

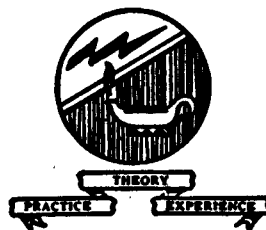
Most - Often - Needed

1961

Volume R-21

**RADIO
DIAGRAMS**

and Servicing Information



Compiled by

M. N. BEITMAN

SUPREME PUBLICATIONS



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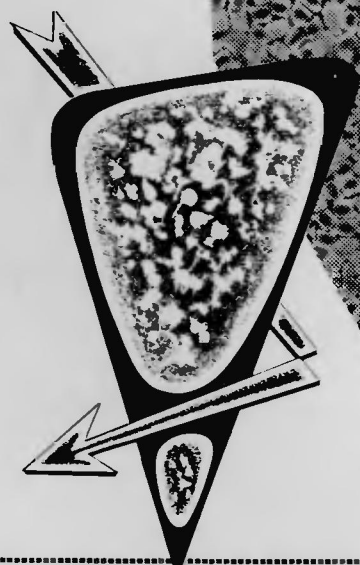


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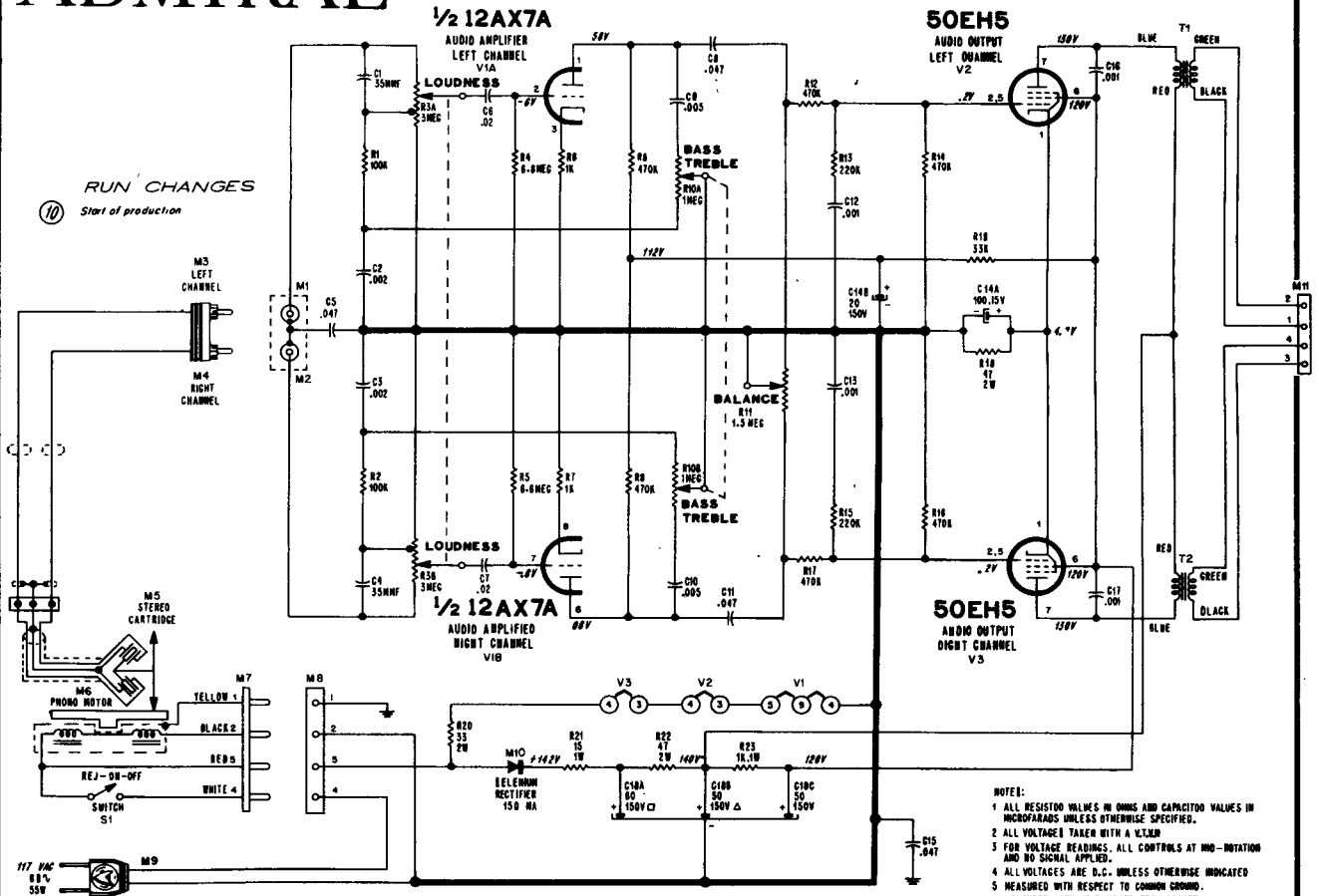
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<input type="checkbox"/> 1960 <input type="checkbox"/> 1959 <input type="checkbox"/> 1958 <input type="checkbox"/> 1957 <input type="checkbox"/> 1956 <input type="checkbox"/> 1955 Radio Manual, only \$2 <input type="checkbox"/> 1954 <input type="checkbox"/> 1953 <input type="checkbox"/> 1952 <input type="checkbox"/> 1951 <input type="checkbox"/> 1950 <input type="checkbox"/> 1949 <input type="checkbox"/> 1948 <input type="checkbox"/> 1947 <input type="checkbox"/> 1946 <input type="checkbox"/> 1942 <input type="checkbox"/> 1941 <input type="checkbox"/> 1948 <input type="checkbox"/> 1926-1938 Manual, \$2.50 <input type="checkbox"/> Simplified Servicing, \$1.50	Popular RADID Diagram Manuals at only \$2.50 each These annual RADIO volumes specially priced at only \$2.50 each THIS GROUP ONLY \$2 EACH	Rush today TV manuals checked <input checked="" type="checkbox"/> below and Radio manuals at left. Satisfaction guaranteed. <input type="checkbox"/> New 1961 TV Manual, \$3. <input type="checkbox"/> 1960 TV, \$3. <input type="checkbox"/> Additional 1959 TV, \$3. <input type="checkbox"/> Early 1959 TV, \$3. <input type="checkbox"/> 1958 TV Manual, \$3. <input type="checkbox"/> Additional 1957 TV, \$3. <input type="checkbox"/> Early 1957 TV, \$3. <input type="checkbox"/> 1956 TV Manual, \$3. <input type="checkbox"/> Additional 1955 TV, \$3. <input type="checkbox"/> Early 1955 TV, \$3. <input type="checkbox"/> 1954 TV, \$3. <input type="checkbox"/> 1953 TV, \$3. <input type="checkbox"/> 1952 TV, \$3. <input type="checkbox"/> 1951 TV, \$3. <input type="checkbox"/> 1957-58 RCA TV Manual, \$1.50 <input type="checkbox"/> New Television Servicing Course, complete...\$3. <input type="checkbox"/> I am enclosing \$..... Send postpaid. <input type="checkbox"/> Send C.O.D. I am enclosing \$..... deposit.
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ADMIRAL CHASSIS 3N1A, MODELS Y4049, Y4071, Y4072, Y4073



Schematic of 3N1A Stereophonic High Fidelity Amplifier Stamped Run 10.

- NOTE:
- 1 ALL RESISTOR VALUES IN OHMS AND CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 - 2 ALL VOLTAGE TAKEN WITH A VT-30M
 - 3 FOR VOLTAGE READINGS, ALL CONTROLS AT MID-POSITION AND NO SIGNAL APPLIED.
 - 4 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE INDICATED
 - 5 MEASURED WITH RESPECT TO COMMON GROUND.
 - 6 MEASURED WITH V3 REMOVED FROM SOCKET.
 - 7 MEASURED WITH V1 AND V2 REMOVED FROM SOCKET.
- ⊕ CHASSIS GROUND ⊖ COMMON GROUND

RUN 11 In All Sets

To improve performance (tonal quality) at low volume level, resistors R1 and R2 were changed from 100,000 ohms to one megohm, one-half-watt.

CHASSIS REMOVAL

Model Y4049: Remove the metal grille by removing the screws along the top and side of the grille.

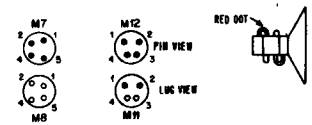
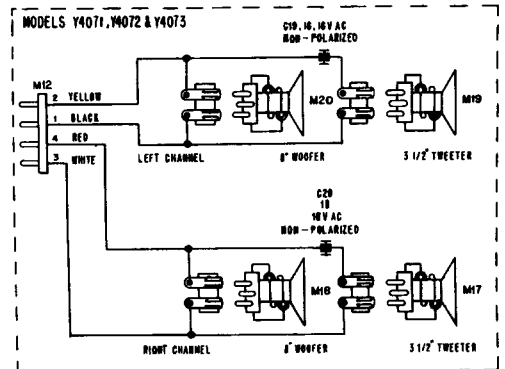
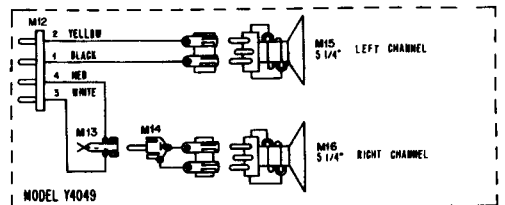
Disconnect the phono motor plug (M7), the two channel input plugs (M3 and M4), and speaker plug (M12). Remove the three control knobs by pulling them straight out from the control shafts.

Remove the screws holding the phono motor board. Lift the board with the record changer out of cabinet. To avoid marring the cabinet or damaging the record changer, do not allow the bottom of the record changer to scrape across the cabinet when removing.

Remove the four nuts holding the chassis to the cabinet. Remove chassis from cabinet.

Models Y4071, Y4072 and Y4073: Disconnect the phono motor plug (M7), the two channel input plugs (M3 and M4), and speaker plug (M12). Remove the three control knobs by pulling them straight out from the control shafts.

Remove the four nuts holding the chassis to the cabinet. Remove chassis from cabinet.



ADMIRAL

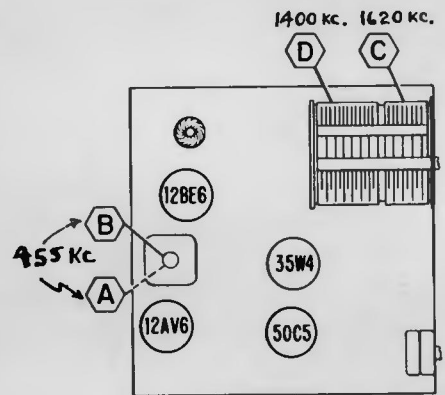
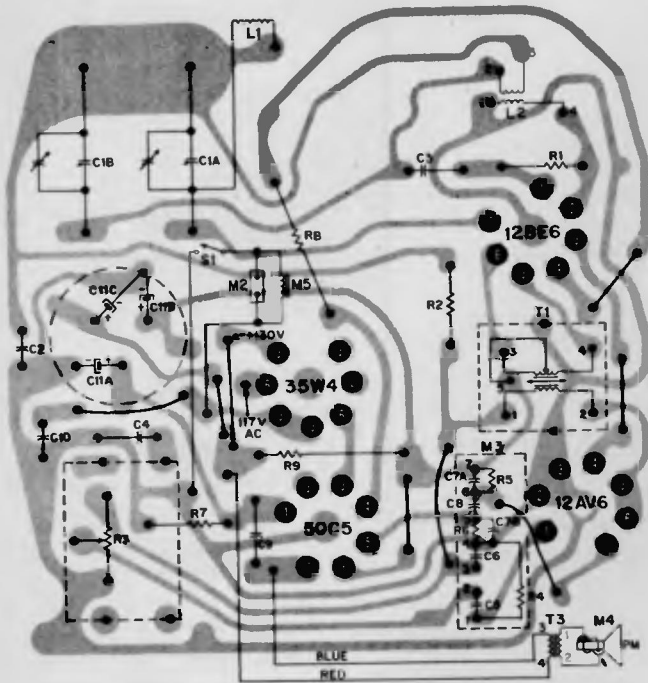
TABLE CLOCK RADIO

MODEL	COLOR	CHASSIS
Y1189A	Grey-Green	4E3A

CLOCK RADIO

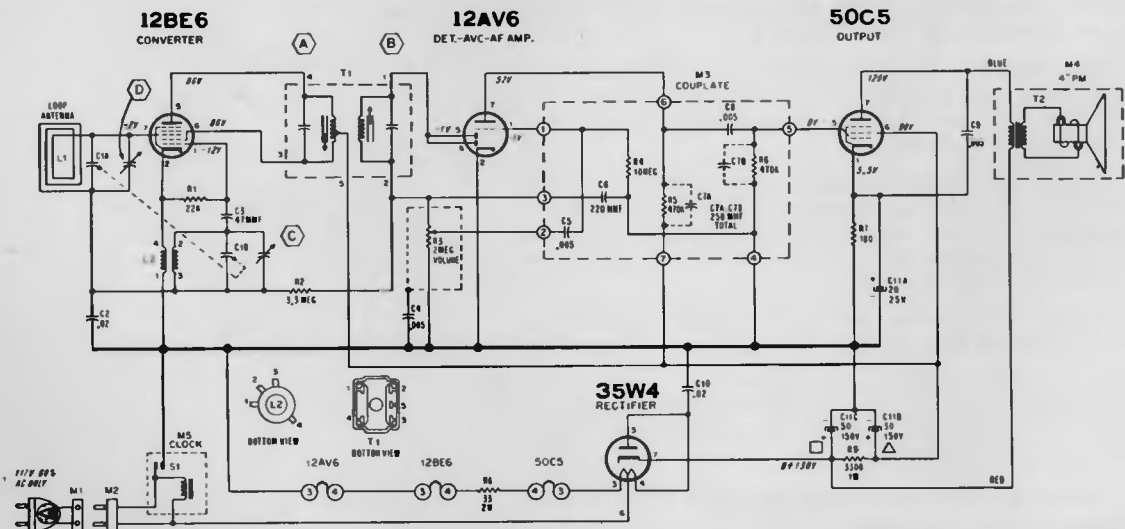
MODEL	COLOR	NAME	CHASSIS
Y3037	Beige and White	Sinclair	4N3
Y3038	Turquoise and White		

The tube complement, tube locations and etched wiring board of the 4N3 chassis, is identical to that of the 4E3A chassis.



Tube and Alignment Point Locations.

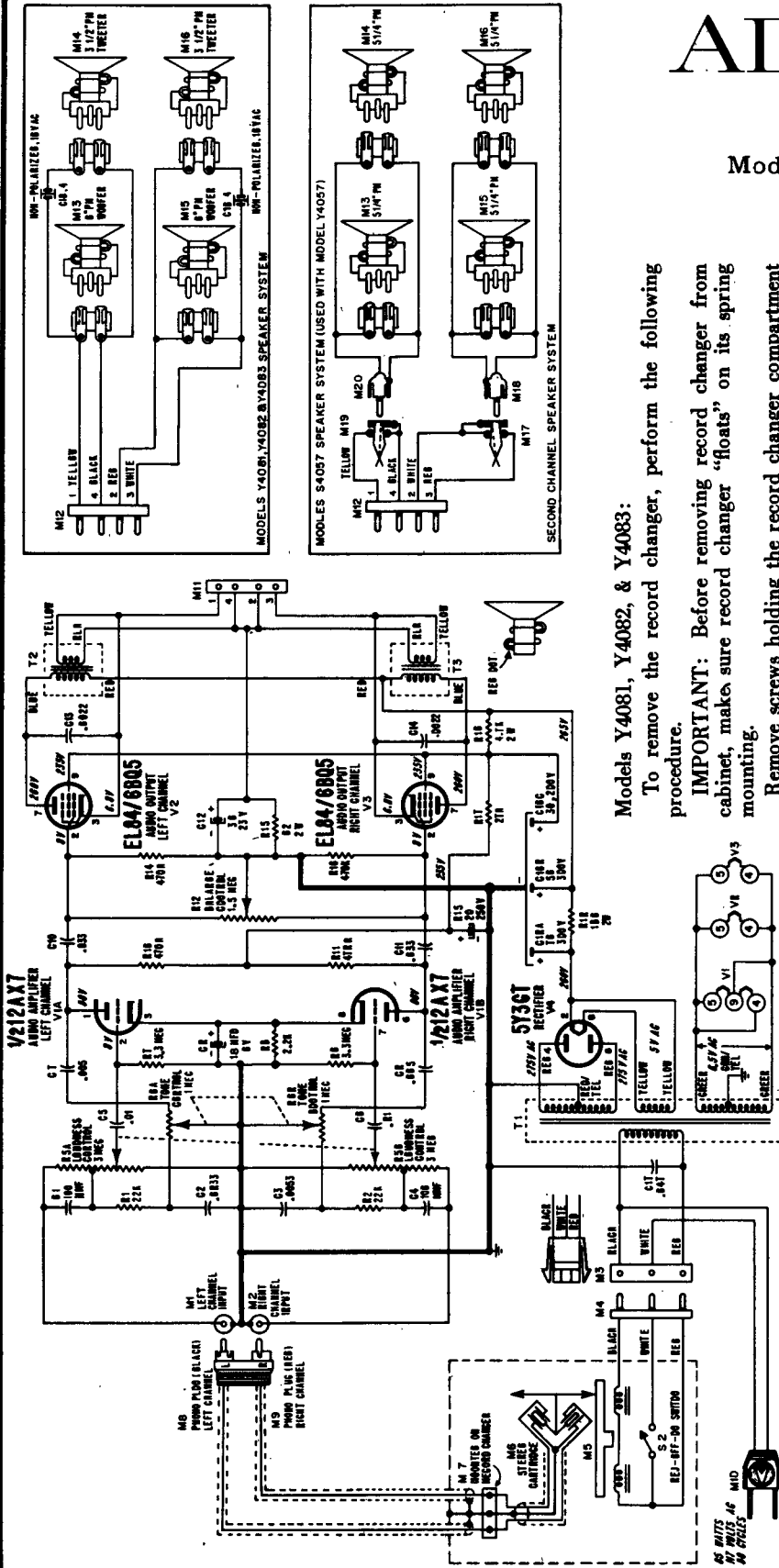
Rear View of Etched Circuit Board, Used in 4E3A Chassis.



ADMIRAL

Chassis 4F3A

Models Y4057, Y4081,
Y4082, and Y4083



Models Y4081, Y4082, & Y4083:

To remove the record changer, perform the following procedure.

IMPORTANT: Before removing record changer from cabinet, make sure record changer "floats" on its spring mounting.

Remove screws holding the record changer compartment panel back and record changer bottom cover.

Speed clips (at bottom of each changer hold down screw) extend through holes in panel under changer. Press clip until it is perpendicular to the changer pan. Remove changer from cabinet for servicing. Disconnect all leads.

CHASSIS REMOVAL

- Disconnect line cord.
- Remove three (3) amplifier control knobs. (Pull knobs straight off from control shafts.)
- Remove record changer compartment back panel by removing screws. Lift out panel.
- Disconnect changer phono output plug, speaker and changer power plug.
- Remove two hexnuts to dismount interlock plug.
- Remove four hexnuts mounting the chassis.
- Lift entire assembly carefully from cabinet.

CHANGER REMOVAL

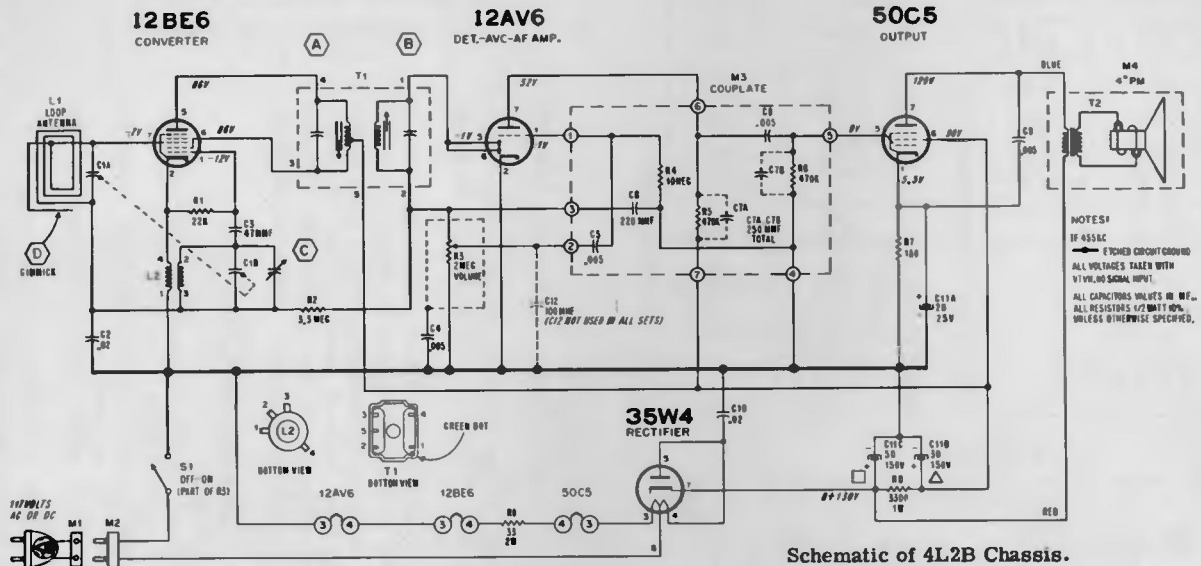
- Model Y4057:
- Disconnect line cord. Remove record changer compartment back panel by removing five (5) screws. Lift out panel.
 - Remove six motor board mounting screws.
 - Disconnect changer phono output plug and changer power plug.
 - Remove changer and motor board from cabinet.

- NOTES
1. ALL RESISTOR VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
 2. ALL CAPACITORS UNLESS OTHERWISE SPECIFIED.
 3. ALL VOLTAGE TERMINALS. ALL CAPACITORS AT 100V UNLESS OTHERWISE INDICATED.
 4. ALL VOLTAGES ARE R.M.S. UNLESS OTHERWISE INDICATED.
 5. MEASURED WITH RESPECT TO GROUND.
- * CHASSIS GROUND



Admiral

CHASSIS 4L2B, MODELS 4L26B, 4L27B, 4L28B, 4L29B



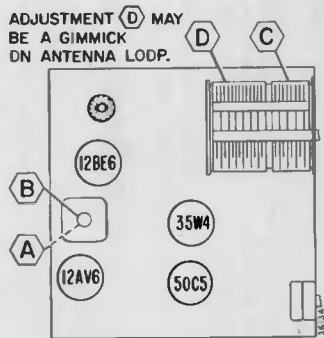
Schematic of 4L2B Chassis.

After start of production of the 4L2B chassis, two components were added to provide better shielding and better RF by-passing in the audio stages.

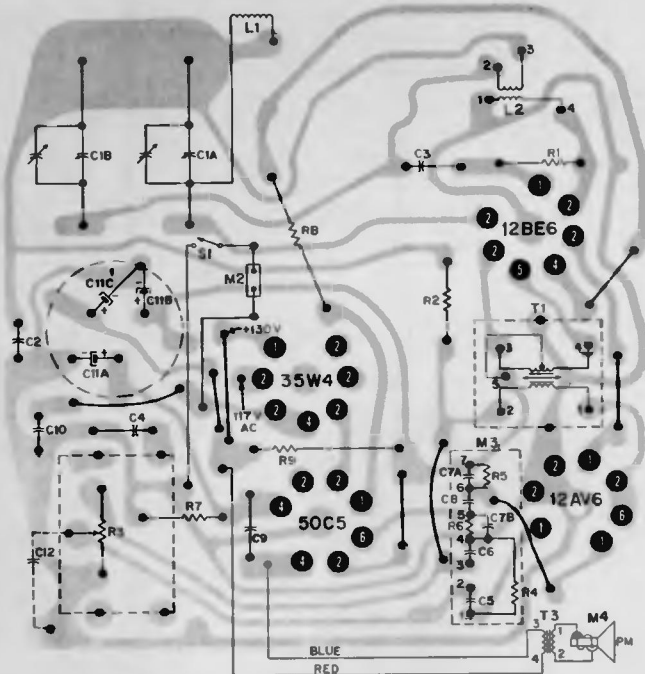
A metal shield (Admiral part number 15A2267-1) was installed over the audio couplate (M3) with one point soldered to pin No. 4 on the couplate. A 100 mmf capacitor (part number 65D10-154) was added from the center-tap of the volume control (R3) to the etched foil ground.

In some cases this capacitor was installed on the rear of the board and in other cases it was added on component side of board on the Volume control terminals.

The 4L2B chassis is a completely new design of the very popular 4L2 and 4L2A chassis.



Tube and Alignment Point Locations.



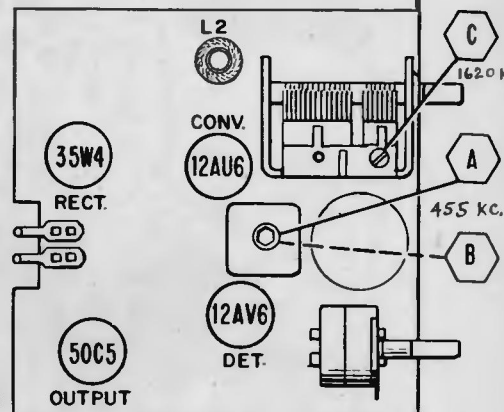
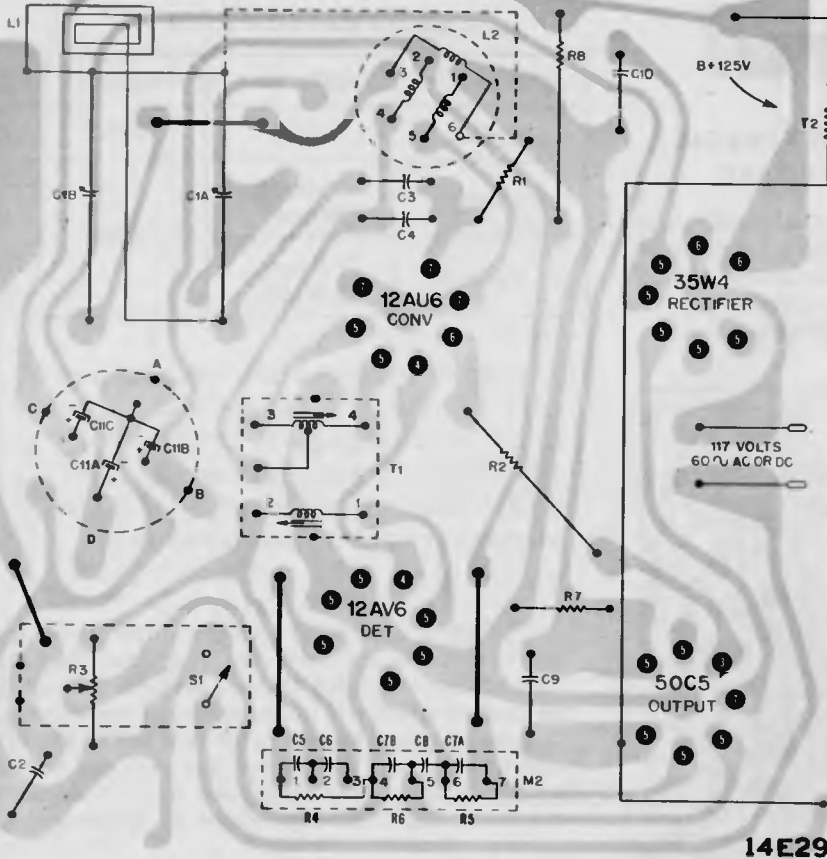
Rear View of Etched Circuit Board, Used in 4L2B Chassis.

ADMIRAL

CHASSIS 4P3

MODELS Y2993, Y2996,
Y2998, and Y2999.

Chassis 4P3A used in Clock
Model Y3037A is identical
except for clock.



14E293

Rear View of Etched Circuit Board. Gray Area represents etched wiring; black symbols and lines represent components and connections on opposite side.

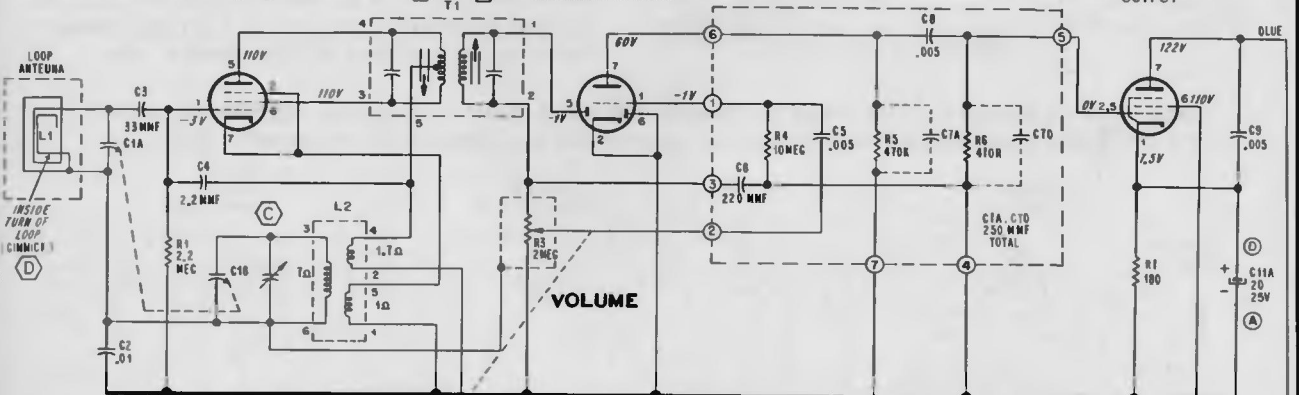
ALIGNMENT 1400 KC, **D** IS AN INSIDE TURN ON LOOP ANTENNA (GIMMICK)

12AU6 CONVERTER

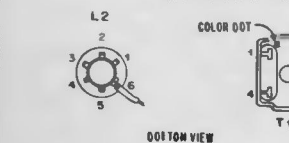
12AV6 DETECTOR-AMF.

M2 COUPLER

50C5 OUTPUT



UNLESS OTHERWISE INDICATED:
RESISTORS IN OHMS, 1/2 WATT, 10%
ALL CAPACITORS IN MF, 20%.



117V 60 \pm AC OR DC

OFF-ON

35W4 RECTIFIER

NOTES: IF=455KC.

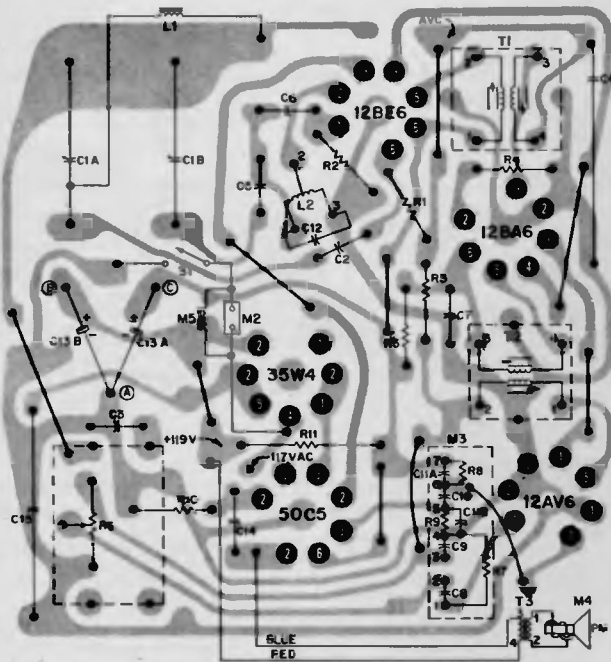
● ETCHED CIRCUIT GROUND.

ALL VOLTAGES TAKEN WITH RESPECT TO ETCHED CIRCUIT GROUND, WITH V1VW, NO SIGNAL, VOL. CONTROL MINIMUM.

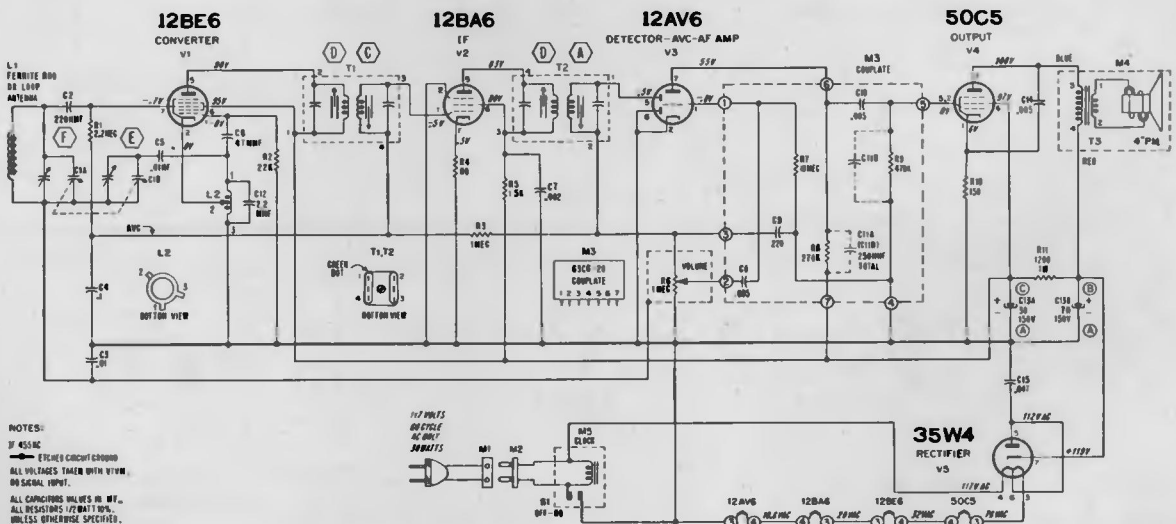
Admiral

CORRECTION IN COMPONENT SYMBOLS ON THE ETCHED CIRCUIT BOARD

In some chassis C3 is shown alongside the electrolytic capacitor (C13). This C3 should be deleted. C8 shown on opposite side of C13 should be read as C3. (C8 is part of couplate M3 and should therefore not show on the board.)



Rear View of Etched Circuit Board in Chassis 5B5B and 5B5C. Gray area represents etched wiring, black symbols and lines represent components and connections on opposite side.



Schematic of 5B5B and 5B5C Chassis.

TABLE CLOCK RADIO

MODEL	COLOR	CHASSIS
Y853C	White	5B5C
Y865B	Melon & White	5B5B
Y866B	Yellow & White	

Both 5B5B and 5B5C chassis are very similar to Chassis 5B5, which is covered on page 5, of Vol. 20, 1960 Radio Diagrams manual, and these instructions may be used for alignment and chassis removal.

The 5B5B and 5B5C chassis differ from the 5B5 chassis in the following respects: The RF input is now shunt fed to the converter to reduce the loading effect and noise pickup of the antenna. The tuning gang and oscillator coil have been redesigned and also the IF amplifier bias and screen bypassing have been increased to reduce, to a minimum, any tendency toward IF regeneration.

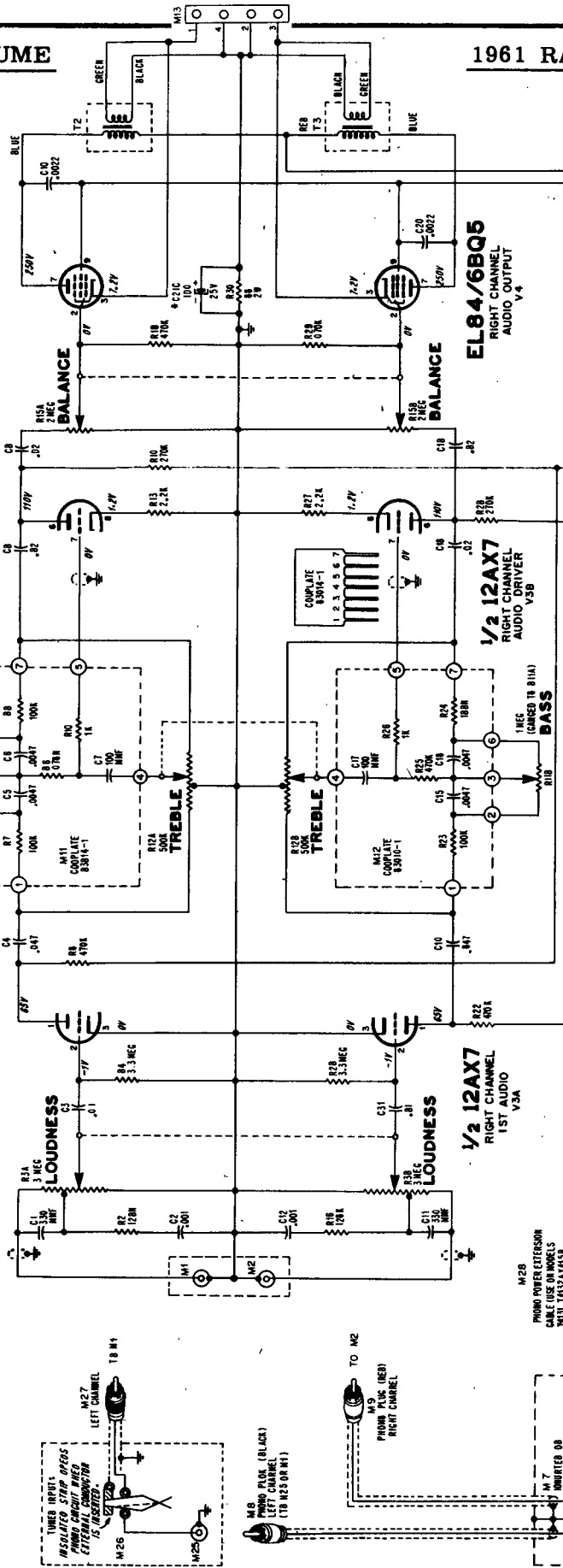
There are no electrical circuit differences between the 5B5B and 5B5C chassis. The 5B5B chassis is equipped with a clock having the Snooze Alarm and Sleep Switch features while the 5B5C clock does not. The etched circuit board has been changed to comply with the new circuit changes, plus a few relocations of components, etc.

ADMIRAL

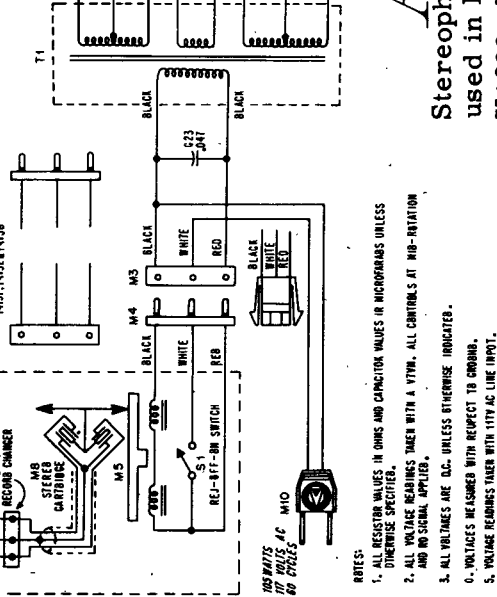
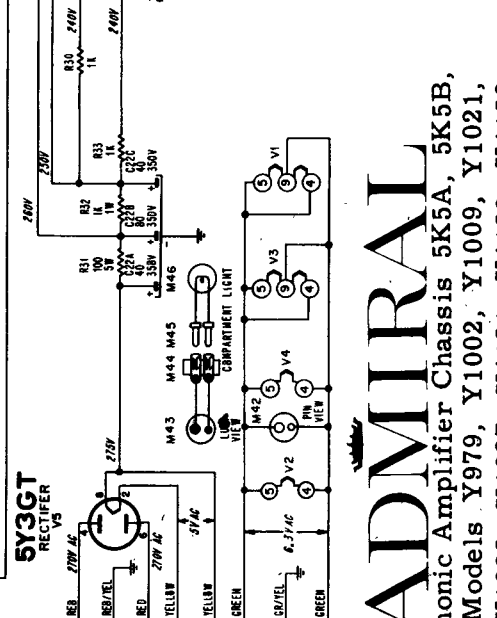
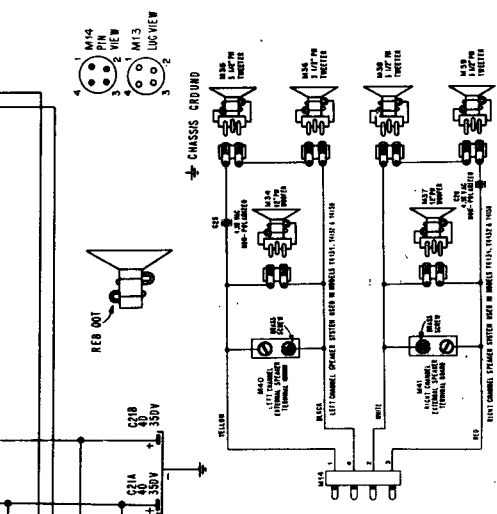
1/2 12AX7
LEFT CHANNEL
1ST AUDIO
V1A

1/2 12AX7
LEFT CHANNEL
AUDIO DRIVER
V1B

EL84/6BQ5
LEFT CHANNEL
AUDIO OUTPUT
V2



1961 RADIO SERVICING INFORMATION



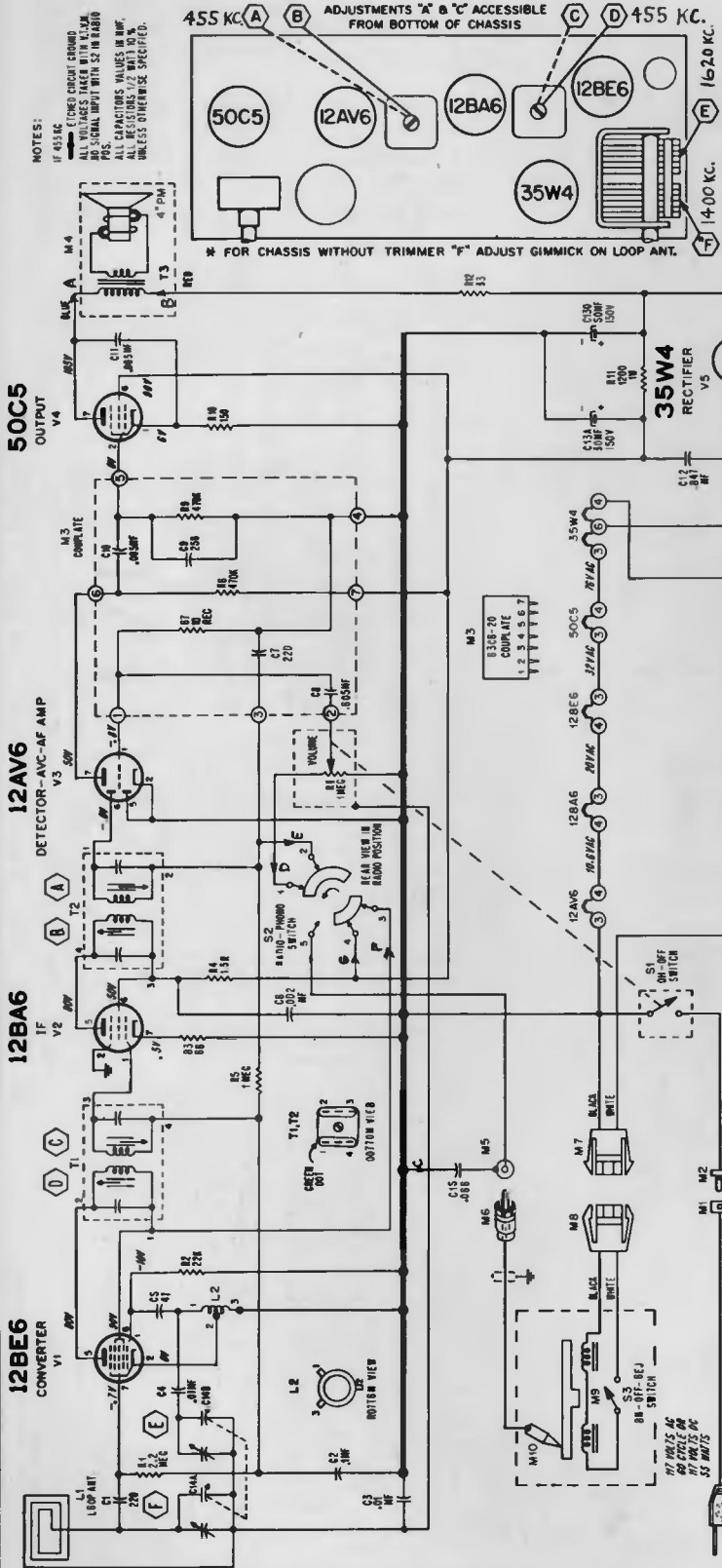
ADMIRAL

Stereophonic Amplifier Chassis 5K5A, 5K5B,
used in Models Y979, Y1002, Y1009, Y1021,
Y1022, Y1023, Y4067, Y4131, Y4132, Y4159

- NOTE:
1. ALL RESISTOR VALUES IN OHMS AND CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 2. ALL VOLTAGE READINGS TAKEN WITH A VTVM. ALL CONTROLS AT MID-RANGE AND NO SIGNAL APPLIED.
 3. ALL VOLTAGES ARE DC, UNLESS OTHERWISE INDICATED.
 4. VOLTAGES MEASURED WITH RESPECT TO GROUND.
 5. VOLTAGE READINGS TAKEN WITH 117V AC LINE INPUT.
 6. * C21C IN EARLY PRODUCTION WAS TWO SHRT IN PARALLEL.

Admiral

CHASSIS 5M5
MODEL Y4017

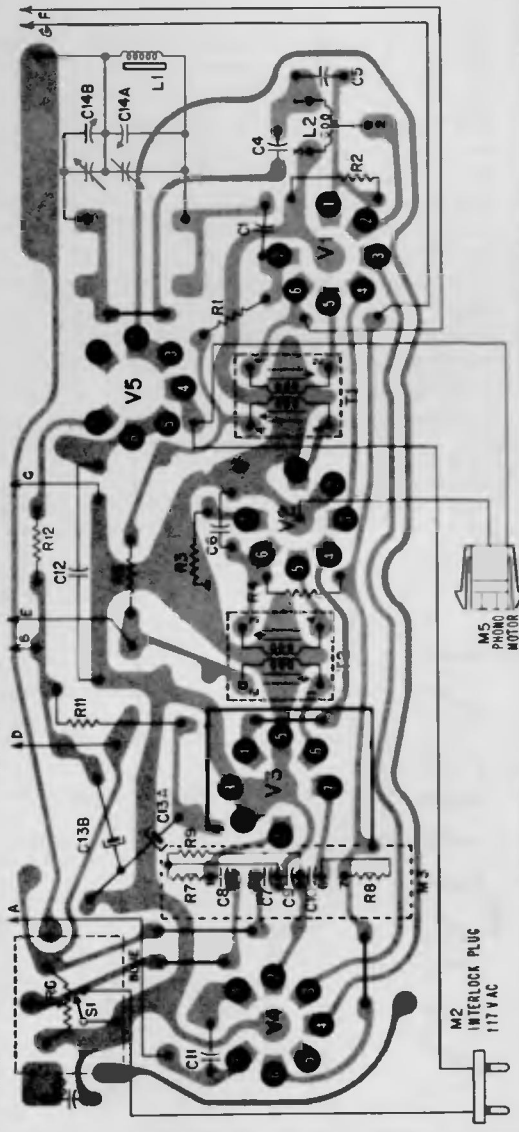


CHANGER REMOVAL

- Disconnect line cord. Remove record changer compartment back panel by removing five (5) screws. Lift out panel.
- Remove six motor board mounting screws.
- Disconnect changer phono output plug and changer power plug.
- Remove changer and motor board from cabinet.

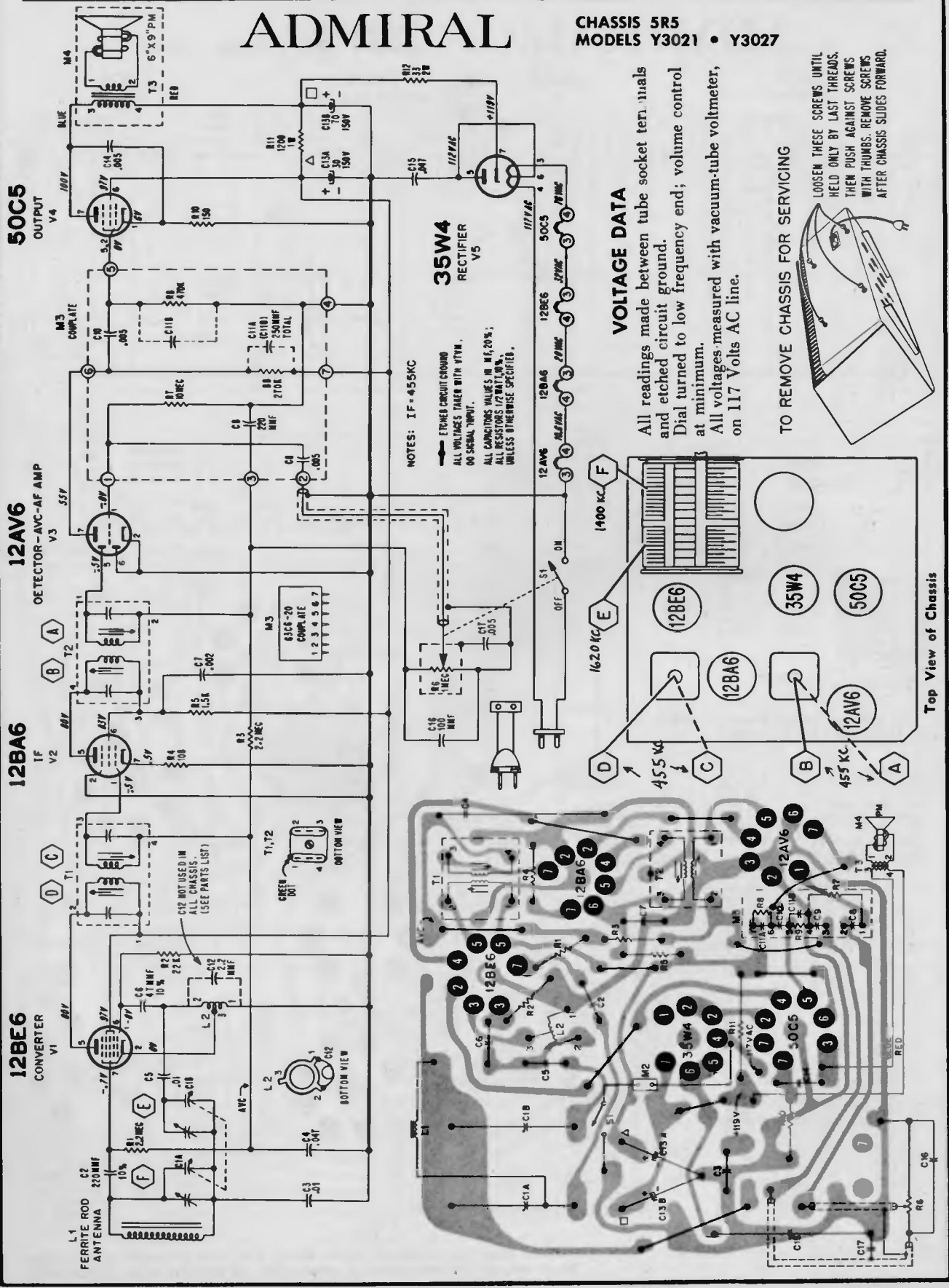
CHASSIS REMOVAL

- Remove three (3) amplifier control knobs. (Pull knobs straight off from control shafts.)
- Remove record changer compartment back panel by removing five (5) screws. Lift out panel.
- Disconnect changer phono output plug and changer power plug.
- Remove two hexnuts to dismount speaker.
- Remove two hexnuts to dismount interlock plug.
- Remove four (4) hexnuts mounting the chassis; located on the antenna mounting board.
- Lift entire assembly carefully from cabinet.



ADMIRAL

CHASSIS 5R5
MODELS Y3021 • Y3027

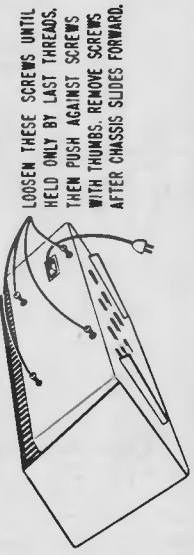


VOLTAGE DATA

All readings made between tube socket terminals and etched circuit ground.
Dial turned to low frequency end; volume control at minimum.
All voltages measured with vacuum-tube voltmeter, on 117 Volts AC line.

NOTES: IF = 455KC
 — TRIMMER CIRCUIT GROUND
 ALL VOLTAGES TAKEN WITH V-TVM,
 ON SIGNAL INPUT.
 ALL CAPACITOR VALUES IN μ F, 20%;
 ALL RESISTOR VALUES IN Ω , 10%,
 UNLESS OTHERWISE SPECIFIED.

TO REMOVE CHASSIS FOR SERVICING

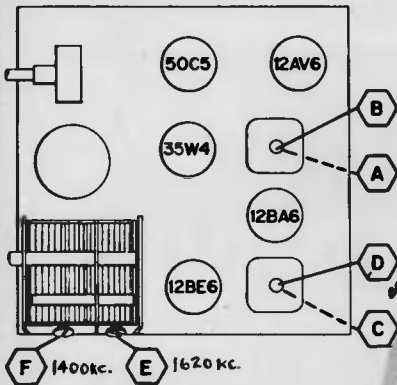
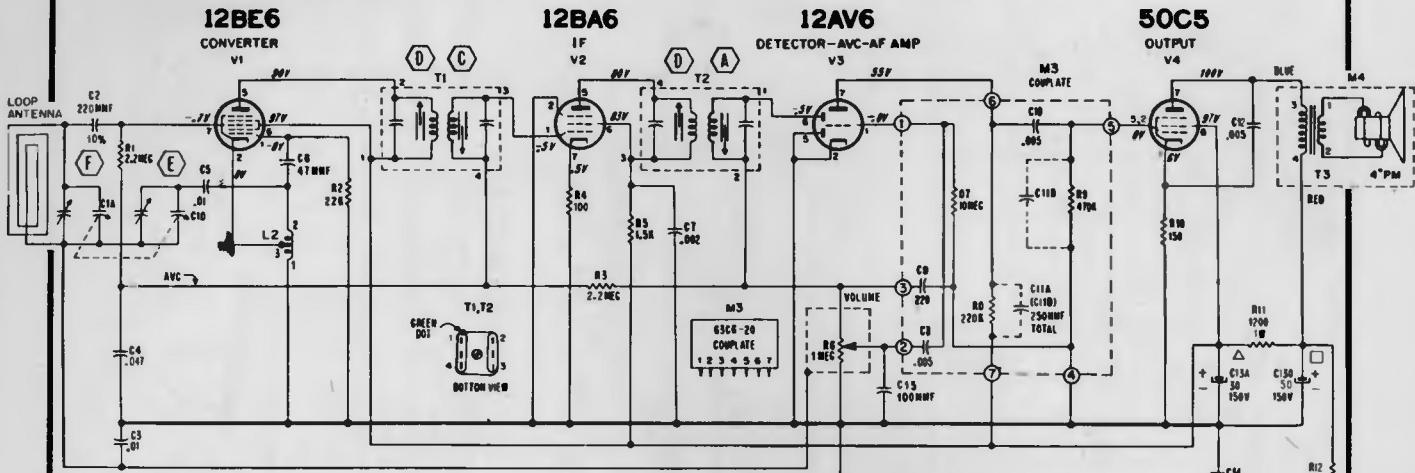


Top View of Chassis

Rear View of Etched Circuit Board. Gray area represents etched wiring; black symbols and lines represent components and connections on opposite side.

ADMIRAL

CHASSIS 555
MODELS Y3046 - Y3048 - Y3049

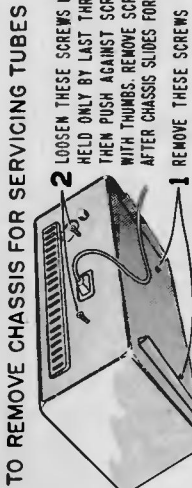


Top View of Chassis Showing Tube and Alignment Point Locations.

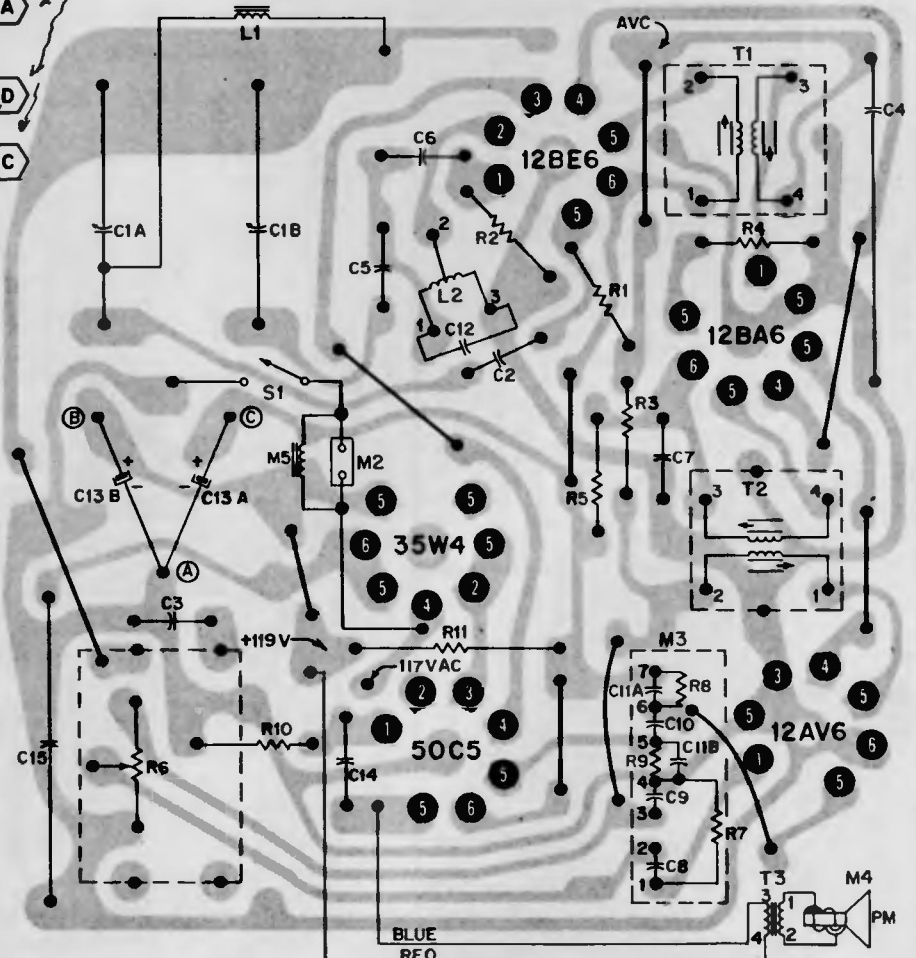
NOTES: IF = 455KC

ETCHED CIRCUIT BOARD
ALL VOLTAGES TAKEN WITH VTVM.
NO SIGNAL INPUT.

ALL CAPACITORS VALUES IN MF, 20%;
ALL RESISTORS 1/2WATT, 10%
UNLESS OTHERWISE SPECIFIED.



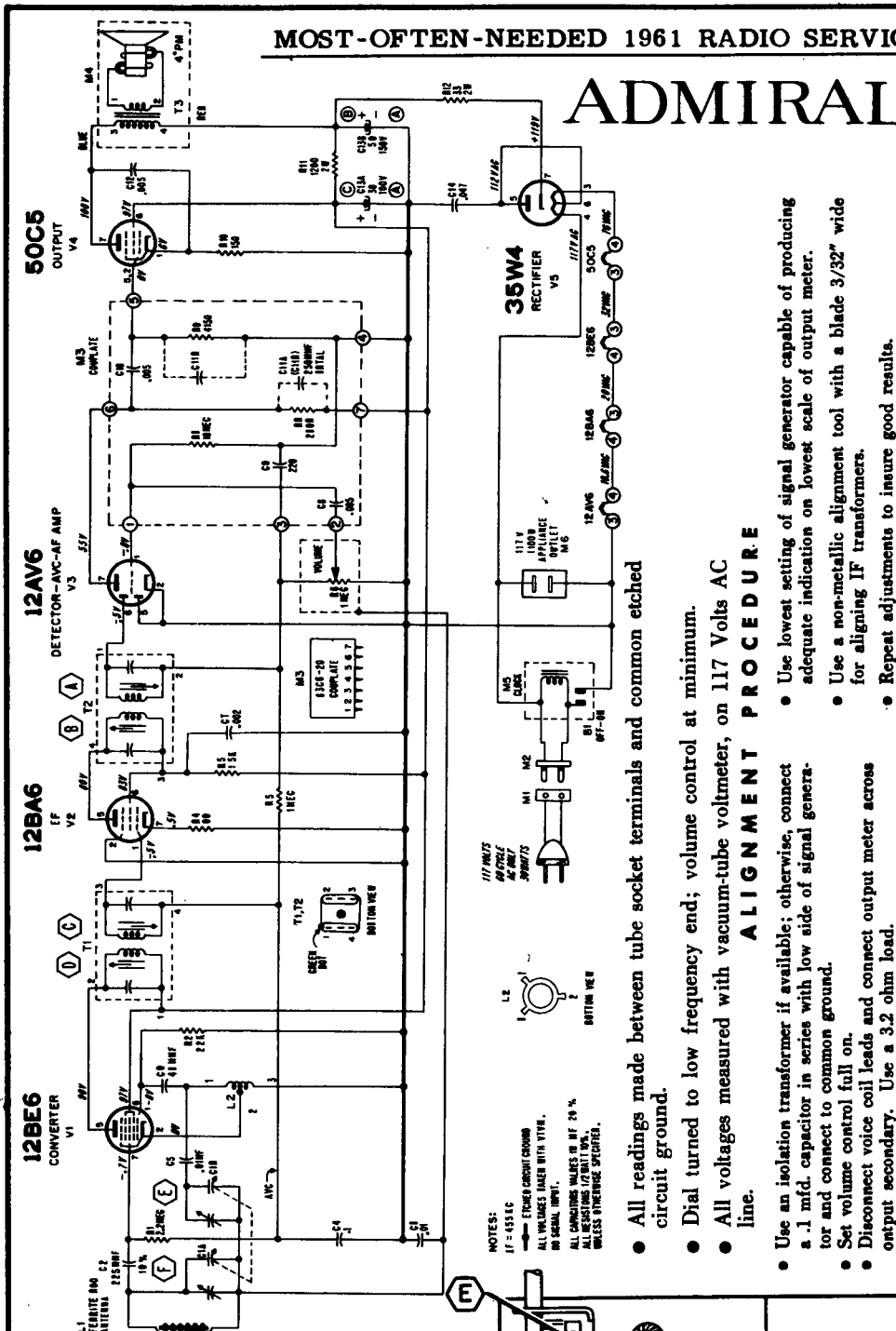
Rear View of Cabinet Showing Chassis Mounting Screws.



Rear View of Etched Circuit Board. Gray area represents etched wiring; black symbols and lines represent components and connections on opposite side.

ADMIRAL

CHASSIS 5T5 // - Y3058
MODELS Y3051 - Y3053



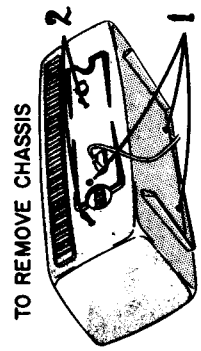
NOTES:
IF = 455 KC
EITHER CIRCUIT CROWN
ALL VALUES GIVEN WITH
NO SERIAL IMPED.
ALL CONDENSER VALUES IN P.P. %
ALL RESISTOR VALUES IN OHMS,
UNLESS OTHERWISE SPECIFIED.

- All readings made between tube socket terminals and common etched circuit ground.
- Dial turned to low frequency end; volume control at minimum.
- All voltages measured with vacuum-tube voltmeter, on 117 Volts AC line.

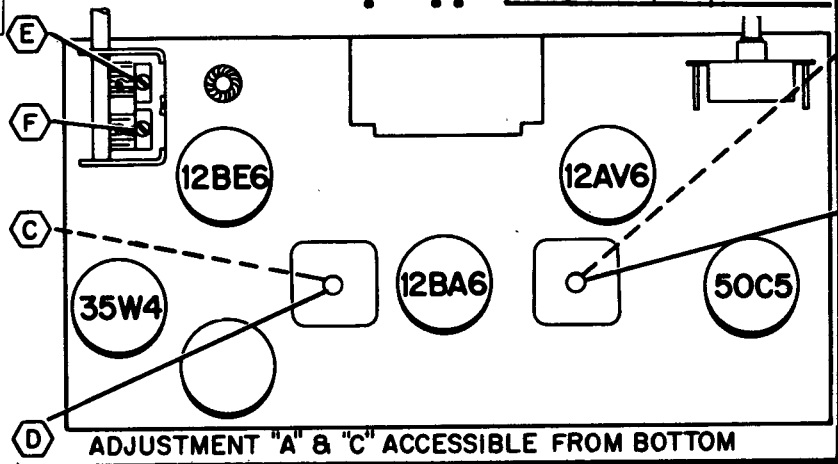
ALIGNMENT PROCEDURE

- Use an isolation transformer if available; otherwise, connect a .1 mfd. capacitor in series with low side of signal generator and connect to common ground.
- Set volume control full on.
- Disconnect voice coil leads and connect output meter across output secondary. Use a 3.2 ohm load.
- Use lowest setting of signal generator capable of producing adequate indication on lowest scale of output meter.
- Use a non-metallic alignment tool with a blade 3/32" wide for aligning IF transformers.
- Repeat adjustments to insure good results.

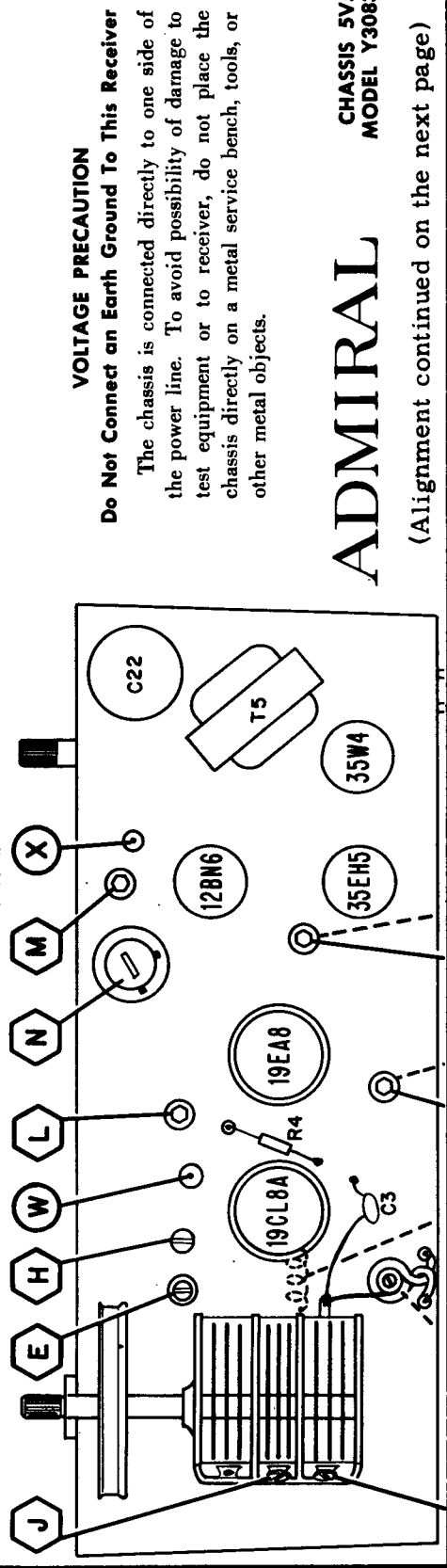
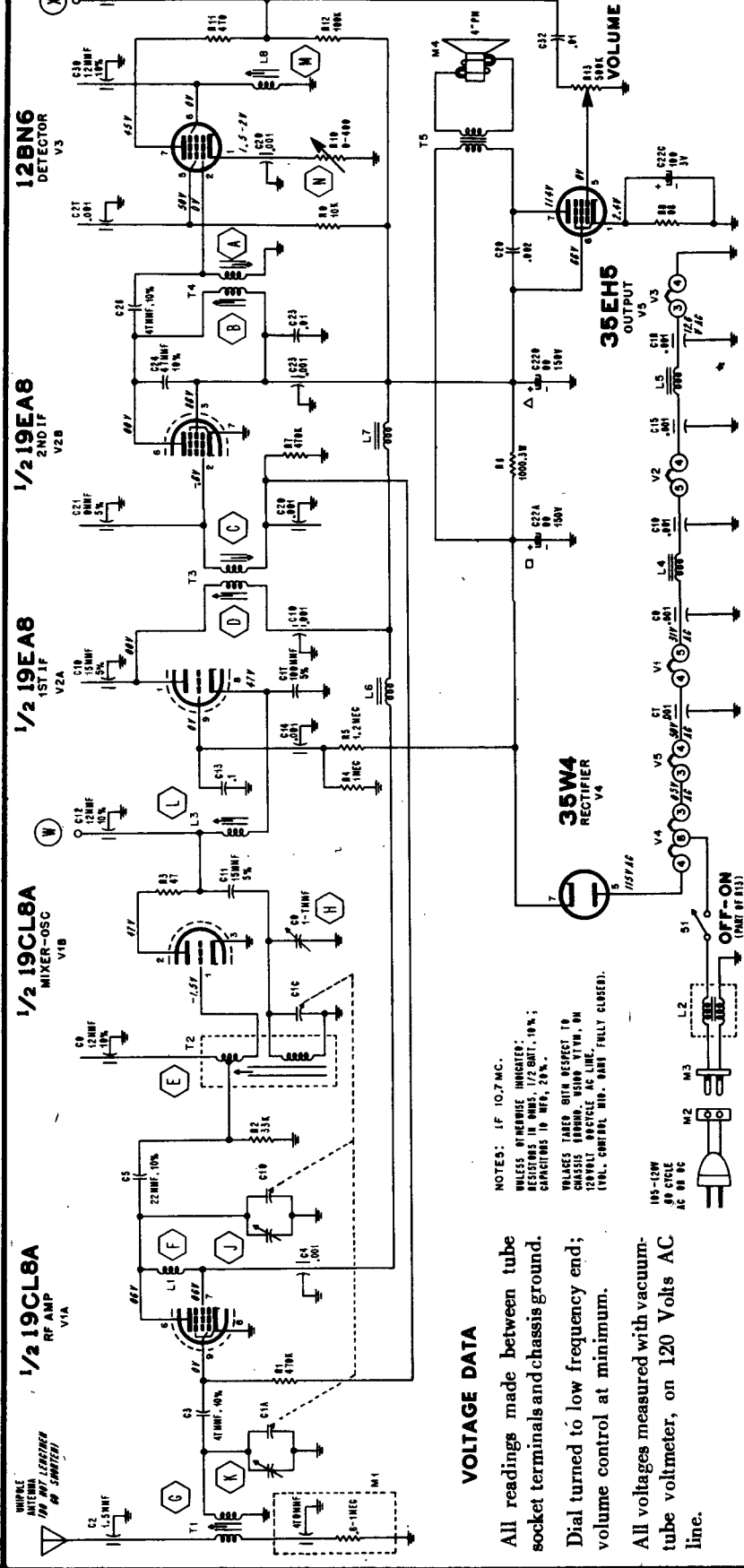
STEP	CONNECTION OF SIGNAL GENERATOR	SIGNAL GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENTS
1	Through .1 mf capacitor to stator, Antenna section of gang tuning capacitor	455 KC	Gang fully open	"A", "B", "C" and "D" for maximum output
2	Same as "STEP 1"	1620 KC	Gang fully open	"E" for maximum output
3	Use a radiated signal. Loop of several turns of wire, or piece generator lead close to ferrite antenna for adequate signal pickup.	1400 KC	Tune in on generator signal	"F" for maximum output



- 1 REMOVE THESE SCREWS
- 2 LOOSEN THESE SCREWS UNTIL HELD ONLY BY LAST THREADS THEN PUSH AGAINST SCREWS WITH THUMBS. REMOVE SCREWS AFTER CHASSIS SLIDES FORWARD



ADJUSTMENT "A" & "C" ACCESSIBLE FROM BOTTOM



VOLTAGE DATA

All readings made between tube socket terminals and chassis ground. Dial turned to low frequency end; volume control at minimum.

All voltages measured with vacuum-tube voltmeter, on 120 Volts AC line.

NOTES: IF 10.7 MC. UNLESS OTHERWISE INDICATED, RESISTORS IN OHMS, 1/2 WATT, 10%; CAPACITORS IN MFD, 20%. VOLTAGES TAKEN WITH RESPECT TO CHASSIS GROUND. 120 VOLT, 60 CYCLE AC LINE (VOL. CONTROL MIN. PART FULLY CLOSED).

VOLTAGE PRECAUTION
 Do Not Connect an Earth Ground To This Receiver
 The chassis is connected directly to one side of the power line. To avoid possibility of damage to test equipment or to receiver, do not place the chassis directly on a metal service bench, tools, or other metal objects.

ADMIRAL
 CHASSIS 5V5
 MODEL Y3083
 (Alignment continued on the next page)

ADMIRAL

CHASSIS 5V5, MODEL Y3083 Alignment Procedure, Continued

ALIGNMENT USING AM. SIGNAL GENERATOR AND VTVM

- Allow set and test equipment to warm up for approximately 15 minutes before alignment.
 - Use an isolating transformer or insert a .01 mfd capacitor in series with the high side of signal generator. **DO NOT CONNECT AN EARTH GROUND TO THIS RECEIVER.**
 - Connect a short wire jumper from the center point of C30 to chassis. (To short L8 to chassis ground.)
 - Set signal generator for 400 or 1000 cycle modulation, 30%. Set volume control full on. Keep signal generator output low to prevent overloading.
 - Turn bias control, (R10) to full counterclockwise position (maximum bias point).
 - Connect the VTVM across output transformer secondary (voice coil leads). Use the 1.5 volt AC scale for output readings.
- NOTE: If available, a commercial output meter is more desirable for this purpose. Disconnect voice coil leads and use a 3.2 ohm load.
- Use nonmetallic alignment tools. Use hex tool (Admiral part no. 98A30-7) for transformer adjustment slugs.

STEP	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENT FOR MAXIMUM
1	Test Point W (Center Point of C12)	10.7 MC	Fully open	A, B, C, and D
2	Set trimmers J and K one turn from tight. Set adjustment screw (H) 1/2 inch above chassis.			
3	Antenna. (Center point of C2 through 75 ohm resistor.)	87.5 MC	Fully closed (set indicator dial on end mark)	E, *F, and G
4	Same as step 3	108 MC	108 MC	H, J, K and L
5	Same as step 3	87.5 MC	Fully closed	Touch-up E
6	Same as step 3	108 MC	108 MC	Touch-up H, J and K
7	a. Set up equipment as in step 1 above. b. Remove short across L8 and adjust M for maximum output. c. Adjust N (R10, starting from full clockwise position) to the first point of maximum sound. Use weakest signal possible.			
7 op.	OPTIONAL METHOD FOR STEP 7 a. Disconnect signal generator from receiver. b. Remove wire jumper from across L8 (C30 to chassis ground). c. Tune in a very weak signal, or reduce signal level, until a strong hiss is heard in the sound. (If necessary coil up antenna in a ball or short antenna lead to chassis or both.) d. Adjust M (quadrature coil, L8) for maximum output. e. Adjust N (R10) for maximum output and clearest tone.			

IF ALIGNMENT CHECK USING SWEEP GENERATOR AND OSCILLOSCOPE

- a. Use the same equipment setup as in step 1 but add the oscilloscope (vert. input) connected to test point "X".
- b. Use a wideband sweep, unmodulated for response check, except the final adjustment given in step e.
- c. Sweep generator signal injected at the same points as given in steps above.
- d. Oscilloscope pattern should be a typical response curve. Adjust as in step 1 for best symmetry as well as maximum gain.
- e. Final Adjustment: With generator connected as in step 4, and dial set to 108 MC; use ±75 KC sweep and 400 cycle modulation. Remove short from across L8. Adjust M and N for maximum output, using minimum signal input.

*Coil (L3) is adjusted by squeezing or spreading turns of the coil.

CHASSIS REMOVAL

To remove the chassis from the cabinet it is necessary to remove only the rear cabinet section, since the front panel and knobs are attached to the chassis.

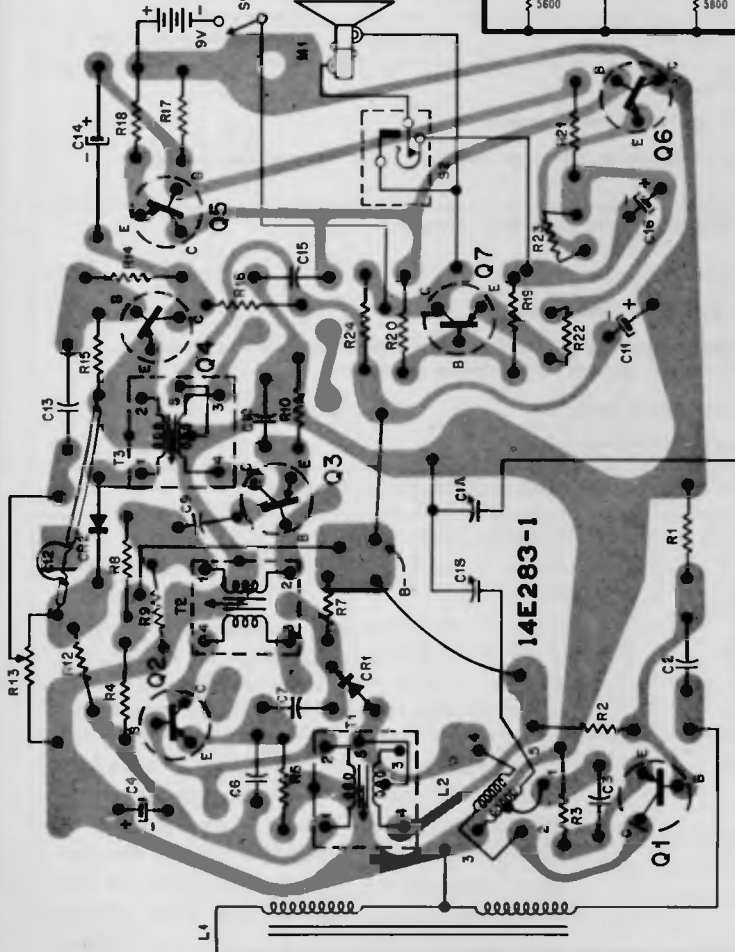
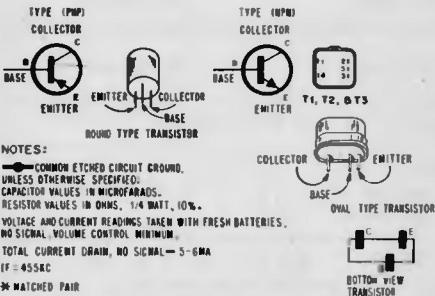
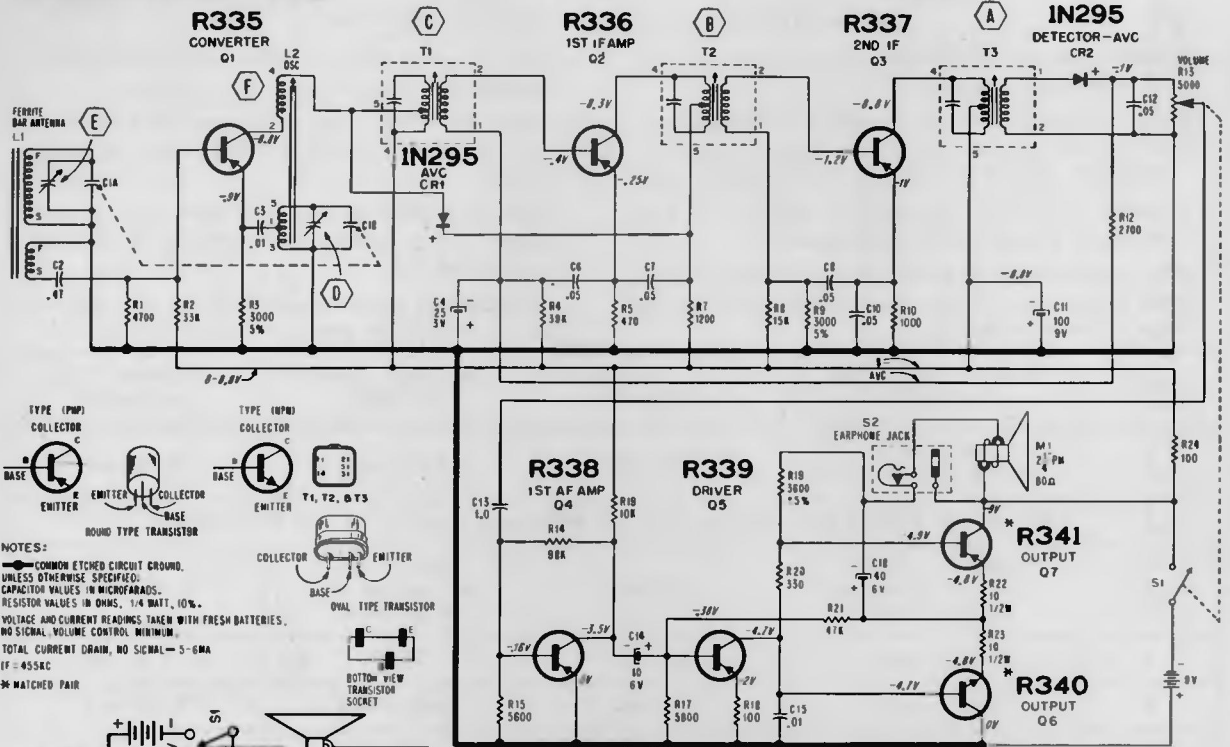
1. Turn set bottom side up and using a screw driver,

force chassis forward by pushing on the front panel section visible through the elongated chassis mounting holes. A small elevation is provided on the section of the panel inside this slot for this purpose. After the AC interlock connection has been broken, the chassis with the front panel attached will slide forward easily and out of the rear section.

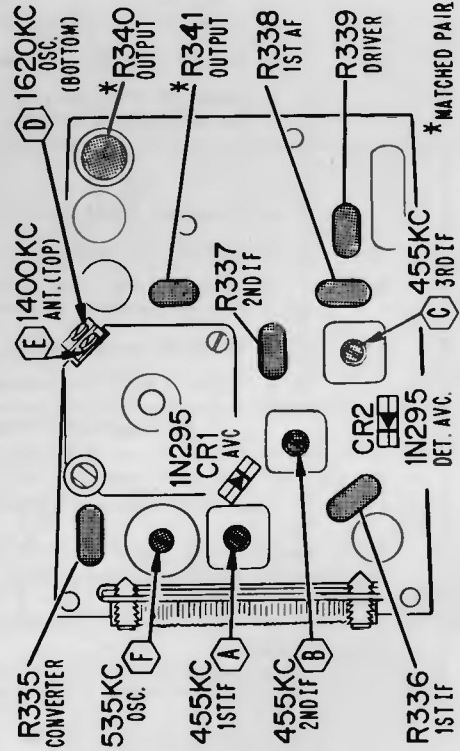
Admiral

CHASSIS 7A2

MODELS Y2061 · Y2063 · Y2067 · Y2068



Rear View of Etched Circuit Board. Gray area represents the etched wiring; block symbols and lines represent components and connections on opposite side.



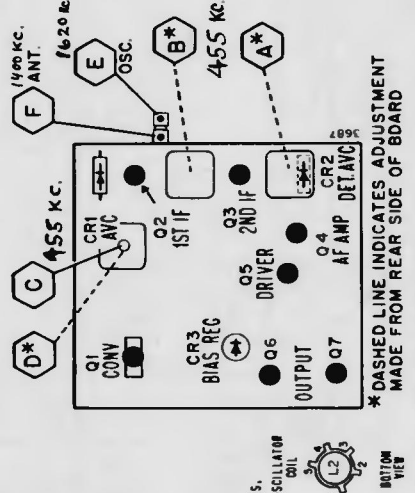
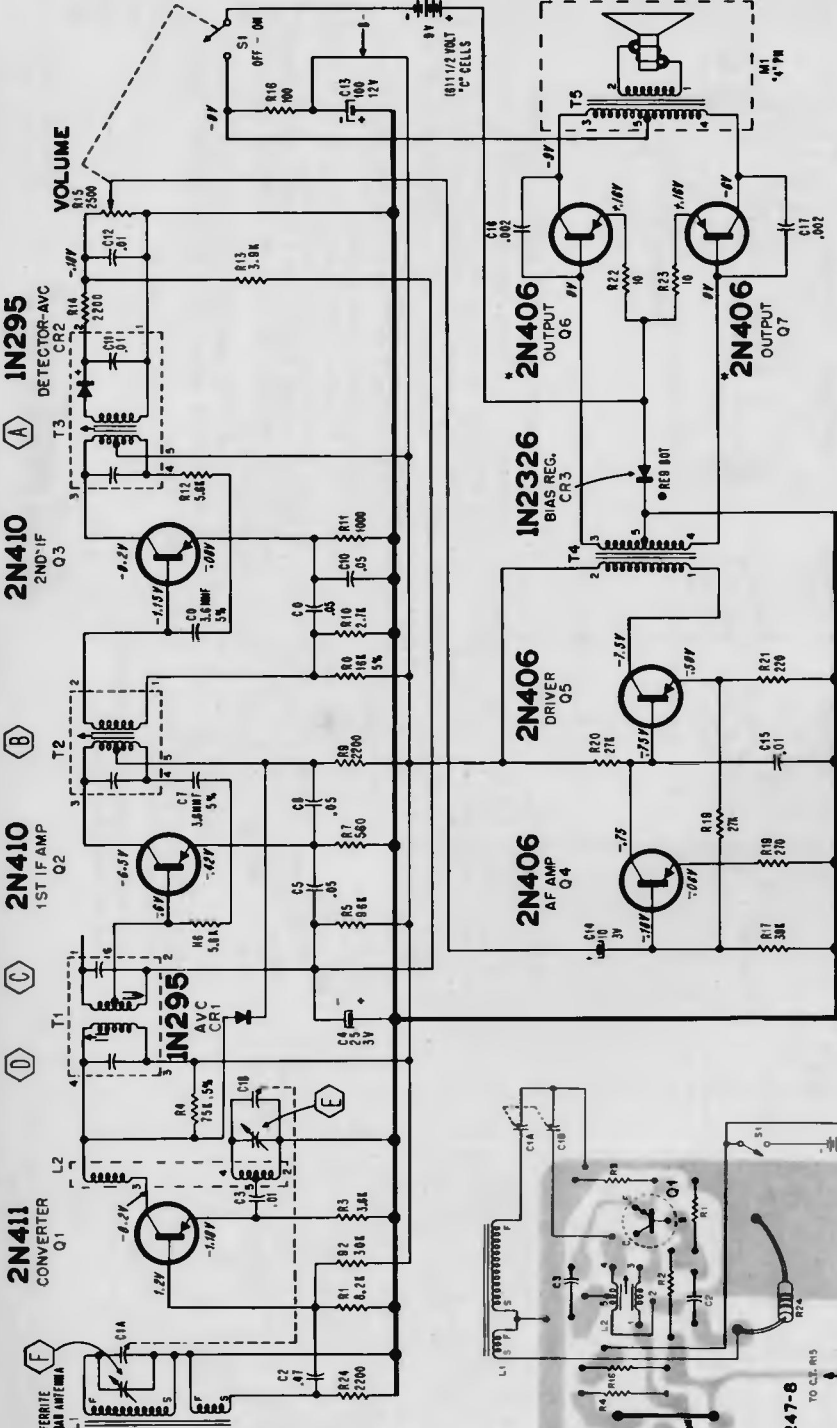
REMOVING CHASSIS FROM CABINET

Remove the three Phillips head screws securing the etched circuit board to the front case.

Transistor and Alignment Point Locations

Admiral

CHASSIS 7D2
MODEL Y2119



TRANSISTOR TYPE (MPP)
 C: COLLECTOR
 B: BASE
 E: EMITTER
 W: WIRE IN TYPE TRANSISTOR

NOTES: IF = 455 KC
 * COMMON ETCHED CIRCUIT BOARD UNLESS OTHERWISE SPECIFIED
 CAPACITOR VALUES IN MICROFARADS
 RESISTOR VALUES IN OHMS, 1/2, 10, 100, 1K, 10K, 100K, 1M
 VOLTAGE READINGS TAKEN WITH VOLUME USING FRESH BATTERIES, NO SIGNAL, VOLUME CONTROL, MINIMUM
 TOTAL CURRENT DRAIN TWO SIGNALS = 10-12 MA
 8V ANY GROUNDING

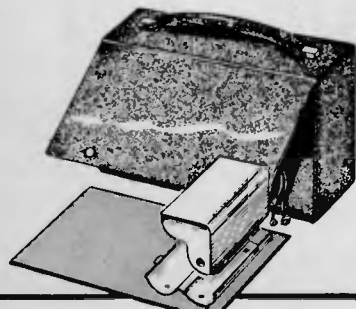
COLOR CODES
 1: BROWN
 2: RED
 3: ORANGE
 4: YELLOW
 5: GREEN
 6: BLUE
 7: VIOLET
 8: BLACK

8: SWITCHED PAIR

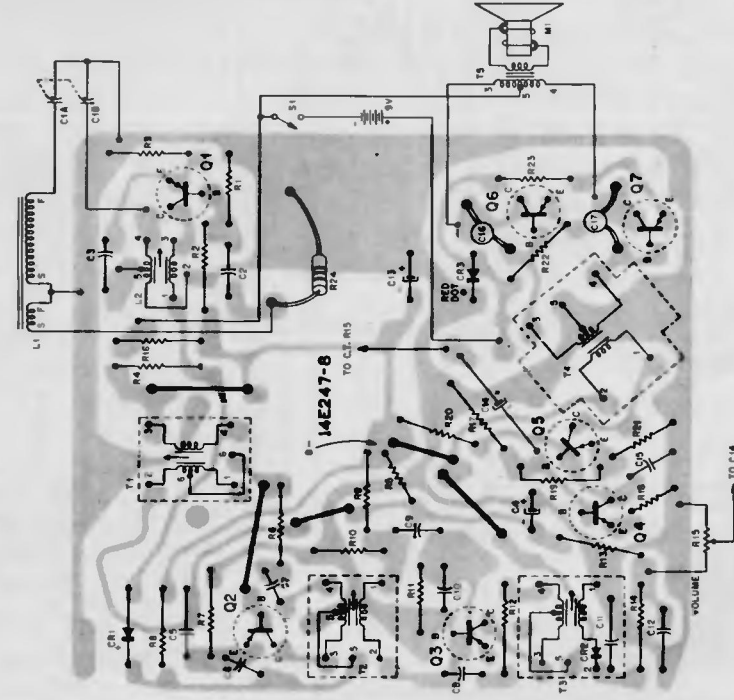
OSCILLATOR COIL
 L2

BOTTOM VIEW

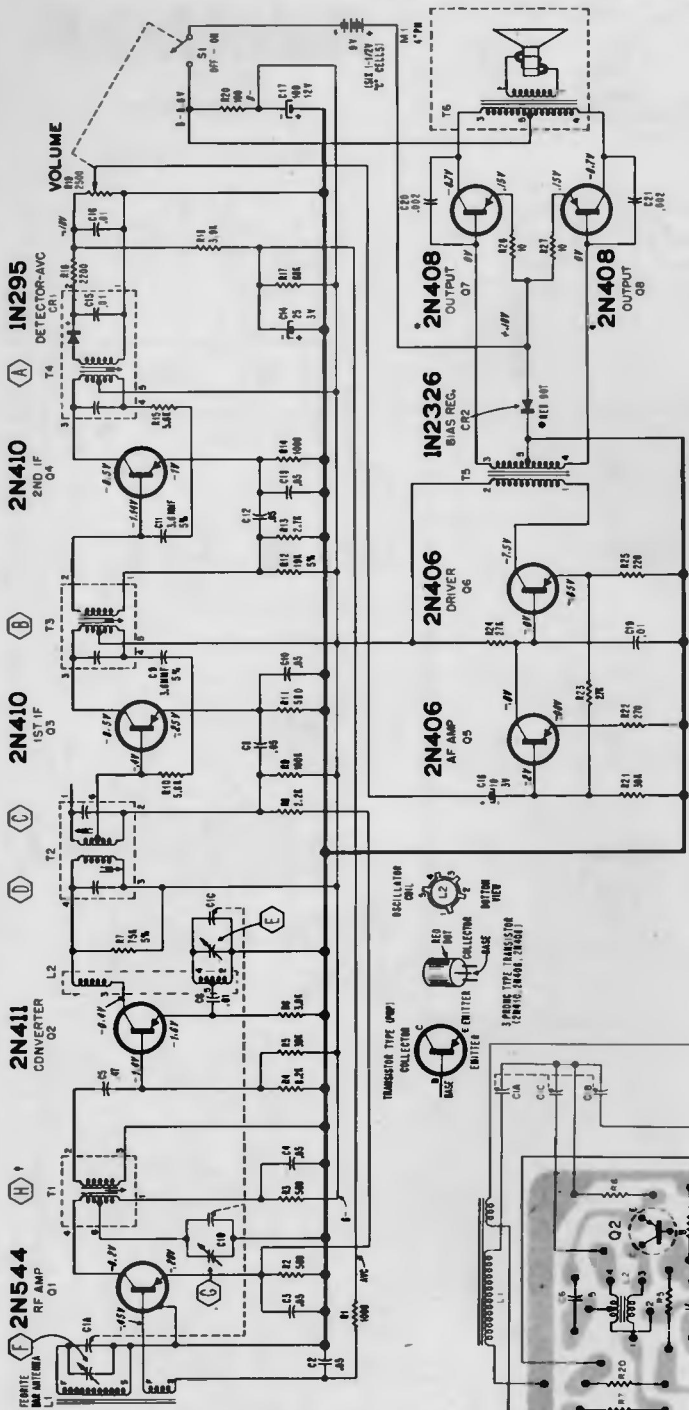
*** DASHED LINE INDICATES ADJUSTMENT MADE FROM REAR SIDE OF BOARD**



Rear View Showing Battery Case Removed.



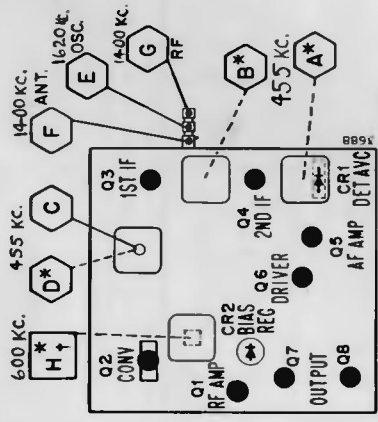
Rear View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.



REMOVING CHASSIS FROM CABINET

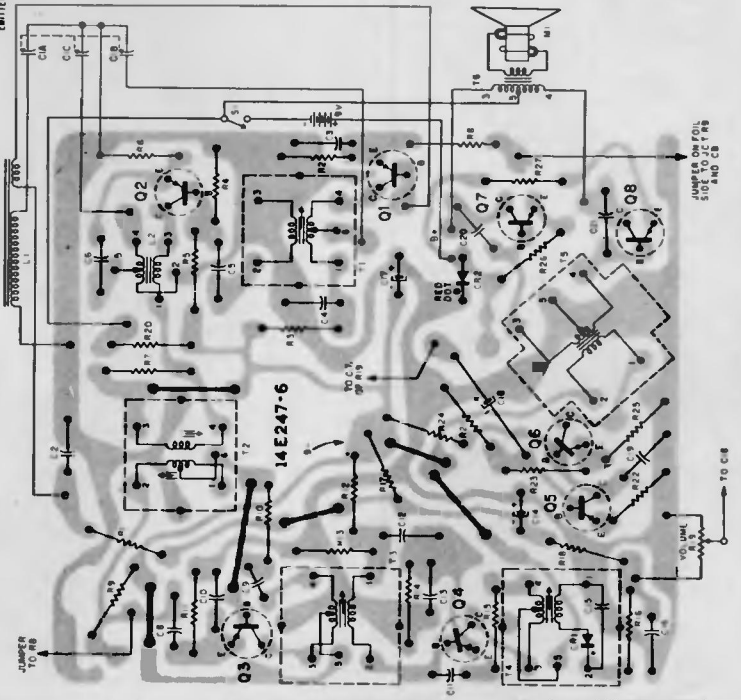
1. Remove the two knobs plus the two chassis mounting screws at the bottom of the cabinet, if used.
2. Unsnap back cover and remove battery case.
3. Remove the two nuts at the right corners of the chassis.
4. Keeping one hand on front escutcheon, slide chassis to right to remove from cabinet.

NOTE: The left side of the chassis (from rear) is held only by two flanges on the escutcheon.
WARNING: NEVER ALLOW THE BATTERY CONNECTORS ON BATTERY HOLDER TO COME IN CONTACT WITH THE METAL CHASSIS.
 The contact of the negative clip to the metal chassis, even with the set turned off, can damage the "Battery Miser" diode.

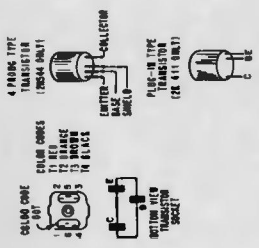


* ADJUST FROM REAR SIDE OF BOARD
 † ALIGNMENT SLUG HAS SQUARE HOLE

Top View of Chassis Showing Transistor and Alignment Point Locations.



Rear View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.

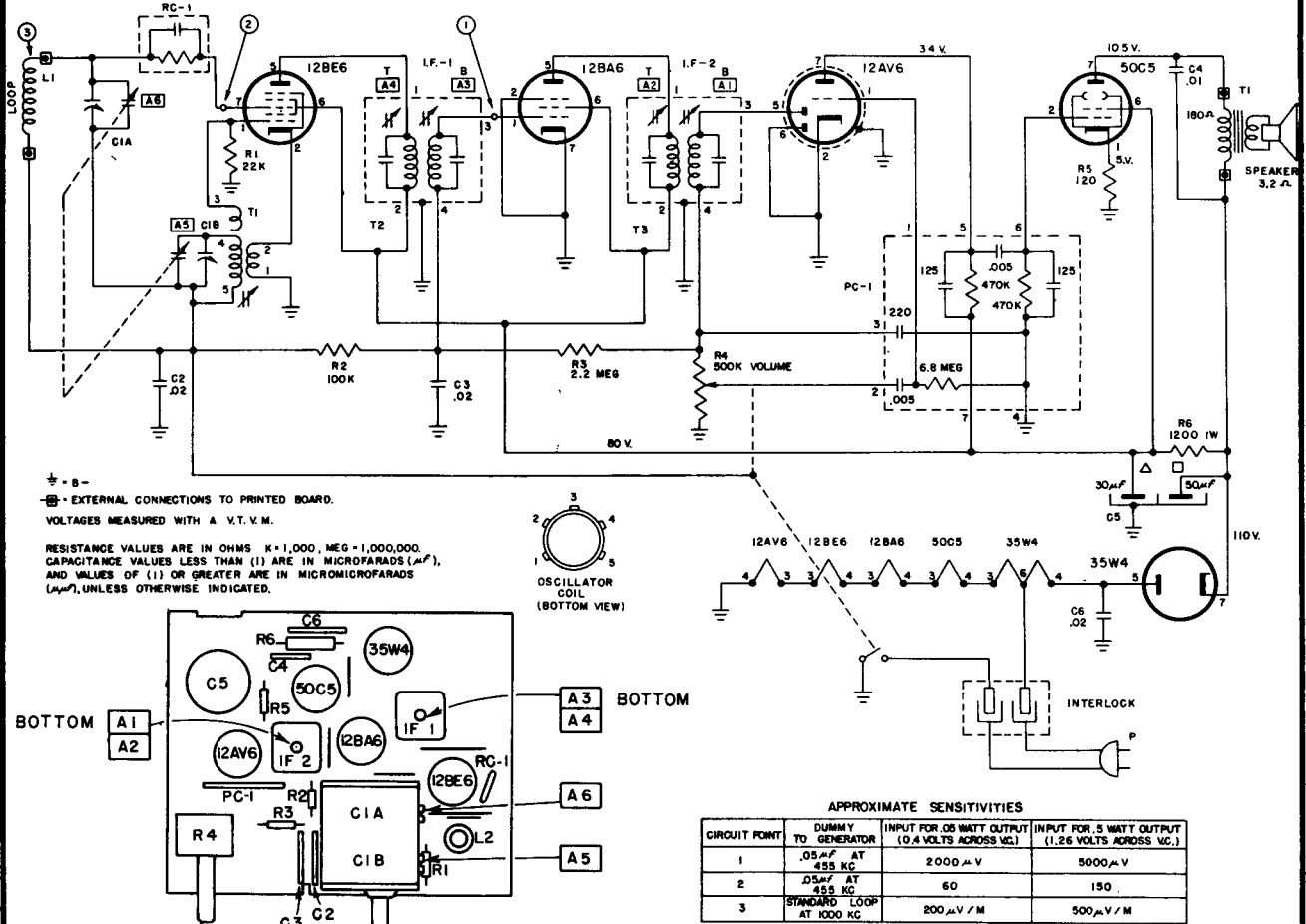


NOTES:
 * USE CORRECT CIRCUIT DIAGRAM.
 † USE CORRECT PART NUMBER.
 ‡ CAPACITOR VALUES IN MICROFARADS.
 § RESISTOR VALUES IN OHMS, †/2 OHMS, †† OHMS.
 ‡‡ UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4 WATT.
 ††† UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE 50V.
 †††† UNLESS OTHERWISE SPECIFIED, ALL TRANSISTORS ARE 100°C.
 ††††† UNLESS OTHERWISE SPECIFIED, ALL DIODES ARE 1N4001.
 †††††† UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4 WATT.
 ††††††† UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE 50V.
 †††††††† UNLESS OTHERWISE SPECIFIED, ALL TRANSISTORS ARE 100°C.
 ††††††††† UNLESS OTHERWISE SPECIFIED, ALL DIODES ARE 1N4001.

MODEL Y2127
 CHASSIS 8D2

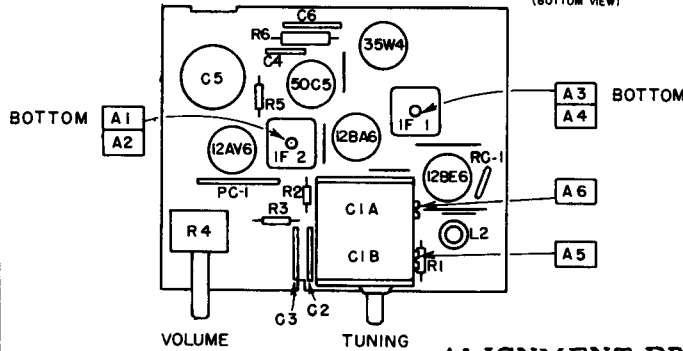
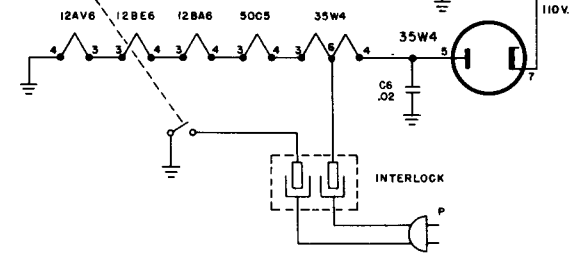
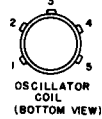
Admiral

ARVIN RADIO MODELS 10R16 10R18 CODE 1.42202



⊕ - B -
 ⊕ - EXTERNAL CONNECTIONS TO PRINTED BOARD.
 VOLTAGES MEASURED WITH A V.T.V.M.

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.



APPROXIMATE SENSITIVITIES

CIRCUIT POINT	DUMMY TO GENERATOR	INPUT FOR .05 WATT OUTPUT (0.4 VOLTS ACROSS VC.)	INPUT FOR .5 WATT OUTPUT (1.26 VOLTS ACROSS VC.)
1	.05 μF AT 455 KC	2000 μV	5000 μV
2	.05 μF AT 455 KC	60	150
3	STANDARD LOOP AT 1000 KC	200 μV / M	500 μV / M

ALIGNMENT PROCEDURE

PRELIMINARY:

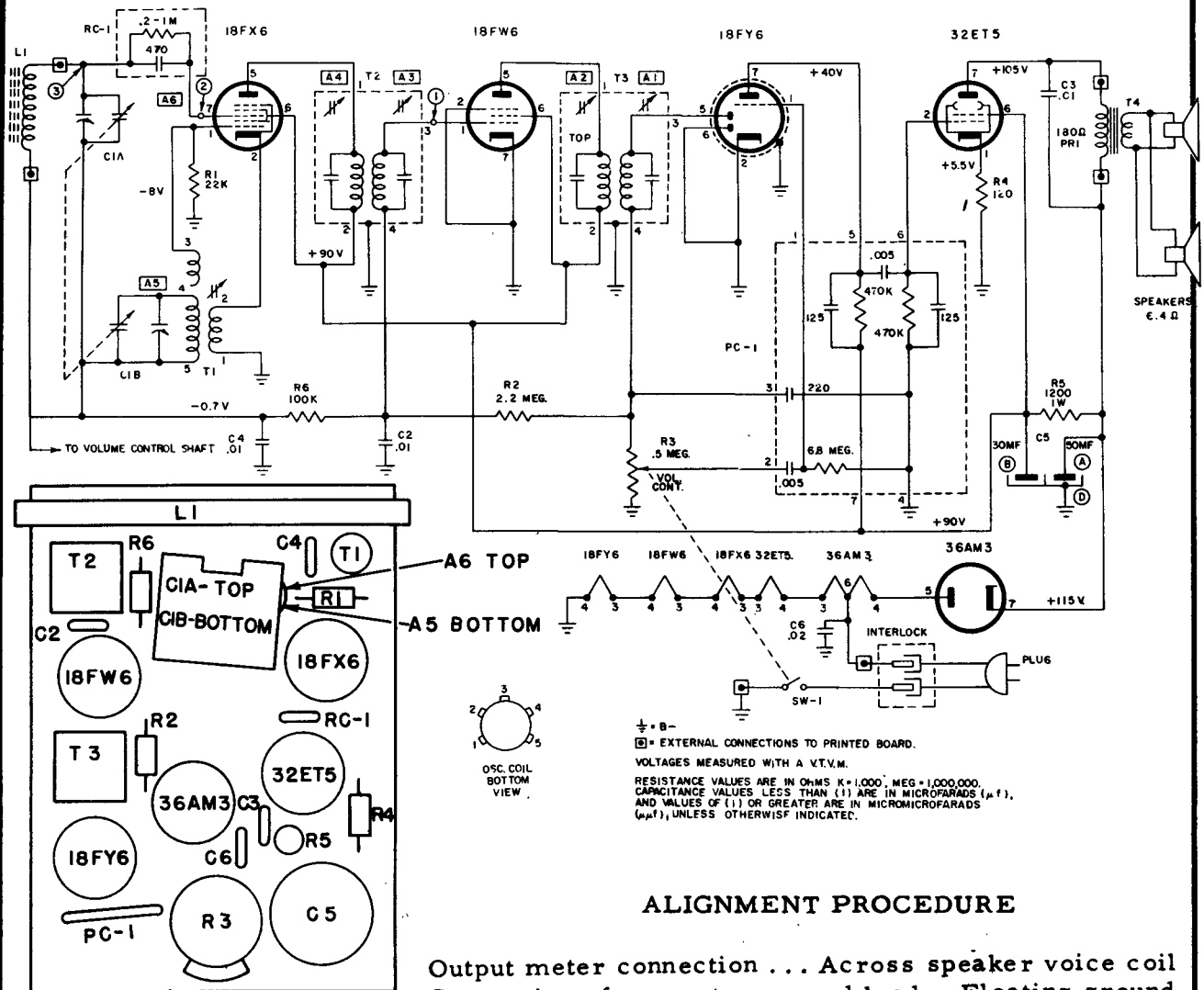
- Output meter connection Across speaker voice coil
- Output meter reading to indicate 500 milliwatts (standard output) ... 1.26 volts
- Connection of generator ground lead Floating ground
- Generator modulation 30% 400 cycles
- Position of Volume Control Fully clockwise

Position of 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 12BE6	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 MODELS 10R32 10R38 10R39 CHASSIS 1. 49801



ALIGNMENT PROCEDURE

Output meter connection ... Across speaker voice coil
 Connection of generator ground lead .. Floating ground
 Generator modulation 30% 400 cycles
 Position of Volume Control Fully clockwise

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

MODELS 30R12 30R18

CODE 1. 48101
CODE 1. 48102

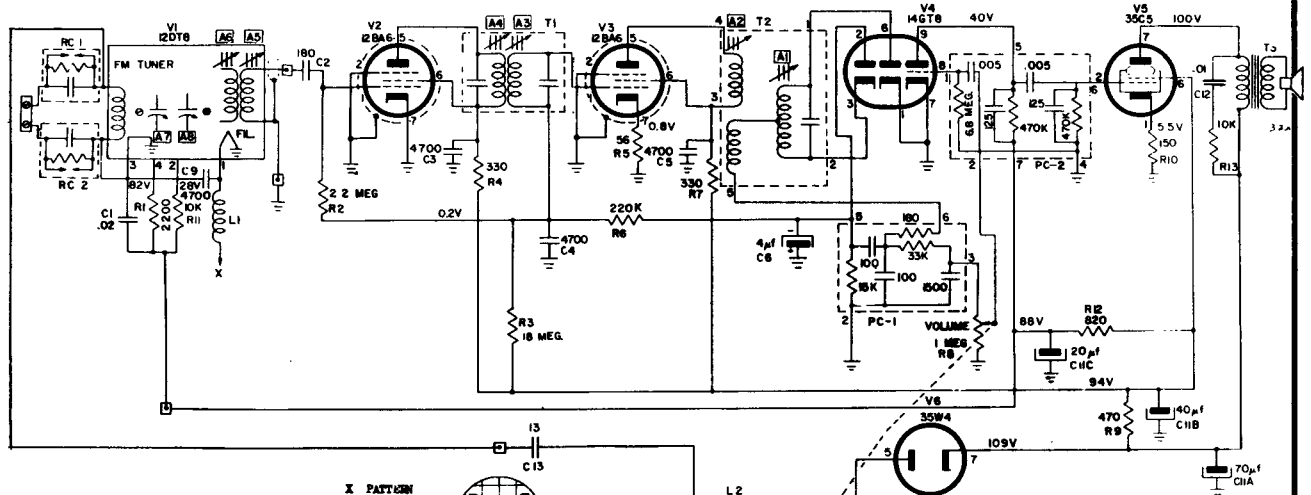


FIG. 1
X PATTERN CENTER FREQUENCY

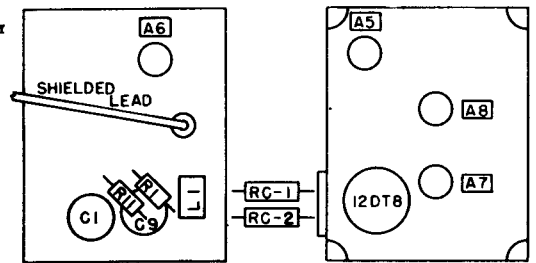
FIG. 2
SMALL X PATTERN ABOVE AND BELOW CENTER FREQUENCY

VOLTAGES MEASURED TO B- WITH A VTVM ± 20%, NO SIGNAL. FIG. 1
RESISTANCE VALUES ARE IN OHMS, K=1,000, MEG=1,000,000
CAPACITANCE VALUES LESS THAN (μ) ARE IN MICROFARADS (μf),
AND VALUES OF (μ) OR GREATER ARE IN MICROMICROFARADS (μμf),
UNLESS OTHERWISE INDICATED.

ALIGNMENT PROCEDURE

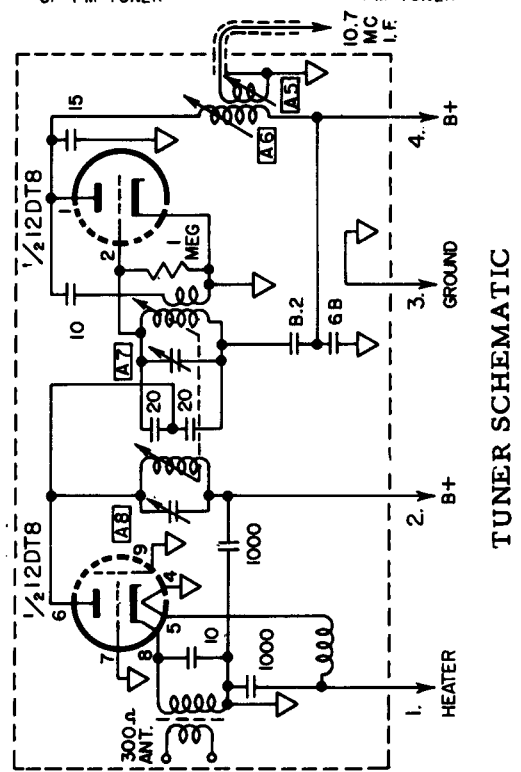
Detector and I. F. alignment using signal Generator and Oscilloscope.

1. Connect FM Generator, High Side, to grid (pin 1) of 12BA6 2nd I. F. tube through .01 mfd. dummy.
2. Set generator frequency to 10.7 Mc. modulated either 60 cycles or 400 cycles, 480 Kc sweep (240 Kc deviation)
3. Connect vertical input of scope across volume control of receiver (grounded terminal to B-, ungrounded terminal to high side of control).
4. Set scope switch for internal synchronization and set horizontal oscillator to 2X frequency of modulating voltage of generator. (120 or 800 cycles)
5. Tune FM to high end of band.
6. Adjust frequency vernier of horizontal oscillator on scope until the pattern becomes stationary.
7. Adjust ratio detector primary slug No. A2 (outer peak) for maximum vertical sweep of the scope pattern.
8. Adjust ratio detector secondary slug No. A1 (outer peak) to center the cross-over point of the pattern. Pattern should look like Figure 1, with the same amount of curve on both ends, and the cross-over point in the center.
9. Adjust I. F. slugs A3, A4 (outer peak) for greatest vertical sweep of the pattern, consistent with linearity. If the I. F. slugs are adjusted for maximum sweep of the pattern, the pattern may become non-linear. Therefore, adjustment should be made for the greatest sweep which can be obtained and still have all four ends of the "X" pattern similar in size and shape.
10. Connect generator to antenna screws on the back of the chassis.
11. Adjust tuner slugs A5, A6 for greatest vertical sweep consistent with linearity.
12. Check the alignment of the I. F. and detector circuits by varying the signal generator frequency above and below the center frequency of 10.7 Mc. If the receiver is perfectly aligned, two small "x" patterns of similar size and shape will result, one on either side of the center frequency. See Figure 2.

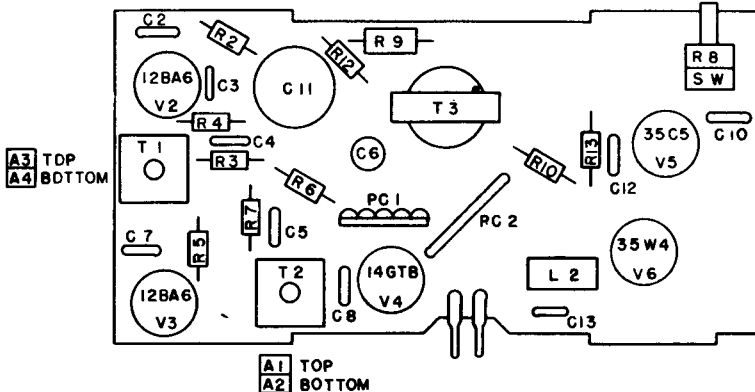


BOTTOM VIEW OF FM TUNER

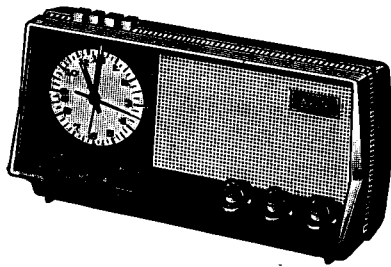
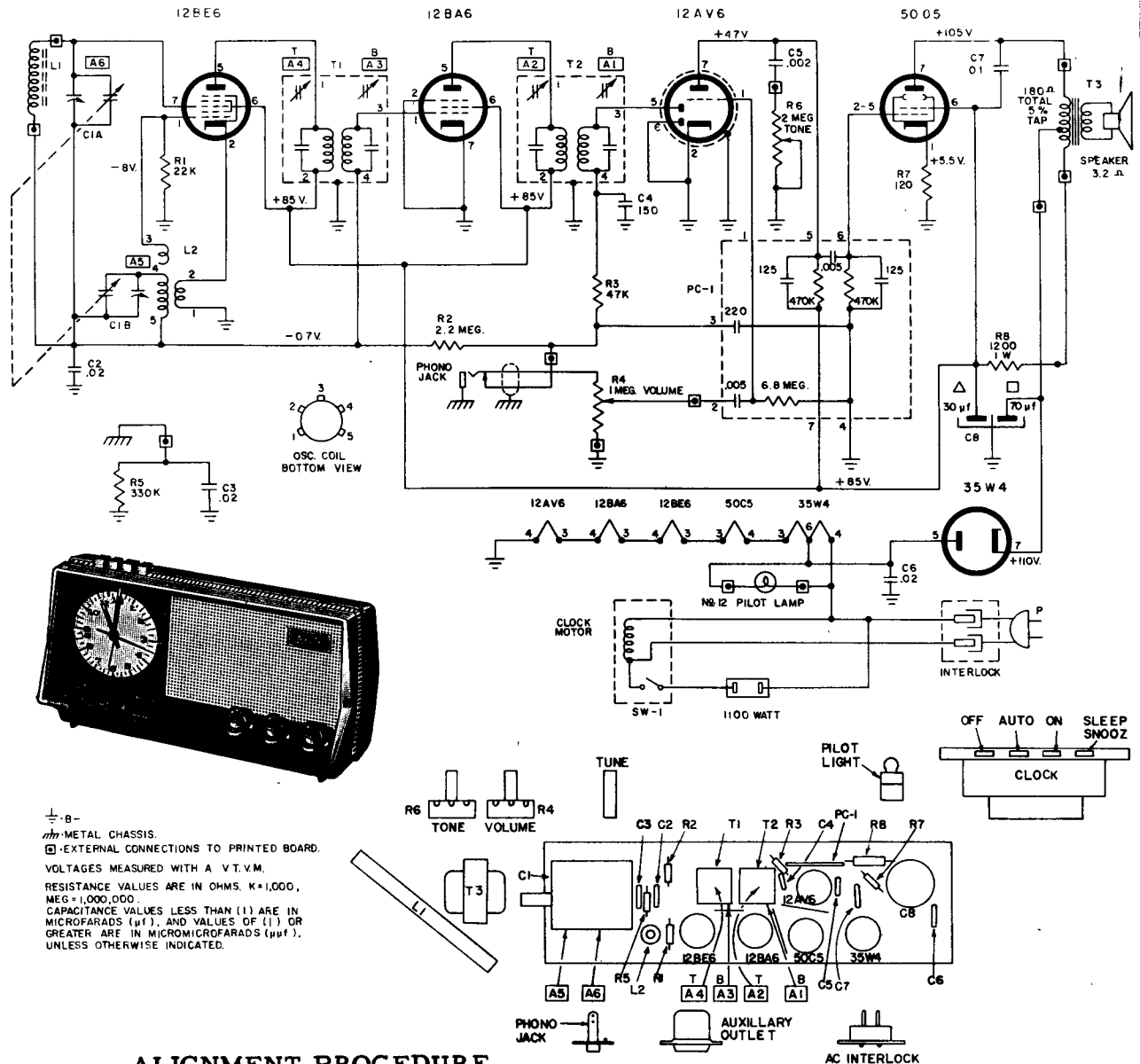
TOP VIEW OF FM TUNER



TUNER SCHEMATIC



ARVIN RADIO MODELS 50R65 50R67 CODE 1.47001



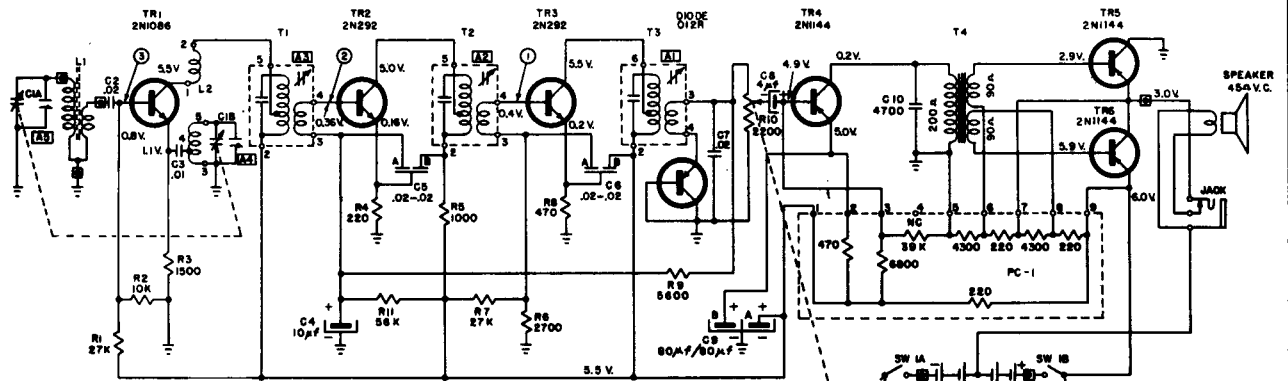
⊕ - B -
 // METAL CHASSIS.
 □ - EXTERNAL CONNECTIONS TO PRINTED BOARD.
 VOLTAGES MEASURED WITH A V.T.V.M.
 RESISTANCE VALUES ARE IN OHMS, K=1,000,
 MEG=1,000,000.
 CAPACITANCE VALUES LESS THAN (1) ARE IN
 MICROFARADS (μf), AND VALUES OF (1) OR
 GREATER ARE IN MICROMICROFARADS (μμf).
 UNLESS OTHERWISE INDICATED.

ALIGNMENT PROCEDURE

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Functions of Trimmer
Open	455	.05 μf	Pin 7 12BE6	A1, A2, A3, A4	I.F. Oscillator Antenna
Open	1670		* Test Loop	A5	
1400	1400		* Test Loop	A6	
600	600		* Test Loop	Check Point	

* Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.
 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 MODELS 60R23 60R28 60R29 CHASSIS 1.49201

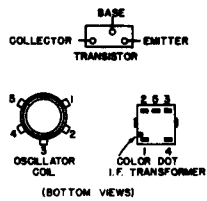


CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μ F), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μ MF) EXCEPT WHERE NOTED.

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.

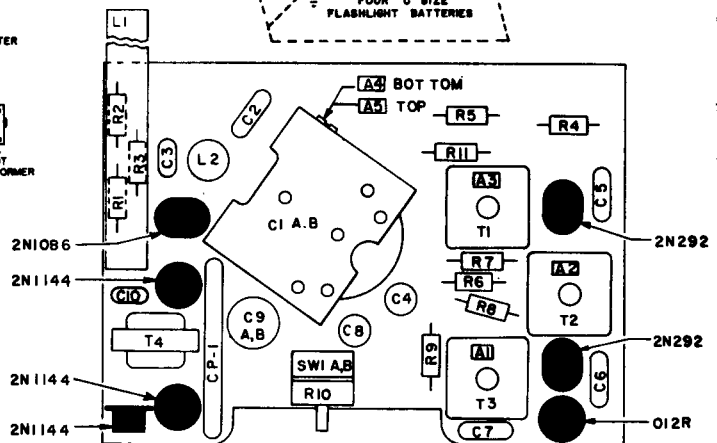
RESISTANCE VALUES ARE IN OHMS, K=1000.

⊕ COMMON GROUND SYMBOL.
 ⊕ EXTERNAL CONNECTION TO PRINTED CIRCUIT.
 TOTAL BATTERY CURRENT DRAIN UNDER NO SIGNAL CONDITIONS, 5 TO 8 MA.

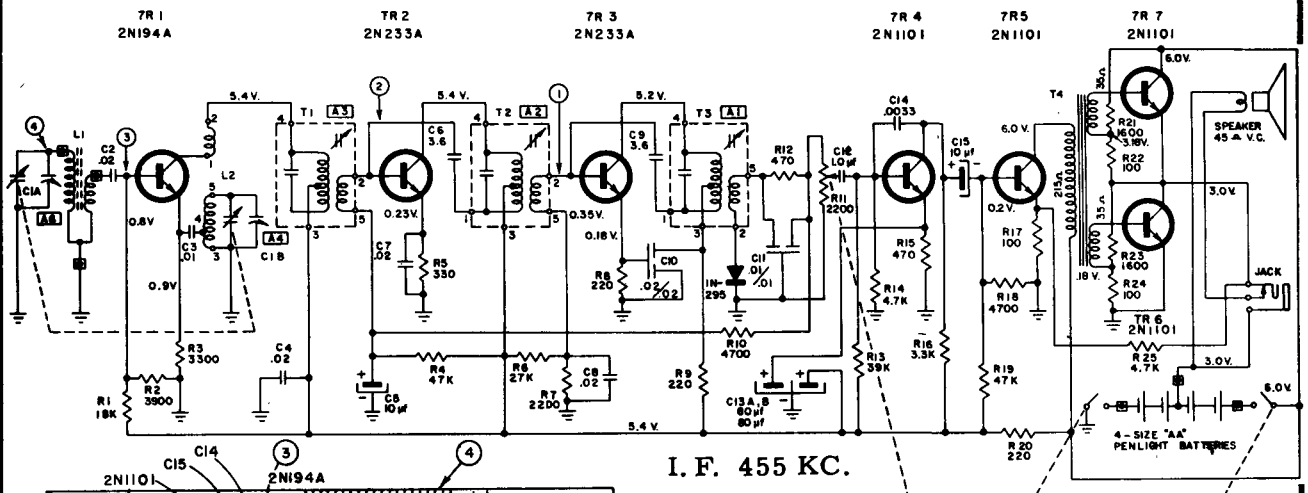


I. F. 455 KC.

SIGNAL TEST POINTS	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 8MM OUTPUT (ATV ADDRESS 45A)
①	455 KC	.05 μ F	2000 μ V
②	455 KC	.05 μ F	110 μ V
③	455 KC	.05 μ F	4 μ V
④	1000 KC	STANDARD LOOP	300 μ V M



Arvin MODELS 60R47 & 60R49 CHASSIS 1.50401



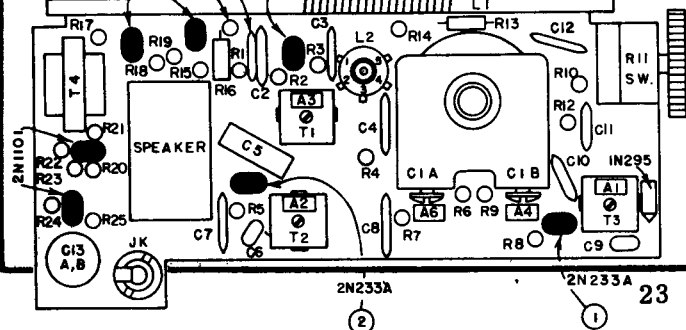
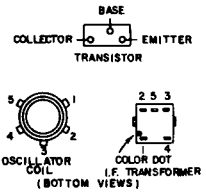
I. F. 455 KC.

CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μ F) AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μ MF) EXCEPT WHERE NOTED.

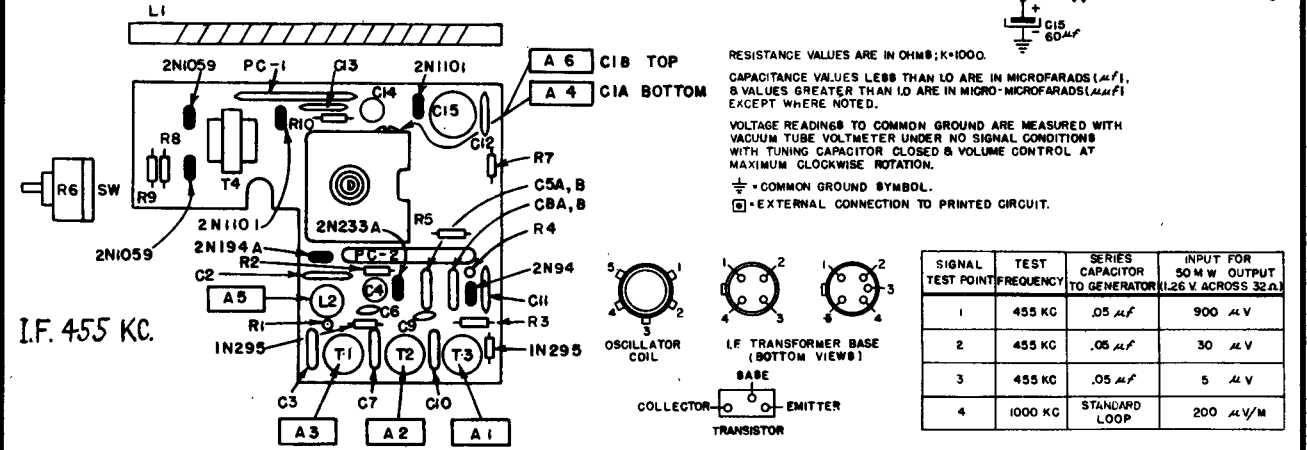
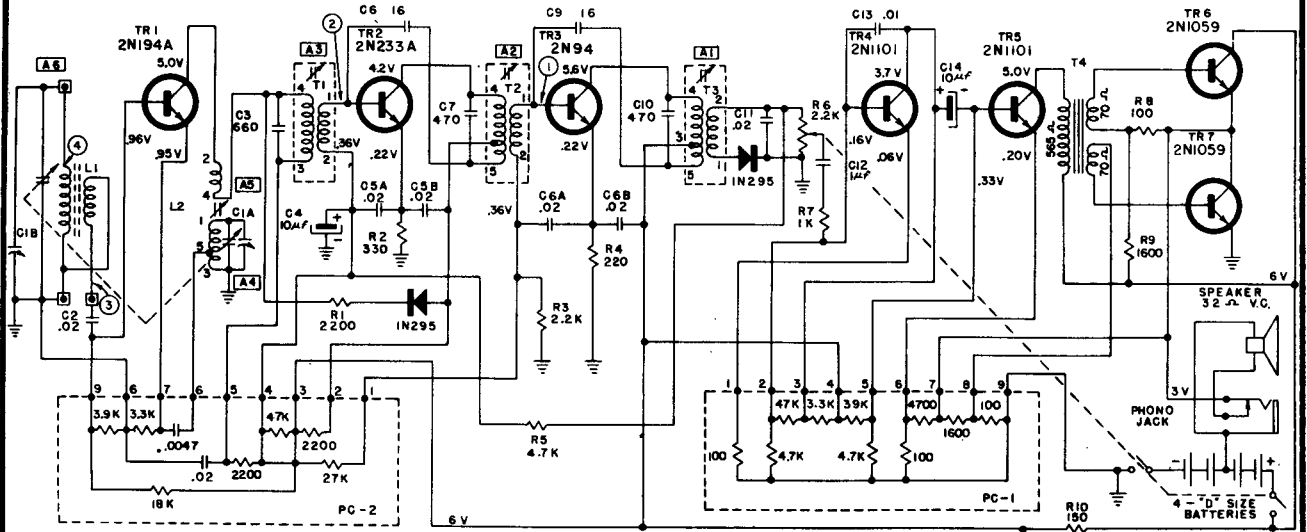
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

RESISTANCE VALUES ARE IN OHMS, K=1000.

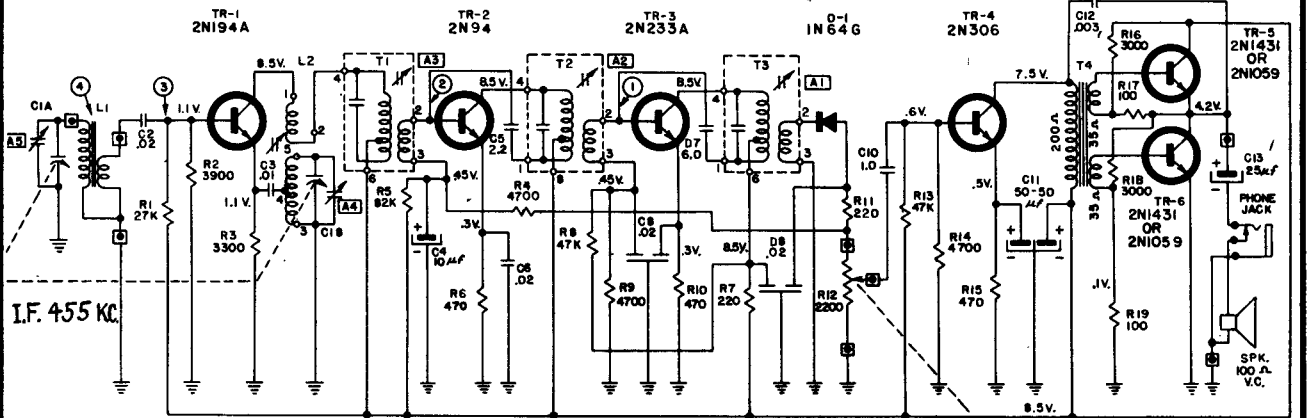
⊕ COMMON GROUND SYMBOL.
 ⊕ EXTERNAL CONNECTION TO PRINTED CIRCUIT.
 TOTAL BATTERY CURRENT DRAIN UNDER NO SIGNAL CONDITIONS, 7 TO 11 MA.



Arvin MODEL 60R58 CHASSIS 1.50300



ARVIN MODELS 60R63 & 60R69 CHASSIS 1.50101 60R73 & 60R79



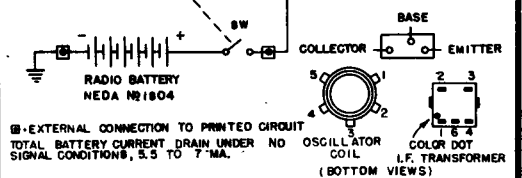
CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μF), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μμF) EXCEPT WHERE NOTED.

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.

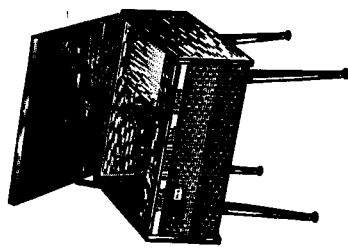
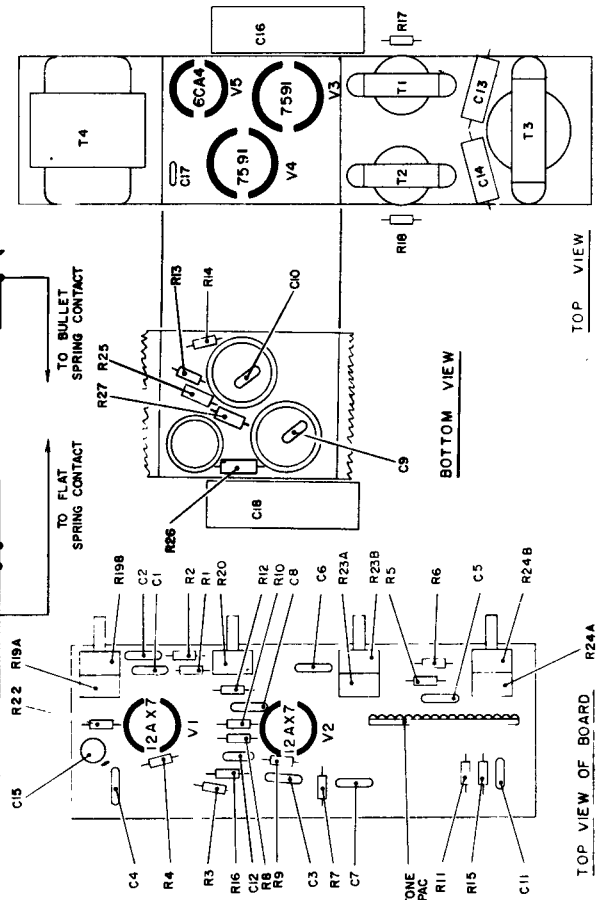
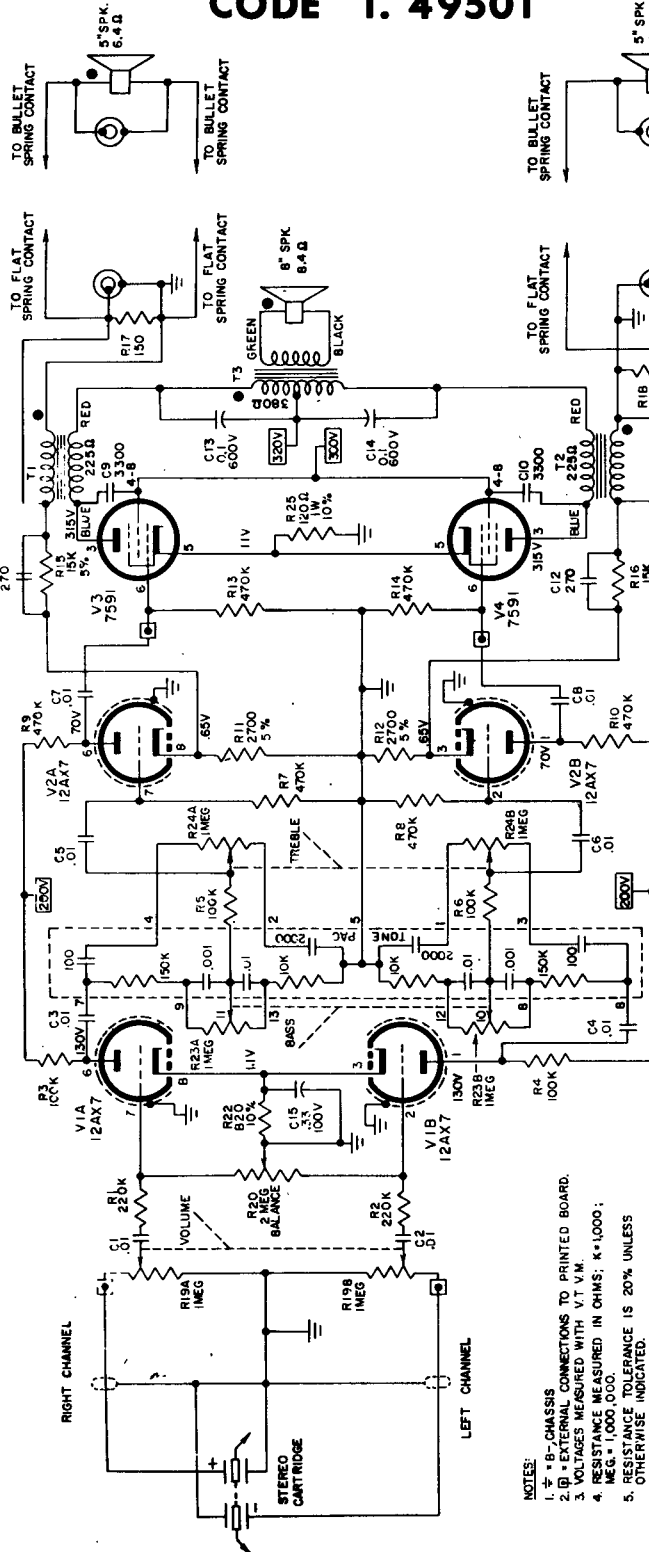
⚡ COMMON GROUND SYMBOL.

SIGNAL TEST POINT	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 5 MW OUTPUT (1.7 V ACROSS 100 Ω)
①	455 KC	.05 μF	500 μV
②	455 KC	.05 μF	50 μV
③	455 KC	.05 μF	2 μV
④	1000 KC	STANDARD LOOP	200 μV/W

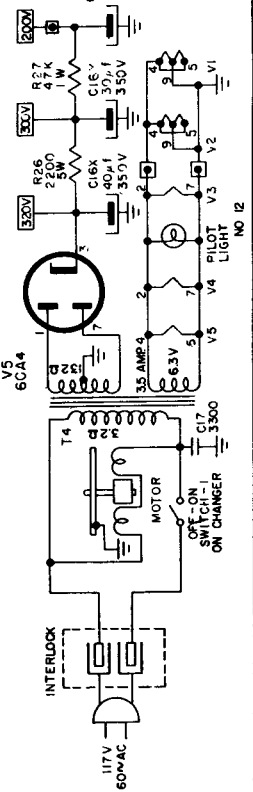


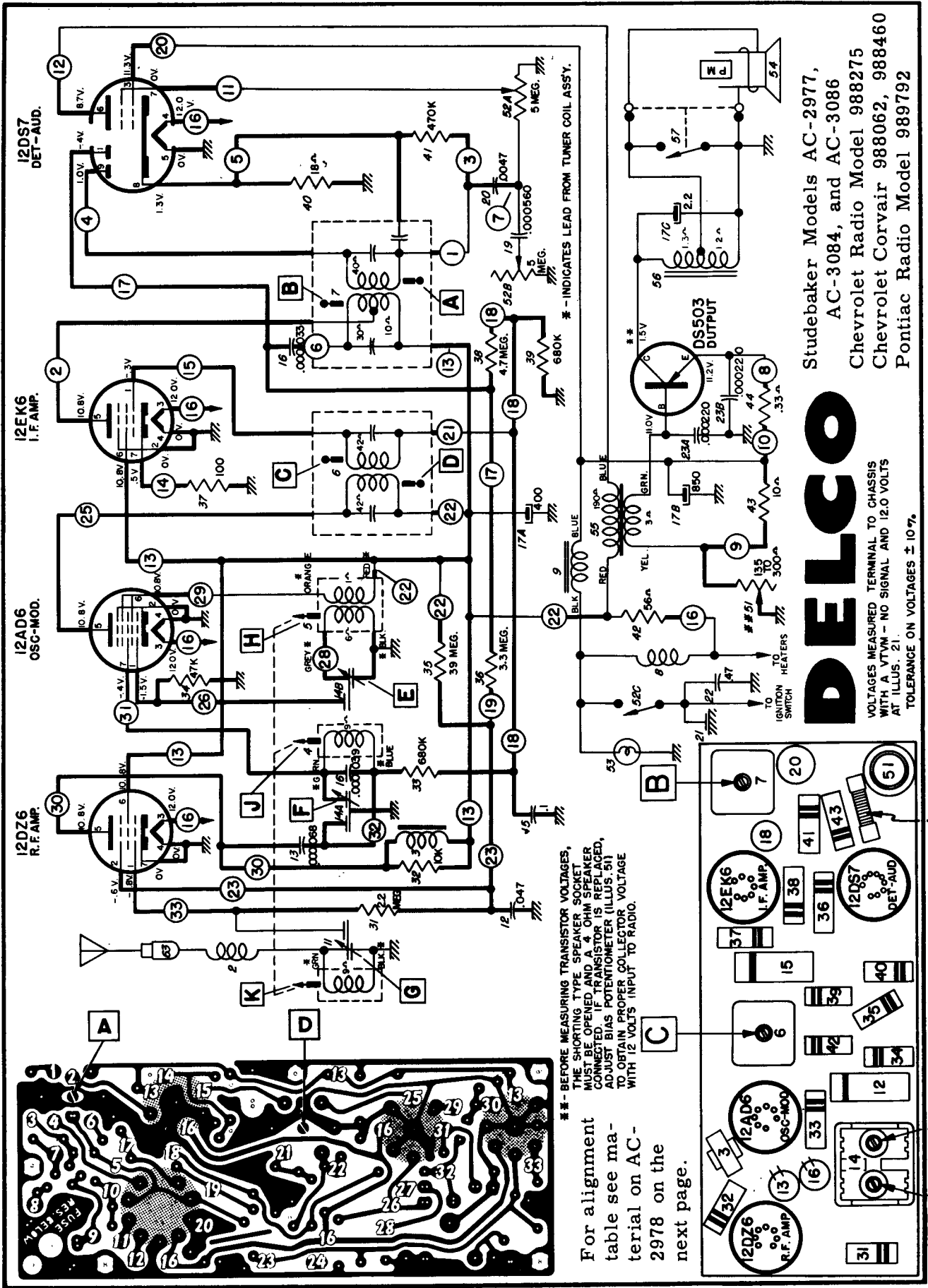
ARVIN PHONOGRAPH

MODEL 90P53
MODEL 90P58
CODE 1. 49501



- NOTES:
1. ∇ - B - CHASSIS
 2. \square - EXTERNAL CONNECTIONS TO PRINTED BOARD.
 3. VOLTAGE MEASURED WITH V.T. V.M.
 4. RESISTANCE MEASURED IN OHMS; K=1,000; MEG.=1,000,000.
 5. RESISTANCE TOLERANCE IS 20% UNLESS OTHERWISE INDICATED.
 6. CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MICROFARADS (μ F), AND VALUES OF ONE (1) OR GREATER ARE IN MICRO-MICROFARADS ($\mu\mu$ F) UNLESS OTHERWISE INDICATED.
 7. COMPONENTS IN THIS AMPLIFIER ARE INTERCONNECTED TO RESULT IN A CONSISTANT PHASE RELATION BETWEEN POSITIVE VOLTAGE AND VOICE COIL MOVEMENT (I.E. A POSITIVE VOLTAGE MOVES VOICE COIL OUTWARD, AND A NEGATIVE VOLTAGE MOVES VOICE COIL INWARD). DO NOT DISTURB THIS PHASE RELATIONSHIP DURING SERVICING.
 8. \bullet PHASING DOT
 9. TRANSFORMER T1/T2 (IN PHASE WITH RED LEAD); T3 (IN PHASE WITH GREEN LEAD); SPEAKERS (POSITIVE VOLTAGE MOVES VOICE COIL OUTWARD).





BOTTOM VIEW

Studebaker Models AC-2977,
 AC-3084, and AC-3086
 Chevrolet Radio Model 988275
 Chevrolet Corvair 988062, 988460
 Pontiac Radio Model 989792

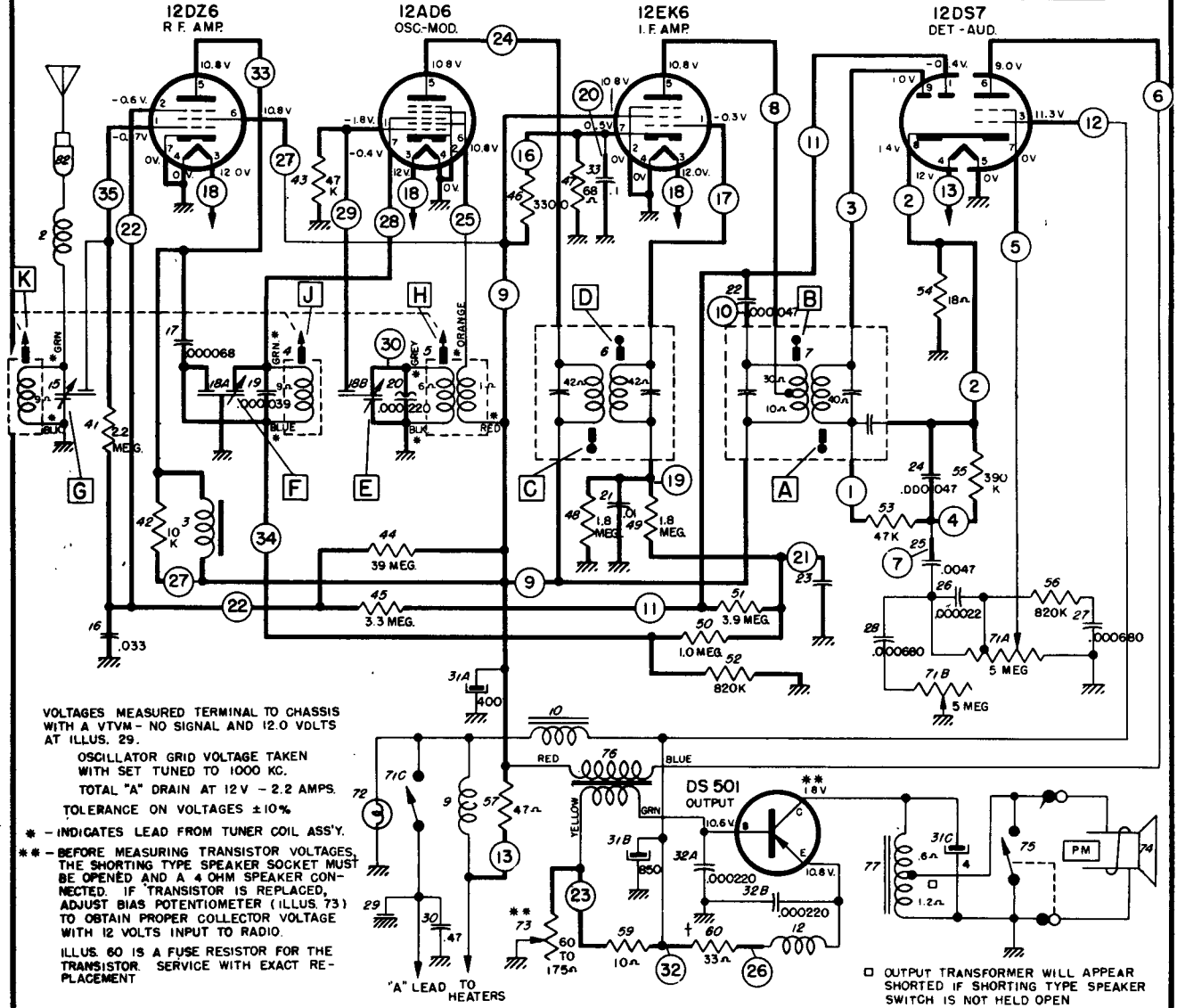
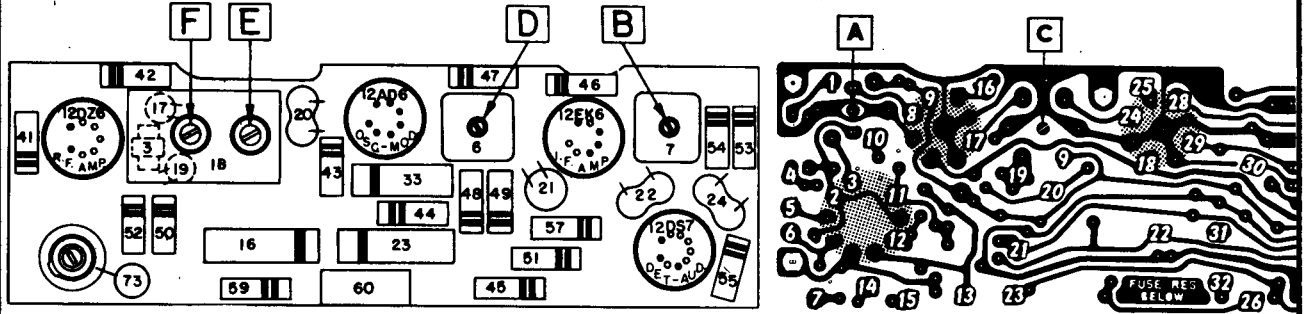


VOLTAGES MEASURED TERMINAL TO CHASSIS
 WITH A VTVM - NO SIGNAL AND 12.0 VOLTS
 AT ILLUS. 21.
 TOLERANCE ON VOLTAGES ± 10%.

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

DELCO Studebaker Radio Models AC-2978, AC-3085, AC-3087

STEPS	SERIES CAPACITOR OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC.	High Frequency Stop	A, B, D, C,
2	0.000068 Mfd.	Antenna Connector	1615 KC.	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC.	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC.	High Frequency Stop	F, G



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 29.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
TOTAL "A" DRAIN AT 12V - 2.2 AMPS.
TOLERANCE ON VOLTAGES ± 10%

* - INDICATES LEAD FROM TUNER COIL ASS'Y.
** - BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.
ILLUS. 60 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT REPLACEMENT

"A" LEAD TO HEATERS

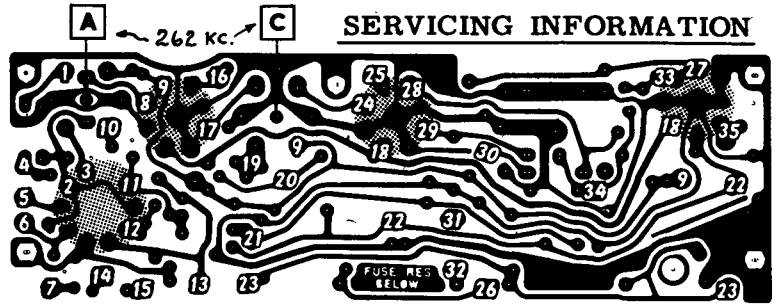
□ OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN

STUDEBAKER AC-2978—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

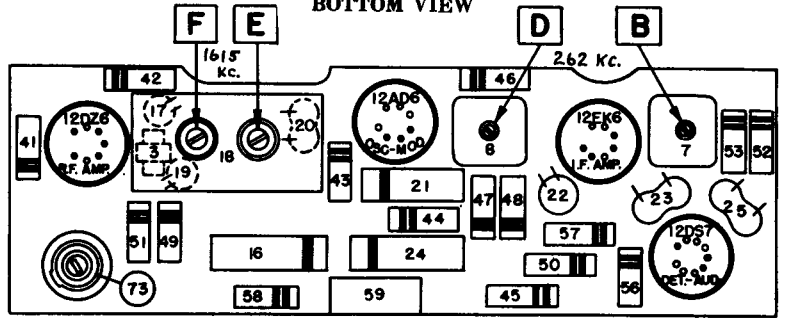
DELCO

BUICK MODEL 980051

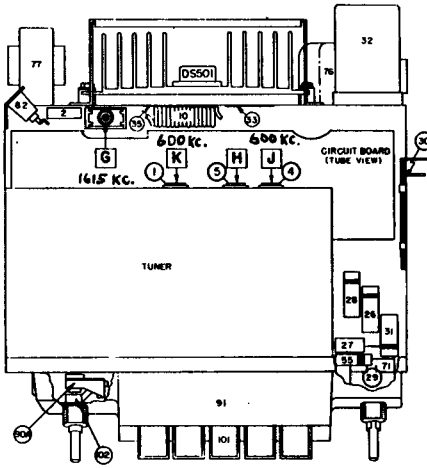
SERVICING INFORMATION



BOTTOM VIEW



TOP VIEW

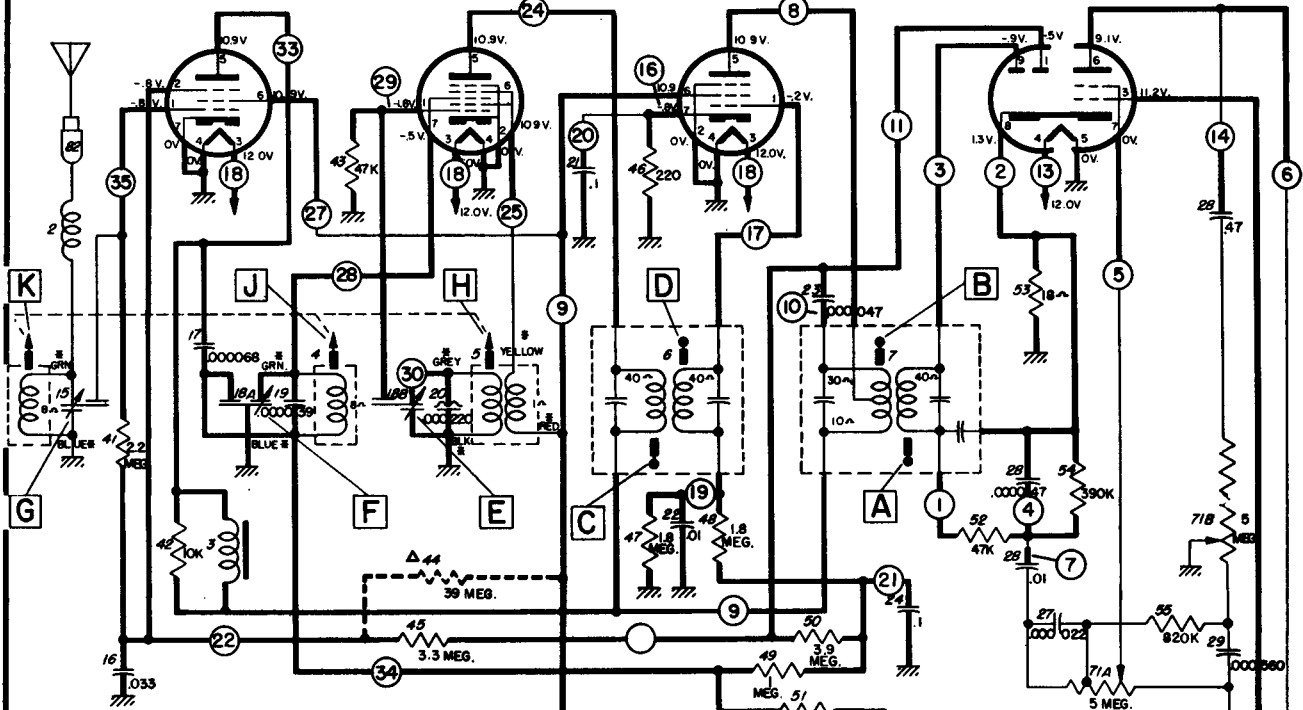


12DZ6
R.F. AMP.

12AD6
OSC.-MOD.

12EK6
I.F. AMP.

12DS7
DET.-AUD.



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 30.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12V. - 2.2 AMPS.

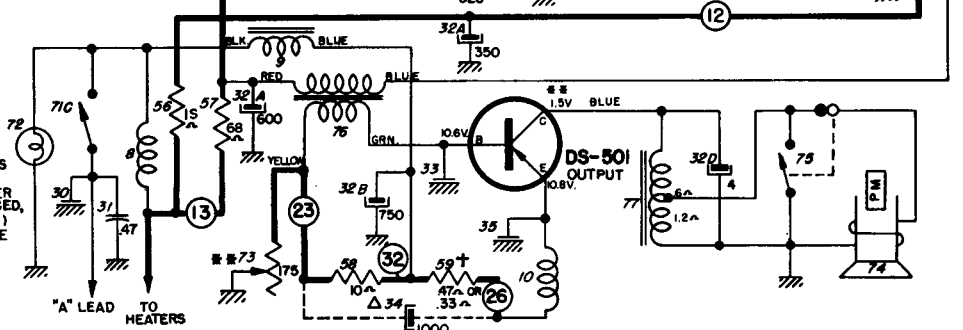
TOLERANCE ON VOLTAGES ± 10%

* - INDICATES LEAD FROM TUNER COIL ASSY.

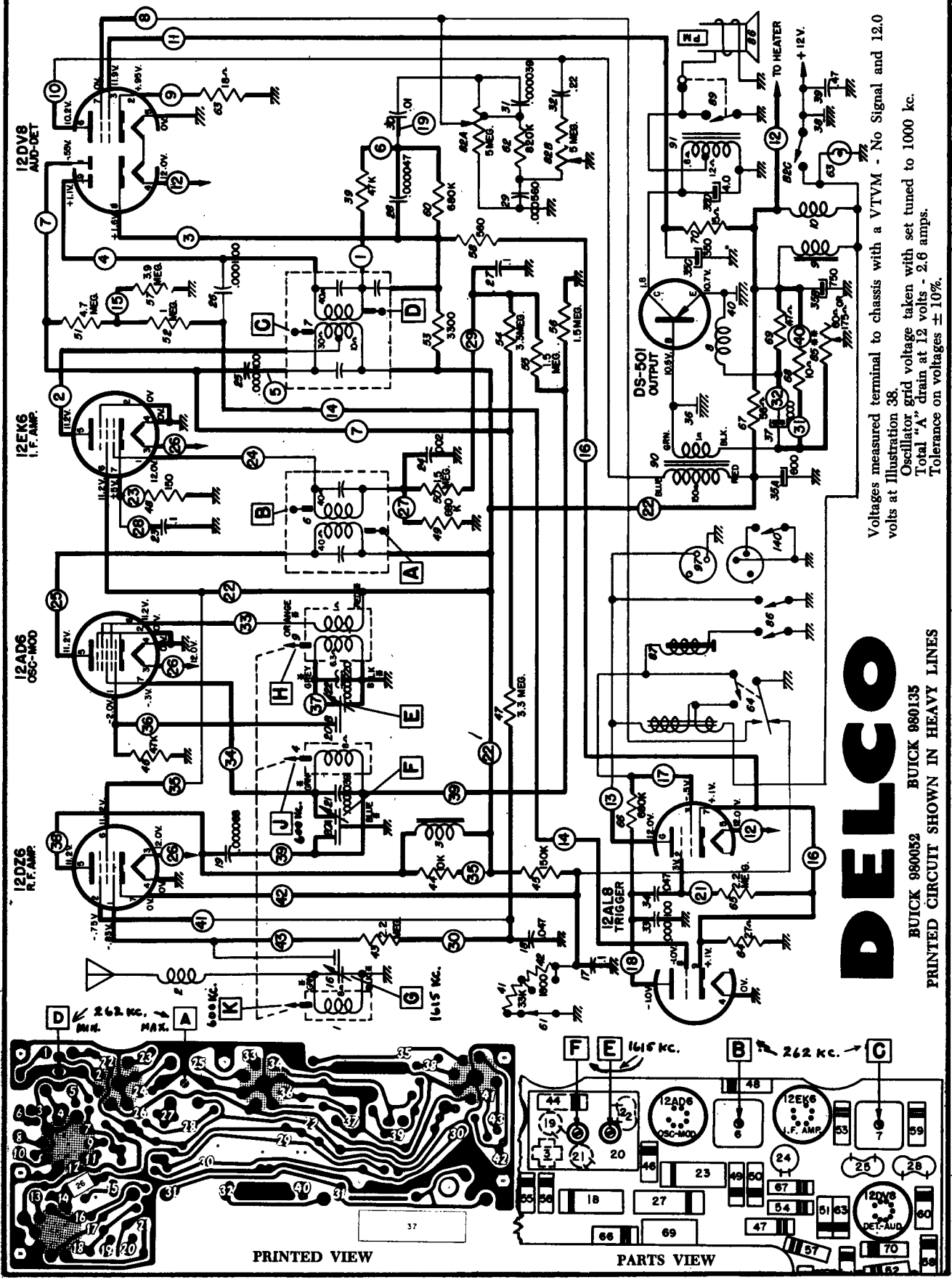
* - BEFORE MEASURING TRANSISTOR VOLTAGES THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

+ ILLUS 59 IS A FUSE RESISTOR FOR THE TRANSISTOR.

Δ - THIS PART WILL NOT APPEAR IN ALL RADIOS.



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



Volts measured terminal to chassis with a VTVM - No Signal and 12.0 volts at Illustration 38.
 Oscillator grid voltage taken with set tuned to 1000 kc.
 Total "A" drain at 12 volts - 2.6 amps.
 Tolerance on voltages ± 10%.

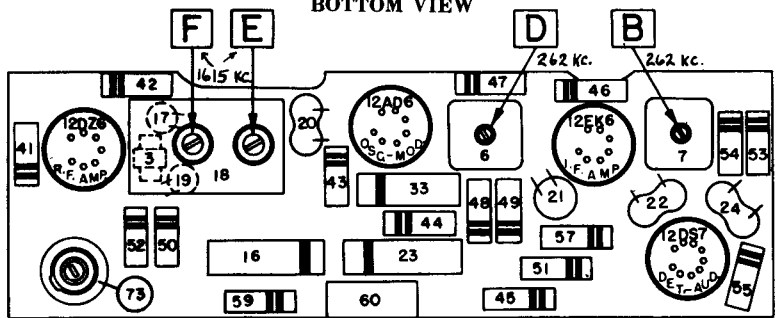
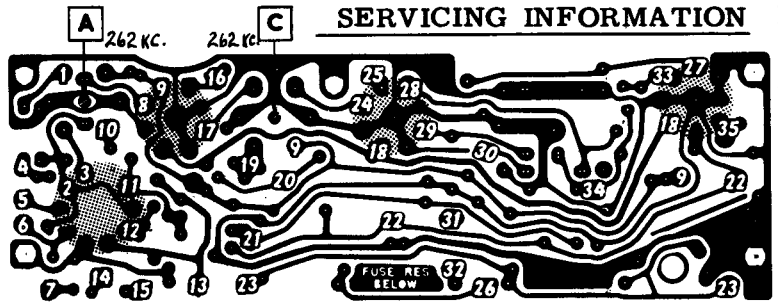
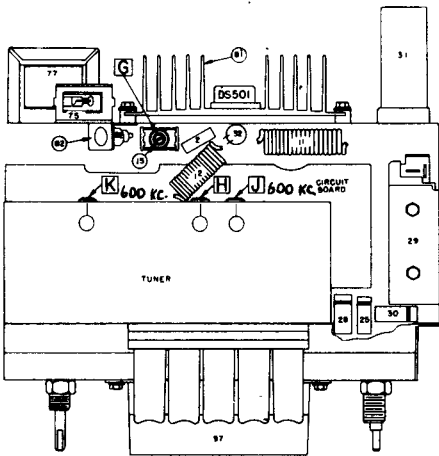
DELCO
 BUICK 980052 BUICK 980135
 PRINTED CIRCUIT SHOWN IN HEAVY LINES

PRINTED VIEW

PARTS VIEW

DELCO

CHEVROLET MODEL 988276



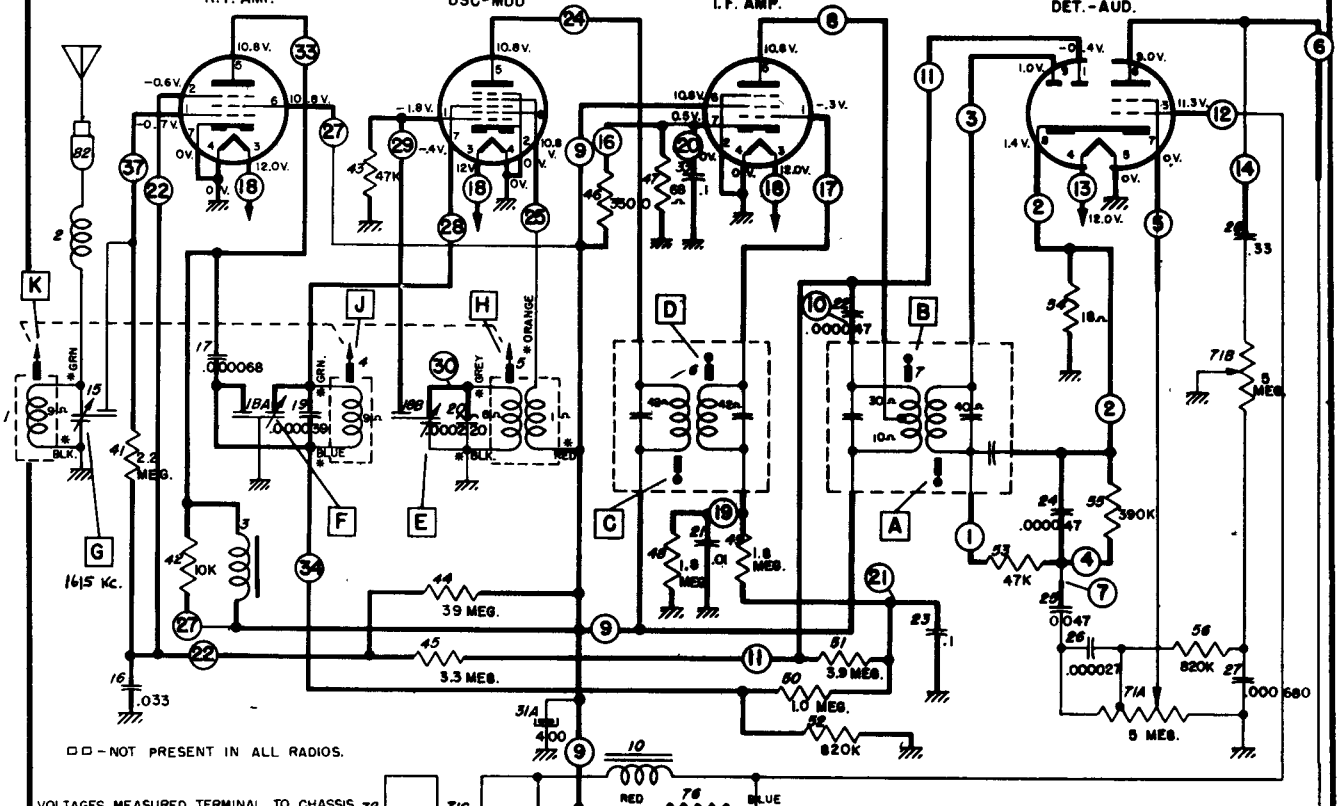
SERVICING INFORMATION

12DZ6
R. F. AMP.

12AD6
OSC-MOD

12EK6
I.F. AMP.

12DS7
DET.-AUD.



□ □ - NOT PRESENT IN ALL RADIOS.

VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 29.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

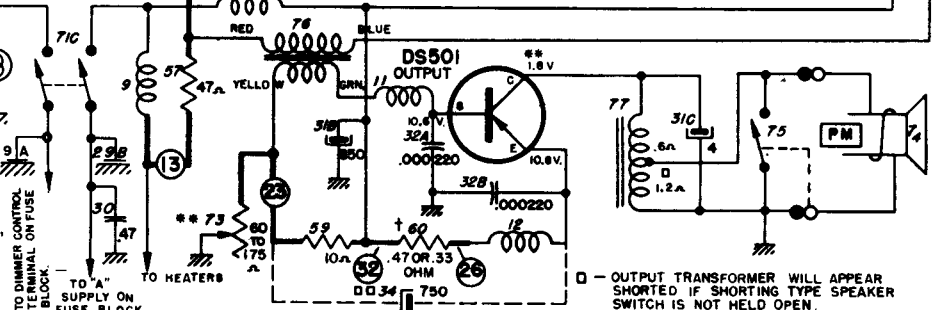
TOTAL "A" DRAIN AT 12 V. - 2.2 AMPS.

TOLERANCE ON VOLTAGES ±10%

* - INDICATES LEAD FROM TUNER COIL ASSY.

** - BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO

† - ILLUS. 60 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT REPLACEMENT.

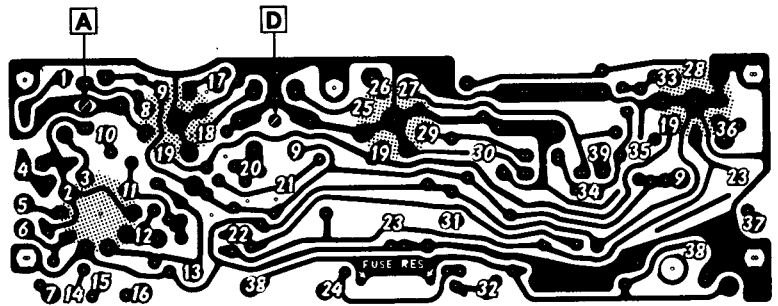


□ - OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.

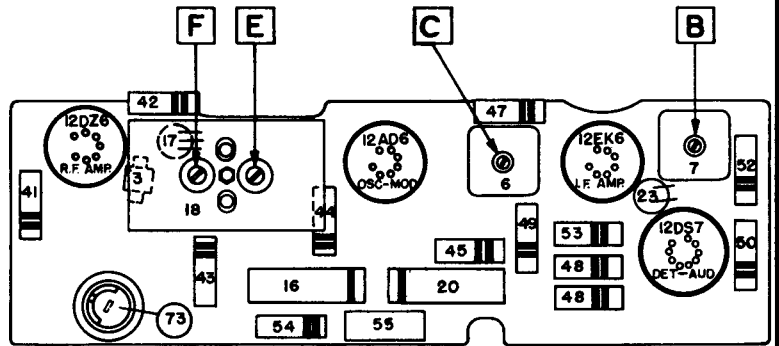
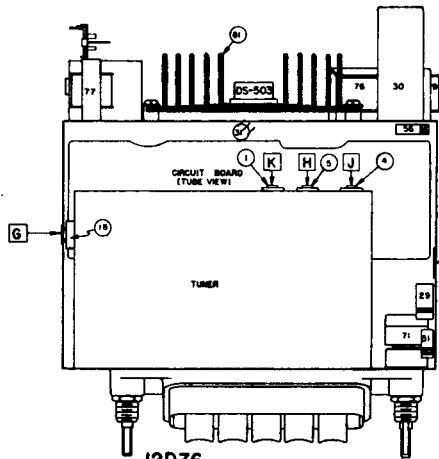
CHEVROLET 988276—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

BUICK MODEL 980132
 OLDSMOBILE MODEL 989387
 Alignment in Table 3, Page 38



BOTTOM VIEW



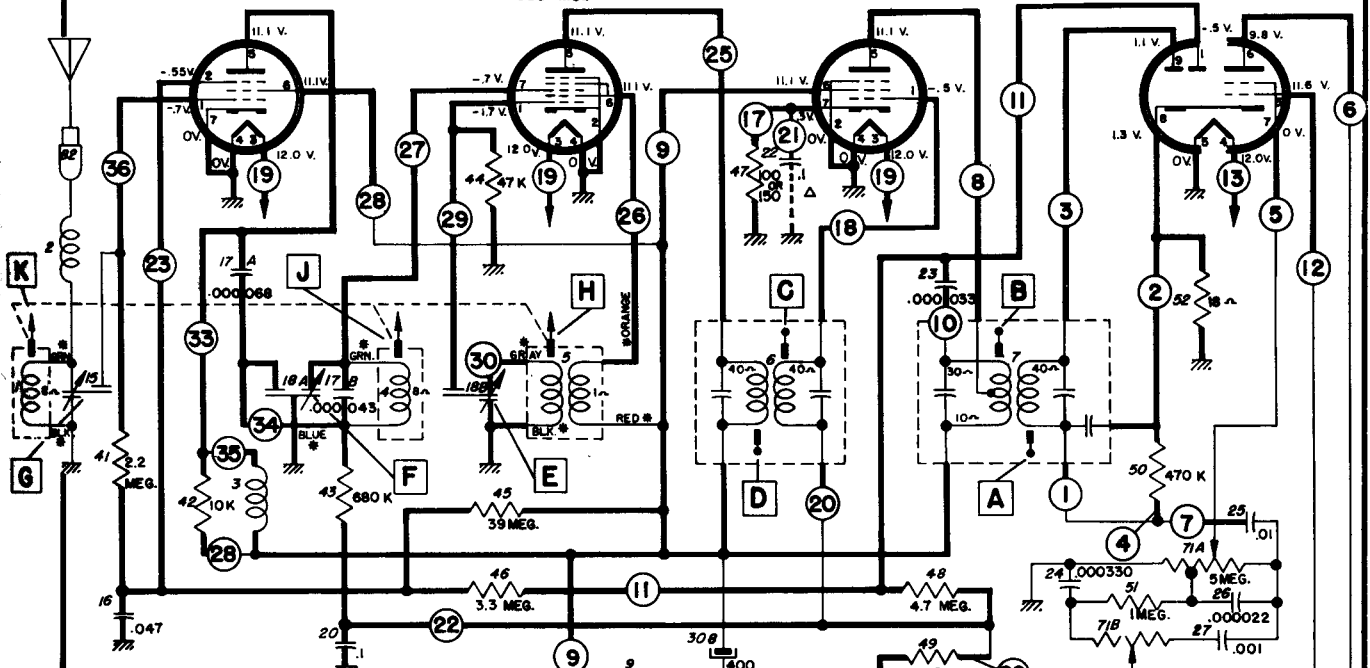
TOP VIEW

12DZ6
R.F. AMP.

12AD6
OSC-MOD

12EK6
I.F. AMP

12DS7
AUD-DET



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 28.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12V.-1.6 AMPS.

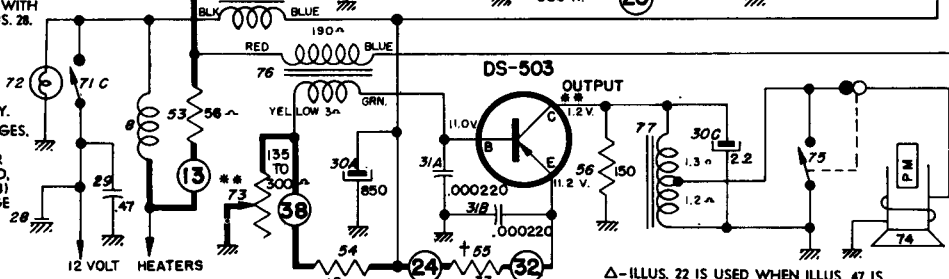
TOLERANCE ON VOLTAGES ±10%.

* - INDICATES LEAD FROM TUNER COIL ASS'Y.

** - BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

† - ILLUS. 56 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT RE-PLACEMENT.

⊕ - OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.



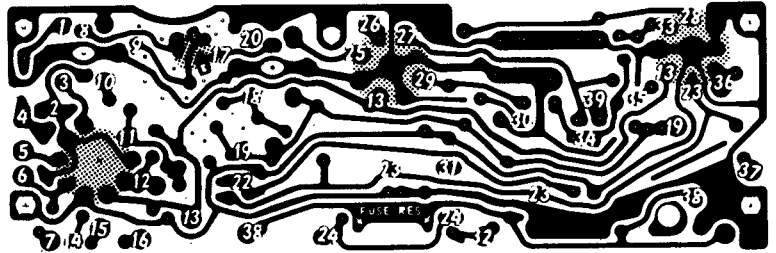
Δ - ILLUS. 22 IS USED WHEN ILLUS. 47 IS 150 OHMS.

BUICK 980132—PRINTED CIRCUIT SHOWN IN HEAVY LINES

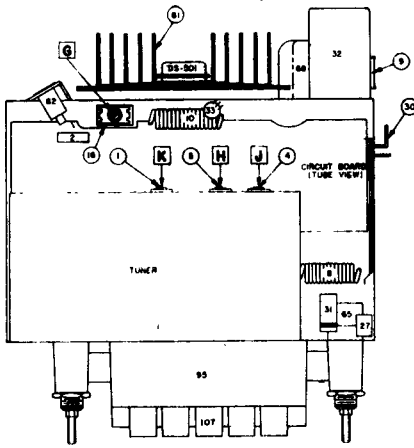
DELCO

NEEDED 1961 RADIO SERVICING INFORMATION

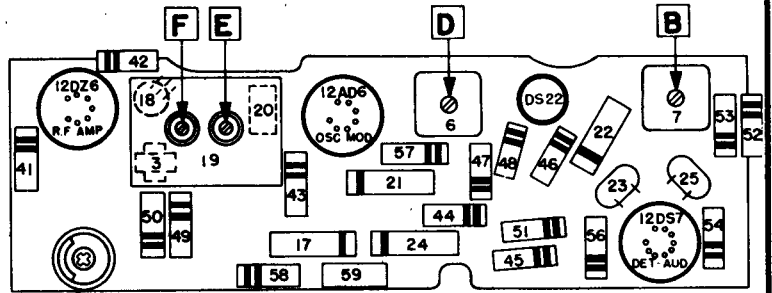
BUICK MODEL 980134
Alignment in Table 1, Page 38



BOTTOM VIEW



TUBE VIEW



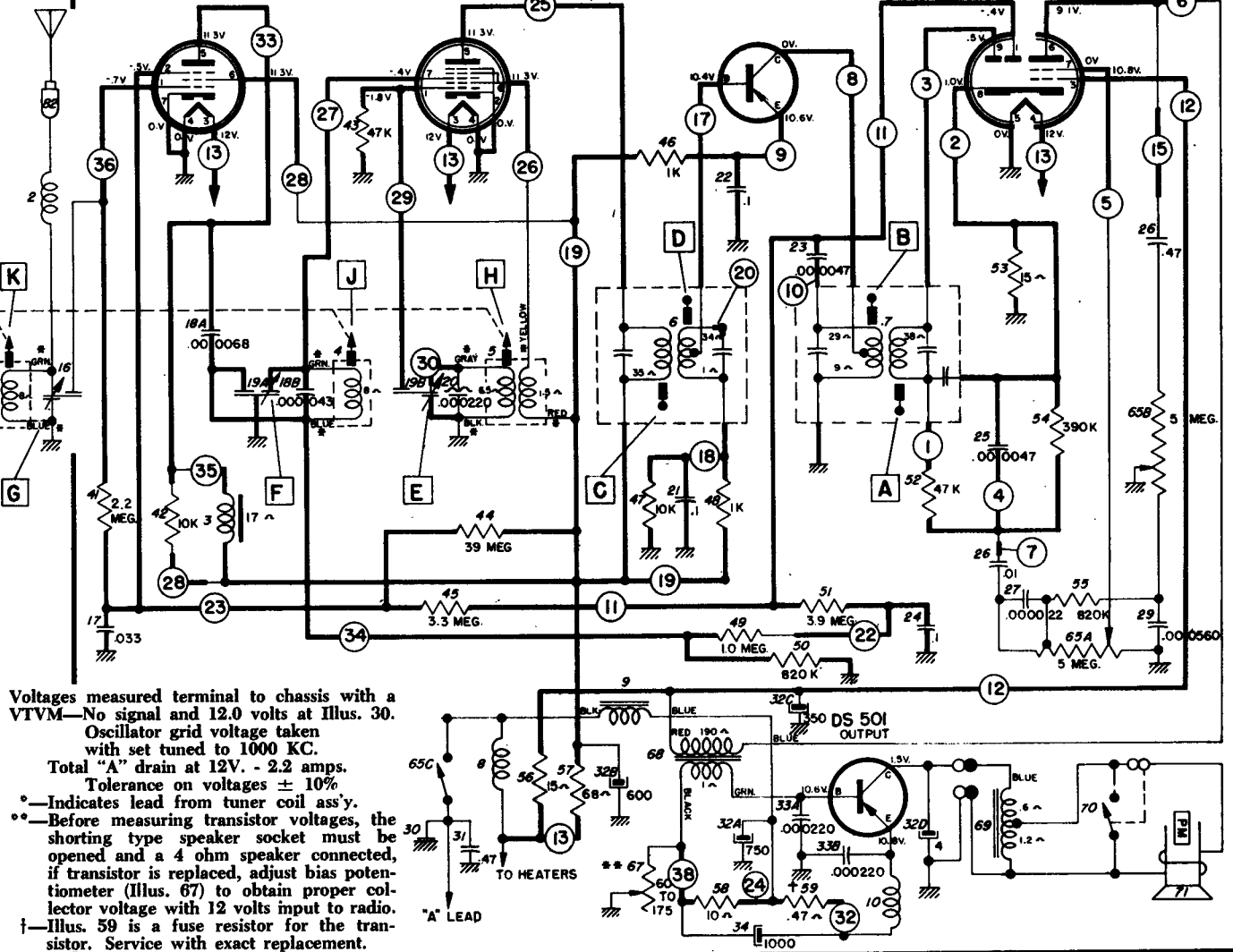
TOP VIEW

12DZ6
R.F. AMP.

12AD6
OSC. MOD.

DS 22
I.F. AMP.

12DS7
DET.-AUD.



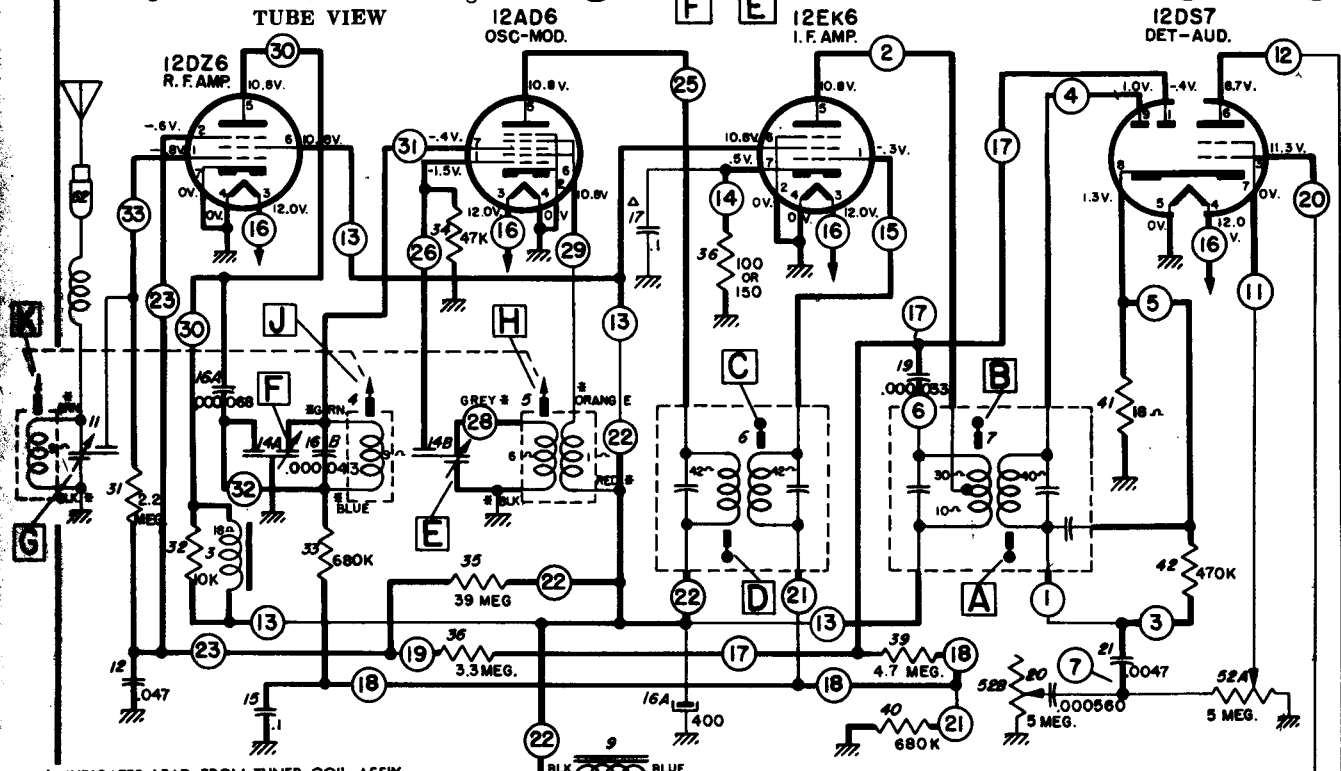
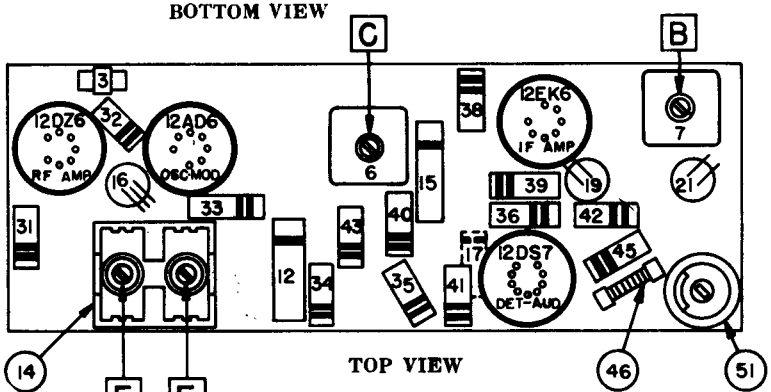
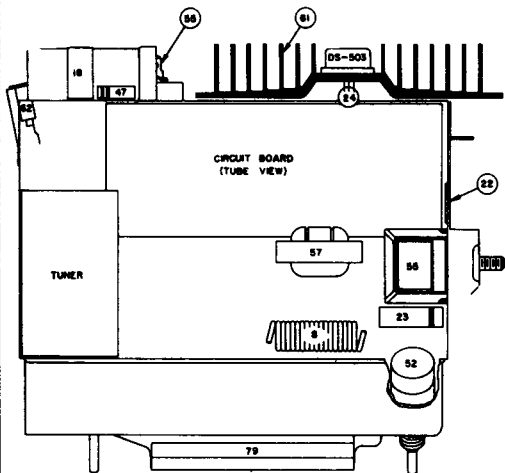
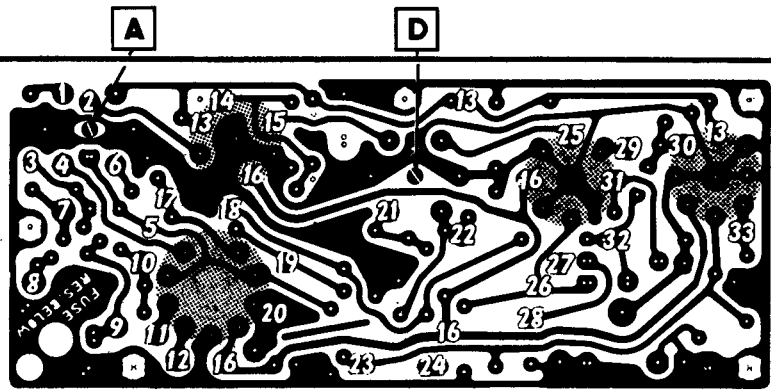
Voltages measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 30.
Oscillator grid voltage taken with set tuned to 1000 KC.
Total "A" drain at 12V. - 2.2 amps.
Tolerance on voltages $\pm 10\%$
—Indicates lead from tuner coil ass'y.
—Before measuring transistor voltages, the shorting type speaker socket must be opened and a 4 ohm speaker connected, if transistor is replaced, adjust bias potentiometer (Illus. 67) to obtain proper collector voltage with 12 volts input to radio.
†—Illus. 59 is a fuse resistor for the transistor. Service with exact replacement.

NUMBERS ON PRINTED CIRCUIT BOARD CORRESPOND WITH NUMBERS IN CIRCLES ON SCHEMATIC

PRINTED CIRCUIT SHOWN IN HEAVY LINES

DELCO

CHEVROLET MODEL 988413
Alignment in Table 4, Page 38

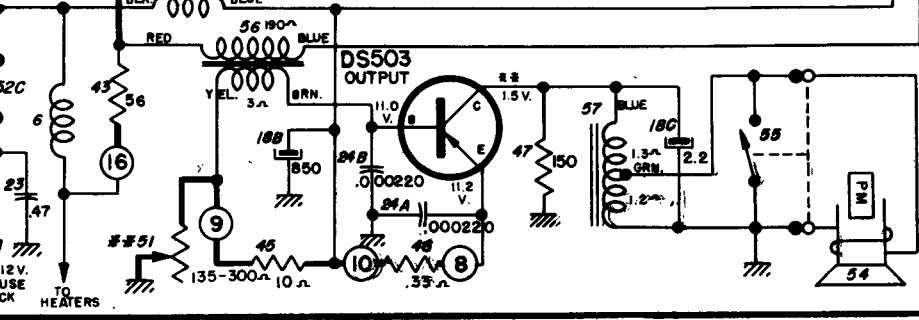


*- INDICATES LEAD FROM TUNER COIL ASS'Y.
Δ- THIS CAPACITOR WILL NOT APPEAR IN ALL RADIOS. (USED WHEN ILLUS. 38 IS 150 OHMS)

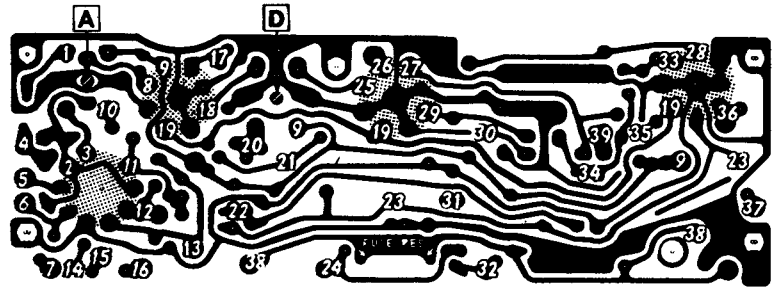
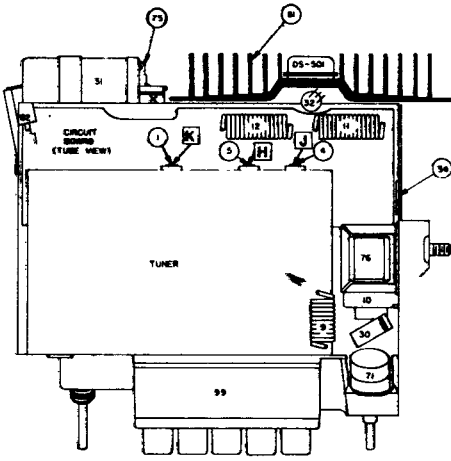
VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM-NO SIGNAL AND 12.0 VOLTS AT ILLUS. 22.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
TOTAL "A" DRAIN AT 12V. -1.6 AMPS.
TOLERANCE ON VOLTAGES ± 10%

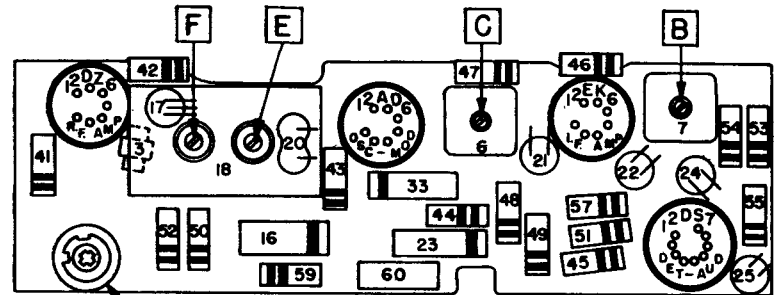
**- BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER ILLUS. 51 TO OBTAIN PROPER COLLECTOR VOLTAGE WHICH IS VOLTS INPUT TO RADIO.



DELCO
CHEVROLET MODEL 988414
 Alignment in Table 1, Page 38



BOTTOM VIEW



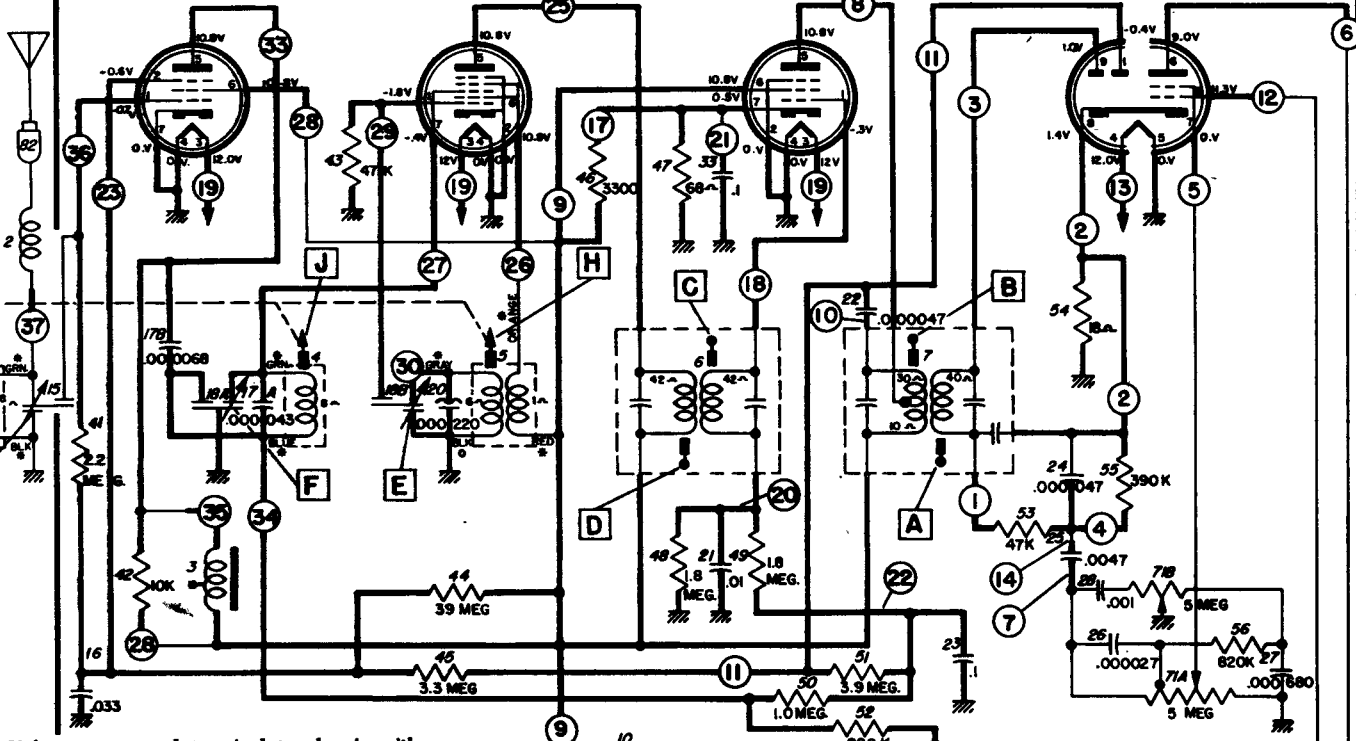
TOP VIEW

12DZ6
R.F. AMP.

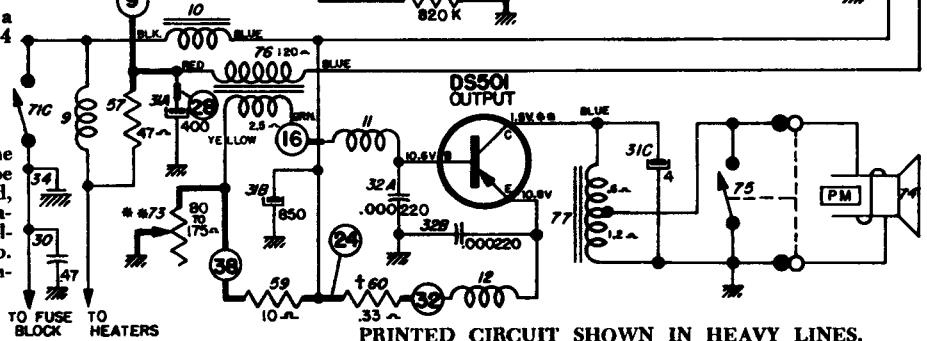
12AD6
OSC-MOD

12EK6
I.F. AMP.

12DS7
DET - AUD



Voltages measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 34
 Oscillator grid voltage taken with set tuned to 1000 KC.
 Total "A" drain at 12V. - 2.2 amps.
 Tolerance on voltages ± 10%
 ° Indicates lead from tuner coil ass'y.
 ° Before measuring transistor voltages, the shorting type speaker socket must be opened and a 4 ohm speaker connected, if transistor is replaced, adjust bias potentiometer (Illus. 73) to obtain proper collector voltage with 12 volts input to radio.
 † Illus. 60 is a fuse resistor for the transistor. Service with exact replacement.



CHEVROLET 988414

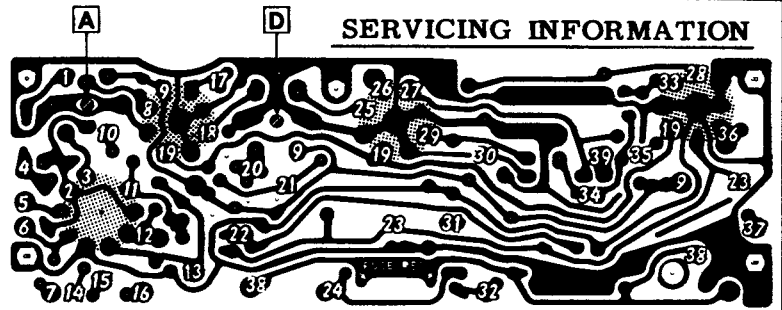
TO FUSE BLOCK
 TO HEATERS

PRINTED CIRCUIT SHOWN IN HEAVY LINES.

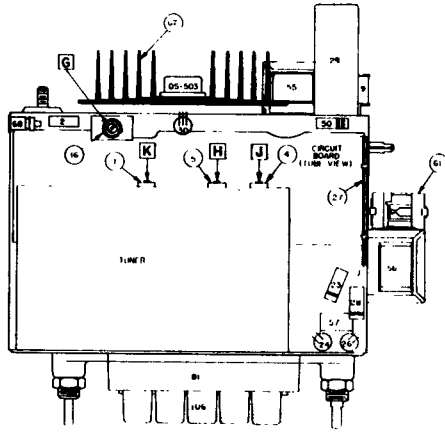
VOLUME R-21, MOST-OFTEN

DELCO
CHEVROLET CORVAIR 988468
Alignment in Table 1, Page 38

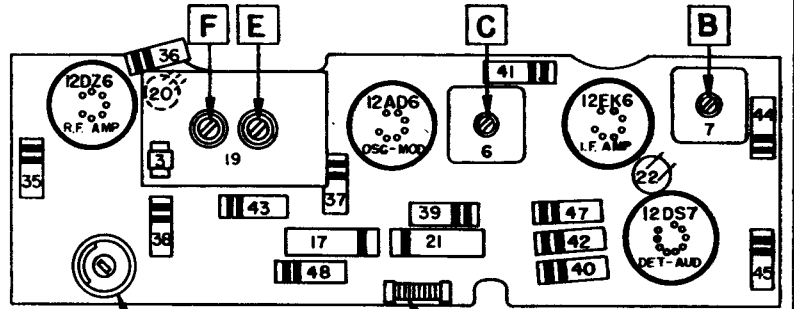
SERVICING INFORMATION



BOTTOM VIEW



TUBE VIEW



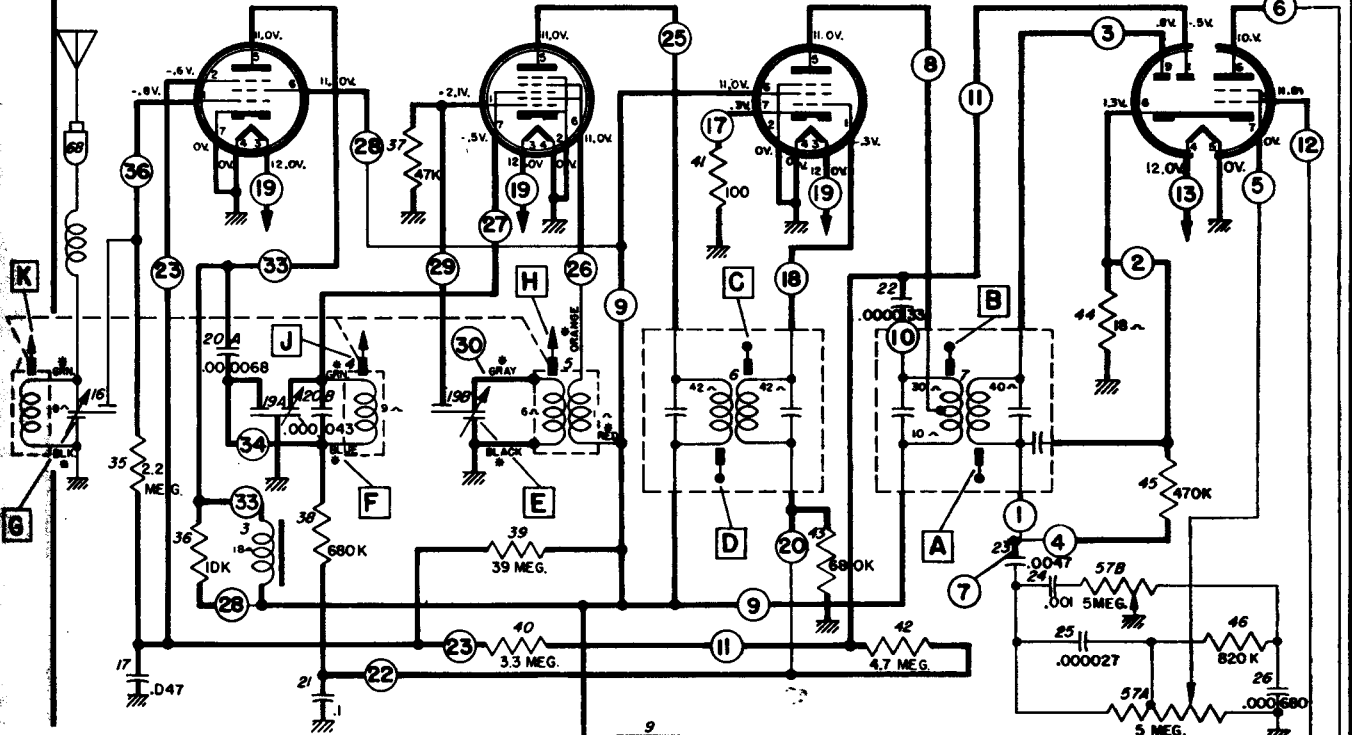
TOP VIEW

12DZ6
R.F. AMP.

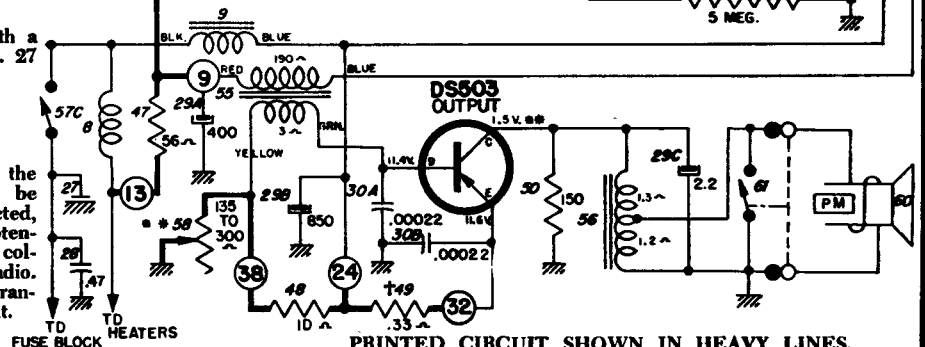
12AD6
OSC-MOD

12EK6
I.F. AMP.

12DS7
DET-AUD



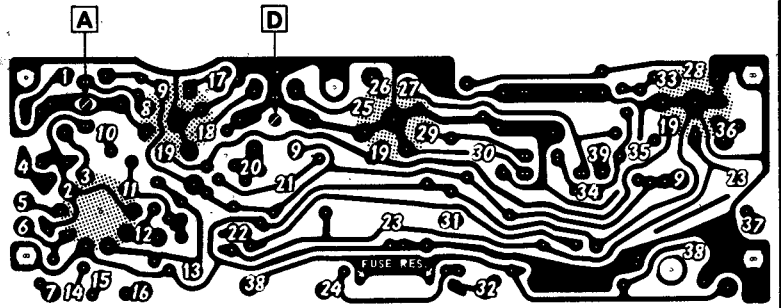
Volts measured terminal to chassis with a VVM—No signal and 12.0 volts at Illus. 27
Oscillator grid voltage taken with set tuned to 1000 KC.
Total "A" drain at 12V. - 1.6 amps.
Tolerance on voltages $\pm 10\%$
Indicates lead from tuner coil ass'y.
Before measuring transistor voltages, the shorting type speaker socket must be opened and a 4 ohm speaker connected, if transistor is replaced, adjust bias potentiometer (Illus. 58) to obtain proper collector voltage with 12 volts input to radio.
Illus. 49 is a fuse resistor for the transistor. Service with exact replacement.
CHEVROLET CORVAIR 988468



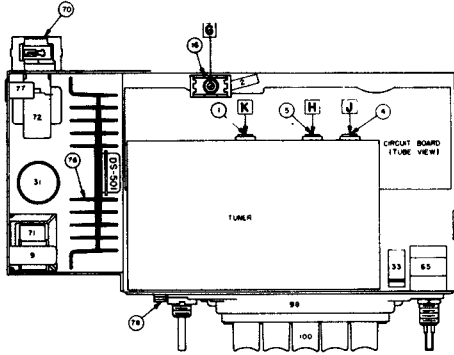
PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

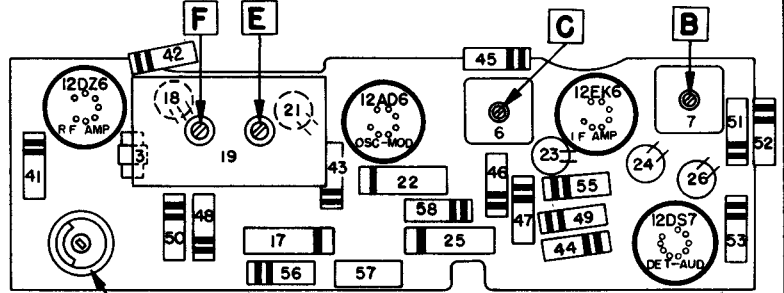
OLDSMOBILE MODEL 989392
Alignment in Table 2, Page 38



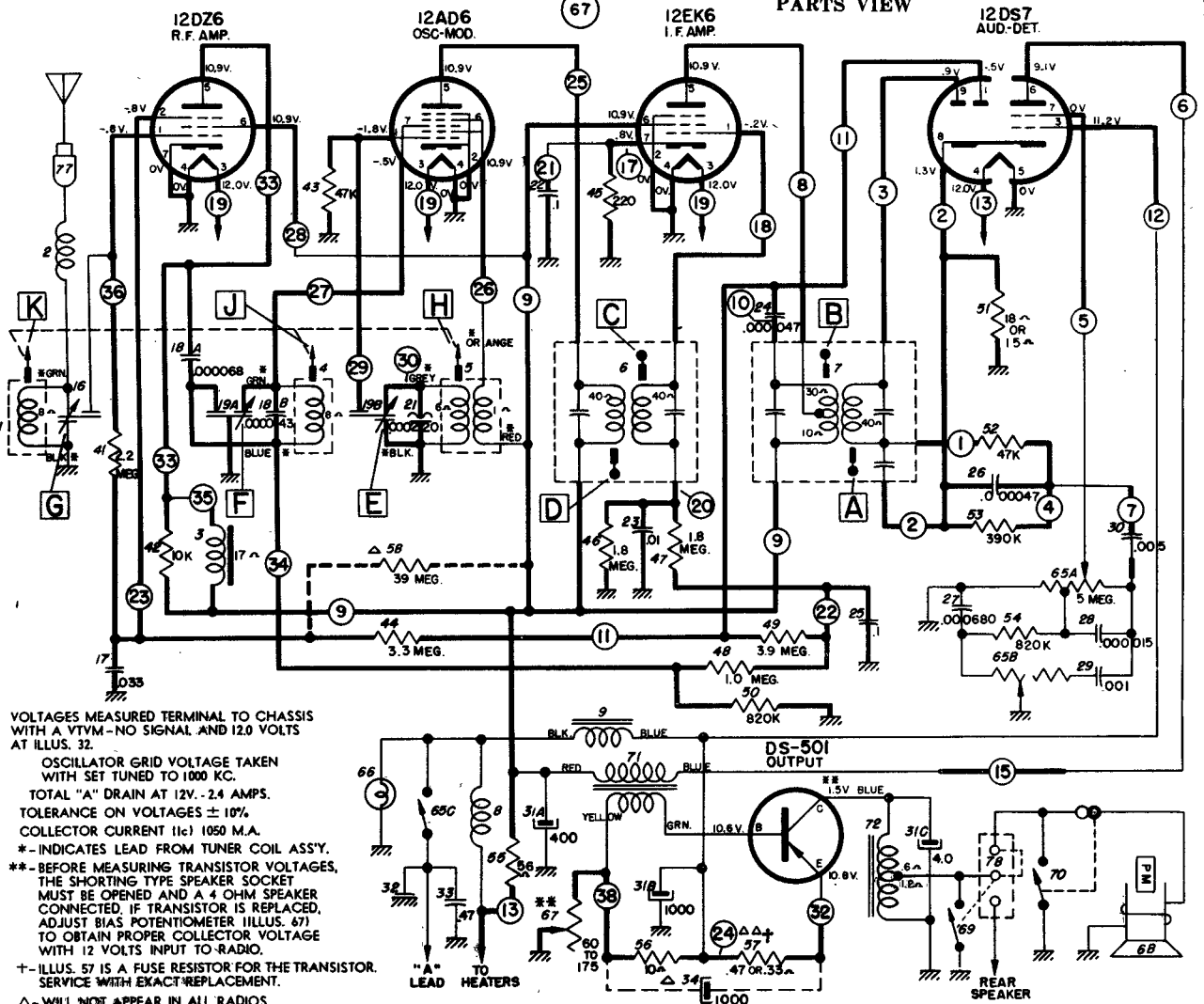
PRINTED VIEW



TUBE VIEW



PARTS VIEW



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM—NO SIGNAL AND 12.0 VOLTS AT ILLUS. 32.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12V.—24 AMPS.

TOLERANCE ON VOLTAGES ± 10%.

COLLECTOR CURRENT 11c) 1050 M.A.

*—INDICATES LEAD FROM TUNER COIL ASS'Y.

**—BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER ILLUS. 67) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

+—ILLUS. 57 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT REPLACEMENT.

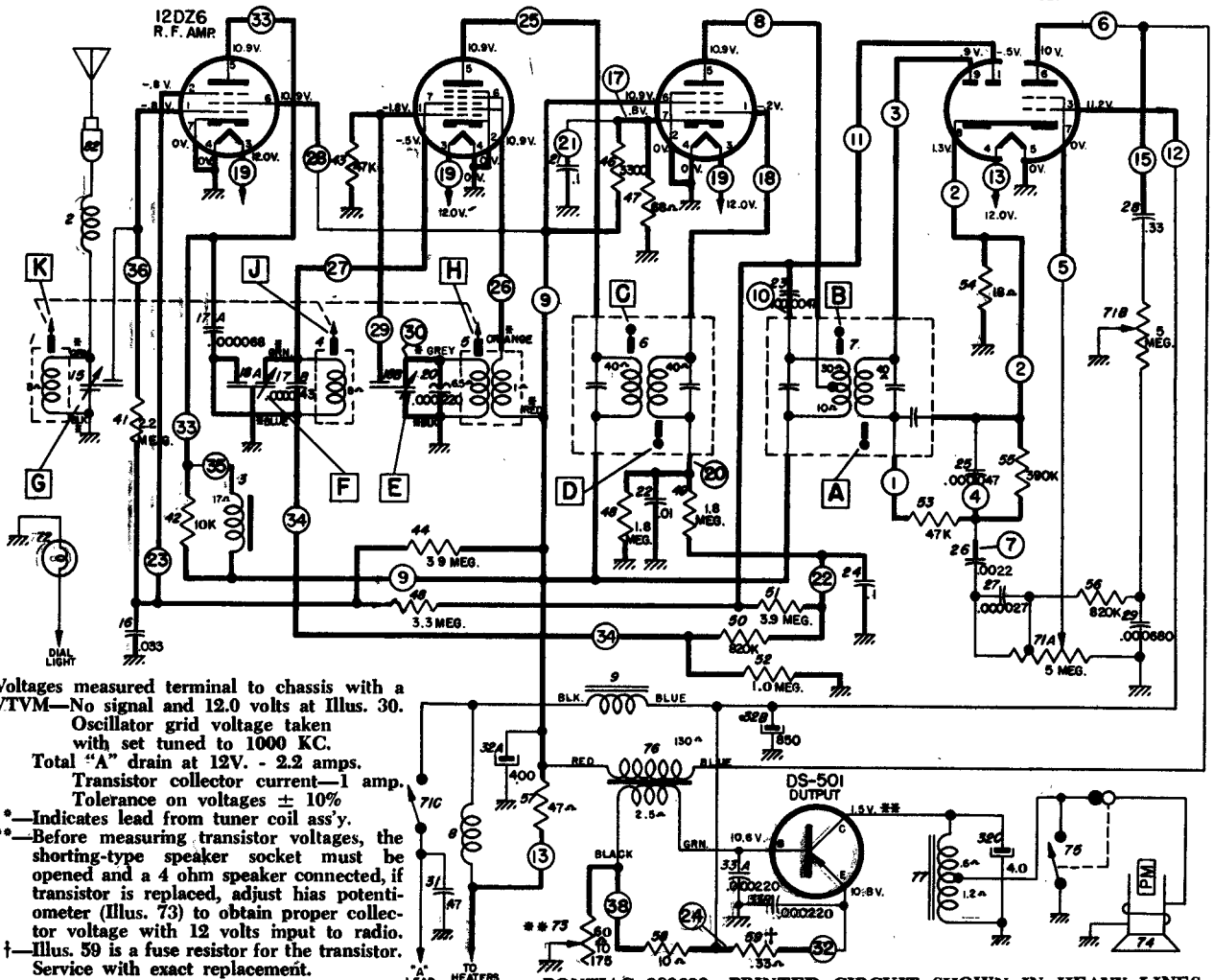
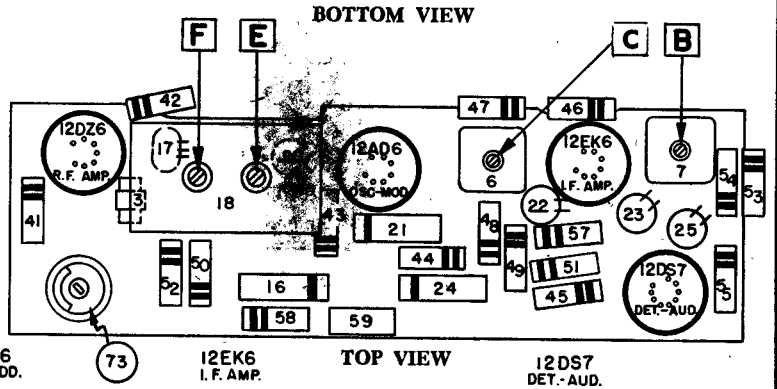
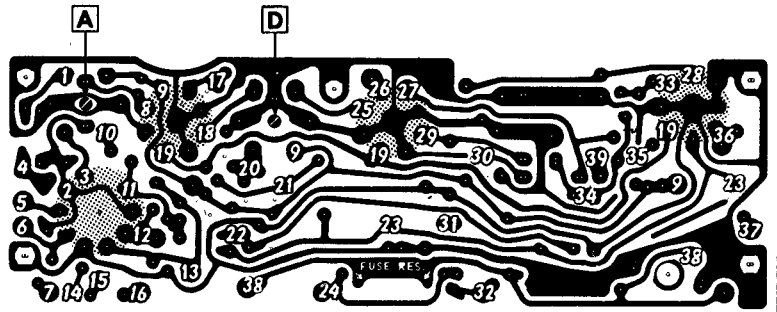
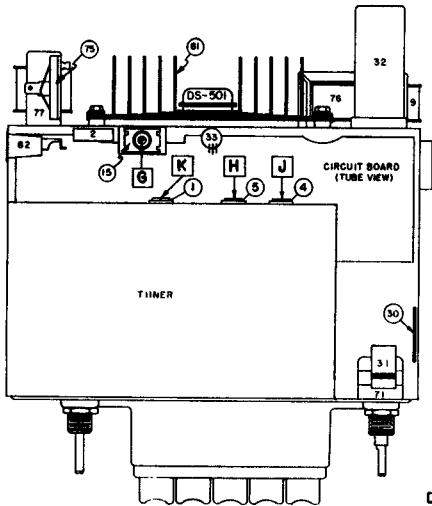
△—WILL NOT APPEAR IN ALL RADIOS

△△—33 OHM MUST BE USED WHEN ILLUS. 34 IS NOT PRESENT.

OLDSMOBILE 989392—PRINTED CIRCUIT SHOWN IN HEAVY LINES

DELCO

PONTIAC MODEL 989693
Alignment in Table 2, Page 38



Voltages measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 30.
 Oscillator grid voltage taken with set tuned to 1000 KC.
 Total "A" drain at 12V. - 2.2 amps.
 Transistor collector current—1 amp.
 Tolerance on voltages $\pm 10\%$
 *—Indicates lead from tuner coil ass'y.
 **—Before measuring transistor socket voltages, the shorting-type speaker must be opened and a 4 ohm speaker connected, if transistor is replaced, adjust bias potentiometer (Illus. 73) to obtain proper collector voltage with 12 volts input to radio.
 †—Illus. 59 is a fuse resistor for the transistor. Service with exact replacement.

PONTIAC 989693—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

DELCO Alignment Procedure for Various 1961 Auto Radios

Output Meter Connections Across Voice Coil
 Generator Return To Receiver Chassis
 Dummy Antenna In Series With Generator
 Volume Control Position Maximum Volume
 Generator Output Minimum for Readable Indication

TABLE 1, Alignment for Buick 980134, Chevrolet 988414, Chevrolet Corvair 988468

STEP	SERIES CONDENSER OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, D, C
2	.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	.000082 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	.000082 Mfd.	Antenna Connector	1100 KC	Signal Generator Signal	L**

TABLE 2, Alignment for Oldsmobile 989392 and Pontiac Model 989693

STEPS	SERIES CAPACITOR OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1100 KC	Signal Generator Signal	L**

TABLE 3, Alignment for Buick 980132 and Oldsmobile Model 989387

STEPS	SERIES CONDENSER OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, D, C
2	.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	.000082 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	.000082 Mfd.	Antenna Connector	900 KC	Signal Generator Signal	L***

TABLE 4, Alignment for Chevrolet Model 988413

STEPS	SERIES CAPACITOR OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC	High Frequency Stop	A, B, C, D,
2	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G,
3	0.000082 Mfd.	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000082 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G

*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1 5/8" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustment should be made with a non-metallic screw driver.

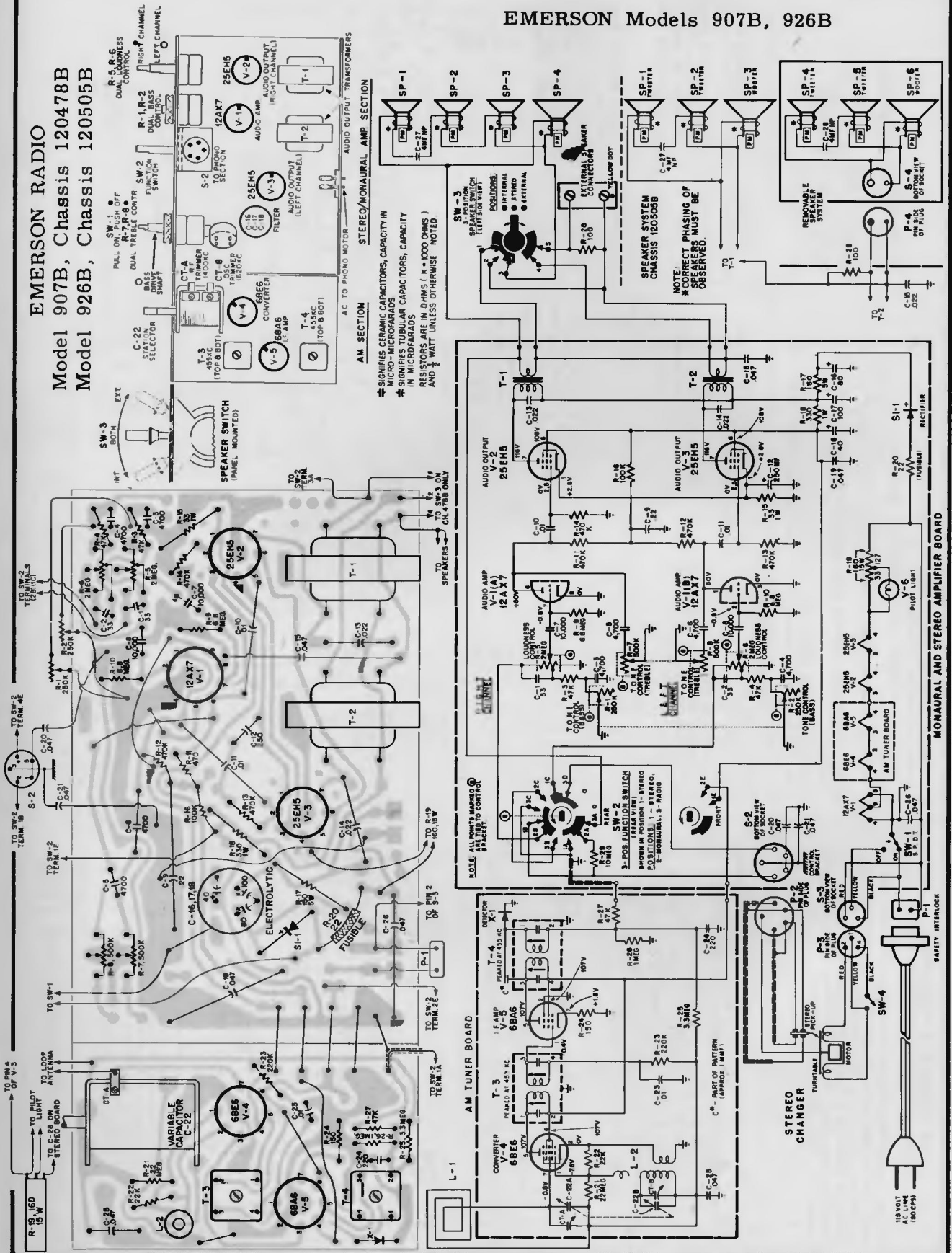
**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 1100 K.C. mark on the dial.

***L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 900 KC mark on the dial.

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 and 1000 KC (see sticker on case.)

EMERSON Models 907B, 926B

EMERSON RADIO
Model 907B, Chassis 120478B
Model 926B, Chassis 120505B



EMERSON RADIO Models 920 and 925 Chassis 120494B

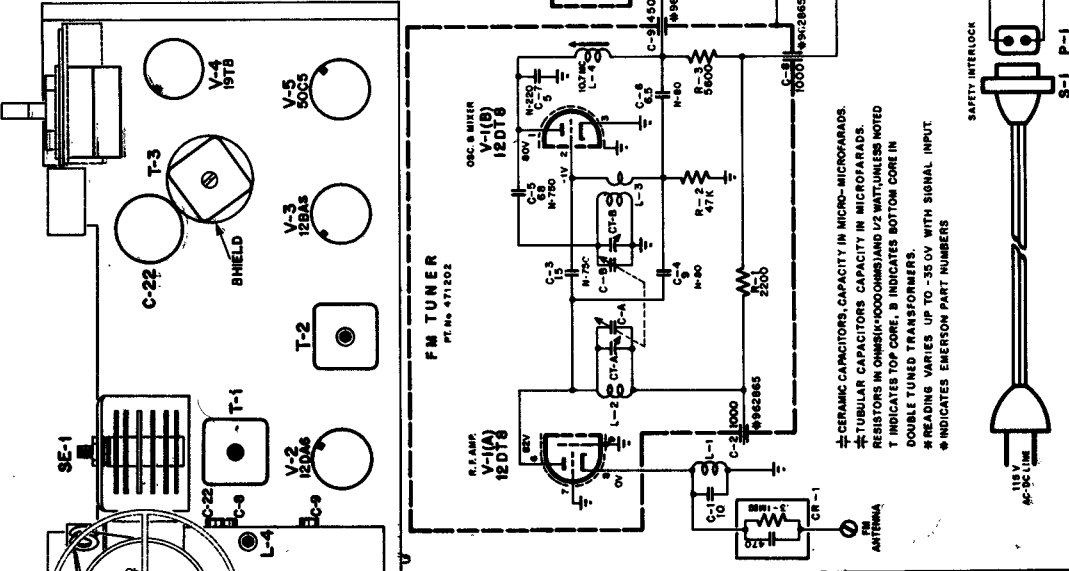
1. Voltages indicated are positive DC, resistances in ohms, unless otherwise indicated.
2. Measurements made with Voltchmyst or equivalent.
3. All measurements taken between pin and chassis ground.
4. All voltage measurements taken under the following conditions:
 - a) Line voltage maintained at 117 volts.
 - b) Tuning control turned fully counterclockwise (low end)

I.F. ALIGNMENT PROCEDURE USING R.F. GENERATOR AND VTVM

Use of this method requires balancing of the ratio detector output before attempting alignment. To accomplish this, construct a voltage divider network by placing two 100 K resistors in series and wire them across C-17 (2 mfd. stabilizer capacitor). Be sure to remove this network after completion of the alignment procedure.

R-11
VOLUME CONTROL

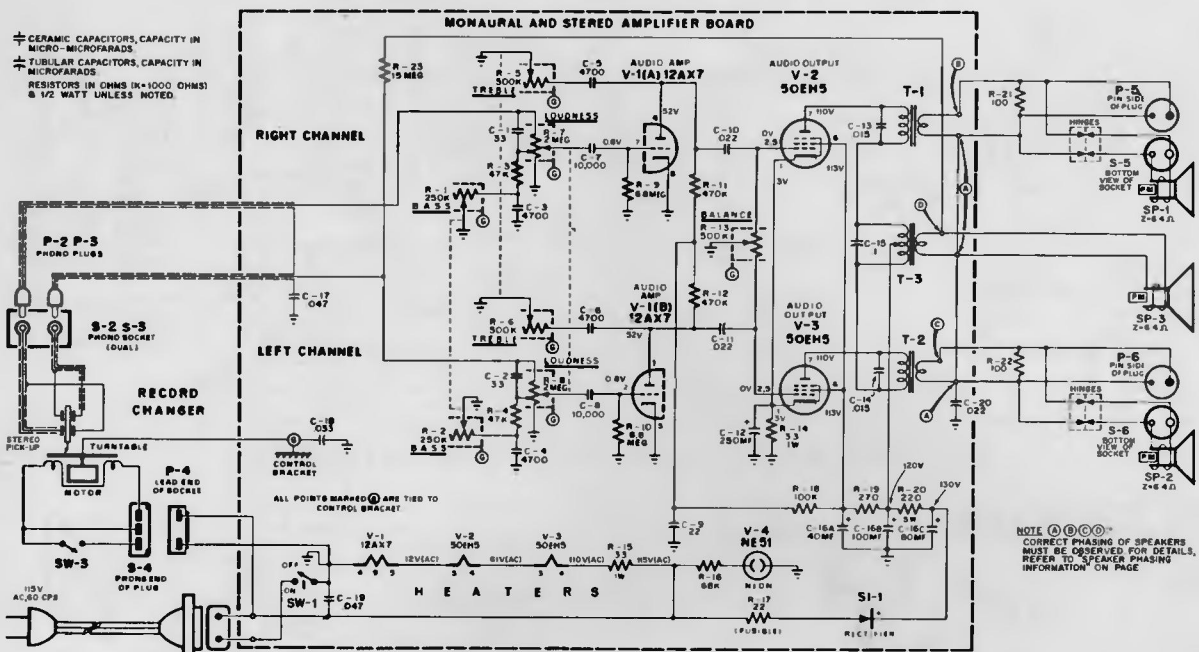
STEP	SIGNAL GENERATOR		DIAL SETTING	VTVM	ADJUST	REMARKS
	COUPLING	FREQUENCY				
1.	High side to ant. input, low side to chassis through a .25 mfd. capacitor.	10.7 MC (unmod.)	Extreme CCW pos. (low end)	Across C-17 (near V-4). Use negative scale.	T-3 bottom, T-2 bottom, T-2 top, T-1 (1st IF), L-4 mixer coil.	Adjust in order given for max. neg. voltage. Maintain sig. gen. put for readings under 2 volts.
2.	" "	" "	" "	" "	T-1 (1st IF)	Return for max. neg. voltage.
3.	" "	" "	" "	One side of meter to center-top of voltage divider network across C-17, other side to junction of R-8, C-14.	T-3 Top	Adjust for 0 volts output between pos. and neg. meter swing.



- ⊕ CERAMIC CAPACITORS, CAPACITY IN MICRO-MICROFARADS.
- ⊕ TUBULAR CAPACITORS, CAPACITY IN MICROFARADS.
- ⊕ RESISTORS IN OHMS/K/Ω/10K/Ω/100K/Ω/1M/Ω/10M/Ω
- T INDICATES TOP CORE, B INDICATES BOTTOM CORE IN DOUBLE TUNED TRANSFORMERS.
- * READINGS VARY UP TO .35 VOL WITH SIGNAL INPUT.
- ⊕ INDICATES EMERSON PART NUMBERS

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

EMERSON RADIO Model 938B, Chassis 120559B



Voltage measurements taken with:
 A) Line voltage maintained at 115 volts A.C.
 B) Loudness control set for minimum volume.
 C) Record changer in "off" position.

MODEL: 938-B

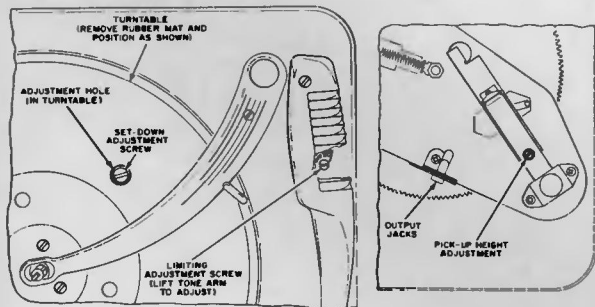
CHASSIS 120559-B

TO REMOVE CHASSIS

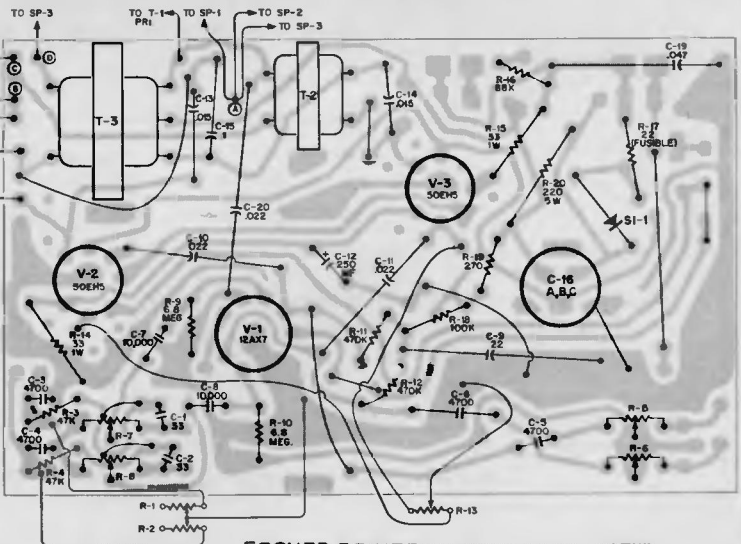
- Remove record changer and mounting board assembly as outlined above.
- Remove knobs from amplifier control panel at front of cabinet.
- Remove screws used to secure AC interlock bracket to cabinet.
- Slide pilot light and socket assembly from its holder.
- Unclip connectors for the right channel, center channel and left channel loudspeakers from their respective terminals.

NOTE: Care must be taken to mark all speaker leads in some manner before disconnecting, to assure proper re-connection of each during re-assembly.

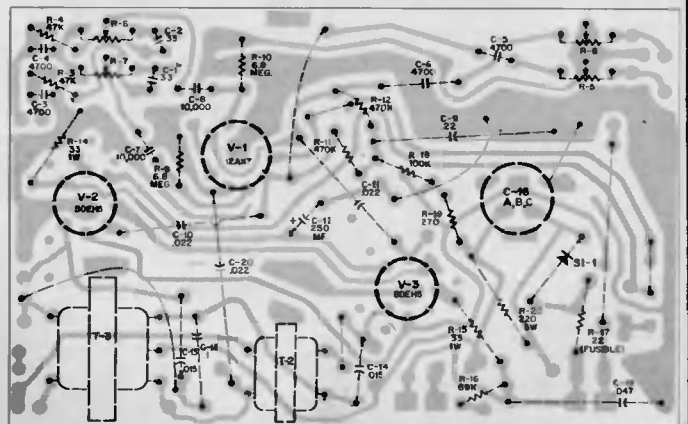
- Remove four Palnuts used to secure chassis and remove chassis from cabinet.
- Re-assemble in reverse order.



RECORD CHANGER 819170, ADJUSTMENT SETTINGS



ETCHED PRINTED CIRCUIT (TOP VIEW)

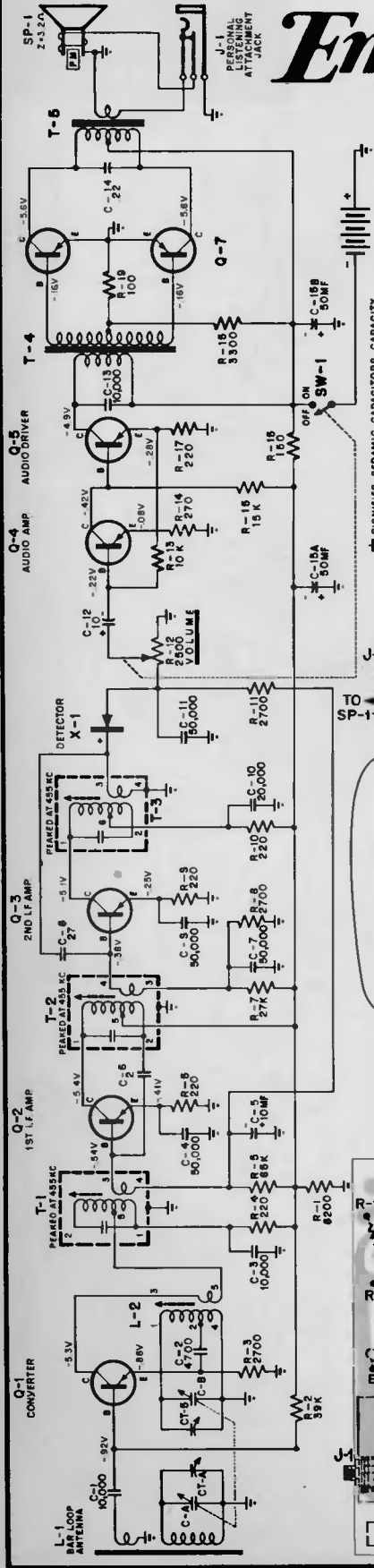


ETCHED PRINTED CIRCUIT (BOT. VIEW)

Emerson

MODEL: 977
 'FALCON'
 CHASSIS 120528

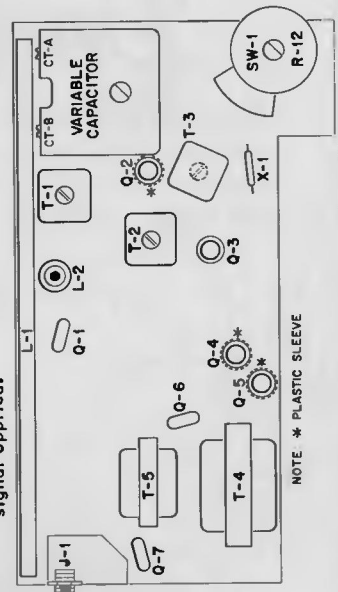
PUSH-PULL
 AUDIO OUTPUT
 Q-8



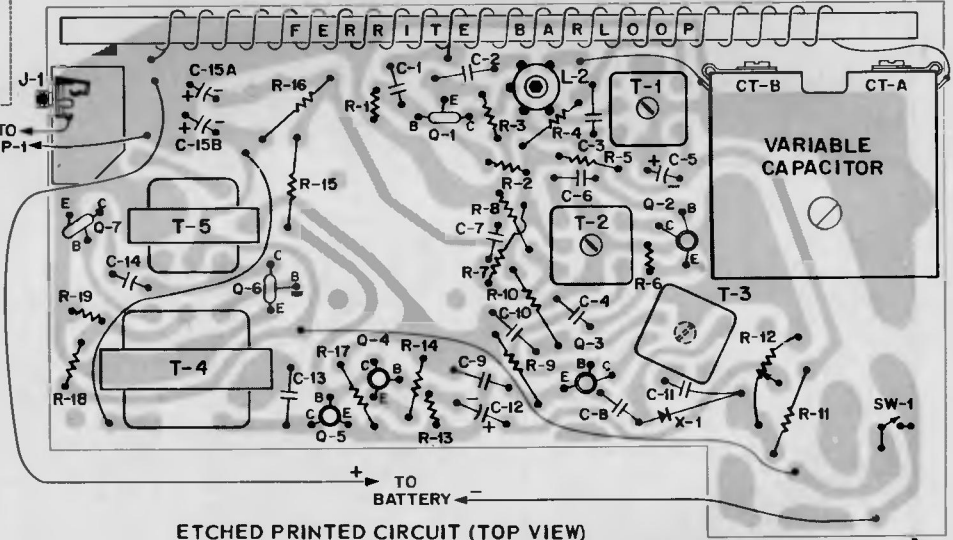
⊕ SIGNIFIES CERAMIC CAPACITORS, CAPACITY IN MICRO-MICROFARADS
 ⊕ SIGNIFIES MICROFARAD CAPACITORS, CAPACITY IN MICROFARADS
 ⊕ RESISTORS ARE IN OHMS (R*1000 OHMS) AND 1/2 WATT

CONDITIONS FOR VOLTAGE READINGS, CHASSIS 120528

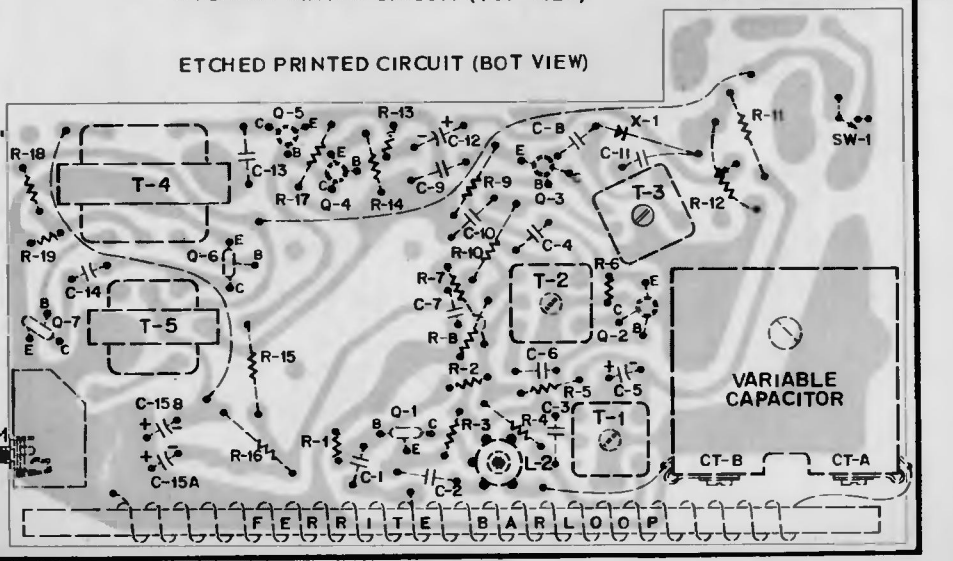
1. Voltages indicated are negative D.C.
 2. All measurements taken between points and chassis.
 3. Voltage measurements taken with:
 - (a) VTVM
 - (b) Fresh 6 Volt battery supply. Four 1½ Volt conventional penlight cells.
- NOTE: Should Mercury or Nickel-Cadmium batteries be used, on approx. 15% lower 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.



NOTE: * PLASTIC SLEEVE



ETCHED PRINTED CIRCUIT (TOP VIEW)

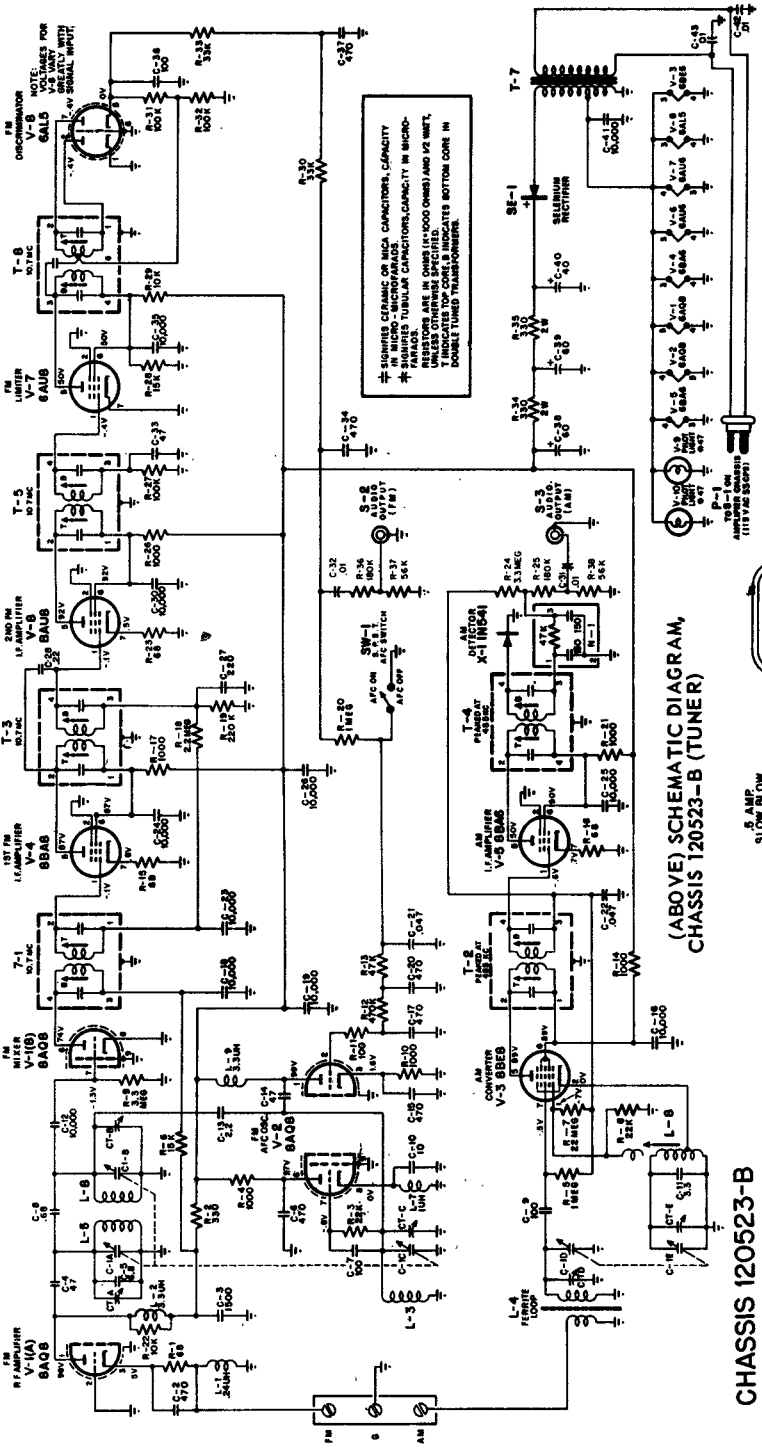


ETCHED PRINTED CIRCUIT (BOT VIEW)

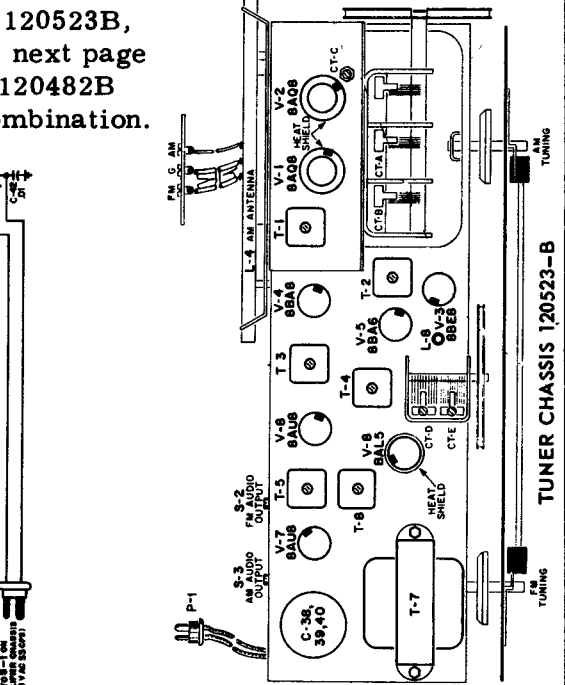
Emerson Radio

MODEL 944-B
CH-120522-B (AUDIO)
CH-120523-B (TUNER)

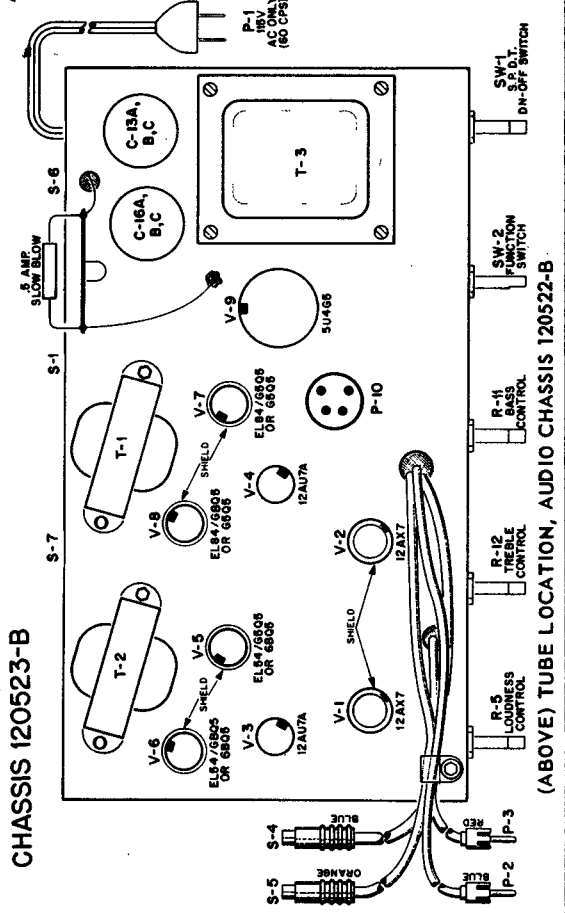
Model 944B, using Audio 120522B and Tuner 120523B, has essential information on this page and the next page adjacent at right. Model 914B, using Tuner 120482B and Audio 120483B, is very similar to this combination.



(ABOVE) SCHEMATIC DIAGRAM, CHASSIS 120523-B (TUNER)

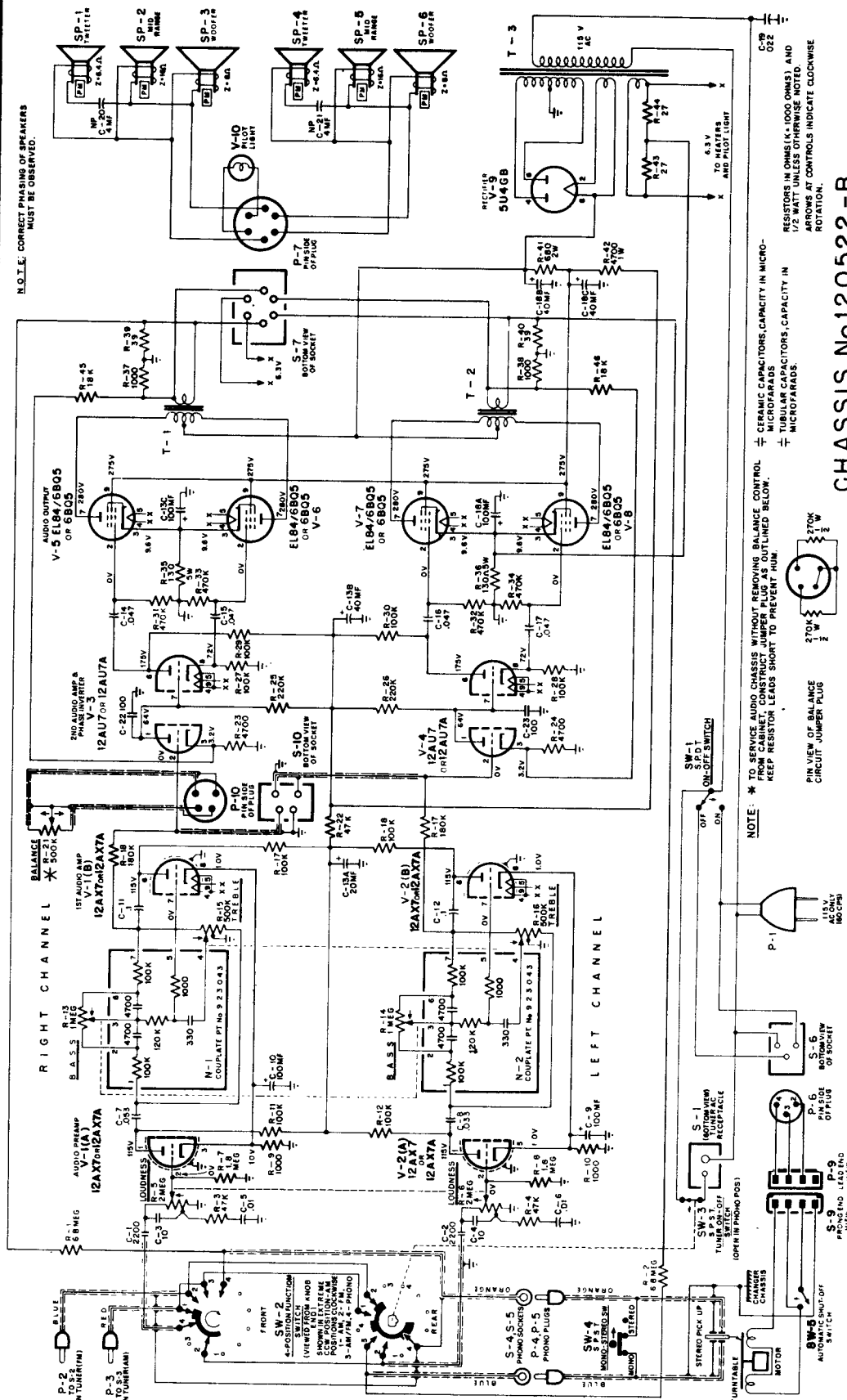


TUNER CHASSIS 120523-B



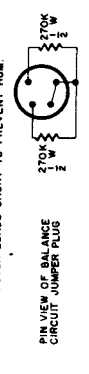
(ABOVE) TUBE LOCATION, AUDIO CHASSIS 120522-B

SCHEMATIC DIAGRAM, CHASSIS 120522-B (AUDIO)



NOTE: CORRECT PHASING OF SPEAKERS MUST BE OBSERVED.

NOTE: * TO SERVICE AUDIO CHASSIS WITHOUT REMOVING BALANCE CONTROL, PIN VIEW OF BALANCE JUMPER PLUG AS OUTLINED BELOW. KEEP RESISTOR LEADS SHORT TO PREVENT HUM.



CHASSIS No.120522-B

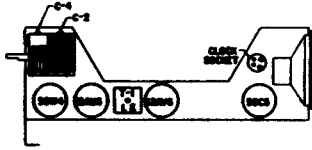
1. Voltages are positive DC, resistances in ohms, unless otherwise indicated.
2. All measurements taken with VoltOhmyst or equivalent.
3. All measurements taken between tube pin and chassis unless otherwise noted.
4. Voltage measurements made with:
 - a) Line voltage maintained at 115 volts AC.
 - b) Loudness control set for minimum volume (max CCW), all others set at mid-range (FM) to tuner chassis.
 - c) No signal input (AM or FM) to audio chassis.
 - d) No signal input to audio chassis.
 - e) SW-2 (on audio chassis) may be in any position.

EMERSON RADIO AND PHONOGRAPH CORP.

Model 944B, using Audio Chassis 120522B and Tuner Chassis 120523B;
 Model 914B, using Tuner Chassis 120482B and Audio Chassis 120483B,
 are very similar to 944B covered on this and preceding page.

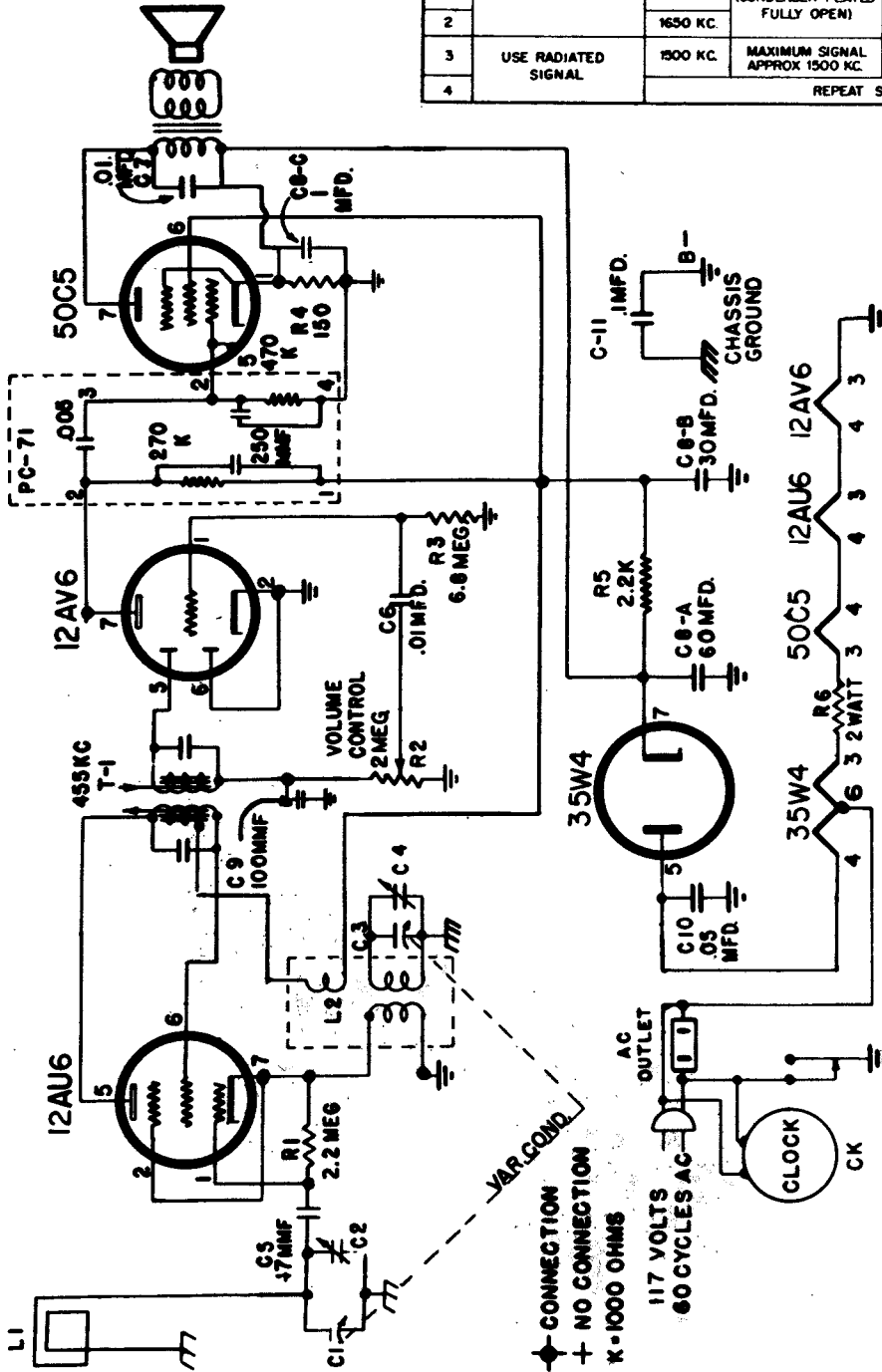
Gamble-Skogmo, Inc.

CORONADO MODEL RA 48-8182A



ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN RECEIVER DIAL TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1MFD. COND.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN)	BOTTOM & TOP OF T-1 IN SAME ORDER (I F TRANSFORMER)
2		1650 KC.		C4 (OSCILLATOR TRIMMER)
3	USE RADIATED SIGNAL	1500 KC.	MAXIMUM SIGNAL APPROX 1500 KC.	C2 (ANTENNA TRIMMER)
4			REPEAT STEPS 2 AND 3	



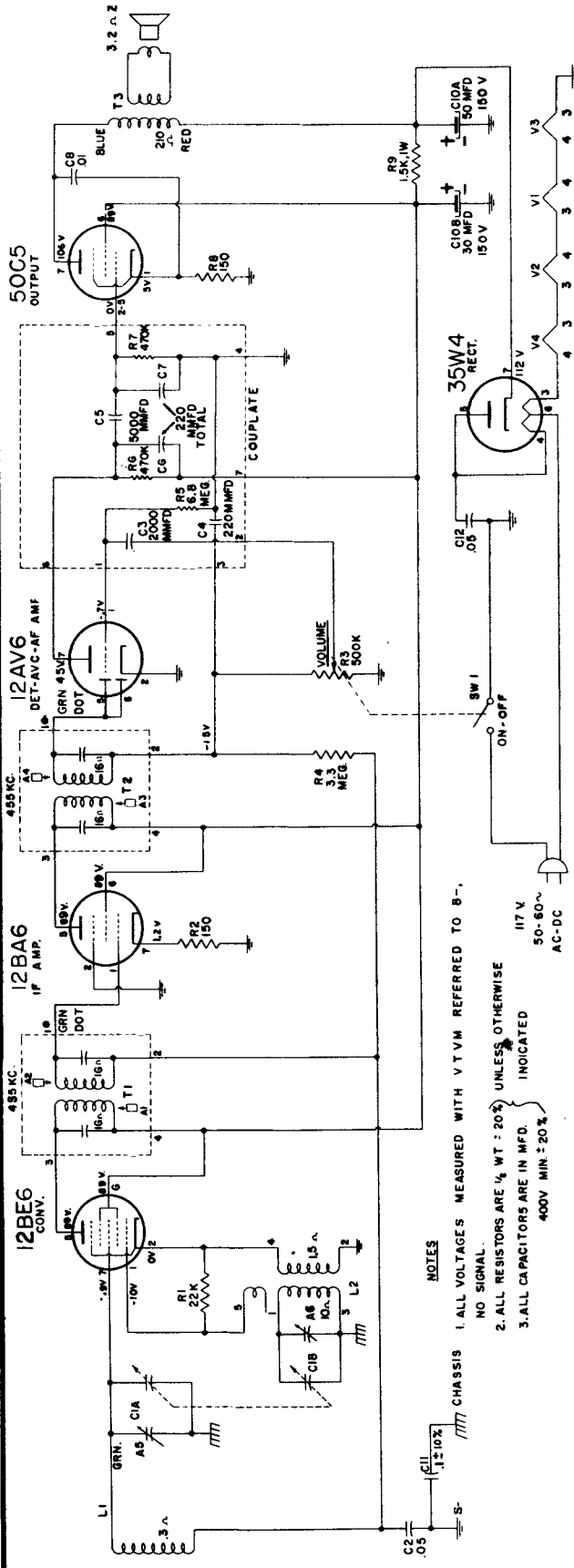
AS A MUSICAL WAKE-UP ALARM

1. Adjust the volume and tune the radio to the desired station you would like to hear in the morning.
2. Set the Red hand to the time you want to be awakened by gently moving the "Alarm and Time Set Knob" forward — toward front of cabinet.
3. Turn the Knob at hour 6 to "Auto" position. The radio is now set to be turned on automatically at the desired time.

ELECTRICAL SPECIFICATIONS

- Power Supply 117 Volts AC
- Frequency Range 540-1650 KC
- Intermediate Frequency 455 KC
- Sensitivity 3000 microvolts on loop for 50 MW output
- Selectivity 10 KC 2X at 455 KC
- Speaker 4" Alnico PM 3.2 Ohm voice coil
- Power Consumption 30 Watts
- Power Output 1.5 Watts, undistorted

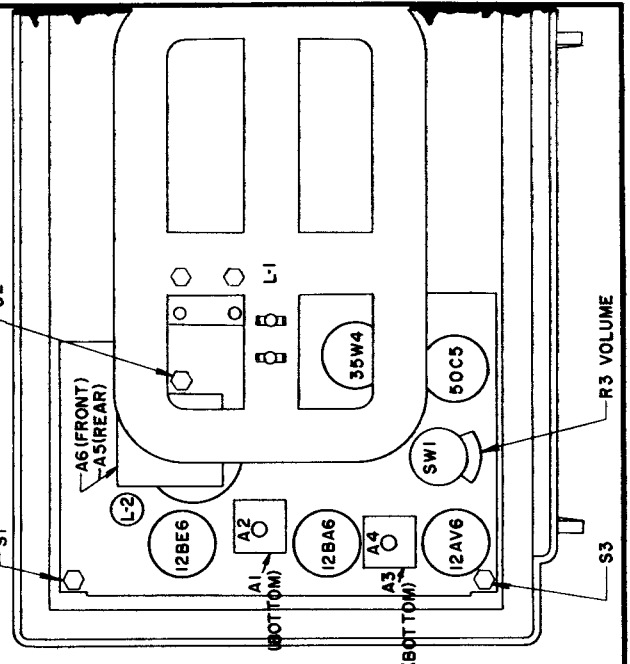
VOLUME R-21, MOST-OFTEN-NEEDED



NOTES
 1. ALL VOLTAGES MEASURED WITH V TVM REFERRED TO B-, NO SIGNAL.
 2. ALL RESISTORS ARE 1/4 WT. ± 20% UNLESS OTHERWISE INDICATED
 3. ALL CAPACITORS ARE IN MFD. 400V MIN. ± 20%
 117 V AC-DC

STEP	Set receiver dial to:	Adjust dummy antenna in series with output of signal generator consisting of:	Attach output of Signal Generator to:	Refer to Fig. 1 for location of alignment adjustments.
1.	Tuning gang fully open (Minimum capacity)	455 KC .05 MFD Condenser 400V.	High side of signal generator to mixer grid. Ground lead of generator through .05 to chassis	Using a non-metallic alignment tool, adjust all the I.F. transformer cores for maximum output.
2.	Tuning gang fully open (Minimum capacity)	1640 KC	Loosely couple generator output to loop antenna. Bring a short length of insulated hookup wire fashioned into a coil of a few turns close to the antenna loop and connect generator output to one end of this wire. Signal generator ground remains connected through .05 MFD condenser to chassis.	Adjust trimmer A6 for maximum output.
3.	1400 KC	1400 KC	Leave connected as above.	Adjust trimmer A5 for maximum output.

CAUTION: Be sure during RF alignment that the hand, or any objects on the bench, do not come in close contact with the antenna loop or detuning will occur and alignment will be incorrect. Wherever possible, RF alignment should be completed with chassis in its normal position in its cabinet.



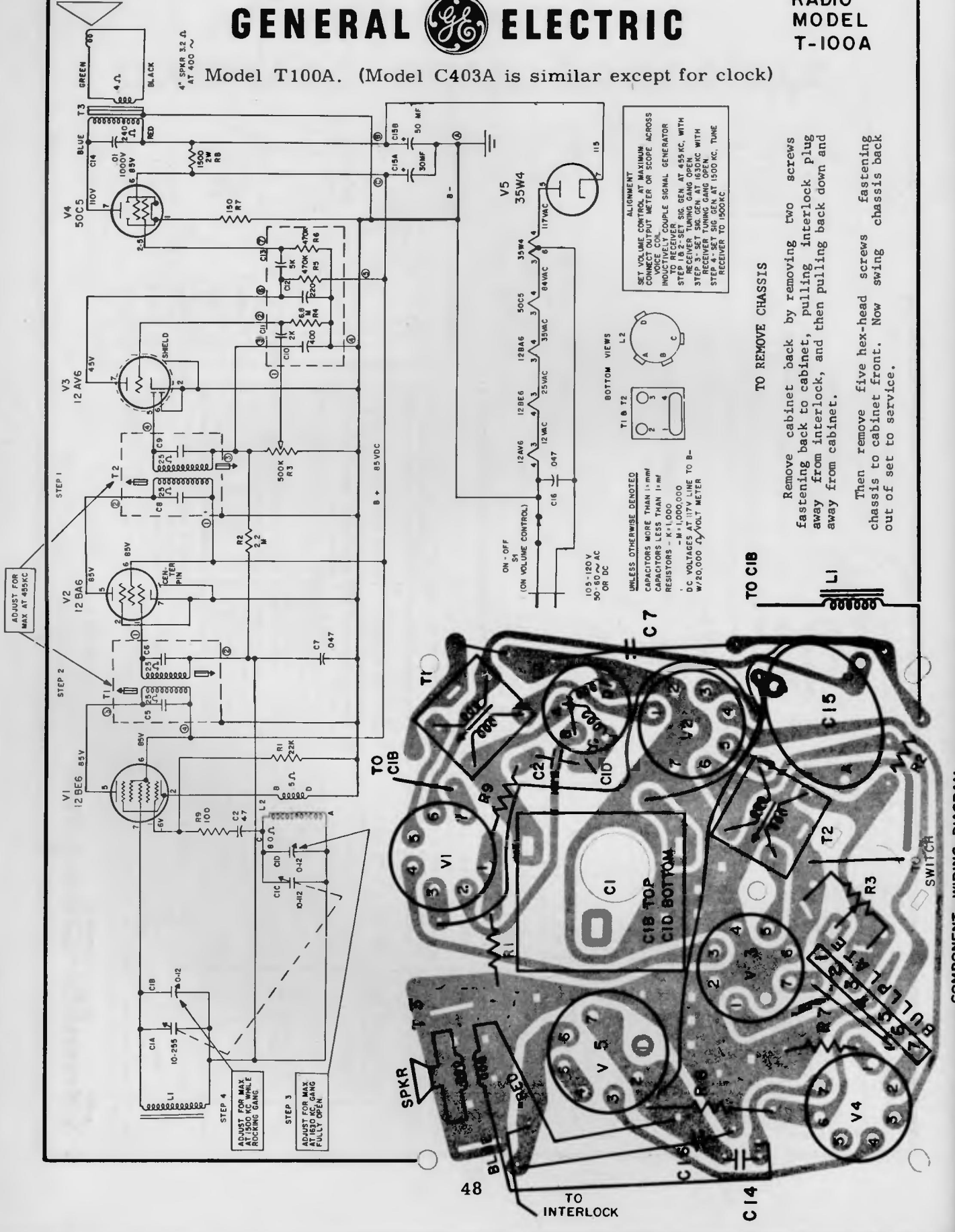
CORONADO MODELS
 RA 50-8231 & RA 50-8232

Gamble-Skogme.

GENERAL ELECTRIC

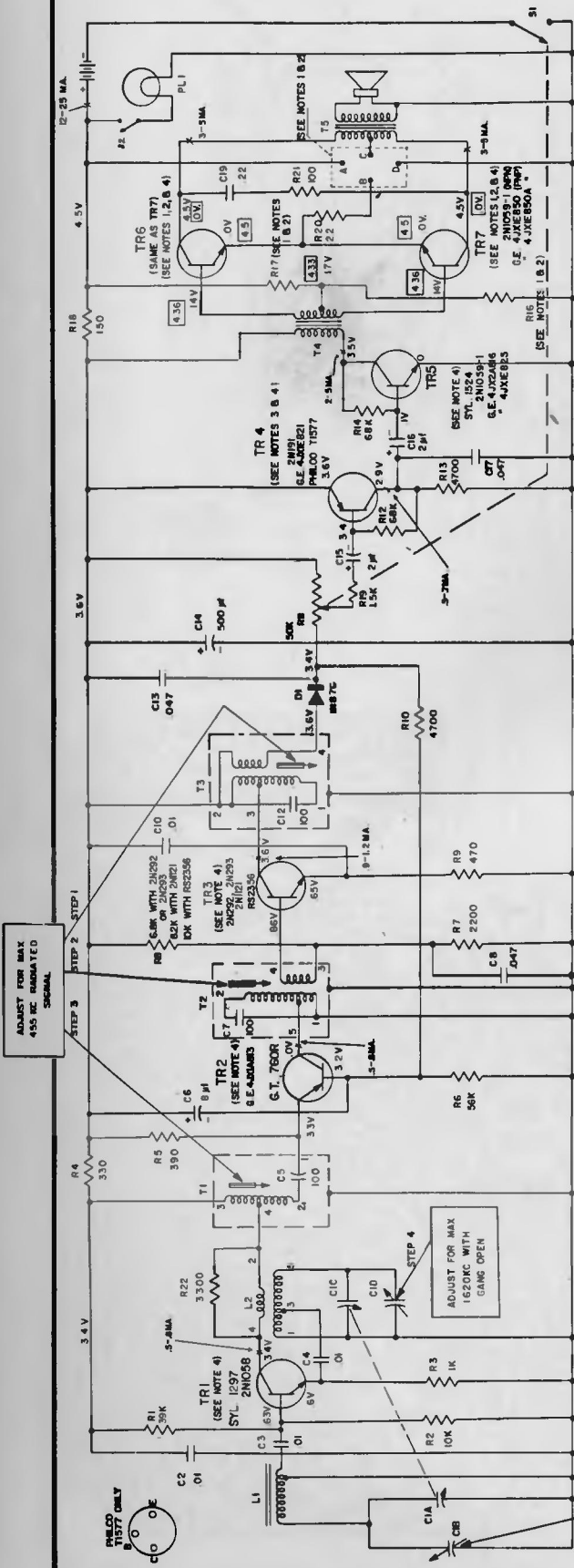
RADIO
MODEL
T-100A

Model T100A. (Model C403A is similar except for clock)



GENERAL ELECTRIC

Radio Models T145A, T146A

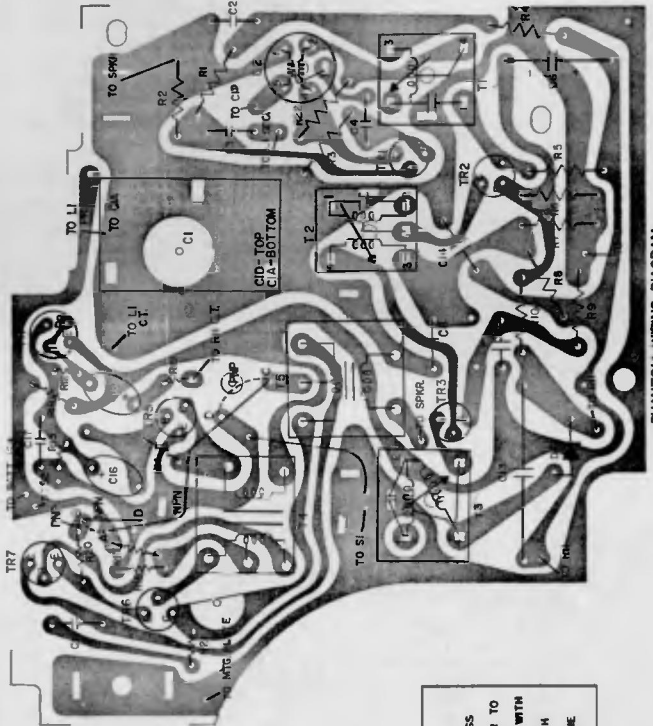


CAPACITORS

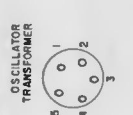
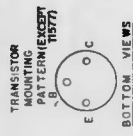
- C1 -- Tuning Cap.
- C2 -- .01mf.
- C3 -- .01mf.
- C4 -- .01mf.
- C6 -- 8mf.
- C8 -- .047mf.
- C10 -- .01mf.
- C13 -- .047mf.
- C14 -- 500mf.
- C15 -- 2mf.
- C16 -- 2mf.
- C17 -- .047mf.
- C19 -- .22mf.

RESISTORS

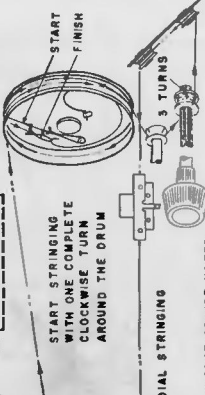
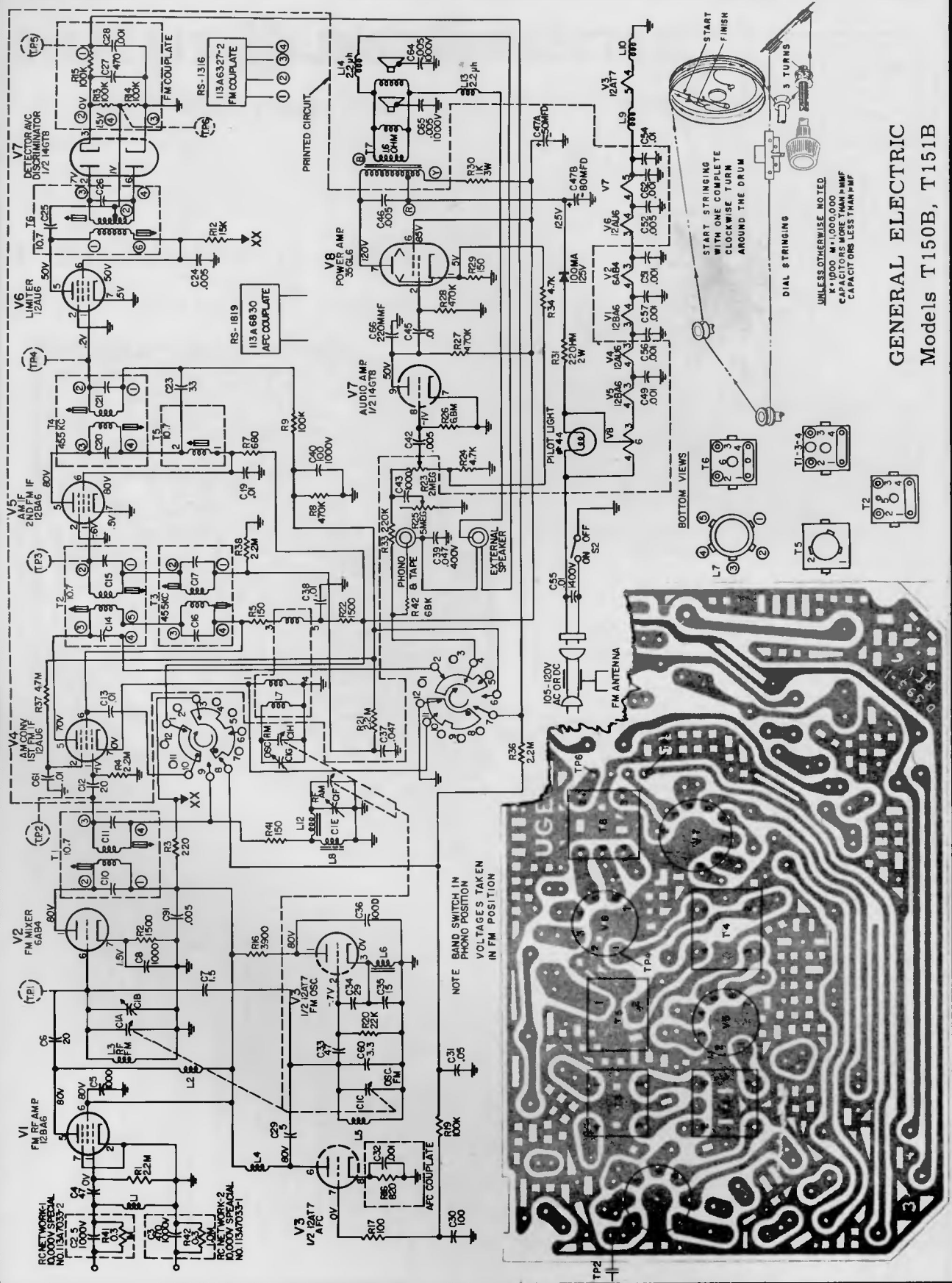
- R1 -- 39K
- R2 -- 10K
- R3 -- 1K
- R4 -- 330
- R5 -- 390
- R6 -- 56K
- R7 -- 2.2K
- R8 -- 6.8K, 8.2K, or 10K
- R9 -- 4.7K
- R10 -- 50K
- R11 -- 50K
- R12 -- 68K
- R13 -- 4.7K
- R14 -- 68K
- R16 -- (See Notes)
- R17 -- (See Notes)
- R18 -- 150
- R19 -- 1.5K
- R20 -- 2.2K
- R21 -- 100
- R22 -- 3.3K



PHANTOM WIRING DIAGRAM



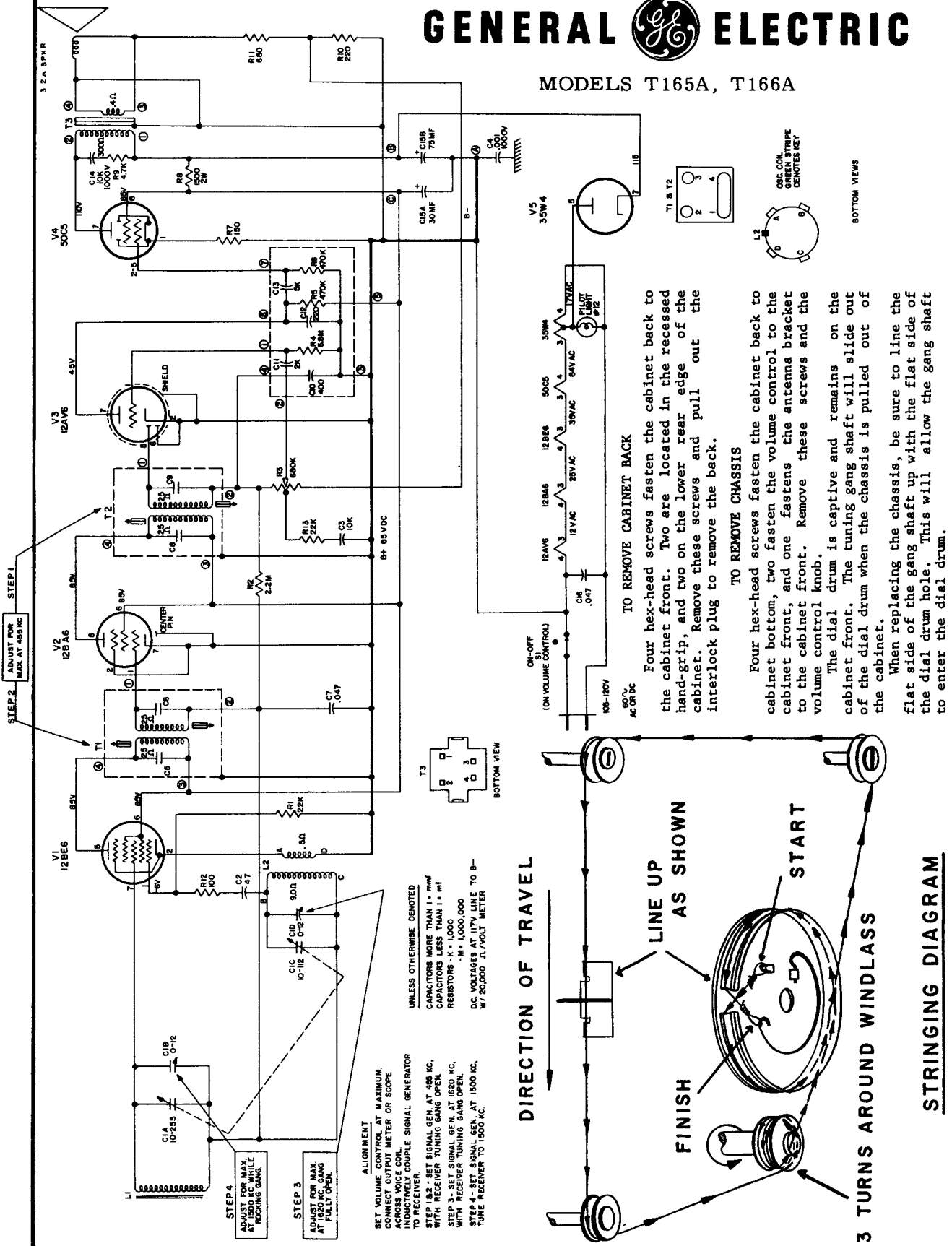
- NOTES-**
1. FOR MPN TR6 & TR7
 - A. CONNECT A JUMPER WIRE BETWEEN POINTS B & D. (SEE PHANTOM WIRING DIAGRAM)
 - B. C. R6 MUST BE 50 OHMS.
 - D. R7 MUST BE 1K.
 2. FOR PNP TR5 & TR7
 - A. CONNECT A JUMPER WIRE BETWEEN POINTS A & B. (SEE PHANTOM WIRING DIAGRAM)
 - B. C. R6 MUST BE 1K.
 - D. R7 MUST BE 50 OHMS.
 3. TET7 (PHILO) TRANSISTOR BASE LEAD MUST BE SOLDERED INTO B2 AS SHOWN ON PHANTOM WIRING DIAGRAM. BASE LEAD OF ALL OTHER RECOMMENDED TRANSISTORS FOR TR4 MUST BE SOLDERED INTO B1.
 4. REPLACE WITH TRANSISTOR TYPES SHOWN.
 - 5. UNLESS OTHERWISE NOTED-- CAPACITORS MORE THAN 1.0 MF CAPACITORS LESS THAN 1.0 MF RESISTORS ARE 1/2 WATT K = 1000
 - 6. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS.
 - 7. VOLTAGES SHOWN IN ARE WITH TR6 & TR7 PNP.

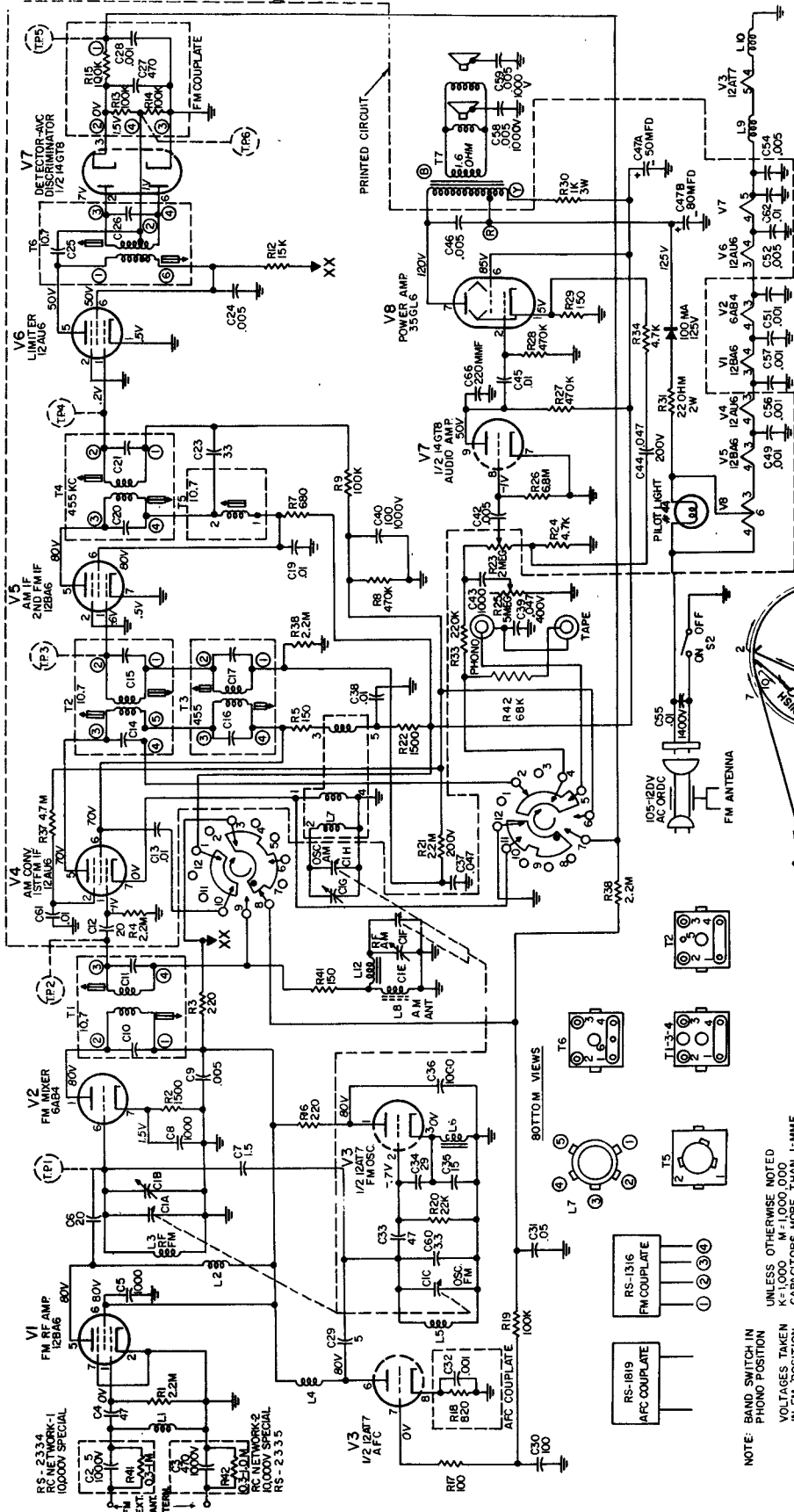


GENERAL ELECTRIC
Models T150B, T151B

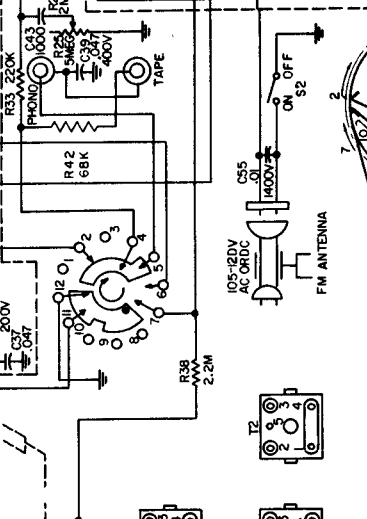
GENERAL ELECTRIC

MODELS T165A, T166A





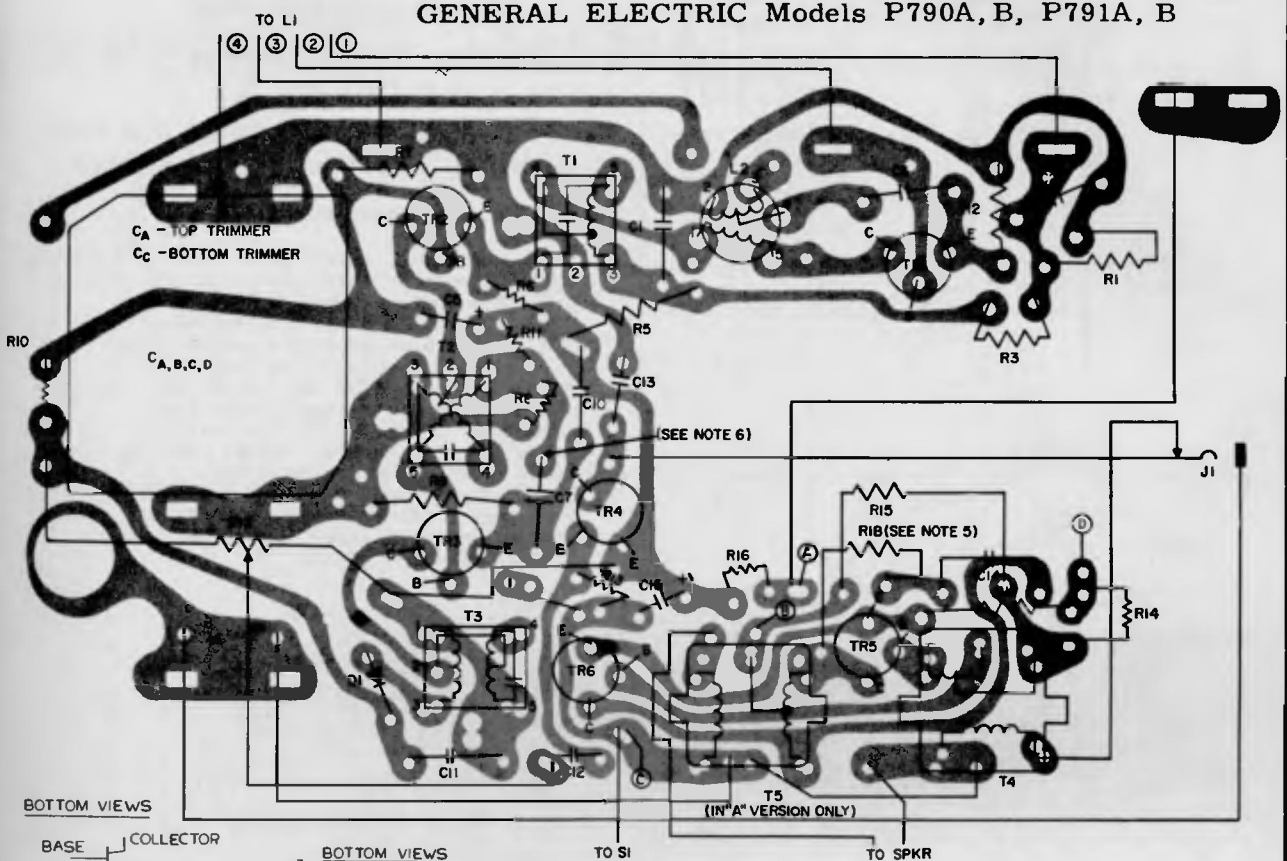
- FM OSCILLATOR COIL**
- The FM oscillator coil, L5, may require adjustment if components, other than tubes, are changed in the FM oscillator-mixer section. Check the band end frequencies. If the set tunes through 108 and 88 MC do not touch the coil. If the oscillator frequency is low, adjust L5 by spreading the turns slightly. (This raises the dial frequency.) If the oscillator frequency is high, adjust L5 by squeezing the turns together slightly. (This lowers the dial frequency.)
- NOTE:** A small change in the space between 2 turns of L5 shifts the frequency approximately 1 MC.
- TO REMOVE CABINET**
1. Remove 2 cab. rear screws & separate front & back.
 2. Chassis can remain on cabinet front for troubleshooting and alignment. (Knobs are removed by releasing captive clips with a screwdriver.)
 3. Same as No. 1 above.
 4. Unscrew the six hex-head screws holding the grille to the cabinet front.
 5. Label and unsolder speaker leads from speaker terminals. Reversed speaker leads will cause distorted audio.
 6. Unscrew the four screws around front of speaker and remove the speaker from cabinet front.



DIAL STRINGING

GENERAL ELECTRIC
Model T210B

GENERAL ELECTRIC Models P790A, B, P791A, B



BOTTOM VIEWS

BASE COLLECTOR

EMITTER

NPN TRANSISTOR

BASE COLLECTOR

EMITTER

PNP TRANSISTOR

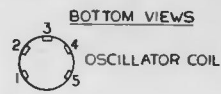
E - EMITTER

B - BASE

C - COLLECTOR

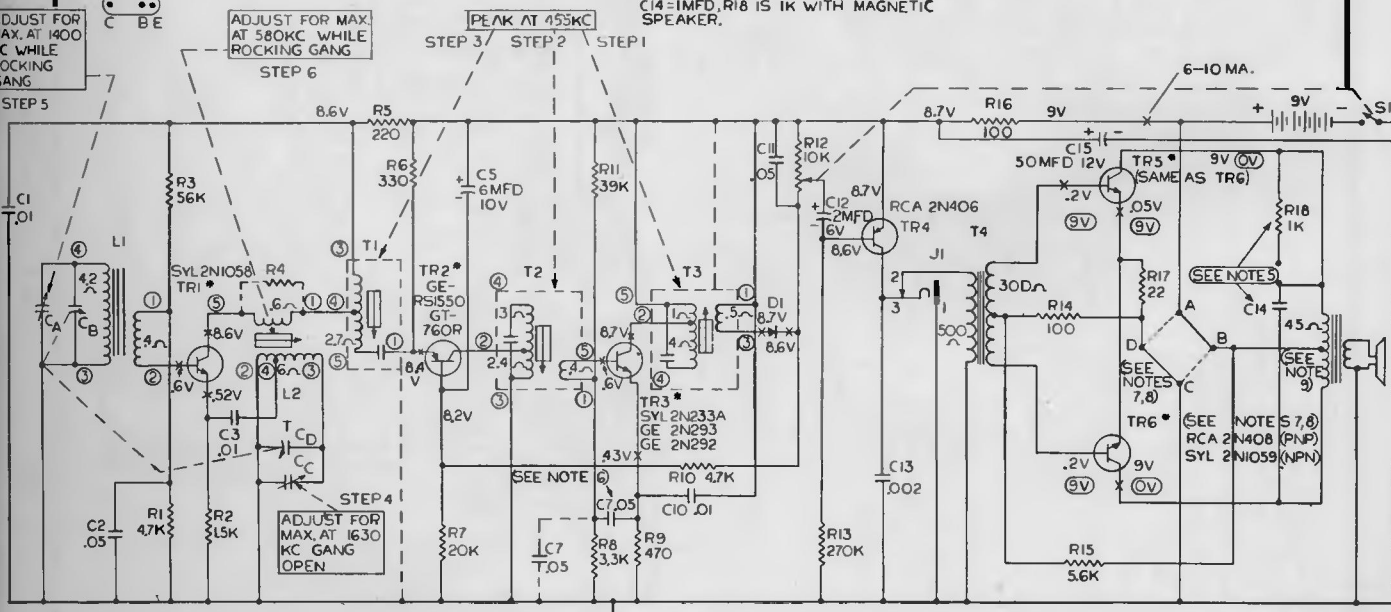
C B E

C B E



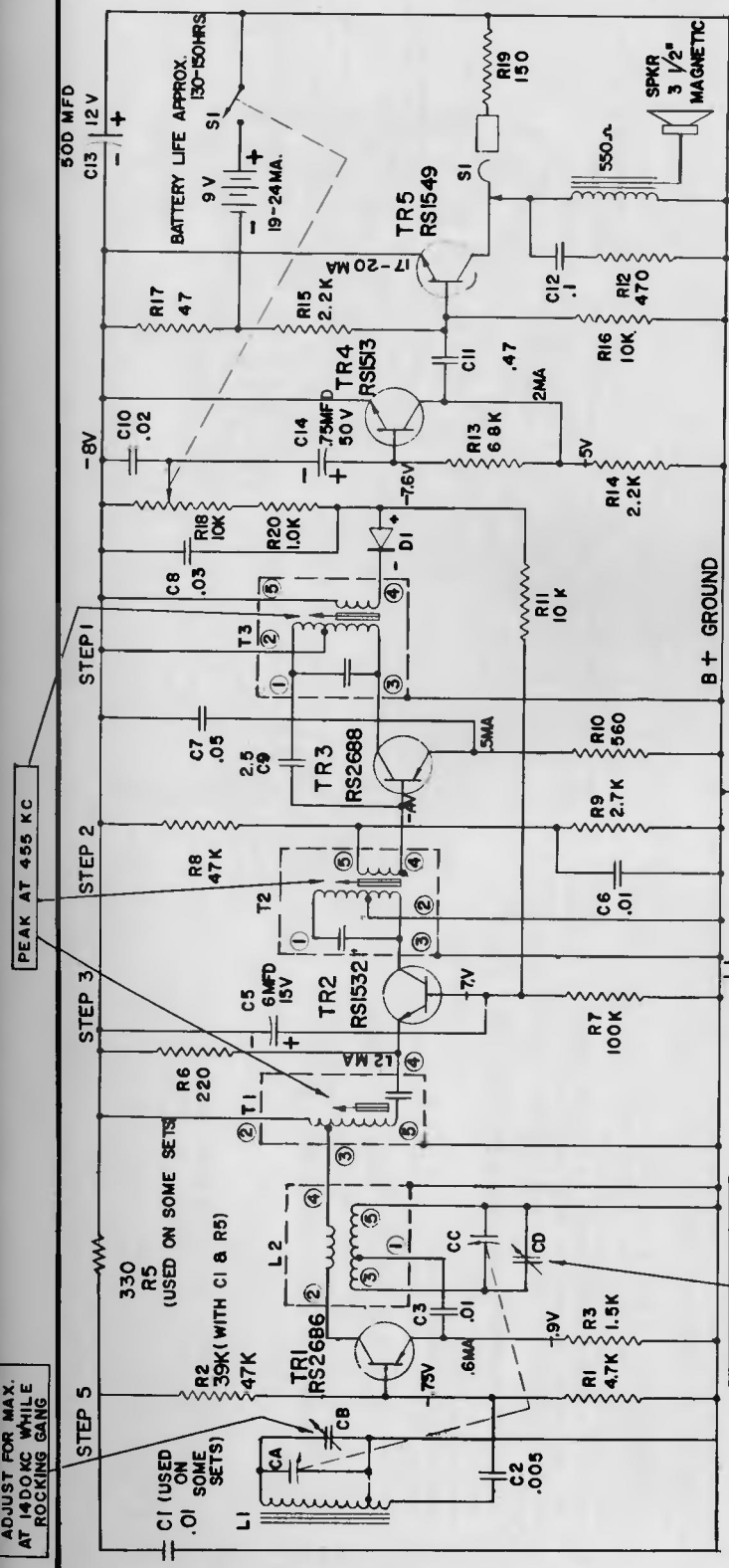
NOTES.

1. UNLESS OTHERWISE NOTED: CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE 1/2 WATT *K=1000
2. VOLTAGE & CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND.
3. SIMILAR APPROVED TRANSISTORS MAY BE USED.
4. VOLTAGES SHOWN IN \square ARE FOR PNP TRANSISTORS IN TR5 & TR6.
5. C14=0.02MFD, R18 IS REPLACED BY JUMPER WITH DYNAMIC SPEAKER. C14=1MFD, R18 IS 1K WITH MAGNETIC SPEAKER.
6. IF TR3 IS 2N293 OR 2N292, C7 GOES TO GROUND.
7. FOR NPN TRANSISTORS IN TR5 & TR6
A. JUMPER A TO B
B. JUMPER C TO D
8. FOR PNP TRANSISTORS IN TR5 & TR6
A. JUMPER A TO D
B. JUMPER B TO C
9. RESISTANCE ACROSS OUTPUT TRANSFORMER IS 45 Ω WITH DYNAMIC SPEAKER. READING WITH MAGNETIC SPEAKER IS 85 Ω .

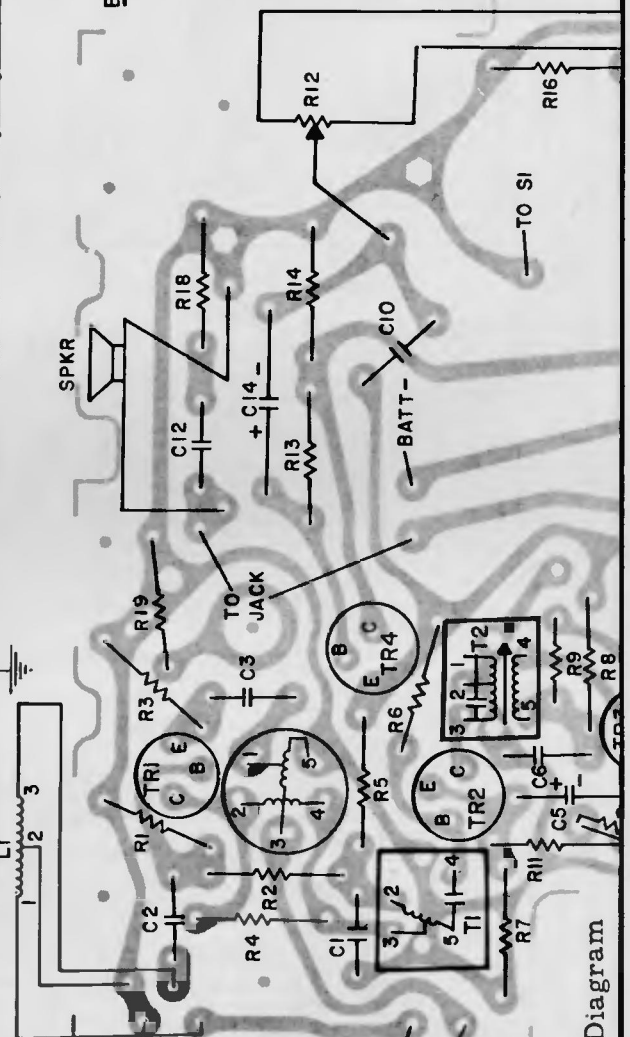
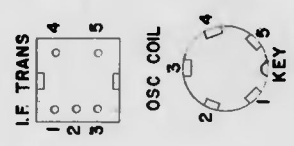


GENERAL ELECTRIC

Radio Models P807B and P808B
(See preceding page for A version)



BOTTOM VIEWS



STEP 4 ADJUST FOR MAX. AT 1630 KC GANG OPEN

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

NOTES:
1. UNLESS OTHERWISE NOTED:
CAPACITORS MORE THAN 1 = MF
CAPACITORS LESS THAN 1 = MF
RESISTORS ARE 1/4 WATT & K=1000
2. VOLTAGES & CURRENT READINGS ARE
AVERAGE UNDER NO SIGNAL CONDITIONS.
VOLTAGES ARE NEGATIVE WITH RESPECT
TO GROUND.

Partial Wiring Diagram

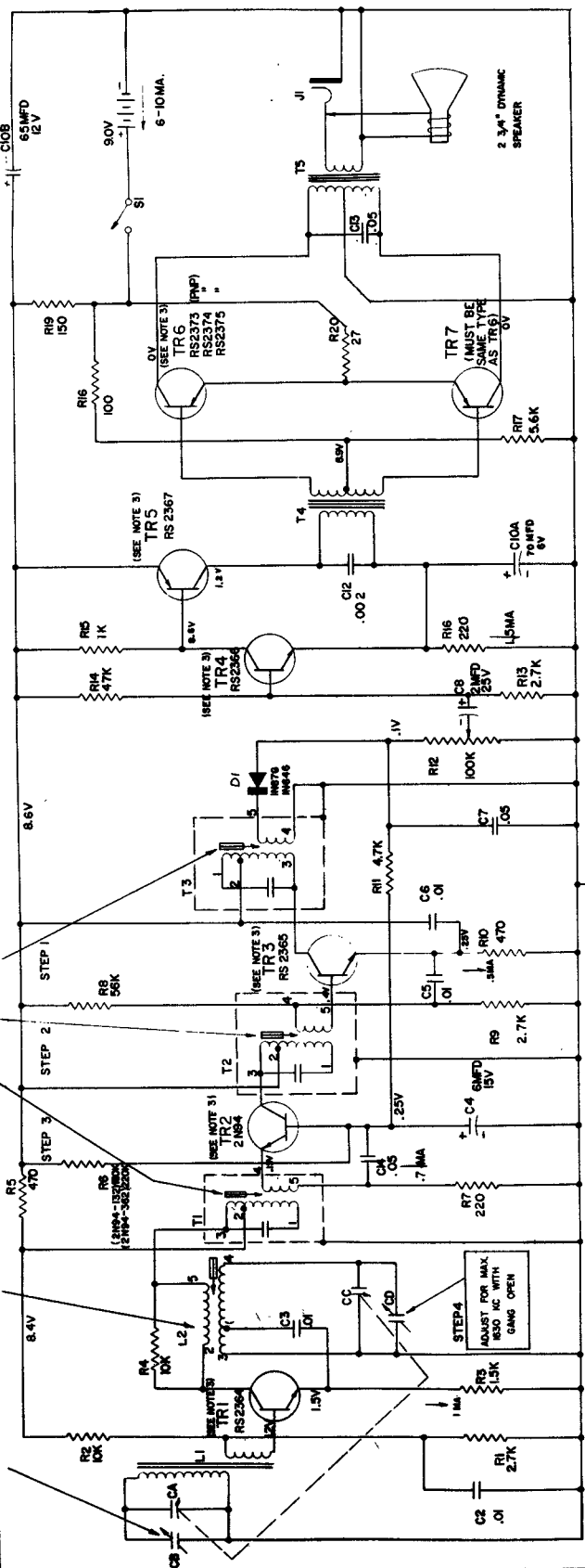
ADJUST FOR MAX. AT 1400 KC WHILE ROCKING GANG

ALIGNMENT
SET VOLUME CONTROL AT MAXIMUM.
CONNECT OUTPUT METER OR SCOPE ACROSS
VOLUME CONTROL TO INDUCTIVELY COUPLE SIGNAL GENERATOR TO
RECEIVER.

ADJUST FOR MAX.
495 KC RADIATED
SIGNAL

ADJUST FOR MAX.
580 KC WHILE
ROCKING GANG

ADJUST FOR MAX.
400 KC WHILE
ROCKING GANG



TO REMOVE CHASSIS

1. Disengage screw on rear of cabinet.
2. Insert coin in slot on bottom of cabinet and twist to remove cabinet back.
3. Remove 5 screws holding board to cabinet bosses. (Do not remove screws from antenna holder.)
4. Do not remove screws from antenna holder.
5. Swing circuit board up 90° from cabinet front.

TO REMOVE VOLUME CONTROL AND/OR TUNING CAPACITOR

1. Remove chassis.
2. Remove volume control knob.
3. Remove two screws holding tuning capacitor mounting plate to cabinet front.
4. Unscrew metal stud holding mounting bracket near speaker and dial scale opening.
5. Carefully lift out chassis and controls, tilt unit slightly to slide dial pointer out of opening.

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 receiver current drain is 6 to 10 mls. This is measured by inserting a milliammeter

in series with the battery (-) and pivoted connector. If an excessive total current drain is recorded, the individual collector currents of each transistor should be checked. An excessive current reading may mean a shorted transistor; no current will indicate that a transistor or associated circuit component is defective.

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:

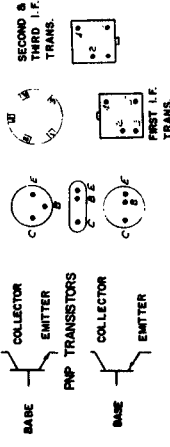
1. Check battery voltage for 9 volts.
2. Check battery current.
3. Check transistor collector currents.
4. Check alignment.

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 or low battery voltage.

NPV TRANSISTORS



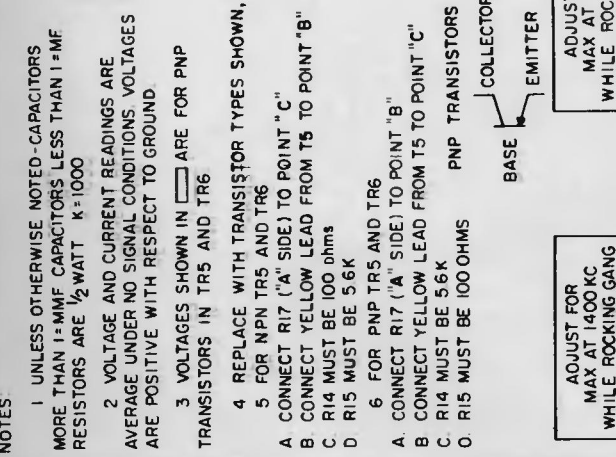
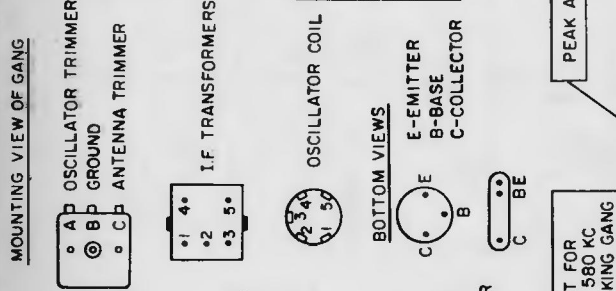
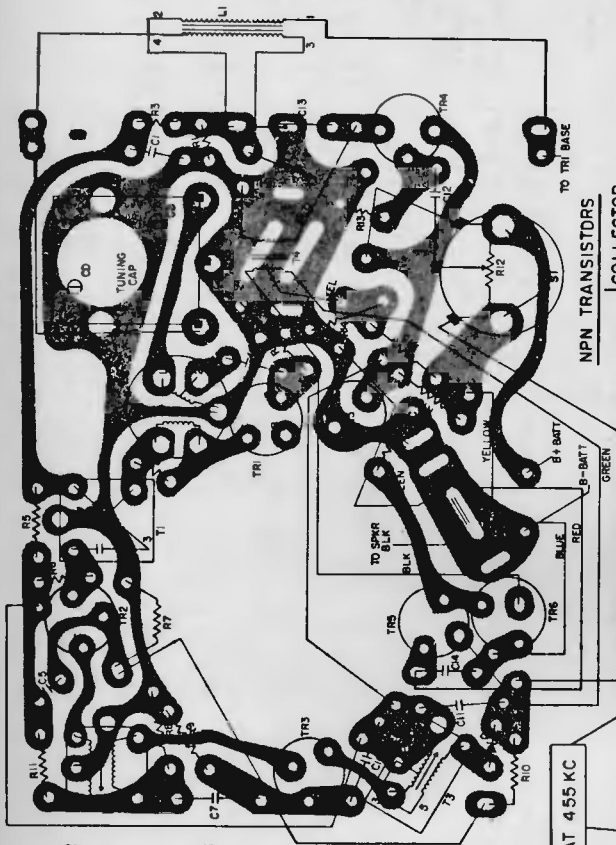
BOTTOM VIEWS

- NOTES—
1. UNLESS OTHERWISE NOTED—CAPACITORS MORE THAN 1.0MFD RESISTORS LESS THAN 1.0MΩ RESISTORS ARE 1/2 WATT X=1000
 2. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS.
 3. REPLACE WITH TRANSISTOR TYPES SHOWN, OR ORDER BY CATALOG NUMBER AS LISTED IN PARTS LIST.

GENERAL ELECTRIC
Models P815A, P816A

GENERAL ELECTRIC

MODELS P830C and P831C



- NOTES:**
- UNLESS OTHERWISE NOTED-CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE 1/2 WATT K=1000
 - VOLTAGE AND CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND
 - VOLTAGES SHOWN IN \square ARE FOR PNP TRANSISTORS IN TR5 AND TR6
 - REPLACE WITH TRANSISTOR TYPES SHOWN, 5 FOR NPN TR5 AND TR6
 - CONNECT R17 ("A" SIDE) TO POINT "C"
 - CONNECT YELLOW LEAD FROM T5 TO POINT "B"
 - R14 MUST BE 100 OHMS
 - R15 MUST BE 56K
 - FOR PNP TR5 AND TR6
 - CONNECT R17 ("A" SIDE) TO POINT "B"
 - CONNECT YELLOW LEAD FROM T5 TO POINT "C"
 - R14 MUST BE 56K
 - R15 MUST BE 100 OHMS

GENERAL ELECTRIC

MODELS
P830E
P831E

TO REMOVE CIRCUIT BOARD

1. Remove cabinet back.
2. Remove screw that is mounted next to volume control.
3. Place fingernail under phone jack and lift chassis up, then slide slightly in direction of cabinet bottom.

When replacing chassis, carefully tilt chassis so that tuning knob fits into knob opening, then slide chassis up towards cabinet top. Chassis mounting screw hole must line up with hole in mounting boss on cabinet.

TO REMOVE VOLUME CONTROL

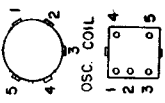
1. Remove tuning knob.
2. Remove two screws mounted under tuning knob.
3. Remove control.

IMPORTANT: After installing volume control, be sure there is continuity between mounting screw head and conductor pattern for each screw.

TO REMOVE TUNING CAPACITOR

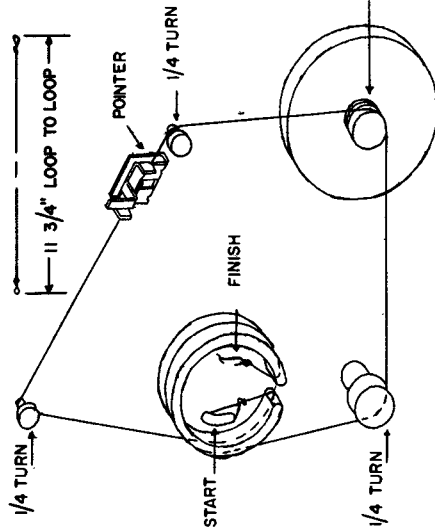
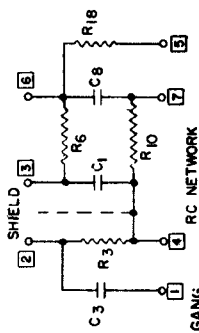
1. Remove pulley from gang shaft.
2. Remove two mounting screws.
3. Unsolder the three gang connection lugs on dip-solder side of board.

IF TRANSFORMERS



NOTES:

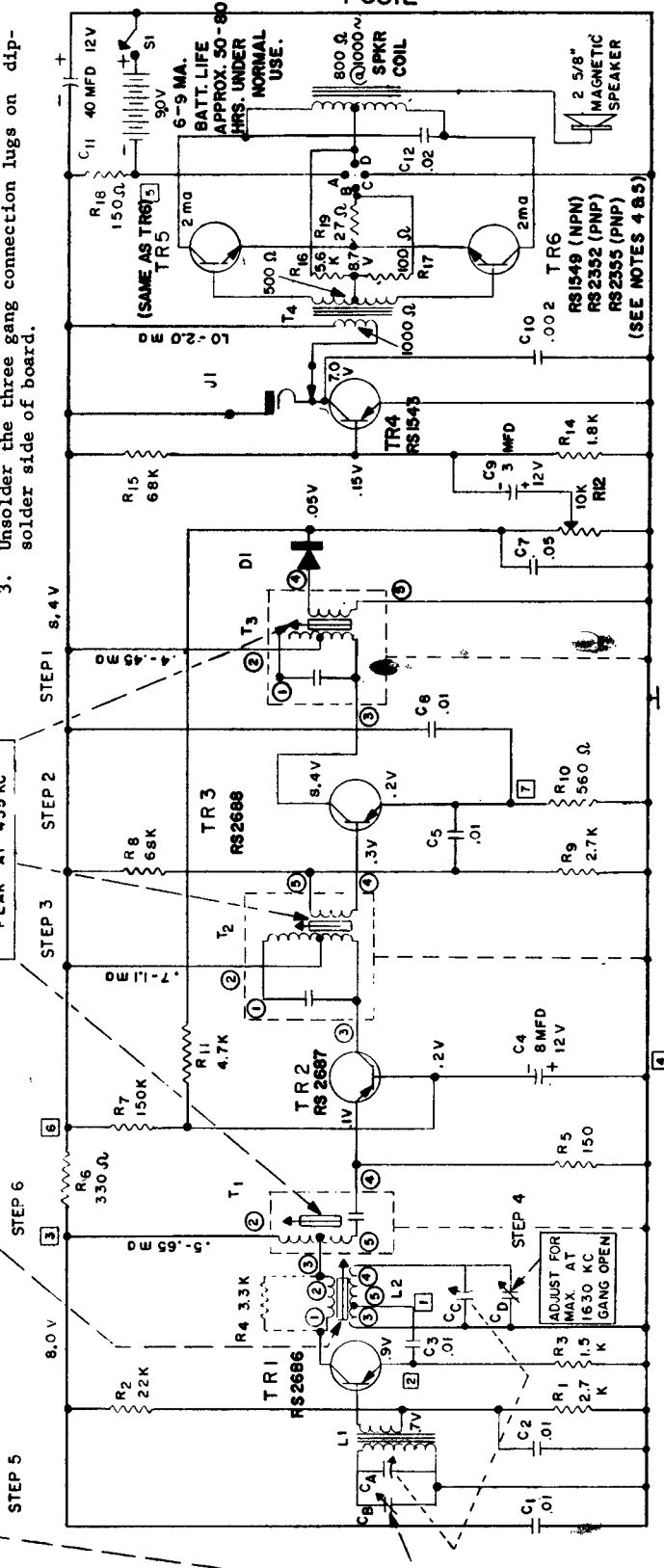
1. UNLESS OTHERWISE NOTED - CAPACITORS MORE THAN 1-μfd CAPACITORS LESS THAN 1-μfd CAPACITORS ARE 1/2 WATT & K=1000 VOLTAGES & CURRENT READINGS ARE AVERAGES UNDER NO SIGNAL CONDITIONS VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND.
3. REPLACE WITH TRANSISTOR TYPES SHOWN.
4. FOR NPN TRANSISTORS IN TR5 & TR6 (a) JUMPER C TO D (b) JUMPER A TO B
5. FOR PNP TRANSISTORS IN TR5 & TR6 (a) JUMPER A TO D (b) JUMPER C TO B



START STRINGING AT GANG DRUM AS INDICATED WITH GANG IN OPEN POSITION & POINTER AT THE RIGHT.

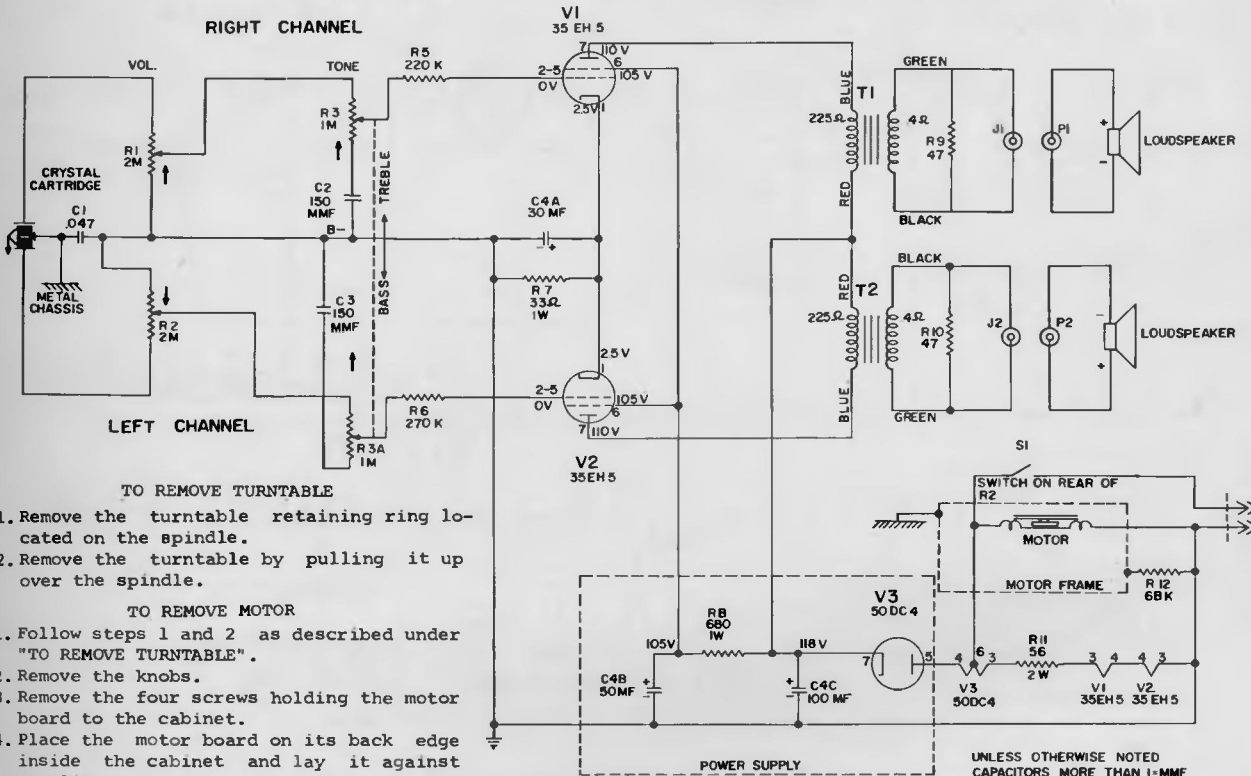
ADJUST FOR MAX. AT 1400 KC WHILE ROCKING GANG

ADJUST FOR MAX. AT 560 KC WHILE ROCKING GANG





Exact material for Model RP1100A, Models RP1127A, RP1128A are similar.



TO REMOVE TURNTABLE

1. Remove the turntable retaining ring located on the spindle.
2. Remove the turntable by pulling it up over the spindle.

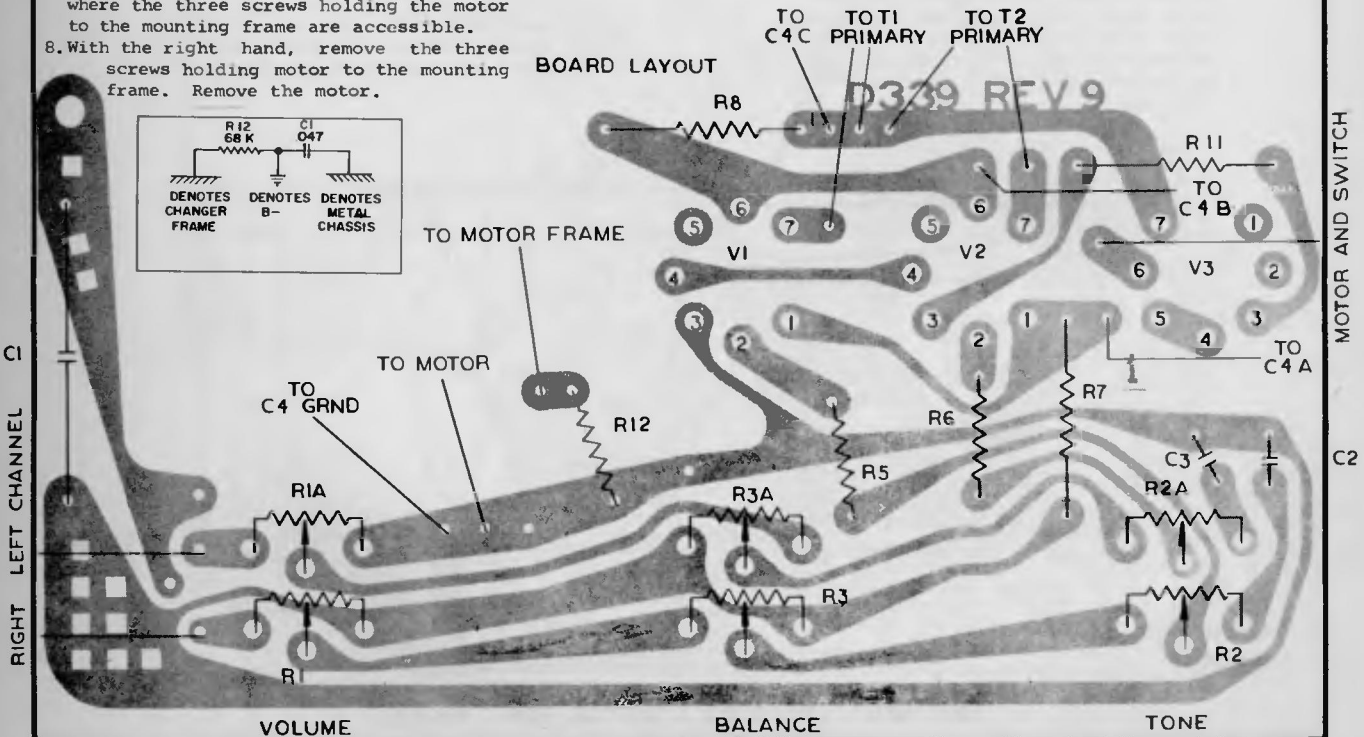
TO REMOVE MOTOR

1. Follow steps 1 and 2 as described under "TO REMOVE TURNTABLE".
2. Remove the knobs.
3. Remove the four screws holding the motor board to the cabinet.
4. Place the motor board on its back edge inside the cabinet and lay it against the lid.
5. Remove the 5/16 inch nut holding the ground lug to the motor.
6. Remove the two plastic Twist Caps on the motor leads.
7. Place the left hand on the motor and bring the motor board back to a position where the three screws holding the motor to the mounting frame are accessible.
8. With the right hand, remove the three screws holding motor to the mounting frame. Remove the motor.

TO PHASE SPEAKERS
PLACE A ONE AND ONE-HALF (1-1/2) 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 THE VOICE COIL AS INDICATED ON SCHEMATIC.

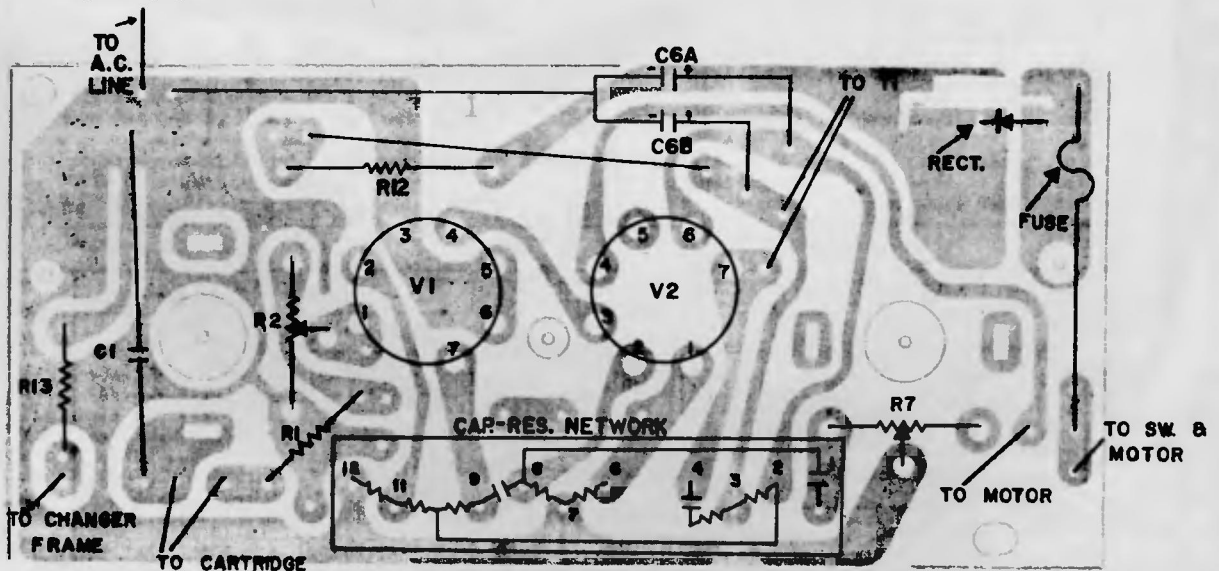
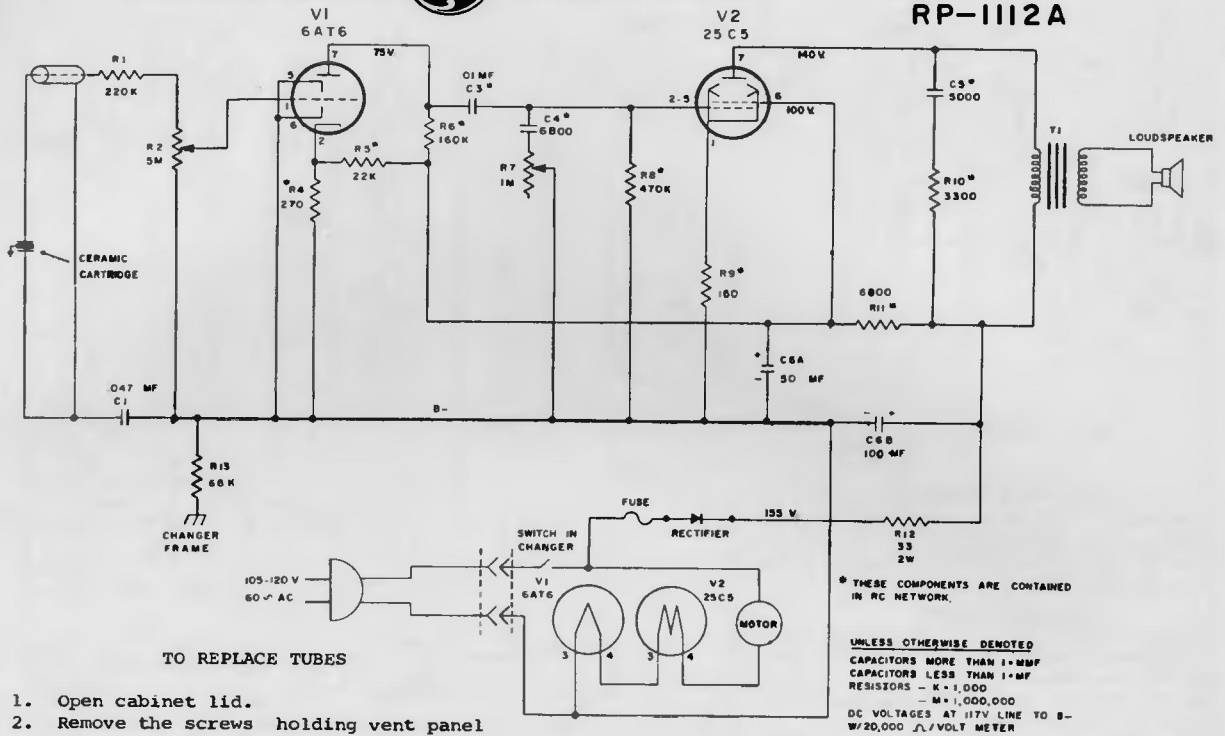
UNLESS OTHERWISE NOTED
CAPACITORS MORE THAN 1-MMF
CAPACITORS LESS THAN 1-MMF
RESISTORS K=1000
RESISTORS M=1,000,000
DC VOLTAGES AT 120V LINE TO B-
W/20,000Ω/VOLT METER
ARROWS INDICATE CLOCKWISE ROTATION

BOARD LAYOUT



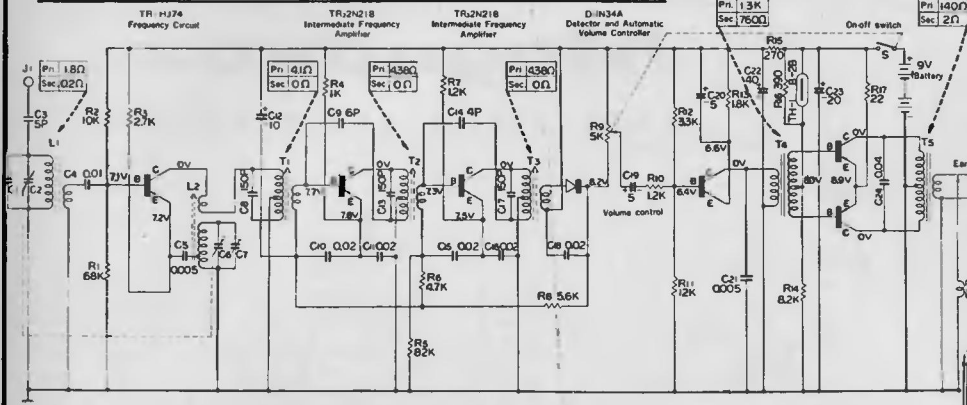
GENERAL ELECTRIC

PHONO
MODEL
RP-1112A



VOLUME R-21, MOST-OFTEN-NEEDED

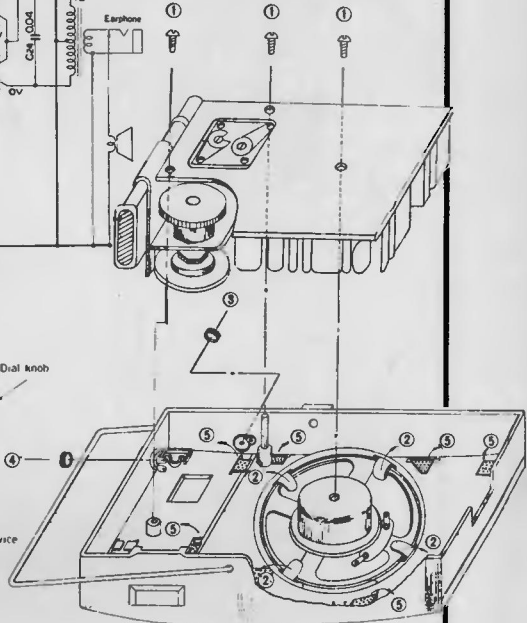
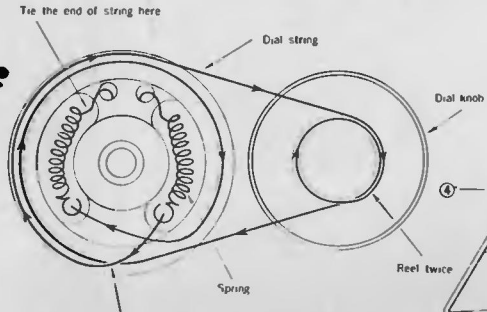
INFORMATION



Hitachi
MODEL TH-627R

Hitachi, Ltd.
Tokyo Japan

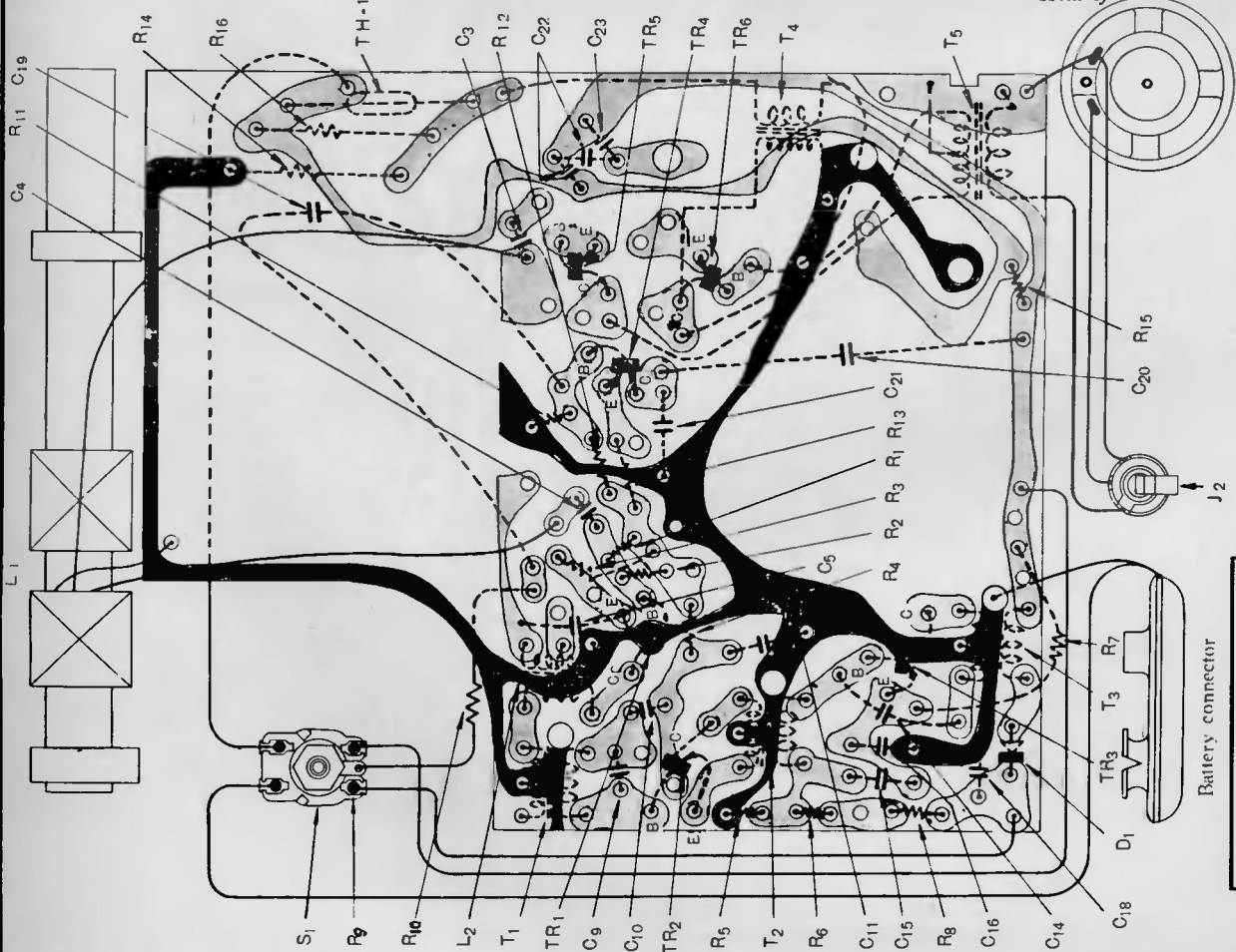
MODEL TH-627R



Tuning range BC 535~1,605 kc,
Intermediate frequency 455 kc

Dial string assembly

Receiver assembly

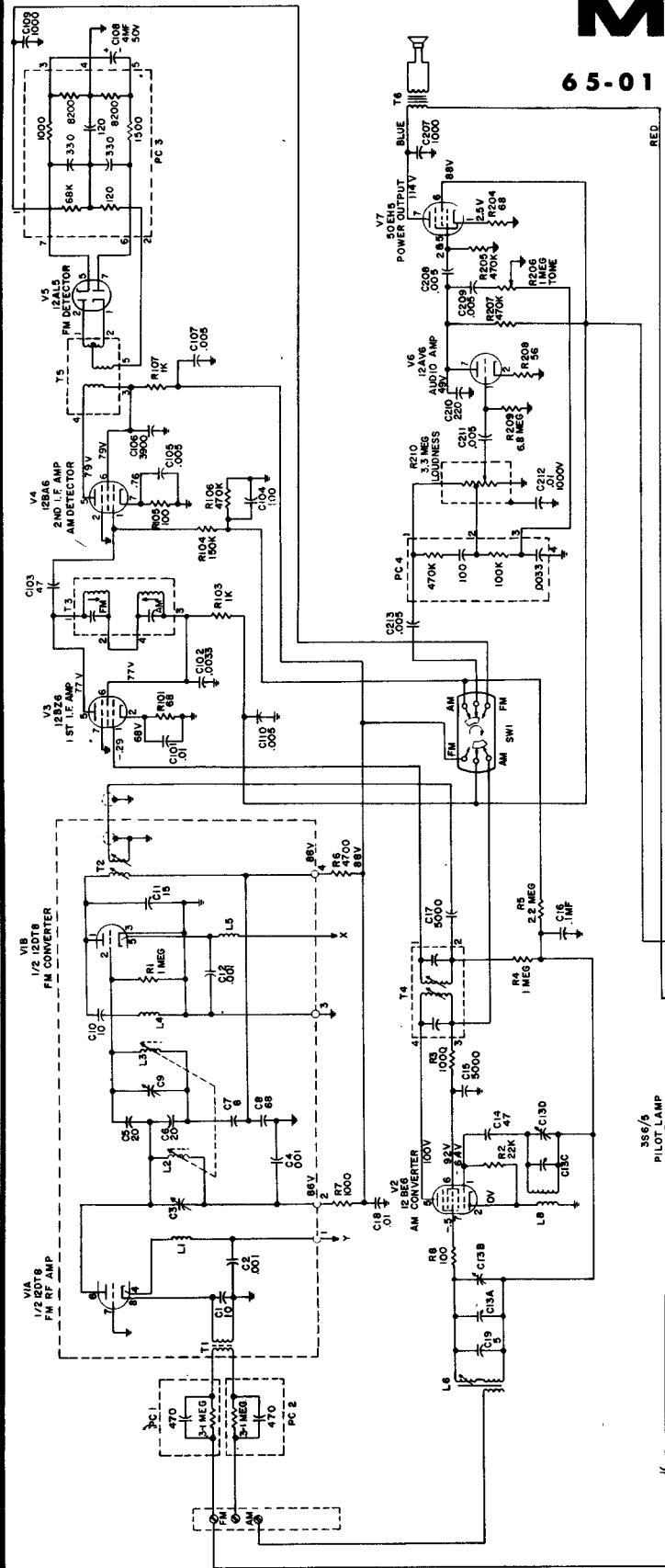


Denote earth wiring

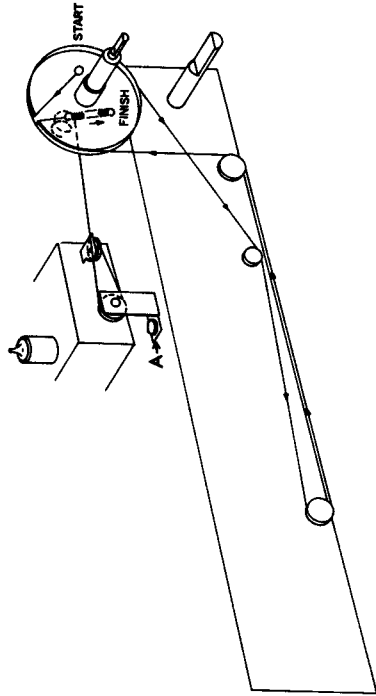
Circuit Board Diagram

Magnavox

65-01 SERIES RADIO CHASSIS



The 65-01 is a series-filament wired AM-FM radio chassis. The chassis contains seven tubes and a selenium diode as a rectifier. An isolation transformer should be used when servicing the chassis.

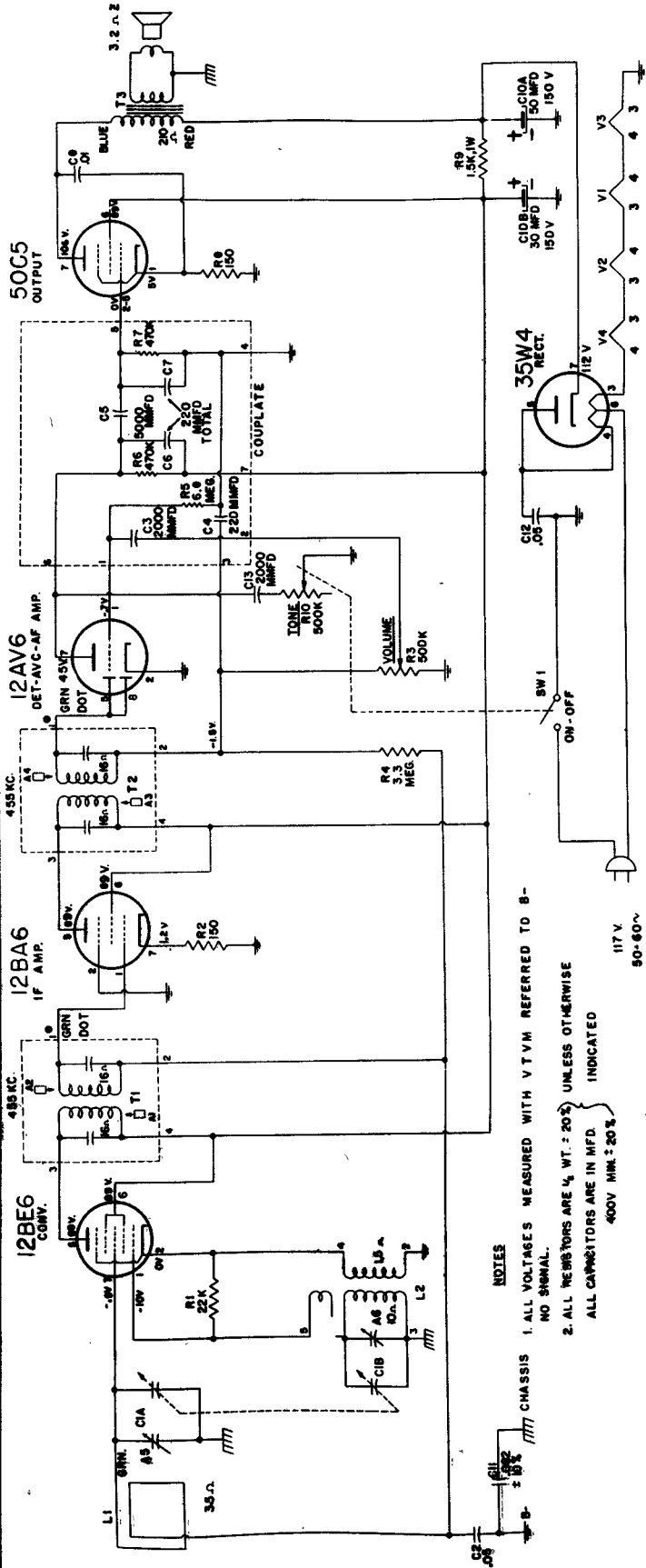


DIAL STRINGING GUIDE

SPECIFICATIONS

Power Source Rating	60 cps.
Frequency	117 volts
Voltage	60 watts
Wattage	
Tuning Frequency Range	540-1620KC
Broadcast Band	88-108MC
FM Band	455KC
IF Frequency (AM)	10.7MC
IF Frequency (FM)	

NOTES:
 1. ALL VOLTAGES MEASURED IN FM POSITION EXCEPT 12BE6
 2. LINE VOLTAGE 117V

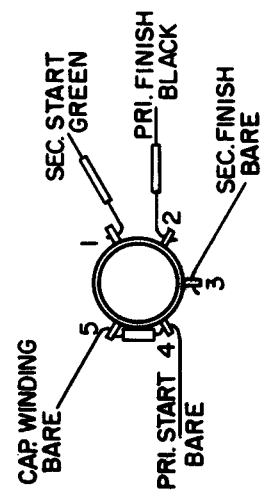


NOTES

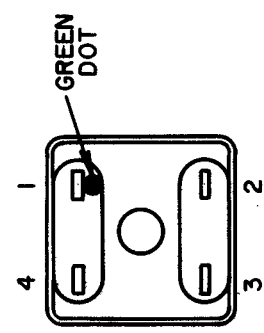
1. ALL VOLTAGES MEASURED WITH VTVM REFERRED TO B- NO SIGNAL.

2. ALL RESISTORS ARE 1/4 WT. ± 20% UNLESS OTHERWISE INDICATED

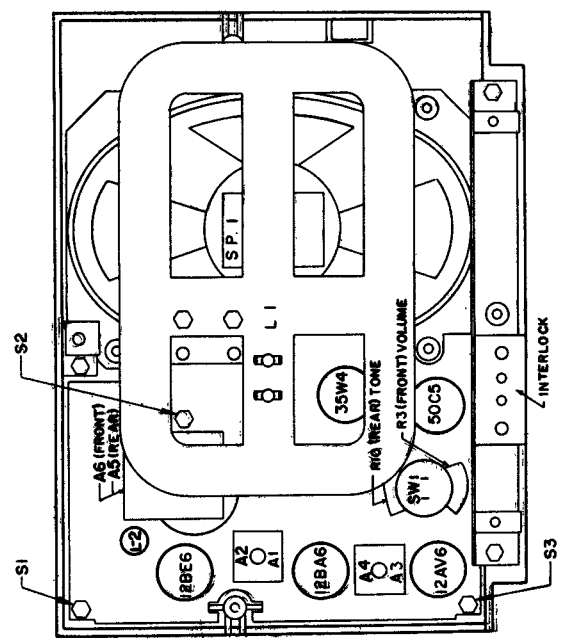
ALL CAPACITORS ARE IN MFD. 400V MIN. ± 20%



L2-OSCILLATOR COIL (BOTTOM VIEW)



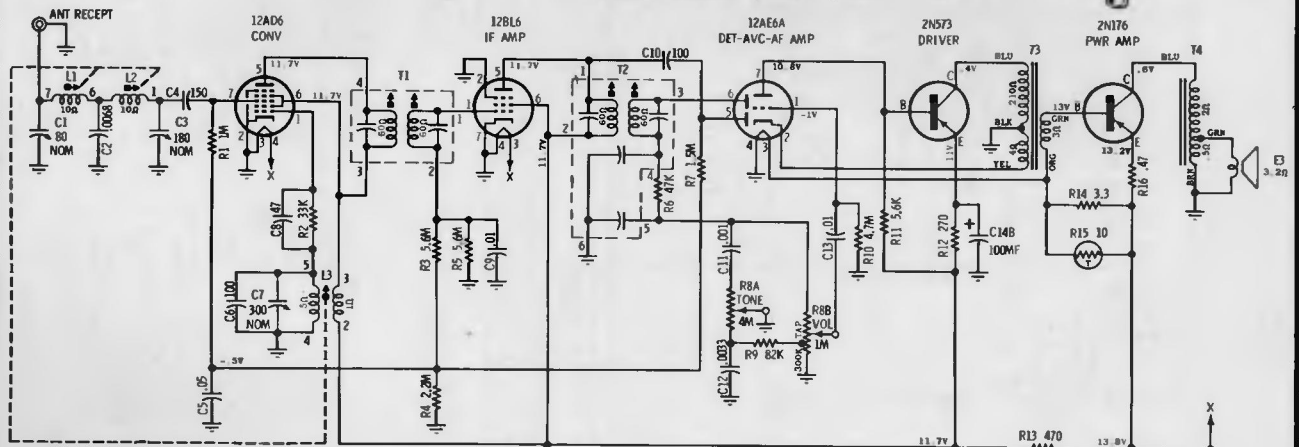
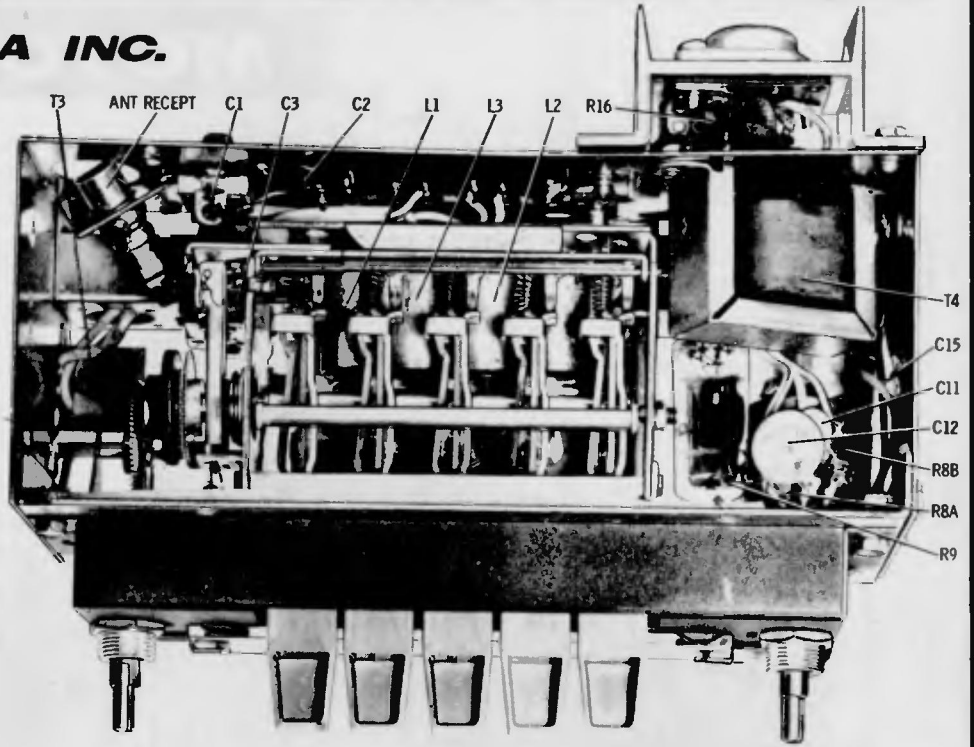
T1, T2-IF TRANSFORMERS (BOTTOM VIEW)



MONTGOMERY WARD
Radio Models GEN-1667A and GEN-1668A

MOTOROLA INC.

AUTO RADIO
MODEL
MOTOROLA 13MA
AMERICAN MOTORS
8990832



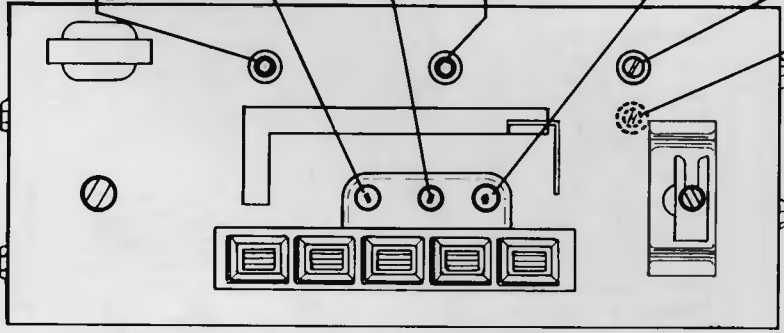
NOTES:

CAPACITORS—Unless otherwise specified, decimal values in MF; all others in MMF. VOLTAGES—Measured from point indicated to chassis. $\pm 10\%$ No signal input. INPUT VOLTAGE—14V DC. TUNING RANGE—540 KC to 1610 KC. IF—262.5 KC.

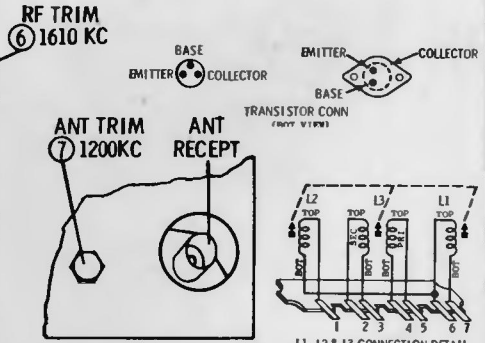
CAUTION
 "A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



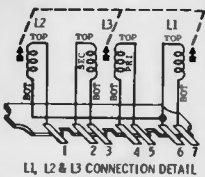
- 2ND IF 262.5 KC TOP ① BOT ②
- RF CORE 1020 KC ⑨
- OSC CORE 1020 KC ⑧
- 1ST IF 262.5KC TOP ④ BOT ③
- ANT CORE 1020 KC ⑩
- OSC TRIM 1610 KC ⑤



FRONT VIEW (WITH DIAL SCALE & BACKGROUND REMOVED)

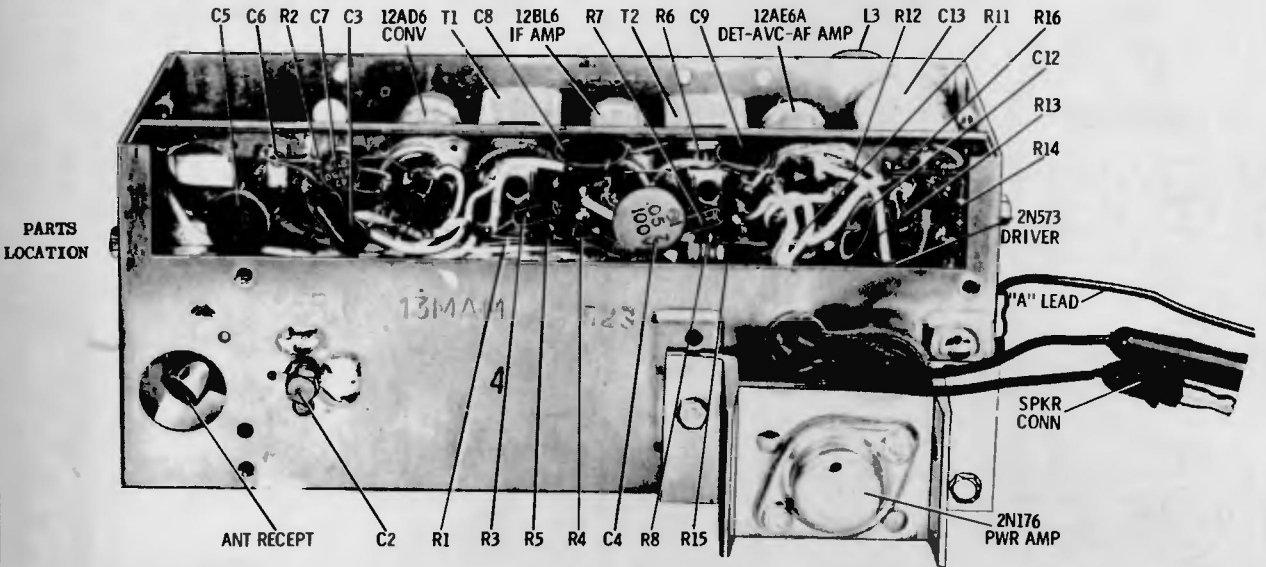


BACK VIEW

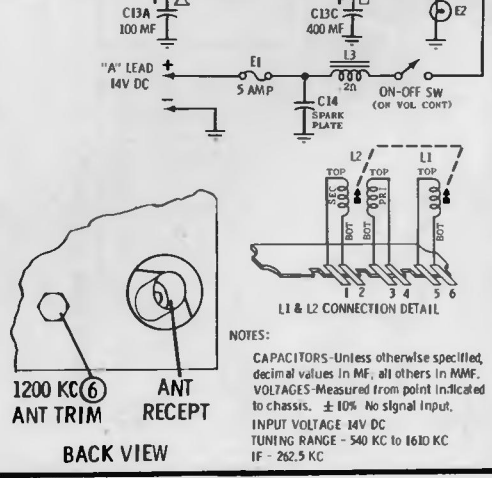
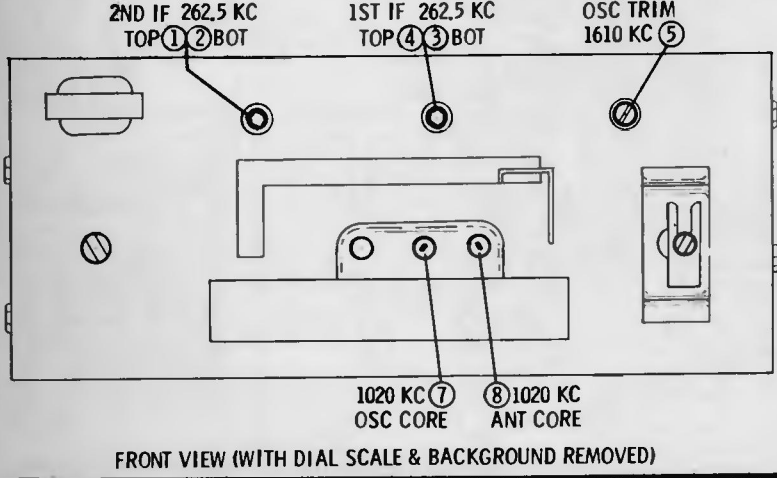
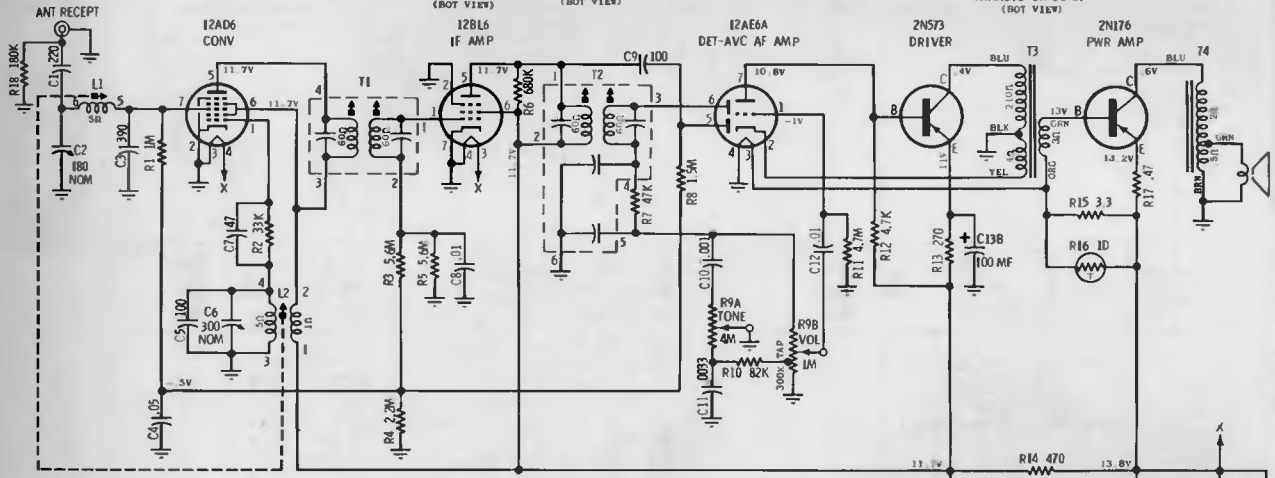
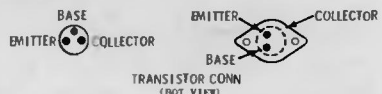




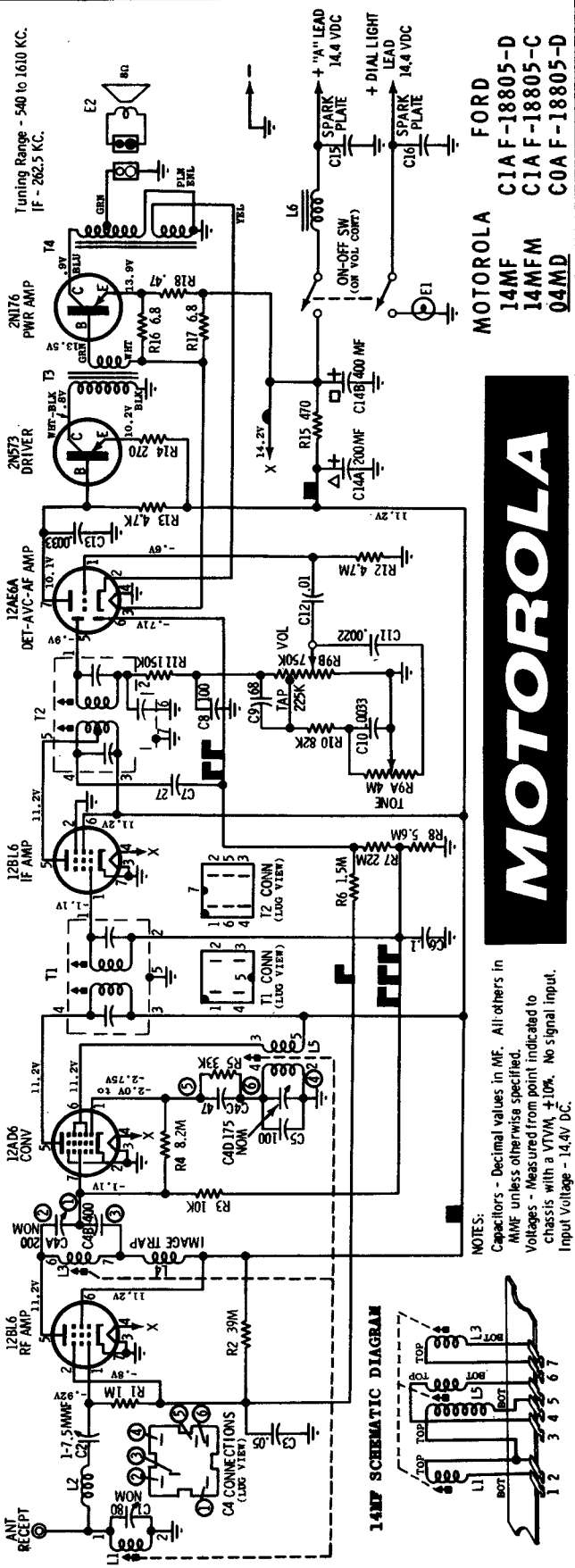
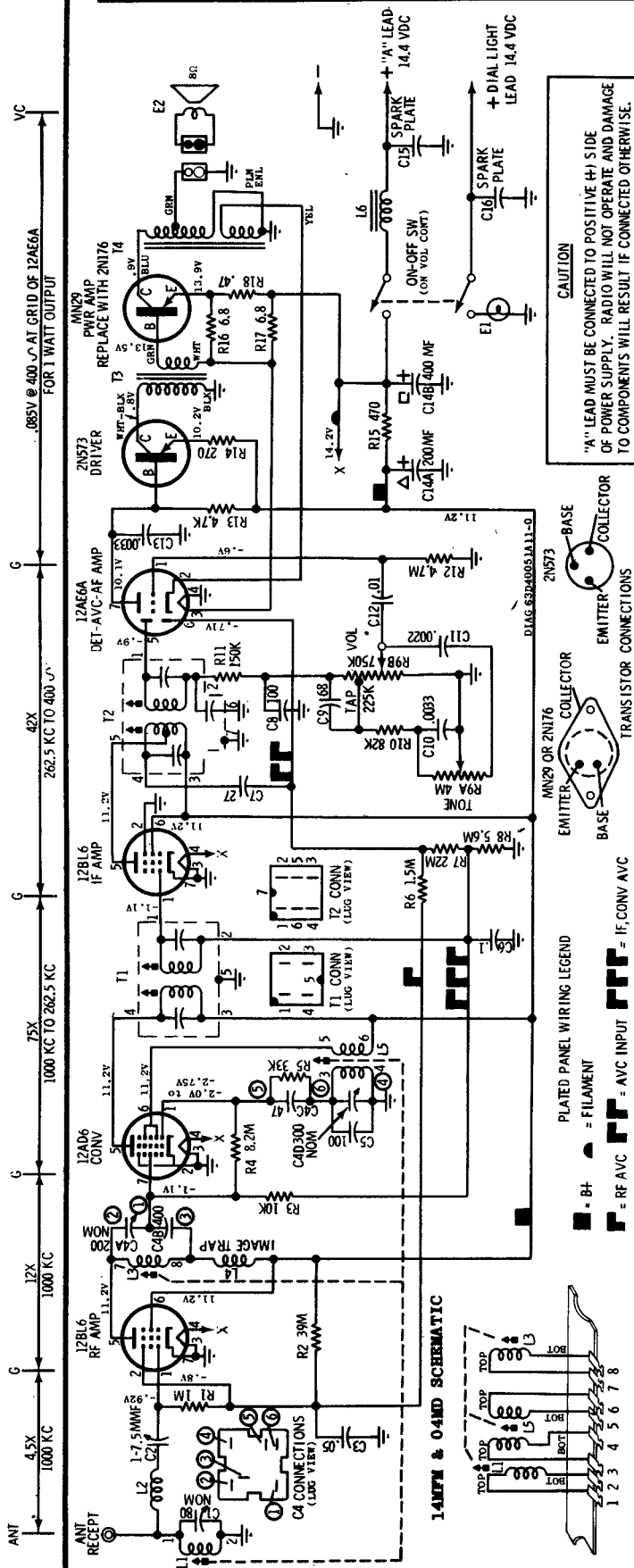
MODEL
MOTOROLA 13MAM
AMERICAN MOTORS 8990831



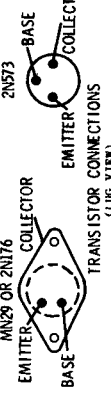
CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



NOTES:
CAPACITORS—Unless otherwise specified, decimal values in MF, all others in MMF.
VOLTAGES—Measured from point indicated to chassis. ± 10% No signal input.
INPUT VOLTAGE 14V DC
TUNING RANGE - 540 KC to 1610 KC
IF - 262.5 KC



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.



PLATED PANEL WIRING LEGEND
 ■ = RF AVC
 ■ = AVC INPUT
 ■ = IF CONV AVC
 ■ = FILAMENT

MOTOROLA FORD
 14MF C1A F-18805-D
 14MFM C1A F-18805-C
 04MD C0A F-18805-D

MOTOROLA

NOTES:
 Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
 Voltages - Measured from point indicated to chassis with a VTVM ±10%. No signal input.
 Input Voltage - 14.4V DC.

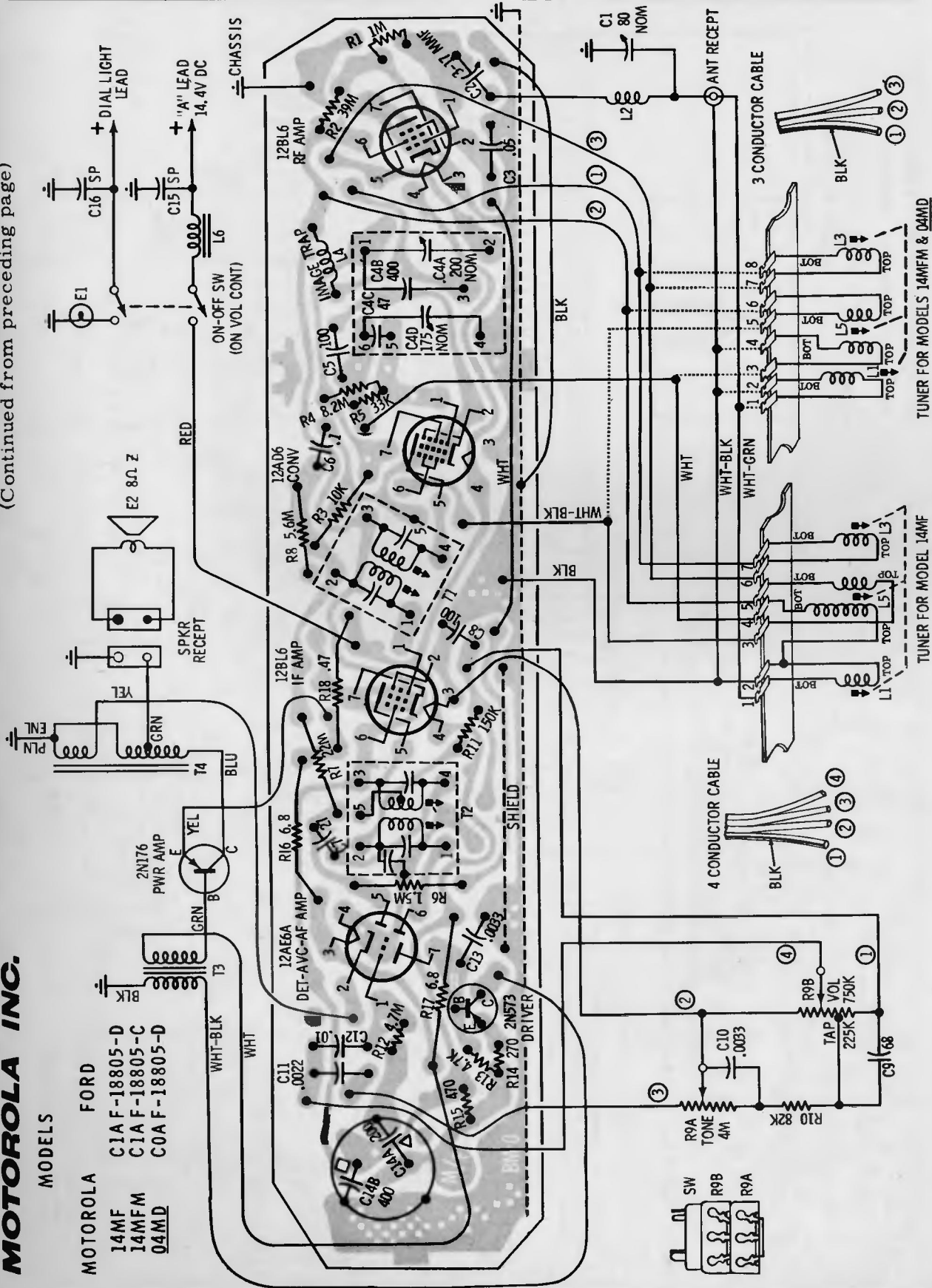
(Additional service material is on the next page, adjacent at right)

(Continued from preceding page)

MOTOROLA INC.

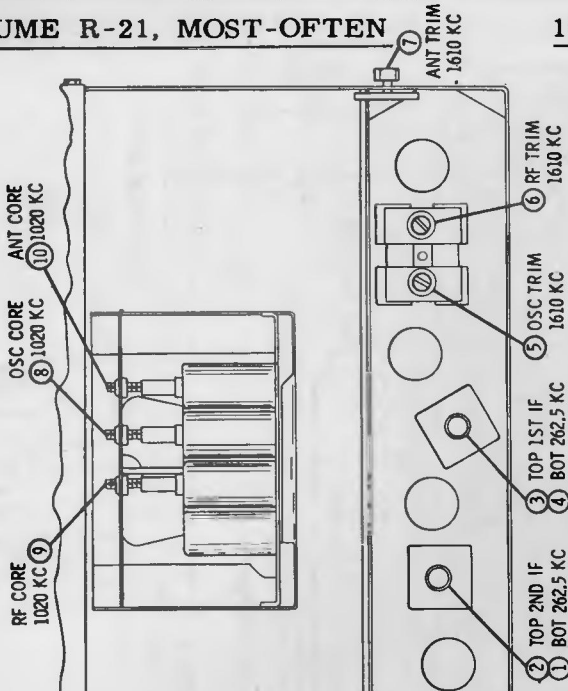
MODELS

MOTOROLA	FORD
14MF	C1AF-18805-D
14MFM	C1AF-18805-C
04MD	C0AF-18805-D



PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM SIDE (COMPONENTS SHOWN ARE ON OPPOSITE SIDE)

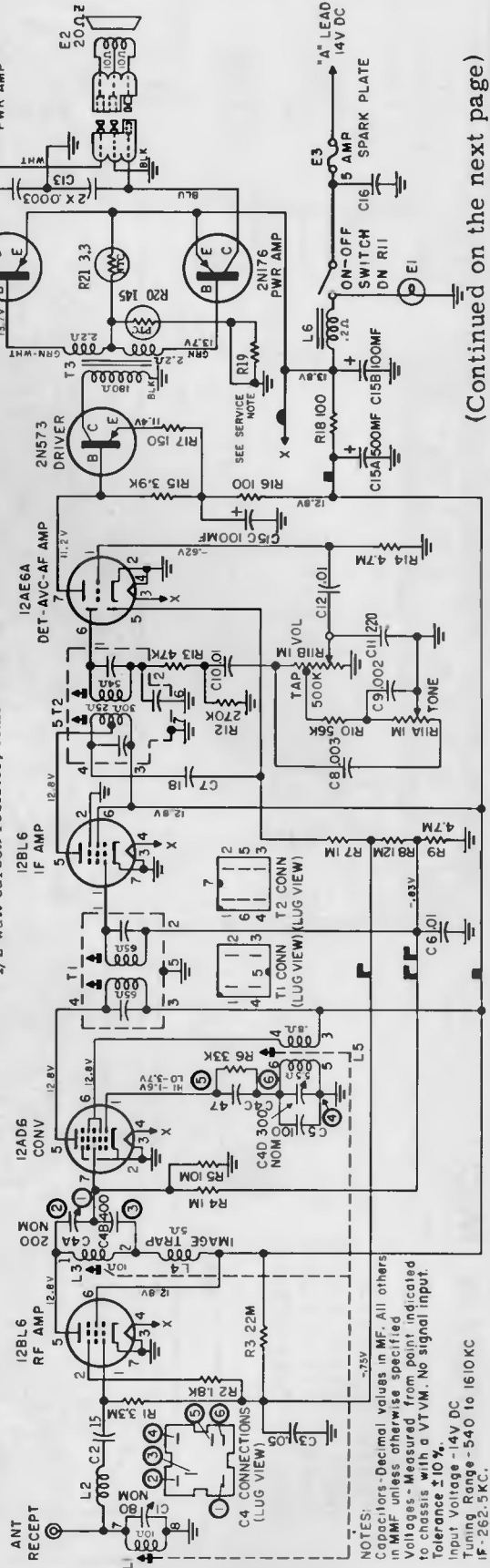
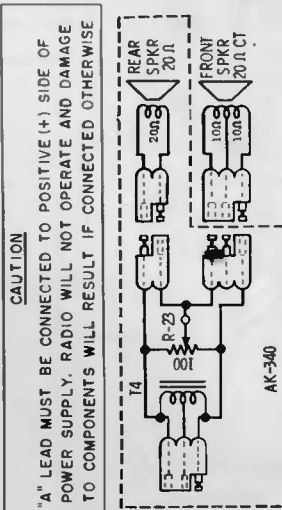
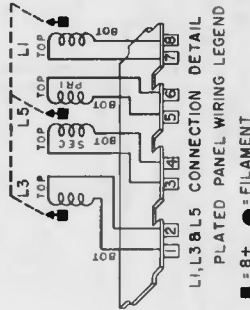
MOTOROLA Model 14MR
American Motors 8990833



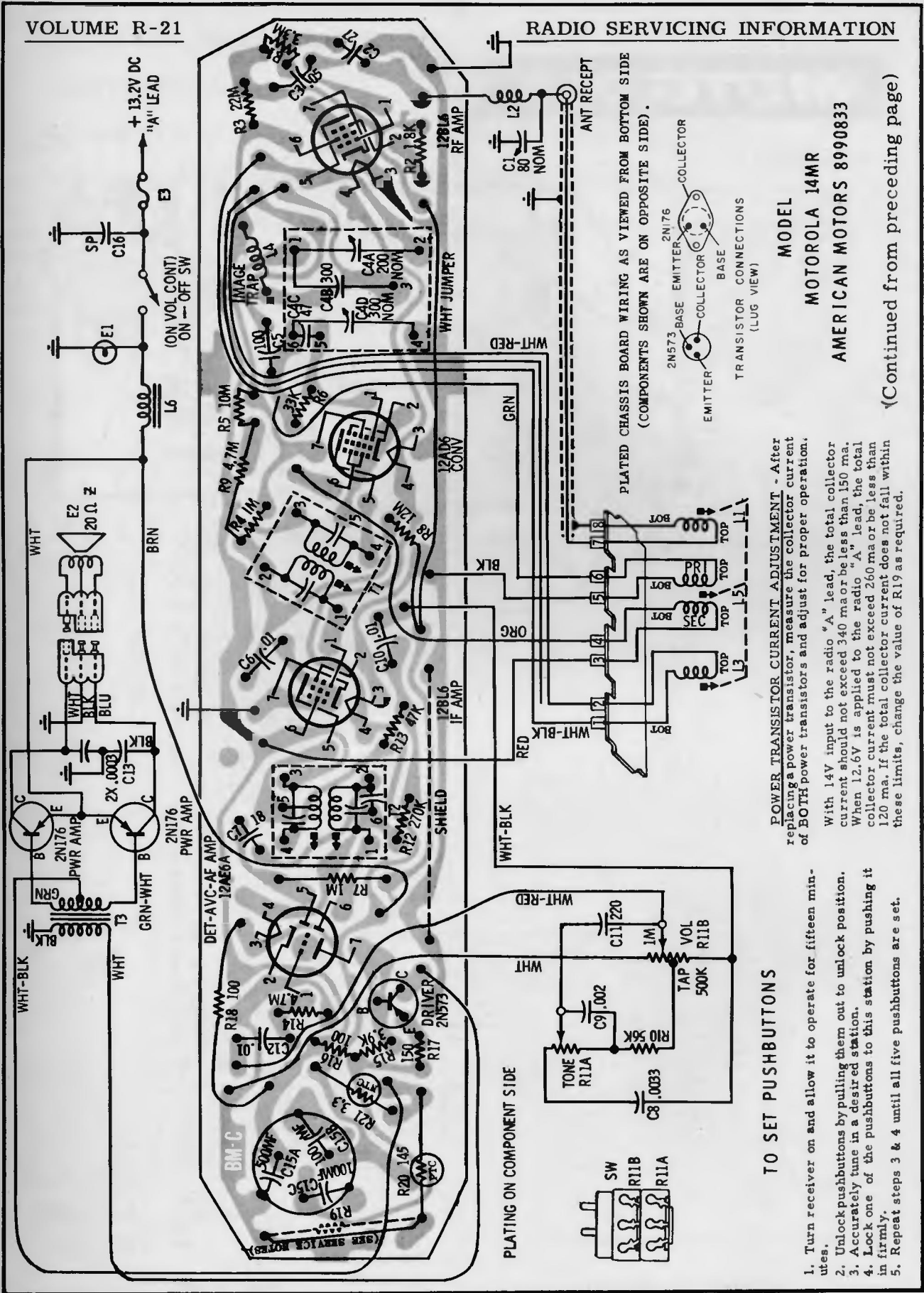
ALIGNMENT POINTS LOCATION DETAIL

R19 is used to limit total collector current. In most sets it is a piece of copper wire; in a few sets it is a 1/2 watt carbon resistor, either 27 or 56 ohms.

PLATED CHASSIS BOARD GROUND CONNECTIONS AS SEEN THRU BOARD FROM WIRING SIDE



(Continued on the next page)



TO SET PUSHBUTTONS

1. Turn receiver on and allow it to operate for fifteen minutes.
2. Unlock pushbuttons by pulling them out to unlock position.
3. Accurately tune in a desired station.
4. Lock one of the pushbuttons to this station by pushing it in firmly.
5. Repeat steps 3 & 4 until all five pushbuttons are set.

POWER TRANSISTOR CURRENT ADJUSTMENT - After replacing a power transistor, measure the collector current of BOTH power transistors and adjust for proper operation.

With 14V input to the radio "A" lead, the total collector current should not exceed 340 ma or be less than 150 ma. When 12.6V is applied to the radio "A" lead, the total collector current must not exceed 260 ma or be less than 120 ma. If the total collector current does not fall within these limits, change the value of R19 as required.

MODEL

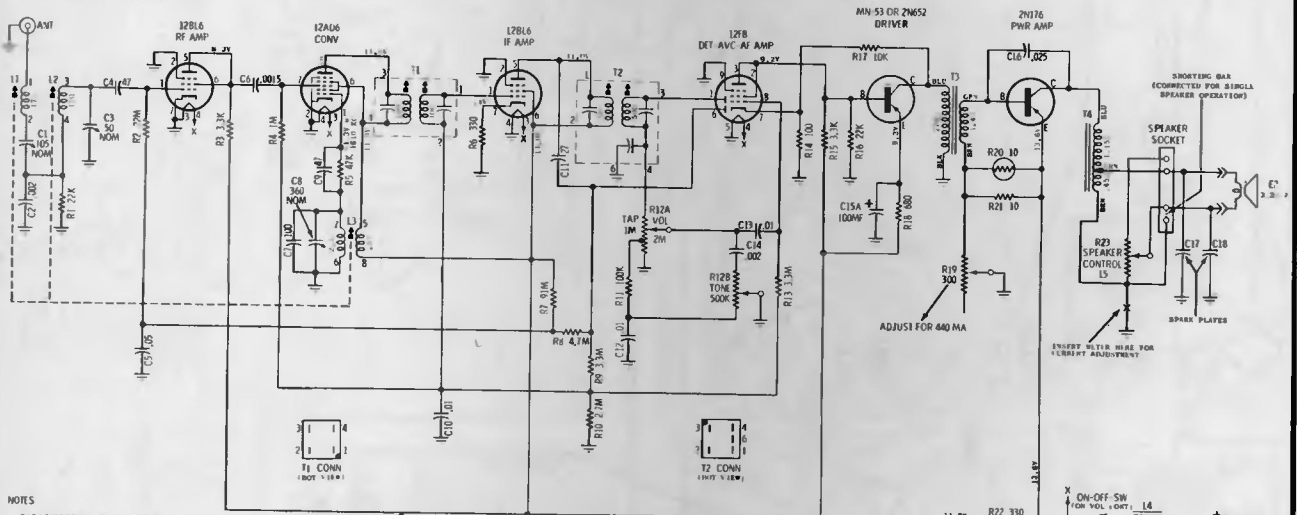
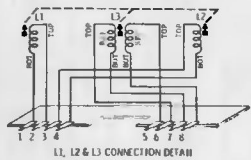
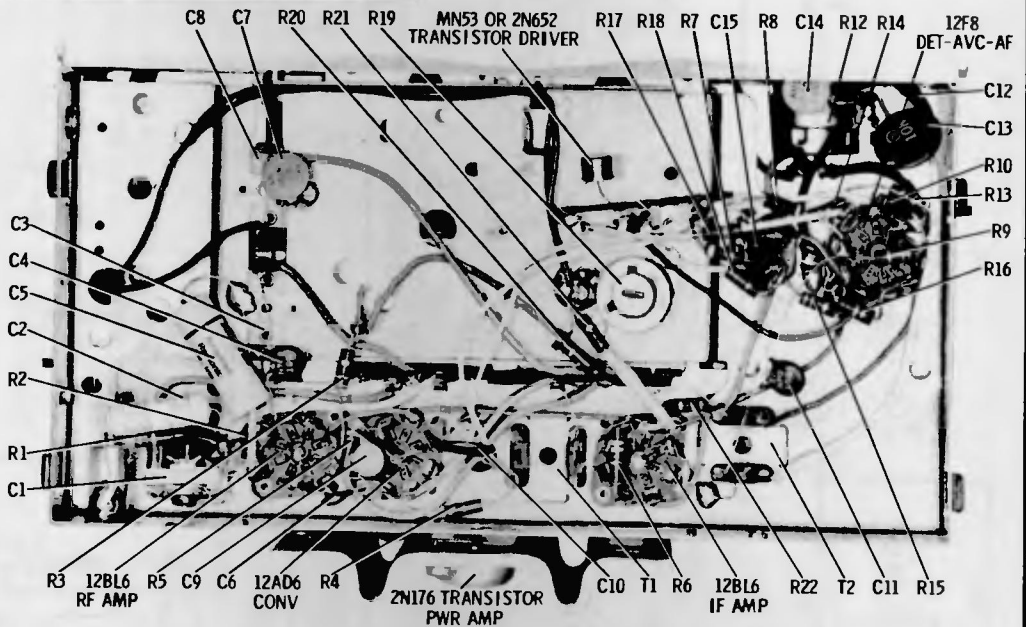
MOTOROLA 14MR
AMERICAN MOTORS 8990833

(Continued from preceding page)

MOTOROLA

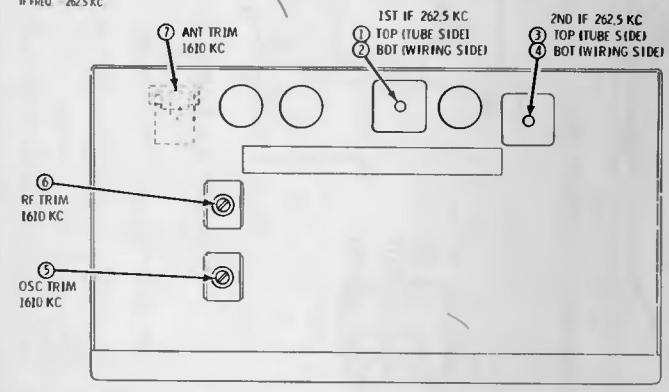
AUTO RADIO

MODELS
BKA60X
PCA60X

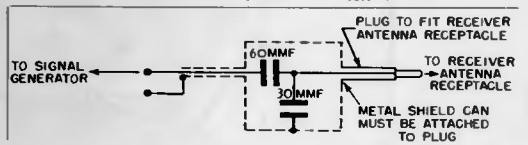
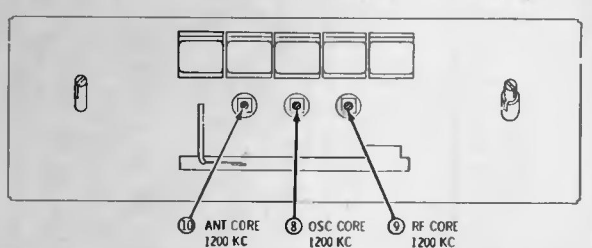


NOTES
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
INPUT VOLTAGE - 14V DC
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ. - 262.5 KC.

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



ALIGNMENT LOCATION DETAIL

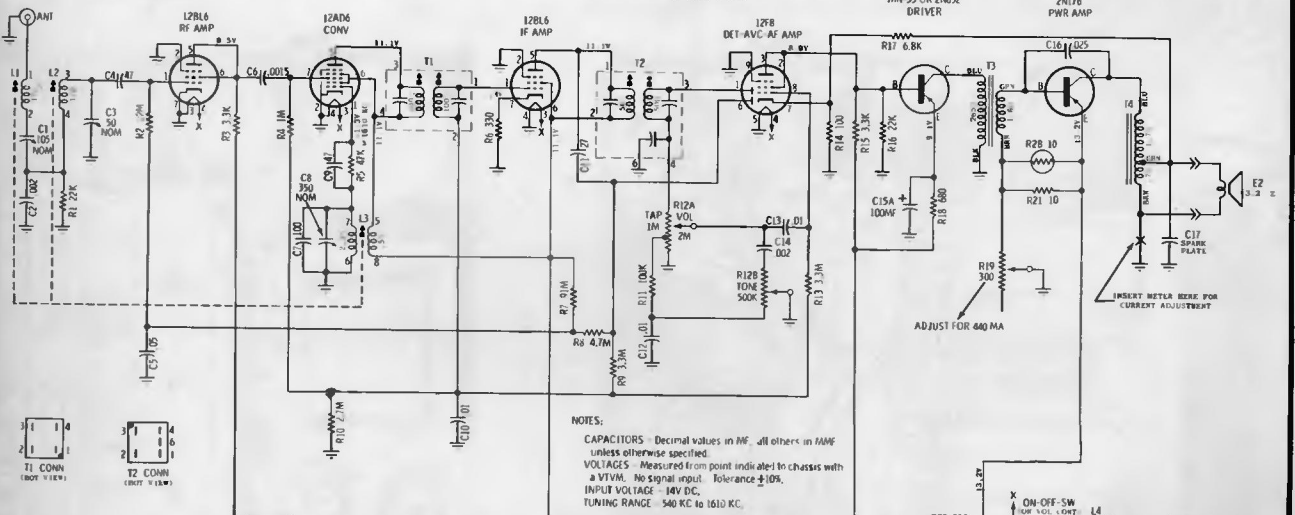
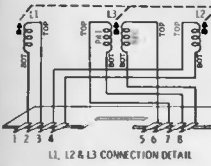
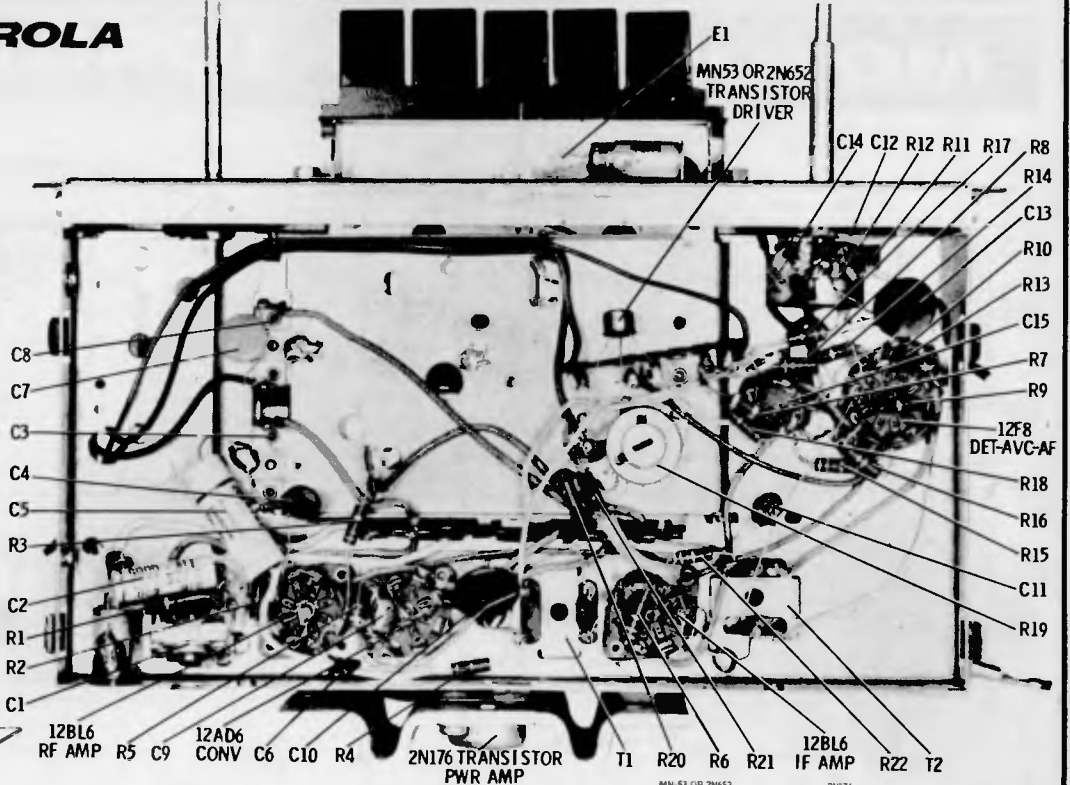


DUMMY ANTENNA

MOTOROLA

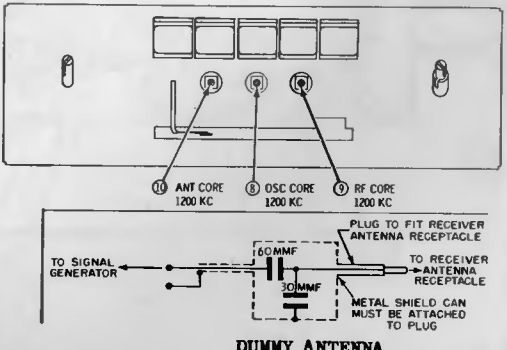
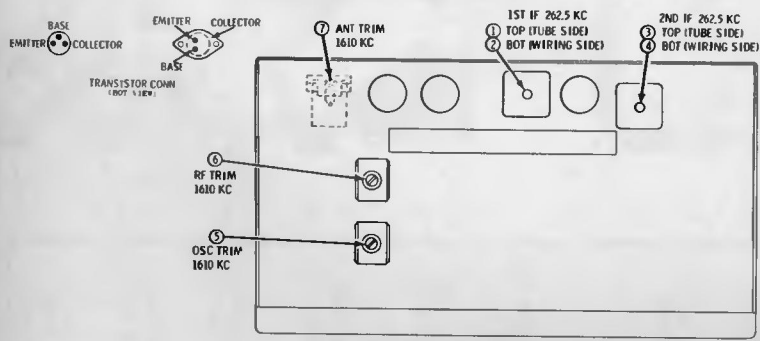
AUTO RADIO

MODEL
CRA60X



NOTES:
CAPACITORS - Decimal values in MF, all others in MUF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
INPUT VOLTAGE - 14V DC.
TUNING RANGE - 540 KC to 1610 KC.

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.

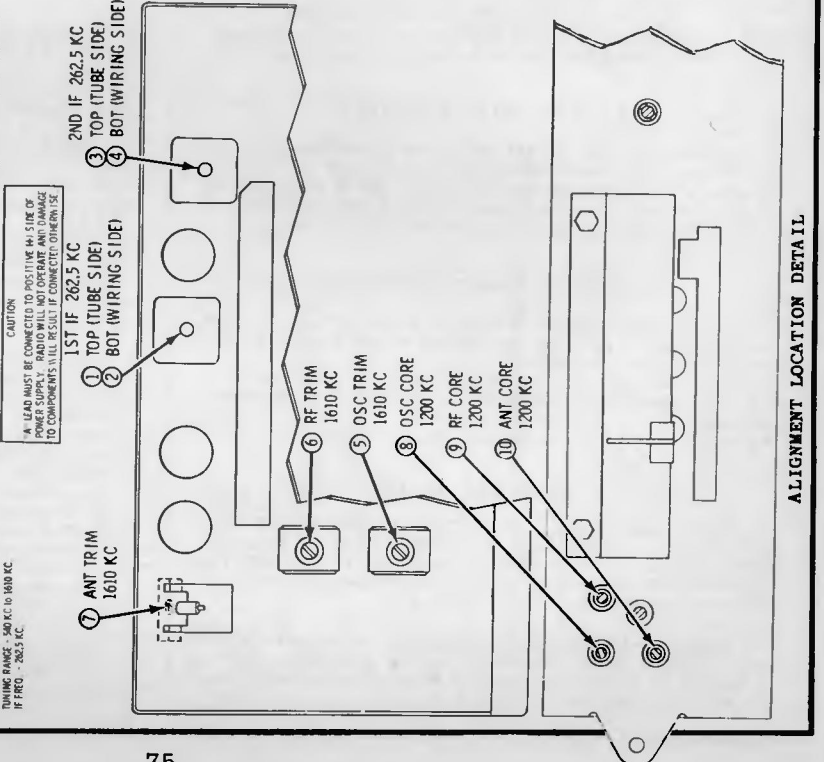
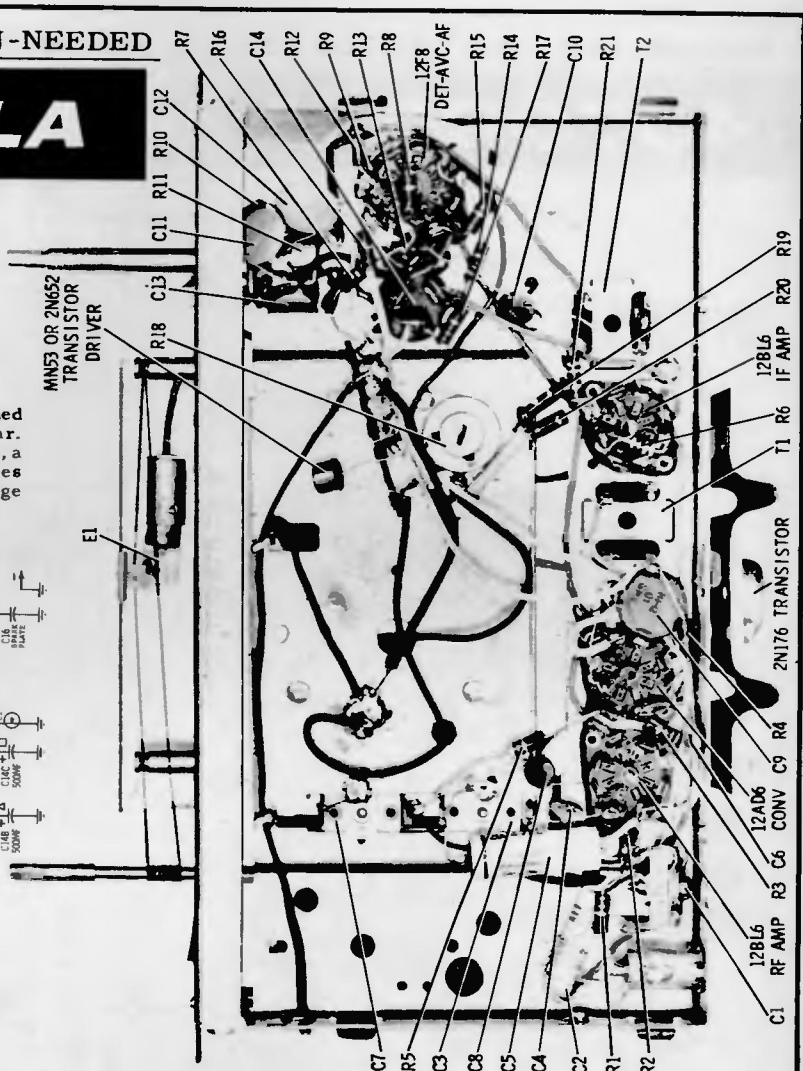
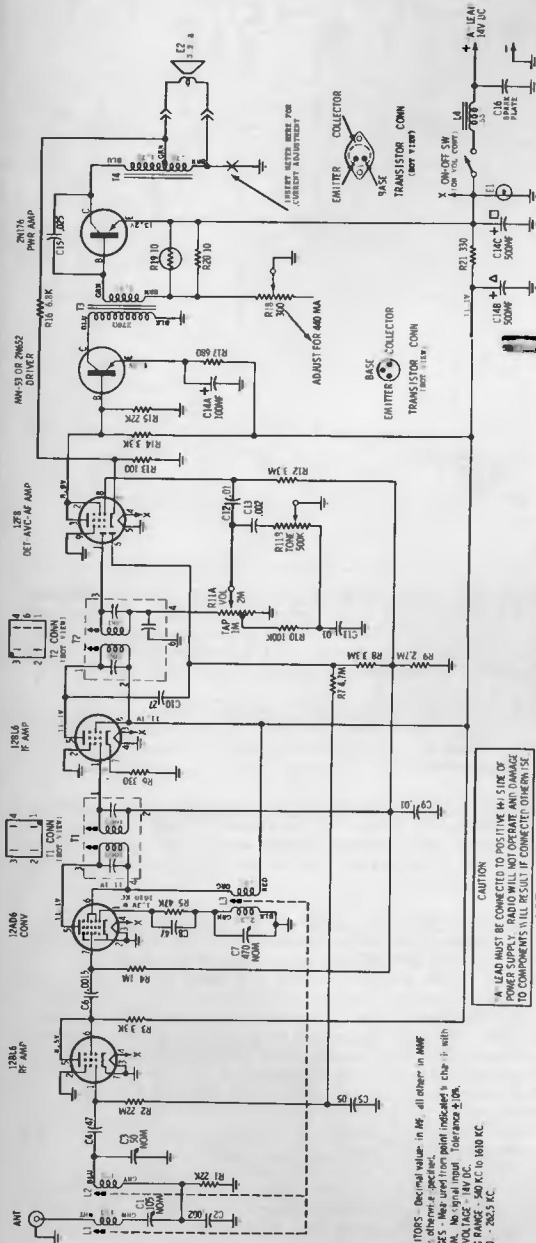


MOTOROLA

AUTO RADIO

MODEL CRM60X

Automotive type superheterodyne receiver designed for custom installation in the 1960 Corvair car. This receiver contains a transistor driver stage, a transistor output stage, and four miniature tubes designed to operate directly from the car's storage battery.

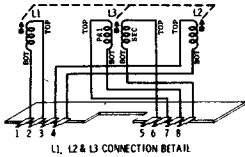


NOTES:
CAPACITORS - Decimal value in μ F, all others in pF unless otherwise specified.
VOLTAGES - Mean unification point indicated's char. μ with tolerance $\pm 10\%$.
INPUT VOLTAGE - 14.0 VDC with tolerance $\pm 10\%$.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ - 262.5 KC.

MOTOROLA

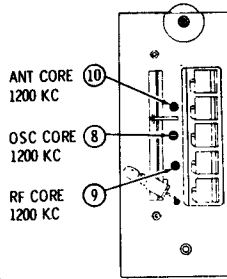
AUTO RADIO

MODEL OEA60X

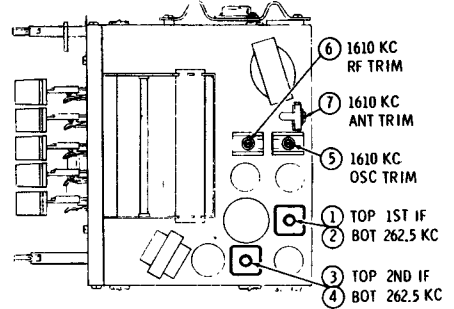


NOTES:

CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated in chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
 INPUT VOLTAGE - 14V DC.
 TUNING RANGE - 540 KC to 1610 KC.
 IF FREQ. - 262.5 KC.

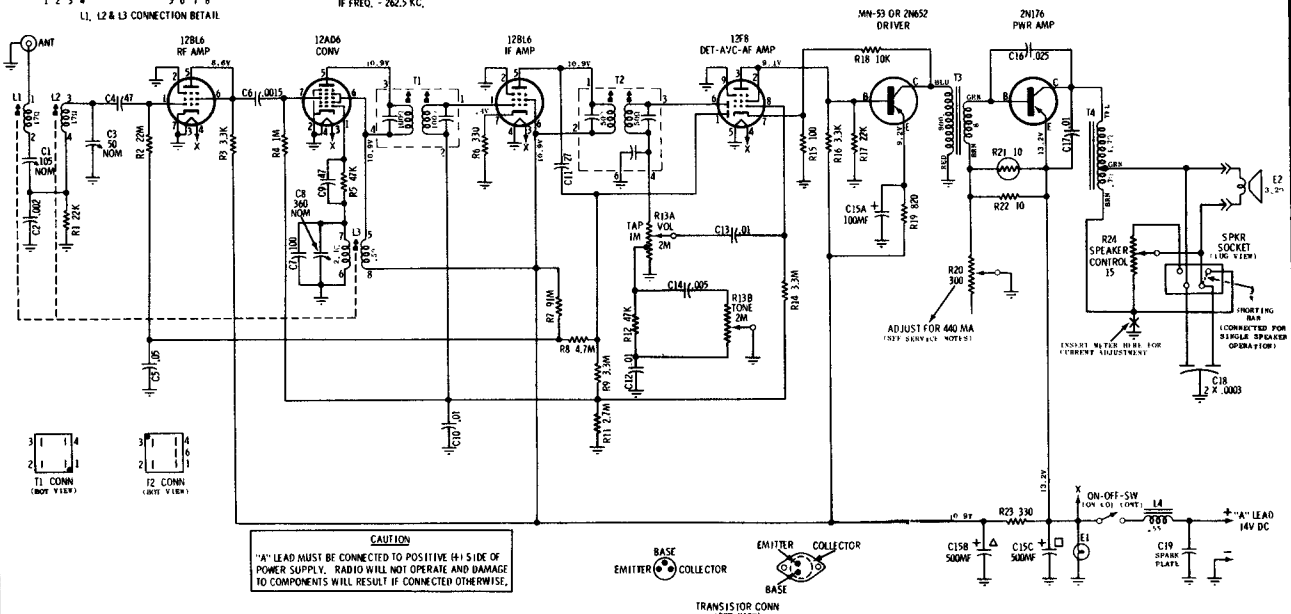


FRONT VIEW



TOP VIEW

ALIGNMENT LOCATION DETAIL



TYPE - Automotive type superheterodyne receiver designed for custom installation in the 1960 Oldsmobile cars.

TO SET PUSHBUTTONS

Pushbuttons can be set up in any order. However, for convenience in remembering, it is suggested that stations be set up in frequency sequence from left to right. During pushbutton set-up, the antenna should be fully extended and antenna trimmer properly peaked at 1400 Kc.

1. Turn receiver on and allow it to operate for fifteen minutes.
2. Unlock pushbuttons by pulling them out with your fingers. In the unlocked position, button will extend about 1/2" forward of its normal position.
3. Accurately tune in station desired for pushbutton setup.
4. Lock one of the pushbuttons to this station by pushing it in firmly.
5. Repeat steps 3 & 4 for remaining pushbuttons

SERVICE NOTES

1. **RADIO POLARITY** - WHEN SERVICING THIS RECEIVER, THE "A" LEAD MUST BE CONNECTED TO THE POSITIVE SIDE OF THE POWER SOURCE. IF CONNECTED OTHERWISE, RECEIVER WILL NOT OPERATE AND DAMAGE TO COMPONENTS MAY RESULT.
2. **POWER SUPPLY REQUIREMENTS** - It is preferable to use a storage battery (without a battery charger) in place of a battery eliminator. If a battery eliminator is used, it must be well regulated and filtered.

3. **POWER TRANSISTOR REPLACEMENT** - When replacing a power transistor, be sure transistor insulator is in place and well greased and that the mounting screws are securely and evenly tightened. Use only the transistor specified in the Replacement Parts List for replacement. See Notes 4 & 6.

4. **POWER TRANSISTOR INSULATOR** - When replacing a power transistor or power transistor insulator, be sure to coat both sides of insulator with DC-4 grease (Motorola Part No. 11M490487) to insure proper heat dissipation.

5. **DRIVER TRANSISTOR REPLACEMENT** - When replacing a driver transistor, grasp the transistor leads (between the transistor body and soldering lug) with a pair of long nose pliers to prevent excessive heating of transistor body during soldering operation.

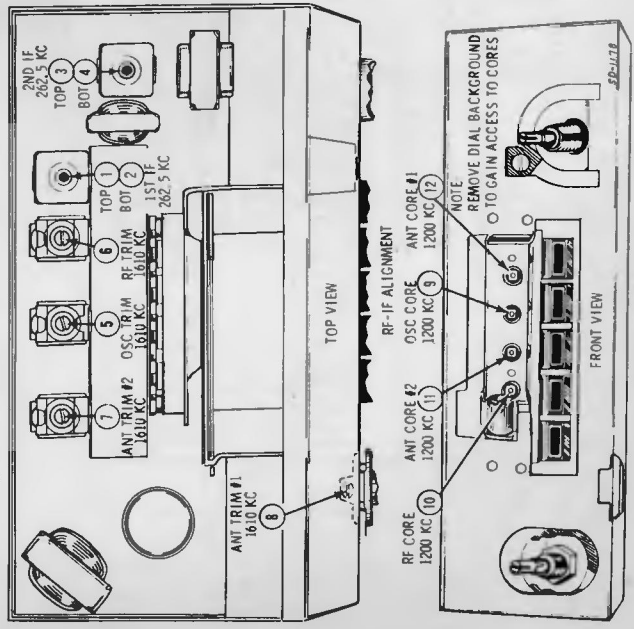
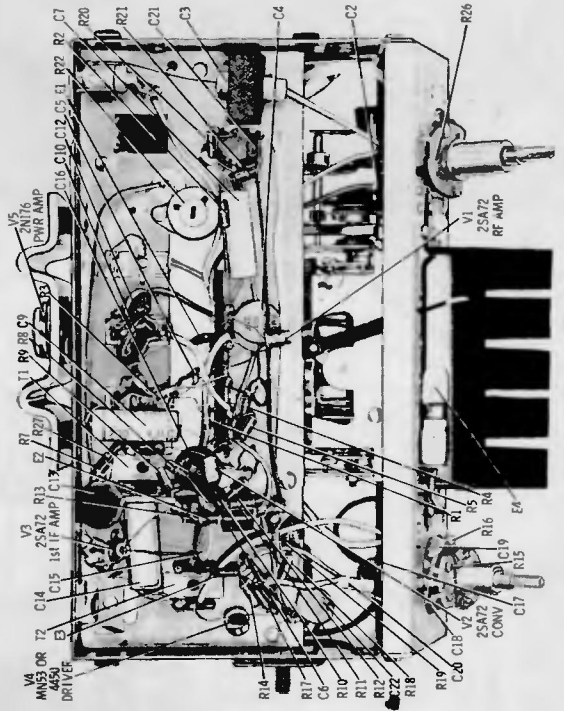
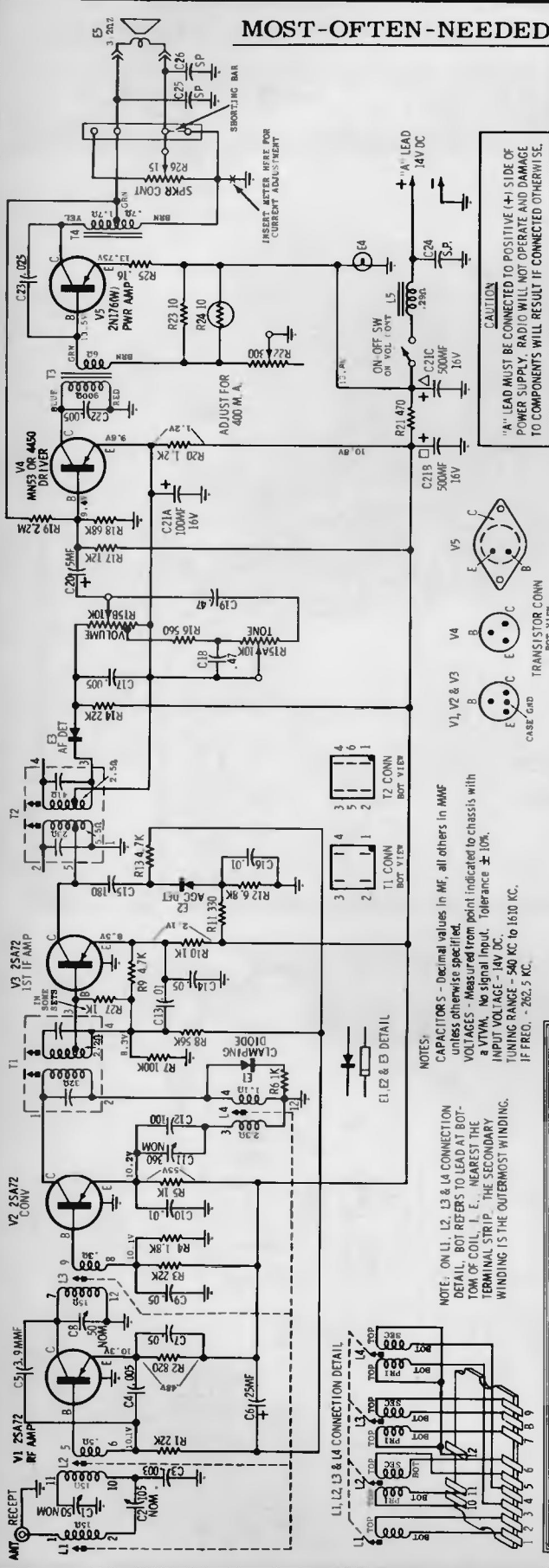
6. **POWER TRANSISTOR CURRENT ADJUSTMENT** - After a power transistor has been replaced, the collector current should be checked and adjusted for proper operation.
 a. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer (T4). Connect the negative post of the meter to ground. **CAUTION:** Be sure the speaker ground lead is connected in common with the transformer ground lead to the positive meter terminal (see schematic).
 b. Turn the radio on and allow it to heat up for about 15 minutes.
 c. Adjust R20 for a reading of 360 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 "A" lead.

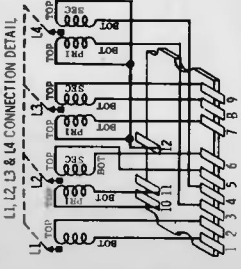
MOTOROLA

Exact material for MODEL CTA61 used in 1961 Chevrolet cars.

MODEL BKA61 used in 1961 Buick cars is identical electrically.



NOTES:
 CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
 VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
 INPUT VOLTAGE - 14V DC.
 TUNING RANGE - 540 KC. to 1610 KC.
 IF FREQ. - 262.5 KC.



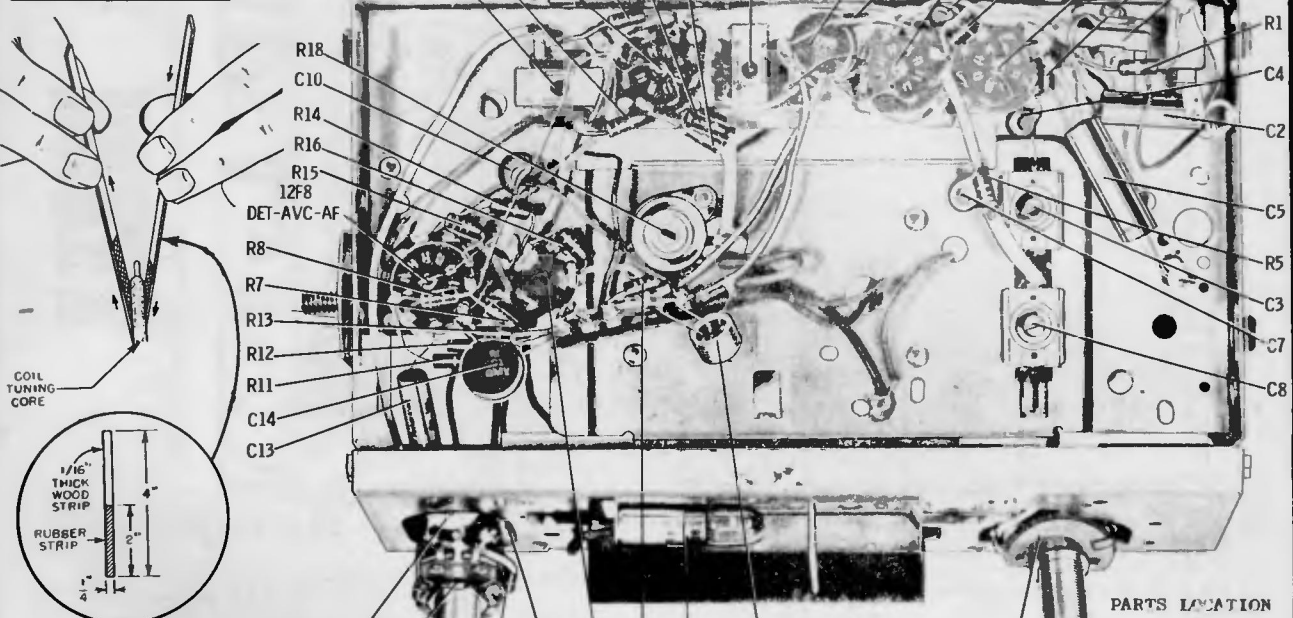
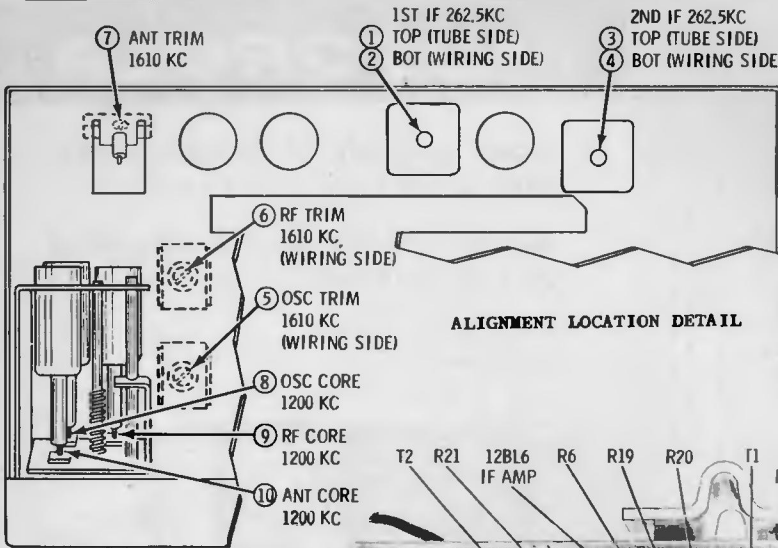
ALIGNMENT LOCATION DETAIL

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

MOTOROLA

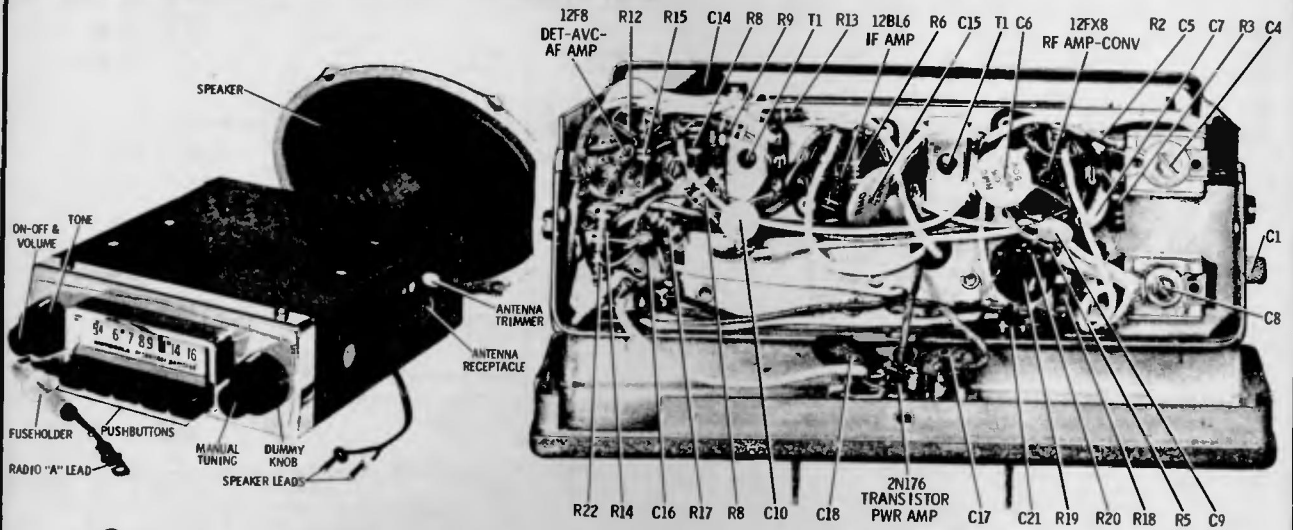
MODEL
CTM61X
CTM61XA

Automotive type superheterodyne receivers designed for custom installation in the 1961 Chevrolet cars. Model CTM61X contains a speaker control & socket for adding a rear speaker, model CTM61XA does not; in all other respects, these two receivers are the same.

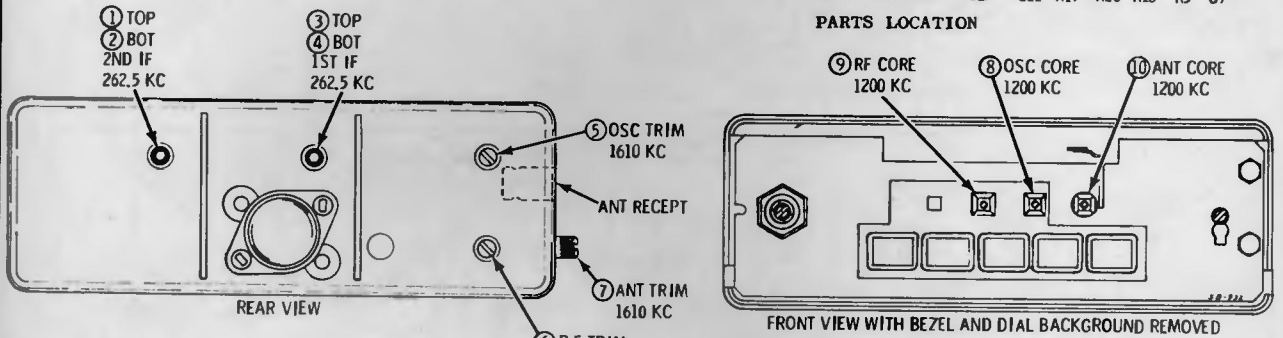


MOTOROLA

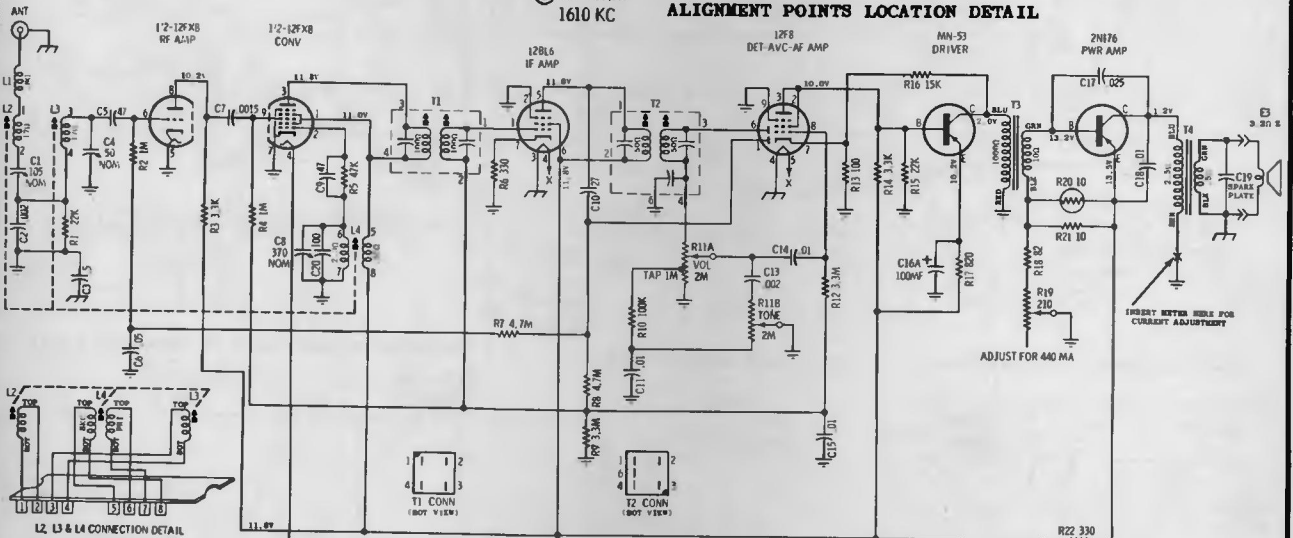
MODEL
500X



PARTS LOCATION

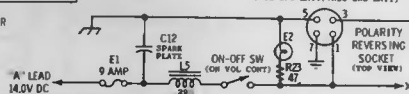
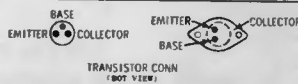
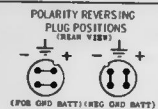


ALIGNMENT POINTS LOCATION DETAIL



NOTES
CAPACITORS - Decimal-values in μF , all others in $\text{M}\mu\text{F}$ unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. $\pm 10\%$.
INPUT VOLTAGE - 14.0V DC.
TUNING RANGE - 535 KC to 1605 KC.
IF FREQ. - 262.5 KC.
- INDICATES ISOLATED NEGATIVE LINE.
- INDICATES CHASSIS AND HOUSING.

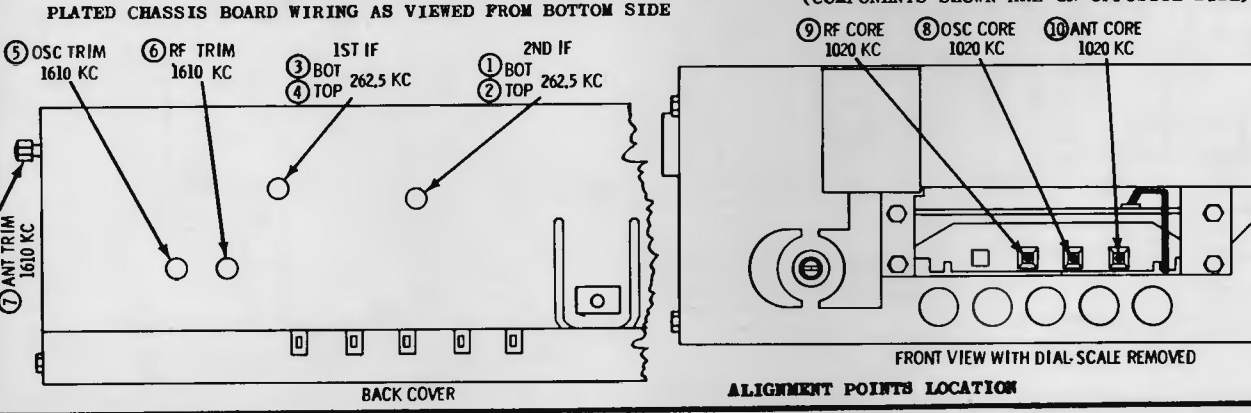
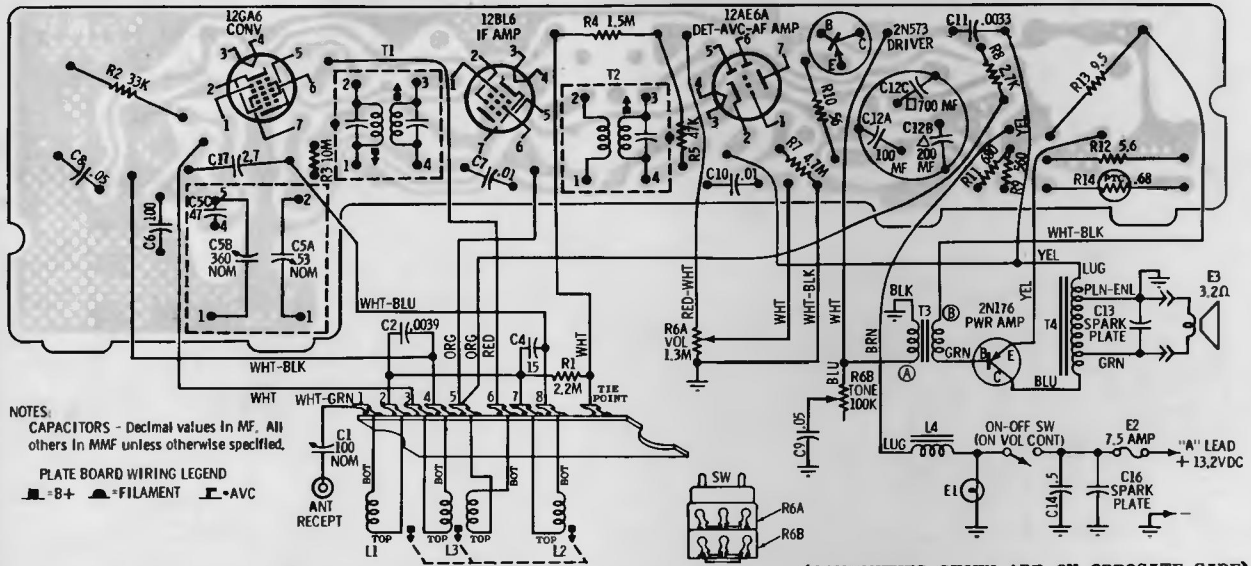
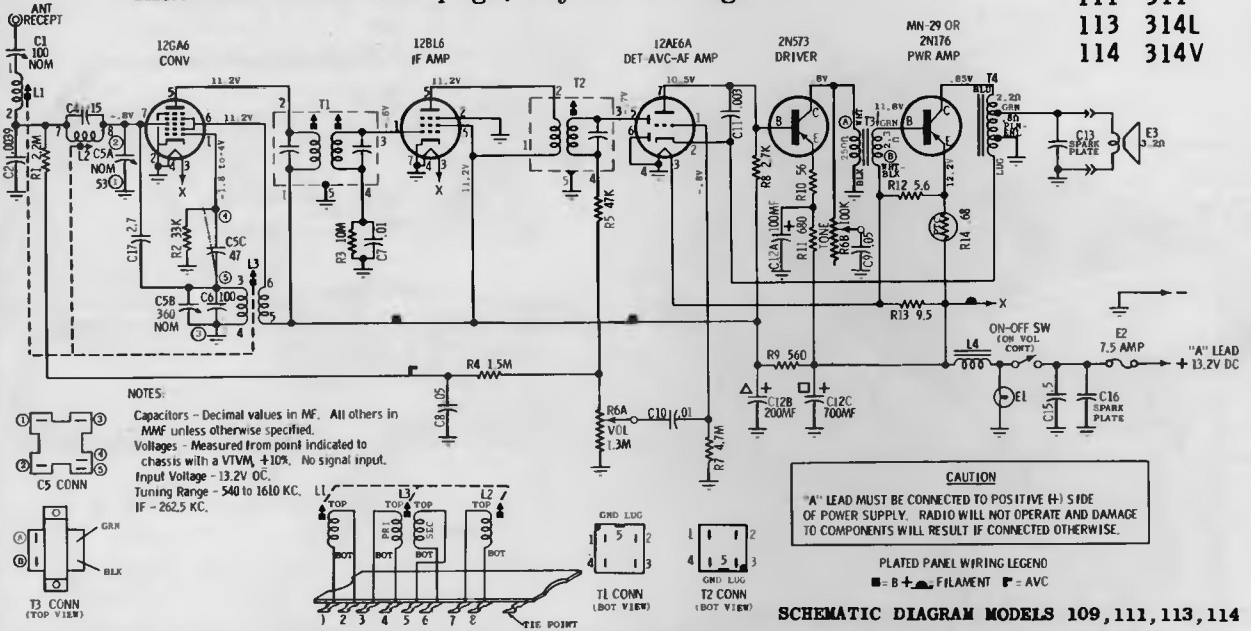
CAUTION
BEFORE CONNECTING 'A' LEAD, BATTERY POLARITY SHOULD BE CHECKED AND POLARITY REVERSING PLUG SHOULD BE CHANGED CORRESPONDINGLY, OTHERWISE SET WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT.



MOTOROLA INC.

Schematic diagram for some models and other service material on the next page, adjacent at right.

MODELS	
MoPar	109 309
	111 311
	113 314L
	114 314V



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

MOTOROLA Models 109, 111, 113, 114, 309, 311, 314L, 314V, Continued

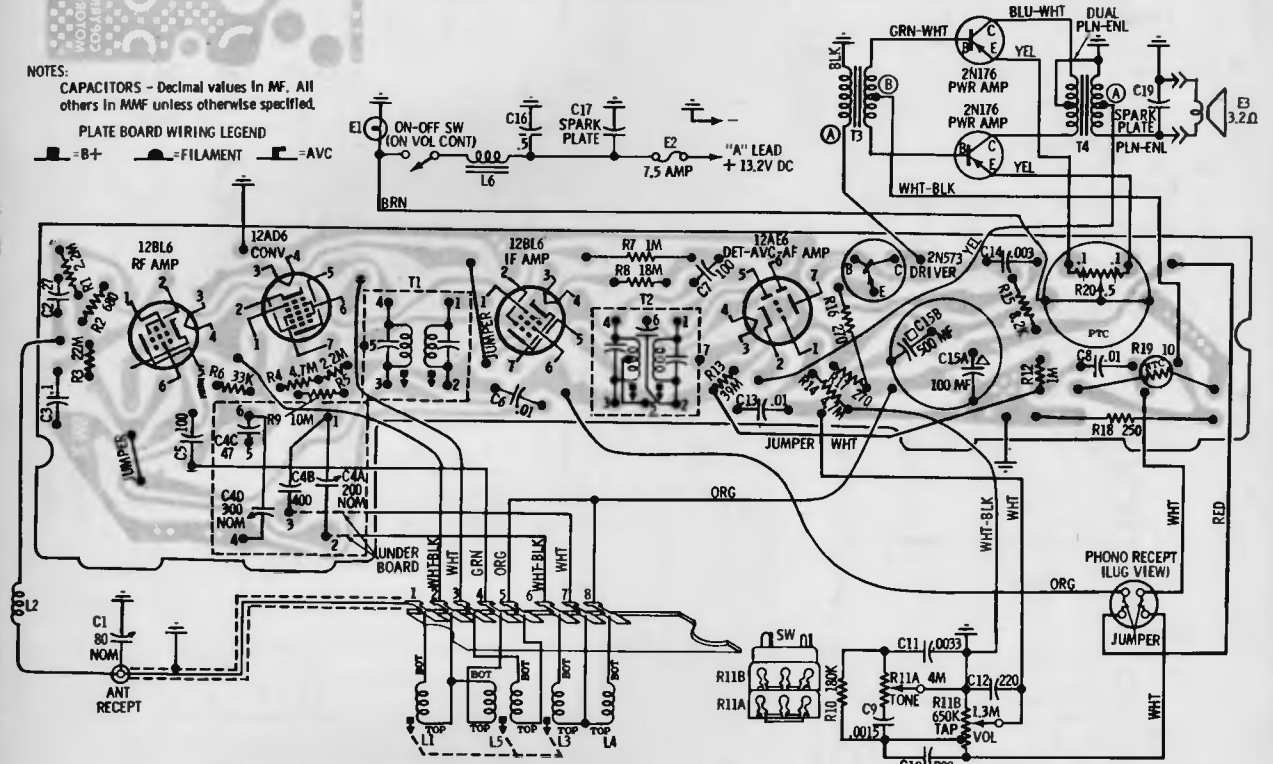
PLATED CHASSIS BOARD GROUND CONNECTIONS AS SEEN THRU BOARD FROM WIRING SIDE
MODELS 309, 311, 314L, 314V

NOTES:

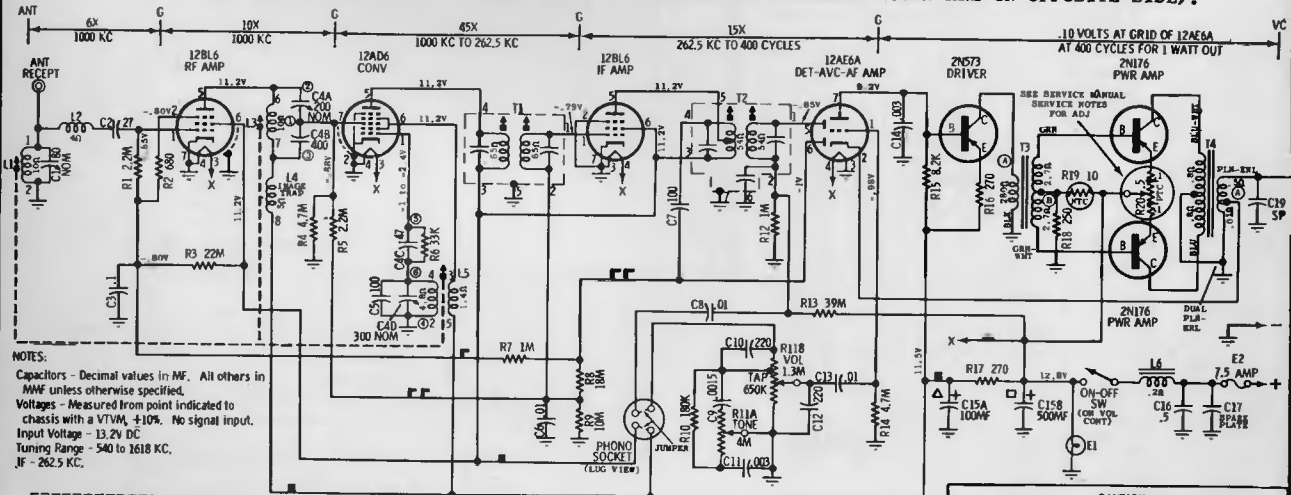
CAPACITORS - Decimal values in MF. All others in MMF unless otherwise specified.

PLATE BOARD WIRING LEGEND

■ = B+ ■ = FILAMENT ■ = AVC



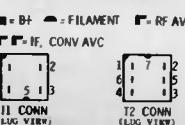
PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM SIDE (COMPONENTS SHOWN ARE ON OPPOSITE SIDE).



NOTES:

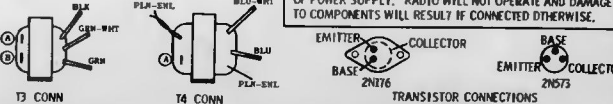
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
 Voltages - Measured from point indicated to chassis with a VTVM, $\pm 10\%$. No signal input.
 Input Voltage - 13.2V DC
 Tuning Range - 540 to 1618 KC.
 IF - 262.5 KC.

PLATED PANEL WIRING LEGEND



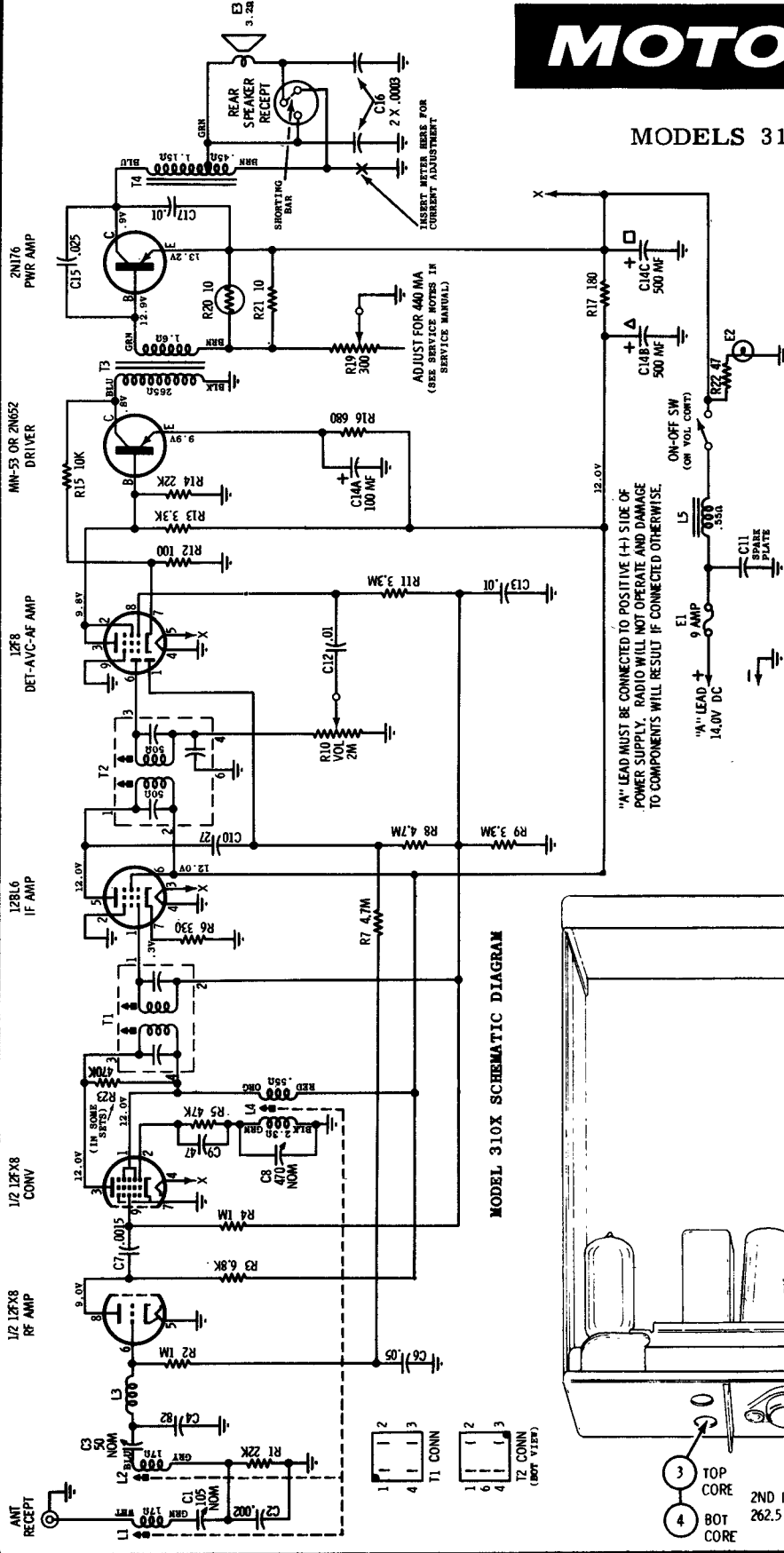
CAUTION

"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

MODELS 310X and 311X

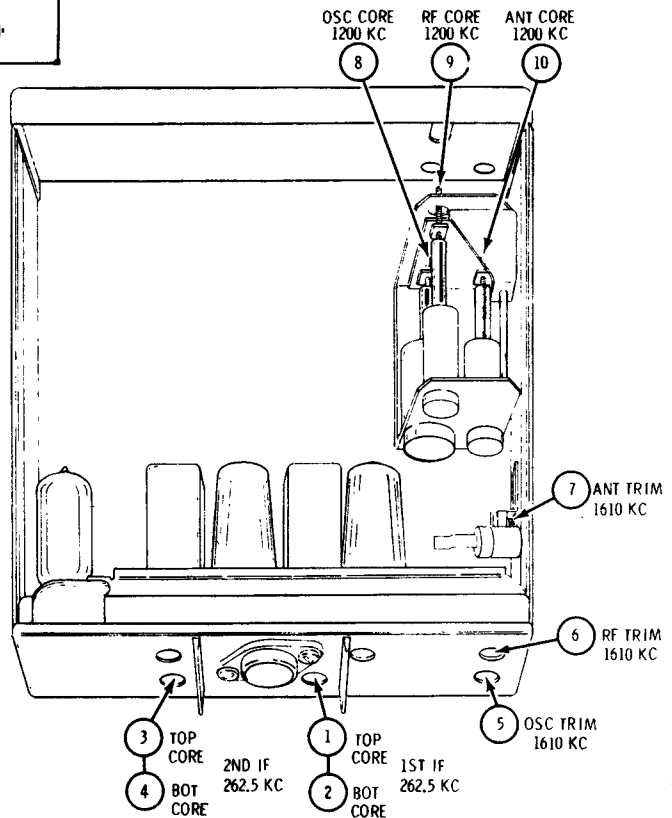


MODEL 310X SCHEMATIC DIAGRAM

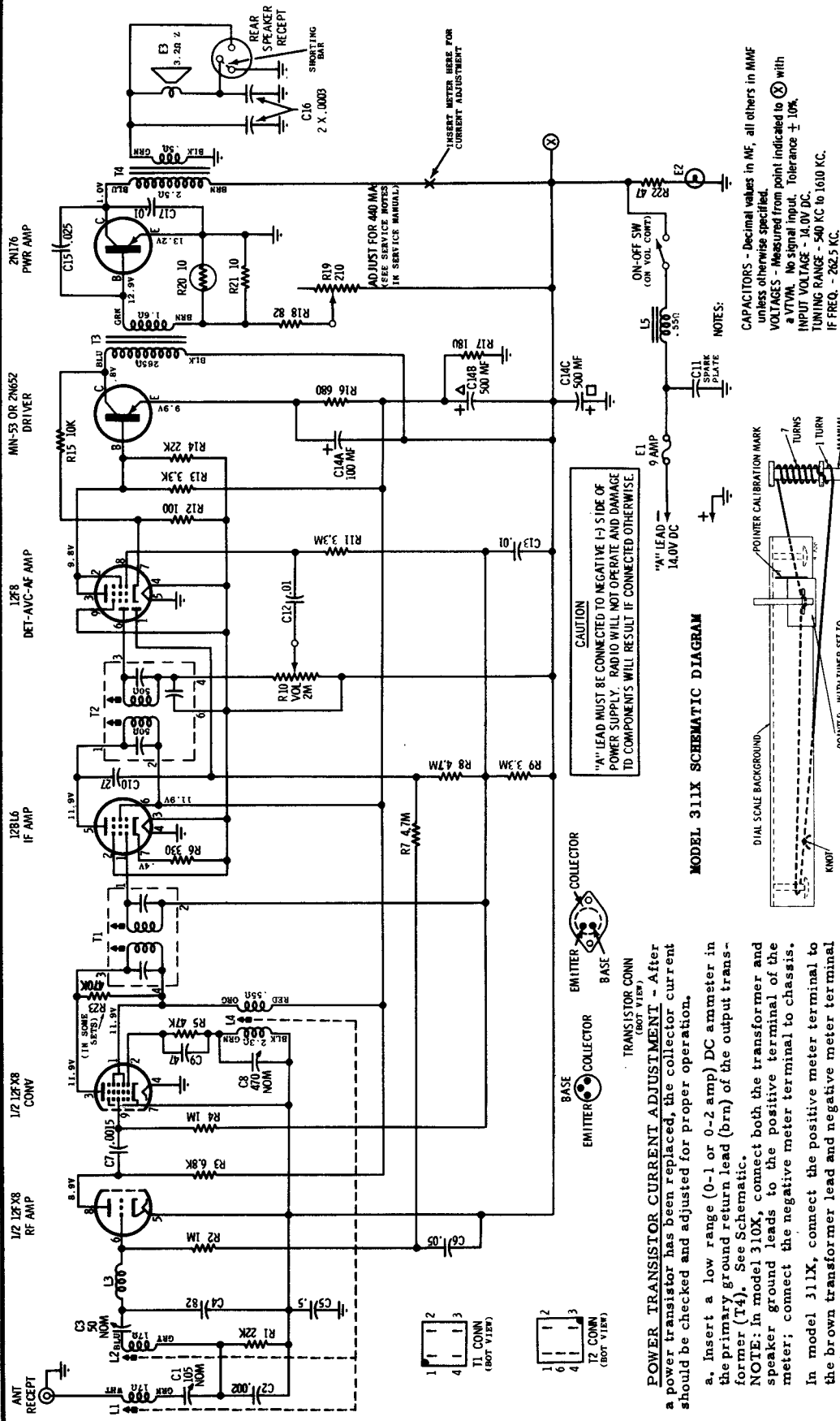
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MODELS 310X and 311X

Schematic diagram of 310X is on this page, diagram of 311X is on the next page, all other service material applicable to both.



ALIGNMENT POINTS LOCATION

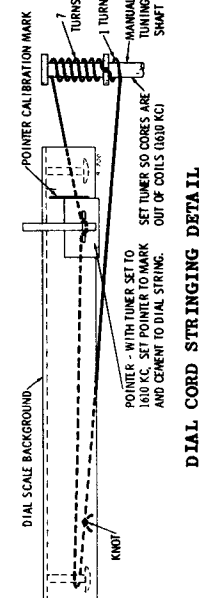


MODEL 311X SCHEMATIC DIAGRAM

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

NOTE:
CAPACITORS - Decimal values in MF, all others in MIMF unless otherwise specified.
VOLTAGES - Measured from point indicated to ⊗ with a VTVM. No signal input. Tolerance ± 10%.
INPUT VOLTAGE - 14.0V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ. - 262.5 KC.

Automotive type 12 volt superheterodyne receivers designed for universal underdash installation in most cars. Model 310X is for use with cars having a negative ground electrical system. Model 311X is for use with cars having a positive ground electrical system.



MOTOROLA INC.
MODELS
310X & 311X

POWER TRANSISTOR CURRENT ADJUSTMENT - After a power transistor has been replaced, 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 (brn) of the output transformer (T4). See Schematic.
NOTE: In model 310X, connect both the transformer and speaker ground leads to the positive terminal of the meter; connect the negative meter terminal to chassis. In model 311X, connect the positive meter terminal to the brown transformer lead and negative meter terminal to the ON-OFF switch terminal.

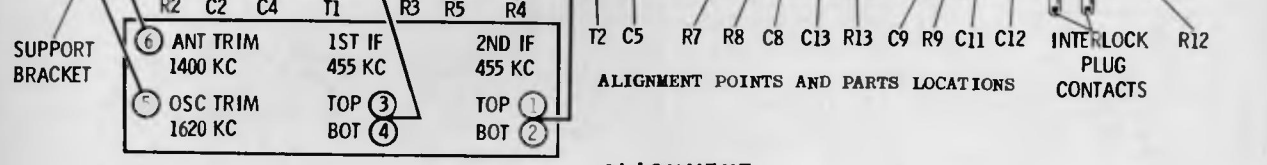
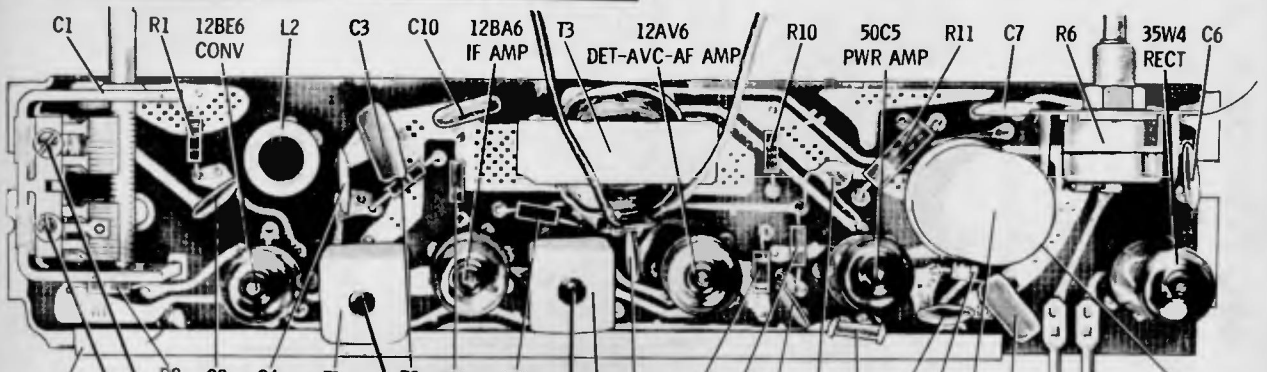
b. Turn the radio on and allow it to heat up for about 15 minutes.

c. Adjust R19 for a reading of 360 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

MODELS
A3B, N
CHASSIS
HS-746

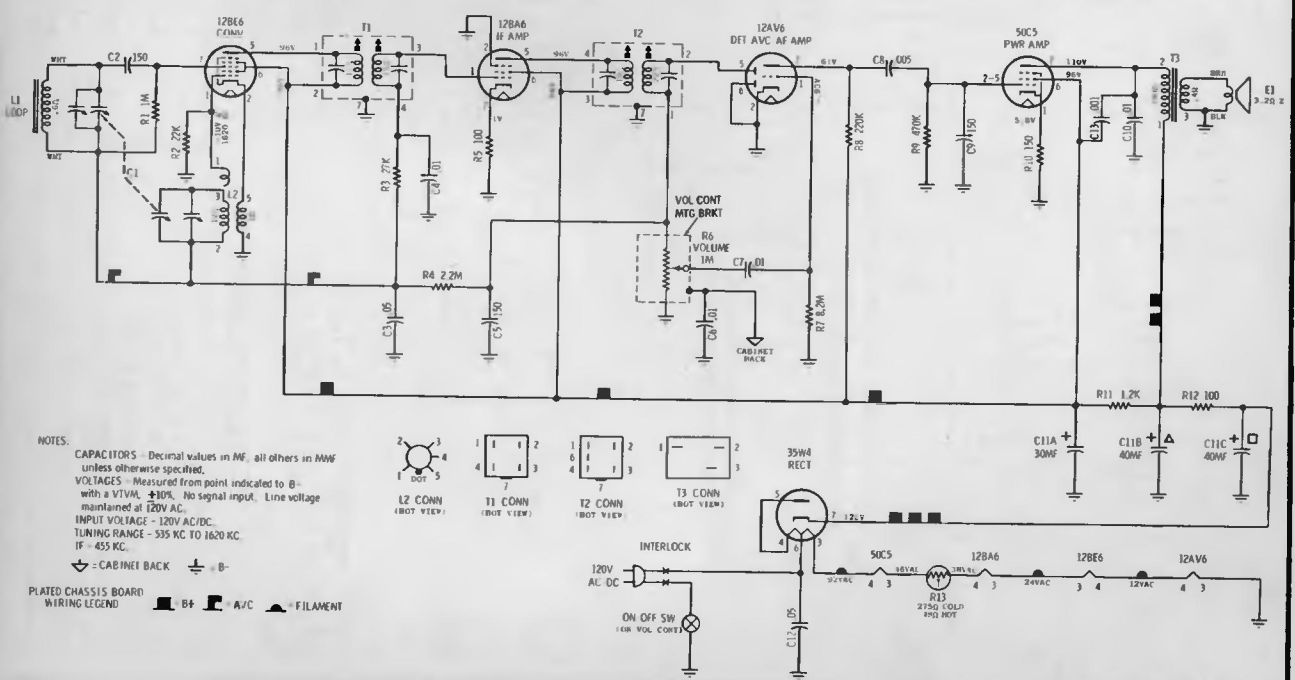


ALIGNMENT

Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .4 volts on output meter to prevent overloading the receiver.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	12BE6 grid (pin 7) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Radiation loop*	1620 Kc	Fully open	5	Adjust for maximum.
3.	"	1400 Kc	Tune for max	6	"

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



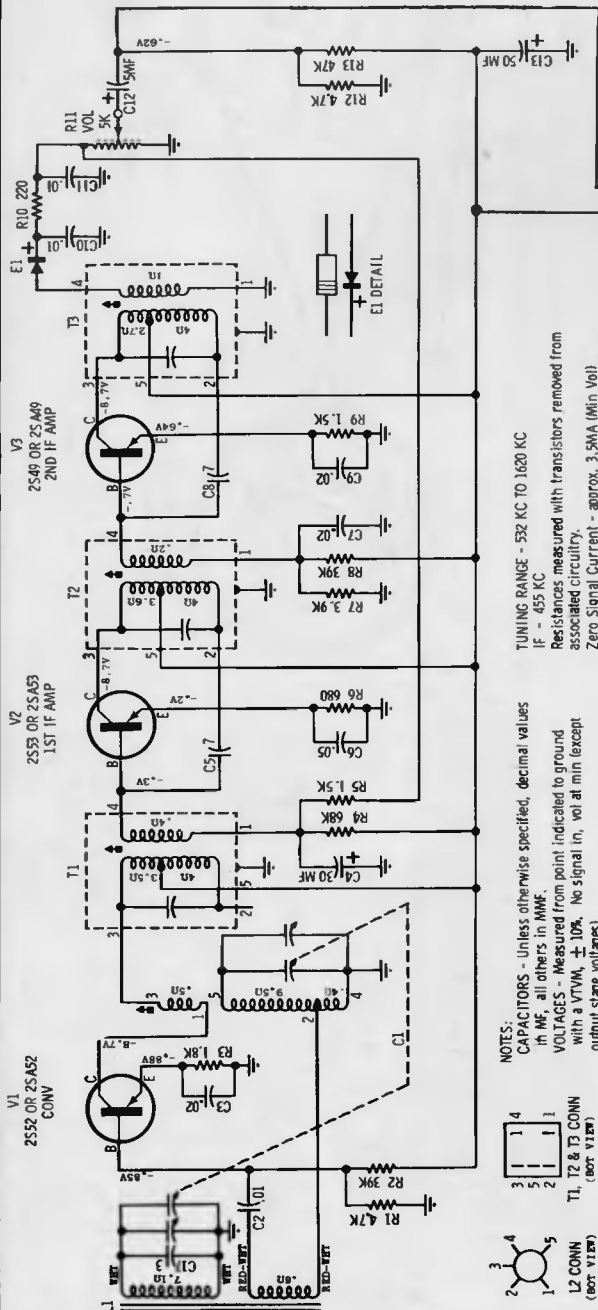
NOTES:
CAPACITORS - Decimal values in μF , all others in $\text{M}\mu\text{F}$ unless otherwise specified.
VOLTAGES - Measured from point indicated to B- with a VTVM $\pm 10\%$. No signal input. Line voltage maintained at 120V AC.
INPUT VOLTAGE - 120V AC/DC.
TUNING RANGE - 535 KC TO 1620 KC.
IF - 455 KC.
- CABINET BACK + B-

PLATED CHASSIS BOARD
WIRING LEGEND: \blacksquare B-F \blacksquare A/C \blacksquare FILAMENT

MOTOROLA

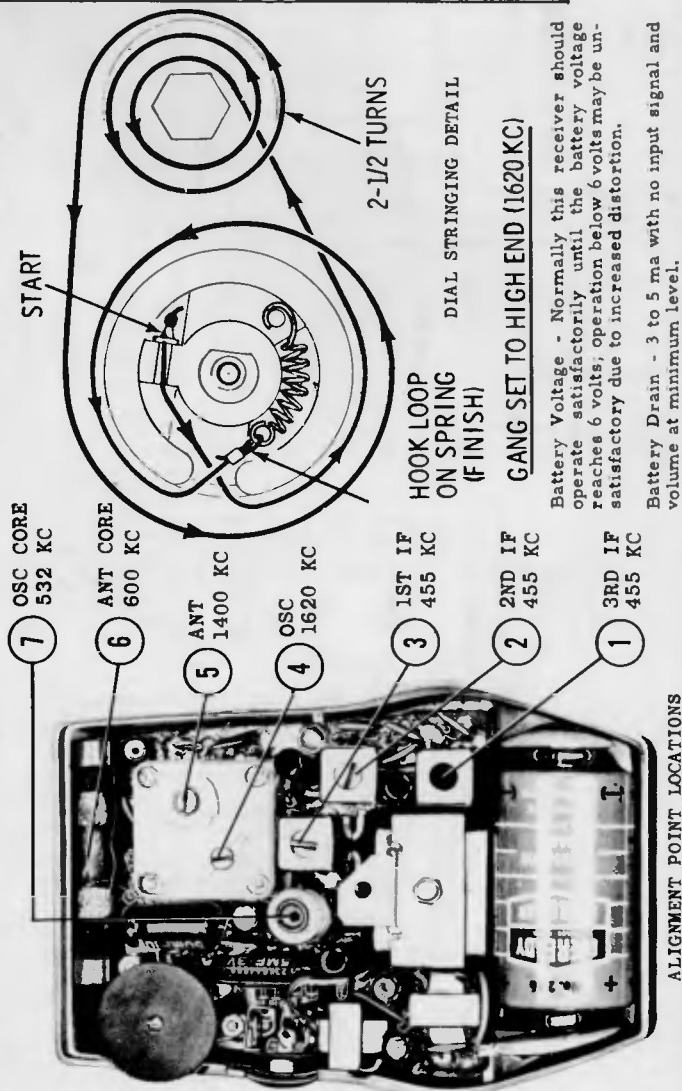
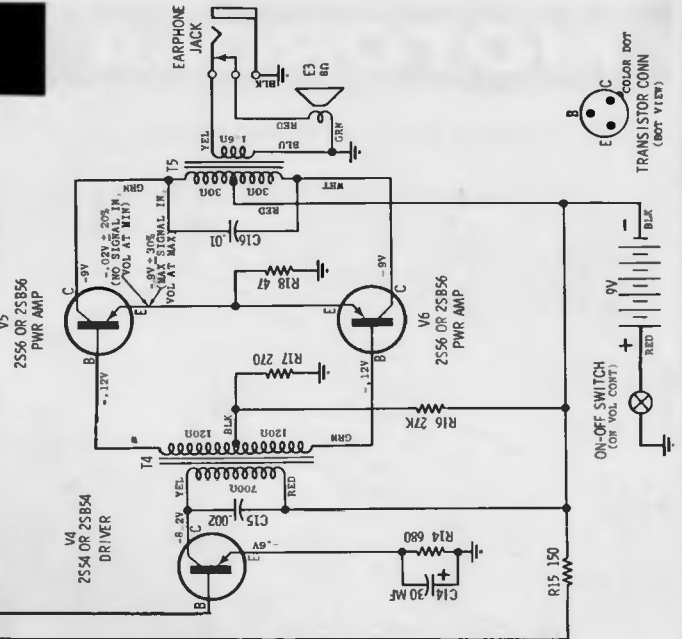
PORTABLE RADIO

MODEL	CHASSIS
X14B	HS-795
X14E	HS-795
X14R	HS-795
X14W	HS-795



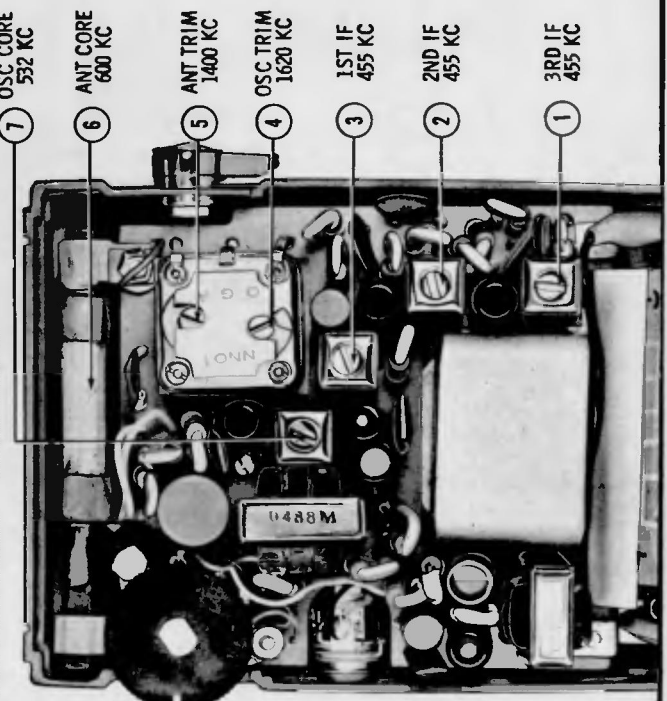
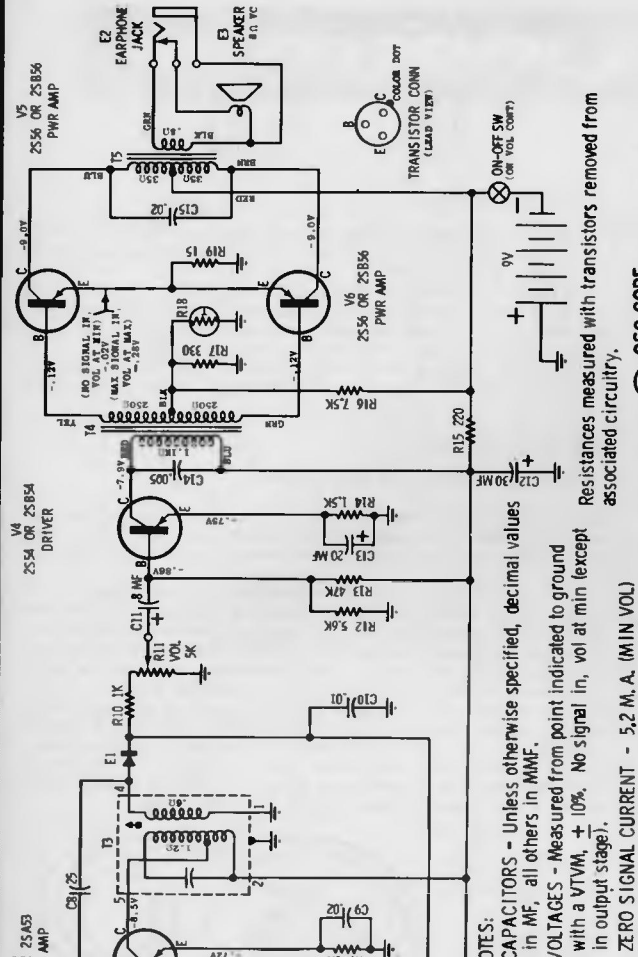
TUNING RANGE - 532 KC TO 1620 KC
IF - 455 KC
Resistances measured with transistors removed from associated circuitry.
Zero Signal Current - approx. 3.5mA (Min Vol)

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 except output stage voltages.

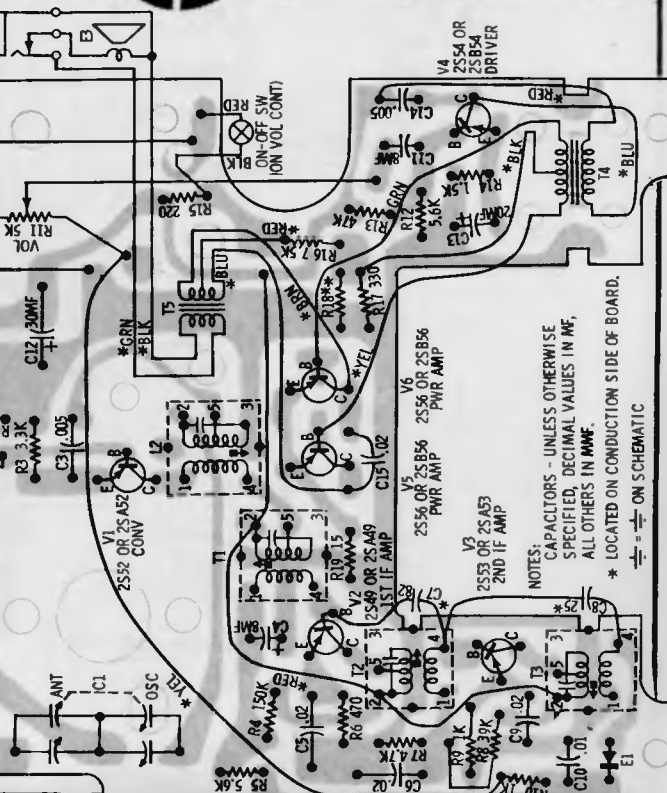


MOTOROLA INC.

MODEL	CHASSIS
X15A	HS-796
X15E	HS-796
X15N	HS-796

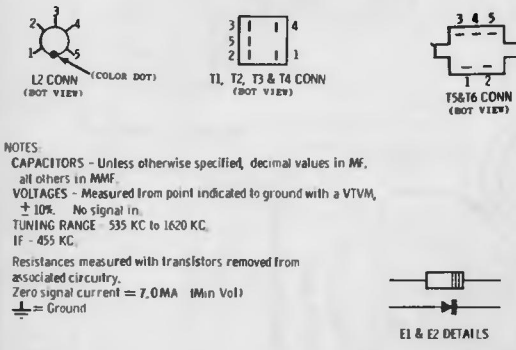
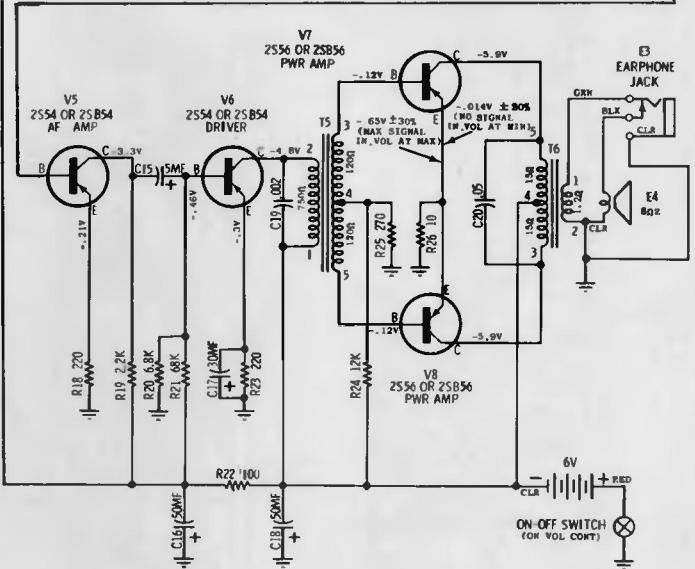
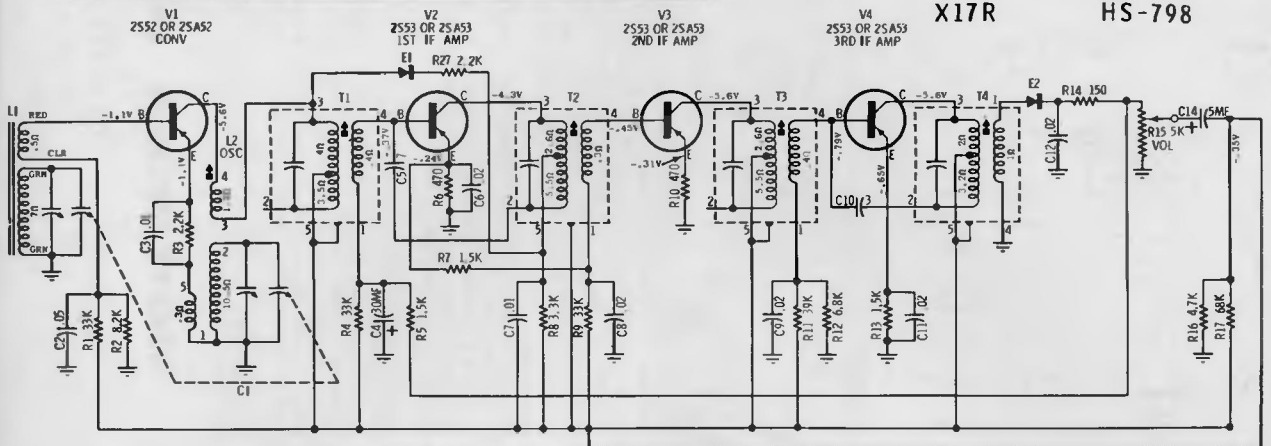


NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in, vol at min (except in output stage).
 ZERO SIGNAL CURRENT - 5.2 M. A. (MIN VOL)

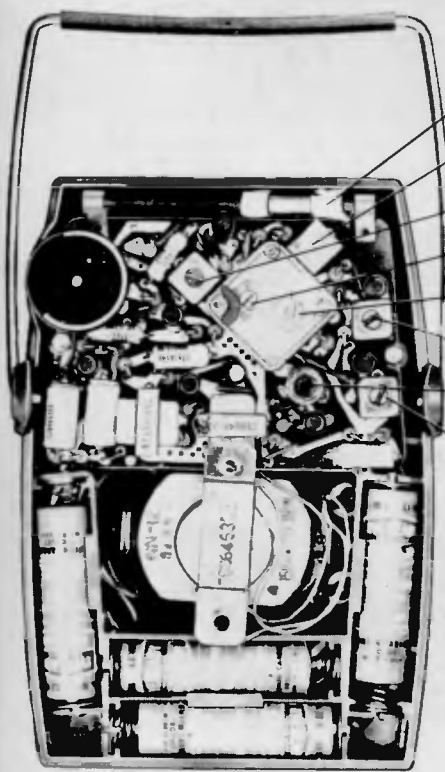


MOTOROLA

MODEL	CHASSIS
X17B	HS-798
X17N	HS-798
X17R	HS-798



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.
 TUNING RANGE - 535 KC to 1620 KC, IF - 455 KC.
 Resistances measured with transistors removed from associated circuitry.
 Zero signal current = 7.0 MA (Min Vol)
 \perp = Ground



- 7 ANT CORE 600 KC
- 2 3RD IF 455 KC
- 1 4TH IF 455 KC
- 5 OSC TRIM 1620 KC
- 6 ANT TRIM 1400 KC
- 3 2ND IF 455 KC
- 8 OSC CORE 532 KC
- 4 1ST IF 455 KC

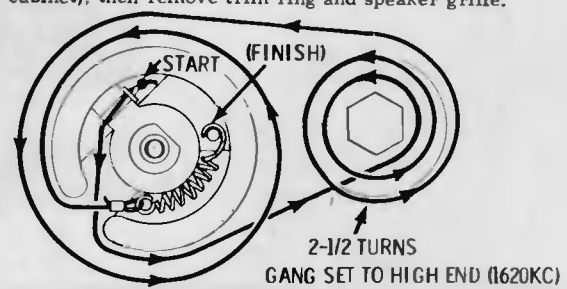
ALIGNMENT POINT LOCATIONS

CHASSIS REMOVAL

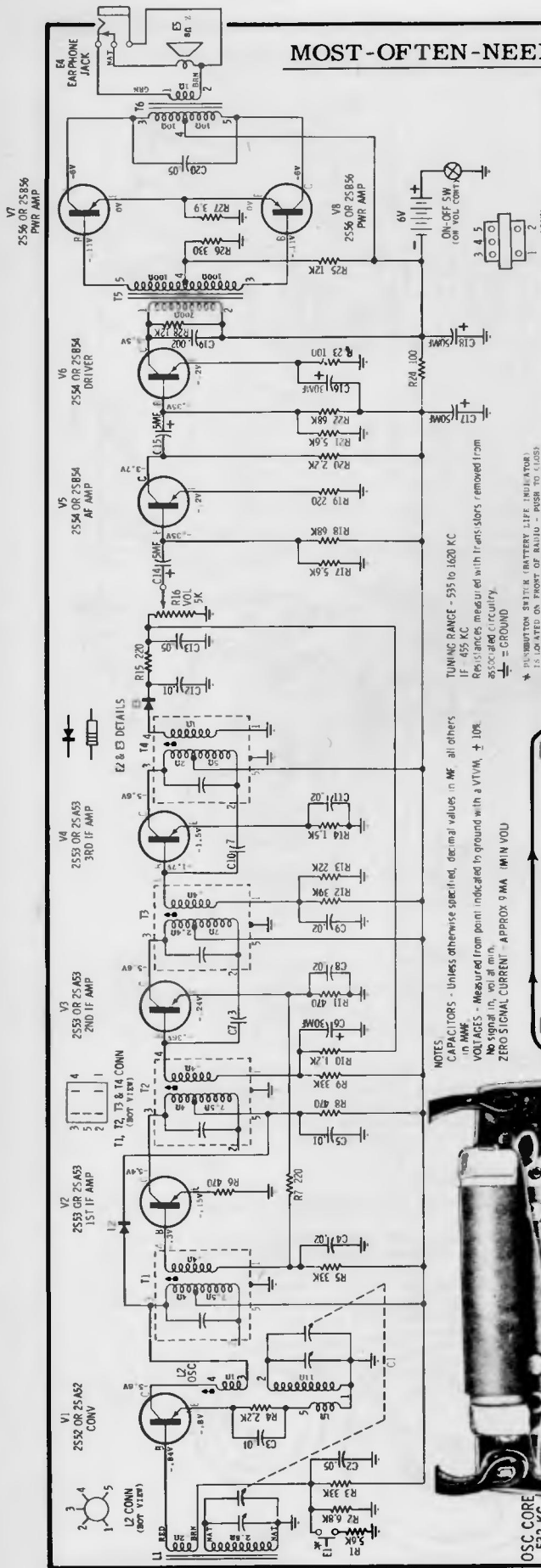
1. Loosen captivated cabinet back mounting screw and pull off cabinet back.
2. Remove 2 chassis mounting screws.
3. Slide chassis to the right and lift out of cabinet.

SPEAKER REMOVAL

1. Loosen captivated cabinet back mounting screw and pull off cabinet back.
2. Remove batteries and unsolder speaker lead connected to chassis; then unsolder earphone jack lead connected to chassis.
3. Remove chassis (see Chassis Removal).
4. Lift up 4 speaker trim ring mounting ears (located at rear of cabinet), then remove trim ring and speaker grille.



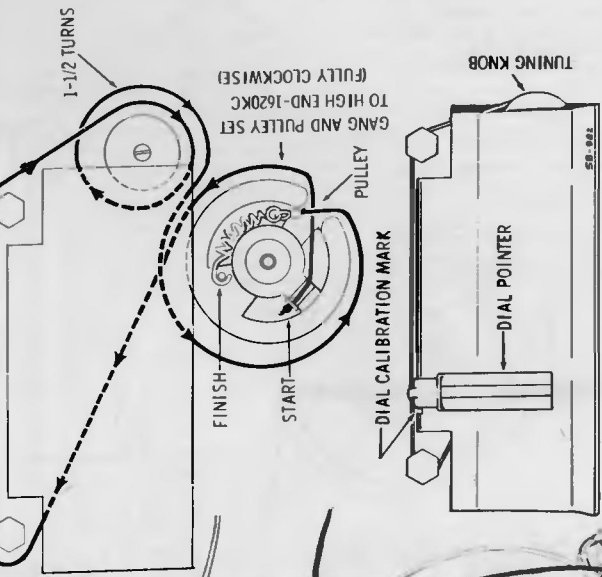
MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



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 9 MA MIN VOLU

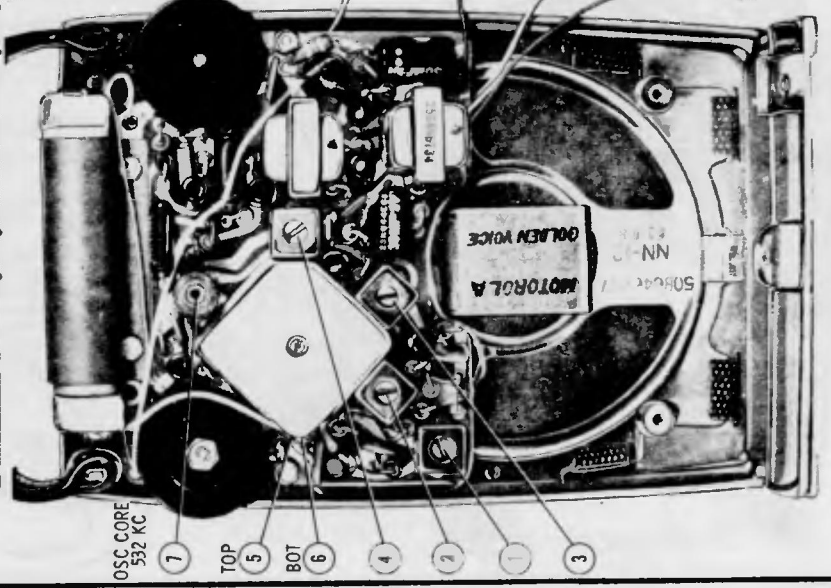
TUNING RANGE - 95 to 1620 KC
IF 455 KC
Resistances measured with Transistors removed from associated circuitry.
⊕ = GROUND

★ DISTRIBUTION SWITCH (BATTERY LIFE INDICATOR) IS LOCATED ON FRONT OF RADIO - PUSH TO CLOSE



NOTE: UPON COMPLETION OF DIAL STRINGING, ROTATE TUNING KNOB FULLY COUNTERCLOCKWISE SO THAT GANG IS FULLY CLOSED (532 KC). PLACE DIAL POINTER SO THAT EDGE OF POINTER JUST COVERS DIAL CALIBRATION MARK.

DIAL STRINGING DETAIL



ALIGNMENT POINT LOCATIONS

- CHASSIS REMOVAL**
1. Lift off battery compartment cover and remove batteries.
 2. Remove 2 cabinet back mounting screws located under batteries and remove cabinet back far enough to gain access to earphone jack; unscrew earphone jack mounting nut.
NOTE: A special tool for removing the earphone jack is available. Order Motorola Part Number 66A646211.
 3. Unsolder battery leads connected to battery compartment on cabinet back.
 4. Unsolder lead and 5.6K resistor (R-1) connected to Battery Life Indicator Switch E-1.
 5. Remove 2 chassis mounting screws.
 6. Lift up chassis far enough to make bottom accessible, then unsolder appropriate leads.

SPEAKER REMOVAL

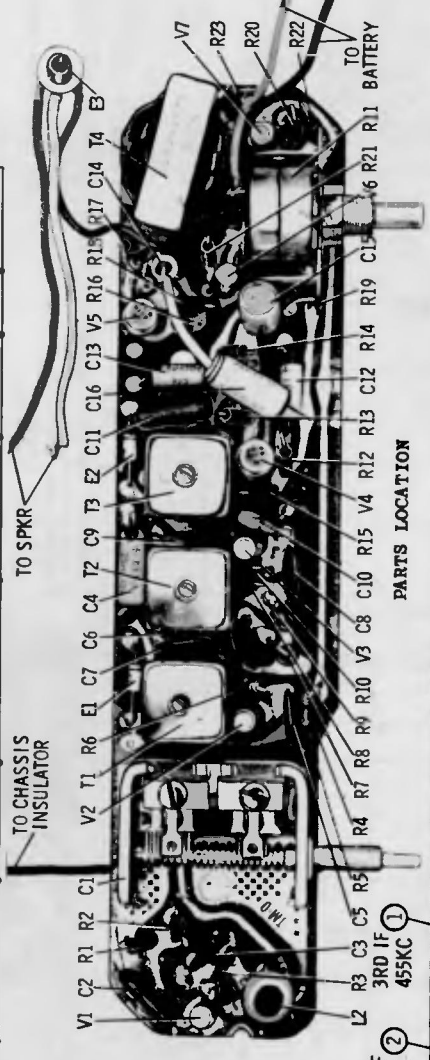
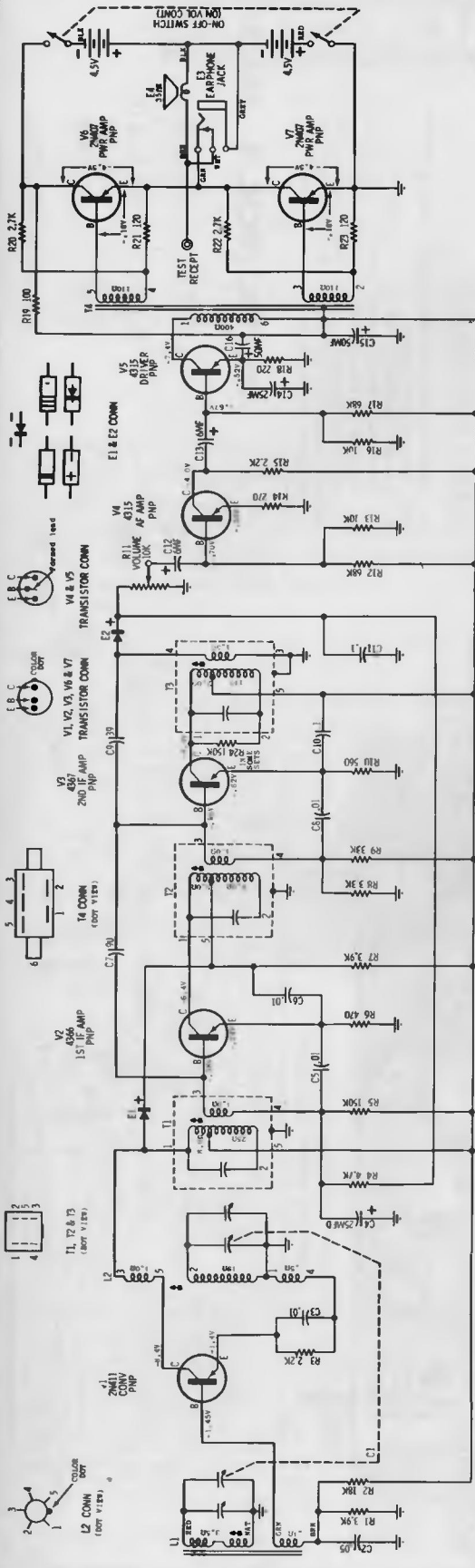
1. Remove chassis from cabinet (see Chassis Removal).
2. Remove decorative nut from cabinet front (on Battery Life Indicator Button).
3. From inside front cabinet, bend up the 8 speaker grille mounting tabs and then remove the grille and speaker gas-keet.
4. Bend up the 3 speaker mounting tabs and remove speaker (from front of cabinet).

MOTOROLA INC.

MODEL CHASSIS
X19A HS-799
X19E HS-799

MOTOROLA

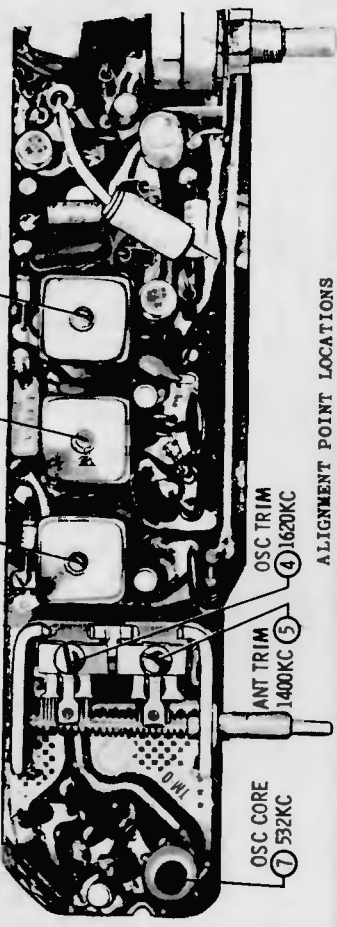
MODEL L20E CHASSIS HS-800



CHASSIS REMOVAL

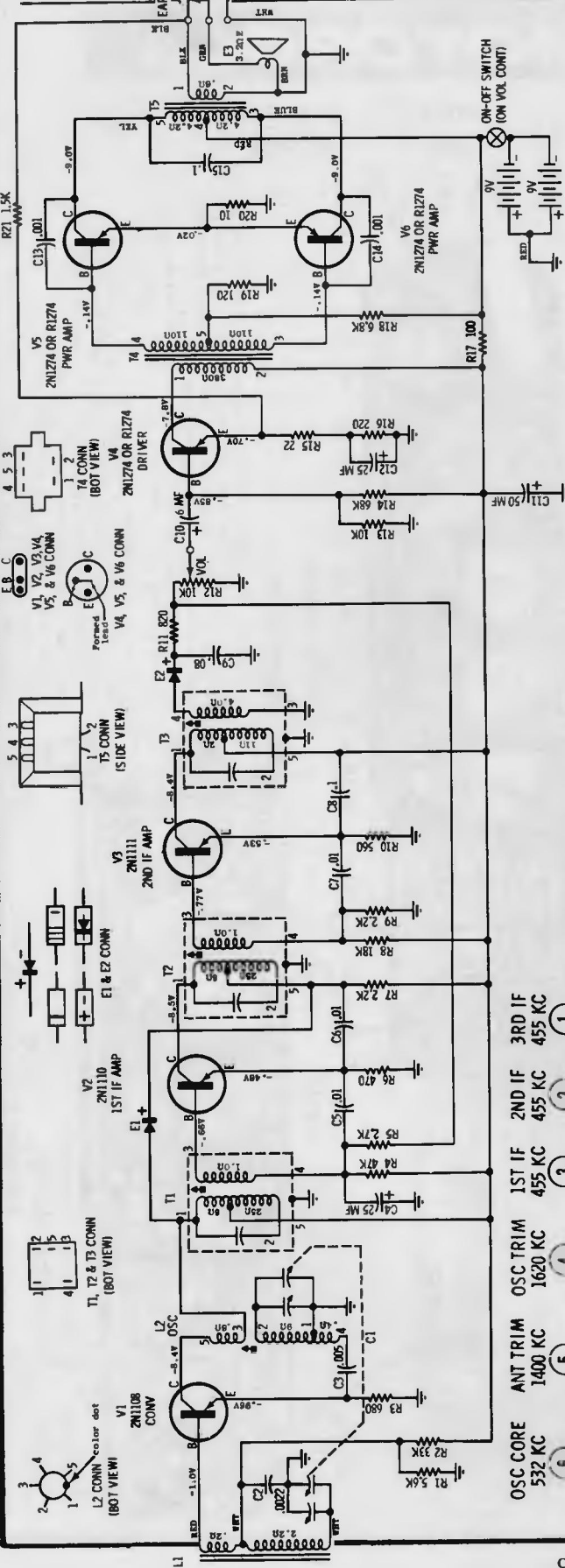
1. Loosen two back panel mounting screws 5 or 6 turns (a coin can be used for a screwdriver) and remove panel (if necessary, press thumb against bottom center edge; the panel will swing free, allowing easy removal).
2. To remove cabinet back, remove 2 cabinet back mounting screws located under batteries; then remove back.
3. Remove volume, tuning and pointer knobs.
4. From front of cabinet, remove dial scale by first removing the two dial scale mounting screws, then remove scale.
5. Remove 2 chassis mounting screws, then remove scale, scale and volume control mounting palnut.
6. Unscrew earphone jack mounting nut.
7. Unsolder chassis leads.
8. Remove chassis from cabinet.

PARTS LOCATION



NOTE:
 CAPACITORS - Unless otherwise specified, decimal values in μ F, all others in μ MF.
 VOLTAGES - Measured from point indicated to ground or across points indicated with a VTVM, $\pm 10\%$. No signal in.
 TUNING RANGE - 535 KC to 1620 KC.
 IF - 455 KC.
 Resistances measured with transmitter's removed from associated circuitry.

VOLUME MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

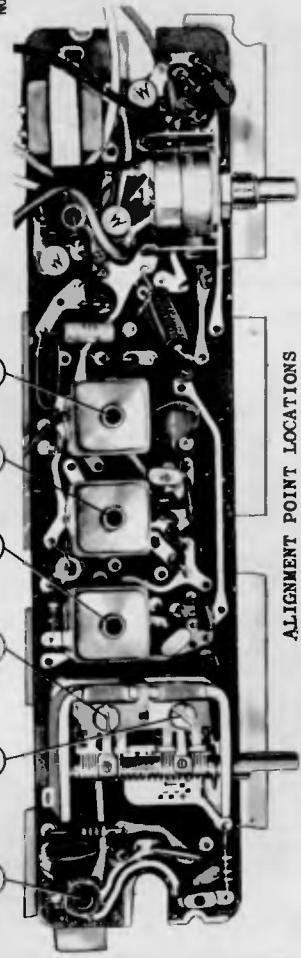


NOTES: CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF. VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in TUNING RANGE - 535 KC to 1620 KC. IF - 455 KC.

Resistances measured with transistors removed from associated circuitry.
 = Ground
 ZERO SIGNAL CURRENT - APPROX 12M. A. UMIN VOLU

CABINET BACK REMOVAL

1. Loosen captivated back panel mounting screws completely and remove back panel.
2. Remove batteries and unsnap connectors.
3. Press button to release handle.
4. Remove 2 cabinet back mounting screws.
5. Unfasten actuator arms from handle rods by using a screwdriver (to push them to the side).
6. Remove cabinet back.



ALIGNMENT POINT LOCATIONS



VOLTAGE READINGS TAKEN FROM BOTTOM SIDE OF CHASSIS

MOTOROLA INC.

PORTABLE / TABLE RADIO
 MODEL CHASSIS
 XT18B HS-802
 XT18S HS-802
 CORDLESS 1500 SERIES

MOTOROLA

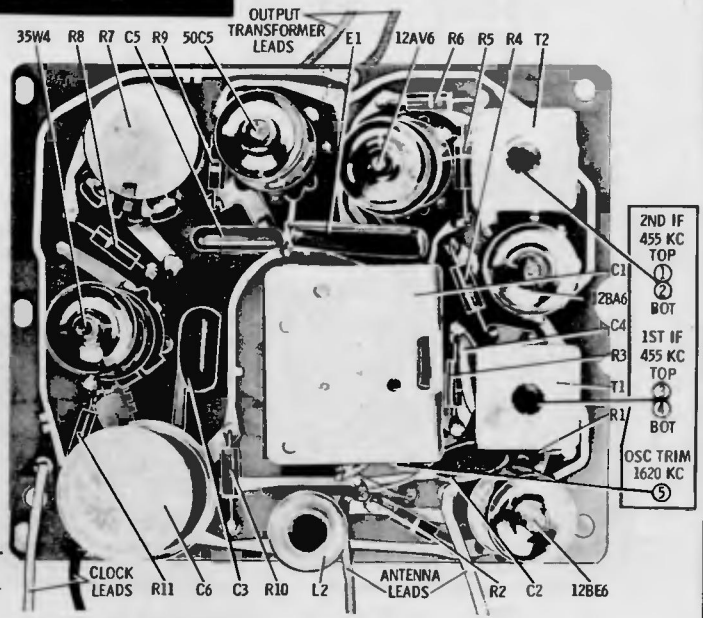
MODELS	CHASSIS
C10N	HS-813
C10P	HS-813
C10W	HS-813

The material on this page is exact for sets listed above. The additional radios listed below are practically identical electrically.

MODELS	CHASSIS
C11B	HS-814
C11G	HS-814
C11S	HS-814

TO REMOVE CHASSIS FROM CABINET

1. Remove volume and tuning knobs.
2. Remove cabinet back - 2 screws hold it in place.
3. From front, remove palnut located under volume knob.
4. From rear, unsolder 2 cabinet back loop leads, then remove 3 chassis mounting screws.
5. Remove chassis from cabinet; to free chassis, unsolder appropriate leads.

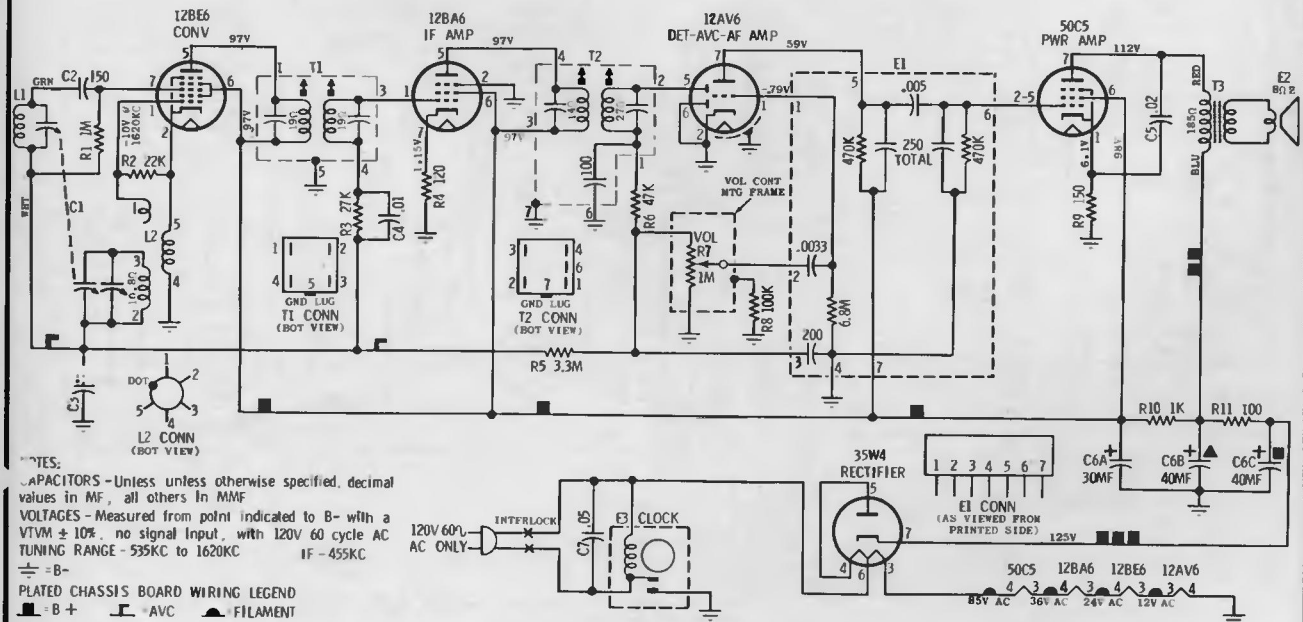


ALIGNMENT POINTS AND PARTS LOCATION

ALIGNMENT

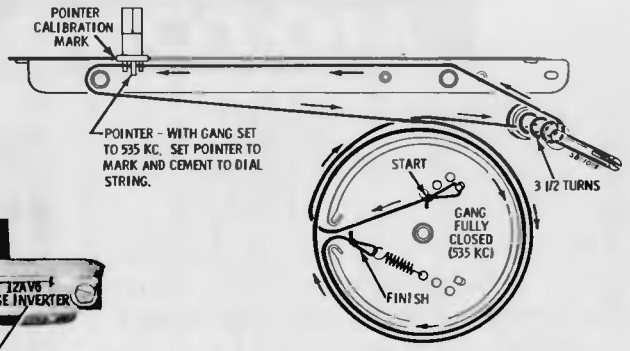
Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .64 volts on output meter to prevent overloading.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
IF ALIGNMENT					
1.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	455 Kc	Fully open	1,2,3, & 4	Adjust for maximum.
RF ALIGNMENT					
2.	Grid of conv (pin 7, 12BE6) thru .1 mf & B-	1620 Kc	Fully open	5	Adjust for maximum.

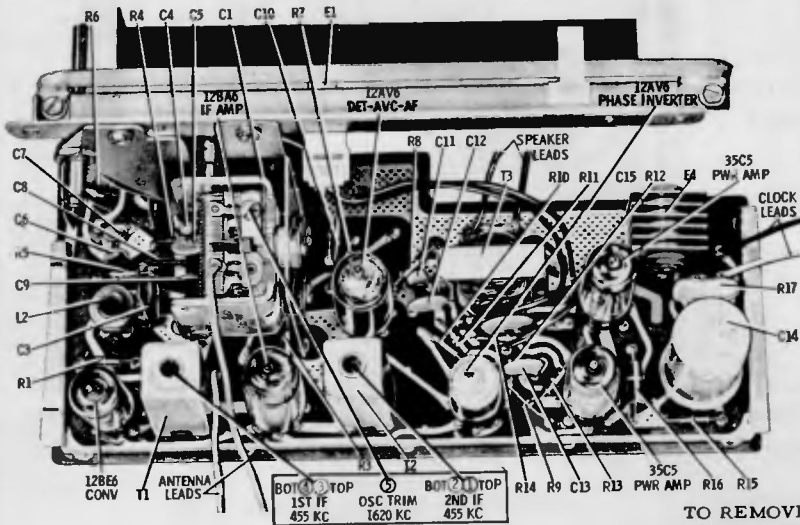


MOTOROLA INC.

MODELS	CHASSIS
C12B	HS-815
C12P	HS-815
C12W	HS-815



DIAL STRINGING DETAIL



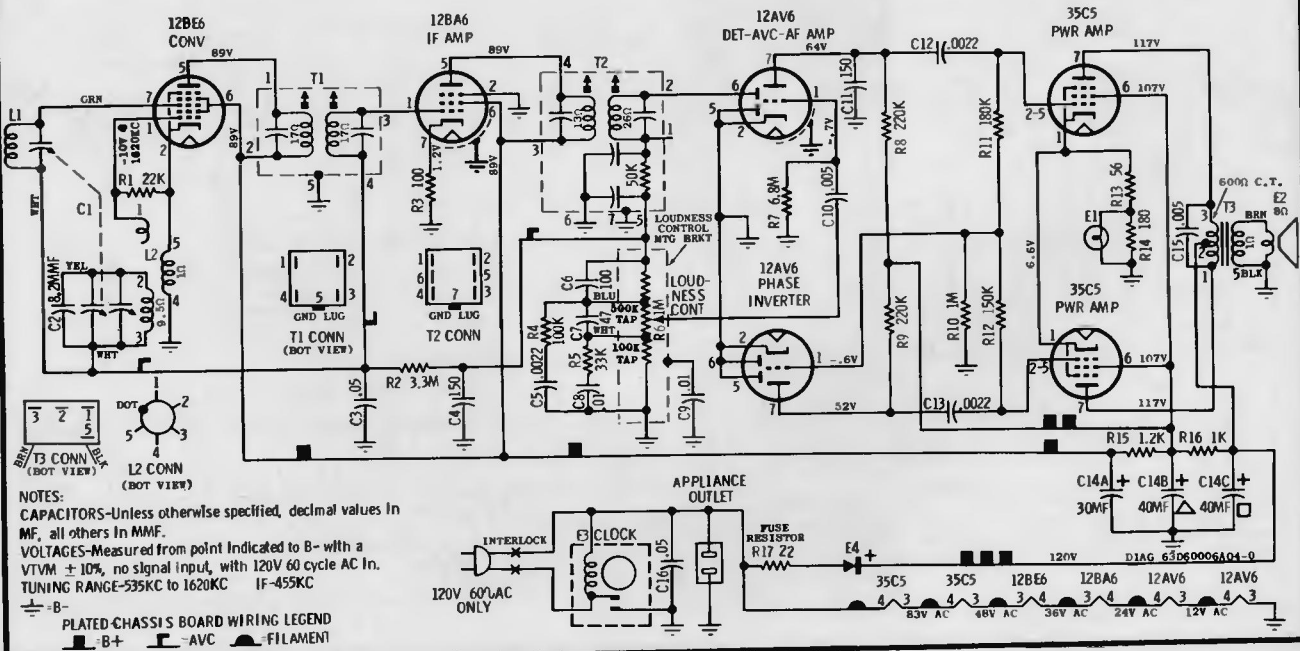
ALIGNMENT POINTS AND PARTS LOCATION

TO REMOVE CLOCK FROM CABINET

1. Remove cabinet back - 5 screws hold it in place.
2. Unsolder all leads connected to clock.
3. Remove 2 appliance outlet bracket mounting screws and remove bracket.
4. Insert a screwdriver between the cabinet and left edge of the clock crystal (near 9 o'clock on clock face) to release catch, then pry out crystal.
5. Set the Hour, Minute and Alarm Set hands to 12 o'clock (use the Time Set-Auto Set knob for this purpose). Remove clock hands by pulling them straight off from their mounting shaft in this order: Second, Minute, Hour and Alarm Set.
6. From rear, remove 4 clock mounting lock screws and remove clock from cabinet.

TO REMOVE CHASSIS FROM CABINET

1. Remove cabinet back - 5 screws hold it in place.
2. From rear, unsolder 2 cabinet back loop leads, then remove the 2 screws that mount the pointer slide bracket (on chassis) to the cabinet.
3. Unsolder 2 chassis leads connected to clock and 2 speaker leads.
4. Remove volume and tuning knobs.
5. From front, remove palnut located under volume knob.
6. Remove chassis from cabinet.

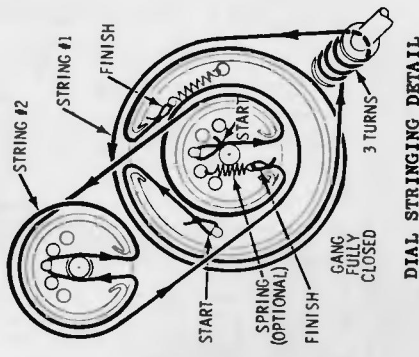


NOTES:
 CAPACITORS—Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES—Measured from point indicated to B— with a VTVM ± 10%, no signal input, with 120V 60 cycle AC in.
 TUNING RANGE—535KC to 1620KC IF—455KC
 —B—
 PLATED CHASSIS BOARD WIRING LEGEND
 —B+— —AVC— —FILAMENT—

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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, with 120V 60 cycle AC in, TUNING RANGE 535KC to 1620KC (IF-455KC)

PLATED CHASSIS BOARD WIRING LEGEND
 -B- : FILAMENT
 -AVC- : -AVC



DIAL STRINGING DETAIL

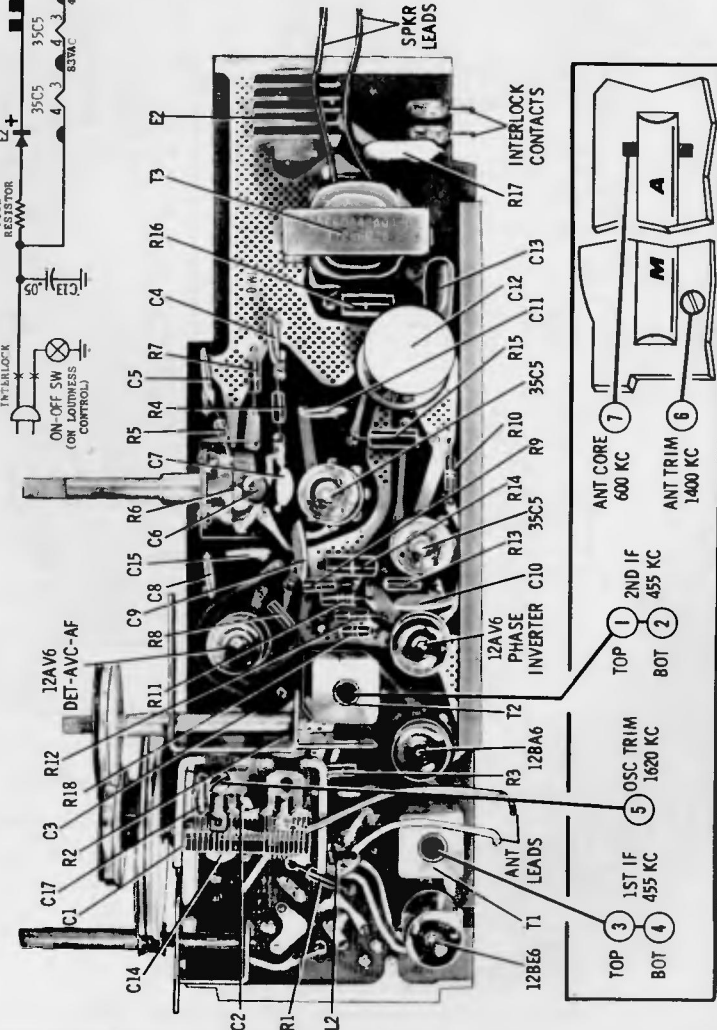
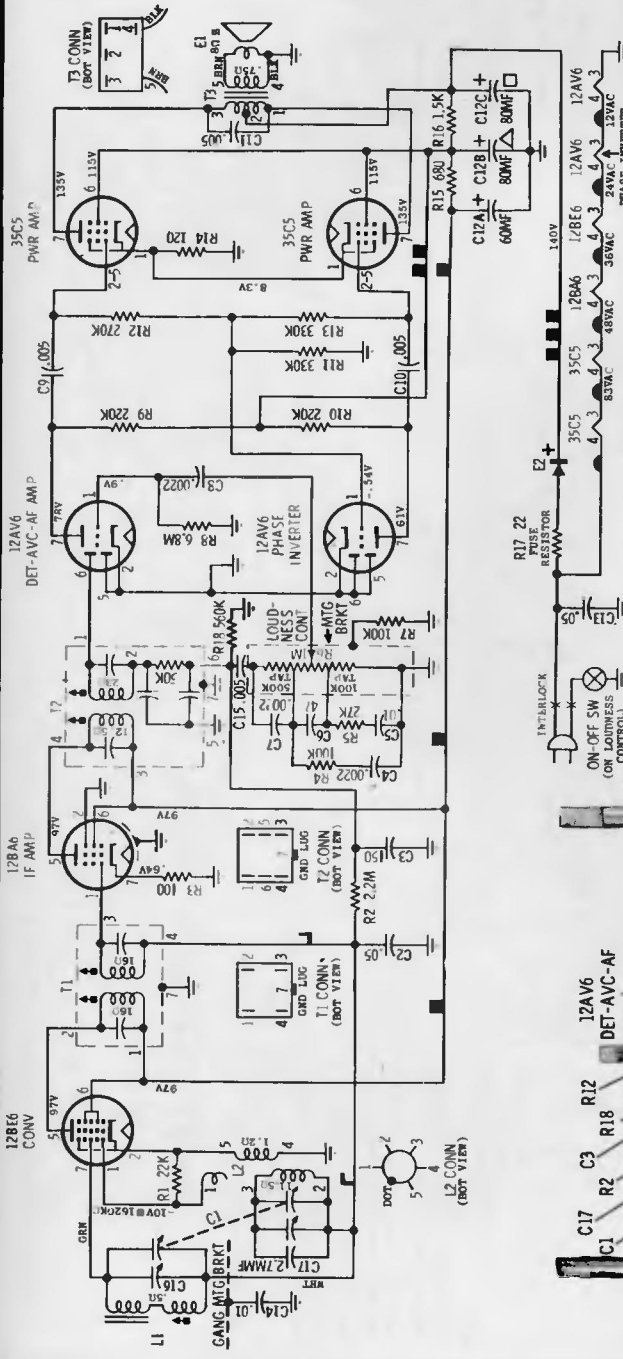
Ref. No.	Part Number	Description
C-1	19B60323A01	Capacitor, variable; 2 gang, 500V
C-2	8B128613	Capacitor, mylar; .05 mf, 500V
C-3	21K129730	Capacitor, cer disc; 150 mf, 500V
C-4	21K129665	Capacitor, cer disc; .0022 mf, 500V
C-5	21K129718	Capacitor, cer disc; .01 mf, 500V
C-6	21R115593	Capacitor, cer disc; 47 mf, 500V
C-7	21K129665	Capacitor, cer disc; .0022 mf, 500V
C-8	21K129665	Capacitor, cer disc; .0022 mf, 500V
C-9	21K129921	Capacitor, cer disc; .005 mf, 500V
C-10	21K129921	Capacitor, cer disc; .005 mf, 500V
C-11	21K129921	Capacitor, cer disc; .005 mf, 500V
C-12	23B60423A01	Capacitor, electrolytic; 60-80 mf, 150V
C-13	8B128613	Capacitor, mylar; .05 mf, 400V
C-14	21K129718	Capacitor, cer disc; .01 mf, 500V
C-15	21K129921	Capacitor, cer disc; .005 mf, 500V
C-16	20B60120A01	Capacitor, mica trim; 1.3 mf to 1.1 mf
C-17	21A541621	Capacitor, cer tub; 2.7 mf, 500V MTC

TO REMOVE CHASSIS FROM CABINET

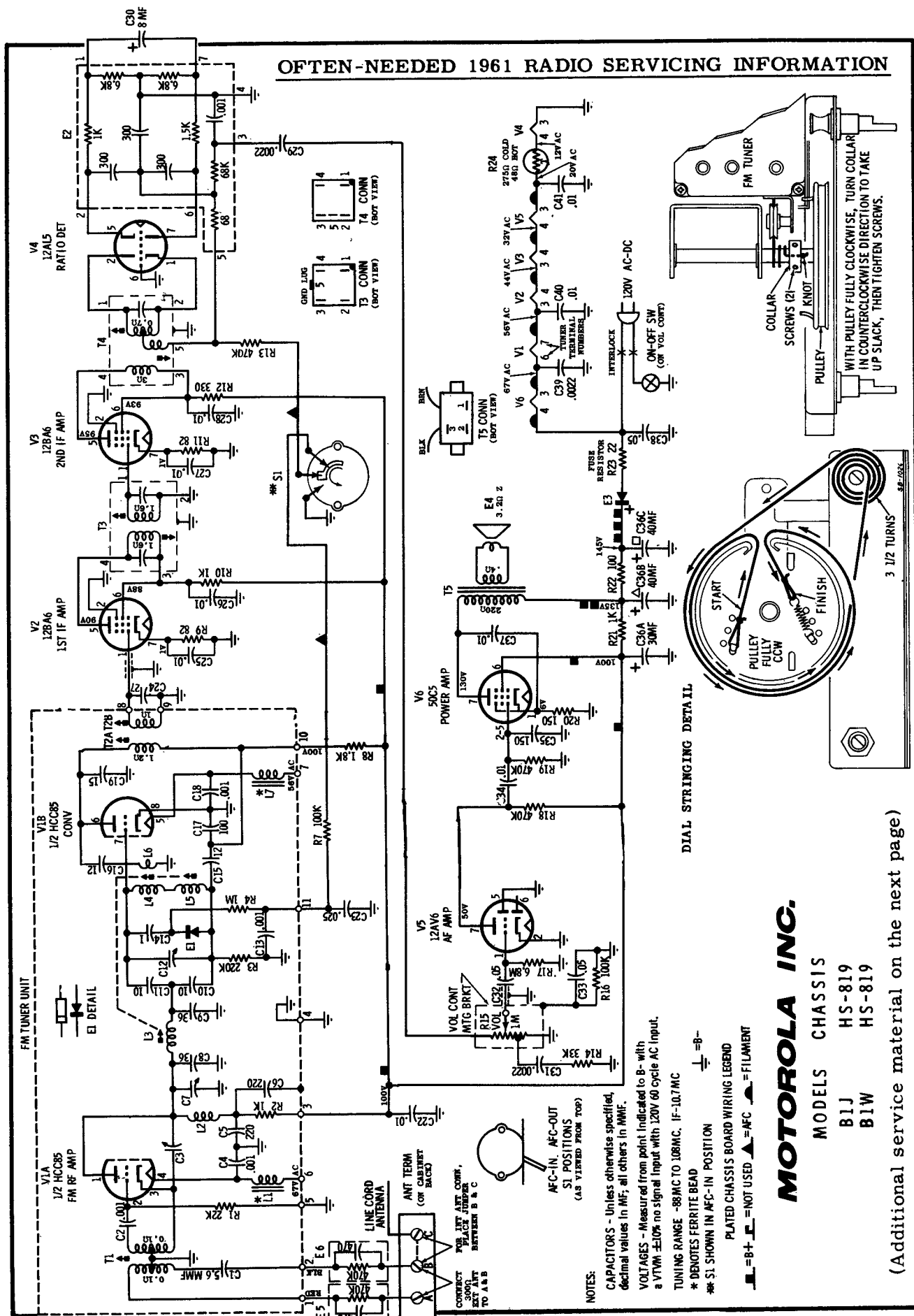
1. Remove back cover - 4 screws hold it in place.
2. From rear, remove 3 dial crystal mounting screws and 3 chassis mounting screws.
3. From front, remove 2 control knobs, dial crystal and dial pointer (observe dial calibration).
4. Unsolder 2 speaker leads and remove chassis from cabinet.

MOTOROLA

MODELS	CHASSIS
A11A	HS-824
A11W	HS-824



ALIGNMENT ADJUSTMENTS & PARTS LOCATION



DIAL STRINGING DETAIL

MOTOROLA INC.

MODELS CHASSIS
 BIJ HS-819
 BIW HS-819

(Additional service material on the next page)

- 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 input with 120V 60 cycle AC input.
 - TUNING RANGE -89MC TO 108MC, IF-10.7MC
 - * DENOTES FERRITE BEAD
 - ** S1 SHOWN IN AFC-IN POSITION
- PLATED CHASSIS BOARD WIRING LEGEND
- = B+ □ = NOT USED ▲ = AFC ● = FILAMENT

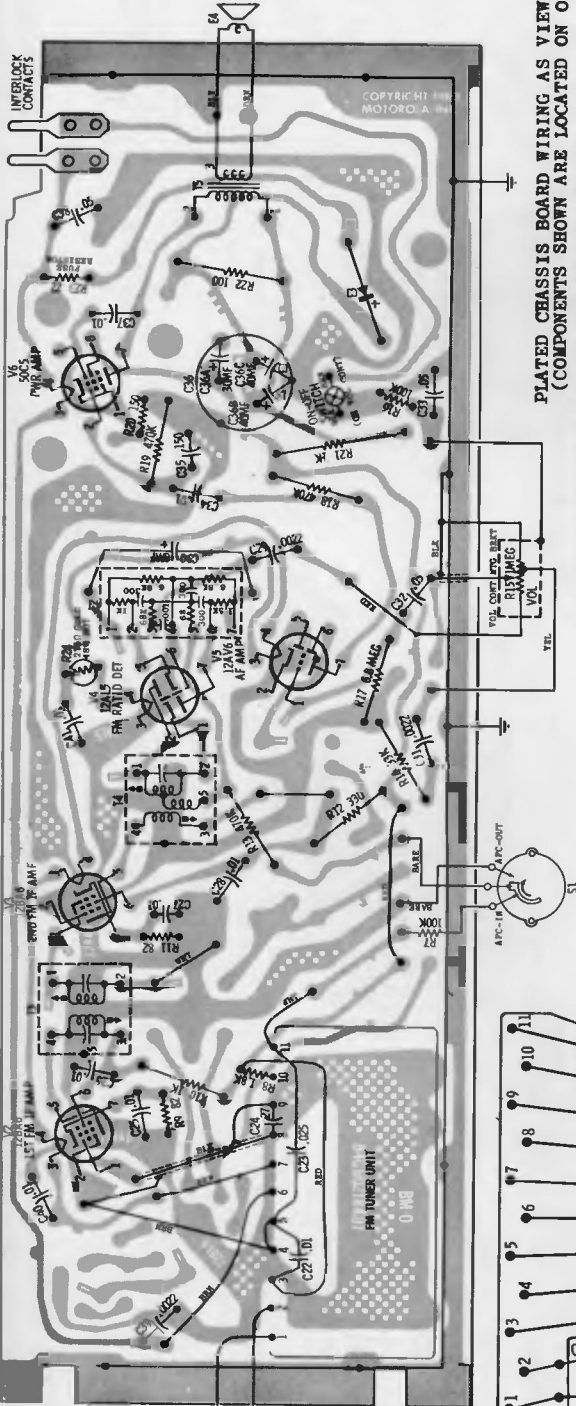
MOTOROLA INC.

MODELS CHASSIS

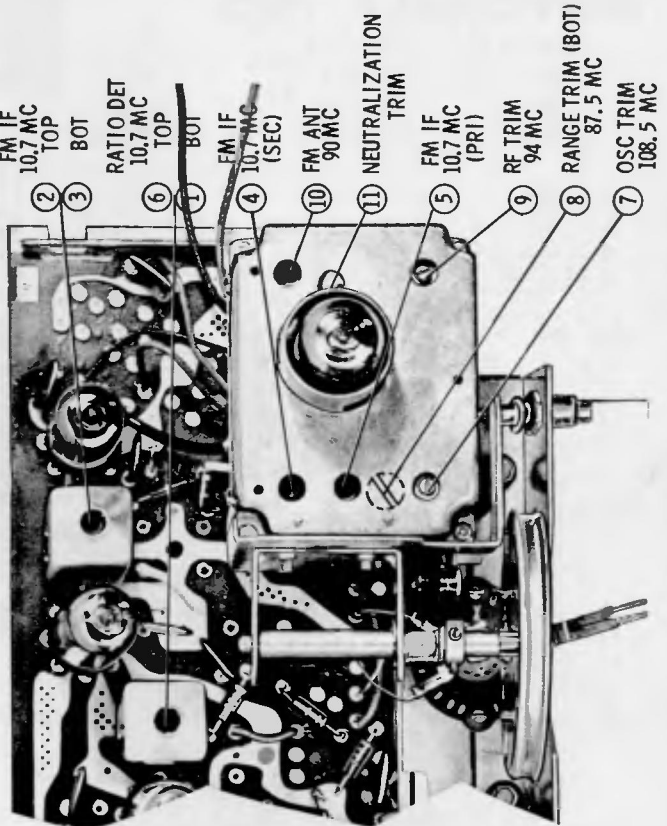
B1J HS-819

B1W HS-819

(Continued from preceding page)

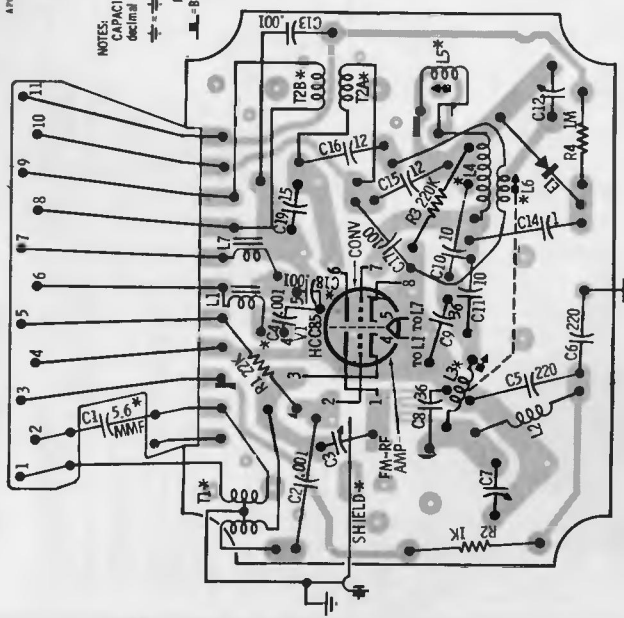


PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM
(COMPONENTS SHOWN ARE LOCATED ON OPPOSITE SIDE)

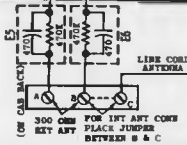


ALIGNMENT POINTS LOCATION

NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF; all others in MMF.
* = ON SCHEMATIC
PLATED CHASSIS BOARD WIRING LEGEND
-B + - NOT USED - AFC - FILAMENT



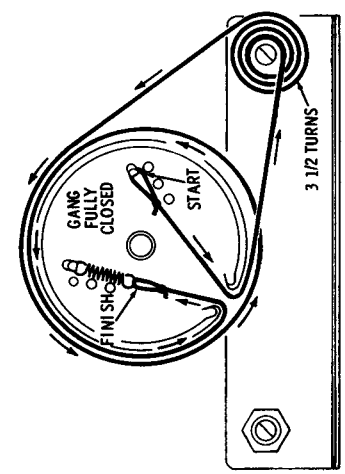
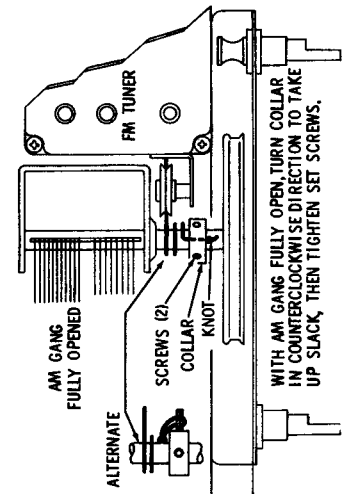
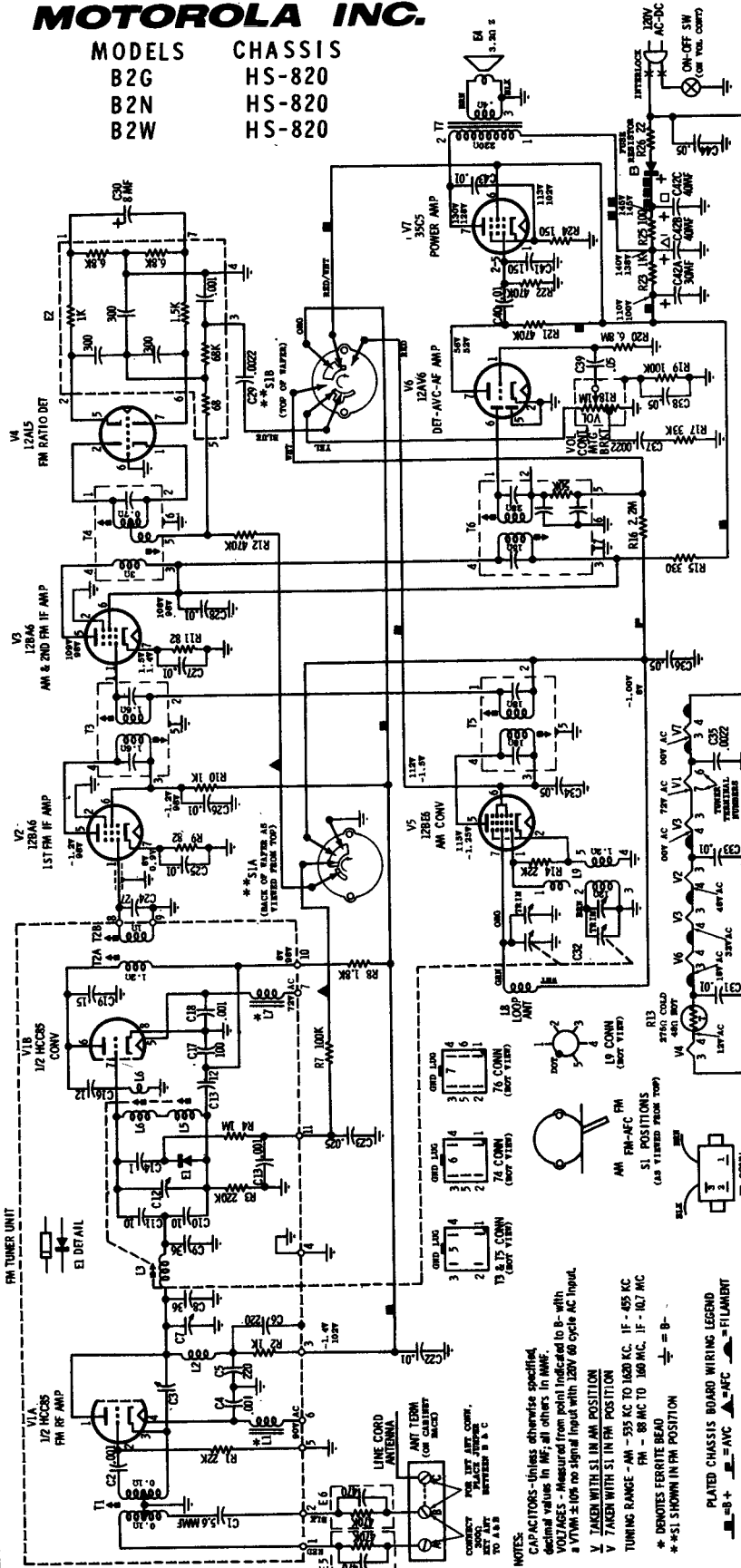
NOTES:
CAPACITORS - Unless otherwise specified decimal values in MF, all others in MMF.
* LOCATED ON CONDUCTION SIDE OF BOARD
FM TUNER PLATED CHASSIS WIRING
(The view shown is from the conduction side of the board; the components shown are actually located on the opposite side).



MOTOROLA INC.

MODELS	CHASSIS
B2G	HS-820
B2N	HS-820
B2W	HS-820

(Continued on the next page)



(Continued on the next page)

DIAL STRINGING DETAIL

PLATED CHASSIS BOARD
 All plated circuit wiring is on bottom of board. The top side is for ground shielding only. No circuits are carried through holes and across the board underneath components. The plated chassis board wiring diagram is shown as viewed from bottom (wiring) side.

TO REMOVE CHASSIS FROM CABINET

1. Remove control knobs - pull straight off.
2. Remove 4 screws holding cabinet back to cabinet.
3. Remove 2 screws holding chassis support channel.
4. Remove 1 screw holding drive pulley bracket to inside front of cabinet.
5. Unsolder speaker leads.
6. Remove chassis from cabinet.

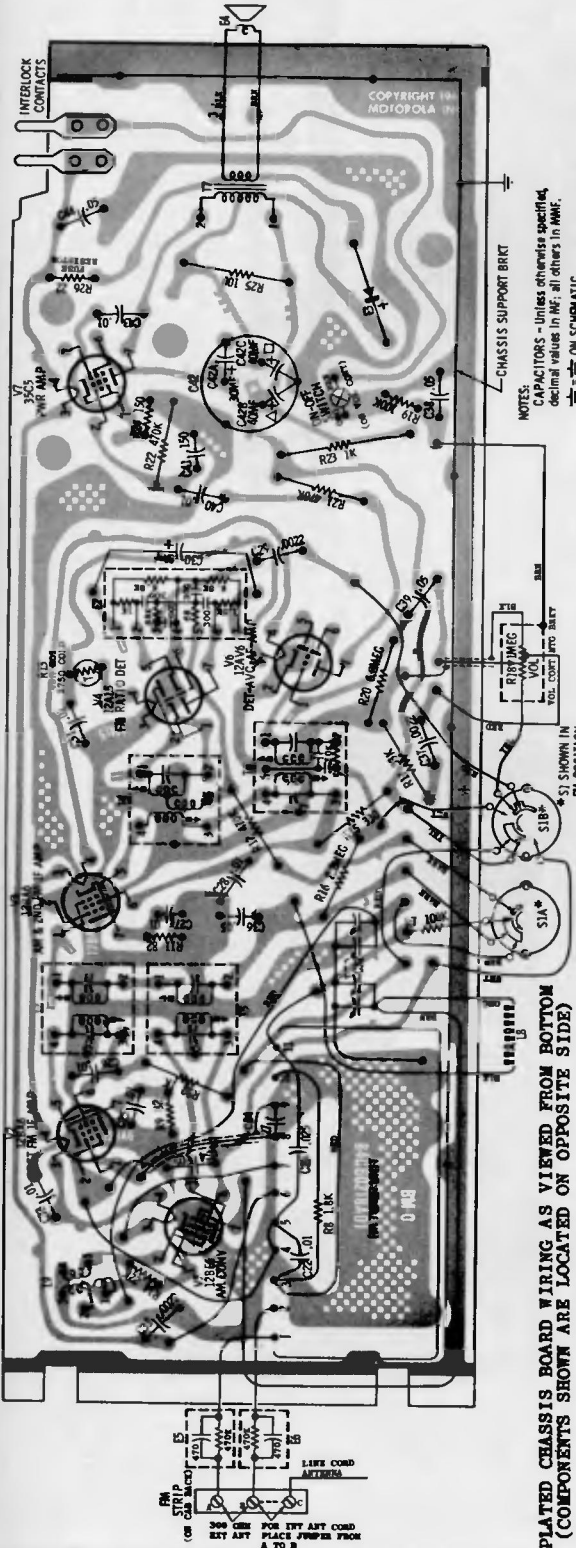
NOTES
 CAPACITORS - unless otherwise specified, decimal values in μF ; all others in MUF.
 VOLTAGES - Measured from point indicated to B - with a 100 Ω load on signal input with 120V 60 cycle AC input.
 V TAKEN WITH S1 IN AM POSITION
 V TAKEN WITH S1 IN FM POSITION
 TUNING RANGE - AM - 535 KC TO 1620 KC. IF - 455 KC
 FM - 88 MC TO 160 MC. IF - 10.7 MC
 * DENOTES FERRITE BEAD
 * S1 SHOWN IN FM POSITION

PLATED CHASSIS BOARD WIRING LEGEND
 — = B + — = ANC — = FILAMENT

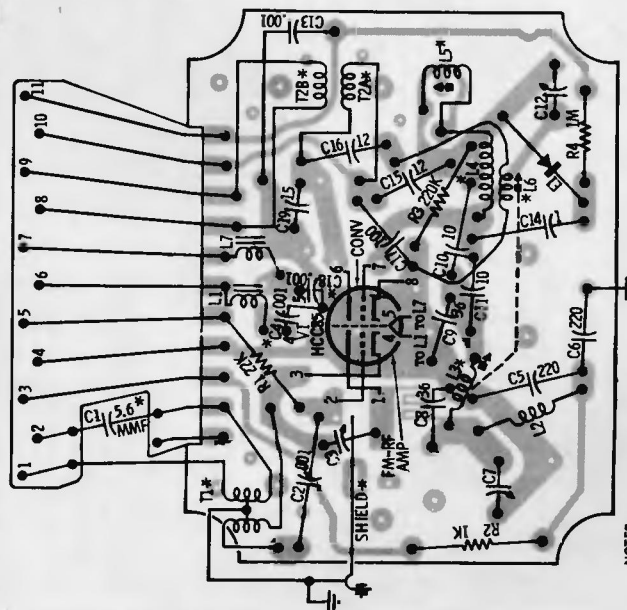
MOTOROLA

(Service material continued from preceding page)

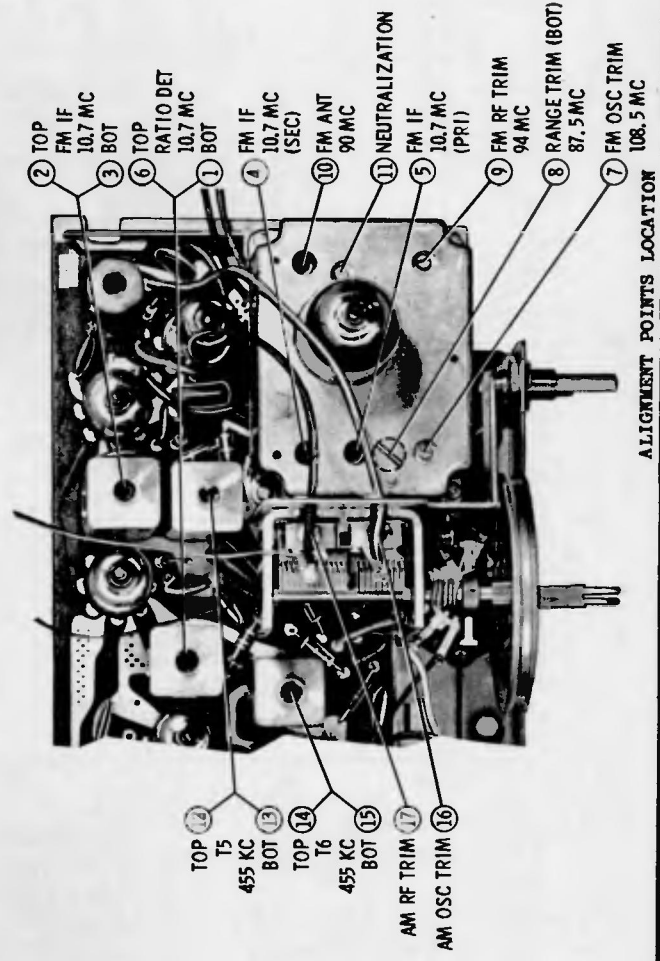
MODELS	CHASSIS
B2G	HS-820
B2N	HS-820
B2W	HS-820



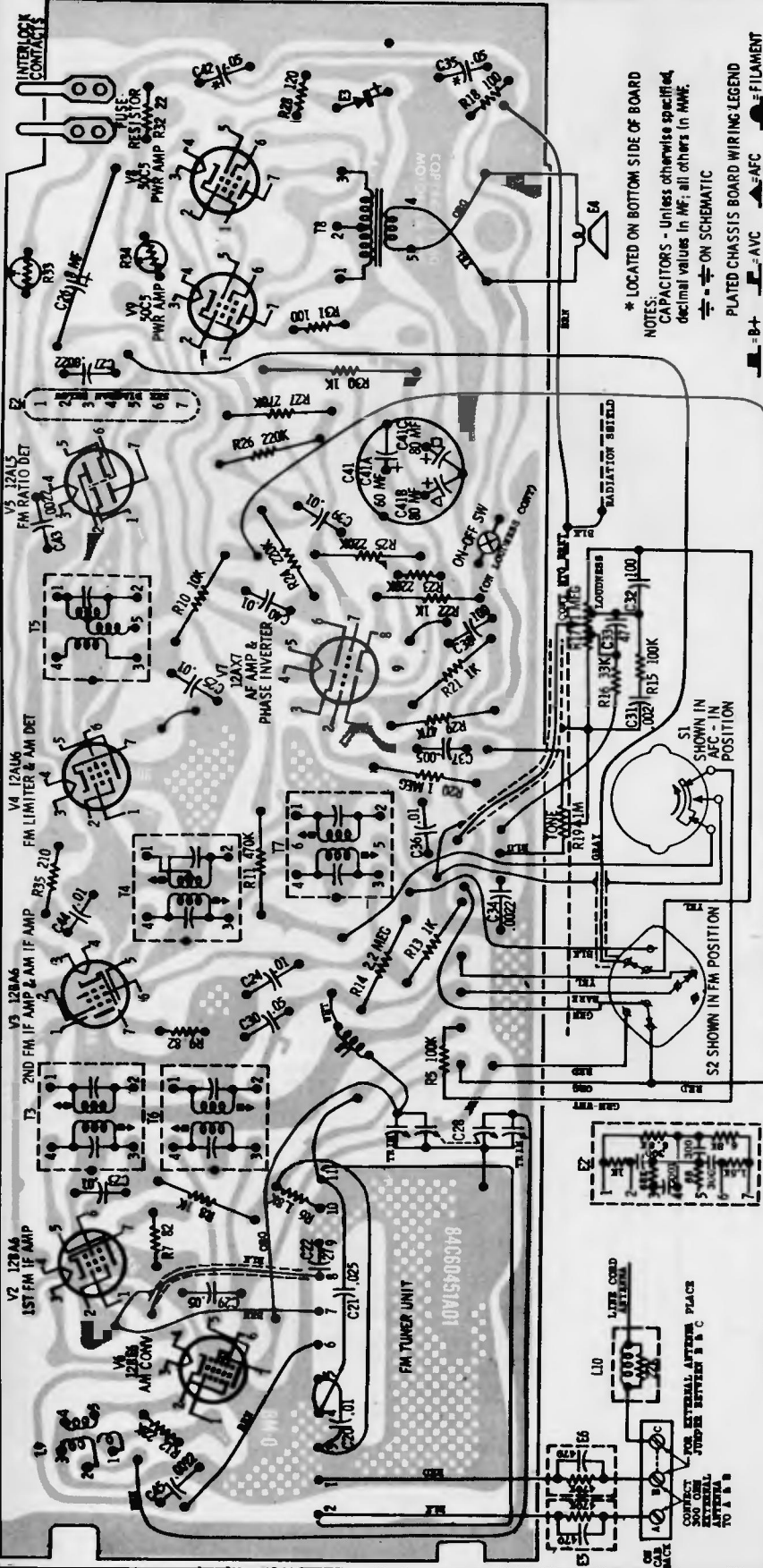
PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM (COMPONENTS SHOWN ARE LOCATED ON OPPOSITE SIDE)



NOTES: CAPACITORS - Unless otherwise specified decimal values in MF, all others in MMF. *LOCATED ON CONDUCTION SIDE OF BOARD FM TUNER PLATED CHASSIS WIRING



ALIGNMENT POINTS LOCATION



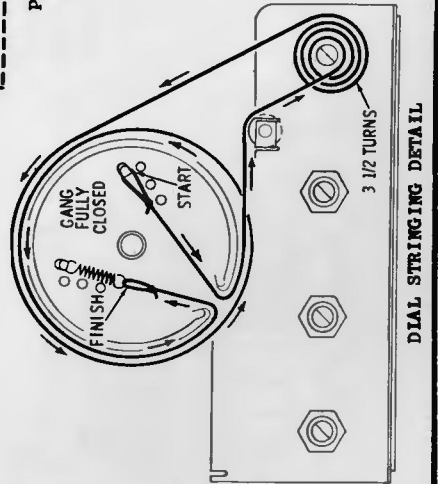
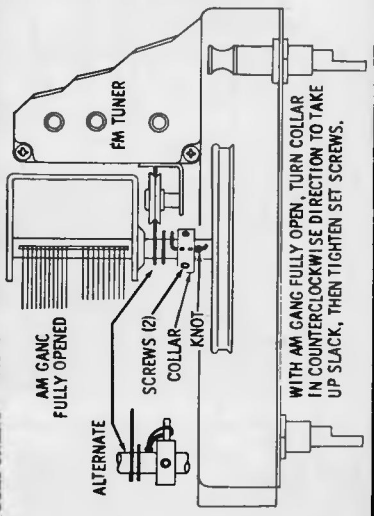
* LOCATED ON BOTTOM SIDE OF BOARD
 NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF; all others in MMF.
 ON SCHEMATIC
 PLATED CHASSIS BOARD WIRING LEGEND

PLATED CHASSIS BOARD WIRING LEGEND
 = B+ = AVC = FILAMENT

TO REMOVE CHASSIS FROM CABINET

1. Remove control knobs - pull straight off.
2. Remove 4 screws holding cabinet back to cabinet.
3. Remove 2 screws holding chassis support channel.
4. Remove 1 screw that mounts the AM gang mounting bracket to cabinet.
5. Remove dial crystal from cabinet - insert a screwdriver between the cabinet and top edge of the crystal to release catch, then pry out crystal.
6. Remove dial pointer - pull straight out.
7. Remove 2 chassis mounting palnuts from front of radio.
8. Unsolder speaker leads. 9. Unsolder lead of bottom shield.
10. Remove chassis from cabinet.

PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM
 (COMPONENTS SHOWN ARE LOCATED ON OPPOSITE SIDE)

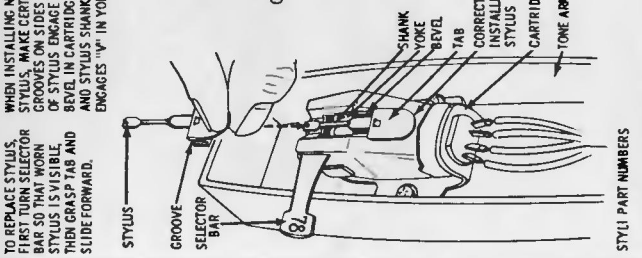
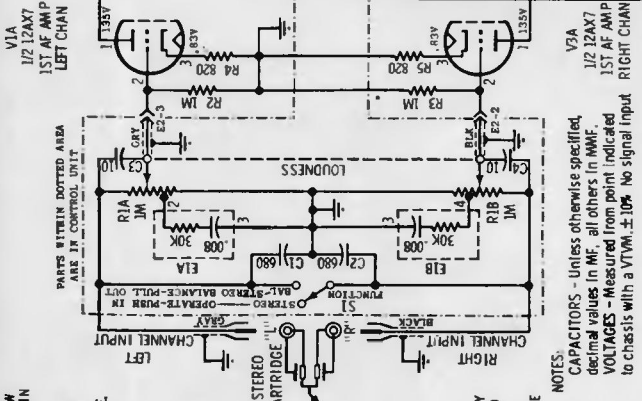
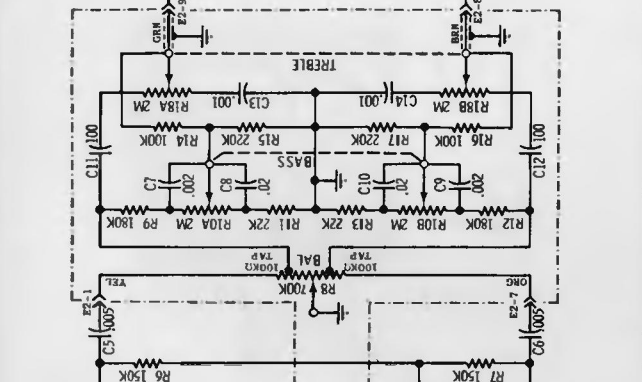
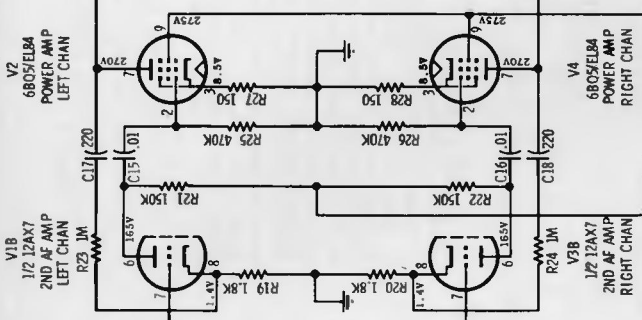
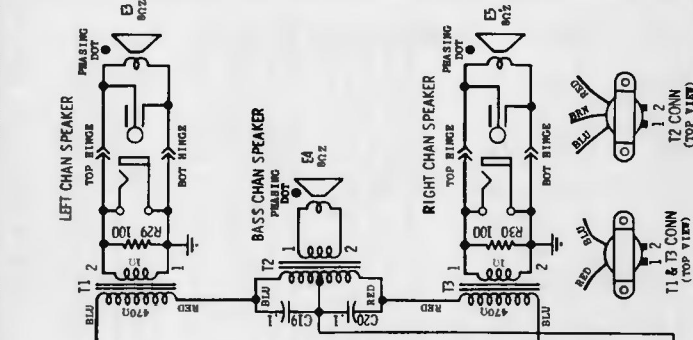


MOTOROLA Model B3E, W, Chassis HS-821
 (Material continued from preceding page)

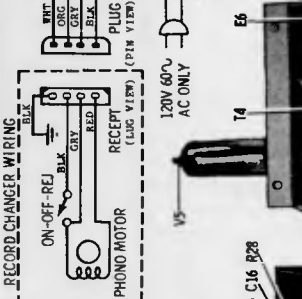
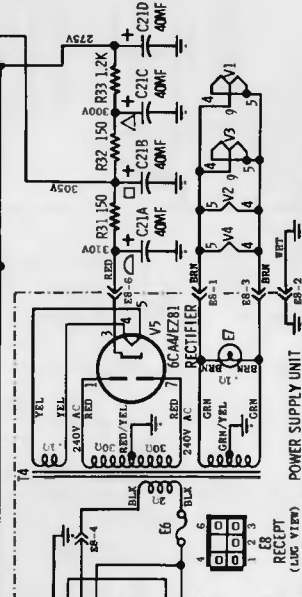
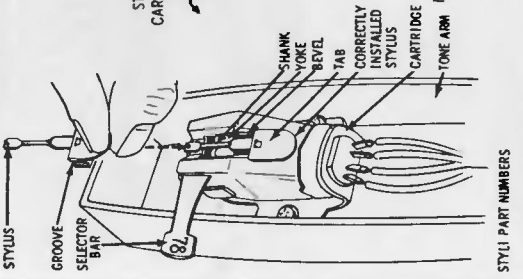
MOTOROLA

STEREO

MODEL CHASSIS
SH20 HS-827 AUDIO AMP
HS-828 PWR SUPPLY



WHEN INSTALLING NEW STYLUS, MAKE CERTAIN GROOVES ON SIDES OF STYLUS ENGAGE BEVEL IN CARTRIDGE AND STYLUS SHANK SLIDE FORWARD.



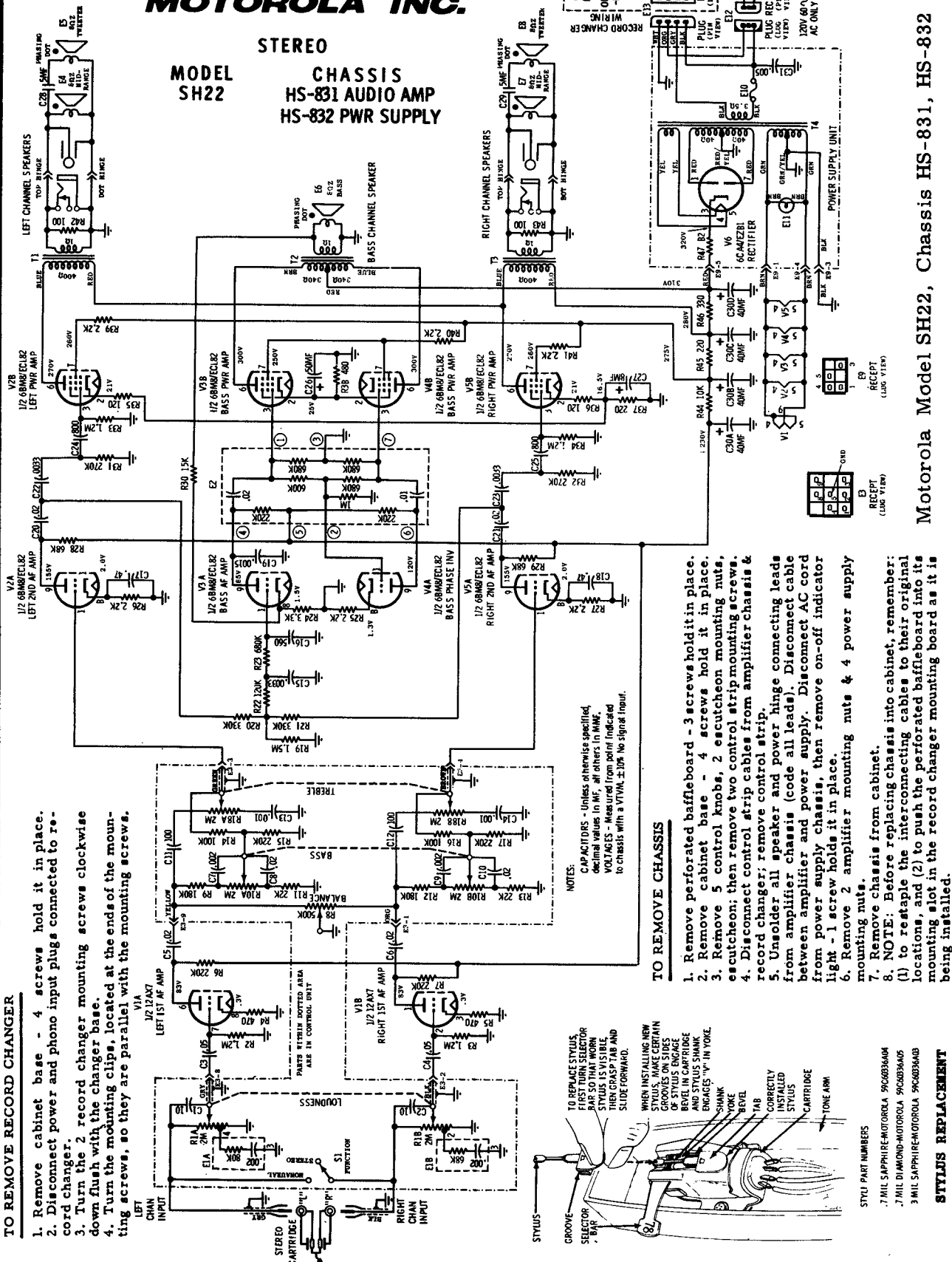
TO REMOVE CHASSIS

1. Remove perforated baffleboard - 3 screws hold it in place.
2. Remove cabinet base - 4 screws hold it in place.
3. Remove control housing - 6 screws hold it in place (3 on top, 3 on bottom); disconnect control strip wiring cable connected to the amplifier.
4. Disconnect all cables connected to power supply and audio amplifier chassis.
5. Remove 4 power supply mounting nuts and 2 amplifier mounting nuts; remove chassis from cabinet.

PARTS LOCATION

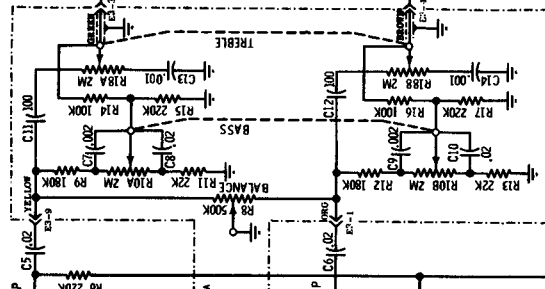
MOTOROLA INC.

**STEREO
MODEL SH22
CHASSIS
HS-831 AUDIO AMP
HS-832 PWR SUPPLY**



TO REMOVE RECORD CHANGER

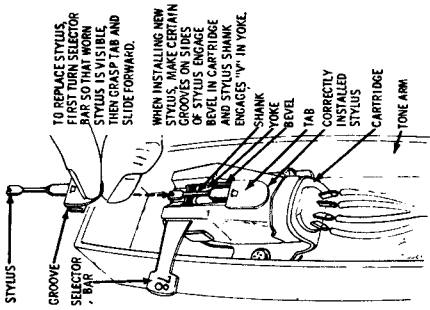
1. Remove cabinet base - 4 screws hold it in place.
2. Disconnect power and phono input plugs connected to record changer.
3. Turn the 2 record changer mounting screws clockwise down flush with the changer base.
4. Turn the mounting clips, located at the ends of the mounting screws, so they are parallel with the mounting screws.



NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MKE.
VOLTAGES - Measured from point indicated to chassis with a VTVM, ±10% No signal input.

TO REMOVE CHASSIS

1. Remove perforated baffleboard - 3 screws hold it in place.
2. Remove cabinet base - 4 escutcheon mounting nuts, 2 escutcheon mounting nuts, 2 escutcheon; then remove two control strip mounting screws.
3. Disconnect control strip cables from amplifier chassis & record changer; remove control strip.
4. Unsolder all speaker and power hinge connecting leads from amplifier chassis (code all leads). Disconnect cable between amplifier and power supply. Disconnect AC cord from power supply chassis, then remove on-off indicator light - 1 screw holds it in place.
5. Remove 2 amplifier mounting nuts & 4 power supply mounting nuts.
6. Remove chassis from cabinet.
7. NOTE: Before replacing chassis into cabinet, remember: (1) to restaple the interconnecting cables to their original locations, and (2) to push the perforated baffleboard into its mounting slot in the record changer mounting board as it is being installed.

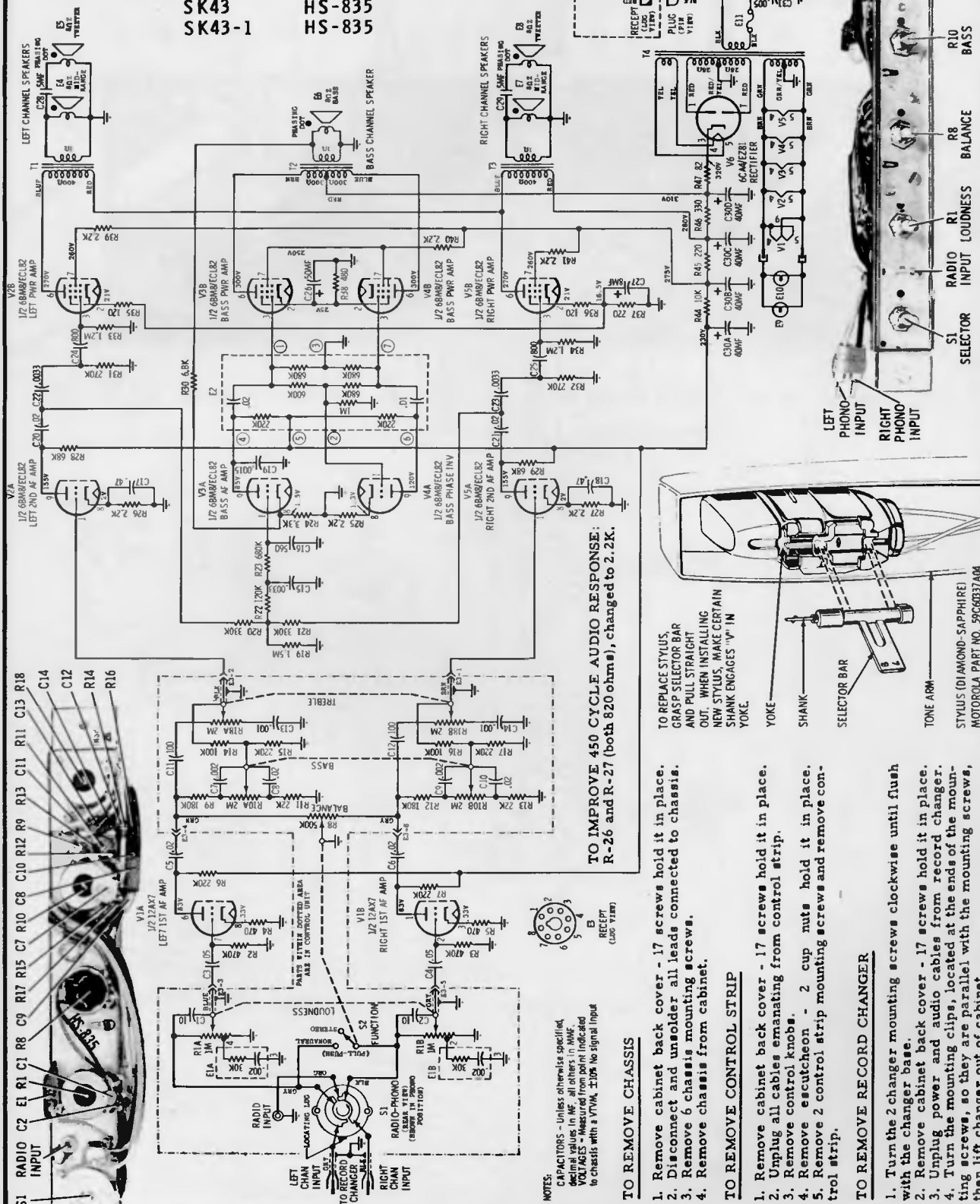


- STYLUS PART NUMBERS**
- 1 MIL SAPPHIRE-MOTOROLA 9K60B3404M
 - 2 MIL DIAMOND-MOTOROLA 9K60B3405M
 - 3 MIL SAPPHIRE-MOTOROLA 9K60B3406M
- STYLUS REPLACEMENT**

MOTOROLA

MODEL SK43
SK43-1

CHASSIS HS-835
HS-835



TO IMPROVE 450 CYCLE AUDIO RESPONSE:
R-26 and R-27 (both 820 ohms), changed to 2.2K.

NOTES:
CAPACITORS - unless otherwise specified, values in μ F. all others in MKE
VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$ No signal input

TO REMOVE CHASSIS

1. Remove cabinet back cover - 17 screws hold it in place.
2. Disconnect and unsolder all leads connected to chassis.
3. Remove 6 chassis mounting screws.
4. Remove chassis from cabinet.

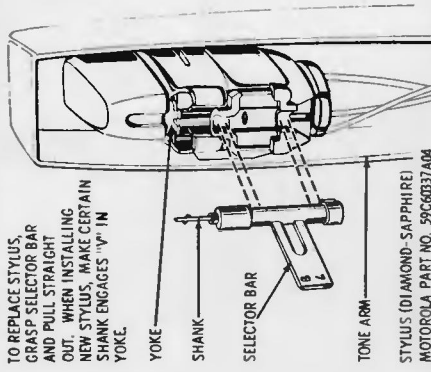
TO REMOVE CONTROL STRIP

1. Remove cabinet back cover - 17 screws hold it in place.
2. Unplug all cables emanating from control strip.
3. Remove control knobs.
4. Remove escutcheon - 2 cup nuts hold it in place.
5. Remove 2 control strip mounting screws and remove control strip.

TO REMOVE RECORD CHANGER

1. Turn the 2 changer mounting screws clockwise until flush with the changer base.
2. Remove cabinet back cover - 17 screws hold it in place.
3. Unplug power and audio cables from record changer.
4. 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.

TO REPLACE STYLUS, GRASP SELECTOR BAR AND PULL STRAIGHT OUT. WHEN INSTALLING NEW STYLUS, MAKE CERTAIN SHANK ENGAGES "V" IN YOKE.



STYLUS (DIAMOND-SAPPHIRE)
MOTOROLA PART NO. 59C6037A04

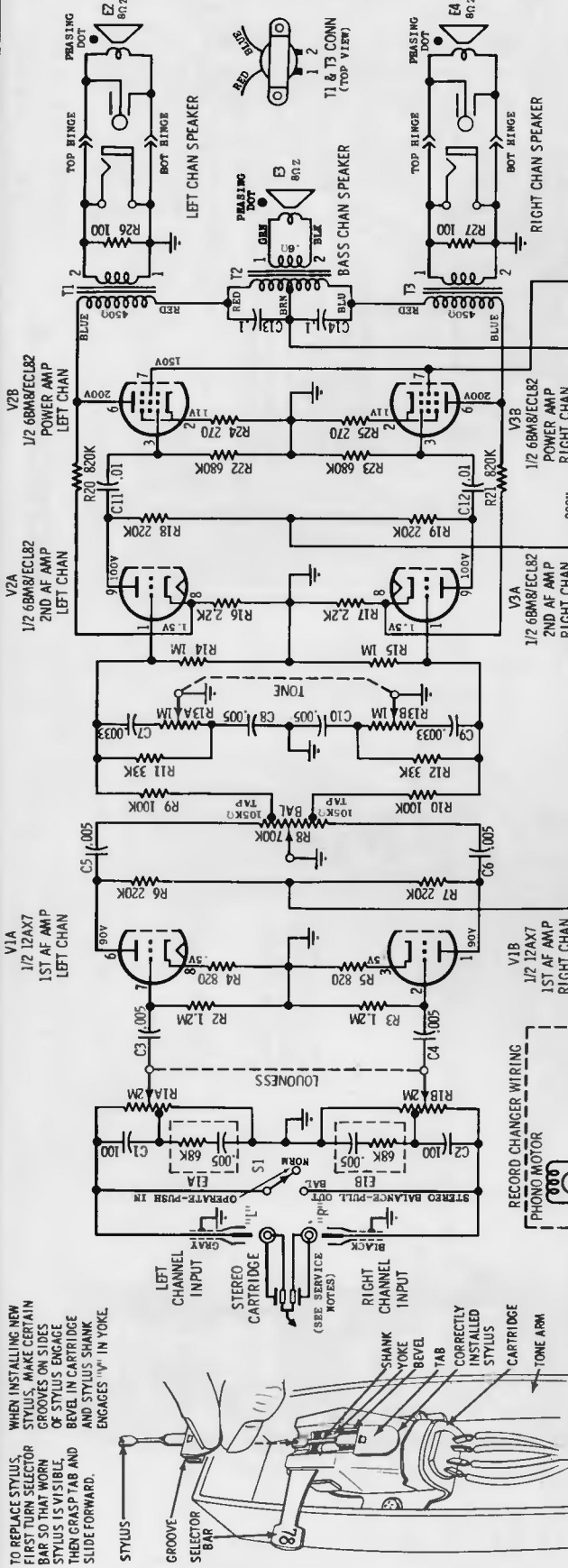
STYLUS REPLACEMENT SK43-1 SERIES

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

MOTOROLA INC.

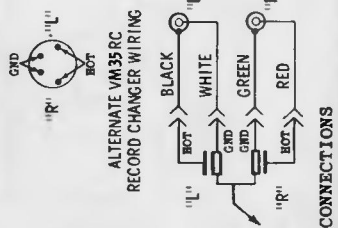
MODEL
SH19

CHASSIS
HS-861 AUDIO AMP
HS-869 PWR SUPPLY

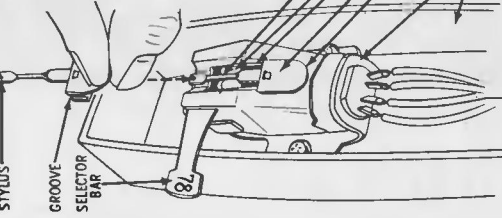


NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
VOLTAGES - Measured from point indicated to chassis with a VTVM, ±10% No signal input.

CARTRIDGE CONNECTIONS (AS VIEWED FROM REAR OF CARTRIDGE)



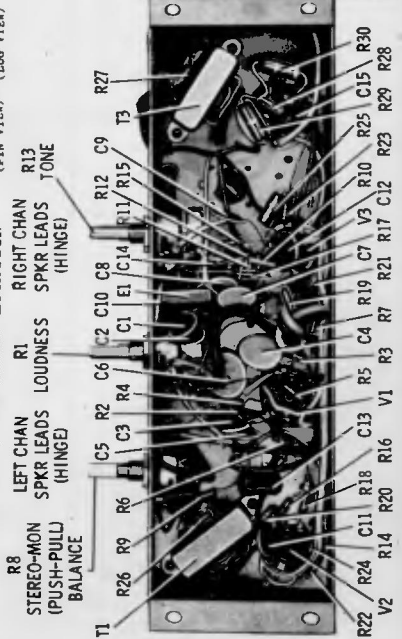
WHEN INSTALLING NEW STYLUS, MAKE CERTAIN GROOVES ON SIDES OF STYLUS ENGAGE AND STYLUS SHANK ENGAGES "V" IN YOKE.



STYLUS PART NUMBERS
.7 MIL SAPPHIRE-MOTOROLA 59C4B36A04
.7 MIL DIAMOND-MOTOROLA 59C6B36A05
3 MIL SAPPHIRE-MOTOROLA 59C4B36A0B

STYLUS REPLACEMENT

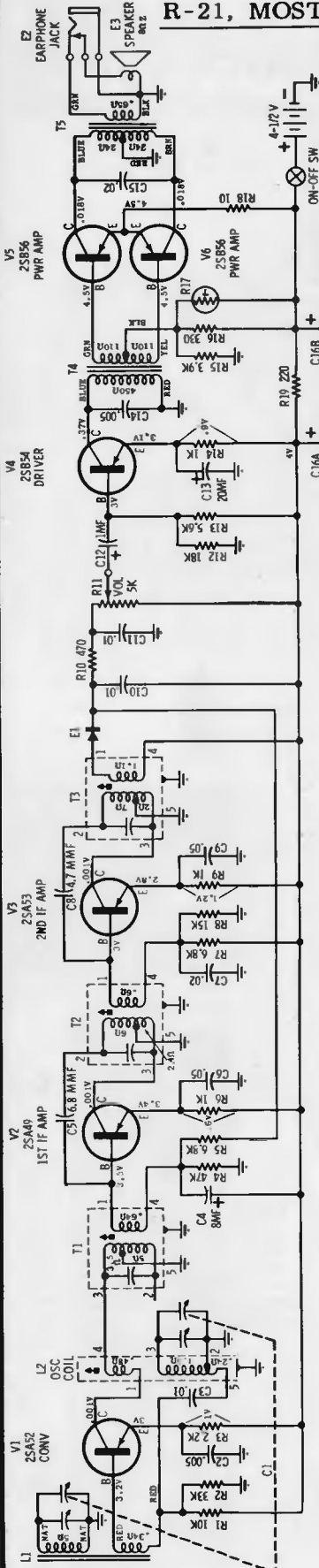
HS-861, 869 PARTS LOCATION



R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

MODEL CHASSIS
X21W HS-876

MOTOROLA

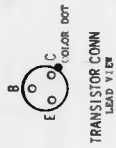


PRINTED CIRCUIT BOARD

TUNING RANGE - 530KC to 1620KC
IF - 455KC

⊕ = GROUND

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.
ZERO SIGNAL CURRENT - 4.0MA A. (MIN VOL)



TRANSISTOR CONN
LEAD VIEW

T1, T2, L2 & L3 CONN
BOT VIEW



ANT CORE
600 KC

ANT TRIM
1400 KC

OSC TRIM
1600 KC

OSC CORE
532 KC

1ST IF
455 KC

2ND IF
455 KC

3RD IF
455 KC

V1
2SA52
CONV
3V

V2
2SA49
1ST IF AMP
3.5V

V3
2SA53
2ND IF AMP
3V

V4
2SB54
DRIVER
3.1V

V5
2SB56
PWR AMP
4.5V

V6
2SB56
PWR AMP
4.5V

C1
8MFD

C2
2.2K

C3
0.001V

C4
8MFD

C5
16.7MMF

C6
0.001V

C7
0.001V

C8
0.001V

C9
0.001V

C10
0.001V

C11
0.001V

C12
0.001V

C13
20MFD

C14
0.005

R1
10K

R2
33K

R3
2.2K

R4
47K

R5
9.9K

R6
1K

R7
1K

R8
1K

R9
1K

R10
470

R11
5K

R12
18K

R13
5.6K

R14
20MFD

R15
3.9K

R16
330

R17
1K

R18
10

R19
220

R20
20MFD

R21
20MFD

R22
20MFD

R23
20MFD

R24
20MFD

R25
20MFD

R26
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R27
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R205
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R206
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R207
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R208
20MFD

R209
20MFD

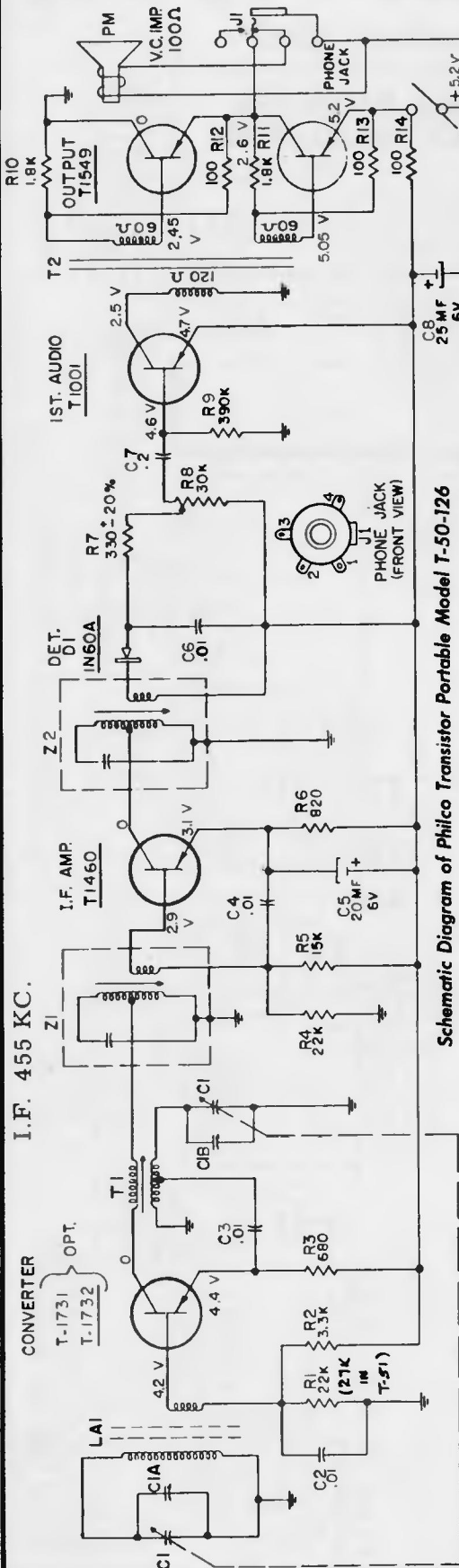
R210
20MFD

R211
20MFD

R212
20MFD

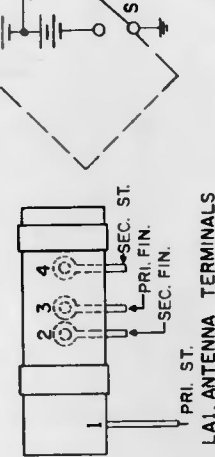
R213
20MFD

R214
20MFD



Schematic Diagram of Philco Transistor Portable Model T-50-126

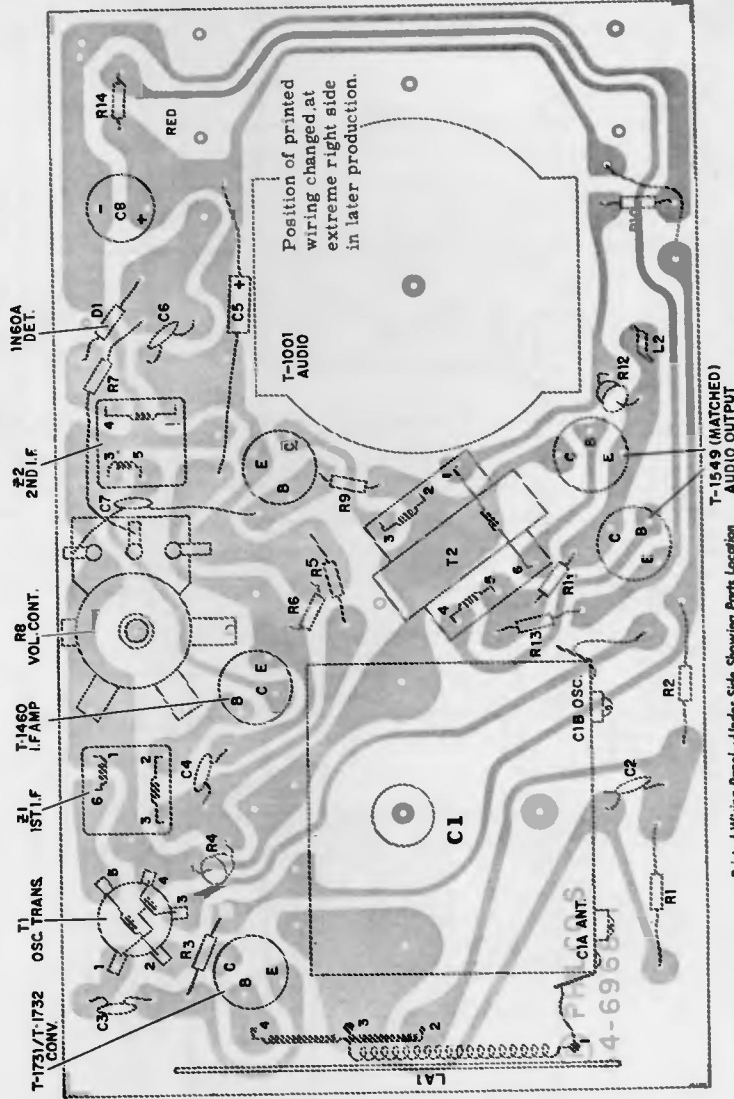
**PHILCO MODEL T-50-126
MODEL T51-124**



NOTES:
ALL RESISTORS 1/2W, 10% CARBON. VOLTAGES MEASURED TO GROUND WITH A 20,000 Ω/VOLT METER UNDER NO SIGNAL CONDITION.
COIL RESISTANCES READ WITH COIL IN CIRCUIT.

PANEL LEAD CONNECTIONS

Black lead from negative battery contact to switch lug #7.
Bare wire from switch lug #6 to ground tab of volume control and to frame of gang.
Red lead from positive battery contact to switch lug #5.
Red lead from switch lug #4 to Panel.
White lead from voltage supply center-tap to J1, lug #1.
Blue lead from J1, lug #1, to speaker.
White lead from J1, lug #3, to speaker.
Brown lead from J1, lug #2 to panel L2.



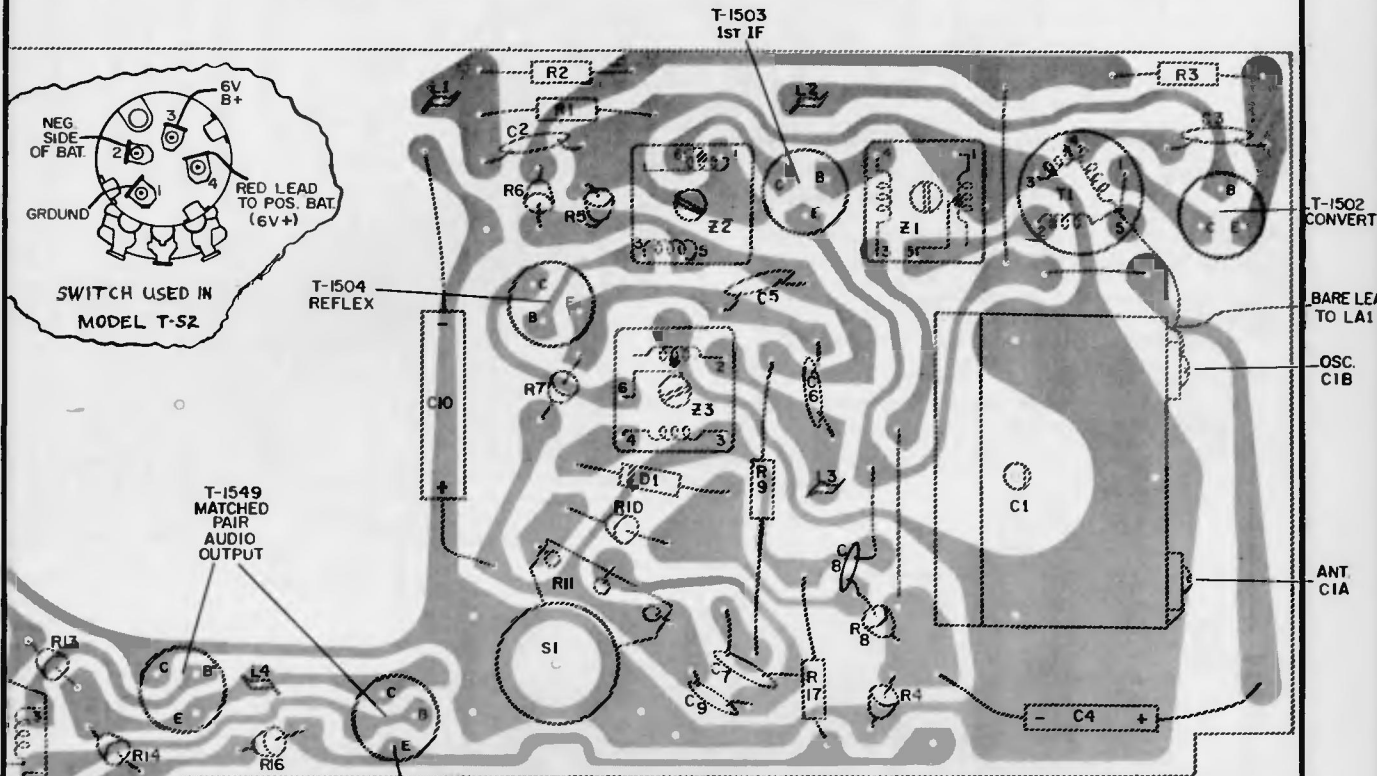
Printed Wiring Panel—Under Side Showing Parts Location

PHILCO Models T-50-126, T-51-124

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

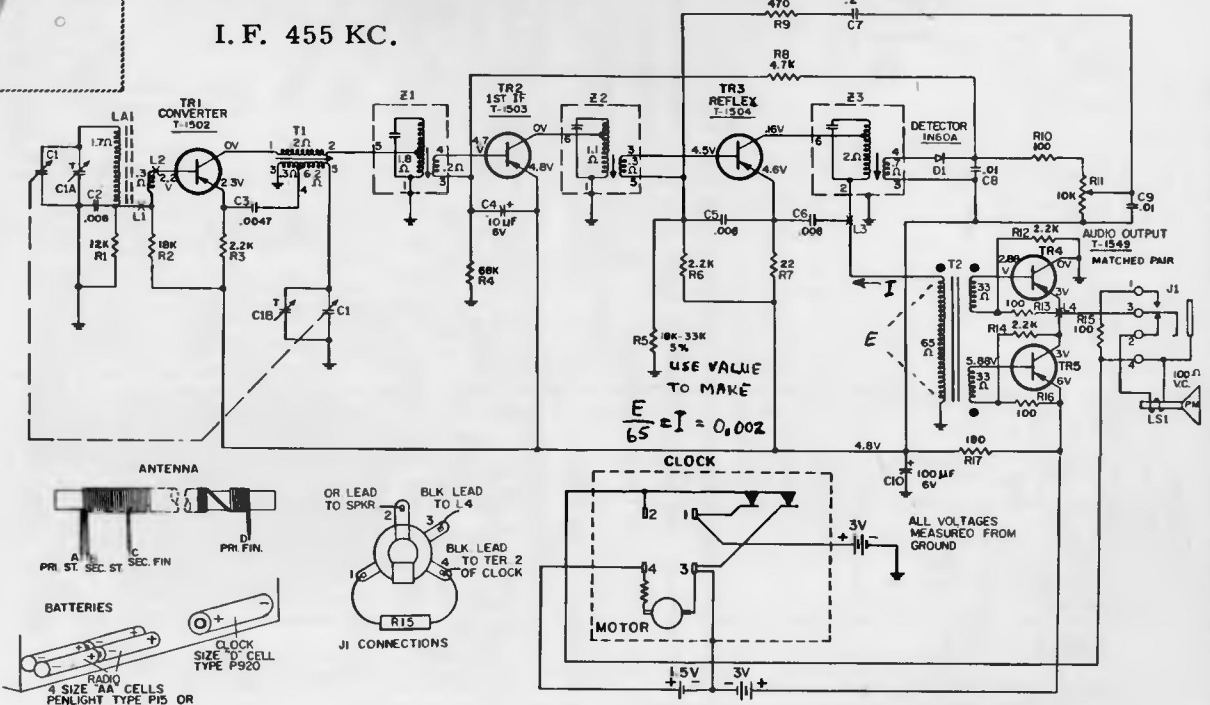
PHILCO MODEL T-52, CODE 124, and CLOCK RADIO MODEL TC-57

These two models use identical perma-circuit panel assembly, but the switch of T-52 is manually operated.



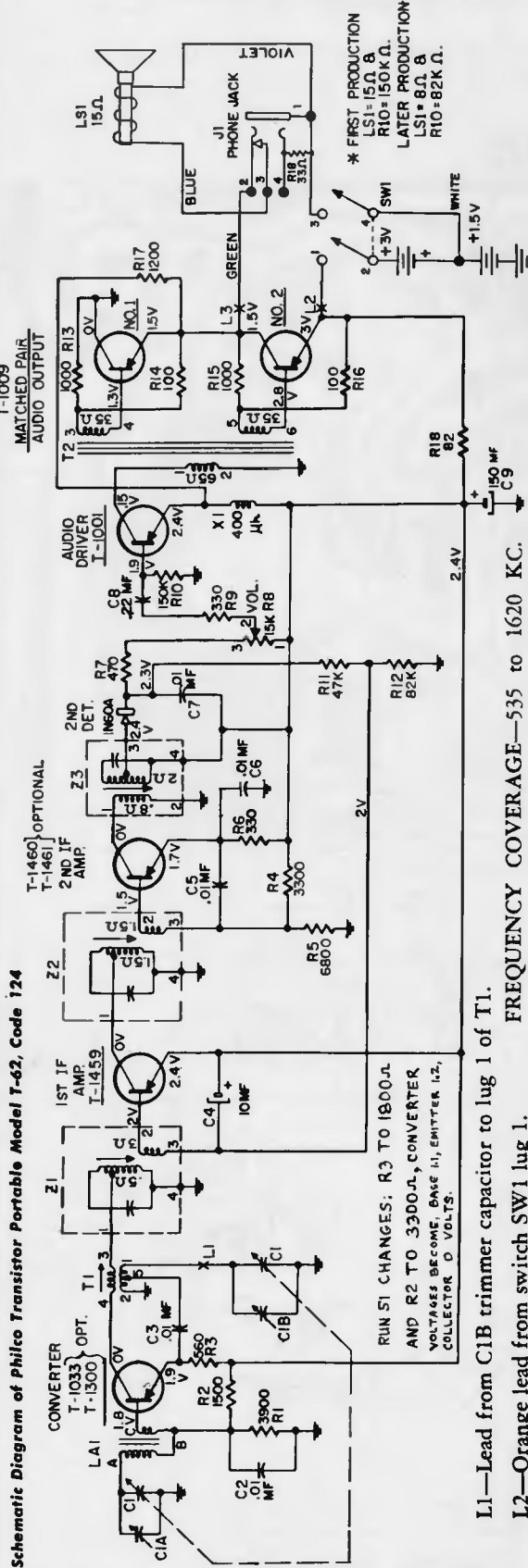
Composite View, Bottom of Panel

I. F. 455 KC.



Schematic Diagram, Model TC-57

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-62, CODE 124



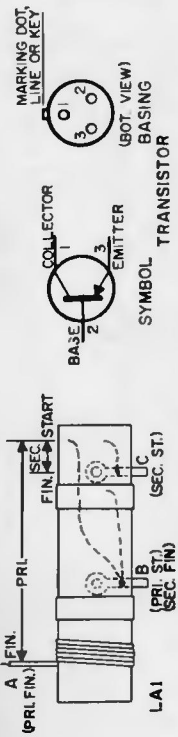
- L1—Lead from C1B trimmer capacitor to lug 1 of T1.
- L2—Orange lead from switch SW1 lug 1.
- L3—Green lead from phone jack.

RUN SW CHANGES: R3 TO 1800Ω AND R2 TO 3300Ω, CONVERTER VOLTAGES BECOME, BASE IN, EMITTER L2, COLLECTOR D VOLTS.

FREQUENCY COVERAGE—535 to 1620 KC.
INTERMEDIATE FREQUENCY—455 KC.

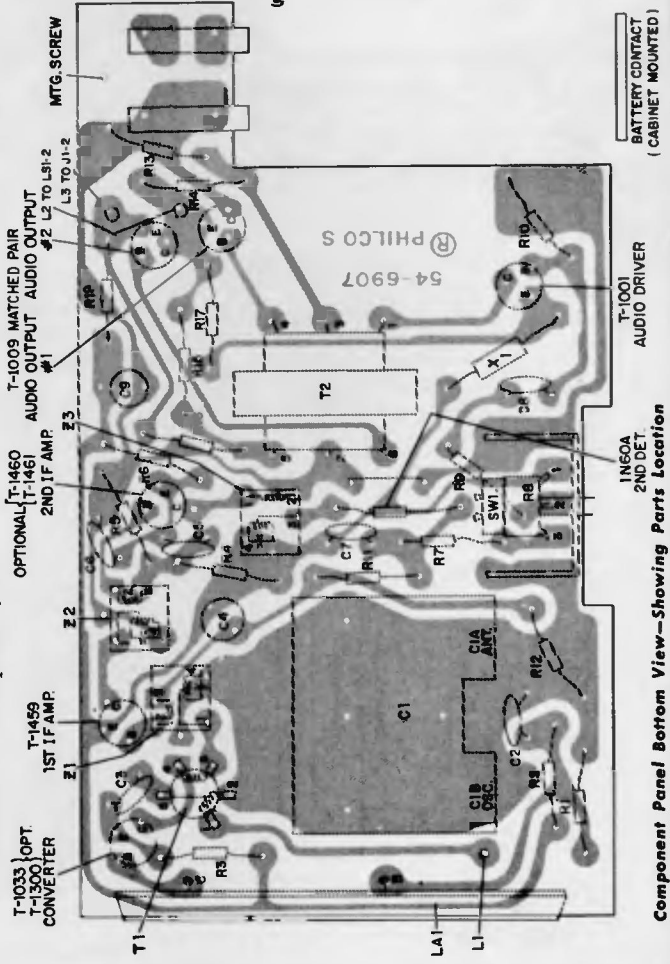
SERVICE NOTES

When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.
Normally, the transistors should be the last item suspected. If C9 opens serious audio oscillation will result.



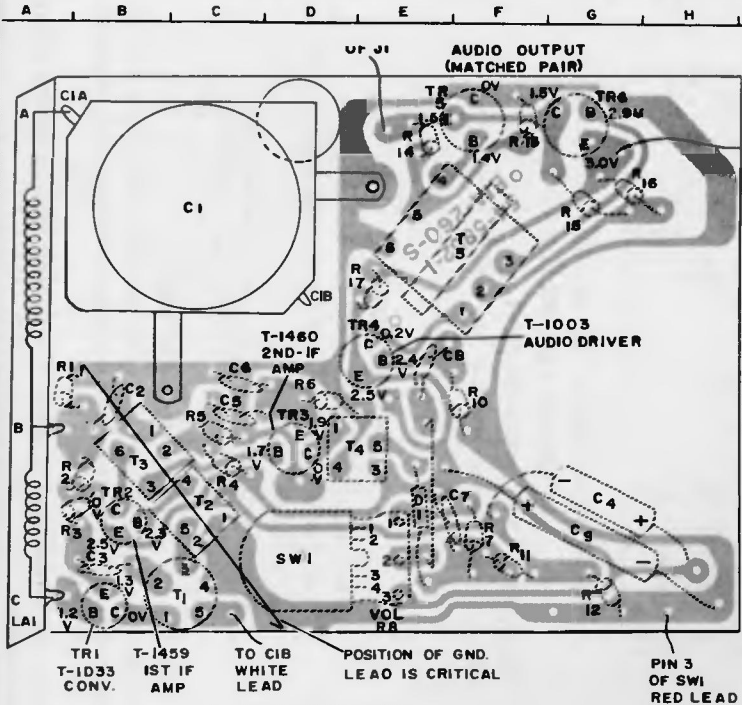
PRINTED-WIRE PANEL REMOVAL

1. Remove the snap-on back of the cabinet and the batteries.
2. Remove the tri-mount fastener next to the battery clips.
3. Carefully spread the sides of the cabinet to free the panel from each of the 4 slotted cabinet supports.
4. Withdraw the panel assembly by sliding it toward the speaker end of the cabinet to free the tuning knob.



Component Panel Bottom View—Showing Parts Location

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-66, CODE 124



Composite Bottom View

NOTE:
 PIN 2 OF SW1
 TO POS. TERM.
 YEL. LEAD
 PIN 4 OF SW1
 TO NEG. TERM
 RED LEAD

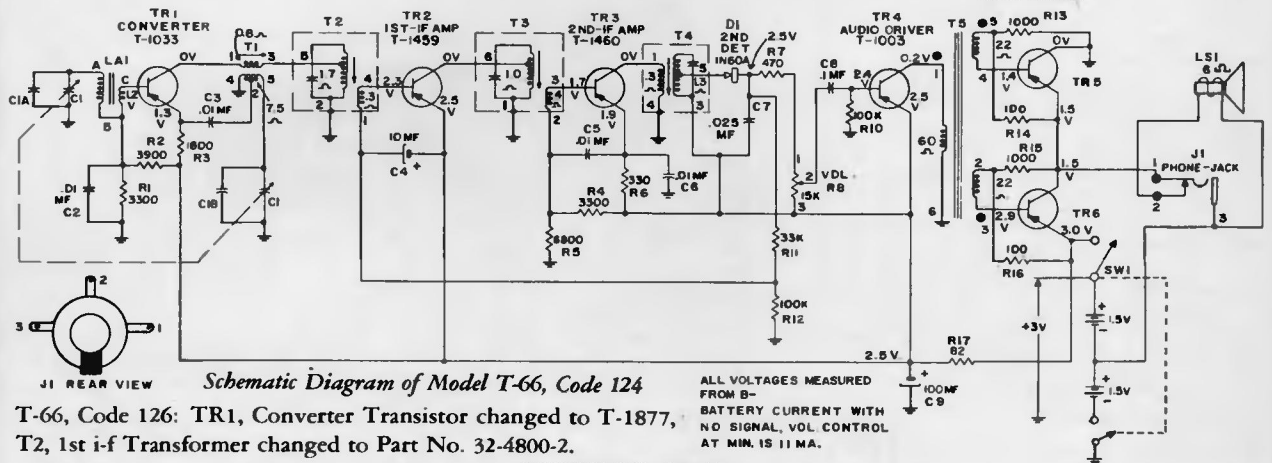
SERVICE NOTES

When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

Normally, the transistors should be the last item suspected. If C9 opens serious audio oscillation will result.

NOTE: Panel Removal

Before panel can be removed from cabinet, a screw located next to the 2nd I-F transformer (C4 graph location) must be removed. Then depress clips on each side of cabinet. Speaker will remain in cabinet.



Schematic Diagram of Model T-66, Code 124

T-66, Code 126: TR1, Converter Transistor changed to T-1877, T2, 1st i-f Transformer changed to Part No. 32-4800-2.

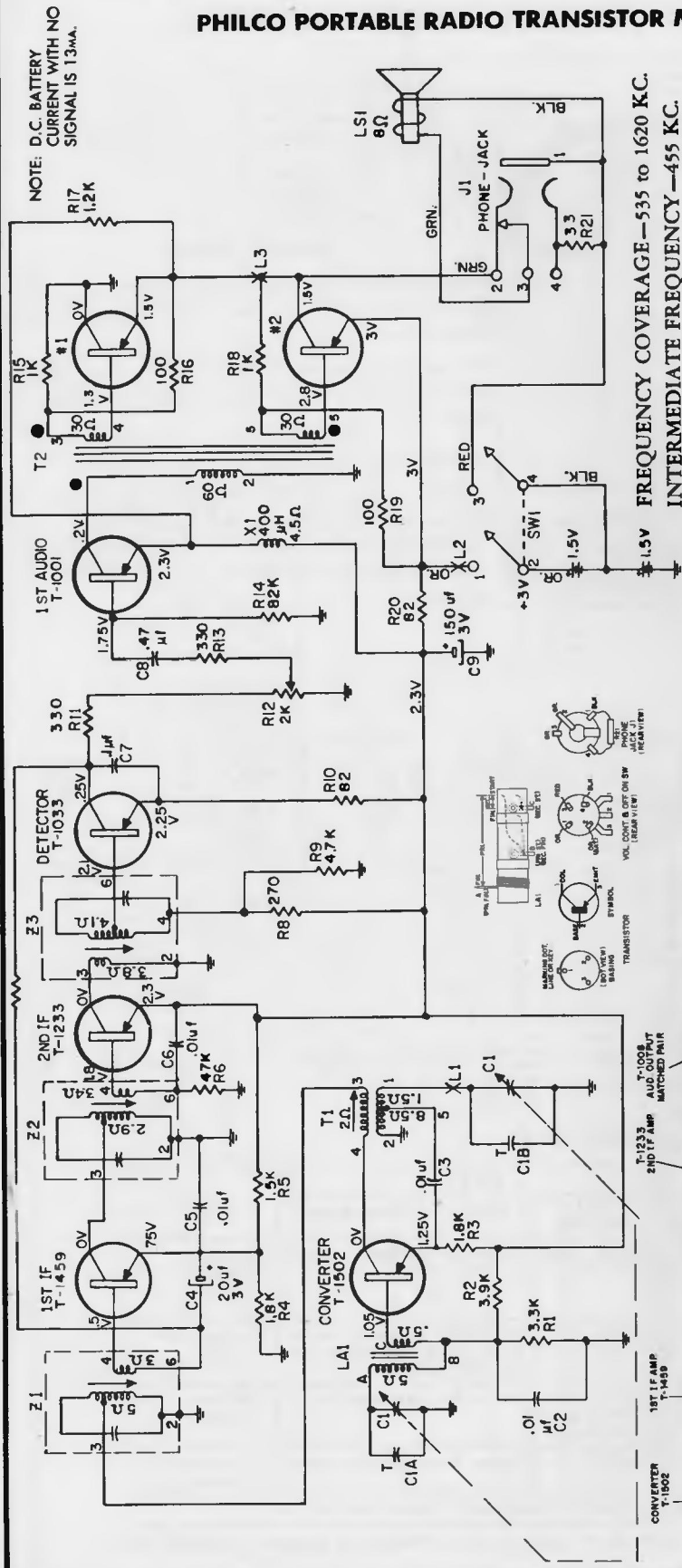
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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.	T4—3rd I-F T3—2nd I-F T2—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.

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-70, CODE 124

AUDIO OUTPUT
T-100B
MATCHED PAIR



TERMINAL LUG IDENTIFICATION

- L1—Lead from CIB Trimmer Capacitor Lug 1 of T1
- L2—Green Lead from Switch SW1, Lug 1
- L3—Green Lead from Phono Jack

SERVICE NOTES

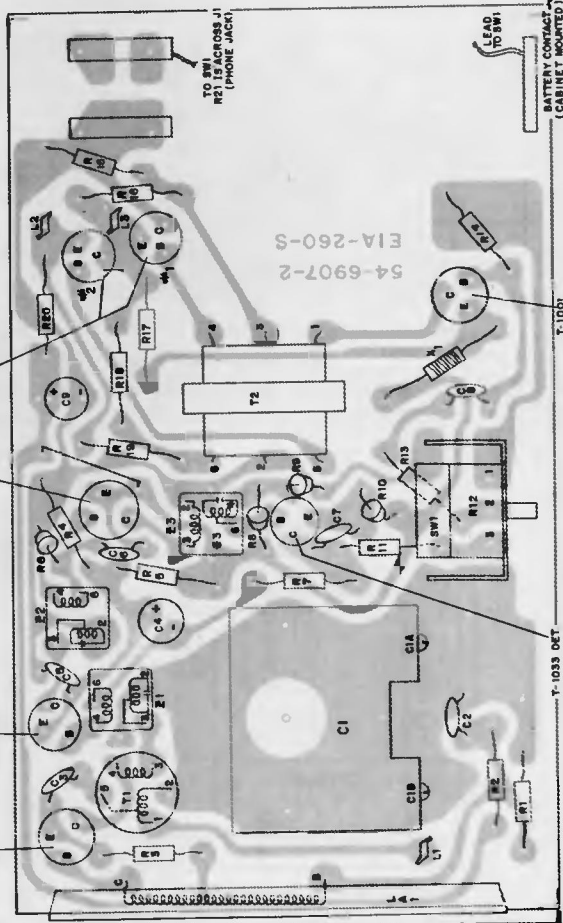
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

Normally, the transistors should be the last item suspected. If C9 opens serious audio oscillation will result.

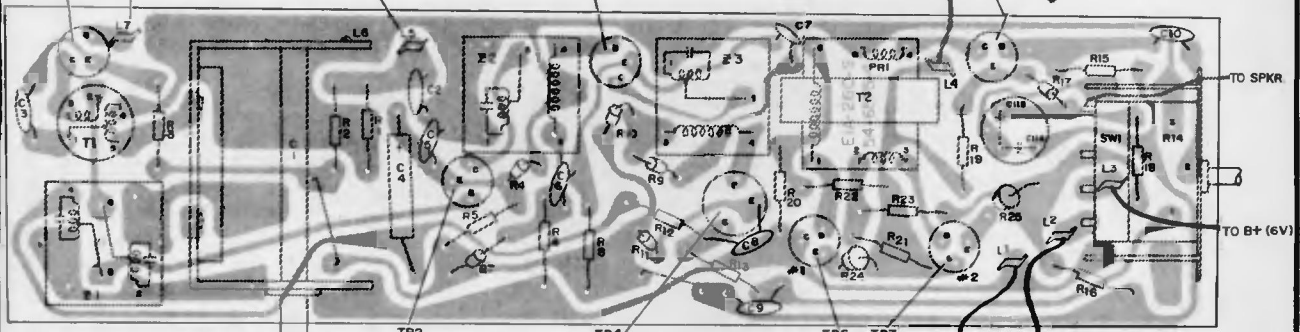
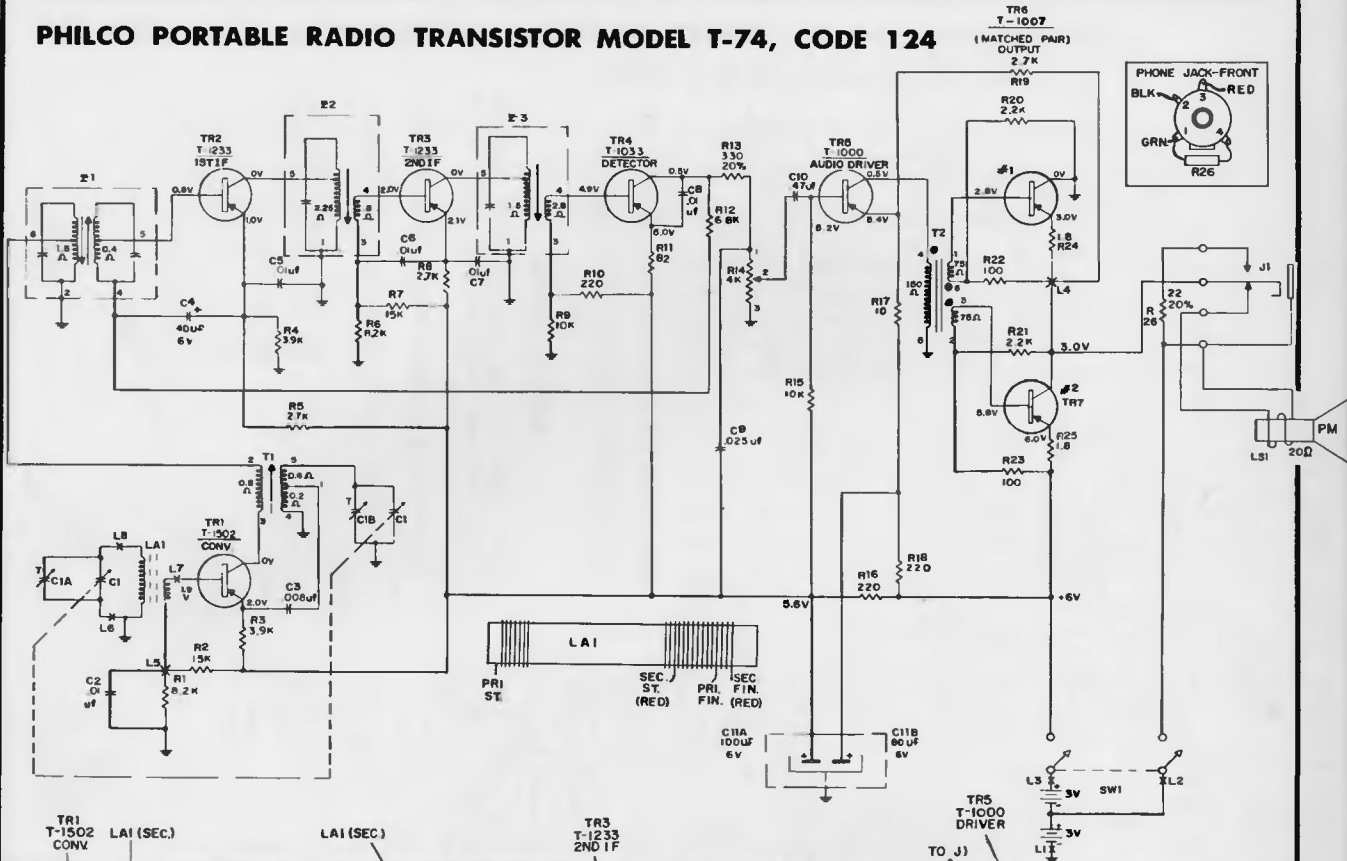
SCHEMATIC NOTES

All voltages taken with a Philco Meter Model 8102, 20,000 ohms per volt. All measurements taken between ground and points indicated. Coil resistances read with coil in circuit.

●—Black dots located at (T2) Audio Transformer indicates phasing polarity of transformer.



PHILCO PORTABLE RADIO TRANSISTOR MODEL T-74, CODE 124



Bottom Composite View of Perma-Circuit Panel

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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.				

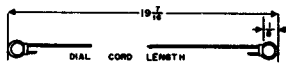
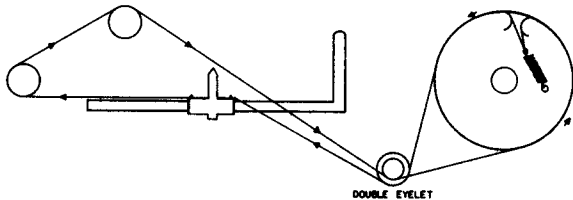
NOTE 1. Use a 6-to-8-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

**PHILCO MODELS J-769 J-772 J-773 J-774 J-775
J-838 J-840 J-842 J-845 J-846**

Material applicable to these sets is below and on pages 122 and 123.

MODELS J-769, J-772, J-773, J-774 and J-775 have similar circuitry with slight variations as shown.

MODELS J-838, J-840, J-842, J-845 and J-846 have similar circuitry with slight variations as shown.

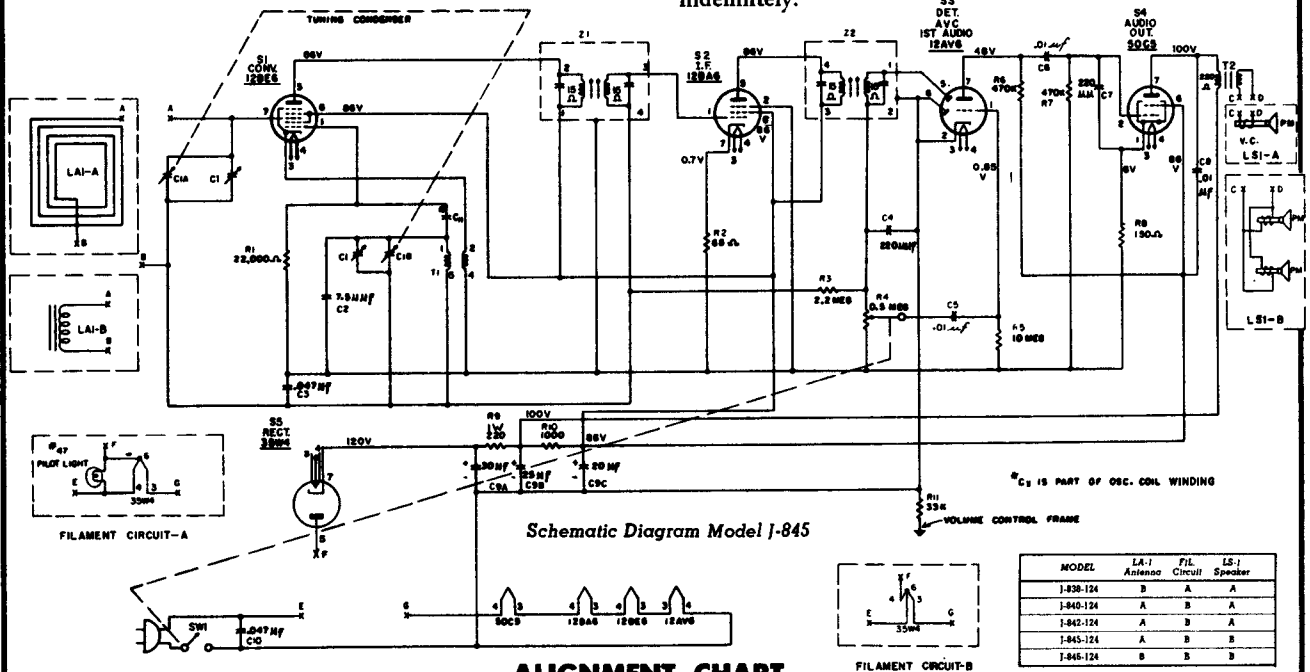


Dial Cord Installation—Model J 774 (Rear View)

SPEAKER PHASING, Models J-845, J-846—When replacing or connecting the two paralleled speakers, it is possible that an out of phase condition may exist; this is readily apparent by weak output and serious distortion. To correct, interchange the leads to one of the speakers.

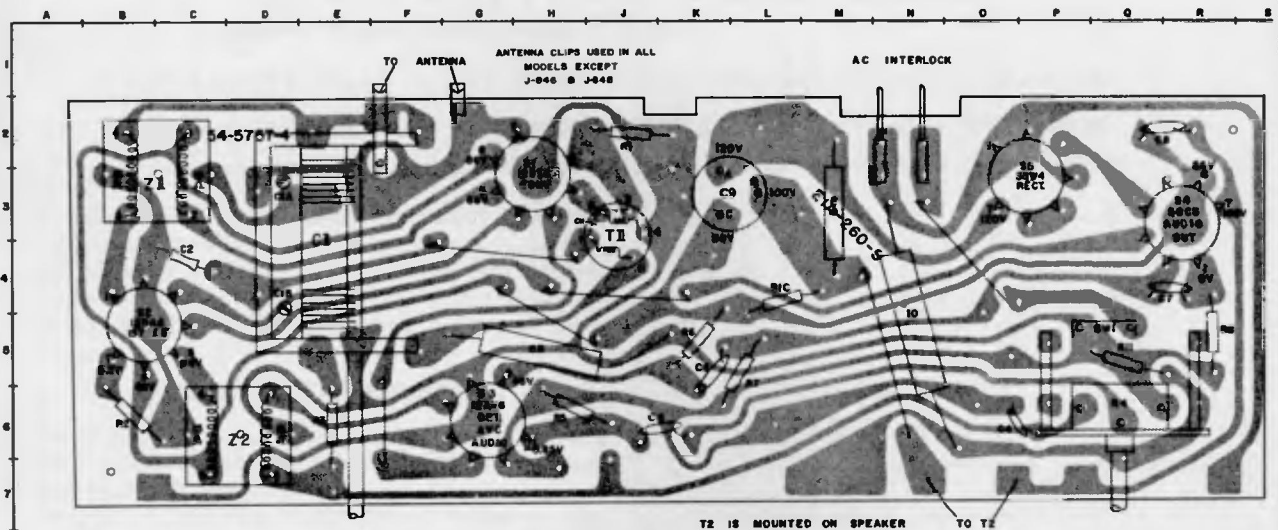
MODELS J-774 J-775

The push button on top of the cabinet is the Forty Winks alarm control. This feature enables the user to silence the buzzer for 10 minutes. After 10 minutes the buzzer will come on again. The 10 minute cycle may be repeated indefinitely.



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

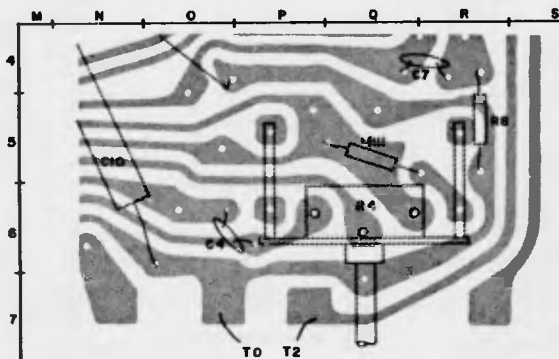
PHILCO Models J-769, J-772, J-773, J-774, J-775, J-838, J-840, etc., Continued



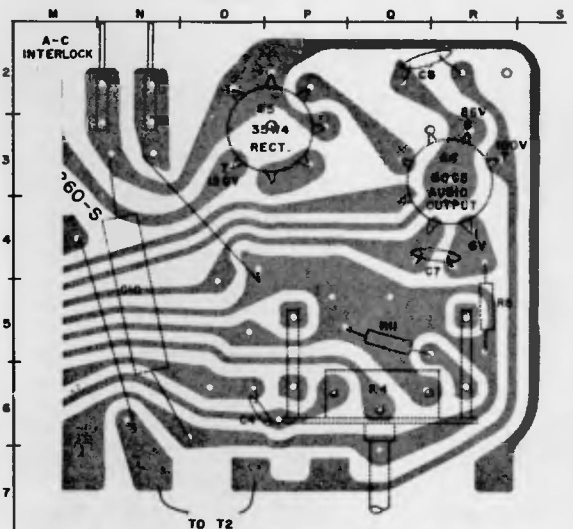
Bottom View of Perma Circuit Panel Component Layout Model J-838

MODEL J-773

In model J-773 the silence time for the forty winks is 7 minutes. After 7 minutes the buzzer goes on again. This 7 minute cycle may be repeated 5 times.



Bottom View, Partial Printed Panel Showing Model J-769 Foil Difference in B-Circuit



Bottom View, Partial Printed Panel Showing Model J-775 Foil Difference in Rect Circuit and Connections to T2

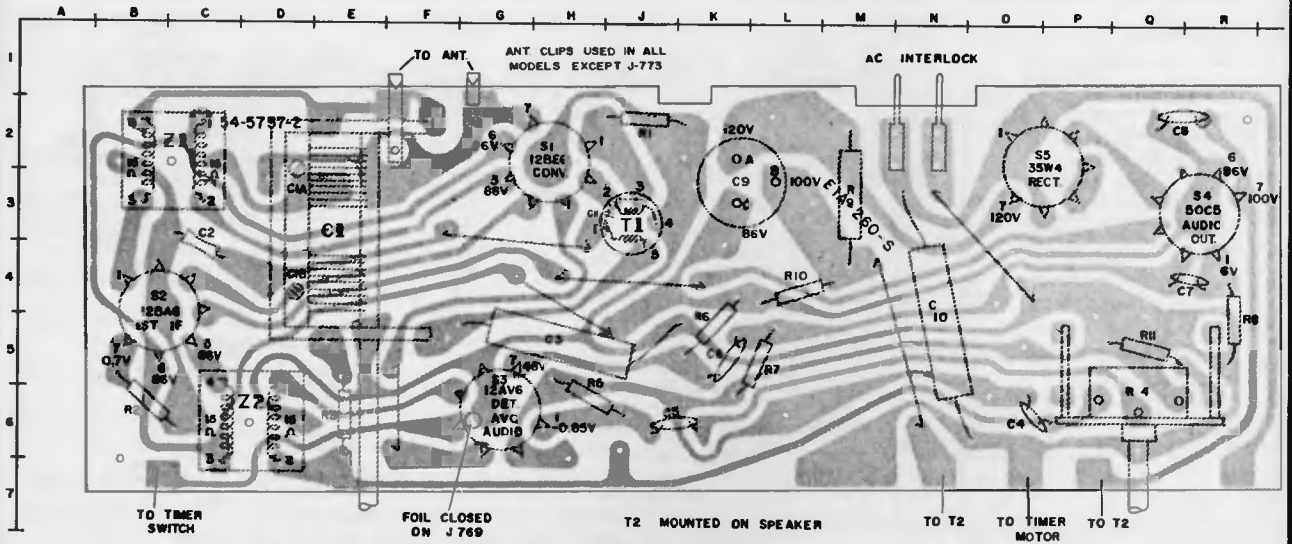
PARTS COMMON TO ALL MODELS

Sym- bol	Loca- tion	Description	Service Part No.
C1	E3	Capacitor, variable, tuning	
C2	C4	Capacitor, 7.5 mmf, temp. comp.	30-1224-83
C3	H5	Capacitor, .047 mf, AVC	30-4650-45
C4	O6	Capacitor, 220 mmf, diode filter	30-1262-23
C5	J6	Capacitor, .01 mf, 1st audio grid	30-1262
C6	K5	Capacitor, .01 mf, output grid	30-1262
C7	Q4	Capacitor, 220 mmf, output grid	30-1262-23
C8	Q2	Capacitor, .01 mf, output plate	30-1262
C9	L3	Capacitor, electrolytic (3 section) 20 mf, 25 mf, 30mf, +150VDC	30-2585-11
C10	N5	Capacitor, .047 mf line bypass	30-4650-45
R1	J2	Resistor, converter grid, 22,000 ohms	66-3228340
R2	B6	Resistor, I-F bias, 68 ohms	66-0688340
R3	E6	Resistor, AVC filter, 2.2 megohms	66-5228340

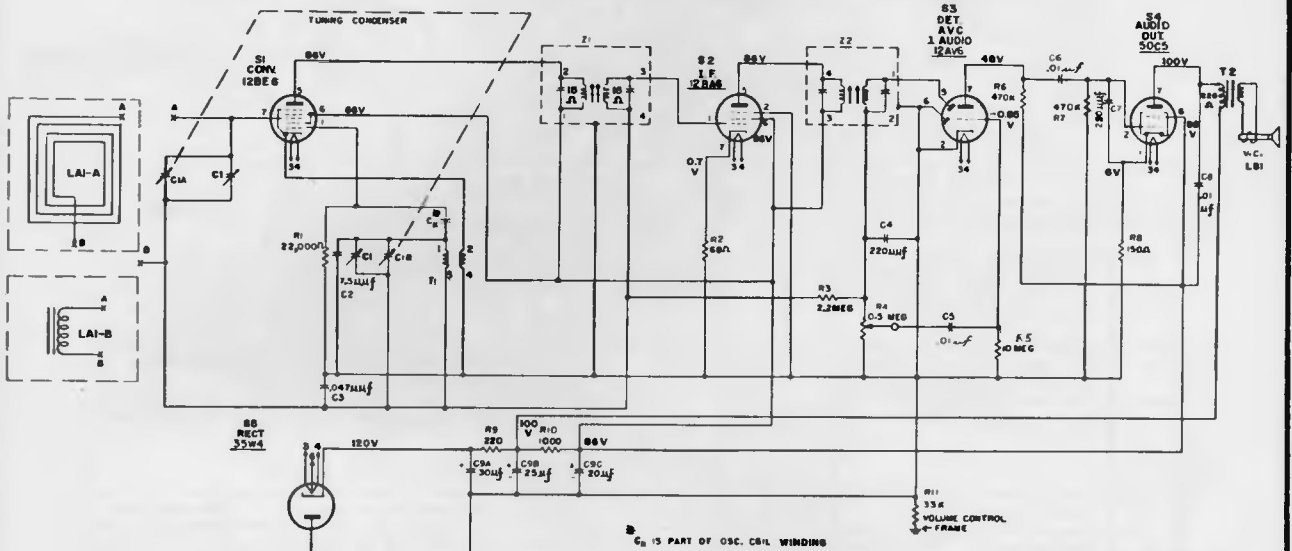
Sym- bol	Loca- tion	Description	Service Part No.
R4	Q6	Resistor, volume control, .5 megohms	
R5	H6	Resistor, 1st audio grid, 10 megohms	66-6108340
R6	K5	Resistor, 1st audio plate, 470,000 ohms	66-4478340
R7	L5	Resistor, audio output grid, 470,000 ohms	66-4478340
R8	R5	Resistor, audio output bias, 150 ohms	66-1158340
R9	M3	Resistor, B+ filter, 220 ohms, 1 watt	66-1224340
R10	L4	Resistor, B+ filter, 1000 ohms	66-2108340
R11	Q5	Resistor, isolation, 33,000 ohms	66-3338340
T1	J3	Transformer, osc.	32-4756-1
T2		Part of Speaker	32-8384-2
Z1	C2	Transformer, 1st I-F	32-4583-23
Z2	D6	Transformer, 2nd I-F	32-4583-23
G1		Contact Panel, antenna	28-12282

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

PHILCO Models J-769, J-772 thru J-775, J-838, J-840, J-842, etc., Continued



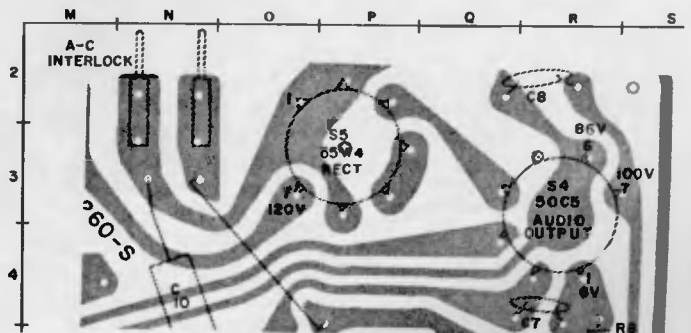
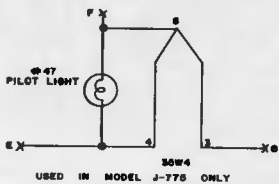
Bottom View of Perma Circuit Panel Component Layout Models J-772, J-773, J-774



MODEL	LA-1 Antenna	TIMER Switch
J-769-124	A	B
J-772-124	A	A
J-773-124	B	A
J-774-124	A	A
J-775-124	B	

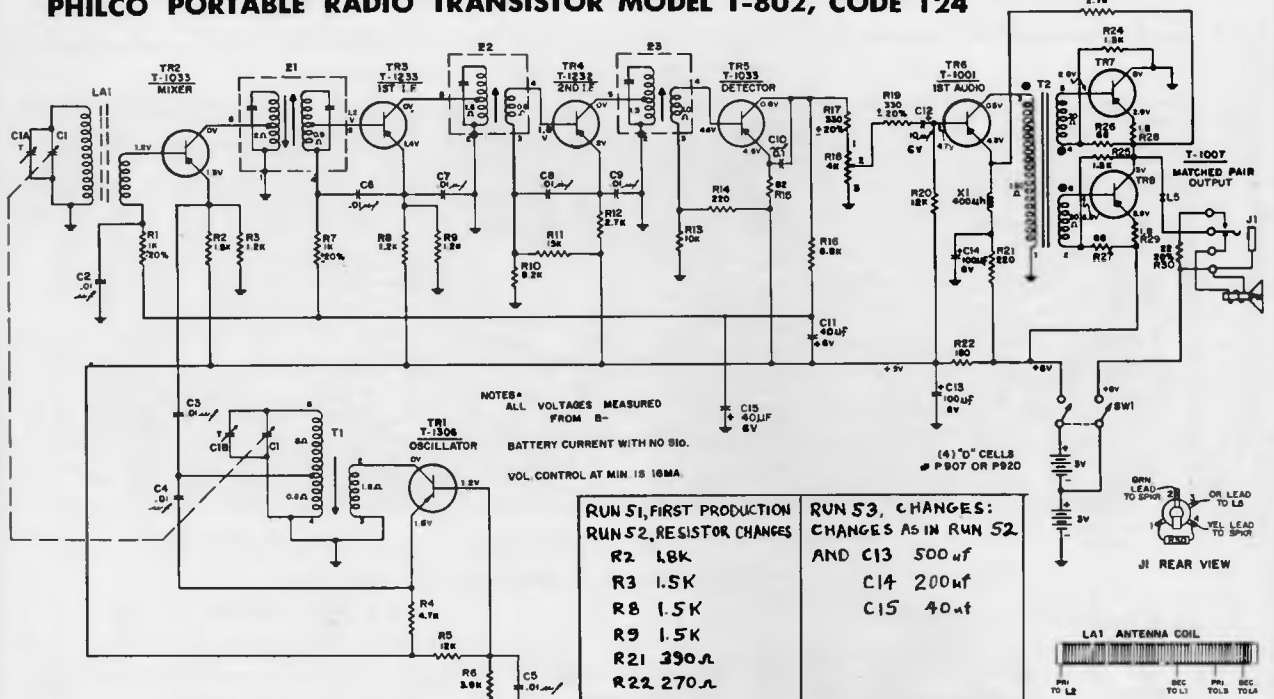
CIRCUIT DIFFERENCES FOR MODEL VARIATIONS

Schematic Diagram Model J-772



Bottom View, Partial Printed Panel Showing Models J-840, J-842, J-846. Foil Difference in Rect. Filament Circuit

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-802, CODE 124



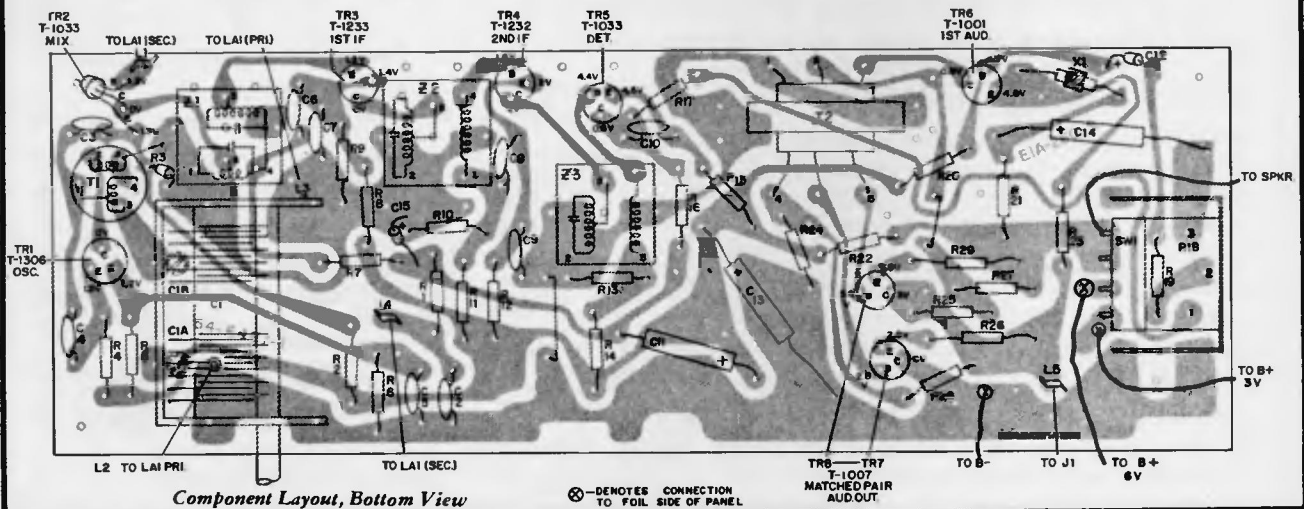
NOTES— ALL VOLTAGES MEASURED FROM B—
BATTERY CURRENT WITH NO SID.
VOL. CONTROL AT MIN IS 16MA.

- | | |
|--------------------------|----------------------|
| RUN S1, FIRST PRODUCTION | RUN S3, CHANGES: |
| RUN S2, RESISTOR CHANGES | CHANGES AS IN RUN S2 |
| R2 1.8K | C13 500uf |
| R3 1.5K | C14 200uf |
| R8 1.5K | C15 40uf |
| R9 1.5K | |
| R21 390Ω | |
| R22 270Ω | |

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 pri. Z2—2nd i-f pri. Z1—bot. core Z1—top core
2	Use radiating loop. (See NOTE 1 below).	600 kc.	600 kc.	Adj. for maximum output. Rock tuning gang while making adj.	T1—osc. core
3	Same as step 2.	1620 kc.	1620 kc. (Tuning gang fully open)	Adjust for maximum output.	C1B—osc. trim.
4	Same as step 2.	1400 kc.	1400 kc.	Adjust for maximum output.	C1A—ant. trim.
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.



Component Layout, Bottom View

⊗—DENOTES CONNECTION TO FOIL SIDE OF PANEL

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-901, CODE 124

Reference Symbol	Location	Description	Reference Symbol	Location	Description	Reference Symbol	Location	Description
C1	—	Capacitor, variable, tuning	R6	B1	Resistor, 1.0K Ω , r-f amp. base	R33	J1	Resistor, 22 Ω , jack
C2	A6	Capacitor, .008 mfd, r-f base	R7	B5	Resistor, 47K Ω , mixer base	SW1	R21	Switch
C3	C8	Capacitor, .008 mfd, r-f emitter	R8	B2	Resistor, 39K Ω , mixer base	E3	E3	XFMR, osc.
C4	F7	Capacitor, .008 mfd, osc. emitter	R9	D5	Resistor, 3.3K Ω , mixer emitter	N7	N7	XFMR, aud. out.
C5	F6	Capacitor, .008 mfd, osc. base	R10	A3	Resistor, 1.0K Ω , 1st i-f base	TR1	A7	Transistor, r-f amp., T-1233
C6	B5	Capacitor, .008 mfd, mixer base	R11*	E3	Resistor, 1.2K Ω , 1st i-f emit.	TR2	F7	Transistor, osc., T-1306
C7	D7	Capacitor, .008 mfd, mixer emitter	R12*	E1	Resistor, 1.2K Ω , 1st i-f emit.	TR3	D5	Transistor, mixer, T-1033
C8	E3	Capacitor, .008 mfd, 1st i-f	R13	F5	Resistor, 8.2K Ω , 2nd i-f base	TR4	D1	Transistor, 1st i-f, T-1233
C9	E1	Capacitor, .008 mfd, 1st i-f	R14	F5	Resistor, 15K Ω , 2nd i-f base	TR5	H3	Transistor, 2nd i-f, T-1232
C10	F5	Capacitor, .008 mfd, 2nd i-f	R15	H5	Resistor, 2.7K Ω , 2nd i-f emit.	TR6	H5	Transistor, det., T-1033
C11	H2	Capacitor, .008 mfd, 2nd i-f	R16	M4	Resistor, 10K Ω , 2nd det. base	TR7	L7	Transistor, aud. drive, T-1001
C12	K5	Capacitor, .008 mfd, det. base	R17	M4	Resistor, 330 Ω , 2nd det. base	TR8**	R9	Transistor, aud. out., T-1007
C13	J6	Capacitor, .025 mfd, det. collector	R18	K5	Resistor, 82 Ω , 2nd det. emit.	TR9**	R8	Transistor, aud. out., T-1007
C14	G9	Capacitor, .1 mfd, volume control	R19	J6	Resistor, 6.8K Ω , 2nd det. col.	X1	K7	Choke, 400 μ h
C15	L6	Capacitor, 40 mfd, AVC filter	R20	H7	Resistor, 330 Ω , 2nd det. col.	Z1	B6	Transformer, R-F transistor
C16*	M5	Capacitor, 40 mfd, AVC filter	R21	—	Resistor, 4K Ω , var. vol. control	Z2	B3	Transformer, 1st I-F
C17	L8	Capacitor, 10 mfd, Audio coupling	R22	L9	Resistor, 330 Ω , driver input filter	Z3	F3	Transformer, 2nd I-F
C18A*	N5	Capacitor, 200 mfd, r-f filter	R23*	M6	Resistor, 3.9K Ω , aud. driver base	Z4	J3	Transformer, 3rd I-F
C18B*	N5	Capacitor, 100 mfd, driver emitter	R24*	Q3	Resistor, 120 Ω , B+ filter			
J1	Case	Jack, listening	R25*	O4	Resistor, 220 Ω , aud. driver emit.			
LA1	Case	Antenna coil	R26	Q8	Resistor, 2.7K Ω , aud. feed-back			
LS1	Case	Speaker, 12 Ω V.C., 4 inch	R27	P3	Resistor, 1.5K Ω , aud. collector			
R1	G8	Resistor, 1.5K Ω , r-f amp. emit.	R28	R5	Resistor, 1.5K Ω , aud. output col.			
R2*	C9	Resistor, 1.5K Ω , r-f amp. emit.	R29	Q5	Resistor, 68 Ω , TR8 base			
R3	C8	Resistor, 4.7K Ω , osc. emit.	R30	S3	Resistor, 68 Ω , TR9 base			
R4	H8	Resistor, 12K Ω , osc. base	R31	S6	Resistor, 1.8 Ω , TR8 emitter			
R5	H6	Resistor, 3.9 K Ω , osc. base	R32	R5	Resistor, 1.8 Ω , TR9 emitter			

*** RUN 2—CHANGE INFORMATION**

C16—deleted	R12—1.5K Ω
C18A—400 mfd	R23—12K Ω
C18B—300 mfd	R24—270 Ω
R2—1.8K Ω	R25—390 Ω
R11—1.5K Ω	

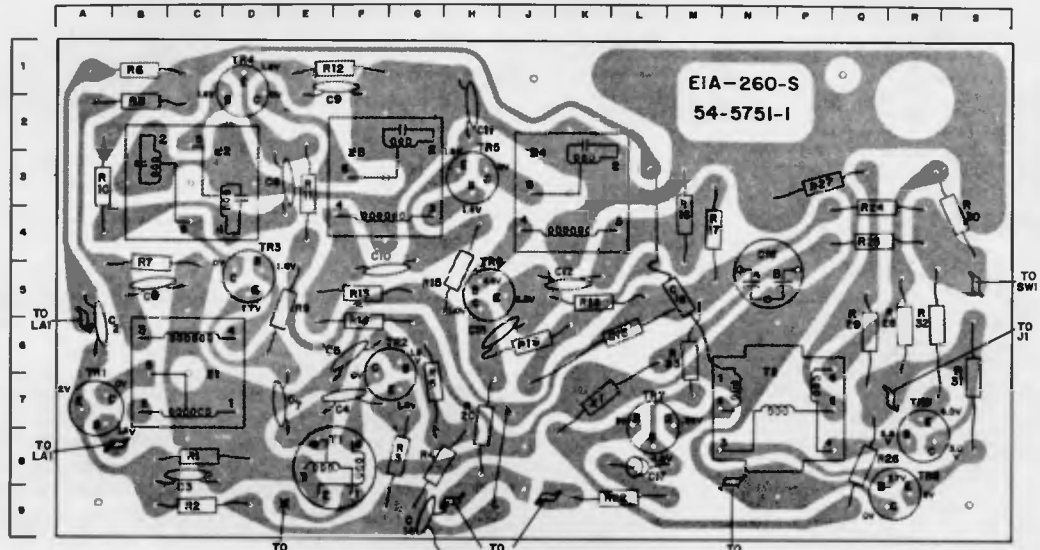
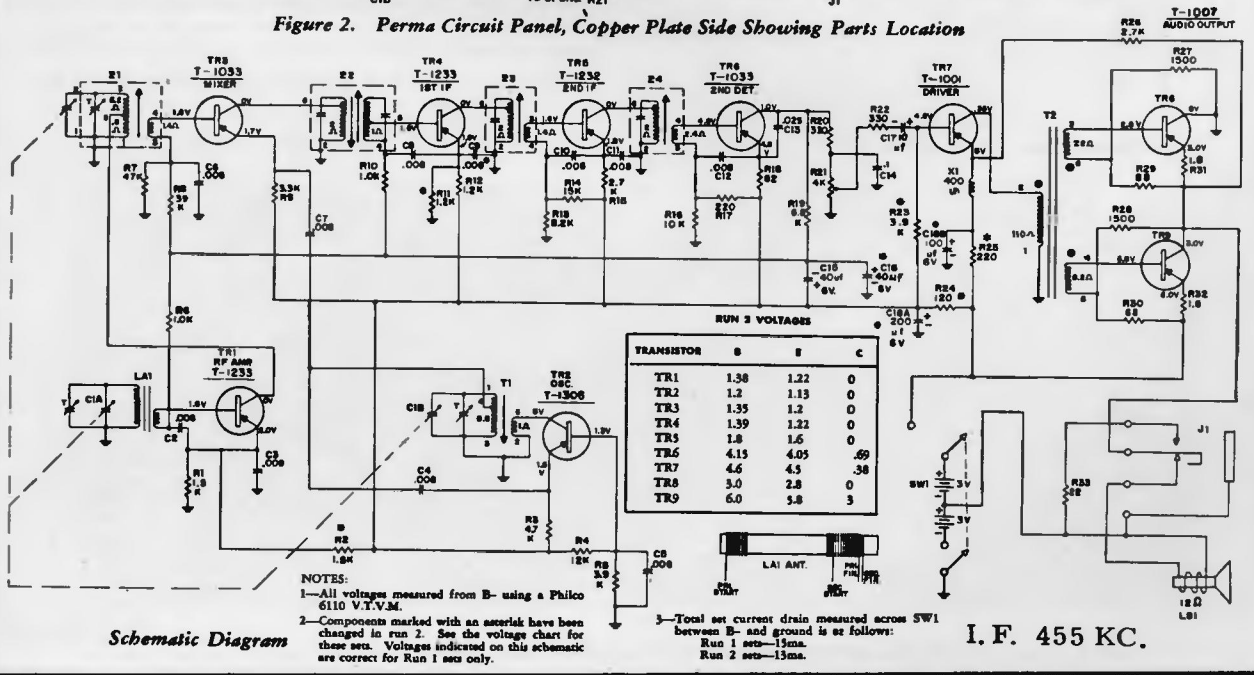
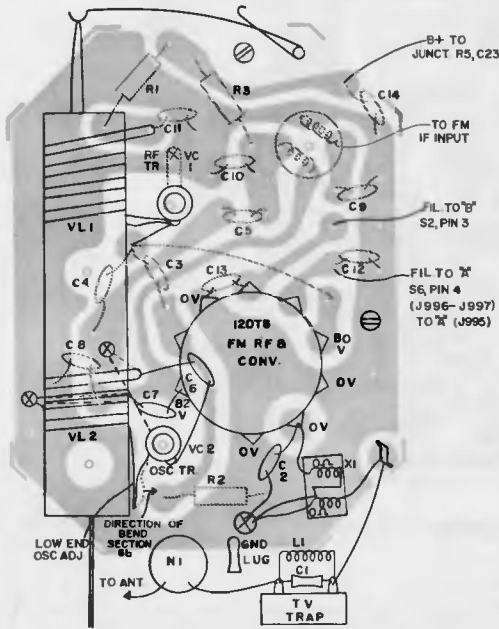
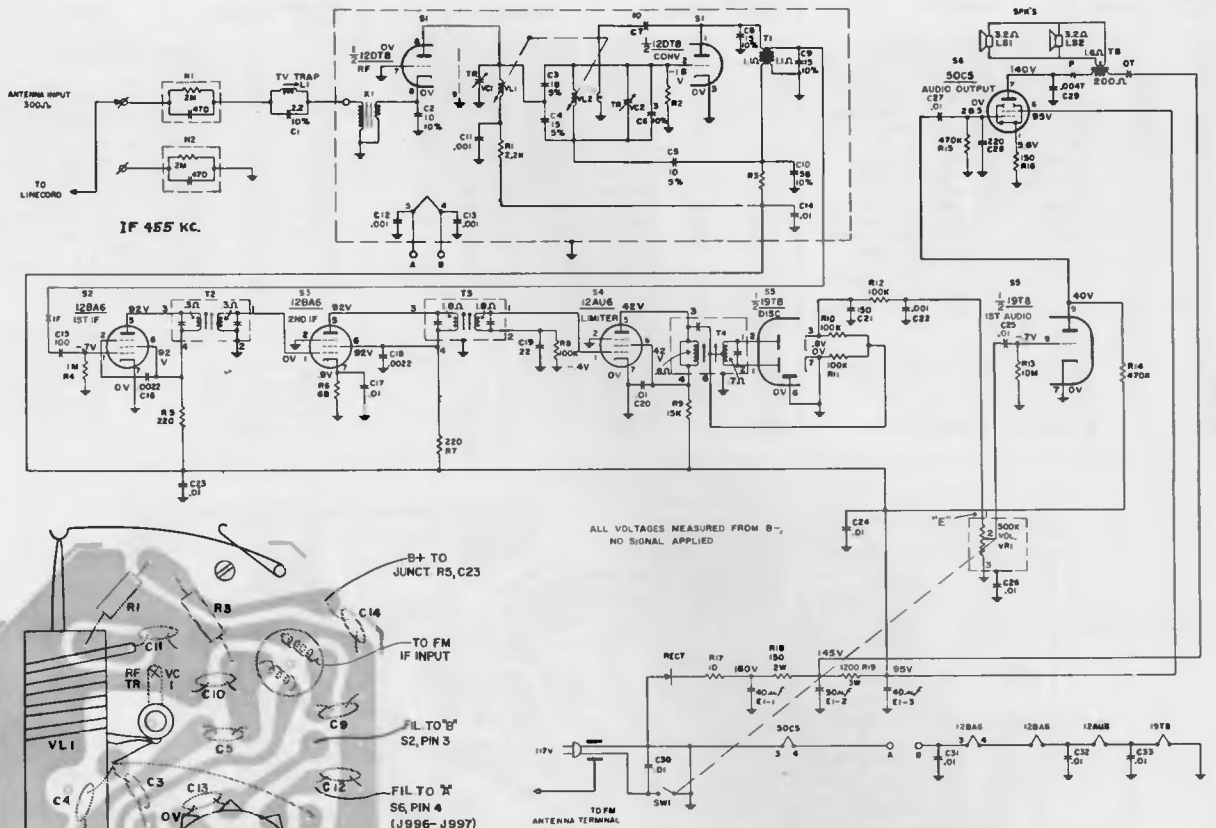


Figure 2. Perma Circuit Panel, Copper Plate Side Showing Parts Location



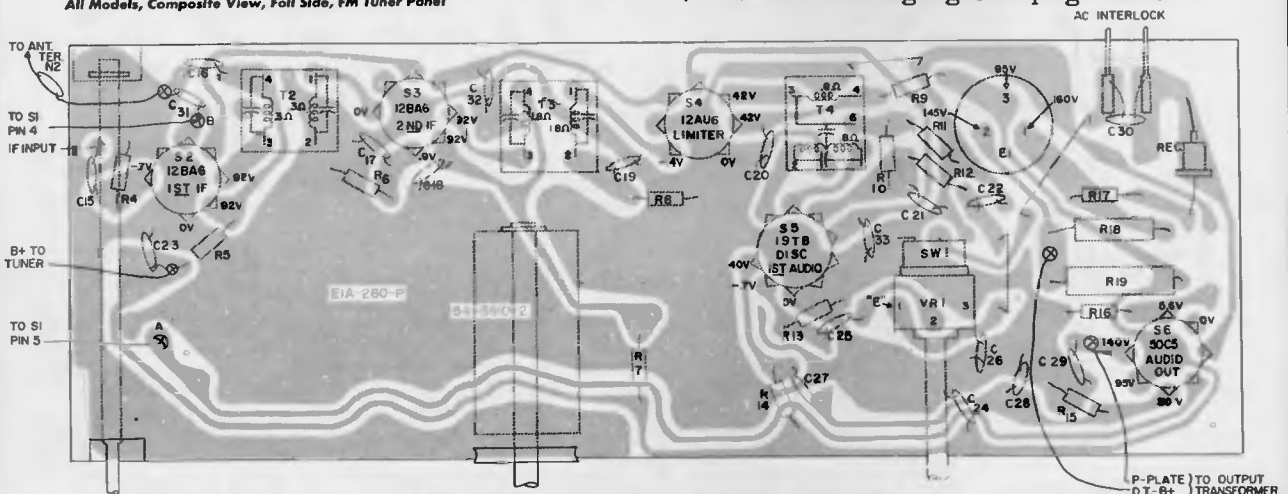
PHILCO FM MODEL J-995



All Models, Composite View, Foil Side, FM Tuner Panel

FM tuner disassembly. Remove chassis from cabinet and place foil side up, tuner toward left. To remove bottom shield from tuner remove two screws located at left edge of shield and screw located under left lug of antenna terminal board (remove terminal board mounting screw first). Loosen screw located near antenna terminal board and remaining tuner mounting screw located near left front corner of main panel. Slide shield to left far enough to clear wires and screws. Retighten remaining tuner mounting screws. The perma-circuit wiring panel can now be removed. To do so, remove screw holding TV trap mounting board. Disconnect ground lug from panel and the tuner drive cord from the pulley shaft. Remove screws holding panel in housing. The panel may now be lifted up and out of the tuner housing.

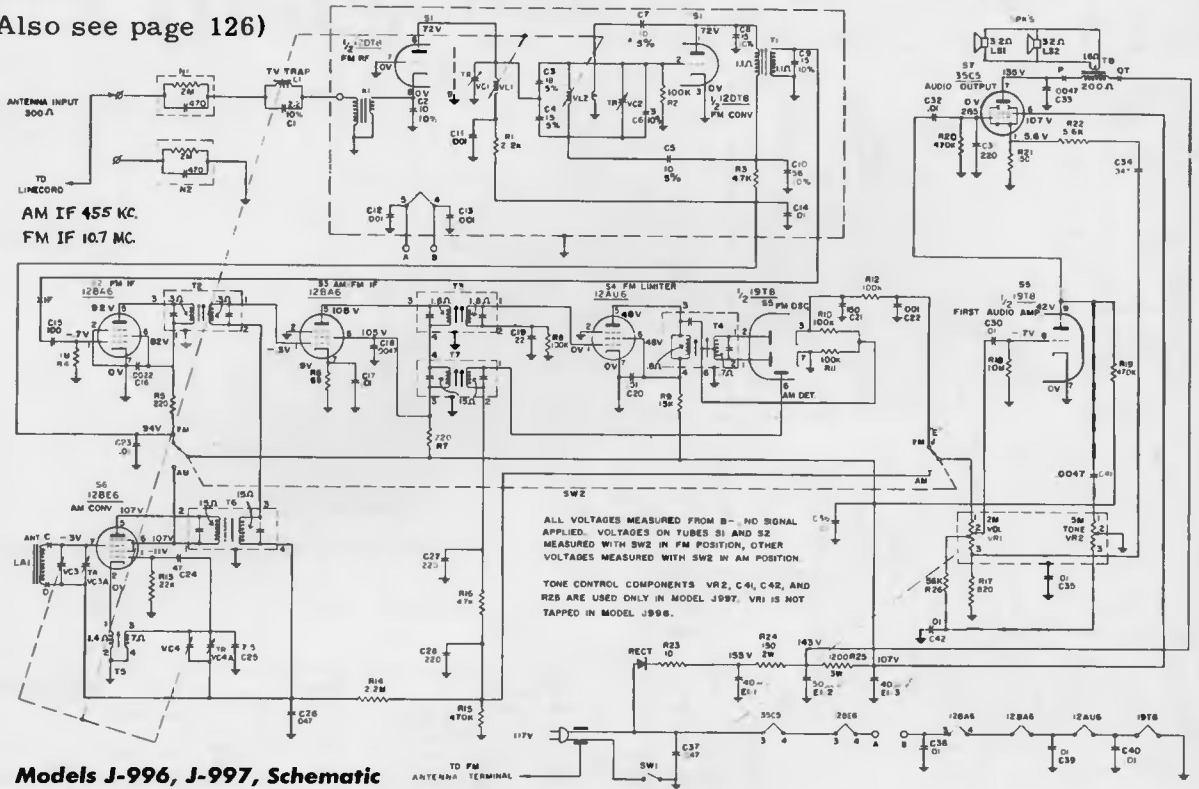
(For dial stringing see page 127)



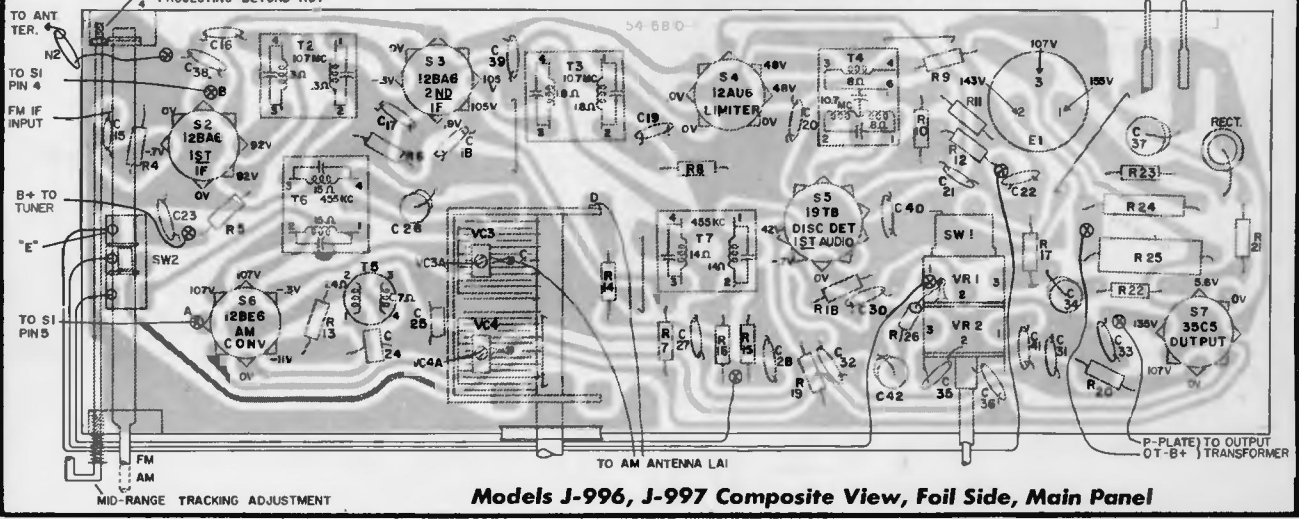
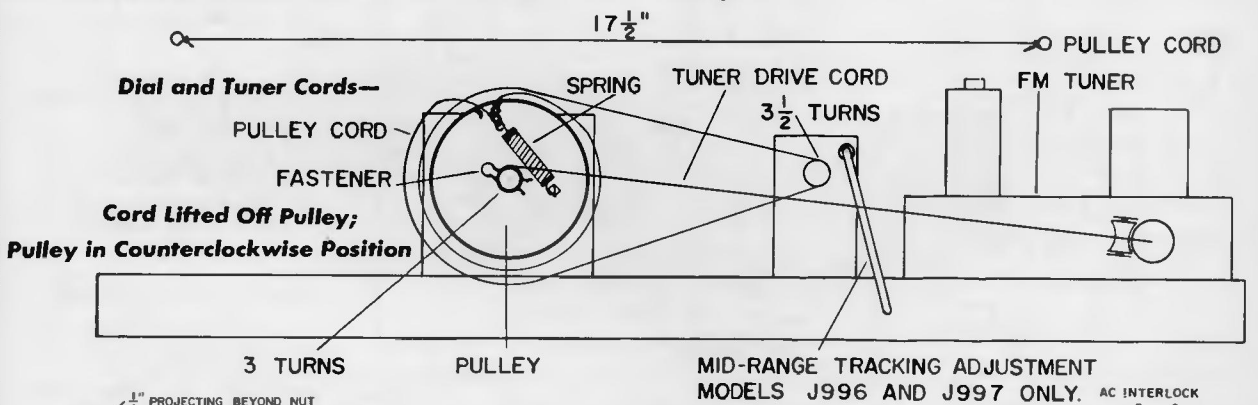
Model J-995, Composite View, Foil Side, Main Panel

PHILCO AM/FM MODELS J-996, J-997

(Also see page 126)



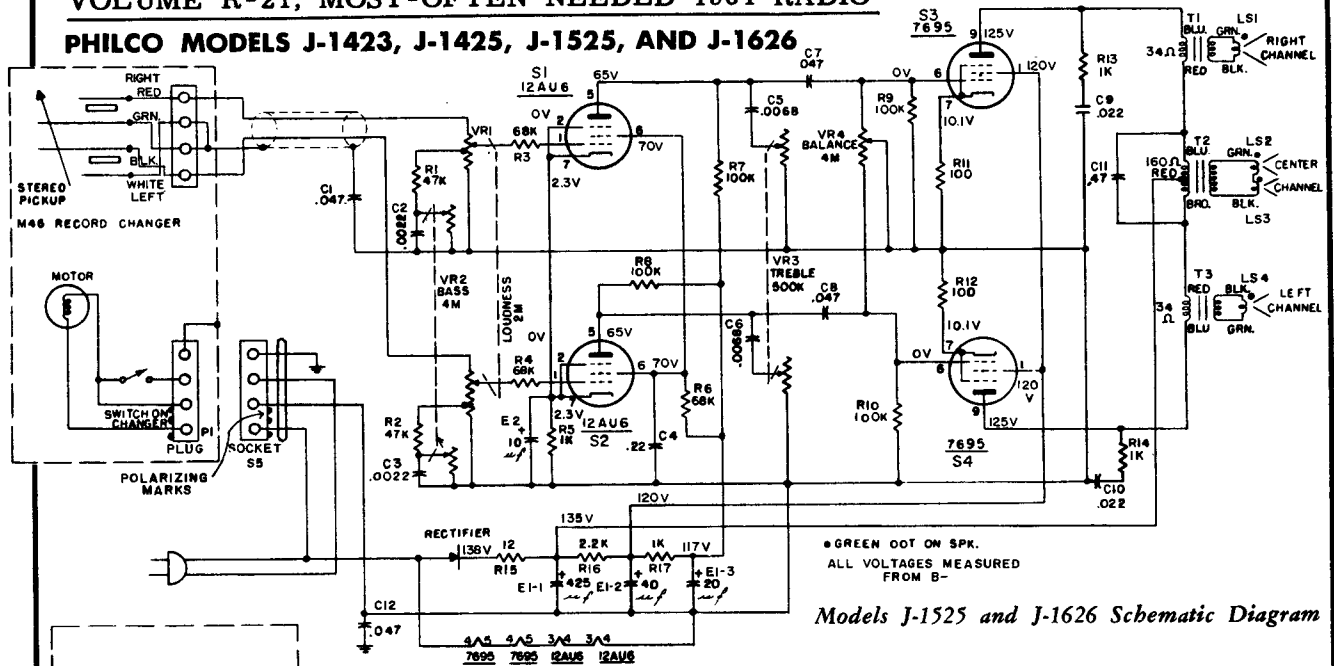
Models J-996, J-997, Schematic



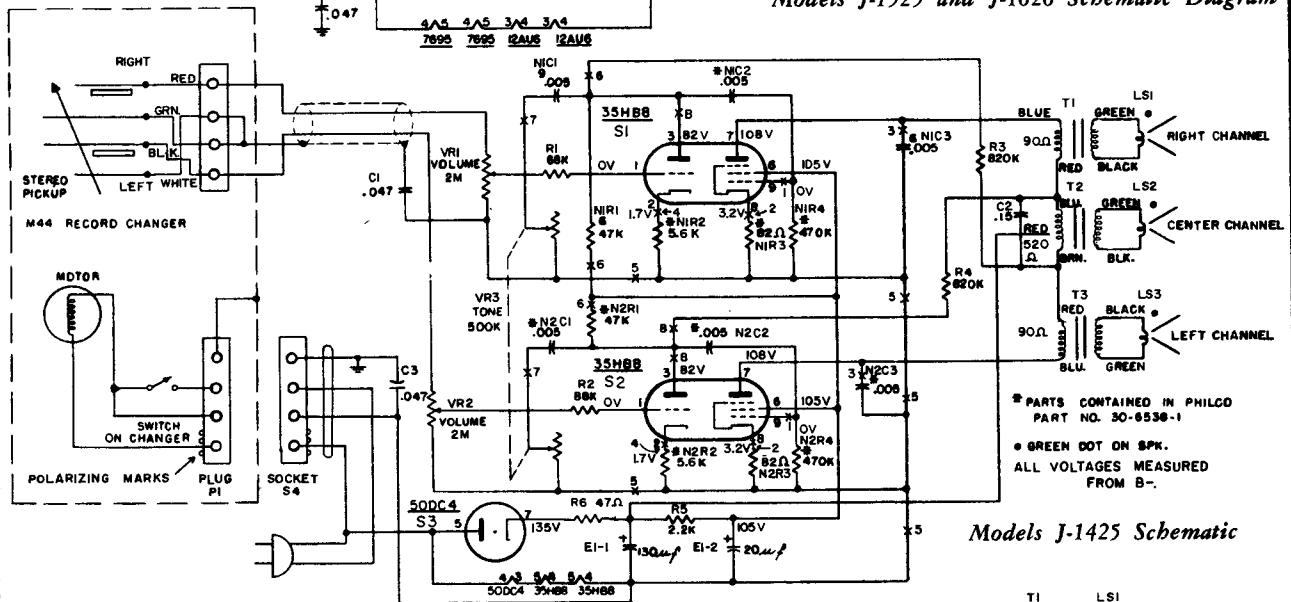
Models J-996, J-997 Composite View, Foil Side, Main Panel

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO

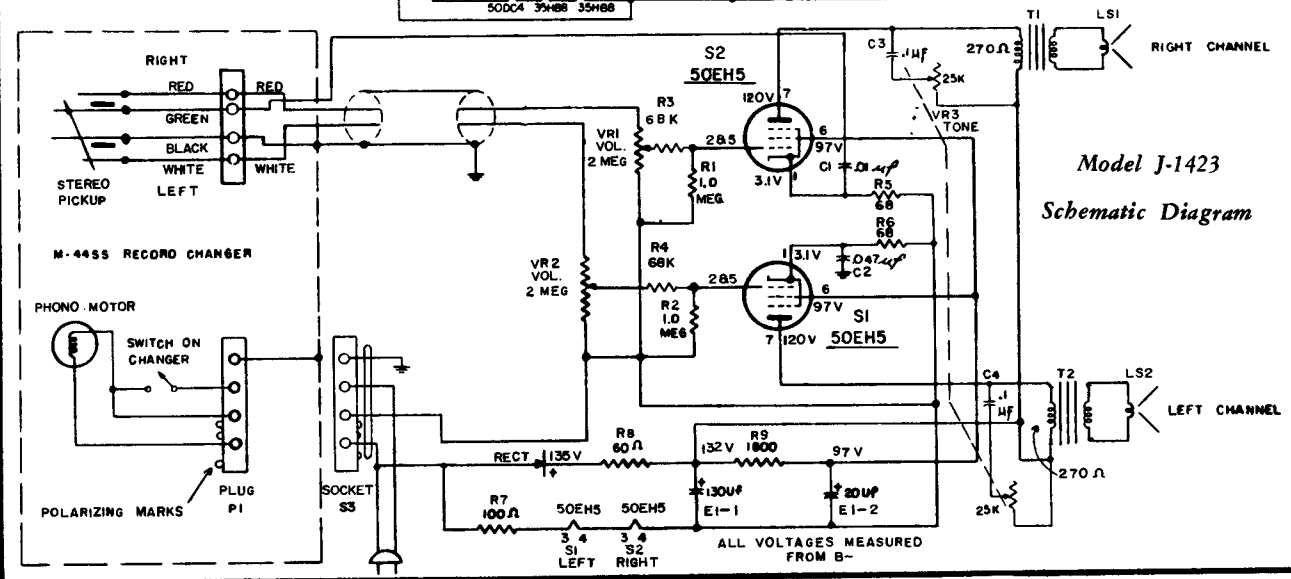
PHILCO MODELS J-1423, J-1425, J-1525, AND J-1626



Models J-1525 and J-1626 Schematic Diagram



Models J-1425 Schematic

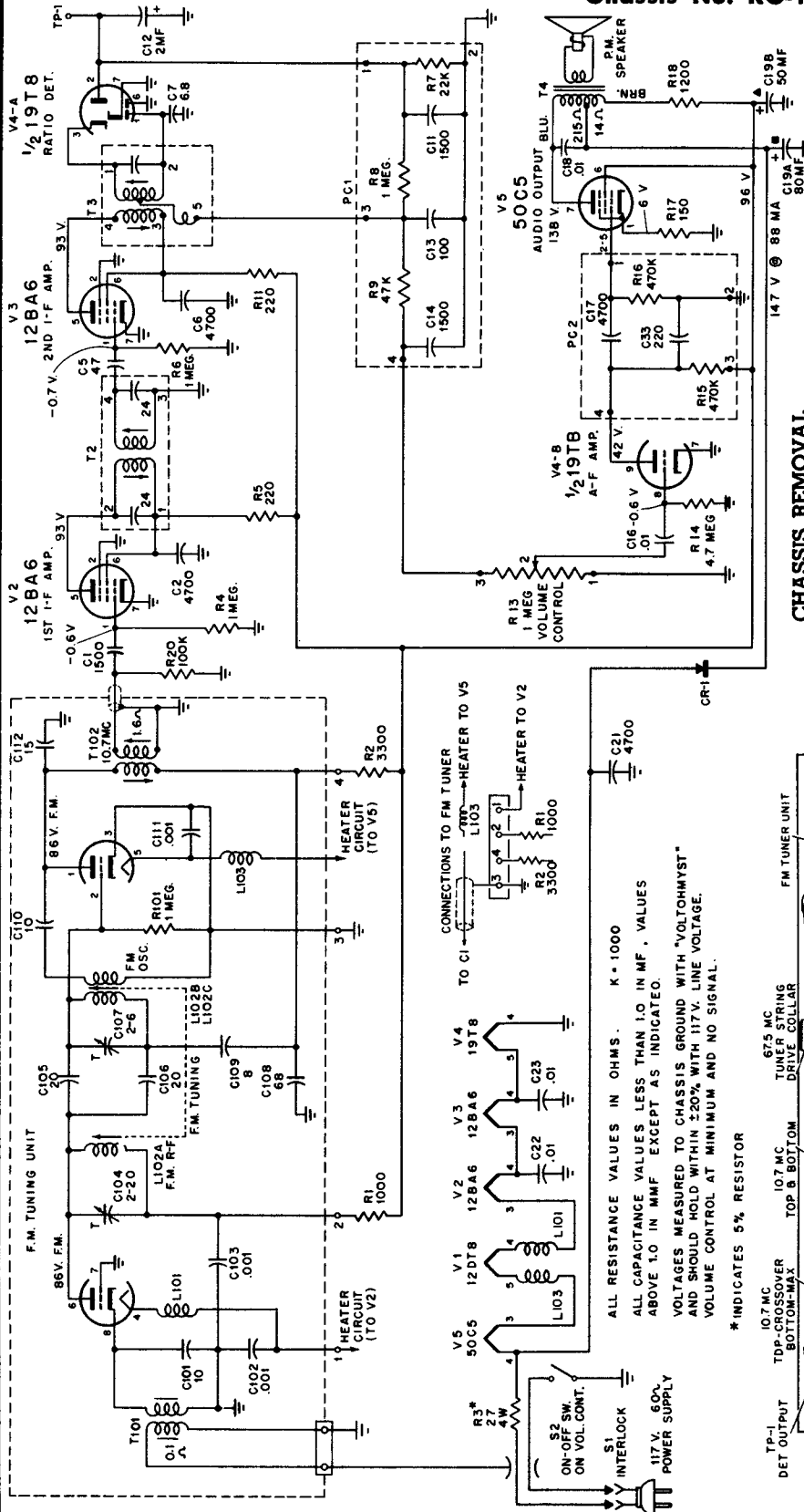


Model J-1423 Schematic Diagram

RCA VICTOR

MODELS 1-F-1, 1-F-2 SERIES

Chassis No. RC-1201A



CHASSIS REMOVAL

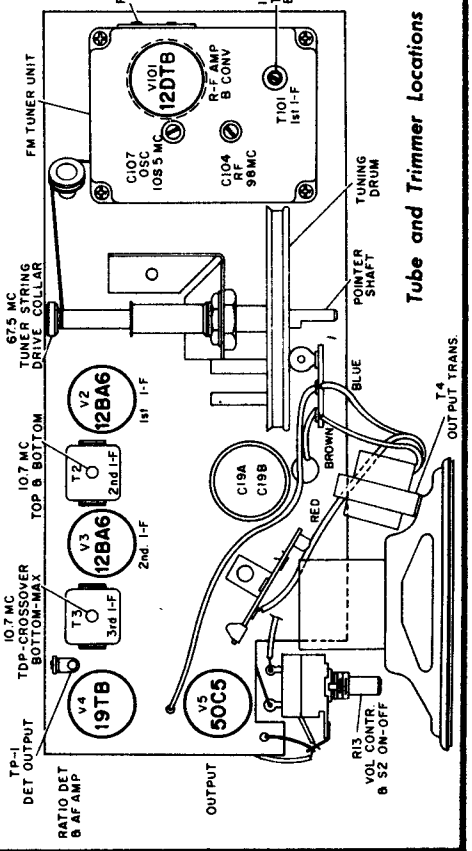
1. Remove two screws at bottom rear of cabinet and one screw at top center—this screw will remain with cabinet back.
2. Pull off volume control knob and remove hex nut holding volume control to cabinet front.
3. Unhook dial drive cord and remove from drum.
4. Bend three retaining lugs to permit removal of power line antenna from cabinet front.
5. Remove two screws holding speaker to cabinet front.
6. Remove two screws at rear apron of chassis.
7. Pull tuning drum shaft out of dial pointer.

CHASSIS INSTALLATION

From back side of cabinet front—squeeze toward center, two lugs of plastic dial crystal—lay crystal and pointer aside.
Reinstall in reverse order of "Chassis Removal".

RCA Victor
Models 1-F-1, and
1-F-2 Series,
Chassis RC-1201A

ALL RESISTANCE VALUES IN OHMS. K = 1000
ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF, VALUES ABOVE 1.0 IN MMF EXCEPT AS INDICATED.
VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" AND SHOULD HOLD WITHIN ±20% WITH 117V. LINE VOLTAGE. VOLUME CONTROL AT MINIMUM AND NO SIGNAL.
* INDICATES 5% RESISTOR



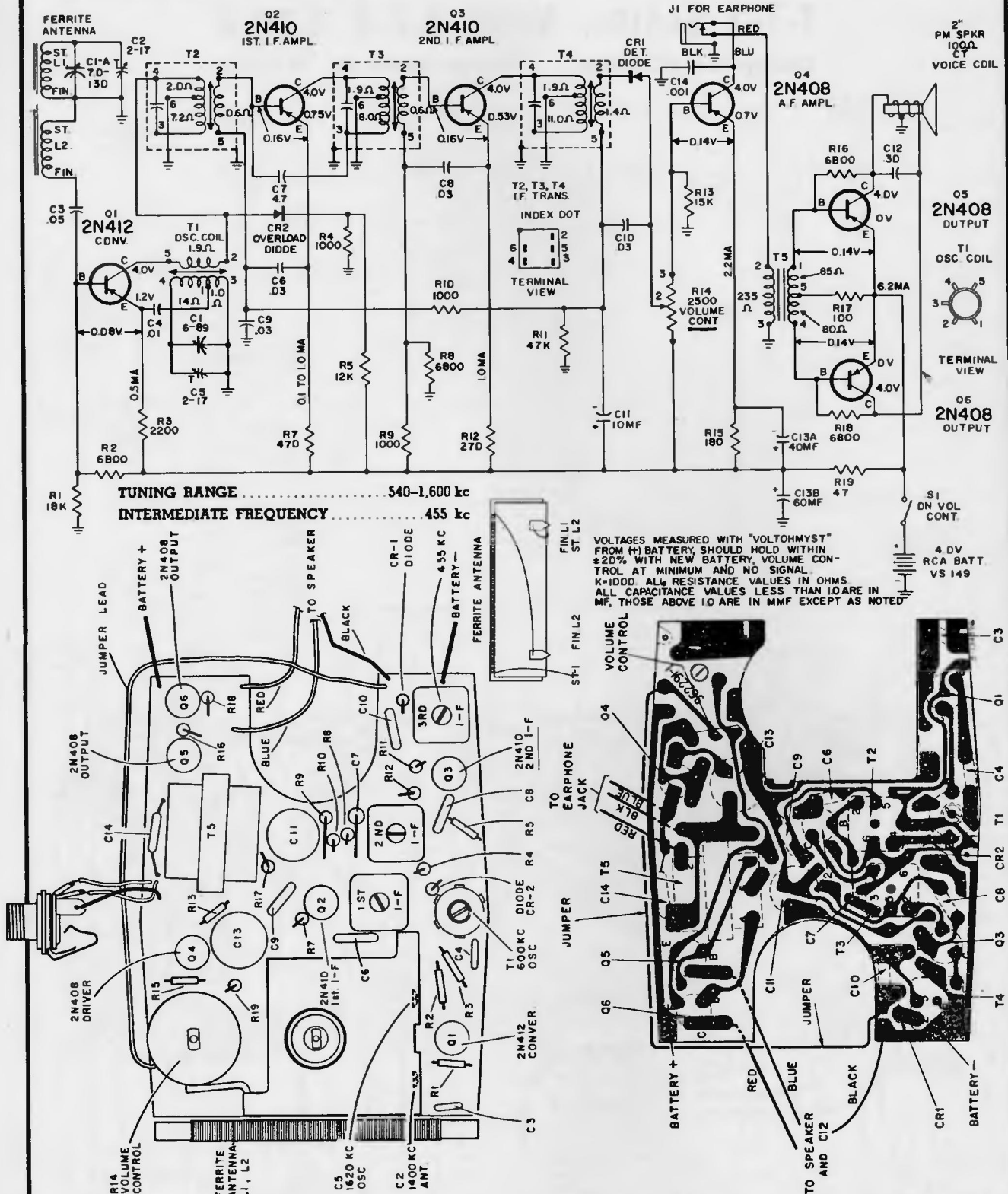
Tube and Trimmer Locations

RCA VICTOR

(For later type see next page)

1-TP-1 SERIES, 1-TP-2 SERIES

Chassis No. RC-1199
RC-1199-A
Circuit Board No. 962291-1

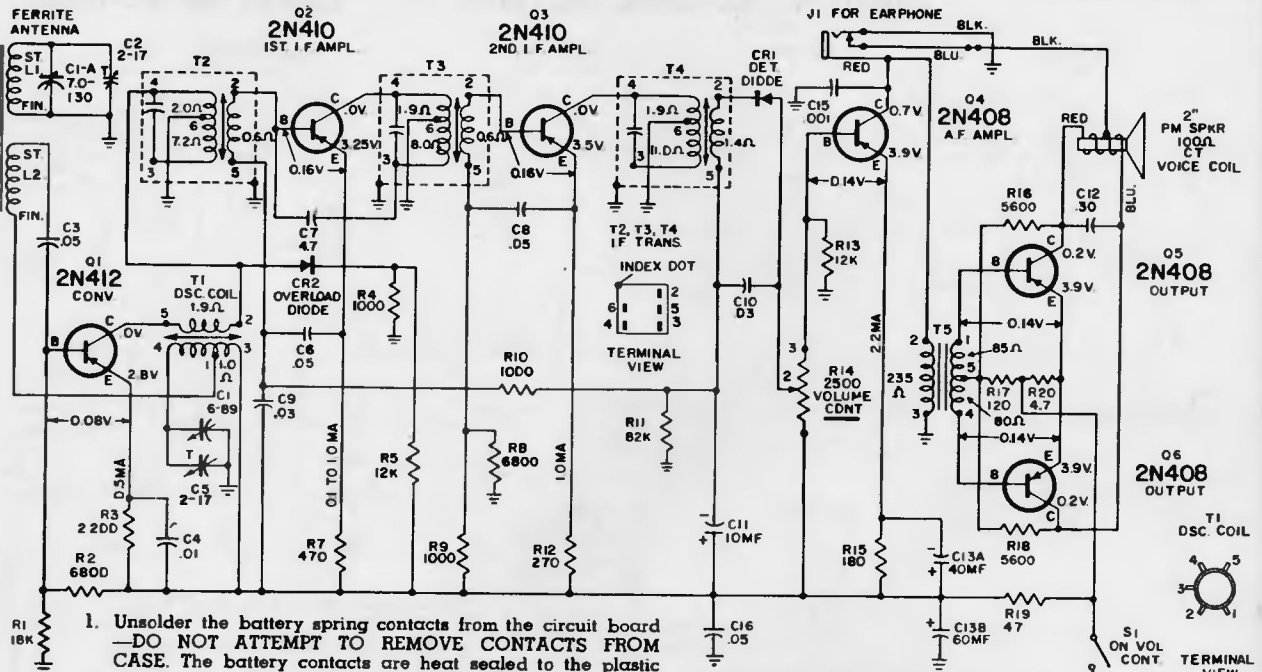


Chassis Layout — View from Component Side

Chassis Wiring and Components — View from Wiring Side

Chassis No. RC-1199B

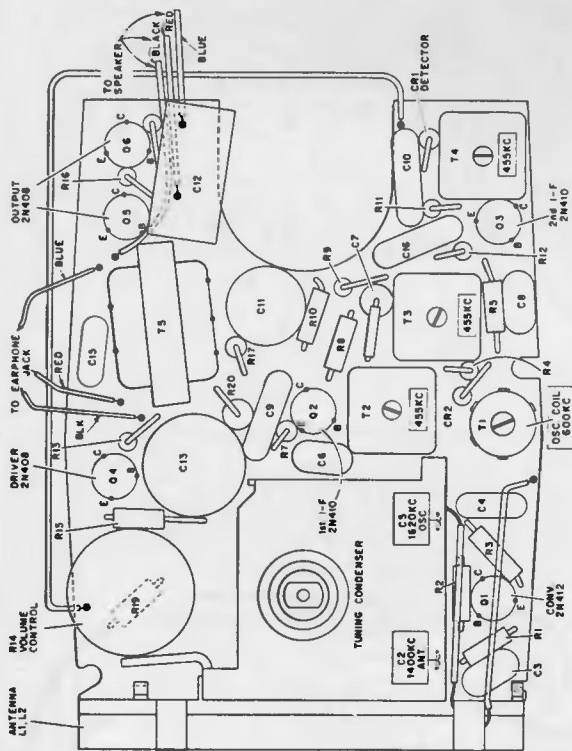
RCA VICTOR 1-TP-1 SERIES Circuit Board No. 962537-1



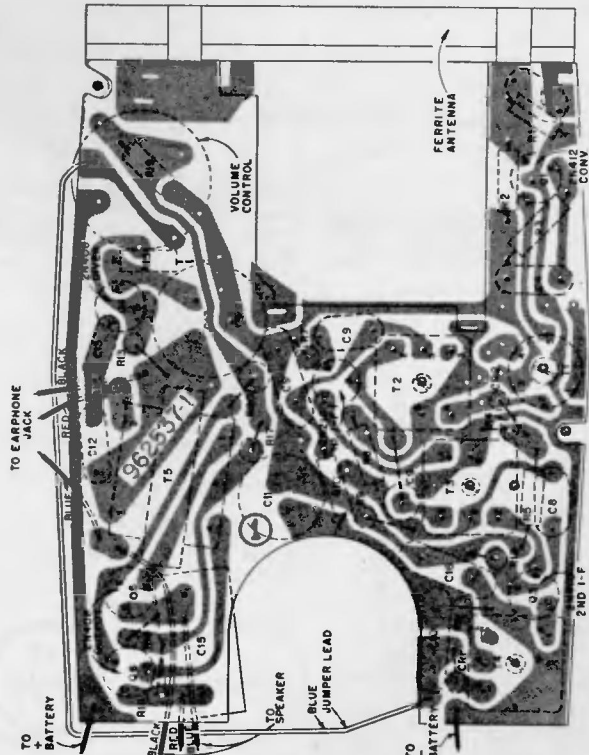
1. Unsolder the battery spring contacts from the circuit board — DO NOT ATTEMPT TO REMOVE CONTACTS FROM CASE. The battery contacts are heat sealed to the plastic case front.
2. Unsolder the three leads from the speaker terminals. The chassis may be serviced without disconnecting it from the speaker.
3. On the 1-TP-1 Series only, pull the dial knob off the tuning condenser shaft.
4. Remove the knurled nut holding the earphone jack to the case.

VOLTAGES MEASURED WITH "VOLTOMYST" FROM (-) BATTERY (+), SHOULD HOLD WITHIN ±20% WITH NEW BATTERY, VOLUME CONTROL AT MINIMUM AND NO SIGNAL. K-1000 ALL RESISTANCE VALUES IN OHMS ALL CAPACITANCE VALUES LESS THAN 10 ARE IN MF, THOSE ABOVE 10 ARE IN MMF EXCEPT AS NOTED

5. Remove the two screws holding the circuit board to the case and lift chassis from the case.



Chassis Layout — View from Component Side



Wiring and Components — View from Wiring Side

The assembly represented above is viewed from the wiring side of the board. The printed wiring, on the near side of the board, is presented in "phantom" view superimposed on the component layout of the reverse side.

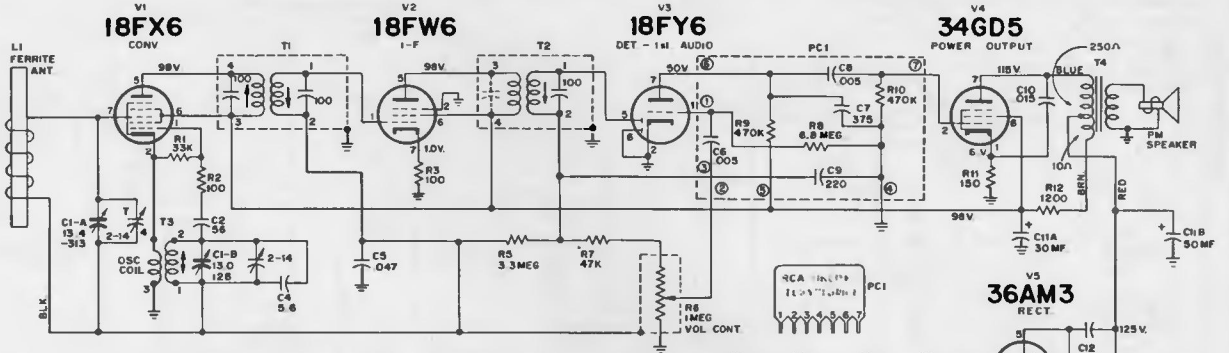
RCA

1-X-2 SERIES, 1-X-3 SERIES

Chassis No. RC-1202A, RC-1202B

1-X-4 SERIES

Chassis No. RC-1202C



RC-1202 B
1-X-3 SERIES

K-1000
ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. VALUES ABOVE 1.0 IN MMF UNLESS OTHERWISE INDICATED.

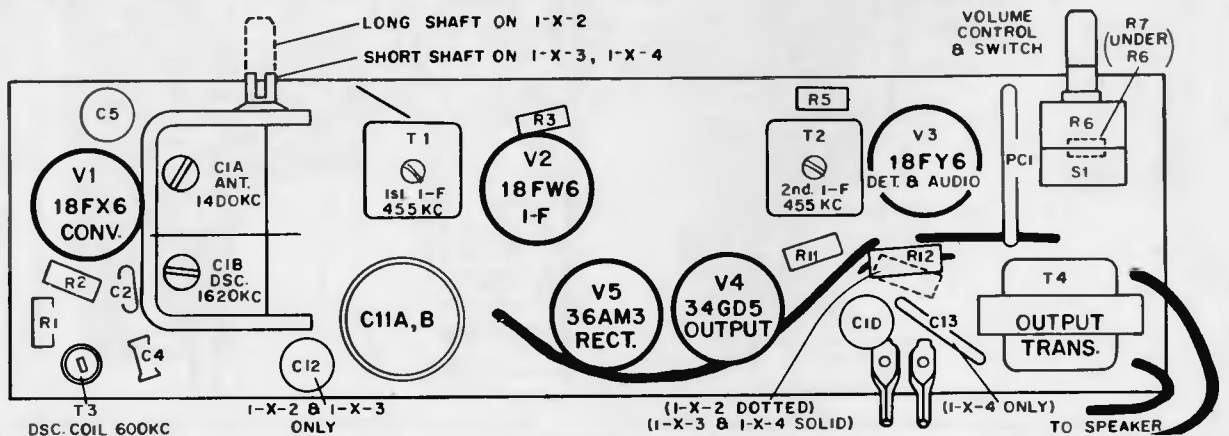
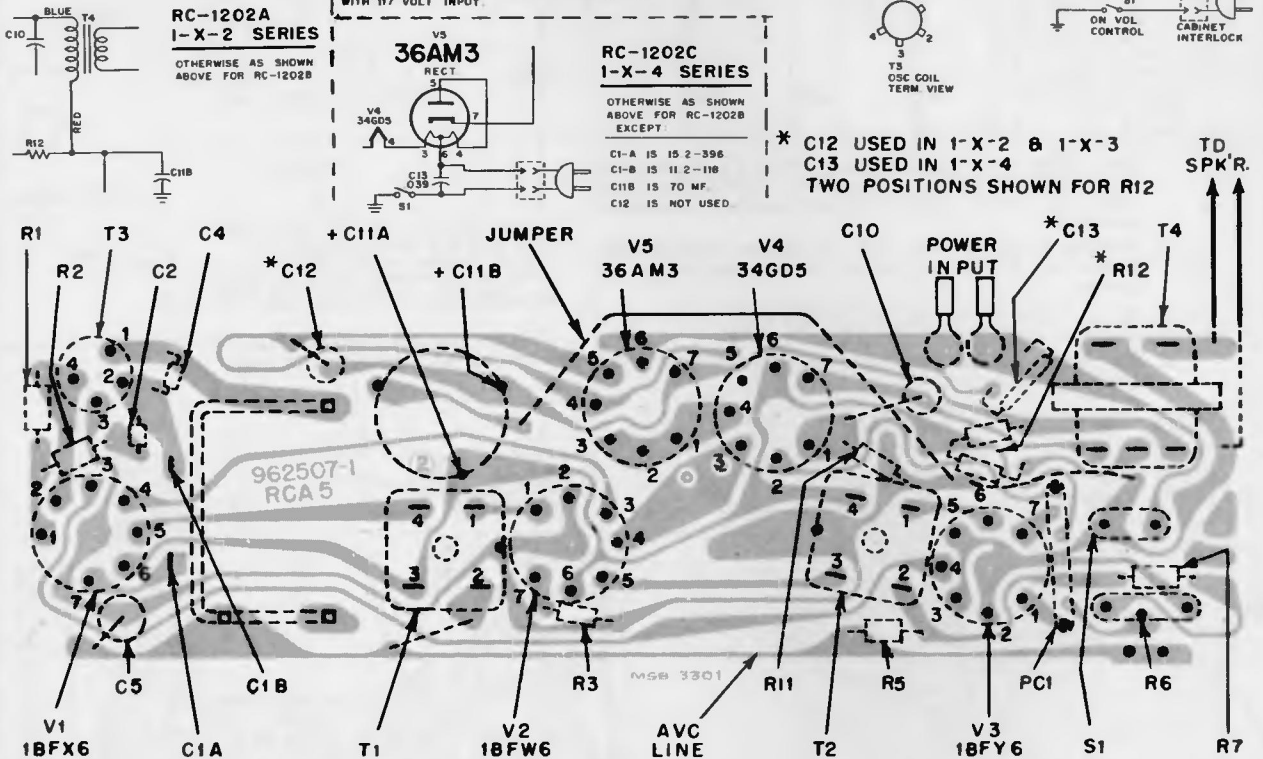
VOLTAGES MEASURED TO COMMON NEGATIVE (⊖) WITH "VOLTOHMYST" AND SHOULD HOLD WITHIN ±20% WITH 117 VOLT INPUT.

RC-1202A
1-X-2 SERIES
OTHERWISE AS SHOWN ABOVE FOR RC-1202B

RC-1202C
1-X-4 SERIES
OTHERWISE AS SHOWN ABOVE FOR RC-1202B EXCEPT:

- C1-A IS 15 2-396
- C1-B IS 11 2-116
- C11B IS 70 MF
- C12 IS NOT USED

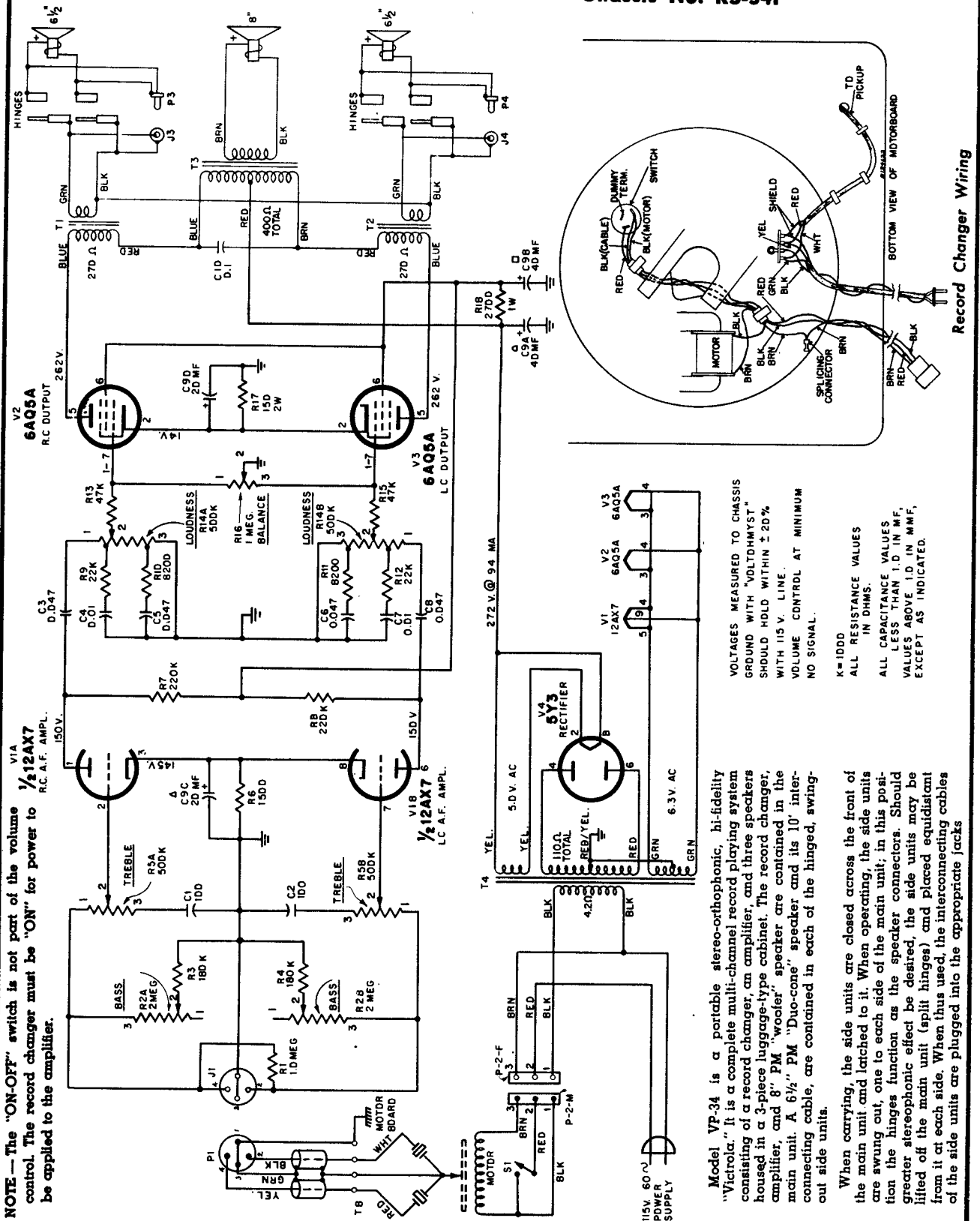
* C12 USED IN 1-X-2 & 1-X-3
C13 USED IN 1-X-4
TWO POSITIONS SHOWN FOR R12



RCA VICTOR

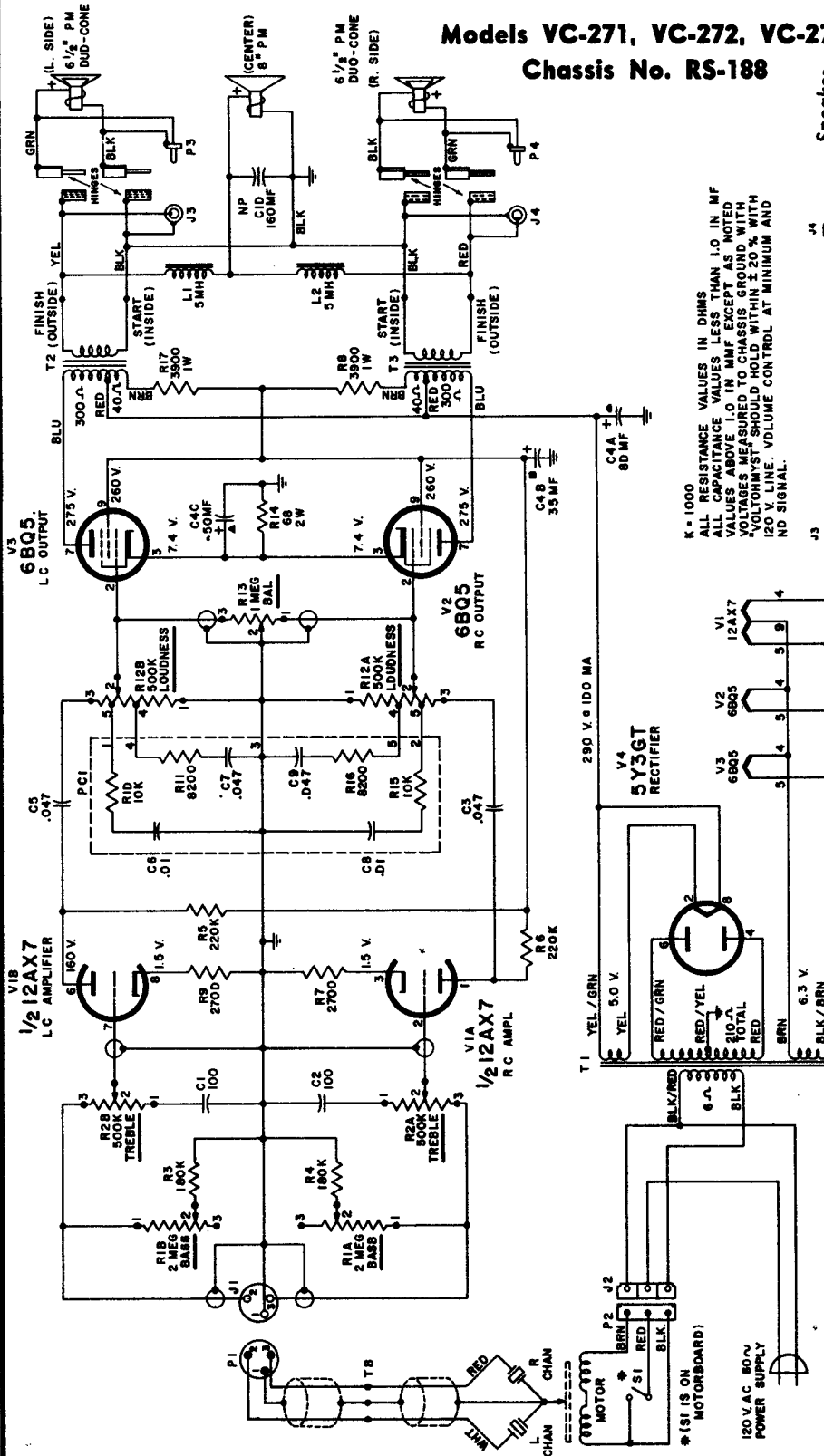
VP-34 SERIES

Chassis No. RS-34P

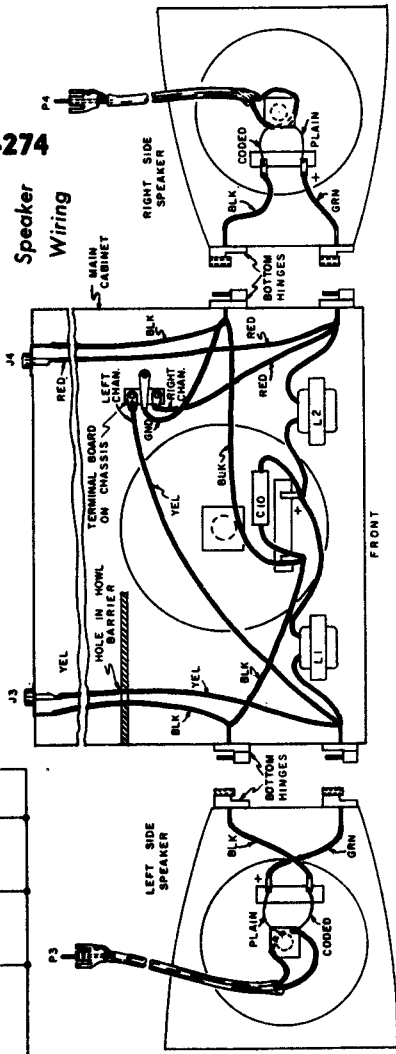


RCA VICTOR VP-33 SERIES VC-270 SERIES

Models VC-271, VC-272, VC-274
Chassis No. RS-188



K = 1000
ALL RESISTANCE VALUES IN OHMS
ALL CAPACITANCE VALUES IN MF EXCEPT AS NOTED
VALUES ABOVE 1.0 IN MF
VOLTAGE MEASURED TO CHASSIS GROUND WITH
120 V. LINE. VOLUME CONTROL AT MINIMUM AND
NO SIGNAL.



CHASSIS REMOVAL

The rear flange of the chassis is fastened to the cabinet by two bolts and the forward (front) flange is held by a retaining clip.

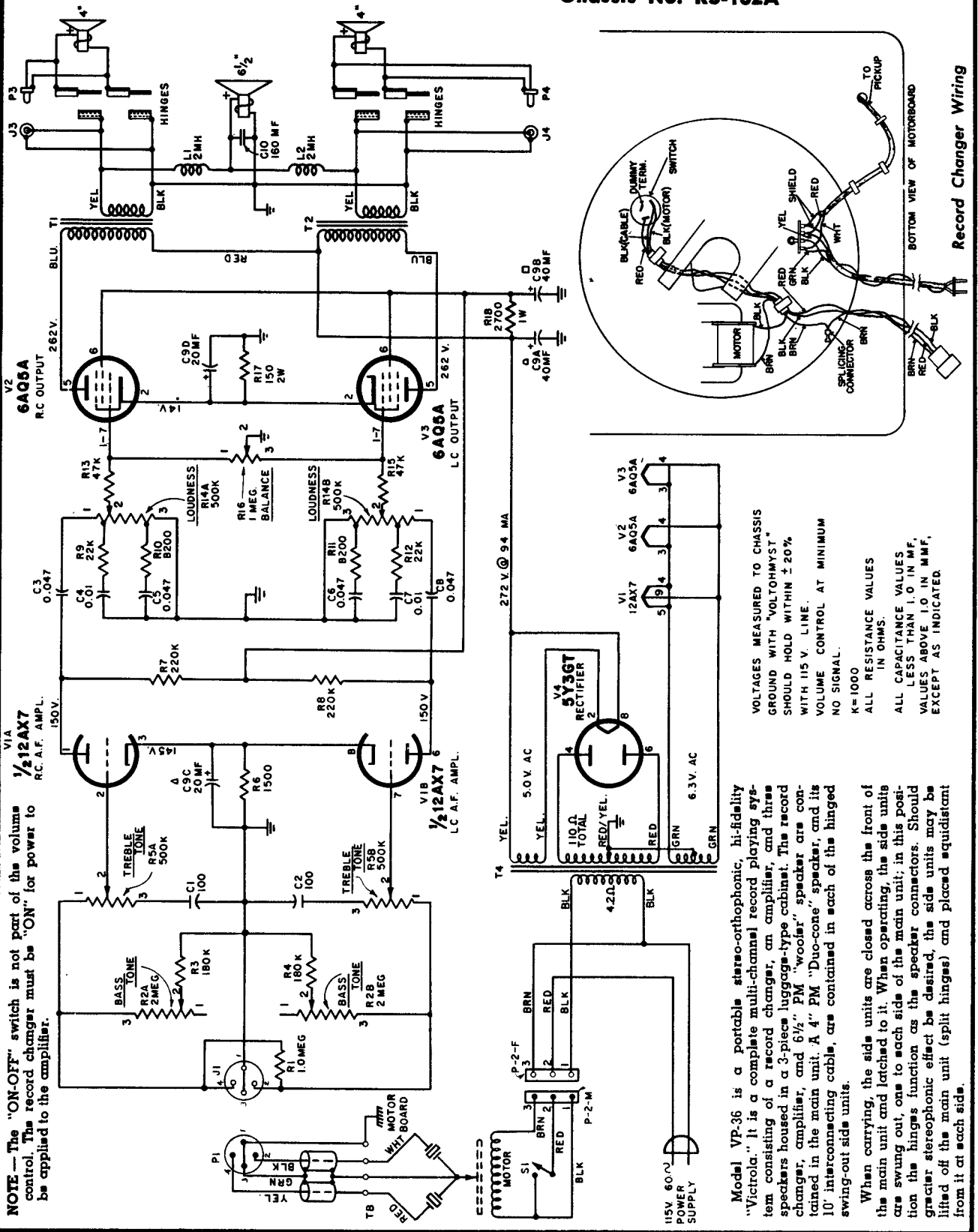
To remove the chassis — (1) remove the knobs, (2) remove the two screws holding the escutcheon and lift it off, (3) remove the two screws holding the changer, (4) unplug the two cables from the chassis and remove the changer, (5) remove the six screws holding the changer mounting board and the four screws holding the metal panel covering the amplifier, (6) lift off the changer mounting board and amplifier cover panel AS A UNIT, (7) remove the two bolts holding the rear flange of the chassis, (8) slide the chassis to the rear of the cabinet and lift it out.

To install the chassis, reverse the above procedure.

RCA VICTOR

MODEL VP-36

Chassis No. RS-182A

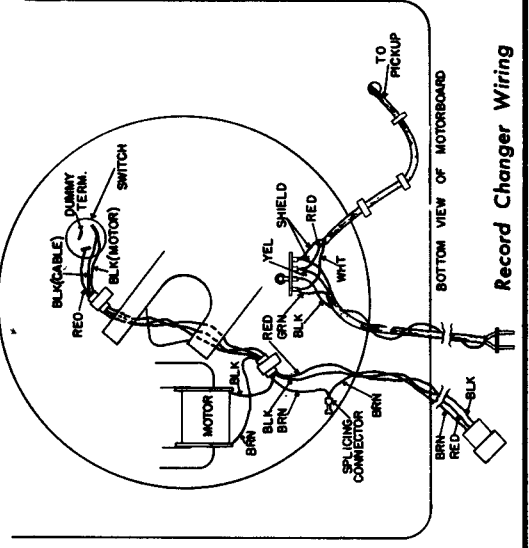


NOTE—The "ON-OFF" switch is not part of the volume control. The record changer must be "ON" for power to be applied to the amplifier.

VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" SHOULD HOLD WITHIN ±20% WITH 115 V. LINE. VOLUME CONTROL AT MINIMUM NO SIGNAL.
K=1000
ALL RESISTANCE VALUES IN OHMS.
ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF, VALUES ABOVE 1.0 IN MMF, EXCEPT AS INDICATED.

Model VP-36 is a portable stereo-orthophonic, hi-fidelity "Victrola." It is a complete multi-channel record playing system consisting of a record changer, an amplifier, and three speakers housed in a 3-piece luggage-type cabinet. The record changer, amplifier, and 6½" PM "woolier" speaker are contained in the main unit. A 4" PM "Duo-cone" speaker, and its 10' interconnecting cable, are contained in each of the hinged swing-out side units.

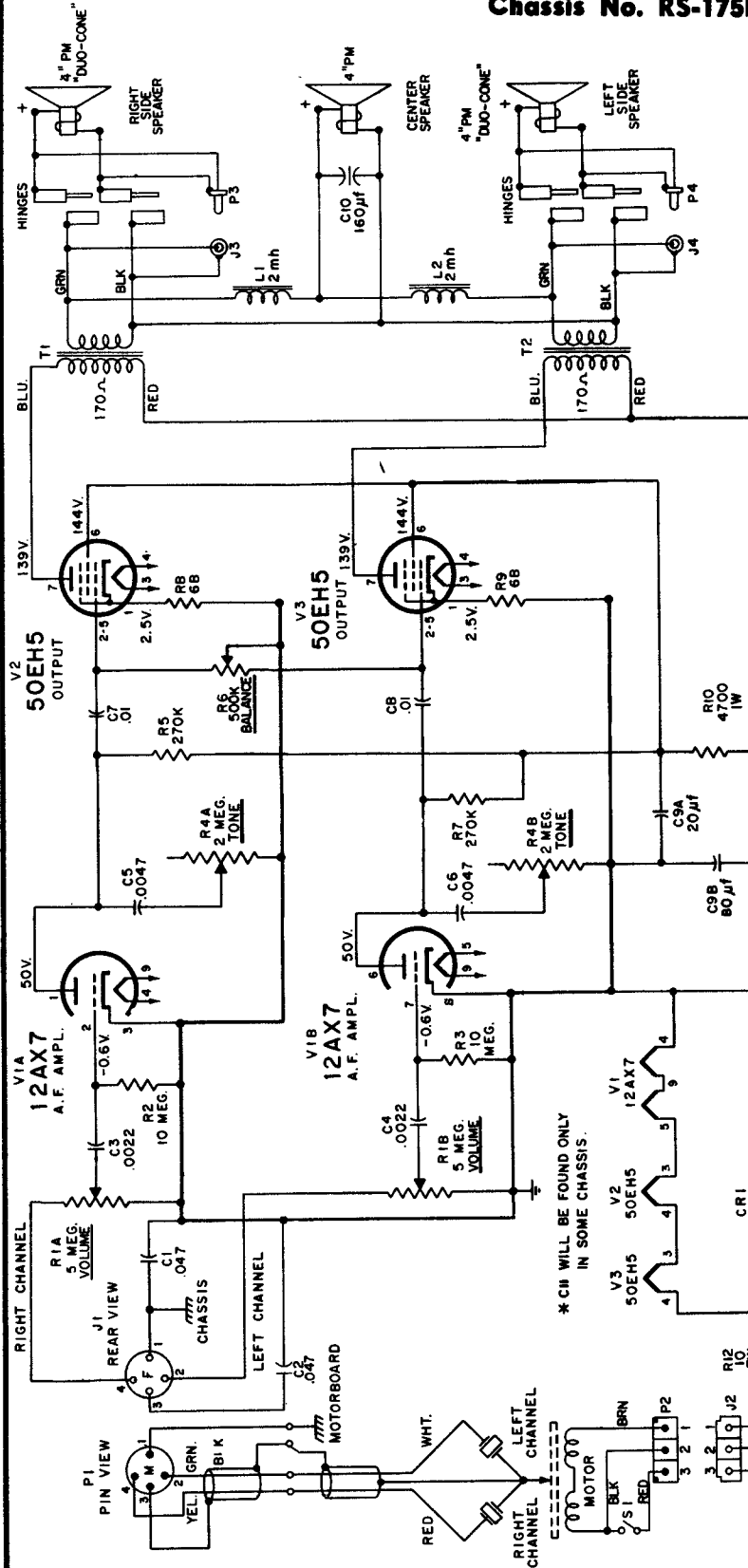
When carrying, the side units are closed across the front of the main unit and latched to it. When operating, the side units are swung out, one to each side of the main unit; in this position the hinges function as the speaker connectors. Should greater stereophonic effect be desired, the side units may be lifted off the main unit (split hinges) and placed equidistant from it at each side.



Record Changer Wiring

RCA VICTOR MODEL VP-38

Chassis No. RS-175B



K = 1000. ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES LESS THAN 1.0 IN μ F, VALUES ABOVE 1.0 IN μ F EXCEPT AS INDICATED.

the three speakers are connected together. A capacitor (C10) is connected across the center speaker.

The side speakers are designed primarily to reproduce only those frequencies in the middle and higher ranges. The two 2mh reactors (L1 and L2) pass and combine the low frequencies of the two side channels to the center speaker. The 160 μ F capacitor (C10) acts as an additional bypass to filter out any of the middle range and higher frequencies thus preventing their reproduction by the center speaker. To prevent electrical cancellation of frequencies at the center speaker, the side-channel signals must be in-phase; this condition is achieved by the use of an "in-phase" pickup. In this system the middle range and higher frequencies, wherein lay the greatest stereophonic effect, are reproduced only in the left and right side speakers; and the combined low frequencies, of the two side channels, are reproduced in the center speaker. The cross-over frequency is approximately 200 cycles.

Each channel of the dual-channel amplifier uses one-half of the 12AX7 tube as an AF amplifier, and one of the 50EH5 tubes as a power amplifier. The Volume and Tone controls are dual section potentiometers; one section of each control is connected in each channel, thus providing simultaneous regulation of the two channels. The Balance control is a single section potentiometer connected between the grid circuits of the two output stages; it has its variable arm grounded. Channel balance is achieved as the arm of the control moves toward one end or the other, thus decreasing the gain of one channel while concurrently increasing the gain of the other. Multi-channel operation is accomplished by the use of three speaker systems and a filter network in the speaker circuitry. The left and right side speakers are direct connected to their respective output transformers. Two reactors (L1 and L2) are connected in series between the high sides of the two output transformer secondaries, and the center speaker is connected to the junction of the two reactors. The low (ground) side of

115V 60 ϕ PWR. SUPP. * C11 .27 μ F \pm 10%, 400V. PAPER TUBULAR * C11 WILL BE FOUND ONLY IN SOME CHASSIS.

VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOMMST" AND SHOULD HOLD WITHIN \pm 20%.

* C11 .27 μ F \pm 10%, 400V. PAPER TUBULAR

VIA 12AX7 A.F. AMPL. 50V. 50EH5 OUTPUT 139V. 50EH5 OUTPUT 139V. 12AX7 A.F. AMPL. 50V. 50EH5 OUTPUT 139V.

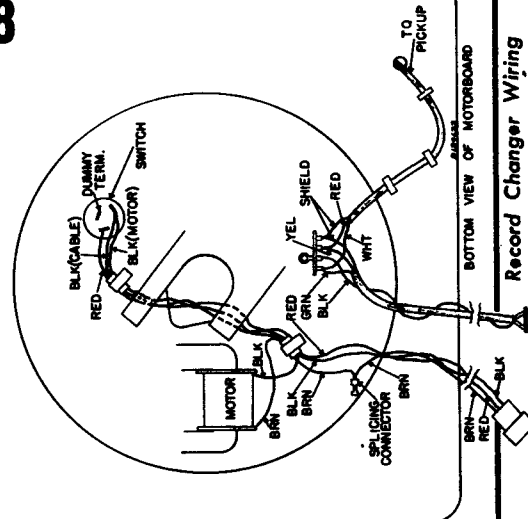
RIGHT CHANNEL REAR VIEW LEFT CHANNEL MOTORBOARD PIN VIEW

RIGHT CHANNEL LEFT CHANNEL

RIGHT CHANNEL LEFT CHANNEL

RIGHT CHANNEL LEFT CHANNEL

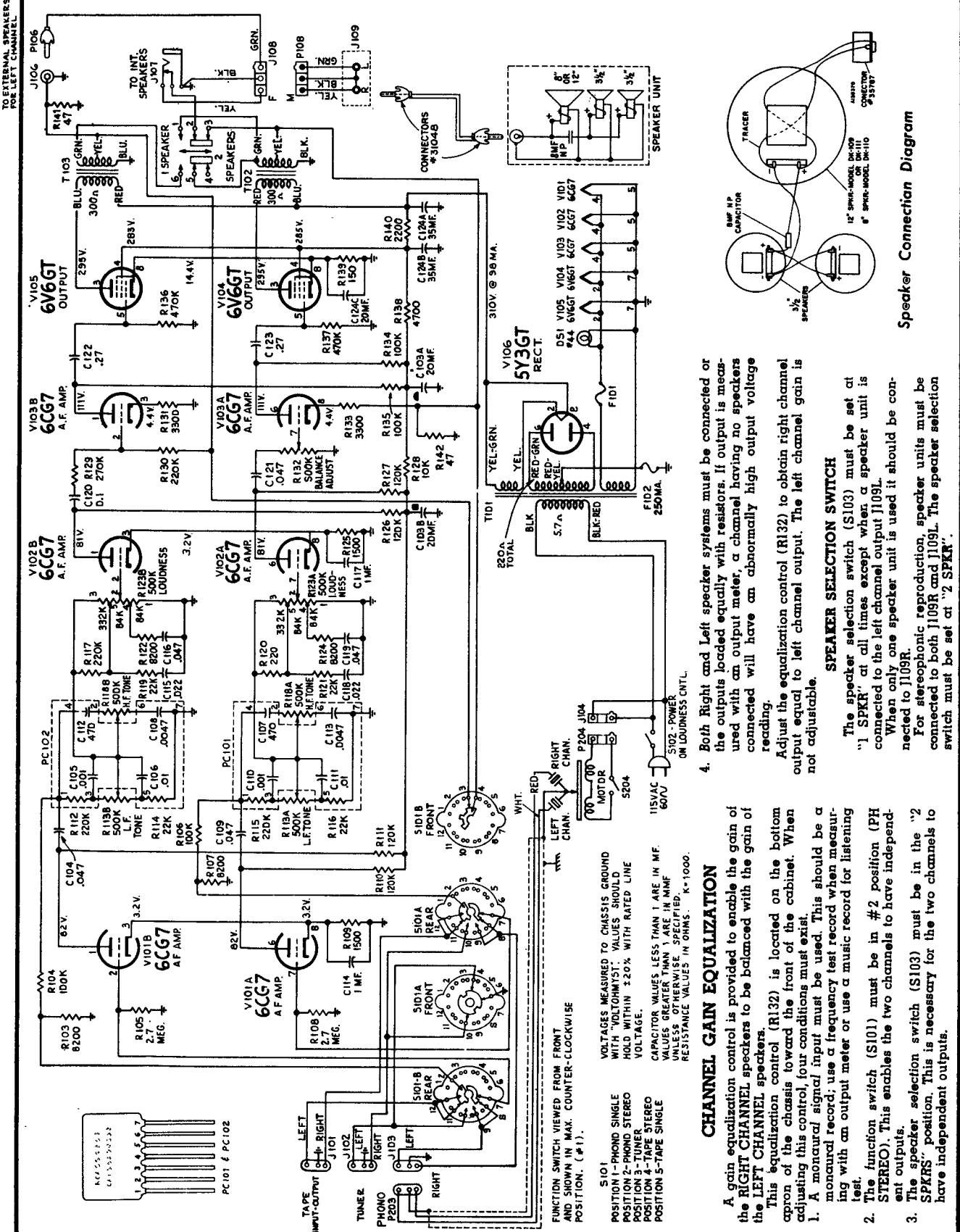
RIGHT CHANNEL LEFT CHANNEL



Record Changer Wiring

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

RCA Victor Model BK-1, Chassis RS-187, and Speakers DK-109, DK-110, DK-111



4. Both Right and Left speaker systems must be connected or the outputs loaded equally with resistors. If output is measured with an output meter, a channel having no speakers connected will have an abnormally high output voltage reading.

Adjust the equalization control (R132) to obtain right channel output equal to left channel output. The left channel gain is not adjustable.

SPEAKER SELECTION SWITCH

The speaker selection switch (S103) must be set at "1 SPKR" at all times except when a speaker unit is connected to the left channel output J109L. When only one speaker unit is used it should be connected to J109R.

For stereophonic reproduction, speaker units must be connected to both J109R and J109L. The speaker selection switch must be set at "2 SPKR".

CHANNEL GAIN EQUALIZATION

A gain equalization control is provided to enable the gain of the RIGHT CHANNEL speakers to be balanced with the gain of the LEFT CHANNEL speakers.

This equalization control (R132) is located on the bottom apron of the chassis forward the front of the cabinet. When adjusting this control, four conditions must exist:

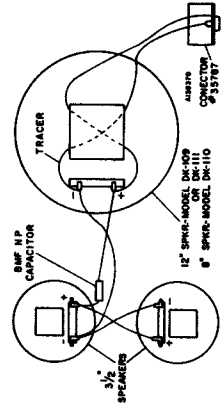
1. A monaural signal input must be used. This should be a monaural record; use a frequency test record when measuring with an output meter or use a music record for listening test.
2. The function switch (S101) must be in #2 position (PH STEREO). This enables the two channels to have independent outputs.
3. The speaker selection switch (S103) must be in the "2 SPKRS" position. This is necessary for the two channels to have independent outputs.

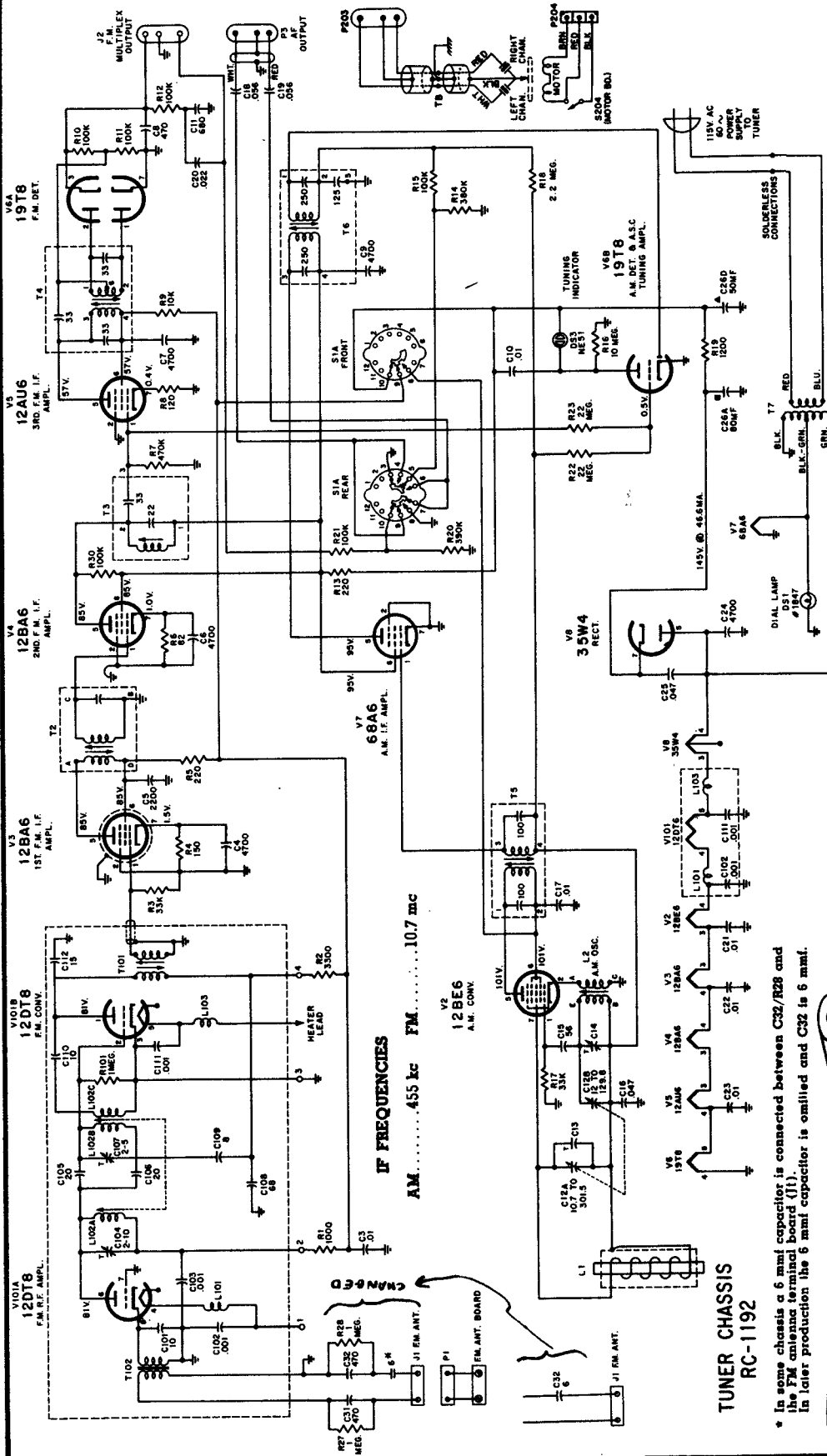
VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMIST". VALUES SHOULD HOLD WITHIN $\pm 20\%$ WITH RATED LINE VOLTAGE.

CAPACITOR VALUES LESS THAN 1 ARE IN MF. VALUES GREATER THAN 1 ARE IN MMF UNLESS OTHERWISE SPECIFIED. RESISTANCE VALUES IN OHMS. K=1000.

S101 FUNCTION SWITCH VIEWED FROM FRONT AND SHOWN IN MAX. COUNTER-CLOCKWISE POSITION. (#1).

Speaker Connection Diagram



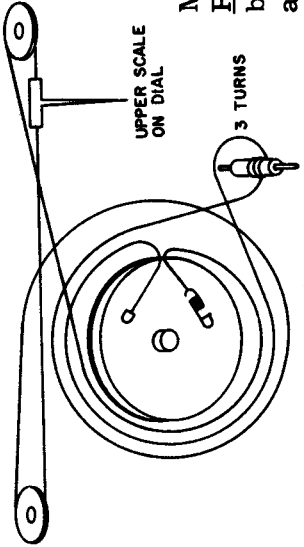


* 1000
 ALL RESISTANCE VALUES IN OHMS
 CAPACITANCE VALUES LESS THAN 1.0 IN MF.
 VALUES ABOVE 1.0 IN MF EXCEPT AS NOTED.
 * VOLTAGES MEASURED TO CHASSIS GROUND WITH
 VOLTMETER SET ON R.F. INPUT MINIMUM
 AND NO SIGNAL.

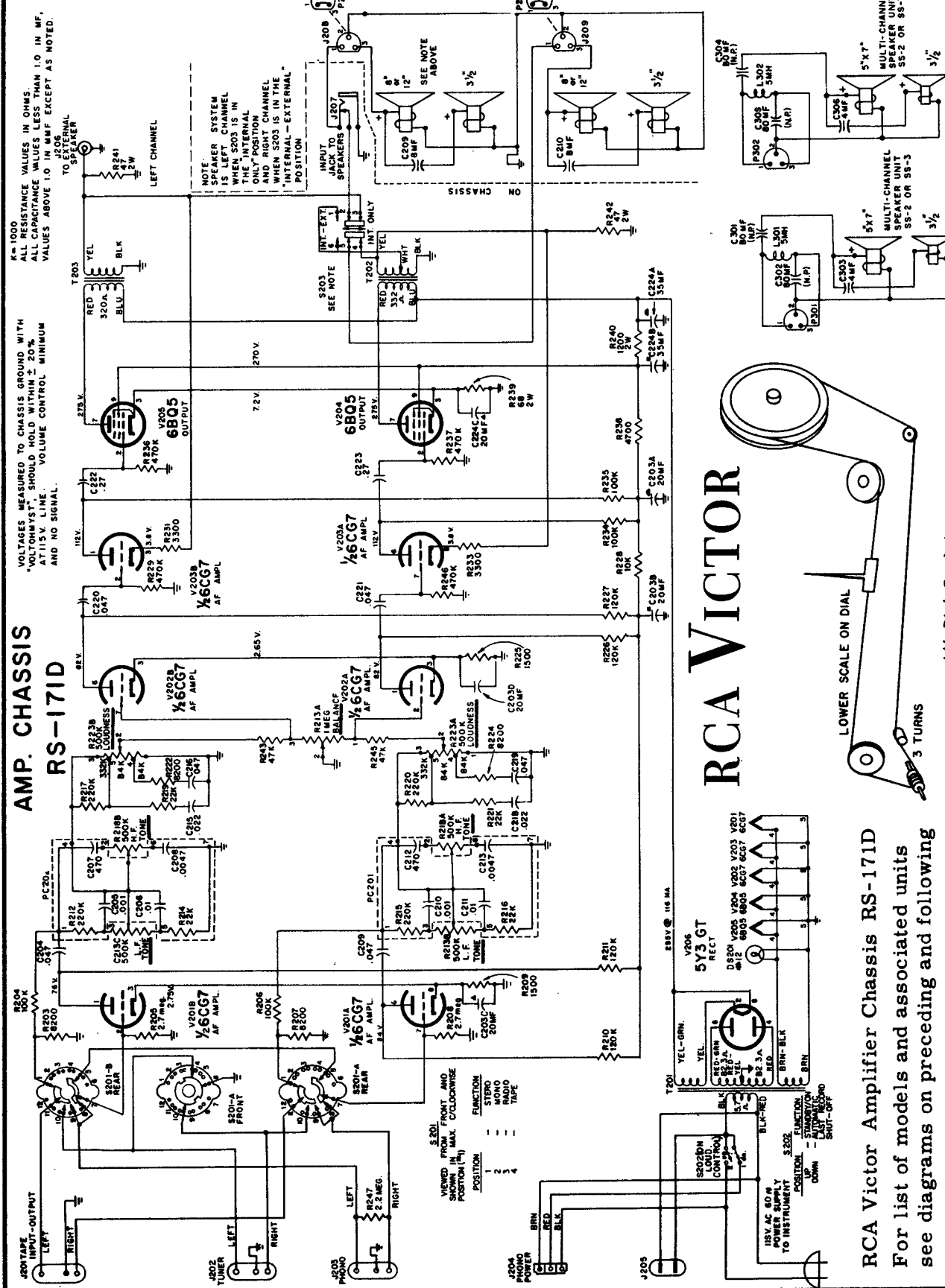
RCA VICTOR

Models TPM-11, TPM-12, TPM-13, VC-13, VCR-13, VC-14, VCR-14, VC-16, PM-17, VC-17, PM-18, and VC-22, all use tuner RC-1192. Some of these combinations use Pre-Amplifier RS-179 and Power Amplifier RS-177A. Others use amplifier RS-171D or RS-171F. Material above and on the next two pages.

* In some chassis a 6 mfd capacitor is connected between C32/R28 and the FM antenna terminal board (11). In later production the 6 mfd capacitor is omitted and C32 is 6 mfd.



FM Dial Cord Arrangement



VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" SHOULD HOLD WITHIN $\pm 20\%$ AT 115V LINE. VOLUME CONTROL MINIMUM AND NO SIGNAL.

K = 1000
ALL RESISTANCE VALUES IN OHMS.
ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF,
VALUES ABOVE 1.0 IN MF EXCEPT AS NOTED.

NOTE: SPEAKER SYSTEM CHANNEL WHEN S203 IS IN THE "INTERNAL" POSITION ONLY. RIGHT CHANNEL AND RIGHT CHANNEL "INTERNAL-EXTERNAL" POSITION.

SEE NOTE ABOVE

ON CHASSIS

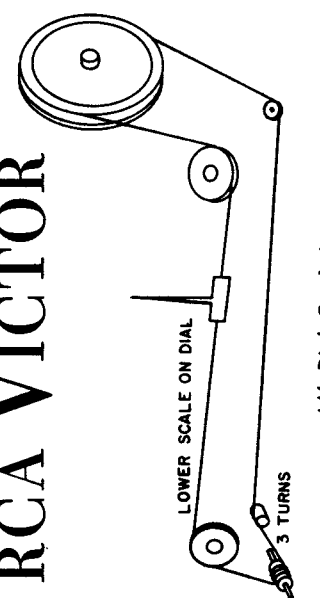
SEE NOTE ABOVE

SEE NOTE ABOVE

SEE NOTE ABOVE

SEE NOTE ABOVE

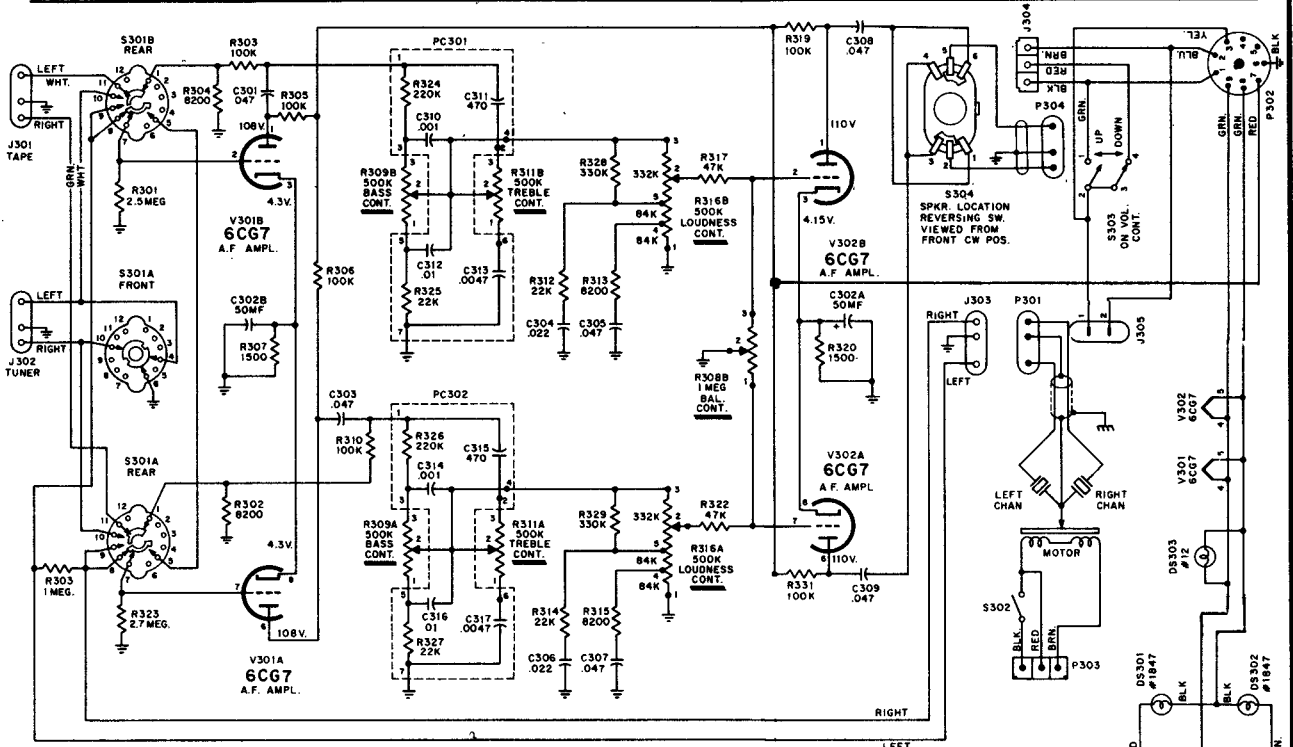
RCA VICTOR



RCA Victor Amplifier Chassis RS-171D
For list of models and associated units
see diagrams on preceding and following
pages.

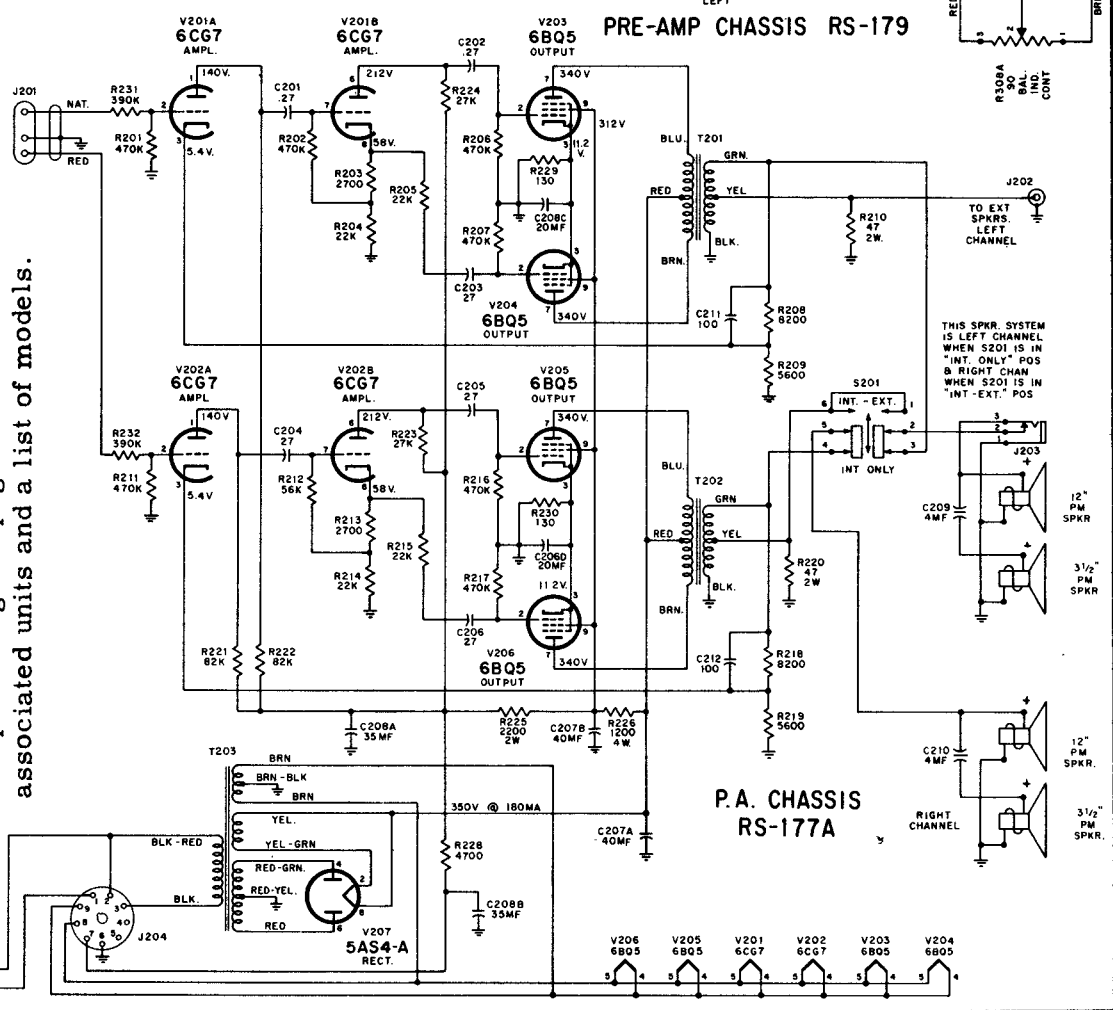
AM Dial Cord Arrangement

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



RCA VICTOR

Diagrams of Chassis RS-179 and RS-177A
See preceding two pages for material of
associated units and a list of models.

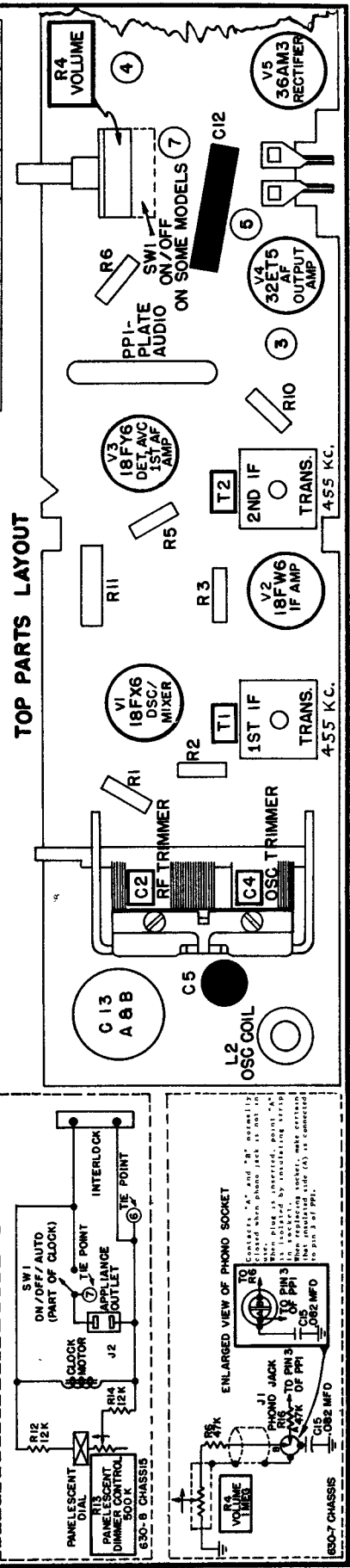
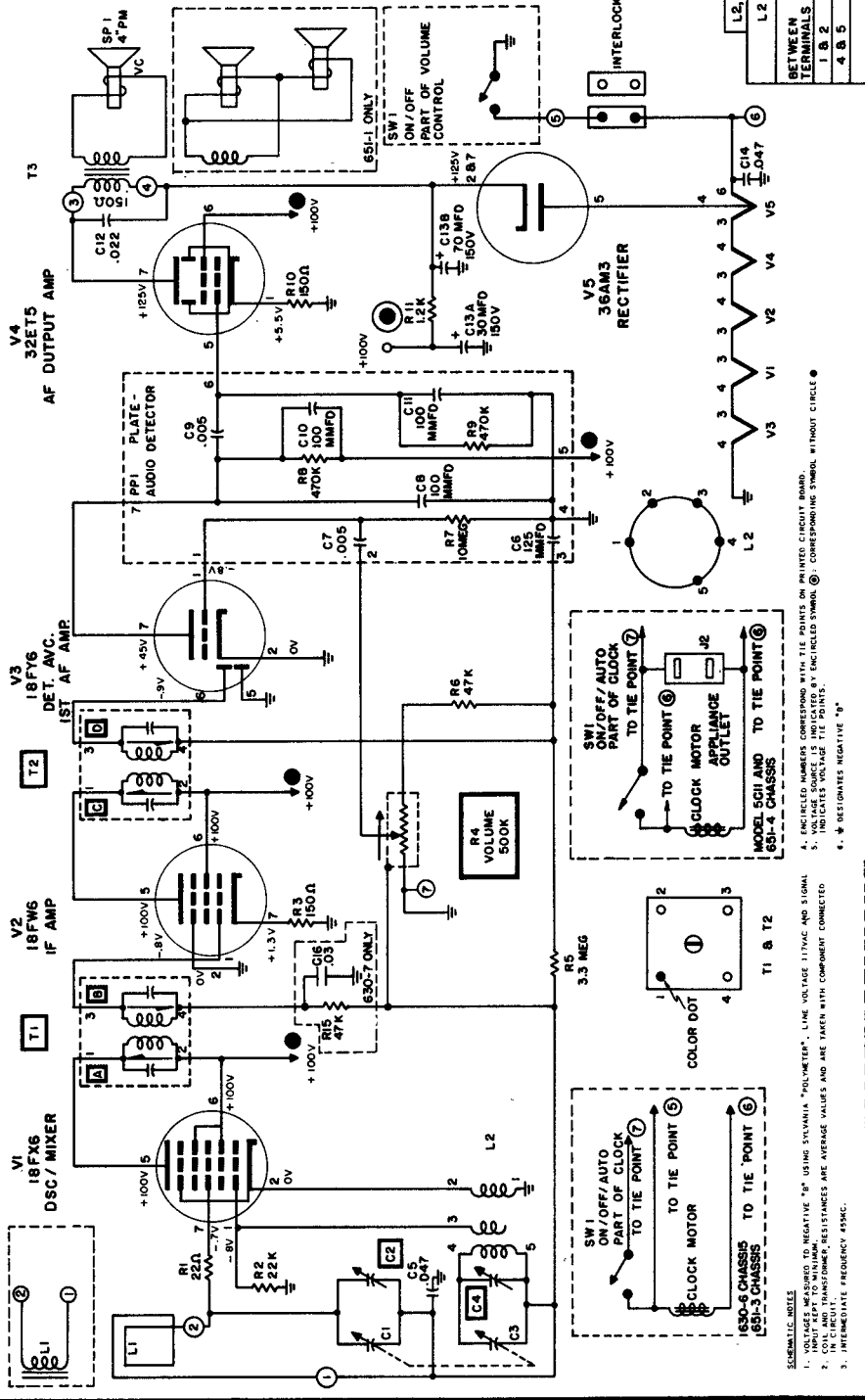


115V 60~
POWER SUPPLY
TO INSTRUMENT

SYLVANIA

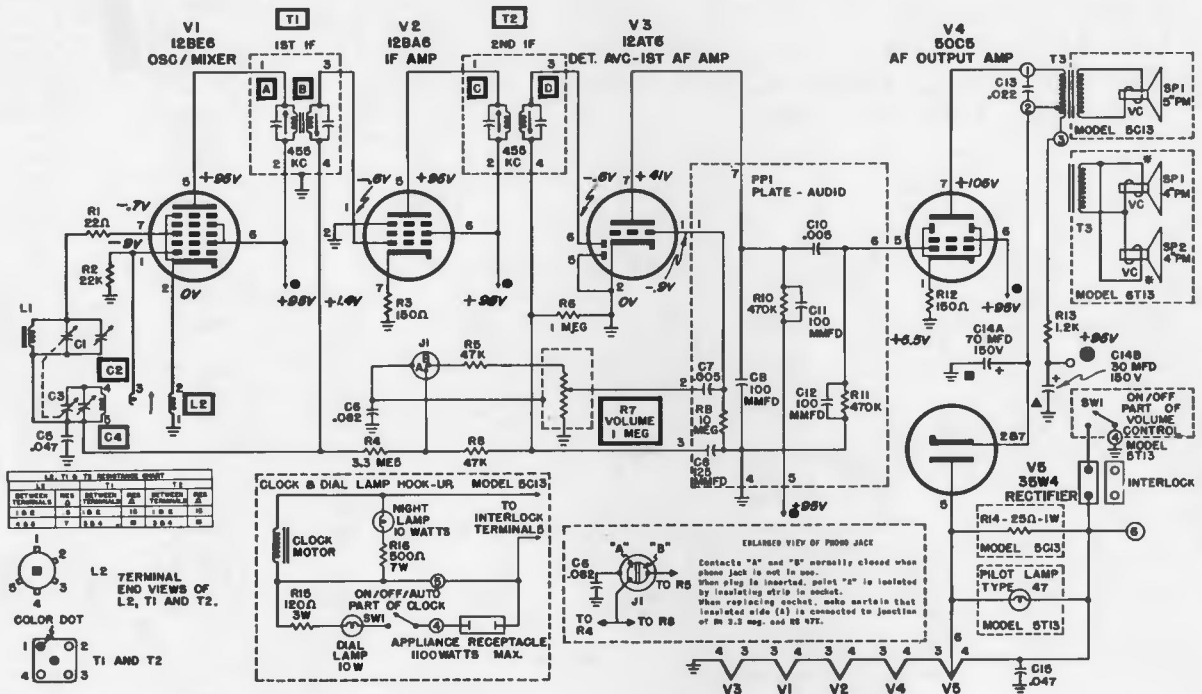
**CHASSIS 630-5 THRU-8
651-1 THRU-4**

Models 5C10B, P, 5C11B, T, 5C12R, T, W, 5T10B, P, 5T11B, T, 5T12R, T, W, 1100, 1111, 1160, 1212, 1219, 1286, 1300, 1301, 1306, 1309, 1322, 1400, 1512, 1519, 1600, 1701, 1704, 1708, and 1709

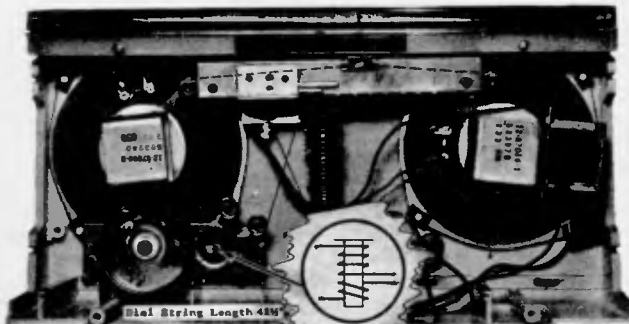
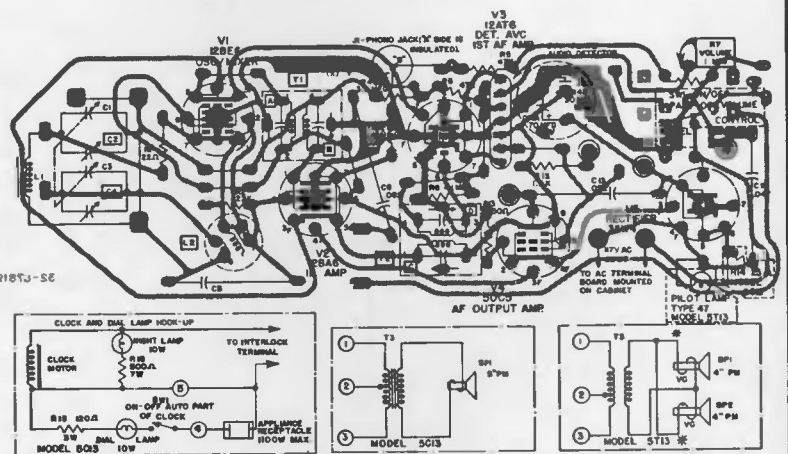


SYLVANIA

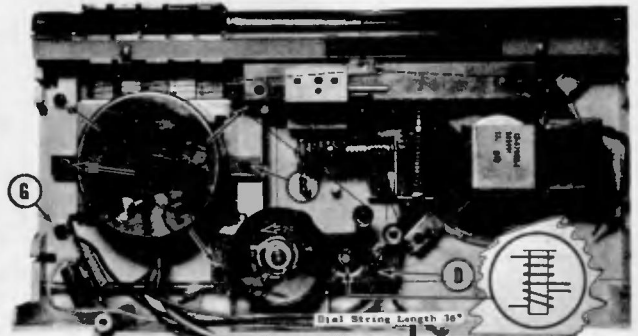
CHASSIS: 631-2-3
MODELS: 5C13, 5T13



I. F. 455 KC. Encircled numbers correspond with tie points on printed board. Voltage source is indicated by encircled dot symbol; corresponding symbol dot without circle is voltage tie point. Ground \perp is B- and reference point for voltage measurements.



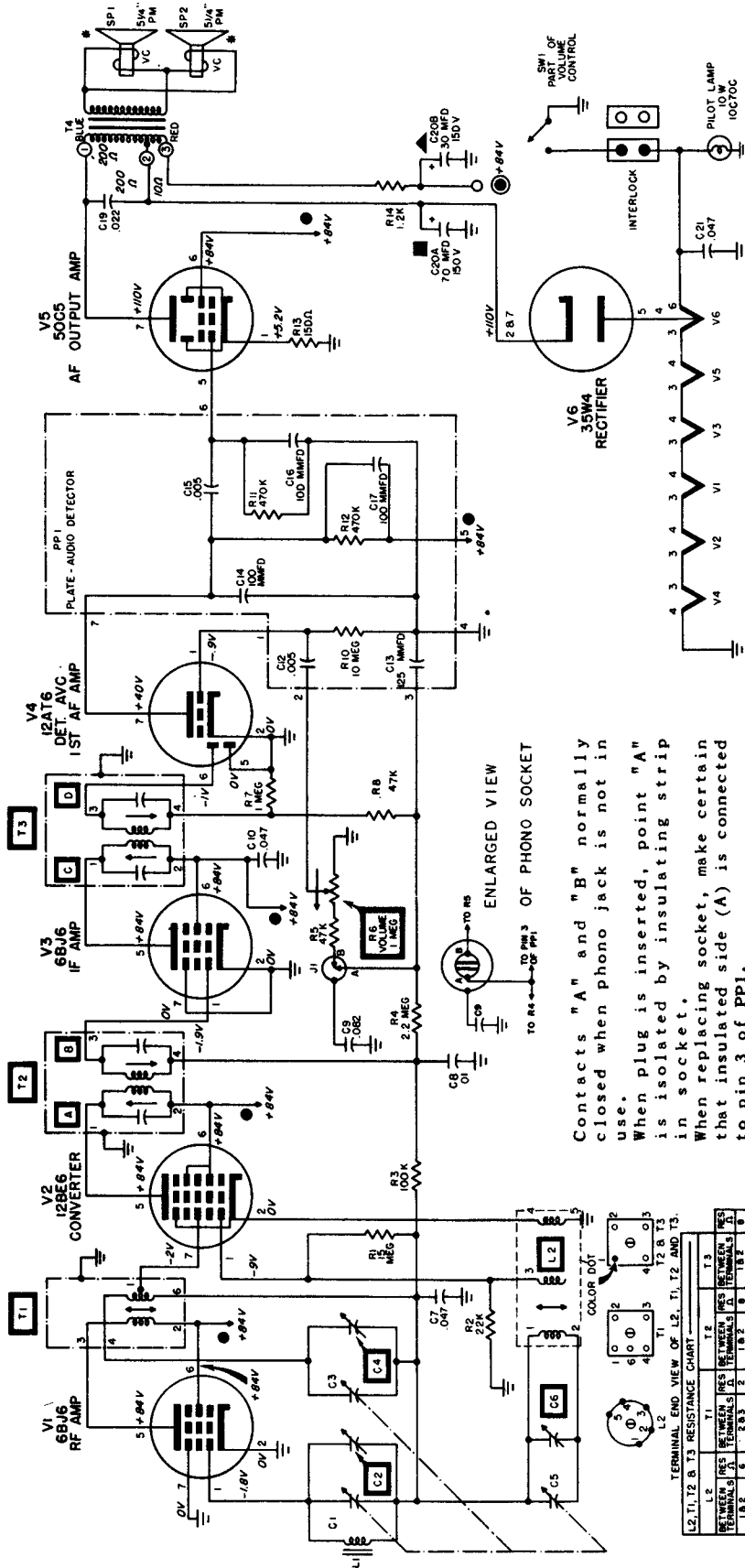
5T13 - Dial Drive & Speaker Assm.



5C13 - Clock, Dial Drive & Speaker Assm.

SYLVANIA

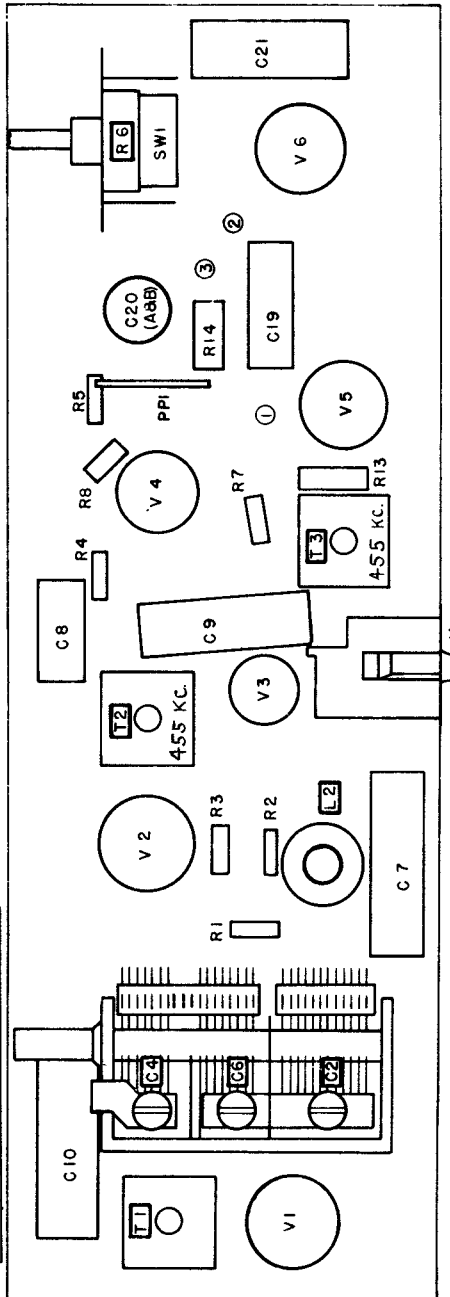
CHASSIS: 632-3
MODELS: 6T14 SERIES



TERMINAL END VIEW OF L2, T1, T2, AND T3

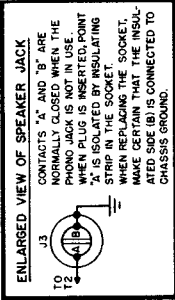
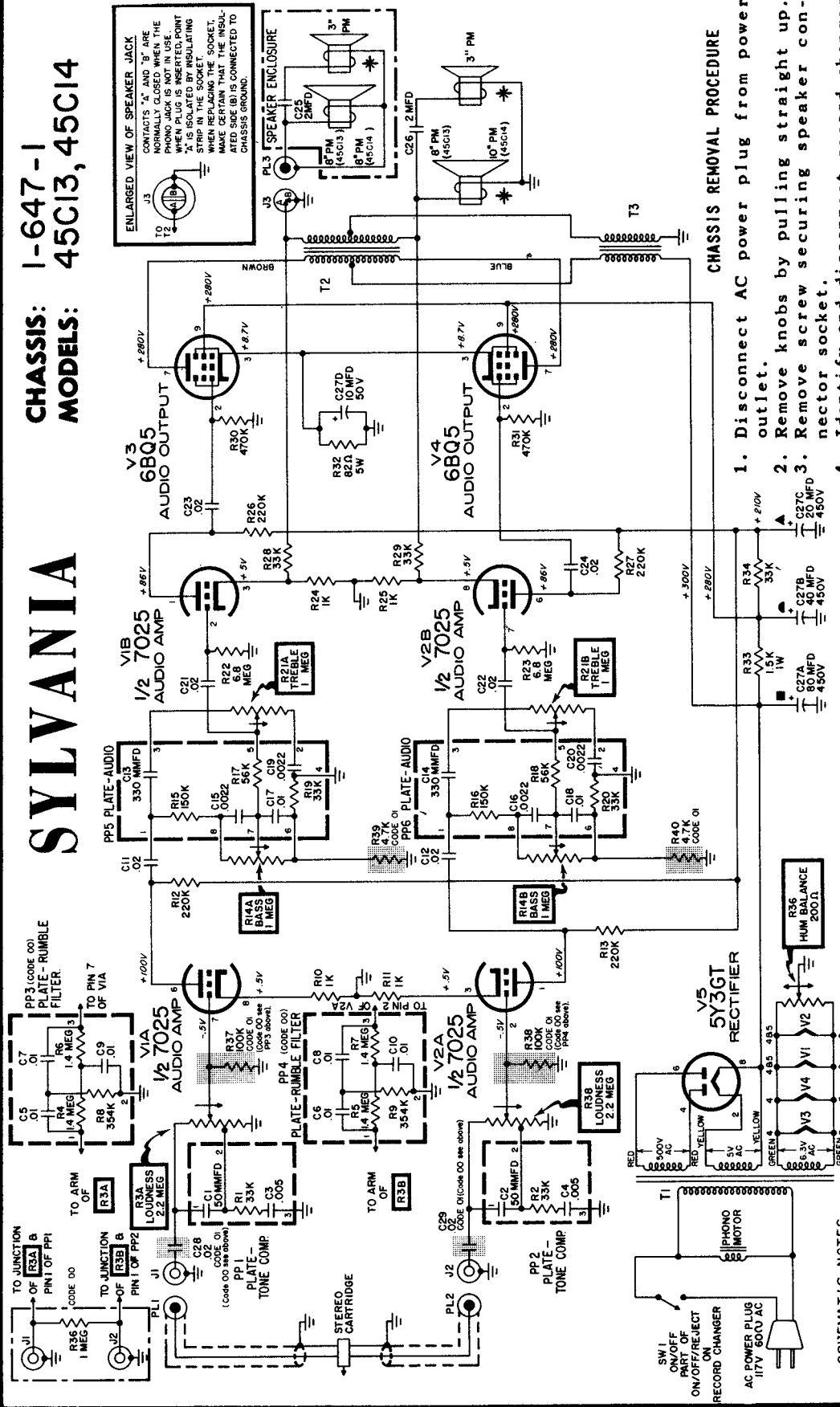
L2, T1, T2 & T3 RESISTANCE CHART

RESISTANCE	T1	T2	T3
RES. TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0
RES. TERMINALS W/ TERMINALS	10.0	10.0	10.0



SYLVANIA

CHASSIS: I-647-1 MODELS: 45C13, 45C14



CHASSIS REMOVAL PROCEDURE

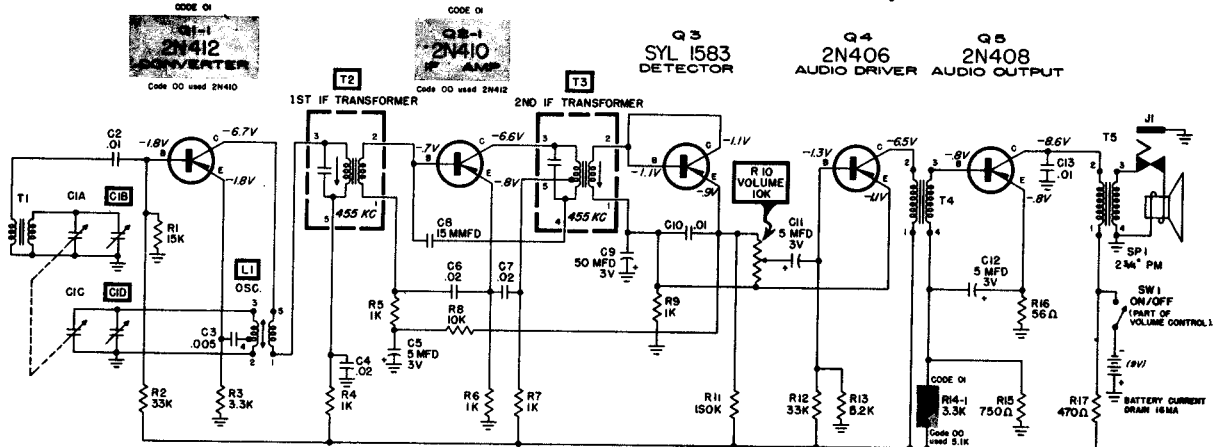
1. Disconnect AC power plug from power outlet.
2. Remove knobs by pulling straight up.
3. Remove screw securing speaker connector socket.
4. Identify and disconnect record changer motor leads, signal input leads and speaker leads.
5. While supporting chassis remove the three (3) screws securing chassis mounting board to cabinet. Remove chassis and board.
6. For under chassis tests, etc. remove the four (4) screws securing chassis to board. Remove board.

SCHEMATIC NOTES

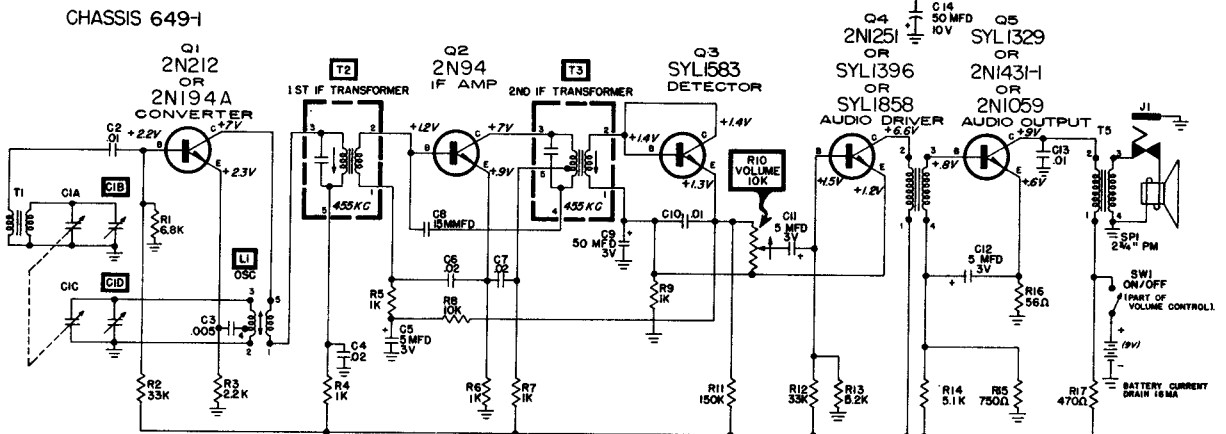
1. VOLTAGES SHOWN ARE AVERAGE READINGS MEASURED TO CHASSIS WITH NO SIGNAL INPUT. VARIATIONS MAYBE NOTED DUE TO NORMAL PRODUCTION TOLERANCES.
2. LINE VOLTAGE 117 VOLT 60 CYCLE.
3. LOUDNESS, BASS AND TREBLE CONTROLS ARE DUAL GANGED CONTROLS.
4. SHADED AREAS DESIGNATE CODE CHANGES.
5. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
6. * INDICATE COLOR DOT ON SPEAKERS FOR CORRECT PHASING.
7. ⏏ DESIGNATE CHASSIS GROUND.

SYLVANIA

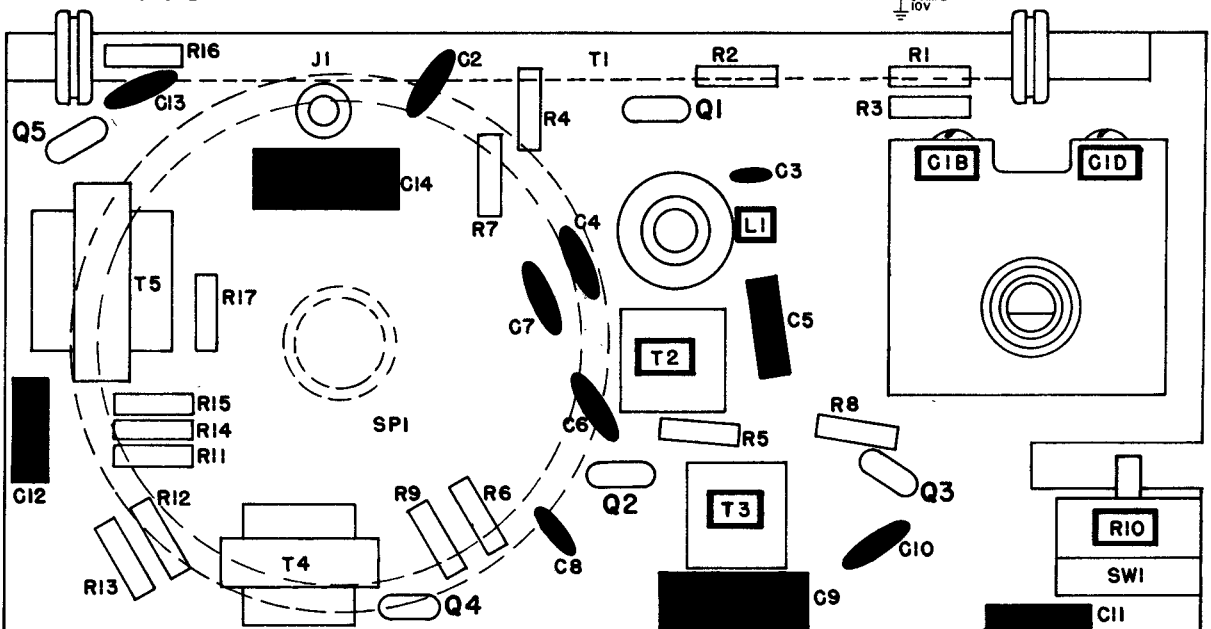
CHASSIS: 649-1,-2
MODELS: 5P16
2300,2400,2500,
2600,2700 SERIES

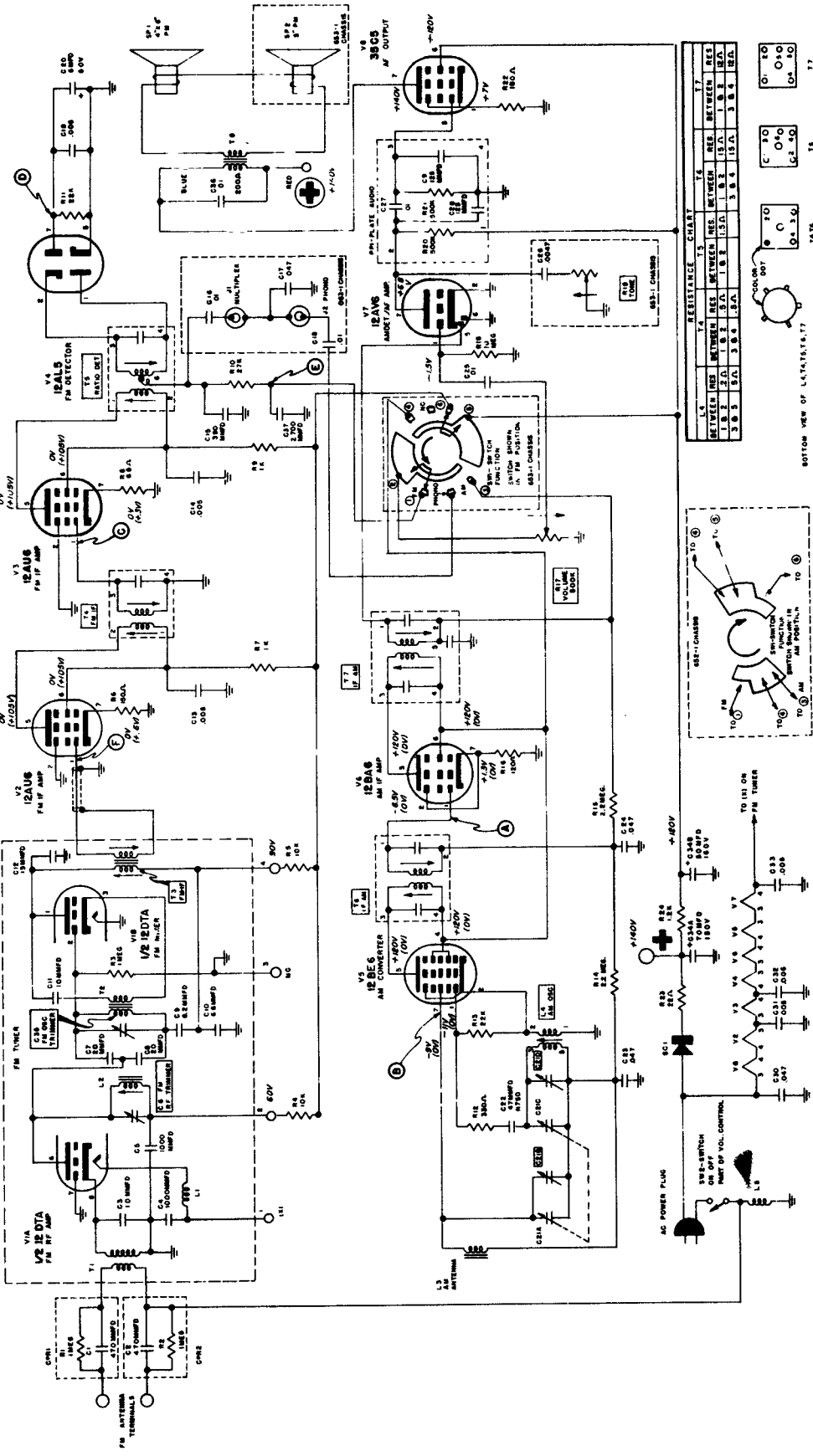


CHASSIS 649-1



CHASSIS 649-2





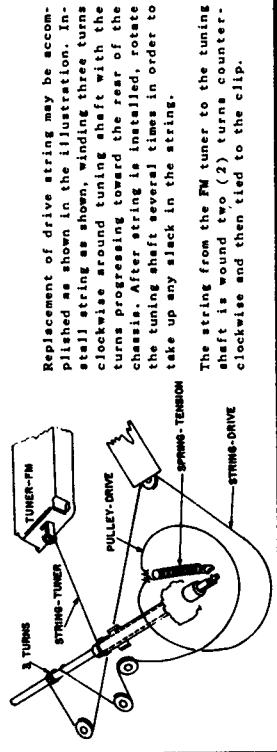
SYLVANIA

CHASSIS: 652-1/653-1
MODELS: 8F15, 8F16

SPECIFICATIONS

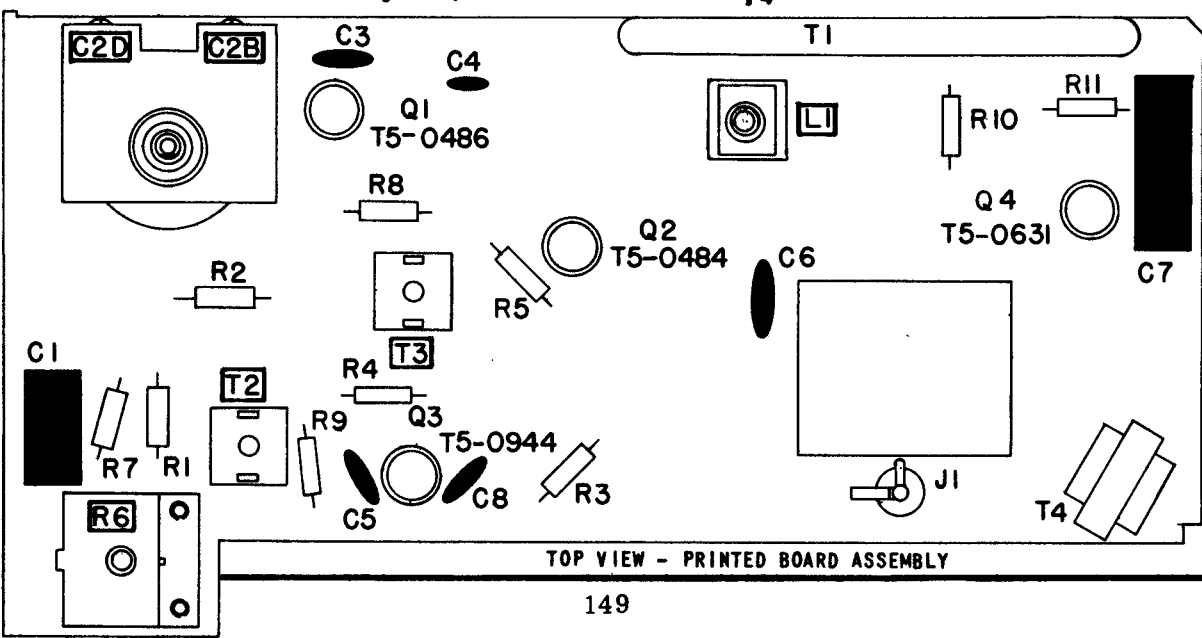
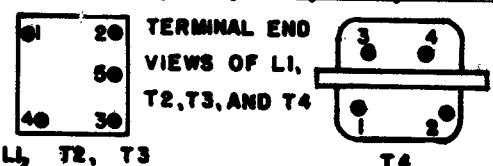
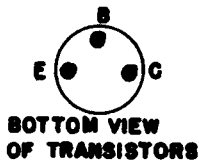
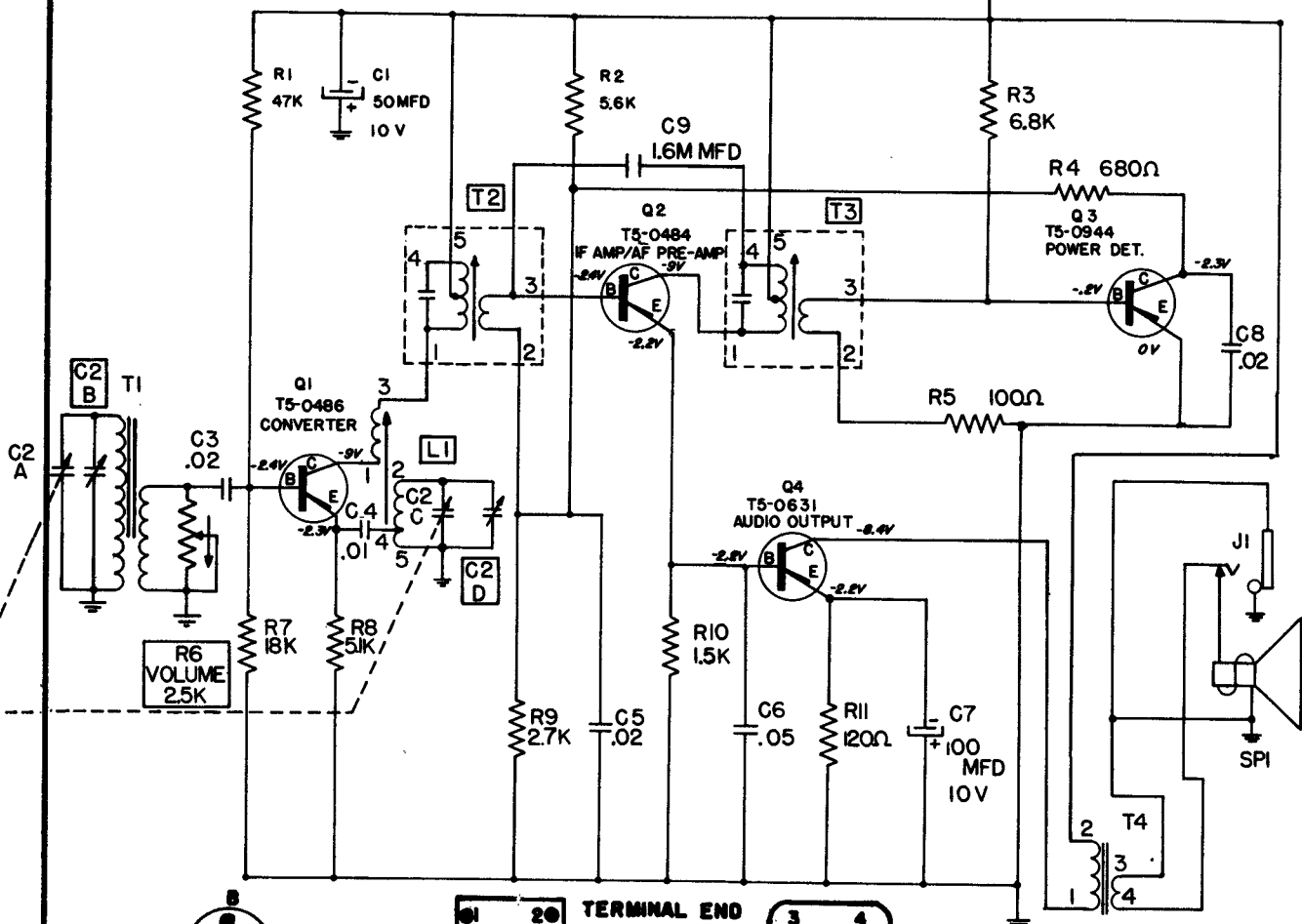
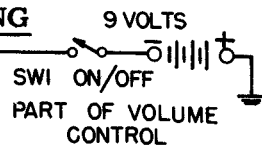
- FREQUENCY RANGE (AM) 540KC to 1650KC
- FREQUENCY RANGE (FM) 88MC to 108MC
- POWER SUPPLY 117 VOLTS, 60 CYCLE (AC)
- POWER CONSUMPTION..... 35 WATTS
- INTERMEDIATE FREQUENCY (IF) AM 455KC
- INTERMEDIATE FREQUENCY (IF) FM 10.7MC

DRIVE STRING REPLACEMENT



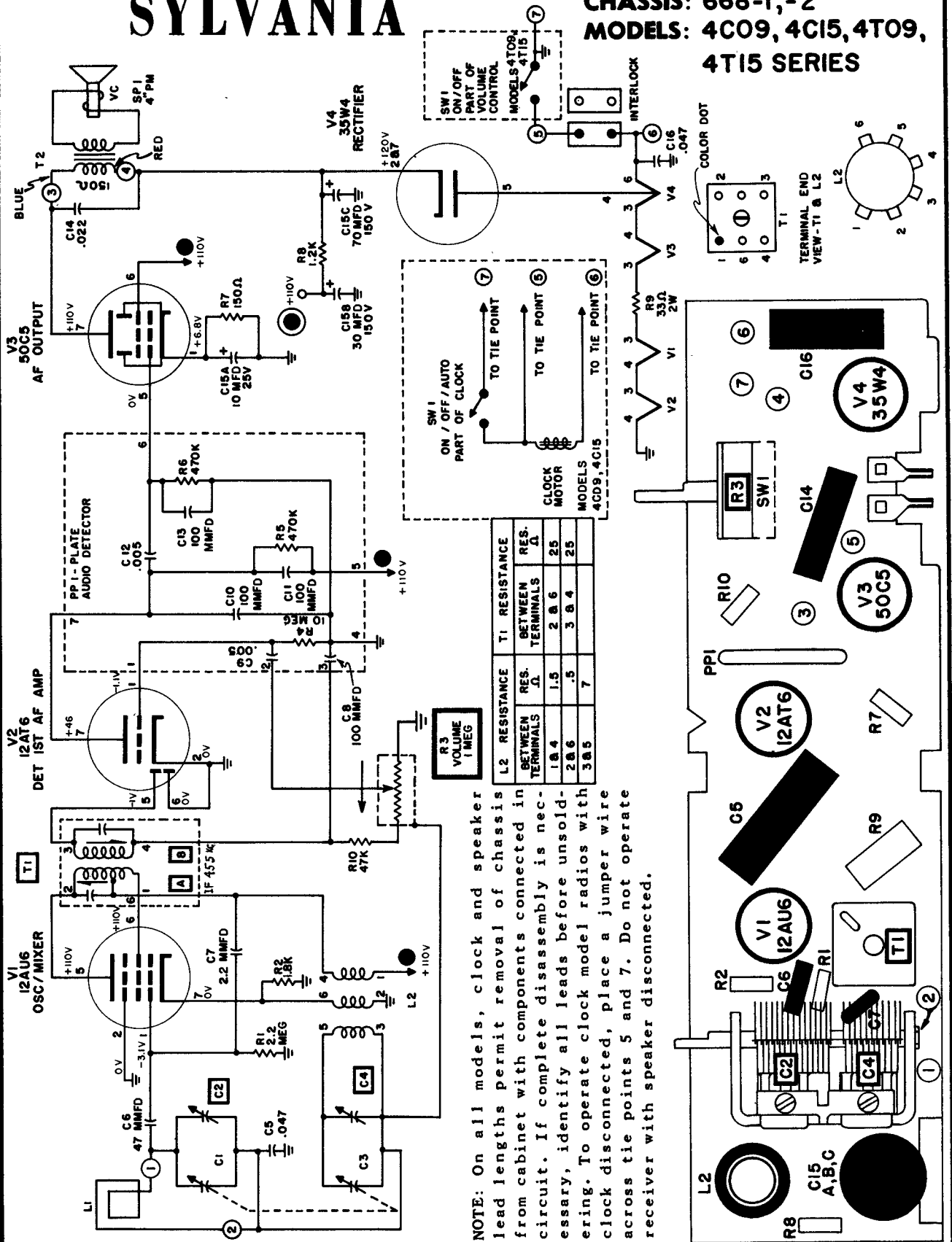
SYLVANIA

CHASSIS: 661-1
MODEL 4PI4, 4PI5



SYLVANIA

CHASSIS: 668-1,-2
MODELS: 4C09, 4C15, 4T09,
4T15 SERIES

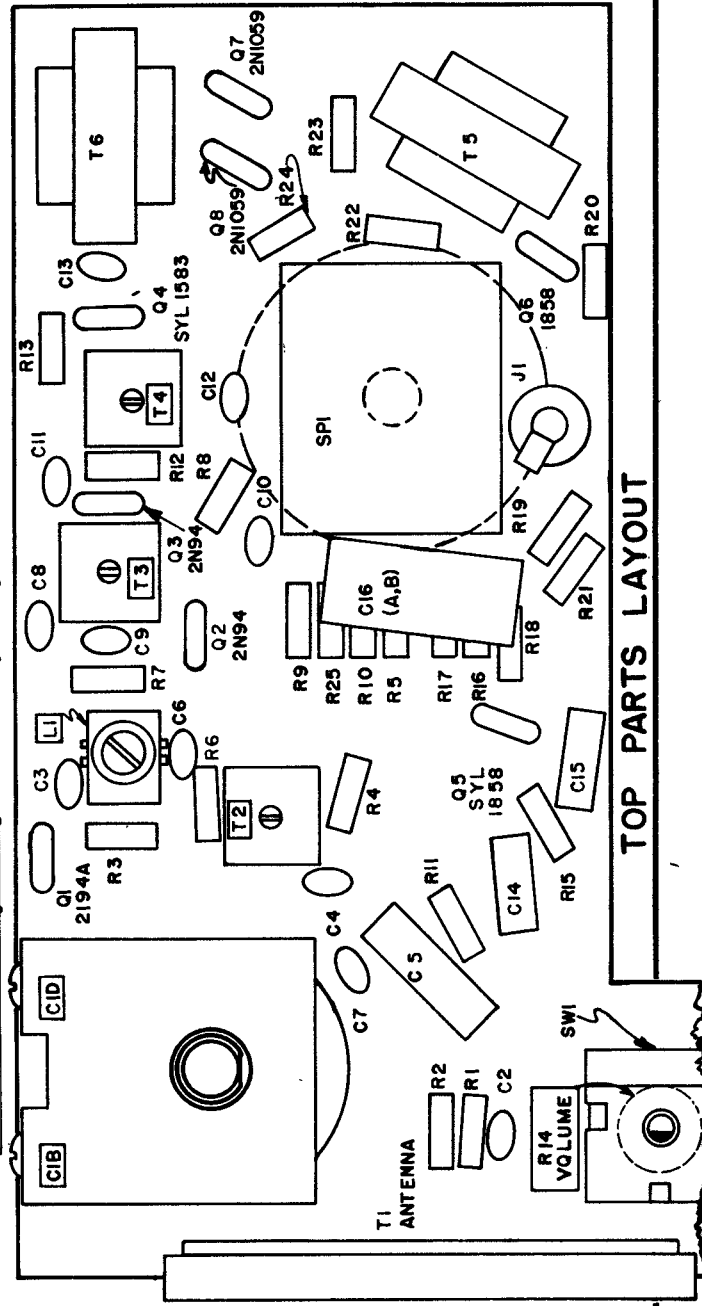
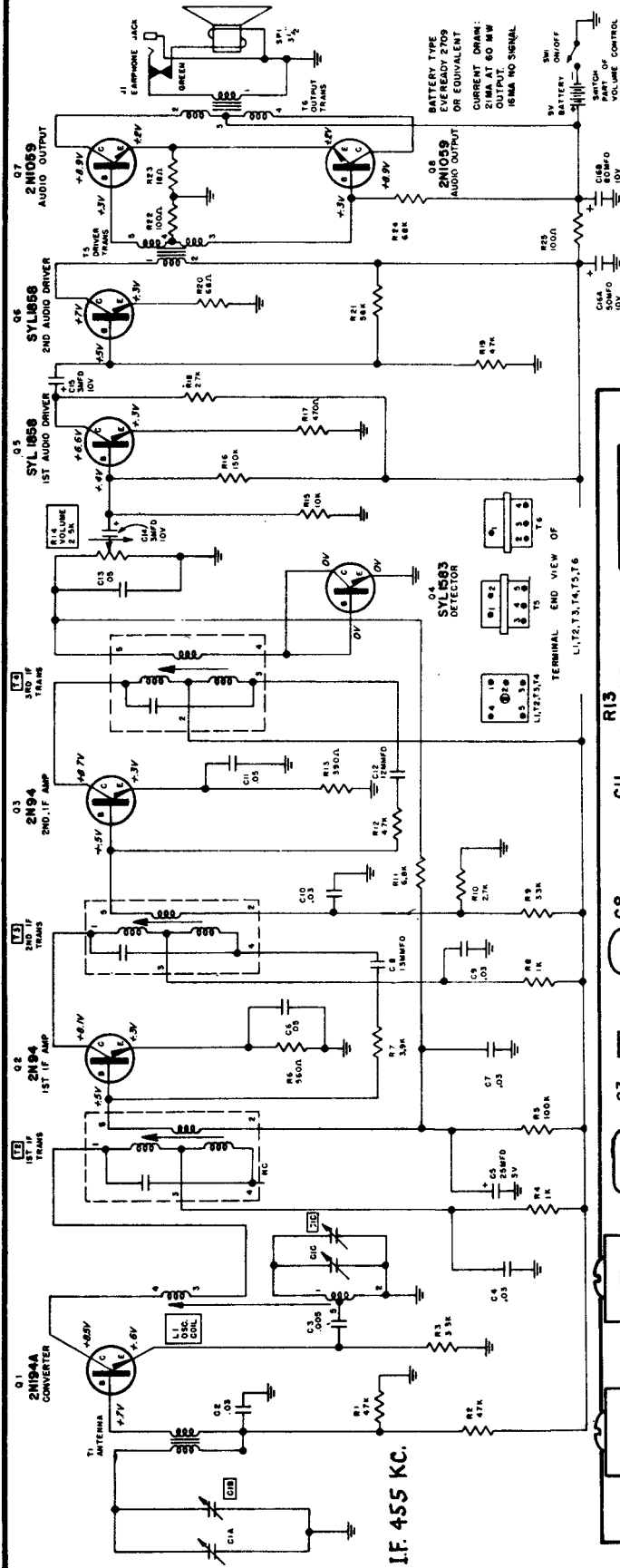


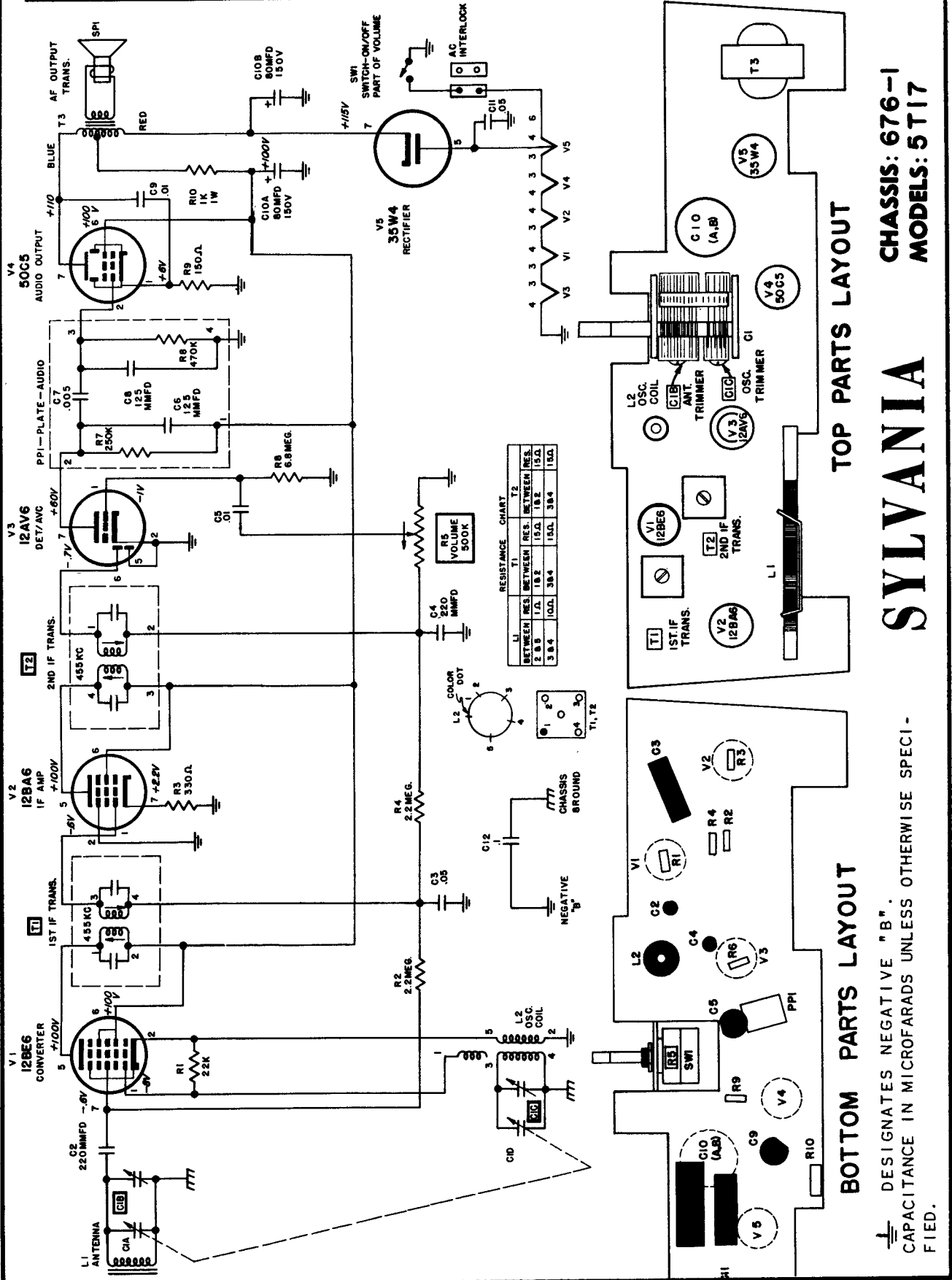
NOTE: On all models, clock and speaker lead lengths permit removal of chassis from cabinet with components connected in circuit. If complete disassembly is necessary, identify all leads before unsoldering. To operate clock model radios with clock disconnected, place a jumper wire across tie points 5 and 7. Do not operate receiver with speaker disconnected.

SYLVANIA

CHASSIS: 673-1
MODELS: 8P18 SERIES

RESISTANCE CHART											
L1		T2		T3		T4		T5		T6	
BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES
182	5Ω	183	35Ω	185	35Ω	182	25Ω	182	300Ω	284	100Ω
185	5Ω	184	75Ω	184	75Ω	185	5Ω	384	150Ω	283	55Ω
384	1Ω	285	1Ω	285	1Ω	485	1Ω	385	250Ω		





RESISTANCE CHART

L1	T1	T2
BETWEEN RES. BETWEEN RES.	BETWEEN RES.	BETWEEN RES.
2 8 8	1 A	15 A
3 8 4	10 A	38 4
	15 0	38 4
	15 0	38 4
	15 0	38 4

TOP PARTS LAYOUT

BOTTOM PARTS LAYOUT

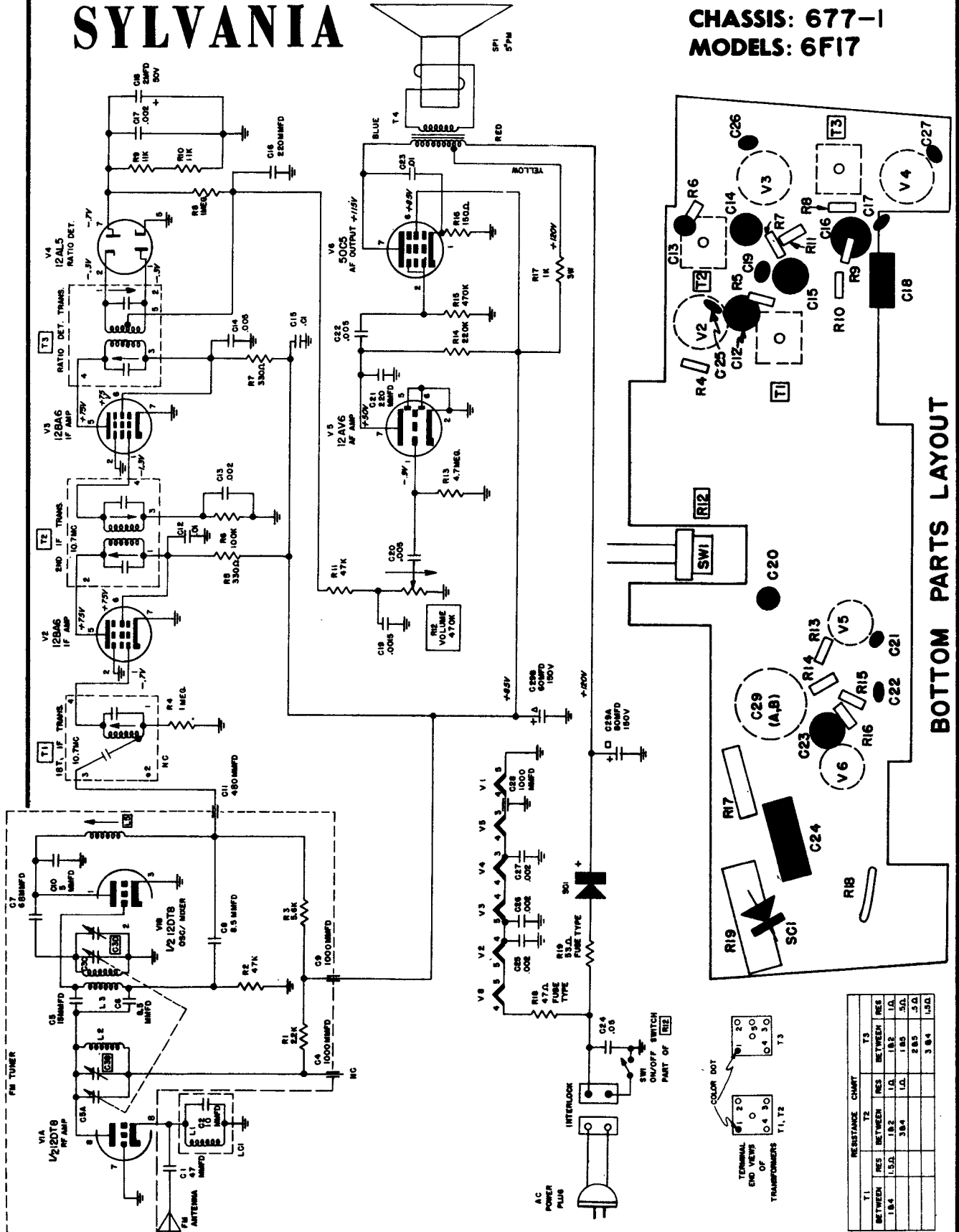
CHASSIS: 676-1
MODELS: 5T17

SYLVANIA

DESIGNATES NEGATIVE "B".
CAPACITANCE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

SYLVANIA

**CHASSIS: 677-1
MODELS: 6F17**



BOTTOM PARTS LAYOUT

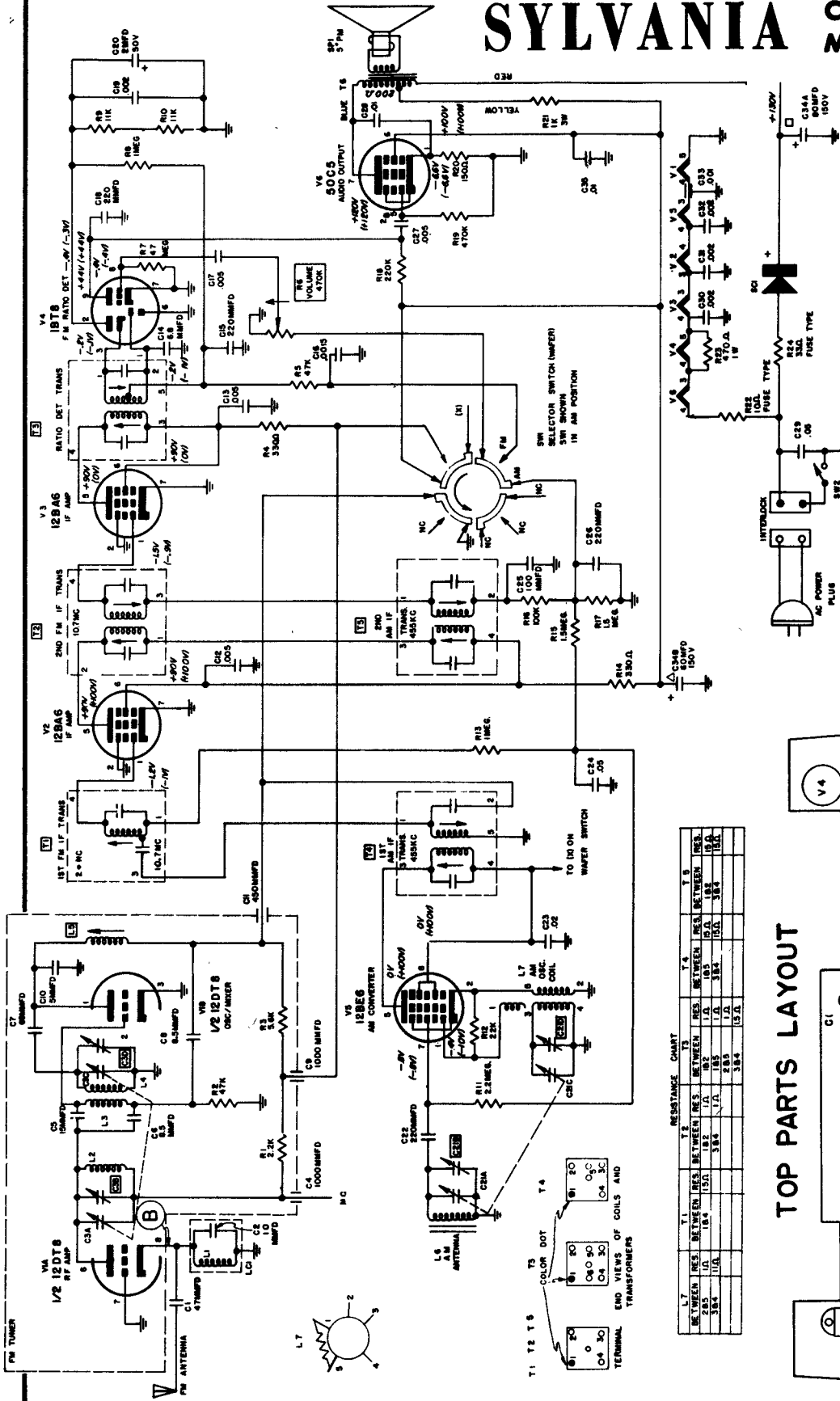
RESISTANCE CHART

T1	T2	T3
BETWEEN NETS	BETWEEN NETS	BETWEEN NETS
18V	18V	18V
1.5Ω	1.2	1.8
38.4	1.1	1.85
	1.1	2.85
		3.84
		1.5Ω

TERMINAL END VIEWS OF TRANSFORMERS T1, T2, T3

SYLVANIA

CHASSIS: 678-1
MODELS: 6F18

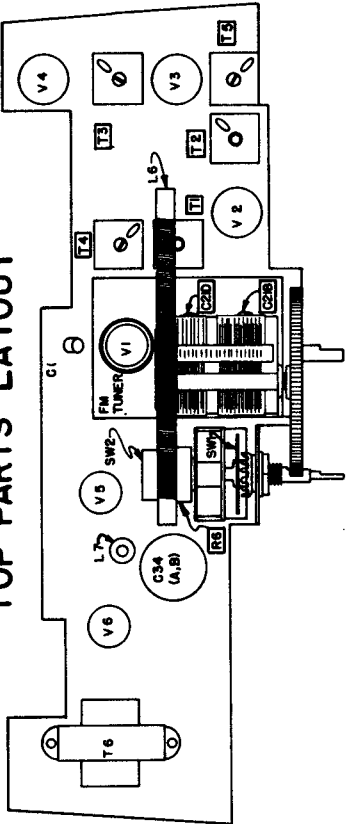


VOLTAGES SHOWN ARE AVERAGE READINGS MEASURED TO CHASSIS WITH NO SIGNAL INPUT. VARIATIONS MAY BE NOTED DUE TO NORMAL PRODUCTION TOLERANCES. VOLTAGE READINGS IN BRACKETS TAKEN WITH SELECTOR SWITCH IN THE AM POSITION. VOLTAGE READINGS WITHOUT BRACKETS TAKEN WITH SELECTOR SWITCH IN THE FM POSITION. RESISTANCES MEASURED WITH COMPONENTS IN THE CIRCUIT. CAPACITANCE IN MICROFARADS UNLESS OTHERWISE SPECIFIED. \perp DESIGNATES CHASSIS GROUND.

RESISTANCE CHART

T1	T2	T3	T4	T5	T6
RES. BETWEEN PINS 1 & 2	RES. BETWEEN PINS 1 & 3	RES. BETWEEN PINS 1 & 4	RES. BETWEEN PINS 1 & 5	RES. BETWEEN PINS 1 & 6	RES. BETWEEN PINS 1 & 7
18.4	15.0	18.2	17.0	18.5	18.0
38.4	38.4	38.4	38.4	38.4	38.4
15.0	15.0	15.0	15.0	15.0	15.0
15.0	15.0	15.0	15.0	15.0	15.0

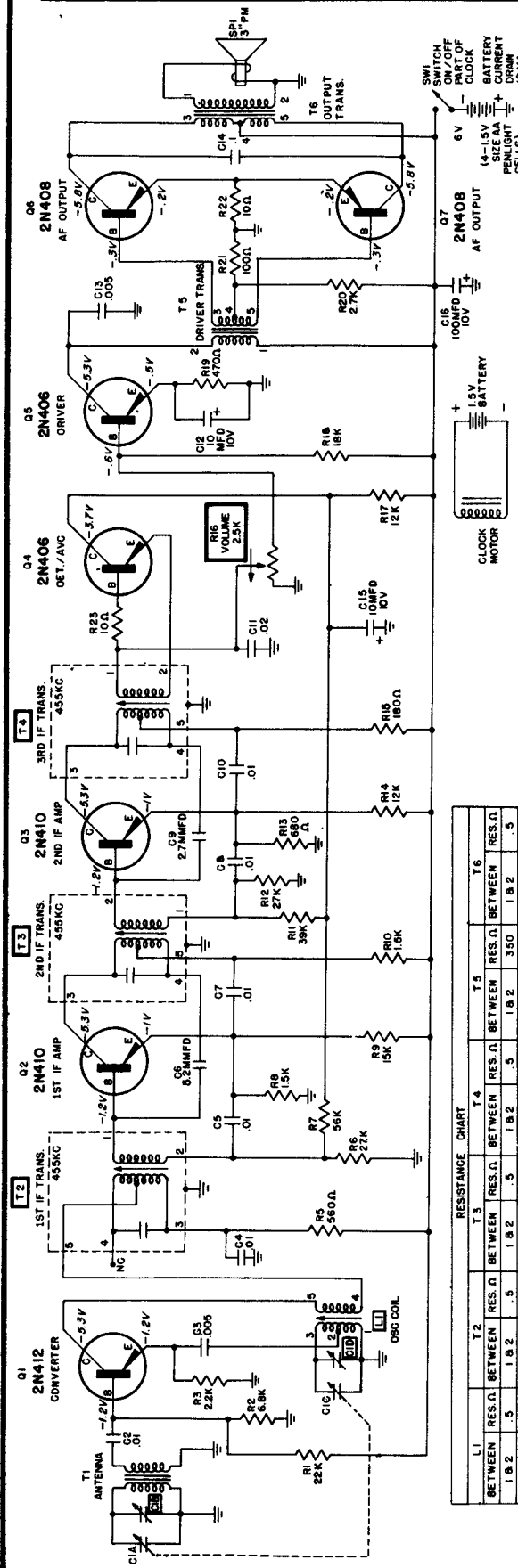
TOP PARTS LAYOUT



SYLVANIA

CHASSIS: 679-1

MODELS: 7K10, 7K11 SERIES



— CHASSIS REMOVAL —

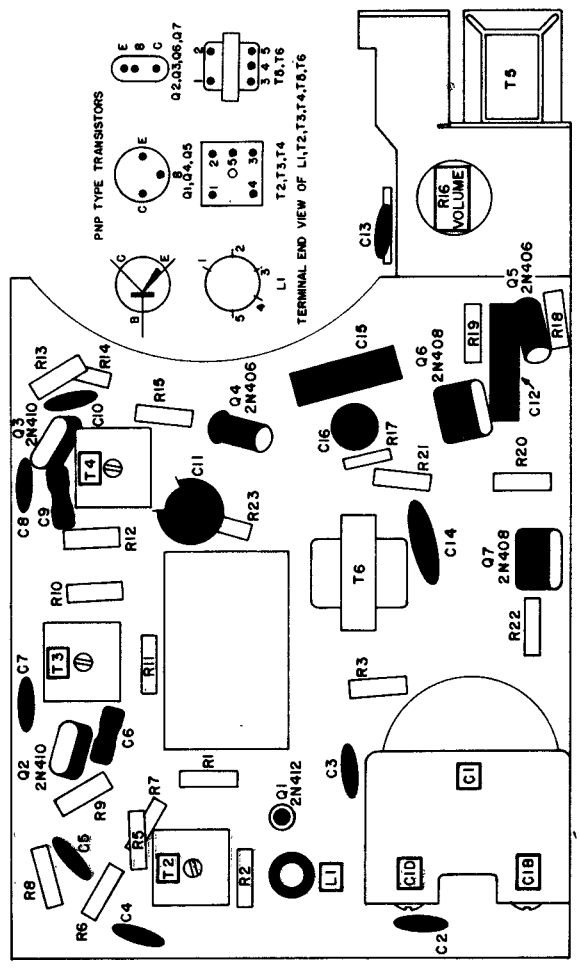
1. Remove volume and station selector knobs by pulling straight outward.
2. Press the right side of case to separate back cover from front of case. Remove back being careful to pass time set knob thru hole in back cover.
3. Remove two (2) screws securing clock battery holder to speaker. Remove holder as far as leads permit.
4. Remove two (2) screws (located on the bottom of case) which secures radio battery holder to case. Remove holder as far as leads permit.
5. Remove three (3) screws and one (1) nut securing corners of chassis to case.
6. Lift chassis from case as far as leads permit.
7. To replace chassis reverse the above procedure making certain all insulating washers removed are replaced.

NOTE: Do not operate receiver with speaker disconnected.

RESISTANCE CHART

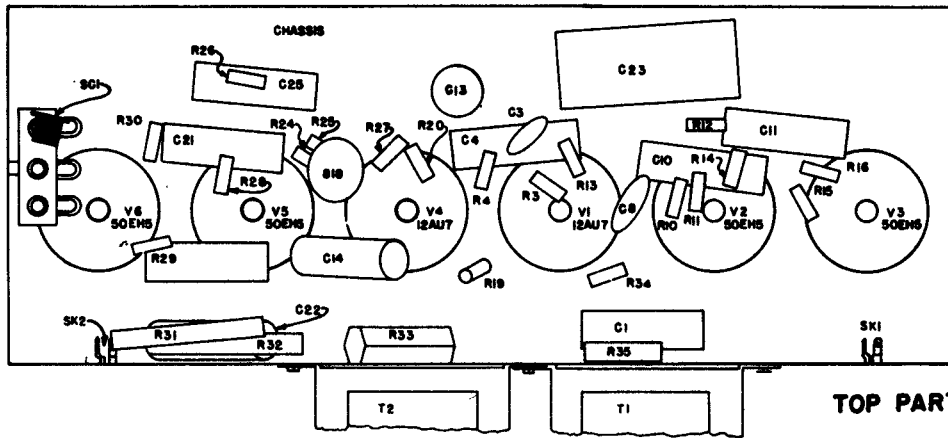
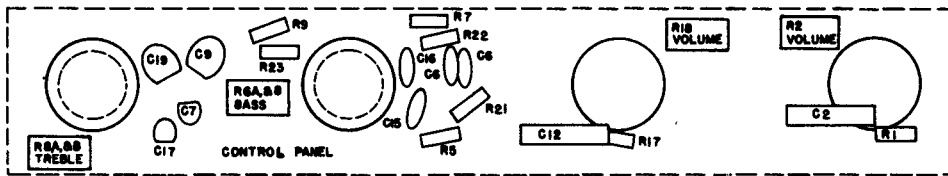
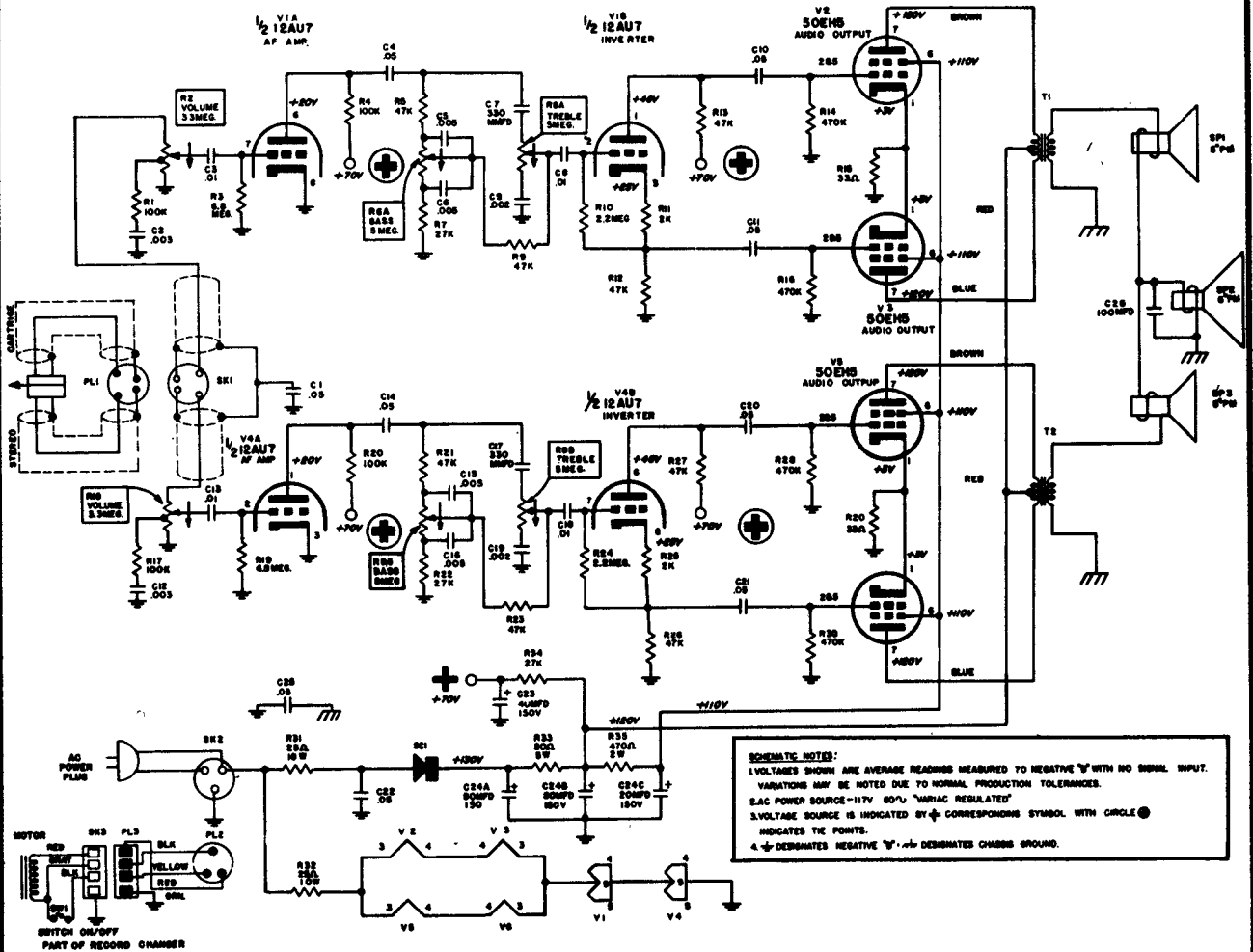
	T2	T3	T4	T5	T6
BETWEEN	RES. Ω	RES. Ω	RES. Ω	RES. Ω	RES. Ω
	BETWEEN	BETWEEN	BETWEEN	BETWEEN	BETWEEN
	RES. Ω	RES. Ω	RES. Ω	RES. Ω	RES. Ω
1.82	.5	1.82	.5	1.82	350
1.82	5	1.82	5	1.82	18.2
1.82	5	3.84	7	3.84	5.5
1.83	5	3.84	7	3.84	5.5
3.85	4.5	3.85	2.5	3.85	1.40
4.85	5	4.85	3.5	4.85	5.5
4.85	5	4.85	1.5	4.85	4.85

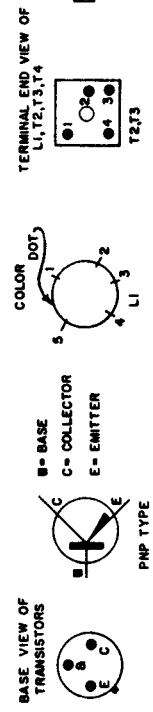
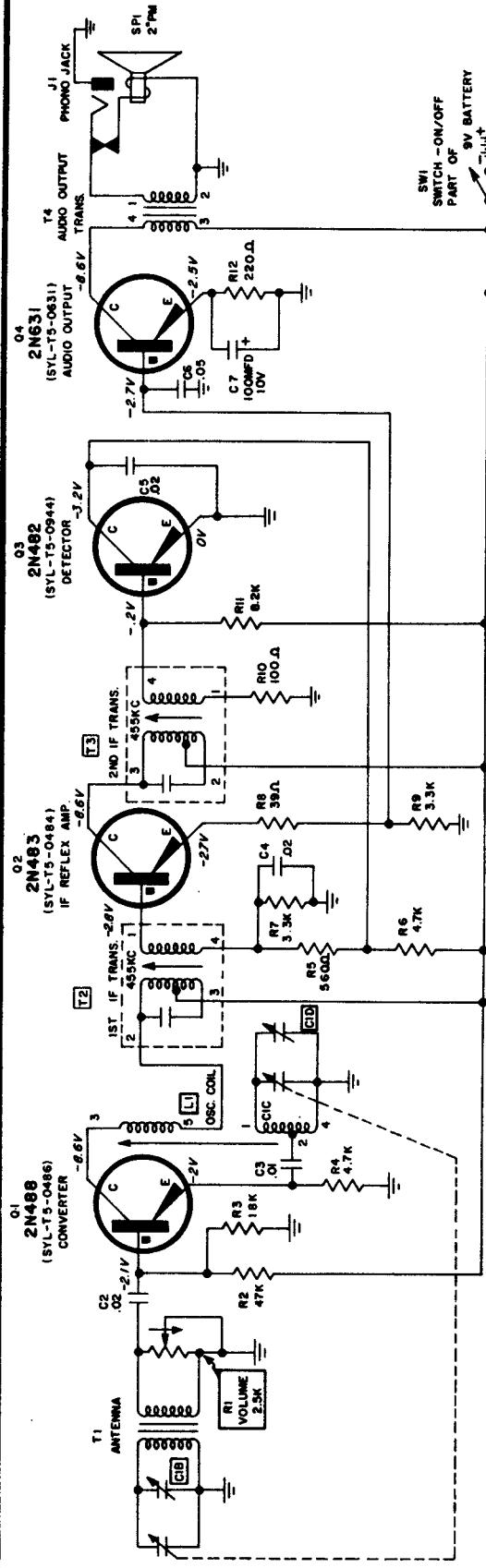
RESISTANCE VALUES TAKEN WITH COMPONENTS IN THE CIRCUIT.
ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.



SYLVANIA

CHASSIS: 680-1
MODELS: 45P19





TERMINAL END VIEW OF
L1, T2, T3, T4

BASE VIEW OF
TRANSISTORS

● = COLOR DOT
C = COLLECTOR
E = EMITTER
B = BASE
PHP TYPE

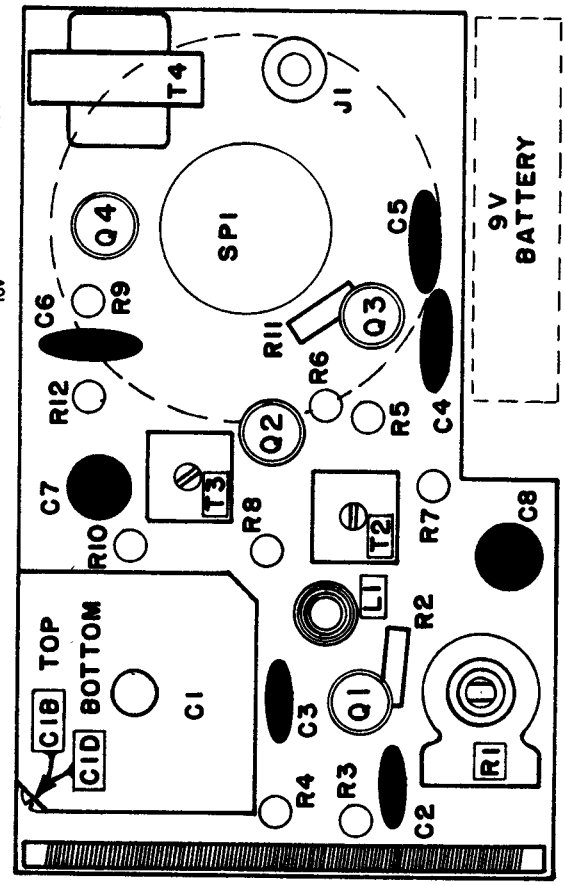
RESISTANCE CHART

L1	T2	T3	T4
BETWEEN RES.	BETWEEN RES.	BETWEEN RES.	BETWEEN RES.
1.02	8.0	1.0	1.0
1.04	0.50	5.0	2.0
2.04	.50	.50	3.04
3.05	.50	1.0	

SCHMATIC NOTES

1. VOLTAGES MEASURED TO CHASSIS GROUND, WITH RECEIVER NOT TUNED TO ANY SPECIFIC STATION.
2. BATTERY VOLTAGE WITH RECEIVER OPERATING 9 VOLTS.
3. VOLTAGES SHOWN ARE AVERAGE READINGS. VARIATIONS MAY BE NOTED DUE TO NORMAL PRODUCTION TOLERANCE.
4. COIL AND TRANSFORMER RESISTANCE ARE TAKEN WITH COMPONENTS CONNECTED IN THE CIRCUIT.
5. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
6. INTERMEDIATE FREQUENCY (IF), 455KC.
7. ⊕ DESIGNATES CHASSIS GROUND.

TOP PARTS LAYOUT

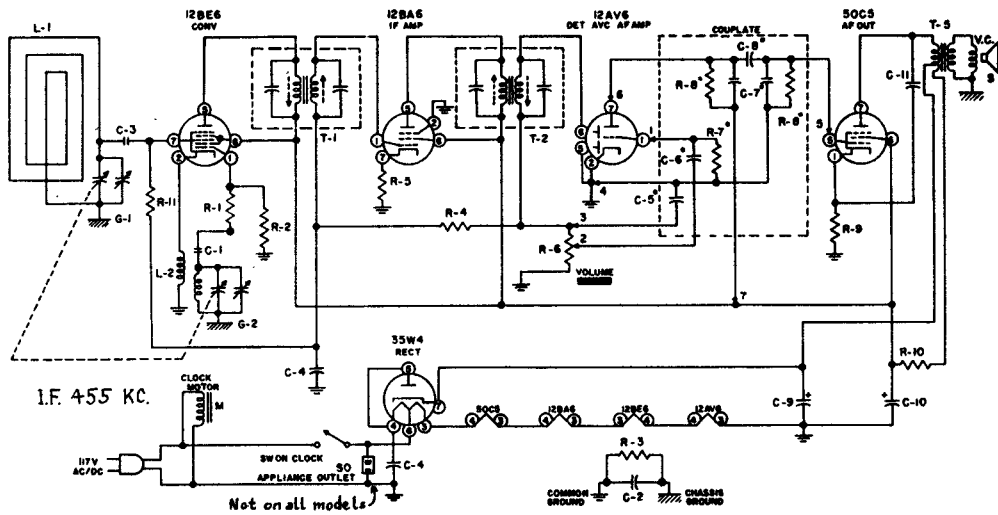


CHASSIS: 690-1
MODELS: 4P05, 4P06

SYLVANIA

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

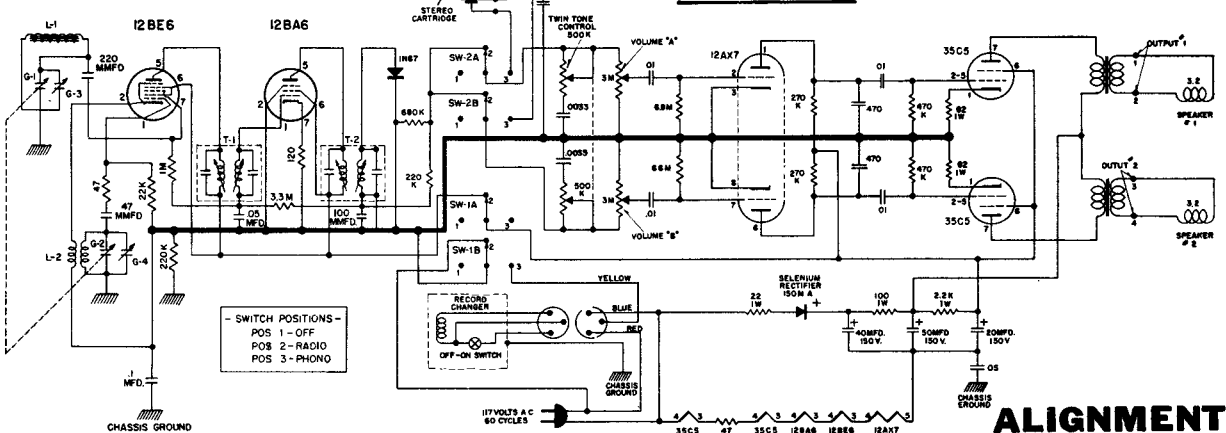
TRAV-LER Models 60C300, 60C301, 60C302, 60C303, 60C320, 60C321, 60C322, 60C323



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
IR-4	R-1 47Ω. RESISTOR 1/2W. 20%	CC-12	C-1 47 MMFD CERAMIC CONDENSER	SPK-55X	5 4" P.M. SPEAKER
IR-45	R-2 22MΩ. RESISTOR 1/2W. 10%	PC-8	C-2 .1 MFD. CONDENSER 400 V.	V.C.	T-3 OUTPUT TRANSFORMER
IR-20	R-3 220MΩ. RESISTOR 1/2W. 20%	CC-33	C-3 220 MMFD. 500V. 20% GER. COND.	LL-46	L-1 LOOP ANTENNA
IR-23	R-4 3.3MEG. RESISTOR 1/2W. 20%	PC-5	C-4 .05 MFD. CONDENSER 400 V.	LO-27	L-2 OSC. COIL
IR-155	R-5 20Ω. RESISTOR 1/2W. 10%	C-5	C-5 220 MMFD.	SO-34	S-O APPLIANCE OUTLET SOCKET
VC-101	R-6 1 MEG. VOLUME CONTROL	C-6	C-6 .002 MFD.	CK-7	M 5W ELECTRIC CLOCK
MC-19	R-7 5.6 MEG.	C-7	C-7 250 MMFD.		
	R-8 470MΩ.	C-8	C-8 .005 MFD.		
IR-98	R-9 150Ω. RESISTOR 1/2W. 10%	EC-68	C-9 70 MFD. 150 W.V.D.C. ELECTROLYTIC		
IR-42	R-10 1000Ω. RESISTOR 1 W. 10%	C-10	C-10 4D MFD.		
IR-12	R-11 1 MEG. RESISTOR 1/2W. 20%	PC-47	C-11 .02 MFD. CONDENSER 400V.		
LI-19	T-1 INPUT I.F. TRANSFORMER	GC-24	G-1 TUNING CONDENSER		
	T-2 OUTPUT I.F. TRANSFORMER		G-2 TUNING CONDENSER		

TRAV-LER RADIO

MODEL-1130

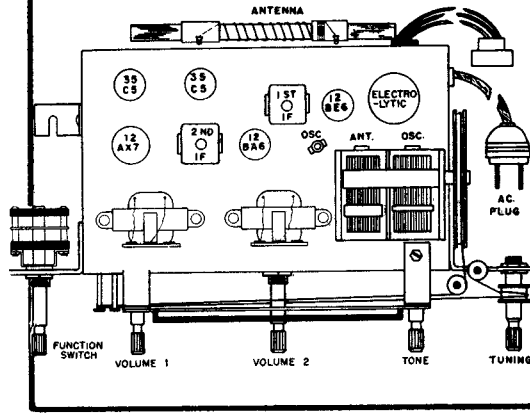


ALIGNMENT

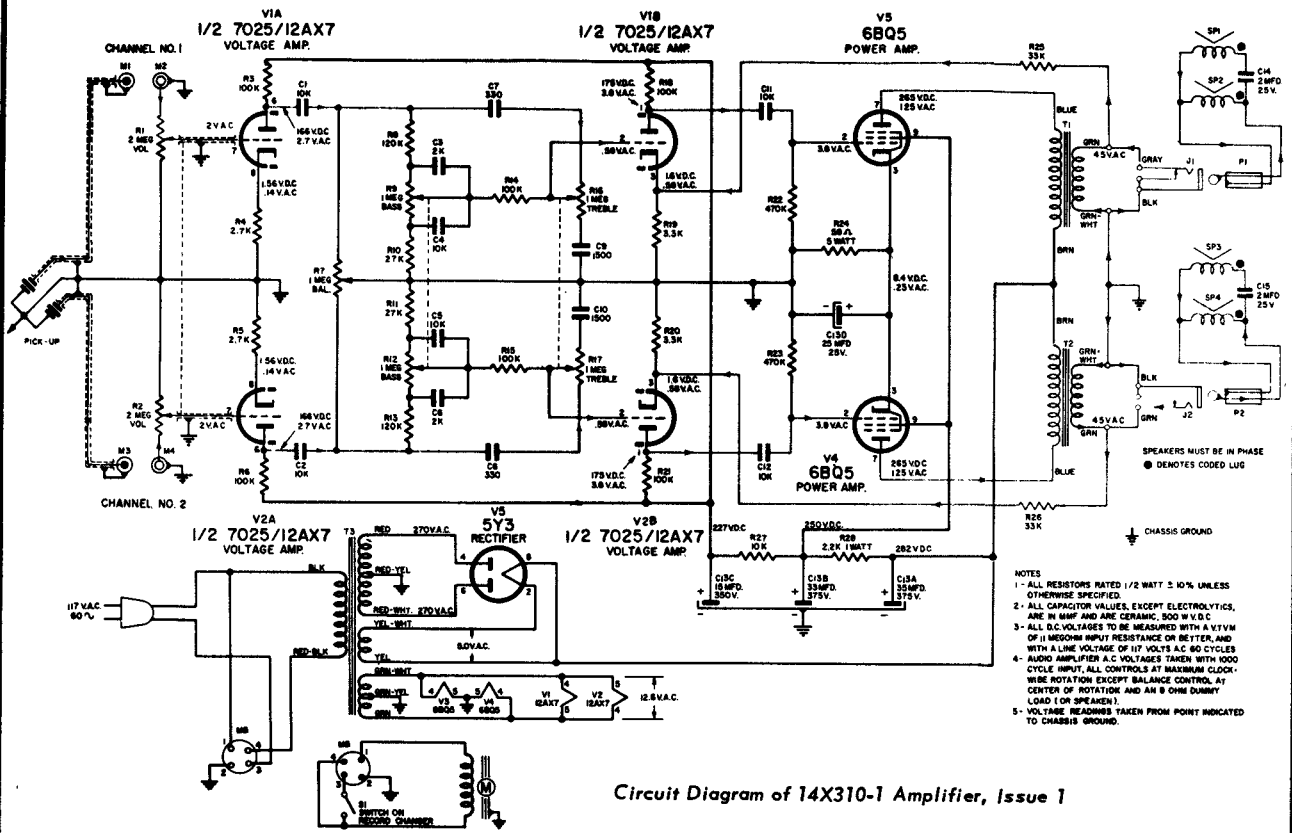
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans.

SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1610 KC. Make sure that the gang condenser is turned to complete minimum capacity. Adjust the generator to 1610 KC. and adjust the oscillator trimmer of the receiver until the signal is tuned in. Next, turn the gang condenser to complete maximum capacity. Adjust the generator to 540 KC., then adjust the iron core in the end of the oscillator coil until the signal is tuned in.

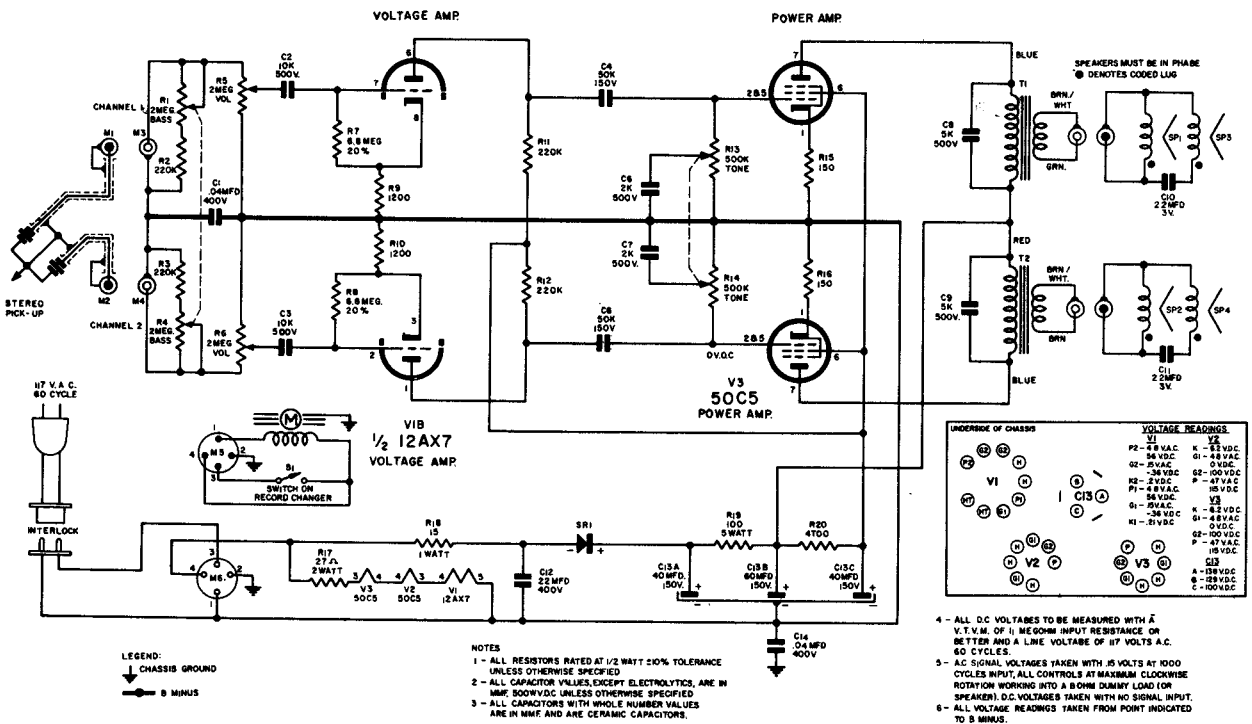
THIRD STEP: Remove the generator leads from the gang condenser and the chassis. Loosely couple the generator to the antenna by laying the hot generator lead near the antenna rod. Set the generator at 1400 KC. and tune in the 1400 KC. signal on the receiver. Adjust the ANT. trimmer until a maximum signal is noted on the output meter.



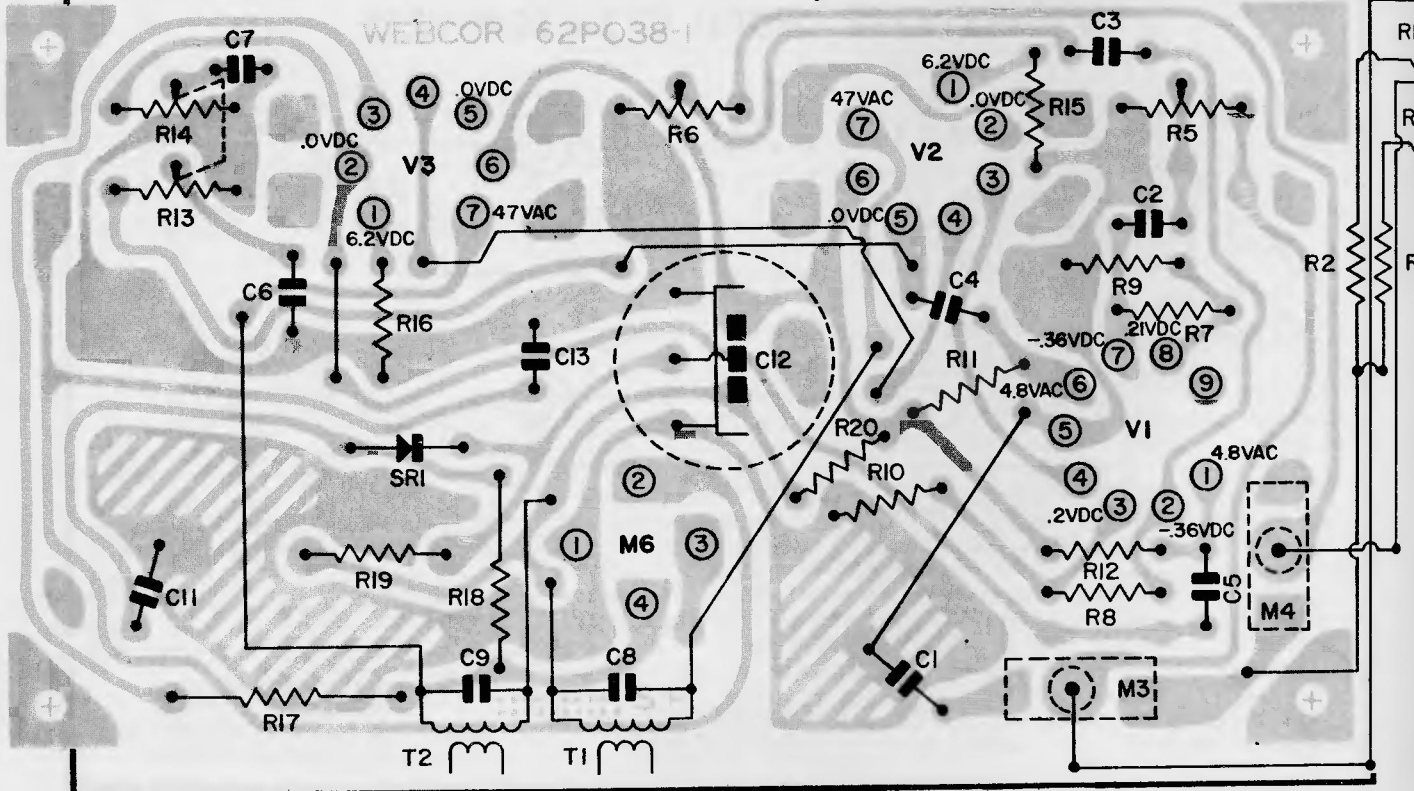
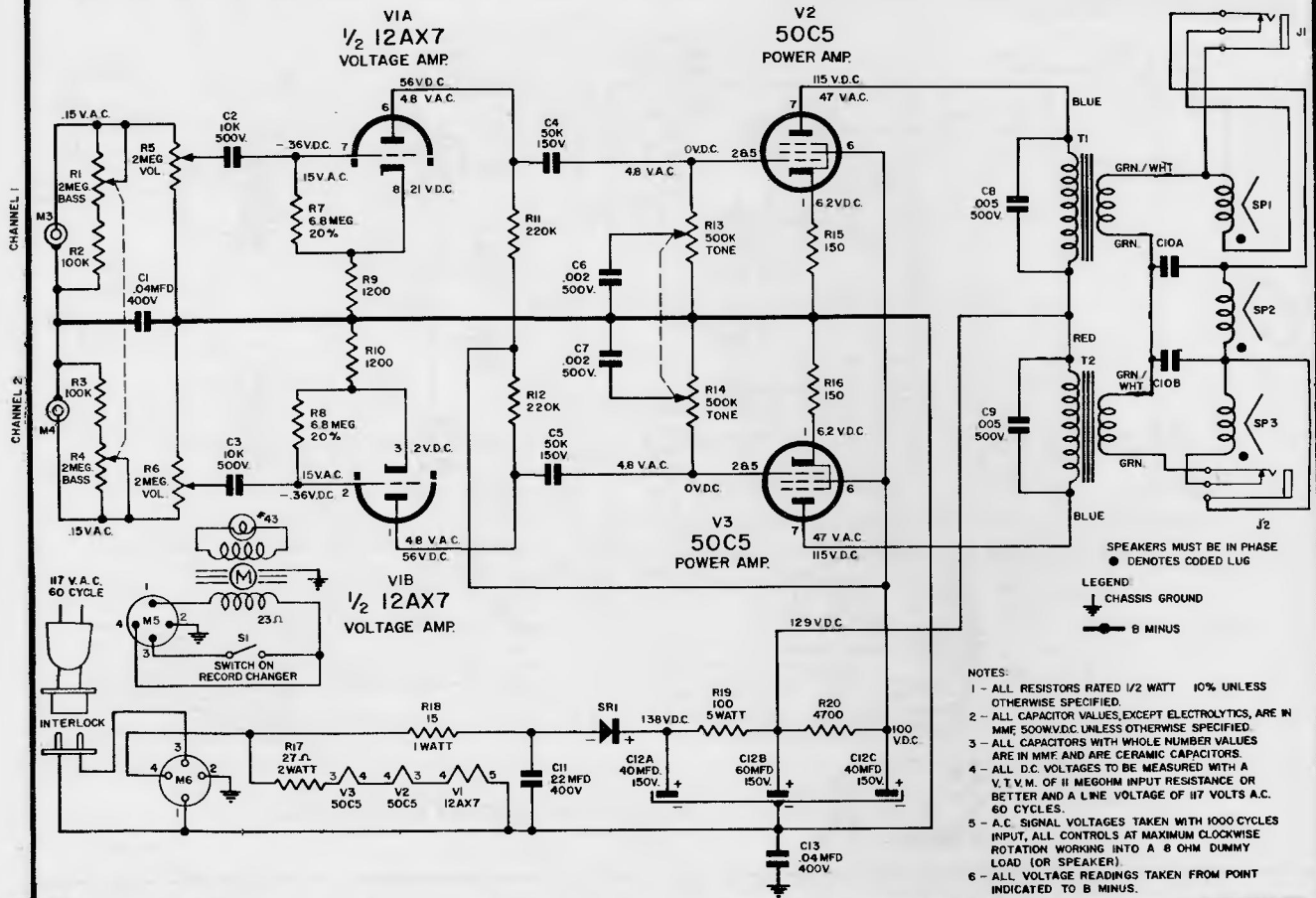
MODEL 1050-1A FONOGRAF



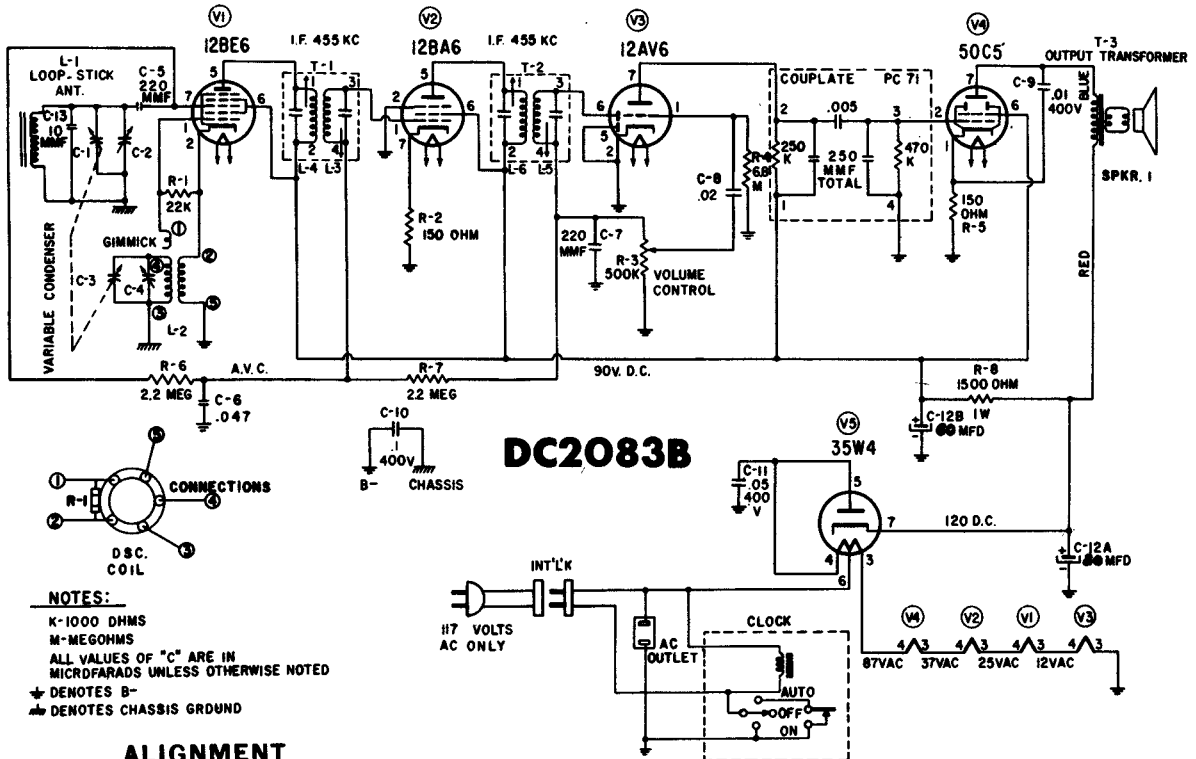
WEBCOR MODEL 1172-1 FONOGRAF



WEBCOR Amplifier 14X331, used in Models BC1055, MC1055, WC1055



WESTERN AUTO Model DC2083B, Exact Service Material.
 Model DC2173A is the same electrically, while additional
 Models DC2082B and DC2172A are very similar electrically
 but do not use clock-switching network.

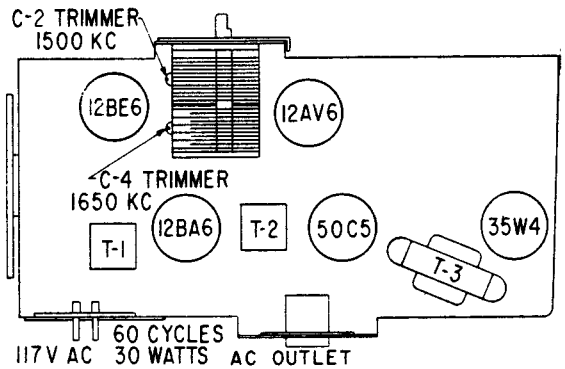


ALIGNMENT

Equipment required: Modulated RF signal generator; output meter; insulated screwdriver, two .1 mfd 600 volt condensers. To insure proper alignment, a radiated signal will be required during part of the alignment procedure. To radiate a signal, connect a loop of about 6 inches in diameter (two or three turns of #18 or #22 wire) across the output of the signal generator, and place this loop parallel to the loop of the receiver to be aligned, at a distance of about 10 or 12 inches. Connect the output meter and signal generator as follows:

Output meter: Connect across the speaker voice coil and turn the volume control to maximum (extreme clockwise position). Signal generator: When the generator is not used to radiate a signal, connect the low side to B--through a .1 mfd condenser, clip the high side through a .1 mfd 600 volt condenser to the point at which signal injection is required, and keep the output as low as possible. Proceed in the sequence shown in the alignment chart.

The chassis is attached to the front panel and must be removed from the cabinet before alignment can be performed. To remove the front panel from the cabinet remove the two screws on back of cabinet.

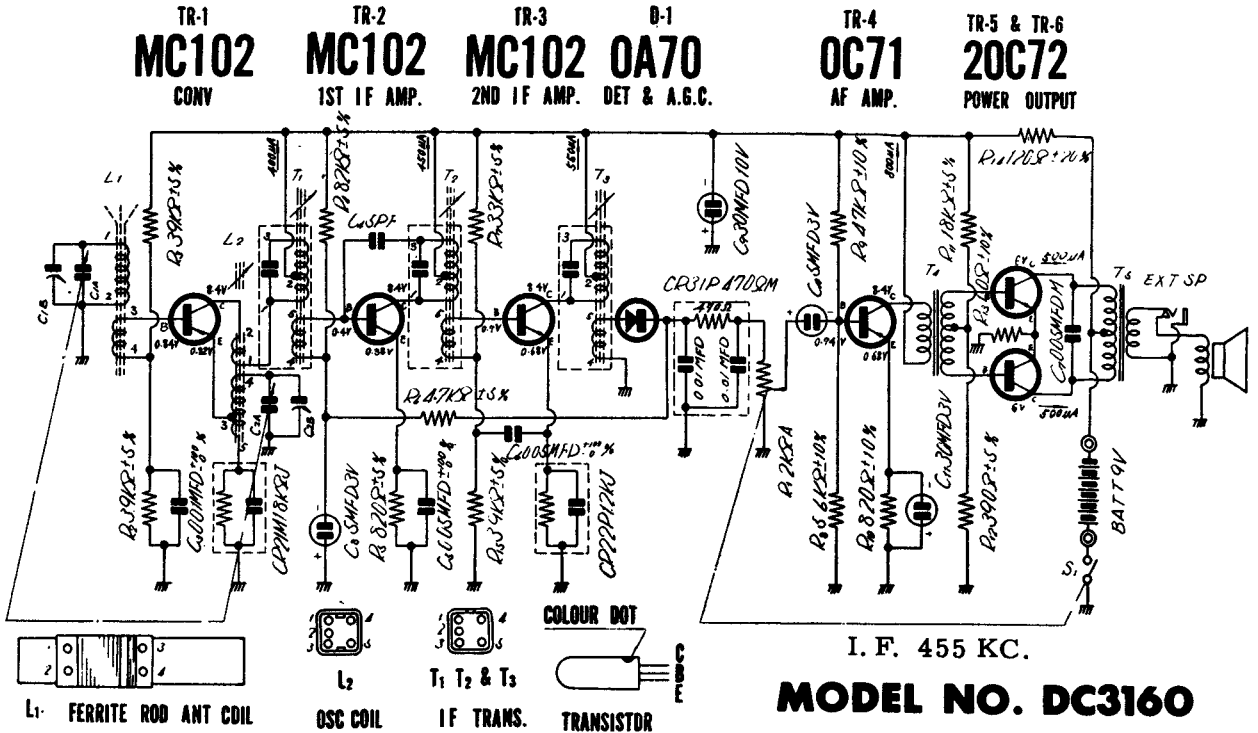


ALIGNMENT PROCEDURE CHART

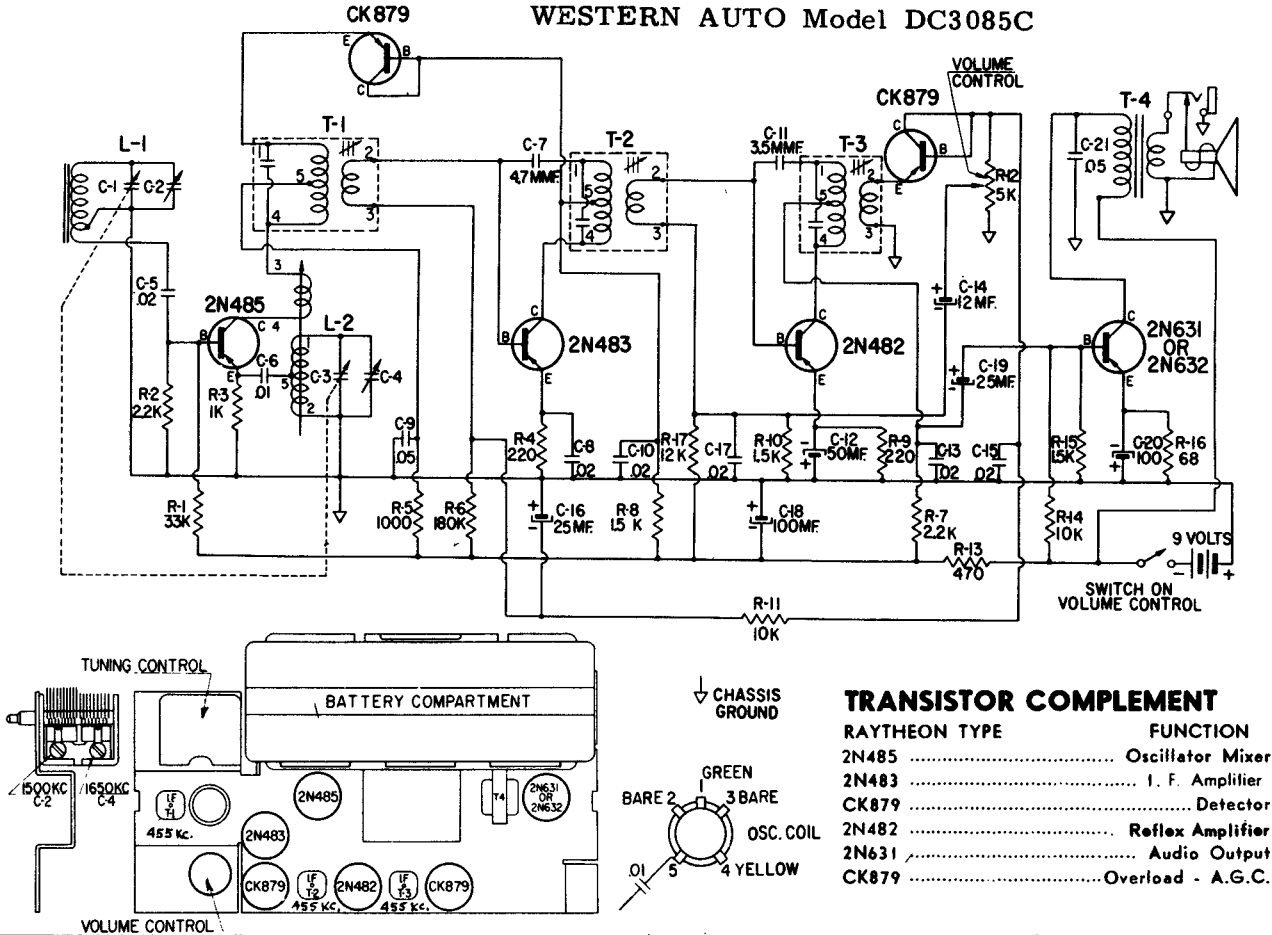
Step	Connect High Side of Signal Generator To—	Set Signal Generator To—	Turn Receiver Dial To—	Adjust The Following for Maximum Output (Keep Signal From Signal Generator As Low As Possible)
1	Antenna Section Tuning Condenser in Series with .1MFD. Cond.	455 KC.	Full Counter Clockwise (Condenser Plates Fully Open)	Top and Bottom T2 and T1 (I.F. Transformers)
2		1650 KC.		C4 (Oscillator Trimmer)
3	Use Radiated Signal	1500 KC.	Maximum Signal Approx. 1500 KC.	C2 Antenna Trimmer)
4		Repeat Steps 2 and 3		

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

WESTERN AUTO Model DC3160



WESTERN AUTO Model DC3085C



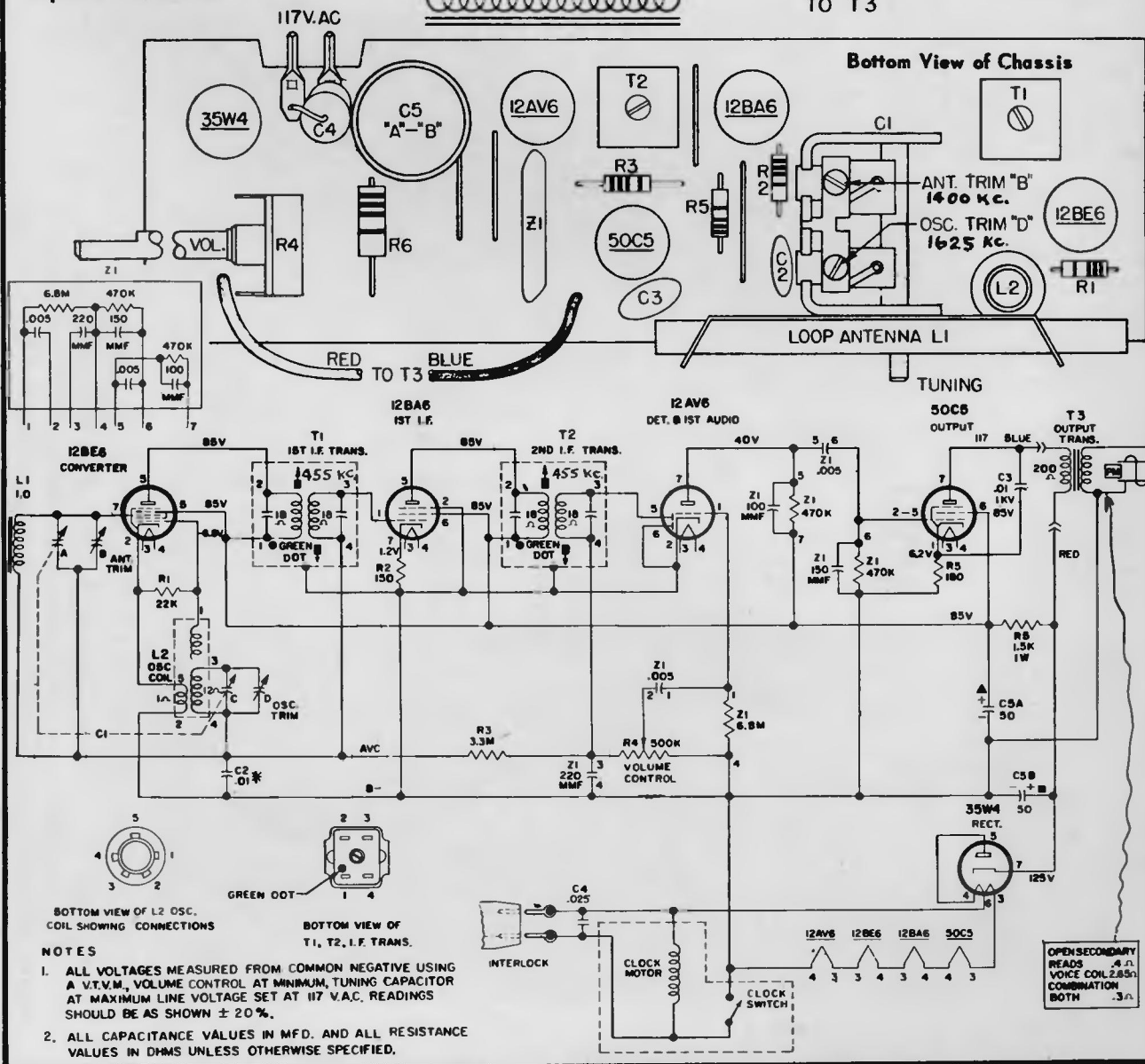
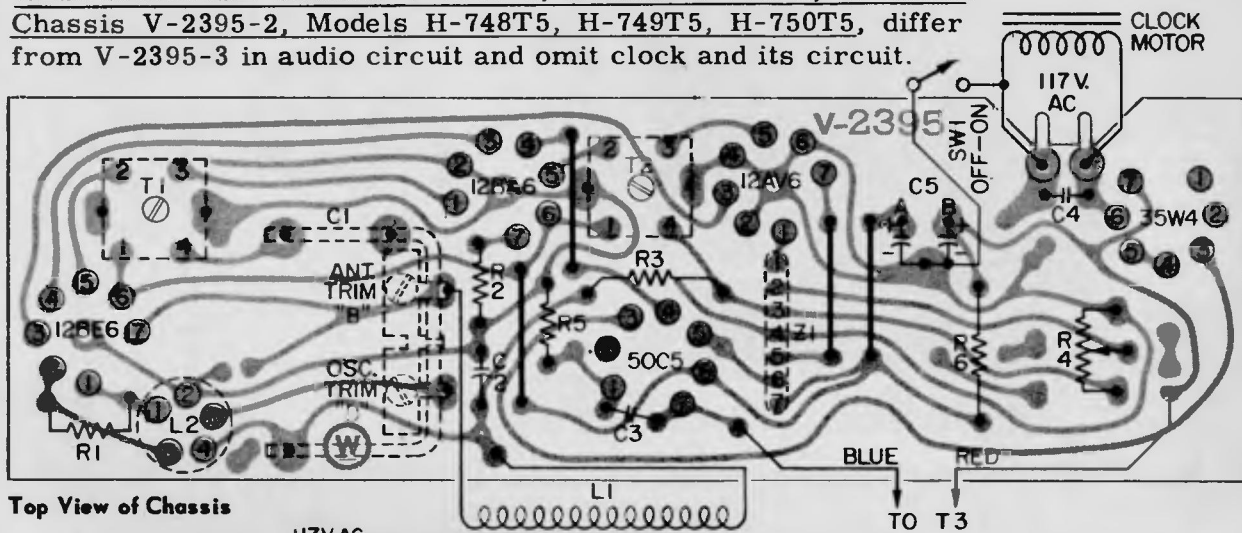
TRANSISTOR COMPLEMENT

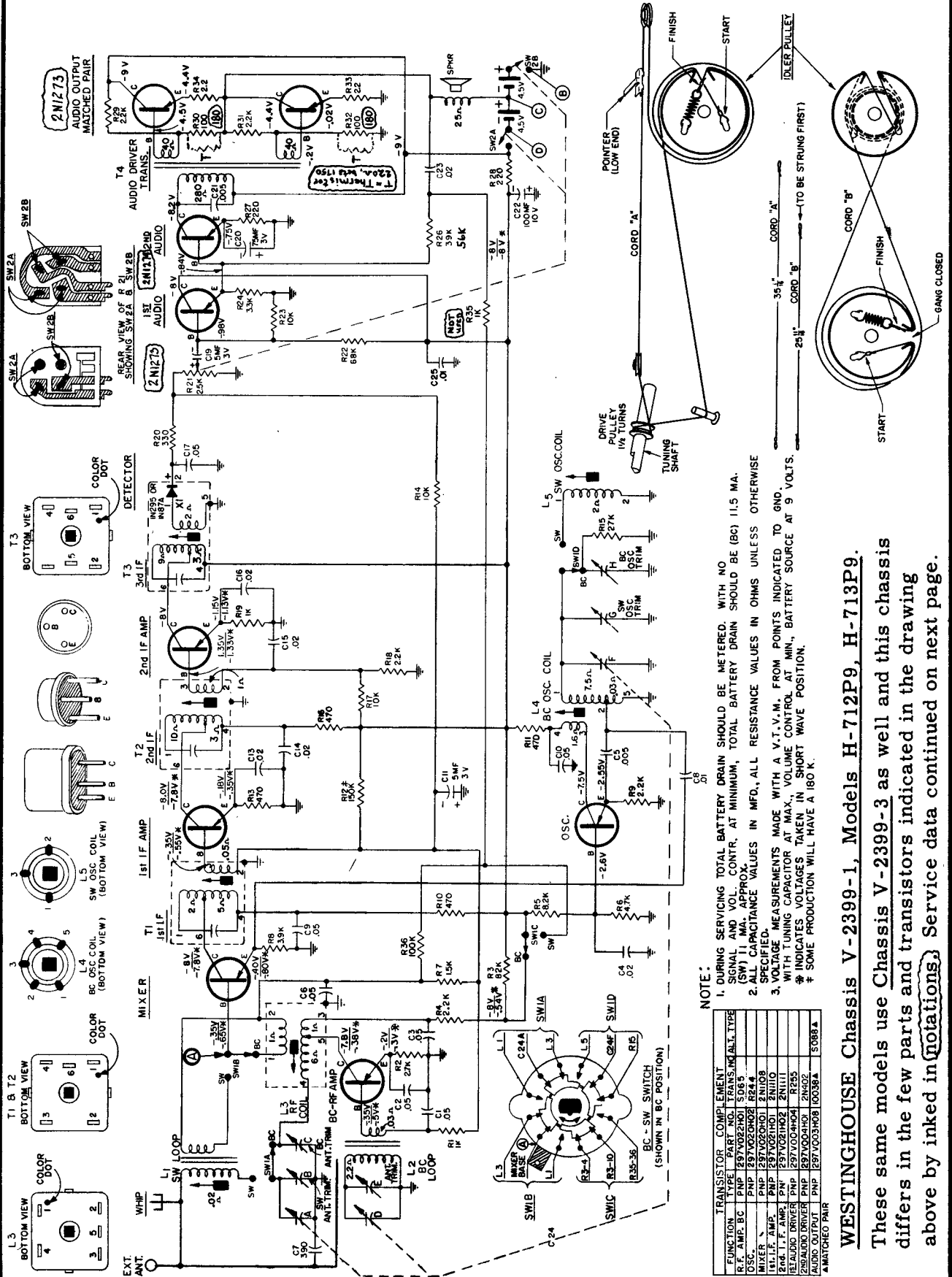
RAYTHEON TYPE	FUNCTION
2N485	Oscillator Mixer
2N483	I. F. Amplifier
CK879	Detector
2N482	Reflex Amplifier
2N631	Audio Output
CK879	Overload - A.G.C.

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2395-3, Models H-753L5, H-755L5.

Chassis V-2395-2, Models H-748T5, H-749T5, H-750T5, differ from V-2395-3 in audio circuit and omit clock and its circuit.





NOTE:

- DURING SERVICING TOTAL BATTERY DRAIN SHOULD BE MONITORED. WITH NO SIGNAL AND VOL. CONTR. AT MINIMUM, TOTAL BATTERY DRAIN SHOULD BE (BC) 11.5 MA. (SW) 11 MA. APPROX.
- ALL CAPACITANCE VALUES IN MFD., ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
- VOLTAGE MEASUREMENTS MADE WITH A V.T.V.M. FROM POINTS INDICATED TO GND. * INDICATES VOLTAGES TAKEN IN SHORT WAVE POSITION. # SOME PRODUCTION WILL HAVE A 180 K.

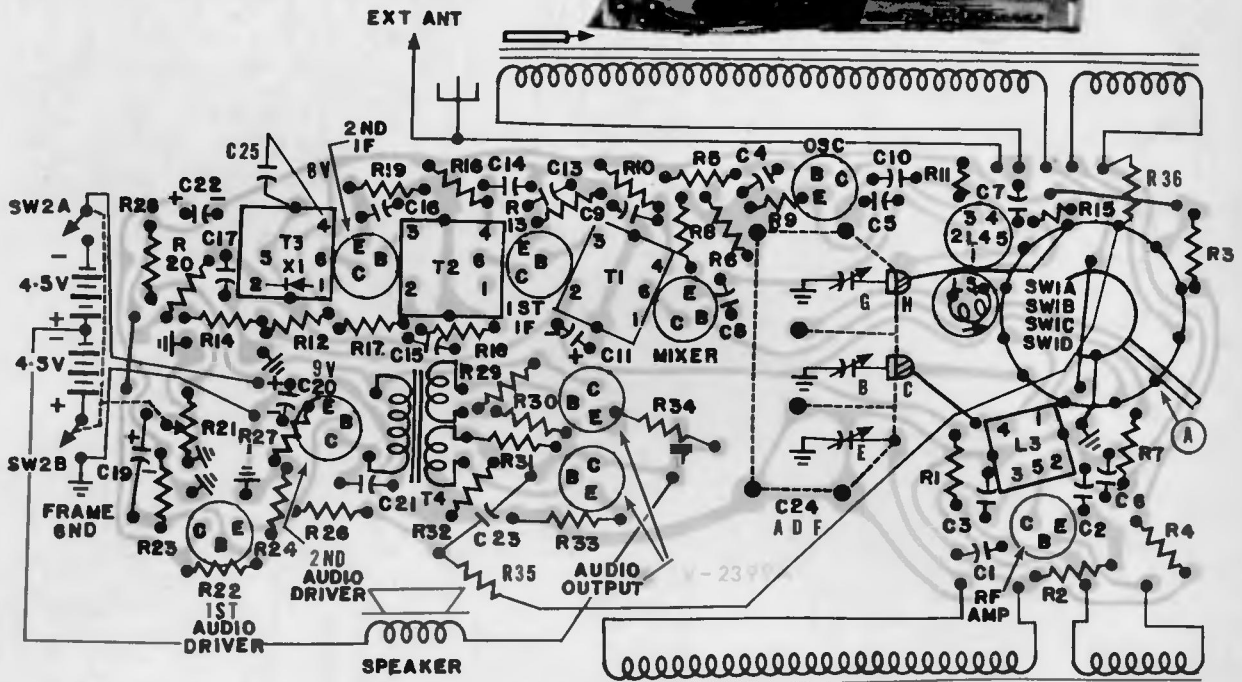
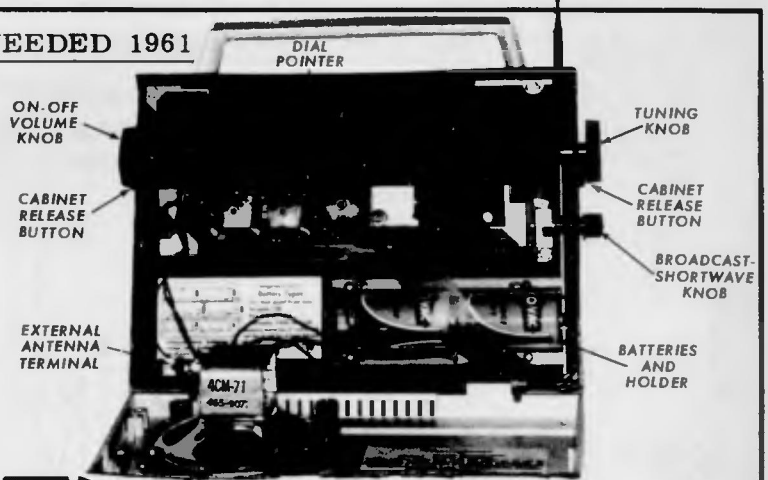
FUNCTION	TRANSISTOR	COMPLEMENT
R.F. AMP. BC	BC-107	TRANS. M.C.A.I. TYPE 5085
MIXER	BC-107	TRANS. M.C.A.I. TYPE 5085
1st I.F. AMP.	BC-107	TRANS. M.C.A.I. TYPE 5085
2nd I.F. AMP.	BC-107	TRANS. M.C.A.I. TYPE 5085
DETECTOR	2N1273	TRANS. M.C.A.I. TYPE 5085
AUDIO DRIVER	2N1273	TRANS. M.C.A.I. TYPE 5085
AUDIO OUTPUT	2N1273	TRANS. M.C.A.I. TYPE 5085

WESTINGHOUSE Chassis V-2399-1, Models H-712P9, H-713P9.

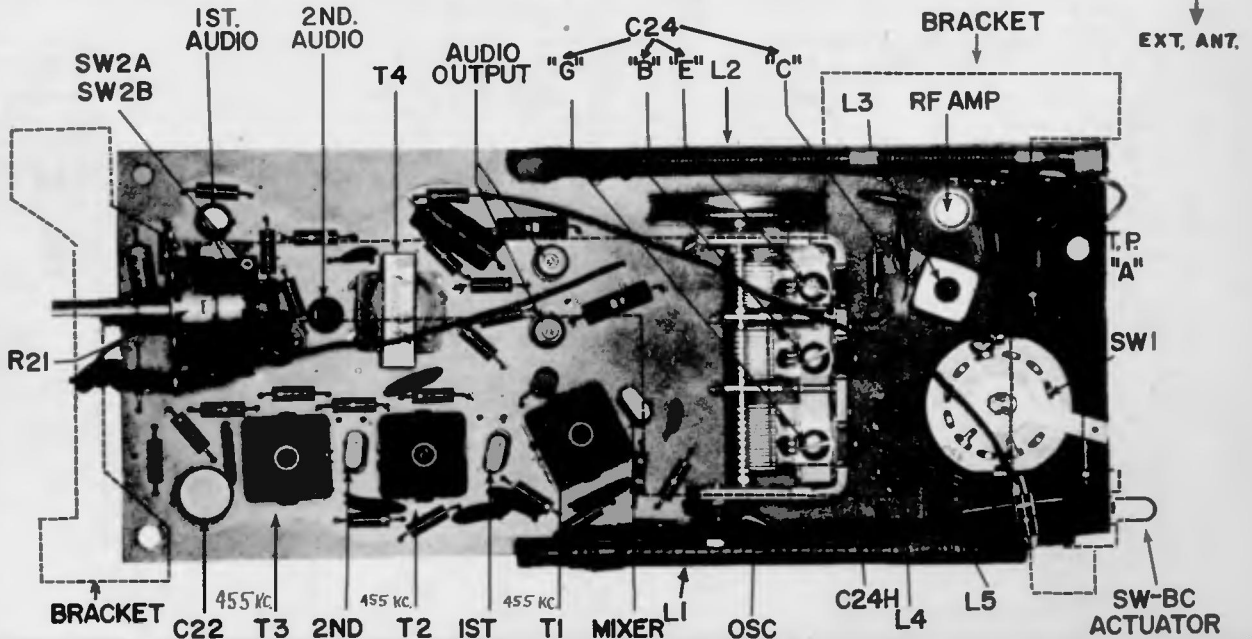
These same models use Chassis V-2399-3 as well and this chassis differs in the few parts and transistors indicated in the drawing above by inked in notations. Service data continued on next page.

WESTINGHOUSE
Chassis V-2399-1
Models H-712P9, H-713P9
 (Continued from preceding page.)

Frequency Range
 Broadcast 540 to 1600KC
 Short Wave 2.4 to 6.5MC
 Intermediate Frequency 455KC



Bottom view of printed circuit chassis, showing components symbolically.

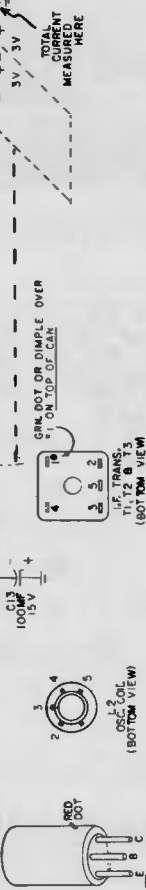
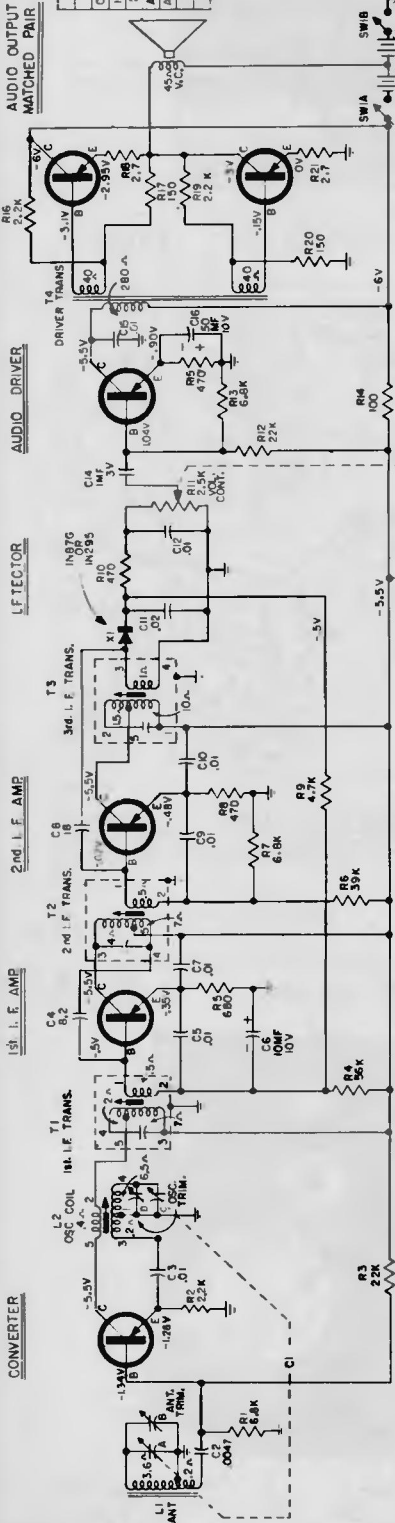


MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

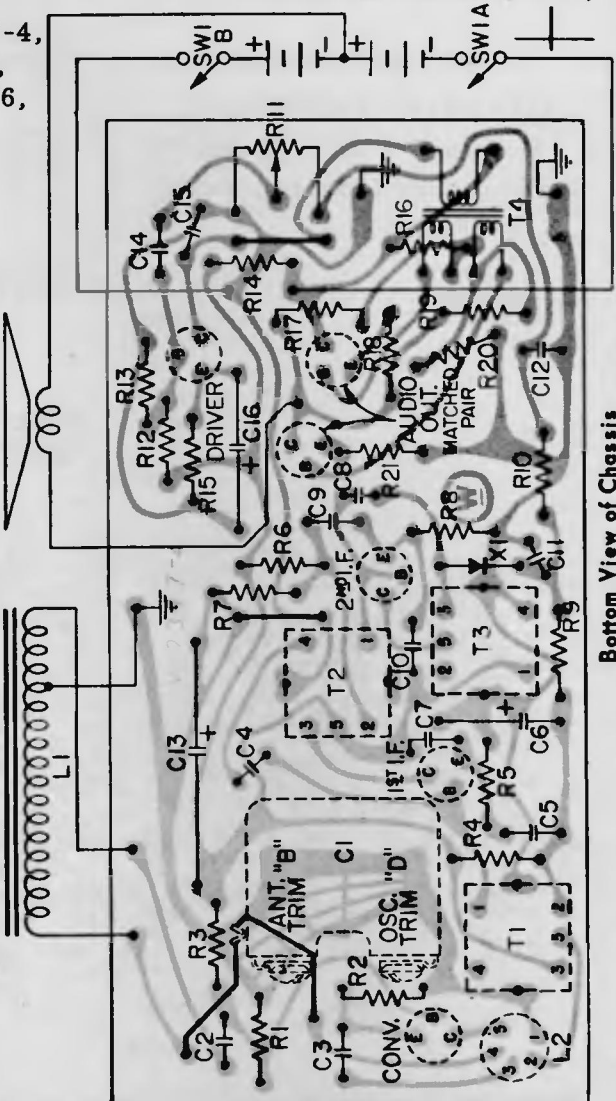
**Westinghouse Chassis V-2397-4,
Models H-725P6A, H-726P6A,
H-727P6A, H-728P6A, H-771P6,
H-771P6GP, H-772P6, -GP,
H-773P6, and H-773P6GP.**

FUNCTION	TRANSISTOR TYPE	PART NO.	ALTERNATES
CONVERTER	PNP	297V01001	2M402
1st I.F. AMP	PNP	297V02105	2M410
2nd I.F. AMP	PNP	297V02105	2M410
AUDIO DRIVER	PNP	297V00403	2M405
AUDIO OUTPUT MATCHED PAIR	PNP	297V00300	2M405

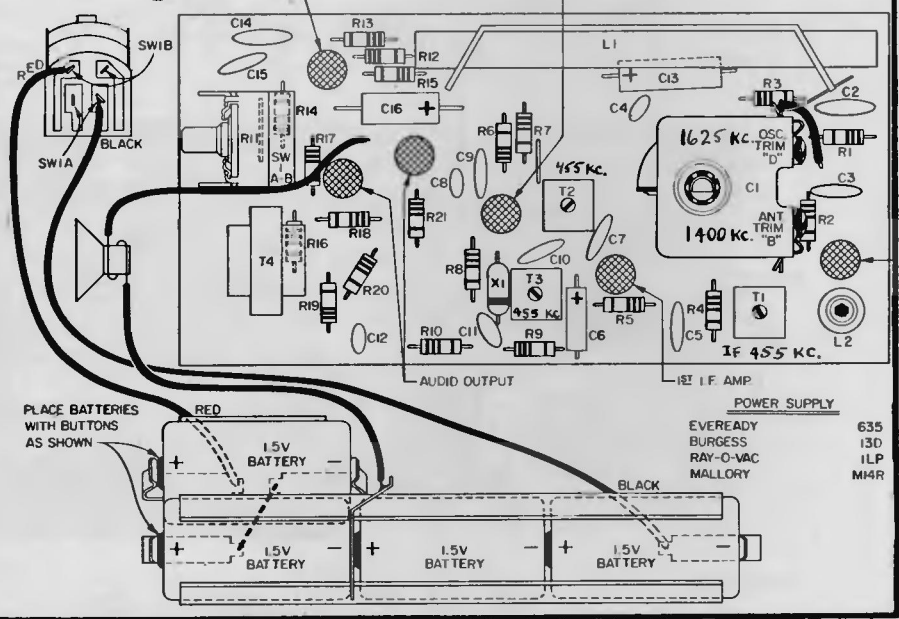
• MATCHED PAIR (SEE NOTES)



- NOTES:**
- DURING SERVICING, TOTAL BATTERY CURRENT SHOULD BE METERED, WITH NO SIGNAL, AND VOLUME CONTROL AT MINIMUM. TOTAL BATTERY DRAIN SHOULD BE APPROX. 9 MA.
 - VOLTAGE MEASUREMENTS MADE WITH A VTVM FROM POINTS INDICATED TO GROUND, WITH TUNING CAPACITOR AT MAXIMUM. VOLUME CONTROL AT MINIMUM. BATTERY SOURCE AT 6 VOLTS.
 - ALL CAPACITORS IN THIS SET ARE IN MF. ALL CAPACITORS GREATER THAN ONE ARE IN MMFD.
 - ANY TWO AUDIO OUTPUT TRANSISTORS WITH IDENTICAL COLOR CODE ON TOP CAN BE USED AS A MATCHED PAIR.



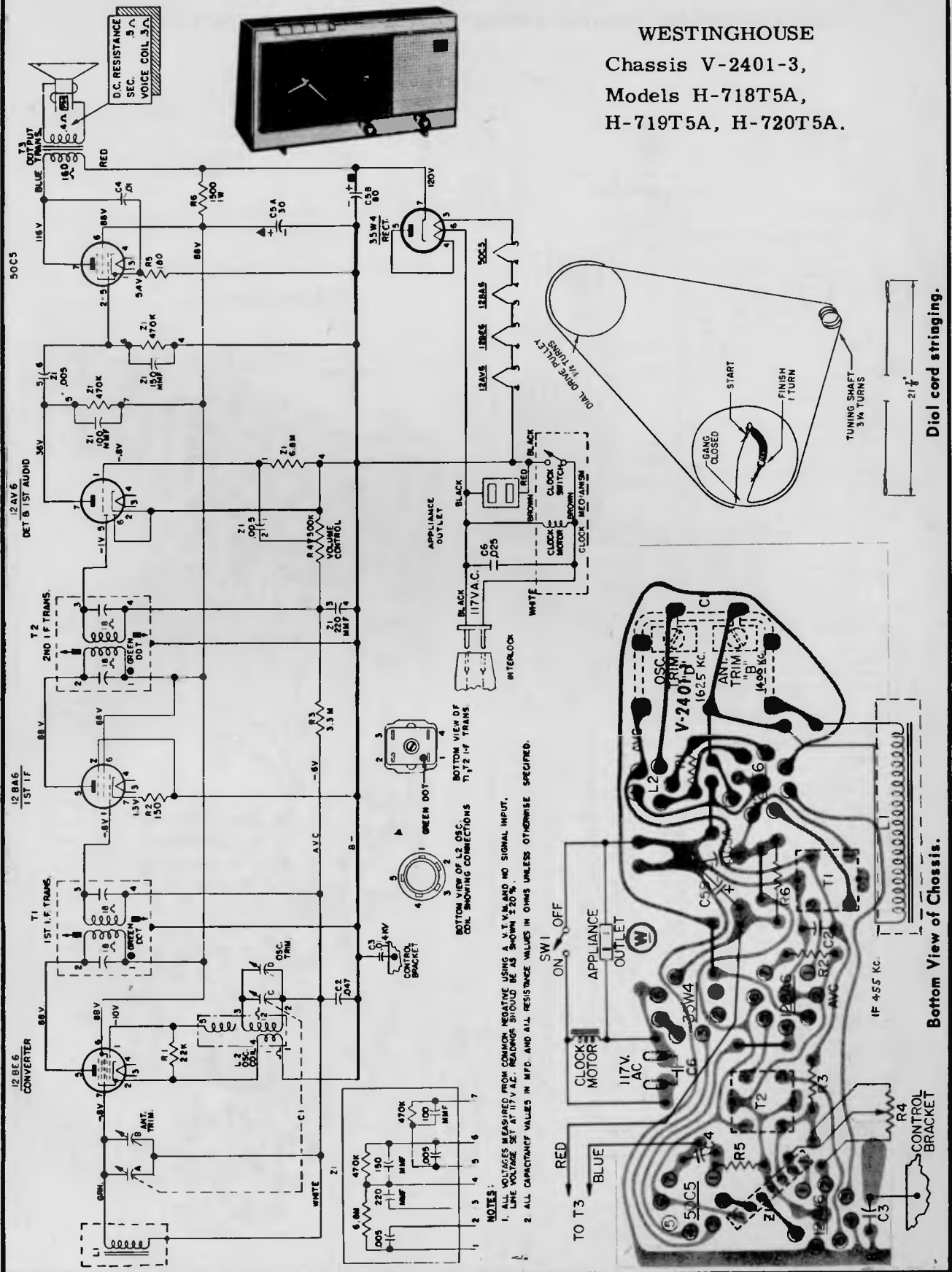
Bottom View of Chassis



Top View of Chassis

635
130
1LP
M4R

WESTINGHOUSE
 Chassis V-2401-3,
 Models H-718T5A,
 H-719T5A, H-720T5A.

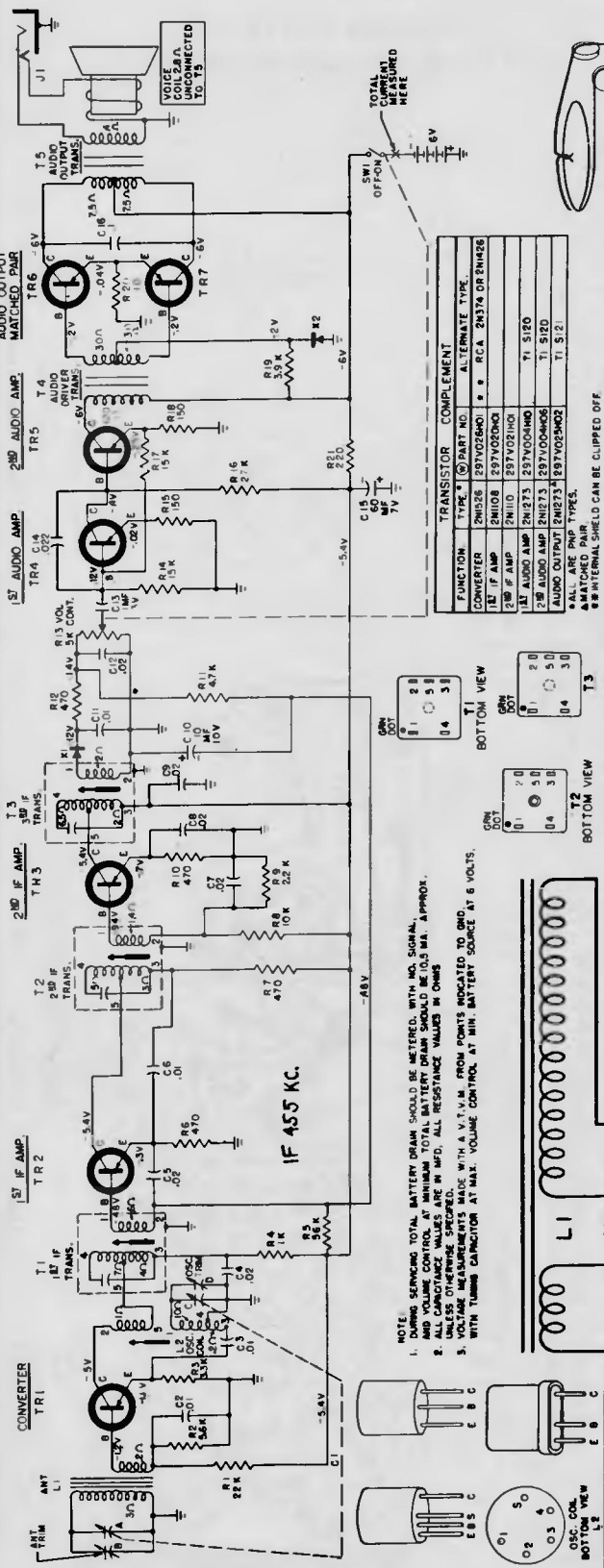


NOTES:
 1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A.V.T.M. AND NO SIGNAL INPUT. LINE VOLTAGE SET AT 117 V. AC. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
 2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.

Dial cord stringing.

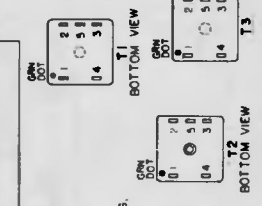
Bottom View of Chassis.

WESTINGHOUSE Chassis V-2404-1, Models H-737P7, H-738P7

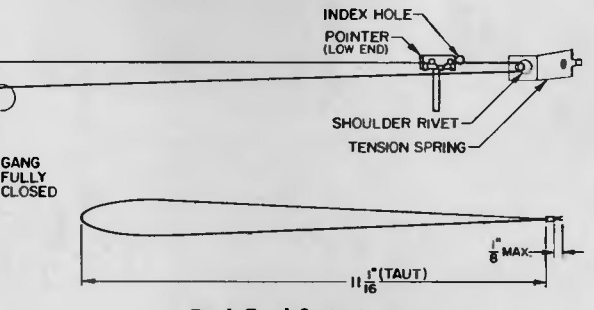


FUNCTION	TYPE	PART NO.	ALTERNATE TYPE
CONVERTER	2N556	257Y0280K	* RCA 2N574 OR 9N198
1 ST IF AMP	2N110	257Y0210K	
2 ND IF AMP	2N110	257Y0210K	
1 ST AUDIO AMP	2N1273	257Y02040K	T1 S120
2 ND AUDIO AMP	2N1273	257Y02040K	T1 S120
AUDIO OUTPUT MATCHED PAIR	2N1273	257Y02040K	T1 S121

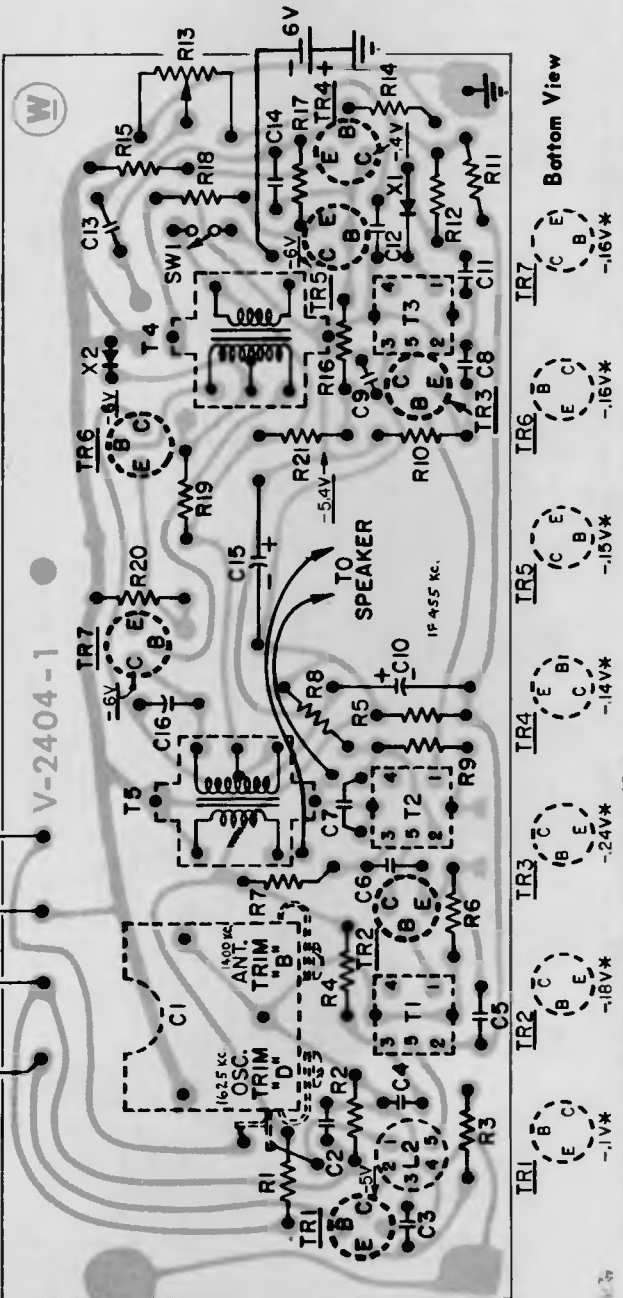
* ALL ARE PNP TYPES.
 † MATCHED PAIR.
 ‡ INTERNAL SHIELD CAN BE CLIPPED OFF.



- NOTE: SERVICING TOTAL BATTERY DRAIN SHOULD BE METERS WITH NO SIGNAL.
 1. AND VOLUME CONTROL AT MINIMUM TOTAL BATTERY DRAIN SHOULD BE 10.5 MA. APPROX.
 2. ALL CAPACITANCE VALUES ARE IN MFD. ALL RESISTANCE VALUES IN OHMS
 3. UNLESS OTHERWISE SPECIFIED.
 4. VOLTAGE MEASUREMENTS MADE WITH A 10 V.M. FROM POINTS INDICATED TO BMS
 WITH TUNING CAPACITOR AT MAX. VOLUME CONTROL AT MIN. BATTERY SOURCE AT 6 VOLTS.

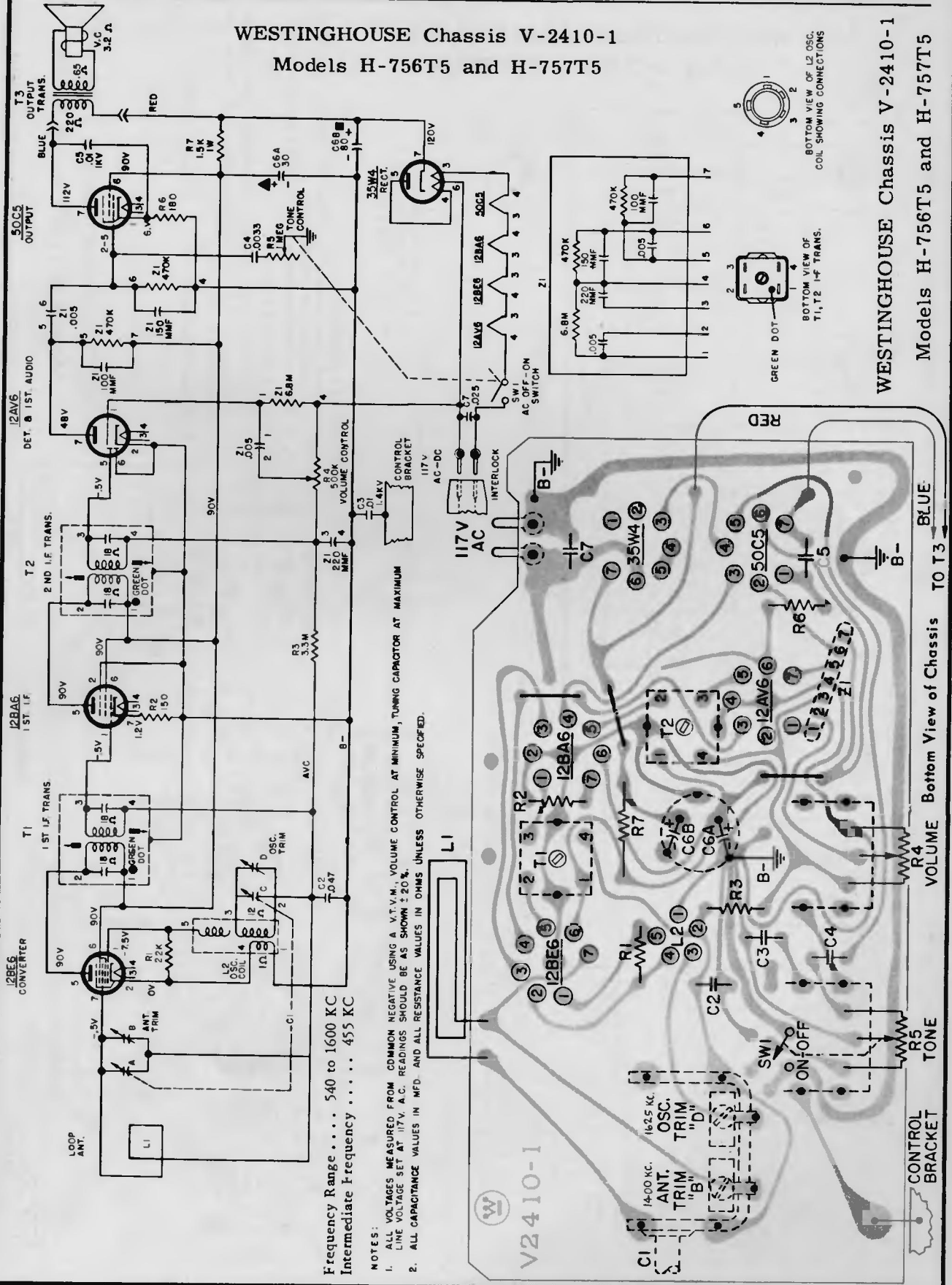


Dial Cord Stringing



ALL VOLTAGES MEASURED IN RESPECT TO GROUND EXCEPT *
 * - INDICATES FORWARD BIAS, MEASURED ON BASE IN RESPECT TO EMITTER. ±1 VOLT VARIATION MAY INDICATE A DEFECTIVE STAGE.

WESTINGHOUSE Chassis V-2410-1
Models H-756T5 and H-757T5



Frequency Range 540 to 1600 KC
Intermediate Frequency 475 KC

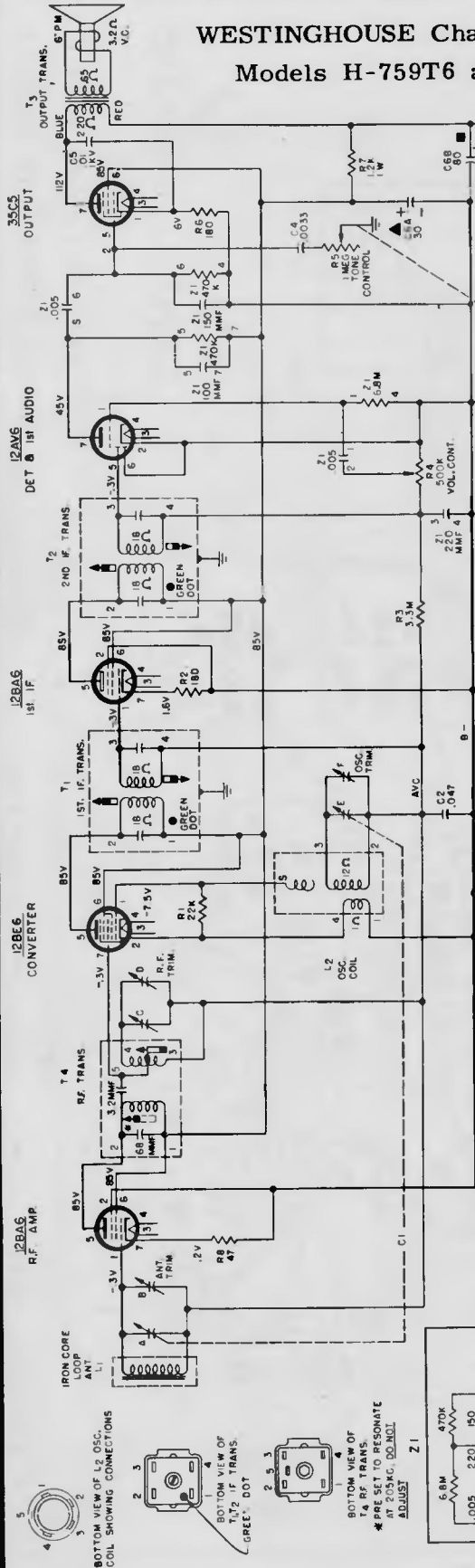
NOTES:

1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A V.T.V.M.; VOLUME CONTROL AT MINIMUM, TUNING CAPACITOR AT MAXIMUM. LINE VOLTAGE SET AT 117V. A.C. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.

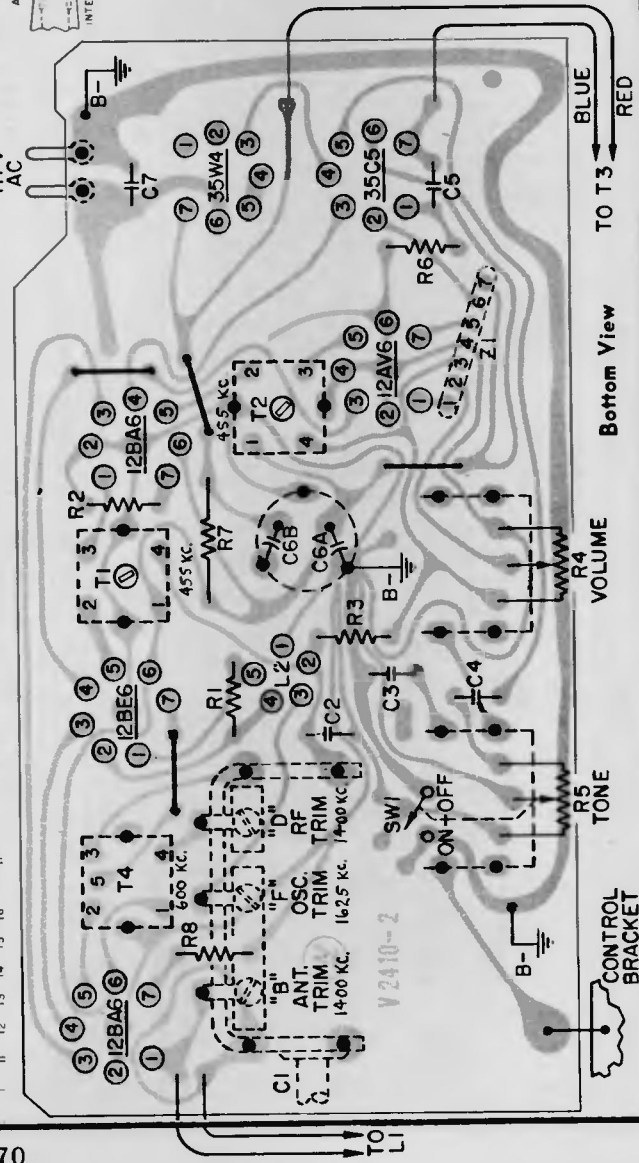


WESTINGHOUSE Chassis V-2410-1
Models H-756T5 and H-757T5

WESTINGHOUSE Chassis V-2410-2
Models H-759T6 and H-760T6



NOTES:
1. VOLTAGES MEASURED FROM COMMON NEGATIVE USING A VTVM. ALL VOLTAGE SET AT 117V. A.C. READINGS SHOULD BE AS SHOWN ± 20%. TUNING CAPACITOR TUNED OFF STATION.
2. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.

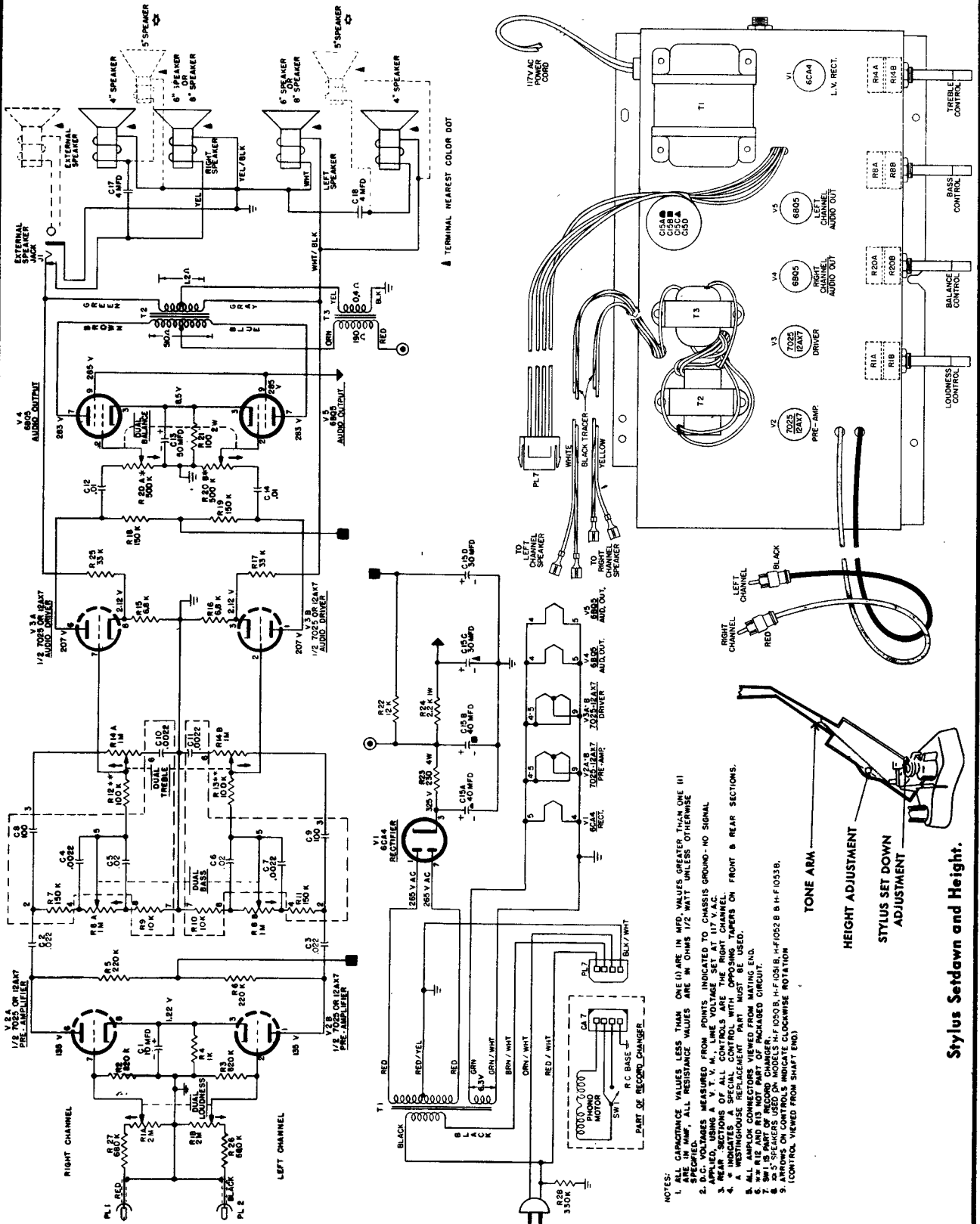


- CHASSIS REMOVAL**
1. Remove four screws, two from top corners on cabinet back and two from cabinet bottom.
 2. Slide cabinet-front and attached chassis out from cabinet.
- CHASSIS REPLACEMENT**
1. Slide chassis and attached cabinet-front into cabinet, making sure that etched circuit board enters the groove provided in the cabinet.
 2. Replace screws removed in "Chassis Removal".

WESTINGHOUSE Chassis V-2410-2
Models H-759T6 and H-760T6

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2512-3, used in Models H-F1010A, H-F1011A, H-F1012A, H-F1013A, H-F1050B, H-F1051B, H-F1052B, H-F1053B

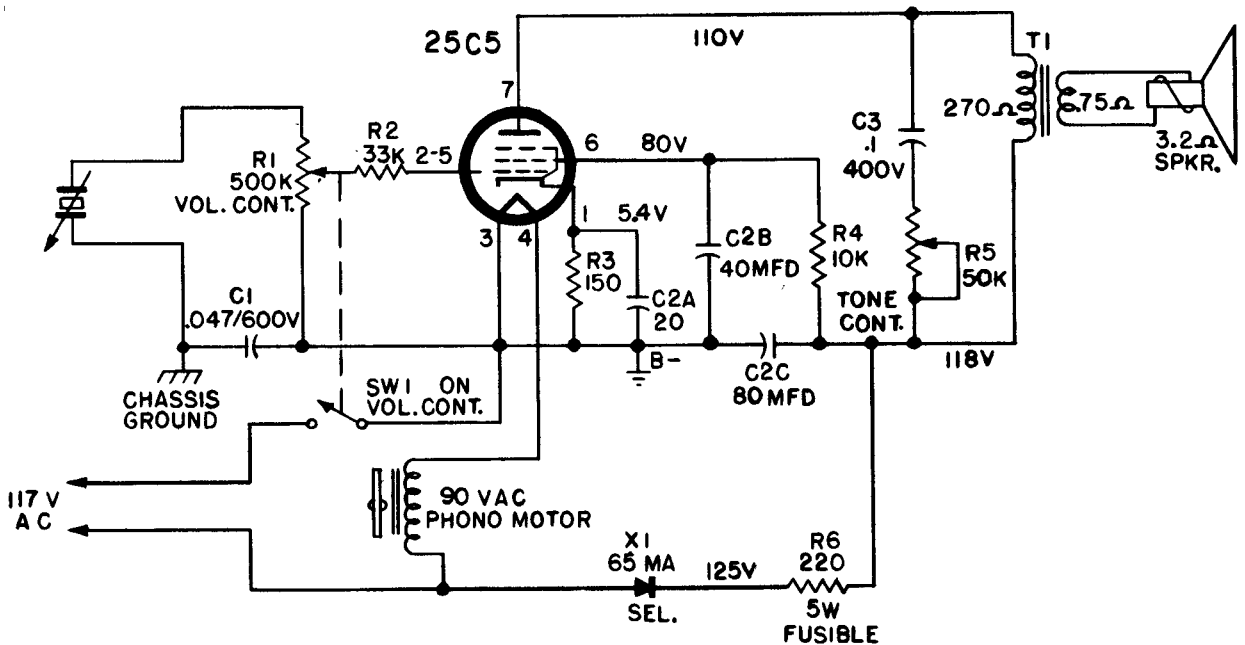


- NOTES:**
1. ALL CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MFD. VALUES GREATER THAN ONE (1) SPECIFIED "M". ALL RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
 2. D.C. VOLTAGES MEASURED FROM POINTS INDICATED BY CHASSIS GROUND - NO SIGNAL APPLIED, USING A V. T. M., LINE VOLTAGE SET AT 117 V.A.C.
 3. ALL CAPACITORS SHOWN WITH POLARITY ARE POLARIZED CAPACITORS.
 4. * INDICATES SPECIAL CONTROL PART WHICH MUST BE USED.
 5. A WESTINGHOUSE REPLACEMENT PART MUST BE USED.
 6. ALL AMP-LOR CONNECTORS VIEWED FROM MATING END.
 7. SW IN AMP LOR MOTOR PART OF PACKAGED CIRCUIT.
 8. SW IN AMP LOR MOTOR PART OF PACKAGED CIRCUIT.
 9. DIMENSIONS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END).

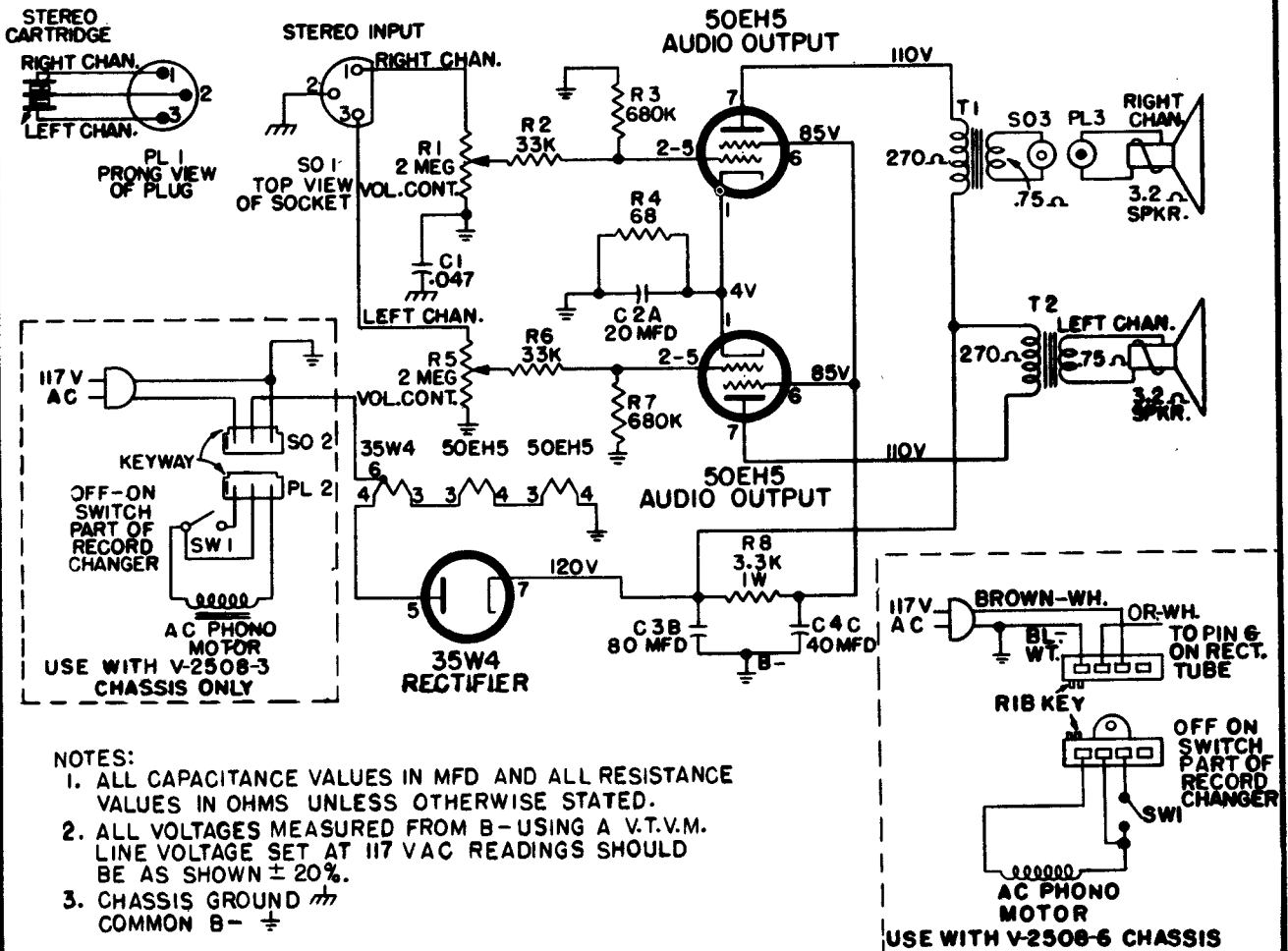
Stylus Setdown and Height.

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

WESTINGHOUSE Chassis V-2508-7, Models H-61MP2, H-61MP3



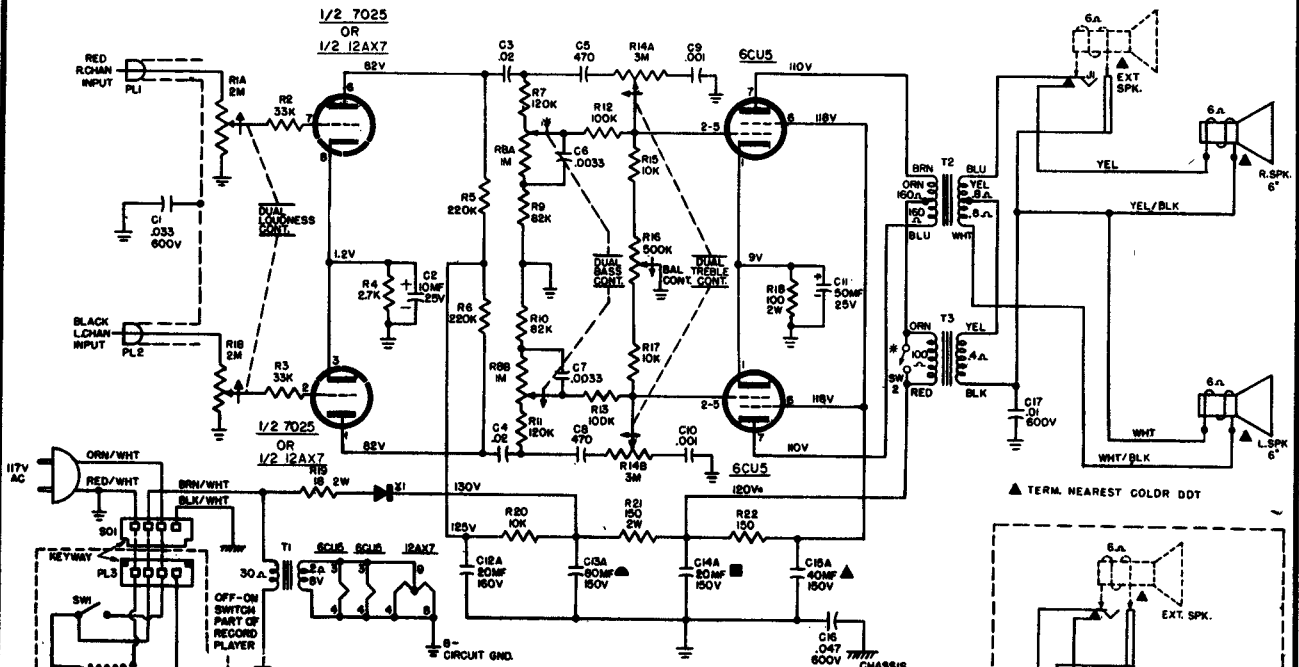
WESTINGHOUSE Chassis V-2508-3, V-2508-6, Models H-64ACS1, H-64ACS2



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

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

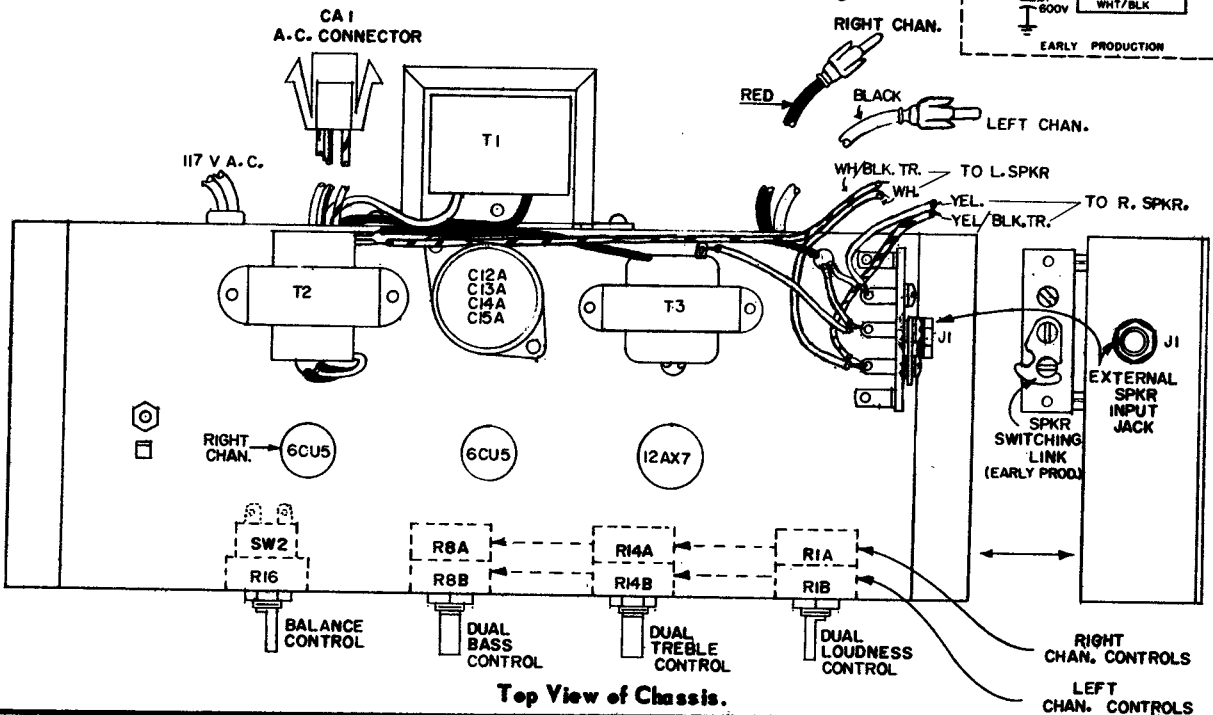
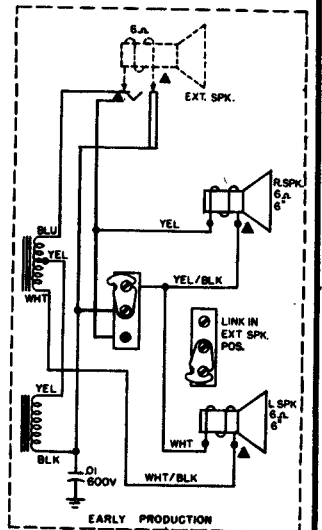
WESTINGHOUSE Chassis V-2507-8, Models H-70ACS1, H-70ACS3, H-70ACS4



CHASSIS REMOVAL

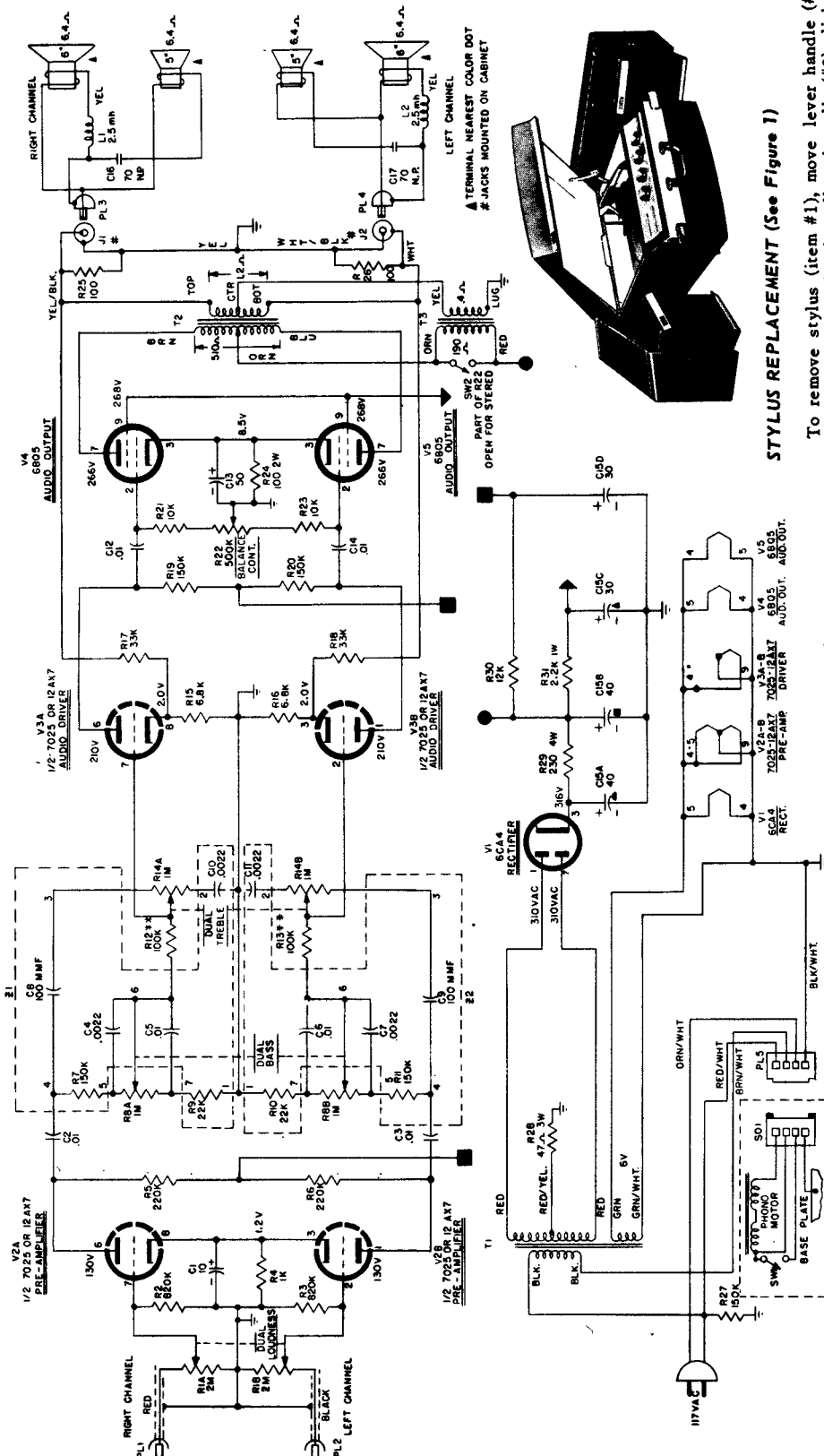
1. Remove control knobs.
 2. Disconnect Amp-Lok type plug from record changer.
 3. Remove phono plugs from record changer noting color of cables and their respective jacks.
 4. Disconnect speaker leads noting connections with regard to lead color and speaker phasing dots.
 5. Remove two nuts securing left speaker baffle and remove baffle.
 6. Remove four nuts securing chassis and remove chassis.
- NOTE: Be sure during chassis installation that phono cables to changer and leads to speakers are properly phased (refer to schematic diagram for speaker lead color coding).

NOTES:
 1. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN MPF, AND VALUES GREATER THAN 1 ARE IN MMFD, WHILE ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
 2. D.C. VOLTAGES MEASURED FROM B-USING VTVM, LINE VOLT. SET AT 117 V.A.C. READINGS SHOULD BE WITHIN 20%
 3. AMP-LOK CONNECTORS VIEWED FROM CONTACT END.
 4. REAR SECTIONS OF ALL CONTROLS ARE RIGHT CHANNEL.
 5. ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
 * SW 2 USED IN EARLY PRODUCTION ONLY, THIS SWITCH IS OPEN IN STEREO POSITION.



Top View of Chassis.

WESTINGHOUSE Chassis V-2507-6
Models H-68ACS1 and H-68ACS2



NOTES:
1. ALL CAPACITANCE VALUES ARE IN MFD, ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. D.C. VOLTS ARE MEASURED FROM POINTS INDICATED TO CHASSIS GROUND - NO SIGNAL APPLIED, USING A 1.5 V. M.M. LINE VOLTAGE SET AT 117 VAC.
3. REAR SECTIONS OF ALL CONTROLS ARE THE RIGHT CHANNEL.
4. ALL AMP/CLK CONNECTORS VIEWED FROM CONTACT END.
5. #1 R12 & R13 ARE NOT INCLUDED IN #1 OR #2.
6. N.P. - NON POLARIZED.

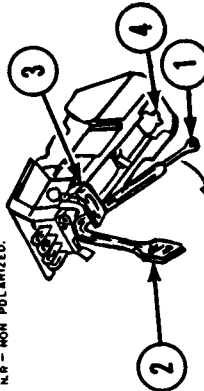


Figure 1
Stylus removal
and replacement.

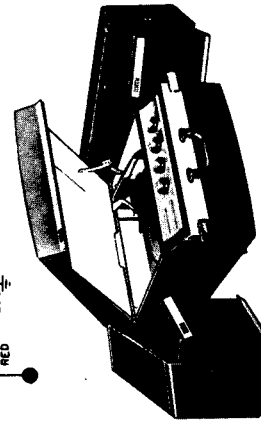


Figure 2 - Cartridge terminal wiring.

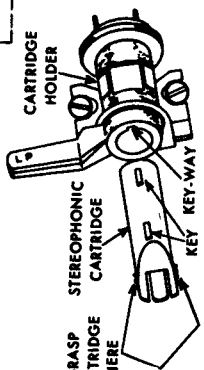
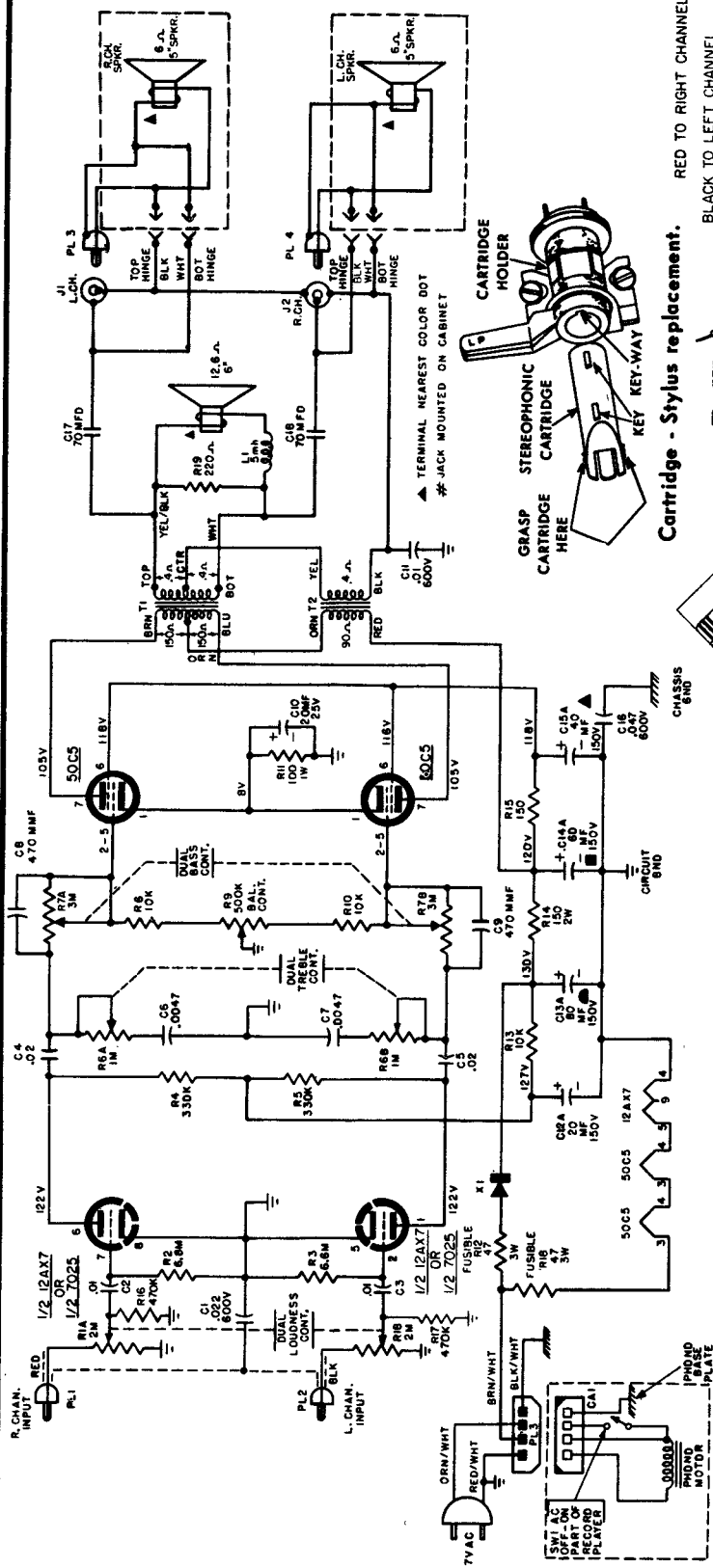
STYLUS REPLACEMENT (See Figure 1)

To remove stylus (item #1), move lever handle (#2) until it is pointing down. Gently pull spring clip (#3) slightly open with finger. Grasp stylus by lever handle and slip it out from under clip. To replace stylus, slip heel of stylus under clip. Gently pull clip slightly open with finger. Slip stylus under clip making certain that stylus shaft rests in center of coupler (#4).

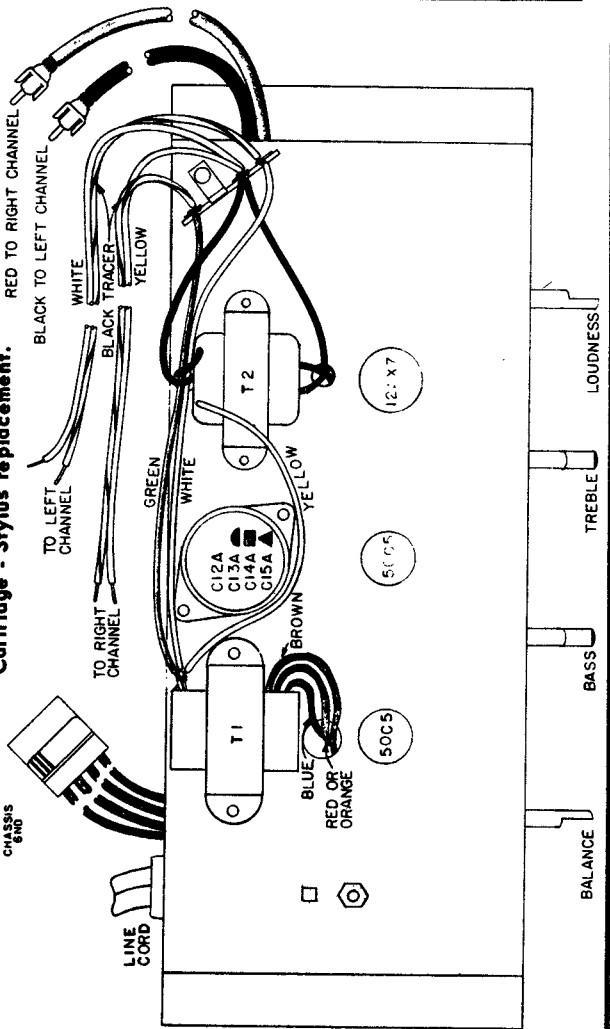
CARTRIDGE REPLACEMENT

Write down the sequence of colored wires connecting to the four terminals at rear of cartridge. Remove the mounting screws securing the cartridge in the tone arm. Remove the push-on connectors from the cartridge terminals. Push the connectors onto the terminals of the replacement cartridge with the wire-colors in the sequence previously noted for the original cartridge.

WESTINGHOUSE Chassis V-2507-5
Models H-67ACS1, H-67ACS2



Cartridge - Stylus replacement.



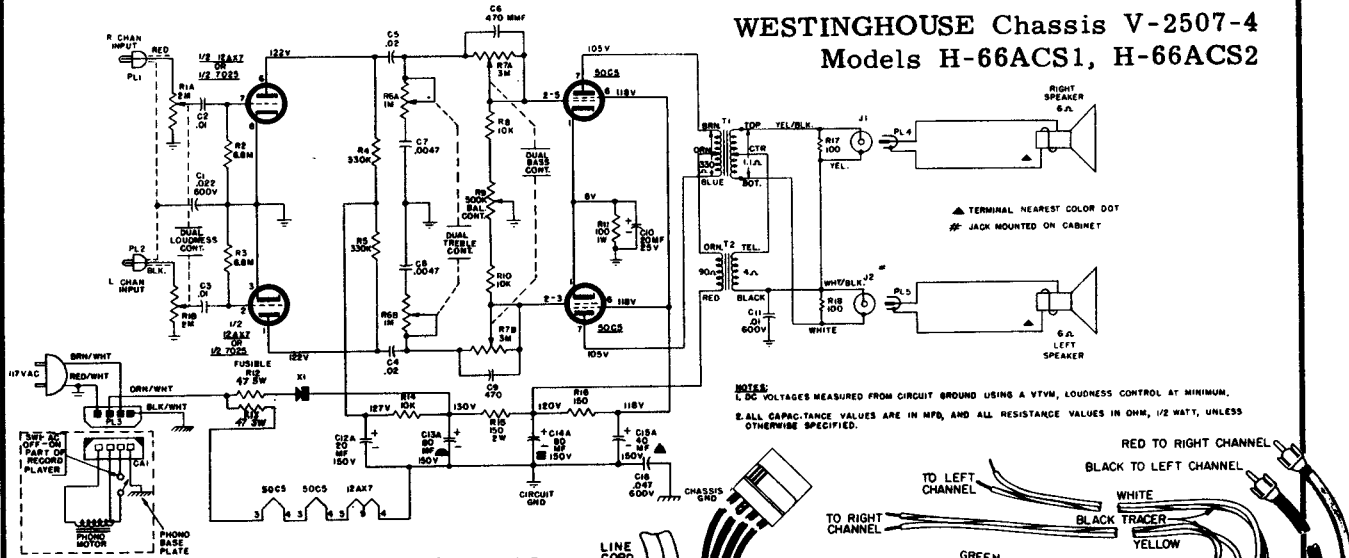
CHASSIS REMOVAL

1. Remove control knobs. Remove the escutcheon mounting board attached to the cabinet by 4 Phillips screws. Remove the perforated tube service cover which is attached to the cabinet by 3 Phillips screws.
2. Remove the 4 Phillips screws holding the motorboard. Lift the motorboard.
3. Note the color and location of the two coax cables connecting to the record changer. Disconnect the amp-loc plug and the two coax cable plugs from the record changer. Remove the record changer.
4. Remove the 2 nuts holding the speaker to the cabinet front and remove the speaker. Note the connections of the speaker leads to the terminal board and unsolder them from the terminals.
5. Remove the 4 nuts holding the chassis and remove the chassis.

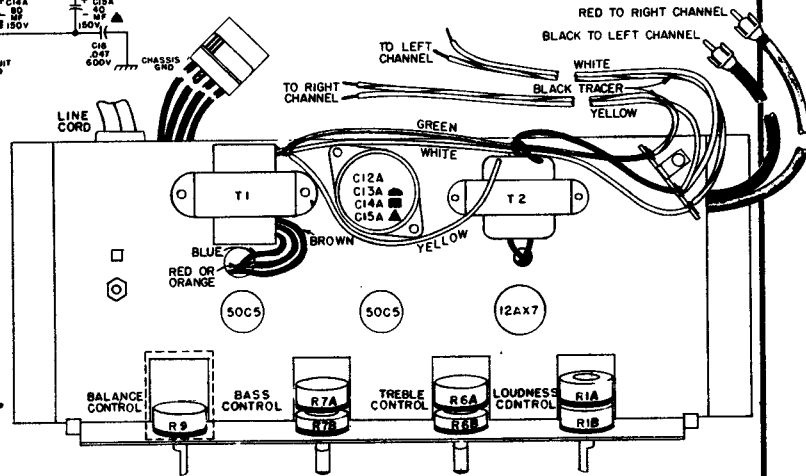
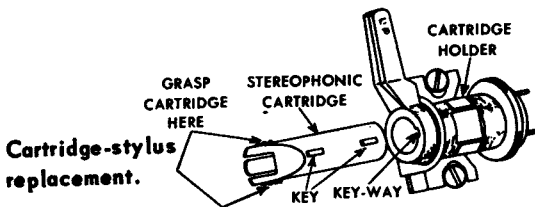
NOTES:
1. DC VOLTAGES MEASURED FROM CIRCUIT GROUND USING A VTVM, LOUDNESS CONTROL AT MINIMUM.
2. ALL CAPACITANCE VALUES ARE IN MFD, AND ALL RESISTANCE VALUES IN OHM, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

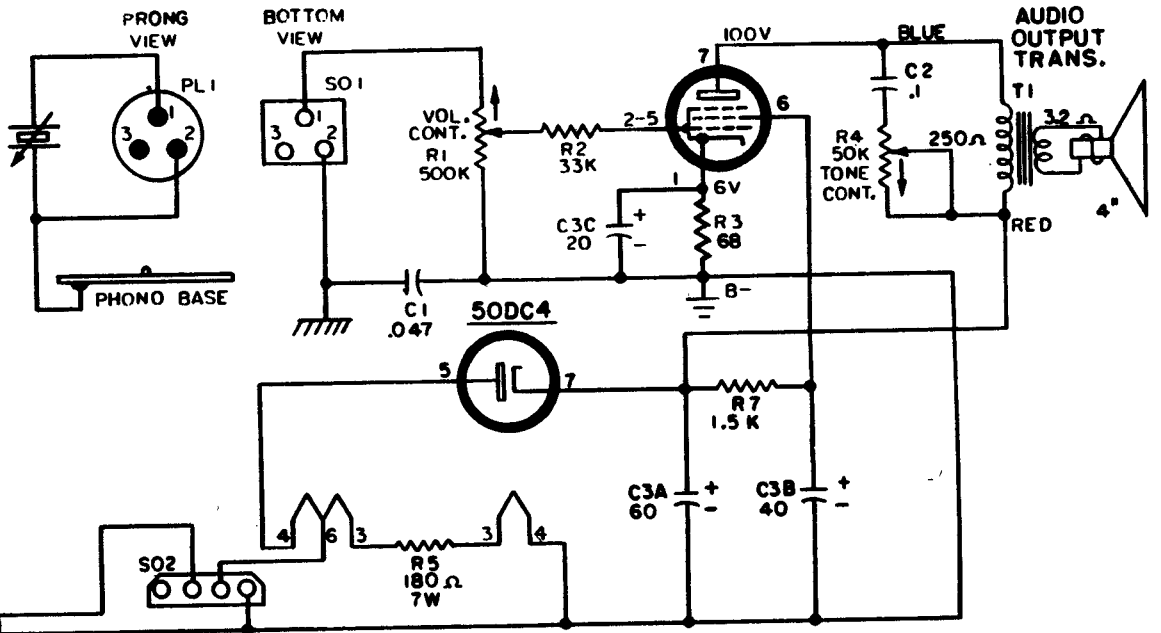
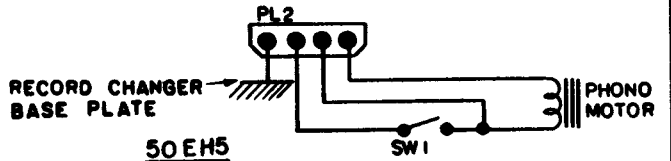
WESTINGHOUSE Chassis V-2507-4
Models H-66ACS1, H-66ACS2

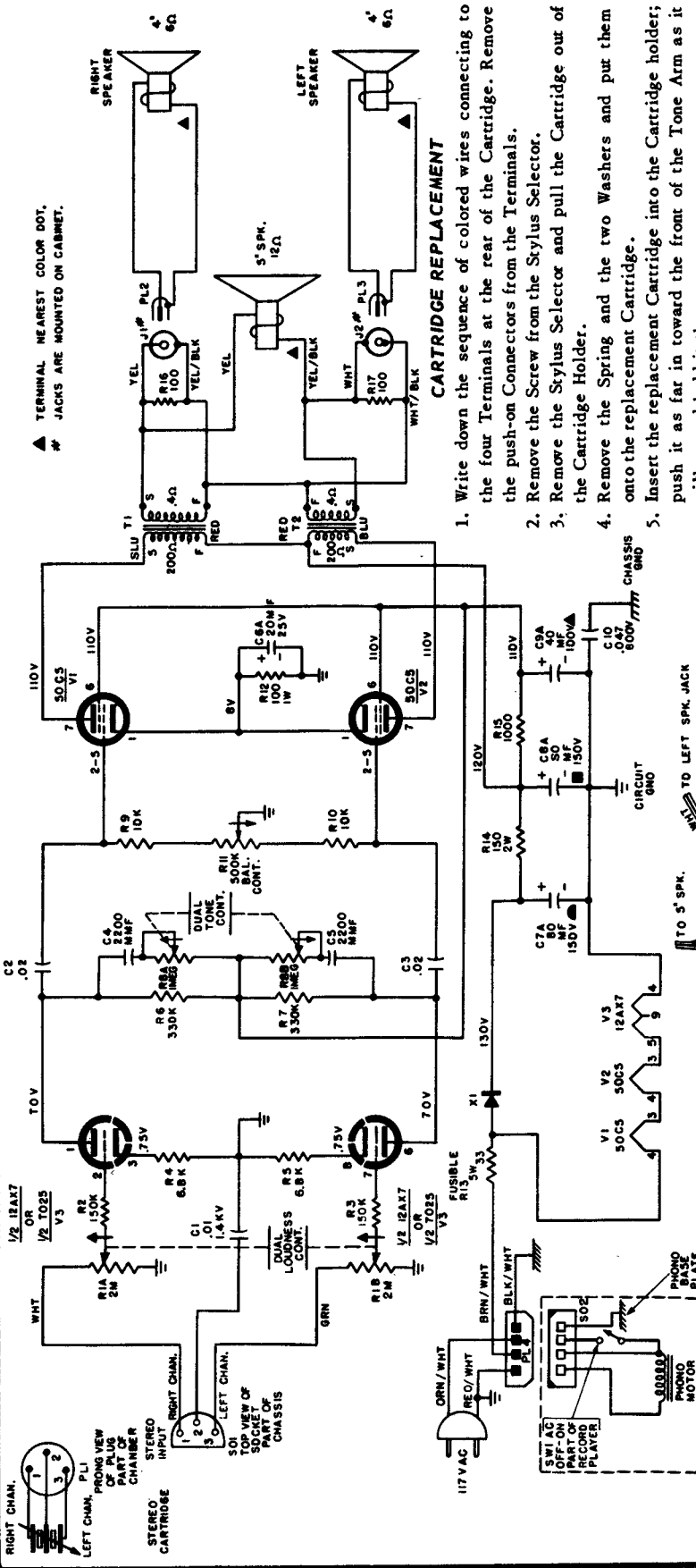


Operating voltage 105 to 120 volts, 60 Cps, AC
 Power consumption 65 watts
 Audio output power 3.8 watts
 Frequency response Flat from 100 Cps to 10,000 Cps, ± 1 DB at 1 watt output
 Speakers (2) 6" PM
 Phono cartridge (part 671V001H02) Astatic 13T stereo



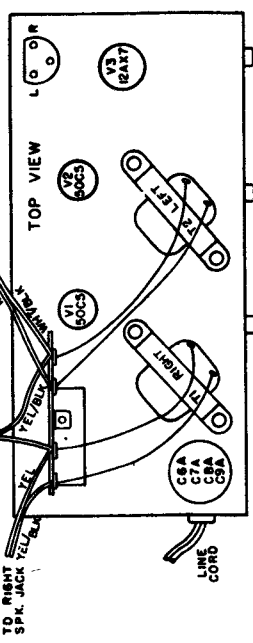
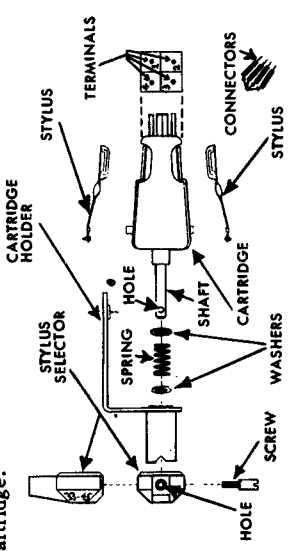
WESTINGHOUSE Chassis V-2508-5
Models H-63AC1, H-63AC2



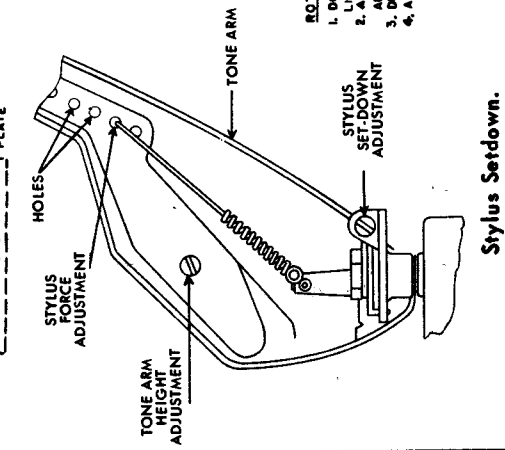


CARTRIDGE REPLACEMENT

1. Write down the sequence of colored wires connecting to the four Terminals at the rear of the Cartridge. Remove the push-on Connectors from the Terminals.
2. Remove the Screw from the Stylus Selector.
3. Remove the Stylus Selector and pull the Cartridge out of the Cartridge Holder.
4. Remove the Spring and the two Washers and put them onto the replacement Cartridge.
5. Insert the replacement Cartridge into the Cartridge holder; push it as far in toward the front of the Tone Arm as it will go and hold it there.
6. Put the Stylus Selector onto the Cartridge Shaft so that the Hole in the Stylus Selector lines up with the Hole in the Cartridge Shaft. Secure it in place with the Screw. Be sure that the "33-45" marking on the Stylus Selector faces upward and the Stylus marked SA-075 faces down.
7. Push the Connectors onto the Terminals with the wire -colors in the sequence previously noted for the original cartridge.



- NOTES:
1. DC VOLTAGES MEASURED FROM CIRCUIT GROUND USING A VTVM, LOUDNESS CONTROL AT MINIMUM. LINE VOLTAGE SET AT 117 V.A.C. READINGS SHOULD BE AS SHOWN ±20%.
 2. ALL CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MFD, VALUES GREATER THAN ONE (1) ARE IN MMF.
 3. ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 4. DUAL CONTROLS ARE WIRED REAR SECTION RIGHT CHAN., - PANEL SECTION LEFT CHAN.
 4. ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEW FROM SHAFT END.)



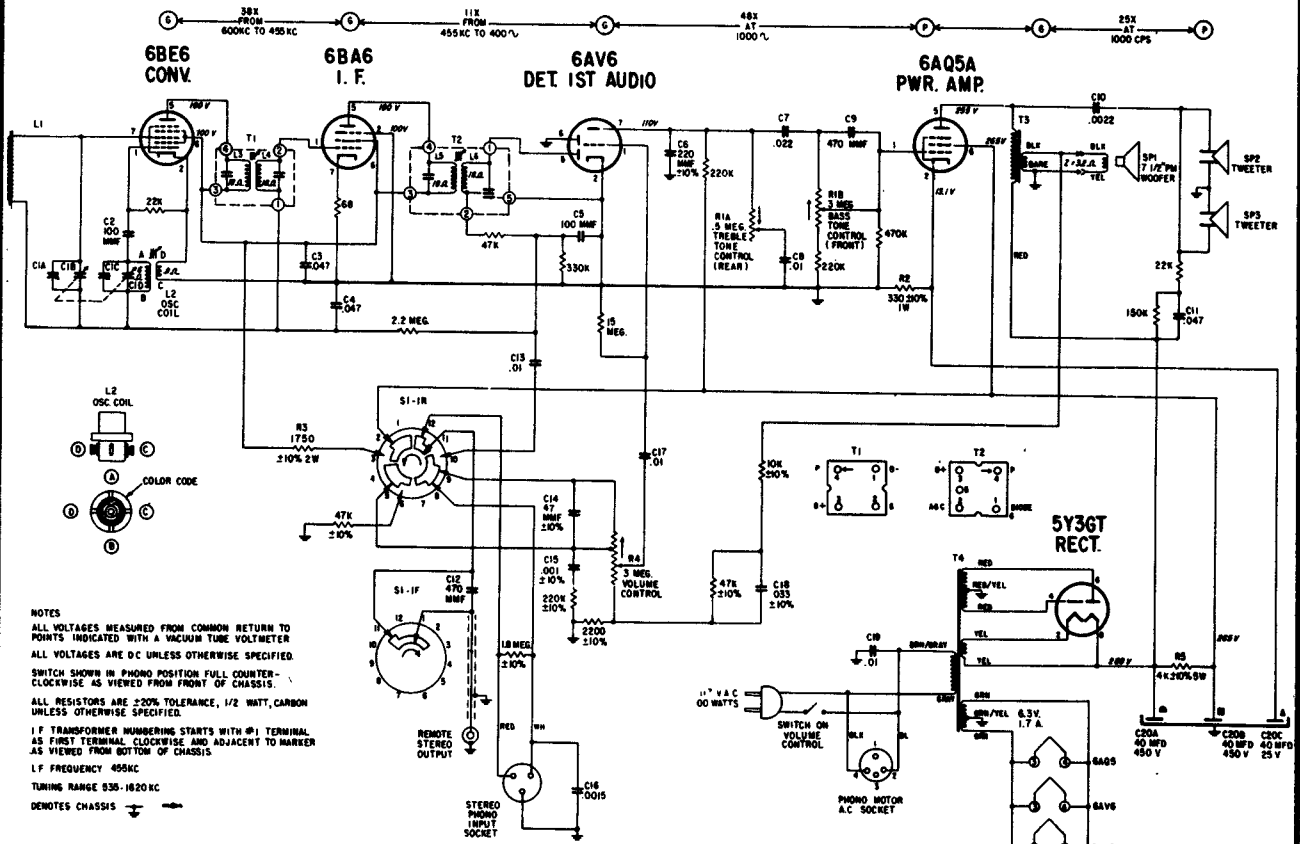
WESTINGHOUSE Chassis V-2506-5
Models H-65ACS1, H-65ACS2

Stylus Setdown.

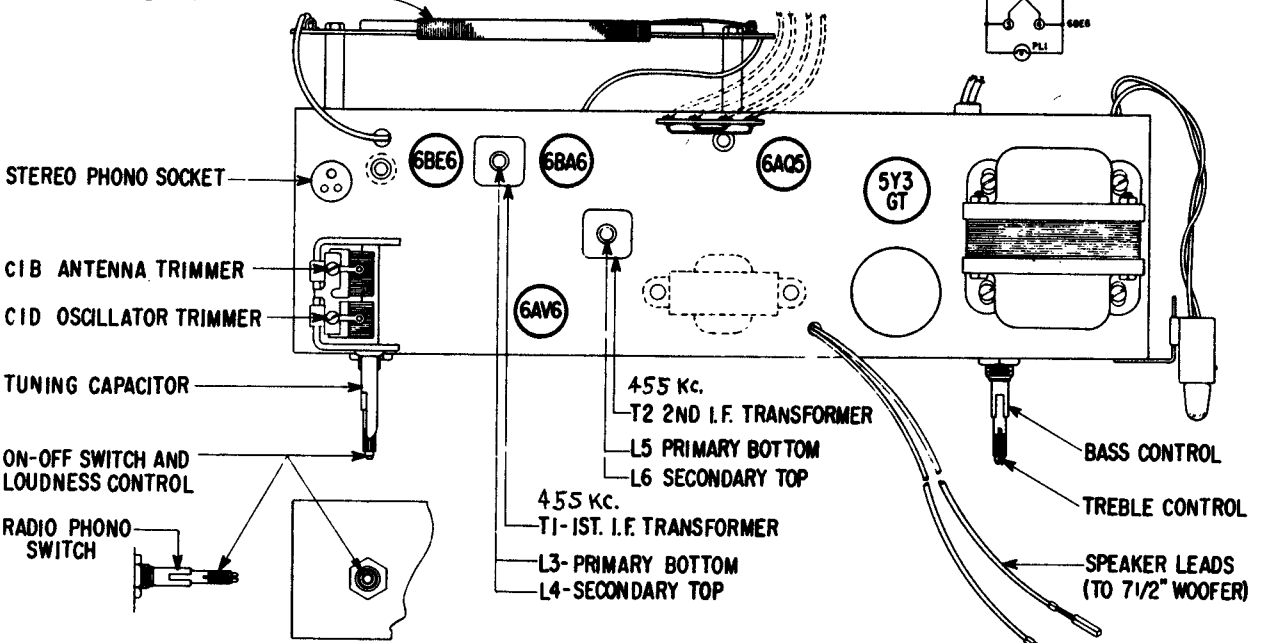
ZENITH RADIO CORPORATION

MODEL SFD-660 PORTABLE

STEREOPHONIC PHONOGRAPH CHASSIS 5D20

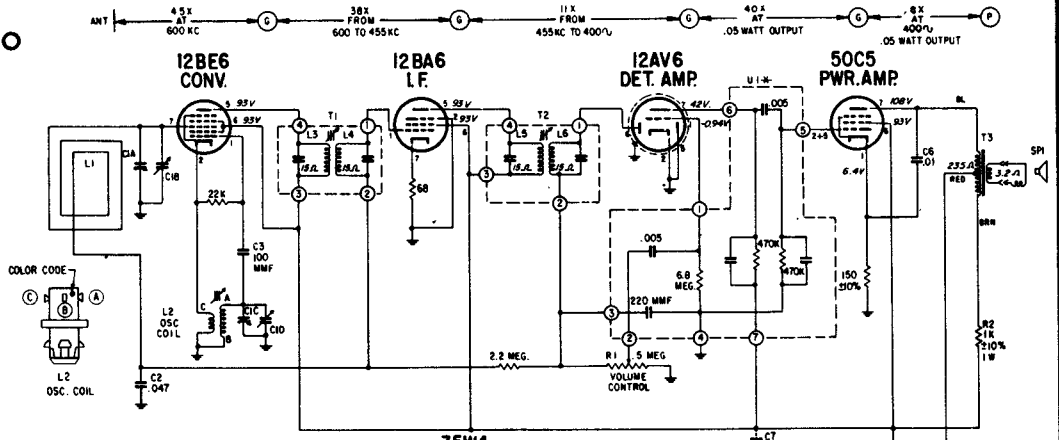


ANTENNA ASSEMBLY



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

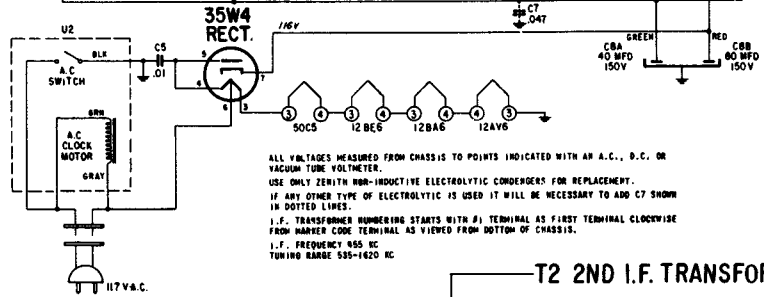
ZENITH RADIO



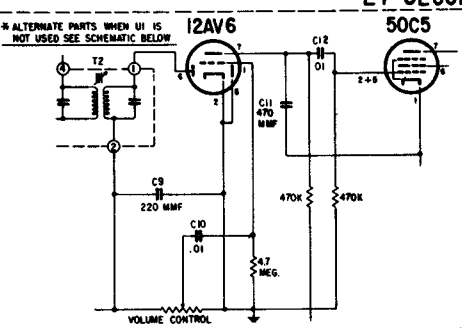
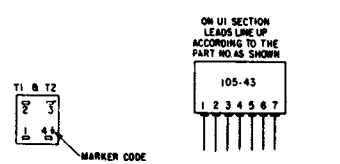
ZENITH RADIO

Chassis 5F03, used in Models XD60C, F, L, V.

Chassis 5E04 used in Models E514B, L, V, W, is the same electrically.

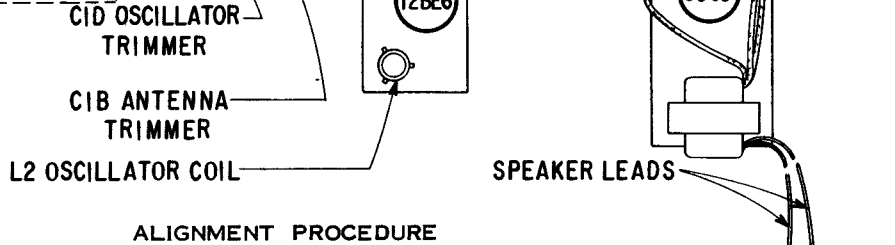


ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
 USE ONLY ZENITH HIGH-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C7 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL AS FIRST TERMINAL CLOCKWISE FROM HARPER CODE TERMINAL AS VIEWED FROM BOTTOM OF CHASSIS.
 I.F. FREQUENCY 455 KC
 TUNING RANGE 535-1620 KC



T1 1ST I.F. TRANSFORMER
 L3 PRIMARY BOTTOM
 L4 SECONDARY TOP

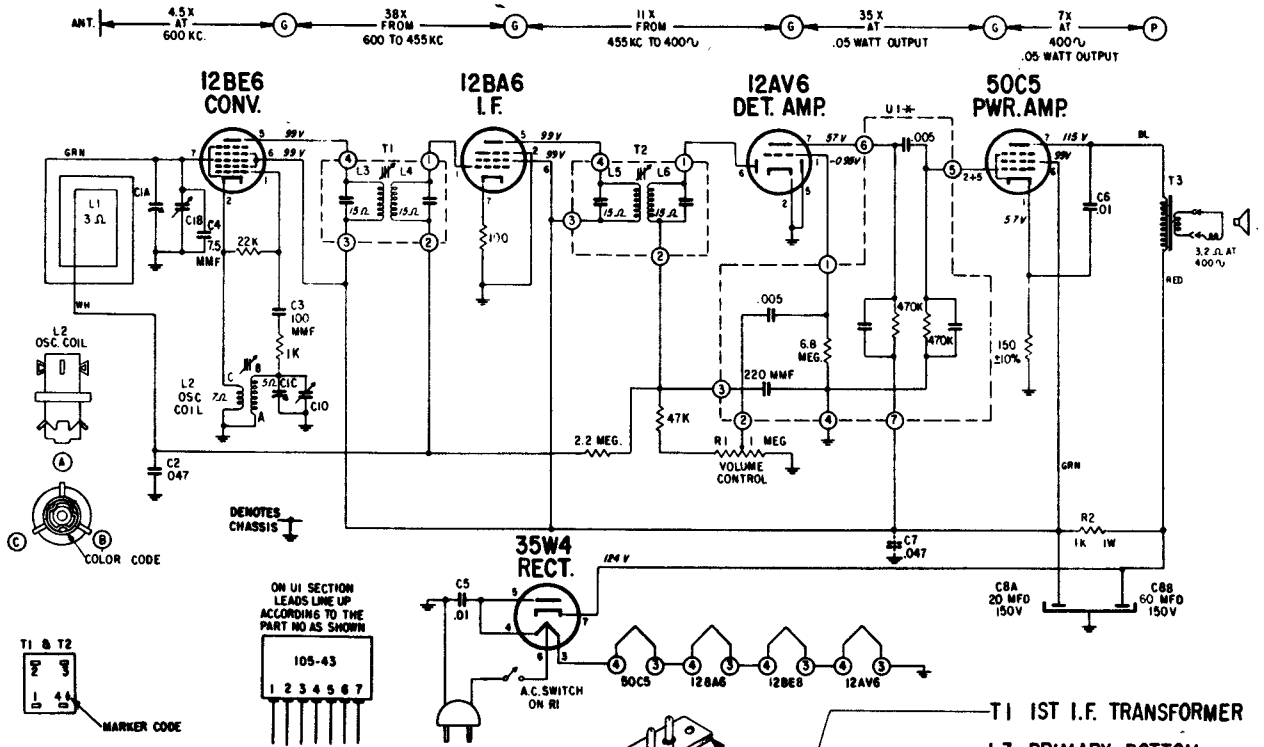
T2 2ND I.F. TRANSFORMER
 L5 PRIMARY BOTTOM
 L6 SECONDARY TOP



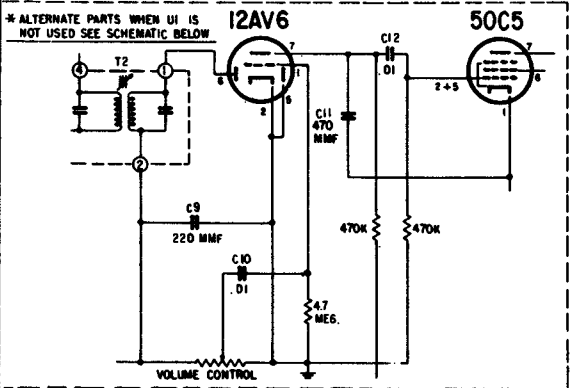
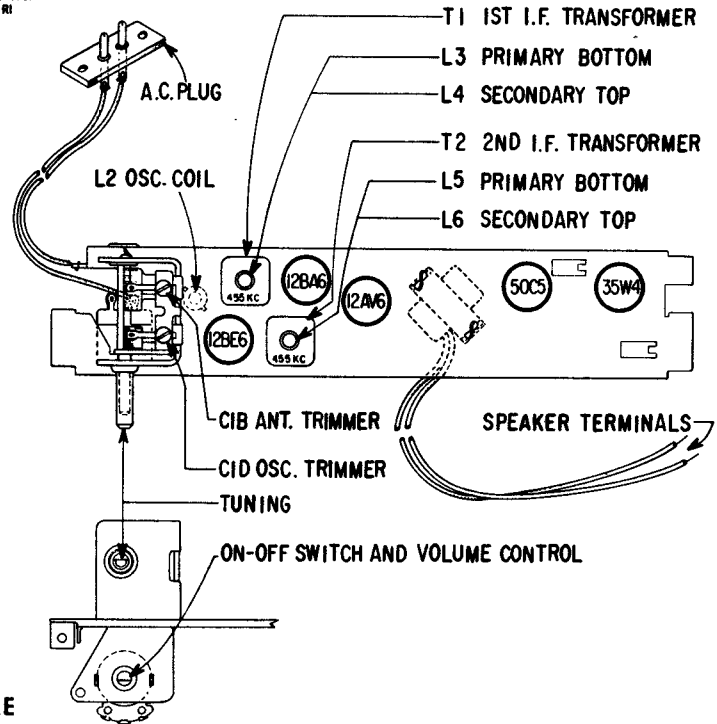
ALIGNMENT PROCEDURE

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

ZENITH RADIO MODELS F512F, C, W, L, CHASSIS 5F13



NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C7 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.

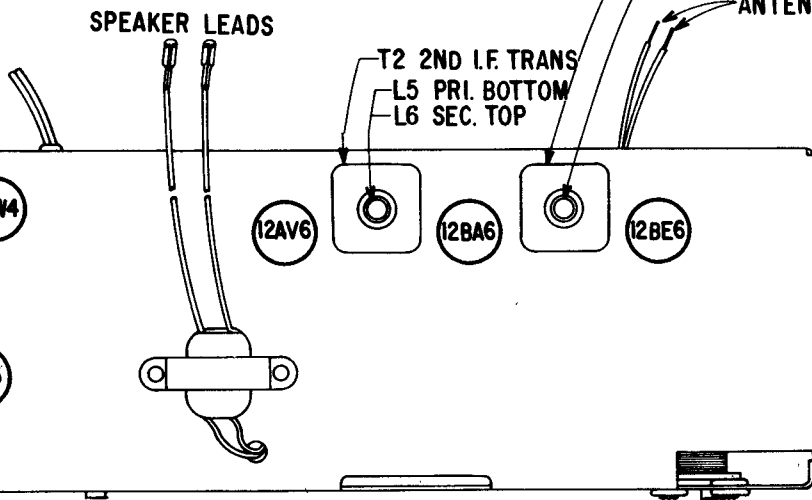
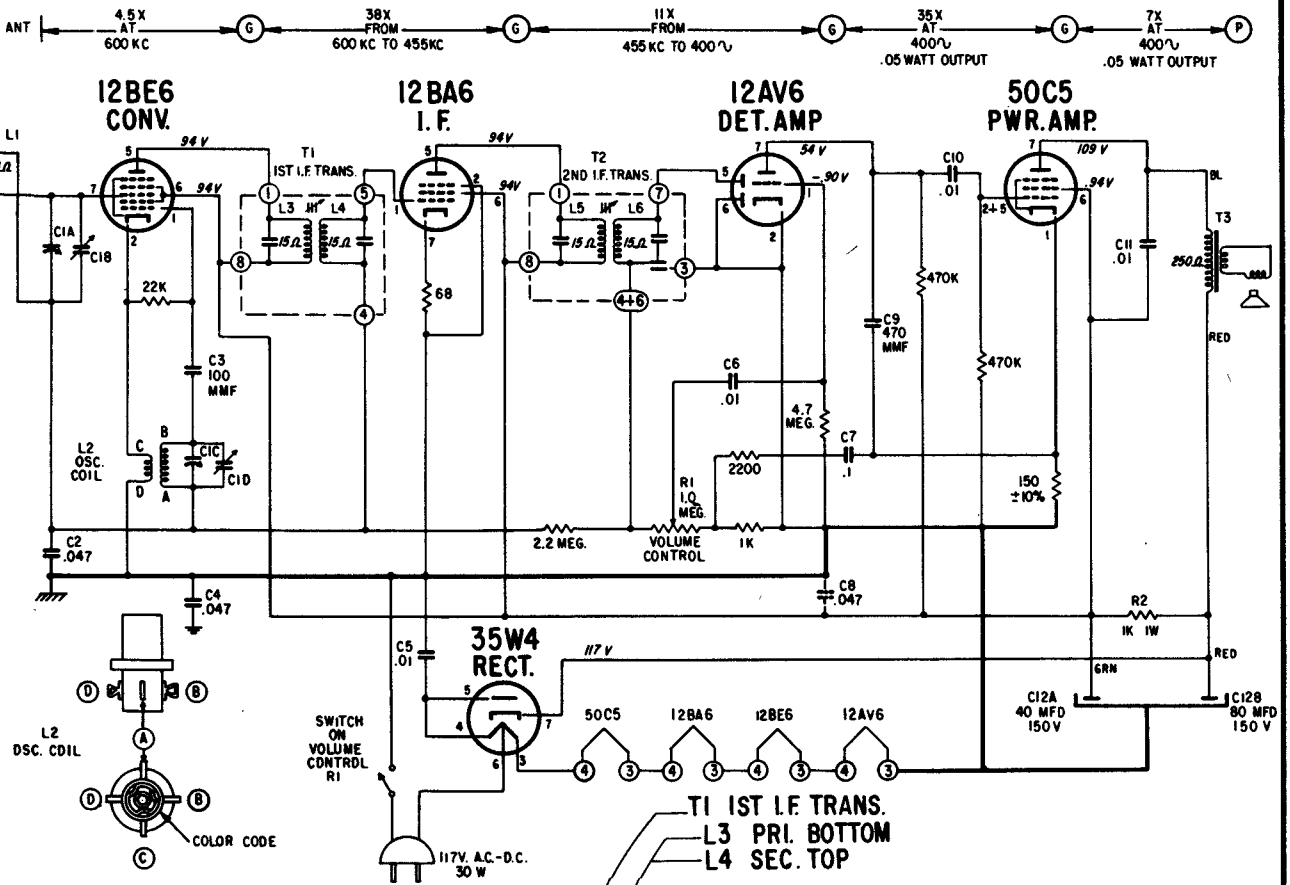


ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	UMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3,4,5,6	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	CID	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	CIB	Align Antenna Stage

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

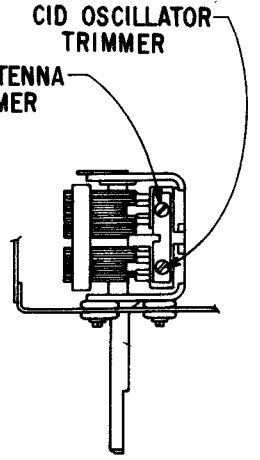
ZENITH RADIO CORPORATION MODELS XD50C, G, R, W, CHASSIS 5D12



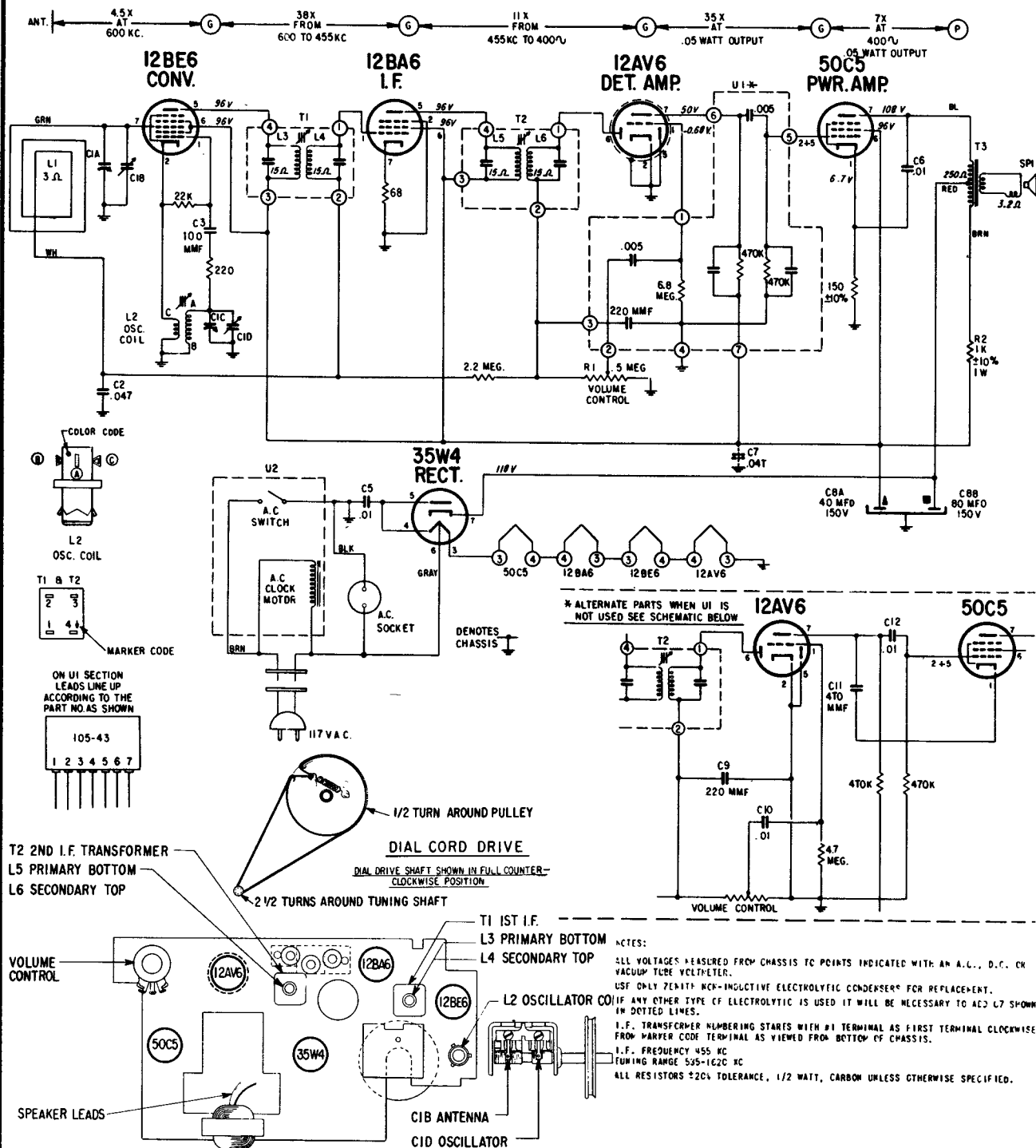
NOTES:
 ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT. IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C8 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL, AS 1ST TERMINAL CLOCKWISE AND ADJACENT TO MARKER AS VIEWED FROM BOTTOM OF CHASSIS.
 ALL RESISTORS ±20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 I.F. FREQUENCY 455 KC.
 TUNING RANGE 535-1620 KC.
 ⚡ DENOTES CHASSIS ⏏ DENOTES COMMON RETURN B-

ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Sig. Frequency	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, L4, L5, L6	For I.F. Alignment.
2	One Turn Loop Coupled	—	1600 Kc.	1600 Kc.	C1D	Set Oscillator to Dial Scale
3	Loosely to Wave Magnet	—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

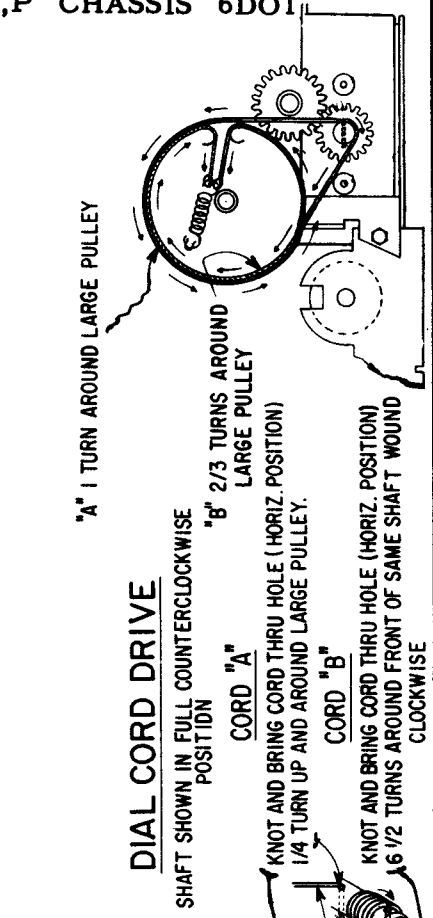
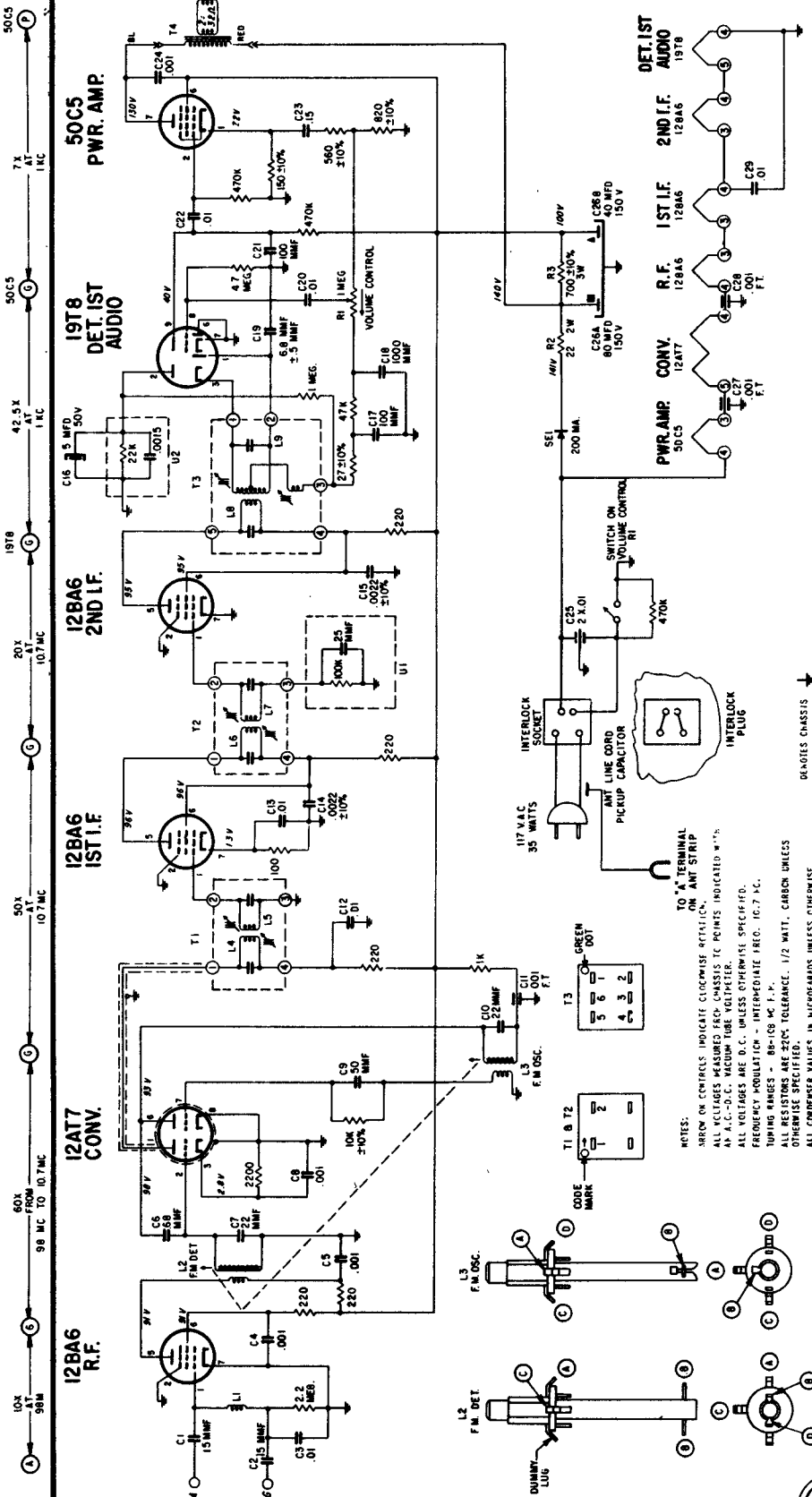


ZENITH RADIO Chassis 5G09, Models G516C, L, V, W

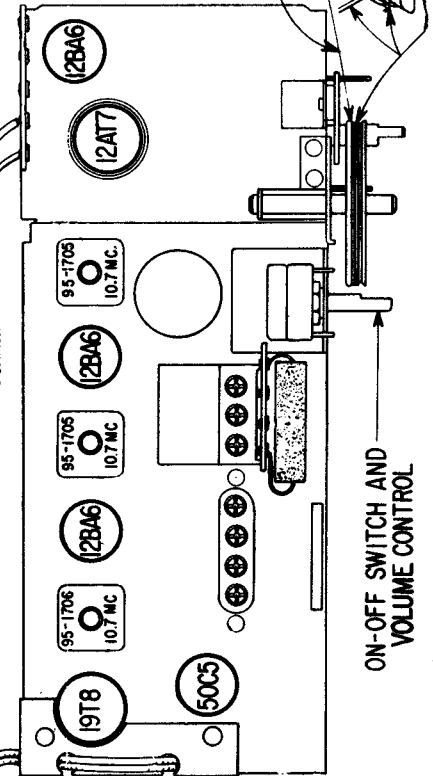


OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.05 Mfd.	455 Kc.	600 Kc.	L3, 4, 5, 6	For I.F. Alignment.
2	One Turn Loop Coupled Loosely to Wave Magnet	—	1600 Kc.	1600 Kc.	CID	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	CIB	Align Antenna Stage

ZENITH RADIO MODEL D720C,P CHASSIS 6D01

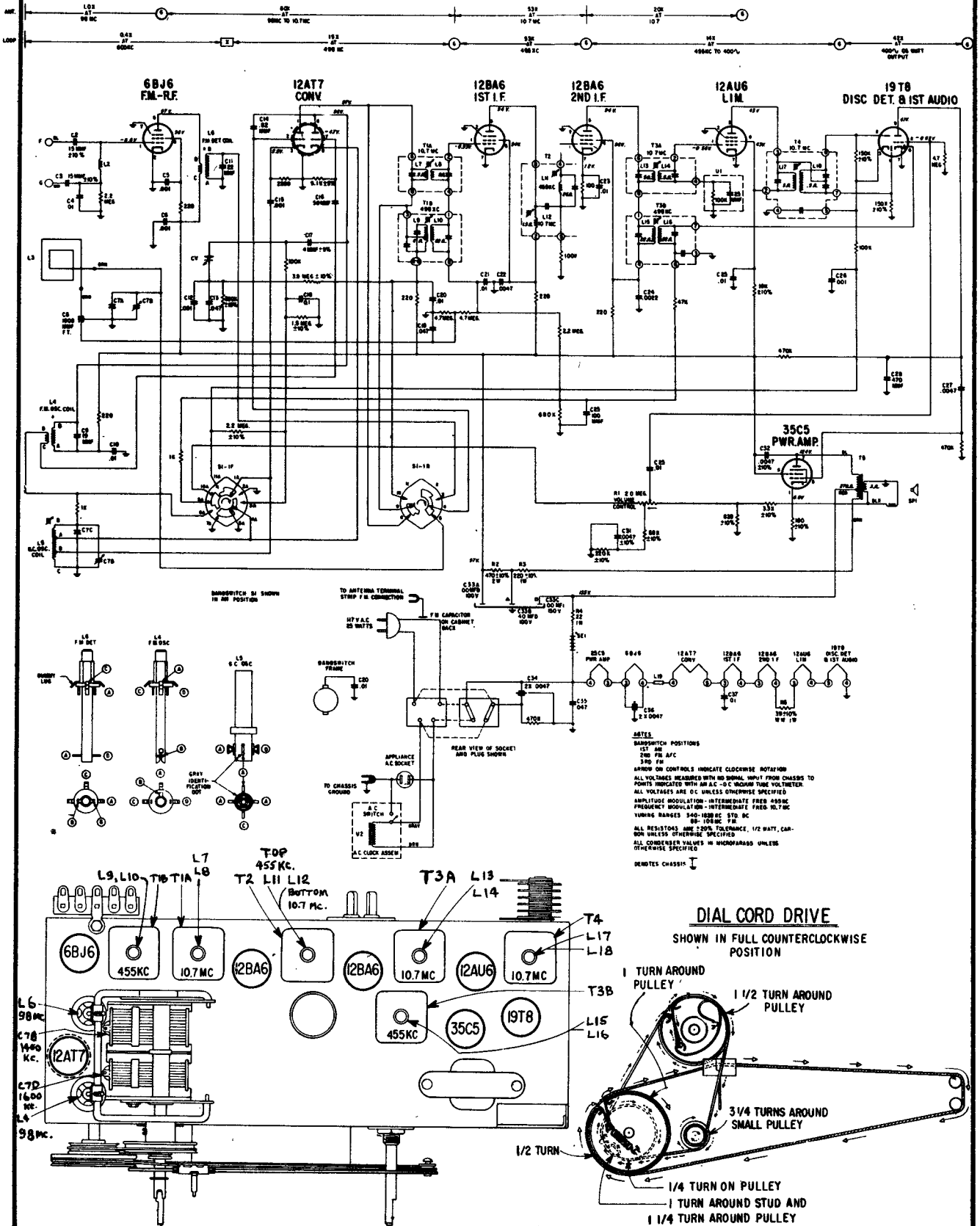


"A" 1 TURN AROUND LARGE PULLEY
 "B" 2/3 TURNS AROUND LARGE PULLEY
 DIAL CORD DRIVE
 SHAFT SHOWN IN FULL COUNTERCLOCKWISE POSITION
 CORD "A"
 CORD "B"
 KNOT AND BRING CORD THRU HOLE (HORIZ. POSITION) 1/4 TURN UP AND AROUND LARGE PULLEY.
 KNOT AND BRING CORD THRU HOLE (HORIZ. POSITION) 1/6 1/2 TURNS AROUND FRONT OF SAME SHAFT WOUND CLOCKWISE



NOTES:
 ARROW ON CONTROLS INDICATE COUNTERCLOCKWISE REVERSE.
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED ***.
 ALL A.C.-D.C. VACUUM TUBE VOLTMETER.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 FREQUENCY MODULATION - INTERMEDIATE FREQ. 10.7 MC.
 TUNING RANGES - 88-108 MC. P.P.
 ALL RESISTORS ARE 20% TOLERANCE. 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSER VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

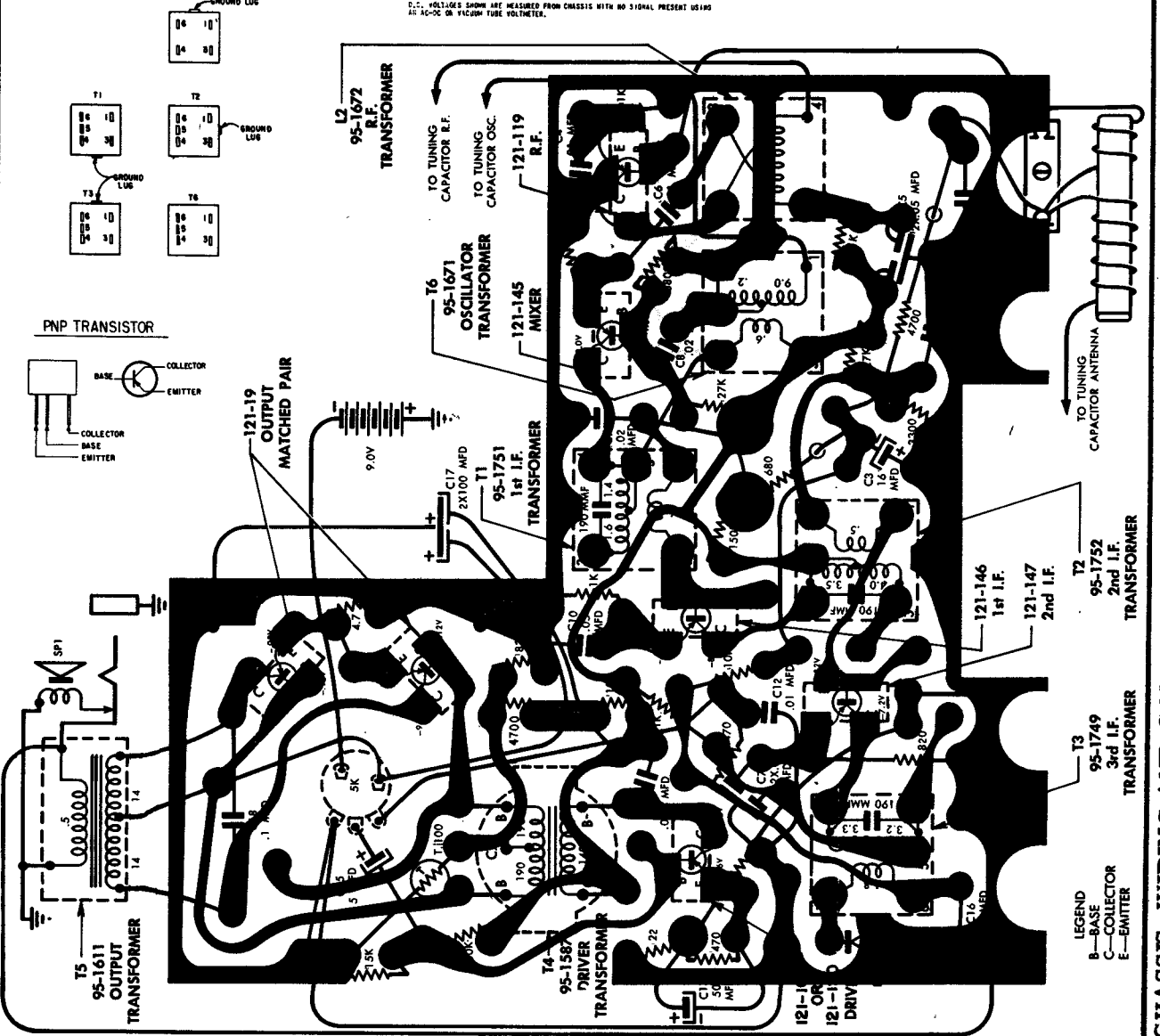
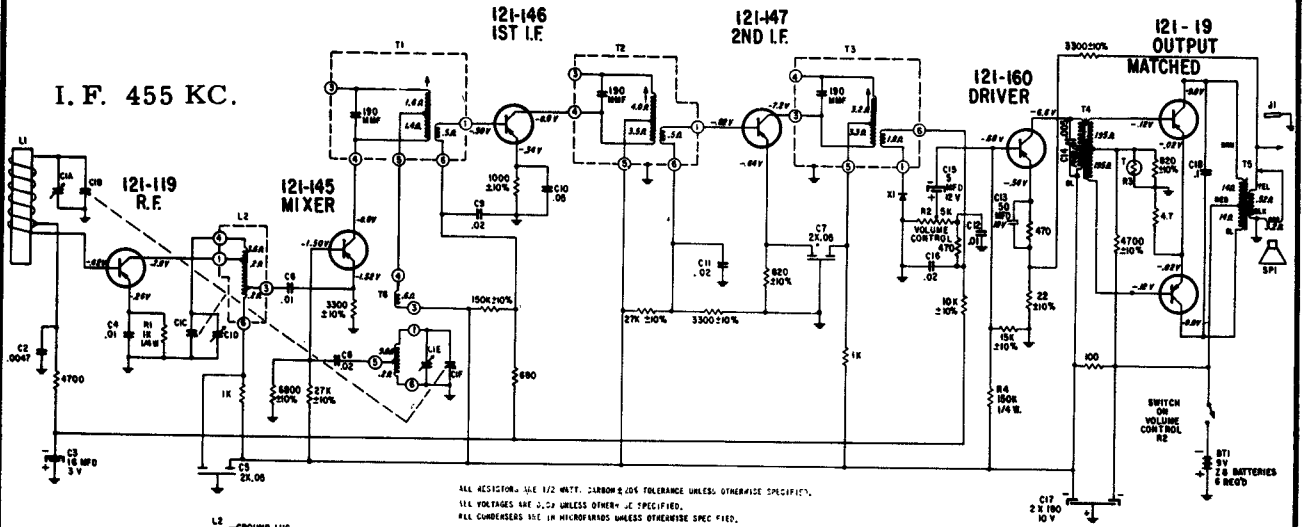
ZENITH MODEL F728C, L & W, CHASSIS 7F03



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

ZENITH RADIO Chassis 7FT45Z1, Model "Royal 475"

I. F. 455 KC.



CHASSIS, WIRING AND COMPONENTS VIEWED FROM WIRING SIDE

ZENITH Chassis 6GT40Z1 & 6GT40Z2, Model "Royal 50"
 (Additional service material on page 187)

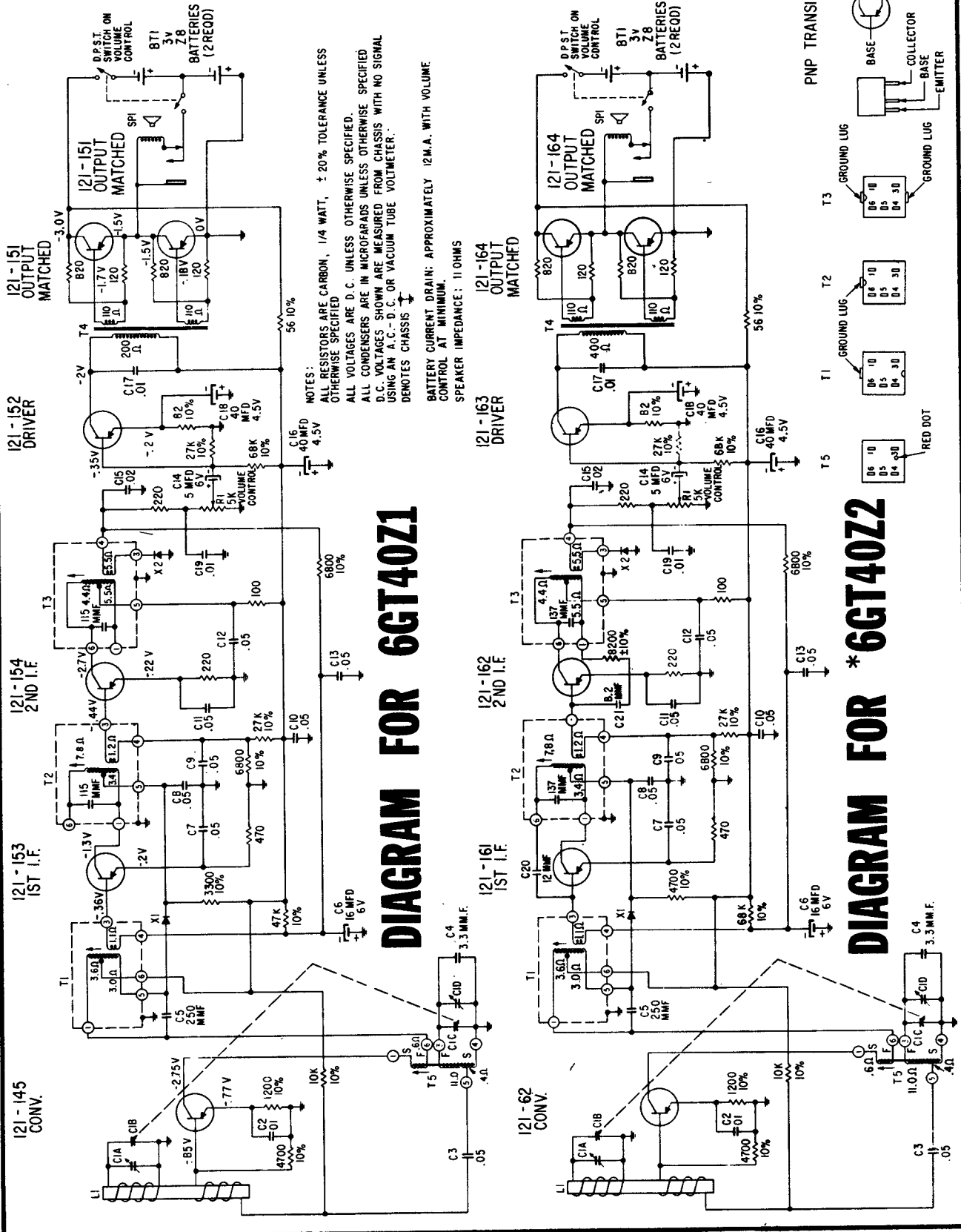


DIAGRAM FOR 6GT40Z1

DIAGRAM FOR *6GT40Z2

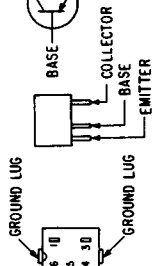
NOTES:
 ALL RESISTORS ARE CARBON, 1/4 WATT, ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.
 DENOTES CHASSIS

BATTERY CURRENT DRAIN: APPROXIMATELY 12M.A. WITH VOLUME CONTROL AT MINIMUM.
 SPEAKER IMPEDANCE: 11 OHMS

121-151 OUTPUT MATCHED
 121-152 DRIVER
 121-153 1ST I.F.
 121-154 2ND I.F.
 121-145 CONV.

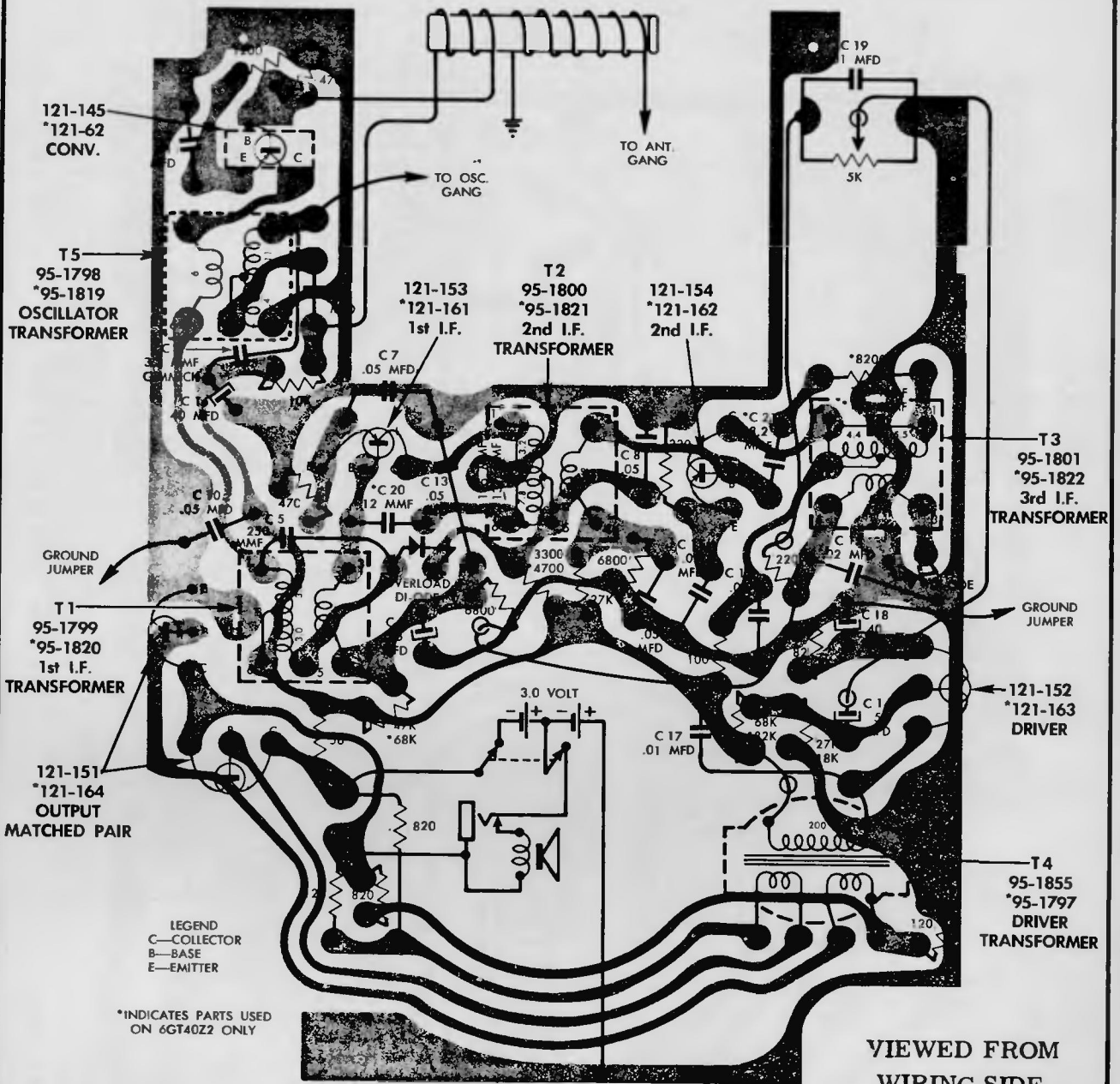
121-164 OUTPUT MATCHED
 121-163 DRIVER
 121-162 2ND I.F.
 121-161 1ST I.F.
 121-62 CONV.

PNP TRANSISTOR



VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

ZENITH Chassis 6GT40Z1 & 6GT40Z2, Model "Royal 50" Continued



ALIGNMENT PROCEDURE

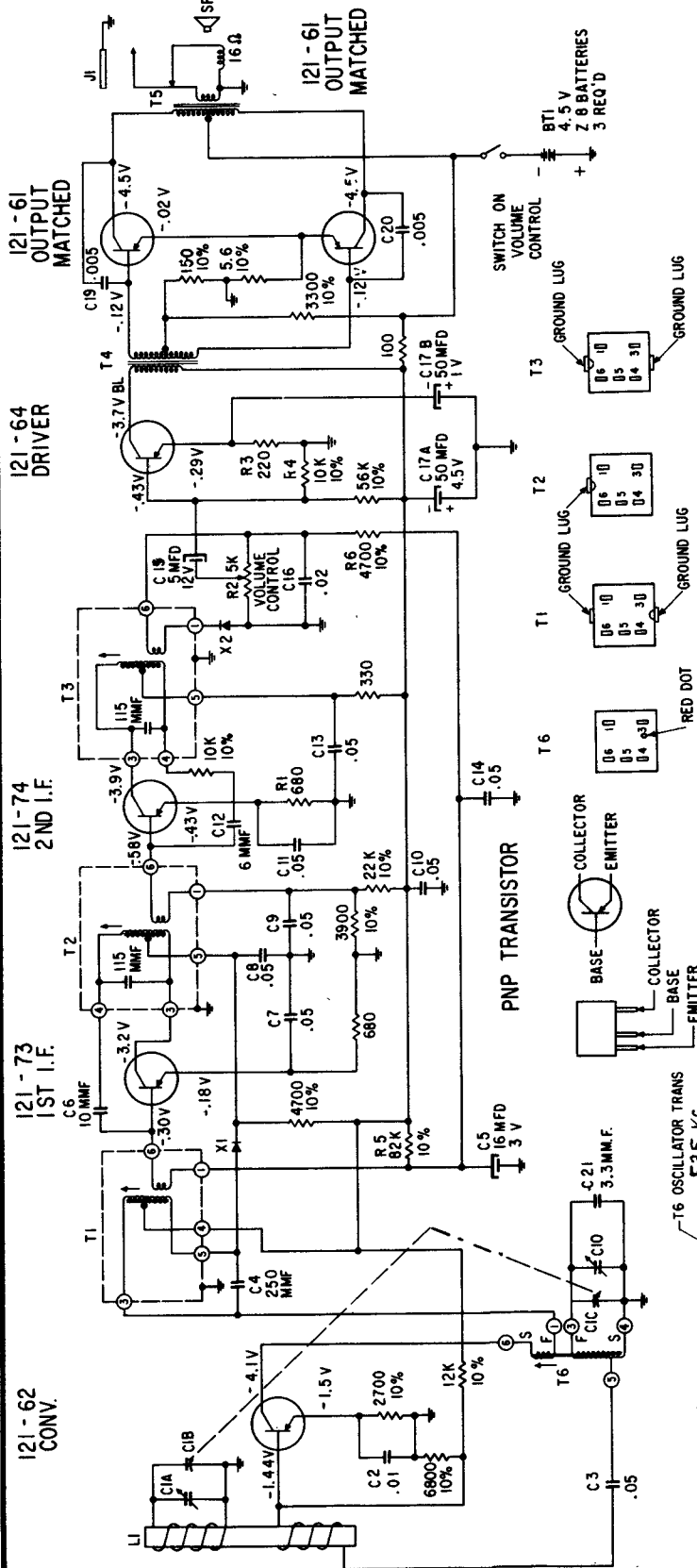
Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		—	Gang wide open.	C1D	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	REPEAT STEPS 2 & 3		—	—	—	—
5	1260 KC		—	1260 KC	C1A	Align loop ant.

DIAGRAM FOR 6ET42Z2

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO

ZENITH Chassis 6ET42Z1 & 6ET42Z2, Model "Royal 100"

(Continued on page 189)

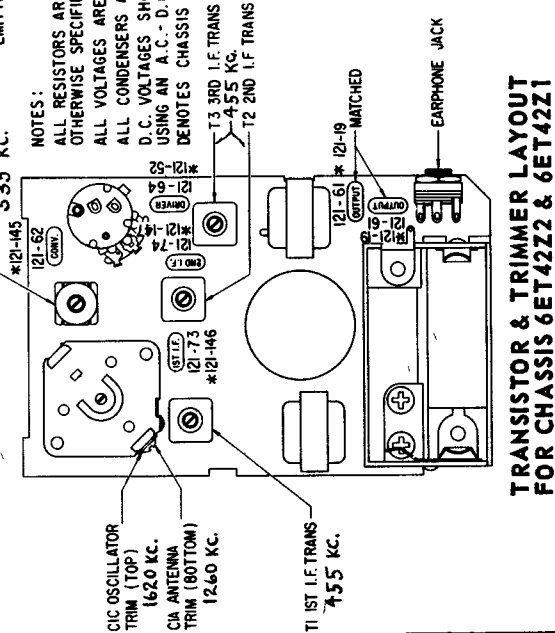


These transistor portable chassis are conventional superheterodyne receivers. Chassis 6ET42Z2 & 6ET42Z1 are virtually identical except for different transistors and a few other parts. The parts marked by asterisks on the chassis wiring and component drawing apply only to chassis 6ET42Z1. Both chassis have a converter to produce the 455 Kc intermediate frequency.

CHASSIS INFORMATION CHART

Chassis	Transistor Layout Label Color	Part No.	Conv.	1st I.F.	2nd I.F.	Crystal Diode Detector	Driver	Output-Output	Supplier
*6ET42Z1	Red 102-7651	Zenith RETMA Type	121-145 2N1108 PNP	121-146 2N1110 PNP	121-147 2N1111 PNP	103-19 1N87G	121-52 R120 PNP	121-19 R16 Matched Pair PNP PNP	Texas Instrument
6ET42Z2	102-7302	Zenith RETMA Type	121-62 2N411 PNP	121-73 2N409 PNP	121-74 2N409 PNP	103-19 1N87G	121-64 2N407 PNP	121-61 2N407 Matched Pair PNP PNP	R.C.A.

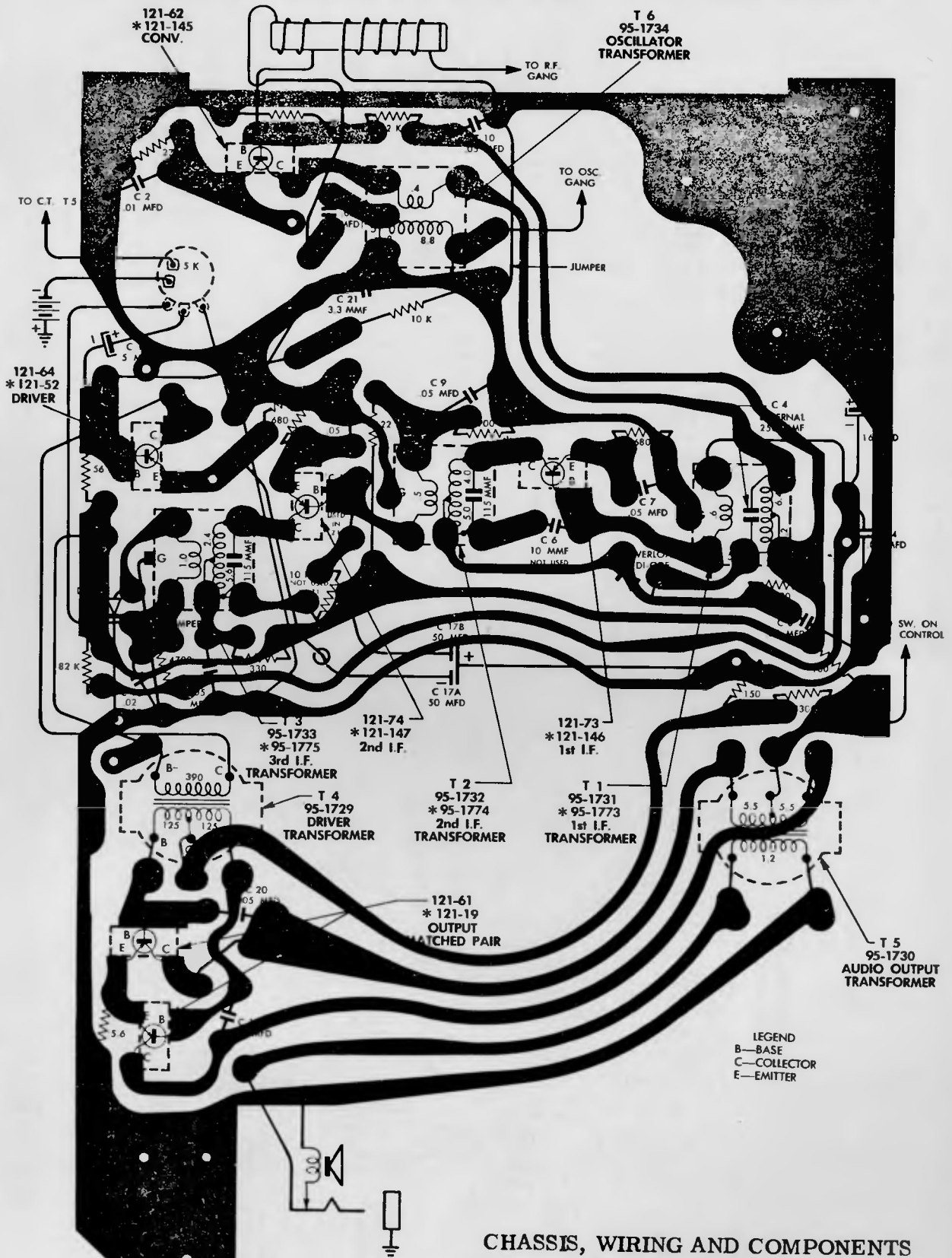
NOTES:
 ALL RESISTORS ARE CARBON, 1/2 WATT, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.
 † DENOTES CHASSIS



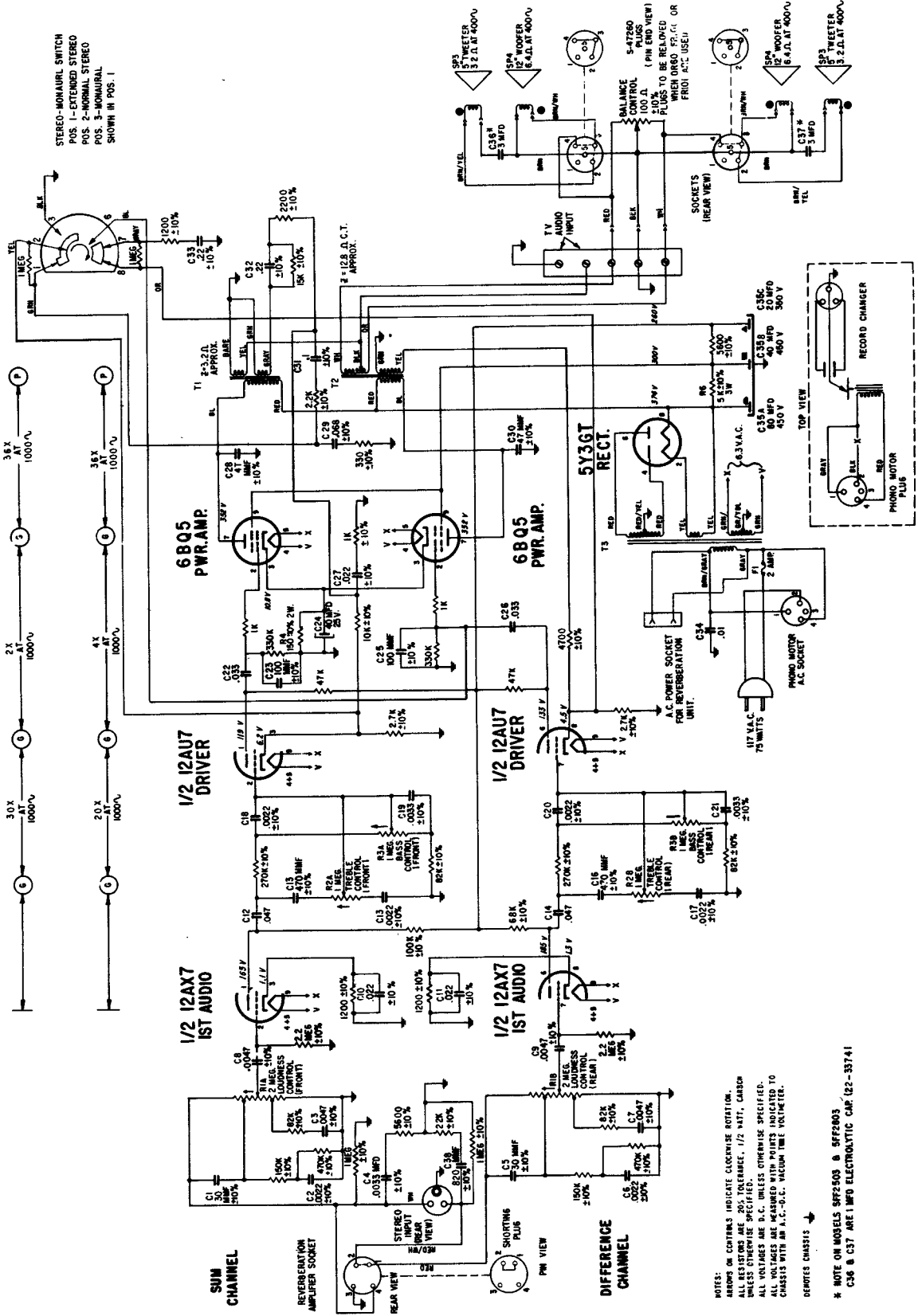
TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 6ET42Z2 & 6ET42Z1

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

ZENITH Chassis 6ET42Z1 & 6ET42Z2, Model "Royal 100" Continued



ZENITH Chassis 5F29, Models SFF2503T, SFF2505T, SFF2603, etc.,



5F29 Schematic For Models SFF2503T, SFF2603, SFF2505T, SFF2605, SFF2606 & SFF2607



Index

Admiral Corp.	Admiral, Cont.	Chevrolet +	Gamble-Skogmo	Motorola, Cont.	Motorola, Cont.
3N1A 3	Y4072 3	988414 34	RA48-8182A 46	A11A 97	109 80
4E3A 4	Y4073 3	988460 26	RA50-8231 47	A11W 97	111 80
4F3A 5	Y4081 5	988468 35	RA50-8232 47	C10N 95	113 80
4L2B 6	Y4082 5	<u>Coronado</u>		C10P 95	114 80
4L26B 6	Y4083 5	RA48-8182A 46	<u>General</u>	C10W 95	309 80
4L27B 6	Y4131 9	RA50-8231 47	<u>Electric</u>	C11B 95	310X 82
4L28B 6	Y4132 9	RA50-8232 47	T100A 48	C11G 95	311 80
4L29B 6	Y4159 9		T145A 49	C11S 95	311X 83
4N3 4		<u>Delco</u>	T146A 49	A12N 104	314L,V 80
4P3, -A 7	<u>American</u>	AC-2977 26	T150B 50	C12B 96	500X 79
5B5B 8	<u>Motors</u>	AC-2978 27	T151B 50	C12P 96	HS-746 85
5B5C 8	8990831 67	AC-3084 26	T165A 51	C12W 96	HS-775 86
5K5A 9	8990832 66	AC-3085 27	T166A 51	13MA 66	HS-776 86
5K5B 9	8990833 70	AC-3086 26	T210B 52	13MAM 67	HS-778 86
5M5 10		AC-3087 27	C403A 48	14MF 68	HS-795 88
5R5 11	<u>Arvin</u>	980051 28	P790A, B 53	14MPM 68	HS-796 89
5S5 12	5R65 22	980052 29	P791A, B 53	14MR 70	HS-797 90
6T5 13	5R67 22	980132 31	P805A 54	X14B 88	HS-798 91
5V5 14	1OR16 19	980134 32	P806A 54	X14E 88	HS-799 92
7A2 16	1OR18 19	980135 29	P807A 54	X14R 88	HS-800 93
7D2 17	1OR32 20	988062 26	P807B 55	X14W 88	HS-802 94
8D2 18	1OR38 20	988275 26	P808A 54	SF15, -1 110	HS-813 95
Y853C 8	1OR39 20	988276 30	P808B 55	SF15-2 110	HS-814 95
Y865B 8	3OR12 21	988413 33	P815A 56	X15A 89	HS-815 96
Y866B 8	3OR18 21	988414 34	P816A 56	X15E 89	HS-819 98
Y979 9	6OR23 23	988460 26	P830C 57	X15N 89	HS-820 100
Y1002 9	6OR28 23	988468 35	P830E 58	X16B 90	HS-821 102
Y1009 9	6OR29 23	989387 31	P831C 57	X16G 90	HS-824 97
Y1021 9	6OR47 23	989392 36	P831E 58	X16N 90	HS-825 104
Y1022 9	6OR49 23	989693 37	RP1100A 59	X17B 91	HS-827 105
Y1023 9	6OR58 24	989792 26	RP1112A 60	X17N 91	HS-828 105
Y1189A 4	6OR63 24	<u>Emerson Radio</u>	RP1127A 59	X17R 91	HS-829 106
Y2061 16	6OR69 24	907B 39	RP1128A 59	XT18B 94	HS-830 106
Y2063 16	6OR73 24	914B 44		XT18S 94	HS-831 107
Y2067 16	6OR79 24	920 40	<u>Hitachi, Ltd.</u>	SH19 111	HS-832 107
Y2068 16	90P53 25	925 40	TH-627R 61	X19A 92	HS-833 108
Y2119 17	90P58 25	926B 39		X19E 92	HS-835 109
Y2127 18	1.42202 19	933B 41	<u>Magnavox</u>	L20E 93	HS-860 110
Y2993 7	1.47001 22	935B 41	65-01 62	SH20 105	HS-861 111
Y2996 7	1.48101 21	937B 41		SH21 106	HS-869 111
Y2998 7	1.48102 21	938B 42	<u>Montgomery</u>	X21W 112	HS-876 112
Y2999 7	1.49201 23	944B 44	<u>Ward</u>	SH22 107	HS-898 110
Y3021 11	1.49501 25	977 43	GEN-1667A 64	SK32W 86	FM-900 84
Y3027 11	1.49801 20	120478B 39	GEN-1668A 64	SK33W 86	1500 94
Y3037 4	1.50101 24	120482B 44	GEN-2030A 63	SK35W 86	
Y3037A 7	1.50300 24	120483B 44	GEN-2030B 63	SK39MB 86	<u>Oldsmobile</u>
Y3038 4	1.50401 23	120494B 40		SK40, -1 108	989387 31
Y3046 12		120505B 39	<u>Motorola, Inc.</u>	SK41 108	989392 36
Y3048 12	<u>Buick</u>	120522B 44	BLJ 98	SK43, -1 109	
Y3049 12	980051 28	120523B 44	BLW 98	BKA 60X 72	<u>Packard-Bell</u>
Y3051 13	980052 29	120528 43	B2G 100	CRA 60X 73	5R8 113
Y3053 13	980132 31	120547B 41	B2N 100	CRM 60X 75	5RC8 113
Y3058 13	980134 32	120548B 41	B2W 100	OEA 60X 76	
Y3083 14	980135 29	120558B 41	A3B,N 85	PCA 60X 72	<u>Philco Corp.</u>
Y4017 10	<u>Chevrolet</u>	120559B 42	B3E 102	VWA 60 74	T-50(126) 114
Y4049 3	988062 26	<u>Ford</u>	B3W 102	BKA 61 77	T-51(124) 114
Y4057 5	988275 26	COAF-18805D 68	O4MD 68	CTA 61 77	T-52(124) 115
Y4067 9	988276 30	CLAF-18805+ 68	10AX 65	CTM61X 78	TC-57 115
Y4071 3	988413 33			CTM61XA 78	T-62 116

(Index continued on page 192, over)

VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

Philco, Cont.		RCA, Cont.		Sylvania, Cont.		Webcor, Inc.		Westinghouse+	
T-66	117	DK-111	139	8F16	148	14X310-1	159	H-F1011A	171
T-70	118	RS-171D	140	8P18	151	14X331	160	H-F1012A	171
T-74	119	RS-171F	140	45C13	146	1050-1A	159	H-F1013A	171
T-76	120	RS-175B	138	45C14	146	BC1055	160	H-F1050B	171
J-769	121	RS-177A	140	45P19	156	MC1055	160	H-F1051B	171
J-772	121	RS-179	140	630-5,-6	143	WC1055	160	H-F1052B	171
J-773	121	RS-182A	137	630-7,-8	143	1172-1	159	H-F1053B	171
J-774	121	RS-187	139	631-2,-3	144			V-2395-2	163
J-775	121	RS-188	136	632-3	145	<u>Western Auto</u>		V-2395-3	163
T-802	124	VC-270	136	649-1,-2	147	DC2082B	161	V-2397-4	166
J-838	121	VC-271	136	651-1,-2	143	DC2083B	161	V-2399-1	164
J-840	121	VC-272	136	651-3,-4	143	DC2172A	161	V-2401-3	167
J-842	121	VC-273	136	652-1	148	DC2173A	161	V-2404-1	168
J-845	121	RC-1192	140	653-1	148	DC3085C	162	V-2410-1	169
J-846	121	RC-1199	132	661-1	149	DC3160	162	V-2410-2	170
T-901	125	RC-1199A	132	668-1,-2	150			V-2506-5	177
J-996	126	RC-1199B	133	673-1	151	<u>Westinghouse</u>		V-2507-4	176
J-997	127	RC-1200	130	676-1	152	H-61MP2	172	V-2507-5	175
J-1423	128	RC-1200A	130	677-1	153	H-61MP3	172	V-2507-6	174
J-1425	128	RC-1201A	129	678-1	154	H-63AC1	176	V-2507-8	173
J-1525	128	RC-1202A	134	679-1	155	H-63AC2	176	V-2508-3	172
J-1626	128	RC-1202B	134	680-1	156	H-64ACS1	172	V-2508-5	176
		RC-1202C	134	690-1	157	H-64ACS2	172	V-2508-6	172
				1100	143	H-65ACS1	177	V-2508-7	172
<u>Pontiac</u>		<u>Studebaker</u>		1111	143	H-65ACS2	177	V-2512-3	171
989693	37	AC-2977	26	1160	143	H-66ACS1	176		
989792	26	AC-2978	27	1212	143	H-66ACS2	176	<u>Zenith Radio</u>	
		AC-3084	26	1219	143	H-67ACS1	175	5D12	181
<u>RCA Victor</u>		AC-3085	27	1286	143	H-67ACS2	175	5D20	178
1F1	129	AC-3086	26	1300	143	H-68ACS1	174	5F03	179
1F2	129	AC-3087	27	1301	143	H-68ACS2	174	5F04	179
1T1	130			1306	143	H-70ACS1	173	5F13	180
1T2	130	<u>Sylvania Elec.</u>		1309	143	H-70ACS3	173	5F29	190
1T3	130	1-647-1	146	1322	143	H-70ACS4	173	5G09	182
1TC4	130	4C09	150	1400	143	H-712P9	164	6D01	183
1TP1	132	4C15	150	1512	143	H-713P9	164	6ET42Z1	188
1TP2	132	4P05	157	1519	143	H-718T5A	167	6ET42Z2	188
1X2	134	4P06	157	1600	143	H-719T5A	167	6GT40Z1	186
1X3	134	4P14	149	1701	143	H-720T5A	167	6GT40Z2	186
1X4	134	4P15	149	1704	143	H-725P6A	166	7F03	184
BK-1	139	4T09	150	1708	143	H-726P6A	166	7FT45Z1	185
TPM-11	140	4T15	150	1709	143	H-727P6A	166	50	186
TPM-12	140	5C10B,P	143	2300	147	H-728P6A	166	XD50C,+	181
TPM-13	140	5C11B,T	143	2400	147	H-737P7	168	XD60C,+	179
VC-13	140	5C12R,T,W	143	2500	147	H-738P7	168	100	188
VCR-13	140	5C13	144	2600	147	H-748T5	163	475	185
VC-14	140	5P16	147	2700	147	H-749T5	163	E512C,+	180
VCR-14	140	5T10B,P	143			H-750T5	163	E514B,+	179
VC-16	140	5T11B,T	143	<u>Trav-ler</u>		H-753L5	163	G516C,+	182
PM-17	140	5T12R,T,W	143	60C300	158	H-755L5	163	SFD660	178
VC-17	140	5T13	144	60C301	158	H-756T5	169	D720C,P	183
PM-18	140	5T17	152	60C302	158	H-757T5	169	F728C,+	184
VC-22	140	6F17	153	60C303	158	H-759T6	170	SFF2503T	190
VP-33	136	6F18	154	60C320	158	H-760T6	170	SFF2505T	190
RS-34P	135	6T14	145	60C321	158	H-771P6,+	166	SFF2603	190
VP-34	135	7K10	155	60C322	158	H-772P6,+	166	SFF2605	190
VP-36	137	7K11	155	60C323	158	H-773P6,+	166	SFF2606	190
DK-109	139	8F15	148	1130	158	H-F1010A	171	SFF2607	190
DK-110	139								