

Most - Often - Needed

1964

Volume R-24

RADIO
DIAGRAMS
and Servicing Information



Compiled by
M. N. BEITMAN

SUPREME PUBLICATIONS

Supreme Publications for Faster Radio-Television Repairs

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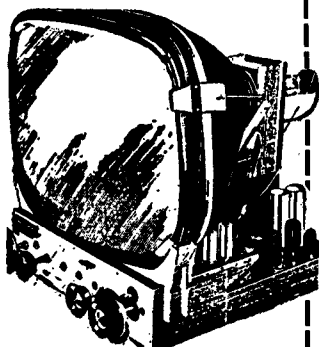
1963

Television

Service Information



The repair of any TV set is simple with **Supreme Television** service manuals. Every set is covered in a practical manner to simplify trouble-shooting and repair. With this help find toughest faults in a jiffy. Most \$3 TV volumes cover a whole year.



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- 1957, 1956, 1955, 1954, 1953, 1952,
- 1951, 1950, 1949, 1948, 1947, 1946,
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SUPREME PUBLICATIONS

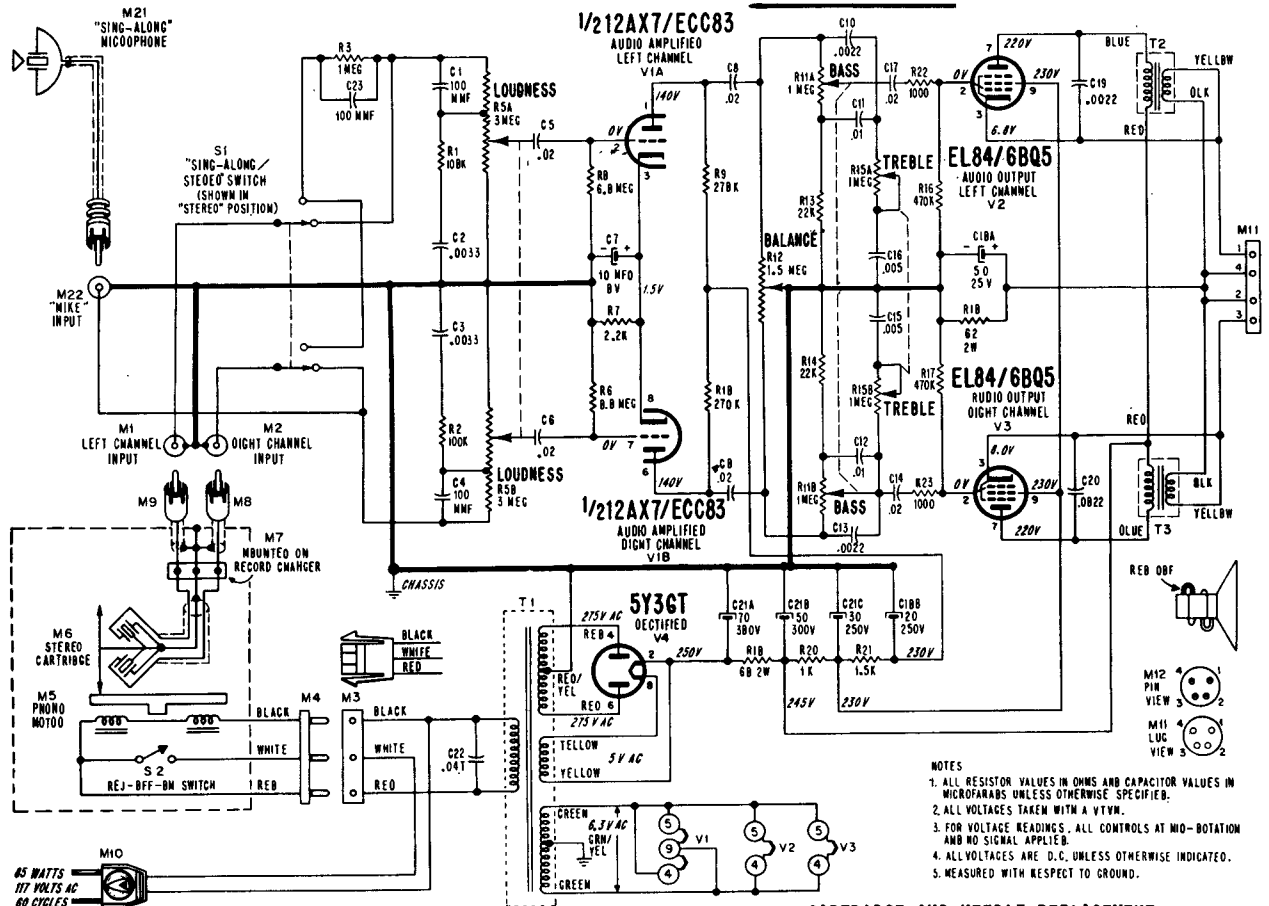
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ADMIRAL

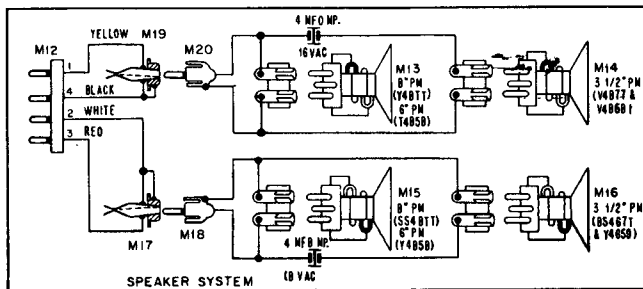
MODEL Y4659 - Y4677
CHASSIS 4S3A



- NOTES
1. ALL RESISTOR VALUES IN OHMS AND CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 2. ALL VOLTAGES TAKEN WITH A VTVM.
 3. FOR VOLTAGE READINGS, ALL CONTROLS AT MID-ROTATION AND NO SIGNAL APPLIED.
 4. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE INDICATED.
 5. MEASURED WITH RESPECT TO GROUND.

CARTRIDGE AND NEEDLE REPLACEMENT

Turn needle selector handle so that desired number (78 or LPS) faces up; corresponding needle will point down. With thumbnail, pull flange at rear of worn needle straight away from cartridge. Line up parallel flanges of new needle with opening in cartridge case and press in place with fingertip.

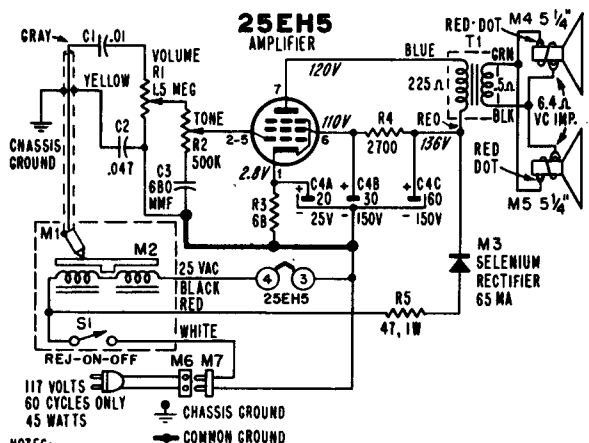


CHASSIS REMOVAL

Disconnect the line cord. Remove four screws holding chassis grille in place. Pull all control knobs off. Remove the nuts under the knobs of the treble and loudness controls while supporting the chassis. Chassis may now be lowered and pulled out for easy servicing.

IMPORTANT: For regular phonograph operation when "sing along" microphone is not being used, unplug microphone from socket and move switch back to "Stereo" position. If microphone is not disconnected with switch in "Stereo" position, the two sound channels will become out of balance, affecting satisfactory sound reproduction. Connect microphone only when using "sing along" operation.

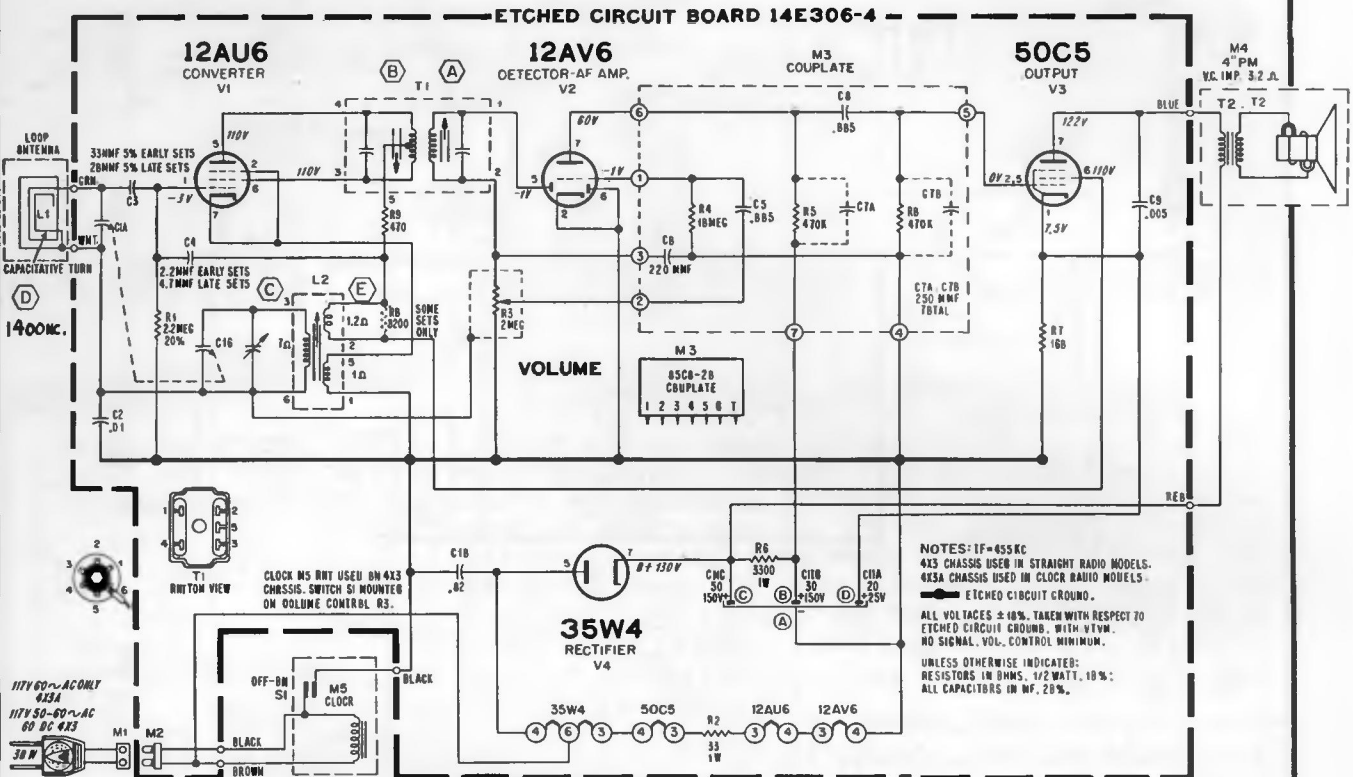
ADMIRAL CHASSIS 1F1B MODEL Y4918



- NOTES:
- ALL RESISTOR VALUES IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS UNLESS OTHERWISE SHOWN. ALL VOLTAGES TAKEN WITH VACUUM TUBE VOLTMETER.

ADMIRAL

CHASSIS: 4X3, 4X3A
 MODELS: Y3303, Y3308, Y3309, Y3337, Y3443

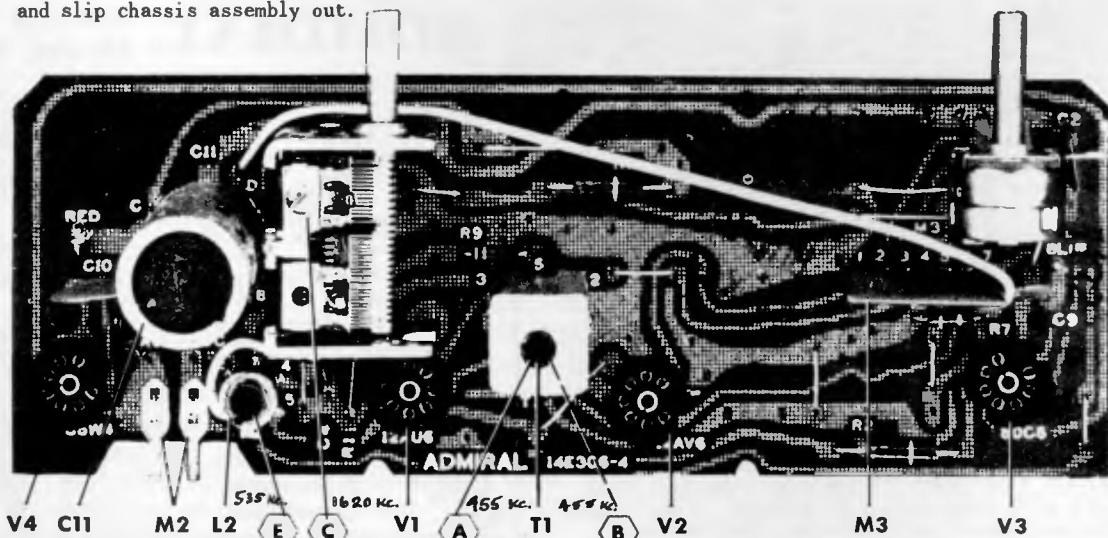


CHASSIS REMOVAL

1. Pull knob off and remove screw under tuning knob.
2. Carefully pry up top of cabinet at back with finger tips, enough to allow removal of cabinet back.
3. Remove screw holding volume control to cabinet front.
4. Remove plastic support from back of chassis and slip chassis assembly out.

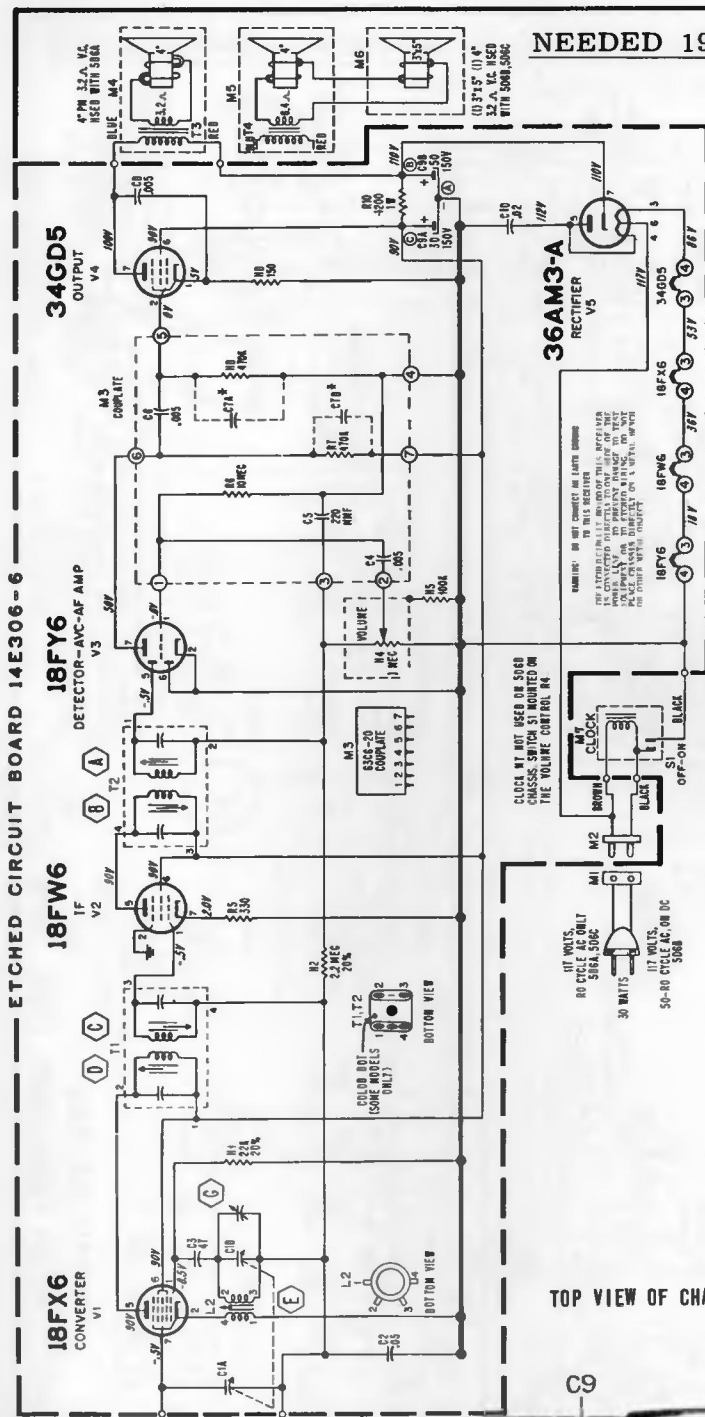
WARNING! DO NOT CONNECT AN EARTH GROUND WIRE TO THIS RECEIVER.

The chassis of this receiver is connected directly to one side of the power line. To prevent damage to test equipment or to etched wiring, do not place chassis directly on a metal bench or other metal object.

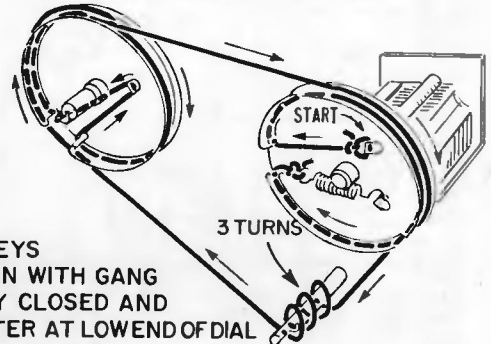


ADMIRAL

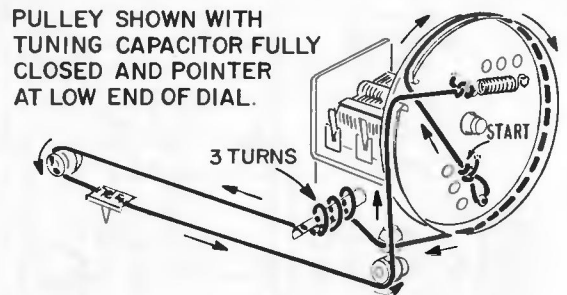
Chassis 5D6A, 5D6B, 5D6C,
Models Y3321, Y3323, Y3346, Y3353,
Y3354, Y3359, Y3363, Y3364, Y3368,
Y3376, Y3377, Y3379, Y3381, Y3383.



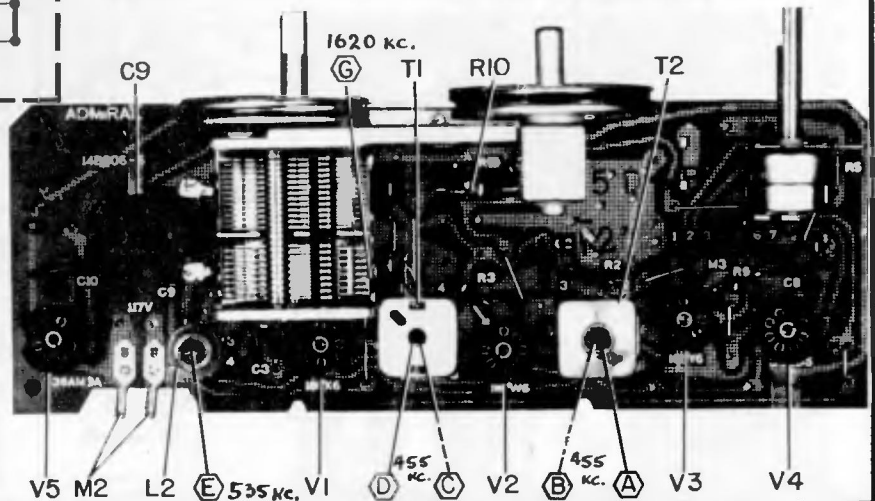
DIAL STRINGING DIAGRAM - 5D6B CHASSIS



DIAL STRINGING DIAGRAM - 5D6C CHASSIS



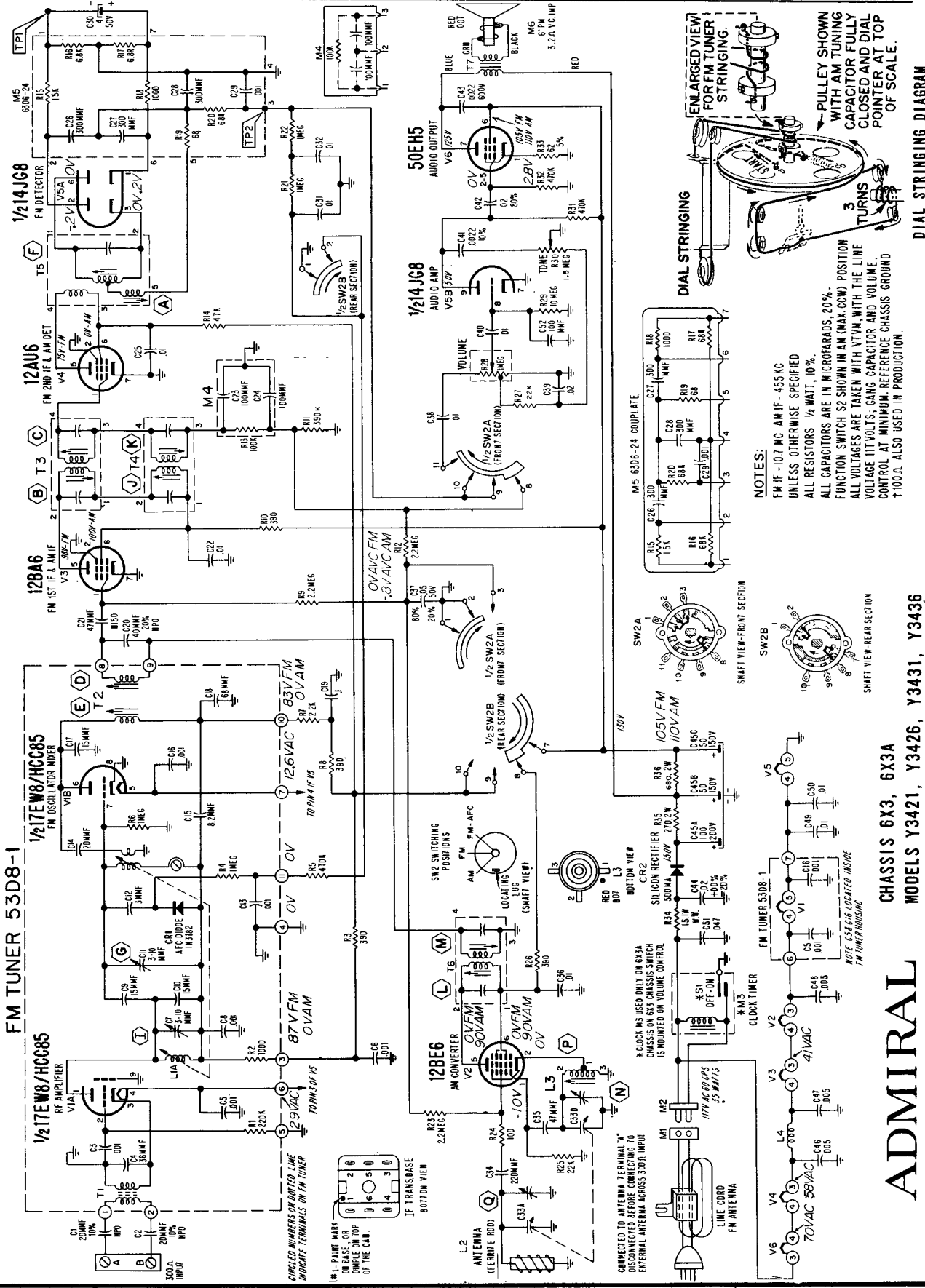
TOP VIEW OF CHASSIS (5D6B) SHOWING COMPONENTS AND ALIGNMENT POINTS



SCHEMATIC NOTES

- IF FREQUENCY 655KC
- ALL VOLTAGES TAKEN WITH VTVM WITH 15TV AC LINE, NO SIGNAL INPUT. ALL VOLTAGES 10%
- ETCHED CIRCUIT GROUND
- ALL CAPACITOR VALUES IN MF UNLESS OTHERWISE SPECIFIED
- * CTA PLUS C78 TOTALS 250MWF TO REMOVE CHASSIS
- 1. PULL KNOBS OFF
- 2. FOR V3320 SERIES ONLY. WITH TAPED SCREW. DRIVER CAREFULLY PRY OUT SQUARE PLASTIC DIAL ESCUTCHEON.
- 3. FOR V3320 SERIES ONLY. PULL CIRCULAR DIAL POINTER OFF BY CAREFULLY PULLING AT OPPOSITE POINTS
- 4. REMOVE TWO SCREWS HOLDING CHASSIS TO CABINET FRONT
- 5. REMOVE PLASTIC BOARD SUPPORT AND SLIP CHASSIS OUT

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION



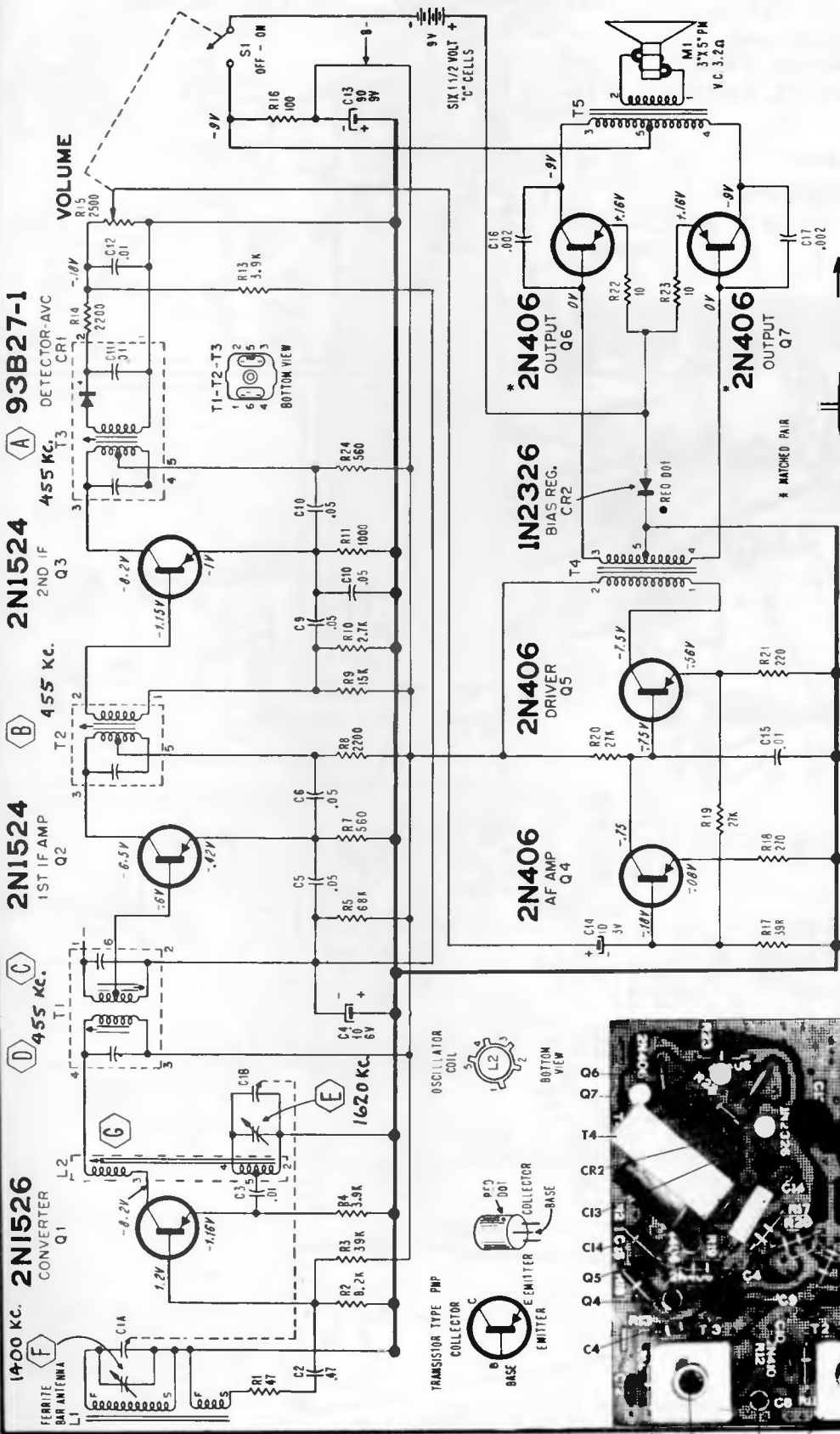
NOTES:

- FM IF -10.7 MC AM IF - 455KC UNLESS OTHERWISE SPECIFIED
- ALL RESISTORS 1/2 WATT, 10%
- ALL CAPACITORS ARE IN MICROFARADS, 20%
- FUNCTION SWITCH S2 SHOWN IN AM (MAX CCW) POSITION
- ALL VOLTAGES ARE TAKEN WITH VTVM, WITH THE LINE VOLTAGE AT MINIMUM. REFERENCE CHASSIS GROUND
- 1.00A. ALSO USED IN PRODUCTION.

CHASSIS 6X3, 6X3A
MODELS Y3421, Y3426, Y3431, Y3435

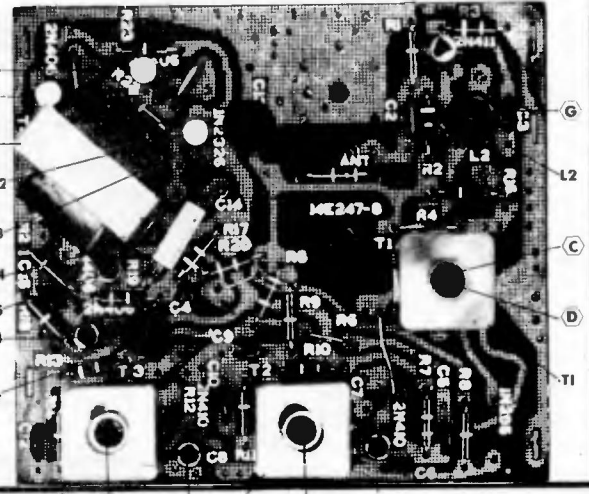
ADMIRAL

ADMIRAL Chassis 7L2, Model Y2347



DIAL POINTER AT 55 ON SCALE
PULLEY SHOWN WITH GANG CAPACITOR FULLY CLOSED
DIAL STRING DIAGRAM

NOTES: IF=455 KC
 — COMMON ETCHED CIRCUIT GROUND
 UNLESS OTHERWISE SPECIFIED:
 CAPACITOR VALUES IN MICROFARADS
 RESISTOR VALUES IN OHMS: 1/2 WATT, 10%,
 VOLTAGE READINGS TAKEN WITH V.T.V.M. USING FRESH
 BATTERIES, NO SIGNAL, VOLUME CONTROL MINIMUM
 TOTAL CURRENT DRAIN (NO SIGNAL) = 7-10 MA.
 B+ IS NOT GROUNDED.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

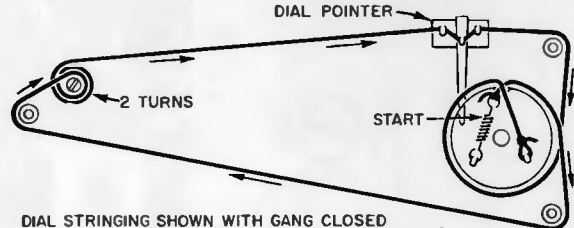
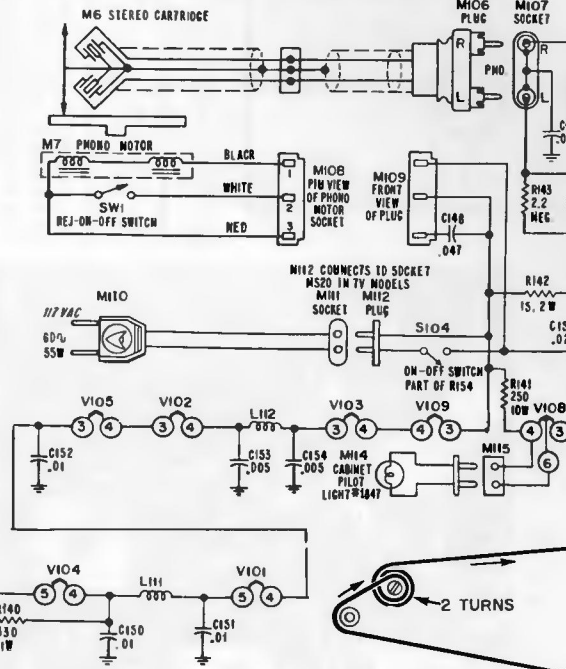
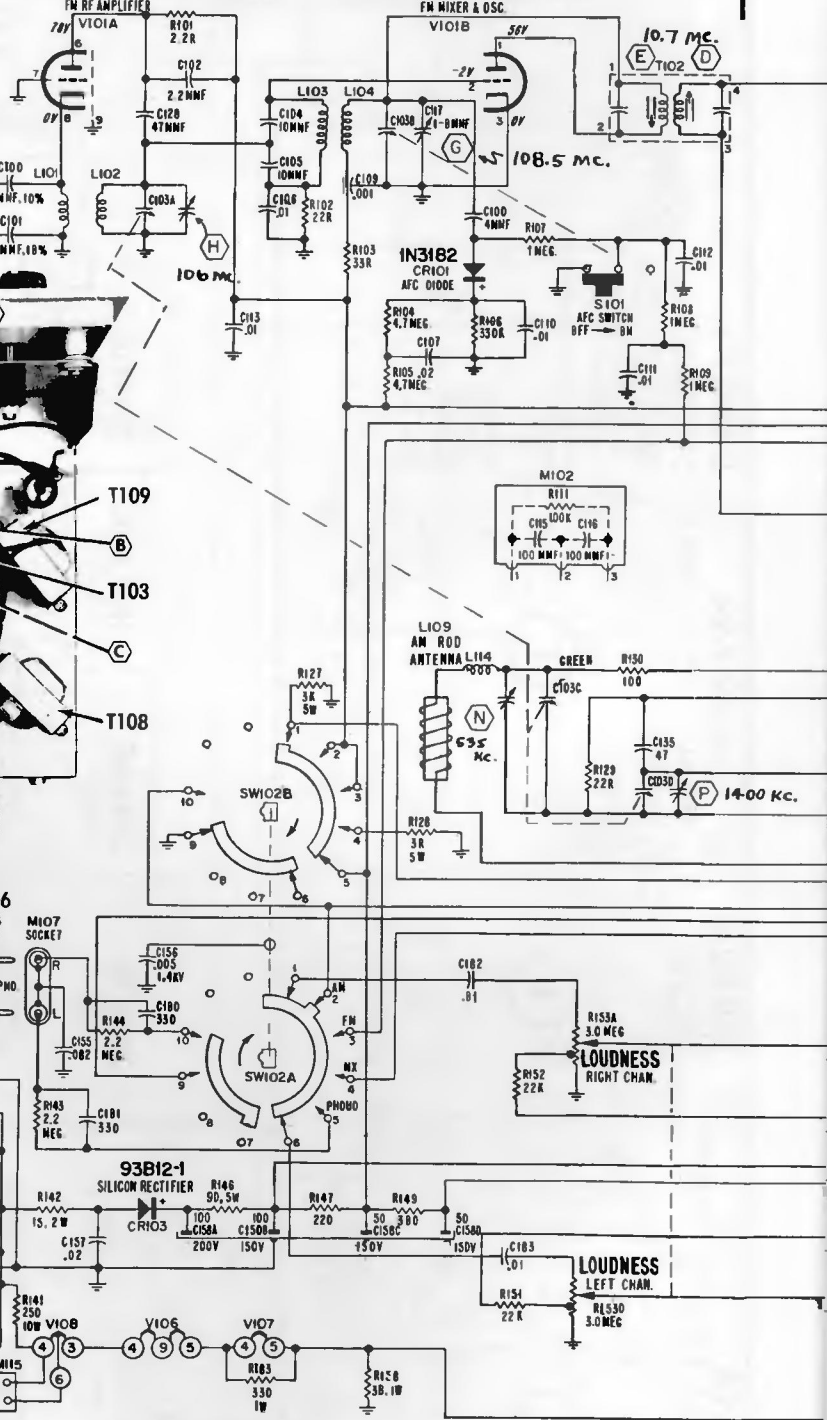
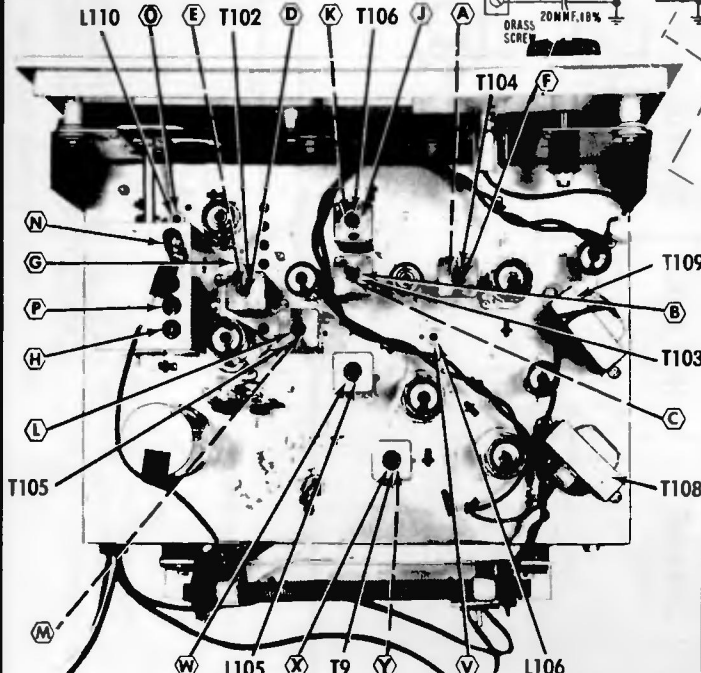
ADMIRAL Chassis 9P1 and similar Chassis 8P1, list of models below, continued

Models Y4851, Y4852, Y4871, Y4872, Y4885, Y4941A, and TV sets SM3811, SM3812, SM3815, SM3831, SR3501, SR3502, SM3503.

1/217EW8/HCC85

1/217EW8/HCC85

TOP VIEW OF CHASSIS ALIGNMENT POINTS AND COMPONENTS

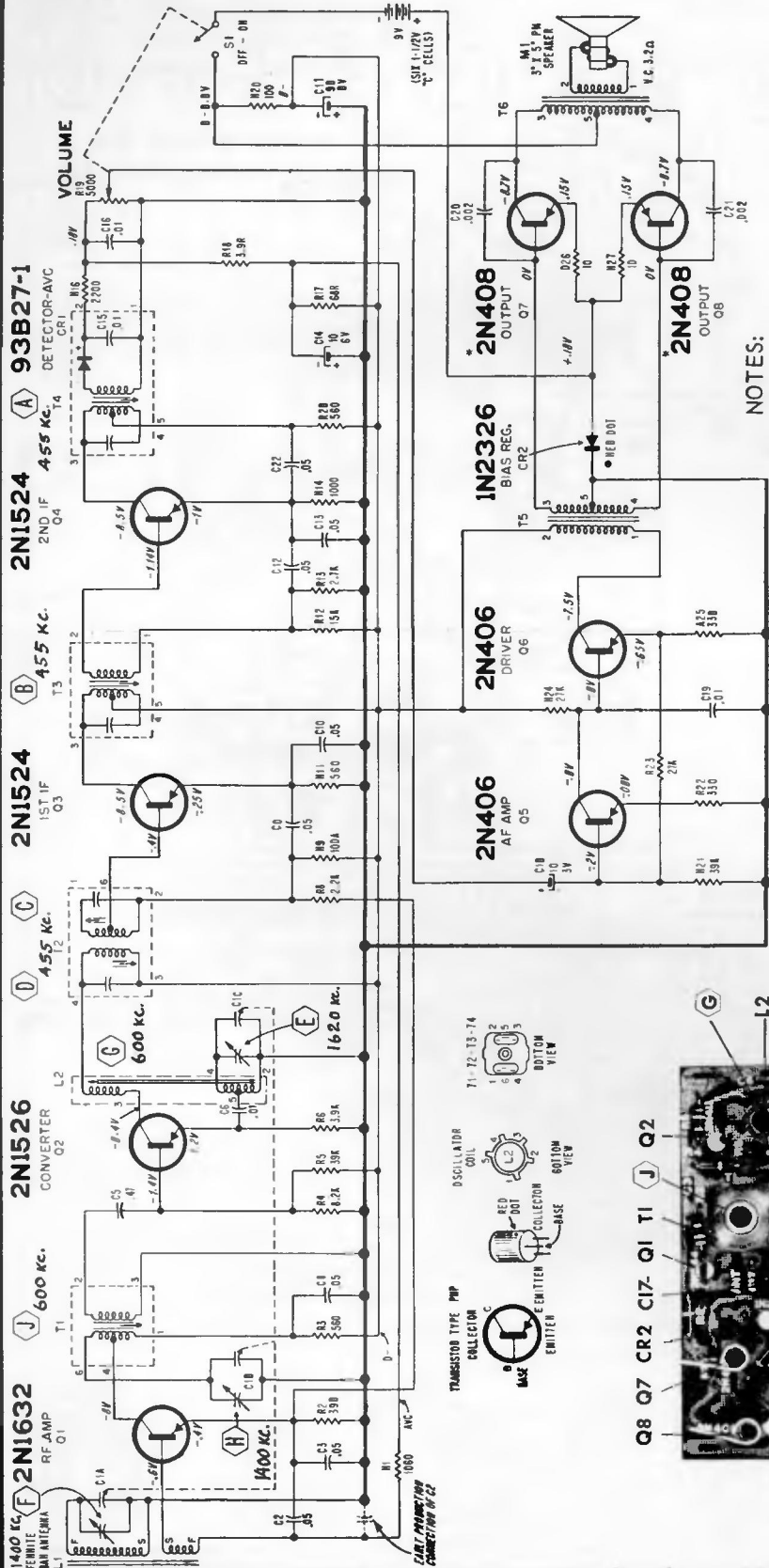


1. FM IF = 10.7 MC.
2. AM IF = 455 KC.
3. UNLESS OTHERWISE SPECIFIED: ALL RESISTORS 1/2 WATT, 10%. ALL CAPACITORS IN MICROFARADS.
4. FUNCTION SWITCH SW102 SHOWN IN AM POSITION (ARROW IS FULLY COUNTER CLOCKWISE) TO SIMPLY THE SCHEMATIC. SW102 SWITCH SECTIONS ARE SHOWN ON SCHEMATIC. MECHANICAL VIEWS IDENTIFY CONNECTION PTS.
5. VOLTAGES ARE MEASURED WITH HTV AC INPUT.
6. ⚡ DENOTES CHASSIS GROUND.

DIAL STRINGING SHOWN WITH GANG CLOSED AND DIAL POINTER AT LOW END OF DIAL SCALE.

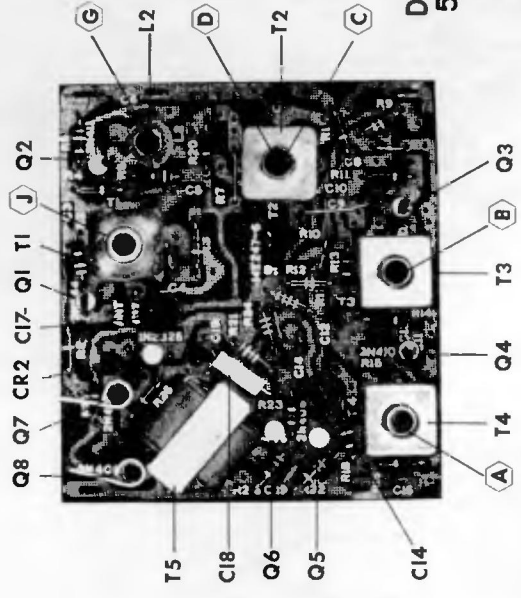
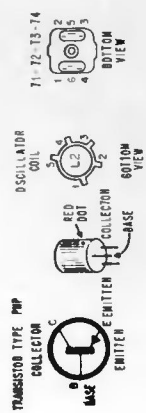
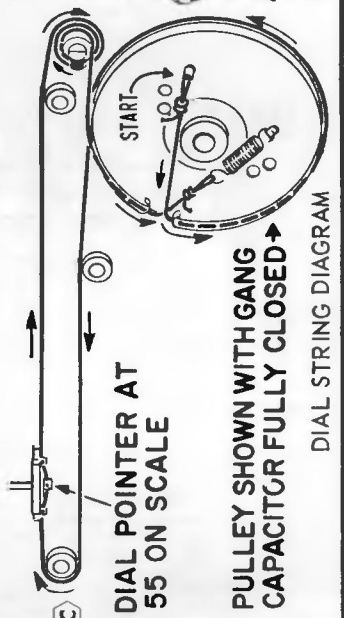
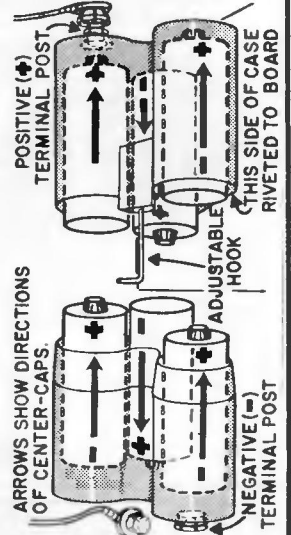
ADMIRAL

CHASSIS: 8G2
MODEL: Y2351



NOTES:
 COMMON ETCHED CIRCUIT GROUND UNLESS OTHERWISE SPECIFIED.
 CAPACITOR VALUES IN MICROFARADS
 RESISTOR VALUES IN OHMS, 1/2 WATT, 10%
 VOLTAGE AND CURRENT READINGS TAKEN WITH FRESH BATTERIES, NO SIGNAL, VOLUME CONTROL MINIMUM

TOTAL CURRENT DRAIN (NO SIGNAL) = 8 - 11MA
 B+ NOT GROUNDED IF = 455KC *MATCHED PAIR

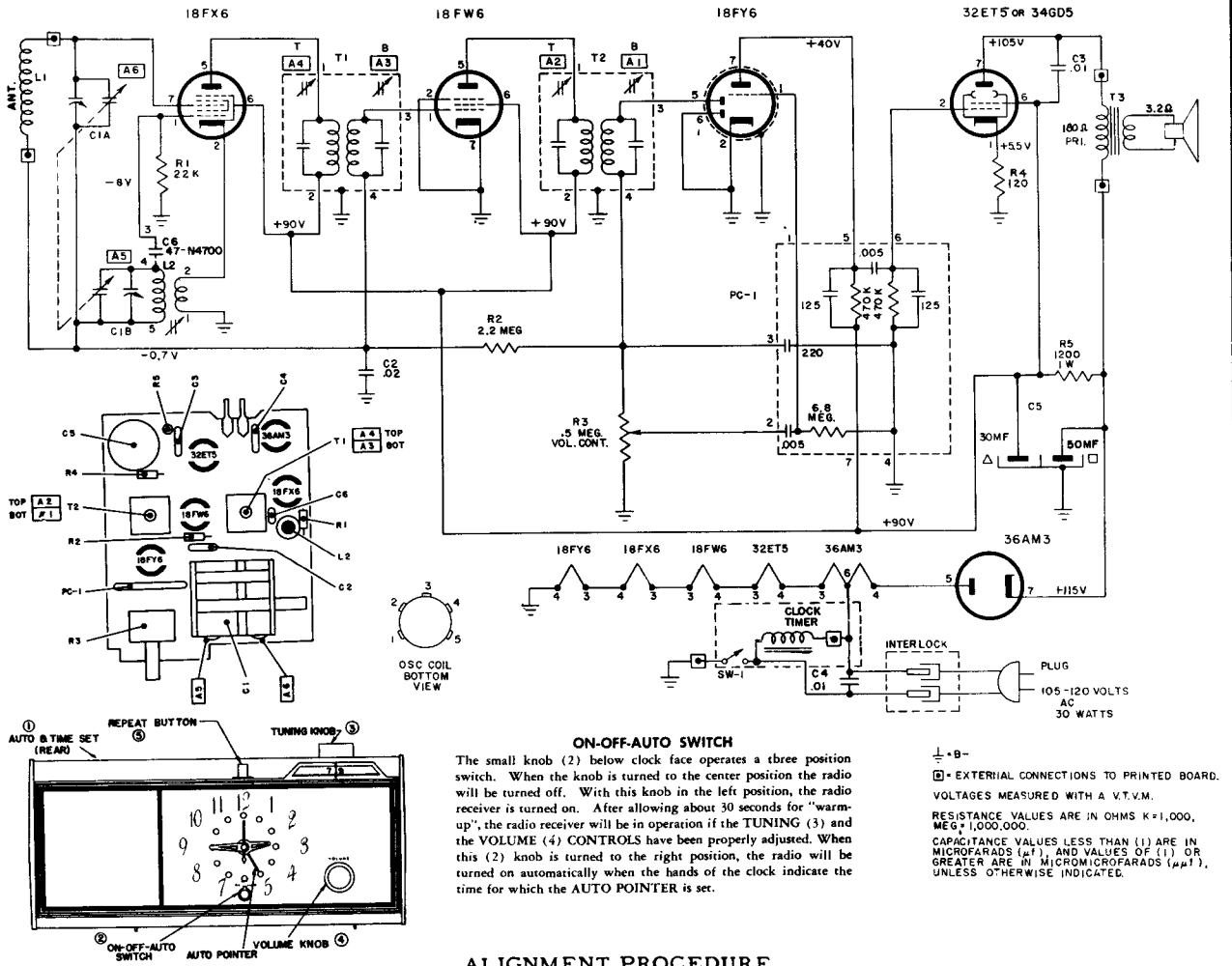


TOP VIEW OF ETCHED CIRCUIT BOARD
 This view is of an early production set and may appear slightly altered in other sets.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION



Models 53R05, 53R07, Code 1.74401, Models 53R17, 53R19, Code 1.75401, Models 53R27, 53R28, Code 1.76001, and electrically similar Models 13R35, 13R37, Code 1.74501, which use dual speakers and are less clock.



ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455 Kc	.05 μ fd	Pin 7 18FX6	A1, A2, A3, A4	I. F. Oscillator Antenna
Open	1670 Kc		* Test Loop	A5	
1400	1400 Kc		* Test Loop	A6	
1000	1000 Kc		* Test Loop	Fan C1A Plates	
600	600 Kc		* Test Loop	Fan C1A Plates	

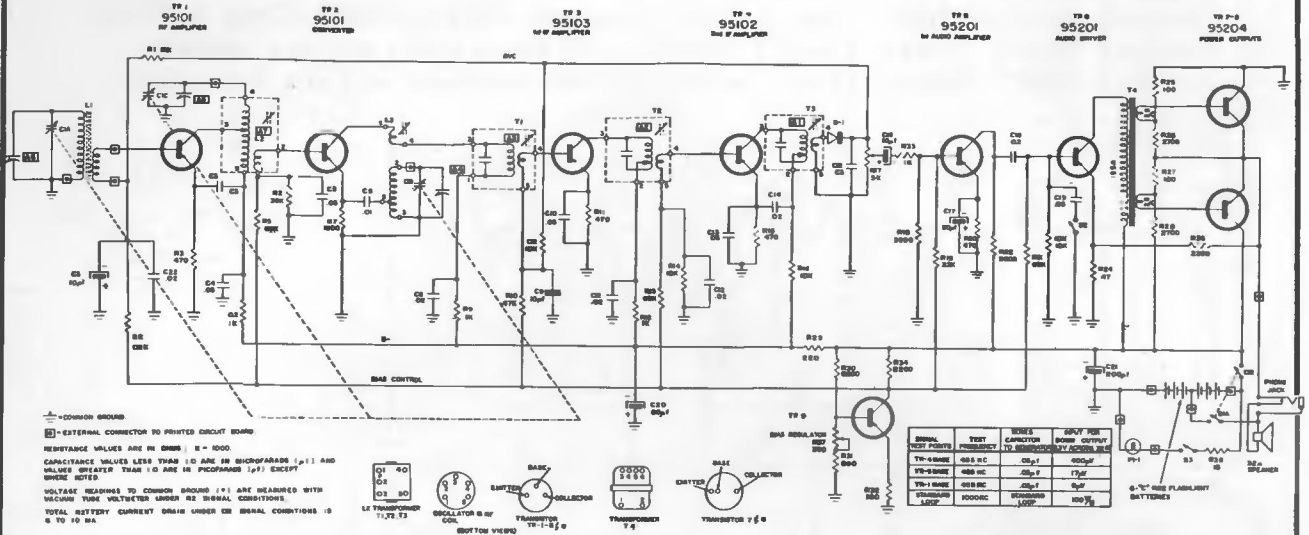
* Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

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

Arvin

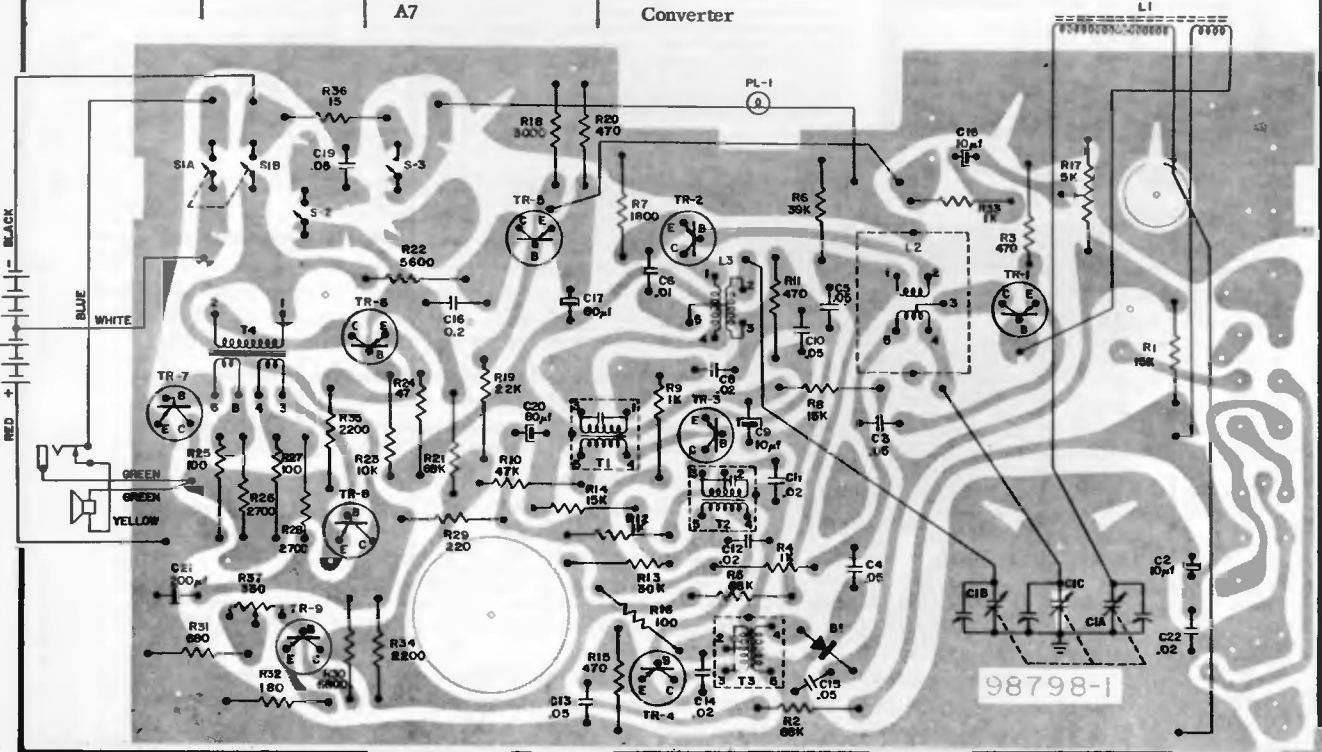
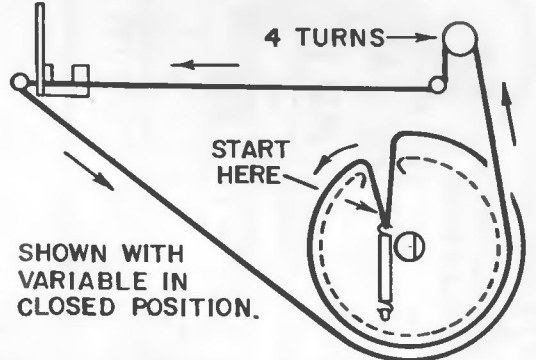
Model 63R58

Code 1.75101

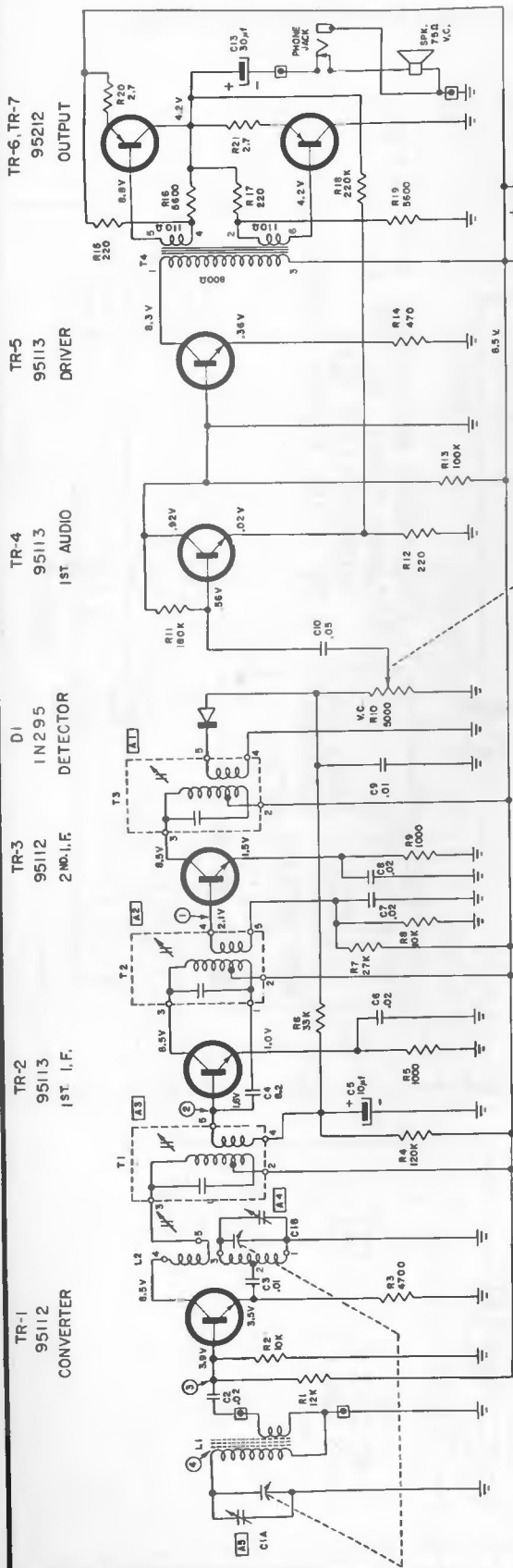


Alignment

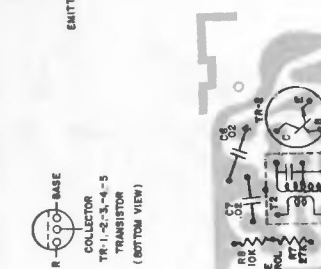
Position of Variable	Generator Frequency	Trimmers Adj. in order shown for Max. Output	Function of Trimmer
Open	455 Kc	A1 (Top of T3) A2 (Top of T2) A3 (Top of T1)	I. F. I. F. I. F.
Open	1640 Kc	A4	Oscillator
1400 Kc	1400 Kc	A5 A6	Converter Antenna
600 Kc	600 Kc	Check Point A7	Converter



ARVIN Model 63R38, Code 1.75001

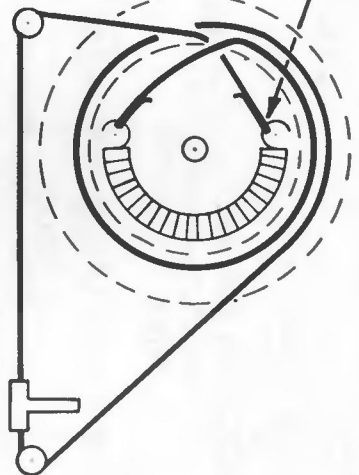


NOTE: CAPACITANCE VALUES LESS THAN 10 ARE IN PICO FARADS (PF) EXCEPT WHERE NOTED.
 VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.
 RESISTANCE VALUES ARE IN OHMS; K=1000.
 ⚡=COMMON GROUND SYMBOL.
 □=EXTERNAL CONNECTION TO PRINTED CIRCUIT.
 TOTAL BATTERY CURRENT DRAIN UNDER NO SIGNAL CONDITIONS: 9 TO 14 MA.

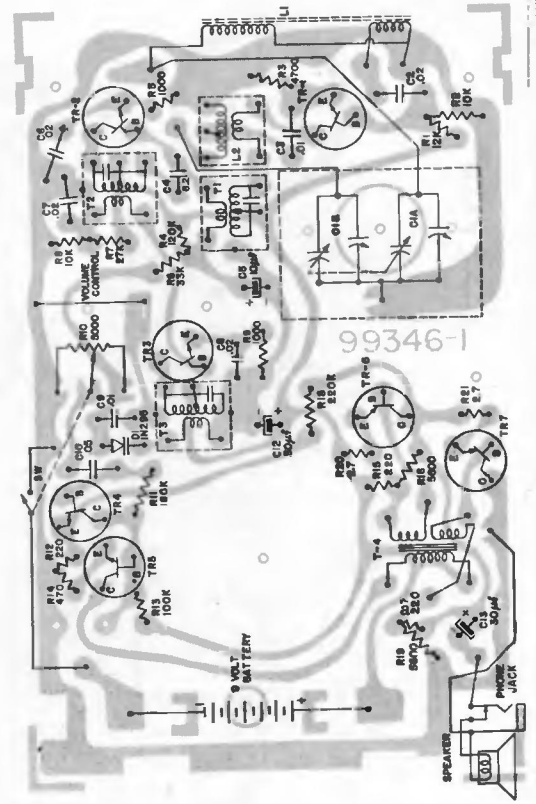


SIGNAL TEST POINTS	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 5 M W. OUTPUT (L.V. ACROSS 75Ω)
①	455 KC	.05 μf	500 μV
②	455 KC	.05 μf	12 μV
③	455 KC	.05 μf	2 μV
④	1000 KC	STANDARD LOOP	200 μV/M

NOTE: SHOWN WITH VARIABLE IN CLOSED POSITION.

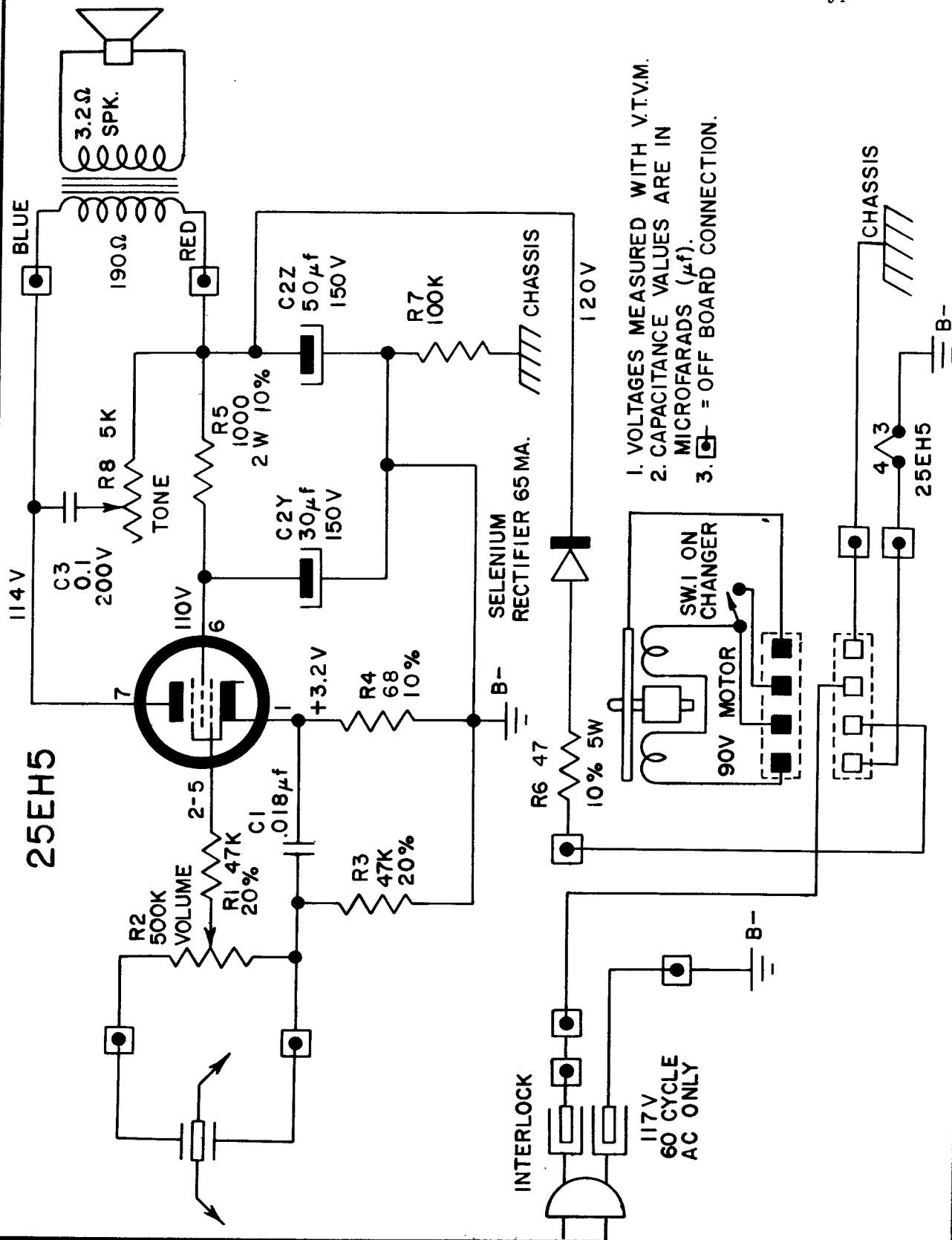


START HERE



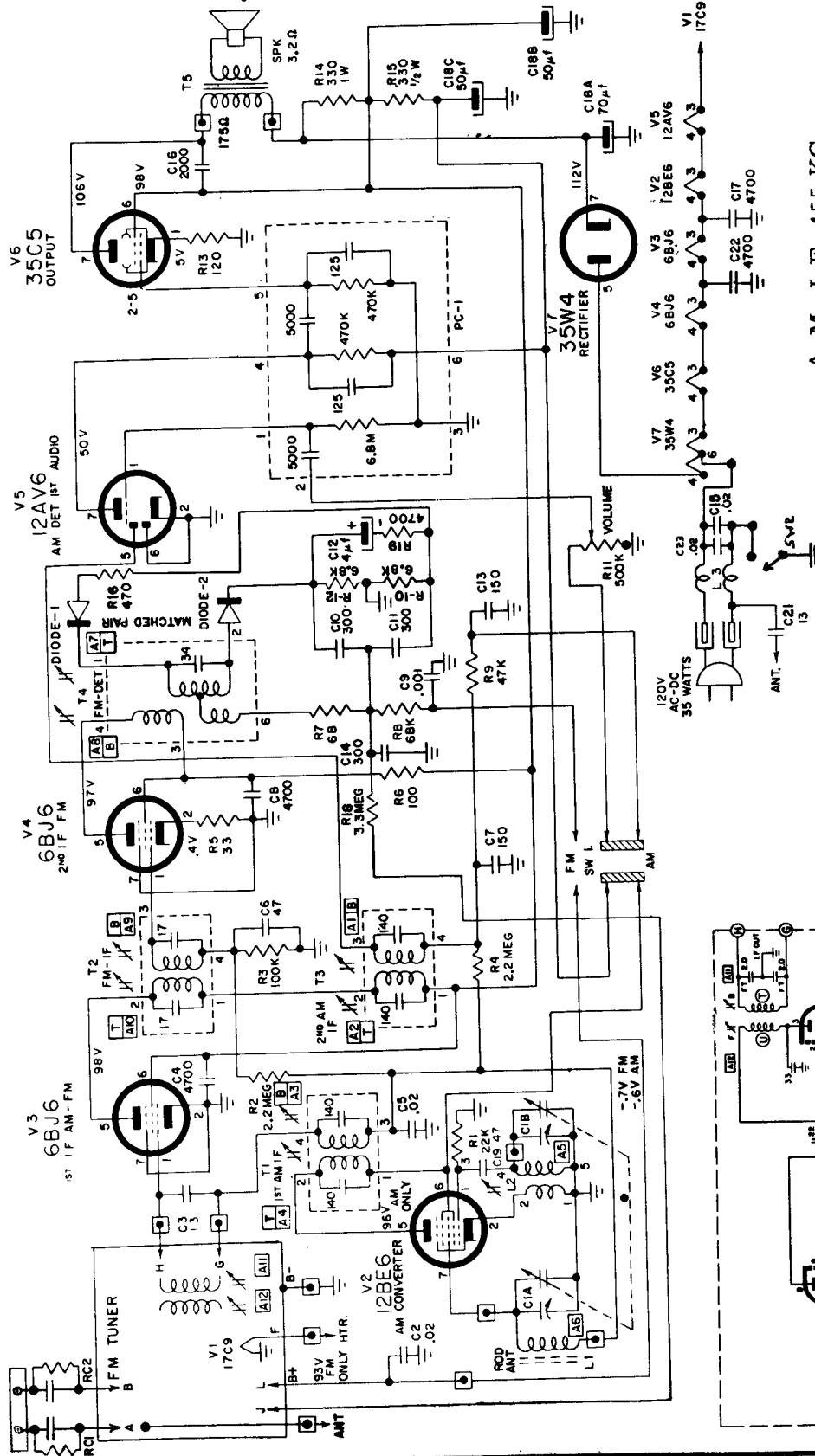
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

ARVIN Models 83P43, 83P53, 83P55, Code 1.77001, and Model 83P15, Code 1.67201, is very similar except for tone control and motor type.

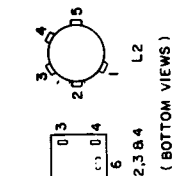


VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

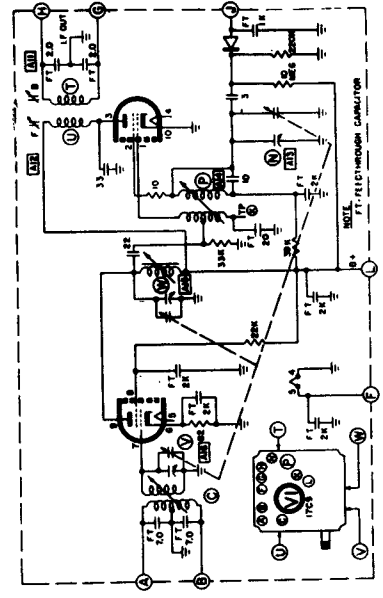
ARVIN Models 33R28, 33R29, Code 1.74301, and Model 43R43, Code 1.78001, which is very similar but includes a tone control and clock timer.



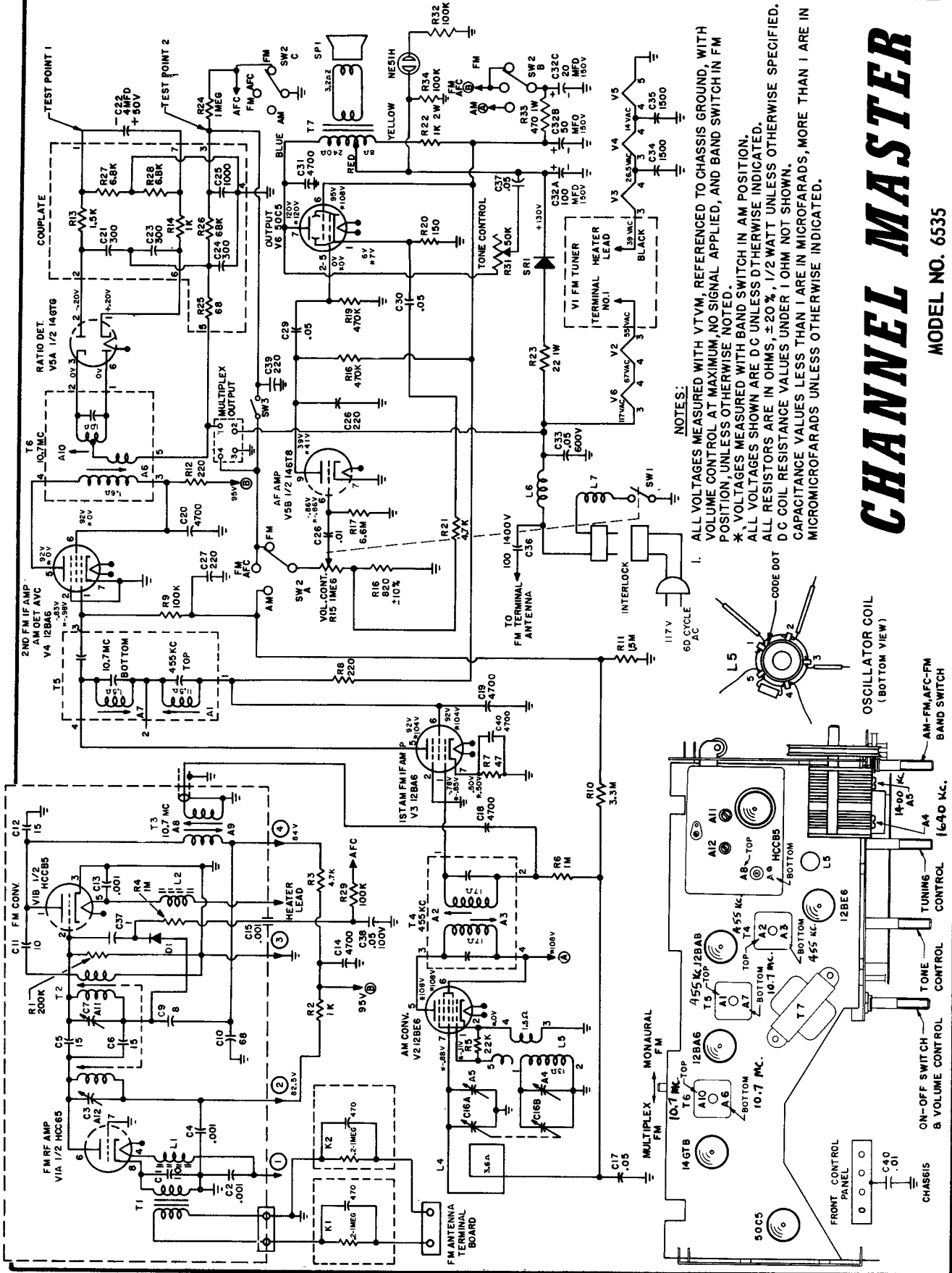
A. M. I. F. 455 KC.
F. M. I. F. 10.7 MC.



EXTERNAL CONNECTION TO PRINTED BOARD.
VOLTAGES MEASURED TO B- WITH A V.T.M. ±20%, NO SIGNAL.
FM POSITION UNLESS OTHERWISE NOTED. B+ VOLTAGES SHOULD BE APPROX 2V HIGHER IN AM POSITION.
RESISTANCE VALUES ARE IN OHMS. K=1,000. MEG=1,000,000.
CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (μF), AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (μμF) UNLESS OTHERWISE INDICATED.



TUNER SCHEMATIC



NOTES:

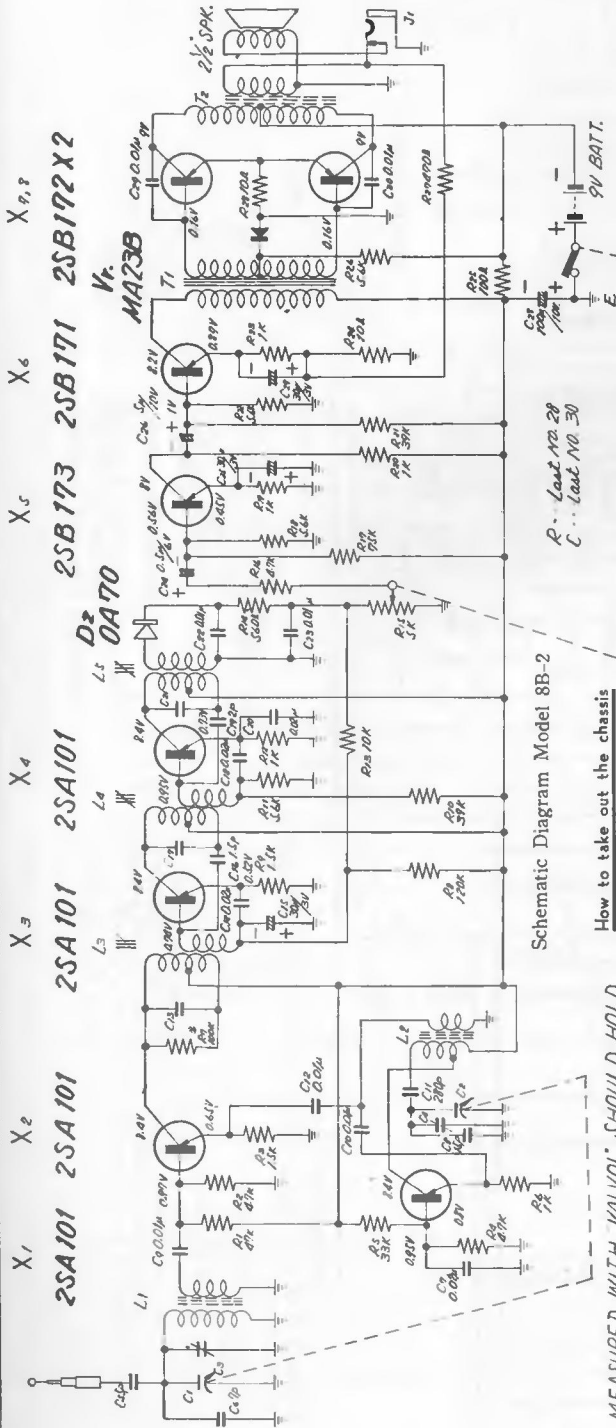
- ALL VOLTAGES MEASURED WITH VTVM, REFERENCED TO CHASSIS GROUND, WITH VOLUME CONTROL AT MAXIMUM, NO SIGNAL APPLIED, AND BAND SWITCH IN FM POSITION, UNLESS OTHERWISE NOTED.
- * VOLTAGES MEASURED WITH BAND SWITCH IN AM POSITION. ALL VOLTAGES SHOWN ARE DC UNLESS OTHERWISE INDICATED. ALL RESISTORS ARE IN OHMS, ±20%, 1/2 WATT UNLESS OTHERWISE SPECIFIED. DC COIL RESISTANCE VALUES LESS THAN 1 ARE IN MICROFARADS, MORE THAN 1 ARE IN MICROMICROFARADS UNLESS OTHERWISE INDICATED.

CHANNEL MASTER

MODEL NO. 6535

DELMONICO

MODEL 8B-2



Schematic Diagram Model 8B-2

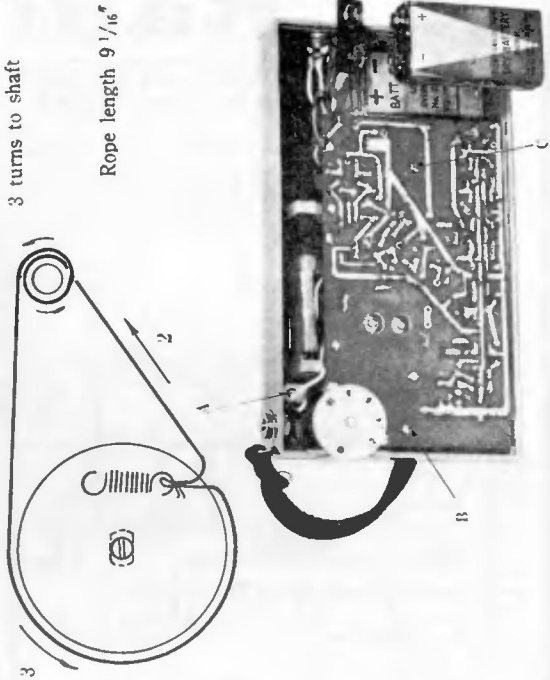
VOLTAGES MEASURED WITH VALVOL SHOULD HOLD WITH IN ±20% WITH NEW BATTERY.

How to take out the chassis

1. Open the back cover of cabinet with coin or driver and remove the 3 screws A, B, C.

How to fit the dial rope

Set the variable Capacitor on maximum capacity, fix the dial drum as shown figure and fit the dial rope in accordance with arrow marks.



* ADJ. RESISTOR

Step	Frequency Band	Input		Places to be Regulated	Dial Pointer Setting
		Frequency	Given to		
1	I F	455 KC	Base of X ₁ through 0.01 μF	L ₃ , L ₄ , L ₅	Fully Open
2	M W	535 KC	Use the standard Loop	L ₂	Max.
3		1680 KC	" "	C ₄	Fully Open
4		Repeat the step 2, 3			
5	M W	620 KC	Use the standard Loop	L ₁	620kc Signal
6		1400 KC	" "	C ₃	1400kc Signal
7		Repeat the step 5, 6			

Note: Output power (at the terminal of voice coil) is kept on always about 10mW.

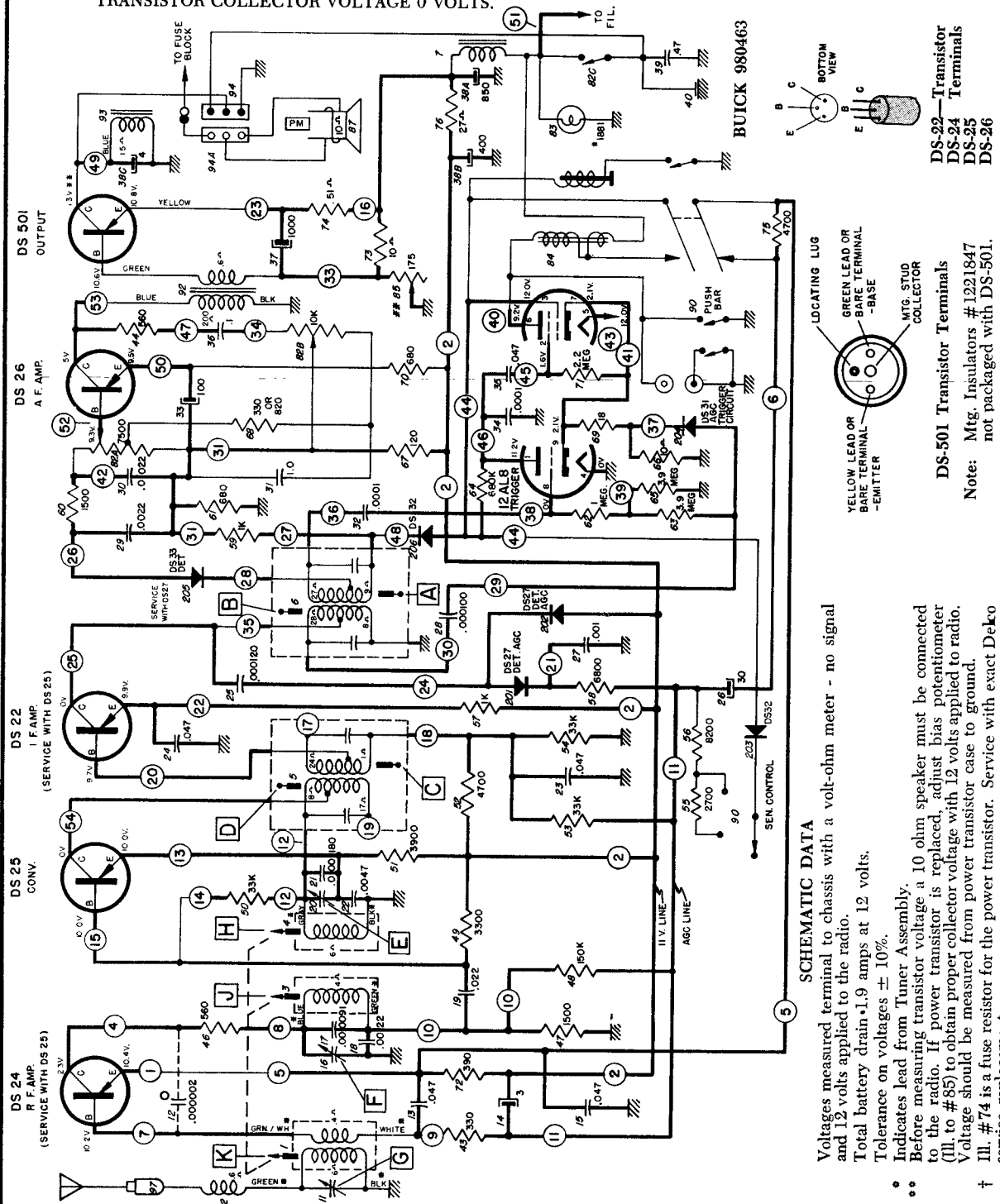
Delco Radio

BUICK Model 980463
 CADILLAC Model 7282315
 CORVETTE Model 985396
 OLDSMOBILE Model 982137

IF RADIO IS POWERED BY BATTERY ELIMINATOR, USE 16 VOLTS FOR PROPER SOLENOID ACTION.

(Continued on the next page adjacent at right)

NOTE: ILLUS. 74 IS FUSE RESISTOR. OPEN FUSE RESISTOR MAKES TRANSISTOR COLLECTOR VOLTAGE 0 VOLTS.



SCHEMATIC DATA

Voltages measured terminal to chassis with a volt-ohm meter - no signal and 12 volts applied to the radio.

Total battery drain 1.9 amps at 12 volts.

Tolerance on voltages ± 10%.

Indicates lead from Tuner Assembly.

Before measuring transistor voltage a 10 ohm speaker must be connected to the radio. If power transistor is replaced, adjust bias potentiometer (Ill. to #85) to obtain proper collector voltage with 12 volts applied to radio.

Voltage should be measured from power transistor case to ground. Ill. #74 is a fuse resistor for the power transistor. Service with exact DeKo service replacement.

Printed on circuit board.

Trigger tube voltages are read with a VTVM and with the tuner seeking. CAUTION: Only a 10 ohm speaker should be used on this radio.

DS-22—Transistor
 DS-24 Terminals
 DS-25
 DS-26

DS-501 Transistor Terminals
 Note: Mtg. Insulators #1221847 not packaged with DS-501.

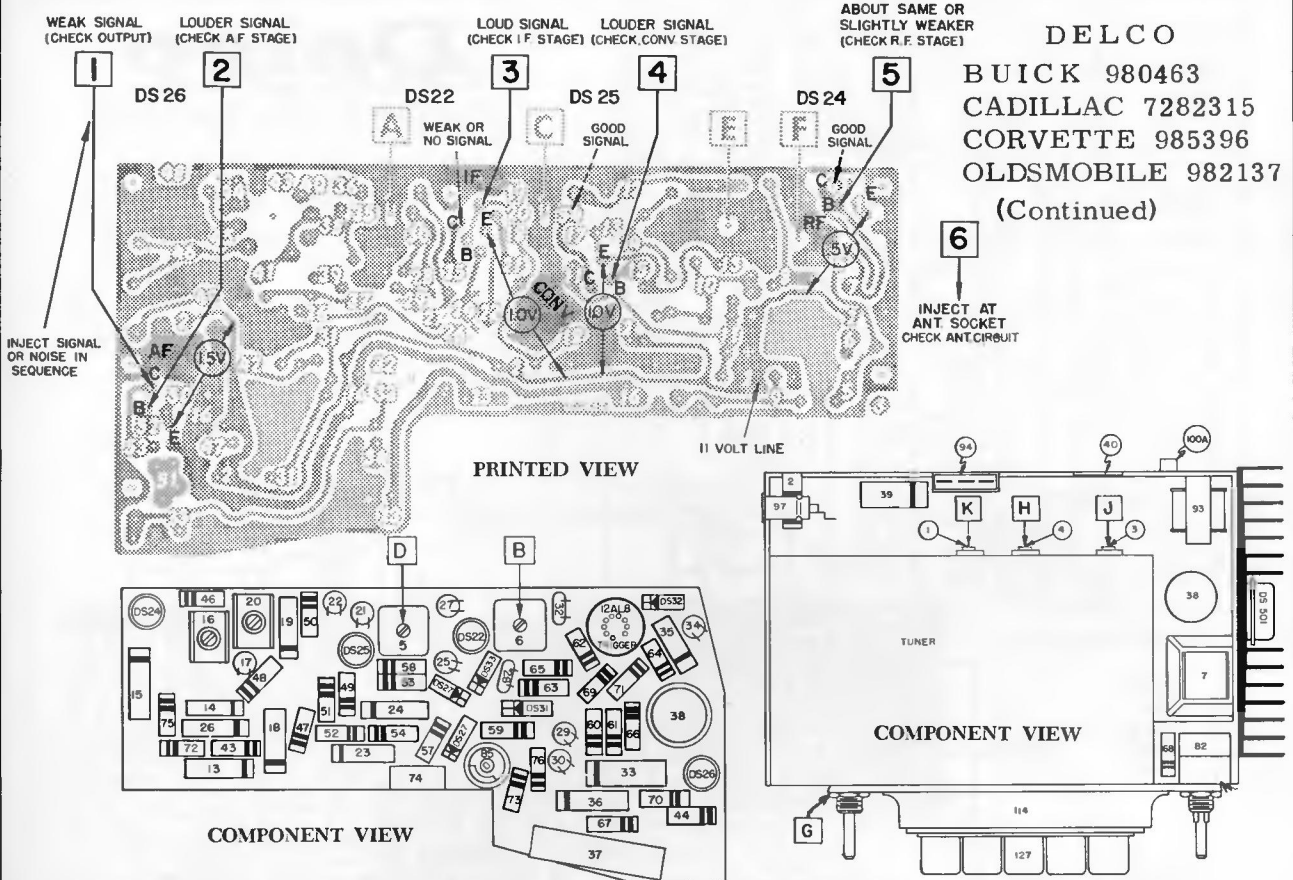
PRINTED CIRCUIT SHOWN IN HEAVY LINES
 NUMBERS ON PRINTED CIRCUIT BOARD CORRESPOND WITH NUMBERS IN CIRCLES ON SCHEMATIC DIAGRAM.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

DELCO

BUICK 980463
 CADILLAC 7282315
 CORVETTE 985396
 OLDSMOBILE 982137

(Continued)



IMPORTANT: With the radio installed and the car antenna plugged in, adjust the antenna trimmer "C" for maximum volume with the radio tuned to a **WEAK** station between 600 KC and 1000 KC. (Prevents fading and station mixing). The antenna trimmer is located behind the dummy knob and can be adjusted from the front of the radio.

ALIGNMENT PROCEDURE

- A. Connections
1. A. C. Voltmeter Across speaker voice coil
 2. Signal Generator Connect capacitor (see chart below for value) in series with generator lead and connect to antenna terminal. Connect generator ground lead to chassis.
- B. Preliminary Adjustments (in order)
1. Volume control Maximum volume
 2. Radio Tuning Pointer Extreme right end of dial
 3. Radio tuner cores Rear of core 1 5/8" from end of coil form. Adjustment is made using a plastic alignment tool marked 1 5/8" from end.
- C. Alignment Adjustments
1. Generator Output Readable A.C. voltage (1/2 to 1 volt) across speaker voice coil
 2. Proceed according to chart - - -

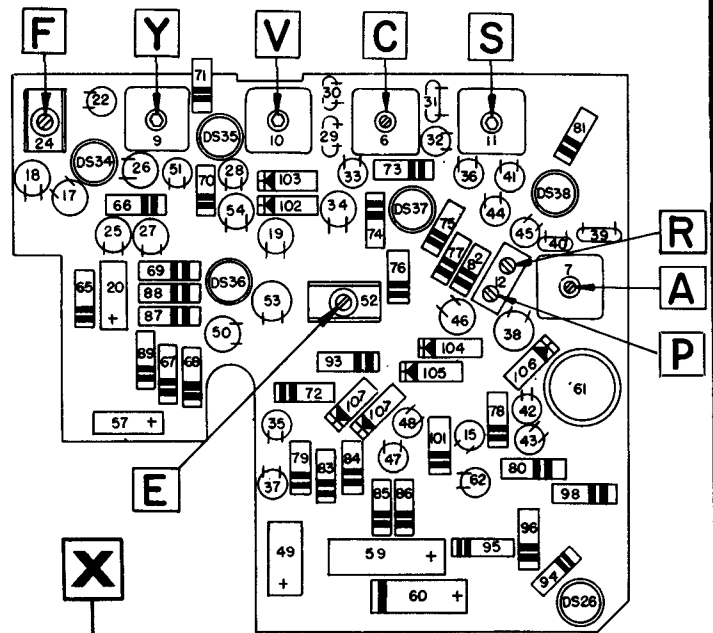
Step	Capacitor	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence
a.	.1 mfd.	262 KC	Hi freq. stop	A, B, C, D
b.	82 mmfd.	1615 KC	Hi freq. stop	E, F, G
c.	82 mmfd.	600 KC	Sig. Gen. Freq.	J, K
d.	82 mmfd.	1615 KC	Sig. Gen. Freq.	F, G
e.	82 mmfd.	900 KC	Sig. Gen. Freq.	Pointer Adjustment

3. Pointer Adjustment With incoming 900 KC signal, insert a screwdriver in the slot of the pointer calibration adjustment link (illustration #124) and twist until the pointer is in line with "9" on the radio dial.
4. Antenna Adjustment See notice above

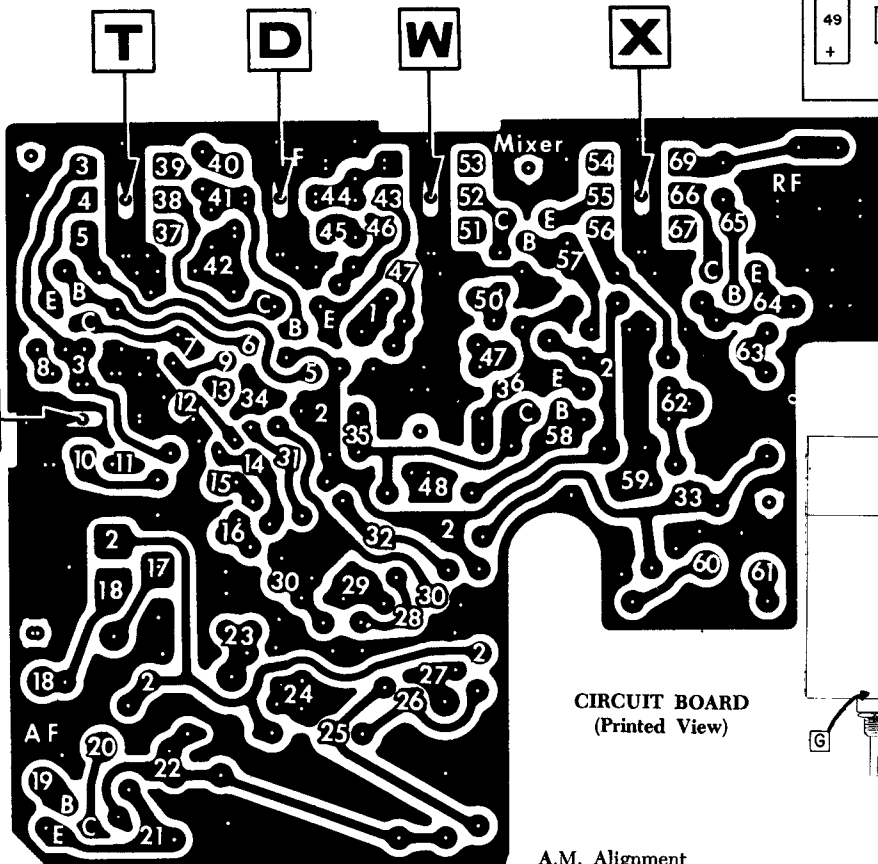
Delco

BUICK Models 980626, 980635
 CADILLAC Model 7283295
 CHRYSLER Model 333
 DODGE Models 331, 332
 PLYMOUTH Model 300
 CORVETTE Model 985686
 OLDSMOBILE Model 982212

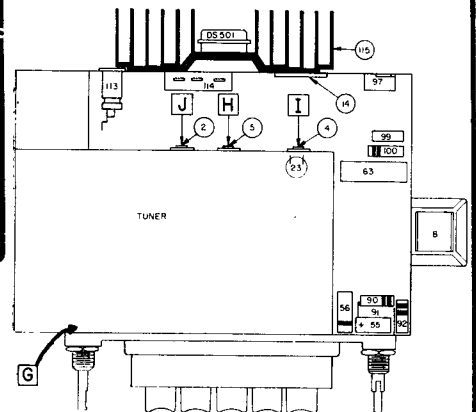
(Continued from preceding page adjacent at left)



CIRCUIT BOARD
(Parts View)



CIRCUIT BOARD
(Printed View)



COMPONENT VIEW

A.M. Alignment

Step	Capacitor	Signal Generator Frequency	Tune Receiver to	Adjust for Maximum in Sequence
a.	.1 mfd.	262 KC	Hi freq. stop	A, B, C, D
b.	56 mmfd.	1615 KC	Hi freq. stop	E, F, G
c.	56 mmfd.	600 KC	Sig. Gen. Freq.	I, J
d.	56 mmfd.	1615 KC	Sig. Gen. Freq.	F, G
e.	56 mmfd.	900 KC	Sig. Gen. Freq.	Pointer Adjustment

F.M. Alignment

Connections

D.C. Voltmeter Positive lead to Orange wire (island #24)
 Negative lead to chassis. Use Lowest Scale.

Generator Output (AM with no modulation or FM) set to 10.7 mc. Connect 56 mmfd. capacitor in series with generator lead and connect to antenna terminal. Connect generator ground lead to chassis.

Alignment Adjustments

1. Adjust in sequence for maximum voltage R, S, T, V, W, X, Y, Z
2. Ratio detector transformer Remove generator and adjust blue (P) slug for zero volts.
3. Tuner K, Q for maximum on a weak station near the top of the dial with antenna connected.

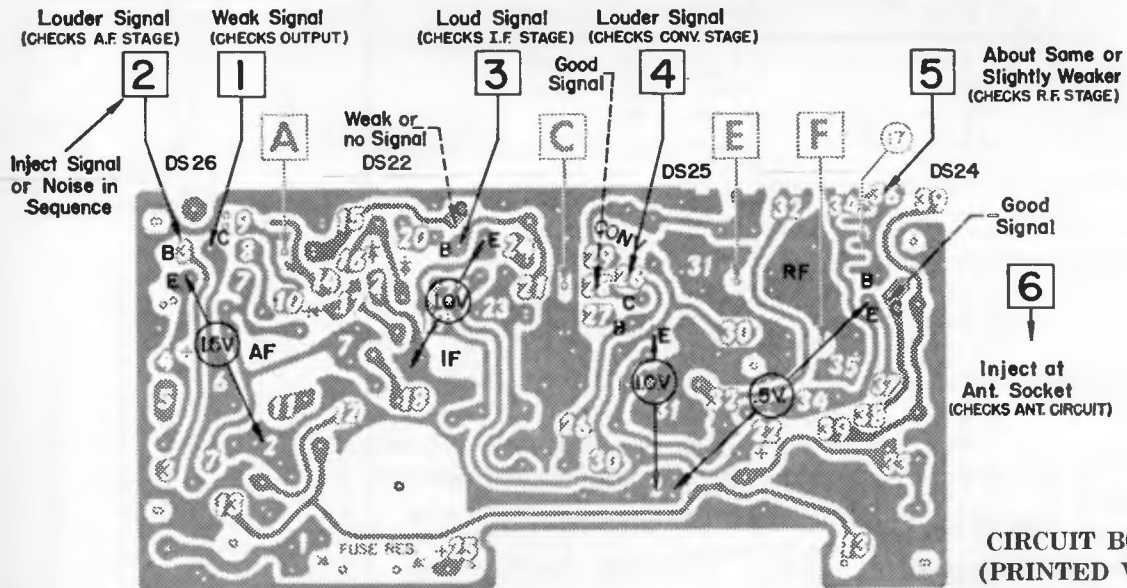
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

DELCO, various models, continued from preceding page adjacent at left.

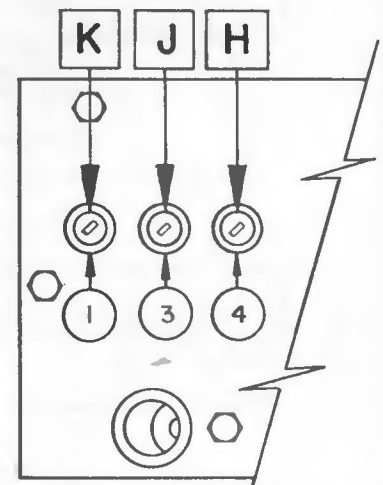
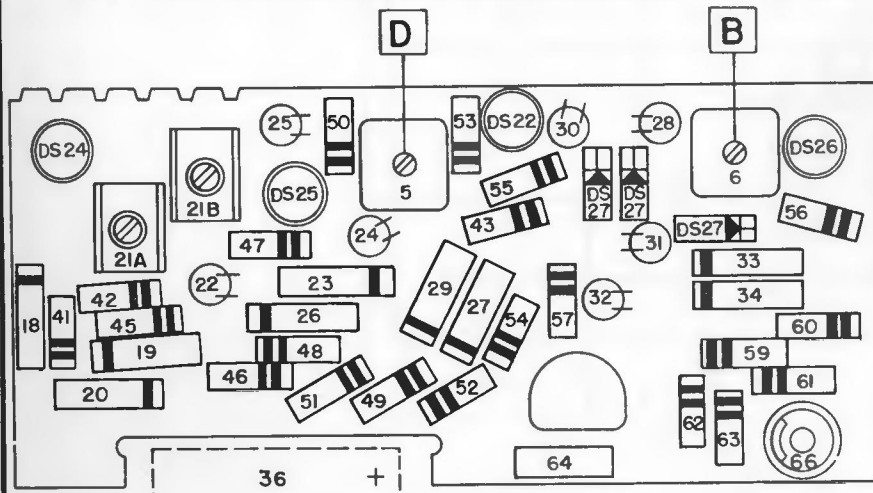
ALIGNMENT PROCEDURE

- A. C. Voltmeter—Across speaker voice coil.
- Signal Generator—Connect capacitor (see chart below for value) in series with generator lead and connect to antenna terminal. Connect generator ground lead to chassis.
- Volume control—Maximum volume
- Radio Tuning Pointer—Extreme right end of dial.
- Radio tuner cores—Rear of core 1 3/8" from end of coil form. Adjustment is made using a plastic alignment tool marked 1 3/8" from end.
- Generator Output—Readable A.C. voltage (1/2 to 1 volt) across speaker voice coil
- Proceed according to chart—

STEP	CAPACITOR	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE
a.	.1 mfd.	262 KC	Hi freq. stop	A, B, C, D
b.	68 mmfd.	1615 KC	Hi freq. stop	E, F, G
c.	68 mmfd.	600 KC	Sig. Gen. Freq.	J, K
d.	68 mmfd.	1615 KC	Sig. Gen. Freq.	F, G
e.	68 mmfd.	900 KC	Sig. Gen. Freq.	Pointer Adjustment



NUMBERS IN SQUARES ARE MAJOR TEST POINTS FOR STAGE ISOLATION—INJECT SIGNAL GENERATOR.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

DELCO, Material on various models continued from preceding page at left

ALIGNMENT PROCEDURE

A. C. Voltmeter—Across speaker voice coil.

Signal Generator—Connect capacitor (see chart below for value) in series with generator lead and connect to antenna terminal. Connect generator ground lead to chassis.

Volume control—Maximum volume

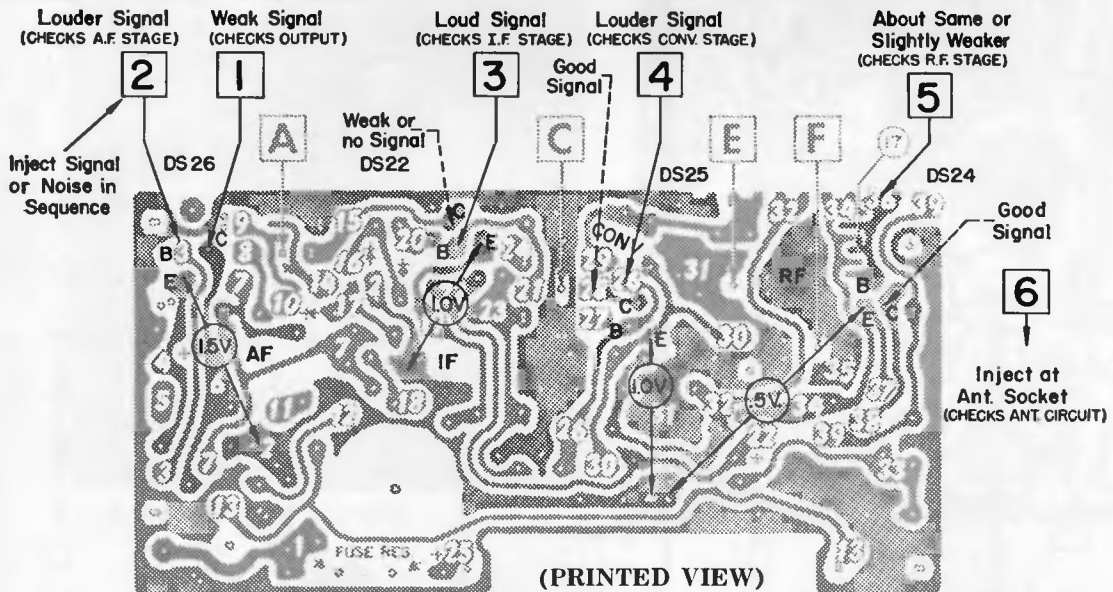
Radio Tuning Pointer—Extreme right end of dial.

Radio tuner cores—Rear of core 1 1/8" from end of coil form. Adjustment is made using a plastic alignment tool marked 1 1/8" from end.

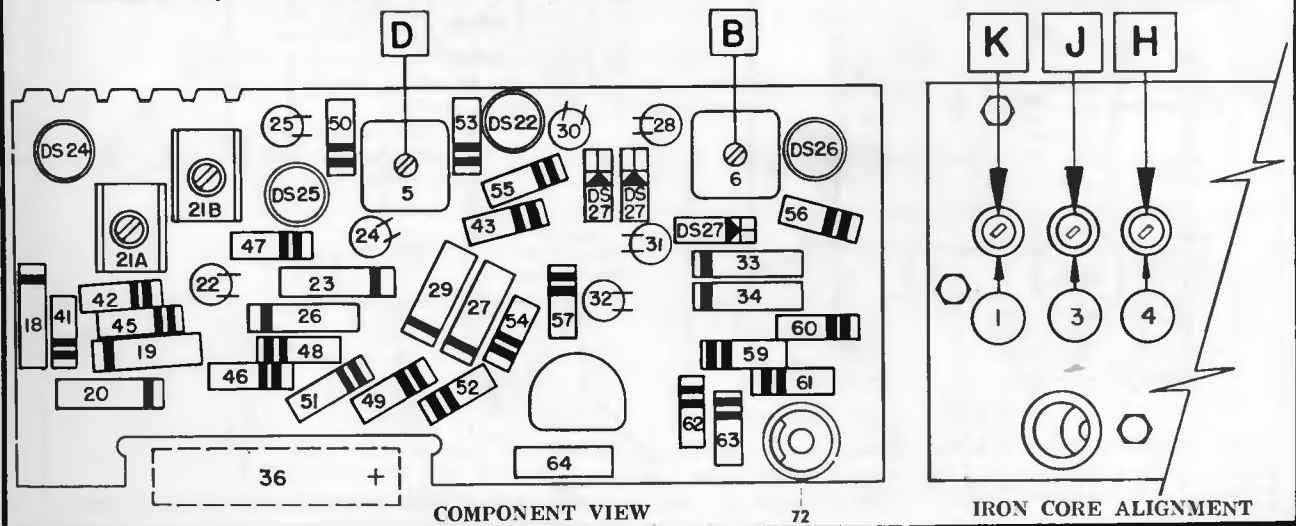
Generator Output—Readable A.C. voltage (1/2 to 1 volt) across speaker voice coil

Proceed according to chart—

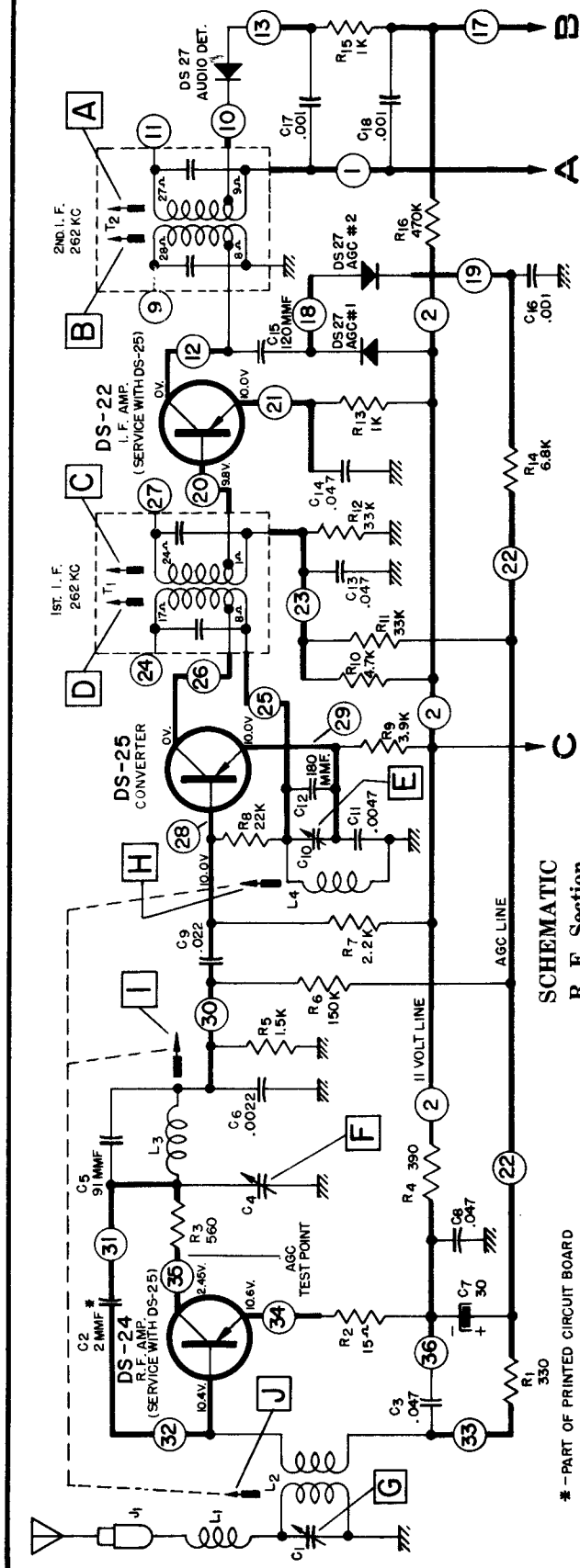
STEP	CAPACITOR	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE
a.	.1 mfd.	262 KC	Hi freq. stop	A, B, C, D
b.	82 mmfd.	1615 KC	Hi freq. stop	E, F, G
c.	82 mmfd.	600 KC	Sig. Gen. Freq.	J, K
d.	82 mmfd.	1615 KC	Sig. Gen. Freq.	F, G
e.	82 mmfd.	900 KC	Sig. Gen. Freq.	Pointer Adjustment



NUMBERS IN SQUARES ARE MAJOR TEST POINTS FOR STAGE ISOLATION—INJECT SIGNAL GENERATOR.

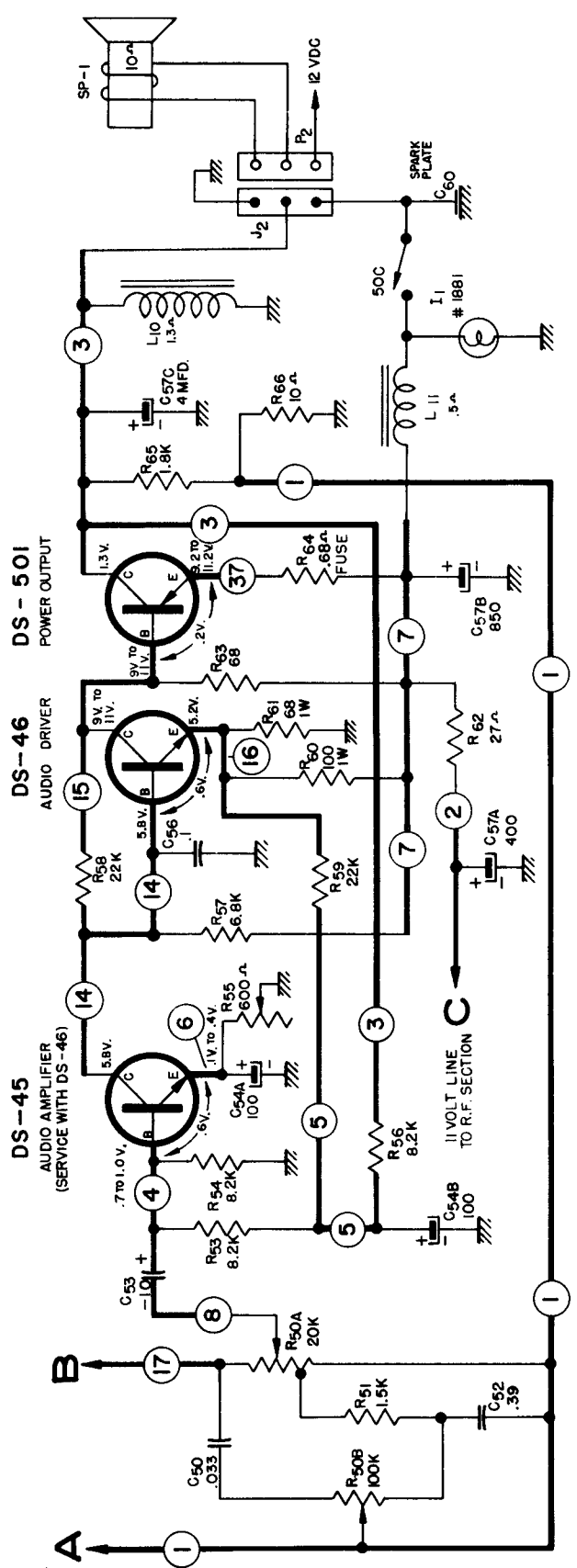


DELCO Buick Model 980655 Diagram, Continued on next page at right



SCHEMATIC R.F. Section

* - PART OF PRINTED CIRCUIT BOARD



DELCO Buick Model 980655 Service Material, Continued from preceding page

Tolerance on voltage $\pm 10\%$, Capacitors in mfd., Resistors in ohms.
 Before measuring transistor voltages, a 10 ohm speaker must be connected to radio.
 Voltage should be measured from power transistor case to ground. If power transistor is replaced, adjust bias potentiometer (Illus. R-55) to obtain proper collector voltage with 12 volts applied to radio.

CAUTION: Only a 10 ohm speaker should be used on this radio.
 Illus. R-64 is a fuse resistor for the power transistor. Service with exact replacement.
 Voltages measured terminal to chassis with a volt-ohm meter — no signal and 12 volts applied to radio.
 Total battery drain 1.2 amps at 12 volts

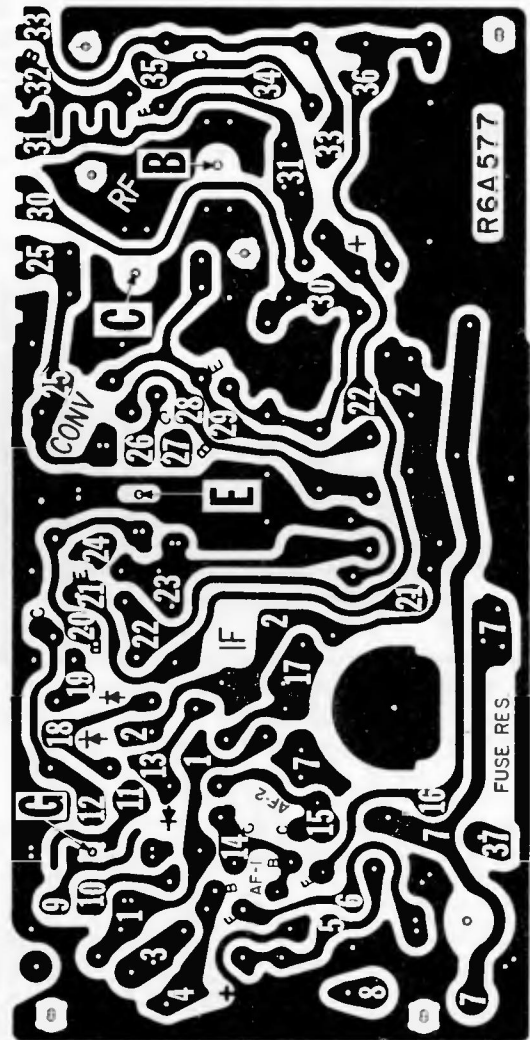


ALIGNMENT PROCEDURE

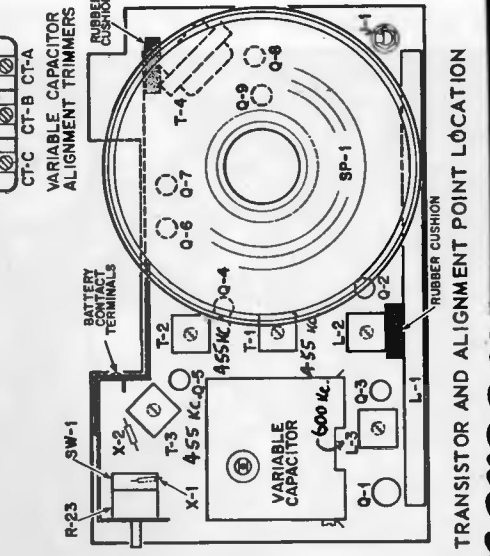
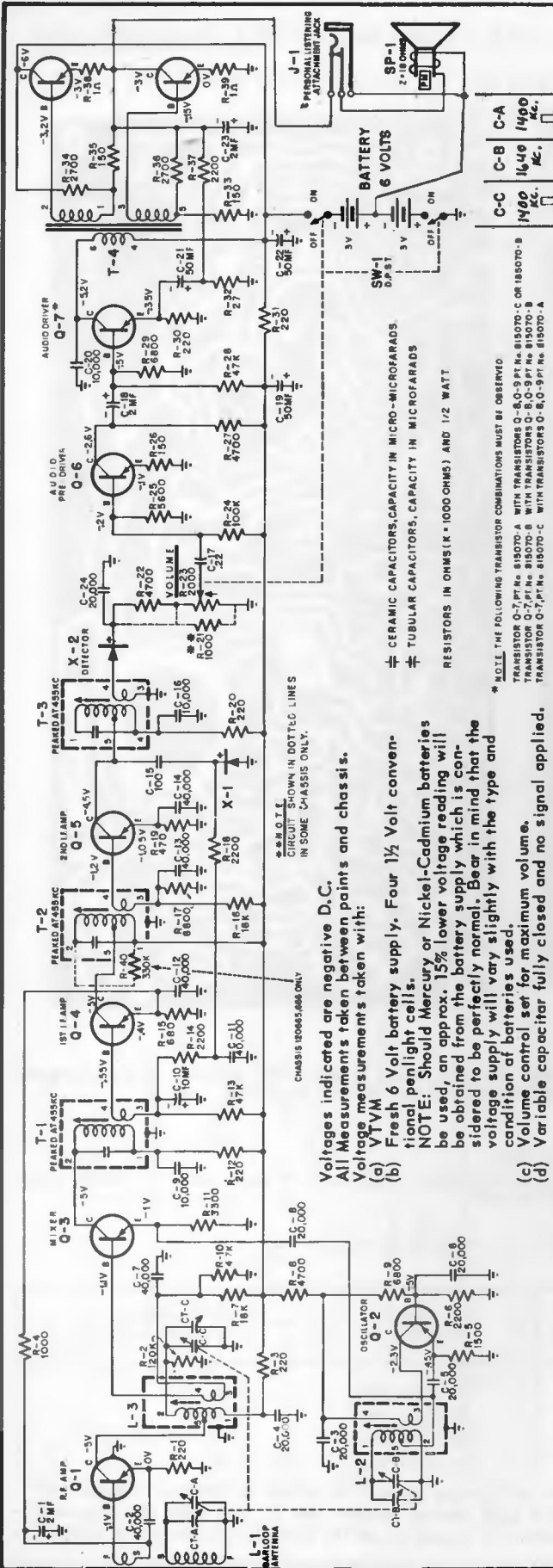
- A. Connections
 1. A. C. Voltmeter—Across speaker coil.
 2. Signal Generator—Connect capacitor (see chart below for value) in series with generator lead and connect to antenna terminal. Connect generator ground lead to chassis.
- B. Preliminary Adjustments (in order)
 1. Volume control—Maximum volume
 2. Radio Tuning Pointer—Extreme right end of dial.
 3. Radio tuner cores—Rear of core $1\frac{1}{2}$ " from end of coil form. Adjustment is made using a plastic alignment tool marked $1\frac{1}{2}$ " from end.
- C. Alignment Adjustments
 1. Generator Output—Readable A.C. voltage ($\frac{1}{2}$ to 1 volt) across speaker voice coil
 2. Proceed according to chart—

STEP	CAPACITOR	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE
a.	.1 mfd.	262 KC	Hi freq. stop	A, B, C, D
b.	82 mmfd.	1615 KC	Hi freq. stop	E, F, G
c.	82 mmfd.	600 KC	Sig. Gen. Freq.	I, J
d.	82 mmfd.	1615 KC	Sig. Gen. Freq.	F, G

IMPORTANT: With the radio installed and the car antenna plugged in, adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station between 600 KC and 1000 KC. (Prevents fading and station mixing). The antenna trimmer is located behind the dummy knob and can be adjusted from the front of the radio.



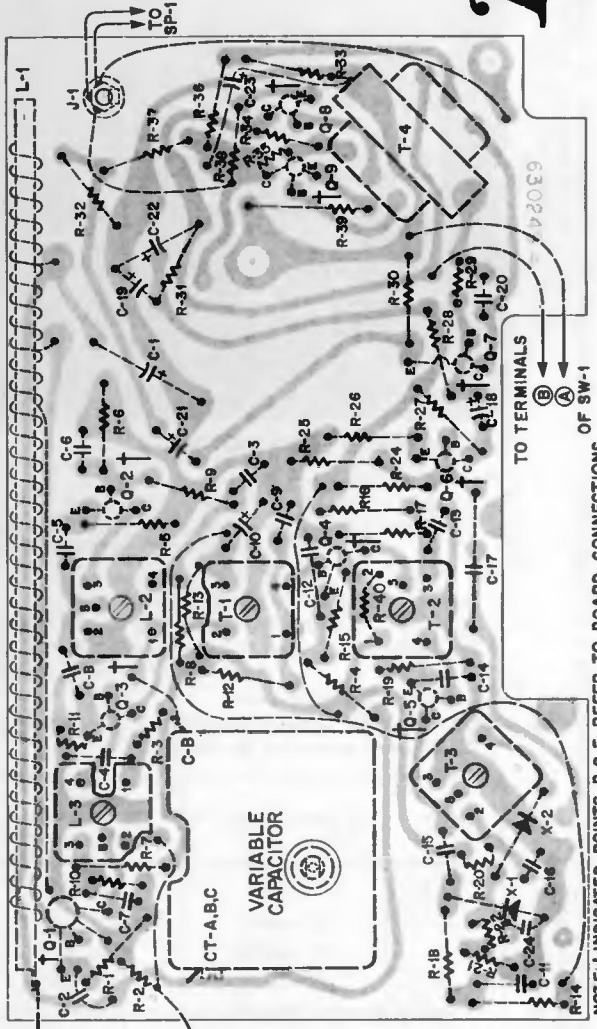
PHONO-ILL. AUDIO OUTPUT Q-8, Q-9*



Emerson

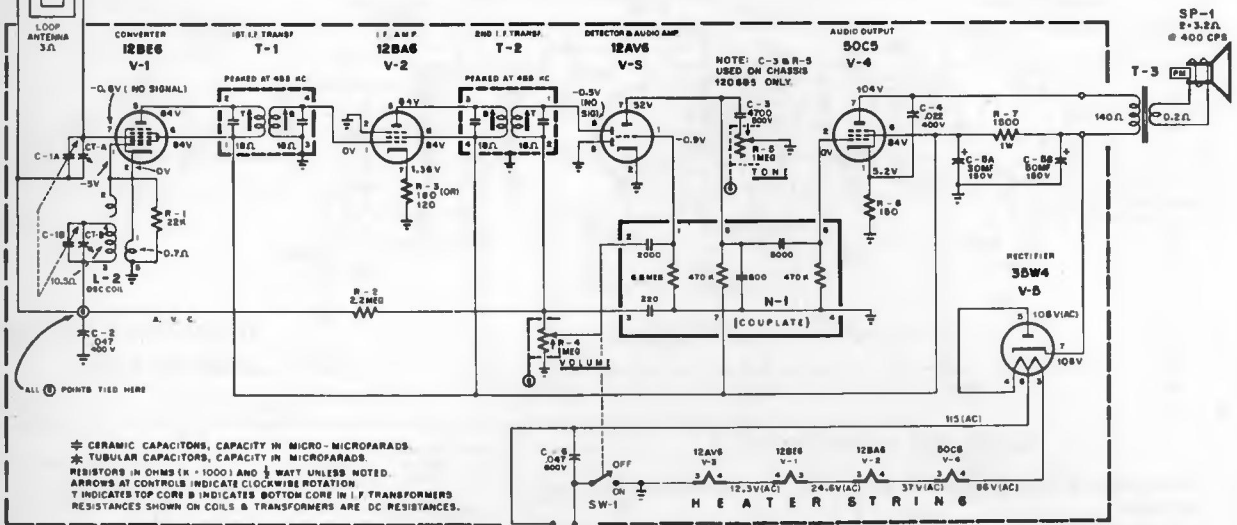
MODELS: 911, 990
CHASSIS: 120486,
120665, 120666

Volts indicated are negative D.C.
All Measurements taken between points and chassis.
Voltage measurements taken with:
 (a) VTVM
 (b) Fresh 6 Volt battery supply. Four 1 1/2 Volt conventional penlight cells.
NOTE: Should Mercury or Nickel-Cadmium batteries be used, an approx. 15% lower voltage reading will be obtained from the battery supply which is considered to be perfectly normal. Bear in mind that the voltage supply will vary slightly with the type and condition of batteries used.
 (c) Volume control set for maximum volume.
 (d) Variable capacitor fully closed and no signal applied.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

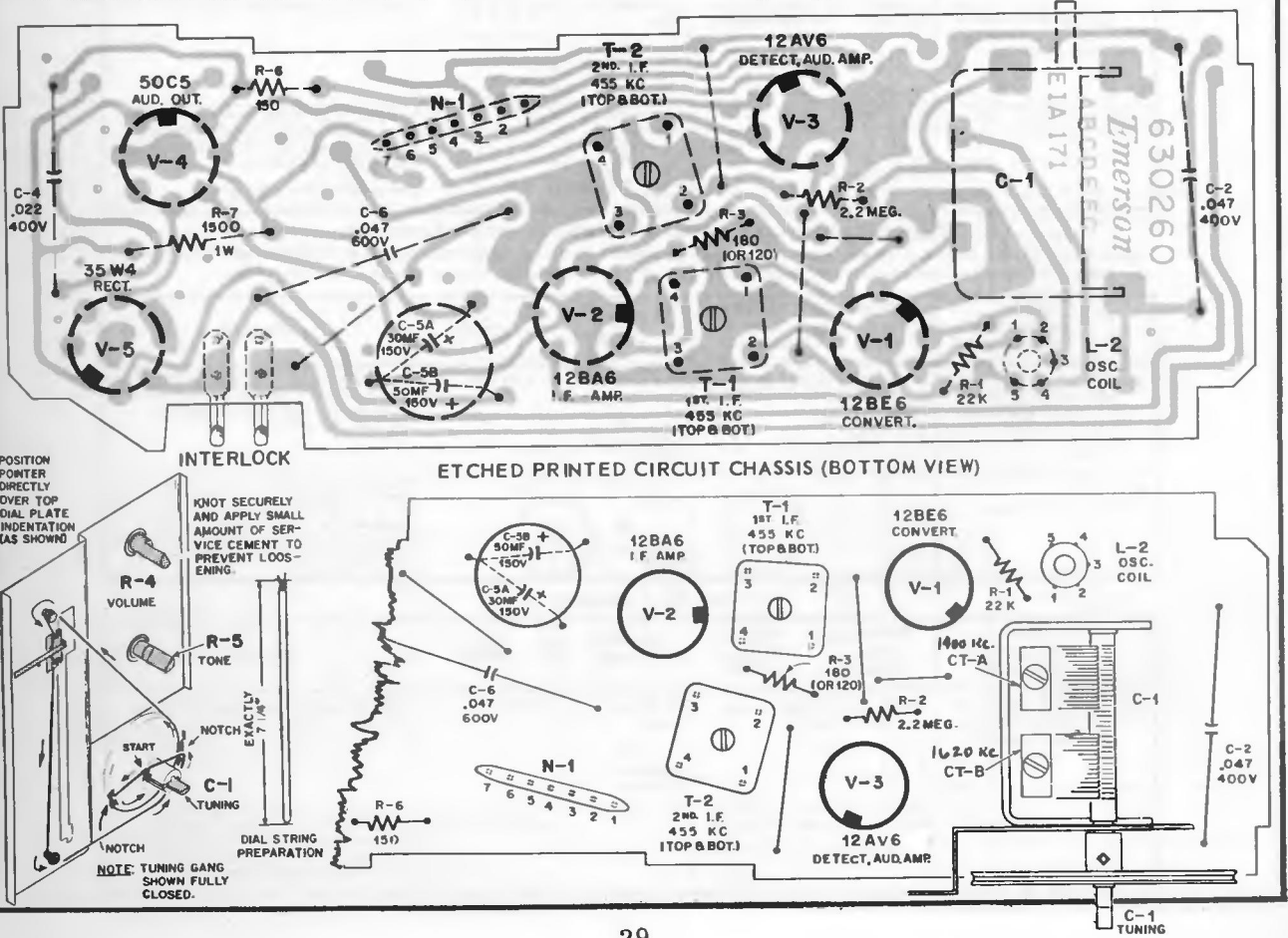
EMERSON Models G-1700, G-1709, using Chassis 120685,
and Model G-1713 using Chassis 120700



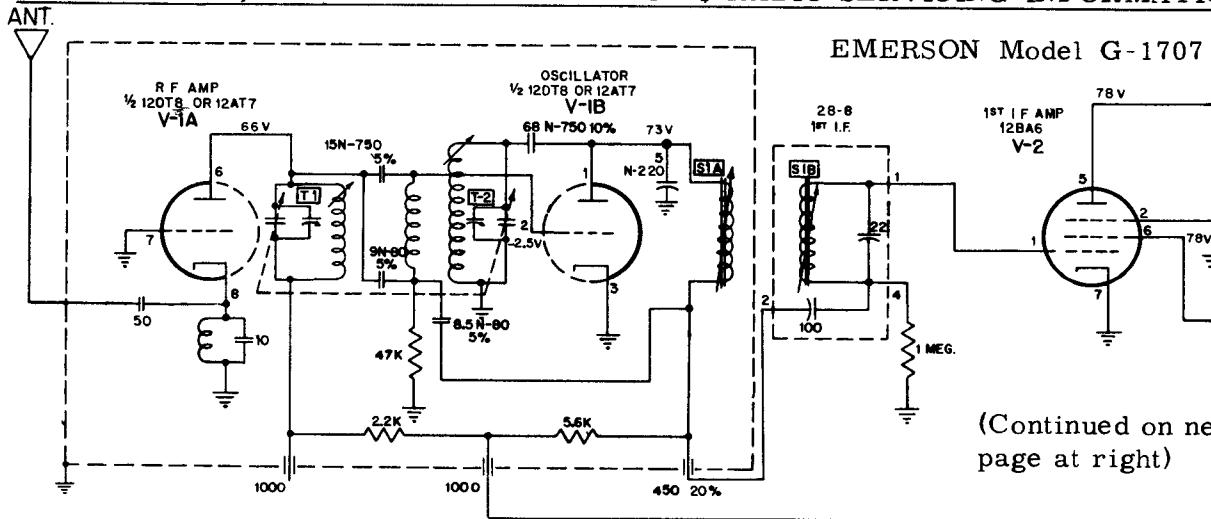
CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

1. Voltages indicated are positive D.C., resistances in ohms unless otherwise indicated.
2. Measurements taken with Voltohmmyst or equivalent VTVM.

3. All measurement taken between points indicated and B minus (low side of volume control), unless otherwise indicated.
4. Voltage readings indicated on schematic were taken with:
 - (A) Line voltage set at 115 volts AC,
 - (B) Volume control set for minimum volume,
 - (C) Tuning capacitor fully closed and no signal applied.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION



(Continued on next page at right)

ALIGNMENT INSTRUCTIONS

- 1) Allow chassis and equipment to be used at least 15 minutes for warm-up.
- 2) Maintain output of signal generator at a point no higher than required to produce a usable reading and use only insulated alignment tools for adjusting.
- 3) Use an isolation transformer between the chassis and the AC line, if available. If no isolation transformer is to be used, insert a .1 mfd. capacitor in series with the signal generator output cable to prevent shock and to protect the equipment.

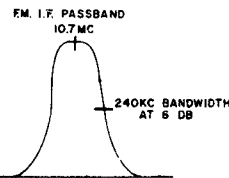


FIG. 1

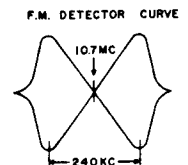


FIG. 2

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GEN. FREQ.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	TO PIN 8 (CATHODE) OF 12DT8 THROUGH A 50 MMF (REMOTE ANT. HANK)	10.7MC (UNMOD.)	POINT OF NON-INTERFERENCE	DC PROBE TO POINT COMMON TO CHASSIS	T3, S2 S1B S1A.	ADJUST FOR MAXIMUM DEFLECTION.
2.	"	"	"	DC PROBE TO POINT COMMON TO POINT	T4	ADJUST FOR ZERO READING. A POSITIVE AND NEGATIVE READING WILL BE OBTAINED ON EITHER SIDE OF THE CORRECT SETTING. PROCEED WITH STEP 5.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

FREQUENCY MODULATE THE IF SIGNAL WITH A 60 CYCLE SINE WAVE TO A TOTAL DEVIATION OF 450 KC. ADJUST THE OSCILLOSCOPE INTERNAL HORIZONTAL DEFLECTION VOLTAGE TO 120 CYCLES, AND SYNCHRONIZE IT WITH THE 60 CYCLE SINE WAVE.

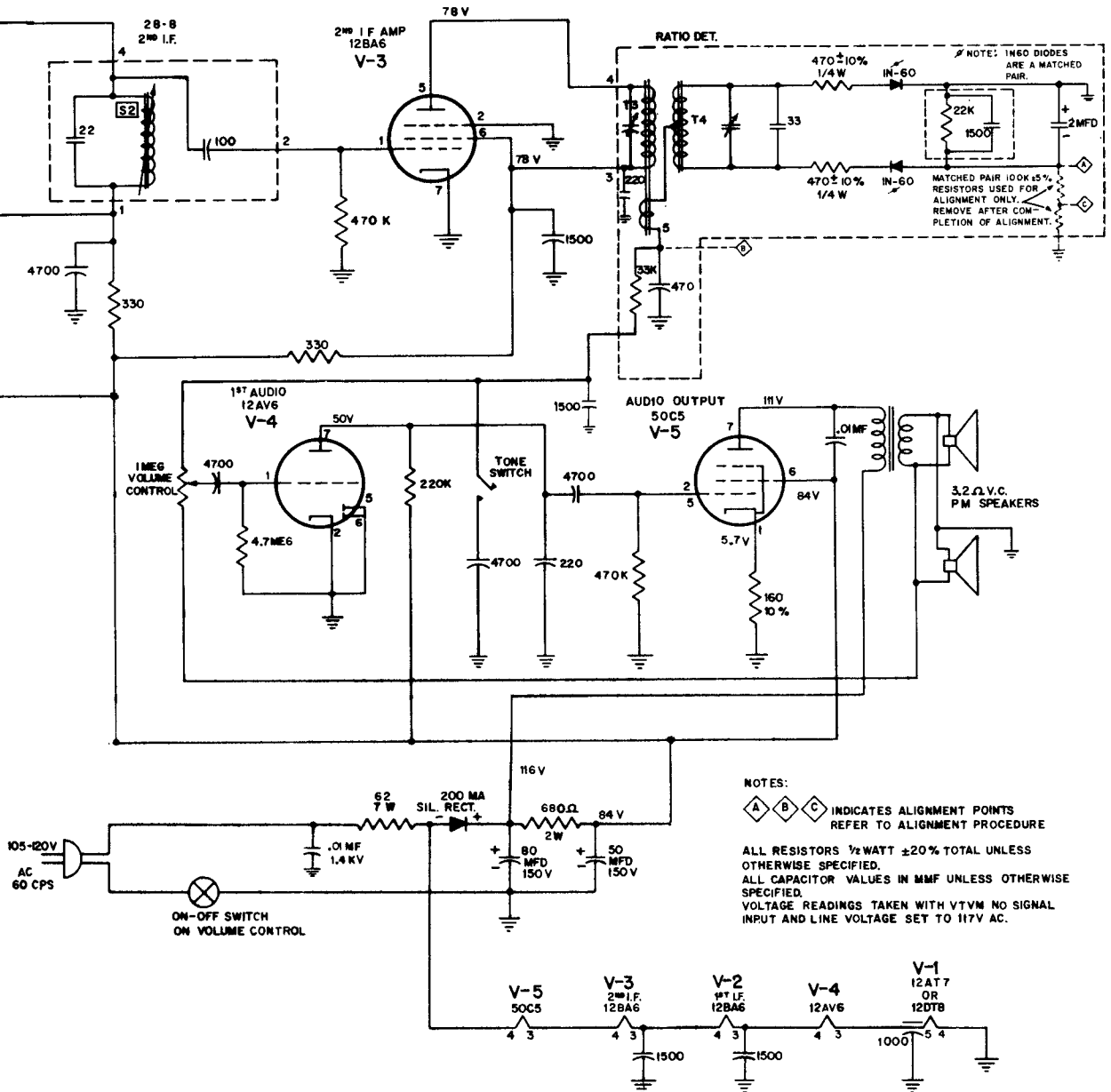
	SIGNAL GENERATOR COUPLING	SIGNAL GEN. FREQ.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
3.	TO PIN 8 (CATHODE) OF 12DT8 THROUGH A 50 MMF (REMOTE ANT. HANK)	10.7MC (450 KC TOTAL DEV.)	POINT OF NON-INTERFERENCE	VERT AMP TO POINT LOW SIDE TO CHASSIS	T3, S2 S1B, S1A.	DISCONNECT STABILIZING CAPACITOR 2MFD. ADJUST FOR CURVE OF MAXIMUM AMPLITUDE AND SYMMETRY SIMILAR TO FIG. 1.
4.	"	"	"	VERT. AMP TO POINT LOW SIDE TO POINT	T4	RECONNECT STABILIZING CAPACITOR 2MFD. ADJUST SO THAT 10.7MC OCCURS AT CENTER OF CROSSOVER LINES SIMILAR TO FIG. 2. SLIGHTLY RE-TOUCH T3 FOR MAX. AMPLITUDE AND STRAIGHTNESS OF CROSSOVER LINES, PROCEED WITH STEP 5.

FM RF ALIGNMENT

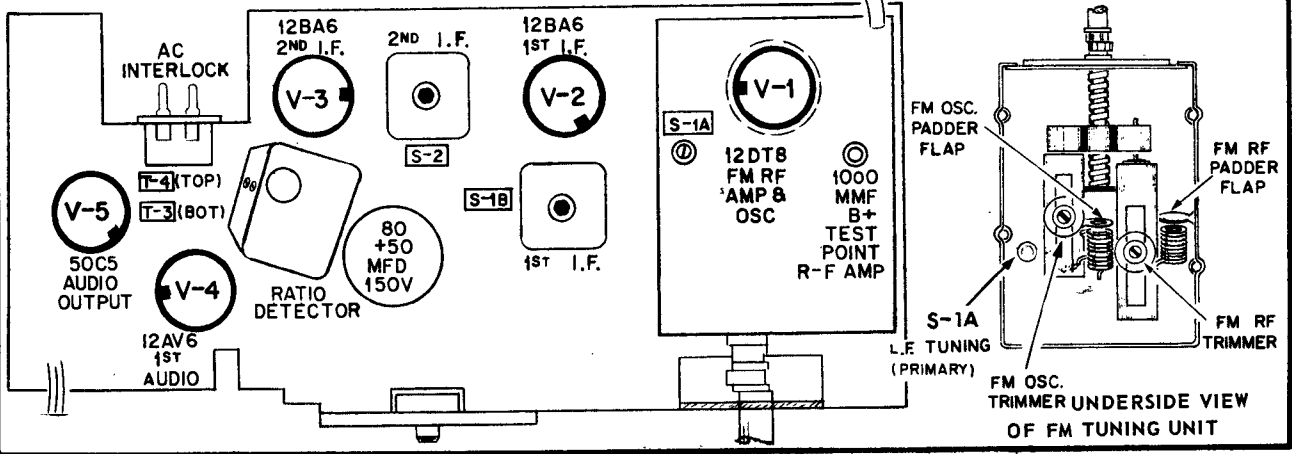
	SIGNAL GENERATOR COUPLING	SIGNAL GEN. FREQ.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	TO PIN 8 (CATHODE) OF 12DT8 THROUGH A 50 MMF (REMOTE ANT. HANK)	108MC	108MC (SLUGS OUT)	DC PROBE TO POINT COMMON TO CHASSIS	T1, T2	ADJUST FOR MAXIMUM DEFLECTION.
6.	"	88MC	88MC (SLUGS IN)	"	PADDER FLAPS	MOVE PADDER FLAPS CLOSER OR FURTHER FROM OSC. & RF COILS FOR MAX. DEFLECTION. REPEAT STEPS 5 & 6. FOR HIGHEST READING.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

EMERSON RADIO Model G-1707, Continued from preceding page, at left.



NOTES:
 ◆ ◆ ◆ INDICATES ALIGNMENT POINTS REFER TO ALIGNMENT PROCEDURE
 ALL RESISTORS 1/2 WATT ±20% TOTAL UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITOR VALUES IN MMF UNLESS OTHERWISE SPECIFIED.
 VOLTAGE READINGS TAKEN WITH VTVM NO SIGNAL INPUT AND LINE VOLTAGE SET TO 117V AC.

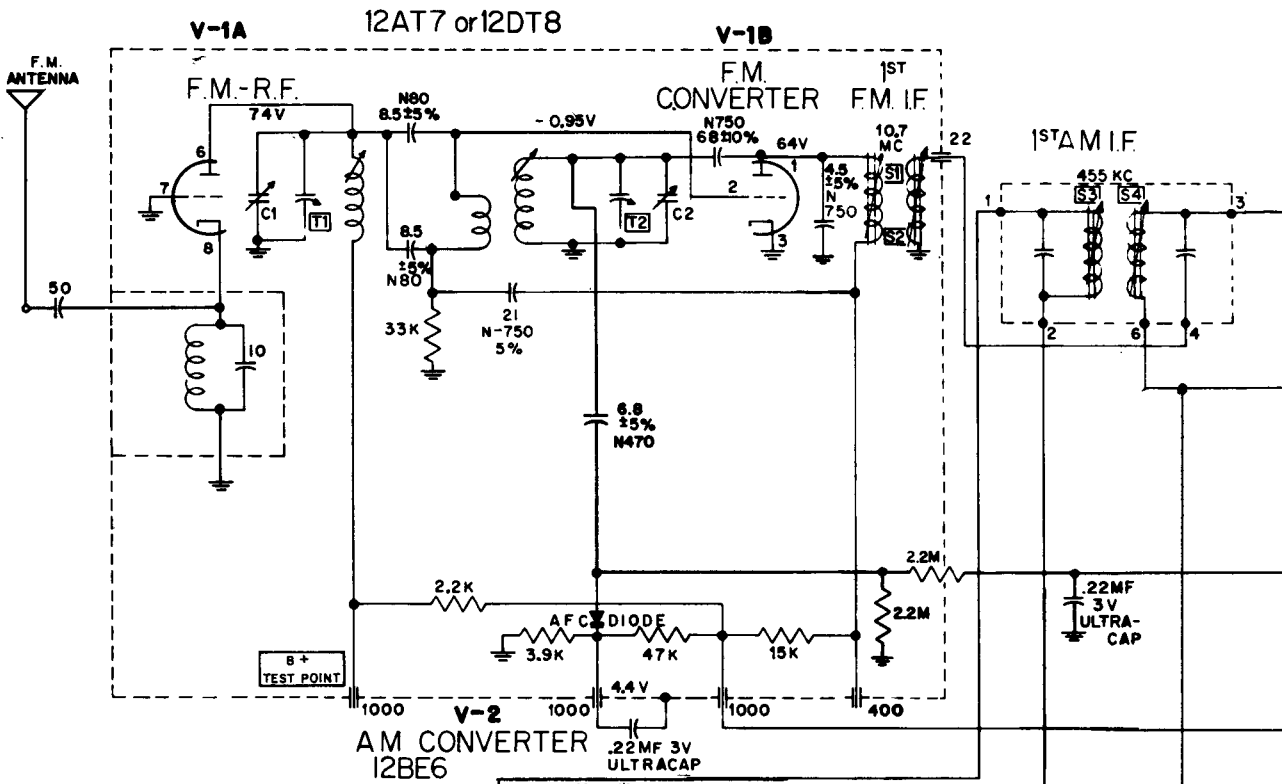


FM OSC. TRIMMER UNDERSIDE VIEW OF FM TUNING UNIT

TUBE LOCATION AND ALIGNMENT POINTS

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

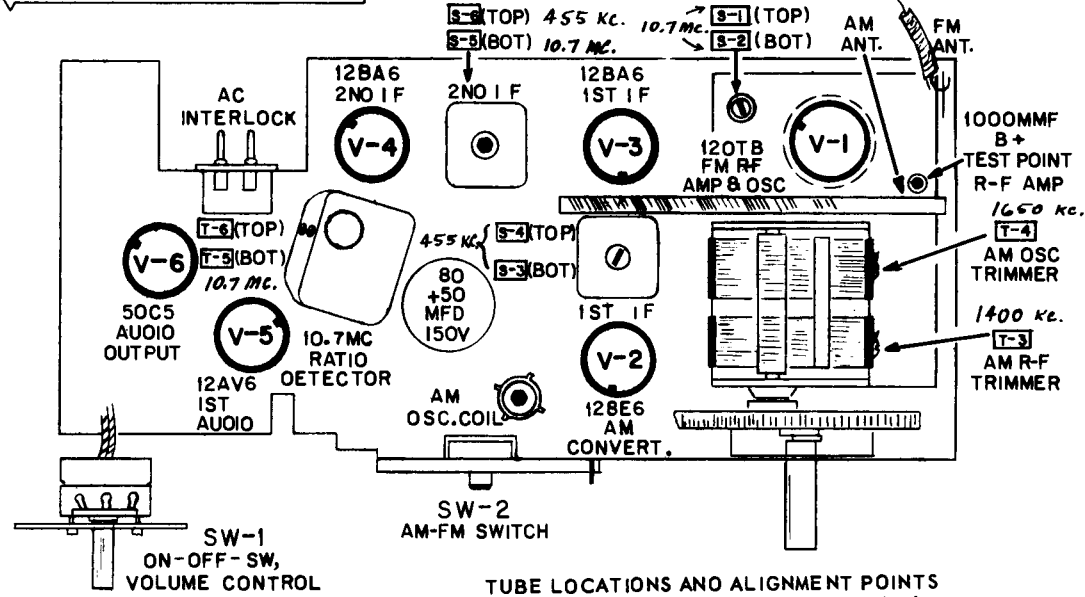
EMERSON RADIO Model G-1708, Continued on the next page at right.



NOTES: All measurements taken between points indicated and chassis ground, unless otherwise specified.

* Indicates measurements taken with common lead of VTVM connected to B+ 126V line (junction of silicon rectifier and 80 mfd. electrolytic capacitor).

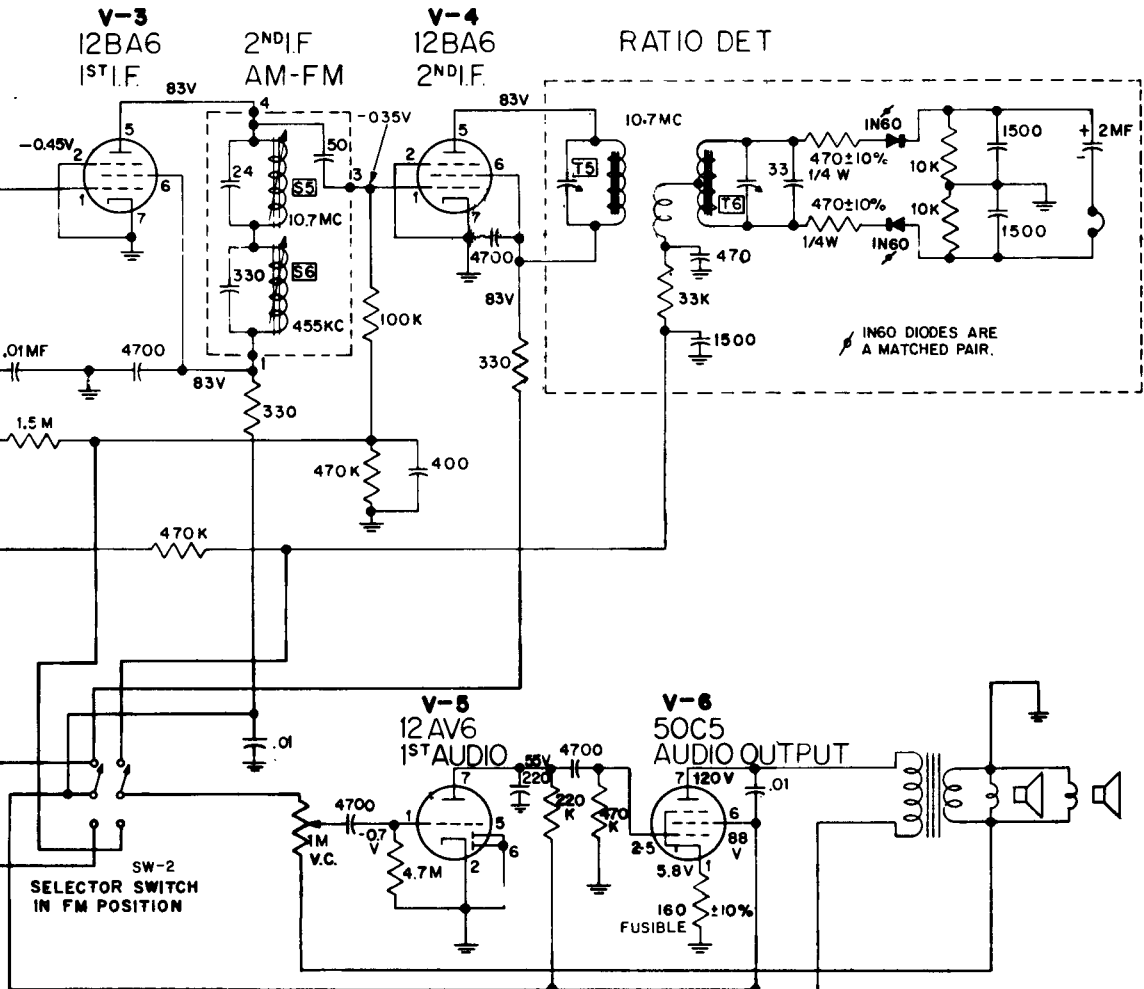
K denotes kilohms; M denotes megohms; N.C. denotes no connection to terminal indicated.



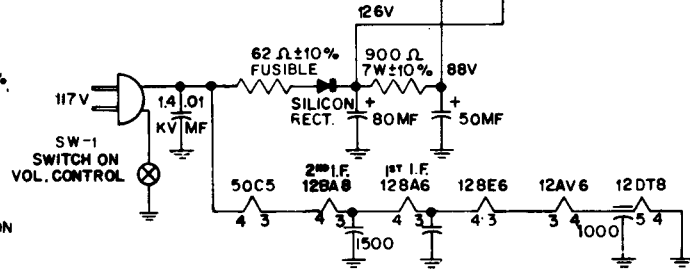
TUBE LOCATIONS AND ALIGNMENT POINTS

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

EMERSON RADIO Model G-1708, Continued from the preceding page at left.



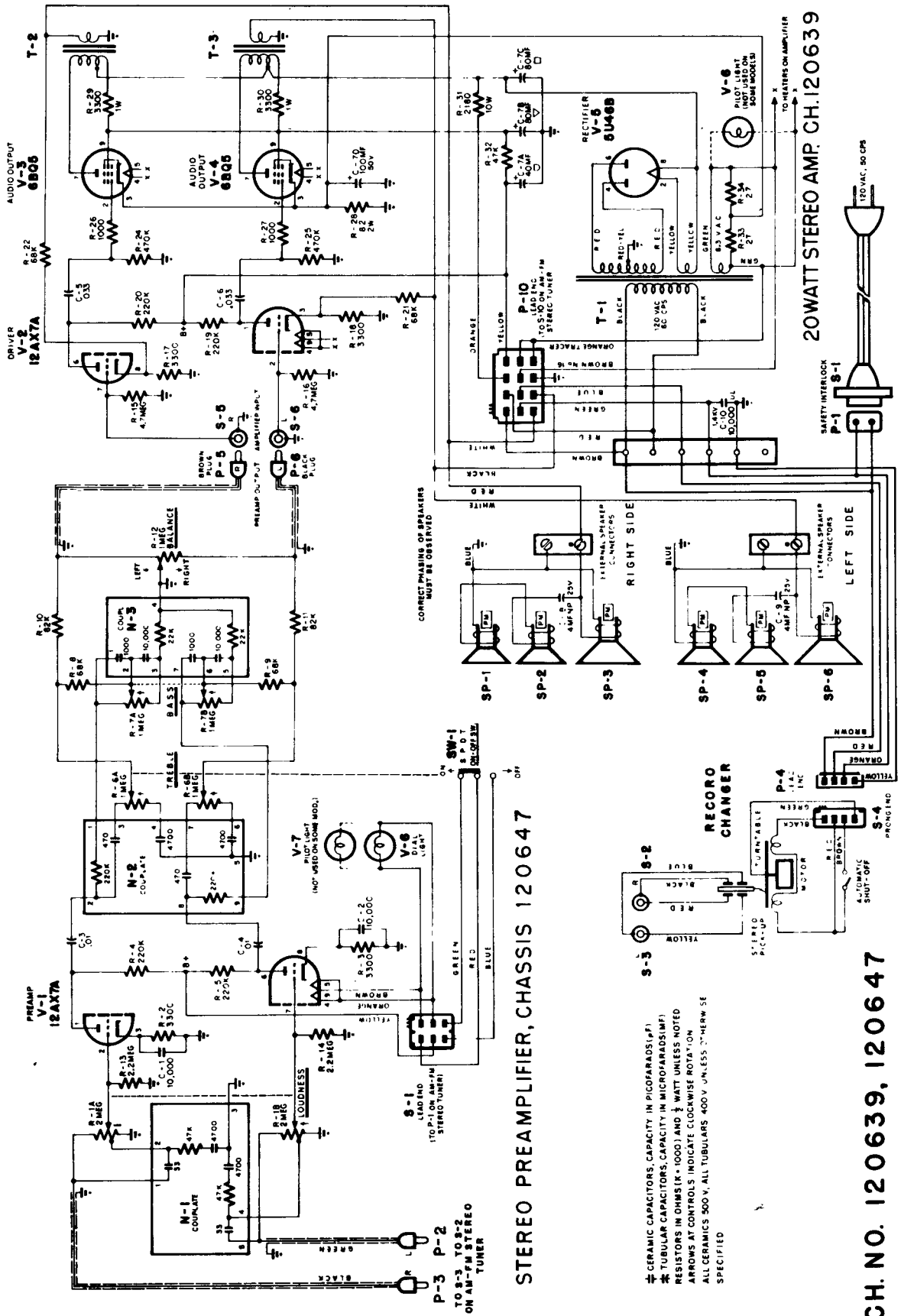
NOTES:
 C1, C2, C3, C4 GANGED
 UNLESS OTHERWISE SPECIFIED
 ALL RESISTOR VALUES IN OHMS, 1/2W ± 20%,
 K=1000Ω M=MEGΩ
 ALL CAPACITOR VALUES IN MMF
 USE V.T.V.M. FOR VOLTAGE MEASUREMENTS
 BAND SWITCH ON FM POSITION, NO SIGNAL,
 LINE VOLTAGE 117 VOLTS RMS 60 ~
 ALL VOLTAGES MEASURED WITH RESPECT
 TO CHASSIS GROUND
 *INDICATES READINGS TAKEN IN A M POSITION



RESISTANCE READINGS CHART, MODEL G-1708

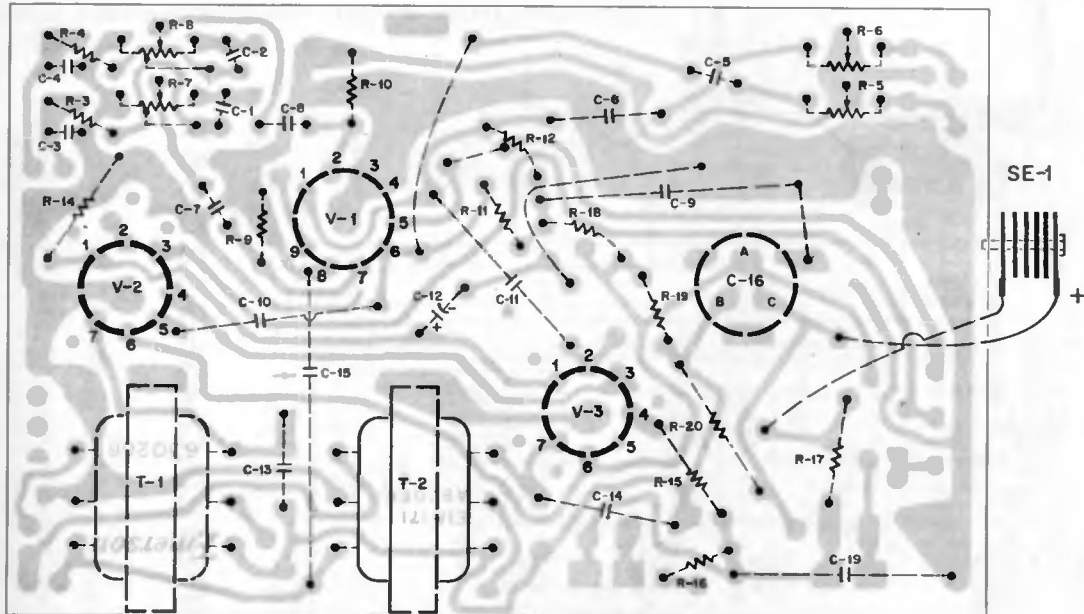
Symbol No.	Tube Type	SW-2 Position	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V-1	12DT8	FM	* 16K	33K	0	0	10	* 3.1K	0	0	N. C.
V-2	12BE6	AM	22K	0.4	20	32	*910	*900	1	-	-
V-3	12BA6	AM or FM	1.6M	0	32	44	*1.2K	*1.2K	0	-	-
V-4	12BA6	FM	470K	0	44	56	*1.2K	*1.2K	0	-	-
V-5	12AV6	AM or FM	4.7M	0	20	10	0	0	*220K	-	-
V-6	50C5	AM or FM	160	470K	56	100	470K	*900	*150	-	-

EMERSON Model P-1913, Amplifier Chassis 120639 and 120647
(Continued from preceding page)



* CERAMIC CAPACITORS, CAPACITY IN PICOFARADS (PF)
 * TUBULAR CAPACITORS, CAPACITY IN MICROFARADS (MF)
 * RESISTORS IN OHMS (K=1000) AND 1/2 WATT UNLESS NOTED
 * ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION
 * ALL CERAMICS 500 V. ALL TUBULARS 400 V UNLESS OTHERWISE SPECIFIED

EMERSON Model P-1914, Chassis 120649, Continued from preceding page



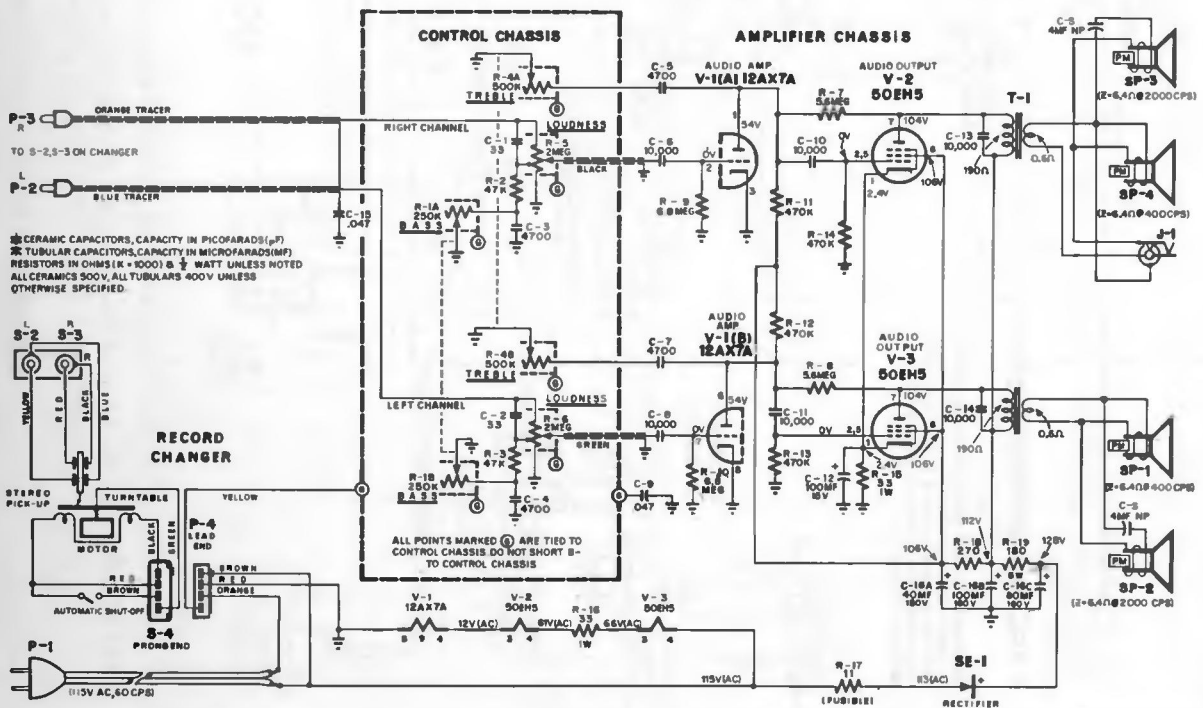
ETCHED PRINTED CIRCUIT CHASSIS (Bottom View)

RESISTANCE READINGS, STEREO AMPLIFIER CHASSIS 120649

SYM.	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V-1	12AX7	*570K	6.8 M	0	0	18	*570K	6.8 M	0	9
V-2	50EH5	33	30 to .5 M	18	64	30 to .5 M	*450	*370	-	-
V-3	50EH5	33	30 to .5 M	64	112	30 to .5 M	*450	*370	-	-

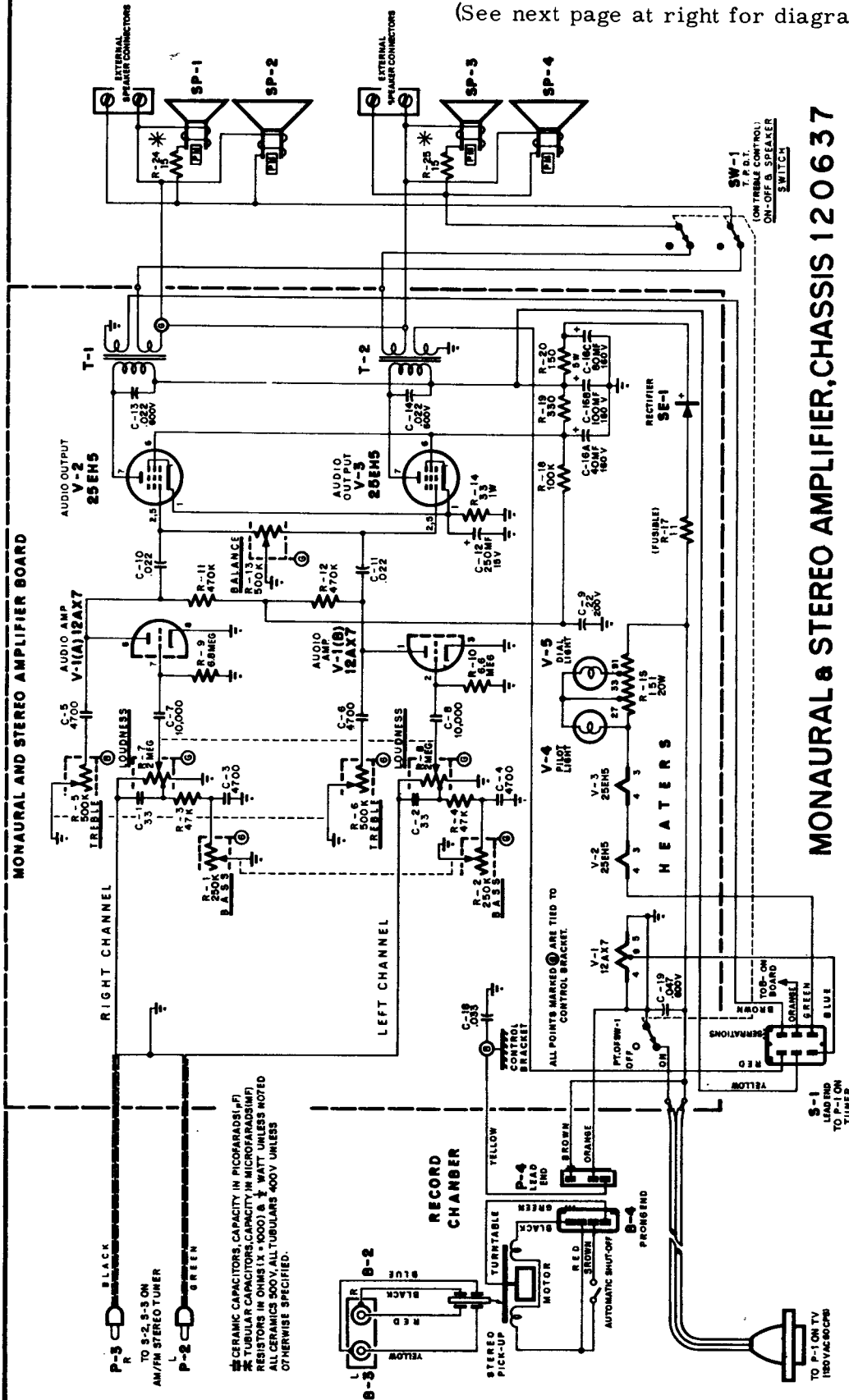
* MEASURED WITH COMMON LEAD OF METER CONNECTED TO POSITIVE SIDE OF SELENIUM RECTIFIER SE-1.

EMERSON Model P-1926, Chassis 120693



EMERSON Models P-1936, P-1937, using Amplifier Chassis 120637

(See next page at right for diagram of tuner)



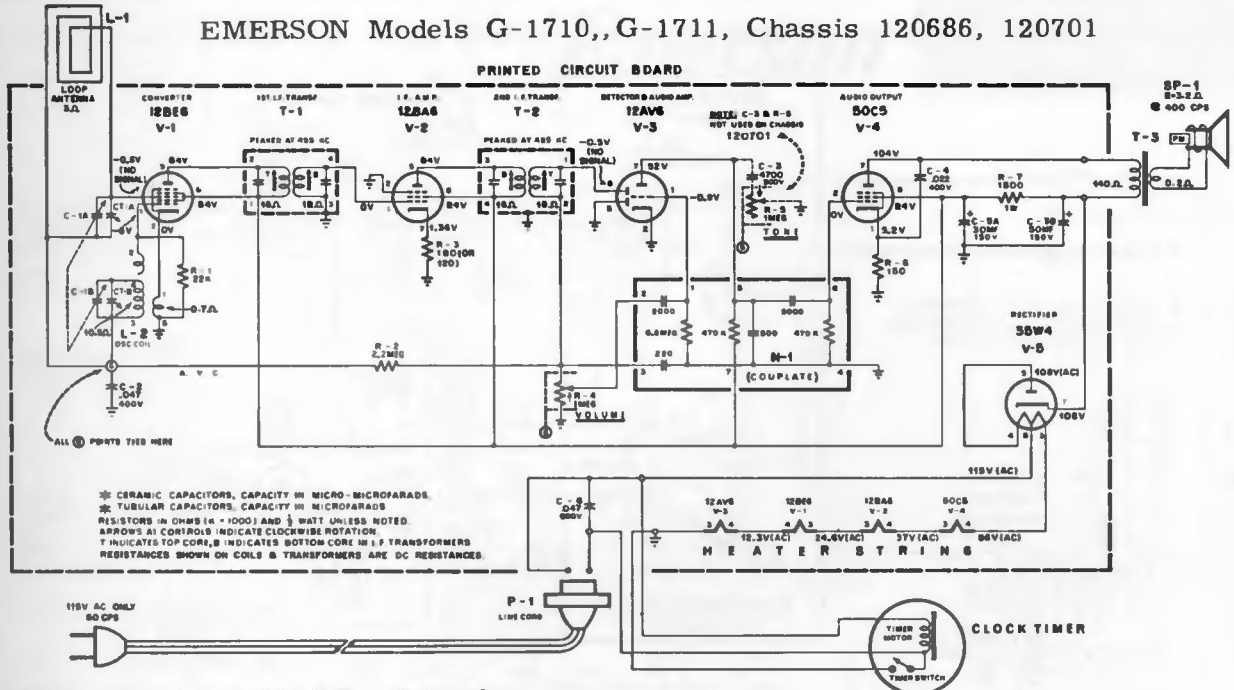
MONAURAL & STEREO AMPLIFIER, CHASSIS 120637

NOTE 1 - Proper phasing of loudspeakers must be observed when making replacements.
 (*) NOTE 2 - R-24 and R-25 used in Model P-1936 only. Model P-1937 utilizes two 4 mfd, non-polarized capacitors (Pt. #925391) in place of these resistors to provide high-frequency cross-over.

EMERSON Models P-1936, P-1937, using Amplifier Chassis 120637
 (See next page at right for diagram of tuner used)

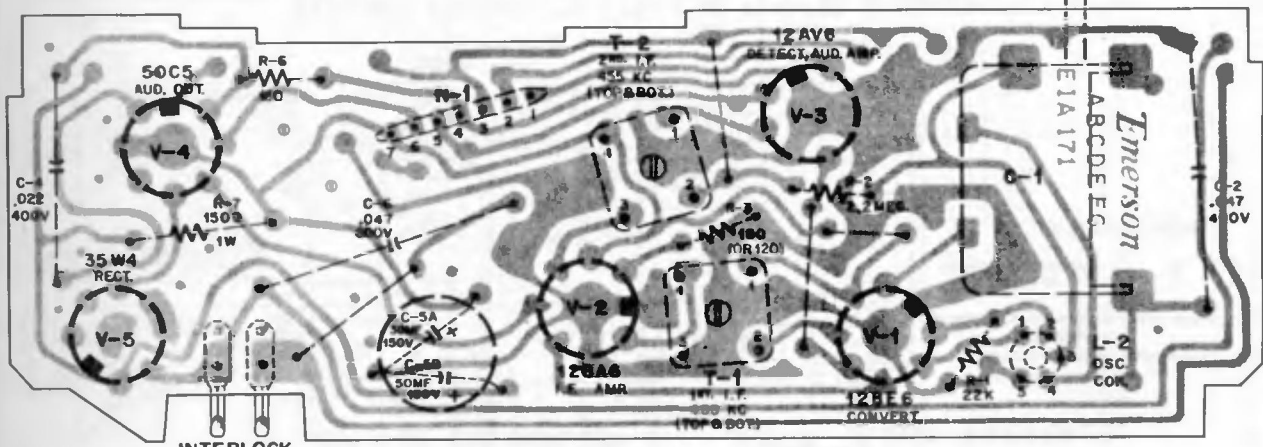
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

EMERSON Models G-1710,,G-1711, Chassis 120686, 120701

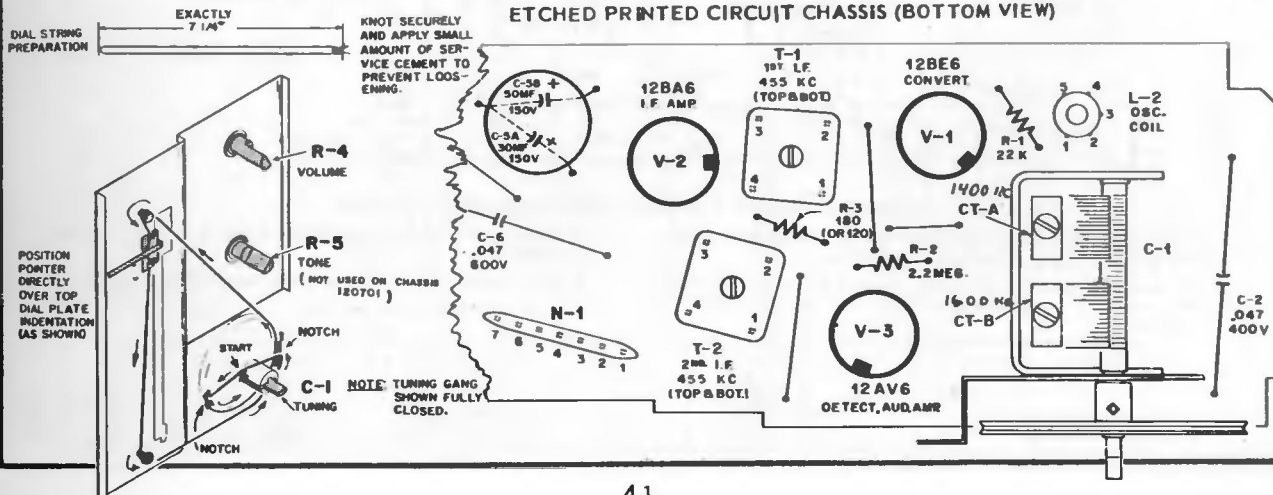


Voltagcs indicated are positive D.C., resistance in ohms unless otherwise indicated. Measurements taken with Voltahmyst or equivalent VTVM. All measurement taken between points indicated ond B minus (low side of volume control).

Voltage readings indicated on schematic were taken with:
 (A) Line voltage set at 115 volts AC,
 (B) Volume control set for minimum volume,
 (C) Tuning capacitor fully closed.

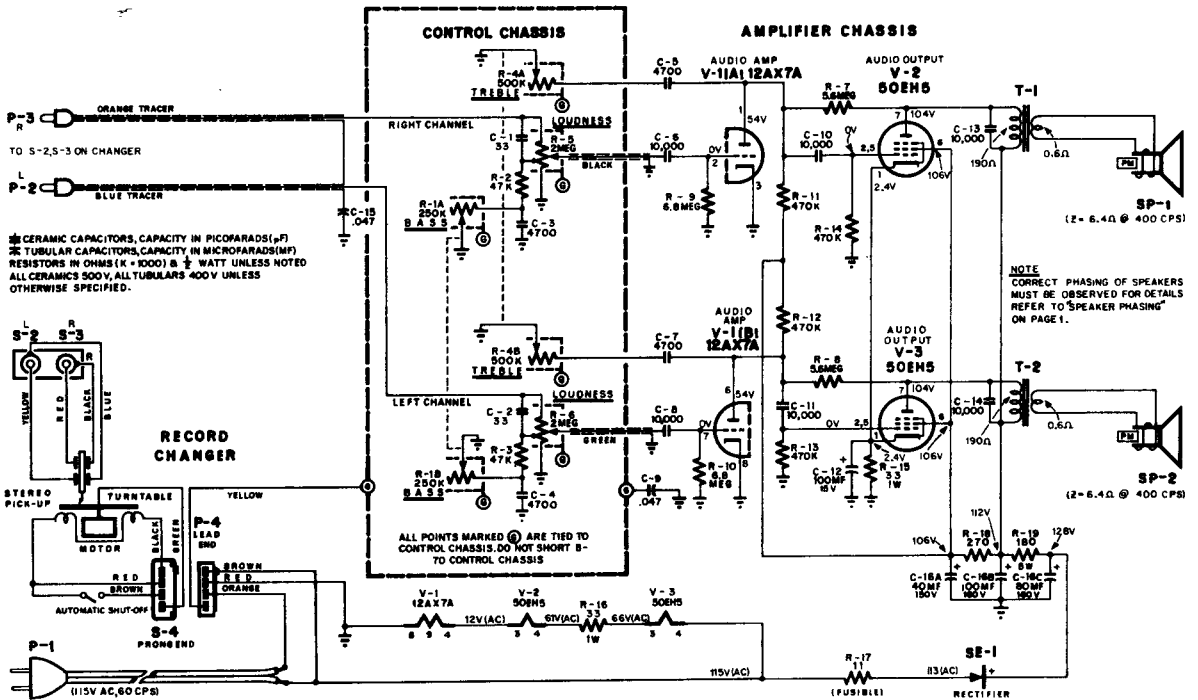


ETCHED PRINTED CIRCUIT CHASSIS (BOTTOM VIEW)

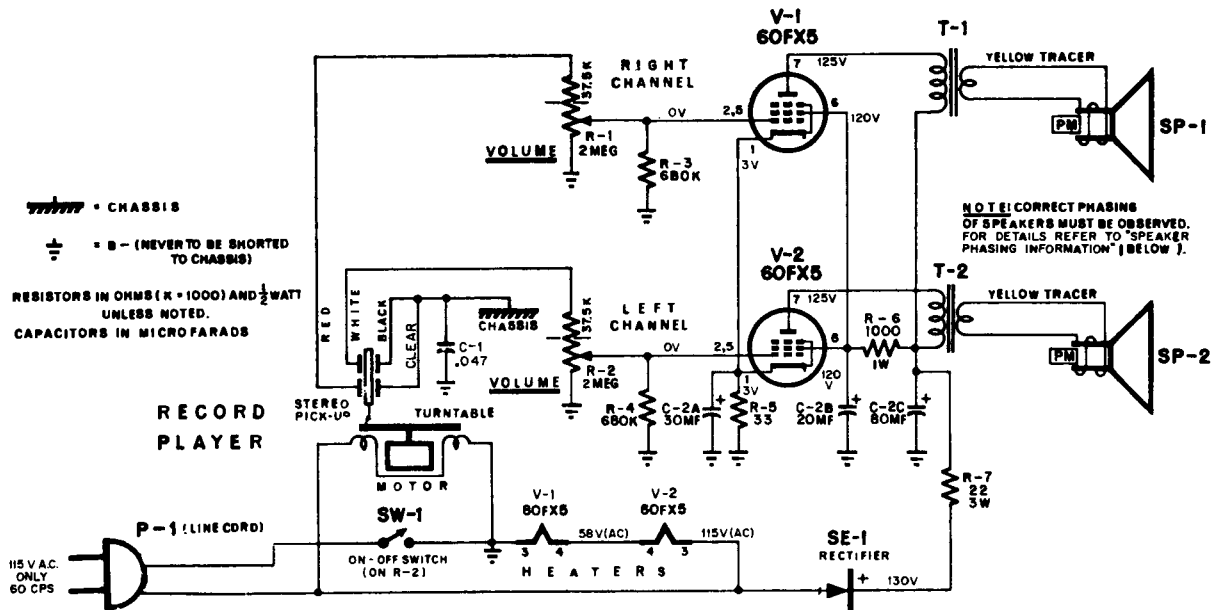


VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

EMERSON Models P-1919, P-1920, Chassis 120668; Model P-1920A, Chassis 120693



EMERSON Models P-1921, -A, Chassis 120567B



CONDITIONS FOR VOLTAGE AND RESISTANCE MEASUREMENTS

1. All voltages measured with VTVM, negative lead to B- (common lead of C-2), volume control set at minimum.
2. All resistance readings taken with AC cord disconnected, negative lead to B- (common lead of C-2), motor switch in "OFF" position.
3. (*) Indicates varying resistance - allow 30 seconds for meter to settle.
4. (**) Reading given varies with setting of volume control.
5. (N.C.) Denotes no connection.

SYMBOL	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
V-1	60 FX5	33	10Ω to 510k **	0	85	10Ω to 510k **	*1 MEG	*1 MEG
V-2	60 FX5	33	10Ω to 510k **	170	85	10Ω to 510k **	*1 MEG	*1 MEG

Gamble-Skogmo, Inc.

Coronado Model RA60-9921A

2SA101AA

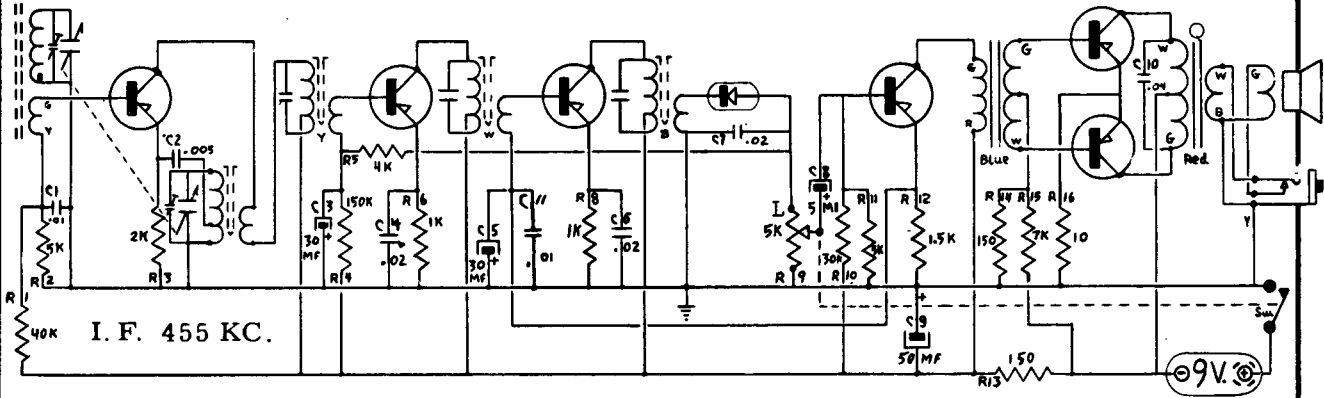
2SA101AA

2SA101AA

MA-80

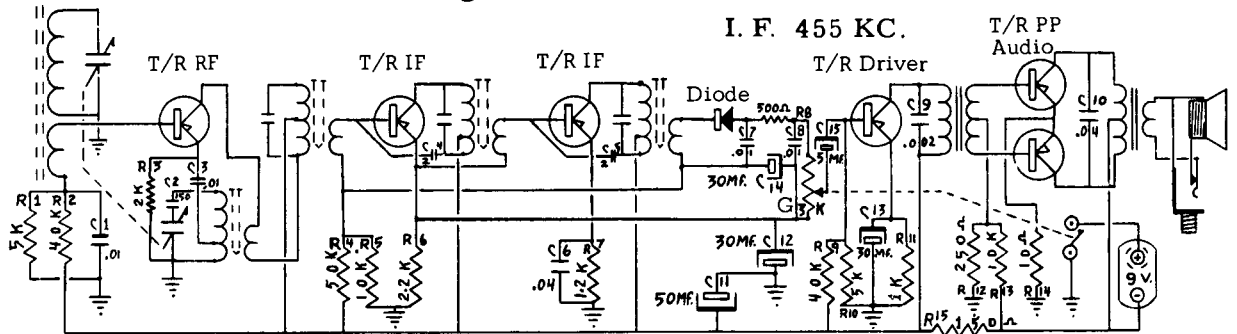
2SB170

2SB172

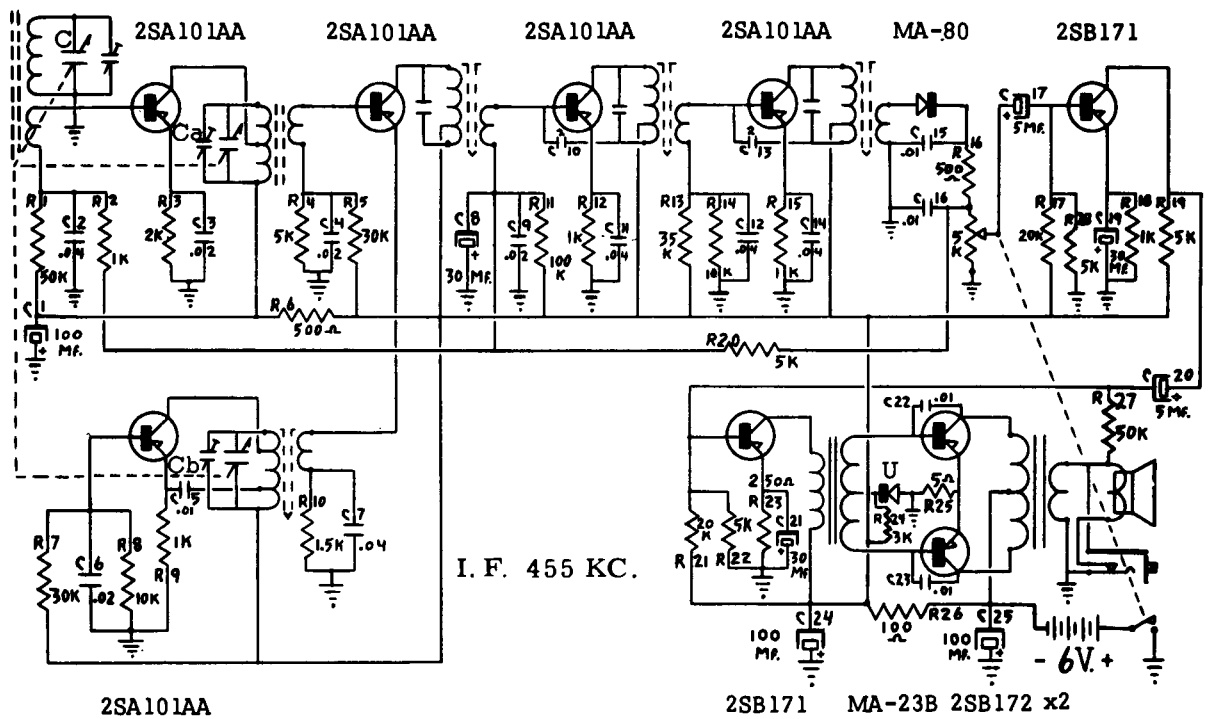


Gamble-Skogmo Coronado Model RA60-9922A

I. F. 455 KC.

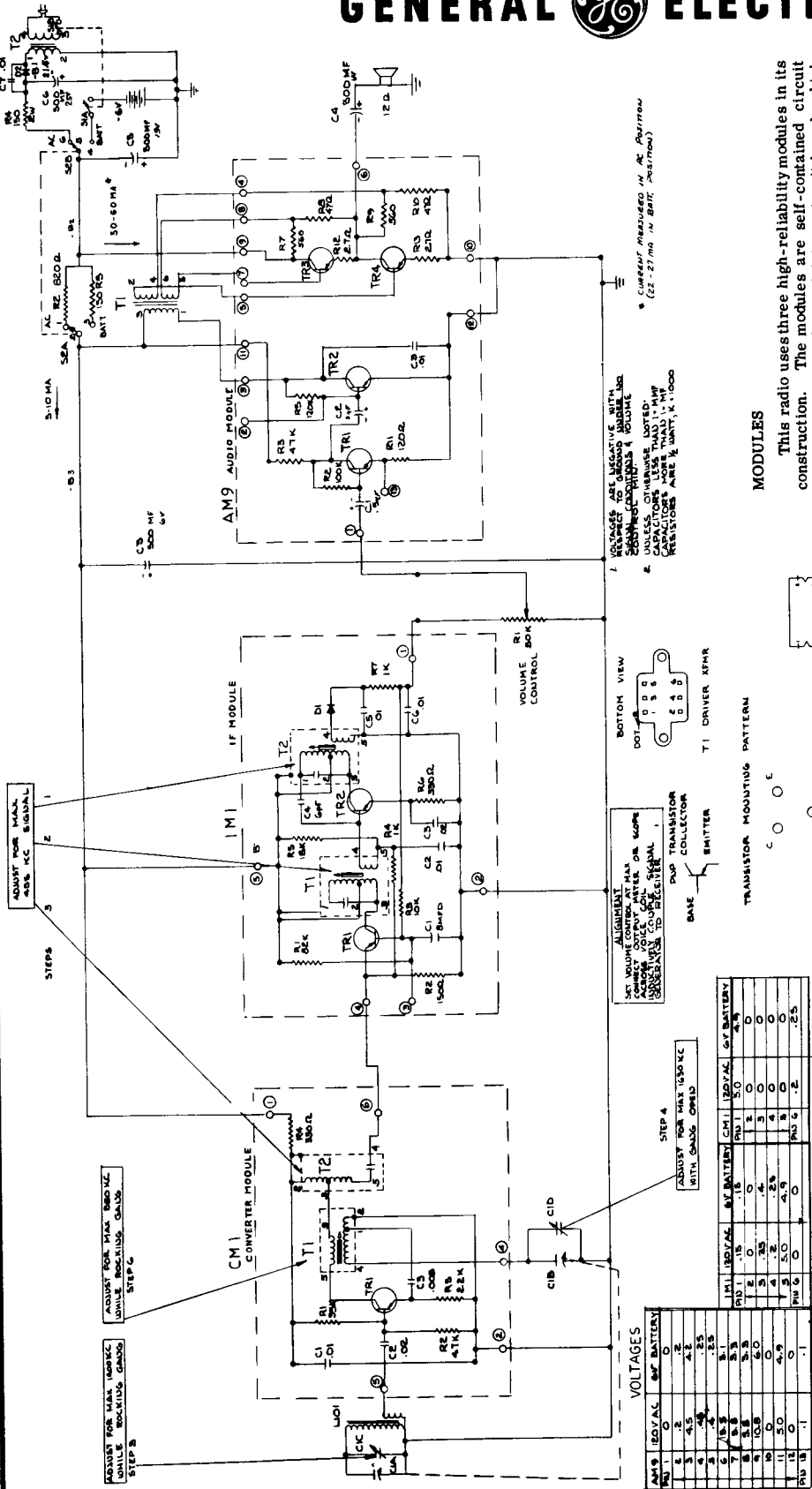


Gamble-Skogmo Coronado Model RA60-9924A



GENERAL ELECTRIC

MODELS
H220A
H221A



MODULES

This radio uses three high-reliability modules in its construction. The modules are self-contained circuit stages, each grouped on a miniature circuit board, which themselves are mounted on and soldered into the main circuit board just like any other component (transistor, capacitor, etc.).

This method of manufacture provides high reliability at an optimum cost. In fact, it allows the cost of the module to fall into the same range as tubes or transistors. This means that defects in the circuits involved in the modules need only be replaced with a good unit.

Almost always this will result in an easier, quicker, and more economical repair than would be possible if the serviceman were to try to locate and replace a defective component within a module. This radio uses such modules in the converter, I. F. and Audio stages.



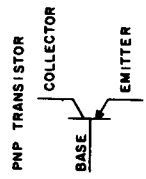
Models P895A-M, P910A-M, P911A-M, P912A-M, P913A-M

(Continued on next page at right)

TABLE 1
TABLE OF TRANSISTOR VOLTAGES

TRANSISTOR	EMITTER	BASE	COLLECTOR
TR1	.85	2.5	
TR2	.19 TO .29	.34 TO .4	2.6
TR3	.18 TO .3	.35 TO .43	2.6
TR4	.0	.2	2.6
TR5	.04	.2	3
TR6	.04	.2	3

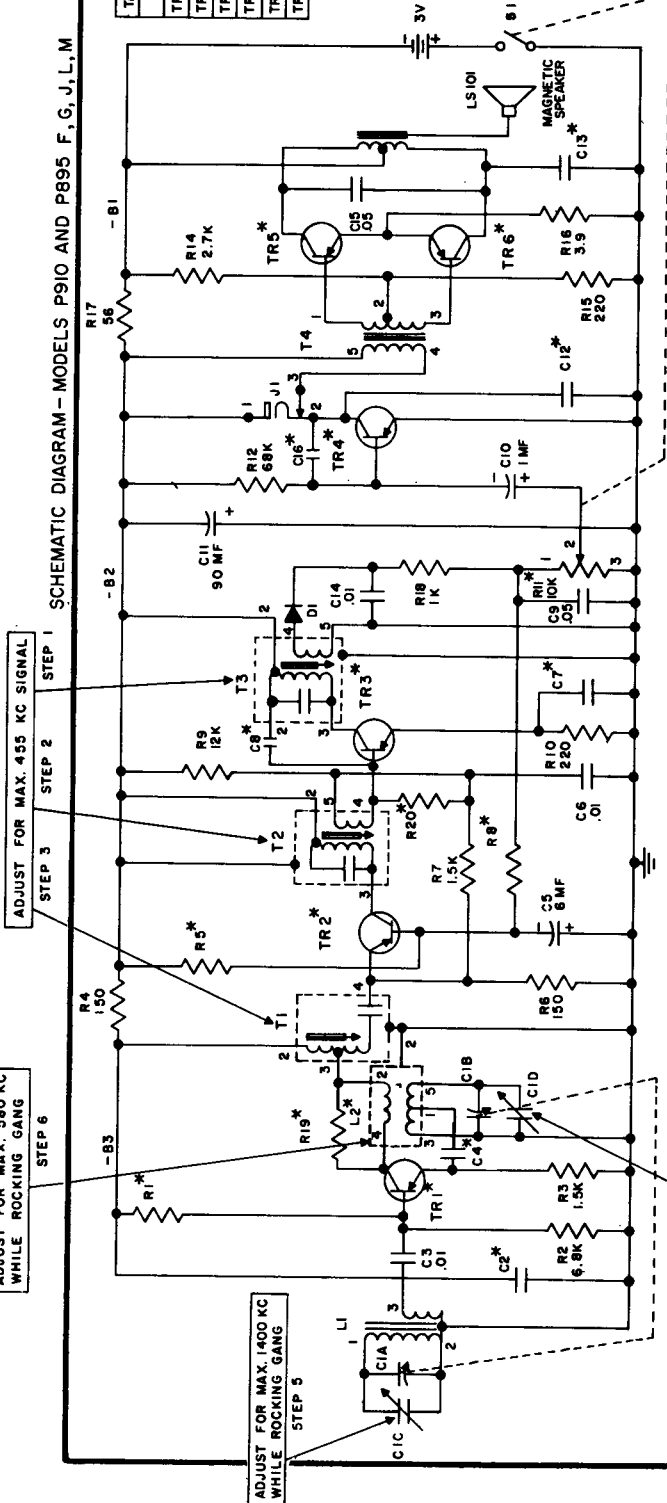
ALIGNMENT
SET VOLUME CONTROL AT MAX.
CONNECT VOLT METER OR SCOPE
ACROSS SWR COIL INDUCTIVELY
INDUCTIVELY COIL SIGNAL
GENERATOR TO RECEIVER



TRANSISTOR MTG PATTERN
C o o E
B

BOTTOM VIEWS

SCHEMATIC DIAGRAM - MODELS P910 AND P895 F, G, J, L, M

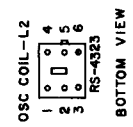


NOTES:

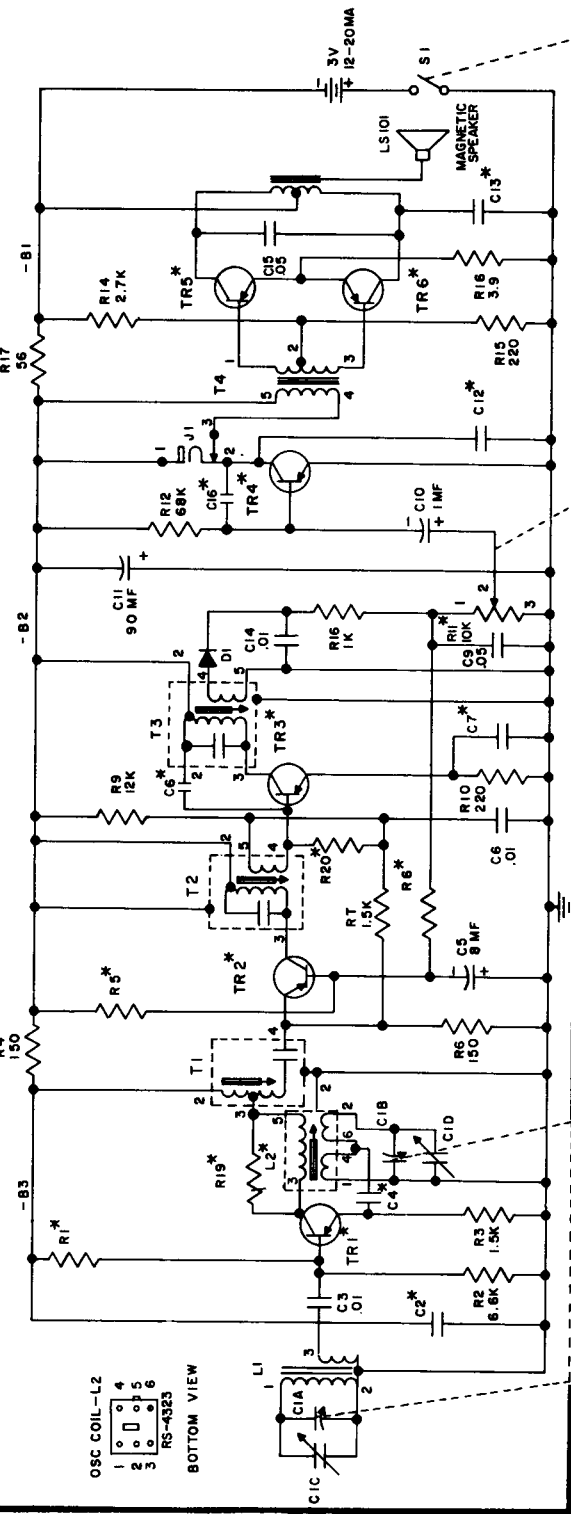
1. UNLESS OTHERWISE NOTED
CAP. MORE THAN 1-μMF
CAP. LESS THAN 1-μMF
RES. ARE 1/2 WATT K=1000
2. VOLTAGES ARE NEGATIVE WITH RESPECT TO GND
3. UNDER NO SIGNAL CONDITIONS & VOL. CONTROL MIN.
4. * SEE TABLE 2.

I.F. TRANSFORMER
1 0 0 4
2 0 0 5
3 0 0 5

OSC COIL-L2
5 0 0 4
2 0 0 5
4 0 0 1
RS-4708



BOTTOM VIEW



SCHEMATIC DIAGRAM - MODELS P910 AND P895 A, B, C, D, E, H, K



Models P895A-M, P910A-M, P911A-M, P912A-M, P913A-M

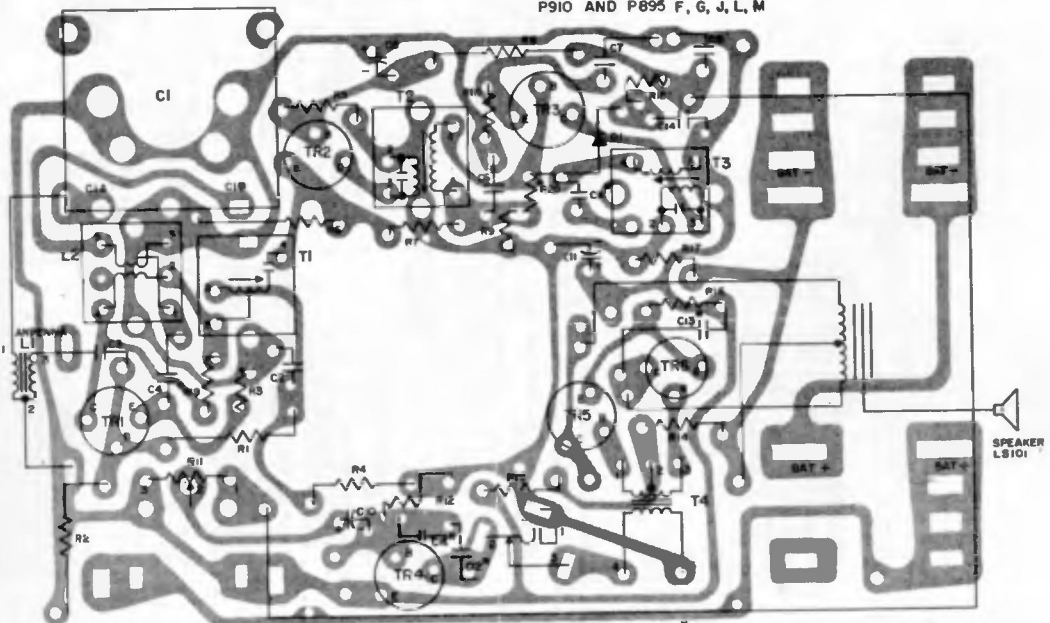
(Continued from preceding page at left)

* TABLE 2 - The following components may vary in value or physical characteristics in different set versions of models P910 or P895. The proper component values or part catalog numbers for all component variables are listed under the appropriate columns.

Set Version	TRANSISTORS					RESISTORS							CAPACITORS			
	TR1	TR2	TR3	TR4	TR5 & TR6	R1	R19	R5	R20	R8	R11 (VC)	C2	C4	C7	C8	
A ₁	RS-3857	RS-3862	RS-3863	RS-5504	RS-5704 or RS-5710	12K	8.2K	27K	3.3K	8.2K	RS-4326	.01	.005 or .01	.05	None	
A ₂	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4326	.01 or .005	.005 or .01	.05	None	
B ₁	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4707	↓	↓	.05	None	
B ₂	RS-3857	RS-3862	RS-3863	RS-5504	↓	12K	8.2K	27K	3.3K	8.2K	RS-4707	.01	↓	.05	None	
C ₁	RS-3857	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4326	.01 or .005	↓	.05	None	
C ₂	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4326	↓	↓	.05	None	
D ₁	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4326	↓	↓	.05	None	
D ₂	RS-3857	RS-3862	RS-3863	RS-5504	↓	12K	8.2K	27K	3.3K	8.2K	RS-4326	↓	↓	.05	None	
E ₁	RS-3857	RS-3862	RS-3863	RS-5504	↓	12K	8.2K	27K	3.3K	8.2K	RS-4326	↓	↓	.05	None	
E ₂	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	5.6K	27K	3.3K	8.2K	RS-4326	↓	↓	.05	None	
E ₃	RS-5104	RS-3862	RS-3863	RS-5504	↓	22K	Omit	27K	3.3K	8.2K	RS-4326	.01	.01	.05	None	
E ₄	RS-5104	RS-5201	RS-5301 or RS-5303	RS-5504	↓	22K	Omit	39K	Omit	12K	RS-4326	.01	.01	.05	7.5mmf	
F	RS-5104	RS-5201	↓	RS-5504	↓	22K	Omit	39K	Omit	12K	RS-4707	.01	.01	.05	7.5mmf	
G	RS-3868	RS-5201	↓	RS-5504	↓	18K	Omit	39K	Omit	12K	RS-4707	.05	.005	.05	7.5mmf	
H	RS-3868	RS-5201	↓	RS-5504	↓	18K	Omit	39K	Omit	12K	RS-4707	.05	.005	.05	7.5mmf	
J	RS-3868	RS-3862	RS-3863	RS-5504	↓	18K	8.2K	27K	Omit	8.2K	RS-4707	.005	.005	.01	Omit	
K	RS-5104	RS-5201	RS-5301	RS-5504	↓	22K	Omit	39K	Omit	12K	RS-4707	.01	.01	.05	7.5mmf	
L	RS-3868	or RS-5202 or RS-5203	or RS-5303 or RS-5310	RS-5504	↓	18K	Omit	39K	Omit	12K	RS-4707	.005	.005	.05	6.8mmf	
M	RS-3868	↓	RS-5304 or RS-5309	RS-5504	↓	18K	Omit	39K	Omit	12K	RS-4707	.005	.005	.05	6.8mmf	

① BOTH TR5 and TR6 must be the same type transistor.

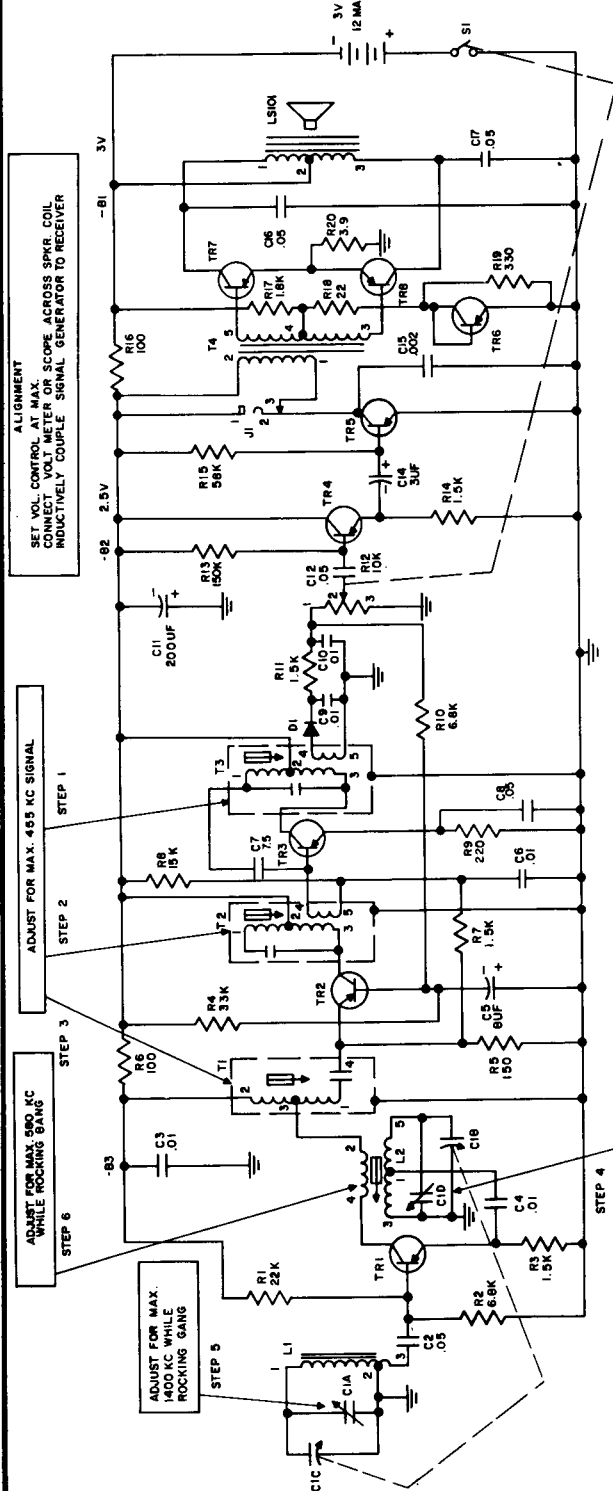
COMPONENT WIRING DIAGRAM—MODELS P910 AND P895 F, G, J, L, M



*NOT FOUND IN ALL VERSIONS. SEE TABLE 2

GENERAL ELECTRIC

Models P915A, B, P916A, B, P917A, B, P9151A, B, P9161A, B, P9171A, B



TROUBLESHOOTING (CONT'D)

If an excessive total quiescent 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.

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 3 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.

CHASSIS REMOVAL

1. Remove the dial knob screw with a small Phillips screw driver and lift off the dial knob.
2. Remove cabinet back by inserting a coin in the slot on the bottom of the set, giving it a slight twist.
3. Remove two 1/8" Phillips-head screws located underneath the batteries.
4. Remove 1/8" Phillips-head screw located next to the tuning capacitor.
5. Slide out the circuit board in the direction of the cabinet bottom and lift out.

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 minimum, tuning gang closed, and with no-signal conditions.

The total quiescent receiver current drain is 12 to 14 mls. This is measured by inserting a milliammeter in series with the batteries.

TABLE OF TRANSISTOR VOLTAGES		FUNCTION		
EMITTER	BASE	COLLECTOR		
TR1	0.7	0.8	2.4	CONVERTER
TR2	0.15	0.3	2.5	2ND I.F. AMP.
TR3	0.2	0.35	2.5	3RD I.F. AMP.
TR4	0.75	0.8	2.5	1ST AUDIO
TR5	0	0.3	2.2	AUDIO DRIVER
TR6	0	0.15	0.15	CURRENT REGULATOR
TR7	0.04	0.15	3.0	PUSH-PULL
TR8	0.04	0.15	3.0	DUPLEX

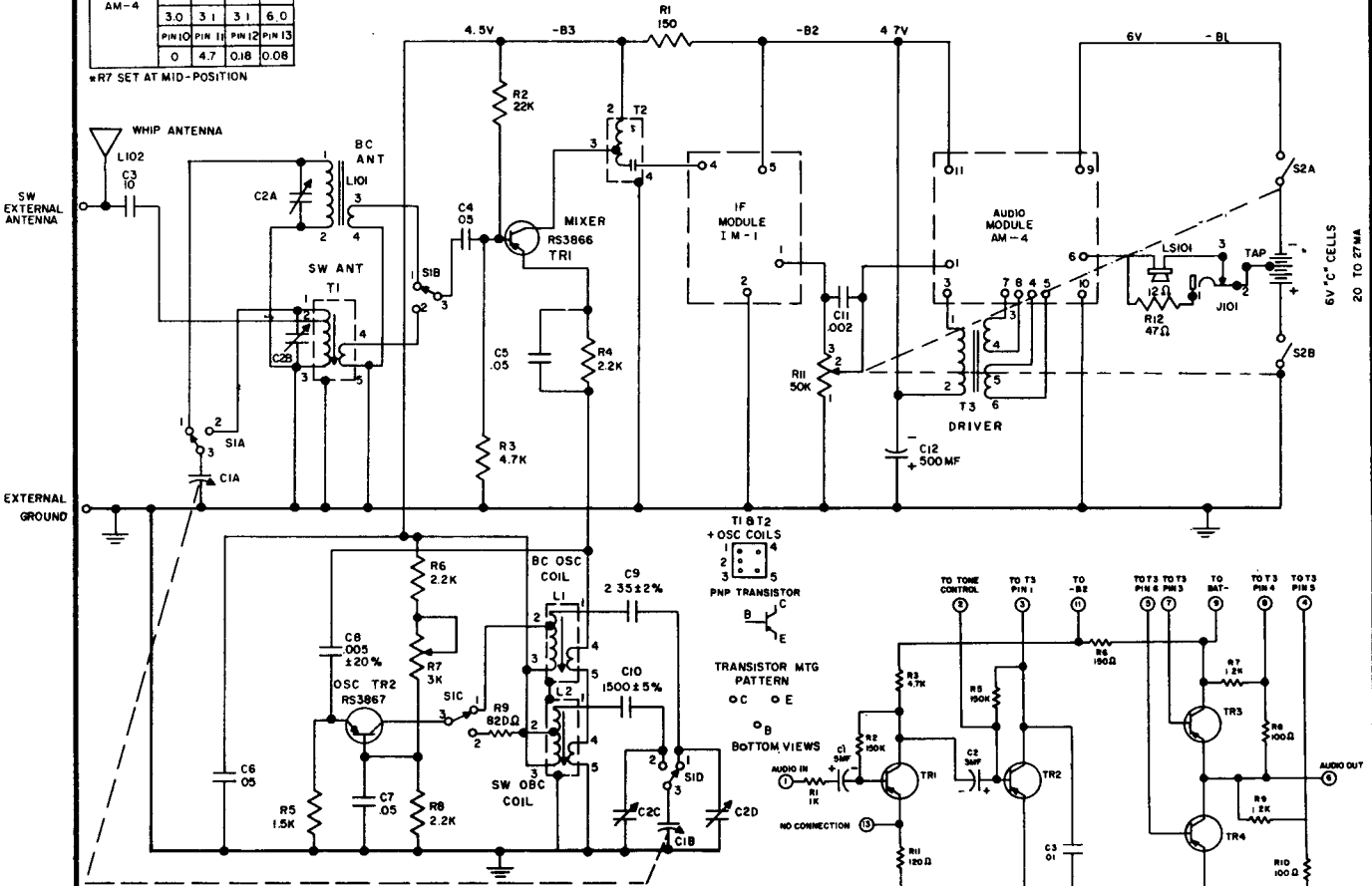
GENERAL ELECTRIC

RADIO
MODEL
P925A

TABLE OF VOLTAGES*

	E	B	C
TR1	0.7	0.8	4.5
TR2	1.1	1.3	4.5
IM-1	PIN 1	PIN 2	PIN 4
	PIN 3	PIN 4	PIN 5
	PIN 1	PIN 3	PIN 4
	PIN 5	PIN 6	PIN 7
AM-4	PIN 6	PIN 7	PIN 8
	PIN 8	PIN 9	PIN 9
	PIN 10	PIN 11	PIN 12
	PIN 12	PIN 13	PIN 13

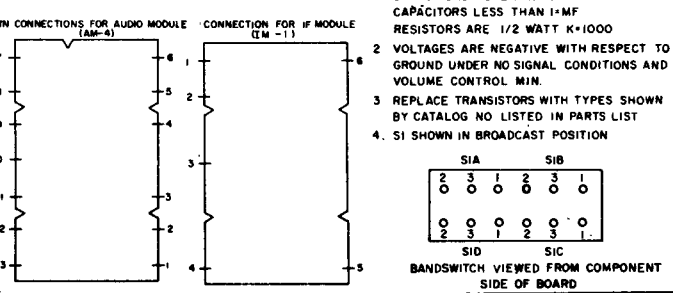
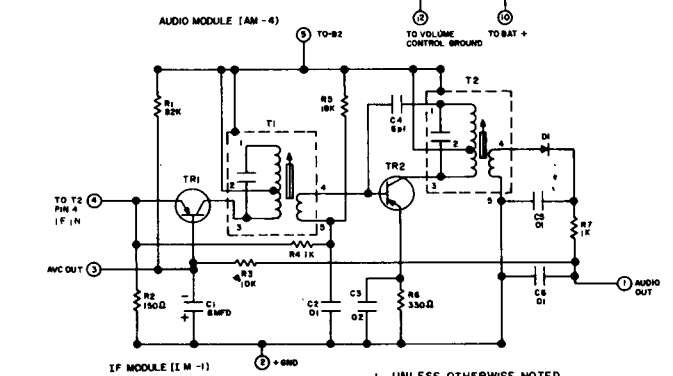
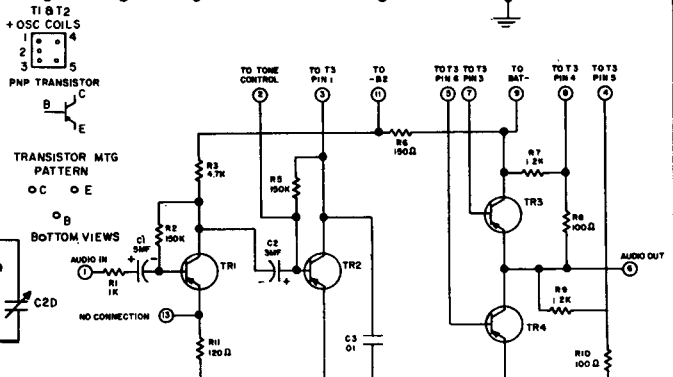
*R7 SET AT MID-POSITION



SWEEP AND PEAK ALIGNMENT PROCEDURES

STEP	SIGNAL GEN. INPUT	BAND SWITCH	TUNING GANG	AM GEN.	SWEEP GEN.	ADJUST THE FOLLOWING:	CONNECT VTVM ACROSS	CONNECT SCOPE ACROSS	REMARKS	
1	Inductively Couple to AM Antenna Loop (L101)	BC	Open	455KC		T2, T1 of IF Module (IM-1), T2 of the circuit board.	Voice Coil	Voice Coil		
2	High side to External SW Ant. terminal. Low side to External Ground terminal.	**SW	12MC	12MC		C2C for Maximum Amplitude	Voice Coil	Voice Coil	Adjust Signal Generator to 910 KC above wanted frequency to observe image frequency response.	
3	High side to External SW Ant. terminal. Low side to External Ground terminal.	SW	4MC	4MC		L2 for Maximum Amplitude	Voice Coil	Voice Coil	Adjust Signal Generator to 910 KC above wanted frequency to observe image frequency response.	
4	Repeat steps 1 and 2 until no further adjustment is required.									
5	High side to External SW Ant. terminal. Low side to External Ground terminal.	SW	12MC	12MC	*12MC	C2B for Maximum Amplitude	Voice Coil	*Across pin 1 of IF Module (IM-1) and Ground	Adjust Sweep width control or center frequency to observe image response.	
6	High side to External SW Ant. terminal. Low side to External Ground terminal.	SW	4MC	4MC	*4MC	T1 for Maximum Amplitude	Voice Coil	*Across pin 1 of IF Module (IM-1) and Ground	Adjust Sweep width control or center frequency to observe image response.	
7	Repeat steps 4 and 5 until no further adjustment is required.									
8	Inductively Couple to AM Antenna Loop	BC	Open	1630 KC		C2D for Maximum Amplitude	Voice Coil	Voice Coil		
9	Inductively Couple to AM Antenna Loop	BC	1400 KC	1400 KC	*1400 KC	C2A for Maximum Amplitude	Voice Coil	*Across pin 1 of IF Module (IM-1) and Ground	Rock Gang during Peak Alignment	
10	Inductively Couple to AM Antenna Loop	BC	580 KC	580 KC	*580 KC	L1 for Maximum Amplitude	Voice Coil	*Across pin 1 of IF Module (IM-1) and Ground	Rock Gang during Peak Alignment	
11	Repeat steps 7, 8 and 9 until no further adjustment is required.									

* SWEEP ALIGNMENT ONLY



- UNLESS OTHERWISE NOTED CAPACITORS MORE THAN 1MMF OR PF CAPACITORS LESS THAN 1MMF RESISTORS ARE 1/2 WATT K-1000
- VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS AND VOLUME CONTROL MIN.
- REPLACE TRANSISTORS WITH TYPES SHOWN BY CATALOG NO LISTED IN PARTS LIST
- S1 SHOWN IN BROADCAST POSITION

GENERAL ELECTRIC

MODEL P955A

MODULES

This radio uses three high-reliability modules in its construction. The modules are self-contained circuit stages, each grouped on a miniature circuit board, which themselves are mounted on and soldered into the main circuit board just like any other component (transistor, capacitor, etc.).

This method of manufacture provides high reliability at an optimum cost. In fact, it allows the cost of the module to fall into the same range as tubes or transistors. This means that defects in the circuits involved in the modules need only be replaced with a good unit.

Almost always this will result in an easier, quicker, and more economical repair than would be possible if the serviceman were to try to locate and replace a defective component within a module. This radio uses such modules in the converter, I. F. and Audio stages.

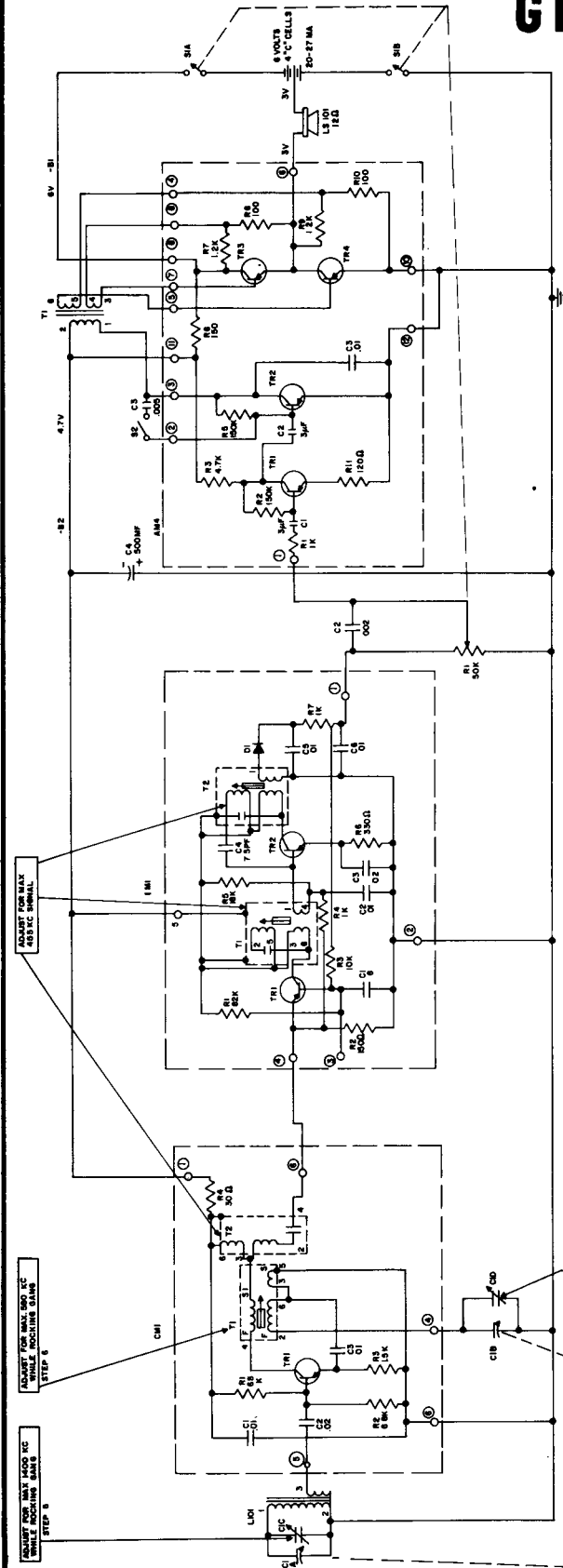
CHASSIS REMOVAL

1. Remove volume and tuning knobs.
2. Remove two Phillips-head screws from cabinet back.
3. Remove seven hex-head screws from circuit board.
4. Label and unsolder wires going to speaker and battery terminals.
5. Carefully lift circuit board from cabinet.

TROUBLESHOOTING

IMPORTANT: The audio output terminals of the radio must be D. C. isolated from ground during servicing procedures. This is to prevent the audio output transistors from becoming damaged by excess voltages in the audio circuit. Therefore, care must be exercised in using test equipment that may cause a D. C. path to ground.

The total battery current drain should always be ascertained before proceeding with the servicing. These current readings should be taken with the receiver in the "OFF" position. Total current is measured by placing a jumper across S1A and measuring the current across the switch terminals of S1B. This current reading should fall between 20-27 MA. After noting this current, remove the jumper across S1A and place it across the terminals of S1B. Measure the current drain across the switch terminals of S1A. This current reading should be approximately the same as the previous reading. Should any significant difference in current readings occur when making this check, a defective audio output stage is indicated.



ADJUST FOR MAX. AFD AC SIGNAL
STEP 5

ADJUST FOR MAX. D.C. IC WHILE TUNING GAIN
STEP 6

ADJUST FOR MAX. AFD IC WITH GAIN OPEN

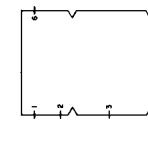
SET VOLUME CONTROL AT MAX. CROSS COUPLER METER OR SCOPE INDICATE COUPLE SIGNAL GENERATOR TO RECEIVER

1. VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND UNDER NORMAL CONDITIONS
- UNLESS OTHERWISE NOTED CAPACITORS MORE THAN 1-100MF RESISTORS ARE 1/2WATT 5% TOL
- SEE SHOWN IN HILITRELEY POSITION

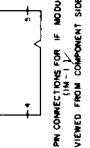
TABLE OF PINNAGES

CH1	4	1	2
1M1	1	2	3
1M2	1	2	3
1M3	1	2	3
1M4	1	2	3
AMA	1	2	3
AMA	1	2	3
AMA	1	2	3
AMA	1	2	3

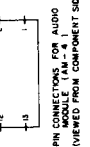
PIN CONNECTIONS FOR CONVERTER MODULE (CM-1)



PIN CONNECTIONS FOR IF MODULE (IM-1)

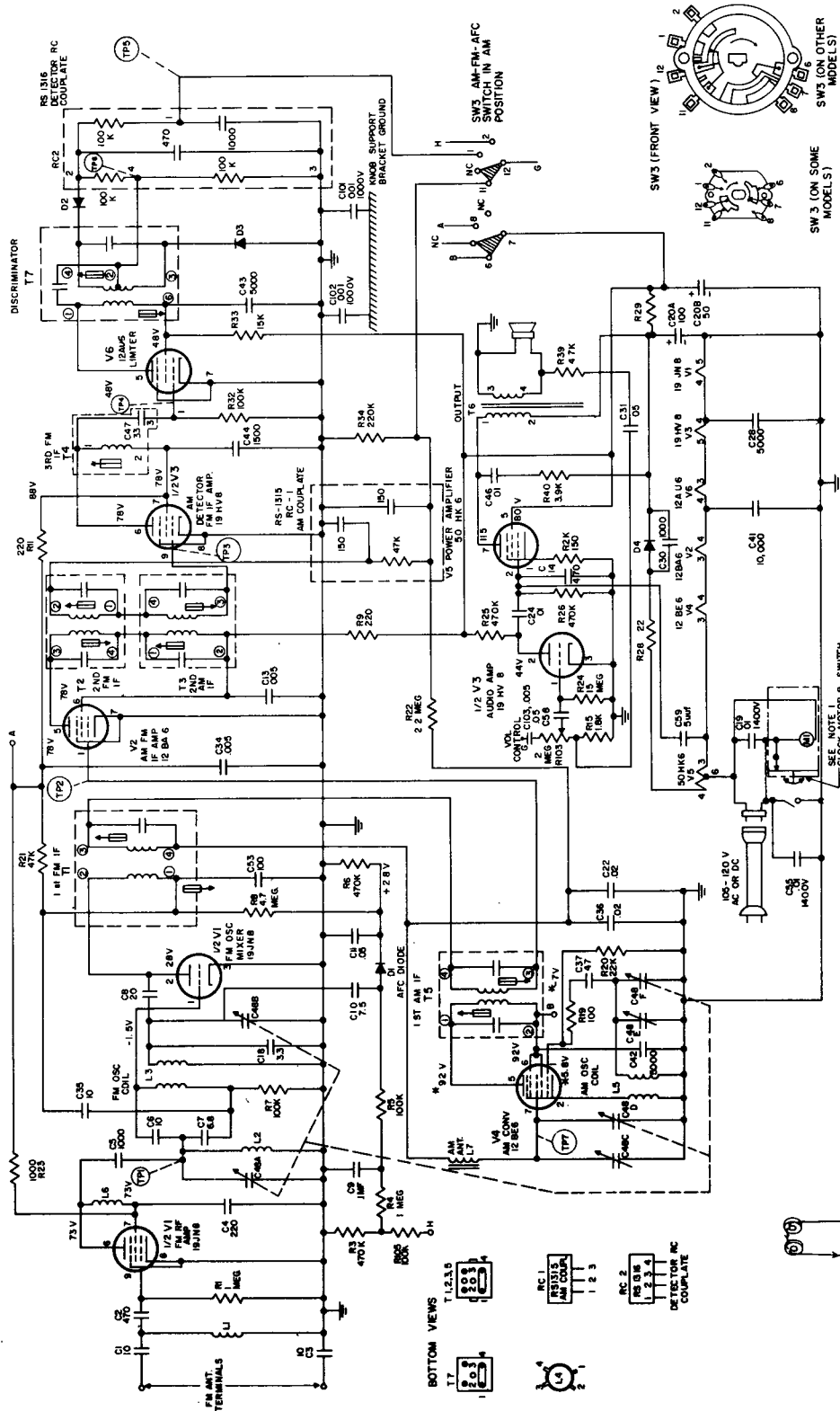


PIN CONNECTIONS FOR AUDIO MODULE (AM-1)



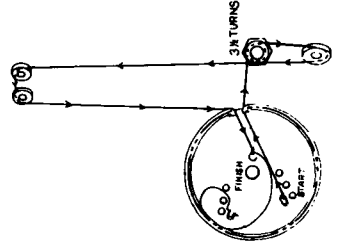
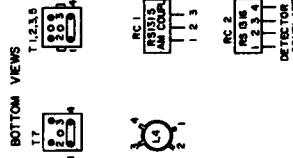
GENERAL ELECTRIC ELECTRIC

MODELS T215A, T216A, T265A, T266A, C540A and C541A



ELECTRICAL RATING: 105 - 120 Volts AC, 30 Watts
 TUNING RANGE: AM 540 - 1600 KC
 FM 88 - 108 MC
 I. F. : AM 455 KC
 FM 10.7 MC
 POWER OUTPUT: Undistorted .8 Watt
 Maximum 1.5 Watts

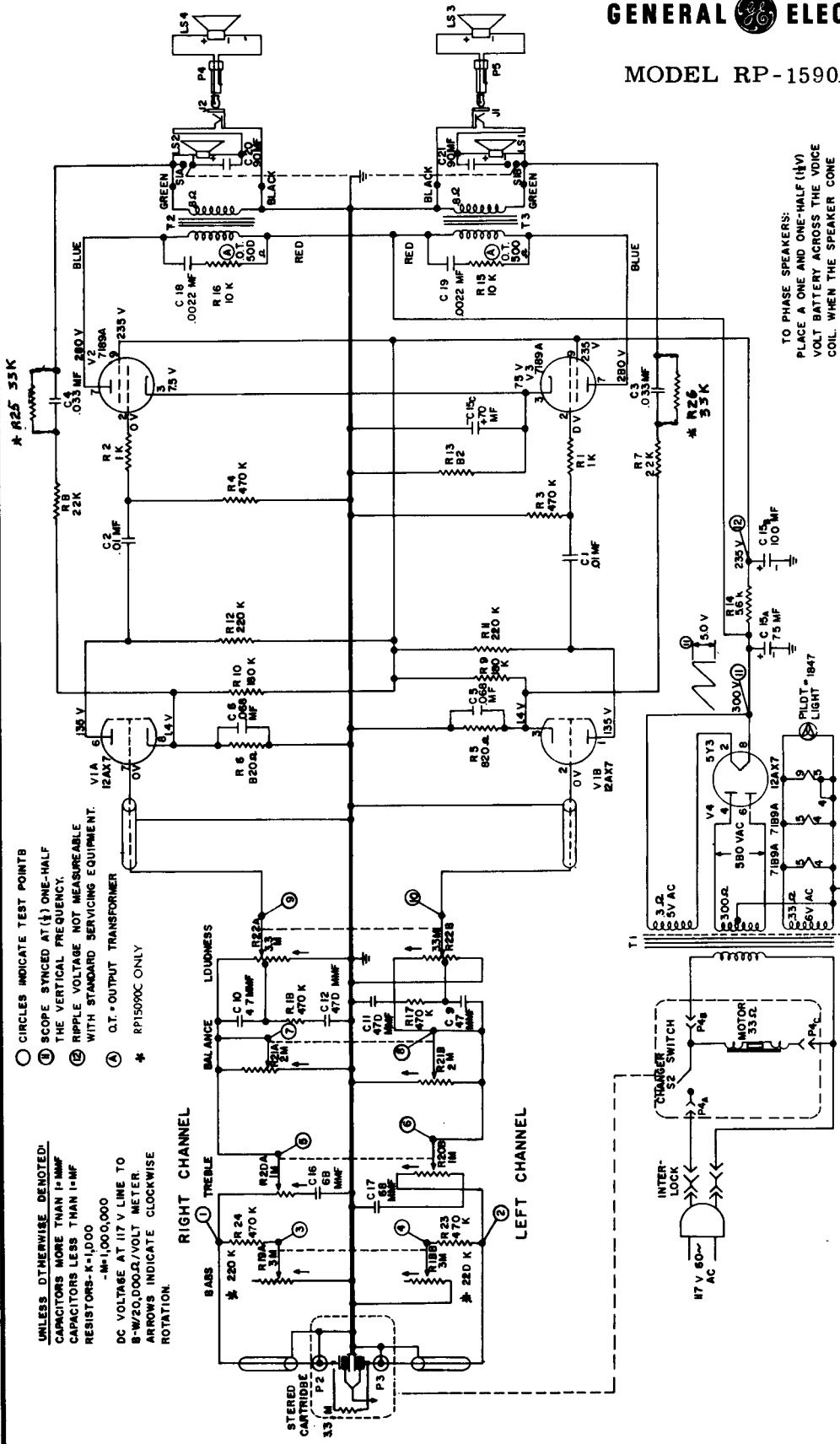
UNLESS OTHERWISE NOTED:
 K = 1000 M = 1,000,000
 CAP MORE THAN 1-MMF
 CAP LESS THAN 1-MMF
 VOLTAGE READINGS TAKEN WITH VTVM
 1. 120V AC INPUT
 2. SET IN FM POSITION
 3. TUNING CONTROL AT MIN
 4. VOLUME CONTROL SET TO 100 MC
 5. SET IN AM POSITION
 NOTE:
 1. USE ONLY ON C540A AND C541A



STRINGING DIAGRAM

GENERAL ELECTRIC

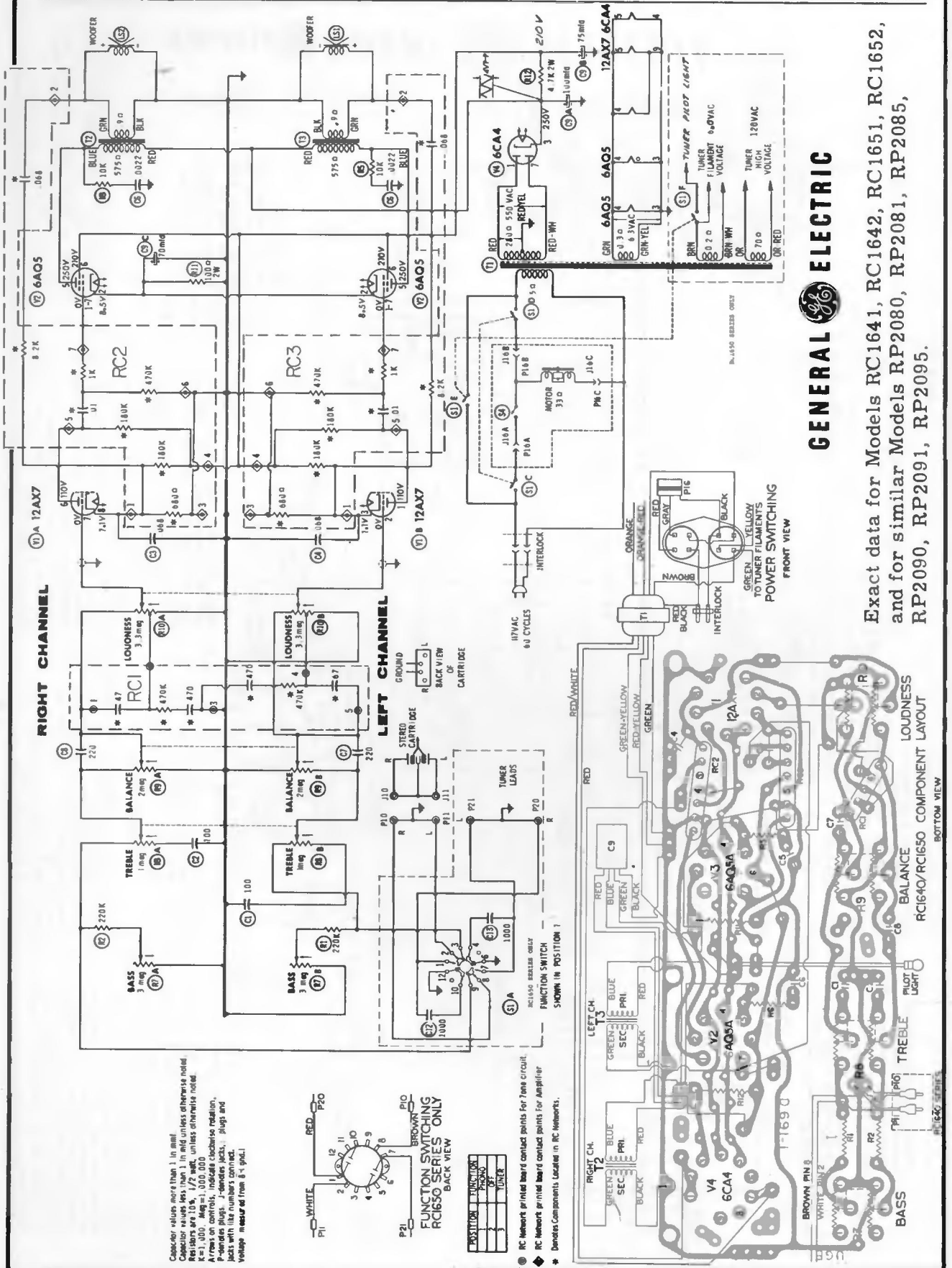
MODEL RP-1590A, C



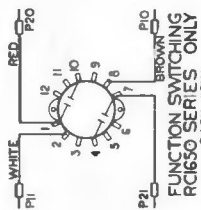
TO PHASE SPEAKERS:
PLACE A ONE AND ONE-HALF (HV)
VOLT BATTERY ACROSS THE VOICE
COIL WHEN THE SPEAKER CONE
MOVES OUT, AWAY FROM THE
MAGNET, THE POSITIVE TERMINAL
ON THE BATTERY IS THE PLUS SIDE
OF VOICE COIL AS INDICATED ON
SCHEMATIC.

- CIRCLES INDICATE TEST POINTS
 - ① SCOPE SYNCED AT (1/2) ONE-HALF THE VERTICAL FREQUENCY.
 - ② RIPPLE VOLTAGE NOT MEASURABLE WITH STANDARD SERVICING EQUIPMENT.
 - ④ D.T. OUTPUT TRANSFORMER
 - * RP1590C ONLY
- UNLESS OTHERWISE DENOTED:
CAPACITORS MORE THAN 1 μMF
CAPACITORS LESS THAN 1 μMF
RESISTORS - K=1,000
-M=1,000,000
DC VOLTAGE AT 117 V LINE TO
8-M/20,000Ω/VOLT METER.
ARROWS INDICATE CLOCKWISE
ROTATION.

5. Remove the three screws located at both ends and front center of the control panel mounting board and remove the board.
6. Remove the two 5/16 inch nuts holding the control panel to the mounting board.
7. Unsolder the four (4) leads on the expanded stereo switch.
8. Remove the screws holding the lead dresser and electrolytic.
9. Remove the three 5/16 inch nuts holding the amplifier chassis.
10. Remove the two 5/16 inch nuts holding the left and right channel output jacks at the rear of the compartment.
- TO REMOVE RECORD CHANGER
1. Remove the three screws on the tube replacement cover and remove the cover.
 2. Remove the two screws on the metal amplifier cover and remove the cover by pulling up on the tab provided on the back side and lift the cover out.
 3. Reach under the motor board and flip the right side shipping screw clip to a vertical position. Lift the right side of the changer to clear the shipping screw clip and slip the left shipping screw through the slotted hole in the motor board to clear the changer. Rest the changer on its back edge in the compartment.
- TO REMOVE CHASSIS
1. Follow steps 1 through 5 as described in "To Remove Record Changer."
 2. Remove the control knobs. (pull up).
 3. Remove the three screws on the control panel escutcheon and remove the escutcheon.
 4. Remove the screw on the perforated back cover and remove the cover.



Capacitor values more than 1 in millifarads are less than 1 in microfarads unless otherwise noted. Resistor values less than 1 in kilohms are 10%, 1/2 watt, unless otherwise noted. A = 1, 100, 1000. Meg = 1,000,000. Arrows on controls indicate clockwise rotation. P = pin on plug. J = stereo jacks. Plugs and jacks with letter numbers connect. Voltage = measure at from 0 to 100V.

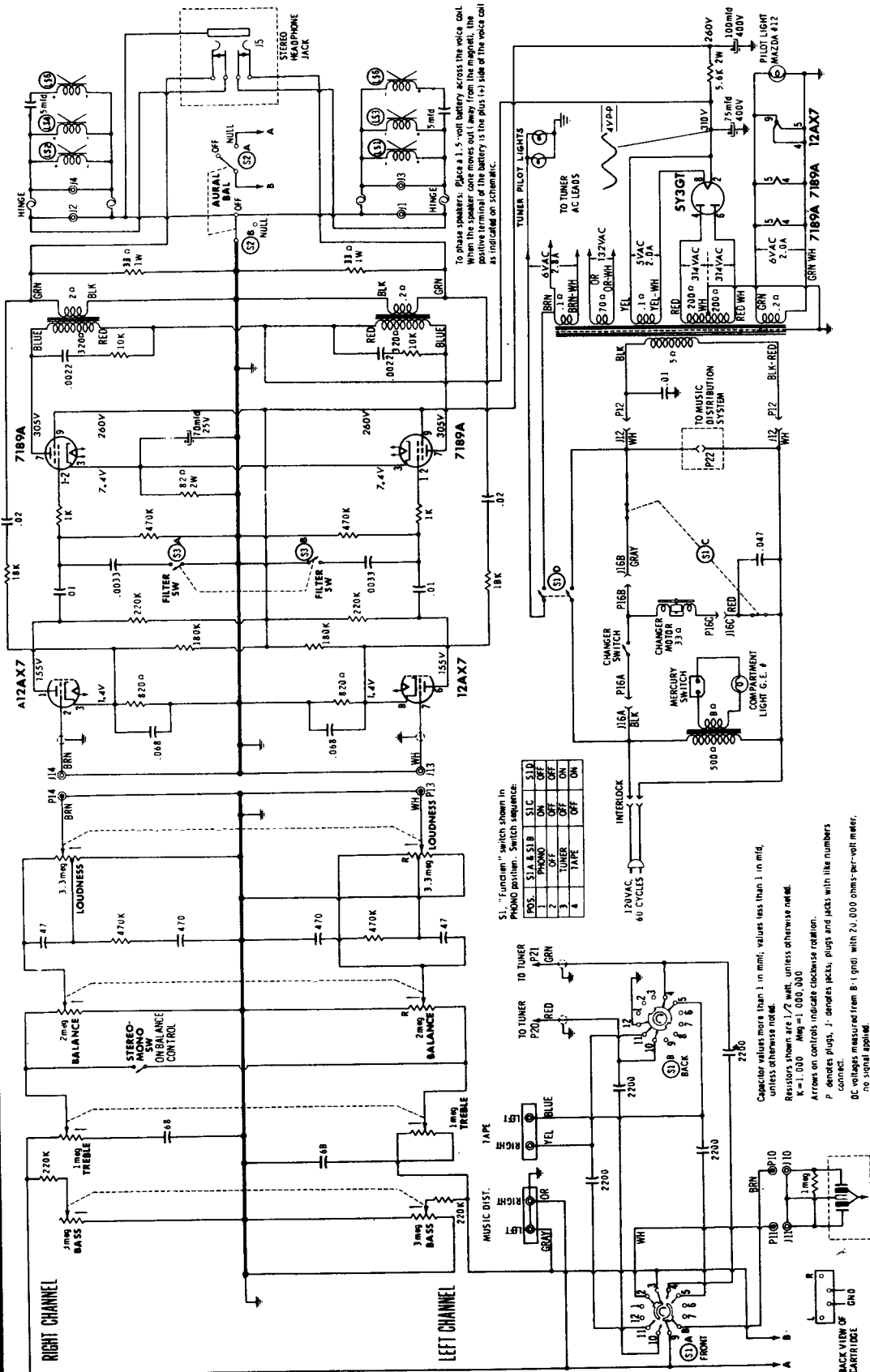


POSITION	FUNCTION
1	TUNER
2	TUNER
3	TUNER

- RC Network printed board contact points for Tone circuit.
- ◆ RC Network printed board contact points for Amplifier.
- * Denotes Components Located in RC Networks.

GENERAL ELECTRIC

Exact data for Models RC1641, RC1642, RC1651, RC1652, and for similar Models RP2080, RP2081, RP2085, RP2090, RP2091, RP2095.



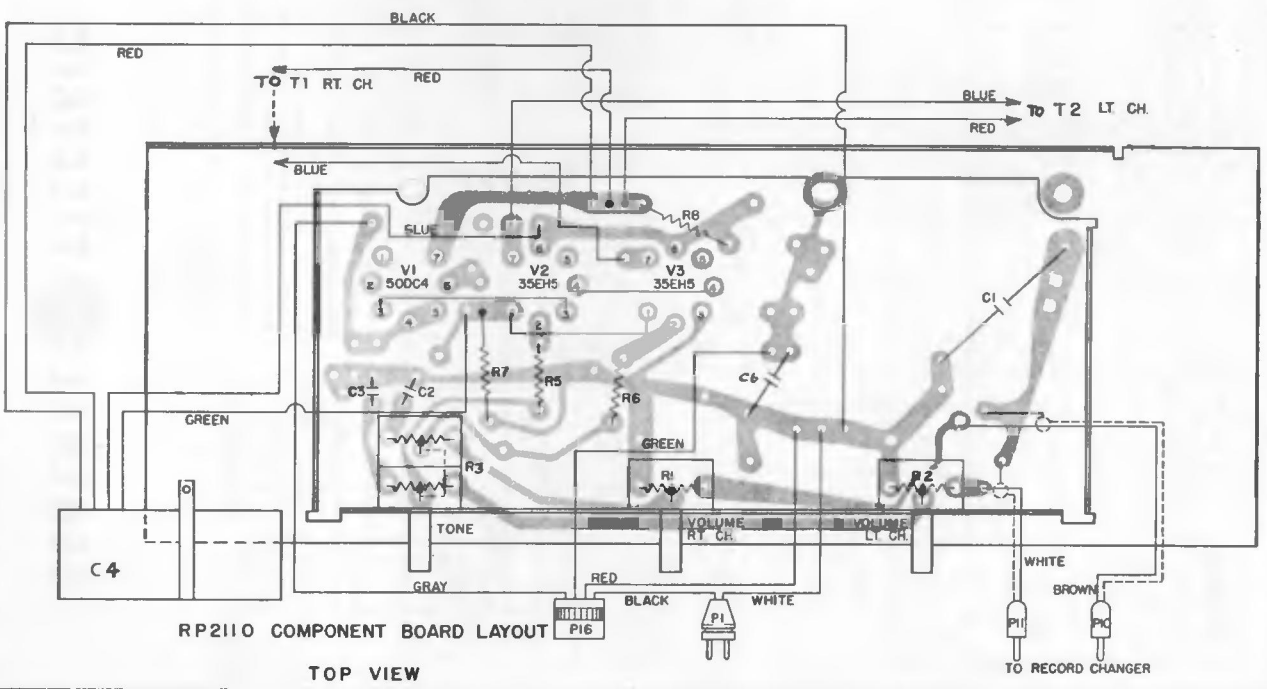
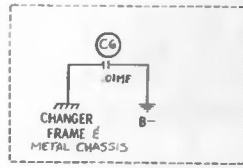
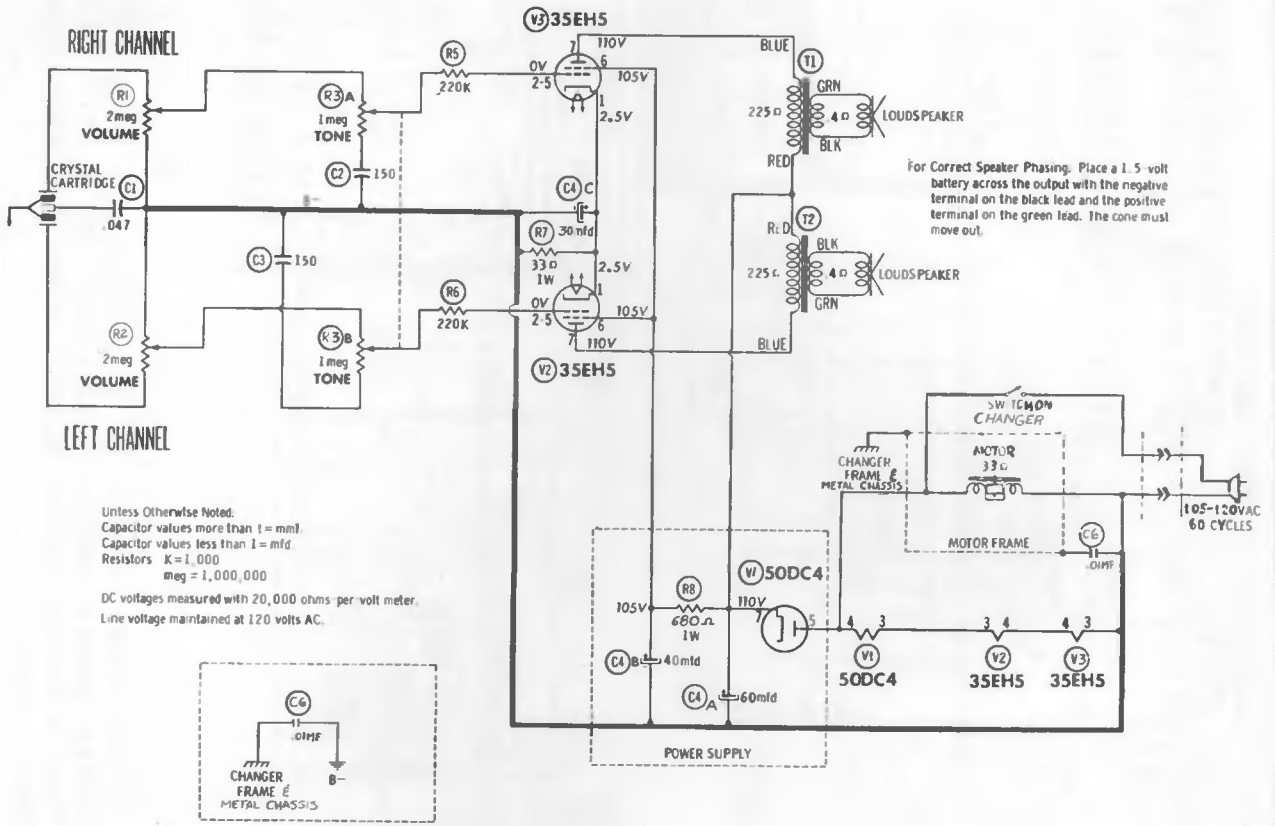
RC1660 Series, Models RC1661, RC1662, RC1663, RC1664;
 RC1670 Series, Models RC1671, RC1672, RC1673, RC1674;
 RC4670 Series, Models RC4671, RC4672, RC4675, RC4679.



GENERAL ELECTRIC



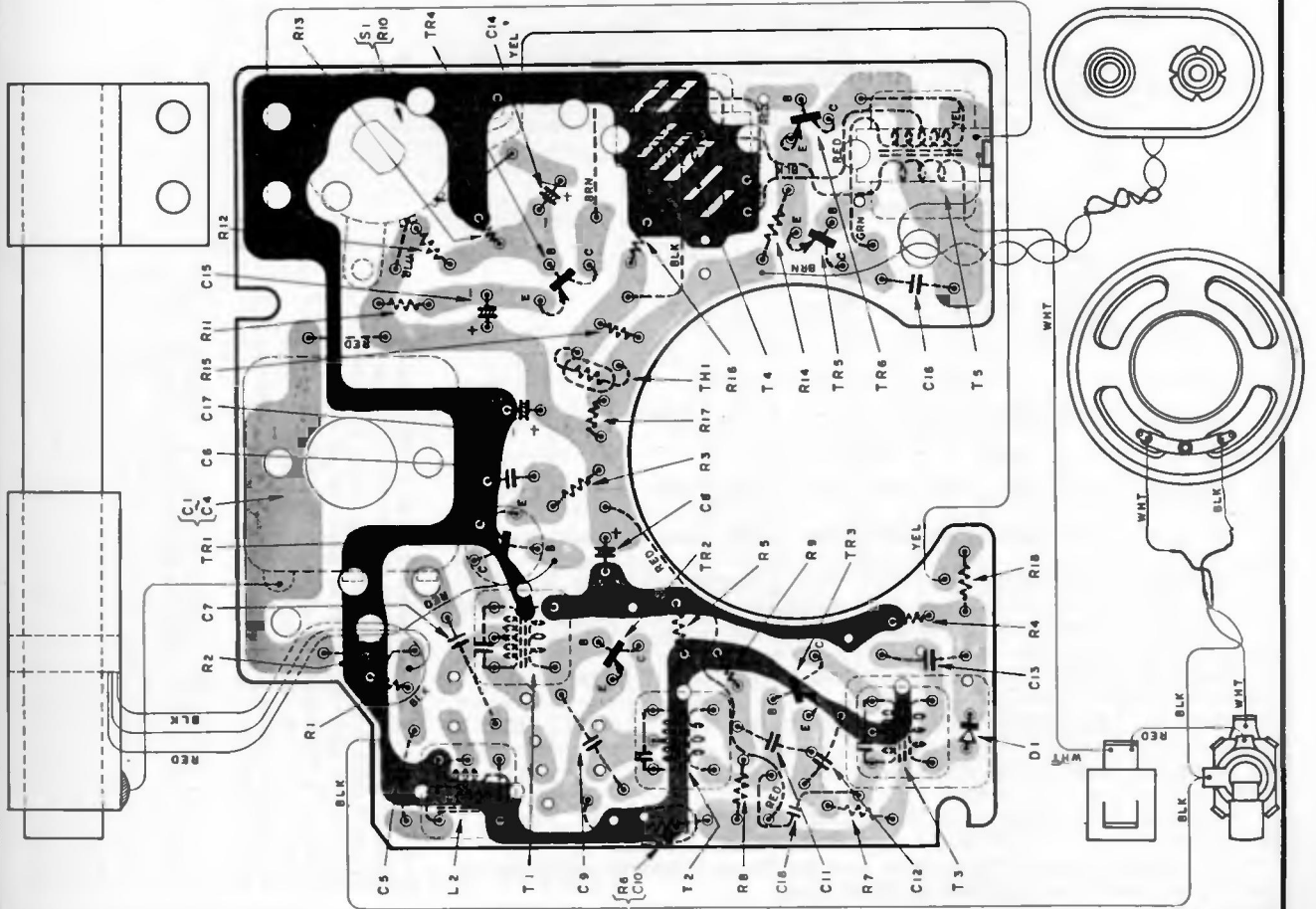
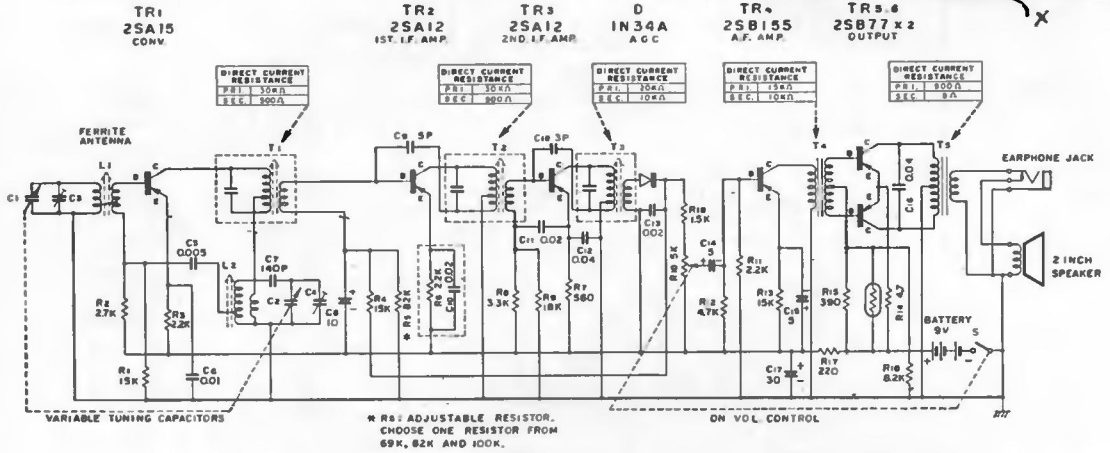
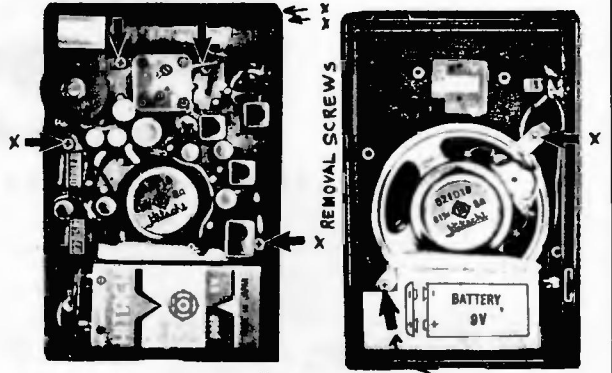
RP2130 Series, Models RP2131A, RP2138A,
 RP2110 Series, Models RP2111 & RP2113,
 Models of the RP1530 Series are very similar.



Hitachi, Ltd.

MODEL TH-650

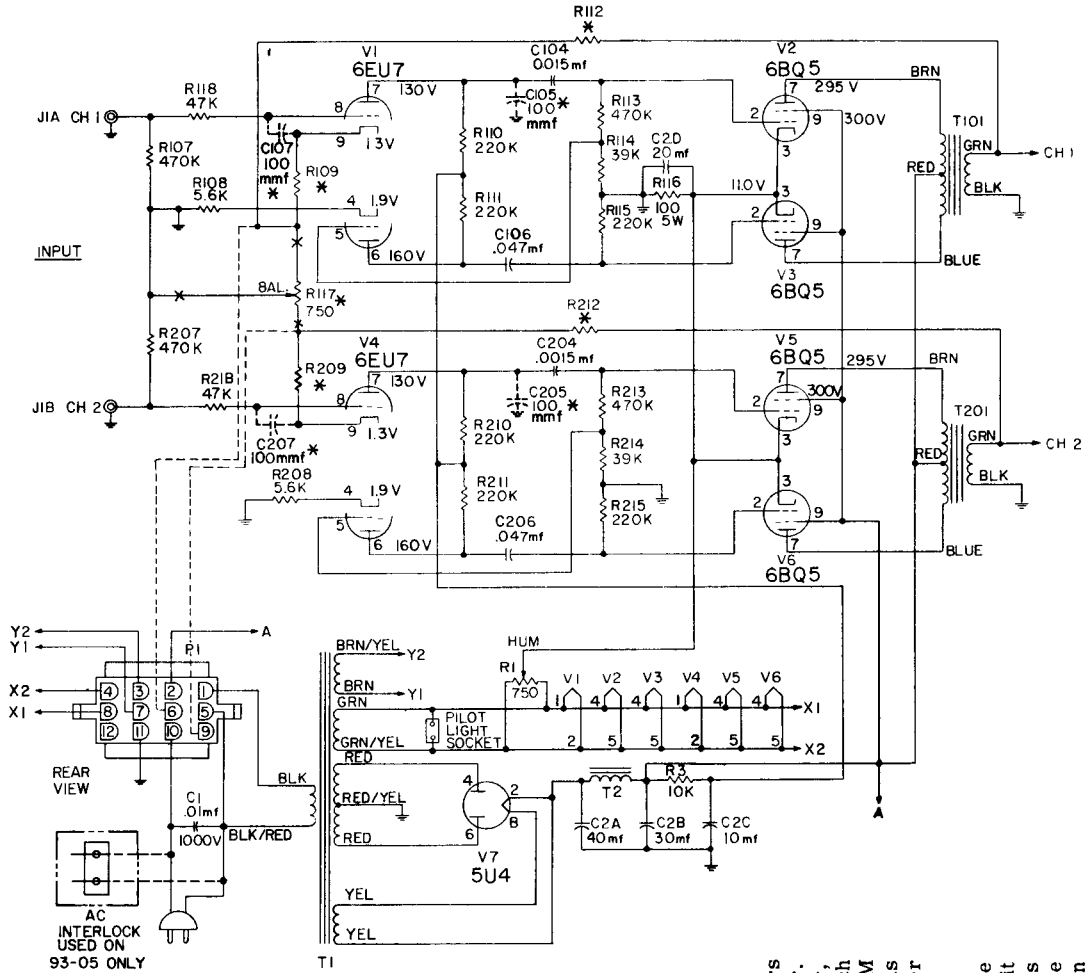
CIRCUIT SYSTEM 6-transistor superheterodyne
 TUNING RANGE 535 kc~1,605 kc
 INTERMEDIATE FREQUENCY 455 kc



Magnavox

93 SERIES AMPLIFIER CHASSIS

(93-01, 93-02, 93-03, 93-04, & 93-05)



CHASSIS	R109	R209	R112	R212	R117	C105	C205	C107	C207
93-01-00	4700	4700	2200	2200	USE	USE	USE	OMIT	OMIT
93-02-00	2200	2200	3900	3900	USE	USE	USE	OMIT	OMIT
93-02-10	2200	2200	3900	3900	USE	OMIT	OMIT	USE	USE
93-03-00	4700	4700	2200	2200	OMIT	USE	USE	OMIT	OMIT
93-03-10	4700	4700	2200	2200	OMIT	OMIT	OMIT	USE	USE
93-04-00	2200	2200	3900	3900	OMIT	USE	USE	OMIT	OMIT
93-04-10	2200	2200	3900	3900	OMIT	OMIT	OMIT	USE	USE
93-05-00	4700	4700	2200	2200	OMIT	OMIT	OMIT	USE	USE

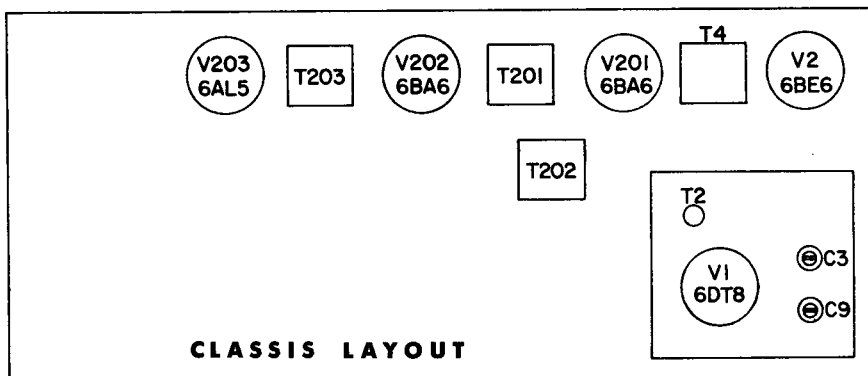
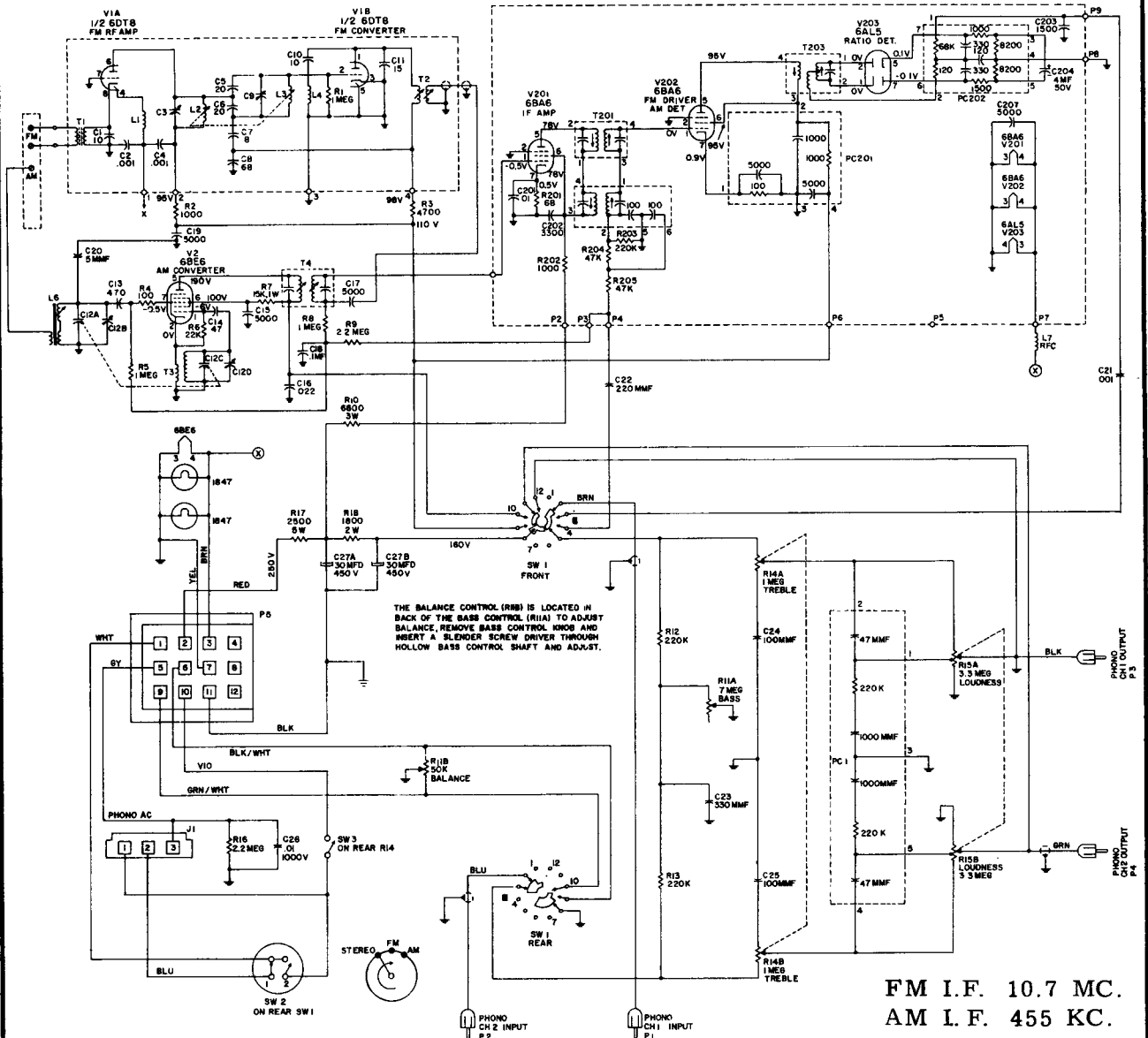
* When Balance Control (R117) is not used the Power Connector will have two additional connections as shown in dotted lines.

The 93 Series Amplifiers are Stereo Amplifiers designed to work in conjunction with an AM-FM Tuner. These chassis contain seven tubes, including rectifier, and provide approximately 15 watts output for each channel. All voltages, including those for the AM-FM Tuner are obtained from these amplifiers. This necessitates using a 5U4 as a rectifier and a heavier power transformer than is normally used.

The 93-01 and 93-02 Amplifiers contain a "Balance Control". This control is located in the cathode circuit of (1/2) of the 6EU7 used as the Audio Amplifier. This control will vary the output of each channel to assure proper balance when reproducing stereo records. On all others this control has been eliminated since these amplifiers are used with AM-FM Tuners which have the Balance Control as part of the tuner.

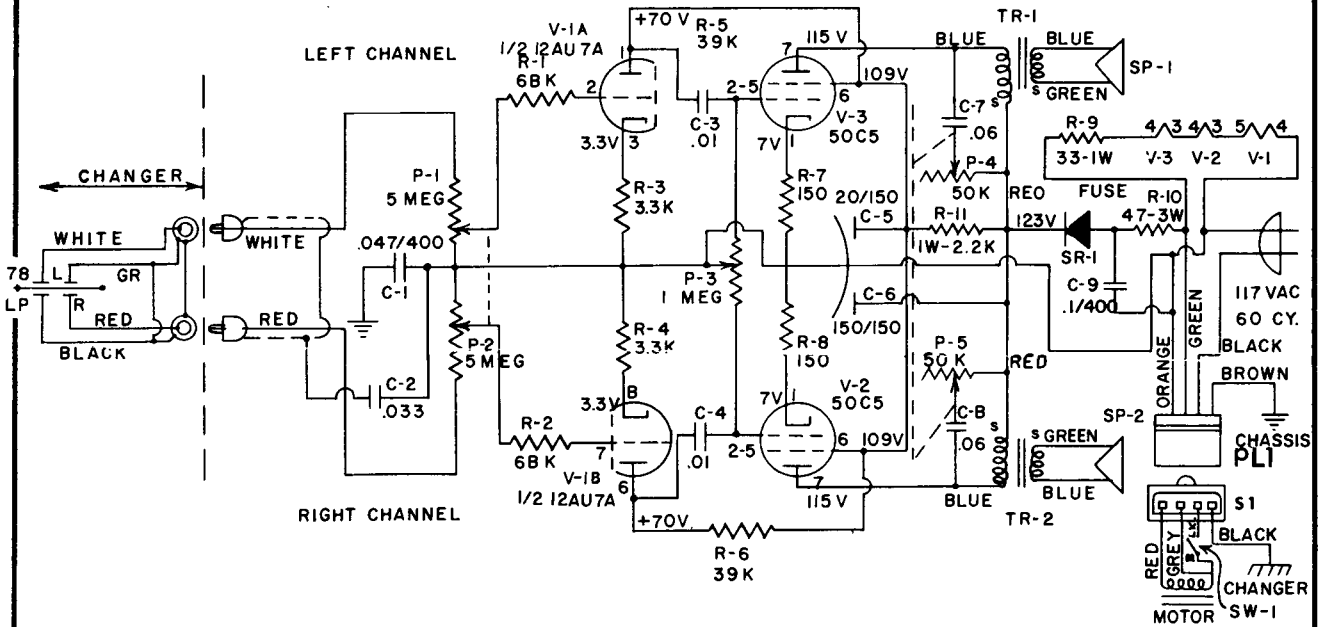
Magnavox

(59-11, & 59-14 & 59-27)

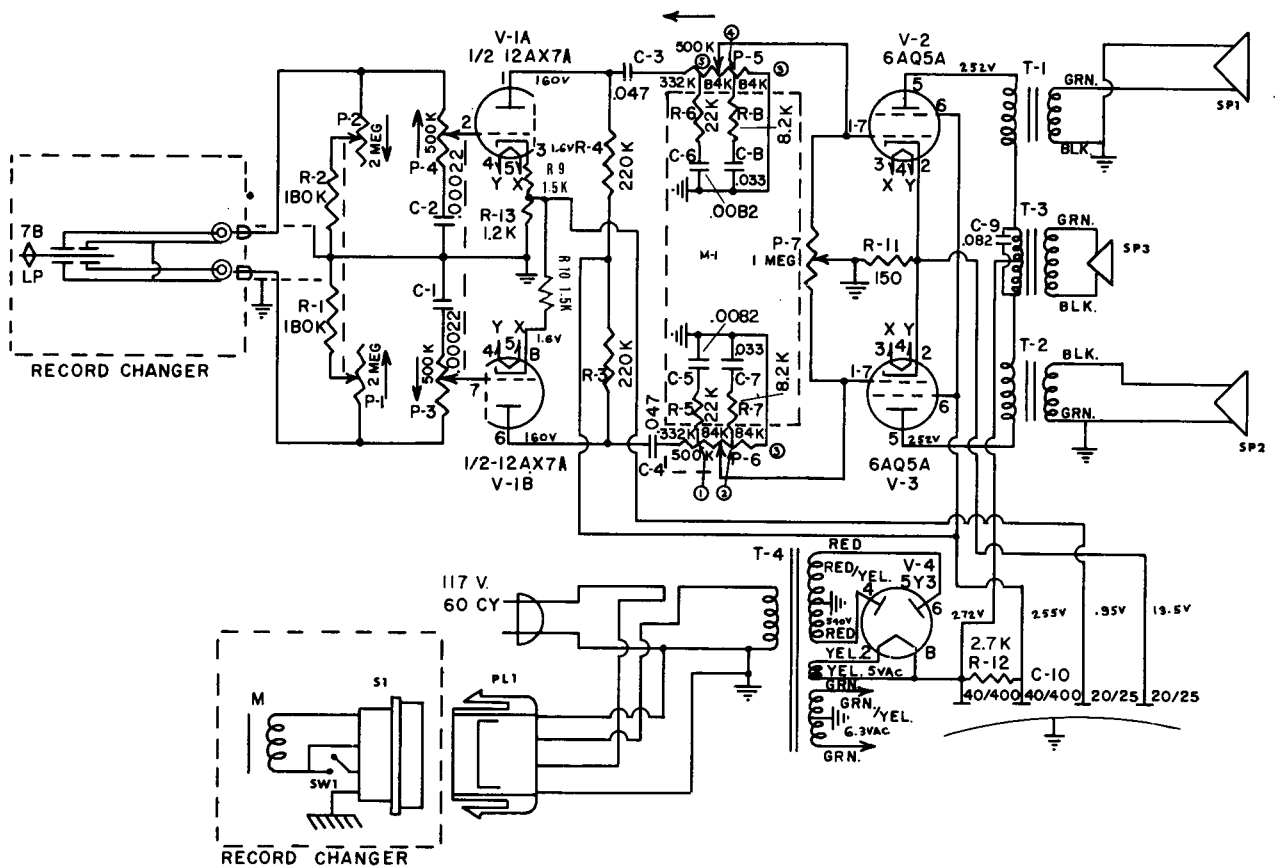


MONTGOMERY WARD

MODELS JWR-953A and JWR-1033B



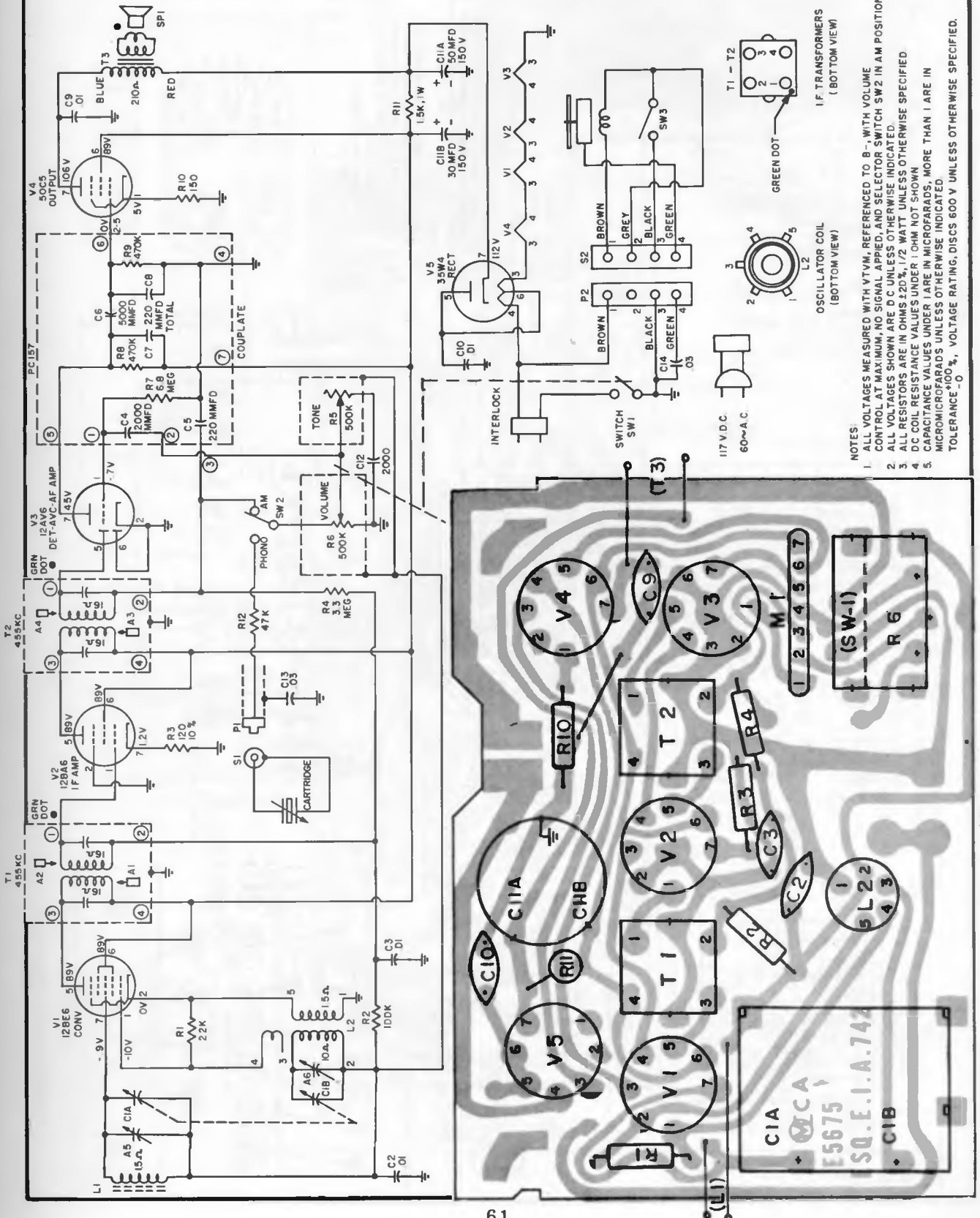
MONTGOMERY WARD Models JWR-956A and JWR-1035B



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

MONTGOMERY WARD

Model GEN-951A exact material. Model GEN-769A same less tone control.
Models GEN-1730A, GEN-1731A, are also the same but less phono circuit.



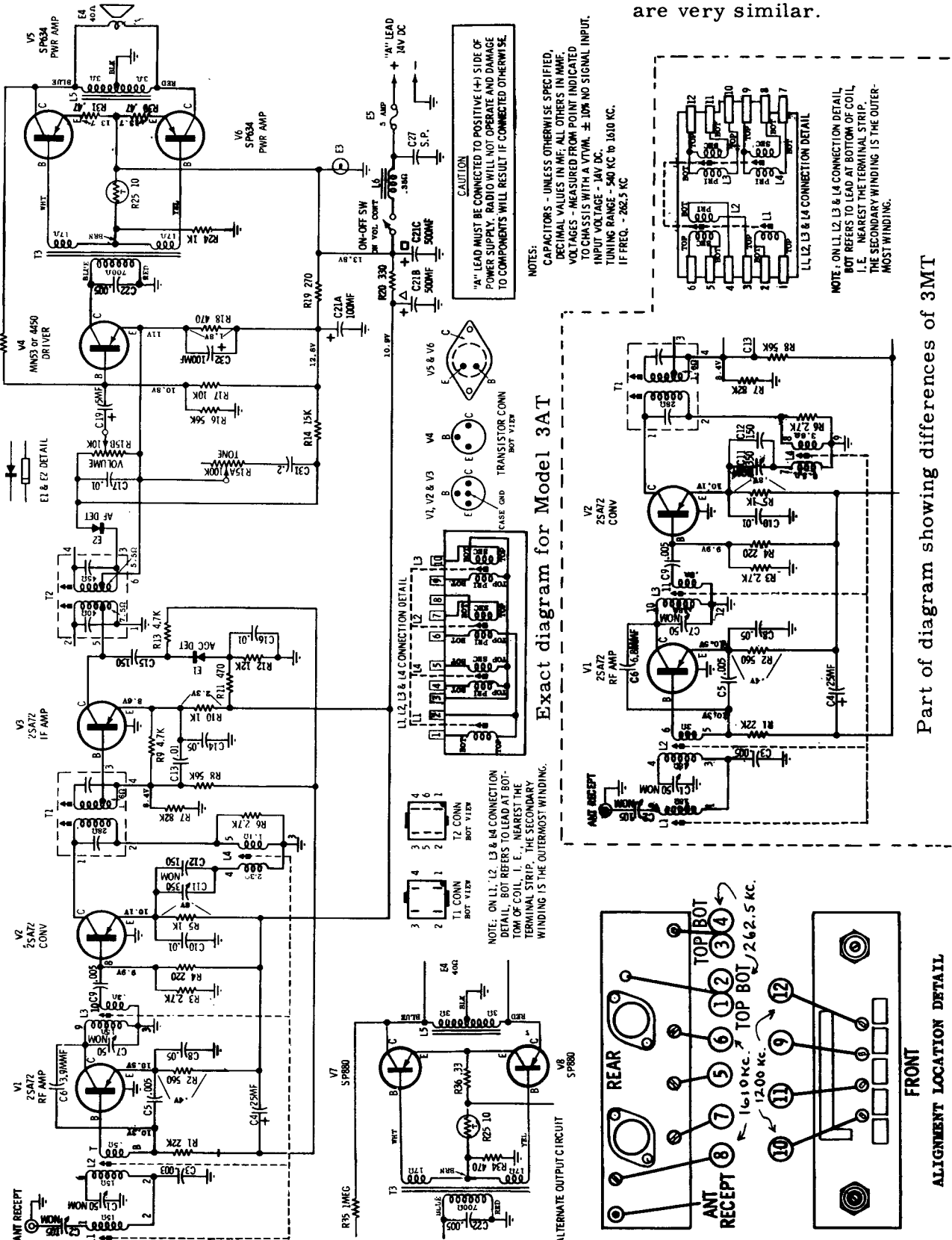
- NOTES:
1. ALL VOLTAGES MEASURED WITH VTVM, REFERENCED TO B-, WITH VOLUME CONTROL AT MAXIMUM, NO SIGNAL APPLIED, AND SELECTOR SWITCH SW2 IN AM POSITION
 2. ALL VOLTAGES SHOWN ARE D.C. UNLESS OTHERWISE INDICATED.
 3. ALL RESISTORS ARE IN OHMS $\pm 20\%$, $1/2$ WATT UNLESS OTHERWISE SPECIFIED
 4. D.C. COIL RESISTANCE VALUES UNDER 1 OHM NOT SHOWN
 5. CAPACITANCE VALUES UNDER 1 ARE IN MICROFARADS, MORE THAN 1 ARE IN MICROMICROFARADS UNLESS OTHERWISE INDICATED
- TOLERANCE $\pm 100\%$, VOLTAGE RATING: DISCS 600 V UNLESS OTHERWISE SPECIFIED.

Bottom View

MOTOROLA

Models 3AT and 3MT (Continued on the next page)

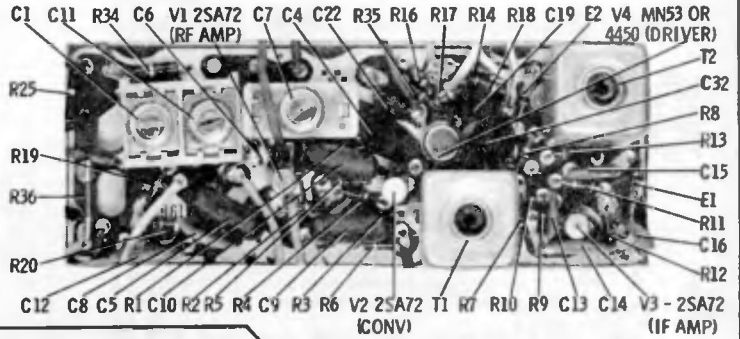
Models BKA63, CTA63, CTM63, and PCA63, are very similar.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

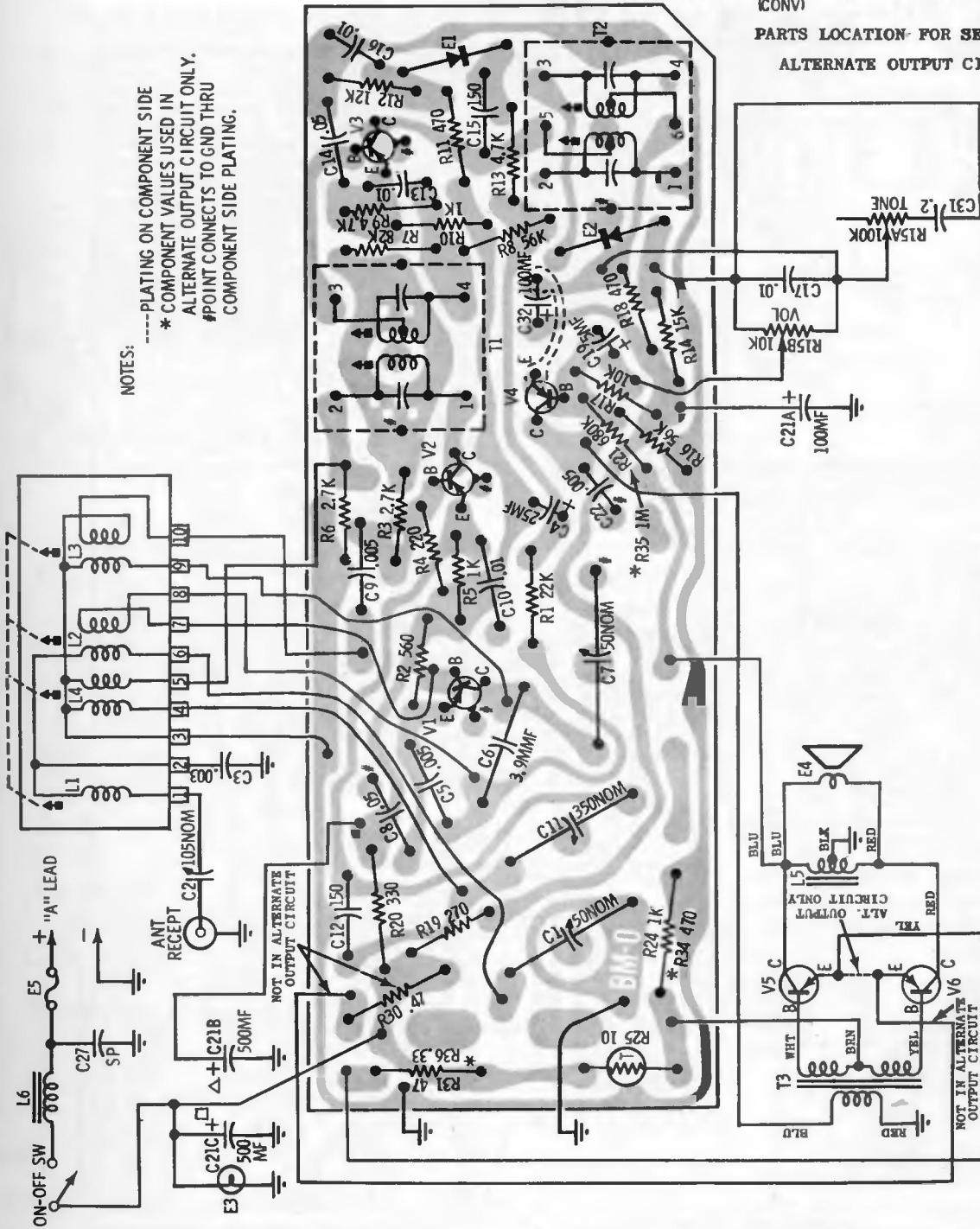
MOTOROLA Model 3AT

Continued from preceding page, at left, other models listed on that page are very similar.



PARTS LOCATION FOR SETS USING ALTERNATE OUTPUT CIRCUIT

NOTES:
 ----PLATING ON COMPONENT SIDE
 * COMPONENT VALUES USED IN ALTERNATE OUTPUT CIRCUIT ONLY.
 # POINT CONNECTS TO GND THRU COMPONENT SIDE PLATING.



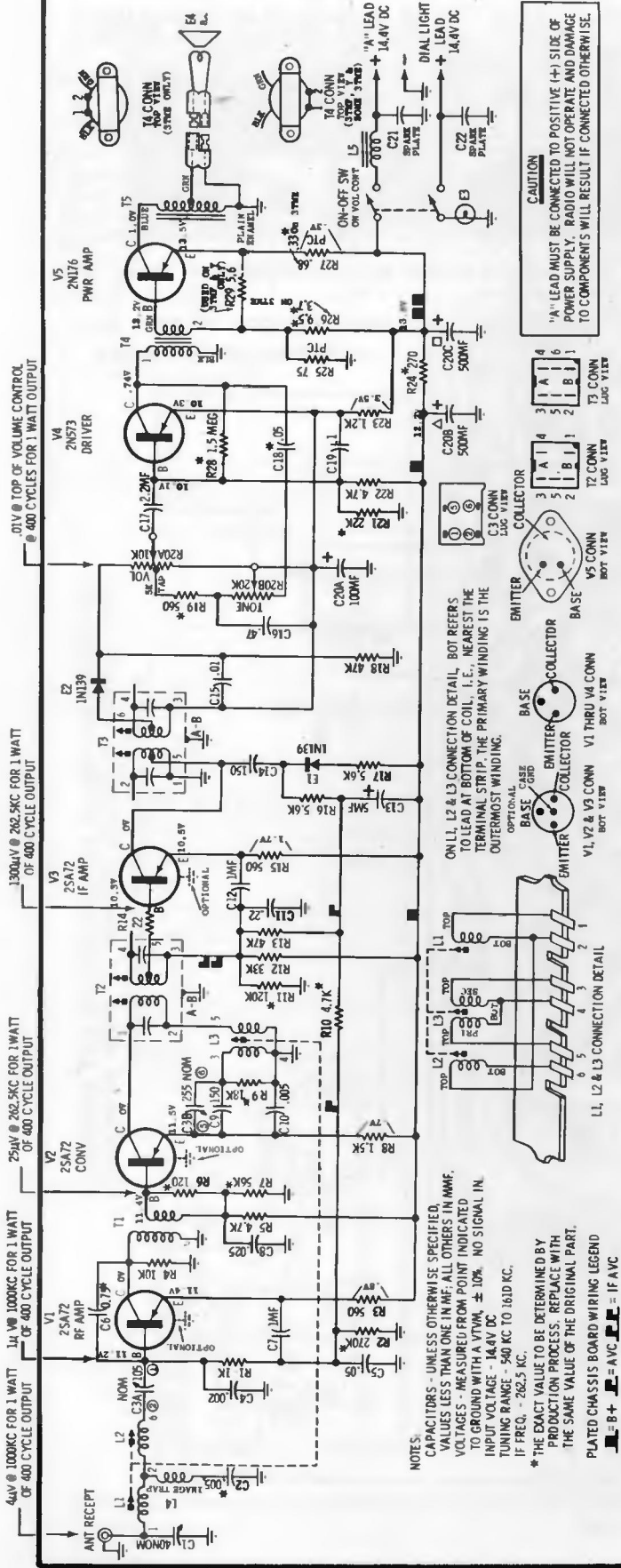
PLATED CHASSIS BOARD WIRING DIAGRAM
 COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE -
 COMPONENT SIDE PLATING CONTAINS GROUND CONNECTIONS ONLY

MOTOROLA

MOTOROLA FORD
 3TME.....C3GA-18806
 3TMF.....C3AA-18806
 3TMY.....C3YA-18806

(Service material continued on the next page at right)

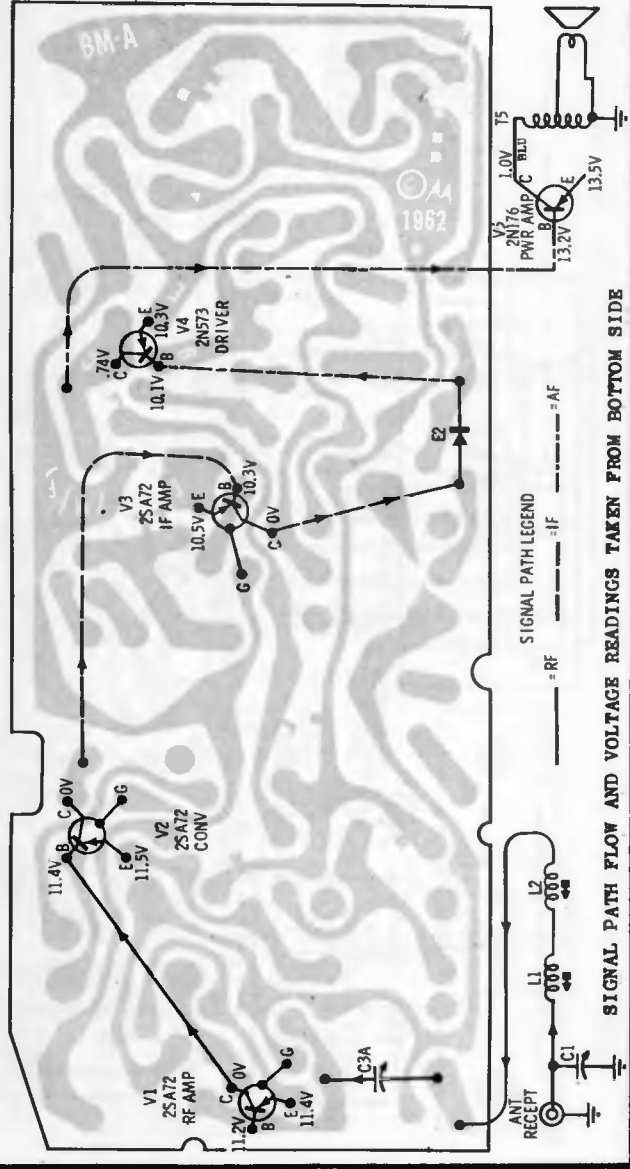
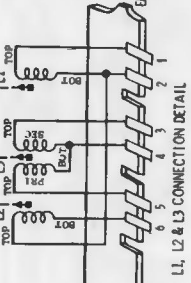
PLATED CHASSIS BOARD DESCRIPTION - Motorola's PLAcir chassis has plating on both sides of the chassis board. The exposed side contains the actual circuit connections while the plating on the component side of the chassis board provides a convenient chassis B-return for components and circuit wiring. Plating on the component side also provides shielding between the top and bottom of the unit,



CAUTION
 "A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

ON L1, L2 & L3 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I.E., NEAREST THE TERMINAL STRIP. THE PRIMARY WINDING IS THE OUTERMOST WINDING.

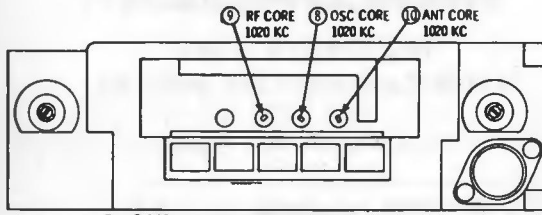
NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF, ALL OTHERS IN MMF. VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, ± 10%, NO SIGNAL IN. INPUT VOLTAGE - 14.4V DC. TUNING RANGE - 540 KC TO 1610 KC, IF FREQ. - 262.5 KC.
 * THE EXACT VALUE TO BE DETERMINED BY PRODUCTION PROCESS. REPLACE WITH THE SAME VALUE OF THE ORIGINAL PART.
 PLATED CHASSIS BOARD WIRING LEGEND
 ■ = B+ ■ = AVC ■ = AF



SIGNAL PATH LEGEND
 - - - - - = AF
 - - - - - = IF

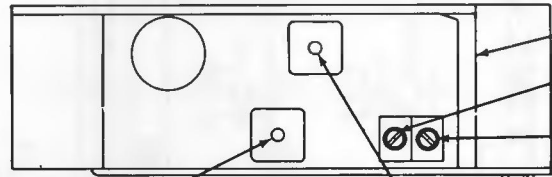
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

MOTOROLA 3TME, 3TMF, 3TMY, Continued from preceding page, at left

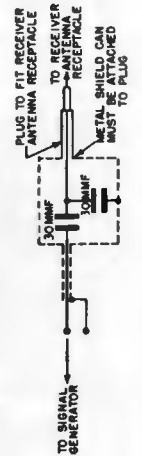
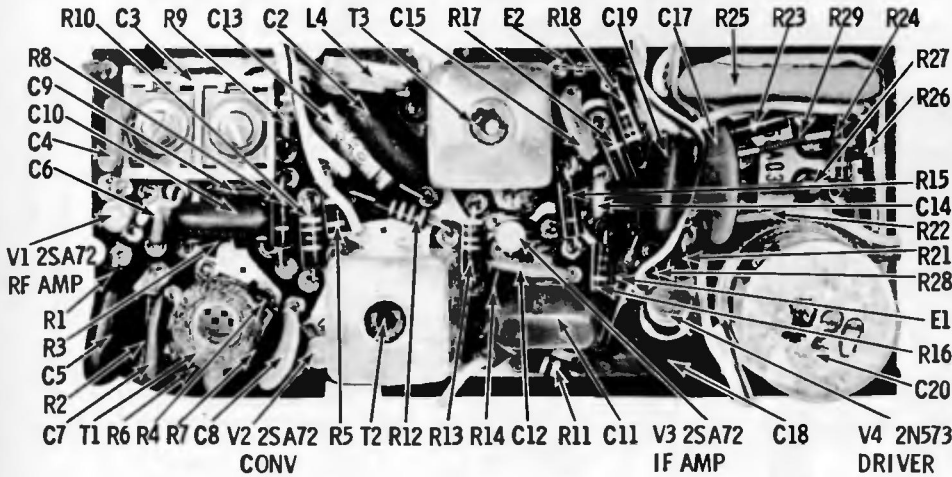


TUNER CORE ADJ SHOWN FROM FRONT OF RADIO

ALIGNMENT POINTS LOCATION DETAIL



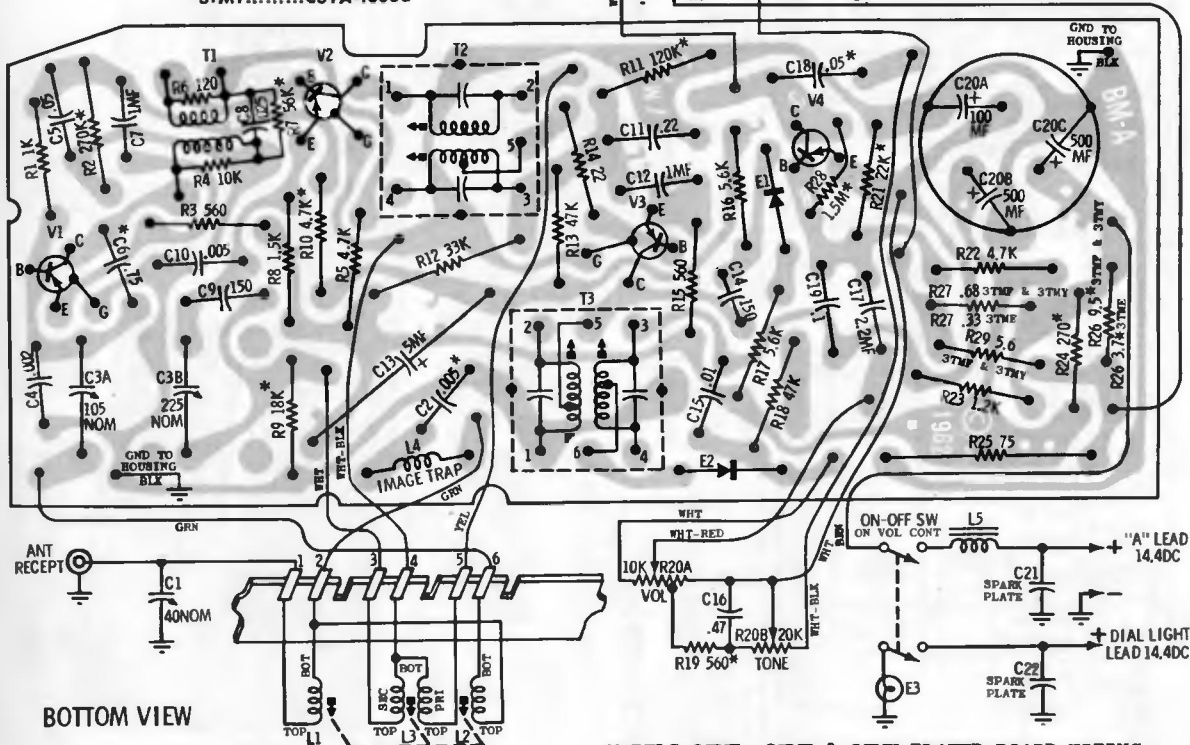
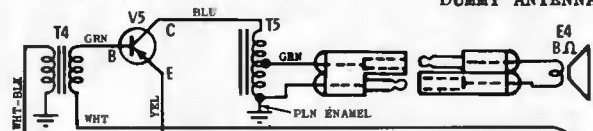
2ND IF TOP ② 262.5 KC BOT ① IF'S & TRIMMERS SHOWN FROM REAR OF RADIO ③ 1ST IF TOP 262.5 KC



DUMMY ANTENNA

MODELS 3TME, 3TMF & 3TMY PARTS LOCATION

MOTOROLA	FORD
3TME.....	C3GA-18806
3TMF.....	C3AA-18806
3TMY.....	C3YA-18806



BOTTOM VIEW

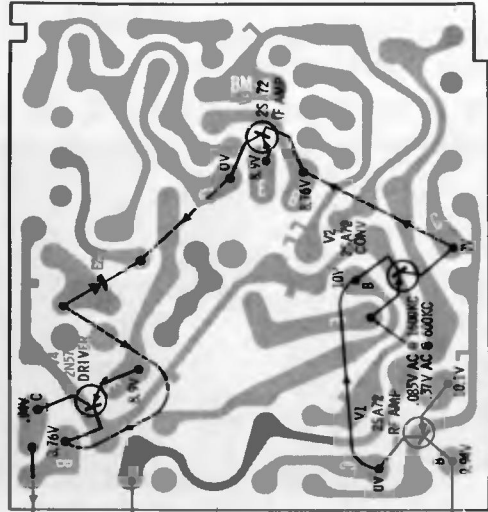
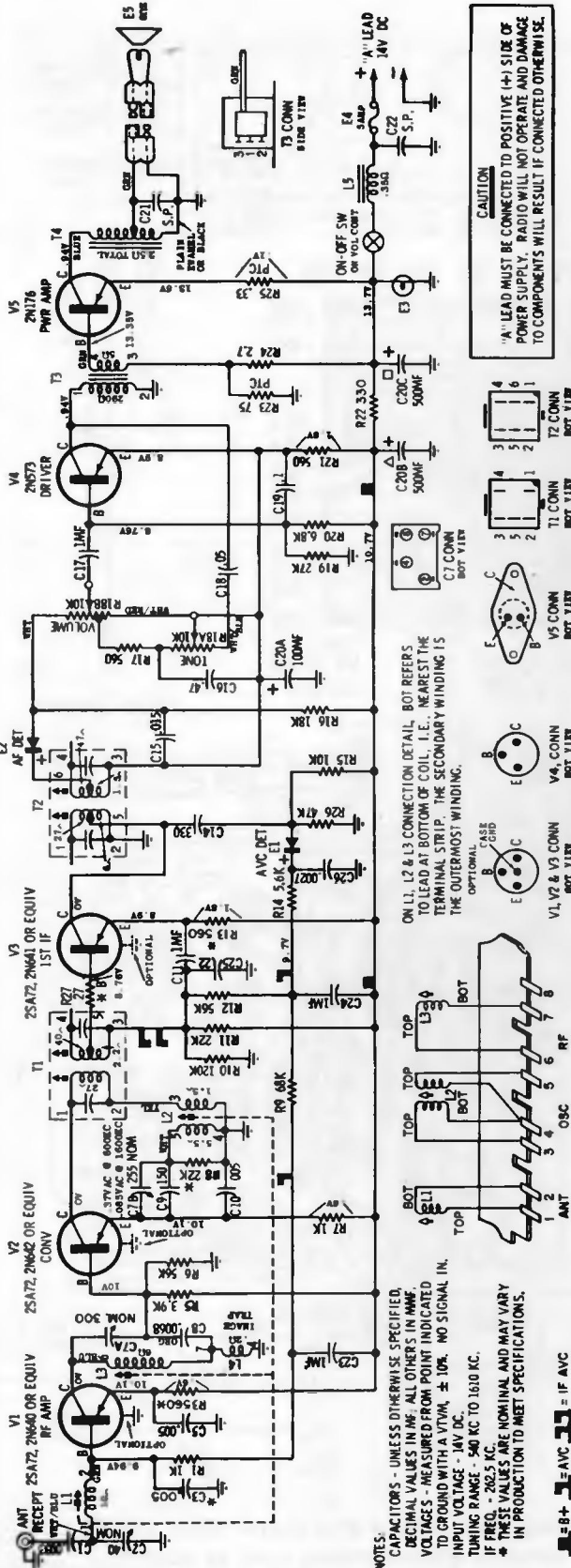
MODELS 3TME, 3TMF & 3TMY PLATED BOARD WIRING

COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE-COMPONENT SIDE OF PLATING CONTAINS GROUND CONNECTIONS ONLY-SEE PLATED CHASSIS BOARD DESCRIPTION

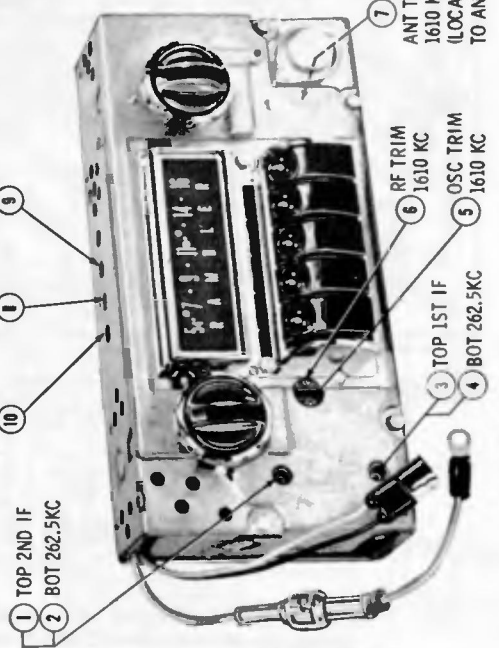
MOTOROLA

MOTOROLA 3TMR AMERICAN MOTORS 8991142

(Continued on the next page at right)



NOTE: SIGNAL PATH FLOW AND VOLTAGE READINGS TAKEN FROM BOTTOM SIDE OF CHASSIS
 SIGNAL PATH LEGEND
 - = RF - = IF - = AUDIO



MOTOROLA

MOTOROLA 3TMR AMERICAN MOTORS 8991142

(Continued from preceding page, at left)

retaining brackets and locked in position with the chassis board locking spring. Re-solder ground lead.

TRANSISTOR REPLACEMENT - When replacing a transistor (other than the power transistor), grasp the transistor leads (between transistor body and plated chassis board) with a pair of long nose pliers to prevent excessive heating of transistor body during soldering operation.

TO SET PUSHBUTTONS

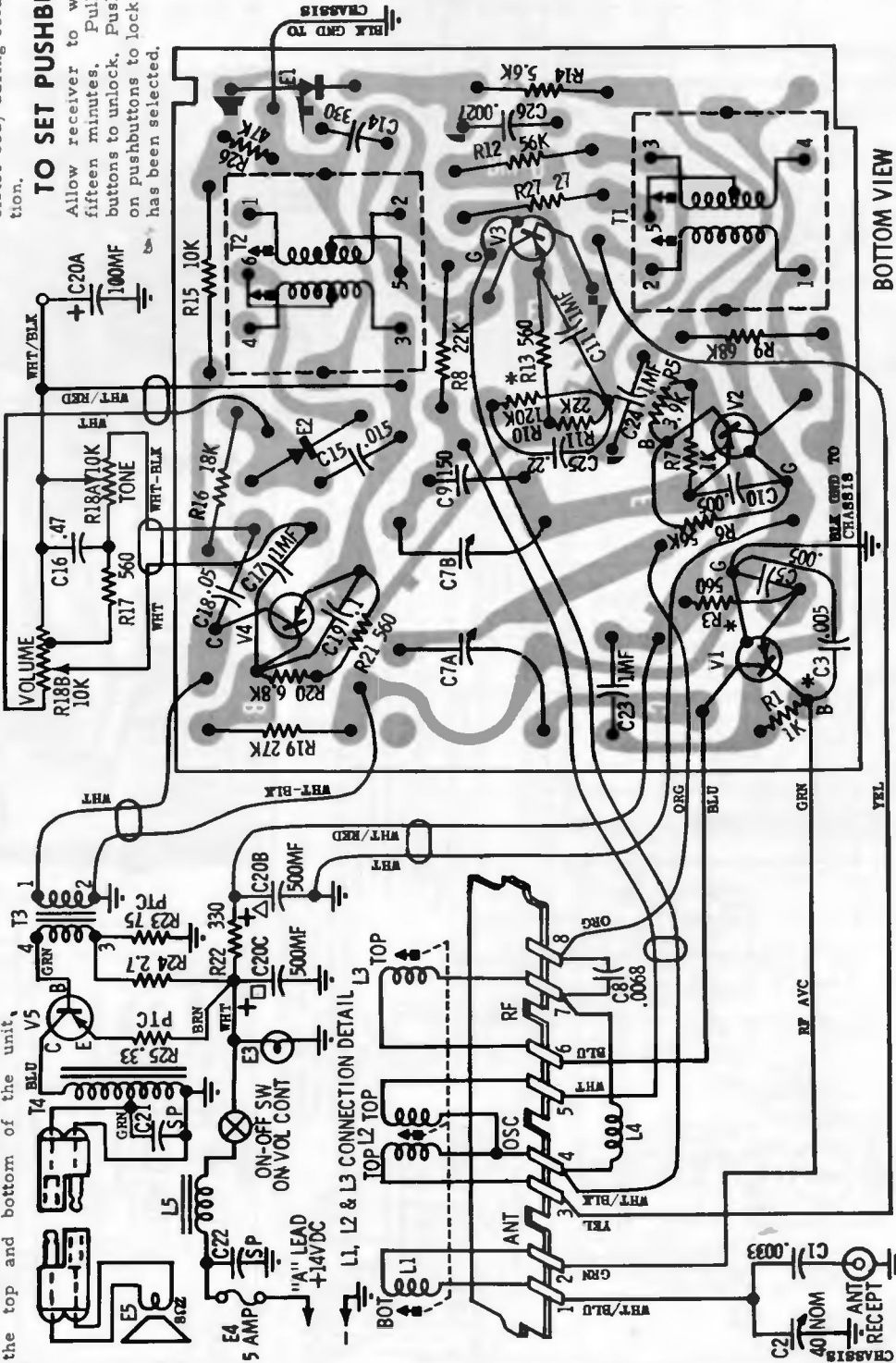
Allow receiver to warm up for fifteen minutes. Pull up on push buttons to unlock. Push down firmly on pushbuttons to lock after station has been selected.

wire from chassis housing. Release the chassis board locking spring and carefully lift chassis board out of housing. Position the chassis board vertically with respect to radio housing for servicing.

After servicing is performed, re-install plated chassis board. Make certain chassis board is properly placed in the grooves of the chassis

All B- connections are carried through the placir chassis in multiple paths to the B- side. This insures a good low resistance return path. Two separate and independent paths are provided to ground.

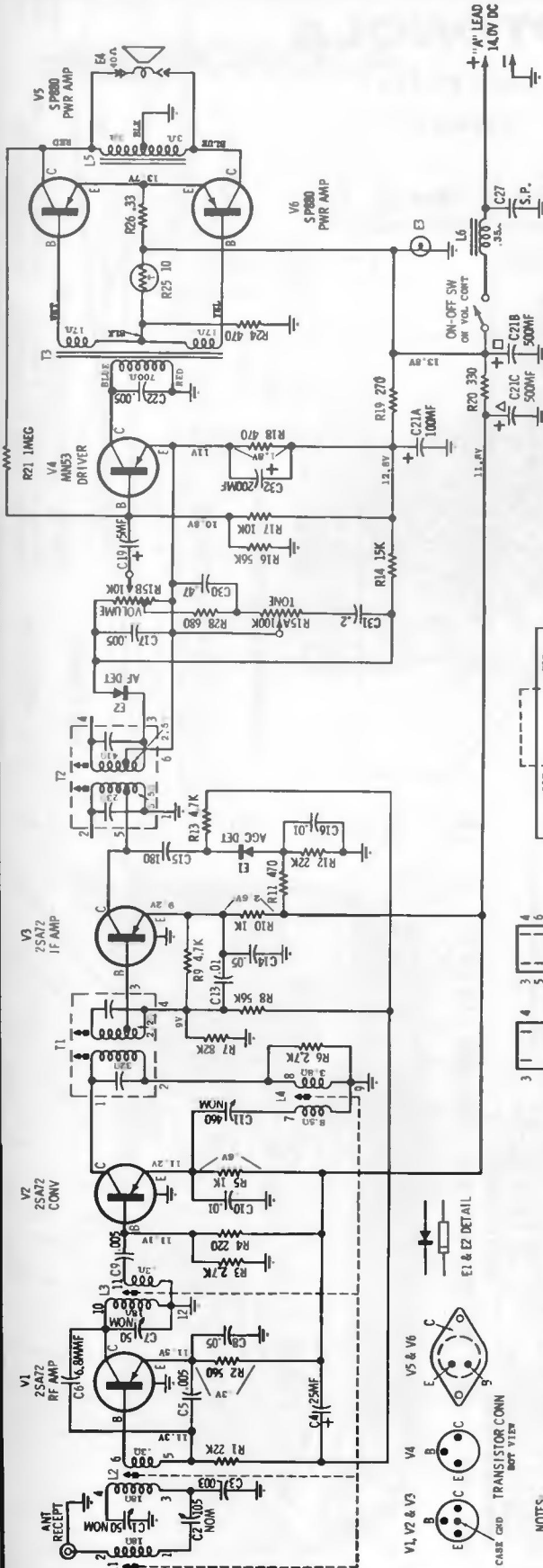
TO SERVICE PLATED CHASSIS BOARD - To remove the plated chassis from the radio housing, unsolder the plated chassis ground



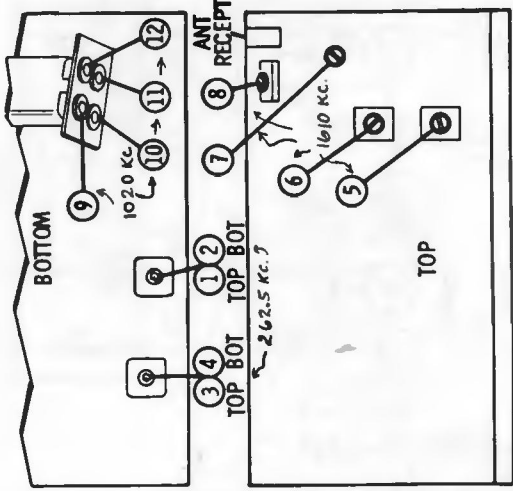
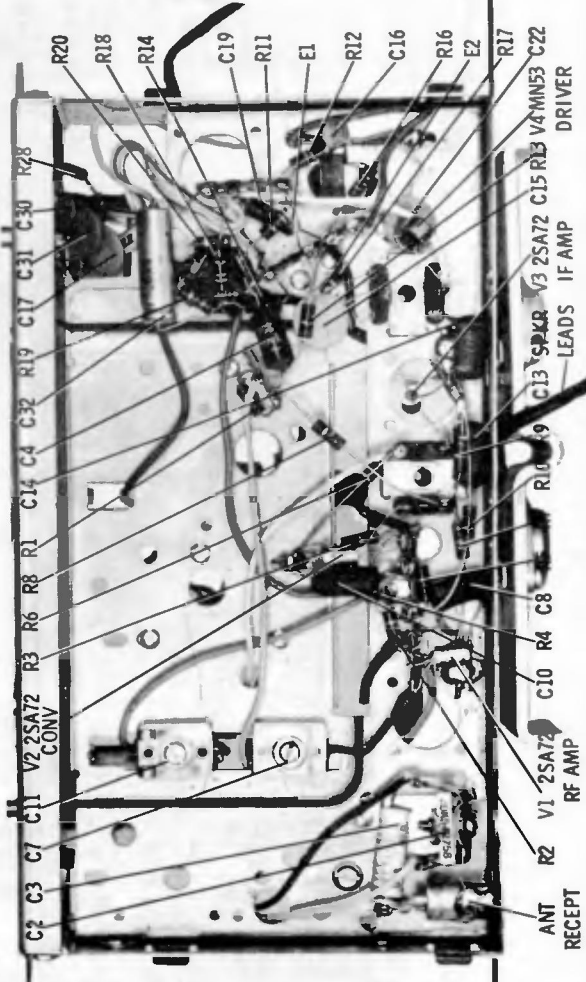
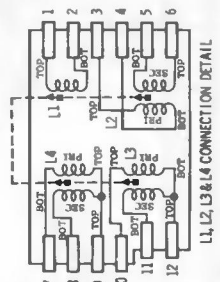
COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE - COMPONENT SIDE OF PLATING CONTAINS GROUND CONNECTIONS ONLY - SEE PLATED CHASSIS BOARD DESCRIPTION

MOTOROLA

auto radio CRM63, CYM63



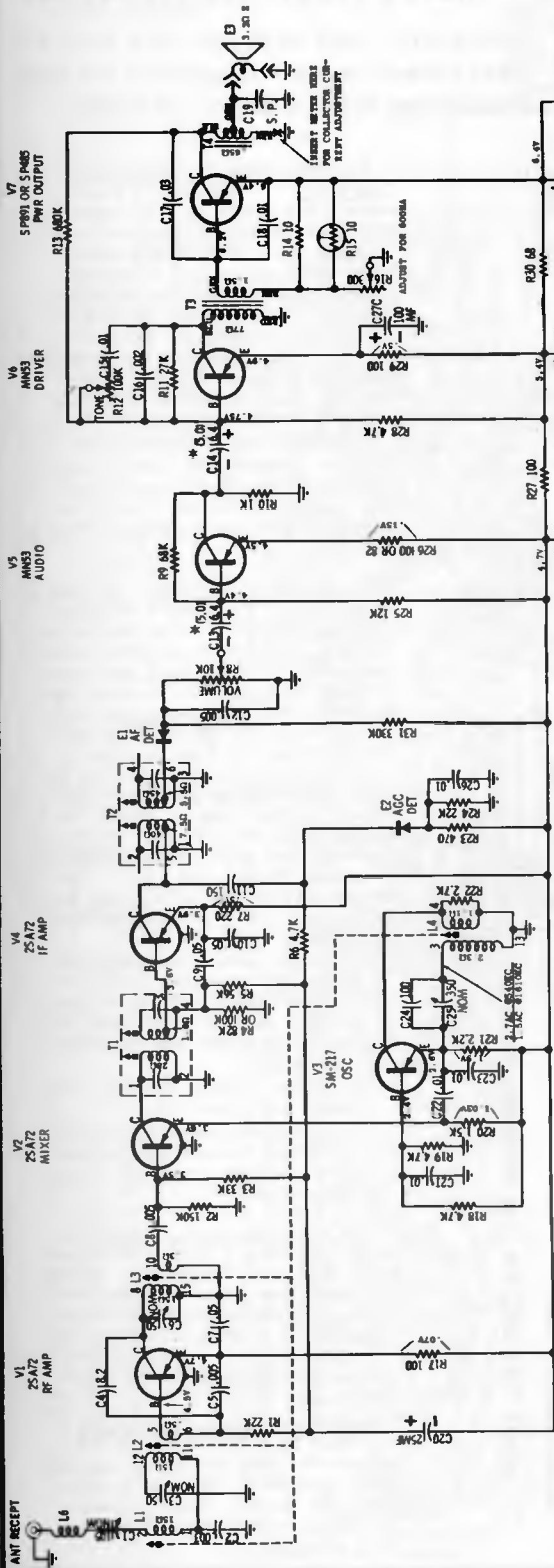
CAUTION
 'A' LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



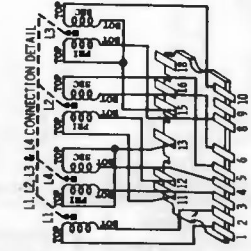
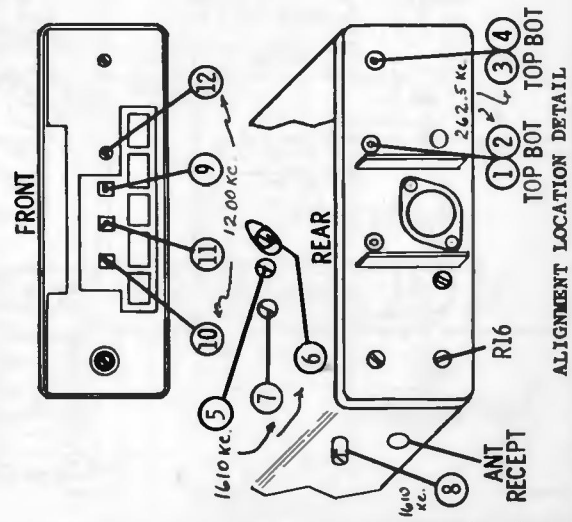
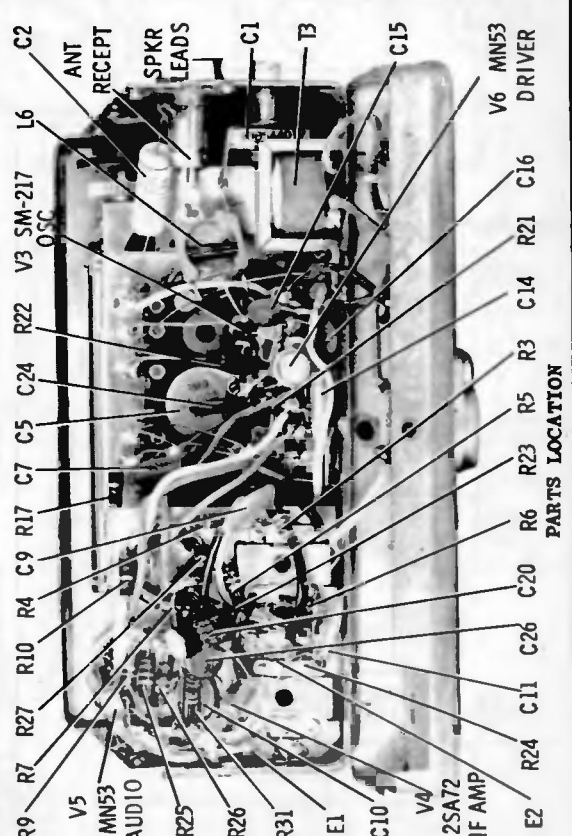
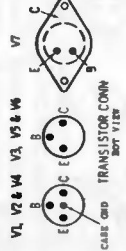
NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF. ALL OTHERS IN MMF.
 VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM, $\pm 10\%$ NO SIGNAL INPUT.
 INPUT VOLTAGE - 1AV DC.
 TUNING RANGE - 540 KC TO 1610 KC.
 IF FREQ. - 262.5 KC

MOTOROLA

auto radio VWA63



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF, ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM, $\pm 10\%$ NO SIGNAL INPUT.
INPUT VOLTAGE - 7.0VDC
TUNING RANGE - 540 KC TO 1618 KC.
IF FREQ. - 282.5 KC



NOTE: ON L1, L2, L3 & L4 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I. E., NEAREST THE TERMINAL STRIP. THE SECONDARY WINDING IS THE OUTERMOST WINDING.
* DENOTES VALUE IN SOME SETS

PARTS LOCATION

ALIGNMENT LOCATION DETAIL

MOTOROLA

auto radio

MOPAR 216,217,337,339,344,345

(Diagrams and service data on the next three pages, alignment on page following; total 4 pages of data)

PLATED CHASSIS BOARD DESCRIPTION

Motorola's PLAcir chassis has plating on both sides of the chassis board. The exposed side contains the actual circuit connections while the plating on the component side of the chassis board provides a convenient chassis B-return for components and circuit wiring. Plating on the component side also provides shielding between the top and bottom of the unit similar to a metal chassis which incorporates hand wiring.

All B-connections are carried through the PLAcir chassis in multiple paths to the B-side. This insures a good low resistance return path.

PLATED CHASSIS BOARD REMOVAL

To remove the plated chassis completely from the radio housing, unsolder the plated chassis mounting bracket, bend the ears straight and carefully remove the bracket from chassis board. Lift plated board until its tabs are free; carefully remove from housing.

After servicing is performed, re-install plated chassis board, engaging 4 board tabs into slots in housing; then attach plated chassis mounting bracket into place. It is important, at this point, that the following leads are dressed correctly.

- A. Make certain the pilot light leads and transistor leads are dressed above the pilot light socket; do not allow them to lie between the pilot light and light shield.
- B. Dress volume control leads away from filter choke.
- C. Dress antenna lead along edge of plated chassis as far away from oscillator and RF trimmer as possible.

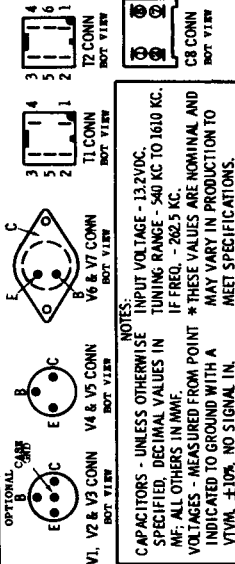
TRANSISTOR REPLACEMENT

When replacing a transistor (other than a power transistor), grasp the transistor leads (between transistor body and plated chassis board) with a pair of long nose pliers to prevent excessive heating of transistor body during soldering operation.

TO SET PUSHBUTTONS

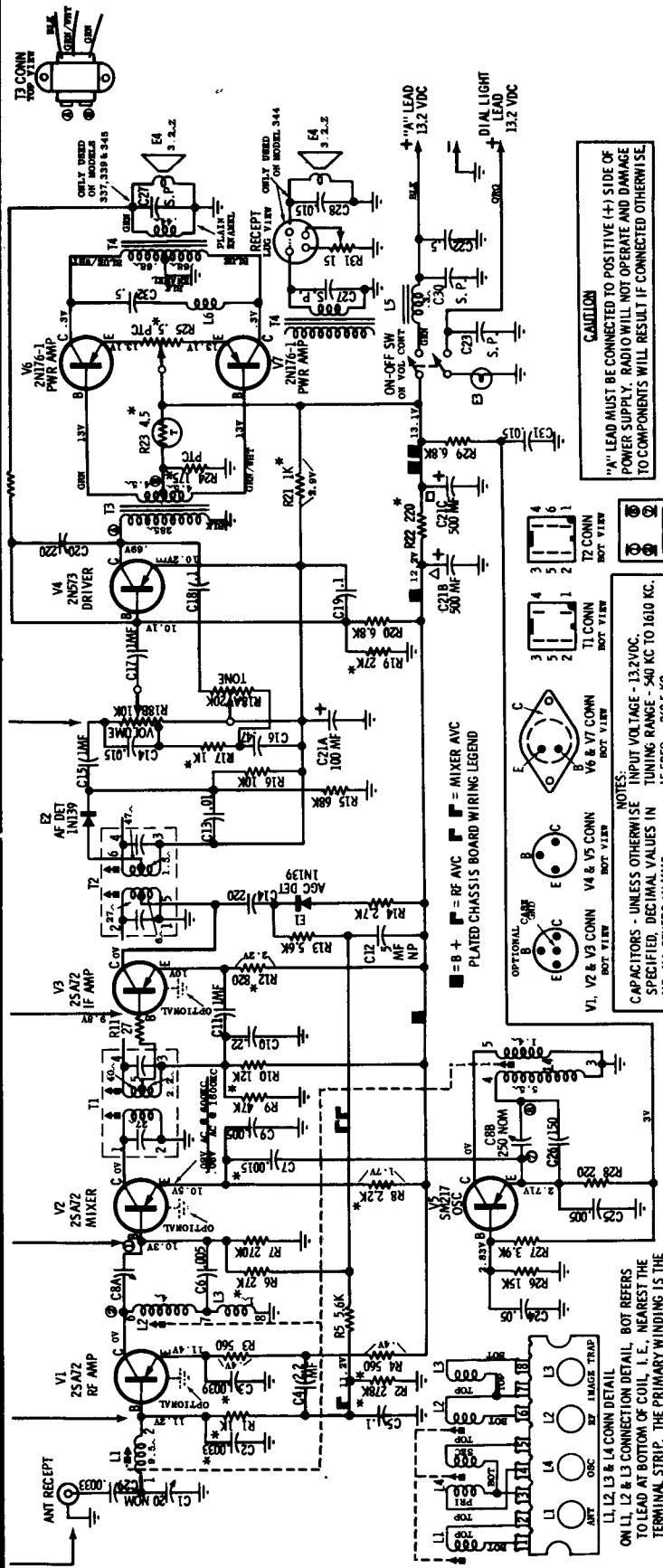
Allow receiver to warm up for fifteen minutes. Pull out on pushbutton to unlock. Push pushbutton in firmly to lock after station has been selected.

CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$, NO SIGNAL IN.
MEET SPECIFICATIONS.

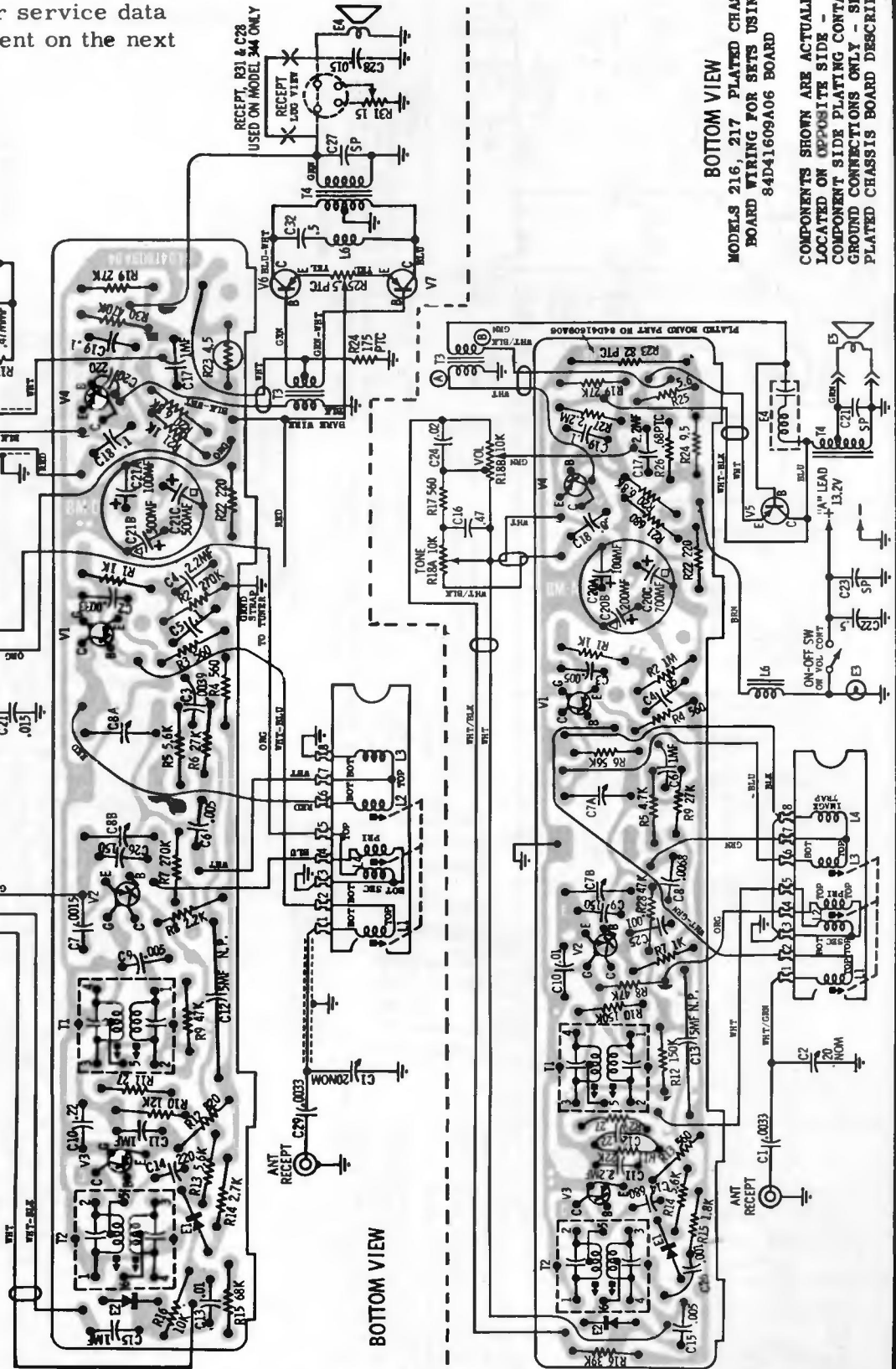
MODELS 337, 339, 344, 345 SCHEMATIC DIAGRAM



MOTOROLA Models 216, 217, 337, 339, 344, 345

(Continued from preceding page, other service data and alignment on the next two pages)

Models 337, 339, 344, 345, Plated Chassis Board Wiring. (See note at bottom, at right)



BOTTOM VIEW
 MODELS 216, 217 PLATED CHASSIS BOARD WIRING FOR SETS USING 84D41609A06 BOARD
 COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE - COMPONENT SIDE PLATING CONTAINS GROUND CONNECTIONS ONLY - SEE PLATED CHASSIS BOARD DESCRIPTION

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

MOTOROLA Models 216, 217,
337, 339, 344, 345

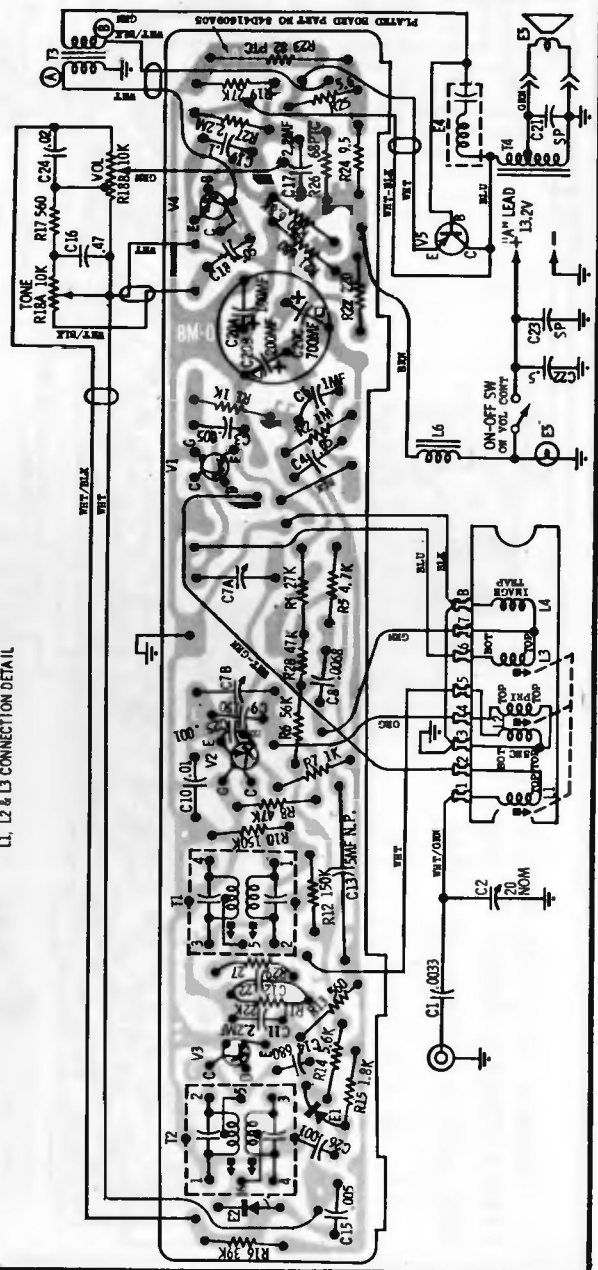
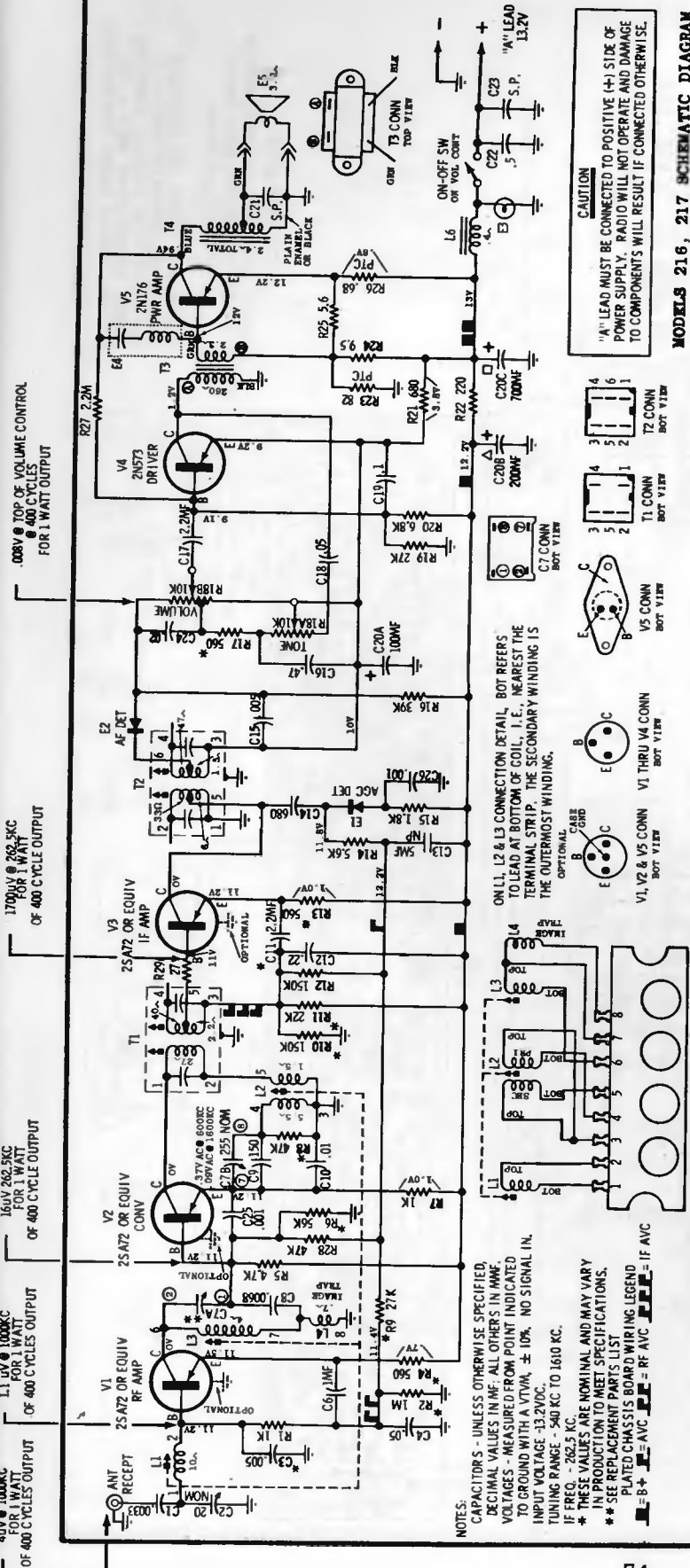
(Continued)

BOTTOM VIEW
MODELS 216, 217 PLATED CHASSIS
BOARD WIRING FOR SETS USING
84D41609A05 BOARD

COMPONENTS SHOWN ARE ACTUALLY
LOCATED ON OPPOSITE SIDE -
COMPONENT SIDE PLATING CONTAINS
GROUND CONNECTIONS ONLY - SEE
PLATED CHASSIS BOARD DESCRIPTION

MODELS 216, 217 SCHEMATIC DIAGRAM

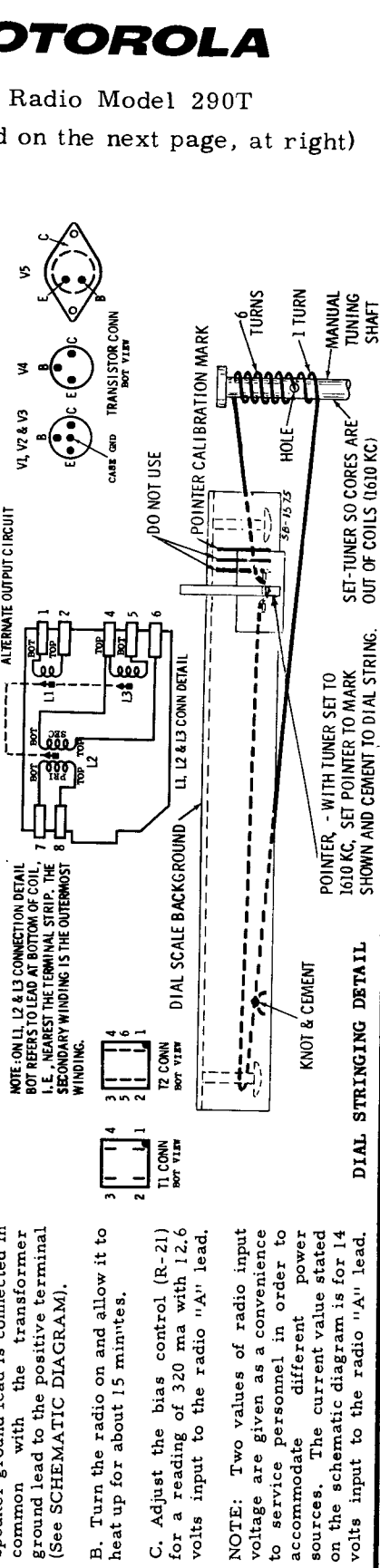
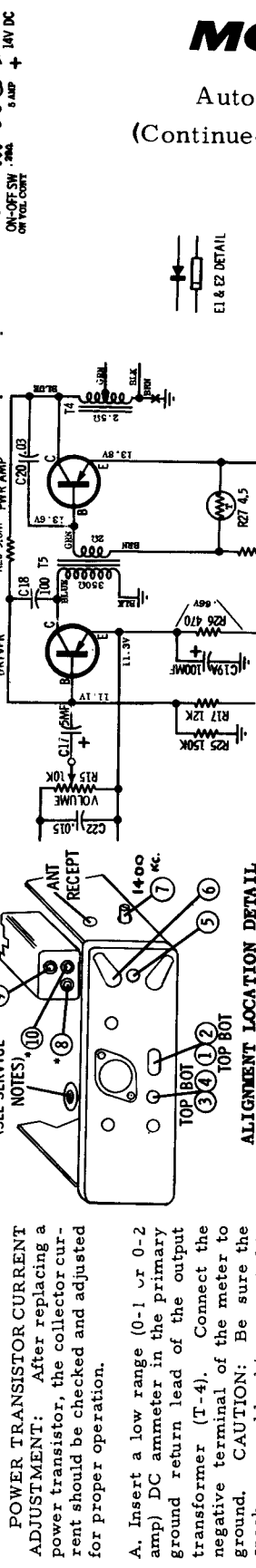
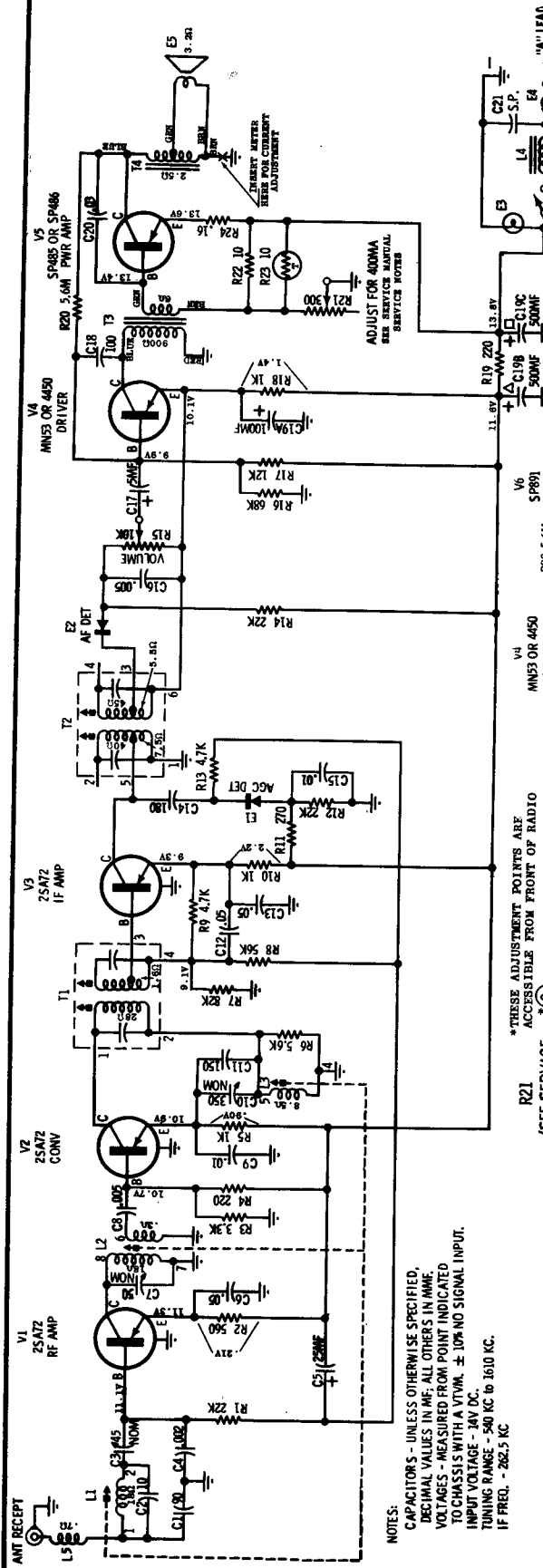
CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF
POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE
TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



MOTOROLA

Auto Radio Model 290T

(Continued on the next page, at right)



NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF.
 VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM, $\pm 10\%$ NO SIGNAL INPUT.
 INPUT VOLTAGE - 14V DC.
 TUNING RANGE - 540 KC TO 1610 KC.
 IF FREQ. - 262.5 KC.

POWER TRANSISTOR CURRENT ADJUSTMENT: After replacing a power transistor, the collector current should be checked and adjusted for proper operation.

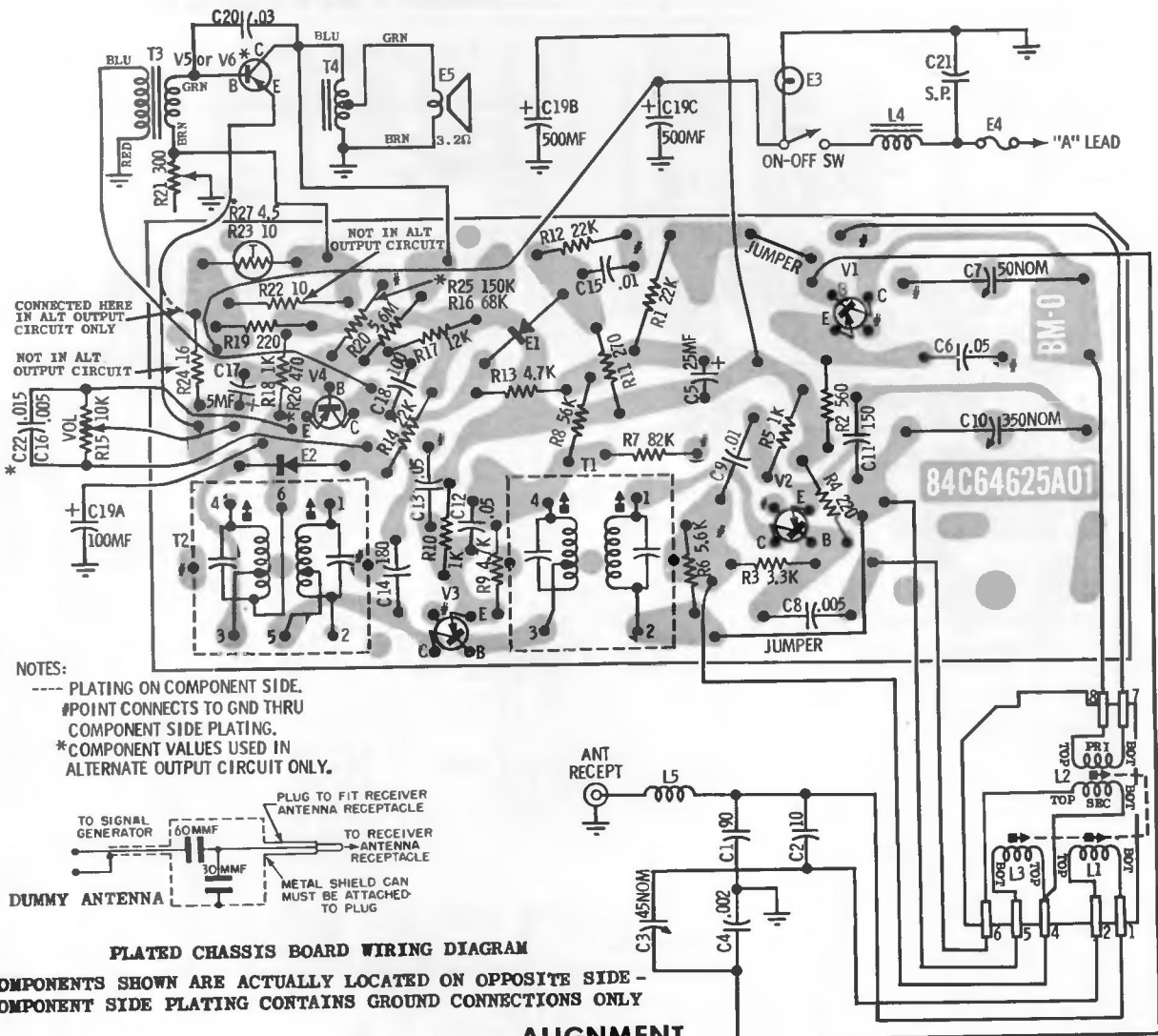
A. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer (T-4). Connect the negative terminal of the meter to ground. CAUTION: Be sure the speaker ground lead is connected in common with the transformer ground lead to the positive terminal (See SCHEMATIC DIAGRAM).

B. Turn the radio on and allow it to heat up for about 15 minutes.

C. Adjust the bias control (R-21) for a reading of 320 ma with 12.6 volts input to the radio "A" lead.

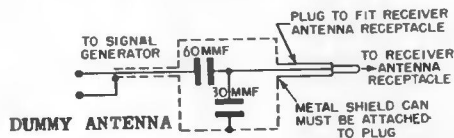
NOTE: Two values of radio input voltage are given as a convenience to service personnel in order to accommodate different power sources. The current value stated on the schematic diagram is for 14 volts input to the radio "A" lead.

MOTOROLA Auto Radio Model 290T (Continued from preceding page)



NOTES:

- PLATING ON COMPONENT SIDE.
- # POINT CONNECTS TO GND THRU COMPONENT SIDE PLATING.
- * COMPONENT VALUES USED IN ALTERNATE OUTPUT CIRCUIT ONLY.



PLATED CHASSIS BOARD WIRING DIAGRAM

COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE - COMPONENT SIDE PLATING CONTAINS GROUND CONNECTIONS ONLY

ALIGNMENT

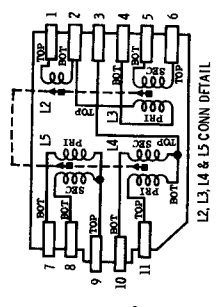
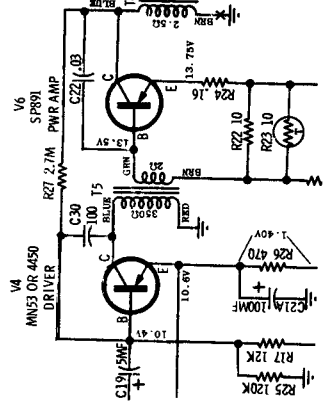
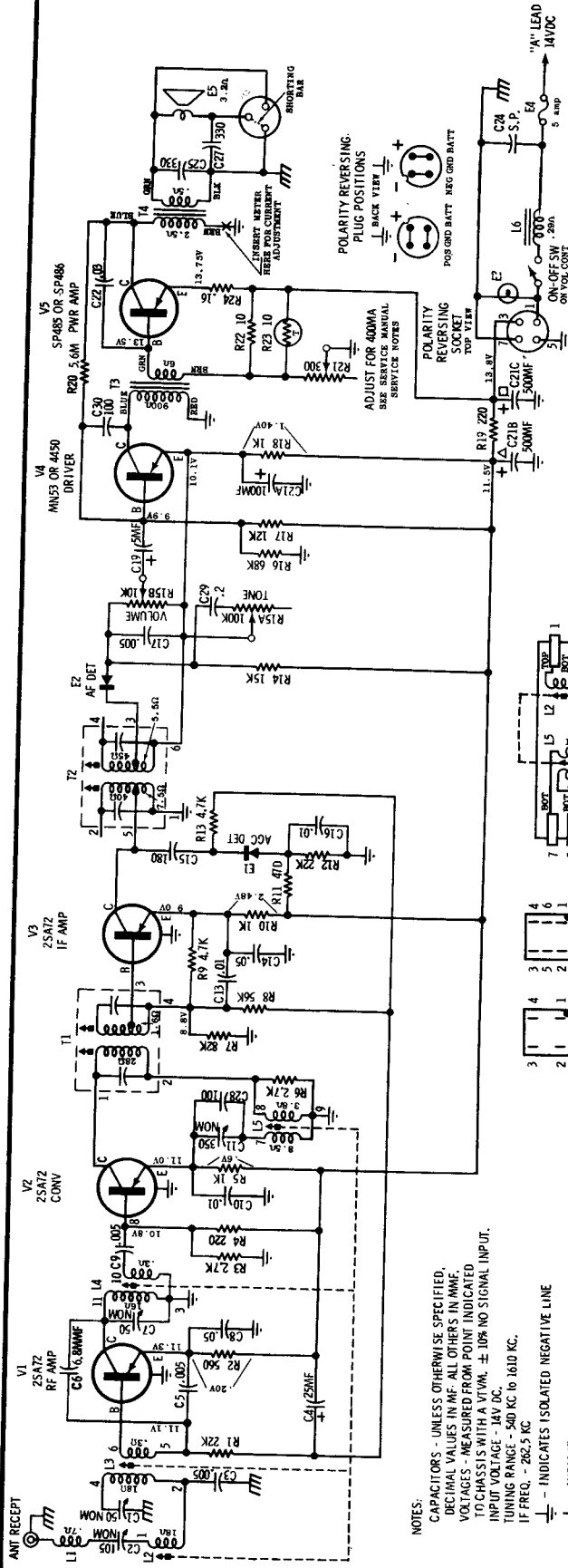
Connect an output meter across the speaker voice coil. Set volume to maximum. Attenuate signal generator output to maintain 1 watt (1.79 volts across a 3.2 ohm load) on output meter at all times.

STEP	GENERATOR CONNECTION	GEN FREQ (400 cycle 30% mod)	TUNER SET TO	ADJUST	REMARKS
1.	To collector of RF amp thru .1mf & chassis	262.5Kc	Hi end stop	1, 2, 3 & 4	Adjust for maximum
2.	Ant recept thru dummy (see figure)	1610Kc	Hi end stop	5, 6 & 7	Adjust for maximum
3.	Ant recept thru dummy (see figure)	1610Kc	Hi end stop	5, 6 & 7	Adjust for maximum
4.	"	1020Kc	Tuner carriage .298" from Hi end stop	8, 9 & 10	Adjust for maximum
5.	"	1610Kc	Hi end stop	5, 6 & 7	Adjust for maximum
6.	Repeat steps 4 and 5 until no further increase; step 5 should be last step. Then, cement core screws in place.				

MOTOROLA

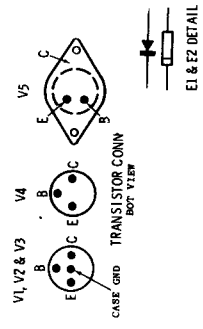
Auto Radio Model 323T

(Continued on next page, at right)



NOTE: ON L2, L3, L4 & L5 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I.E., NEAREST THE TERMINAL STRIP. THE SECONDARY WINDING IS THE OUTERMOST WINDING.

CAUTION
BEFORE CONNECTING "A" LEAD BATTERY POLARITY SHOULD BE CHECKED AND POLARITY REVERSING PLUG SHOULD BE CHANGED CORRESPONDINGLY. OTHERWISE SET WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT.



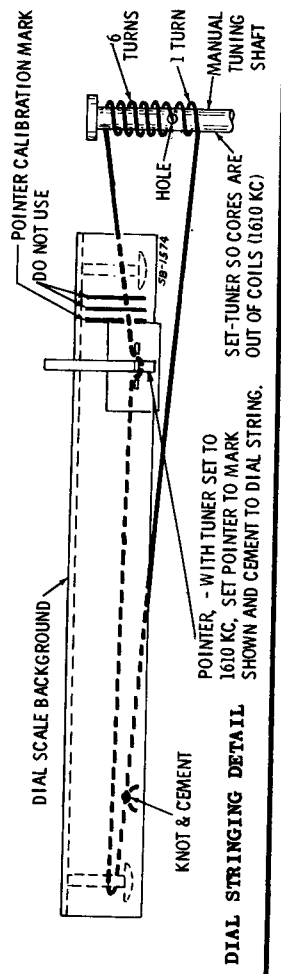
NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF. ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM. $\pm 10\%$ NO SIGNAL INPUT.
INPUT VOLTAGE - 540 DC.
TUNING RANGE - 540 KC TO 1610 KC.
IF FREQ. - 262.5 KC
⊥ - INDICATES ISOLATED NEGATIVE LINE
⏏ - INDICATES OUTER HOUSING

POWER TRANSISTOR CURRENT ADJUSTMENT: After replacing a power transistor, the collector current should be checked and adjusted for proper operation.

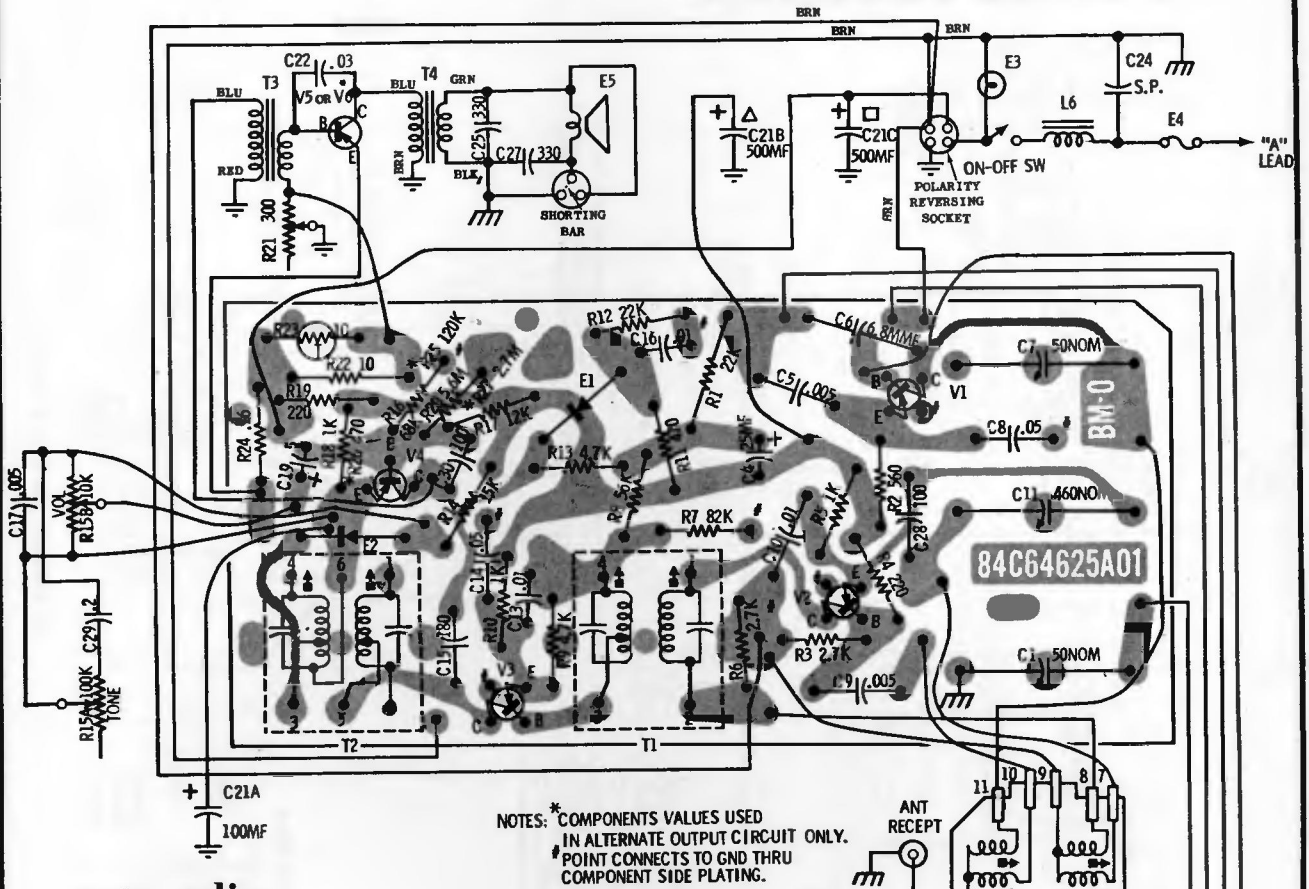
- A. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer. Connect the negative terminal of the meter to isolated negative line on polarity reversing socket.
- B. Turn the radio on and allow it to heat up for about 15 minutes.

C. Adjust the bias control (R-21) for a reading of 320 ma with 12.6 volts input to the radio "A" lead.

NOTE: Two values of radio input voltage are given as a convenience to service personnel in order to accommodate different power sources. The current value stated on the schematic diagram is for 14 volts input to the radio "A" lead.



MOTOROLA Auto Radio Model 323T (Continued from preceding page)



auto radio
323T

PLATED CHASSIS BOARD WIRING DIAGRAM

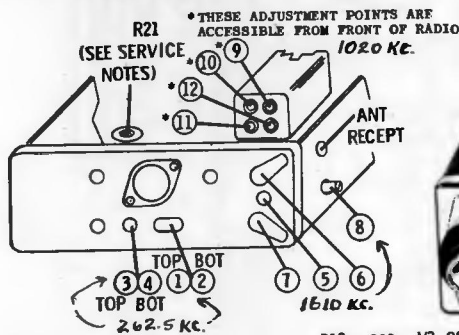
COMPONENTS SHOWN ARE ACTUALLY LOCATED ON OPPOSITE SIDE - COMPONENT SIDE PLATING CONTAINS GROUND CONNECTIONS ONLY

NOTES: * COMPONENTS VALUES USED IN ALTERNATE OUTPUT CIRCUIT ONLY.
POINT CONNECTS TO GND THRU COMPONENT SIDE PLATING.

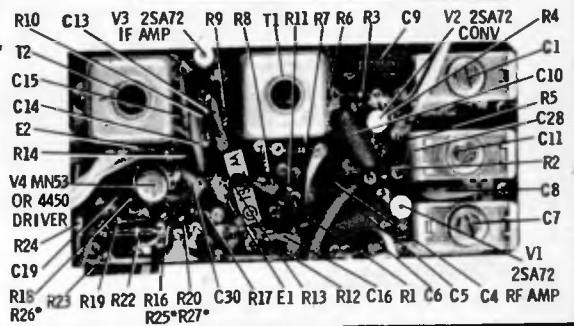
Make certain the "A" lead is connected properly to power source i. e., check position of polarity reversing plug, otherwise, damage to receiver may result.

When replacing a power output transistor, remember to use the transistor specified in the parts list; coat both sides of the transistor insulator with DC-4 grease (Motorola Part No. 11M490487) and securely tighten the transistor mounting screws. When replacing all other transistors, use long-nose pliers as a heat sink, i. e., grasp transistor leads close to transistor base with the pliers to dissipate heat while soldering.

The plated chassis used in this receiver has plating on both sides; the exposed side (opposite components) contains the actual circuitry while the plating on the component side contains B- points only.



ALIGNMENT LOCATION DETAIL

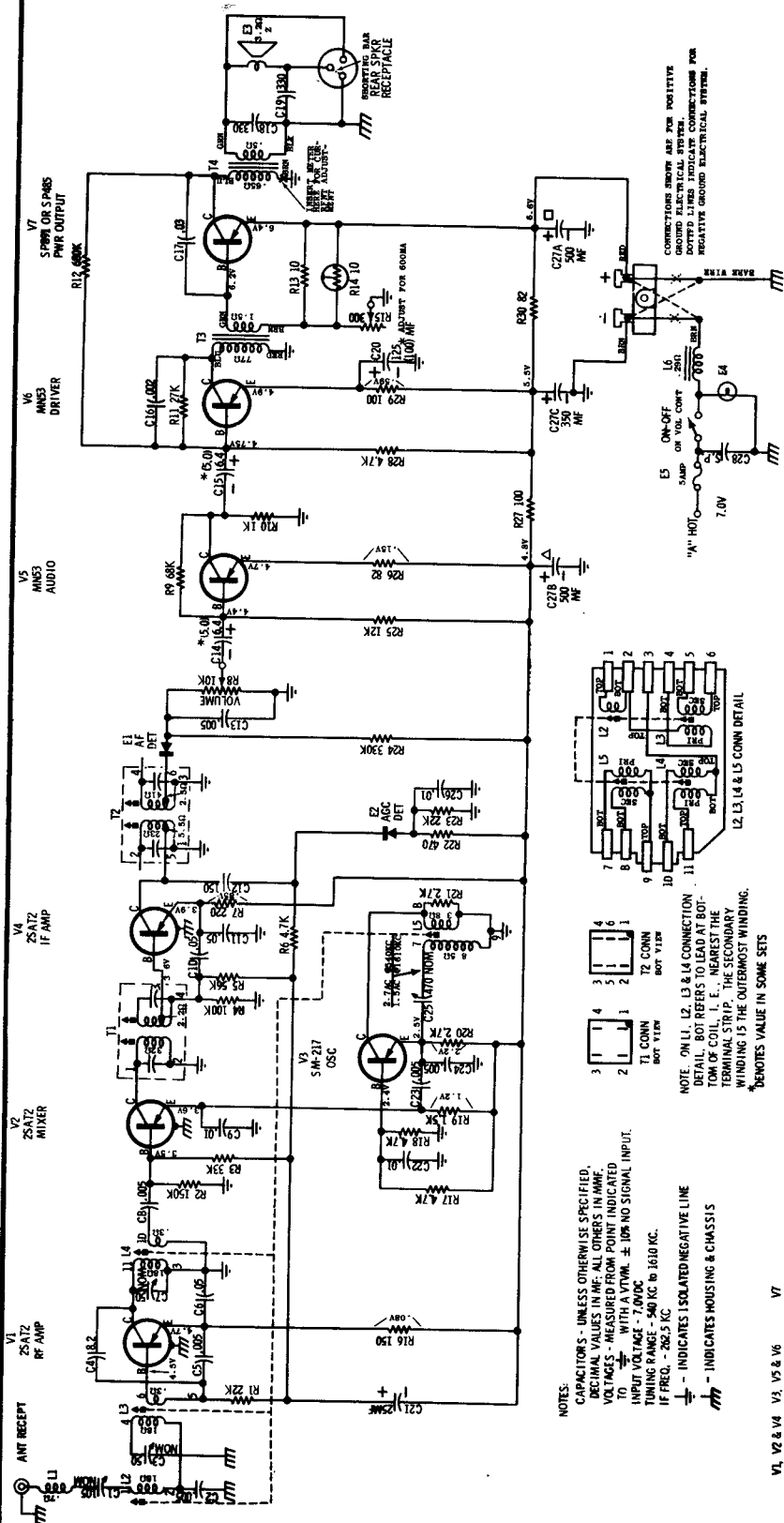


* SEE ALTERNATE OUTPUT CIRCUIT ON SCHEMATIC DIAGRAM

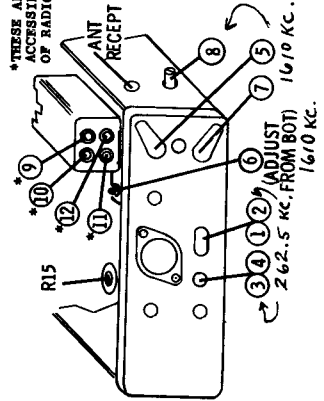
MOTOROLA

auto radio

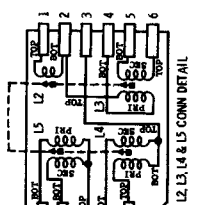
413T



*THESE ADJUSTMENTS ARE ACCESSIBLE FROM FRONT OF RADIO @ 102.0 KC.

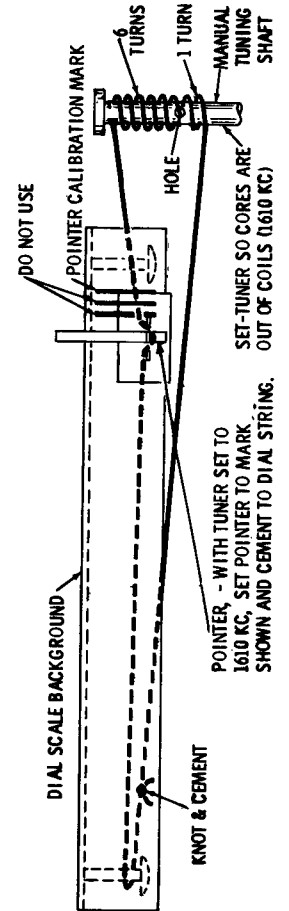
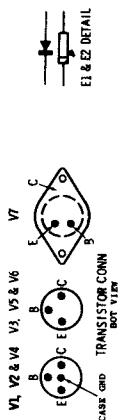


ALIGNMENT LOCATION DETAIL



NOTE: ON L1, L2, L3 & L4 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I. E., NEAREST THE TERMINAL STRIP. THE SECONDARY WINDING IS THE OUTERMOST WINDING. * DENOTES VALUE IN SOME SETS

NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM POINT INDICATED TO WITH A VTVM, ± 10% NO SIGNAL INPUT.
INPUT VOLTAGE - 7.0VDC
TUNING RANGE - 540 KC TO 1610 KC.
IF FREQ. - 286.5 KC
- INDICATES ISOLATED NEGATIVE LINE
- INDICATES HOUSING & CHASSIS



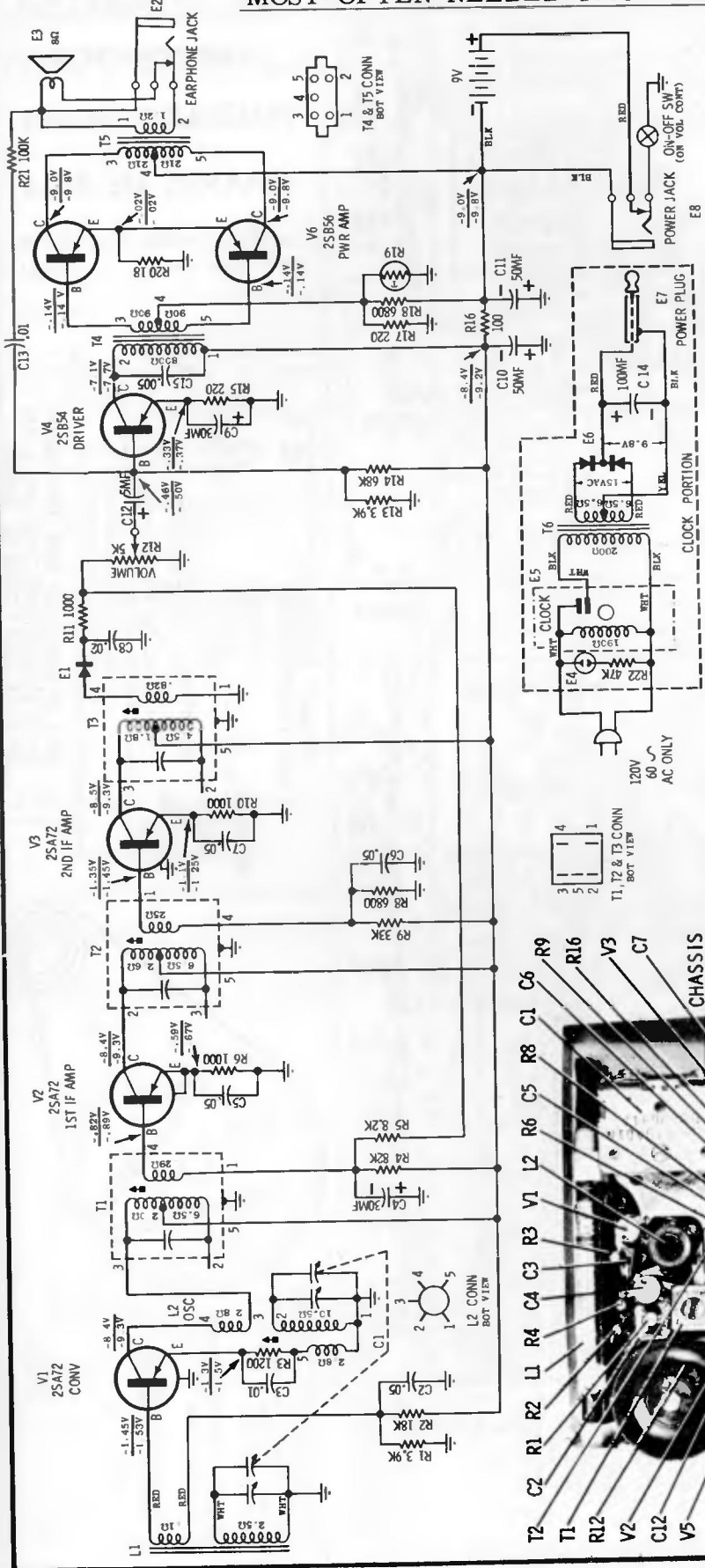
DIAL STRINGING DETAIL

MOTOROLA

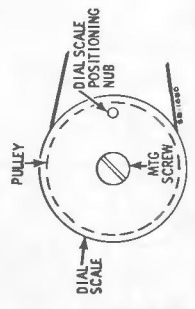
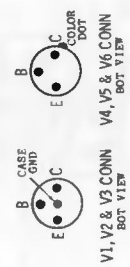
MODEL CX2

CHASSIS HS-6110

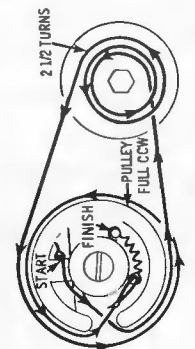
V5
25B56
PWR AMP



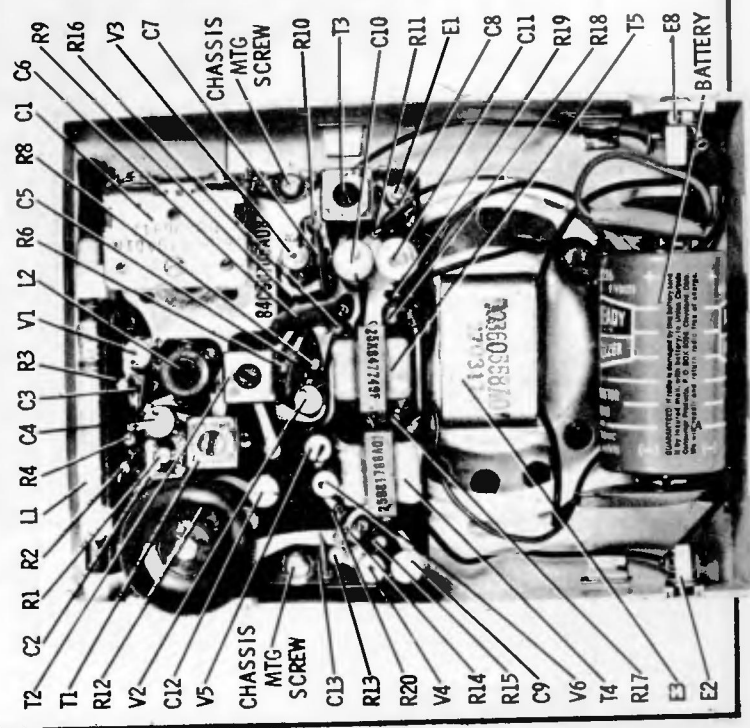
NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF, ALL OTHERS IN MME VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$ NO SIGNAL IN, VOL AT MIN.
TUNING RANGE - 535KC TO 1620KC
ZERO SIGNAL CURRENT - APPROX 7.2MA (MIN VOL)
V. VOLTAGES TAKEN WITH 90V AC POWER SOURCE
V. VOLTAGES TAKEN WITH 120V AC POWER SOURCE



UPON COMPLETION OF DIAL STRINGING, INSTALL DIAL SCALE AS SHOWN.

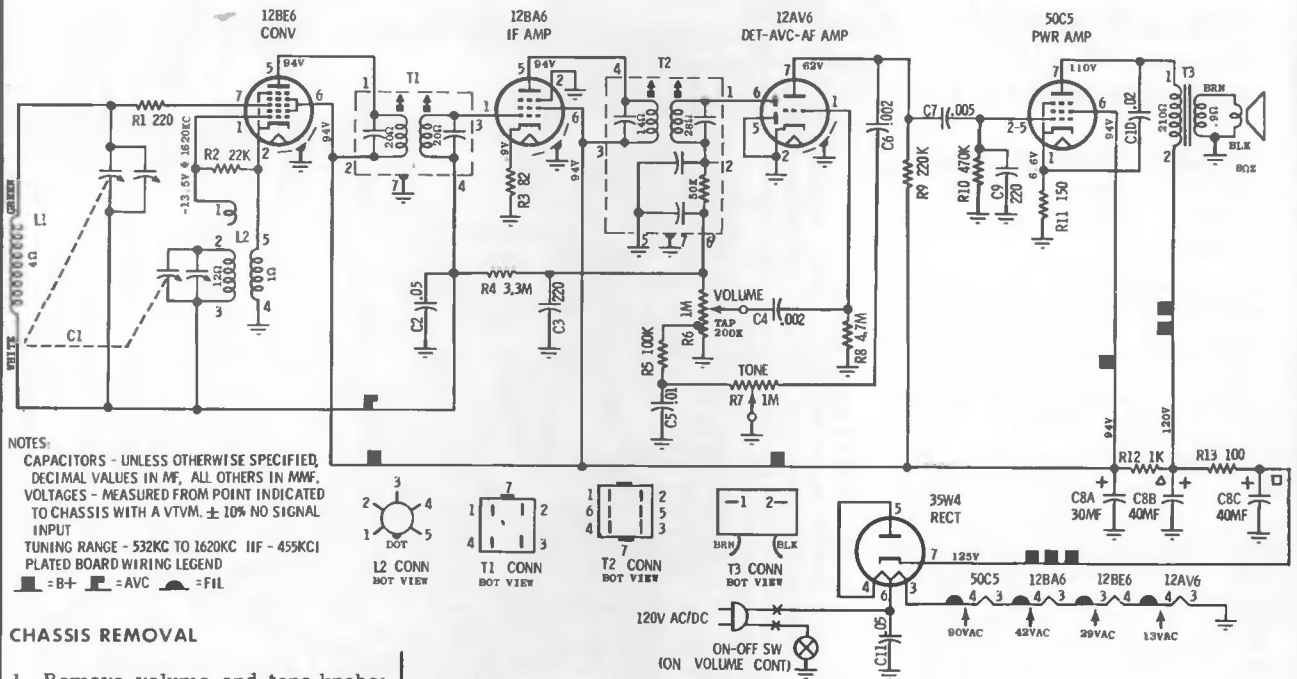


BEFORE STRINGING, ROTATE GANG SHAFT & PULLEY FULLY COUNTER-CLOCKWISE; THEY SHOULD BE IN POSITION AS SHOWN.



NOTE: C15, R5, R21 ARE LOCATED ON BOTTOM OF CHASSIS

MOTOROLA MODEL A24 CHASSIS HS-4136



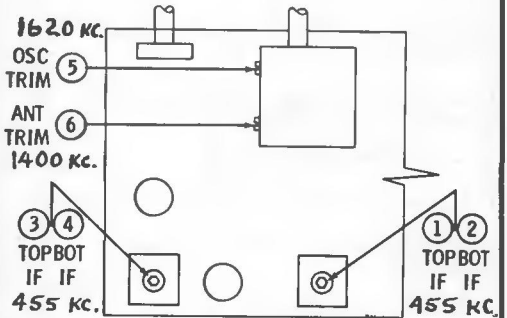
NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF, ALL OTHERS IN MMF. VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM. $\pm 10\%$ NO SIGNAL INPUT
 TUNING RANGE - 532KC TO 1620KC IIF - 455KC
 PLATED BOARD WIRING LEGEND
 ■ = B+ ■ = AVC ■ = FIL

CHASSIS REMOVAL

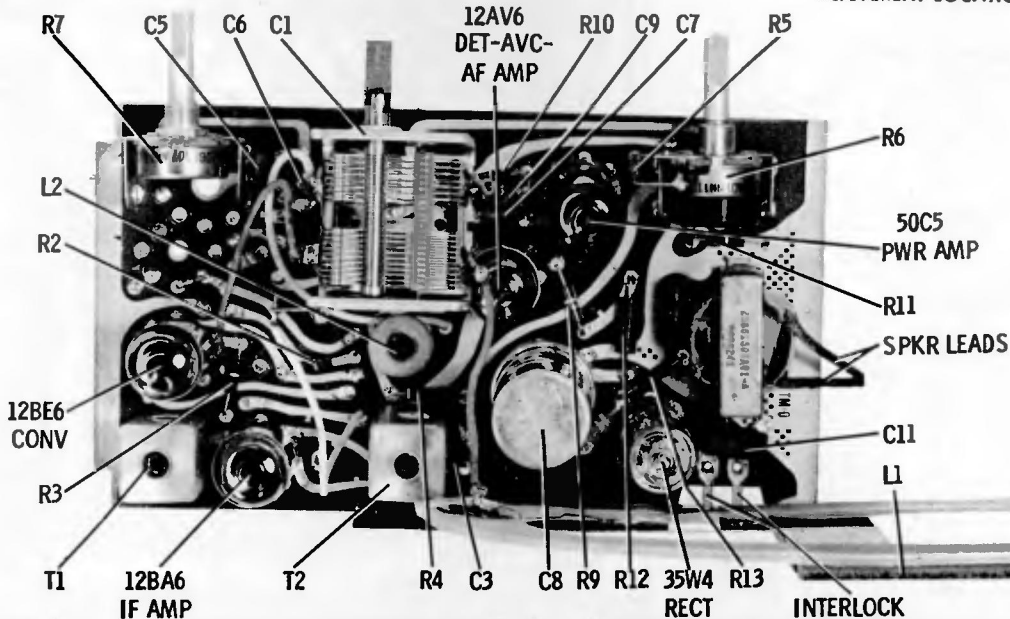
1. Remove volume and tone knobs; do not attempt to remove captivated tuning knob.
2. Remove cabinet back - 4 screws hold it in place.
3. From rear, remove chassis mounting screw at base of chassis, if necessary, also remove two gang mounting screws.
4. Unsolder speaker leads (and gang leads, if gang was not removed in Step 3).
5. Slide chassis and antenna out of cabinet.

TUNING KNOB REMOVAL

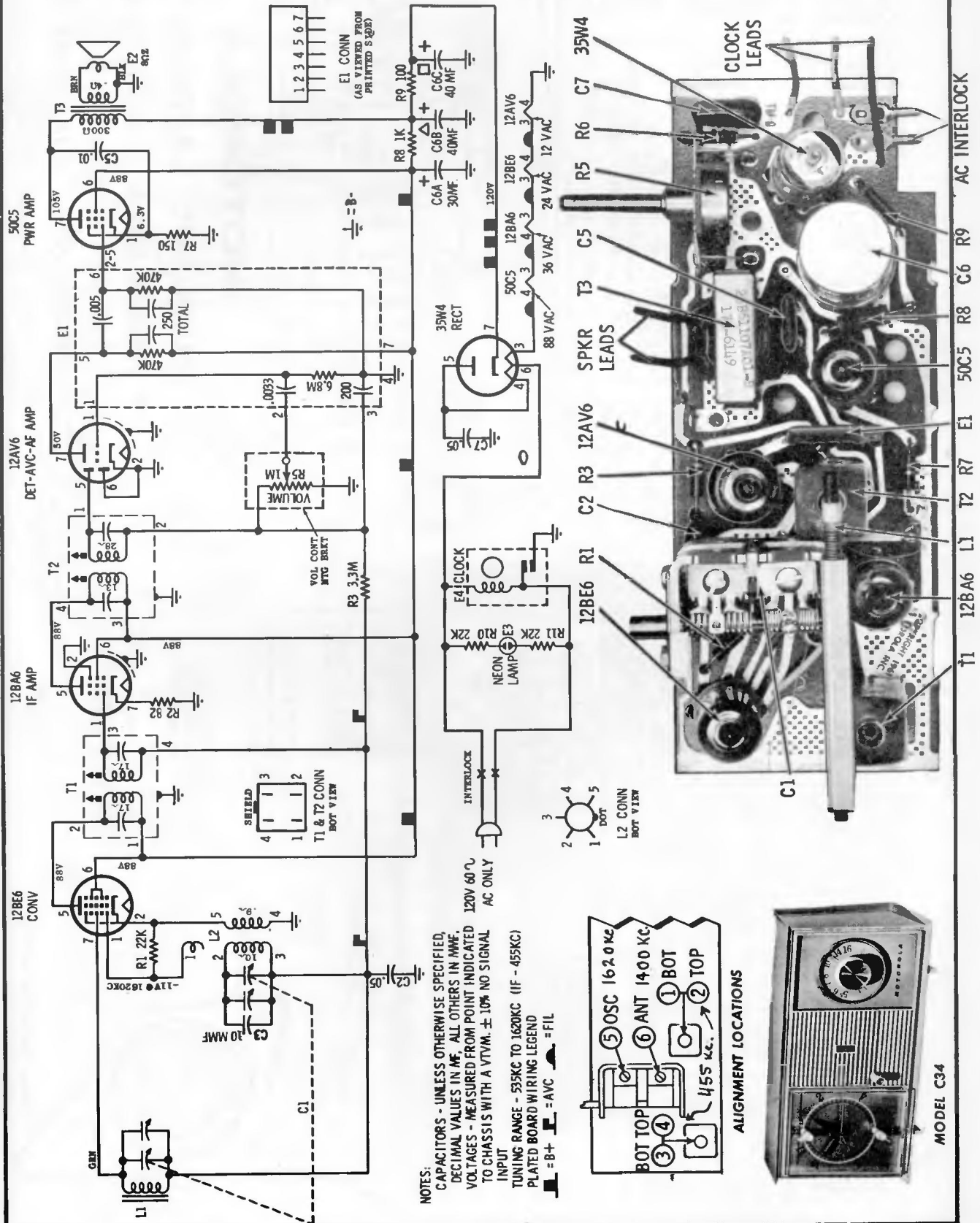
1. Remove cabinet back - 4 screws hold it in place.
2. From rear, remove two gang mounting screws and pull backgang.
3. To remove tuning knob, remove speed clip from knob shank from rear of knob.

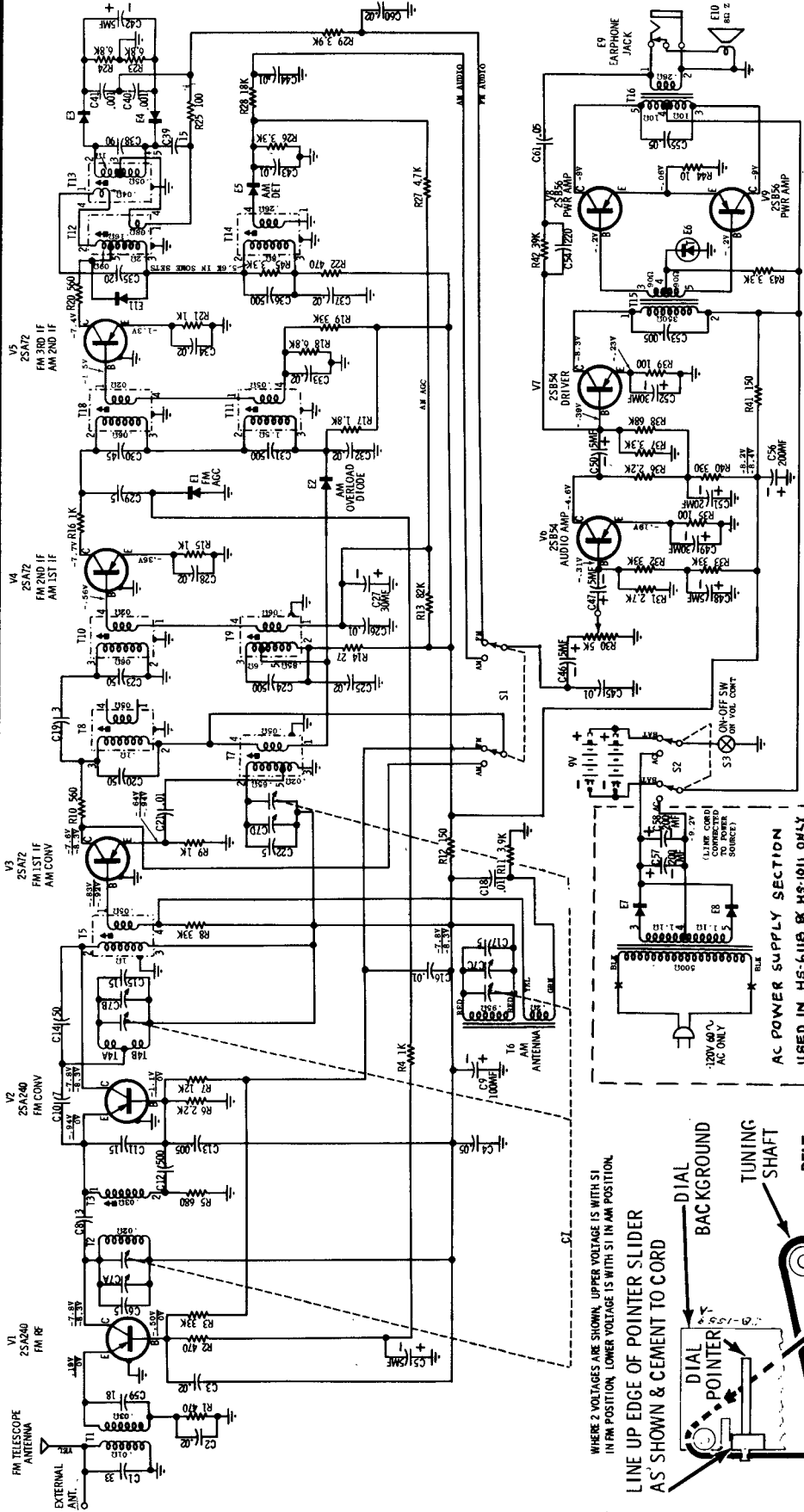


ALIGNMENT LOCATIONS



MOTOROLA MODELS C34, C35, C36 CHASSIS HS-998

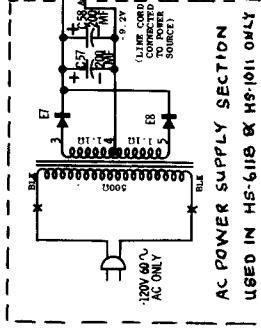
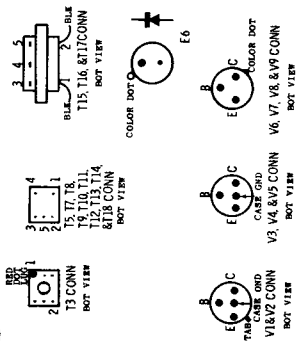




MOTOROLA

MODEL X70 CHASSIS HS-6117
MODEL X42-1 CHASSIS HS-6118
MODEL X42 CHASSIS HS-1011

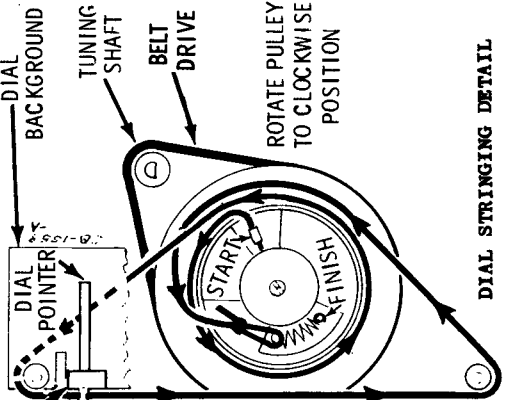
This material is also applicable to
MODEL X42 CHASSIS HS-1011
 which is almost identical to X42-1



NOTES:
 CAPACITORS UNLESS OTHERWISE SPECIFIED
 ARE MFD. VALUES IN PARENTHESIS IN
 VOLTS. MEASURED FROM POINT INDICATED
 TO GROUND WITH A VTVM. ±10% NO SIGNAL IN
 VOL AT MIN.
 AM RANGE 35K TO 160K
 FM RANGE 88MC TO 108MC
 AM IF 455K
 FM IF 10.7MC
 ZERO SIGNAL CURRENT APPROX 16MA (MIN VOL)
 VOLTAGES TAKEN WITH 9V BATTERY

WHERE 2 VOLTAGES ARE SHOWN, UPPER VOLTAGE IS WITH S1
 IN FM POSITION, LOWER VOLTAGE IS WITH S1 IN AM POSITION.

LINE UP EDGE OF POINTER SLIDER
 AS SHOWN & CEMENT TO CORD



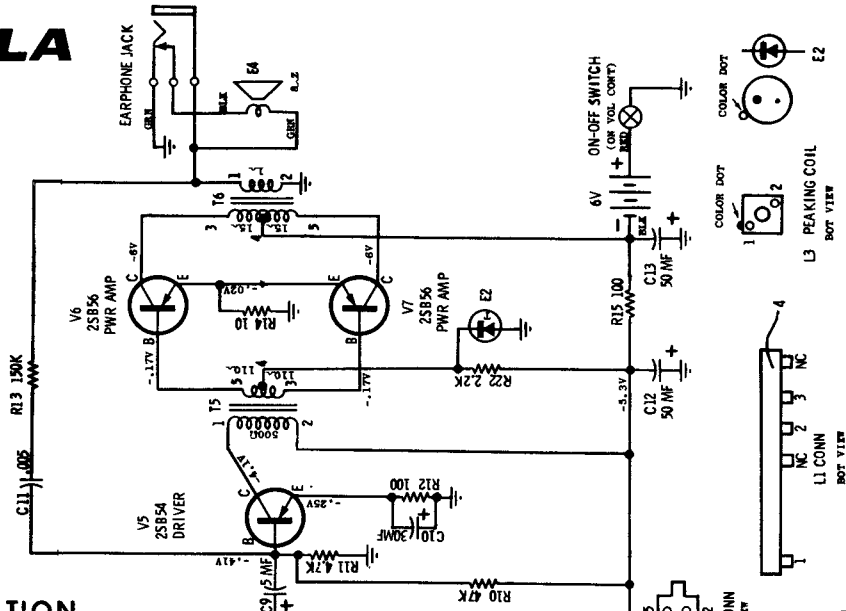
MOTOROLA

MODEL X48

CHASSIS HS-6111

MODEL X48
CHASSIS HS-6111

MOTOROLA



GENERAL INFORMATION

The battery life indicator switch (located on front of radio) is used to check for low battery power. To check the batteries, first turn the radio on and tune to a station near 1000Kc, then, press the battery indicator switch button; if the radio stops playing while the button is held in, approximately 90% of the available battery power has been used up.

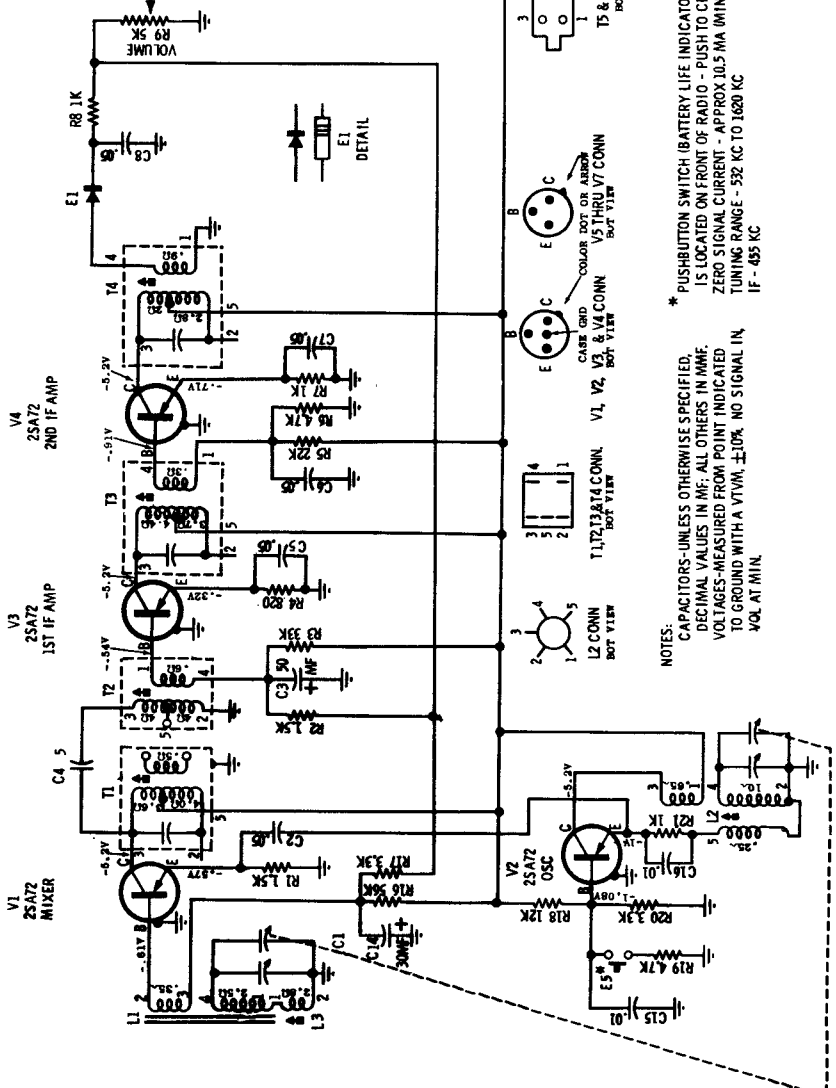
Power Supply

Operates from four (4) 1-1/2 volt batteries; use four (4) Eveready #1015 or equivalent.

Battery Drain - 10.5 ma with no input signal and volume at minimum. To measure battery drain, turn radio off and connect a milliammeter across the terminals of the On-Off switch (observe polarity); the meter should read 10.5 ma.

Chassis Removal

1. Remove the earphone jack mounting nut (a special tool is available - order Part No. 66A646211).
2. Remove the two (2) cabinet mounting screws (they are located on the sides of the cabinet, under the carrying handle - lift the handle to expose them).
3. Lift the escutcheon and chassis as an assembly out of the cabinet.
4. To remove the chassis from the escutcheon, remove the battery life indicator switch mounting nut (the same tool described in Step 1 can be used to remove this nut), remove three (3) chassis mounting screws and, if necessary, unsolder leads connected to chassis.



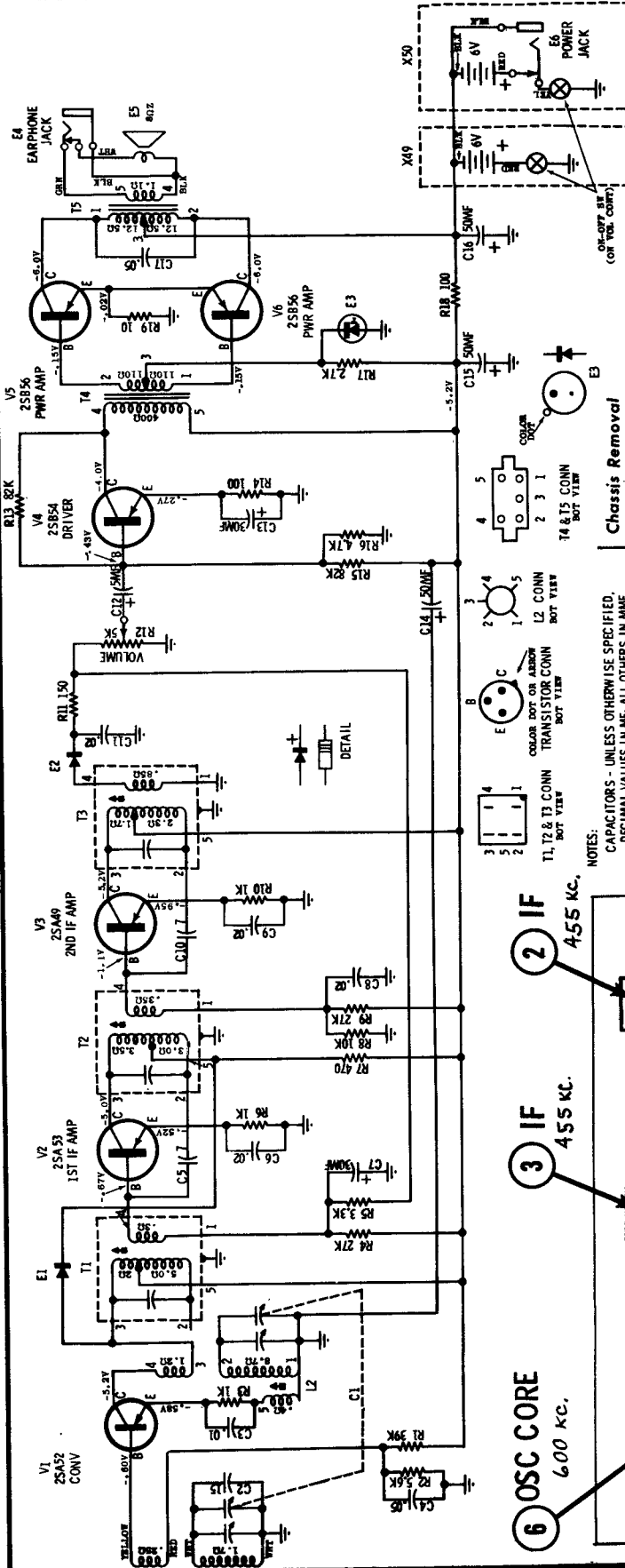
* PUSHBUTTON SWITCH (BATTERY LIFE INDICATOR) IS LOCATED ON FRONT OF RADIO - PUSH TO CLOSE ZERO SIGNAL CURRENT - APPROX 10.5 MA (MIN VOL) TUNING RANGE - 532 KC TO 1620 KC IF - 455 KC

NOTES:
CAPACITORS-UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF. VOLTAGES-MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, ±10%, NO SIGNAL IN VOL AT MIN.

MOTOROLA

MODEL X49, X50

CHASSIS HS-6112



Chassis Removal

1. From front of radio, remove two (2) control knobs and the screw located under the tuning knob.
2. From rear of radio, open back panel by unsnapping the three (3) tabs at bottom of panel; then, lift battery retainer and AC power supply (X50 only) out of their compartment at rear of cabinet.
3. Lift armitie insulator to gain access to chassis.
4. Remove three (3) chassis mounting screws and unsnap antenna from its mounting clamps. If necessary, unsolder leads connected to chassis before removing chassis from the cabinet.
5. If it becomes necessary to remove the earphone jack or the power jack (X50), a special inexpensive tool is available

Power Supply

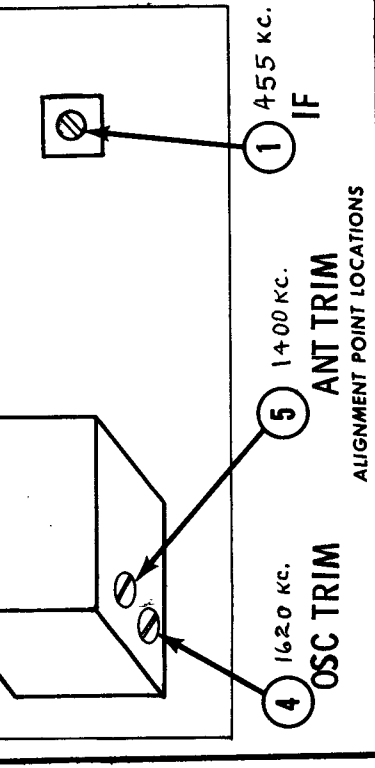
These radios operate from four (4) 1-1/2 volt batteries; use four (4) Eveready #1015 or equivalent. Model X50, in addition, can be powered from a 120 volt, 60 cycle AC power outlet by using the AC power supply included with the radio.

Battery Drain - 9.5 ma with no input signal and volume at minimum. To measure battery drain, turn radio off and connect a milliammeter across the terminals of the On-Off switch (observe polarity); the meter should read 9.5 ma.

NOTES:

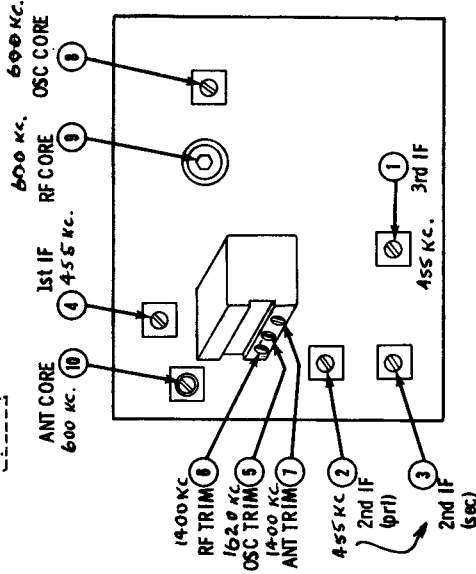
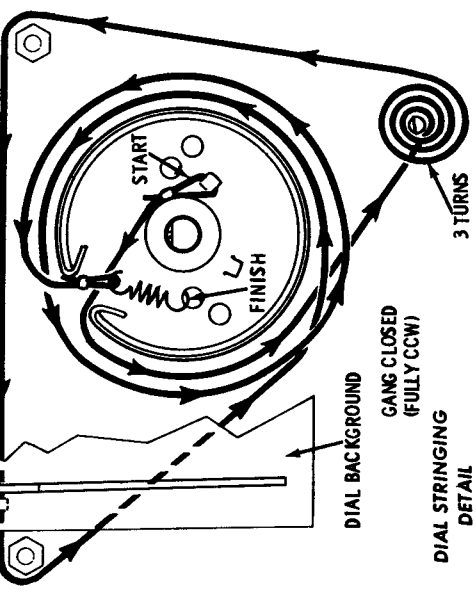
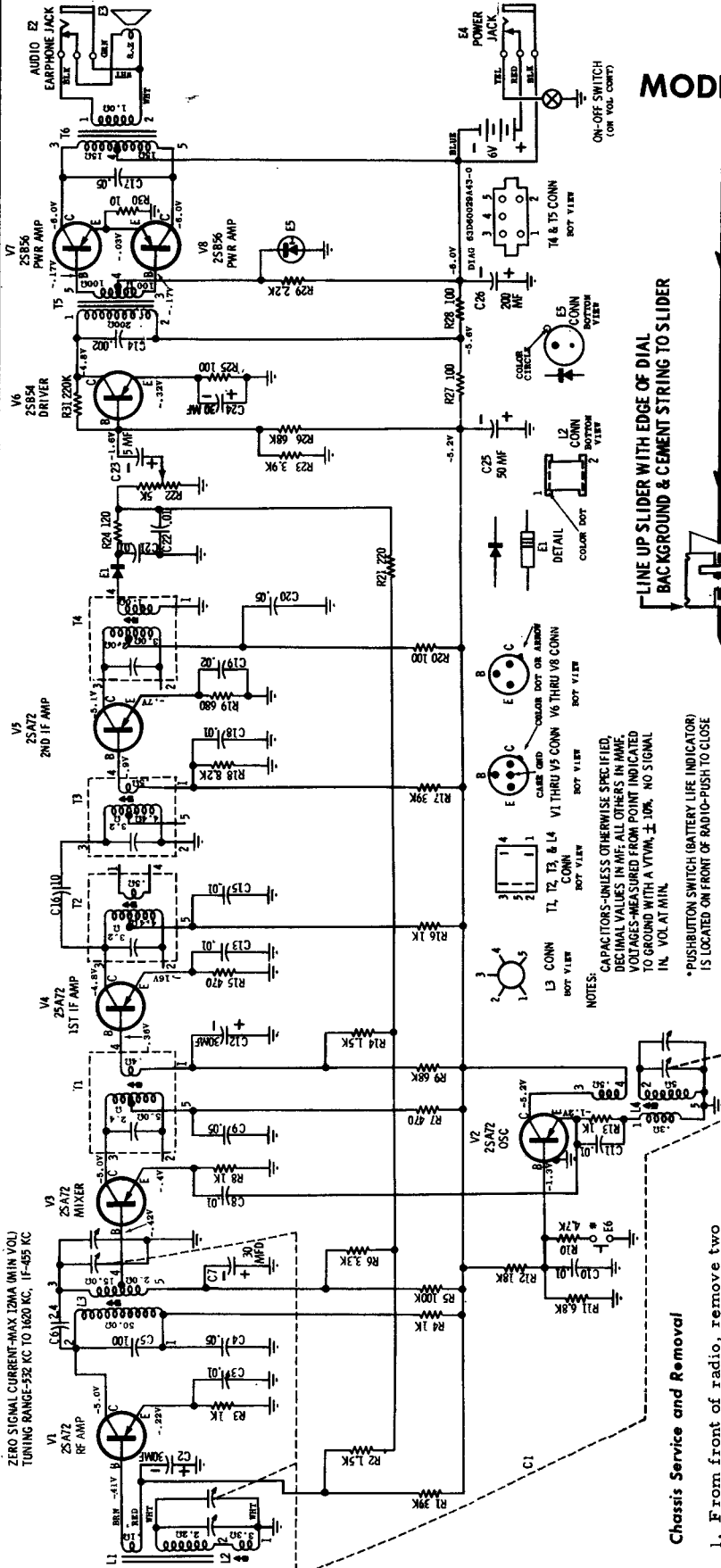
- CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF.
- VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$ NO SIGNAL IN, VOL AT MIN.
- TUNING RANGE - 532 KC TO 1620 KC
- IF - 455 KC
- ZERO SIGNAL CURRENT - APPROX 95 MA (MIN VOL)

Alignment Point Locations



MOTOROLA

MODEL X51 CHASSIS HS-6114



Chassis Service and Removal

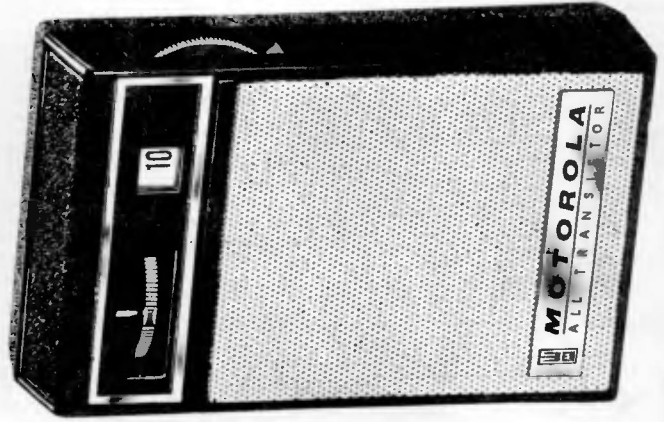
1. From front of radio, remove two (2) control knobs and nuts that mount the earphone jack and the external power supply jack (a special tool is available - order Part No. 66A646211).
2. Remove three (3) cabinet back mounting screws (two (2) are located under the carrying handle; the other is located on the bottom of the cabinet).
3. Lift out escutcheon and chassis from cabinet back.
4. Remove two (2) antenna mounting screws.
5. Remove five (5) chassis mounting screws and lift up chassis and antenna; if necessary, unsolder the chassis connecting leads and remove the nut that mounts the battery life indicator switch.

NOTES:
 CAPACITORS—UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MFD; ALL OTHERS IN MMFD. VOLTAGES—MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$, NO SIGNAL IN VOL AT MIN.
 *PUSHBUTTON SWITCH BATTERY LIFE INDICATOR (S1) IS LOCATED ON FRONT OF RADIO—PUSH TO CLOSE

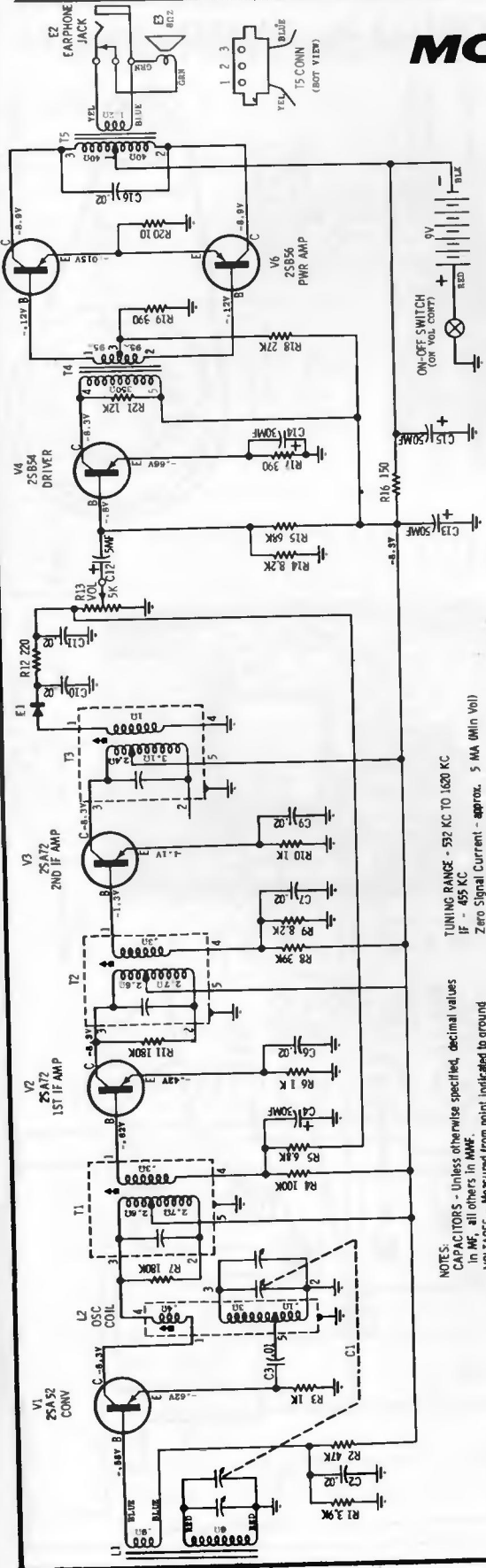
ZERO SIGNAL CURRENT—MAX 120MA (MIN VOL) TUNING RANGE—532 KC TO 1620 KC, IF—455 KC

MOTOROLA

**MODEL X54
CHASSIS HS-6123**



V5
Z5B56
PMR AMP



NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in, vol \neq min.

TUNING RANGE - 52 KC TO 1620 KC
IF - 455 KC
Zero Signal Current - approx. 5 MA (Min Vol)

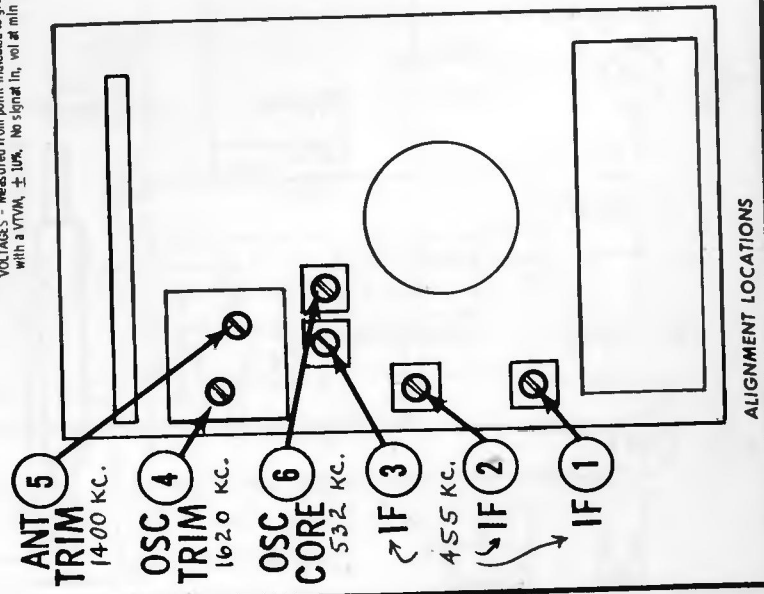
Power Supply

Operates from one (1) 9-volt battery; use Eveready #206 or equivalent.

Battery Drain - 5.0 ma with no input signal and volume at minimum. To measure battery drain, turn radio off and connect a milliammeter across the on-off switch (observe polarity); the meter should read 5.0 ma.

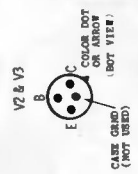
Chassis Removal

1. Remove cabinet back by applying thumb pressure at bottom; then remove one (1) chassis mounting screw located next to tuning gang.
2. Spread cabinet slightly at right side (adjacent to volume control) until chassis is free from its two (2) chassis retainers (part of cabinet). Lift chassis up until it clears all three (3) retainers.
3. If necessary, unsolder all chassis connecting leads. If it becomes necessary to remove the earphone jack, pull jack retainer out of the groove in cabinet wall.

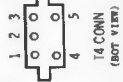


ANT TRIM 1400 KC.
OSC TRIM 1620 KC.
OSC CORE 532 KC.
IF 3 455 KC.
IF 2
IF 1

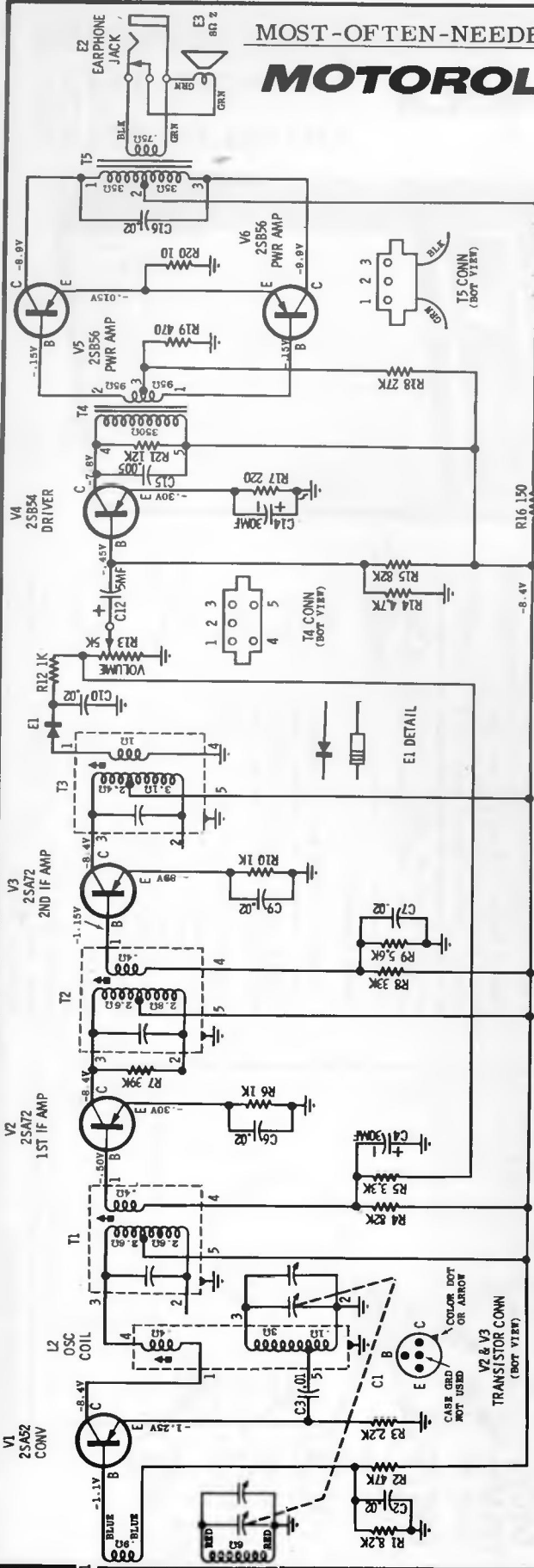
ALIGNMENT LOCATIONS



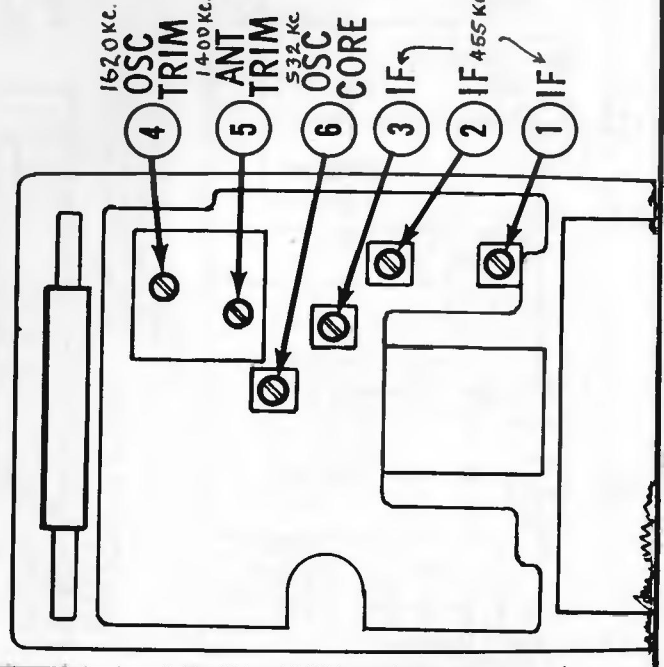
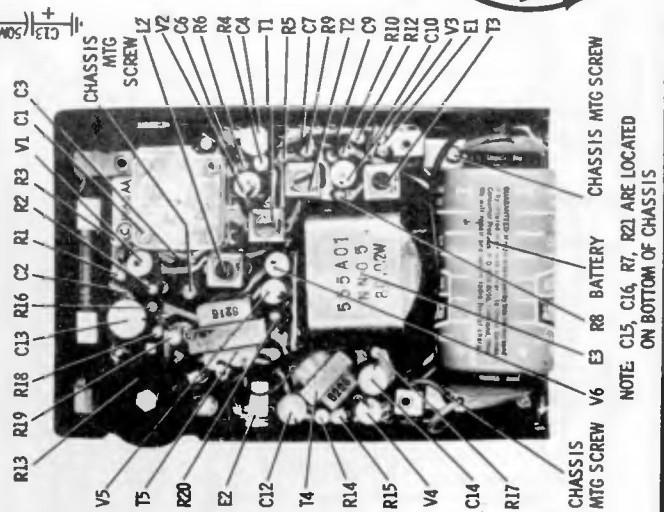
V1, V4, V5 & V6



MOTOROLA MODEL X56 CHASSIS HS-6124

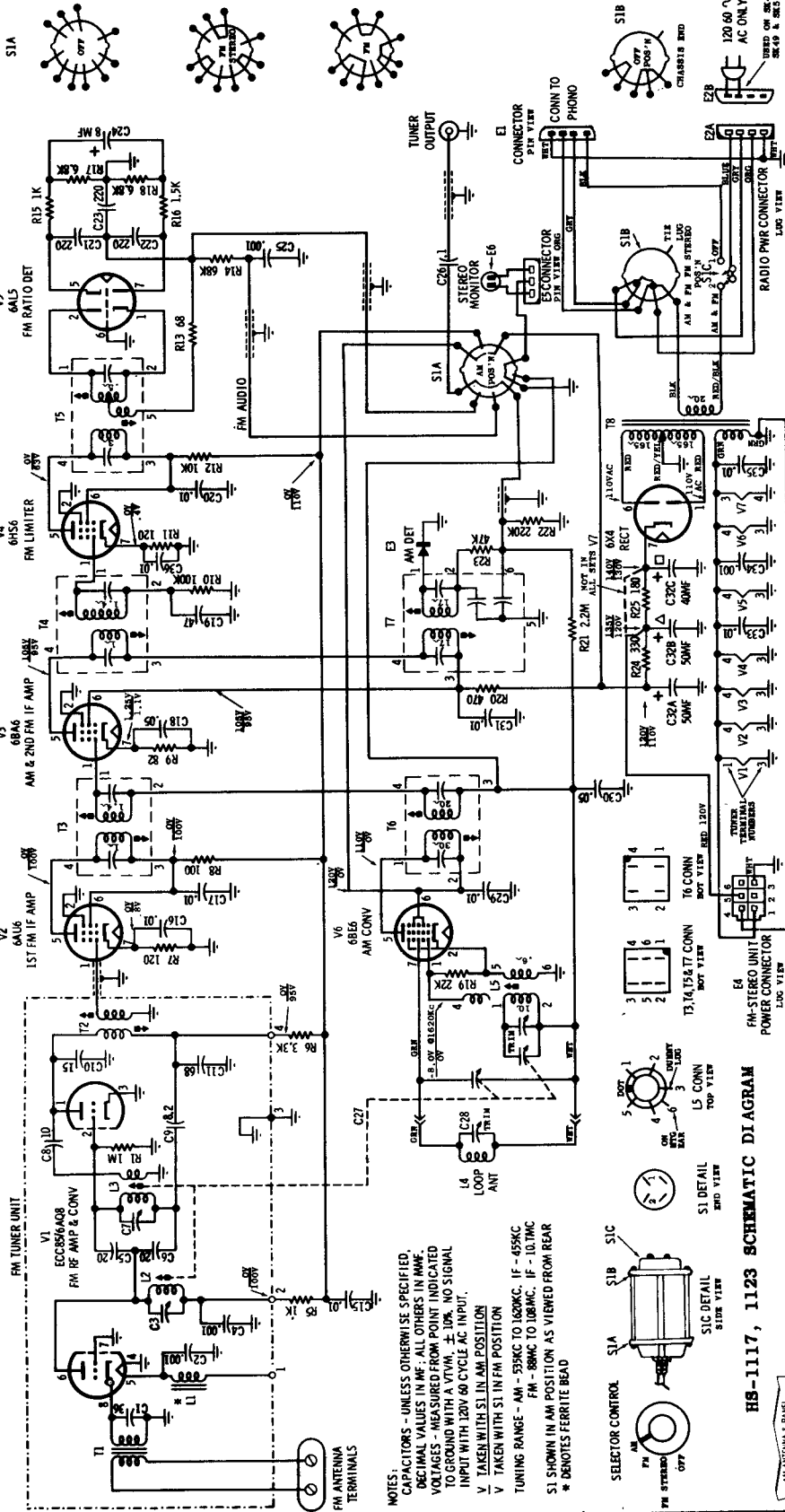


NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF. ALL OTHERS IN MMF.
 VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$, NO SIGNAL IN VOL AT MIN. ZERO SIGNAL CURRENT - APPROX. 3.5 MA (MIN VOL)

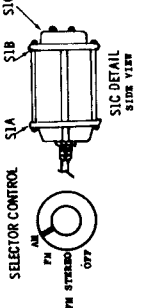


MOTOROLA

MODELS HK53-1 (HS-1117), HK53-2 (HS-1123)

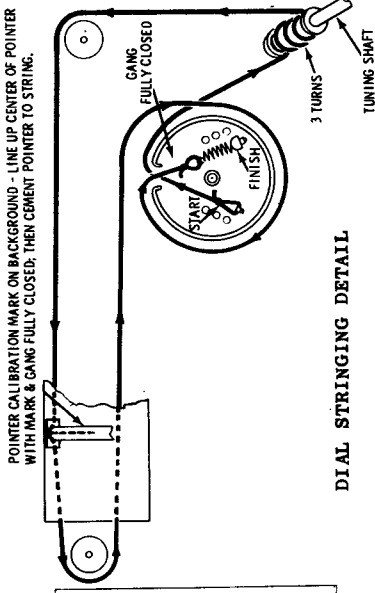
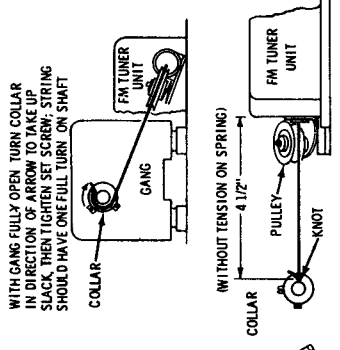


NOTES:
 CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF.
 VOLTAGES - MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$, NO SIGNAL INPUT WITH 120V 60 CYCLE AC INPUT.
 V TAKEN WITH S1 IN AM POSITION
 V TAKEN WITH S1 IN FM POSITION
 TUNING RANGE - AM - 530KC TO 1600KC. IF - 455KC
 FM - 88MC TO 108MC. IF - 10.7MC
 S1 SHOWN IN AM POSITION AS VIEWED FROM REAR
 * DENOTES FERRITE BEAD

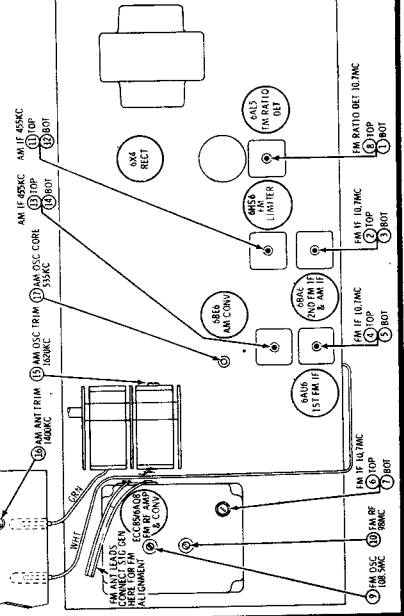


HS-1117, 1123 SCHEMATIC DIAGRAM

(This tuner is used in various combinations)

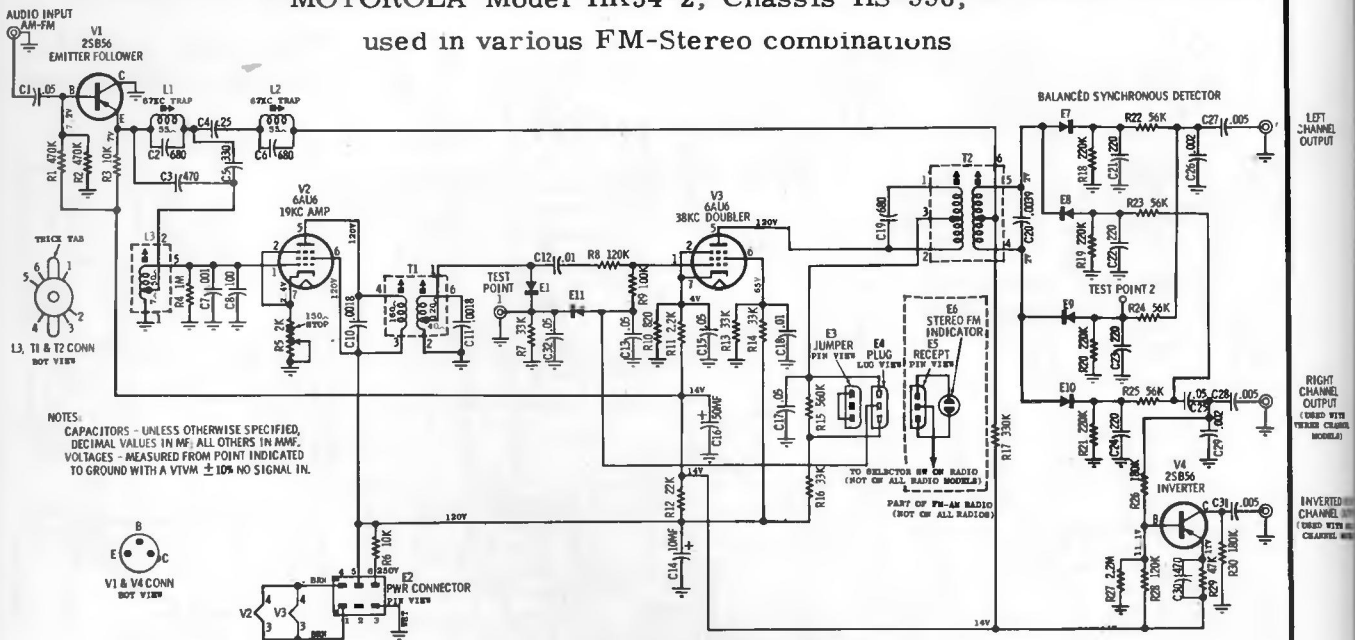


DIAL STRINGING DETAIL

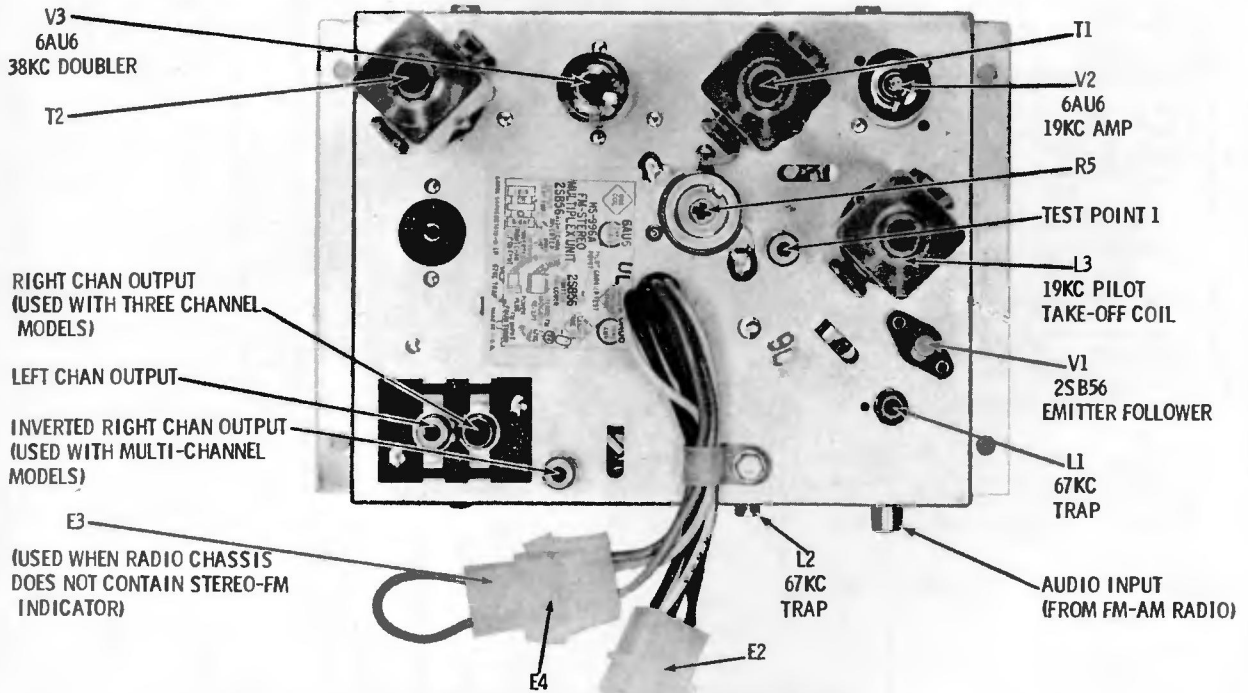


ALIGNMENT LOCATION DETAIL

MOTOROLA Model HK54-2, Chassis HS-996,
used in various FM-Stereo combinations



HS-996AB SCHEMATIC DIAGRAM



METHOD ALIGNMENT OF HK-54-2 USING AN FM-STEREO STATION AIR SIGNAL

NOTE: Storecast traps cannot be aligned using an air signal. A generator must be used for trap alignment.

19Kc Pilot Carrier Channel Alignment And 38Kc Frequency Doubler Adjustment

With stereo radio tuned to a good stereo-FM broadcast and output of radio applied to audio input jack of HK-54-2, proceed as follows:

1. Connect positive lead of VTVM to Test Point 1; negative lead to ground.
2. Adjust L-3 and primary and secondary of T-1 for maximum indication on VTVM.
3. Move VTVM to Test Point 2 and adjust T-2 primary and secondary for maximum meter indication.
4. Move VTVM to Test Point 1 and while monitoring this voltage, care-

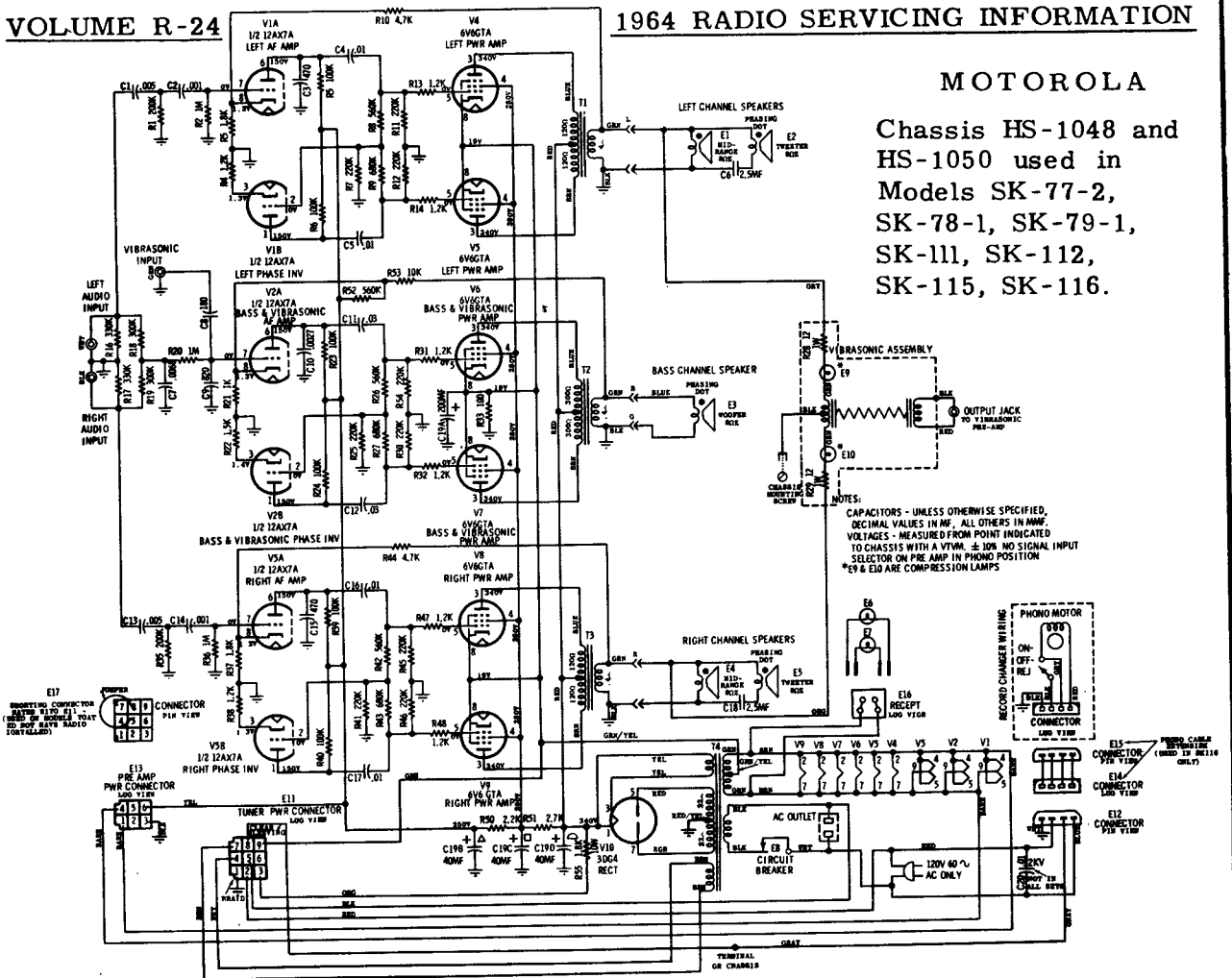
fully adjust L-3 for maximum separation in left and right speakers on program material. This maximum separation point should be very near peak meter indications.

Adjustment of Sensitivity Control, R 5

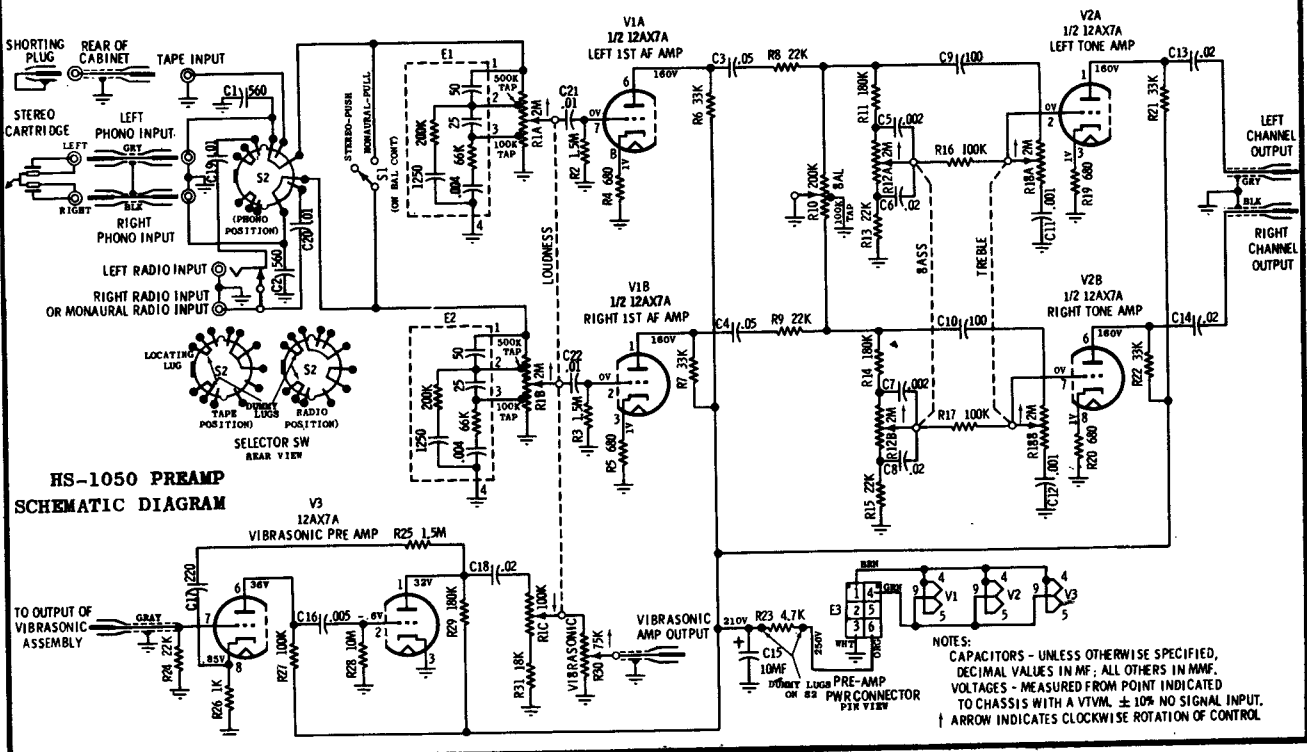
The control should be set so that the stereo monitor lights on stereo signals but does not light on noise in between stations.

MOTOROLA

Chassis HS-1048 and HS-1050 used in Models SK-77-2, SK-78-1, SK-79-1, SK-111, SK-112, SK-115, SK-116.



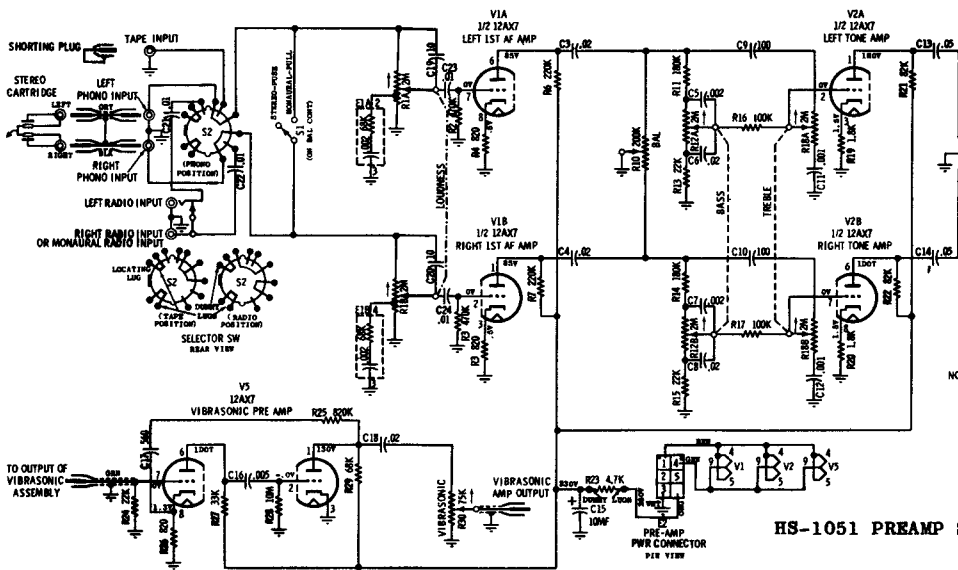
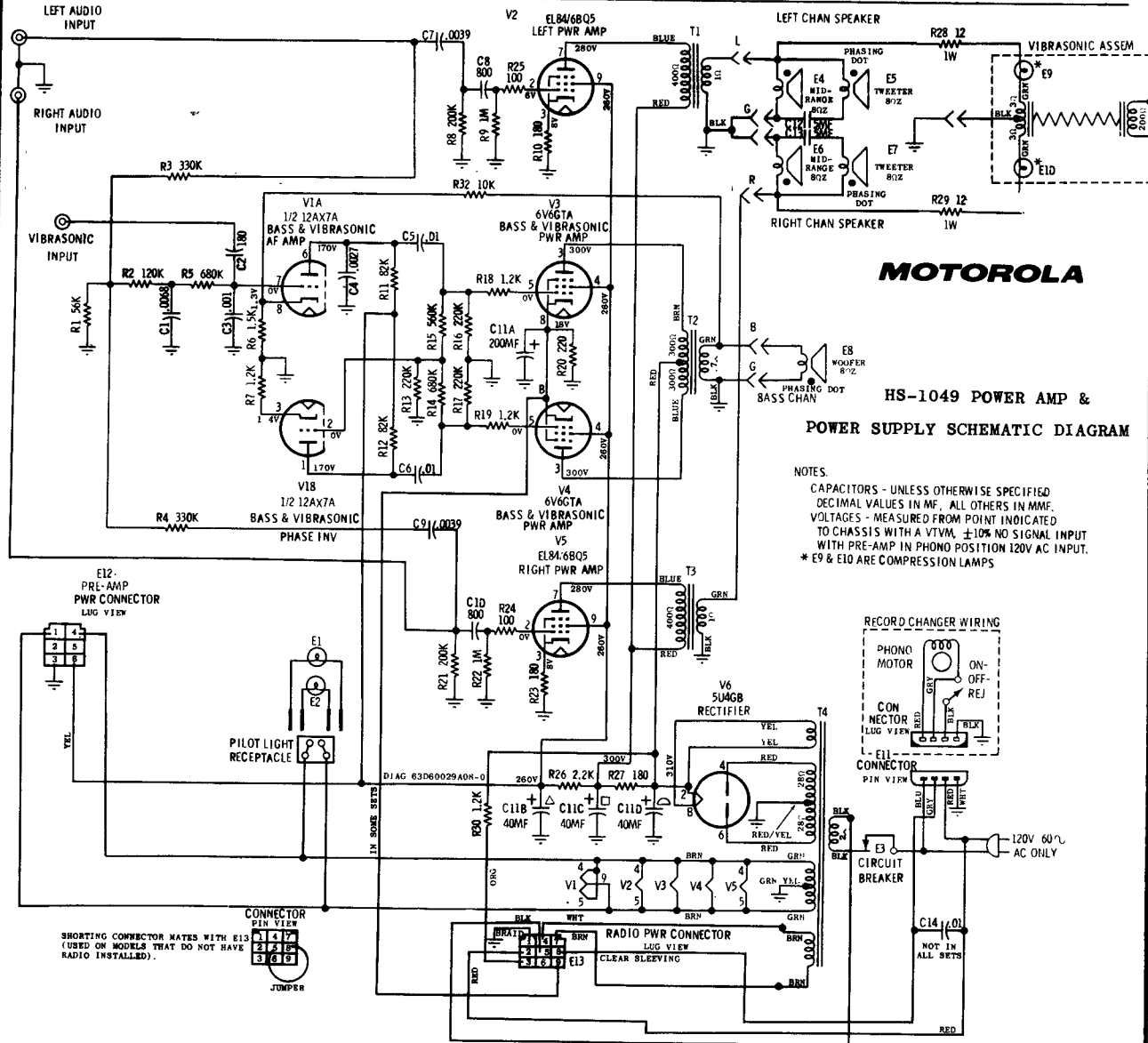
HS-1048 POWER AMP & POWER SUPPLY SCHEMATIC DIAGRAM



HS-1050 PREAMP SCHEMATIC DIAGRAM

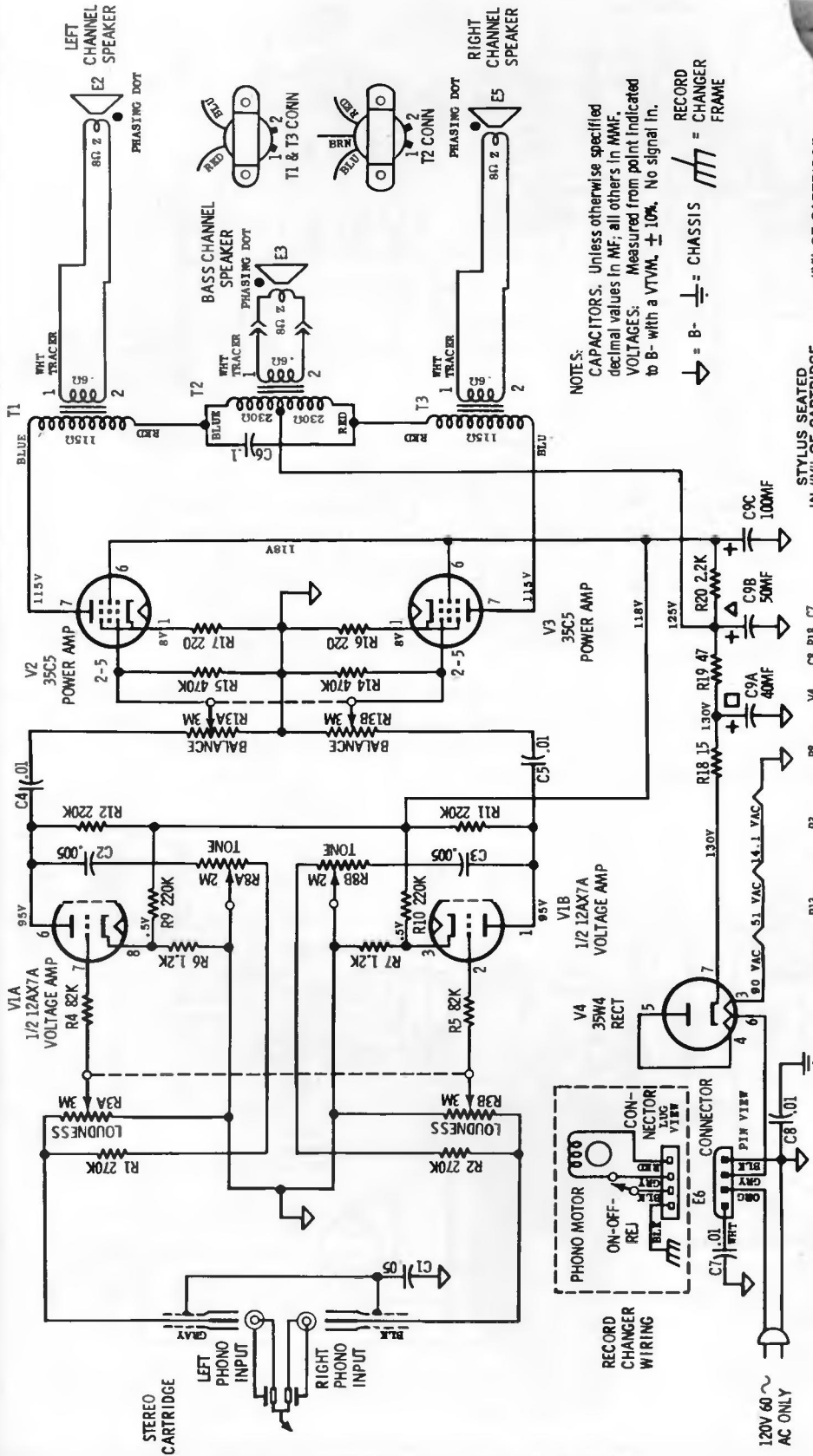
NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF, ALL OTHERS IN MMF. VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM, ± 10% NO SIGNAL INPUT. *E9 & E10 ARE COMPRESSION LAMPS. † ARROW INDICATES CLOCKWISE ROTATION OF CONTROL.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

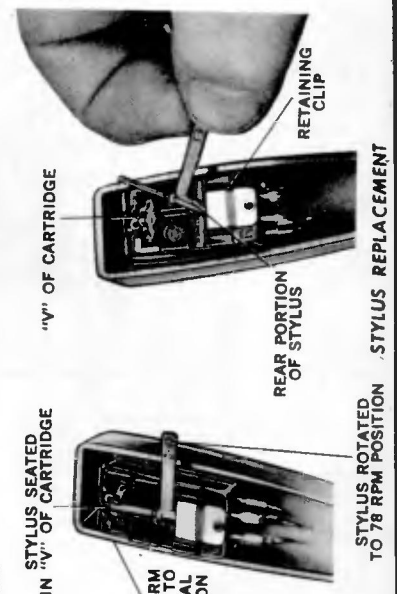


Chassis HS-1049 with HS-1051 used in sets SK106, SK107, SK109, SK110.

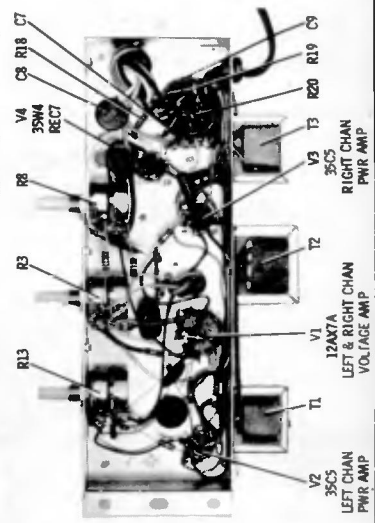
MOTOROLA MODELS SK100-4, SK124, SK125 CHASSIS HS-1201



NOTES:
 CAPACITORS: Unless otherwise specified decimal values in MF; all others in MMF.
 VOLTAGES: Measured from point indicated to B- with a VTVM, $\pm 10\%$. No signal in.
 \rightarrow = B- = CHASSIS
 \equiv = RECORD FRAME



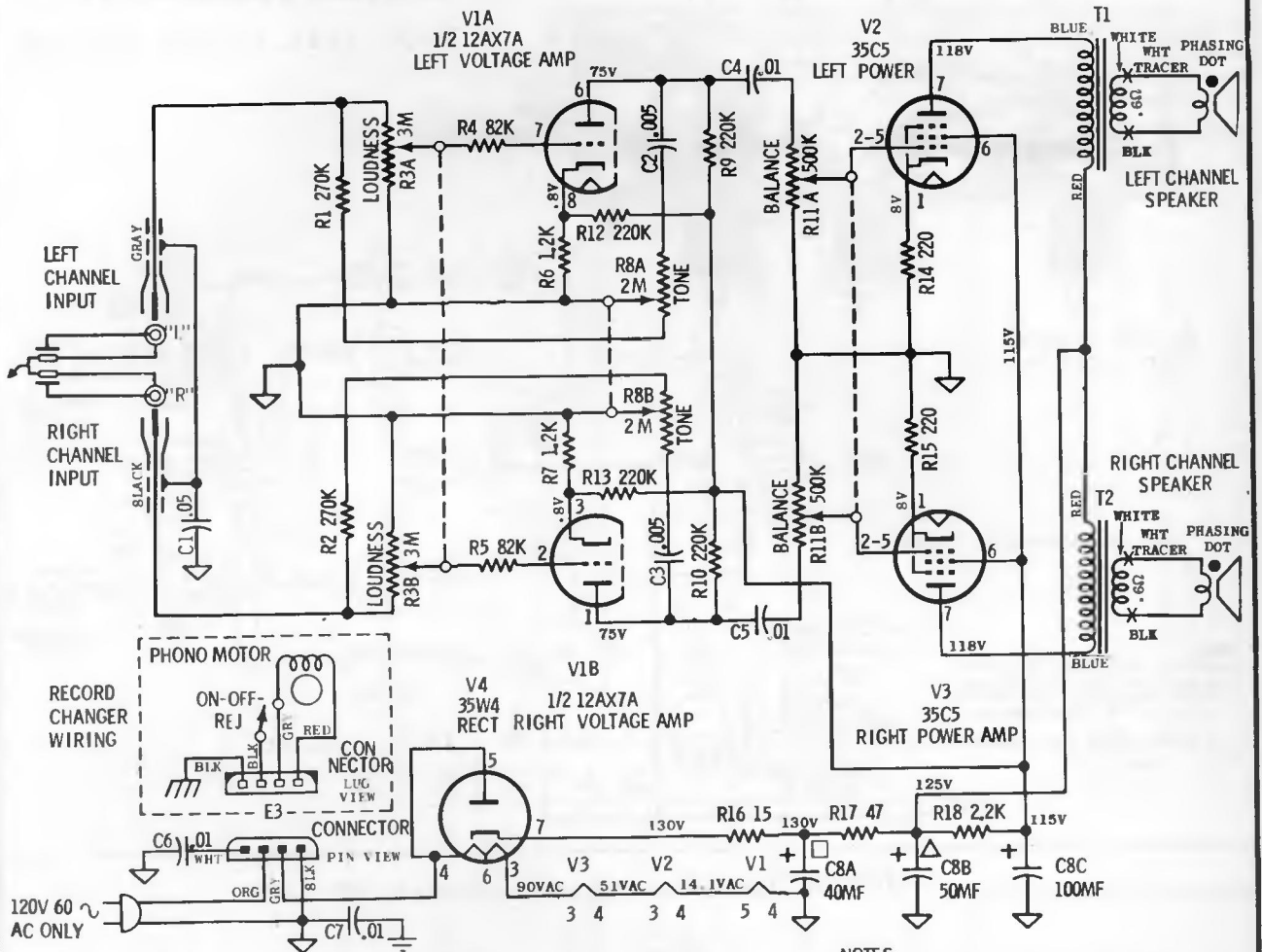
RETAINING CLIP
 REAR PORTION OF STYLUS
 STYLUS ROTATED TO 78 RPM POSITION
 STYLUS REPLACEMENT
 STYLUS SEATED IN "V" OF CARTRIDGE
 TONE ARM RAISED TO VERTICAL POSITION



CHASSIS REMOVAL

1. From bottom of cabinet, disconnect all leads and cables connected to chassis (on SK100-4, remove bottom panel first).
2. From inside record changer compartment, remove 3 control knobs and loosen large hex nuts located under knobs; then grasp the chassis from bottom and loosen nuts completely.
3. Remove chassis from cabinet.

MOTOROLA MODEL SK119 CHASSIS HS-1192

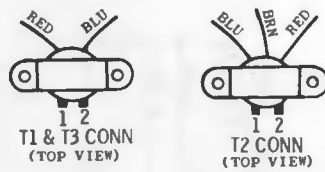


CHASSIS REMOVAL

1. From bottom of cabinet, disconnect all leads and cables connected to chassis.
2. From inside record changer compartment, remove 3 control knobs and loosen large hex nuts located under knobs; then grasp chassis from bottom and loosen nuts completely.
3. Remove chassis from cabinet.

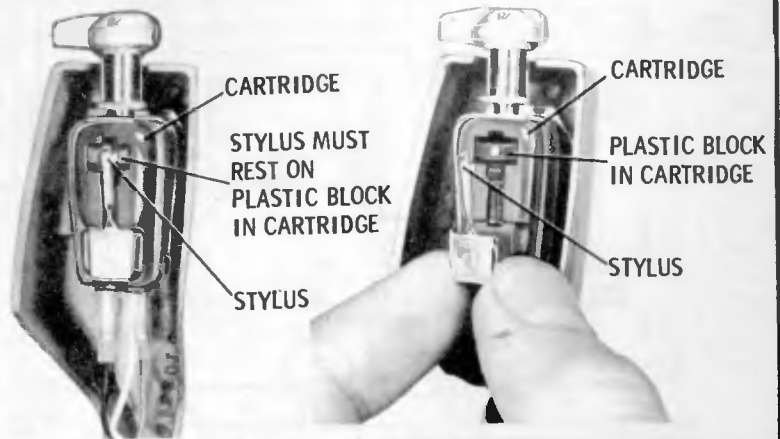
RECORD CHANGER REMOVAL

1. Turn the 2 changer mounting screws clockwise until they are flush with the changer base.
2. From underside of changer, disconnect all cables from record changer.
3. Turn the mounting clips located at the ends of the mounting screws so they are parallel with the mounting screws, then lift changer out of cabinet.



NOTES:

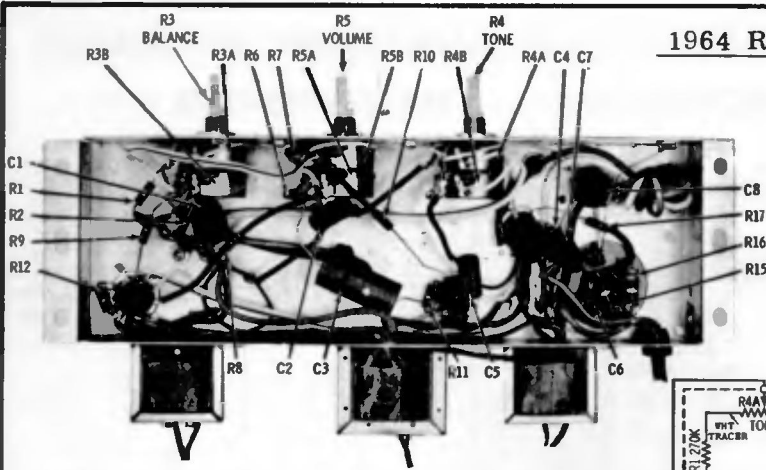
CAPACITORS - Unless otherwise specified decimal values in MF; all others in MMF.
 VOLTAGES - Measured from point indicated to B- with a VTVM, +10%. No signal in.



STYLUS REPLACEMENT

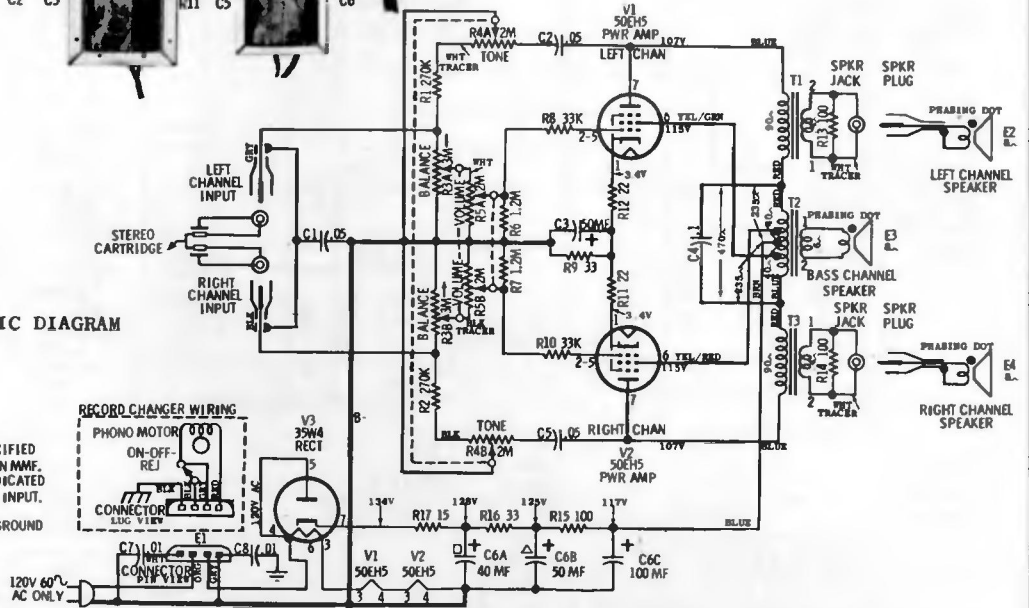
1964 RADIO SERVICING INFORMATION

MOTOROLA
Model SP44, Chassis HS-1058



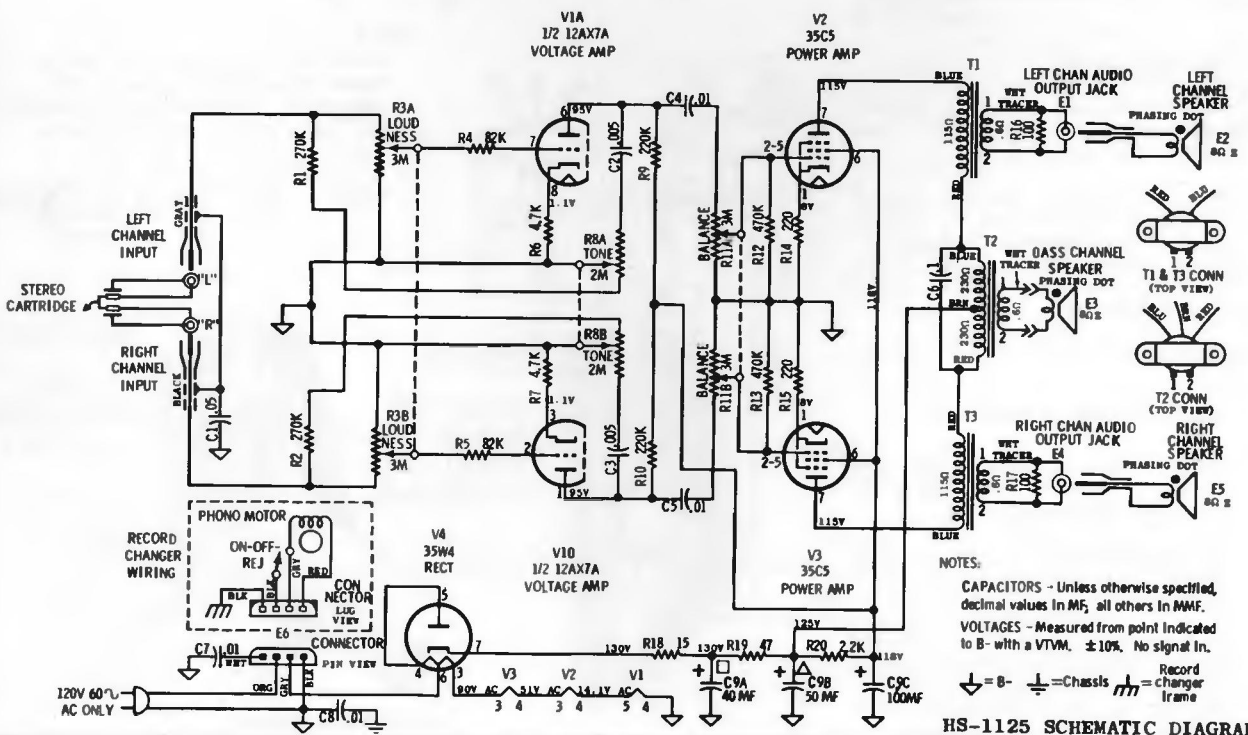
HS-1058 CHASSIS
PARTS LOCATION

HS-1058 SCHEMATIC DIAGRAM



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED
DECIMAL VALUES IN MF. ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM POINT INDICATED
TO B- WITH A VTVM. $\pm 10\%$ NO SIGNAL INPUT.
⊥ = CHASSIS GROUND $\text{---} \text{---}$ = RC GROUND
— = 0-

MOTOROLA Model SP44-1, Chassis HS-1125

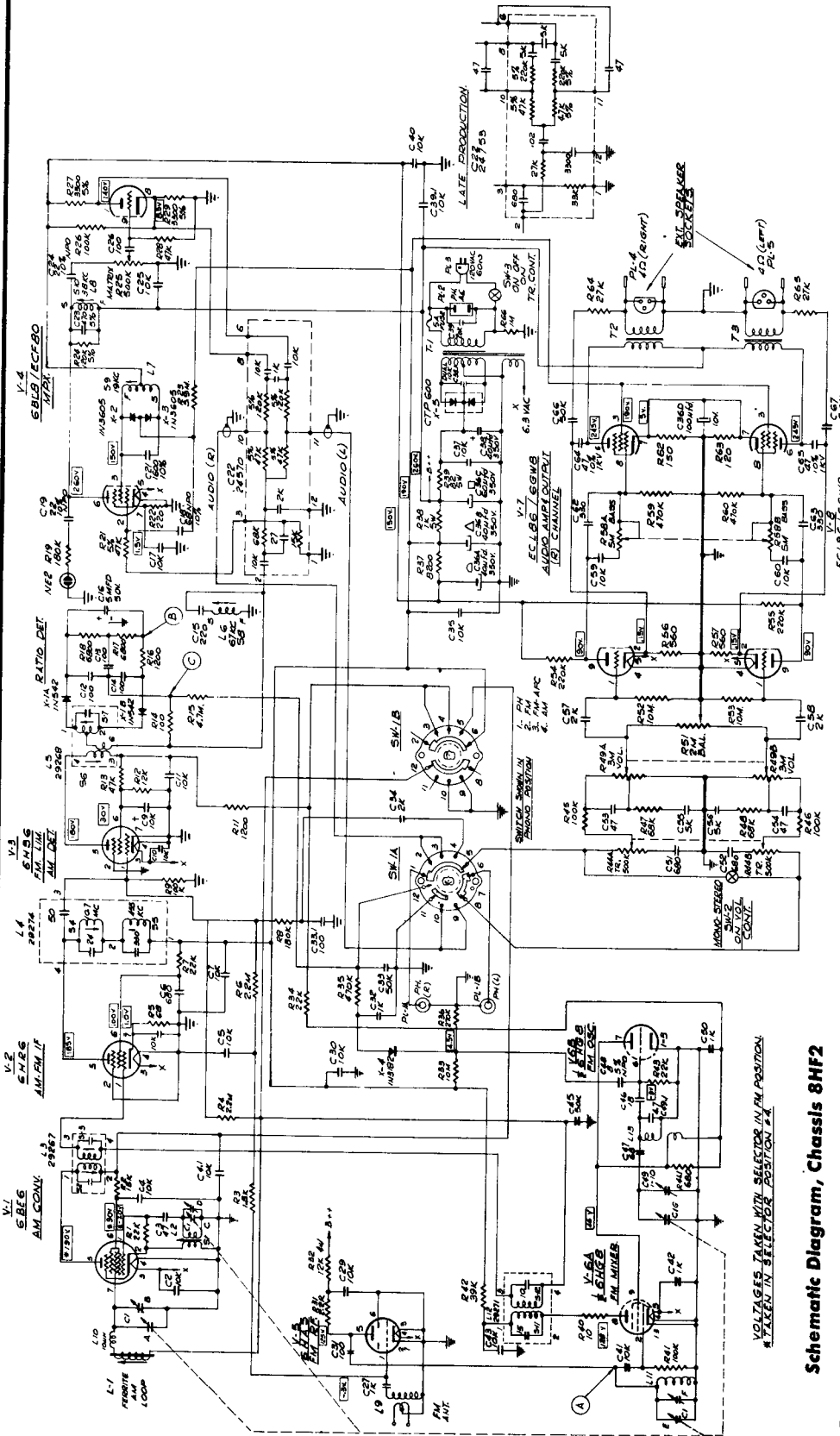


NOTES:
CAPACITORS - Unless otherwise specified,
decimal values in MF, all others in MMF.
VOLTAGES - Measured from point indicated
to B- with a VTVM. $\pm 10\%$. No signal in.
⊥ = B- ⊥ = Chassis $\text{---} \text{---}$ = Record
changer frame

HS-1125 SCHEMATIC DIAGRAM

Packard Bell

Model RC-1S, using Chassis 8HF1 or 8HF2
(Continued on the next page)




Intermediate Frequencies:
AM Radio: 455 kc
FM Radio: 10.7 mc





Model RC-1S contains either chassis 8HF1 or chassis 8HF2. These chassis are similar, each being an AM/FM radio receiver with built-in multiplex circuitry. The major difference between the 8HF1 and 8HF2 is that the tube types of V-5 and V-6 differ, along with the associated circuitry. See schematics for details of differences.

Schematic Diagram, Chassis 8HF2

VOLTAGES TAKEN WITH SELECTOR IN FM POSITION
* TAKEN IN SELECTOR POSITION 2A



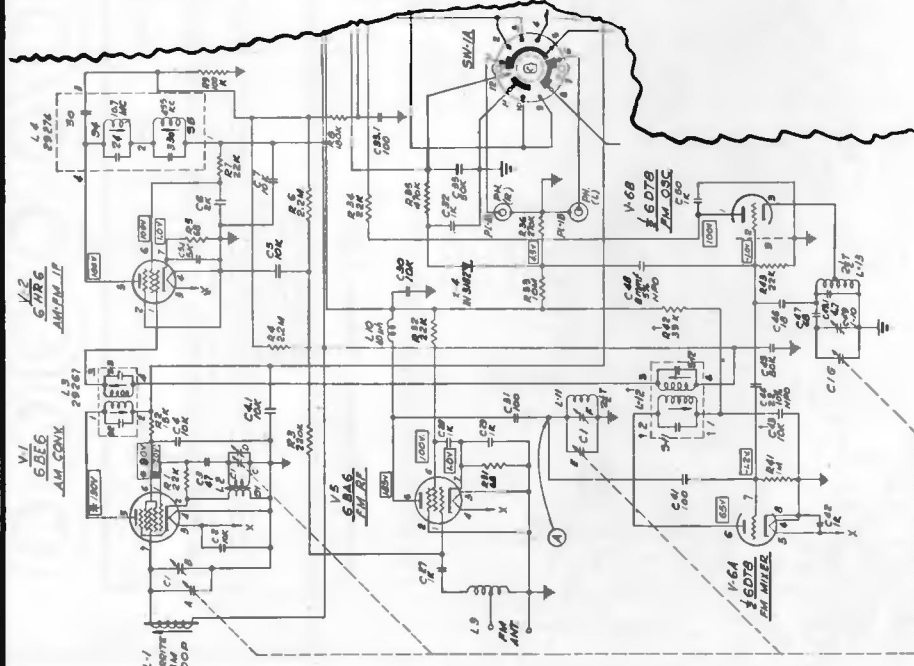
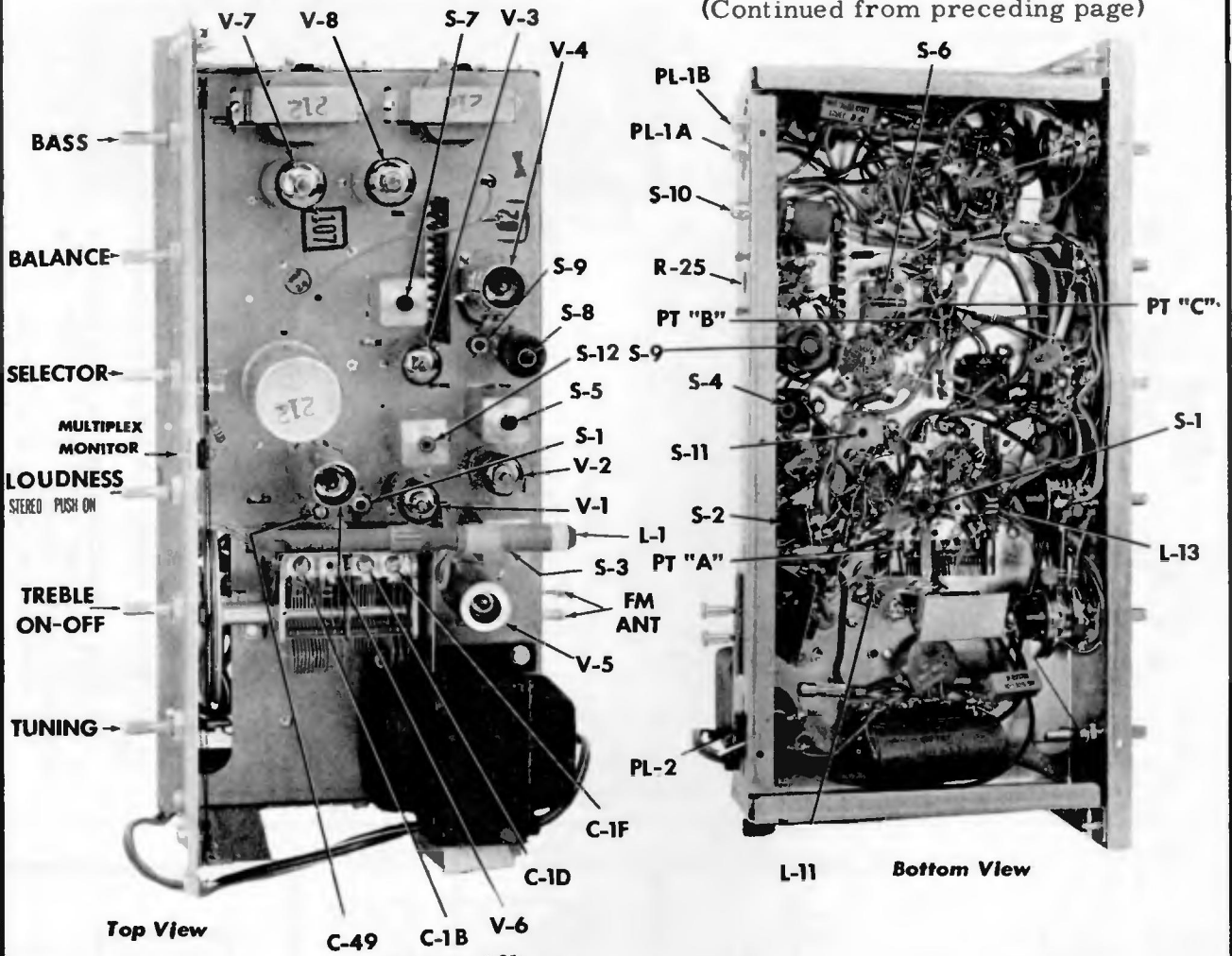
AM 55 80 70 80 100 120 140 160		FM 88 90 94 97 101 104 106 108 110	
BASS	BALANCE	TREBLE	TUNING

Control Panel, Model RC-1S

Packard Bell

Model RC-1S, Chassis 8HF1 or 8HF2
(Continued from preceding page)

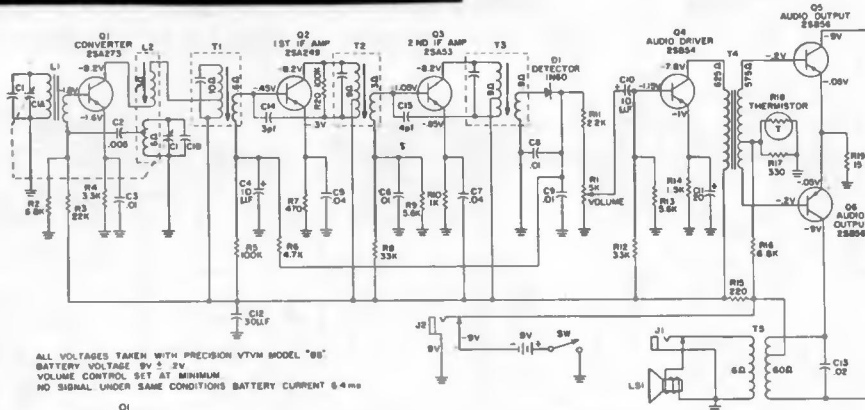


Partial diagram of Chassis 8HF1, showing differences from 8HF2.

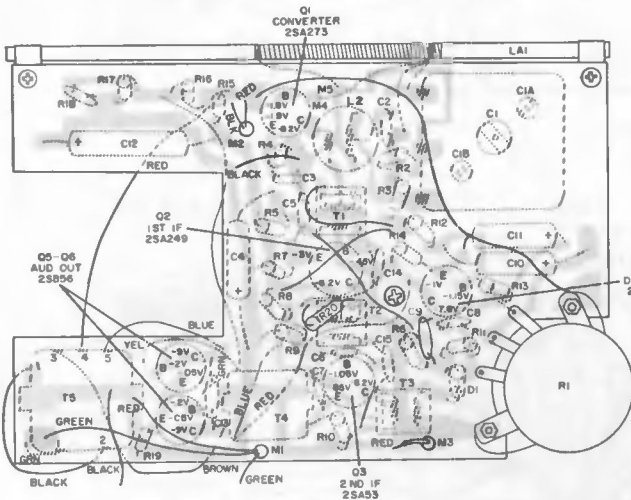
PRODUCTION MODIFICATION ON 8HF1
 Capacitors C-9 and C-43 were changed from 2000 mmf to 10,000 mmf.
 Resistor R-42 was changed from 220,000 ohms to 39,000 ohms.
 Chassis stamped with the number 4104 (or a higher number) contain the production modification described above.
MARKING FOR 8HF2 CHASSIS:
 Models containing chassis 8HF2 are stamped with the number 4116.

PHILCO

TRANSISTOR PORTABLE MODEL T-67



ALL VOLTAGES TAKEN WITH PRECISION VTVM MODEL "88"
BATTERY VOLTAGE 9V ± 2V
VOLUME CONTROL SET AT MINIMUM
NO SIGNAL UNDER SAME CONDITIONS BATTERY CURRENT 6.4 ma



PANEL REMOVAL - To remove panel from cabinet, lift out jack assembly and remove screw in panel located at D5 (see graph). Panel may now be lifted out; speaker will remain in cabinet.

Foil Side of Perma-Circuit Panel

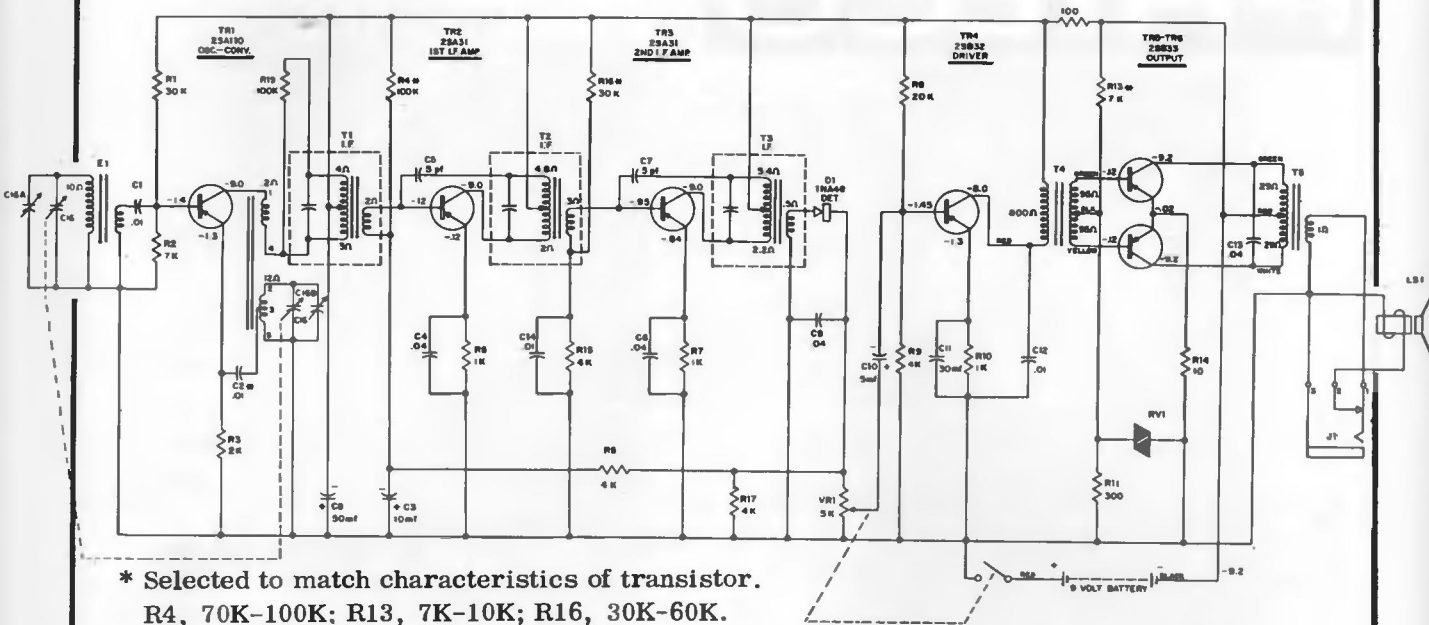
ALIGNMENT: Allow the test equipment at least 15 minutes to warm up before starting the alignment procedure. Connect an a-c VTVM or oscilloscope across the speaker voice coil. Use an AM R-F signal generator connected as indicated in chart. Keep generator output low enough to prevent A.G.C. overload.

ALIGNMENT CHART

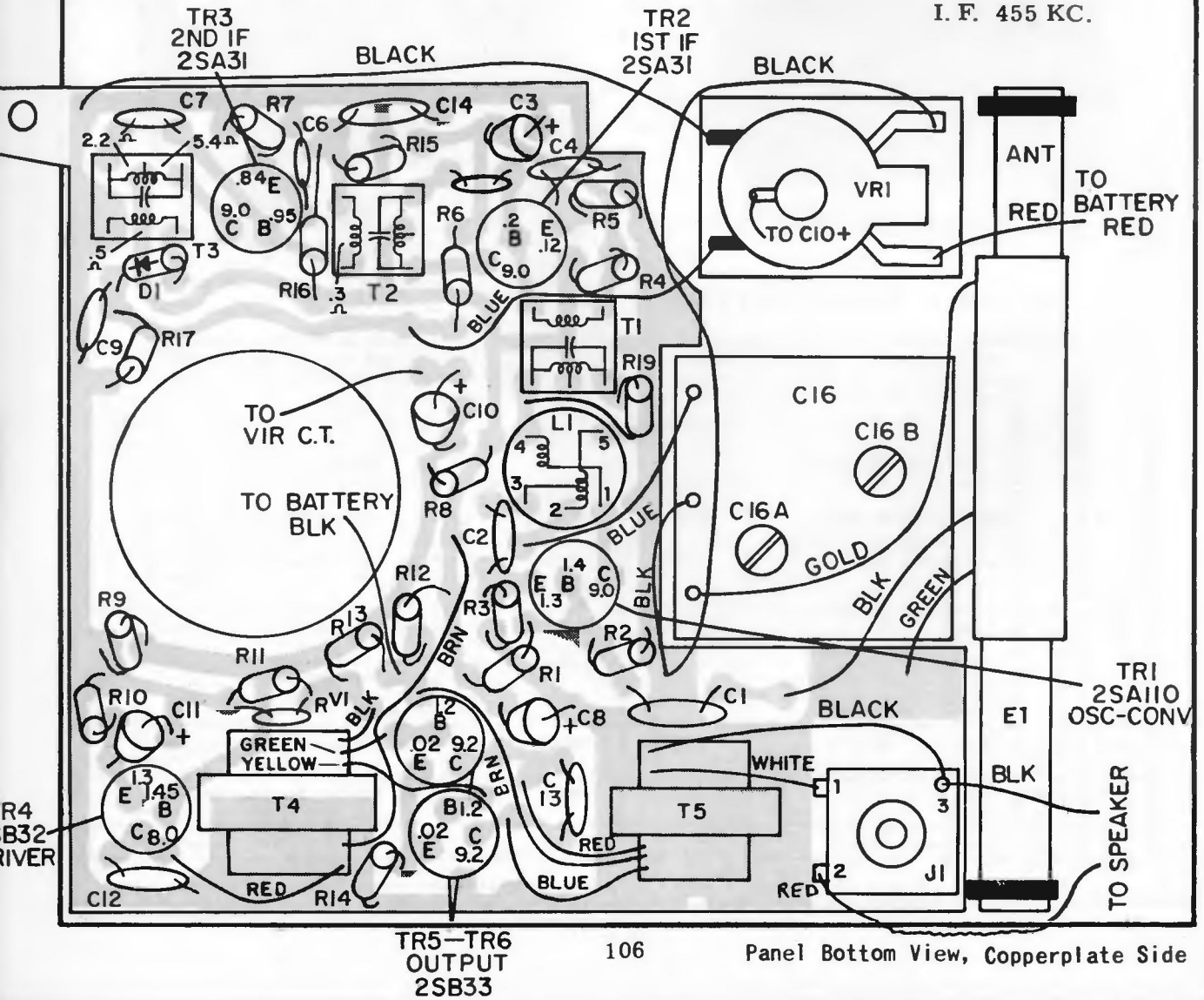
STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Use radiating loop (see note 1 below)	455KC	1600KC gang fully open	Adjust for maximum output in order given	T3-3rd I-F T2-2nd I-F T1-1st I-F
2	Same as Step 1	540KC	540KC	Adjust for maximum output. Adjust L1 by sliding coil on core and waxing into position of maximum output. Rock tuning gang while adjusting L2.	L2-osc. L1-ant. coil
3	Same as Step 1	1600KC	1600KC	Adjust for maximum output.	C1A-ant. trimmer
4	Same as Step 1	1400KC	1400KC	Adjust for maximum output.	C1B-osc. trimmer
5	Repeat last three steps.				

NOTE 1: Use a 6 to 8 turn, 6-inch diameter loop made up of insulated wire. Connect to generator terminals and loose couple to radio antenna.

PHILCO Transistor Portable Model T-68

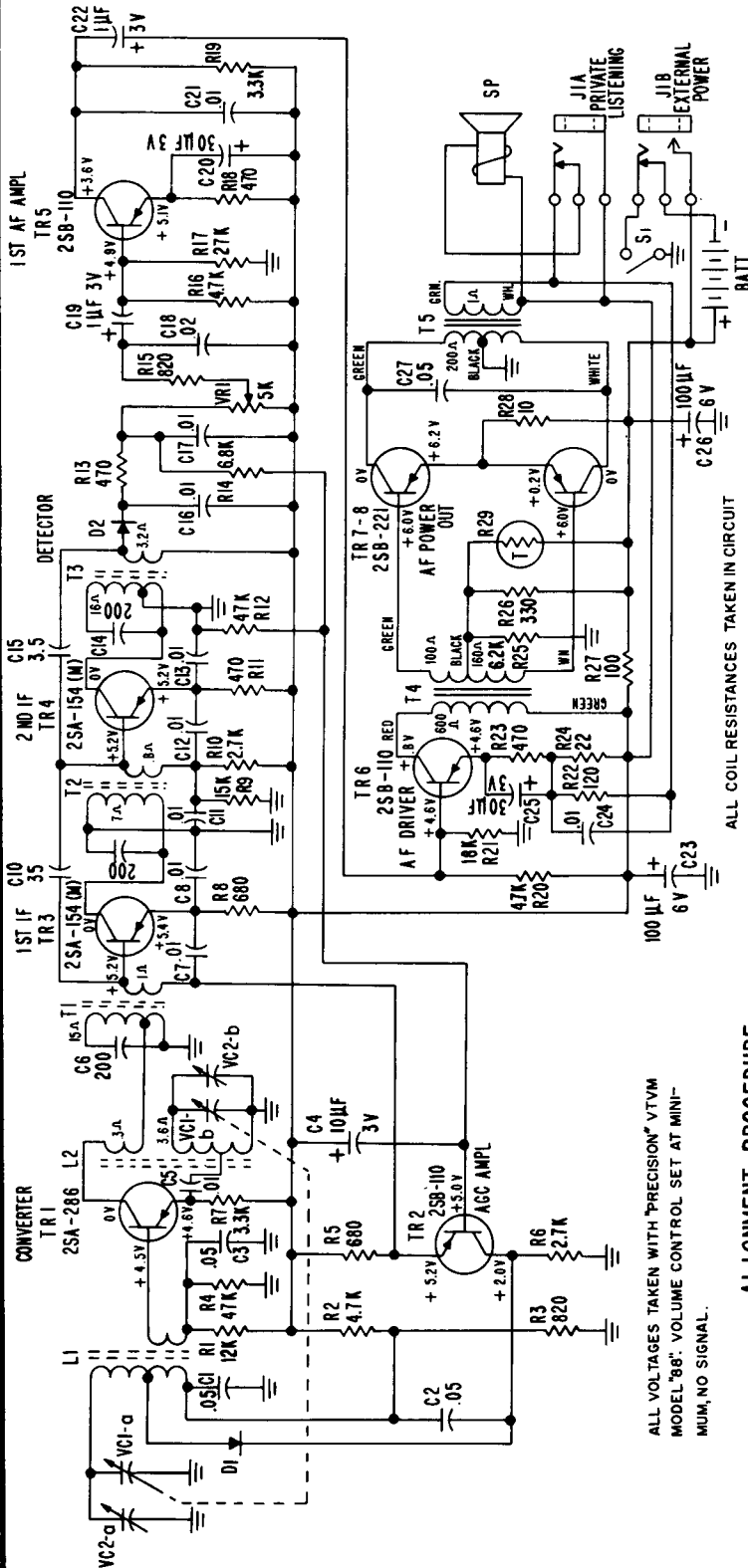


I. F. 455 KC.



PHILCO

PORTABLE TRANSISTOR RADIO — MODEL T-84



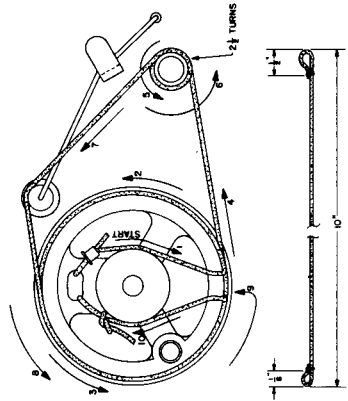
ALL COIL RESISTANCES TAKEN IN CIRCUIT

ALL VOLTAGES TAKEN WITH "PRECISION" VTVM MODEL "86". VOLUME CONTROL SET AT MINIMUM, NO SIGNAL.

ALIGNMENT PROCEDURE

Allow the test equipment at least fifteen (15) minutes to warm up before starting the alignment procedure. Connect an a-c VTVM or oscilloscope across the speaker voice coil. Use an AM-R-F signal generator connected to a test loop placed in close proximity to the receiver antenna. Keep generator output low enough to prevent A.V.C. overload. Set volume at maximum.

STEP	SIGNAL GENERATOR SETTING	DIAL INDICATOR SETTING	ADJUST FOR MAX. OUTPUT
1	455KC	Quiet point near 1600KC	I-F transformers T3, T2, T1
2	1600KC	1600KC	CV2-b (osc. trimmer)
3	1400KC	1400KC	CV2-a (RF trimmer)
4	540KC	540KC	L2 (osc. -slug)
5	600KC	600KC	L1 (ant.)
6	Repeat steps 2, 3, 4 and 5.		



Dial Cord - Model T-84

PANEL REMOVAL -

The complete panel, tuning dial and knob assembly is removed by extracting three Phillips head screws located as follows: 1 - single screw on right end of panel (viewing from rear); 2 - screw holding metallic mounting assembly tab located between volume control knob and tuning dial; 3 - screw holding metallic mounting assembly tab located between tuning knob and case bottom. Note that it is advisable to slide the external power jack free of the cabinet to prevent strain on the connecting leads.

PORTABLE TRANSISTOR RADIO — MODEL T-84

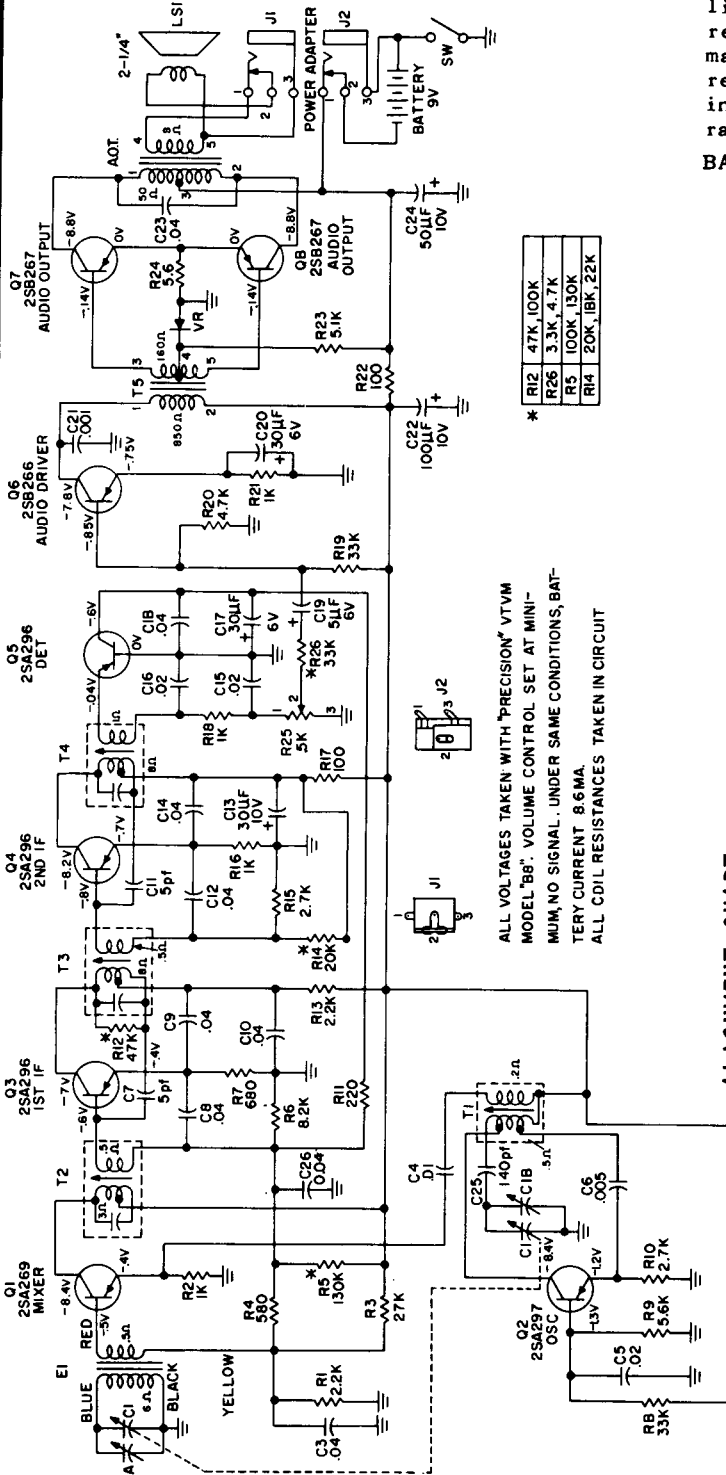
PHILCO

(Continued on the next page, at right)

TRANSISTOR PORTABLE MODEL T-81

Panel Removal - To remove panel from cabinet, remove three Phillips head screws located at A1, C9 and G1 (see bottom component location view). Panel and jack assembly may now be lifted out simultaneously. The speaker will remain in the cabinet. Jack assembly and panel may not be removed separately. They must be removed together. Remove jack assembly by prying up side of jack assembly toward front of radio.

BATTERY SUPPLY - One 9 volt type 216 battery. Special receptacle provided for connecting a line connected power supply. Special receptacle automatically disconnects internal battery with use of external supply.



ALIGNMENT CHART

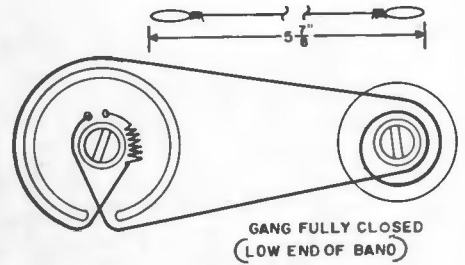
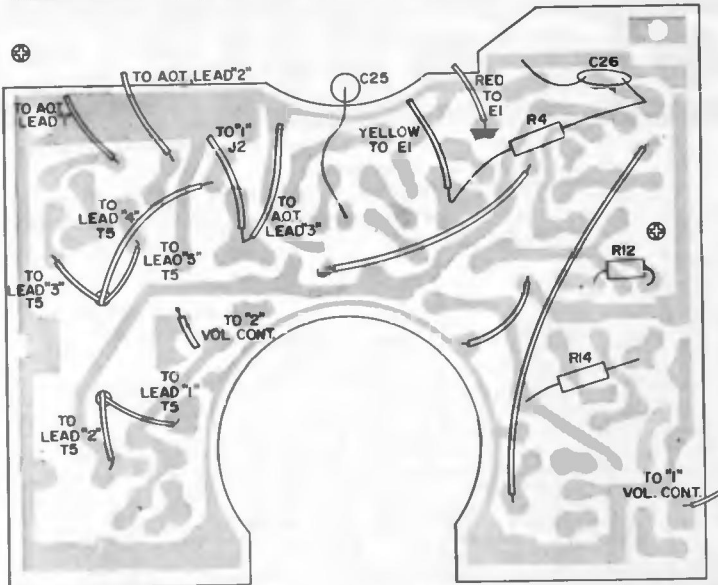
STEP	SIGNAL GENERATOR	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	RADIO	ADJUST
1	To base of mixer, Q1 through a .01 µfd cap.	455KC	Quietpoint near 1600KC	Adjust for max. output in order given.		T4-3rd I-F T3-2nd I-F T2-1st I-F
2	Radiating loop (See Note below)	600KC	600KC	Adjust for max. output.		T1-osc.
3	Radiating loop	1500KC	1500KC	Adjust for max. output.		C1B-osc. trimmer
4	Repeat steps 2 and 3 until no further improvement is obtained.					
5	Radiating loop	600KC	600KC	Adjust for max. output by sliding ant. coil on core.		E1 - antenna
6	Radiating loop	1500KC	1500KC	Adjust for maximum output.		C1A - ant. trimmer
7	Repeat steps 5 and 6 until no further improvement is obtained.					

Note: For radiating loop, 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 antenna coil.

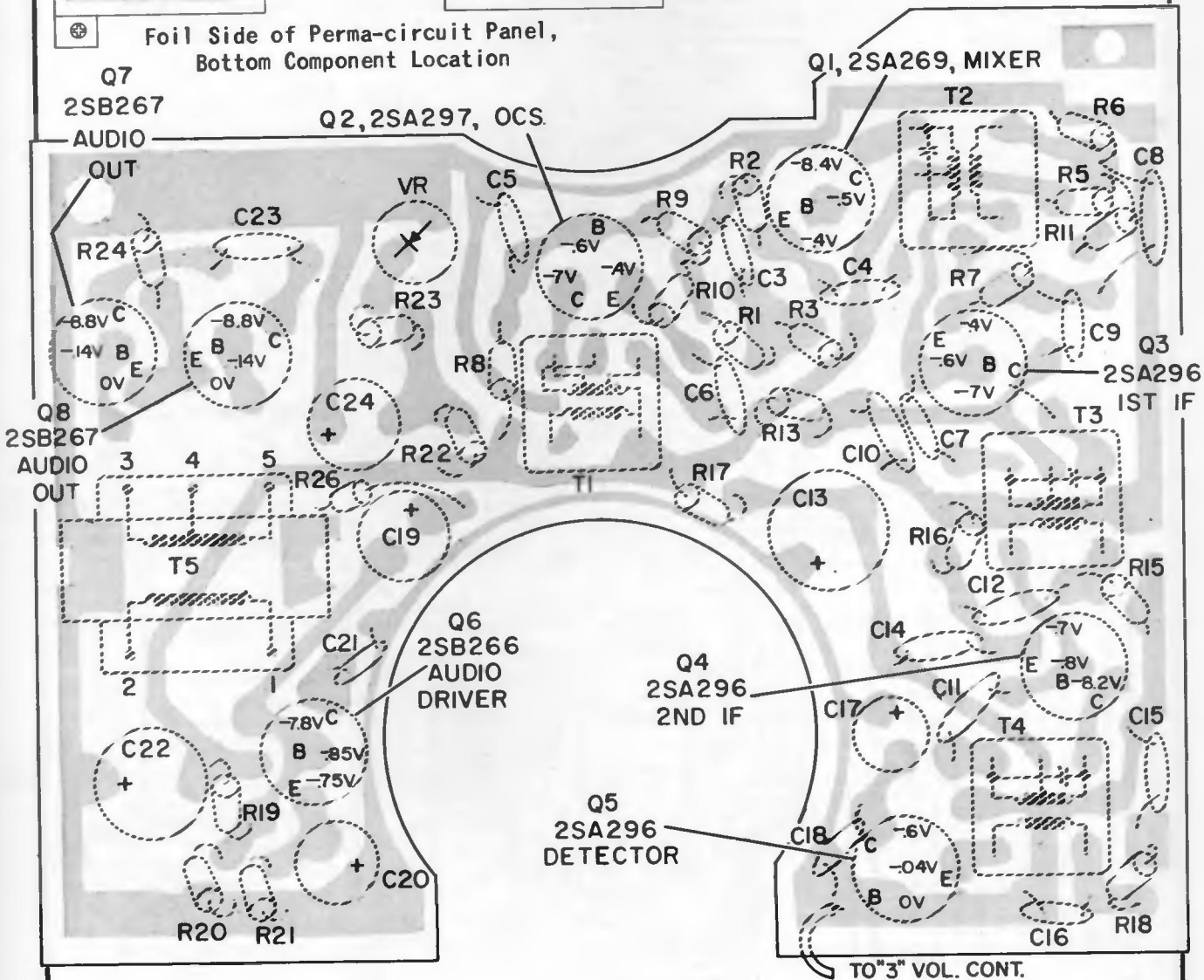
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

PHILCO
MODEL T-81

(Continued from preceding page at left)



Foil Side of Perma-circuit Panel,
Bottom Component Location

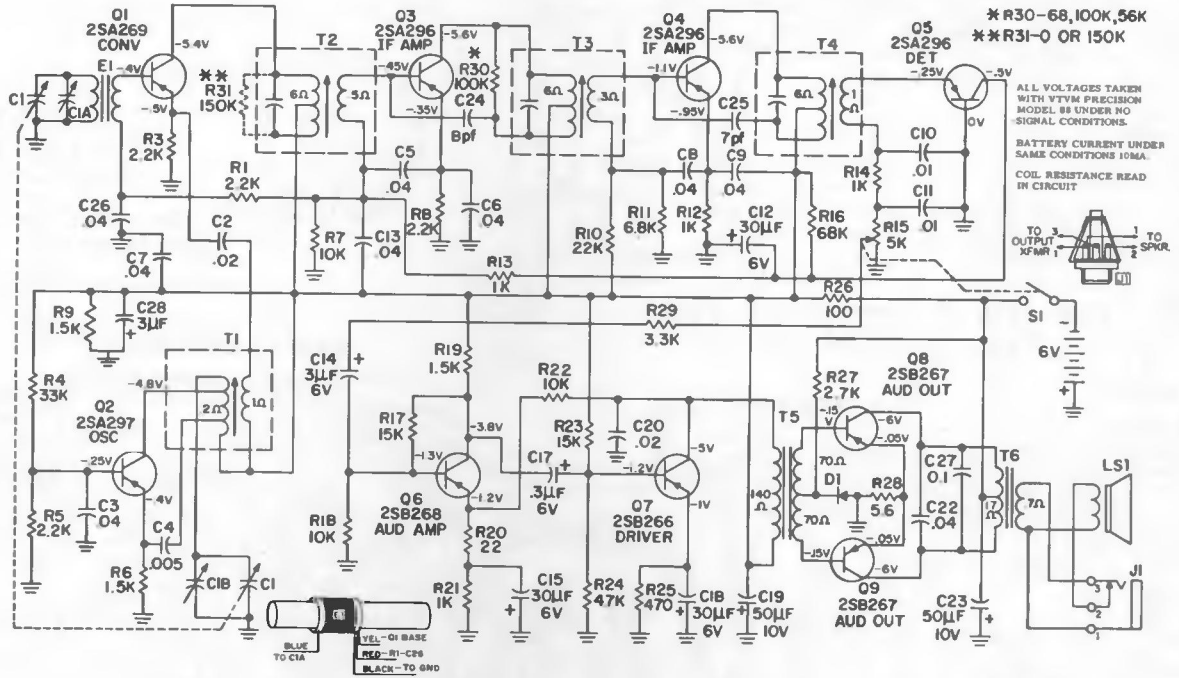


Foil Side of Perma-circuit Panel, Top Component Location

PHILCO

TRANSISTOR PORTABLE MODEL T-90

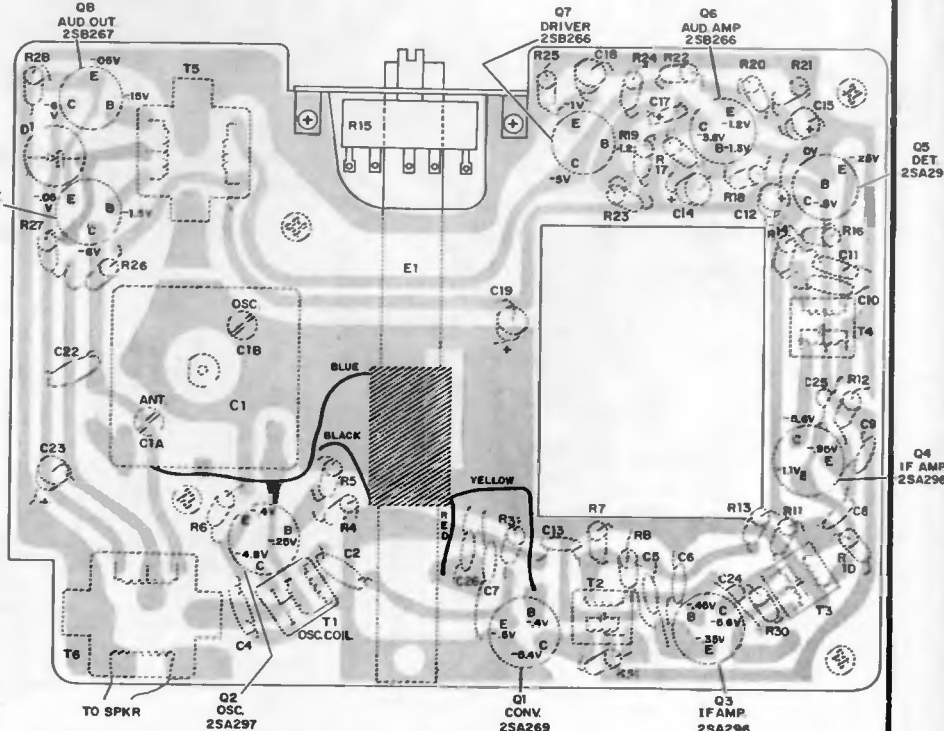
FREQUENCY COVERAGE: 520KC to 1650KC
 INTERMEDIATE FREQUENCY: 455KC
 ANTENNA: Self-contained ferrite loop
 SPEAKER: 2-3/4 inch PM 10 ohms V.C. impedance. Jack provided for optional private listening attachment.
 BATTERY SUPPLY: 4 penlight cells, 6 volt supply, battery type "AA", P-15 or mercury type "AA" P-9



PERMA-CIRCUIT PANEL REMOVAL

1. Remove battery compartment cover (bottom of case) and remove battery holder.
2. Remove two screws located on top of back cover, push out back cover from inside.
3. Remove decorative plate from center of tuning knob (turn counter-clockwise) and unscrew tuning knob spacer. Tuning knob can now be removed.
4. Remove four screws holding perma-circuit panel to cabinet (graph locations D3, B6, K1 and K8) and remove panel.

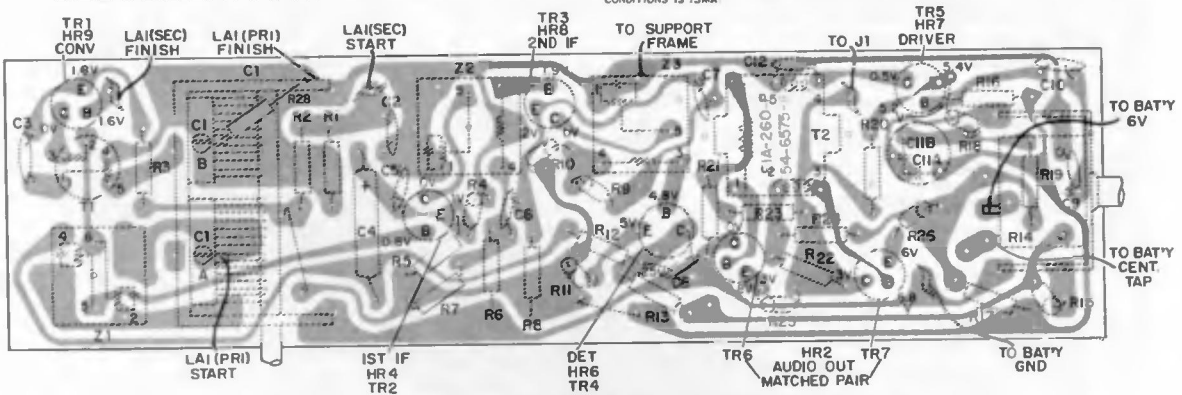
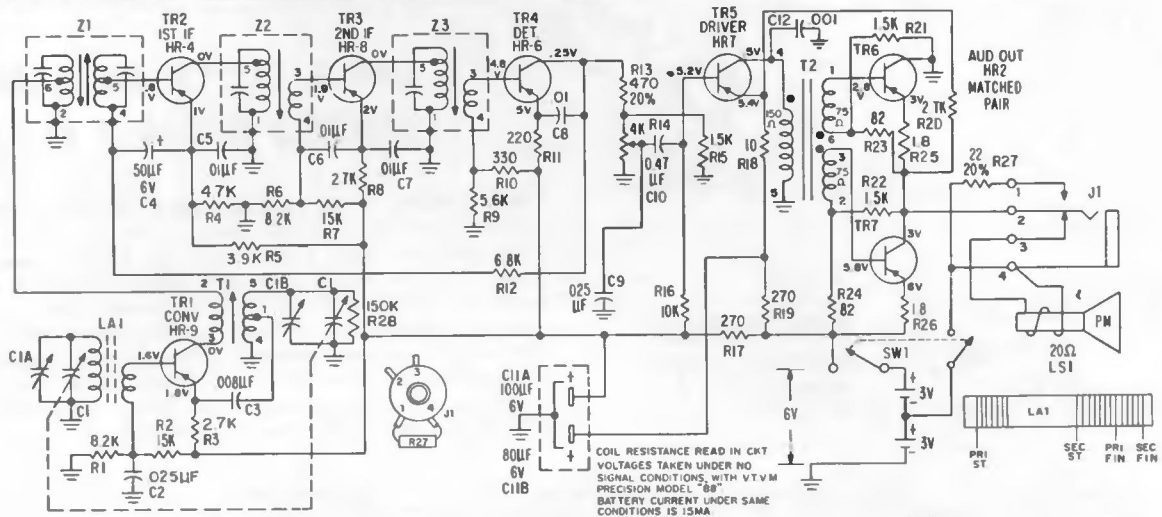
Speaker will remain in cabinet when panel is removed.



Bottom View of Perma-Circuit Panel Showing Parts Location

PHILCO

TRANSISTOR PORTABLE MODEL T-703 CODE 124



Bottom Composite View of Perma-Circuit Panel

ALIGNMENT PROCEDURE

Allow the test equipment to warm up for fifteen minutes before starting the alignment procedure. Connect the output indicator (a-c voltmeter, or an oscilloscope) across the voice-coil terminals. Use an AM r-f signal generator. Connect the ground lead to chassis, and connect the output lead as indicated in the alignment chart. Attenuate the signal-generator output throughout the alignment so as to maintain the output level below 1 volt.

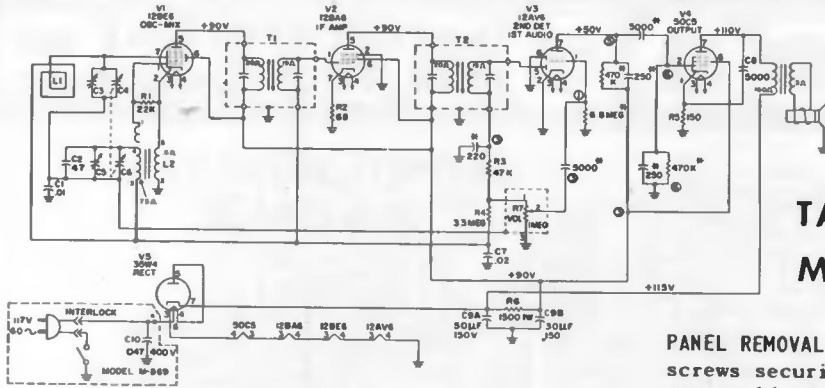
SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Connect signal generator through a .1-uf. condenser to ant. section of gang.	455 kc.	Tuning gang fully open.	Adjust for maximum output in order given.	Z3 - 3rd i-f Z2 - 2nd i-f Z1 - 1st i-f
2	Use radiating loop. (See NOTE 1 below)	600 kc.	600 kc.	Adjust for maximum output. Rock tuning gang while making this adjustment.	T1 - osc. core
3	Same as step 2.	1620 kc.	1620 kc. (Tuning gang fully open)	Adjust for maximum output.	C1B - osc. trimmer
4	Same as step 2.	1400 kc.	1400 kc.	Adjust for maximum output.	C1A - antenna trimmer
5	Repeat steps 2, 3 and 4 until no further improvement is obtained. Always "stop on step 4.				

NOTE 1. 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 radio loop.

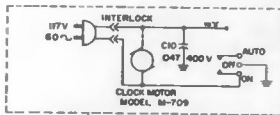
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

PHILCO

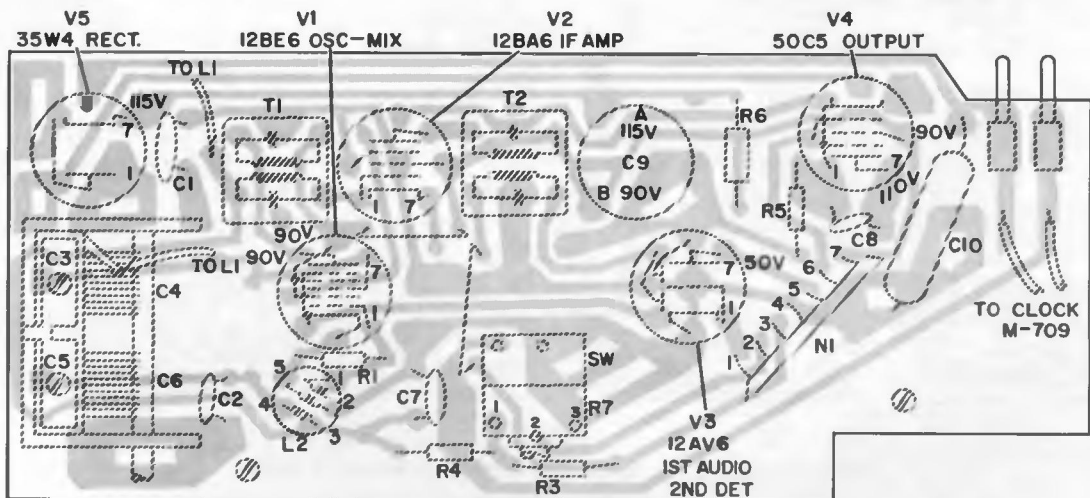
TABLE/CLOCK AM RADIO
MODELS M-709 & M-869



PANEL REMOVAL - To remove panel, unscrew two screws securing cabinet back to front. Separate cabinet back from front by prying away front on line cord side of cabinet. Separate cabinet, being careful not to break time and alarm set knob and antenna leads. Remove knobs and nut on volume control. Remove two screws located at E3 and D10 (see parts location). Unsolder speaker, antenna and clock wires (M-709 only). Panel may now be removed.



NOTE
ALL COMPONENTS MARKED WITH AN ASTERISK ARE CONTAINED IN ONE SWITCH CONNECTIONS ARE ENCIRCLED NUMBERS
ALL VOLTAGES AND RESISTANCES TAKEN WITH "PRECISION" VTVM MODEL "86" VOLUME CONTROL SET AT MINIMUM, NO SIGNAL IN
RESISTANCES TAKEN WITH COILS AND TRANSFORMERS IN CIRCUIT



Component Location, Foil Side of Perma-Circuit Panel

ALIGNMENT - To eliminate shock hazard, use an isolation transformer between radio chassis and a-c power outlet. Allow radio and test equipment about 15 minutes to warm up before starting alignment. Connect an a-c VTVM across the speaker voice coil. Use an AM R-F signal generator connected as indicated in chart. Set volume control to maximum no signal output. Keep generator output as low as possible.

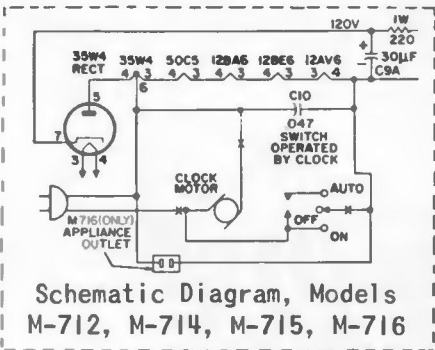
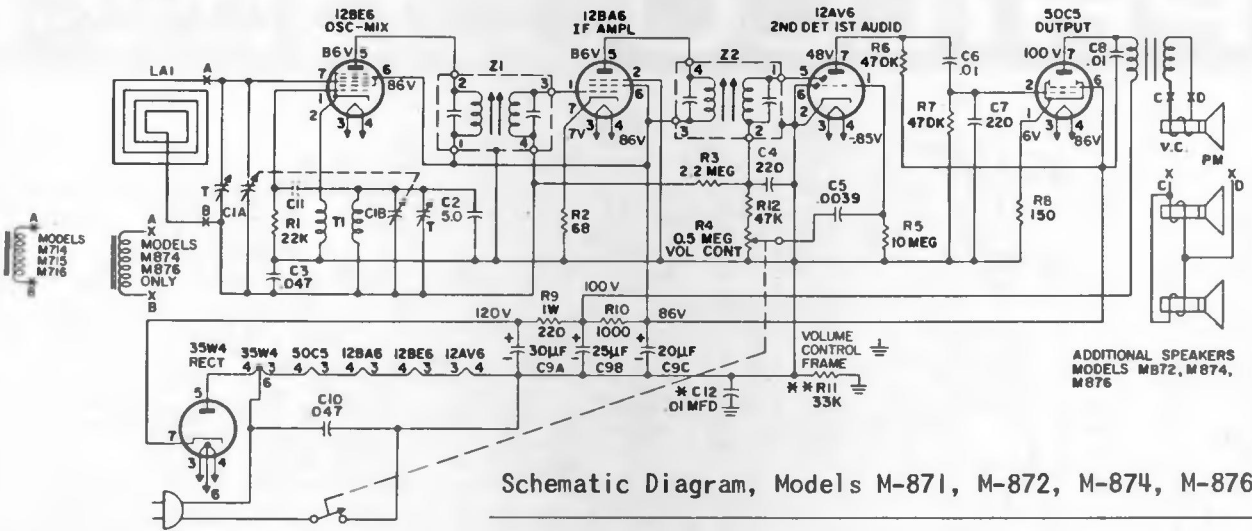
ALIGNMENT CHART

SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	R-F section of gang through a .1mf cap.	455KC	Gang fully open	Adjust for max. output in order given.	T1-bot. & top T2-bot. & top
2	Use radiated signal (See note)	600KC	600KC	Adjust for max. output; rock tuning gang while making adjustment.	L1-osc.
3	Use radiated signal	1650KC	Gang fully open	Adjust for max. output.	C5-osc. trim.
4	Use radiated signal	1500KC	1500KC	Adjust for max. output.	C3-ant. trim.
5	Repeat steps 2, 3 and 4 until no further improvement is obtained.				

NOTE: 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 radio loop.

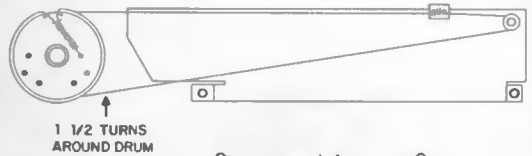
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

PHILCO Models M-712, M-714, M-715, M-716, M-871, M-872, M-874, M-876

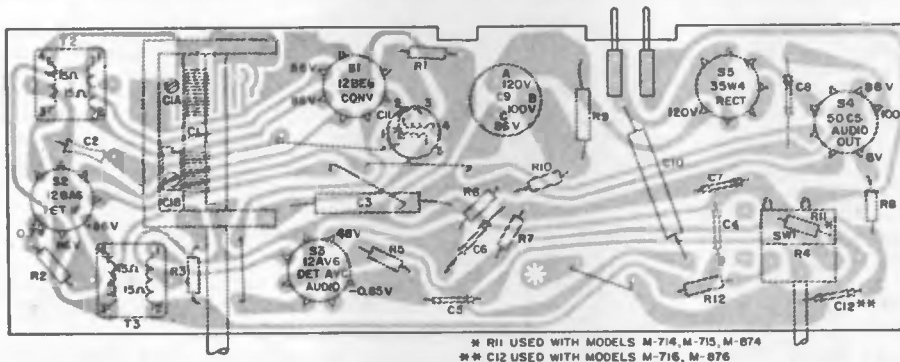
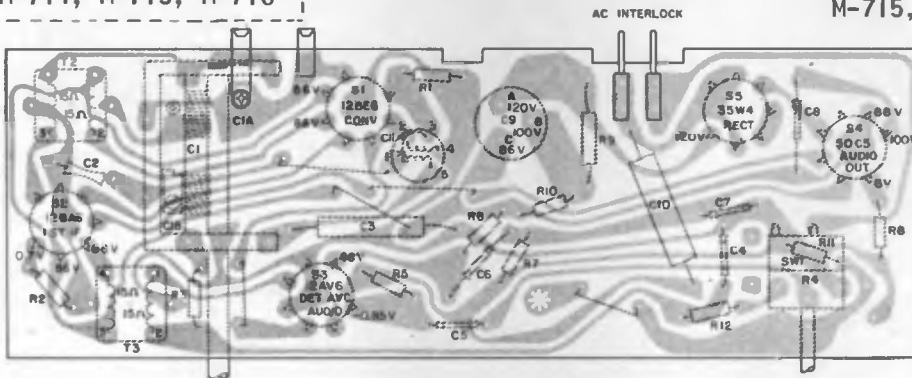


I.F. 455 KC.

C11 IS PART OF OSC. COIL
 * MODEL M876, M716.
 ** MODELS M871, M872, M874,
 M712, M714, M715.



Dial Cord Stringing Models M-714, M-715, M-874

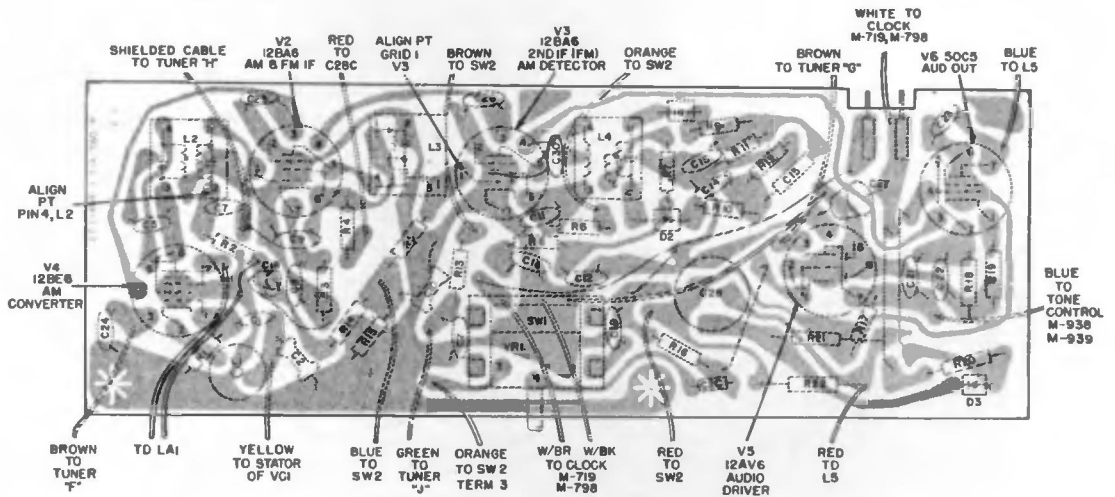
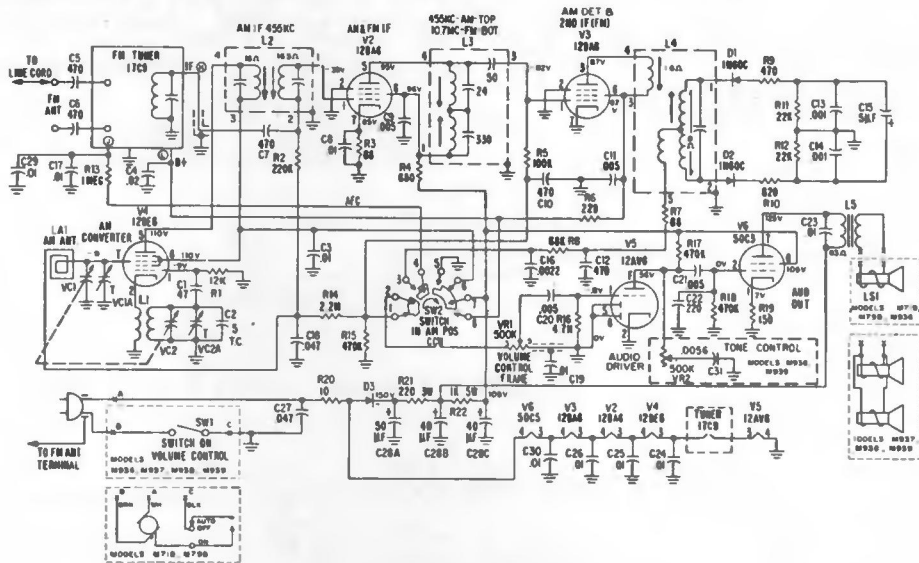


* R11 USED WITH MODELS M-714, M-715, M-874
 ** C12 USED WITH MODELS M-716, M-876

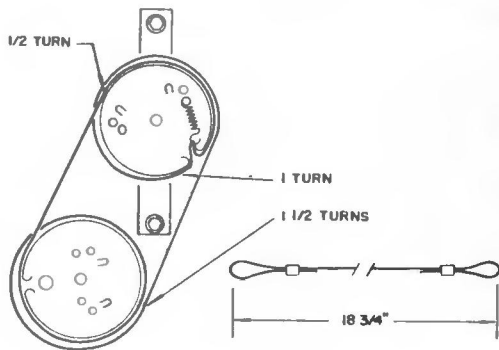
Perma-Circuit Panel, AM Models M-714, M-715, M-716, M-874, M-876, Bottom View

PHILCO

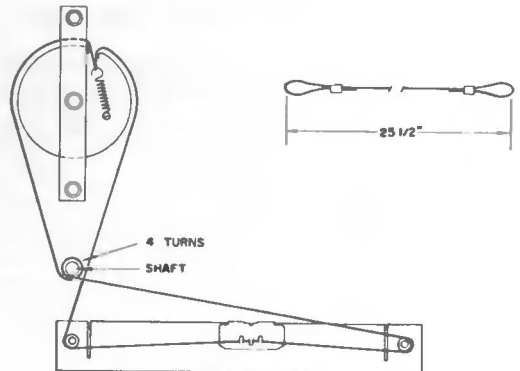
TABLE/CLOCK AM-FM RADIOS M-719, M-798, M-936, M-937, M-938, M-939



Perma-Circuit Panel, AM-FM Models, Bottom View



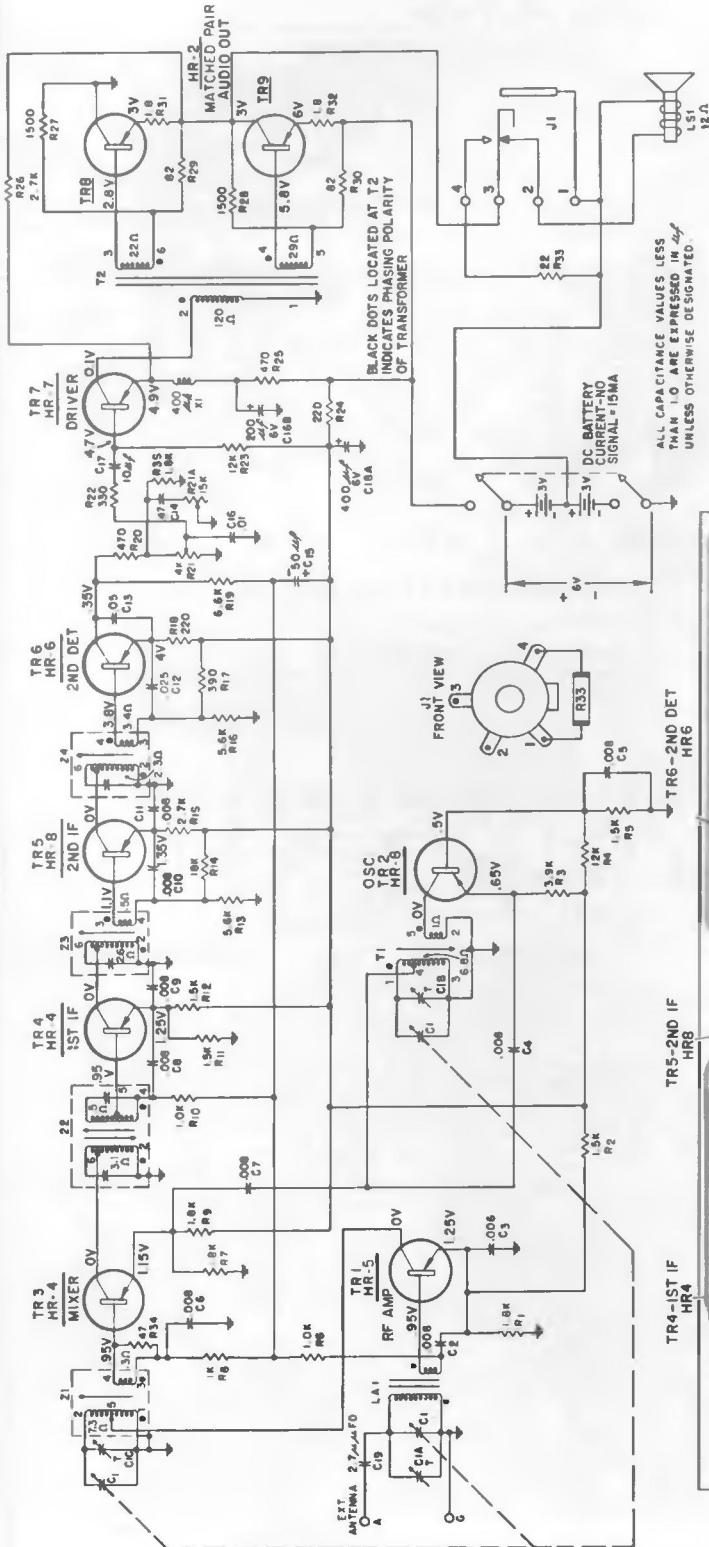
Tuner Dial Cord Stringing
FM Models



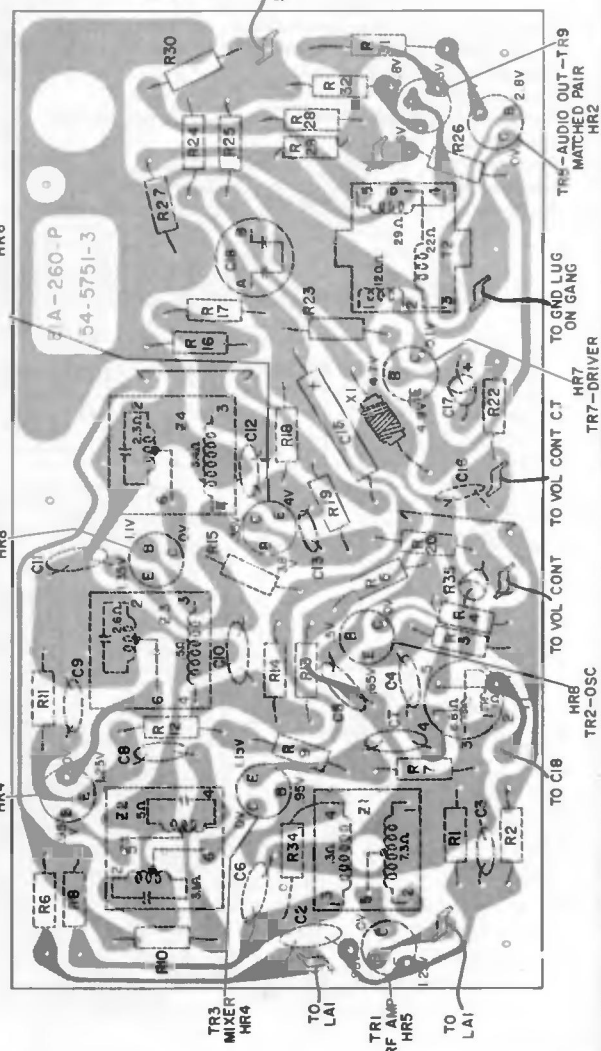
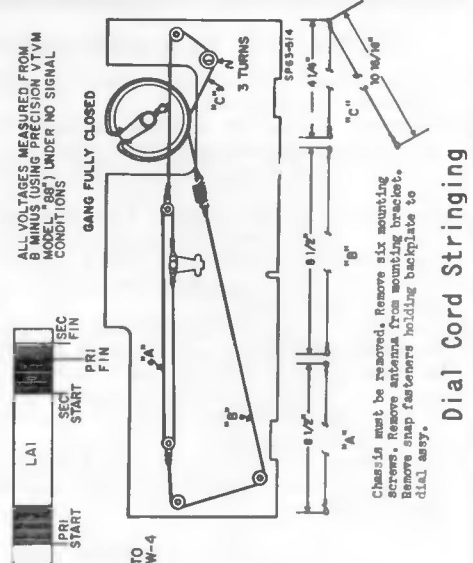
Main Dial Cord Stringing
FM Models

PHILCO

TRANSISTOR PORTABLE MODEL T-902, CODE 128



FREQUENCY COVERAGE: 540 to 1620 KC.
INTERMEDIATE FREQUENCY: 455 KC.



Base Layout - Bottom View of Perma-Circuit Panel

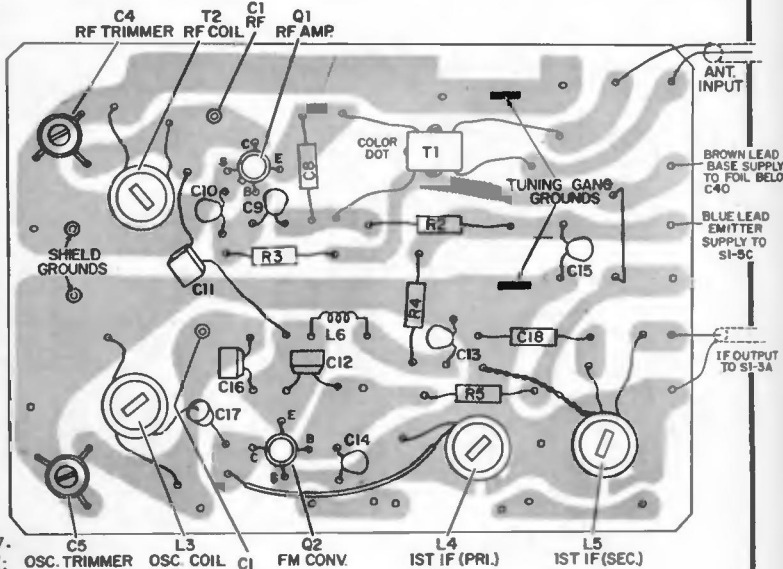
PHILCO

AM-FM TRANSISTOR PORTABLE MODEL T-907

(Material below and the next two pages)

REMOVAL OF FM TUNER PANEL

1. Remove chassis from cabinet. See "Chassis Disassembly" instructions.
2. Remove 2 magnecore antenna mounting clamps and swing magnecore out of the way.
3. Loosen 2 FM tuner shield screws and remove shield.
4. Disconnect FM tuner leads from their points of origin. See FM tuner perma-circuit illustration. Do Not attempt to disconnect leads from the tuner panel. Bring free leads up through hole in main perma-circuit panel.
5. Unsolder "Tuning Gang Grounds" (See FM tuner perma-circuit illustration), separate and straighten lugs. Be sure lugs are free of excess solder.
6. Unsolder "Shield Grounds" from rear or outside of back shield. Be sure lugs are clean and free in the shield holes.
7. While alternately heating the gang terminals C1-R-F and C1-osc., gently pry panel out using a thin bladed tool.

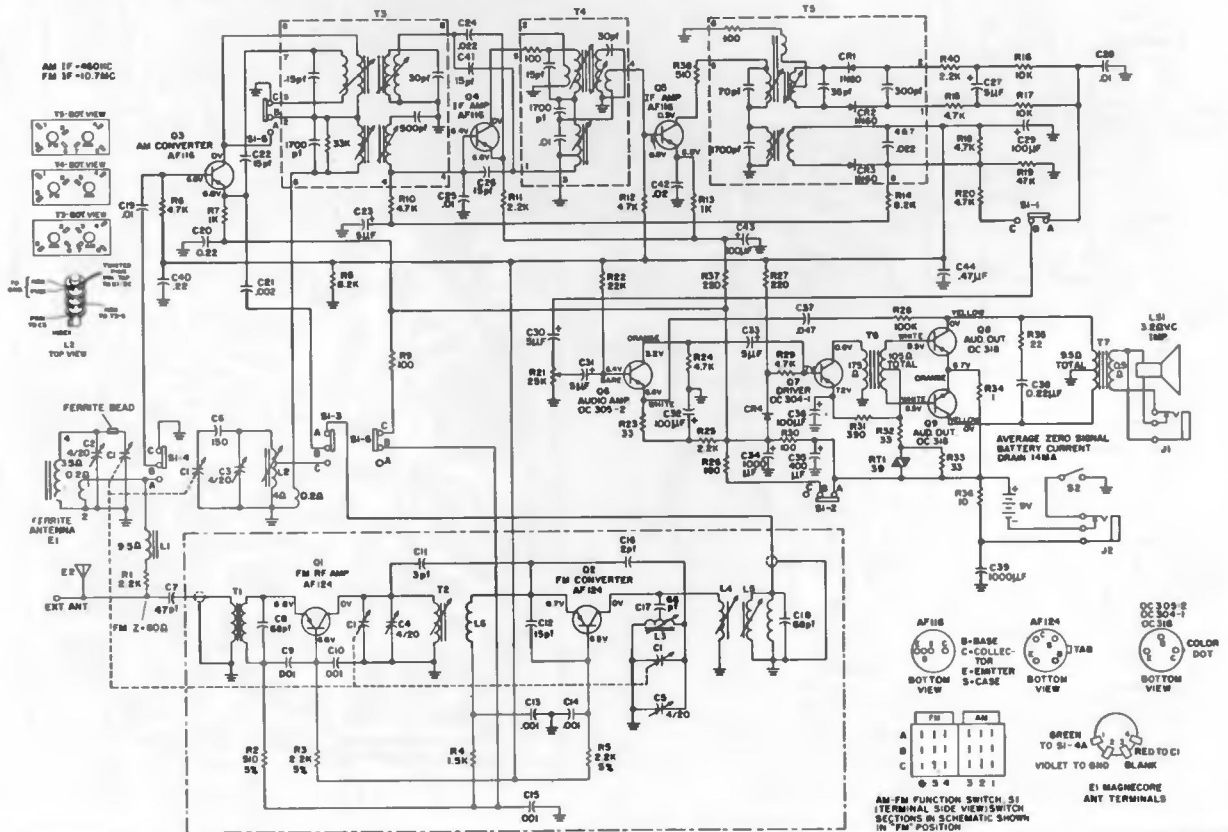


Top Composite View of FM Tuner Perma-Circuit Panel

CHASSIS DISASSEMBLY

1. Remove back by loosening back retaining screw. CAUTION - Monopole antenna lead is connected; disconnect lead from antenna.
2. Remove knobs.
3. Remove nut holding band switch clamp and remove clamp.
4. Remove back mounting threaded post.
5. Remove nut at volume control end of back plate.
6. Remove nut at left end of FM R-F sub-assembly.

7. Remove nut in front of 1st I-F, T3.
8. Remove panel, dial, switch and mtg. plate assembly.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

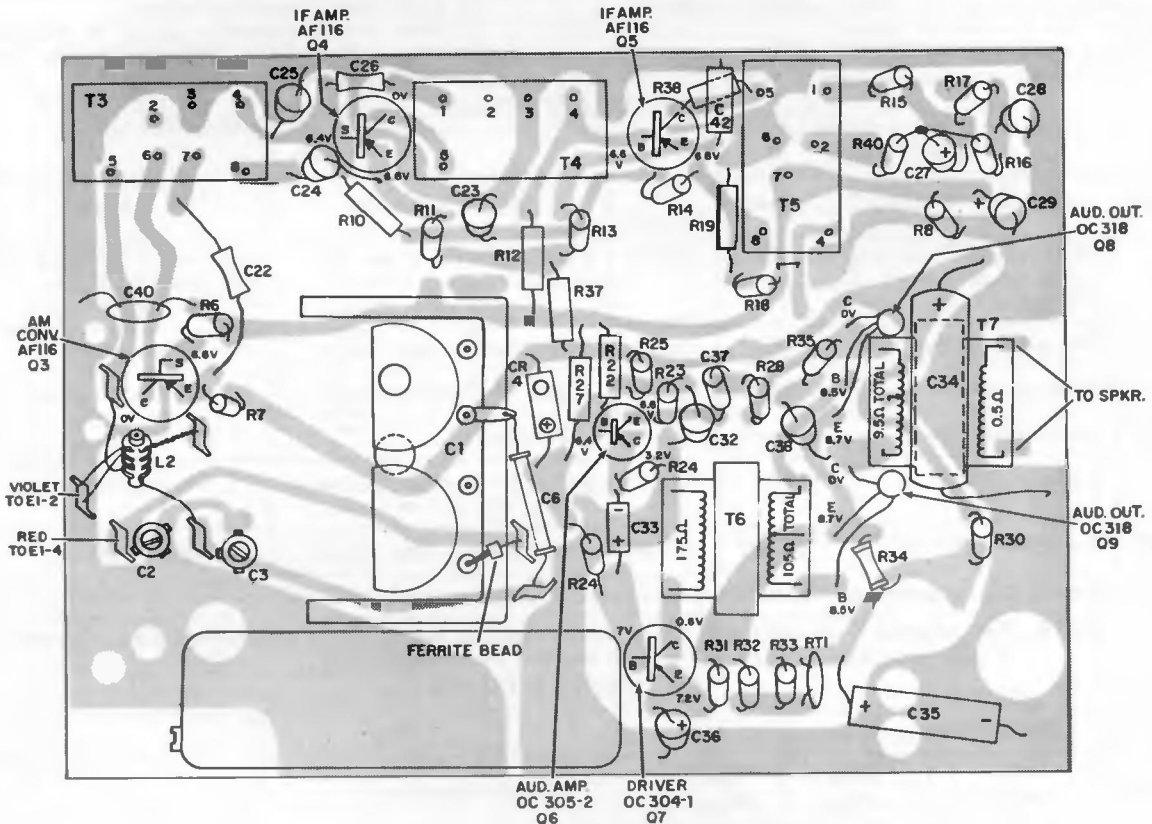
PHILCO Model T-907, Continued from preceding page, alignment on next page

BATTERY SUPPLY - 6 type "C" cells (number 635) in a 9 volt supply. Provision for connecting an external battery or AC power supply. Special receptacle automatically disconnects internal battery.

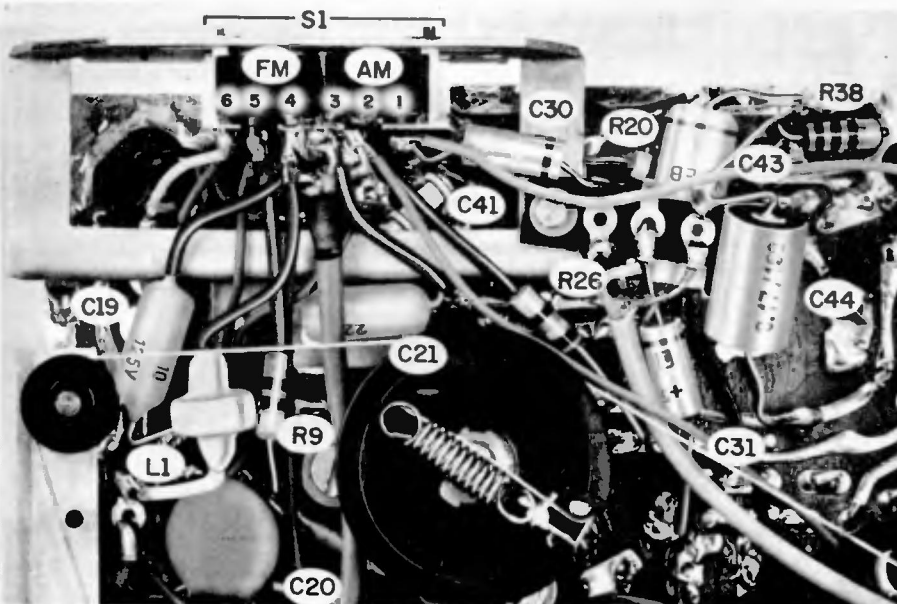
CIRCUIT - Nine transistor, 3 diode, AM-FM super-heterodyne.

FREQUENCY COVERAGE - AM, 540KC to 1610KC
FM, 87.5MC to 108.5MC

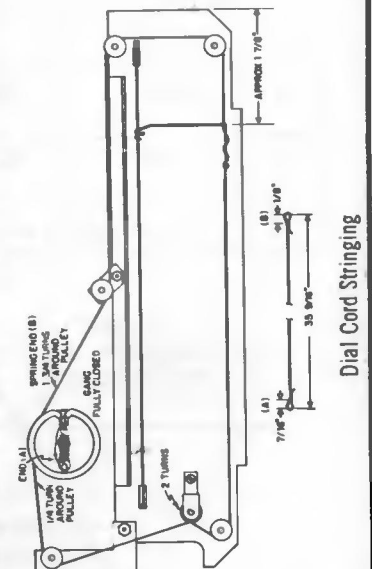
INTERMEDIATE FREQUENCY - AM, 460KC
FM, 10.7MC



Bottom Composite View of Main Perma-Circuit Panel



Under Panel Component Identification



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

PHILCO Model T-907, Alignment Information, Continued from preceding pages

AM ALIGNMENT PROCEDURE

Allow generator to warm up for 15 minutes.
 Check pointer-scale alignment.
 Chassis must be removed from cabinet. See disassembly instructions.
 Connect scope or AC meter across speaker voice coil to observe output.
 Volume control to maximum.
 Check battery supply voltage, 9 volts.

FM ALIGNMENT PROCEDURE

Check pointer-scale alignment.
 Chassis must be removed from cabinet. See disassembly instructions.
 Depress FM push button.
 Connect scope across volume control to observe "S" curve (see illustration below).
 Loosely couple generator output to telescope antenna. Use only sufficient signal for clean scope presentation --- Do Not Overload.

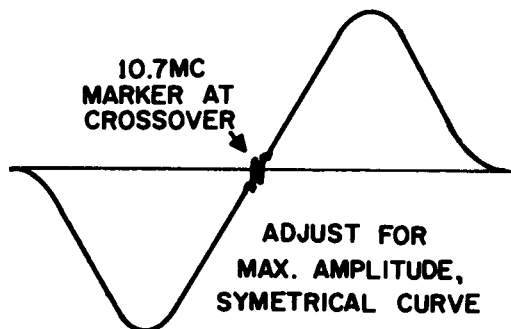
AM ALIGNMENT CHART

Signal Generator			Radio		
Step	Connection To Radio	Frequency	Dial Setting	Special Instructions	Adjust
1	To base of AM converter, Q3, thru a .01 μ fd capacitor.	460KC	1500KC	Adjust, in order given, for maximum output.	T3, 1st AM I-F top & bot. T4, 2nd AM I-F, top T5, 3rd AM I-F, top
2	Use radiating loop.	600KC	600KC	Adjust for maximum output.	L2, AM oac. core
3	Radiating loop	1500KC	1500KC	Adjust for maximum output.	C3, AM osc. trimmer
4.	Repeat Steps 2 and 3 until no further improvement is obtained.				
5	Radiating loop	600KC	600KC	Adjust for maximum output by sliding ant. coil on core.	E1, AM magnecore ant.
6	Radiating loop	1500KC	1500KC	Adjust for maximum output.	C2, AM ant. trimmer
7	Repeat Steps 5 and 6 until no further improvement is obtained.				

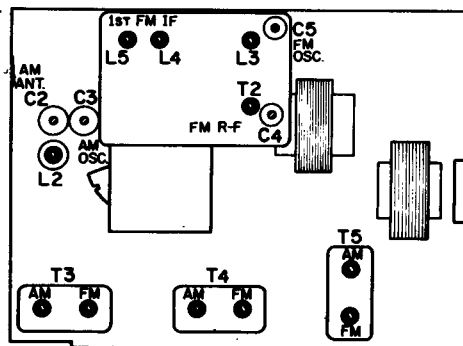
NOTE: For radiating loop, use a 6 to 8 turn, 6-inch diameter loop made up of insulated wire. Connect to generator terminals and place about one foot from antenna coil.

FM ALIGNMENT CHART

Sweep Generator			Radio		
Step	Center Frequency	Sweep Width	Dial Setting	Special Instructions	Adjust
1	10.7MC	50KC		Adjust for cross-over at 10.7MC.	T5 - FM top.
				Adjust in order given for maximum output and best symmetry. Repeat	T5 - FM bottom T4 - FM Top & Bot. T3 - FM Top & Bot. L4 & L5
2	89MC	25KC	89MC	Adjust for maximum output.	L3 - FM osc. core T2 - FM R-F core
3	102MC	25KC	102MC	Adjust for maximum output.	C5 - FM osc. trim. C4 - FM R-F trim.
4	Repeat Steps 2 and 3 until no further improvement is noted.				

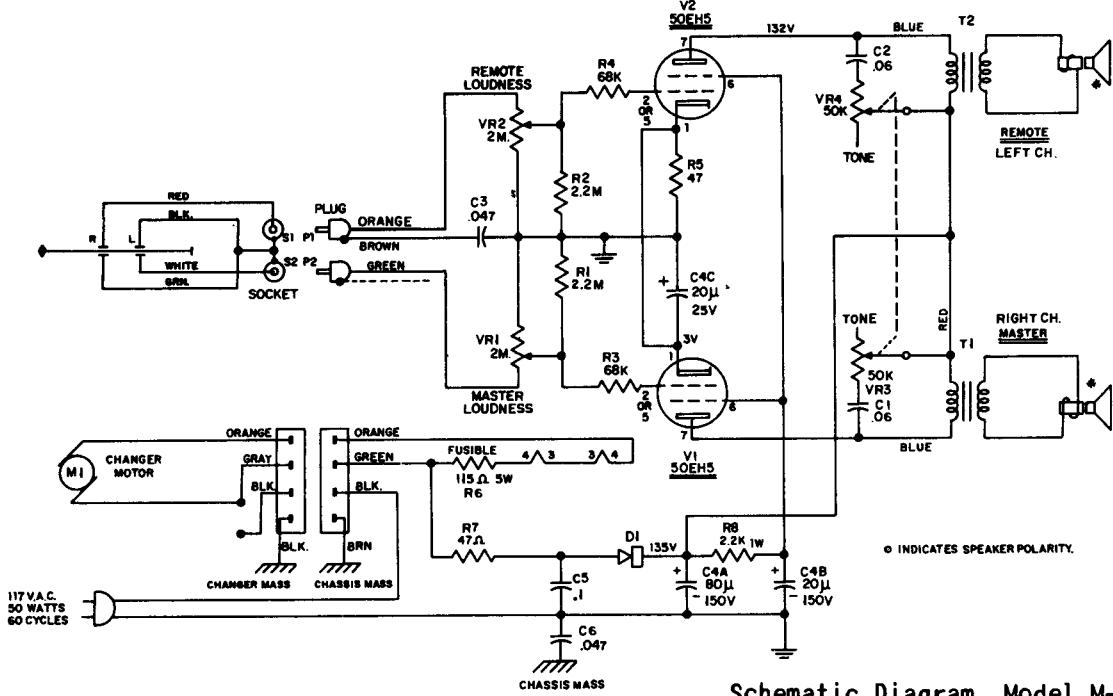


FM Alignment Curve



Chassis Alignment Points

PHILCO Model M-1428 and Model M-1430

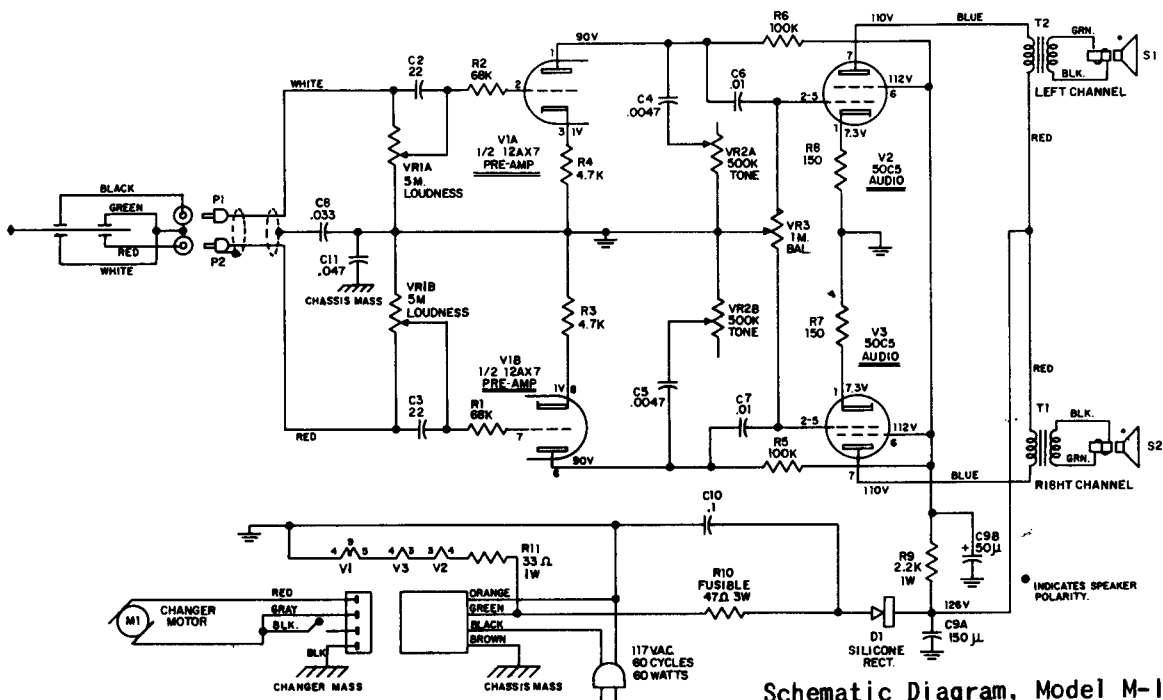


Schematic Diagram, Model M-1428

AMPLIFIER REMOVAL - MODEL M-1428

1. Remove four Phillips screws securing right speaker panel and remove panel.
2. Remove knobs and T-nuts from controls.
3. Remove nut on stud securing rear of chassis.
4. Remove four Phillips screws securing changer.

5. Lift changer and remove phono power and phono input cables.
6. Push cables through holes in back of changer compartment.
7. Pull enough left hand speaker cable into changer compartment in order to remove amp.
8. Amp. may now be removed by lifting rear of chassis up and out.

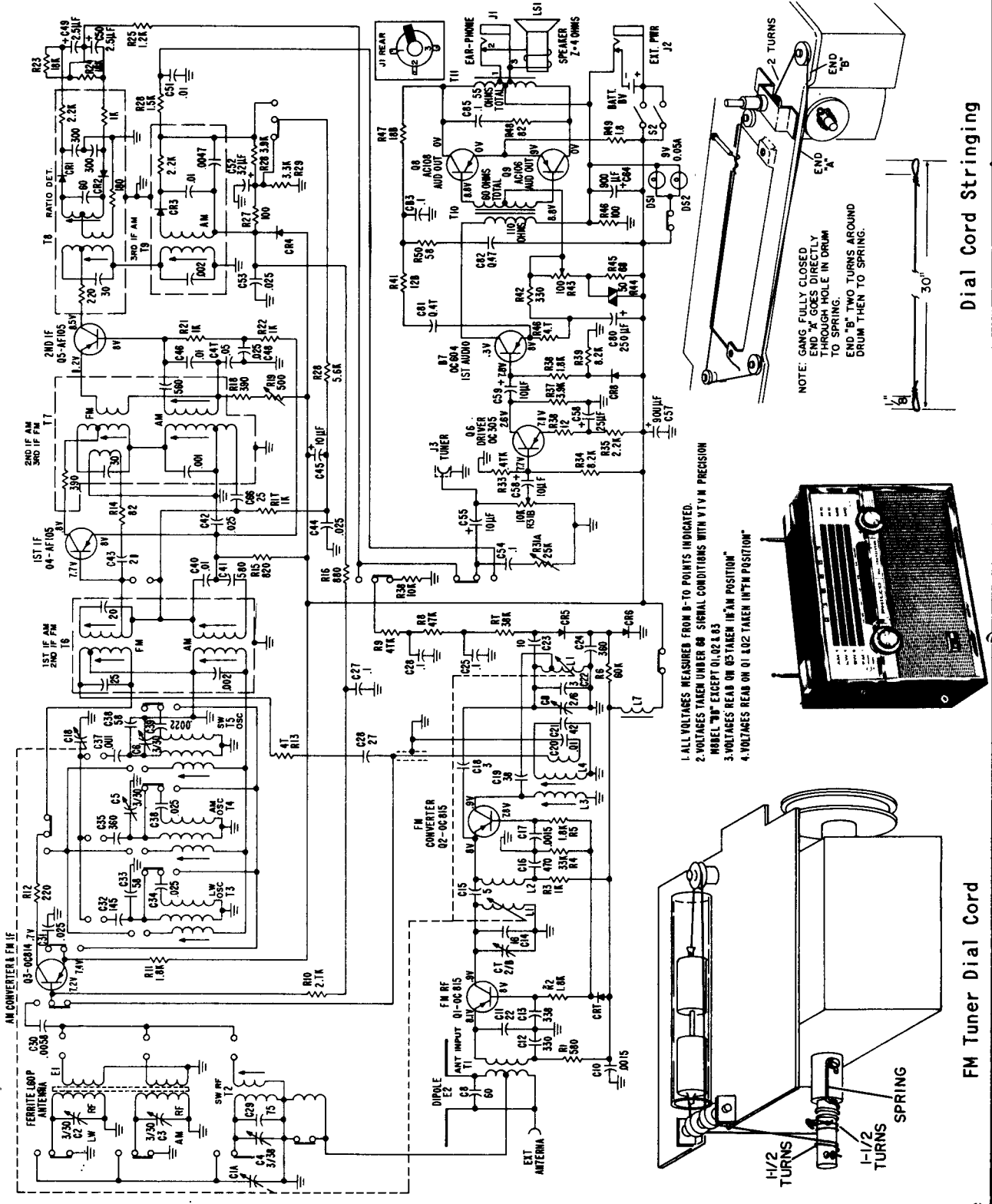


Schematic Diagram, Model M-1430

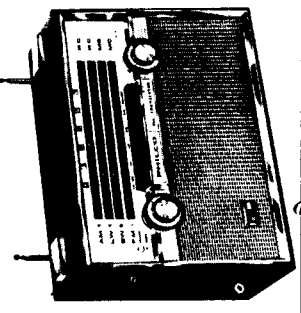
PHILCO

TRANSISTOR PORTABLE AM-FM MULTI-BAND T-911

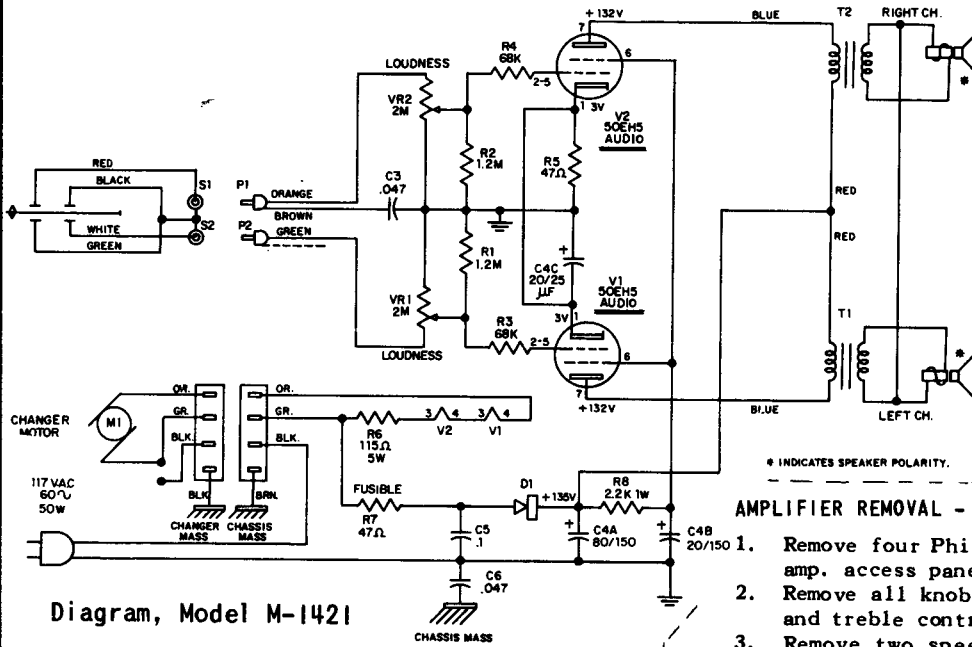
(Service material continued on the next page, at right)



1. ALL VOLTAGES MEASURED FROM B-TO POINTS INDICATED.
2. VOLTAGES TAKEN UNDER 60 SIGNAL CONDITIONS WITH VTM IN PRECISION MODEL "B" EXCEPT Q1, Q2 & Q3.
3. VOLTAGES READ ON Q3 TAKEN IN "AM POSITION"
4. VOLTAGES READ ON Q1, Q2 TAKEN IN "FM POSITION"



PHILCO
Model M-1421
and
Model M-1529



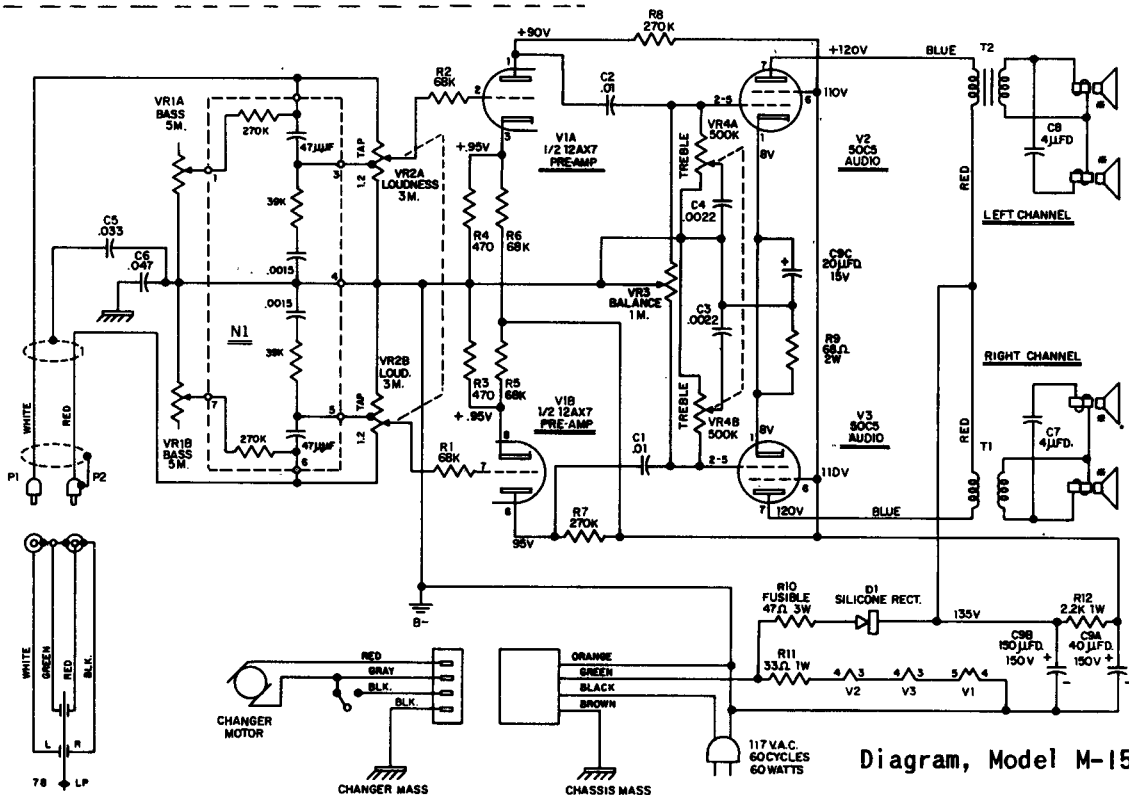
Diagram, Model M-1421

AMPLIFIER REMOVAL - MODEL M-1421

1. Remove six Phillips screws securing changer mounting board to cabinet.
2. Remove changer mounting board and amp. assembly.
3. Remove two T-nuts securing amp. to changer mounting board.
4. Amp. may now be removed.

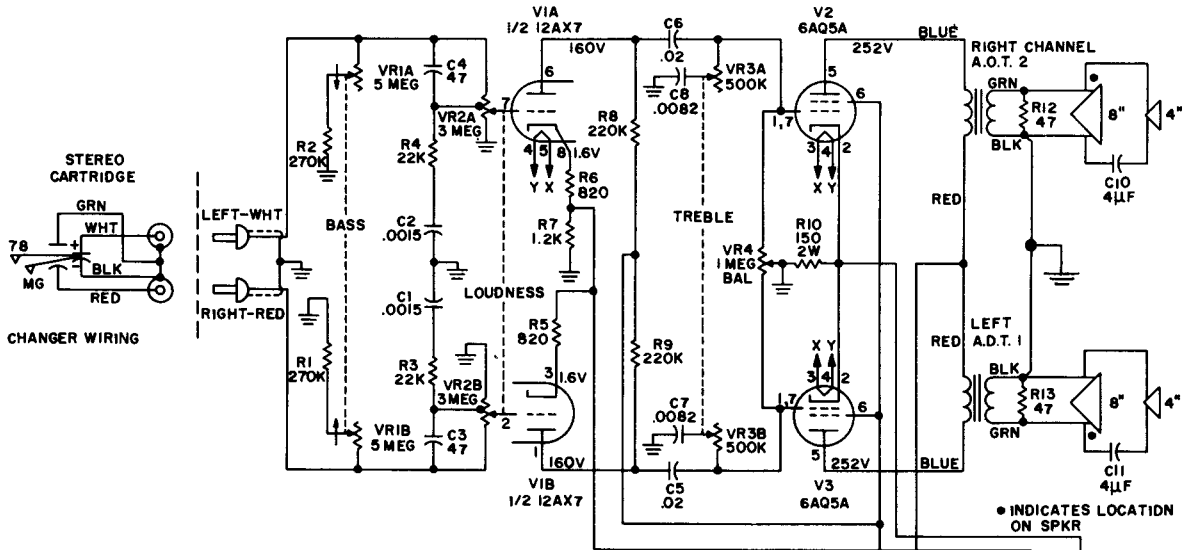
AMPLIFIER REMOVAL - MODEL M-1529

1. Remove four Phillips screws securing rear amp. access panel and remove panel.
2. Remove all knobs and two T-nuts from bass and treble controls.
3. Remove two speed nuts on studs securing rear of chassis.
4. Straighten clip securing left side of changer. Lift left side of changer to free mounting screws. Slide changer to left in order to free right mounting screw.
5. Lift changer and remove phono power and phono input cables.
6. Remove two cable clamps securing phono power and phono input cables.
7. Remove amp. while feeding cables through slot in side of changer drawer.

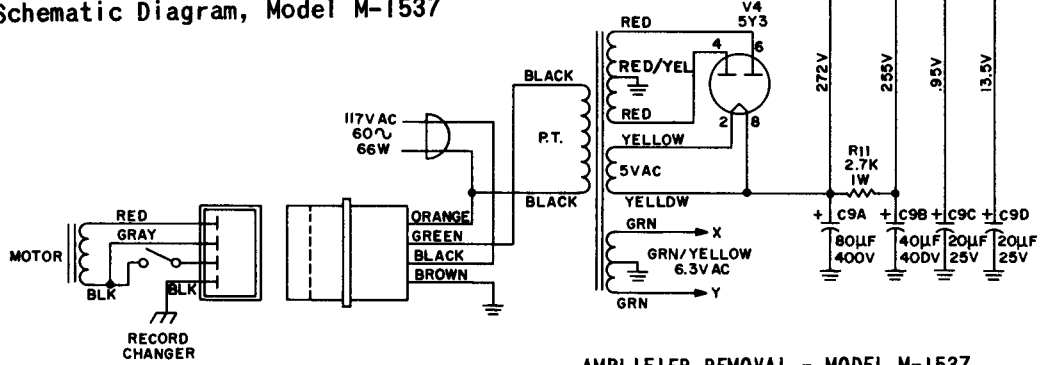


Diagram, Model M-1529

PHILCO Model M-1537 and Model M-1416 (Below)

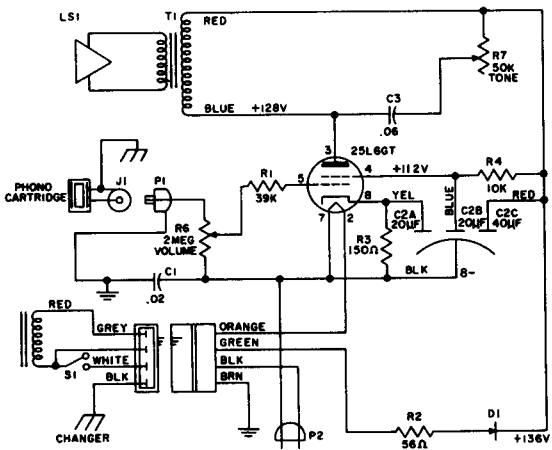


Schematic Diagram, Model M-1537



AMPLIFIER REMOVAL - MODEL M-1537

1. Remove two Phillips screws from back of cabinet. Do not remove two screws that fasten grille to cabinet back.
2. Remove plug on right side of changer base. Grasp washer on changer, hold down screw with long nose pliers. Grasp washer on side opposite washer opening through hole in right side of changer bin.
3. Lift right side of changer and slide changer to the right in order to free left side.
4. Unplug phono power and phono input cables. Set changer aside.
5. With a short screw driver, remove the two Phillips screws holding the amplifier compartment in the cabinet. These screws are located at the top of the changer compartment and run through the changer bin stop blocks.
6. Loosen phono power and phono input cable hold downs.
7. Slide amplifier compartment out of cabinet guiding all cables through openings in side and back of cabinet.
8. Remove knobs and T-nuts located on controls behind knobs.
9. Remove two speed nuts from studs on amplifier rear flange. Lift amplifier to clear studs and pull away from compartment.

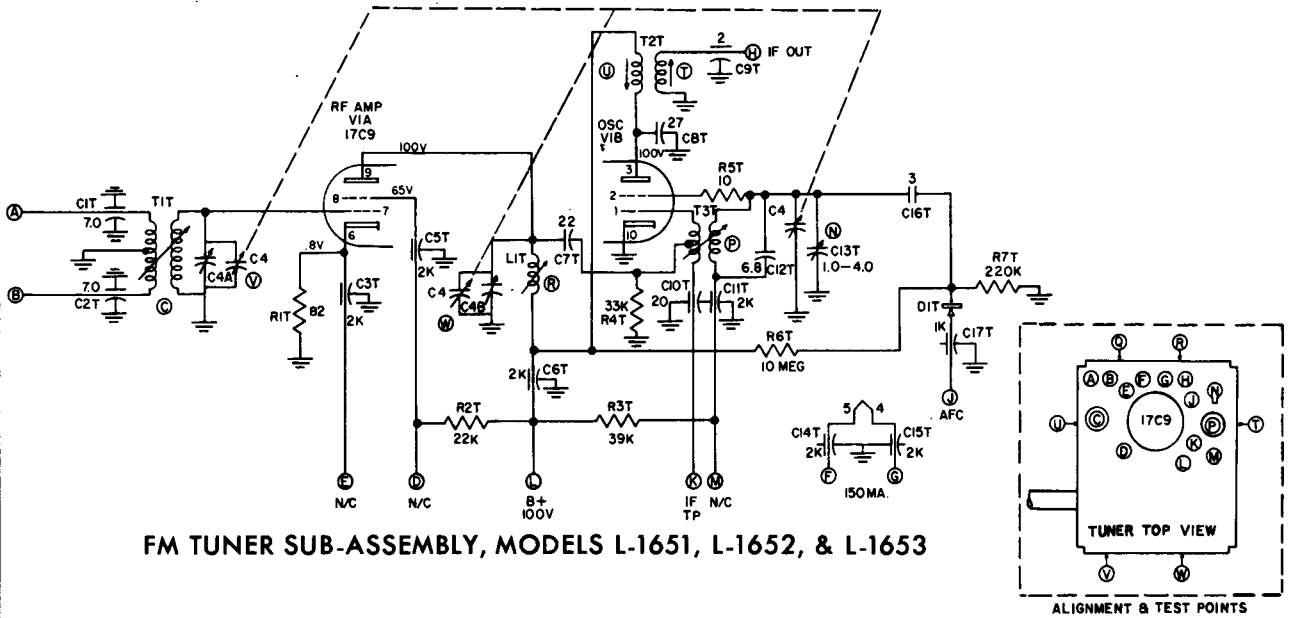


Schematic Diagram, Model M-1416

PHILCO

MODELS L-1651, L-1652, & L-1653

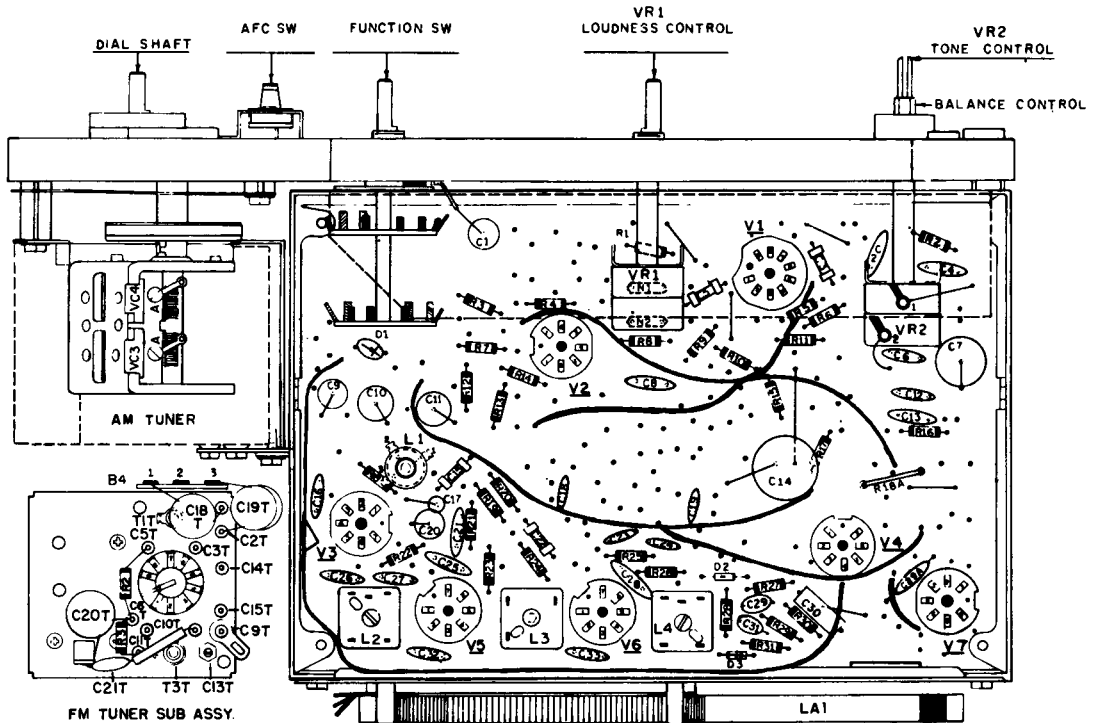
(Service material continued on pages 125 through 128)



FM TUNER SUB-ASSEMBLY, MODELS L-1651, L-1652, & L-1653

FM TUNER SUB-ASSY. REMOVAL -
MODELS L-1651, L-1652 & L-1653

1. Remove 8 screws holding front faceplate to chassis.
2. Remove faceplate and large pulley connected to AM tuning gang. DO NOT REMOVE dial cord.
3. Remove connecting cord from FM and AM tuning gang pulleys only.
4. Unsolder 6 wires that connect tuner to chassis.
5. Remove 4 sheet metal screws holding front and back of tuner in chassis.
6. Remove tuner by forcing from chassis.

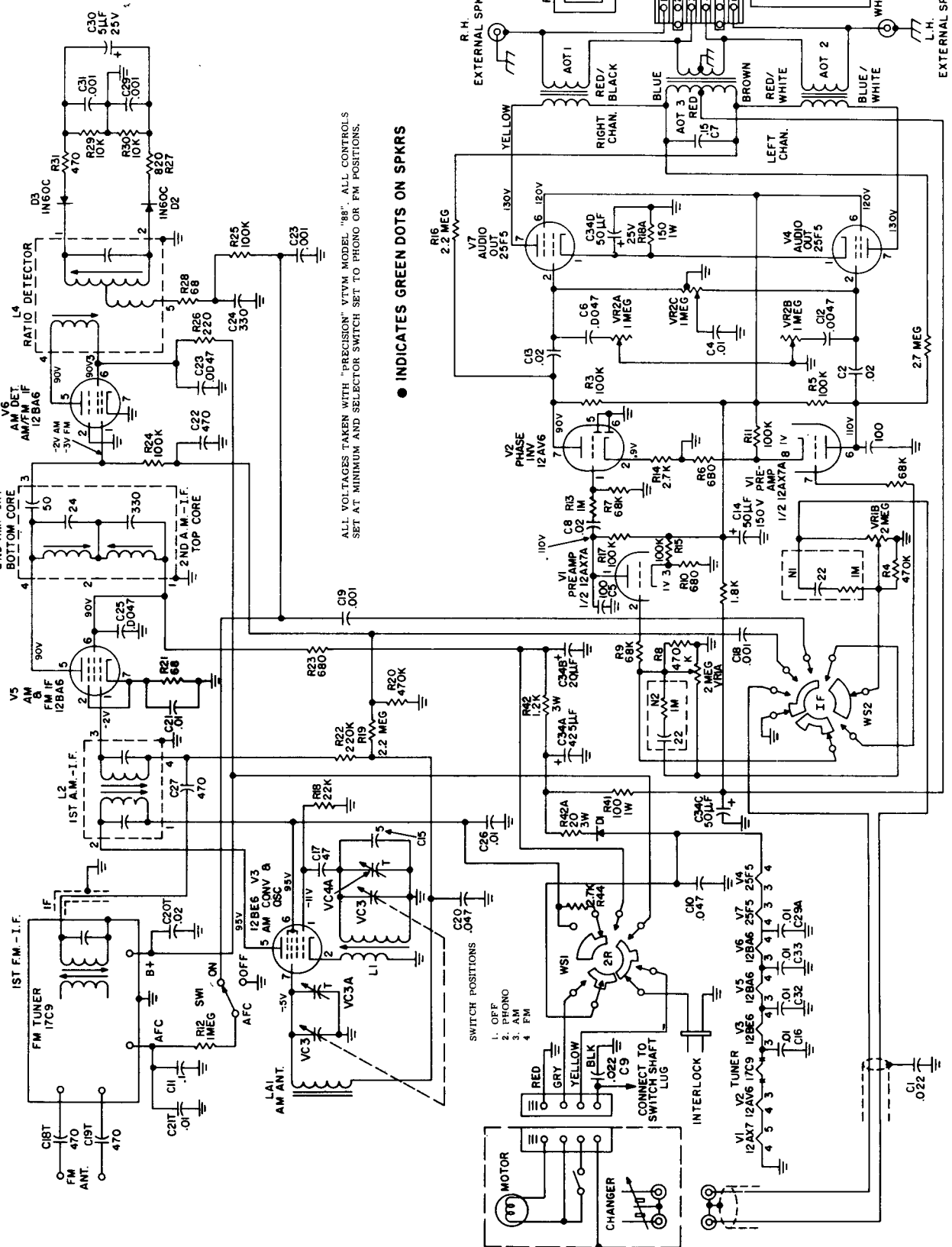


Top View Component Location Model L-1651

PHILCO Model L-1651

(Continued from pages 124-125)

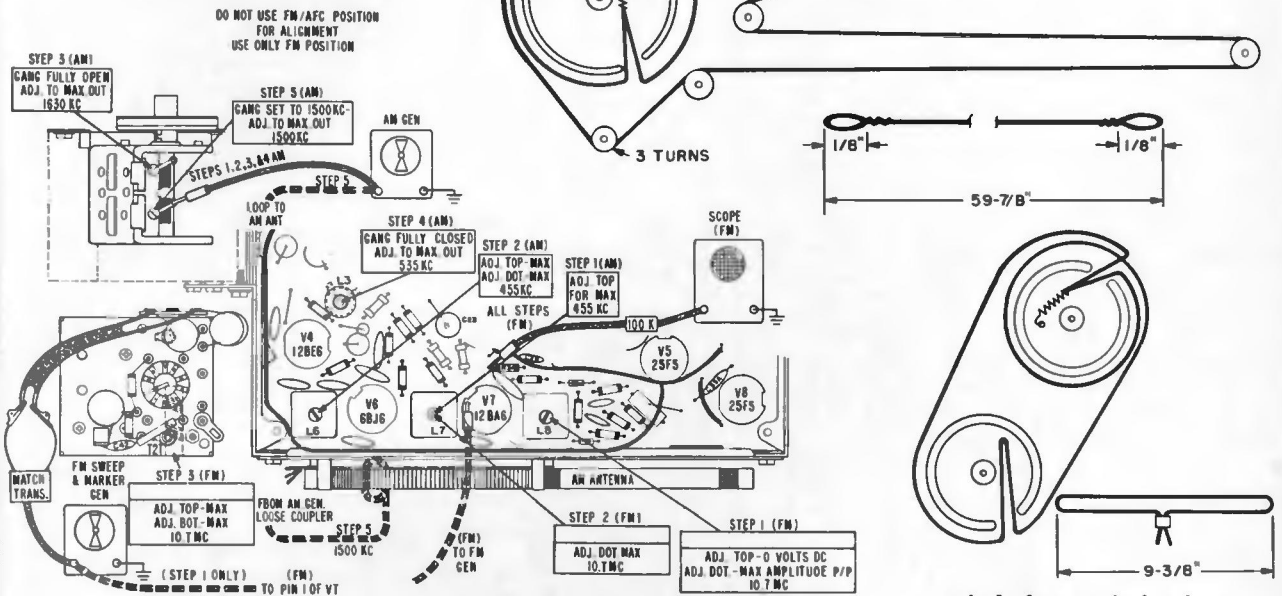
Amplifier and Tuner Schematic Model L-1651



PHILCO

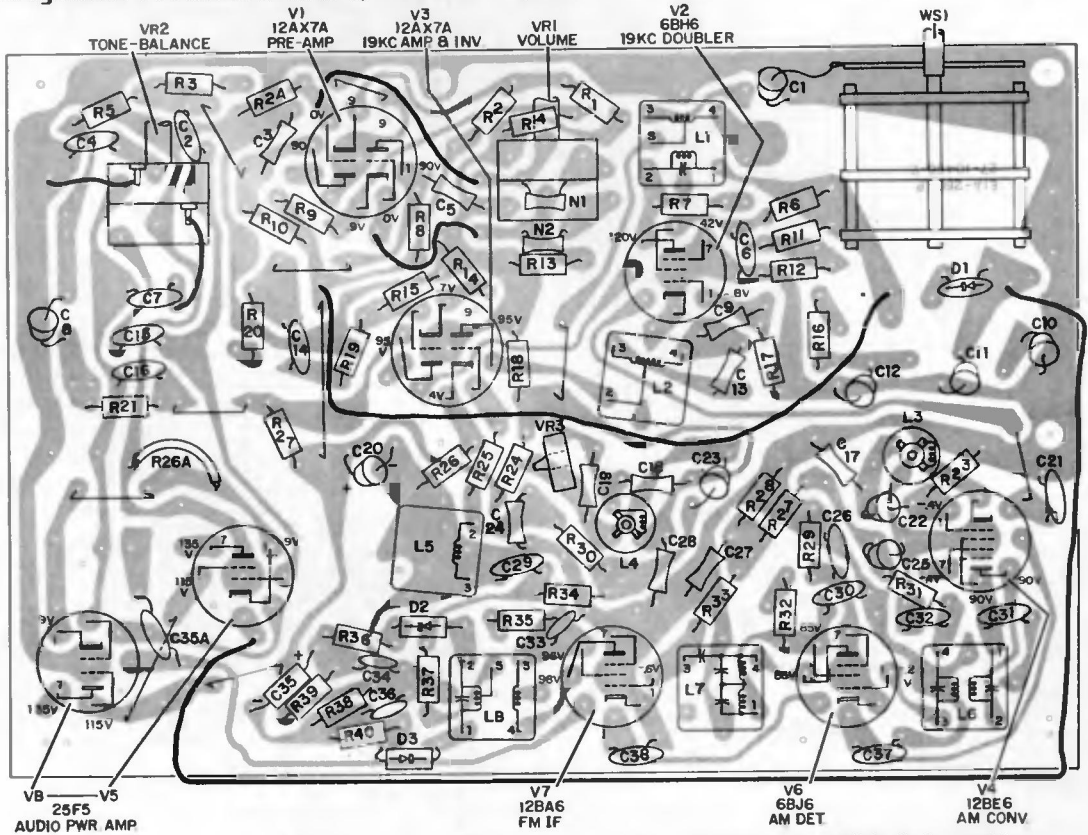
MODELS L-1652 & L-1653
AMPLIFIER AND TUNER

(Continued)



Alignment Procedure Chart, Models L-1652 & L-1653

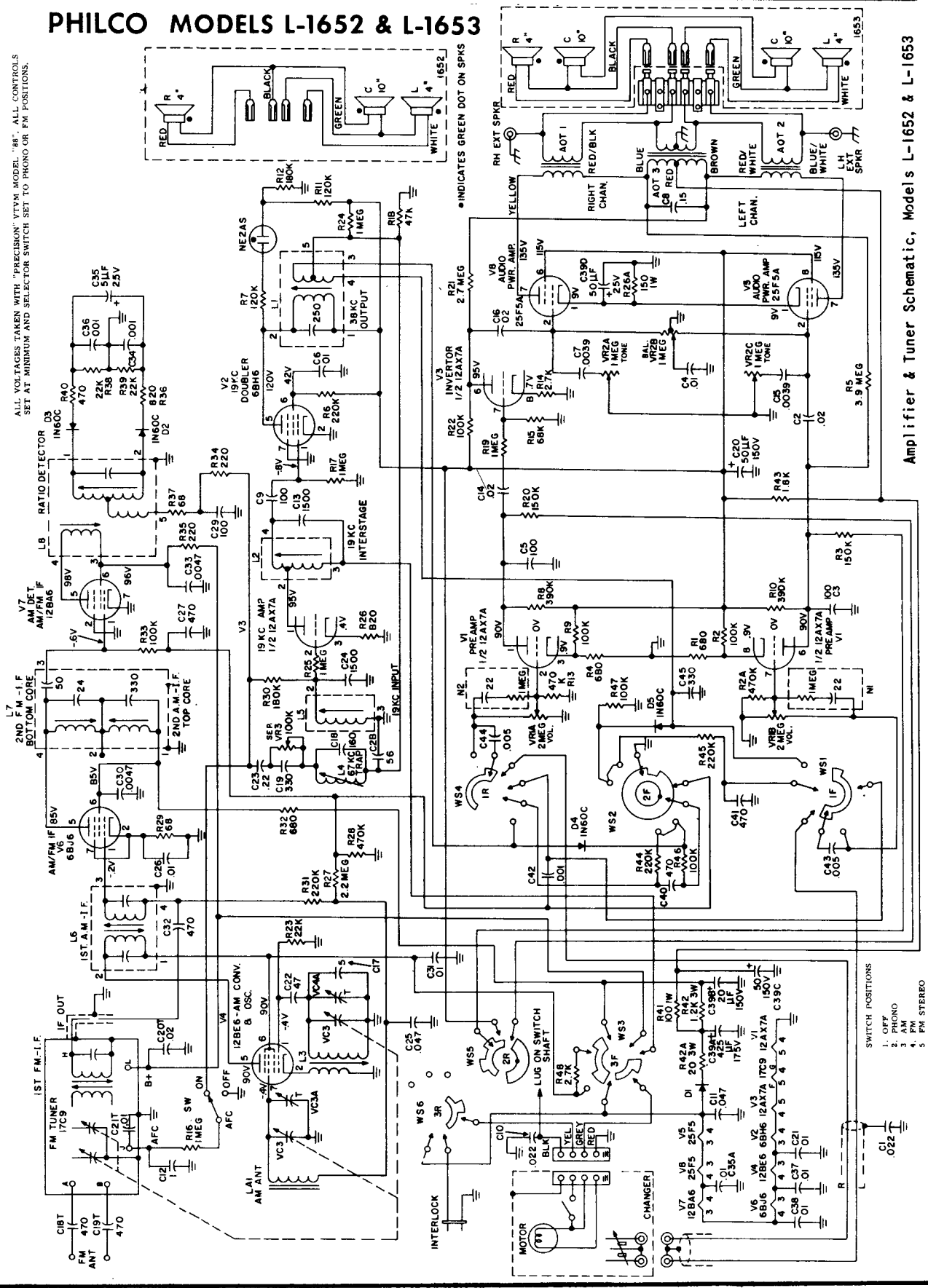
Dial Cord Stringing



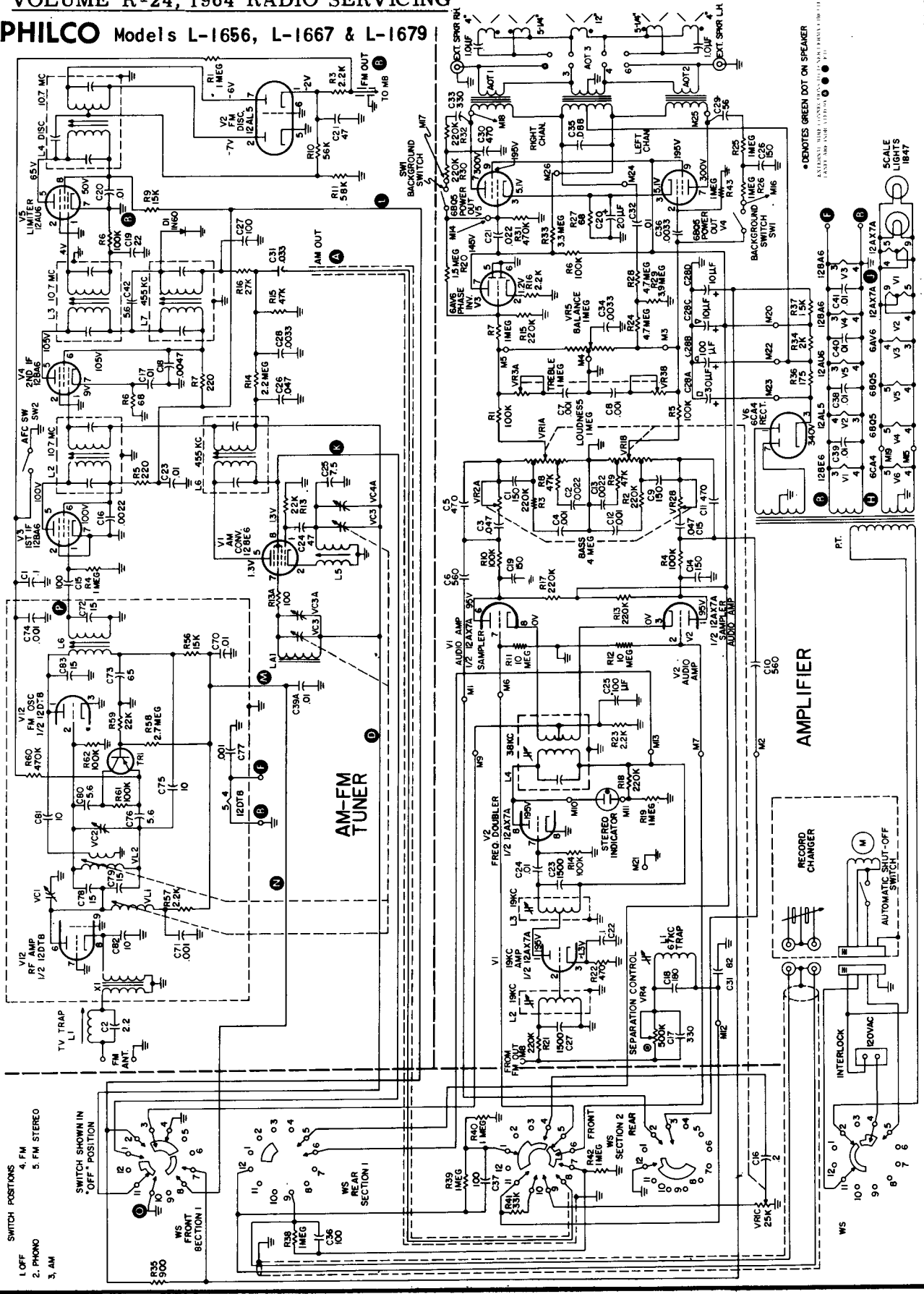
Bottom Perma-Circuit View Parts Location, Models L-1652 & L-1653

PHILCO MODELS L-1652 & L-1653

ALL VOLTAGES TAKEN WITH "PRECISION" VTVM MODEL "98". ALL CONTROLS SET AT MINIMUM AND SELECTOR SWITCH SET TO PHONO OR FM POSITIONS.



PHILCO Models L-1656, L-1667 & L-1679



SWITCH POSITIONS
 1 OFF
 2 PHONO
 3 AM
 4 FM
 5 FM STEREO

SWITCH SHOWN IN OFF POSITION

WS FRONT SECTION I

WS REAR SECTION I

SECTION 2 FRONT

SECTION 2 REAR

INTERLOCK

120VAC

AMPLIFIER

RECORD CHANGER

AUTOMATIC SHUT-OFF SWITCH

PT.

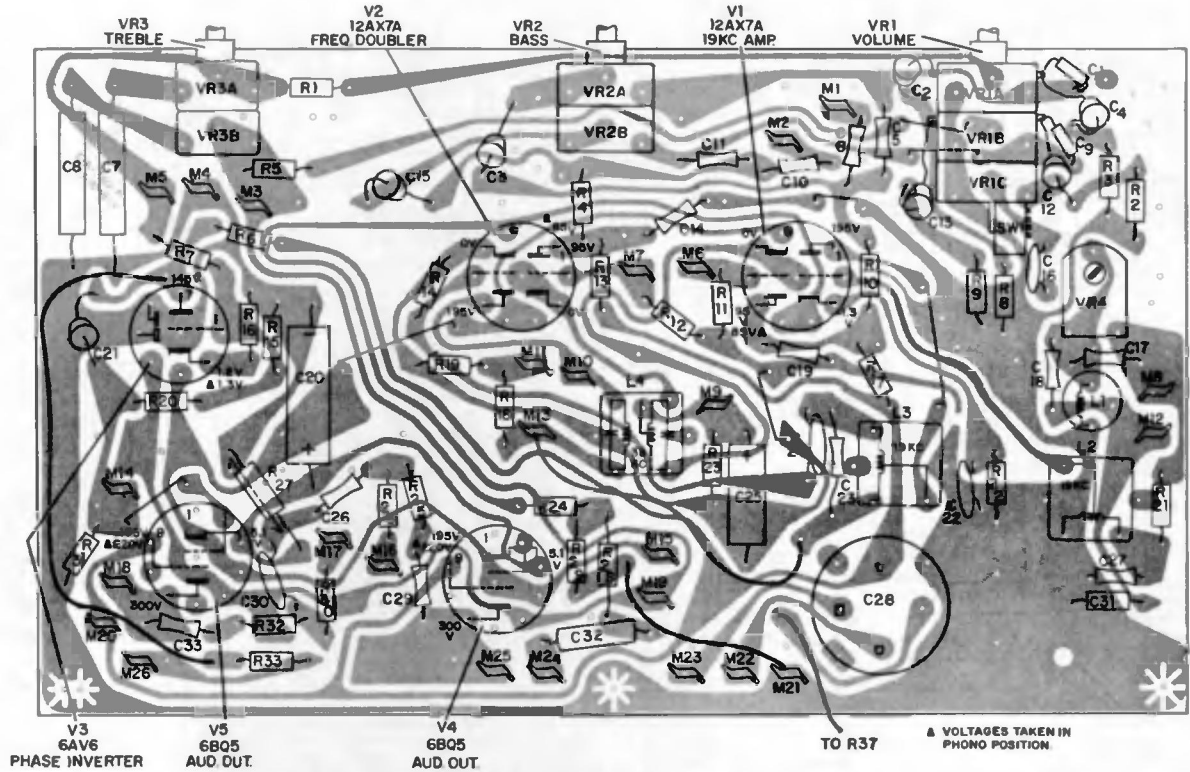
SCALE LIGHTS 1B47

* DENOTES GREEN DOT ON SPEAKER

† ALL VOLTAGES TAKEN WITH PRECISION VTVM MODEL 387. ALL CONTROLS SET AT MINIMUM AND SELECTOR SWITCHES SET TO PHONO OR FM POSITIONS.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

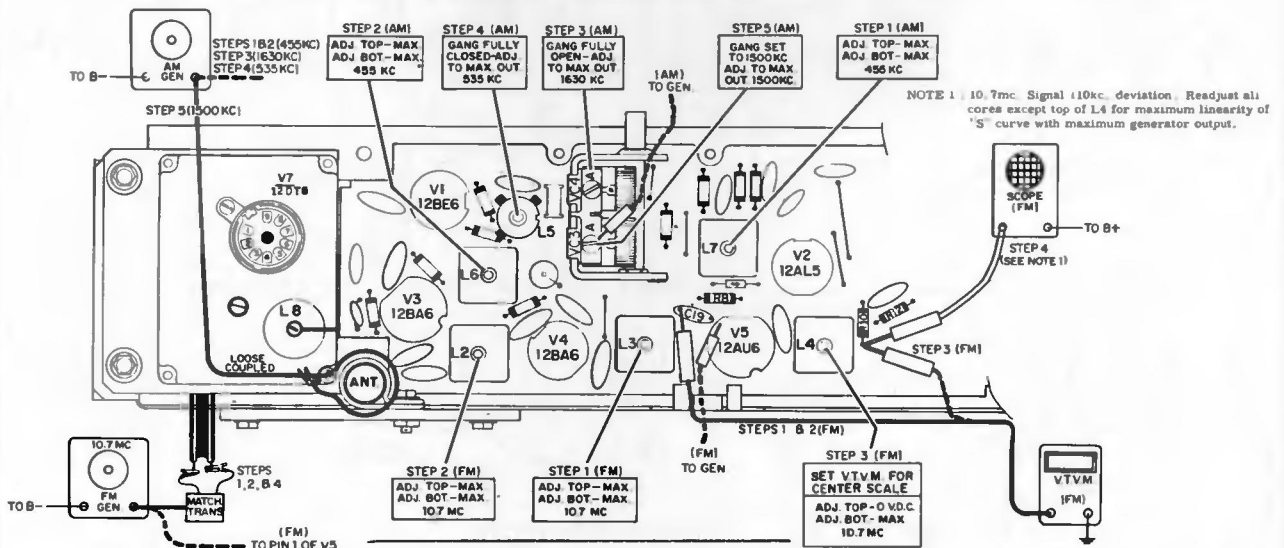
PHILCO Models L-1656, L-1667, L-1679, (L-1731) Amplifier & Tuner (Continued)



Bottom Perma-Circuit View, Parts Location, Models L-1656, L-1667 & L-1679

Amplifier perma-circuit panel was changed to Run 2 identified by a red dot. Panel changes consisted of removing wire jumper from Pin 1 of V1 to center tap of L3. Wire jumper was replaced with a 1K Ω resistor R16A. Resistor R18 was changed to 270K Ω . R14 was changed to 220K Ω . The copper foil connecting M10 and Pin 6 of V2 was opened. A 780K Ω resistor was soldered to the bottom of the panel from M10 to Pin 6 of V2. R19 was changed to a 1 megohm resistor.

Amplifier perma-circuit panel was changed to Run 3 identified by an orange dot. Panel changes consisted of removing wire jumper connecting Pin 2 of V5 to junction of M14, C21 and R31 and replacing with a 1K Ω resistor.



Alignment Procedure Chart AM-FM Tuner Models L-1656, L-1667, L-1679 & L-1731

RCA VICTOR

Chassis RS-202A, Models 3VC64, 3VC82, 4VC64, 4VC69, 4VC82,
and similar Chassis RS-202B, used in Models 4VE045, 4VE046.

ACCESS TO TUBES

All tubes are accessible through the small panel on the rear of the instrument.

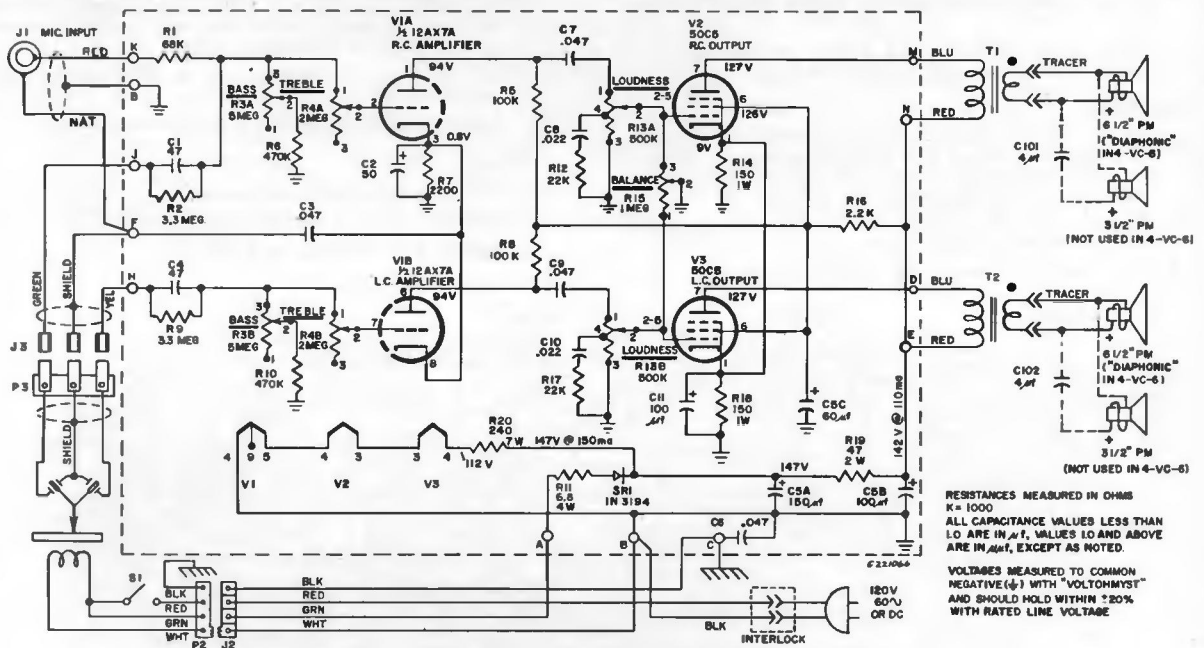
1. Remove power cord.
2. Remove three (3) plated screws holding small access panel on rear of instrument.
3. Swing panel down and to right on its pivot. DO NOT ATTEMPT TO REMOVE PANEL.

CHASSIS REMOVAL

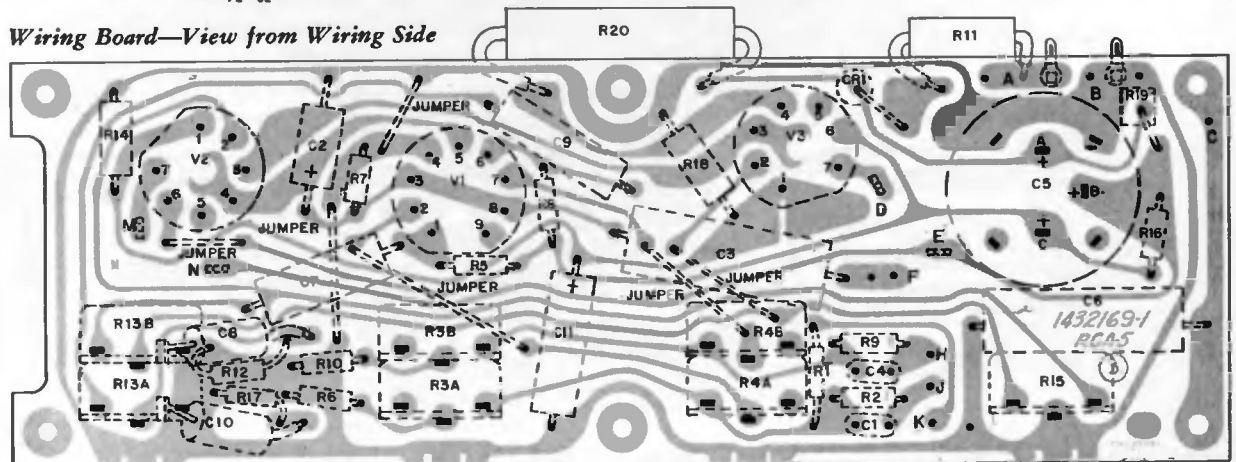
The top of the record changer compartment comprises the complete chassis. It rests on and is secured to a ledge at the front and is held by screws at the rear. The recommended procedure for its removal is as follows:

1. Remove knobs.
2. Open small access panel as described in "Access to Tubes."
3. Position two (2) holes in access panel over screws holding power cord interlock.
4. Remove two (2) machine screws holding interlock.

5. Pull record changer drawer down.
- If it is not desired to remove chassis completely, omit Steps 6 & 7.
6. Unscrew two (2) bolts securing record changer in access holes in turntable, one at front and one at rear.) drawer. (Lift mat of turntable and reach bolts through access holes in turntable, one at front and one at rear.) DO NOT ATTEMPT TO REMOVE RECORD CHANGER DRAWER.
7. Lift up changer and disconnect cables.
8. Remove four (4) plated screws holding front of chassis to horizontal ledge located inside of compartment at front of top.
9. Remove wires, running down each back corner of compartment, from holding clips.
10. Remove four (4) painted screws holding rear of chassis to rear of instrument—just below the access panel.
11. Chassis may then be lowered and removed.
12. Disconnect speaker cables from transformers and lift chassis out of case.



Wiring Board—View from Wiring Side



RCA VICTOR

4RA1 Series, Models 4RA10, 4RA14, 4RA15, Chassis RC-1213A,
 4RA3 Series, Models 4RA30, 4RA31, 4RA34, Chassis RC-1213B,
 4RA4 Series, Models 4RA41, 4RA42, 4RA45, Chassis RC-1213F,
 4RD4 Series, Models 4RD40, 4RD44, 4RD41, Chassis RC-1213H,
 4RD5 Series, Models 4RD51, 4RD52, 4RD55, Chassis RC-1213E.

(Service data below and continued on the next page at right)

CHASSIS ACCESSIBILITY

4RA1 and 4RD4 Series

1. DO NOT ATTEMPT TO REMOVE THE KNOBS. The tuning and volume control knobs are held captive to the cabinet by retainers on their shafts.
2. Remove the back cover by lifting the protrusions on the bottom of the back cover, out of the slots in the base of the cabinet.
3. Unsolder speaker leads if necessary. Avoid putting a strain on the speaker leads.
4. Remove two chassis retainers (screws or clips), one at the volume control and one on the left end mounting.
5. Grasp tuning capacitor and volume control, and pull chassis out of knobs and mounting slots.

4RA3 Series

1. IT IS NOT NECESSARY TO REMOVE THE KNOBS. The chassis, antenna, and loudspeaker are all mounted on the front panel section and are readily accessible when the back is removed.
2. Remove two (2) screws, one at each of the upper corners of the back.
3. Pull front panel section out of hood-back section.

To reassemble—

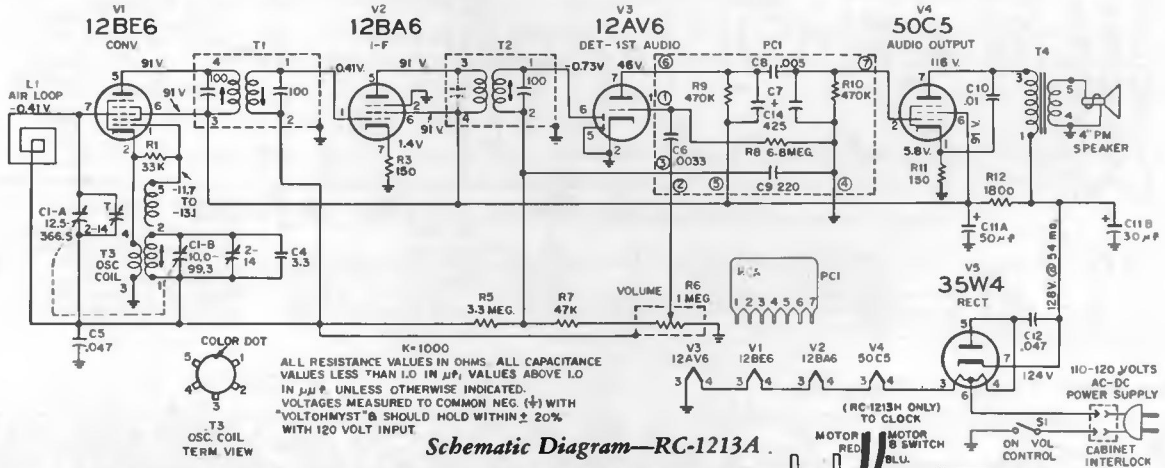
1. Align the power interlock connector.
2. Press the front and back sections of the cabinet together.
3. Check that the three bosses on the bottom of the front section are seated in their respective slots in the bottom of the back section.
4. Replace screws at upper back corners.

4RA4 and 4RD5 Series

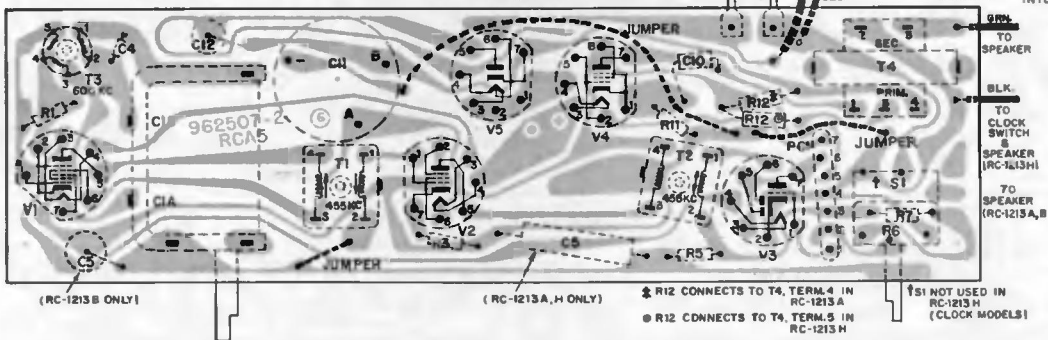
1. IT IS NOT NECESSARY TO REMOVE THE KNOBS. The chassis, antenna, and loudspeaker are all mounted on the front panel section and are readily accessible when the back is removed.
2. Remove four (4) screws, one at each of the back corners.
3. Pull front panel section out of hood-back section.

To reassemble—

1. Align the power interlock connector.
2. Press the front and back sections together.
3. Replace four screws in back corners.



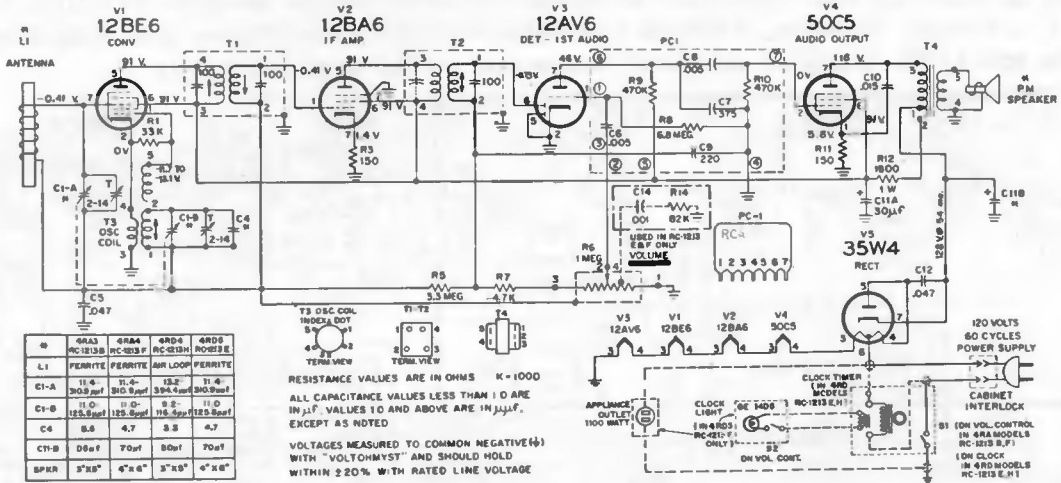
Schematic Diagram—RC-1213A



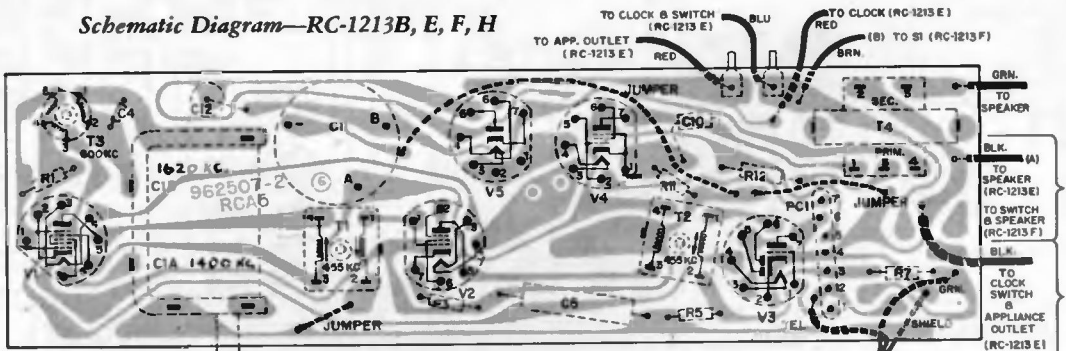
Chassis Layout—RC-1213A, B, H

View from Wiring Side

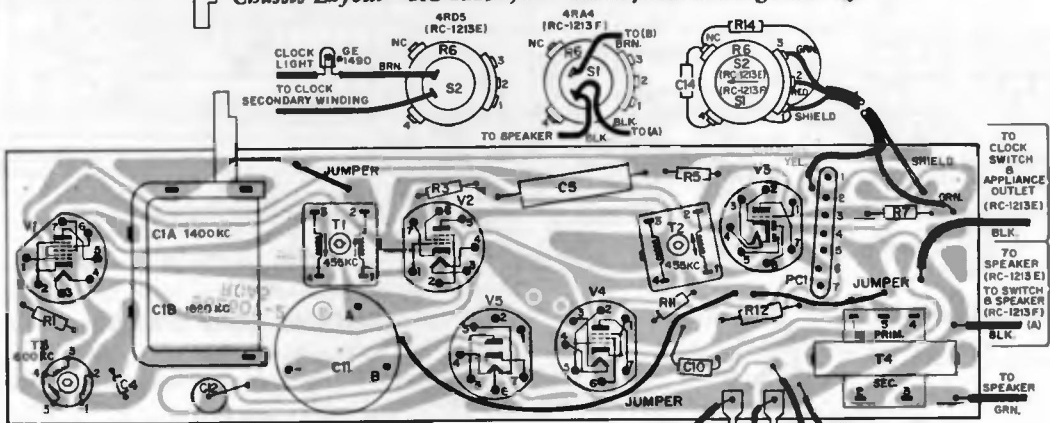
RCA Victor Chassis RC-1213A, -B, -E, -F, -H, Continued from preceding page.



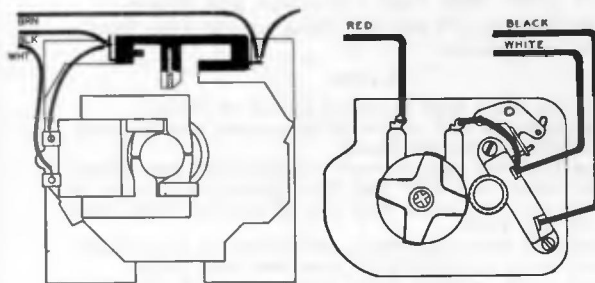
Schematic Diagram—RC-1213B, E, F, H



Chassis Layout—RC-1213E, F View from Wiring Side

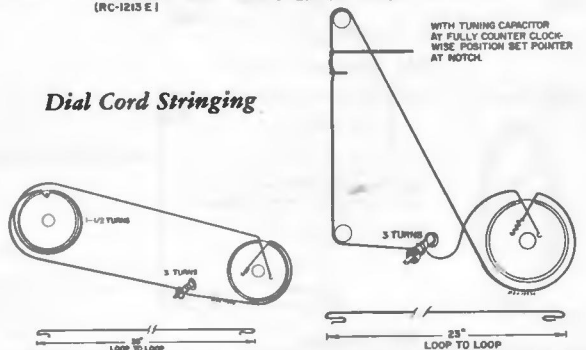


Chassis Layout—RC-1213E, F View from Component Side



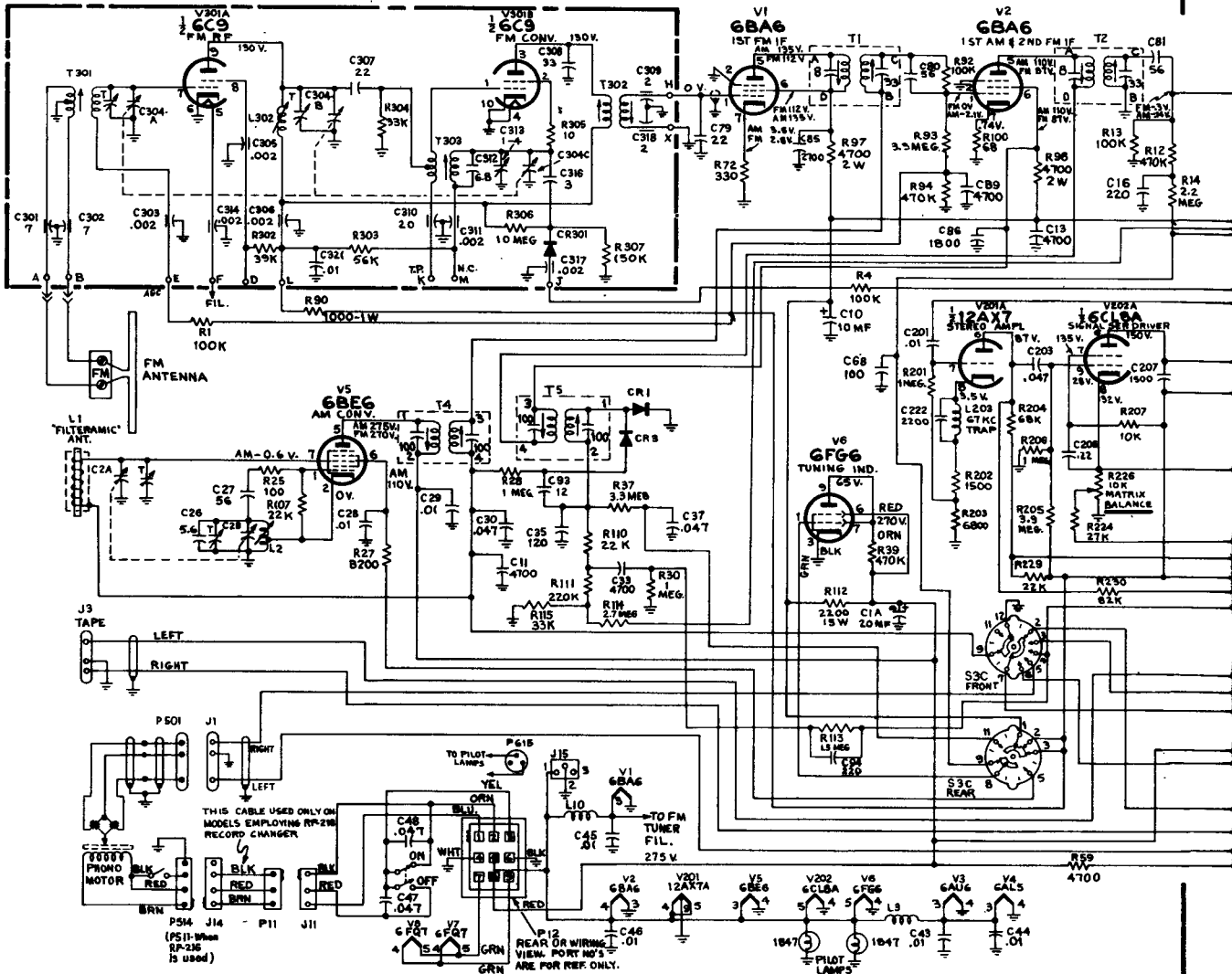
Clock Wiring

Dial Cord Stringing

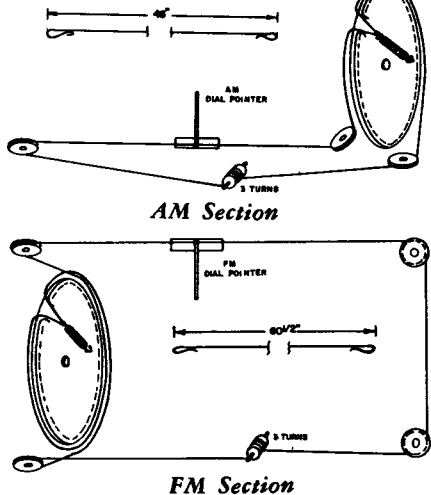


VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

RCA VICTOR Models 3VF305, 3VF306, 3VF340, 3VF346, 3VF349, employ Tuner Chassis RC-1205C and Amplifier Chassis RS-199B; while Models 3VF405, 3VF446, 3VF516, 3VF534, 3VF604, 3VF619, 3VF646, use the same Tuner and Amplifier Chassis RS-177H. Service material below and on the next two pages.



Dial Cord Stringing



CRITICAL LEAD DRESS

RC-1205C

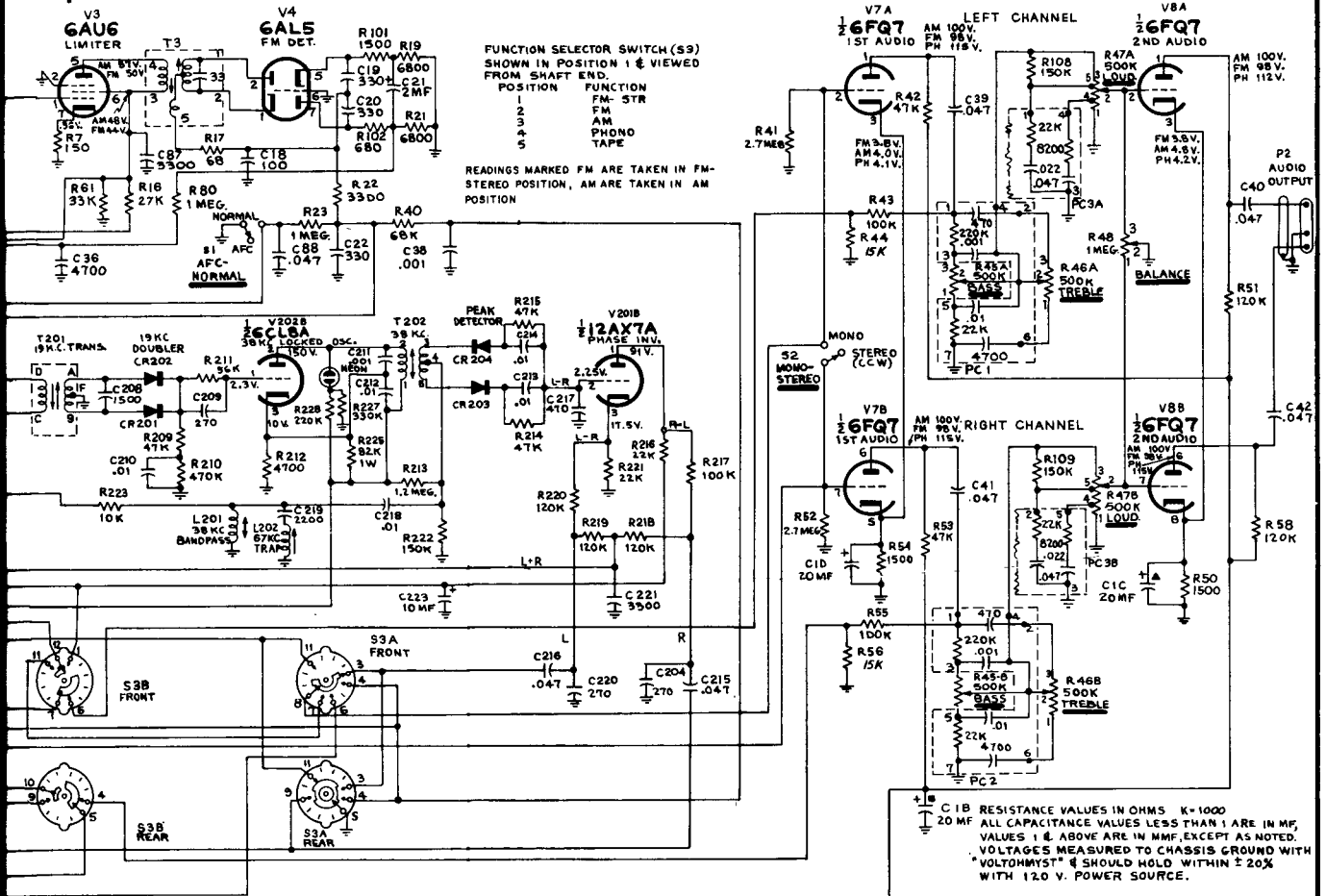
1. Dress R3 and R9 up and away from all other components.
2. Keep 10.7 mc IF grid and plate wiring short and close to chassis.
3. Dress L3 close to chassis.
4. Keep heater leads away from audio grid circuits.
5. Dress C46 and C48 and AC wiring up and away from audio components.

RS-177H

1. Dress all heater leads flat along bottom of chassis.
2. Use minimum lead length on all resistors between V401 and V402 and terminal board.
3. Dress feed back leads between terminal board near output transformers and V401 and V402, along inside corner of chassis and then along back side of terminal board near V401 and V402.
4. Dress plate leads from output transformers to output tubes down center of chassis away from feed back leads.
5. Dress power resistors R426, R427, and R428 well away from chassis. All insulated leads are to be dressed away from these resistors.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

RCA VICTOR Continuation of service material on Tuner Chassis RC-1205C, for list of models using this chassis see preceding page at left, material on Amplifier Chassis RS-177H and RS-199B is on the next page, over.



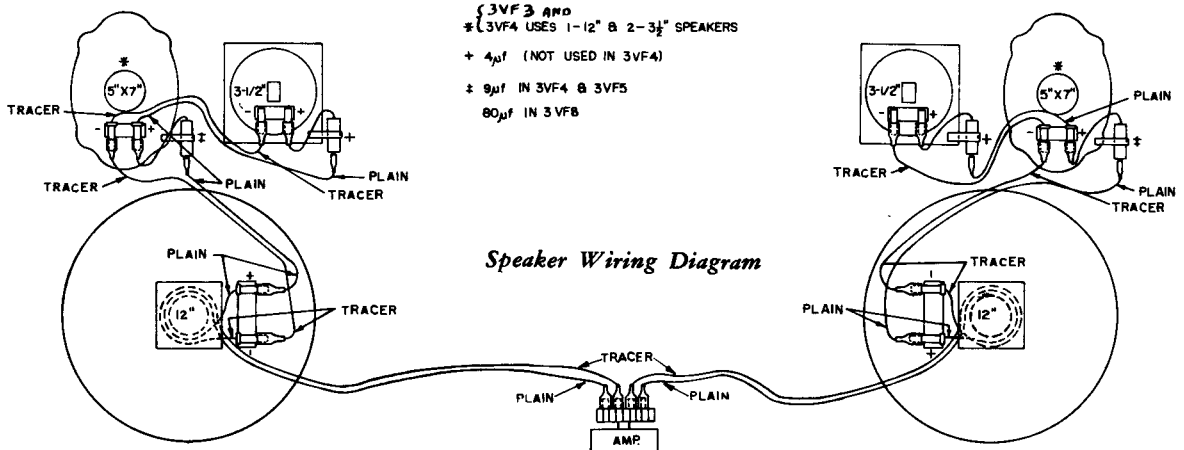
RC-1205C TUNER CHASSIS

SPEAKER PHASING

The two speaker systems must be properly connected in order to have "in-phase" sound outputs. Incorrect connections will be evidenced by "loss of bass" or distortion in the sound when playing a monophonic recording and listening

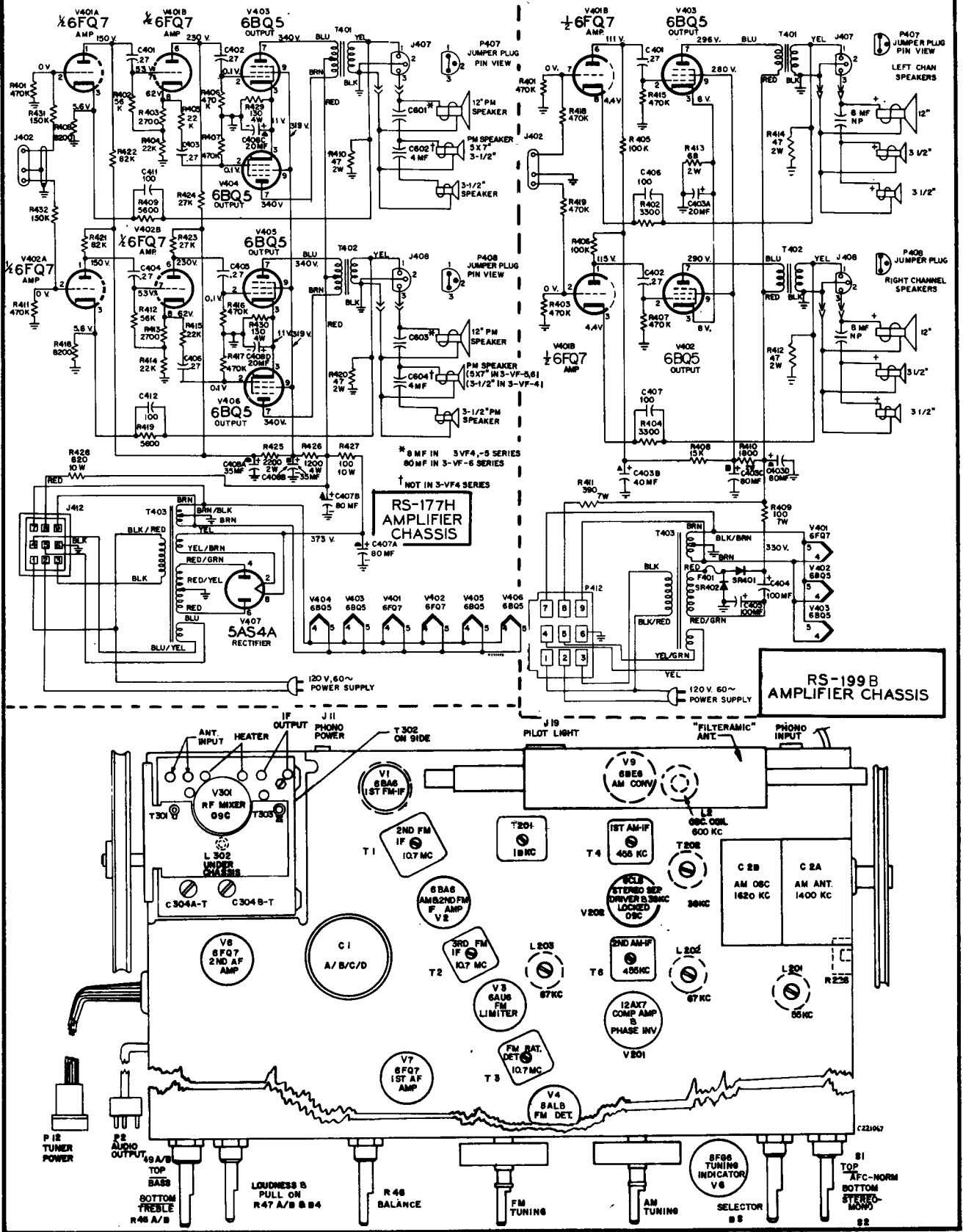
from a point midway between the two speaker systems. Similarly the speakers in each system must be phased with each other.

To maintain correct phasing, the speaker connections as shown should be closely followed.



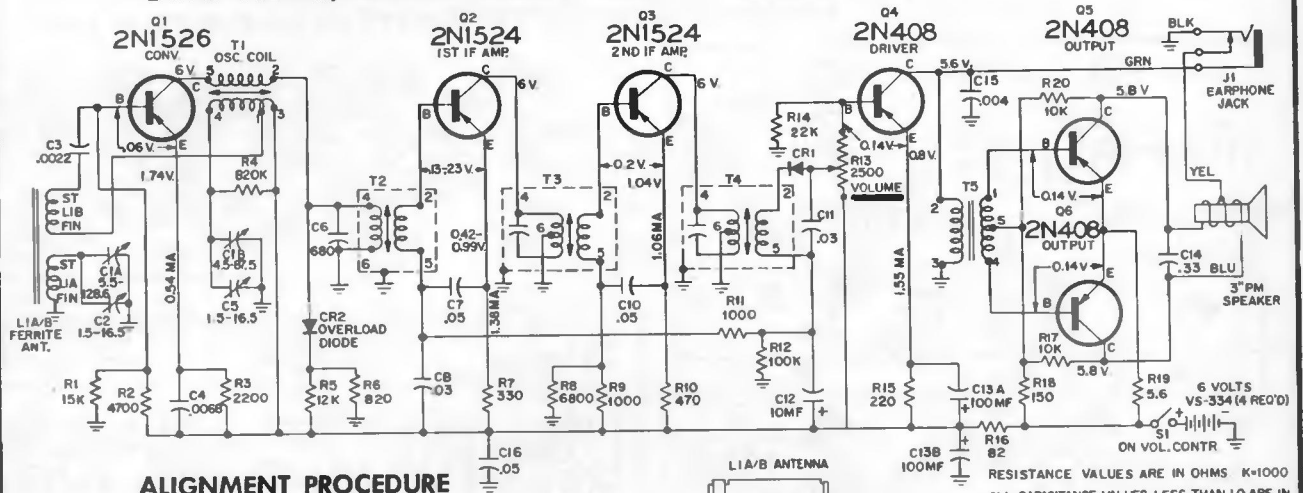
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

RCA VICTOR Amplifier Chassis RS-177H and RS-199B, for list of models using these chassis, associated tuner data, etc., see preceding two pages.



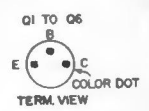
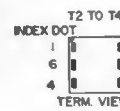
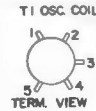
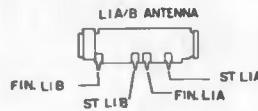
RCA VICTOR

4RG1 Series, Models 4RG11, 4RG12, 4RG16, Chassis RC-1208D
 4RG3 Series, Models 4RG31, 4RG34, Chassis RC-1208H



ALIGNMENT PROCEDURE

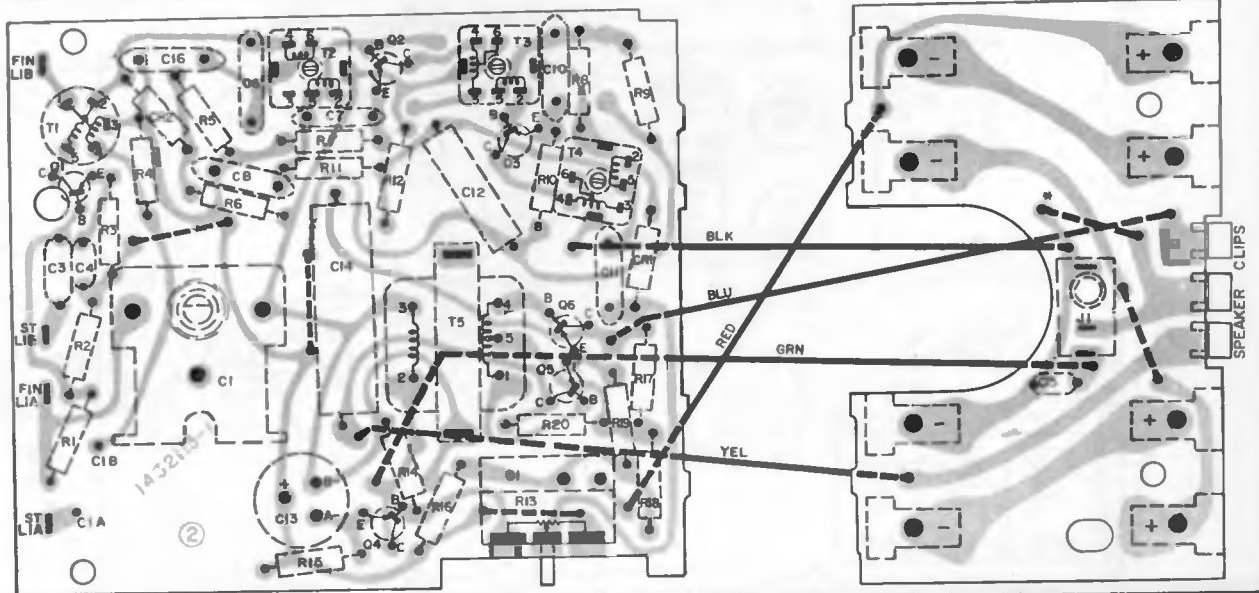
Step	Connect High Side of Signal Generator to—	Signal Gen. Output	Dial Pointer Setting	Adjust for Max. Output
1	Antenna gang stator C1A thru .01 mf capacitor	455 kc	Gang fully open	T4 (3rd I-F)
2				T3 (2nd I-F)
3				T2 (1st I-F)
4	Repeat Steps 1, 2, and 3			
5	Short wire placed near antenna for radiated signal	1620 kc	Gang fully open	Oscillator trimmer C5
6		1400 kc (rock gang if necessary)	1400 kc (rock gang if necessary)	Antenna trimmer C2
7		600 kc	600 kc (rock gang)	T1 osc. coil
8	Repeat Steps 5, 6, and 7.			



RESISTANCE VALUES ARE IN OHMS K=1000
 ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN MF, THOSE ABOVE 1.0 ARE IN MMF EXCEPT AS NOTED.
 VOLTAGES MEASURED WITH "VOLTOMYST" FROM BATTERY(+) & SHOULD WITHIN ± 20% WITH A NEW BATTERY

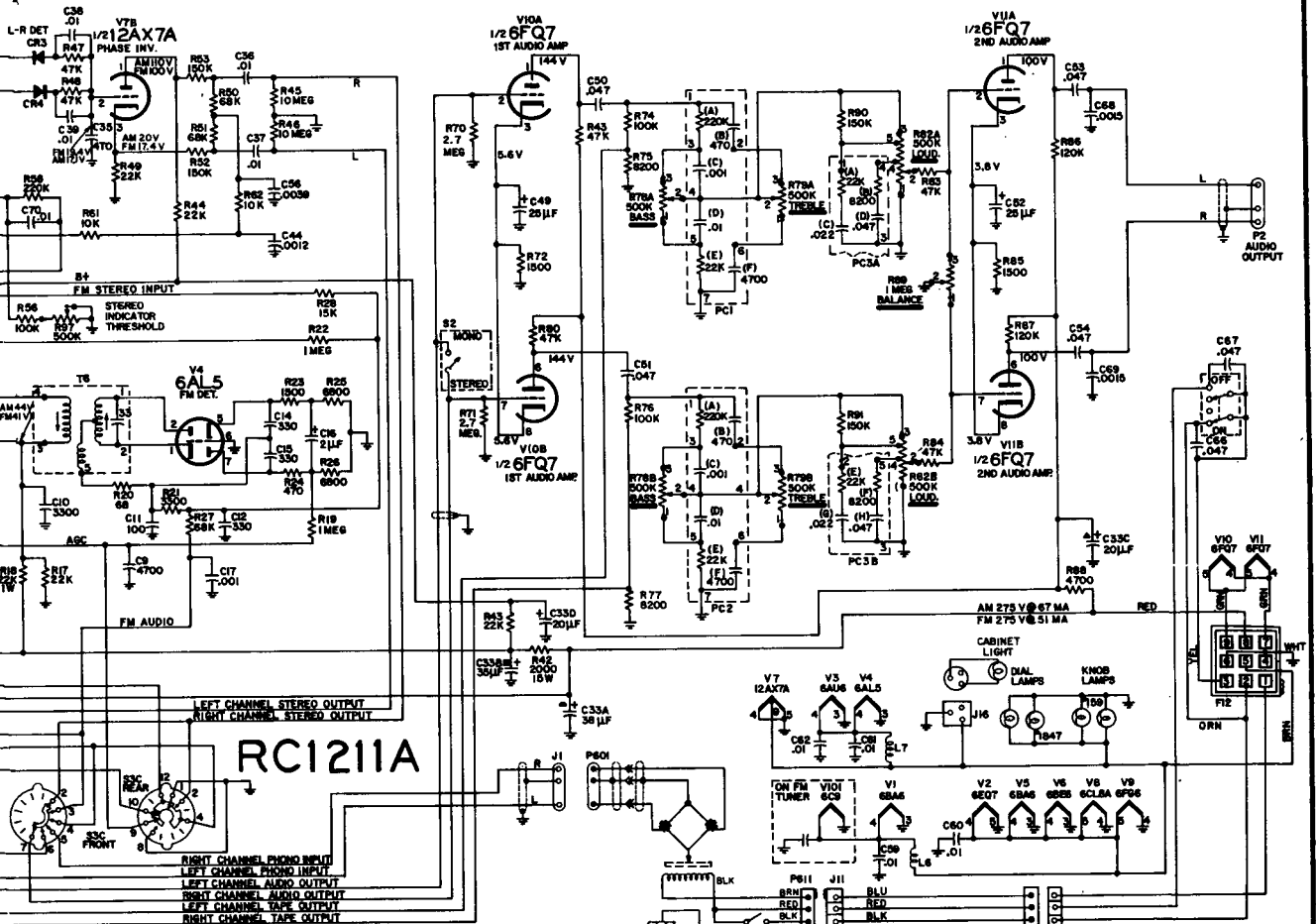
CHASSIS REMOVAL

Remove tuning knob. Open case
 Remove two screws—one at each corner—located near antenna. Remove two screws located between positive battery contacts.
 If speaker is connected to board by wires, unsolder wires at board.
 Lift slightly the end of each board that was secured by screws and slide boards out of slots which hold opposite ends.

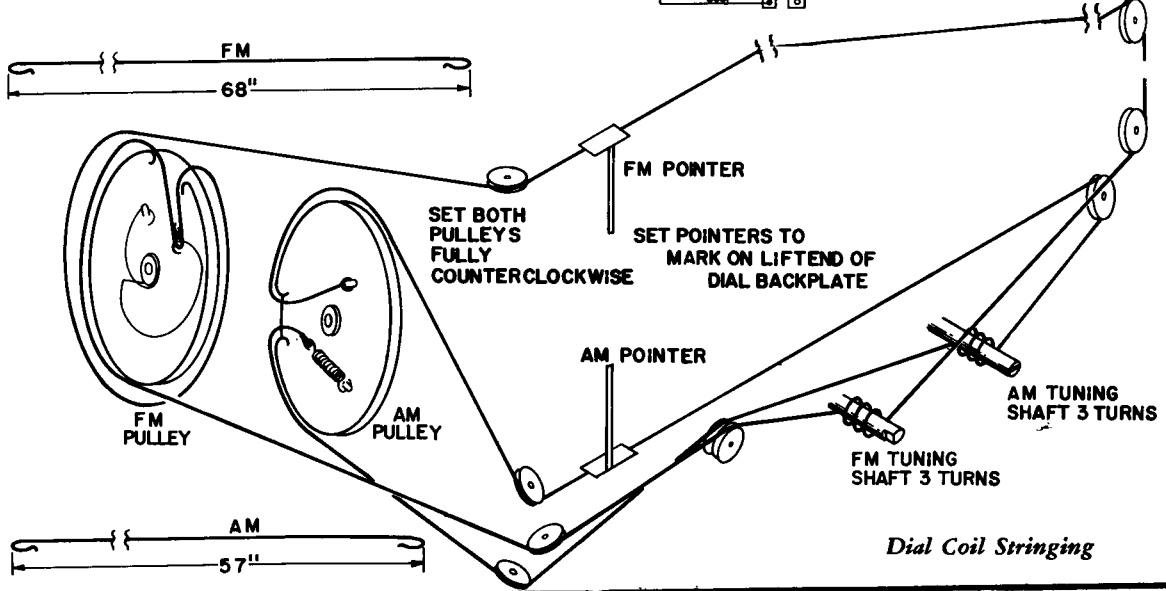


RCA VICTOR

Models 4VF304, 4VF325, 4VF326, 4VF348, 4VF349, 4VF405, 4VF446, 4VF464, 4VF480, 4VF488, 4VF534, use Tuner Chassis RC-1211A covered across these two pages, and Amplifier Chassis RS-177J or RS-199C which are similar to amplifier chassis of corresponding number (but different suffix) of previous section.



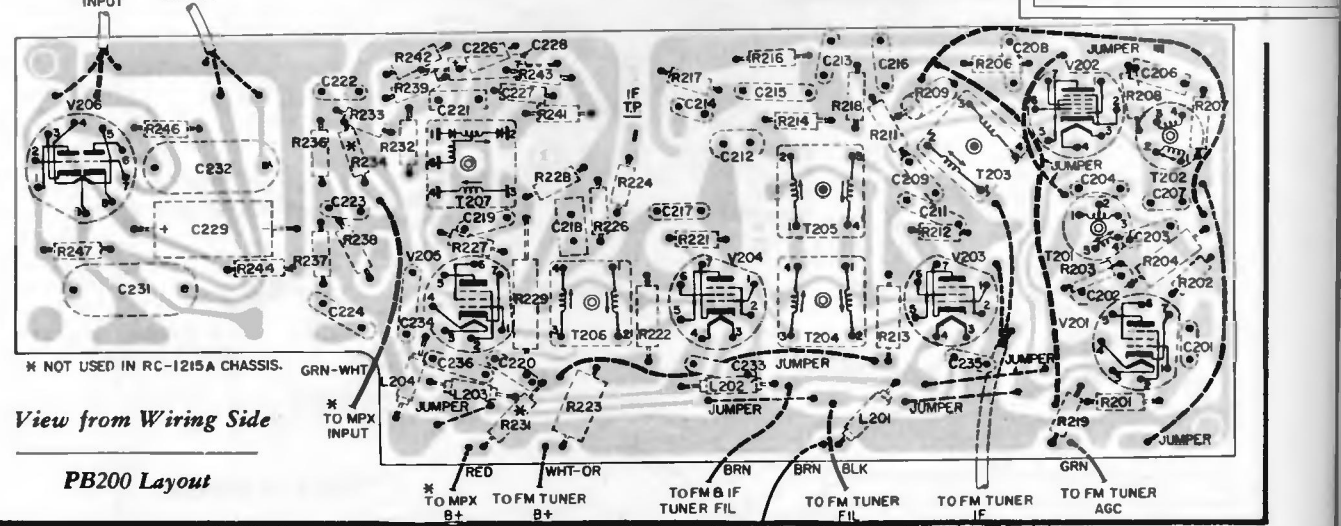
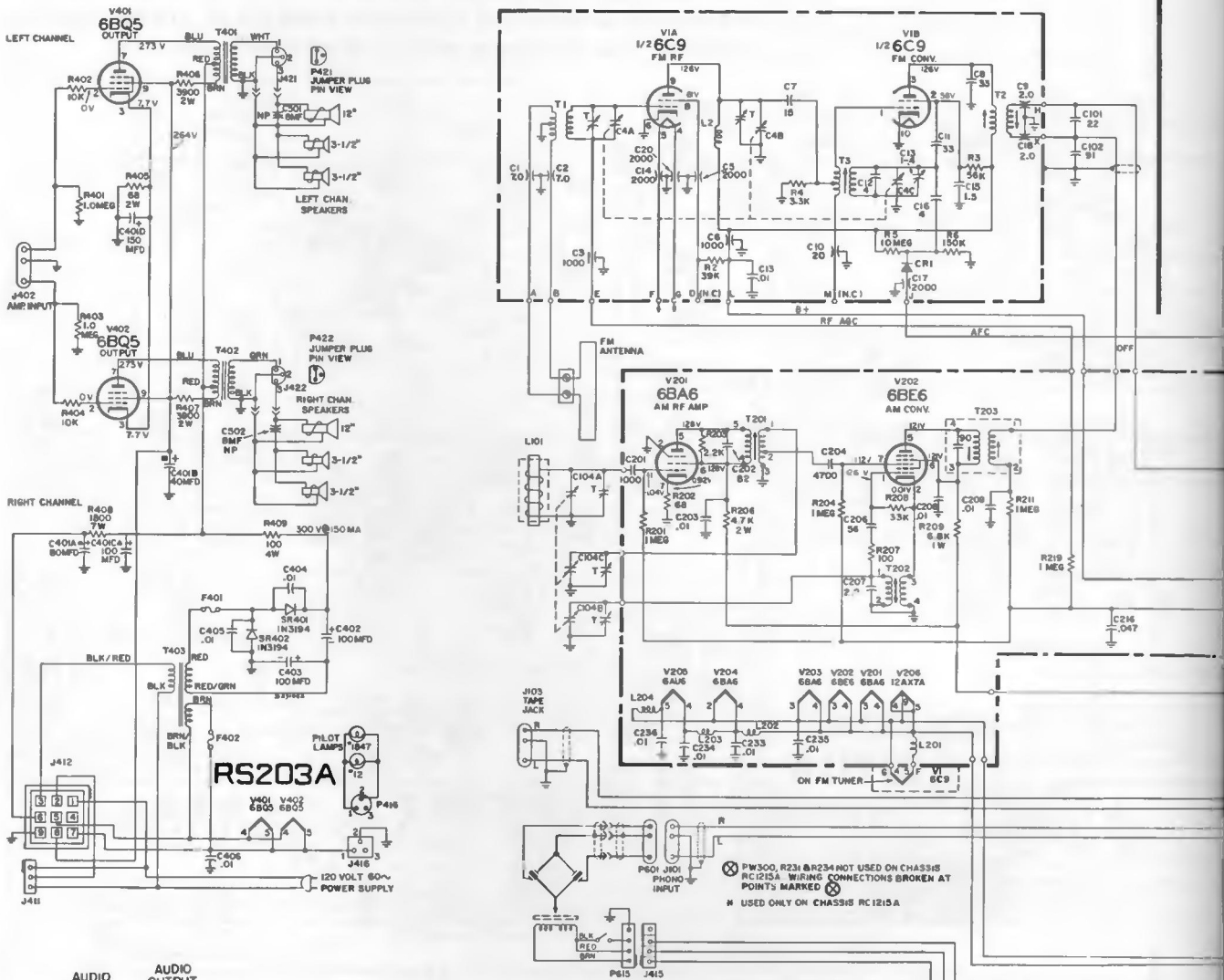
RC1211A



Dial Coil Stringing

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

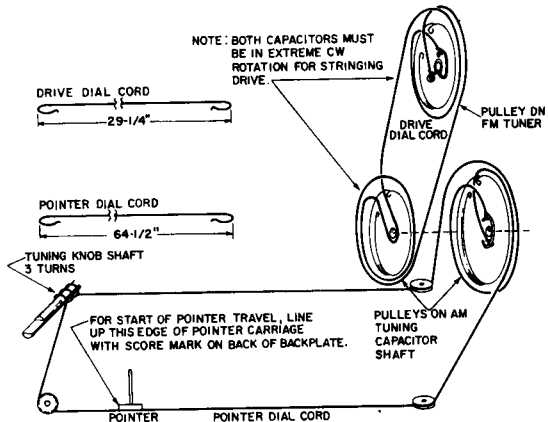
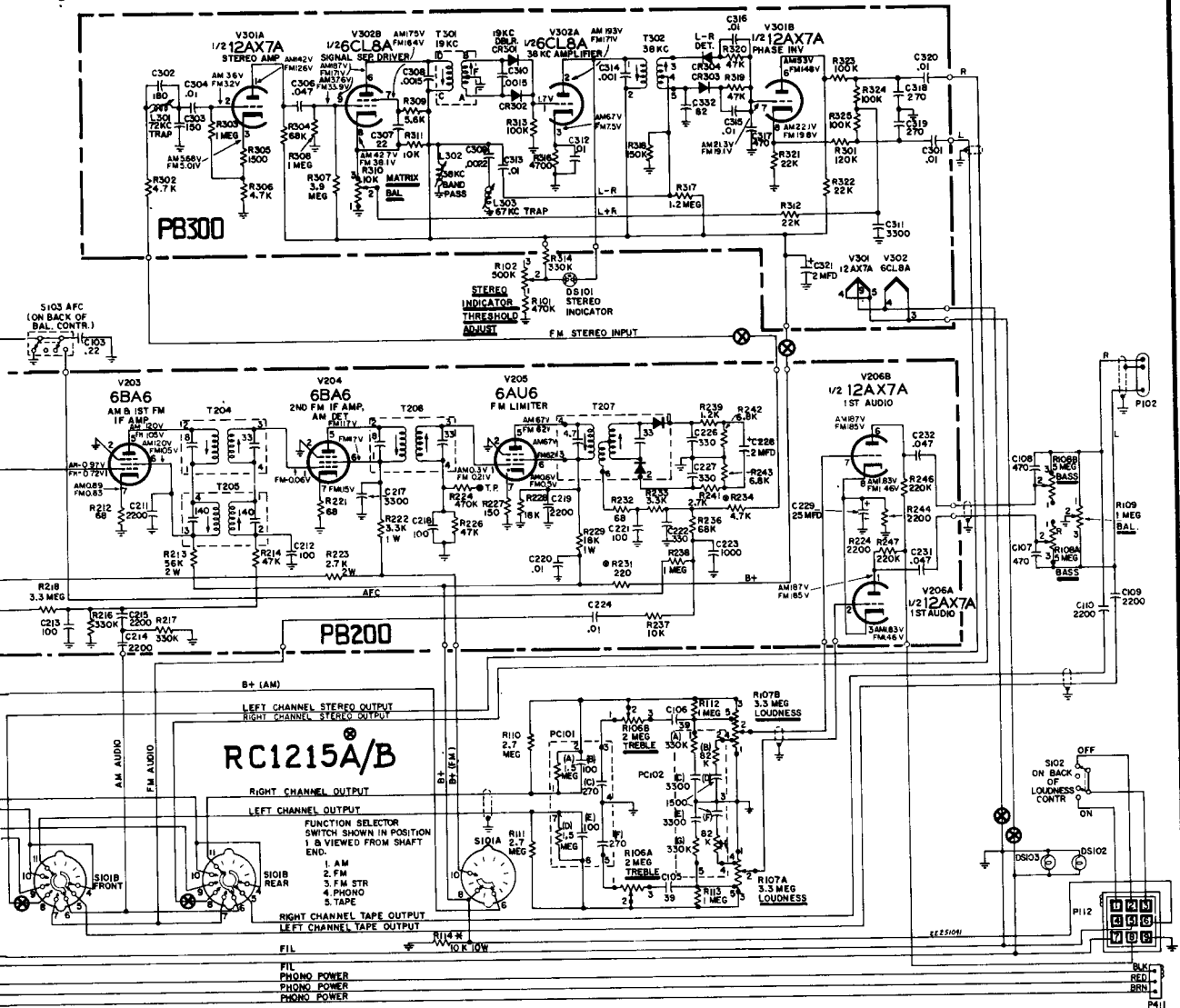
RCA Victor Models 4VF095, 4VF096, 4VF105, 4VF106, 4VF114, 4VF124, 4VF145, 4VF146, 4VF155, 4VF156, 4VF206, 4VF224, 4VF282, 4VF289, use Chassis RC-1215A & B Tuner and Amplifier Chassis RS-203A, schematics across these two pages and other service material on the page following.



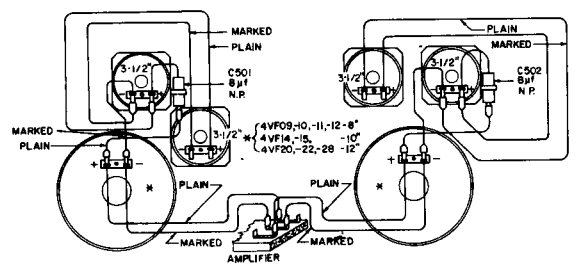
View from Wiring Side
PB200 Layout

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

RCA Victor Models 4VF095, 4VF096, 4VF105, 4VF106, 4VF114, 4VF124, 4VF145, 4VF146, 4VF155, 4VF156, 4VF206, 4VF224, 4VF282, 4VF289, use Tuner Chassis RC-1215A & B and Amplifier Chassis RS-203A, schematics printed across these two pages and other material on the page following.



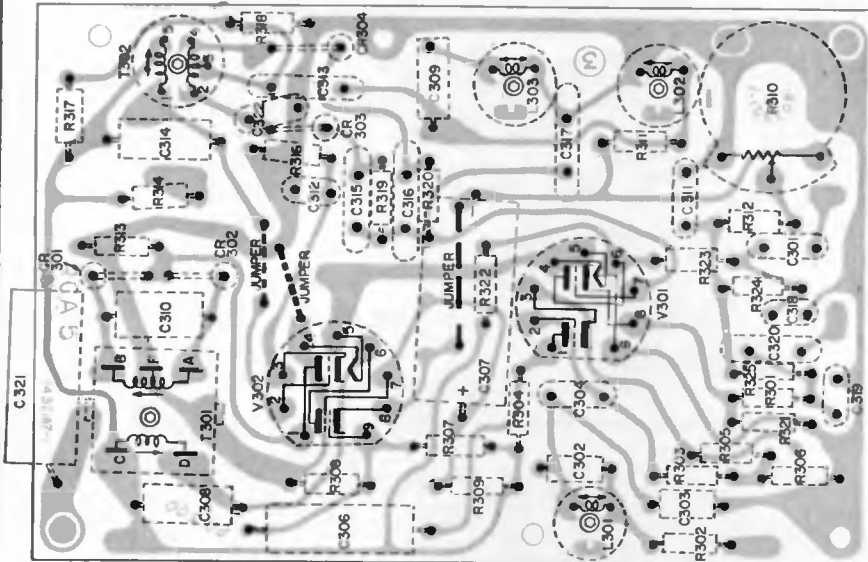
Dial Cord Arrangement



Speaker Wiring

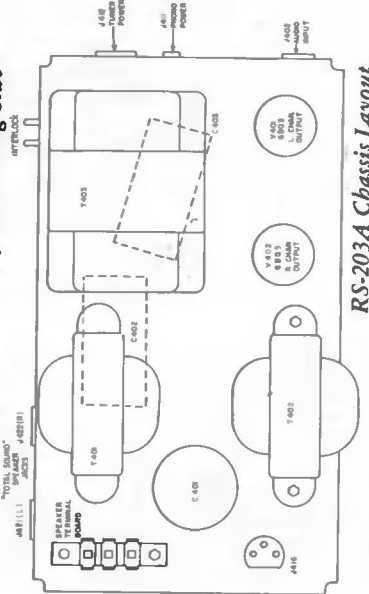
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

RCA Victor Models 4VF095, 4VF096, 4VF105, 4VF106, 4VF114, 4VF124, 4VF145, 4VF146, 4VF155, 4VF156, 4VF206, 4VF224, 4VF282, 4VF289, use Tuner Chassis RC-1215A & B, Amplifier RS-203A, material continued.

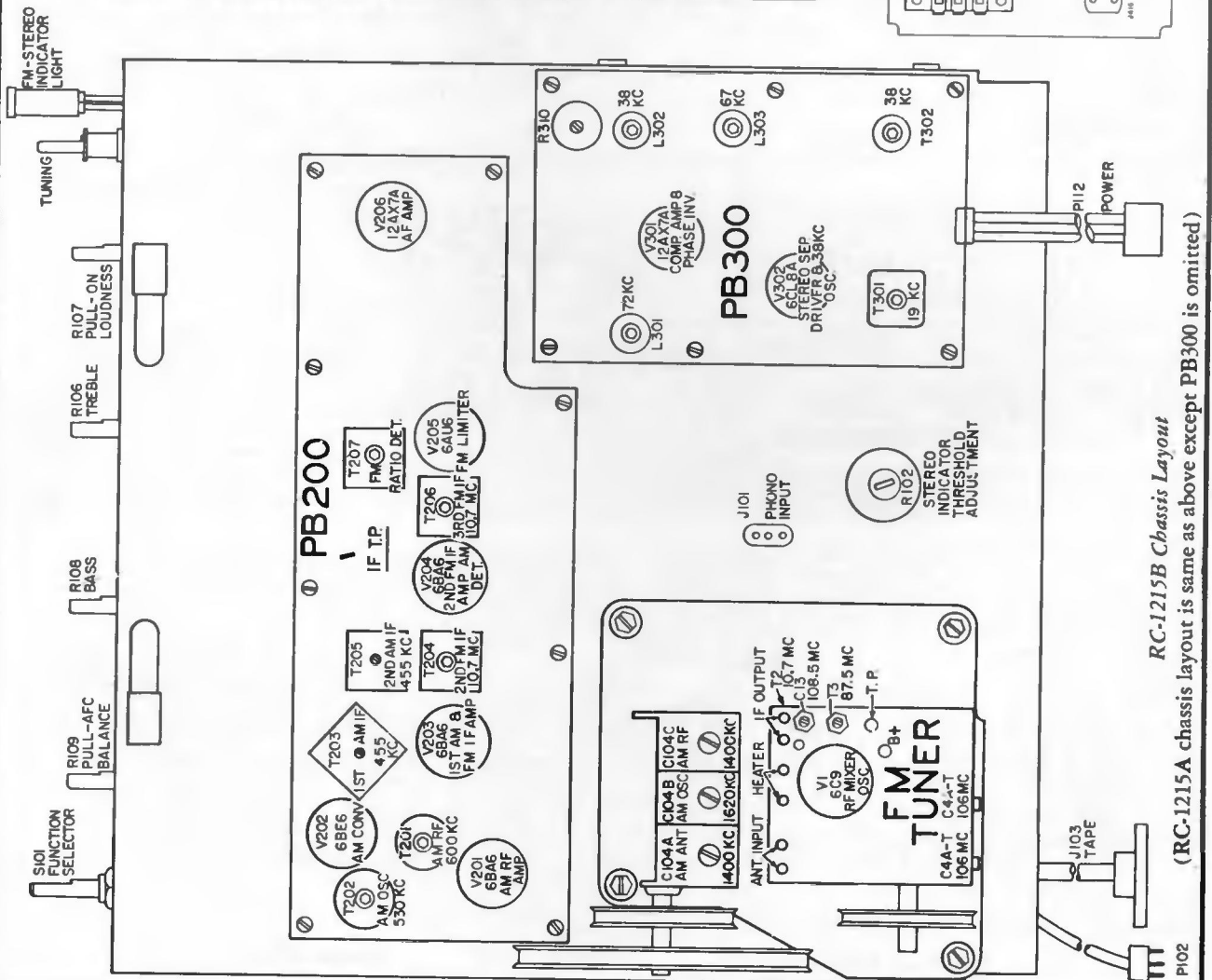


PB300 Layout

View from Wiring Side



RS-203A Chassis Layout

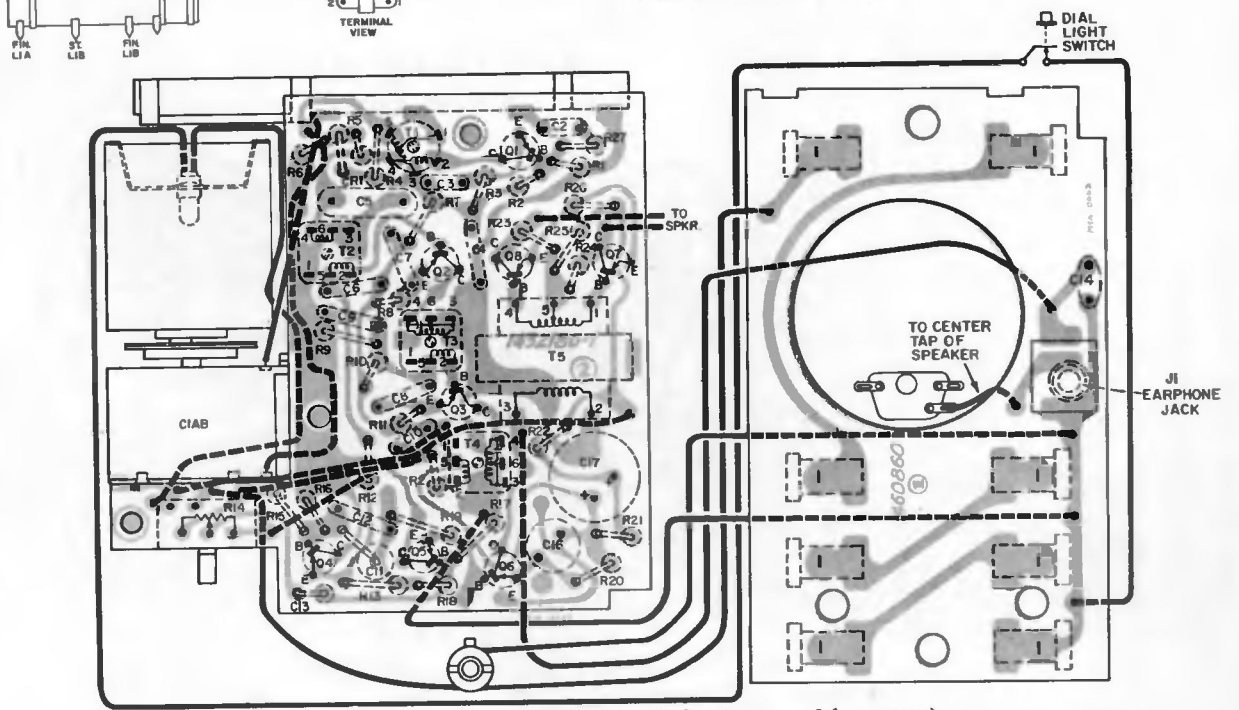
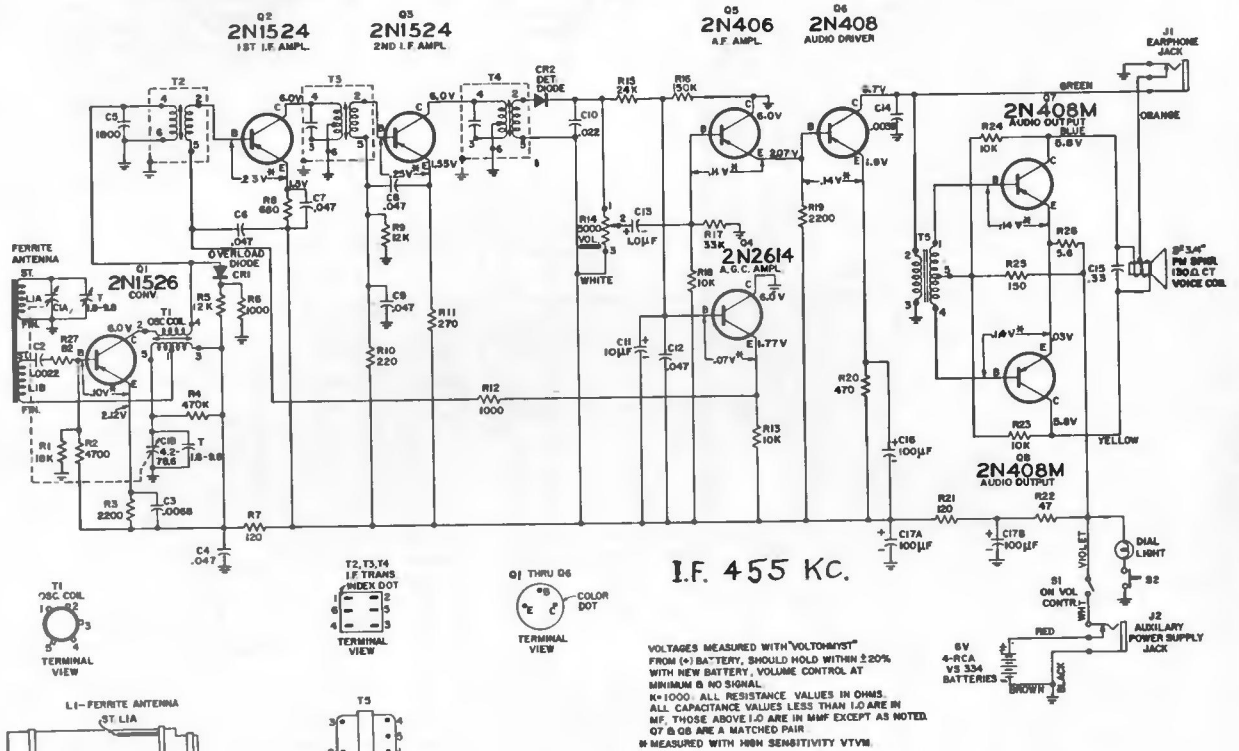


RC-1215B Chassis Layout

(RC-1215A chassis layout is same as above except PB300 is omitted)

RCA VICTOR

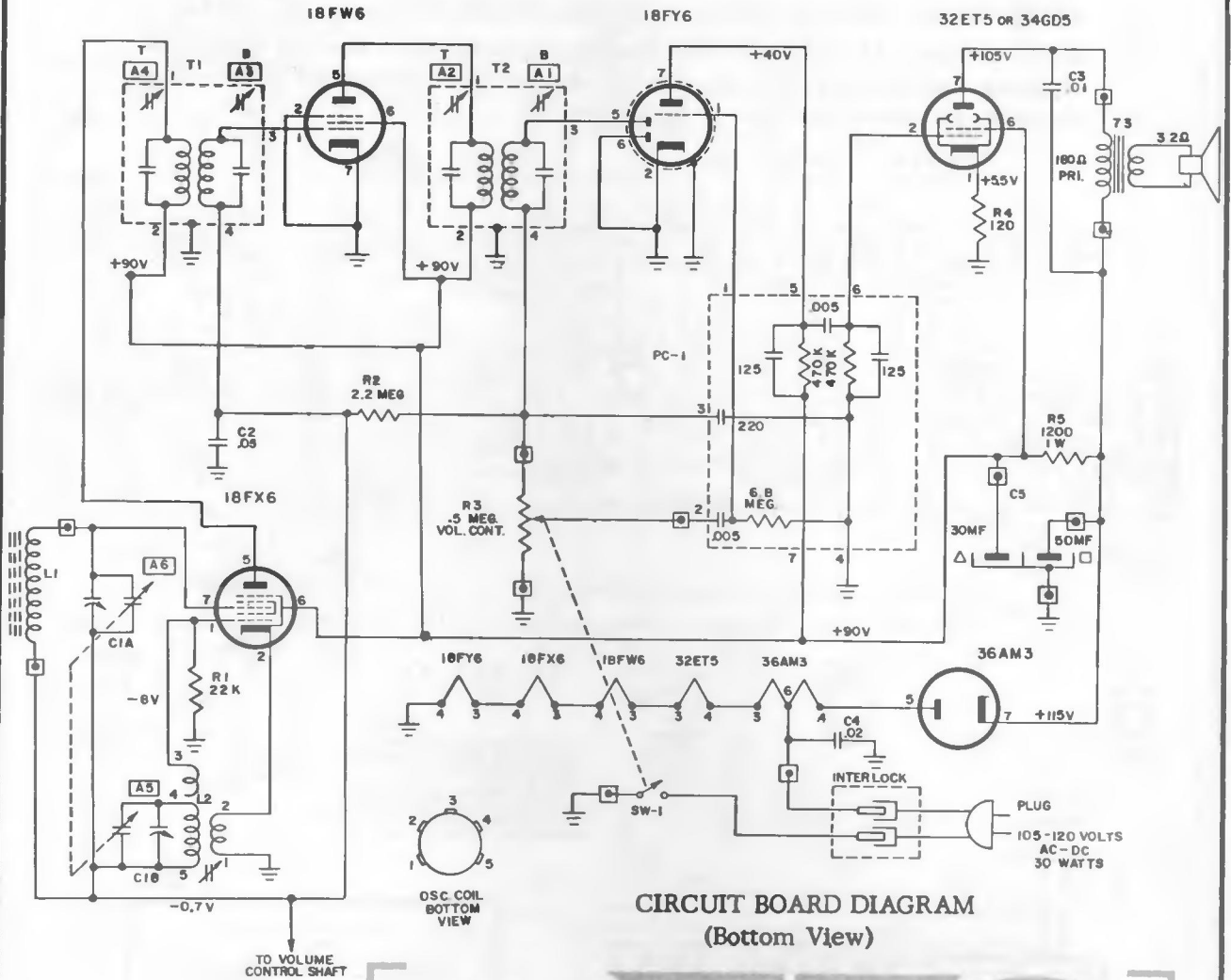
4RG6 Series, Models 4RG61, 4RG62, 4RG66, Chassis RC-1214A;
 4RG5 Series, Models 4RG51, 4RG52, 4RG56, also use the same chassis and are electrically the same, but are positioned differently in the case and do not use a dial light.



SEARS, ROEBUCK AND CO.

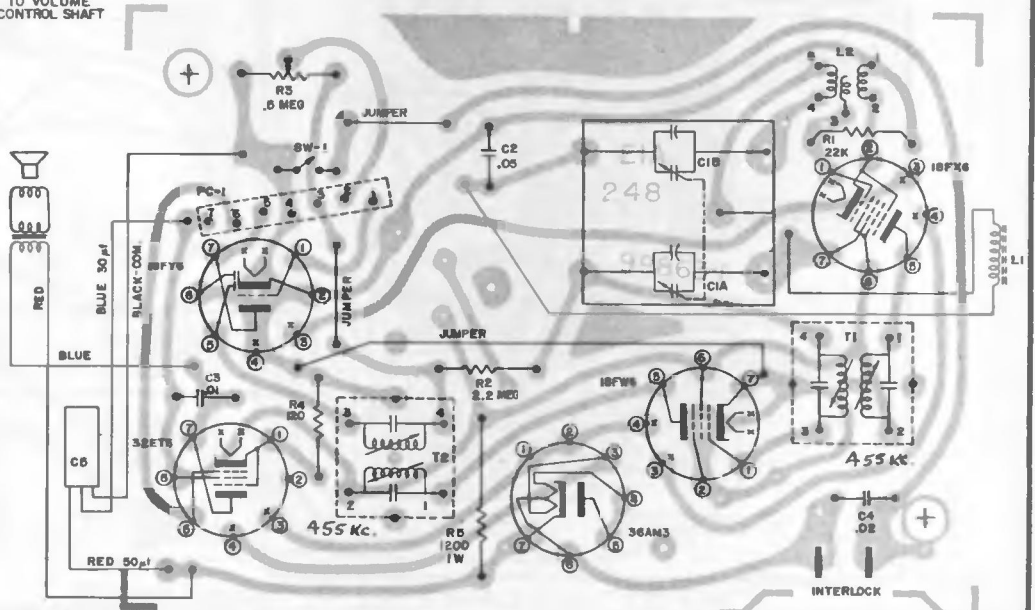
Silvertone

CHASSIS 132.75901
MODEL 4001, 4002, 4003



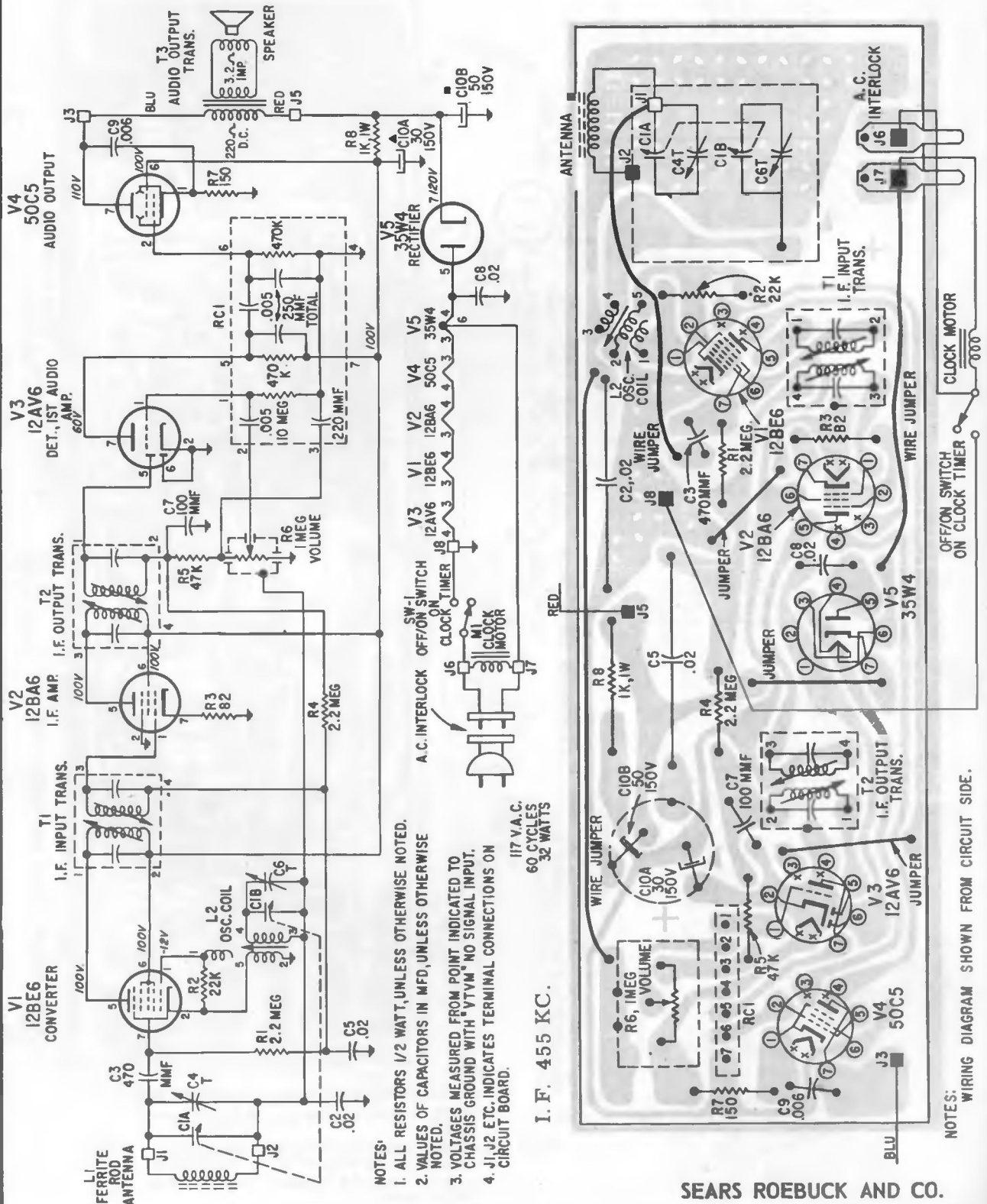
CIRCUIT BOARD DIAGRAM
(Bottom View)

⊥ = B-
□ = EXTERNAL CONNECTIONS TO PRINTED BOARD.
VOLTAGES MEASURED WITH A V.T.M.
RESISTANCE VALUES ARE IN OHMS R=1,000,
MEG=1,000,000.
CAPACITANCE VALUES LESS THAN (1) ARE IN
MICROFARADS (μF) AND VALUES OF (1) OR
GREATER ARE IN MICROMICROFARADS (μμF),
UNLESS OTHERWISE INDICATED.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

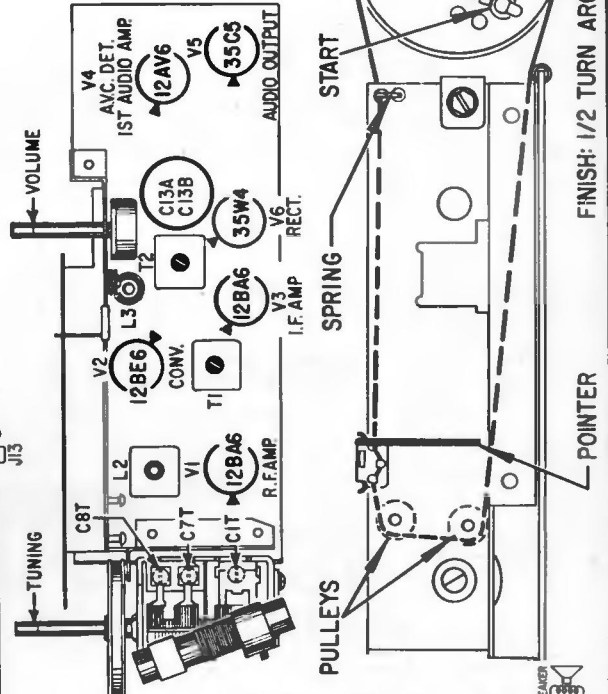
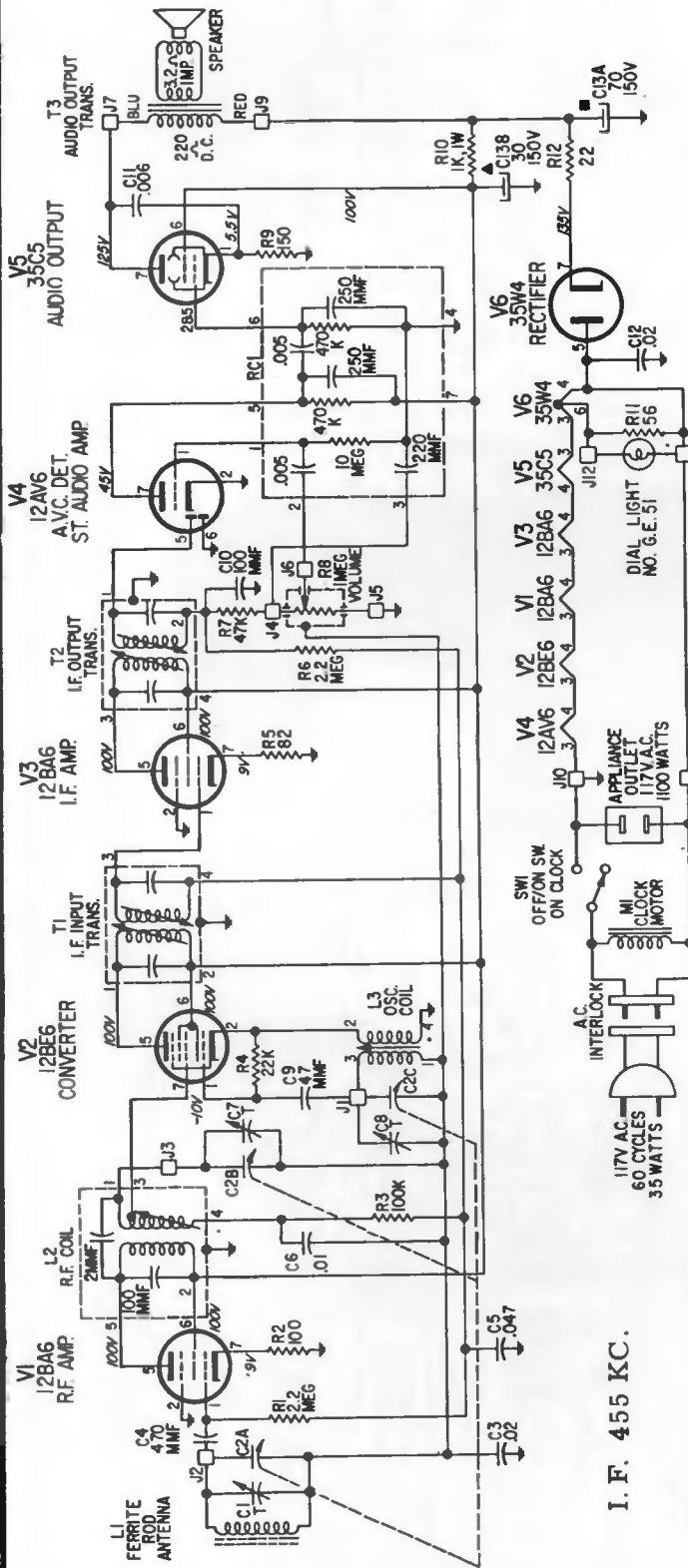
SEARS, ROEBUCK & CO. Chassis 528.54400, Model 4030



NOTES: WIRING DIAGRAM SHOWN FROM CIRCUIT SIDE.

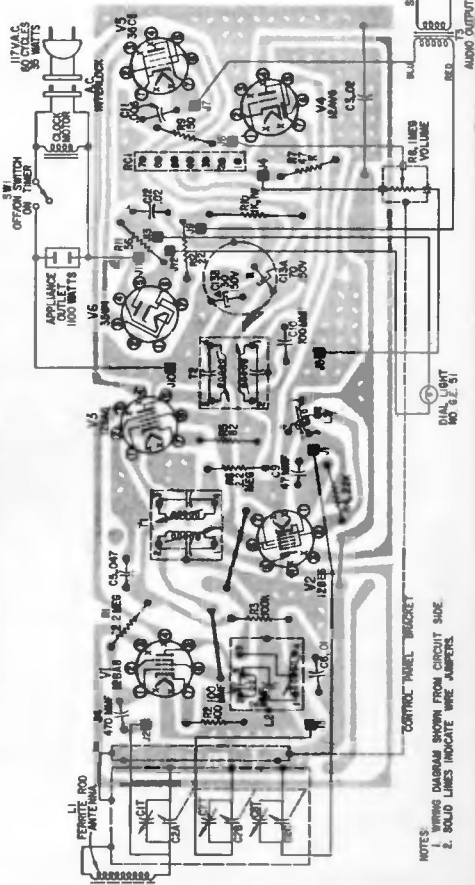
SEARS, ROEBUCK and CO.

Chassis 528.54670,
Models 4043, 4044



I. F. 455 KC.

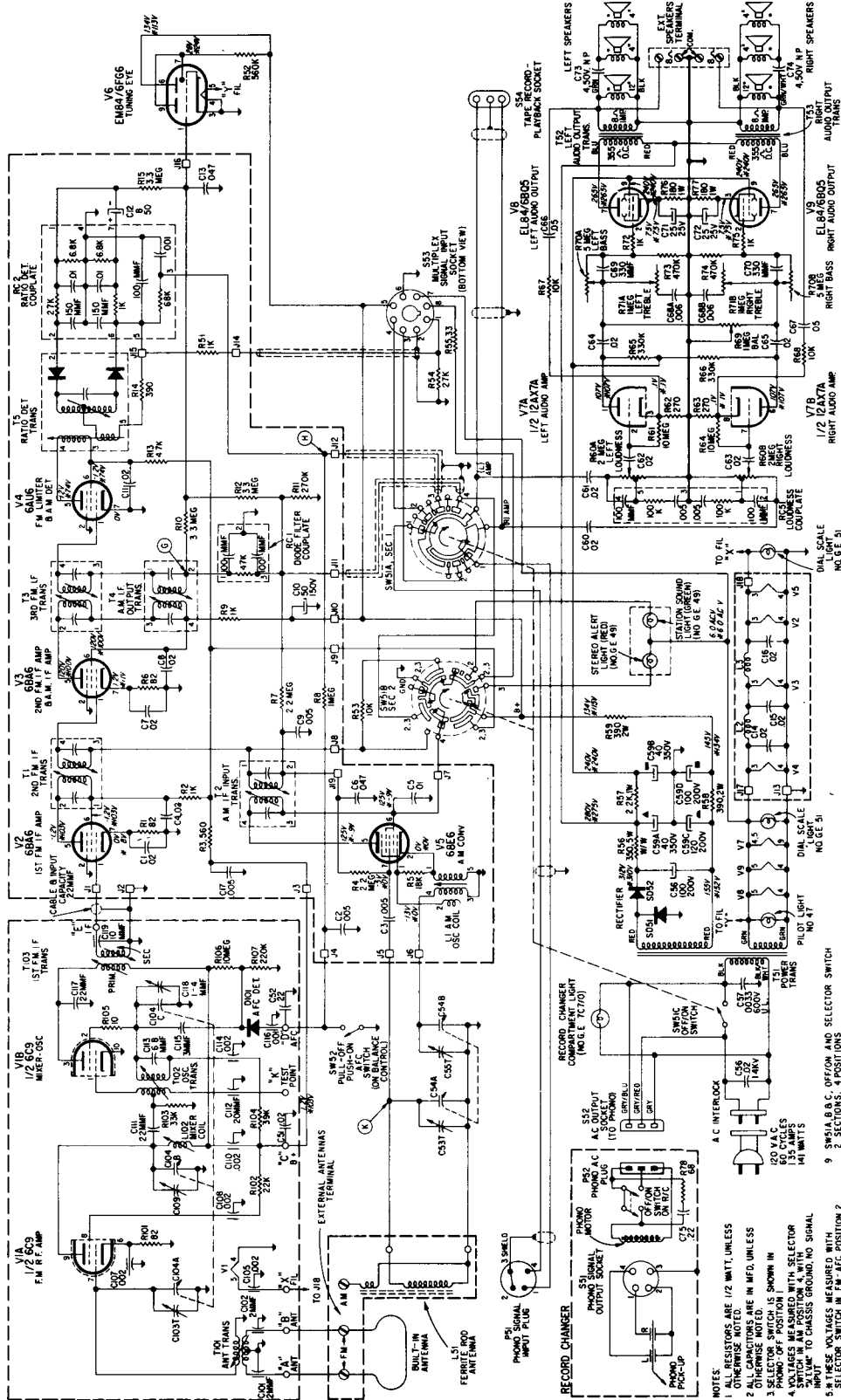
- NOTES:
1. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS ARE MFD, UNLESS OTHERWISE NOTED.
 3. VOLTAGES MEASURED FROM POINT INDICATED TO CHASSIS GROUND WITH "VTVM" NO SIGNAL INPUT.
 4. J1, J2, ETC. INDICATE TERMINAL CONNECTIONS ON CIRCUIT BOARD.



NOTES:
1. WIRING DIAGRAM SHOWN FROM CIRCUIT SIDE.
2. SOLID LINES INDICATE WIRE ASSEMBLY.

SEARS, ROEBUCK and CO.

SEARS, ROEBUCK & CO. Chassis 528.54880, Models 4079, 4080, 4081, 4082

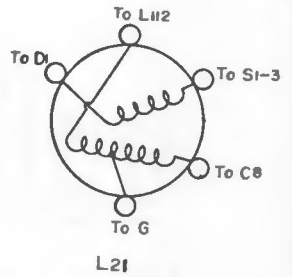
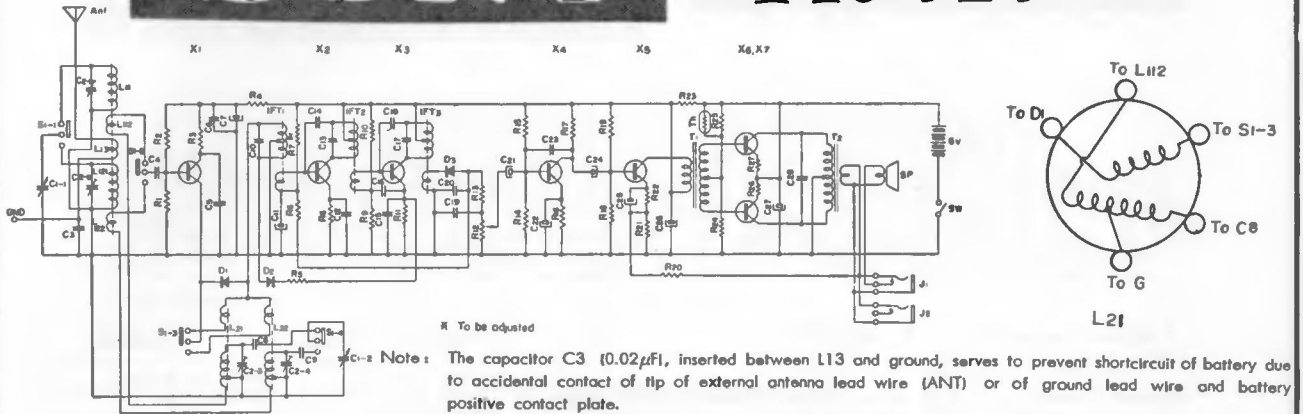


A.M. I.F. 455 KC.
F.M. I.F. 10.7 MC.

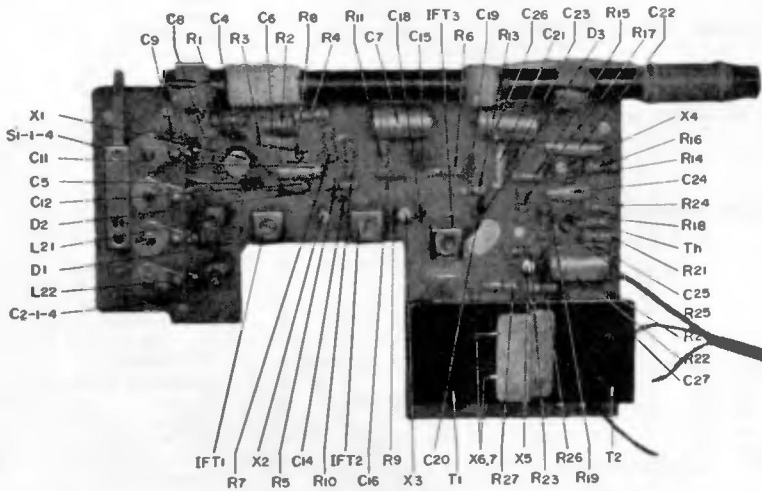
SEARS, ROEBUCK & CO. Chassis 528.54880, Models 4079, 4080, 4081, 4082

- NOTES:
1. ALL RESISTORS ARE 1/2 WATT, UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS ARE IN MICRO-FARADS UNLESS OTHERWISE NOTED.
 3. PHONO OFF POSITION IS SHOWN IN PICTURE.
 4. VOLTAGES MEASURED WITH SELECTOR SWITCH ON CHASSIS GROUND, NO SIGNAL INPUT.
 5. VOLTAGE MEASURES WITH SELECTOR SWITCH ON RADIO OFF.
 6. VOLTAGE TOLERANCE MAY VARY 20%.
 7. J1, J2, ETC. ARE TERMINAL CONNECTION ON CIRCUIT BOARD.
 8. DOTS ON SPEAKERS INDICATE...

SONY TR-727



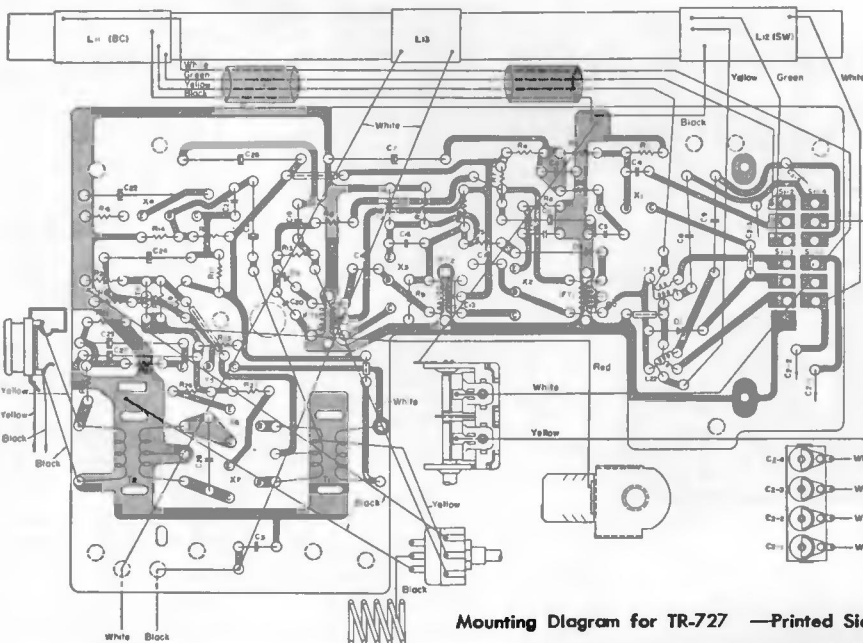
Mounting Diagram for TR-727 —Mounted Side—



Frequency Coverage: MW 535 Kc—1,605 Kc
SW 3.9 Mc—12 Mc
IF Frequency: 455 Kc

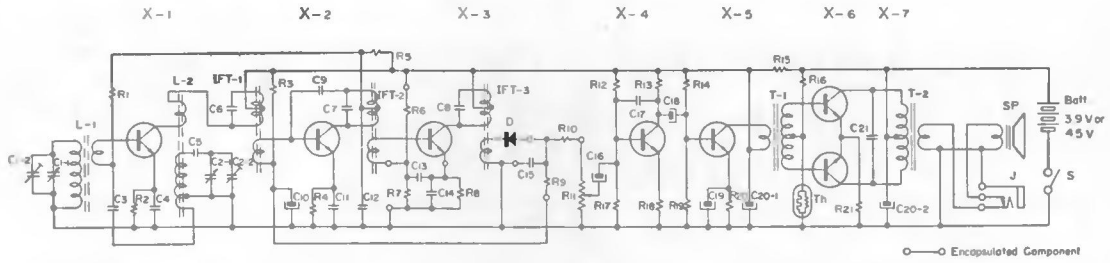
Electronic Parts List for TR-727

Parts No.	Symbol	Description
1-401-118-00	R ₁₁ , L ₁₁ , L ₁₂	Ferrite Bar Antenna
1-405-003-01	L ₂₁	MW, Oscillator Coil
1-405-004-01	L ₂₃	SW, Oscillator Coil
1-513-056-00	S ₁ , S ₂ , S ₃	Band Setting Switch
1-403-034-00	IFT ₁	IF Transformer
1-403-035-00	IFT ₂	"
1-403-036-00	IFT ₃	"
1-423-043-00	T ₁	Driving Transformer
1-427-051-00	T ₂	Output Transformer
1-507-030-20	T ₃	Tuning Earphone Jack
1-502-063-00	S ₄	Speaker 8Ω
1-403-036-00	X ₁	Transistor 2SA70
	X ₂	" 2SC769
	X ₃	" 2SC768
	X ₄	" 2SD451
	X ₅	" 2SD450
	X ₆	" 2S8513
	X ₇	" 2S8513
	D ₁	Diode 1T26G
	D ₂	" 1T23G
	D ₃	Diode 1T23G
	D ₄	Thermistor 5-90
	Th	Thermistor 5-90
1-203-130-00	R ₁	Carbon Resistor
	R ₂	18 KΩ RD 1/4L ± 5%
1-203-058-00	R ₃	" 3.3 KΩ "
1-203-049-00	R ₄	" 2.2 KΩ "
1-203-049-00	R ₅	" 2.2 KΩ "
1-203-031-00	R ₆	" 1 KΩ "
1-203-065-00	R ₇	" 5.6 KΩ "
1-203-583-00	R ₈	" 64 KΩ "
1-203-024-00	R ₉	" 470Ω "
1-203-058-00	R ₁₀	" 3.3 KΩ "
1-203-129-00	R ₁₁	" 27 KΩ "
1-203-024-00	R ₁₂	" 330Ω "
1-221-231-00	R ₁₃	Potentiometer 5 KΩ
1-203-026-00	R ₁₄	Carbon Resistor
	R ₁₅	" 470Ω RD 1/4L ± 5%
1-203-065-00	R ₁₆	" 5.6 KΩ "
1-203-130-00	R ₁₇	" 18 KΩ "
1-203-031-00	R ₁₈	" 1 KΩ "
1-203-058-00	R ₁₉	Carbon Resistor
	R ₂₀	3.3 KΩ RD 1/4L ± 5%
1-203-058-00	R ₂₁	" 3.3 KΩ "
1-203-045-00	R ₂₂	" 5.6 KΩ "
1-203-011-00	R ₂₃	" 100Ω "
1-203-001-00	R ₂₄	" 51Ω "
1-203-018-00	R ₂₅	" 220Ω "
1-203-011-00	R ₂₆	" 100Ω "
1-203-049-00	R ₂₇	" 2.2 KΩ "
1-203-011-00	R ₂₈	" 100Ω "
1-203-584-00	R ₂₉	" 3Ω "
1-203-584-00	R ₃₀	" 3Ω "
1-151-057-00	C ₁	Tuning Capacitor 2 Gang
1-141-109-00	C ₂	Trimmer Capacitor 4 Unit
1-101-073-00	C ₃	Ceramic Capacitor 10µF ± 10%
1-101-072-00	C ₄	" 0.01µF "
1-101-098-00	C ₅	" 0.005µF "
1-101-072-00	C ₆	" 0.01µF "
1-119-010	C ₇	Electrolytic Capacitor 100µF 6V
1-103-044	C ₈	Styrol Capacitor 370pf ± 5%
1-103-038	C ₉	Styrol Capacitor 3000pf ± 5%
1-119-001	C ₁₀	180pf built in IFT ₁
1-101-073-00	C ₁₁	Electrolytic Capacitor 10µF 3V
1-101-073-00	C ₁₂	Ceramic Capacitor 0.02µF ± 10%
1-101-073-00	C ₁₃	" 180pf built in IFT ₂
1-101-046-00	C ₁₄	" 2pf ± 0.5pf "
1-101-073-00	C ₁₅	" 0.02µF ± 10% "
1-101-073-00	C ₁₆	" 180pf built in IFT ₃
1-101-046-00	C ₁₇	" 2pf ± 0.5pf "
1-101-073-00	C ₁₈	" 0.02µF ± 10% "
1-101-073-00	C ₁₉	" 0.02µF "
1-119-001	C ₂₀	Electrolytic Capacitor 10µF 3V
1-119-007	C ₂₁	" 30µF 3V
1-101-098-00	C ₂₂	Ceramic Capacitor 0.005µF ± 10%
1-119-001	C ₂₃	Electrolytic Capacitor 10µF 3V
1-119-007	C ₂₄	" 30µF 3V
1-119-010	C ₂₅	" 100µF 6V
1-119-010	C ₂₆	" 100µF 6V
1-105-097-00	C ₂₇	Mylar Capacitor 0.3µF



Mounting Diagram for TR-727 —Printed Side—

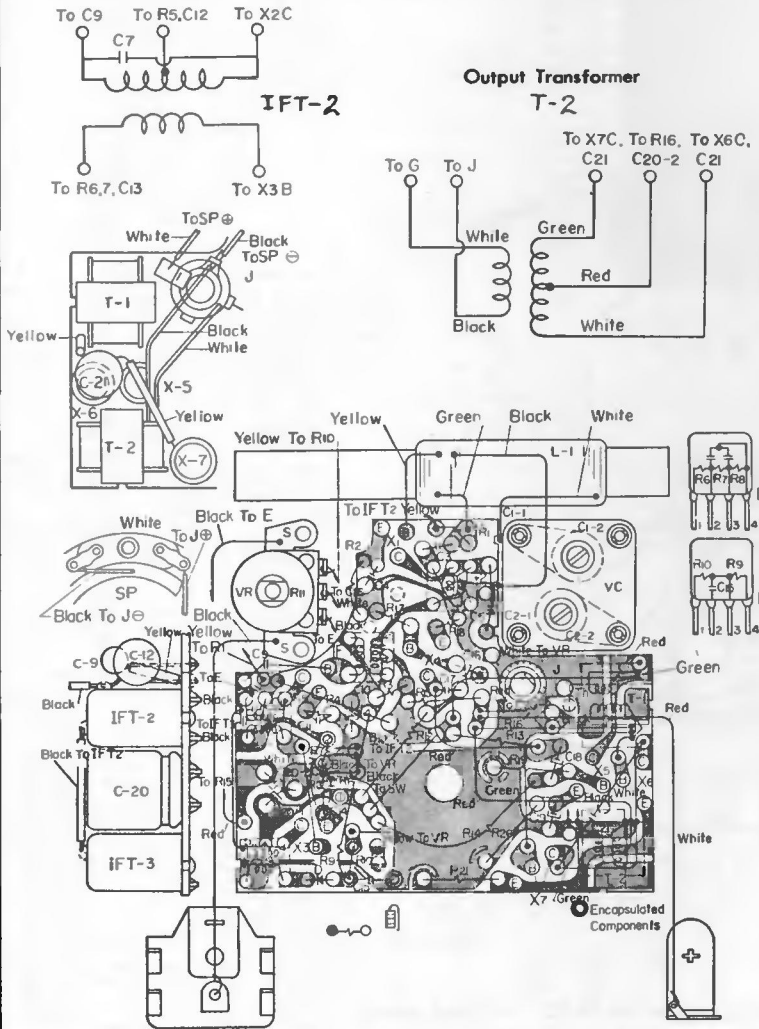
SONY TR-730



Frequency Coverage: 535 Kc ~ 1,605 Kc
IF Frequency: 455 Kc
Current Drain: 9 mA at zero signal, 42 mA at 92 mW output
Dimensions: 3" x 2-1/4" x 1-1/8" (76 x 57 x 29 mm)
Weight: Less than 7 ounces (180 gr.) with Battery

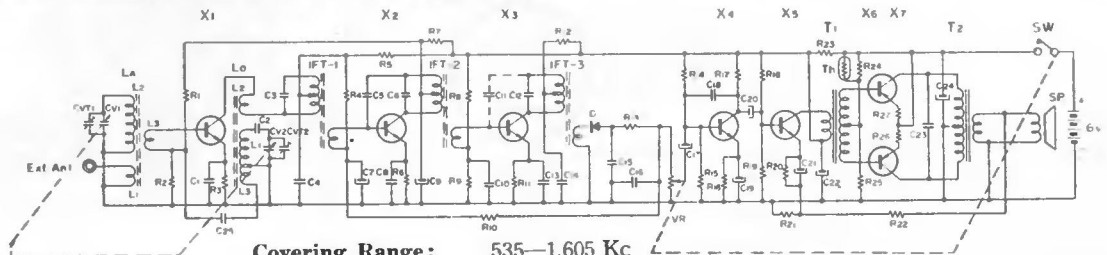
To take out Circuit Board:

- 1) Remove one gold-plated Philips screw (plus screw) on the left side.
- 2) Unscrew the rear cover securing screw.
- 3) Open the rear cover.
- 4) Remove securing metal post for rear cover.
- 5) Remove one Philips screw (plus screw) on the chassis near volume knob.



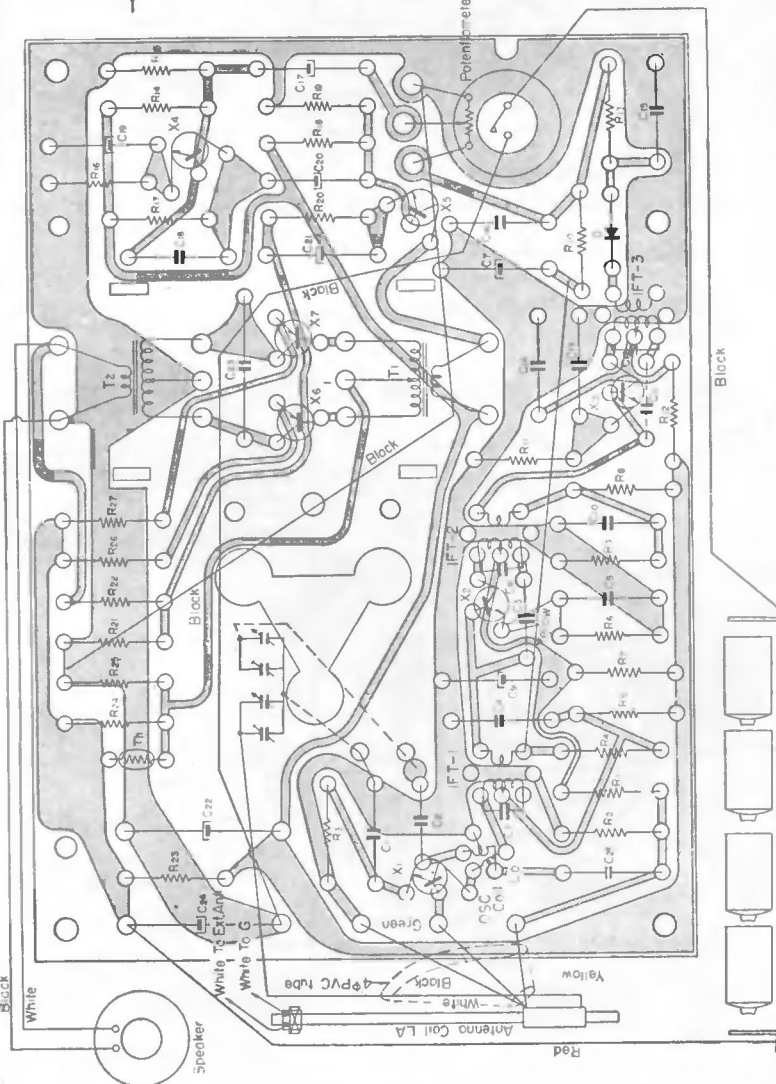
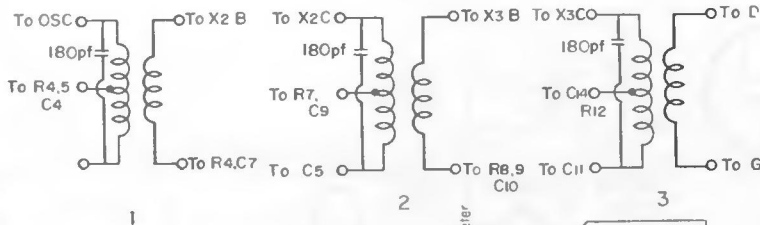
Parts No.	Symbol	Description
1-401-108-01	L ₁	Ferrite Bar Antenna
1-405-001-	L ₂	Oscillator Coil
1-403-057-00	IFT ₁	IF Transformer
1-403-058-00	IFT ₂	"
1-403-059-00	IFT ₃	"
1-423-042-	T ₁	Driving Transformer
1-427-059-	T ₂	Output "
1-502-044	Sp	Speaker
1-507-038-01	J	Earphone Jack
	X ₁	Transistor 2SC73
	X ₂	" 2SC75
	X ₃	" 2SC76
	X ₄	" 2SD65
	X ₅	" "
	X ₆	" "
	X ₇	" "
	D	Diode 1T23G
	Th	Thermistor CS120
	Batt.	Battery
	R ₁	Composition Resistor 10 kΩ 1/10 W ± 10%
	R ₂	15 kΩ "
	R ₃	75 kΩ 1/10 W ± 5%
	R ₄	330 Ω 1/10 W ± 10%
	R ₅	5.6 kΩ "
	R ₆	Encapsulated Components 22 kΩ
	R ₇	" " 3.3 kΩ
	R ₈	" " 330 kΩ
	R ₉	" " 10 kΩ
	R ₁₀	" " 330 Ω
	R ₁₁	Potentiometer 5 kΩ
	R ₁₂	Composition Resistor 56 kΩ 1/10 W ± 10%
	R ₁₃	2.2 kΩ "
	R ₁₄	27 kΩ "
	R ₁₅	Composition Resistor 100 Ω 1/10 W ± 10%
	R ₁₆	" 2.7 kΩ "
	R ₁₇	" 3.3 kΩ "
	R ₁₈	" 33 Ω "
	R ₁₉	" 2.2 kΩ "
	R ₂₀	" 62 Ω "
	R ₂₁	" 5.1 Ω "
	C ₃	Capacitor 0.01 μF +80%/-20% Ceramic
	C ₄	" 0.005 μF " "
	C ₅	" 130 pF ± 50% Styrol
	C ₆	" 150 pF built in IFT ₁
	C ₇	" 150 pF built in IFT ₂
	C ₈	" 150 pF built in IFT ₃
	C ₉	" 1 pF 0.5 pF Ceramic
	C ₁₀	" 5 μF ± 100% 3 V Electrolytic
	C ₁₁	" 0.02 μF +80%/-20% Ceramic
	C ₁₂	" 0.01 μF " "
	C ₁₃	0.01 μF (Encapsulated with R ₆ , 7, 8)
	C ₁₄	0.01 μF (Encapsulated with R ₉ , 10)
	C ₁₅	"
	C ₁₆	Capacitor 0.3 μF +100%/-20% 6 V Aiox
	C ₁₇	0.02 μF +100%/-20% Ceramic
	C ₁₈	5 μF ± 100% 3 V Electrolytic
	C ₁₉	5 μF +100%/-20% "
	C ₂₀	50 μF x 2 ± 100% 4.5 V Electrolytic Block
	C ₂₁	0.01 μF +80%/-20% Ceramic

SONY TR-7170



Covering Range: 535—1,605 Kc
IF Frequency: 455 Kc

IFT

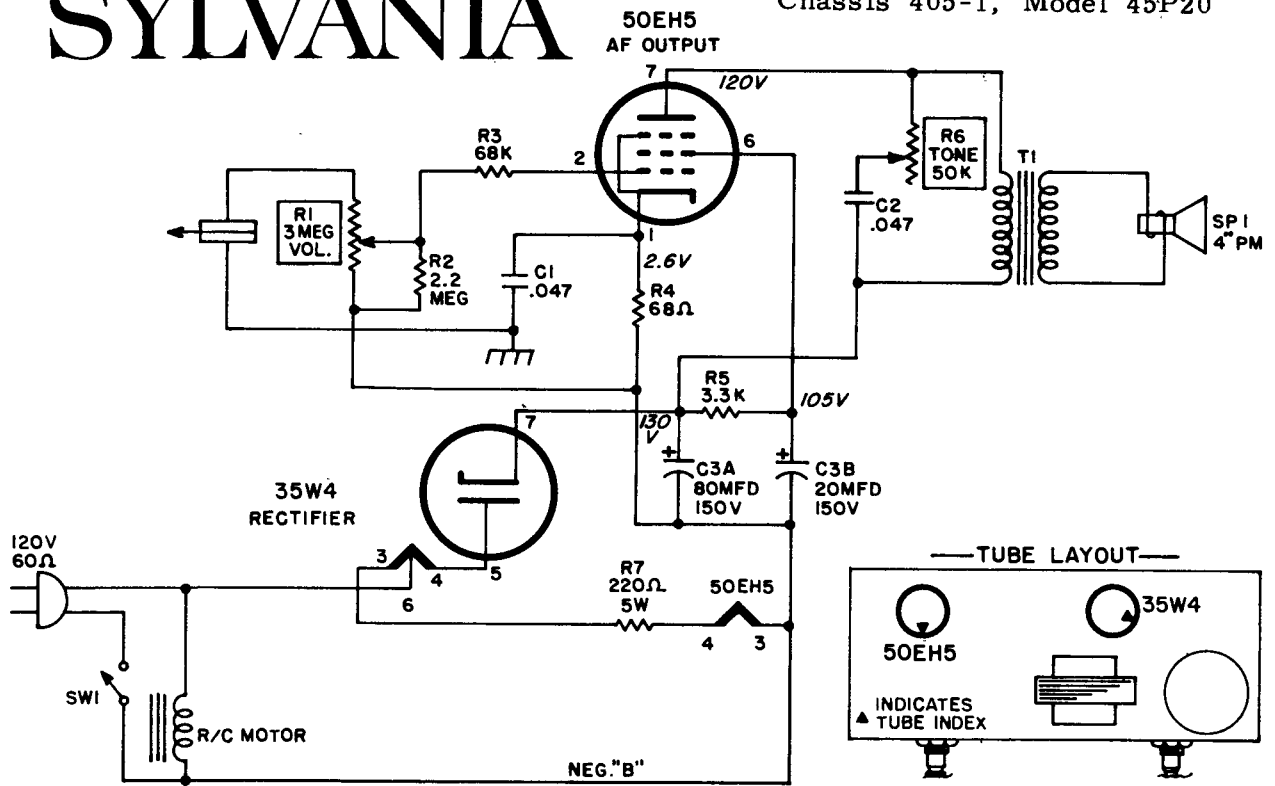


Mounting Diagram (Printed Side)

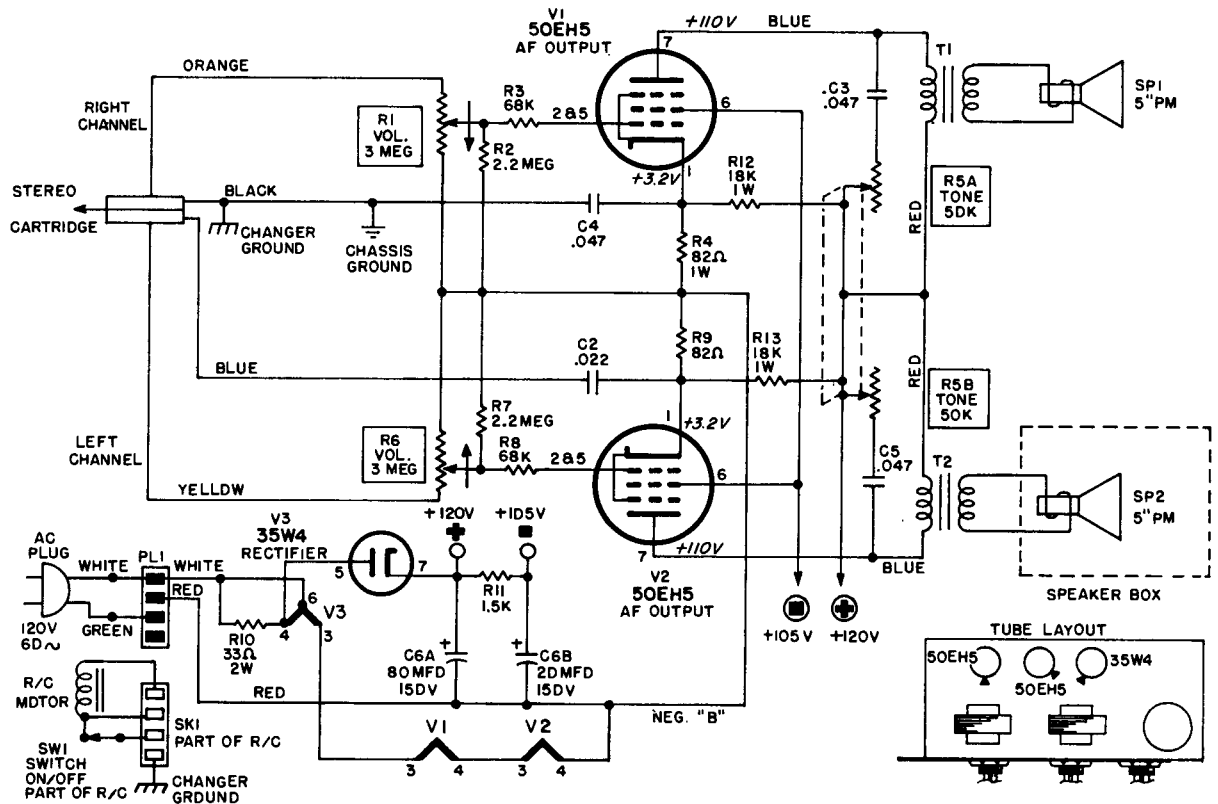
Symbol	Description
LA	Ferrite Bar Antenna
Lo	Oscillator Coil
IFT-1	IF transformer
VR	Potentiometer
X ₁	Transistor 2SC 73
X ₂	" 2SC 76
X ₃	" 2SC 76
X ₄	" 2SD 65
X ₅	" 2SD 65
X ₆	" 2SB 51
X ₇	" 2SB 51
D	Diode 1T 23
Th	Thermistor S-90
R ₁	Carbon Resistor 12 KΩ 1/2 W ± 10%
R ₂	" 150 KΩ " "
R ₃	" 8.2 KΩ " "
R ₄	" 47 KΩ " "
R ₅	" 1.0 KΩ " "
R ₆	" 470 Ω " "
R ₇	" 6.8 KΩ " "
R ₈	" 12 KΩ " "
R ₉	" 2.2 KΩ " "
R ₁₀	" 5.6 KΩ " "
R ₁₁	" 470 Ω " "
R ₁₂	" 470 Ω " "
R ₁₃	" 1.0 KΩ " "
R ₁₄	" 5.6 KΩ " "
R ₁₅	" 2.2 KΩ " "
R ₁₆	" 470 Ω " "
R ₁₇	Carbon Resistor 1.0 KΩ
R ₁₈	" 5.6 KΩ " "
R ₁₉	" 3.3 KΩ " "
R ₂₀	" 220 Ω " "
R ₂₁	" 10 Ω " "
R ₂₂	" 100 Ω " "
R ₂₃	" 220 Ω " "
R ₂₄	" 100 Ω " "
R ₂₅	" 2.2 KΩ " "
R ₂₆	" 3 Ω " "
R ₂₇	" 3 Ω " "
C ₁	Capacitor 0.005 μF Electrolytic
C ₂	" 370 pF Styrol
C ₃	" 180 pF built in IFT
C ₄	" 0.05 μF Electrolytic
C ₅	" 2 pF Styrol
C ₆	" 180 pF built in IFT
C ₇	" 10 μF 6 V Electrolytic
C ₈	" 0.05 μF " "
C ₉	" 10 μF " "
C ₁₀	" 0.05 μF " "
C ₁₁	" -deleted-
C ₁₂	Capacitor 180 pF built in IFT
C ₁₃	" 0.05 μF Electrolytic
C ₁₄	" 0.05 μF " "
C ₁₅	" 0.02 μF " "
C ₁₆	" 0.01 μF " "
C ₁₇	" 10 μF 6 V " "
C ₁₈	" 0.005 μF " "
C ₁₉	" 30 μF 3 V " "
C ₂₀	" 10 μF 6 V " "
C ₂₁	" 30 μF 3 V " "
C ₂₂	" 100 μF 6 V " "
C ₂₃	" 0.3 μF (0.25) " "
C ₂₄	" 100 μF 6 V " "
C ₂₅	" 0.01 μF " "

SYLVANIA

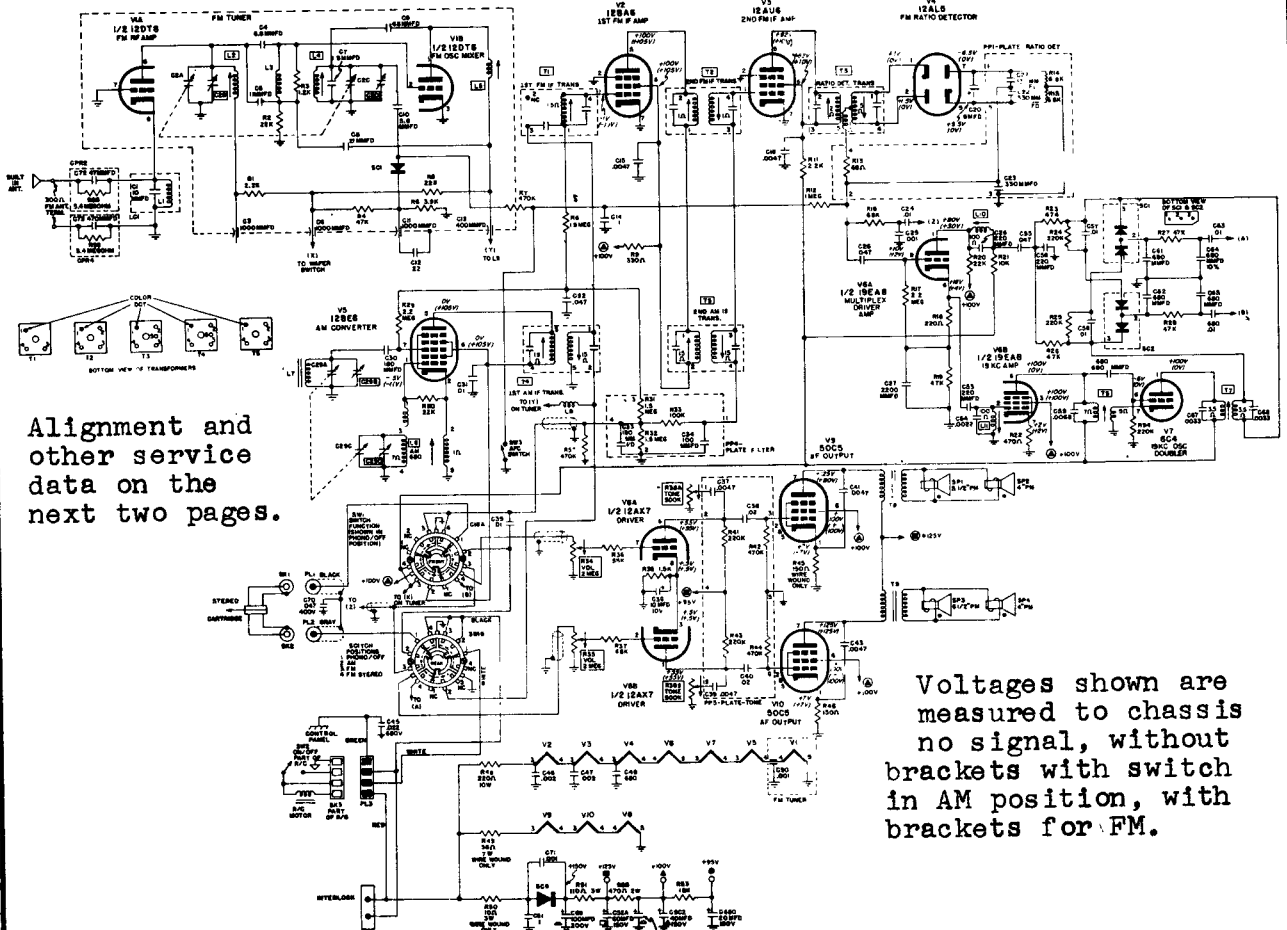
Chassis 405-1, Model 45P20



SYLVANIA Chassis 406-1, Model 45P32

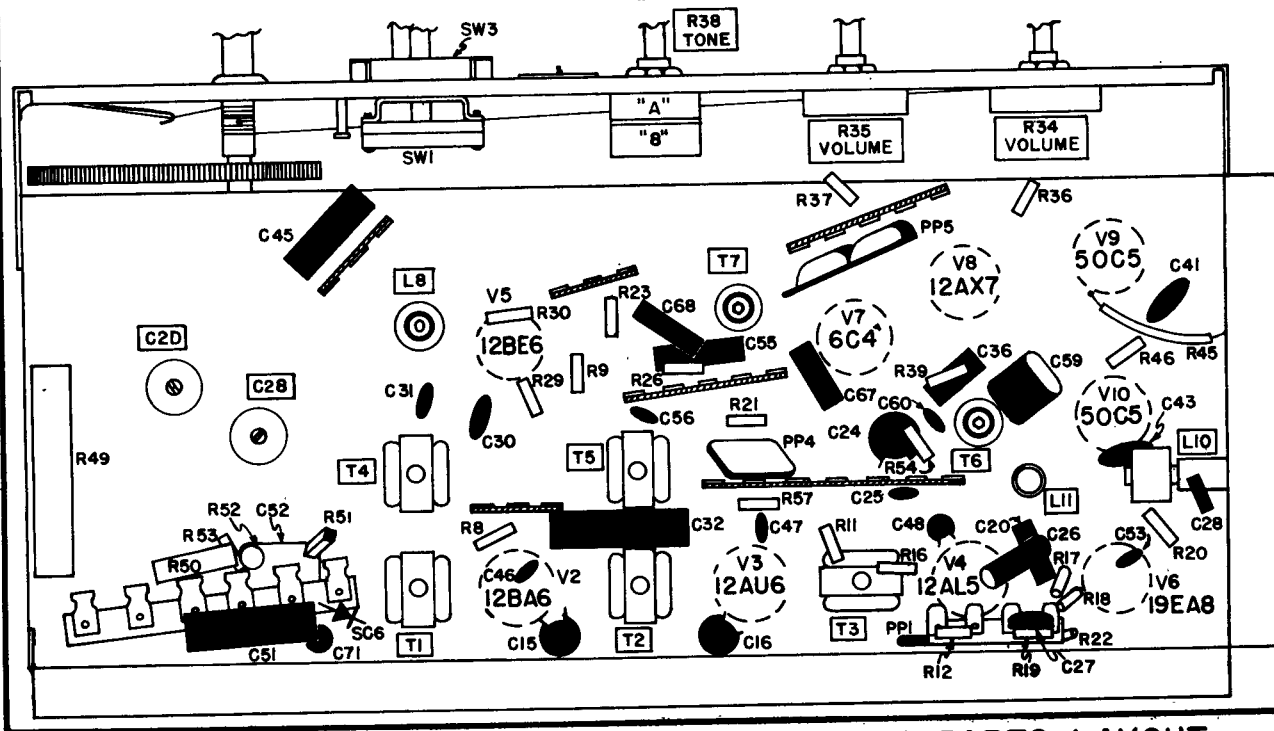


SYLVANIA Chassis 702-2, Models SC26 Series



Alignment and other service data on the next two pages.

Voltages shown are measured to chassis no signal, without brackets with switch in AM position, with brackets for FM.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

SYLVANIA Chassis 702-2, Models SC26 Series, Alignment Information, Continued
 (Alignment continued on the next page, other data preceding and following)

— AM ALIGNMENT —
(Selector switch in AM position)

STEP	TUNING CAPACITOR SETTING	TEST EQUIPMENT HOOK-UP	GENERATOR FREQUENCY	ADJUSTMENT POINT	ADJUST FOR
1	Fully Open	SIGNAL GENERATOR - "Hot" lead thru a .1 Mfd Capacitor to test point (A) . Ground lead to chassis. AC VOLTMETER - Across Speaker terminals of channel set at maximum volume.	455 KC	T5 Bottom T5 Top T4 Bottom T4 Top	Maximum Meter Reading
2	Fully Open	Same as Step 1	1620 KC	C29D AM Osc. Trimmer	Maximum Meter Reading
3	1400	SIGNAL GENERATOR - Radiate signal to receiver through a lobb consisting of several turns of wire. AC VOLTMETER - Same as Step 1.	Set generator to a frequency corresponding to receiver dial (until signal is heard through receiver speaker.)	C29B AM Ant. Trimmer	Maximum Meter Reading

— FM ALIGNMENT —
(Selector switch in FM position)

STEP	TUNING CAPACITOR SETTING	TEST EQUIPMENT HOOK-UP	GENERATOR FREQUENCY	ADJUSTMENT POINT	ADJUST FOR
1	Point of non-interference	SIGNAL GENERATOR - "Hot" lead through a .005 Mfd capacitor to test point (B) . Ground lead to chassis. AC VOLTMETER - "Hot" lead to test point (C) . Ground lead to chassis.	10.7 MC	T3 Bottom T2 Bottom T2 Top T1 Top L5	Maximum Meter Reading
2	Same as Step 1	SIGNAL GENERATOR - Same as Step 1. AC VOLTMETER - "Hot" lead to test point (D) . Ground lead connected to chassis.	10.7 MC	T3 Top	Zero Meter Reading
3	108	SIGNAL GENERATOR - Same as Step 1. AC VOLTMETER - Same as Step 1.	108 MC	C2D FM Osc. Trimmer	Maximum Meter Reading

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION
 SYLVANIA Chassis 702-2, Models SC26 Series, Alignment Information, Continued

— FM ALIGNMENT (Continued) —

4	88	SIGNAL GENERATOR - Same as Step 1. AC VOLTMETER - Same as Step 1.	88 MC	C2B FM Ant. Trimmer	Maximum Meter Reading
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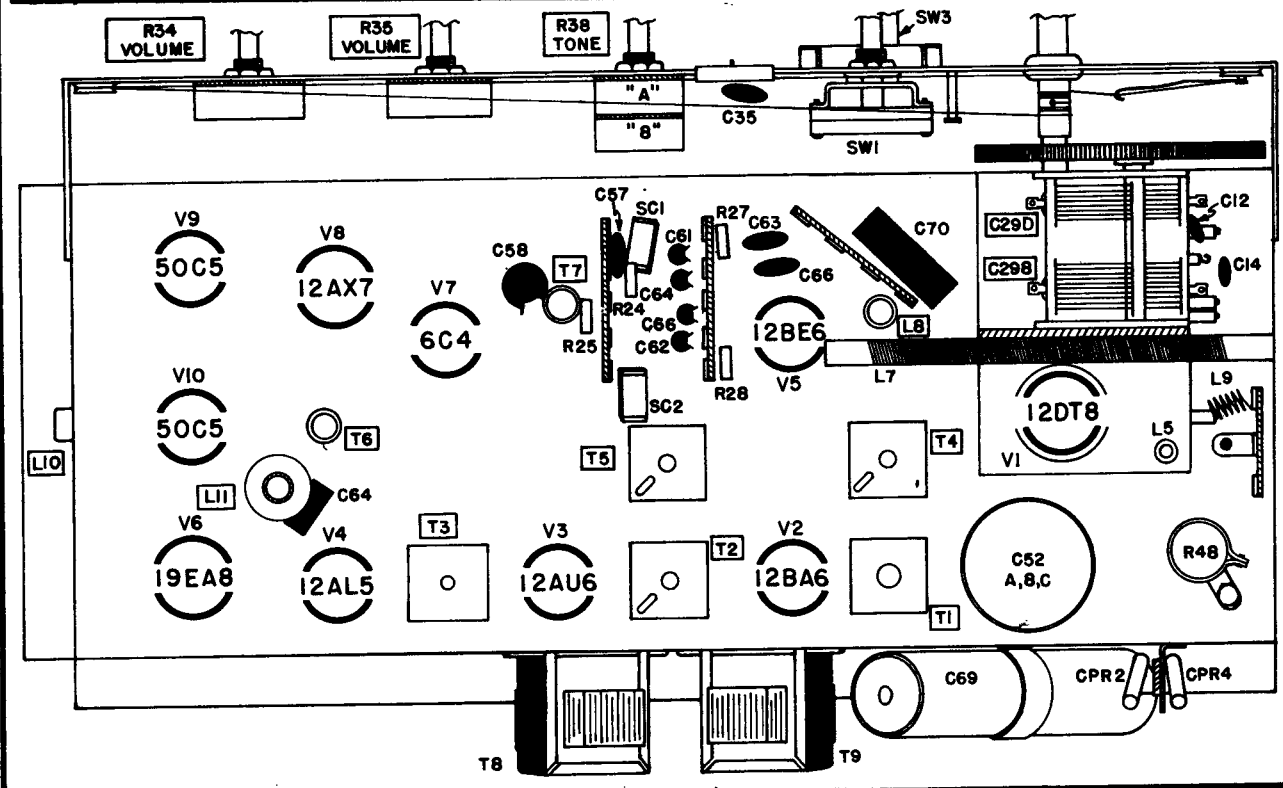
— MULTIPLEX ALIGNMENT PROCEDURE —

Outlined below is an alternate method of FM MULTIPLEX ALIGNMENT using a standard Multiplex Broadcast as the signal source. Whenever FM multiplex alignment equipment is used, follow the procedures specified

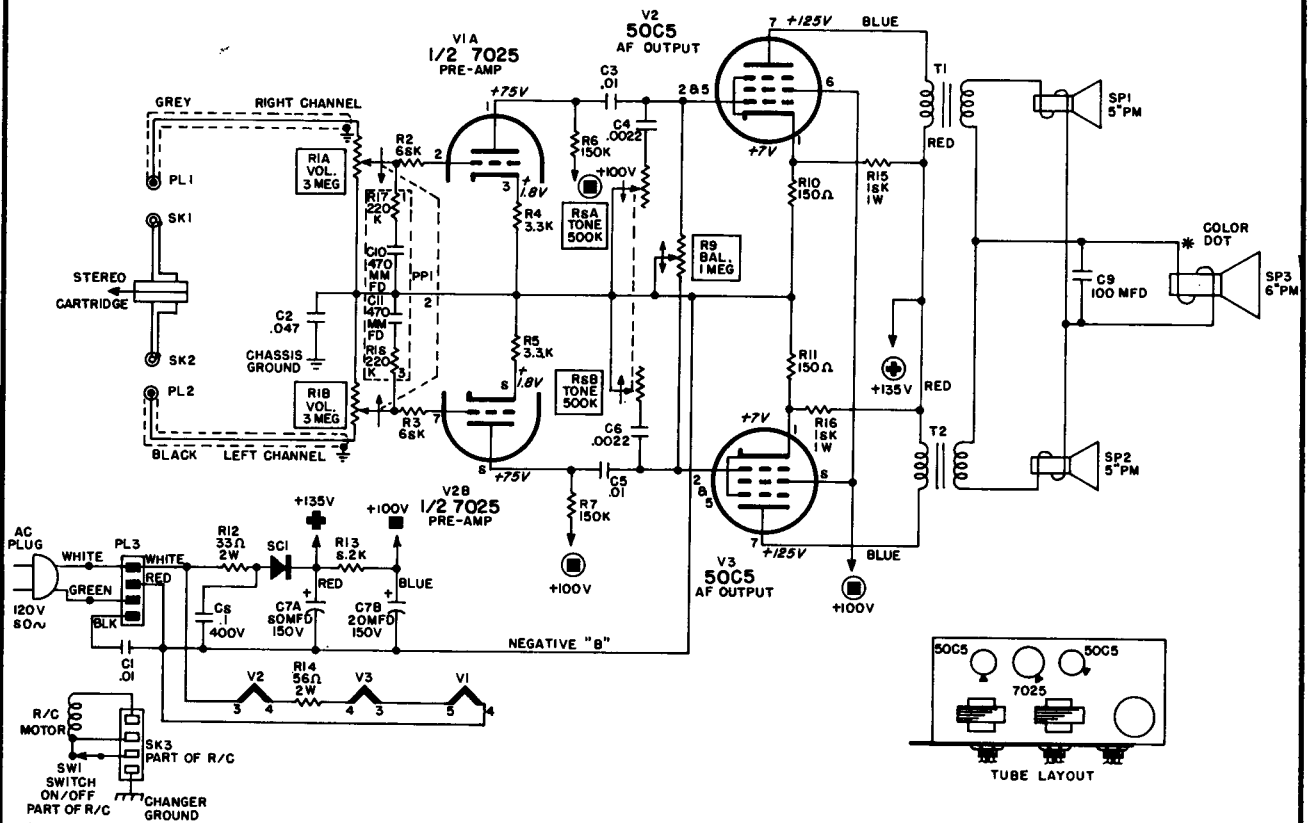
by the equipment manufacturer. Peaking of the 19KC and 38KC coils is easily accomplished, however correct phase relationship is absolutely essential for maximum channel separation.

(Selector switch in FM multiplex position)

STEP	TEST EQUIPMENT HOOK-UP	SIGNAL USED	ADJUSTMENT POINT	ADJUST FOR
1	OSCILLOSCOPE - Hot lead to pin 6 of 19EA8. Ground lead to chassis.	Multiplex	T6	Max output of the 19 KC pilot carrier
2	OSCILLOSCOPE - Hot lead to pin 1 of 6C4. Ground lead to chassis	Multiplex	T7	Max output of the 38 KC signal
3	Remove test equipment			
4	Very carefully readjust T6 and T7 for maximum separation of sound. NOTE: Some multiplex stations transmit announcements on one channel only. Adjust T6 or T7 for minimum output on opposite channel being transmitted.			



SYLVANIA Chassis 407-1, Models 45P34, 45P35 Series

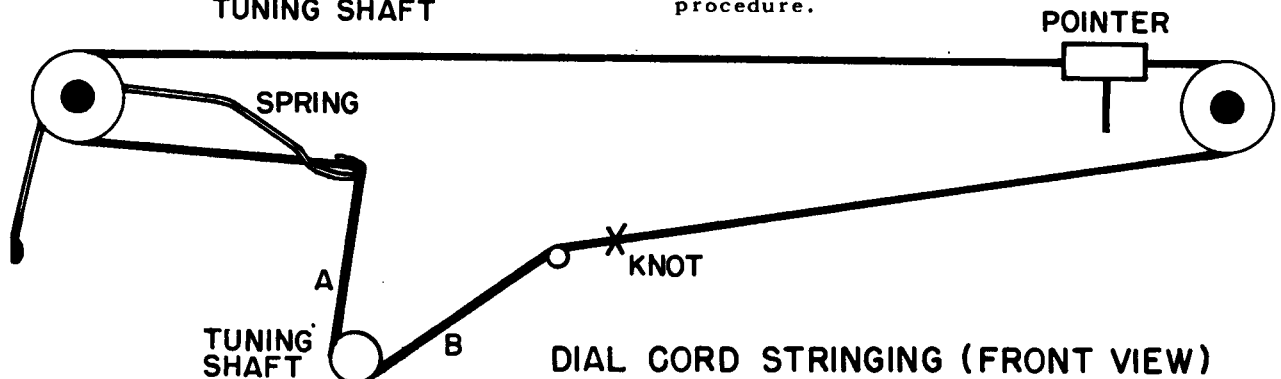
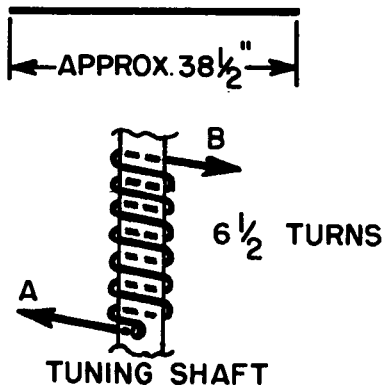


SYLVANIA Chassis 702-2, Models of SC26 Series, Service data continued

CHASSIS REMOVAL

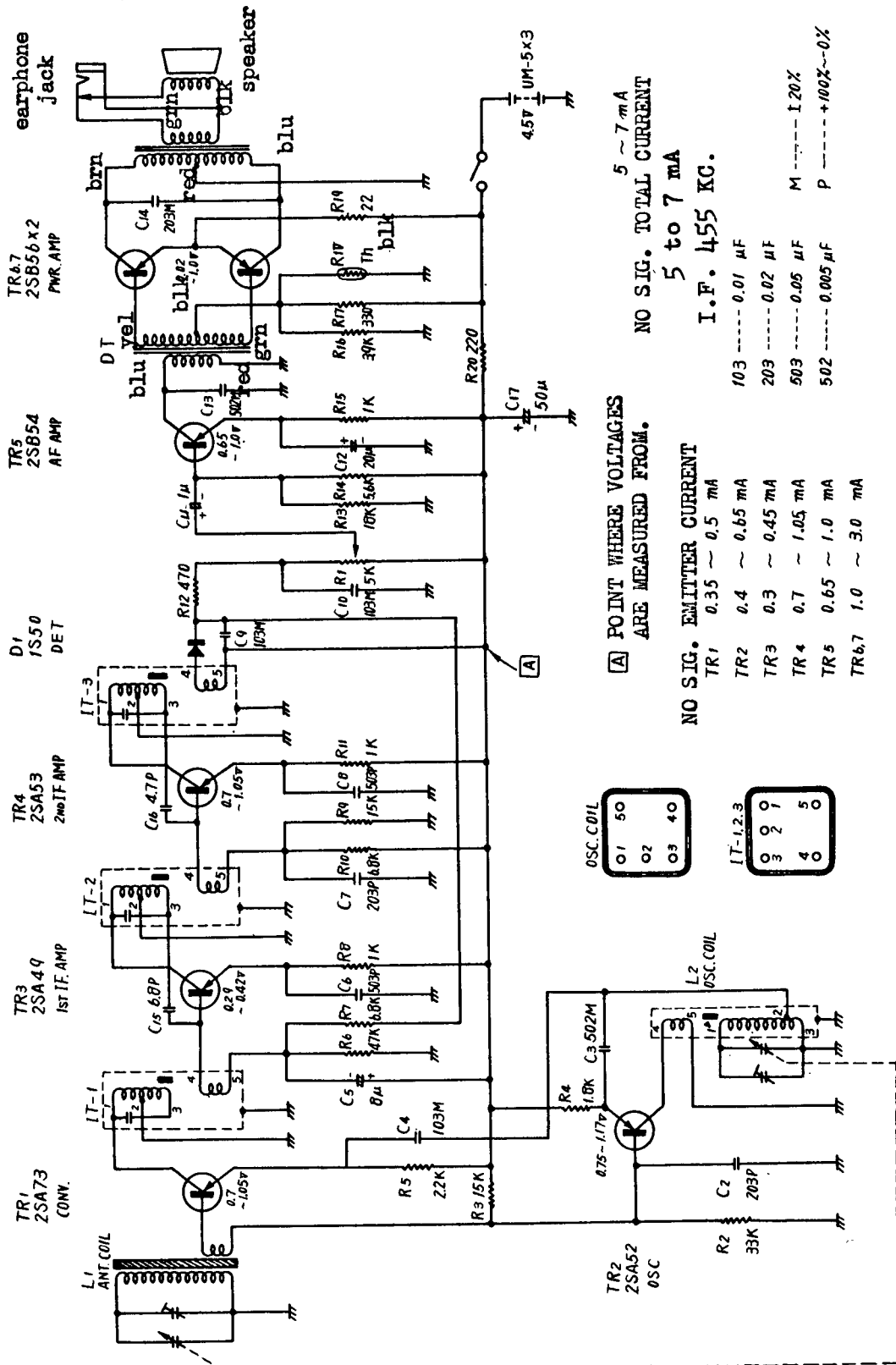
1. Remove screws securing backcover. Remove backcover.
2. Identify and disconnect leads to speakers and record changer.
3. Remove two (2) screws securing interlock to cabinet.
4. Remove screws securing antenna terminal board to cabinet.
5. Remove knobs by pulling straight up.
6. While supporting chassis remove the five (5) screws and two (2) nuts securing chassis to cabinet.
7. To replace chassis reverse the above procedure.

DIAL CORD





MODELS 7TP-30, 7TP-403Y



[A] POINT WHERE VOLTAGES ARE MEASURED FROM.

NO SIG. TOTAL CURRENT 5 ~ 7 mA

I.F. 455 KC.

NO SIG. EMITTER CURRENT

TR1	0.35	~ 0.5	mA
TR2	0.4	~ 0.65	mA
TR3	0.3	~ 0.45	mA
TR4	0.7	~ 1.05	mA
TR5	0.65	~ 1.0	mA
TR6,7	1.0	~ 3.0	mA

103 ----- 0.01 μ F

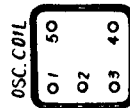
203 ----- 0.02 μ F

503 ----- 0.05 μ F

502 ----- 0.005 μ F

M ----- 120%

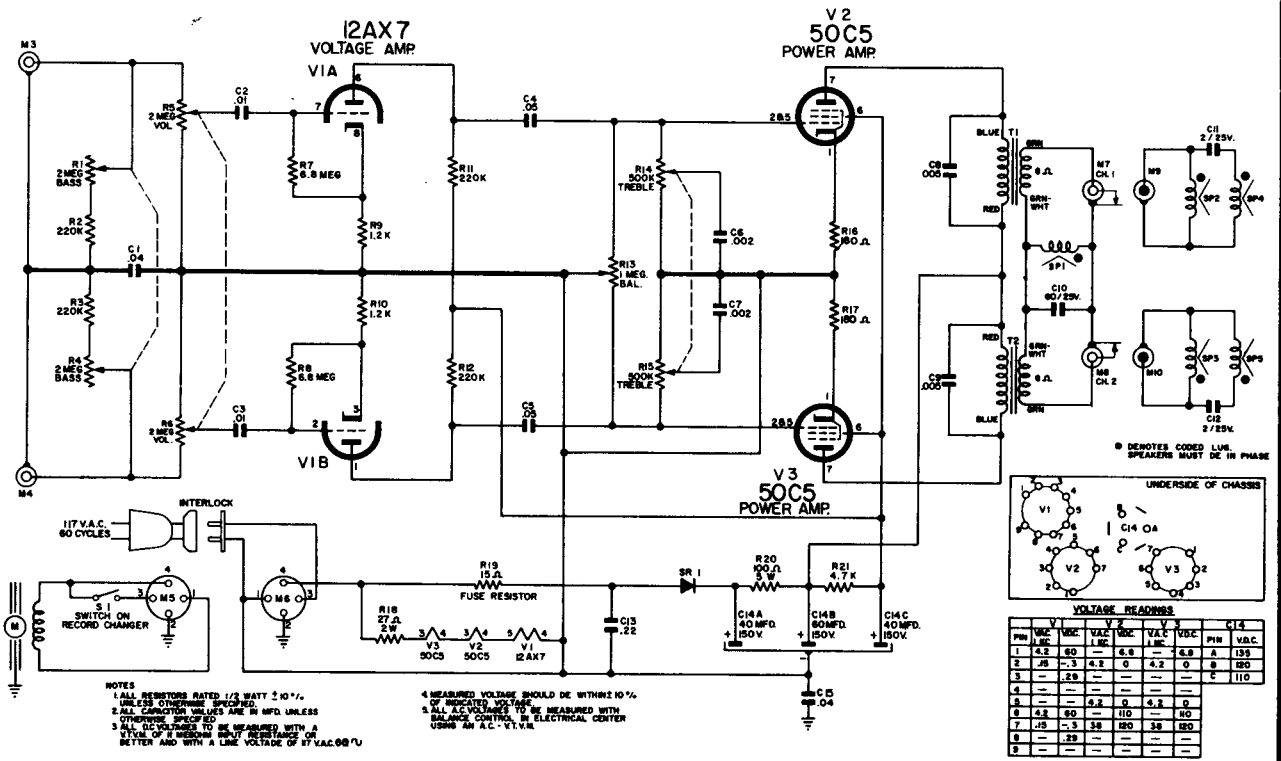
P ----- +100%--0%



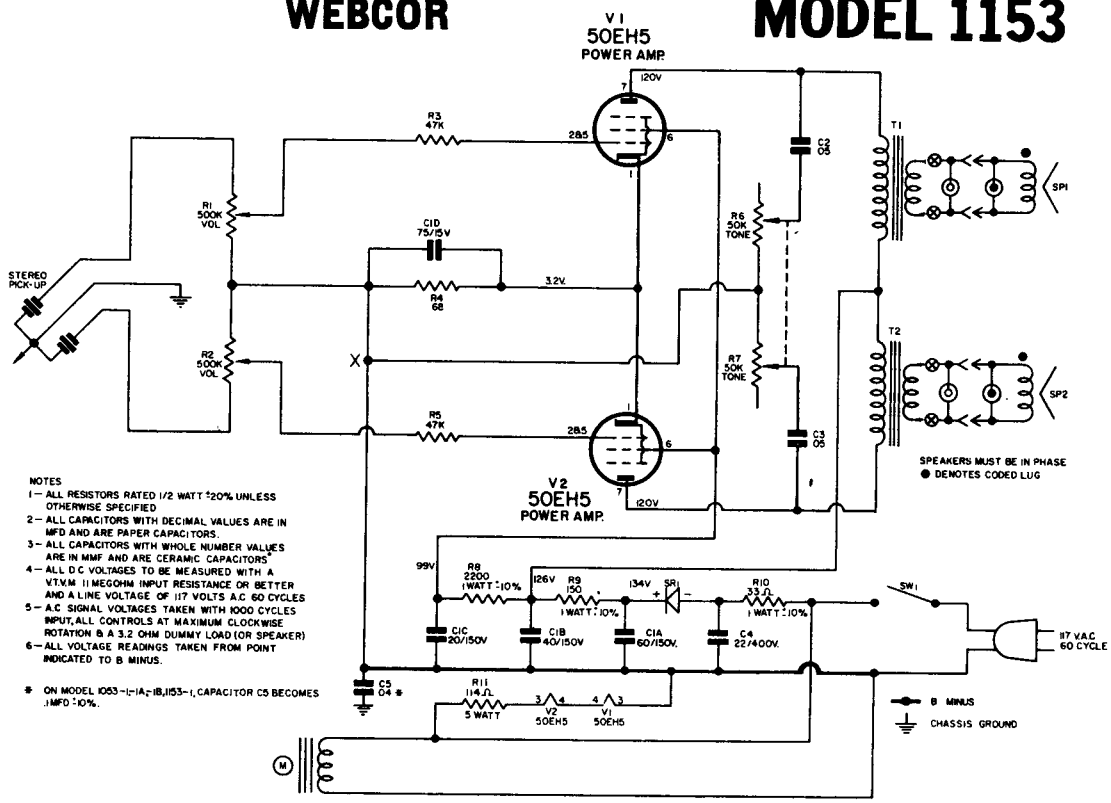
TOSHIBA Models 7TP-30, 7TP-403Y

WEBCOR

DIAGRAM FOR MODEL 1354

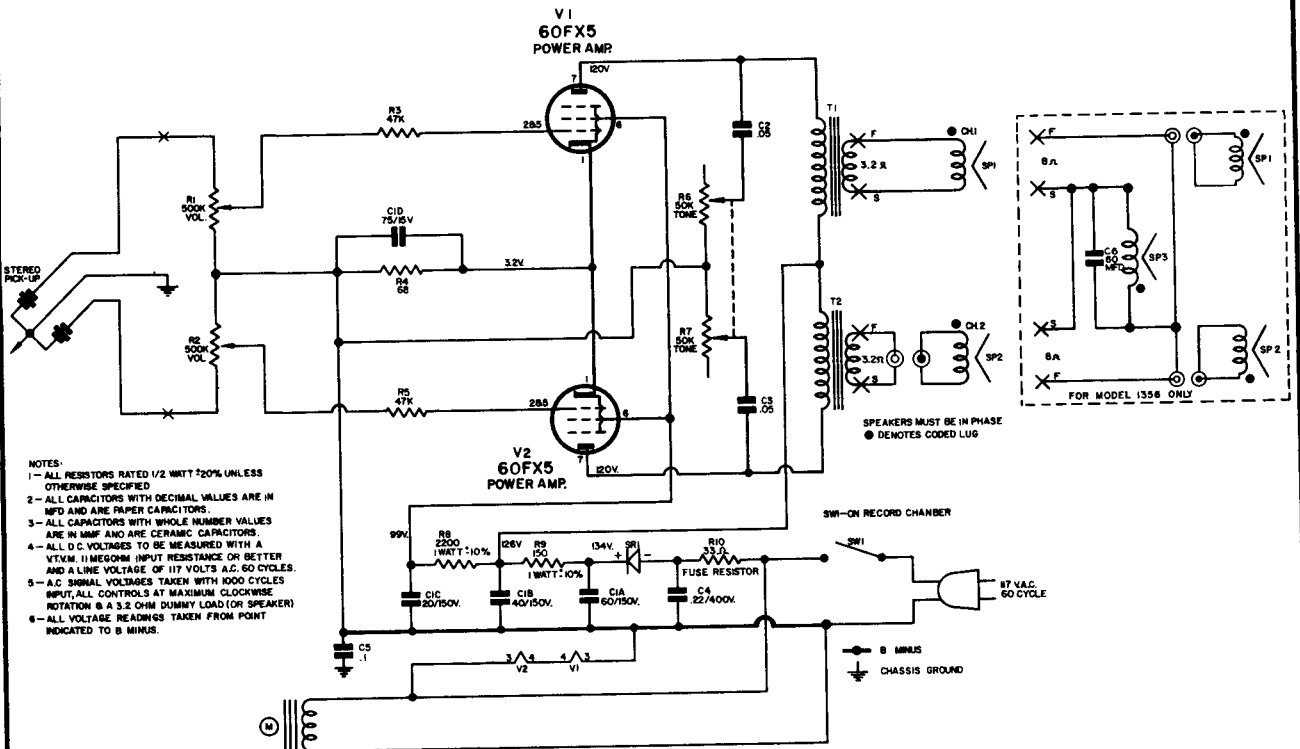


WEBCOR MODEL 1153



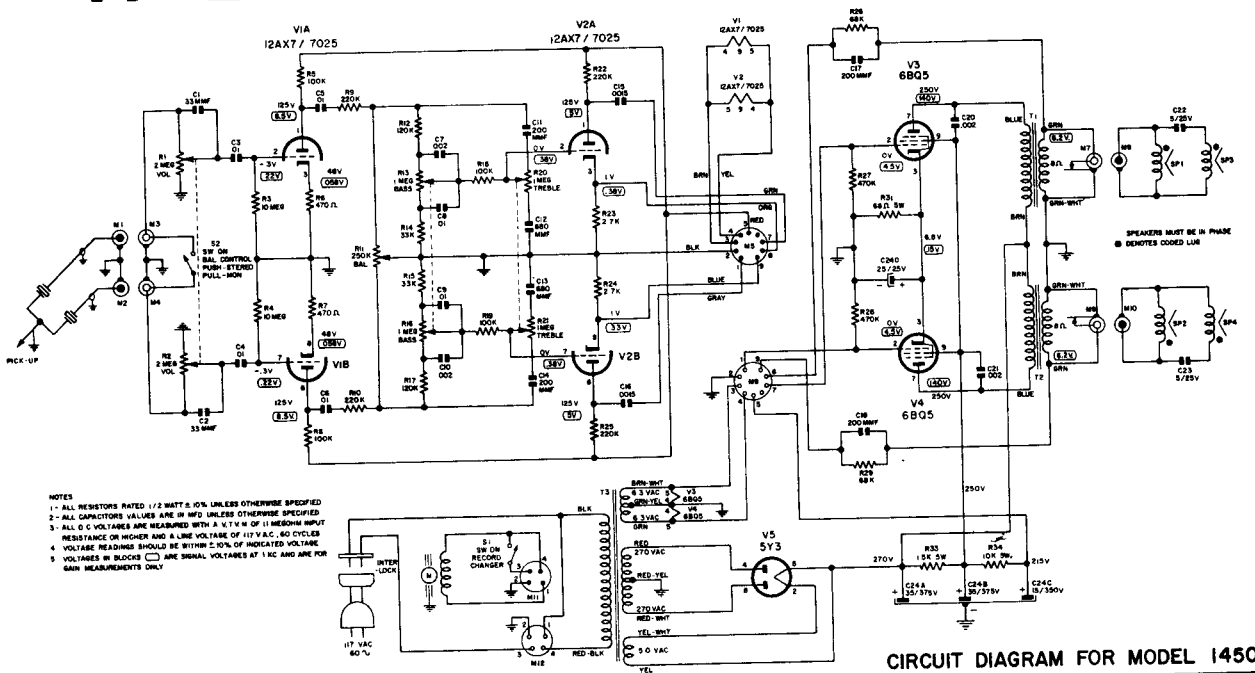
W E B C O R

MODEL 1353 AND 1356



W E B C O R

MODEL 1450



CIRCUIT DIAGRAM FOR MODEL 1450

Westinghouse

MODELS
H-846P8GP
H-846P8GPM

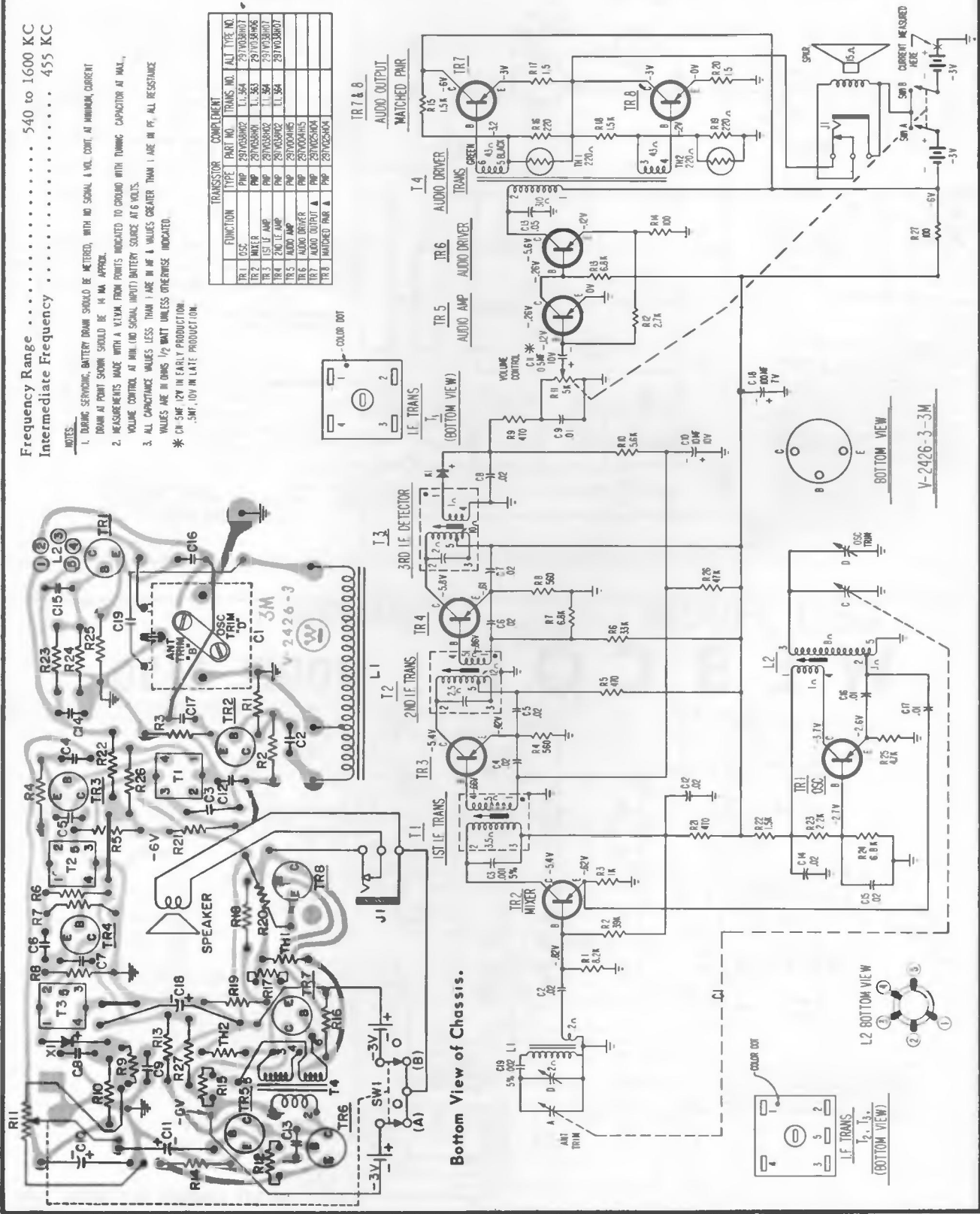
CHASSIS
V-2426-3
V-2426-3M

Frequency Range 540 to 1600 KC
Intermediate Frequency 455 KC

NOTES:

1. DURING SERVICING, BATTERY TAPING SHOULD BE METRED, WITH NO SIGNAL & VOL. CONT. AT MINIMUM CURRENT DOWN AT POINT SHOWN SHOULD BE 14 MA APPROX.
 2. MEASUREMENTS MADE WITH A KTYM FROM POINTS INDICATED TO GROUND WITH TUNING CAPACITOR AT MAX. VOLUME CONTROL AT MIN. (NO SIGNAL INPUT) BATTERY SOURCE AT 6 VOLTS.
 3. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN μF & VALUES GREATER THAN 1 ARE IN PF. ALL RESISTANCE VALUES ARE IN OHMS $1/2$ WATT UNLESS OTHERWISE INDICATED.
- * ON 5M, 12V IN EARLY PRODUCTION
-5M, 10V IN LATE PRODUCTION.

TRANSISTOR	FUNCTION	TYPE	PART NO.	TRANS. NO.	ALT. TYPE NO.
TR1	OSC.	PNP	2N1038B007	11-564	2N1038B007
TR2	MIXER	PNP	2N1038B007	11-564	2N1038B007
TR3	1ST I.F. AMP.	PNP	2N1038B007	11-564	2N1038B007
TR4	2ND I.F. AMP.	PNP	2N1038B007	11-564	2N1038B007
TR5	AUDIO AMP.	PNP	2N1038B007	11-564	2N1038B007
TR6	AUDIO DRIVER	PNP	2N1038B007	11-564	2N1038B007
TR7	AUDIO DRIVER	PNP	2N1038B007	11-564	2N1038B007
TR8	MATCHED PAIR	PNP	2N1038B007	11-564	2N1038B007



Bottom View of Chassis.

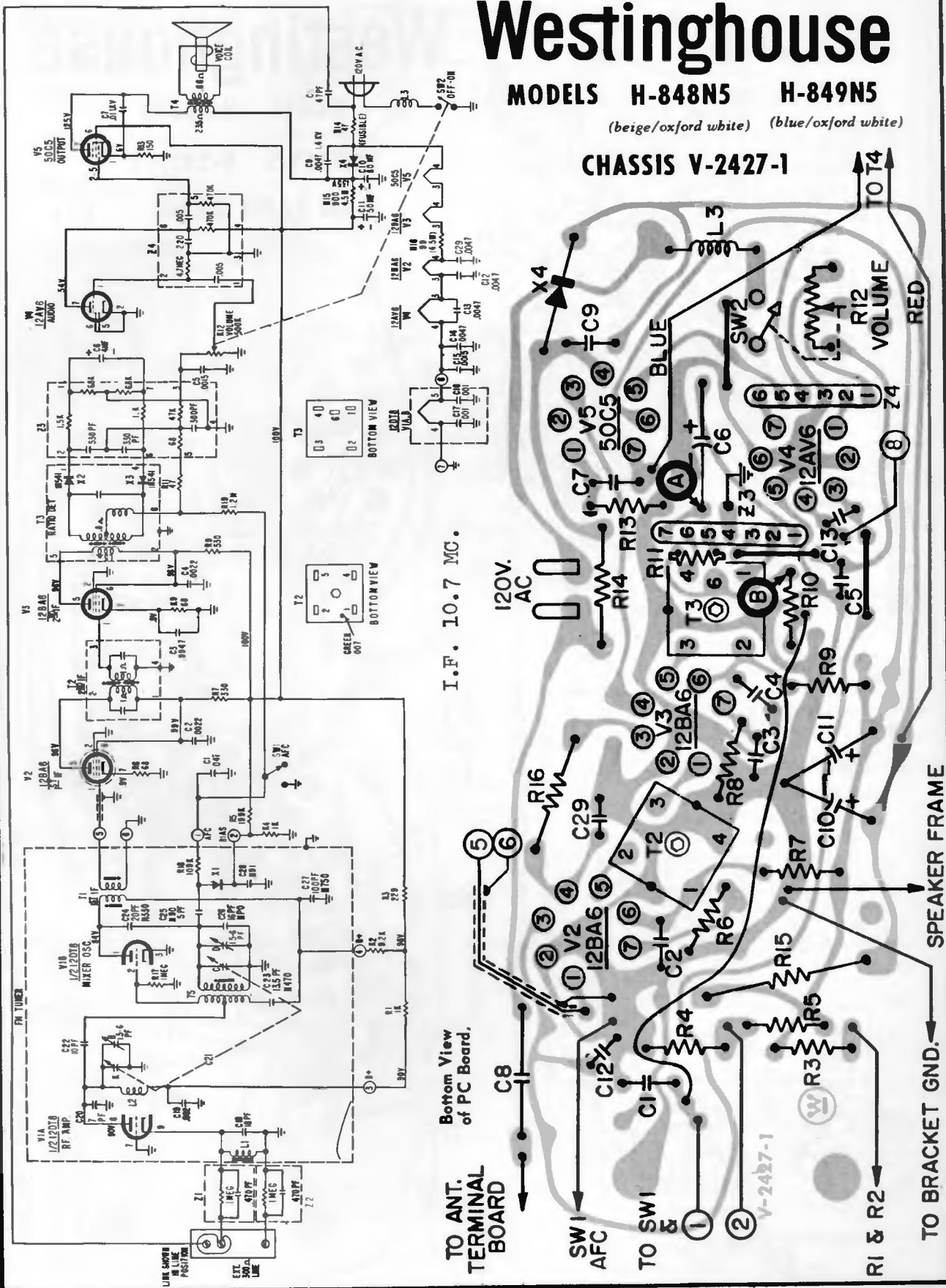
V-2426-3-3M

Westinghouse

MODELS H-848N5 H-849N5

(beige/oxford white) (blue/oxford white)

CHASSIS V-2427-1



I.F. 10.7 MC.

Bottom View of PC Board.

TO ANT. TERMINAL BOARD

120V. AC

SW1 AFC

TO SW1 &

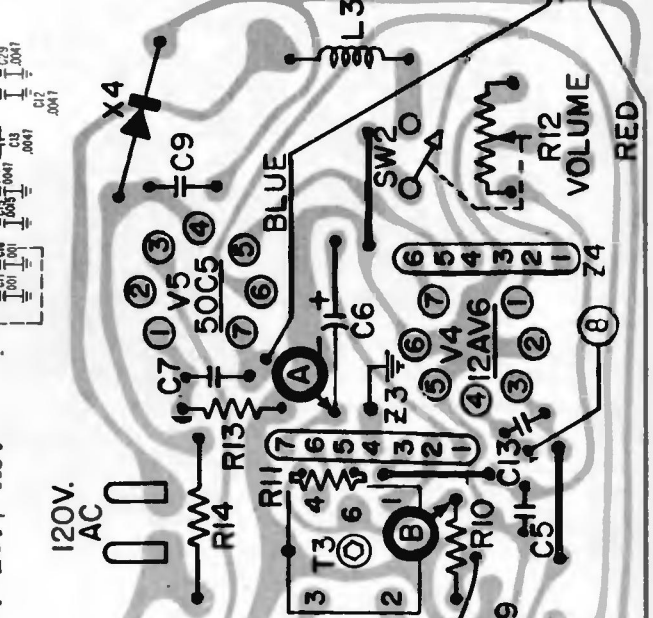
V-2427-1

RI & R2

TO BRACKET GND. SPEAKER FRAME

VOLUME RED

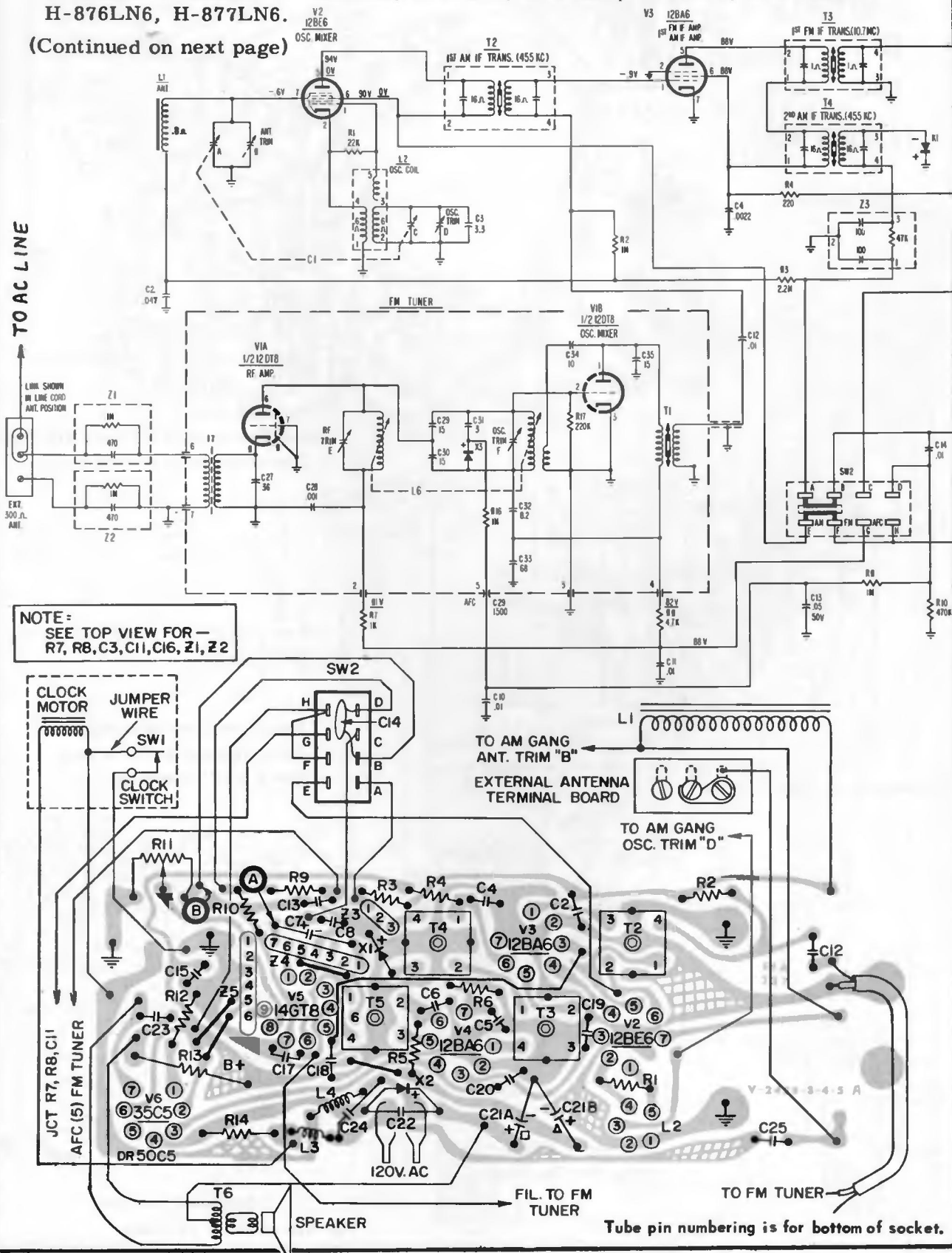
TO T4



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2428-3 and -4, used in Models H-850N6, H-851N6, H-852N6, H-855LN6, H-856LN6, H-871N6, H-872N6, H-873N6, H-875LN6, H-876LN6, H-877LN6.

(Continued on next page)

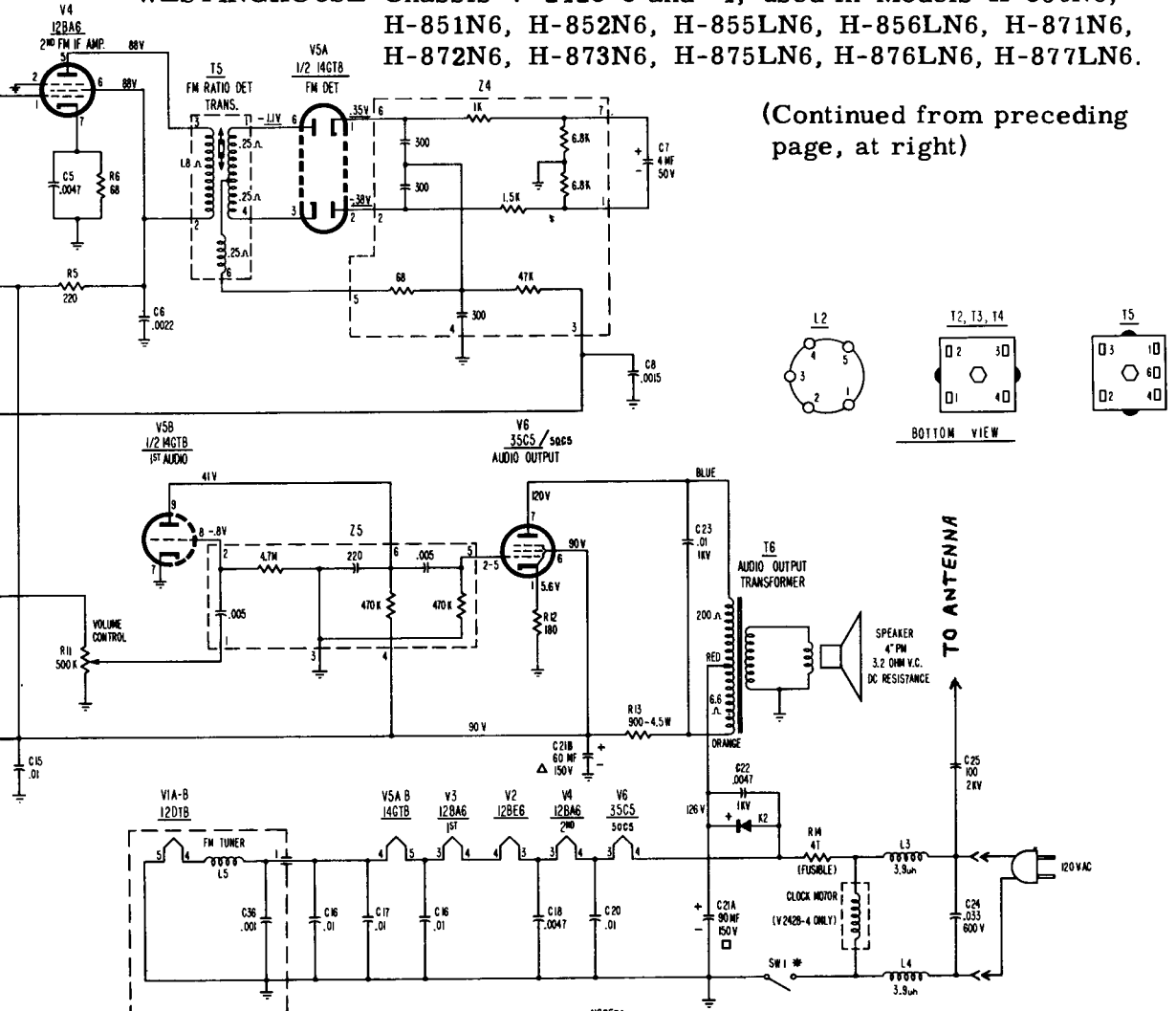


Bottom view of PC board showing location of top components in solid outlines.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

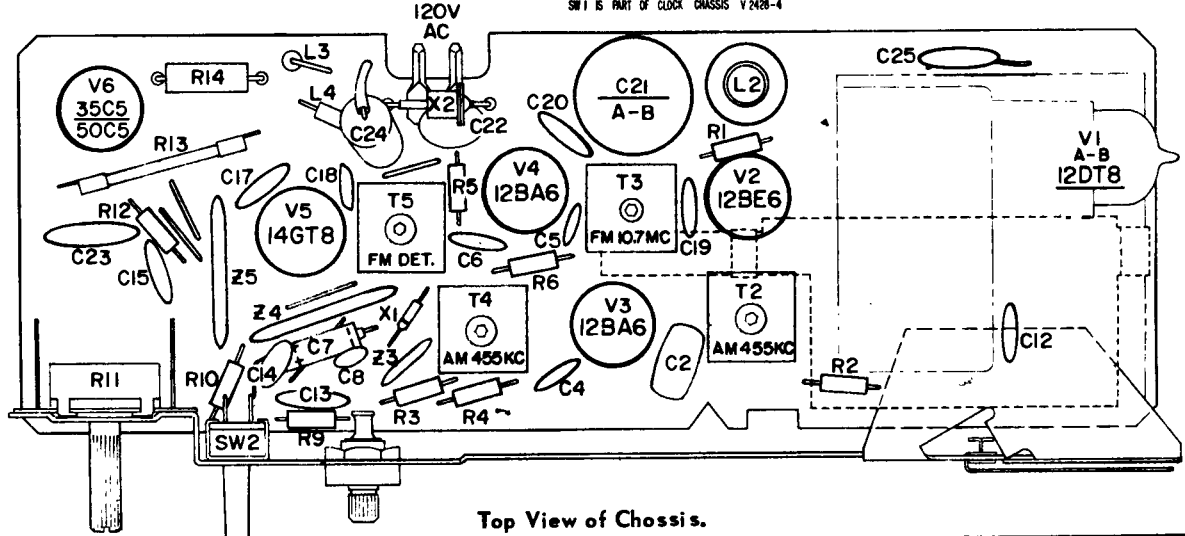
WESTINGHOUSE Chassis V-2428-3 and -4, used in Models H-850N6, H-851N6, H-852N6, H-855LN6, H-856LN6, H-871N6, H-872N6, H-873N6, H-875LN6, H-876LN6, H-877LN6.

(Continued from preceding page, at right)



NOTES:

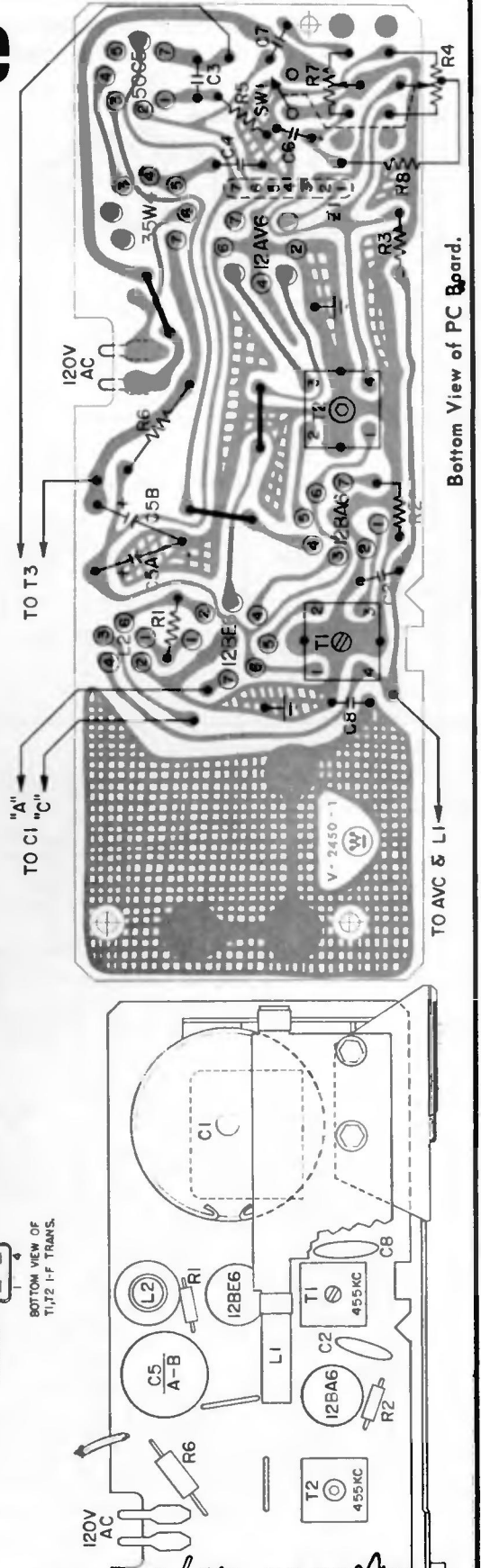
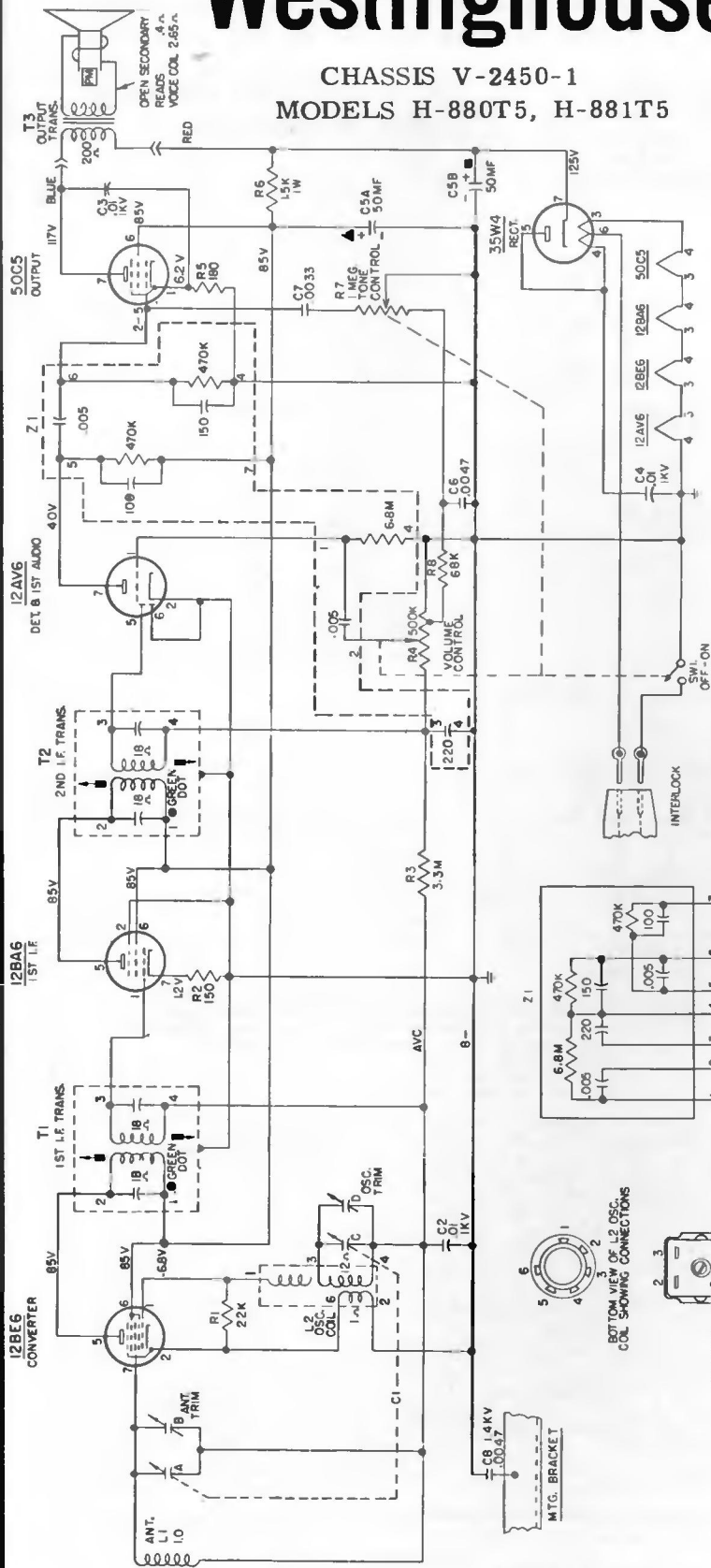
1. ALL CAPACITANCE VALUES LESS THAN 1(ONE) ARE IN PF AND VALUES GREATER THAN 1(ONE) ARE IN PF (PICOFARAD). ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
 2. VOLTAGES TAKEN WITH A VTVM FROM POINTS INDICATED TO B-, TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM, LINE VOLTAGE AT 120V AC NO SIGNAL INPUT. SW 2 IN AM POSITION.
- * SW 1 IS PART OF VOLUME CONTROL CHASSIS V 2428-3
 * SW 1 IS PART OF CLOCK CHASSIS V 2428-4



Top View of Chassis.

Westinghouse

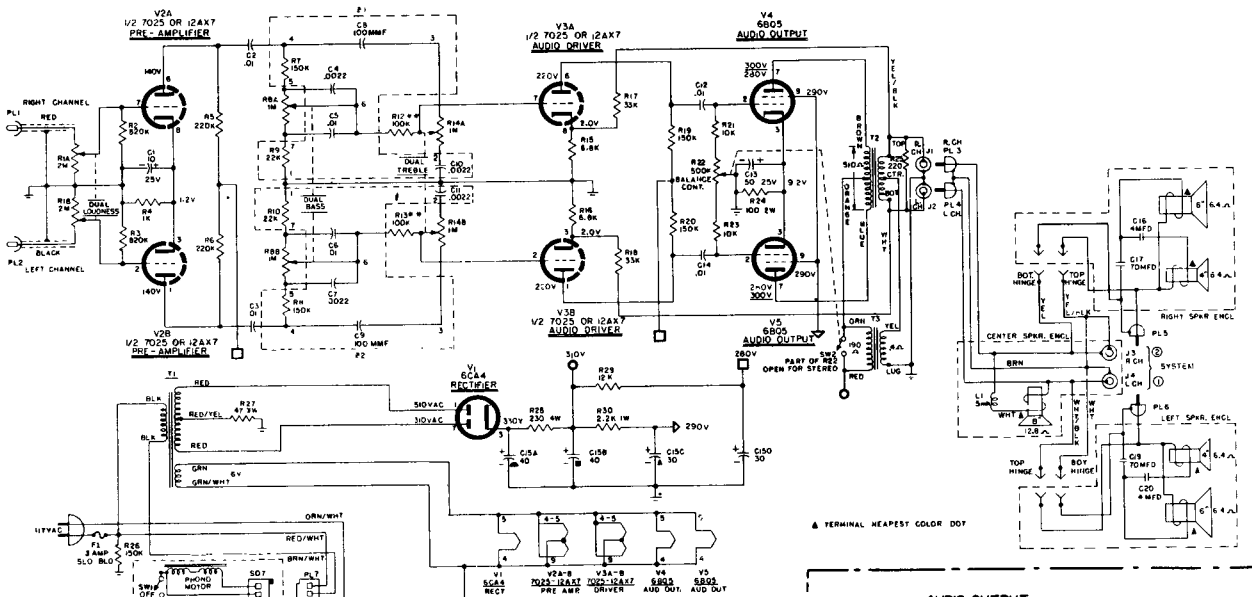
CHASSIS V-2450-1
 MODELS H-880T5, H-881T5



Bottom View of PC Board.

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

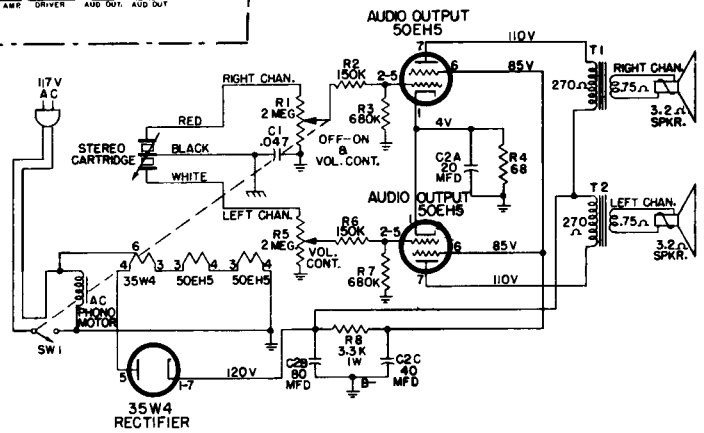
WESTINGHOUSE Chassis V-2507-7, Model H-69ACS1A



- NOTES:
1. ALL CAPACITANCE VALUES IN MFD & ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
 2. ALL VOLTAGES MEASURED FROM CHASSIS GROUND USING A V.T.V.M. NO SIGNAL INPUT. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
 3. REAR SECTIONS OF ALL CONTROLS ARE THE RIGHT CHANNEL.
 4. ALL AMPULOX CONNECTORS VIEWED FROM CONTACT END.
 5. W & B IN R13 ARE NOT INCLUDED IN R1 OR R2.
 6. VOLTAGES UNDERLINED WITH SW 2 IN MONAURAL POSITION.
 7. FUSE F1 IN LATER PRODUCTION ONLY.

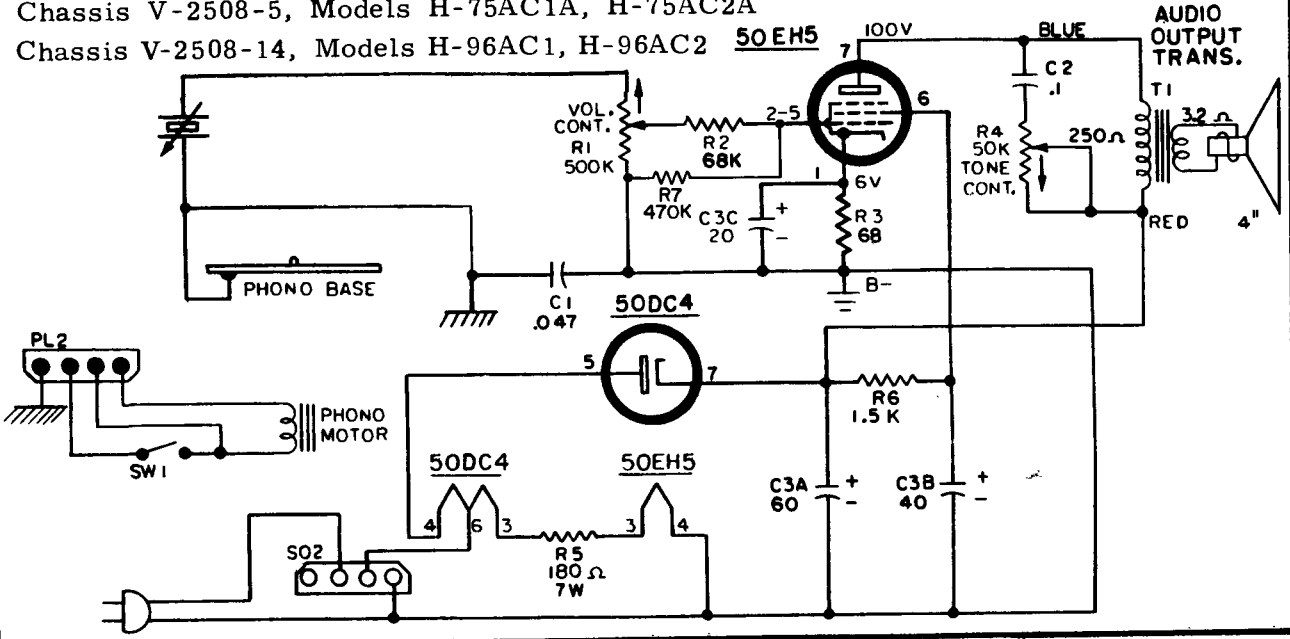
Models H-62MPS1A, H-62MPS2A, H-62MPS3A, Chassis V-2508-2

- NOTES:
1. ALL CAPACITANCE VALUES IN MFD AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE STATED.
 2. ALL VOLTAGES MEASURED FROM 0- USING A V.T.V.M. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
 3. CHASSIS GROUND IN COMMON B-.



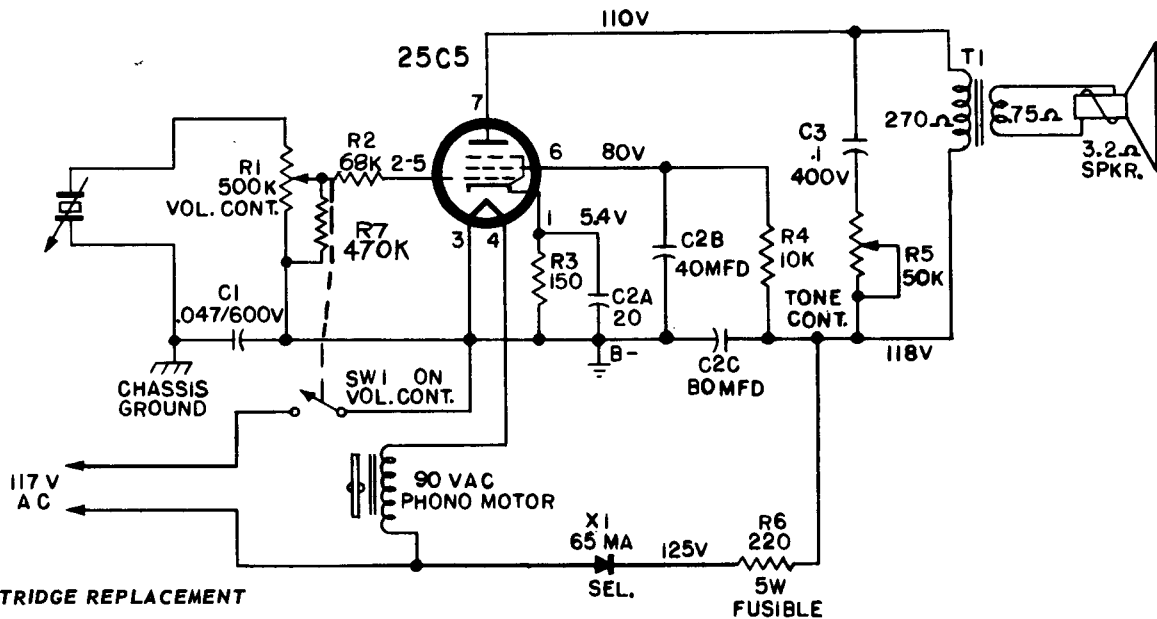
Chassis V-2508-5, Models H-75AC1A, H-75AC2A

Chassis V-2508-14, Models H-96AC1, H-96AC2



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2508-13, Models H-85MP1, H-85MP2, H-85MP3



CARTRIDGE REPLACEMENT

1. Remove the knob retainer screw and turnover knob.
2. Pull the cartridge out from the tone arm. Remove the spring, washer, and push-on connectors.

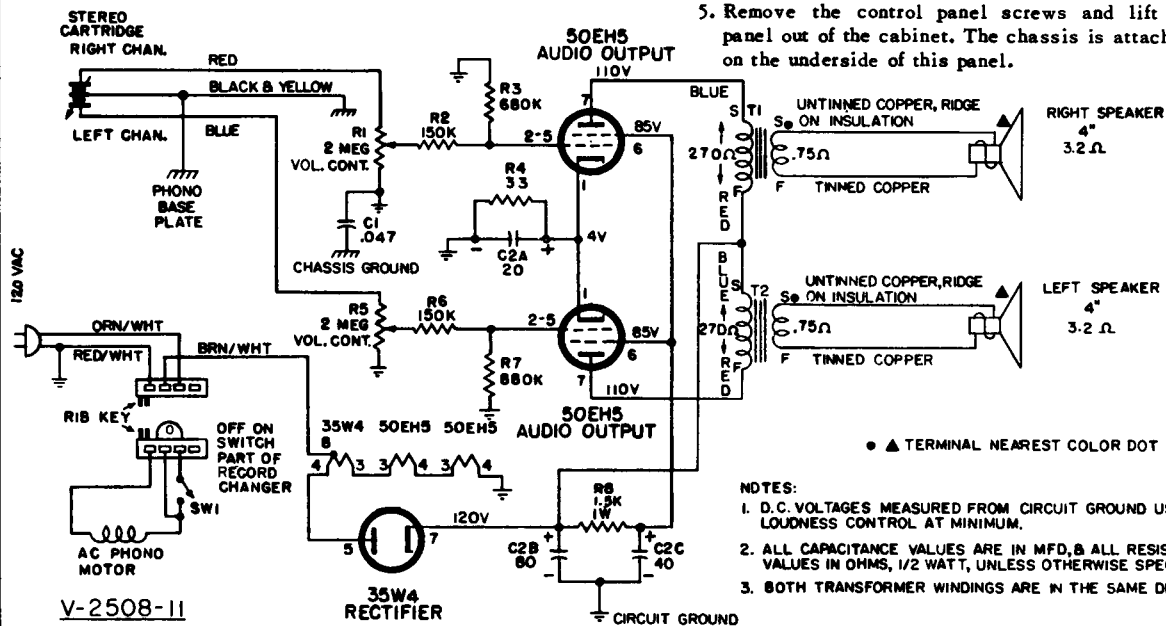
CHASSIS REMOVAL

1. Remove two nylon-head screws from bottom of cabinet base.
2. Remove turntable.
3. Remove two screws located underneath turntable.
4. Snap the edge of the motorboard out of the retaining grooves in the cabinet. Lift motorboard out of cabinet.

CHASSIS REMOVAL

1. Remove the tube service cover.
2. Remove the speaker compartment cover on the left side of the cabinet.
3. Remove the screws holding the motorboard. Lift the motorboard out of the cabinet.
4. Disengage the amp-lok from the changer. Unsolder the leads to the changer terminal board and the leads to the speakers.
5. Remove the control panel screws and lift the control panel out of the cabinet. The chassis is attached to studs on the underside of this panel.

CHASSIS V-2508-11, MODEL H-87ACS1

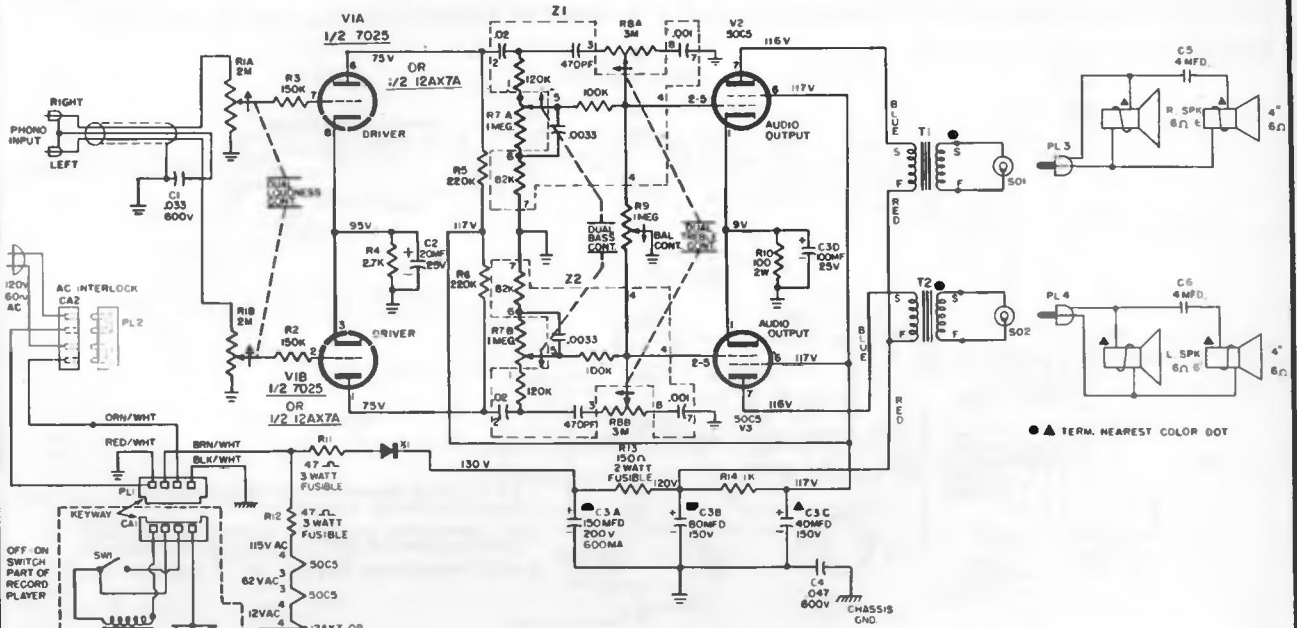


● ▲ TERMINAL NEAREST COLOR DOT

NOTES:

1. D.C. VOLTAGES MEASURED FROM CIRCUIT GROUND USING A V T V M, LOUDNESS CONTROL AT MINIMUM.
2. ALL CAPACITANCE VALUES ARE IN MFD, & ALL RESISTANCE VALUES IN OHMS, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
3. BOTH TRANSFORMER WINDINGS ARE IN THE SAME DIRECTION.

WESTINGHOUSE Chassis V-2523-1, Model H-89ACS1

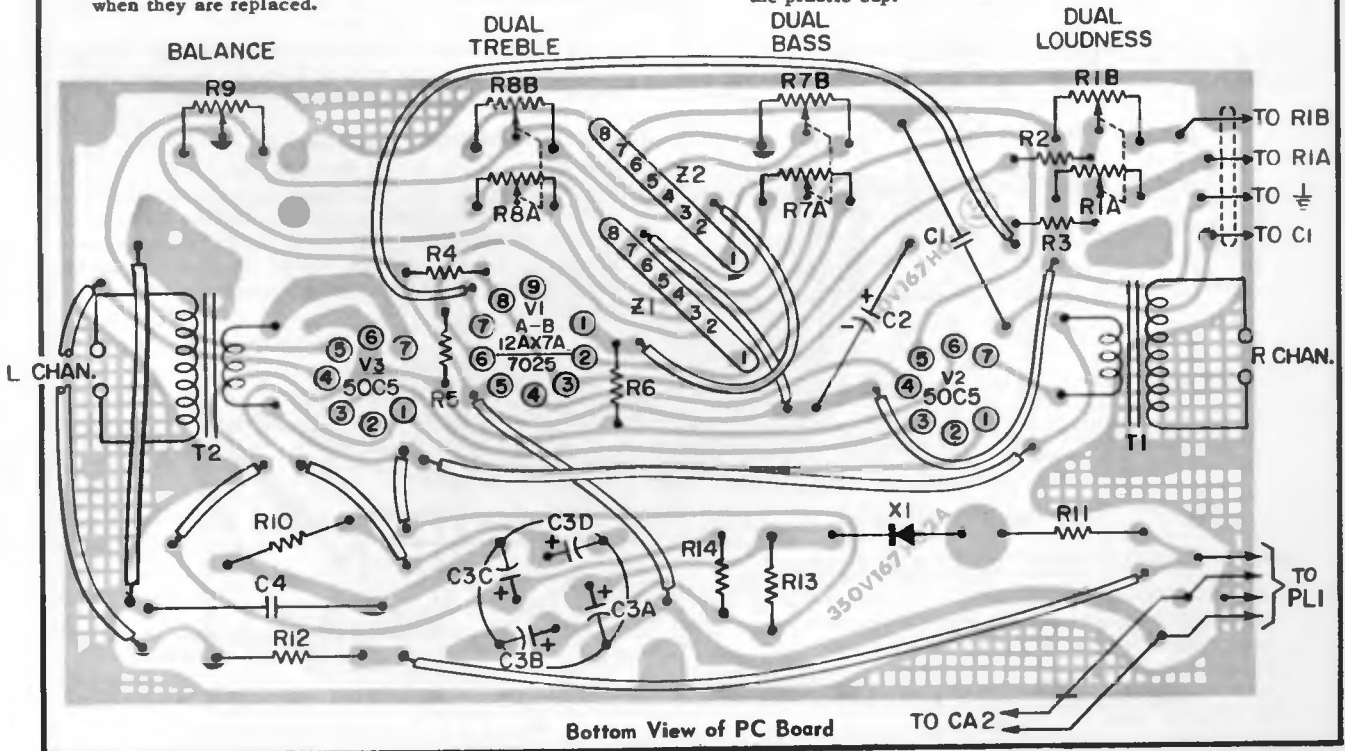


MOTORBOARD REMOVAL

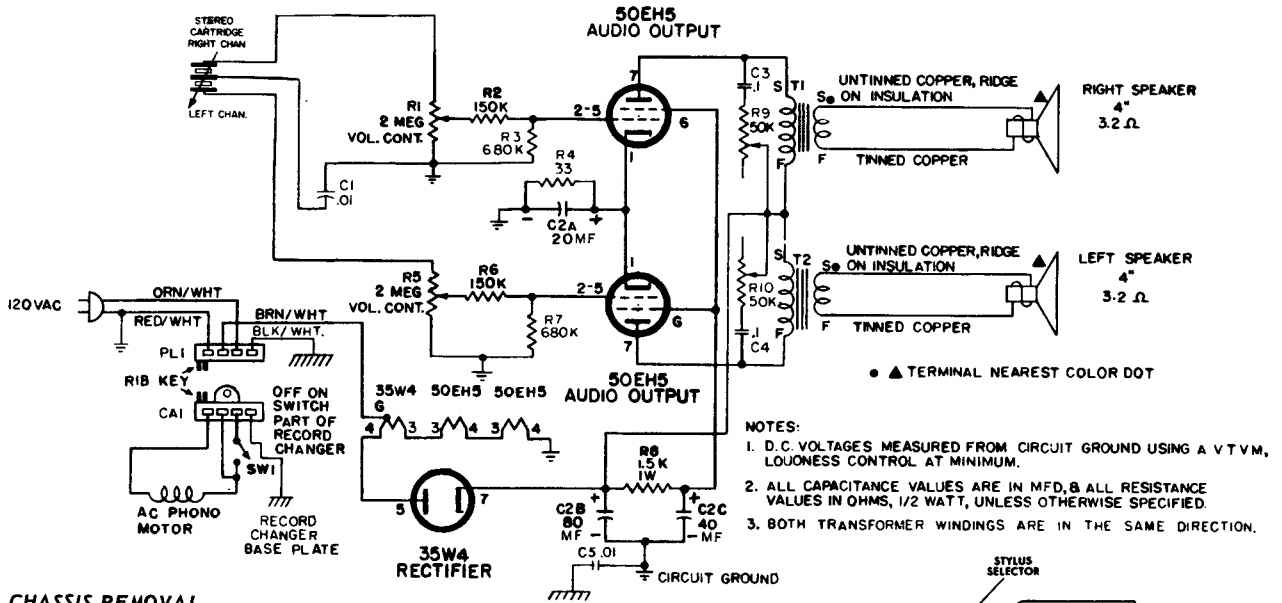
1. Remove 4 rubber feet from bottom of case.
2. Lift entire motor board up and out of the case. Interlock plate screws must be removed before you can lift motor board. Be careful when pulling the motorboard out of the case. See that all components on the bottom of the board clear the case. In some instances it may be necessary to remove the tube service cover and pry the interlock out of its socket.
3. Unsolder the leads connected to phono output jacks. Note the colors and resolder the leads to the same terminals when they are replaced.

CHASSIS REMOVAL FROM MOTORBOARD

1. Remove knobs.
2. Remove 2 screws from control escutcheon.
3. Remove 2 screws from board underneath the control escutcheon.
4. Remove 2 screws located underneath the wooden escutcheon. These are accessible through holes in the escutcheon.
5. Disconnect the amplok and phono plug from the changer.
6. Remove one screw holding power supply section of chassis to motorboard.
7. Remove all chicken bands and tape from wires.
8. Remove the screw holding the line cord, located inside the plastic cup.



WESTINGHOUSE Chassis V-2527-2, Models H-86ACS1A, H-86ACS2A,
Also applicable to Chassis V-2527-1 used in same models and H-86ACS3.



CHASSIS REMOVAL

1. Remove the perforated tube service cover, attached by one phillips screw.
2. Remove 4 phillips screws holding the motor-board. Lift the motor-board out of the cabinet.
3. Disengage the amp-loc and unsolder the three input leads to the amplifier. Unsolder the leads connected to the output transformers.
4. Remove the 3 knobs.
5. Remove the 4 speed nuts holding the chassis to the cabinet side. Remove the chassis from the cabinet.

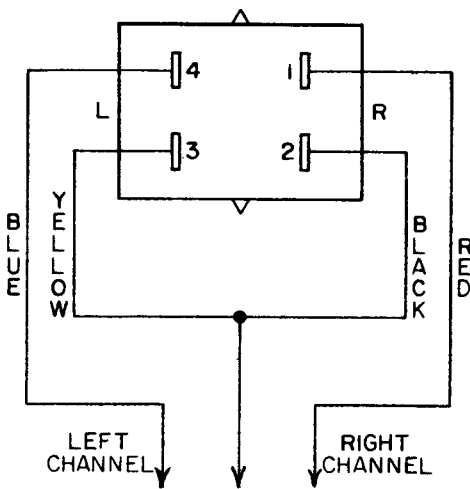


Figure 1 - Cartridge Wiring Diagram

CARTRIDGE REPLACEMENT (CHASSIS V-2527-2)

1. Observe the sequence of wires, as shown in Figure 1.
2. Remove the push-on connectors from the terminals.
3. Remove the cartridge, pulling it away from the cartridge holder. CAUTION: A spring and 2 washers are located on the mounting shaft.

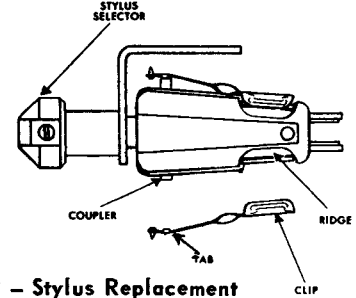


Figure 2 - Stylus Replacement

4. Slide the new cartridge into the cartridge holder with the stylus marked SA-250 facing in the same direction as the side of the stylus marking 33-45.
5. Apply slight pressure to the rear of the cartridge to align the holes in the stylus selector knob and mounting shaft. Replace the screw in the stylus selector knob.

STYLUS REPLACEMENT (see Figure 2)

1. Pull the stylus clip off the cartridge ridge.
2. Push the clip of the replacement stylus onto the ridge.
3. Lift the front part of the stylus a small amount so that it is not pressing against the coupler - then let it fall back and engage the coupler. The tabs on the stylus should be centered, with one on each side of the projecting end of the coupler.

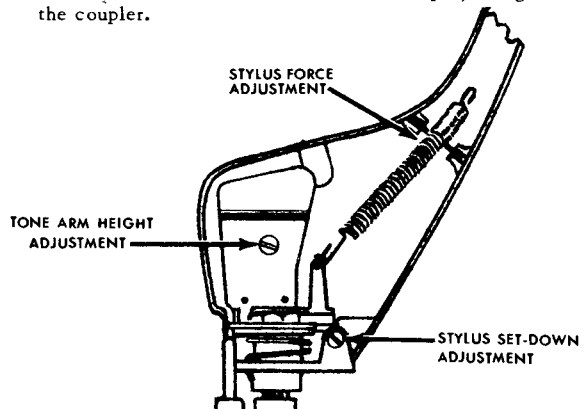
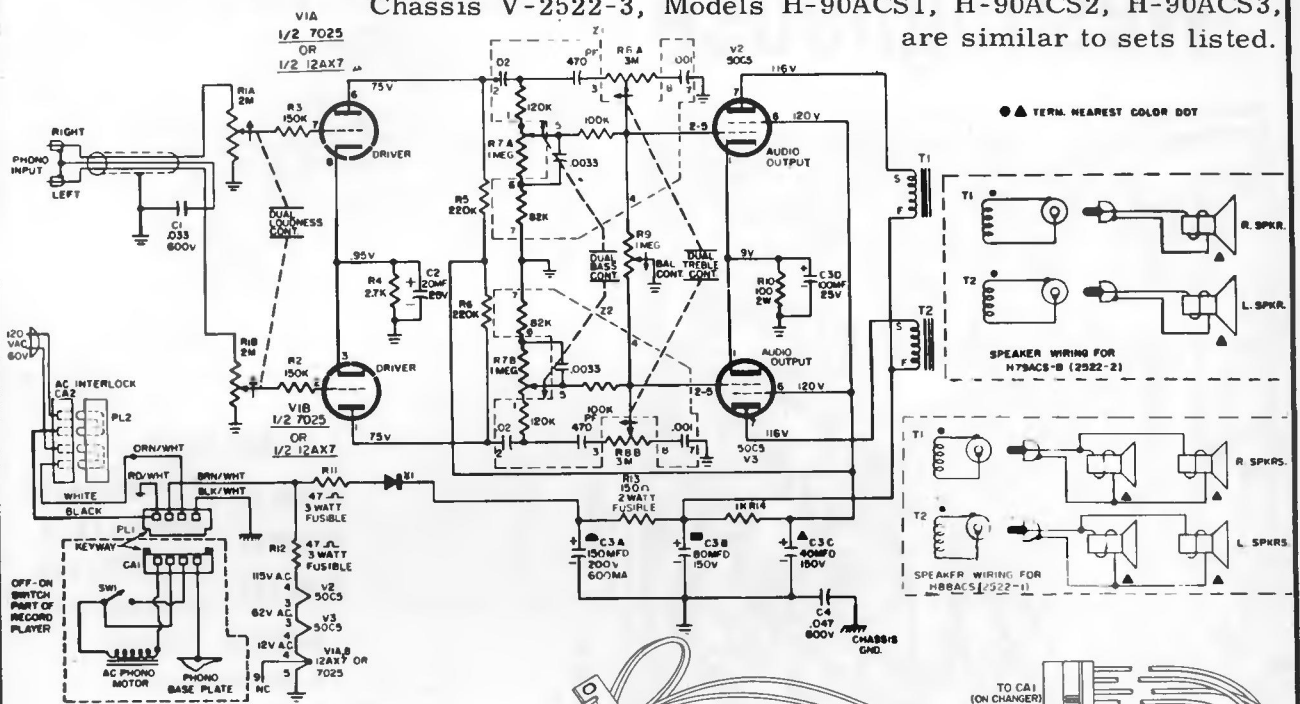


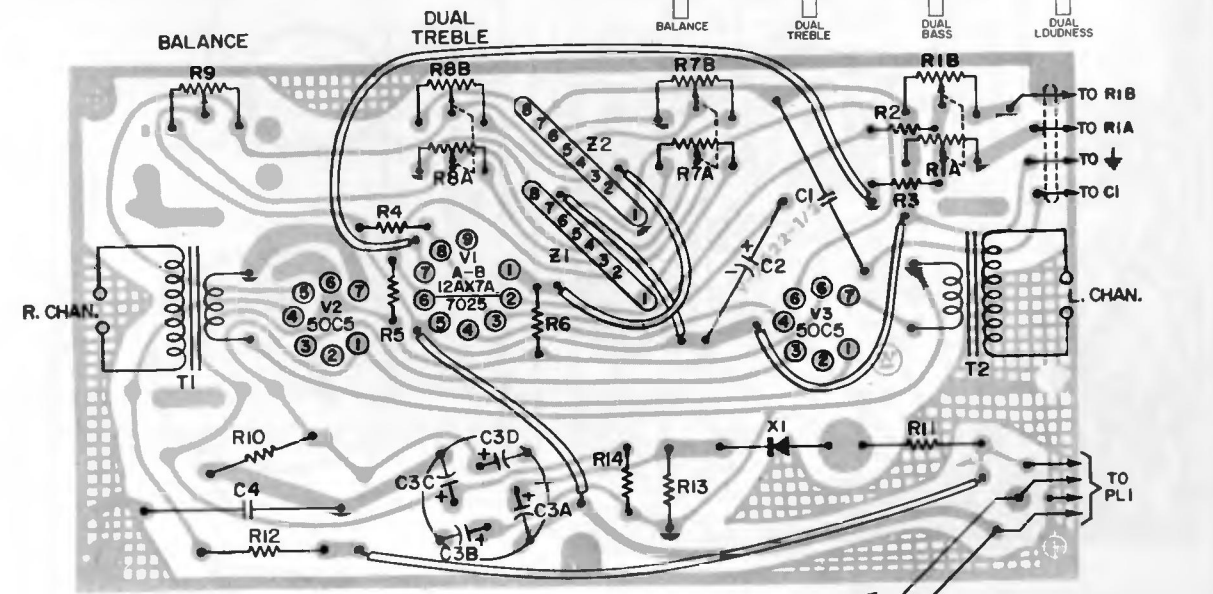
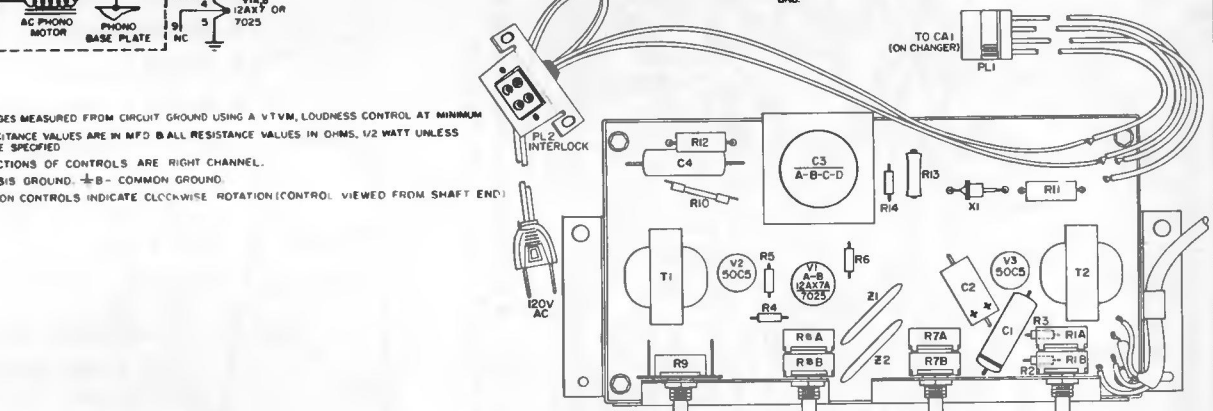
Figure 3 - Tone Arm Adjustments

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2522-1, -2, Models H-79ACS1B, H-79ACS2B, H-88ACS1
 Chassis V-2522-3, Models H-90ACS1, H-90ACS2, H-90ACS3,
 are similar to sets listed.



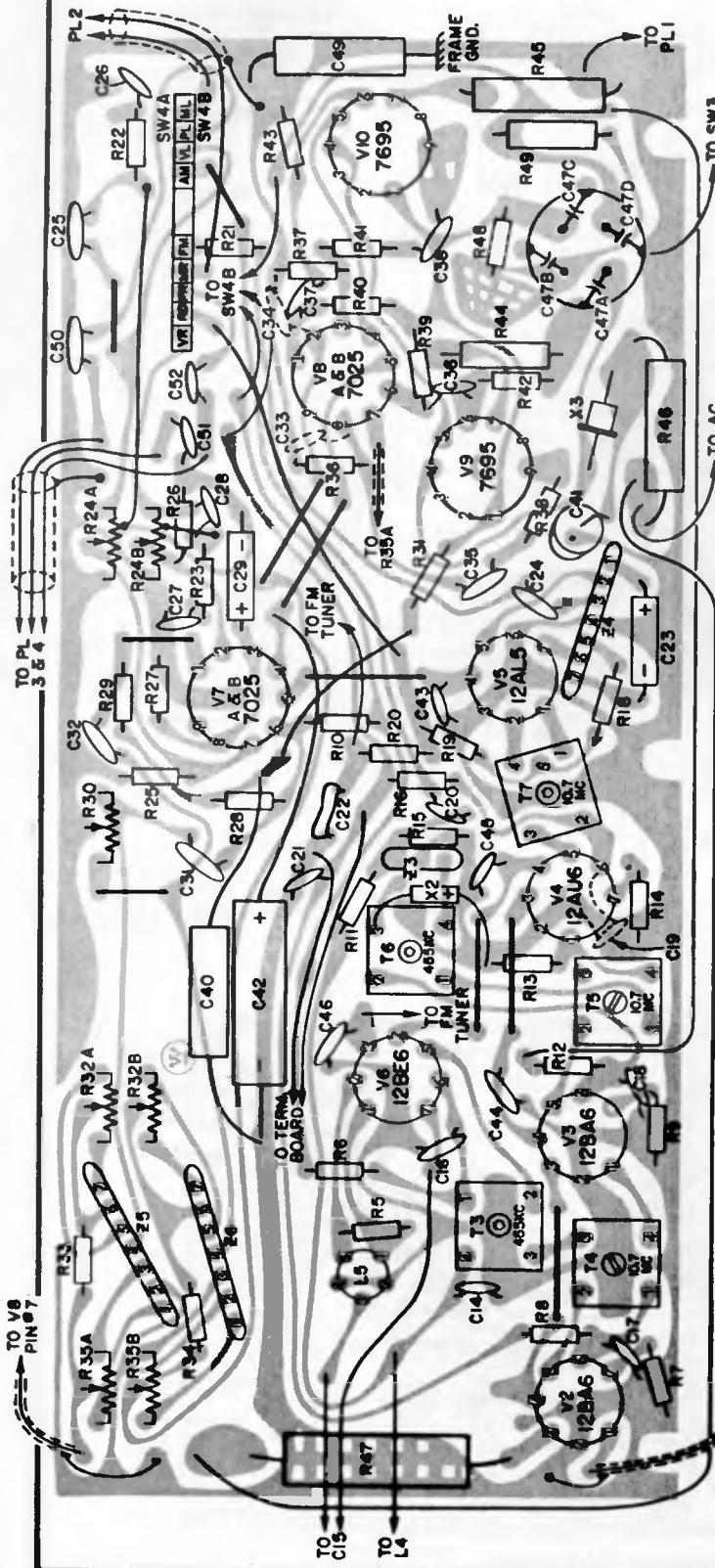
- NOTES**
- 1 DC VOLTAGES MEASURED FROM CIRCUIT GROUND USING A VTVM, LOUDNESS CONTROL AT MINIMUM
 - 2 ALL CAPACITANCE VALUES ARE IN MFD & ALL RESISTANCE VALUES IN OHMS, 1/2 WATT UNLESS OTHERWISE SPECIFIED
 - 3 REAR SECTIONS OF CONTROLS ARE RIGHT CHANNEL.
 - 4 ∇ CHASSIS GROUND, ∇ -B- COMMON GROUND.
 - 5 ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



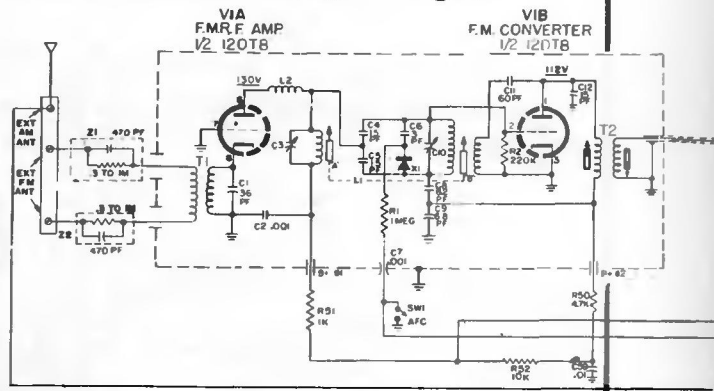
Bottom View of PC Board Showing Top Components in Solid Outline.

Westinghouse

(Continued on page at right)



Bottom view of Chassis V-2515-4 PC board showing location of top components in solid outline. Tube pin numbering is for bottom of socket.



MODELS

- H-M1790 H-M1810/A/B
- H-M1791 H-M1811/A/B
- H-M1793 H-M1813/A/B
- H-M1793 H-M1815/A/B

H-M1910 (walnut)

H-M1911 (cherry)

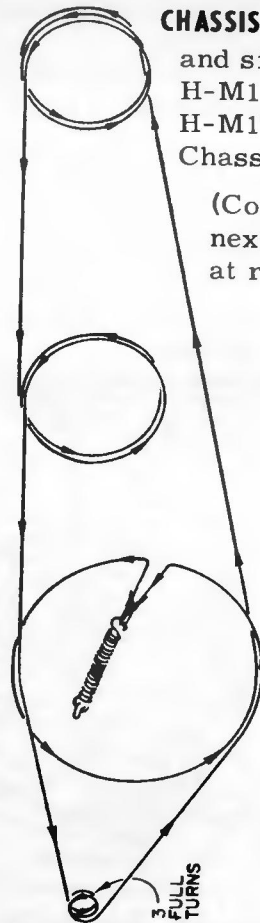
H-M1913 (maple)

H-M1914 (butternut)

CHASSIS V-2515-4

and similar Models H-M1760, H-M1761, H-M1763, using Chassis V-2515-8.

(Continued on the next page adjacent at right)

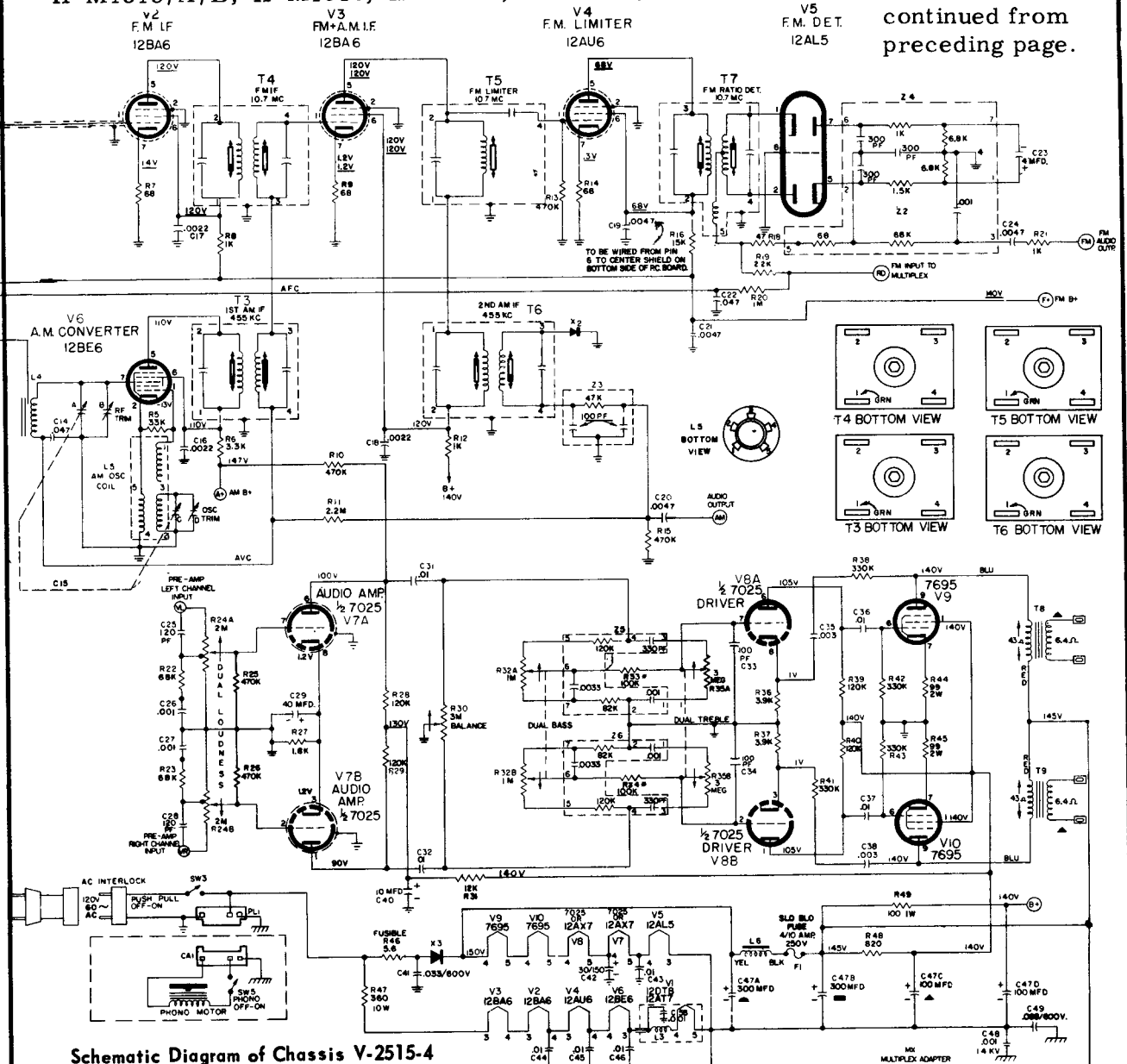


Diol Cord Stringing

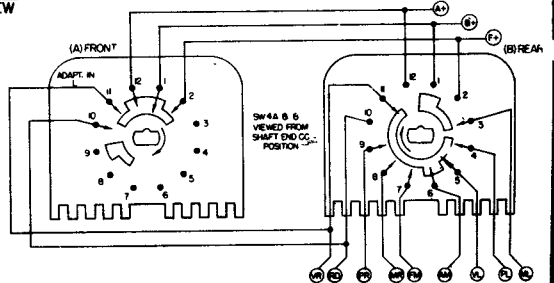
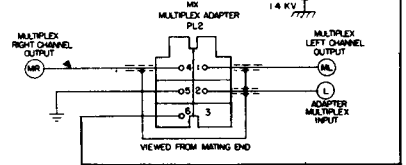
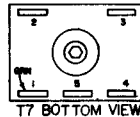
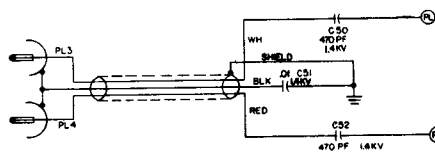
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2515-4, Models H-M1810/A/B, H-M1811/A/B, H-M1813/A/B, H-M1815/A/B, H-M1910, H-M1911, H-M1913, and H-M1914, and others models,

continued from preceding page.



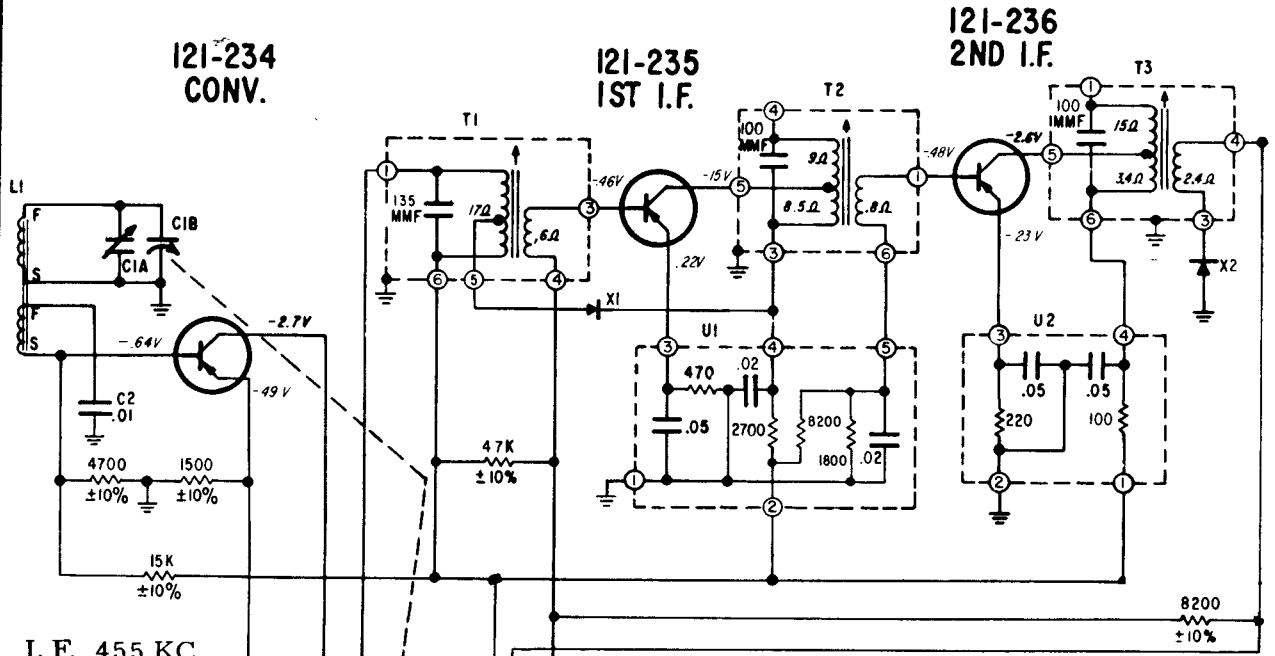
Schematic Diagram of Chassis V-2515-4



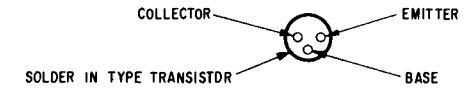
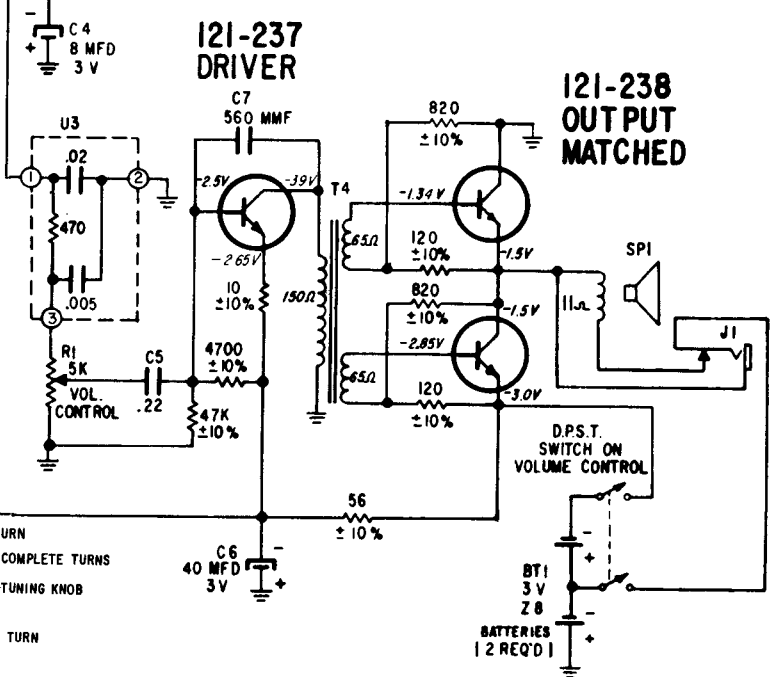
- ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
- D.C. VOLTAGES MEASURED FROM POINTS INDICATED TO CIRCUIT GROUND, NO SIGNAL APPLIED, USING A V.T.V.M., LINE VOLTAGE SET AT 120 VAC.
- * R33 & R34 NOT INCLUDED IN PACKAGE CIRCUITS Z5 & Z6.
- UNDERLINED VOLTAGES ARE TAKEN IN FM POSITION.
- ALL REFERENCES TO LEFT & RIGHT ARE AS VIEWED FACING FRONT OF SET
- SW4A, B IS SHOWN IN THE CCW POSITION, (AM POSITION)
- REAR SECTIONS OF CONTROLS (FARTHEST FROM SHAFTS) ARE RIGHT CHANNEL.
- ARROWS ON CONTROLS INDICATE CW ROTATION (CONTROL VIEWED FROM SHAFT END)

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

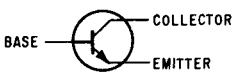
ZENITH Model Royal 130, Chassis 6KT47Z1



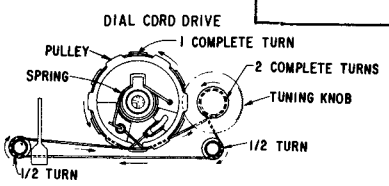
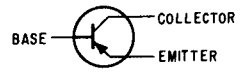
I. F. 455 KC.



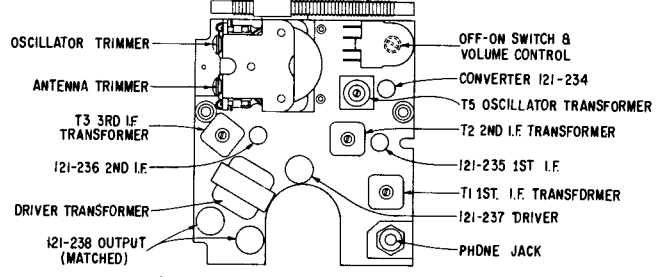
NPN TRANSISTOR



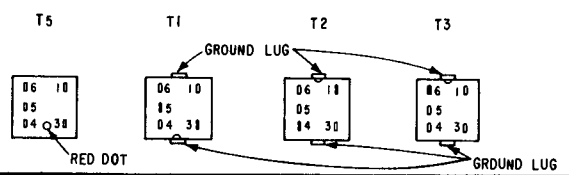
PNP TRANSISTOR



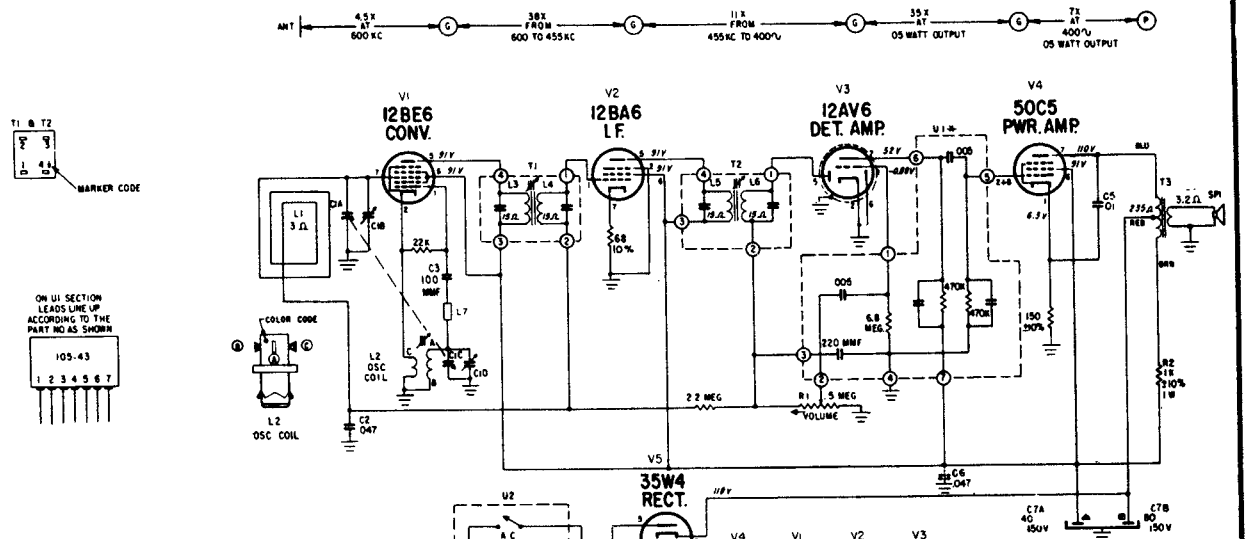
SHOWN WITH GANG IN FULL CCW POSITION AS VIEWED FROM FRONT OF CHASSIS.



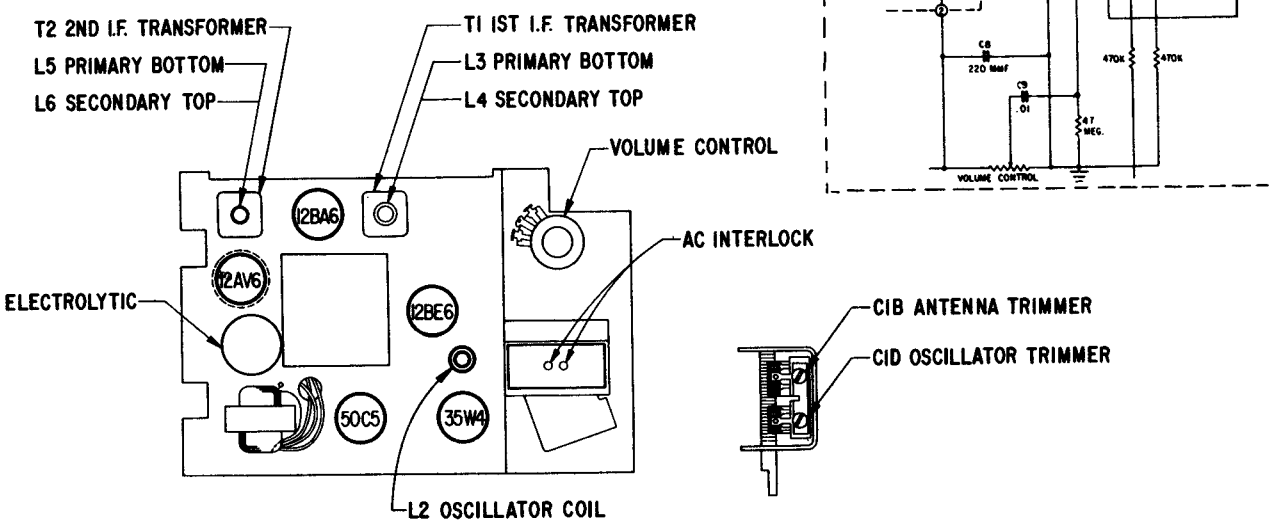
NOTES:
 ALL RESISTORS ARE CARBON, 1/2 WATT, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE MEASURED FROM GROUND WITH NO SIGNAL USING A VACUUM TUBE VOLTMETER.
 † DENOTES GROUND.
 BATTERY CURRENT DRAIN: APPROXIMATELY 12 M.A. WITH VOLUME CONTROL AT MINIMUM.



ZENITH RADIO MODELS L519C, F, G, W CHASSIS 5L07



NOTES
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH A V.T.V.M.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C6 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL AS FIRST TERMINAL CLOCKWISE FROM MARKER CODE TERMINAL AS VIEWED FROM BOTTOM OF CHASSIS.
 I.F. FREQUENCY 455 KC
 TUNING RANGE 535-1620 KC
 ALL RESISTORS 20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.



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 Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

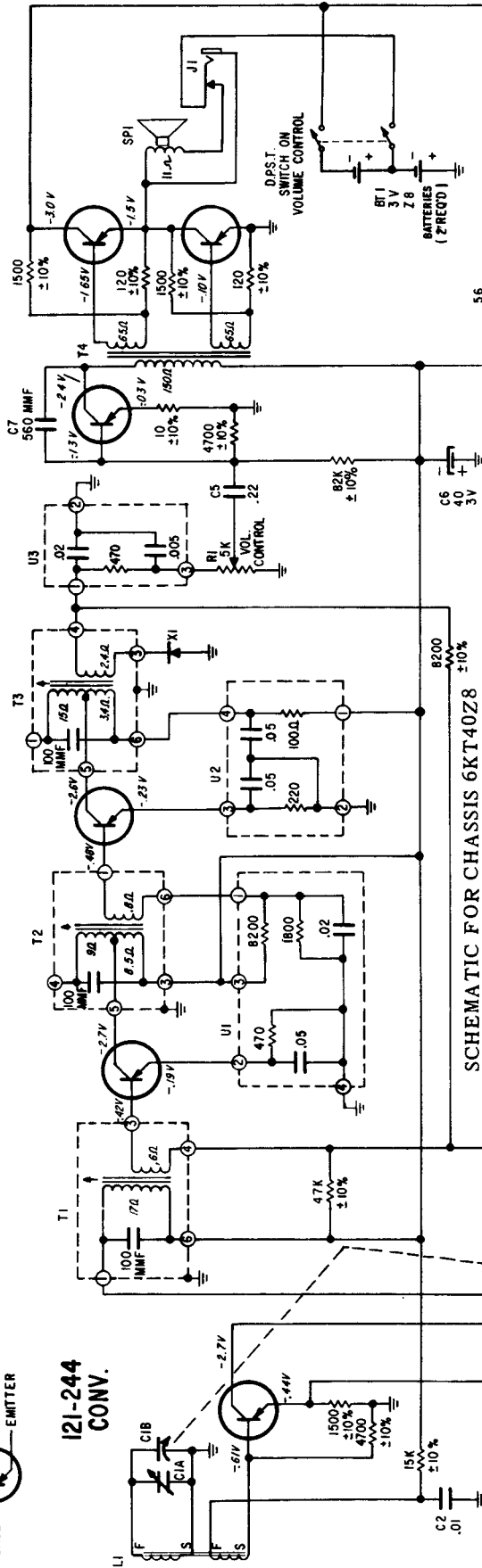
12I-246
OUTPUT
MATCHED

12I-245
DRIVER

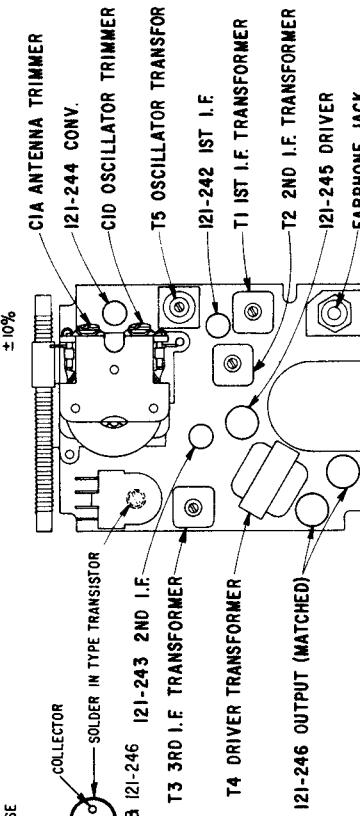
12I-243
2ND I.F.

12I-242
1ST I.F.

PNP TRANSISTOR



SCHEMATIC FOR CHASSIS 6KT40Z8



TRANSISTOR & TRIMMER
LAYOUT FOR CHASSIS 6KT40Z8

ZENITH Model Royal 50L
using Chassis 6KT40Z8

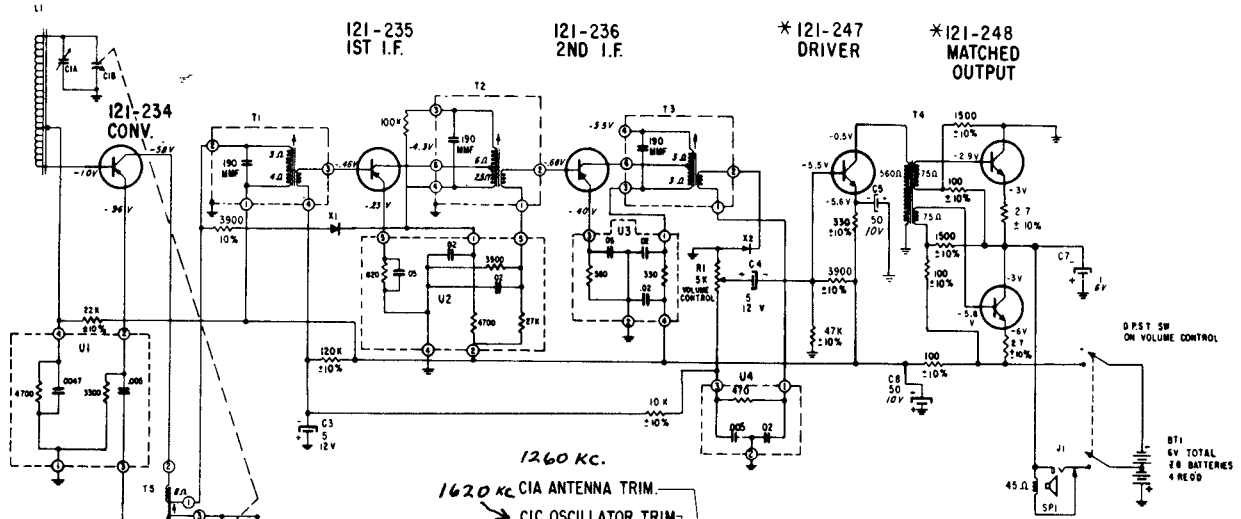
(For schematic notes and other
information see preceding page)

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		Gang wide open.	CID	Set Oscillator to dial scale
3	600 KC		Near 600 KC	Adjust slug in T5	While rocking gang, adjust T5 for maximum output regardless of dial accuracy.
4	1260 KC		1260 KC	CIA	Align loop ant.
5	REPEAT STEPS 2 & 3		-	-	-

VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

ZENITH Models 265, 645, 670, Chassis 6KT41Z1, 6KT42Z1, 6KT45Z1



SCHMATIC FOR CHASSIS 6KT42Z1

NOTES:
 ALL RESISTORS ARE CARBON, 1/2 WATT, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES THRU ARE DERIVED FROM CHASSIS WITH NO SIGNAL USING A VACUUM TUBE VOLTMETER.
 DEMOTES CHASSIS:
 BATTERY CURRENT DRAIN APPROX. 4.5 MA WITH VOLUME CONTROL AT MID-RANGE.
 *SPEAKER IMPEDANCE 22Ω AT 400 CPS

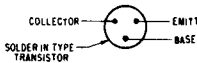
T5 COLOR CODE

D 4	D 0
D 5	
D 4	D 3

DRIVER	MATCHED OUTPUT
121-247	121-248
VIOLET	BLACK
BLACK	VIOLET
WHITE	BLUE

* THE MATCHING IDENTIFICATION WILL BE A COLORED DOT.
 THE MATCHING OF TRANSISTORS WILL BE AS INDICATED IN THE ABOVE CHART

PNP TRANSISTORS



NPN TRANSISTOR

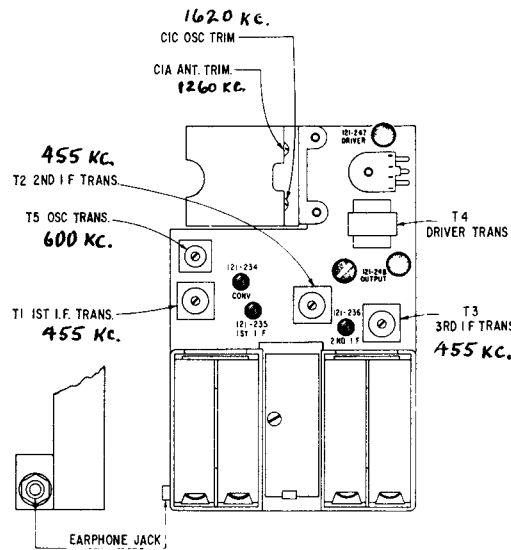


TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 6KT45Z1 & 6KT41Z1

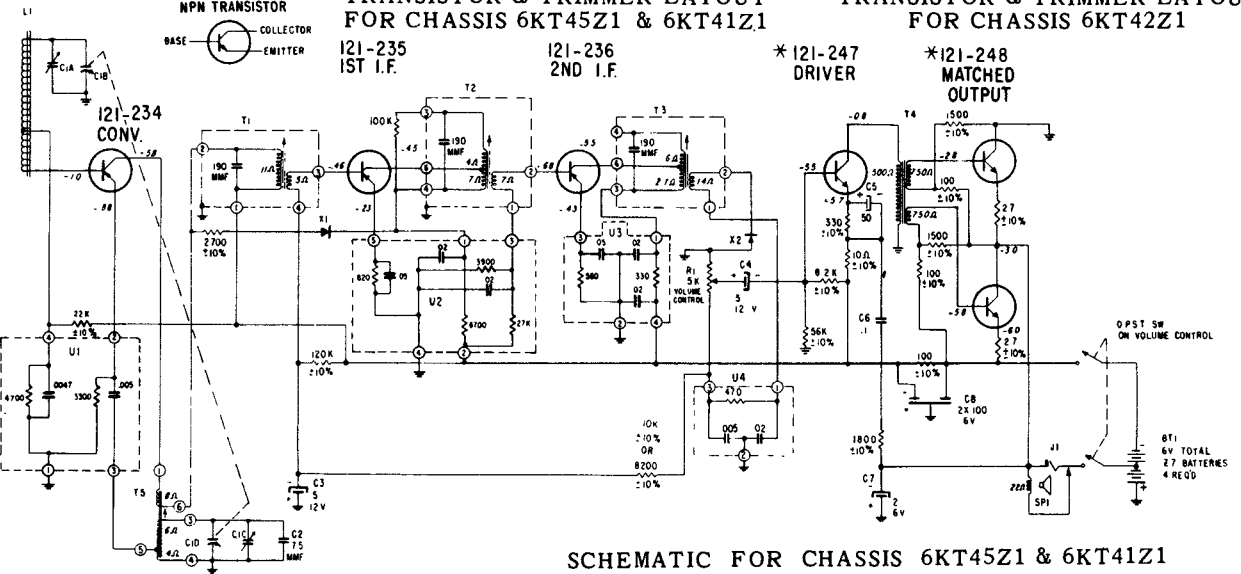
121-235 1ST I.F.
 121-236 2ND I.F.
 *121-247 DRIVER
 *121-248 MATCHED OUTPUT

455 KC. T2 2ND I.F. TRANS.
 600 KC. T5 OSCILLATOR TRANS.
 455 KC. T1 1ST I.F. TRANS.
 455 KC. T3 3RD I.F. TRANS.

SCHMATIC FOR CHASSIS 6KT42Z1



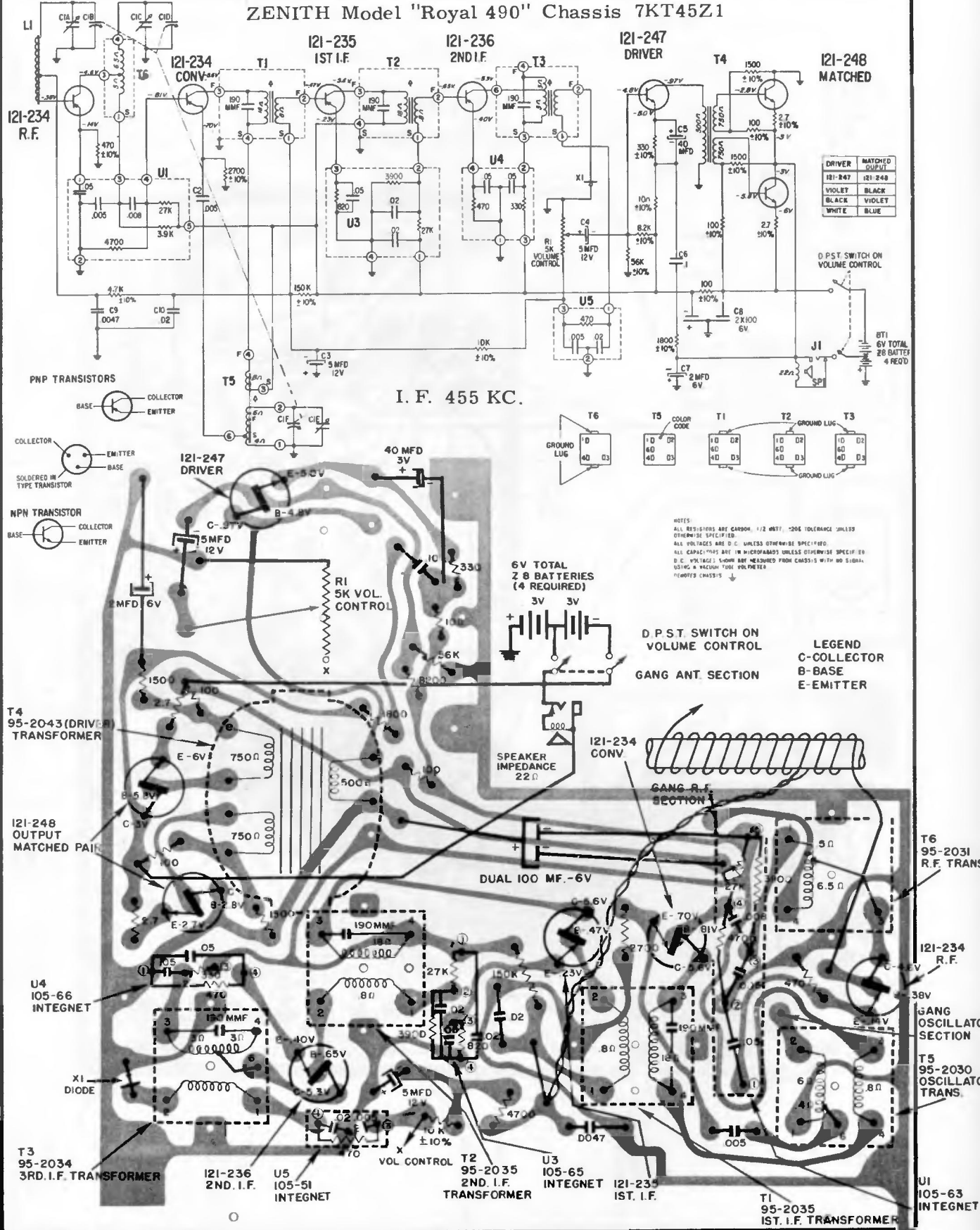
TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 6KT42Z1



SCHMATIC FOR CHASSIS 6KT45Z1 & 6KT41Z1

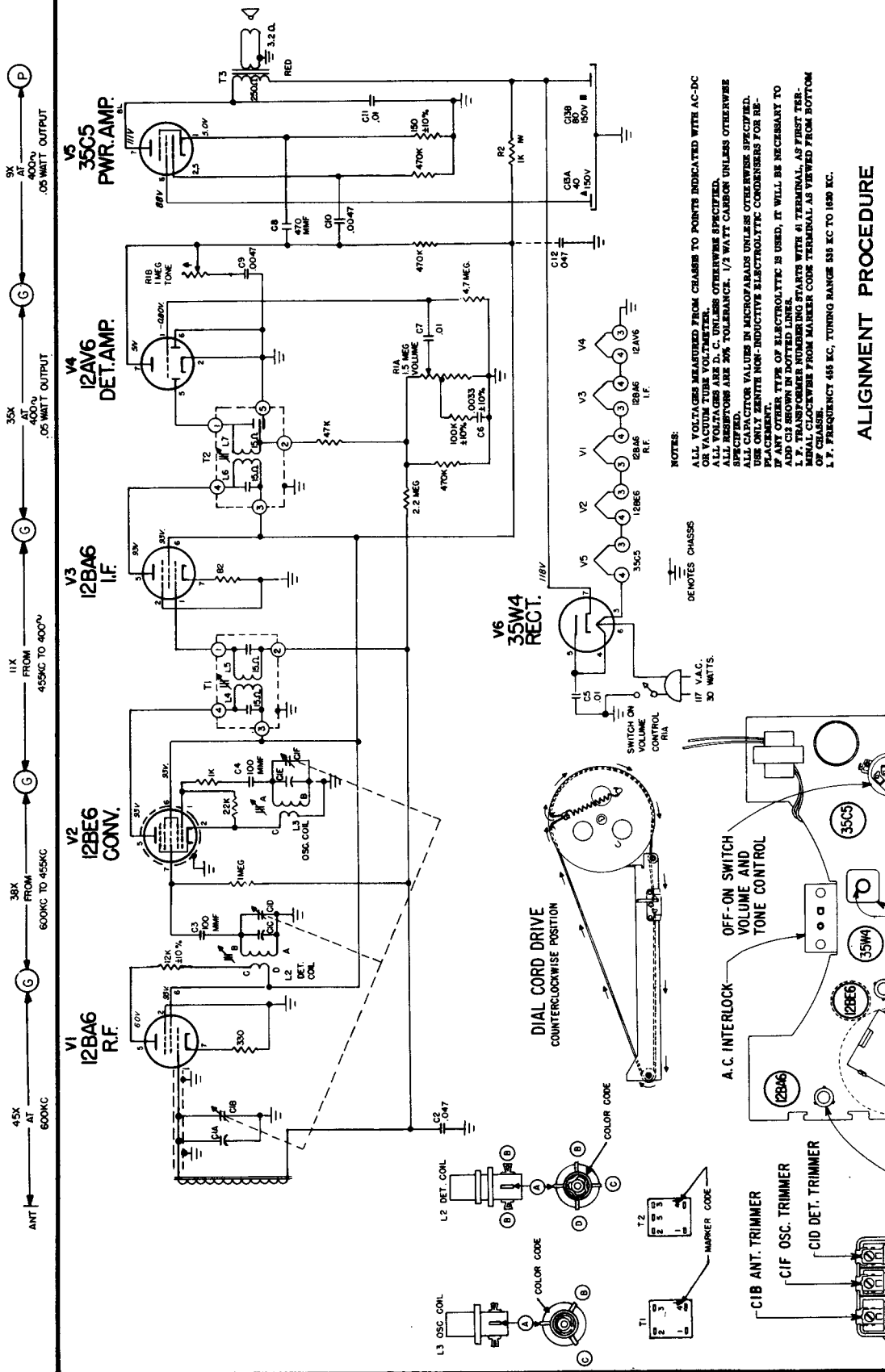
VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

ZENITH Model "Royal 490" Chassis 7KT45Z1



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING

ZENITH RADIO Model K615B, C, W, Chassis 6K05



ALIGNMENT PROCEDURE

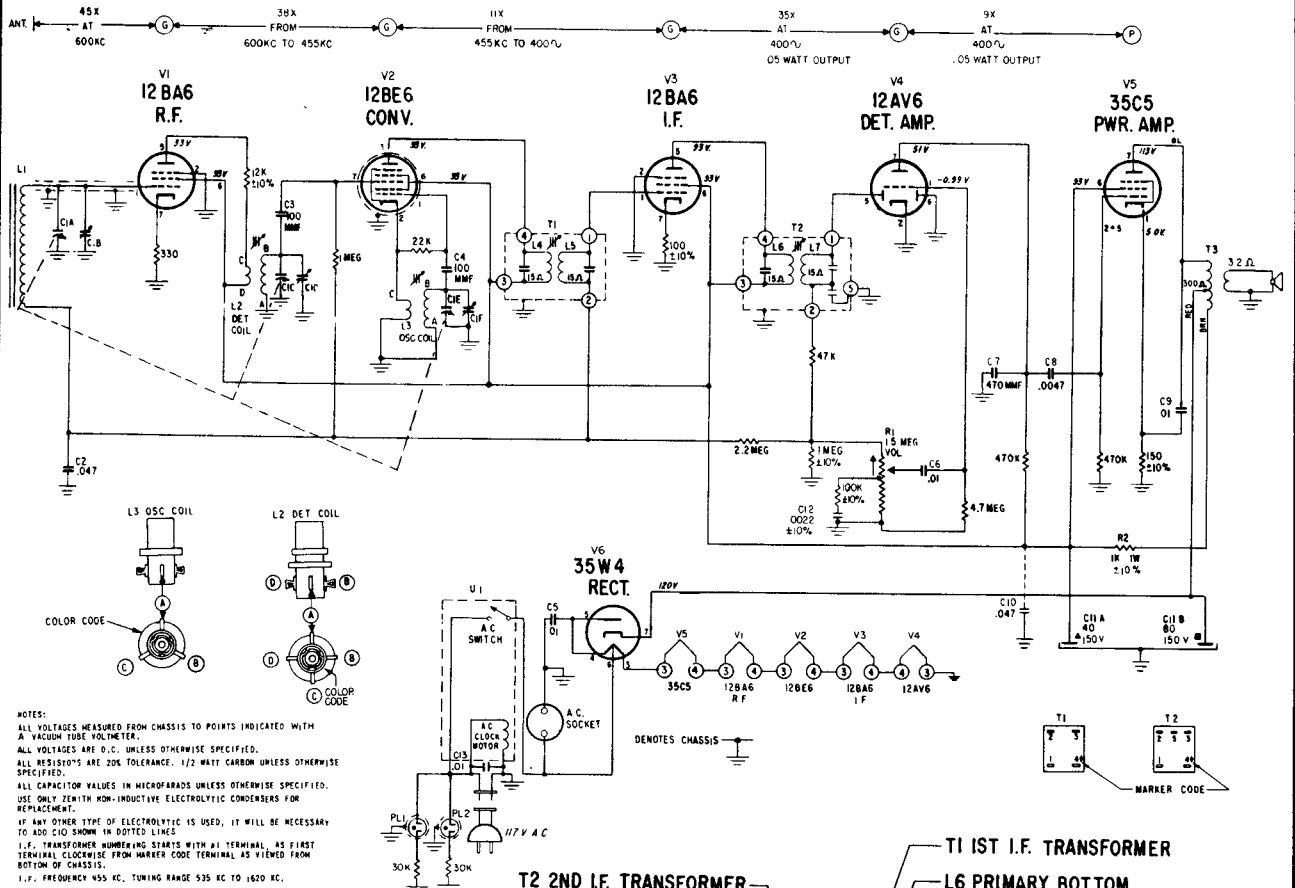
Operation	Connect Dscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L4, L5, L6, L7	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to	—	1600 Kc.	1600 Kc.	C1F	Set Oscillator to Dial Scale
3	Wave Magnet	—	1400 Kc.	1400 Kc.	C1D, C1B	Align Detector and Antenna Stage

NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH AC-DC OR VACUUM TUBE VOLTMETER.
 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 RE-PAIR.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD C12 SHOWN IN DOTTED LINE.
 I.F. TRANSFORMER WINDING STARTS WITH #1 TERMINAL, AS FIRST TERMINAL IS VIEWED FROM BOTTOM OF CORE.
 I.F. FREQUENCY 455 KC, TUNING RANGE 535 KC TO 1620 KC.

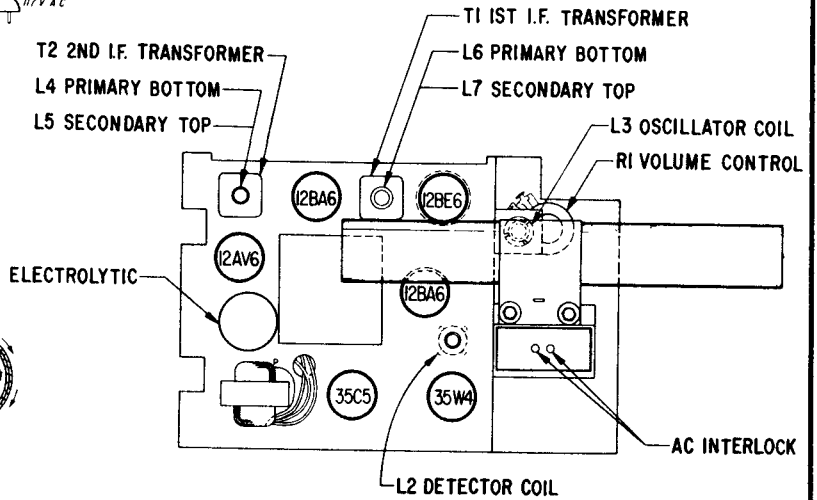
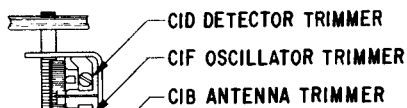
ZENITH RADIO

MODEL L624

CHASSIS 6L03



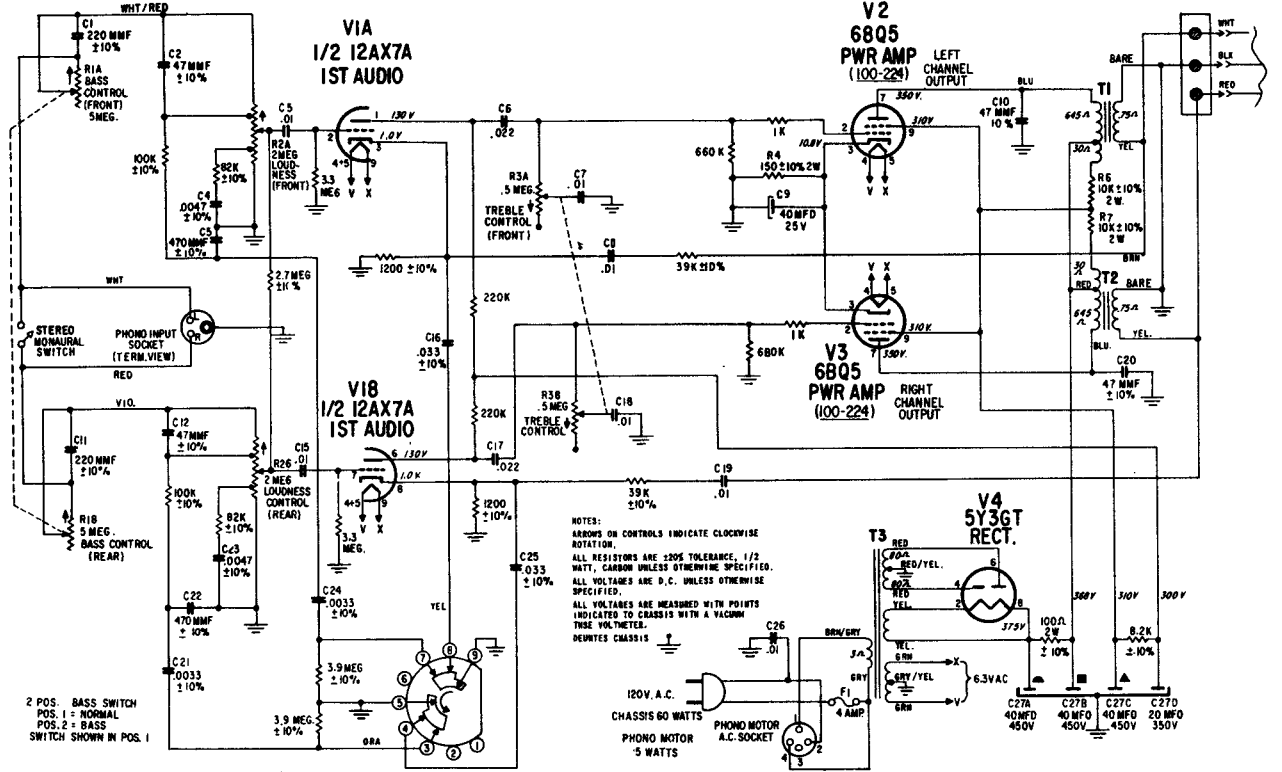
NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH A VACUUM TUBE VOLTMETER.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL RESISTORS ARE 20% TOLERANCE. 1/2 WATT CARBON UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD C10 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS WITH #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.



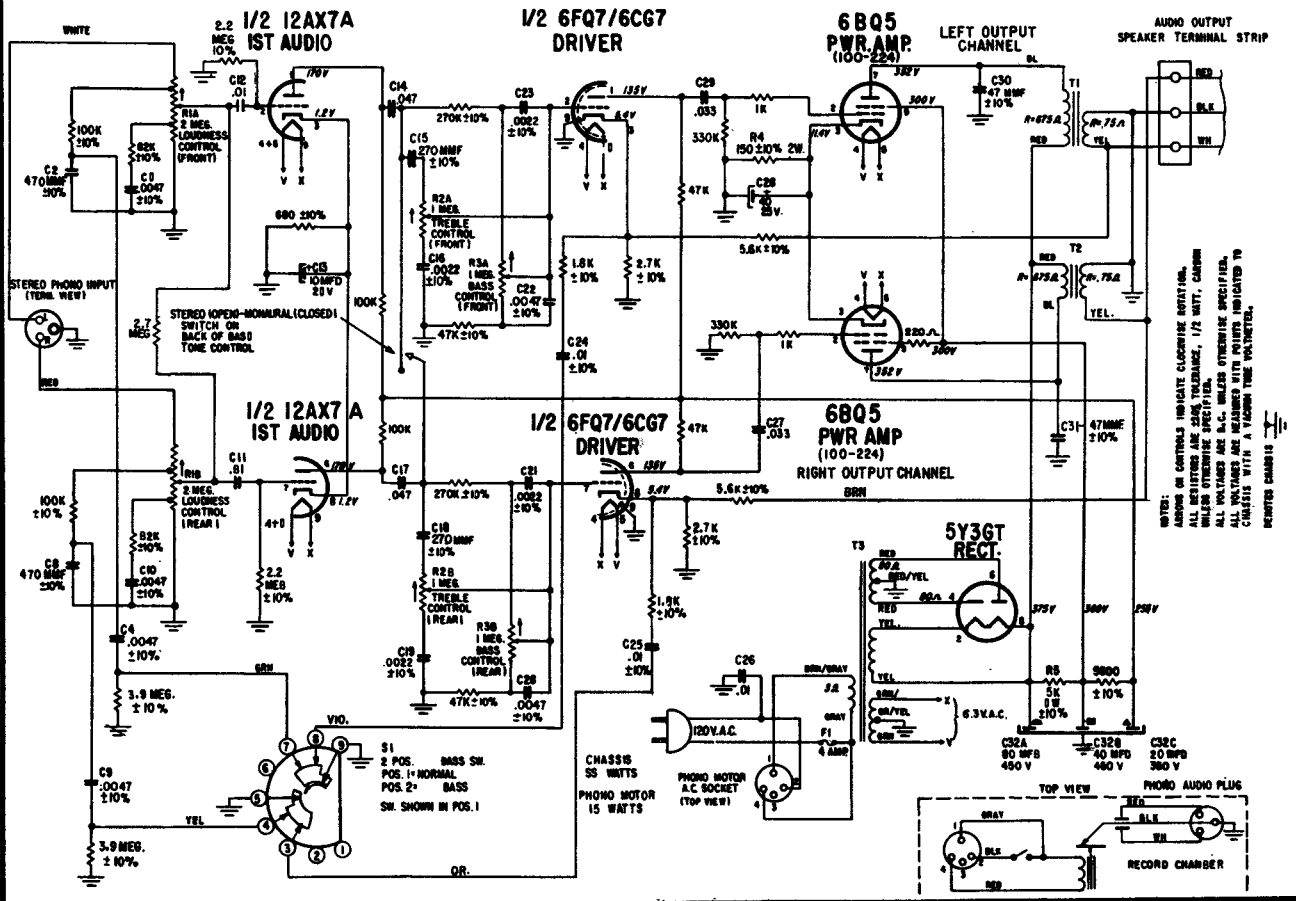
ALIGNMENT PROCEDURE

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.

ZENITH 4L21 SCHEMATIC FOR MODELS ST1971, MT1971, ST1981, MT1981, ML2786 AND 7200. AUDIO OUTPUT SPEAKER TERMINAL STRIP



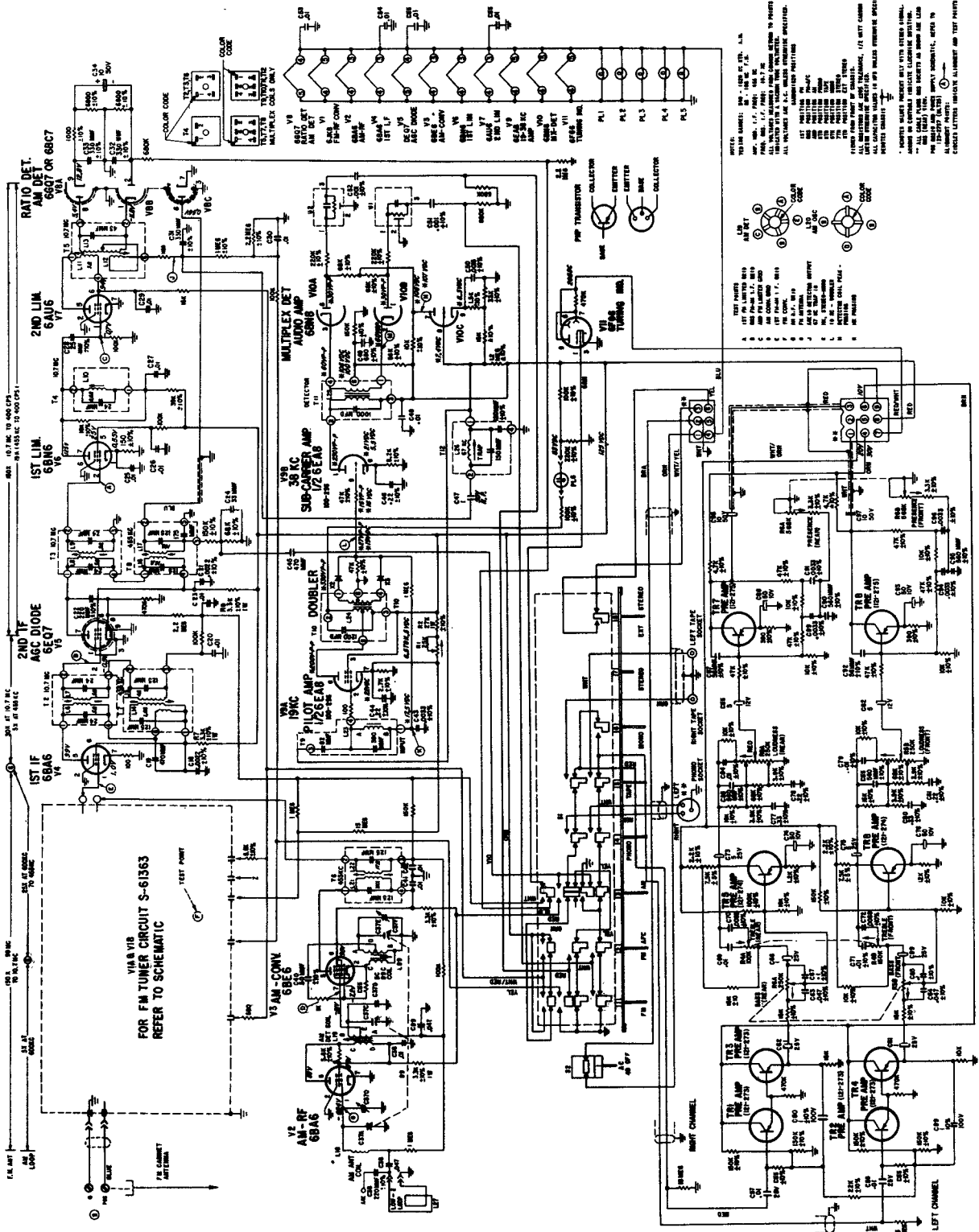
5L29 SCHEMATIC FOR MODELS SL2505, ML2605, ML2606, ML2607, ML2608, ML2610 AND ML2636.



VOLUME R-24, MOST-OFTEN-NEEDED 1964 RADIO SERVICING INFORMATION

ZENITH 11L8T25 SCHEMATIC FOR MODELS ML2668, ML2670, ML2675, ML2685 AND 7500.

(For chassis layout and FM tuner schematic see page 189)



TEST POINTS:

1. 1ST IF (68A6)
2. 2ND IF (68G7)
3. 2ND LIM (6AU6)
4. RATIO DET (68Q7)
5. 1ST LIM (68N6)
6. 2ND LIM (6AU6)
7. MULTIPLEX DET (68N6)
8. SUBCARRIER AMP (300C)
9. DOUBLER (300C)
10. AM-RF (68A6)
11. V5 AM-CONV (68E6)
12. V6 AM-CONV (68E6)
13. 6X4 AMP (6X4)
14. 6Y5 FILAMENT (6Y5)
15. 6X4 POWER (6X4)
16. SPEAKER (SPEAKER)

NOTES:

1. ALL VALUES UNLESS OTHERWISE SPECIFIED.

2. ALL VALUES ARE P.C. UNLESS OTHERWISE SPECIFIED.

3. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

4. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

5. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

6. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

7. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

8. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

9. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

10. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

11. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

12. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

13. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

14. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

15. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

16. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

17. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

18. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

19. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

20. ALL COMPONENTS SHOWN IN THIS SCHEMATIC ARE STANDARD.

INDEX

Under each manufacturer's name, at left there are listed that make chassis and models in numerical order. The corresponding page number at right of each listing refers to the first page of the section dealing with such material.

<u>Admiral Corp.</u>	<u>Arvin, Cont.</u>	<u>Delco</u>	<u>Emerson, Cont.</u>	<u>G. E. Continued</u>	<u>Montgomery Ward</u>
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