814083	6.8K, 5%, 1/2 W
R46	814080	5.1K, 5%, 1/2 W

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C1	850003	12mmf, 5% (N750) Ceramic
C2A		
C2B		
C2C		
C2D		
C2E		
C2F		
C2G		
C2H		
C2I		
C2J		
C2K		
C2L		
C2M		
C2N		
C2O		
C2P		
C2Q		
C2R		
C2S		
C2T		
C2U		
C2V		
C2W		
C2X		
C2Y		
C2Z		
C3A		
C3B		
C3C		
C3D		
C3E		
C3F		
C3G		
C3H		
C3I		
C3J		
C3K		
C3L		
C3M		
C3N		
C3O		
C3P		
C3Q		
C3R		
C3S		
C3T		
C3U		
C3V		
C3W		
C3X		
C3Y		
C3Z		
C4	851123	3300mmf, 20% Ceramic
C5	851002	.01mfd Ceramic Disc
C6	851123	1000mmf, 20% Ceramic
C7	851002	.01mfd Ceramic Disc
C8	851128	100mmf, 20% Ceramic
C9	850003	12mmf, 5% (N750) Ceramic
C10	850002	.01mfd Ceramic Disc
C11	856016	25mfd @ 3V, Tubular
C12	851002	.01mfd Ceramic Disc
C13	851128	100mmf, 20% Ceramic
C14	850012	33mmf, 20% (NPO) Ceramic
C15	850003	12mmf, 5% (NPO) Ceramic
C16	851002	.01mfd Ceramic Disc
C17	851126	1000mmf, 20% Ceramic
C18	852006	1.8mfd Tubular Trimmer
C19	851002	.01mfd Ceramic Disc
C20	851128	100mmf, 20% Ceramic
C21	862401	390mmf, 5% Silver Mica
C22	851129	1500mmf, 20% Ceramic
C23	854035	2.2mmf, 10% Composition
C24	851128	1000mmf, 20% Ceramic
C25	851126	1000mmf, 20% Ceramic
C26	851002	.01mfd Ceramic Disc
C27	851002	.01mfd Ceramic Disc
C28	866219	.033mfd, 20%, 400V
C29	866219	.033mfd, 20%, 400V
C30	866219	.033mfd, 20%, 400V
C31	851002	.01mfd Ceramic Disc
C32	851002	.01mfd Ceramic Disc
C33	866126	.1mfd, 20%, 200V
C34	851002	.01mfd Ceramic Disc
C35	851115	1500mmf, 20%, 1.5KV
C36	851115	1500mmf, 20%, 1.5KV
C37	851128	100mmf, 20% Ceramic
C38	851002	.01mfd Ceramic Disc
C39	851002	.01mfd Ceramic Disc
C40	851116	270mmf, 10%, 500V
C41	851106	600mmf, 10%, 500V
C42	851106	600mmf, 20% Ceramic
C43	851116	270mmf, 10%, 500V
C44	866035	1mfd, 100V Tubular
C45	856014	8mfd @ 150V Tubular
C46	870221	.0047, 20%, 600V
C47	851134	.004mfd, 20%, 1.5KV
C48	851002	.01mfd Ceramic Disc

HOFFMAN HI-FI INSTRUMENTS

MODEL SERIES 801, 802, 802A, 8001, 8002, 8002A

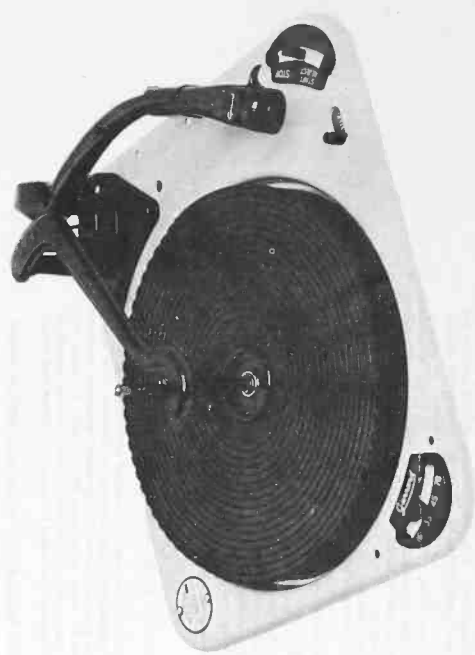


FIGURE 2. GARRARD R.C. 121/4D RECORD CHANGER. FOR SERVICE AND PARTS DATA REFER TO HOFFMAN SERVICE DATA NOTE NO. 301.

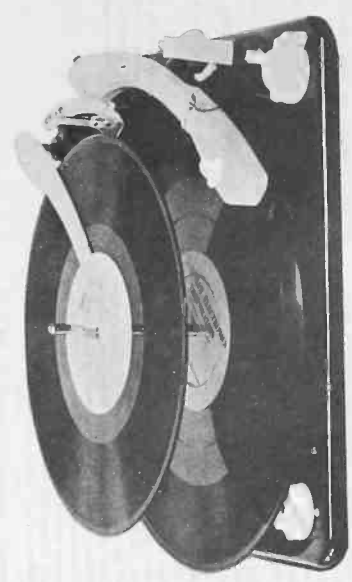


FIGURE 3. GARRARD R.C. 121/4 MARK II RECORD CHANGER

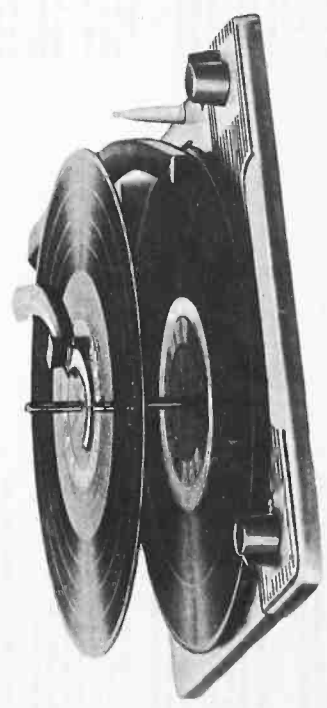
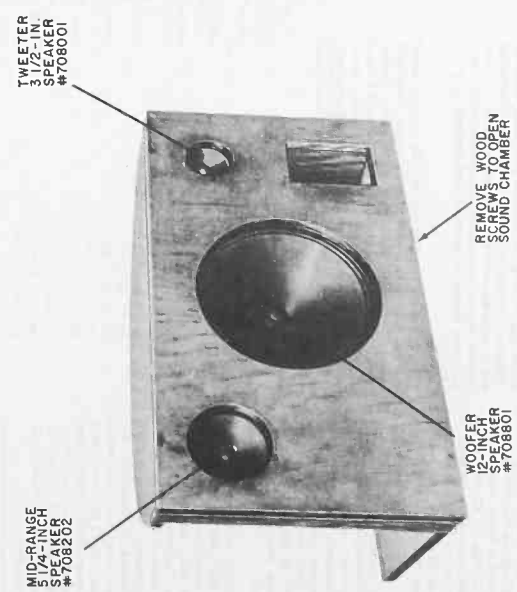


FIGURE 4. V.M. 1200A RECORD CHANGER. REFER TO V.M. BOOKLETS NO. 6004 AND 1017 FOR SERVICE AND PARTS DATA.



TWEETER
3 1/2-IN.
SPEAKER
#708001

MID-RANGE
5 1/4-INCH
SPEAKER
#708202

REMOVE WOOD
SCREWS TO OPEN
SOUND CHAMBER

WOOFER
SPEAKER
#708801

FIGURE 1. HOFFMAN FLOATING SOUND CHAMBER

MODELS 801, 802, 802A, 8001, 8002, 8002A

INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

MODEL SERIES 801 - Instruments in this group are Hoffman High Fidelity Record Players. VM four-speed changers and Hoffman High Fidelity Amplifier #1112 are incorporated in these models. Replacement Parts and Service Data for all parts of the instrument except the record changer are included in this Service Data Note. Refer to V-M booklets No. 6004 and 1017 for the record changer, service and parts information other than cartridge, needles, and 45 RPM adapter.

MODEL SERIES 8001 - Instruments in this group are Hoffman High Fidelity AM-FM Radio/Record players. The AM-FM radio tuner is shock mounted on the amplifier, chassis #1119. Replacement Parts Data for all parts of the instrument, except record changer, are included in this Service Data Note. Refer to V-M booklets No. 6004 and 1017 for record changer service and parts information other than cartridge, needles and 45 RPM adapter.

MODEL SERIES 802, 802A, 8002 - Instruments in this group are Hoffman High Fidelity models using the basic amplifier, sound chamber, and cabinet. The major differences are in the use of AM-FM tuners and record changers. Refer to the Replacement Cabinet Parts list in this Service Data Note for the components used in specific models. All service and parts data for these instruments is included in this Service Data Note except that pertaining to the record changers. Cartridge, needle, and 45 RPM parts data will be found in the Replacement Cabinet Parts List. For complete data on Garrard Changer Model R.C. 121/4D refer to Hoffman Service Data Note No. 801. The complete data for Garrard Changer Model R.C. 121/4 Mk. II will be released later.

SIGNIFICANT CODE LETTER DESIGNATIONS

Code letters are used to designate component variations in Hoffman instruments. The code letter is stamped in the space provided for this purpose in the letter of the model designation. Following are code letters and parts which are important regarding service and parts for the instruments covered by this Service Data Note.

MODEL SERIES 802, with no code designation have a two-conductor shielded cable between the record player and amplifier. The PHONO receptacle on the amplifier is a three-terminal receptacle (#934004), and a three-pin plug (#932003) is used on the connecting cable.

MODEL SERIES 802, CODE "A" Instruments use the conventional type phono receptacle (#934006) and cable plug (#932008) with shielded connecting cable between the amplifier and record changer.

MODEL SERIES 802, CODE "B" and CODE "C" Instruments have minor revisions to facilitate Factory assembly of the complete instrument.

MODEL SERIES 802, CODE "D" and CODE "E" Instruments use the Garrard Model R.C. 121/4 Mk. II record changer. The pilot lamp connection for these instruments has been removed from the speaker socket at the rear of the amplifier. A pilot lamp connecting socket has been added to the top surface of the amplifier on these instruments.

MODEL SERIES 8002, CODE "A", CODE "B", AND CODE "C" Instruments have the same variations as Model Series 802 Instruments for each respective code designation.

MODEL SERIES 8002, CODE "D" AND CODE "E" Instruments use the Garrard Model R.C. 121/4 Mk. II record changer and AM-FM radio tuner #1120 in place of tuner #1116.

ACCESSORIES

Hoffman Model Series 802, 802A, 801, 8002, and 8002A High Fidelity instruments have extra audio receptacles, switch controlled AC power receptacles and an entertainment selector switch to allow for permanent plug-in installation of accessory items. Accessories should be equipped with Hoffman plug No. 932015.

RECORDING ON A TAPE RECORDER - Model Series 802 and 8002 have an extra audio output receptacle connected directly across the audio output transformer. The impedance at the receptacle is 8 ohms and allows for recording on tape while you are listening to the record player or radio. It is not necessary

Unpack the instrument and then refer to the special installation instructions attached to the turntable of the record changer. Follow these instructions in the order specified for best results. Models 802, 802A, and 8002A are equipped with the exclusive Hoffman "Floating Sound" Chamber.

1. CABINET LEGS - Models which include cabinet legs have the legs removed for shipment. The legs are packed in a small cardboard box attached to the back compartment of the instrument. Lay the instrument over on its side, on a protective pad, and then install the legs by threading the bolts into the Tee Nuts or mounting plates on the bottom of the cabinet.

2. FLOATING SOUND CHAMBER - The sound chamber is secured to the cabinet for shipment. The shipping bolts must be removed during installation. If the complete instrument is to be moved at any time, replace the shipping bolts to avoid accidental damage to the sound chamber or other components of the instrument during shipment.

3. 45 RPM SPINDLE ADAPTER - The 45 RPM spindle adapter will be found packed in a carton attached to the back of the instrument. On models which include legs, the adapter is packed with the legs.

4. RECORD CHANGER - On Model Series 801 and 8001 the record changer is secured to the cabinet by two machine screws which extend above the baseplate of the changer. Turn these screws down flush with the top of the baseplate to float the changer. On Model Series 802, 802A, 8002, and 8002A the changer is secured to the cabinet with two machine screws marked with red paint for easy identification. Remove these two screws when putting the instrument into operation. Remove all packing material from the changer.

For best results the record changer should be absolutely level, floating freely on its spring mounting. Check by placing a small level on the turntable. On models using the Garrard R.C. 121/4D or R.C. 121/4 Mk. II, slight corrections may be made by adjusting the changer mounting screws. On other models leveling may be accomplished by use of small shims under the legs of the instrument.

5. TONE ARM - Remove all padding material and packing from the tone arm and place the tone arm on its pedestal. Be sure to remove the stylus guard from the bottom side of the cartridge.

6. POWER - Plug the power cord into a 110 to 120 volt 60 cycle AC power outlet. Set the selector switch to PHONO and turn the LOUDNESS fully to the right (clockwise). Reverse the AC cord plug if necessary to eliminate hum.

7. AMPLIFIER OPERATION - Rotate the LOUDNESS knob to the left to the point of minimum volume. Then proceed to check out the record changer.

to change the setting of the SELECTOR while recording. For recording purposes it is suggested that the BASS be set to the flat position and the TREBLE set to the maximum position.

Models 801 and 8001 have no recording receptacle but can be used for recording by connecting the recorder across the secondary of the audio output transformer at the back of the instrument. The output transformer for Model Series 8001 instruments is located on the frame of the 12-inch speaker.

EXTERNAL SPEAKERS - The audio output receptacle on Model Series 802 and 8002 may also be used to connect remote speakers to the instrument. Impedance at the receptacle is 8 ohms. On Model Series 801 and 8001 make appropriate connections for remote speakers directly to the output transformer.

PLAYING TAPE RECORDINGS - The input signal to the amplifier should be about 1.5 volts for best results. Plug the output from the tape recorder into the TAPE REC. receptacle on the amplifier on Model Series 802, 802A, 8002A, 8001, and Model Series 8001 use the AUXILIARY receptacle. On Model Series 8001 use the PHONO receptacle. The LOUDNESS CONTROL is the appropriate position. AUXILIARY INPUTS - Hoffman High Fidelity instruments are connected to input signals from accessories which are connected to output of about 1.5 volts. Use a preamplifier if the signal does not meet these requirements.

8. RADIO - If the instrument is equipped with a radio, the radio should be checked out next for proper operation. Built-in antennas are provided for both AM and FM reception. No external antenna should be required for reception in normal signal areas. AM and FM antenna input terminals are provided on the back of the tuner chassis. Connect the ground terminal to the tuner chassis. Connect the antenna to the antenna terminal on the back of the AM antenna is added or if stray AC hum pickup is a problem on any portion of the AM band while operating in an antenna. If an external FM antenna is desired, reception conditions will determine the type of antenna to be used. An external antenna will not be required for FM reception except in cases of extreme fringe signal or problem reception areas with multi-path conditions. The FM antenna input is 300 ohm balanced.

9. CONTROLS - Instruct the owner in the use of all operating controls. The TREBLE and BASS controls should be set at the mid-position for initial set up. The LOUDNESS control should be set at the minimum position when the instrument is first turned on. Be sure to instruct the owner in the use of the stylus lever; RED dot or LP for long play micro-groove records and WHITE dot or 78 for standard 78 RPM records.

Models with radio tuner have two FM tuning positions on the SELECTOR switch, FM and FM-AFC. When switched to the FM position the AFC (Automatic Frequency Control) circuit is disabled. This feature provides for accurate tuning of FM stations which are closely spaced on the dial or in tuning stations in fringe areas. Tune the station on the FM position and then switch to FM-AFC to lock the tuner to the station.

NOTE: The LOUDNESS control is designed around a linear variable resistor other than the tapered volume control usually used on television and radio receivers. This feature allows for uniform increase or attenuation of all frequencies as the LOUDNESS control is adjusted.

A special HUM control is provided on the amplifier of each instrument covered by this Service Data Note. This control is factory adjusted and will usually require no further adjustment unless repair of the amplifier becomes necessary. Adjustment is made with the amplifier in the cabinet and all components of the instrument connected together in normal fashion.

SPECIAL SERVICE NOTES

MODELS WITH CHASSIS 1119 and 1120

A 330 ohm resistor is installed across the FM antenna terminals of these tuners at the factory. The resistor may be removed for increased sensitivity in areas where there is no local FM station. In areas with strong local stations, the 330 ohm resistor should not be removed or image frequency problems may result.

ALL MODELS WITH FREQUENCY DISPLAY SCOPE To avoid accidental damage to the Frequency Display Scope Indicator, keep the Bass and Treble controls adjusted to either extreme right or extreme left while removing the amplifier chassis from the cabinet and while it remains outside of the cabinet. This will keep the tips of the indicator inside the protective cage of the dial plate and prevent breakage due to an accidental bump hand the amplifier.

ELECTRICAL POWER - 110 to 120 volts 60 cycle AC power. Do not connect to DC or AC of any other frequency.

INTERMEDIATE FREQUENCIES - AM radio 455 kilocycles. FM radio 10.7 megacycles.

TUNING RANGE - AM radio, 530 to 1620 kilocycles. FM radio, 88 to 108 megacycles.

FM ANTENNA INPUT IMPEDANCE - 300 ohm balanced.

FM TUNER SENSITIVITY - 2 to 3 microwolts.

AMPLIFIER OUTPUT IMPEDANCE - 8 ohms.

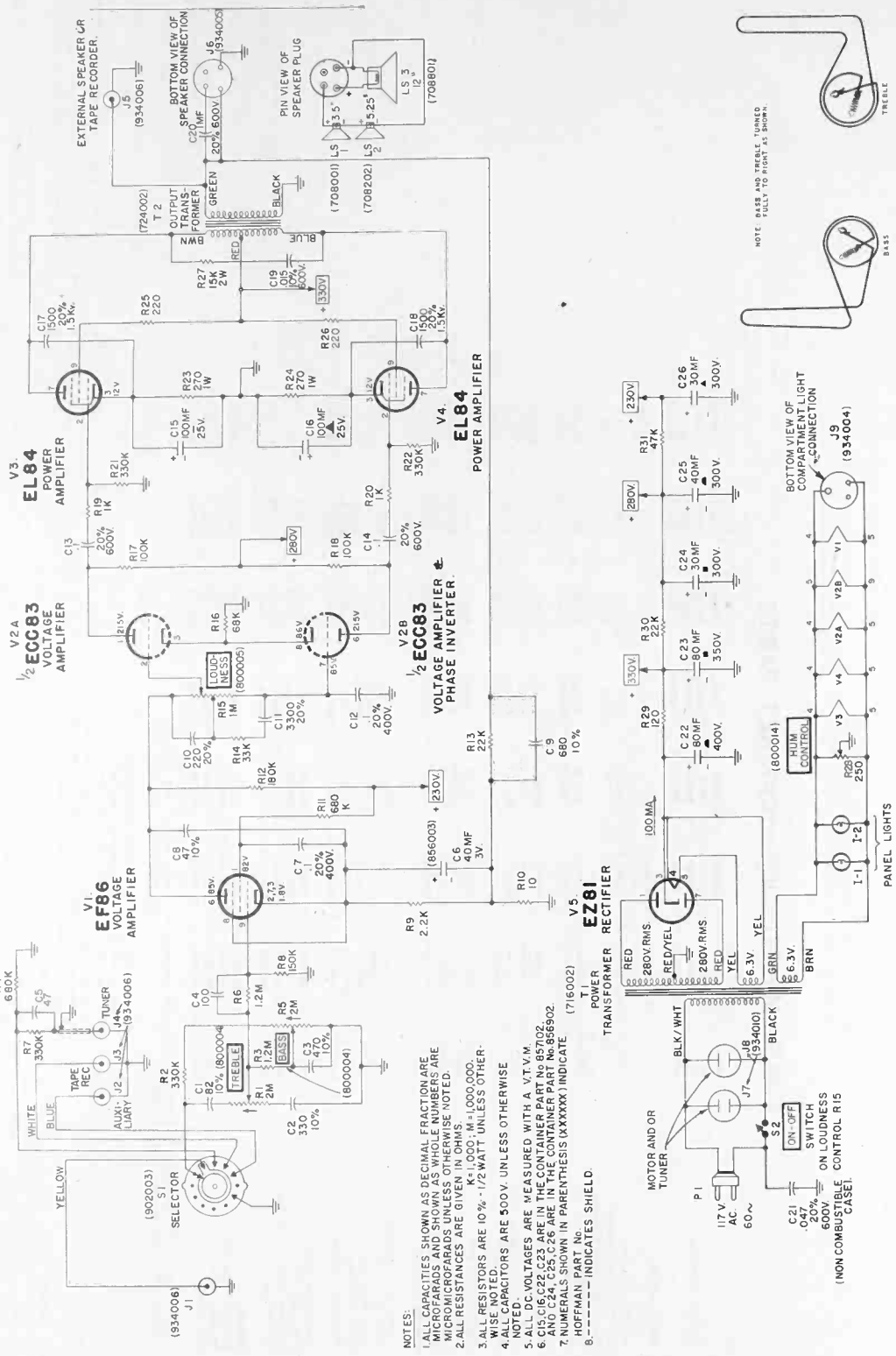
SPEAKERS - 12-inch woofer, 5-1/4 inch midrange, 3-1/2 inch tweeter.

SOUND CHAMBERS - Models in the 802, 802A, 8002, and 8002A groups are equipped with the exclusive Hoffman "Floating Sound" Chamber. Models in the 801 and 8001 series have three-speaker systems built into the cabinet.

FINISH...MODEL...CODE...CABINET PARTS

MODEL NUMBER	W801	W8001	W802	W8002	W8002	W8002	W8002	C8002A
	M801	M8001	M802	M8002	M8002	M8002	M8002	LW8002A
	SP801	SP8001	SP802	SP8002	SP8002	SP8002	SP8002	M8002A
								B8002A
								SP8002A
CODE LETTER	A, B, C	A, B, C	D, E	A, B, C	A, B, C	D, E	D, E	-----
Amplifier Chassis	1112	1108	1108	1108	1108	1108	1108	1108
AM-FM Tuner Chassis	-----	-----	-----	-----	-----	-----	-----	-----
Tuner-Amplifier Chassis	1119	1116	1116	1116	1116	1120	1120	-----
Record Changer	990004	990002	990006	990002	990006	990006	990006	990006
Sound Chamber	-----	390003	390003	390003	390003	390003	390003	390003
Bezel Display Scope	-----	529002	529002	529002	529002	529002	529002	529002
Bezel Tuner	-----	619001	619001	619001	619001	619001	619001	529001
Dial Glass, Amplifier	-----	619001	619001	619001	619001	619001	619001	619001
Dial Glass, Tuner	619000	-----	-----	619008	619008	619008	619008	619008
Cabinet, Mahogany	381006	381006	381018	381006	381006	381018	381023	381023
Cabinet, Oak	381010	381007	381019	381007	381007	381019	381024	381024
Cabinet, Walnut	381009	381005	381017	381005	381005	381017	381022	381022
Cabinet, Sycamore	381012	381008	381020	381008	381008	381020	381025	381025
Cabinet, Cherry	-----	-----	-----	-----	-----	-----	381021	381021
Escutcheon, Amplifier	452014	452024	452024	452024	452024	452024	452035	452035
Escutcheon, Tuner	-----	452026	-----	452025	452025	452025	452034	452034
Knob, With Pointer	500027	500030	500028	500028	500028	500028	500035	500035
Knob, No Pointer	-----	500019	500029	500029	500029	500029	500036	500036
Instruction Booklet	640009	640016	640013	640013	640013	640013	640025	640025
Changer Cartridge	981003	981003	981003	981003	981003	981003	981003	981003
Dual Sapphire Needles	990507	990507	990507	990507	990507	990507	990507	990507
Diamond Sapphire Needles	990506	990506	990506	990506	990506	990506	990506	990506
45 RPM Spindle	990502	990502	990501	990501	990501	990516	990516	990516
Speaker, 3.5 inch	708001	708001	708001	708001	708001	708001	708001	708001
Speaker, 5.25 inch	708202	708202	708202	708202	708202	708202	708202	708202
Speaker, 12 inch	708801	708801	708801	708801	708801	708801	708801	708801
Pilot Lamp	940044	940044	940044	940044	940044	940044	940044	940044

* NOTE: Includes 724014 Output Transformer, Plus Cable and Plug.
 # NOTE: For Tuner Selector Knob use 500037.



NOTES:
 1. ALL CAPACITORS SHOWN AS DECIMAL FRACTIONS ARE MICROFARADS AND SHOWN AS WHOLE NUMBERS ARE MICROFARADS UNLESS OTHERWISE NOTED.
 2. ALL RESISTORS ARE GIVEN IN OHMS.
 3. ALL RESISTORS ARE 10% - 1/2 WATT UNLESS OTHERWISE NOTED.
 4. ALL CAPACITORS ARE 500V. UNLESS OTHERWISE NOTED.
 5. ALL DC VOLTAGES ARE MEASURED WITH A V.T.V.M.
 6. C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C118, C119, C120, C121, C122, C123, C124, C125, C126, C127, C128, C129, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C140, C141, C142, C143, C144, C145, C146, C147, C148, C149, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179, C180, C181, C182, C183, C184, C185, C186, C187, C188, C189, C190, C191, C192, C193, C194, C195, C196, C197, C198, C199, C200, C201, C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C220, C221, C222, C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234, C235, C236, C237, C238, C239, C240, C241, C242, C243, C244, C245, C246, C247, C248, C249, C250, C251, C252, C253, C254, C255, C256, C257, C258, C259, C260, C261, C262, C263, C264, C265, C266, C267, C268, C269, C270, C271, C272, C273, C274, C275, C276, C277, C278, C279, C280, C281, C282, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C293, C294, C295, C296, C297, C298, C299, C300, C301, C302, C303, C304, C305, C306, C307, C308, C309, C310, C311, C312, C313, C314, C315, C316, C317, C318, C319, C320, C321, C322, C323, C324, C325, C326, C327, C328, C329, C330, C331, C332, C333, C334, C335, C336, C337, C338, C339, C340, C341, C342, C343, C344, C345, C346, C347, C348, C349, C350, C351, C352, C353, C354, C355, C356, C357, C358, C359, C360, C361, C362, C363, C364, C365, C366, C367, C368, C369, C370, C371, C372, C373, C374, C375, C376, C377, C378, C379, C380, C381, C382, C383, C384, C385, C386, C387, C388, C389, C390, C391, C392, C393, C394, C395, C396, C397, C398, C399, C400, C401, C402, C403, C404, C405, C406, C407, C408, C409, C410, C411, C412, C413, C414, C415, C416, C417, C418, C419, C420, C421, C422, C423, C424, C425, C426, C427, C428, C429, C430, C431, C432, C433, C434, C435, C436, C437, C438, C439, C440, C441, C442, C443, C444, C445, C446, C447, C448, C449, C450, C451, C452, C453, C454, C455, C456, C457, C458, C459, C460, C461, C462, C463, C464, C465, C466, C467, C468, C469, C470, C471, C472, C473, C474, C475, C476, C477, C478, C479, C480, C481, C482, C483, C484, C485, C486, C487, C488, C489, C490, C491, C492, C493, C494, C495, C496, C497, C498, C499, C500, C501, C502, C503, C504, C505, C506, C507, C508, C509, C510, C511, C512, C513, C514, C515, C516, C517, C518, C519, C520, C521, C522, C523, C524, C525, C526, C527, C528, C529, C530, C531, C532, C533, C534, C535, C536, C537, C538, C539, C540, C541, C542, C543, C544, C545, C546, C547, C548, C549, C550, C551, C552, C553, C554, C555, C556, C557, C558, C559, C560, C561, C562, C563, C564, C565, C566, C567, C568, C569, C570, C571, C572, C573, C574, C575, C576, C577, C578, C579, C580, C581, C582, C583, C584, C585, C586, C587, C588, C589, C590, C591, C592, C593, C594, C595, C596, C597, C598, C599, C600, C601, C602, C603, C604, C605, C606, C607, C608, C609, C610, C611, C612, C613, C614, C615, C616, C617, C618, C619, C620, C621, C622, C623, C624, C625, C626, C627, C628, C629, C630, C631, C632, C633, C634, C635, C636, C637, C638, C639, C640, C641, C642, C643, C644, C645, C646, C647, C648, C649, C650, C651, C652, C653, C654, C655, C656, C657, C658, C659, C660, C661, C662, C663, C664, C665, C666, C667, C668, C669, C670, C671, C672, C673, C674, C675, C676, C677, C678, C679, C680, C681, C682, C683, C684, C685, C686, C687, C688, C689, C690, C691, C692, C693, C694, C695, C696, C697, C698, C699, C700, C701, C702, C703, C704, C705, C706, C707, C708, C709, C710, C711, C712, C713, C714, C715, C716, C717, C718, C719, C720, C721, C722, C723, C724, C725, C726, C727, C728, C729, C730, C731, C732, C733, C734, C735, C736, C737, C738, C739, C740, C741, C742, C743, C744, C745, C746, C747, C748, C749, C750, C751, C752, C753, C754, C755, C756, C757, C758, C759, C760, C761, C762, C763, C764, C765, C766, C767, C768, C769, C770, C771, C772, C773, C774, C775, C776, C777, C778, C779, C780, C781, C782, C783, C784, C785, C786, C787, C788, C789, C790, C791, C792, C793, C794, C795, C796, C797, C798, C799, C800, C801, C802, C803, C804, C805, C806, C807, C808, C809, C810, C811, C812, C813, C814, C815, C816, C817, C818, C819, C820, C821, C822, C823, C824, C825, C826, C827, C828, C829, C830, C831, C832, C833, C834, C835, C836, C837, C838, C839, C840, C841, C842, C843, C844, C845, C846, C847, C848, C849, C850, C851, C852, C853, C854, C855, C856, C857, C858, C859, C860, C861, C862, C863, C864, C865, C866, C867, C868, C869, C870, C871, C872, C873, C874, C875, C876, C877, C878, C879, C880, C881, C882, C883, C884, C885, C886, C887, C888, C889, C890, C891, C892, C893, C894, C895, C896, C897, C898, C899, C900, C901, C902, C903, C904, C905, C906, C907, C908, C909, C910, C911, C912, C913, C914, C915, C916, C917, C918, C919, C920, C921, C922, C923, C924, C925, C926, C927, C928, C929, C930, C931, C932, C933, C934, C935, C936, C937, C938, C939, C940, C941, C942, C943, C944, C945, C946, C947, C948, C949, C950, C951, C952, C953, C954, C955, C956, C957, C958, C959, C960, C961, C962, C963, C964, C965, C966, C967, C968, C969, C970, C971, C972, C973, C974, C975, C976, C977, C978, C979, C980, C981, C982, C983, C984, C985, C986, C987, C988, C989, C990, C991, C992, C993, C994, C995, C996, C997, C998, C999, C1000, C1001, C1002, C1003, C1004, C1005, C1006, C1007, C1008, C1009, C1010, C1011, C1012, C1013, C1014, C1015, C1016, C1017, C1018, C1019, C1020, C1021, C1022, C1023, C1024, C1025, C1026, C1027, C1028, C1029, C1030, C1031, C1032, C1033, C1034, C1035, C1036, C1037, C1038, C1039, C1040, C1041, C1042, C1043, C1044, C1045, C1046, C1047, C1048, C1049, C1050, C1051, C1052, C1053, C1054, C1055, C1056, C1057, C1058, C1059, C1060, C1061, C1062, C1063, C1064, C1065, C1066, C1067, C1068, C1069, C1070, C1071, C1072, C1073, C1074, C1075, C1076, C1077, C1078, C1079, C1080, C1081, C1082, C1083, C1084, C1085, C1086, C1087, C1088, C1089, C1090, C1091, C1092, C1093, C1094, C1095, C1096, C1097, C1098, C1099, C1100, C1101, C1102, C1103, C1104, C1105, C1106, C1107, C1108, C1109, C1110, C1111, C1112, C1113, C1114, C1115, C1116, C1117, C1118, C1119, C1120, C1121, C1122, C1123, C1124, C1125, C1126, C1127, C1128, C1129, C1130, C1131, C1132, C1133, C1134, C1135, C1136, C1137, C1138, C1139, C1140, C1141, C1142, C1143, C1144, C1145, C1146, C1147, C1148, C1149, C1150, C1151, C1152, C1153, C1154, C1155, C1156, C1157, C1158, C1159, C1160, C1161, C1162, C1163, C1164, C1165, C1166, C1167, C1168, C1169, C1170, C1171, C1172, C1173, C1174, C1175, C1176, C1177, C1178, C1179, C1180, C1181, C1182, C1183, C1184, C1185, C1186, C1187, C1188, C1189, C1190, C1191, C1192, C1193, C1194, C1195, C1196, C1197, C1198, C1199, C1200, C1201, C1202, C1203, C1204, C1205, C1206, C1207, C1208, C1209, C1210, C1211, C1212, C1213, C1214, C1215, C1216, C1217, C1218, C1219, C1220, C1221, C1222, C1223, C1224, C1225, C1226, C1227, C1228, C1229, C1230, C1231, C1232, C1233, C1234, C1235, C1236, C1237, C1238, C1239, C1240, C1241, C1242, C1243, C1244, C1245, C1246, C1247, C1248, C1249, C1250, C1251, C1252, C1253, C1254, C1255, C1256, C1257, C1258, C1259, C1260, C1261, C1262, C1263, C1264, C1265, C1266, C1267, C1268, C1269, C1270, C1271, C1272, C1273, C1274, C1275, C1276, C1277, C1278, C1279, C1280, C1281, C1282, C1283, C1284, C1285, C1286, C1287, C1288, C1289, C1290, C1291, C1292, C1293, C1294, C1295, C1296, C1297, C1298, C1299, C1300, C1301, C1302, C1303, C1304, C1305, C1306, C1307, C1308, C1309, C1310, C1311, C1312, C1313, C1314, C1315, C1316, C1317, C1318, C1319, C1320, C1321, C1322, C1323, C1324, C1325, C1326, C1327, C1328, C1329, C1330, C1331, C1332, C1333, C1334, C1335, C1336, C1337, C1338, C1339, C1340, C1341, C1342, C1343, C1344, C1345, C1346, C1347, C1348, C1349, C1350, C1351, C1352, C1353, C1354, C1355, C1356, C1357, C1358, C1359, C1360, C1361, C1362, C1363, C1364, C1365, C1366, C1367, C1368, C1369, C1370, C1371, C1372, C1373, C1374, C1375, C1376, C1377, C1378, C1379, C1380, C1381, C1382, C1383, C1384, C1385, C1386, C1387, C1388, C1389, C1390, C1391, C1392, C1393, C1394, C1395, C1396, C1397, C1398, C1399, C1400, C1401, C1402, C1403, C1404, C1405, C1406, C1407, C1408, C1409, C1410, C1411, C1412, C1413, C1414, C1415, C1416, C1417, C1418, C1419, C1420, C1421, C1422, C1423, C1424, C1425, C1426, C1427, C1428, C1429, C1430, C1431, C1432, C1433, C1434, C1435, C1436, C1437, C1438, C1439, C1440, C1441, C1442, C1443, C1444, C1445, C1446, C1447, C1448, C1449, C1450, C1451, C1452, C1453, C1454, C1455, C1456, C1457, C1458, C1459, C1460, C1461, C1462, C1463, C1464, C1465, C1466, C1467, C1468, C1469, C1470, C1471, C1472, C1473, C1474, C1475, C1476, C1477, C1478, C1479, C1480, C1481, C1482, C1483, C1484, C1485, C1486, C1487, C1488, C1489, C1490, C1491, C1492, C1493, C1494, C1495, C1496, C1497, C1498, C1499, C1500, C1501, C1502, C1503, C1504, C1505, C1506, C1507, C1508, C1509, C1510, C1511, C1512, C1513, C1514, C1515, C1516, C1517, C1518, C1519, C1520, C1521, C1522, C1523, C1524, C1525, C1526, C1527, C1528, C1529, C1530, C1531, C1532, C1533, C1534, C1535, C1536, C1537, C1538, C1539, C1540, C1541, C1542, C1543, C1544, C1545, C1546, C1547, C1548, C1549, C1550, C1551, C1552, C1553, C1554, C1555, C1556, C1557, C1558, C1559, C1560, C1561, C1562, C1563, C1564, C1565, C1566, C1567, C1568, C1569, C1570, C1571, C1572, C1573, C1574, C1575, C1576, C1577, C1578, C1579, C1580, C1581, C1582, C1583, C1584, C1585, C1586, C1587, C1588, C1589, C1590, C1591, C1592, C1593, C1594, C1595, C1596, C1597, C1598, C1599, C1600, C1601, C1602, C1603, C1604, C1605, C1606, C1607, C1608, C1609, C1610, C1611, C1612, C1613, C1614, C1615, C1616, C1617, C1618, C1619, C1620, C1621, C1622, C1623, C1624, C1625, C1626, C1627, C1628, C1629, C1630, C1631, C1632, C1633, C1634, C1635, C1636, C1637, C1638, C1639, C1640, C1641, C1642, C1643, C1644, C1645, C1646, C1647, C1648, C1649, C1650, C1651, C1652, C1653, C1654, C1655, C1656, C1657, C1658, C1659, C1660, C1661, C1662, C1663, C1664, C1665, C1666, C1667, C1668, C1669, C1670, C1671, C1672, C1673, C1674, C1675, C1676, C1677, C1678, C1679, C1680, C1681, C1682, C1683, C1684, C1685, C1686, C1687, C1688, C1689, C1690, C1691, C1692, C1693, C1694, C1695, C1696, C1697, C1698, C1699, C1700, C1701, C1702, C1703, C1704, C1705, C1706, C1707, C1708, C1709, C1710, C1711, C1712, C1713, C1714, C1715, C1716, C1717, C1718, C1719, C1720, C1721, C1722, C1723, C1724, C1725, C1726, C1727, C1728, C1729, C1730, C1731, C1732, C1733, C1734, C1735, C1736, C1737, C1738, C1739, C1740, C1741, C1742, C1743, C1744, C1745, C1746, C1747, C1748, C1749, C1750, C1751, C1752, C1753, C1754, C1755, C1756, C1757, C1758, C1759, C1760, C1761, C1762, C1763, C1764, C1765, C1766, C1767, C1768, C1769, C1770, C1771, C1772, C1773, C1774, C1775, C1776, C1777, C1778, C1779, C1780, C1781, C1782, C1783, C1784, C1785, C1786, C1787, C1788, C1789, C1790, C1791, C1792, C1793, C1794, C1795, C1796, C1797, C1798, C1799, C1800, C1801, C1802, C1803, C1804, C1805, C1806, C1807, C1808, C1809, C1810, C1811, C1812, C1813, C1814, C1815, C1816, C1817, C1818, C1819, C1820, C1821, C1822, C1823, C1824, C1825, C1826, C1827, C1828, C1829, C1830, C1831, C1832, C1833, C1834, C1835, C1836, C1837, C1838, C1839, C1840, C1841, C1842, C1843, C1844, C1845, C1846, C1847, C1848, C1849, C1850, C1851, C1852, C1853, C1854, C1855, C1856, C1857, C1858, C1859, C1860, C1861, C1862, C1863, C1864, C1865, C1866, C1867, C1868, C1869, C1870, C1871, C1872, C1873, C1874, C1875, C1876, C1877, C1878, C1879, C1880, C1881, C1882, C1883, C1884, C1885, C1886, C1887, C1888, C1889, C1890, C1891, C1892, C1893, C1894, C1895, C1896, C1897, C1898, C1899, C1900, C1901, C1902, C1903, C1904, C1905, C1906, C1907, C1908, C1909, C1910, C1911, C1912, C1913, C1914, C1915, C1916, C1917, C1918, C1919, C1920, C1921, C1922, C1923, C1924, C1925, C1926, C1927, C1928, C1929, C1930, C1931, C1932, C1933, C1934, C1935, C1936, C1937, C1938, C1939, C1940, C1941, C1942, C1943, C1944, C1945, C1946, C1947, C1948, C1949, C1950, C1951, C1952, C1953, C1954, C1955, C1956, C1957, C1958, C1959, C1960, C1961, C1962, C1963, C1964, C1965, C1966, C1967, C1968, C1969, C1970, C1971, C1972, C1973, C1974, C1975, C1976, C1977, C1978, C1979, C1980, C1981, C1982, C1983, C1984, C1985, C1986, C1987, C1988, C1989, C1990, C1991, C1992, C1993, C1994, C1995, C1996, C1997, C1998, C1999, C2000, C2001, C2002, C2003, C2004, C2005, C2006, C2007, C2008, C2009, C2010, C2011, C2012, C2013, C2014, C2015, C2016, C2017, C2018, C2019, C2020, C2021, C2022, C2023, C2024, C2025, C2026, C2027, C2028, C2029, C2030, C2031, C2032, C2033, C2034, C2035, C2036, C2037, C2038, C2039, C2040, C2041, C2042, C2043, C2044, C2045, C2046, C2047, C2048, C2049, C2050, C2051, C2052, C2053, C2054, C2055, C2056, C2057, C2058, C2059, C2060, C2061, C2062, C2063, C2064, C2065, C2066, C2067, C2068, C2069, C2070, C2071, C2072, C2073, C2074, C2075, C2076, C2077, C2078, C2079, C2080, C2081, C2082, C2083, C2084, C2085, C2086, C2087, C2088, C2089, C2090, C2091, C2092, C2093, C2094, C2095, C2096, C2097, C2098, C2099, C2100, C2101, C2102, C2103, C2104, C2105, C2106, C2107, C2108, C2109, C2110, C2111, C2112, C2113, C2114, C2115, C2116, C2117, C2118, C2119, C2120, C2121, C2122, C2123, C2124, C2125, C2126, C2127, C2128, C2129, C2130, C2131, C2132, C2133, C2134, C2135, C2136, C2137, C2138, C2139, C2140, C2141, C21

AMPLIFIER CHASSIS 1112

V1 6AV6 VOLTAGE AMPLIFIER

V2A 1/2 6C83 VOLTAGE AMPLIFIER

V3 EL84 POWER AMPLIFIER

V4 EL84 POWER AMPLIFIER

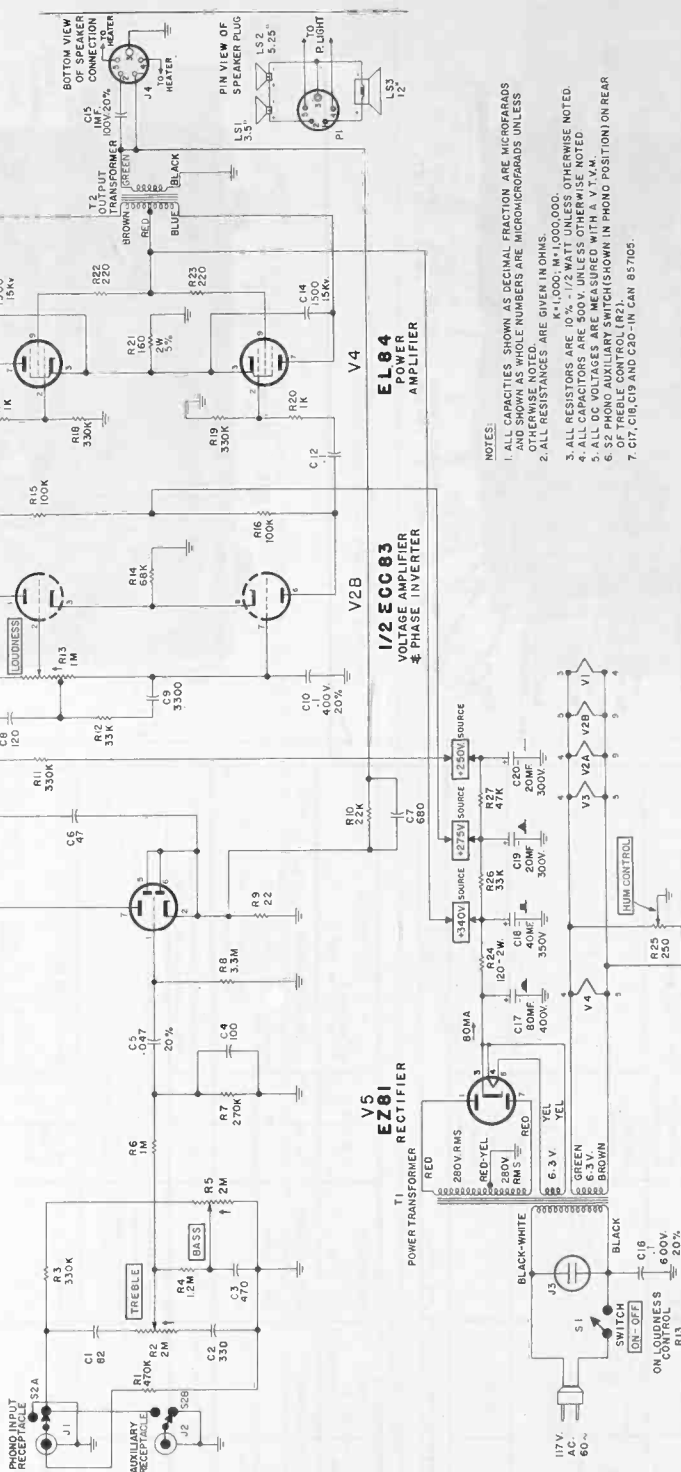
V5 EZ81 RECTIFIER

T1 POWER TRANSFORMER

SPECIAL REPLACEMENT PARTS NOTE
 Refer to the Schematic Notes for interpretation of part symbols, description, and part numbers. Special type components are listed below for your convenience and should be replaced only with the types specified. Part numbers for replacement components which apply to complete instruments are included in the Replacement Cabinet Parts List.

SYMBOL PART NO. DESCRIPTION

SYMBOL	PART NO.	DESCRIPTION
C(17)	857105	80 MF., 400 DCWV, Electrolytic
C(18)	800004	40 MF., 350 DCWV, Electrolytic
C(19)	800005	20 MF., 300 DCWV, Electrolytic
C(20)	851115	20 MF., 300 DCWV, Electrolytic
C13	851115	1500 MMF., 20%, 1.5 KV Electrolytic
C14	851115	1500 MMF., 20%, 1.5 KV Electrolytic
E(3)	800033	Treble Control, .2M
E(4)	800004	Phono-Auxiliary Switch
R(1)	800005	Loudness Control
S(1)		On-Off Switch
CONTROLS		
MISCELLANEOUS		
T1	716007	Power Transformer
I2	706009	Output Transformer
J1, J2	934006	Input Receptacles
J4	934019	Speaker Receptacle



- NOTES:**
1. ALL CAPACITIES SHOWN AS DECIMAL FRACTION ARE MICROFARADS UNLESS OTHERWISE NOTED.
 2. ALL RESISTANCES ARE GIVEN IN OHMS.
 3. ALL RESISTORS ARE K=1,000; M=1,000,000.
 4. ALL DC VOLTAGES ARE 900V UNLESS OTHERWISE NOTED.
 5. ALL DC VOLTAGES ARE MEASURED WITH A V.T.M.
 6. S2 PHONO AUXILIARY SWITCH SHOWN IN PHONO POSITION ON REAR OF TREBLE CONTROL (R2).
 7. C17, C18, C19 AND C20-IN CAN 857105.

REPLACEMENT PARTS DATA & SCHEMATIC DIAGRAM FOR HOFFMAN CHASSIS 1112

EASY-SERVICE AM-FM TUNER ALIGNMENT GUIDE

The signal generator output should be no higher than necessary to produce 0.3 VAC during AM alignment and 2VDC during FM alignment. To set the dial pointer, turn the tuning condenser fully closed. Then set the pointer about 1/16 inch beyond the left end of the center horizontal line on the dial plate. Use an insulated alignment screwdriver and hex head alignment tool for adjusting trimmers and coils in the tuner.

AM ALIGNMENT

TUNER SELECTOR SWITCH	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR INPUT POINT	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1. AM	455 KC AM at 400 CPS	High side to pin #7 of V1. Low side to chassis. .01 MF isolation	High end of dial	Across tuner output cable	Four (4) cores in 455 KC IF transformers	Adjust for maximum. Keep the generator output low. Maximum of 0.3 VAC at tuner output.
2. "	600KC AM	High side to AM antenna terminal through 150MMF. Low side to chassis	600KC	"	600 KC L8 oscillator coil	"
3. "	1620 KC	"	1620 KC	"	1620 KC C10E osc. trimmer	"
4. "	1400 KC	"	1400 KC	"	1500 KC antenna trimmer	"
5.	Repeat step #2. If adjustment of 600 KC (L8) is required, repeat step #3 and 4 also.					

FM ALIGNMENT

TUNER SELECTOR SWITCH	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR INPUT POINT	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1. FM	10.7 MC	High side to FM RF stator lug on tuning condenser. Low side to chassis. Use .01 MF for isolation.	High end of dial	Between pin #2 of the 6AL5 and chassis. Use 5 VDC scale.	Six (6) cores in 10.7 MC IF transformers	Adjust for maximum. Keep the generator output low. Do not exceed 2 VDC on the VTVM.
2. "	"	"	"	"	"	Attenuate the generator to get a 1 VDC reading on the VTVM.
3. "	"	"	"	Move high side lead to terminal #3 of test socket.	Top core of ratio detector. Last 10.7 MC IF transformer	Adjust for zero VDC
4. "	90 MC CW	High side to the #1 Fm antenna terminal through 100 ohm. Low side to #2 Fm antenna terminal through 150 ohm.	90 MC	Same as step #1	88 MC 92 MC 92 MC	Same as step #1
5. "	107 MC	"	107 MC	"	106 MC 106 MC 108 MC	"
6.	Repeat step #4. If any adjustments are required, repeat step #5 also.					

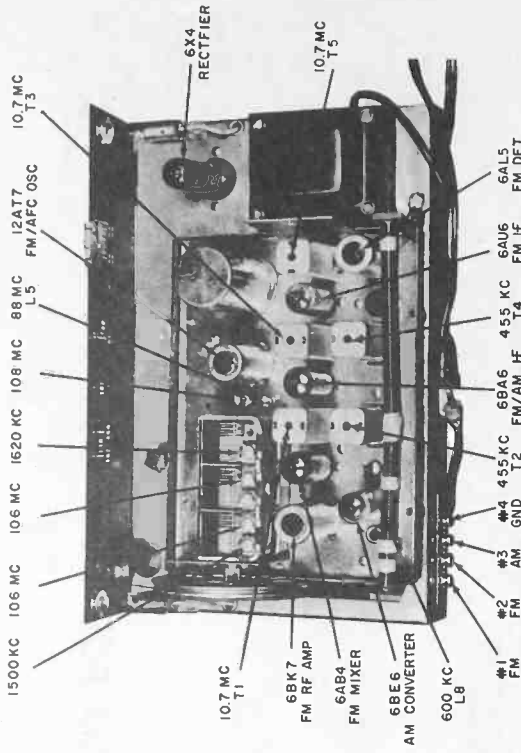


FIGURE 6. TOP VIEW OF HOFFMAN AM-FM RADIO TUNERS—CHASSIS 1116 & 1120

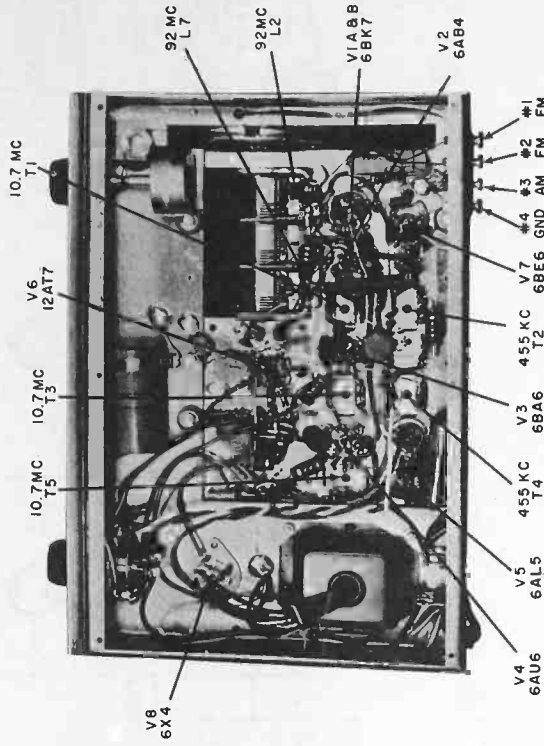


FIGURE 7. BOTTOM VIEW OF HOFFMAN AM-FM RADIO TUNERS

ALIGNMENT PROCEDURE FOR HOFFMAN AM-FM TUNER

EQUIPMENT REQUIRED:

- A) VTVM
- B) AM signal generator with 30% modulation at 400 CPS. The generator should have outputs at frequencies of 455 KC, 600 KC, 1400 KC, and 1620 KC.
- C) CW signal generator with output at frequencies of 10.7 MC, 90 MC, 98 MC and 107 MC.

PROCEDURE:

Remove the tuner from the cabinet. Remove the bottom chassis plate and connect the power cord to a 117 volt 60 CPS AC power outlet.

Alignment adjustment points are identified by frequency on the tuner chassis illustrations and in this alignment procedure to simplify their location. For example: The AM oscillator (L8) is identified as 600 KC which is also its alignment adjustment frequency. Alignment reference marks have also been included on the backside of the dial pointer slide rail to assist the technician in locating correct setting of the tuning condenser for 1620 KC, AM alignment. The tuning condenser can be accurately set to 1620 KC by use of the 1620 KC mark on the back of the pointer slide rail, in conjunction with the regular dial pointer and scale. Turn the tuning knob until the left side of the carriage just covers the 1620 mark on the slide rail.

NOTE: The alignment illustrations show tuners No. 1116 and No. 1120 but may also be used for chassis 1119 which includes the same tuner sub-chassis.

IF ALIGNMENT FOR AM

1. Set the tuner selector switch to AM.
2. Apply a 455 KC, 30% AM at 400 CPS signal to pin 7 of the 69E6 AM converter. Use a .01 MF capacitor in series with the high side lead from the generator to connect the low side lead from the generator to the tuner chassis.
3. Set the tuning condenser to minimum capacity (wide open or with the pointer to the high end of the dial).
4. Set the VTVM to read AC and connect to the output cable of the tuner. Use the high side of the Loudness control on chassis #1119. Use a low reading scale, one volt would be ideal.
5. Adjust the four (4) 455 KC IF cores for maximum output. The input is necessary to keep the output below 0.3 VAC. Four IF cores, or slugs, are in the two 455 KC transformer windings (one on top and bottom of each can) on the back edge of the chassis pan.

ANTENNA AND OSCILLATOR ADJUSTMENTS FOR AM

1. Tighten the two AM trimmers on the tuning capacitor. 1500 KC is the antenna trimmer. 1620 KC is the oscillator trimmer. Then back off each of the two trimmers 1/4 turn to the left.
2. Turn the tuning condenser to maximum capacity (fully meshed). The dial pointer should now be one inch to the left of the base dial marker. Adjust the pointer as required if it is not correctly positioned.
3. Apply a 600 KC 30% AM signal through a 150 MMF condenser to the AM antenna terminal. Connect the low side to the tuner chassis. Connect the VTVM across the tuner output cable and set the meter to read AC. Turn the dial pointer to 60 on the AM position of the dial.

4. Adjust 600 KC (the oscillator coil L8) for maximum output. The generator output reduced to the point giving an output voltage of less than 0.3 VAC.

5. Change the generator output to 1620 KC and tune to 162 on the tuner dial. Adjust 1620 KC (the oscillator trimmer) for maximum output. Attenuate the generator output if necessary to keep the output below 0.3 VAC.

6. Change the generator output to 1400 KC and tune to 140 on the tuner dial. Adjust 1500 KC (AM loop trimmer) for maximum. Keep the generator output at a level that will produce 0.3 VAC or less on the meter.

7. Recheck steps 3 and 4. If any adjustment of 600 KC (the oscillator coil) is required, repeat steps 5 and 6 also.

IF ALIGNMENT FOR FM

1. Set the tuner selector switch to FM.
2. Apply a 10.7 MC CW signal through a .01 MF capacitor to the stator lug on the FM section of the center gang of the tuning condenser. NOTE: The FM section of each gang is the smaller section and has two (2) plates on the rotor and two on the stator.
3. Turn the tuning condenser for minimum capacity (pointer to the high end of the dial).
4. Set the VTVM to the 5 VDC scale and connect the meter between pin #2 of the 6AL5 tube and chassis.
5. Adjust the six (6) 10.7 MC IF cores for maximum DC voltage reading. Keep the DC voltage under 2 volts by reducing the generator output. The IF cores are in the top and bottom of the three (3) 10.7 MC IF transformers.
6. Reduce the 10.7 MC input signal until one (1) volt

output is obtained. Move the meter lead from pin #2 of the 6AL5 to terminal 3 of the test socket.

7. Adjust the top core of the ratio detector (last 10.7 MC IF transformer for zero VDC. ANTENNA, RF, AND OSCILLATOR ADJUSTMENT FOR FM

1. Connect the hot lead of the CW generator through a 100 ohm resistor to the #1 FM antenna terminal. Connect the low side of the generator to the #2 FM antenna terminal through a 150 ohm resistor. Use 1/2 watt composition resistors.

2. Set the VTVM to read 5 VDC scale and connect the meter between pin #2 of the 6AL5 tube and chassis.

3. Turn the tuning condenser to a reading of 90 MC on the FM section of the dial. Turn the tuner selector switch to FM.

4. Set the 108 MC adjustment (FM oscillator trimmer, adjacent to the tuning condenser) with the bottom of the screw head about 1/2 inch above the chassis. Loosen 106 MC (FM RF trimmer on the center section of tuning condenser) 1/8 turn from maximum clockwise. Loosen 106 MC (FM antenna trimmer on the first section of tuning condenser 5/8 turn from the maximum clockwise position.

5. With an input signal of 90 MC, adjust 88 MC (FM oscillator coil) and the two 92 MC coils (antenna coil and mixer coil located beneath the chassis) for maximum. Reduce the generator output as required to keep the meter at 2 volts or less.

6. Turn the tuning condenser to a reading of 107 MC on the FM section of the dial. Change the generator signal to 107 MC. Then adjust 106 MC, 107 MC, and 108 MC for maximum output.

7. Repeat step 5. If any adjustments are required in step 5, step 6 should also be repeated.

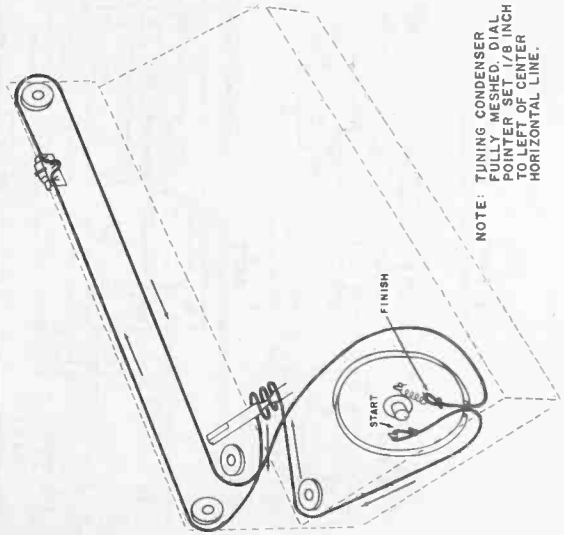


FIGURE 5. AM-FM TUNER DIAL STRINGING PROCEDURE

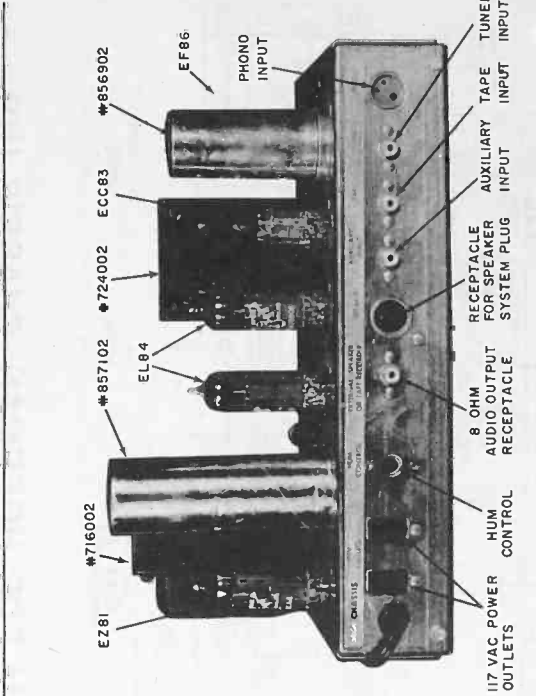


FIGURE 8. TOP VIEW OF AMPLIFIER CHASSIS 1108

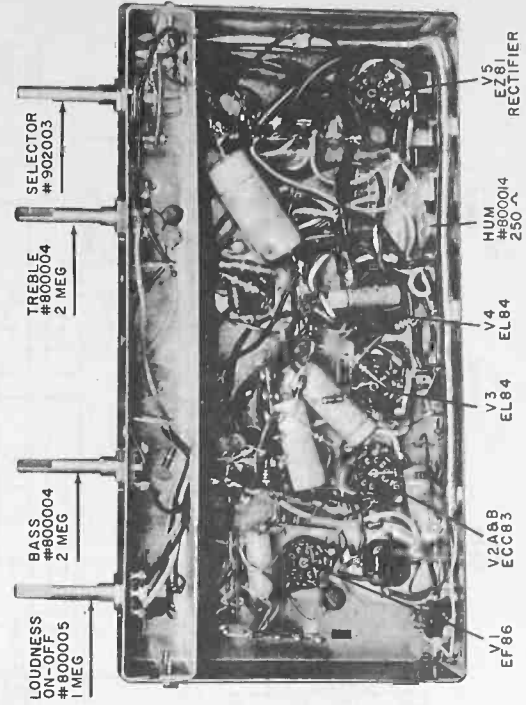
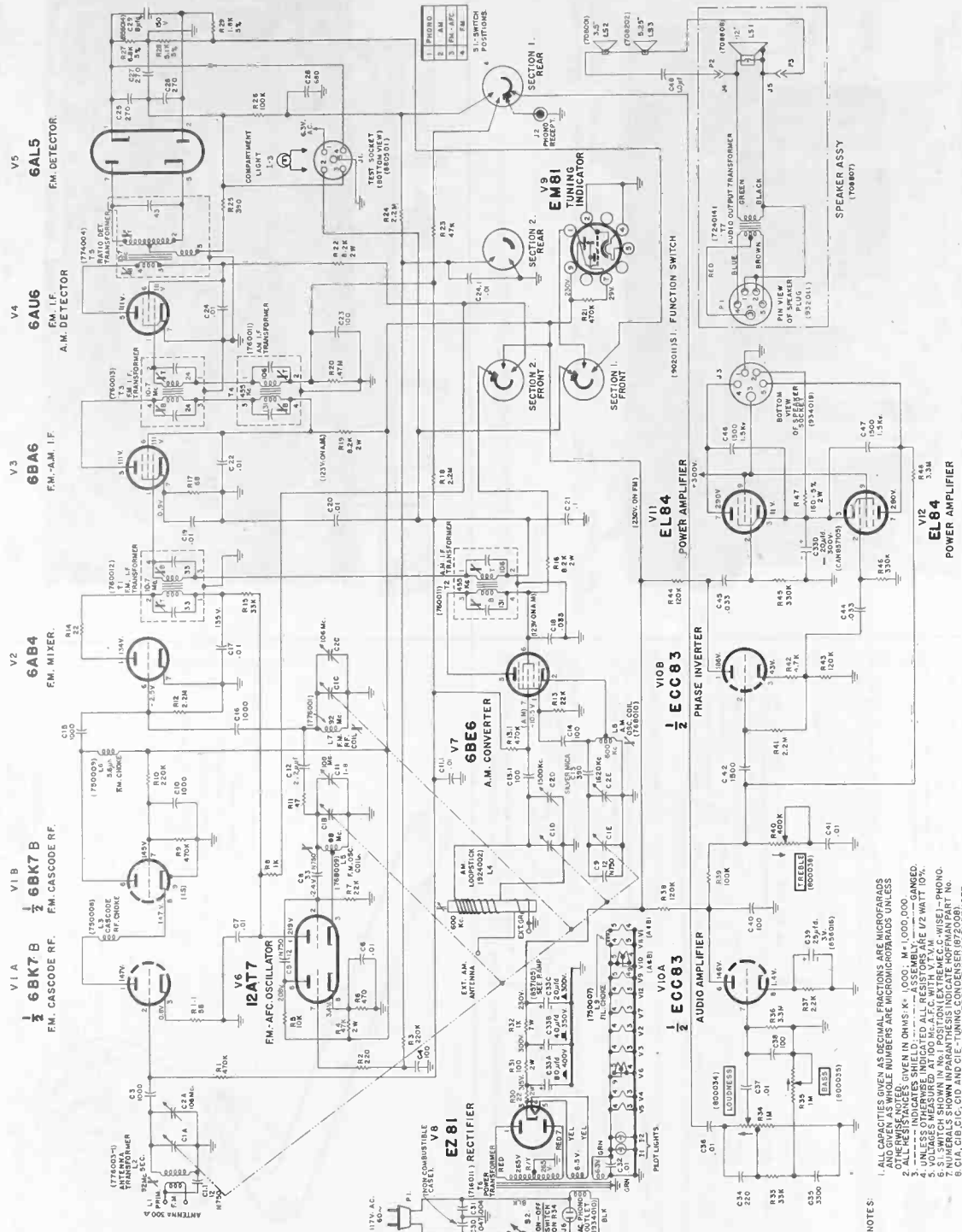


FIGURE 9. BOTTOM VIEW OF AMPLIFIER CHASSIS 1108



SPECIAL REPLACEMENT PARTS NOTE
 Refer to the Schematic Notes for interpretation of parts symbols, description, and part numbers. Special type components are listed below for your convenience and should be replaced only with the types specified. Part numbers for replacement components which apply to complete instruments are included in the Replacement Cabinet Parts List.

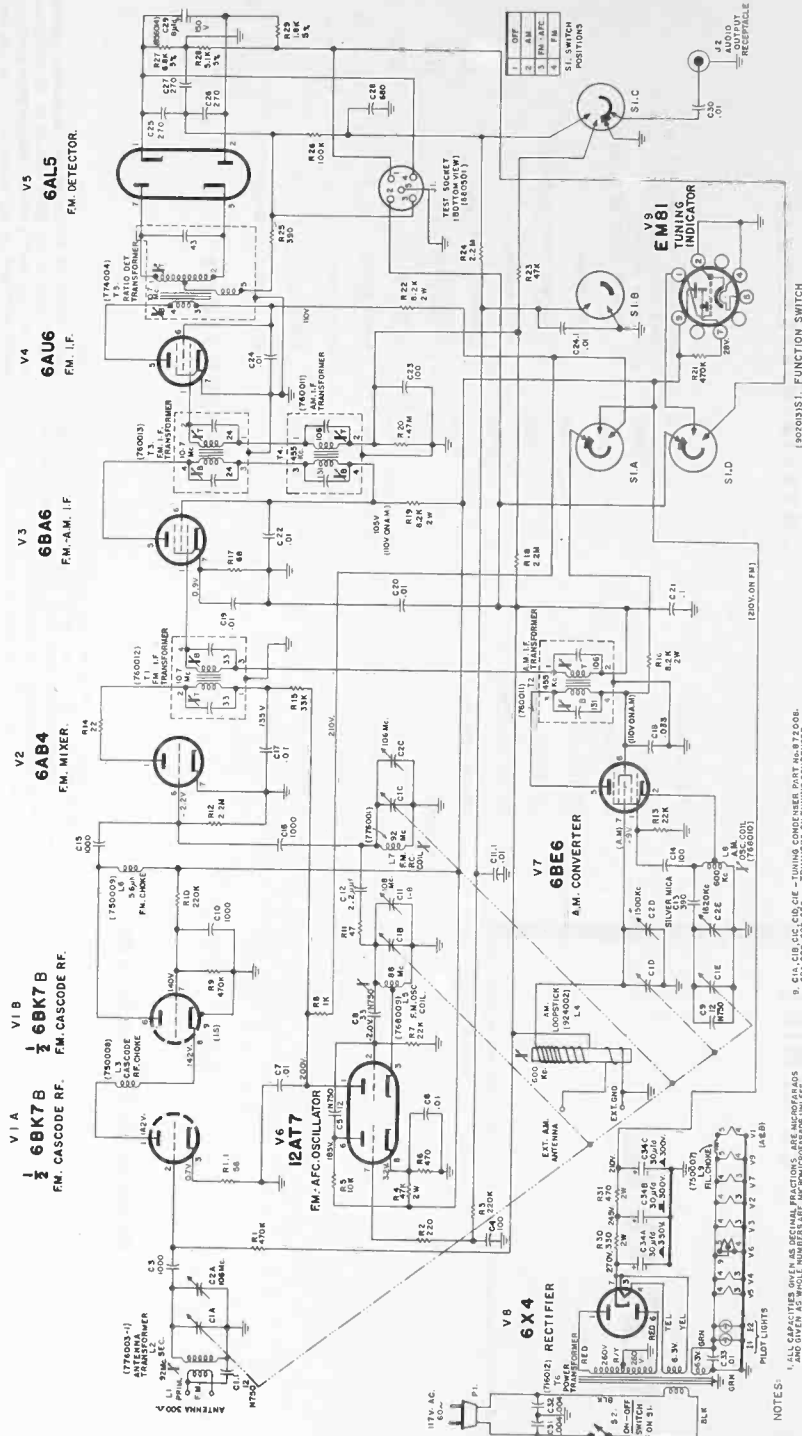
SYMBOL	PART NO.	DESCRIPTION
	872008	Tuning Condenser
	Consists of C1A, C1B, C1C, C1D, C1E plus:	
	850003	Trimmer C2A, C2C, C2D, C2E.
	C8	12 MMF, 5%, N750
	C9	850003
	C11	12 MMF, 5%, N750
	C13	1 - 8 Tubular Trimmer
	C29	390 MMF, 5%, Silver Mica
	C30	8 MF, 150 DCWV, Electrolytic
	C31	-.047 MF, 20%, 600V, Non-combustible
	C33A)	.004 MF, 20%, 1.5 KV
	C33B)	80 MF, 400 DCWV, Electrolytic
	C33C)	40 MF, 350 DCWV, Electrolytic
	C33D)	20 MF, 300 DCWV, Electrolytic
	C39	20 MF, 300 DCWV, Electrolytic
	C46	25 MF, 3 DCWV, Electrolytic
	C47	1500 MMF, 20%, 1.5 KV
		1500 MMF, 20%, 1.5 KV

CONTROLS		
R24)	800034	Loudness, 1M
S2)		On-Off Switch
R35)	800035	Bass Control, 1M
R40)	800036	Treble Control, 400K
S1)	902011	Selector Switch

MISCELLANEOUS		
L4	924002	AM Antenna
L5	768009	FM Oscillator Coil
L8	750009	AM Oscillator Coil
T1	760012	FM IF Transformer
T2	760011	AM IF Transformer
T3	760013	FM IF Transformer
T4	760011	AM IF Transformer
T5	774004	FM Ratio Detector
T6	716011	Power Transformer (Part of Speaker Assembly)
T7	724014	Output Transformer (Part of Speaker Assembly)

NOTES:
 1. ALL CAPACITIES GIVEN AS DECIMAL FRACTIONS ARE MICROFARADS AND GIVEN AS WHOLE NUMBERS ARE MEGAFARADS UNLESS OTHERWISE INDICATED.
 2. ALL RESISTANCES GIVEN IN OHMS, K = 1000, M = 1,000,000.
 3. ALL VOLTAGES ARE AC UNLESS OTHERWISE SPECIFIED.
 4. ALL VOLTAGES MEASURED AT 100 MA AC WITH V.T.M.
 5. VOLTAGE MEASURED AT 100 MA AC WITH V.T.M.
 6. S1 SWITCH SHOWN IN NO. 1 POSITION (EXTREME CC-WISE) - PHONO.
 7. S1 SWITCH SHOWN IN NO. 2 POSITION (EXTREME CW-WISE) - PHONO.
 8. C1A, C1B, C1C, C1D AND C1E - TUNING CONDENSER 872008.
 9. C33 - 48.8 KC TAND - IN CAN PART NO. 857705.

REPLACEMENT PARTS DATA & SCHEMATIC DIAGRAM FOR HOFFMAN CHASSIS 1119



SPECIAL REPLACEMENT PARTS NOTE
 Refer to the Schematic NOTES for interpretation of parts symbols, description, and part numbers. Special type components are listed below for your types specified. Part numbers for replacement components which apply to complete instruments are included in the Replacement Cabinet Parts List.

SYMBOL	PART NO.	DESCRIPTION
	872008	Tuning Condenser
	Consists of C1A, C1B, C1C, C1D, C1E plus;	
	C2C	Trimmer
	C5	500K
	C8	12MMF, 5%, N750
	C9	12MMF, 20%, N750
	C11	1-8MMF, Tubular
	C13	390MMF, 5%, Silver Mica
	C29	8MF, 150DCWV, Electrolytic
	C31	.004MF, 20%, 1.5KV
	C32	.004MF, 20%, 1.5KV
	C34A	Electrolytic
	C34B	30MF, 350DCWV, Electrolytic
	C34C	20MF, 300DCWV, Electrolytic

CONTROLS	
S1)	Selector Switch, Chassis 1116
S2)	Selector Switch, Chassis 1120

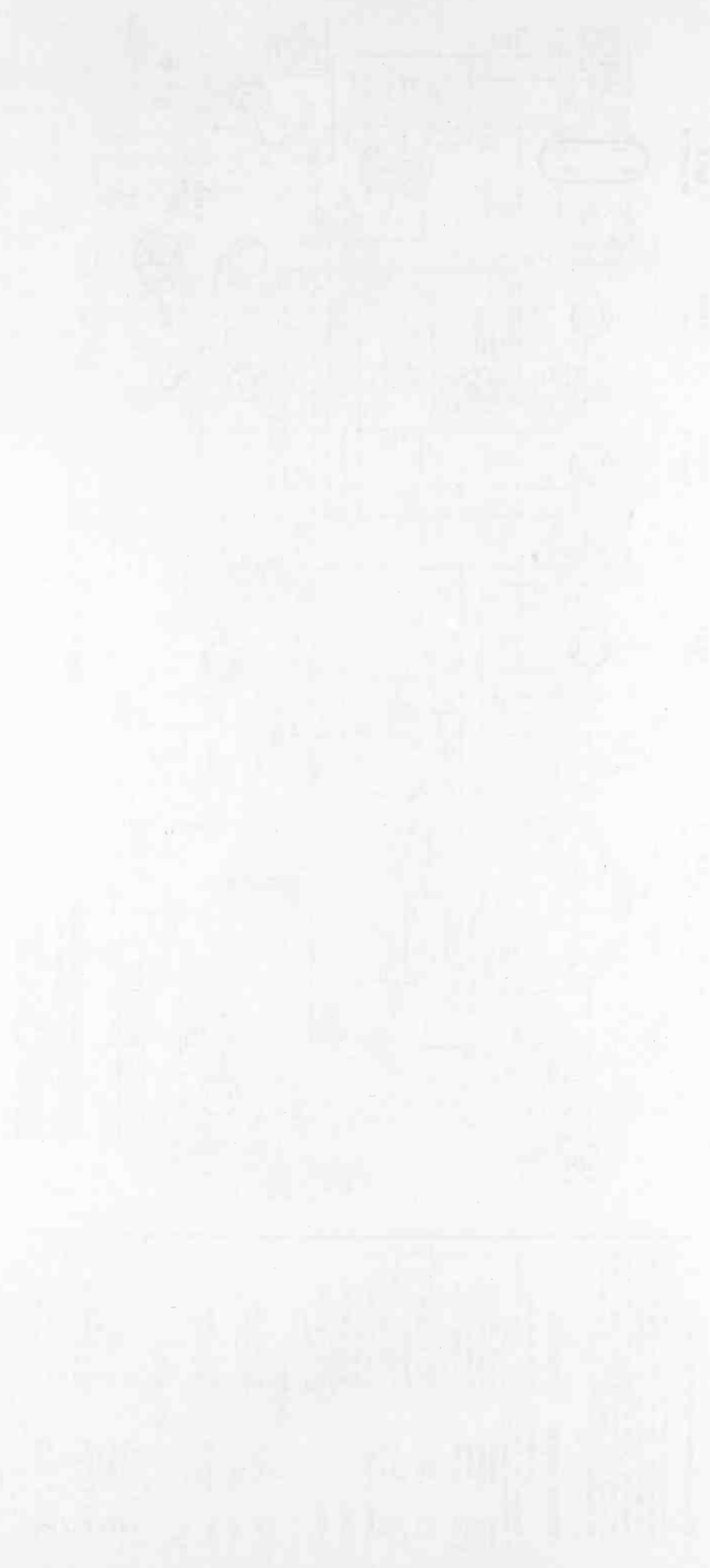
MISCELLANEOUS	
L4	AM Antenna
L5	FM Oscillator Coil
L8	AM Oscillator Coil
T1	FM IF Transformer
T2	AM IF Transformer
T3	FM IF Transformer
T4	AM IF Transformer
T5	FM Ratio Detector
T6	Power Transformer

NOTES:
 1. ALL CAPACITIES GIVEN AS DECIMAL FRACTIONS, ARE MICROFARADS UNLESS OTHERWISE NOTED.
 2. ALL RESISTANCES GIVEN IN OHMS, *1,000, *10,000, *100,000.
 3. UNLESS OTHERWISE SPECIFIED, RESISTORS ARE 1/2 WATT 10%.
 4. ALL TRANSFORMERS ARE 100 MAZ A.C. WITH 117 VOLT A.C. OPT.
 5. ALL TRANSFORMERS ARE 100 MAZ A.C. WITH 117 VOLT A.C. OPT.
 6. NUMERALS SHOWN IN PARENTHESES INDICATE HOFFMAN PART NO.

REPLACEMENT PARTS DATA & SCHEMATIC DIAGRAM FOR HOFFMAN CHASSIS 1116 & 1120

1950

1950



Magnavox

RADIO CHASSIS — 51 SERIES

GENERAL

This manual covers the 51 series radio chassis, versions 51-01AA thru 51-11AA and also the 51-03BA version. Three complete electrical parts lists and 3 schematics are shown to provide complete coverage. On the 51-03BA version an electrical change has been made regarding the AC switch on the rear of the band switch. This switch was eliminated and a double-throw switch used on the Bias control as an Off-On switch. This change is shown on the schematic diagram on page 10.

the 51-03BA version an electrical change has been made regarding the AC switch on the rear of the band switch. This switch was eliminated and a double-throw switch used on the Bias control as an Off-On switch. This change is shown on the schematic diagram on page 10.

SPECIFICATIONS

Tuning Frequency Range:	540-1620 KC	AM Detector (crystal)	1N34A
Broadcast Band	88-108 MC	Tuning Eye†	6E5
FM Band	455KC/10.7 MC	Audio Amp*	6AV6
Intermediate Frequency		Audio Amp**	(1/2) 6U8
		Audio Amp***	(1/2) 12AX7
Tubes:		Phase Inverter**	(1/2) 6U8
FM RF Amplifier	6C45	Cathode Follower***	(1/2) 12AX7
AM RF Amplifier	6BZ6	Audio Output*	6AQ5
FM Mixer & Osc.	6U8	Push-Pull Audio Output**	(2) 6AQ5
AM Converter	6BE6	Rectifier***	5Y3
IF Amplifier	6BA6		
FM Driver	6BA6		
Ratio Detector	6AL5		

†Not used on 51-01, 02, 07, 09 & 11
 *Used only on 51-02
 **Used only on 51-01, 04, 07, 09 & 11
 ***Used only on 51-03, 05 & 08

CHASSIS DIFFERENCES

Chassis No.	Tuning Eye	Output	Chassis No.	Tuning Eye	Output
51-01	No	Push-Pull	51-07	No	Push-Pull
51-02	No	Single Ended	51-08	Yes	None
51-03	Yes	None	51-09	No	Push-Pull
51-04	Yes	Push-Pull	51-10	Not Released	Push-Pull
51-05	Yes	None	51-11		
51-06	Not Released				

ALIGNMENT

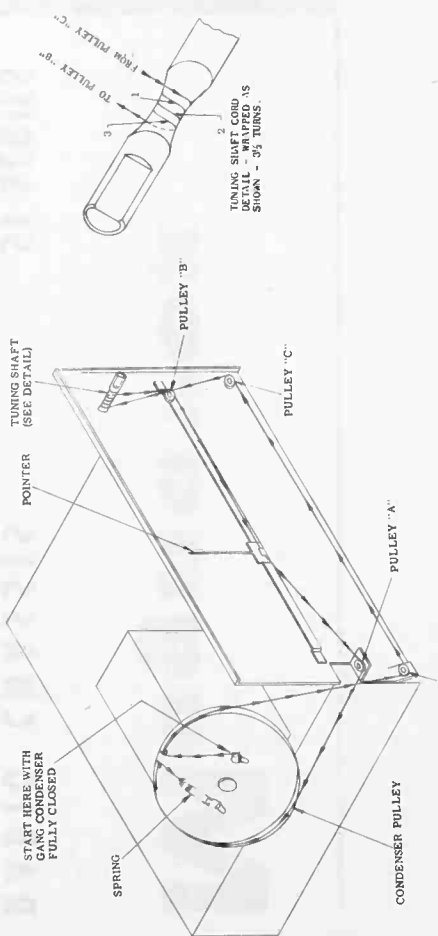
DIAL STRINGING INSTRUCTIONS

DIAL CORD PLACEMENT

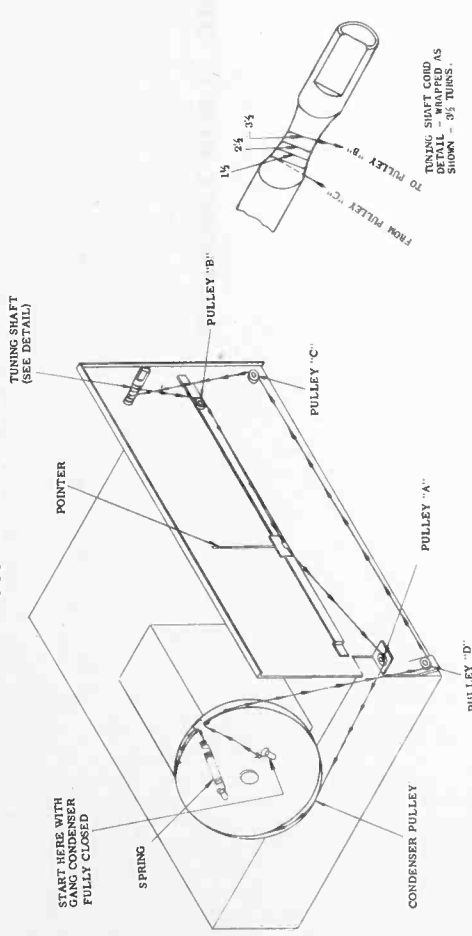
Select a 50-inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the condenser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.

Place the dial pointer onto the pointer slide and turn the tuning gang completely in mesh. Lace the dial cord around the three hooks on the front of the pointer and with the tuning condenser still fully in mesh, slide the pointer over until it lines up with the last dial calibration mark at the low frequency end of the broadcast band. This completes the assembly.

DIAL STRINGING GUIDE (51-03, 51-05 & 51-08)



DIAL STRINGING GUIDE (ALL OTHERS)



AM ALIGNMENT
Set band switch to AM position. Check dial pointer positioning.

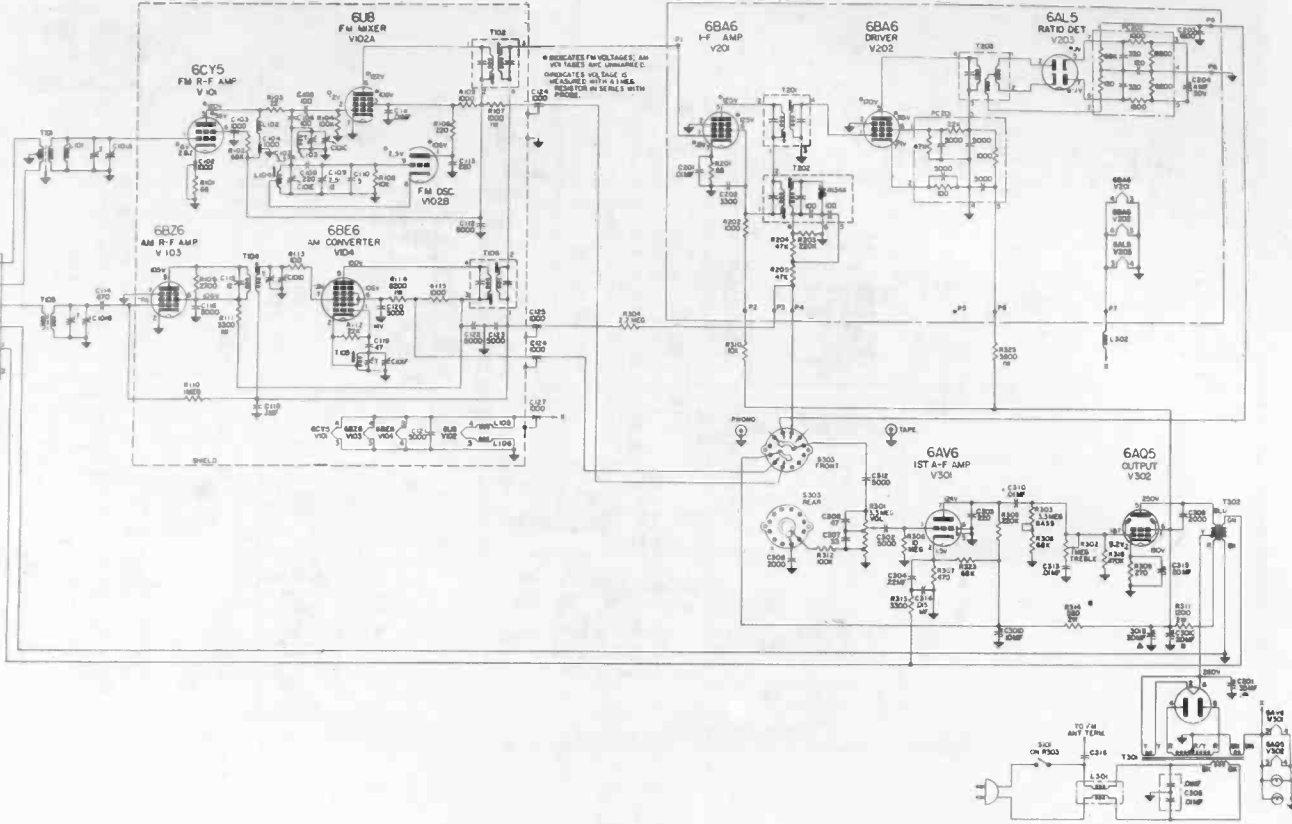
COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY	DIAL TO:				
6BE6 (pin 7) thru .01 mfd	455 kc (modulated)	Near 1000 kc (free of interference)	T202, T106, top and bottom slugs	Across voice coil	Adjust for max. output	
AM ant. term. thru 10 mmf	1400 kc (modulated)	1400 kc	C101F C101D C101B	"	"	
"	600 kc (modulated)	600 kc	T106, T104	"	Adjust for max. output.	
"	-----	-----	-----	"	Repeat steps 2 and 3.	

FM ALIGNMENT (Using AM Signal Generator and VTVM)
Set band switch to FM position. Note: Place a 1 megohm resistor in series with hot side of VTVM.

COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY	DIAL TO:				
6CY5 (pin 5) thru .01 mfd	10.7 mc unmodulated	Low end of dial	T201, T102 top & bottom slugs and T203 bottom slug	From (pin 5) to pin 4 of PC202	Adjust for max. neg. reading on VTVM.	
"	"	Low end of dial	T203 top slug	Across C203	Tune for zero VTVM. (point where voltage swings pos. or neg.)	
"	"	Low end of dial	Repeat steps 1 & 2	Repeat steps 1 & 2	Repeat steps 1 & 2	
FM ant. terms in series with: 120 ohms (high side) 150 ohms (low side)	107 mc	107 mc	C109 C101A C101C	From pin 5 to pin 4 of PC202	Adjust for max. neg. reading on VTVM.	
"	89 mc	89 mc	L104 (osc. coil)	"	"	
"	-----	-----	-----	-----	Repeat two preceding steps.	

SCHEMATIC DIAGRAM
(51-02)

PAGE 8

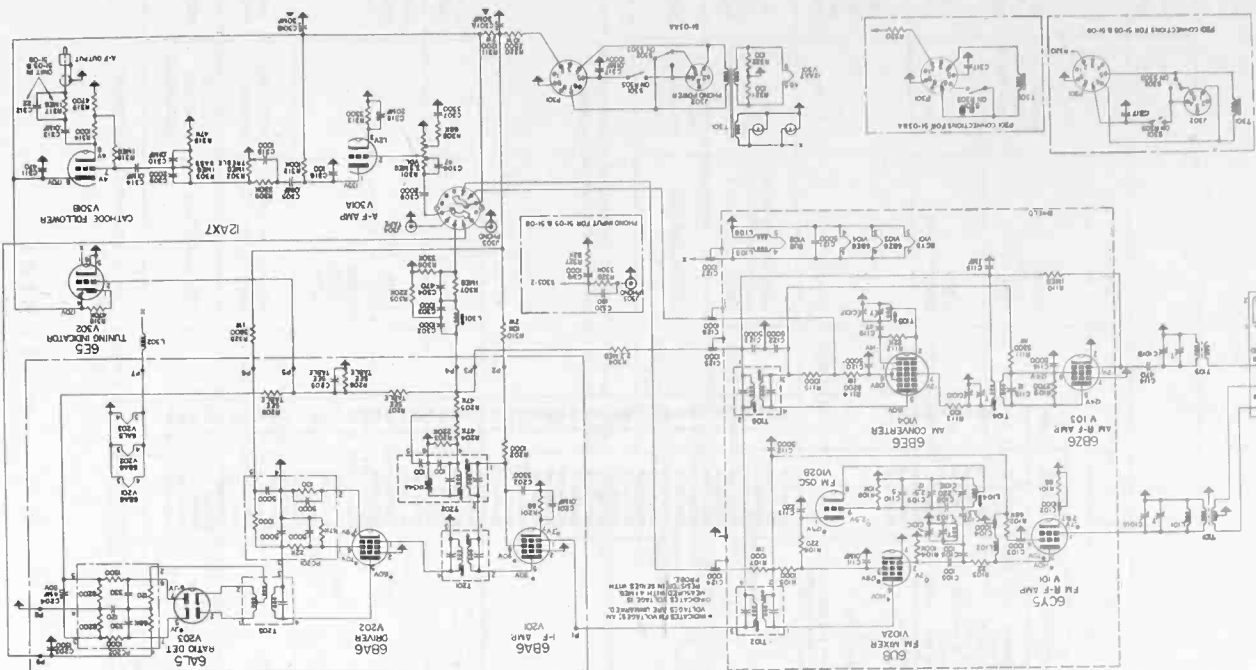


PARTS LIST
(51-01, 51-04, 51-07, 51-09, 51-11)

SYMBOL	DESCRIPTION	PART NO.	LIST
T101	FM Input	366491-4	1.00
T102	I-F	366492-1	1.50
T103	RF Antenna Assembly	366496-1	1.50
T104	AM R-F	366753-1	1.35
T105	AM Oscillator	366752-1	.65
T106	1st AM I-F	366811-1	1.40
T201	2nd AM I-F	366749-1	1.60
T202	Ratio	366748-1	2.65
T301	Power (51-04)	360165-2	13.50
T302	Audio Output	320077-1	3.35
L101	FM Antenna	360750-1	.15
L102	RF Choke	360522-9	.30
L103	FM R-F	360751-1	.35
L104	FM Oscillator	360628-1	.90
L105	RF Choke	360522-9	.30
L106	RF Choke	360522-9	.30
L301	10KC Filter	360421-1	.35
L302	RF Choke	360522-9	.30
C101	Tuning Capacitor	260147-1	6.75
C102	Feed Thru, 1000 mfd	250276-2	.20
C103	Feed Thru, 1000 mfd	250276-1	.20
C104	Feed Thru, 1000 mfd	250276-1	.25
C105	Mica, 100 mfd	250187-53	.25
C106	Mica, 2.2 mfd	250231-18	.15
C107	Mica, 220 mfd	250187-57	.35
C108	Cer. 2.5-12.0 mfd (Trimmer)	250188-9	.30
C109	Cer. 5 mfd-.5%	250088-138	.20
C110	Cer. 5000 mfd	250175-30	.30
C111	Mica, 200 mfd	250187-57	.35
C112	Mica, 10 mfd	250189-102	.25
C113	Cer. 10 mfd-.5%	250175-30	.20
C114	Cer. 5000 mfd	250175-30	.30
C115	Mylar, .1 mfd-100V	250218-17	.15
C116	Cer. 47 mfd	250175-30	.20
C117	Cer. 5000 mfd	250175-30	.30
C118	Cer. 5000 mfd	250175-30	.30
C119	Cer. 5000 mfd	250175-30	.30
C120	Cer. 5000 mfd	250175-30	.30
C121	Cer. 5000 mfd	250175-30	.30
C122	Cer. 5000 mfd	250175-30	.30
C123	Cer. 5000 mfd	250175-30	.30
C124	Cer. 5000 mfd	250175-30	.30
C125	Cer. Feed Thru, 1000 mfd	250276-1	.25
C126	Cer. Feed Thru, 1000 mfd	250276-1	.25
C127	Cer. Feed Thru, 1000 mfd	250276-1	.25
C201	Cer., .01 mfd	250234-66	.30
C202	Cer., .0033 mfd	250234-154	.25
C203	Cer., .0015 mfd	250234-146	.20
C204	Electrolytic, 4mf-50V	270559-9	1.10
C205	Paper, 100 mfd	250218-17	.15
C301	Electrolytic 35 mfd-350V	270621-71	2.75
C302	20 mfd-350V	250228-354	.45
C303	10 mfd-350V	250228-354	.45
C304	Mica, 1000 mfd, 5%	250218-17	.15
C305	Ceramic, 90 mfd	250218-17	.15
C306	Ceramic, 47 mfd	250218-17	.15
C307	Ceramic, 33 mfd	250218-21	.25
C308	Ceramic, 2000 mfd	250218-20	.25
R101	68	230104-84	2.00
R102	68K	230104-42	2.00
R103	22	230104-86	2.00
R104	100K	230104-82	2.00
R105	1000	230104-54	2.50
R106	220	230104-82	2.00
R107	100K	230104-84	2.00
R108	10K	230104-84	2.00
R109	100K	230104-84	2.00
R110	100K	230104-84	2.00
R111	100K	230104-84	2.00
R112	22K	230104-78	2.00
R113	100	230104-50	2.00
R114	8200 - 1W	230104-82	2.50
R115	1000	230104-82	2.00
R201	680	230104-84	2.00
R202	100K	230104-82	2.00
R203	220K	230104-90	2.00
R204	47K	230104-82	2.00
R205	47K	230104-82	2.00
R206*	1.5 meg.	230104-100	2.00
R207*	2.2 meg.	230104-102	2.00
R208*	2.2 meg.	230104-102	2.00
R301	100K	220072-38	2.00
R302	100K	220072-38	2.00
R303	100K	220072-38	2.00
R304	2.2 meg	230104-102	2.00
R305	220K	230104-92	2.00
R306	330K	230104-92	2.00
R307	2.2 - 2W	230109-2	3.50
R308	150 - 2W	230106-1052	3.50
R309	100K - 2W	230106-1074	3.50
R310	100K - 2W	230106-1074	3.50
R311	1200 - 2W	230106-1063	3.50
R312	1200K	230104-86	2.00
R313	3300	230104-82	2.00
R314	1000	230104-82	2.00
R315	2.2 meg.	230104-102	2.00
R316	470K	230104-84	2.00
R317	470K	230104-84	2.00
R318	5600	230104-71	2.00
R319	470K	230104-84	2.00
R320	33K	230104-80	2.00
R321	470K	230104-94	2.00
R322	220 - 2W	230106-1054	3.50
R323	68K	230104-84	2.00
R324	12K	230104-75	2.00
R325	470K	230104-84	2.00
R326	470K	230104-84	2.00
R327*	22K	230104-78	2.00

*Used only on 51-04 Chassis.

PARTS LIST
(51-03, 51-05, 51-08)



PARTS LIST
(51-02)

SYMBOL	DESCRIPTION	PART NO.	LIST
T101	TRANSFORMERS-COILS-CHOICES		
T102	FM Input	360491-4	1.00
T103	FM Input	360598-1	1.80
T104	Red Antenna Assembly	360746-1	3.50
T105	AM R-F	360753-1	1.35
T106	AM Oscillator	360752-1	1.65
T201	1st AM I-F	360811-1	1.40
T202	2nd FM I-F	360798-1	2.85
T203	Ratio Detector	360748-1	2.85
T301	Power	300164-1	12.00
L101	Audio Output	320297-1	15
L102	FM Antenna	360750-1	3
L103	RF Choke	360751-1	3
L104	FM Oscillator	360754-1	15
L105	RF Choke	360522-9	30
L301	AC Line Choke	360551-1	30
L302	RF Choke	360522-9	30
C101	Tuning Capacitor	260147-1	6.75
C102	Feed Thru, 1000 mf	250276-2	.20
C103	Feed Thru, 1000 mf	250276-2	.20
C104	Feed Thru, 1000 mf	250187-53	.25
C105	Mica, 100 mmf	250187-53	.25
C106	Mica, 2.2 mmf	250221-118	.15
C107	Mica, 220 mmf	250187-57	.35
C108	Mica, 220 mmf	250188-9	.30
C109	Cap., 5 mmf - 5%	250218-106	.30
C110	Cap., 5 mmf - 5%	250218-106	.30
C111	Cap., 5 mmf - 5%	250218-106	.30
C112	Cap., 5 mmf - 5%	250218-106	.30
C113	Cap., 5 mmf - 5%	250159-102	.35
C114	Mica, 470 mmf	250187-57	.35
C115	Cap., 2 mmf - 5%	250188-9	.30
C116	Cap., 2 mmf - 5%	250218-106	.30
C117	Cap., 2 mmf - 5%	250218-106	.30
C118	Mica, 1 mfd - 100V	250218-125	.40
C119	Cap., 47 mmf	250218-117	.15
C120	Cer., 5000 mmf	250175-30	.20
C121	Cer., 5000 mmf	250175-30	.20
C122	Cer., 5000 mmf	250175-30	.20
C123	Cer., 5000 mmf	250175-30	.20
C124	Cer., Feed Thru, 1000 mf	250276-1	.25
C125	Cer., Feed Thru, 1000 mf	250276-1	.25
C126	Cer., Feed Thru, 1000 mf	250276-1	.25
C127	Cer., Feed Thru, 1000 mf	250276-1	.25
C128	Ceramic, .0015 mf	250234-154	.20
C201	Ceramic, .0015 mf	250234-154	.20
C202	Ceramic, .0015 mf	250234-154	.20
C203	Ceramic, .0015 mf	250234-154	.20
C204	Electrolytic 4 mf - 50V	270559-9	1.10
R101	68K	230104-48	2.00
R102	68K	230104-48	2.00
R103	22K	230104-48	2.00
R104	100K	230104-86	2.00
R105	100K	230104-86	2.00
R106	220	230104-62	2.00
R107	1000 - 1W	230104-54	2.00
R108	10K	230105-62	2.50
R109	2700	230104-74	2.00
R110	3300K - 1W	230104-67	2.00
R111	22K	230104-67	2.00
R112	22K	230104-67	2.00
R113	100	230104-68	2.50
R114	82000 - 1W	230104-78	2.00
R115	3000	230104-50	2.00
R201	9000	230105-75	2.00
R202	220K	230104-48	2.00
R203	220K	230104-48	2.00
R204	47K	230104-62	2.00
R205	47K	230104-82	2.00
R301	Loudness Control (3.3 meg)	230104-82	2.00
R302	Treble Control (1.5 meg)	230104-82	2.00
R303	Treble Control (1.5 meg)	230104-82	2.00
R304	2.2 meg	230104-82	2.00
R305	220K	230104-102	2.00
R306	10 meg	230104-90	2.00
R307	470	230104-10	2.00
R308	22K	230104-84	2.00
R309	10K - 2W	230104-55	2.00
R310	10K - 2W	230106-1074	3.50
R311	100K	230106-1074	3.50
R312	100K	230106-1074	3.50
R313	3500	230106-1074	3.50
R314	470K	230106-1074	3.50
R315	470K	230106-1074	3.50
R316	68K	230104-84	2.00
R317	68K	230104-84	2.00
R318	68K	230104-84	2.00
R319	68K	230104-84	2.00
R320	68K	230104-84	2.00
R321	68K	230104-84	2.00
R322	68K	230104-84	2.00
R323	68K	230104-84	2.00
R324	68K	230104-84	2.00
R325	3900 - 1W	230106-69	3.50

PRICES FOR RESISTORS ARE FOR A PACKAGE OF 10 UNLESS INDICATED BY @.
MISCELLANEOUS PARTS LIST
(ALL CHASSIS)

SYMBOL	DESCRIPTION	PART NO.	LIST
PC201	Photo & Tube Input	180586-1	.20
PC202	Pilot Light #1847	180181-17	.20
PC203	Pilot Light #1847	180181-17	.20
PC204	Band Switch	102984-1	2.75
PC205	Band Switch (61-03 & 04)	102984-1	1.75
PC206	Band Switch (61-03BA)	102984-4	1.75
PC207	Printed Circuit	250255-1	1.15
PC208	Printed Circuit	250255-1	1.15

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE
PRICES SLIGHTLY HIGHER IN WEST

SCHEMATIC DIAGRAM
(51-03, 51-05, 51-08)

SYMBOL	DESCRIPTION	PART NO.	LIST	SYMBOL	DESCRIPTION	PART NO.	LIST
T101	TRANSFORMERS-COILS-CHOKES			C311	Ceramic, 470 mmf	250218-6	2.00
T102	1st FM I-F	360491-4	1.00	C312	Ceramic, 10K mmf	250218-19	2.00
T103	1st FM I-F	360626-1	1.60	C313	Ceramic, 10K mmf	250218-19	2.00
T104	1st FM I-F	360746-1	3.50	C314	Ceramic, 10K mmf	250218-19	2.00
T105	1st FM I-F	360753-1	1.35	C315	Ceramic, 10K mmf	270027-28	1.00
T106	AM Oscillator	360752-1	1.65	C316	Mica, 100 mmf	250187-53	2.25
T201	2nd FM I-F	360811-1	1.40	C317	Ceramic, 10K mmf - 1000V	250218-2	2.00
T202	2nd FM I-F	360811-1	1.40	C318	Ceramic, 1000 mmf	250218-18	2.00
T203	2nd FM I-F	360749-1	2.65	C319	Ceramic, 1000 mmf	250218-18	2.00
T301	Ratio Detector	360748-1	2.65	C320**	Ceramic, 180 mmf	250175-40	2.20
L101	Flament	320277-2	4.50		RESISTORS		
L102	FM Antenna	360750-1	.30		All resistors are 10% - 1/2W unless specified otherwise		
L103	FM R-F	360522-9	1.15	R101	68K	230104-48	2.00
L104	FM R-F	360751-1	1.15	R102	22	230104-42	2.00
L105	RF Choke	360522-9	3.00	R103	100K	230104-86	2.00
L106	RF Choke	360522-9	3.00	R104	200	230104-86	2.00
L301	10KC Filter	360821-1	3.35	R105	100	230104-84	2.00
L302	RF Choke	360522-9	3.30	R106	100	230104-84	2.00
				R107	1000 - 1W	230105-62	2.50
				R108	10K	230104-74	2.00
				R109	2700	230104-87	2.00
				R110	1 meg	230104-88	2.00
				R111	3300 - 1W	230105-68	2.50
				R112	10K	230104-82	2.00
				R113	100	230104-82	2.00
				R114	8200 - 1W	230104-50	2.00
				R115	1000	230105-73	2.50
				R201	680	230104-62	2.00
				R202	1000	230104-62	2.00
				R203	220K	230104-90	2.00
				R204	47K	230104-82	2.00
				R205	47K	230104-82	2.00
				R206	1.5 meg	230104-100	2.00
				R207	2.2 meg	230104-102	2.00
				R208	2.2 meg	230104-102	2.00
				R301	Loudness Control (3.3 meg)	220131-13	@1.25
				R302	Treble Control (1 meg)	220072-38	@1.00
				R303***	Base Control (1 meg)	230073-102	@1.60
				R304	220K	230104-80	2.00
				R305	220K	230104-80	2.00
				R306	330K	230104-92	2.00
				R307	1 meg	230104-88	2.00
				R308	68K	230104-84	2.00
				R309	330K	230104-92	2.00
				R310	10K - 2W	230104-104	3.50
				R311	100K - 2W	230104-104	3.50
				R312	100K - 2W	230104-86	2.00
				R313	3300	230104-68	2.00
				R314	1000	230104-62	2.00
				R315	47K	230104-82	2.00
				R316	470K	230104-94	2.00
				R317*	1 meg	230104-98	2.00
				R318	470K	230104-98	2.00
				R319	4700	230104-70	2.00
				R320	2500 - 10W	240071-39	@.40
				R321	100	230104-50	2.00
				R322	100	230104-50	2.00
				R323	3900 - 1W	230105-69	2.50
				R324	82K	230104-94	2.50
				R325**	330K	230104-92	2.50
					*Used only in 51-03		
					**Used only in 51-05 & 08		
					***Used only in 51-03&08		
C101	TRANSFORMERS-COILS-CHOKES				RESISTORS		
C102	Tuning Capacitor	280147-1	6.75		All resistors are 10% - 1/2W unless specified otherwise		
C103	Feed Thru, 1000 mmf	250276-2	.20				
C104	Feed Thru, 1000 mmf	250276-1	.20				
C105	Mica, 100 mmf	250276-1	.25				
C106	Mica, 100 mmf	250187-53	.25				
C107	Mica, 2.2 mmf	250187-53	.25				
C108	Mica, 2.2 mmf	250221-118	.15				
C109	Mica, 220 mmf	250187-57	.35				
C110	Cer. 2.5 - 12.0 mmf (Trimmer)	250188-9	.20				
C111	Cer. 5 mmf - 5%	250211-38	.25				
C112	Cer. 5000 mmf	250211-7	.25				
C113	Mica, 220 mmf	250175-30	.20				
C114	Mica, 470 mmf	250187-57	.35				
C115	Cer. 12 mmf - 5%	250159-102	.25				
C116	Cer. 5000 mmf	250088-179	.20				
C117	Mylar, 1000 mmf - 100V	250241-75	.40				
C118	Cer. 47 mmf	250218-17	.15				
C119	Cer. 5000 mmf	250175-30	.20				
C120	Cer. 5000 mmf	250175-30	.20				
C121	Cer. 5000 mmf	250175-30	.20				
C122	Cer. 5000 mmf	250175-30	.20				
C123	Cer. 5000 mmf	250175-30	.20				
C124	Cer. Feed Thru, 1000 mf	250276-1	.25				
C125	Cer. Feed Thru, 1000 mf	250276-1	.25				
C126	Cer. Feed Thru, 1000 mf	250276-1	.25				
C127	Cer. Feed Thru, 1000 mf	250276-1	.25				
C201	Ceramic, 01 mf	250234-66	.30				
C202	Ceramic, .0033 mf	250234-154	.25				
C203	Ceramic, .0015 mf	250234-146	.20				
C204	Electrolytic 4 mfd - 50V	270358-9	1.00				
C205	Electrolytic 4 mfd - 50V	270358-9	1.00				
C301	Electrolytic 30-30 mfd-450V	270021-58	2.25				
C302	Mica, 1000 mmf	250228-354	.45				
C303	Mica, 1000 mmf	250228-354	.45				
C304	Ceramic, 470 mmf	250218-6	.20				
C305	Ceramic, 2x10K mmf - 1000V	250218-3	.55				
C306	Ceramic, 3300 mmf	250218-21	.15				
C307	Ceramic, 2000 mmf	250218-20	.25				
C308	Ceramic, 2000 mmf	250218-20	.25				
C310	Ceramic, 10K mmf	250218-19	.20				

Magnavox

51 SERIES RADIO CHASSIS

MAINTENANCE MANUAL 1326

GENERAL

Complete maintenance information necessary for the proper servicing of any of the 51 series radio chassis is covered on the following pages. Some of these chassis are AM-FM tuners only which require an additional amplifier for voltages and output. Others contain a built-in amplifier which may have push-pull output or single ended output. The chassis having push-pull output provide approximately 6-watts power output and those chassis having single-ended output provide approximately 3-watts power output.

Electrical changes which were made on the 51-01 and 51-03 are included on the schematic diagram covering those chassis. These electrical changes will appear in those chassis which contain the suffix letters "BA" appearing after the chassis numbers. The chassis which have the suffix letters "BAX" appearing after the chassis numbers are identical to the "BA" versions, however, they use a different transformer as illustrated in the Parts List.

SPECIFICATIONS

Tuning Frequency Range:	540-1620KC	Ratio Detector	6AL5
Broadcast Band	88-108MC	AM Detector (crystal)	1N34A
FM Band	455KC/10.TMC	Tuning Eye (51-03, 04, 05, 08)	6E5
Intermediate Frequency		Audio Amp. (51-02)	6AV6
Tubes:		Audio Amp. (51-01, 04, 07, 08, 11)	(1/2) 6U8
FM RF Amplifier	8CY5	Phase Inverter (51-01, 04, 07, 08, 11)	(1/2) 12AX7
AM RF Amplifier	8BZ6	Cathode Follower (51-03, 05, 08)	(1/2) 6U8
FM Mixer & Osc.	6U8	Audio Output (51-02)	6AQ5
AM Converter	8BE8	Audio Output Push-Pull (51-01, 04, 07, 08, 11)	(2) 6AQ5
IF Amplifier	8BA8	Rectifier (51-01, 02, 04, 07, 08, 11)	5Y3
FM Driver	8BA6		

CHASSIS DIFFERENCES

Chassis No.	Tuning Eye	Output	Chassis No.	Tuning Eye	Output
51-01	No	Push-Pull	51-07	No	Push-Pull
51-02	No	Single Ended	51-08	Yes	None
51-03	Yes	None	51-09	No	Push-Pull
51-04	Yes	Push-Pull	51-10	Not Released	
51-05	Yes	None	51-11	No	Push-Pull
51-06	Not Released*				

ALIGNMENT

AM ALIGNMENT
Set band switch to AM position. Check dial pointer positioning.

COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY					
6BE6 (pin 7) thru .01 mfd	455 kc (modulated)		Near 1000 kc (free of interference)	T202, T106, top and bottom slugs	Across voice coil	Adjust for max. output
AM ant. term. thru 10 mmf	1400 kc (modulated)		1400 kc	C101F C101D C101B	"	"
"	600 kc (modulated)		600 kc	T106, T104	"	Adjust for max. output.
"	-----		-----	-----	"	Repeat steps 2 and 3.

FM ALIGNMENT (Using AM Signal Generator and VTVM)
Set band switch to FM position. Note: Place a 1 megohm resistor in series with hot side of VTVM.

COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY					
6CY5 (pin 5) thru .01 mfd	10.7 mc unmodulated		Low end of dial	T201, T102 top & bottom slugs and T203 bottom slug	From (pin 5) to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	"		Low end of dial	T203 top slug	Across C203	Tune for zero VTVM. (Point where voltage swings pos. or neg.)
"	"		Low end of dial	Repeat steps 1 & 2	Repeat steps 1 & 2	Repeat steps 1 & 2
FM ant. terms in series with: 120 ohms (high side) 150 ohms (low side)	107 mc		107 mc	C109 C101A C101C	From pin 5 to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	89 mc		89 mc	L104 (osc. coil)	"	"
"	-----		-----	-----	-----	Repeat two preceding steps.

ALIGNMENT

FM I-F AND RATIO DETECTOR ALIGNMENT (Using Sweep Generator and Oscilloscope).
 Note: Place 1 megohm resistor in series with hot scope lead.

SWEEP GENERATOR	FREQUENCY	SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT SCOPE TO	REMARKS
6CY5 (pin 5) thru .01 mfd and 1000 ohms in series	10.7 mc (.3 mc sweep) couple a marker sig. to 6CY5 pin 5	Low end of dial	T201, T102 top and bottom slugs and T203 bottom slug	From pin 5 to pin 4 of PC202	Open one end of C204. Adjust for max. amplitude and symmetry. See fig. 1 below.
"	"	Low end of dial	T203 top slug	Across C203	Adjust for best amplitude and straightest slope. See fig. 2.
"	"	Low end of dial	T203 bottom slug	"	Adjust for best symmetry about 10.7 mc. See fig. 2.
"	"	-----	-----	-----	Repeat steps 1, 2 and 3.

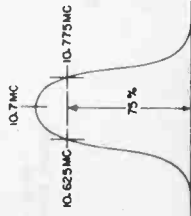


FIG. 1 F.M.I.F. SELECTIVITY CURVE

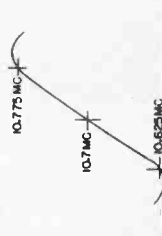
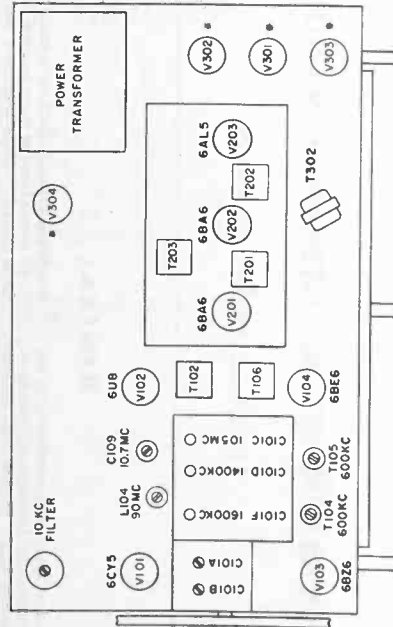


FIG. 2 RATIO DETECTOR RESPONSE CURVE

CHASSIS LAYOUT



DIAL STRINGING INSTRUCTIONS

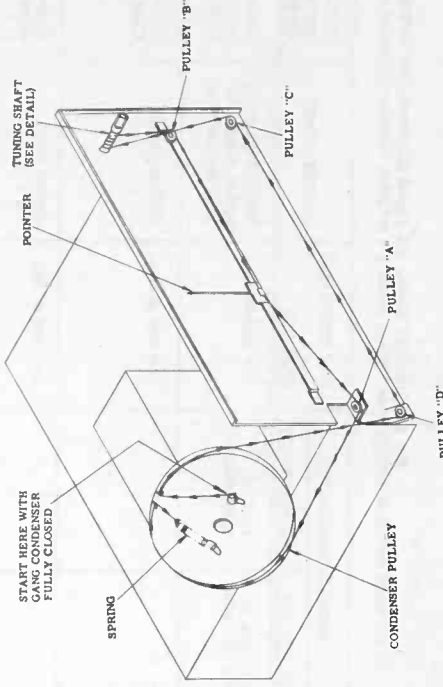
DIAL CORD PLACEMENT

Select a 50-inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the condenser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.

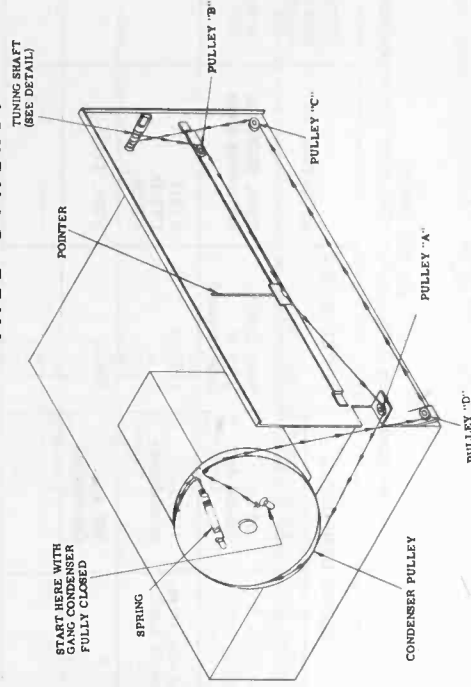
DIAL POINTER PLACEMENT

Place the dial pointer onto the pointer slide and turn the tuning gang completely in mesh. Lace the dial cord around the three hooks on the front of the pointer and with the tuning condenser still fully in mesh, slide the pointer over until it lines up with the last dial calibration mark at the low frequency end of the broadcast band. This completes the assembly.

DIAL STRINGING GUIDE (51-03, 51-05 & 51-08)



DIAL STRINGING GUIDE (ALL OTHERS)

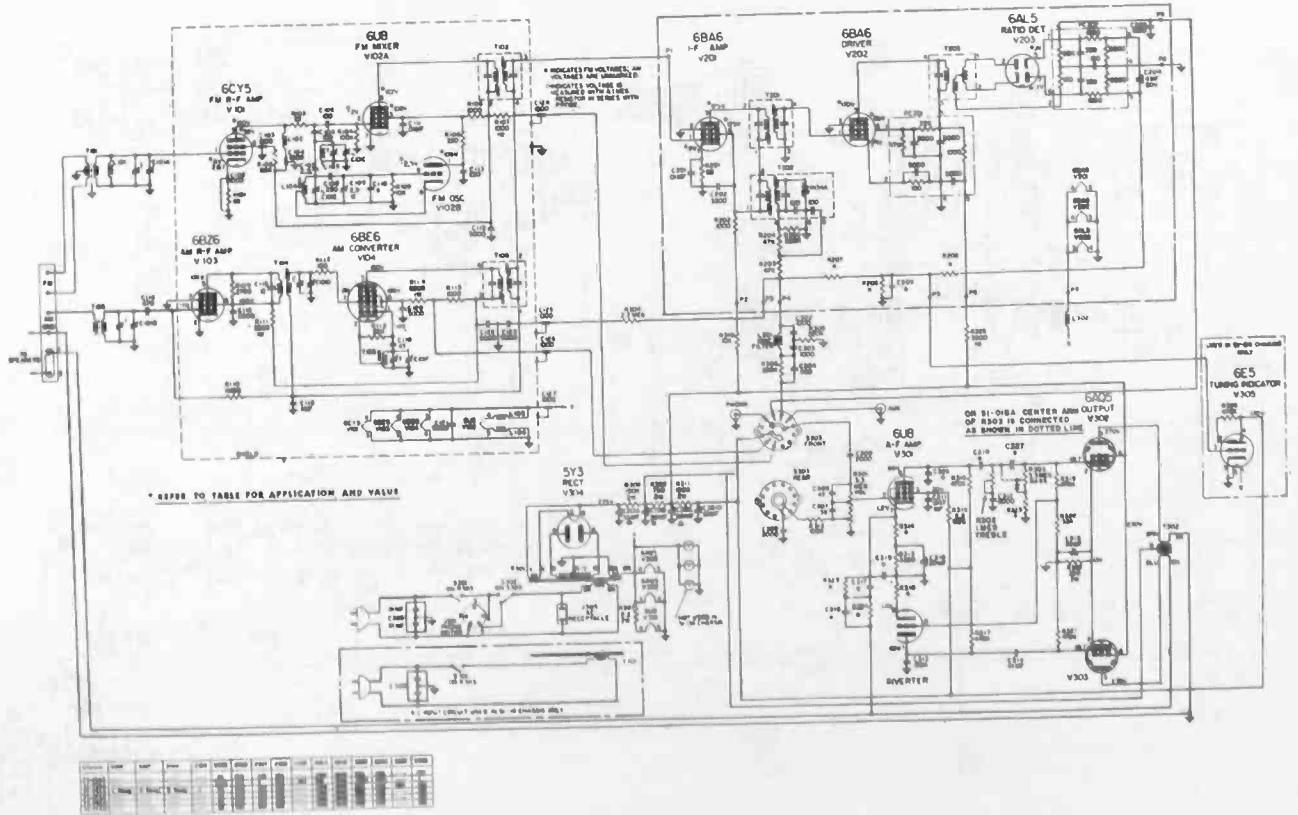


REPLACEMENT PARTS LIST
(51-01, 04, 07, 09, 11)

SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION	PART NO.
T101	TRANSFORMERS-COILS-CHOKES	360491-4	R101	68	230104-48
T102	FM Input	360526-1	R103	22	230104-64
T103	1st FM I-F	360746-1	R104	100K	230104-82
T104	Rod Antenna Assembly	360753-1	R105	1000	230104-82
T105	AM R-F	360752-1	R106	200, 1W	230104-64
T106	AM Oscillator	360511-1	R107	10K	230104-62
T201	1st AM I-F	360747-1	R108	10K	230104-62
T202	2nd FM I-F	360748-1	R109	2700	230104-67
T203	2nd AM I-F	360749-1	R110	1 meg	230104-68
T301	Audio Output	360185-2	R111	3300, 1W	230104-78
T302	Power (51-04) & (51-01BAX)	320677-1	R112	22K	230104-88
L101	FM Antenna	360750-1	R113	100	230104-50
L102	RF Choke	360522-9	R114	3200, 1W	230104-82
L103	FM R-F	360751-1	R115	1000	230104-82
L104	FM Oscillator	360628-1	R201	680	230104-48
L105	RF Choke	360522-9	R202	1000	230104-62
L106	RF Choke	360522-9	R203	220K	230104-62
L301	10KC Filter	360621-1	R204	47K	230104-82
L302	RF Choke	360522-9	R205	47K	230104-82
C101	Tuning Capacitor	260147-1	R206	1.5 meg	230104-102
C102	Feed Thru, 1000 mfd	260276-2	R207	2.2 meg	230104-102
C103	Feed Thru, 1000 mfd	260276-2	R301	2.2 meg	230104-102
C104	Feed Thru, 1000 mfd	260276-1	R302	Control (3.3 meg)	230104-102
C105	Mica, 100 mfd	260187-53	R303	Treble Control (1 meg)	230104-102
C106	Mica, 2.2 mfd	260221-118	R304	Base Control (3.3 meg)	230104-102
C107	Mica, 2.2 mfd	260187-57	R305	2.2 meg	230104-82
C108	Mica, 220 mfd	260221-118	R306	2.2 meg	230104-82
C109	Cer. 2.5-12.0 mfd (Trimmer)	260188-9	R307	2.2 ZW	230104-82
C110	Cer. 5 mfd, 5%	260088-138	R308	150, 3W	230104-82
C111	Cer. 5000 mfd	260175-30	R309	10K, 2W	230104-82
C112	Mica, 200 mfd	260187-87	R310	100K	230104-82
C113	Mica, 470 mfd	260188-102	R311	1000	230104-82
C114	Cer. 12 mfd, 5%	260088-179	R312	3300	230104-82
C115	Cer. 5000 mfd	260175-30	R313	1000	230104-82
C116	Cer. 5000 mfd	260175-30	R314	1000	230104-82
C117	Mylar, 1 mfd, 100V	260218-17	R315	2.2 meg	230104-82
C118	Cer. 5000 mfd	260175-30	R316	470K	230104-82
C119	Cer. 5000 mfd	260175-30	R317	470K	230104-82
C120	Cer. 5000 mfd	260175-30	R318	5600	230104-82
C121	Cer. 5000 mfd	260175-30	R319	470K	230104-82
C122	Cer. 5000 mfd	260175-30	R320	33K	230104-82
C123	Cer. 5000 mfd	260175-30	R321	470K	230104-82
C124	Cer. Feed Thru, 1000 mfd	260276-1	R322	220, 2W	230104-104
C125	Cer. Feed Thru, 1000 mfd	260276-1	R323	88K	230104-84
C126	Cer. Feed Thru, 1000 mfd	260276-1	R324	150K (51-01BA)	230104-84
C127	Cer. Feed Thru, 1000 mfd	260276-1	R325	12K	230104-84
C201	Cer., .01 mfd	260234-86	R326	4.7K (51-01BA)	230104-84
C202	Cer., .0083 mfd	260234-154	R327	3900, 1W	230104-84
C203	Cer., .0015 mfd	260234-146	R328	470K	230104-84
C204	Electrolytic, 4 mfd-50V	270559-9	R329	5600	230104-84
C205*	Paper, 1mfd - 200V	260240-13	R330	3300 (51-01BA)	230104-84
C301	Electrolytic 35 mfd - 350V	270021-11	R331	470K	230104-84
C302	30 mfd - 350V		R332	33K	230104-84
C303	10 mfd - 350V		R333	470K	230104-84
C304	Mica, 1000 mfd, 5%	260228-354	R334	220, 2W	230104-104
C305	Ceramic, 680 mfd, 5%	260218-4	R335	88K	230104-84
C306	Ceramic, 2 x 10K mfd-1000V	260219-3	R336	150K (51-01BA)	230104-84
C307	Ceramic, 47 mfd	260218-17	R337	12K	230104-84
C308	Ceramic, 33 mfd	260218-21	R338	4.7K (51-01BA)	230104-84
C309	Ceramic, 2000 mfd	260218-20	R339	3900, 1W	230104-84
C310	Cer., 2000 mfd	260218-20	R340	470K	230104-84
C311	Cer., 10K mfd	260218-19	R341	5600	230104-84
C312	Paper, .047 mfd-200V	260202-11	R342	3300 (51-01BA)	230104-84
C313	Ceramic, 5000 mfd	260178-39	R343	22 (51-01BA)	230104-42
C314	Cer., 100 mfd	260218-22			

*Used only on 51-04 Chassis.

SCHEMATIC DIAGRAM
(51-01, 04, 07, 09, 11)



REPLACEMENT PARTS LIST
(51-03,05,08)

SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION	PART NO.
T101	FM Input	360481-4	R101	68K	230104-48
T102	1st FM I-F	360486-1	R102	22K	230104-54
T103	1st FM R-F	360753-1	R103	100K	230104-52
T104	AM R-F	360753-1	R104	100K	230104-52
T105	AM Oscillator	360752-1	R105	200	230104-52
T106	1st AM I-F	360611-1	R106	1000, 1W	230105-82
T201	2nd FM I-F	360747-1	R107	1000, 1W	230104-74
T202	2nd AM I-F	360749-1	R108	2700	230104-57
T203	Ratio Detector	320277-2	R109	1 meg	230104-88
T301	Filament	360750-1	R110	3300, 1W	230105-68
L101	FM Antenna	360522-9	R111	22K	230104-78
L102	RF Choke	360751-1	R112	100	230104-50
L103	FM R-F	360628-1	R113	8200, 1W	230105-73
L104	FM Oscillator	360522-9	R114	1000	230104-62
L105	RF Choke	360522-9	R201	680	230104-48
L106	RF Choke	360522-9	R202	1000	230104-62
L301	10K Filter	360521-1	R203	220K	230104-90
L302	RF Choke	360522-9	R204	47K	230104-82
			R205	47K	230104-82
			R206	1.5 meg	230104-100
			R207	2.2 meg	230104-102
			R208	2.2 meg	230104-102
			R209	2.2 meg	230104-102
			R210	2.2 meg	230104-102
			R211	2.2 meg	230104-102
			R212	2.2 meg	230104-102
			R213	2.2 meg	230104-102
			R214	2.2 meg	230104-102
			R215	2.2 meg	230104-102
			R216	2.2 meg	230104-102
			R217	2.2 meg	230104-102
			R218	2.2 meg	230104-102
			R219	2.2 meg	230104-102
			R220	2.2 meg	230104-102
			R221	2.2 meg	230104-102
			R222	2.2 meg	230104-102
			R223	2.2 meg	230104-102
			R224	2.2 meg	230104-102
			R225	2.2 meg	230104-102
			R226	2.2 meg	230104-102
			R227	2.2 meg	230104-102
			R228	2.2 meg	230104-102
			R229	2.2 meg	230104-102
			R230	2.2 meg	230104-102
			R231	2.2 meg	230104-102
			R232	2.2 meg	230104-102
			R233	2.2 meg	230104-102
			R234	2.2 meg	230104-102
			R235	2.2 meg	230104-102
			R236	2.2 meg	230104-102
			R237	2.2 meg	230104-102
			R238	2.2 meg	230104-102
			R239	2.2 meg	230104-102
			R240	2.2 meg	230104-102
			R241	2.2 meg	230104-102
			R242	2.2 meg	230104-102
			R243	2.2 meg	230104-102
			R244	2.2 meg	230104-102
			R245	2.2 meg	230104-102
			R246	2.2 meg	230104-102
			R247	2.2 meg	230104-102
			R248	2.2 meg	230104-102
			R249	2.2 meg	230104-102
			R250	2.2 meg	230104-102
			R251	2.2 meg	230104-102
			R252	2.2 meg	230104-102
			R253	2.2 meg	230104-102
			R254	2.2 meg	230104-102
			R255	2.2 meg	230104-102
			R256	2.2 meg	230104-102
			R257	2.2 meg	230104-102
			R258	2.2 meg	230104-102
			R259	2.2 meg	230104-102
			R260	2.2 meg	230104-102
			R261	2.2 meg	230104-102
			R262	2.2 meg	230104-102
			R263	2.2 meg	230104-102
			R264	2.2 meg	230104-102
			R265	2.2 meg	230104-102
			R266	2.2 meg	230104-102
			R267	2.2 meg	230104-102
			R268	2.2 meg	230104-102
			R269	2.2 meg	230104-102
			R270	2.2 meg	230104-102
			R271	2.2 meg	230104-102
			R272	2.2 meg	230104-102
			R273	2.2 meg	230104-102
			R274	2.2 meg	230104-102
			R275	2.2 meg	230104-102
			R276	2.2 meg	230104-102
			R277	2.2 meg	230104-102
			R278	2.2 meg	230104-102
			R279	2.2 meg	230104-102
			R280	2.2 meg	230104-102
			R281	2.2 meg	230104-102
			R282	2.2 meg	230104-102
			R283	2.2 meg	230104-102
			R284	2.2 meg	230104-102
			R285	2.2 meg	230104-102
			R286	2.2 meg	230104-102
			R287	2.2 meg	230104-102
			R288	2.2 meg	230104-102
			R289	2.2 meg	230104-102
			R290	2.2 meg	230104-102
			R291	2.2 meg	230104-102
			R292	2.2 meg	230104-102
			R293	2.2 meg	230104-102
			R294	2.2 meg	230104-102
			R295	2.2 meg	230104-102
			R296	2.2 meg	230104-102
			R297	2.2 meg	230104-102
			R298	2.2 meg	230104-102
			R299	2.2 meg	230104-102
			R300	2.2 meg	230104-102
			R301	2.2 meg	230104-102
			R302	2.2 meg	230104-102
			R303	2.2 meg	230104-102
			R304	2.2 meg	230104-102
			R305	220K	230104-90
			R306	330K	230104-92
			R307	1 meg	230104-84
			R308	88K	230104-84
			R309	330K	230104-84
			R310	1200, 2W	230104-1074
			R311	1200, 2W	230106-1063
			R312	100K	230104-86
			R313	3300	230104-86
			R314	1000	230104-82
			R315	470K	230104-82
			R316	470K	230104-82
			R317	1 meg	230104-88
			R318	1 meg	230104-88
			R319	4700	230104-70
			R320	2500, 10W	230104-30
			R321	100	240071-59
			R322	100	230104-50
			R323	100	230104-50
			R324	8900, 1W	230105-69
			R325	82K	230104-85
			R326	82K	230104-82
			R327	82K	230104-82
			R328	82K	230104-82
			R329	82K	230104-82
			R330	82K	230104-82
			R331	82K	230104-82
			R332	82K	230104-82
			R333	82K	230104-82
			R334	82K	230104-82
			R335	82K	230104-82
			R336	82K	230104-82
			R337	82K	230104-82
			R338	82K	230104-82
			R339	82K	230104-82
			R340	82K	230104-82
			R341	82K	230104-82
			R342	82K	230104-82
			R343	82K	230104-82
			R344	82K	230104-82
			R345	82K	230104-82
			R346	82K	230104-82
			R347	82K	230104-82
			R348	82K	230104-82
			R349	82K	230104-82
			R350	82K	230104-82
			R351	82K	230104-82
			R352	82K	230104-82
			R353	82K	230104-82
			R354	82K	230104-82
			R355	82K	230104-82
			R356	82K	230104-82
			R357	82K	230104-82
			R358	82K	230104-82
			R359	82K	230104-82
			R360	82K	230104-82
			R361	82K	230104-82
			R362	82K	230104-82
			R363	82K	230104-82
			R364	82K	230104-82
			R365	82K	230104-82
			R366	82K	230104-82
			R367	82K	230104-82
			R368	82K	230104-82
			R369	82K	230104-82
			R370	82K	230104-82
			R371	82K	230104-82
			R372	82K	230104-82
			R373	82K	230104-82
			R374	82K	230104-82
			R375	82K	230104-82
			R376	82K	230104-82
			R377	82K	230104-82
			R378	82K	230104-82
			R379	82K	230104-82
			R380	82K	230104-82
			R381	82K	230104-82
			R382	82K	230104-82
			R383	82K	230104-82
			R384	82K	230104-82
			R385	82K	230104-82
			R386	82K	230104-82
			R387	82K	230104-82
			R388	82K	230104-82
			R389	82K	230104-82
			R390	82K	230104-82
			R391	82K	230104-82
			R392	82K	230104-82
			R393	82K	230104-82
			R394	82K	230104-82
			R395	82K	230104-82
			R396	82K	230104-82

GENERAL

The service information on the following pages covers the three versions of the 52 Series chassis. These chassis are AM-FM tuners only and the 52-01 and 52-02 versions obtain their voltages from the Amplifier used in conjunction with them. The 52-03 version contains its own power supply and uses a 5Y3GT as a rectifier.

Provisions are provided for the connection of an external AM or FM antenna. A terminal board having two connections marked FM, a connection marked AM and three other connections marked G, 1, and 2 respectively are located on a fibre board fastened to the rear of the radio chassis. To connect an external FM antenna to this unit merely connect the FM antenna leads to the two connections marked FM and to connect

an external AM antenna connect one lead to the AM connection and ground the antenna to the connection marked G. The connections marked 1 and 2 are not used.

Provisions have also been provided for using a tape recorder in conjunction with instruments using these chassis. On the rear apron of the radio chassis are two sockets labeled "Record" and "Play". To record from either radio or phone set the band selector switch to the desired recording position and connect the input to the tape recorder to the socket identified as "Record". To play the tape recorder back thru instruments using these chassis, set the band selector switch to Tape and plug the output of the recorder into the socket identified as "Play".

SPECIFICATIONS

POWER SUPPLY 117 VOLTS, 50/60 CYCLES AC
 POWER CONSUMPTION 75 WATTS
 TUNING FREQUENCY RANGE:
 BROADCAST BAND 540-1620 KC
 FM BAND 88-108 MC
 INTERMEDIATE FREQUENCY 455 KC/10.7 MC
 TUBES:
 FM RF AMPLIFIER 6CY5
 FM MIXER-OSCILLATOR 6U8
 AM RF AMPLIFIER 6BE6
 AM CONVERTER 6BE6

I. F. AMPLIFIER 6BA6
 FM DRIVER 6BA6
 RATIO DETECTOR 6AL5
 AM DETECTOR (CRYSTAL DIODE) 1N34A
 1ST AUDIO AMP (52-01) (1/2) 12AT7
 1ST AUDIO AMP (1/2) 12AX7
 CATHODE FOLLOWER (52-01) (1/2) 12AT7
 CATHODE FOLLOWER (1/2) 12AX7
 PHONO PREAMPLIFIER 6AV6
 RECTIFIER (52-03) 5Y3
 TUNING INDICATOR 6E5

Magnavox

RADIO CHASSIS - 52 SERIES

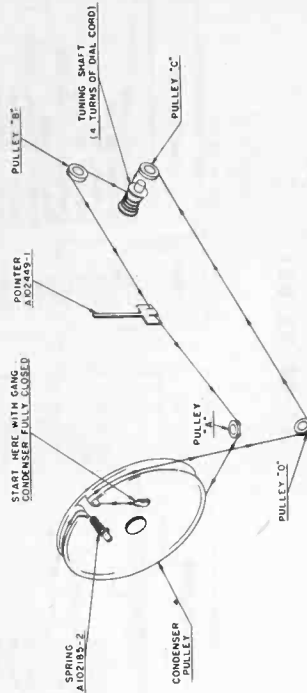
DIAL CORD PLACEMENT

Select a 64 inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the condenser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.

DIAL STRINGING

DIAL POINTER PLACEMENT

Place the dial pointer onto the pointer slide and turn the tuning gang completely in mesh. Lace the dial cord around the three hooks on the front of the pointer and with the tuning condenser still fully in mesh, slide the pointer over until it lines up with the last dial calibration mark at the low frequency end of the broadcast band. This completes the assembly.



ALIGNMENT

FM I-F AND RATIO DETECTOR ALIGNMENT (Using Sweep Generator and Oscilloscope).
 Note: Place 1 megohm resistor in series with hot scope lead.

COUPLE TO:	SWEEP GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT SCOPE TO	REMARKS
	FREQUENCY	DIAL TO:				
6CY5 (pin 5) thru .01 mfd and 1000 ohms in series	10.7 mc (.3 mc sweep) couple a marker sig. to 6CY5 pin 5	Low end of dial	T201, T102 top and bottom slugs T203 bottom slug	From pin 5 to pin 4 of PC202	Open one end of C204. Adjust for max. amplitude and symmetry. See fig. 1 below.	
"	"	Low end of dial	T203 top slug	Across C203	Adjust for best amplitude and straightest slope. See fig. 2.	
"	"	Low end of dial	T203 bottom slug	"	Adjust for best symmetry about 10.7 mc. See fig. 2.	
"	"	-----	-----	-----	Repeat steps 1, 2 and 3.	

ALIGNMENT

AM ALIGNMENT
 Set band switch to AM position. Check dial pointer positioning.

COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY	DIAL TO:				
6BE6 (pin 7) thru .01 mfd	455 kc (modulated)	Near 1000 kc (free of interference)	T202, T106, top and bottom slugs	Across voice coil	Adjust for max. output	
AM ant. term. thru 10 mfd	1400 kc (modulated)	1400 kc	C101F C101D C101B	"	"	
"	600 kc (modulated)	600 kc	T106, T104	"	Adjust for max. output.	
"	-----	-----	-----	-----	Repeat steps 2 and 3.	

FM ALIGNMENT (Using AM Signal Generator and VTVM)
 Set band switch to FM position. Note: Place a 1 megohm resistor in series with hot side of VTVM.

COUPLE TO:	SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
	FREQUENCY	DIAL TO:				
6CY5 (pin 5) thru .01 mfd	10.7 mc unmodulated	Low end of dial	T201, T102 top & bottom slugs and T203 bottom slug	From (pin 5) to pin 4 of PC202	Adjust for max. neg. reading on VTVM.	
"	"	Low end of dial	T203 top slug	Across C203	Tune for zero VTVM. (Point where voltage swings pos. or neg.)	
"	"	Low end of dial	Repeat steps 1 & 2	Repeat steps 1 & 2	Repeat steps 1 & 2	
FM ant. terms in series with: 120 ohms (high side) 150 ohms (low side)	107 mc	107 mc	C109 C101A C101C	From pin 5 to pin 4 of PC202	Adjust for max. neg. reading on VTVM.	
"	89 mc	89 mc	L104 (osc. coil)	"	"	
"	-----	-----	-----	-----	Repeat two preceding steps.	

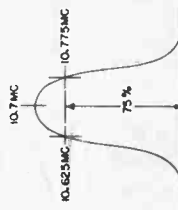


FIG 1 F.M. IF SELECTIVITY CURVE

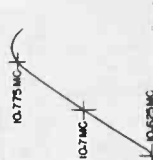
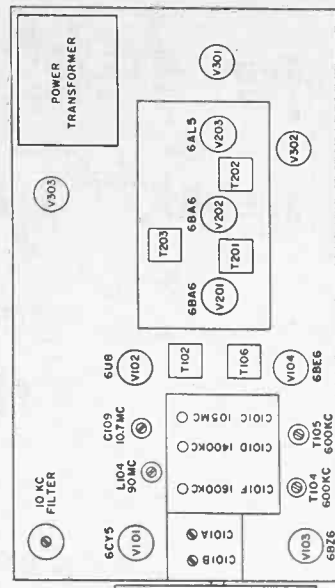
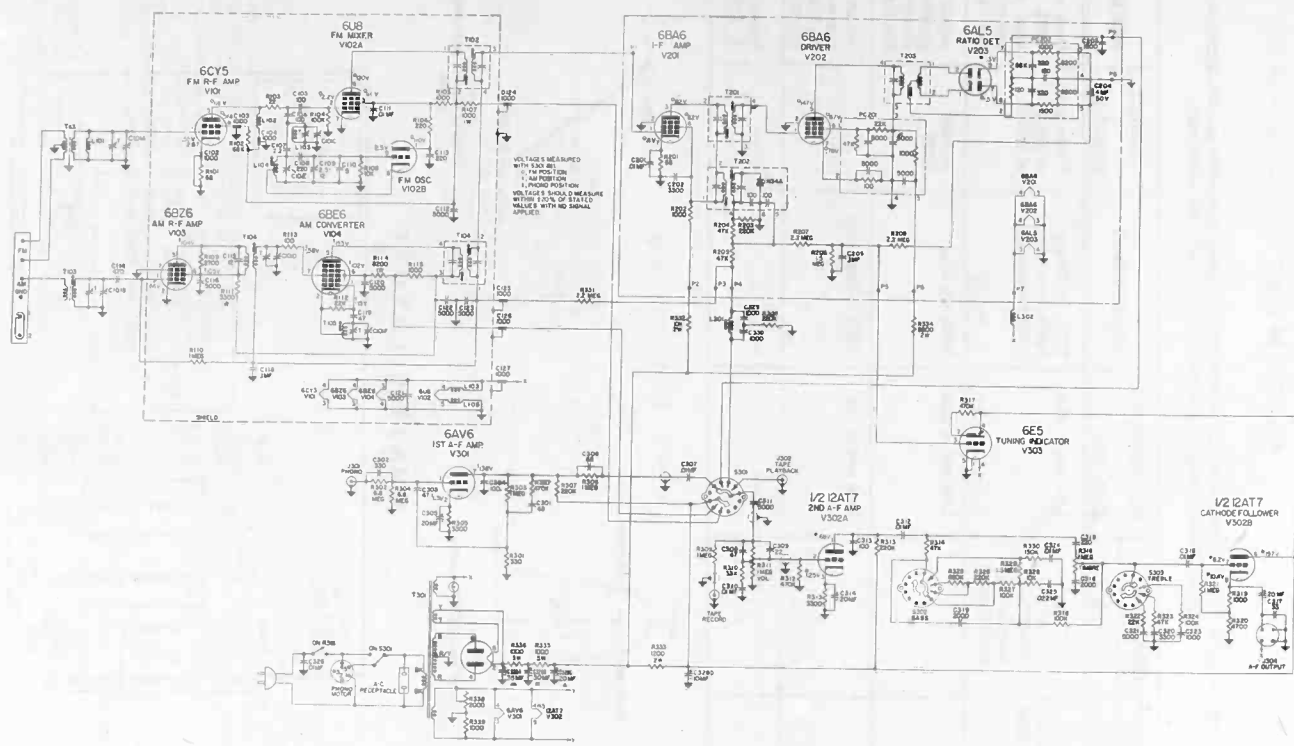


FIG 2 RATIO DETECTOR RESPONSE CURVE

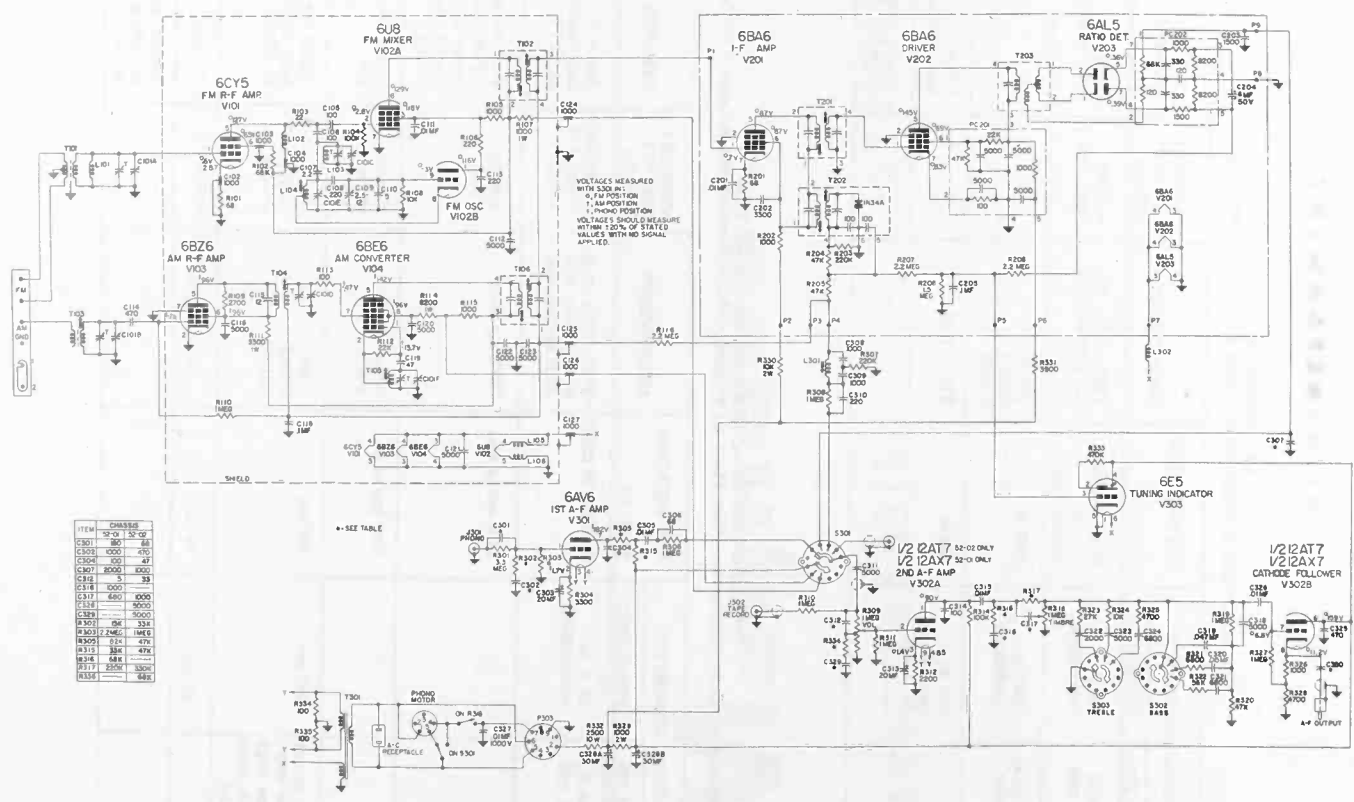
CHASSIS LAYOUT



**SCHEMATIC DIAGRAM
(52-03)**



**SCHEMATIC DIAGRAM
(52-01 and 02)**



ITEM	CHASSIS
C801	5K2 1/2 500K
C802	500 68
C803	1000 470
C804	500 47
C805	500K 500
C806	5 33
C807	5000
C808	5000
C809	5000
C810	5000
C811	5000
C812	5000
C813	5000
C814	5000
C815	5000
C816	5000
C817	5000
C818	5000
C819	5000
C820	5000
C821	5000
C822	5000
C823	5000
C824	5000
C825	5000
C826	5000
C827	5000
C828	5000
C829	5000
C830	5000
C831	5000
C832	5000
C833	5000
C834	5000
C835	5000
C836	5000
C837	5000
C838	5000
C839	5000
C840	5000
C841	5000
C842	5000
C843	5000
C844	5000
C845	5000
C846	5000
C847	5000
C848	5000
C849	5000
C850	5000
C851	5000
C852	5000
C853	5000
C854	5000
C855	5000
C856	5000
C857	5000
C858	5000
C859	5000
C860	5000
C861	5000
C862	5000
C863	5000
C864	5000
C865	5000
C866	5000
C867	5000
C868	5000
C869	5000
C870	5000
C871	5000
C872	5000
C873	5000
C874	5000
C875	5000
C876	5000
C877	5000
C878	5000
C879	5000
C880	5000
C881	5000
C882	5000
C883	5000
C884	5000
C885	5000
C886	5000
C887	5000
C888	5000
C889	5000
C890	5000
C891	5000
C892	5000
C893	5000
C894	5000
C895	5000
C896	5000
C897	5000
C898	5000
C899	5000
C900	5000
C901	5000
C902	5000
C903	5000
C904	5000
C905	5000
C906	5000
C907	5000
C908	5000
C909	5000
C910	5000
C911	5000
C912	5000
C913	5000
C914	5000
C915	5000
C916	5000
C917	5000
C918	5000
C919	5000
C920	5000
C921	5000
C922	5000
C923	5000
C924	5000
C925	5000
C926	5000
C927	5000
C928	5000
C929	5000
C930	5000
C931	5000
C932	5000
C933	5000
C934	5000
C935	5000
C936	5000
C937	5000
C938	5000
C939	5000
C940	5000
C941	5000
C942	5000
C943	5000
C944	5000
C945	5000
C946	5000
C947	5000
C948	5000
C949	5000
C950	5000
C951	5000
C952	5000
C953	5000
C954	5000
C955	5000
C956	5000
C957	5000
C958	5000
C959	5000
C960	5000
C961	5000
C962	5000
C963	5000
C964	5000
C965	5000
C966	5000
C967	5000
C968	5000
C969	5000
C970	5000
C971	5000
C972	5000
C973	5000
C974	5000
C975	5000
C976	5000
C977	5000
C978	5000
C979	5000
C980	5000
C981	5000
C982	5000
C983	5000
C984	5000
C985	5000
C986	5000
C987	5000
C988	5000
C989	5000
C990	5000
C991	5000
C992	5000
C993	5000
C994	5000
C995	5000
C996	5000
C997	5000
C998	5000
C999	5000
C1000	5000

REPLACEMENT PARTS LIST (Con't.)

SYMBOL	DESCRIPTION	PART NO.	LIST
R314	47K (52-03)	230104-82	2.00
R315	47K (52-01)	230104-80	2.00
R316	47K (52-03)	230104-80	2.00
R317	220K (52-03)	230104-90	2.00
R318	68K (52-01)	230104-84	2.00
R319	1 meg. Timbre (52-03)	230135-5	2.00
R320	220K (52-01)	230104-90	2.00
R321	470K (52-03)	230104-82	2.00
R322	100K (52-03)	230135-5	2.00
R323	100K (52-03)	230104-86	2.00
R324	100K (52-03)	230104-86	2.00
R325	100K (52-03)	230104-82	2.00
R326	4.7K (52-03)	230104-82	2.00
R327	4.7K (52-03)	230104-82	2.00
R328	4.7K (52-03)	230104-82	2.00
R329	1.5 meg (52-03)	230104-100	2.00

SYMBOL	DESCRIPTION	PART NO.	LIST
R330	10K - 2W	230104-82	2.00
R331	100K (52-03)	230104-80	2.00
R332	3000 - 1W	230104-80	2.00
R333	2500 - 1W	230104-80	2.00
R334	100K - 1W (52-03)	230104-84	2.00
R335	100K - 1W (52-03)	230135-5	2.00
R336	470K	230104-90	2.00
R337	1200 - 2W (52-03)	230104-82	2.00
R338	100	230135-5	2.00
R339	100	230104-86	2.00
R340	100K 5W (52-03)	230104-86	2.00
R341	68K (52-03)	230104-82	2.00
R342	1000 (52-03)	230104-82	2.00
R343	2000 (52-03)	230104-82	2.00
R344	2000 (52-03)	230104-72	2.00
R345	1000 (52-03)	230104-88	2.00
R346	22K (52-01)	230104-78	2.00
R347	47K (52-03)	230104-82	2.00
R348	100K (52-03)	230104-74	2.00
R349	100K (52-03)	230104-86	2.00
R350	68K (52-03)	230104-86	2.00
R351	680K (52-03)	230104-86	2.00
R352	220K (52-03)	230104-86	2.00
R353	1 meg.	230104-86	2.00
R354	100K (52-03)	230104-86	2.00
R355	4.7K (52-03)	230104-86	2.00
R356	10K (52-03)	230104-86	2.00
R357	10K (52-03)	230104-76	2.00
R358	10K (52-03)	230104-76	2.00
R359	1.5 meg (52-03)	230104-100	2.00

REPLACEMENT PARTS LIST

SYMBOL	DESCRIPTION	PART NO.	LIST
C315	Ceramic, .01 mid	250218-19	2.00
C316	Ceramic, 100 mfd (52-03)	250218-20	2.00
C317	Ceramic, 2000 mfd (52-01)	250218-20	2.00
C318	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C319	Ceramic, 680 mfd (52-01)	250218-4	2.00
C320	Ceramic, 1000 mfd (52-02)	250218-21	2.00
C321	Ceramic, 33 mfd (52-03)	250218-21	2.00
C322	Ceramic, 5000 mfd	250218-21	2.00
C323	Paper, .047 mid-200V	250218-11	2.00
C324	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C325	Paper, .015 mid-200V	250202-8	2.00
C326	Electrolytic, 20mfd-150V(52-03)	270027-13	1.50
C327	Paper, 6800 mfd-200V	250211-6	2.00
C328	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C329	Ceramic, 2000 mfd	250218-20	2.00
C330	Ceramic, 3300 mfd (52-03)	250175-28	2.00
C331	Ceramic, 5000 mfd	250175-30	2.00
C332	Paper, 6800 mfd-200V	250211-6	2.00
C333	Ceramic, 470 mfd	250218-4	2.00
C334	Paper, .022 mid-200V (52-03)	250202-8	2.00
C335	Ceramic, .01 mid	250218-19	2.00
C336	Ceramic, .01 mid-1000V	250218-19	2.00
C337	Ceramic, .01 mid-1000V	250218-2	2.00
C338	Electrolytic, 35-20-20-10mfd-350V	270027-11	2.25
C339	Ceramic, 5000 mfd (52-02)	250175-30	2.00

SYMBOL	DESCRIPTION	PART NO.	LIST
R101	68	230104-46	2.00
R102	68K	230104-44	2.00
R103	100K	230104-44	2.00
R104	100K	230104-86	2.00
R105	1000	230104-82	2.00
R106	220	230104-84	2.00
R107	1000, 1W	230105-62	2.50
R108	10K	230104-74	2.00
R109	2700	230104-74	2.00
R110	3300	230104-84	2.00
R111	3300, 1W	230105-68	2.50
R112	22K	230104-78	2.00
R113	100	230104-50	2.00
R114	8200, 1W	230105-73	2.00
R115	1000	230104-82	2.00
R116	68	230104-46	2.00
R117	68	230104-42	2.00
R118	1000	230104-82	2.00
R119	220K	230104-80	2.00
R120	47K	230104-82	2.00
R121	47K	230104-80	2.00
R122	2.2 meg	230104-102	2.00
R123	2.2 meg	230104-102	2.00
R124	3.3 meg (52-03)	230104-102	2.00
R125	15K (52-01)	230104-102	2.00
R126	6.8 meg (52-03)	230104-108	2.00
R127	2.2 meg (52-01)	230104-102	2.00
R128	1 meg	230104-98	2.00
R129	3300	230104-88	2.00
R130	6.8 meg (52-03)	230104-108	2.00
R131	47K (52-02)	230104-82	2.00
R132	1 meg	230104-88	2.00
R133	1 meg	230104-88	2.00
R134	1 meg (52-03)	230104-88	2.00
R135	1 meg (52-03)	230104-88	2.00
R136	33K (52-03)	230104-88	2.00
R137	1 meg	230104-88	2.00
R138	1 meg	230104-88	2.00
R139	2.2K	230104-84	2.00
R140	470K (52-03)	230104-84	2.00
R141	3300	230104-88	2.00

SYMBOL	DESCRIPTION	PART NO.	LIST
RESISTORS			
All resistors are 10% - 1/7W unless specified otherwise			
C315	Ceramic, .01 mid	250218-19	2.00
C316	Ceramic, 100 mfd (52-03)	250218-20	2.00
C317	Ceramic, 2000 mfd (52-01)	250218-20	2.00
C318	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C319	Ceramic, 680 mfd (52-01)	250218-4	2.00
C320	Ceramic, 1000 mfd (52-02)	250218-21	2.00
C321	Ceramic, 33 mfd (52-03)	250218-21	2.00
C322	Ceramic, 5000 mfd	250218-21	2.00
C323	Paper, .047 mid-200V	250218-11	2.00
C324	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C325	Paper, .015 mid-200V	250202-8	2.00
C326	Electrolytic, 20mfd-150V(52-03)	270027-13	1.50
C327	Paper, 6800 mfd-200V	250211-6	2.00
C328	Ceramic, 2000 mfd (52-03)	250218-20	2.00
C329	Ceramic, 2000 mfd	250218-20	2.00
C330	Ceramic, 3300 mfd (52-03)	250175-28	2.00
C331	Ceramic, 5000 mfd	250175-30	2.00
C332	Paper, 6800 mfd-200V	250211-6	2.00
C333	Ceramic, 470 mfd	250218-4	2.00
C334	Paper, .022 mid-200V (52-03)	250202-8	2.00
C335	Ceramic, .01 mid	250218-19	2.00
C336	Ceramic, .01 mid-1000V	250218-19	2.00
C337	Ceramic, .01 mid-1000V	250218-2	2.00
C338	Electrolytic, 35-20-20-10mfd-350V	270027-11	2.25
C339	Ceramic, 5000 mfd (52-02)	250175-30	2.00

SYMBOL	DESCRIPTION	PART NO.	LIST
CAPACITORS			
All capacitors are 500V unless specified otherwise			
C301	Tuning Coil	26047-1	6.75
C302	Feed Thru, 1000 mfd	250276-2	2.00
C303	Feed Thru, 1000 mfd	250276-2	2.00
C304	Feed Thru, 1000 mfd	250276-1	2.00
C305	Mica, 100 mfd	250187-53	2.00
C306	Mica, 2.3 mfd	250221-119	1.50
C307	Ceramic, 220 mfd	250218-5	2.00
C308	Trimmer 2.5, .53 mfd	250218-9	2.00
C309	Ceramic, 9 mfd, 9%	250088-138	2.00
C310	Paper, 100 mfd	250175-30	2.00
C311	Ceramic, 5000 mfd	250187-37	3.5
C312	Mica, 220 mfd	250158-102	2.00
C313	Mica, 470 mfd	250088-179	2.00
C314	Ceramic, 13 mfd, 9%	250158-102	2.00
C315	Ceramic, 5000 mfd	250175-30	2.00
C316	Aluminum Electrolytic, 47 mfd	250218-12	2.00
C317	Ceramic, 5000 mfd	250175-30	2.00
C318	Ceramic, 5000 mfd	250175-30	2.00
C319	Ceramic, 5000 mfd	250175-30	2.00
C320	Feed Thru, 1000 mfd	250276-1	2.00
C321	Feed Thru, 1000 mfd	250276-1	2.00
C322	Ceramic, .01 mid	250234-68	2.00
C323	Ceramic, .0033 mid	250234-154	2.00
C324	Ceramic, .0033 mid	250234-154	2.00
C325	Electrolytic, 4 mid-50V	270027-27	1.00
C326	Paper, .1 mid, 200V	250202-13	2.00
C327	Ceramic, 180 mfd (52-01)	250218-7	2.00
C328	Ceramic, 68 mfd	250218-7	2.00
C329	Ceramic, 1000 mfd (52-01)	250218-4	2.00
C330	Ceramic, 100 mfd (52-01)	250218-4	2.00
C331	Electrolytic, 20mfd-25V (52-01)	270027-28	1.00
C332	Ceramic, 100 mfd	250218-22	2.00
C333	Ceramic, .01 mid	250218-17	2.00
C334	Ceramic, .01 mid	250218-19	2.00
C335	Ceramic, 68 mfd	250218-7	2.00
C336	Ceramic, 68 mfd	250218-7	2.00
C337	Ceramic, 1000 mfd	250218-20	2.00
C338	Ceramic, .01 mid (52-03)	250218-19	2.00
C339	Ceramic, 47 mfd (52-03)	250218-17	2.00
C340	Ceramic, 220 mfd (52-03)	250218-17	2.00
C341	Ceramic, 220 mfd	250218-5	2.00
C342	Ceramic, .01 mid (52-03)	250218-19	2.00
C343	Ceramic, 5000 mfd	250175-30	2.00
C344	Ceramic, 5000 mfd	250175-30	2.00
C345	Ceramic, 33 mfd (52-02)	250218-11	2.00
C346	Ceramic, .01 mid (52-02)	250218-11	2.00
C347	Electrolytic, 20 mfd, 25V	270027-28	1.00
C348	Electrolytic, 100 mfd (52-03)	250218-22	2.00
C349	Ceramic, 100 mfd	250218-22	2.00
C350	Electrolytic, 20mfd-25V (52-01)	270027-28	1.00

GENERAL

The CR-740 radio chassis is designed for use on the AM broadcast band and works in conjunction with a separate audio amplifier. All voltages are obtained from the external amplifier.

carry the suffix letters "AA" after the 740. If it is necessary to make an electrical change, the chassis will then be identified as the CR-740BA. If no electrical change is necessary but a mechanical change has been deemed necessary, the chassis will be identified as the CR-740AB.

Original production of the CR-740 will

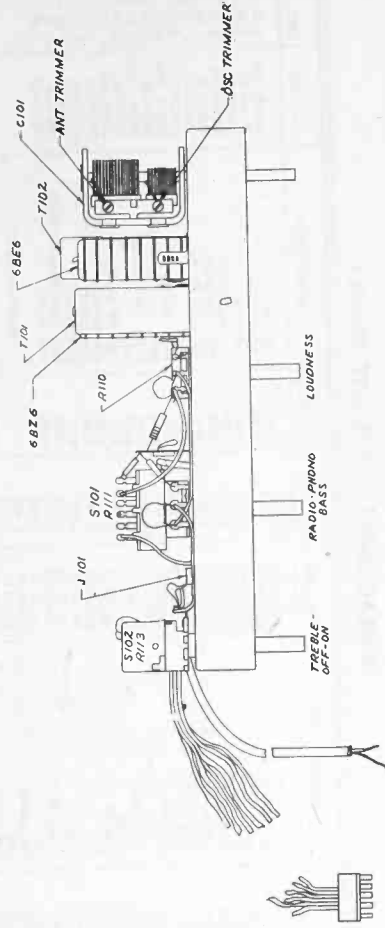
ALIGNMENT

The output indicator may be a VTVM connected in the AVC circuit from test point A to circuit ground or an output meter across the speaker voice coil if test signal is modulated.

SIGNAL GENERATOR INPUT	SIGNAL GENERATOR FREQUENCY	TUNING CAPACITOR SETTING	ADJUSTMENTS	NOTES
Converter grid (pin #7 of 6BE6) thru .01 mfd cap.	455 KC	Near mid-range point of no interference	Top end bottom slugs of T102 and T101	Adjust for max. reading of VTVM or output meter
Same	1620 KC	Fully unmeshed (maximum high frequency limit of tuning dial)	Oscillator trimmer, on tuning gang	Same
Radiating loop*	1400 KC	Tuned to 1400KC	Ant. trimmer on tuning gang	Same
Same	600 KC	600 KC	If necessary, move adjustable portion of rod antenna back and forth	Same
Repeat last two steps				

Radiating loop may consist of a loop of wire approximately 2 inches in diameter connected across terminals of signal generator leads and loosely coupled to receiver loop antenna.

CHASSIS LAYOUT



Magnavox

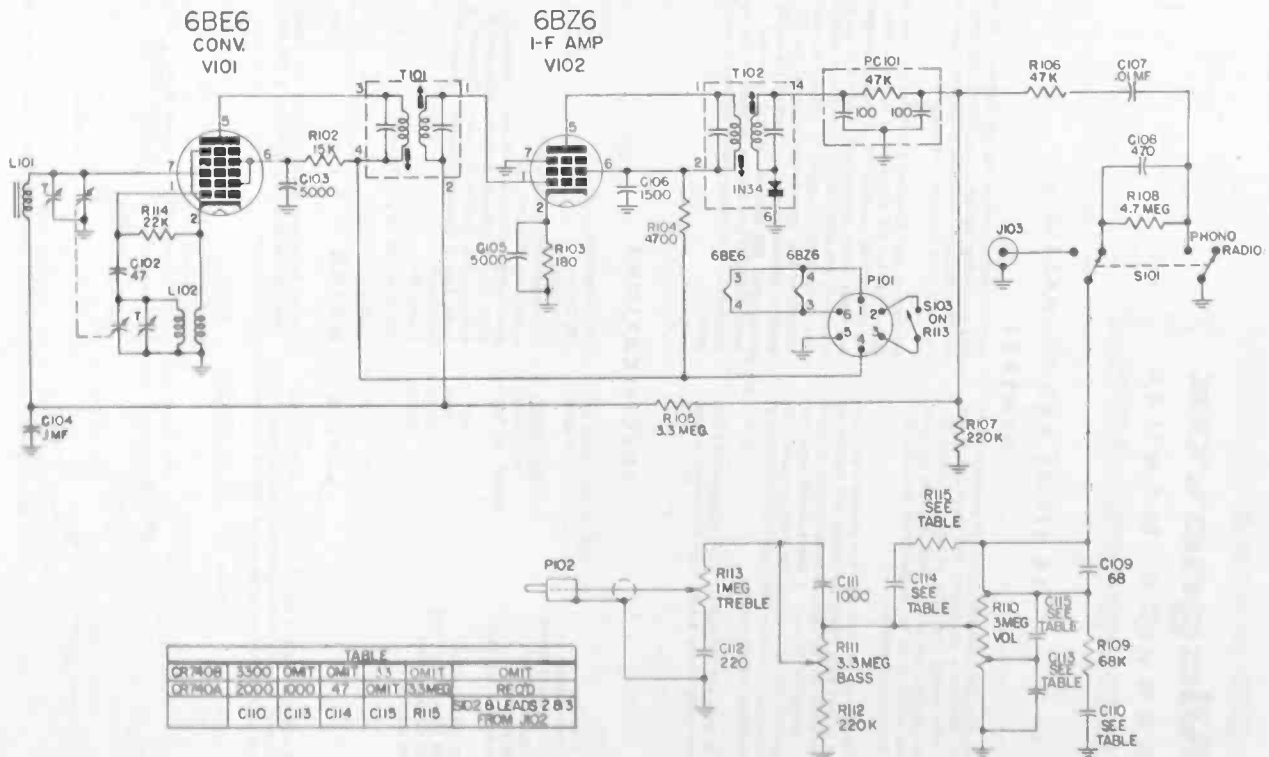
RADIO CHASSIS — CR-740

MAINTENANCE MANUAL 1319

REPLACEMENT PARTS LIST

SYMBOL	DESCRIPTION	PART NO.	LIST	SYMBOL	DESCRIPTION	PART NO.	LIST
TRANSFORMERS & COILS							
T101	1st I-F transformer	360611-1	1.40	C102	Cer., 47 mmf	250218-17	.15
T102	2nd I-F transformer	360703-1	2.35	C103	Cer., 5000 mmf	250175-1	.25
L101	Ferrite antenna coil	360705-1	2.50	C104	Paper, .1 mfd, 200V	250202-13	.30
L102	Oscillator air core coil	360702-1	.85	C105	Cer., 5000 mmf	250175-1	.25
RESISTORS							
All resistors are 10%, 1/2W unless specified otherwise							
Prices shown are for packages of 10							
R101	100	230104-50	2.00	C106	Cer., 1500 mmf	250218-18	.20
R102	15K, 2W	230106-1076	3.50	C107	Cer., .01 mfd	250218-19	.20
R103	180	230104-53	2.00	C108	Cer., 470 mmf	250218-15	.30
R104	3300, 2W	230106-1068	3.50	C109	Cer., 68 mmf	250218-7	.20
R105	3.3 meg	230104-104	2.00	C110	Cer., 2000 mmf	250218-20	.25
R106	47 K	230104-83	2.00	C111	Cer., 3300 mmf	250218-24	.25
R107	220K	230104-90	2.00	C112	Cer., 1000 mmf	250218-8	.25
R108	4.7 meg	230104-106	2.00	C113	Cer., 220 mmf	250218-5	.20
R109	68K	230104-84	2.00	C114	Cer., 1000 mmf	250218-8	.25
R112	220K	230104-90	2.00	C115	Cer., 47 mmf	250218-17	.15
R114	22K	230104-78	2.00			250218-21	.15
R115	3.3 meg	230104-104	2.00	CONTROLS			
CAPACITORS							
All capacitors are 500V unless specified otherwise							
C101	Gang condenser	260139-1	3.55	R110	3.3 meg, Volume	220131-9	1.10
				R111	3.3 meg, Bass (with S101 Radio-phono switch)	220119-4	1.90
				R113	1 meg, Treble (with S102 On-Off switch)	220123-26	1.35
				R113	1 meg, Treble (CR-740BA)	220072-38	1.25
				MISCELLANEOUS			
				J101	Phono receptacle	180466-1	.10
				PC101	Printed circuit diode filter	250170-1	.40
				1N34A	Crystal diode	530049-1	1.85

SCHMATIC DIAGRAM



Magnavox SERVICE MANUAL

1329

54 SERIES RADIO CHASSIS

GENERAL

The 54 series radio chassis contains two separate audio circuits. These are necessary for operation of the chassis with record changers or tape recorders designed for stereo operation. Dual controls are used throughout which vary the output from each channel equally and simultaneously.

On the 54-02 and 54-03 inputs are provided for connecting a Stereo tape recorder which will enable the tape recorder to play through the audio circuits of these chassis. On the 54-01 only a conventional tape recorder can be played through the audio circuits. On all three chassis, however, only conventional monaural tape recordings can be made.

Due to the design of the chassis it is recommended that a tape recording having a high input and output impedance be used.

ance be used for recording and playback. However, a tape recording having a low output impedance can be used for playback providing sufficient signal output is available from the tape recorder.

Provisions are provided for the connection of an external AM or FM antenna. A terminal board having two connections marked FM, a connection marked AM and three other connections marked G, 1, and 2 respectively are located on a fibre board fastened to the rear of the radio chassis. To connect the FM antenna leads to this unit merely connect the FM antenna to an external AM antenna connect one lead to the AM connection and ground the antenna to the connection marked G. The connections marked 1 and 2 are not used.

SPECIFICATIONS

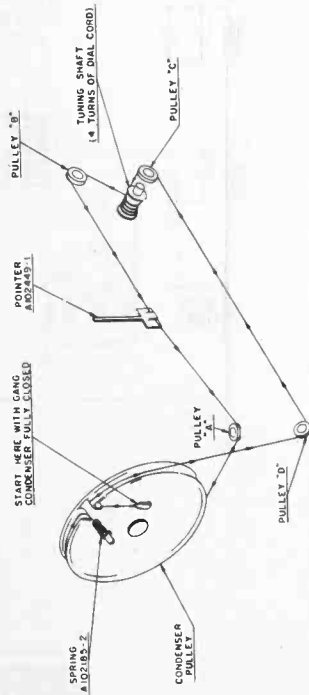
- Power Supply 117 volts, 50/60 cycles AC
- Power Consumption 75 watts
- Tuning Frequency Range: 540-1620KC
- Broadcast Band 86-108MC
- FM Band 455KC/10.7MC
- Intermediate Frequency 6CY5
- FM RF Amplifier 6U8
- FM Mixer-Oscillator 6BZ6
- AM RF Amplifier 6BE6
- AM Converter 6BE6
- I. F. Amplifier 6BA6
- FM Driver 6AL5
- Ratio Detector 1N94A
- AM Detector (Crystal Diode) 12AX7
- Audio Amp (Channel 1&2) 12AX7
- Audio Amp & Cathode Follower (Channel 1) 12AX7
- Audio Amp & Cathode Follower (Channel 2) 12AT7
- Audio Amp & Cathode Follower (Channel 1)* 12AT7
- Audio Amp & Cathode Follower (Channel 2)* 5Y3GT
- Rectifier* 6E5
- Tuning Eye

*Used only on 54-02 Chassis.

DIAL STRINGING

Select a 64 inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the con-

denser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.



©John F. Rider

ALIGNMENT

AM ALIGNMENT
Set band switch to AM position. Check dial pointer positioning.

SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
COUPLE TO:	FREQUENCY				
8BE6 (pin 7) thru .01 mfd	455 kc (modulated)	Near 1000 kc (free of interference)	T202, T106, top and bottom slugs	Across voice coil	Adjust for max. output
AM ant. term. thru 10 mfd	1400 kc (modulated)	1400 kc	C101F C101D C101B	"	"
"	600 kc (modulated)	600 kc	T106, T104	"	Adjust for max. output.
"	-----	-----	-----	"	Repeat steps 2 and 3.

FM ALIGNMENT (Using AM Signal Generator and VTVM)
Set band switch to FM position. Note: Place a 1 megohm resistor in series with hot side of VTVM.

SIGNAL GENERATOR		SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT OUTPUT METER	REMARKS
COUPLE TO:	FREQUENCY				
6CY5 (pin 5) thru .01 mfd	10.7 mc unmodulated	Low end of dial	T201, T102 top & bottom slugs and T203 bottom slug	From (pin 5) to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	"	Low end of dial	T203 top slug	Across C203	Tune for zero VTVM. (Point where voltage swings pos. or neg.)
"	"	Low end of dial	Repeat steps 1 & 2	Repeat steps 1 & 2	Repeat steps 1 & 2
FM ant. terms in series with: 120 ohms (high side) 150 ohms (low side)	107 mc	107 mc	C109 C101A C101C	From pin 5 to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	89 mc	89 mc	L104 (osc. coil)	"	"
"	-----	-----	-----	-----	Repeat two preceding steps.

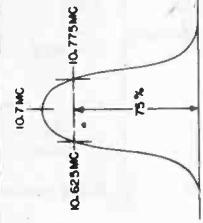


FIG 1 F.M.I.F. SELECTIVITY CURVE

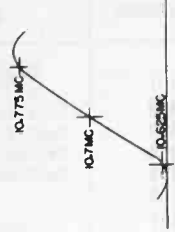
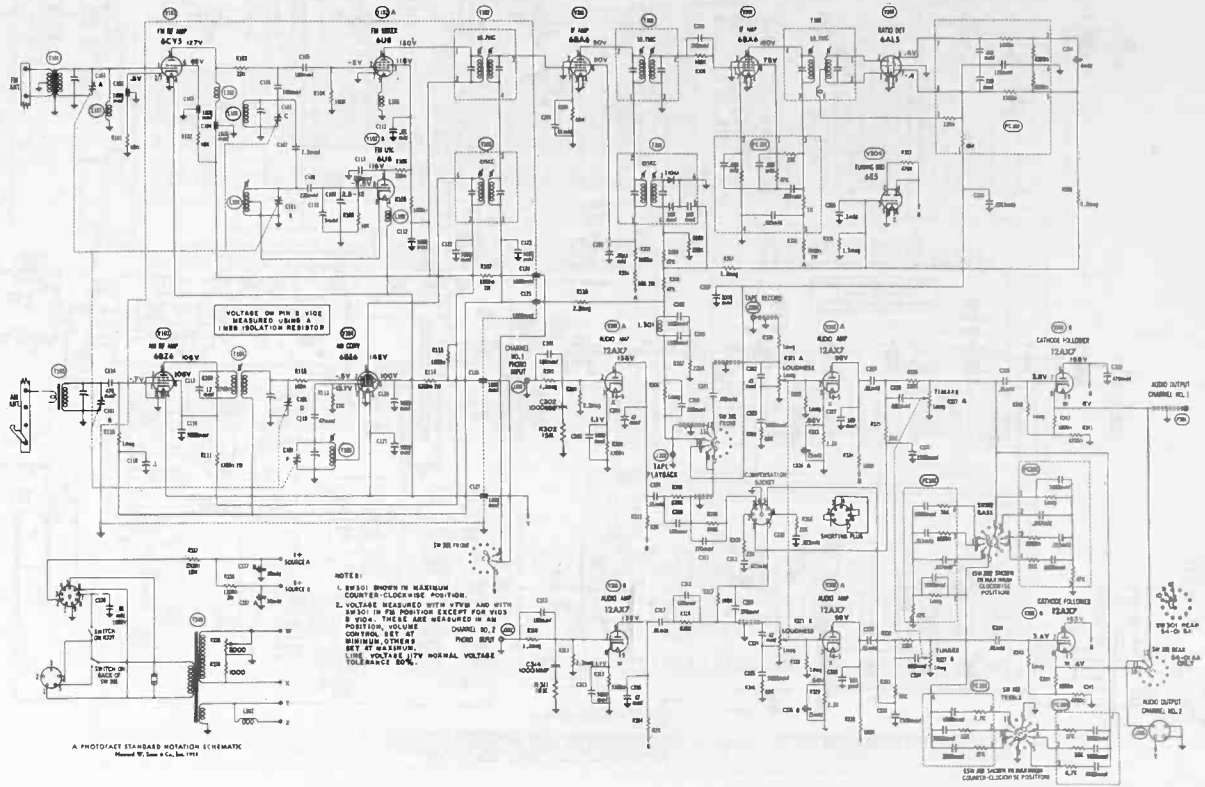


FIG 2 RATIO DETECTOR RESPONSE CURVE

SCHEMATIC DIAGRAM
(54-01)

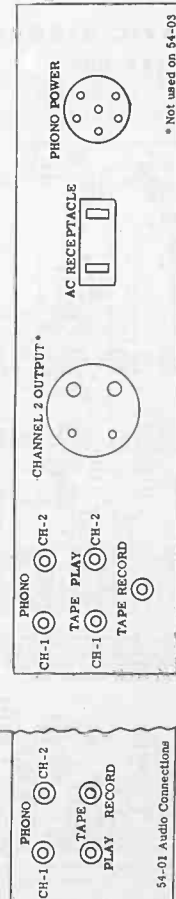


ALIGNMENT

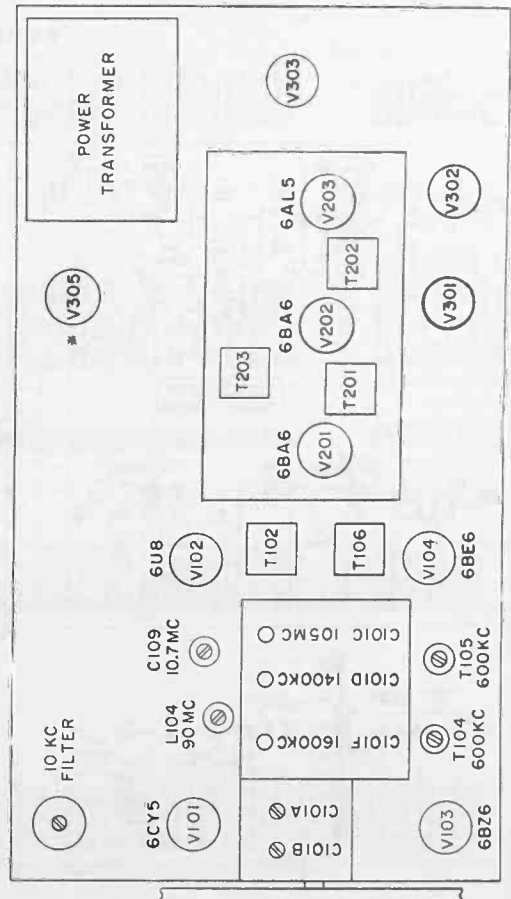
FM I-F AND RATIO DETECTOR ALIGNMENT (Using Sweep Generator and Oscilloscope).
Note: Place 1 megohm resistor in series with hot scope lead.

SWEEP GENERATOR COUPLE TO:	FREQUENCY	SET RECEIVER DIAL TO:	ADJUSTMENTS	CONNECT SCOPE TO	REMARKS
6CY5 (pin 5) thru .01 mfd and 1000 ohms in series to 6CY5 pin 5	10.7 mc (.3 mc sweep) couple a marker sig. to 6CY5 pin 5	Low end of dial	T201, T102 top and bottom slugs T203 bottom slug See fig. 1	From pin 5 to pin 4 of PC202	Open one end of C204. Adjust for max. amplitude and symmetry. See fig. 1
"	"	Low end of dial	T203 top slug	Across C203	Adjust for best amplitude and straightest slope. See fig. 2.
"	"	Low end of dial	T203 bottom slug	"	Adjust for best symmetry about 10.7 mc. See fig. 2.
"	"	"	"	"	Repeat steps 1, 2 and 3.

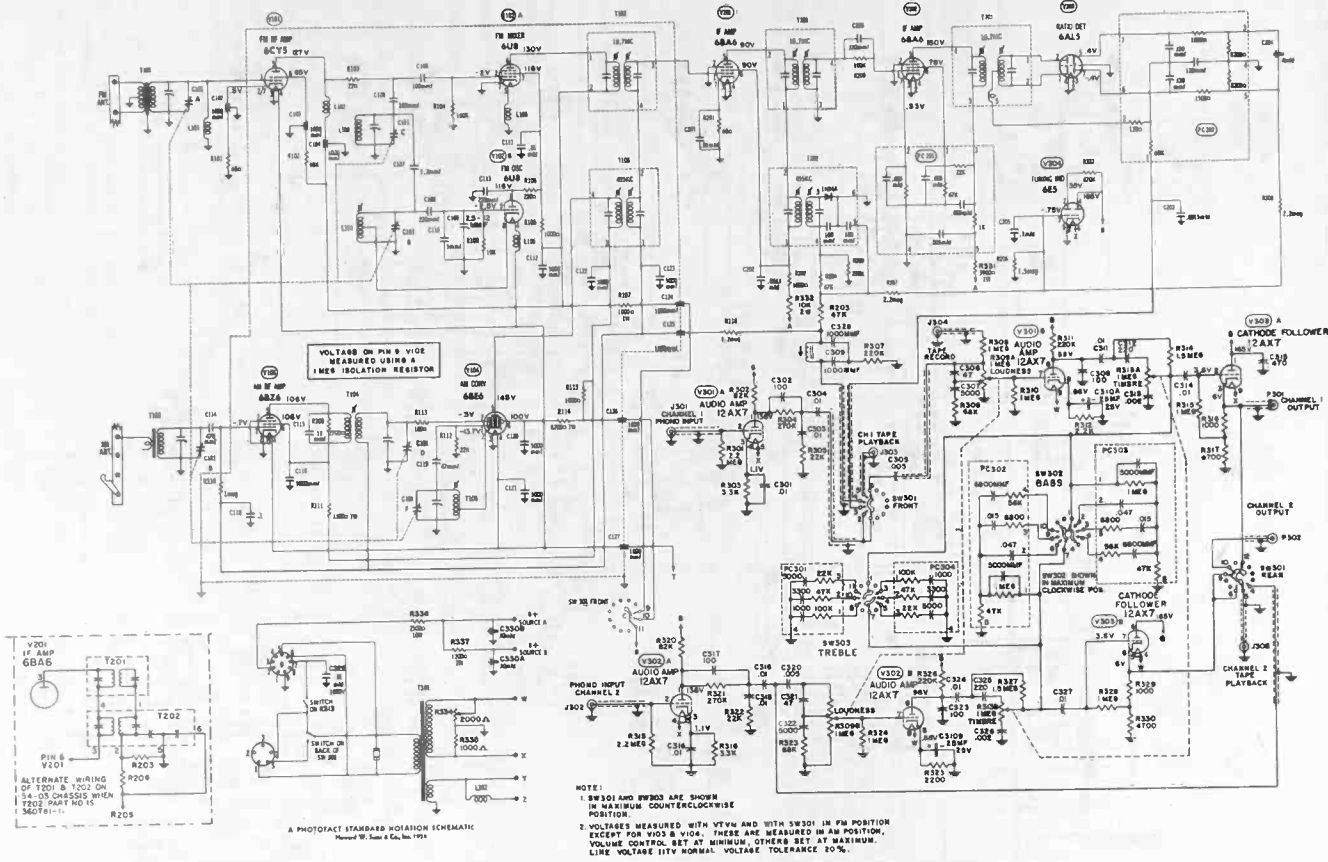
CHASSIS REAR PANEL



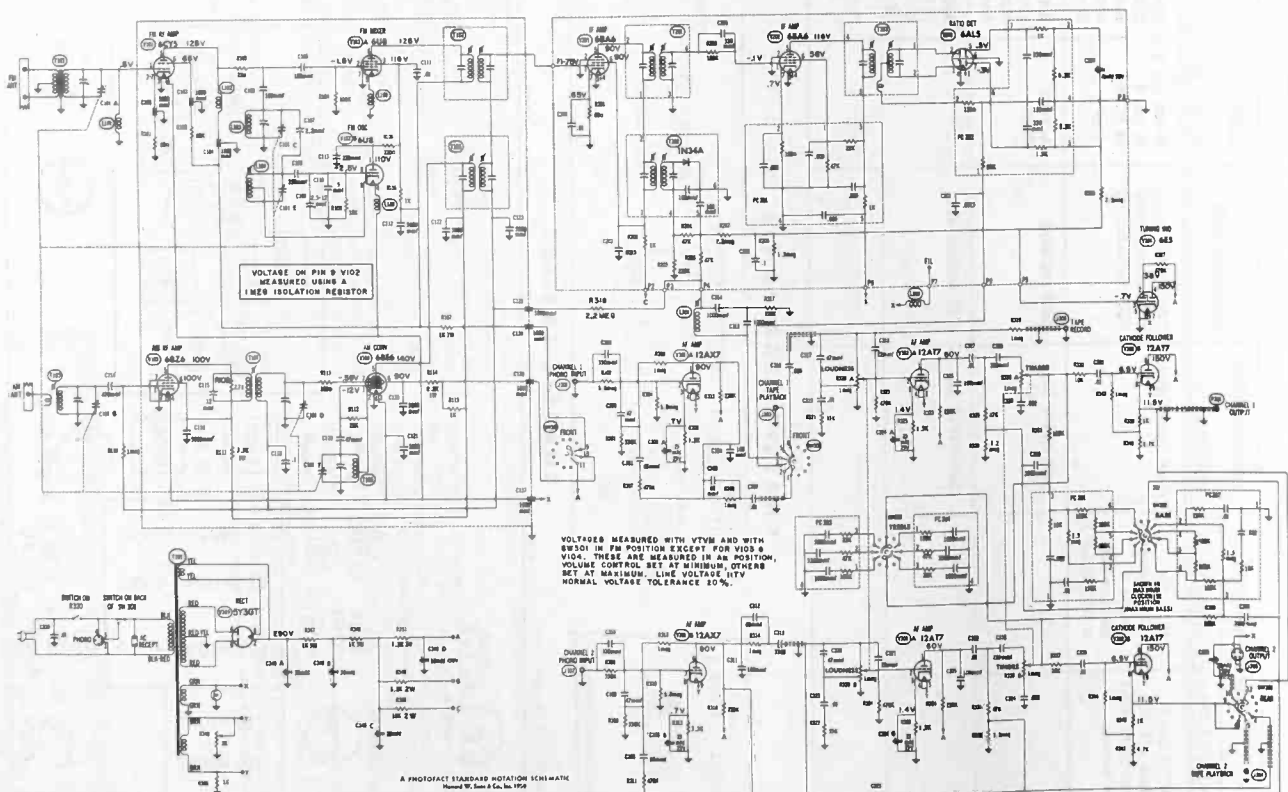
CHASSIS LAYOUT



SCHEMATIC DIAGRAM (54-03)



SCHEMATIC DIAGRAM (54-02)

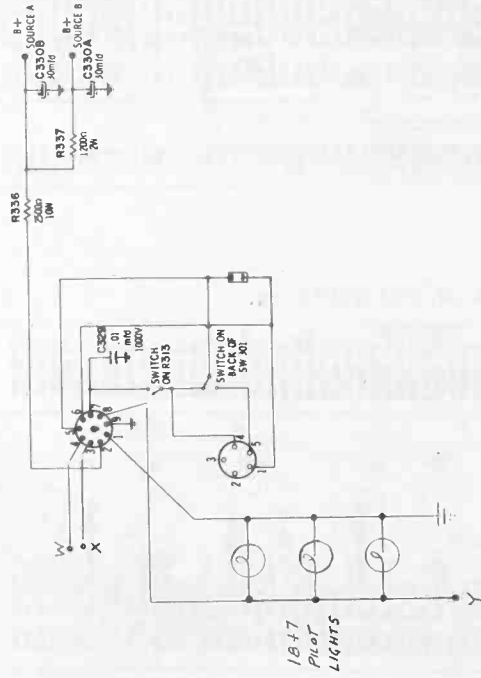


REPLACEMENT PARTS LIST

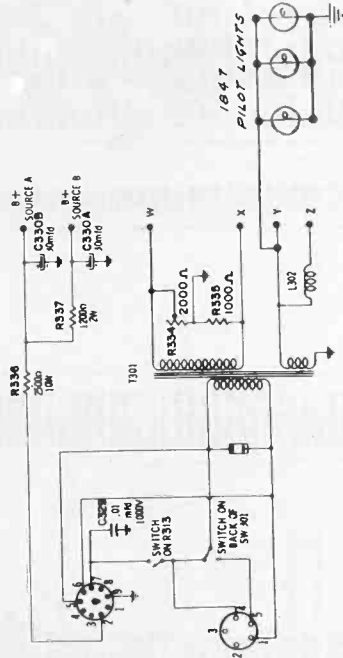
SYMBOL	DESCRIPTION	PART NO.
T101	FM Input Transformer	386491-4
T102	1st FM I.F. Trans.	386746-1
T103	2nd FM I.F. Trans.	386746-2
T104	AM RF Trans.	386753-1
T105	AM Oscillator Coil	386752-1
T106	1st AM IF Trans.	386746-1
T107	2nd AM IF Trans.	386746-2
T201	Ratio Detector Trans.	386746-1
T202	Detector Trans. (4-03)	386750-1
T203	FM Antenna Coil	386750-1
L101	FM RF Coil	386751-1
L102	FM RF Coil	386751-1
L103	RF Choke	386522-9
L104	RF Choke	386522-9
L105	RF Choke	386522-9
L106	10K Filter	386521-1
L107	RF Choke	386521-9
R101	88	230104-48
R102	91K	230104-49
R103	100K	230104-50
R104	150K	230104-51
R105	200K	230104-52
R106	300K	230104-53
R107	400K	230104-54
R108	500K	230104-55
R109	600K	230104-56
R110	700K	230104-57
R111	800K	230104-58
R112	900K	230104-59
R113	100K	230104-60
R114	150K	230104-61
R115	200K	230104-62
R116	300K	230104-63
R117	400K	230104-64
R118	500K	230104-65
R119	600K	230104-66
R120	700K	230104-67
R121	800K	230104-68
R122	900K	230104-69
R123	100K	230104-70
R124	150K	230104-71
R125	200K	230104-72
R126	300K	230104-73
R127	400K	230104-74
R128	500K	230104-75
R129	600K	230104-76
R130	700K	230104-77
R131	800K	230104-78
R132	900K	230104-79
R133	100K	230104-80
R134	150K	230104-81
R135	200K	230104-82
R136	300K	230104-83
R137	400K	230104-84
R138	500K	230104-85
R139	600K	230104-86
R140	700K	230104-87
R141	800K	230104-88
R142	900K	230104-89
R143	100K	230104-90
R144	150K	230104-91
R145	200K	230104-92
R146	300K	230104-93
R147	400K	230104-94
R148	500K	230104-95
R149	600K	230104-96
R150	700K	230104-97
R151	800K	230104-98
R152	900K	230104-99
R153	100K	230104-100
R154	150K	230104-101
R155	200K	230104-102
R156	300K	230104-103
R157	400K	230104-104
R158	500K	230104-105
R159	600K	230104-106
R160	700K	230104-107
R161	800K	230104-108
R162	900K	230104-109
R163	100K	230104-110
R164	150K	230104-111
R165	200K	230104-112
R166	300K	230104-113
R167	400K	230104-114
R168	500K	230104-115
R169	600K	230104-116
R170	700K	230104-117
R171	800K	230104-118
R172	900K	230104-119
R173	100K	230104-120
R174	150K	230104-121
R175	200K	230104-122
R176	300K	230104-123
R177	400K	230104-124
R178	500K	230104-125
R179	600K	230104-126
R180	700K	230104-127
R181	800K	230104-128
R182	900K	230104-129
R183	100K	230104-130
R184	150K	230104-131
R185	200K	230104-132
R186	300K	230104-133
R187	400K	230104-134
R188	500K	230104-135
R189	600K	230104-136
R190	700K	230104-137
R191	800K	230104-138
R192	900K	230104-139
R193	100K	230104-140
R194	150K	230104-141
R195	200K	230104-142
R196	300K	230104-143
R197	400K	230104-144
R198	500K	230104-145
R199	600K	230104-146
R200	700K	230104-147
R201	800K	230104-148
R202	900K	230104-149
R203	100K	230104-150
R204	150K	230104-151
R205	200K	230104-152
R206	300K	230104-153
R207	400K	230104-154
R208	500K	230104-155
R209	600K	230104-156
R210	700K	230104-157
R211	800K	230104-158
R212	900K	230104-159
R213	100K	230104-160
R214	150K	230104-161
R215	200K	230104-162
R216	300K	230104-163
R217	400K	230104-164
R218	500K	230104-165
R219	600K	230104-166
R220	700K	230104-167
R221	800K	230104-168
R222	900K	230104-169
R223	100K	230104-170
R224	150K	230104-171
R225	200K	230104-172
R226	300K	230104-173
R227	400K	230104-174
R228	500K	230104-175
R229	600K	230104-176
R230	700K	230104-177
R231	800K	230104-178
R232	900K	230104-179
R233	100K	230104-180
R234	150K	230104-181
R235	200K	230104-182
R236	300K	230104-183
R237	400K	230104-184
R238	500K	230104-185
R239	600K	230104-186
R240	700K	230104-187
R241	800K	230104-188
R242	900K	230104-189
R243	100K	230104-190
R244	150K	230104-191
R245	200K	230104-192
R246	300K	230104-193
R247	400K	230104-194
R248	500K	230104-195
R249	600K	230104-196
R250	700K	230104-197
R251	800K	230104-198
R252	900K	230104-199
R253	100K	230104-200
R254	150K	230104-201
R255	200K	230104-202
R256	300K	230104-203
R257	400K	230104-204
R258	500K	230104-205
R259	600K	230104-206
R260	700K	230104-207
R261	800K	230104-208
R262	900K	230104-209
R263	100K	230104-210
R264	150K	230104-211
R265	200K	230104-212
R266	300K	230104-213
R267	400K	230104-214
R268	500K	230104-215
R269	600K	230104-216
R270	700K	230104-217
R271	800K	230104-218
R272	900K	230104-219
R273	100K	230104-220
R274	150K	230104-221
R275	200K	230104-222
R276	300K	230104-223
R277	400K	230104-224
R278	500K	230104-225
R279	600K	230104-226
R280	700K	230104-227
R281	800K	230104-228
R282	900K	230104-229
R283	100K	230104-230
R284	150K	230104-231
R285	200K	230104-232
R286	300K	230104-233
R287	400K	230104-234
R288	500K	230104-235
R289	600K	230104-236
R290	700K	230104-237
R291	800K	230104-238
R292	900K	230104-239
R293	100K	230104-240
R294	150K	230104-241
R295	200K	230104-242
R296	300K	230104-243
R297	400K	230104-244
R298	500K	230104-245
R299	600K	230104-246
R300	700K	230104-247
R301	800K	230104-248
R302	900K	230104-249
R303	100K	230104-250
R304	150K	230104-251
R305	200K	230104-252
R306	300K	230104-253
R307	400K	230104-254
R308	500K	230104-255
R309	600K	230104-256
R310	700K	230104-257
R311	800K	230104-258
R312	900K	230104-259
R313	100K	230104-260
R314	150K	230104-261
R315	200K	230104-262
R316	300K	230104-263
R317	400K	230104-264
R318	500K	230104-265
R319	600K	230104-266
R320	700K	230104-267
R321	800K	230104-268
R322	900K	230104-269
R323	100K	230104-270
R324	150K	230104-271
R325	200K	230104-272
R326	300K	230104-273
R327	400K	230104-274
R328	500K	230104-275
R329	600K	230104-276
R330	700K	230104-277
R331	800K	230104-278
R332	900K	230104-279
R333	100K	230104-280
R334	150K	230104-281
R335	200K	230104-282
R336	300K	230104-283
R337	400K	230104-284
R338	500K	230104-285
R339	600K	230104-286
R340	700K	230104-287
R341	800K	230104-288
R342	900K	230104-289
R343	100K	230104-290
R344	150K	230104-291
R345	200K	230104-292
R346	300K	230104-293
R347	400K	230104-294
R348	500K	230104-295
R349	600K	230104-296
R350	700K	230104-297
R351	800K	230104-298
R352	900K	230104-299
R353	100K	230104-300
R354	150K	230104-301
R355	200K	230104-302
R356	300K	230104-303
R357	400K	230104-304
R358	500K	230104-305
R359	600K	230104-306
R360	700K	230104-307
R361	800K	230104-308
R362	900K	230104-309
R363	100K	230104-310
R364	150K	230104-311
R365	200K	230104-312
R366	300K	230104-313
R367	400K	230104-314
R368	500K	230104-315
R369	600K	230104-316
R370	700K	230104-317
R371	800K	230104-318
R372	900K	230104-319
R373	100K	230104-320
R374	150K	230104-321
R375	200K	230104-3

ADDENDA
SERVICE MANUAL 1329

The following information concerns production changes made since the publication release of Service Manual 1329. The 54-03 Chassis has been revised in the initial production run so that a filament transformer is not used. All power connections are supplied from the Main Amplifier as shown below.



The 54-04 Chassis has recently been released for production. This version is identical to the 54-03 except for the power connections shown below.



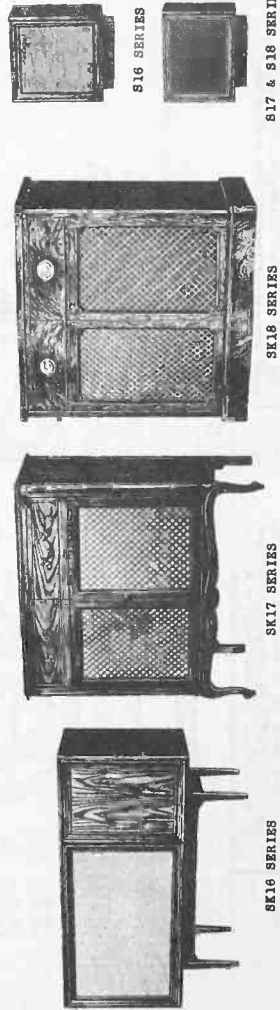
The schematic diagram shown in Manual 1329 for the 54-03 Chassis will be correct for the 54-03 and 54-04 with exceptions noted above.

The Parts List for the 54-03 Chassis in Manual 1329 is correct for the 54-03 and 54-04 Chassis except that T301, L302, R334 & R335 are not used on the 54-03.

MOTOROLA Service Manual

SUPERSEDES SK16, 17, 18 SERIES PRELIMINARY SERVICE MANUAL PART NO. 68P43063.

HOME RADIO CHASSIS
MODELS
 SK16W HS-710,711
 S16W
 SK17W HS-710,711
 S17W
 SK18M HS-710,711
 S18M
 Drexel Series



SK16 SERIES

SK17 SERIES

SK18 SERIES

S17 & S18 SERIES

GENERAL INFORMATION

TYPE - Models SK16, SK17 & SK18 are console stereos containing a high-fidelity radio-phono combination containing a dual channel amplifier, AM-FM tuner, four-speed record changer and multiple speaker system. Models S16, S17 & S18 are the right channel speaker systems. These models differ from each other only in the type of cabinetry used.

TUBE COMPLEMENT -

HS-710 TUNER & PRE-AMP

Ref. No.	Type	Function
V-1	6BQ7A	FM RF amp & converter
V-2	6BA6	1st FM IF
V-3	6BA6	AM IF & 2nd FM IF
V-4	6AU6	FM limiter
V-5	6AL5	FM ratio detector
V-6	6BE6	AM RF amp
V-7	6BE6	Tuner converter
V-8	6X4	Rectifier
V-9	6X4	1st & 2nd AF amp
V-10	12AX7	1st & 2nd AF amp

HS-711 POWER AMP

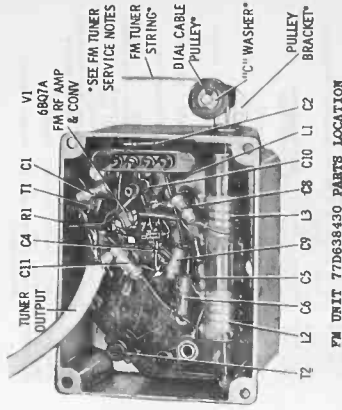
Ref. No.	Type	Function
V-1	12AX7	Phase inverter
V-2	EL84/6B05	Power amp
V-3	EL84/6B05	Power amp
V-4	EL84/6B05	Power amp
V-5	EL84/6B05	Power amp
V-6	EL84/6B05	Power amp
V-7	5U4GB	Rectifier

RECORD CHANGER

These models use the VM2ARC record changer. Refer to the VM17-VM2ARC Record Changer Service Manual (Motorola Part Number 68P043063) for service information and changer operation.

FM TUNER SERVICE NOTES

Do not free the dial cable pulley located on the FM tuner unit, as this may result in audio loss. The audio signal vibration caused by acoustic feedback from the loudspeaker at certain frequencies. Silicon grease is applied at the junction of string and pulley, to insure smooth tuning action and must not be removed. Therefore, whenever tuning action is erratic, check for proper use of silicon grease (Motorola Part Number 11M490487). Also affecting tuning action, is the binding of the pulley bracket with respect to the take-up spring. Position bracket until tuning action is as smooth as possible.



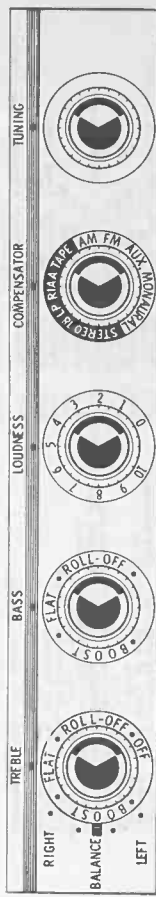
AUXILIARY CIRCUITS AND EXTERNAL CONNECTIONS

STEREO TAPE INPUT JACKS

A stereophonic tape recorder may be connected to these jacks (located on cabinet back) to enable stereophonically recorded tapes to be played through this system when the COMPENSATOR is set to NORM. The output of the tape recorder is connected to the RIGHT channel of the recorder (in tape recorder) for NARTB playback. Connect the right channel output of the recorder to RIGHT STEREO TAPE INPUT and the left channel output of the recorder to LEFT STEREO TAPE INPUT. Use a suitable phone plug (Motorola Part No. 28K731154 or equivalent) and shielded audio cable to minimize hum pick-up.

AUX JACK

An audio signal from any external source (such as the



FRONT PANEL CONTROLS

SERVICE NOTES

DISASSEMBLY INSTRUCTIONS

To Remove Chassis From Cabinet (HS-710)

1. Remove control knobs.
2. Remove cabinet back cover.
3. Disconnect all chassis connecting leads (from power amp, record changer, etc. NOTE: The green AM antenna lead is held in place by an armite strip, therefore, slide the lead through the strip so that chassis can be removed easily).
4. Remove pilot light socket from record changer compartment by first pulling up the light shield, then unclipping pilot light mounting socket from the retaining clip.
5. Remove the 4 chassis mounting screws (accessible from underneath chassis) and remove chassis from cabinet.

To Remove Chassis From Cabinet (HS-711)

1. Remove cabinet back cover.

2. Disconnect all chassis connecting cables except connections to left channel speaker system.

3. Remove chassis mounting screws, then rotate chassis until left channel speaker mounting screws are accessible; then disconnect leads to left channel system.

4. Remove chassis from cabinet.

To Remove Record Changer From Cabinet

1. Remove cabinet back cover.
2. Turn the 2 record changer mounting screws clockwise until they are flush with the changer base.
3. Disconnect all cable to record changer.
4. Turn the mounting clips, located at the ends of the mounting screws, so they are parallel with the mounting screws.
5. Lift the changer out of the cabinet.

REPLACEMENT PARTS LIST

When ordering parts, specify model number of set in addition to part number and description of part. Electronic parts of equivalent rating are not necessarily of equivalent standards. The components in this Service Manual have been chosen for reliability and applicability to the maximum life expectancy of the set. Maximum customer satisfaction and minimized on-lie-backs, use the exact Motorola parts replacement.

Ref. No.	Part Number	Description	Part No.	Description
C-1	218640021	Capacitor, cer tub: 10 mf 500V	L-4	1V642422 AM Antenna & Panel: incl C1 (SK18 only)
C-2	218640022	Capacitor, cer tub: .001 mf 500V	L-5	*1V642412 AM Antenna & Panel: incl C2 (SK17 only)
C-3	218640023	Capacitor, mica trim: .01 mf 500V		*1V642410 AM Antenna & Panel: incl C1 (SK18 only)
C-4	218640024	Capacitor, cer tub: 20 mf 800V		24893940 Coil, AM onc
C-5	218640025	Capacitor, cer tub: 20 mf 800V		
C-6	218640026	Capacitor, cer tub: 20 mf 800V		
C-7	218640027	Capacitor, cer tub: 20 mf 800V		
C-8	218640028	Capacitor, cer tub: 20 mf 800V		
C-9	218640029	Capacitor, cer tub: 20 mf 800V		
C-10	218640030	Capacitor, cer tub: 20 mf 800V		
C-11	218640031	Capacitor, cer tub: 20 mf 800V		
L-1	758640000	Ferrite bead (this represents inductance)		
L-2	248640031	Coil, FM RF: complete (incl L3)		
L-3	—	Coil, FM onc (part of L2) (incl L3)		
R-1	174640032	Resistor, carbon film: 1 meg 10%		
T-1	258640033	Transformer, FM ant input		
T-2	258640034	Transformer, FM IF: incl cores		
FM TUNER 770638430 (UT-343) ELECTRICAL PARTS				
C-1	218640021	Capacitor, cer tub: 10 mf 500V		
C-2	218640022	Capacitor, cer tub: .001 mf 500V		
C-3	218640023	Capacitor, mica trim: .01 mf 500V		
C-4	218640024	Capacitor, cer tub: 20 mf 800V		
C-5	218640025	Capacitor, cer tub: 20 mf 800V		
C-6	218640026	Capacitor, cer tub: 20 mf 800V		
C-7	218640027	Capacitor, cer tub: 20 mf 800V		
C-8	218640028	Capacitor, cer tub: 20 mf 800V		
C-9	218640029	Capacitor, cer tub: 20 mf 800V		
C-10	218640030	Capacitor, cer tub: 20 mf 800V		
C-11	218640031	Capacitor, cer tub: 20 mf 800V		
L-1	758640000	Ferrite bead (this represents inductance)		
L-2	248640031	Coil, FM RF: complete (incl L3)		
L-3	—	Coil, FM onc (part of L2) (incl L3)		
R-1	174640032	Resistor, carbon film: 1 meg 10%		
T-1	258640033	Transformer, FM ant input		
T-2	258640034	Transformer, FM IF: incl cores		
FM TUNER 770638430 (UT-343) MECHANICAL PARTS				
C-1	770638430	FM Tuner, complete		
C-2	436640041	Collar, tuning shaft: brass, set screws		
C-3	768640036	Core, IF trim: incl string		
C-4	768640037	Core, IF trim: incl string		
C-5	3K640042	Screw, machine (tuner sub-chassis etc)		
C-6	3K827518	Screw, tapping: #4 x 3/8 (FM Tuner etc)		
C-7	3K840044	Set screw (tuning gang shaft collar)		
C-8	3K840045	Set screw (tuning gang shaft collar)		
C-9	416640037	Spring, RV & onc coil main		
C-10	31K640040	Strip, ant terminal return		
C-11	4K601456	Washer, "C" (pulley anti-vibrating - not in set)		
C-12	416640038	Washer, "C" (pulley retainer)		
HS-710 ELECTRICAL PARTS				
C-1 thru C-11	See FM Tuner Parts List			
C-12	21R1482728	Capacitor, cer disc: .01 mf 500V (not in set)		
C-13	21R1292931	Capacitor, cer disc: .005 mf 500V		
C-14	21R1212836	Capacitor, cer disc: .01 mf 500V		
C-15	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-16	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-17	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-18	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-19	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-20	23A638538	Capacitor, electrolytic: 8 mf 50V		
C-21	3B8641670	Capacitor, mica trim: 1.3 mf to 11 mf		
C-22	3B8641670	Capacitor, mica trim: 1.3 mf to 11 mf		
C-23	8R121005	Capacitor, paper tub: .05 mf 200V		
C-24	21R121848	Capacitor, cer disc: .01 mf 500V		
C-25	21R121848	Capacitor, cer disc: .01 mf 500V		
C-26	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-27	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-28	21R121848	Capacitor, cer disc: .01 mf 500V		
C-29	21R121848	Capacitor, cer disc: .01 mf 500V		
C-30	8R121005	Capacitor, paper tub: .005 mf 500V		
C-31	8R121005	Capacitor, paper tub: .002 mf 500V		
C-32	21R120872	Capacitor, cer disc: 56 mf 500V (not in all sets)		
C-33	8R128691	Capacitor, paper tub: .02 mf 400V		
C-34	8R128691	Capacitor, paper tub: .02 mf 400V		
C-35	8R128691	Capacitor, paper tub: .02 mf 400V		
C-36	23B642469	Capacitor, electrolytic: 10 mf 400V		
C-37	8R128691	Capacitor, paper tub: .02 mf 400V		
C-38	8R128691	Capacitor, paper tub: .02 mf 400V		
C-39	21R121848	Capacitor, cer disc: .01 mf 500V		
C-40	21R1482728	Capacitor, cer disc: .01 mf 500V (120 ohm sets)		
C-41	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-42	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-43	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-44	8R128691	Capacitor, paper tub: .02 mf 400V		
C-45	8R128691	Capacitor, paper tub: .02 mf 400V		
C-46	21R121848	Capacitor, cer disc: .01 mf 500V		
C-47	21R1482728	Capacitor, cer disc: .01 mf 500V (120 ohm sets)		
C-48	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-49	21R1482728	Capacitor, cer disc: .01 mf 500V		
C-50	8R121668	Capacitor, paper tub: .002 mf 600V		
E-1	51829144	Printed Resistor - Capacitor Plate		
E-2	68R125895	Bulb, pilot light: #1847; 6V		
E-3	68R125895	Bulb, pilot light: #1847; 6V		
E-4	51861843	Printed Resistor - Capacitor Plate		
E-5	51861843	Printed Resistor - Capacitor Plate		
E-6	51861843	Printed Resistor - Capacitor Plate		
E-7	68R125895	Bulb, pilot light: #1847; 6V		
E-8	68R125895	Bulb, pilot light: #1847; 6V		
L-1, 2 & 3	See FM Tuner Parts List			

- Replace pilot light.
- Replace On-Off Indicator Pilot Light (SK17, SK18 only).
- Remove cabinet back cover (model SK18 only).
- Remove pilot light bracket mounting screw located in side cabinet (rear bottom).
- Replace pilot light.
- Replace bracket and cabinet back cover (SK18).

STEREO NOTES

Excellent stereophonic reproduction can be obtained from this unit with correct installation.

Semingly imperfect stereophonic record reproduction does not necessarily mean the unit itself is at fault. In-correct location, volume level, balance adjustment, etc., can create the illusion that the unit is not operating properly. Therefore, before suspecting the unit, make certain that the initial setup is correct (see Operating Instruction booklet, if necessary). The room, with its individual acoustic characteristics, and the level at which the unit is operated, are of importance. Some room settings are better than others; experimentation in setting up the units will determine which setting is best (try to have the main unit and right speaker placed along the same wall). The listener, seated in the center of the room, should be 7 feet from the main unit and 4 to 7 feet from the right speaker (listener is closer to unit and greater spacing (5 to 10 feet) at higher volume levels (listener is further away). Too great a spacing, however, will cause the commonly known "hole in the middle" effect, or if the listener is seated too far from the units, there will be a loss of the stereophonic effect.

Once the room setup is determined, the controls should be adjusted. First, the output level from both speaker systems must be made the same. With the unit operating (use a monaural LP disc; set COMPENSATOR to RIAA) and the loudness control at an intermediate setting to avoid blast, adjust the balance control so that each speaker has approximately the same volume level.

Secondly, adjust the loudness control to desired listening level. (Extremely low loudness levels may require readjustment of the balance control.)

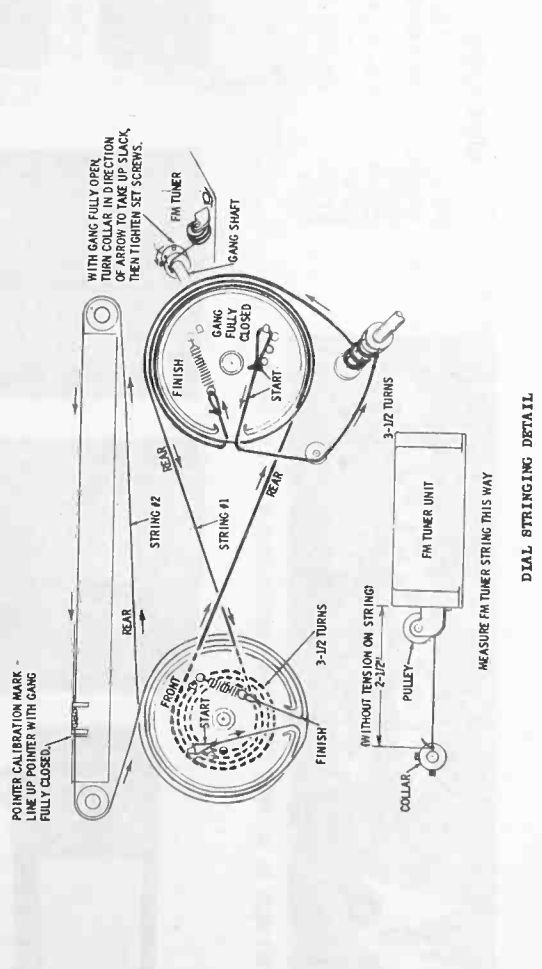
Thirdly, since the directional characteristic of stereophonic reproduction is dependent to a great degree on mid-range and treble notes, the treble control should be advanced to increase treble response; however, the advancement of so many controls may require an intermediate setting for best tonal balance.

Finally, re-orientation of main cabinet and right channel speaker system may be necessary.

PRODUCTION CHANGES HS-710

Chassis Coding	Changes
HS-710A	Original chassis
HS-710B	SHIELDED CABLE ADDED: The signal input cable to the grids of V-10A-12AX7 (pin #2) V-10B-12AX7 (pin #7), and the cable to the input of the two loudness controls (pin #1 on E-4 and E-6) has been changed to a shielded type.

HS-710B (cont'd)
 Dropping resistor added, the following were used: .1 ohm 2W ww; 1.2 ohm 1/2W ww; .47 ohm 1/2W ww. Use 17K49266, 47 ohm 10% or: replacement (see R-43 on schematic diagram).



ALIGNMENT

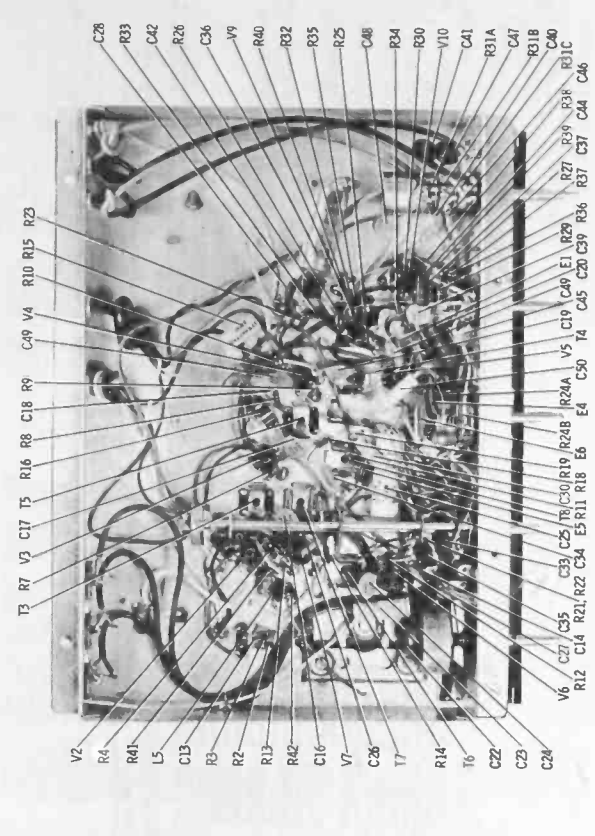
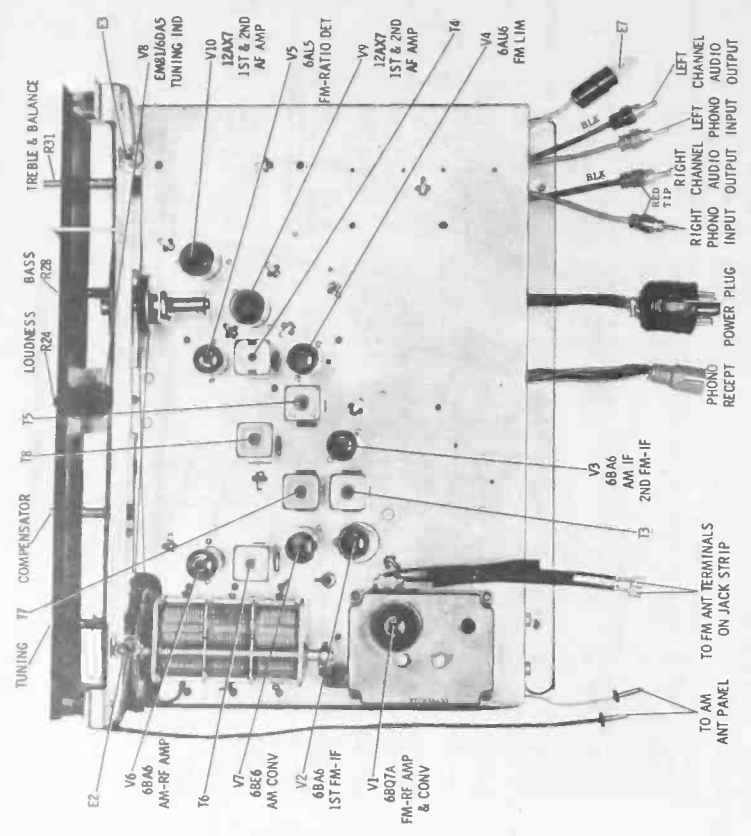
PRELIMINARY PROCEDURE

Either AM or FM alignment may be performed independent of the other. Use an AM signal generator, a VTVM and output meter as indicated. Set loudness and bass controls to maximum, treble control to minimum. The AM antenna loop should be connected; use either the speakers or an 8 ohm load connected to output transformer secondary. Use insulated alignment tools. As stages are brought into alignment, keep reducing signal generator output so meter reads no more than -8V DC when aligning FM, or no more than 2V AC when aligning AM; this prevents overloading and assures greater accuracy. With gang fully closed, right edge of pointer (rear) should line up with mark on right end of pointer rail (see Dial Stringing Detail). In AM alignment, signal generator output should be modulated with 400 cps.

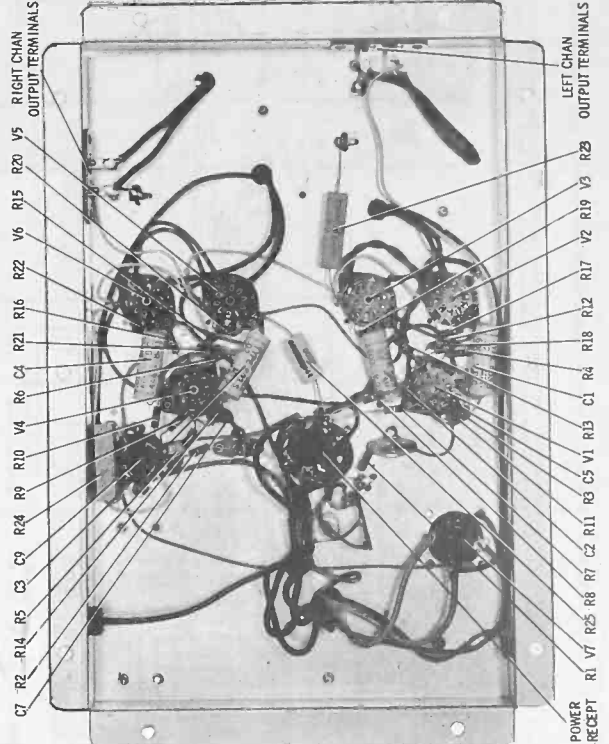
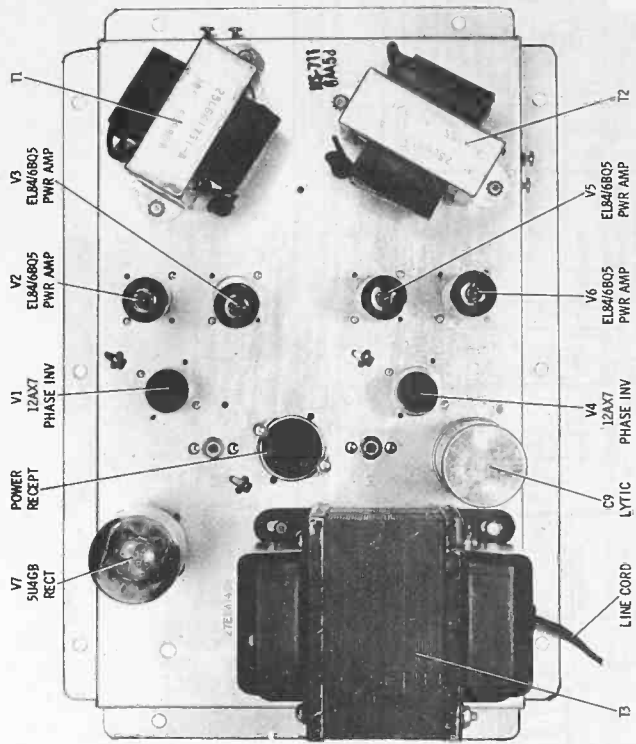
STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	BAND SW SETTING	OUTPUT INDICATOR	ADJUST	REMARKS
1.	FM-IF ALIGNMENT FM ant terminals	10.7 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1. Com to chassis	1, 2, 3, 4, 5, 6 & 7	Adjust for max neg reading
2.	FM ant terminals	"	"	FM	VTVM-DC probe to lead 3 of E-1. Com to chassis	8	Adjust for zero reading on VTVM. A positive and negative reading will be obtained on either side of correct setting. (If meter has zero center scale, use this scale.) Repeat steps 1 and 2 until no further steps; step 2 should be last step.
FM-RF ALIGNMENT - See Note *							
3.	FM ant terminals	108.1 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1. Com to chassis	9	Adjust for max neg reading
4.	FM ant terminals	98 Mc No mod	Tune for max	FM	"	10	"
AM-IF ALIGNMENT							
5.	5SE6 grid (pin 7) thru antenna cap of AM tuning coil thru .1 mf & chassis	455 Kc	Fully open	AM	Output meter across VC	11, 12, 13 & 14	Adjust for max reading
AM-RF ALIGNMENT							
6.	Radiation loop**	1620 Kc	"	AM	"	15	"
7.	"	1400 Kc	Tune for max	AM	"	16	"
8.	"	"	"	AM	"	17	With chassis installed in cabinet, adjust for max reading
NOTE: Do not perform the following steps unless the RF or oscillator cores have been tampered with or associated components have been replaced.							
9.	6SE6 grid (pin 7) thru .1 mf & chassis	1620 Kc	Fully open	AM	Output meter across VC	15	Adjust for max reading
10.	"	535 Kc	Fully closed	AM	"	18	Adjust for max reading. Repeat steps 9 & 10 until oscillator covers required range; step 9 should be last adjustment.
11.	Radiation loop**	1400 Kc	Tune for max	AM	"	16	Adjust for max reading
12.	"	600 Kc	Tune for max	AM	"	19	Adjust for max reading. Repeat steps 11 and 12 until no further increase; step 11 should be last adjustment.
13.	Repeat step 8.						

*If FM tuner string has been replaced or tampered with, check it for correct length and set-up before proceeding with steps 3 & 4. String should measure about 2-1/2" from FM tuner opening to gang shaft collar. Open gang fully, place collar on string on gang shaft, then turn collar clockwise to just remove slack from string; tighten collar set screws (see Dial Stringing Detail).

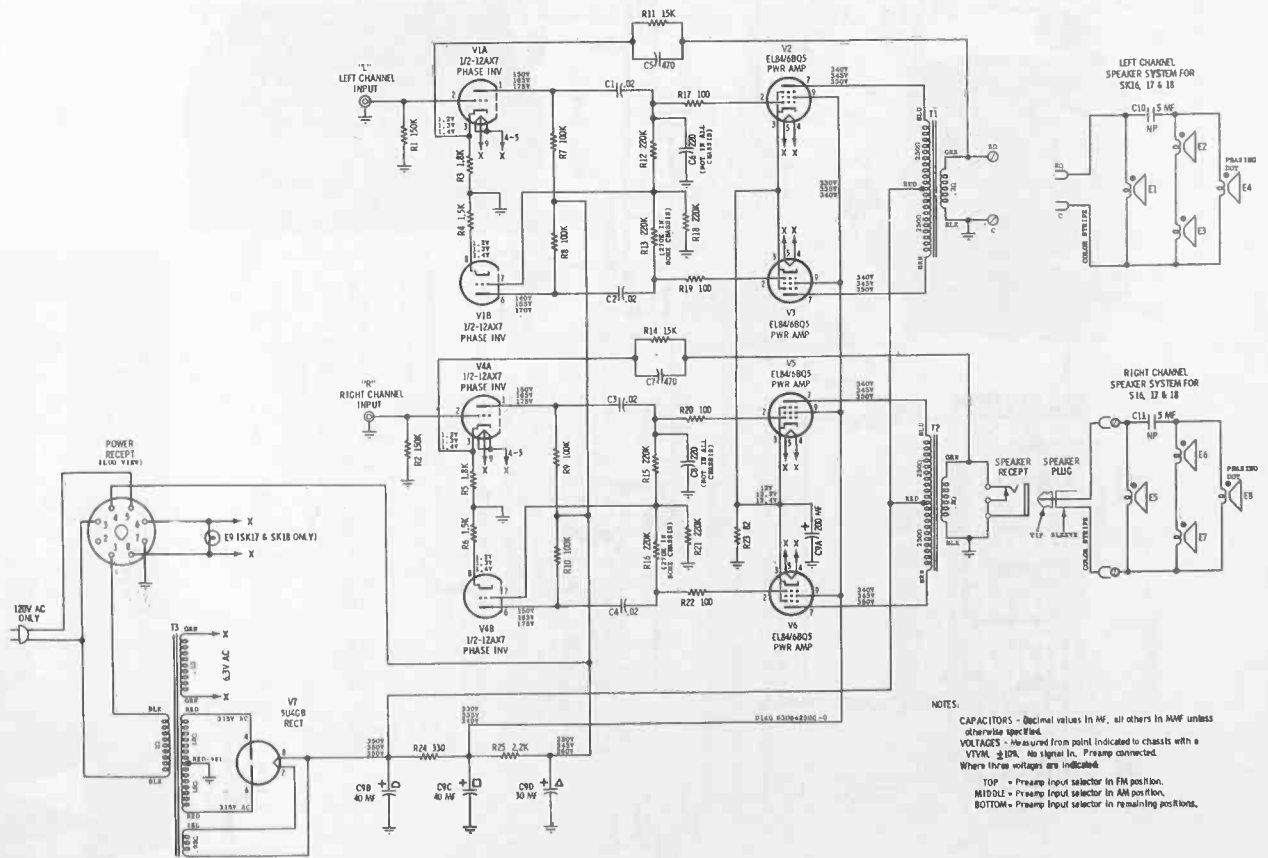
**Connect generator across 5" diameter, 5-turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver loop.



HS-710A PARTS LOCATIONS (SEE PRODUCTION CHANGES)



BB-711 PARTS LOCATIONS

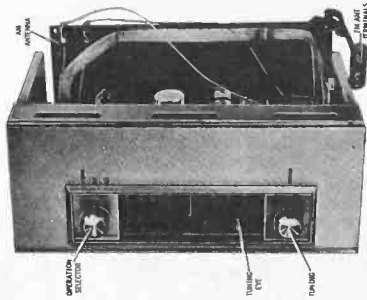


NOTES:
 CAPACITORS - Decimal values in MF, all others in MAF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$, No signal in. Preamp connected. Where tube voltages are indicated.
 TOP - Preamp input selector in FM position.
 MIDDLE - Preamp input selector in AM position.
 BOTTOM - Preamp input selector in remaining positions.

MOTOROLA

Service Manual

HOME RADIO
MODEL HK-27 CHASSIS HS-695



GENERAL INFORMATION

TYPE - High-Fidelity AM-FM tuner custom designed for installation in the record storage compartment of Motorola Models 6K13, 6K22, 5K11, 5K12, 5K13, 5K14 or into any space that has the following dimensions: 14-3/4" x 6-1/8" x 6-3/4" (HWD).

This model features built-in AM antenna with precision tuning for simplified tuning, tuning eye for FM and low impedance cathode follower output to permit longer interconnecting cables between tuner and amplifier with little or no high frequency loss.

When the tuner is installed into the Motorola Models listed above per instructions given in the HK-27 installation and operation booklet, the following operating instructions of 800 words should be followed. When the tuner Operation Selector knob is in the PHONO position; in the AM or FM positions, the phonograph motor is automatically shut off and the AM or FM stations are played through the amplifier-speaker system of the phonograph.

POWER SUPPLY - 120 volts, 60 cycle AC only

POWER CONSUMPTION - 40 watts

TUNING RANGE - AM 540 to 1600 Kc FM 88 to 108 Mc
AM IF - 455 Kc FM IF - 10.7 Mc

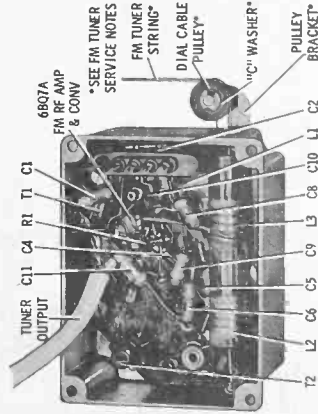
FM TUNER SERVICE NOTES

Do not free the dial cable pulley located on the FM tuner unit, as this may result in audio howl. This is due to vibration caused by acoustic feedback from the loudspeaker at certain frequencies. Silicon grease is applied at the junction of string and pulley, to insure smooth tuning action and must not be removed. Therefore, whenever tuning action is erratic, check for proper use of silicon grease (Molokote Tuner Oil #90487). Also affecting tuning action is the angle the pulley is set with respect to the take-up shaft. Position bracket until tuning action is as smooth as possible.

HK-27 SERIES

TUBE COMPLEMENT -

Type	Function
6BE6	AM converter
6BQ7A	FM RF amp & converter
6BA6	AM IF amp
6AU6	FM limiter
6AL5	FM ratio detector
12AU7	AM Det-AVC-cathode follower
6X4	Rectifier
EM-81/6DA5	Tuning eye



FM UNIT 77D638430 PARTS LOCATION

ALIGNMENT

PRELIMINARY PROCEDURE

Either AM or FM alignment may be performed independent of the other. Use an AM signal generator and a VTVM as indicated. The AM antenna loop should be connected. Use insulated alignment tools. As stages are brought into alignment, keep reducing signal generator output so meter reads no more than -5V DC when aligning FM; this prevents overloading and assures greater accuracy. With gang fully closed, left edge of pointer (dial) should line up with mark on left end of pointer rail (see Dial Stringing Detail). In AM alignment, signal generator should be modulated with 400 cps.

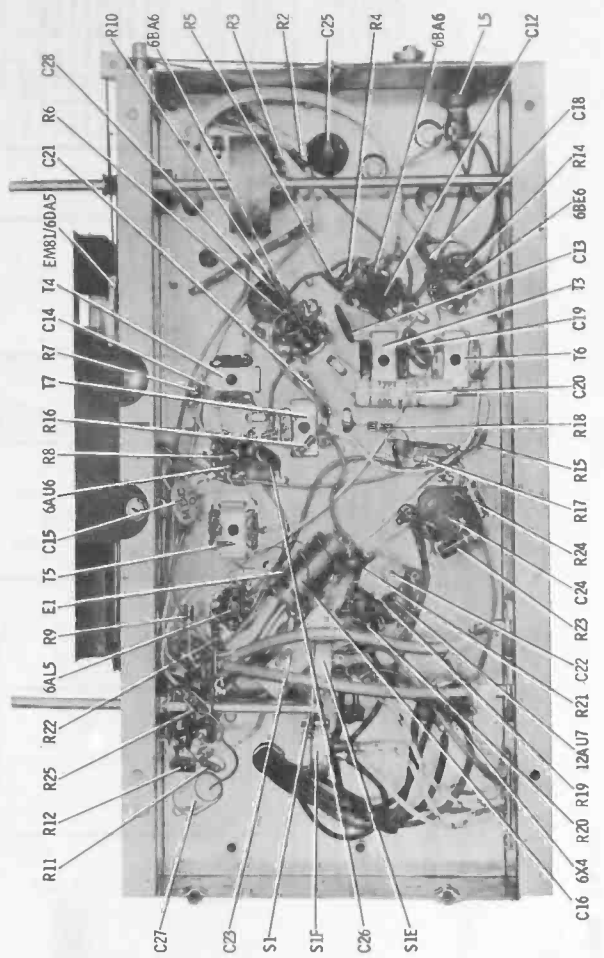
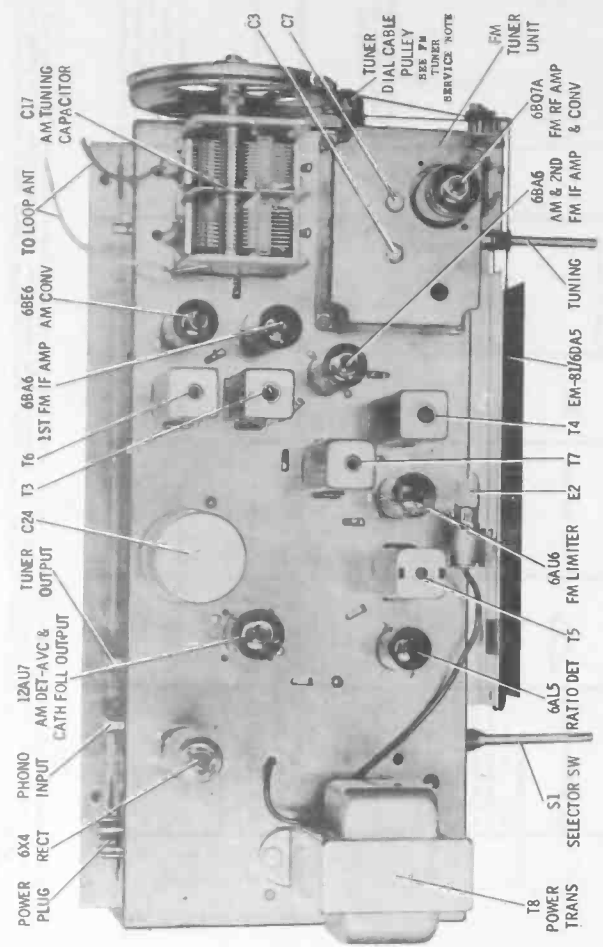
STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	BAND SW SETTING	OUTPUT INDICATOR	ADJUST	REMARKS
1.	FM-IF ALIGNMENT FM ant terminals	10.7 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1, Com to chassis	1, 2, 3, 4, 5, 6 & 7	Adjust for max neg reading.
2.	FM ant terminals	"	"	FM	VTVM-DC probe to lead 3 of E-1, Com to chassis	8	Adjust for zero reading on VTVM. A positive and negative reading will be obtained on either side of zero center scale. If meter has zero center scale, use this scale. Repeat steps 1 and 2 until no further increase; step 2 should be last step.
FM-RF ALIGNMENT - See Note *							
3.	FM ant terminals	108, 1 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1, Com to chassis	9	Adjust for max neg reading
4.	FM ant terminals	98 Mc No mod	Tune for max	FM	"	10	"
5.	AM-IF ALIGNMENT 6BE6 grid (pin 7) or antenna star of AM tuning cap thru .1 mf & ch	455 Kc	Fully open	AM	VTVM-DC probe to AVC line (pin 3 of T9), Com to chassis	11, 12, 13 & 14	"
6.	AM-RF ALIGNMENT Radiation loop**	1620 Kc	"	AM	"	15	"
7.	"	1400 Kc	Tune for max	AM	"	16	With chassis installed in cabinet, adjust for max close of tuning eye

NOTE: Do not perform the following steps unless the oscillator core has been tampered with or associated components have been replaced.

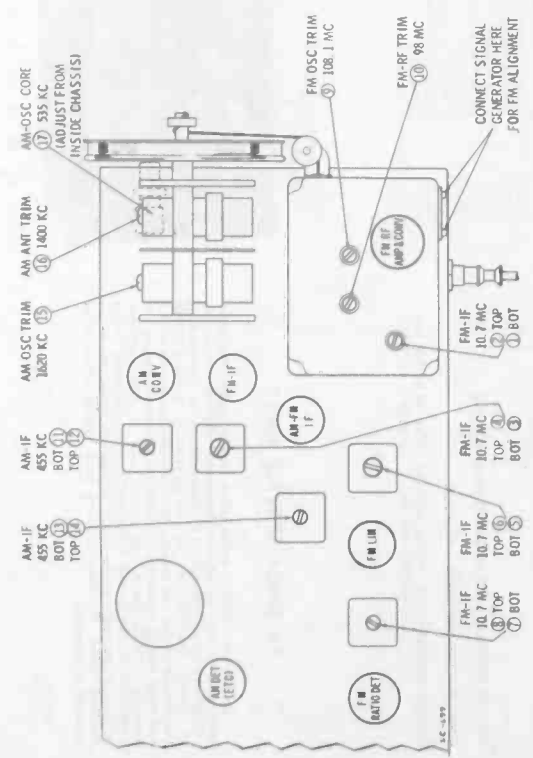
8.	6BE6 grid (pin 7) thru .1 mf & chassis	1620 Kc	Fully open	AM	VTVM-DC probe to AVC line (pin 3 of T9), Com to chassis	15	Adjust for max neg reading
9.	"	535 Kc	Fully closed	AM	"	17	Adjust for max neg reading. Repeat steps 8 & 9 until oscillator covers required range; step 8 should be last adjustment
10.	Repeat step 7.						

*If FM tuner string has been replaced or tampered with, check it for correct length and set-up before proceeding with steps 3 & 4. String should measure 3" from FM tuner opening to gang shaft collar. Open gang fully, place collar and string on gang shaft, then turn collar counterclockwise to just remove slack from string; tighten collar setscrews (see Dial Stringing Detail).

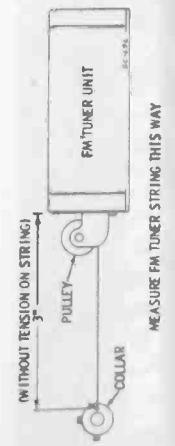
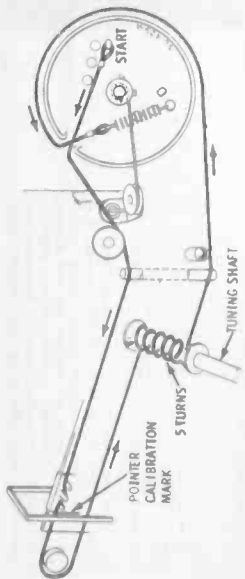
**Connect generator across 5" diameter, 5-turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver loop.



PARTS LOCATION



ALIGNMENT POINTS LOCATION DETAIL



DIAL STRINGING DETAIL

REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part. Electronic parts of equivalent rating are not necessarily of equivalent standards. The components listed in this Service Manual have been chosen for reliability and applicability to the specific maximum customer satisfaction and minimized call-backs, use the exact Motorola parts replacement.

Ref. Number	Part Number	Description	Ref. Number	Part Number	Description
FM TUNER 77DS3840 (UT-343) ELECTRICAL PARTS	C-1	21K540021 Capacitor, cer tub: 10 mcf 500V MTC750PPM	R-9	6R6054	10,000 20% 1/2W
	C-2	21K540022 Capacitor, cer tub: .001 mf 500V	R-10	6R6054	1 meg 20% 1/2W
	C-3	20K640023 Capacitor, mica film 100 pf 500V	R-11	6K124494	1 meg 20% 1/2W
	C-4	21K540024 Capacitor, cer tub: 20 mf 500V	R-12	6K121277	4.7 meg 10% 1/2W
	C-5	21K540025 Capacitor, cer tub: 20 mf 500V	R-13	6K121278	2 meg 20% 1/2W
	C-6	21K540026 Capacitor, cer tub: 20 mf 500V	R-14	6K121279	2 meg 20% 1/2W
	C-7	21K540027 Capacitor, cer tub: 10 mcf 500V MTC750PPM	R-15	6K127001	2.2 meg 10% 1/2W
	C-8	21K540028 Capacitor, cer tub: 10 mcf 500V MTC750PPM	R-16	6K121687	47,000 20% 1/2W
	C-9	21K540029 Capacitor, cer tub: 10 mcf 500V MTC750PPM	R-17	6K121688	47,000 20% 1/2W
	C-10	21K540030 Capacitor, cer tub: 15 mcf 500V	R-18	6K121689	100,000 20% 1/2W
	C-11	21K540031 Capacitor, cer tub: 60 mcf 500V MTC750PPM	R-19	6K121690	100,000 20% 1/2W
L-1	76K640030 Ferrite bead (this represents inductance)	R-20	6K121691	47,000 20% 1/2W	
L-2	24K640031 Coil, FM RF: complete (incl L3)	R-21	6R6117	330 20% 1W	
L-3	17K640032 Resistor, carbon film: 1 meg 10%	R-22	6K121692	47,000 20% 1/2W	
R-1	17K640033 Resistor, carbon film: 1 meg 10%	R-23	6R6117	330 20% 1W	
T-1	23K640034 Transformer, FM ant: incl cores	R-24	6K119926	2700 10% 1/2W	
T-2	23K640034 Transformer, FM IF: incl cores	S-1	40K639788	Switch, selector selector	
FM TUNER 77DS3840 (UT-343) MECHANICAL PARTS					
T-1	43K640041 FM Tuner, complete	S-1F	40K639787	Switch, SPST (on S1)	
43K640043	Coil, FM RF: complete (incl L3)	T-1 & 2	24C638846	Transformer, FM 1st IF: 10.7 Mc	
43K640044	Coil, FM RF: complete (incl L3)	T-3	24C638847	Transformer, FM 2nd IF: 10.7 Mc	
43K640045	Coil, FM RF: complete (incl L3)	T-4	24C634507	Transformer, AM 1st IF: 455 Kc	
43K640046	Coil, FM RF: complete (incl L3)	T-5	24C634508	Transformer, AM 2nd IF: 455 Kc	
43K640047	Coil, FM RF: complete (incl L3)	T-6	25C638269	Transformer, power	
43K640048	Coil, FM RF: complete (incl L3)	HS-695 MECHANICAL PARTS			
43K640049	Coil, FM RF: complete (incl L3)	44K638274	Background, dial		
43K640050	Coil, FM RF: complete (incl L3)	44K638275	Background, dial		
43K640051	Coil, FM RF: complete (incl L3)	44K638276	Background, dial		
43K640052	Coil, FM RF: complete (incl L3)	44K638277	Background, dial		
43K640053	Coil, FM RF: complete (incl L3)	44K638278	Background, dial		
43K640054	Coil, FM RF: complete (incl L3)	44K638279	Background, dial		
43K640055	Coil, FM RF: complete (incl L3)	44K638280	Background, dial		
43K640056	Coil, FM RF: complete (incl L3)	44K638281	Background, dial		
43K640057	Coil, FM RF: complete (incl L3)	44K638282	Background, dial		
43K640058	Coil, FM RF: complete (incl L3)	44K638283	Background, dial		
43K640059	Coil, FM RF: complete (incl L3)	44K638284	Background, dial		
43K640060	Coil, FM RF: complete (incl L3)	44K638285	Background, dial		
43K640061	Coil, FM RF: complete (incl L3)	44K638286	Background, dial		
43K640062	Coil, FM RF: complete (incl L3)	44K638287	Background, dial		
43K640063	Coil, FM RF: complete (incl L3)	44K638288	Background, dial		
43K640064	Coil, FM RF: complete (incl L3)	44K638289	Background, dial		
43K640065	Coil, FM RF: complete (incl L3)	44K638290	Background, dial		
43K640066	Coil, FM RF: complete (incl L3)	44K638291	Background, dial		
43K640067	Coil, FM RF: complete (incl L3)	44K638292	Background, dial		
43K640068	Coil, FM RF: complete (incl L3)	44K638293	Background, dial		
43K640069	Coil, FM RF: complete (incl L3)	44K638294	Background, dial		
43K640070	Coil, FM RF: complete (incl L3)	44K638295	Background, dial		
43K640071	Coil, FM RF: complete (incl L3)	44K638296	Background, dial		
43K640072	Coil, FM RF: complete (incl L3)	44K638297	Background, dial		
43K640073	Coil, FM RF: complete (incl L3)	44K638298	Background, dial		
43K640074	Coil, FM RF: complete (incl L3)	44K638299	Background, dial		
43K640075	Coil, FM RF: complete (incl L3)	44K638300	Background, dial		
43K640076	Coil, FM RF: complete (incl L3)	44K638301	Background, dial		
43K640077	Coil, FM RF: complete (incl L3)	44K638302	Background, dial		
43K640078	Coil, FM RF: complete (incl L3)	44K638303	Background, dial		
43K640079	Coil, FM RF: complete (incl L3)	44K638304	Background, dial		
43K640080	Coil, FM RF: complete (incl L3)	44K638305	Background, dial		
43K640081	Coil, FM RF: complete (incl L3)	44K638306	Background, dial		
43K640082	Coil, FM RF: complete (incl L3)	44K638307	Background, dial		
43K640083	Coil, FM RF: complete (incl L3)	44K638308	Background, dial		
43K640084	Coil, FM RF: complete (incl L3)	44K638309	Background, dial		
43K640085	Coil, FM RF: complete (incl L3)	44K638310	Background, dial		
43K640086	Coil, FM RF: complete (incl L3)	44K638311	Background, dial		
43K640087	Coil, FM RF: complete (incl L3)	44K638312	Background, dial		
43K640088	Coil, FM RF: complete (incl L3)	44K638313	Background, dial		
43K640089	Coil, FM RF: complete (incl L3)	44K638314	Background, dial		
43K640090	Coil, FM RF: complete (incl L3)	44K638315	Background, dial		
43K640091	Coil, FM RF: complete (incl L3)	44K638316	Background, dial		
43K640092	Coil, FM RF: complete (incl L3)	44K638317	Background, dial		
43K640093	Coil, FM RF: complete (incl L3)	44K638318	Background, dial		
43K640094	Coil, FM RF: complete (incl L3)	44K638319	Background, dial		
43K640095	Coil, FM RF: complete (incl L3)	44K638320	Background, dial		
43K640096	Coil, FM RF: complete (incl L3)	44K638321	Background, dial		
43K640097	Coil, FM RF: complete (incl L3)	44K638322	Background, dial		
43K640098	Coil, FM RF: complete (incl L3)	44K638323	Background, dial		
43K640099	Coil, FM RF: complete (incl L3)	44K638324	Background, dial		
43K640100	Coil, FM RF: complete (incl L3)	44K638325	Background, dial		
43K640101	Coil, FM RF: complete (incl L3)	44K638326	Background, dial		
43K640102	Coil, FM RF: complete (incl L3)	44K638327	Background, dial		
43K640103	Coil, FM RF: complete (incl L3)	44K638328	Background, dial		
43K640104	Coil, FM RF: complete (incl L3)	44K638329	Background, dial		
43K640105	Coil, FM RF: complete (incl L3)	44K638330	Background, dial		
43K640106	Coil, FM RF: complete (incl L3)	44K638331	Background, dial		
43K640107	Coil, FM RF: complete (incl L3)	44K638332	Background, dial		
43K640108	Coil, FM RF: complete (incl L3)	44K638333	Background, dial		
43K640109	Coil, FM RF: complete (incl L3)	44K638334	Background, dial		
43K640110	Coil, FM RF: complete (incl L3)	44K638335	Background, dial		
43K640111	Coil, FM RF: complete (incl L3)	44K638336	Background, dial		
43K640112	Coil, FM RF: complete (incl L3)	44K638337	Background, dial		
43K640113	Coil, FM RF: complete (incl L3)	44K638338	Background, dial		
43K640114	Coil, FM RF: complete (incl L3)	44K638339	Background, dial		
43K640115	Coil, FM RF: complete (incl L3)	44K638340	Background, dial		
43K640116	Coil, FM RF: complete (incl L3)	44K638341	Background, dial		
43K640117	Coil, FM RF: complete (incl L3)	44K638342	Background, dial		
43K640118	Coil, FM RF: complete (incl L3)	44K638343	Background, dial		
43K640119	Coil, FM RF: complete (incl L3)	44K638344	Background, dial		
43K640120	Coil, FM RF: complete (incl L3)	44K638345	Background, dial		
43K640121	Coil, FM RF: complete (incl L3)	44K638346	Background, dial		
43K640122	Coil, FM RF: complete (incl L3)	44K638347	Background, dial		
43K640123	Coil, FM RF: complete (incl L3)	44K638348	Background, dial		
43K640124	Coil, FM RF: complete (incl L3)	44K638349	Background, dial		
43K640125	Coil, FM RF: complete (incl L3)	44K638350	Background, dial		
43K640126	Coil, FM RF: complete (incl L3)	44K638351	Background, dial		
43K640127	Coil, FM RF: complete (incl L3)	44K638352	Background, dial		
43K640128	Coil, FM RF: complete (incl L3)	44K638353	Background, dial		
43K640129	Coil, FM RF: complete (incl L3)	44K638354	Background, dial		
43K640130	Coil, FM RF: complete (incl L3)	44K638355	Background, dial		
43K640131	Coil, FM RF: complete (incl L3)	44K638356	Background, dial		
43K640132	Coil, FM RF: complete (incl L3)	44K638357	Background, dial		
43K640133	Coil, FM RF: complete (incl L3)	44K638358	Background, dial		
43K640134	Coil, FM RF: complete (incl L3)	44K638359	Background, dial		
43K640135	Coil, FM RF: complete (incl L3)	44K638360	Background, dial		
43K640136	Coil, FM RF: complete (incl L3)	44K638361	Background, dial		
43K640137	Coil, FM RF: complete (incl L3)	44K638362	Background, dial		
43K640138	Coil, FM RF: complete (incl L3)	44K638363	Background, dial		
43K640139	Coil, FM RF: complete (incl L3)	44K638364	Background, dial		
43K640140	Coil, FM RF: complete (incl L3)	44K638365	Background, dial		
43K640141	Coil, FM RF: complete (incl L3)	44K638366	Background, dial		
43K640142	Coil, FM RF: complete (incl L3)	44K638367	Background, dial		
43K640143	Coil, FM RF: complete (incl L3)	44K638368	Background, dial		
43K640144	Coil, FM RF: complete (incl L3)	44K638369	Background, dial		
43K640145	Coil, FM RF: complete (incl L3)	44K638370	Background, dial		
43K640146	Coil, FM RF: complete (incl L3)	44K638371	Background, dial		
43K640147	Coil, FM RF: complete (incl L3)	44K638372	Background, dial		
43K640148	Coil, FM RF: complete (incl L3)	44K638373	Background, dial		
43K640149	Coil, FM RF: complete (incl L3)	44K638374	Background, dial		
43K640150	Coil, FM RF: complete (incl L3)	44K638375	Background, dial		
43K640151	Coil, FM RF: complete (incl L3)	44K638376	Background, dial		
43K640152	Coil, FM RF: complete (incl L3)	44K638377	Background, dial		
43K640153	Coil, FM RF: complete (incl L3)	44K638378	Background, dial		
43K640154	Coil, FM RF: complete (incl L3)	44K638379	Background, dial		
43K640155	Coil, FM RF: complete (incl L3)	44K638380	Background, dial		
43K640156	Coil, FM RF: complete (incl L3)	44K638381	Background, dial		
43K640157	Coil, FM RF: complete (incl L3)	44K638382	Background, dial		
43K640158	Coil, FM RF: complete (incl L3)	44K638383	Background, dial		
43K640159	Coil, FM RF: complete (incl L3)	44K638384	Background, dial		
43K640160	Coil, FM RF: complete (incl L3)	44K638385	Background, dial		
43K640161	Coil, FM RF: complete (incl L3)	44K638386	Background, dial		
43K640162	Coil, FM RF: complete (incl L3)	44K638387	Background, dial		
43K640163	Coil, FM RF: complete (incl L3)	44K638388	Background, dial		
43K640164	Coil, FM RF: complete (incl L3)	44K638389	Background, dial		
43K640165	Coil, FM RF: complete (incl L3)	44K638390	Background, dial		
43K640166	Coil, FM RF: complete (incl L3)	44K638391	Background, dial		
43K640167	Coil, FM RF: complete (incl L3)	44K638392	Background, dial		
43K640168	Coil, FM RF: complete (incl L3)	44K638393	Background, dial		
43K640169	Coil, FM RF: complete (incl L3)	44K638394	Background, dial		
43K640170	Coil, FM RF: complete (incl L3)	44K638395	Background, dial		
43K640171	Coil, FM RF: complete (incl L3)	44K638396	Background, dial		
43K640172	Coil, FM RF: complete (incl L3)	44K638397	Background, dial		
43K640173	Coil, FM RF: complete (incl L3)	44K638398	Background, dial		
43K640174	Coil, FM RF: complete (incl L3)	44K638399	Background, dial		
43K640175	Coil, FM RF: complete (incl L3)	44K638400	Background, dial		
43K640176	Coil, FM RF: complete (incl L3)	44K638401	Background, dial		
43K640177	Coil, FM RF: complete (incl L3)	44K638402	Background, dial		
43K640178	Coil, FM RF: complete (incl L3)	44K638403	Background, dial		
43K640179	Coil, FM RF: complete (incl L3)	44K638404	Background, dial		
43K640180	Coil, FM RF: complete (incl L3)	44K638405	Background, dial		
43K640181	Coil, FM RF: complete (incl L3)	44K638406	Background, dial		
43K640182	Coil, FM RF: complete (incl L3)	44K638407	Background, dial		
43K640183	Coil, FM RF: complete (incl L3)	44K638408	Background, dial		
43K640184	Coil, FM RF: complete (incl L3)	44K638409	Background, dial		
43K640185	Coil, FM RF: complete (incl L3)	44K638410	Background, dial		
43K640186	Coil, FM RF: complete (incl L3)	44K638411	Background, dial		
43K640187	Coil, FM RF: complete (incl L3)	44K638412	Background, dial		
43K640188	Coil, FM RF: complete (incl L3)	44K638413	Background, dial		
43K640189	Coil, FM RF: complete (incl L3)	44K638414	Background, dial		
43K640190	Coil, FM RF: complete (incl L3)	44K638415	Background, dial		
43K640191	Coil, FM RF: complete (incl L3)	44K638416	Background, dial		
43K640192	Coil, FM RF: complete (incl L3)	44K638417	Background, dial		
43K640193	Coil, FM RF: complete (incl L3)	44K638418	Background, dial		
43K640194	Coil, FM RF: complete (incl L3)	44K638419	Background, dial		
43K640195	Coil, FM RF: complete (incl L3)	44K638420	Background, dial		
43K640196	Coil, FM RF: complete (incl L3)	44K638421	Background, dial		
43K640197	Coil, FM RF: complete (incl L3)	44K638422	Background, dial		
43K640198	Coil, FM RF: complete (incl L3)	44K638423	Background, dial		
43K640199	Coil, FM RF: complete (incl L3)	44K638424	Background, dial		
43K640200	Coil, FM RF: complete (incl L3)	44K638425	Background, dial		

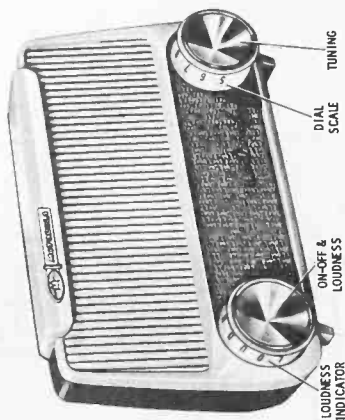
Ref. Number	Part Number	Description	Ref. Number	Part Number	Description
HS-695 ELECTRICAL PARTS	C-1 thru C-11	See FM Tuner Parts List	L-4	24B641532	Antenna & Panel
	C-12	21K482726 Capacitor, cer disc: .01 mf 500V	L-4	13K641506	Bezel
	C-13	21K482726 Capacitor, cer disc: .01 mf 500V	L-4	13K641507	Bezel
	C-14	21K115593 Capacitor, cer disc: .01 mf 500V</			

HOME RADIO
 MODELS CHASSIS
 6T15N HS-680
 6T15S HS-680

MOTOROLA

Service Manual

SUPERSEDES 6T15 PRELIMINARY SERVICE MANUAL PART NO. 68P642571



6T15 SERIES

GENERAL INFORMATION

TYPE - AC/DC table model superheterodyne receiver with plate detector and ferrite loop antenna. This set features a push-pull type On-Off & Loudness control plus vernier tuning. The push-pull feature eliminates the necessity of readjusting the loudness every time the radio is turned on. To turn radio ON, pull the LOUDNESS knob out; to turn radio OFF, push the same knob in.

TUBE COMPLEMENT - 12BA6 RF amp
 12BE6 Conv
 12BA6 IF amp
 12AY6 Det-AVC-AF amp
 35C5 Power supply
 35W4 Rectifier

TUNING RANGE - 532 to 1620 KC
IF - 455 KC
POWER SUPPLY - 120 volts AC/DC; 35 watts

SERVICE NOTES

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the powercord circuit is broken by an interlock when the cabinet rear cover is removed. When servicing or aligning this chassis from A.C., an isolation transformer should be inserted between the power line and the chassis.

DISASSEMBLY INSTRUCTIONS

To Remove Chassis From Cabinet

1. Remove two screws on bottom of cabinet; separate rear cabinet from front cabinet and unscrew (from inside rear cabinet) the lead lug which connects chassis to rear cabinet.
2. Remove the insert knob sections on the Loudness control and the Dial Scale. (The two control knobs are each composed of two sections.)
3. Remove Dial Scale knob and the screw (located behind knob) that mounts chassis to cabinet.
4. From front of cabinet, unscrew pinnut from Loudness Indicator knob in order to free the chassis.
5. From rear of cabinet, remove the two screws that mount the plated panel bracket to cabinet.
6. Unsolder speaker leads, antenna leads, and remove chassis from cabinet.

CIRCUIT DESCRIPTION

1. The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
2. The metal plating extends through all the holes on the chassis, connecting circuits on the top with those on the bottom.
3. Reference to the schematic diagram, plated panel wiring diagrams, and to chassis, will permit the circuit to be traced easily.

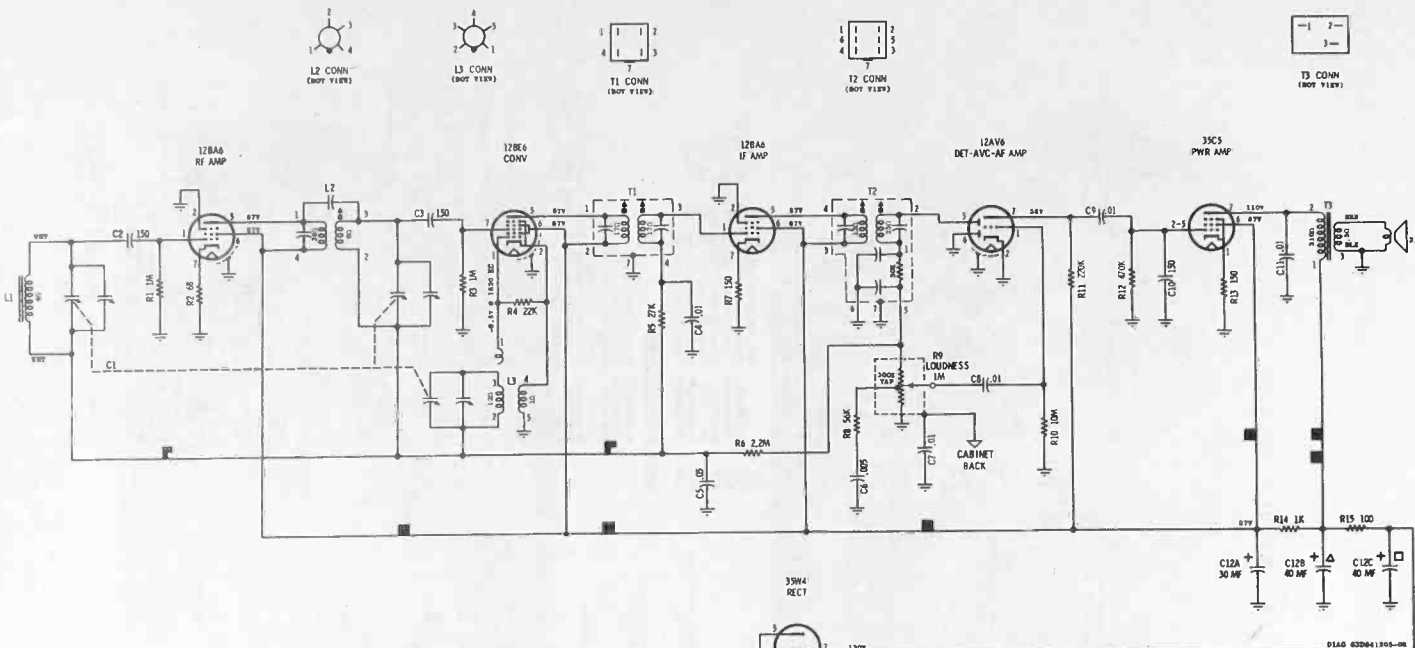
NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis has been included and wiring of electric components is shown. This is done in two ways: the chassis as viewed from the bottom (component side) and the chassis as viewed from the top with components as they would appear on opposite side.

COMPONENT REPLACEMENT

Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P636536) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

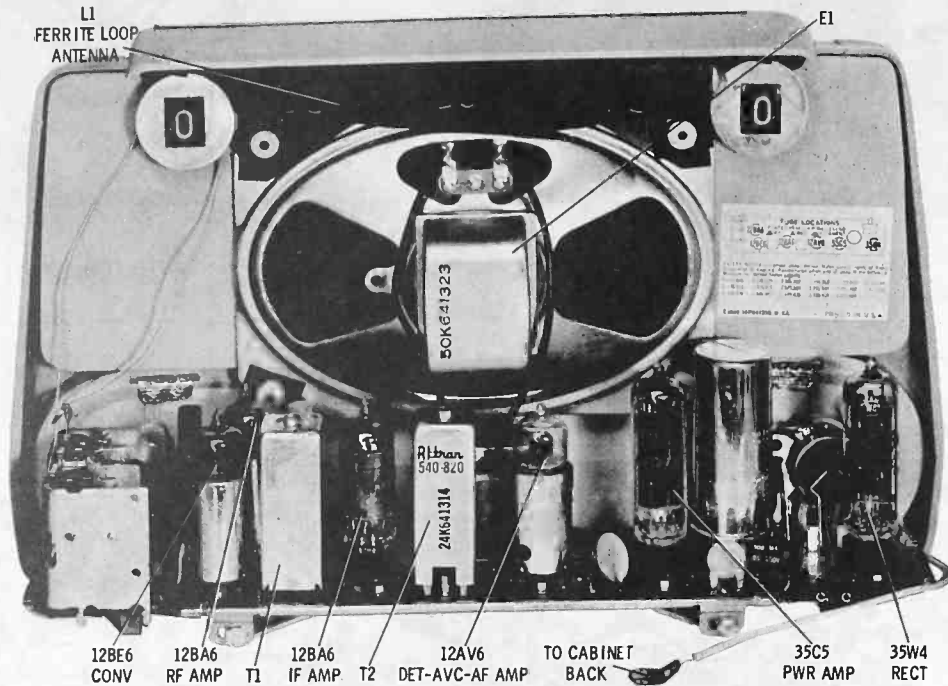
SAFETY PRECAUTIONS

1. Do not service the chassis on a metal plate because of the possibility of a short circuit.
2. Use caution when handling the chassis with power applied because all high voltage leads are exposed.



NOTES:

CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM, ±10%. Line voltage maintained at 120V.
 TUNING RANGE - 532 KC to 1620 KC.
 IF FREQ - 455 KC.
 INPUT VOLTAGE - 120V AC/DC.
 C = CABINET BACK
 PLATED PANEL WIRING LEGEND
 □ = IF △ = AVC ● = FILAMENT



PARTS LOCATION

REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part.
Electronic parts of equivalent rating are not necessarily of equivalent standards. The components listed in this Service Manual have been chosen for reliability and applicability to the specific circuits involved. For maximum customer satisfaction and minimized call-backs, use the exact Motorola parts replacement.

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
ELECTRICAL PARTS					
C-1	19C641067	Capacitor, variable: 3 gang	used as replacement for 84K641380 & 84K643200. This panel replaces the two other versions. In panel 84K641380, the support bracket and the edge plating were connected to B-. In panel 84K643200, the support bracket and edge plating were removed electrically from B-. In panel 84K643250, the support bracket and edge plating were connected to B- thru a capacitor (C7). The physical placement of the components is the same in all versions. When replacing panel, solder plated panel bracket to point "A" as indicated on Plated Panel Wiring Diagram.		
C-2	21K127652	Capacitor, cer disc: 150 mmf 500V	5K636314	Rivet, shield (tube socket center)	
C-3	21K127652	Capacitor, cer disc: 150 mmf 500V	98635616	Socket, tube: 7 pin min	
C-4	21R128284	Capacitor, cer disc: .01 mf 500V	CABINET PARTS		
C-5	8K121268	Capacitor, paper tub: .05 mf 400V	1V641381	Cabinet Front: brown (6T15M)	
C-6	21K633232	Capacitor, cer disc: .005 mf 500V	1V641382	Cabinet Front: tan (6T15S)	
C-7	21R128284	Capacitor, cer disc: .01 mf 500V	16K641010	Cabinet Rear: tortoise shell	
C-8	21R128284	Capacitor, cer disc: .01 mf 500V	2K637286	Clip, speed (latch mtg - not in all sets)	
C-9	21R128284	Capacitor, cer disc: .01 mf 500V	2K637708	Clip, speed (spkr mtg)	
C-10	21K127652	Capacitor, cer disc: 150 mmf 500V	1V642899	Grille, trim: incl nameplate	
C-11	21K533472	Capacitor, cer disc: .01 mf 500V	36K641065	Knob, dial scale: brown (6T15M)	
C-12	23B839468	Capacitor, electrolytic: 30-40-40mf/150V	36K641064	Knob, dial scale: tan (6T15S)	
C-13	8K121268	Capacitor, paper tub: .05 mf 400V	36K641028	Knob, loudness indicator: brown (6T15M)	
E-1	50C640765	Speaker, PM: 4 x 8"; 3.2 ohm VC	36K641027	Knob, loudness indicator: tan (6T15S)	
L-1	1V641352	Antenna, ferrite rod	36C641020	Knob, tuning: clear	
L-2	24B641321	Coil, RF	36C641022	Knob, On-off & loudness: clear	
L-3	24B641320	Coil, oscillator	30K640846	Line Cord: brown	
Resistors - Note: All resistors are insulated carbon type unless otherwise specified.			32A640999	Nameplate	
R-1	6K122324	1 meg 20% 1/2W	237051	Pinout: 3/8-32 x 9/16 (loudness cont mtg)	
R-2	6R2039	68 10% 1/2W	35128636	Screw, tapping: #8 x 3/8 (cab back mtg)	
R-3	6K122324	1 meg 20% 1/2W	35122335	Screw, tapping: #6 x 1/2 (loudness knob & chassis mtg)	
R-4	8K118405	22,000 20% 1/2W	42B640989	Spring, cover latch	
R-5	6K121300	27,000 10% 1/2W	7K640907	Stand, cabinet: gold	
R-6	6R3927	2.2 meg 20% 1/2W	35122335	Screw, tapping: #6 x 1/2 (cover latch spring mtg - not in all sets)	
R-7	6K124797	150 10% 1/2W	4A643846	Washer, cup (cover latch spring mtg - not in all sets)	
R-8	8K127641	86,000 10% 1/2W			
R-9	18B640959	Loudness Control & Switch: 1 meg, tap at 300K			
R-10	6K119408	10 meg 20% 1/2W			
R-11	8R8015	220,000 20% 1/2W			
R-12	8K119406	470,000 20% 1/2W			
R-13	6K124797	150 10% 1/2W			
R-14	6R6327	1000 10% 1/2W			
R-15	6R6326	100 10% 1/2W			
T-1	24K641313	Transformer, 1st IF: 455 Kc			
T-2	24K641314	Transformer, 2nd IF: 455 Kc			
T-3	25K640899	Transformer, output			
MECHANICAL PARTS					
	29A635682	Contact, AC interlock			
	1V641355	Plated Panel Board: less all components; incl AC contacts and 84K643250 plated panel board			
Note: When replacing the plated panel, Part No. 84K643250 is					
LIMITED REPLACEMENT PARTS					
Note: The volume of replacement on the following parts is small, consequently, it is suggested that ordering be done only as required.					
	7K643282	Bracket, plated panel support			
	42A643259	Clip, plastic (brkt mtg)			
	32B640979	Gasket, trim grille			

MOTOROLA Service Manual

**SUPERSEDES 13KT15 PRELIMINARY SERVICE MANUAL
PART NO. 68P643064**

GENERAL INFORMATION

TYPE - Hi-Fi radio-phonograph containing an AM-FM tuner, four-speed record changer, multiple speaker system. Also built-in provision for simple, future conversion to stereophonic operation through use of appropriate conversion kit.

TUBE COMPLEMENT

Ref. No.	Type	Function
V-1	6BQ7A	FM RF amp and converter
V-2	6BA6	1st FM IF amp
V-3	6AU6	FM limiter
V-4	6AL5	FM ratio detector
V-5	6BA6	AM RF amp
V-6	6BE6	AM converter
V-7	6BE6	Tuning indicator
V-8	EM81/6DA5	1st & 2nd AF amp
V-9	12AX7	AF amp & inverter
V-10	12AX7	Power output
V-11	EL84/6BD5	Power output
V-12	EZ81/6BD5	Rectifier
V-13	EZ81/6CA4	Rectifier

ELECTRICAL SPECIFICATIONS

Frequency Response: 20 to 20,000 cps at normal listening level
Power Output - 10 watts @ 1% distortion; 20 watts peak
Amplifier Sensitivity - .2 volt in for 10 watts output
Minimum Error Load - 16 ohms
Power Factor - .89
Power Consumption - 165 watts
Volts indicates an output of 10 watts.

FM TUNER SERVICE NOTES

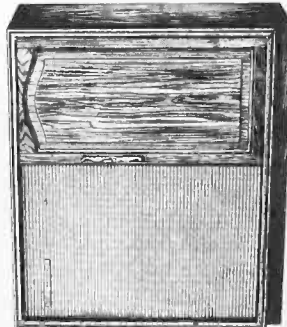
Do not free the dial cable pulley located on the FM tuner unit, as this may result in audio howl. This is due to cone vibration caused by acoustic feed-back from the loudspeaker at certain frequencies. Silicon grease is applied at the junction of string and pulley, to insure smooth tuning action and must not be removed. Therefore, whenever tuning action is erratic, check for proper use of silicon grease (Motorola Part Number 11M490487). Also affecting tuning action, is the angle of the pulley bracket with respect to the take-up string. Position bracket until tuning action is as smooth as possible.

PRODUCTION CHANGES

Chassis Coding	Changes
HS-677A	Original Chassis
HS-677B	TO REDUCE 12AX7 FIL. VOLTAGE: Dropping resistor added, the following were used: 1 ohm

HOME RADIO

MODEL	CHASSIS
13KT15B	HS-677
13KT15CW	HS-677
13KT15M	HS-677

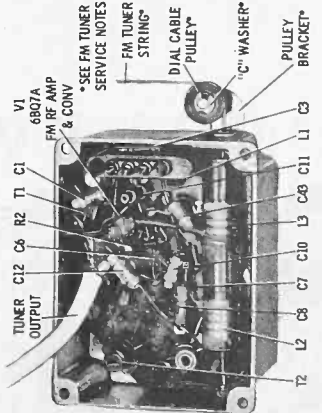


13KT15 SERIES

Tone Controls - Bass +10, -12 db at 50 cps
Treble +7, -12 db at 10,000 cps
AM Tuning Range - 540 to 800 Kc FM IF - 455 Kc
FM Tuning Range - 88 to 108 Mc
FM IF - 10.7 Mc
Power Consumption - 165 watts
Speaker System - one 15" woofer, two 5-1/4" mid-range, one 5" tweeter

RECORD CHANGER

These models use the VM17RC record changer. Refer to the VM17RC Record Changer Service Manual (Motorola Part Number 68P643068) for service information and changer operation.



FM UNIT 770638430 PARTS LOCATION

Chassis Coding	Changes
2W ww.	1. 2 ohm 1/2W ww., .94 ohm choke (used as resistor); .47 ohm 1/2W ww. Use 17K488266, .47 ohm 10% 1/2W wirewound as replacement (see R50 on schematic diagram).

AUXILIARY CIRCUITS AND EXTERNAL CONNECTIONS

EXT SPEAKER JACK

The Hi-Fi sound of this Radio-Phonograph can be played through an external speaker system in addition to the internal speaker system within the cabinet; the external speaker system is connected to the EXT SPEAKER 8 Ω jack on the cabinet back. The Speaker Switch selects either internal, external, or simultaneous operation of both internal and external speakers.

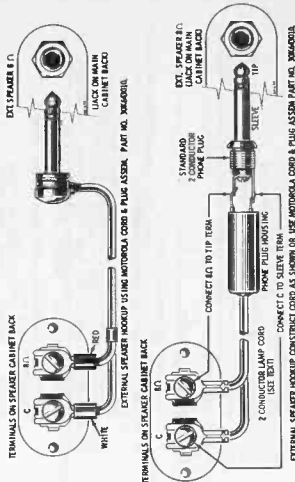
Use an external FM speaker with a voice coil impedance of 4 to 8 ohms, and connect it to the EXT SPEAKER 8 Ω jack. The use of more than one external speaker may cause a loss of volume. To connect external speaker, use Cord and Plug Assembly (Motorola Part No. 30K643010), or no more than 25 feet of Number 20 lamp cord (see Details). If the distance is greater than 25 feet, use a heavier gauge wire to reduce power losses. A complete line of suitable speaker enclosures, such as the S12, S14, S16, S17, S18, and S19, is available from Motorola Dealers or Distributors. When using a Motorola external speaker, the proper phasing connections are made as shown in the details shown, however, when using other speaker systems, the phasing should be checked (see Speaker Phasing).

RIGHT STEREO CHANNEL JACK - STEREO CONVERSION

The RIGHT STEREO CHANNEL jack (located on cabinet back) terminates in a stereo shielded lead connected to the tone arm. This lead is used when this model is to be converted to stereophonic operation. Motorola Stereo Conversion Kit HK33, available at Motorola Dealers or Distributors contains all necessary conversion parts, including stereophonic cartridge.

AUX (INPUT) JACK

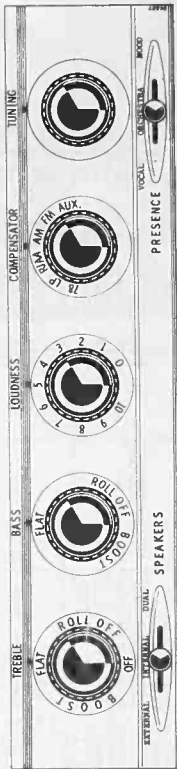
An audio signal from any external source (such as the



EXTERNAL SPEAKER HOOKUP

pre-equalized output from a tape recorder... etc) whose magnitude is 1 volt RMS or more may be connected into the AUX (input) jack on back of cabinet; the external source can be operated when the COMPENSATOR knob is turned to AUX position. Use a shielded cable to minimize hum pickup.

IMPORTANT: Care should be exercised when making connections to external antenna type equipment. When in doubt, suitable tests should be employed to prevent damage to equipment or dangerous electrical shock.



FRONT PANEL CONTROLS

SERVICE NOTES

with the screws.
 5. Grasp changer at base and lift up.

TO REPLACE PILOT LIGHT (in record changer compartment)

1. Remove light shield (in record changer compartment).
2. Replace pilot light in socket.

TO REPLACE PILOT LIGHTS (on chassis)

1. Remove cabinet back cover.
2. From inside cabinet, replace pilot light in socket.

SPEAKER PHASING

THE SPEAKERS MUST BE IN PHASE OR A LOSS OF MID-RANGE FREQUENCIES WILL RESULT

Phasing can be checked by momentarily connecting a 1-1/2 volt flashlight battery in parallel with the speaker connecting leads (temporarily short across any capacitor in crossover network) and noting if all speaker cones move in same direction. If they do not, reverse the connections of the speaker whose cone is out of phase.

DISASSEMBLY INSTRUCTIONS

To Remove Chassis From Cabinet

1. Remove control knobs.
2. Remove light shield (in record changer compartment).
3. Remove pilot light socket from its mounting clip.
4. Disconnect all chassis connecting leads (AM antenna leads, phono power plug, etc).
5. Unsolder blue lead at 15" speaker and disconnect black speaker circuit lead from chassis.
6. Remove the four chassis mounting screws (accessible from storage compartment) and remove chassis from cabinet.

To Remove Record Changer From Cabinet

1. Remove cabinet back cover.
2. Disconnect all changer leads.
3. Turn the two record changer mounting screws fully clockwise (down flush against changer base).
4. From bottom of changer, turn the two mounting clips, located at ends of mounting screws, so they are parallel.

REPLACEMENT PARTS LIST

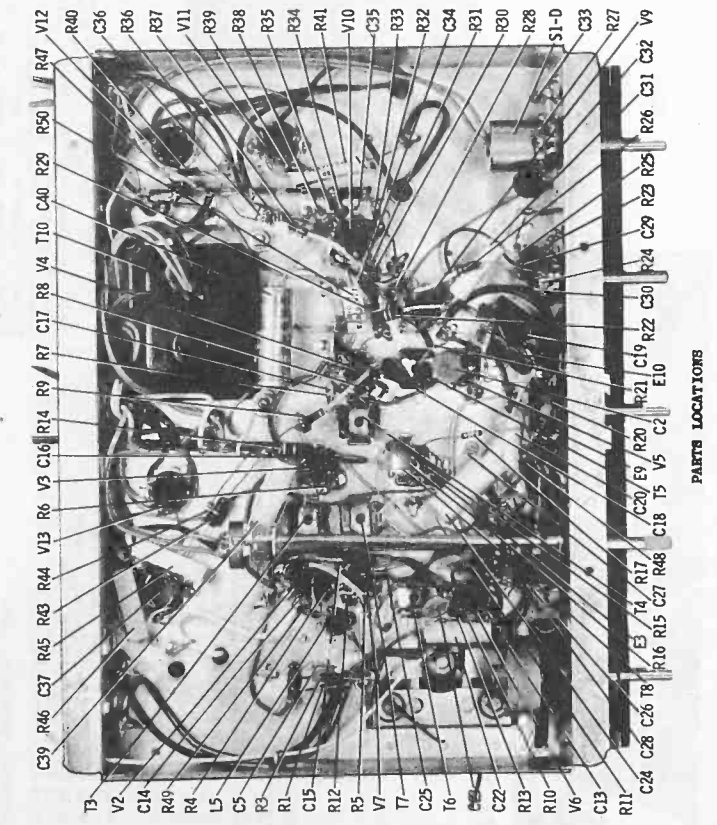
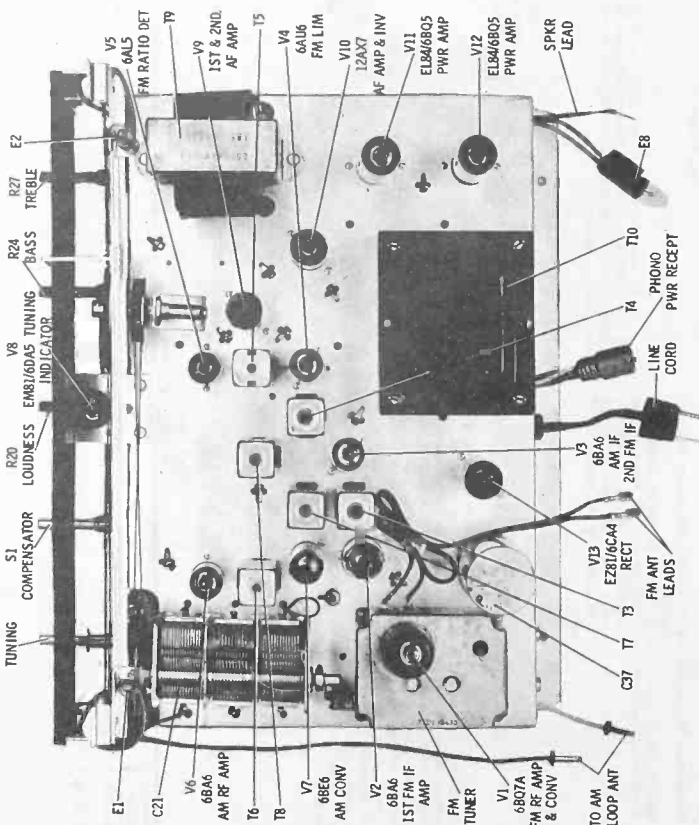
NOTE: When ordering parts, specify model number of set in addition to part number and description of part. Electronic parts of equivalent ratings are not necessarily of equivalent standard. The components listed in this Service Manual have been chosen for reliability and are available to the public. For maximum customer satisfaction and minimized call-backs, use the exact Motorola parts replacement.

Table with columns: Ref. No., Part Number, Description. Includes parts like FM TUNER 77D638430, capacitors, resistors, and transformers.

Table with columns: Ref. No., Part Number, Description. Includes mechanical parts like washers, pulleys, and springs.

Table with columns: Ref. No., Part Number, Description. Includes electrical parts like capacitors, resistors, and transformers.

Table with columns: Ref. No., Part Number, Description. Includes mechanical parts like pulleys, springs, and washers.



PARTS LOCATIONS

HOME RADIO

MODELS CHASSIS
10KT12B HS-674
10KT12M HS-674
10KT12W HS-674

MOTOROLA

Service Manual

SUPERSEDES 10KT12 PRELIMINARY SERVICE MANUAL PART NO. 68P643062.

GENERAL INFORMATION

TYPE - Hi-Fi radio-phonograph containing an AM-FM tuner, four-speed record changer, multiple speaker system. Also built-in provision for simple, future conversion to stereophonic operation, through use of appropriate conversion kit.

TUBE COMPLEMENT

Ref. No.	Type	Function
V-1	6BQ7A	FM RF amp and converter
V-2	6AU6	1st FM IF amp
V-3	6BA6	AM IF amp-2nd FM IF amp
V-4	6BE6	AM ratio detector
V-5	6BE5	AM detector
V-6	12AX7	1st & 2nd AF amp
V-7	12AX7	AF amp & inv
V-8	EL84/6BQ5	Power output
V-9	EL84/6BQ5	Power output
V-10	EZ81/6CA4	Rectifier

ELECTRICAL SPECIFICATIONS

Frequency Response - 20 to 20,000 cps at normal listening level
Power Output - 10 watts @ 1% distortion; 20 watts peak output
Amplifier Sensitivity - .2 volt in for 10 watts output (measured across an 8 ohm resistive load. A reading of 8.9 volts indicates an output of 10 watts).

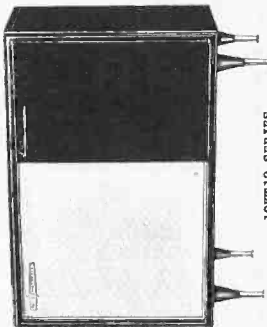
FM TUNER SERVICE NOTES

Do not free the dial cable pulley located on the FM tuner unit, as this may result in audio howl. This is due to core vibration caused by acoustic feedback from the loudspeaker to the tuner. The pulley is attached to the tuner by the junction of string and pulley to insure smooth tuning action and must not be removed. Therefore, whenever tuning action is erratic, check for proper use of silicone grease (Motorola Part No. 11M490487). Also affecting tuning action is the angle of the pulley bracket with respect to the take-up shaft. Position bracket until tuning action is as smooth as possible.

AUXILIARY CIRCUITS AND EXTERNAL CONNECTIONS

EXT SPEAKER JACK

The Hi-Fi sound of this Radio-Phonograph can be played through an external speaker system. In addition to the internal speaker system within the cabinet, the external speaker system is connected to the EXT SPEAKER 8 in. jack on the cabinet back. The Speaker Switch selects either internal, external, or simultaneous operation of both internal and external speakers.

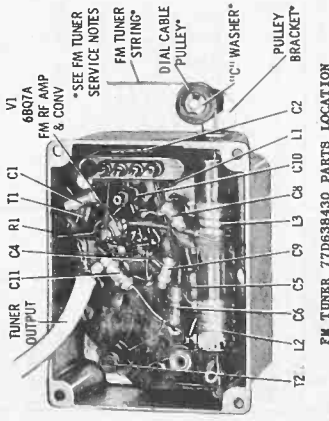


10KT12 SERIES

Tone Controls - Bass +10, -15 db at 50 cps
Trebble +7, -12 db at 10,000 cps
AM Tuning Range - 540 to 1600 Kc FM IF - 45.5 Kc
Power Supply - 120 volt 60 cycle AC only
Speaker System - one 12" woofer, one 6" mid-range, one 4" tweeter

RECORD CHANGER

These models use the VM17RC record changer. Refer to the VM17RC-VM22RC Record Changer Service Manual (Motorola Part Number 68P643068) for service information and changer operation.



Use an external PM speaker with a voice coil impedance of 4 to 8 ohms; 8 ohms is recommended. The use of more than one external speaker may cause a loss of volume. To obtain maximum volume, use a speaker with a voice coil impedance of 8 ohms (Motorola Part No. 30K643010) or no more than 25 feet of Number 20 lamp cord (see details). If the distance is greater than 25 feet, use a heavier gauge wire to reduce power losses. A complete line of suitable speaker enclosures, such as the S12, S14, S16, S17, S18, and S21 is

available from Motorola Dealers or Distributors. When using a Motorola external speaker system, the proper phasing of internal and external speakers is achieved if the connections are made as shown in the details below, however, when using other speaker systems, the phasing should be checked (see Speaker Phasing).

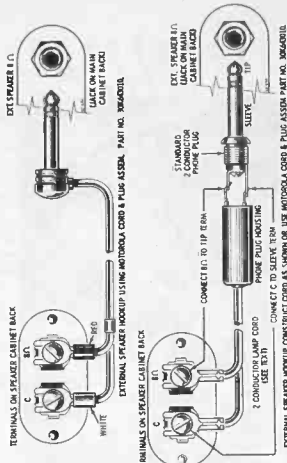
RIGHT STEREO CHANNEL JACK -STEREO CONVERSION

The RIGHT STEREO CHANNEL jack (located on cabinet back) terminates in a second pair of leads located in the tone arm; these leads are used when this model is to be converted to stereophonic operation. Motorola Stereo Conversion Kit HK33, available at Motorola Dealers or Distributors contains all necessary conversion parts, including stereophonic cartridge.

AUX (INPUT) JACK

An audio signal from any external source (such as the pre-equalized output from a tape recorder, etc.) whose magnitude is .1 volts RMS or more may be connected into the AUX (input) jack on back of cabinet; the external source can be operated when the COMPENSATOR knob is turned to AUX position. Use a suitable phono plug (Motorola Part No. 28K731134 or equivalent), and shielded cable to minimize hum pick-up.

IMPORTANT: Care should be exercised when making connection to transformerless type equipment. When in doubt, suitable tests should be employed to prevent damage to equipment or dangerous electrical shock.



EXTERNAL SPEAKER HOOK-UP

SERVICE NOTES

- From bottom of changer, turn the two mounting clips, located at ends of mounting screws, so they are parallel with the screws.
- Grasp changer at base and lift up.

To Replace Pilot Light (in record changer compartment)

- Remove light shield (in record changer compartment).
- Replace pilot light in socket.

To Replace Pilot Lights (on chassis)

- Remove cabinet back cover.
- From inside cabinet, replace pilot light in socket.

SPEAKER PHASING

THE SPEAKERS MUST BE IN PHASE OR A LOSS OF MID-RANGE FREQUENCIES WILL RESULT

Phasing can be checked by momentarily connecting a 1-1/2 volt flashlight battery in parallel with the speaker connecting leads (temporarily disconnect the speaker in case-over excitation should be avoided if all speaker cones move in opposite directions). If they do not, reverse the connections of the speaker whose cone is out of phase.

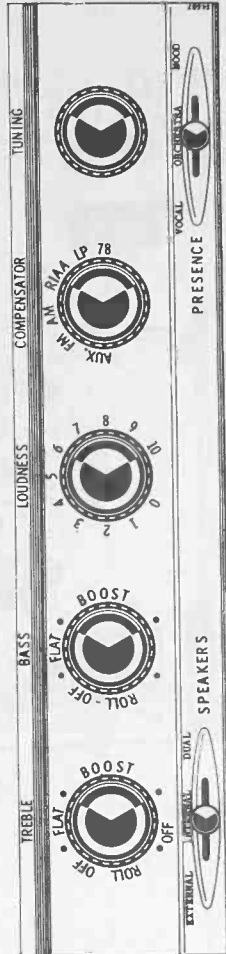
DISASSEMBLY INSTRUCTIONS

To Remove Chassis From Cabinet

- Remove control knobs.
- Remove light shield inside record changer compartment; then remove pilot light socket from its mounting clip.
- Remove leads from FM antenna terminals on rear of cabinet, then remove cabinet back cover.
- Disconnect all chassis connecting leads (AM antenna leads, phono power plug, etc.).
- Unsolder blue lead at 12" speaker and disconnect black speaker circuit lead from chassis.
- Remove the four chassis mounting screws (accessible from record compartment) and remove chassis from cabinet.

To Remove Record Changer From Cabinet

- Remove cabinet back cover.
- Disconnect all changer leads.
- Turn the two record changer mounting screws fully clockwise (down flush against changer base).



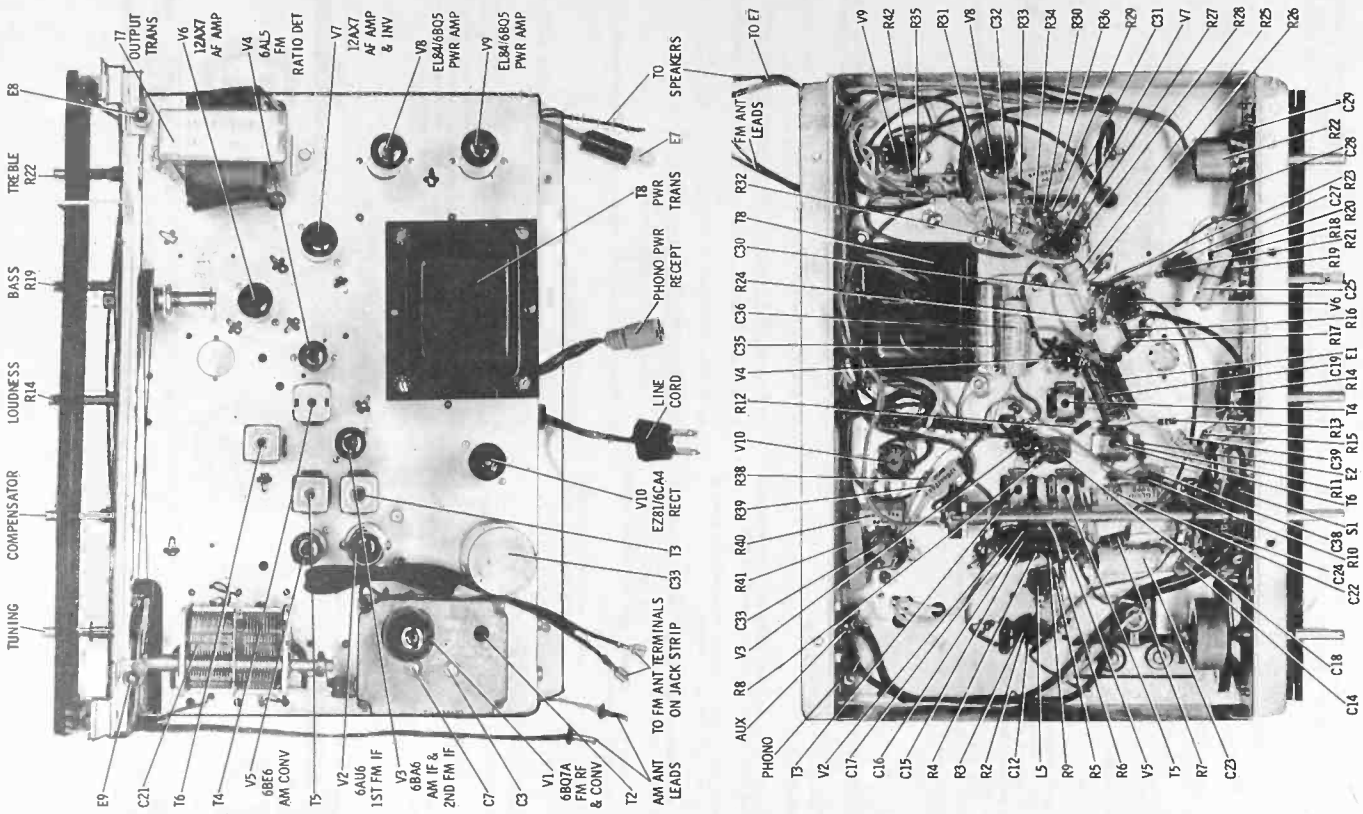
FRONT PANEL CONTROLS

ALIGNMENT

Either AM or FM alignment may be performed independent of the other. Use an AM signal generator, a VTVM, and output meter as indicated. Set loudness and bass controls to maximum, treble control to minimum. The AM antenna loop should be connected; use either the speakers or an 8 ohm load connected to output transformer secondary. Use insulated alignment tools. As stages are brought into alignment, keep reducing signal generator output so meter reads no more than 8-10 divisions. When aligning FM, or no more than 2V AC when aligning AM; this prevents overloading, and assures proper alignment. With gang fully closed, right edge of pointer (rear) should line up with mark on right end of pointer rail (see Dial Stringing Detail). In AM alignment, signal generator output should be modulated with 400 cps.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	GANG SETTING	BAND SW SETTING	OUTPUT INDICATOR	ADJUST	REMARKS
1.	FM-IF ALIGNMENT FM ant terminals	10.7 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1. Com to chassis	1, 2, 3, 4, & 5	Adjust for max neg reading
2.	FM ant terminals	"	"	FM	VTVM-DC probe to lead 3 of E-1. Com to chassis	6	Adjust for zero reading on VTVM. A positive and negative reading will be obtained on either side of correct setting. (If meter has zero center scale, use this scale.) Repeat steps 1 and 2 until no further increase; step 2 should be last step.
FM-RF ALIGNMENT - See Note *							
3.	FM ant terminals	108.1 Mc No mod	Fully open	FM	VTVM-DC probe to lead 7 on E-1. Com to chassis	7	Adjust for max neg reading
4.	FM ant terminals	98 Mc No mod	Tune for max	FM	"	8	"
5.	AM-IF ALIGNMENT Pin 7 of 6BE6 or antenna stator of AM tuning capacitor thru .1 mf and chassis	455 Kc	Fully open	AM	Output meter across VC	9, 10, 11, & 12	Adjust for max reading
6.	AM-RF ALIGNMENT Radiation loop**	1620 Kc	"	AM	"	13	"
7.	"	1400 Kc	"	AM	"	14	Adjust for max. Repeat steps 6 and 7 until no further increase; step 7 should be last step.
NOTE: Do not perform steps 8 & 9 unless the oscillator core has been tampered with or associated components have been replaced.							
8.	6BE6 grid (pin 7) thru .1 mf & chassis	1620 Kc	Fully open	AM	Output meter across VC	13	Adjust for max reading.
9.	"	535 Kc	Fully closed	AM	"	15	Adjust for max reading. Repeat steps 8 and 9 until oscillator covers required range; step 8 should be last step.
10.	Radiation loop**	1400 Kc	Fully open	AM	"	14	With chassis installed in cabinet, adjust for max reading.

*If FM tuner string has been replaced or tampered with, check it for correct length and set-up before proceeding with steps 3 & 4. String should measure about 2-1/2" from FM tuner opening to gang shaft fully. Pin 7 of 6BE6 and string on gang shaft, then turn collar clockwise to just remove slack from string; tighten collar set screws (see Dial Stringing Detail).
**Connect generator across 5" diameter, 5-turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver loop.



CHASSIS HS-674A PARTS LOCATION (SEE PRODUCTION CHANGES)

REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part. Electronic parts of equivalent rating are not necessarily of equivalent standards. The components shown are those used in the original design. For maximum customer satisfaction and minimized call-backs, use the exact Motorola parts replacement.

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
	FM TUNER 77D638430 (UT-343)	ELECTRICAL PARTS			
C-1	21K640021	Capacitor, cer tub: 10 mfd 500V MTC470PPM	R-8	6K119405	82 10% 1/2W
C-2	21K640022	Capacitor, cer tub: .001 mfd 500V	R-9	6K119406	200 10% 1/2W
C-3	21K640023	Capacitor, cer tub: .001 mfd 500V	R-10	6K119407	2,700 10% 1/2W
C-4	21K640024	Capacitor, cer tub: .001 mfd 500V	R-11	6K112298	47,000 10% 1/2W
C-5	21K640025	Capacitor, cer tub: .001 mfd 500V	R-12	6K112299	47,000 10% 1/2W
C-6	21K640026	Capacitor, cer tub: .001 mfd 500V	R-13	6K112300	300,000 10% 1/2W
C-7	21K640027	Capacitor, cer tub: .001 mfd 500V	R-14	189641721	Control, loudness: 1 meg
C-8	21K640028	Capacitor, cer tub: .001 mfd 500V	R-15	6K124484	500 10% 1/2W
C-9	21K640029	Capacitor, cer tub: .001 mfd 500V	R-16	6K124485	500 10% 1/2W
C-10	21K640030	Capacitor, cer tub: .001 mfd 500V	R-17	6K124486	500 10% 1/2W
C-11	21K640031	Capacitor, cer tub: .001 mfd 500V	R-18	6K119335	22,000 10% 1/2W
L-1	76640030	Ferrite bead (this replacement inductance)	R-19	6K119336	22,000 10% 1/2W
L-2	246640031	Coil, FM RF: complete (incl L3)	R-20	6K119337	22,000 10% 1/2W
L-3	246640032	Coil, FM RF: complete (incl L2)	R-21	6K119338	22,000 10% 1/2W
R-1	171640032	Resistor, carbon film: 1 meg 10%	R-22	189641776	Control, treble & switch: 2 meg
T-1	258640033	Transformer, FM ant input	R-23	6K122445	1,800 10% 1/2W
T-2	258640034	Transformer, FM IF; incl cores	R-24	6K122446	1,800 10% 1/2W
	FM TUNER 77D638430 (UT-343)	MECHANICAL PARTS	R-25	6K119339	12,000 10% 1/2W
C-11	77664009	FM Tuner, complete	R-26	6K122447	1,800 10% 1/2W
C-12	786640043	Core, ant & RF coil: incl string	R-27	6K122448	1,800 10% 1/2W
C-13	786640036	Core, IF trana	R-28	6K122449	1,800 10% 1/2W
C-14	21K640042	Capacitor, cer disc: .005 mfd 500V	R-29	6K122450	1,800 10% 1/2W
C-15	21K640043	Capacitor, cer disc: .005 mfd 500V	R-30	6K122451	1,800 10% 1/2W
C-16	21K640044	Capacitor, cer disc: .005 mfd 500V	R-31	6K122452	1,800 10% 1/2W
C-17	21K640045	Capacitor, cer disc: .005 mfd 500V	R-32	6K119334	15,000 10% 1/2W
C-18	21K640046	Capacitor, cer disc: .005 mfd 500V	R-33	6K119335	15,000 10% 1/2W
C-19	21K640047	Capacitor, cer disc: .005 mfd 500V	R-34	6K122322	220,000 10% 1/2W
C-20	21K640048	Capacitor, cer disc: .005 mfd 500V	R-35	176640026	Wirewound: 150 10% 5W
C-21	21K640049	Capacitor, cer disc: .005 mfd 500V	R-36	176640027	Wirewound: 18 10% 5W
C-22	21K640050	Capacitor, cer disc: .005 mfd 500V	R-37	176640028	Wirewound: 18 10% 5W
C-23	21K640051	Capacitor, cer disc: .005 mfd 500V	R-38	6K121931	390 10% 1/2W 10% 5W
C-24	21K640052	Capacitor, cer disc: .005 mfd 500V	R-39	176641740	Wirewound: 2,200 10% 5W
C-25	21K640053	Capacitor, cer disc: .005 mfd 500V	R-40	176641741	Wirewound: 2,200 10% 5W
C-26	21K640054	Capacitor, cer disc: .005 mfd 500V	R-41	176642037	Wirewound: 330 10% 5W
C-27	21K640055	Capacitor, cer disc: .005 mfd 500V	R-42	6K124668	100 20% 1/2W
C-28	21K640056	Capacitor, cer disc: .005 mfd 500V	R-43	6K124669	100 20% 1/2W
C-29	21K640057	Capacitor, cer disc: .005 mfd 500V	R-44	6K119405	22,000 20% 1/2W (See Prod Changes)
C-30	21K640058	Capacitor, cer disc: .005 mfd 500V	R-45	408642108	Switch, 6-pos (compensator)
C-31	21K640059	Capacitor, cer disc: .005 mfd 500V	R-46	408642109	Switch, AC-on-off (on S1)
C-32	21K640060	Capacitor, cer disc: .005 mfd 500V	R-47	408642110	Switch, 3-pos (presence)
C-33	21K640061	Capacitor, cer disc: .005 mfd 500V	R-48	408642111	Switch, 3-pos (presence)
C-34	23A632250	Capacitor, electrolytic: 40-60-20 mfd/350V	R-49	408642112	Switch, 3-pos (presence)
C-35	23A632250	Capacitor, electrolytic: 5 mfd 10V	R-50	408642113	Switch, 3-pos (presence)
C-36	23A632250	Capacitor, electrolytic: 10 mfd 400V	R-51	408642114	Switch, 3-pos (presence)
C-37	21K640015	Capacitor, cer disc: .005 mfd 500V	R-52	408642115	Switch, 3-pos (presence)
C-38	21K640015	Capacitor, cer disc: .005 mfd 500V	R-53	408642116	Switch, 3-pos (presence)
C-39	21K640015	Capacitor, cer disc: .005 mfd 500V	R-54	408642117	Switch, 3-pos (presence)
E-1	58639144	Printed Resistor-Capacitor Plate	R-55	408642118	Switch, 3-pos (presence)
E-2	58639144	Printed Resistor-Capacitor Plate	R-56	408642119	Switch, 3-pos (presence)
E-3	58639144	Printed Resistor-Capacitor Plate	R-57	408642120	Switch, 3-pos (presence)
E-4	58639144	Printed Resistor-Capacitor Plate	R-58	408642121	Switch, 3-pos (presence)
E-5	58639144	Printed Resistor-Capacitor Plate	R-59	408642122	Switch, 3-pos (presence)
E-6	58639144	Printed Resistor-Capacitor Plate	R-60	408642123	Switch, 3-pos (presence)
E-7	58639144	Printed Resistor-Capacitor Plate	R-61	408642124	Switch, 3-pos (presence)
E-8	58639144	Printed Resistor-Capacitor Plate	R-62	408642125	Switch, 3-pos (presence)
E-9	58639144	Printed Resistor-Capacitor Plate	R-63	408642126	Switch, 3-pos (presence)
L-1,2,3	1V642422	AM antenna & panel (incl C20)	R-64	408642127	Switch, 3-pos (presence)
L-4	246640034	Coil, AM osc	R-65	408642128	Switch, 3-pos (presence)
R-1	6K6034	See FM Tuner Replacement Parts List unless otherwise specified	R-66	408642129	Switch, 3-pos (presence)
R-2	6K6034	See FM Tuner Replacement Parts List unless otherwise specified	R-67	408642130	Switch, 3-pos (presence)
R-3	6K124787	150 10% 1/2W	R-68	408642131	Switch, 3-pos (presence)
R-4	6K124787	150 10% 1/2W	R-69	408642132	Switch, 3-pos (presence)
R-5	6K124787	150 10% 1/2W	R-70	408642133	Switch, 3-pos (presence)
R-6	6K124787	150 10% 1/2W	R-71	408642134	Switch, 3-pos (presence)
R-7	6K124787	150 10% 1/2W	R-72	408642135	Switch, 3-pos (presence)

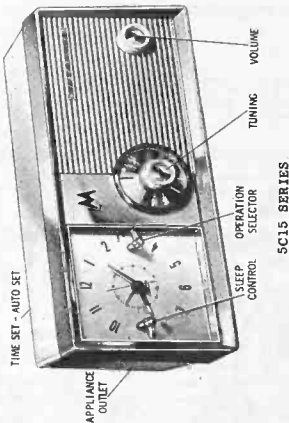
Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
	CHASSIS HS-674	ELECTRICAL PARTS			
C-1 thru	See FM Tuner Parts List				
C-1	21K640021	Capacitor, cer disc: .01 mfd 500V	R-1	6K119405	82 10% 1/2W
C-2	21K640022	Capacitor, cer disc: .01 mfd 500V	R-2	6K119406	200 10% 1/2W
C-3	21K640023	Capacitor, cer disc: .01 mfd 500V	R-3	6K119407	2,700 10% 1/2W
C-4	21K640024	Capacitor, cer disc: .01 mfd 500V	R-4	6K119408	2,700 10% 1/2W
C-5	21K640025	Capacitor, cer disc: .01 mfd 500V	R-5	6K119409	2,700 10% 1/2W
C-6	21K640026	Capacitor, cer disc: .01 mfd 500V	R-6	6K119410	2,700 10% 1/2W
C-7	21K640027	Capacitor, cer disc: .01 mfd 500V	R-7	6K119411	2,700 10% 1/2W
C-8	21K640028	Capacitor, cer disc: .01 mfd 500V	R-8	6K119412	2,700 10% 1/2W
C-9	21K640029	Capacitor, cer disc: .01 mfd 500V	R-9	6K119413	2,700 10% 1/2W
C-10	21K640030	Capacitor, cer disc: .01 mfd 500V	R-10	6K119414	2,700 10% 1/2W
C-11	21K640031	Capacitor, cer disc: .01 mfd 500V	R-11	6K119415	2,700 10% 1/2W
C-12	21K640032	Capacitor, cer disc: .01 mfd 500V	R-12	6K119416	2,700 10% 1/2W
C-13	21K640033	Capacitor, cer disc: .01 mfd 500V	R-13	6K119417	2,700 10% 1/2W
C-14	21K640034	Capacitor, cer disc: .01 mfd 500V	R-14	6K119418	2,700 10% 1/2W
C-15	21K640035	Capacitor, cer disc: .01 mfd 500V	R-15	6K119419	2,700 10% 1/2W
C-16	21K640036	Capacitor, cer disc: .01 mfd 500V	R-16	6K119420	2,700 10% 1/2W
C-17	21K640037	Capacitor, cer disc: .01 mfd 500V	R-17	6K119421	2,700 10% 1/2W
C-18	21K640038	Capacitor, cer disc: .01 mfd 500V	R-18	6K119422	2,700 10% 1/2W
C-19	21K640039	Capacitor, cer disc: .01 mfd 500V	R-19	6K119423	2,700 10% 1/2W
C-20	21K640040	Capacitor, cer disc: .01 mfd 500V	R-20	6K119424	2,700 10% 1/2W
C-21	21K640041	Capacitor, cer disc: .01 mfd 500V	R-21	6K119425	2,700 10% 1/2W
C-22	21K640042	Capacitor, cer disc: .01 mfd 500V	R-22	6K119426	2,700 10% 1/2W
C-23	21K640043	Capacitor, cer disc: .01 mfd 500V	R-23	6K119427	2,700 10% 1/2W
C-24	21K640044	Capacitor, cer disc: .01 mfd 500V	R-24	6K119428	2,700 10% 1/2W
C-25	21K640045	Capacitor, cer disc: .01 mfd 500V	R-25	6K119429	2,700 10% 1/2W
C-26	21K640046	Capacitor, cer disc: .01 mfd 500V	R-26	6K119430	2,700 10% 1/2W
C-27	21K640047	Capacitor, cer disc: .01 mfd 500V	R-27	6K119431	2,700 10% 1/2W
C-28	21K640048	Capacitor, cer disc: .01 mfd 500V	R-28	6K119432	2,700 10% 1/2W
C-29	21K640049	Capacitor, cer disc: .01 mfd 500V	R-29	6K119433	2,700 10% 1/2W
C-30	21K640050	Capacitor, cer disc: .01 mfd 500V	R-30	6K119434	2,700 10% 1/2W
C-31	21K640051	Capacitor, cer disc: .01 mfd 500V	R-31	6K119435	2,700 10% 1/2W
C-32	21K640052	Capacitor, cer disc: .01 mfd 500V	R-32	6K119436	2,700 10% 1/2W
C-33	21K640053	Capacitor, cer disc: .01 mfd 500V	R-33	6K119437	2,700 10% 1/2W
C-34	21K640054	Capacitor, cer disc: .01 mfd 500V	R-34	6K119438	2,700 10% 1/2W
C-35	21K640055	Capacitor, cer disc: .01 mfd 500V	R-35	6K119439	2,700 10% 1/2W
C-36	21K640056	Capacitor, cer disc: .01 mfd 500V	R-36	6K119440	2,700 10% 1/2W
C-37	21K640057	Capacitor, cer disc: .01 mfd 500V	R-37	6K119441	2,700 10% 1/2W
C-38	21K640058	Capacitor, cer disc: .01 mfd 500V	R-38	6K119442	2,700 10% 1/2W
C-39	21K640059	Capacitor, cer disc: .01 mfd 500V	R-39	6K119443	2,700 10% 1/2W
C-40	21K640060	Capacitor, cer disc: .01 mfd 500V	R-40	6K119444	2,700 10% 1/2W
C-41	21K640061	Capacitor, cer disc: .01 mfd 500V	R-41	6K119445	2,700 10% 1/2W
C-42	21K640062	Capacitor, cer disc: .01 mfd 500V	R-42	6K119446	2,700 10% 1/2W
C-43	21K640063	Capacitor, cer disc: .01 mfd 500V	R-43	6K119447	2,700 10% 1/2W
C-44	21K640064	Capacitor, cer disc: .01 mfd 500V	R-44	6K119448	2,700 10% 1/2W
C-45	21K640065	Capacitor, cer disc: .01 mfd 500V	R-45	6K119449	2,700 10% 1/2W
C-46	21K640066	Capacitor, cer disc: .01 mfd 500V	R-46	6K119450	2,700 10% 1/2W
C-47	21K640067	Capacitor, cer disc: .01 mfd 500V	R-47	6K119451	2,700 10% 1/2W
C-48	21K640068	Capacitor, cer disc: .01 mfd 500V	R-48	6K119452	2,700 10% 1/2W
C-49	21K640069	Capacitor, cer disc: .01 mfd 500V	R-49	6K119453	2,700 10% 1/2W
C-50	21K640070	Capacitor, cer disc: .01 mfd 500V	R-50	6K119454	2,700 10% 1/2W
C-51	21K640071	Capacitor, cer disc: .01 mfd 500V	R-51	6K119455	2,700 10% 1/2W
C-52	21K640072	Capacitor, cer disc: .01 mfd 500V	R-52	6K119456	2,700 10% 1/2W
C-53	21K640073	Capacitor, cer disc: .01 mfd 500V	R-53	6K119457	2,700 10% 1/2W
C-54	21K640074	Capacitor, cer disc: .01 mfd 500V	R-54	6K119458	2,700 10% 1/2W
C-55	21K640075	Capacitor, cer disc: .01 mfd 500V	R-55	6K119459	2,700 10% 1/2W
C-56	21K640076	Capacitor, cer disc: .01 mfd 500V	R-56	6K119460	2,700 10% 1/2W
C-57	21K640077	Capacitor, cer disc: .01 mfd 500V	R-57	6K119461	2,700 10% 1/2W
C-58	21K640078	Capacitor, cer disc: .01 mfd 500V	R-58	6K119462	2,700 10% 1/2W
C-59	21K640079	Capacitor, cer disc: .01 mfd 500V	R-59	6K119463	2,700 10% 1/2W
C-60	21K640080	Capacitor, cer disc: .01 mfd 500V	R-60	6K119464	2,700 10% 1/2W
C-61	21K640081	Capacitor, cer disc: .01 mfd 500V	R		

HOME RADIO

MOTOROLA
Service Manual

MODELS CHASSIS
5C15BW HS-662
5C15GW HS-662
5C15VW HS-662

SUPERSEDES 5C15 SERIES PRELIMINARY SERVICE MANUAL PART NO. 68P642576.



GENERAL INFORMATION

TYPE - Clock model superheterodyne receiver with plated circuit chassis and ferrite loop antenna. This receiver has an electric clock for automatically controlling radio operation.

TUBE COMPLEMENT - 12BE6 Converter
12AV6 IF amp
50C5 Det-AVC-AF amp
35W4 Rectifier

TUNING RANGE - 532 to 1620 Kc
POWER SUPPLY - 120 volts, 60 cycle AC only; 35 watts

SERVICE NOTES

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an interlock when the cabinet rear section is removed. When servicing or aligning this chassis, an isolation transformer should be inserted between the power line and the chassis.

CIRCUIT DESCRIPTION

- The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
- The metal plating extends through all the holes on the chassis, connecting circuits on the top with those on the bottom.
- Reference to the schematic diagram, plated panel wiring diagrams, and to chassis, will permit the circuit to be traced easily.

NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This (component side) view of the chassis as viewed from the top shows components as they would appear on opposite side.

COMPONENT REPLACEMENT

Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P636516) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

SAFETY PRECAUTIONS

- Do not service the chassis on a metal plate because of the possibility of a short circuit.

REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number in addition to part number and description of part. Electronic parts of equivalent rating are not necessarily of equivalent standards. The components listed in this Service Manual have been chosen for reliability and applicability to the specific chassis involved. For maximum customer satisfaction and minimized call-backs, use the exact Motorola part replacement.

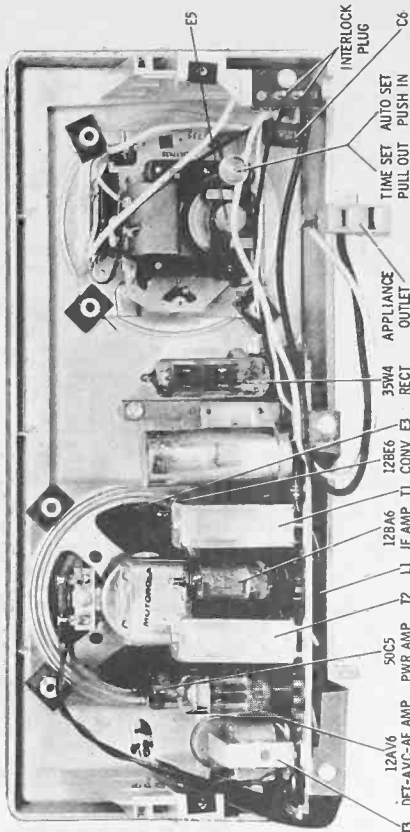
Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
		ELECTRICAL PARTS			CABINET PARTS
C-1	198640769	Capacitor, variable: 2 gang	1Y64986	Cabinet Front: blue (5C15BW)	
C-2	21K127652	Capacitor, var disc: 150 mfr 500V	1Y64986	Cabinet Front: blue (5C15GW)	
C-3	21K333473	Capacitor, var disc: .0033 mfr 400V	1Y64986	Cabinet Front: byafish (5C15VW)	
C-4	238339493	Capacitor, electrolytic: 30-40-40mfr/150V	1Y64986	Cabinet Rear: antique white (5C15 Serles)	
C-5	81128690	Capacitor, Mylar: .05 mfr 400V	44A637826	CLIP, speed (rear cab screw mtg)	
E-1	51C837000	Modular Component	61K638013	Crystal, clock	
E-2	51K637001	Modular Component	38E637836	Knob, clock	
E-3	51K637002	Modular Component	38E637836	Knob, dial scale: clear	
E-4	58K254895	Submer pilot light: #847	38E638015	Knob, volume: antique white	
E-5	72K640838	Clock Assembly	38E640838	Line Cord: antique white	
L-1	24K628190	Antenna, ferrite rod	28K37028	Line Cord: (appliance outlet com - not in set)	
L-2	24K637228	Cell, one	38E640833	Receptacle, appliance outlet (rubber - in some sets)	
L-3	24K637228	Cell, one	28K641395	Plug, interlock	
R-1	6K122224	1 meg 20% 1/2W	98E0817	Receptacle, appliance outlet (plastic - in some sets)	
R-2	6K123300	27,000 10% 1/2W	98E630319	Receptacle, appliance outlet (plastic - in some sets)	
R-3	6K123300	27,000 10% 1/2W	32120648	Screw, lock: 6-32 x 3/16 (eng brkt mtg)	
R-4	18K637988	Volume Control: 1 meg ttp at 300K	35127592	Screw, machine: 10-24 x 3/4 (line cord mtg)	
R-5	6K121887	47,000 10% 1/2W	38E62888	Screw, special (spher mtg) (chassis mtg)	
R-6	68E0018	100 20% 1/2W	38E62888	Screw, special (spher mtg) (chassis mtg)	
T-1	24K638016	Transformer, 1st IF: 455 Kc	38E62888	Screw, tapping: #6 x 1/2 (chassis & interlock mtg)	
T-2	24K638016	Transformer, 2nd IF: 455 Kc	38E62888	Screw, tapping: #6 x 1/2 (chassis & interlock mtg)	
T-3	258640787	Transformer, output			
		METHEMICAL PARTS			
		84K641493 Plated Panel Board: less all components			
		Note: When ordering, specify part number (and letter - if any) and quantity. The part number is different from that found in this parts list, order by complete part number found on board assembly model number of this set.			
		Note: All resistors are laminated carbon type unless otherwise specified.			
		38E637836 Knob, clock			
		38E637836 Knob, dial scale: clear			
		38E638015 Knob, volume: antique white			
		38E640838 Line Cord: antique white			
		28K37028 Line Cord: (appliance outlet com - not in set)			
		38E640833 Receptacle, appliance outlet (rubber - in some sets)			
		28K641395 Plug, interlock			
		98E0817 Receptacle, appliance outlet (plastic - in some sets)			
		98E630319 Receptacle, appliance outlet (plastic - in some sets)			
		32120648 Screw, lock: 6-32 x 3/16 (eng brkt mtg)			
		35127592 Screw, machine: 10-24 x 3/4 (line cord mtg)			
		38E62888 Screw, special (spher mtg) (chassis mtg)			
		38E62888 Screw, special (spher mtg) (chassis mtg)			
		38E62888 Screw, tapping: #6 x 1/2 (chassis & interlock mtg)			
		38E62888 Screw, tapping: #6 x 1/2 (chassis & interlock mtg)			

LIMITED REPLACEMENT PARTS

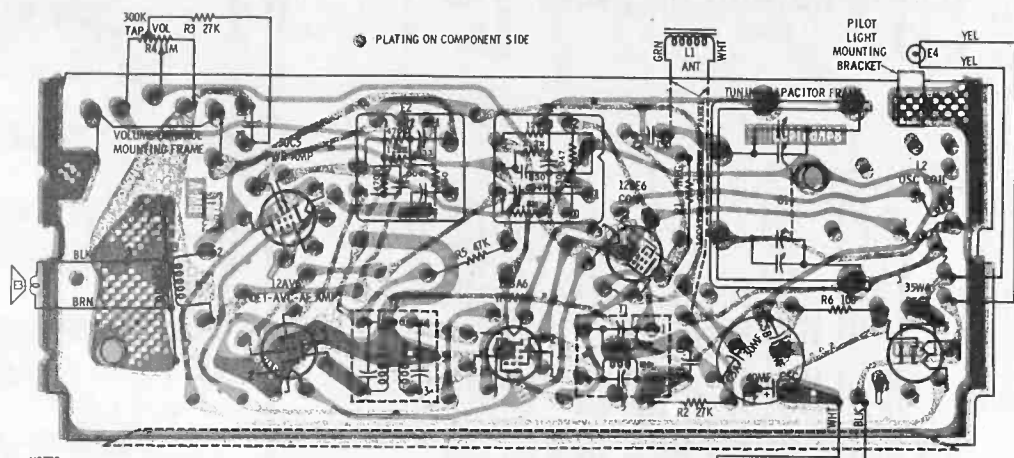
Note: The volume of replacement on the following part is small, consequently, it is suggested that ordering be done only when necessary.

- 78E3782 Bracket, plated panel support

*New Item, Appear in any List for First Time

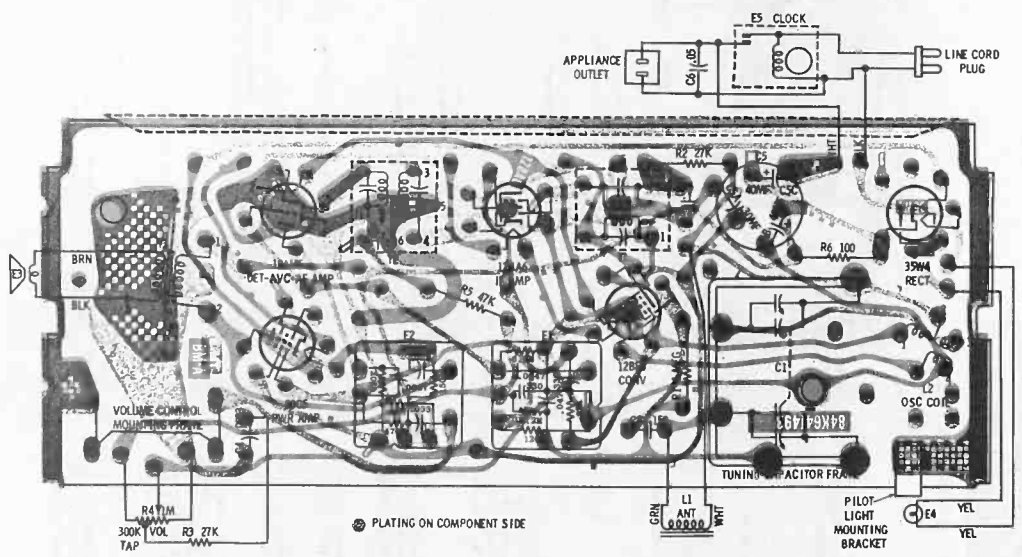


PARTS LOCATIONS

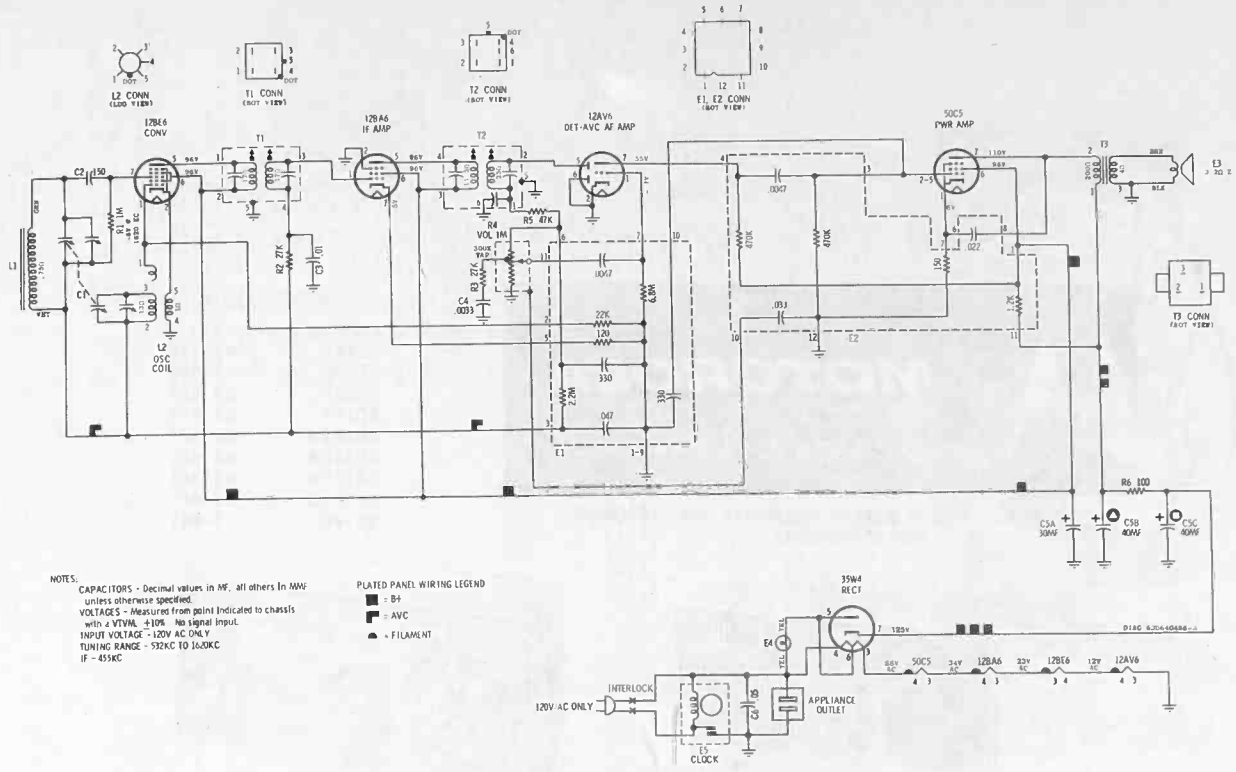


NOTES:
 CAPACITORS - DECIMAL VALUES IN MF. ALL OTHERS IN MMF UNLESS OTHERWISE SPECIFIED.
 PLATED PANEL WIRING LEGEND
 ■ - B+ □ - AVC ● - FILAMENT

PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



PLATED PANEL WIRING AS VIEWED FROM BOTTOM



NOTES:
 CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$. No signal input.
 INPUT VOLTAGE - 120V AC ONLY.
 TUNING RANGE - 520KC TO 1600KC IF - 455KC

PLATED PANEL WIRING LEGEND
 ■ - B+
 □ - AVC
 ● - FILAMENT

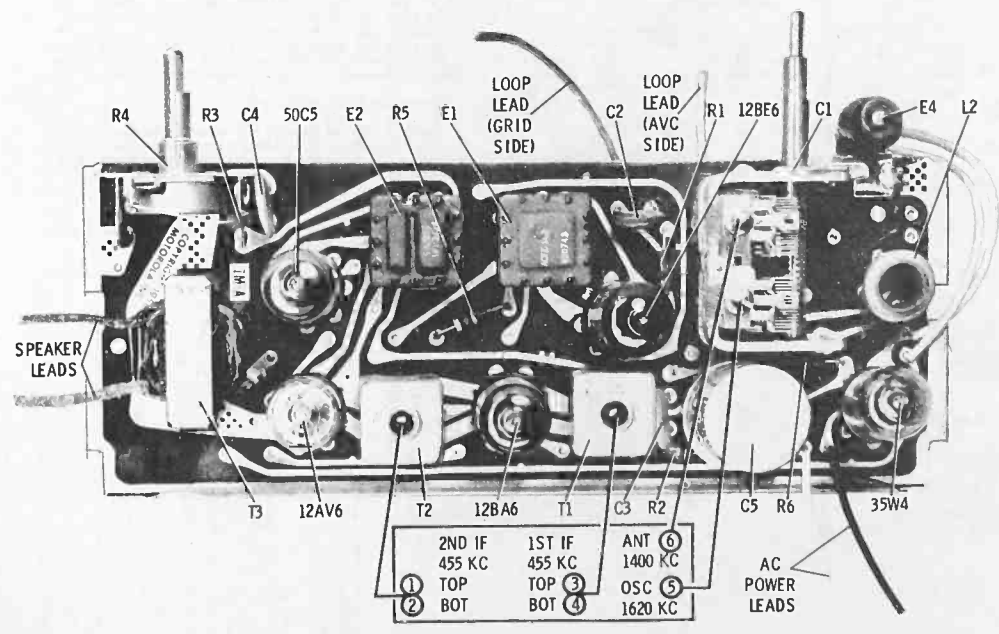
SCHEMATIC DIAGRAM

ALIGNMENT

Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B through a .1 mf capacitor. Connect a low range output meter across the speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .4 volts on output meter to prevent overloading the receiver.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	12BE6 grid (pin 7) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Radiation loop*	1620 Kc	Fully open	5	Adjust for maximum.
3.	"	1400 Kc	Tune for max	6	"
4. Repeat steps 2 & 3 until no further increase; step 3 should be last adjustment.					

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



ALIGNMENT POINTS & PARTS LOCATIONS

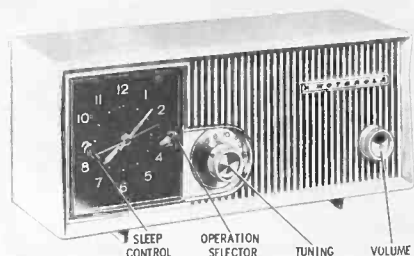
CHASSIS HS-660, 661, 663



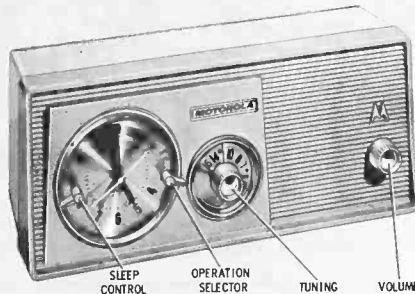
SUPERSEDES 5C13, 5C14, 5C16 SERIES PRELIMINARY SERVICE MANUAL
PART NO. 68P642572.

HOME RADIO

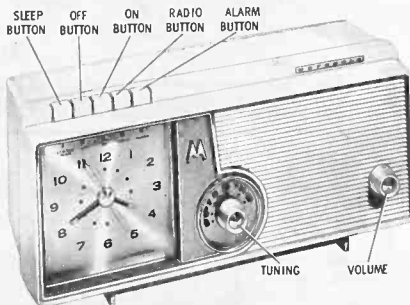
MODELS	CHASSIS
5C13B	HS-660
5C13M	HS-660
5C13P	HS-660
5C13W	HS-660
5C14CW	HS-661
5C14GW	HS-661
5C14PW	HS-661
5C16NW	HS-663
5C16W	HS-663



5C13 SERIES



5C14 SERIES



5C16 SERIES

GENERAL INFORMATION

TYPE - Clock model superheterodyne receivers with a plated circuit chassis and ferrite rod antenna. These receivers have an electric clock for automatically controlling radio operation.

TUBE COMPLEMENT - 12BE6 Converter
12BA6 IF amp
12AV6 Det-AVC-AF amp
50C5 Power amp
35W4 Rectifier

TUNING RANGE - 532 to 1620 Kc IF - 455 Kc

POWER SUPPLY - 120 volts, 60 cycle AC only; 35 watts

SERVICE NOTES

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an interlock when the cabinet rear section is removed. When servicing or aligning this chassis, an isolation transformer should be inserted between the power line and the chassis.

CIRCUIT DESCRIPTION

1. The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
2. The metal plating extends through all the holes on the chassis, connecting circuits on the top with those on the bottom.
3. Reference to the schematic diagram, plated panel wiring diagrams, and to chassis, will permit the circuit to be traced easily.

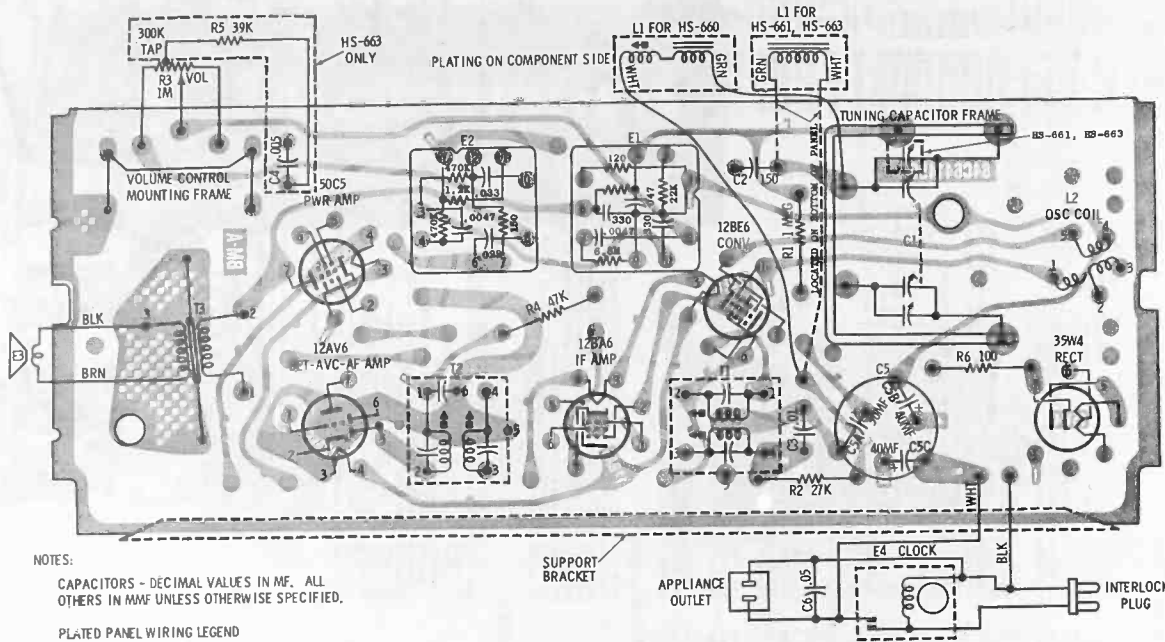
NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This is done in two ways; the chassis as viewed from the top (component side) and the chassis as viewed from the bottom with components as they would appear on opposite side.

COMPONENT REPLACEMENT

Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P636536) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

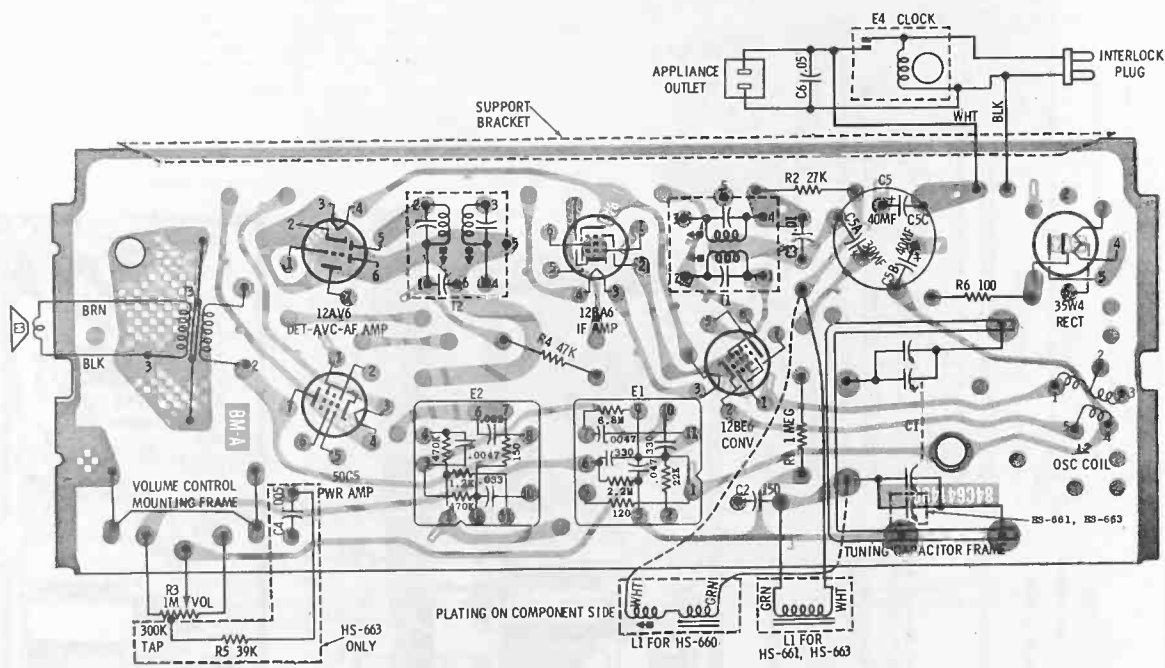
SAFETY PRECAUTIONS

1. Do not service the chassis on a metal plate because of the possibility of a short circuit.
2. Use caution when handling the chassis with power applied because all high voltage leads are exposed.

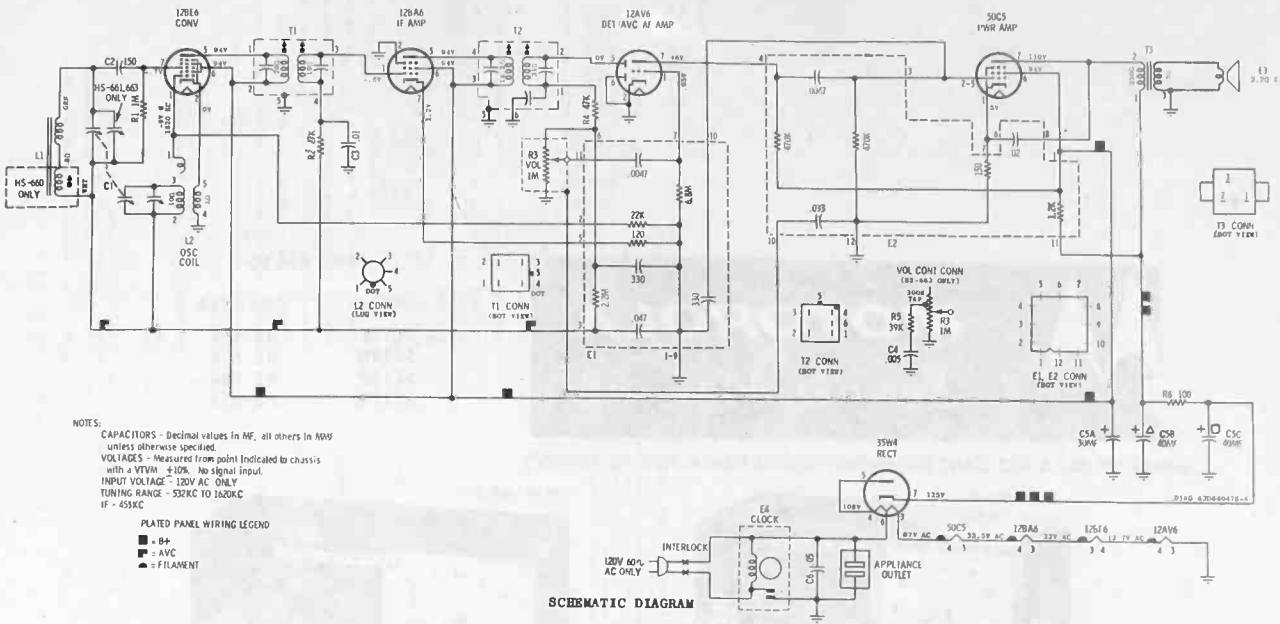


NOTES:
 CAPACITORS - DECIMAL VALUES IN MF. ALL OTHERS IN MMF UNLESS OTHERWISE SPECIFIED.
 PLATED PANEL WIRING LEGEND
 ■ - B+ □ - AVC ◉ - FILAMENT

HS-660, 661 & 663 PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



HS-660, 661 & 663 PLATED PANEL WIRING AS VIEWED FROM BOTTOM

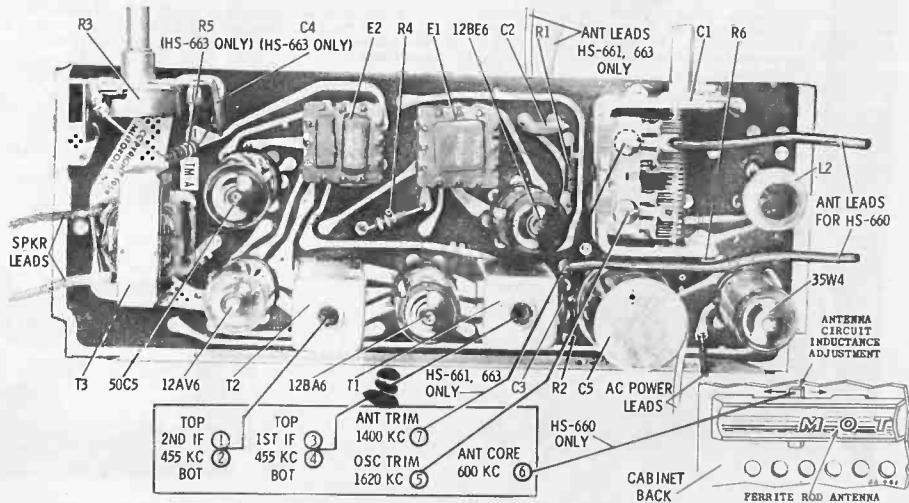


ALIGNMENT

Alignment on HS-661 and HS-663 can be performed without removing chassis from cabinet. Use an isolation transformer between the power line and the receiver. If not available, connect low side of signal generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .4 volts on output meter to prevent overloading.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	1620 Kc	"	5	"
ANTENNA ADJUSTMENT (HS-660)					
3.	Radiation loop*	600 Kc	Tune for max	6	With radio installed in cabinet, adjust for maximum.
ANTENNA ADJUSTMENT (HS-661, 663)					
3.	Radiation loop*	1400 Kc	Tune for max	7	Adjust for maximum.

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





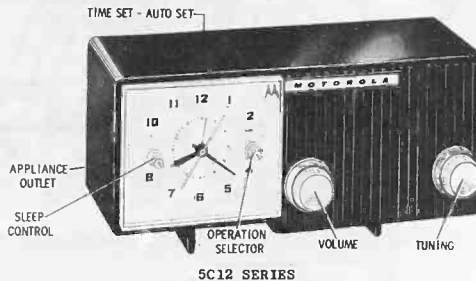
HOME RADIO

MODELS	CHASSIS
5C11E	HS-658
5C12M	HS-658
5C12P	HS-658
5C12W	HS-658

SUPERSEDES 5C11 & 5C12 SERIES PRELIMINARY SERVICE MANUAL PART NO. 68P642573.



SC11 SERIES



SC12 SERIES

GENERAL INFORMATION

TYPE - Clock model superheterodyne receiver with plated circuit chassis and loop antenna. These receivers have an electric clock for automatically controlling radio operation. Model 5C12 also has an appliance outlet (located on back of receiver) and a sleep control on the clock.

POWER SUPPLY - 120 volts, 60 cycle AC only; 35 watts

TUBE COMPLEMENT - 12BE6 Converter
 12BA6 IF amp
 12AV6 Det-AVC-1st AF amp
 50C5 Pwr amp
 35W4 Rectifier

TUNING RANGE - 535 to 1620 Kc IF - 455 Kc

SERVICE NOTES

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an interlock when the cabinet rear cover is removed. When servicing or aligning this chassis, an isolation transformer should be inserted between the power line and the chassis.

DISASSEMBLY INSTRUCTIONS

To Remove Chassis

1. Remove cabinet back screws and remove cabinet back.
2. Pull off the two control knobs from the front of the radio.
3. From front, remove the Phillips head screw near tuning shaft.
4. From rear, remove chassis mounting screw from the ear of the volume control.
5. Unsolder power leads from connector strip located behind clock and also unsolder speaker leads from speaker.
6. Remove chassis from cabinet.

To Remove Clock Crystal

1. Pull off clock knobs. Insert a screwdriver between the cabinet and the right-hand edge of the clock crystal (near number 3) to release catch.
2. Pry the crystal out with the screwdriver.

To Remove Clock

1. Remove clock crystal (see above).
2. Remove mounting screws from the interlock plug and the connecting strip.
3. Remove two speednuts from the rear of clock and pull clock out through front of radio.

CIRCUIT DESCRIPTION

1. The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
2. The metal plating extends through all the holes on the chassis, connecting circuits on the top with those on the bottom.

3. Reference to the schematic diagram, plated panel wiring diagram, and to chassis, will permit the circuit to be traced easily.

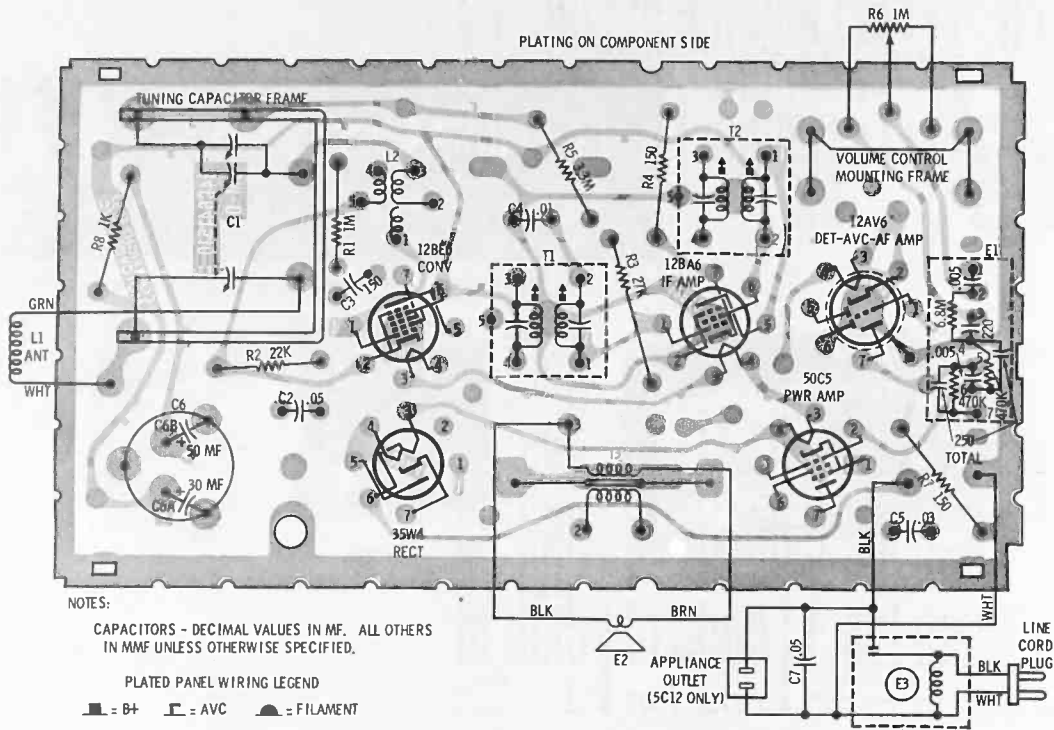
NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This is done in two ways; the chassis as viewed from the top (component side) and the chassis as viewed from the bottom with components as they would appear on opposite side.

COMPONENT REPLACEMENT

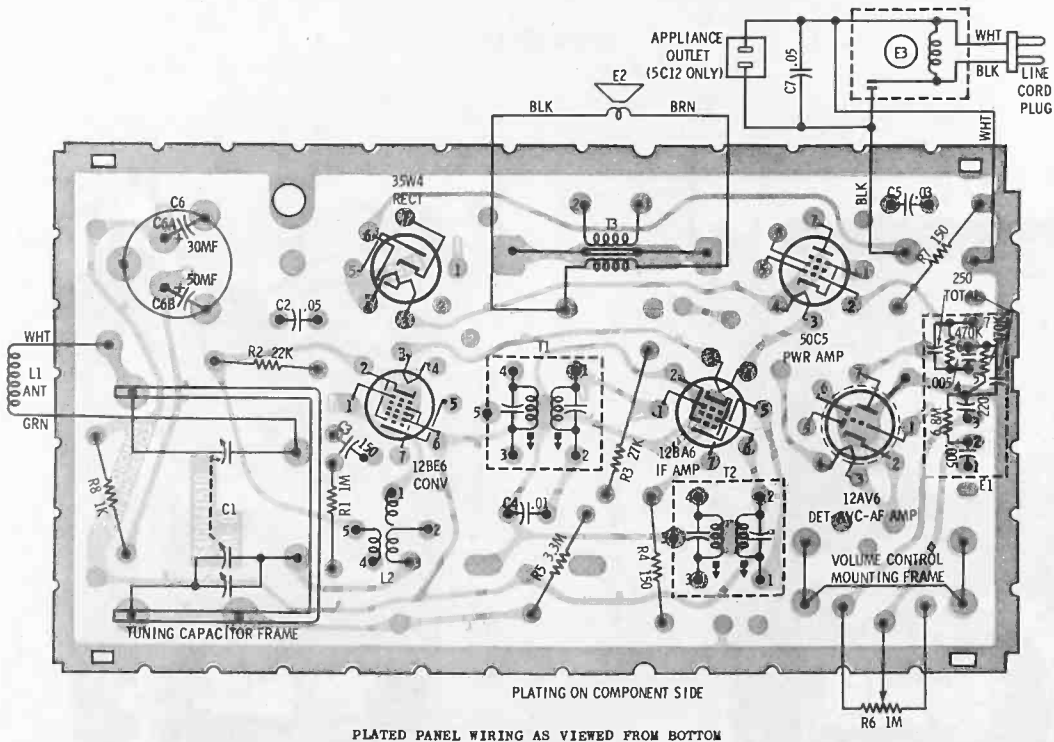
Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P636536) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

SAFETY PRECAUTIONS

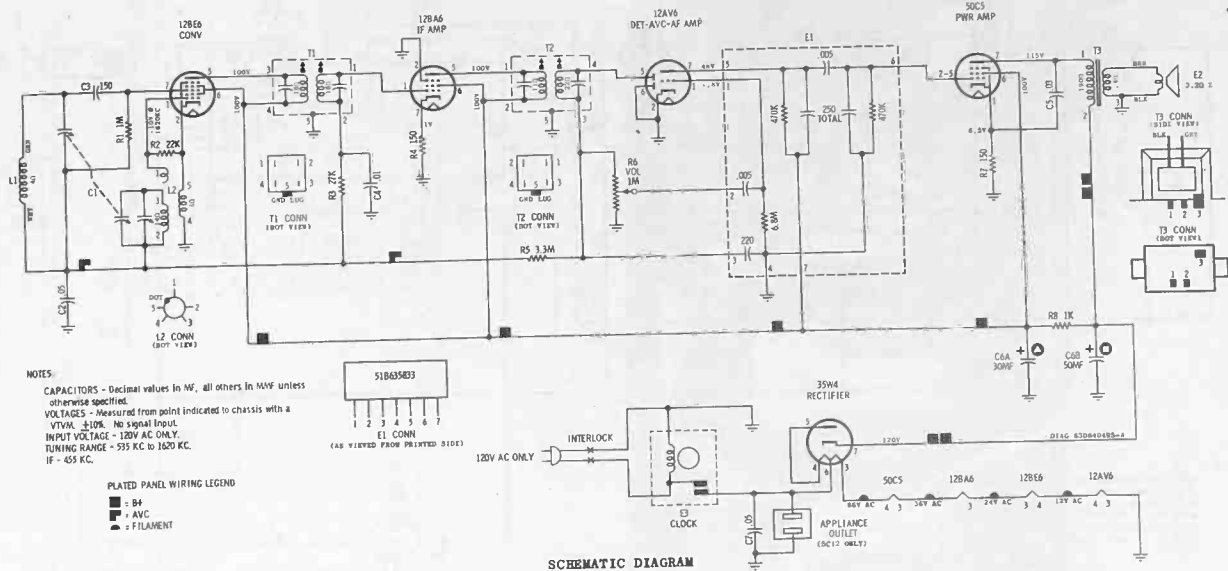
1. Do not service the chassis on a metal plate because of the possibility of a short circuit.
2. Use caution when handling the chassis with power applied because all high voltage leads are exposed.



PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



PLATED PANEL WIRING AS VIEWED FROM BOTTOM



NOTES:
 CAPACITORS - Decimal values in μ F, all others in μ MF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$. No signal input.
 INPUT VOLTAGE - 120V AC ONLY.
 TUNING RANGE - 555 KC to 1620 KC.
 IF - 455 KC.

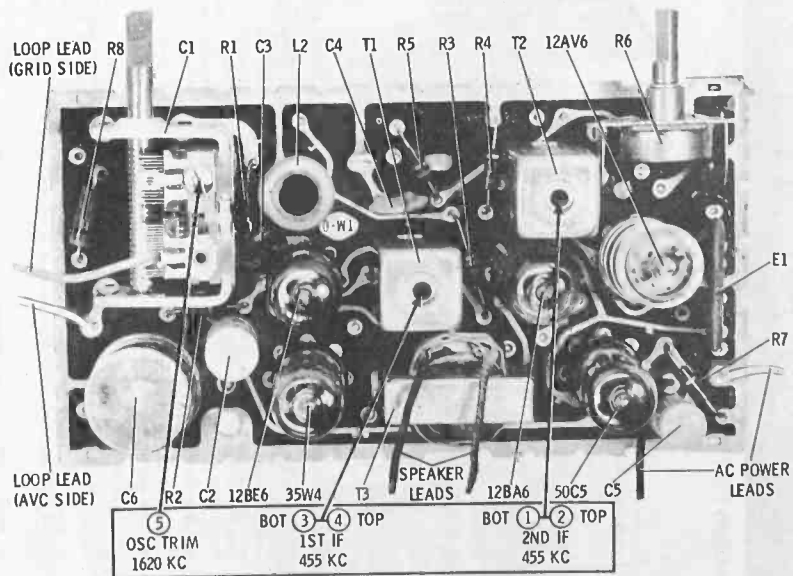
PLATED PANEL WIRING LEGEND
 ■ = B+
 ■ = AVC
 ● = FILAMENT

SCHMATIC DIAGRAM

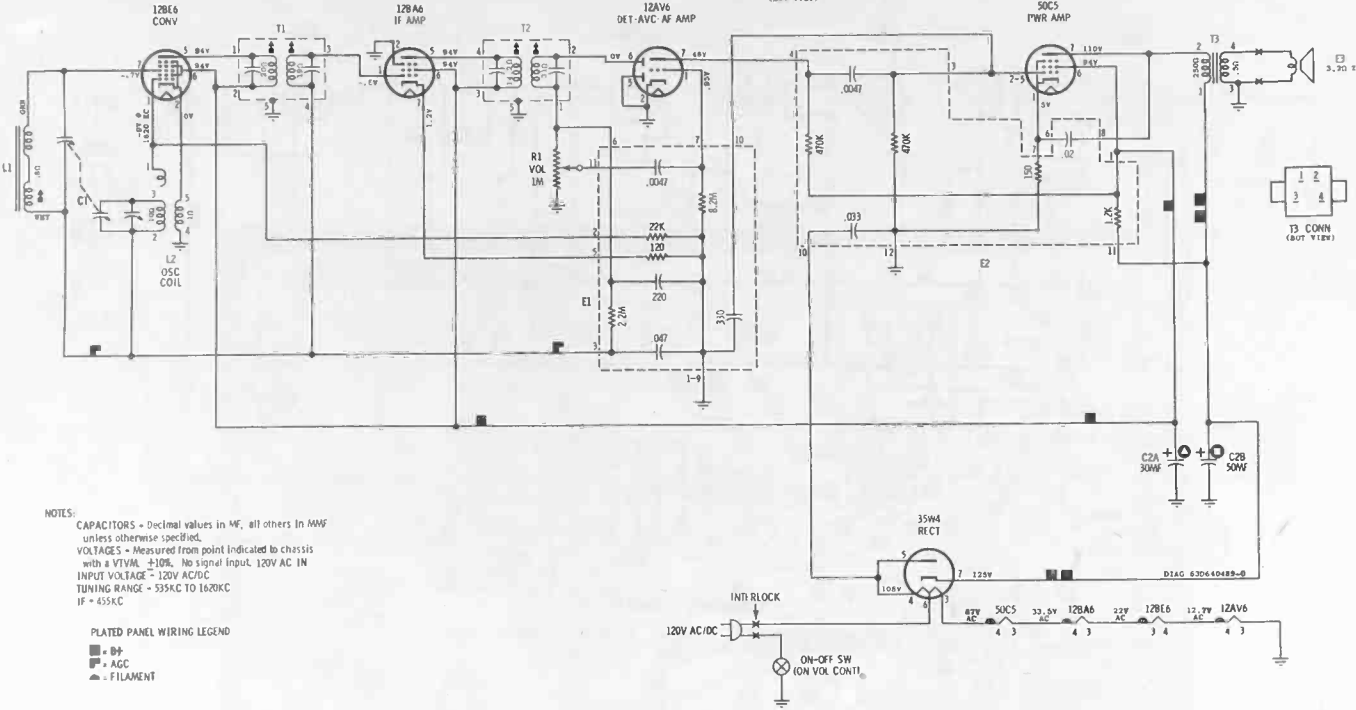
ALIGNMENT

Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Temporarily connect speaker thru jumper and connect AC leads. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .40 volts on output meter to prevent overloading.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT 1.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT 2.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	1620 Kc	Fully open	5	Adjust for maximum.



ALIGNMENT POINTS & PARTS LOCATIONS



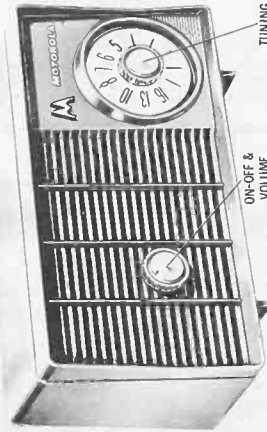
NOTES:
 CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM $\pm 10\%$. No signal input. 120V AC IN INPUT VOLTAGE - 120V AC/DC
 TUNING RANGE - 535KC TO 1620KC
 IF - 455KC

PLATED PANEL WIRING LEGEND
 ■ - GND
 ▲ - AC
 ● - FILAMENT

SCHEMATIC DIAGRAM

HOME RADIO

MODELS	CHASSIS
5T11G	HS-652
5T11M	HS-652
5T11R	HS-652
5T11W	HS-652



5T11 SERIES

SERVICE NOTES

CIRCUIT DESCRIPTION

- The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
- The metal plating extends through all the holes on the chassis, connecting circuits on the front with those on the rear.
- Reference to the schematic diagram, plated panel wiring diagram, and to chassis, will permit the circuit to be traced easily.

NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This is done in two ways: the chassis as viewed from the top (component side) and the chassis as viewed from the bottom with components as they would appear on opposite side.

COMPONENT REPLACEMENT

Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P63636) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

SAFETY PRECAUTIONS

- Do not service the chassis on a metal plate because of the possibility of a short circuit.
- Use caution when handling the chassis with power applied because all high voltage leads are exposed.



SUPERSEDES 5T11 PRELIMINARY SERVICE MANUAL PART NO. 68P642569

GENERAL INFORMATION

TYPE - AC/DC table model superheterodyne receiver with plated circuit chassis, modular components and ferrite loop antenna.

TUBE COMPLEMENT - 12BE6 Converter
 12BA6 IF amp
 12AV6 Det-AVC-AF amp
 50C5 Pwr amp
 35W4 Rectifier

TUNING RANGE - 535 to 1620 Kc IF - 455 Kc

POWER SUPPLY - 120 volts AC/DC; 35 watts

USE OF ISOLATION TRANSFORMER

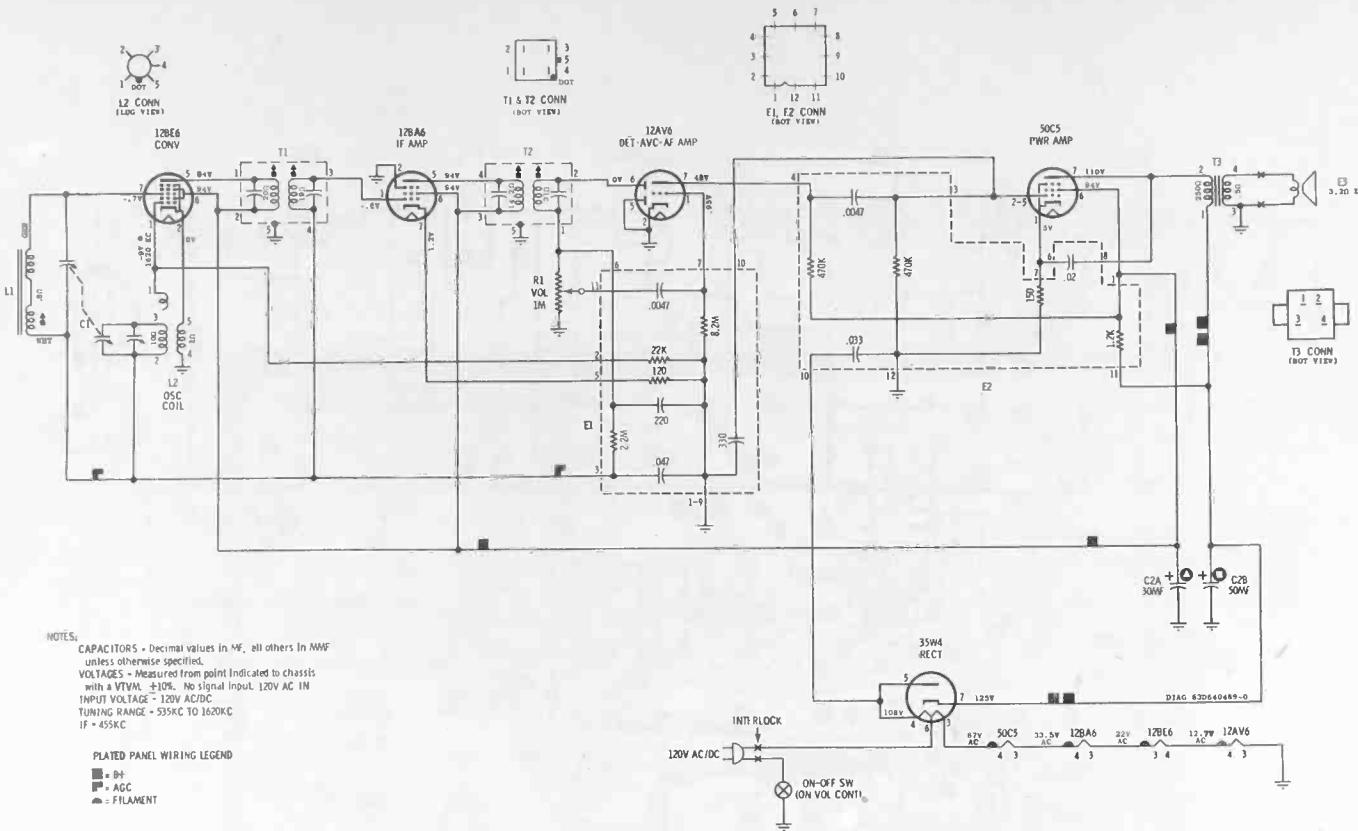
The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an interlock when the cabinet rear cover is removed. When servicing or aligning this chassis from AC, an isolation transformer should be inserted between the power line and the chassis.

TO REMOVE CHASSIS FROM CABINET

- Remove the two screws that hold the cabinet back cover in place, and remove back cover.
- Do not attempt to remove tuning knob from front of radio, as it is held in place with a speed clip from inside of cabinet. (See Tuning Knob Removal section.)
- From rear of radio, remove the two chassis mounting screws from gang mounting bracket and ear of volume control.
- Remove plated circuit chassis by taking hold of gang condenser and the volume control, and sliding out of cabinet. Volume knob will come off without marring the cabinet.

TO REMOVE TUNING KNOB

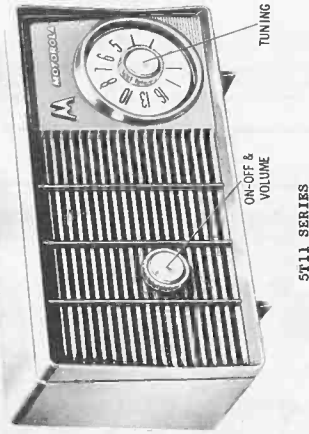
- Remove chassis from cabinet. (See Chassis Removal section.)
- From rear of radio, remove speed clip from manual tuning knob.



SCHEMATIC DIAGRAM

HOME RADIO

MODELS	CHASSIS
5T11G	HS-652
5T11M	HS-652
5T11R	HS-652
5T11W	HS-652



5T11 SERIES

SERVICE NOTES

CIRCUIT DESCRIPTION

1. The circuit of this chassis is conventional - there are no built-in resistors or capacitors. Leads are plated on both sides of the chassis base, thereby replacing the usual connecting wires and making wiring more uniform.
2. The metal plating extends through all the holes on the chassis, connecting circuits on the front with those on the rear.
3. Reference to the schematic diagram, plated panel wiring diagram, and to chassis, will permit the circuit to be traced easily.

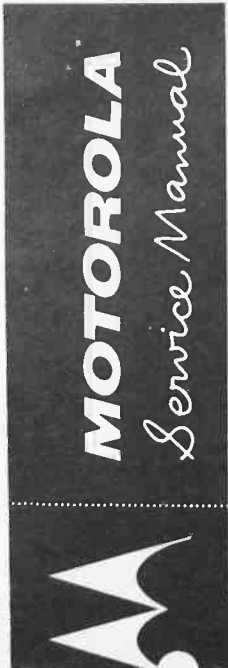
NOTE: To facilitate servicing, phantom views showing plated panel wiring of both sides of the chassis plus location and wiring of electrical components are given. This is done in two ways: the chassis as viewed from the top (component side) and the chassis as viewed from the bottom with components as they would appear on opposite side.

COMPONENT REPLACEMENT

Refer to "Plated Chassis Servicing Techniques" manual (Motorola Part No. 68P63636) for recommended tools and procedures to be used when servicing Motorola plated circuit chassis.

SAFETY PRECAUTIONS

1. Do not service the chassis on a metal plate because of the possibility of a short circuit.
2. Use caution when handling the chassis with power applied because all high voltage leads are exposed.



SUPERSEDES 5T11 PRELIMINARY SERVICE MANUAL PART NO. 68P642569

GENERAL INFORMATION

TYPE - AC/DC table model superheterodyne receiver with plated circuit chassis, modular components and ferrite loop antenna.

TUBE COMPLEMENT

- 12BE6 Converter
- 12BA6 IF amp
- 12AV6 Det-AVC-AF amp
- 50C5 Pwr amp
- 35W4 Rectifier

TUNING RANGE - 535 to 1620 Kc IF - 455 Kc

POWER SUPPLY - 120 volts AC/DC; 35 watts

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an interlock when the cabinet rear cover is removed. When servicing or aligning this chassis from AC, an isolation transformer should be inserted between the power line and the chassis.

TO REMOVE CHASSIS FROM CABINET

1. Remove the two screws that hold the cabinet back cover in place, and remove back cover.
2. Do not attempt to remove tuning knob from front of radio, as it is held in place with a speed clip from inside of cabinet. (See Tuning Knob Removal section.)
3. From rear of radio, remove the two chassis mounting screws from gang mounting bracket and ear of volume control.
4. Remove plated circuit chassis by taking hold of gang condenser and the volume control, and sliding out of cabinet. Volume knob will come off without marring the cabinet.

TO REMOVE TUNING KNOB

1. Remove chassis from cabinet. (See Chassis Removal section.)
2. From rear of radio, remove speed clip from manual tuning knob.

REPLACEMENT PARTS LIST

NOTE: Each drawing part, quantity, and unit of measure is given in parentheses to part number. The number in parentheses is the quantity of each part to be replaced. The number in parentheses is the quantity of each part to be replaced. The number in parentheses is the quantity of each part to be replaced.

Part No.	Description	Part No.	Description
1-1	12B6 CONV	1-1	12AV6 DET-AVC-AF AMP
1-2	12BA6 IF AMP	1-2	50C5 PWR AMP
1-3	12BE6 500K	1-3	35M4 RECT
1-4	12BE6 500K	1-4	12AV6 DET-AVC-AF AMP
1-5	12BE6 500K	1-5	50C5 PWR AMP
1-6	12BE6 500K	1-6	35M4 RECT
1-7	12BE6 500K	1-7	12AV6 DET-AVC-AF AMP
1-8	12BE6 500K	1-8	50C5 PWR AMP
1-9	12BE6 500K	1-9	35M4 RECT
1-10	12BE6 500K	1-10	12AV6 DET-AVC-AF AMP
1-11	12BE6 500K	1-11	50C5 PWR AMP
1-12	12BE6 500K	1-12	35M4 RECT
1-13	12BE6 500K	1-13	12AV6 DET-AVC-AF AMP
1-14	12BE6 500K	1-14	50C5 PWR AMP
1-15	12BE6 500K	1-15	35M4 RECT
1-16	12BE6 500K	1-16	12AV6 DET-AVC-AF AMP
1-17	12BE6 500K	1-17	50C5 PWR AMP
1-18	12BE6 500K	1-18	35M4 RECT
1-19	12BE6 500K	1-19	12AV6 DET-AVC-AF AMP
1-20	12BE6 500K	1-20	50C5 PWR AMP

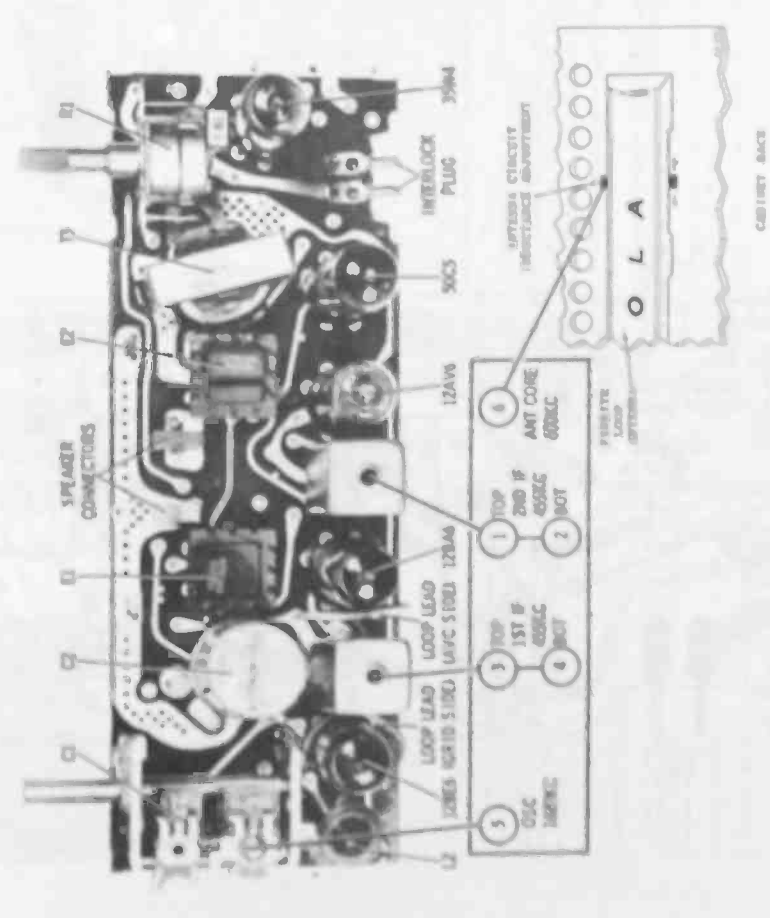
NOTE: This number is different from that found in this list. If part number is different from that found in this list, it may be a different model or version of the part. It may be a different model or version of the part. It may be a different model or version of the part.

ALIGNMENT

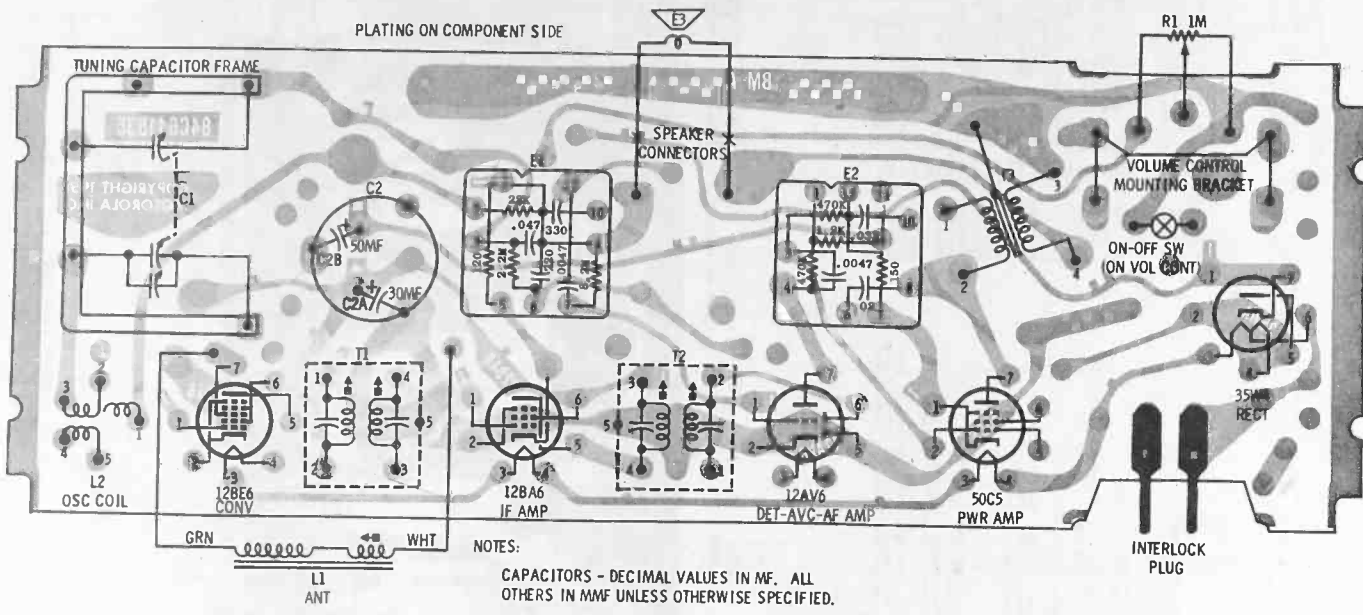
Check up alignment procedure between the speaker and the receiver. If not available, connect one end of signal generator to B-1 through 4. If not available, connect one end of signal generator to B-1 through 4. If not available, connect one end of signal generator to B-1 through 4.

STEP	OPERATION	ADJUSTMENT	REMARKS
1	Check up speaker	Adjust for maximum	
2	Check up speaker	Adjust for maximum	
3	Check up speaker	Adjust for maximum	
4	Check up speaker	Adjust for maximum	
5	Check up speaker	Adjust for maximum	
6	Check up speaker	Adjust for maximum	

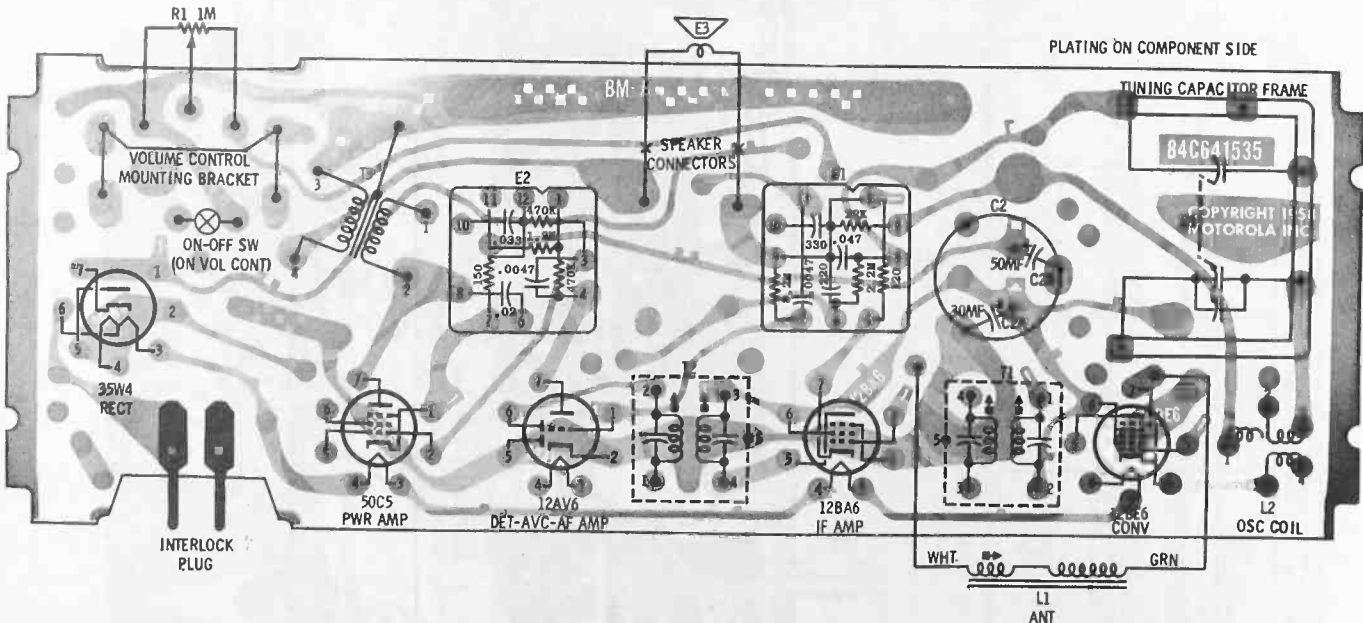
NOTE: Connect generator output across P-1 through 6. Keep loop and couple transformer in receiver loop. Keep loop in loop 1/2 inch for maximum.

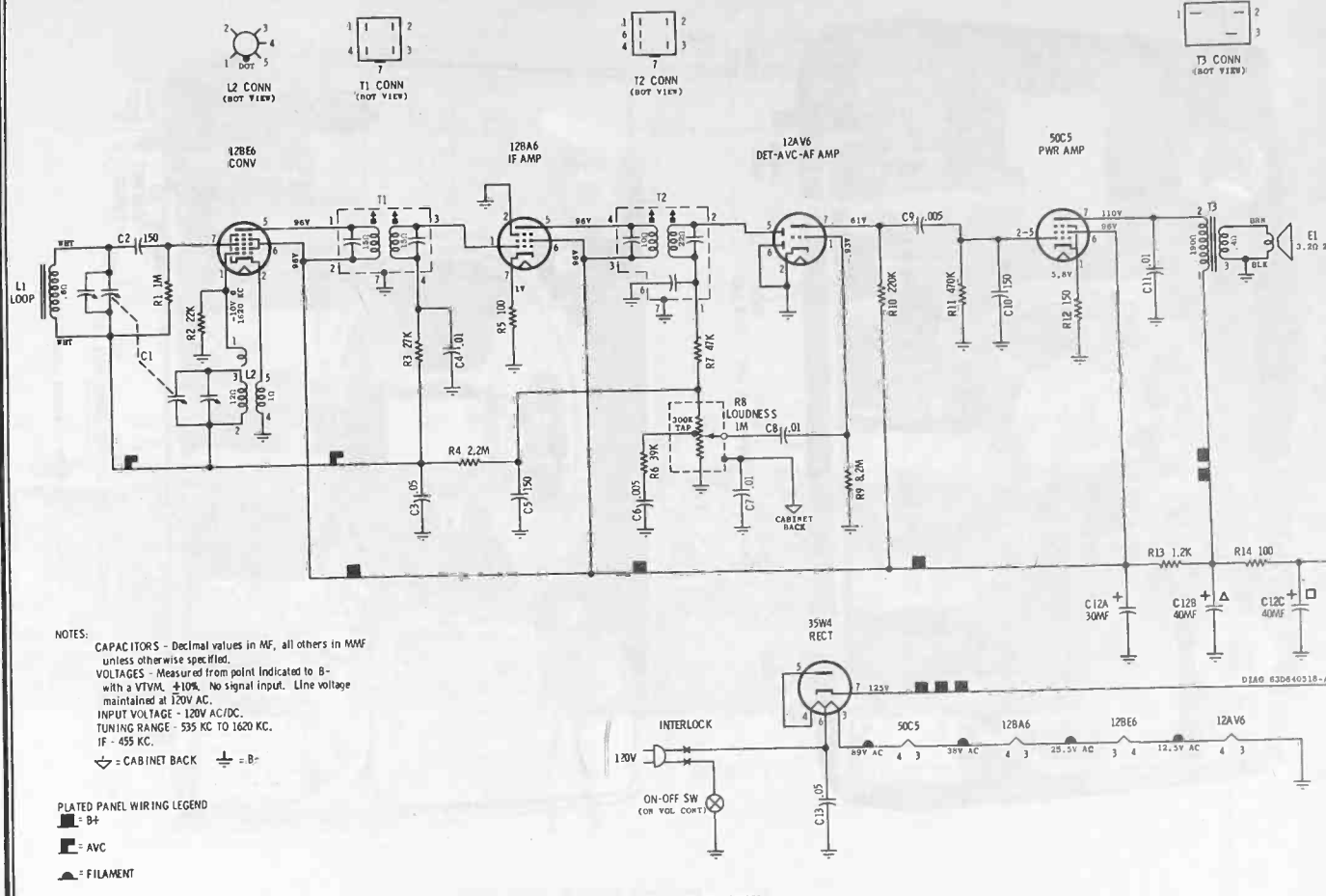


ALIGNMENT POINTS & PARTS LOCATIONS



PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



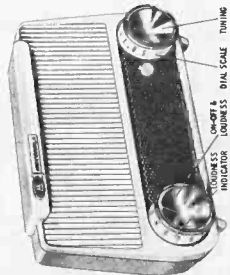


NOTES:
 CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to B- with a VTVM, $\pm 10\%$. No signal input. Line voltage maintained at 120V AC.
 INPUT VOLTAGE - 120V AC/DC.
 TUNING RANGE - 535 KC TO 1620 KC.
 IF - 455 KC.
 ▽ - CABINET BACK ⊕ - B-

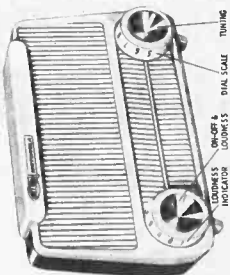
PLATED PANEL WIRING LEGEND
 ■ = B4
 □ = AVC
 ▲ = FILAMENT

SCHEMATIC DIAGRAM

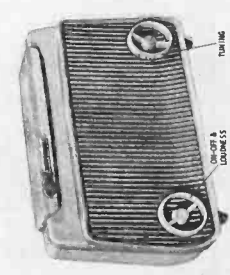
- HOME RADIO
 MODELS CHASSIS
 5T12B HS-653
 5T12M HS-653
 5T12P HS-653
 5T12W HS-653
 5T13P HS-654
 5T13S HS-654
 5T14GW HS-654
 5T14W HS-654



5T14 SERIES



5T13 SERIES



5T12 SERIES

GENERAL INFORMATION

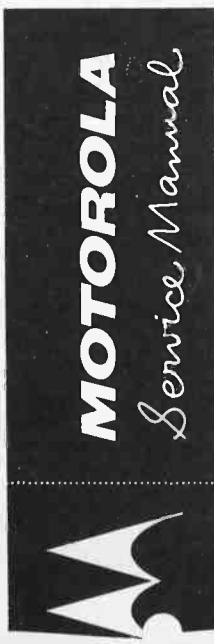
TYPE - AC/DC table model superheterodyne receiver with push-pull circuitry.
 Plated circuit board.
 This set features a push-pull type On-Off & Loudness control. The push-pull feature eliminates the necessity of re-adjusting the loudness every time the radio is turned on. To turn radio ON, pull the LOUDNESS knob out; to turn radio OFF, push the same knob in.
 TUBE COMPLEMENT - 12B66 Converter IF amp
 12A66 Det-AVC-AF amp
 50C5 Pwr amp
 35W4 Rectifier
 TUNING RANGE - 535 to 1620 Kc. IF - 455 Kc
 POWER SUPPLY - 120 volts AC/DC; 35 watts

SERVICE NOTES

- Unsold speaker leads, antenna leads and remove chassis from cabinet.
- Remove the insert knob sections on the Loudness control knob sections. (The two control knobs are each composed of two sections.)
- From front of cabinet, unscrew paint from Loudness indicator knob in order to remove the Loudness indicator knob from the chassis.
- From rear of cabinet, remove the two screws that mount the plated panel bracket to cabinet.
- Unsold speaker leads, antenna leads, and remove chassis from cabinet.

CIRCUIT DESCRIPTION

The circuit of this chassis is conventional - there are built-in sections. Leads are listed on both sides of the chassis base, thereby replacing the usual



SUPERSEDES PRELIMINARY SERVICE MANUAL PART NO. 68P64250.

USE OF ISOLATION TRANSFORMER

The chassis of this receiver is connected directly to the power line, however, the power cord circuit is broken by an isolation transformer. The chassis rear cover is removed, when the isolation transformer should be inserted between the power line and the chassis.

DISASSEMBLY INSTRUCTIONS

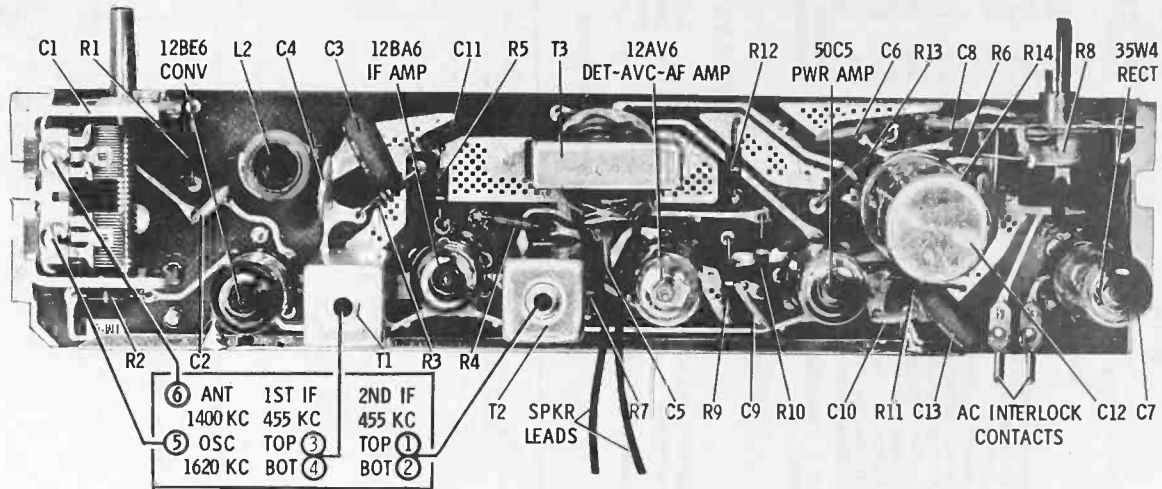
- To Remove Chassis From Cabinet.
- Remove two cover mounting screws on bottom of cabinet; separate rear cover from front section and unscrew (to cabinet back) the lead leg which connects chassis to cabinet back.
 - On Model 5T12 Series:
 - Remove the two control knobs from front of radio.
 - From rear of cabinet, remove screw from gang mounting bracket and also from ear of loudness control.
 - Remove the two screws that mount the plated panel bracket to cabinet.

ALIGNMENT

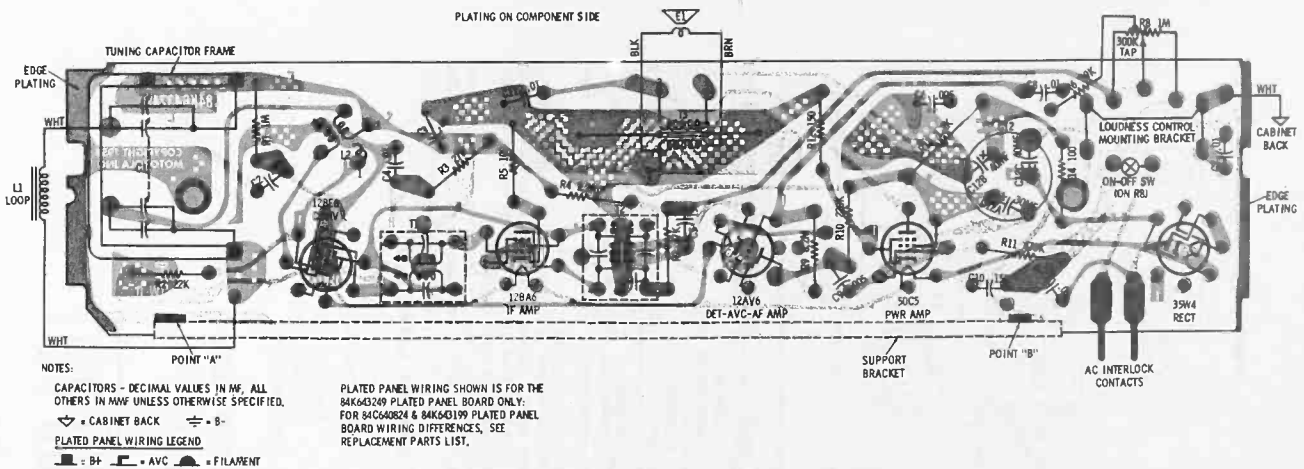
Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .4 volts on output meter to prevent overloading the receiver.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	12BE6 grid (pin 7) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum
RF ALIGNMENT					
2.	Radiation loop*	1620 Kc	Fully open	5	Adjust for maximum
3.	"	1400 Kc	Tune for max	6	"

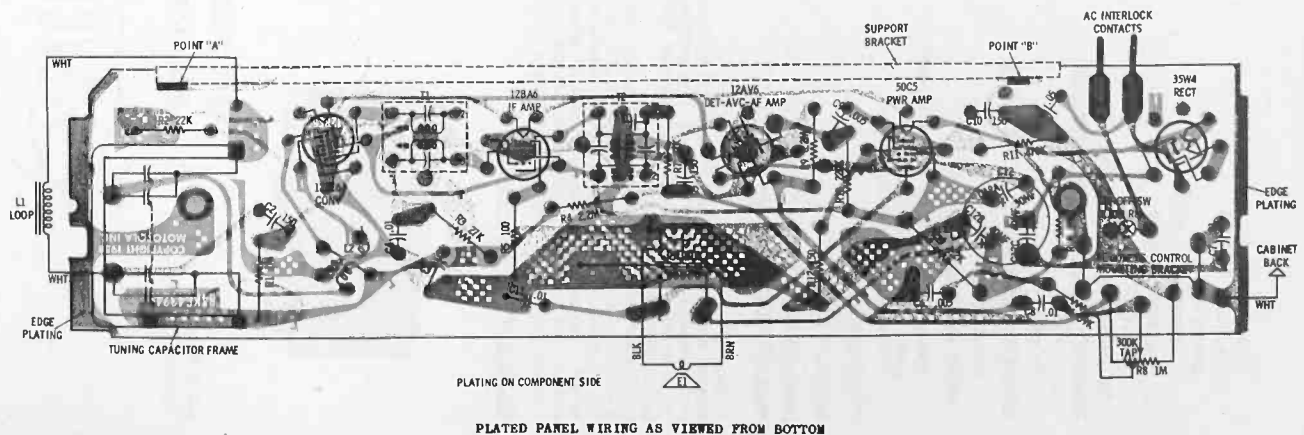
*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver loop.



ALIGNMENT POINTS & PARTS LOCATIONS

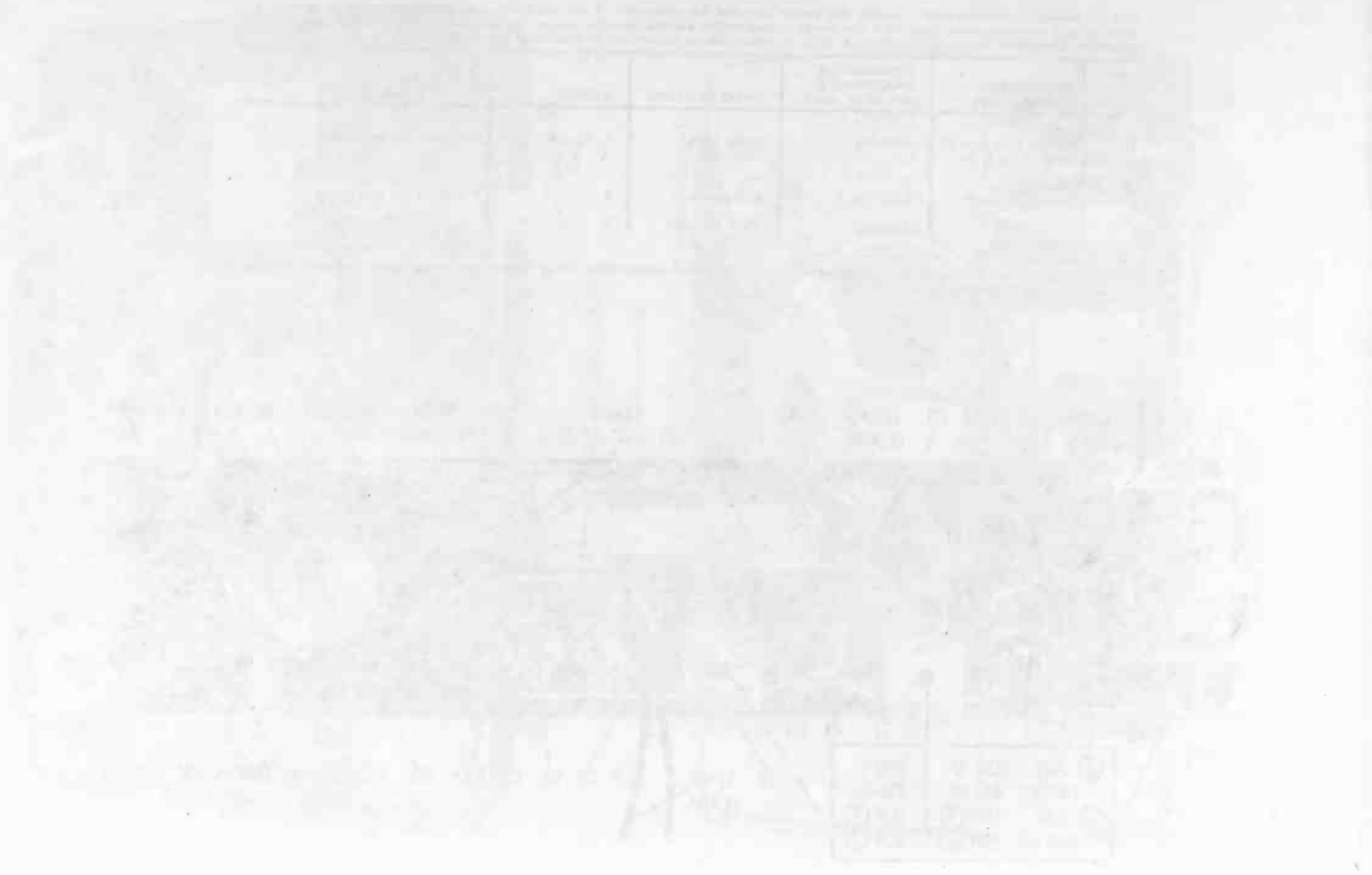


PLATED PANEL WIRING AS VIEWED FROM TOP (COMPONENT SIDE)



PLATED PANEL WIRING AS VIEWED FROM BOTTOM

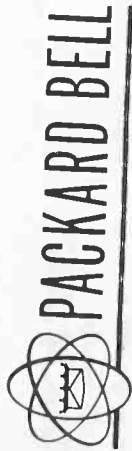
1930-1935



AMERICAN RADIO HISTORY.COM

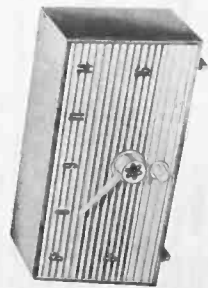
WWW.AMERICANRADIOHISTORY.COM





12333 W. Olympic Blvd.
Los Angeles 64

SERVICE MANUAL TABLE MODEL RADIO 5R5



- Oscillator Coil:**
Primary, 1 ohm
Secondary, 10 ohms
- Loop Antenna:**
Resistance, 5 ohms

ALIGNMENT PROCEDURE:

The alignment of the set is accomplished by following the steps in the chart below. Connect output meter to speaker voice coil. Use isolation transformer, if available, for shock protection.

Each adjustment should be made using a minimum input signal. Connect oscillator through a .01 mfd capacitor in step one; loose-couple oscillator lead in steps two and three.

Step	Connect Test Oscillator To	Test Oscillator Frequency	Radio Dial Setting	Adjust
1.	Pin 1, V-1 (12BE6)	455 Kc.	540 Kc.	S-1, S-2, S-3, & S-4 for MAX.
2.	Loose-couple to antenna	1620 Kc.	1620 Kc.	C-2B for MAX.
3.	ditto	1500 Kc.	Tune to Osc. Signal	C-1B for Max.

GENERAL DESCRIPTION:

Model 5R5 is a five tube, superheterodyne radio receiver. The cabinet is plastic and is available in a variety of colors. The electron tubes are of the standard miniature type, connected for AC-DC operation. A permanent magnet speaker is employed. There are two controls, the tuning knob with sweep pointer, and the volume control with switch.

The antenna is a high impedance pancake type loop mounted on the back of the set. If an external antenna is required, couple it to the loop as directed on back.

SPECIFICATIONS (to nearest 1/4 in.):
DIMENSIONS: 5 1/4 h by 10 3/4 w by 4 1/4 dp

WEIGHT: 3.3 lb

ELECTRICAL RATINGS:

Line voltage, 110-120 volts AC or DC
Power consumption, 27 watts
(Reverse power plug for minimum hum.)

TUNING FREQUENCY RANGE:

540 to 1620 Kc.

ELECTRICAL POWER OUTPUT, MAXIMUM:

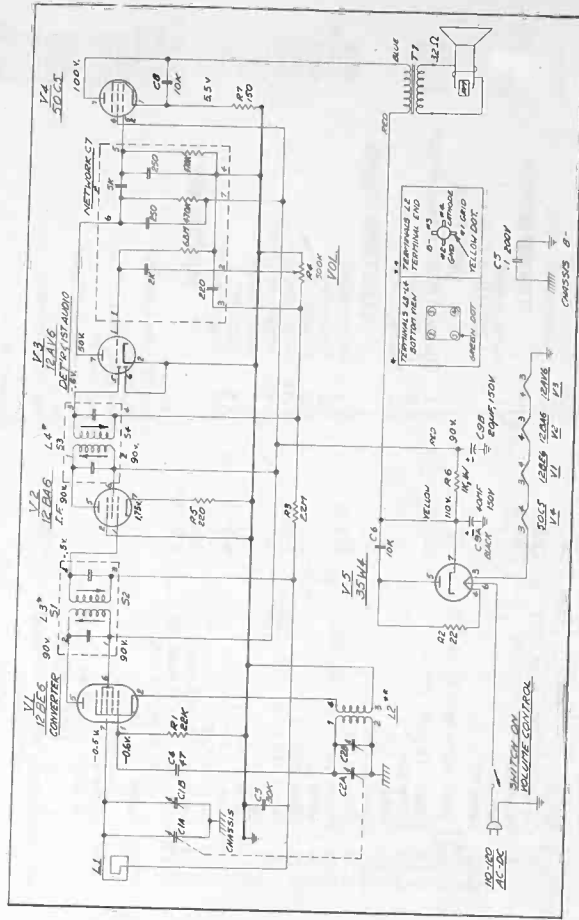
1.7 watts

SPECIAL SERVICING INFORMATION:

DC RESISTANCE MEASUREMENTS:

- 1st I-F Coil:**
Primary, 19 ohms
Secondary, 19 ohms
- 2nd I-F Coil:**
Primary, 19 ohms
Secondary, 19 ohms

Manual BC-57
Oct. 10, 1958



Schematic, Model 5R5

Socket voltages measured as follows:

1. Line voltage, 117 volts AC.
2. Volume control at maximum.
3. VTVM between socket terminal and B minus bus.
4. Only DC voltages measured. Allow 10% tolerance.

REPLACEABLE PARTS

CAPACITORS

REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
C-1A	Variable, RF section	
C-1B	Trimmer, RF section	23556
C-2A	Variable, osc section	
C-2B	Trimmer, osc section	23652A
C-3	Ceramic, 30,000 mfmf	23651
C-4	Ceramic, 47 mfmf, 20%, N1400	23707
C-5	Paper, molded case, 1 mfd, 200 v	23631
C-6	Ceramic, 10,000 mfmf	23630B
C-7	Network	
C-8	Same as C-6	
C-9	(A&B) Electrolytic, 40-20 mfd/150 v	24163C

CONTROL

REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
R-4	Volume, 500,000 ohms w/sw	25062E

COILS

REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
L-1	Loop antenna	29361
L-2	Oscillator coil	23157B
L-3	1st I-F	23155
L-4	2nd I-F	23156

RESISTORS

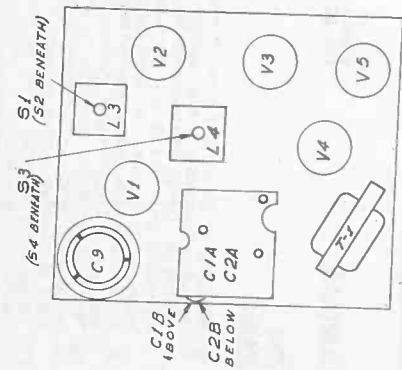
REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
R-1	22,000 ohms	73141
R-2	22 ohms	73105
R-3	2.2 megohms	73165
R-4	See CONTROLS	
R-5	220 ohms	73117
R-6	1000 ohms, 1 watt	73325
R-7	150 ohms	73115

ELECTRON TUBES

REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
V-1	Converter	12BE6
V-2	I-F amplifier	12BA6
V-3	Detector & 1st Audio	12AV6
V-4	Audio output	50C5
V-5	Rectifier	35W4

MISCELLANY

REFERENCE SYMBOL	DESCRIPTION	PACKARD BELL PART NUMBER
	Cabinet, specify color	21152B
	Cord, AC power, 6 ft	32032A
	Knobs	
	Tuning (specify color)	52246
	Volume (specify color)	52247
	Speaker, 4 in. PM, 3.2 ohms	83019
	Transformer, audio output (T-1)	2500 to 3.2 ohms
		89487



Adjustments, Model 5R5



12333 W. Olympic Blvd.
Los Angeles 64

SERVICE MANUAL

**MODEL 7R1
SIGALERT RADIO**



GENERAL DESCRIPTION:

Model 7R1 is a seven tube radio receiver designed to receive police calls and sigalerts as well as standard AM broadcasts. The switch on the back selects between:

1. RADIO, for customary broadcast reception, including sigalerts.
2. POLICE, which includes all police broadcasts.
3. SIGALERT, which also tunes to police frequency, but reproduces only sigalerts and hourly time signals.

SPECIFICATIONS:

OVERALL DIMENSIONS: 12½" w by 6½" h by 7½" (incl knobs) d.
ELECTRICAL RATINGS:
Line voltage 110-120 v AC or DC
Power consumption 30 watts
TUNING FREQUENCIES:
540 to 1620 kc
1730 kc

SHIPPING WEIGHT: 8 lb

EQUIPMENT NEEDED:

1. Signal generator providing the following:
455 kc modulated by 400 or 1000 cps, 30%
610 kc " " " " " "
1000 kc " " " " " "
1500 kc " " " " " "
1730 kc ± .03%, modulated by 25 cps ± .25 cps, and also by 400 or 1000 cps.
2. Vacuum tube voltmeter.
3. Output meter, range 50 milliwatts.
4. Tuning wand, w/brass and powdered-iron ends.
5. Capacitor, paper, .01 mfd.

PROCEDURE:

1. Connect generator through .01 mfd capacitor to mixer grid of 12BE6 (pin 7, V-2). Negative lead goes to B-minus bus.
2. Connect output meter across secondary of audio output transformer. Set to 50 mw range.
3. Turn variable capacitor to open position and set switch to RADIO.
4. Turn volume control fully clockwise.
5. Set generator frequency to 455 kc, modulated, and turn generator output up until a reading is obtained on meter.

- 25 CYCLE FILTER ALIGNMENT:**
1. Turn switch to SIGALERT.
 2. Feed a 1730 kc signal modulated 25 cycles ± .25 cycles to loose coupled antenna.
 3. Connect VTVM across C-29, .47 mfd capacitor. Positive lead goes to junction of C-29 and R-30, negative to B minus bus. Set VTVM to 15 volt range.
 4. Adjust 25 cycle filter for maximum voltage on VTVM by alternately adding and removing C-19 (470 mfd) and R-24 (22,000 ohms).

NOTE: C-19 is in parallel with C-23 & R-24, and may be removed by clipping out of circuit. R-24 is in series with R-25 (215K) and may be removed or added by the use of a jumper wire.
The voltage across C-29 should be at least 8 volts at 25 cycles, and not more than 3 volts at 21 cycles and 29 cycles.

REPLACEABLE PARTS, 7R1

CAPACITORS

- C-1A RF section of variable 23550A
- C-1B Trimmer for C-1A 23438
- C-2 Trimmer, 2.7 to 30 mmf 23550A
- C-3A Osc section of variable
- C-3B Trimmer for C-3A
- C-4 Trimmer, tubular, 1.5 to 10 mmf, NPO 23430
- C-5 Ceramic, 18 mmf, 5%, N750 23637
- C-6 Paper, .047 mfd, 200 v 23705
- C-7 Ceramic, 220 mmf, 20% 23915
- C-8 Ceramic, 47 mmf, 20% 23912
- C-9 Ceramic, 47 mmf, 10%, NPO 23833
- C-10 Ceramic, 1.5 mmf, 10% 23866
- C-11 Same as C-7
- C-12A Eltrylic, 50 mfd, 150 v } dual 24073
- C-12B Eltrylic, 50 mfd, 150 v }
- C-13 Ceramic, 10,000 mmf, GMW 23939
- C-14 Ceramic, 470 mmf, 20% 23916
- C-15 Same as C-13
- C-16 Same as C-13
- C-17A } Dual, same as C-12 (A & B)
- C-17B }
- C-18 Paper, .15 mfd, 200 v 23708
- C-19 Same as C-14
- C-20 Same as C-6
- C-21 Same as C-6
- C-22 Same as C-6
- C-23 Paper, .01 mfd, 5%, 200 v 23170
- C-24 Same as C-23
- C-25 Same as C-23
- C-26 Paper, .15 mfd, 10%, 200 v 23308
- C-27 Same as C-6
- C-28 Same as C-6
- C-29 Paper, .47 mfd, 200 v 23071
- C-30 Same as C-6
- C-31 Ceramic, 10,000 ohms, 20% 23612
- C-32 Ceramic, 50,000 mmf, 50 v 23614A
(C-32 at grid of V4B)
- C-33 Same as C-31
- C-34 Same as C-6
(C-33 near R-9)
(C-34 near R-6)

TRANSFORMERS

- T-1 Audio output 2500 to 3.2 ohms 89417

CRYSTALS

- X-1 Diode, 1N295, audio detector 72028
- X-2 Diode, dual 72030
- X-3 Same as X-2

ELECTRON TUBES

- V-1 RF amplifier 6BJ6
- V-2 Converter 12BE6
- V-3 I-F amplifier 6BJ6
- V-4A Audio amplifier 1/2 7025
- V-4B Trigger amplifier 1/2 7025
- V-5 Audio output 35C5
- V-6 Rectifier 35W4
- V-7 Trigger output 12AU6

MISCELLANY

- 21142-1 Cabinet
- 32029A Cord, AC power, white
- 38161B Dial, radio
- 40003 Drive cord, 40 in.
- 52220-1 Knob, switch
- 52227 Knob, tuning or volume
- 54002 Lamp, dial, 1.47
- 66047 Plug, AC interlock
- 83122 Pointer
- 86065A Speaker, 6 x 4
- Switch

CONTROLS

- R-7 Control, volume, 500,000 ohms, w/switch 25047

COILS

- L-1 Loop, ferrite 29358

- L-2 Trap, 455 kc 29088
- L-3 Oscillator coil 29229
- L-4 1st I-F 29077
- L-5 2nd I-F 29078

RESISTORS

- R-1 68 ohms 73011
- R-2 4700 ohms 73033
- R-3 1 megohm, 20% 73161
- R-4 22,000 ohms 73041
- R-5 Same as R-1
- R-6 2.2 megohms, 20% 73165
- R-7 See CONTROLS
- R-8 82,000 ohms 73048
- R-9 5600 ohms 73034
- R-10 2.2 megohms 73065
- R-11 220,000 ohms, 20% 73153
- R-12 470,000 ohms, 20% 73157
- R-13 150 ohms 73015
- R-14 Not used
- R-15 Not used
- R-16 1000 ohms, 20%, 1 watt 73325
- R-17 Same as R-1
- R-18 120,000 ohms 73050
- R-19 Same as R-10
- R-20 270,000 ohms 73054
- R-21 Same as R-10
- R-22 955,000 ohms, 1% 73727
- R-23 Same as R-22
- R-24 Same as R-4
- R-25 215,000 ohms, 1% 73728
- R-26 1 megohm 73061
- R-27 150,000 ohms 73051
- R-28 330,000 ohms, 20% 73155
- R-29 2700 ohms 73030
- R-30 Same as R-26
- R-31 3.3 megohms, 20% 73167

TRANSFORMER

- T-1 Audio output 2500 to 3.2 ohms 89417

CRYSTALS

- X-1 Diode, 1N295, audio detector 72028
- X-2 Diode, dual 72030
- X-3 Same as X-2

ELECTRON TUBES

- V-1 RF amplifier 6BJ6
- V-2 Converter 12BE6
- V-3 I-F amplifier 6BJ6
- V-4A Audio amplifier 1/2 7025
- V-4B Trigger amplifier 1/2 7025
- V-5 Audio output 35C5
- V-6 Rectifier 35W4
- V-7 Trigger output 12AU6

MISCELLANY

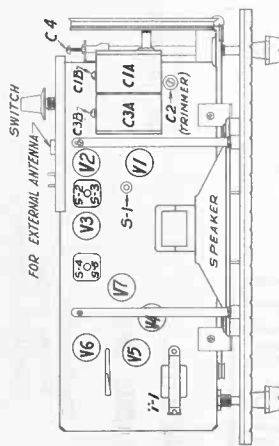
- 21142-1 Cabinet
- 32029A Cord, AC power, white
- 38161B Dial, radio
- 40003 Drive cord, 40 in.
- 52220-1 Knob, switch
- 52227 Knob, tuning or volume
- 54002 Lamp, dial, 1.47
- 66047 Plug, AC interlock
- 83122 Pointer
- 86065A Speaker, 6 x 4
- Switch

CONTROLS

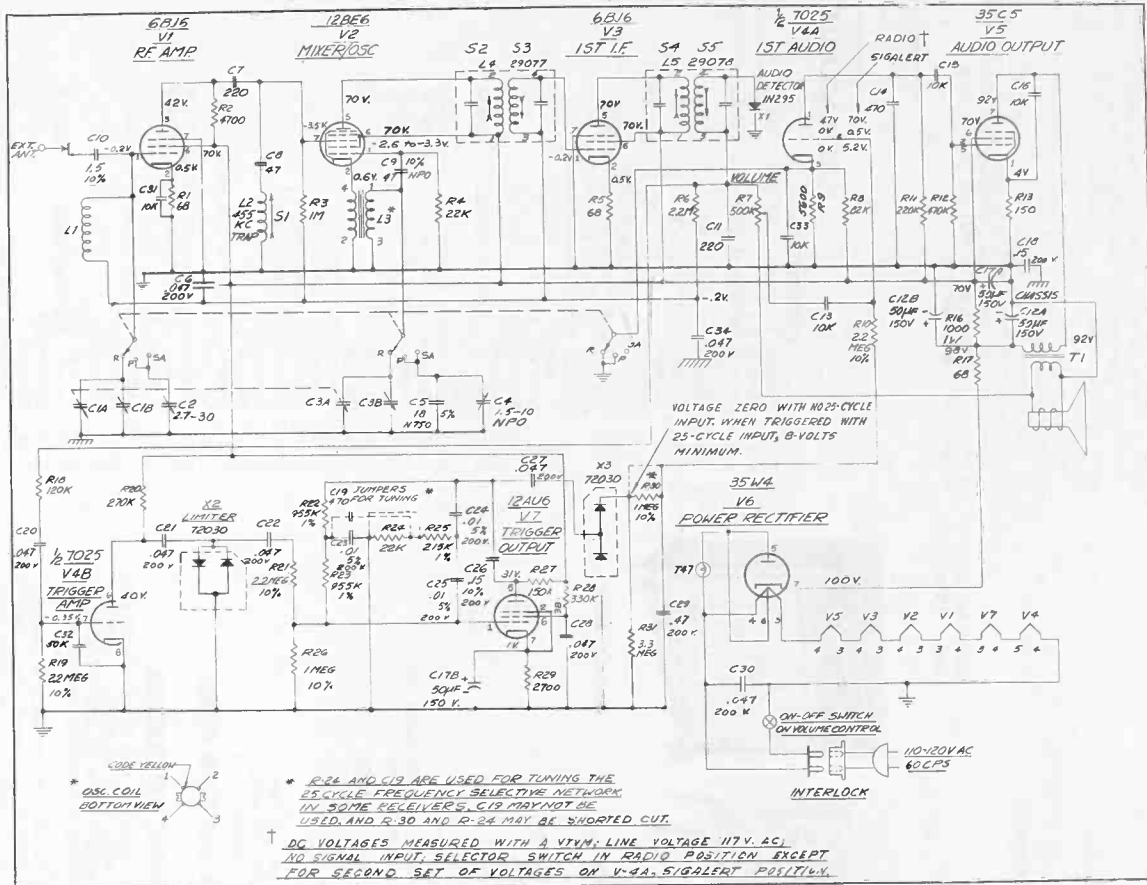
- R-7 Control, volume, 500,000 ohms, w/switch 25047

COILS

- L-1 Loop, ferrite 29358



Adjustments



Schematic Diagram, Model 7R1



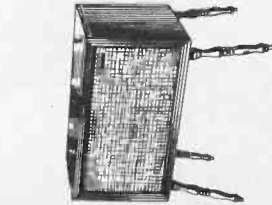
SERVICE MANUAL

**MODELS 11RP6S, 11RP7S, 11RP8S, & 11RP9S
COMBINATION RADIO-PHONOGRAPHS**

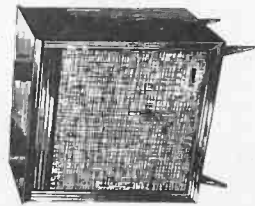
12333 W. Olympic Blvd.
Los Angeles 64

(CHASSIS 11HF1S)

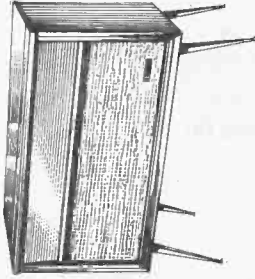
Manual BC-56
Nov. 1, 1958



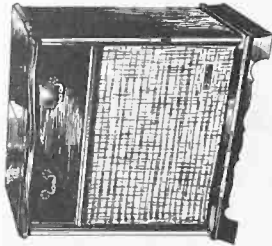
Model 11RP6S



Model 11RP7S



Model 11RP8S



Model 11RP9S

GENERAL DESCRIPTION:

Models 11RP6S, 11RP7S, 11RP8S, and 11RP9S are radio-phonograph combinations, each using the same chassis, 11HF1S. The illustrations above show the external differences, and the list of replaceable parts, points out other variations, such as speaker complement and record changer.
The chassis contains eleven electron tubes, and is designed to receive AM and FM radio as well as to reproduce recordings. Stereophonic recordings may be played with the addition of an external amplifier, as described in the section headed "Stereophonic Operation."
Antennas for both AM and FM are built in the sets, but terminals are provided for an outside FM antenna which may be needed in weak-signal areas.

SPECIFICATIONS:

CABINET DIMENSIONS & FINISHES				
Model	Height	Width	Depth	Finishes
11RP6S	14"	24"	18"	MOC*
11RP7S	26"	24"	18"	WMOC
11RP8S	21"	38"	18"	MOCSc
11RP9S	33"	31"	20"	MOCFp

* M — Mahogany, O — Oak, C — Colonial
 † Plus legs, 12"
 ‡ Plus legs, 6"
 § Plus legs, 10"
 Cabinet dimensions are to nearest inch, and vary somewhat with the style of the cabinet.

SHIPPING WEIGHTS:

- 11RP6S: 60 lb.
- 11RP7S: 90 lb.
- 11RP8S: 100 lb.
- 11RP9S: 100 lb.

ELECTRICAL RATINGS:

Line voltage: 110-120 v, 60 cycles only
 Power consumption: 75 watts

TUNING FREQUENCY RANGE:

AM radio: 530 to 1620 kc
 FM radio: 88 to 108 mc

WATTS OUTPUT:

1% distortion: 6 watts
 10% distortion: 10 watts
 Peak output: 18 watts

SPEAKERS & ELECTRON TUBES:

See parts list.

STEREOPHONIC OPERATION:

Stereophonic recordings may be reproduced with the aid of an external amplifier-speaker system. This system is connected to either the OUTPUT LO or the OUTPUT HI according to the setting of the switch (see next paragraph).
 The switch at the rear of the set has three positions:
 Position 1: AM-FM HI. The tuner output, besides going thru the regular speaker-amplifier system in set, is amplified and piped to the OUTPUT HI for use with the remote system. See Position 3.

Position 2: STEREO LO. Stereo signal from cartridge goes directly, without amplification, to OUTPUT LO. This output is for use with an external system with enough gain that preamplification of the stereo signal is not required. In this position OUTPUT HI is dead.

Position 3: AM-FM LO, STEREO HI. Stereo output of cartridge is preamplified, and appears at OUTPUT HI. (Use position 2 and STEREO LO unless gain of external system is insufficient.)

In position 3 the tuner output, at a lower level than in position 1, appears at OUTPUT LO. This is for a remote system with high gain.

DC RESISTANCE MEASUREMENTS:

(Coils not listed have negligible resistance).

- L-2, choke, 2 ohms
- L-4, 1st I-F, FM, primary 1.5 ohms, sec., 1.5 ohms.
- L-5, 2nd I-F, FM, primary 2.5 ohms, sec., 0.75 ohms.
- L-6, ratio detector, primary 3.2 ohms, sec., 0.25 ohms
- L-7 and L-10 chokes, 0.5 ohms
- L-8, 1st I-F, AM, primary 16 ohms, sec., 16 ohms
- L-9, 2nd I-F, AM, primary 16 ohms, sec., 16 ohms
- L-11, ferroloop, 0.3 ohms
- L-13, oscillator, AM, primary 8.5 ohms, sec., 0.6 ohms

REPLACEABLE PARTS

CAPACITORS	
C-1	Ceramic, 1000 mmf, GMV, disc
C-2	Same as C-1
C-3	Ceramic, 5000 mmf, GMV, disc
C-4	Same as C-1
C-5	Ceramic, 47 mmf, 20%
C-6	Ceramic, 330 mmf, 20%
C-7	Variable, four section w/trimmers
C-7 A & B	= FM RF w/trimmer
C-7 C & D	= FM osc w/trimmer
C-7 E & F	= AM RF w/trimmer
C-7 G & H	= AM osc w/trimmer
C-8	Same as C-3
C-9	Same as C-1
C-10	Same as C-3
C-11	Same as C-3
C-12	Ceramic, 10,000 mmf, 500 v
C-13	Same as C-1
C-14	Ratio detector network
C-15	Electrolytic, 5 mfd/50 v
C-16	Paper, .047 mfd, 400 v
C-17	Paper, .1 mfd, 400 v
C-18	Same as C-16
C-19	Not used
C-20A	Electrolytic, 25 mfd/25 v
C-20B	Electrolytic, 40 mfd/350 v
C-20C	Electrolytic, 40 mfd/350 v
C-20D	Electrolytic, 20 mfd/350 v
C-21	Same as C-3
C-22	Same as C-1
C-23	Ceramic, 10,000 mmf, 25 v min
C-24	Not used
C-25	Trimmer, 5 to 25 mmf (= C-7D)
C-26	Ceramic, 4.7 mmf, 10%, NPO
C-27	Same as C-5
C-28	Ceramic, 1.5 mmf, 10%
C-29	Same as C-1
C-30	Same as C-1
C-31	Same as C-23
C-32	Ceramic, 220 mmf, 20%
C-33	Same as C-3
C-34	Not used
C-35	Paper, .022 mfd, 200 v
C-36	Same as C-23
C-37	Same as C-35
C-38	Same as C-23

CONTROLS

- R-33 500,000 ohms, tapped 100K, 25057
- R-37 500,000 ohms, treble, w/switch 25039A
- R-39 500,000 ohms, bass 25038A

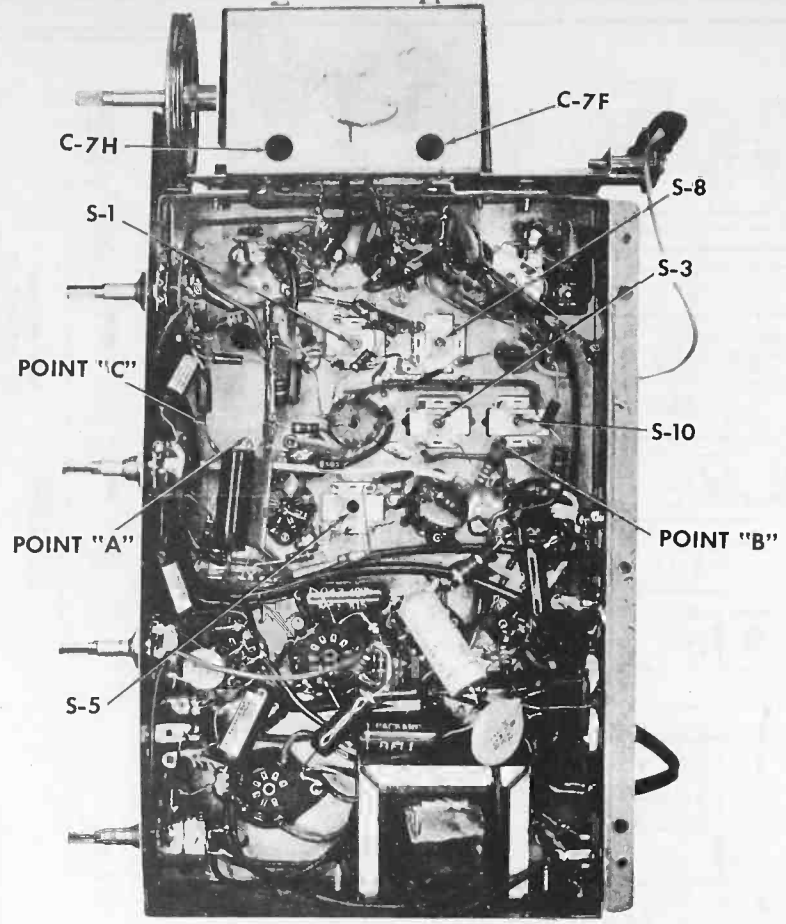
COILS

- L-1 Antenna, FM 29426
- L-2 Choke, 1 microhenry 29124
- L-3 RF, FM 29158
- L-4 1st I-F, FM 29148
- L-5 2nd I-F, FM 29152
- L-6 Ratio detector 29084
- L-7 Choke, 4.7 microhenry 29145
- L-8 1st I-F, AM 29066
- L-9 2nd I-F, AM 29067
- L-10 Same as L-7 29358A
- L-11 Loop antenna, AM 29242A
- L-12 Oscillator, FM 29229B
- L-13 Oscillator, AM

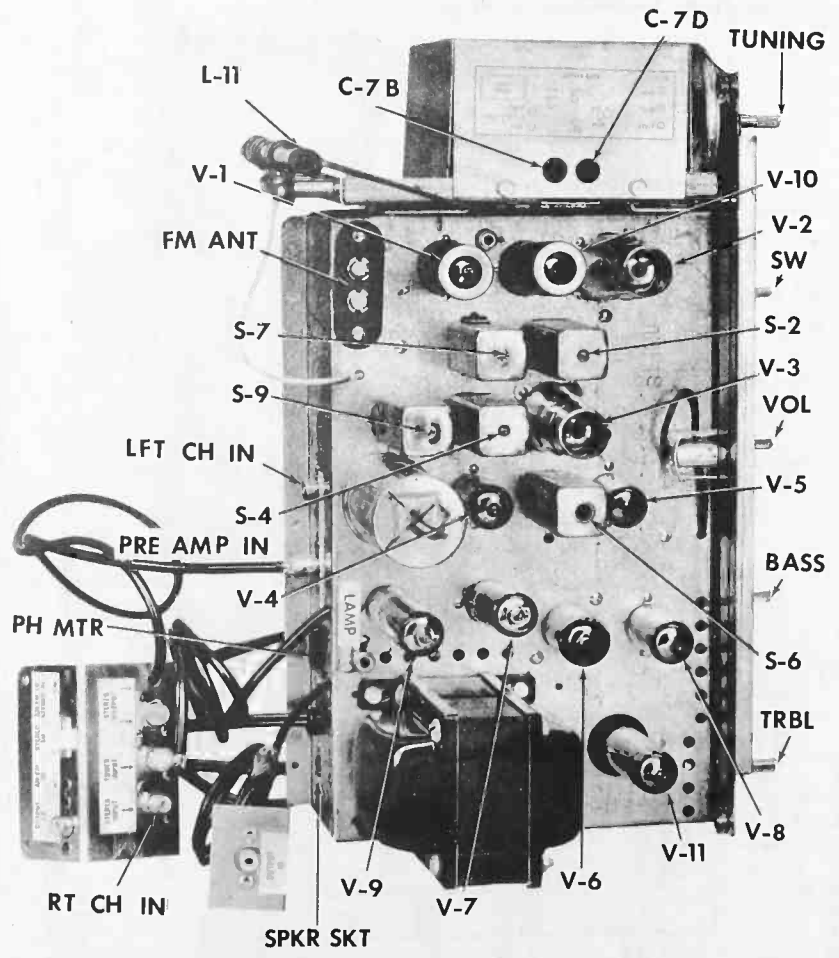
RESISTORS

- R-1 1/2 watt, 10% unless specified 73016
- R-2 180 ohms 73033
- R-3 4700 ohms 73167
- R-4 3.3 megohms, 20% 73025
- R-5 1000 ohms 73014
- R-6 120 ohms 73011
- R-7 68 ohms 73037
- R-8 10,000 ohms 73024

MODELS 11RP6S, 11RP7S, 11RP8S, 11RP9S



Chassis 11HF15, Top View



Chassis 11HF15 Bottom View

MISCELLANY

73028	1800 ohms	R-9	32031	Cord, AC power, 8 ft.
73161	1 megohm, 20%	R-10	38170	Dial, tuning
73045	Not used	R-11	40003	Drive cord, 31 in.
73153	47,000 ohms	R-12	52205	Knob, Treble, Bass, or Switch
73049	220,000 ohms, 20%	R-13	52206	Knob, Volume or Tuning
73157	Same as R-9	R-14	54002	Lamp, T-47, compartment
73157	100,000 ohms	R-15	54006	Lamp, T-51, dial
73221	100,000 ohms, 20%	R-16		
73035	470 ohms, 1 watt	R-17		
73022	6800 ohms	R-18		
	Same as R-10	R-19		
	560 ohms	R-20		
	Not used	R-21		
	Same as R-16	R-22		
	Same as R-10	R-23		
	Same as R-20	R-24		
	22,000 ohms	R-25		
	8200 ohms	R-26		
	Same as R-10	R-27		
	6800 ohms, 1 watt	R-28		
	2.2 megohms, 20%	R-29		
	330,000 ohms, 20%	R-30		
	Not used	R-31		
	Same as R-30	R-32		
	See CONTROLS	R-33		
	Same as R-12	R-34		
	4.7 megohms	R-35		
	1200 ohms	R-36		
	See CONTROLS	R-37		
	Same as R-13	R-38		
	See CONTROLS	R-39		
	Same as R-25	R-40		
	Not used	R-41		
	560,000 ohms, 20%	R-42		
	Same as R-13	R-43		
	330,000 ohms (10%)	R-44		
	Same as R-1C	R-45		
	Same as R-25	R-46		
	10,000 ohms, 1 watt	R-47		
	2500 ohms, 5 watts	R-48		
	Same as R-48	R-49		

TRANSFORMERS

T-1	Output, 10,000 ohms to 8 ohms	89460		
T-2	Power	89075		
	Primary, 117 volts			
	Secondary: 550 volts CT @ 70 ma			
	6.3 volts @ 4 1/2 amp			

ELECTRON TUBES

V-1	FM RF amplifier	6AU6		
V-2A	FM mixer	1/2 12AT7		
V-2B	FM oscillator	1/2 12AT7		
V-3A	1st I-F amplifier	1/2 6EA8		
V-3B	AFC	1/2 6EA8		
V-4	2nd I-F amplifier, AM detector	6AU6		
V-5	Ratio detector	6AL5		
V-6	2nd audio & stereo preamplifier	12AX7 or ECC83		
V-7	Power amplifier	6AQ5		
V-8	1st audio amplifier	6AU6		
V-9	Power amplifier	6AU6		
V-10	AM converter	6BE6		
V-11	Rectifier	6X4		

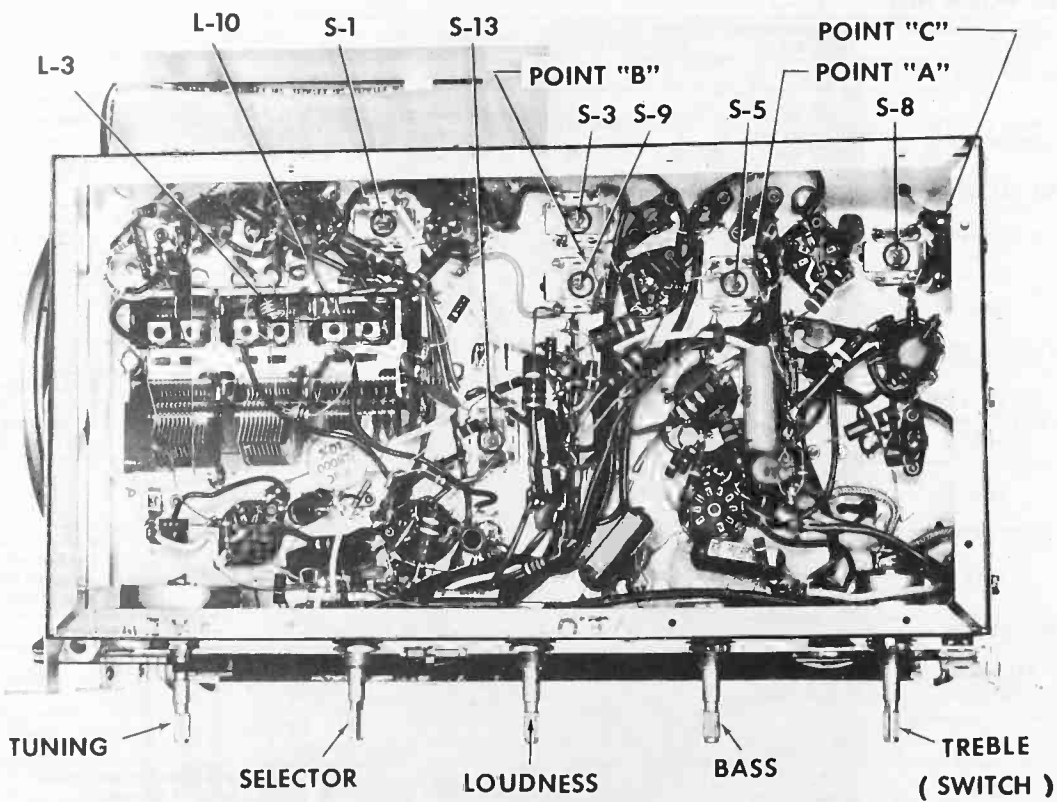
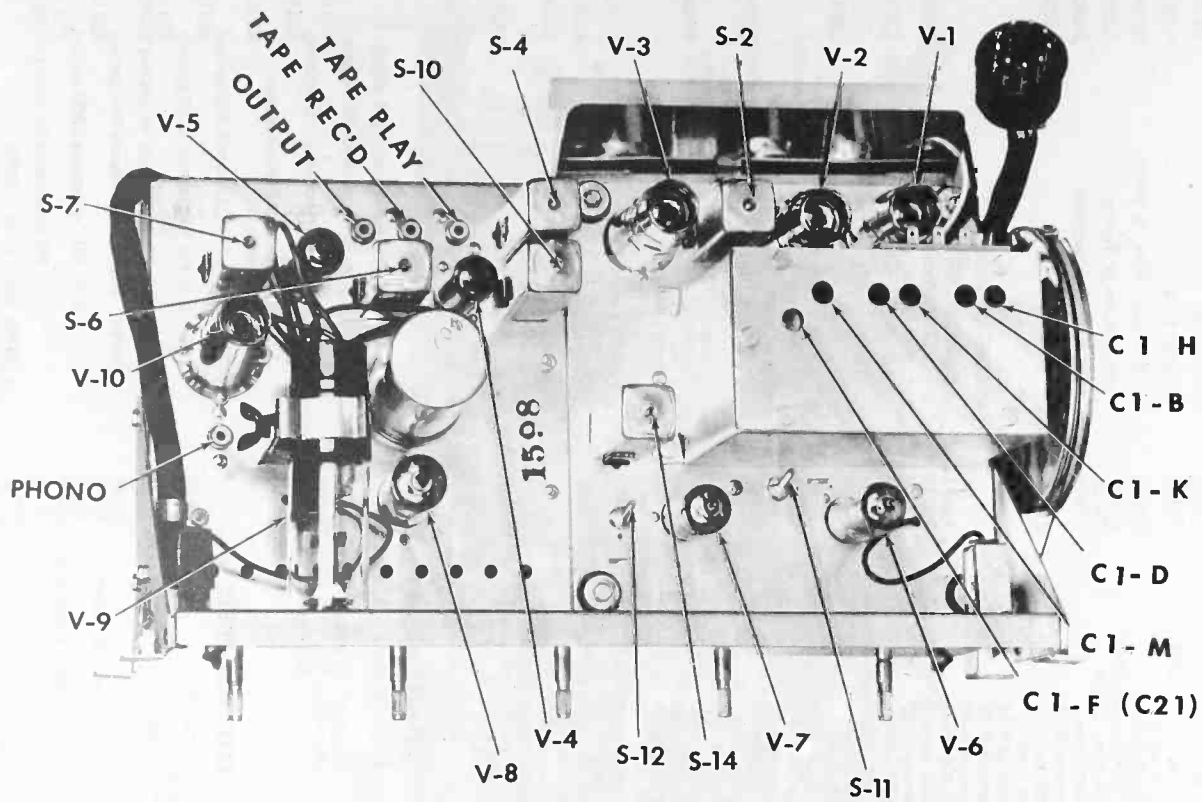
BE SURE TO ALIGN AM SECTION FIRST

DUMMY ANTENNA	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RADIO RECEIVER DIAL SETTING	VTVM CONNECTION	ADJUST	NOTES
ALIGNMENT OF I-F, AM SECTION						
1. .01 mfd in series with gen. output	Pin 7 of V-10 (grid 3, 6BE6)	455 kc, modulated with 400 cps	Low frequency end point	Negative to pt. "B," positive to ground	S-7, S-8, S-9, & S-10 for MAX	Reduce signal generator output to lowest usable level
ALIGNMENT OF R-F, AM SECTION						
2. None	Loose couple to loop	1620 kc, modulated with 400 cps	High frequency end point	Ditto	C7-H for MAX	None
3. None	Ditto	1500 kc, modulated with 400 cps	Tune in signal	Ditto	C7-F for MAX	None
ALIGNMENT OF I-F, FM SECTION						
4. .01 mfd. in series with gen. output	Pin 2 of V-2A (grid, FM mixer, 1/2 12AT7)	10.7 mc, unmodulated	Low frequency end point	Ditto	S-1, S-2, S-3, & S-4 for MAX	Reduce signal generator output to less than one volt at pt. "B"
5. Ditto	Ditto	Ditto	Ditto	Negative to pt. "A," positive to ground	S-5 for MAX	None
6. Ditto	Ditto	Ditto	Ditto	Negative to pt. "C," positive to ground	S-6 for ZERO	A plus or minus reading will be obtained on each side of setting.
ALIGNMENT OF R-F, FM SECTION						
7. 150 ohms in each lead	FM antenna terminal	106 mc, unmodulated	106 mc	Negative to pt. "A," positive to ground	C7-D (= C25) for MAX	None
8. Ditto	Ditto	Ditto	Ditto	Ditto	C7-B for MAX	None
9. Ditto	Ditto	92 mc, unmodulated	92 mc	Ditto	Remove shield and adjust core of L-12 for MAX VTVM reading	
10. Ditto	Ditto	Ditto	Ditto	Ditto	Melt wax on L-3 and expand or compress for MAX VTVM reading. Rewax to prevent howl.	
11. REPEAT STEPS 7 THRU 10 UNTIL NO FURTHER INCREASE IN VTVM READING OCCURS.						

ALIGNMENT CHART

Equipment Required: Signal generator, AM; two 150 ohm 1/2 watt resistors; one .01 mfd, 600 volt paper capacitor.

MODELS 11RP6S, 11RP7S, 11RP8S, 11RP9S

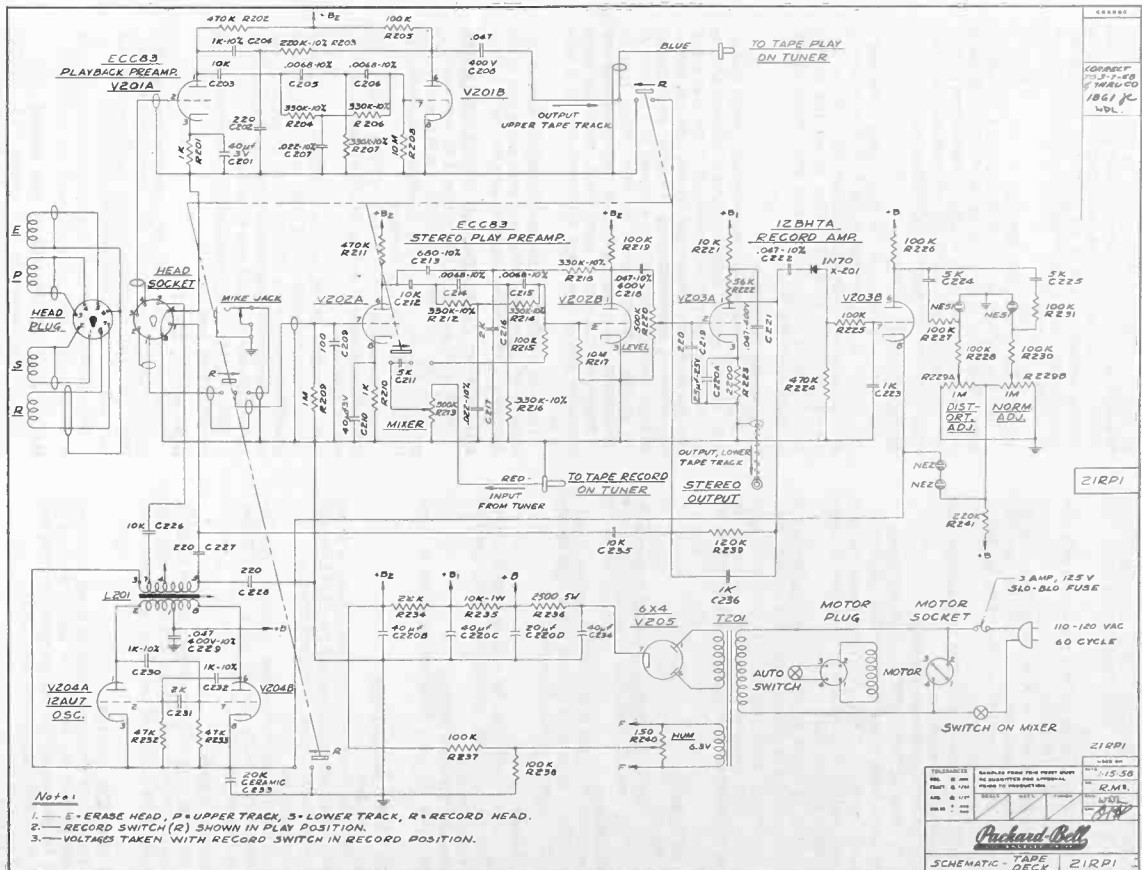


Tuner, Top and Bottom Views (FOLDOUT)
(Access Holes Indicated)

DUMMY ANTENNA CONNECTION	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RADIO RECEIVER DIAL SETTING	VTVM CONNECTION	ADJUST	NOTES
ALIGNMENT OF I-F, AM SECTION						
1. .01 mfd in series with gen. output	Pin 7 of V-7 (grid 3, 6BE6)	455 kc, modulated with 400 cps	Low frequency end point	Negative to pt "B" thru 4.7 megohms, positive to ground	S-9, S-10, S-13, & S-14 for MAX	Reduce signal generator output to lowest usable level
ALIGNMENT OF R-F, AM SECTION						
2. None	Loose-couple to loop	1620 kc, modulated with 400 cps	High frequency end point	Ditto	C1-M for MAX	None
3. None	Ditto	1500 kc, modulated with 400 cps	Tune in signal	Ditto	C1-H & C1-K for MAX	None
4. None	Ditto	600 kc, modulated with 400 cps	600 kc	Ditto	S-12 & S-11 for MAX	None
5. REPEAT STEPS 2 THRU 4 UNTIL NO FURTHER INCREASE IN VTVM READING OCCURS.						
ALIGNMENT OF I-F, FM SECTION						
6. .01 mfd in series with gen. output	Pin 7 of V-2A (grid, FM mixer, 1/2 12AT7)	10.7 mc, unmodulated	Low frequency end point	Negative to pt "A" thru 4.7 megohms, positive to ground	S-1, S-2, S-3, S-4, S-5, & S-6 for MAX	Reduce signal generator output to less than one volt at pt. "A"
7. Ditto	Ditto	Ditto	Ditto	Positive to pt "C" thru 4.7 megohms, negative to ground	S-7 for MAX	Detune S-8 slightly before adjusting S-7
8. Ditto	Ditto	Ditto	Ditto	Ditto	S-8 for min	None
ALIGNMENT OF R-F, FM SECTION						
9. 150 ohms in each lead	FM antenna terminal	106 mc, unmodulated	106 mc	Negative to pt "A" thru 4.7 megohms, positive to ground	C1-F (= C21) for MAX	None
10. Ditto	Ditto	Ditto	Ditto	Ditto	C1-D & C1-B for MAX	None
11. Ditto	Ditto	92 mc, unmodulated	92 mc	Ditto	Compress or expand coil L-10 for MAX VTVM reading	
12. Ditto	Ditto	Ditto	Ditto	Ditto	Compress or expand coil L-3 for MAX VTVM reading	
13. REPEAT STEPS 9 THRU 13 UNTIL NO FURTHER INCREASE IN VTVM READING OCCURS.						

ALIGNMENT CHART

Equipment Required: Signal generator, AM; two 150 ohm 1/2 watt resistors; one .01 mfd, 600 volt paper capacitor., one 4.7 megohm resistor.



Tape Deck, Schematic

MODELS 11RP6S, 11RP7S, 11RP8S, 11RP9S

© John F. Rider

REPLACEABLE PARTS, TUNER CHASSIS

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER	PACKARD-BELL PART NUMBER
R-60	2700 ohms	73030	73030
R-61	150,000 ohms, 1 watt	73251	73251
R-62	Same as R-32		
R-63	Same as R-27		
R-64	2200 ohms	73029	73029
R-65	Same as R-61		
R-66	Same as R-15		
CONTROLS			
R-42	1 megohm, tapped, volume	25044	25044
R-48	5 megohms, w/ switch, treble	25522	25522
R-51	5 megohms, bass	25521	25521
CAPACITORS			
C-1	Variable, 6-gang w/ trimmers	23552	23552
	Sec. A-B — FM antenna & trimmer		
	Sec. C-D — FM RF & trimmer		
	Sec. E-F — FM osc & trimmer C-21		
	Sec. G-H — AM antenna & trimmer		
	Sec. J-K — AM RF & trimmer		
	Sec. L-M — AM osc & trimmer		
C-2	Ceramic, 220 mmf, 20%	23915	23915
C-3	Ceramic, 5000 mmf, +80, -20%, working voltage, 25 v minimum, 1/4 in. dia.	23611	23611
C-4	Ceramic, 10,000 mmf, 25 v, 3/8 in. dia (see p/m 4)	23612	23612
C-5	Same as C-3	23914	23914
C-6	Ceramic, 100 mmf, 20%	23931	23931
C-7	Same as C-6	23603	23603
C-8	Ceramic, 5000 mmf, GMV	23963	23963
C-9	Ceramic, 1 mmf, 10%	23944	23944
C-10	Same as C-6	23860	23860
C-11	Ceramic, 330 mmf, 20%	23616	23616
C-12	Ceramic, 1000 mmf, GMV		
C-13	Same as C-12		
C-14	Ceramic, 100 mmf, 5%, N470	23862	23862
C-15	Same as C-3	23432	23432
C-16	Same as C-3		
C-17	Same as C-8		
C-18	Same as C-4		
C-19	Same as C-8		
C-20	Ceramic, 10,000 mmf, GMV	23862	23862
C-21	Trimmer for C-1, sec F, 3 to 12 mmf, NPO	23432	23432
C-22	Same as C-6		
C-23	Same as C-6		
C-24	Ceramic, 47 mmf, 20%	23912	23912
C-25	Same as C-12		
C-26	Same as C-12		
C-27	Same as C-6		
C-28	Same as C-4		
C-29	Ceramic, 4.7 mmf, 10%, NPO	23978	23978
C-30	Same as C-24		
C-31	Same as C-12		
C-32	Tweet filter, see diagram	23990	23990
C-33	Same as C-20		
C-34	Ceramic, 15 mmf, 20%	23910	23910
C-35	Same as C-2		
C-36	Paper, .047 mfd, 200 v	23105	23105
C-37	Paper, .047 mfd, 400 v, 10%	23324	23324
C-38	Ceramic, 5000 mmf, 10%	23986	23986
C-39	Same as C-34		

RESISTORS
(1/2 w unless specified)
(10% unless specified)

REFERENCE SYMBOL

DESCRIPTION

PACKARD-BELL PART NUMBER

REFERENCE SYMBOL

DESCRIPTION

PACKARD-BELL PART NUMBER

PAUSE BUTTON

To stop the travel of the tape while recording or playing, push the PAUSE button. To lock, push it to the rear and move it to the right. The purpose of this control is to allow for the adjustment of recording volume before the tape is set in motion, to eliminate commercials from a radio recording, or lulls from a recorded conversation.

AUTOMATIC SHUT-OFF SWITCH

The mechanism is automatically shut off unless tape is threaded in front of the plastic shut-off lever. Should tape break, or the supply wheel become empty, the mechanism will shut off automatically and will remain so until the machine is rethreaded.

STEREOPHONIC TAPES

Stereophonic tapes of the type called "stacked" or "in line", may be played on the 21RP1 by attaching an additional amplifier and speaker system to the jack marked STEREO OUTPUT. This allows the second soundtrack to be amplified and reproduced simultaneously with the first.

THREADING THE TAPE

With STOP button depressed, place empty reel on right hand (take-up) spindle. Place a full reel of tape on left hand (supply) spindle, so that it unwinds counterclockwise. Thread tape, glossy side out, following threading line (embossed in plastic escutcheon) straight through the slot in the covers and in front of the plastic automatic shut off lever. Place tape in front of chrome plated tape guide and insert free end of tape into hub slot of right hand reel. Wind right hand reel one or two turns counterclockwise to take up slack.

Detailed instructions for performing the various operations of recording, playback, etc., are given in the operating instructions supplied with the set.

ADJUSTMENT OF RECORDING INDICATOR LIGHTS

Set MIXER and VOLUME controls to maximum. Inject 30 millivolts at 1000 cycles into TAPE REC'D plug (red cable). Set NORMAL adjustment so that NORMAL light just flickers.

Increase voltage to 0.5 volts (1000 cycles). Set DISTORT adjustment so that DISTORT light just flickers or goes out.

As a further check, advance voltage to one volt (1000 cycles) and turn VOLUME to minimum. Now advance it (clockwise). The NORMAL should light between one-quarter and one-half turns, and the DISTORT between one-half and three-fourths.

Turn VOLUME full up and MIXER to minimum. Both lamps should now be out.

HUM ADJUSTMENT

Turn on receiver and tape mechanism. Set SELECTOR switch to TAPE position and turn the TREBLE, BASS and LOUDNESS controls to maximum. Then adjust HUM control (R-236) for minimum hum.

Reverse AC power cord plug and readjust HUM control. Use plug position that produces the least hum.

MECHANICAL ADJUSTMENTS AND PARTS LIST

See Service Manual on V-M models 711 and 750 for mechanical adjustments and parts list. Packard-Bell Factory Service Depts. will be supplied with a copy of the V-M manual.

Tape Deck

THE TAPE DECK IS FOUND ONLY ON MODEL 21RP1 BUT THIS SECTION MAY BE USEFUL IN USING AN EXTERNAL TAPE RECORDER WITH THE 16RP1.

MIXER control is used to add phono or radio output to microphone recording.

LEVEL control adjusts volume to correct level for tape recording as indicated by the NORMAL and DISTORT lamps. It also controls volume of stereo output when playing binaural tapes.

DISTORT adjustment, NORMAL adjustment, and HUM adjustment are concealed.

CONNECTORS (cable with pin-plug)

1. RED cable: to TAPE REC'D on tuner chassis. Receives audio signal for recording on tape.
2. BLUE cable: to TAPE PLAY on tuner chassis. Feeds output of playback preamplifier to tuner chassis, then to power chassis.
3. STEREO OUTPUT. Feeds pre-amplified output of binaural head to external amplifier and speaker.

MICROPHONE JACK. Besides microphone supplied, any high impedance crystal, ceramic, or dynamic microphone may be plugged into this receptacle.

PUSH BUTTONS

Stop Button

The STOP button should be depressed before each operation and when the machine is not in use.

Record Button

Depress the RECORD button for recording a tape. The red SAFETY lever must be held to the right before the RECORD button can be depressed.

Play Button

Depress the PLAY button for playing back a recording. Adjust the VOLUME control and TONE controls on the tuner chassis.

Rewind and Forward Buttons

These wind the tape in either direction at high speed.

RECORD LEVEL INDICATORS

The DISTORT lamp indicates when tape is being overrecorded while recording. Adjust the LEVEL control so that faint flashes occur at loudest sounds.

Normal Indicator

The NORMAL lamp indicates correct recording level. Adjust the LEVEL control until the NORMAL lamp flashes regularly.

TAPE INDEX TIMER

Set both the large and small dials of the timer to zero after threading a reel of tape. After each selection is recorded, note the timer readings for future reference.

SPEED CONTROL BUTTON

The pointer on the speed control knob indicates the speed (inches per second) at which the tape is passing by the heads. To change speed, turn speed control knob after depressing stop button.

SAFETY LEVER

The safety lever locks the RECORD button to prevent accidental erasing. Push "S" lever to the right and hold while depressing the RECORD button.

REPLACEABLE PARTS, TAPE DECK

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER	REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
C-40	Same as C-24		R-201	1000 ohms	73025
C-41	Same as C-8		R-202	470,000 ohms, 20%	73157
C-42	Same as C-8		R-203	220,000 ohms	73053
C-43	Same as C-20		R-204	330,000 ohms	73055
C-44	Same as C-36		R-205	100,000 ohms	73049
C-45	Same as C-4		R-206	Same as R-204	
C-46	Same as C-36		R-207	Same as R-204	
C-47	Same as C-6		R-208	10 megohms, 20%	73173
C-48A	Electrolytic, 40 mfd, 450 v	24147	R-209	1 megohm, 20%	73161
C-48B	Electrolytic, 40 mfd, 450 v		R-210	Same as R-202	
C-48C	Electrolytic, 20 mfd, 450 v	23122	R-211	Same as R-202	
C-49	Paper, .022 mfd, 400 v		R-212	Same as R-204	
C-50	Ceramic, 82 mmf, 10%	23964	R-213	See CONTROLS	
	(see p/m 3)		R-214	Same as R-204	
C-51	Same as C-12		R-215	Same as R-205	
C-52	Ceramic, 2000 mmf, 20%	23839	R-216	Same as R-204	
C-53	Same as C-4	23107	R-217	Same as R-208	
C-54	Paper, .1 mfd, 200 v		R-218	Same as R-204	
C-55	Same as C-20		R-219	Same as R-205	
C-56	Same as C-20		R-220	See CONTROLS	
C-57	Same as C-12		R-222	56,000 ohms	73037
C-58	Same as C-52		R-223	2200 ohms	73046
C-59	Same as C-12		R-224	Same as R-202	73029
C-60	Same as C-8		R-225	Same as R-205	
C-61	Same as C-8		R-226	Same as R-205	
C-62	Same as C-8		R-227	Same as R-205	
			R-228	Same as R-205	
			R-229A}	See CONTROLS	
			R-229B}	See CONTROLS	
L-1	Antenna, FM	29425B	R-230	Same as R-205	
L-2	Choke, RF	29145	R-231	Same as R-205	
L-3	RF coil, FM	29144D	R-232	47,000 ohms	73045
L-4	Choke, suppressor	29146	R-233	Same as R-232	
L-5	1st I-F, FM	29148	R-234	22,000 ohms	73041
L-6	2nd I-F, FM	29148	R-235	10,000 ohms	73237
			R-236	2500 ohms, 5 watts	73635
			R-237	Same as R-205	
			R-238	Same as R-205	
			R-239	120,000 ohms	73050
			R-240	See CONTROLS	
			R-241	Same as R-203	
			R-213	500,000 ohms, mixer, w/ switch	25048
			R-220	500,000 ohms, recording level	25058
			R-229A	1 megohm, distort adjust	Dual 25050
			R-229B	1 megohm, normal adjust	Dual 25050
			R-240	150 ohms, hum control	25943

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
L-7	2nd I-F, AM	29067
L-8	3rd I-F, FM	29096
L-9	Discriminator	29092B
L-10	Oscillator, FM (see p/m 2)	29238B
L-11	Antenna, AM	29357
L-12	RF, AM	29143
L-13	Oscillator, AM	29237
L-14	1st I-F, AM	29093

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
Cartridge	GE #C-1D3SC	63037
Alt:	GE #4-GC-1D3SC	63038
Changer, record		58066A
(Garrard RC-121)		
Dial, glass		38162A
Dial, paper		65221
KNOBBS		
Treble, Bass, Loudness & Selector		52205
Tuning		52206
Magic Power-Minder		52210
Lamp, T-47		54002
Plug, spkr		66013
(used w/ shield 78026)		
Pointer		67044A
Socket, phono		79109
SPEAKERS (impedance of each: 8 ohms)		
5' PM, 900 cps resonance		83211
5' PM, 1200 cps resonance		83212
12' PM, 55 cps resonance		83808
Switch, band		86061
Switch, power-minder		86064
(Cover: 86064-1)		

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
R-114	Same as R-113	
R-115	Same as R-113	
R-116	Same as R-113	
R-117	Same as R-105	
R-118	Wirewound, 125 ohms, 10 watts	73718
R-119	Wirewound, 1000 ohms, 5 watts	73621
R-120	Wirewound, 2000 ohms, 5 watts	73631
R-121	10 ohms	73001
TRANSFORMERS		
T-101	Output	89478A
T-102	Power	89063
	Pri: 117 v	
	Sec: 5v @ 3 amp	
	700 v CT @ 225 ma	
	6.3 v @ 3 amp	
	6.3 v @ 2 1/2 amp	
ELECTRON TUBES		
V-101A	Audio amplifier	6AN8
V-101B	Inverter	6V6-GT
V-102	Output	6V6-GT
V-103	Output	6V6-GT
V-104	Output	6V6-GT
V-105	Output	6V6-GT
V-106	Rectifier	5U4-GB
MISCELLANEOUS PARTS		
CORD, AC		32011
Socket, 4-pin AC		79180
Socket, phono		79005
Socket, power		79122
Socket, speaker		79004

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
R-101	1500 ohms	73027
R-102	470,000 ohms, 20%	73157
R-103	270,000 ohms	73054
R-104	1.2 megohms	73062
R-105	680 ohms, 1 watt	73223
R-106	47 ohms	73009
R-107	47,000 ohms, 5%, 1 watt	73245-1
R-108	Same as R-107	
R-109	Same as R-107	
R-110	Same as R-103	
R-111	Same as R-103	
R-112	820 ohms, 2 watts	73424
R-113	1000 ohms	73025

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
C-101	Ceramic, 470 mmf, 20%	
C-102	Paper, .1 mfd, 400 v	23916
C-103A	Electrolytic, 40 mfd, 450 v	23126
C-103B	Electrolytic, 40 mfd, 450 v	24147
C-103C	Electrolytic, 20 mfd, 450 v	
C-104	Paper, .1 mfd, 600 v	23145
C-105	Same as C-104	
C-106	Electrolytic, 250 mfd, 25 v	24144
C-107	Ceramic, dual 10,000 mmf, AC	23982A
C-108	Electrolytic, 40 mfd, 450 v	24143
C-109	Electrolytic, 5 mfd, 25 v, non-polarized	24146

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
R-101	1500 ohms	73027
R-102	470,000 ohms, 20%	73157
R-103	270,000 ohms	73054
R-104	1.2 megohms	73062
R-105	680 ohms, 1 watt	73223
R-106	47 ohms	73009
R-107	47,000 ohms, 5%, 1 watt	73245-1
R-108	Same as R-107	
R-109	Same as R-107	
R-110	Same as R-103	
R-111	Same as R-103	
R-112	820 ohms, 2 watts	73424
R-113	1000 ohms	73025

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
C-201	Electrolytic, 40 mfd, 3 volts	24150
C-202	Ceramic, 220 mmf, 20%	23915
C-203	Ceramic, 10,000 mmf, GMV	23862
C-204	Ceramic, 1000 mmf, 10%	23983
C-205	Paper, .0068 mfd, 10%, 200 v	23176
C-206	Same as C-205	
C-207	Paper, .022 mfd, 10%, 200 v	23177
C-208	Paper, .047 mfd, 20%, 400 v	23124
C-209	Ceramic, 100 mmf, 20%	23914
C-210	Same as C-201	
C-211	Ceramic, 5000 mmf, GMV	23931
C-212	Same as C-203	
C-213	Ceramic, 680 mmf, 10%	23892
C-214	Same as C-205	
C-215	Same as C-205	
C-216	Ceramic, 2000 mmf, 20%	23839
C-217	Same as C-207	
C-218	Paper, .047 mfd, 10%, 400 v	23324
C-219	Same as C-202	
C-220A	Electrolytic, 25 mfd, 25 v	
C-220B	Electrolytic, 40 mfd, 350 v	
C-220C	Electrolytic, 40 mfd, 350 v	
C-220D	Electrolytic, 20 mfd, 350 v	
C-221	Same as C-208	
C-222	Same as C-218	
C-223	Same as C-204	
C-224	Same as C-211	
C-225	Same as C-203	
C-226	Same as C-211	
C-227	Same as C-202	
C-228	Same as C-202	
C-229	Same as C-218	
C-230	Same as C-218	
C-231	Same as C-216	
C-232	Same as C-204	
C-233	Ceramic, 20,000 mmf, 20%	23972
C-234	Electrolytic, 40 mfd, 450 v	24143
C-235	Same as C-203	
C-236	Ceramic, 1000 mmf, GMV	23860

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
X-201	Crystal diode 1N70	72040
COILS, TRANSFORMERS		
L-201	Coil, bias oscillator	29240
T-201	Transformer, power	89068
MISCELLANY		
(in addition to Miscellaneous listed under Tuner and Power Supply sec.)		
Fuse, 3 amp, 125 volt, six-bio		45043
Jack, microphone		51005
Knob, mixer and volume		52205
Lamp, neon, NE-51		54009
Lamp, neon, NE-52		54010
Microphone, w/ plug		57013
Shield, novel tube		78114
Switch, pushbutton		86307

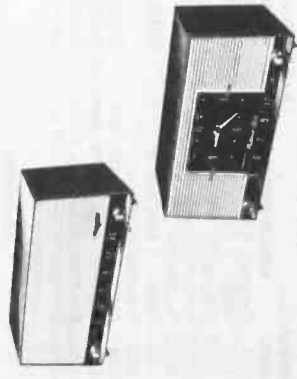
Packard Bell

ELECTRONICS

12333 W. Olympic Blvd.
Los Angeles 64

SERVICE MANUAL

TABLE MODEL RADIO 6R1 CLOCK RADIO MODEL 6RC1



SPECIFICATIONS: (both models unless noted)
CABINET DIMENSIONS (to nearest 1/4 in.):
6 in. h by 12 1/2 in. w by 6 in. d

SHIPPING WEIGHT:
Radio 6R1: 8 lb.
Clock radio 6RC1: 8 lb

ELECTRICAL RATINGS:
Line voltage 110-120 volts AC or DC (must be 60 cycle AC for clock radio)
Power consumption, 30 watts for radio, 32 watts for clock radio.

TUNING FREQUENCY RANGE:
540 to 1620 kc.

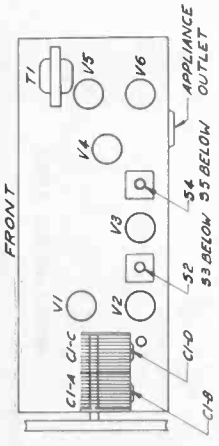
POWER OUTPUT, MAXIMUM:
1.9 watts

SPEAKER DATA:
See parts table, also general description above.

SPECIAL SERVICING INFORMATION:
OSCILLATOR GRID VOLTAGES, Pin 1, V-2:
(Measured using a VTVM with input impedance of more than 10 megohms. Line voltage 117 volts AC.)
1500 kc -5.5 volts DC (rms)
1000 kc -5.5 volts
750 kc -5.0 volts
540 kc -4.8 volts

ALIGNMENT PROCEDURE:

The alignment of the set is accomplished by following the steps in the chart below. Connect output meter to speaker voice coil. Use isolation transformer between radio and power line to reduce shock hazard. Each adjustment should be made using a minimum input signal. Connect test oscillator through a .01 mfd capacitor to the point indicated below. Ground lead of oscillator is connected to B minus bus.



Adjustments

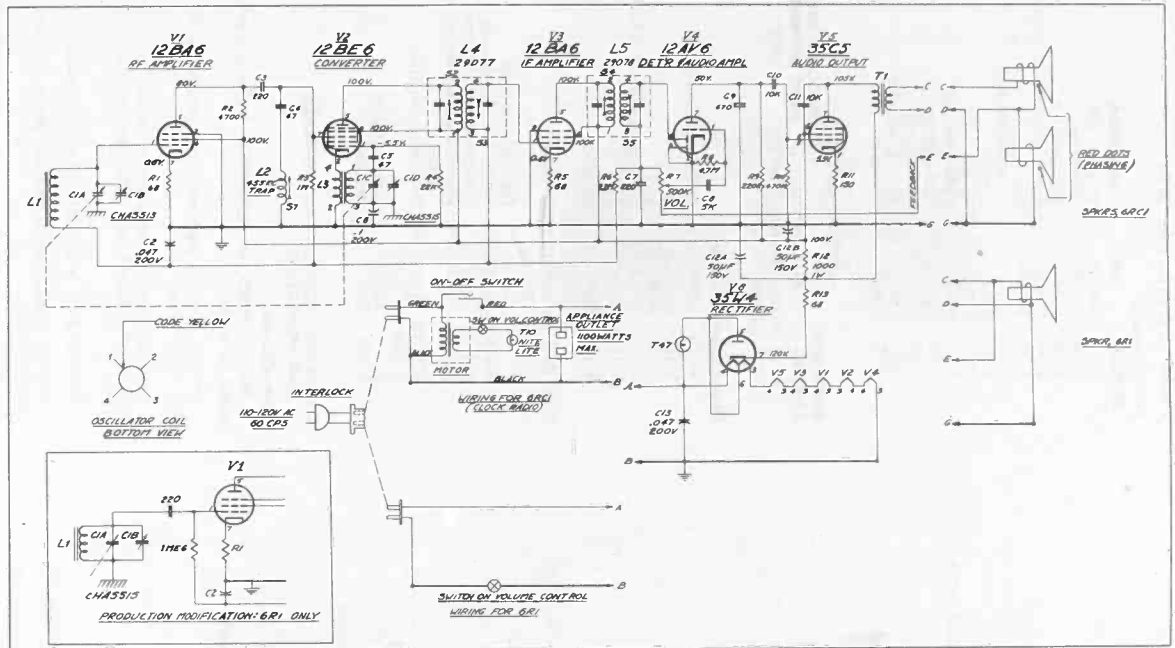
- STEP FOR**
1. Radio only
 2. Radio with shut-off
 3. Automatic turn-on
 4. Automatic buzzer with shut-off and turn-on
 5. Automatic turn-on
- To service tubes, remove two hex head screws at rear of cabinet, and slide entire chassis and front panel out of cabinet.

Step	Connect Test Oscillator to	Test Oscillator Frequency	Radio Dial Setting	Adjust
1.	Pin 1, V-1 (12BA6)	455 kc	540 kc	S-1 for minimum
2.	ditto	ditto	ditto	S-2, S-3, S-4, & S-5 for MAXIMUM
3.	ditto	1620 kc	Tune to	C1-D for MAXIMUM
4.	Loose-couple to antenna	1500 kc	1620 kc oscillator	C1-B for MAXIMUM

REPLACEABLE PARTS

MODELS 6R1 & 6RC1
Parts are common to both models unless noted.

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER	REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
R-1	68 ohms, 10%	73011	L-4	1st I-F	29077
R-2	4700 ohms, 10%	73033	L-5	2nd I-F	29078
R-3	1 megohm, 20%	73161	T-1	Transformer, output 2500 to 3.2 ohms	89417A
R-4	22,000 ohms, 10%	73041		SPEAKERS	
R-5	Same as R-1		Model	Oval, 6 x 4 in., one used	83122
R-6	2.2 megohms, 20%	73165	6R1	Impedance 3.2 ohms	83120
R-7	Control, volume, 500,000 ohms w/switch.	25047	6RC1	Three in. dia, two used	
	(Switch is ON-OFF on 6R1 and Nite-Lite on 6RC1)			Impedance of ea., 3.2 ohms	
R-8	4.7 megohms, 20%	73169		KNOBBS	
R-9	220,000 ohms, 20%	73153	Both models	Tuning & Volume	52227A
R-10	470,000 ohms, 20%	73157	6RC1 only	Timer knob (two used)	52226B
R-11	150 ohms, 10%	73015		MISCELLANY	
R-12	1000 ohms, 20%, 1 watt	73325	Cabinet Cord, AC power		21142D
R-13	Same as R-1		6R1 (# 18 AWG)		32029A
			6RC1 (# 16 AWG)		32028A
C-1 (A, B, C, D)	Variable, two gang & trimmers	23550A	Dial		38161A
C-2	Paper, molded case, .047 mfd, 200 volts	23705	Escutcheon, front		41140C
C-3	Ceramic, 220 mmf, 20%	23915	6R1		41124D
C-4	Ceramic, 47 mmf, 20%	23912	Light, "Nite-Lite", T-43		54002
C-5	Same as C-4		(On 6RC1 only)		54007
C-6	Paper, molded case, .1 mfd, 220 volts	23707	Timer (clock)		58064A
C-7	Same as C-3		(On 6RC1 only)		66047
C-8	Ceramic, 5000 mmf, GMV	23931	Plug, AC interlock		67045A
C-9	Ceramic, 470 mmf, 20%	23916	Pointer		69003C
C-10	Ceramic, 10,000 mmf, GMV	23939	Pulley		79096
C-11	Same as C-10		Socket, AC appliance (On 6RC1 only)		
C-12 (A & B)	Dual 50 mfd/150 volts	24073B		ELECTRON TUBES	
C-13	Same as C-2		V-1	R-F Amplifier	12BA6
			V-2	Converter	12BE6
			V-3	I-F Amplifier	12BA6
			V-4	Detector and Audio Amplifier	12AV6
L-1	Loop, ferrite	29358	V-5	Audio output	35C5
L-2	Trap, 455 kc	29088	V-6	Rectifier	35W4
L-3	Oscillator coil	29229B			



Note production modification at lower left on 6R1 only.

Schematic, 6R1 & 6RC1. Note differences in speaker section and AC power input section in the two circuits.

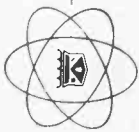
DC RESISTANCE MEASUREMENTS:

1st I-F Coil (29077):
 Primary, 12 ohms
 Secondary, 13 ohms

2nd I-F Coil (29078)
 Primary, 13 ohms
 Secondary, 13 ohms

Oscillator Coil (29229B)
 Primary, 1 ohm
 Secondary, 5.5 ohms

Loop antenna:
 Resistance, 0.3 ohms



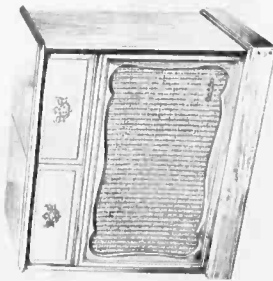
Packard Bell ELECTRONICS

SERVICE MANUAL

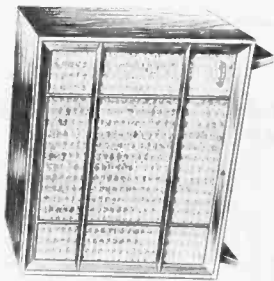
MODEL 16RP1 COMBINATION PHONO-RADIO MODEL 21RP1 COMBINATION PHONO-RADIO-TAPE RECORDER

12333 West Olympic Blvd.
Los Angeles 64, Calif.

MANUAL BC-46
MARCH 1, 1958



Colonial Finish (Mahogany Similar)



Walnut or Oak Finish

GENERAL DESCRIPTION:

Model 16RP1 is a high-fidelity combination phono-graph and radio (AM and FM) containing a total of sixteen electron tubes, including rectifier. Separate treble and bass controls are provided, and the ON-OFF switch is the push-pull type, operated by the treble control knob. The selector switch has six positions, two for AM and FM radio, three for record re-production (AES, LP, and 78), and one for tape playback from an external tape recorder.

The record changer is automatic, four speed, with a spindle provided for 45 rpm records. Antennas for both AM and FM are built-in the set, but in fringe areas, a separate antenna may be needed for FM reception.

A special feature is the "Magic Power Minder" switch which may be set to turn off power after last record is completed.

Provision is made for connecting additional speakers if desired. Connections for four, eight, or sixteen ohms impedance are available.

Model 16RP1 is divided into two chassis: the tuner chassis and the power supply chassis. The former contains the AM and FM circuitry, plus two stages of audio to the output receptacle. The power supply chassis, besides furnishing power to the system, contains the push-pull parallel output stages.

Model 21RP1 consists of the two chassis comprising the 16RP1 plus a tape recorder and associated amplifier on a third chassis, the tape deck. This has five additional tubes, making the total twenty-one.

A block diagram illustrates the functions of the component circuits for both the 16RP1 and 21RP1.

TUBE COMPLEMENT:

Tuner chassis:	TUBE SYMBOL	TUBE	FUNCTION
	V-1	6BQ7A	RF ampli, FM
	V-2A	1/2 12AT7	FM mixer
	V-2B	1/2 12AT7	FM oscillator
	V-3A	1/2 6U8	1st I-F amplifier
	V-3B	1/2 6U8	AFC
	V-4	6AU6	I-F ampli; AM det'r
	V-5	6AU6	Limiter
	V-6	6BA6	RF ampli, AM
	V-7	6BE6	Converter, AM
	V-8A	1/2 12AT7	Audio ampli
	V-8B	1/2 12AT7	Audio ampli
	V-9	6ES	Tuning indicator
	V-10	12AX7	Phono pre-amp

REFERENCE SYMBOL	DESCRIPTION	PACKARD-BELL PART NUMBER
X-1	Crystal, Amperex 1N542 (matched pair)	72027
X-2		

Power supply chassis:

V-101	6AN8	Audio ampli & inverter
V-102	6V6-GT	Parallel push-pull output
V-103	6V6-GT	
V-104	6V6-GT	
V-105	6V6-GT	Rectifier
V-106	5U4-GB	

Tape deck (in model 21RP1 only):

V-201	(A & B) ECC83	Playback pre-amp
V-202A	1/2 ECC83	Stereo OR mic pre-amp
V-202B	1/2 ECC83	Stereo pre-amp OR mixer
V-203A	1/2 12BH7A	Stereo output OR recording ampli
V-203B	1/2 12BH7A	Recording amplifier
V-204	(A & B) 12AU7	Bias oscillator
V-205	6X4	Rectifier

CONTROLS, CONNECTORS, SWITCHES, AND INDICATORS:

Tuner Chassis
TREBLE, BASS, and LOUDNESS knobs are indicated by markings.
ON-OFF switch is push-pull type operated by TREBLE control knob.
SELECTOR switch has positions for FM radio, AM radio, Tape playback, and three positions for phono-graph.
TUNING knob is for both AM and FM radio.
POWER CABLE plugs into receptacle on power supply chassis.
PHONO receptacle receives pin-plug from record player cartridge.
OUTPUT receptacle feeds output of audio ampli-

fier in tuner through cable to dual push-pull power amplifier and speakers.

TAPE REC'D receptacle feeds output of radio or phono to MIXER in tape deck in Model 21RP1, or to any external tape recorder used with model 16RP1.

TAPE PLAY receptacle receives input from tape playback pre-amplifier in tape deck (Model 21RP1) or other tape output (Model 16RP1).

TUNING INDICATOR tube allows visual control for accurate frequency adjustment.

Power Supply Chassis
INPUT receptacle receives audio signal from tuner chassis for final amplification and output.

EXTERNAL SPEAKER connections are provided for attaching an additional speaker (S) if desired. Binding posts are marked for speaker impedances of 4, 8, or 16 ohms.

SPEAKER socket and SPEAKER plug are both on this chassis, as are the PHONO AC plug and socket.

TAPE RECORDER AC socket is used with tape deck or other tape recorder.

POWER RECEPTACLE feeds power thru cable attached to tuner.

RECORD CHANGER

The operation of the record changer is covered by the booklet furnished with the set and printed by the manufacturer (Garrard) of the changer. An important adjunct to the changer is the Magic Power-Minder switch described immediately below.

MAGIC POWER-MINDER

A special feature of your instrument is the Magic Power-Minder switch. This is controlled by the knob near the left rear corner of the record changer. There are two positions of this knob: MAN'L and AUTO.

(Be sure to distinguish between this switch and the AUTO-MANUAL switch on the changer plate.)

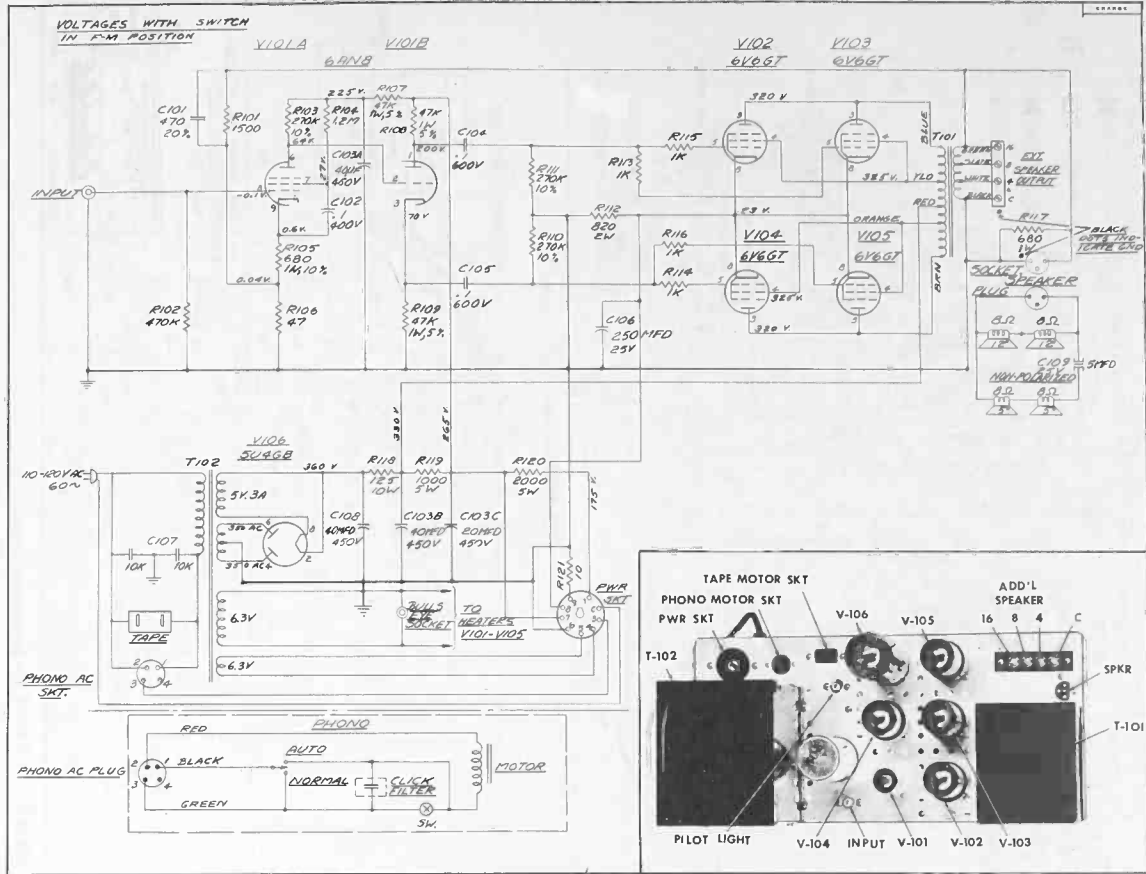
When the Magic Power-Minder is in MAN'L position, changer will turn off after last record but set will remain on.

When the Magic Power-Minder is in AUTO position, entire set will turn off after last record.

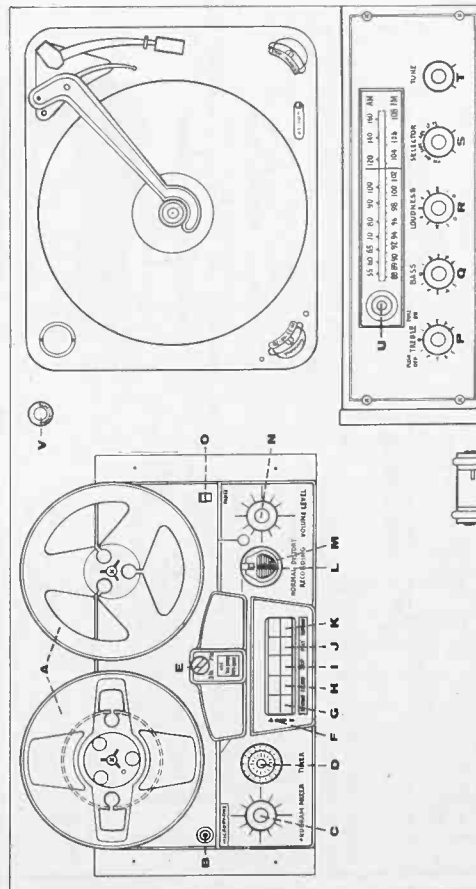
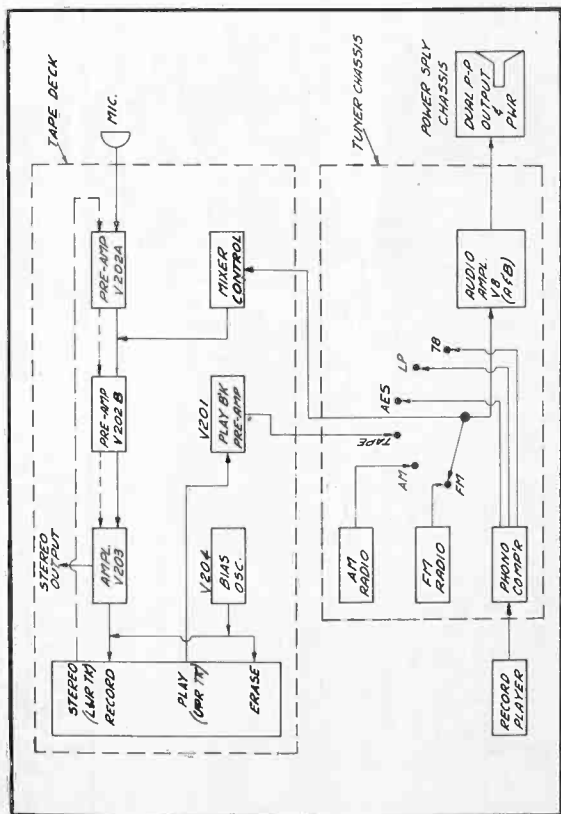
Leave the Magic Power-Minder knob in MAN'L position unless it is desired to turn off entire set after last record.

To use this automatic power-off feature, the record player must be in operation automatically (records stacked, switch ON CHANGER set to AUTO, and control knob set to START). Then the Magic Power-Minder knob is turned to AUTO and the set left to turn itself off.

SWITCHING TO "AUTO" WHILE CHANGER IS NOT OPERATING WILL TURN OFF THE SET.



Power Supply, Schematic and Top View

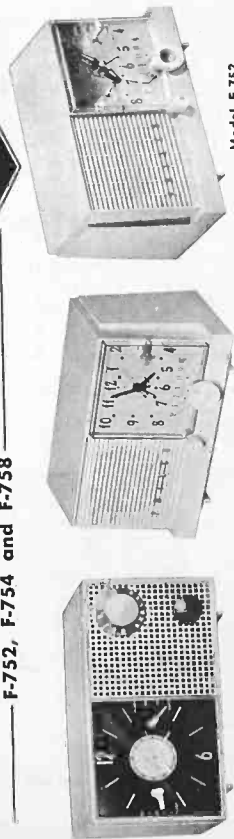


- TAPE RECORDER DECK**
- A Tape Reels
 - B Microphone Input
 - C Receptacle
 - D Program Mixer
 - E Stop Button
 - F Play Button
 - G Forward Button
 - H Record Level Indicators (Normal and Distort)
 - I Safety Lever
 - J Rewind Button
 - K Record Button
 - L
 - M
 - N
 - O
 - P
 - Q
 - R
 - S
- TUNER**
- U On-Off and Treble
 - V Bass
 - W Loudness
 - X
 - Y
 - Z
- V MAGIC POWER MINDER**
(Turn to MAN'L before turning set on)
- PHONOGRAPH**
(See separate envelope marked "Garraid Record Changer.")

Controls, 16RP1 and 21RP1

PHILCO HOME RADIO SERVICE MANUAL

MODELS F-743, F-750, F-752, F-754 and F-758



Model F-743

Model F-750

Model F-752

Model F-754

Model F-758

SPECIFICATIONS

- Cabinet**—Plastic, table models.
- Circuit**—5 tube superheterodyne (including rectifier).
- Frequency Range**—540 KC to 1620 KC.
- Intermediate Frequency**—455 KC.
- Audio Output**—9 watt.
- Power Consumption**—30 watts.
- Operating Voltage**—105 to 120 volts, 60 cycles.
- Aerial**—High impedance loop mounted on inside of cabinet back.
- Philco Tubes**—12BE6, oscillator converter; 12BA6, I-F amplifier; 12AV6, 2nd detector; AVC, 1st audio; 50C5, audio output and 35W4, rectifier.
- Dial Lighting**—Models F-754 and F-758 have illuminated dials.
- Timer**—Model F-743 uses a Teletron C103
- F-750, code 124, uses a Teletron "J"
- F-750, code 126, uses a Westclox TS4
- F-752 uses a Teletron C103
- F-754 uses a Teletron C103
- F-758 uses a Teletron C103

Speakers—All models except F-758 employ one 4-in. pm speaker; Model F-758 uses a 2-in. x 10-in. speaker.

Slow-off—All models except F-750 have the on-off switch in the filament return line. When the switch is opened, the set fades out rather than cuts off. Model F-750 has a conventional switching arrangement located in the B—line.

ALIGNMENT PROCEDURE
Radio Controls—Set volume control to maximum. Set tuning control as indicated in chart.
Output Meter—Connect across voice coil terminals.
Signal Generator—Connect generator and set frequency as indicated in chart. Use modulated output, 30%.
Output Level—During alignment, adjust signal-generator output to hold output-meter reading below .5 volts.

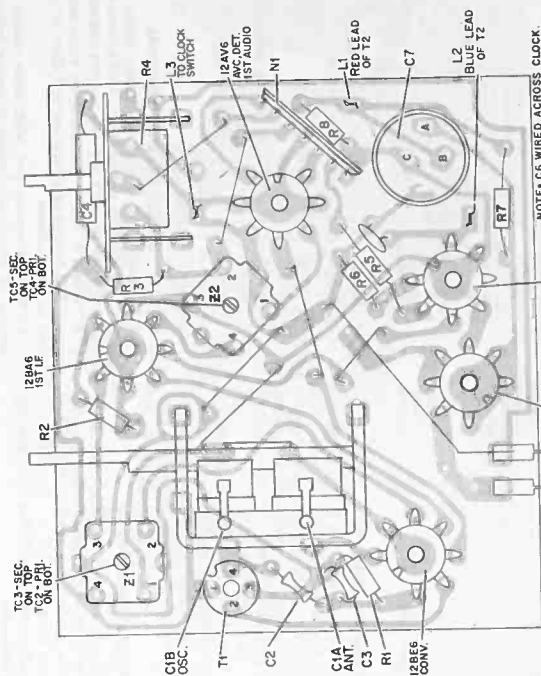
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to B—; output lead through .001 mfd condenser to grid (pin 7) of 12BE6 or top of t-f tuning condenser.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. TC3, TCS, TC2—1st i-f pri. TC2—1st i-f pri.	TC3—2nd i-f sec. TC4—2nd i-f pri. TCS TC3 TC2—1st i-f pri.
2.	Radiating loop [See Note below].	1620 kc.	1620 kc.	Adapt for maximum output.	C1-B—osc.
3.	Same as step 2.	1500 kc.	1500 kc.	Adapt for maximum output.	C1-A—aerial

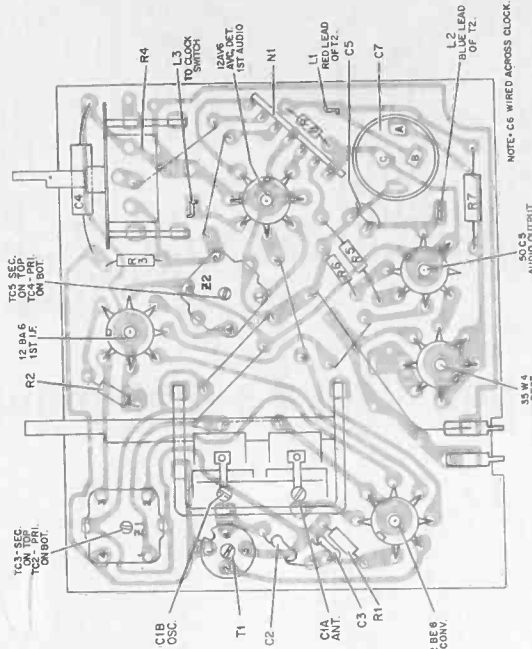
NOTE: Make up a 6-8 turn, 6 inch diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006 inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

HOME RADIO MODELS F-743, F-750, F-752, F-754 and F-758

PR-3175



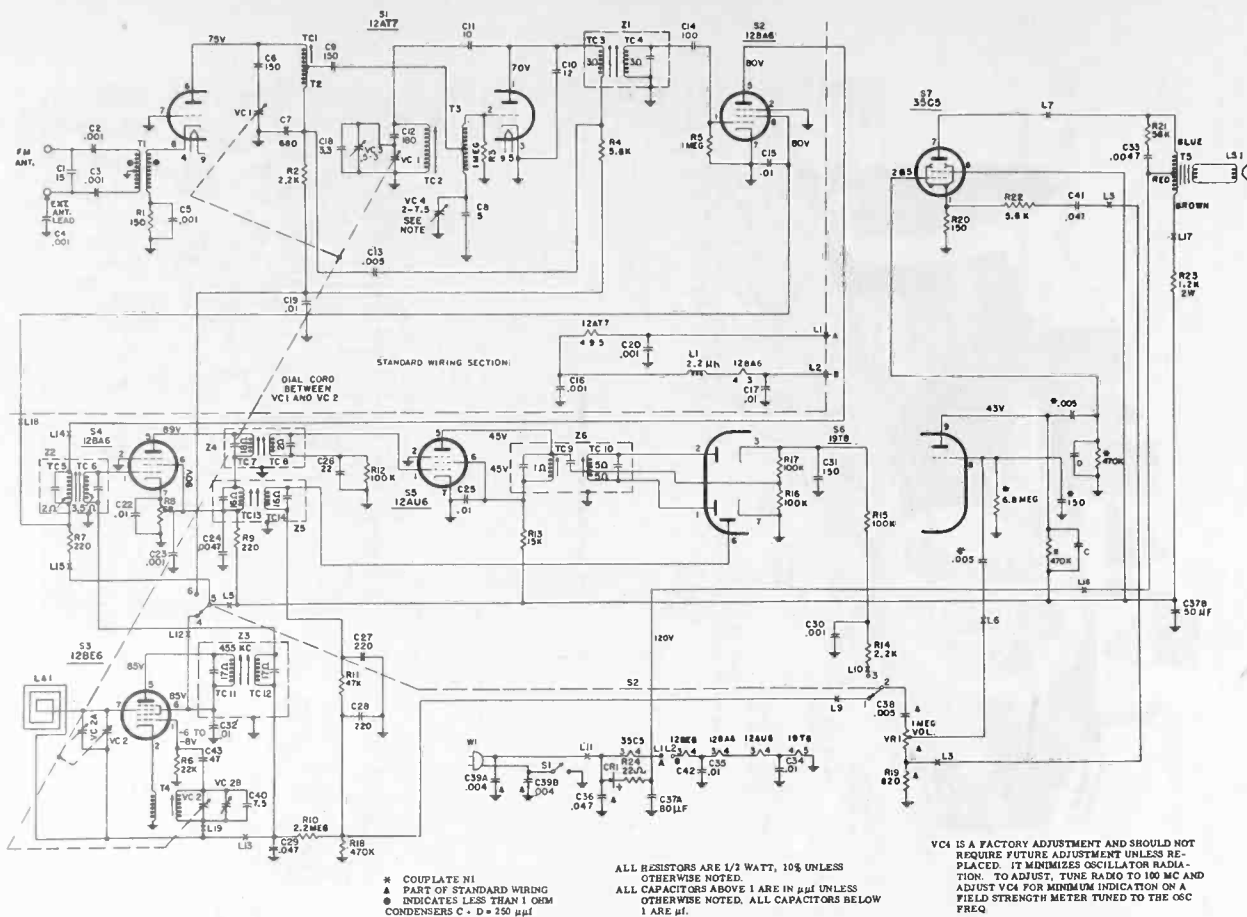
Printed Panel Component Layout — Model F-750



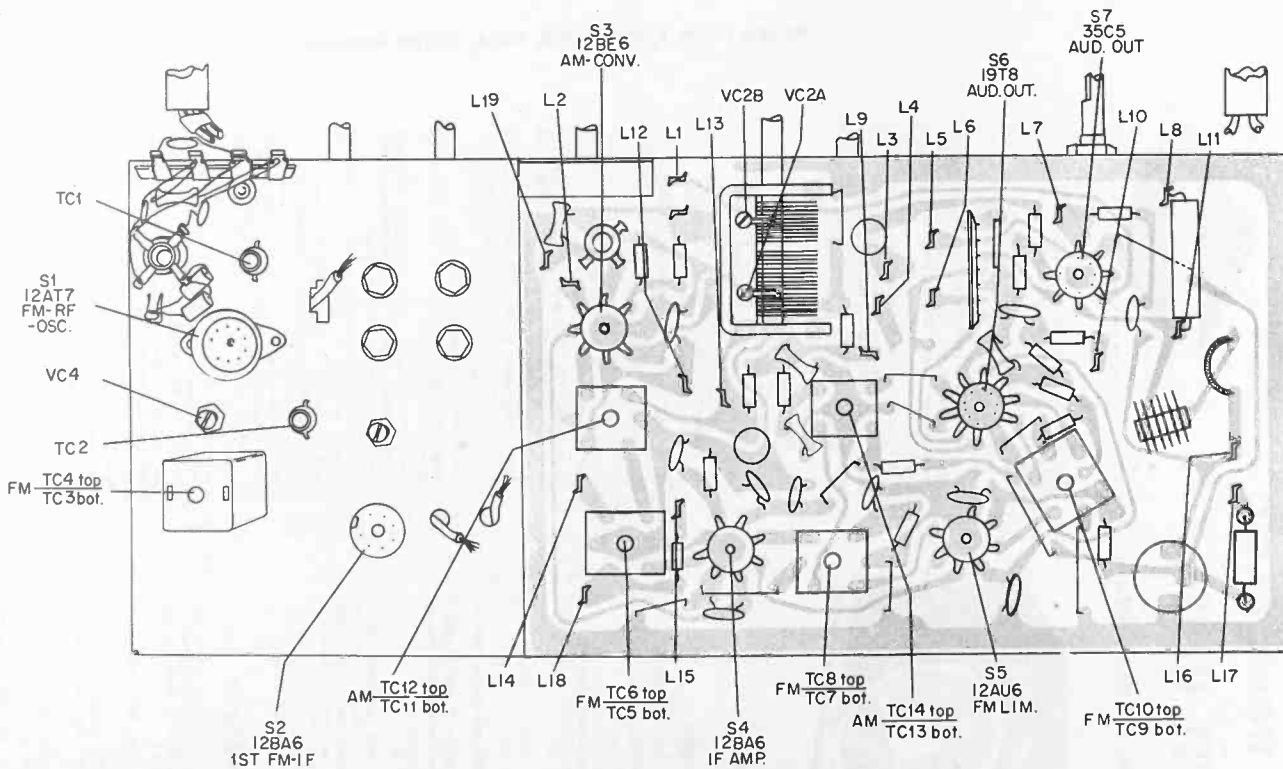
Printed Panel Component Layout — Models F-754 and F-758

NOTE

Printed panel component layout for Models F-743 and F-752 is similar to that of Models F-754 and F-758 except for the foil arrangement at pins 4, 5 and 6 of the 35W4. The foil arrangement of the 35W4 in Models F-743 and F-752 is similar to that of the Model F-750. This change is to accommodate the pilot light. (See schematic diagram.)



Schematic Diagram Model F-974



Top View - Showing Alignment Points, Tube Locations and Tie Lugs

IDENTIFICATION OF PRINTED PANEL TIE LUGS

- | | | | | | |
|----|--|-----|---|-----|--|
| L1 | Filament lead from pin 4 of S-7 (35C5) to pin 5 of S-1 (12AT7) | L7 | Blue lead from audio output, T-5, to plate, pin 7 of S-7 | L13 | Loop antenna return to A.V.C. |
| L2 | Filament lead from pin 3 of S-2 (12BA6) to pin 3 of S-3 (12BE6) | L8 | Bare wire from panel ground to chassis ground | L14 | Blue lead from plate, pin 5 of S2, to 2nd FM I-F transformer, Z2 |
| L3 | Green lead to bottom of VR1 from C41 | L9 | Yellow lead, AM audio to lug 1 of S2 from junction of R11, C28, R10 and R18 | L15 | Red lead (+) from lug 5 of S2 to R7 |
| L5 | Red lead (+) from lug 5 of S-2 to screen of S-7 and terminal 6 of N1 | L10 | Orange lead, FM audio to lug 3 of S2 | L16 | Red lead from junction of R24 and C37A to audio output, T5 |
| L6 | Yellow lead from arm of VR1 to terminal 2 of N1 | L11 | Brown lead from AC Interlock to C36 | L17 | Brown lead from audio output, T5, to R23 |
| | | L12 | Red lead (+) from lug 4 of S2 to AM converter screen, pin 6, and Z3 | L18 | Orange lead (+) to pin 6 of S2 |
| | | | | L19 | Blue lead to L13 |

REPLACEMENT PARTS LIST

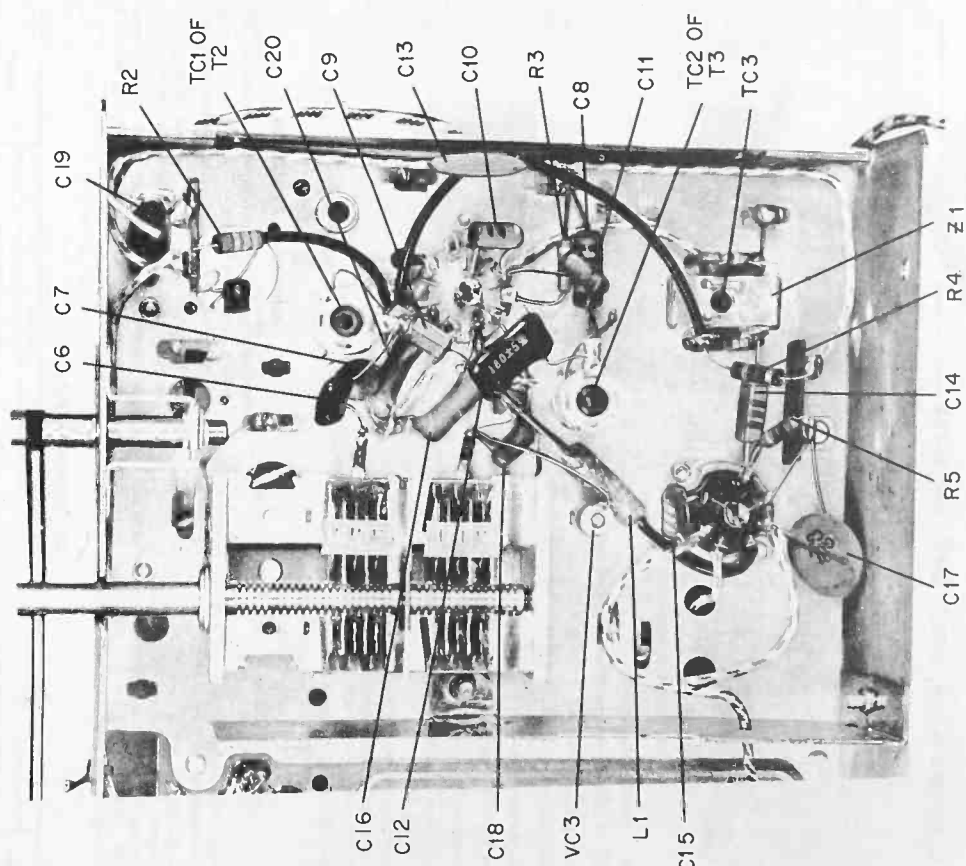
Reference Symbol	Description	Service Part No.	Part No.	Description	Service Part No.
C1	Condenser, FM antenna, 15 mmf, ceramic	62-01540901	34-8040-4	Selenium rectifier, 100 ma	34-8040-4
C2	Condenser, FM antenna coupling, .001 mid, ceramic	30-1287-4	32-4422-8	Choke, filament de-coupling, 2.2 mh	32-4422-8
C3	Condenser, FM antenna coupling, .001 mid, ceramic	30-1287-4	76-11304	Loop antenna, Am	76-11304
C4	Condenser, antenna lead, .001 mid, ceramic	30-1287-4	45-9733	Interlock connector, AC	45-9733
C5	Condenser, input cathode by-pass, .001 mid, ceramic	62-210001011	66-113340	Resistor-condenser network, audio stage	66-113340
C6	Condenser, gang DC isolation, 150 mmf, mica	30-1257-13	66-113340	Resistor, FM B+ de-coupling, 220 ohms	66-113340
C7	Condenser, r-f coil signal return, 680 mmf, mica	60-0885411	66-113340	Resistor, FM B+ de-coupling, 220 ohms	66-113340
C8	Condenser, mixer coil signal return, 5 mmf, ceramic	30-1257-14	66-113340	Resistor, mixer B+ de-coupling, 5600 ohms	66-113340
C9	Condenser, interstage coupling, 150 mmf, mica	62-013300013	66-113340	Resistor, FM IF grid return, 1 megohm	66-113340
C10	Condenser, mixer plate by-pass, 12 mmf, ceramic	62-010409001	66-113340	Resistor, AM Osc. grid return, 22,000 ohms	66-113340
C11	Condenser, osc. coupling, 10 mmf, ceramic	30-1257-9	66-113340	Resistor, FM IF B+ de-coupling, 220 ohms	66-113340
C12	Condenser, special mica	30-1286-1	66-113340	Resistor, 1F cathode bias, 68 ohms	66-113340
C13	Condenser, grid coupling, 160 mmf, ceramic	62-010090001	66-113340	Resistor, AVC filter, 2.2 megohms	66-113340
C14	Condenser, 1F screen by-pass, .001 mid, ceramic	30-1286-2	66-113340	Resistor, 3rd FM IF grid return, 100,000 ohms	66-113340
C15	Condenser, filament by-pass, .001 mid, ceramic	62-210001011	66-113340	Resistor, 3rd FM IF B+ de-coupling, 15,000 ohms	66-113340
C16	Condenser, filament by-pass, .01 mid, disk	30-1238-2	66-113340	Resistor, de-emphasis, 2200 ohms	66-113340
C17	Condenser, FM temperature compensating, 3.3 mid, ceramic	30-1264-114	66-113340	Resistor, discriminator, 100,000 ohms	66-113340
C18	Condenser, B+ by-pass, .01 mid, disk	30-1231-2	66-113340	Resistor, discriminator, 100,000 ohms	66-113340
C19	Condenser, filament by-pass, .001 mid, disk	30-1257-4	66-113340	Resistor, AM audio feedback, 470,000 ohms	66-113340
C20	Condenser, 2nd IF cathode by-pass, .01 mid, disk	30-1282-2	66-113340	Resistor, audio feedback, 820 ohms	66-113340
C21	Condenser, 2nd IF screen de-coupling, .001 mid, disk	30-1282-2	66-113340	Resistor, output cathode bias, 150 ohms	66-113340
C22	Condenser, 2nd IF screen de-coupling, .001 mid, disk	30-1282-2	66-113340	Resistor, tone compensation, 56,000 ohms	66-113340
C23	Condenser, 2nd IF screen de-coupling, .001 mid, disk	30-1282-2	66-113340	Resistor, feed-back, lone circuit 5500 ohms	66-113340
C24	Condenser, 3rd IF B+ de-coupling, .0047 mid, disk	30-1262-9	66-113340	Resistor, B+ filter, 1200 ohms, 2 watts	66-113340
C25	Condenser, 3rd IF screen de-coupling, .01 mid, disk	30-1262-9	66-113340	Resistor, rectifier current limiting, 22 ohms	66-113340
C26	Condenser, 3rd IF grid by-pass, 22 mmf, disk	30-1262-9	66-113340	Switch, on/off	Part of VRI
C27	Condenser, AM IF filter, 220 mmf, disk	30-1262-23	66-113340	Switch, AM/FM	Part of VRI
C28	Condenser, AM IF filter, 220 mmf, disk	30-1262-23	66-113340	Transformer, FM antenna	32-4716-1
C29	Condenser, A.V.C. by-pass, .047 mid, moulded	30-4685-28	66-113340	Transformer, FM IF	32-4716-1
C30	Condenser, de-emphasis, 150 mmf, disk	30-1262-24	66-113340	Transformer, FM osc.	32-4716-1
C31	Condenser, de-emphasis, 150 mmf, disk	30-1262-24	66-113340	Transformer, AM osc.	32-4716-1
C32	Condenser, AM mixer screen de-coupling, .01 mid, disk	30-1262-24	66-113340	Transformer, audio output	32-4716-1
C33	Condenser, tone compensation, .0047 mid, disk	30-1262-3	66-113340	Tuning gang, 2 section, FM	37-2782-7
C34	Condenser, filament by-pass, .01 mid, disk	30-1262-3	66-113340	Variable condenser, FM osc., 5-1.0 mmf	31-6202-18
C35	Condenser, filament by-pass, .01 mid, disk	30-1262-3	66-113340	Variable condenser, osc. bridge capacitor, 2.75	31-6202-18
C36	Condenser, AC by-pass, .047 mid, tubular	30-4630-45	66-113340	Volume control, 1 meg	33-5483-9
C37	Condenser, 150 WVDC electrolytic, 2 section filter, 80/50, disk	30-2385-9	66-113340	Line cord	41-4230
C38	Condenser, audio coupling, .005 mid, disk	30-1238-1	66-113340	Transformer, 1st FM	32-4712-1
C39	Condenser, line by-pass, .004, .004 mid, dual disk	30-1266-1	66-113340	Transformer, 2nd FM	32-4712-1
C40	Condenser, Osc. temp. compensating, 7.5 mmf, ceramic	30-1224-43	66-113340	Transformer, 3rd FM	32-4712-1
C41	Condenser, tone control, .047 mid, moulded	30-4685-45	66-113340	Transformer, 4th FM	32-4712-1
C42	Condenser, AM osc. coupling, 47 mmf, ceramic	30-1330-4	66-113340	Printed Panel	54-9861-3
C43	Condenser, AM osc. coupling, 47 mmf, ceramic	30-1330-4	66-113340		

CABINET MISCELLANEOUS PARTS

Description	Service Part No.
Cabinet, Maroon	11294
Knobs, 2 used, volume and tuning, ebony	54-8093-21
Knobs, 2 used, volume and tuning, maroon	54-8093-21
Knob, AM-FM switch, maroon	54-8458-1
Pointer	54-8458-2
Cabinet back and loop Assy.	76-10853-1
Scale	54-8455-1
FM antenna Assy.	41-3791-4
Shield tube 12AT7	56-5628-5
Shield tube 12BD6	56-5628-12
Socket, 9 pin min. 12BA6, chassis mfg.	27-8203-19
7 pin min. 12AT7, chassis mfg.	27-8203
9 pin min. panel mfg., 4 used	27-8205-1
9 pin min. panel mfg., 1978	27-8205-2
Spring, drive cord tension, 2 used	28-9490
Spring, drive cord tension, 1 used	36-2417
Shaft, tuning	38-1131
Ruby, retaining	1W603707A3

PRODUCTION CHANGES

- C8 was changed from 10 µf to 5 µf and VC4 was added.
- C1 was moved from the coil side to the antenna side of C2 and C3.
- A .001 condenser, C5, from the antenna lead to ground was removed in later production and the antenna transformer (T1) was wired
- with an unbalanced input instead of a balanced input. (ground connection changed from cathode to lower end of primary)
- C15 was changed from a 680 µf condenser to a .01 mid condenser.

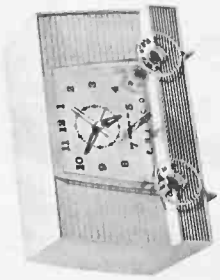


Bottom View — Model F-974, FM Chassis Components

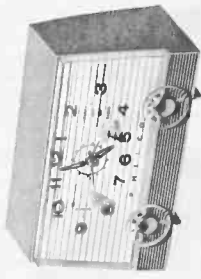


-PHILCO HOME RADIO SERVICE MANUAL-

—MODELS G-749, G-751, G-753 and G-755



Model G-749



Model G-751



Model G-753



Model G-755

SPECIFICATIONS

- Cabinet**—Plastic, table models.
- Circuit**—5 tube superheterodyne (including rectifier).
- Frequency Range**—540 KC to 1620 KC.
- Intermediate Frequency**—455 KC.
- Audio Output**—9 watt.
- Power Consumption**—30 watts.
- Operating Voltage**—105 to 120 volts, 60 cycles.
- Aerial**—High impedance loop mounted on inside of cabinet back.

- Philco Tubes**—12BE6, oscillator converter; 12BA6, I-F amplifier; 12AV6, 2nd detector; AVC, 1st audio; 50C5, audio output and 35W4, rectifier.
- Timer**—Model G-749 uses a Telechron J2
- G-751 uses a Telechron J3
- G-753 uses a Telechron J3
- G-755 uses a Westclox fully automatic push button timer.

- Speakers**—All models employ one 4-in., 3.2 ohm V.C., pm speaker.
- Slow-off**—All models except G-749 have the on-off switch in the filament return line. When the switch is opened, the set fades out rather than cuts off. Model G-749 has a conventional switching arrangement located in the B— line.

ALIGNMENT PROCEDURE

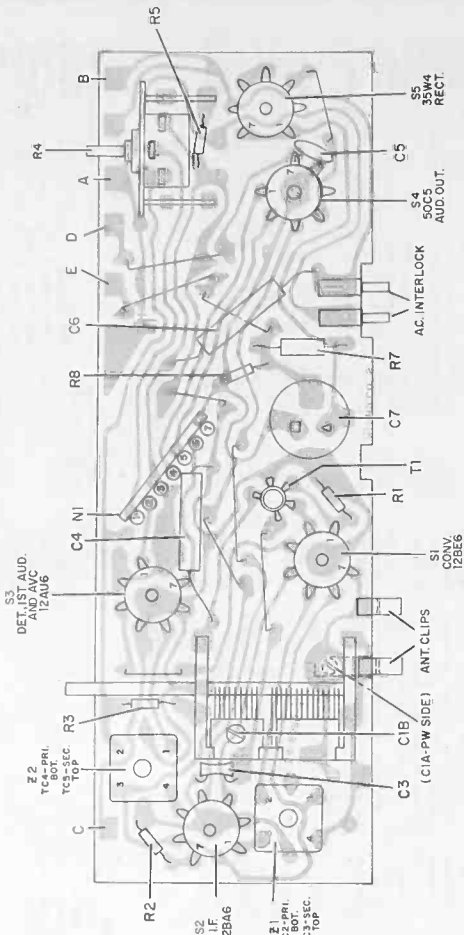
- Radio Controls**—Set volume control to maximum. Set tuning control as indicated in chart.
- Output Meter**—Connect across voice coil terminals.
- Signal Generator**—Connect generator and set frequency as indicated in chart. Use modulated output, 30%.
- Output Level**—During alignment, adjust signal-generator output to hold output-meter reading below .5 volts.

ALIGNMENT CHART

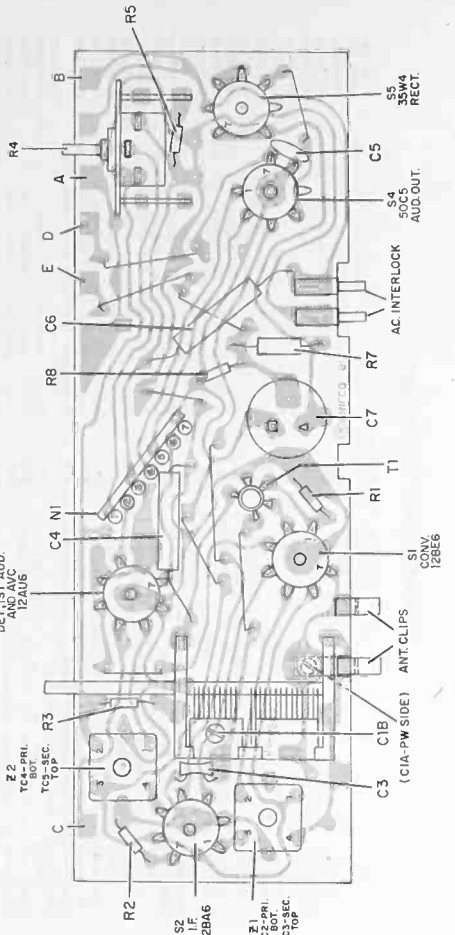
STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to B—; output lead through a .1 mf condenser to grid (pin 7) of 12BE6 or top or r-f tuning condenser.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. TC3 and TC5 are located on top of transformers.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.
2.	Radiating loop [See Note below].	1620 kc.	1620 kc.	Adjust for maximum output.	C1-B—osc.
3.	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1-A—aerial

NOTE: Make up a 68 turn, 6 inch diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. For proper adjustment of the oscillator-trimmer, fully open the tuning gang and insert a .006 inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

©John F. Rider



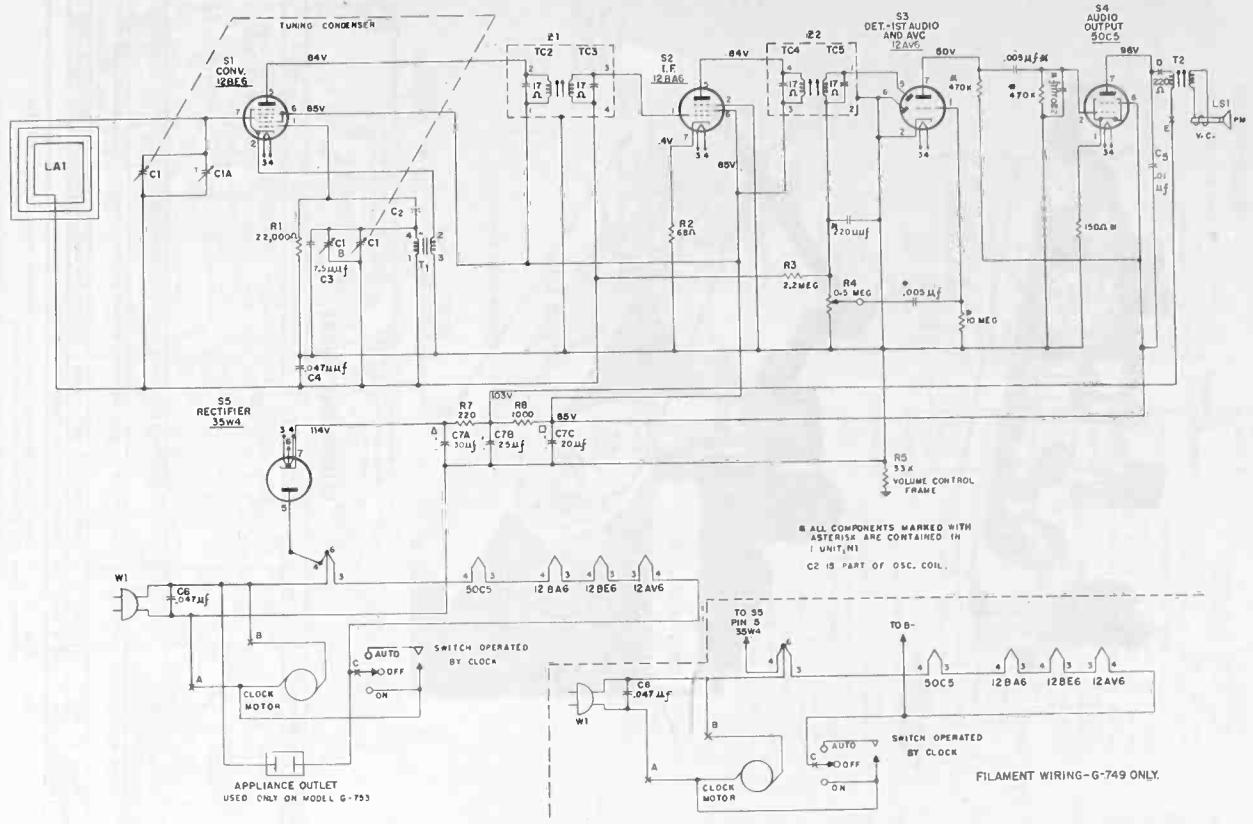
Printed Panel Component Layout — Model G-749



Printed Panel Component Layout — Models G-751, G-753 and G-755

HOME RADIO MODELS G-749, G-751, G-753 and G-755

PR-3252



Schematic Diagram — Models G-749, G-751, G-753 and G-755

REPLACEMENT PARTS LIST

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning	31-2793-15
C2	Condenser, oscillator grid	30-5575-5
C3	Condenser, osc. temp. compensating	86-3398340
C4	Condenser, AVC by-pass, 0.01 mf.	66-1224490
C5	Condenser, output plate, 0.01 mf.	66-2108340
C6	Condenser, line by-pass, 0.07 mf.	32-4556-1
C7	Condenser, electrolytic filter, 3 section	32-8984-2
LA1	Antenna	41-4270-4
LS1	Speaker and transformer, Model G-749 and G-751	32-4583-20
	Speaker and transformer, Model G-753 and G-755	54-6585-3
N1	RC Network, audio circuit	36-1675-2
R1	Resistor, oscillator grid, 22,000 ohms	30-6500-1
R2	Resistor, I.F. cathode bias, 68 ohms	66-3229340
R3	Resistor, AVC, 2.2 megohms	66-0689340
		66-5229340
S1	Tuning condenser	86-1675-9
S2	12BE6	32-4583-21
S3	12BE6	54-6585-1
S4	12AV6	27-6509-1
S5	35W4	13520FE18
T1	Transformer, audio output	76-3931
T2	Transformer, 1st I.F.	56-5529-12
T3	Transformer, 2nd I.F.	
W1	Line Cord (G-749 and G-751)	
	Line Cord (G-753 and G-755)	
Z1	Printed Panel, model G-749	
Z2	Printed Panel, models G-751, G-753, and G-755	
	Socket, tube, 5 used	
	Contact, made, 2 used	
	Appliance outlet, model G-753	
	Tube shield	

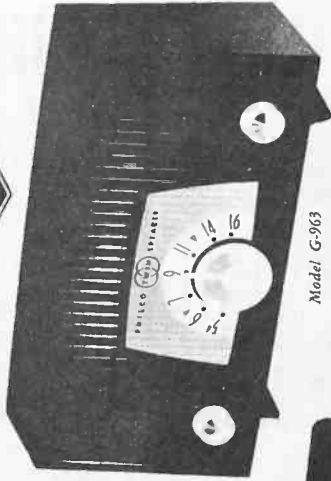
CABINET PARTS

Description	Service Part No.
Cabinet, Model G-749	51-0017
Crystal, clock	6713-1
Clock	41-2068
Dial, clock	54-5379-1
Hand, hour	28-11374-25
Hand, minute	28-11374-26
Hand, sweep	28-11374-19
Hand, alarm set	28-11374-20
Shaft, rear time set	28-11985-3
Knob, tuning	54-6624-4
Knob, volume	54-6624-5
Knob, clock	54-6436-2
Cabinet, Model G-751	
Lustrite Ivory	51-0017-1
Pink	51-0017-2
Aqua	51-0017-2
Clock	54-6714-1
Crystal, clock	54-5380-1
Dial, clock, Lustrite Ivory	54-5380-2
Dial, clock, Pink or Aqua	28-11374-31
Hand, alarm set, Lustrite Ivory	28-11374-32
Hand, alarm set, Pink or Aqua	28-11374-33
Hand, hour, Lustrite Ivory	28-11374-34
Hand, hour, Pink or Aqua	28-11374-35
Hand, minute, Lustrite Ivory	28-11374-36
Hand, minute, Pink or Aqua	28-11374-37
Hand, sweep	28-11374-38
Hand, minute, Lustrite Ivory	28-11374-39
Hand, minute, Pink or Aqua	28-11374-40
Knob, tuning	54-6624-4
Knob, volume	54-6624-5
Knob, clock (2 used)	54-6436-1
Knob, tuning, Lustrite Ivory	54-6624-8
Knob, tuning, Pink or Aqua	54-6624-9
Knob, volume, Lustrite Ivory	54-6624-9
Knob, volume, Pink or Aqua	54-6624-5
Shaft, rear time set	28-11985-3

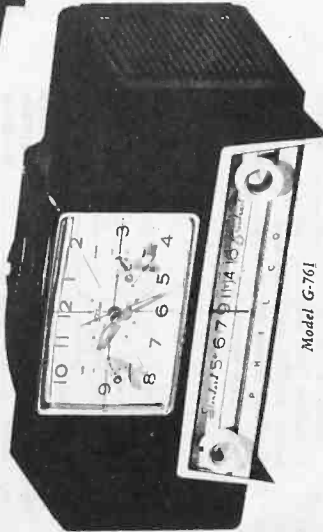
Remaining cabinet parts for Model G-755 are identical to those of the Model G-753.

PHILCO HOME RADIO SERVICE MANUAL

MODEL G-761 and G-963



Model G-963



Model G-761

SPECIFICATIONS

Cabinet: Plastic, table model; Model G-963 has a rotary dial scale with a 5:1 drive ratio. Model G-761 has a slide rule dial with a 6:1 drive ratio.

Circuit: Six tube superheterodyne, including a tuned RF stage.

Frequency Coverage: 535KC to 1620KC.

Intermediate Frequency: 455KC.

Audio Output: 0.9 watts.

Operating Voltage: Model G-963—105 to 120 volts, AC. Model G-761—105 to 120 volts, AC.

Aerial: High impedance loop mounted on back.

Speakers: (2) 4" pm speakers, each with 3.2 ohm voice coil.

Philco Tubes: 12BA6 RF Amplifier, 12BE6 Oscillator-Converter, 12BA6 IF Amplifier, 12AV6 Detector-AVC-1st Audio, 35C5 Audio Output, 35W4 Rectifier and a type 47 Dial Light.

Timer: G-761 only—A fully automatic Telechron (type C-103) internal timer and clock. Includes Sleep-Switch, Buzzer Alarm, and "Lullaway" Slow Shut-off.

SPEAKER PHASING

When either or both of the paralleled speakers are replaced or reconnected, it is possible to cause weak out-

put and distortion unless properly connected.

G-761—Since the speakers are mounted in opposite ends of the cabinet, the speakers must be connected "in proper phase." The common lead between the two speakers should connect from the V.C. lug with the green dot of one speaker to the unmarked V.C. lug on the other.

G-963—Since the speakers are both mounted on the cabinet front, the speakers must also be connected "in proper phase." The green V.C. lugs of the speakers are connected together and the unmarked lugs connect together.

ALIGNMENT PROCEDURE

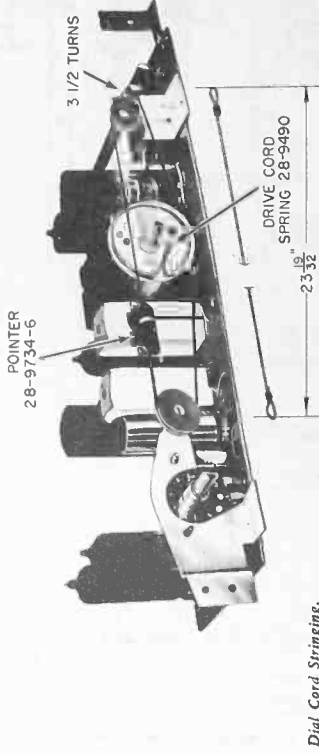
GENERAL

Radio Controls—Set volume control to maximum. Set radio tuning as directed in the alignment chart.

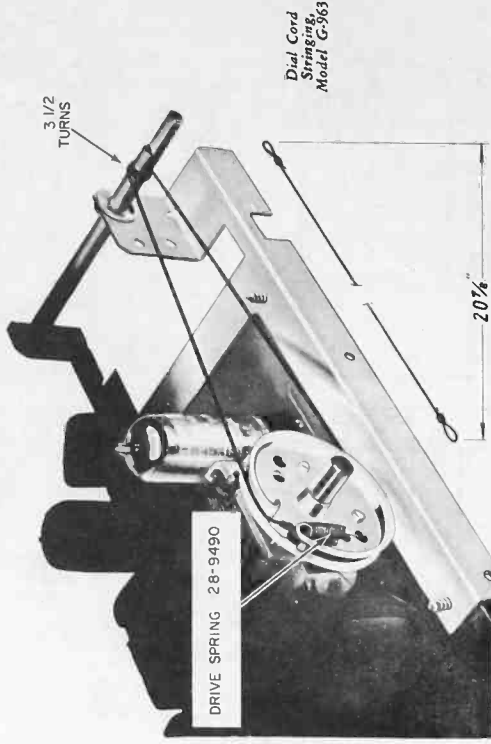
Output Indicator—Connect output indicator (either an oscilloscope or a 1000 ohms/volt a-c meter) across speaker voice-coil terminals.

Signal Generator—Use an AM r-f generator connected as indicated in the alignment chart.

Output Level—During alignment, attenuate the signal generator output to maintain radios' output, as shown on meter or scope, below 0.4 volt.



Drive Spring, Model G-761



Dial Cord Springing, Model G-363

ALIGNMENT CHART

Step	Signal Generator	Freq.	Dial Setting	Special Instructions	Adjust
1	Ground lead to B—; Output lead through a .01 mfd cond. to pin 7 (input grid) of 12BE6 converter	455KC	Gang fully open	Adjust, in order given, for max. output	Sec., 2nd IF, top Z3 Pri., 2nd IF, bot Z3 Sec., 1st IF, top Z2 Pri., 1st IF, bot Z2
2	Radiating loop. See Note 1 below	1620KC	1620KC See Note 2 below	Adjust for max. output	C1C, osc. trimmer
3	Same as step 2	1520KC	Tune radio to gen. signal	Adjust for max. output	C1B, mixer grid trimmer C1A, ant. trimmer
4	Same as step 2	580KC	Tune radio to gen. signal	Adjust for max. output	Sec., RF trans., top Z1
5	Repeat steps 3 and 4 until no further improvement is obtained.				

Note 1: Make up a 6-8 turn, 6 inch diameter loop from insulated wire, connect to signal generator leads and place near radio loop antenna.

Note 2: To set the tuning gang to 1620KC—place a 6 mil shim between rotor and stator; turn rotor until shim is held in place, remove shim.

PHILCO HOME RADIOS

SERVICE MANUAL

MODELS G-820, G-822, G-824,
G-826 and G-828



SPECIFICATIONS

CABINET—Plastic, table models.
CIRCUIT—5-tube superheterodyne (including rectifier).
FREQUENCY RANGE—540 KC to 1620 KC.
INTERMEDIATE FREQUENCY—455 KC.
AUDIO OUTPUT—9 watt.
POWER CONSUMPTION—30 watts.
OPERATING VOLTAGE—105 to 125 volts, AC-DC.
AERIAL—High Impedance loop mounted on inside of back.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	RADIO SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-1; output lead through a .1 mf condenser to grid (pin 7) of 12BE6.	455 KC	Tuning gang fully open.	Adjust tuning cores, in order given, for max. output. TC3 and TC2 are located on top of transformers.	TC4—2nd i-f sec TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop. (See Note below).	1620 KC	1620 KC*	Adjust for maximum output.	C1-B—osc.
3	Same as step 2.	1500 KC	1500 KC	Adjust for maximum output.	C1-A—aerial

NOTE: Make up a 6.8 mm. 6-inch diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.
 * For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

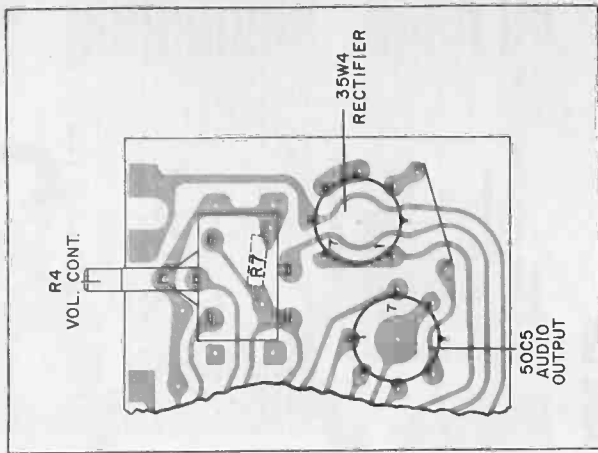
©John F. Rider

ALIGNMENT PROCEDURE

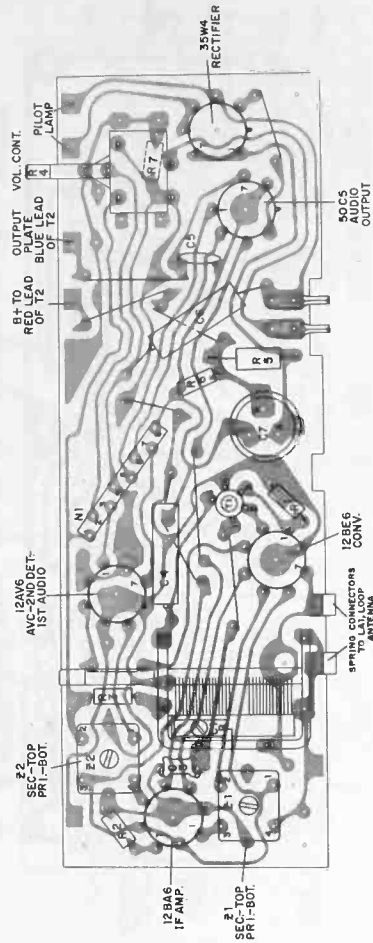
RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart.
OUTPUT METER—Connect across voice coil terminals.
SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output, 30%.
OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below .5 volts.

SPEAKER PHASING (Models G-826 and G-828 only)

When replacing or reconnecting the two, parallel speakers, it is possible that an out-of-phase condition may exist. This is readily apparent by weak output and serious distortion. To correct, interchange the leads to one of the speakers.



Partial Printed Panel Showing G-820, G-822 and G-824 AC Input Circuit Foil Difference



Printed Panel Component Layout—Models G-820, G-822, G-824, G-826 and G-828
 (See Figure Above for G-820, G-822 and G-824 AC Input Difference)

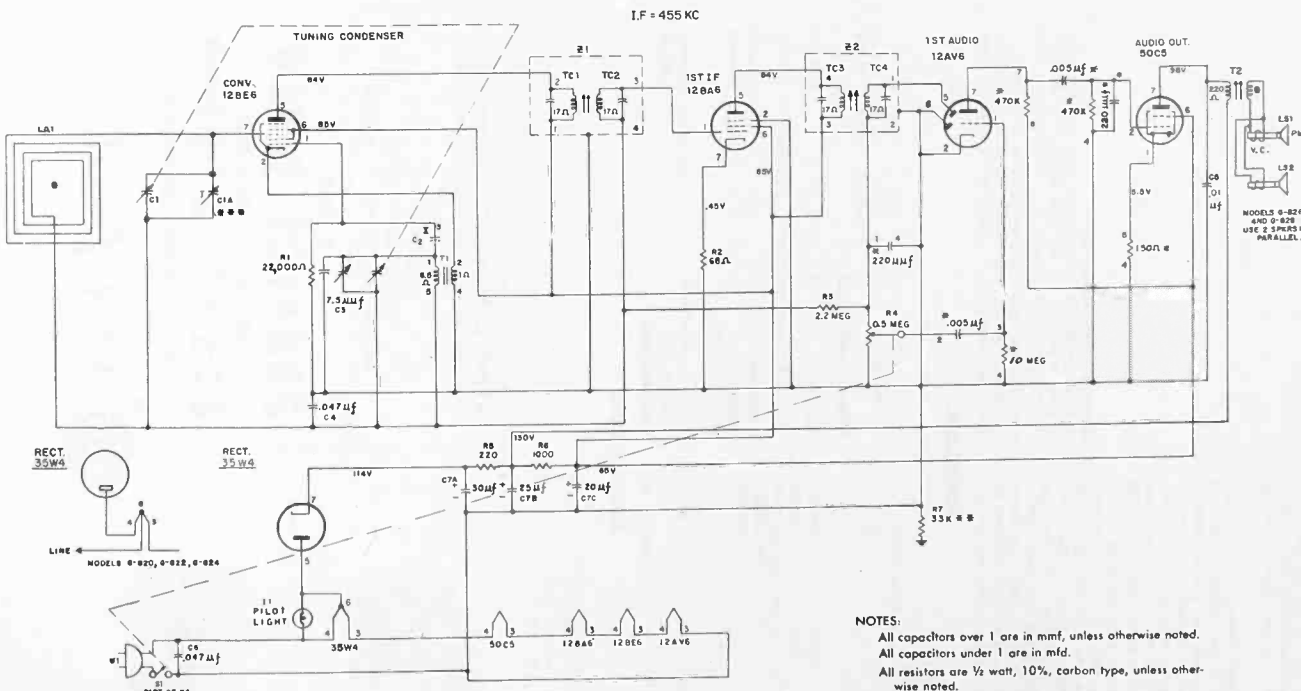
REPLACEMENT PARTS LIST

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, model G-820 and G-822	31-2783-16
	Condenser, tuning gang, model G-824	31-2783-13
	Condenser, tuning gang, model G-826 and G-828	31-2783-15
C2	Condenser, osc. grid	Part of T1, osc. coil
C3	Condenser, osc. resp. compensating	30-1224-83
C4	Condenser, A.V.C. by-pass, .047 mfd.	30-4650-45
	Condenser, output plate, .01 mfd. disk	30-1262
C6	Condenser, line by-pass, .047 mfd.	30-4650-45
C7	Condenser, electrolytic filter, 3-section	30-5185-11
C7	Pilot lamp, #47, models G-826 and G-828 only	34-2068
LA1	Antenna	See Cabinet Parts
LS1	Speaker	See Cabinet Parts
N1	R.C. network audio circuit	30-6500-1
R1	Resistor, osc. grid, 22,000 ohms	66-3228340
R2	Resistor, i.f. cathode bias, 68 ohms	66-6688340
R3	Resistor, A.V.C., 2.2 megohms	66-5228340
R4	Volume control, 5 megohm, models G-820 and G-822	33-5575-17
	Volume control, 5 megohm, models G-824, G-826 and G-828	33-5575-15
R5	Resistor, B+ filter, 1 watt, 220 ohms	66-1224340
R6	Resistor, B+ filter, 1000 ohms	66-2108340
R7	Resistor, leakage, 33,000 ohms	66-3308340
T1	Transformer, oscillator	33-4756-1
T2	Transformer, audio output	33-8384-2
	Transformer, audio output, model G-828 and G-826	32-20094
Z1	Transformer, 1st i.f.	32-4583-20
Z2	Transformer, 2nd i.f.	32-4583-21
	Printed panel, models G-820, G-822 and G-824	54-6585
	Printed panel, models G-826 and G-828	54-6585-2
	Contact, male, AC interlock, 2 used	13520FE18
	Contact, panel, antenna	28-1282
	Contact, panel, antenna (includes antenna trimmer)	28-1282-1
	Finger, grounding	28-11233
	Shield, tube	66-5629-12
	Socket, tube, 5 used	27-6309-1
	Pilot lamp socket Assy.	27-6323-103

CABINET PARTS

Description	Service Part No.
Cabinet, model G-820	51-0003
Mahogany	51-0003-1
Dial	54-5355
Knob, tuning	54-6653-1
Knob, volume	54-6607-1
Cabinet back and loop Assy.	76-10521-1
Line cord	41-4270-1
Speaker, 4-inch pm.	36-1075-6
Cabinet, model G-822	51-0003-1
Lustré ivory	51-0003-1
Dial	54-5355
Knob, tuning	54-6653-1
Knob, volume	54-6607-1
Cabinet back and loop Assy.	76-10521-1
Line cord	41-4270-1
Speaker, 4-inch pm.	36-1075-6
Cabinet, model G-824	51-0003-1
Ivory and black	51-0003-1
Plak and black	11322-1
Dial plate	28-12251
Trim, cabinet front	28-12540-1
Trim, cabinet back	28-12540-2
Knob, tuning	54-6606-1
Knob, volume	54-6607-1
Back, cabinet	54-6605-1
Antenna loop	32-4757
Line cord	41-4270-2
Speaker, 4-inch pm.	36-1075-3
Cabinet, model G-826	51-0003
Lustré ivory	51-0003-1
Flame	11325-1
Flame	11325-2
Agua	54-6623-1
Dial	54-6694
Trim, cabinet	54-6624-1
Knob, tuning	54-6624-2
Cabinet back and loop Assy.	76-10097-1
Line cord	41-4207-1
Speaker, 4-inch pm.	36-1075-4
Speaker, 4-inch pm (with transformer)	36-1075-5
Cabinet, model G-828	51-0004-1
Mahogany	51-0004-1
Dial	54-6661-1
Trim cabinet	54-5361
Medallion	28-10036-1
Knob, tuning	54-6659-2
Knob, volume	54-6659-3
Cabinet back and loop Assy.	76-10335-1
Line cord	41-4270-1
Speaker, 6-inch pm (with transformer)	36-1081-1
Speaker, 4.66-inch pm.	36-1076-2

MODELS G-820, G-822, G-824, G-826, G-828



Schematic Diagram—Models G-820, G-822, G-824, G-826 and G-828

NOTES:
 All capacitors over 1 are in mmf, unless otherwise noted.
 All capacitors under 1 are in mfd.
 All resistors are 1/2 watt, 10%, carbon type, unless otherwise noted.
 Voltages are taken with a 20,000 ohm/volt meter, between the point indicated and B—, under no-signal condition.
 ⊕ Indicates a resistance of less than one ohm.
 P1, pilot light, is used in Models G-826 and G-828 only. See insert of 35W4 wiring for Models G-820, G-822, and G-824.
 Models G-826 and G-828 have two speakers connected in parallel.
 *Indicates component is part of N1.
 **R7 is grounded to volume control frame.
 ***CIA is on underside of panel.

RCA VICTOR

A-C Operated Clock-Radio

9-C-7 SERIES, 9-C-8 SERIES

Chassis No. RC-1166B

SERVICE DATA

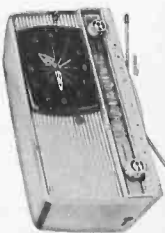
— 1958 No. 3 —

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE COMPANY
CAMDEN 8, N. J.

FOR
RCA VICTOR RADIO AND "VICTROLA" DIVISION
RADIO CORPORATION OF AMERICA



9-C-7 Series—The "Herald"
Model 9-C-7EE—Antique White
Model 9-C-7FE—Pink and White
Model 9-C-7LE—Turquoise and White



9-C-8 Series—The "Balletin"
Model 9-C-8EE—Pink and White
Model 9-C-8F—Two-tone Gray
Model 9-C-8ME—Maple and White

TUNING RANGE		INTERMEDIATE FREQUENCY		TUBE COMPLEMENT		POWER SUPPLY RATING	
540-1,600 kc	540-1,600 kc	455 kc	455 kc	(1) RCA 12BE6	Converter	115 volts, 60 cycles, a. c.	35 watts
				(2) RCA 12BA6	I.F. Amplifier	Caution: Do not connect to a d. c. power supply.	
				(3) RCA 12AV6	Det.-AVC-A.F. Amp.		
				(4) RCA 50CS	Output		
				(5) RCA 35W4	Rectifier		

SPECIFICATIONS

LOUD SPEAKER
Size and type 4 in. P.M.
Voice coil impedance 3.2 ohms at 400 cycles

POWER OUTPUT
Undistorted 1.0 watts
Maximum 1.3 watts

TUNING DRIVE RATIO 9 1/2:1 (4 3/4 turns of knob)

WEIGHT 6 lbs. net

CABINET DIMENSIONS
Model 9-C-7 Height 6 1/2", Width 12 3/4", Depth 6"
Model 9-C-8 Height 7 1/4", Width 12 3/4", Depth 6"

DESCRIPTION

The "9-C-7 Series" and the "9-C-8 Series" are five-tube (including rectifier) table model clock-radios designed for operation on a 115 volt 60 cycle power supply. The cabinet completely encloses the radio chassis and clock, using a molded hood instead of a conventional back cover. The chassis and clock are mounted in a plastic cradle which comprises the cabinet bottom and front. The plastic slide tube dial is fastened to the cradle. The 9-C-8 Series has a decorative metal base attached to the bottom of the cabinet.

The chassis is of the "printed wiring" type in which all electrical components except loop antenna and speaker are mounted on an insulation plate. A conventional superheterodyne circuit is employed using 150-millimetre series-string miniature tubes. All wiring, except for external leads, is "printed" on the underside of the insulation plate. The switching type phono input jack is accessible at the left side of the cabinet.

The clock-timer features not only the commonly accepted self-starting type of clock with sweep-second hand but also a clock-controlled switch which will: (1) turn the radio (and appliance if desired) off after a period of operation of up to 60 minutes; (2) turn the radio (and appliance if desired) on at

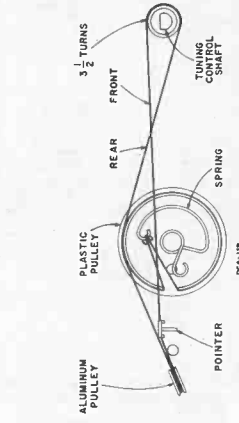
9-C-7 Series, 9-C-8 Series

Alignment Procedure

Test Oscillator—For all alignment operations, connect the low side of the test oscillator to the "common negative wiring." If a power supply isolation transformer is not available for use during service, an isolating capacitor should be used between the low side of the test oscillator and the "common negative wiring."

If an audio output meter is used for alignment indication, keep the oscillator output as low as possible to avoid a-v-c action.

Dial Indicator—With tuning condenser plates fully meshed, set left hand edge of dial indicator to the calibration mark on the dial backplate.

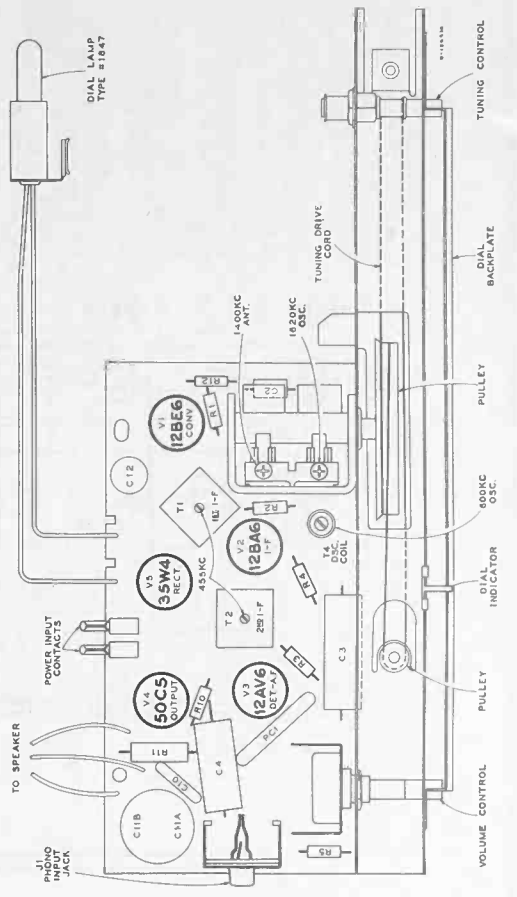


Tuning Drive Cord Assembly

Servicing Precaution

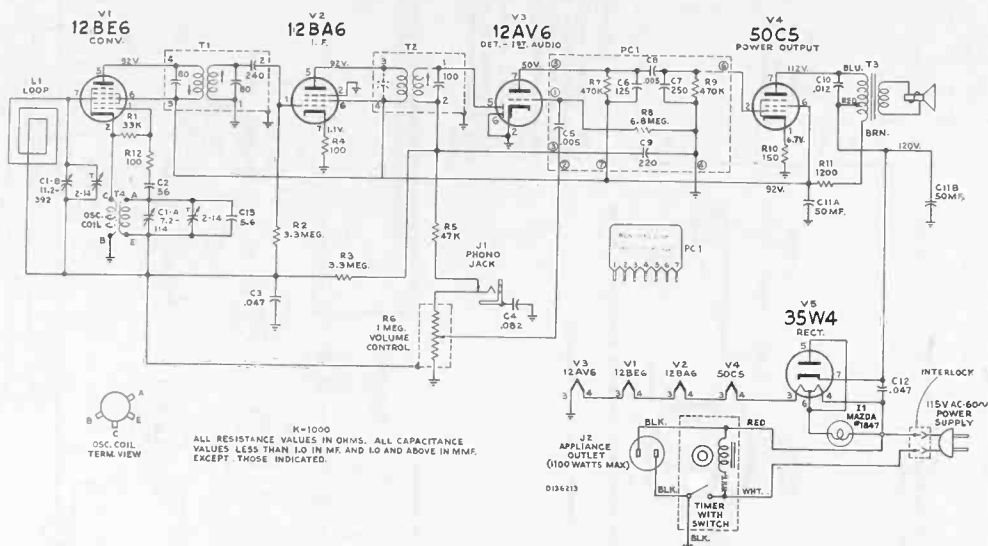
The "common negative wiring" of these receivers is connected directly to one side of the AC power supply. Service should not be attempted by anyone not thoroughly familiar with the precautions necessary when working on this type of circuit.

An isolation transformer (115 v./115 v.) should be connected between the AC power line and the power catchment cord of the radio before performing any service on the radio.



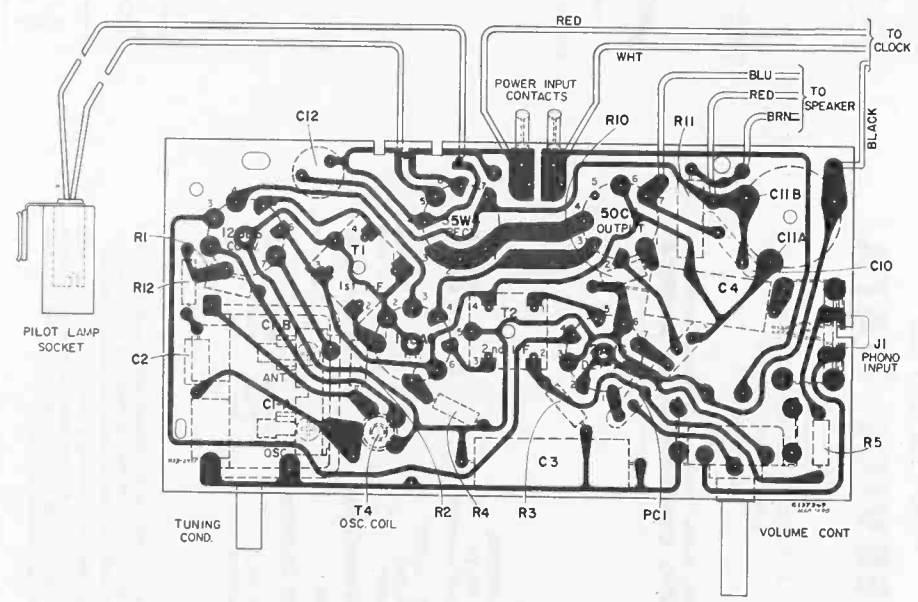
CHASSIS RC-1166B

9-C-7 Series, 9-C-8 Series



K=1000
ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. AND 1.0 AND ABOVE IN MMF. EXCEPT THOSE INDICATED.

D134213



Chassis Wiring and Components — View from Wiring Side

The assembly represented above is viewed from the wiring side of the board.
The printed wiring, on the near side of the board, is presented in "phantom" view superimposed on the component layout of the reverse side.

Component replacement, when necessary, should be made following the techniques outlined in "RCA Radio and Victrola Service Tips" Volume VI — Issue 6 — Dated August 25, 1955.

RCA VICTOR

AC-DC-Battery Portable Radio

MODEL 1-BX-5 SERIES

MODEL 1-BX-6 SERIES

MODEL 1-BX-7 SERIES

Chassis Nos. RC-1183, RC-1183A, RC-1183B

SERVICE DATA

— 1958 No. 5 —

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE COMPANY
CAMDEN 8, N. J.

FOR
RCA VICTOR RADIO AND "VICTROLA" DIVISION
RADIO CORPORATION OF AMERICA



1-BX-5 Series The "Shipmate"
1-BX-57 Maple and White
1-BX-59 Turquoise and White

1-BX-6 Series The "Caravan"
1-BX-62 Green and White
1-BX-64 Pink and White
1-BX-67 Yellow and White

1-BX-7 Series The "Cruiser"
1-BX-78 Flame and Beige
1-BX-79 Turquoise and Beige

Specifications

TUNING RANGE	540-1,600 kc
INTERMEDIATE FREQUENCY	455 kc
LOUDSPEAKER	4 in. P.M.
Size and Type	3.2 ohms at 400 cycles
Voice Coil Impedance	140 milliwatts
POWER OUTPUT (Battery operation)	225 milliwatts
Undistorted	Maximum
Power output on power line operation is approx. 10% less.	
TUBE COMPLEMENT	
(1) RCA 1R5	Converter
(2) RCA 1U4	I.F. Amplifier
(3) RCA 1U5	Det.—A.V.C.—1st A.F.
(4) RCA 3V4	Output
A selenium rectifier is used.	
BATTERY OPERATION	
Power Line Operation	115 volts, d. c. or 50 to 60 cycles a. c. 15 watts
Battery Operation	
"A" Battery, RCA #VS 065	7.5 volts, 53 ma.
"B" Battery, RCA #VS 219	90 volts, 12 ma.
Battery life	approx. 35 hrs. intermittent service
TUNING DRIVE RATIO	
1-BX-5, 1-BX-6 Series	1:1 (direct drive)
1-BX-7 Series	6:1 (3 turns of knob)
WEIGHT (Approx.)	
Without battery	4½ lbs.
With battery	5½ lbs.
DIMENSIONS (Overall)	
Height	7½ in.
Width	10¼ in.
Depth	3½ in.

Battery Operation

Place the power cord plug in the socket provided on the top of the chassis. Wind the power cord around the two small spools attached to the cabinet back.

Power Line Operation

A power cord is stored inside the cabinet. To open the cabinet, pull backwards on the top of the cabinet back. It is secured by means of two spring clips and catches on the inside of the cabinet. Remove the plug of the power cord from its socket on the chassis and insert the plug into a convenient electrical power outlet. A notch in the left side of the cabinet allows the back to be closed with the cord passing through.

Note: If reception is not obtained on DC, reverse plug in power outlet. On AC operation, reversal of the plug may reduce hum.

Alignment Procedure

Test Oscillator—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Battery operation of the receiver is preferable during alignment. On AC operation, it may be necessary to connect the low side of the test oscillator to "common negative."

Output Meter Alignment—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Step	Connect High Side of Sig. Gen. to—	Sig. Gen. Output	Dial Pointer Setting	Adjust for Max. Output
1	Remove chassis from case			
2	Pin #6 of 1U4 tube in series with .01 mid.	455 kc	Quiet point near 1600 kc	T2 2nd I. F. Trans.
3	Connection lug of C1-B in series with .01 mid.			T1 1st I. F. Trans.
4	Install chassis in case. On 1-BX-6 and 1-BX-7 Series, fasten antenna leads in slots provided in cabinet.			
5	Short wire placed near antenna for radiated signal	1620 kc	Gang fully open	C1-B (osc.)
6		1400 kc	1400 kc signal	C1-A (ant.)
7		600 kc	600 kc signal	T4 (osc.) rock gang
8	Repeat steps 5, 6 and 7.			

CAUTION

Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.

CAUTION
AN ISOLATION TRANSFORMER SHOULD BE USED FOR THE RECEIVER WHEN BENCH SERVICE IS BEING PERFORMED AND REPAIR IS BEING OPERATED FROM AN AC POWER LINE.

Circuit Description

These instruments are three-way "personal" portable radio receivers using four miniature tubes and a selenium rectifier.

The receiver circuit is a conventional superheterodyne including pentagrid converter, I.F. amplifier stage, combined detector-a.v.c.—first audio stage and a power amplifier.

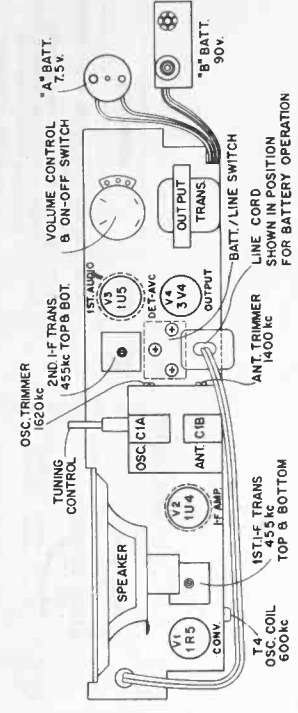
Switching from battery operation to power line operation is accomplished by inserting the line plug in the chassis to actuate the LINE-BATTERY switch. The line plug is non-polarized.

Critical Lead Dress

1. Dress ballast resistors R12, R13, R14 and fuse resistor R11 such that they do not contact other leads or short to chassis cover.
2. Make lead from V2-2 to T2-3 as short as possible and dress down toward chassis. Also keep other leads away.
3. Solder C8 with short lead at V2-2 and dress down towards chassis.
4. Dress leads into lances below selenium rectifier such that they do not contact rectifier plates.
5. Dress leads at volume control such that they clear cabinet enclosure when chassis is mounted in the cabinet.
6. Dress oscillator lead from osc. coil to gang away from metal as much as practicable.
7. Dress lead from antenna section of gang to V1-6, be- tween 1U4 tube shield and 1st I.F. transformer and away from top of chassis.
8. Make sure speaker is grounded to chassis.
9. Dress blue lead of output transformer to 3V4 plate toward rear apron of chassis.
10. Dress loop leads into slots provided in cabinet. Excess lead should be on outside of chassis.

To Remove Cabinet Back

With the back fully open, grip the cabinet with thumb pressing forward against case front and fingers pressing backward against case back. Insert a screwdriver under one hinge and pry the center of the hinge out of the opening in the cabinet while maintaining pressure on the back with the fingers and on the cabinet with the thumb. Repeat this procedure with the other hinge. Pull the back straight to the rear using both hands.



Tube and Trimmer Locations

Replacement Parts

SYMBOL No.	STOCK NO.	DESCRIPTION	SYMBOL No.	STOCK NO.	DESCRIPTION
		CHASSIS ASSEMBLIES RC-1183 for 1-BX-5 Series RC-1183A for 1-BX-6 Series RC-1183B for 1-BX-7 Series			
C1A, C1B	105946	Capacitor—Variable tuning capacitor for chassis RC-1183			
C1A, C1B	105954	Capacitor—Variable tuning capacitor for chassis RC-1183A			
C1A, C1B	105955	Capacitor—Variable tuning capacitor for chassis RC-1183B			
C3	101222	Capacitor—Fixed, ceramic, .56 mfd., ±20%, 500 v.	L1		Shield—Tube shield for V2
C5	739540	Capacitor—Fixed, ceramic, 0.01 mfd., ±10%, 500 v.			Socket—Tube socket 7 pin miniature for V2
C6	101233	Capacitor—Fixed, beaded lead, 3 mfd., ±10%, 500 v.			Socket—Tube socket 7 pin miniature for V3
C7	102455A	Capacitor—Fixed, paper, 0.0033 mfd., ±20%, 200 v.			Washer—Nylon, insulating washer for tuning capacitor (2 req'd)
C8	73552	Capacitor—Fixed, paper, 0.033 mfd., ±24%, 450 v.			SPEAKER ASSEMBLY Speaker—4" PM speaker complete with cone
C9, C10, C11, C12		Part of PCI			MISCELLANEOUS Antenna—Ferrite antenna and case assembly for Model 1B2, 1B2A, 1B2B, 1B2C, 1B2D, 1B2E, 1B2F, 1B2G, 1B2H, 1B2I, 1B2J, 1B2K, 1B2L, 1B2M, 1B2N, 1B2O, 1B2P, 1B2Q, 1B2R, 1B2S, 1B2T, 1B2U, 1B2V, 1B2W, 1B2X, 1B2Y, 1B2Z, 1B3, 1B3A, 1B3B, 1B3C, 1B3D, 1B3E, 1B3F, 1B3G, 1B3H, 1B3I, 1B3J, 1B3K, 1B3L, 1B3M, 1B3N, 1B3O, 1B3P, 1B3Q, 1B3R, 1B3S, 1B3T, 1B3U, 1B3V, 1B3W, 1B3X, 1B3Y, 1B3Z, 1B4, 1B4A, 1B4B, 1B4C, 1B4D, 1B4E, 1B4F, 1B4G, 1B4H, 1B4I, 1B4J, 1B4K, 1B4L, 1B4M, 1B4N, 1B4O, 1B4P, 1B4Q, 1B4R, 1B4S, 1B4T, 1B4U, 1B4V, 1B4W, 1B4X, 1B4Y, 1B4Z, 1B5, 1B5A, 1B5B, 1B5C, 1B5D, 1B5E, 1B5F, 1B5G, 1B5H, 1B5I, 1B5J, 1B5K, 1B5L, 1B5M, 1B5N, 1B5O, 1B5P, 1B5Q, 1B5R, 1B5S, 1B5T, 1B5U, 1B5V, 1B5W, 1B5X, 1B5Y, 1B5Z, 1B6, 1B6A, 1B6B, 1B6C, 1B6D, 1B6E, 1B6F, 1B6G, 1B6H, 1B6I, 1B6J, 1B6K, 1B6L, 1B6M, 1B6N, 1B6O, 1B6P, 1B6Q, 1B6R, 1B6S, 1B6T, 1B6U, 1B6V, 1B6W, 1B6X, 1B6Y, 1B6Z, 1B7, 1B7A, 1B7B, 1B7C, 1B7D, 1B7E, 1B7F, 1B7G, 1B7H, 1B7I, 1B7J, 1B7K, 1B7L, 1B7M, 1B7N, 1B7O, 1B7P, 1B7Q, 1B7R, 1B7S, 1B7T, 1B7U, 1B7V, 1B7W, 1B7X, 1B7Y, 1B7Z, 1B8, 1B8A, 1B8B, 1B8C, 1B8D, 1B8E, 1B8F, 1B8G, 1B8H, 1B8I, 1B8J, 1B8K, 1B8L, 1B8M, 1B8N, 1B8O, 1B8P, 1B8Q, 1B8R, 1B8S, 1B8T, 1B8U, 1B8V, 1B8W, 1B8X, 1B8Y, 1B8Z, 1B9, 1B9A, 1B9B, 1B9C, 1B9D, 1B9E, 1B9F, 1B9G, 1B9H, 1B9I, 1B9J, 1B9K, 1B9L, 1B9M, 1B9N, 1B9O, 1B9P, 1B9Q, 1B9R, 1B9S, 1B9T, 1B9U, 1B9V, 1B9W, 1B9X, 1B9Y, 1B9Z, 1B10, 1B10A, 1B10B, 1B10C, 1B10D, 1B10E, 1B10F, 1B10G, 1B10H, 1B10I, 1B10J, 1B10K, 1B10L, 1B10M, 1B10N, 1B10O, 1B10P, 1B10Q, 1B10R, 1B10S, 1B10T, 1B10U, 1B10V, 1B10W, 1B10X, 1B10Y, 1B10Z, 1B11, 1B11A, 1B11B, 1B11C, 1B11D, 1B11E, 1B11F, 1B11G, 1B11H, 1B11I, 1B11J, 1B11K, 1B11L, 1B11M, 1B11N, 1B11O, 1B11P, 1B11Q, 1B11R, 1B11S, 1B11T, 1B11U, 1B11V, 1B11W, 1B11X, 1B11Y, 1B11Z, 1B12, 1B12A, 1B12B, 1B12C, 1B12D, 1B12E, 1B12F, 1B12G, 1B12H, 1B12I, 1B12J, 1B12K, 1B12L, 1B12M, 1B12N, 1B12O, 1B12P, 1B12Q, 1B12R, 1B12S, 1B12T, 1B12U, 1B12V, 1B12W, 1B12X, 1B12Y, 1B12Z, 1B13, 1B13A, 1B13B, 1B13C, 1B13D, 1B13E, 1B13F, 1B13G, 1B13H, 1B13I, 1B13J, 1B13K, 1B13L, 1B13M, 1B13N, 1B13O, 1B13P, 1B13Q, 1B13R, 1B13S, 1B13T, 1B13U, 1B13V, 1B13W, 1B13X, 1B13Y, 1B13Z, 1B14, 1B14A, 1B14B, 1B14C, 1B14D, 1B14E, 1B14F, 1B14G, 1B14H, 1B14I, 1B14J, 1B14K, 1B14L, 1B14M, 1B14N, 1B14O, 1B14P, 1B14Q, 1B14R, 1B14S, 1B14T, 1B14U, 1B14V, 1B14W, 1B14X, 1B14Y, 1B14Z, 1B15, 1B15A, 1B15B, 1B15C, 1B15D, 1B15E, 1B15F, 1B15G, 1B15H, 1B15I, 1B15J, 1B15K, 1B15L, 1B15M, 1B15N, 1B15O, 1B15P, 1B15Q, 1B15R, 1B15S, 1B15T, 1B15U, 1B15V, 1B15W, 1B15X, 1B15Y, 1B15Z, 1B16, 1B16A, 1B16B, 1B16C, 1B16D, 1B16E, 1B16F, 1B16G, 1B16H, 1B16I, 1B16J, 1B16K, 1B16L, 1B16M, 1B16N, 1B16O, 1B16P, 1B16Q, 1B16R, 1B16S, 1B16T, 1B16U, 1B16V, 1B16W, 1B16X, 1B16Y, 1B16Z, 1B17, 1B17A, 1B17B, 1B17C, 1B17D, 1B17E, 1B17F, 1B17G, 1B17H, 1B17I, 1B17J, 1B17K, 1B17L, 1B17M, 1B17N, 1B17O, 1B17P, 1B17Q, 1B17R, 1B17S, 1B17T, 1B17U, 1B17V, 1B17W, 1B17X, 1B17Y, 1B17Z, 1B18, 1B18A, 1B18B, 1B18C, 1B18D, 1B18E, 1B18F, 1B18G, 1B18H, 1B18I, 1B18J, 1B18K, 1B18L, 1B18M, 1B18N, 1B18O, 1B18P, 1B18Q, 1B18R, 1B18S, 1B18T, 1B18U, 1B18V, 1B18W, 1B18X, 1B18Y, 1B18Z, 1B19, 1B19A, 1B19B, 1B19C, 1B19D, 1B19E, 1B19F, 1B19G, 1B19H, 1B19I, 1B19J, 1B19K, 1B19L, 1B19M, 1B19N, 1B19O, 1B19P, 1B19Q, 1B19R, 1B19S, 1B19T, 1B19U, 1B19V, 1B19W, 1B19X, 1B19Y, 1B19Z, 1B20, 1B20A, 1B20B, 1B20C, 1B20D, 1B20E, 1B20F, 1B20G, 1B20H, 1B20I, 1B20J, 1B20K, 1B20L, 1B20M, 1B20N, 1B20O, 1B20P, 1B20Q, 1B20R, 1B20S, 1B20T, 1B20U, 1B20V, 1B20W, 1B20X, 1B20Y, 1B20Z, 1B21, 1B21A, 1B21B, 1B21C, 1B21D, 1B21E, 1B21F, 1B21G, 1B21H, 1B21I, 1B21J, 1B21K, 1B21L, 1B21M, 1B21N, 1B21O, 1B21P, 1B21Q, 1B21R, 1B21S, 1B21T, 1B21U, 1B21V, 1B21W, 1B21X, 1B21Y, 1B21Z, 1B22, 1B22A, 1B22B, 1B22C, 1B22D, 1B22E, 1B22F, 1B22G, 1B22H, 1B22I, 1B22J, 1B22K, 1B22L, 1B22M, 1B22N, 1B22O, 1B22P, 1B22Q, 1B22R, 1B22S, 1B22T, 1B22U, 1B22V, 1B22W, 1B22X, 1B22Y, 1B22Z, 1B23, 1B23A, 1B23B, 1B23C, 1B23D, 1B23E, 1B23F, 1B23G, 1B23H, 1B23I, 1B23J, 1B23K, 1B23L, 1B23M, 1B23N, 1B23O, 1B23P, 1B23Q, 1B23R, 1B23S, 1B23T, 1B23U, 1B23V, 1B23W, 1B23X, 1B23Y, 1B23Z, 1B24, 1B24A, 1B24B, 1B24C, 1B24D, 1B24E, 1B24F, 1B24G, 1B24H, 1B24I, 1B24J, 1B24K, 1B24L, 1B24M, 1B24N, 1B24O, 1B24P, 1B24Q, 1B24R, 1B24S, 1B24T, 1B24U, 1B24V, 1B24W, 1B24X, 1B24Y, 1B24Z, 1B25, 1B25A, 1B25B, 1B25C, 1B25D, 1B25E, 1B25F, 1B25G, 1B25H, 1B25I, 1B25J, 1B25K, 1B25L, 1B25M, 1B25N, 1B25O, 1B25P, 1B25Q, 1B25R, 1B25S, 1B25T, 1B25U, 1B25V, 1B25W, 1B25X, 1B25Y, 1B25Z, 1B26, 1B26A, 1B26B, 1B26C, 1B26D, 1B26E, 1B26F, 1B26G, 1B26H, 1B26I, 1B26J, 1B26K, 1B26L, 1B26M, 1B26N, 1B26O, 1B26P, 1B26Q, 1B26R, 1B26S, 1B26T, 1B26U, 1B26V, 1B26W, 1B26X, 1B26Y, 1B26Z, 1B27, 1B27A, 1B27B, 1B27C, 1B27D, 1B27E, 1B27F, 1B27G, 1B27H, 1B27I, 1B27J, 1B27K, 1B27L, 1B27M, 1B27N, 1B27O, 1B27P, 1B27Q, 1B27R, 1B27S, 1B27T, 1B27U, 1B27V, 1B27W, 1B27X, 1B27Y, 1B27Z, 1B28, 1B28A, 1B28B, 1B28C, 1B28D, 1B28E, 1B28F, 1B28G, 1B28H, 1B28I, 1B28J, 1B28K, 1B28L, 1B28M, 1B28N, 1B28O, 1B28P, 1B28Q, 1B28R, 1B28S, 1B28T, 1B28U, 1B28V, 1B28W, 1B28X, 1B28Y, 1B28Z, 1B29, 1B29A, 1B29B, 1B29C, 1B29D, 1B29E, 1B29F, 1B29G, 1B29H, 1B29I, 1B29J, 1B29K, 1B29L, 1B29M, 1B29N, 1B29O, 1B29P, 1B29Q, 1B29R, 1B29S, 1B29T, 1B29U, 1B29V, 1B29W, 1B29X, 1B29Y, 1B29Z, 1B30, 1B30A, 1B30B, 1B30C, 1B30D, 1B30E, 1B30F, 1B30G, 1B30H, 1B30I, 1B30J, 1B30K, 1B30L, 1B30M, 1B30N, 1B30O, 1B30P, 1B30Q, 1B30R, 1B30S, 1B30T, 1B30U, 1B30V, 1B30W, 1B30X, 1B30Y, 1B30Z, 1B31, 1B31A, 1B31B, 1B31C, 1B31D, 1B31E, 1B31F, 1B31G, 1B31H, 1B31I, 1B31J, 1B31K, 1B31L, 1B31M, 1B31N, 1B31O, 1B31P, 1B31Q, 1B31R, 1B31S, 1B31T, 1B31U, 1B31V, 1B31W, 1B31X, 1B31Y, 1B31Z, 1B32, 1B32A, 1B32B, 1B32C, 1B32D, 1B32E, 1B32F, 1B32G, 1B32H, 1B32I, 1B32J, 1B32K, 1B32L, 1B32M, 1B32N, 1B32O, 1B32P, 1B32Q, 1B32R, 1B32S, 1B32T, 1B32U, 1B32V, 1B32W, 1B32X, 1B32Y, 1B32Z, 1B33, 1B33A, 1B33B, 1B33C, 1B33D, 1B33E, 1B33F, 1B33G, 1B33H, 1B33I, 1B33J, 1B33K, 1B33L, 1B33M, 1B33N, 1B33O, 1B33P, 1B33Q, 1B33R, 1B33S, 1B33T, 1B33U, 1B33V, 1B33W, 1B33X, 1B33Y, 1B33Z, 1B34, 1B34A, 1B34B, 1B34C, 1B34D, 1B34E, 1B34F, 1B34G, 1B34H, 1B34I, 1B34J, 1B34K, 1B34L, 1B34M, 1B34N, 1B34O, 1B34P, 1B34Q, 1B34R, 1B34S, 1B34T, 1B34U, 1B34V, 1B34W, 1B34X, 1B34Y, 1B34Z, 1B35, 1B35A, 1B35B, 1B35C, 1B35D, 1B35E, 1B35F, 1B35G, 1B35H, 1B35I, 1B35J, 1B35K, 1B35L, 1B35M, 1B35N, 1B35O, 1B35P, 1B35Q, 1B35R, 1B35S, 1B35T, 1B35U, 1B35V, 1B35W, 1B35X, 1B35Y, 1B35Z, 1B36, 1B36A, 1B36B, 1B36C, 1B36D, 1B36E, 1B36F, 1B36G, 1B36H, 1B36I, 1B36J, 1B36K, 1B36L, 1B36M, 1B36N, 1B36O, 1B36P, 1B36Q, 1B36R, 1B36S, 1B36T, 1B36U, 1B36V, 1B36W, 1B36X, 1B36Y, 1B36Z, 1B37, 1B37A, 1B37B, 1B37C, 1B37D, 1B37E, 1B37F, 1B37G, 1B37H, 1B37I, 1B37J, 1B37K, 1B37L, 1B37M, 1B37N, 1B37O, 1B37P, 1B37Q, 1B37R, 1B37S, 1B37T, 1B37U, 1B37V, 1B37W, 1B37X, 1B37Y, 1B37Z, 1B38, 1B38A, 1B38B, 1B38C, 1B38D, 1B38E, 1B38F, 1B38G, 1B38H, 1B38I, 1B38J, 1B38K, 1B38L, 1B38M, 1B38N, 1B38O, 1B38P, 1B38Q, 1B38R, 1B38S, 1B38T, 1B38U, 1B38V, 1B38W, 1B38X, 1B38Y, 1B38Z, 1B39, 1B39A, 1B39B, 1B39C, 1B39D, 1B39E, 1B39F, 1B39G, 1B39H, 1B39I, 1B39J, 1B39K, 1B39L, 1B39M, 1B39N, 1B39O, 1B39P, 1B39Q, 1B39R, 1B39S, 1B39T, 1B39U, 1B39V, 1B39W, 1B39X, 1B39Y, 1B39Z, 1B40, 1B40A, 1B40B, 1B40C, 1B40D, 1B40E, 1B40F, 1B40G, 1B40H, 1B40I, 1B40J, 1B40K, 1B40L, 1B40M, 1B40N, 1B40O, 1B40P, 1B40Q, 1B40R, 1B40S, 1B40T, 1B40U, 1B40V, 1B40W, 1B40X, 1B40Y, 1B40Z, 1B41, 1B41A, 1B41B, 1B41C, 1B41D, 1B41E, 1B41F, 1B41G, 1B41H, 1B41I, 1B41J, 1B41K, 1B41L, 1B41M, 1B41N, 1B41O, 1B41P, 1B41Q, 1B41R, 1B41S, 1B41T, 1B41U, 1B41V, 1B41W, 1B41X, 1B41Y, 1B41Z, 1B42, 1B42A, 1B42B, 1B42C, 1B42D, 1B42E, 1B42F, 1B42G, 1B42H, 1B42I, 1B42J, 1B42K, 1B42L, 1B42M, 1B42N, 1B42O, 1B42P, 1B42Q, 1B42R, 1B42S, 1B42T, 1B42U, 1B42V, 1B42W, 1B42X, 1B42Y, 1B42Z, 1B43, 1B43A, 1B43B, 1B43C, 1B43D, 1B43E, 1B43F, 1B43G, 1B43H, 1B43I, 1B43J, 1B43K, 1B43L, 1B43M, 1B43N, 1B43O, 1B43P, 1B43Q, 1B43R, 1B43S, 1B43T, 1B43U, 1B43V, 1B43W, 1B43X, 1B43Y, 1B43Z, 1B44, 1B44A, 1B44B, 1B44C, 1B44D, 1B44E, 1B44F, 1B44G, 1B44H, 1B44I, 1B44J, 1B44K, 1B44L, 1B44M, 1B44N, 1B44O, 1B44P, 1B44Q, 1B44R, 1B44S, 1B44T, 1B44U, 1B44V, 1B44W, 1B44X, 1B44Y, 1B44Z, 1B45, 1B45A, 1B45B, 1B45C, 1B45D, 1B45E, 1B45F, 1B45G, 1B45H, 1B45I, 1B45J, 1B45K, 1B45L, 1B45M, 1B45N, 1B45O, 1B45P, 1B45Q, 1B45R, 1B45S, 1B45T, 1B45U, 1B45V, 1B45W, 1B45X, 1B45Y, 1B45Z, 1B46, 1B46A, 1B46B, 1B46C, 1B46D, 1B46E, 1B46F, 1B46G, 1B46H, 1B46I, 1B46J, 1B46K, 1B46L, 1B46M, 1B46N, 1B46O, 1B46P, 1B46Q, 1B46R, 1B46S, 1B46T, 1B46U, 1B46V, 1B46W, 1B46X, 1B46Y, 1B46Z, 1B47, 1B47A, 1B47B, 1B47C, 1B47D, 1B47E, 1B47F, 1B47G, 1B47H, 1B47I, 1B47J, 1B47K, 1B47L, 1B47M, 1B47N, 1B47O, 1B47P, 1B47Q, 1B47R, 1B47S, 1B47T, 1B47U, 1B47V, 1B47W, 1B47X, 1B47Y, 1B47Z, 1B48, 1B48A, 1B48B, 1B48C, 1B48D, 1B48E, 1B48F, 1B48G, 1B48H, 1B48I, 1B48J, 1B48K, 1B48L, 1B48M, 1B48N, 1B48O, 1B48P, 1B48Q, 1B48R, 1B48S, 1B48T, 1B48U, 1B48V, 1B48W, 1B48X, 1B48Y, 1B48Z, 1B49, 1B49A, 1B49B, 1B49C, 1B49D, 1B49E, 1B49F, 1B49G, 1B49H, 1B49I, 1B49J, 1B49K, 1B49L, 1B49M, 1B49N, 1B49O, 1B49P, 1B49Q, 1B49R, 1B49S, 1B49T, 1B49U, 1B49V, 1B49W, 1B49X, 1B49Y, 1B49Z, 1B50, 1B50A, 1B50B, 1B50C, 1B50D, 1B50E, 1B50F, 1B50G, 1B50H, 1B50I, 1B50J, 1B50K, 1B50L, 1B50M, 1B50N, 1B50O, 1B50P, 1B50Q, 1B50R, 1B50S, 1B50T, 1B50U, 1B50V, 1B50W, 1B50X, 1B50Y, 1B50Z, 1B51, 1B51A, 1B51B, 1B51C, 1B51D, 1B51E, 1B51F, 1B51G, 1B51H, 1B51I, 1B51J, 1B51K, 1B51L, 1B51M, 1B51N, 1B51O, 1B51P, 1B51Q, 1B51R, 1B51S, 1B51T, 1B51U, 1B51V, 1B51W, 1B51X, 1B51Y, 1B51Z, 1B52, 1B52A, 1B52B, 1B52C, 1B52D, 1B52E, 1B52F, 1B52G, 1B52H, 1B52I, 1B52J, 1B52K, 1B52L, 1B52M, 1B52N, 1B52O, 1B52P, 1B52Q, 1B52R, 1B52S, 1B52T, 1B52U, 1B52V, 1B52W, 1B52X, 1B52Y, 1B52Z, 1B53, 1B53A, 1B53B, 1B53C, 1B53D, 1B53E, 1B53F, 1B53G, 1B53H, 1B53I, 1B53J, 1B53K, 1B53L, 1B53M, 1B53N, 1B53O, 1B53P, 1B53Q, 1B53R, 1B53S, 1B53T, 1B53U, 1B53V, 1B53W, 1B53X, 1B53Y, 1B53Z, 1B54, 1B54A, 1B54B, 1B54C, 1B54D, 1B54E, 1B54F, 1B54G, 1B54H, 1B54I, 1B54J, 1B54K, 1B54L, 1B54M, 1B54N, 1B54O, 1B54P, 1B54Q, 1B54R, 1B54S, 1B54T, 1B54U, 1B54V, 1B54W, 1B54X, 1B54Y, 1B54Z, 1B55, 1B55A, 1B55B, 1B55C, 1B55D, 1B55E, 1B55F, 1B55G, 1B55H, 1B55I, 1B55J, 1B55K, 1B55L, 1B55M, 1B55N, 1B55O, 1B55P, 1B55Q, 1B55R, 1B55S, 1B55T, 1B55U, 1B55V, 1B55W, 1B55X, 1B55Y, 1B55Z, 1B56, 1B56A, 1B56B, 1B56C, 1B56D, 1B56E, 1B56F, 1B56G, 1B56H, 1B56I, 1B56J, 1B56K, 1B56L, 1B56M, 1B56N, 1B56O, 1B56P, 1B56Q, 1B56R, 1B56S, 1B56T, 1B56U, 1B56V, 1B56W, 1B56X, 1B56Y, 1B56Z, 1B57, 1B57A, 1B57B, 1B57C, 1B57D, 1B57E, 1B57F, 1B57G, 1B57H, 1B57I, 1B57J, 1B57K, 1B57L, 1B57M, 1B57N, 1B57O, 1B57P, 1B57Q, 1B57R, 1B57S, 1B57T, 1B57U, 1B57V, 1B57W, 1B57X, 1B57Y, 1B57Z, 1B58, 1B58A, 1B58B, 1B58C, 1B58D, 1B58E, 1B58F, 1B58G, 1B58H, 1B58I, 1B58J, 1B58K, 1B58L, 1B58M, 1B58N, 1B58O, 1B58P, 1B58Q, 1B58R, 1B58S, 1B58T, 1B58U, 1B58V, 1B58W, 1B58X, 1B58Y, 1B58Z, 1B59, 1B59A, 1B59B, 1B59C, 1B59D, 1B59E, 1B59F, 1B59G, 1B59H, 1B59I, 1B59J, 1B59K, 1B59L, 1B59M, 1B59N, 1B59O, 1B59P, 1B59Q, 1B59R, 1B59S, 1B59T, 1B59U, 1B59V, 1B59W, 1B59X, 1B59Y, 1B59Z, 1B60, 1B60A, 1B60B, 1B60C, 1B60D, 1B60E, 1B60F, 1B60G, 1B60H, 1B60I, 1B60J, 1B60K, 1B60L, 1B60M, 1B60N, 1B60O, 1B60P, 1B60Q, 1B60R, 1B60S, 1B60T, 1B60U, 1B60V, 1B60W, 1B60X, 1B60Y, 1B60Z, 1B61, 1B61A, 1B61B, 1B61C, 1B61D, 1B61E, 1B61F, 1B61G, 1B61H, 1B61I, 1B61J, 1B61K, 1B61L, 1B61M, 1B61N, 1B61O, 1B61P, 1B61Q, 1B61R, 1B61S, 1B61T, 1B61U, 1B61V, 1B61W, 1B61X, 1B61Y, 1B61Z, 1B62, 1B62A, 1B62B, 1B62C, 1B62D, 1B62E, 1B62F, 1B62G, 1B62H, 1B62I, 1B62J, 1B62K, 1B62L, 1B62M, 1B62N, 1B62O, 1B62P, 1B62Q, 1B62R, 1B62S, 1B62T, 1B62U, 1B62V, 1B62W, 1B62X, 1B62Y, 1B62Z, 1B63, 1B63A, 1B63B, 1B63C, 1B63D, 1B63E, 1B63F, 1B63G, 1B63H, 1B63I, 1B63J, 1B63K, 1B63L, 1B63M, 1B63N, 1B63O, 1B63P, 1B63Q, 1B63R, 1B63S, 1B63T, 1B63



Stereophonic High-Fidelity Combination
MODEL SHC-8
Stereophonic High-Fidelity Victrola®
MODEL SHP-8
 AM-FM Tuner
MODEL 9-T-2

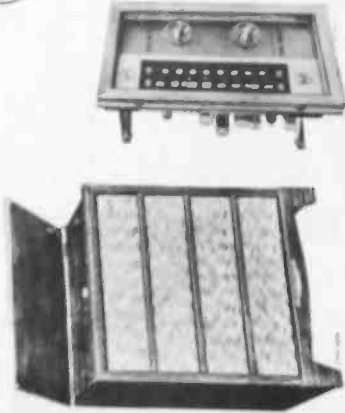
Tuner Chassis No. RC-1155AX
 Amp. Chassis No. RS-171

Record Changer RP-205C-2X, RP-205E-2X

SERVICE DATA
 — 1958 No. 13 —

PREPARED BY COMMERCIAL SERVICE
 RCA SERVICE COMPANY

A DIVISION OF
RADIO CORPORATION OF AMERICA
 CAMDEN 8, N. J.



Model SHC-8 Tuner—Model VIII D—
 Model SHP-8 Tuner—Model VIII D—
 Alignment, Oak, Maple or Walnut

Model 9-T-2
 AM-FM Tuner

Model SHC-8 is a combination radio-phonograph. It is a combination of Model SHP-8 and Model 9-T-2.
 Model SHP-8 is a phonograph using AF amplifier chassis RS-171 record changer RP-205C-2X or RP-205E-2X and four speakers.
 Model 9-T-2 is an AM-FM tuner using tuner chassis RC-1155AX. It is an accessory designed for installation in Model SHP-8.

TUNING RANGE
 Standard Broadcast (AM) 540-1600 kc
 Frequency Modulation (FM) 88-108 mc

INTERMEDIATE FREQUENCIES
 AM 455 kc FM 10.7 mc

TUBE COMPLEMENT

- TUNER CHASSIS RC-1155AX**
- (1) RCA 6X6 R.F. Amplifier
 - (2) RCA 12X8 Mixer-Oscillator
 - (3) RCA 12BA6 I.F. Amplifier
 - (4) RCA 12AU6 F.M. I.F. Amplifier
 - (5) RCA 12AU6 F.M. I.F. Amplifier
 - (6) RCA 12AV6 F.M. Detector
 - (7) RCA 12AV6 AM Det.-A.V.C.—Phase Inv. Rectifier
 - (8) RCA 35W4 Rectifier
- AMPLIFIER CHASSIS RS-171**
- (1) RCA 6CG7 Two-channel A.F. Pre-amplifier
 - (2) RCA 6CG7 Two-channel 1st A.F. Amplifier
 - (3) RCA 6CG7 Two-channel 2nd A.F. Amplifier
 - (4) RCA 6V6GT Left Channel A.F. Output
 - (5) RCA 6V6GT Right Channel A.F. Output
 - (6) RCA 5Y4GT Rectifier

RECORD CHANGER
 Turntable speed 16 2/3, 33 1/3, 45 or 78 r.p.m.
 Record capacity Up to fifteen 10 inch or ten 12 inch or ten 10 in. and 12 in. international
 Pickup (Stock No. 106770) Stereophonic Ceramic

SPECIFICATIONS

LOUDSPEAKERS
 Two 12" FM "woofers" 6.8 ohms each @ 400 cycles
 Two 3 1/2" FM "treble" 6.8 ohms each @ 3000 cycles

POWER SUPPLY RATING
 Model SHC-8: 115 volts, 60 cycles 140 watts
 Model SHP-8: 115 volts, 60 cycles 105 watts

AUDIO POWER OUTPUT
 Stereo 7 watts max. on each channel
 Monaural 14 watts maximum

FREQUENCY RESPONSE 45 cycles to 20,000 cycles

TUNING DRIVE RATIO 7W:1 (3% turns of knob)

DIMENSIONS (Overall)
 Height 32" Width 28 1/2" Depth 17 1/2"

ALIGNMENT PROCEDURE

ALIGNMENT INDICATORS:

An RCA VoltOhmyst® or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate maximum audio output during AM alignment. Connect the output meter across the speaker voice coil. The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure AVC voltage. When audio output is being measured, the volume control should be turned to maximum. Adjust tone controls to mid-position.

SIGNAL GENERATOR:

For all alignment operations, connect the low side of the signal generator to the receiver chassis. If output measurement is used for AM alignment, the output of the signal generator should be kept as low as possible to avoid AVC action.

AM Alignment

FUNCTION SWITCH IN AM POSITION

Steps	Connected high side of sig. gen. to—	Big gen. output	Turn radio dial to—	Adjust for peak output
1	Pin No. 1 in series with .01 mfd. capacitor	455 kc. (mod.)	Quiet point at high freq. end	T2 bottom core (sec.) T2 top core (pri.)
2	Top lug of AM IF coil	1600 kc. (mod.)	1600 kc. (gang open)	C1-E.T. (sec.)
3	Short wire placed near radiated signal	1400 kc. (mod.)	1400 kc. signal	C1-A.T. (pri.) C1-C.T. (pri.)
4		800 kc. (mod.)	800 kc. signal	L4 (sec.) (rock gang)
5				L4 (pri.)
6				
7				

Repeat steps 4, 5 and 6 until maximum gain is obtained

Oscillator frequency is above signal frequency on both AM and FM

FM SWEEP ALIGNMENT:

If an FM sweep generator is used for FM alignment, adjust for 10.7 mc, 0.4 mc sweep. Connect oscillator across C23, adjusting discriminator T6 top core for 10.7 mc crossover, and T6 bottom core for balanced peaks. Peak separation should be approximately 330 kc. When aligning the other FM tuned circuits, connect oscilloscope lead through a 220K resistor to pin 1 of V5. Follow alignment table sequence, adjusting for maximum gain and symmetrical curves.

FM Alignment

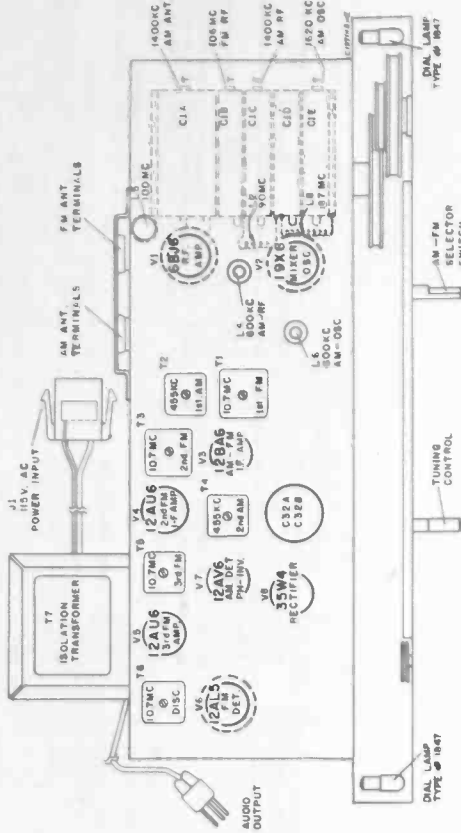
FUNCTION SWITCH IN FM POSITION

Steps	Connected high side of sig. gen. to—	Big gen. output	Turn radio dial to—	Adjust for max. output
1	Pin No. 1 of V5-12A06	10.7 mc	Quiet point at frequency band	T6 top core T6 bottom core T6 bottom core R18 and R19
2	Pin No. 1 of V5-12A06			T7 top core T7 bottom core
3	Pin No. 1 of V5-12A06			T7 top core T7 bottom core
4	C1-B resistor			T7 top core T7 bottom core
5	FM Ant. terminals (using shielded)	87 mc	87 mc signal	FM osc. coil
6	FM Ant. terminals	108 mc	108 mc signal	FM A.F. C14
7	FM Ant. terminals	90 mc	90 mc signal	FM R.F. L2
8				
9				

Repeat steps 6 and 7 until maximum gain is obtained

If necessary for accurate peaking, the winding in the same transformer coil being peaked should be loaded with a 500 ohm resistor. This resistor will load maximum impedance on grid terminal and output adjusted for 1 volt a.c. Dress VoltOhmyst lead away from input circuits.

NOTE—FM coils L8, L2 and L5 are adjusted by increasing or decreasing spacing between turns.



RC-1155AX Tuner Chassis—View Showing Location of Tubes and Controls

DESCRIPTION

Model SHC-8 is a radio-phonograph. It is a combination of Model SHP-8 and Model 9-T-2.

Model SHP-8 is a phonograph designed for use with either stereophonic records or monaural records. The instrument employs audio amplifier chassis RS-171, record changer RP-205C-2X or RP-205E-2X, two 12-inch wide-range speakers and two 3 1/2-inch tweeters mounted on plastic housing to give panoramic distribution of the higher frequencies.

The tuner chassis provides R-F amplification on both AM and FM operation. The FM antenna input is broad-banded and resonates to the approximate center of the FM band. This mixer is pentode in AM L-F operation and triode in FM operation. The detector provides AVC voltage, FM I-F circuit, and a discriminator detector. An item of unusual interest is the inclusion of an AF phase inverter in this chassis. This simplifies switching between stereo and monaural operation in the audio chassis. AC supply voltage for the 35W4 rectifier tube and the series connected tube heaters is obtained from an isolation transformer.

A five-position audio function switch is contained in the audio amplifier chassis and permits use of a tape recorder in conjunction with either radio or phono functions. This chassis has two single-

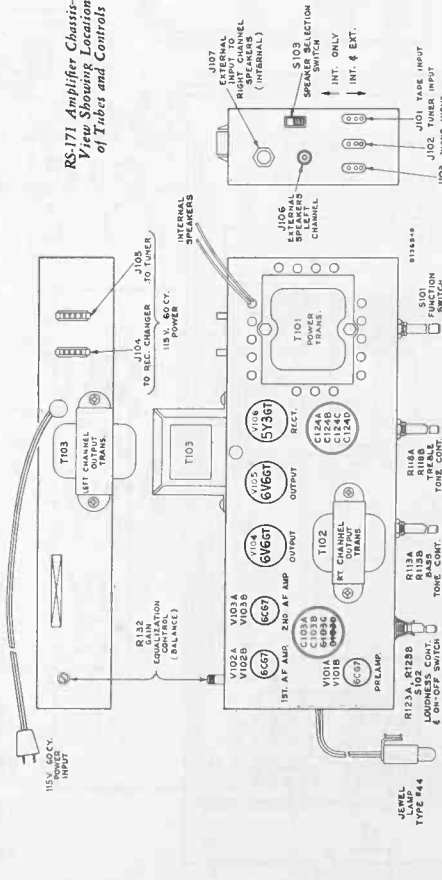
ended amplifiers for dual-channel amplification of stereophonic sound from records or tapes. The outputs of these two single-ended amplifiers are reconnected as a push-pull amplifier when using the instrument for monaural reproduction. Three 6CG7 tubes (dual 6V6CT) provide three stages of dual-channel AF amplification; a push-pull output stage in each channel. Negative feedback, applied to each third AF amplifier, is derived from the secondaries of the two output transformers.

A dual loudness control and dual tone controls are used to provide wide range of volume in each channel. The right channel amplifier channel. A gain equalization control in the right channel amplifier stage permits the right channel (internal speakers) output to be balanced with left channel (external speakers) output.

A speaker selection switch (one system or two system) is used to connect the two amplifier channels in parallel when internal speakers only are used. Provision is made to use this instrument as a companion speaker in conjunction with other amplifiers when so desired.

A four-speed record changer (16 2/3, 33 1/2, 45 and 78 r.p.m.) is used which is designed for use with either stereophonic or monaural records. It utilizes a ceramic two-stylus pickup having two elements and two audio outputs.

RS-171 Amplifier Chassis—View Showing Location of Tubes and Controls



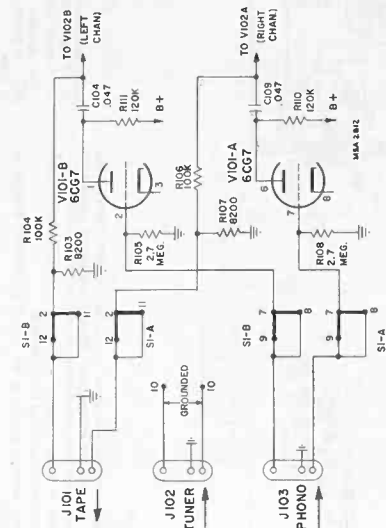
CRITICAL LEAD DRESS

1. All FM I-F transformer grid and plate leads should be short and direct as possible and kept low, near chassis.
2. R18 and R19 leads should be kept as short as possible on T6 terminal 6 side.
3. Keep leads V5 pin 5, to T6 term 1, as short as possible and low near chassis.
4. Dress C33 down on chassis and against terminal board. Run filament lead between V5 and V6 on side of V6 socket opposite C33.
5. All bypass capacitors should have leads as short as possible.
6. Green lead from AM oscillator stator gang terminal to AM oscillator coil should be dressed against front of shield box and up above filament choke.
7. RF plate choke L1, should be dressed at least 1/4" away from AM R.F. coil L4 and at least 1/4" from shield.
8. Mixer grid condenser C10 should be dressed away from FM oscillator stator terminal and away from leads connecting to terminals 8 and 9 of V2 socket.
9. Filament chokes L10 and L11 should be raised a minimum of 1/16" above chassis.
10. Oscillator grid condenser C12 should have short leads and be dressed away from filament choke L10.
11. Keep wires and components away from 1200 ohm resistor R22.
12. C24 should ground in hole near terminal 3 of V6 with short leads.
13. Heavy buss lead from terminal 6 of V2 to S1-A terminal 9 should be short and direct.

CHASSIS RS-171

1. The following components, R103, R104, R105, R111 and C104, in the preamplifier (V101) section should be dressed with short leads and be dressed away from R106, R107, R108, R110 and C109.
2. Stand PC101 and PC102 vertically between the tone controls.
3. Dress all wires and components away from R140 (2200 ohm).
4. Leads from function switch to V101 should be dressed down to chassis and against chassis apron; maintain some separation between wires.

POSITION #1 — PHONO SINGLE
Yellow leads (secondary tap) of both output transformers are connected in parallel through S101-B Front.

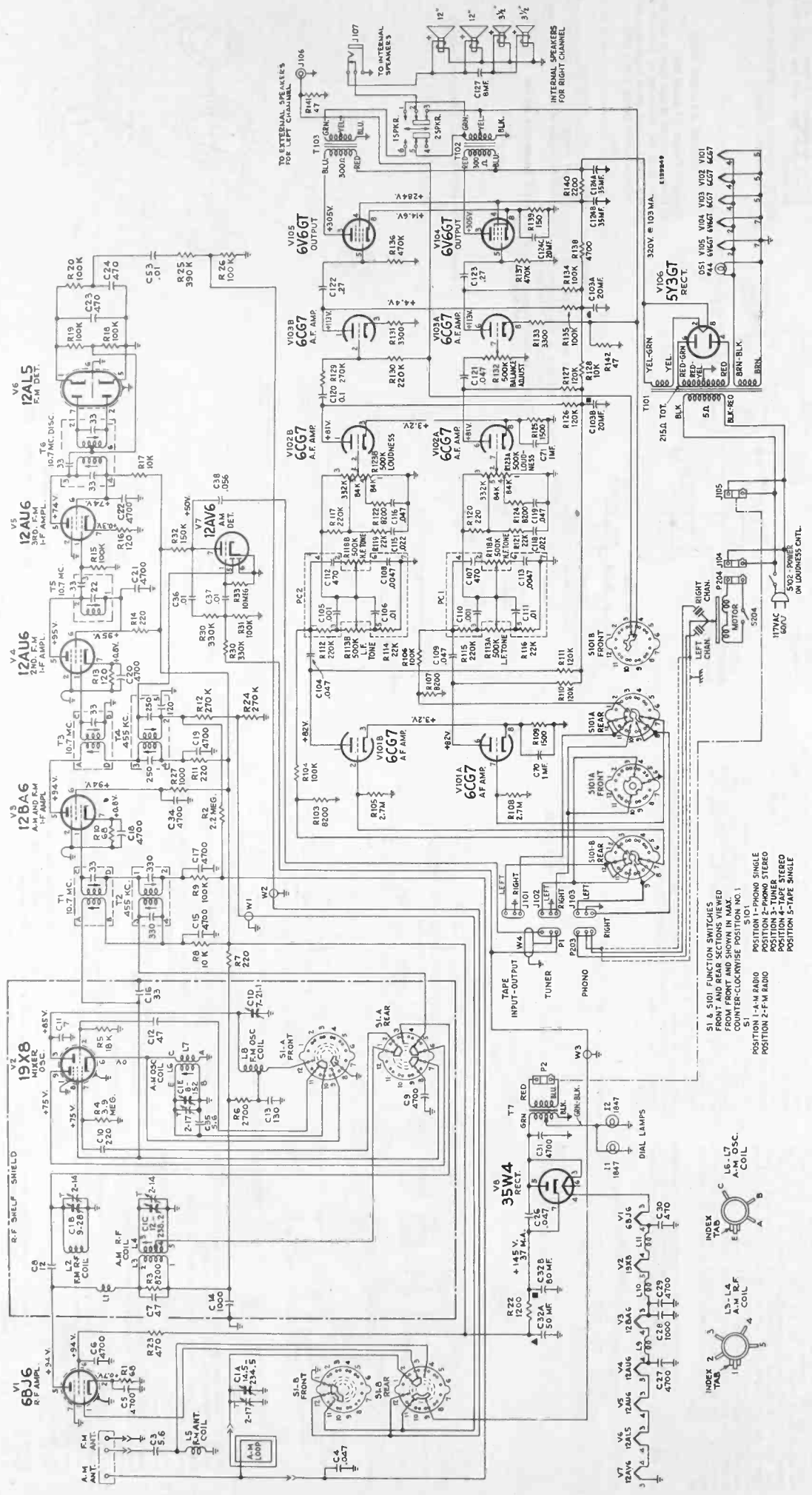


POSITION #2 — PHONO STEREO
Identical to Position #1 except that:
(1) there is no connection between term. #7 and #8 of the function switch between term. #11 and #2 of the function switch.
(2) S101-B Front does not connect yellow leads of output transformers in parallel.

POSITION #5 — TAPE SINGLE
Identical to Position #1 except that:
(1) Through connection of tape inputs is made through term. #12 and #7 instead of #11 and #7.
(2) Yellow leads of both output transformers are connected in parallel through S101-B Front.

POSITION #3 — TUNER
(1) Tuner input is connected to grids of V101-A and V101-B.
(2) Output to tape recorder (T101) is connected to outputs of V101-A and V101-B as in Position #1.
(3) Yellow leads (secondary tap) of both output transformers are connected in parallel through S101-B Front.





Complete Schematic Diagram

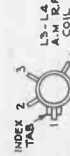
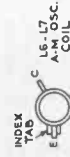
The output to a tape recorder at the TAPE INPUT/OUTPUT jack (J102) is two-channel stereophonic when stereophonic records are being played (function switch must be set to PHONO STEREO). The output to a tape recorder is identical on both channels when:

- (1) Monaural records are being played.
- (2) When function switch is set at either PHONO SINGLE or TUNER.

**FOR RECORD CHANGER INFORMATION—
REFER TO "RP-205 SERIES SERVICE DATA"
AND TO "RP-205 SERIES SERVICE
DATA SUPPLEMENT"**

SPEAKER SELECTION SWITCH
The speaker selection switch (S103) must be set at "INT. ONLY" at all times except when external speakers are connected to the left channel. EXT. speaker jack.
The speaker selection switch (S103) must be set at "INT. & EXT." to permit stereophonic sound reproduction from either records or tape.

- S1 & S101 FUNCTION SWITCHES FRONT AND REAR SECTIONS VIEWED FROM FRONT AND SHOWN IN MAX. CENTER-CLOCKWISE POS. (NO. 1)
- S1 POSITION 1—PHONO SINGLE
 - S1 POSITION 2—PHONO STEREO
 - S1 POSITION 3—TUNER
 - S1 POSITION 4—TAPE STEREO
 - S1 POSITION 5—TAPE SINGLE

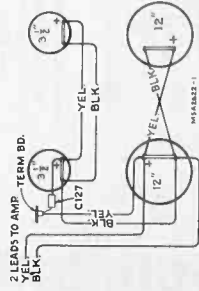


CHANNEL GAIN EQUALIZATION — CHASSIS RS-171

A gain equalization control is provided to enable the gain of the RIGHT CHANNEL (internal speakers) to be balanced with the gain of the LEFT CHANNEL (external speakers).

This equalization control (R132) is located on the bottom apron of the chassis forward the front of the cabinet. When adjusting this control, four conditions must exist:

1. A monaural signal input must be used. This should be a monaural record, use of the record when measuring with an output meter or use a music record for listening test.
2. The function switch (S101) must be in #2 position (PH STEREO). This enables the two channels to have independent outputs.
3. The speaker selection switch (S103) must be in the 'JMT. & EXTERNAL' position. This is necessary for the two channels to have independent outputs.



IMPORTANT

The four speakers must be connected as shown in the illustration at left. Improper connections may result in distorted or weak reproduction.

REPLACEMENT PARTS—Continued

SYMBOL NO.	STOCK NO.	DESCRIPTION	SYMBOL NO.	STOCK NO.	DESCRIPTION
R131	52233	Clip—F transformers mounting	R131	52233	3200 ohms, ±10%
R132	106212	Connector—2 contact female for antenna leads	R132	106212	C
R133	502233	Connector—2 contact male audio cable from tuner	R133	502233	3000 ohms ±10%
R134, R135	502410	Diode—Diode drive (250 foot spool)	R134, R135	502410	100,000 ohms, ±10%
R136	502240	Diode—Diode drive (250 foot spool)	R136	502240	470,000 ohms, ±10%
R137	502240	Diode—Diode drive (250 foot spool)	R137	502240	470,000 ohms, ±10%
R138	502240	Diode—Diode drive (250 foot spool)	R138	502240	470,000 ohms, ±10%
R139	522115	Eyelet—Tuner wood frame and dial mounting	R139	522115	150 ohms, ±10%, 2 w.
R140	522222	Crane—Wood frame for AM/FM tuner dial	R140	522222	2200 ohms, ±10%, 2 w.
R141, R102	522047	Crane—Wood frame for AM/FM tuner dial	R141, R102	522047	47 ohms, ±10%, 2 w.
R142	106209	Plate—Dial backplate with mounting holes	R142	106209	Part of R132A, R123B
R143	106210	Plate—Dial backplate with mounting holes	R143	106210	Part of R132A, R123B
R144	106211	Plate—Dial backplate with mounting holes	R144	106211	Part of R132A, R123B
R145	106212	Plate—Dial backplate with mounting holes	R145	106212	Part of R132A, R123B
R146	106213	Plate—Dial backplate with mounting holes	R146	106213	Part of R132A, R123B
R147	106214	Plate—Dial backplate with mounting holes	R147	106214	Part of R132A, R123B
R148	106215	Plate—Dial backplate with mounting holes	R148	106215	Part of R132A, R123B
R149	106216	Plate—Dial backplate with mounting holes	R149	106216	Part of R132A, R123B
R150	106217	Plate—Dial backplate with mounting holes	R150	106217	Part of R132A, R123B
R151	106218	Plate—Dial backplate with mounting holes	R151	106218	Part of R132A, R123B
R152	106219	Plate—Dial backplate with mounting holes	R152	106219	Part of R132A, R123B
R153	106220	Plate—Dial backplate with mounting holes	R153	106220	Part of R132A, R123B
R154	106221	Plate—Dial backplate with mounting holes	R154	106221	Part of R132A, R123B
R155	106222	Plate—Dial backplate with mounting holes	R155	106222	Part of R132A, R123B
R156	106223	Plate—Dial backplate with mounting holes	R156	106223	Part of R132A, R123B
R157	106224	Plate—Dial backplate with mounting holes	R157	106224	Part of R132A, R123B
R158	106225	Plate—Dial backplate with mounting holes	R158	106225	Part of R132A, R123B
R159	106226	Plate—Dial backplate with mounting holes	R159	106226	Part of R132A, R123B
R160	106227	Plate—Dial backplate with mounting holes	R160	106227	Part of R132A, R123B
R161	106228	Plate—Dial backplate with mounting holes	R161	106228	Part of R132A, R123B
R162	106229	Plate—Dial backplate with mounting holes	R162	106229	Part of R132A, R123B
R163	106230	Plate—Dial backplate with mounting holes	R163	106230	Part of R132A, R123B
R164	106231	Plate—Dial backplate with mounting holes	R164	106231	Part of R132A, R123B
R165	106232	Plate—Dial backplate with mounting holes	R165	106232	Part of R132A, R123B
R166	106233	Plate—Dial backplate with mounting holes	R166	106233	Part of R132A, R123B
R167	106234	Plate—Dial backplate with mounting holes	R167	106234	Part of R132A, R123B
R168	106235	Plate—Dial backplate with mounting holes	R168	106235	Part of R132A, R123B
R169	106236	Plate—Dial backplate with mounting holes	R169	106236	Part of R132A, R123B
R170	106237	Plate—Dial backplate with mounting holes	R170	106237	Part of R132A, R123B
R171	106238	Plate—Dial backplate with mounting holes	R171	106238	Part of R132A, R123B
R172	106239	Plate—Dial backplate with mounting holes	R172	106239	Part of R132A, R123B
R173	106240	Plate—Dial backplate with mounting holes	R173	106240	Part of R132A, R123B
R174	106241	Plate—Dial backplate with mounting holes	R174	106241	Part of R132A, R123B
R175	106242	Plate—Dial backplate with mounting holes	R175	106242	Part of R132A, R123B
R176	106243	Plate—Dial backplate with mounting holes	R176	106243	Part of R132A, R123B
R177	106244	Plate—Dial backplate with mounting holes	R177	106244	Part of R132A, R123B
R178	106245	Plate—Dial backplate with mounting holes	R178	106245	Part of R132A, R123B
R179	106246	Plate—Dial backplate with mounting holes	R179	106246	Part of R132A, R123B
R180	106247	Plate—Dial backplate with mounting holes	R180	106247	Part of R132A, R123B
R181	106248	Plate—Dial backplate with mounting holes	R181	106248	Part of R132A, R123B
R182	106249	Plate—Dial backplate with mounting holes	R182	106249	Part of R132A, R123B
R183	106250	Plate—Dial backplate with mounting holes	R183	106250	Part of R132A, R123B
R184	106251	Plate—Dial backplate with mounting holes	R184	106251	Part of R132A, R123B
R185	106252	Plate—Dial backplate with mounting holes	R185	106252	Part of R132A, R123B
R186	106253	Plate—Dial backplate with mounting holes	R186	106253	Part of R132A, R123B
R187	106254	Plate—Dial backplate with mounting holes	R187	106254	Part of R132A, R123B
R188	106255	Plate—Dial backplate with mounting holes	R188	106255	Part of R132A, R123B
R189	106256	Plate—Dial backplate with mounting holes	R189	106256	Part of R132A, R123B
R190	106257	Plate—Dial backplate with mounting holes	R190	106257	Part of R132A, R123B
R191	106258	Plate—Dial backplate with mounting holes	R191	106258	Part of R132A, R123B
R192	106259	Plate—Dial backplate with mounting holes	R192	106259	Part of R132A, R123B
R193	106260	Plate—Dial backplate with mounting holes	R193	106260	Part of R132A, R123B
R194	106261	Plate—Dial backplate with mounting holes	R194	106261	Part of R132A, R123B
R195	106262	Plate—Dial backplate with mounting holes	R195	106262	Part of R132A, R123B
R196	106263	Plate—Dial backplate with mounting holes	R196	106263	Part of R132A, R123B
R197	106264	Plate—Dial backplate with mounting holes	R197	106264	Part of R132A, R123B
R198	106265	Plate—Dial backplate with mounting holes	R198	106265	Part of R132A, R123B
R199	106266	Plate—Dial backplate with mounting holes	R199	106266	Part of R132A, R123B
R200	106267	Plate—Dial backplate with mounting holes	R200	106267	Part of R132A, R123B
R201	106268	Plate—Dial backplate with mounting holes	R201	106268	Part of R132A, R123B
R202	106269	Plate—Dial backplate with mounting holes	R202	106269	Part of R132A, R123B
R203	106270	Plate—Dial backplate with mounting holes	R203	106270	Part of R132A, R123B
R204	106271	Plate—Dial backplate with mounting holes	R204	106271	Part of R132A, R123B
R205	106272	Plate—Dial backplate with mounting holes	R205	106272	Part of R132A, R123B
R206	106273	Plate—Dial backplate with mounting holes	R206	106273	Part of R132A, R123B
R207	106274	Plate—Dial backplate with mounting holes	R207	106274	Part of R132A, R123B
R208	106275	Plate—Dial backplate with mounting holes	R208	106275	Part of R132A, R123B
R209	106276	Plate—Dial backplate with mounting holes	R209	106276	Part of R132A, R123B
R210	106277	Plate—Dial backplate with mounting holes	R210	106277	Part of R132A, R123B
R211	106278	Plate—Dial backplate with mounting holes	R211	106278	Part of R132A, R123B
R212	106279	Plate—Dial backplate with mounting holes	R212	106279	Part of R132A, R123B
R213	106280	Plate—Dial backplate with mounting holes	R213	106280	Part of R132A, R123B
R214	106281	Plate—Dial backplate with mounting holes	R214	106281	Part of R132A, R123B
R215	106282	Plate—Dial backplate with mounting holes	R215	106282	Part of R132A, R123B
R216	106283	Plate—Dial backplate with mounting holes	R216	106283	Part of R132A, R123B
R217	106284	Plate—Dial backplate with mounting holes	R217	106284	Part of R132A, R123B
R218	106285	Plate—Dial backplate with mounting holes	R218	106285	Part of R132A, R123B
R219	106286	Plate—Dial backplate with mounting holes	R219	106286	Part of R132A, R123B
R220	106287	Plate—Dial backplate with mounting holes	R220	106287	Part of R132A, R123B
R221	106288	Plate—Dial backplate with mounting holes	R221	106288	Part of R132A, R123B
R222	106289	Plate—Dial backplate with mounting holes	R222	106289	Part of R132A, R123B
R223	106290	Plate—Dial backplate with mounting holes	R223	106290	Part of R132A, R123B
R224	106291	Plate—Dial backplate with mounting holes	R224	106291	Part of R132A, R123B
R225	106292	Plate—Dial backplate with mounting holes	R225	106292	Part of R132A, R123B
R226	106293	Plate—Dial backplate with mounting holes	R226	106293	Part of R132A, R123B
R227	106294	Plate—Dial backplate with mounting holes	R227	106294	Part of R132A, R123B
R228	106295	Plate—Dial backplate with mounting holes	R228	106295	Part of R132A, R123B
R229	106296	Plate—Dial backplate with mounting holes	R229	106296	Part of R132A, R123B
R230	106297	Plate—Dial backplate with mounting holes	R230	106297	Part of R132A, R123B
R231	106298	Plate—Dial backplate with mounting holes	R231	106298	Part of R132A, R123B
R232	106299	Plate—Dial backplate with mounting holes	R232	106299	Part of R132A, R123B
R233	106300	Plate—Dial backplate with mounting holes	R233	106300	Part of R132A, R123B
R234	106301	Plate—Dial backplate with mounting holes	R234	106301	Part of R132A, R123B
R235	106302	Plate—Dial backplate with mounting holes	R235	106302	Part of R132A, R123B
R236	106303	Plate—Dial backplate with mounting holes	R236	106303	Part of R132A, R123B
R237	106304	Plate—Dial backplate with mounting holes	R237	106304	Part of R132A, R123B
R238	106305	Plate—Dial backplate with mounting holes	R238	106305	Part of R132A, R123B
R239	106306	Plate—Dial backplate with mounting holes	R239	106306	Part of R132A, R123B
R240	106307	Plate—Dial backplate with mounting holes	R240	106307	Part of R132A, R123B
R241	106308	Plate—Dial backplate with mounting holes	R241	106308	Part of R132A, R123B
R242	106309	Plate—Dial backplate with mounting holes	R242	106309	Part of R132A, R123B
R243	106310	Plate—Dial backplate with mounting holes	R243	106310	Part of R132A, R123B
R244	106311	Plate—Dial backplate with mounting holes	R244	106311	Part of R132A, R123B
R245	106312	Plate—Dial backplate with mounting holes	R245	106312	Part of R132A, R123B
R246	106313	Plate—Dial backplate with mounting holes	R246	106313	Part of R132A, R123B
R247	106314	Plate—Dial backplate with mounting holes	R247	106314	Part of R132A, R123B
R248	106315	Plate—Dial backplate with mounting holes	R248	106315	Part of R132A, R123B
R249	106316	Plate—Dial backplate with mounting holes	R249	106316	Part of R132A, R123B
R250	106317	Plate—Dial backplate with mounting holes	R250	106317	Part of R132A, R123B
R251	106318	Plate—Dial backplate with mounting holes	R251	106318	Part of R132A, R123B
R252	106319	Plate—Dial backplate with mounting holes	R252	106319	Part of R132A, R123B
R253	106320	Plate—Dial backplate with mounting holes	R253	106320	Part of R132A, R123B
R254	106321	Plate—Dial backplate with mounting holes	R254	106321	Part of R132A, R123B
R255	106322	Plate—Dial backplate with mounting holes	R255	106322	Part of R132A, R123B
R256	106323	Plate—Dial backplate with mounting holes	R256	106323	Part of R132A, R123B
R257	106324	Plate—Dial backplate with mounting holes	R257	106324	Part of R132A, R123B
R258	106325	Plate—Dial backplate with mounting holes	R258	106325	Part of R132A, R123B
R259	106326	Plate—Dial backplate with mounting holes	R259	106326	Part of R132A, R123B
R260	106327	Plate—Dial backplate with mounting holes	R260	106327	Part of R132A, R123B
R261	106328	Plate—Dial backplate with mounting holes	R261	106328	Part of R132A, R123B
R262	106329	Plate—Dial backplate with mounting holes	R262	106329	Part of R132A, R123B
R263	106330	Plate—Dial backplate with mounting holes	R263	106330	Part of R132A, R123B
R264	106331	Plate—Dial backplate with mounting holes	R264	106331	Part of R132A, R123B
R265	106332	Plate—Dial backplate with mounting holes	R265	106332	Part of R132A, R123B
R266	106333	Plate—Dial backplate with mounting holes	R266	106333	Part of R132A, R123B
R267	106334	Plate—Dial backplate with mounting holes	R267	106334	Part of R132A, R123B
R268	106335	Plate—Dial backplate with mounting holes	R268	106335	Part of R132A, R123B
R269	106336	Plate—Dial backplate with mounting holes	R269	106336	Part of R132A, R123B
R270	106337	Plate—Dial backplate with mounting holes	R270	106337	Part of R132A, R123B
R271	106338	Plate—Dial backplate with mounting holes	R271	106338	Part of R132A,

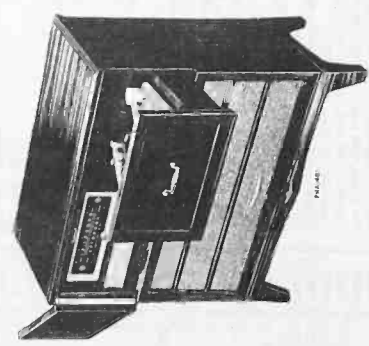
RCA VICTOR

Stereophonic High-Fidelity Combination MODEL SHC-4 Tuner/Amp. Chassis No. RC-1168C Record Changer RP-205G-1 SERVICE DATA

- 1958 No. 14 -

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE COMPANY

A DIVISION OF
RADIO CORPORATION OF AMERICA
CAMDEN 8, N. J.



Model SHC-4 The "Mark IV"
Mahogany, Maple or Oak

SPECIFICATIONS

TUNING RANGE	Standard Broadcast (AM) 540-1,600 kc. Frequency Modulation (FM) 88-108 mc.
INTERMEDIATE FREQUENCIES	AM 455 kc. FM 10.7 mc.
TUBE COMPLEMENT	(1) RCA 6CB6 R.F. Amplifier (2) RCA 6X8 Mixer & Oscillator (3) RCA 6BA6 I.F. Amplifier (4) RCA 6AU6 2nd F.M. I.F. Ampl. (5) RCA 6AV6 Ratio Detector (6) RCA 6AL7-GT A.M. Det.—A.V.C.—Ph. Inv. (7) RCA 6AL7-GT Tuning Eye (8) RCA 5A5A4 Rectifier (9) RCA 6CG7 Two-channel Audio Preamp. (10) RCA 6CG7 Two-channel Audio Ampl. (11) RCA 6CG7 Two-channel Audio Ampl. (12) RCA 6V6GT Left Channel Output (13) RCA 6V6GT Right Channel Output (14) RCA 6V6GT Right Channel Output
POWER SUPPLY RATING	115 volts, 60 cycles, 145 watts (includes record changer)
TUNING DRIVE RATIO	Up to fifteen 7 inch or twelve 10 inch or ten 12 inch and 12 inch intermixed
RECORD CHANGER	Turntable speed 16%, 33 1/3, 45 or 78 r.p.m. Record capacity Up to fifteen 7 inch or ten 12 inch or ten 12 inch and 12 inch intermixed
AUDIO POWER OUTPUT	Pickup Stock No. 106770 14 watts maximum
FREQUENCY RESPONSE	. . . . . 45 cycles to 20,000 cycles
LOUDSPEAKERS	Two 12" PM "woofers" 8 ohms @ 400 cycles Two 3 1/2" PM "tweeters" 5-8 ohms @ 3000 cycles
CABINET DIMENSIONS	Height, 34" Width, 38" Depth, 16 1/2"

DESCRIPTION

The "MARK IV" is a stereophonic high-fidelity combination instrument consisting of a tuner/amplifier, stereophonic record changer and four speakers all in one cabinet.

The tuner/amplifier incorporates a tuned r.f. stage, mixer/oscillator stages of AM i.f. amplification and three stages of FM i.f. amplification. Each audio channel has a separate stereo reproduction. Each audio channel has a separate inverse feedback derived from the secondaries of the two output transformers, is applied to the third a.f. amplifiers.

The circuit is designed to enable tape recordings to be made from either monaural (either monaural or stereo) or radio programs. The program being recorded can be monitored on the speakers.

A two-pullbutton switch, located above the tuning dial, is used to select either MONAURAL or STEREO audio output. This switch permits stereo reproduction from stereophonic sources and yet retaining many of the advantages of push-pull operation when monaural sources are used. A "left channel" external speaker system must be used in conjunction with the "MARK IV" when stereophonic sound is desired.

A two-position slide-type switch, located on the back of the chassis, is used to permit operating the two audio output channels in parallel when a "left channel" speaker system is not connected. Provision is made for use of this instrument as a companion speaker unit in conjunction with stereotape players.

ALIGNMENT PROCEDURE

Signal Generator
For alignment operations connect the low side of the signal generator to the receiver chassis. The output of the signal generator should always be controlled to prevent over-loading or excessive AVC action.

Alignment Indicators
For measuring the developed d-c voltage across R45 or R47 during FM alignment on RCA VoltOhmyst® or an equivalent meter should be used.

The RCA VoltOhmyst can also be used to indicate audio output voltage across the voice coil or developed voltage on the AVC bus.

Alignment Sequence
There is a slight interaction between AM and FM adjustments on the tuning condenser; if a large amount of adjustment is required of any circuit, all others should be checked in the following order:
FM I.F. AM I.F. AM Osc. ant. and r.f.
FM Osc. ant. and r.f. Final adjustment of AM ant. trimmer should be made with chassis and antenna in cabinet.

FM Alignment

RANGE SWITCH IN FM POSITION
VOLUME CONTROL, MAXIMUM—TONE CONTROL CENTER

Steps	Connect high side of signal generator to—	Sig. gen. output	Turn ratio dial to—	Adjust for peak output
1	Pin 1 of V5 in series with .01 mid. *	10.7 mc.	Quiet point at low freq. end	
2	Connect VoltOhmyst across R45 or R47 resistor. Adjust Sig. gen. output to give 5 volts d-c on VoltOhmyst.			T8 top core for max. d-c voltage across R45 or R47
3	Connect VoltOhmyst from chassis to junction of R40 and C33.			T8 bottom core for 0 volts d-c
4	Connect VoltOhmyst to pin #1 of V5			
5	Pin 1 of V3 in series with .01 mid. *	10.7 mc.	Quiet point freq. end	T7 top core. T5 top & bottom cores.
6	Stator of CID in series with .01 mid. *	90 mc.		T4-F3 top and bottom cores
7	FM ant. terminals thru 120 ohms in each side of line	90 mc.		Remove bottom **Osc. coil L4
8		106 mc. signal		Replace bottom terminal of L4 ant., C29 L4
9		90 mc.		**L1 ant. L3 r.f.
10	Repeat steps 7, 8 and 9 until further adjustment does not improve calibration.			

* Use ceramic disc capacitor with short leads.

** Alternate loading may be necessary to provide accurate observation of peaks. Alternate loading involves the use of a 270 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being pecked. Then the grid winding is loaded with the resistor while the plate winding is pecked. Only one winding is loaded at any one time.

It is possible to run the IF transformer cores all the way through the coil winding and obtain a second peak. This will cause serious overcoupling and should be avoided by using a marked adjusting stick. The correct peak is always the first peak obtained when the core is started in from the "backed all the way out" position.

** Note: FM antenna, mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The location of the top on the antenna coil is 1/2 turn to 3/4 turn from the ground end.

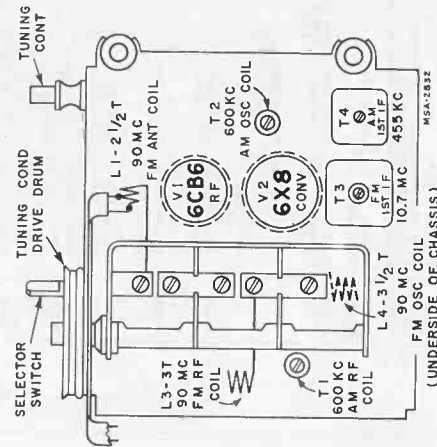
Oscillator frequency is above signal frequency on both AM and FM.

Oscilloscope Alignment

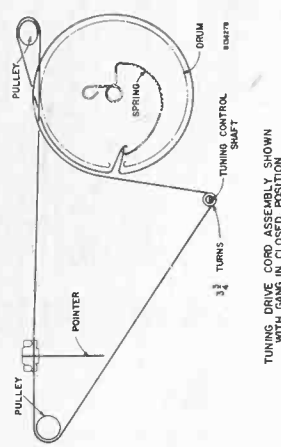
It is preferable to use a sweep generator and oscilloscope for aligning I.F. and R.F. circuits to obtain a visual observation of curve shape during alignment.

With FM sweep generator connected between FM ant. (#3) terminal and chassis, and oscilloscope connected between the junction of R40-C33 and chassis, the overall FM linearity may be observed. There should be a peak-to-peak separation of 250 kc. with 50,000 microvolts input.

For FM alignment of the ratio detector, connect oscilloscope to junction of R40-C33 as in alignment table, adjusting T8 top and bottom cores for 10.7 mc. crossover and balanced peaks. When aligning other FM tuned circuits, connect oscilloscope to pin #1 of V5 (3rd FM IF) and disconnect C29. Follow alignment table sequence, adjusting for maximum gain and symmetry.



FM Coil Locations



Tuning Drive Cord Assembly Shown With "MARK" in Closed Position

Dial Cord and Drive Assembly

ALIGNMENT PROCEDURE — LEAD DRESS

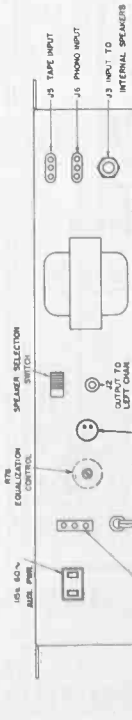
AM Alignment

Step	Range Switch in AM Position	Adjustment
1	Connect high side of lig. gen. to—	Adjust for peak output
2	Ph. 1 of V1	T5 bottom core (prt.)
3	T1 core, 4 in series with .01 mfd.	T4 top core (sec.)
4	gang fully open	C17
5	Shunt a 10,000 ohm resistor across the r.f. section (C17) in lig. genp.	C3 ant. C9 r.f.
6	600 kc. signal (Rock gang.)	T2 osc. signal
7	Remove the 10,000 ohm resistor and peak T1 r.f. at 600 kc.	
8	Repeat 3, 4, 5 and 7	

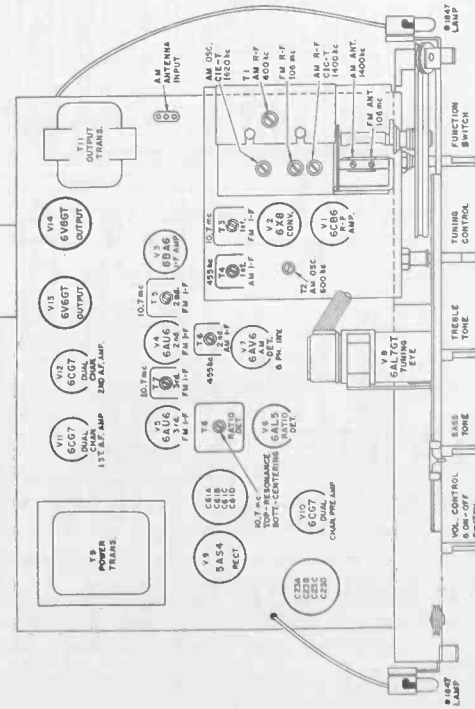
The RF transformer (T1) and the oscillator coil (T2) cores should be adjusted on the peak obtained with the core coming out the lug end of the coil. When adjusting from the top of the chassis, this is the peak with the core farthest into the coil.

Critical Lead Dress

1. Dress R16, R33, R83 and R87 up in the air and away from all other components.
2. Dress R51 and R4 down against chassis and keep leads short.
3. Keep leads of C33 and C39 short and dress these components down against chassis.
4. Keep all LF. bypass capacitor leads short.
5. Dress power line leads away from all audio leads at loudness control.
6. Do not relocate ground straps from chassis to R.F. shield.
7. Lead from terminal "gr." of 1st FM I.F. transformer to switch should be 3 inches ± 1/8".
8. Dress all components and wiring away from V1 grid circuit.
9. Dress R42 down against chassis.
10. Leads of R40 and R43 joining to R42 should be as short as possible.
11. Keep knob light leads away from audio leads on same terminal board.
12. Dress audio capacitors down against chassis and away from heater leads wherever possible.
13. Replace all shields securely if it has been necessary to remove them.



Location of Tubes and Major Components



CHANNEL GAIN EQUALIZATION

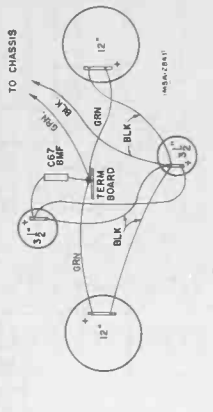
A gain equalization control is provided to enable the gain of the RIGHT CHANNEL (internal speakers) to be balanced with the gain of the LEFT CHANNEL (external speakers).

1. A monaural signal input must be used. This should be a monaural test record; use a frequency test record when measuring with an output meter or use a music record for listening test.
2. The function switch must be in #1 position (PHONO).
3. The STEREO pushbutton must be depressed. This enables the two channels to have independent outputs.
4. The speaker selection switch must be in the "INT. & EXT. SPKR'S." position. This is necessary for the two channels to have independent outputs.
5. Both internal and external speaker systems must be connected or the outputs loaded equally with resistors. If output is measured with an output meter, a channel having no speakers connected will have an abnormally high output voltage reading.

Adjust the equalization control (R78) to obtain right channel output equal to left channel output. The left channel gain is not adjustable.

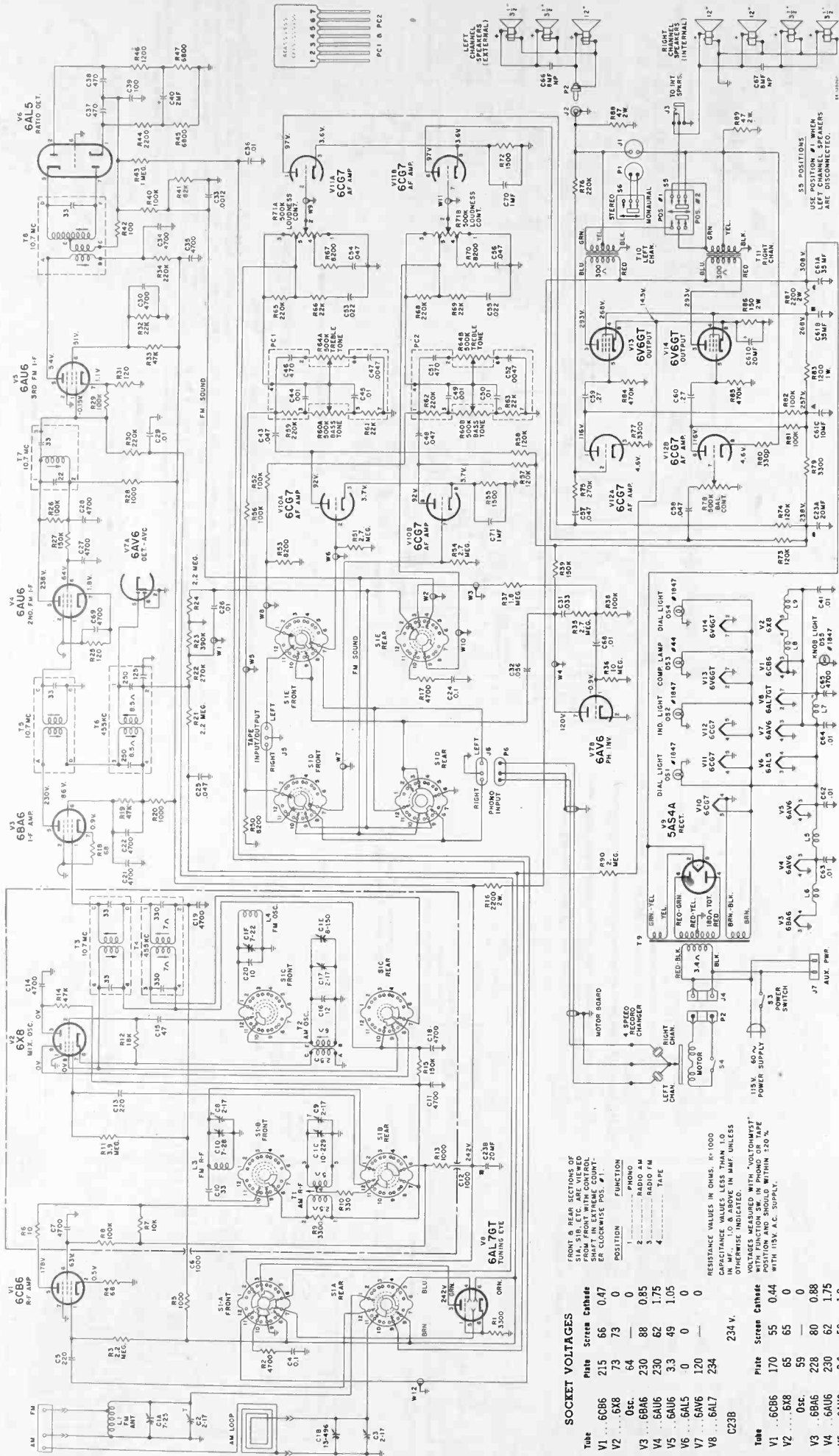
It is not necessary to measure the audio output while making the equalization. The best adjustment accuracy can usually be had by the left channel speaker placed for stereo listening. Adjust the balance control until the sound appears to be coming from a point midway between the two speakers.

If the external speaker system is other than 3.5 ohms impedance, the output voltages will not be equal for equal power output.



Speaker Wiring Assembly

COMPLETE SCHEMATIC DIAGRAM



FRONT & REAR SECTIONS OF SHUNT IN EXTREME CONTROL OR CLOCKWISE POS. #1

POSITION	FUNCTION
1	PHONO
2	RADIO AM
3	RADIO FM
4	TAPE

RESISTANCE VALUES IN OHMS. R=1000 IN METRIC & ABOVE IN AM. UNLESS OTHERWISE INDICATED.

VOLTAGES MEASURED WITH "VOLTOHMETER" IN PARALLEL WITH TAPES POSITION AND SHOULD WITHIN 20% WITH 115V A.C. SUPPLY.

SOCKET	Plate	Screen	Control
V1	6CB6	215	66 0.47
V2	6X8	73 0	73 0
V3	6BA6	230 88 0.85	230 88 0.85
V4	6AU6	230 62 1.75	230 62 1.75
V5	6AL5	3.3 0 0	3.3 49 1.05
V6	6AV6	120 0 0	120 0 0
V7	6AL7	234	234
C23B			234 V.

SOCKET	Plate	Screen	Control
V1	6CB6	170 55 0.44	170 55 0.44
V2	6X8	65 65 0	65 65 0
V3	6BA6	59 0 0	59 0 0
V4	6AU6	228 80 0.88	228 80 0.88
V5	6AU6	230 62 1.75	230 62 1.75
V6	6AL5	3.5 0 0	3.5 0 0
V7	6AV6	120 0 0	120 0 0
V8	6AL7	232	232
C23B			232 V.

"STEREO-MONAUURAL" PUSHBUTTON SWITCH
 When the "Stereo" pushbutton is depressed, the two amplifier channels are permitted to act independently for reproduction of stereophonic sound. Must be depressed for stereo.
 When the "Monaural" pushbutton is depressed, the secondaries of the two output transformers are connected in parallel to obtain many of the advantages of push-pull operation.

"INT. & EXT. - INT. ONLY" SLIDE SWITCH
 This switch, located on the back of the chassis is used to permit opening the two audio output channels in parallel when a "left channel" speaker system is not connected.

Complete Schematic Diagram - Tuner/Amplifier Chassis & Record Changer



RCA VICTOR

Stereophonic High-Fidelity Combination

MODEL SHC-7

Stereophonic High-Fidelity Victrola®

MODEL SHP-7

Tuner Chassis No. RC-1155B
Amp. Chassis No. RS-171
Record Changer RP-205G-1

SERVICE DATA

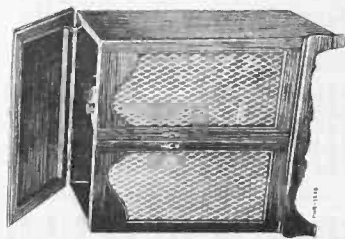
— 1958 No. 15 —

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE COMPANY

A DIVISION OF

RADIO CORPORATION OF AMERICA

CAMDEN 8, N. J.



Model SHC-7 The "Mark VII D"
Model SHP-7 The "Mark VII"
Mahogany, Maple or Cherry

Model SHC-7 is a combination radio-phonograph. It is a combination of Model SHP-7 and Model 9-T-2.
Model SHP-7 is a phonograph using AF amplifier chassis RS-171, record changer RP-205G-1 and four speakers.
Model 9-T-2 is an AM/FM tuner using tuner chassis RC-1155B; it is an accessory designed for installation in Model SHP-7.

SPECIFICATIONS

TUNING RANGE
Standard Broadcast (AM) 540-1600 kc
Frequency Modulation (FM) 88-108 mc

INTERMEDIATE FREQUENCIES
AM 455 kc FM 10.7 mc

TUBE COMPLEMENT
TUNER CHASSIS RC-1155B
(1) RCA 6B6 R.F. Amplifier
(2) RCA 19XB Mixer-Oscillator
(3) RCA 12A6 I.F. Amplifier
(4) RCA 12AU6 FM I.F. Amplifier
(5) RCA 12AU6 FM I.F. Amplifier
(6) RCA 12AL5 F.M. Detector
(7) RCA 12AV6 AM Det.-AVC—Phase Inv.
(8) RCA 35W4 Rectifier

AMPLIFIER CHASSIS RS-171
(1) RCA 6CG7 Two-channel A.F. Pre-amplifier
(2) RCA 6CG7 Two-channel 1st A.F. Amplifier
(3) RCA 6CG7 Two-channel 2nd A.F. Amplifier
(4) RCA 6V6GT Left Channel A.F. Output
(5) RCA 6V6GT Right Channel A.F. Output
(6) RCA 5Y3GT Rectifier

RECORD CHANGER
Turntable speed 16%, 33%, 45 or 78 r.p.m.
Record capacity Up to fifteen 7 inch or twelve 10 inch. or ten 12 inch.
Pickup (Stock No. 106770) Stereophonic Ceramic

AM/FM TUNER CHASSIS RC-1155B

MODEL 9-T-2

This chassis is identical to Chassis RC-1155AX except for a slight difference in finish of the dial backplate and the wood frame surrounding the dial.

Except for the use of Chassis RC-1155B instead of RC-1155AX, Model 9-T-2 as used in Model SHC-7 is identical to Model 9-T-2 as used in Model SHC-8.

FOR ADDITIONAL INFORMATION
REFER TO SERVICE DATA 1958 NO. 13
(SHC-8, SHP-8, 9-T-2)

FOR RECORD CHANGER INFORMATION
REFER TO "RP-205 SERIES SERVICE DATA"
AND TO "RP-205 SERIES SERVICE DATA SUPPLEMENT"

REPLACEMENT PARTS

AM/FM TUNER CHASSIS
RC-1155B

Same as previously listed for RC-1155AX in Service Data 1958 No. 13 (SHC-8, SHP-8, 9-T-2)

EXCEPT

Stock No. X3971 Frame is used in place of X3823 Frame.

AMPLIFIER CHASSIS
RS-171

Same as previously listed for RS-171 in Service Data 1958 No. 13 (SHC-8, SHP-8, 9-T-2).

RECORD CHANGER WIRING,
SPEAKER ASSEMBLY

Same as previously listed in Service Data 1958 No. 13 (SHC-8, SHP-8, 9-T-2).

MISCELLANEOUS

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
101363	Antenna—AM loop	106446	Knob—Function
104531	Bracket—Mounting for interior light	106866	Knob—Loudness
100523	Board—Terminal, for FM antenna cable	104789	Knob—Tuning
104796	Bushing—Rubber, for mounting tuner chassis	X3974	Lid—For cherry bisque cabinet
X4428	Cabinet—Cherry Bisque	X3973	Lid—For mahogany cabinet
X4427	Cabinet—Mahogany	X3975	Lid—For maple cabinet
X4433	Cabinet—Maple	73634	Nut—Retainer for speaker
X3723	Cloth—Cabinet grille	76894	Nut—#10-32 for record changer mounting stud #79339
74752	Connector—2 contact male for FM antenna cable	106601	Pull—Decorative door pull
74882	Connector—3 contact (polarized) male for AM loop antenna cable	104421	Spring—For lid support
X3900	Cover—Polystyrene bottom for tuner compartment	104128	Spring—For mounting record changer
100459	Cushion—Lid	74734	Spring—Retaining for control knobs
106425	Executcheon—Control knob	104124	Stud—Record changer mounting—front and rear positions
101051	Hinge—Lid—cherry and maple cabinets	79339	Stud—Record changer mounting—side positions
102420	Hinge—Lid—mahogany cabinet	104422	Support—Lid
79957	Insulator—Rubber, for record changer mounting stud (4 req'd)	79340	Washer—Fiber, for record changer mounting stud #79339
13103	Level—Lamp cap	103929	Washer—Nylon for control knobs
104797	Knob—AM/FM function	79753	Washer—Rubber, for record changer mounting stud #79339
104127	Knob—Bass or treble	104540	Window—For interior light



Stereophonic High-Fidelity Combination

MODELS SHC-2, SHC-3

Tuner/Amp. Chassis No. RC-1168C

MODEL SHC-6

Tuner/Amp. Chassis No. RC-1168D

Record Changer RP-205G-1

SERVICE DATA

- 1958 No. 17 -

PREPARED BY COMMERCIAL SERVICE
RCA SERVICE COMPANY

A DIVISION OF
RADIO CORPORATION OF AMERICA
CAMDEN 8, N. J.



Model SHC-2
The "Mark II"
Mahogany or Cherry



Model SHC-3
The "Mark III"
Mahogany, Oak or Walnut



Model SHC-6
The "Mark VI"
Mahogany, Oak or Walnut

SPECIFICATIONS

TUNING RANGE	Standard Broadcast (AM) 540-1,600 kc
Frequency Modulation (FM) 88-108 mc	
INTERMEDIATE FREQUENCIES	AM 455 kc
FM 10.7 mc	
TUBE COMPLEMENT	(1) RCA 6CB5 RF Amplifier
(2) RCA 6X8 Mixer & Oscillator	
(3) RCA 6BA6 I.F. Amplifier	
(4) RCA 6AU6 2nd F.M. I.F. Ampl.	
(5) RCA 6AU6 3rd F.M. I.F. Ampl.	
(6) RCA 6AL5 Ratio Detector	
(7) RCA 6AV6 A.M. Det.—A.V.C.—Ph. Inv.	
(8) RCA 6AL7-GT Tuning Eye	
(9) RCA 5A54A Rectifier	
(10) RCA 6CG7 Two-channel Audio Preamp.	
(11) RCA 6CG7 Two-channel Audio Ampl.	
(12) RCA 6CG7 Two-channel Audio Ampl.	
(13) RCA 6V6GT Left Channel Output	
(14) RCA 6V6GT Right Channel Output	
POWER SUPPLY RATING	115 volts, 60 cycles, 145 watts (includes record changer)
TUNING DRIVE RATIO	7 1/2:1 (3 3/4 turns of knob)
RECORD CHANGER	Turntable speed 16%, 33 1/2, 45 or 78 r.p.m.
Record capacity Up to fifteen 7 inch or	twenty 10 inch or
ten 10 inch and 12 inch intermixed	
Pickup Stock No. 106770 Stereophonic Ceramic	
AUDIO POWER OUTPUT	14 watts maximum
FREQUENCY RESPONSE	45 cycles to 20,000 cycles
LOUDSPEAKERS	Two 12" PM "woolers" 8 ohms @ 400 cycles
Two 3 1/2" PM "tweeters" 6-8 ohms @ 3000 cycles	
CABINET DIMENSIONS	SHC-2: Height 36" Width 19"
SHC-3: Height 35" Width 41 1/2"	
SHC-6: Height 31" Width 39"	

DESCRIPTION

Models SHC-2, SHC-3 and SHC-6 are stereophonic high-fidelity combination instruments, each consisting of a tuner/amplifier, stereophonic record changer and four speakers all in one cabinet. The tuner/amplifier incorporates a tuned r.f. stage, mixer/oscillator, one stage of AM i.f. amplification and three stages of FM i.f. amplification. Audio amplification is twin-channel for stereophonic reproduction. Each audio channel consists of preamplifier, two stages of voltage amplification and, BV6GT power output inverse feedback derived from the secondaries of the two output transformers, is applied to the third a.f. amplifiers.

A switch is used to select either MONAURAL or STEREO audio output. On Models SHC-2 and SHC-3 this switch is a two-pushbutton type and is located above the tuning dial. On Model SHC-6 this switch is a slide type and is located in the record changer compartment. This switch permits stereo reproduction from stereophonic sources and yet retaining many of the advantages of push-pull operation when monaural sources are used. A "left channel" external speaker system must be used in conjunction with the combination instrument when stereophonic sound is desired.

Models SHC-2, SHC-3 and SHC-6 are radio/phonograph instruments very similar to Model SHC-4.

Tuner/amplifier chassis RC-1168C is used in Models SHC-2, SHC-3 and SHC-4. Tuner/amplifier chassis RC-1168D is used in Model SHC-6; it differs from RC-1168C only in the omission of the indicator lamp and the knob lamp.

**FOR ADDITIONAL INFORMATION
REFER TO SERVICE DATA PREVIOUSLY
ISSUED FOR MODEL SHC-4.**

**PARTS LIST ADDITIONS
(All models)**

On original production, a two-piece motif was used; on late production a one-piece motif is used. This one-piece motif (Stock No. 106789) can be used to replace the two-piece motif.

Stock No.	Description
106789	Motif—Dual Amplifier Stereo—Orthophonic High-Fidelity RCA Victor.
74879	Connector—2-contact female for FM antenna cable (part of chassis assembly)

**FOR RECORD CHANGER INFORMATION—
REFER TO "RP-205 SERIES SERVICE DATA"
AND TO "RP-205 SERIES SERVICE DATA
SUPPLEMENT"**

The following "MISCELLANEOUS" items are used on Model SHC-2 but not on Model SHC-4. Refer to replacement parts listing of Model SHC-4 for all other items.

STOCK NO.	DESCRIPTION
X4426	Cabinet—Cherry
X4423	Cabinet—Mahogany
104860	Cap—L.H. trim for knob escutcheon or "Victrola" drawer escutcheon knob escutcheon or "Victrola" drawer escutcheon
104861	Door—L.H. and R.H.—less hardware for cherry cabinet
X3978	Door—L.H. and R.H.—less hardware, for mahogany cabinet
X3977	Drawer—Record changer mounting—less hardware— for mahogany cabinet
X3980	Drawer—Record changer mounting—less hardware— for mahogany cabinet
X3979	Drawer—Record changer mounting—less hardware— for mahogany cabinet
106590	Escutcheon—trim
106591	Escutcheon—"Victrola" drawer
102849	Panel—Record changer drawer back—mahogany only stocked for replacement
106592	Pull—Door pull with key (RH and LH) (1 set)
102848	Slider—For record changer drawer (2 req'd)

The following "MISCELLANEOUS" items are used on Model SHC-3 but not on Model SHC-4. Refer to replacement parts listing of Model SHC-4 for all other items.

STOCK NO.	DESCRIPTION
X4485	Cabinet—Mahogany
X4487	Cabinet—Oak
X4486	Cabinet—Walnut
103771	Cloth—for speaker grille, and cabinet door
X5033	Clip—Rubber for cabinet back cover latch pin
X5033	Door—With cloth and back panel—less hinges for mahogany cabinet
X5035	Door—With cloth and back panel—less hinges for oak cabinet
X5034	Door—With cloth and back panel—less hinges for walnut cabinet
106763	Escutcheon—Control knob
106773	Latch—for cabinet back cover
106774	Latch—for cabinet door
X3042	Leg—Front and cross bar assembly for mahogany cabinet (1 set)
X5044	Legs—Front legs and cross bar assembly for oak cabinet (1 set)
X5043	Legs—Front legs and cross bar assembly for walnut cabinet (1 set)
X5039	Leg—Rear leg for mahogany cabinet
X5041	Leg—Rear leg for oak cabinet
X5040	Leg—Rear leg for walnut cabinet
101869	Spring—Extension for cabinet back cover latch

The following "MISCELLANEOUS" items are used on Model SHC-6 but not on Model SHC-4. Refer to replacement parts listing for Model SHC-4 for all other items.

STOCK NO.	DESCRIPTION
X4497	Cabinet—Mahogany—less legs
X4498	Cabinet—Oak—less legs
X4499	Cabinet—Walnut—less legs
103771	Clip—Tubular for back cover latch pin
X5045	Cloth—Grille for cabinet
106800	Escutcheon—Control knob
106801	Escutcheon—"Victrola"/"Monaural" for slide switch (SS)
106802	Hinge—Cabinet lid
106773	Latch—for cabinet back cover
Z5050	Leg—Metal—for cabinet
74712	Nut—Retainer for motif
104423	Nut—Tee—cabinet leg mounting
106819	Support—Cabinet lid
33900	Switch—Stereos/Monaural" function switch (SS) slide type

CHASSIS RC-1155B, RP-205G-1, RS-171A



Stereophonic High-Fidelity Combination

MODEL SHC-9

Stereophonic High-Fidelity Victrola®

MODEL SHP-9

AM-FM Tuner MODEL 9-T-2

Record Storage MODEL SHR-9 Cabinet

Auxiliary Speaker MODEL SHS-9 Cabinet

Benches MODELS SHB-1, SHB-2

Tuner Chassis No. RC-1155B

Amp. Chassis No. RS-171A

Record Changer RP-205G-1

SERVICE DATA

— 1958 No. 19 —

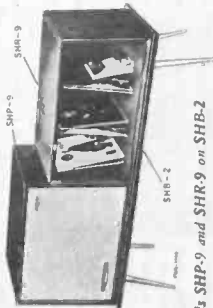
PREPARED BY COMMERCIAL SERVICE

RCA SERVICE COMPANY

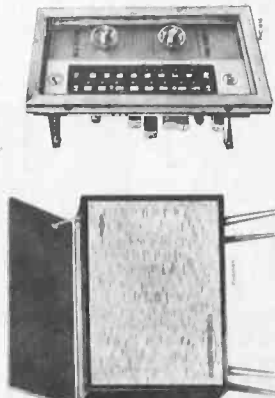
A DIVISION OF

RADIO CORPORATION OF AMERICA

CAMDEN 8, N. J.



Models SHP-9 and SHR-9 on SHB-2



Model 9-T-2 AM-FM Tuner

Model SHC-9 The "Mark IX D"

Model SHP-9 The "Mark IX"

Model SHS-9 Same as above except that cabinet top does not open.

Ebony, Mahogany, Oak or Walnut

Model SHB-9 is a combination radio-phonograph. It is a combination of Model SHP-9 and Model 9-T-2.
Model SHP-9 is a phonograph using AF amplifier chassis RS-171A, record changer RP-205G-1 and three speakers.
Model SHS-9 is an auxiliary speaker cabinet using three speakers.

Model 9-T-2 is an AM-FM tuner using tuner chassis RC-1155B; it is an accessory designed for installation in Model SHP-9.

SPECIFICATIONS

TUNING RANGE
Standard Broadcast (AM) 540-1600 kc
Frequency Modulation (FM) 88-106 mc
INTERMEDIATE FREQUENCIES
AM 455 kc FM 10.7 mc

TUBE COMPLEMENT
TUNER CHASSIS RC-1155B
(1) RCA 6B6
(2) RCA 19X8 Mixer-Oscillator
(3) RCA 12BA6 I.F. Amplifier
(4) RCA 12AU6 FM I.F. Amplifier
(5) RCA 12AU6 F.M. Detector
(6) RCA 12AL5 F.M. Detector
(7) RCA 12AV6 AM Det.-AVC—Phase Inv.
(8) RCA 35W4 Rectifier
AMPLIFIER CHASSIS RS-171A
(1) RCA 6CC7 Two-channel A.F. Pre-amplifier
(2) RCA 6CC7 Two-channel A.F. Amplifier
(3) RCA 6CC7 Two-channel 2nd A.F. Amplifier
(4) RCA 6V6GT Right Channel A.F. Output
(5) RCA 6V6GT Left Channel A.F. Output
(6) RCA 5Y3GT Rectifier

POWER SUPPLY RATING
Model SHC-9: 115 volts, 60 cycles
Model SHP-9: 115 volts, 60 cycles
LOUDSPEAKERS
One 12" PM "wooler" 3.2 ohms @ 400 cycles
Two 3 1/2" PM "tweeters" 6.8 ohms each @ 3000 cycles

RECORD CHANGER
Turntable speed 16 2/3, 33 1/2, 45 or 78 r.p.m.
Record capacity Up to fifteen 7 inch or ten 12 inch.
Pickup (Stock No. 106770) Stereophonic Ceramic
FREQUENCY RESPONSE 50 cycles to 20,000 cycles
TUNING DRIVE RATIO 7 1/2:1 (3 3/4 turns of knob)
DIMENSIONS (Overall)
SHC-9, SHP-9, Height: 32 1/2" Width: 29 1/2" Depth: 16 1/2"
SHS-9, Height: 14 1/2" Width: 29 1/2" Depth: 16 1/2"
SHB-1, SHB-2, Height: 14 1/2" Length: 60 1/2" Width: 17 1/2"

ALIGNMENT PROCEDURE

ALIGNMENT INDICATORS:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate maximum audio output during AM alignment. Connect the output meter across the speaker voice coil. The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure AVC voltage. When audio output is being measured, the volume control should be turned to maximum. Adjust tone controls to mid-position.

SIGNAL GENERATOR:

For all alignment operations, connect the low side of the signal generator to the receiver chassis. If output measurement is used for AM alignment, the output of the signal generator should be kept as low as possible to avoid AVC action.

AM Alignment

FUNCTION SWITCH IN AM POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Pin No. 1 of V3 in mid with .01 mfd. cap.	455 kc (mod.)	Outlet point at high freq. end	T4 bottom core (sec.) T5 top core (pri.) T2 bottom core (sec.) T2 top core (pri.)
2	Top lug of V3 on AM RF coil	1620 kc. (mod.)	1620 kc. (gang open)	C1-E.T. (osc.)
3	Short wire placed near isolated signal	1400 kc. (mod.)	1400 kc. signal	C1-A.T. (ant.) C1-C.T. (f.i.)
4	Repeat steps 4, 5 and 6 until maximum gain is obtained	600 kc. (mod.)	600 kc. signal	L6 (osc. (rock gang))
5				L4 (RF)
6				
7				

Oscillator frequency is above signal frequency on both AM and FM

FM SWEEP ALIGNMENT:

An FM sweep generator is used for FM alignment, adjust for 10.7 mc. 0.4 mc. sweep rate. Connect output of C72 to tuning discriminator T6 top core for 10.7 mc. crossover, and T6 bottom core for balanced peaks. Peak separation should be approximately 330 kc. When aligning the other FM tuned circuits, connect oscilloscope lead through a 220K resistor to pin 1 of V5. Follow alignment table sequence, adjusting for maximum gain and symmetrical curves.

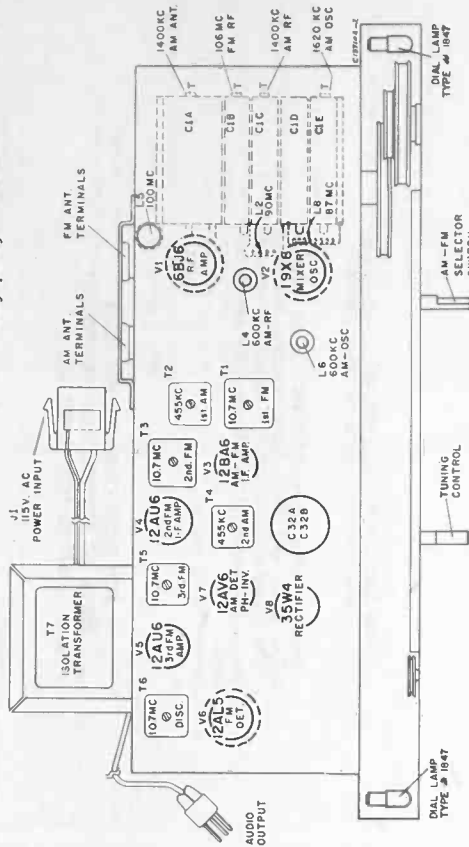
FM Alignment

FUNCTION SWITCH IN FM POSITION

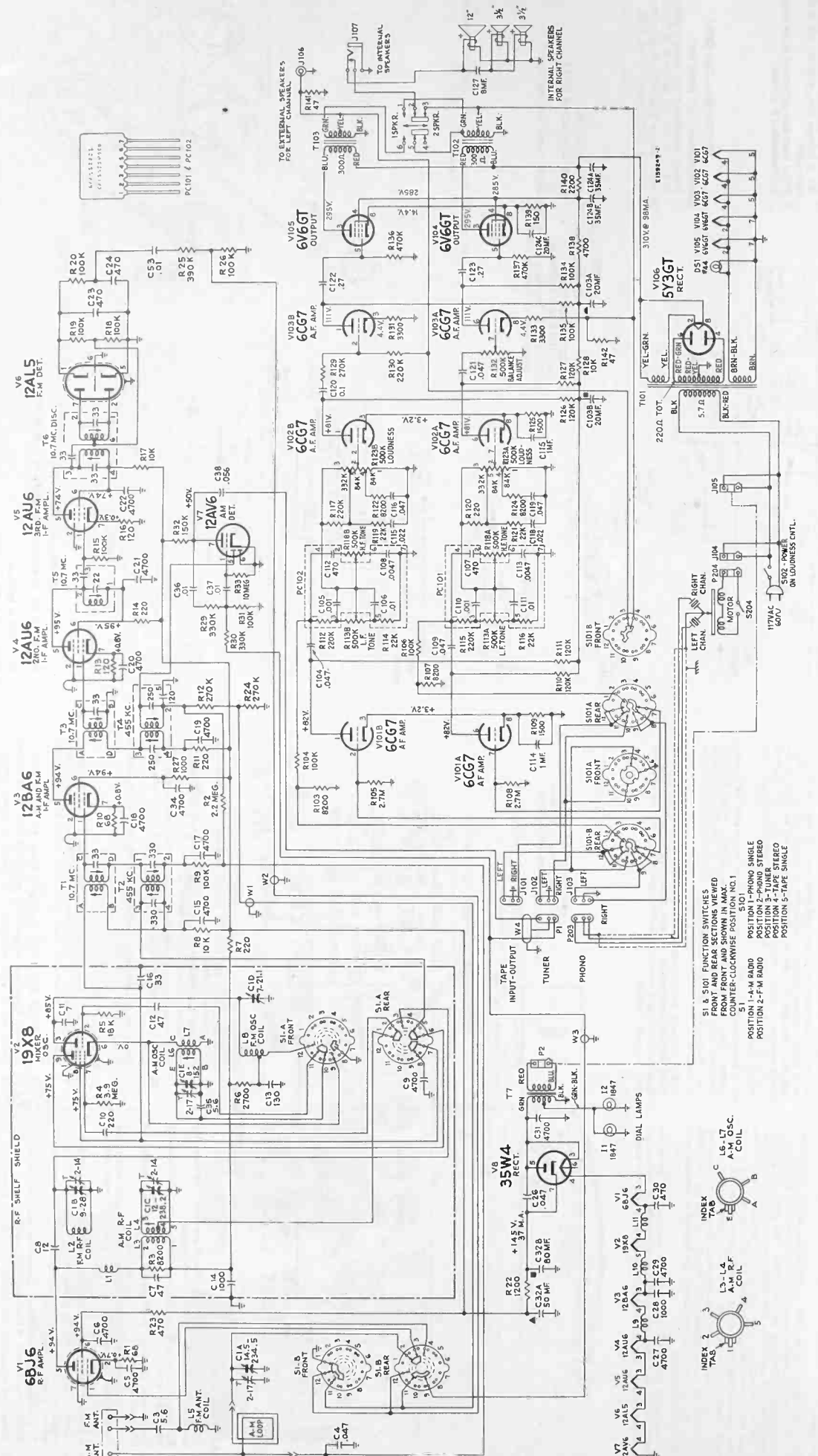
Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for max. output
1	Pin No. 1 of V5-12AU6	10.7 mc	Outlet point at low frequency end	T6 top core for zero d.c. T6 bottom core for maximum d.c. T1 top core T1 bottom core T1 top core T1 bottom core
2	Pin No. 1 of V4-12AU6	87 mc	87 mc (gang closed)	4FM osc. L8
3	Pin No. 1 of V3-12BA6	106 mc	106 mc signal	4FM R.F. C1B-T
4	C1-B Slator	90 mc	90 mc signal	4FM R.F. L2
5	FM Ant. terminals thru 270 ohm resistor	Repeat steps 6 and 7 until maximum gain is obtained	Repeat steps 6 and 7 until maximum gain is obtained	4FM ant. coil L3
6				
7				
8				
9				

*If necessary for accurate peaking, the winding in the same transformer not being peaked should be located with a 680 ohm resistor.
†Connect VoltOhmyst to pin 1 of V5 through a 220K isolating resistor with a 100 ohm maximum lead away from input circuit.
‡Volt d.c. Sweep VoltOhmyst lead away from input circuit.

NOTE—FM coils 18, 12 and 15 are adjusted by increasing or decreasing spacing between turns.



RC-1155B Tuner Chassis—View Showing Location of Tubes and Controls



**FOR RECORD CHANGER INFORMATION—
REFER TO "RP-205 SERIES SERVICE DATA"
AND TO "RP-205 SERIES SERVICE
DATA SUPPLEMENT"**

Complete Schematic Diagram

The output to a tape recorder at the TAPE INPUT/OUTPUT jack (J102) is two-channel stereophonic when stereophonic records are being played (function switch must be set to PHONO STEREO). The output to a tape recorder is identical on both channels when:

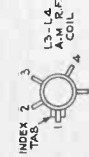
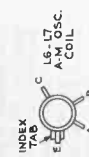
- (1) Monaural records are being played.
- (2) When function switch is set at either PHONO SINGLE or TUNER.

SPEAKER SELECTION SWITCH

The speaker selection switch (S103) must be set at "INT. ONLY" at all times except when stereophonic records are connected to the left channel "EXT." speaker jack.

The speaker selection switch (S103) must be set at "INT. & EXT." to permit stereophonic sound reproduction from either records or tape.

- S1, S, S101 FUNCTION SWITCHES FROM FRONT AND SHOWN IN MAX. COUNTER-CLOCKWISE POSITION NO. 1
- S101
- POSITION 2-PHONO SINGLE
- POSITION 3-TUNER
- POSITION 4-STEREO
- POSITION 5-TAPE SINGLE



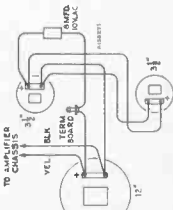
SHC-9, SHP-9, SHS-9, 9-T-2

CHANNEL GAIN EQUALIZATION — CHASSIS RS-171A

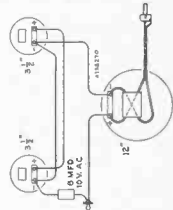
A gain equalization control is provided to enable the gain of the RIGHT CHANNEL (internal speakers) to be balanced with the gain of the LEFT CHANNEL (external speakers). This equalization control (R132) is located on the bottom apron of the chassis toward the front of the cabinet. When adjusting this control, adjust the equalization control (R132) to obtain right channel output equal to left channel output. The left channel gain is not adjustable.

Adjust the equalization control (R132) to obtain right channel output equal to left channel output. The left channel gain is not adjustable.

NOTES:
1. A monaural signal input must be used. This should be a monaural record; use a frequency test record when measuring with an output meter or use a music record for listening test.
2. The function switch (S101) must be in #2 position (PH STEREO). This enables the two channels to have independent outputs.
3. The speaker selection switch (S103) must be in the 'INT. & EXT. SPEAKERS' position. This is necessary for the two channels to have independent outputs.



Speaker Connections—Model SHC-9 or SHP-9



Speaker Connections—Model SHS-9

IMPORTANT

The three speakers must be connected as shown in the illustrations above. Improper connections may result in distorted or weak reproduction.

REPLACEMENT PARTS

SYMBOL NO.	STOCK NO.	DESCRIPTION	SYMBOL NO.	STOCK NO.	DESCRIPTION
C1A, B, C, D, E	105328	CAPACITORS:	R1	502066	RESISTORS: Fixed, Composition, 1/2 watt unless
C4	74182	Variable tuning	R2	502122	68 ohms, ±10%
C5	73558	Ceramic, 5.6 mmf., ±1.0%, 200 v. Coel.-0	R3	502282	2.2 megohms, ±10%
C6	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R4	502318	9200 ohms, ±10%
C7	101940	Ceramic, 22 mmf., ±10%, 500 v.	R5	502227	18,000 ohms, ±10%
C8	70895	Ceramic, 4700 mmf., ±10%, 0-500 v.	R6	502122	220 ohms, ±20%
C9	101174	Ceramic, 220 mmf., ±20%, 500 v. Coel.-0	R7	502110	10,000 ohms, ±10%
C10	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R8	502066	68,000 ohms, ±10%
C11	73531	Ceramic, 4700 mmf., ±10%, 500 v. Coel.-0	R9	502122	220 ohms, ±20%
C12	73531	Ceramic, 4700 mmf., ±10%, 500 v. Coel.-0	R10	502122	220 ohms, ±20%
C13	77332A	Ceramic, 130 mmf., ±2%, 500 v. Coel.-750	R11	502122	220 ohms, ±20%
C14	105660	Feed thru, 1000 mmf., ±100%, 0-500 v.	R12	502122	220 ohms, ±20%
C15	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R13	502112	120 ohms, ±10%
C16	100150	Feed thru, 33 mmf., ±5%, 500 v.	R14	502122	220 ohms, ±20%
C17 thru C20	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R15	502110	10,000 ohms, ±10%
C21	104035	Ceramic, 3300 mmf., ±20%, 500 v.	R16	502110	10,000 ohms, ±10%
C22	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R17	502110	10,000 ohms, ±10%
C23	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R18	502110	10,000 ohms, ±10%
C24	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R19	502110	10,000 ohms, ±10%
C25	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R20	502110	10,000 ohms, ±10%
C26	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R21	502110	10,000 ohms, ±10%
C27	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R22	502110	10,000 ohms, ±10%
C28	105660	Feed thru, 1000 mmf., ±100%, 0-500 v.	R23	502147	470 ohms, ±20%, v. wire-wound
C29	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R24	502427	270,000 ohms, ±10%
C30	76992	Mics, 470 mmf., ±100%, 300 v.	R25	502439	390,000 ohms, ±10%
C31	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R26	502410	100,000 ohms, ±5%
C32A, C32B	73500	Electrolytic, 30/80 mmf., 150/150 v.	R27	502210	1000 ohms, ±10%
C33	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R28	502222	22,000 ohms, ±10%
C34	73473	Ceramic, 4700 mmf., ±10%, 0-500 v.	R29	502439	390,000 ohms, ±10%
C35	103440	Ceramic, 5.6 mmf., ±0.5 mmf., 500 v. Coel.-N3300	R30	502415	150,000 ohms, ±10%
C36	106185	Paper, 0.01 mfd., ±10%, 400 v.	R31	502415	150,000 ohms, ±10%
C37	101000	Paper, 0.05 mfd., ±10%, 400 v.	R32	502415	150,000 ohms, ±10%
C38	102859A	Transformer—1st FM IF	R33	502415	150,000 ohms, ±10%
L1	77354	Coil—RF choke	S1A, S1B	104660	Switch—AM/FM function
L2	77358	Coil—FM choke	T1	100112	Transformer—1st FM IF
L3	77358	Coil—FM choke	T2	76335	Transformer—1st AM IF
L4	77358	Coil—FM choke	T3	76228	Transformer—2nd FM IF
L5, L6	77358	Coil—FM antenna	T4	104619	Transformer—3rd AM IF
L7	77358	Coil—FM antenna	T5	104619	Transformer—3rd FM IF
L8	77358	Coil—FM oscillator	T6	104619	Transformer—Power transformer
L9, L10, L11	77355	Coil—Flament choke	T7	104619	Bumper—For tuner, wood frame (4 req'd)

REPLACEMENT PARTS (Continued)

SYMBOL NO.	STOCK NO.	DESCRIPTION	SYMBOL NO.	STOCK NO.	DESCRIPTION
S101A, S101B	106209	Clip—IF transformer mounting	S101	106209	Switch—Function
S102	74879	Connector—2 contact female for antenna leads	S102	106209	Part of R12A, R12B
S103	106458	Connector—3 contact male audio cable from tuner	S103	106458	Switch—Speaker selector
T101	106458	Core—Dial drive (230 tooth steel)	T101	106458	Transformer—Power
T102, T103	70392	Eyebolt—For RF shield mounting	T102, T103	70392	Transformer—Output
104403	104403	Eyebolt—Tuner wood frame and dial mounting	104403	104403	Clip—Mounting and demerol for loudness control
104404	104404	Frame—Wood frame for AM/FM tuner dial	104404	104404	Common—On/off switch
104405	104405	Plate—Dial backplate with 1/2" O.D. pulley, double pulley shaft—less double pulley, pointer—control dial and backplate	104405	104405	Socket—3 pin miniature for power cable (1 w/1)
104406	104406	Pulley—1/2" O.D. for dial backplate	104406	104406	Socket—O-ring for V104 and V105
104407	104407	Screw—#6-32 x 1/4", cup point for drive cord	104407	104407	Socket—3 pin miniature for V101 and V102
104408	104408	Shield—For V1	104408	104408	Connector—3-contact male — for phono pickup cable
104409	104409	Shield—For V2	104409	104409	Connector—Closed end for phono motor leads
104410	104410	Socket—Lamp socket and lead assembly	104410	104410	Capacitor—Electrolytic, 8 mfd., 10 AC
104411	104411	Socket—7 pin miniature for V1	104411	104411	Capacitor—Paper, 0.047 mfd., 50 v.
104412	104412	Socket—3 pin miniature for V3, V4, V5, V6, V7 & V8	104412	104412	Capacitor—Paper, 0.047 mfd., ±10%, 400 v.
104413	104413	Spring—Drive cord	104413	104413	Part of PC102
104414	104414	Washer—C type retaining for double pulley shaft	104414	104414	Part of PC101
104415	104415	Washer—C type retaining for tuning control shaft	104415	104415	Film, 1 m., ±10%, 50 v.
104416	104416	Washer—C type retaining for tuning control shaft	104416	104416	Paper, 0.022 mfd., ±10%, 200 v.
104417	104417	Washer—C type retaining for tuning control shaft	104417	104417	Paper, 0.022 mfd., ±10%, 200 v.
104418	104418	Washer—C type retaining for tuning control shaft	104418	104418	Film, 1 m., ±10%, 50 v.
104419	104419	Washer—C type retaining for tuning control shaft	104419	104419	Paper, 0.047 mfd., ±10%, 200 v.
104420	104420	Washer—C type retaining for tuning control shaft	104420	104420	Paper, 0.047 mfd., ±10%, 200 v.
104421	104421	Washer—C type retaining for tuning control shaft	104421	104421	Paper, 0.047 mfd., ±10%, 400 v.
104422	104422	Washer—C type retaining for tuning control shaft	104422	104422	Paper, 0.27 mfd., ±10%, 400 v.
104423	104423	Washer—C type retaining for tuning control shaft	104423	104423	Electrolytic, 35/85/20 mfd., 400/400/25 v.
104424	104424	Washer—C type retaining for tuning control shaft	104424	104424	Part of Speaker Assembly
104425	104425	Washer—C type retaining for tuning control shaft	104425	104425	Connector—2 contact female for phono motor or output, tuner input and phono input
104426	104426	Washer—C type retaining for tuning control shaft	104426	104426	Connector—2 contact female for phono motor or output, tuner input and phono input
104427	104427	Washer—C type retaining for tuning control shaft	104427	104427	Connector—Single contact female, for external speaker
104428	104428	Washer—C type retaining for tuning control shaft	104428	104428	Lock—Internal speaker
104429	104429	Washer—C type retaining for tuning control shaft	104429	104429	Capacitor—10,000 ohms, ±10%
104430	104430	Washer—C type retaining for tuning control shaft	104430	104430	Capacitor—100,000 ohms, ±10%
104431	104431	Washer—C type retaining for tuning control shaft	104431	104431	Capacitor—8200 ohms, ±10%
104432	104432	Washer—C type retaining for tuning control shaft	104432	104432	Capacitor—2.7 megohms, ±10%
104433	104433	Washer—C type retaining for tuning control shaft	104433	104433	Capacitor—1500 ohms, ±10%
104434	104434	Washer—C type retaining for tuning control shaft	104434	104434	Capacitor—3300 ohms, ±10%
104435	104435	Washer—C type retaining for tuning control shaft	104435	104435	Capacitor—3300 ohms, ±10%
104436	104436	Washer—C type retaining for tuning control shaft	104436	104436	Capacitor—3300 ohms, ±10%
104437	104437	Washer—C type retaining for tuning control shaft	104437	104437	Capacitor—4700 ohms, ±10%
104438	104438	Washer—C type retaining for tuning control shaft	104438	104438	Capacitor—150 ohms, ±10%, 2 w.
104439	104439	Washer—C type retaining for tuning control shaft	104439	104439	Capacitor—47 ohms, ±10%, 2 w.
104440	104440	Washer—C type retaining for tuning control shaft	104440	104440	Capacitor—8200 ohms, ±10%
104441	104441	Washer—C type retaining for tuning control shaft	104441	104441	Capacitor—8200 ohms, ±10%
104442	104442	Washer—C type retaining for tuning control shaft	104442	104442	Capacitor—8200 ohms, ±10%
104443	104443	Washer—C type retaining for tuning control shaft	104443	104443	Capacitor—8200 ohms, ±10%
104444	104444	Washer—C type retaining for tuning control shaft	104444	104444	Capacitor—8200 ohms, ±10%
104445	104445	Washer—C type retaining for tuning control shaft	104445	104445	Capacitor—8200 ohms, ±10%
104446	104446	Washer—C type retaining for tuning control shaft	104446	104446	Capacitor—8200 ohms, ±10%
104447	104447	Washer—C type retaining for tuning control shaft	104447	104447	Capacitor—8200 ohms, ±10%
104448	104448	Washer—C type retaining for tuning control shaft	104448	104448	Capacitor—8200 ohms, ±10%
104449	104449	Washer—C type retaining for tuning control shaft	104449	104449	Capacitor—8200 ohms, ±10%
104450	104450	Washer—C type retaining for tuning control shaft	104450	104450	Capacitor—8200 ohms, ±10%
104451	104451	Washer—C type retaining for tuning control shaft	104451	104451	Capacitor—8200 ohms, ±10%
104452	104452	Washer—C type retaining for tuning control shaft	104452	104452	Capacitor—8200 ohms, ±10%
104453	104453	Washer—C type retaining for tuning control shaft	104453	104453	Capacitor—8200 ohms, ±10%
104454	104454	Washer—C type retaining for tuning control shaft	104454	104454	Capacitor—8200 ohms, ±10%
104455	104455	Washer—C type retaining for tuning control shaft	104455	104455	Capacitor—8200 ohms, ±10%
104456	104456	Washer—C type retaining for tuning control shaft	104456	104456	Capacitor—8200 ohms, ±10%
104457	104457	Washer—C type retaining for tuning control shaft	104457	104457	Capacitor—8200 ohms, ±10%
104458	104458	Washer—C type retaining for tuning control shaft	104458	104458	Capacitor—8200 ohms, ±10%
104459	104459	Washer—C type retaining for tuning control shaft	104459	104459	Capacitor—8200 ohms, ±10%
104460	104460	Washer—C type retaining for tuning control shaft	104460	104460	Capacitor—8200 ohms, ±10%
104461	104461	Washer—C type retaining for tuning control shaft	104461	104461	Capacitor—8200 ohms, ±10%
104462	104462	Washer—C type retaining for tuning control shaft	104462	104462	Capacitor—8200 ohms, ±10%
104463	104463	Washer—C type retaining for tuning control shaft	104463	104463	Capacitor—8200 ohms, ±10%
104464	104464	Washer—C type retaining for tuning control shaft	104464	104464	Capacitor—8200 ohms, ±10%
104465	104465	Washer—C type retaining for tuning control shaft	104465	104465	Capacitor—8200 ohms, ±10%
104466	104466	Washer—C type retaining for tuning control shaft	104466	104466	Capacitor—8200 ohms, ±10%
104467	104467	Washer—C type retaining for tuning control shaft	104467	104467	Capacitor—8200 ohms, ±10%
104468	104468	Washer—C type retaining for tuning control shaft	104468	104468	Capacitor—8200 ohms, ±10%
104469	104469	Washer—C type retaining for tuning control shaft	104469	104469	Capacitor—8200 ohms, ±10%
104470	104470	Washer—C type retaining for tuning control shaft	104470	104470	Capacitor—8200 ohms, ±10%
104471	104471	Washer—C type retaining for tuning control shaft	104471	104471	Capacitor—8200 ohms, ±10%
104472	104472	Washer—C type retaining for tuning control shaft	104472	104472	Capacitor—8200 ohms, ±10%
104473	104473	Washer—C type retaining for tuning control shaft	104473	104473	Capacitor—8200 ohms, ±10%
104474	104474	Washer—C type retaining for tuning control shaft	104474	104474	Capacitor—8200 ohms, ±10%
104475	104475	Washer—C type retaining for tuning control shaft	104475	104475	Capacitor—8200 ohms, ±10%
104476	104476	Washer—C type retaining for tuning control shaft	104476	104476	Capacitor—8200 ohms, ±10%
104477	104477	Washer—C type retaining for tuning control shaft	104477	104477	Capacitor—8200 ohms, ±10%
104478	104478	Washer—C type retaining for tuning control shaft	104478	104478	Capacitor—8200 ohms, ±10%
104479	104479	Washer—C type retaining for tuning control shaft	104479	104479	Capacitor—8200 ohms, ±10%
104480	104480	Washer—C type retaining for tuning control shaft	104480	104480	Capacitor—8200 ohms, ±10%
104481	104481	Washer—C type retaining for			

528.53420

**MODEL
NUMBERS**
9024
9025

PARTS LIST
for
Silvertone[®]

CLOCK RADIO

SILVERTONE CLOCK-RADIO RECEIVER CHASSIS NUMBER 528.53420

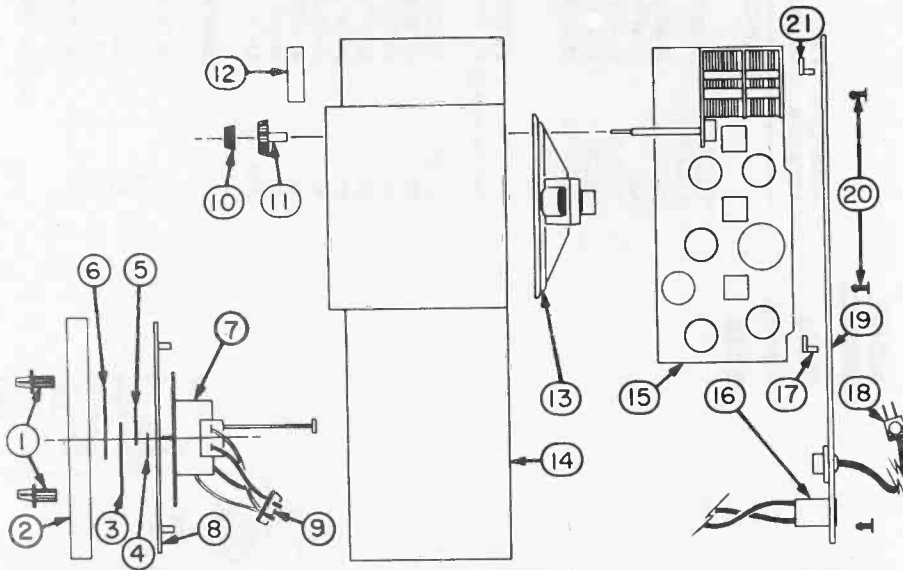


FIG. 1. EXPLODED VIEW OF CABINET PARTS

CABINET PARTS LIST

Key No.	MODEL NO.		Description
	9024 BROWN	9025 IVORY	
1.	52-1057-0	52-1057-0	Knob, Clock Control (2)
2.	48-158-1	48-158-1	Window, Clock
3.	52-70-1	52-70-1	Hand, Minute
4.	52-66-1	52-66-1	Hand, Alarm Set
5.	52-71-1	52-71-1	Hand, Hour
6.	52-69-1	52-69-1	Hand, Second
7.	59-134	59-134	Timer, Clock (Inc. 3, 4, 5 and 6)
8.	67-653-0	67-653-0	Face, Clock
9.	45-160-3	45-160-3	Receptacle, AC Interlock
10.	52-702-0	52-702-0	Knob, Volume
11.	52-703-0	52-703-0	Knob, Tuning
12.	48-143-1	48-143-1	Window, Dial Scale
13.	33-295-4	33-295-4	Speaker, 5", (Inc. T3)
14.	42-59-1	42-60-1	Cabinet
15.	*	*	Chassis, Radio
16.	45-17-3	45-17-3	Outlet, Appliance
17.	11-1692	11-1692	Bracket, Board and Back Support
18.	23-26-0	23-26-0	Line Cord and Plug
19.	82-8-1	82-8-1	Antenna Loop and Cabinet Back
20.	22-2-5	22-2-5	Clip, Cabinet Back Retainer
21.	11-1412	11-1412	Bracket, Board Retainer

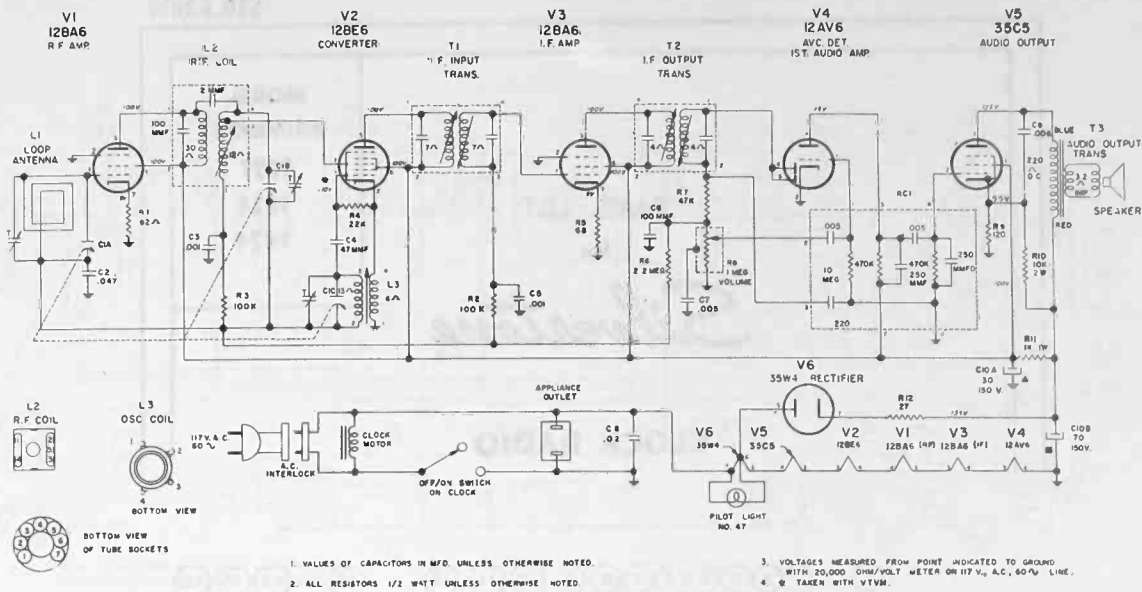


FIG. 4. SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.53420

SILVERTONE CLOCK-RADIO RECEIVER CHASSIS NUMBER 528.53420

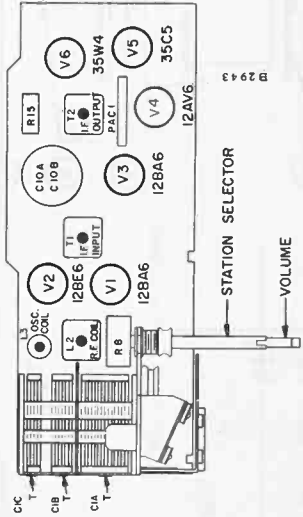


FIG. 3. TOP VIEW OF CHASSIS

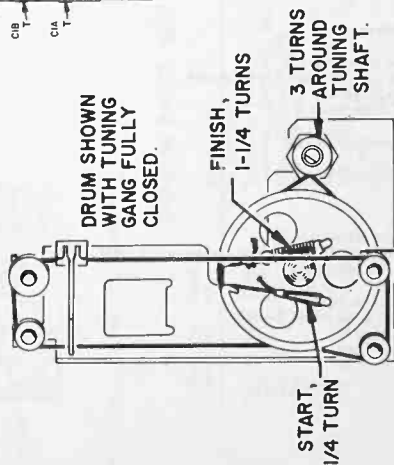


FIG. 2. DIAL STRINGING DIAGRAM

CHASSIS PARTS LIST

Schematic Part Location No.	Description	Schematic Part Location No.	Description
C1 A, B & C 19-24-3	Variable, Tuning	10-95-2	Transformer, I.F. Output
C2 20-47-1	Tubular, .047 mfd., 200 v.	80-14-1	Transformer, Audio Output (Mounted on Speaker)
C3 15-10217	Disc, .001 mfd., 500 v., GMV	82-8-1	Loop Antenna and Cabinet Back
C4 15-470118	Disc, 47 mmfd., 500 v., N3300	10-23-0	Coil, R.F., with cover
C5 15-10116	Disc, 100 mmfd., 500 v.	10-35-4	Coil, Oscillator
C6 15-50217	Disc, .005 mfd., 500 v., GMV	MISCELLANEOUS CHASSIS PARTS	
C7 15-20317	Disc, .02 mfd., 500 v., GMV	11-169-4	Bracket, Volume Control
C8 15-60216	Disc, .006 mfd., 500 v., 20%, GP	39-2-1	Pulley, Idler (3)
C9 15-60216	Disc, .006 mfd., 500 v., 20%, GP	39-2-5	Shaft, Tuning Pulley
C10 A & B 18-58-5	70 mfd., 150 v. (B)	70-203-0	Spring, Tuning Shaft Retainer
(All resistors 1/2 w., 10% unless otherwise noted)		51-109	Cord, Dial (29')
R1 60-82001	82 ohm	11-169-3	Bracket, Dial Scale Mounting
R2 60-10401	100K ohm	67-632-0	Dial Scale
R3 60-22302	22K ohm, 20%	52-15-1	Plip, Dial Scale Mounting (2)
R4 60-68001	68 ohm	45-22-2	Socket, Tube (V1, V3)
R5 60-68001	68 ohm	45-22-2	Socket, Tube (V5, V6)
R6 60-22502	2.2 megohm, 20%	45-49-2	Socket, Tube (V2, V4)
R7 60-47301	47K ohm	71-69-0	Shield, Tube (2)
R8 24-276-0	1 megohm, VOLUME	89-7-4	Socket, Pilot Light
R9 60-12101	120 ohm	33-295-4	Pilot Light, #47 Bayonet
R10 60-10321	10K ohm, 2 w.	23-26-0	Line Cord and Plug
R11 60-10211	10K ohm, 1 w.		
R12 60-27001	27 ohm		
R13-14-3	Ceramic Coupling Unit		
RCT1	TRANSFORMERS AND COILS		
T1	Transformer, I.F. Input		
T2	Transformer, I.F. Output		
T3	Transformer, Audio Output (Mounted on Speaker)		
L1	Loop Antenna and Cabinet Back		
L2	Coil, R.F., with cover		
L3	Coil, Oscillator		

528.53410

**MODEL
NUMBERS**
9027
9028
9029

PARTS LIST
for
Silvertone[®]

CLOCK RADIO

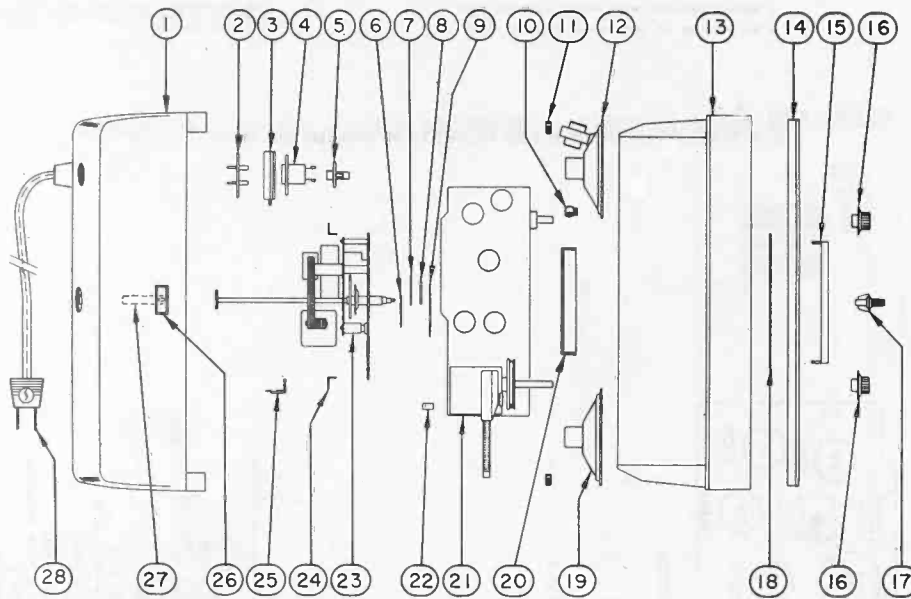


FIG. 1. EXPLODED VIEW OF CABINET PARTS

CABINET PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1.	21-352-0	Cover, Cabinet, Brown, Model No. 9027
	21-353-0	Cover, Cabinet, Ivory, Model No. 9028
	21-354-0	Cover, Cabinet, Pink, Model No. 9029
2.	45-56-3	Receptacle, Interlock
3.	11-1298	Bracket, Interlock
4.	45-161-3	Receptacle, Appliance Outlet
5.	45-58-3	Receptacle, Phono Input
6.	52-66-1	Hand, Alarm Set
7.	52-65-1	Hand, Hour
8.	52-64-1	Hand, Minute
9.	52-63-1	Hand, Sweep Second
10.	22-23-3	Clamp, Cable
11.	77-28-0	Spacer, Speaker Mounting (2)
12.	33-364-4	Speaker, 4" PM (Inc. Output Transformer)
13.	40-37-1	Grille and Base, Cabinet
14.	67-650-0	Dial Scale and Trim Strip
15.	48-157-1	Window, Timer
16.	52-1093-0	Knob, Tuning and Volume (2)
17.	52-1057-0	Knob, Timer (2)
18.	67-8-1	Insert, Clock Face (Daylight)
19.	33-363-4	Speaker, 4" PM
20.	44-34-0	Baffle, Light
21.	*	Chassis, Radio
22.	11-1297	Bracket, Chassis Mounting
23.	59-133	Timer, Clock (Inc. 6, 7, 8, 9 and Fluorescent Light)
24.	11-860	Bracket, Timer Mounting (4)
25.	76-37-0	Strip, Terminal
26.	52-1092-0	Button, "SNOOZ-ALARM"
27.	22-173-0	Retainer, "SNOOZ-ALARM" Button
28.	23-43-0	Line Cord and Plug

* Not Supplied as a Repair Part.

SILVERTONE CLOCK-RADIO RECEIVER CHASSIS NUMBER 528.53410

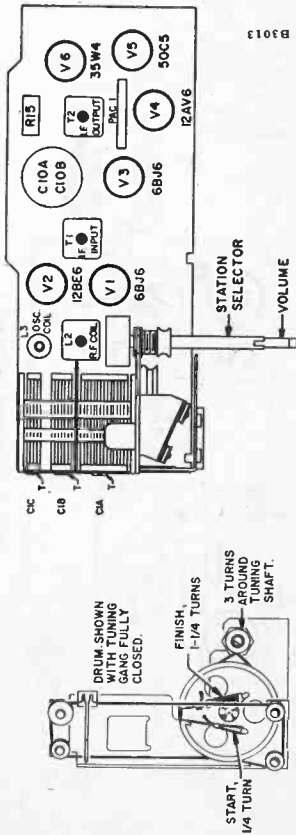


FIG. 2. DIAL STRINGING DIAGRAM

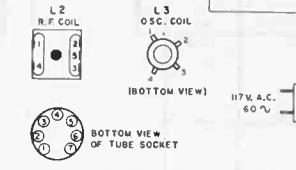


FIG. 3. TOP VIEW OF CHASSIS

CHASSIS PARTS LIST

Schematic Location	Part No.	Description
C1 A, B & C	19-27-3	Variable, Tuning
C2	20-47-1	Tubular, .047 mfd., 200 v., 20%
C3, C5	15-10217	Disc, .001 mfd., 500 v., GMV
C4	15-470118	Disc, 47 mmfd., 500 v., N3300
C6	15-10116	Disc, 100 mmfd., 500 v., 20%
C7	15-10116	Disc, .006 mfd., 500 v., 20% GP
C8 A & B	18-60216	Electrolytic, 30 mfd., 150 v. (A); 70 mfd., 150 v. (B)
C9	16-47348	Tubular, .047 mfd., 400 v., 20%
C10	15-20317	Disc, .02 mfd., 500 v., GMV
R1	60-82001	(All resistors 1/2 w., 10% unless otherwise noted)
R2, R4	60-10211	82 ohm
R3	60-10201	100K ohm
R5	60-22301	22K ohm
R6	60-98001	86 ohm
R7	60-22302	2.2 meg ohm, 20%
R8	60-47301	47K ohm
R9	60-31100	1 meg ohm, VOLUME
R10	60-10321	120 ohm
R11	60-10321	10K ohm, 2 w.
R12	60-10211	1K ohm 1K ohm, 1 w.
R13, R14	60-22001	27 ohm
RC1	60-19301	18K ohm (Mounted on Clock Timer)
T1	13-14-3	Ceramic Coupling Unit
T2	10-94-2	TRANSFORMERS AND COILS
T3	10-95-2	Transformer, I.F. Input
L1	80-67-1	Transformer, I.F. Output
L2	82-148-0	Antenna, Ferrite Rod (Mounted on Speaker)
L3	10-23-0	Coil, R.F. (with Cover)
	10-35-4	Coil, Oscillator
		MISCELLANEOUS CHASSIS PARTS
	11-1299	Bracket, Front
	37-57-0	Insulator, Shield
	39-9-1	Pulley, Idler
	11-1295	Bracket, Antenna Mounting
	51-109	Card, Dial
	70-295-0	Spring, Extension
	52-62-1	Pointer
	45-22-2	Socket, Tube (V1, V3)
	45-23-2	Socket, Tube (V5, V6)
	45-49-2	Socket, Tube (V2, V4)
	71-69-0	Shield, Tube
	45-56-4	Socket, Pilot Light
	89-7	Light, Pilot, #47

FIG. 4. SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.53410

NOTE: 1. VALUES OF CAPACITORS IN MFD UNLESS OTHERWISE NOTED.
 2. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
 3. VOLTAGES MEASURED FROM POINT INDICATED TO GROUND WITH 20,000 OHM/VOLT METER ON 117 V.A.C. LINE.
 4. * MEASURED WITH ELECTRONIC VOLT-METER

SILVERTONE PORTABLE RADIO CHASSIS NUMBER 528.53020

CHASSIS PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C1	20-94-0	CAPACITORS Disc., .001 mfd., G.P., 20%	R6	60-47011	47 ohm, 1 w.
C2 A & B	18-85-2	Variable Tuning (Part of T1)	-RC1	13-14-3	Couplate
C3	14-27178	Disc., .005 mfd., 200 v., G.M.V.	T1	10-22-0	Transformer, Antenna (inc. C1)
C4	15-80717	Disc., .005 mfd., 500 v., G.M.V.	T2	10-46-2	Transformer, I.F.
C5	15-40716	Disc., .000 mfd., 500 v., GP, 20%	T3	80-1-1	Transformer, Audio Output
C6 A, B & C	18-48-5	Electrolytic, 30 mfd., 150 v. (A); 50 mfd., 150 v. (B); 20 mfd., 50 v. (C)	L1	10-30-4	Coil, Oscillator
C7	15-70317	Disc., .02 mfd., 500 v., G.M.V.			
RESISTORS					
(All resistors 1/2 w., 10% unless otherwise stated)					
R1	60-22301	22K ohm			
R2	60-22501	2.2 megohm			
R3	24-283-0	1 megohm, VOLUME			
R4	60-21101	120 ohm			
R5	60-10211	1K ohm, 1 w.			

CABINET PARTS LIST

DESCRIPTION	MODEL	MODEL
	7016 A	7016 B
	GREY	WALNUT
	PART NO.	PART NO.
Cabinet	42-43-1	42-11-1
Escutcheon, Timer Face	40-16-0	40-16-0
Grill Cloth	98-56-0	98-56-0
Clack Mechanism (inc. Hands)	59-114	59-102
Hand, Alarm Set	52-17-1	52-85-1
Hand, Second	52-80-1	52-80-1
Hand, Hour	52-82-1	52-84-1
Hand, Minute	52-81-1	52-83-1
Knob, Volume	52-999-0	52-649-0
Knob, Tuning	52-1000-0	52-786-0
Knob, Clock Switch	52-650-0	52-650-0
Cabinet Back	21-340-0	21-340-0
Line Cord and Plug	23-216-0	23-216-0

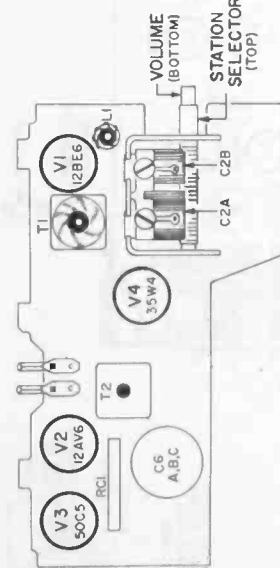


FIG. 1. TOP VIEW OF CHASSIS

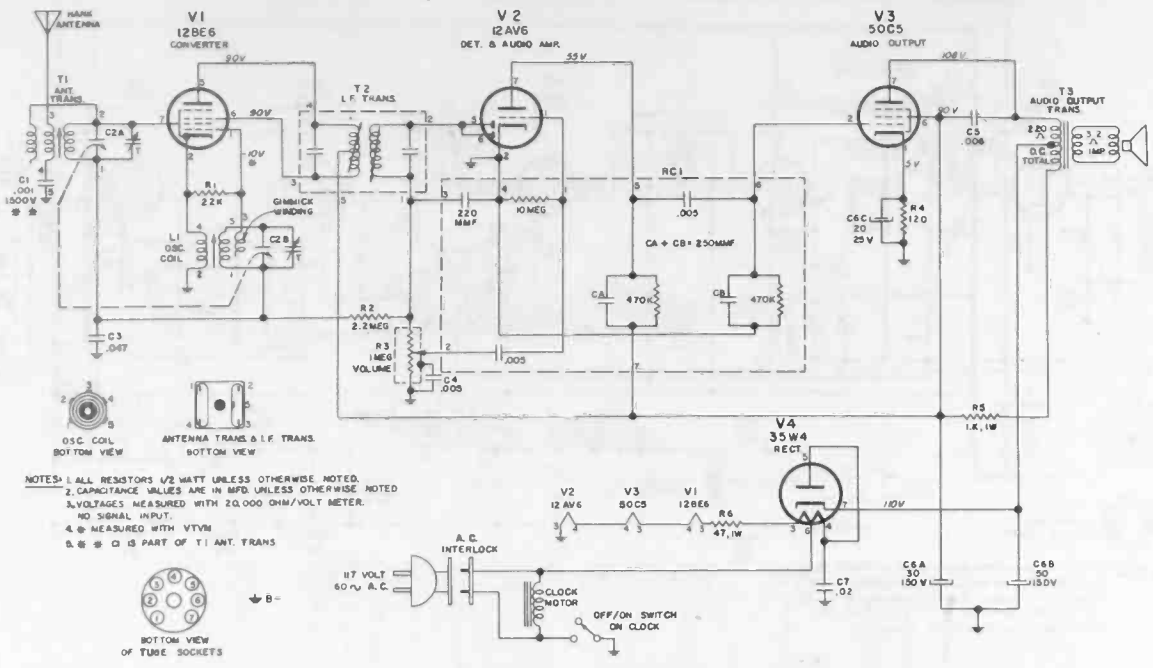


FIG. 2. SCHEMATIC DIAGRAM OF CHASSIS 528.53020

MODEL NUMBERS
7016A
7016B

(Revised) 528.53200

MODEL
NUMBERS

8019

8020

9017

PARTS LIST
for*Silvertone*[®]

CLOCK RADIO

SILVERTONE CLOCK-RADIO RECEIVER CHASSIS NUMBER 528.53200

CABINET PARTS LIST

Ref. No.	Description	MODEL NO.	MODEL NO.	MODEL NO.
		8019 BROWN CABINET Part No.	8020 IVORY CABINET Part No.	9017 BROWN CABINET Part No.
1.	Mechanism, Timer (Includes 2, 3, 4 and 5)	59-109	59-109	59-127
2.	Hand, Alarm Set	52-23-1	52-23-1	52-66-1
3.	Hand, Hour	52-57-1	52-57-1	52-46-1
4.	Hand, Minute	52-15-1	52-15-1	52-47-1
5.	Hand, Second	52-24-1	52-24-1	52-78-1
6.	Window, Timer	48-146-1	48-146-1	48-150-1
7.	Cabinet	42-36-1	42-37-1	42-46-1
8.	Knob, Clock	52-784-0	52-784-0	52-650-0
9.	Knob, Volume	52-932-0	52-932-0	52-1030-0
10.	Knob, Tuning	52-933-0	52-933-0	52-1029-0
11.	Logo, "Silvertone"	40-21-2	40-21-2	40-51-2
12.	Speaker, 4" PM, 3.2 ohm (Including T3) Baffle, Speaker (Not illustrated)	33-327-4	33-327-4	33-327-4
13.	Chassis, Radio	*	*	*
14.	Bracket, Chassis Retainer	11-1169	11-1169	11-1169
15.	Line Cord and Plug	23-216-0	23-216-0	23-43-0
16.	Clip, Cabinet Back Retainer	22-2-5	22-2-5	22-2-5
17.	Clip, Timer Mounting (Not illustrated)	22-417-2	22-417-2	---
	Back and Antenna Loop (L1)	82-126-1	82-126-1	82-2-1
	Owners Manual and Service Data Sheet	38-2051	38-2051	38-2297

* Not supplied as a repair part.

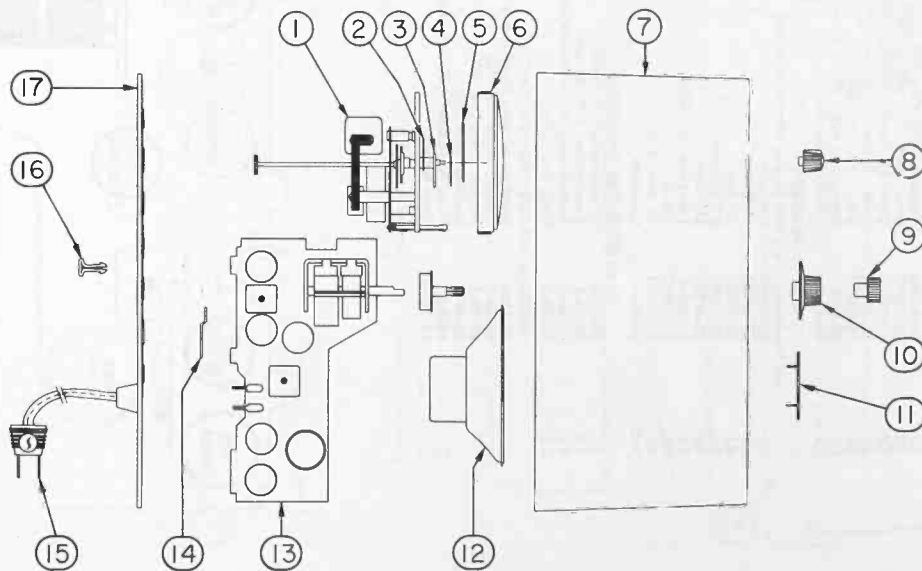
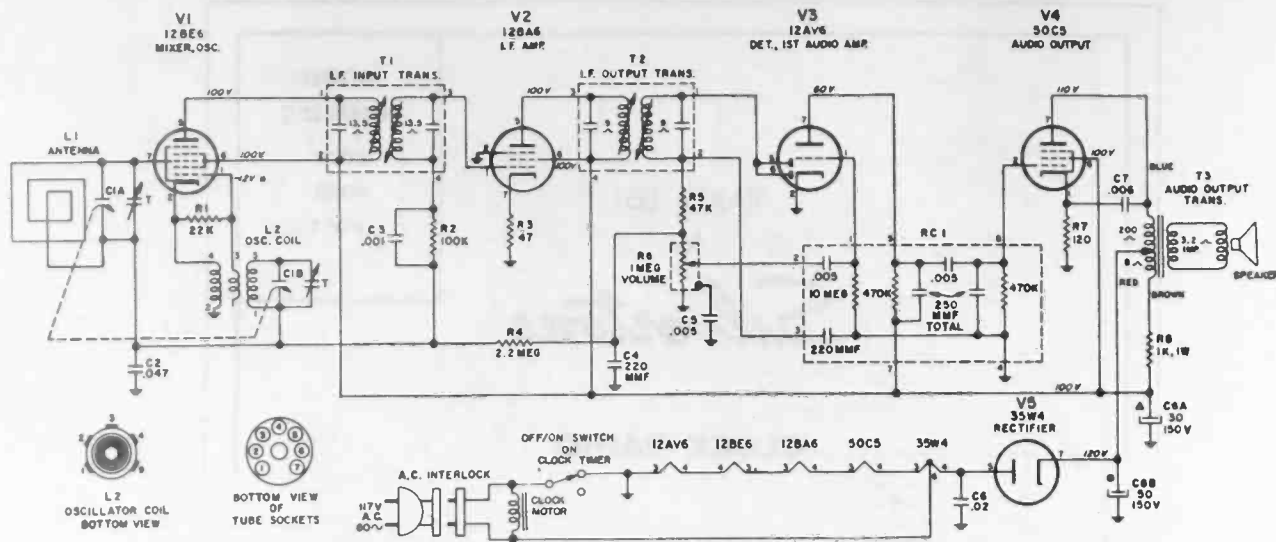


FIG. 1. EXPLODED VIEW OF CABINET



- NOTES:
1. VALUES OF CAPACITORS IN MFD., UNLESS OTHERWISE NOTED.
 2. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
 3. VOLTAGE MEASURED FROM POINT INDICATED TO GROUND WITH 20,000 OHM/VOLT METER ON 117 V.A.C. LINE.
 4. R MEASURED WITH ELECTRONIC VOLT METER.

FIG. 3. SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.53200

SILVERTONE CLOCK-RADIO RECEIVER CHASSIS NUMBER 528.53200

CHASSIS PARTS LIST

Schematic Location	Part No.	Description
C1 A & B	19-65-2	Variable, Tuning
C2	16-47328	Tubular, .047 mfd., 200 v.
C3	15-10217	Disc, .001 mfd., 500 v., GMV
C4	15-20111	Disc, 220 mfd., 500 v., 10% CP
C5	15-50217	Disc, .005 mfd., 500 v., GMV
C6	15-20317	Disc, .02 mfd., 500 v.
C7	20-85-0	Disc, .006 mfd., 500 v. (Spec. no sub.)
C8 A & B	18-49-5	Electrolytic, 30 mfd., 150 v. (A) 50 mfd., 150 v. (B)
R1	60-22301	(All Resistors 1/2 w., 10% unless otherwise noted)
R2	60-10401	22K ohm
R3	60-47001	47 ohm
R4	60-22501	2.2 megohm
R5	60-47301	47K ohm
R6	24-288-0	1 megohm VOLUME
R7	60-12101	120 ohm
R8	60-10211	1K ohm, 1 w.
RC1	13-14-3	Couplate
T1	10-73-2	Transformer, I.F. Input
T2	10-72-2	Transformer, I.F. Output
T3	80-38-1	Transformer, Audio Output (Mounted on Speaker)
L2	10-30-4	Coil, Oscillator
MISCELLANEOUS CHASSIS PARTS		
	11-1168	Bracket, Volume Control Mtg.
	45-22-2	Socket, Tube (V1, V2)
	45-23-2	Socket, Tube (V4, V5)
	45-49-2	Socket, Tube (V3)
	45-9-0	Plug, Connector, AC Interlock
	71-121-0	Tube Shield

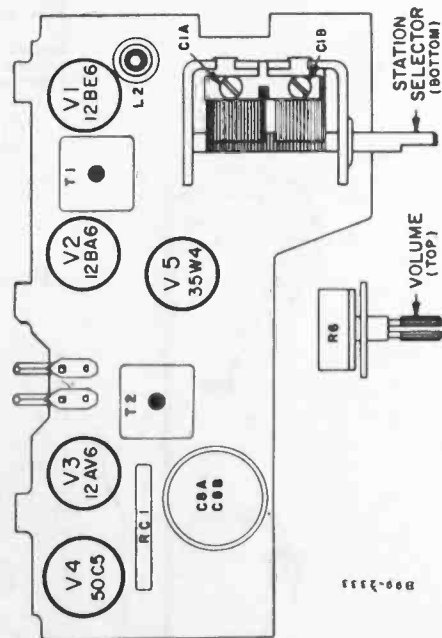


FIG. 2. TOP VIEW OF CHASSIS

528.53350

MODEL
NUMBERS

9214

9215

9217A

9218B

PARTS LIST

for

Silvertone

MADE IN U.S.A. PAT. OFF.

3WAY

PORTABLE RADIO

SILVERTONE PORTABLE RADIO CHASSIS NUMBER 528.53350

CABINET PARTS LIST

Ref. No.	Description	MODEL	MODEL	MODEL	MODEL
		9214 COCO A Part No.	9215 AQUA Part No.	9217A CHARCOAL GREY Part No.	9218A CORAL Part No.
1.	Trim Strip (Grille)	---	40-85-3	40-105-3	40-105-3
2.	Grille, Front	40-29-1	40-30-1	40-41-1	40-41-1
3.	Chassis	---	---	---	---
4.	Retainer, Chassis	22-180-0	22-180-0	22-180-0	22-180-0
5.	Knob, Off/On-Volume	52-1067-0	52-1068-0	52-1068-0	52-1068-0
6.	Minge, Clip (2)	22-77-1	22-77-1	22-77-1	22-77-1
7.	Insulator, Switch	37-46-0	37-46-0	37-46-0	37-46-0
8.	Retainer, Door Catch	22-165-0	22-165-0	22-165-0	22-165-0
9.	Retainer, Door Spring	22-164-0	22-164-0	22-164-0	22-164-0
10.	Door, Rear Compartment	21-322-0	21-323-0	21-385-0	21-386-0
11.	Power Cord and Plug	23-40-0	23-40-0	23-40-0	23-40-0
12.	Cabinet	42-57-1	42-58-1	42-62-1	42-63-1
13.	Knob, Tuning	52-1065-0	52-1066-0	52-1066-0	52-1066-0
14.	Trim Strip (Handle)	---	---	40-106-3	40-106-3
15.	Retainer, Antenna (2)	22-163-0	22-163-0	22-163-0	22-163-0
16.	Perule, Speaker Mounting (2)	83-1236	83-1236	83-1236	83-1236
17.	Clamp, Cable	22-23-3	22-23-3	22-23-3	22-23-3
18.	Speaker (Inc. T3)	33-357-4	33-357-4	33-357-4	33-357-4
19.	Baffle, Grille	---	---	44-30-0	44-30-0
20.	Grille, Metal	---	---	40-43-1	40-43-1
21.	Logo, DUR-PAC	---	---	40-67-2	40-67-2

* Not Supplied as a Repair Part

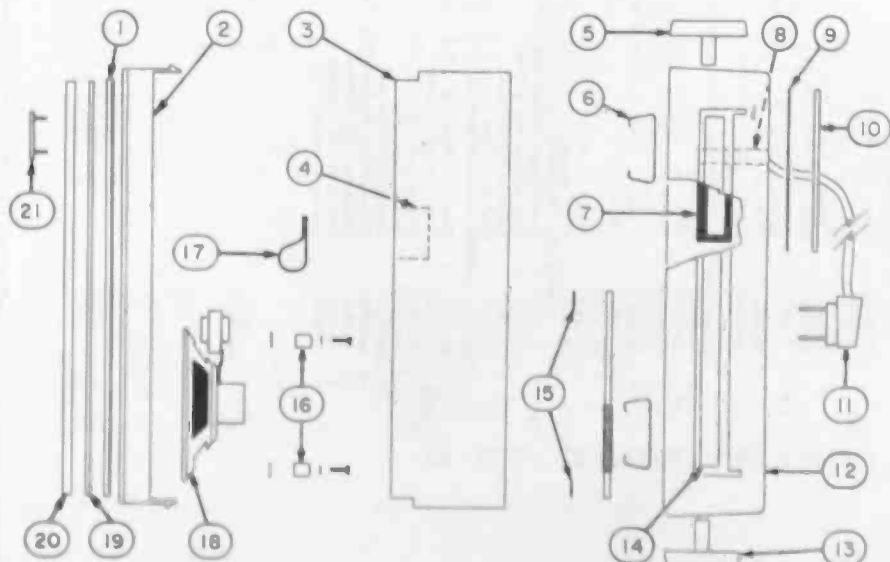


FIG. 1. EXPLODED VIEW OF CABINET

SILVERTONE PORTABLE RADIO CHASSIS NUMBER 528.53350

CHASSIS PARTS LIST

Schematic Location	Part No.	Description
C1	20-82-0	CAPACITORS
C2 A & B	19-71-2	Disc, .02 mfd., 1400 v.
C3	20-70-0	Variable, Tuning
C4	20-51-1	Disc, .02 mfd., 500 v., GP
C5	20-91-0	Tubular, .1 mfd., 200 v.
C6 A, B & C	18-54-5	Disc, .005 mfd., 500 v., GP
C7	20-69-0	Electrolytic, 100 mfd., 10 v. (A); 30 mfd., 150 v. (B); 70 mfd., 150 v. (C)
C8	16-20343	Disc, .002 mfd., 500 v., GP
R1	60-1520-1	Tubular, .02 mfd., 400 v.
R2	60-1520-1	(All resistors 1/2 w. 10% unless otherwise noted)
R3	60-2250-2	1.5K ohm
R4	60-1060-2	100K ohm
R5	24-310-0	2.2 megohm, 20%
R6	61-22-0	1 megohm VOLUME & OFF/ON Switch
R7	60-1820-1	160 ohm, 3 w.
R8	61-23-0	1.8K ohm
PAC 1	13-24-5	2K ohm, 10 w.
T1, T2	10-102-2	TRANSFORMERS AND COILS
T3	80-62-1	Transformer, 1st and 2nd I.F.
L1	82-143-0	Transformer, Audio Output
L2	10-45-4	Antenna, Ferrite Rod
SL1	83-1117	Coil, Oscillator
S2 A, B & C	69-275-0	MISCELLANEOUS CHASSIS PARTS
	45-128-2	Rectifier, Selenium
	45-126-2	Switch, AC-DC, Battery
	45-56-3	Socket, Tube (V1, V2, V3)
	45-59-3	Socket, Tube (V4)
	45-28-0	Receptacle, Line Cord
	45-75-5	or Receptacle, Line Cord (Alt. Part)
	37-47-0	Connector, "A" Battery
		Insulator, Switch

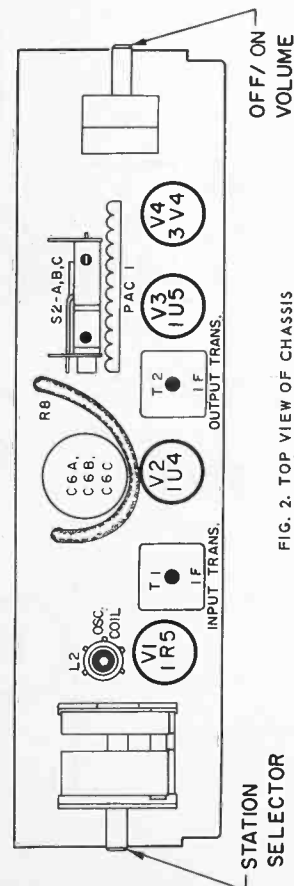


FIG. 2. TOP VIEW OF CHASSIS

©John F. Rider

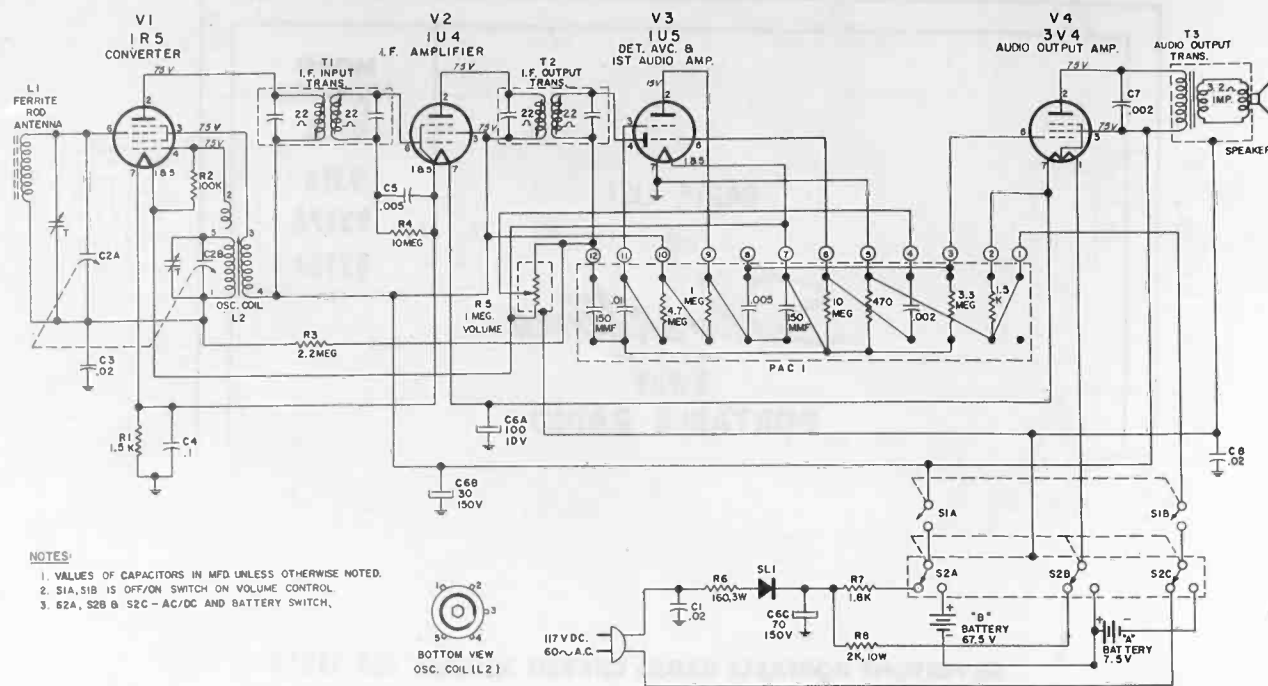


FIG. 3. SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.53350

NOTES:

- VALUES OF CAPACITORS IN MFD UNLESS OTHERWISE NOTED.
- S1A, S1B IS OFF/ON SWITCH ON VOLUME CONTROL.
- S2A, S2B & S2C - AC/DC AND BATTERY SWITCH.



BOTTOM VIEW OSC. COIL (L2)

528.53370

CHASSIS 528.53370

PARTS LIST
forMODEL
NUMBERS
9045
9046*Silvertone*RADIO-RECORD
CHANGER

PARTS LIST - RADIO CHASSIS 528.53370

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
CAPACITORS					
C1, C6, C16	20-44-1	Tubular, .047 mfd., 400 v.	RC1	13-18-3	Couplate, Tone Compensator
C2A & B	19-74-2	Variable Tuning	RC2	13-16-3	Couplate, Push Pull
C3, C12	15-47111	Disc., 470 mmfd., 500 v., 10%	TRANSFORMERS AND COILS		
C4	19-180-0	Trimmer, Antenna (Part of L1)	T1	10-81-2	Transformer, I.F. Input
C5, C9	20-47-1	Tubular, .047 mfd., 200 v.	T2	10-71-2	Transformer, I.F. Output
C7	15-151164	Disc., 150 mmfd., 500 v., N750	T3	80-69-1	Transformer, Audio Output
C8, C11	15-10316	Disc., .01 mfd., 500 v.	L1	82-126-0	Coil, Antenna, Ferrite Rod Type (Inc. C4)
C10	18-62-5	Electrolytic, 4 mfd., 150 v.	L2	10-34-4	Coil, Oscillator
C13A & B	18-58-5	Electrolytic, 30 mfd., 150 v. (A); 70 mfd., 150 v. (B)	MISCELLANEOUS CHASSIS PARTS		
C14 & C15	15-10216	Disc., .001 mfd., 500 v.,	39-132-3		Tuning Shaft
C17	20-55-1	Tubular, .047 mfd., 400 v.	84-6439		Bracket, Dial Disc
RESISTORS					
(All resistors 1/2 w., 10% unless otherwise stated)					
R1, R11	60-22301	22K ohm	84-6440		Shaft & Pulley, Dial Disc
R2, R4	60-22502	2.2 megohm, 20%	22-49-1		Retainer, "C" Washer (4)
R3	60-15101	150 ohm	52-165-1		Dial Disc
R5	60-47302	47K ohm, 20%	45-7-3		Receptacle, AC Line
R6A & B	24-173-2	Tone Control, 500K ohm, BASS (a); 3 megohm TREBLE (b)	45-8-3		Socket, Phono Audio
R7	60-56501	5.6 megohm	45-61-3		Socket, Phono Motor
R8	24-330-0	1 megohm, VOLUME and OFF/ON Sw.	45-17-2		Socket, 7 Pin Miniature
R9	60-15501	1.5 megohm	45-18-2		Socket, 7 Pin Miniature Shield (3) (V1, V2 & V3)
R10	60-33401	330K ohm	45-116-2		Socket, 7 Pin Miniature
R12	60-47501	4.7 megohm	45-115-2		Socket, 7 Pin Miniature
R14	60-10501	1 megohm	51-105		Dial Cord (42-3/4")
R15	60-10101	100 ohm	69-270-0		Switch, RADIO-PHONO
R16	60-10211	1K ohm, 1w.	70-295-0		Spring, Dial Cord Tension (2)
R17	61-10-0	33 ohm, 3 w.	71-69-0		Tube, Shield (2)
R18	60-10401	100K ohm	SL1	83-1146	Selenium Rectifier (100MA)

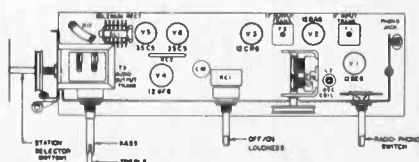


Fig. 1. Top View Chassis

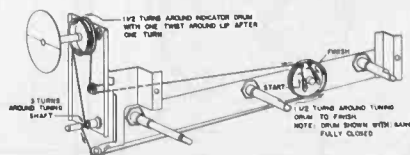


Fig. 2. Dial Stringing Diagram

CHASSIS 528.53370

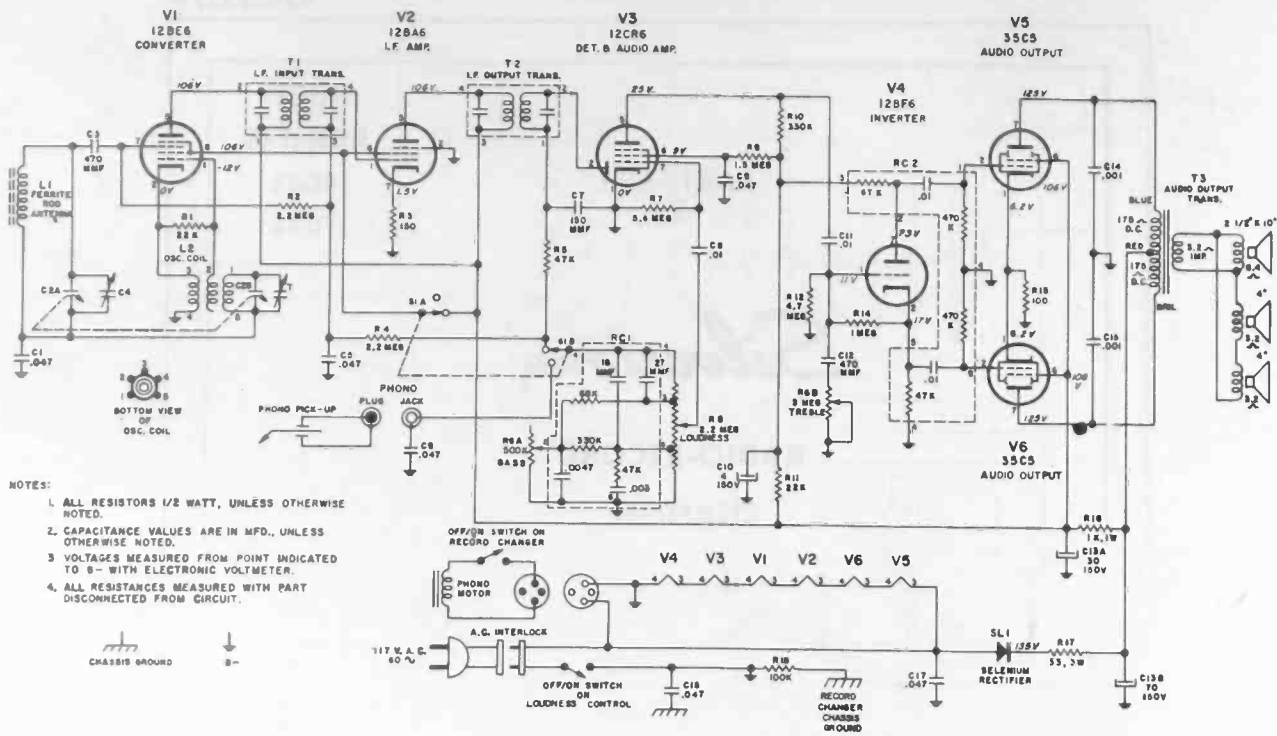


Fig. 3. Schematic Diagram - Chassis 528.53370

SILVERTONE RADIO RECEIVER CHASSIS NUMBER 528.53370

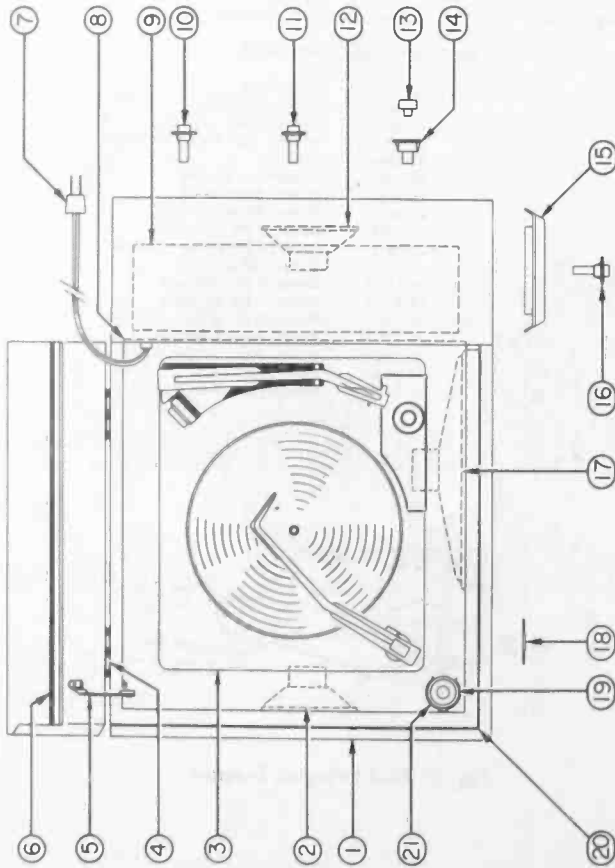


Fig. 4. Cabinet Parts Diagram

CABINET PARTS LIST

Key No.	Part No.	Description
1	42-64-3	Cabinet, Mahogany (Model 9045)
1	42-65-3	Cabinet, Lined Oak (Model 9046)
2	33-256-4	Speaker, 4" PM, 3.2 ohm
3	..	Record Changer
4	49-289	Hinge (2)
5	49-336	Lid Lift
6	40-58-3	Trim Strip
7	23-44-0	Line Cord
8	21-342-0	Cover, Radio Compartment
9	..	Radio Chassis
10	52-1088-0	Knob, Radio-Phono
11	52-1087-0	Knob, Off/On-Loudness
12	33-372-4	Speaker, 4" PM, 3.2 ohm (with bracket)
13	52-1089-0	Knob, Treble
14	52-837-0	Knob, Bass
15	48-149-0	Escutcheon, Tuning
16	52-1086-0	Knob, Tuning
17	33-373-4	Speaker, 2-1/2" x 10" PM, 6.4 ohm
18	40-348-2	Logo, "Silvertone"
19	84-6197	45 RPM Spindle Adaptor
20	98-164-0	Grill Cloth
21	22-66-3	Clamp, Spindle Adaptor

.. Not Supplied As A Repair Part

528.53380

MODEL
NUMBERS9061
9062

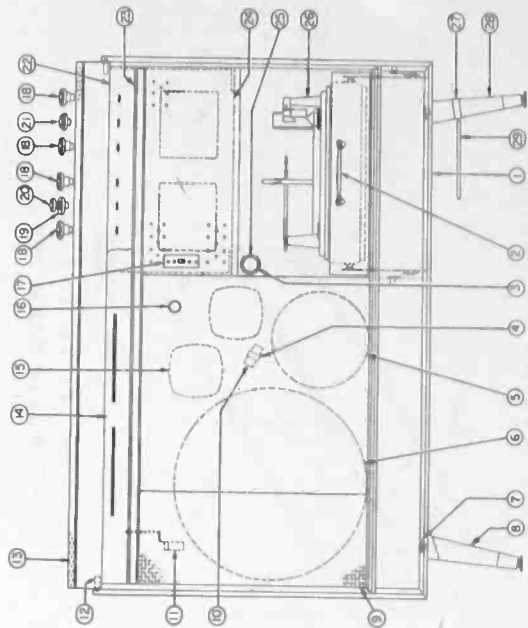
PARTS LIST
for
Silvertone
AM-FM
RADIO-RECORD CHANGER

CHASSIS PARTS LIST

Schematic Location	Part No.	Description	Schematic Location	Part No.	Description	
CAPACITORS			R59,R62	60-22401	220K ohm	
(All Capacitors 500 v., 10% unless otherwise noted)			R63,R74	24-180-2	Base Control	
C1,A,B,C,D,E	19-6-6	Tuning Trimmer, Part of C1A	R61	60-12401	120K ohm	
C3,C9,C14,C19	15-470611	Tubular, 47 mmfd.	R66,R67	60-10102	100 ohm, 20%	
C4,C5,C7,C12	15-10316	Disc, .01 GP	R70,R73	60-36125	360 ohm, 2 w., 5%	
C13,C22,C23			R71,R72	60-39201	3.9K ohm	
C26,C27,C28			TRANSFORMERS AND COILS			
C29,C30,C31			L1	10-3-1	Coil, Antenna (FM)	
C33,C34,C46			L2	10-24-1	Coil, R.F. (FM)	
C49,C52,C53			L3	10-47-4	Coil, Oscillator (FM)	
C6			L4	10-140-1	Coil, Choke	
C8,C35,C48			L5	10-46-4	Coil, Oscillator (AM)	
C10			L6	10-129-1	Choke, R.F.	
C11,C15,C24			L7	80-11-6	Filter Choke	
C16	T1,T2	10-44-2	Transformer, 1st & 2nd IF (FM)			
C17	C18	15-100611	15-330611	15-330611	Transformer Ratio Detector (FM)	
C18	C20	15-101618	15-1011-2	15-1011-2	Transformer, 1st IF (AM)	
C21	C25	15-101116	15-1011-2	15-1011-2	Transformer, 2nd IF (AM)	
C25	C32,C68	20-27-0	T6	80-11-0	Transformer, Power	
C32,C68	C36,C38,C39	15-10116	T7	80-24-1	Transformer, Audio Output	
C36,C38,C39	C37	15-27111	MISCELLANEOUS CHASSIS PARTS			
C37	C40	15-10261	11-1367	11-1369	Bracket, Pilot Light (2)	
C40	C41,C65	18-74-5	11-1371	11-1376	Bracket, Tuning Eye	
C41,C65	C42	15-10211	11-1376	21-17-1	Bracket, Pointer Mounting	
C42	C43	15-47111	21-17-1	21-82-1	Bracket, Pointer Support	
C43	C44	15-15211	21-82-1	21-381-0	Shell, Connector	
C44	C45	15-60211	21-381-0	22-32-1	Shell, Connector	
C45	C47,A,B,C	20-647-1	22-32-1	22-74-1	Cover, Volume Control Switch	
C47,A,B,C	C50,C51,C55	18-35-3	22-74-1	22-81-1	Clip, I.F. Mtg.	
C50,C51,C55	C54	15-47061	22-81-1	22-113-0	Retaining Ring (2)	
C54	C56,C57,C59	15-20316	22-113-0	22-142-1	Retainer "C", Washer	
C56,C57,C59	C58	16-47258	22-142-1	23-18-0	Tube Holder	
C58	C60,C61	15-33111	23-18-0	26-19-2	Spring Clip	
C60,C61	C62	16-22357	26-19-2	31-322-0	Line Cord	
C62	C63,C64	18-23-0	31-322-0	37-6-0	Threaded Bushing	
C63,C64	C66	16-33268	37-6-0	37-43-0	Plate, Shield Cover	
C66	C67	19-3-5	37-43-0	39-53-0	Shield, Coil	
C67	RESISTORS			39-53-0	Insulator, Transformer	
(All Resistors 1/2 w., 10% unless otherwise noted)			39-9-1	39-20-2	Insulator, Tuning Eye Socket	
R1,R6,R16	60-22501	2.2 megohm	39-20-2	39-21-2	Idler Pulley (4)	
R2,R15	60-10001	10 ohm	39-21-2	39-40-1	Crown Gear (Pulley Shaft)	
R3	60-10501	1 megohm	39-40-1	39-147-3	Crown Gear (Pointer Shaft)	
R4	60-56101	560 ohm	39-147-3	39-149-3	Pulley & Shaft	
R5	60-68502	6.8 megohm, 20%	39-149-3	39-150-3	Pointer Shaft	
R7	60-68001	68 ohm	39-150-3	44-43-1	Gear Shaft	
R8	60-68301	68K ohm	44-43-1	44-65-1	Shaft Idler Pulley (2)	
R9,R24	60-10301	10K ohm	44-65-1	45-4-2	Shield, Pilot Light (2)	
R10,R13	60-68311	68K ohm, 1 w.	45-4-2	45-4-3	Heat Barrier	
R11,R19,R28	60-10401	100K ohm	45-4-3	45-7-0	Socket, Octal (Molded)	
R12,R23	60-47101	470 ohm	45-7-0	45-11-2	AC Power Receptacle	
R64,R65	60-22301	22K ohm	45-11-2	45-12-2	Phono Plug (2)	
R14,R17	60-15001	15 ohm	45-12-2	45-12-3	Socket (9 Pin) (Molded)	
R18	60-15311	15K ohm	45-12-3	45-31-0	Socket, 7 Pin (Molded) (3)	
R20	60-10502	1 megohm	45-31-0	45-33-2	Socket, Double-Phono (2)	
R21	60-10502	1 megohm	45-33-2	45-39-4	Plug, 6 Pin	
R22,R47	60-47401	470K ohm	45-39-4	45-59-4	Socket, 9 Pin (Molded) (2)	
R25	61-136-0	8K ohm, 15 w., w.w.	45-59-4	45-60-3	Socket, Pilot Light (Dial)	
R26	60-47201	4.7K ohm	45-60-3	45-62-3	Socket, 6 Pin Wafer	
R27	60-22311	22K ohm, 1 w.	45-62-3	45-62-4	Socket (6 Pin)	
R29,R35,R40	60-68001	68 ohm	45-62-4	45-122-2	Socket, Pilot Light (Cabinet)	
R30,R36	60-27311	27K ohm, 1 w.	45-122-2	45-123-2	Socket, 9 Pin (Molded)	
R31,R42	60-10201	1K ohm	45-123-2	45-203-2	Socket, 7 Pin (Molded)	
R32,R68,R69	60-10401	100K ohm	45-203-2	51-105	Socket, 7 Pin (Wafer) (3)	
R33,R52	60-39401	390K ohm	51-105	69-269-0	Dial Cord ((83''))	
R34	60-22502	2.2 megohm, 20%	69-269-0	69-277-0	Slide Switch	
R37	60-22202	2.2K ohm, 20%	69-277-0	69-278-0	Selector Switch	
R41,R60	60-68301	68K ohm	70-246-0	69-278-0	Compensator Switch	
R43	60-56901	5.6 ohm	70-246-0	70-246-0	Spring, Ground Wiper	
R44,R45	60-68201	6.8K ohm	70-269-0	70-295-0	Spring, Dial Cord (Long)	
R46	60-12201	1.2K ohm	70-295-0	71-69-0	Spring, Dial Cord (Short)	
R48,R49	60-47502	4.7 megohm, 20%	71-69-0	71-80-0	Tube Shield (7 Pin)	
R50	61-137-0	900 ohm, 10 w., w.w.	71-80-0	71-93-0	Tube Shield (9 Pin)	
R51	24-327-0	Stereo Balance Control	71-93-0	77-162-0	Shield, Tuner (Top)	
R53	60-15401	150K ohm	77-162-0	84-6415	Spacer (4)	
R54	24-328-0	Volume Control	84-6415	84-6582	Connector Receptacle	
R55	60-33321	33K, 2 w.	84-6582	84-6582	Bracket, Gear & Pointer Mtg.	
R56	60-10602	10 megohm, 20%	84-6586	84-6586	Pulley & Shaft	
R57	60-27401	270K ohm	84-6586	84-6587	Connector Cable	
R58	24-181-2	Treble Control	84-6587	84-6668	Pulley & Hub	
			84-6668	84-6669	Tracking Indicator	
			84-6669	84-6672	Idler Pulley (2)	
			84-6672	84-6675	Pointer (Cylinder)	
			84-6675	86-408	Bottom Shield	
			86-408	89-7	Spring Washer	
			89-7		Pilot Lamp, #47 (3)	

SILVERTONE AM-FM RADIO CHASSIS NUMBER 528.53380

SILVERTONE AM-FM RADIO CHASSIS NUMBER 528.53380



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	42-79-3	Cabinet (Mahogany 9061)	15	33-375-4	Tweeter, 5" PM
2	42-80-3	Cabinet (Lined Oak 9082)	16	49-354	Knob, Phono Door
3	49-98	Drawer Pull	17	40-145-0	Escutcheon, Auto Power Control
4	22-66-3	Clamp, Spindle Adaptor	18	52-1113-0	Knob, Indicating
5	22-20-1	Clamp, Capstan, Mounting	19	52-1109-0	Knob, Station Selector
6	33-365-4	Speaker, 1 1/2" PM, 8 ohm	20	52-1132-0	Knob, OFF/ON Switch
7	33-319-4	Speaker, 1 1/2" PM, 8 ohm	21	52-1131-0	Knob, Dual
8	22-151-2	Leg (Mahogany, 810-32 Rear)	22	67-654-0	Dial Scale
9	19-401	Leg (Mahogany)	23	22-38-5	Dial Scale Cushion
10	98-163-0	Leg (Lined Oak - Rear)	24	84-6299	Radio Chassis
11	18-9-5	Grill Cloth	25	45 RPM, Spindle Adaptor (Cat. No. 57-5774)	
12	11-1377	Cross Over Capacitor, 4 mfd., NP	26	Record Changer	
13	49-392	Clip, Capacitor Mounting	27	Leg (Mahogany Front)	
14	21-46-0	Hinge, PH (2)	28	Leg (Lined Oak Front)	
		Control Panel Cover (Mahogany)	29	Rod, Leg Support	
		Control Panel Cover (Lined Oak)		Back, Phono Compartment	
		Panel Background			

50	84-6384	Phono Pull-Out Unit	56	77-24-0	Spacer (2)
51	37-32-3	Grommet Pass Thru (2)	57	26-28-2	Bushing, Spring Anchor (2)
52	84-6349	Carriage Frame	58	86-394	Flatwasher (Nylon) (2)
53	84-6385	Hinge (RH)	59	70-338-0	Spring (2)
54	62-115-0	Bumper Plug (2)	60	21-377-0	Bottom Panel
55	11-1280	Cross Brace (2)	61	84-6386	Hinge (LH)
	84-6335	Wing Nut (2)		62-1160	Bumper Plug (Rear) (2)

Spartan

MAINTENANCE MANUAL 109

RADIO CHASSIS — 51 SERIES

GENERAL

This manual covers the 51 series radio chassis, versions 51-01A thru 51-11AA and also the 51-03BA version. Three complete electrical parts lists and 3 schematics are shown to provide complete coverage. On the 51-03BA version an electrical change has been

made regarding the AC switch on the rear of the band switch. This switch was eliminated and a double-throw switch used on the Bass control as an Off-On switch. This change is shown on the schematic diagram on page 10.

SPECIFICATIONS

Tuning Frequency Range:	AM Detector (crystal)	IN34A
Broadcast Band	540-1620 KC	6E5
FM Band	88-108 MC	6AV6
Intermediate Frequency	455KC/10.7 MC	(1/2) 6U8
Tubes:		(1/2) 12AX7
FM RF Amplifier	6C45	6U8
AM RF Amplifier	6BZ6	(1/2) 12AX7
FM Mixer & Osc.	6U8	6AQ5
AM Converter	6BE6	6AQ5
IF Amplifier	6BA6	5Y3
FM Driver	6BA6	
Ratio Detector	6AL5	

†Not used on 51-01, 02, 07, 09 & 11
 **Used only on 51-02
 ***Used only on 51-01, 04, 07, 09 & 11
 ****Used only on 51-03, 05 & 08

CHASSIS DIFFERENCES

Chassis No.	Tuning Eye	Output	Chassis No.	Tuning Eye	Output
51-01	No	Push-Pull	51-07	No	Push-Pull
51-02	No	Single Ended	51-08	Yes	None
51-03	Yes	None	51-09	No	Push-Pull
51-04	Yes	Push-Pull	51-10	Not Released	Push-Pull
51-05	Yes	None	51-11	No	Push-Pull
51-06	Not Released				

DIAL STRINGING INSTRUCTIONS

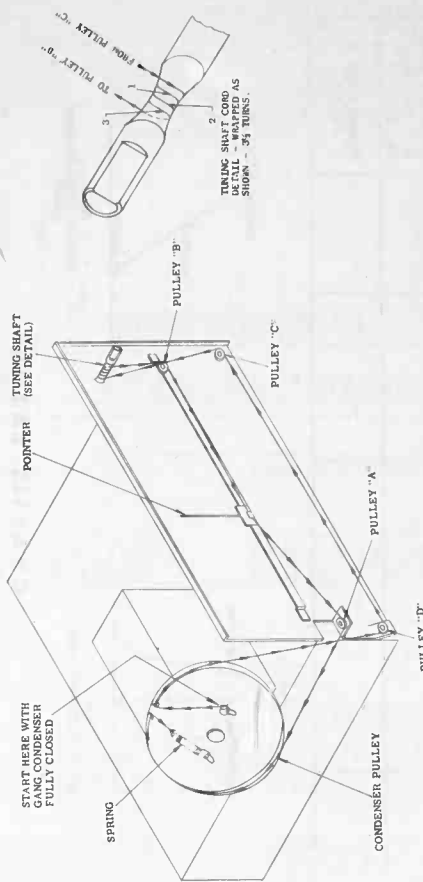
DIAL CORD PLACEMENT

Select a 50-inch length of dial cord and tie a small loop at each end. Turn the tuning gang fully out of mesh and hook one end of the cord over the metal hook on the condenser pulley nearest the front of the chassis and proceed with the stringing as shown in the drawing below.

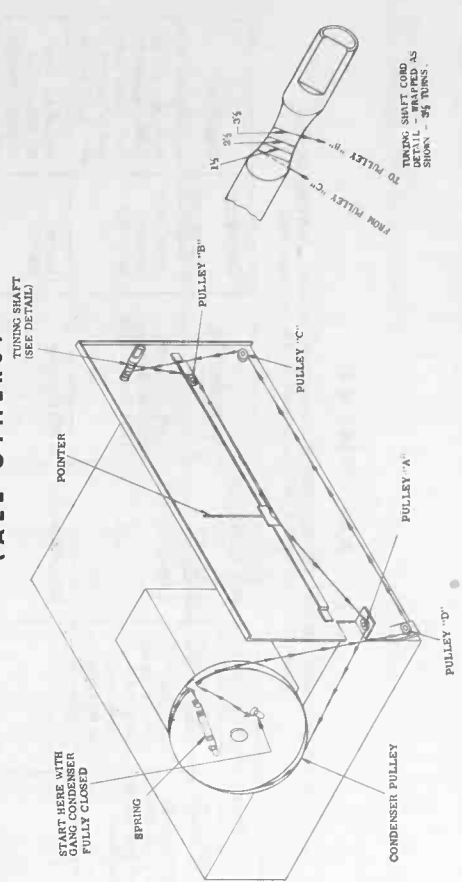
DIAL POINTER PLACEMENT

Place the dial pointer onto the pointer slide and turn the tuning gang completely in mesh. Lace the dial cord around the three hooks on the front of the pointer and with the tuning condenser still fully in mesh, slide the pointer over until it lines up with the last dial calibration mark at the low frequency end of the broadcast band. This completes the assembly.

DIAL STRINGING GUIDE (51-03, 51-05 & 51-08)



DIAL STRINGING GUIDE (ALL OTHERS)



ALIGNMENT

FM I-F AND RATIO DETECTOR ALIGNMENT (Using Sweep Generator and Oscilloscope).
 Note: Place 1 megohm resistor in series with hot scope lead.

SWEEP GENERATOR		SET RECEIVER	ADJUSTMENTS	CONNECT	REMARKS
COUPLE TO:	FREQUENCY	DIAL TO:		SCOPE TO	
6CY5 (pin 5) thru .01 mfd and 1000 ohms in series	10.7 mc (-.3 mc sweep) couple a marker sig. to 6CY5 pin 5	Low end of dial	T201, T102 top and bottom slugs T203 bottom slug	From pin 5 to pin 4 of PC202	Open one end of C204. Adjust for max. amplitude and symmetry. See fig. 1 below.
"	"	Low end of dial	T203 top slug	Across C203	Adjust for best amplitude and straightest slope. See fig. 2.
"	"	Low end of dial	T203 bottom slug	"	Adjust for best symmetry about 10.7 mc. See fig. 2.
"	"	-----	-----	-----	Repeat steps 1, 2 and 3.

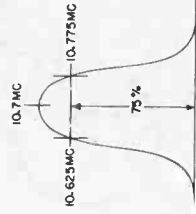


FIG 1 F.M. I-F SELECTIVITY CURVE

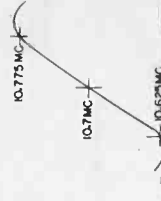
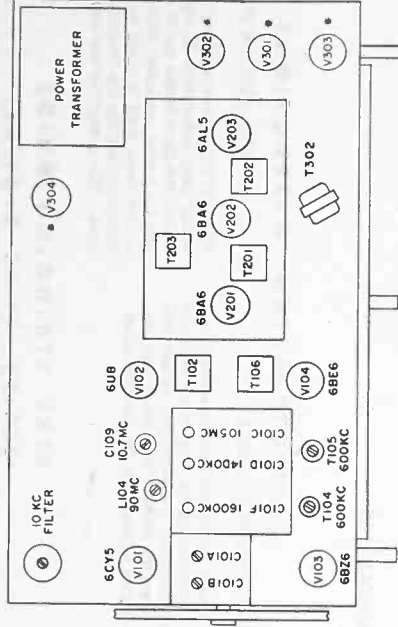


FIG 2 RATIO DETECTOR RESPONSE CURVE

CHASSIS LAYOUT



ALIGNMENT

AM ALIGNMENT
 Set band switch to AM position. Check dial pointer positioning.

SIGNAL GENERATOR		SET RECEIVER	ADJUSTMENTS	CONNECT	REMARKS
COUPLE TO:	FREQUENCY	DIAL TO:		OUTPUT METER	
6BE6 (pin 7) thru .01 mfd	455 kc (modulated)	Near 1000 kc (free of interference)	T202, T106, top and bottom slugs	Across voice coil	Adjust for max. output
AM ant. term. thru 10 mmf	1400 kc (modulated)	1400 kc	C101F C101D C101B	"	"
"	600 kc (modulated)	600 kc	T105, T104	"	Adjust for max. output.
"	-----	-----	-----	"	Repeat steps 2 and 3.

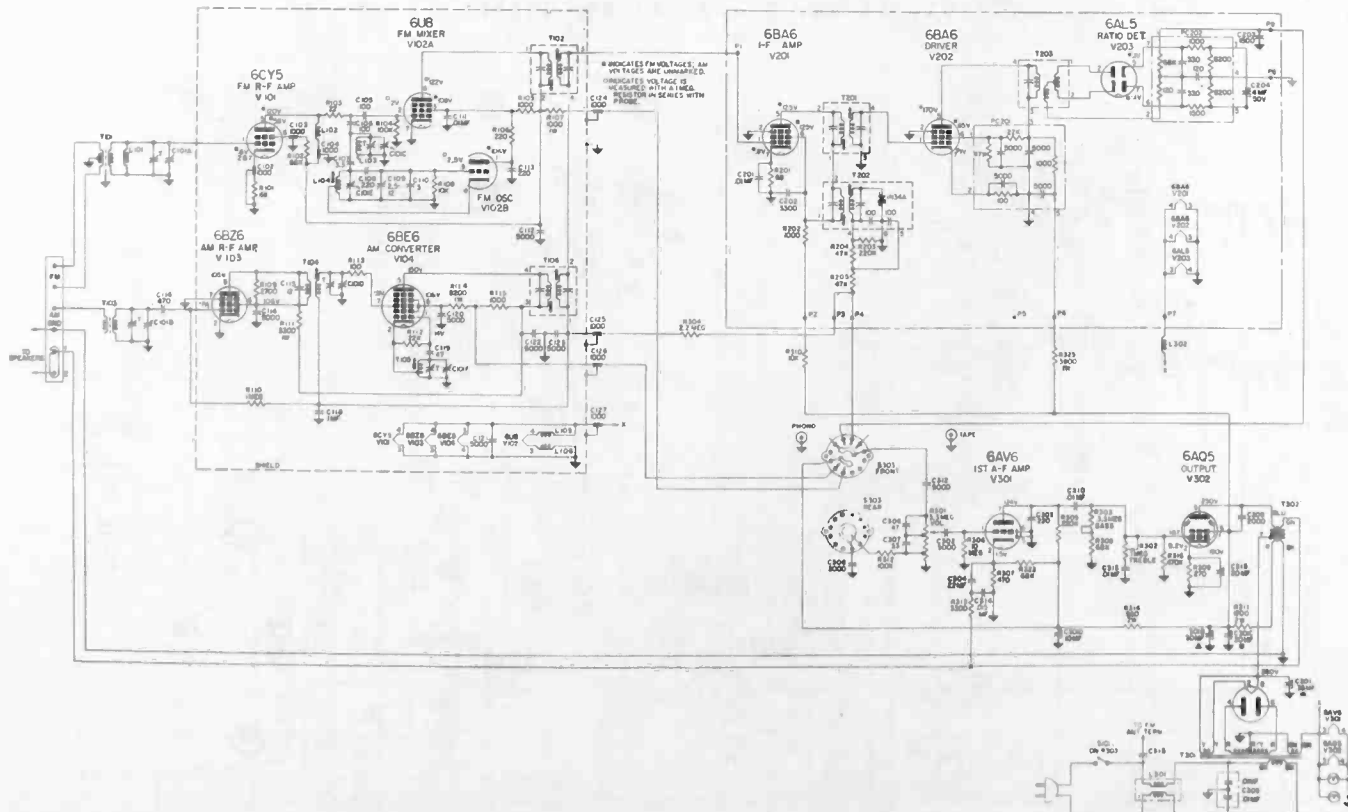
FM ALIGNMENT (Using AM Signal Generator and VTVM)
 Set band switch to FM position. Note: Place a 1 megohm resistor in series with hot side of VTVM.

SIGNAL GENERATOR		SET RECEIVER	ADJUSTMENTS	CONNECT	REMARKS
COUPLE TO:	FREQUENCY	DIAL TO:		OUTPUT METER	
6CY5 (pin 5) thru .01 mfd	10.7 mc unmodulated	Low end of dial	T201, T102 top & bottom slugs and T203 bottom slug	From (pin 5) to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	"	Low end of dial	T203 top slug	Across C203	Tune for zero VTVM. (Point where voltage swings pos. or neg.)
"	"	Low end of dial	Repeat steps 1 & 2	Repeat steps 1 & 2	Repeat steps 1 & 2
FM ant. term. in series with: 120 ohms (high side) 150 ohms (low side)	107 mc	107 mc	C109 C101A C101C	From pin 5 to pin 4 of PC202	Adjust for max. neg. reading on VTVM.
"	89 mc	89 mc	L104 (osc. coil)	"	"
"	-----	-----	-----	-----	Repeat two preceding steps.

**PARTS LIST
(51-02)**

SYMBOL	DESCRIPTION	PART NO.	LIST
T101	TRANSFORMERS-COILS-CHOKES		
T102	FM Input	360481-4	1.00
T103	1st FM I-F	360626-1	1.60
T104	Rod Antenna Assembly	360746-1	3.50
T105	AM R-F	360753-1	1.85
T106	AM Oscillator	360752-1	1.65
T107	1st AM I-F	360011-1	1.40
T108	2nd FM I-F	360749-1	1.85
T109	1st FM I-F	360748-1	1.85
T201	Radio Detector	300164-1	12.00
T301	Power	320287-1	2.50
T302	Audio Output	360750-1	1.15
L101	FM Antenna	360522-9	.30
L102	RF Choke	360751-1	1.15
L103	FM R-F	360522-9	.30
L104	RF Choke	360522-9	.30
L105	RF Choke	360522-9	.30
L106	AC Line Choke	360653-1	.30
L301	RF Choke	360522-9	.30
L302	RF Choke	360522-9	.30
C101	Tuning Capacitor	260147-1	6.75
C102	Feed Thru, 1000 mf	250276-2	.20
C103	Feed Thru, 1000 mf	250276-1	.20
C104	Feed Thru, 1000 mf	250276-1	.25
C105	Mica, 100 mmf	250187-53	.25
C106	Mica, 100 mmf	250187-53	.25
C107	Mica, 2.2 mmf	250221-118	.15
C108	Mica, 220 mmf	250187-57	.35
C109	Cer., 5 mmf - 5%	250188-9	.20
C110	Cer., 2.5 - 12.0 mmf (Trimmer)	250088-138	.20
C111	Paper, 5000 mmf - 400V	250175-30	.20
C112	Mica, 220 mmf	250175-30	.25
C113	Mica, 470 mmf	250187-57	.25
C114	Cer., 12 mmf - 8%	250159-102	.25
C115	Cer., 5000 mmf	250088-179	.20
C116	Mylar, 1 mf - 100V	250175-30	.40
C117	Cer., 5000 mmf	250261-125	.20
C118	Cer., 5000 mmf	250175-30	.20
C119	Cer., 5000 mmf	250175-30	.20
C120	Cer., 5000 mmf	250175-30	.20
C121	Cer., 5000 mmf	250175-30	.20
C122	Cer., 5000 mmf	250175-30	.20
C123	Cer., 5000 mmf	250175-30	.20
C124	Cer., Feed Thru, 1000 mf	250276-1	.25
C125	Cer., Feed Thru, 1000 mf	250276-1	.25
C126	Cer., Feed Thru, 1000 mf	250276-1	.25
C127	Cer., Feed Thru, 1000 mf	250276-1	.25
C201	Ceramic, .01 mf	250234-66	.25
C202	Ceramic, .0033 mf	250234-154	.25
C203	Ceramic, .0015 mf	250234-146	.20
C204	Electrolytic 4 mf - 50V	270559-9	1.10
R101	68	230104-68	2.00
R102	8K	230104-8	2.00
R103	20K	230104-20	2.00
R104	100K	230104-86	2.00
R105	1000	230104-82	2.00
R106	220	230104-54	2.00
R107	1000 - 1W	230105-62	2.50
R108	10K	230104-74	2.00
R109	2700	230104-88	2.00
R110	100K	230104-88	2.00
R111	100K	230105-68	2.50
R112	22K	230104-78	2.00
R113	100	230104-50	2.00
R114	8200 - 1W	230105-73	2.50
R115	1000	230104-82	2.00
R201	680	230104-68	2.00
R202	1000	230104-82	2.00
R203	10K	230104-82	2.00
R204	47K	230104-82	2.00
R205	47K	230104-82	2.00
R301	Loudness Control (3.3 meg)	230131-13	81.25
R302	Treble Control (1 meg)	220072-36	81.25
R303	Bass Control (3.3 meg)	220072-36	81.25
R304	2.2 meg	230104-80	2.00
R305	10K	230104-80	2.00
R306	10K	230104-80	2.00
R307	470	230104-110	2.00
R308	68K	230104-58	2.00
R309	270	230104-84	2.00
R310	10K - 2W	230104-55	2.00
R311	1200 - 2W	230106-1074	3.50
R312	330K	230104-88	2.00
R313	330K	230104-88	2.00
R314	580 - 2W	230106-1059	3.50
R316	470K	230104-94	2.00
R323	68K	230104-84	2.00
R325	3900 - 1W	230105-69	3.50

**SCHEMATIC DIAGRAM
(51-02)**



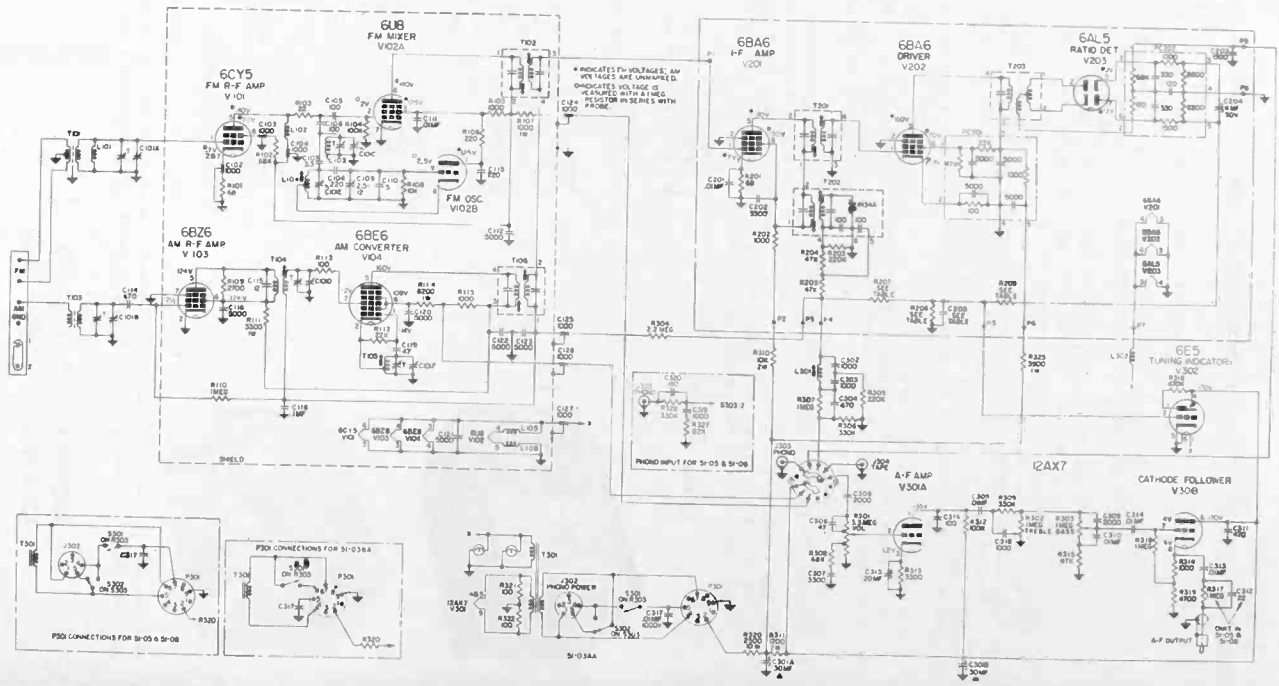
PRICES FOR RESISTORS ARE FOR A PACKAGE OF 10 UNLESS INDICATED BY @.
MISCELLANEOUS PARTS LIST
(ALL CHASSIS)

SYMBOL	DESCRIPTION	PART NO.	LIST
PC201	Printed Circuit	530254-1	1.15
PC202	Crystal Diode (1N34A)	530046-1	1.85
SW203	Dial Glass (51-05)	150545-1	.90
SW303	Dial Glass (51-01)	150520-1	.85
SW303	Dial Glass (51-03)	150533-1	.90
SW303	Dial Glass (51-07)	150549-1	.90
SW303	Dial Glass (51-08)	150521-1	.90
SW303	Dial Glass (51-02 & 04)	150521-1	.90
PC201	Dial Pointer	102446-2	.35

**SCHEMATIC DIAGRAM
(51-03, 51-05, 51-08)**

SYMBOL	DESCRIPTION	PART NO.	LIST
C311	Ceramic, 470 mmf	250218-5	20
C312*	Ceramic, 22 mmf	250218-19	20
C313	Ceramic, 10K mmf	250218-19	20
C314	Ceramic, 10K mmf	250218-19	20
C315	Electrolytic, 20 mfd - 25V	270027-28	1.00
C316	Ceramic, 10K mmf	250187-53	25
C317	Ceramic, 10K mmf - 1000V	250218-18	20
C318	Ceramic, 1000 mmf	250218-18	20
C319**	Ceramic, 180 mmf	250175-40	20
RESISTORS			
All resistors are 10% - 1/2W unless specified otherwise			
R101	68K	231004-48	2.00
R102	22	231004-42	2.00
R103	100K	231004-86	2.00
R104	100K	231004-62	2.00
R105	220	231005-62	2.50
R106	220	231005-62	2.50
R107	1000 - 1W	231004-74	2.00
R108	10K	231004-67	2.00
R109	2700	231004-98	2.00
R110	3300 - 1W	231004-88	2.50
R111	22K	231004-78	2.00
R112	100	231004-50	2.50
R113	100	231005-73	2.50
R114	8200 - 1W	231004-62	2.00
R115	4000	231004-83	2.00
R116	4000	231004-83	2.00
R117	1000	231004-90	2.00
R118	220K	231004-82	2.00
R119	47K	231004-82	2.00
R120	47K	231004-100	2.00
R121	2.2 meg	231004-100	2.00
R122	2.2 meg	231004-102	2.00
R123	2.2 meg	231004-102	2.00
R124	220K	220131-13	(1.25)
R125	Loudness Control (3.3 meg)	220073-34	(1.00)
R126	Treble Control (1 meg)	220073-34	(1.00)
R127	Bass Control (1 meg)	220073-34	(1.00)
R128	220K	231004-90	2.00
R129	220K	231004-92	2.00
R130	330K	231004-84	2.00
R131	1 meg	231004-84	2.00
R132	68K	231004-82	2.00
R133	10K - 2W	231004-82	2.00
R134	10K - 2W	231008-1003	3.50
R135	100K	231004-86	2.00
R136	3300	231004-82	2.00
R137	47K	231004-84	2.00
R138	470K	231004-84	2.00
R139	1 meg	231004-88	2.00
R140	4700	231004-70	2.00
R141	4700	231004-70	2.00
R142	100 - 10W	231004-50	2.00
R143	100	231004-50	2.00
R144	3900 - 1W	231004-85	2.50
R145	82K	231004-85	2.50
R146	330K	231004-85	2.50
R147	330K	231004-85	2.50
CAPACITORS			
All capacitors are 500V unless specified otherwise			
C101	Tuning Capacitor	260147-1	6.75
C102	Feed Thru, 1000 mmf	250276-2	.20
C103	Feed Thru, 1000 mmf	250276-2	.20
C104	Feed Thru, 1000 mmf	250276-2	.20
C105	Mica, 100 mmf	250187-53	.25
C106	Mica, 100 mmf	250187-53	.25
C107	Mica, 2.2 mmf	250221-118	.15
C108	Mica, 220 mmf	250287-57	.35
C109	2.2 mfd, 5% (Trimmer)	250188-9	.30
C110	Cer., 5 mfd, 5%	250311-7	.25
C111	Paper, .01 mfd - 400V	250311-7	.25
C112	Cer., 5000 mmf	250175-30	.20
C113	Mica, 220 mmf, 5%	250189-102	.25
C114	Mica, 12 mmf, 5%	250189-102	.25
C115	Cer., 4000 mmf	250175-30	.20
C116	Mylar, .01 mfd - 100V	250261-125	.40
C117	Cer., 47 mmf	250218-17	.15
C118	Cer., 5000 mmf	250175-30	.20
C119	Cer., 5000 mmf	250175-30	.20
C120	Cer., 5000 mmf	250175-30	.20
C121	Cer., 5000 mmf	250175-30	.20
C122	Cer., 5000 mmf	250175-30	.20
C123	Cer., 5000 mmf	250175-30	.20
C124	Cer., Feed Thru, 1000 mmf	250276-1	.25
C125	Cer., Feed Thru, 1000 mmf	250276-1	.25
C126	Cer., Feed Thru, 1000 mmf	250276-1	.25
C127	Cer., Feed Thru, 1000 mmf	250276-1	.25
C128	Ceramic, .01 mfd	250234-68	.30
C129	Ceramic, .0037 mfd	250234-154	.25
C130	Ceramic, .0035 mfd	250234-146	.20
C131	Electrolytic, 1 mfd, 50V	270559-9	1.10
C132	Electrolytic, 1 mfd, 50V	270559-9	1.10
C133	Electrolytic, 30-30 mfd-450V	270031-48	2.45
C134	Mica, 1000 mmf	250228-354	.45
C135	Mica, 1000 mmf	250228-354	.45
C136	Ceramic, 470 mmf	250218-6	.20
C137	Ceramic, 470 mmf	250218-6	.20
C138	Ceramic, 47 mfd	250218-17	.15
C139	Ceramic, 3300 mmf - 1000V	250175-28	.25
C140	Ceramic, 3300 mmf	250218-20	.25
C141	Ceramic, 3000 mmf	250218-20	.25
C142	Ceramic, 10K mmf	250218-19	.20

**PARTS LIST
(51-03, 51-05, 51-08)**



COMPLETE SERVICE INFORMATION

July 1958



CHASSIS: 1-629-1, -2
MODELS: 1107 & 2108

SYLVANIA HOME ELECTRONICS, a division of Sylvania Electric Products Inc., Service Dept., Batavia, N. Y.

SPECIFICATIONS

FREQUENCY RANGE.....540 KC to 1650 KC
POWER SUPPLY.....117V, 60 Cycles
POWER CONSUMPTION......35 Watts
INTERMEDIATE FREQUENCY (IF)......455 KC
SPEAKER......4" PM

MODEL 1107

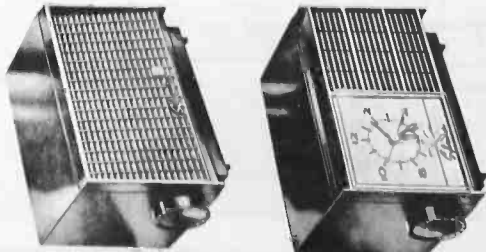
TUBE COMPLEMENT

V1 Oscillator/Mixer.....12AU6
V2 Detector, 1st AF Amplifier.....12AT6
V3 AF Output.....50C5
V4 Rectifier.....35W4

ALIGNMENT PROCEDURE
PRELIMINARY INSTRUCTIONS

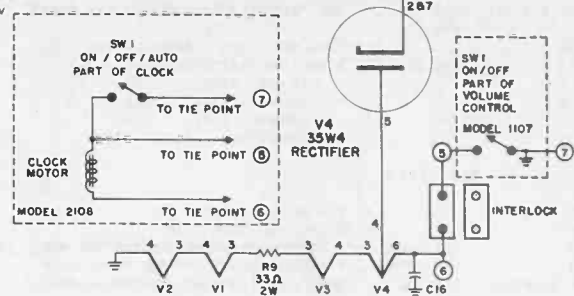
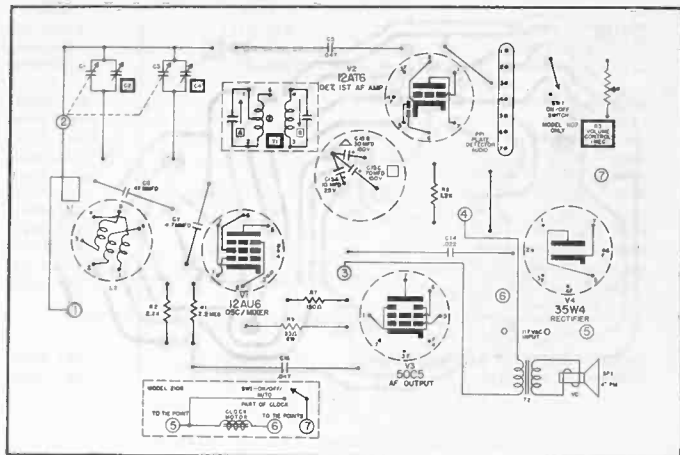
Connect an isolation transformer between power line and radio chassis. Utilize a test bench with a non-conductive work surface during all electrical tests on receiver.

1. Disconnect power line plug from power outlet.
2. Pull out on Volume and Station Selector knobs until free from respective shafts.
3. Remove screws securing back cover and remove back cover as far as permissible without unsoldering antenna leads from chassis.
4. Disconnect speaker leads at tie points (3) and (4). NOTE: On models incorporating a clock, also unsolder clock leads at tie points (5), (6) and (7). Remove screw and clip securing chassis and remove chassis from cabinet.
5. Remove speaker from cabinet if spare speaker of the exact type (with output transformer connected) is not available.
6. Reconnect output transformer to tie points (3) and (4). (On models incorporating a clock, also place a jumper wire across tie points (6) and (7). Reconnect back cover interlock assembly to chassis. Stand radio chassis in such a manner to facilitate Chassis IF Alignment. (CONT'D-OVER)

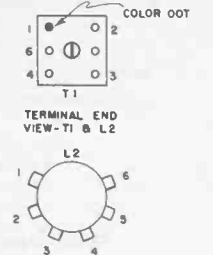


CLOCK REMOVAL

1. Remove back cover and chassis as outlined under "Preliminary Instructions" in the alignment procedure.
2. Remove the On/Off/Auto knob by pulling straight outward.
3. Carefully depress side of clock crystal until tabs on crystal clear slots in cabinet. Remove crystal.
4. Remove clock hands by pulling straight out. NOTE: For correct position when replacing clock hands, rotate alarm set knob counterclockwise until a click is heard. Stop rotation at this point and place alarm and hour hand pointing in the 6 o'clock direction, the minute and sweep hand in the 12 o'clock direction.
5. Compress four (4) spring clips securing clock to cabinet then remove clock.
6. For clock replacement, reverse the above procedure.



L2 RESISTANCE		T1 RESISTANCE	
BETWEEN TERMINALS	RES. Ω	BETWEEN TERMINALS	RES. Ω
1 & 4	1.5	2 & 6	25
2 & 6	.5	3 & 4	25
3 & 5	7		



CHASSIS 1-629-1, -2

REPLACEMENT PARTS LIST

SCHEMATIC LOCATION	SERVICE PART NO.	DESCRIPTION
CAPACITORS		
	170-0019	VARIABLE TUNING CAPACITOR
C1,C3		ANTENNA GANG, OSCILLATOR GANG
C2,C4		ANTENNA TRIMMER, OSCILLATOR TRIMMER
C5		.047 MFD - 20% - 400V - PAPER
C6		47 MMFD - 10% - 400V - CERAMIC
C7		4.7 MMFD - 10% - 400V - CERAMIC
C8,C9,C10	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"
C11,C12,C13	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"
C14		.022 MFD - 20% - 400V - PAPER
C15	161.3035	3 SECTION ELECTROLYTIC
A		10 MFD. 25V
B		30 MFD. 150V
C		70 MFD. 150V
C16		.047 MFD - 20% - 400V - PAPER
RESISTORS		
R1		2.2 MEGOHM - 20% - 1/4W
R2		2,200 OHM - 10% - 1/4W
R3	157-0050	1 MEGOHM-VOLUME/ON/OFF-CONTROL-MODEL 1107
R3	157-0051	1 MEGOHM-VOLUME CONTROL-MODEL 2108
R4,R5,R6	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"
R7		150 OHM - 10% - 1/4W
R8		1,200 OHM - 10% - 1/4W
R9		33 OHM - 10% - 2W

SCHEMATIC LOCATION	SERVICE PART NO.	DESCRIPTION
COILS AND TRANSFORMERS		
L1	PART OF BACK COVER	ANTENNA - LOOP
L2	113-0044	COIL - OSCILLATOR
T1	121-0107	TRANSFORMER - IF
T2	143-0045	TRANSFORMER - AUDIO OUTPUT (SPEAKER MOUNTED)

MISCELLANEOUS ELECTRICAL PARTS

PP1	190-0028	PLATE - AUDIO DETECTOR
C8,C9		125 MMFD. .005 MFD.
C10,C11		100 MMFD. 100 MMFD.
C12,C13		.005 MFD. 100 MMFD.
R4,R5,R6		10 MEG OHM, 470,000 OHM, 470,000 OHM
SW1	PART OF CLOCK	SWITCH - ON/OFF - MODEL 2108
SW1	PART OF VOLUME CONTROL	SWITCH - ON/OFF - MODEL 1107

CABINET PARTS

DESCRIPTION	MODELS	
	1107	2108
CABINET - MOLDED	813-0117	813-0118
CABLE - AC POWER	195-0001	195-0001
COVER - INTERLOCK (INCLUDES ANTENNA AND AC CABLE)	582-0032	582-0033
CRYSTAL - CLOCK		717-0004
FACE - CLOCK		721-0020
HAND - MINUTE		206-0002
HAND - HOUR		206-0003
HAND - SWEEP		206-0004
HAND - ALARM		206-0005
KNOB - TUNING	741-0042	741-0042
KNOB - VOLUME	742-0022	742-0022
KNOB - CLOCK CONTROL		740-0170
SHAFT - EXTENSION - TIME SET		493-0128
SPEAKER - 4" PM	539-0429	539-0429

CHASSIS PARTS

SOCKET - TUBE - 7 PIN MINIATURE	412-0040	412-0040
TERMINAL - AC PRONG	487-0040	487-0040

SCHEMATIC NOTES:

- VOLTAGES MEASURED TO NEGATIVE "B" USING SYLVANIA "POLYMER". LINE VOLTAGE 117VAC AND SIGNAL INPUT KEPT TO MINIMUM.
- COIL AND TRANSFORMER RESISTANCES ARE AVERAGE VALUES AND ARE TAKEN WITH COMPONENT CONNECTED IN THE CIRCUIT.
- INTERMEDIATE FREQUENCY 455KC.
- ENCIRCLED NUMBERS CORRESPOND WITH TIE POINTS ON PRINTED BOARD.
- VOLTAGE SOURCE IS INDICATED BY ENCIRCLED SYMBOL (⊙); CORRESPONDING SYMBOL WITHOUT CIRCLE (●) INDICATES VOLTAGE TIE POINTS.
- ⊖ DESIGNATES NEGATIVE "B".

PRELIMINARY INSTRUCTIONS (CONT'D)

- Apply 117V. to chassis. Set signal generator for an RF output signal amplitude modulated (AM) by 400 cycles. Allow radio chassis and signal generator several minutes warm-up time. During alignment, keep signal generator output at lowest level that gives perceptible audio output.
 - Use either an audible check or an AC voltmeter connected across speaker voice coil to indicate output. Adjust volume control to full volume.
- NOTE: The following alignment procedure was performed using Sylvania test equipment.

STEP	ALIGNMENT SETUP NOTES	TEST EQUIPMENT HOOKUP	ADJUST FOR MAXIMUM OUTPUT
1.	Set variable tuning capacitor fully open (minimum capacity).	SIGNAL GENERATOR - "Hot" lead through a .1 Mfd. capacitor to tie point number (1). Ground lead to negative "B". Set generator to 455 KC. AC VOLTMETER - Across speaker voice coil.	T1-B - Bottom core T1-A - Top core Repeat for optimum performance.
2.	Same as step 1.	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to 1650 KC. AC VOLTMETER - across speaker voice coil.	C4 - trimmer
3.	Set variable tuning capacitor to the 600 KC position, (plates meshed approximately 3/16"). Adjust this setting slightly to eliminate any interfering signals.	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to a frequency corresponding to receiver tuning capacitor setting (until signal is heard through receiver speaker). AC VOLTMETER - Across speaker voice coil.	C2 - trimmer

COMPLETE SERVICE INFORMATION

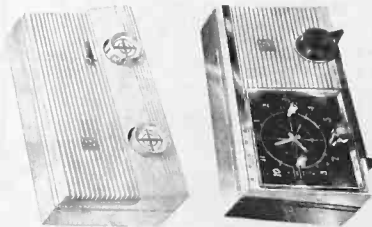
CHASSIS 1-630-1,-2

July 1958



**CHASSIS: 1-630-1,-2
MODELS: 1108 & 2109**

SYLVANIA HOME ELECTRONICS, a division of Sylvania Electric Products Inc., Service Dept., Batavia, N.Y.



MODEL 1108

MODEL 2109

SPECIFICATIONS

FREQUENCY RANGE.....540 KC to 1650 KC
POWER SUPPLY.....117 Volts
POWER CONSUMPTION.....35 Watts
INTERMEDIATE FREQUENCY (IF).....455 KC
SPEAKER.....4" PM

TUBE COMPLIMENT

V1 Oscillator/Mixer.....12BE6
V2 IF Amplifier.....12BA6
V3 Detector, AVC, 1st AF Amplifier.....12AT6
V4 AF Output Amplifier.....50C5
V5 Rectifier.....35W4

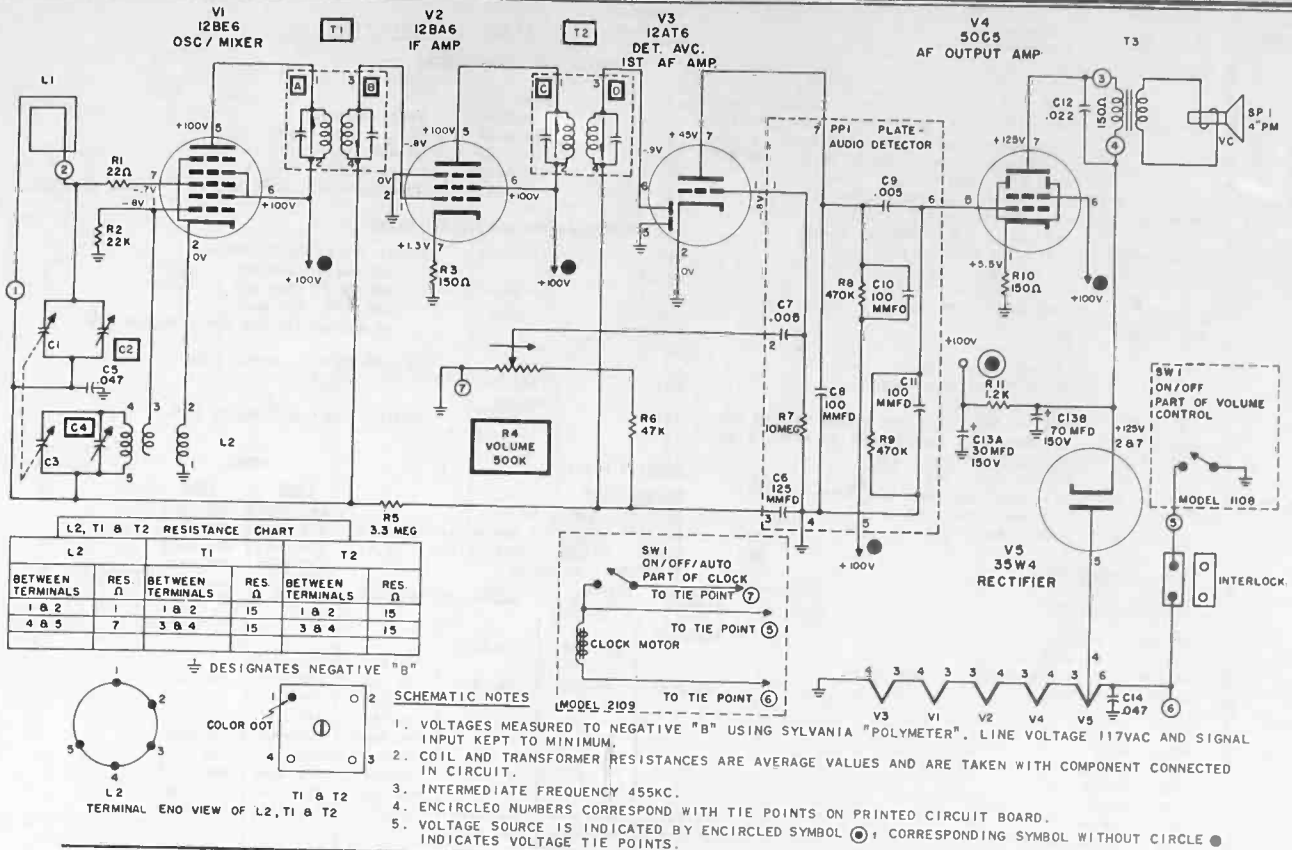
**ALIGNMENT PROCEDURE
PRELIMINARY INSTRUCTIONS**

Connect an isolation transformer between power line and radio chassis. Utilize a test bench with a non-conductive work surface during all electrical tests on receiver.

1. Disconnect power line plug from power outlet.
2. Pull out on Volume and Station Selector Knobs until free from respective shafts.
3. Remove screws securing back cover and remove back cover as far as permissible without unsoldering antenna leads from chassis.
4. Disconnect speaker leads at tie points (3) and (4). NOTE: On models incorporating clock, also unsolder clock leads at tie points (5), (6) and (7). Remove screw and clip securing chassis and remove chassis from cabinet.
5. Remove speaker from cabinet if spare speaker of the exact type (with output transformer connected) is not available.
6. Reconnect output transformer to tie points (3) and (4). (On models incorporating a clock, also place a jumper wire across tie points (5) and (7). Reconnect back cover interlock assembly to chassis. Stand radio chassis in such a manner to facilitate under chassis IF alignment. (CONT D-OVER)

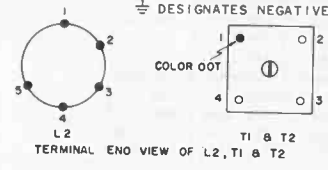
CLOCK REMOVAL

1. Remove back cover and chassis as outlined under "Preliminary Instructions" in the alignment procedure.
2. Cut retaining washer on volume knob to facilitate knob removal, then remove knob. (Replace washer when reinstalling knob.)
3. Remove Sleep Switch and On/Off/Auto Knobs by pulling straight outward.
4. Carefully depress top of clock crystal until tabs on crystal clear slots in cabinet. Remove crystal.
5. Remove clock hands by pulling straight out. NOTE: For correct position when replacing clock hands, rotate (very slowly counterclockwise) the alarm set knob until two (2) clicks are heard. Stop rotation at this point and place the alarm and hour hand pointing in the 6 o'clock direction, the minute and sweep hand in the 12 o'clock direction. Use care so as not to bend hands.
6. Compress four (4) spring clips securing clock to cabinet then remove clock.
7. For clock replacement, reverse the above procedure.



L2, T1 & T2 RESISTANCE CHART

L2		T1		T2	
BETWEEN TERMINALS	RES. Ω	BETWEEN TERMINALS	RES. Ω	BETWEEN TERMINALS	RES. Ω
1 & 2	1	1 & 2	15	1 & 2	15
4 & 5	7	3 & 4	15	3 & 4	15



- SCHEMATIC NOTES**
1. VOLTAGES MEASURED TO NEGATIVE "B" USING SYLVANIA "POLYMER". LINE VOLTAGE 117VAC AND SIGNAL INPUT KEPT TO MINIMUM.
 2. COIL AND TRANSFORMER RESISTANCES ARE AVERAGE VALUES AND ARE TAKEN WITH COMPONENT CONNECTED IN CIRCUIT.
 3. INTERMEDIATE FREQUENCY 455KC.
 4. ENCIRCLED NUMBERS CORRESPOND WITH TIE POINTS ON PRINTED CIRCUIT BOARD.
 5. VOLTAGE SOURCE IS INDICATED BY ENCIRCLED SYMBOL (⊙); CORRESPONDING SYMBOL WITHOUT CIRCLE (•) INDICATES VOLTAGE TIE POINTS.

PRELIMINARY INSTRUCTIONS (CONT'D)

7. Apply 117V. to chassis. Set signal generator for an RF output signal amplitude modulated (AM) by 400 cycles. Allow radio chassis and signal generator several minutes warm-up time. During alignment, keep signal generator output at lowest level that gives perceptible audio output.
 8. Use either an audible check or an AC voltmeter connected across speaker voice coil to indicate output. Adjust volume control to full volume.
- NOTE:** The following procedure was performed using Sylvania test equipment.

CHASSIS 1-630-1, -2

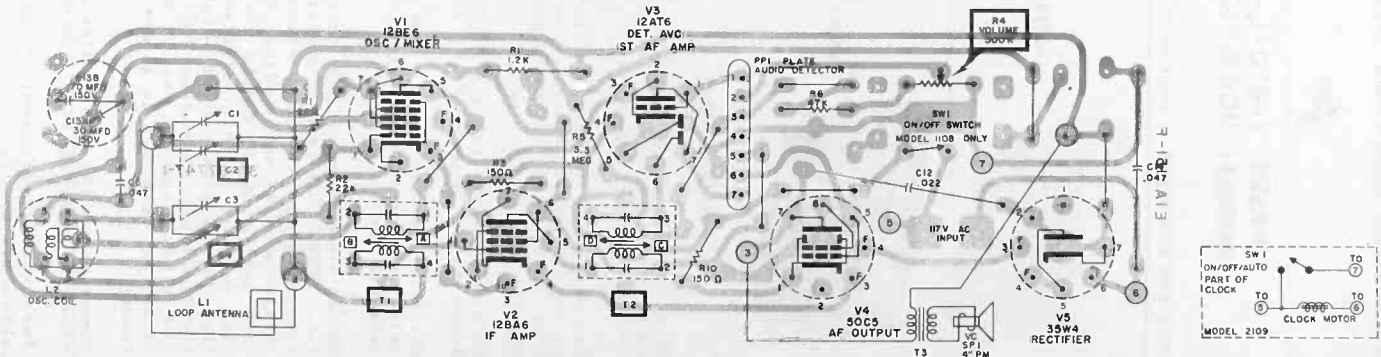
SCHEMATIC LOCATION	SERVICE PART NO.	DESCRIPTION	SCHEMATIC LOCATION	SERVICE PART NO.	DESCRIPTION
CAPACITORS			COILS AND TRANSFORMERS		
	170-0019	VARIABLE TUNING CAPACITOR - MODEL 1108	L1	PART OF BACKCOVER	LOOP - ANTENNA
C1, C3	170-0029	VARIABLE TUNING CAPACITOR - MODEL 2109	L2	113-0045	COIL - OSCILLATOR
C2, C4		ANTENNA GANG, OSCILLATOR GANG	T1	121-0108	TRANSFORMER - 1ST IF
C5		.047 MFD - 20% - 400V. - PAPER	T2	121-0108	TRANSFORMER - 2ND IF
C6, C7, C8	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"	T3	143-0045	TRANSFORMER - AUDIO OUTPUT (SPEAKER MOUNTED)
C9, C10, C11	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"			
C12		.022 MFD - 20% - 400V. - PAPER			
C13	161-2016	2 SECTION ELECTROLYTIC			
A		30 MFD - 150V.	PP1	190-0028	PLATE - AUDIO DETECTOR
B		70 MFD - 150V.	C6, C7		125 MMFD. .005 MFD
C14		.047 MFD - 20% - 400V. - PAPER	C8, C9		100 MMFD. .005 MFD
			C10, C11		100 MMFD, 100 MMFD
			R7, R8, R9		10 MEGOHM 470,000 OHM, 470,000 OHM

RESISTORS			MISCELLANEOUS ELECTRICAL PARTS		
R1		22 OHM - 20% - 1/4W.	PP1	190-0028	PLATE - AUDIO DETECTOR
R2		22,000 OHM - 10% - 1/4W.	C6, C7		125 MMFD. .005 MFD
R3		150 OHM - 10% - 1/4W.	C8, C9		100 MMFD. .005 MFD
R4	157-0041	500,000 OHM - CONTROL-VOLUME/ON/OFF MODEL 1108	C10, C11		100 MMFD, 100 MMFD
R4	157-0052	500,000 OHM - CONTROL-VOLUME MODEL 2109	R7, R8, R9		10 MEGOHM 470,000 OHM, 470,000 OHM
R5		3.3 MEGOHM - 20% - 1/4W.	SW1	PART OF CLOCK	SWITCH - ON/OFF - MODEL 2109
R6		47,000 OHM - 20% - 1/4W.	SW1	PART OF VOLUME	PART OF VOLUME
R7, R8, R9	PART OF PP1	SEE "MISCELLANEOUS ELECTRICAL PARTS"		CONTROL	SWITCH - ON/OFF - MODEL 1108
R10		150 OHM - 20% - 1/4W.			
R11		1,200 OHM - 10% - 1/4W.			

DESCRIPTION	MODEL					
	1108WH	1108BL	1108RE	2109BL	2109RE	2109WH
CABINET - MOLDED	813-0119					813-0128
CABINET - PAINTED		813-0121	813-0122			
CABINET - PAINTED (INCLUDES CLOCK FACE)				813-0120	813-0123	
CABLE - AC POWER	195-0001	195-0001	195-0001	195-0001	195-0001	195-0001
CRYSTAL - CLOCK				717-0005	717-0005	717-0005
FACE - CLOCK				721-0021	721-0021	721-0023
HAND - HOUR				206-0006	206-0006	206-0010
HAND - MINUTE				206-0007	206-0007	206-0011
HAND - ALARM				206-0008	206-0008	206-0008
HAND - SWEEP				206-0009	206-0009	206-0009
KNOB - TUNING	741-0043	741-0044	741-0045	741-0044	741-0045	741-0068
KNOB - VOLUME/ON/OFF	742-0023	742-0025	742-0026			
KNOB - VOLUME				742-0024	742-0024	742-0024
KNOB - CLOCK CONTROL - ON/OFF				740-0170	740-0170	740-0170
KNOB - CLOCK CONTROL - SLEEP				740-0205	740-0205	740-0205
NAMEPLATE - SYLVANIA	818-0147	818-0148	818-0149			
SHAFT - EXTENSION - TIME SET				493-0131	493-0131	493-0131
SPEAKER - 4" PM	539-0429	539-0429	539-0429	539-0429	439-0429	539-0429
COVER - INTERLOCK (INCLUDES ANTENNA AND AC CABLE)	582-0034	582-0034	582-0034	582-0035	582-0035	582-0035

ALIGNMENT SETUP NOTES TEST EQUIPMENT HOOKUP ADJUST FOR MAXIMUM OUTPUT

1.	Set variable tuning capacitor plates fully open (minimum capacity).	SIGNAL GENERATOR - "Hot" lead through .1 Mfd. capacitor to junction of R1 (22 Ohm) and pin 7 of V1 (12BE6); ground lead to (negative "B"). Set generator to 455 KC. AC VOLTMETER - across speaker voice coil.	T2-D - Bottom core T2-C - Top core T1-B - Bottom core T1-A - Top core Repeat for optimum performance.
2.	Same as step 1.	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to 1650 KC. AC VOLTMETER - Across speaker voice coil.	C4 trimmer
3.	Set variable tuning capacitor to 600 KC position, plates meshed approximately 3/16 inch. Adjust this setting slightly to eliminate any interfering signals.	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to a frequency corresponding to receiver tuning capacitor setting (until signal is heard through receiver speaker). AC VOLTMETER - Across speaker voice coil.	C2 trimmer



COMPLETE SERVICE INFORMATION

for

CHASSIS: 1-631-1
MODELS: 1303

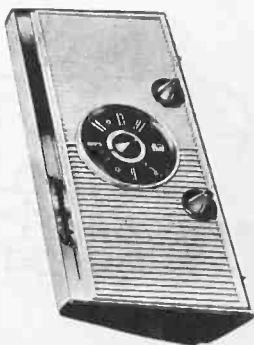
RADIO

CHASSIS 1-631-1

October 1958



SYLVANIA HOME ELECTRONICS, a division of Sylvania Electric Products Inc., Service Dept., Batavia, N.Y.



MODEL 1303

CHASSIS REMOVAL PROCEDURE

1. Disconnect power line plug from power outlet.
2. Remove volume and tone knobs by pulling straight out.
3. Remove (3) three screws securing back cover to cabinet and remove back cover.
4. Remove screw securing interlock mounting plate to cabinet.
5. Remove screw and clip securing chassis to cabinet. Remove chassis by sliding straight back until mounting slots are cleared.
6. To replace chassis reverse the above procedure. When replacing chassis, make certain that slot in the variable tuning arm engages peg on the variable tuning pulley. NOTE: Speaker and dial lamp lead length permit removal of chassis from cabinet with components connected in circuit. If complete disassembly is necessary, identify speaker leads and unsolder at tie points (1), (2) and (3), remove screw securing pilot lamp mounting bracket to cabinet and remove chassis.

CAUTION: Do not operate receiver with speakers disconnected.

SPECIFICATIONS

FREQUENCY RANGE.....540 KC to 1650 KC
POWER SUPPLY.....117 Volts
POWER CONSUMPTION.....35 Watts
INTERMEDIATE FREQUENCY (IF).....455 KC
SPEAKERS.....2 - 4" PM

TUBE COMPLIMENT

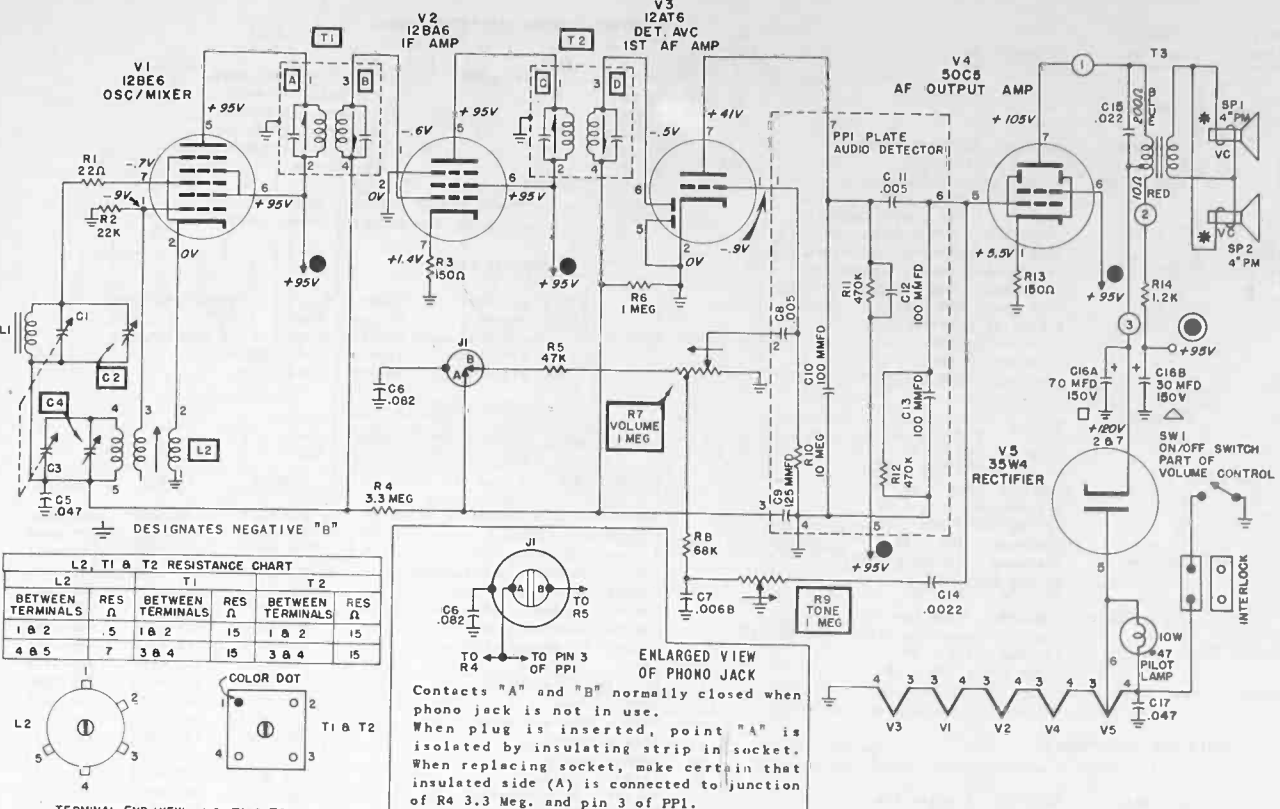
V1 Oscillator/Mixer.....12BE6
V2 IF Amplifier.....12BA6
V3 Detector, AVC, 1st AF Amplifier.....12AT6
V4 AF Output Amplifier.....50C5
V5 Rectifier.....35W4

ALIGNMENT PROCEDURE

PRELIMINARY INSTRUCTIONS

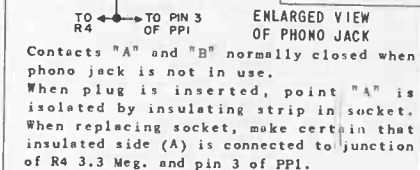
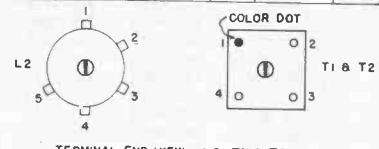
Connect an isolation transformer between power line and radio chassis. Utilize a test bench with a non-conductive work surface during all electrical tests on receiver.

1. Disconnect power line plug from power outlet.
2. Remove chassis as outlined under "Chassis Removal Procedure".
3. Stand radio chassis in such a manner to facilitate under Chassis IF Alignment.
4. Apply 117V. to chassis. Set signal generator for an RF output signal amplitude modulated (AM) by 400 cycles. Allow radio chassis and signal generator several minutes warm-up time. During alignment, keep signal generator output at lowest level that gives perceptible audio output.
5. Use either an audible check or an AC voltmeter connected across speaker voice coil to indicate output. Adjust volume control to full volume. NOTE: the following procedure was performed using Sylvania Test Equipment.



L2, T1 & T2 RESISTANCE CHART

L2		T1		T2	
BETWEEN TERMINALS	RES Ω	BETWEEN TERMINALS	RES Ω	BETWEEN TERMINALS	RES Ω
1 & 2	.5	1 & 2	15	1 & 2	15
4 & 5	7	3 & 4	15	3 & 4	15



Contacts "A" and "B" normally closed when phono jack is not in use. When plug is inserted, point "A" is isolated by insulating strip in socket. When replacing socket, make certain that insulated side (A) is connected to junction of R4 3.3 Meg. and pin 3 of PPI.

- SCHEMATIC NOTES:**
1. VOLTAGES MEASURED TO NEGATIVE "B" USING SYLVANIA "POLYMER". LINE VOLTAGE 117V AC AND SIGNAL INPUT KEPT TO MINIMUM.
 2. COIL AND TRANSFORMER RESISTANCES ARE AVERAGE VALUES AND ARE TAKEN WITH COMPONENTS CONNECTED IN CIRCUIT.
 3. INTERMEDIATE FREQUENCY 455 KC.
 4. ENCIRCLED NUMBERS CORRESPOND WITH THE POINTS ON PRINTED CIRCUIT BOARD.
 5. VOLTAGE SOURCE IS INDICATED BY ENCIRCLED SYMBOL. CORRESPONDING SYMBOL WITHOUT CIRCLE INDICATES VOLTAGE TIE POINTS.
 6. * INDICATES COLOR DOT ON SPEAKERS FOR CORRECT PHASING.

CHASSIS 1-631-1

SCHEMATIC LOCATION SERVICE PART NO. DESCRIPTION

MISCELLANEOUS ELECTRICAL PARTS

CAPACITORS

C1, C3	170-0030	VARIABLE TUNING CAPACITOR
C2	PART OF C1	ANTENNA TRIMMER
C4	PART OF C3	OSCILLATOR TRIMMER
C5		.047 MFD - 20% - 400V. - PAPER
C6		.082 MFD - 20% - 400V. - PAPER
C7		.0068 MFD - 20% - 500V. - CERAMIC
C8, C9, C10		SEE "MISCELLANEOUS ELECTRICAL PARTS"
C11, C12, C13		SEE "MISCELLANEOUS ELECTRICAL PARTS"
C14		.0022 MFD - 20% - 400V. - PAPER
C15		.022 MFD - 20% - 400V. - PAPER
C16	161-2016	2 SECTION ELECTROLYTIC
A		70 MFD - 150V.
B		30 MFD - 150V.
C17		.047 MFD - 20% - 400V. - PAPER

RESISTORS

R1		22 OHM - 20% - 1/2W.
R2		22,000 OHM - 20% - 1/2W.
R3		150 OHM - 20% - 1/2W.
R4		3.3 MEGOHM - 20% - 1/2W.
R5		47,000 OHM - 20% - 1/2W.
R6		1 MEGOHM - 20% - 1/2W.
R7	152-0054	1 MEGOHM - VOLUME CONTROL
R8		68,000 OHM - 20% - 1/2W.
R9	PART OF VOLUME CONT.	1 MEGOHM - TONE CONTROL
R10, R11, R12		SEE "MISCELLANEOUS ELECTRICAL PARTS"
R13		150 OHM - 20% - 1/2W.
R14		1,200 OHM - 10% - 1W.

COILS AND TRANSFORMERS

L1	581-0015	ANTENNA - FERRITE ROD
L2	113-0046	COIL - OSCILLATOR
T1	121-0108	TRANSFORMER - 1ST IF
T2	121-0108	TRANSFORMER - 2ND IF
T3	143-0052	TRANSFORMER - AUDIO OUTPUT (SPEAKER MOUNTED)

PP1	190-0028	PLATE - AUDIO DETECTOR
C8, C9		.005 MFD. 125 MMFD
C10, C11		100 MMFD. .005 MFD
C12, C13		100 MMFD. 100 MMFD
R10, R11		10 MEGOHM. 470,000 OHM
R12		470,000 OHM
SW1	PART OF VOLUME CONT.	SWITCH - ON/OFF
J1	417-0030	SOCKET - PHONO INPUT

CHASSIS PARTS

487-0050	CLAMP - PLASTIC - ANTENNA RETAINER
482-0016	SHIELD - TUBE
412-0051	SOCKET - TUBE - 7 PIN MINIATURE
487-0040	TERMINAL - AC PRONGS
411-0035	SOCKET - PILOT LAMP

CABINET PARTS

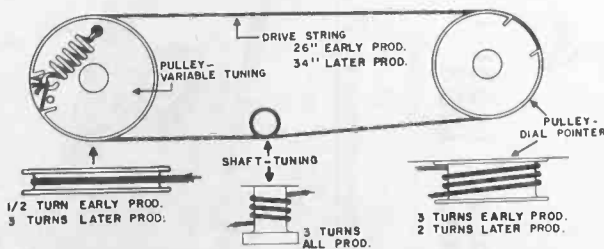
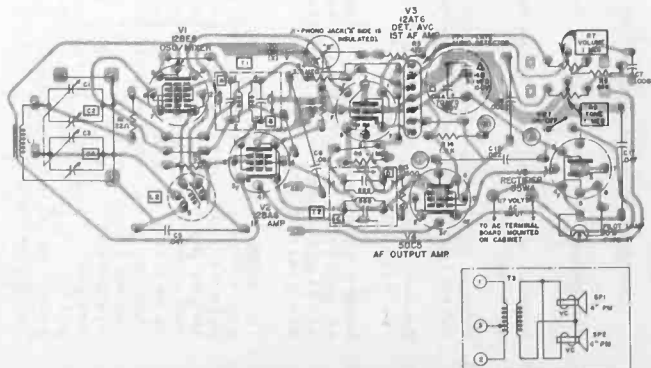
DESCRIPTION	1303RE	1303TU	1303YE
ARM - VARIABLE CAPACITOR DRIVE	473-0005	473-0005	473-0005
BACKGROUND - DIAL	727-0009	727-0009	727-0009
BAFFLE - SPEAKER	776-0011	776-0011	776-0011
BOARD - TERMINAL - INTERLOCK	415-0029	415-0029	415-0029
CABINET - BACK	822-0029	822-0031	822-0033
CABINET - FRONT - INCLUDES OVERLAY	822-0028	822-0028	822-0028
CABINET - TOP	822-0030	822-0032	822-0034
CABLE - ASSEMBLY - POWER	195-0019	195-0020	195-0021
CREST - SYLVANIA	818-0169	818-0169	818-0169
DIAL AND DRIVE MOUNT	722-0069	722-0069	722-0069
KNOB - DUMMY	740-0225	740-0225	740-0225
KNOB - TONE AND ON/OFF	740-0223	740-0223	740-0223
KNOB - TUNING	740-0222	740-0222	740-0222
KNOB - VOLUME	740-0224	740-0224	740-0224
POINTER - DIAL	792-0023	792-0023	792-0023
PULLEY - DIAL POINTER	494-0033	494-0033	494-0033
PULLEY - VARIABLE TUNING	493-0147	493-0147	493-0147
RETAINER - LINE CORD	554-0086	554-0086	554-0086
SHAFT - POINTER	493-0146	493-0146	493-0146
SHAFT - TUNING	493-0075	493-0075	493-0075
SPEAKER - 4" PM (INCLUDES TRANSFORMER)	539-0431	539-0431	539-0431
SPEAKER - 4" PM	539-0432	539-0432	539-0432
SPRING - TENSION - DRIVE STRING	496-0023	496-0023	496-0023

ALIGNMENT SETUP NOTES

TEST EQUIPMENT HOOKUP

ADJUST FOR MAXIMUM OUTPUT

1.	Set variable tuning capacitor plates fully open (minimum capacity).	SIGNAL GENERATOR - "Hot" lead through .1 Mfd capacitor to junction of R1 (22 Ohm) and pin 7 of V1 (12BE6); ground lead to (negative "B"). Set generator to 455 KC.	T2 - D Bottom Core T2 - C Top Core T1 - B Bottom Core T1 - A Top Core Repeat for optimum performance.
2.	Same as step 1	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to 1650 KC.	C4 Trimmer
3.	Set variable tuning capacitor to 600 KC position, plates fully meshed except for approximately 3/16 inch. Adjust this setting slightly to eliminate any interfering signal.	SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to a frequency corresponding to receiver tuning capacitor setting (until signal is heard through receiver speaker).	C2 Trimmer
4.	Same as step 3 - 600 KC position.	SIGNAL GENERATOR - Same as step 3.	L2 (Oscillator coil) while simultaneously rocking tuning capacitor through the 600 KC position.



DIAL STRINGING

COMPLETE SERVICE INFORMATION

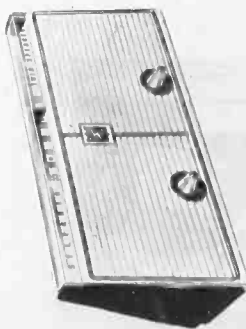
for
CHASSIS: 1-632-1,-2
MODELS: 1304 & 2305

RADIO
CHASSIS 1-632-1,-2

October 1958



SYLVANIA HOME ELECTRONICS, a division of Sylvania Electric Products Inc., Service Dept., Batavia, N.Y.



MODEL 1304



MODEL 2305

SPECIFICATIONS

FREQUENCY RANGE.....540 KC to 1650 KC
 POWER SUPPLY.....117 Volts
 POWER CONSUMPTION.....35 Watts
 INTERMEDIATE FREQUENCY.....455 KC
 SPEAKERS MODEL 1304 (2).....5 1/4" PM
 MODEL 2305 (1).....5" PM

TUBE COMPLIMENT

V1 RF Amplifier.....6BJ6
 V2 Converter.....12BE6
 V3 IF Amplifier.....6BJ6
 V4 Det., AVC and AF Amplifier.....12AT6
 V5 AF Output Amplifier.....6X4
 V6 Rectifier.....35W4

CHASSIS REMOVAL PROCEDURE

1. Disconnect power line plug from power outlet.
2. Remove three (3) screws securing back cover and remove back cover.
3. Remove volume and tone knobs by pulling straight out.
4. Remove screw and clip securing chassis to cabinet.
5. Unsolder ground lead from speaker to volume control.
6. Remove screw securing to cabinet-interlock board (Model 1304), interlock board and appliance receptacle (Model 2305).
7. Slide chassis back until chassis clears slots in the bottom of cabinet. Lead lengths permit removal of chassis from cabinet with components connected in circuit. If complete disassembly is necessary, identify all leads

and unsolder at the following points.

MODEL 1304

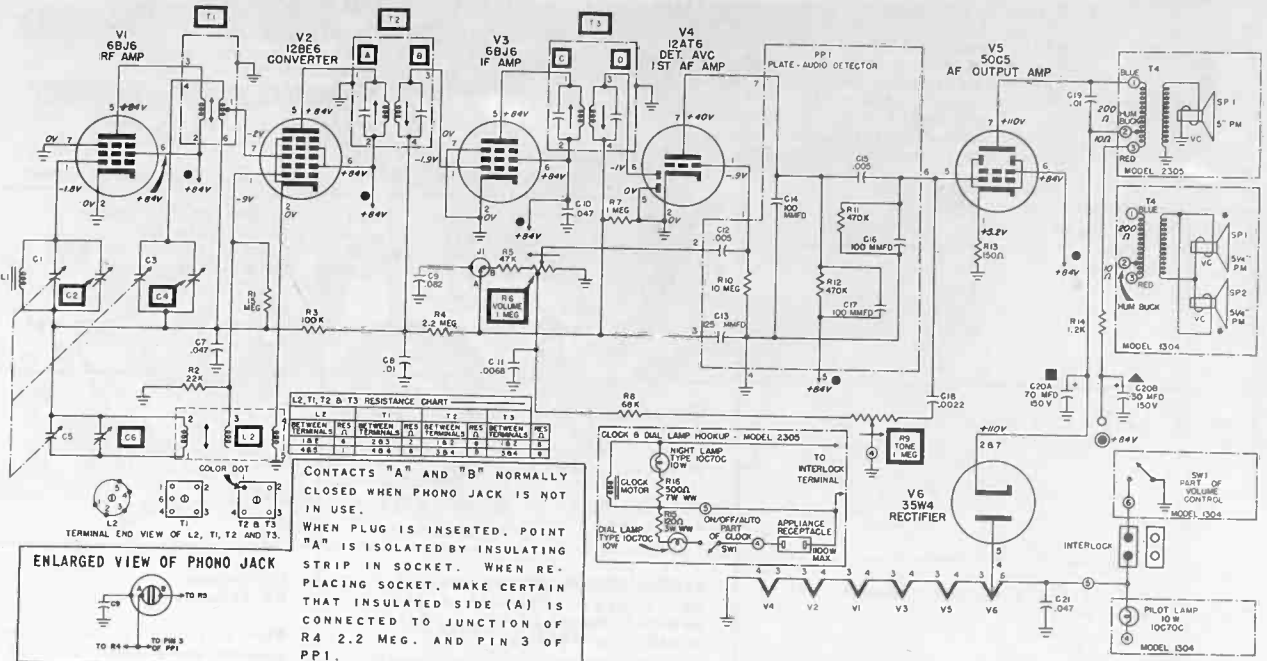
- A. Speaker transformer leads at tie points 1, 2 and 3.
- B. Pilot lamp leads at tie points 4 and 5.

MODEL 2305

- A. Speaker transformer leads at tie points 1, 2 and 3.
- B. Clock, appliance receptacle and pilot lamp leads at tie points 4 and 5. To operate chassis with clock disconnected, apply line voltage to tie points 4 and 5.

8. To replace chassis, reverse the above procedure. When replacing chassis make certain that slot in the variable tuning drive arm engages pin on the variable tuning pulley.

NOTE: Do not operate receiver with speaker leads disconnected.



SCHEMATIC NOTES:

1. VOLTAGES MEASURED TO NEGATIVE "B" USING SYLVANIA "POLYMER". LINE VOLTAGE 117V AC AND SIGNAL INPUT KEPT TO MINIMUM.
2. COIL AND TRANSFORMER RESISTANCES ARE AVERAGE VALUES AND ARE TAKEN WITH COMPONENTS CONNECTED IN CIRCUIT.
3. INTERMEDIATE FREQUENCY 455 KC.
4. ENCIRCLED NUMBERS CORRESPOND WITH THE POINTS ON PRINTED CIRCUIT BOARD.
5. VOLTAGE SOURCE IS INDICATED BY ENCIRCLED SYMBOL (⊙); CORRESPONDING SYMBOL WITHOUT CIRCLE (•) INDICATES VOLTAGE TIE POINTS
6. * INDICATES COLOR DOT ON SPEAKERS FOR CORRECT PHASING.
7. † DESIGNATES NEGATIVE "B".

ALIGNMENT PROCEDURE PRELIMINARY INSTRUCTIONS

Connect an isolation transformer between power line and radio chassis. Utilize a test bench with a non-conductive work surface during all electrical tests on receiver.

1. Disconnect power line plug from power outlet.
2. Remove chassis as outlined under "Chassis Removal Procedure."

3. Stand radio chassis in such a position to facilitate under Chassis IF Alignment. Apply 117V. to chassis. Set signal generator for an RF output signal amplitude modulated (AM) by 400 cycles. Allow radio chassis and signal generator several minutes warm up time. During alignment, keep signal generator output at lowest level that

gives perceptible audio output.

4. Use either an audible check or an AC voltmeter connected across speaker voice coil to indicate output. Adjust volume control to full volume.

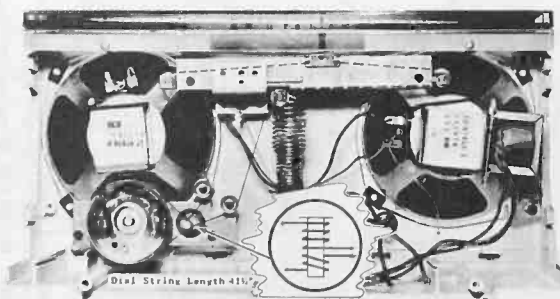
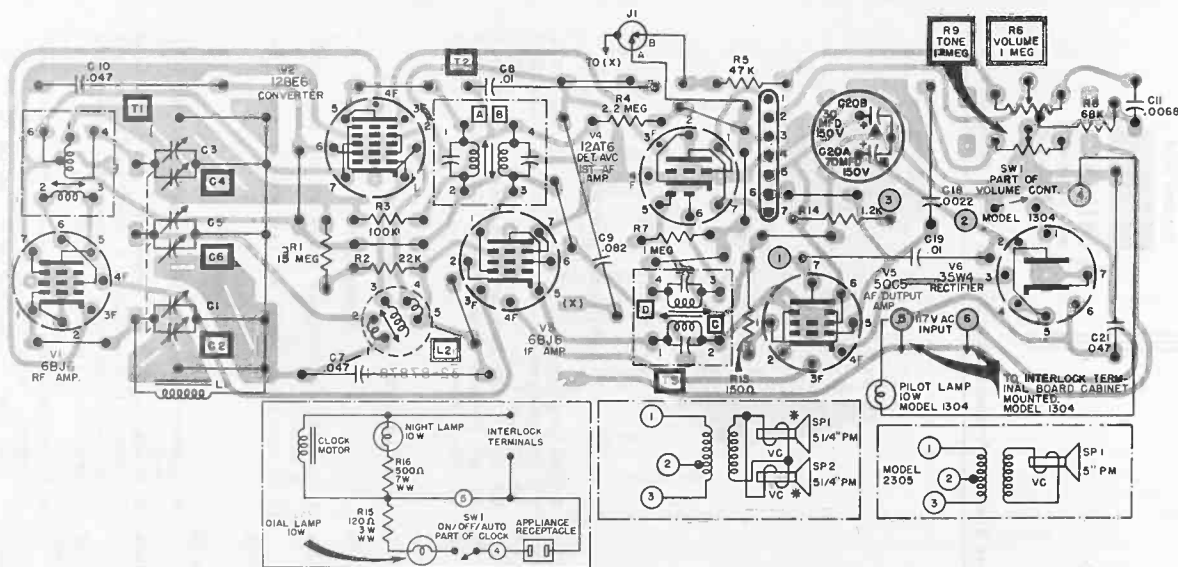
NOTE: The following procedure was performed using Sylvania test equipment.

ALIGNMENT SETUP NOTES

TEST EQUIPMENT HOOKUP

ADJUST FOR MAXIMUM OUTPUT

<p>1. Set variable tuning capacitor plates fully open (minimum capacity).</p>	<p>SIGNAL GENERATOR - "Hot" lead through a .1 Mfd. capacitor to pin 7 of V2 (12BE6); ground lead to (negative "B"). Set generator to 455 KC.</p> <p>AC VOLTMETER - Across speaker voice coil.</p>	<p>T3-D - Bottom core T3-C - Top core T2-B - Bottom core T2-A - Top core</p> <p>Repeat for optimum performance.</p>
<p>2. Same as step 1.</p>	<p>SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to 1650 KC.</p> <p>AC VOLTMETER - Across speaker voice coil.</p>	<p>C6 trimmer</p>
<p>3. Set variable tuning capacitor to 1400 KC.</p>	<p>SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to 1400 KC.</p> <p>AC VOLTMETER - Across speaker voice coil.</p>	<p>C4 trimmer C2 trimmer</p> <p>While rocking variable tuning capacitor through 1400 KC.</p>
<p>4. Set variable tuning capacitor to 600 KC position, plates fully meshed except for approximately 3/16 inch. Adjust this setting slightly to eliminate any interfering signals.</p>	<p>SIGNAL GENERATOR - Radiate signal to receiver through a loop of several turns of wire. Set generator to a frequency corresponding to receiver tuning capacitor setting (until signal is heard through receiver speaker).</p> <p>AC VOLTMETER - Across speaker voice coil.</p>	<p>L2 - Oscillator coil T1 - RF coil</p> <p>While rocking variable tuning capacitor through 600 KC.</p>



MODEL 1304 - DIAL DRIVE & SPEAKER ASSEMBLY

WG
No. 10-475

MODEL NO. DC2836B

FACTS ABOUT YOUR NEW TRUETONE FM AND BROADCAST RADIO
Instructions for Installation, Operation, and Service

CHECK YOUR LINE VOLTAGE

Unless otherwise marked this radio must be operated on a supply of 105-125 volts AC, 50-60 cycles or 105-125 volts DC. Do not connect the radio to a wall outlet unless certain that the power supply is correct for the receiver. If in doubt, telephone your local power company before inserting the plug. Radios of this model which are to be used on other power supplies are marked accordingly.

BROADCAST BAND

540-1600 KILOCYCLES-This band is calibrated in channel numbers. To obtain the kilocycle number add two zeros to the dial number. Thus when the dial pointer is at 12 on the dial, the radio is tuned to 1200 kilocycles.

ON-OFF SWITCH AND VOLUME CONTROL

The On-Off switch and Volume control are operated by the same knob. To turn the radio on, turn the knob clockwise until a click is heard. Allow approximately 30 seconds for the tubes to heat. Then continue to turn the knob clockwise to increase the volume.

AM - FM SWITCH

This control has two positions, FM & AM. Turn the knob to the extreme right for AM (broadcast) reception and to the extreme left for FM (frequency modulation) reception.

FM BAND

88 - 108 MEGACYCLES-This band is calibrated in megacycles and covers the frequency modulation band of 88-108 megacycles. Reception in this band is usually limited to "line of sight," distances between the transmitting and receiving antennas. This is normally up to about 30 miles with approximately 45 miles being the extreme range.

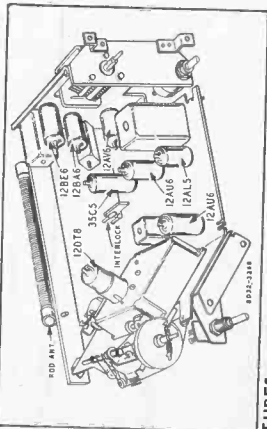
TUNING KNOB (FM OR AM)

Use this knob to tune in the desired station. Turn the knob until the station is heard. Then slowly rotate it back and forth until the signal is clearest and strongest. If signal is too strong, reduce it by means of the volume control, not by using the tuning knob.

ANTENNA

Two built-in antennas are incorporated in the receiver. A Truetoone Stratoscope Antenna for the broadcast range and an FM antenna for the FM (frequency modulation) range. When operating the radio with the built-in antennas, directional effects are obtained. Better reception of distant stations and reduction of local interference may be obtained by rotating the radio until the desired signal is at a maximum. However, in some locations for the reception of FM stations, an outside antenna is essential. A folded dipole with a 300 ohm line lead-in should be used. It must be

carefully installed according to the directions furnished with it and connected to the FM terminals at the rear of the receiver. It should be remembered in conjunction with the erection of an FM folded dipole antenna that FM reception is usually limited to "line of sight" distances or up to 45 miles. Before erecting a special antenna for FM reception it is best to make certain that an FM station exists in your area.



TUBES

The type designation of each tube is stamped on the tube. The correct positions in which the tubes must be installed are shown in the tube position illustration.

All tubes must be in their sockets to operate the radio.

The tubes in the radio should be checked periodically by taking them out and having them tested. To reach the tubes for servicing, remove the two screws from the rear of the cabinet. Then remove cabinet front.

When replacing the tubes, be sure that they are inserted in the proper sockets. To install a tube into a miniature type tube socket, line up the tube prongs with the holes in the socket and then gently push the tube down until it is held firmly in the socket.

IF THE RADIO FAILS TO OPERATE SATISFACTORILY

Recheck the foregoing instructions. If the radio still does not appear to operate satisfactorily, proceed as follows:

FIRST-Check Power Supply. Be sure there is power at the convenience outlet to which the radio is connected. To determine this, connect a lamp to the outlet and see whether or not the lamp lights.

Check the voltage and frequency of the power supply with that shown on the power rating label on the radio. If there is any doubt concerning the power supply, withdraw the plug from the outlet and consult the local power company before reinserting the plug.

SECOND-Check Tube Positions. See that the tubes are in the correct sockets as shown in the illustration. Make certain that the tubes are operating. (Glass tubes will light very dimly.)

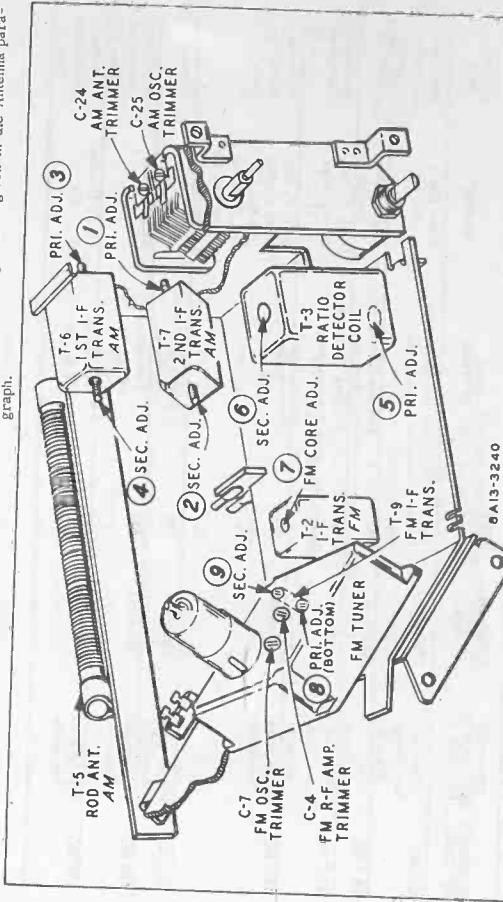
MODEL NO. DC2836B

THIRD-Check Antenna. If an outside antenna is being used, inspect the antenna system to see that it is in good condition and not grounded at any point.

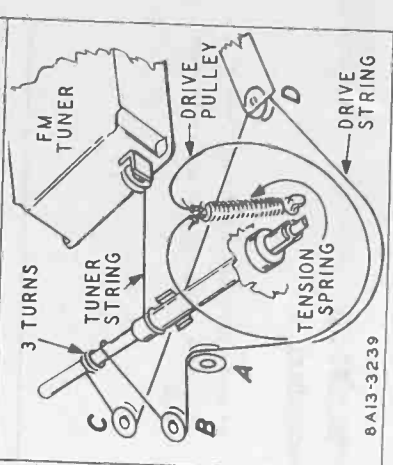
FOUR-Test Tubes. Remove the tubes from the radio, take them to your local radio dealer and have them tested either by means of a tube tester or by inserting them in a radio that is operating satisfactorily.

FIFTH-Service. If the radio does not function properly after the above procedure has been followed and the tubes have been tested, get in touch with the dealer from whom the radio was purchased or call in a competent radio technician.

FAULTY FM RECEPTION
The requirements for FM reception are more critical than for Standard band broadcast or short wave reception. This includes the area in which the receiver is located, the type of antenna used, the distance the receiver is located from the station to be received and other factors not encountered in Standard band broadcast reception. It is to be noted that reception in the high frequency FM band is usually limited to "line of sight" distances or up to about 45 miles. Also tall buildings or other structures between the transmitter and the receiver may be found to affect reception. Reception under these conditions will sometimes be helped by the addition of an external folded dipole antenna with a 300 ohm line lead-in. Information concerning this is given in the Antenna paragraph.



8A13-3240



8A13-3239

DRIVE CORD REPLACEMENT

Replacement of the drive cord may be accomplished as shown in the illustration. For this purpose use the drive cord assembly listed in the replacement parts list. Then install the string as shown, winding three turns clockwise around the tuning shaft with the turns progressing toward the rear of the chassis. After the cord is installed rotate the tuning shaft several times in order to take up any slack in the cord.

The string from the FM tuner to the tuning shaft is wound 2 turns counter-clockwise and then tied to the clip.

MODEL NO. DC2836B

WG
No. 10-475

TUBE COMPLEMENT

- 1-12DT8 R-F Amplifier & Mixer
- 1-12AU6 FM I-F Amplifier
- 1-12AU6 FM I-F Amplifier
- 1-12AL5 AM Detector
- 1-12BE6 AM Converter
- 1-12BA6 AM I-F Amplifier
- 1-12AV6 AM Detector & 1st Audio Amplifier
- 1-35C5 Audio Output

- Speaker - 4 X 6 inch P.M. dynamic
- Frequency Ranges
Broadcast 540-1600 KC
Frequency Modulation 88-108 MC
- Intermediate Frequency -
AM 455 K C - FM 10.7 MC

Selectivity - AM - 45 KC broad 1000 times down,
and 8 KC at two times down,
I.F. FM - 200 KC broad at 2 times down
I.F. FM - 900 KC broad at 100 times down

AM Sensitivity - (For 50 Milliwatts output)
25 microvolts average

FM Sensitivity - (For 50 Milliwatts output)
25 microvolts average

ELECTRICAL SPECIFICATIONS

Power Input -
55 watts, 105-125 volts AC
50-60 cycles or 105-125 volts DC

Power Output -
2 watts maximum
1.3 watt 10% distortion

ALIGNMENT PROCEDURES

AM STAGES

The following is required for aligning:

An All Wave Signal Generator Which Will Provide an Accurately Calibrated Signal at the Test Frequencies as listed.

Output Indicating Meter, Non-Metallic Screwdriver, Dummy Antenna - 1. mf.

Volume Control Maximum all Adjustments.

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

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

MODEL NO. DC2836B

ALIGNMENT PROCEDURES

FM STAGES

The following is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below. Dummy antennas, 5000 mmf and 300 ohms.

V.T.V.M. having a range of approximately 5 volts.

Allow chassis and signal generator to heat up for several minutes.

SIGNAL GENERATOR

FREQUENCY SETTING	CONNECT SIGNAL GENERATOR OUTPUT TO	THROUGH DUMMY ANTENNA	BAND SWITCH SETTING	DIAL SETTING	ADJUST	ADJUST FOR
10.7 MC	Pin 1 of 2nd 12AU6 (Note 3)	5000 mmf	FM	Extreme Clockwise Rotation	Ratio Det. Pri. (5)	Maximum Deflection (Note 1)
10.7 MC	Pin 1 of 2nd 12AU6	5000 mmf	FM	Extreme Clockwise Rotation	Ratio Det. Sec. (6)	Maximum Deflection (Note 2)
10.7 MC	Pin 1 of 1st 12AU6 (Note 4)	5000 mmf	FM	Extreme Clockwise Rotation	2nd I. F. Adj. (at top only) (7)	Maximum Deflection (Note 1)
10.7 MC	FM Antenna Terminals	300 ohms	FM	Extreme Clockwise Rotation	1st I. F. Adj. Pri. (8) and Sec. Adj. (7) Ratio Det. Pri. (5) In order shown	Maximum Deflection (Note 1)
10.7 MC	FM Antenna Terminals	300 ohms	FM	Extreme Clockwise Rotation	Ratio Det. Sec. (6)	Maximum Deflection (Note 2)
108 MC	FM Antenna Terminals	300 ohms	FM	Pointer to 108 mc. on dial	Osc. Trimmer C-7	Maximum Deflection (Note 1)
98 MC	FM Antenna Terminals	300 ohms	FM	Pointer to 98 mc. on dial	R.F. Trimmer C-4	Maximum Deflection (Note 1)

FM ALIGNMENT NOTES

NOTE 1 - Connect V.T.V.M. common lead to chassis. Connect D.C. probe to Pin 7 of 12AL5. Input should be adjusted for approximately 4.5V. output.

point of above 2 resistors and connect D.C. probe to junction point of C-18 and R-8. Adjust ratio detector secondary for zero voltage.

NOTE 2 - Connect 2 100 Kohms .5 watt resistors in series and connect from pin 7 of 12AL5 to chassis. Connect V.T.V.M. common lead to mid

NOTE 3 - 12AU6 nearest ratio detector (T-3).

NOTE 4 - 12AU6 nearest I.F. transformer FM (T-2).

SIGNAL GENERATOR

FREQUENCY SETTING	CONNECT THROUGH DUMMY ANTENNA	CONNECT TO	GANG CONDENSER SETTING	ADJUST	ADJUST FOR
455KC	Control Grid 12BA6 Pin No. 1	Chassis Base	Rotor Fully Open	2nd I. F. Pri. (1) and Sec. (2)	Maximum Output
455KC	Control Grid 12BE6 Pin No. 7 1st Def.	Chassis Base	Rotor Fully Open	1st I. F. Pri. (3) and Sec. (4)	Maximum Output
455 KC	Control Grid 12BE6 Pin No. 7	Chassis Base	Rotor Fully Open	2nd. I. F. Pri. (1) and Sec. (2)	Maximum Output
1620 KC	Control Grid 12BE6 Pin No. 7	Chassis Base	Rotor Fully Open	Oscillator C-25	Maximum Output
1400 KC	See Note A	See Note A	Set Pointer to 1400 KC	Antenna C-24	Maximum Output

Note A - Connect generator leads across a 6" diameter loop of wire and place near AM antenna.

MODEL NO. DC2836B
REPLACEMENT PARTS LIST FOR DC2836B

Ref. No.	Description	Approximate Suggested Price
MISCELLANEOUS		
12A531	4" x 6" PM Speaker	11.50
25A1163	Tuner, F-M	2.55
70X5	Selenium Rectifier	.65
3A486	Resistor-Capacitor Assembly	.15
3A491	Tube Socket (12AV6-35C5)	.15
4X1165	Tube Socket (12AL5-12AU6-12BE6-12BA6)	.55
13X615-3	Crest	.65
10X93	Line Cord Assembly	.05
28X603	Drive Cord Assembly	.05
20X1660	Spring Drive Cord	
28X635	Rings (10A911-1 & 10A912-1 Knob)	
2A488	Switch, AM-FM	
10A910-1	Knob, Dial Scale FM	
10A911	Knob, Tuning	
10A912-1	Knob, Dial Scale AM	
S-38A586	Knob, On-Off and Switch	
S-38A587	Front Baffle & Grille Cloth Assembly	
	Assembly, Cabinet Shell (Charcoal)	

CAPACITORS

C-1	Part of 76X5 (See Miscellaneous)	
C-2	5K mmf	.30
C-3	47 mmf	.20
C-4	Part of T-2	
C-5	Part of T-3	
C-6	47X670	.30
C-7	47X775	.25
C-8	45X823	.25
C-9	RCP10M2103M .01 mf	
C-10	Part of 76X5 (See Miscellaneous)	
C-11	RCP10M4103M .01 mf	
C-12	14A232	3.35
C-13	Part of Gang Condenser Assembly	
C-14	Part of Gang Condenser Assembly	
C-15	RCP10M2473M .047 mf	
C-16	Part of T-6	
C-17	Part of T-7	
C-18	RCP10M4473M .047 mf	
C-19	45X444	.30
C-20	80X15	
C-21A	400 V Molded Tubular	
C-21C	400 V Molded Tubular	
C-22	400 V Molded Tubular	
C-23A	400 V Molded Tubular	
C-23B	150 V Tubular	
C-24	150 V Dry Electrolytic	
C-25	500 V Ceramic	
C-26	500 V Ceramic	
C-27	500 V Ceramic	
C-28	500 V Ceramic	
C-29	500 V Ceramic	
C-30	500 V Ceramic	
C-31	500 V Ceramic	
C-32	500 V Ceramic	
C-33	500 V Ceramic	
C-34	500 V Ceramic	
C-35A	500 V Ceramic	
C-35B	500 V Ceramic	
C-36	500 V Ceramic	
C-37	500 V Ceramic	
C-39	500 V Ceramic	

Prices Shown Are Approximate and Subject to Change Without Notice.

MODEL NO. DC2836B
REPLACEMENT PARTS LIST FOR DC2836B

Ref. No.	Description	Approximate Suggested Price
RESISTORS		
B84103	10 K	.15
	Part of 25A1163 FM Tuner Assembly	
B84680	68	.15
B85102	1K	.10
B84273	27 K	.15
B84223	22 K	.15
B85106	10 Meg.	.10
	Part of 76X5 (See Miscellaneous)	
B84181	180	.15
B85330	33	.10
B84121	120	.15
B85225	2.2 Meg.	.10
36X399	500 K	1.20
43X386	22	.20
C84122	1.2 K	.20
	Wirewound (Fuse Type)	
TRANSFORMERS & COILS		
9A2408	Oscillator Coil	.85
	Part of 25A1163 FM Tuner Assembly	
9A2309	Coil, I-F FM	1.00
9A2260	Ratio Detector	3.25
51X188	Output Transformer	1.75
9A2409	Rod Antenna	1.70
9A2343	Coil, Ist I-F A-M	1.20
9A2344	Coil, 2nd I-F A-M	1.30
	Part of 25A1163 FM Tuner Assembly	

Manual No. 10-477

HGR
No. 10-477

MODEL NOS. DC2980A & DC2981A

Factory Model 462
4 Tube, Including Rectifier

Factory Model 462
4 Tube, Including Rectifier

Factory Model 462
4 Tube, Including Rectifier

INSTALLATION

Place the receiver upright on a table or other level surface convenient to a power outlet. Do not place it on or near a radiator or heater.

This receiver is designed to operate from a 117 Volt AC or DC source of supply. On AC, improved reception may sometimes be obtained by turning the plug halfway around and reinserting it into the power outlet. Try it both ways and leave it in the position which gives the best reception. On DC, the receiver will operate with the plug inserted in only one position.

ANTENNA

This Radio is equipped with a built-in loop antenna which will produce satisfactory reception from nearby stations. This antenna may be somewhat directional and in some installations the signal may be improved by turning the cabinet in various directions.

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

OPERATION

Insert the power cord plug into the power receptacle. Turn the receiver on, by turning the Volume Control knob at the left clockwise until a click is heard. In about 30 seconds the set will be in operating condition. Turning the Volume to the right or clockwise increases the volume.

Tune in stations by turning the large upper knob. The numbers on the tuning scale show Kilocycles with the last two ciphers left off. For example number 9 is the location of 900 Kilocycles. As you have tuned in the station desired move the tuning knob to the position which produces the deepest rounded tones with a minimum background noise and clearest reception.

The tuning scale shows the "CD" Civil Defense Emblem at-Conecord Frequencies-640 and 1240 Kilocycles. In a Civil Defense emergency tune to either of these frequencies to receive defense news, instructions and information.

To turn the receiver off, turn the volume knob to the left or counter clockwise position until a click is heard.

In locations where signals of low strength prevail, signals can be increased by adding a length of wire running around the room floor and around the window frames. Attach this wire to the lead provided in the back of the receiver.

ELECTRICAL SPECIFICATIONS

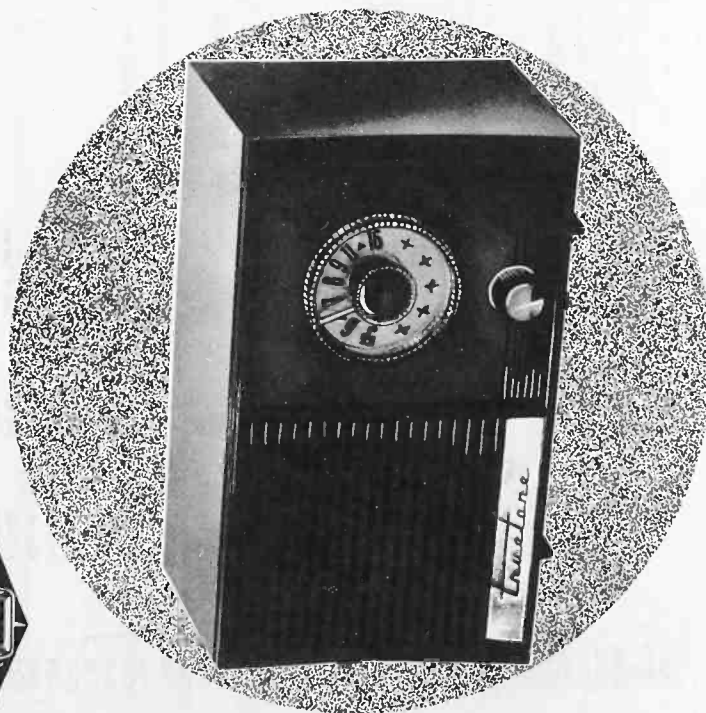
Power Supply	117 Volts D.C. or 117 Volts, 50-60 Cycles A.C.
Frequency Range	535 to 1650 K C
Intermediate Frequency	455 K C
Tuning	Two gang capacitor
Speaker	4 inch PM, 3.2 ohm voice coil impedance
Power Consumption	30 Watts
Power Output	1 watt undistorted, 1.5 watt maximum
Sensitivity	3000 Microvolts at 50 milliwatts Output
Selectivity	120 kc. broad at 1000 times signal at 1000 kc.

TUBE COMPLEMENT

12AUG	Mixer and Oscillator
12AV6	Detector, A.V.C. and 1st Audio
50 C5	Audio Output
35W4	Power Rectifier

Truettone
TABLE RADIO

**INSTALLATION, OPERATING
and SERVICE INSTRUCTIONS**

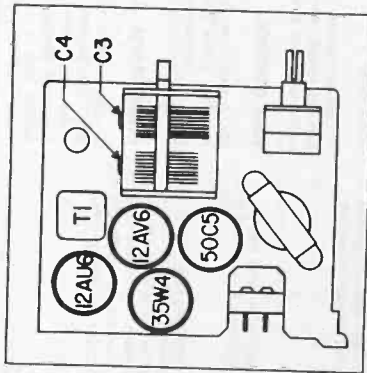


MODELS DC2980A (White) & DC2981A (Red)

MODEL NOS. DC2980A & DC2981A

TUBES

This receiver is shipped with the tubes in their proper sockets. If for some reason tubes have been removed, make certain they are reinserted into their proper sockets as shown below.



TUBE LAYOUT

ALIGNMENT PROCEDURE

PRELIMINARY:

- Output meter connection Across 3.2 ohm speaker voice coil
- Output meter reading to indicate 0.05 watt across speaker voice coil 0.4 volt
- Generator Modulation 30%, 400 cycles
- Position of volume control maximum (fully clockwise)
- Position of pointer with Rotor full open (Plates out of mesh) 1650 kc

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN RECEIVER DIAL TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD COND.	455 KC	FULL CLOCKWISE POSITION. (CONDENSER PLATES FULLY OPEN)	BOTTOM 8 TOP OF T-1 IN SAME ORDER (I.F. TRANSFORMER)
2		1650 KC		C4 (OSCILLATOR TRIMMER)
3	USE RADIATED SIGNAL	1500 KC		C3 (ANTENNA TRIMMER)
4			REPEAT STEPS 2 AND 3	

Align for maximum output. Reduce input as needed to keep output near 0.4 volts. Always keep the output from the generator at its lowest possible value.

The alignment procedure should be done in the order given for greatest accuracy.

MODEL NOS. DC2980A & DC2981A

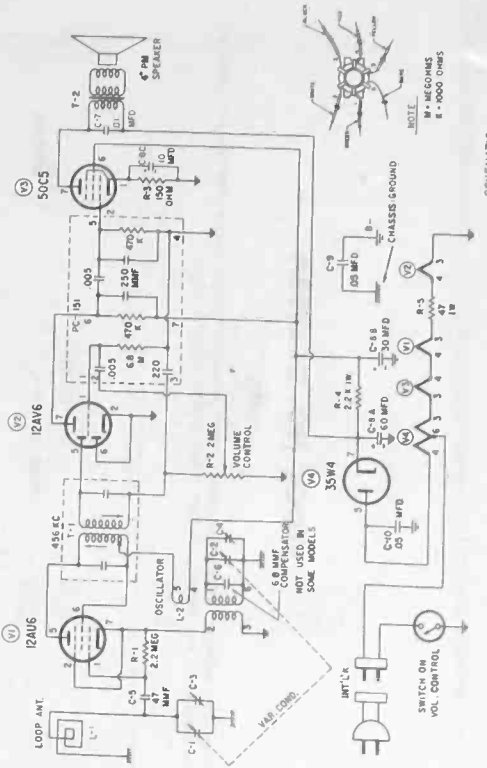
REPLACEMENT PARTS LIST

When ordering parts, specify part number, model number and series.

REF. NO.	PART NO.	DESCRIPTION	APPROXIMATE SELLING PRICE
R1	180-107	RESISTORS	
R2	120-117	2.2 Megohms ± 20%, 1/2 w	.08
R3	180-111	Volume Control, 2 Megohms, (with Switch)	1.10
R4	180-101	150 ohms ± 20%, 1/2 w	.08
R5	180-185	2200 Ohms ± 20%, 1/2 w	.08
		47 Ohms ± 10%, 1/2 w	.14
C1, C2, C3, C4	160-129	CONDENSERS	
C5	15G-107	245-102 MMF Variable	2.64
C6	168-102	50 MMFD	.16
C7	158-102	6.8 MMFD	.16
C8	150-141	.01 MFD	.18
C9	152-111	60-50-10/150 V, Electrolytic	1.50
C10	152-111	.05/400 V	.26
PC151	166-111	Couplate	.82
		CABINET AND ACCESSORIES	
	220-152	Knob, Tuning - clear	.56
	220-122	Knob, Volume - clear	.26
	210-142R	Cabinet - Red (with dial)	4.00*
	210-142W	Cabinet - White (with dial)	4.00*
	215-164	Dial Insert	.26
	185-128	Line Cord	.72
	175-137	Speaker - 4" - Alnico V	3.86*
T1	130-106	COILS AND TRANSFORMERS	
T2	138-130	Transformer, IF	1.50
L1	134-112	Transformer, Output - 2500/3.2 Ohms	1.86
L2	136-139	Loop, with back Oscillator Coil	1.24*
			.94

* Federal Excise Tax Included

Prices Shown Are Approximate and Subject to Change Without Notice.



SCHEMATIC
DRAWN BY SP27 CHECK 5/4 4/4

RETMA SOURCE NO. 785 PART NO. 250-304 CODE 482

STOCK NO. DC2988A

Factory Model 816
6 Tubes, Including Rectifier

ELECTRICAL SPECIFICATIONS

Power Supply.....	105-120 Volts AC-DC
Frequency Range.....	540-1650 Kilocycles
Intermediate Frequency.....	456 Kilocycles
Sensitivity.....	.20 microvolts on ferrite loop for 50 MW output
Selectivity.....	.8 Kilocycles 2X-20 Kilocycles 10X at 456 Kilocycles
Tuning.....	3 Gang Capacitor
Speaker.....	6 1/2" Alnico, 3.2 Ohm voice coil
Power Consumption.....	35 Watts
Power Output.....	1.5 Watt undistorted

TUBE COMPLEMENT

12BA6.....	RF Amplifier
12BE6.....	Oscillator and Mixer
12AV6.....	I.F. Amplifier
35C5.....	Detector A.V.C. and 1st Audio
35W4.....	Audio Output Power Rectifier

GENERAL DESCRIPTION

DESCRIPTION

This receiver is equipped with a six tube radio receiver incorporating a tuned radio frequency amplifier which is capable of receiving weak stations with minimum noise background. This radio frequency stage increases selectivity - the ability to separate a signal from one station to another - minimizing interference. Background signal interference is also eliminated.

This receiver makes use of the very latest advances achieved in the field of high fidelity sound reproduction. Great strides have been made in present day reproduction of sound which is now accomplished with lower distortion and a finer balance between bass frequencies and treble frequencies. Among high fidelity enthusiasts this balance between bass and treble tones is referred to as loudness contour. A tone control that enables the listener to tailor the treble response to their taste has been incorporated in this receiver. The deep console like bass response achieved in this True-tone table receiver - accomplished by Basso-fonic circuitry and special speaker characteristics - represents a distinct advance in the field of table radios.

INSTALLATION

Place the receiver upright on a table or other level surface convenient to a power outlet. Do not place it on or near a radiator or heater.

This receiver is designed to operate from a 117 Volt AC or DC source of supply. On AC, improved reception may sometimes be obtained by turning the plug halfway around and reinserting it into the power outlet. Try it both ways and leave it in the position which gives the best reception. On DC, the receiver will operate with the plug inserted in only one position.

ANTENNA

This Radio is equipped with a built-in ferrite loop antenna which will produce satisfactory reception. This antenna may be somewhat directional and in some installations the signal may be improved by turning the cabinet in various directions.

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

OPERATION

Make sure that "Phono-Radio Switch" in back of receiver is moved to the right - the Radio position. Turn the receiver on, by pulling the bottom volume control knob out until a click is heard. In about 30 seconds the set will be in operating condition. Turning the volume control knob to the right, or clockwise, increases the volume.

Tune in stations by turning the top tuning knob at the right. The number on the tuning scale show Kilocycles with the last two ciphers left off. For example number 9 is the location of 900 Kilocycles. As you have tuned in the station desired move the tuning knob to the position which produces the deepest rounded tones with a minimum background noise and clearest reception.

The tuning scale shows the "CD" Civil Defense Emblem at - Conelrad Frequencies - 640 and 1240 Kilocycles. In a Civil Defense emergency tune to either of these frequencies to receive defense news, instructions and information.

To turn the receiver off, push lower volume knob in. When Radio is turned on by pulling this knob outward again, the volume level will return to your previous setting.

STONE CONTROL

The center knob is the tone control. To increase bass response, rotate this control counter clockwise, or to the left. To increase treble response, rotate this control to the right, or clockwise.

PHONOGRAPH - STEREO CONNECTION

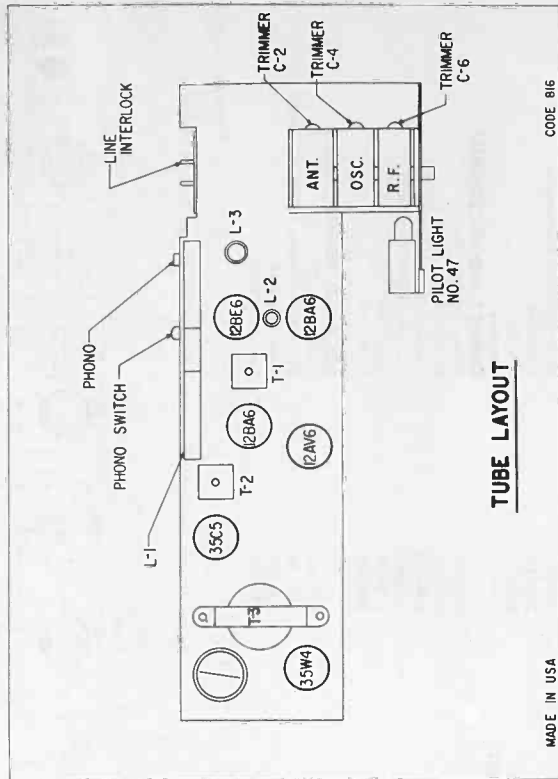
To play records through this radio connect the "pick-up plug" from the record player to the jack to "Phono-Stereo" socket at the rear of the receiver. Move phono-radio switch to the left. (looking at back of cabinet) turn bottom volume control knob in counter clockwise position. Phonograph volume increases with counter clockwise movement of this bottom volume control knob.

This radio can be used for the second channel of a stereo phonograph by having the "pick-up plug" of stereo equipment channel 2 inserted in the phono-stereo socket provided in the back of the receiver. The "pick-up plug" of either a phonograph or the second channel stereo can remain attached to the receiver. In order to restore operation as a radio, return phono-radio switch to the right move bottom volume control clockwise.

STOCK NO. DC2988A

TUBES

This receiver is shipped with the tubes in their proper sockets. If for some reason tubes have been removed, make certain they are reinserted in their proper sockets as shown below.



ALIGNMENT PROCEDURE

The alignment of the receiver below indicates the method for obtaining maximum sensitivity and lowest noise pickup.

- (1) Connect output meter across voice coil of receiver.
- (2) Use oxide rectifier type with 0-1 volt scale.
- (3) Use the minimum amount of signal necessary. Keep generator as far away as possible if the shielding is inadequate.
- (4) Use .4 volts as reference level.
- (5) Volume and tone controls set in maximum position.

STOCK NO. DC2988A

PARTS PRICE LIST
When ordering parts, specify stock number, model number and part number.
RESISTORS

Ref. No.	Part No.	Description	Approximate Selling Price
R1	180-117	330 Ohms 1/2 Watt 10%	.10
R2	180-107	2.2 Megohms 1/2 Watt 20%	.08
R3	180-102	22K 1/2 Watt 20%	.08
R4	180-190	10K 1/2 Watt 10%	.10
R5	180-148	220 Ohms 1/2 Watt 10%	.08
R6	180-107	2.2 Megohms 1/2 Watt 20%	.08
R7	180-470	4 Megohm Volume Control with Switch	1.26
R8	180-135	470 K Ohm 1/2 Watt 20%	.08
R9	180-110	150 Ohms 1/2 Watt 20%	.08
R10	180-110	470 K Ohms 1/2 Watt 20%	.08
R11	180-111	470 K Ohms 1/2 Watt 20%	.08
R12	180-110	1000 Ohms 1 W WW 10%	.18
R13	180-184	Tone Control 100 K Ohms	.80
R14	120-138	15K Ohms 1/2 Watt 10% Critical	.10
R15	180-115	330 K 1/2 Watt 20%	.10
R16	180-109	1800 Ohms 1/2 Watt 10%	.10
R17	180-159	1800 Ohms 1/2 Watt 10%	.10

STOCK NO. DC2988A
HG No. 10-485

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS	ADJUST FOR
456 KC Approx. 500 Microvolts	C3 Section Variable and Pin 3 12AV6	Top and Bottom T1 and T2	Maximum Output
SIGNAL GENERATOR FREQUENCY	POSITION OF GANG	CONNECT TO	ADJUST
1650 KC	Fully Open	Same as	C4 Trimmer for maximum output
540 KC	Fully Closed	for IF Position	Check for range only
1500 KC	Set for Maximum Signal	Spray signal into loopstick using 6 turns across generator output. Couple close enough to get signal.	C2-6 Trimmer maximum output
600 KC	Set for Maximum Signal	As Above	Adj. L-2 Slug for maximum

Check tracking, using silencer or Ferrite stick and Aluminum Plate 4" square.

CONDENSERS

Ref. No.	Part No.	Description	Approximate Selling Price
C1-2-3	160-130	Variable Condenset 3/8"sec Planetary	4.66
C4	156-111	220 MMF Disc 400V	.16
C5	132-104	.05 MFD 200 WV (small)	.22
C6	152-102	.1 MFD 200 WV (small)	.34
C7	152-102	.1 MFD 200 WV (small)	.20
C8	156-111	220 MMF Disc 400V (small)	.16
C9	156-111	220 MMF Disc 400V (small)	.16
C10	152-102	.01 MFD "K" CAP-400V	.28
C11	152-102	.022 MFD 400 WV (small)	.28
C12	152-102	.05 MFD 400 WV (small)	.28
C13	152-109	.05 MFD 400 WV (small)	.28
C14	152-109	.05 MFD 400 WV (small)	.28
C15	132-109	Electrolytic 100 x 80 - 150 WV w/strap	1.76
C16	132-102	.1 MFD - 200 WV (small)	.34
C17	132-102	.22 MFD - 400 WV (small)	.20
C18	166-107	PC-50 Complete Tweet Filter	.36

COILS AND TRANSFORMERS

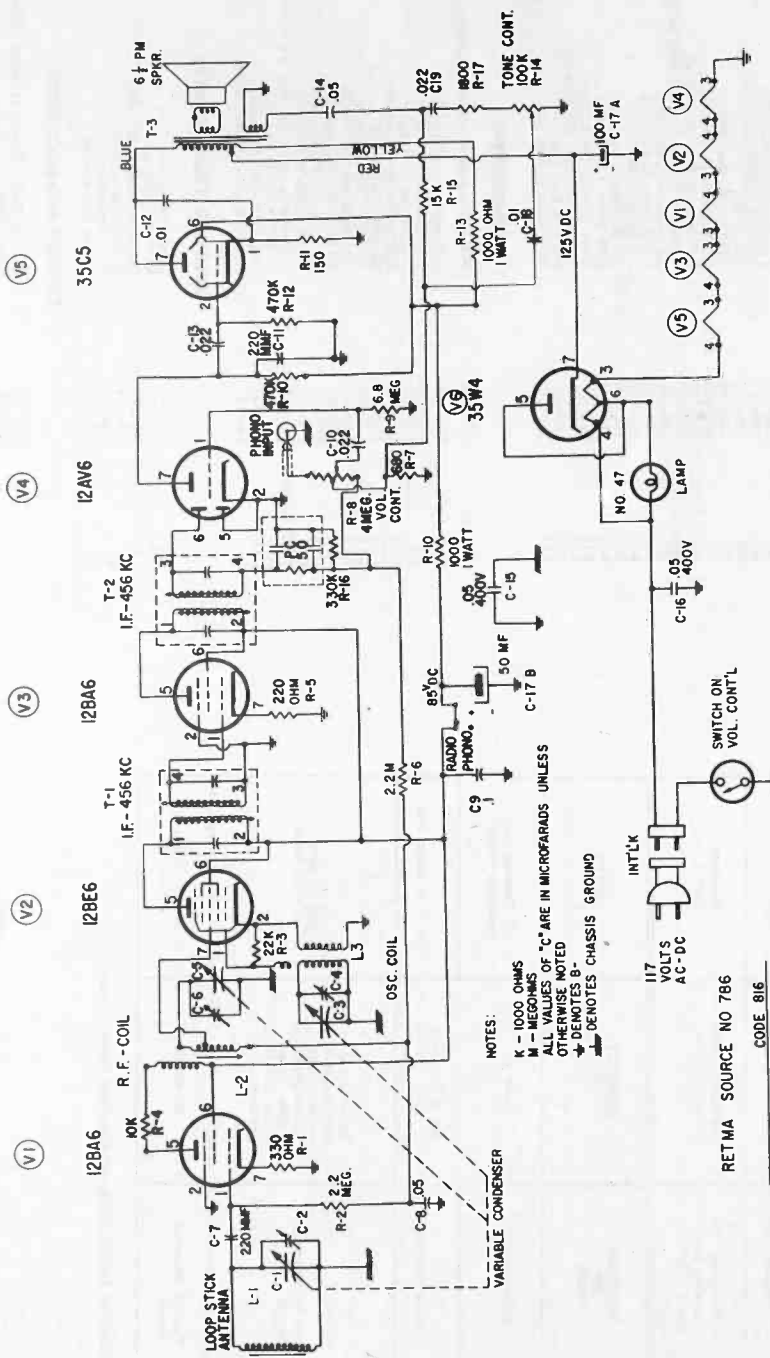
Ref. No.	Part No.	Description	Approximate Selling Price
L-1	132-140	Loop Ferrite Rod	*1.92
L-2	132-139	RF Coil (with R4)	1.16
L-3	136-141	Oscillator Coil (with R3)	1.44
T1	130-114	IF Transformer No. 1	1.28
T2	130-114	IF Transformer No. 2	1.28
T3	130-131	Output Transformer	*3.20

CABINET AND ACCESSORIES

Ref. No.	Part No.	Description	Approximate Selling Price
210-185	210-185	Cabinet Shell - Ebony, in carton (230-174)	*5.20
205-126	205-126	Panel Insert	*2.20
205-130	205-130	Control Panel Insert, Crystal	*.32
205-134	205-134	Panel Insert, Plates	.74
215-165	215-165	Indicator Bar, Tuning Dial	.78
220-158	220-158	Knob/Volume & Tone	.32
220-159	220-159	Calibration Disc	.34
220-160	220-160	Knob (Tuning Planetary)	.32
230-342	230-342	WA Crest	.34
140-116	140-116	Phone Jack	.10
140-116	140-116	Mounting Light	.25
185-128	185-128	Pilot Light Assembly	.20
185-128	185-128	Line Cord (Push-In Interlock) 6' 0"	.80
175-139	175-139	Speaker - PM - 6 1/2"	*6.10
125-111	125-111	Slide Switch	.36

* Federal Excise Tax Included.

MODEL DC2988A



NOTES:
 K - 1000 OHMS
 M - MEGOHMS
 ALL VALUES OF "C" ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 ↓ DENOTES B-
 ⊥ DENOTES CHASSIS GROUND

SCHEMATIC NO. DC2988A

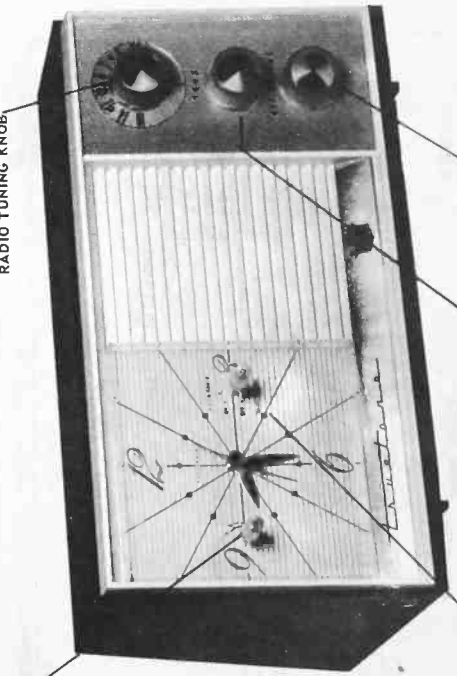
DRW'N 3-19-58 BY APPROVED

RETMA SOURCE NO 786
 CODE 816

PART NO 250-349

STOCK NO. DC2989A

Pull Out C
RADIO TUNING KNOB



**Pull Out A
SLUMBER CONTROL KNOB**
Turning this knob to the "ON" position will allow you to listen to the radio for a period of time only - after the time you set for has elapsed, it will automatically turn the radio off. To turn it off, move this knob to the "OFF" position. For "Wake up to Music, and Buzzer Alarm", move this knob to the "Radio Alarm Position".

**Pull Out B
TONE CONTROL**

**Pull Out C
VOLUME CONTROL**
To increase volume, turn to the right clockwise. To lower volume, turn to the left, counter-clockwise.

Figure 1

INSTALLATION - OPERATING INSTRUCTIONS

DESCRIPTION

This Clock Radio is equipped with a six tube radio receiver incorporating a tuned radio frequency amplifier which is capable of receiving weak stations with minimum noise background. This radio frequency stage increases selectivity - the ability to separate a signal from one station to another - minimizing interference. Background signal interference is also eliminated.

This Clock Radio makes use of the very latest advances achieved in the field of high fidelity sound reproduction. Great strides have been made in present day reproduction of sound which is now accomplished with lower distortion and a finer balance between bass frequencies and treble frequencies. Among high fidelity enthusiasts this balance between bass and treble tones is referred to as loudness contour. A tone control that enables the listener to tailor the treble response to his taste has been incorporated in this receiver. The deep console like bass response achieved in this Truetone Clock Radio - accomplished by Basso-foenic circuitry and special speaker-characteristics - represents a distinct advance in the field of Clock Radios.

INSTALLATION

Place the receiver upright on a table or other level surface convenient to a power outlet. Do not place it on or near a radiator or heater.

This receiver is designed to operate on 117 Volt AC only. Improved reception may sometimes be obtained by turning the plug halfway around and reinserting it into the power outlet. Try it both ways and leave it in the position which gives the best reception.

ANTENNA

This Radio is equipped with a built-in ferrite loop antenna which will produce satisfactory reception from nearby stations. This antenna may be somewhat directional and in some installations the signal may be improved by turning the cabinet in various directions.

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

TO SET THE CLOCK

Your self-starting Telechron movement will begin operating when the set is plugged into the AC outlet. Check the clock by noting the rotation of the Sweep Second Hand. Set the clock to the correct time by means of the "Alarm and Time Set Knob" in the back of the cabinet. Gently pull this knob back - away from the cabinet - which engages the hands of the clock, enabling you to set the clock to the correct time. See Figure 2 on following page.

STOCK NO. DC2989A

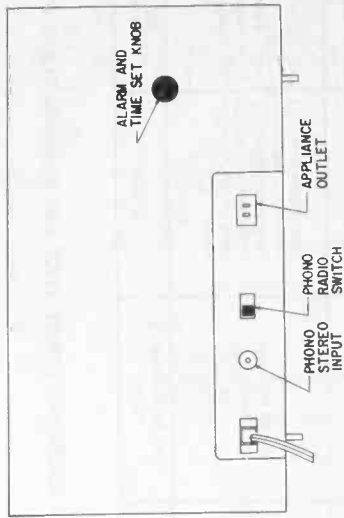


Figure 2

TO PLAY THE RADIO AT ANY TIME

To turn on the radio, turn the "Selector Switch Knob" to the "ON" position. Rotate "Volume Control Knob" - in lower right hand corner - to 3/4 rotation position.

Tune in stations by turning the "Radio Tuning Knob" located at the top right hand corner. The numbers on the Tuning Scale show Kilocycles with the last two cyphers left off. For example, number 9 is the location of 900 Kilocycles. As you have tuned in the stations desired, move the Tuning Knob to the position which produces the deepest rounded tones with a minimum background noise and clearest reception.

The Tuning Scale shows the "CD" Civil Defense emblem at Conelrad Frequencies 640 and 1240 Kilocycles. In a Civil Defense emergency tune to either of these frequencies to receive defense news, information in instructions.

Adjust the Volume Control by turning the bottom "Volume Knob" to the volume desired.

To turn off the radio, turn the "Selector Switch Knob" to the "OFF" position. See figure 1.

TO GO TO SLEEP BY MUSIC

Turn the "Slumber Control Knob" to the desired play time, up to 60 minutes, as shown in Figure 1. If you wish to turn the radio off before end of setting turn "Slumber Control Knob" counter clockwise.

TO WAKE UP TO MUSIC(w/ or without Buzzer Alarm)

1. Adjust the volume and tune the radio to the desired station you would like to hear in the morning.
2. Set the Red Alarm Setting Hand to the time you want to be awakened. Gently move the "Alarm and Time Set Knob" forward to the front of the cabinet, which engages the Red Alarm Setting Hand, enabling you to set the alarm for the time you want to be awakened. See Figure 2.

3. With Buzzer Alarm move "Selector Switch Knob" (see Figure 1) to right, or clockwise "Radio Alarm" position. The Buzzer will come on ten minutes after the radio has been turned on automatically.

4. To turn off Radio and Buzzer, move the "Selector Switch Knob" clockwise to "OFF" position.

5. Without Buzzer Move this "Selector Switch Knob" clockwise to "Auto-Radio" position.

OPERATION OF APPLIANCE OUTLET

An electrical appliance outlet is provided in the back of the receiver for connecting an electric lamp or an electrical appliance up to rating of 1100 Watts. This Appliance Outlet is shown in Figure 2.

To turn off appliance connected to the outlet, turn the "Selector Switch Knob" to "OFF" and remove appliance plug.

TO TONE CONTROL

The center knob (see figure 1) is the Tone Control. To increase bass response, rotate this control counter-clockwise, or to the left. To increase treble response, rotate this control clockwise, or to the right.

PHONOGRAPH - Stereo Connection

To play records through this radio connect the "back-up plug" from the record player to the jack to "Phono-Stereo" socket at the rear of the receiver. Move phono-radio switch to the left (looking at back of cabinet) turn bottom volume control knob in counter clockwise position. Phono-graph volume increases with counter clockwise movement of this bottom volume control knob.

STOCK NO. DC2989A

This radio can be used for the second channel of a stereo phonograph by having the "pick-up plug" of stereo equipment channel 2 inserted in the Phono-Stereo socket provided in the back of the receiver. The "pick-up plug" of

either a phonograph or the second channel stereo can remain attached to the receiver. In order to restore operation as a radio, return phono-radio switch to the right - move bottom volume control clockwise.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

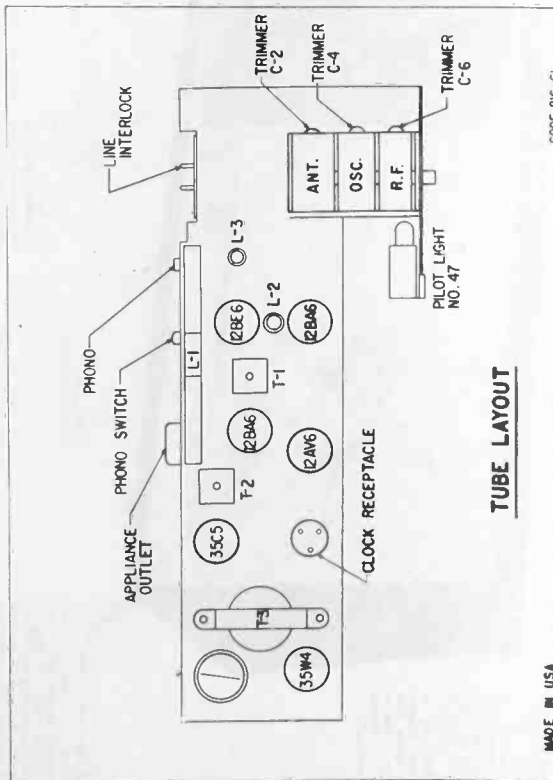
- Power Supply.....117 Volts AC 60 cycles only
- Power Consumption.....As Radio 35 Watts
- Frequency Range.....540-1650 Kilocycles
- Intermediate Frequency.....456 Kilocycles
- Sensitivity.....20 microvolts on ferrite loop for 50 MW output
- Selectivity.....8 Kilocycles 2X-20 Kilocycles
- Tuning.....10% at 456 Kilocycles
- Speaker.....6" x 4" Alnico V, 8 Ohm, 3W
- Power Output.....1.5 Watt undistorted

TUBE COMPLEMENT

- 12BA6.....RF Amplifier
- 12BE6.....Oscillator and Mixer
- 12AV6.....I.F. Amplifier
- 35C3.....Detector A.V. C. and 1st. Audio
- 35W4.....Audio Output
- 35W4.....Power Rectifier

TUBES

This receiver is shipped with the tubes in their proper sockets. If for some reason tubes have been removed, make certain they are reinserted in their proper sockets as shown below.



MADE IN USA
MODEL NO. DC2989A

CODE B16-CL
PART NO. 250-352

STOCK NO. DC2989A

ALIGNMENT PROCEDURE

- The alignment of the receiver below indicates the method for obtaining maximum sensitivity and lowest noise pickup.
- (1) Connect output meter across voice coil of receiver. Use oxide rectifier type with 0-1 volt scale.
 - (2) Use isolation transformer to keep power line ground off chassis.
 - (3) Use the minimum amount of signal necessary. Keep generator as far away as possible if the shielding is inadequate.
 - (4) Use .4 Volts as reference level.
 - (5) Volume and tone controls set in maximum position.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS	ADJUST FOR	
IF	456 KC Approx. 500 Microvolts	C5 section variable and Pin 3 12AV6	Top and Bottom T1 and T2	Maximum Output
	1650 KC	POSITION OF GANG	CONNECT TO	ADJUST
RF	540 KC	Fully Open	Same as for IF Position	C4 Trimmer for maximum output
	1500 KC	Fully Closed	Spray signal into loopstick using 6 turns across generator output. Couple close enough to get signal	Check for range only
	600 KC	Set for Maximum signal	Set for Maximum signal	C2-6 Trimmer maximum output
		Set for Maximum signal	as above	ADJ. L-2 Slug for maximum

CHECK TRACKING, USING SLICER OR FERRITE STICK AND ALUMINUM PLATE 4" SQUARE

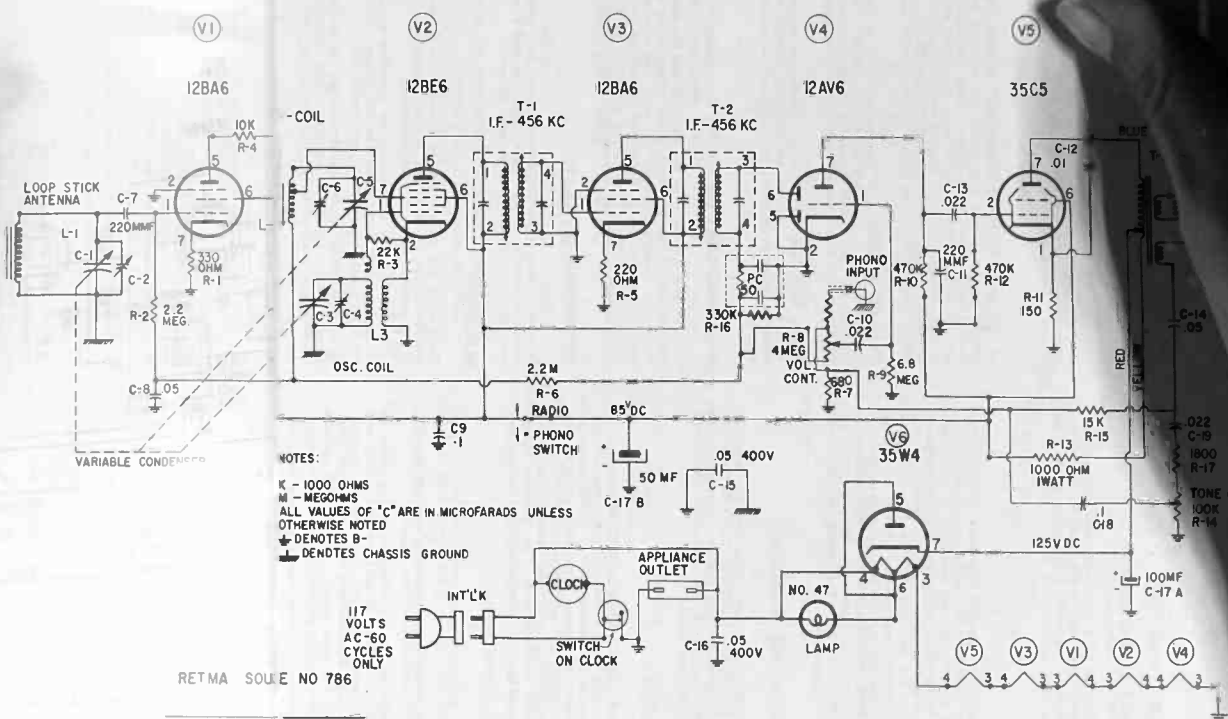
STOCK NO. DC2989A

REPLACEMENT PARTS PRICE LIST

When ordering parts, specify stock no., model no., and part no.

Part No.	Description	Approximate Selling Price
R1	180-117	.08
R2	180-107	.10
R3	180-102	.10
R4	180-190	.10
R5	180-148	.20
R7	180-140	1.26
R8	120-141	.08
R9	180-135	.08
R10	180-110	.08
R11	180-111	.08
R12	180-110	.08
R13	180-184	.18
R14	120-138	.80
R15	180-115	.10
R16	180-109	.08
R17	180-159	.10
C1-2-3-4-5-6	Variable Condenser, 3/2 sec, Planetary	4.66
C7	220 MMF Disc 400V	.16
C8	.05 MFD 200 WV (small)	.22
C9	.1 MFD 200 WV (small)	.34
C10	.022 MFD 400 WV (small)	.20
C11	220 MMF DISC 400V	.16
C12	.01 MFD "K" CAP-400V	.18
C13	.022 MFD, 400 WV (small)	.20
C14	.05 MFD, 400 WV, (small)	.28
C15	.05 MFD, 400 WV, (small)	.28
C16	.05 MFD, 400 WV (small)	.28
C17A, C17B	Electrolytic 100 x 50 - 150 WV W/Strip	1.76
C18	.1 MFD - 200 WV (small)	.34
C19	.022 MFD - 400 WV (small)	.20
L1	PC-50 Couplate tweet filter	.36
L2	Loop Ferrite Rod	1.92
L3	RF Coil (with R4)	1.16
L4	Oscillator Coil (with R3)	1.44
T1	I.F. Transformer #1	1.28
T2	I.F. Transformer #2	1.28
T3	Output Transformer	3.20
V1	12BA6	5.20
V2	12BE6	2.20
V3	12BA6	.74
V4	12AV6	.28
V5	35C5	.34
V6	35W4	.32
V7	No. 47 Pilot Light	.10
V8	No. 47 Pilot Light	.25
V9	Pilot Light Assembly	1.10
V10	Line Cord 16 Gauge, 6 ft. Interlock	6.10
V11	Speaker - PM - 6" x 4"	.36
V12	Slide Switch	
V13	Cabinet Shell Ebony in catton (230-175)	
V14	Panel Inset Clock	
V15	Crystal, Clock Insert	
V16	Panel Inset Plate	
V17	Knob (Volume & Tone)	
V18	Knob (Tuning Planetary)	
V19	Knob (Tuning Planetary)	
V20	Pho. Jack	
V21	No. 47 Pilot Light	
V22	140-116	
V23	140-134	
V24	185-131	
V25	175-140	
V26	125-111	

* Federal Excise Tax included



NOTES:
 X - 1000 OHMS
 M - MEGOHMS
 ALL VALUES OF "C" ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 Δ DENOTES B-
 ▽ DENOTES CHASSIS GROUND

RETMA SOURCE NO 786

PART NO 250

SCHEMATIC NO. DC 2989A
 CODE 816-CL

STOCK NO. DC2989A

This radio can be used for the second channel of a stereo phonograph by having the "pick-up plug" of stereo equipment channel 2 inserted in the Photo-Stereo socket provided in the back of the receiver. The "pick-up plug" of move bottom volume control clockwise.

either a phonograph or the second channel stereo can remain attached to the receiver. In order to restore operation as a radio, return phono-radio switch to the right - move bottom volume control clockwise.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

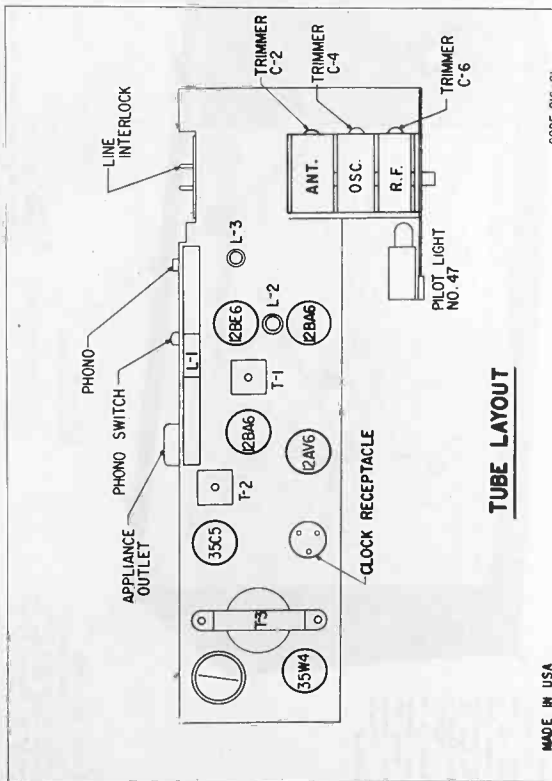
- Power Supply.....117 Volts AC 60 cycles only
- Power Consumption.....As Radio 35 Watts
- Frequency Range.....540-1650 Kilocycles
- Intermediate Frequency.....456 Kilocycles
- Sensitivity.....20 microvolts for 50 Mw output
- Selectivity.....8 Kilocycles 2X-20 Kilocycles
- Tuning.....10X at 456 Kilocycles
- Speaker.....6" x 4" Alnico V, Ohm voice coil
- Power Output.....11.5 Watt undistorted

TUBE COMPLEMENT

- 12BA6.....RF Amplifier
- 12BE6.....Oscillator and Mixer
- 12BA6.....I.F. Amplifier
- 32C5.....Detector A.V. C. and 1st Audio Output
- 35W4.....Power Rectifier

TUBES

This receiver is shipped with the tubes in their proper sockets. If for some reason tubes have been removed, make certain they are reinserted in their proper sockets as shown below.



MADE IN USA
MODEL NO DC 2989A
CODE B15-CL
PART NO. 250-352

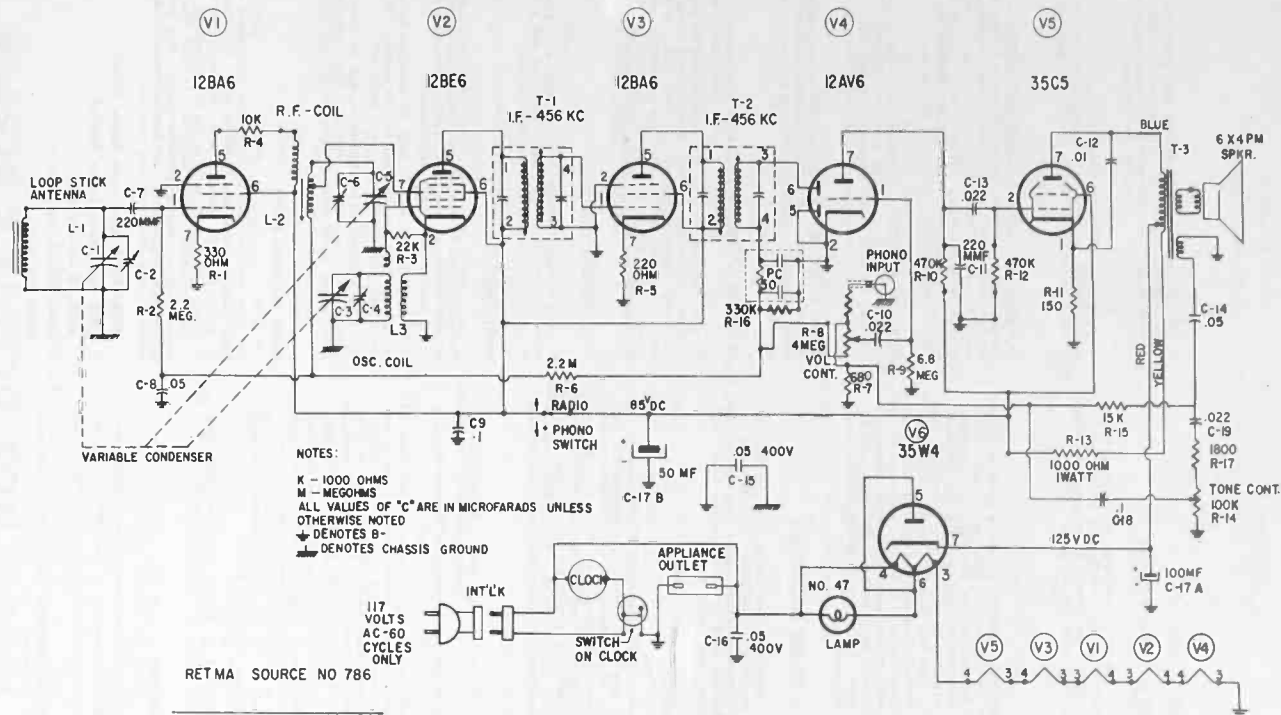
STOCK NO. DC2989A

ALIGNMENT PROCEDURE

- The alignment of the receiver below indicates the method for obtaining maximum sensitivity and lowest noise pickup.
- (1) Connect output meter across voice coil of receiver. Use oxide rectifier type with 0-1 volt scale.
 - (2) Use isolation transformer to keep power line ground off chassis.
 - (3) Use the minimum amount of signal necessary. Keep generator as far away as possible if the shielding is inadequate.
 - (4) Use .4 Volts as reference level.
 - (5) Volume and tone controls set in maximum position.

IF	SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS	ADJUST FOR
	456 KC Approx. 500 Microvolts	C5 section variable and Pin 3 12AV6	Top and Bottom T1 and T2	Maximum Output
RF	SIGNAL GENERATOR FREQUENCY	POSITION OF GANG	CONNECT TO	ADJUST
	1650 KC	Fully Open	Same as for IF Position	C4 Trimmer for maximum output
	540 KC	Fully Closed		Check for range only
	1500 KC	Set for Maximum signal	Spray signal into loopstick using 6 turns across generator output. Couple close enough to get signal	C2-6 Trimmer maximum output
	600 KC	Set for Maximum signal	as above	ADJ .1-2 Slug for maximum

CHECK TRACKING, USING SLICER OR FERRITE STICK AND ALUMINUM PLATE 4" SQUARE



NOTES:
 K - 1000 OHMS
 M - MEGOHMS
 ALL VALUES OF "C" ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 ▽ DENOTES B-
 ▽ DENOTES CHASSIS GROUND

RETMA SOURCE NO 786

PART NO 250-352

SCHEMATIC NO. DC 2989A
 CODE 816-CL

STOCK NO. DC2989A REPLACEMENT PARTS PRICE LIST

When ordering parts, specify stock no., model no., and part no.

Part No.	Description	Approximate Selling Price
R1	180-117	.10
R2	180-107	.08
R3	180-102	.08
R4	180-190	.10
R5	180-148	.08
R6	180-107	.08
R7	180-140	.20
R8	120-141	.08
R9	180-135	.08
R10	180-110	.08
R11	180-111	.08
R12	180-184	.08
R13	180-184	.13
R14	120-136	.80
R15	180-110	.10
R16	180-109	.08
R17	180-159	.10
C1-2-3-4-5-6	Variable Condenser, 3/sec, Planetary	4.66
C7	220 MFD 50V	.16
C8	.05 MFD 200 WV (small)	.22
C9	.1 MFD 200 WV (small)	.34
C10	.022 MFD 400 WV (small)	.20
C11	220 MFD DISC W/O (small)	.16
C12	.01 MFD "K" C-40-400V	.18
C13	.022 MFD, 400 WV (small)	.20
C14	.05 MFD, 400 WV (small)	.28
C15	.05 MFD, 400 WV (small)	.28
C16	.05 MFD, 400 WV (small)	.28
C17A, C17B	Electrolytic 100 X 50 - 150 WV W/Strap	1.76
C18	.1 MFD 200 WV (small)	.34
C19	.022 MFD 400 WV (small)	.20
166-107	PC-50 Couplate tweet filter	.36
L1	Loop Ferrite Rod	1.92
L2	RF Coil (with R4)	1.16
L3	Oscillator Coil (with R3)	1.44
T1	IF Transformer #1	1.28
T2	IF Transformer #2	1.28
T3	Output Transformer	3.20
MISCELLANEOUS		
210-154	Cabinet Shell, Ebony in carton (230-175)	5.20
205-127	Panel Insert Clock	2.20
205-129	Crystal, Clock Insert	.52
205-134	Panel Insert Bar	.74
215-165	Indicator Bar, Tuning Dial	.94
220-158	Knob (Volume & Tone)	.22
220-159	Calibration Disk	.24
220-160	Knob (Tuning Planetary)	.22
170-140	Phono Jack	.16
140-116	No 47 Pilot Light	.25
140-134	Pilot Light Assy.	.48
185-131	Line Cord 16 Gauge 6 ft. Interlock	1.10
175-140	Speaker - PM - 6" x 4"	6.10
125-111	Slide Switch	.36

* Federal Excise Tax included

STOCK NO. DC2989A

This radio can be used for the second channel of a stereo phonograph by having the "pick-up plug" of stereo equipment channel 2 inserted in the Phono-Servo socket provided in the back of the receiver. The "pick-up plug" of

either a phonograph or the second channel stereo can remain attached to the receiver. In order to restore operation as a radio, return phono-radio switch to the right - move bottom volume control clockwise.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

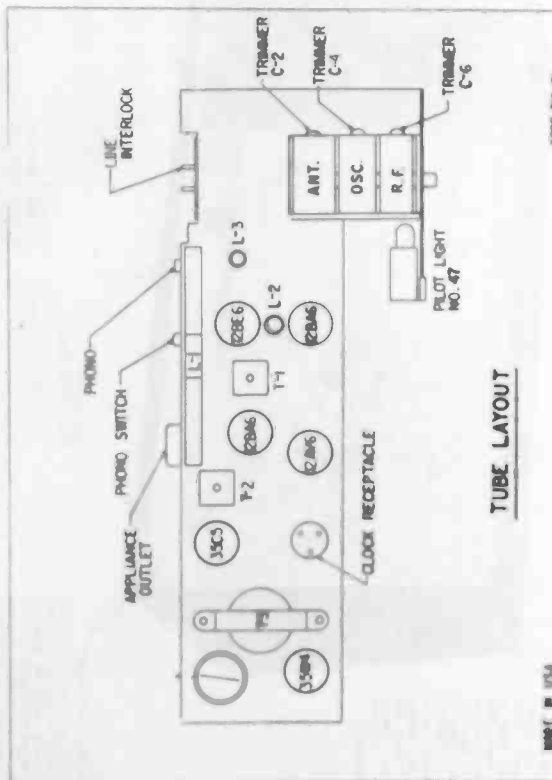
- Power Supply.....117 Volts AC 60 cycles only
- Power Consumption.....As Radio 35 Watts
-With Appliance 1100 Watts maximum
- Frequency Range.....540-1650 Kilocycles
- Intermediate Frequency.....456 Kilocycles
- Sensitivity.....30 microvolts on further loop
- Selectivity.....8 Kilocycles 20 dB output
-10 Kilocycles 30 dB output
- Tuning.....10K 456 Kilocycles
- Speaker.....3 Gang Capacitor 1.2
-4" Alnico 9, Ohm voice coil
- Power Output.....1.5 Watt modulated

TUBE COMPLEMENT

- 12BA6.....RF Amplifier
- 12BE6.....Oscillator and Mixer
- 12BA6.....I.F. Amplifier
- 12AV6.....Detector A.V. C. and 1st Audio
- 35C.....Audio Output
- 35B.....Power Rectifier

TUBES

This receiver is shipped with the tubes in their proper sockets. If for some reason tubes have been removed, make certain they are reinstalled in their proper sockets as shown below.



STOCK NO. DC2989A

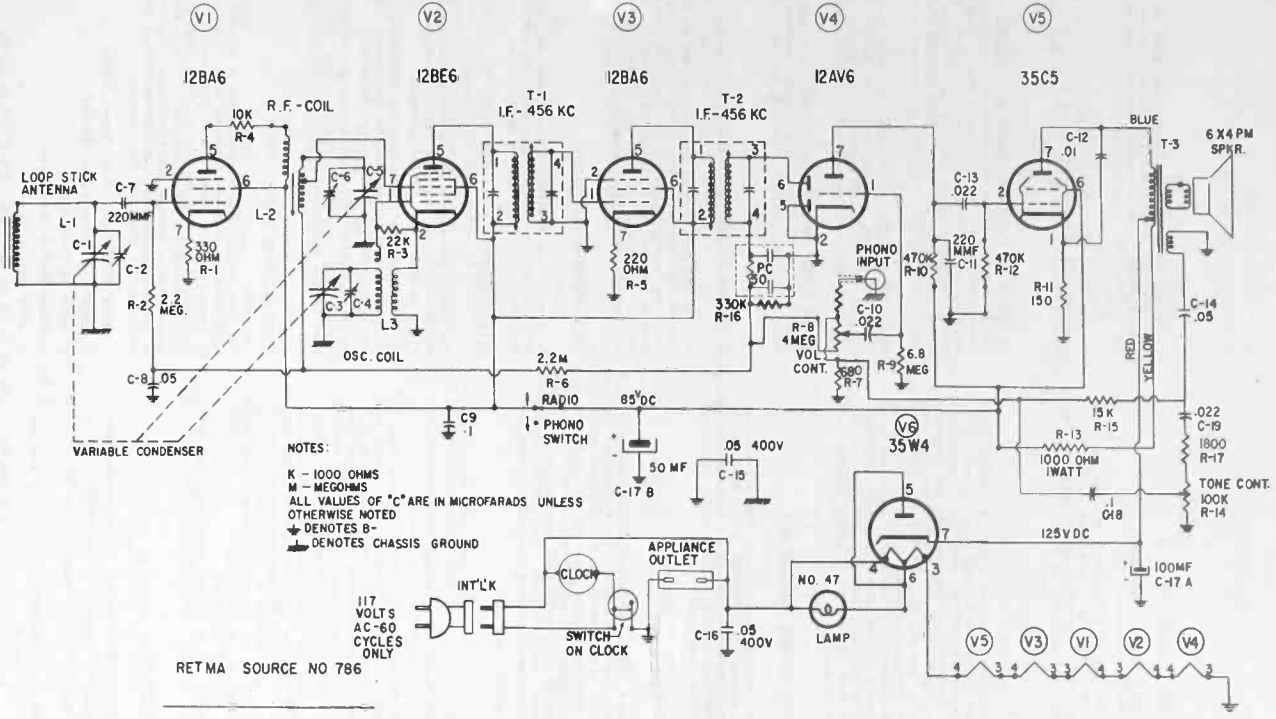
ALIGNMENT PROCEDURE

The alignment of the receiver below indicates the method for obtaining maximum sensitivity and lowest noise pickup.

- (1) Connect output meter across voice coil of receiver. Use outside rectifier type with 0-1 volt scale.
- (2) Use isolation transformer to keep power line ground off chassis.
- (3) Use the minimum amount of signal necessary. Keep generator as far away as possible if the shielding is inadequate.
- (4) Use .4 Volts as reference level.
- (5) Volume and tone controls set in maximum position.

IF	SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS	ADJUST FOR
	456 KC	C5 section variable and Pto 3 12AV6	Top and Bottom T1 and T2	Maximum Output
RF	SIGNAL GENERATOR FREQUENCY	POSITION OF GANG	CONNECT TO	ADJUST
	1650 KC	Fully Open	Same as for IF Position	C4 Trimmer for maximum output
	540 KC	Fully Closed		Check for range only
	1500 KC	Set for Maximum signal	Spray signal into loopstick using 6 turns across generator output. Couple close enough to get signal	C2-6 Trimmer maximum output
	600 KC	Set for Maximum signal	as above	ADJ .L-2 Slug for maximum

CHECK TRACKING, USING SLICER OR FERRITE STICK AND ALUMINUM PLATE 4" SQUARE



NOTES:
 K - 1000 OHMS
 M - MEGOHMS
 ALL VALUES OF "C" ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 * DENOTES B-
 † DENOTES CHASSIS GROUND

RETMA SOURCE NO 786

PART NO 250-352

SCHEMATIC NO. DC 2989A
 CODE 816-CL

STOCK NO. DC2989A
REPLACEMENT PARTS PRICE LIST

When ordering parts, specify stock no., model no., and part no.

Part No.	Description	Approximate Selling Price
R1	180-117	.10
R2	330 Ohms 1/2 Watt 10%	.08
R3	2.2 Megohms 1/2 Watt 20%	.08
R4	22K 1/2 Watt 20%	.10
R5	10K 1/2 Watt 10%	.10
R6	220 Ohms 1/2 Watt 10%	.08
R7	2.2 Megohms 1/2 Watt 20%	.20
R8	680 Ohms 1/2 Watt 5% Critical	.08
R9	4 Megohms Volume Control no switch	.08
R10	470K Ohms, 1/2 Watt, 20%	.08
R11	150 Ohms, 1/2 Watt, 20%	.08
R12	470K Ohms, 1W, WW, 10%	.18
R13	1000 Ohms, 1W, WW, 10%	.18
R14	Tone Control, 100 K Ohms	.80
R15	15K Ohms, 1/2 Watt, 10% Critical	.10
R16	330K, 1/2 Watt, 20%	.08
R17	1800 Ohms, 1/2 Watt, 10%	.10
C1	Variable Condenser, 3/Sec, Planetar	4.66
C2	220 MAF Disc 400V	.16
C3	.05 MFD 200 WV (small)	.22
C4	.1 MFD 200 WV (small)	.34
C5	.022 MFD 400 WV (small)	.16
C6	220 MAF DISC 400V	.16
C7	.01 MFD "K" CAP-400V	.18
C8	.022 MFD, 400 WV (small)	.20
C9	.05 MFD, 400 WV, (small)	.28
C10	.05 MFD, 400 WV, (small)	.28
C11	.05 MFD, 400 WV (small)	.28
C12	.05 MFD, 400 WV (small)	.28
C13	Electrolytic 100 x 50 - 150 WV W/Strap	1.76
C14	.1 MFD - 200 WV (small)	.34
C15	.022 MFD - 400 WV (small)	.20
C16	PC-50 Couplate tweet filter	.36
L1	Loop Ferrite Rod	*1.92
L2	RF Coil (with R4)	1.16
L3	Oscillator Coil (with R3)	1.44
L4	IF Transformer #1	1.28
L5	IF Transformer #2	1.28
L6	Output Transformer	*3.20
V1	12BA6	
V2	12BE6	
V3	12BA6	
V4	12AV6	
V5	35C5	
V6	35W4	
T1	T-1 IF-456 KC	
T2	T-2 IF-456 KC	
PC	PC-50 Couplate	
SW	Switch on Clock	
INT'LK	117 Volts AC-60 Cycles Only	
APPL	Appliance Outlet	
LAMP	Lamp	
NO. 47	No. 47 Pilot Light	
SPKR	6 X 4 PM SPKR.	
RESISTORS		
CONDENSERS		
COILS & TRANSFORMERS		
MISCELLANEOUS		

* Federal Excise Tax included

MODEL NOS. DC5992 & DC5994

Instructions for Installation, Operation and Service

GENERAL DESCRIPTION

This high fidelity AM-FM Radio-Phono combination is a ten (10) tube (including rectifier) plus four (4) diodes, chassis. It has a four (4) speed automatic record changer. Controls are provided for tuning, bass, treble, loudness, AM and FM radio separately. Special features include true adaptability to STEREO SPEAKER REPRODUCTION, separate variable tone controls for treble, bass and loudness. A tape input jack; plus a selector switch, which allows the amplifier to be connected in conjunction with the St. Jack, which makes it possible to receive simultaneous AM-FM broadcasts. It has four (4) matched speakers, two (2) 8" woofers and two (2) 3" tweeters that are connected by a crossover network which feeds the highs and lows into the proper speakers. A spindle for playing 45 RPM records automatically without using adapters is included. * This feature functions only when set has been adapted to Stereo Disc Reproduction.

CHECK YOUR LINE VOLTAGE

This radio must be operated on a 105 to 125 volt, 60 cycle AC supply only. If there is any doubt, consult the local power company before inserting the plug.

BROADCAST BANDS - AM-540 to 1620 Kilocycles
FM - 88 to 108 Megacycles

BASE AND TREBLE CONTROLS

By using the two tone controls, bass and treble, the high and low tones can be increased or decreased to suit your individual listening pleasure. To bring out the full richness of the bass instruments turn the bass control clockwise. For the full brilliance of the treble instruments, and for overtones of all instruments, turn the treble control clockwise. See ON-OFF-BASS CONTROL and RECORD CHANGER instructions for other functions of bass control.

ON-OFF-BASS CONTROL

The ON-OFF and BASS CONTROL is operated by the same knob. To turn the set "On", pull up on knob. Allow approximately 30 seconds for tubes to heat. To turn set "Off", push down. This type of control allows the set to be turned on and off without changing a pre-set position of the bass control.

STEREOPHONIC SOUND

This unit is truly adaptable to stereo disc reproduction with the use of an additional amplifier, speaker system and stereo cartridge. A switch is provided on the back of the cabinet for separation of second phono channel and AM radio. Plug a conventional stereo cartridge into the phono input jack. When the switch is in the phono position, the unit is tuned ready for playing stereo records. This unit has two stereo channels, both an AM and an FM broadcast simultaneously. When both an AM and an FM station are broadcasting the two channels of a stereophonic recording, it will be possible to use the set as a stereophonic receiver. Turn the Hi-Fi selector Switch to "FM". Tune the

FM program as usual on the Hi-Fi set. Tune the AM program with the "AM" dial but adjust the volume and when this set is controls on your second amplifier. When this set is controls for stereophonic sound, it is also possible to receive FM program in one room while receiving an AM program on the remote speaker unit in another room.

FM RADIO OPERATION

First turn set "ON" as outlined in "ON-OFF-BASS" CONTROL. Then turn SELECTOR knob to FM position, tune desired FM station using the FM DIAL knob, turn SELECTOR knob to AFC position which automatically locks the station in and keeps it from drifting. Adjust the BASS and TREBLE controls to the most pleasing balance.

FM ANTENNA

Intervening hills or other obstructions may reduce the signal strength in your area. If you are within the normal range of an FM Station and do not get good reception, it may be necessary to use an outdoor FM Antenna. It is advisable also to use the outdoor Antenna in noisy areas or when reception from greater distances is desired.

The built-in Air Wave FM Antenna is usually adequate for reception of FM signals of normal strength within a line of sight distance of 30-40 miles from the broadcasting station.

Connections for the outdoor FM Antenna are provided on the back of the set.

AM RADIO OPERATION

First turn set "ON" as outlined in "ON-OFF-BASS" CONTROL. Then turn SELECTOR knob to AM position, tune to desired AM station using the AM DIAL knob. Set the BASS and TREBLE control to the most pleasing balance.

AM ANTENNA

The built-in Air Wave Antenna is sufficient for receiving local and powerful distant stations. To receive less powerful or more distant stations, attach an AM Antenna to the AM antenna terminal on the back of the set. The use of the antenna also will improve reception in noisy locations.

THE CHASSIS SPECIFICATIONS

POWER SUPPLY - 117 V.A.C. 60 Cycles-Radio 75 Watts

FREQUENCY RANGES - AM-540 to 1620 KC

FM - 88 to 108 MC

I. F. FREQUENCY - AM - 455 KC FM - 10.7 MC

AMPLIFIER FREQUENCY RESPONSE - 30 - 17,000 Cycles

POWER OUTPUT - 17 watts maximum.

8 watts at less than 1% distortion.

LOUDSPEAKERS - 2, 8" woofers and

2, 3" tweeters.

TUBES - Ten (10) including rectifier plus four Diodes.

Two 6BQ6 tubes are used for Push-Pull output.

RECORD CHANGER - 1210A-132

CARTRIDGE - ASTATIC-DUAL SAPPHIRE #89TB Powerpoint

NOTE: The needles on this cartridge are not replaceable, as the cartridge, therefore, to replace the complete cartridge when a needle is worn.

THE SPEAKERS

The four (4) permanent magnet speakers used in this reproducer are designed for optimum speaker performance. The speaker system consists of one eight inch "woofer" designed to reproduce the low frequencies and another eight inch speaker to reproduce the "mid-range" frequencies and two (2) 3" "tweeters" reproduce the high frequencies and are spaced to aid in proper sound dispersion. All are connected by a crossover network as explained in General Description. In addition, an attenuated speaker jack is located on the back of the set to which an additional speaker may be connected.

CONELRAD (CIVIL DEFENSE INFORMATION)

When broadcast stations must leave the air because of a national emergency, CONELRAD (Civil Defense Information) will be broadcast. This information is broadcast on 640 or 1240 Kc indicated by the Civil Defense symbol on your radio dial.

THE RECORD CHANGER

This four speed (16-33-45-78) TONE automatic record changer has been especially engineered for the reproduction of both monaural and STEREO records. It maintains constant speed when records are changed. Balanced turntable has records of the same speed. Interchangeable tone arms, operating on a noise-free motor. Muting switch. The changer automatically after the last record has been played.

LOADING

1. Lift record support arm clear of center spindle and swing it all the way to the right.
2. Place records on the spindle, allowing them to rest against the felt. Steady records with one hand and swing pickup arm back to center. Ten and twelve inch records are provided all are of the same speed. Use 45 RPM spindle or record adapter discs in all 45 RPM records.
3. The power point cartridge contains two needles. Standard 78 RPM records require one needle and long playing 16, 33-1/3 and 45 RPM require another needle. To change from one needle to the other, push the lever on the side of the tone arm downward and under to the other side of the tone arm.

NOTE: When needle is in proper position, the lever will read "78" or "LP" (Long Play Records).

AUTOMATIC OPERATION

1. Turn the MOTOR SPEED control to the proper speed.
2. Turn the SELECTOR control to the PHONO position.
3. Turn the RECORD CHANGER control to "REJ." and release.
4. Adjust TONE and LOUDNESS controls to the most pleasing tonal balance.

5. To turn changer off before the last record has been played, remove any remaining records, return support arm to center and turn record changer control to "REJ." position and release.

Be sure to push ON-OFF-BASS Control all the way down when through playing records of radio, and turn the changer speed selector to the "5-78" position.

IF MECHANISM FAILS TO CHANGE NEXT RECORD - An old record may not have the eccentric recording groove needed for automatic changing. Home recordings and some 7 inch 78 RPM (children's records) will not change automatically. Should one of these records be in the stack, turn the RECORD CHANGER Control to "REJ." and release, to start the automatic cycling.

TO REJECT A RECORD - If you do not want to hear the record that is playing turn the RECORD CHANGER Control to "REJ." and release. The pickup arm will lift and the next record will drop into position.

MANUAL OPERATION - By leaving the record support arm in its place at left of the changer instead of putting it on the spindle, records may be played manually.

EXTENSION SPEAKER (Optional)

To play the speakers in the console and the extension speaker at the same time, place phono plug in the extension speaker jack all the way. To play the extension speaker only, place the switch to extension speaker only, remove the extension speaker plug.

TAPE RECORDER (Optional)

To play a tape recorder through your set, place the selector switch to the "Tape" position and plug tape recorder into input jack on back of set.

MAINTENANCE

The pickup arm of the record changer may be moved in any direction at any time without damaging the eye-cycling mechanism or the adjustments.

If the pickup arm should fail to function or neglect to cycle, your records may be the cause. Some records are not standard or are imperfect. Some records are noisy scratching while the phonograph is playing indicates worn records or needles. Some records will last longer than others, even though all are given the same use.

TUBES AND DIAL LAMPS

The type designation of each tube is stamped on the tube. The position in which the tubes must be installed are shown on the position illustration. All tubes must be in their correct position to operate the radio. Use only No. 12 dial lamps for replacement of burned out dial lamps. Use only a GE No. 47 for replacement of the indicator lamp, located in the front of the cabinet.

- 1 6AQ6/ECC85 used with Tuner #1023
- 1 6DT8 used with Tuner #1023A
- 1 6BE6 AM Converter
- 1 6BA6 AM-I-F Amplifier
- 1 6AV6 1st Audio

MODEL NOS. DC5992 & DC5994

ALIGNMENT PROCEDURE AM STAGES

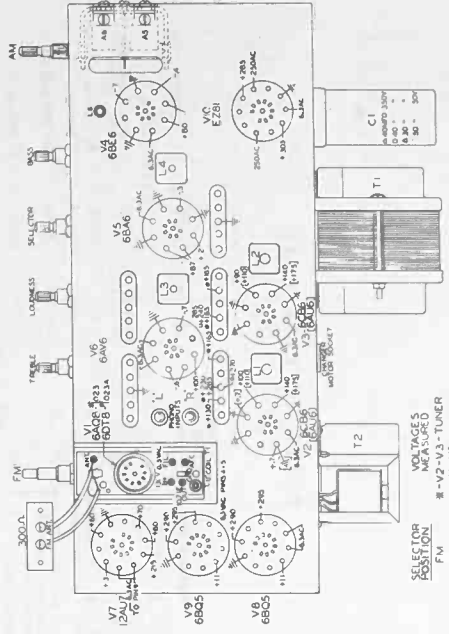
The following is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output indicating Meter, Non-Metallic Screwdriver, Dummy Antenna--1 mf. Volume Control Maximum all Adjustments.

FREQUENCY SETTING	SIGNAL GENERATOR CONNECT TO	DUMMY ANTENNA	GANG SETTING	ADJUST FOR	NOTES
455KC	Pin 7 (Control Grid) of V-4	.1 MFD	Open	A7-A8 Output	Connect Radio Chassis to ground post of Signal Generator with a short heavy lead.
1620KC	Yellow Wire on L5	1.0MF*	Open	A6 Output	Allow Chassis and Signal Generator to "heat up" for 15 minutes.
1400KC	Yellow Wire on L5	1.0MF*	Max. Output 1400KC	A5 Output	* 2 Turns insulated wire may be used

FM STAGES

The following is required for aligning:
An accurately calibrated Signal Generator providing unmodulated signals at the test frequencies listed below.
Non-Metallic Screwdriver.
Dummy Antennas and I-F Loading Resistor--5000 mmf.

FREQ.	SIGNAL GENERATOR OUTPUT TO	DIAL SETTING	CONNECT TO	ADJUST FOR	NOTES
10.7 MC	Pin 1 V-2	Extreme Clockwise Rotation	Junction of C10 & R9	Maximum Voltage	Adjust input signal for 1.5 to 3. volts deflection
10.7 MC	Pin 1 V-2	Extreme Clockwise Rotation	Junction of C14 & R13	0. Volts (Balance)	
100 MC	Ant. Terminal	Tune for 300 OHM	Junction of C10 & R9	Maximum Voltage	Rock tuner while making this adjustment



MODEL NOS. DC5992 & DC5994

- CUSTOMERS may order all replacement parts from any Western Auto Store or Associate Store. Each store has an up-to-date price list on replacement parts.
- Company and Associate Stores may order any part shown in any Western Auto Replacement Parts and Price Lists from these Parts Warehouses:

Western Auto Parts Warehouse
2610 Grand Avenue
Kansas City 8, Missouri

Western Auto Parts Warehouse
1227-29 First Avenue South
Birmingham, Alabama

Western Auto Parts Warehouse
1217 Alhambra Avenue
Sacramento, California

Western Auto Parts Warehouse
3142-44 West Liberty
Pittsburgh, Pennsylvania

CARE AND MAINTENANCE

This instrument has been designed and constructed to render trouble-free performance with a minimum of care or maintenance and under normal conditions will not require any special attention. If reception is poor, the radio will not operate, the following action is recommended:

- Be sure the radio is connected and operated as described in this folder.
- See if there is power at the wall outlet by disconnecting radio and connecting a lamp to the same outlet.
- If radio programs cannot be tuned in when the tuning knob is rotated, note if the SELECTOR is turned to the position you wish to have function.
- Check for a corroded or loose connection on the indicator lamp (if one is used) and be sure it is not grounded.
- Inspect tubes to be sure each is firmly seated in its socket. If not, first disconnect the power cord from wall outlet.
- A tube may be faulty. A qualified radio serviceman will test the tubes. Improper tube insertion or a defective tube may result in serious damage. Do not install an tube into a miniature type tube socket. Line up the tube prongs with the holes in the socket and then gently push the tube down until it is held firmly in the socket.
- The cabinet has a rubbed and waxed finish. Care for it as you would any other piece of fine furniture. Remove film or dust and restore original lustre by merely wiping the cabinet with a polishing cloth. CAUTION - Do not place the set too near a hot radiator or where it will be exposed to direct sunlight.
- If performance is still unsatisfactory, get in touch with the store or dealer from whom the set was purchased.

HOW AND WHERE TO ORDER REPLACEMENT PARTS

To eliminate error and to speed delivery of replacement parts always include the following information on your order.

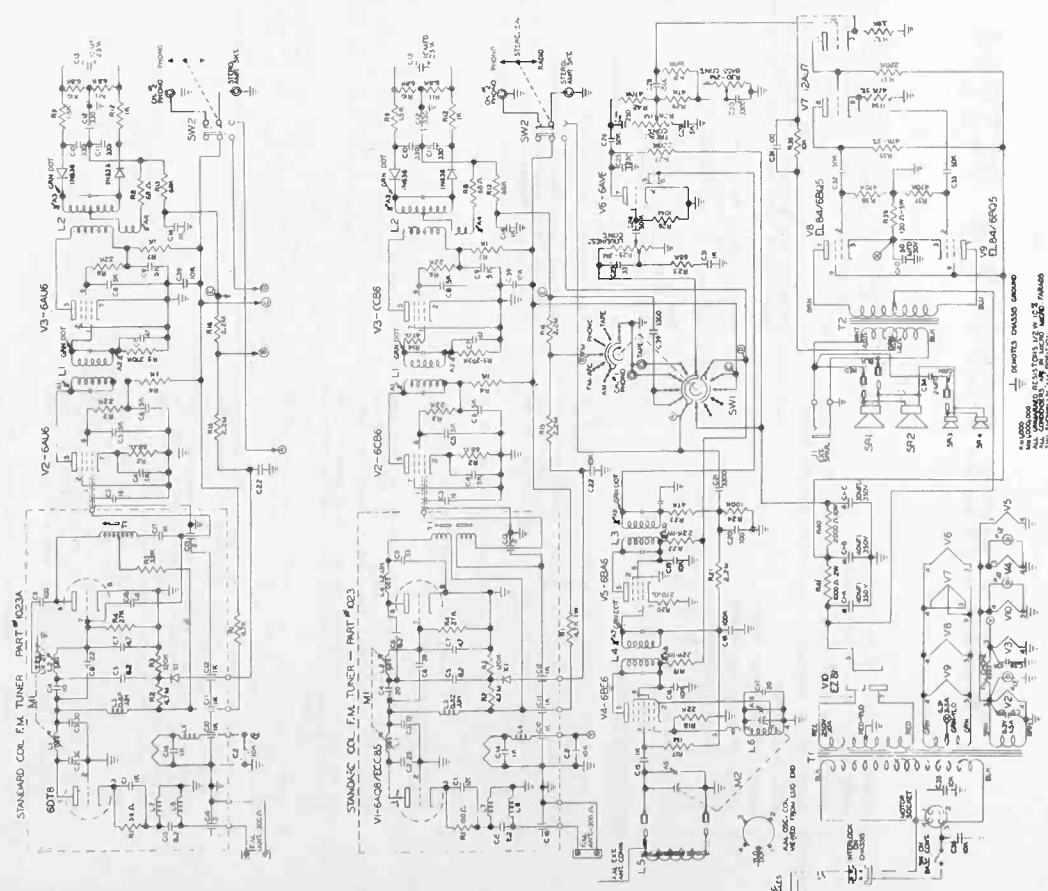
- Complete identification of the Radio-Phonograph for which the part is wanted.
 - (a) Name Item Phonograph
 - (b) Model Number-DC5992 Mahog. DC5994 Oak
 - (c) Serial Number

- Best possible identification of the part itself.
 - (a) Part Number
 - (b) Part Name
 - (c) If necessary, return the old part as sample.

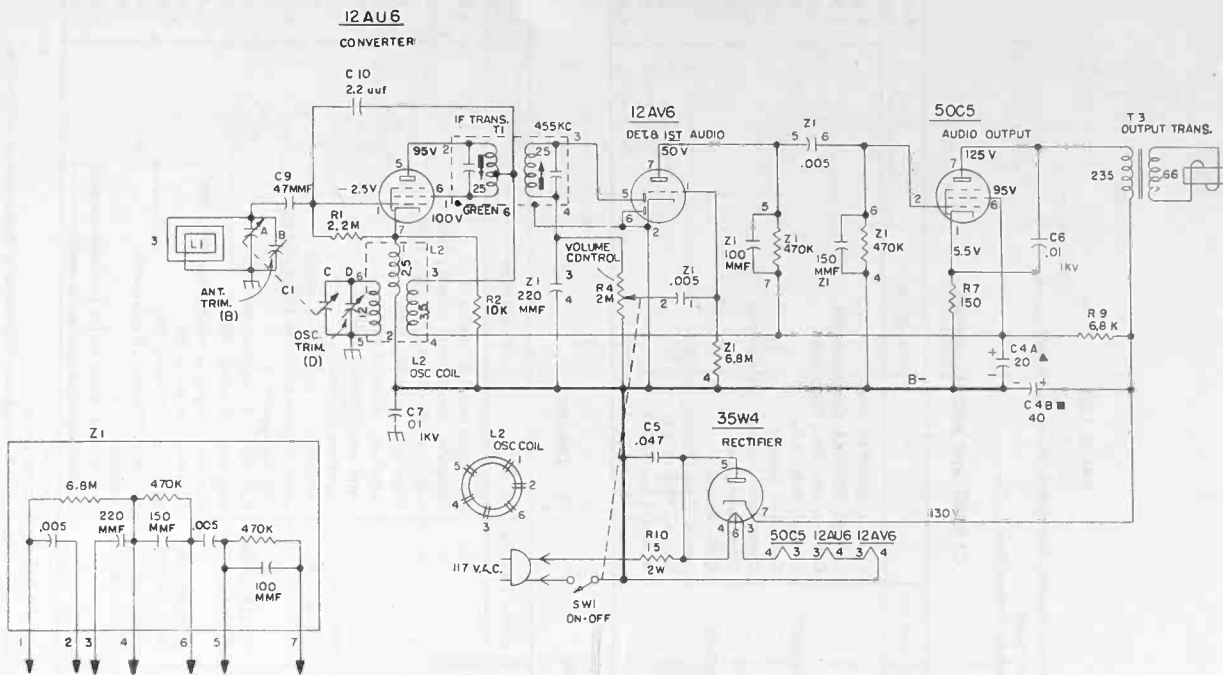
MODEL NOS. DC5992 & DC5994

PARTS & PRICE LIST

REF. NO.	PART NO.	DESCRIPTION	APPROX. SELLING PRICE	REF. NO.	PART NO.	DESCRIPTION	APPROX. SELLING PRICE
L4	1405	TRANSFORMERS & COILS		C1-A, C1-B, C1-C, C1-D	1032	CONDENSERS	
L3	1406A	455KC I.F.		C2	819B	Filter Condenser 40-40	3.00
L1	1413	455KC I.F.	1.00	C18	804	.01 Discap w/Tuner	.14
L2	1414	10.7 MC I.F. (Automatic 2607-5 or equivalent)	1.32	C39, C36, C32, C35	828A	.1 MFD/200 V	.16
L6	1401A	AM Osc. Coil	.52	C13	916	.05 MFD/400 V	.22
T1	1108	Power	10.20	C35, C36	911	10 MFD/25 V	.68
T2	1212	Output	4.06	C39	917	.01 MFD Discap	.14
R30	423	2 Meg. Bass Control	1.16	C16, C19, C22, C37, C38, C39	819B	.0033 MFD/600 V	.16
R25	401E	Volume Control	.68	C4, C5, C6, C8, C9, C29	906	.01 MFD Discap	.15
R28	421	1 Meg. Treble Control	.64	C17	845	.005 MFD Discap	.12
R40	642	RESISTORS		C14, C15, C31	832	20UUF N750 10% Discap	.12
R39	643	2K 10W 10%	.30	C10, C11, C12	839	.001 MFD Discap	.08
R41	648	130 Ohm 5W 10%	.24	C25, C27	817	330 MMFD	.08
R1	646	1000 Ohm 2W 10%	.24	C20, C31	826	250 MMFD Discap	.16
R19, R22	647	4700 Ohm 1W 10%	.12	C7	843	100 MMFD Discap	.12
R2, R8	551A	22K 1W 10%	.14	C23	908	47 MMFD Discap	.12
R14	520	68 Ohm 1/2W 10%	.08	C3	846A	33 MMFD Discap	.12
R20	546	47 Ohm 1/2W 20%	.06	C34	830A	18 MMFD Discap 5%	.14
R4, R7, R12	539A	270 Ohm 1/2W 10%	.08			Unpolarized Lytic	.84
R9	559	1000 Ohm 1/2W 10%	.08			MISCELLANEOUS	
R32	556A	1500 Ohm 1/2W 10%	.08	L5	1512E	Loop Ant.	1.66
R10, R11	549A	3900 Ohm 1/2W 10%	.08		2640	8" Speaker	6.96
R36	522	6800 Ohm 1/2W 10%	.08		2640A	8" Speaker	8.00
R3, R6, R18	517	10K 1/2W 20%	.06		2641	3 1/2" Speaker	3.76
C28	821	22K 1/2W 20%	.06		1651	Dial Plate	3.60
R23, R29	523A	1500 MFD Discap	.16		2457	AM Tuning Knob	.38
R34, R35	523B	47K 1/2W 5%	.08		2457A	AM Dial Skirt	.42
R13, R25	547A	47K 1/2W 10%	.14		2458	FM Tuning Knob	.42
R24	507A	68K 1/2W 10%	.08		2458A	FM Dial Skirt	.42
R31	508	100K 1/2W 10%	.08		2436	Aux. Knobs	.14
R27, R33	511A	180K 1/2W 20%	.08	SW2	1892A	DPTT Slide Switch	.28
R5	529A	220K 1/2W 10%	.08	M2	1024	AM Tuning Geng	2.88
R4, R2, R37, R28	502A	270K 1/2W 10%	.08	SW1	420A	4 Pole 5 Position Switch	2.40
R17	516	470K 1/2W 10%	.08		1023	FM Tuner (w/6A08)	
R15, R16, R21	615	1 Meg. 1/2W 20%	.06		1023A	FM Tuner (w/6D78)	
R26	530	2.2 Meg. 1/2W 20%	.06				



John F. Rider



NOTE:

1. ALL RESISTANCE VALUES IN OHMS & ALL CAPACITANCE VALUES IN MF UNLESS OTHERWISE SPECIFIED.
2. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING V.T.V.M. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ± 20%.
3. CHASSIS GROUND \perp COMMON B - \perp

CHASSIS NO. V 2239-7

FIGURE 1. SCHEMATIC DIAGRAM

MODELS
H-629T4A
 (Ivory)
H-630T4A
 (Carnation Pink)
H-631T4A
 (Light Green)
 Chassis V-2239-7

Westinghouse
SERVICE MANUAL
 radio

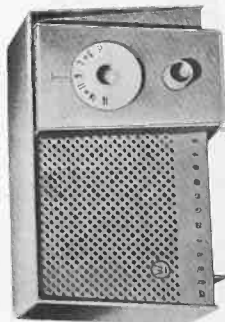


SERVICE DEPARTMENT • TELEVISION-RADIO DIVISION
 WESTINGHOUSE ELECTRIC CORP. • METUCHEN, N. J.



SPECIFICATIONS

Frequency Range	540 to 1600 Kc.
Intermediate Frequency	455 Kc.
Tube Complement:	
1 12AU6	Converter
1 12AV6	Det., AVC and 1st AF Amp.
1 50C5	Output Amp.
1 35W4	Rectifier
Power Output:	
Undistorted	0.9 watts
Maximum	1.5 watts
Loudspeaker	4" PM
Operating Voltage	105 to 120 volts, 50-60 cycle AC or DC
Power Consumption	.30 watts



PRINTED BOARD REMOVAL

1. Remove the front control knobs.
2. Remove the screw located above the tuning shaft (this screw mounts the printed circuit board to the front of the cabinet).
3. Remove the two self-tapping screws from the back of the cabinet.
4. Remove the back cover. Be careful not to break the two leads from the antenna loop to the chassis.
5. Loosen the metal band securing the speaker leads to the speaker to provide slack in the leads.
6. Carefully slide the printed board out from the rear of the cabinet (the printed board is held secure in the cabinet by a top and bottom channel molded into the cabinet).
7. Use a conventional TV AC interlock line cord to power the radio while servicing. It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer. While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to weakest usable signal level.

Step	Connect Signal Generator To -	Signal Generator Frequency	Radio Dial	Connect V.T.V.M. Across Voice Coil and Adjust for Maximum Output -
1.	Stator of ant. tuning capacitor through a 200 mmf capacitor	455 kc.	minimum capacity	Top and bottom slugs of T1.*
2.	Radiated signal	1625 kc.	minimum capacity	Oscillator trimmer (D)
3.	Radiated signal	1400 kc.	1400 kc.	Antenna trimmer (B)

*It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

PARTS LIST

When ordering parts, specify part number, description and model number of set.

CABINET AND MISCELLANEOUS

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
†		558V120H02		Background, foil	.40
		513V017H01		Cabinet, H-632T5A (Mocha & White)	7.95
		513V017H02		Cabinet, H-633T5A (Turquoise & White)	7.95
		V-15765-1		Contact, male	.10
		751V000A01	770V415H01	Cord, AC power (snap-in)	1.12
		V-3219		Cord, dial stringing, 100' spool	1.57
		558V083H06		Dial	.45
†		558V185H01		Dial-background	.15
†		558V153H02		Front, cabinet	2.75
†		783V061H01		Insert, special	.35
		550V082H01		Knob, tuning and volume	.35
		756V501H02		Lamp, pilot lamp, # 1847	.22
		558V089H01		Pointer	.05
		761V075H56		Screw, 3/8" (mounts cabinet)	.40
		783V055H06		Shaft, tuning	.20
		751V513H01		Socket, 7 pin (50C5)	.17
		751V513H04		Socket, snap-in (35W4)	.17
		751V513H05		Socket, snap-in (12BE6 & 12BA6)	.45
		751V546H01		Socket, snap-in (12AV6)	.80
		751V529H01		Socket, dial light	8.75
		570V051H01	770V250H03	Speaker, 10" x 2 5/8" PM (includes T3)	.10
†		V-6795-3		Spring-dial drive	.05
		763V000H24		Washer, "C" tuning shaft	

CHASSIS PARTS LIST

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
	C1	330V011H01		Capacitor, variable	Tuning	3.20
	C2	210V111H05		Capacitor, .05 mfd, 200V	AVC bypass	.27
	C3	215V300H03		Capacitor, .01 mfd, ceramic	B- to bracket	.35
	C4	215V104A72	R2CC63Y5Y472M	Capacitor, .0047 mfd, ceramic	Tone compensation	.17
	C5	215V306H03		Capacitor, .01 mfd, 1.4KV, ceramic	Audio output	.22
	C6A	218V043H01		Capacitor, 50 mfd, 150 V, Electrolytic	Filter	1.57
	C6B	218V043H01		Capacitor, 50 mfd, 150 V, Electrolytic		
	C7	210V204A73	RCP10W6473M	Capacitor, .047 mfd, 400V aux. outlet	Line by-pass	.40
	L1	317V006H06		Loop (includes bracket & coil)	Antenna	1.40
	L2	230V004H02		Coil	Oscillator	.95
	R1	250V222A23	RC20AE223K	Resistor, 22K ohms, 1/2W	Osc. grid	.06
	R2	250V231A01	RC20AE101M	Resistor, 100 ohms, 1/2W	1st IF bias	.05
	R3	250V223A35	RC20AE335K	Resistor, 3.3 megohms, 1/2W	AVC filter	.09
	R4	270V039H01		Control, 500K (includes SW1)	Volume	1.70
	R5	250V226A83	RC20AE683K	Resistor, 68K ohms, 1/2W	Tone compensation	.05
	R6	250V221A81	RC20AE181K	Resistor, 180 ohms, 1/2W	Bias audio output	.10
	R7	250V331A52	RC30AE152M	Resistor, 1.5K ohms, 1W	Supply filter	.10
	SW1	270V039H01		Switch, Push-pull (includes R4)	AC off-on	1.70
	T1	V-15547-1	235V023H11	Transformer, IF	1st IF	1.57
	T2	V-15547-1	235V023H12	Transformer, IF	2nd IF	1.57
	T3	570V051H01		Transformer, audio (includes speaker)	Audio output	8.75
†	Z1	219V001H01		Couplate	Audio detector	.95

† New part number listed for the first time in Westinghouse television or radio service information.

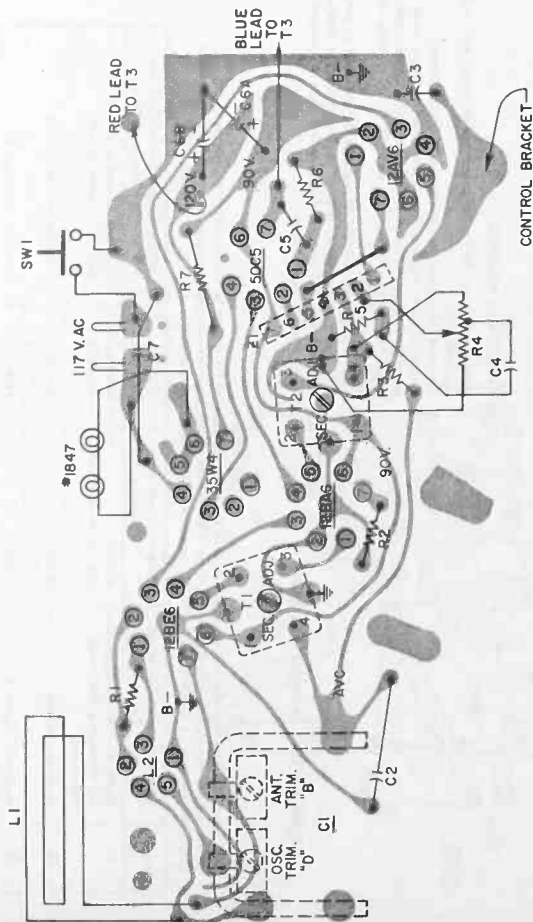


Figure 3 - Bottom view of chassis

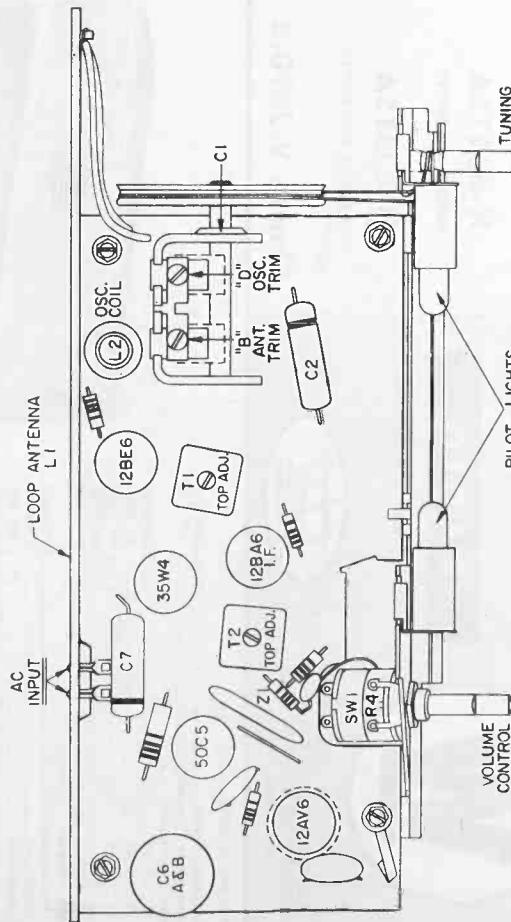
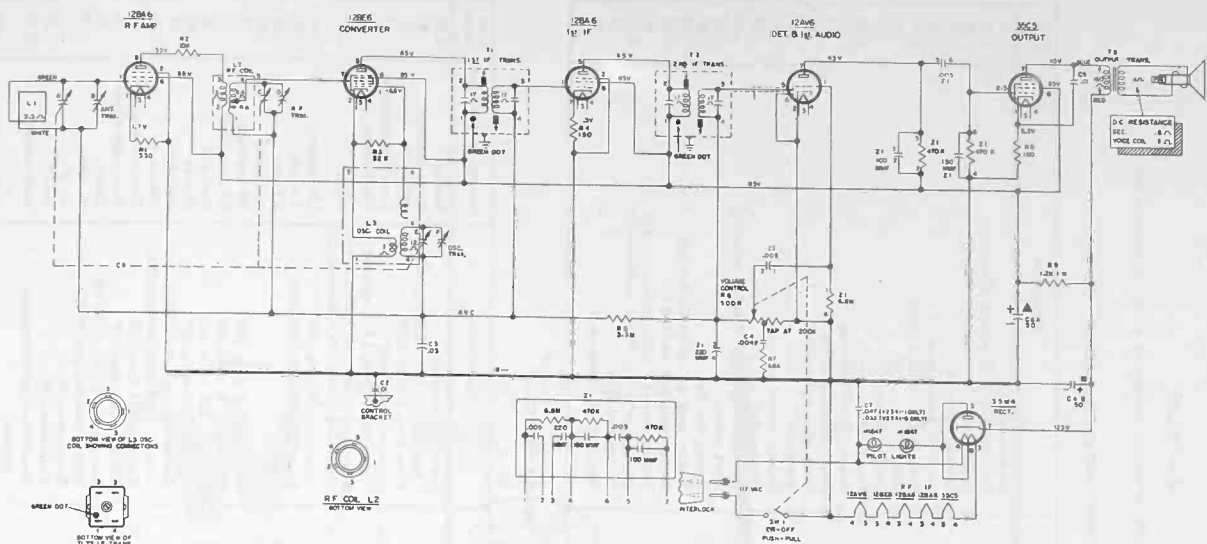


Figure 4 - Top view of chassis



NOTE: 1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A K.T.V.M. LINE VOLTAGE SET AT 117V.A.C. READINGS SHOULD BE $\pm 20\%$. TUNING CAPACITOR TUNED OFF STATION.
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.

FIGURE 2 - SCHEMATIC DIAGRAM

ALIGNMENT PROCEDURE

It is recommended that the chassis be isolated from the power line by means of an isolation transformer. While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action. *It is recommended that a fiber alignment tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

STEP	CONNECT SIGNAL GENERATOR TO	SIG. GEN. FREQ. MOD. 400 CYCLES	RADIO DIAL SETTING	V.T.V.M. ACROSS VOICE COIL ADJUST FOR MAX. OUTPUT
1	Pin No. 7 of the 12BE6 through a 200 mmf. cap.	455kc	minimum cap.	Top & bottom slugs of T2 and T1 in order given.*
2	Stator of antenna tuning capacitor (A) through a 200 mmf. capacitor	1625kc	minimum capacity	Oscillator Trimmer (F)
3	Same as Step 2	1400kc	1400kc	RF Trimmer (D)
4	Radiated signal	1400kc	1400kc	Antenna Trimmer (B)

Westinghouse

RADIO

SERVICE MANUAL

Publication

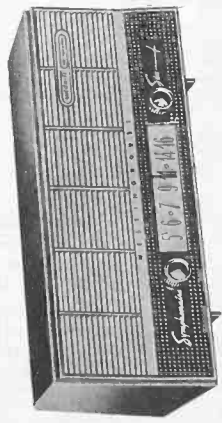
MODELS

H-636T6A (Ivory and white)

H-637T6A (Coral and white)

Chassis V-2391-6

SERVICE DEPARTMENT
RADIO-TELEVISION DIVISION
WESTINGHOUSE ELECTRIC CORP.
METUCHEN, N. J.



SPECIFICATIONS

Frequency Range	540 to 1600 Kc.
Intermediate Frequency	455 Kc.
Tube Complement:	
1 12BA6	RF Amp.
1 12BE6	Converter
1 12BH6	IF Amp.
1 12AV6	Det., AVC and 1st AF Amp.
1 35C2	Output Amp.
1 35Y4	Rectifier
Power Output:	
Undistorted	0.9 watts
Maximum	1.5 watts
Loadspeaker:	10" x 2 5/8" PM
Operating Voltage	105 to 120 volts, 50-60 cycle AC or DC
Power Consumption	35 watts

PRINTED BOARD REMOVAL

1. Remove the two 3/8" screws located at either end of the cabinet rear.
2. Remove the screw on the bottom of the cabinet.
3. Separate the cabinet front from the cabinet back to expose the radio chassis. (The two 3/8" screws can be used to do this by pushing on both at same time).

4. Use a conventional TV AC interlock line cord to power the radio while servicing. It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

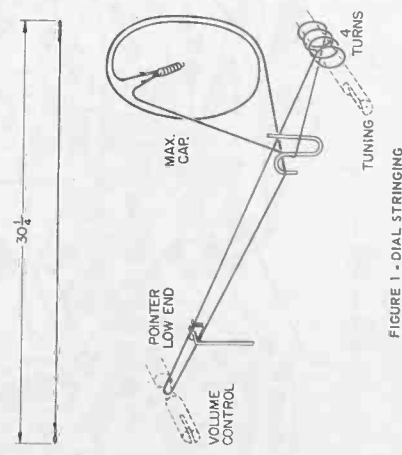


FIGURE 1 - DIAL STRINGING

PARTS LIST

When ordering parts, specify part number, description and model number of set.

CABINET AND MISCELLANEOUS

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
		538V120H02		Background, foil	.40
		513V017H04		Cabinet, H-63T6A (Ivory & White)	7.95
		513V017H05		Cabinet, H-63T6A (Coral & White)	7.95
		V-15765-1		Contact, Male, AC	.10
		751V000A01	770V415H01	Cord, AC power (snap-in)	1.12
		V-3219		Cord, dial string (100' spool)	1.57
		538V083H05		Dial background	.85
		538V185H01		Front, cabinet	.15
		538V153H01		Insert, cabinet mounting	3.00
		783V061H01		Knob, volume & tuning	.35
		550V082H01		Lamp, pilot light, # 1847	.22
		756V501H02		Nameplate	.27
		538V088H01		Palnut, control	.05
		V-5353-2	767V002A01	Pointer, dial	.22
		538V089H01		Screw, hex head, 3/8" (Cabinet mounting)	.05
		761V809H01		Shaft, tuning	.40
		783V053H06		Socket, dial light	.80
		751V529H01		Socket, snap-in 7 pin (35C5 & 35W4)	.17
		751V513H04		Socket, snap-in 7 pin (12BA6)	.17
		751V513H05		Socket, snap-in 7 pin (12BE6 & 12AV6)	.45
		751V546H01		Speaker, 10" x 2 5/8" PM (includes T3)	8.75
		570V051H01	770V250H03	Spring, dial drive	.10
		V-6795-3		Washer, "C" (tuning shaft)	.05
		763V000H24			

CHASSIS PARTS LIST

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
C1		330V012H01		Capacitor, variable	Tuning	4.90
C2		215V300H03		Capacitor, .01 mfd, 1KV, ceramic	B - to bracket	.35
C3		210V111H05		Capacitor, .05 mfd, 200V	AVC to B -	.27
C4		215V104A72		Capacitor, .0047 mfd	Tone Compensation	.17
C5		215V306H03		Capacitor, .01 mfd, 1 KV, ceramic	Audio output	.22
C6A		218V043H01		Capacitor, 50 mfd, 150 V, Electrolytic	Filter	1.57
C6B		210V213A33		Capacitor, 50 mfd, 150 V, Electrolytic	Line bypass	.40
L1		317V006H06		Capacitor, .033 mfd, 600V	Antenna	1.40
L2		230V037H01		Loop (includes mag. brackets)	RF amp	1.00
L3		230V004H02		Coil	Oscillator	.95
R1		250V223A31		Resistor, 330 ohms, 1/2W	RF amp bias	.05
R2		250V221A03		Resistor, 10K ohms, 1/2W	RF plate load	.05
R3		250V222A23		Resistor, 22K ohms, 1/2W	Osc. grid	.06
R4		250V221A51		Resistor, 150 ohms, 1/2W	IF bias	.05
R5		250V223A55		Resistor, 3.3 megohms, 1/2W	AVC filter	.09
R6		270V039H01		Control, 500K ohms (includes SW1)	Volume	1.70
R7		250V226A83		Resistor, 68K ohms, 1/2W	Tone compensation	.05
R8		250V321A22		Resistor, 180 ohms, 1W, 10%	Audio output bias	.10
R9		270V039H01		Resistor, 1.2K ohms, 1W, 10%	Filter	.12
SW1		V-15547-1	235V023H01	Switch, push pull (part of R6)	AC off-on	1.70
T1		V-15547-1	235V023H01	Transformer, IF	1st IF	1.57
T2				Transformer, IF	2nd IF	1.57
T3		570V051H01		Transformer, audio (includes speaker)	Audio output	8.75
Z1		219V001H01		Couplate	Audio coupling	.95

† New part number listed for the first time in Westinghouse television or radio service information.

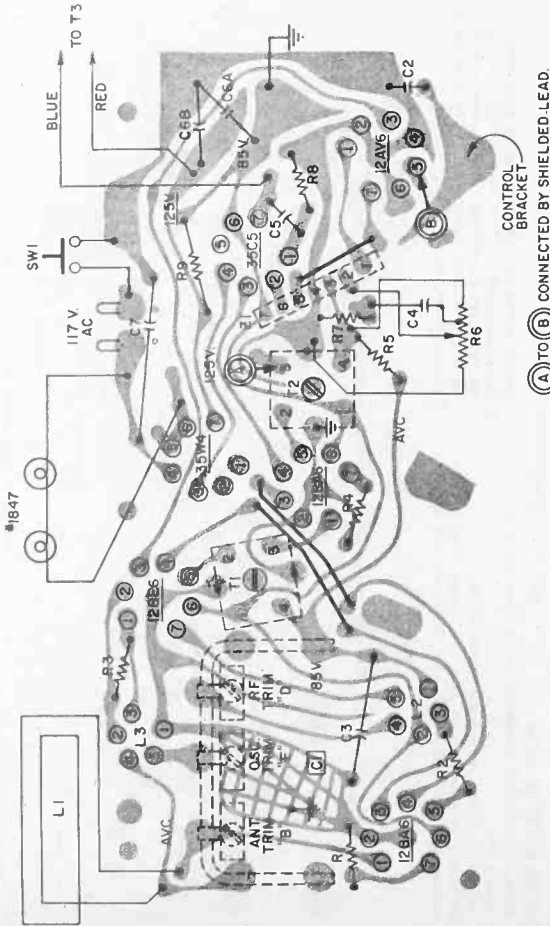


FIGURE 3 - BOTTOM VIEW OF CHASSIS

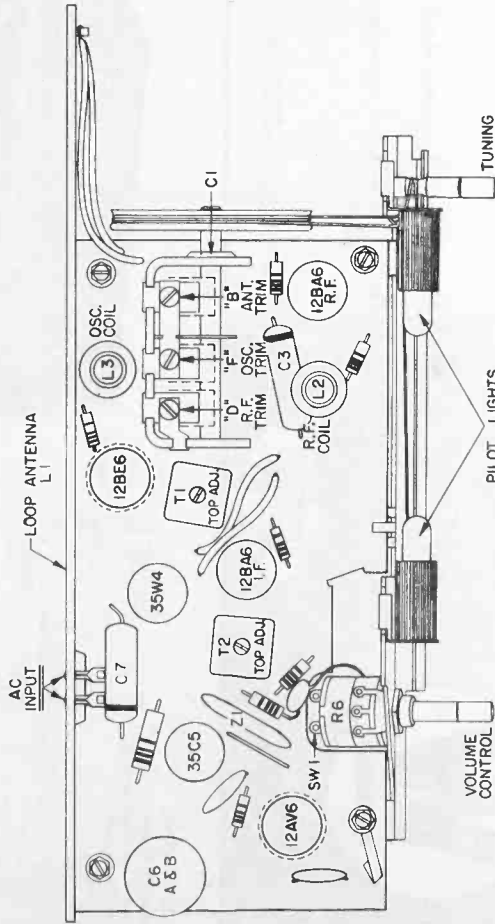


FIGURE 4 - TOP VIEW OF CHASSIS



Westinghouse

SERVICE MANUAL

radio



SERVICE DEPARTMENT • TELEVISION-RADIO DIVISION
WESTINGHOUSE ELECTRIC CORP. METUCHEN, N. J.

MODELS

H-649T7

(Ivory)

H-650T7

(Charcoal)

CHASSIS V-2392

SPECIFICATIONS

OPERATING VOLTAGES	105 to 120 volts DC or 50 to 60 cycles AC
POWER CONSUMPTION	37 Watts
POWER OUTPUT	
Maximum	2.5 Watts
Undistorted	1.5 Watts
TUNER FREQUENCY RANGES:	
AM	540 to 1600 kc
FM	88 to 108 mc
INTERMEDIATE FREQUENCIES	
AM	455 kc
FM	10.7 mc



TUBE COMPLEMENT

12BA6	FM RF Amplifier
12AT7	FM Mixer-Oscillator
12AU6	1st FM IF Amplifier & AM Converter
12BA6	2nd FM IF Amplifier & 1st AM IF Amplifier
12AL5	FM Detector
12AV6	AM Detector & 1st Audio Amplifier
50C5	Audio Output

FM ANTENNA INFORMATION

The receiver is shipped from the factory with the FM antenna connection in the internal position. The FM antenna connections are located on the back of the AM loop antenna and are accessible through a hole in the rear cover. When the captivated shorting bar connects the center and right hand terminals the FM input is connected to the AC power line through capacitor C33. The AC power line hence serves as the FM antenna.

When using an external FM antenna, disconnect the captivated shorting bar from the center terminal. Connect a 300 ohm antenna across the center and left hand terminals.

PHONOGRAPH INPUT INFORMATION

The audio amplifier section of the receiver can be used as a phonograph amplifier by inserting the plug from the phonograph output into the receptacle on the rear of the receiver. The AM-FM-PHONO switch should be set to the PHONO position.

The phonograph should employ either a crystal or ceramic type cartridge for best results. If hum is being picked up by the phonograph try reversing the AC plug of the phonograph in the AC power outlet, and/or the radio power plug.

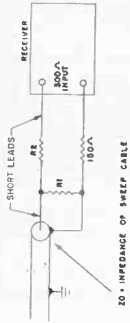
CHASSIS REMOVAL

1. Remove the two $3\frac{1}{2}$ " long screws located at either end of the cabinet rear.
2. Remove the short screw located in the center of the cabinet rear and the screw on the bottom of the cabinet.
3. Separate the cabinet front from the cabinet back to expose the radio chassis. (The two $3\frac{1}{2}$ " screws can be used to do this by pushing on both at same time).
4. Use a conventional TV AC interlock line cord to power the radio while servicing. It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

FM ALIGNMENT

FM ALIGNMENT

1. Don't attempt FM alignment until the AM alignment has been completed.
2. Connect two 100k ohm resistors from test point "C" (pin No. 7 12AL5) to ground as shown in schematic.
3. Use V.T.V.M. connected as indicated in the FM alignment chart.
4. Use a signal generator with output frequencies of 10.7 mc and 80 to 110mc. Generator should have an adjustable output attenuator.
5. Set the volume control R22 at maximum.
6. Set the switch SW1 to the FM position.
7. Keep the signal generator output voltage level low to avoid overload.



50 - IMPEDANCE OF SWEEP CABLE

Z0	R1	R2
85 Ω	50 Ω	100 Ω
75 Ω	85 Ω	10 Ω

Figure 5 Impedance matching network

FM ALIGNMENT CHART

Step	Connect Signal Generator to:	Signal Generator Frequency	C37 Setting	V.T.V.M. Connection	Adjustment
1	High side of generator to lug F on H of SW1	10.7 mc unmodulated	Min.	Between points "A" and "B" see fig. 1	Secondary of T4 (top adj.) for zero voltage
2	"	"	"	Between point "C" and ground	Primary of T4 (bottom adj.) and primary and secondary of T2 for maximum negative voltage
3	"	10.7 mc unmodulated input increased 10X	"	Between points "A" and "B"	Recheck T4 secondary and adjust for zero voltage if necessary
4	"	"	"	Between point "C" and ground	Recheck T4 primary and adjust for maximum negative voltage if necessary
5	REMOVE THE TWO 100K OHM RESISTORS				
6	Across FM antenna with proper termination see fig. 5	98 mc unmodulated	98 mc	Between point "C" and ground	T7 for maximum negative voltage
7	"	"	"	"	T1 primary and secondary for maximum negative voltage
8	"	108.5 mc unmodulated	Min.	"	C41 for maximum negative voltage
9	"	87.5 mc unmodulated	Max.	"	T7 for maximum negative voltage
10	REPEAT STEPS 8 AND 9 UNTIL NO FURTHER CHANGE				
11	ACROSS FM antenna with proper termination	106 mc unmodulated	Tune for signal	Between point "C" and ground	C37 "B" for maximum negative voltage (rock in)
12	"	90 mc unmodulated	"	"	T6 for maximum negative voltage (rock in)
13	CHECK STEPS 8 AND 9 AND TOUCH UP IF NECESSARY				

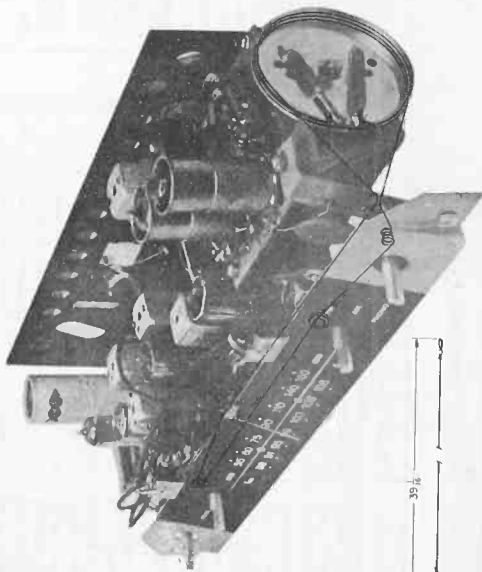


Figure 4 Dial string arrangement

AM ALIGNMENT

1. Connect V.T.V.M. as indicated in the AM alignment chart.
2. Use signal generator covering 455 kc to 1700 kc, AM modulated, with adjustable output attenuator.
3. Set the volume control R22 at maximum.
4. Set switch SW1 at AM.
5. Keep the signal generator output voltage level low to avoid AVC action.
6. Set C38 (tuning capacitor) to minimum.

AM ALIGNMENT CHART

Step	Connect Signal Generator to:	Signal Generator Frequency	C38 Setting	V.T.V.M. Connection	Adjustment
1	High side thru .1 μfd to stator "A" of C38. Low side to tuning capacitor frame (B-)	455 kc modulated	min.	Across spkr. voice coil	Primary and secondary of T5 and T3 for maximum output
2	"	1625 kc modulated	"	"	C38 "D" for maximum output
3	Radiated signal	1400 kc modulated	Tune for signal	"	C38 "B" Rock in for maximum output

CHASSIS PARTS LIST -- Continued

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
†	C1	213V182H01		Capacitor, 10 mmf, 10%, mica	Impedance matching	.25
†	C2	213V182H01		Capacitor, 10 mmf, 10%, mica	Impedance matching	.25
†	C3	215V111A01		Capacitor, 100 mmf, ceramic	FM ant. coupling	.20
†	C4	215V308H02		Capacitor, .001 mf, ceramic, GMV	FM RF amp. screen	.20
†	C5	215V102A22	R2CC62Y5222M	Capacitor, .0022 mf, ceramic, 20%	FM RF amp. screen	.22
†	C6	219V025H02		Capacitor, .0015 mf, feed thru	B+ RF amp.	.20
†	C7	215V308H02		Capacitor, .001 mf, ceramic, GMV	FM osc. plate	.20
†	C8	215V300H45		Capacitor, 47 mmf, 10%, N750	Osc. grid	.20
†	C9	217V011A09	R2CC61Y5Y471M	Capacitor, 470 mmf, ceramic, 20%	Osc. injection	.15
†	C10	215V104A71		Capacitor, .0015 mf, feed thru	FM RF coupling	.20
†	C11	219V025H02		Capacitor, .0015 mf, feed thru	B+ FM mixer	.20
†	C12	215V308H02		Capacitor, .001 mf, ceramic, GMV	Filament by-pass	.20
†	C13	210V111H06		Capacitor, .047 mf, 600 V, 20%	AM RF return	.25
†	C14	215V014A70	R1CC62G470K	Capacitor, 47 mmf, 10%, ceramic	12AU6 grid coupling	.17
†	C15	215V102A22	R2CC62Y5222M	Capacitor, .0022 mf, ceramic, 20%	12AU6 screen by-pass	.22
†	C16	215V102A22	R2CC62Y5222M	Capacitor, .0022 mf, ceramic, 20%	1F Amp screen by-pass	.22
†	C17	215V308H02		Capacitor, .001 mf, ceramic	FM detector	.27
†	C18	210V111H05		Capacitor, .05 mf	AVC filter	.27
†	C19	215V306H03		Capacitor, .01 mf, 1.4 KV, ceramic	Control bracket to B-	.35
†	C20	215V300H03		Capacitor, .60 mf, 150 V, elect.	Control plate	.22
†	C21A	218V033H01	early production only	Capacitor, 80 mf, 150 V, elect.	B+ filter	2.10
†	C21B	218V033H01		Capacitor, .005 mf, ceramic	Tone	2.10
†	C22	215V308H04		Capacitor, .01 mf, 1.4 KV, ceramic	Control bracket to B-	.35
†	C23	215V306H02		Capacitor, .047 mf, 600 V	Line by-pass	.35
†	C24	210V214A73		Capacitor, .0015 mf, feed thru	Filament FM tuner	.20
†	C25	219V025H02		Capacitor, .0015 mf, feed thru	Filament FM tuner	.20
†	C26	219V025H02		Capacitor, .0015 mf, feed thru	Filament by-pass	.20
†	C27	219V025H02		Capacitor, .0015 mf, feed thru	Filament by-pass	.20
†	C28	215V308H04		Capacitor, .005 mf, ceramic	Filament by-pass	.20
†	C29	215V308H04		Capacitor, .005 mf, ceramic	Filament by-pass	.20
†	C30	215V308H04		Capacitor, .005 mf, ceramic	Filament by-pass	.20
†	C31	215V308H04		Capacitor, .005 mf, ceramic	Filament by-pass	.20
†	C32	218V012H13		Capacitor, 4 mf, electrolytic, 50 V	FM detector	1.15
†	C33	213V182H02		Capacitor, 47 mmf, mica, 20%	Line by-pass	.20
†	C34	215V308H04		Capacitor, .005 mf, ceramic	Filament by-pass	.20
†	C35	215V300H46		Capacitor, 8.2 mmf, 5%, N470	FM osc. grid	.20
†	C37	330V016H01		Capacitor, variable	FM tuning	3.75
†	C38	330V015H04		Capacitor, variable	AM tuning	3.10
†	C39	215V308H04		Capacitor, .005 mf, ceramic	IF amp. screen	.20
†	C40	215V308H04		Capacitor, .005 mf, ceramic	FM mixer plate	.20
†	C41	215V307H01		Trimmer, 1.5-6 mmf	FM oscillator	.35
†	C42	215V308H04		Capacitor, .005 mf, ceramic	FM B+ decoupling	.20
†	C43	218V022H01		Capacitor, 20 mf, electrolytic, 175 V	B+ filter	1.25
†	C44	218V012H01		Capacitor, 40 mf, electrolytic, 25 V	B+ filter	1.35
†	L1	230V065H01		Coil, antenna	Audio output cathode	.25
†	L2	230V056H17		Coil, RF (includes 820 ohm resistor)	FM RF input	.40
†	L3	230V056H02		Coil, RF reactor, 1.1 uh	FM mixer plate	.35
†	L4	230V056H02		Coil, RF reactor, 1.1 uh	Filament choke	.35
†	L5	V-9099-5	230V028H05	Coil, RF reactor, 2.7 uh	Filament choke	.20
†	L6	V-9099-5	230V028H05	Coil, RF reactor, 2.7 uh	RF choke	.20
†	L7	787V087H01		Loop antenna assembly	AM loop	2.25
†	L8	756V027H01		Switch, push-pull (part of R22)	Selector	2.10
†	SW2	270V039H01		Transformer, 10.7 mc	On-off	1.70
†	T1	235V039H01	V-9688	Transformer, 10.7 mc	FM mixer plate	1.80
†	T2	235V037H02		Transformer, 455 kc	2nd FM IF	1.65
†	T3	235V044H01		Transformer, 455 kc	1st AM IF	1.65
†	T4	235V035H01		Transformer, 10.7 mc	FM detector	2.30
†	T5	235V038H02		Transformer, 10.7 mc	2nd FM IF	1.50
†	T6	230V045H01		Coil	RF FM plate	.90
†	T7	230V045H02		Coil	RF FM plate	.90
†	T8	230V044H01		Coil	FM oscillator	.90
†	T9	430V051H01		Transformer	AM oscillator	1.75
†	Z1	219V019H01		Package circuit	Audio output	.95
†	Z2	219V020H01		Package circuit	Audio coupling	.75
†	Z3	219V022H01		Package circuit	FM deemphasis	.45
†	X1	295V012H01		Rectifier, selenium	AM tweet filter	2.75

New Part number listed for the first time in Westinghouse Television or Radio Service Information. Prices are subject to change without notice. All resistors are 10% unless otherwise specified.

MISCELLANEOUS AND MODEL PARTS

When ordering parts, specify part number, description of part and model number. Do not order by model number alone. Where applicable, prices include Federal Excise Tax.

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
†		513V017H13		Cabinet shell, Ivory, H649T7	4.90
†		770V415H01		Cabinet shell, Charcoal, H650T7	4.90
†		781V042H01	V-15765-1	Contact, male, AC power	1.0
†		781V000A01		Coupling, flexible variable gang to pulley shaft	.05
†		V-321-9		Cord, AC power, snap-in	1.12
†		558V118H01		Cord, dial drive, 100 foot spool	1.57
†		558V175H01		Dial, plastic front	1.30
†		558V153H01		Dial, background, scale	.25
†		783V061H01		Front, cabinet	3.00
†		550V082H01		Insert, mounts cabinet front	.35
†		550V082H02		Knob, AM-FM Tuning, Volume & Tone	.35
†		558V088H01		Knob, AM-FM Tuning, Volume & Tone	.35
†		756V501H07		Lamp, pilot light, W#1828	.40
†		558V125H01		Nameplate, Wide-Fi 10" Speaker	.40
†		783V055H09		Pointer	.27
†		751V513H05		Socket, 7 pin, center shield, 12AL5	.17
†		751V513H07		Socket, 7 pin, 30CS	.20
†		751V546H01		Socket, 7 pin, shielded, 12AV6, 12AU6 & 12BA6	.45
†		751V549H02		Socket, 7 pin, shielded, 12BA6	.45
†		751V549H02		Socket, 9 pin, shielded, 12AT7	.45
†		751V529H01		Socket, dial light	.80
†		770V250H03	V-6795-3	Spring, dial drive	.10
†		570V024H01		Speaker, 10" x 2 5/8"	10.12

CHASSIS PARTS LIST

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
R1		250V234A75	RC20AE475K	Resistor, 4.7 megohms, 1/2W	FM RF grid	.05
R2		250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	FM RF screen decoup.	.17
R3		250V231A03	RC20AE103K	Resistor, 10K ohms, 1/2W	AM converter cathode	.05
R4		250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	FM osc. plate decoup.	.17
R5		250V223A35	RC20AE335K	Resistor, 3.3 megohms, 1/2W	FM mixer grid	.12
R6		250V221A03	RC20AE103K	Resistor, 10K ohms, 1/2W	FM osc. grid	.05
R7		250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	FM mixer plate	.17
R8		250V221A25	RC20AE125K	Resistor, 1.2 megohms, 1/2W	12AU6 grid	.12
R9		250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	12AU6 plate decoup.	.17
R10		250V224A70	RC20AE470K	Resistor, 47 ohms, 1/2W	IF amp. cathode	.05
R11		250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	IF amp. cathode	.17
R12		250V222A25	RC20AE225M	Resistor, 2.2 megohms, 1/2W, 20%	AVC filter	.06
R13		250V214A74	RC20AE474J	Resistor, 470K ohms, 1/2W, 5%	AVC filter	.22
R14		250V222A23	RC20AE223K	Resistor, 22K ohms, 1/2W	FM detector	.07
R15		250V222A21	RC20AE221K	Resistor, 220 ohms, 1/2W	FM audio coupling	.05
R16		250V211A81	RC30AE181K	Resistor, 180 ohms, 1W	Audio output cathode	.12
R17		250V226A83	RC20AE683K	Resistor, 68K ohms, 1/2W	Tone compensation	.05
R18		251V020H15		Resistor, 22 ohms, 3W	B+ filter	.40
R19		251V023H20		Resistor, 22 ohms, glassohm	Rectifier protection	.40
R20		250V436A81	RC40AE681K	Resistor, 680 ohms, 2W	Pilot lamp	.25
R21		250V436A81	RC40AE681K	Resistor, 680 ohms, 2W	dropping	.25
R22		270V039H01		Control, 500K ohms (includes SW2)	Volume	1.70
R23		270V039H07		Control, 1 megohm	Tone	.95
R24		250V321A81	RC30AE181K	Resistor, 180 ohms, 1W	B+ filter	.12
R25		250V224A70	RC20AE470K	Resistor, 47 ohms, 1/2W	12AU6 cathode bias	.05

Westinghouse

SERVICE MANUAL

radio



SERVICE DEPARTMENT • TELEVISION-RADIO DIVISION
WESTINGHOUSE ELECTRIC CORP., METUCHEN, N. J.

MODELS
H659P4
(Mocha & White)
H660P4
(Red & White)

CHASSIS V-2394-1

- SPECIFICATIONS**
- FREQUENCY RANGE 540 to 1600 kc
 - INTERMEDIATE FREQUENCY 455 kc
 - TUBE COMPLEMENT
 - 1 1R5 Converter
 - 1 1U4 I.F. Amplifier
 - 1 1U5 Detector AVC and 1st Audio Amplifier
 - 1 3V4 Audio Output
 - POWER CONSUMPTION AC OPERATION 15 Watts
 - AUDIO POWER OUTPUT (AC OPERATION)
 - MAXIMUM 300 Watts
 - UNDISTORTED 150 Watts
 - LOUDSPEAKER 4" PM
 - BATTERY OPERATION
 - POWER SUPPLY 90V
 - 1 "A" Battery (9V) Eveready #276, Burgess #D6, Ray-O-Vac #1603, General #88
 - 1 "B" Battery (90V) Eveready #479, Burgess #P60, Ray-O-Vac #214, General #176
 - CURRENT CONSUMPTION (Battery Operation)
 - "A" Battery050 Amp.
 - "B" Battery009 Amp.



4. Remove the two self-tapping screws securing the chassis bracket to the top of the case.
 5. Carefully slide the chassis out from the receiver case. The on-off-volume control knob is captivated and thus remains in the case as the control shaft is pulled off the knob.
- When servicing with the receiver connected to the AC power line use an isolation transformer between the receiver and the AC line. To replace the chassis reverse the above procedure. Be careful to correctly seat the chassis in the cabinet mounting grooves.

CHASSIS REMOVAL (See figure 1)

1. Press in the two cabinet release buttons on either side of the receiver case. Open the case to expose the chassis and batteries.
2. Unsnap the battery cable assemblies from the "A" and "B" batteries.
3. Remove the two self-tapping screws securing the AC receptacle.

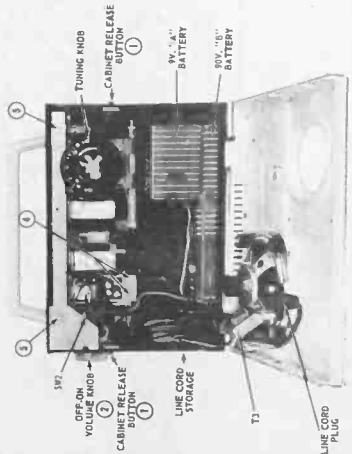


Figure 1
View of cabinet case opened showing battery location and components to be removed for chassis removal.

NOTE

1. VOLTAGES TAKEN WITH V.T.M. FROM POINTS INDICATED, TO 0 - ± 20%.
2. NO SIGNAL INPUT TUNING CAPACITOR AT MAXIMUM VOLUME CONTROL AT MINIMUM.
3. ALL CAPACITANCE VALUES IN MFD - ALL RESISTANCE VALUES IN OHMS & Ω.
4. I.F. WATT RATING, UNLESS OTHERWISE SPECIFIED.
5. ALL UNDERLINED VOLTAGES TAKEN IN BATTERY POSITION.
6. VOLTAGES INDICATED BY 0 ARE TAKEN AT TUBE PINS.

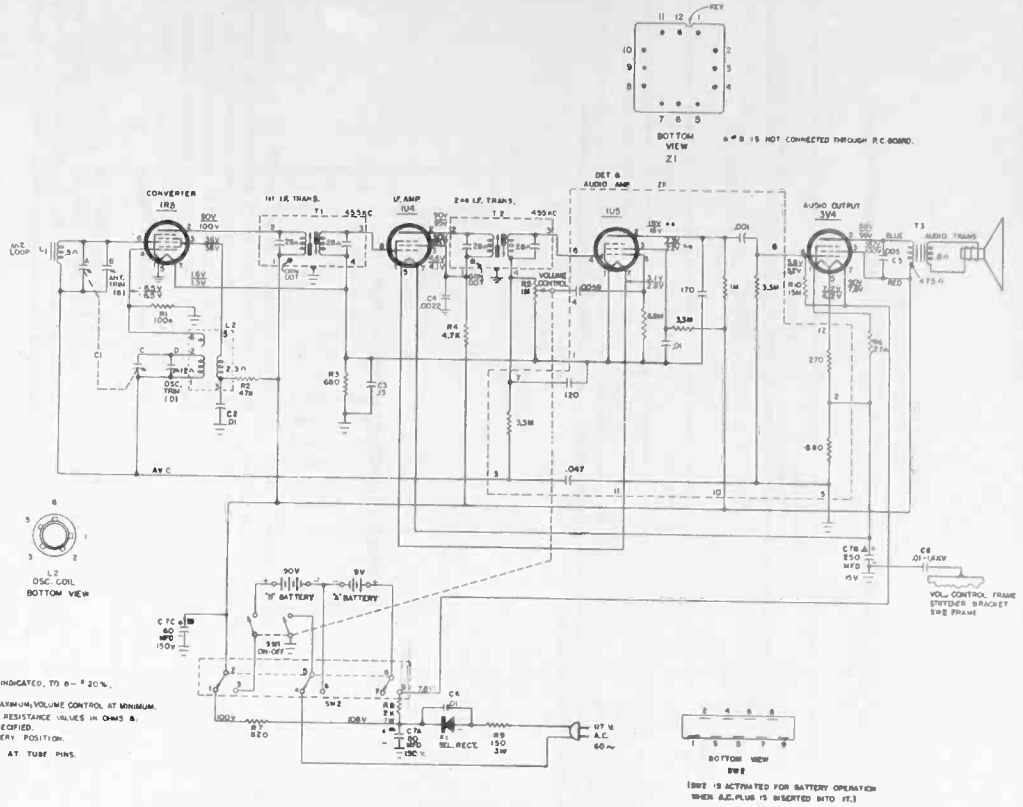


Figure 2 - Schematic Diagram

ALIGNMENT

While making the following adjustments, keep the volume control set at maximum output and the signal generator output attenuated to avoid AVC action.

Step	Connect Signal to:	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output
1	Stator of ant. tuning cap. "A" thru a .01 mfd capacitor	455 kc	Min. cap.	Top and bottom slugs of T2 and T1 in order given
2	"	1625 kc	Min. cap.	Osc. trimmer "D"
3	Radiated sig.	1400 kc	1400 kc	Antenna trimmer "B"

It is recommended that a fibre aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot in the IF transformer.

MODULE SERVICING INFORMATION

The Detector-First Audio Amplifier stage of this receiver has been modularized to provide greater reliability, compactness and ease of servicing. All the components of this stage, including the tube socket, are contained in this packaged circuit.

The module consists of five printed circuits, stacked, one on top of another. Each printed circuit is made up of a ceramic wafer with more than one component (capacitors or resistors) printed on the wafer. The five stacked wafers are connected together by twelve riser wires. At the top of the module, seven of the risers connect to the tube socket. At the bottom of the module the riser wires are extended so that they can be soldered directly into the printed circuit board.

Because the module is a complete unit, it is easier to service and replace than the individual components. A bottom view of the module is shown on the schematic

diagram (figure 2). A key (notch) on one side of the module indicates pin #1 of the module. With exception of pin #9 all the riser wires are soldered into the printed circuit chassis. The components contained in the module are shown on the schematic enclosed in dashed lines. The corresponding riser numbers are shown as they enter the circuit.

It is not recommended that the module itself be serviced. It is rather difficult to replace components within the module. If the trouble is localized to the module it is recommended that the module be replaced.

To replace a module cut the riser wires at the base of the module, where they enter the printed circuit board. Remove the remaining wires from the board with the soldering iron (low wattage type). Observing the correct position of the module key, install the new module in the holes in the board and solder in place.

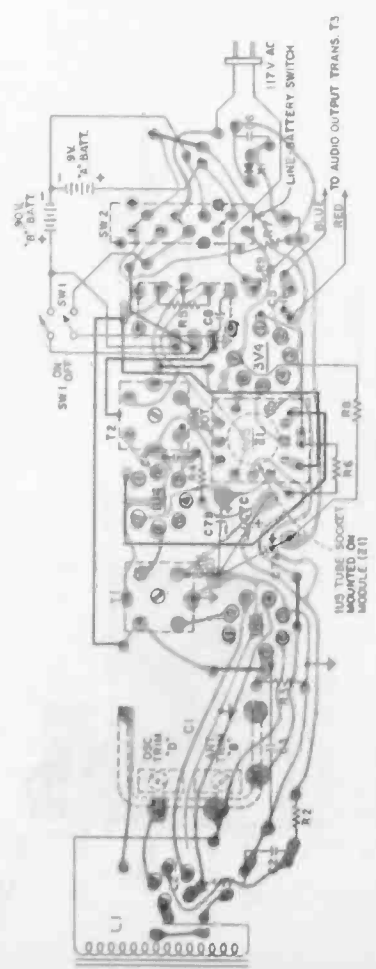


Figure 3 - Bottom view of chassis with components shown symbolically

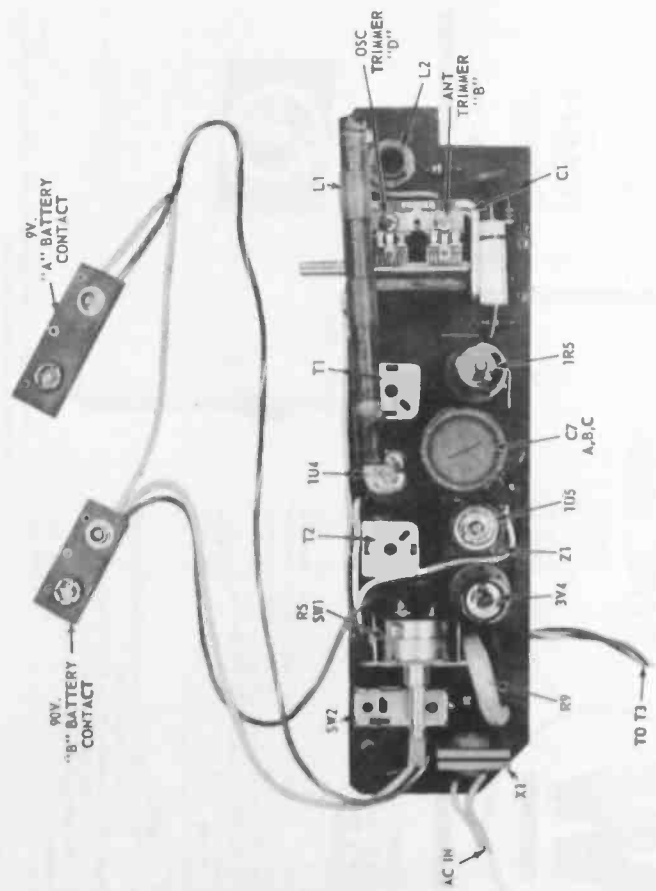


Figure 4 - Top view of chassis

MODEL PARTS LIST

When ordering parts, specify part number, description of part and model number.
Do not order by model number alone.
Where applicable, prices include Federal Excise Tax.

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
†		770V565H01		Bracket, handle	.10
†		778V104H01		Bracket Assy., AC receptacle	.45
†		559V027H01		Catch Assy., H-659P4	1.00
†		559V027H02		Catch Assy., H-660P4	1.00
†		513V028H01		Cabinet Assy., Mocha & White, H-659P4	8.75
†		513V028H02		Cabinet Assy., Red & White, H-660P4	8.75
†		759V042H02		Cable, Batteries	.70
†		751V009H01		Cord, AC power	.75
†		558V159H01		Handle	.65
†		558V166H01		Insigna	.45
†		550V096H02		Knob, volume	.55
†		550V088H02		Knob, tuning	.75
†		770V520H01		Spring, hinge	.10
		751V513H04		Socket, 7 pin - 3V4	.17
		751V513H05		Socket, 7 pin, shielded, 1U4, 1R5	.17
†		570V050H01		Speaker, 4" PM (includes T3)	6.00

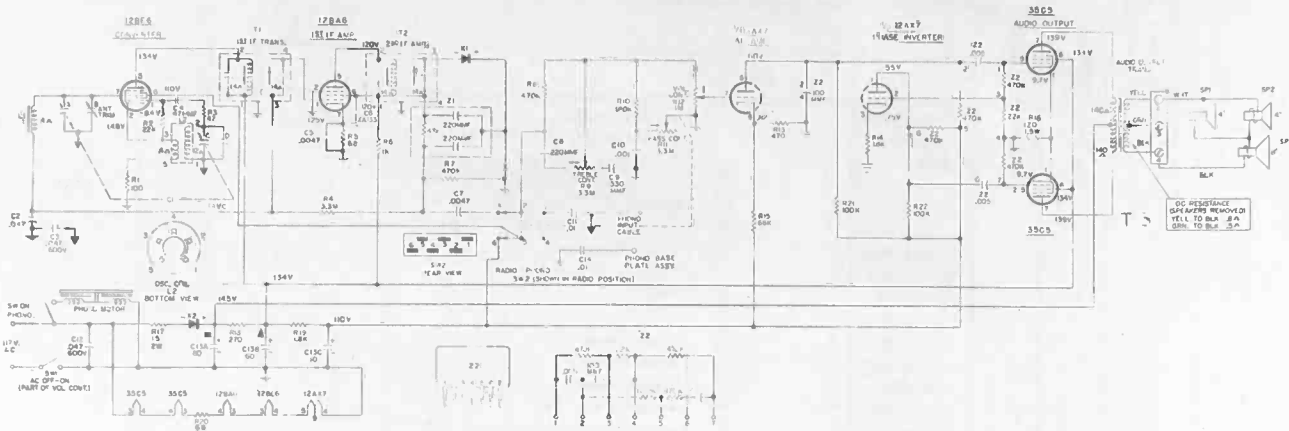
CHASSIS PARTS LIST

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
†	C1	330V014H02		Capacitor, variable	Tuning	.40
	C2	215V111A03	R2CC63Z5Z103P	Capacitor, .01 mf, ceramic GMV	Osc. plate by-pass	.20
†	C3	210V111H08		Capacitor, .15 mf, 200 V, tubular	IF Amp. grid bias	.35
	C4	215V112A22	R2CC62Z5Z222P	Capacitor, .0022 mf, ceramic, 500 V	IF Amp. screen by-pass	.17
	C5	215V308H04		Capacitor, .005 mf, ceramic, 500 V	Audio output	.20
	C6	215V111A03	R2CC63Z5Z103P	Capacitor, .01 mf, ceramic, 500 V	Rectifier by-pass	.20
†	C7A	218V025H18		Capacitor, 80 mf, 150 V, electrolytic	AC filter	2.45
†	C7B			Capacitor, 250 mf, 150 V, electrolytic	AC filter	2.45
†	C7C			Capacitor, 60 mf, 150 V, electrolytic	AC filter	2.45
	C8	215V306H03		Capacitor, .01 mf, 1.4 kv	Bracket to ground	.35
	R1	250V231A04	RC20AE104M	Resistor, 100K ohms, 1/2W, 20%	Osc. grid	.05
	R2	250V234A73	RC20AE473J	Resistor, 47K ohms, 1/2W, 5%	Osc. screen	.17
	R3	250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	IF grid bias	.17
	R4	250V234A72	RC20AE472J	Resistor, 4.7K ohms, 1/2W, 5%	IF Amp. plate	.12
†	R5	270V027H06		Control, 1 megohm (includes SW1)	Volume	1.95

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
	R6	250V222A70	RC20AE270K	Resistor, 27 ohms, 1/2W	3V4 filament	.06
	R7	250V228A21	RC20AE821K	Resistor, 820 ohms, 1/2W	B+ filter	.12
†	R8	251V026H01		Resistor, 2K ohms, 7W, ballast	Filament dropping	.70
†	R9	251V025H02		Resistor, 150 ohms, 3W, ballast	Selenium protection	.55
	R10	250V211A56	RC20AE156J	Resistor, 15 megohms, 1/2W, 5%	Audio output grid	.20
†	L1	310V041H01		Loop, iron-core	Antenna	1.80
†	L2	230V063H01		Coil	Oscillator	.95
†	SW1	270V027H06		Switch (includes R5)	On-off	1.95
†	SW2	756V030H01		Switch	AC battery	1.45
†	T1	235V043H01		Transformer, 455 kc	1st IF	1.60
†	T2	235V043H02		Transformer, 455 kc	2nd IF	1.60
†	T3	570V050H01		Transformer (includes speaker)	Audio output	6.00
†	X1	295V014H01		Rectifier, selenium	AC rectifier	2.00
†	Z1	219V026H01		Module, used with 1U5	Audio circuit	2.30

† New part listed for the first time in Westinghouse Television or Radio Service Information.
Prices are subject to change without notice.
All resistors are 10% unless otherwise specified.

CHASSIS V-2503-1



V250: 1

1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS SPECIFIED.
 2. ALL VOLTAGES MEASURED TO B+ USING A VTM WITH THE VOLTAGE SET AT 107V AC, VFLY/ALS SHOULD BE AS SHOWN ± 20%. NO SIGNAL INPUT, LOUDNESS AT MINIMUM, TUNING CAPACITANCE AT MAXIMUM.
 3. R21 AND R22 ARE NOT PART OF Z2.

FIGURE 1. SCHEMATIC DIAGRAM OF V-2503-1 PHONOGRAPH AND AM RADIO CHASSIS, USED WITH MODELS HR112AN AND HR113AN

Westinghouse
SERVICE MANUAL
 high fidelity

MODELS
 HR112AN (mahogany)
 HR113AN (oak)

CHASSIS ASSEMBLY
V-2503-1
TUNER-AMPLIFIER

SERVICE DEPARTMENT • TELEVISION-RADIO DIVISION
 WESTINGHOUSE ELECTRIC CORP., METUCHEN, N. J.

HIGH FIDELITY
AM RADIO-PHONOGRAPH COMBINATION

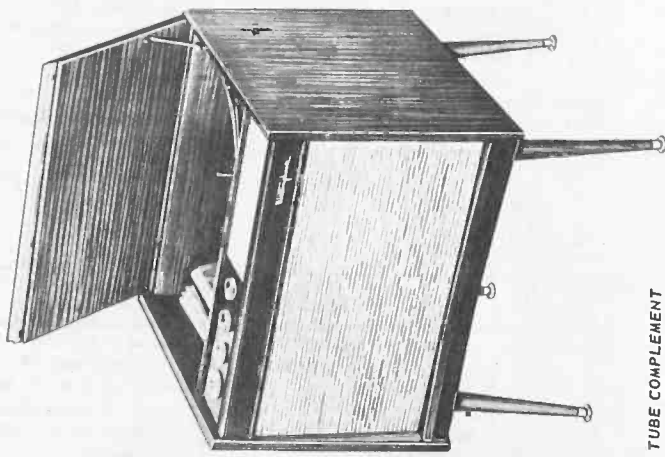


TABLE OF CONTENTS

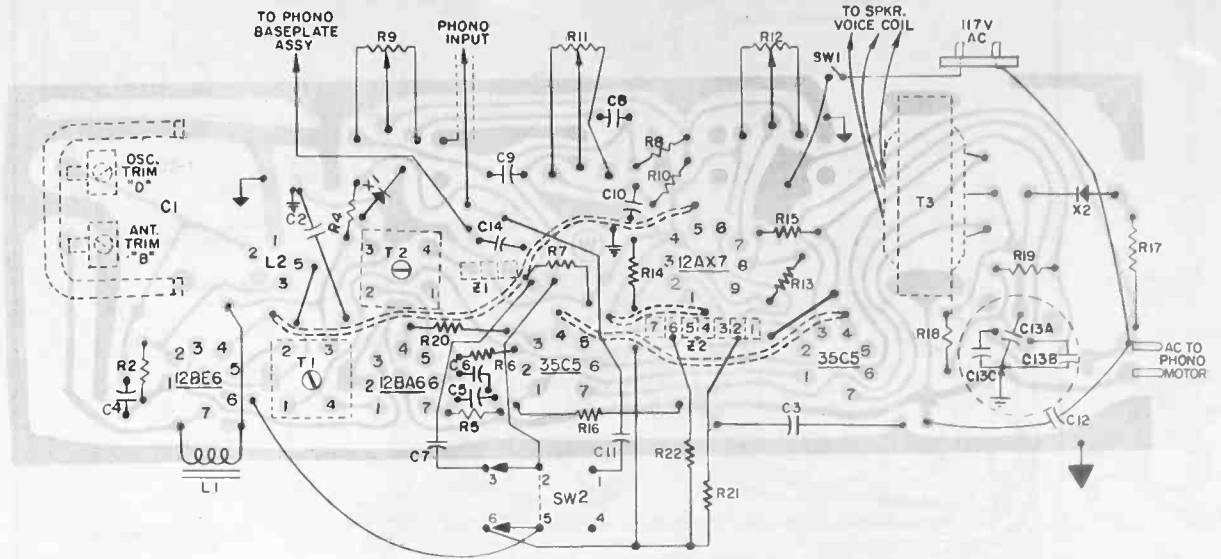
- Schematic diagram, V-2503-1 chassis..... 2
- Bottom view of V-2503-1 printed circuit board..... 3
- Top view of V-2503-1 chassis..... 4
- Rear view of cabinet showing speaker connections..... 5
- Specifications..... 6
- Tube replacement data..... 6
- Chassis removal instructions..... 6
- Radio-phonograph switch information..... 6
- Remote speaker connection instructions..... 6
- Speaker phasing information and instructions..... 7
- AM alignment procedure..... 8
- Record changer, list of authorized repair stations..... 9 & 10
- Parts list..... 11

TUBE COMPLEMENT

- 12BE6.....Mixer-oscillator
- 12BA6.....1st IF amplifier
- 12AX7.....1st audio amplifier and phase inverter
- 35C5.....Audio output
- 35C5.....Audio output

RECORD CHANGER

The record changer used in High Fidelity models HR112AN and HR113AN is manufactured especially for Westinghouse by the Collaro Corporation. Consult the Westinghouse Service Manual on the Collaro Conquest record changer for the following information: Record changer parts list, dismantling, re-assembling, servicing and maintenance instructions. Authorized Collaro repair agencies are equipped to service this changer. A complete list appears on pages 9 & 10 of this manual.



V2503-1

FIGURE 2. BOTTOM VIEW OF V-2503-1 PRINTED CIRCUIT BOARD SHOWING TOP PARTS AS SCHEMATIC SYMBOLS

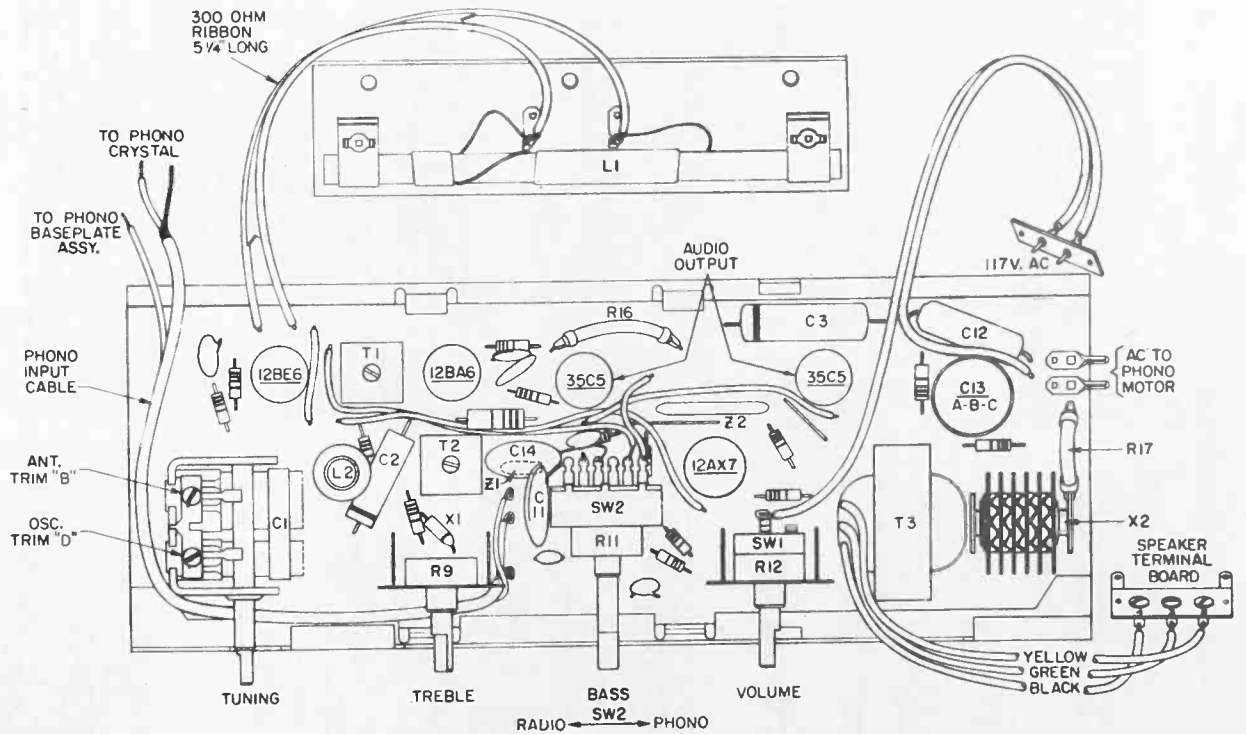
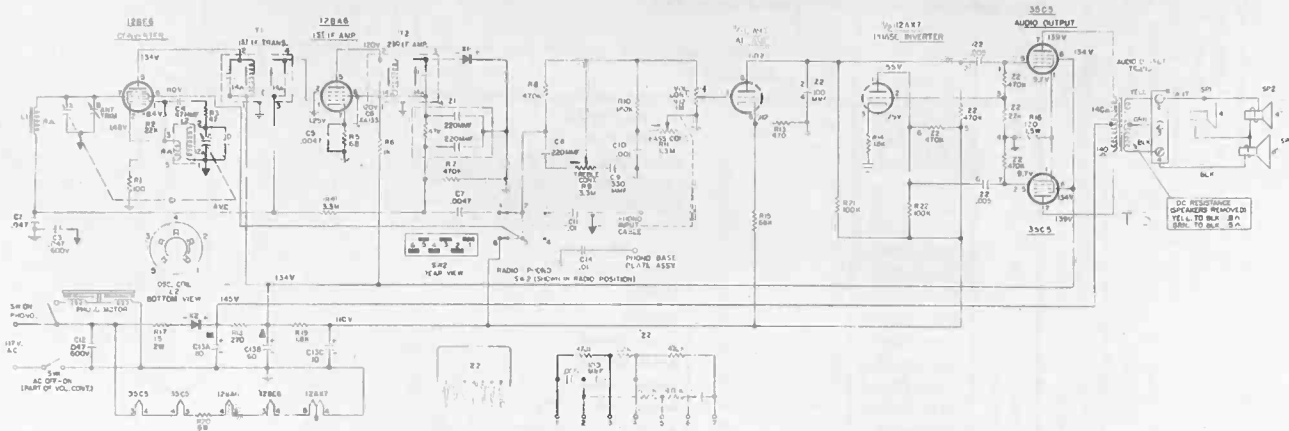


FIGURE 3. TOP VIEW OF V-2503-1 CHASSIS



V250: 1

1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS SPECIFIED.
 2. ALL VOLTAGES MEASURED TO B USING A VEHM LINE VOLTAGE SET AT 0.7V AC, VEHM GAS SHOULD BE AS SHOWN ± 20%. NO SIGNAL INPUT, LOADS AS AT MAXIMUM TUNING CAPACITANCE AT MAXIMUM.
 3. R2 AND R22 ARE NOT PART OF Z2.

FIGURE 1. SCHEMATIC DIAGRAM OF V-2503-1 PHONOGRAPH AND AM RADIO CHASSIS, USED WITH MODELS HR112AN AND HR113AN

MODELS
 HR112AN (mahogany)
 HR113AN (oak)
CHASSIS ASSEMBLY
 V-2503-1
TUNER-AMPLIFIER

Westinghouse
SERVICE MANUAL
 high fidelity



SERVICE DEPARTMENT • TELEVISION-RADIO DIVISION
 WESTINGHOUSE ELECTRIC CORP. METUCHEN, N. J.

HIGH FIDELITY
AM RADIO-PHONOGRAPH COMBINATION

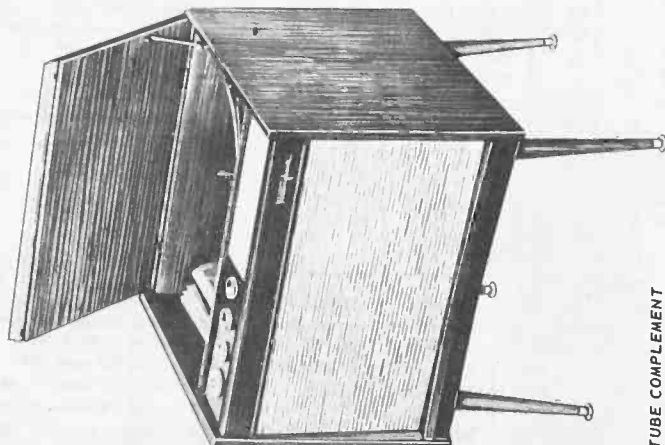


TABLE OF CONTENTS

- Schematic diagram, V-2503-1 chassis.....2
- Bottom view of V-2503-1 printed circuit board.....3
- Top view of V-2503-1 chassis.....4
- Rear view of cabinet showing speaker connections.....5
- Specifications.....6
- Tube replacement data.....6
- Chassis removal instructions.....6
- Radio-phonograph switch information.....6
- Remote speaker connection instructions.....6
- Speaker phasing information and instructions.....7
- AM alignment procedure.....8
- Record changer, list of authorized repair stations..... 9 & 10
- Parts list.....11

TUBE COMPLEMENT

- 12BE6.....Mixer-oscillator
- 12BA6.....1st IF amplifier
- 12AX7.....1st audio amplifier and phase inverter
- 35C5.....Audio output
- 35C5.....Audio output

RECORD CHANGER

The record changer used in High Fidelity models HR112AN and HR113AN is manufactured especially for Westinghouse by the Collaro Corporation. Consult the Westinghouse Service Manual on the Collaro Conquest record changer for the following information: Record changer parts list, dismantling, re-assembly, servicing and maintenance instructions. Authorized Collaro repair agencies are equipped to service this changer. A complete list appears on pages 9 & 10 of this manual.

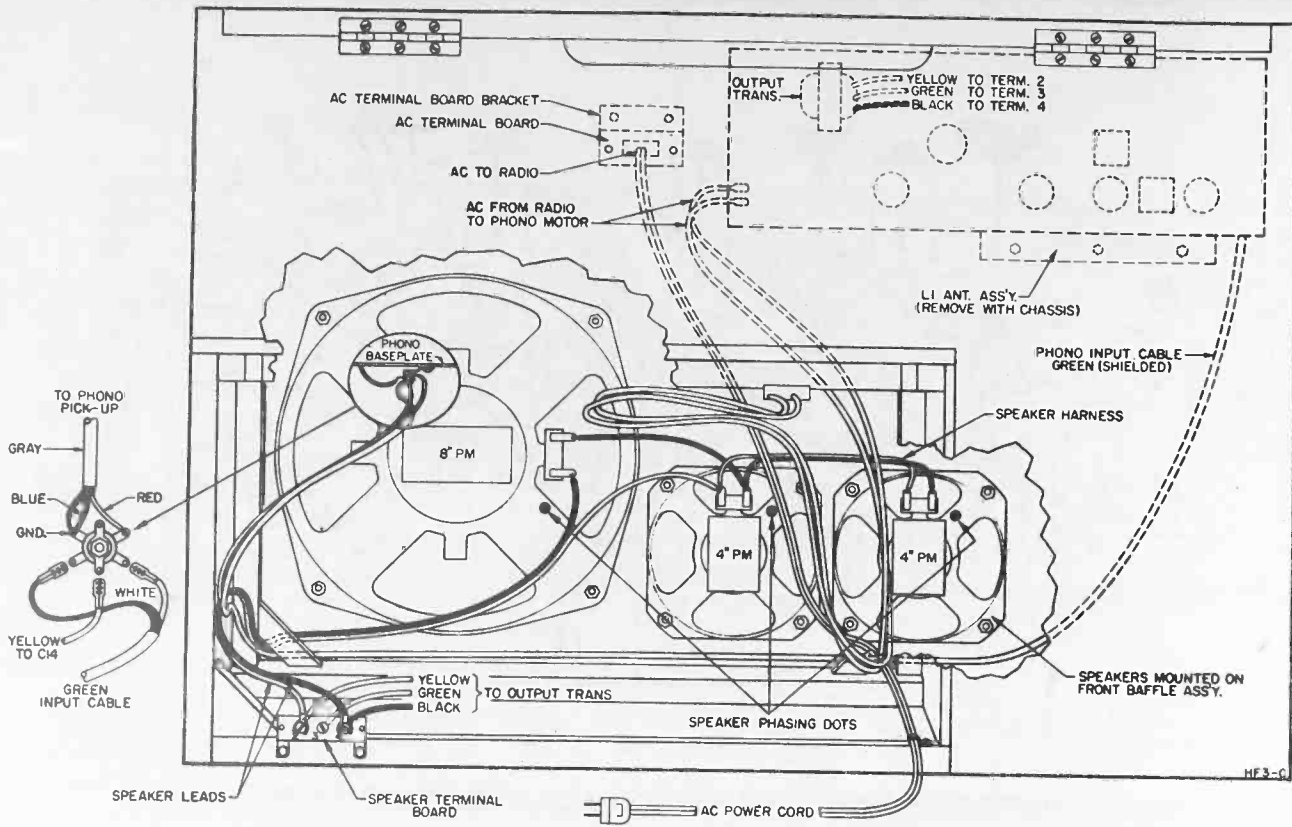


FIGURE 4. REAR VIEW OF CABINET, MODELS HR112AN AND HR113AN, SHOWING SPEAKER CONNECTIONS

AUDIO PACKAGED CIRCUIT

In early production of the V-2503-1 chassis, audio packaged circuit 219V024H01 is used. This unit has two 100K ohm resistors wired externally on the board in parallel with terminals 2 and 5 and terminals 5 and 6. In later production a new packaged circuit will be used. When used, the new packaged circuit number will be 219V024H02. If the new packaged circuit is used to replace the old, remove and discard the two 100K ohm resistors.

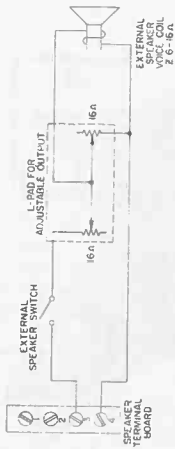


FIGURE 5. METHOD FOR CONNECTING AN EXTERNAL SPEAKER, WITH SWITCH AND L PAD

REMOTE SPEAKER

To add additional speakers to High Fidelity models HR112AN or HR113AN, the Westinghouse Remote Speaker System, models HE123, HE124 or HE125, is recommended. Designed especially for use with Westinghouse High Fidelity equipment, each system includes complete installation instructions.

To connect one or more remote speakers made by another manufacturer, proceed as follows:

1. Use an external speaker with a voice coil impedance of not less than six ohms.
 2. Remove the internal speaker lead (from the speaker mounted in the HR112AN or HR113AN cabinet) from terminal 2 on the speaker terminal board. (The speaker terminal board is located at the rear of the cabinet, lower left). Connect this lead to terminal 3.
 3. Connect the remote speaker or speakers in parallel to terminals 3 and 4 on the speaker terminal board.
- All speakers — those mounted in the cabinet and those externally located — are now connected in parallel to terminals 3 and 4.*
4. Note: If the external speakers are to be installed within hearing range of other speakers, see information below on speaker phasing.
 5. To install a switch and volume control for the external speakers, see information in figure 5. The purpose of the L pad is to maintain constant impedance across the output transformer (across terminals 3 and 4) as the speaker level is varied.
- Note: The L pad shown, which is NOT sold by Westinghouse, may be purchased from a local parts dealer.

SPECIFICATIONS

- Operating voltage.....105 to 120 volts, 60 cycles AC
- AC power consumption.....50 watts
- Radio.....70 watts
- Radio (amplifier) with phono motor in operation.....12.8 ohms
- Output impedance (across audio output transformer secondary).....6.4 ohms
- Terminals 2 and 4.....3.5 watts
- Terminals 3 and 4.....6 watts
- Audio output power.....3.5 watts
- Undistorted.....6 watts
- Maximum.....6 watts
- Frequency response.....Flat from 100 to 15,000 cps, ±2 db at 1 watt output
- Speakers.....Low frequency
- One 8" PM.....High frequency
- Two 4" PM.....540 to 1600 kc
- Frequency range of radio.....Collaro Conquest
- Record Changer.....Electro-Voice No.015G-TUL (needle not removable — entire cartridge must be replaced)

TUBE REPLACEMENT

To check or replace tubes, remove the five wood screws which secure the cover back located inside the record changer well.

CHASSIS REMOVAL

Note: It is not necessary to completely remove the chassis for most repair work. The first four steps will make the chassis sufficiently accessible for test and repair in most instances, although the chassis will not be completely free of the cabinet and record player.

1. Remove all panel knobs.
2. Remove two hex-head wood screws from the bottom of the cabinet.
3. Remove the baffle. (If the baffle fits snugly, push it out from the rear of the cabinet using a screwdriver or similar tool).
4. Remove two screws which hold the chassis to the front panel. One screw is located under the LOUDNESS control, the other under the TUNING control. **IMPORTANT:** When removing the screws, support the chassis with one hand to prevent it from falling.

Most repair work can be performed at this time. To test the equipment, connect the AC cord through an isolation transformer.

AS FOLLOWS: COMPLETELY REMOVE THE CHASSIS, CONTINUE

5. If the AC plug had been connected, remove it.
6. Remove the two hex-head screws which secure the AC terminal board to the interlock bracket. (Figure 4)
7. Remove the two hex-head wood screws which secure the loop antenna.
8. Remove the speaker leads from the speaker terminal board located at the cabinet rear.
9. Remove the two hex-head wood screws which secure the speaker terminal board to the cabinet rear.
10. Disconnect the AC lead to the phono motor at the receiver chassis.
11. Remove the chassis.

RADIO-PHONO SWITCH

A RADIO-PHONO switch of novel design is used in models HR112AN and HR113AN. This switch is mounted on the BASS control. When the BASS control is turned to its extreme counterclockwise position (to the point where a click is heard), the equipment is switched to the RADIO position. The BASS control will then affect the radio sound when turned in a clockwise direction.

When the BASS control is turned to its extreme clockwise position (to the point where a click is heard), the equipment is switched to the PHONO position. The BASS control will affect the phono sound when turned in a counterclockwise direction. The PHONO position, B4, is removed from the screen of the 12BE6 oscillator to prevent leak-through of broadcast signals during phono operation.



FIGURE 7. SPEAKER LOCATION AFFECTS SOUND QUALITY

SPEAKER PHASING METHOD

(Figure 8)

The following method may be used when auxiliary speaker is to be added or a replacement speaker installed. This method involves the use of a nine volt battery.

All terminal references mentioned here refer to those shown in figure 8.

1. Disconnect one voice coil lead of speaker A.
 2. Connect the battery to speaker A, as shown by the solid-line battery leads. Note whether the speaker cone moves in or out when the battery is connected.
 3. Remove the battery leads from the speaker A voice coil. Connect the battery leads to the speaker B voice coil so that the cone of speaker B moves in the same direction as did the cone of speaker A. For example, if the speaker A cone had moved in, connect the speaker B voice coil to the battery so that the speaker B cone also moves in. To achieve this result, it may be necessary to connect terminal 3 to positive and 4 to negative or (reversing the leads) 4 to positive and 3 to negative.
 4. Connect both speaker voice coils in parallel so that the cones of both speakers move in the same direction when the battery is connected to the parallelized voice coils. For example, if + connected to terminal 1 caused speaker A cone pull-in, and + connected to terminal 3 caused speaker B cone pull-in, connect terminals 1 and 3 together. (The remaining voice coil leads are then connected together).
 5. Connect the parallelized voice coils to the output transformer secondary, terminals 1 and 5.
- The phasing technique described above may be adapted to the installation of more than one additional speaker.

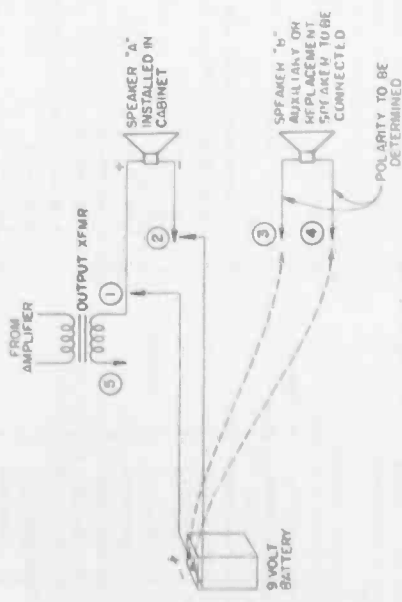


FIGURE 8. SPEAKER PHASING METHOD

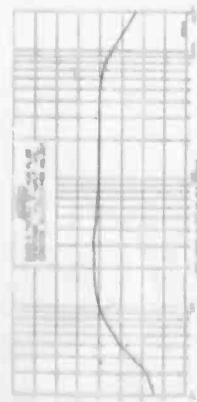


FIGURE 4. FREQUENCY RESPONSE CURVE

SPEAKER PHASING

When two or more speakers are used in the same listening area, speaker phasing is an important consideration. When two speakers are said to be in phase, the cones of both speakers move in and out at the same instant when audio voltage is simultaneously fed to both speakers. Speakers which are mounted close to each other must be connected in phase to produce good quality sound. Speakers may be phased using the battery method suggested under SPEAKER PHASING METHOD, or a "cut and try" method may be employed. The latter method simply means listening to the sound, then reversing the voice coil leads of one of the speakers. If reversing the leads improves the sound, speakers are connected properly. When more than two speakers are used, the battery method is more practical.

If two speakers are to be separated from each other by some distance, a "cut and try" phasing method may be desirable. As indicated in figure 7 the sound from one speaker, located at a greater distance from the listener, reaches the listener an instant later than sound from the closer speaker. For this reason, it is desirable to experiment with speaker location and phasing. The speaker hook-up (disconnect and solder coil connections) which sounds best is the one to use.

AM ALIGNMENT

Preliminary Instructions

1. Remove chassis as described under CHASSIS REMOVAL.
2. Use an isolation transformer between the AC input of the equipment and the AC source. Connect AC and turn on equipment.
3. During alignment, leave the LOUDNESS control set at maximum volume. The signal generator output level should be kept sufficiently attenuated to avoid AVC action.

4. Turn the BASS control to its extreme counterclockwise position so that SW 2 is switched to the RADIO position. Then, turn the BASS control to approximately mid-range. (The equipment will remain in the RADIO position. The action of this switch and control is explained under RADIO-PHONO SWITCH in this manual).
5. Connect a 12 or 15 ohm, 4 watt resistor between terminals 2 and 4 on the speaker terminal board.
6. Use a non-metallic alignment tool which fits snugly into the adjustment slot. A properly fitting alignment tool prevents damage to the slotted iron core.

AM ALIGNMENT CHART

Connect VTVM across terminals 2 and 4

Step	Connect Signal Generator Output To:	Sig. Gen. Freq.	Radio Dial Setting	Adjust Following for Maximum VTVM Reading
1	Slider of antenna tuning capacitor (A) thru a 200 mmf capacitor.	455 kc	Minimum capacity	Top slug of T2. Bottom slug of T2. Top slug of T1. Bottom slug of T1.
2	" " " "	1625 kc	Minimum capacity	Oscillator trimmer (D)
3	Disconnect signal generator. Leave signal generator output lead several feet from receiver antenna so that radiated signal is picked up.	1400 kc	1400 kc	Antenna trimmer (B)

MODEL PARTS

HR112AN - mahogany
HR113AN - oak

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
+		559V028H01		Baffle and grille cloth assembly	5.95
+		516V053H01		Cabinet, mahogany, HR112AN	35.80
+		516V053H02		Cabinet, oak, HR113AN	36.75
+		770V415H01	V-15765-1	Contact, male, AC to phono	.10
+		751V008H01		Cord, AC power	.85
+		768V080H05		Hinge, but, HR112AN	.57
+		768V080H06		Hinge, but, HR113AN	.57
+		550V084H01		Knob, on-off-volume, base and treble	.45
+		550V030H01		Knob, tuning	.50
+		550V019H01		Knob, dial	.45
+		518V001H11		Leg, HR112AN	2.00
+		518V001H12		Leg, HR113AN	2.00
+		754V003A01		Receptacle, power cord	.17
+		751V513H01		Socket, 7 pin molded 35C5	.17
+		751V513H02		Socket, 7 pin, 12BE6 and 12BA6	.20
+		570V048H01		Speaker, 8 inch PM	.17
+		570V049H01		Speaker, 4 inch PM	9.50
+		770V454H04		Support, lid, HR112AN	3.95
+		770V454H03		Support, lid, HR113AN	.90
+		558V126H03		Trim, plastic angle	1.07
+		558V165H01		Trim, handle	.65
+				Trim, handle	2.20

CHASSIS PARTS

V-2503-1 chassis

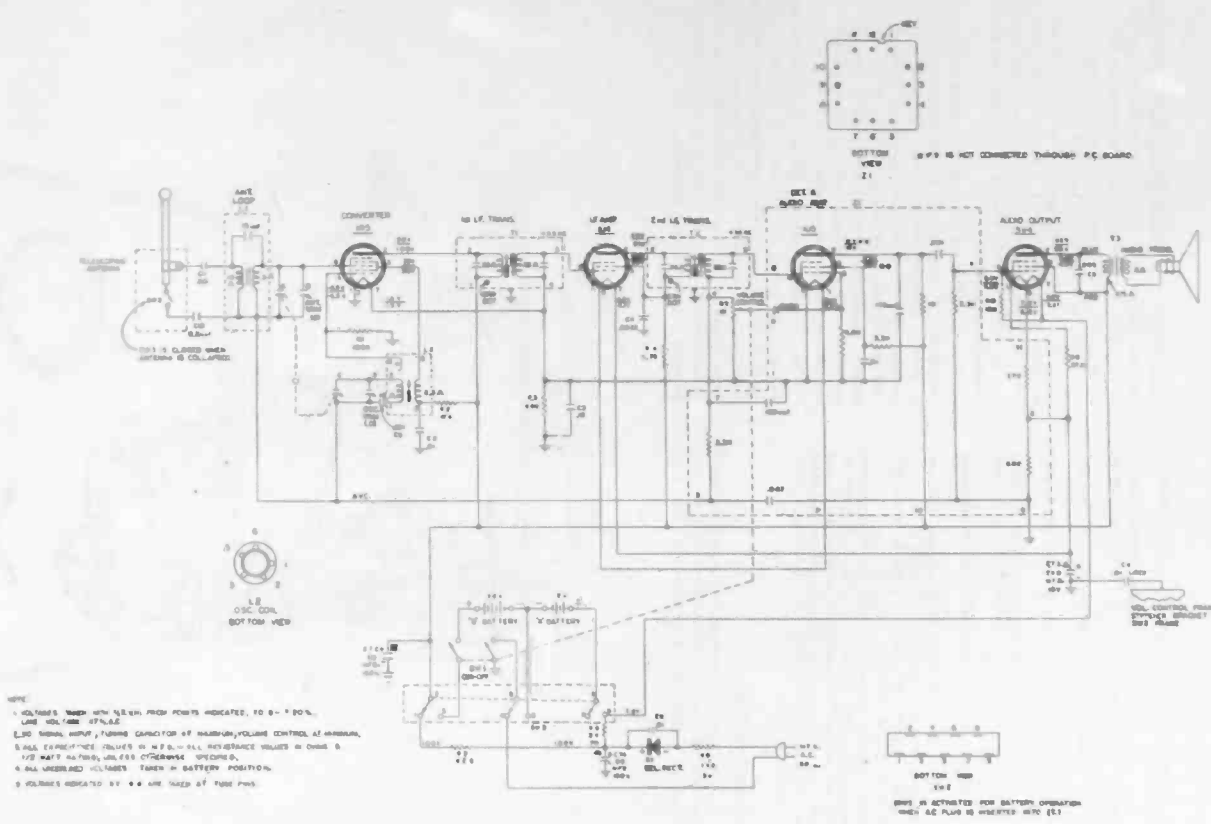
New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Function	List Price
+	C1	330V010H02		Capacitor, variable two gang	Tuning	3.75
+	C2	210V054A73		Capacitor, .047 mf 400V	AVC	.22
+	C3	210V214A73		Capacitor, .047 mf 600V	B- to chassis	.35
+	C4	215V014A70	R1CC62R2G470K	Capacitor, disc, 47 mmf, 20%	Oscillator grid	.17
+	C5	215V114A72	R2CC62Z5Z472P	Capacitor, disc, .0047 mf	IF cathode	.17
+	C6	215V103A32		Capacitor, disc, 3300 mmf	IF neutralizing	.27
+	C7	215V114A72	R2CC62Z5Z472P	Capacitor, disc, .0047 mf	Detector coupling	.17
+	C8	215V102A21	R2CC61Y5Y221M	Capacitor, disc, 220 mmf	Treble control	.22
+	C9	215V103A31		Capacitor, disc, 330 mmf	Treble control	.20
+	C10	215V101A03	R2CC62Y5Y102M	Capacitor, disc 1000 mmf	Bass control	.22
+	C11	215V201A03		Capacitor, disc .01 mf 1.4 KV	Phono coupling	.35
+	C12	210V024A73	RCP10W6473M	Capacitor, molded .047 mf 600V	Across AC line	.22

CHASSIS PARTS (Con't.)


V-2503-1 chassis

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Function	List Price
+	C-13A	218V025H17		Capacitor, electrolytic 80-60-10 mf 150V	Filter	2.50
+	C-13B	215V201A03		Capacitor, .01 mf disc, 1.4 KV	Phono base plate	.35
+	C-13C	310V030H01		Loop antenna, iron core		2.10
+	L1	230V061H01		Coil, oscillator		.90
<i>All resistors are rated at 1/2 watt, 10% unless otherwise noted</i>						
+	R1	250V231A01	RC20AE101M	Resistor, 100 ohms	Oscillator cathode	.05
+	R2	250V222A23	RC20AE223K	Resistor, 22K ohms	Oscillator grid	.07
+	R3	250V224A70	RC20AE470K	Resistor, 47 ohms	Oscillator grid	.05
+	R4	250V223A35	RC20AE355K	Resistor, 3.3 megohms	AVC	.12
+	R5	250V226A80	RC20AE680K	Resistor, 68 ohms	IF cathode	.04
+	R6	250V221A02	RC20AE102K	Resistor, 1K ohms	12BA6 screen	.12
+	R7	250V224A74	RC20AE474K	Resistor, 470K ohms	Diode load	.05
+	R8	250V224A74	RC20AE474K	Resistor, 470K ohms	Tone compensation	.05
+	R9	270V027H07		Control, 3.3 megohms	Treble	1.10
+	R10	250V221A84	RC20AE184K	Resistor, 180K ohms	Bass compensation	.05
+	R11	270V052H01		Control, 3.3 megohms, 1/2W, includes SW2	Bass	2.00
+	R12	270V027H08		Control, 1 megohms, includes SW1	Volume	1.65
+	R13	250V224A71	RC20AE471K	Resistor, 470 ohms	12AX7	.12
+	R14	250V221A82	RC20AE182K	Resistor, 1.8K ohms	12AX7 cathode	.05
+	R15	250V226A83	RC20AE683K	Resistor, 68K ohms	12AX7 cathode	.05
+	R16	251V023H19	V-6067-12	Resistor, 120 ohms, 1.5W, 10% glassohm	Cathode output	.40
+	R17	251V023H13		Resistor, 15 ohms, 2W, glassohm	Selenium protection	.27
+	R18	250V222A71	RC20AE271K	Resistor, 270 ohms	AC filter	.10
+	R19	250V221A82	RC20AE182K	Resistor, 1.8K ohms	AC filter	.05
+	R20	250V426A80		Resistor, 68 ohms, 2W 10%	Filament series	.35
+	R21	250V221A04	RC20AE104K	Resistor, 100K ohms	Plate load	.12
+	R22	250V221A04	RC20AE104K	Resistor, 100K ohms	Plate load	.12
+	SW1	270V027H08		Switch, on-off, part of R12		1.65
+	SW2	270V052H01		Switch, radio-phono, part of R11		2.00
+	T1	235V042H01		Transformer, 1st IF (455 KC)		1.50
+	T2	235V042H02		Transformer, 2nd IF (455KC)		1.50
+	T3	430V058H01		Transformer, audio		3.20
+	X1	296V002H01		Crystal, diode		1.25
+	X2	295V012H02		Rectifier, selenium, 150 ma		2.85
+	Z1	219V033H02		Packaged circuit, detector filter		1.75
+	Z2	219V024H01		Packaged circuit, audio		1.75

* New part number listed for the first time in Westinghouse television or radio service information.



V-2394-2
Figure 1 - Schematic Diagram



Westinghouse

RADIO

SERVICE MANUAL


MODELS

H662P4
(Charcoal and White)

H663P4
(Spruce Green and White)

H664P4
(Lemon Yellow and White)

CHASSIS V-2394-2



SERVICE DEPARTMENT
RADIO-TELEVISION DIVISION
WESTINGHOUSE ELECTRIC CORP.
PITTSBURGH, PA.



SPECIFICATIONS

Frequency Range	540 to 1600 kc
Intermediate Frequency	455 kc
Tube Complement	5
1 1B5	Converter
1 1U4	I.F. Amplifier
1 1X7	Detector AVC and 1st Audio Amplifier
1 3V4	Audio Output
Power Consumption AC Operation	15 Watts
Audio Power Output (AC-Operation)	15 Watts
Undistorted	100 Watts
Speaker	150 Watts
Power Supply	4" PM
Battery Operation	
1 "A" Battery (9V) Eveready #276, Burgess #D6, Ray-O-Vac #1603, General #89	
1 "B" Battery (9V) Eveready #479, Burgess #P60, Ray-O-Vac #214, General #176	
Current Consumption (Battery Operation)	
"A" Battery	.050 Amp.
"B" Battery	.009 Amp.

MODULE SERVICING INFORMATION

The Detector-Firm Audio Amplifier stage of this receiver has been modularized to provide greater reliability, compactness and ease of servicing. All the components of this stage, including the tube socket, are contained in this packaged circuit.

The module consists of five printed circuits, stacked, one on top of another. Each printed circuit is made up of a ceramic carrier with more than one component (capacitors or resistors) printed on the wafer. The five stacked wafers are connected together by twelve riser wires. At the top of the module, seven of the risers connect to the tube socket. At the bottom of the module the riser wires are extended so that they can be soldered directly into the printed circuit board.

Because the module is a complete unit, it is easier to service and replace than the individual components. A bottom view of the module is shown on the schematic diagram

(Figure 1). A key (notch) on one side of the module indicates pin #1 of the module. With exception of pin #9 all the riser wires are soldered into the printed circuit chassis. The components contained in the module are shown on the schematic enclosed in dashed lines. The corresponding riser numbers are shown as they enter the circuit.

It is not recommended that the module itself be serviced. It is rather difficult to replace components within the module. If the trouble is localized to the module it is recommended that the module be replaced.

To replace a module enter the riser wires at the base of the module, where they enter the printed circuit board. Remove the remaining wires from the board with the soldering iron (low wattage type). Observing the correct position of the module key, install the new module in the holes in the board and solder to place.

extended is 38" long. The telescoping antenna is inductively and capacitively coupled to the grid of the RF amplifier. It is connected to a primary winding, wound on the ferrite rod antenna and tightly coupled to the tuned secondary. The high ends of the windings are coupled together through a 15 mmf capacitor. In this manner a constant high impedance is presented to the telescoping antenna over the entire AM band. For low AM frequencies the signal is predominantly coupled inductively while high AM frequencies are primarily coupled capacitively.

When extended, the telescoping antenna represents 15 mmf capacity to earth ground. In the retracted position this is reduced to approximately 7 mmf. Hence, to maintain a constant capacity, an 8.2 mmf capacitor is placed in shunt with the antenna, in the retracted position (SW3). The telescoping antenna should therefore be used in either the fully extended or fully retracted positions for optimum results, not in some intermediate position.

The telescoping antenna serves as a non-directional pickup. This means that the radio can be rotated to any position without encountering nulls (dead spots) as usually found with conventional loop or ferrite-core antennas. In areas of high ambient electrical noise level, it may be found advantageous to keep the telescoping antenna in its fully retracted position for best performance.

CHASSIS REMOVAL

1. Press in the two cabinet release buttons on either side of the receiver case. Open the case to expose the chassis and batteries.
2. Unsnap the battery cable assemblies from the "A" and "B" batteries.
3. Remove the two self-tapping screws securing the AC receptacle.
4. Disengage the volume control knob from the control shaft. This knob is caprivated and thus will remain in the case when the chassis is removed.
5. Remove the battery leads from under the two retaining bands.
6. Unsolder the wire to the telescoping antenna. Unsolder the loop antenna end of capacitor C11 (.001 mf).
7. Remove the two self-tapping screws securing the chassis bracket to the top of the case.
8. Carefully slide the chassis out from the receiver case. When servicing, with the receiver connected to the AC power line, use an isolation transformer between the AC line and the receiver. To replace the chassis, reverse the above procedure. Be careful to correctly seat the chassis in the cabinet mounting grooves.

ANTENNA INFORMATION

This receiver employs two antennas. One is a horizontal ferrite-core and the other a vertical telescoping antenna. The telescoping antenna has 5 sections and when fully

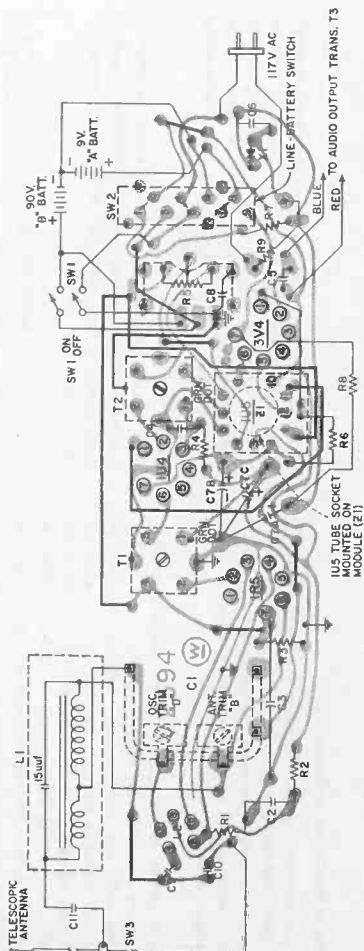


Figure 2 - Bottom view of chassis with components shown symbolically

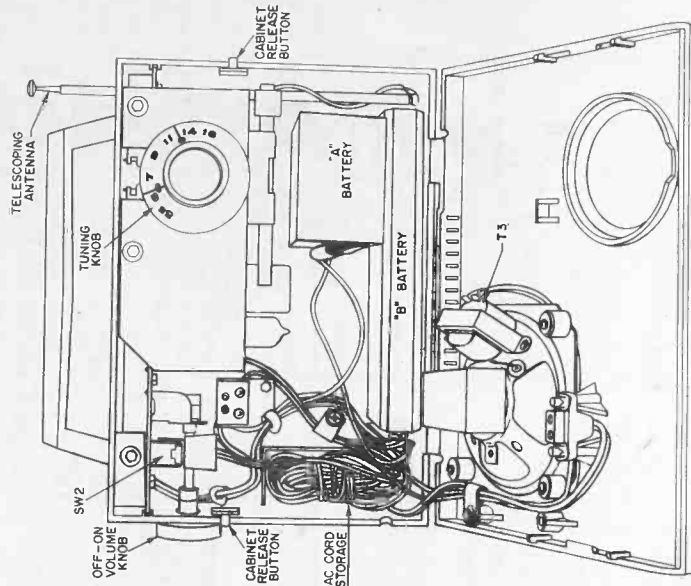


Figure 4 - View of receiver with case opened

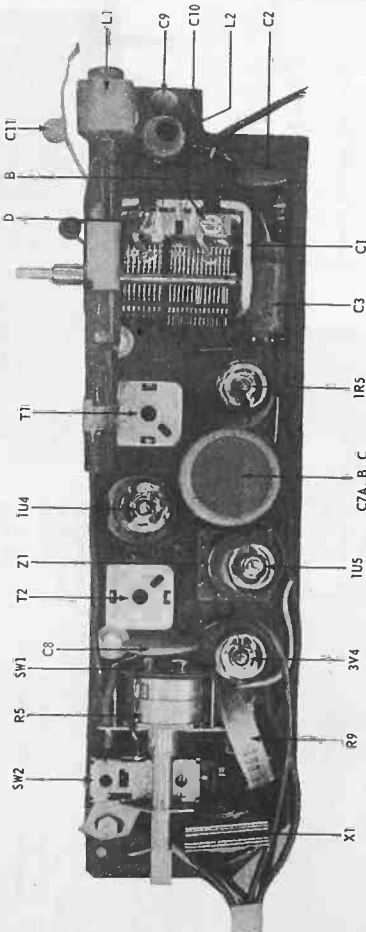


Figure 3 - Top view of chassis

ALIGNMENT

While making the following adjustments, keep the volume control set at maximum output and the signal generator output attenuated to avoid AVC action.

If the receiver is powered from the 117 volt AC line, it is recommended that an isolation transformer be used between the receiver and the AC line.

Step	Connect Signal to:	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output
1	Stator of tuning capacitor (F) through a .01 mf capacitor.	455KC	Minimum capacity	Top and bottom slugs of T2 & T1 in order given
2	Capacitor C11 as shown in Figure 5 through a 15 mmf capacitor.	1625KC	Minimum capacity	Oscillator trimmer "C"
3	Same as step #2	1400KC	1400KC	RF trimmer "F" and antenna trimmer "B"
4	Same as step #2	600KC	600KC	L2
5	Repeat steps 2, 3 & 4 until no further change is noted			

It is recommended that a fibre aligning tool, that snugly fits the slot in the powdered iron core, be used, to prevent chipping of the slot in the IF transformers and coils.

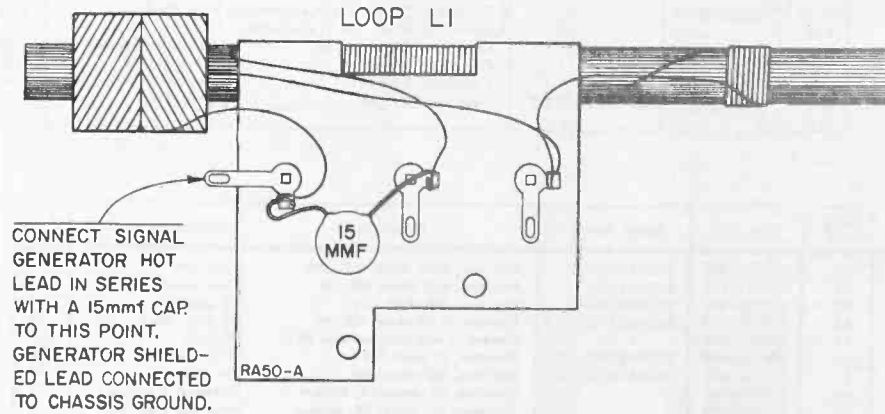


Figure 5 - Signal generator connection in step 2 of alignment procedure

MODEL PARTS LIST

When ordering parts, specify part number, description of part and model number.
Do not order by model number alone.
Where applicable, prices include Federal Excise Tax.

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	List Price
		318V004H01		Antenna, telescoping	3.00
		770V565H01		Bracket, handle	.10
		778V104H01		Bracket assy., AC receptacle	.45
†		513V028H03		Cabinet, H662P4, Charcoal & White	10.00
†		513V028H04		Cabinet, H663P4, Spruce Green & White	10.00
†		513V028H05		Cabinet, H664P4, Lemon Yellow & White	10.00
		759V042H02		Cable, batteries	.70
†		559V027H03		Catch assy., H662P4	1.00
†		559V027H04		Catch assy., H663P4	1.00
†		559V027H05		Catch assy., H664P4	1.00
		770V588H01		Contact, antenna (secured to inside of cabinet)	.20
		751V009H01		Cord, AC power	.75
		555V028H01		Escutcheon	.85
		558V159H01		Handle	.65
		558V166H01		Insignia	.45
		550V096H01		Knob, volume	.55
		550V087H01		Knob, dial	.55
		550V088H01		Knob, tuning	1.00
†		558V162H03		Nameplate, handle	.85
		768V044H09		Nut (captures dial knob)	.05
		783V079H01		Nut, brass sleeve (mounts telescoping antenna)	.10
		751V513H04		Socket, 7 pin (3V4)	.17
		751V513H05		Socket, 7 pin (1R5 & 1U4)	.17
		570V050H01		Speaker, 4" PM (includes T3)	6.00
		770V520H01		Spring, hinge	.10
		763V000H95		Washer (captures volume knob)	.05

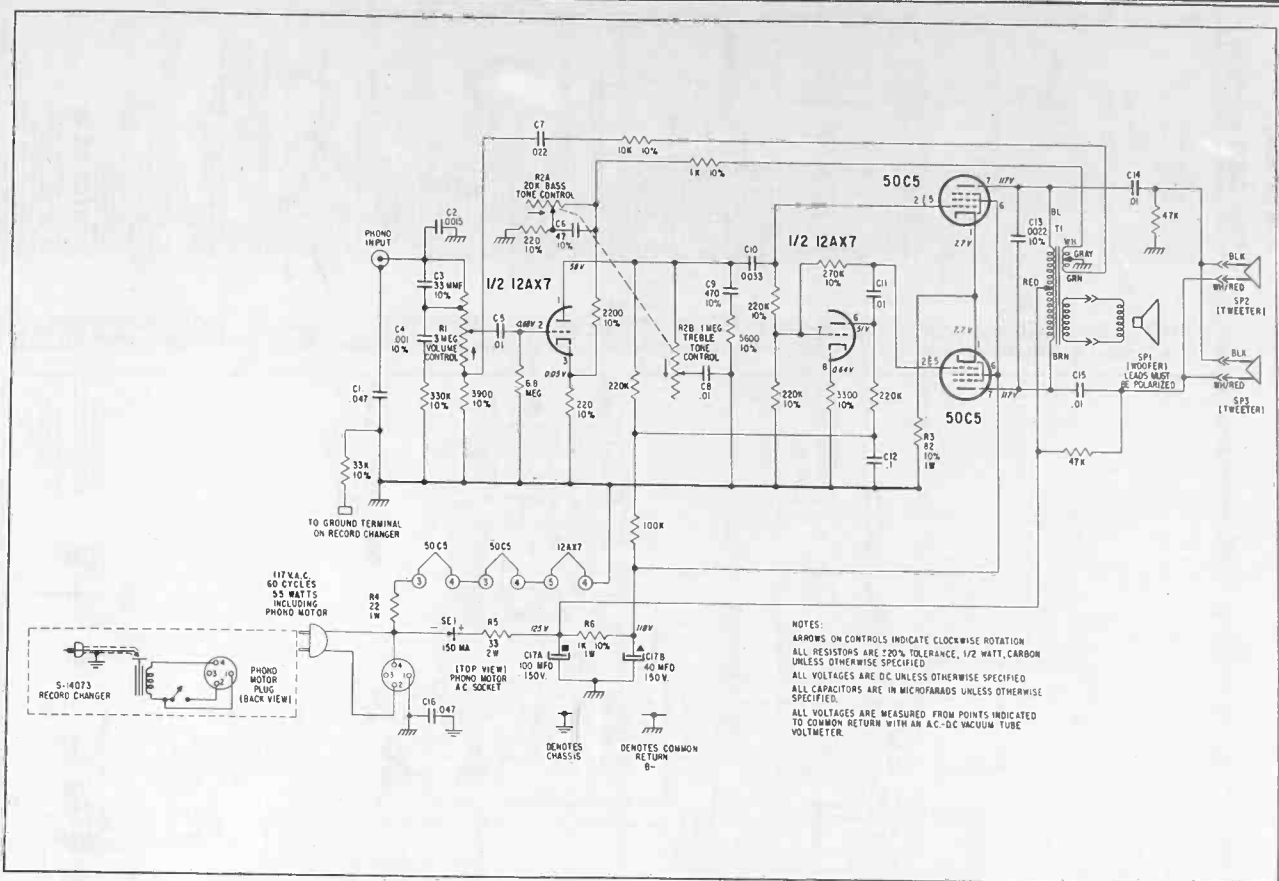
CHASSIS PARTS LIST

Resistors are 1/2 watt, 10% unless otherwise specified.

New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
†	C1	330V008H03		Capacitor, variable	Tuning	3.75
	C2	215V111A03	R2CC63Z5Z103P	Capacitor, .01 mf, ceramic GMV	Osc. plate by-pass	.20
	C3	210V111H08		Capacitor, .15 mf, 200 V, tubular	1F Amp. grid bias	.35
	C4	215V112A22	R2CC62Z5Z222P	Capacitor, .0022 mf, ceramic, 500 V	1F Amp. screen	.17
	C5	215V308H04		Capacitor, .005 mf, ceramic, 500 V	Audio output	.20
	C6	215V111A03	R2CC63Z5Z103P	Capacitor, .01 mf, ceramic, 500 V	Rectifier by-pass	.20
	C7A	218V025H18		Capacitor, 80 mf, 150 V, electrolytic	AC filter	2.45
	C7B			Capacitor, 250 mf, 150 V, electrolytic		
	C7C			Capacitor, 60 mf, 150 V, electrolytic		
	C8	215V306H03		Capacitor, .01 mf, 1.4 kv	Bracket to ground	.35
	C9	215V300H48		Capacitor, .001 mf	Osc. padder	.20
	C10	215V300H46		Capacitor, 8.2 mmf	Ant. loop	.20
	C11	215V111A02	R2CC61Z5Z102P	Capacitor, .001 mf	Ant. loop	.17

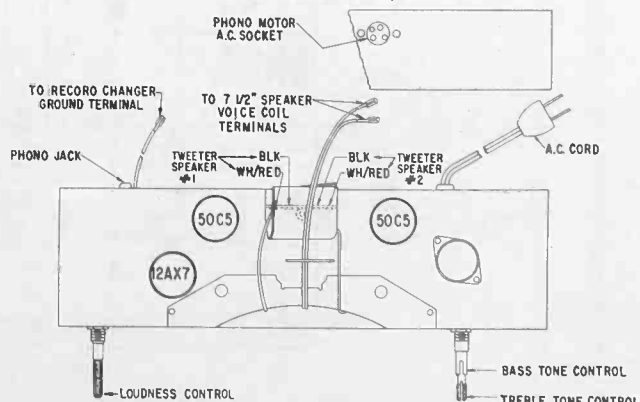
New Part	Ref. No.	Part No.	Equiv. Part No.	Description	Location or Function	List Price
	R1	250V231A04	RC20AE104M	Resistor, 100K ohms, 1/2W, 20%	Osc. grid	.05
	R2	250V234A73	RC20AE473J	Resistor, 47K ohms, 1/2W, 5%	Osc. screen	.17
	R3	250V226A81	RC20AE681K	Resistor, 680 ohms, 1/2W	1F grid bias	.17
	R4	250V234A72	RC20AE472J	Resistor, 4.7K ohms, 1/2W, 5%	1F Amp. plate	.12
	R5	270V027H06		Control, 1 megohm (includes SW1)	Volume	1.95
	R6	250V222A70	RC20AE270K	Resistor, 27 ohms, 1/2W	3V4 filament	.06
	R7	250V228A21	RC20AE821K	Resistor, 820 ohms, 1/2W	B+ filter	.12
	R8	251V026H01		Resistor, 2K ohms, 7W, ballast	Filament drooping	.70
†	R9	251V020H55		Resistor, 150 ohms, 5W, ballast	Selenium protection	.35
	R10	250V211A56	RC20AE156J	Resistor, 15 megohms, 1/2W, 5%	Audio output grid	.20
	L1	310V031H01		Loop, (includes 15 mmf capacitor)	Antenna	2.00
†	L2	230V067H01		Coil	Oscillator	1.20
	SW1	270V027H06		Switch, (includes R5)	On-off	1.95
	SW2	756V030H01		Switch	AC battery	1.45
	SW3	318V004H01		Switch, (includes telescoping antenna)	Antenna	3.00
	T1	235V043H01		Transformer, 455 kc	1st 1F	1.60
	T2	235V043H02		Transformer, 455 kc	2nd 1F	1.60
	T3	570V050H01		Transformer, (includes speaker)	Audio output	6.00
	X1	295V014H01		Rectifier, selenium	AC rectifier	2.00
	Z1	219V026H01		Module, used with 1U5	Audio circuit	2.30

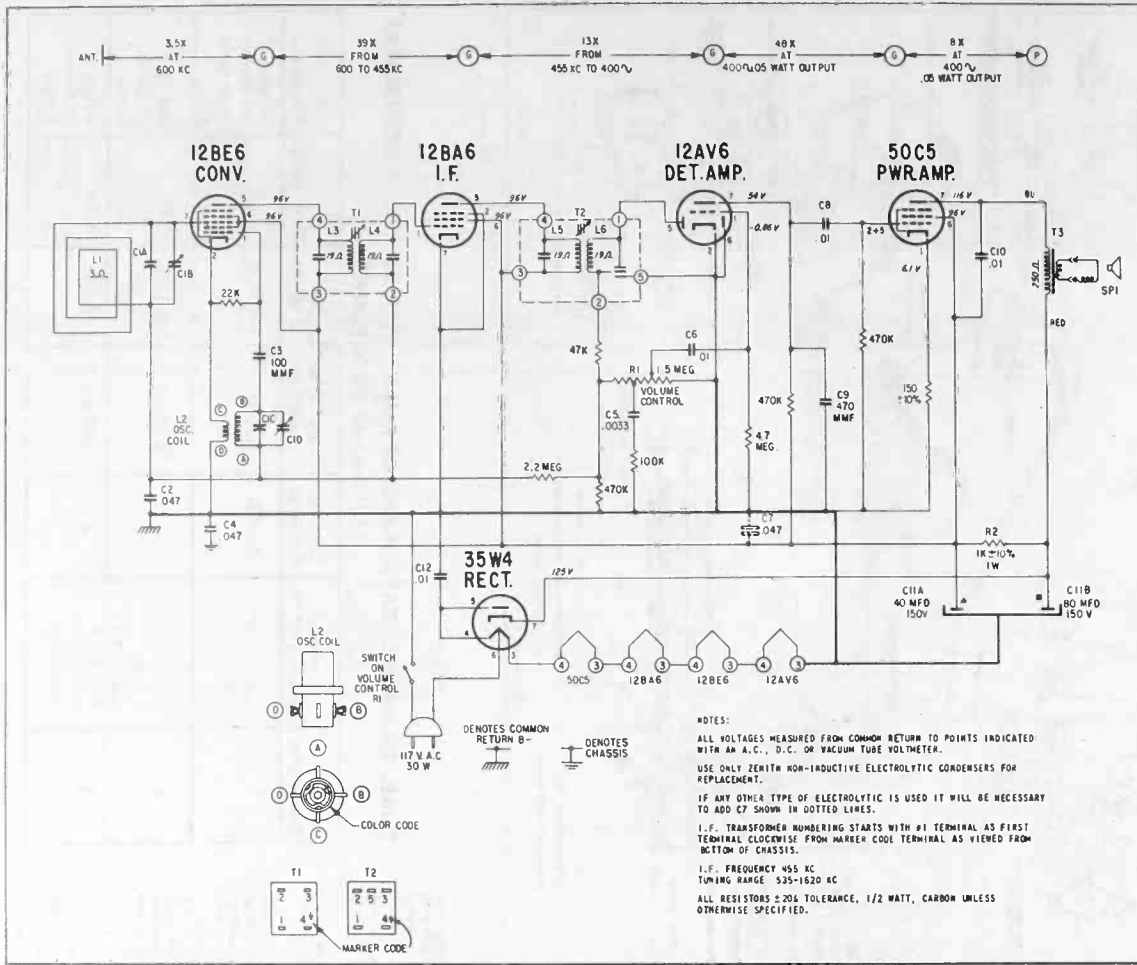
† New part listed for the first time in Westinghouse Television or Radio Service Information.
Prices are subject to change without notice.



ZENITH RADIO CORPORATION MODELS HF110G & J CHASSIS 3Z04

PART NO.	DIA. NO.	3Z04 CHASSIS PARTS DESCRIPTION	PRICE
11-103		Line Cord	1.00
22-3	C5, 8, 11, 14, 15	.01 mfd. ceramic disc. 1KV (5 used)	.30
22-11	C10	.0033 mfd. ceramic disc. 500V	.25
22-12	C2	.0015 mfd. ceramic disc. 500V	.25
22-16	C9	470 mfd. ceramic disc. 800V	.25
22-17	C4	.001 mfd. ceramic disc. 1KV	.25
22-1777	C12	.1 mfd. molded - 200V	.35
22-2765	C6	.47 mfd. tubular - 200V	.60
22-2792	C1, 16	.047 mfd. tubular - 200V (2 used)	.35
22-2807	C7	.022 mfd. tubular - 200V	.25
22-2839	C13	.0022 mfd. tubular - 600V	.30
22-2863	C3	33 mfd. ceramic disc - 500V	.25
22-2864	C17A, B	Electrolytic 40/150V, 100/150V	2.50
44-25		Phono Jack	.25
54-139		3/8-32 x 9/16 hex palnut (1 mts. ea. 63-4003 & 4004)	.01
54-267		6-32 x 5/16 hex palnut (used on 114-510)	.01
63-965	R6	1000 ohm 1W Ins. 10%	.25
63-1757		220 ohm 1/2W Ins. 10% (2 used)	.17
63-1785		1000 ohm 1/2W Ins. 10%	.17
63-1799		2200 ohm 1/2W Ins. 10%	.17
63-1806		3300 ohm 1/2W Ins. 10%	.17
63-1810		3900 ohm 1/2W Ins. 10%	.17
63-1817		5600 ohm 1/2W Ins. 10%	.17
63-1827		10K ohm 1/2W Ins. 10%	.17
63-1848		33K ohm 1/2W Ins. 10%	.17
63-1856		47K ohm 1/2W Ins. 10% (2 used)	.17
63-1870		100K ohm 1/2W Ins. 20%	.17
63-1883		220K ohm 1/2W Ins. 10% (2 used)	.17
63-1894		220K ohm 1/2W Ins. 20%	.17
63-1887		220K ohm 1/2W Ins. 10%	.17
63-1890		330K ohm 1/2W Ins. 10%	.17
63-1947		6.8 megohm 1/2W Ins. 20%	.17
63-3197	R4	22 ohm 1W Ins. 20%	.25
63-3636	R3	82 ohm 1W Ins. 10%	.25
63-3637	R2A, B	1 megohm treble - 20K bass	.25
63-3687	R1	3 megohm volume control	.25
63-3643	R5	33 ohm 2W Ins. 20%	.34
78-275		Electrolytic socket	.05
78-402		4 Contact socket	.15
78-810		7 Contact miniature tube socket (1 mts. ea. 50C5)	.15
78-846		9 Pin miniature tube socket (mts. 12AX7)	.25
83-1119		Insulating strip	.05
83-2115		7 Lug terminal strip	.15
83-2216		7 Lug terminal strip	.15
83-2307		4 Lug terminal strip	.10
83-2454		4 Lug terminal strip (2 used)	.10
83-2494		Insulating strip	.05
83-2530		Armitie strip	.10
83-2628		1 Lug terminal strip	.05
83-2635		5 Lug terminal strip	.10
86-254		Terminal (part of S-24248)	.05
93-2		Brass washer (2 mt. 95-1481)	.10
95-1481	T1	Output transformer	4.00
114-510		6-32 x 1-5/8 x 1/2 hex h. mach. screw (mts. 212-18)	.03
125-96		Strain relief grommet	.10
212-18	SE1	Selenium rectifier	2.35
S-24248		Wire & terminal asm.	
MODELS HF110, G & J CABINET PARTS			
Using Chassis 3Z04			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
14-2405G		Table Cabinet - Model HF110G	
14-2405J		Table Cabinet - Model HF110J	
16-1446		Packing Carton	.20
19-298		Mounting Clip (mts. S-41437)	
24-923		Chassis Cover - Model HF110J	
24-924		Chassis Cover - Model HF110G	
36-210		Cabinet Handle (part of 14-2405G)	
36-211		Cabinet Handle (part of 14-2405J)	
40-157		Lid Support Hinge (part of 14-2405, G & J)	1.30
40-189		Hinge (2 part of 14-2405 G & J)	.30
46-1318		Knob - Volume & Tone HF110J	.75
46-2001		Knob - Volume & Tone HF110G	.03
49-795	SP1	7 1/4" P. M. Speaker	8.50
54-10		8-32 x 1/8 Hex. Nut (3 part of 14-2405 G & J)	.03
54-424		8-32 x 11/32 Hex. Palnut (3 mt. 49-795)	.03
57-1721		Emblem Plate (part of 14-2405 G & J)	.25
70-215		6 x 3/8 Philips. Rd. Hd. Wood Screw (6 used on 14-923 & 924)	.04
70-239		6 x 7/8 Philips. Oval Hd. Wood Screw (4 used on 14-2405 G & J)	.04
83-765		Armitie strip (2 used)	.03
83-1475		Armitie strip	.03
83-2535		Phono Shipping Strip (2 used)	.03
83-2761		Phono Shipping Strip	.15
86-254		Terminal (4 used)	.03
93-1173		6 Finishing Washer (1 used on ea. 70-239)	.03
93-1260		Fibre Washer (2 part of S-14083)	.03
97-511		Handle Stud (2 part of 14-2405 G & J)	.25
112-788		8-32 x 1-1/8 Swedge Hd. Mach. Screw (3 part of 24-2405 G & J)	.03
112-1038		Record Changer Mtg. Screw (2 part of S-14083)	.15
112-1142		S-20 x 1/8 PHII - Rd. Hd. Self Tap Screw (mts. 19-298)	.04
114-329		6-18 x 3/8 x 1/4 Hex. Hd. Self Tap Screw (2 mt. ea. S-23829)	.03
114-478		10-32 x 1/2 Hex Slot Hd. Mach. Screw - Flat washer att. (4 used on 3Z04)	.03
142-87		Dual Cartridge (Sapphire-Sapphire)	3.95
156-45		Cover Latch (2 part of 14-2405J)	1.50
159-94		Plug Button (4 used on 14-2405 G & J)	.10
159-95		Plug Button Screen (2 used on 14-2405 G & J)	.55
166-114		Plastic Bumper (4 part of 14-2405 G & J)	.55
188-102		Knob Retaining Ring (1 part of ea. S-43478, 43479, 44126 & 44127)	.03
188-195		Retaining Ring (2 part of S-14083)	.03
202-1362		Instruction Book	.30
S14083		Record Changer	
S-23829	SP2, 3	Tweeter Speaker (2 used)	2.95
S-41437		45 RPM Record Adapter	1.10
S-42308		Cartridge Holder (part of S-14083)	1.00
S-43478		Knob & Ring Assem.	.25
S-43479		Knob & Ring Assem.	.25
S-44126		Knob & Ring Assem. Tone HF110G	
S-44127		Knob & Ring Assem. Dummy HF110G	



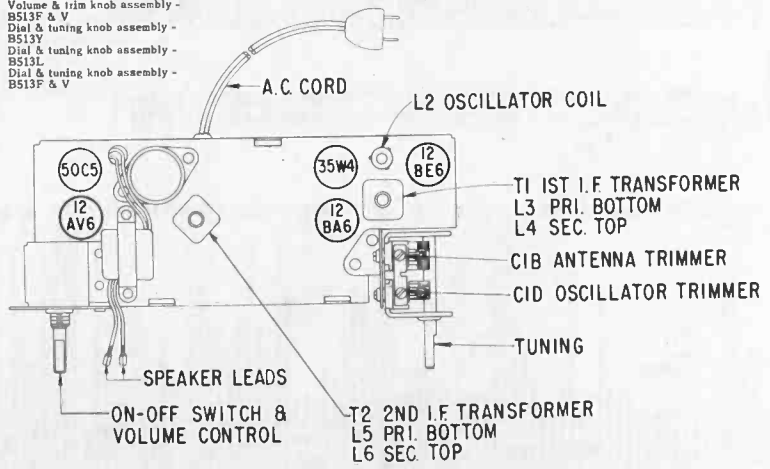


ZENITH RADIO CORPORATION MODEL B513Y, L, F, V CHASSIS 5B01

CHASSIS PARTS		
PART NO.	DIA. NO.	DESCRIPTION
11-85		Line cord & plug .75
12-2323		Wavemagnet mtg. bracket .15
12-2677		Variable capacitor mtg. bracket
12-2678		Volume control mtg. bracket
19-238		Coil mounting clip (part of S-43910) .10
22-3	C6,8,10,12	.01 mfd. ceramic disc capacitor - 500V (4 used) .30
22-5	C3	100 mmfd. ceramic disc capacitor - 500V .25
22-6	C9	470 mmfd. ceramic disc capacitor - 1KV .25
22-11	C5	.0033 mfd. ceramic disc capacitor - 500V .25
22-2351		Electrolytic capacitor - 40/150 80/150 .25
22-2792	C2,4,7	.047 mfd. paper dielectric capacitor - 200V (2 used) .30
22-3098	C1A,B,C,D	Two section variable capacitor
54-139	R2	3/8-32x9/16 paint (mts. 63-4404) .03
63-965		1000 ohm ins. 1W 10% .25
63-1750		150 ohm ins. 1/2W 10% .17
63-1842		22 K ohm ins. 1/2W 10% .17
63-1856		47 K ohm ins. 1/2W 20% .17
63-1870		100 K ohm ins. 1/2W 20% .17
63-1898		470 K ohm ins. 1/2W 20% (3 used) .17
63-1926		2.2 megohm ins. 1/2W 20% .17
63-1940		4.7 megohm ins. 1/2W 20% .17
63-404	R1	Volume control & switch .05
78-275		Electrolytic capacitor socket
78-831		Seven contact wafer tube socket
78-889		Seven contact wafer tube socket (3 used) .15
78-990		Seven contact wafer tube socket .15
83-2132		Single lug terminal strip .05
86-199		Terminal shakeproof (used with 114-275) .03
86-237		Connector terminal (2 used) .03
94-295		Gang capacitor mtg. bushing (3 used) .05
95-1504	T1	1st I.F. transformer 2.50
95-1505	T2	2nd I.F. transformer 2.50
95-1637	T3	Output transformer
113-78		6-32x1/6x1/4 AF hex. hd. mach. screw - lockwasher att. (2 used on 22-3098) .03
114-78		8-18x5/16x1/4 AF hex. hd. self-tapping screw (1 used on 12-2323, and 2 on ea. 12-2577 & 2678) .03
114-365		8-32x3/8 hex. hd. self-tap screw - flat washer att. (used on S-4517) .05
114-542		6-32x11/32 hex. hd. mach. screw (used on 22-3098) .03
125-94		Rubber grommet (3 used) .03
125-96		Strain relief grommet .10
145-211		Iron core (part of S-43910) .10
S-43910	L2	Oscillator coil
S-44517	L1	Wavemagnet

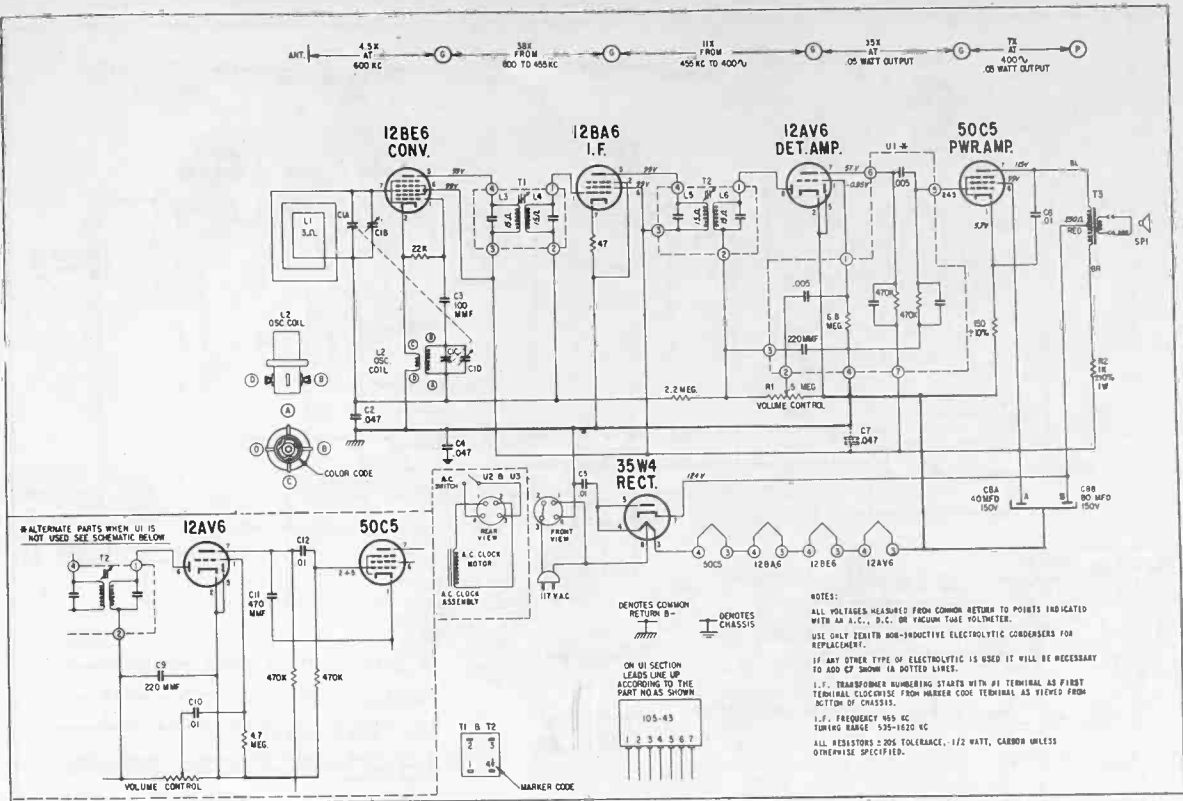
CABINET PARTS		
PART NO.	DIA. NO.	DESCRIPTION
114-523		8-18x7/16 hex. hd. self-tapping screw - flat washer att. (4 used on 49-869) .05
114-637		8-32x1/2 slotted hex. hd. mach. screw - flat washer att. (4 used on 5B01)
126-896		Heat shield
138-210		Cabinet grille - B513Y
138-211		Cabinet grille - B513L
138-212		Cabinet grille - B513F & V
188-155		Knob clamping ring (used on S-44790 & 44792) .04
188-231		Knob clamping ring (used on S-44803 & 44805)
202-1396		Instruction book
S-26670		Terminal strip
S-44790		Volume & trim knob assembly - B513Y
S-44791		Volume & trim knob assembly - B513L
S-44792		Volume & trim knob assembly - B513F & V
S-44803		Dial & tuning knob assembly - B513Y
S-44804		Dial & tuning knob assembly - B513L
S-44805		Dial & tuning knob assembly - B513F & V

I.F. TRANSFORMERS:
The I.F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers, the tuning wrench 68-19 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.



ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, L4, L5, L6	Align I.F. for max. output.
2	One Turn Loop Coupled Loosely to Wave Magnet.	-	1600 Kc.	1600 Kc.	C1D	Set Osc. to Dial Scale.
3		-	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage.



MODELS B514F,W,C,V-B515B,P,G,Y CHASSIS 5B04-5B06

CHASSIS PARTS			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
11-85		Line cord & plug	.75
12-2323		Wavemagnet mtg. bracket	.15
12-2667		Variable capacitor mtg. bracket	.10
19-238		Coil mtg. clip (part of S-43910)	.10
22-3	C5,5, 10,12	.01 mfd. ceramic disc capacitor - 500V (2 used)	.30
22-5	C3	100 mfd. ceramic disc capacitor - 500V	.25
22-2351	C8A,B	Electrolytic - 40/150 80/150	2.30
22-2792	C2,4,7	.047 mfd. paper dielectric capacitor - 200V (2 used)	.30
22-3088	C1A,B	Two section variable capacitor - 500V	
63-965	R2	1000 ohm 1/2W ins. 10%	.25
63-1730		47 ohm 1/2W ins. 10%	.17
63-1750		150 ohm 1/2W ins. 10%	.17
63-1842		22 K ohm 1/2W ins. 20%	.17
63-1926		2.2 megohm 1/2W ins. 20%	.17
63-4390	R1	Volume control	.05
78-275		Electrolytic socket	.05
78-831		Seven contact wafer tube socket	.15
78-989		Seven contact wafer tube socket (3 used)	.15
78-990		Seven contact wafer tube socket	.15
78-1122		Four contact socket	.03
86-10		Terminal	.03
86-237		Connector terminal (2 part of 95-1627)	.03
94-295		Gang capacitor mtg. bushing (3 used)	.05
95-1504	T1	1st I.F. transformer	2.50
95-1527	T3	Output transformer	
95-1636	T2	2nd I.F. transformer	
105-43	U1	Integnet	
113-78		6-32x1/32x1/4 AF hex. hd. mach. screw - lockwasher att. (2 used on 22-3088)	.03
114-78		8-18x5/16x1/4 AF hex. hd. self-tapping screw (1 used on 12-2323, 2 on 12-2667)	.03
114-275		6-32x5/16x1/4 AF hex. hd. mach. screw (mts. 86-30 or 22-3088)	.03
114-365		8-32x3/8 hex. hd. self-tap screw - flat washer att. (used on S-44171)	.05
114-542		6-32x1/32 hex. hd. mach. screw (mts. 86-30 or 22-3088)	.03
125-94		Rubber grommet (3 used)	.03
125-96		Strain relief grommet	.10
149-211		Iron core (part of S-43910)	.10
S-43910	L2	Oscillator coil	
S-44171	L1	Wavemagnet	
CABINET PARTS			
12-2666		Grille mtg. bracket (2 used)	6.00
14-2460		Plastic table cabinet - B514F	6.00
14-2461		Plastic table cabinet - B514W	6.00
14-2462		Plastic table cabinet - B514C	6.00
14-2463		Plastic table cabinet - B514V	6.00
14-2464		Plastic table cabinet - B515B	6.00
14-2465		Plastic table cabinet - B515P	6.00
14-2466		Plastic table cabinet - B515Q	6.00
14-2469		Plastic table cabinet - B515Y	6.00
16-1471		Packing carton - B514	
16-1472		Packing carton - B515	
26-611		Radio dial scale - B514	
26-619		Radio dial scale - B515	
46-2015		Volume control knob	
46-2016		Clock knob - B514	
46-2017		Clock knob - B515 (2 used)	
46-2072		Tuning control knob	5.00
46-438	SP1	4" PM speaker	.35
57-2498		Emblem plate	
57-2576		Dial mtg. plate	
58-742		4 pin pin	
80-1003		Knob retaining spring	.10
80-1156		Iron retaining spring - B515 (2 used)	.03
83-2976		Dial spacer strip	
93-1182		Spring washer	.03

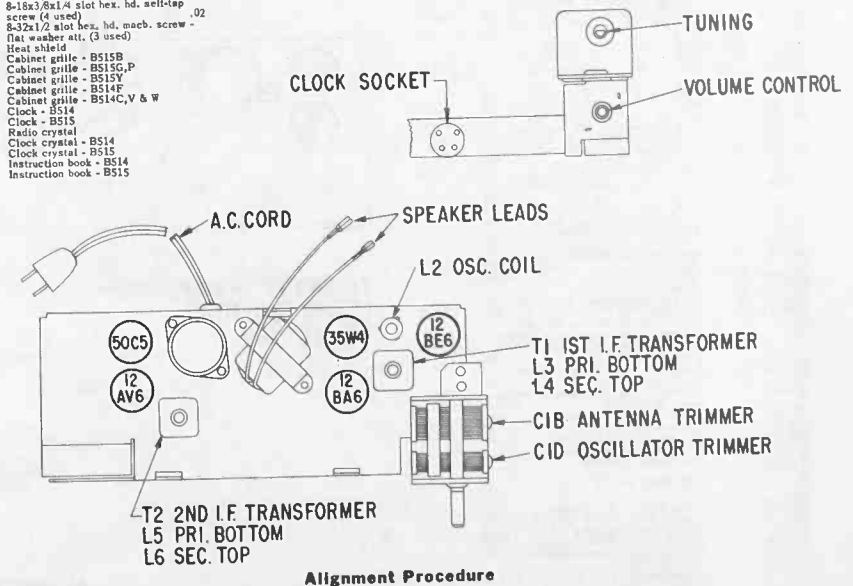
CABINET PARTS

PART NO.	DIA. NO.	DESCRIPTION	PRICE
110-325		Grille cloth - B514C,V & W & B515G & P	
110-326		Grille cloth - B514F & B515B	
110-328		Grille cloth - B515Y	
112-1170		8-32x 2 3/4 phis. pan hd. mach. screw (4 used)	
114-423		8-18x5/16x1/4 hex. hd. self-tap screw (10 used)	.02
114-507		8-18x5/16x1/4 slot hex. hd. self-tap screw (4 used)	.02
114-637		8-32x1/2 slot hex. hd. mach. screw - flat washer att. (3 used)	
126-896		Heat shield	
138-190		Cabinet grille - B515B	
138-191		Cabinet grille - B515G,P	
138-192		Cabinet grille - B515Y	
138-230		Cabinet grille - B514F	
138-231		Cabinet grille - B514C,V & W	
172-3	U2	Clock - B514	
172-4	U3	Clock - B515	
192-264		Radio crystal	
192-265		Clock crystal - B514	
192-266		Clock crystal - B515	
202-1381		Instruction book - B514	
202-1382		Instruction book - B515	

TO THE SERVICEMAN:

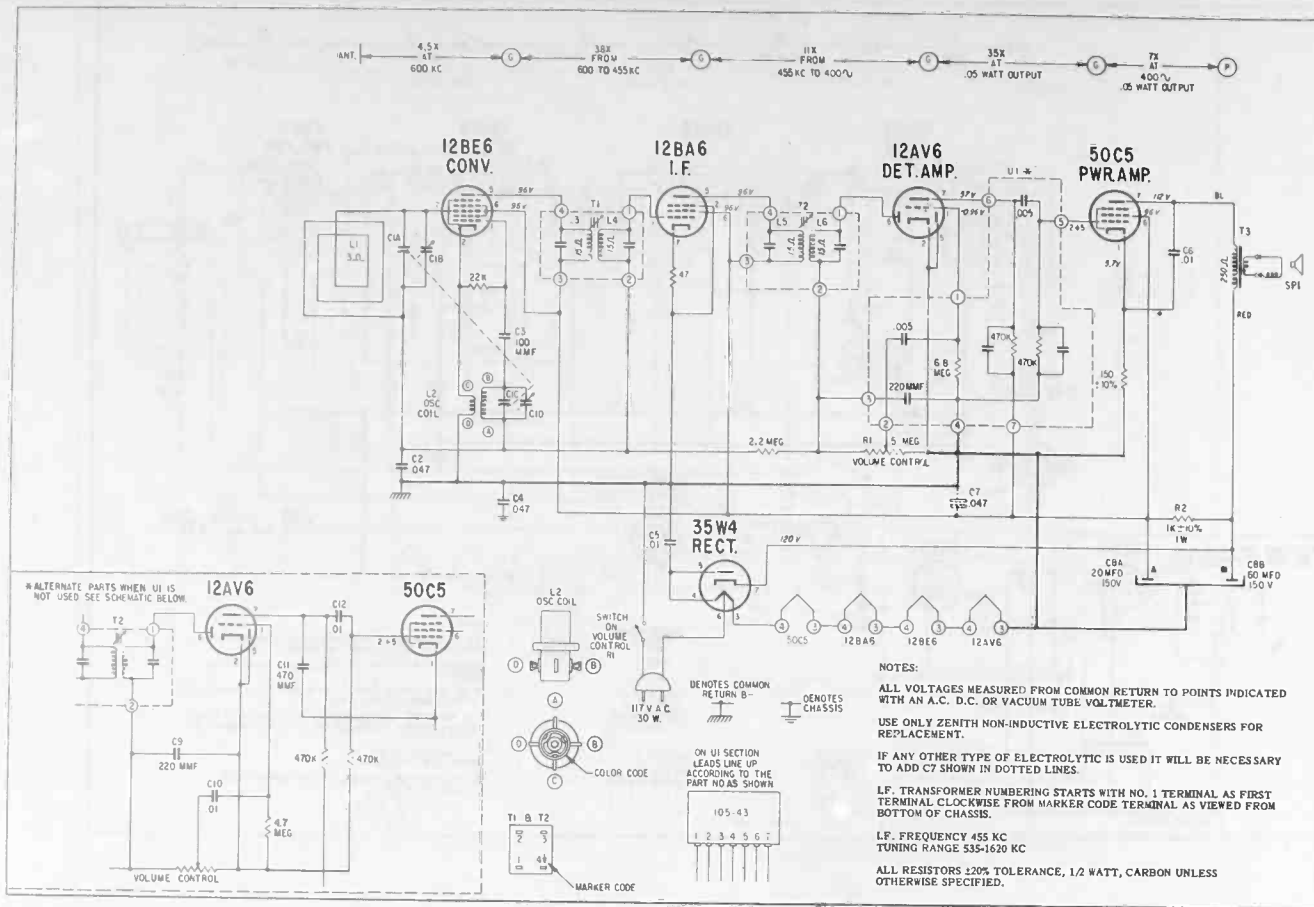
Clock and Timer Note:

The clock and timer assemblies used in this receiver are manufactured by Telechron. Face parts, such as hands, knobs, scales, bezel, etc., are not available through local Telechron service depts. We suggest that all clock and timer assemblies complete (less the rear cover and bushing) be returned to your local Zenith Distributor for repair or replacement. Be sure to pack all clock and timer assemblies individually and carefully to prevent damage in shipment.



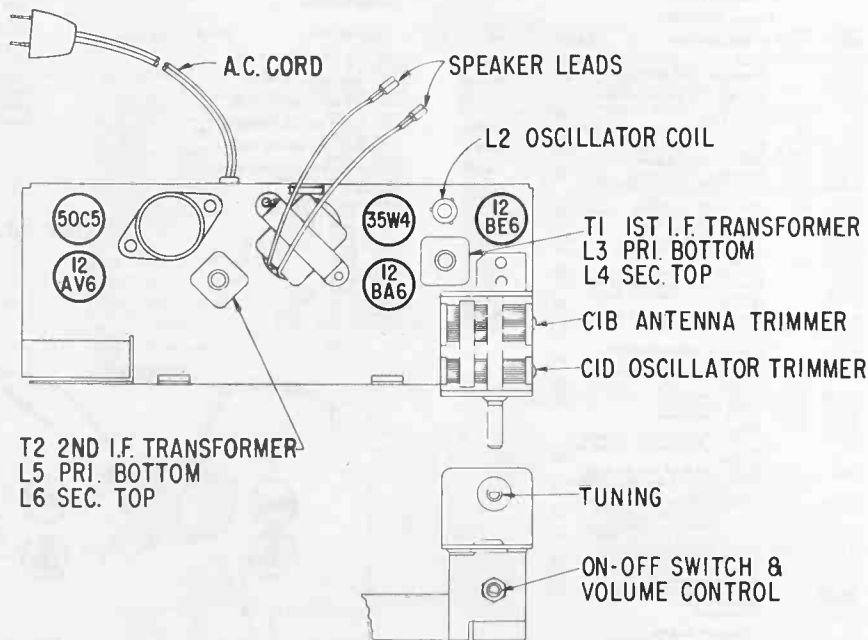
Alignment Procedure

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, 4, 5, 6	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3	—	—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage



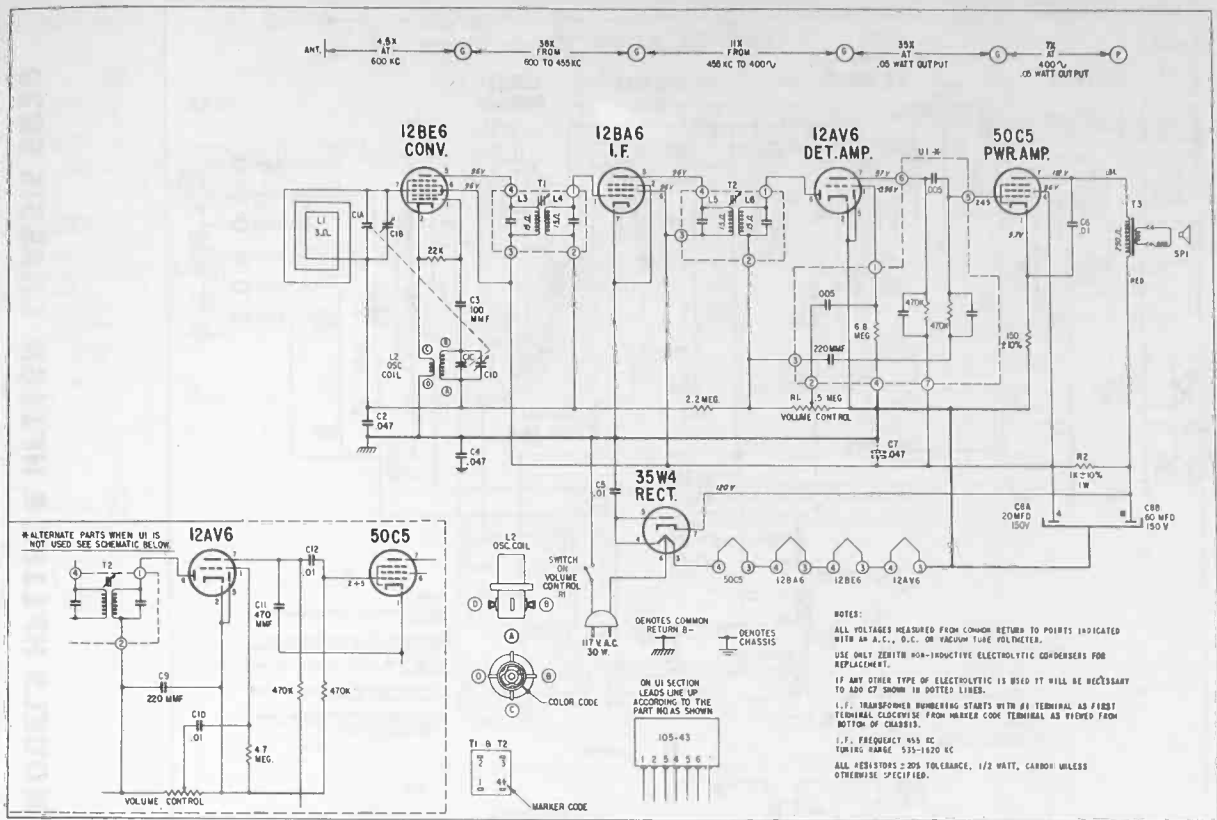
MODELS B511 B, P, L, V CHASSIS 5B10

CHASSIS PARTS			
Chassis 5B10			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
11-85		Line cord & plug	.75
12-2323		Wavemagnet mtg. bracket	.15
12-2667		Variable capacitor mtg. bracket	
19-238		Coil mtg. clip (part of S-43910)	.10
22-3		.01 mfd. ceramic disc capacitor - 500V (2 used)	.30
22-5		100 mmfd. ceramic disc capacitor - 500V	.25
22-2202	C8A,B	Electrolytic - 20/150 60/150	2.15
22-2792	C4	.047 mfd. paper - 200V	.30
22-3088	C1A,B, C,D	Two section variable capacitor	
63-965	R2	1000 ohm resistor 1W ins. 10%	.25
63-1730		47 ohm 1/2W ins. 20%	.17
63-1750		150 ohm resistor 1/2W ins. 10%	.17
63-1842		22 K ohm resistor 1/2W ins. 20%	.17
63-1926		2.2 megohm resistor 1/2W ins. 20%	.17
63-4440	R1	Volume control & switch	
78-275		Electrolytic socket	.05
78-831		Seven contact wafer tube socket	
78-989		Seven contact wafer tube socket (3 used)	.15
78-990		Seven contact wafer tube socket	.15
86-30		Terminal	.03
86-237		Connector terminal (2 part of 95-1626)	.03
94-295		Gang capacitor mtg. bushing (3 used)	.05
95-1504	T1	1st I.F. transformer	2.50
95-1626	T3	Output transformer	
95-1636	T2	2nd I.F. transformer	
105-43	U1	Integnet	
113-78		8-18x11/32x1/4 AF hex. hd. self-tap screw - lockwasher att. (1 used on 12-2323, & 2 used on ea. 12-2667 & 22-3088)	.03
114-365		8-32x3/8 hex. hd. self-tap screw (used on 12-2323)	.05
114-542		6-32x11/32 hex. hd. mach. screw (used on 22-3088)	.03
125-94		Rubber grommet (3 used)	.03
125-96		Strain relief grommet - .10	.10
149-211		Iron core (part of S-43910)	.10
S-43910	L2	Oscillator coil assembly	
S-44171	L1	Wavemagnet assembly	
CABINET PARTS			
12-2666		Grille mtg. bracket (2 used)	
14-2456		Plastic table cabinet - B511B	6.00
14-2457		Plastic table cabinet - B511P	6.00
14-2458		Plastic table cabinet - B511L	6.00
14-2459		Plastic table cabinet - B511V	6.00
16-1470		Packing carton	
46-2012		Tuning knob	
46-2013		Volume control knob	
49-838		4" PM speaker	5.00
57-2498		Emblem plate	.35
80-1003		Knob retaining spring	.10
93-1182		Spring washer	.03
112-1170		8-32x 2 3/4 phillips pan hd. mach. screw (2 used)	.03
114-423		8-18x5/16x1/4 AF hex. hd. self-tapping screw (2 used)	.03
114-507		8-18x3/8 slot hex. hd. self-tap screw (4 used)	.03
114-637		8-32x1/2 slotted hex. hd. mach. screw - flat washer att. (3 used)	
126-896		Heat shield	
138-186		Cabinet grille - B511B	
138-187		Cabinet grille - B511P,V	
138-188		Cabinet grille - B511L	
202-1380		Instruction book	



ALIGNMENT PROCEDURE

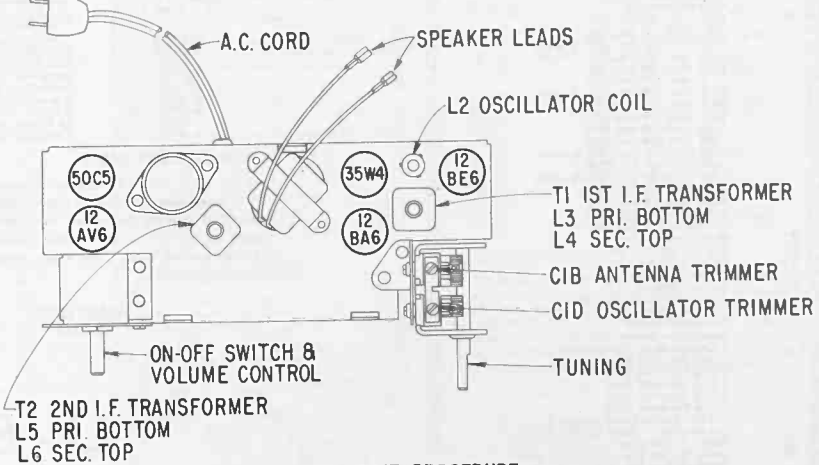
Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, L4, L5, L6	For I.F. Alignment.
2	One Turn Loop Coupled	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3	Loosely to Wave Magnet	—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage



MODELS B509C, P, V, F CHASSIS 5B11

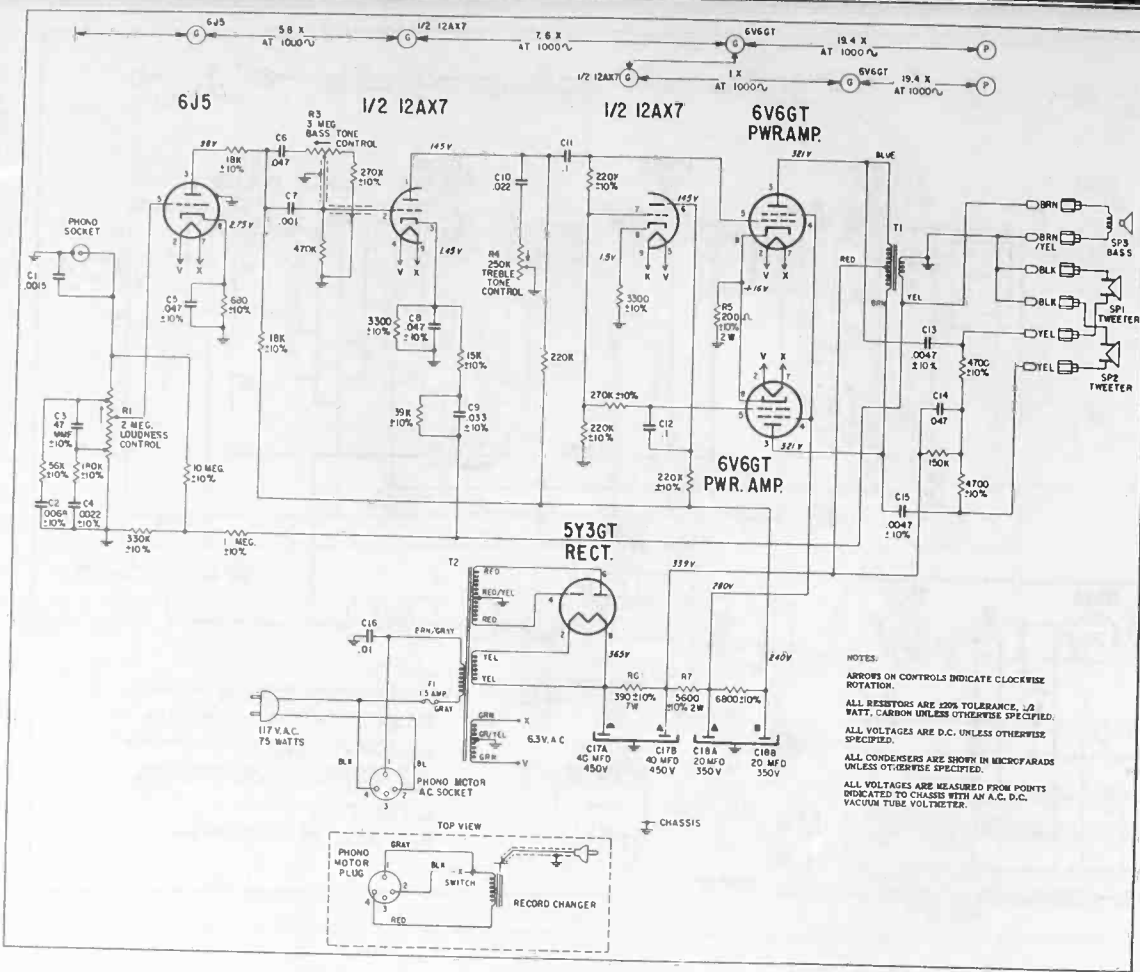
CHASSIS PARTS			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
11-85		Line cord & plug	.65
12-2323		Wavemagnet mtg. bracket	.15
12-2677		Variable capacitor mtg. bracket	
12-2678		Volume control mtg. bracket	
19-238		Coil mtg. clip (part of S-43910)	.10
22-3	C5,6	.01 mfd. ceramic disc capacitor -	
10,12	500V	(2 used)	.30
22-5	C3	100 mfd. ceramic disc capacitor -	
	500V		.25
22-2202	C8A,B	Electrolytic - 20/150 60/150	2.15
22-2792	C2,4	.047 mfd. paper dielectric	
	capacitor - 200V (2 used)		.30
22-3096	C1A,B, C,D	Two section variable capacitor	3.25
54-139		3/8x32x9/16 paintn (mts. 63-4401)	.03
63-965	R2	1000 ohm resistor 1W Ins. 10%	.25
63-1750		150 ohm resistor 1/2W Ins. 10%	.17
63-1842		22 K ohm resistor 1/2W Ins. 20%	.17
63-1926		2.2 megohm resistor 1/2W Ins. 20%	.17
63-4401	R1	Volume control & switch	
78-275		Electrolytic socket	.05
78-831		Seven contact wafer tube socket	
78-989		Seven contact wafer tube socket (3 used)	.15
78-990		Seven contact wafer tube socket	.15
86-199		Terminal (used with 114-275)	.03
86-237		Connector terminal (2 part of 95-1626)	.03
94-295		Gang capacitor mtg. bushing (3 used)	.05
95-1504	T1	1st I.F. transformer	2.50
95-1626	T3	Output transformer	
95-1636	T2	2nd I.F. transformer	
105-43	U1	Integnet	
113-78		6-32x5/16x1/4 AF hex. hd. mech. screw - lockwasher att. (2 used on 22-3096)	.03
114-78		8-18x5/16x1/4 AF hex. hd. self-tapping screw (1 used on 12-2323, 2 on 12-2677 & 3 on 12-2678)	.03
114-365		8-32x3/8 hex. hd. self-tap screw - flat washer att. (used on S-44383)	.05
114-542		6-32x11/2 hex. hd. self-tapping screw - flat washer att. (used on 22-3096)	.03
125-94		Rubber grommet (3 used)	.10
125-96		Strain relief grommet	.10
149-85		Iron core (part of S-43910)	.10
S-43910	L2	Oscillator coil assembly	
S-44336		Electrolytic capacitor & clamp assembly	
S-44383	L1	Wavemagnet assembly	
CABINET PARTS			
14-2491		Plastic table cabinet - B509C	5.50
14-2492		Plastic table cabinet - B509P	5.50
14-2493		Plastic table cabinet - B509V	5.50
14-2494		Plastic table cabinet - B509F	5.50
16-1489		Packing carton	
27-259		Pointer indicator disc	
46-2028		Dial knob	
46-2029		Volume & tuning control knob - B509C	

CABINET PARTS			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
46-2030		Volume & tuning control knob - L509P (2 used)	
46-2031		Volume & tuning control knob - B509F (2 used)	
46-2032		Volume & tuning control knob - B509F (2 used)	
49-865	SP1	3 1/2" PM speaker	
54-459		Tinnerman nut (2 used)	.30
57-2445		Emblem plate	
112-1176		6-20x4 7/16 phillips pan hd. self-tapping screw (2 used)	
114-248		6-20x5/16x1/4 AF hex. hd. self-tapping screw (2 mt. ex. 54-459)	.03
114-423		8-18x5/16x1/4 AF hex. hd. self-tapping screw (4 mt. 49-865)	.03
114-637		8-32x1/2 slotted hex. hd. mach. screw - flat washer att. (4 used on 5B11)	
126-896		Heat shield	
138-204		Cabinet grille - B509C,P & V	
138-207		Cabinet grille - B509F	
188-155		Knob clamping ring (1 used on 46-2030, 2031 or 2032)	.04
188-231		Knob clamping ring (used on 46-2028)	
202-1389		Instruction book	



ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, L4, L5, L6	For I.F. Alignment.
2	One Turn Loop Coupled	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3	Loosely to Wave Magnet	—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage



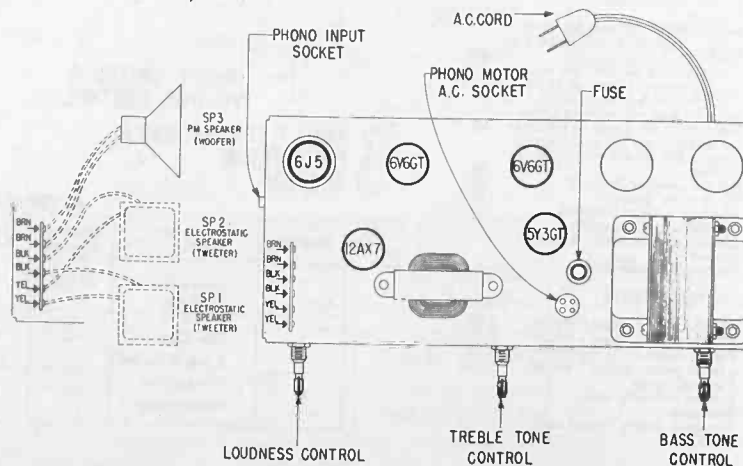
NOTES:
 ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.
 ALL RESISTORS ARE 5% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSERS ARE SHOWN IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE MEASURED FROM POINTS DEDICATED TO CHASSIS WITH AN A.C. D.C. VACUUM TUBE VOLTMETER.

PART NO.	DIA. NO.	MODEL HF116, E & R CHASSIS 5B20 PARTS LIST DESCRIPTION	PRICE
11-103		Line Cord & Plug	1.00
15-115		Fuse Holder - Cap	.25
22-3	C16	.01 mfd. Ceramic Disc 500V	.30
22-12	C1	.0015 mfd. Ceramic Disc 500V	.25
22-14	C13	.0047 mfd. Ceramic Disc 1KV (2 used)	.30
22-1612	C17	.001 mfd. Ceramic Disc 1KV	.25
22-2376	C3	47 mfd. Electrolytic Capacitor 2x40 mfd. 450V	3.50
22-2782	C11, C12	.1 mfd. Paper 600V (2 used)	.25
22-2792	C14	.047 mfd. Paper 200V	.35
22-2794	C6	.047 mfd. Paper 600V	.35
22-2795	C5	.047 mfd. Paper 200V (2 used)	.25
22-2801	C9	.033 mfd. Paper 200V	.30
22-2806	C10	.022 mfd. Paper 600V	.30
22-2819	C2	.0068 mfd. Paper 200V	.30
22-2837	C4	.0022 mfd. Paper 200V	.30
22-2905	C18	Electrolytic Capacity - 2x20 mfd. 350V	2.25
54-149		3/8-32 x 9/16 Polnut (1 mts. ea. 63-4067, 4378, 4391)	.03
54-382		Hex Nut (mts. 62-17)	.06
62-17		Fuse Receptacle	.40
63-1193	R7	5400 ohm 2W Ins. 10%	.34
63-1778		680 ohm 1/2W Ins. 10%	.17
63-1806		3300 ohm 1/2W Ins. 10% (2 used)	.17
63-1813		4700 ohm 1/2W Ins. 10% (2 used)	.17
63-1820		6800 ohm 1/2W Ins. 10%	.17
63-1834		15 K ohm 1/2W Ins. 10%	.17
63-1838		18 K ohm 1/2W Ins. 10% (2 used)	.17
63-1852		39 K ohm 1/2W Ins. 10%	.17
63-1859		56 K ohm 1/2W Ins. 10%	.17
63-1877		150K ohm 1/2W Ins. 20%	.17
63-1880		180K ohm 1/2W Ins. 10%	.17
63-1883		220K ohm 1/2W Ins. 10% (3 used)	.17
63-1884		220K ohm 1/2W Ins. 20%	.17
63-1887		270K ohm 1/2W Ins. 10% (2 used)	.17
63-1890		330K ohm 1/2W Ins. 10%	.17
63-1898		470K ohm 1/2W Ins. 10%	.17
63-1911		1 megohm 1/2W Ins. 10%	.17
63-1953		10 megohm 1/2W Ins. 10%	.17
63-4378	R3	Bass Tone Control	1.40
63-4379	R5	200 ohm 2W WW 10%	.34
63-4380	R6	390 ohm 7W WW 10%	.80
63-4391	R4	Treble Tone Control	1.40
63-4067	R1	Volume Control	1.40
78-250		Electrolytic Capacitor Socket	.10
78-402		4 Contact Socket	.15
78-644		Connector Socket	.15
78-755		Octal Tube Socket (4 used)	.20
78-846		9 Contact Wafer Tube Socket	.25
83-2145		5 Lug Terminal Strip	.10
83-2216		7 Lug Terminal Strip	.15
83-2522		6 Lug Terminal Strip	.15
83-2627		2 Lug Terminal Strip	.05
83-2638		3 Lug Terminal Strip	.05
93-1179		Rubber Washer (used on 62-17)	.03
93-1180		Lackwasher (used on 62-17)	.03
95-1410	T2	Power Transformer	16.25
95-1622		Audio Output Transformer	.05
114-370		10-32 x 1/2 Hex Hd. Self Tap Screw - Flat washer att. (4 mt. 95-1410)	.10
125-96		Strain Relief Grommet	.10
136-32	F1	Fuse - 1 1/2 Amp. 3AG	.15
199-263		Shielded Paper Sleeve	.15

PART NO.	DIA. NO.	MODELS HF116, E & R CABINET PARTS LIST DESCRIPTION	PRICE
54-10		8-32 x 1/2 Hex Nut (4 part of 14-2423)	.03
54-30		8-32 x 5/16 Hex Nut (4 mts. 49-855)	.03
54-254		Speed Nut (5 part of 14-2423)	.03
57-2273		Name Plate (High Fidelity)(part of 14-2423)	.30
57-2280		Name Plate (Zenith)(part of 14-2423)	.15
83-765		Armita Strip (2 used)	.03
83-1475		Armita Strip (2 used)	.03
83-2535		Phono Shipping Strip (2 used)	.15
83-2762		Phono Shipping Strip	.15
83-2806		Terminal Strip (Ext. Speaker)	.15
86-237		Connector Terminal (2 used on Ext. Speaker)	.03
86-254		Connector Terminal (6 used, 2 used on 83-2806), 05	.03
93-1260		Fibre Washer (2 part of S-14083)	.03
96-143		Cabinet Leg (4 part of 14-2423R)	.03
96-144		Cabinet Leg (4 part of 14-2423E)	.03
112-788		8-32 x 1-1/8 Swedge Hd. Mach. Screw (4 part of 14-2423)	.03
112-1038		Record Changer Mt. Screw (2 part of S-14083)	.15
112-1142		5-20 x 1/2 Phils. Rd. Hd. Self-Tap Screw (mts. 19-298)	.04
114-239		6-18 x 3/8 x 1/2 Hex. Hd. Self Tap Screw (2 mts. ea. S-23829 & 1 mts. 83-2806)	.03
114-386		Chassis Mfg. Screw (4 used)	.10
126-780		Heat Shield	.25
142-87		Dual Pickup Cartridge (sapphire-sapphire)	3.95
188-195		Retaining Ring (part of S-14083)	.03
202-1374		Instruction Book	.40
S-14083		4 Speed Record Changer	1.10
S-23829	SP1	Tweeter Speaker (2 used)	2.95
S-41437		45 R.P.M. Record Adapter	1.00
S-42308		Cartridge Holder (part of S-14083)	1.00

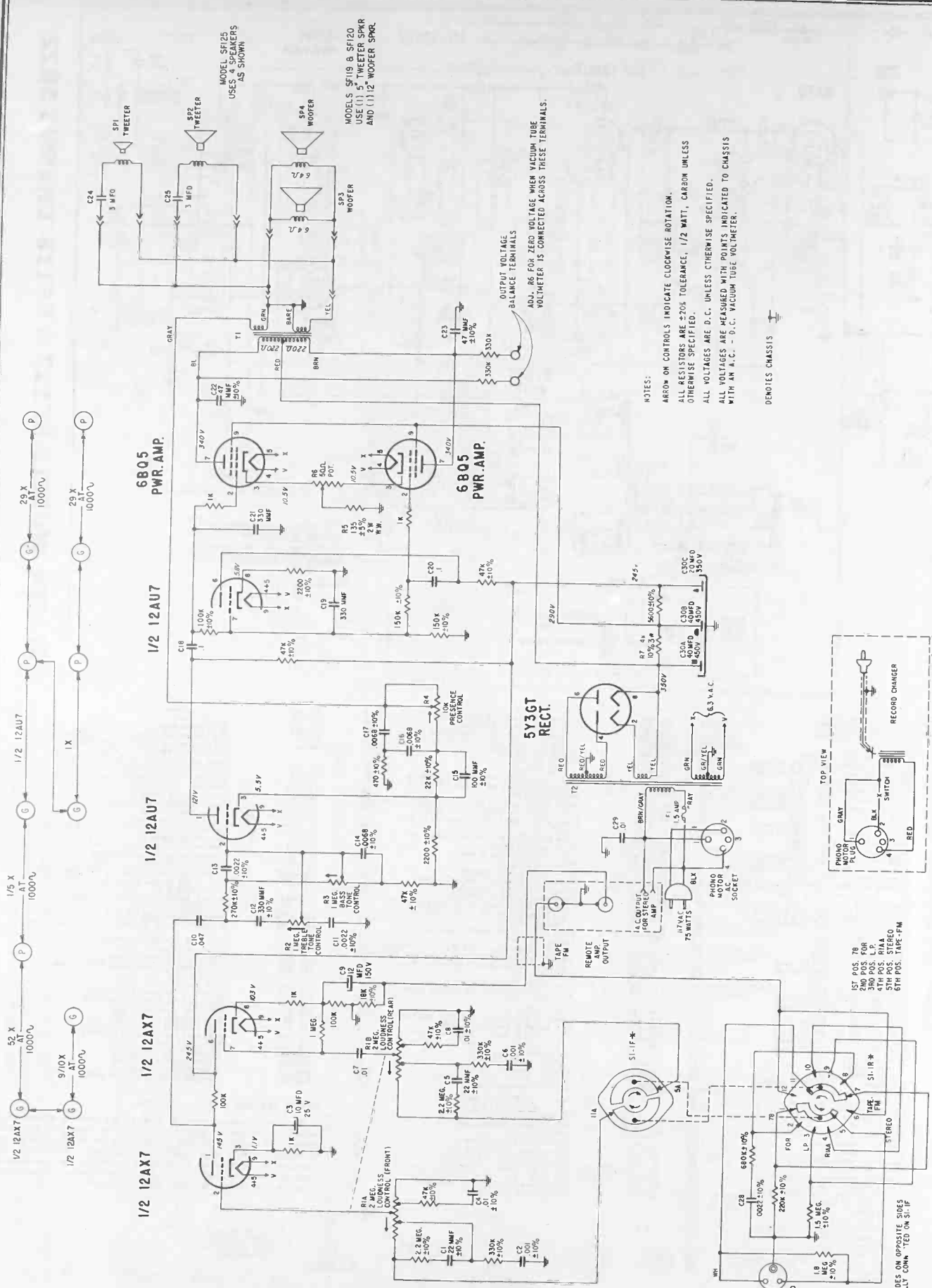
TO THE SERVICE MAN:

In the event a chassis must be removed and speaker wires disconnected, it is imperative that when replacing the wires on the terminal board of the amplifier chassis that proper color coding can be observed; brown wires must go to the terminals marked 'brown', black wires must go to the terminals marked 'black', and wires marked yellow must go to the terminals marked 'yellow'.



ZENITH RADIO CORPORATION MODELS HF116E & HF116R CHASSIS 5B20

PART NO.	DIA. NO.	MODELS HF116, E & R CABINET PARTS LIST DESCRIPTION	PRICE
14-2423E		Record Player Cabinet HF116E	
14-2423R		Record Player Cabinet HF116R	
16-1462		Packing Carton	
19-298		Mounting Clip (mts. S-41437)	.20
40-195		Lid Hinge (2 part of 14-2423R)	.60
40-197		Lid Hinge (2 part of 14-2423E)	.60
40-202		Lid Support Hinge (part of 14-2423R)	.60
40-203		Lid Support Hinge (part of 14-2423E)	.60
46-1999		Knob - Tone Control Val. Control (3 used)	.75
49-855	SP3	10" PM Speaker	15.00



ZENITH RADIO CORPORATION MODELS SF119, SF120 & SF125 CHASSIS 5B23

©John F. Rider

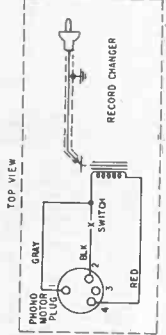
NOTES:
 ARROW ON CONTROLS INDICATE CLOCKWISE ROTATION.
 ALL RESISTORS ARE 20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE MEASURED WITH POINTS INDICATED TO CHASSIS WITH AN A.C. - D.C. VACUUM TUBE VOLTMETER.

DENOTES CHASSIS

OUTPUT VOLTAGE
 BALANCE TERMINALS
 10A, 05 POS. ZERO VOLTAGE WHEN VACUUM TUBE
 VOLTMETER IS CONNECTED ACROSS THESE TERMINALS.

MODEL SF125
 USES 4 SPEAKERS
 AS SHOWN

MODELS SF119 & SF120
 USE 2 TWEETER SPEAKERS
 AND (1) 1/2 WOOFER SPEAKERS



- 1ST POS. TB
- 2ND POS. FOR
- 3RD POS. LP
- 4TH POS. RMA
- 5TH POS. STEREO
- 6TH POS. TAPE-FM

* MOTOR BLADES ON OPPOSITE SIDES
 MUST BE EXACTLY CONNECTED ON SI-IF
 AND SI-IR

ZENITH RADIO CORPORATION MODELS SF119, SF120 & SF125 CHASSIS 5B23

TO THE SERVICEMAN:

Models SF119, SF120, and SF125 are identical electrically except for cabinet styling, speaker systems and Model SF125 uses a chrome changer.

Chassis 5B23 is a complete high-fidelity amplifier and in addition has a cathode follower which feeds audio energy to remote amplifier and speaker units SR510 or SR515.

The wires to the stereo cartridge should be connected as follows, "Red" wire to "R" terminal of cartridge, "Black" to "outer" terminal and "White" wire to "L" terminal of cartridge.

It is most important that coded speaker leads be connected to coded terminals on speakers for proper polarity within the speaker group. In addition to this, when these units are used in conjunction with remote amplifier and speaker units, SR510 or SR515 as a Stereo Combination, it is then most important that the speaker groups be in phase with each other. An excellent method to determine if the speaker groups are in phase with each other is to play either a stereo or monaural record with the record compensator in RIAA position, with the tone controls on both units in mid position and with the audio outputs from each unit at the same level. Under these conditions, the sound should appear to come from a point mid-way between the two units. If the sound comes from any other point than mid-point then one speaker or group is out of phase with the other and you should check speaker polarity.

If one or both of the 6B05 output tubes are replaced, it will be necessary to connect a DC volt meter across the balance terminals and adjust the balance control for minimum voltage.

PART NO.	DIA. NO.	CABINET PARTS Models SF119, E & R DESCRIPTION	PRICE
14-2518		Record player cabinet - SF119	
14-2518R		Record player cabinet - SF119R	
14-2518E		Record player cabinet - SF119E	
16-1498		Packing carton	
19-298		Mounting clip (mts. S-43992)	.20
22-2945	C24,25	Electrolytic capacitor 3 mfd. - 30V (part of 49-856)	1.25
40-195		Lid hinge (part of 14-2518, R)	.60
40-197		Lid hinge (part of 14-2518E, R)	.60
40-202		Lid support hinge (part of 14-2518 & R)	.60
40-203		Lid support hinge (part of 14-2518E)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob (4 used)	.75
46-2096		Volume control knob	.75
49-870		12" PM speaker	7.00
49-856	SP2	5" PM speaker	7.00
54-10		8-32 x 1/4 Hex. nut (4 part of 14-2518, E & R, 4 mt. ea. 49-856)	.03
54-34		Speed nut - Finerman (2 part of 14-2518, E & R)	.03
54-424		8-32 x 1 1/32 Hex. palm nut washer type (4 mt. ea. 49-870)	.03
57-2498		Emblem plate (part of 14-2518, E & R)	.35
57-2561		Name plate (part of 14-2518, E & R)	1.00
83-765		Armitie strip (3 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2762		Phono shipping strip	.15
86-237		Connector terminal (4 part of S-23071)	.03
86-254		Connector terminal (2 part of S-23071)	.05
93-1260		Fibre washer (2 used on S-14091)	.03
112-789		8-32 x 1-3/8 Swedge hd. mach. screw (4 part of 14-2518, E & R)	.03
112-943		6-32 x 1" Swedge hd. mach. screw (8 part of 14-2519E & R)	.03
112-1038		Record changer mtg. screw (2 part of S-14091)	.15
112-1142		5-20 x 1/2 Phillips rd. hd. self-tapping screw (mts. 19-298)	.04
114-329		6-18 x 3/8 AF hex. hd. self-tap screw (2 used on 5B23)	.10
114-386		Chassis mtg. screw (4 used)	.03
115-34		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
126-780		Heat shield	.25
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
188-195		Retaining ring (2 used on S-14091)	.03
202-1350		Instruction book	.50
S-14901		Four speed record changer	.45
S-23071		Speaker lead & terminal assembly	.45
S-26657		Terminal strip assembly (2 part of 49-856)	.20
S-43992		45 RPM record adapter assembly	2.95
S-26657		Terminal strip assembly (part of 49-856)	.20
S-43992		45 RPM record adapter	2.95

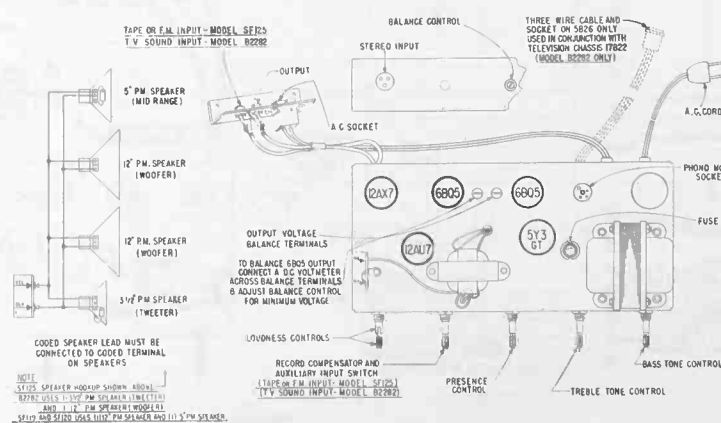
PART NO.	DIA. NO.	CABINET PARTS Models SF120 E & R DESCRIPTION	PRICE
14-2519E		Record player cabinet - SF120E	
14-2519R		Record player cabinet - SF120R	
16-1499		Packing carton	
19-298		Mounting clip (mts. S-43992)	.20
22-2945		3 mfd. electrolytic capacitor - 30V (part of 49-856)	1.25

PART NO.	DIA. NO.	CABINET PARTS Models SF120 E & R DESCRIPTION	PRICE
40-195		Lid hinge (2 part of 14-2519E)	.60
40-197		Lid hinge (2 part of 14-2519R)	.60
40-202		Lid support hinge (part of 14-2519E)	.60
40-203		Lid support hinge (part of 14-2519R)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob	.75
46-2096		Volume control knob (4 used)	.75
49-850		5" PM speaker	5.50
49-856		5" PM speaker	7.00
49-871		12" PM speaker	16.00
54-10		8-32 x 1/4 Hex nut (4 part of 14-2519E&R)	.03
54-34		6-32 x 1/2 Hex nut (8 part of 14-2519E&R and 4 mt. ea. 49-850 & 49-856)	.03
54-312		Speed nut - Finerman (2 part of 14-2519E & R)	.03
54-424		8-32 x 1 1/32 Hex palm nut washer type (4 mts. 49-871)	.03
57-2498		Emblem plate (part of 14-2519E & R)	.35
57-2561		Name plate (part of 14-2519E & R)	1.00
83-765		Armitie strip (3 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2762		Phono shipping strip	.15
86-237		Connector terminal (6 used)	.03
86-254		Connector terminal (2 used)	.05
86-312		Terminal shake proof	.03
93-1260		Fibre washer (2 used on S-14091)	.03
96-177		Cabinet leg (4 part of 14-2519E)	.03
96-178		8-32 x 1-3/8 Swedge hd. mach. screw (4 part of 14-2519E & R)	.03
112-789		6-32 x 1" Swedge hd. mach. screw (8 part of 14-2519E & R)	.03
112-943		Record changer mtg. screw (2 part of S-14091)	.15
112-1038		5-20 x 1/2 Phillips rd. hd. self-tapping screw (mts. 19-298)	.04
112-1142		6-18 x 3/8 AF hex. hd. self-tap screw (2 used on 5B23)	.10
114-329		Chassis mtg. screw (4 used)	.03
114-386		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
115-34		20 shield	.25
126-780		Cabinet grille (part of 14-2519E)	.50
142-92		Cabinet grille (part of 14-2519E)	.50
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
188-195		Retaining ring (2 used on S-14090)	.03
202-1350		Instruction book	.50
S-14091		Four speed record changer	.45
S-26657		Terminal strip assembly (1 part of ea. 49-850, 49-856 & 49-871)	2.95
S-43992		45 RPM record adapter	2.95

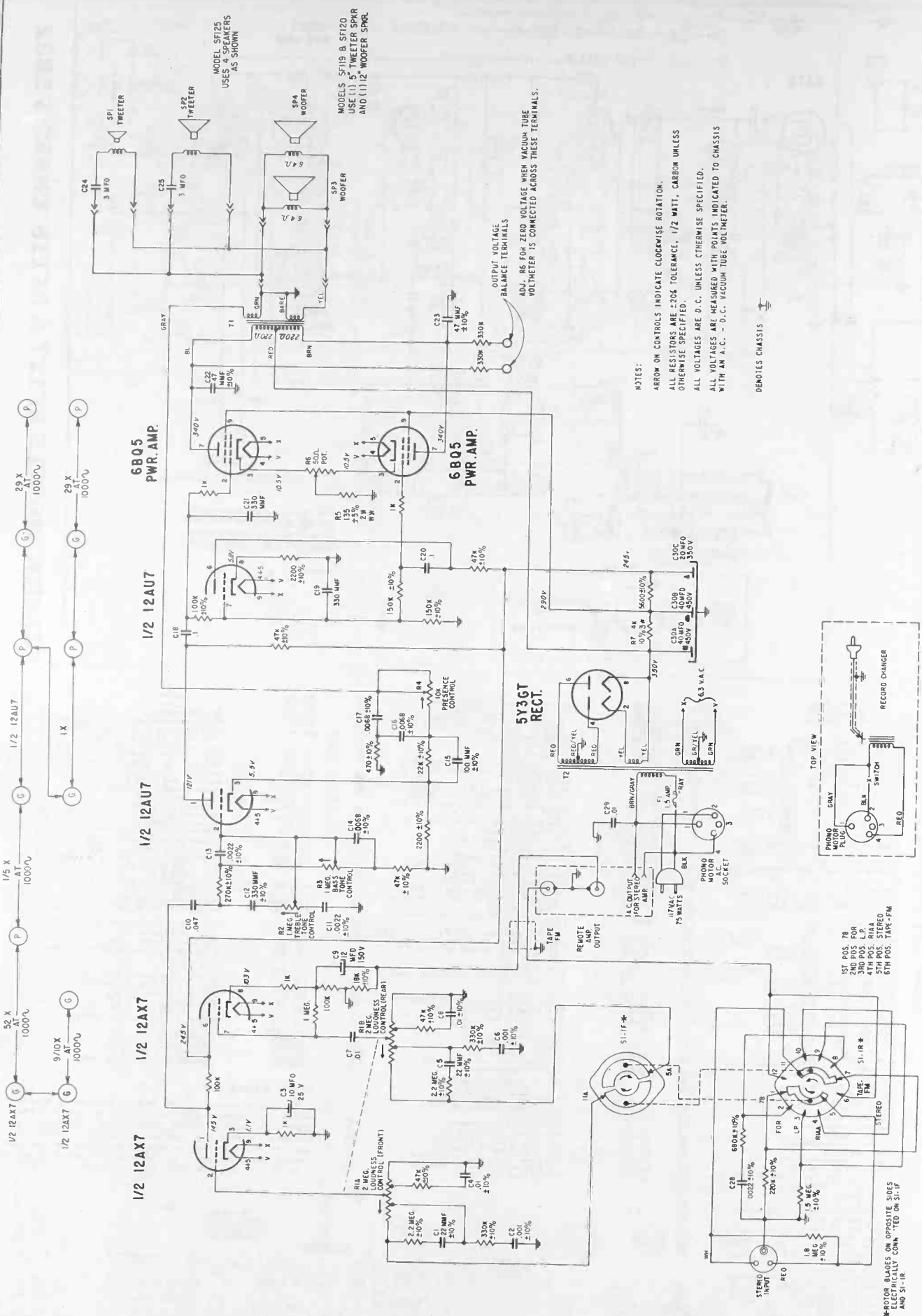
PART NO.	DIA. NO.	CABINET PARTS Models SF125, E & R DESCRIPTION	PRICE
14-2401		Record player cabinet - SF125	
14-2401E		Record player cabinet - SF125E	
14-2401R		Record player cabinet - SF125R	
16-1440		Packing carton	
19-298		Mounting clip (mts. S-43992)	.20
22-2945	C24,25	3 mfd. electrolytic 3 mfd. - 30V (1 part of ea. 49-856 & 49-846)	1.25
40-195		Lid hinge (2 part of 14-2401 & R)	.60
40-197		Lid hinge (2 part of 14-2401E & R)	.60
40-210		Lid support hinge (part of 14-2401 & R)	.60
40-211		Lid support hinge (part of 14-2401E)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob (4 used)	.75
46-2096		Volume control knob	.75
49-846		3 1/2" PM tweeter speaker	7.00
49-852	SP3	12" PM speaker	16.00
49-853	SP4	12" PM speaker	16.00
49-856	SP2	5" PM speaker	7.00
54-10		8-32 x 1/4 Hex nut (8 part of 14-2401, E&R)	.03
54-34		6-32 x 1/2 Hex nut (6 part of 14-2401, E&R and 2 mts. 49-846 & 4 mts. 49-856)	.03
54-312		Speed nut (2 part of 14-2401, E & R)	.03
54-424		8-32 x 1 1/32 Hex. palm nut (4 mts. ea. 49-852 & 49-853)	.03
57-2498		Emblem plate (part of 14-2401, E & R)	.35
57-2561		Name plate (part of 14-2401, E & R)	1.00
83-765		Armitie strip (4 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2763		Phono shipping strip	.15
86-237		Connector terminal (8 used)	.03
86-254		Connector terminal (2 used)	.05
86-312		Terminal shake proof	.03
93-1260		Fibre washer (2 used on S-14090 or S-14093)	.03
112-789		8-32 x 1-3/8 Swedge hd. mach. screw (8 part of 14-2401, E & R)	.03
112-943		6-32 x 1" Swedge hd. mach. screw (6 part of 14-2402, E & R)	.03
112-1038		Record changer mtg. screw (2 used on S-14090 or S-14093)	.15
112-1142		5-20 x 1/2 Phis. rd. hd. self-tap screw (mts. 19-298)	.04

PART NO.	DIA. NO.	CABINET PARTS Models SF125, E & R DESCRIPTION	PRICE
114-329		6-18 x 3/8 AF hex. hd. self-tap screw (2 used on 5B23)	.10
114-386		Chassis mtg. screw (4 used)	.03
115-34		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
126-780		Heat shield	.25
138-178		Metal grille (part of 14-2401, & R)	.50
138-179		Metal grille (part of 14-2401E)	.50
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
159-91		Plug button (2 used)	.03
188-195		Retaining ring (2 used on S-14090 or S-14093)	.50
202-1350		Instruction book	.50
S-14090 or S-14093		4 Speed record changer	.45
S-14093		4 Speed record changer	.45

PART NO.	DIA. NO.	CHASSIS 5B23 DESCRIPTION	PRICE
11-103		Line cord & plug	.75
15-115		Fuse holder cap	.25
22-3	C7,29	.01 mfd. ceramic disc - 1KV (2 used)	.30
22-9	C15	100 mfd. ceramic disc - 500V	.25
22-17	C2	.001 mfd. ceramic disc - 1KV (2 used)	.25
22-18	C1,13,28	.0022 mfd. ceramic disc - 500V (3 used)	.25
22-2056	C9	12 mfd. electrolytic capacitor - 150V	1.20
22-2309	C12,19,21	330 mfd. ceramic - 500V (3 used)	.25
22-2376	C22,23	47 mfd. ceramic disc - 500V (2 used)	.25
22-2782	C18,20	1 mfd. paper - 600V (2 used)	1.75
22-2794	C10	.047 mfd. paper - 600V	.35
22-2813	C4,8	.01 mfd. paper - 200V (2 used)	.25
22-2819	C14,16,17	.0068 mfd. paper - 200V (3 used)	.30
22-2903	C1	22 mfd. ceramic disc - 500V (2 used)	.25
22-3046	C30A,B,C	20-40-40 mfd. electrolytic - 350V-450V-450V	4.50
22-3076	C3	10 mfd. electrolytic capacitor - 30V	1.75
44-33		Connector jack (2 part of S-43879)	.15
52-797		Shielded lead	.50
54-139		3/8-32 x 9/16 Palm nut (4 used)	.03
54-140		3/8-32 x 9/16 x 3/32 Tkk. hex. nut (used on 63-4373)	.06
54-382		Hex. nut (used on 62-17)	.06
62-17		Fuse receptacle	.40
63-1771		470 ohm 1/2W ins. 10%	.17
63-1786		1000 ohm 1/2W ins. 20% (4 used)	.17
63-1799		2200 ohm 1/2W ins. 10% (2 used)	.17
63-1817		5600 ohm 1/2W ins. 10%	.17
63-1838		18 K ohm 1/2W ins. 10%	.17
63-1841		22 K ohm 1/2W ins. 10%	.17
63-1855		47 K ohm 1/2W ins. 10% (5 used)	.17
63-1869		100K ohm 1/2W ins. 10%	.17
63-1870		100K ohm 1/2W ins. 20% (2 used)	.17
63-1876		150K ohm 1/2W ins. 10% (2 used)	.17
63-1883		220K ohm 1/2W ins. 10%	.17
63-1887		270K ohm 1/2W ins. 10%	.17
63-1890		330K ohm 1/2W ins. 10% (2 used)	.17
63-1891		330K ohm 1/2W ins. 20% (2 used)	.17
63-1904		680K ohm 1/2W ins. 10%	.17
63-1912		1 megohm 1/2W ins. 20%	.17
63-1918		1.5 megohm 1/2W ins. 10%	.17
63-1922		1.8 megohm 1/2W ins. 10%	.17
63-1925		2.2 megohm 1/2W ins. 10% (2 used)	.17
63-4064	R3	Bass tone control	1.40
63-4065	R2	Treble tone control	1.40
63-4066	R4	Presence control	1.40
63-4069	R7	4000 ohm 3W 10%	.45
63-4373	R1A,B	Dual volume control	2.75
63-4397	R5	135 ohm 2W 5%	.68
63-4402	R6	Current balance control	1.40
69-320		2/64 x 5/16 Rd. hd. mach. screw (2 used on 63-4373)	.15
78-402		4 contact socket	.20
78-403		Octal tube socket	.25
78-846		9 contact water tube socket (2 used)	.40
78-939		9 contact molded tube socket (2 used)	.20
78-1099		3 contact socket	.65
78-1116		A.C. socket & wire	.15
80-1249		Shaft friction spring	.15
80-1250		Sleeve friction spring	.15
83-2145		5 Lug terminal strip (2 used)	.10
83-2307		4 Lug terminal strip	.10
83-2612		2 Lug terminal strip	.05
83-2618		8 Lug terminal strip	.10
83-2627		2 Lug terminal strip	.05
83-2898		3 Lug terminal strip	.10
83-2915		4 Lug terminal strip	.10
85-607	S1	Record compensator switch	2.50
93-1179		Rubber washer (used on 62-17)	.03
93-1180		Lock washer (used on 62-17)	.03
95-1603	T2	Power transformer	15.50
95-1604	T1	Output transformer	5.50
114-370		10-32 x 1/2 Hex. hd. self-tap screw flat washer att. (4 mts. 95-1603)	.05
125-96		Strain relief grommet (2 used)	.10
136-32	F1	Fuse 1 1/2 amp. - 3AG (2 used)	.75
S-43879		A.C. socket, jack & bracket assembly	1.50



NOTE: CODED SPEAKER LEAD MUST BE CONNECTED TO CORRECT TERMINAL ON SPEAKERS.



ZENITH RADIO CORPORATION MODELS SF119, SF120 & SF125 CHASSIS 5B23

©John F. Rider

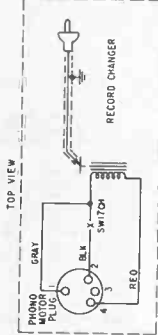
NOTES:
 ARROW ON CONTROLS INDICATE CLOCKWISE ROTATION.
 ALL RESISTORS ARE ±20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE MEASURED WITH POINTS INDICATED TO CHASSIS WITH AN A.C. - D.C. VACUUM TUBE VOLTMETER.

DEMOTES CHASSIS

OUTPUT VOLTAGE
 BALANCE TERMINALS
 VOL. BE FOR ZERO VOLTAGE WHEN VACUUM TUBE
 VOLTMETER IS CONNECTED ACROSS THESE TERMINALS.

MODEL SF125
 USES 4 SPEAKERS
 AS SHOWN

MODELS SF119, SF120
 USE (1) 4" TWEETER SPKR
 AND (1) 12" WOOFER SPKR



1ST POS. 78
 2ND POS. 78
 3RD POS. 78
 4TH POS. 78
 5TH POS. STEREO
 6TH POS. TARE-FM

*PUSH BLADES ON OPPOSITE SIDES
 OF CONTACTS TO BE CONNECTED ON S1-IF
 AND S1-R

ZENITH RADIO CORPORATION MODELS SF119, SF120 & SF125 CHASSIS 5B23

TO THE SERVICEMAN:

Models SF119, SF120, and SF125 are identical electrically except for cabinet styling, speaker systems and Model SF125 uses a chrome changer.

Chassis 5B23 is a complete high-fidelity amplifier and in addition has a cathode follower which feeds audio energy to remote amplifier and speaker units SR510 or SR515.

The wires to the stereo cartridge should be connected as follows, "Red" wire to "R" terminal of cartridge, "Black" to "outer" terminal and "White" wire to "L" terminal of cartridge.

It is most important that coded speaker leads be connected to coded terminals on speakers for proper polarity within the speaker group. In addition to this, when these units are used in conjunction with remote amplifier and speaker units, SR510 or SR515 as a Stereo Combination, it is then most important that the speaker groups be in phase with each other. An excellent method to determine if the speaker groups are in phase with each other is to play either a stereo or monaural record with the record compensator in RIAA position, with the tone controls on both units in mid position and with the audio outputs from each unit at the same level. Under these conditions, the sound should appear to come from a point mid-way between the two units. If the sound comes from any other point than mid-point then one speaker group is out of phase with the other and you should check speaker polarity.

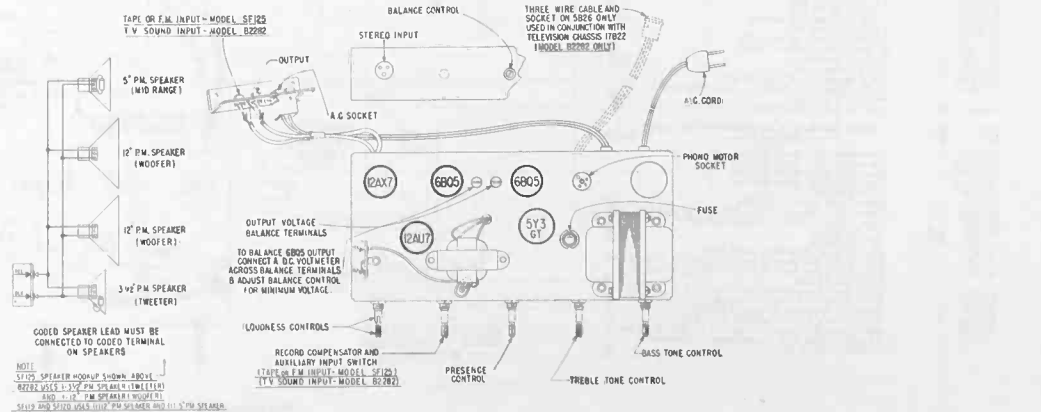
If one or both of the 6B05 output tubes are replaced, it will be necessary to connect a DC volt meter across the balance terminals and adjust the balance control for minimum voltage.

PART NO.	DIA. NO.	CABINET PARTS Models SF119, E & R DESCRIPTION	PRICE
14-2518		Record player cabinet - SF119	
14-2518R		Record player cabinet - SF119R	
14-2518E		Record player cabinet - SF119E	
16-1498		Packing carton	
19-298		Mounting clip (mts. S-43992)	.20
22-2945	C24,25	Electrolytic capacitor 3 mfd. - 30V (part of 49-856)	1.25
40-195		Lid hinge (part of 14-2518, R)	.60
40-197		Lid hinge (part of 14-2518E, R)	.60
40-202		Lid support hinge (part of 14-2518 & R)	.60
40-203		Lid support hinge (part of 14-2518E)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob (4 used)	.75
46-2096		5" PM speaker	7.00
49-870		12" PM speaker	16.00
49-856	SP2	5" PM speaker	7.00
54-10		8-32 x 1/4 Hex. nut (4 part of 14-2518, E & R)	.03
54-34		6-32 x 1/4 Hex. nut-steel (4 part of 14-2518, E & R)	.03
54-312		Speed nut - innerman (2 part of 14-2518, E & R)	.03
54-424		8-32 x 1 1/32 Hex. palm nut washer type (4 mts. 49-870)	.03
57-2498		Emblem plate (part of 14-2518, E & R)	.35
57-2561		Name plate (part of 14-2518, E & R)	1.00
83-765		Armitie strip (3 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2762		Phono shipping strip	.03
86-237		Connector terminal (4 part of S-23071)	.03
86-254		Connector terminal (2 part of S-23071)	.05
93-1260		Fibre washer (2 used on S-14091)	.03
112-789		8-32 x 1-3/8 Swedge hd. mach. screw (4 part of 14-2518, E & R)	.03
112-943		6-32 x 1" Swedge hd. mach. screw (4 part of 14-2518, E & R)	.03
112-1038		Record changer mtg. screw (2 part of S-14091)	.15
112-1142		5-20 x 1/2 Phillips rd. hd. self-tapping screw (mts. 19-298)	.04
114-329		6-18 x 3/8 x 1/4 AF hex. hd. self-tap screw (2 used on 5B23)	.10
114-386		Chassis mtg. screw (4 used)	.10
115-34		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
126-780		Heat shield	.25
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
188-195		Retaining ring (2 used on S-14091)	.03
202-1350		Instruction book	.50
S-1490		Four speed record changer	.45
S-23071		Speaker lead & terminal assembly	.45
S-26557		Terminal strip assembly (2 part of 49-856)	.20
S-43992		45 RPM record adapter assembly	2.95
S-26657		Terminal strip assembly (part of 49-856)	.20
S-43992		45 RPM record adapter	2.95

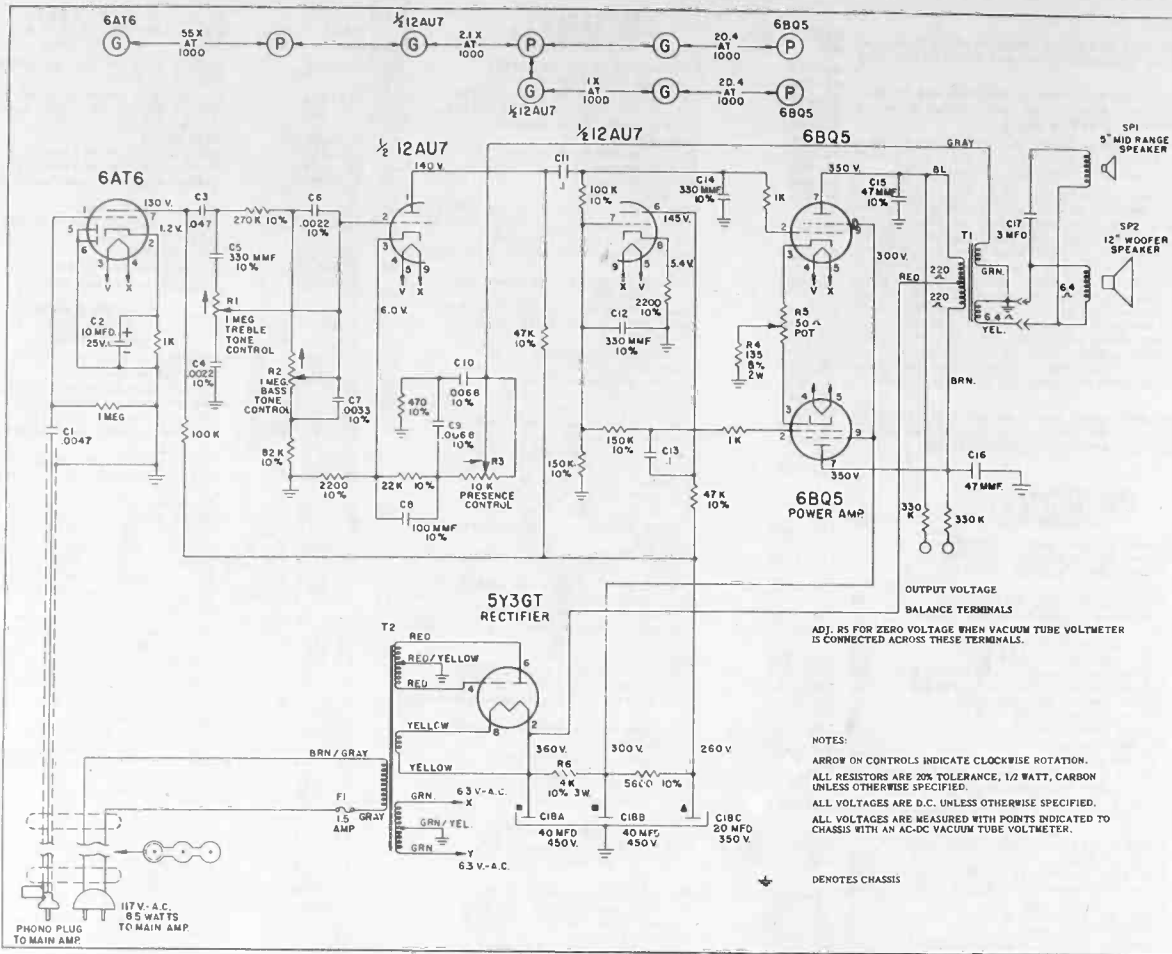
PART NO.	DIA. NO.	CABINET PARTS Models SF120 E & R DESCRIPTION	PRICE
40-195		Lid hinge (2 part of 14-2519R)	.60
40-197		Lid hinge (2 part of 14-2519E)	.60
40-202		Lid support hinge (part of 14-2519R)	.60
40-203		Lid support hinge (part of 14-2519E)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob	.75
46-2096		Volume control knob (4 used)	.75
49-850		5" PM speaker	5.50
49-856		5" PM speaker	7.00
49-871		12" PM speaker	16.00
54-10		8-32 x 1/4 Hex nut (4 part of 14-2519E&R)	.03
54-34		6-32 x 1/4 Hex nut (8 part of 14-2519E&R and 4 mts. ea. 49-850 & 49-856)	.03
54-312		Speed nut - innerman (2 part of 14-2519E & R)	.03
54-424		8-32 x 1 1/32 Hex palm nut washer type (4 mts. 49-871)	.03
57-2498		Emblem plate (part of 14-2519E & R)	.35
57-2561		Name plate (part of 14-2519E & R)	1.00
83-765		Armitie strip (3 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2762		Phono shipping strip	.03
86-237		Connector terminal (6 used)	.03
86-254		Connector terminal (2 used)	.05
93-1260		Terminal shake proof	.03
93-1260		Fibre washer (2 used on S-14091)	.03
96-177		Cabinet leg (4 part of 14-2519E)	.03
96-178		Cabinet leg (4 part of 14-2519E)	.03
112-789		8-32 x 1-3/8 Swedge hd. mach. screw (4 part of 14-2519E & R)	.03
112-943		6-32 x 1" Swedge hd. mach. screw (8 part of 14-2519E & R)	.03
112-1038		Record changer mtg. screw (2 part of S-14091)	.15
112-1142		5-20 x 1/2 Phillips rd. hd. self-tapping screw (mts. 19-298)	.04
114-329		6-18 x 3/8 x 1/4 AF hex. hd. self-tap screw (2 used on 5B23)	.10
114-386		Chassis mtg. screw (4 used)	.10
115-34		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
126-780		Heat shield	.25
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
188-195		Retaining ring (2 used on S-14090)	.03
202-1350		Instruction book	.50
S-14091		Four speed record changer	.45
S-26657		Terminal strip assembly (1 part of ea. 49-850, 49-856 & 49-871)	2.95
S-43992		45 RPM record adapter	2.95

PART NO.	DIA. NO.	CABINET PARTS Models SF125, E & R DESCRIPTION	PRICE
14-2401		Record player cabinet - SF125	
14-2401E		Record player cabinet - SF125E	
14-2401R		Record player cabinet - SF125R	
16-1440		Packing carton	
19-298		Mounting clip (mts. S-43992)	.20
22-2945	C24, 25	3 mfd. electrolytic 3 mfd. - 30V (1 part of ea. 49-856 & 49-846)	1.25
40-195		Lid hinge (2 part of 14-2401 & R)	.60
40-197		Lid hinge (2 part of 14-2401E)	.60
40-210		Lid support hinge (part of 14-2401 & R)	.60
40-211		Lid support hinge (part of 14-2401E)	.60
46-1997		Volume control knob (remote)	.75
46-2081		Control knob (4 used)	.75
46-2096		Volume control knob	.75
49-846	SP1	3 1/2" PM tweeter speaker	7.00
49-852	SP3	12" PM speaker	16.00
49-853	SP4	12" PM speaker	16.00
49-856	SP2	5" PM speaker	7.00
54-10		8-32 x 1/4 Hex nut (8 part of 14-2401, E&R)	.03
54-34		6-32 x 1/4 Hex nut (8 part of 14-2401, E&R and 2 mts. 49-846 & 4 mts. 49-856)	.03
54-312		Speed nut (2 part of 14-2401, E & R)	.03
54-424		8-32 x 1 1/32 Hex. palm nut (4 mts. ea. 49-852 & 49-853)	.03
57-2498		Emblem plate (part of 14-2401, E & R)	.35
57-2561		Name plate (part of 14-2401, E & R)	1.00
83-765		Armitie strip (4 used)	.03
83-2535		Phono shipping strip (2 used)	.15
83-2763		Phono shipping strip	.03
86-237		Connector terminal (8 used)	.03
86-254		Connector terminal (2 used)	.05
86-312		Terminal shake proof	.03
93-1260		Fibre washer (2 used on S-14090 or S-14093)	.03
112-789		8-32 x 1-3/8 Swedge hd. mach. screw (8 part of 14-2401, E & R)	.03
112-943		6-32 x 1" Swedge hd. mach. screw (6 part of 14-2402, E & R)	.03
112-1038		Record changer mtg. screw (2 used on S-14090 or S-14093)	.15
112-1142		5-20 x 1/2 Phis. rd. hd. self-tap screw (mts. 19-298)	.04

PART NO.	DIA. NO.	CABINET PARTS Models SF125, E & R DESCRIPTION	PRICE
114-329		6-18 x 3/8 x 1/4 AF hex. hd. self-tap screw (2 used on 5B23)	.10
115-34		4-40 x 5/32 Fill. hd. mach. screw (2 mts. 142-92)	.25
126-780		Heat shield	.25
138-178		Metal grille (part of 14-2401, & R)	
138-179		Metal grille (part of 14-2401E)	
142-92		Dual pick-up cartridge (Sapphire-Sapphire)	21.50
159-91		Plug button (2 used)	.03
188-195		Retaining ring (2 used on S-14090 or S-14093)	.03
202-1350		Instruction book	.50
S-14090 or S-14093		4 Speed record changer	.45
		4 Speed record changer	.45
PART NO.	DIA. NO.	CABINET PARTS Chassis 5B23 DESCRIPTION	PRICE
11-103		Line cord & plug	.75
15-115		Fuse holder cap	.25
22-3	C7, 29	.01 mfd. ceramic disc - 1KV (2 used)	.30
22-9	C15	100 mfd. ceramic disc - 500V	.25
22-17	C2, 6	.001 mfd. ceramic disc - 1KV (2 used)	.25
22-18	C11, 13, 28	.0022 mfd. ceramic disc - 500V (3 used)	.25
22-2056	C9	12 mfd. electrolytic capacitor - 150V	1.20
22-2309	C12, 19, 21	330 mfd. ceramic - 500V (3 used)	.25
22-2376	C22, 23	47 mfd. ceramic disc - 500V (2 used)	.25
22-2782	C18, 20	.1 mfd. paper - 600V (2 used)	.45
22-2794	C10	.047 mfd. paper - 600V	.35
22-2813	C4, 8	.01 mfd. paper - 200V (2 used)	.25
22-2819	C14, 16, 17	.0068 mfd. paper - 200V (3 used)	.30
22-2903	C1	22 mfd. ceramic disc - 500V (2 used)	.25
22-3046	C30A, B, C	20-40 ufd. electrolytic - 350V-450V-450V	4.50
22-3076	C3	10 mfd. electrolytic capacitor - 30V	1.75
44-33		Connector jack (2 part of S-43879)	.15
52-797		Shielded lead	.50
54-139		3/8-32 x 9/16 Palm nut (4 used)	.03
54-140		3/8-32 x 9/16 x 3/32 Tkk. hex. nut (used on 63-4373)	.06
54-382		Hex. nut (used on 62-17)	.40
62-17		Fuse receptacle	.17
63-1771		470 ohm 1/2W ins. 10%	.17
63-1786		1000 ohm 1/2W ins. 20% (4 used)	.17
63-1799		2200 ohm 1/2W ins. 10% (2 used)	.17
63-1817		5600 ohm 1/2W ins. 10%	.17
63-1838		18 K ohm 1/2W ins. 10%	.17
63-1841		22 K ohm 1/2W ins. 10%	.17
63-1855		47 K ohm 1/2W ins. 10% (5 used)	.17
63-1869		100K ohm 1/2W ins. 10%	.17
63-1870		100K ohm 1/2W ins. 20% (2 used)	.17
63-1876		150K ohm 1/2W ins. 10% (2 used)	.17
63-1883		220K ohm 1/2W ins. 10%	.17
63-1887		270K ohm 1/2W ins. 10%	.17
63-1890		330K ohm 1/2W ins. 10% (2 used)	.17
63-1891		330K ohm 1/2W ins. 20% (2 used)	.17
63-1904		680K ohm 1/2W ins. 10%	.17
63-1912		1 megohm 1/2W ins. 20%	.17
63-1918		1.5 megohm 1/2W ins. 10%	.17
63-1922		1.8 megohm 1/2W ins. 10%	.17
63-1925		2.2 megohm 1/2W ins. 10% (2 used)	.17
63-4064	R3	Bass tone control	1.40
63-4065	R2	Treble tone control	1.40
63-4066	R4	Presence control	1.40
63-4069	R7	4000 ohm 3W 10%	.45
63-4373	R1A, B	Dual volume control	2.75
63-4397	R5	135 ohm 2W 5%	.68
63-4402	R6	Current balance control	1.40
69-320		2/64 x 5/16 Rd. hd. mach. screw (2 used on 63-4373)	.15
78-402		4 contact socket	.20
78-755		Octal tube socket	.25
78-846		9 contact water tube socket (2 used)	.40
78-939		9 contact molded tube socket (2 used)	.20
78-1099		3 contact socket	.20
78-1116		A.C. socket & wire	.65
80-1249		Shaft friction spring	.15
80-1250		Sleeve friction spring	.15
83-2145		5 Lug terminal strip (2 used)	.10
83-2307		4 Lug terminal strip	.10
83-2612		2 Lug terminal strip	.05
83-2618		8 Lug terminal strip	.10
83-2627		2 Lug terminal strip	.05
83-2898		3 Lug terminal strip	.10
83-2915		4 Lug terminal strip	.10
85-607	S1	Record compensator switch	2.50
93-1179		Rubber washer (used on 62-17)	.03
93-1180		Lock washer (used on 62-17)	.03
95-1603	T2	Power transformer	15.50
95-1604	T1	Output transformer	5.50
114-370		10-32 x 1/2 Hex. hd. self-tap screw (flat washer att. (4 mts. 95-1603)	.05
125-96		Strain relief grommet (2 used)	.10
136-32	F1	Fuse 1 1/2 amp. - 3AG (2 used)	.15
S-43879		A.C. socket, jack & bracket assembly	



NOTE: SPEAKER HOODS SHOWN ABOVE ARE NOT USED ON THE 12\"/>



ADJ. R5 FOR ZERO VOLTAGE WHEN VACUUM TUBE VOLTMETER IS CONNECTED ACROSS THESE TERMINALS.

NOTES:
 ARROW ON CONTROLS INDICATE CLOCKWISE ROTATION.
 ALL RESISTORS ARE 20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE MEASURED WITH POINTS INDICATED TO CHASSIS WITH AN AC-DC VACUUM TUBE VOLTMETER.

• DENOTES CHASSIS

ZENITH RADIO CORPORATION MODELS SRS10 & SRS15 CHASSIS 5B24

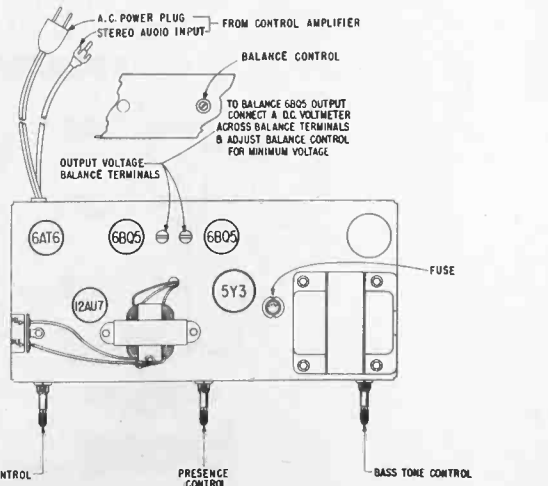
PART NO.	QTY.	DESCRIPTION	PRICE
15-115		Fusible Cap	.25
22-9	CB	100 mfd. Ceramic Disc Capacitor 500V	.25
22-14	C1	.0047 mfd. Ceramic Disc Capacitor 500V (2 used)	.25
22-18	Cd, 6	.0022 mfd. Ceramic Disc Capacitor 500V (2 used)	.25
22-2309	CS, 12, 14	330 mfd. Ceramic Capacitor 500V (3 used)	.25
22-276	C15, 16	330 mfd. Ceramic Disc Capacitor 500V (2 used)	.25
22-2870	C7	.0033 mfd. Ceramic Disc Capacitor 500V	.25
22-2782	C11, 13	.1 mfd. Paper Dielectric Capacitor 600V (2 used)	.45
22-2794	C8	.01 mfd. Paper Dielectric Capacitor 600V	.35
22-2819	C9, 10	.0068 mfd. Paper Dielectric Capacitor 200V (2 used)	.30
22-3046	C10B	Electrolytic Capacitor (20/350-40/450-40/450)	4.50
22-3076	C1	1.0 mfd. Electrolytic Capacitor 25V	1.75
54-139	C1	3/8-32 x 1/16 Palnut (1 used on nos. 63-4064, 4065 & 4066)	.03
54-382		Hex Nut (used on 63-17)	.06
62-17		Fuse Receptacle	.40
63-1771		470 ohm Resistor 1/2W. Ins. 10%	.17
63-1784		1K ohm Resistor 1/2W. Ins. 20% (2 used)	.17
63-1799		2200 ohm Resistor 1/2W. Ins. 10%	.17
63-1817		5600 ohm Resistor 1/2W. Ins. 10%	.17
63-1841		2K ohm Resistor 1/2W. Ins. 10%	.17
63-1855		47K ohm Resistor 1/2W. Ins. 10%	.17
63-1866		82K ohm Resistor 1/2W. Ins. 10%	.17
63-1869		100K ohm Resistor 1/2W. Ins. 10%	.17
63-1870		100K ohm Resistor 1/2W. Ins. 20%	.17
63-1876		150K ohm Resistor 1/2W. Ins. 10%	.17
63-1887		270K ohm Resistor 1/2W. Ins. 10%	.17
63-1891		330K ohm Resistor 1/2W. Ins. 20%	.17
63-1912		330 ohm Resistor 1/2W. Ins. 20%	.17
63-4064	R2	Slide tone control	1.40
63-4065	R1	Presence Control	1.40
63-4066	R3	1K ohm Resistor 3W. 10%	.45
63-4069	R6	15 ohm Resistor 2W. 5%	.68
63-4379	R4	Current Balance Control	1.40
63-4602	R5	Control Tube Socket	.20
78-806		Miniature Seven Contact Water Tube Socket	.15
78-846		Novel Water Tube Socket	.25
78-919		Molded Tube Socket (5 contact), (2 used)	.40
80-2135		4 Lug Terminal Strip (2 used)	.10
82-2145		5 Lug Terminal Strip	.10
83-2307		4 Lug Terminal Strip	.10
83-2639		3 Lug Terminal Strip	.05
83-2898		3 Lug Terminal Strip Special	.10
83-2989		Cable Retaining Strip	.02
83-1179		Rubber Washer (used on 62-17)	.02
93-1180		1/2" Lockwasher (used on 62-17)	.02
95-1603	T2	Power Transformer	15.50
95-1623	T1	Output Transformer	5.75
102-3790		Local Speaker Lead Connection	.02
114-370		10-32 x 1/2 Hex. Nut, self tapping screw (Flat washer mt.) (4 mts. 95-1003)	.05
136-32	F1	Fuse 1 1/2 Amp. Type 3AG	.15

PART NO.	QTY.	DESCRIPTION	PRICE
83-745		Cable Retaining Strip (2 used on 52-810)	.03
83-1475		Armita Strip (2 used)	.03
83-2989		Cable Retaining Strip	.05
86-237		Connector Terminal (4 used)	.05
86-254		Connector Terminal (2 used)	.05
112-789		8-32 x 1-3/8 Swed. Hd. Mech. Screw (4 part of 14-2517, E, H & R)	.03
112-943		6-32 x 1" Swed. Hd. Mech. Screw (4 part of 14-2517, E, H & R)	.03
114-51		6-32 x 3/8 AF Hex. Hd. M.S. (2 mts. 83-2989)	.03
114-386		Chassis Mtg. Screw (4 used)	.10
114-453		6-18 x 3/8 Hex. Washer Hd. Self-tap screw (mts. 17-155)	.10
202-1395		Instruction Book	.20
5-23471		Speaker Lead & Terminal Assembly	.40
5-26657		Terminal Strip Assm. (part of 49-856)	.20

PART NO.	QTY.	DESCRIPTION	PRICE
14-2514		Consolelet Cabt. Model SRS15	1.25
14-2514E		Consolelet Cabt. Model SRS15E	.75
14-2514R		Consolelet Cabt. Model SRS15R	7.00
14-2514S		Consolelet Cabt. Model SRS15S	7.00
17-155		Podding carton	.10
22-2945	C17	Electrolytic Capacitor - 3 mid., 30V (part of 49-856)	1.25
46-2081		Knob - Bass - Treble - Presence - Control	.75
49-852	SP2	12" PM Speaker	16.00
49-856	SP1	5" PM Speaker	7.00
52-810		AC Line Cord, Shielded Lead & Plug	4.00
54-10		6-32 x 1/2 Hex. Nut (4 part of 14-2514, E & R and 4 mts. 49-856)	.03
54-34		8-32 x 1/2 Hex. Nut (4 part of 14-2514, E & R)	.03
54-312		Speed Nut (2 part of 14-2514, E & R)	.03
54-424		8-32 x 1 1/2 Hex. Palnut washer type (4 mts. 49-852)	.03
54-461		Speed nut (1 used on no. 114-51)	.05

PART NO.	QTY.	DESCRIPTION	PRICE
14-2517		Consolelet Cabt. Model SRS10	1.25
14-2517E		Consolelet Cabt. Model SRS10E	.75
14-2517H		Consolelet Cabt. Model SRS10H	7.00
14-2517R		Consolelet Cabt. Model SRS10R	7.00
16-1497		Packing Carton	.10
17-155		Cable Clamp (used on 52-810)	.10
22-2945	C17	Electrolytic Capacitor 3 mid., 30V (part of 49-856)	1.25
46-2081		Knob - Bass - Treble - Presence - Control	.75
49-852	SP2	12" PM Speaker	16.00
49-856	SP1	5" PM Speaker	7.00
52-810		AC Line Cord, Shielded Lead & Plug	4.00
54-10		6-32 x 1/2 Hex. Nut - Swed. (4 part of 14-2517, E, H & R)	.03
54-34		6-32 x 1/2 Hex. Nut - Swed. (4 part of 14-2517, E, H & R and 4 mts. 49-856)	.03
54-312		Speed Nut - Tinmeron (2 part of 14-2517, E, H & R)	.03
54-424		8-32 x 1 1/2 Hex. Palnut Washer type (4 mts. 49-852)	.03
54-461		Speed mt. Tinmeron (1 used on 14-51)	.02
57-2498		Emblem Plate (part of 14-2517, E, H & R)	.35
57-2561		Name Plate (Stereoaphonic) (part of 14-2517, E, H & R)	.10
72-127		8 x 1 1/2 Phillips Flat Hd. wood screw (2 used on 14-2517, E, H & R)	.05

CODED SPEAKER LEADS MUST CONNECT TO CODED TERMINALS ON SPEAKERS



MODELS A624G, W & Y CHASSIS 6A03

CABINET PARTS

Part No.	Dia. No.	Description	Price
7-21		Bezel	1.75
12-2326		Dimmer Control Mtg. Bracket	.15
16-1226		Packing Carton	.05
19-208		Cable Clamp	.05
46-1561		Alarm, Radio, Auto-off & Dimmer Control Knob	.25
46-1562		Vol. & Tuning Control Knob	.50
49-713	SP1	4" P M Speaker	4.50
54-139		3/8-32 X 9/16 Nut (Mts. 63-3659)	.01
54-270		8-32 X 1 1/2 Nut (1 used on Ea. 96-91)	.01
54-384		4-40 X 1/4 Nut (3 joins S-24583, 19-208, & 83-2285)	.01
57-1725		Emblem Plate	.25
57-2274		Dial Background Plate	.40
69-119		Pointer	.40
63-3659	R4	Dimmer Control	1.40
78-1085		Dial Light Socket & Wire (Clock)	.30
80-1102		Dial Crystal Ret. Spring	.10
80-1156		Knob Ret. Spring (3 used)	.02
83-2285		Terminal Strip	.10
83-2850		Felt Strip - Model A624Y	.05
83-2851		Felt Strip - Model A624G	.05
83-2852		Felt Strip - Model A624W	.05
93-369		Lockwasher (1 used on Ea. 96-91)	.01
93-805		1/8 X .120 X 3/8 Steel Washer (3 used)	.01
96-91		Cabinet Leg (2 used)	.30
100-51	PL2	Pilot Light Bulb	.15
114-192		6-20 X 7/16 X 1/4 Hex. Hd. S/T Screw (1 used on Ea. 57-2274 & S-24553)	.01
114-201		8-32 X 5/16 X 1/4 Hex. Hd. S/T Screw (Mts. 12-2326)	.01
114-246		6-20 X 5/16 X 1/4 Hex. Hd. S/T Screw (1 used on 57-2274 & 2 Mt. Ea. S-24553 & 49-713)	.01
114-448		10-32 X 1/2 Slot. Hex. Hd. Mach. Screw F/W Att. (2 Mt. S-24544)	.03
114-492		6-20 X 8/8 Hex. Hd. S/T Screw P/W Att. (used on S-24553)	.03
159-69		Trimout Stud (4 Mt. S-24554)	.01
166-88		Leg Bumper (2 used)	.05
188-194		Trim Ring (2 used on 192-224)	.10
192-224		Dial Crystal	1.00
202-1313		Instruction Book	.25
S-24552		Clock Cover & Strip Assem.	17.50
S-24553	U1	Clock Assembly	17.50
S-24554	L1	WAVE MAGNET Ant. Assembly	9.00
S-40224		Cabinet & Grille Assem. - A624G	9.00
S-40245		Cabinet & Grille Assem. - A624W	9.00
S-40574		Cabinet & Grille Assem. - A624Y	9.00

CHASSIS 6A03 PARTS

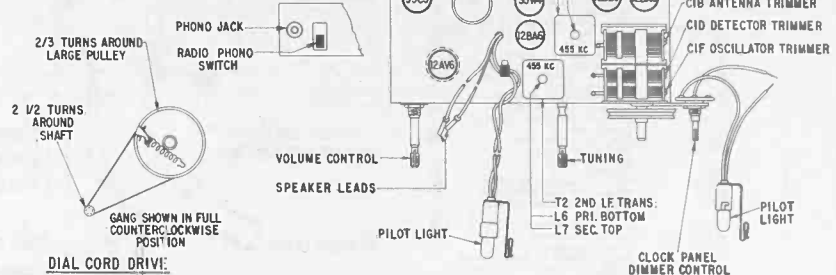
11-111		Line Cord & Plug	1.25
11-115		Line Cord & Plug	1.25
19-249		Coil Mounting Clip (2 used)	.05
22-3	C3, 6, 9, 10	.01 Mid. Ceramic Disc - 1KV (4 used)	.30
22-6	C7	470 Mmf. Ceramic Disc - 1KV	.25
22-2351	C12A, 12B	Electrolytic 40/150V. 80/150V.	2.30
22-2792	C2, 4, 5, 11	.047 Mid. Paper - 200V. (3 used)	.35
22-2879		3 Section Variable	4.00
54-139		3/8-32 X 9/16 Nut (Mts. 63-3661)	.01
54-271		6-32 X 1/4 Nut (1 Mts. Ea. 95-1101 & 1102)	.01
63-965		1000 Ohm 1 W. Ins. 10%	.25
63-1712	R2	18 Ohm 1/2W. Ins. 10%	.17
63-1737		68 Ohm 1/2W. Ins. 20%	.17
63-1750		150 Ohm 1/2W. Ins. 10%	.17
63-1765		330 Ohm 1/2W. Ins. 20%	.17
63-1786		1000 Ohm 1/2W. Ins. 20%	.17
63-1835		15 K Ohm 1/2W. Ins. 20%	.17
63-1842		22 K Ohm 1/2W. Ins. 20%	.17
63-1856		47 K Ohm 1/2W. Ins. 20%	.17
63-1868		470 K Ohm 1/2W. Ins. 20% (2 used)	.17
63-1926		2.2 Megohm 1/2W. Ins. 20%	.17
63-1940		4.7 Megohm 1/2W. Ins. 20%	.17
63-3661	R1	Volume Control	1.40
76-808		Tuning Shaft	.50
78-275		Electrolytic Capacitor Socket	.05
78-808		Miniature Tube Socket (4 used)	.15
78-807		Miniature Tube Socket	.15

CHASSIS PARTS CONTINUED

Connector Socket	.15
Miniature Molded Tube Socket	.25
2 Contact Socket	.30
Dial Light Socket & Wire	.50
Dial Cord Tension Spring	.04
1 Lug Terminal Strip	.05
Line Cord Terminal Strip	.10
Line Cord Insulation Strip	.05
Radio - Phone Switch	.60
Terminal (used on 22-2879)	.02
Brass Washer (2 Mt. 95-1568)	.01
Insulating Washer	.02
Gang Mounting Bushing (3 used)	.01
1st. L. F. Transformer	3.00
2nd. L. F. Transformer	3.00
Output Transformer	
Dial Light Bulb	.15
6-32 X 7/16 Hex. Hd. Mach. Screw-L/W Att. (2 Mt. 22-2879)	.02
6-32 X 7/16 Hex. Hd. Mach. Screw (Mts. 86-199)	.01
Rubber Grommet (3 Mt. 22-2879)	.05
Tube Shield (used on 12AV6)	.05
Iron Core (1 part of Ea. S-22851 & 22852)	.10
Rubber Bumper (used on 22-2879)	.02
Retaining Ring (used on 76-808)	.02
Dial Cord & Eyelet Assem.	.10
Detector Coil Assembly	1.00
Oscillator Coil Assembly	1.00

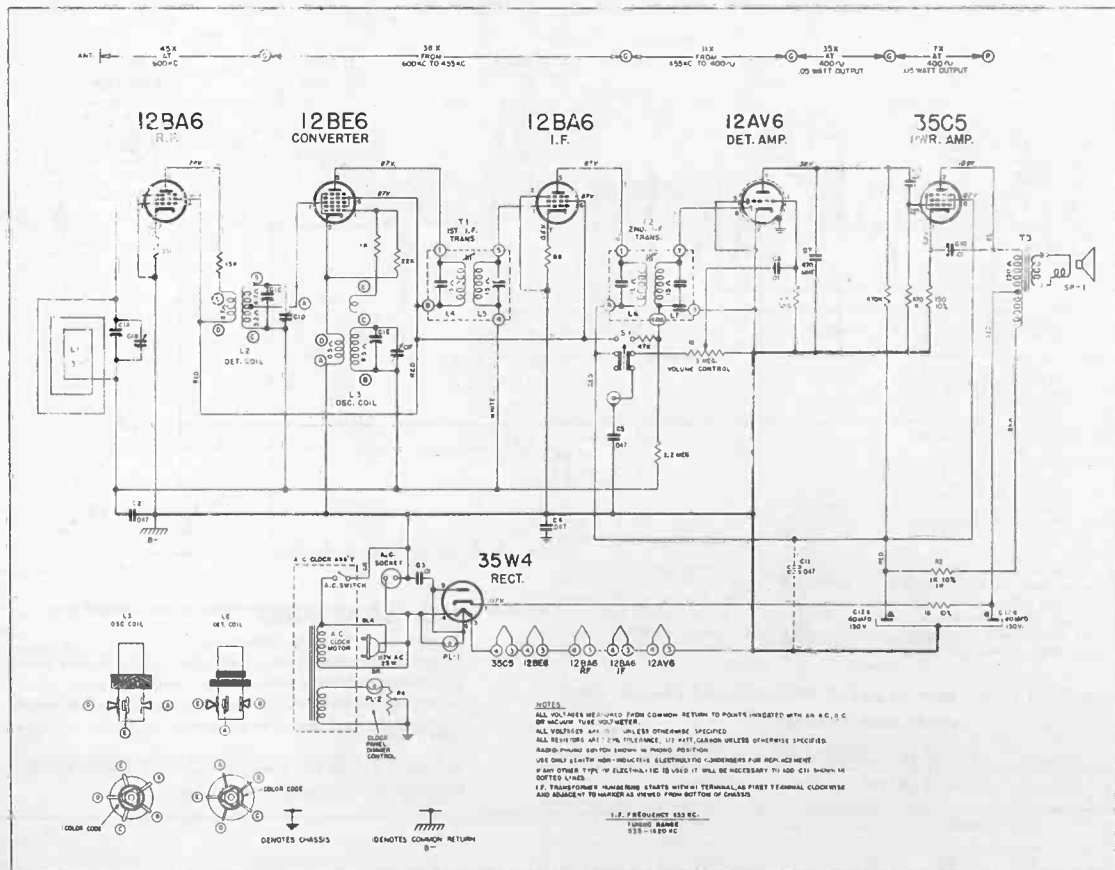
TO THE SERVICEMAN:
Clock and Timer Note:

The clock and timer assemblies used in this receiver are manufactured by Telchtron. Face parts, such as hands, knobs, scales, bezel, etc., are not available through local Telchtron service depots. We suggest that all clock and timer assemblies complete (less the rear cover and bushing) be returned to your local Zenith Distributor for repair or replacement. Be sure to pack all clock and timer assemblies individually and carefully to prevent damage in shipment.



ALIGNMENT PROCEDURE

Operation	Connect Oscillator #0	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L4, L5, L6, L7	For I.F. Alignment.
2	One Turn Loop Coupled	---	1600 Kc.	1600 Kc.	C1F	Set Oscillator to Dial Scale
3	Loosely to Wave Magnet	---	1400 Kc.	1400 Kc.	C1D, C1B	Align Detector and Antenna Stage



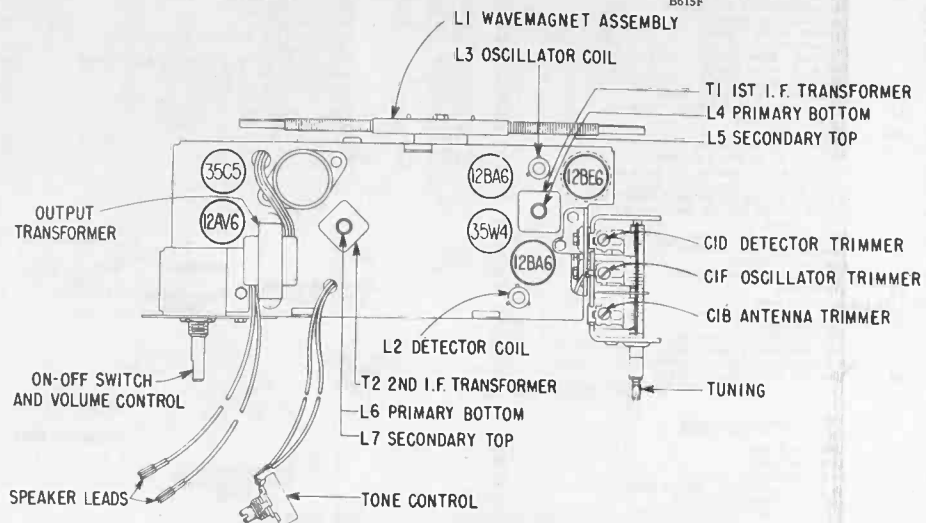
CHASSIS 6B05

MODELS B615L, F, G CHASSIS 6B05

CHASSIS PARTS			
PART NO.	DIA. NO.	DESCRIPTION	PRICE
11-85		Line cord & plug	.75
12-2678		Volume control mtg. bracket	
12-2681		Tuning capacitor mtg. bracket	
12-2682		Antenna mtg. bracket	
19-238		Coil mtg. clip (1 part of ea. S-43910 & 44923)	
22-3	C6,9	.01 mfd. ceramic disc capacitor - 500V (2 used)	.10
22-4	C12	.0047 mfd. ceramic disc capacitor - 500V (2 used)	.25
22-5	C4,5	100 mfd. ceramic disc capacitor - 500V (2 used)	.25
22-6	C2,10	470 mfd. ceramic disc capacitor - 1000V (2 used)	.25
22-2351	C15A,B	Electrolytic capacitor - 40/150 80/250	2.30
22-2670	C8	.0033 mfd. paper dielectric capacitor - 200V	.25
22-2792	C3,7,14	.047 mfd. paper dielectric capacitor - 200V (2 used)	.30
22-2811	C13	.01 mfd. paper dielectric capacitor - 400V	.25
22-3101	C1A,B,C,D,E,F	Three section variable capacitor	6.00
54-139		3/8-32x9/16 palnut (mts. 63-4408)	.03
63-1574	R3	1 K ohm resistor 1W Ins. 20%	.25
63-1750		150 ohm resistor 1/2W Ins. 10%	.17
63-1754		180 ohm resistor 1/2W Ins. 10%	.17
63-1828		10 K ohm resistor 1/2W Ins. 20%	.17
63-1842		22 K ohm resistor 1/2W Ins. 20%	.17
63-1856		47 K ohm resistor 1/2W Ins. 20%	.17
63-1869		10 K ohm resistor 1/2W Ins. 10%	.17
63-1898		470 K ohm resistor 1/2W Ins. 20% (3 used)	.17
63-1912		1 megohm resistor 1/2W Ins. 20% (2 used)	.17
63-1926		2.2 megohm resistor 1/2W Ins. 20%	.17
63-1940		4.7 megohm resistor 1/2W Ins. 20%	.17
63-3540	R2	Tone control	1.40
63-4408	R1	Volume control & switch	
78-275		Electrolytic capacitor socket	.05
78-737		Miniature molded tube socket (seven contact)	.20
78-989		Miniature water tube socket (seven contact) (4 used)	.15
78-990		Miniature water tube socket (seven contact)	.15
83-2307		Four lug terminal strip	.10
83-2967		Antenna mtg. strip (part of S-44810)	.15
86-81		Terminal	.03
86-199		Terminal (used on 22-3101)	.03
86-237		Terminal (2 used on 95-1643)	.03
94-295		Gang capacitor mtg. bushing (3 used)	.05
95-1504	T1	1st I.F. transformer	2.50
95-1505	T2	2nd I.F. transformer	2.50
95-1643	T3	Output transformer	
113-78		6-32x11/32x1/4 AF hex. hd. mach. screw - lockwasher att. (2 used on 22-3101)	.03
114-78		8-32x3/8 hex. hd. self-tapping screw (1 used on 86-81, & 2 on ea. 12-2678 & 22-3101)	.03
114-365		8-32x3/8 hex. hd. self-tapping screw - flat washer att. (used on S-44810)	.05
114-542		6-32x11/32 hex. hd. mach. screw (used on 22-3101)	.03
125-94		Rubber grommet (3 used on 22-3101)	.03
125-96		Strain relief grommet	.10
126-554		Tube shield	.05
149-211		Iron core (1 part of ea. S-43910 & 44923)	.10
S-43910	L3	Oscillator coil	
S-44810	L1	Antenna	
S-44923	L2	Detector coil	

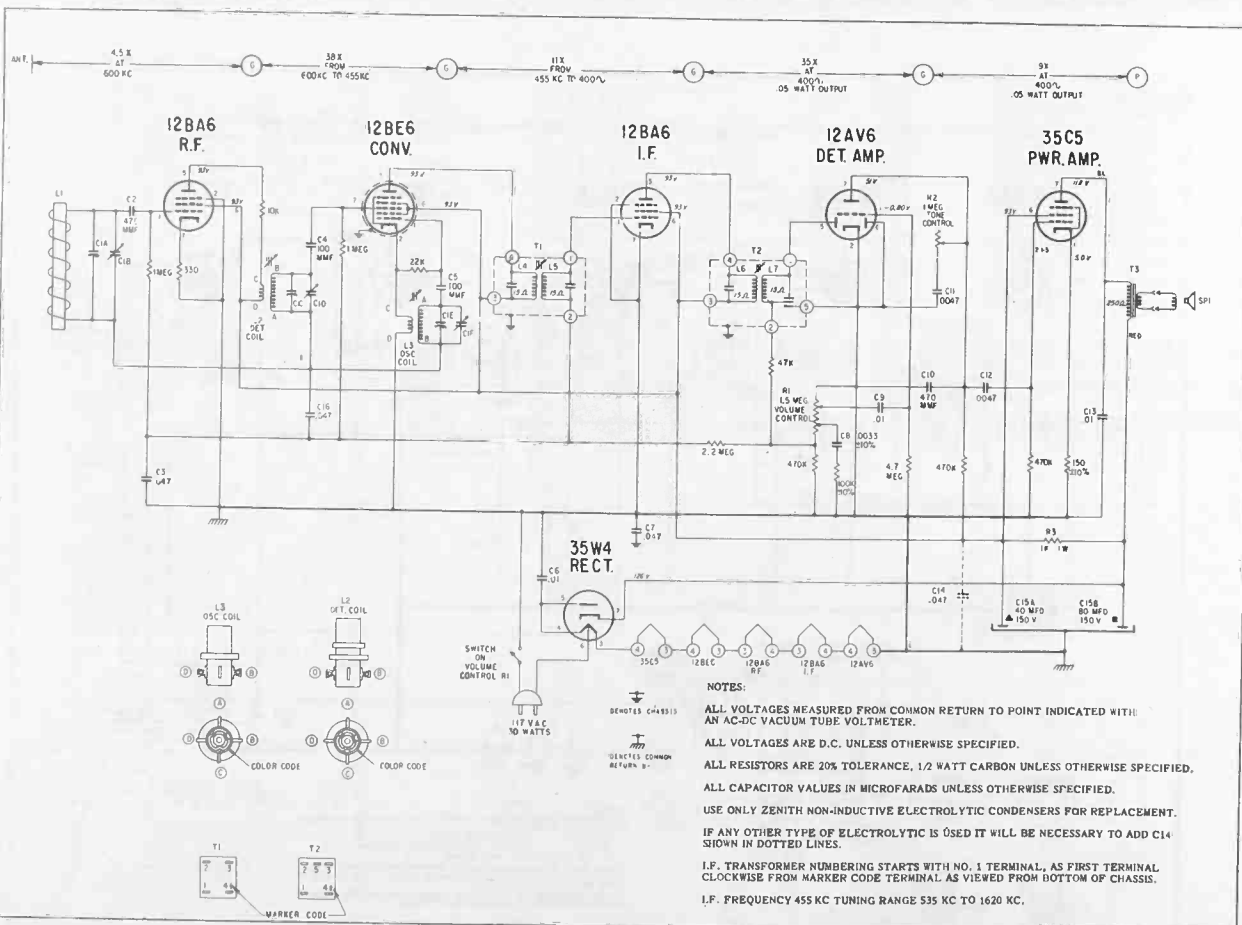
CABINET PARTS	
12-2679	Grille mtg. bracket (2 used)
12-2684	Grille mtg. bracket - bottom (2 used)
14-2507	Plastic table cabinet - B615L
14-2508	Plastic table cabinet - B615F
14-2509	Plastic table cabinet - B615G
16-1506	Packing carton
46-2039	Tuning control knob
46-2040	Dial knob - B615L
46-2041	Dial knob - B615F
46-2042	Dial knob - B615G
46-2066	Tone control knob - B615L
46-2067	Tone control knob - B615F
46-2068	Tone control knob - B615G
49-869	6" x 9" PM speaker
54-279	3/8-32x1/2x3/32 thk. hex. nut (used on 6B05)
57-2445	Emblem plate
57-2602	Name plate (Zenith)
83-3048	Felt strip (4 used)
112-1076	6-20x5/16 phillips fillister hd. self-tapping screw (2 used on ea. 12-2684)
112-1181	8-32x1 7/8 phillips pan hd. mach. screw (2 used)

CABINET PARTS	
112-1185	8-32x3/8 phillips pan hd. mach. screw (2 used on 138-218)
114-335	8-18x1/2x1/4 AF hex. hd. self-tapping screw (2 used on 12-2679)
114-481	8-18x1/2 hex. hd. self-tapping screw - flat washer att. (4 mt. 49-869)
114-637	8-32x1/2 slotted hex. hd. mach. screw - flat washer att. (3 used on 6B05)
126-896	Heat shield
138-216	Cabinet grille - B615L
138-217	Cabinet grille - B615F
138-218	Cabinet grille - B615G
188-192	Knob clamping ring (1 used on ea. dial & volume knob)
202-1401	Instruction book
S-26670	Terminal strip
S-44969	Volume control knob assembly - B615G
S-44971	Volume control knob assembly - B615L
S-44973	Volume control knob assembly - B615F



ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L4, L5, L6, L7	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1F	Set Oscillator to Dial Scale
3	—	—	1400 Kc.	1400 Kc.	C1D, C1B	Align Detector and Antenna Stage



NOTES:

ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINT INDICATED WITH AN AC-DC VACUUM TUBE VOLTMETER.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

ALL RESISTORS ARE 20% TOLERANCE, 1/2 WATT CARBON UNLESS OTHERWISE SPECIFIED.

ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

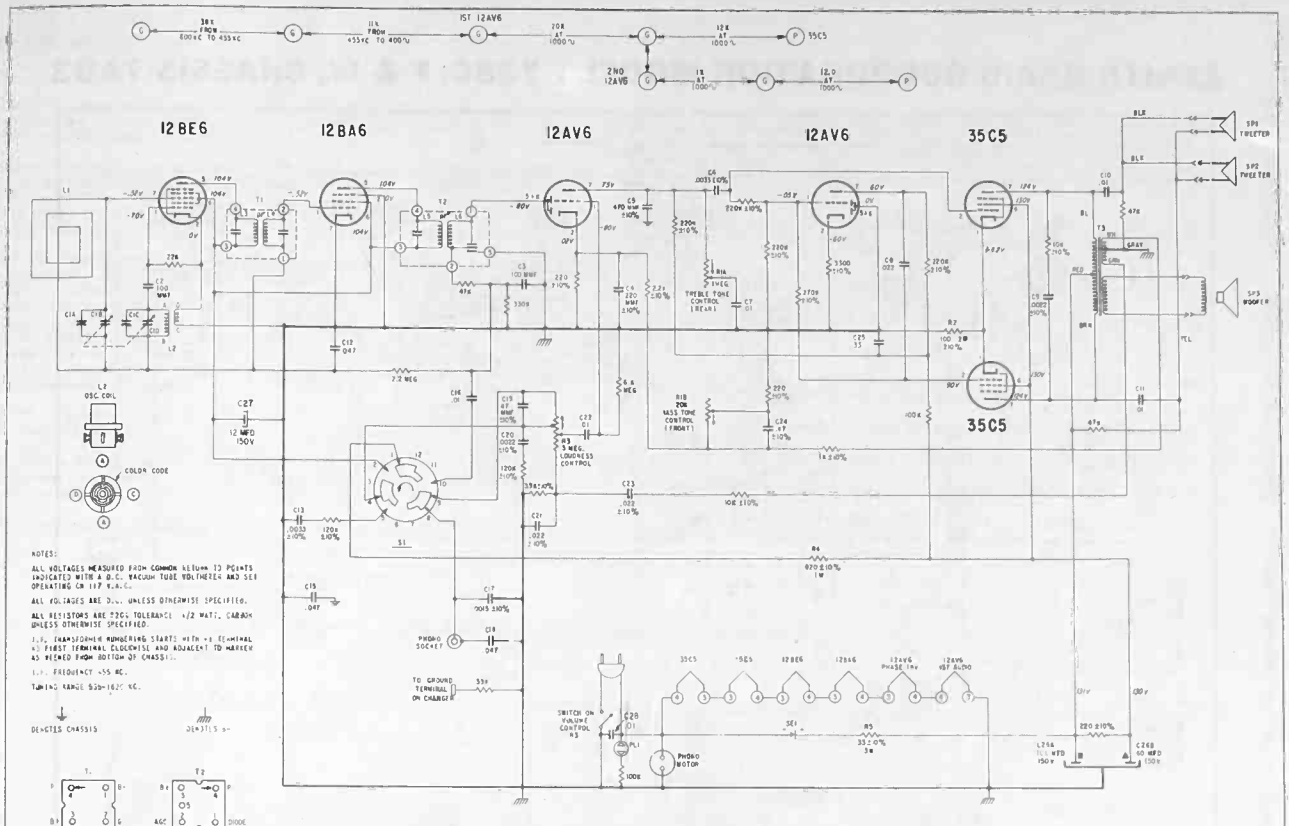
USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.

IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C14 SHOWN IN DOTTED LINES.

I.F. TRANSFORMER NUMBERING STARTS WITH NO. 1 TERMINAL, AS FIRST TERMINAL CLOCKWISE FROM MARKER CODE TERMINAL AS VIEWED FROM BOTTOM OF CHASSIS.

I.F. FREQUENCY 455 KC TUNING RANGE 535 KC TO 1620 KC.

©John F. Rider

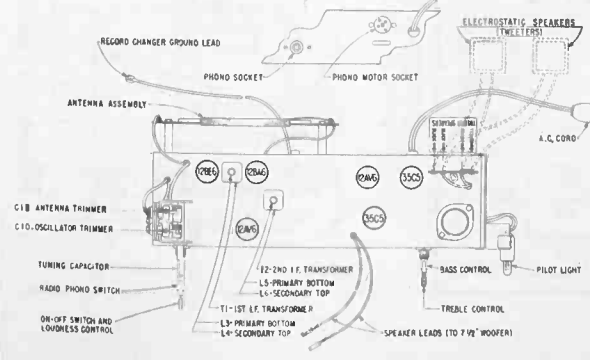


NOTES:
 ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER AND SET OPERATING ON 100 P.A.S.
 ALL RESISTORS ARE 20% TOLERANCE 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 1.1. TRANSISTOR AND SEMICONDUCTOR PARTS WITH A 10% TOLERANCE AT FIRST TERMINAL, ELONGATED AND ADJUSTED TO MATCH AS SHOWN FROM BOTTOM OF CHASSIS.
 1.2. FREQUENCY - 55 MC.
 TUNING RANGE 520-1625 KC.



Zenith Radio Corporation Model HF660 Chassis 6B06

PART NO.	DIA. NO.	Chassis Parts Description	PRICE	PART NO.	DIA. NO.	Chassis Parts Description	PRICE	PART NO.	DIA. NO.	Chassis Parts Description	PRICE
11-103		Line cord & plug	1.00	63-4372	R3	Radio-phonograph switch & volume control & switch		19-290		Mounting clip (mts. S-41437)	.20
12-2329		Variable capacitor mtg. bracket	.10	78-229		Electrolytic socket	.05	24-295		Chassis cover	2.25
19-306		Coil utg. clip	.10	78-402		4 Contact socket	.10	36-212		Cabinet handle (part of 14-2419F)	
22-3	C7,10,11,16,	.01 Mfd. ceramic disc - 500V (3 used)	.30	78-806		7 Contact miniature wafer tube socket (0 used)	.10	40-157		Idt support hinge (part of 14-2419F)	1.30
22-28	C2,3	100 Mfd. ceramic disc - 500V (2 used)	.25			Contact miniature wafer tube socket (0 used)	.10	40-189		Hinge (2 part of 14-2419F)	.30
22-12	C17	.0015 Mfd. ceramic disc - 500V	.25	78-807		7 Contact miniature wafer tube socket (0 used)	.10	46-1992		Loudness & treble tone control knob	
22-18	C9,20	.0025 Mfd. ceramic disc - 500V (2 used)	.25	78-1060		Pilot light socket & wire	.15	46-1993		Base tone control knob	
22-2321	C4	.220 Mfd. ceramic - 500V	.25	83-1119		Insulating strip (phone jack)	.03	46-2021		Tuning knob	
22-2376	C19	.47 Mfd. ceramic disc - 500V	.25	83-2189		5 Lug terminal strip (2 used)	.10	49-249		Radio-phonograph knob	
22-2670	C5,13	.0033 Mfd. ceramic disc - 500V (2 used)	.25	83-2313		7 Lug terminal strip	.10	54-30		7 1/2" PM speaker	.03
22-2765	C24	.47 Mfd. paper - 200V	.50	83-2336		Antenna mtg. strip (part of S-24659)	.05	54-424		8-32x1 1/2 Hex. palmst (4 mt. 49-849)	.03
22-2781		1 Mfd. paper - 400V	.50	83-2364		6 Lug terminal strip	.10	70-215		6x1/8 Phils. rd. wd. wood screw (6 used on 24-295)	.04
22-2792	C12,15,18	.047 Mfd. paper - 200V (3 used)	.30	83-2365		7 Lug terminal strip	.10	70-219		6x1/8 Phils. oval hd. wood screw (4 used on 14-2419F)	.04
22-2793		.047 Mfd. paper - 400V	.25	83-2366		7 Lug terminal strip	.10	83-175		Armit Strip (2 used)	.03
22-2805	C8	.022 Mfd. paper - 400V	.25	83-2367		Terminal	.03	83-2535		Armit Strip	.03
22-2807	C21,23	.022 Mfd. paper - 200V (2 used)	.25	86-199		Connector terminal (2 part of 95-1618)	.01	83-2535		Phono shipping strip (2 used)	.03
22-3073	C1A,B,C,D	2 Section variable		86-237		Connector terminal (2 part of S-24240)	.01	83-2761		Phono shipping strip	.15
22-3078	C26A,B	60-100 Mfd. electrolytic - 150 V	3.00	86-254		Capacitor Mtg. bushing (3 mt. 22-3073)	.05	86-254		Terminal (4 used)	.05
44-25		Phono Jack	.25	93-127		1st. I. F. transformer	2.50	93-1173		Finishing washer - brass plate (1 used on 70-219)	.03
54-139		3/8 x 32 x 9/16 Palmst (1 mt. on. 63-4003 & 63-4372)	.03	94-299		2nd. I. F. transformer	2.50			Finishing washer - brass plate (1 used on 70-219)	.03
54-267		6-32 x 5/16 Palmst (used on 114-510)	.03	95-1506	T1	Audio output transformer				Fiber washer (2 part of S-14083)	.03
63-1744		100 Ohm 1/2W Ins. 20%	.03	95-1556	T2	Pilot light bulb - NE-51	.21			Handle stud (2 part of 14-2419F)	.25
63-1757		220 Ohm 1/2W Ins. 10%	.17	100-105	PL1	Incandescent att. (2 used on 22-3073)	.03			8-32x1 1/8 Overage hd. mech. screw (4 part of 14-2419F)	.03
63-1799		1 K Ohm 1/2W Ins. 10%	.17	113-34		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 used on 22-3073)	.03			Record changer mtg. screw (2 part of S-14083)	.15
63-1806		2200 Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. mech. screw (mts. 212-18)	.03			5-20x1/2 Phils. rd. hd. self-tap screw (1 mt. 19-290)	.04
63-1799		3300 Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			6-18x1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03
63-1810		3900 Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			10-32x1/2 Hex. slot hd. mech. screw-Flat washer att. (4 used on 6B06)	.03
63-1827		10 K Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Dual cartridge (sapphire-sapphire)	3.99
63-1828		10 K Ohm 1/2W Ins. 20%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Cover latch (2 part of 14-2419F)	1.50
63-1828		10 K Ohm 1/2W Ins. 20%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Plug button (4 used on 14-2419F)	.10
63-1849		47 K Ohm 1/2W Ins. 20% (3 used)	.34	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Metal glide (4 part of 14-2419F)	.10
63-1856		100 K Ohm 1/2W Ins. 20% (2 used)	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Pilot light lens	.05
63-1873		220 K Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Retaining ring (2 part of S-14083)	.05
63-1883		220 K Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Instruction book	
63-1887		270 K Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Record changer	1.10
63-1891		330 K Ohm 1/2W Ins. 10%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Speaker (2 part of S-14083)	1.10
63-1896		2.2 Megohm 1/2W Ins. 20%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			45 RPM record adapter	2.99
63-1947		6.8 Megohm 1/2W Ins. 20%	.17	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03			Cartridge holder (part of S-14083)	1.00
63-1971	R2	100 Ohm 2W Ins. 10%	.14	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03				
63-2772	R5	33 Ohm 3W Ins. 10%	.45	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03				
63-3281	R4	500 Ohm 1W Ins. 10%	.25	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03				
63-4003	R1A,B	Dual tone control	2.75	114-201		8-32x1 1/8x1/4 Hex. hd. self-tap screw (2 mt. S-24659)	.03				



I. F. TRANSFORMERS:

The I. F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers, the tuning wrench 48-19 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.

TUBE, TRIMMER LOCATION AND DETAILED VIEW OF I. F. TRANSFORMERS.

ALIGNMENT OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, L4, L5, L6	Align I.F. for maximum output
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale.
3	—	—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

TO THE SERVICE MAN:

The 7A03 chassis incorporates a superheterodyne circuit with two stages of IF, on the FM Band, and two stages on the AM Band. There is one stage of RF amplification on the FM Band.

When adjustments are made on the 7A03 or any AC-DC chassis, a line isolation transformer (110-V input to 110-V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

The I.F. transformers and the discriminator transformer are the new permeability tuned type. The advantage of an IF transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these IF and discriminator transformers, tuning wrench 68-19 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.

FM IF Alignment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the FM IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z8001) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined in this service note.

FM Discriminator Alignment: When the secondary of the discriminator is

aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

Alignment of this chassis will, in most cases, be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

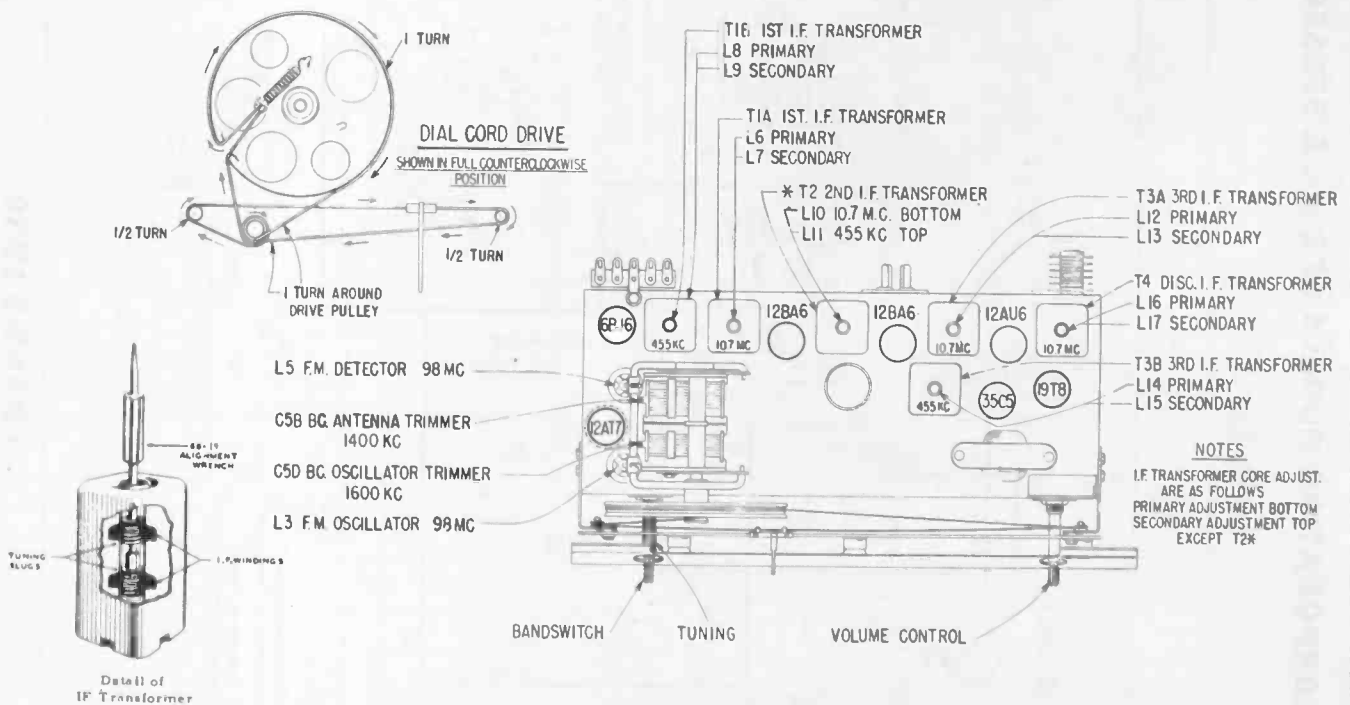
A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

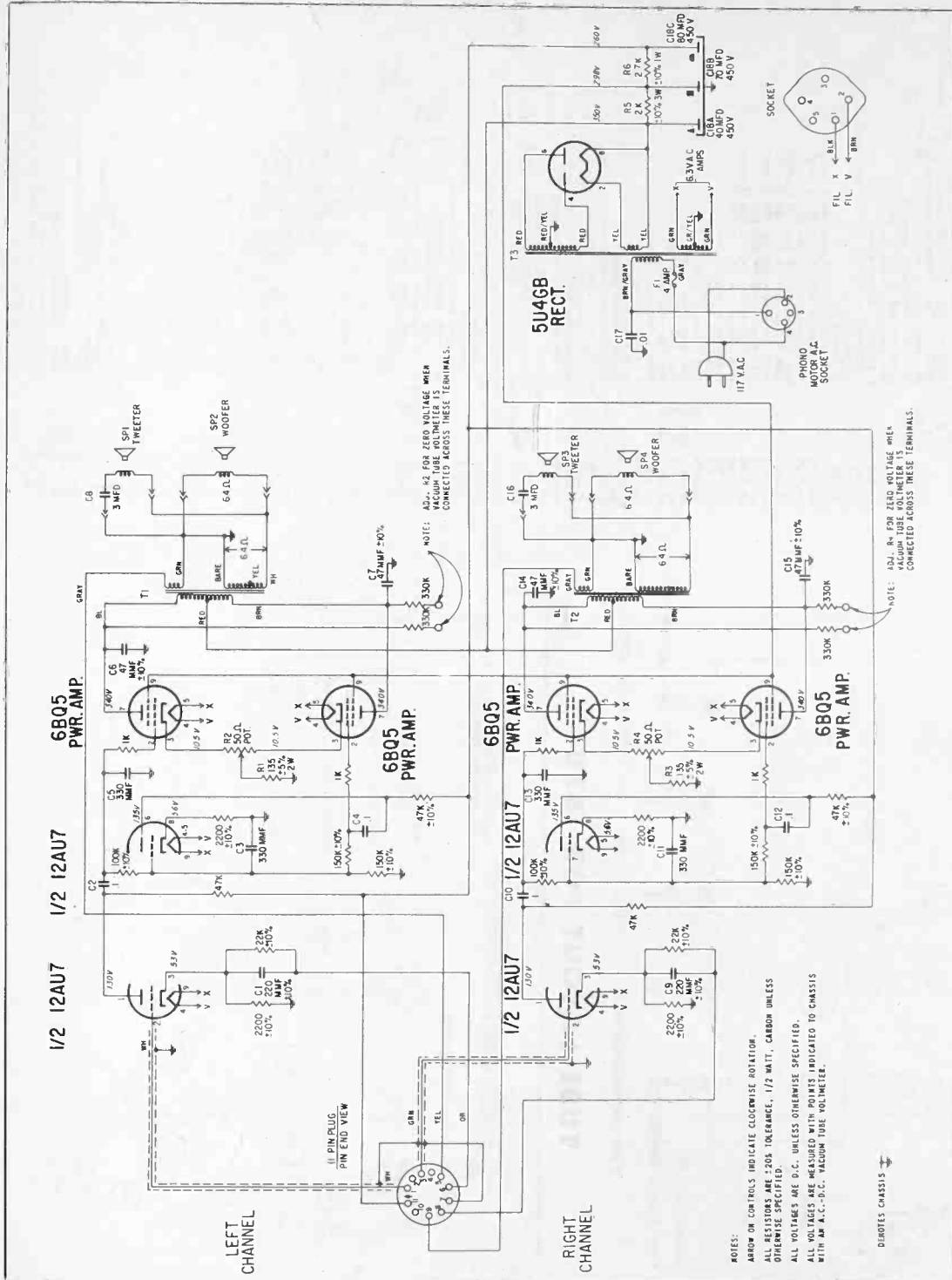
- (a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).
- (b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).
- (c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
- (d) Loosen Slugs by applying a hot iron to the cement.

TUBE AND TRIMMER LOCATION



ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJ. TRIMMERS	PURPOSE
1	Pin 2 12A7 Converter	.05 Mfd.	455 Kc. Modulated.	BC	600 Kc.	L8, 9, 11, 14, 15	Align I.F. channel for maximum output.
2	2 turns loosely coupled to wavemagnet		1600 Kc. Modulated.	BC	1600 Kc.	C5D	Set oscillator to dial scale.
3	2 turns loosely coupled to wavemagnet		1400 Kc. Modulated.	BC	1400 Kc.	C5B	Align antenna stage
4 (a)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated.	FM		L16 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter	.05 Mfd.	10.7 Mc. Unmodulated.	FM		L17 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated.	FM		L12 & L13 Prim. & Sec. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (e)	Pin 1 (grid) on 12BA6 1st IF.	.05 Mfd.	10.7 Mc. Unmodulated.	FM		L10 Prim. of 2nd IF transformer.	Align 2nd IF transformer for maximum reading.
8 (e)	Pin 2 (grid) on 12A7 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated.	FM		L6 & L7 Prim. & Sec. of 1st IF trans.	Align 1st IF transformer for maximum reading.
9 (a)	Antenna Post FM (Remove line ant.)	270 ohms	98 Mc. Unmodulated.	FM	98 Mc.	L3 Osc. Coil Slug	Set Oscillator to dial scale.
10 (e) (d)		270 ohms	98 Mc. Unmodulated.	FM	98 Mc.	L5 Det. Coil Slug	Align det. stage to maximum reading.



CHASSIS 7B30

MAIN CHASSIS 1B30 PARTS

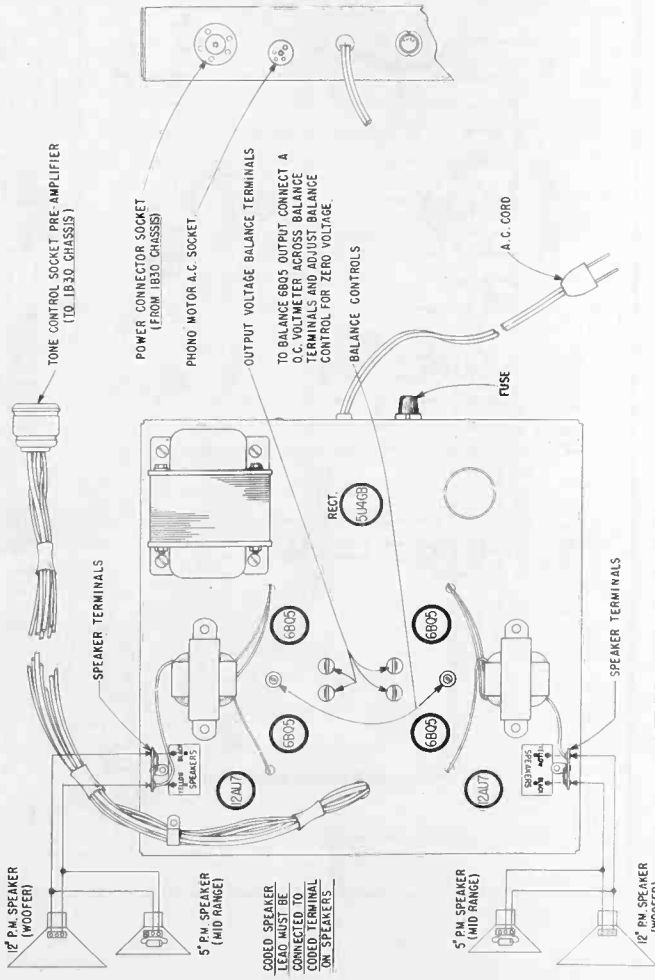
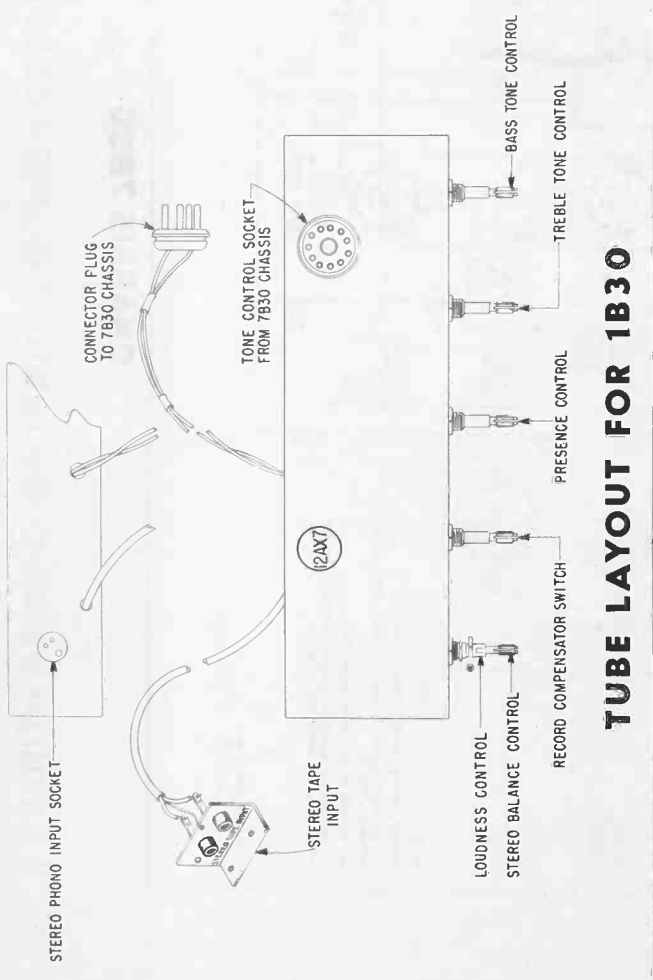
PART NO.	DIA. NO.	DESCRIPTION	PRICE
22-3	C5, 18	.01 mid. ceramic disc capacitor - 1KV (2 used)	.30
22-14	C6, 19	.0047 mid. ceramic disc capacitor - 1KV (2 used)	.25
22-2321	C22, 23	.01 mid. ceramic disc capacitor - 1KV (2 used)	.25
22-2740	C13	220 ohm ceramic capacitor (2 used)	1.50
22-2825	C2, 3, 8, 9, 10, 11, 12, 14, 16, 20	Electrolytic capacitor - 10 mfd. 350V	.30
22-2887	C24	.0047 mid. Paper Dielectric capacitor 200V (10 used)	.30
22-3072	C1, 15	.0022 mid. Paper Dielectric capacitor 200V	.20
22-3076	C4, 17	39 mfd. Gimmick capacitor 500V (2 used)	1.75
52-813		mid. Electrolytic capacitor 25V (2 used)	.15
54-139		Two conductor shielded lead	.03
58-158		3/8-32 x 9/16 Palmot (4 used)	.06
58-220		5 Prong Plug	.55
63-1786		1/2 ohm resistor 1/2W. 10% (2 used)	.17
63-1828		10K ohm resistor 1/2W. 10% (2 used)	.17
63-1862		68K ohm resistor 1/2W. 10% (2 used)	.17
63-1870		100K ohm resistor 1/2W. 10% (2 used)	.17
63-1883		220K ohm resistor 1/2W. 10% (2 used)	.17
63-1890		330K ohm resistor 1/2W. 10% (4 used)	.17
63-1912		680K ohm resistor 1/2W. 10% (2 used)	.17
63-1918		1.5 megohm resistor 1/2W. 10% (2 used)	.17
63-4373	R1A, B	Dual Volume Control	2.75
63-4416	R3A, B	Dual Bass Tone Control	2.75
63-4418	R2A, B	Dual Treble Tone Control	2.75
63-4419	R4A, B	Dual Presence Control	2.75
78-846		Water Tube Socket (9 contact)	.25
80-1249		3 Contact Socket	.20
80-1250		Shifter Foot Pedal	.15
83-2216		2 Lug Terminal Strip (4 used)	.05
83-2627		Record Compensator Switch	2.50
85-607	S1	6-20 x 1/4 AF Hex. Hd. Self-Tap. Screw (2 for 58-220)	.03
114-180		Stereo Jack & Bracket Assembly	
S-4775			

CHASSIS PARTS

PART NO.	DIA. NO.	DESCRIPTION	PRICE
11-103		Line Cord & Plug	1.00
15-63		Plug Cap & Insulator (used on 78-987)	.05
15-115		Fuseholder Cap	.25
17-149	C17	Cable Clamp	.30
22-3089	C15, 11, 13	.01 mid. ceramic disc capacitor - 1KV (4 used)	.25
22-3220	C16	.001 mid. ceramic capacitor 500V (4 used)	.25
22-3276	C4, 7, 14, 15	.01 mid. ceramic disc capacitor 500V (4 used)	.25
22-2782	C24, 10, 12	17 mfd. Paper Dielectric Capacitor 600V (4 used)	.45
22-3106		Electrolytic capacitor - 4-40-80	.55
52-811		Shielded Lead	.55
52-812		Hex Nut (used on 62-17)	.06
54-382		Fuse receptacle	.40
62-1573	R6	1K ohm resistor 1W 10% (4 used)	.15
63-1786		2200 ohm resistor 1/2W 10% (4 used)	.17
63-1799		22K ohm resistor 1/2W 10% (4 used)	.17
63-1841		47K ohm resistor 1/2W 10% (2 used)	.17
63-1855		100K ohm resistor 1/2W 10% (4 used)	.17
63-1869		150K ohm resistor 1/2W 10% (2 used)	.17
63-1876		330K ohm resistor 1/2W 10% (4 used)	.17
63-1902	R2, 4	500 ohm resistor 1/2W 10% (2 used)	1.00
63-4397	R1	135 ohm resistor 2W 5% (2 used)	.48
63-4417	R5	2000 ohm resistor 3W 10%	.15
78-402		4 contact socket	.20
78-755		Octal tube socket	.15
78-792		5 contact socket	.25
78-846		Noval Molded Tube socket (4 used)	.75
78-987		Tube socket	.20
83-475		Insulator strip	.03
83-2216		7 Lug Terminal strip (4 used)	.15
83-2639		3 Lug Terminal strip (2 used)	.05
83-2898		3 Lug Terminal strip special (3 used)	.10
93-1779		Rubber Washer (used on 62-17)	.03
93-1180		1/2" Internal Tooth Lockwasher (use on 62-17)	.03
95-1642	T3	Power Transformer (2 used)	19.00
102-3790	T1, 2	Label (speaker lead connections)	6.00
114-635		10-16 x 1/2 Hex Hd. Self-Tap Screw (flat washer att.) (4 mts. 95-1641)	.05
125-96		Strain Relief Grommet	.10
136-31	F1	Fuse 4 amp. type 3AG	.25

CABINET PARTS

PART NO.	DIA. NO.	DESCRIPTION	PRICE
2-608		Cabinet Back SF2510, L & R	4.00
2-609		Cabinet Back SF2510R	4.00



112-1131	6-18 x 5/8 Phillips Flat Hd. Self-Tap. screw (3 ea. mts. S-18560)	.03
112-1132	6-20 x 1/2 Phillips Rd. Hd. Self-Tap. Screw (mrs. 19-298)	.04
112-1184	Record Changer mtr. screw (2 used)	.05
113-65	8-32 x 1/4 AF Hex. Hd. Mach. screw (Lockwasher att.) (2 mts. 36-185)	.03
114-40	Chassis mtr. screw (4 used)	.10
114-329	6-18 x 3/8 Phillips Hd. Mach. Screw (2 used)	.10
114-433	6-18 x 3/8 Phillips Hd. Mach. Screw (4 mts. Power Supply)	.10
114-433	6-18 x 5/8 Slotted Hex Washer Hd. Self-Tap. screw (9 mts. Cabt. back)	.10
114-644	Special Hex Hd. Screw Red Finish on Head - washer att. (used on 33-185)	.10
115-24	40 Phillips Flat Hd. Mach. Screw (2 mts. 142-93)	.03
142-93	Record Pick-up Cartridge (Diamond-Sapphire)	37.50
152-298	Wood Block (Record Changer Stop)	.50
156-33	Bullet Catch (2 part of 14-2498E)	.05
156-33	Bullet Catch (2 part of 14-2498R)	.05
188-195	Retaining Ring (2 used on S-14090 or S-14093)	.03
202-40398	Four Speed Record Changer	2.75
S-14093	Four Speed Record Changer	2.75
S-18560	Record Changer Slide Assem. (2 used)	2.95
S-26657	Terminal strip assem. (2 part of 49-856)	2.95
S-49992	45 R.P.M. Record Adapter Assem. (2 used)	
S-49991	Final Chassis Assem. - Model 1B30	
S-49931	Final Chassis Assem. - Model 1B30	

All prices shown are suggested retail prices which include Federal Manufacturers' Excise Tax where applicable - and are subject to change without notice.

TO THE SERVICE MAN:
 Models SF2510, SF2510R, SF2510R, SF2550E and SF2550R are identical electrically. The only differences are in cabinet styling and chassis mounting. Chassis (1B30-7B30) are complete high-fidelity stereophonic amplifiers. They use two 12-inch woofer and two 5-inch cone tweeter speakers.

The wires to the stereo cartridge should be connected as follows: "Red" wire to "R" terminal of cartridge, "Black" to "middle" terminal and "white" wire to "L" terminal of cartridge.

It is most important that coded speaker leads be connected to coded terminals on speakers for proper polarity within each speaker group. It is most important then that the speaker groups be in phase with each other. An excellent method to determine if the speaker groups are in phase is to play either a stereo or mono record with the record compensator in RIAA position, with the tone controls on both units, in mid position and with the audio outputs from each speaker group at the same level. Under these conditions, the sound should appear to come from a point midway between the two speaker groups. If the sound comes from any other point than mid-point then one speaker group is out of phase with the other and you should check speaker polarity.

If one or both of the 6305 output tubes in each final audio amplifier are replaced, it will be necessary to connect a DC volt meter across the balance terminals and adjust the balance control for minimum voltage.

120	Record Player - Cabinet Model SF2510	7.00
1.25	Record Player - Cabinet Model SF2510R	22.50
.60	Packing Carton	.03
.50	3 mid. Electrolytic capacitor - 30V (part of 49-856)	.03
.50	Lid rings (2 part of 14-2521, L & R)	.03
.75	Lid Support Hinge (part of 14-2521, L & R)	.03
7.00	Volume Control Knob (Remote)	.03
22.50	Control Knob (4 used)	.03
22.50	5" PM Speaker (2 used)	.03
.03	12" PM Speaker (2 used)	.03
.03	8-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
.03	6-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
.03	Special 1/32 Hex Nut (8 part of 14-2521, L & R)	.03
.03	Spacers (2 used on S-14090 or S-14093)	.03
.03	Emblem Plate (part of 14-2521, L & R)	.03
1.00	Name Plate (part of 14-2521, L & R)	.03
.03	#8 x 1/2 Phillips Flat Hd. Wood Screw (4 used on 14-2521, L & R)	.03
.03	Amite strip (3 used)	.03
.03	Amite strip (3 used)	.03
.03	Phono Shipping strip	.03
.05	Connector Terminal (8 used)	.03
.03	Terminal Shakeproof (2 used on S-14090 or S-14093)	.03
.03	Fibre Washer (2 used on S-14090 or S-14093)	.03
.03	Cabinet Leg (4 part of 14-2521)	.03
.03	Cabinet Leg (4 part of 14-2521R)	.03
.03	8-32 x 1-3/8 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
.15	6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
.03	Record Changer Mtr. Hd. Self-Tap. Screw (mrs. 19-298)	.03
.03	Chassis mtr. screw (4 used)	.03
.03	6-18 x 3/8 AF Hex. Hd. Self-Tap. screw (2 used on 1B30)	.03
.10	Chassis mtr. screw (4 mts. power supply)	.10
.03	6-18 x 5/8 Slotted Hd. Washer Hd. Self-Tap. screw (9 used)	.03
37.50	40 x 5/32 Phillips Hd. Mach. Screw (2 mts. 142-93)	.03
.03	Phono Pick-up Cartridge (2 used on S-14090 or S-14093)	.03
.03	Instruction Book	.03
2.75	Four Speed Record Changer	.03
2.95	Terminal Strip Assem. (1 ea. part of 49-856)	.03
2.95	45 R.P.M. Record Adapter screw (1 ea. part of 49-856)	.03
	Final Chassis Assem. - Model 1B30 (chassis model 7B30)	
	Final Chassis Assem. - Model 1B30R	

CABINET PARTS
MODEL SF2550 E, R

Cabinet Back Model SF 2550
 Cabinet Back Model SF 2550R
 Cabinet Back Model SF 2550E
 Console Cabinet Model SF 2550
 Console Cabinet Model SF 2550R
 Hold Down Bkt. (2 used) (Shipping)
 Mfg. cilia (mrs. 43992)
 3 mid. Electrolytic capacitor 30V (part of 49-856)
 Record Changer Mtr. frame
 Volume Control Knob (Remote)
 Control Knob (4 used)
 Control Knob
 5" PM Speaker (2 used)
 12" PM Speaker (2 used)
 8-32 x 1/8 Hex Nut (8 part of 14-2498, E & R)
 6-32 x 1/8 Hex Nut (8 part of 14-2498, E & R and 4 mts. ea. 49-856)
 Special 1/32 Hex Nut (8 part of 14-2498, E & R)
 Spacers (2 used on S-14090 or S-14093)
 Strike Plate (2 part of 14-2498E & R)
 Strike Plate (2 part of 14-2498R & R)
 Emblem Plate (part of 14-2498, E & R)
 Name Plate (part of 14-2498, E & R)
 #8 x 1/2 Phillips Flat Hd. Wood screw (2 used 15-2488)
 Amite strip (3 used)
 Phono shipping strip (2 used)
 Wire strip
 Friction strip - shipping (2 used)
 Corrugated, Filler strip - shipping (2 used)
 Connector Terminal (8 used)
 Control Terminal (3 used)
 Spade Terminal
 Fibre Washer (2 used on S-14090 or S-14093)
 Spacer Washer (Shipping)
 Cabt. Leg (4 part of 14-2498R)
 Cabt. Leg (4 part of 14-2498E)
 8-32 x 1-3/8 Swedge Hd. Mach. Screw (8 part of 14-2498, E & R)
 8-18 x 1/2 Phillips Flat Hd. Mach. screw (4 mts. S-18560 to 33-185)
 6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2498, E & R)

14-2521	Record Player - Cabinet Model SF2510	7.00
14-2521L	Record Player - Cabinet Model SF2510R	22.50
14-2521R	Record Player - Cabinet Model SF2510R	22.50
16-1502	Packing Carton	.03
22-2945	3 mid. Electrolytic capacitor - 30V (part of 49-856)	.03
40-195	Lid rings (2 part of 14-2521, L & R)	.03
40-212	Lid Support Hinge (part of 14-2521, L & R)	.03
46-1997	Volume Control Knob (Remote)	.03
46-2081	Control Knob (4 used)	.03
46-856	5" PM Speaker (2 used)	.03
49-873	12" PM Speaker (2 used)	.03
54-10	8-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
54-34	6-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
54-312	Special 1/32 Hex Nut (8 part of 14-2521, L & R)	.03
57-2561	Spacers (2 used on S-14090 or S-14093)	.03
83-765	Emblem Plate (part of 14-2521, L & R)	.03
83-765	Name Plate (part of 14-2521, L & R)	.03
83-2552	#8 x 1/2 Phillips Flat Hd. Wood Screw (4 used on 14-2521, L & R)	.03
86-237	Amite strip (3 used)	.03
86-254	Amite strip (3 used)	.03
86-312	Phono Shipping strip	.03
93-1260	Connector Terminal (8 used)	.03
96-170	Terminal Shakeproof (2 used on S-14090 or S-14093)	.03
96-171	Fibre Washer (2 used on S-14090 or S-14093)	.03
96-172	Cabinet Leg (4 part of 14-2521)	.03
112-789	Cabinet Leg (4 part of 14-2521R)	.03
112-943	8-32 x 1-3/8 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
112-1038	6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
112-1142	Record Changer Mtr. Hd. Self-Tap. Screw (mrs. 19-298)	.03
114-329	Chassis mtr. screw (4 used)	.03
114-380	6-18 x 3/8 AF Hex. Hd. Self-Tap. screw (2 used on 1B30)	.03
114-456	Chassis mtr. screw (4 mts. power supply)	.10
115-34	6-18 x 5/8 Slotted Hd. Washer Hd. Self-Tap. screw (9 used)	.03
142-93	40 x 5/32 Phillips Hd. Mach. Screw (2 mts. 142-93)	.03
198-188	Phono Pick-up Cartridge (2 used on S-14090 or S-14093)	.03
208-1398	Instruction Book	.03
S-14090	Four Speed Record Changer	2.75
S-14093	Four Speed Record Changer	2.75
S-26657	Terminal Strip Assem. (1 ea. part of 49-856)	2.95
S-43992	45 R.P.M. Record Adapter screw (1 ea. part of 49-856)	2.95
S-44901	Final Chassis Assem. - Model 1B30 (chassis model 7B30)	
S-44931	Final Chassis Assem. - Model 1B30R	

CABINET PARTS
MODEL SF2550 E, R

Cabinet Back Model SF 2550
 Cabinet Back Model SF 2550R
 Cabinet Back Model SF 2550E
 Console Cabinet Model SF 2550
 Console Cabinet Model SF 2550R
 Hold Down Bkt. (2 used) (Shipping)
 Mfg. cilia (mrs. 43992)
 3 mid. Electrolytic capacitor 30V (part of 49-856)
 Record Changer Mtr. frame
 Volume Control Knob (Remote)
 Control Knob (4 used)
 Control Knob
 5" PM Speaker (2 used)
 12" PM Speaker (2 used)
 8-32 x 1/8 Hex Nut (8 part of 14-2498, E & R)
 6-32 x 1/8 Hex Nut (8 part of 14-2498, E & R and 4 mts. ea. 49-856)
 Special 1/32 Hex Nut (8 part of 14-2498, E & R)
 Spacers (2 used on S-14090 or S-14093)
 Strike Plate (2 part of 14-2498E & R)
 Strike Plate (2 part of 14-2498R & R)
 Emblem Plate (part of 14-2498, E & R)
 Name Plate (part of 14-2498, E & R)
 #8 x 1/2 Phillips Flat Hd. Wood screw (2 used 15-2488)
 Amite strip (3 used)
 Phono shipping strip (2 used)
 Wire strip
 Friction strip - shipping (2 used)
 Corrugated, Filler strip - shipping (2 used)
 Connector Terminal (8 used)
 Control Terminal (3 used)
 Spade Terminal
 Fibre Washer (2 used on S-14090 or S-14093)
 Spacer Washer (Shipping)
 Cabt. Leg (4 part of 14-2498R)
 Cabt. Leg (4 part of 14-2498E)
 8-32 x 1-3/8 Swedge Hd. Mach. Screw (8 part of 14-2498, E & R)
 8-18 x 1/2 Phillips Flat Hd. Mach. screw (4 mts. S-18560 to 33-185)
 6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2498, E & R)

120	Record Player - Cabinet Model SF2510	7.00
1.25	Record Player - Cabinet Model SF2510R	22.50
.60	Packing Carton	.03
.50	3 mid. Electrolytic capacitor - 30V (part of 49-856)	.03
.50	Lid rings (2 part of 14-2521, L & R)	.03
.75	Lid Support Hinge (part of 14-2521, L & R)	.03
7.00	Volume Control Knob (Remote)	.03
22.50	Control Knob (4 used)	.03
22.50	5" PM Speaker (2 used)	.03
.03	12" PM Speaker (2 used)	.03
.03	8-32 x 1/8 Hex Nut (8 part of 14-2498, E & R)	.03
.03	6-32 x 1/8 Hex Nut (8 part of 14-2498, E & R and 4 mts. ea. 49-856)	.03
.03	Special 1/32 Hex Nut (8 part of 14-2498, E & R)	.03
.03	Spacers (2 used on S-14090 or S-14093)	.03
.03	Strike Plate (2 part of 14-2498E & R)	.03
.03	Strike Plate (2 part of 14-2498R & R)	.03
.05	Emblem Plate (part of 14-2498, E & R)	.03
1.00	Name Plate (part of 14-2498, E & R)	.03
.03	#8 x 1/2 Phillips Flat Hd. Wood screw (2 used 15-2488)	.03
.03	Amite strip (3 used)	.03
.03	Phono shipping strip (2 used)	.03
.03	Wire strip	.03
.05	Friction strip - shipping (2 used)	.05
.05	Corrugated, Filler strip - shipping (2 used)	.05
.03	Connector Terminal (8 used)	.03
.03	Control Terminal (3 used)	.03
.03	Spade Terminal	.03
.20	Fibre Washer (2 used on S-14090 or S-14093)	.20
.03	Spacer Washer (Shipping)	.03
.03	Cabt. Leg (4 part of 14-2498R)	.03
.03	Cabt. Leg (4 part of 14-2498E)	.03
.03	8-32 x 1-3/8 Swedge Hd. Mach. Screw (8 part of 14-2498, E & R)	.03
.03	8-18 x 1/2 Phillips Flat Hd. Mach. screw (4 mts. S-18560 to 33-185)	.03
.03	6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2498, E & R)	.03

14-2521	Record Player - Cabinet Model SF2510	7.00
14-2521L	Record Player - Cabinet Model SF2510R	22.50
14-2521R	Record Player - Cabinet Model SF2510R	22.50
16-1502	Packing Carton	.03
22-2945	3 mid. Electrolytic capacitor - 30V (part of 49-856)	.03
40-195	Lid rings (2 part of 14-2521, L & R)	.03
40-212	Lid Support Hinge (part of 14-2521, L & R)	.03
46-1997	Volume Control Knob (Remote)	.03
46-2081	Control Knob (4 used)	.03
46-856	5" PM Speaker (2 used)	.03
49-873	12" PM Speaker (2 used)	.03
54-10	8-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
54-34	6-32 x 1/8 Hex Nut (8 part of 14-2521, L & R)	.03
54-312	Special 1/32 Hex Nut (8 part of 14-2521, L & R)	.03
57-2561	Spacers (2 used on S-14090 or S-14093)	.03
83-765	Emblem Plate (part of 14-2521, L & R)	.03
83-765	Name Plate (part of 14-2521, L & R)	.03
83-2552	#8 x 1/2 Phillips Flat Hd. Wood Screw (4 used on 14-2521, L & R)	.03
86-237	Amite strip (3 used)	.03
86-254	Amite strip (3 used)	.03
86-312	Phono Shipping strip	.03
93-1260	Connector Terminal (8 used)	.03
96-170	Terminal Shakeproof (2 used on S-14090 or S-14093)	.03
96-171	Fibre Washer (2 used on S-14090 or S-14093)	.03
96-172	Cabinet Leg (4 part of 14-2521)	.03
112-789	Cabinet Leg (4 part of 14-2521R)	.03
112-943	8-32 x 1-3/8 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
112-1038	6-32 x 1 Swedge Hd. Mach. screw (8 part of 14-2521, L & R)	.03
112-1142	Record Changer Mtr. Hd. Self-Tap. Screw (mrs. 19-298)	.03
114-329	Chassis mtr. screw (4 used)	.03
114-380	6-18 x 3/8 AF Hex. Hd. Self-Tap. screw (2 used on 1B30)	.03
114-456	Chassis mtr. screw (4 mts. power supply)	.10
115-34	6-18 x 5/8 Slotted Hd. Washer Hd. Self-Tap. screw (9 used)	.03
142-93	40 x 5/32 Phillips Hd. Mach. Screw (2 mts. 142-93)	.03
198-188	Phono Pick-up Cartridge (2 used on S-14090 or S-14093)	.03
208-1398	Instruction Book	.03
S-14090	Four Speed Record Changer	2.75
S-14093	Four Speed Record Changer	2.75
S-26657	Terminal Strip Assem. (1 ea. part of 49-856)	2.95
S-43992	45 R.P.M. Record Adapter screw (1 ea. part of 49-856)	2.95
S-44901	Final Chassis Assem. - Model 1B30 (chassis model 7B30)	
S-44931	Final Chassis Assem. - Model 1B30R	