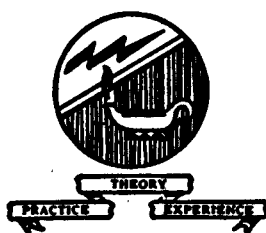


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1961

Volume R-21

**RADIO
DIAGRAMS**
and Servicing Information



Compiled by
M. N. BEITMAN

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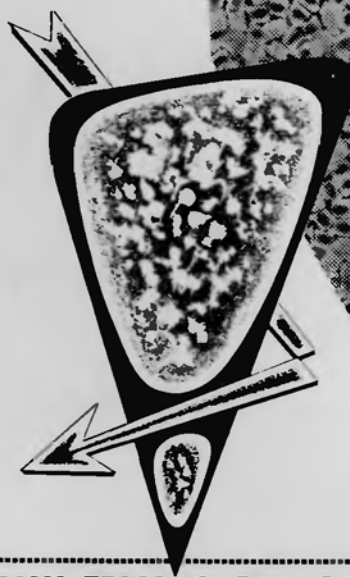
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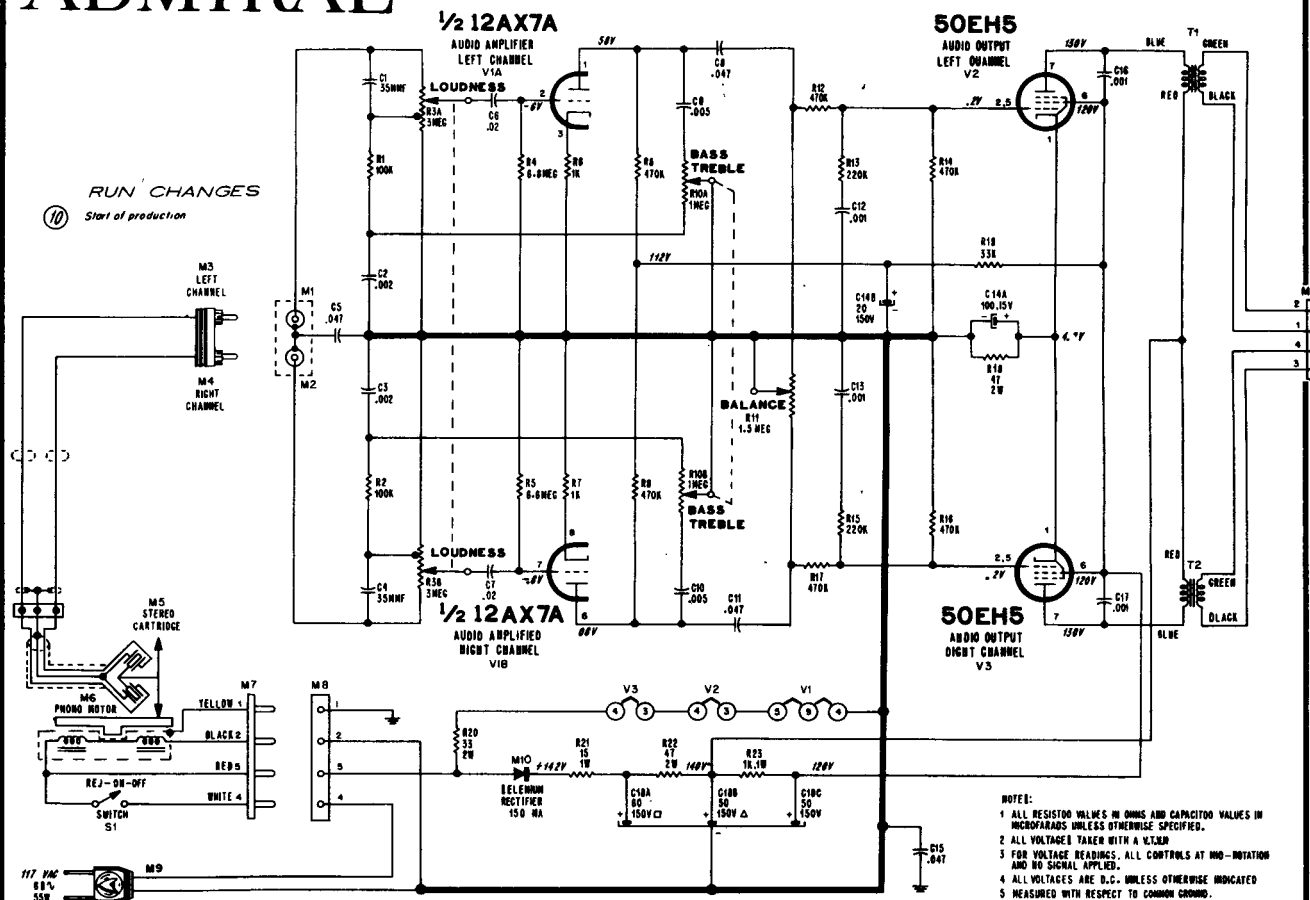
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☐ 1960 ☐ 1959 ☐ 1958 ☐ 1957 ☐ 1956 ☐ 1955 Radio Manual, only \$2 ☐ 1954 ☐ 1953 ☐ 1952 ☐ 1951 ☐ 1950 ☐ 1949 ☐ 1948 ☐ 1947 ☐ 1946 ☐ 1945 ☐ 1944 ☐ 1943 ☐ 1942 ☐ 1941 ☐ 1940 ☐ 1938-1939 Manual, \$2.50 ☐ Simplified Servicing, \$1.50	Popular RADIO Diagram Manuals at only \$2.50 each These annual RADIO volumes specially priced at only \$2.50 each THIS GROUP ONLY \$2 EACH 1926-1938 Manual, \$2.50 Simplified Servicing, \$1.50	Rush today TV manuals checked ☒ below and Radio manuals at left. Satisfaction guaranteed. ☐ New 1961 TV Manual, \$3. ☐ 1960 TV, \$3. ☐ Additional 1959 TV, \$3. ☐ Early 1959 TV, \$3. ☐ 1958 TV Manual, \$3. ☐ Additional 1957 TV, \$3. ☐ Early 1957 TV, \$3. ☐ 1956 TV Manual, \$3. ☐ Additional 1955 TV, \$3. ☐ Early 1955 TV, \$3. ☐ 1954 TV, \$3. ☐ 1953 TV, \$3. ☐ 1952 TV, \$3. ☐ 1951 TV, \$3. ☐ 1957-58 RCA TV Manual, \$1.50 ☐ New Television Servicing Course, complete... \$3. ☐ I am enclosing \$..... Send postpaid. ☐ 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.

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.

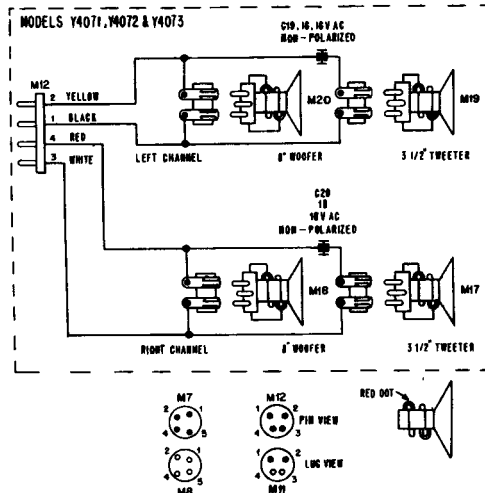
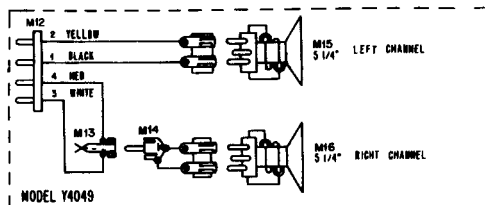
Disconnect the phono motor plug (M7), the two channel input plugs (M3 and M4), and speaker plug (M12). Remove the three control knobs by pulling them straight out from the control shafts.

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

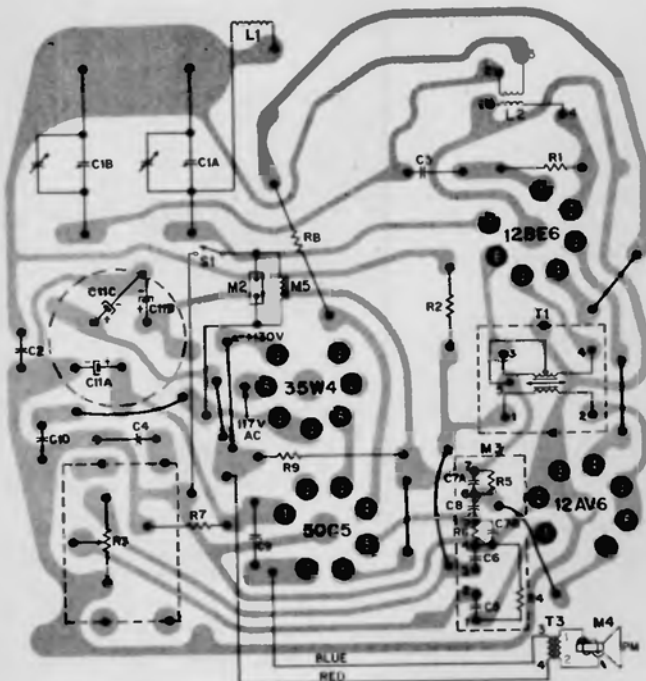
TABLE CLOCK RADIO

MODEL	COLOR	CHASSIS
Y1189A	Grey-Green	4E3A

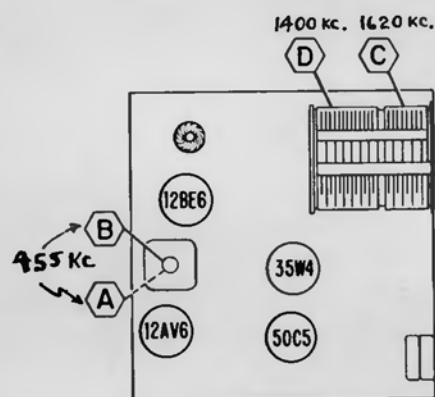
CLOCK RADIO

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

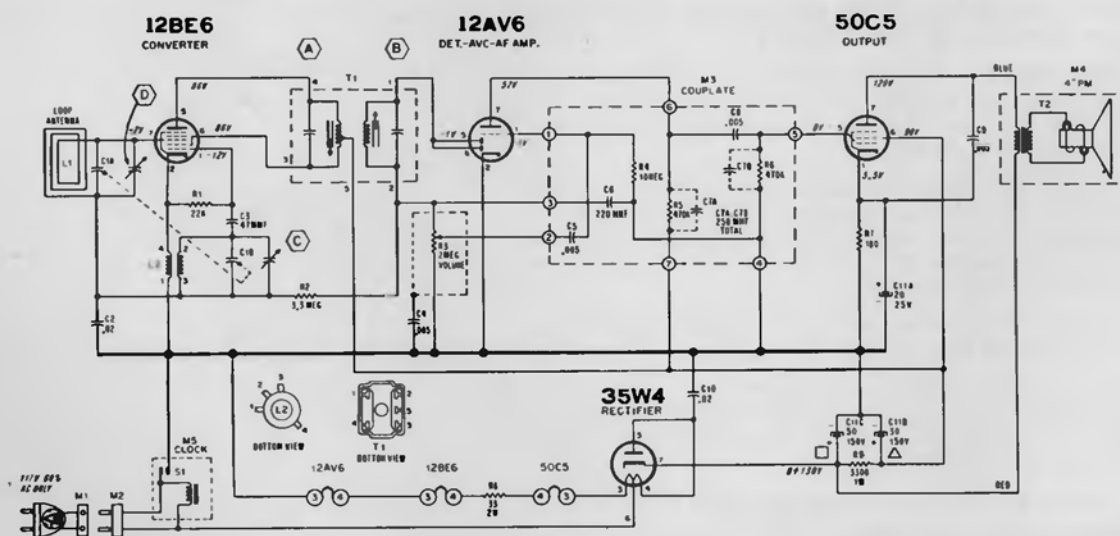
The tube complement, tube locations and etched wiring board of the 4N3 chassis, is identical to that of the 4E3A chassis.



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

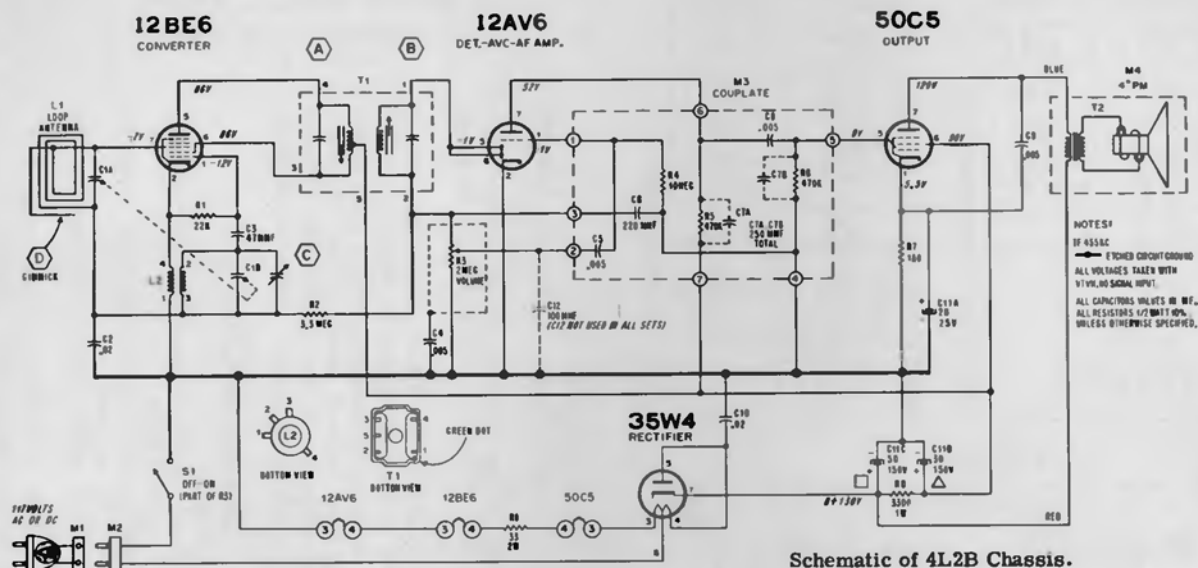


Tube and Alignment Point Locations.



Admiral

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



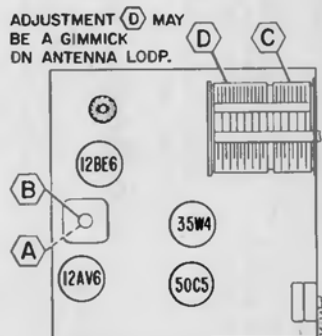
Schematic of 4L2B Chassis.

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.

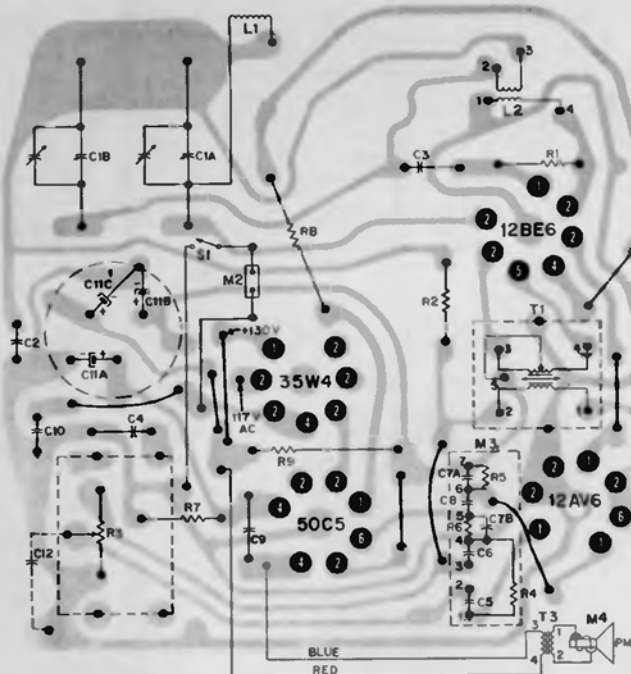
A metal shield (Admiral part number 15A2267-1) was installed over the audio couplate (M3) with one point soldered to pin No. 4 on the couplate. A 100 mmf capacitor (part number 65D10-154) was added from the center-tap of the volume control (R3) to the etched foil ground.

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.



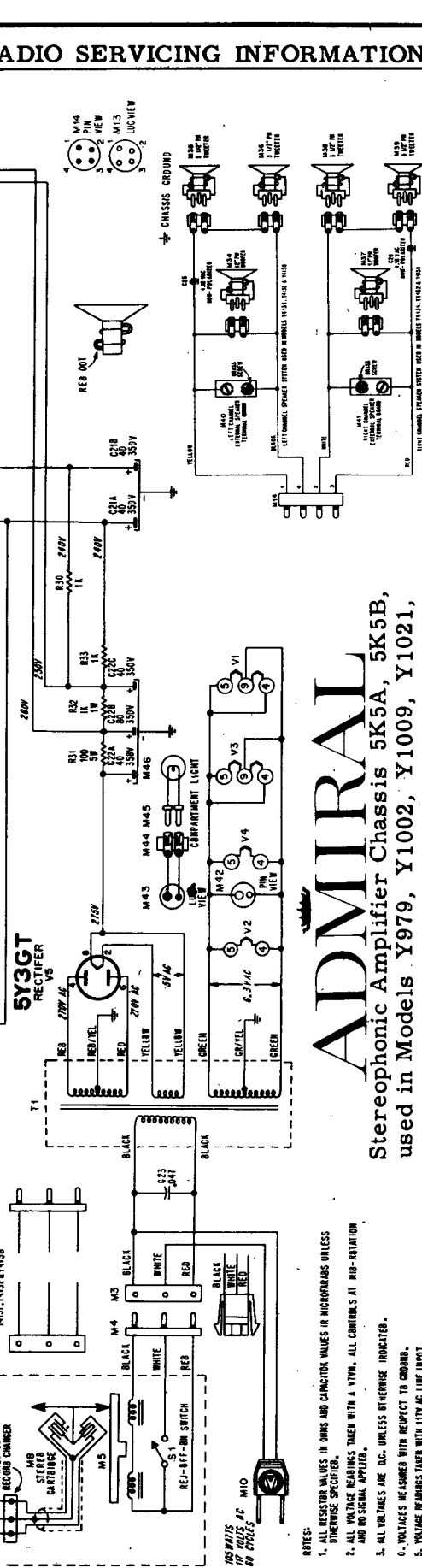
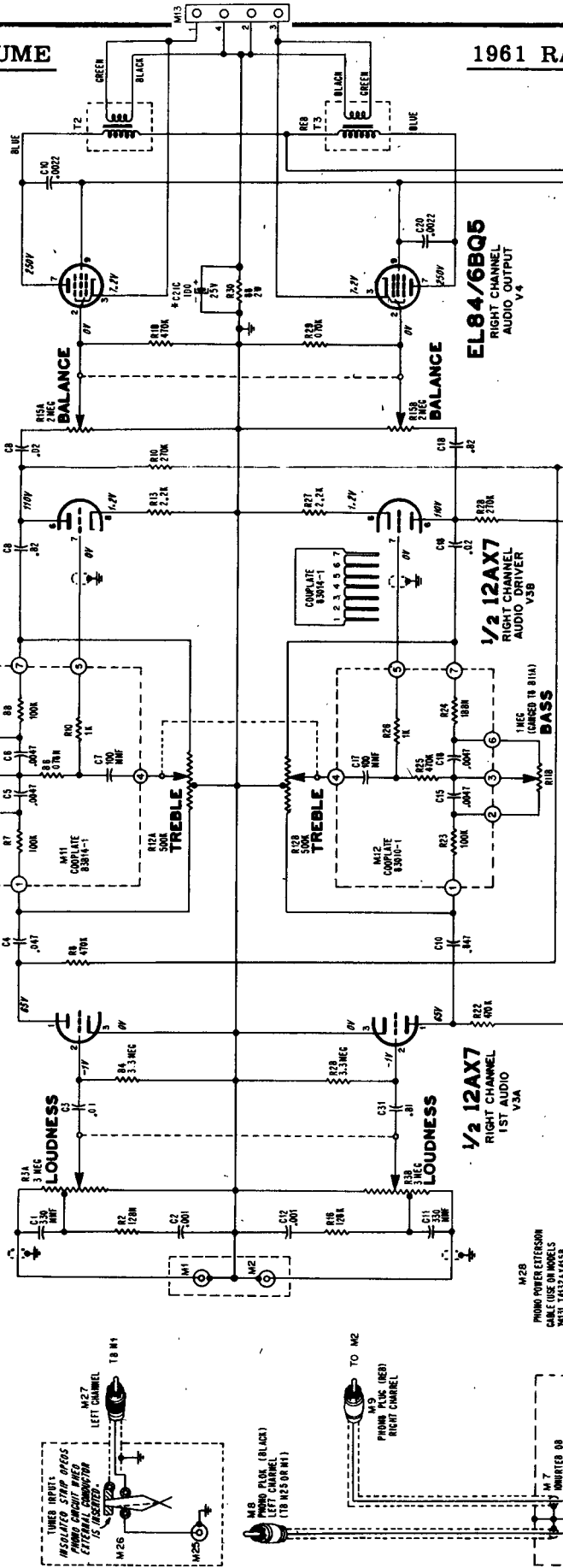
Rear View of Etched Circuit Board, Used in 4L2B Chassis.

ADMIRAL

1/2 12AX7
LEFT CHANNEL
1ST AUDIO
V1A

1/2 12AX7
LEFT CHANNEL
AUDIO DRIVER
V1B

EL84/6BQ5
LEFT CHANNEL
AUDIO OUTPUT
V2

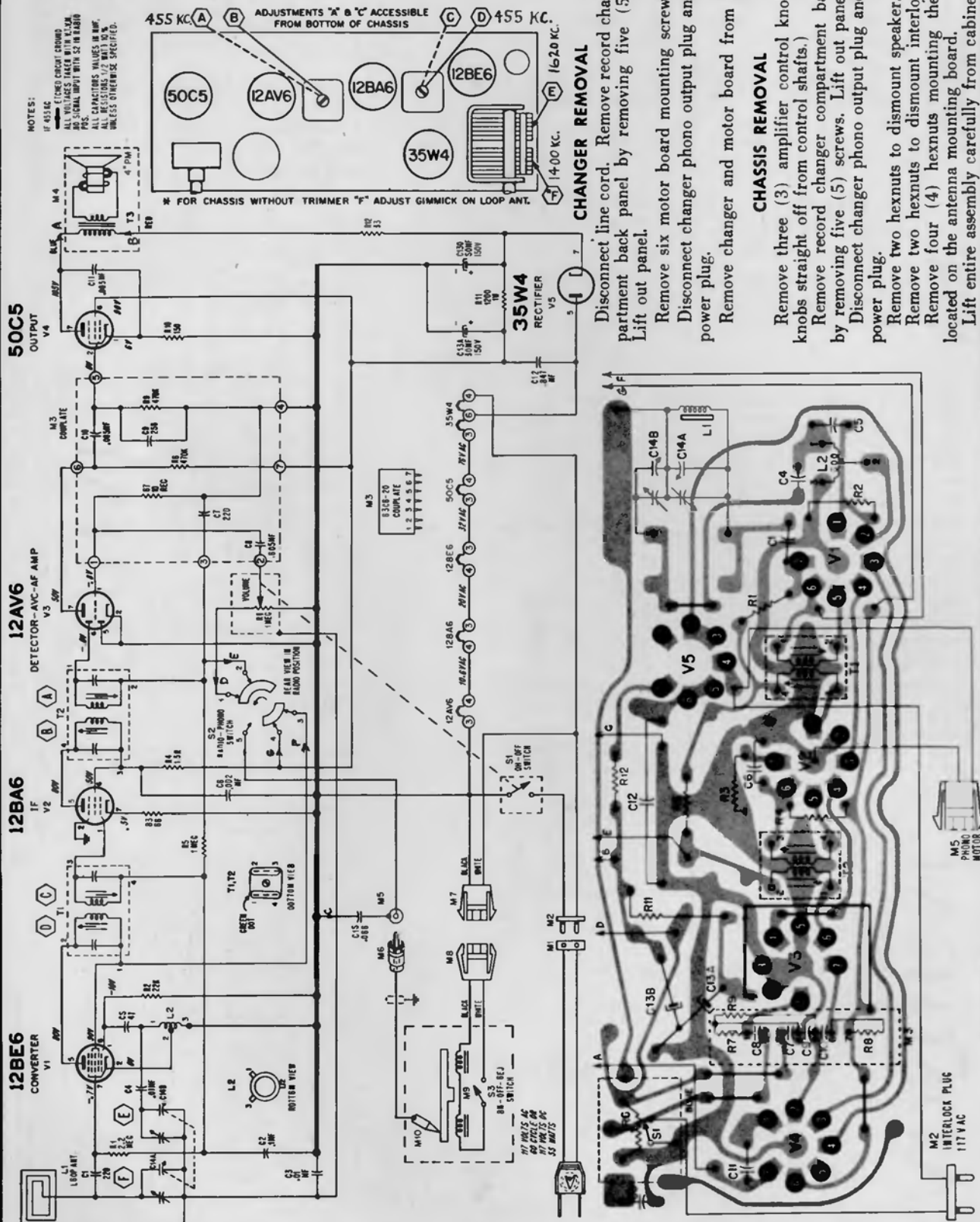


ADMIRAL
Stereophonic Amplifier Chassis 5K5A, 5K5B,
used in Models Y979, Y1002, Y1009, Y1021,
Y1022, Y1023, Y4067, Y4131, Y4132, Y4159

- NOTES:
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-POSITION AND NO SIGNAL APPLIED.
 3. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE INDICATED.
 4. VOLTAGES MEASURED WITH RESPECT TO CHASSIS.
 5. VOLTAGE READINGS TAKEN WITH 117V AC LINE INPUT.
 6. * C20 IN EARLY PRODUCTION WAS TWO 500K IN PARALLEL.

Admiral

CHASSIS 5M5
MODEL Y4017



ADMIRAL

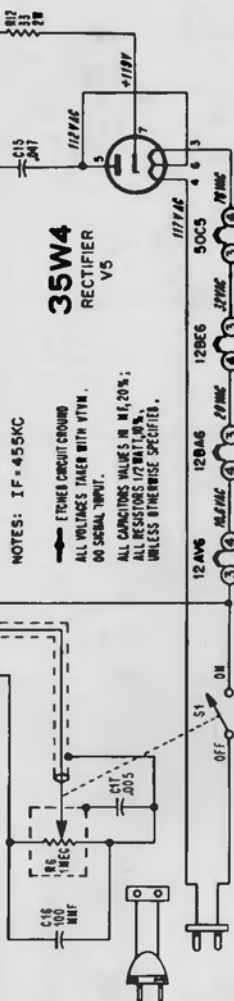
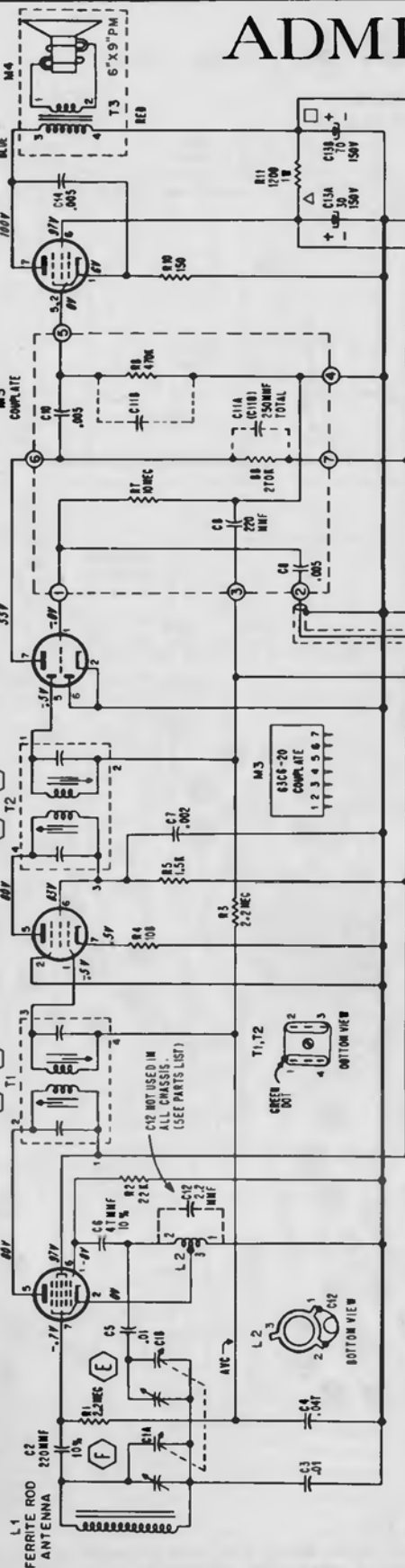
CHASSIS 5R5
MODELS Y3021 • Y3027

50C5
OUTPUT
V4

12AV6
DETECTOR-ABC-AF AMP
V3

12BA6
IF
V2

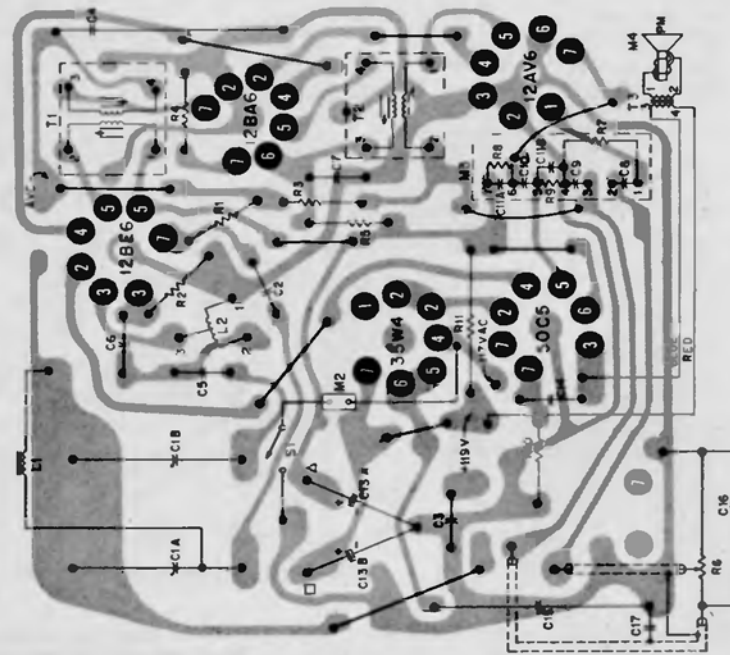
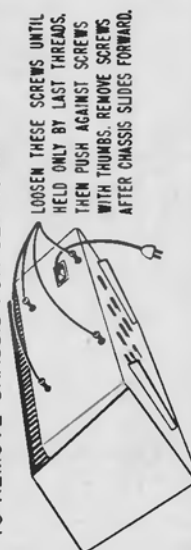
12BE6
CONVERTER
V1



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.

TO REMOVE CHASSIS FOR SERVICING

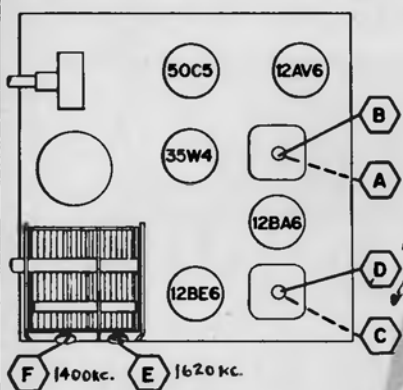
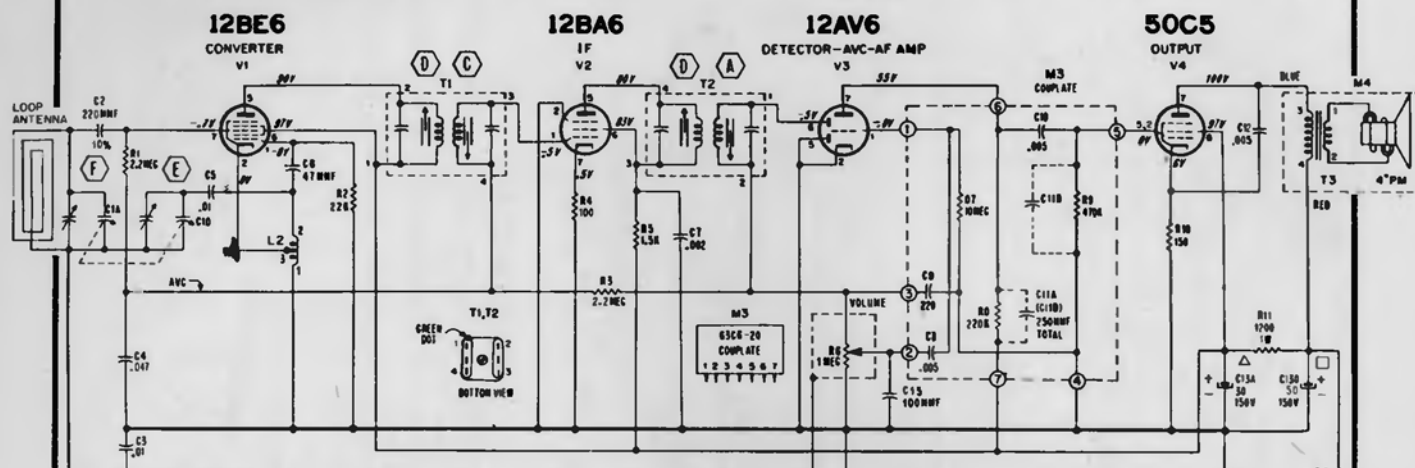


Top View of Chassis

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 = 455 KC

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

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

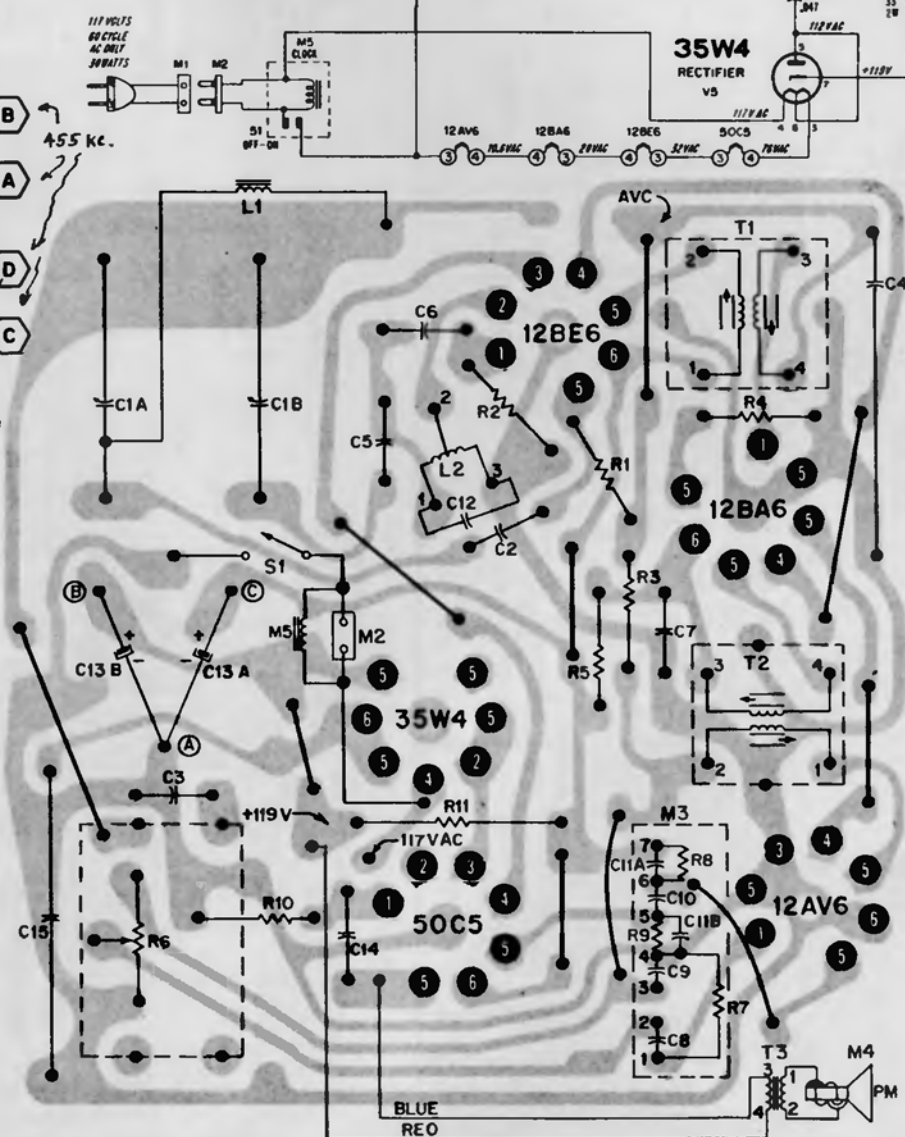


BOTTOM VIEW

TO REMOVE CHASSIS FOR SERVICING TUBES



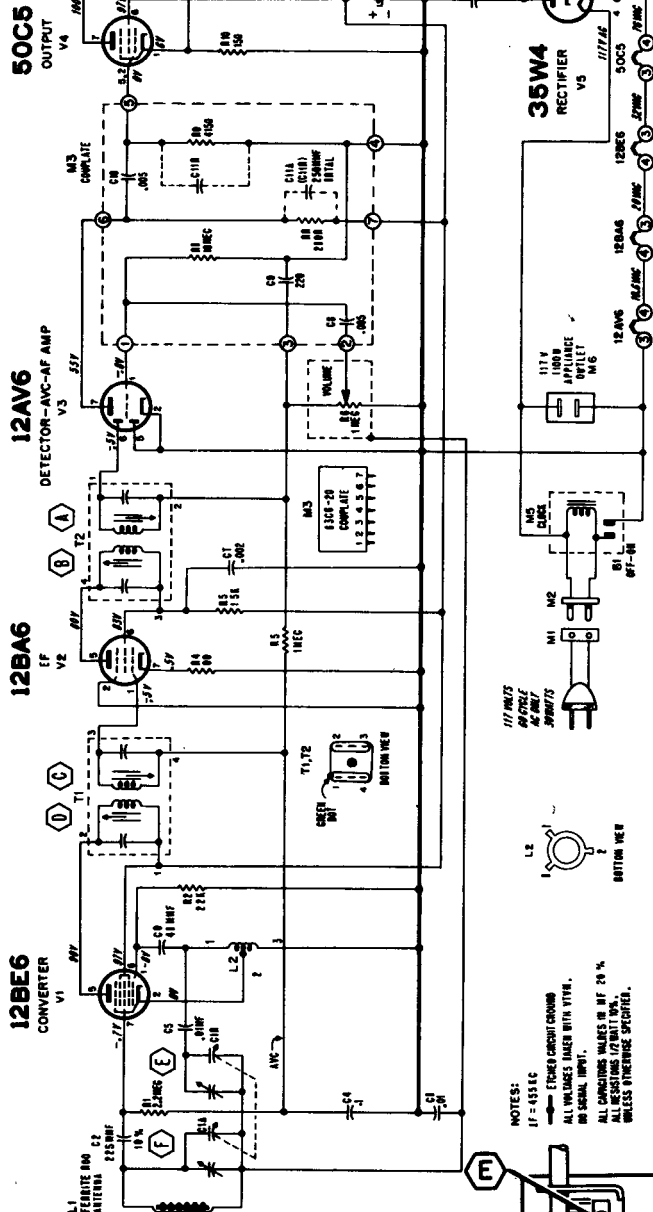
Rear View of Cabinet Showing Chassis Mounting Screws.



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



• All readings made between tube socket terminals and common etched circuit ground.

• Dial turned to low frequency end; volume control at minimum.

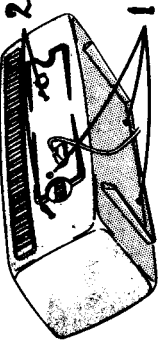
• All voltages measured with vacuum-tube voltmeter, on 117 Volts AC line.

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.

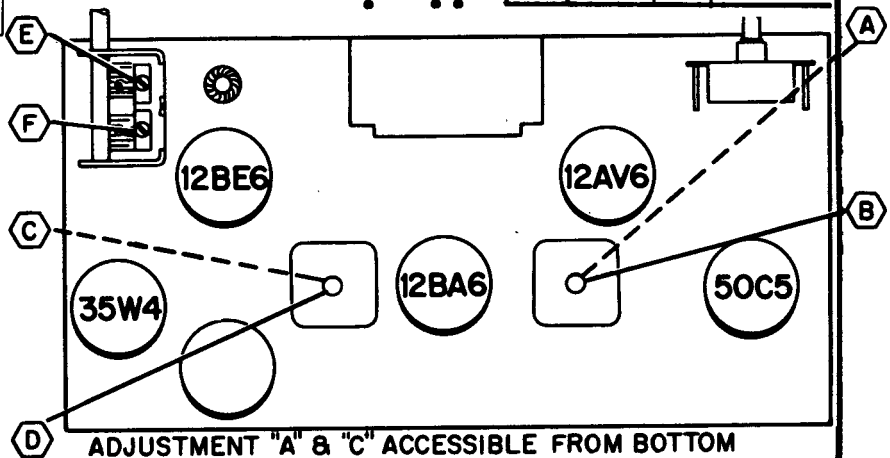
STEP	CONNECTION OF SIGNAL GENERATOR	SIGNAL GENERATOR FREQUENCY	RECEIVER GANG SETTING	ADJUSTMENTS
1	Through .1 mf capacitor to stator, Antenna section of gang tuning capacitor	455 KC	Gang fully open	"A", "B", "C" and "D" for maximum output
2	Same as "STEP 1"	1620 KC	Gang fully open	"E" for maximum output
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

TO REMOVE CHASSIS



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

12BN6
DETECTOR
V3

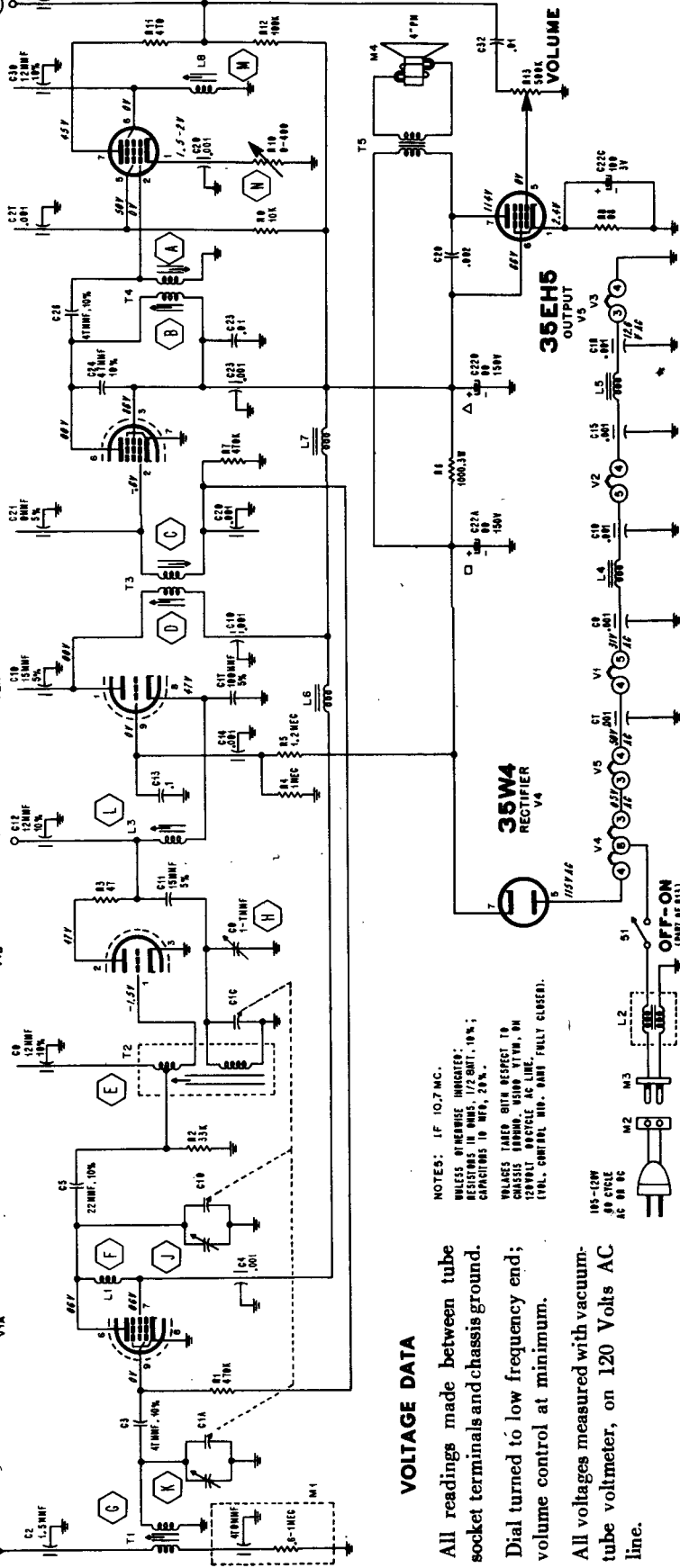
1/2 19EA8
2ND I.F.
V2B

1/2 19EA8
1ST I.F.
V2A

1/2 19CL8A
MIXER-OSC
V1B

1/2 19CL8A
RF AMP
V1A

WIPPLE
ANTENNA
SWITCH
RF AMP
V1A



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, 4500 VOLT, 50 MA
120VOLT BOOSTER AC LINE.
(VOL. CONTROL MIN. DIAL FULLY CLOSED).

100-500W
AC CYCLE
AC 60 Hz

VOLTAGE PRECAUTION

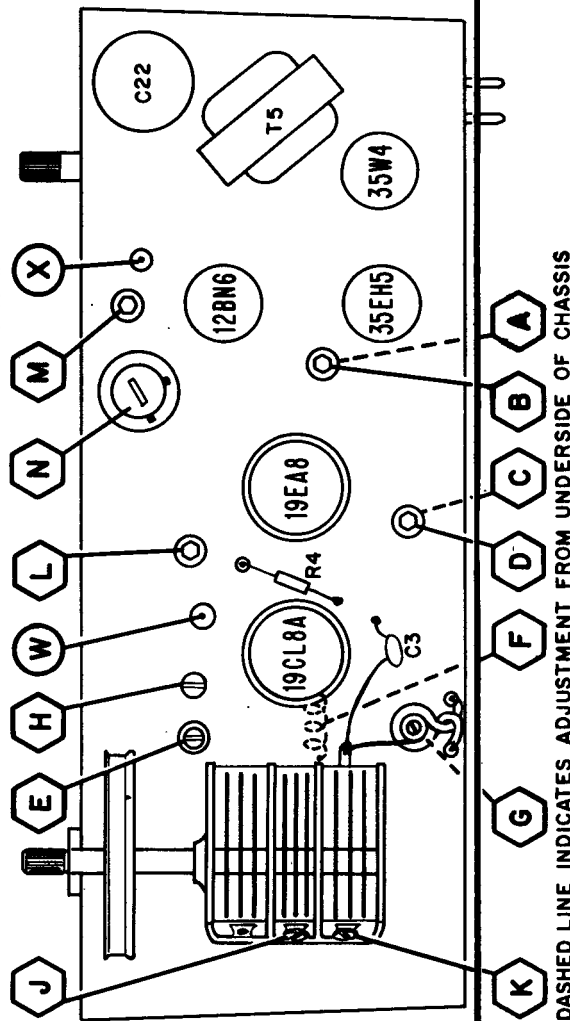
Do Not Connect an Earth Ground To This Receiver

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)



DASHED LINE INDICATES ADJUSTMENT FROM UNDERSIDE OF CHASSIS

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) ½ 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 bath.) 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.

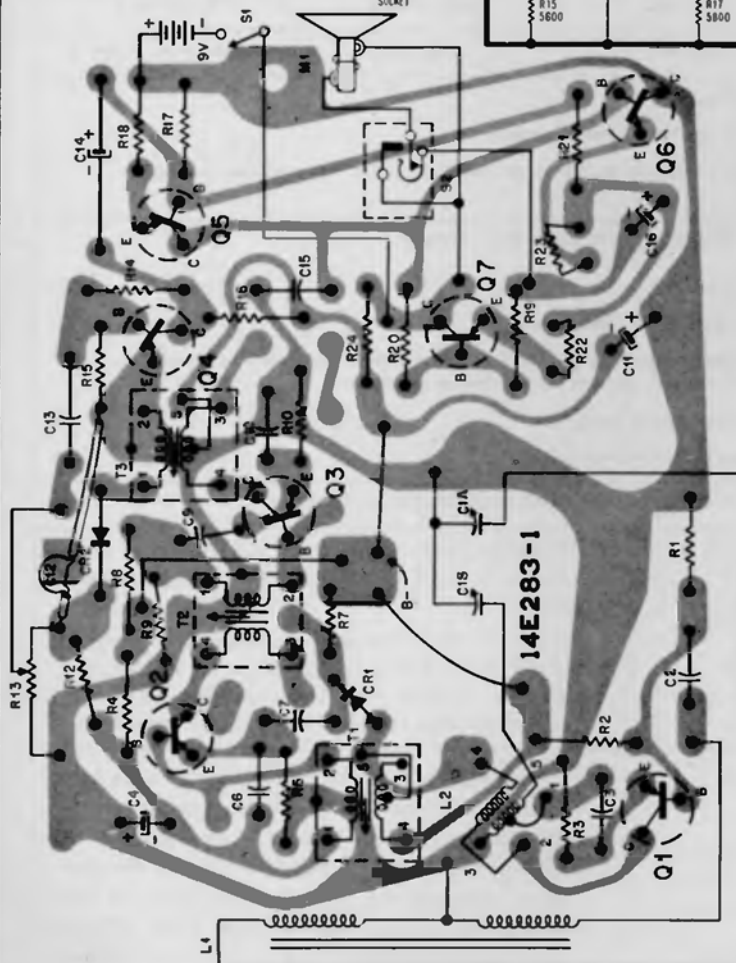
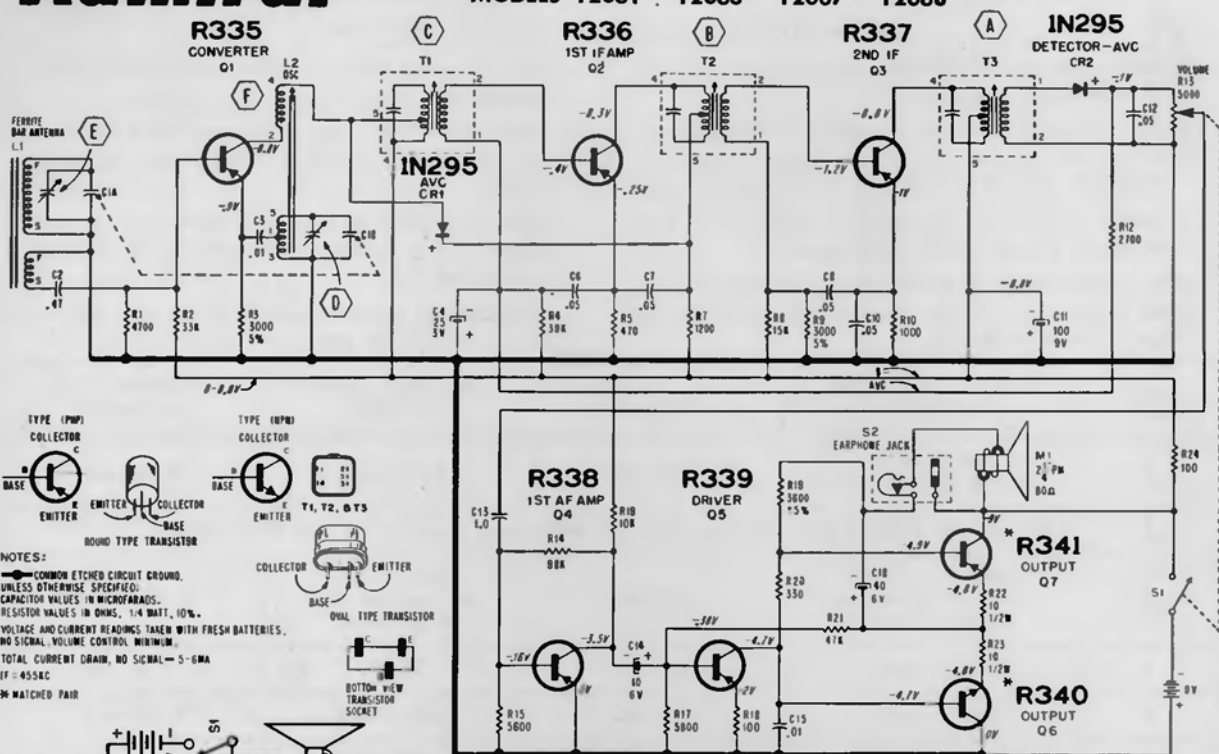
1. Turn set bottom side up and using a screw driver,

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.

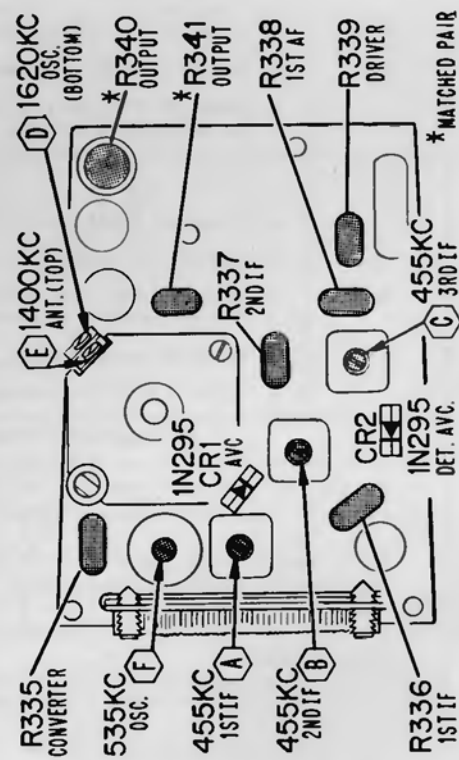
Admiral

CHASSIS 7A2

MODELS Y2061 • Y2063 • Y2067 • Y2068



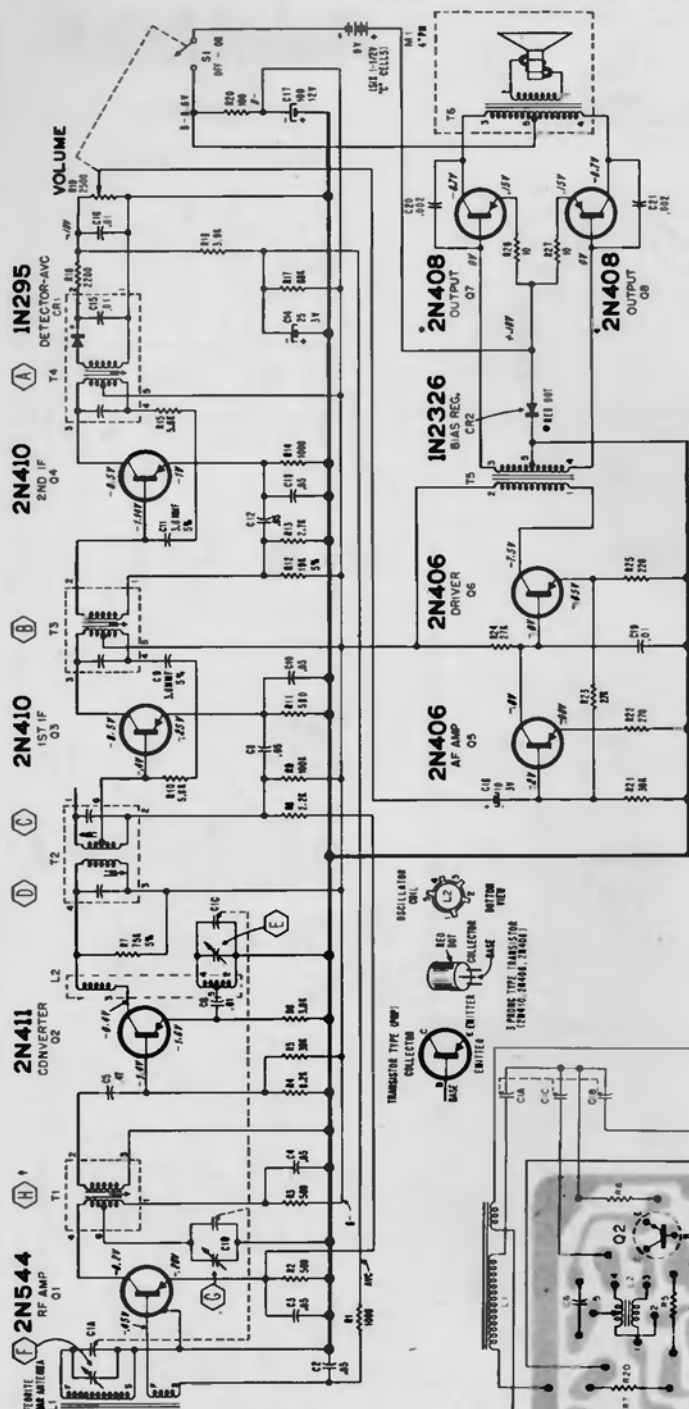
Rear View of Etched Circuit Board. Gray area represents the etched wiring; block symbols and lines represent components and connections on opposite side.



Transistor and Alignment Point Locations

REMOVING CHASSIS FROM CABINET

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



REMOVING CHASSIS FROM CABINET

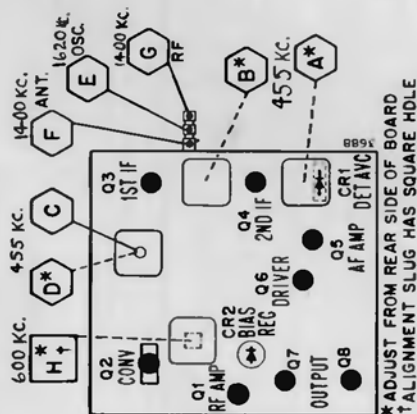
1. Remove the two knobs plus the two chassis mounting screws at the bottom of the cabinet, if used.
2. Unsnap back cover and remove battery case.
3. Remove the two nuts at the right corners of the chassis.

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.

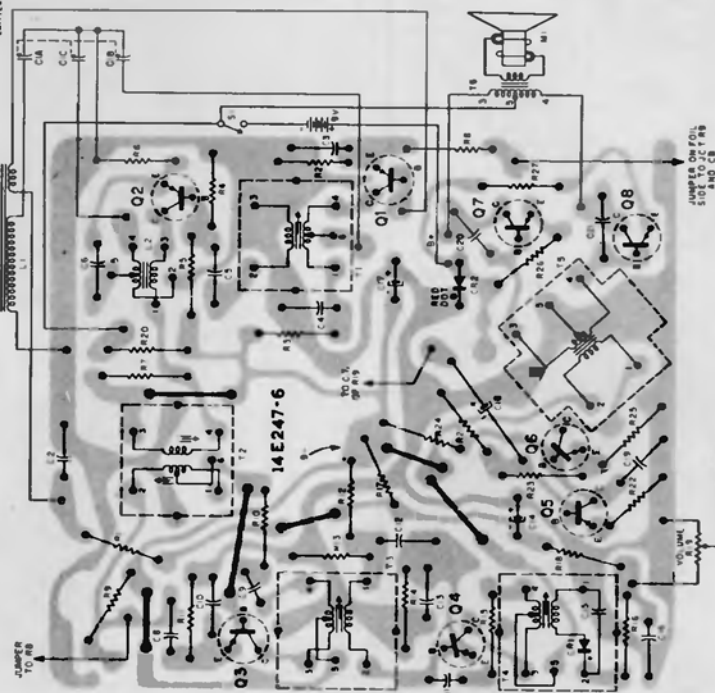
WARNING: NEVER ALLOW THE BATTERY CONNECTORS ON BATTERY HOLDER TO COME IN CONTACT WITH THE METAL CHASSIS.

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 HDLE

Top View of Chassis Showing Transistor and Alignment Point Locations.

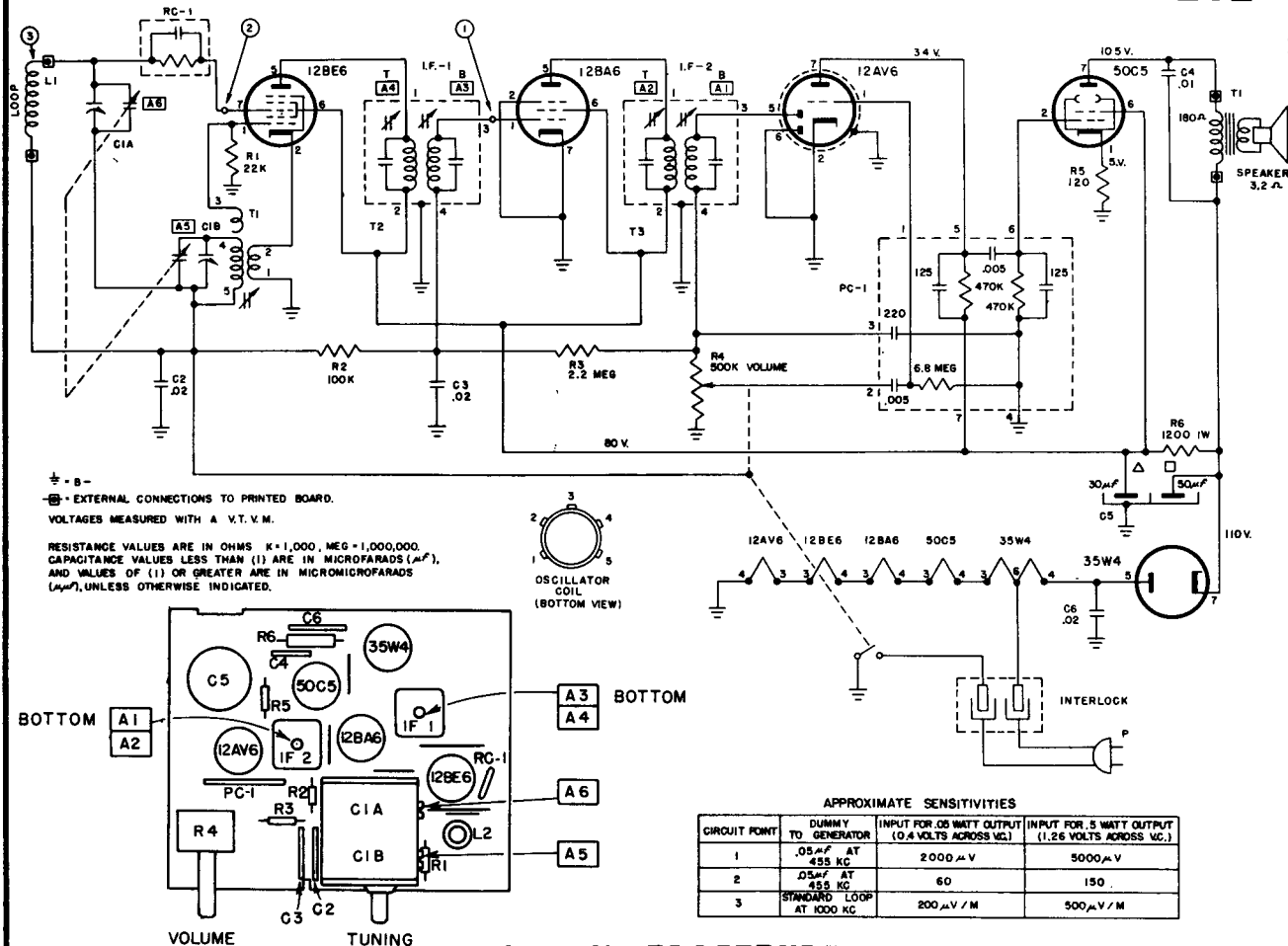


Rear View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.

Admiral

MODEL Y2127
CHASSIS 8D2

ARVIN RADIO MODELS 10R16 10R18 CODE 1.42202



ALIGNMENT PROCEDURE

PRELIMINARY:

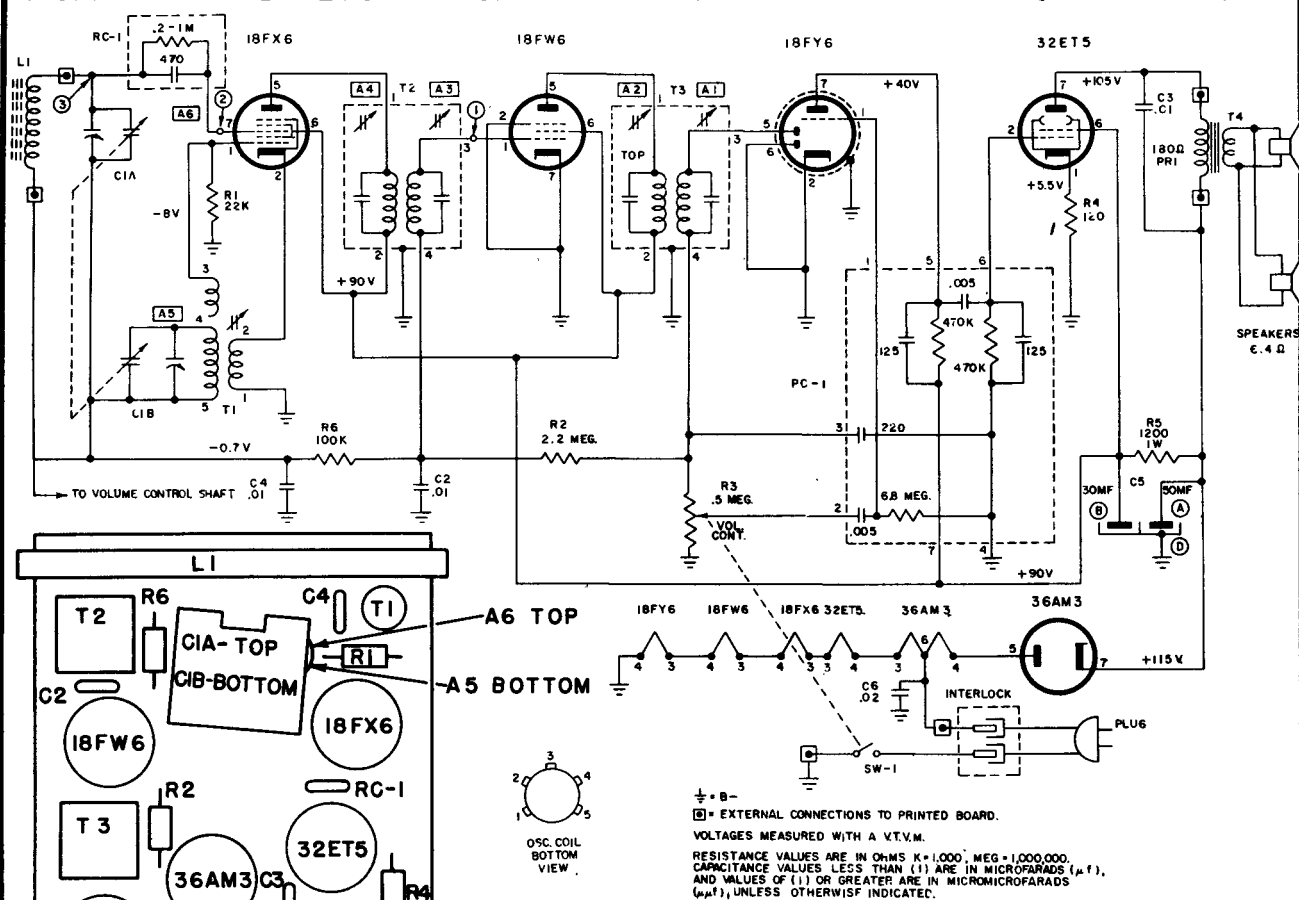
Output meter connection Across speaker voice coil
 Output meter reading to indicate 500 milliwatts (standard output) . . . 1.26 volts
 Connection of generator ground lead Floating ground
 Generator modulation 30% 400 cycles
 Position of Volume Control Fully clockwise

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.
Open	1670 Kc		* Test Loop	A5	Oscillator
1400	1400 Kc		* Test Loop	A6	Antenna
1000	1000 Kc		* Test Loop	Fan C1A Plates	
600	600 Kc		* Test Loop	Fan C1A Plates	

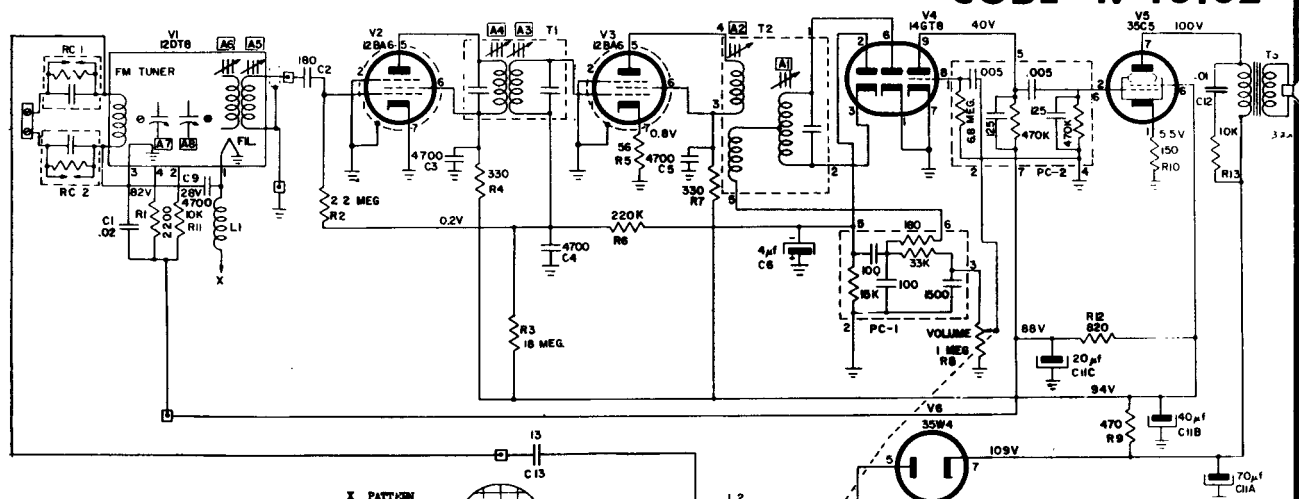
* Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.

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



- B-
- EXTERNAL CONNECTION TO PRINTED BOARD.

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 (1) ARE IN MICROFARADS (μ F),
AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (μ MF),
UNLESS OTHERWISE INDICATED.

ALIGNMENT PROCEDURE

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

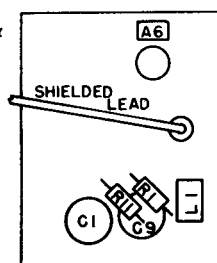
1. Connect FM Generator, High Side, to grid (pin 1) of 12BA6 2nd I. F. tube through .01 mfd. dummy.
2. Set generator frequency to 10.7 Mc. modulated either 60 cycles or 400 cycles, 480 Kc sweep (240 Kc deviation)
3. Connect vertical input of scope across volume control of receiver (grounded terminal 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.

X PATTERN
CENTER FREQUENCY

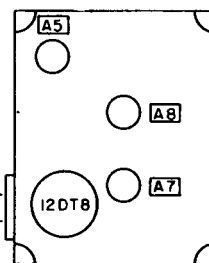


SMALL X PATTERN
ABOVE AND BELOW
CENTER FREQUENCY

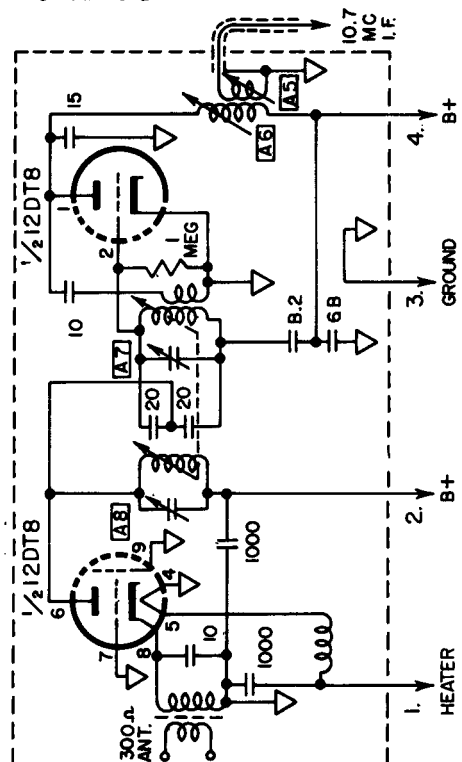
FIG. 2



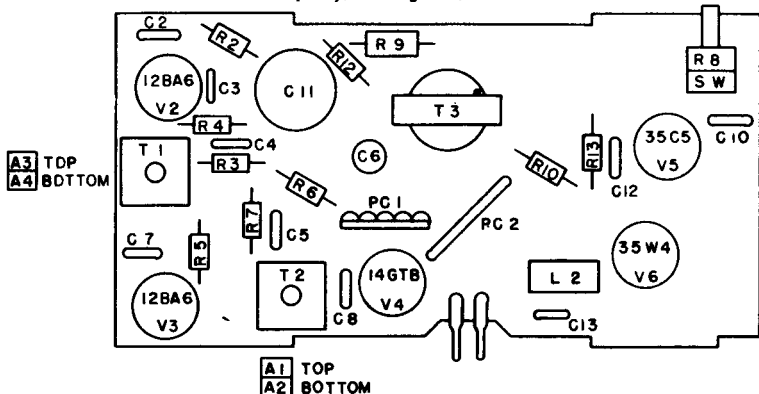
BOTTOM VIEW
OF FM TUNER



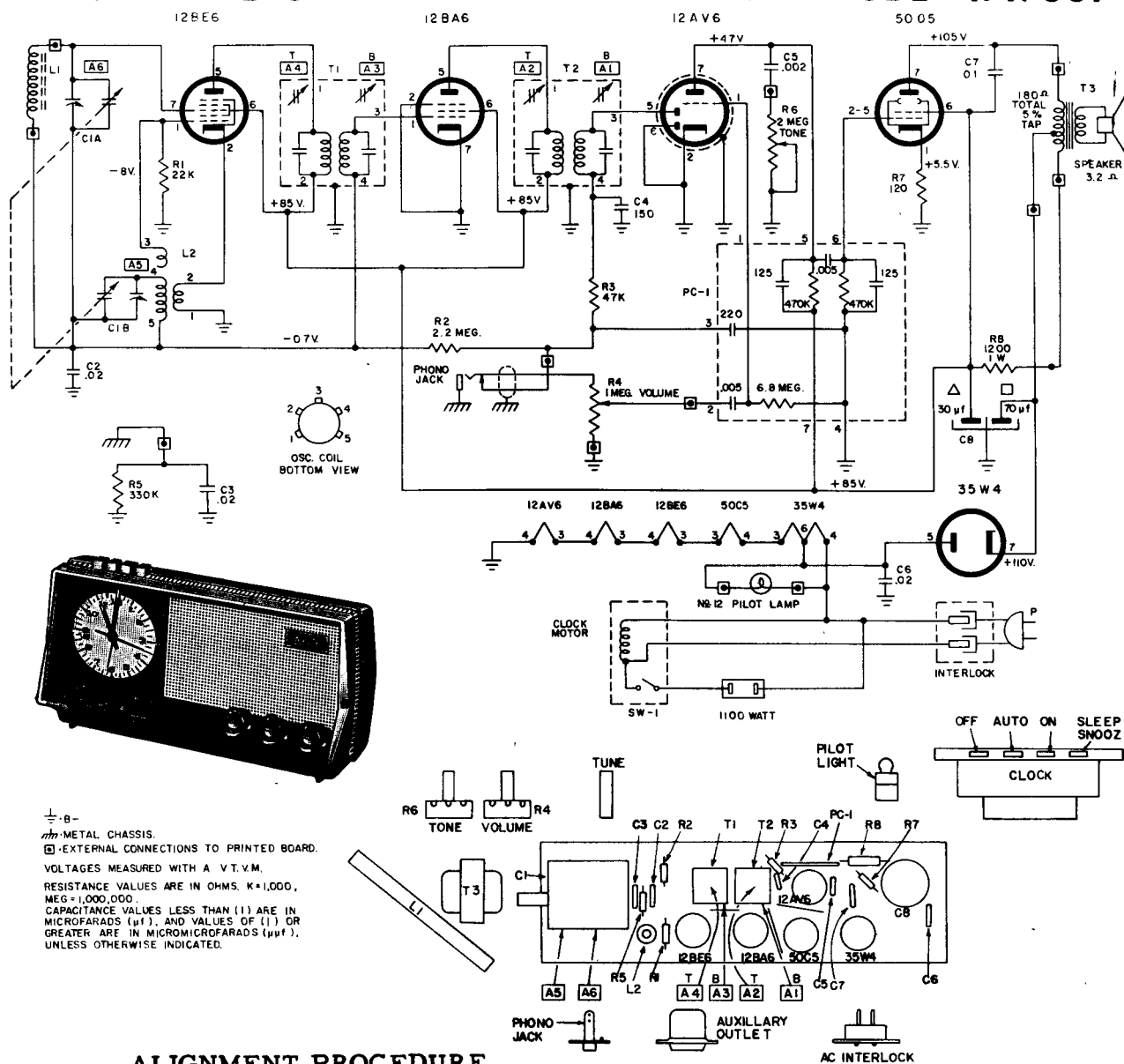
TOP VIEW OF
FM TUNER



TUNER SCHEMATIC



ARVIN RADIO MODELS 50R65 50R67 CODE 1.47001



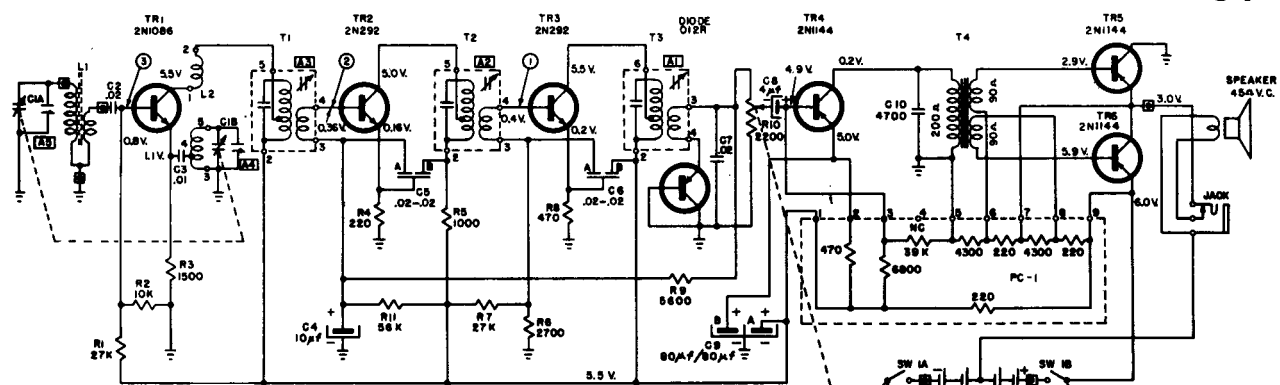
ALIGNMENT PROCEDURE

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.
Open	1670		* Test Loop	A5	Oscillator
1400	1400		* Test Loop	A6	Antenna
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 F) EXCEPT WHERE NOTED.

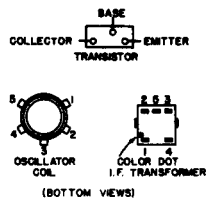
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM COUNTERCLOCKWISE ROTATION.

RESISTANCE VALUES ARE IN OHMS, K=1000.

⊕ COMMON GROUND SYMBOL.

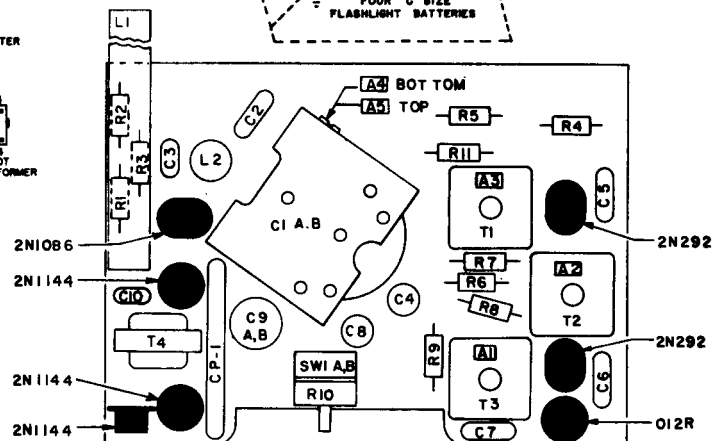
⊗ EXTERNAL CONNECTION TO PRINTED CIRCUIT.

TOTAL BATTERY CURRENT DRAIN UNDER NO SIGNAL CONDITIONS, 570 MA.

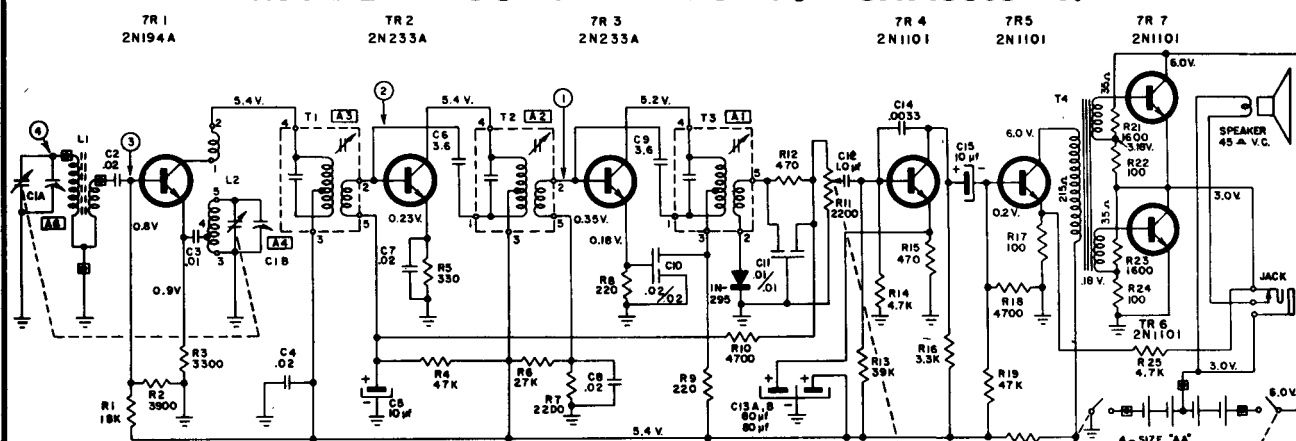


I. F. 455 KC.

SIGNAL TEST POINTS	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR (WTV ACROSS 45A)	INPUT FOR 8MW OUTPUT (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	30 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 F) EXCEPT WHERE NOTED.

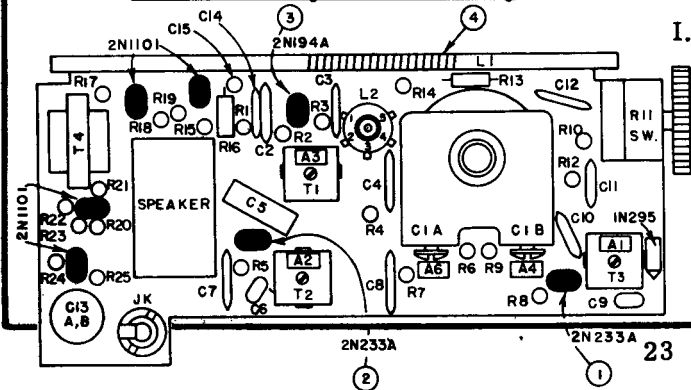
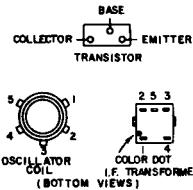
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM COUNTERCLOCKWISE ROTATION.

RESISTANCE VALUES ARE IN OHMS, K=1000.

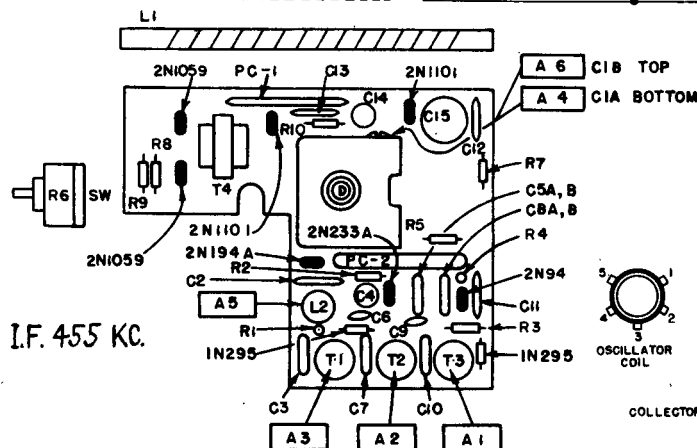
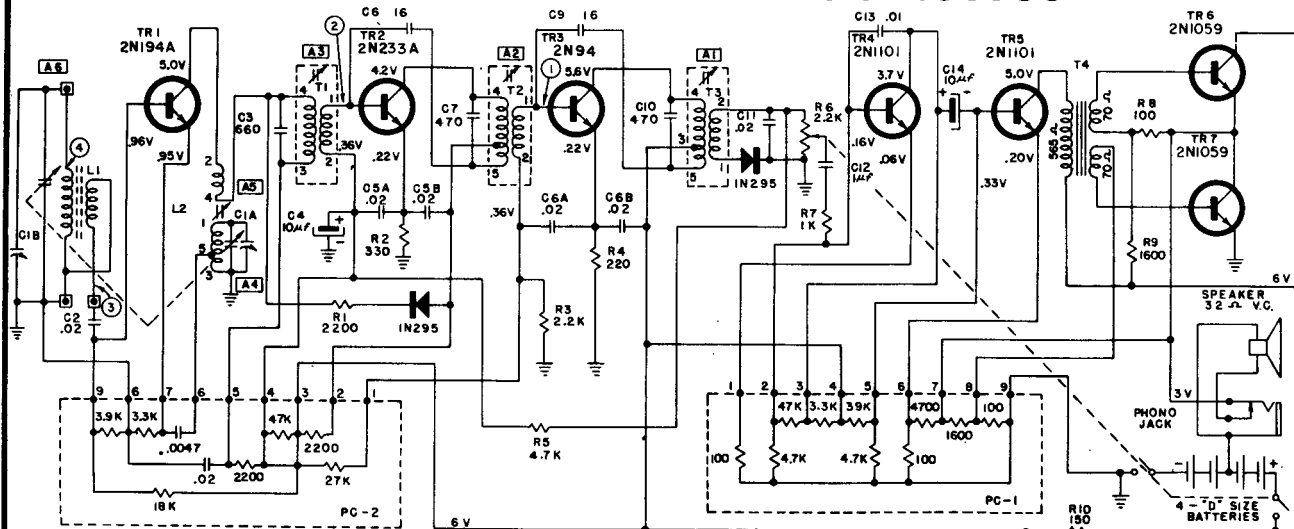
⊕ COMMON GROUND SYMBOL.

⊗ EXTERNAL CONNECTION TO PRINTED CIRCUIT.

TOTAL BATTERY CURRENT DRAIN UNDER NO SIGNAL CONDITIONS, 7 TO 11 MA.



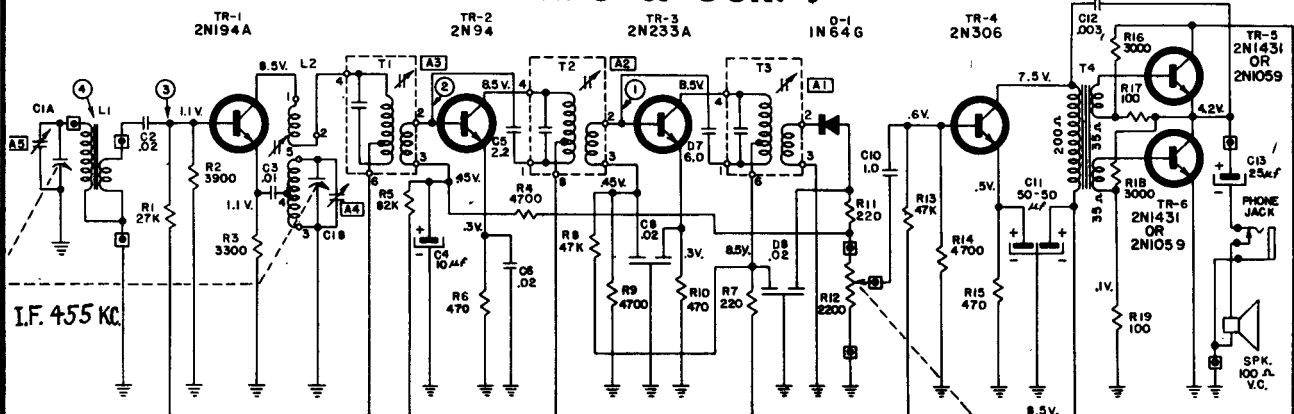
Arvin MODEL 60R58 CHASSIS 1.50300



RESISTANCE VALUES ARE IN OHMS; K=1000.
CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μ F), & VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μ M) EXCEPT WHERE NOTED.
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED & VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.
⊕ - COMMON GROUND SYMBOL.
□ - EXTERNAL CONNECTION TO PRINTED CIRCUIT.

SIGNAL TEST POINT	TEST FREQUENCY	SERIES CAPACITOR TO GENERATOR	INPUT FOR 50 MW OUTPUT TO GENERATOR (1.26 V ACROSS 32 Ω)
1	455 KC	.05 μ F	900 μ V
2	455 KC	.05 μ F	30 μ V
3	455 KC	.05 μ F	5 μ V
4	1000 KC	STANDARD LOOP	200 μ V/M

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

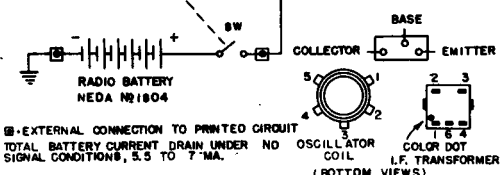


CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μ F), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS (μ M) EXCEPT WHERE NOTED.

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 50 MW OUTPUT TO GENERATOR (1.26 V ACROSS 32 Ω)
①	455 KC	.05 μ F	500 μ V
②	455 KC	.05 μ F	50 μ V
③	455 KC	.05 μ F	2 μ V
④	1000 KC	STANDARD LOOP	200 μ V/M

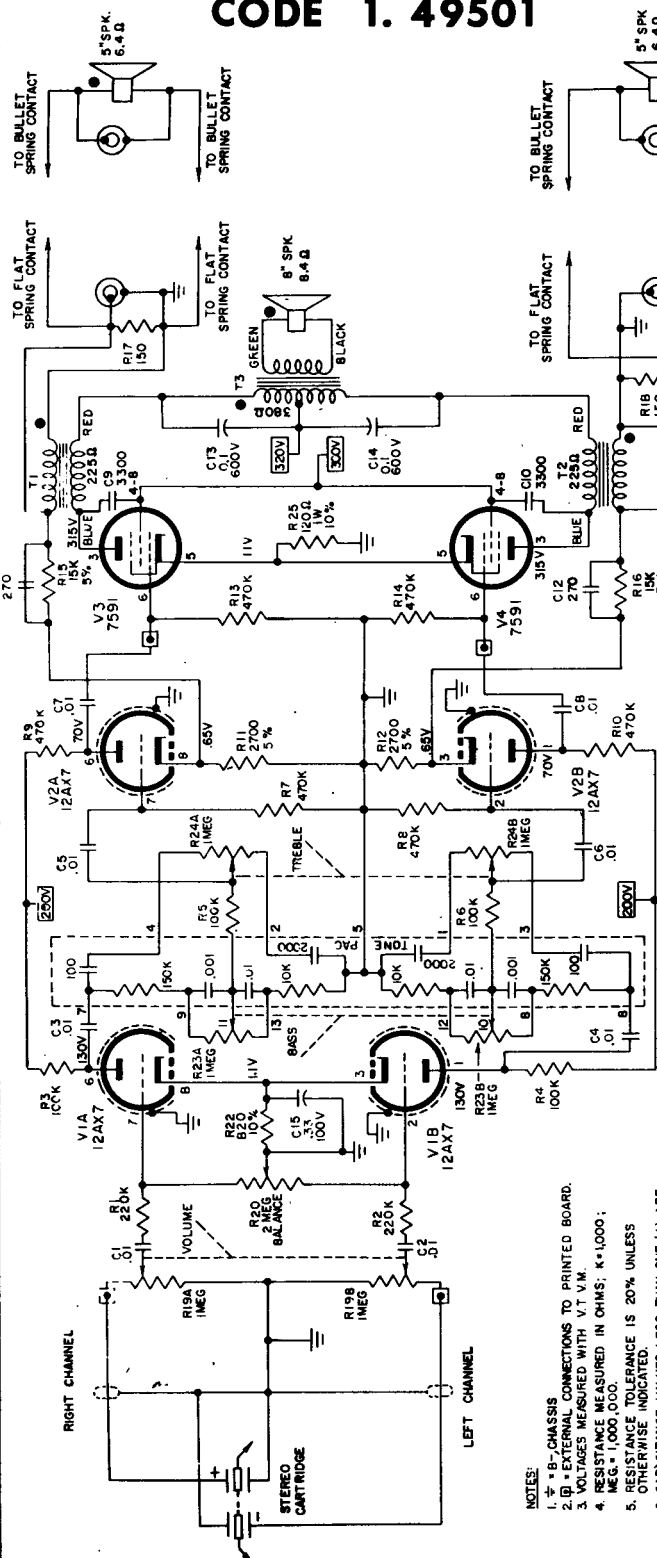


ARVIN PHONOGRAPH

MODEL 90P53

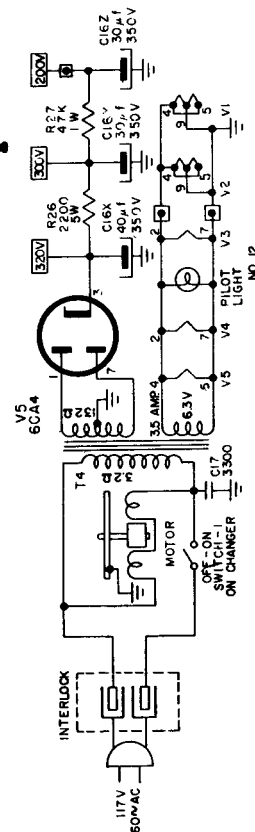
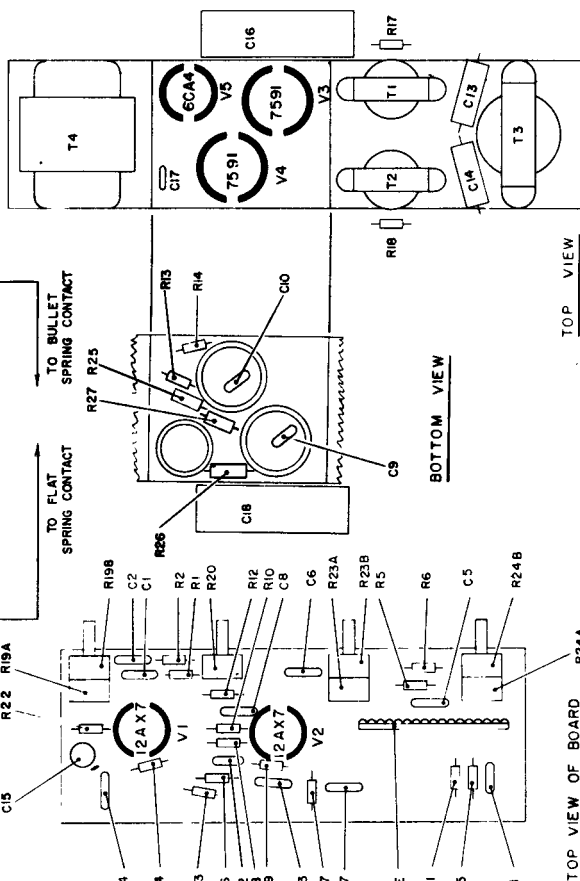
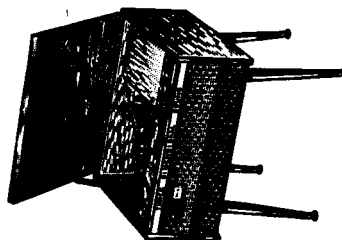
MODEL 90P58

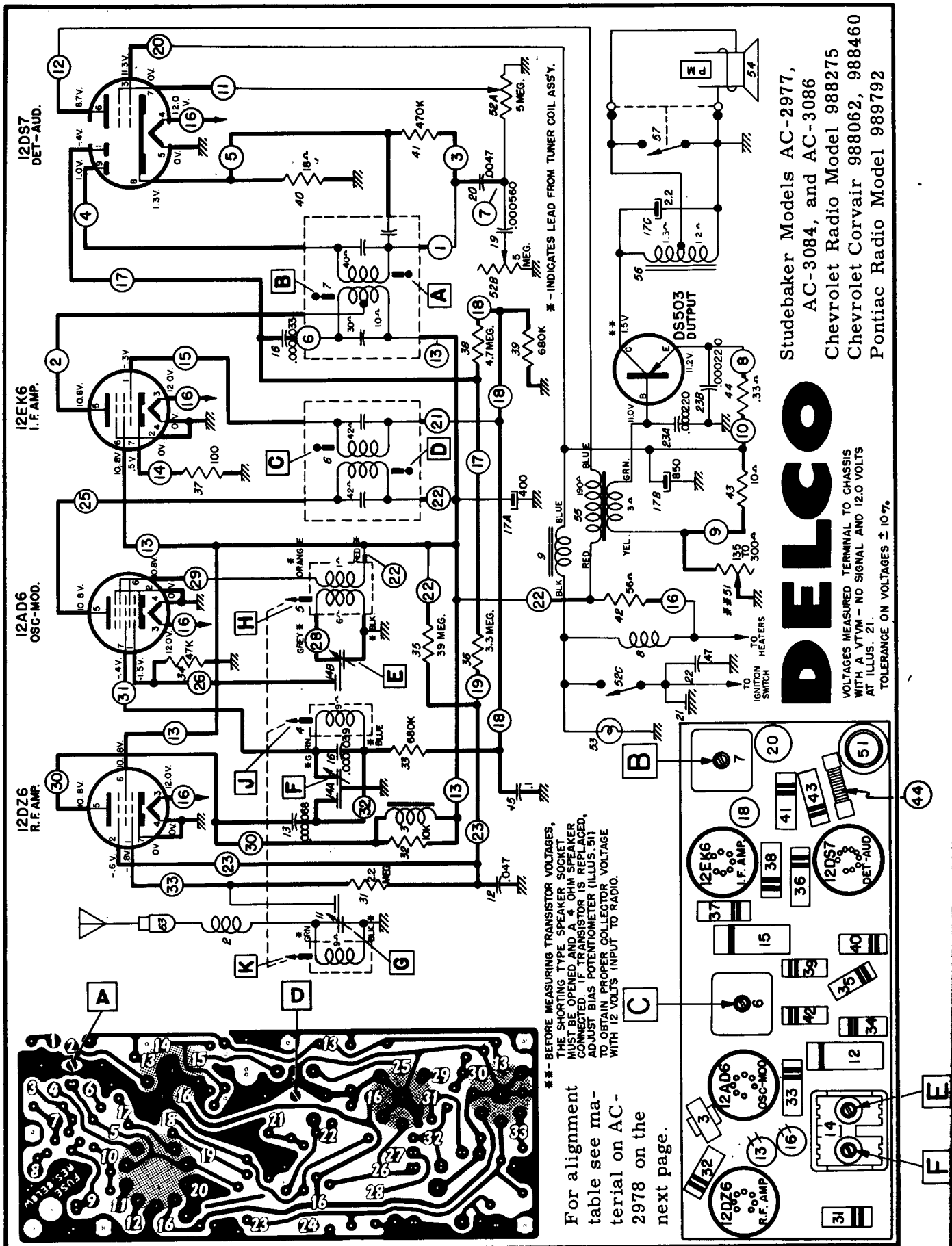
CODE 1.49501



NOTES:

1. Φ - B-CHASSIS
2. Φ - EXTERNAL CONNECTIONS TO PRINTED BOARD.
3. VOLTAGES MEASURED WITH V.T.V.M.
4. RESISTANCE TOLERANCE IS 20% UNLESS OTHERWISE INDICATED.
5. RESISTANCE TOLERANCE IS 20% UNLESS OTHERWISE INDICATED.
6. IN MICROFARADS (M) OR IN MICRO-MICROFARADS (MM) UNLESS OTHERWISE INDICATED.
7. COMPONENTS IN THIS AMPLIFIER ARE INTERCONNECTED TO MAINTAIN PHASE RELATIONSHIP BETWEEN APPLIED VOLTAGE AND VOICE COIL MOVEMENT (I.E. A POSITIVE INPUT VOLTAGE MOVES VOICE COIL OUTWARD IN RIGHT CHANNEL, INWARD ON LEFT CHANNEL.) DO NOT DISTURB THIS PHASE RELATIONSHIP DURING SERVICING.
8. $\bullet$ PHASING DOT.
9. TRANSFORMERS T1, T2 (IN PHASE WITH RED LEAD); T3 (IN PHASE WITH GREEN LEAD); SPEAKERS (POSITIVE VOLTAGE MOVES VOICE COIL OUTWARD).



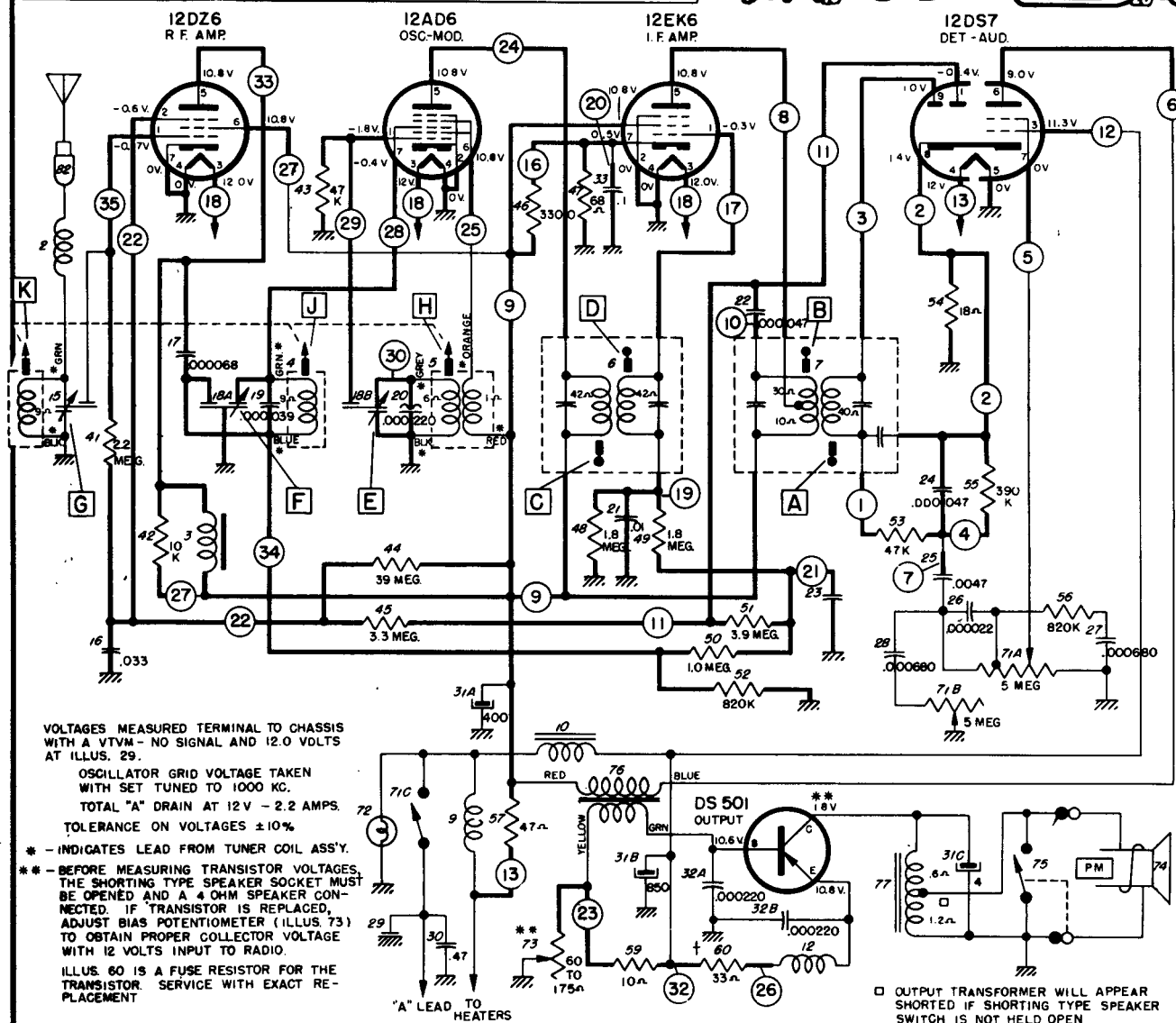
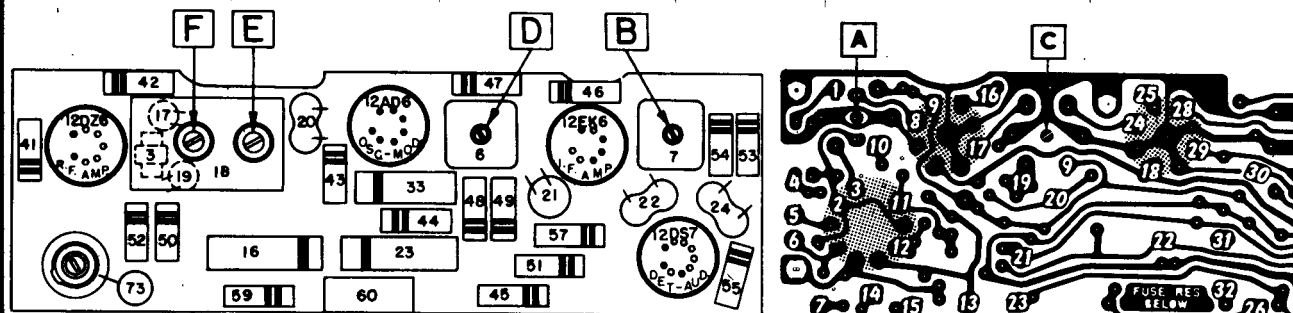


BOTTOM VIEW

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

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

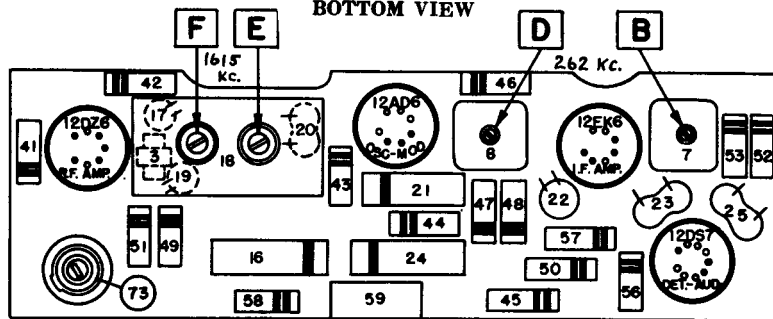
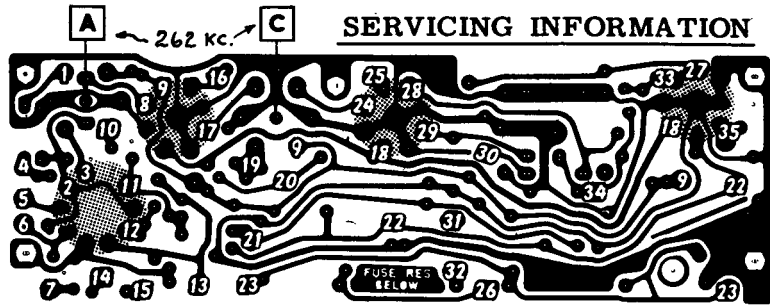
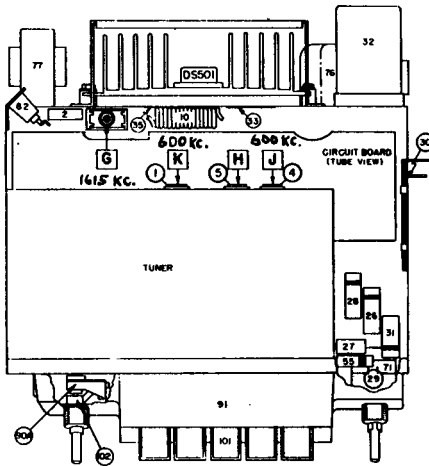
STEPS	SERIES CAPACITOR OR DUMMY ANTENNA	CONNECT SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	TUNE RECEIVER TO	ADJUST IN SEQUENCE FOR MAX. OUTPUT
1	0.1 Mfd.	12AD6 Grid (Pin #7)	262 KC.	High Frequency Stop	A, B, D, C,
2	0.000068 Mfd.	Antenna Connector	1615 KC.	High Frequency Stop	*E, F, G
3	0.000068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



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

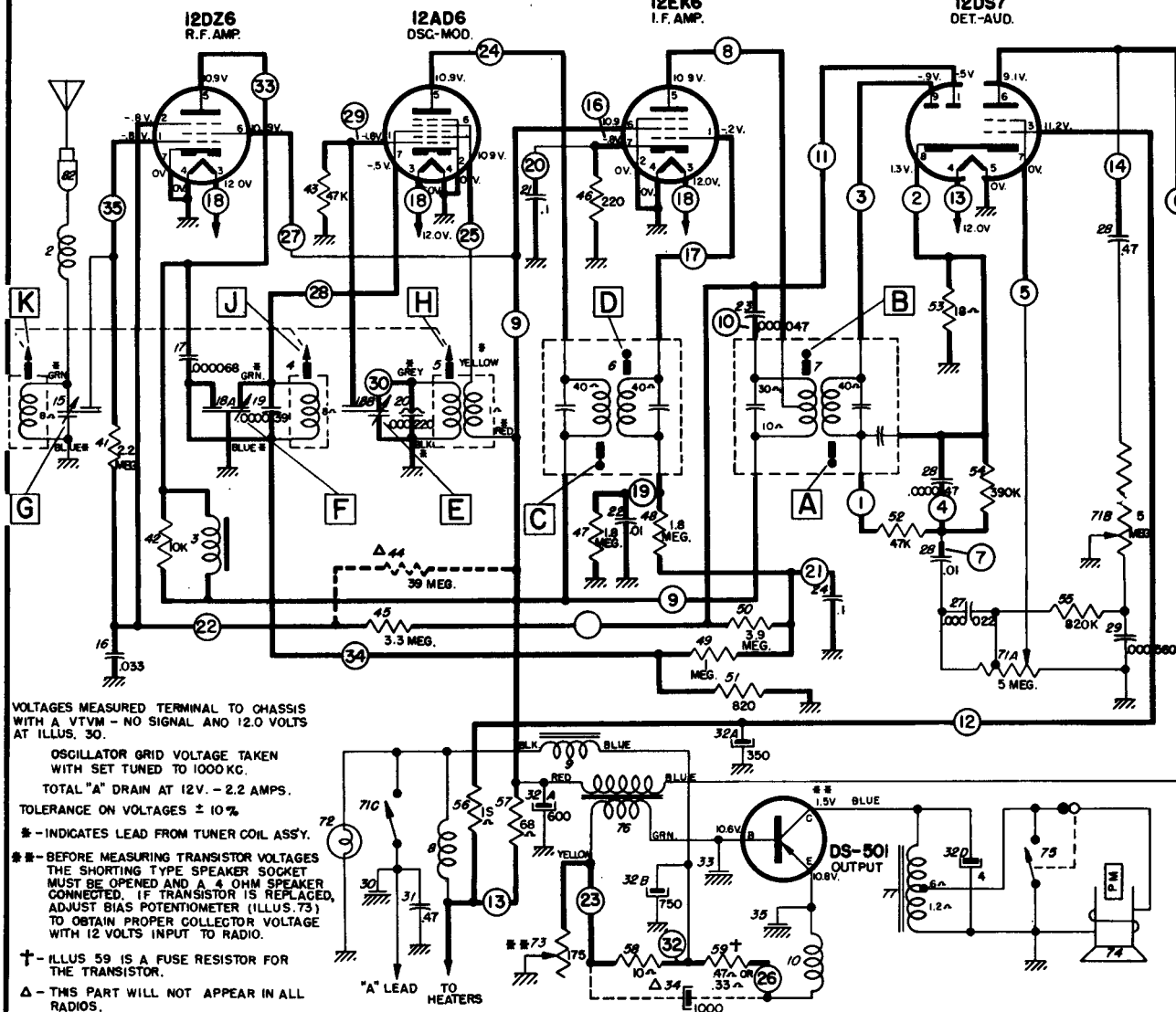
DELCO

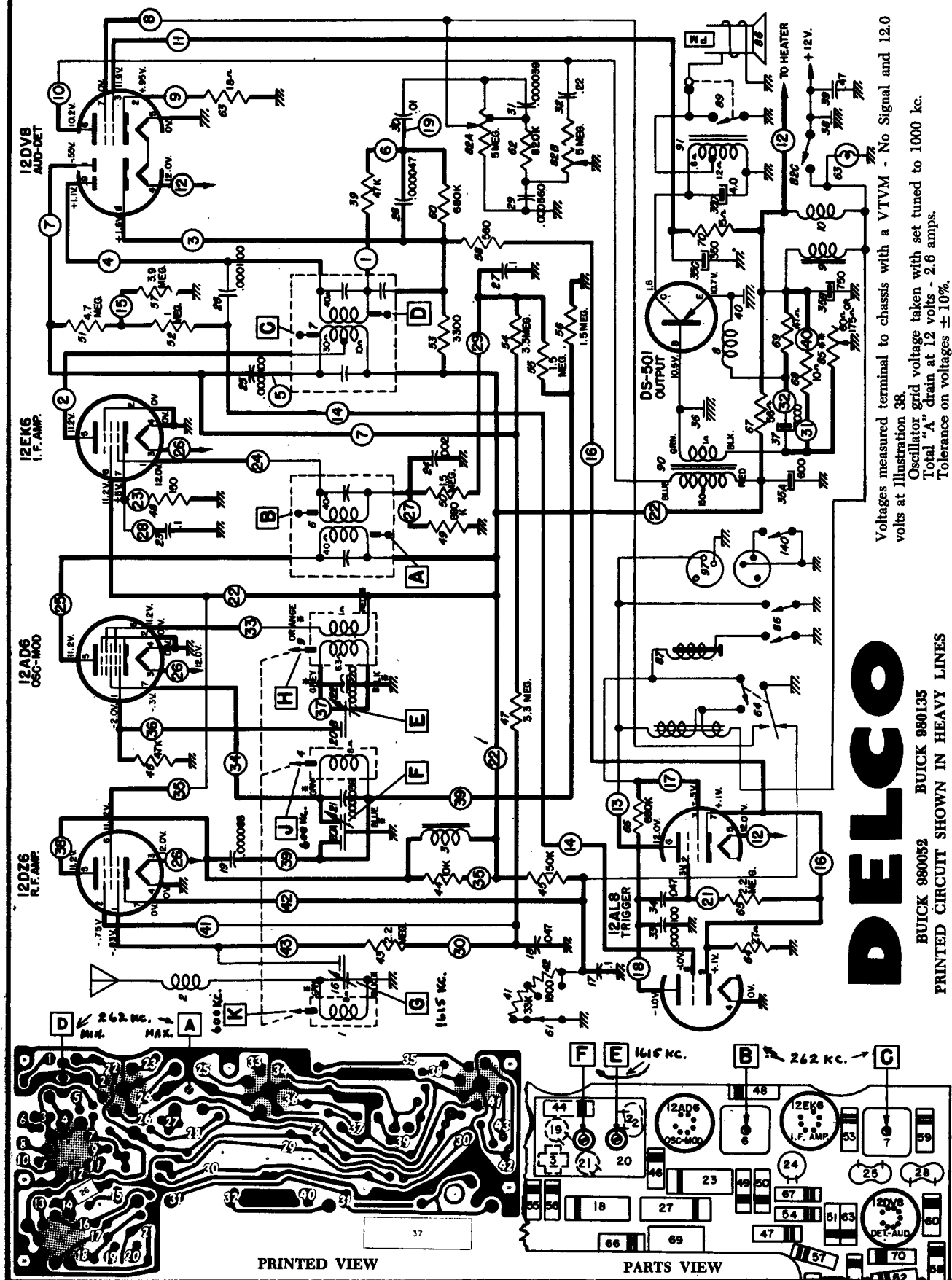
BUICK MODEL 980051



BOTTOM VIEW

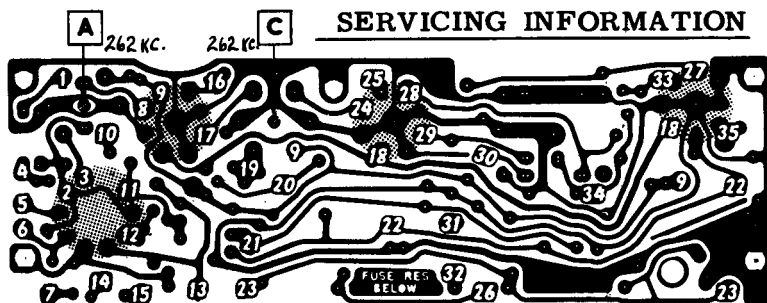
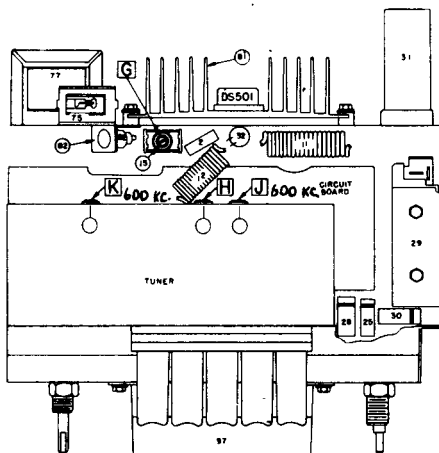
TOP VIEW



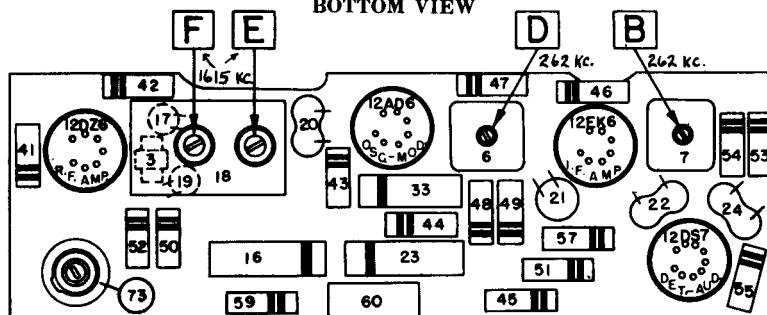


DELCO

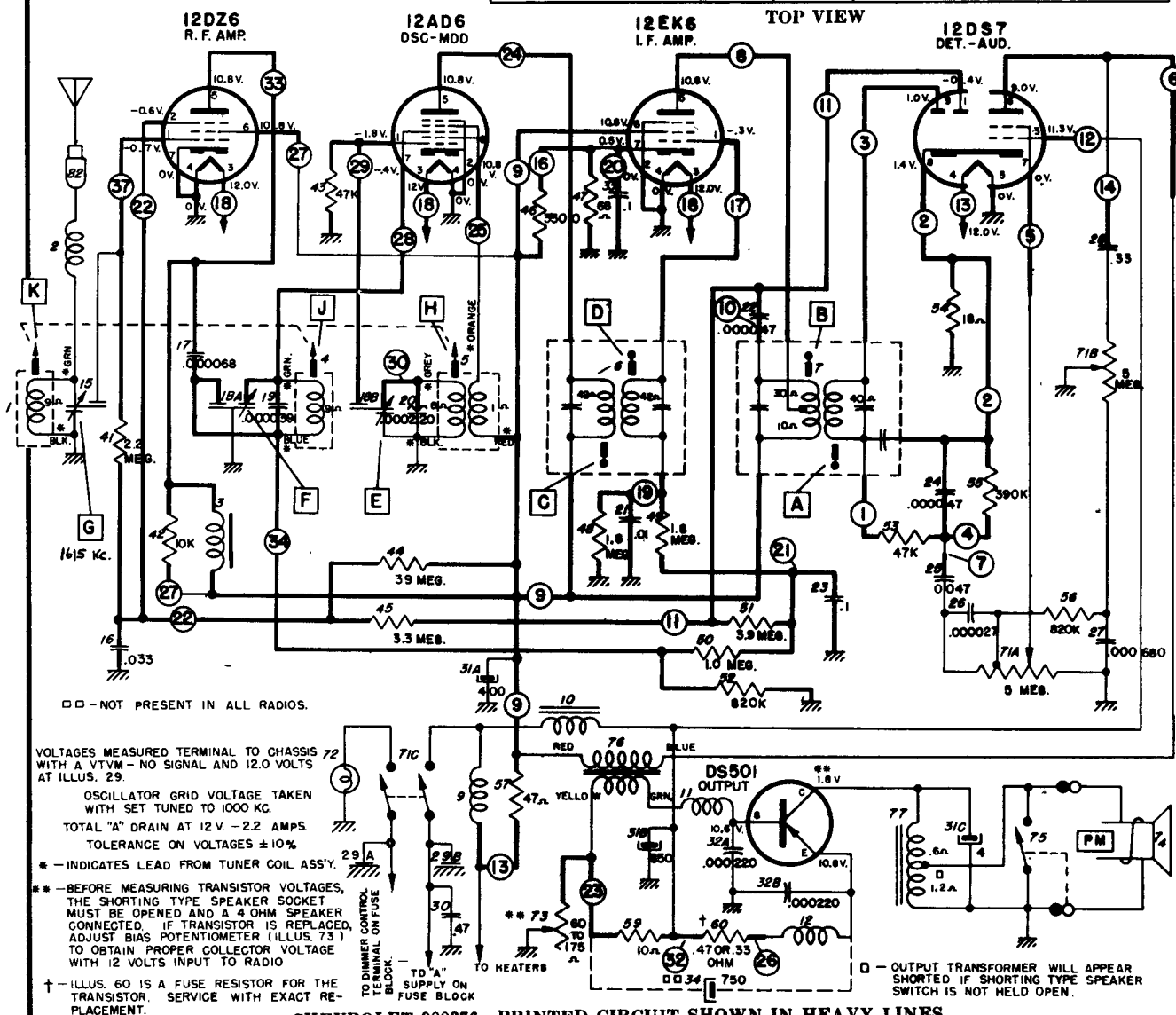
CHEVROLET MODEL 988276



BOTTOM VIEW



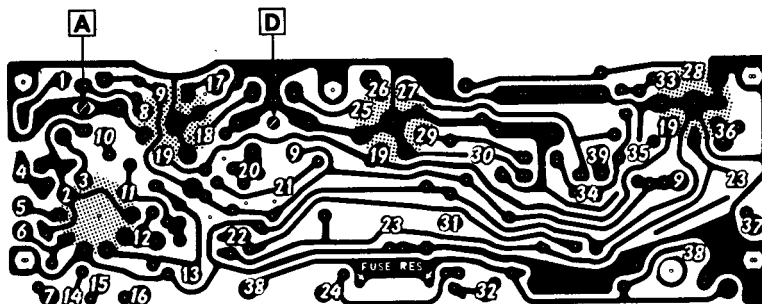
TOP VIEW



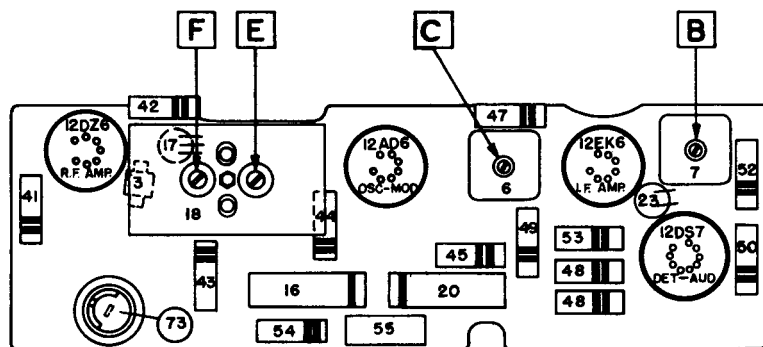
CHEVROLET 988276—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

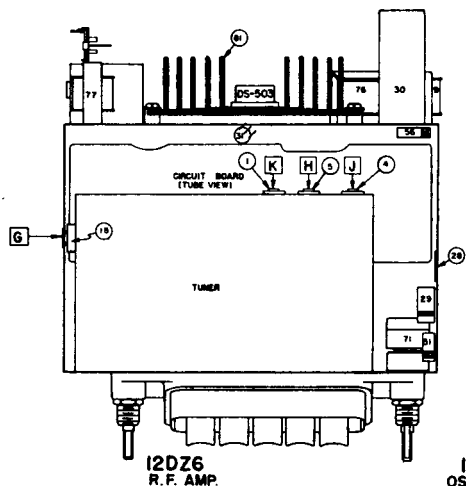
BUICK MODEL 980132
OLDSMOBILE MODEL 989387
Alignment in Table 3, Page 38



BOTTOM VIEW



TOP VIEW

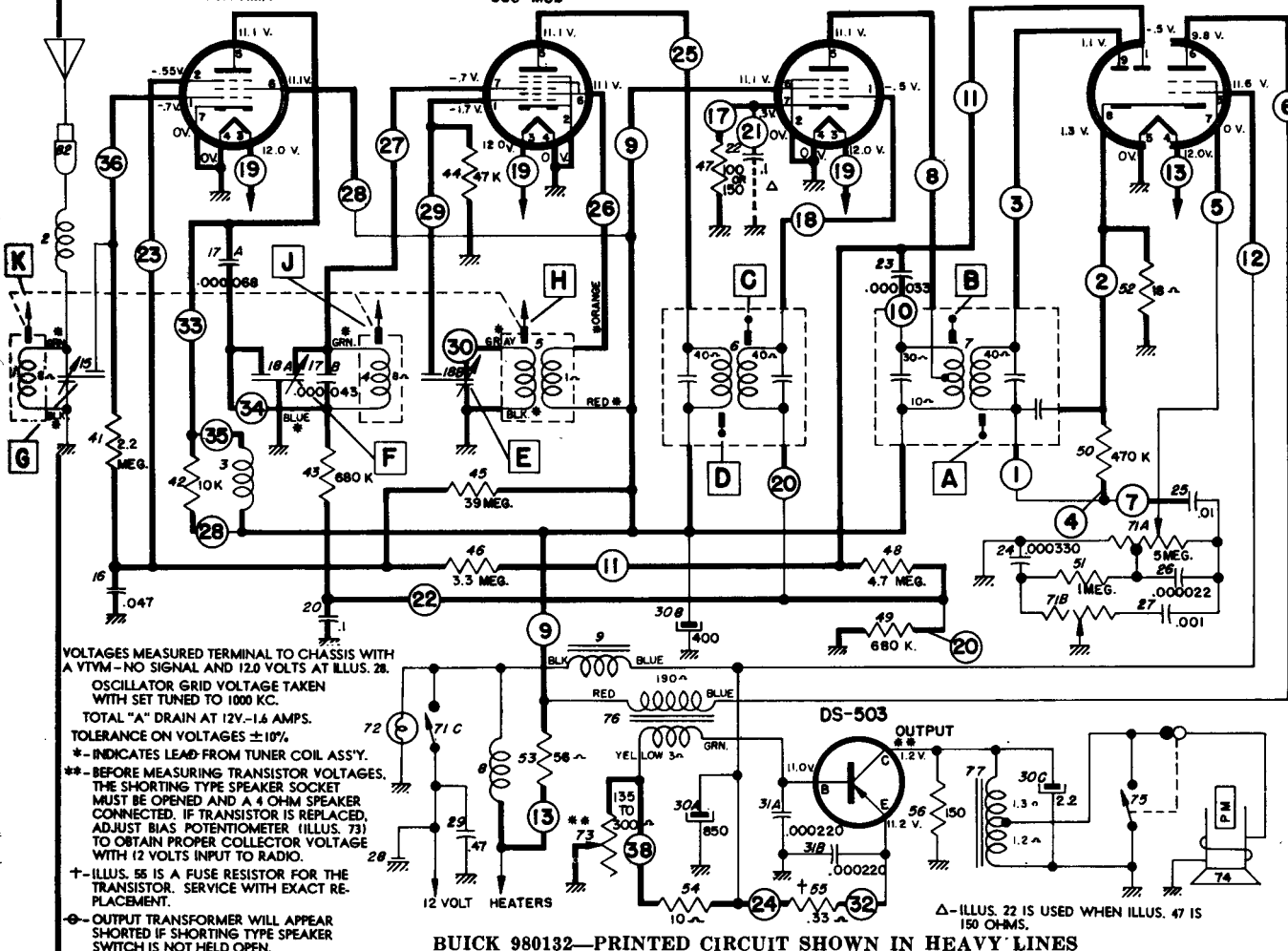


12DZ6
R.F. AMP.

12AD6
OSC-MOD

12EK6
I.F. AMP.

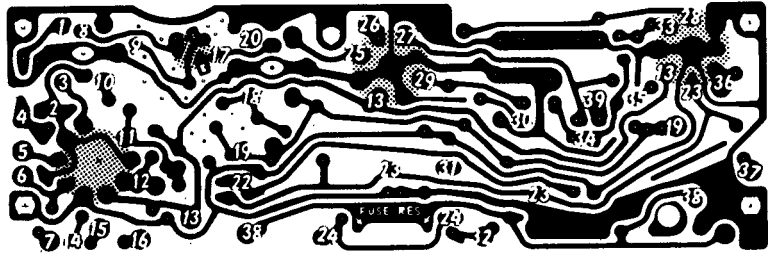
12DS7
AUD-DET



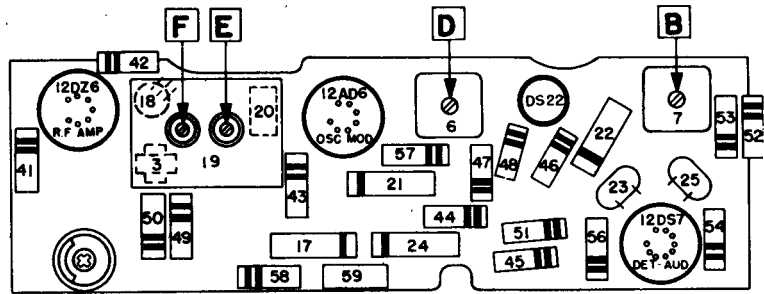
DELCO

NEEDED 1961 RADIO SERVICING INFORMATION

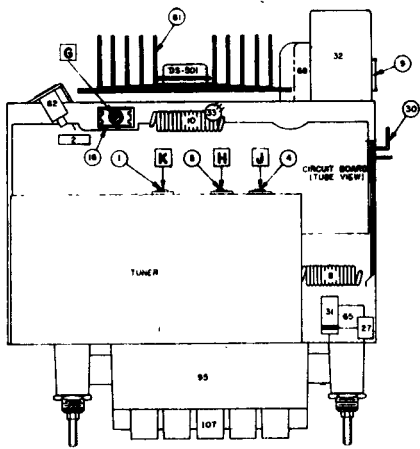
BUICK MODEL 980134
Alignment in Table 1, Page 38



BOTTOM VIEW



TOP VIEW



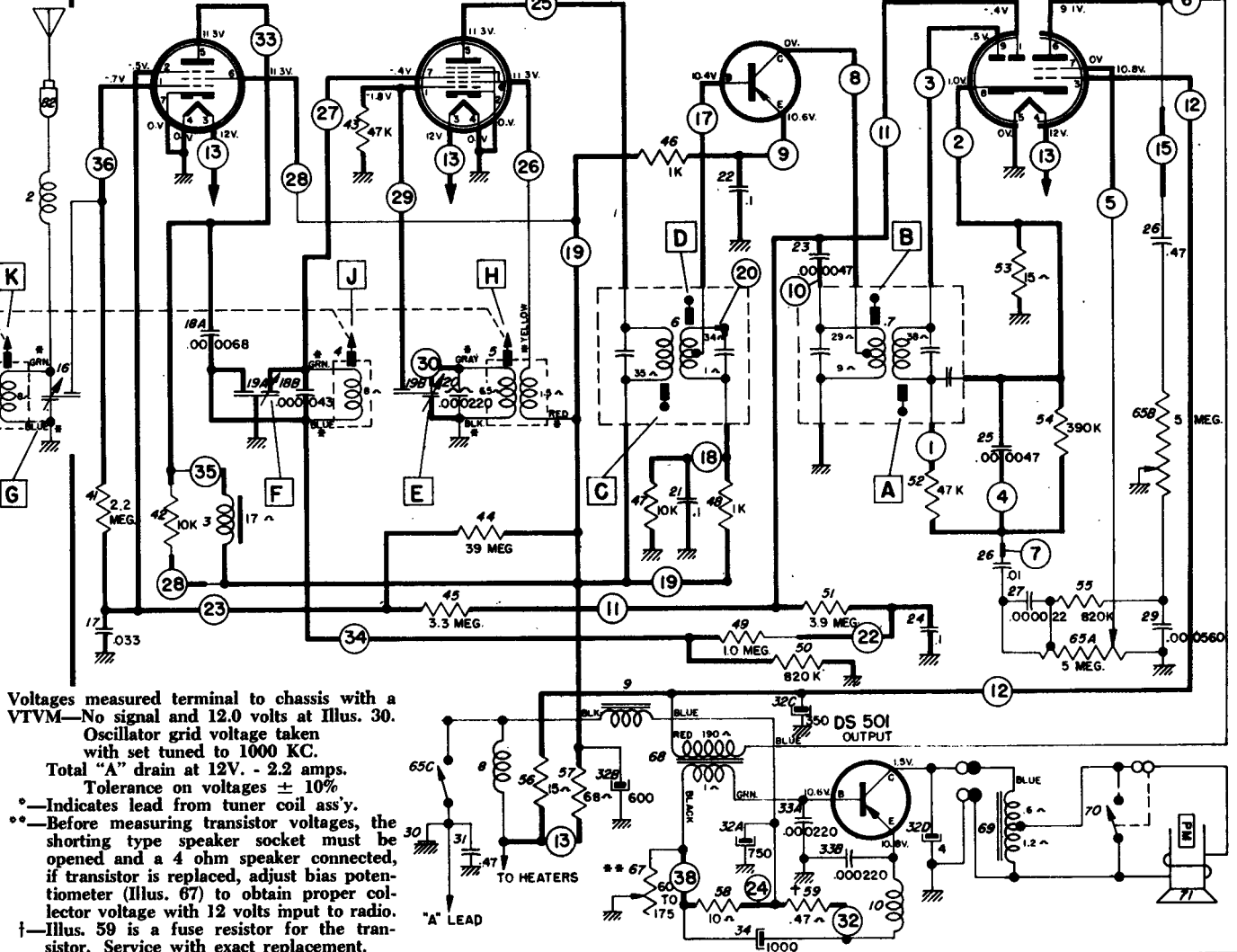
TUBE VIEW

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 $\pm 10\%$

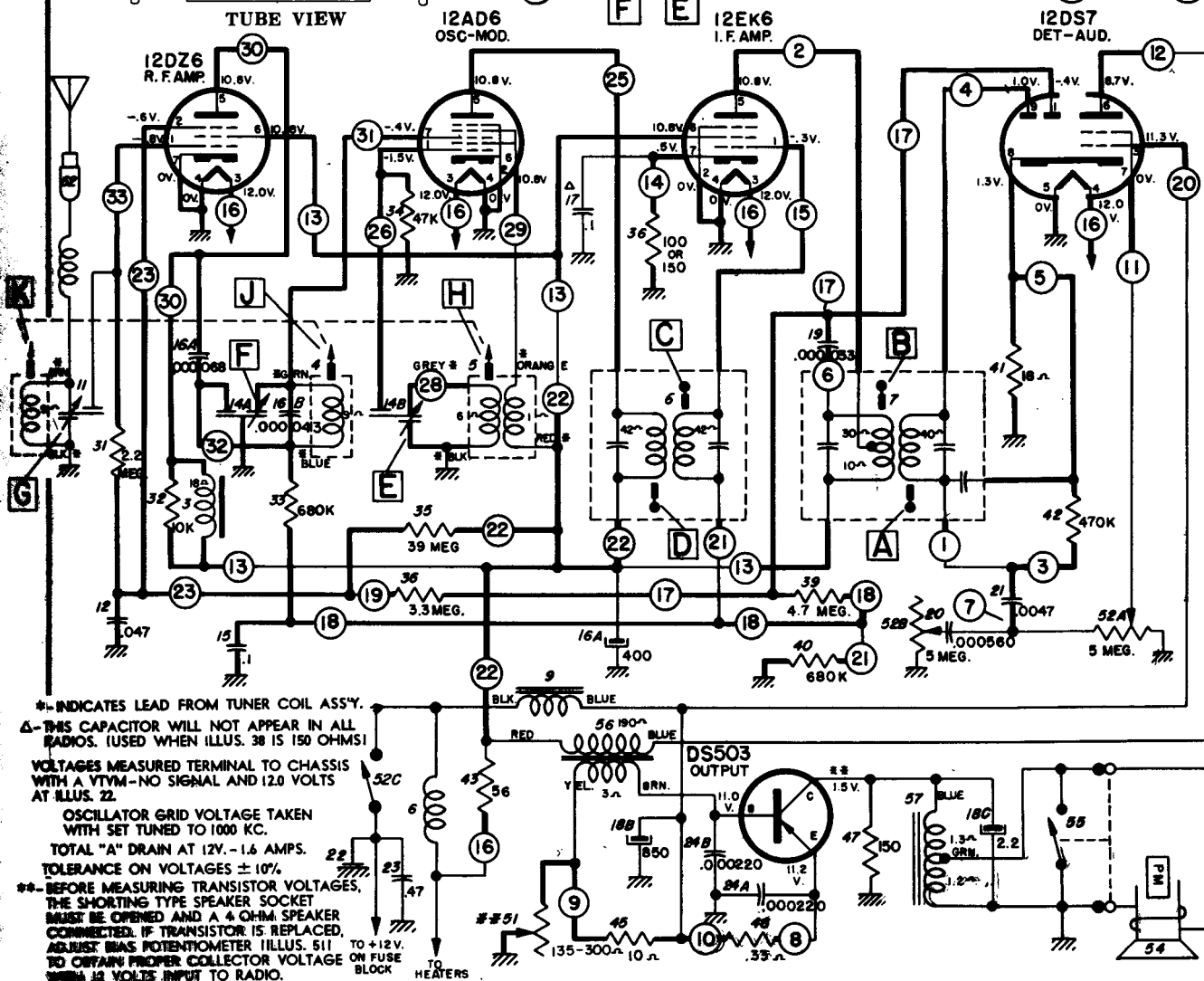
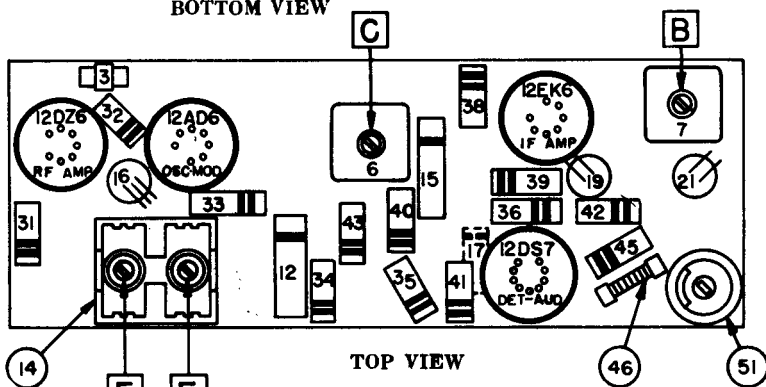
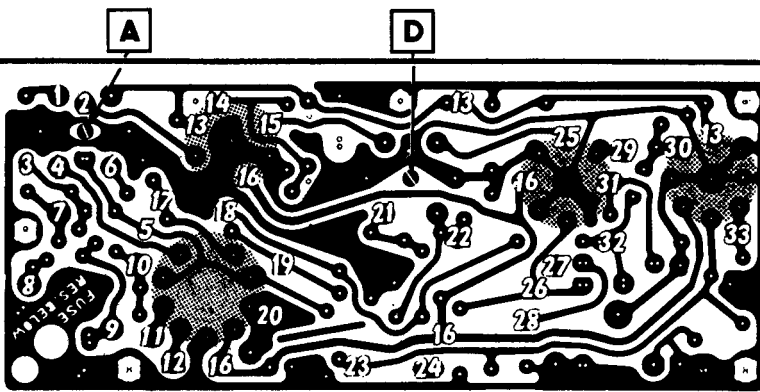
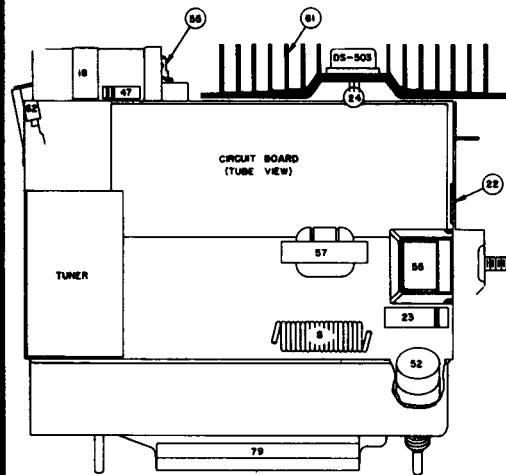
*—Indicates lead from tuner coil ass'y.

**—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.

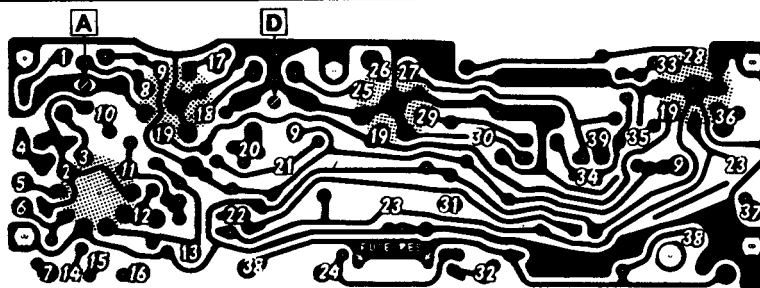
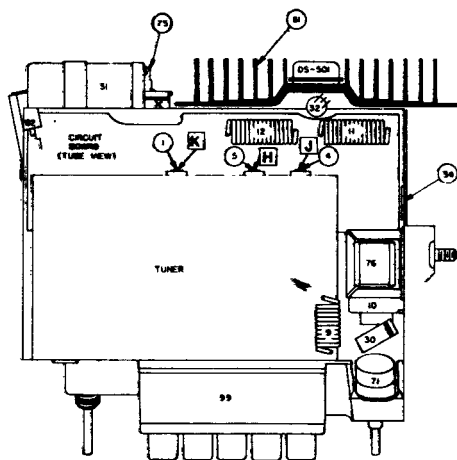
†—Illus. 59 is a fuse resistor for the transistor. Service with exact replacement.

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

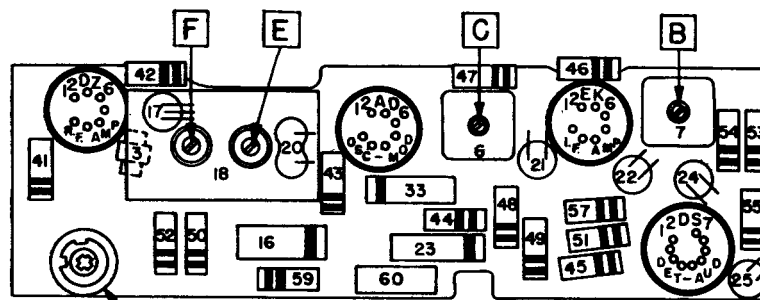
PRINTED CIRCUIT SHOWN IN HEAVY LINES

DELCOCHEVROLET MODEL 988413
Alignment in Table 4, Page 38

DELCO
CHEVROLET MODEL 988414
 Alignment in Table 1, Page 38



BOTTOM VIEW



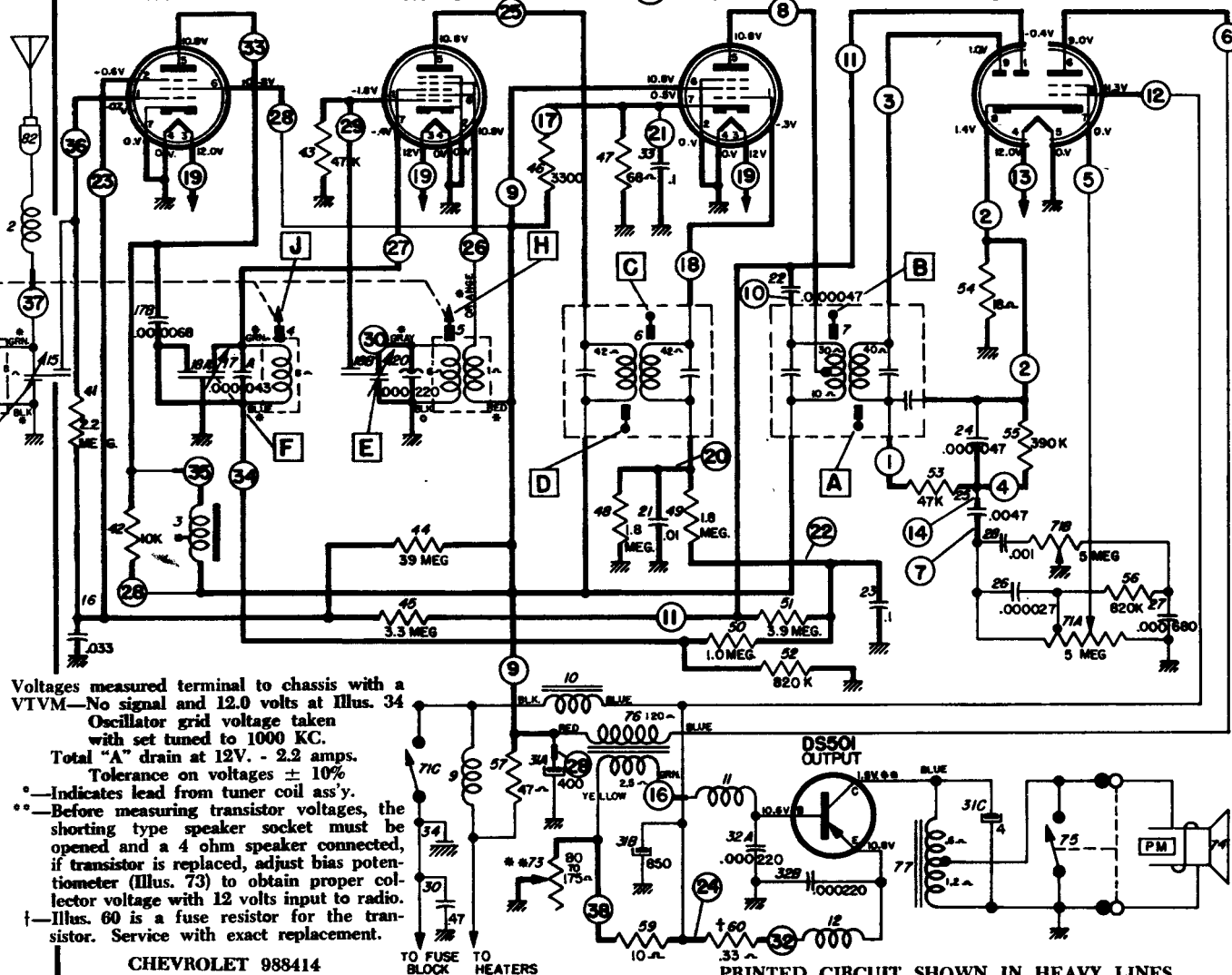
TOP VIEW

12DZ6
R.F. AMP.

12AD6
OSC-MOD

12EK6
I.F. AMP.

12DS7
DET - AUD



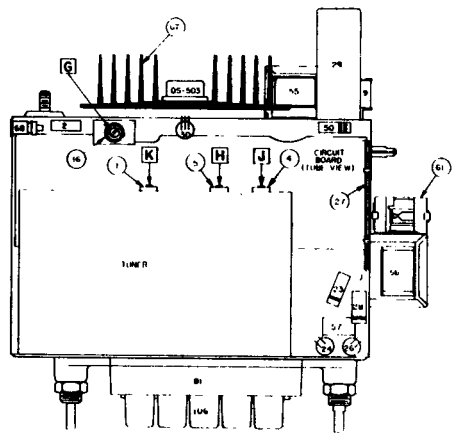
Voltages measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 34
 Oscillator grid voltage taken with set tuned to 1000 KC.
 Total "A" drain at 12V. - 2.2 amps.
 Tolerance on voltages $\pm 10\%$
 *—Indicates lead from tuner coil ass'y.
 **—Before measuring transistor voltages, the shorting type speaker socket must be opened and a 4 ohm speaker connected, if transistor is replaced, adjust bias potentiometer (Illus. 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

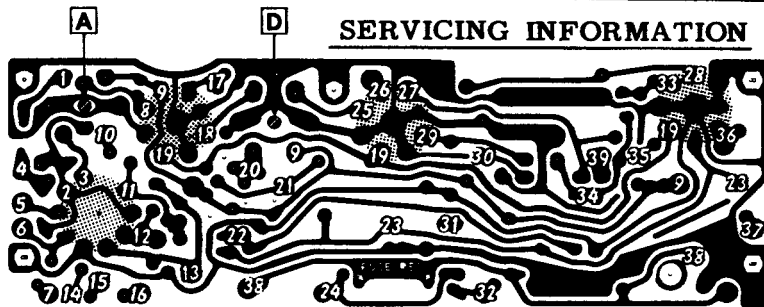
PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO
CHEVROLET CORVAIR 988468
Alignment in Table 1, Page 38

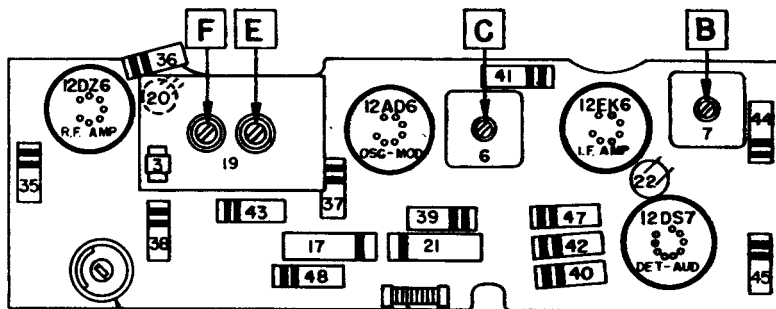
SERVICING INFORMATION



TUBE VIEW



BOTTOM VIEW



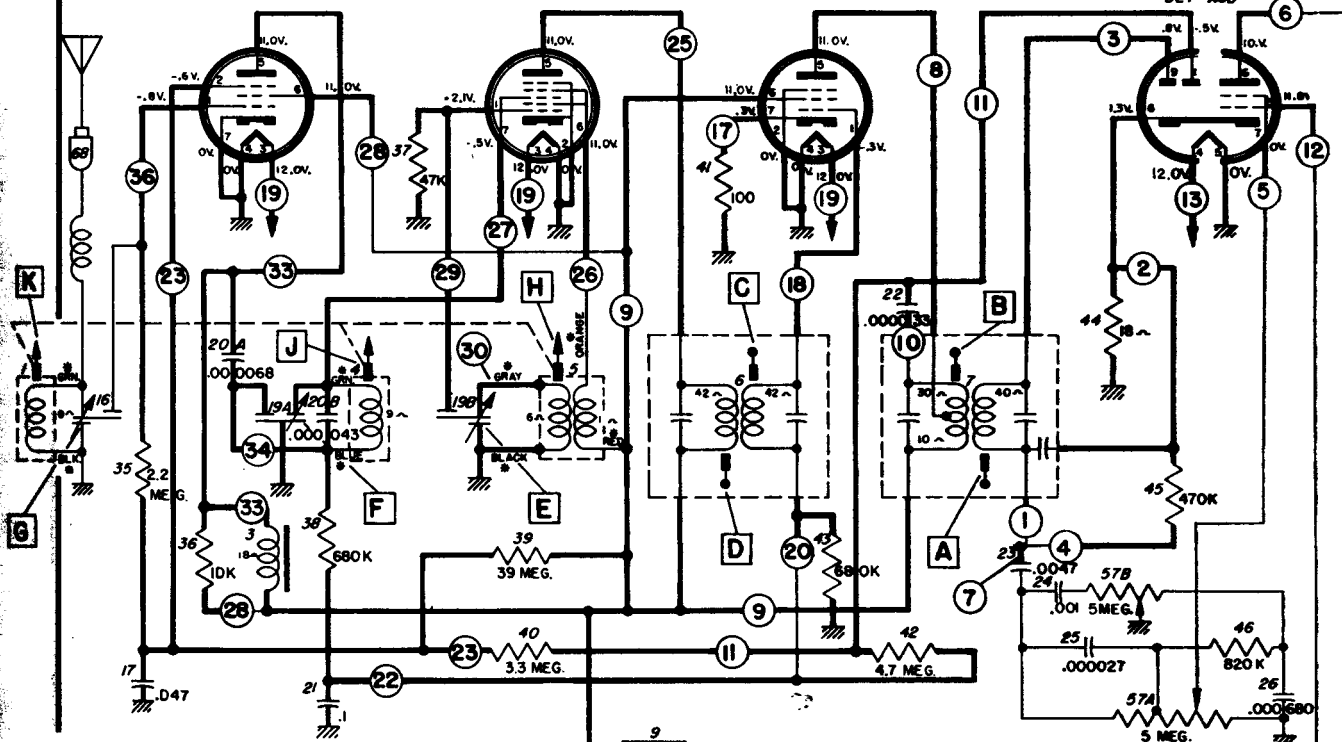
TOP VIEW

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. 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

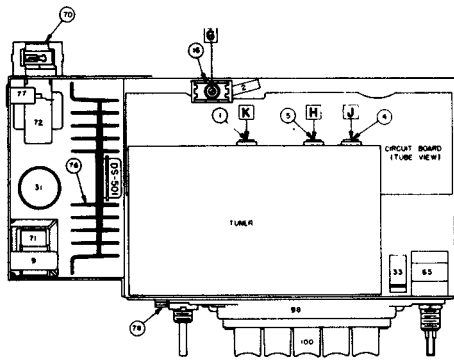
FUSE BLOCK

PRINTED CIRCUIT SHOWN IN HEAVY LINES.

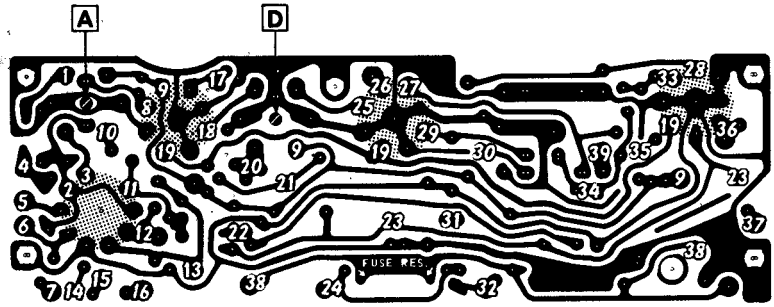
DELCO

OLDSMOBILE MODEL 989392

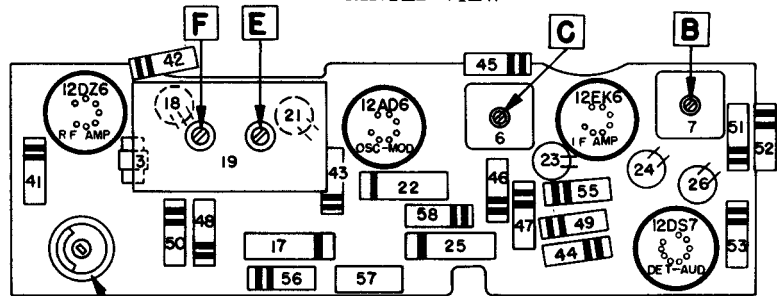
Alignment in Table 2, Page 38



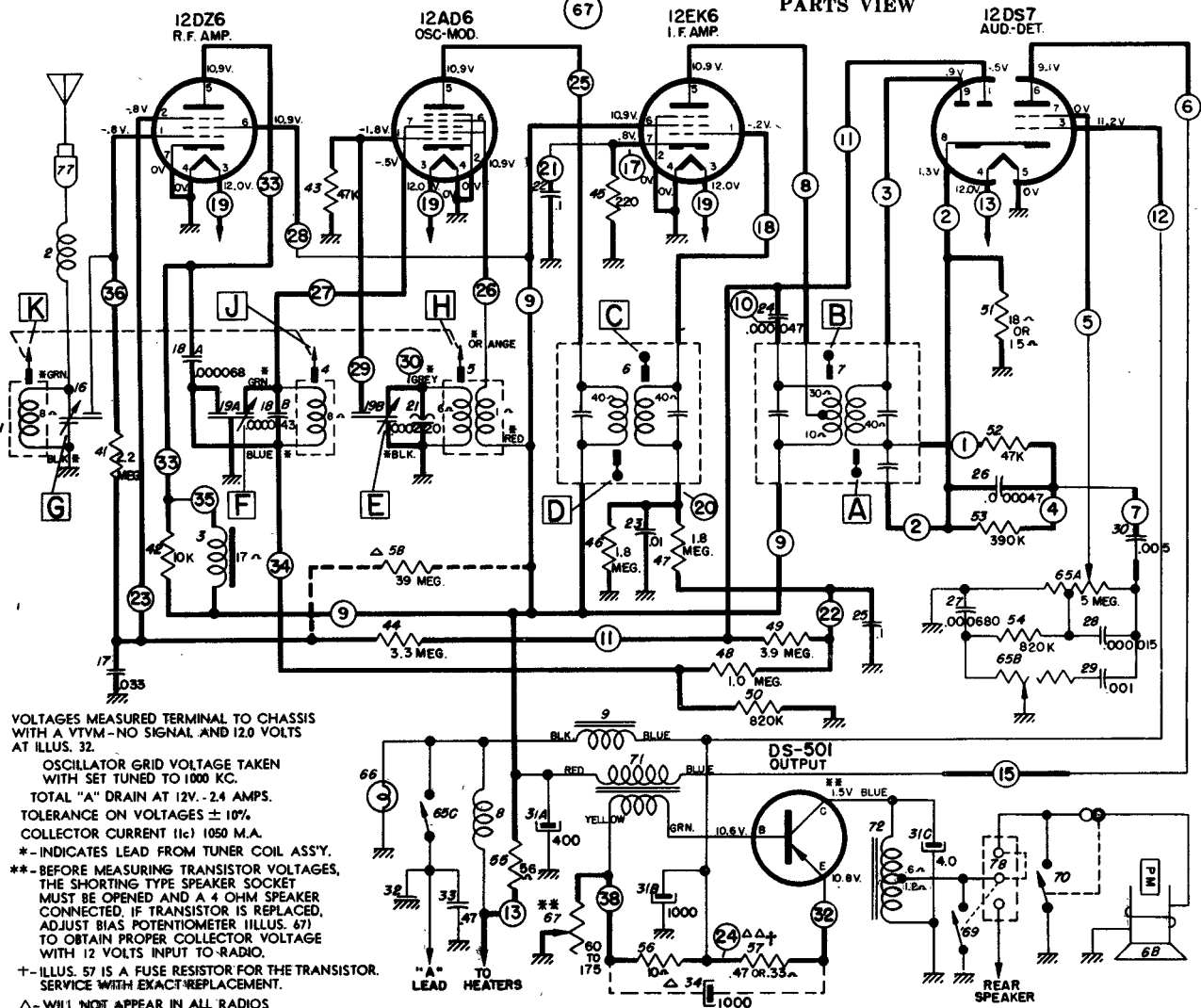
TUBE VIEW



PRINTED 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.—2.4 AMPS. TOLERANCE ON VOLTAGES $\pm 10\%$. COLLECTOR CURRENT (Ic) 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.

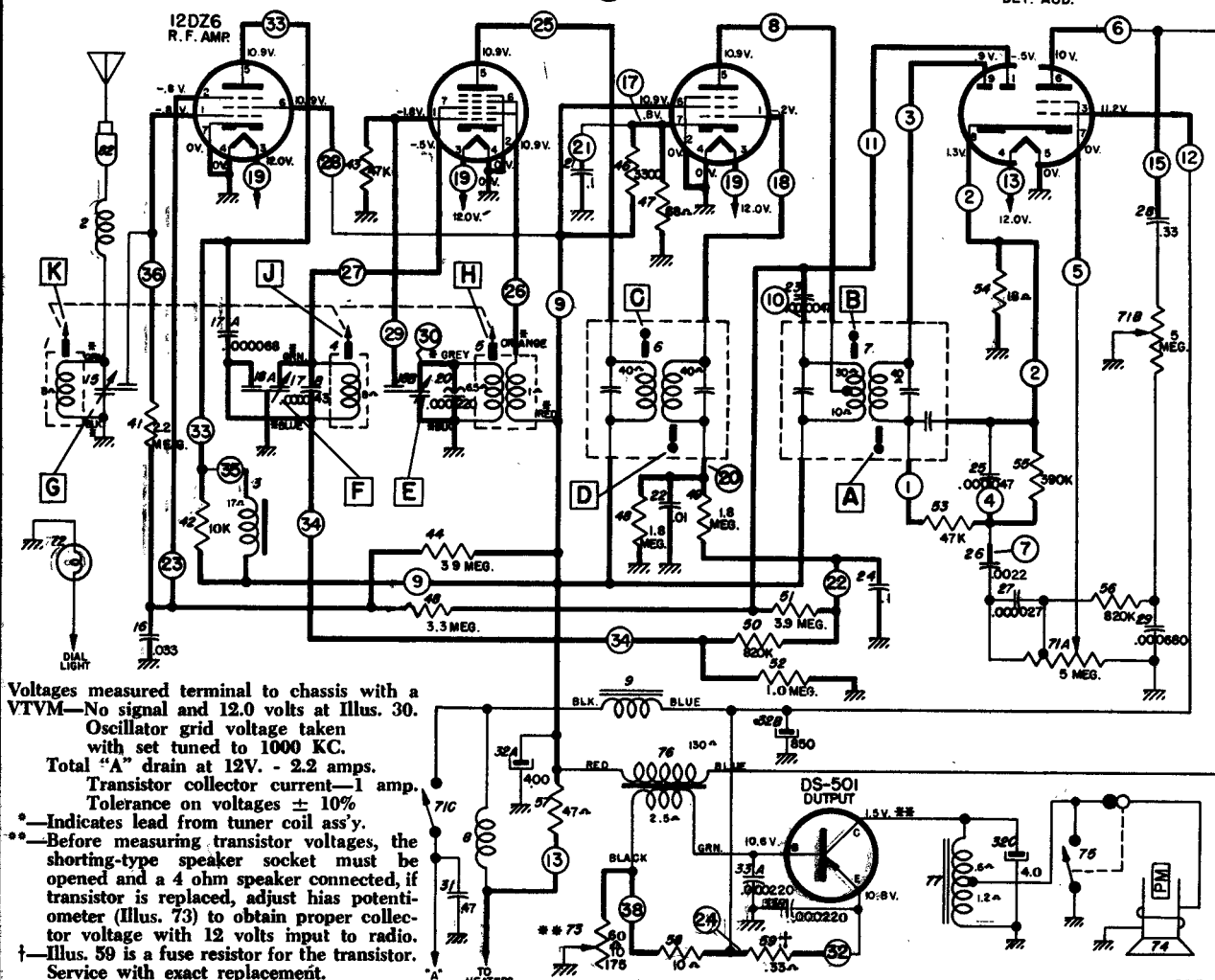
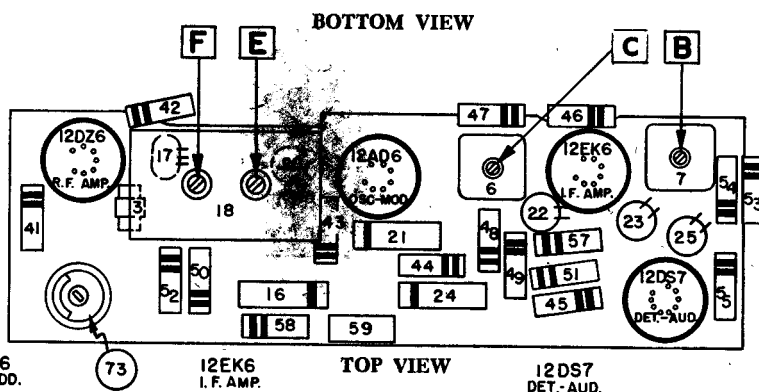
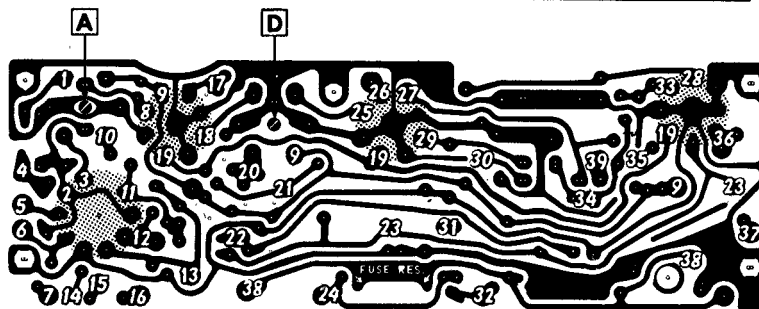
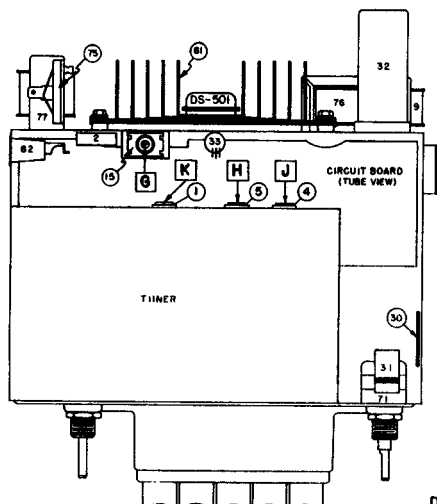
△—WILL NOT APPEAR IN ALL RADIOS

△△—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 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.
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 1/4" 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.

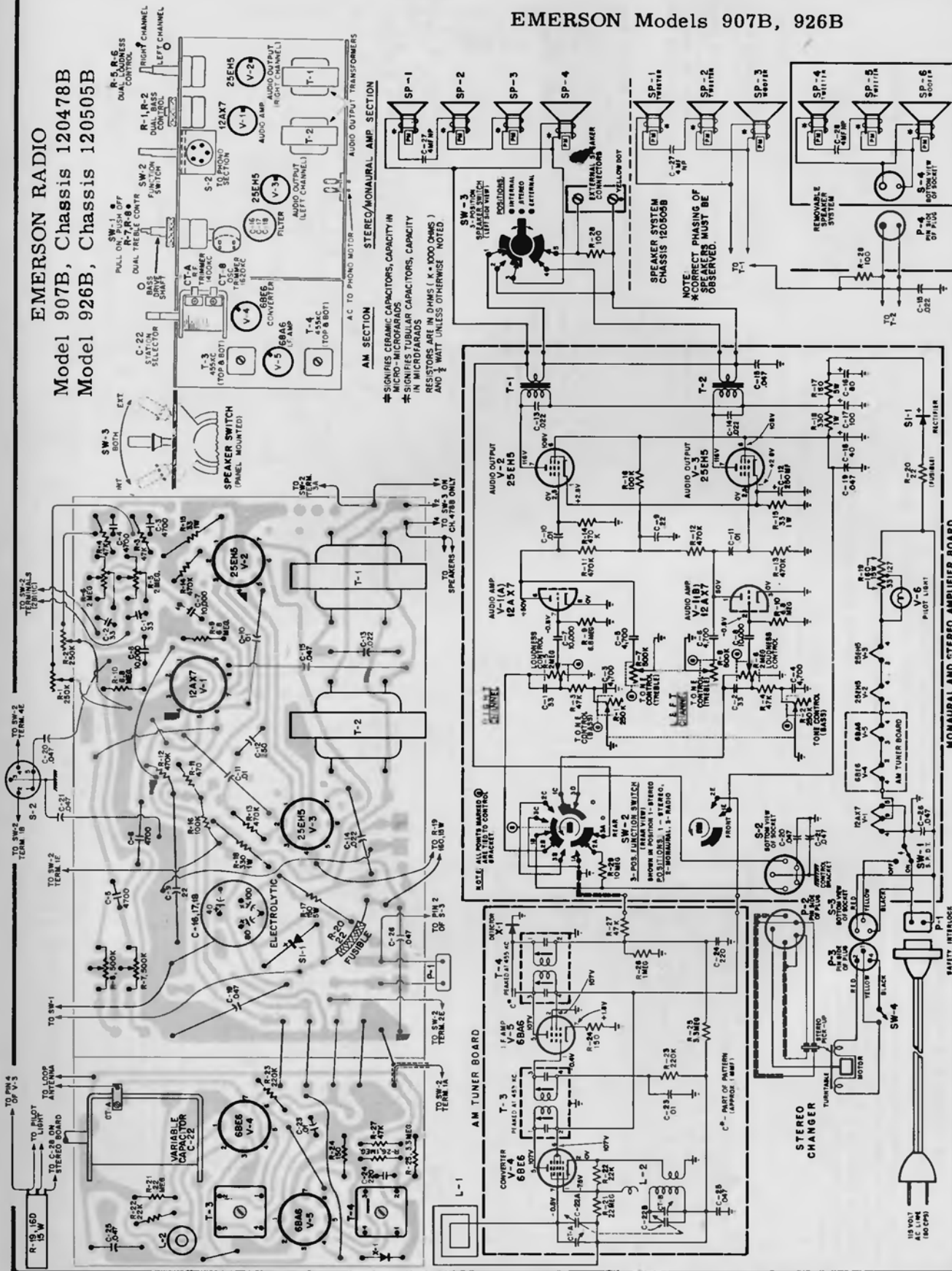
**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 1100 K.C. mark on the dial.

***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.)

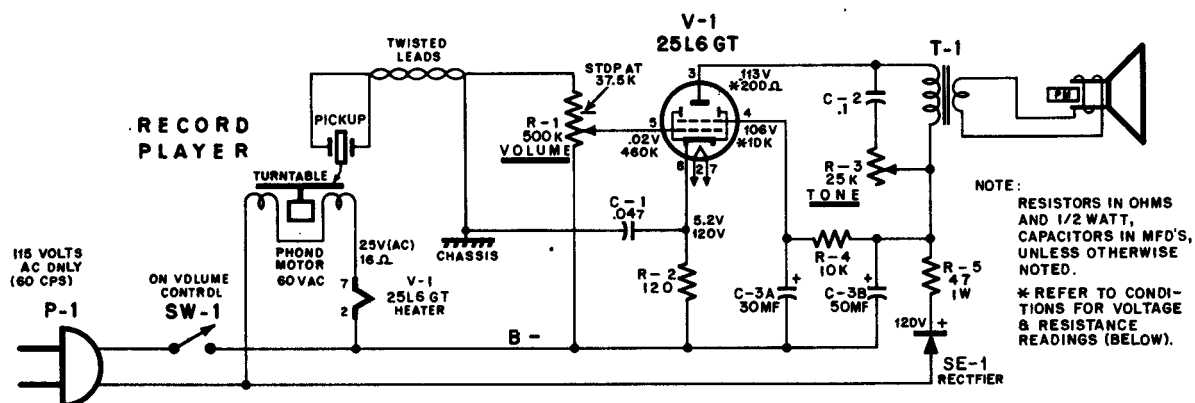
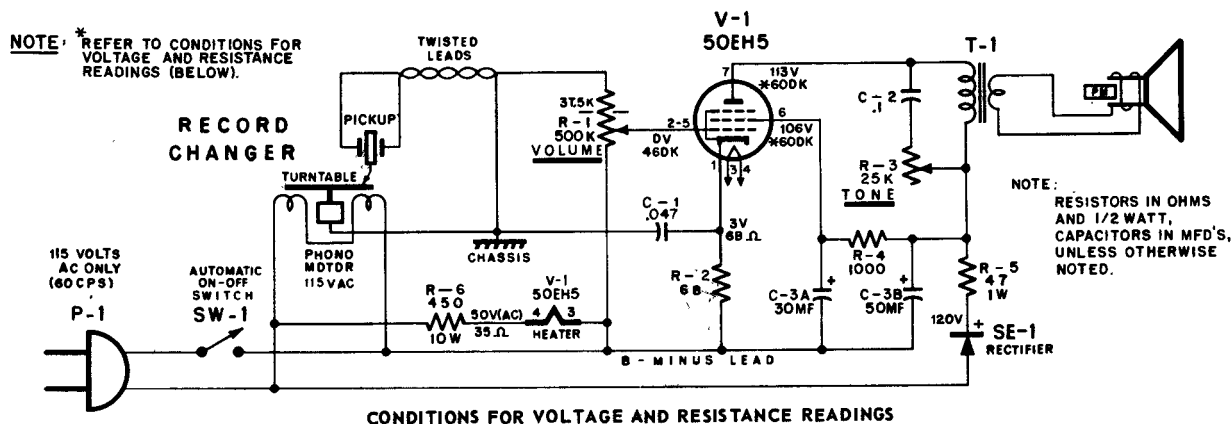
EMERSON Models 907B, 926B

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



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

EMERSON RADIO Model 933B, Chassis 120547B

**EMERSON RADIO Model 935B, Chassis 120548B**

CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

1. Voltages indicated are positive d.c., resistances in ohms, unless otherwise indicated.
2. Measurements made with voltohmmyst or equivalent.
3. All measurements taken from pin to B minus unless otherwise indicated.
4. Voltage measurements taken with:
 - a) Line voltage maintained at 115 volts a.c.
 - b) Volume control set for maximum volume.
5. Resistance measurements taken with:
 - a) Power line cord disconnected from outlet.
 - b) Volume control set for maximum volume.
6. Nominal tolerance on component values makes possible a variation of $\pm 15\%$ in voltage and resistance readings.
7. N.C. denotes no connection, K is kilohms, Meg. is megohms.
8. Resistances marked with * vary due to capacitor charge. Allow about 30 seconds for meter to settle.

EMERSON RADIO Model 937B, Chassis 120558B

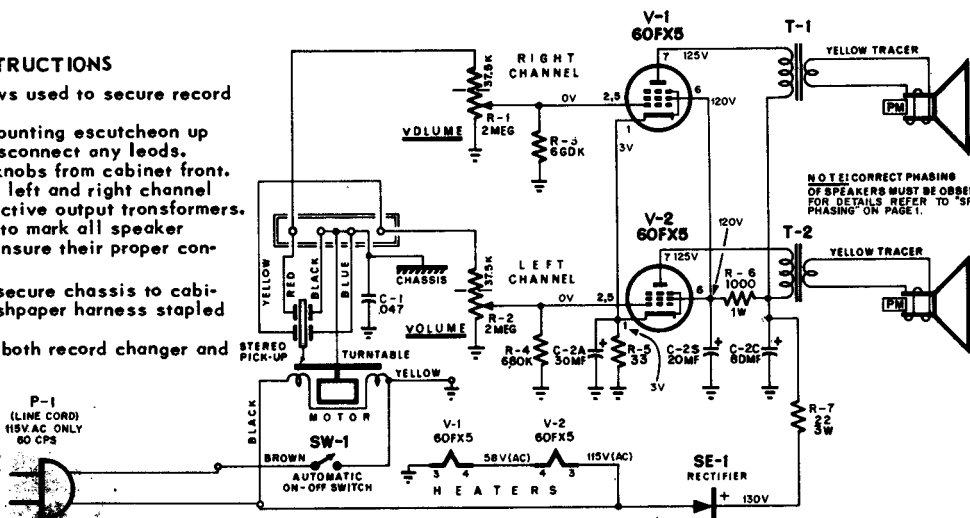
DISASSEMBLY INSTRUCTIONS

1. Remove 2 Phillips head screws used to secure record changer to cabinet.
2. Lift changer and cardboard mounting escutcheon up and tilt backwards. Do not disconnect any leads.
3. Remove both volume control knobs from cabinet front.
4. Disconnect leads for both the left and right channel loudspeakers from their respective output transformers.
NOTE: Care should be taken to mark all speaker leads before disassembly to insure their proper connection during re-assembly.
5. Remove two pinbolts used to secure chassis to cabinet and free line cord from fishpaper harness stapled to cabinet.
6. Slide chassis to rear and lift both record changer and chassis from cabinet.
7. Re-assemble in reverse order

• CHASSIS

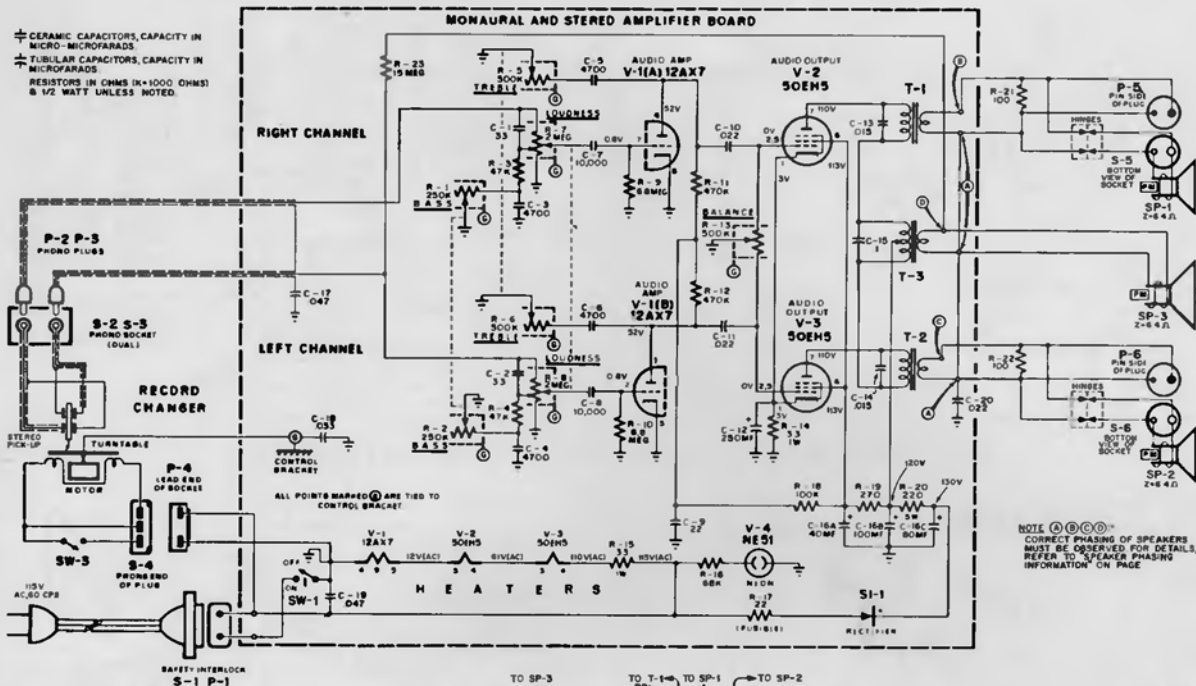
⊕ B - (NEVER TO BE SHORTED TO CHASSIS)

RESISTORS IN OHMS (K = 1000) AND $\frac{1}{2}$ WATT
UNLESS NOTED.
CAPACITORS IN MICROFARADS



**NOTE! CORRECT PHASING
OF SPEAKERS MUST BE OBSERVED
FOR DETAILS REFER TO "SPEAKER
PHASING" ON PAGE 1.**

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.

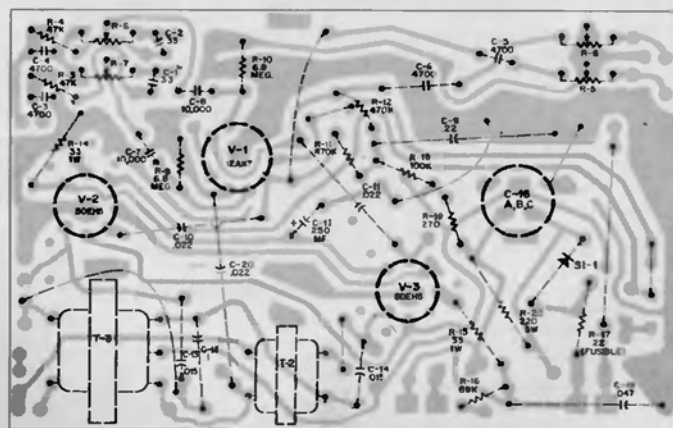
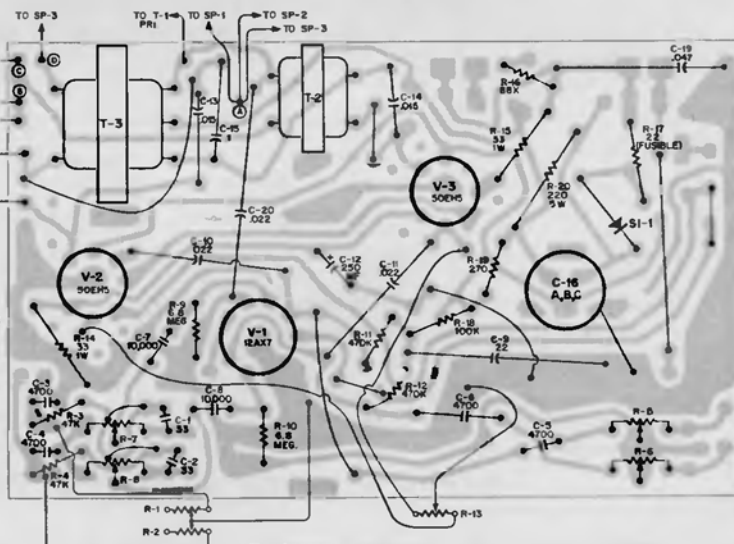
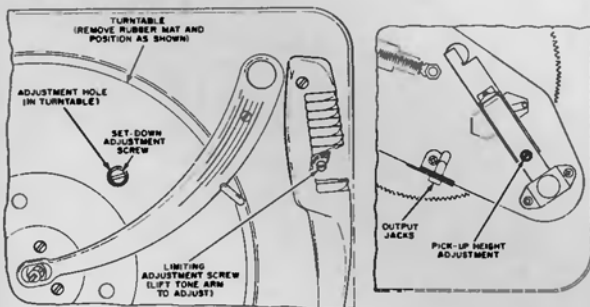
MODEL: 938-B
CHASSIS 120559-B

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.

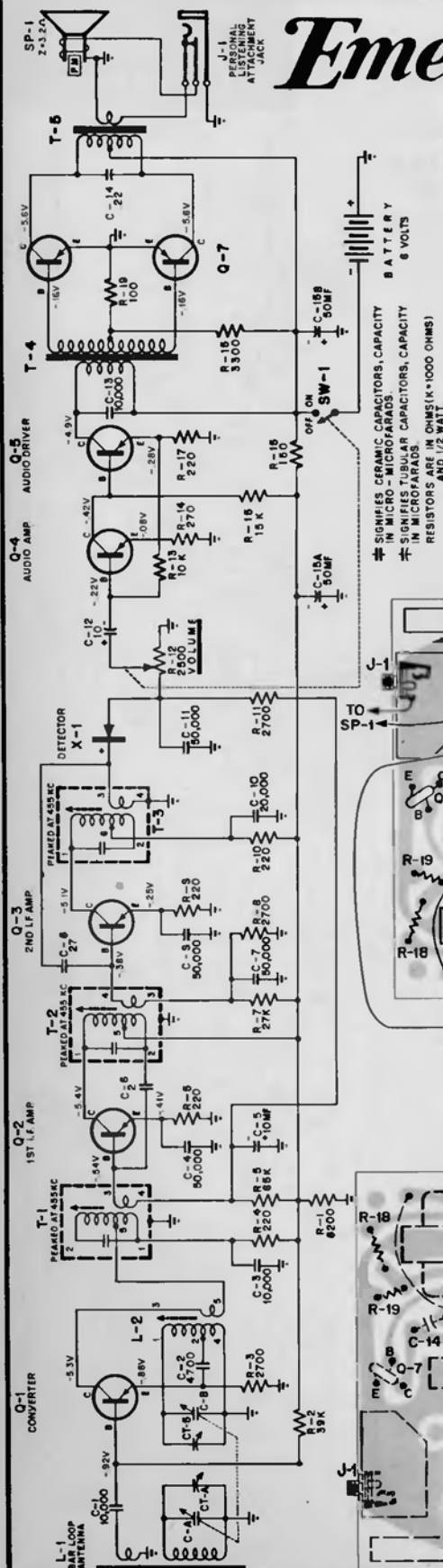
Remove four Palnuts used to secure chassis and remove chassis from cabinet.
Re-assemble in reverse order.



Emerson

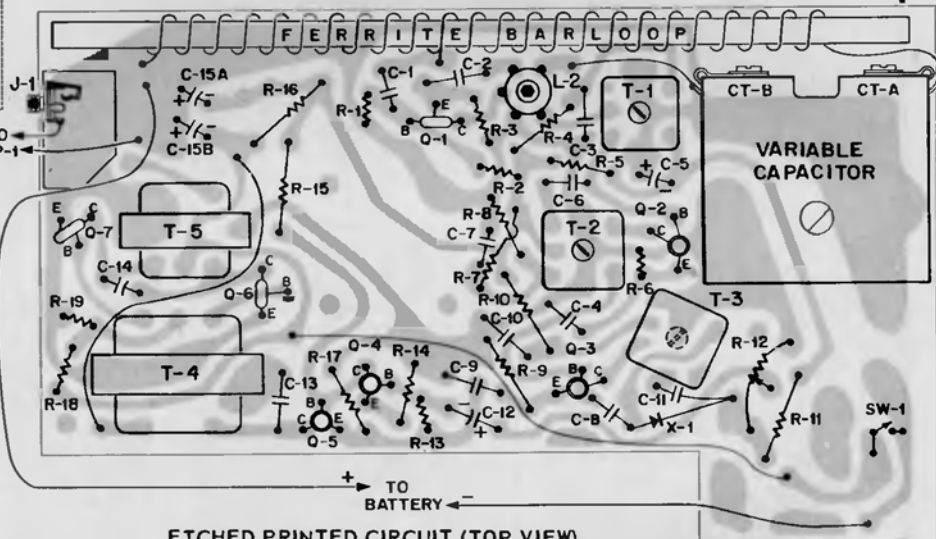
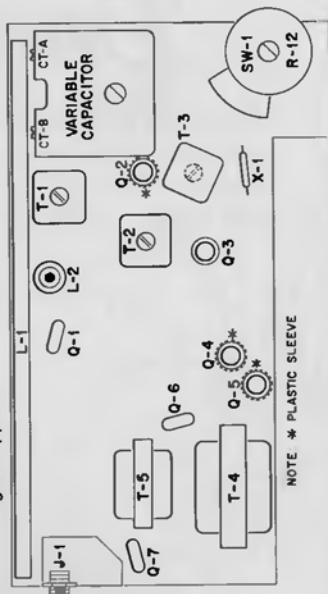
MODEL: 977
'FALCON'
CHASSIS 120528

PUSH-PULL
AUDIO OUTPUT
Q-6

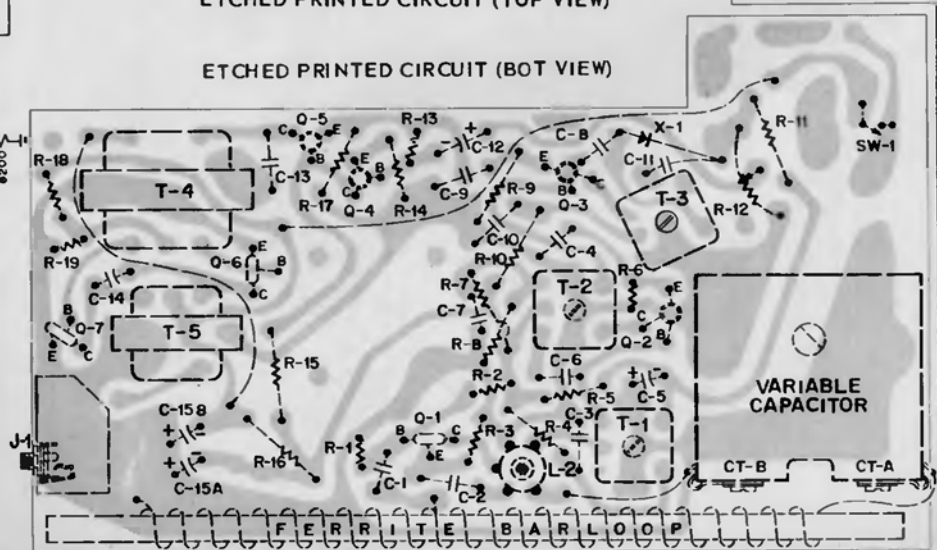


CONDITIONS FOR VOLTAGE READINGS, CHASSIS 120528

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.



ETCHED PRINTED CIRCUIT (TOP VIEW)



ETCHED PRINTED CIRCUIT (BOT VIEW)

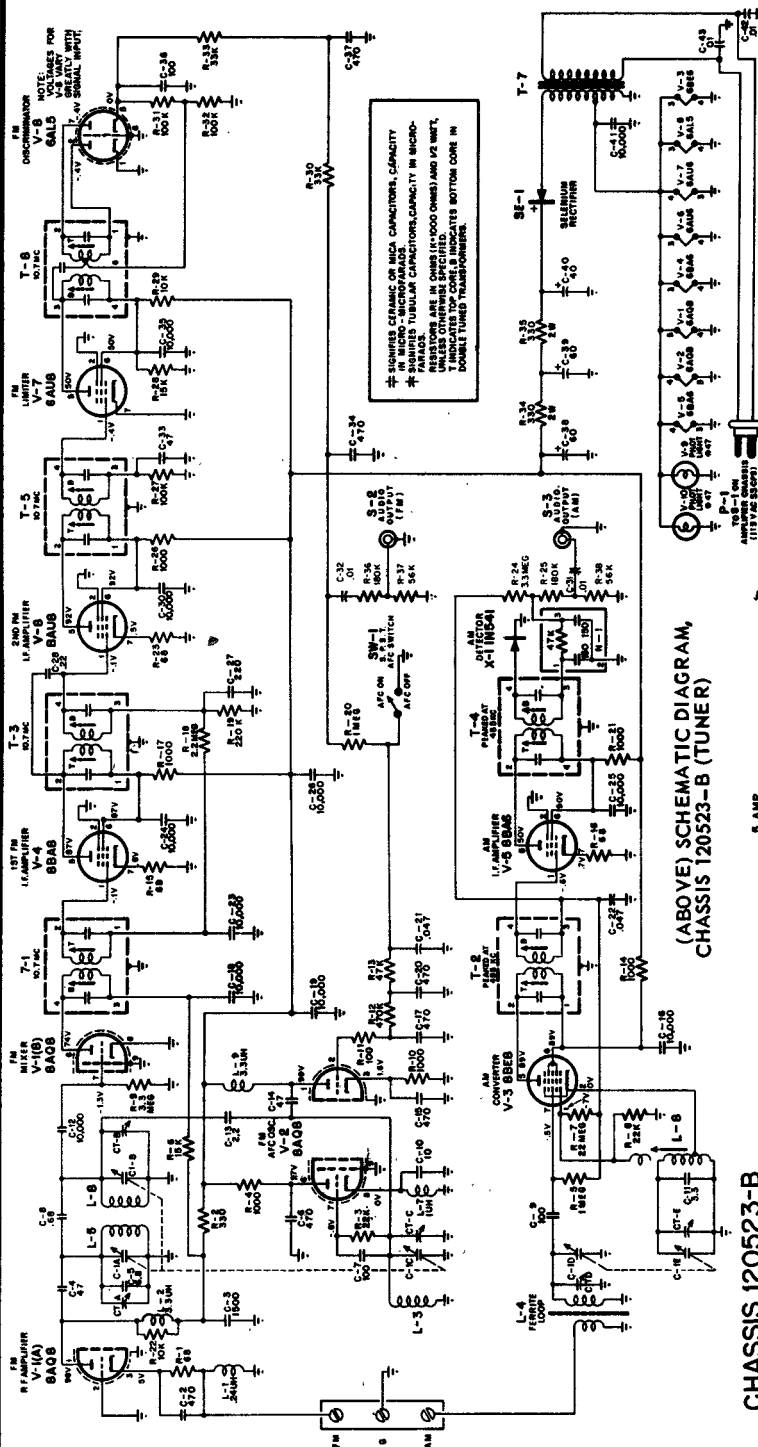
Emerson Radio

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.

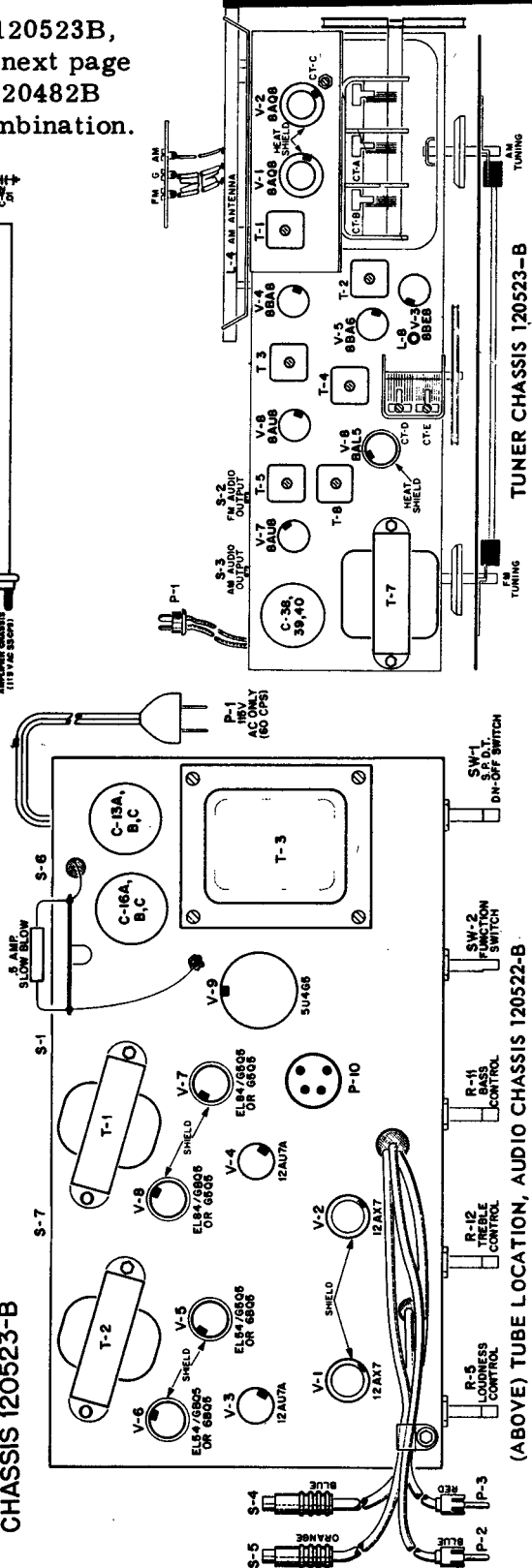
MODEL 944-B

CH.120522-B (AUDIO)

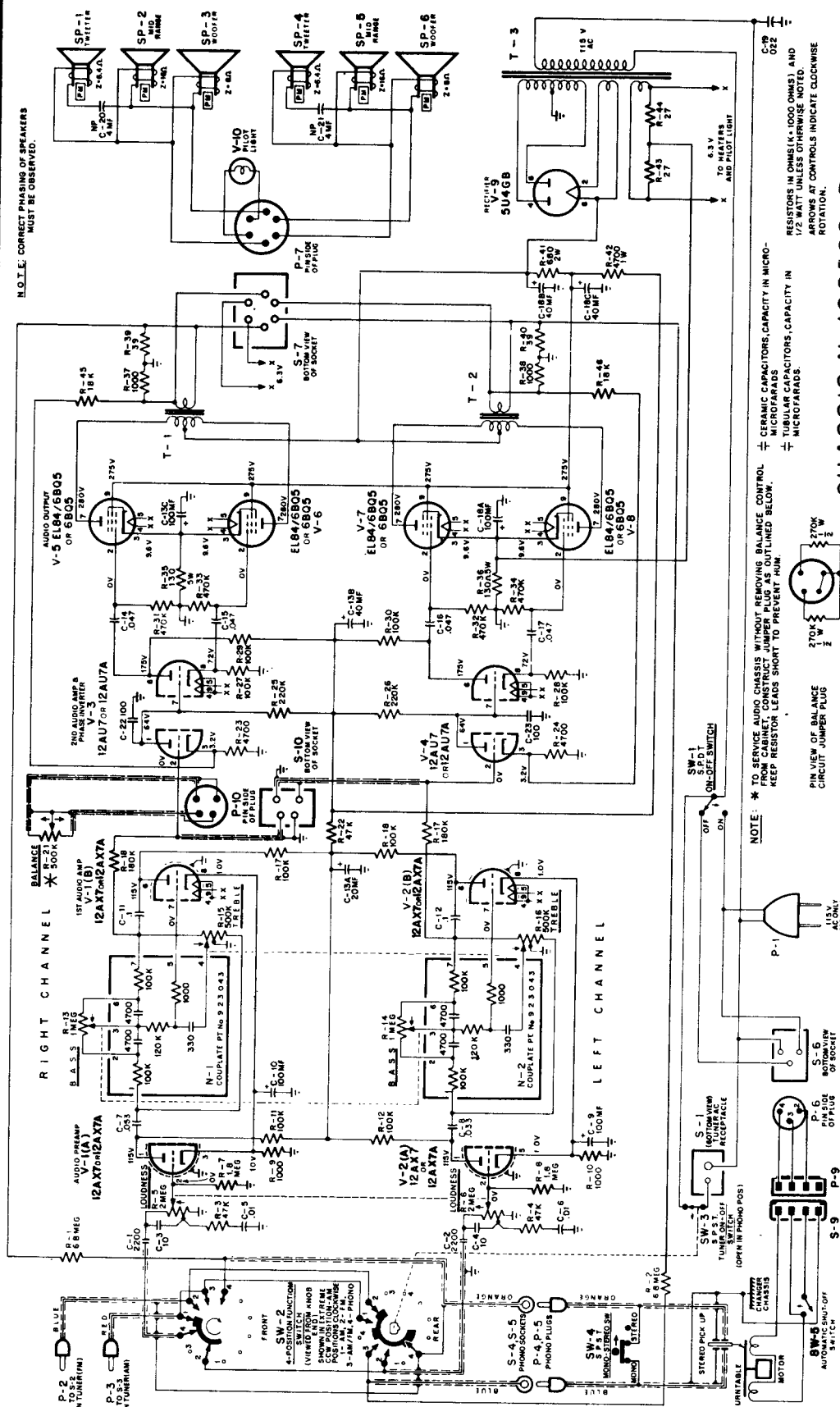
CH.120523-B (TUNER)



CHASSIS 120523-B



SCHEMATIC DIAGRAM, CHASSIS 120522-B (AUDIO)



CHASSIS No.120522-B

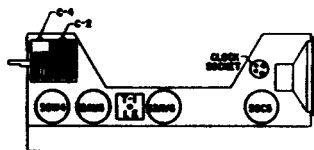
1. Voltages are positive DC, resistances in ohms, unless otherwise indicated.
2. All measurements taken with Volt Ohmyst or equivalent.
3. All measurements taken between tube pin and chassis unless otherwise noted.
4. Voltage measurements made with:
 - a) Line voltage maintained at 115 volts AC.
 - b)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

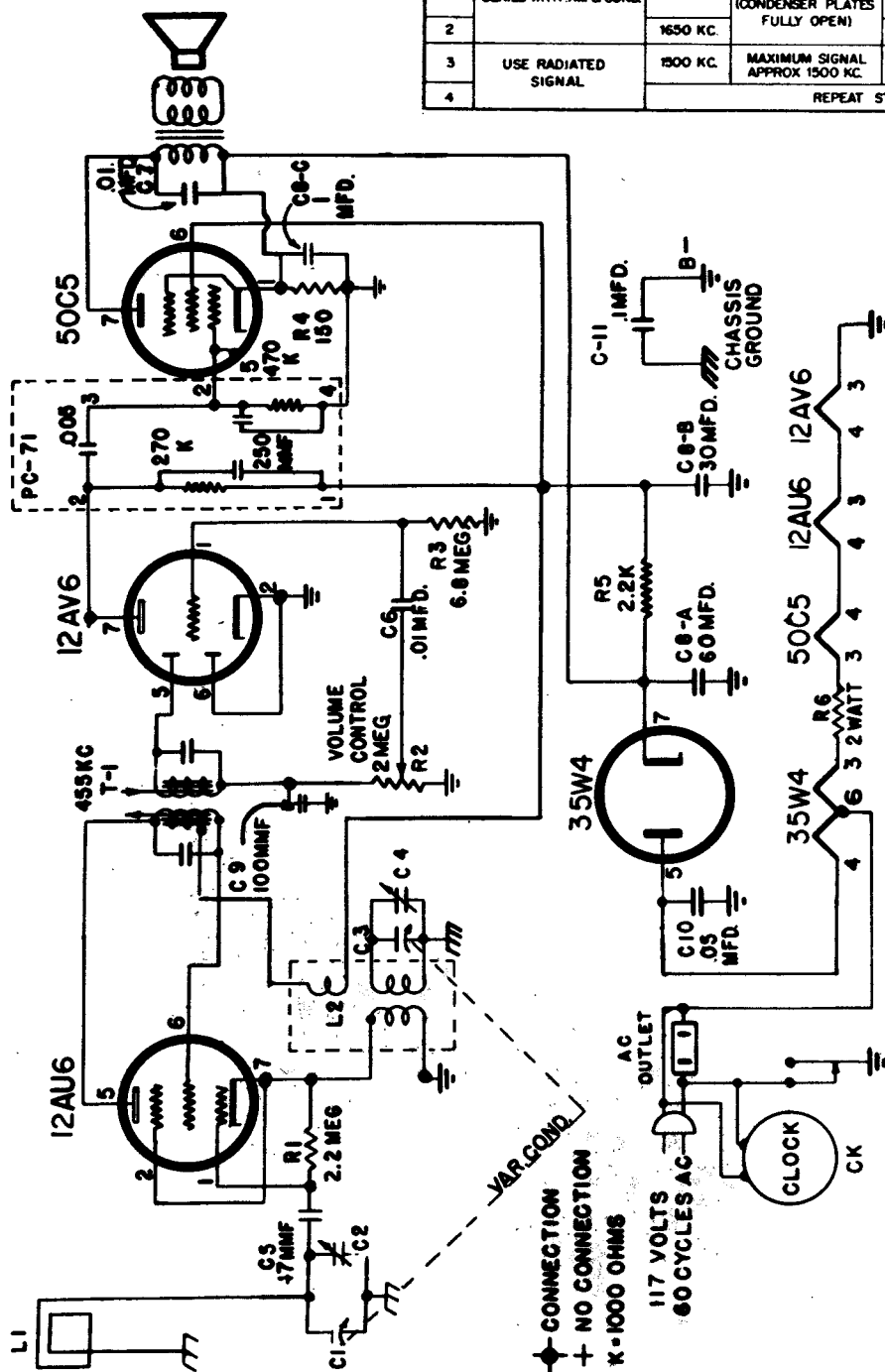
Gamble-Skogmo, Inc.

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	



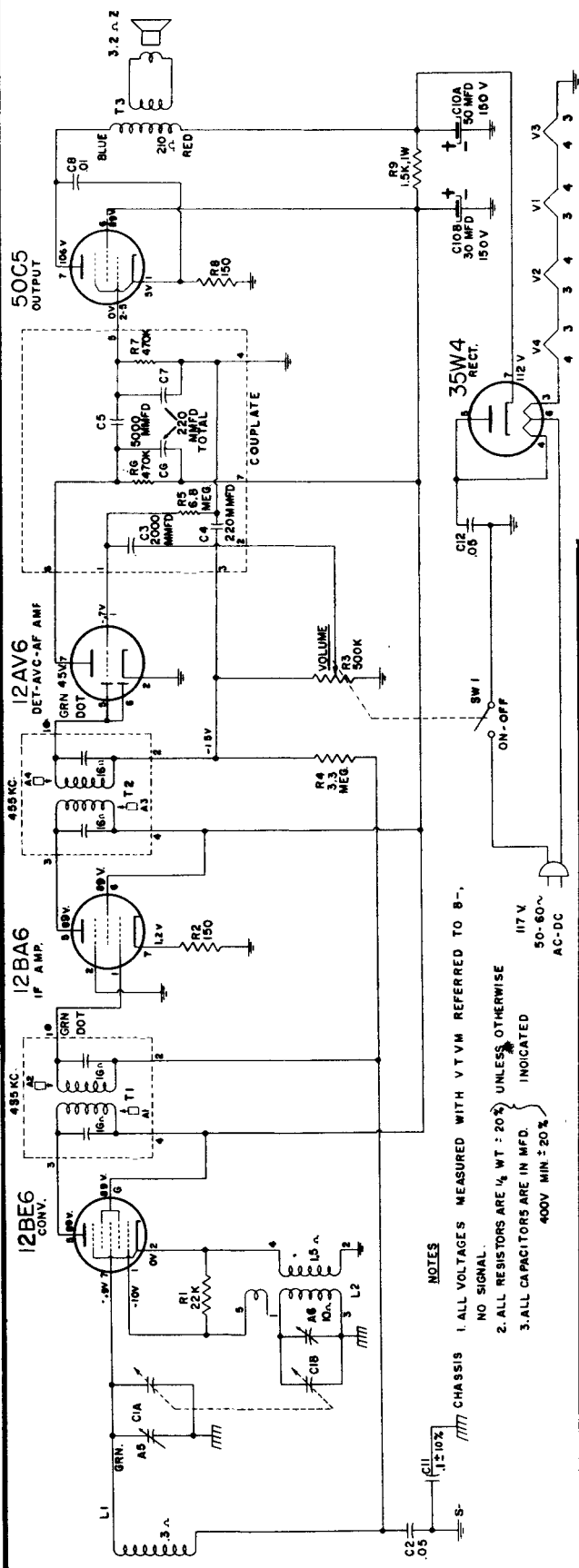
AS A MUSICAL WAKE-UP ALARM

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

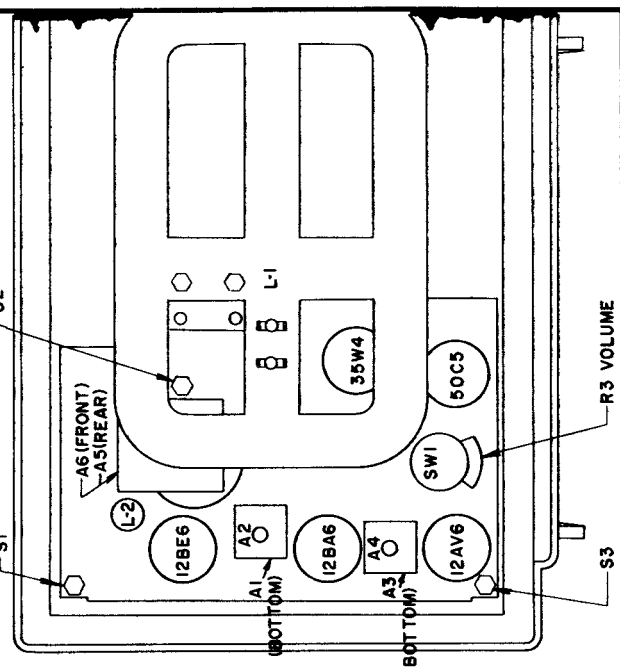


NOTES

1. ALL VOLTAGES MEASURED WITH V T M REFERRED TO B -.
2. NO SIGNAL.
3. ALL RESISTORS ARE 1/2 W T : 20% UNLESS OTHERWISE INDICATED

STEP	Set receiver dial to:	Adjust test oscillator frequency to:	Use 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)	Exactly 1640 KC	Loosely couple generator output to loop antenna. Bring a short length of insulated hook-up 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.



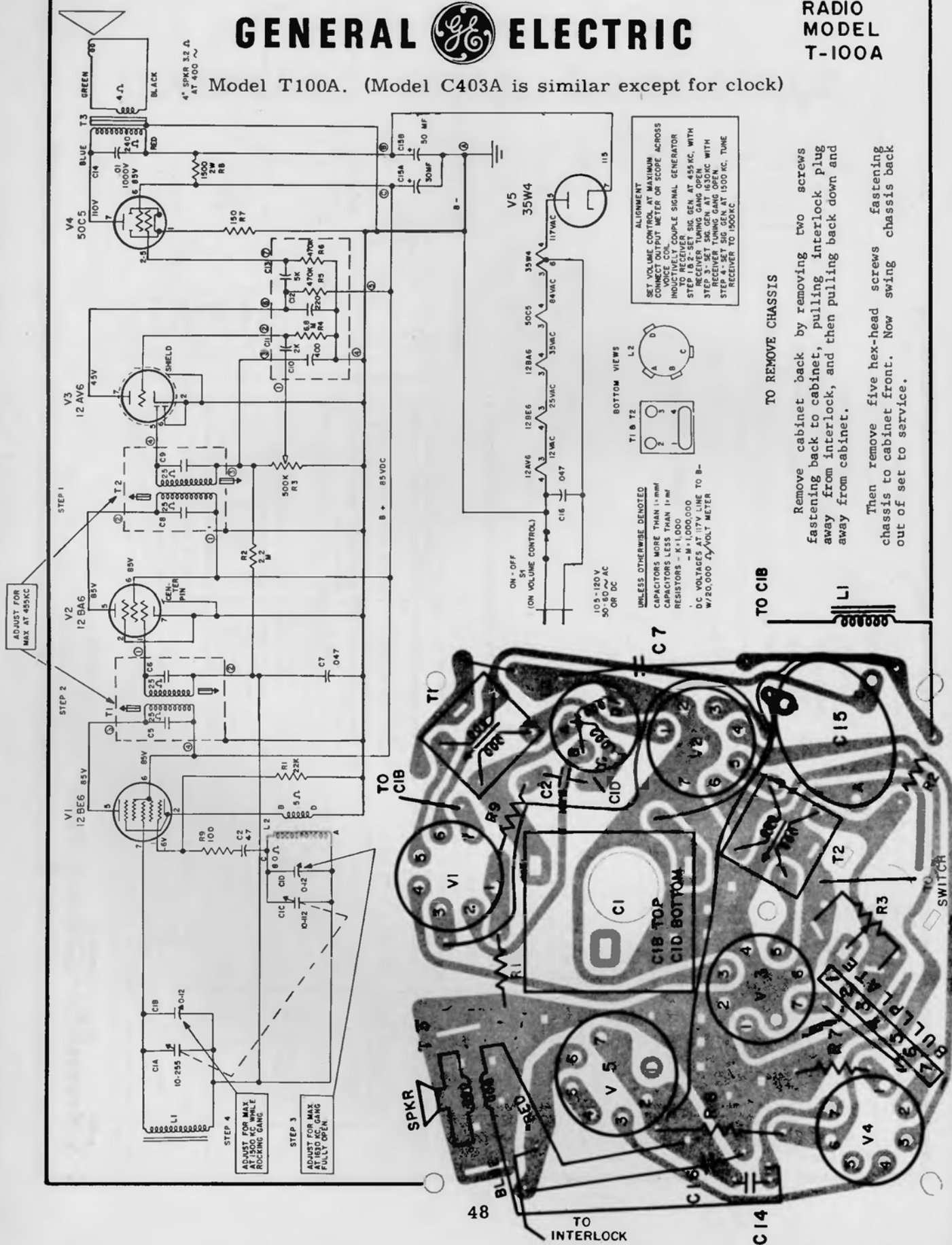
CORONADO MODELS
RA 50-8231 & RA 50-8232

Gamble-Shogmo.

GENERAL ELECTRIC

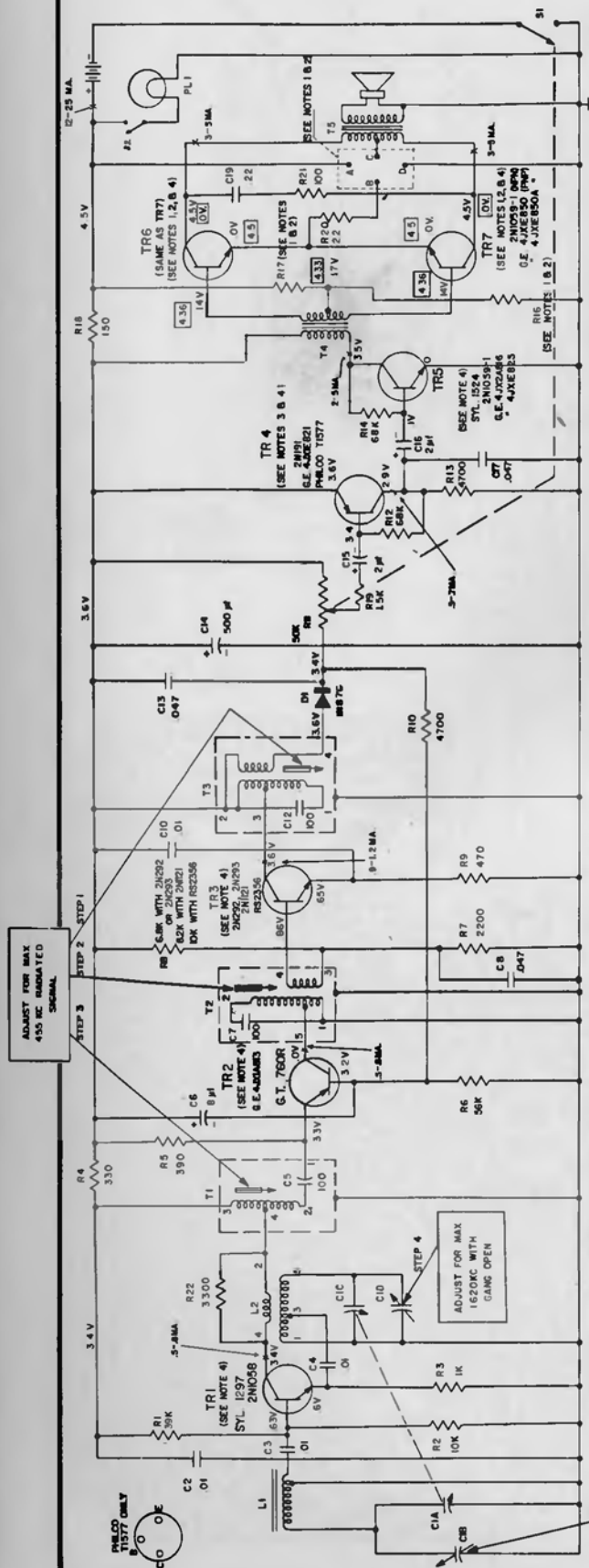
Model T100A. (Model C403A is similar except for clock)

**RADIO
MODEL
T-100A**



GENERAL ELECTRIC

Radio Models T145A, T146A

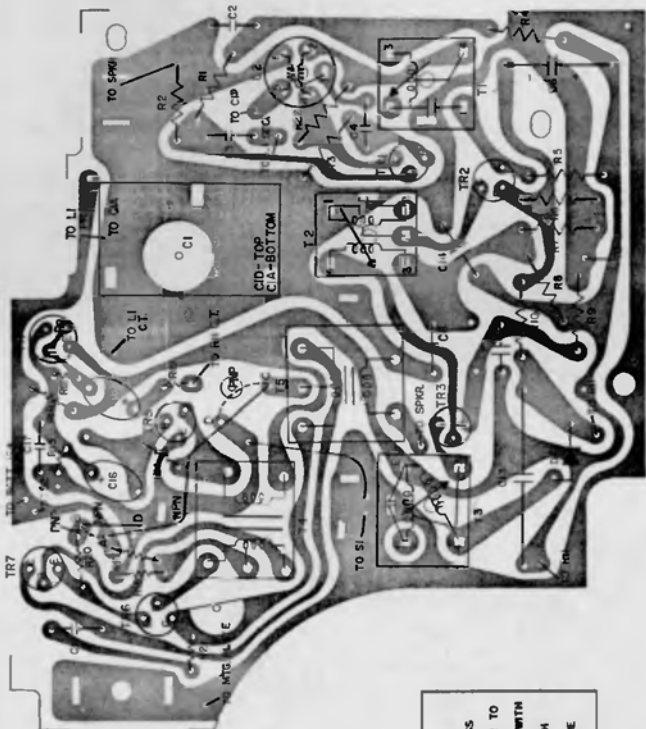


CAPACITORS

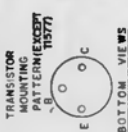
- | | Tuning | Cap. |
|-------|---------|------|
| C1 -- | | |
| C2 -- | .01mf. | |
| C3 -- | .01mf. | |
| C4 -- | .01mf. | |
| C6 -- | 8mf. | |
| C8 -- | .047mf. | |
| C10-- | .01mf. | |
| C13-- | .047mf. | |
| C14-- | .50mf. | |
| C15-- | 2mf. | |
| C16-- | 2mf. | |
| C17-- | .047mf. | |
| C19-- | .2mf. | |

RESISTORS

- R1 -- 39K
R2 -- 10K
R3 -- 1K
R4 -- 330
R5 -- 390
R6 -- 56K
R7 -- 2.2K
R8 -- 6.8K, 8.2K, or 10K
R9 -- 470
R10 -- 4.7K
R11 -- 50K
R12 -- 68K
R13 -- 4.7K
R14 -- 68K
R16 -- (See Notes)
R17 -- (See Notes)
R18 -- 150
R19 -- 1.5K
R20 -- 2.2 Ω
R21 -- 100
R22 -- 3.3K



PHANTOM WIRING DIAGRAM



-SOLD-

- FOR NPN TR6 B, TR7
- A. CONNECT A JUMPER WIRE BETWEEN POINTS B B D. (SEE PHANTOM WRING DIAGRAM)
- B. A B C.
- C. R6 MUST BE 50 OHMS
- D. R7 MUST BE 1K.
2. FOR PNP TR6 B, TR7
- A. CONNECT A JUMPER WIRE BETWEEN POINTS A B. (SEE PHANTOM WRING DIAGRAM)
- B. A B C D.
- C. R6 MUST BE 50 OHMS
- D. R7 MUST BE 1K
3. T6T7 (PHILO) TRANSISTOR BASE LEAD MUST BE SOLDERED INTO B2 AS SHOWN ON PHANTOM WRING 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 MF
CAPACITORS LESS THAN 1 MF
RESISTORS ARE 1/2 WATT
R = 1000
6. VOLTAGES ARE POSITIVE WITH
RESPECT TO GROUND UNDER NO
SIGNAL CONDITIONS
7. VOLTAGES SHOWN IN ☐ ARE
WITH TR5 B, TR6 N
- ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM

CONNECT OUTPUT METER ON SCOPE

1. TUNING GANG OPEN

2. INDUCTIVELY COUPLE SIGNAL GENERATOR TO TUNING GANG

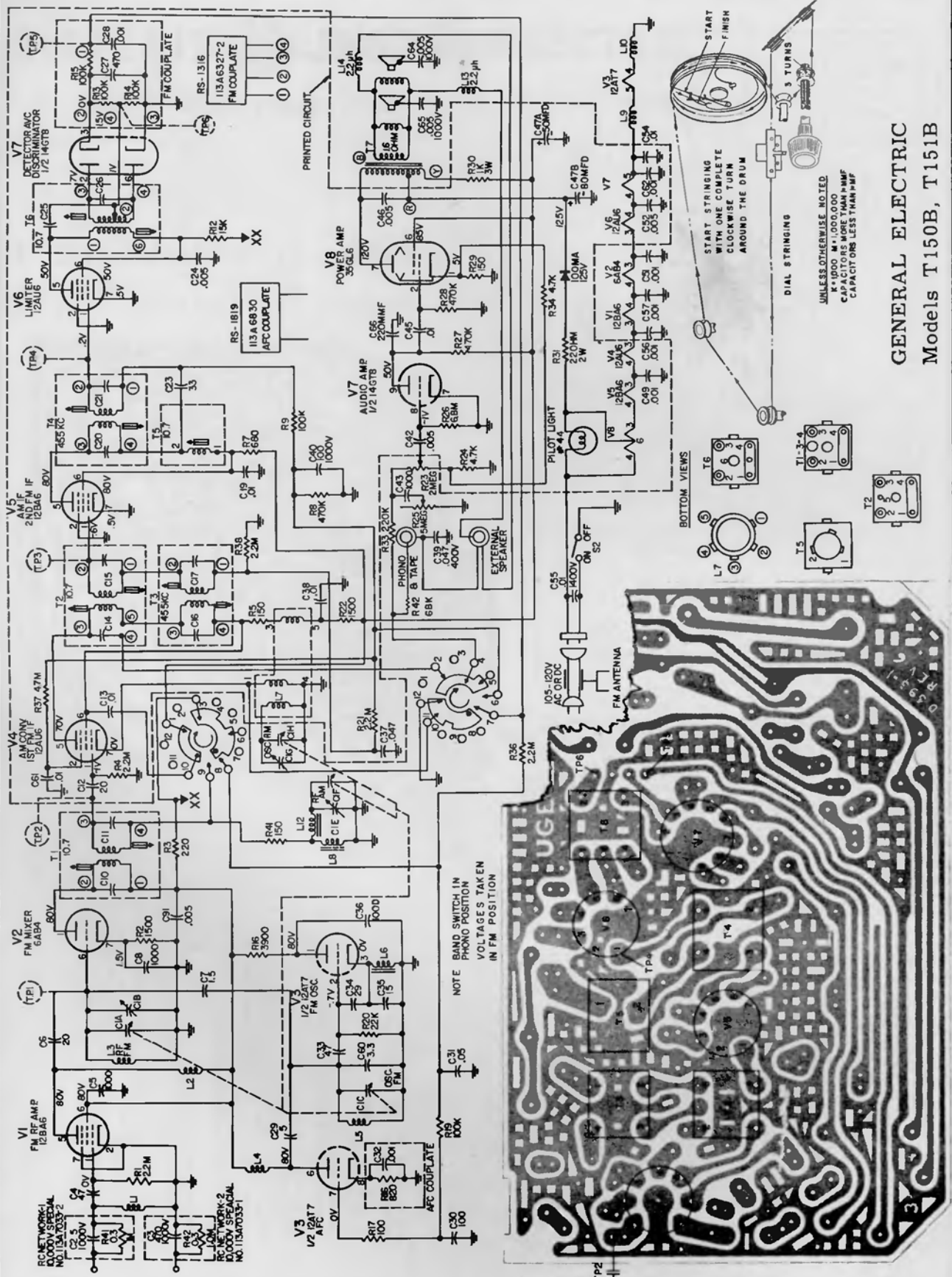
3. STEP 1, 2, 3 - SET SIG GEN AT 450 KHZ

4. RECEIVER TUNING GANG OPEN

5. STEP 1, 2, 3 - SET SIG GEN AT 1620 KHZ

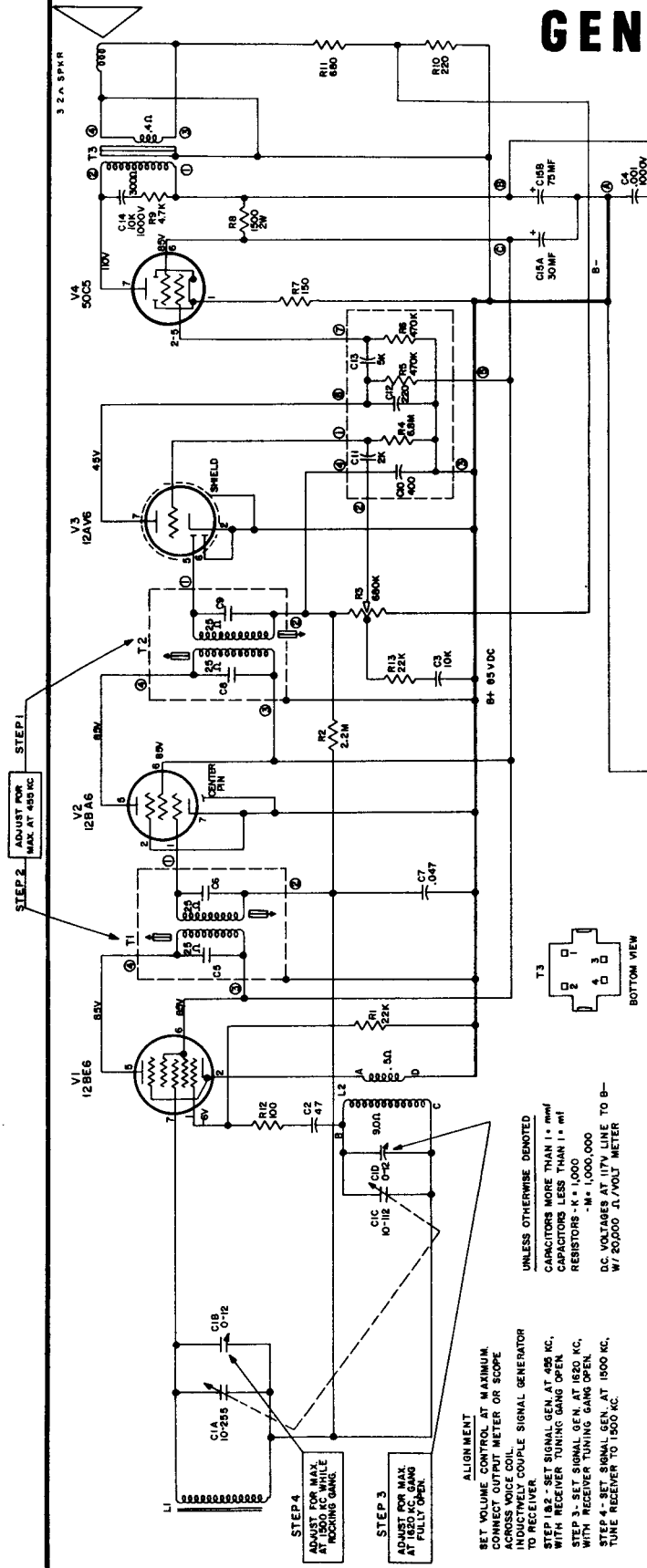
6. RECEIVER TUNING GANG OPEN

7. STEP 5 - SET SIG N AT 1400 KHZ

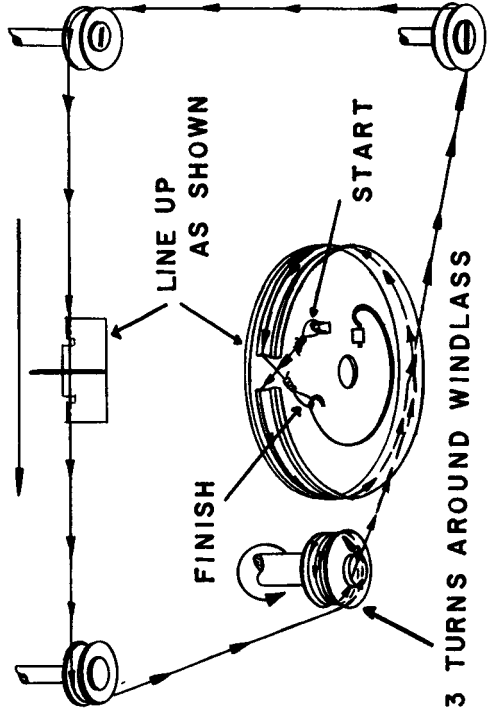


GENERAL ELECTRIC

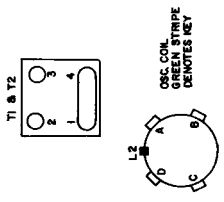
MODELS T165A, T166A

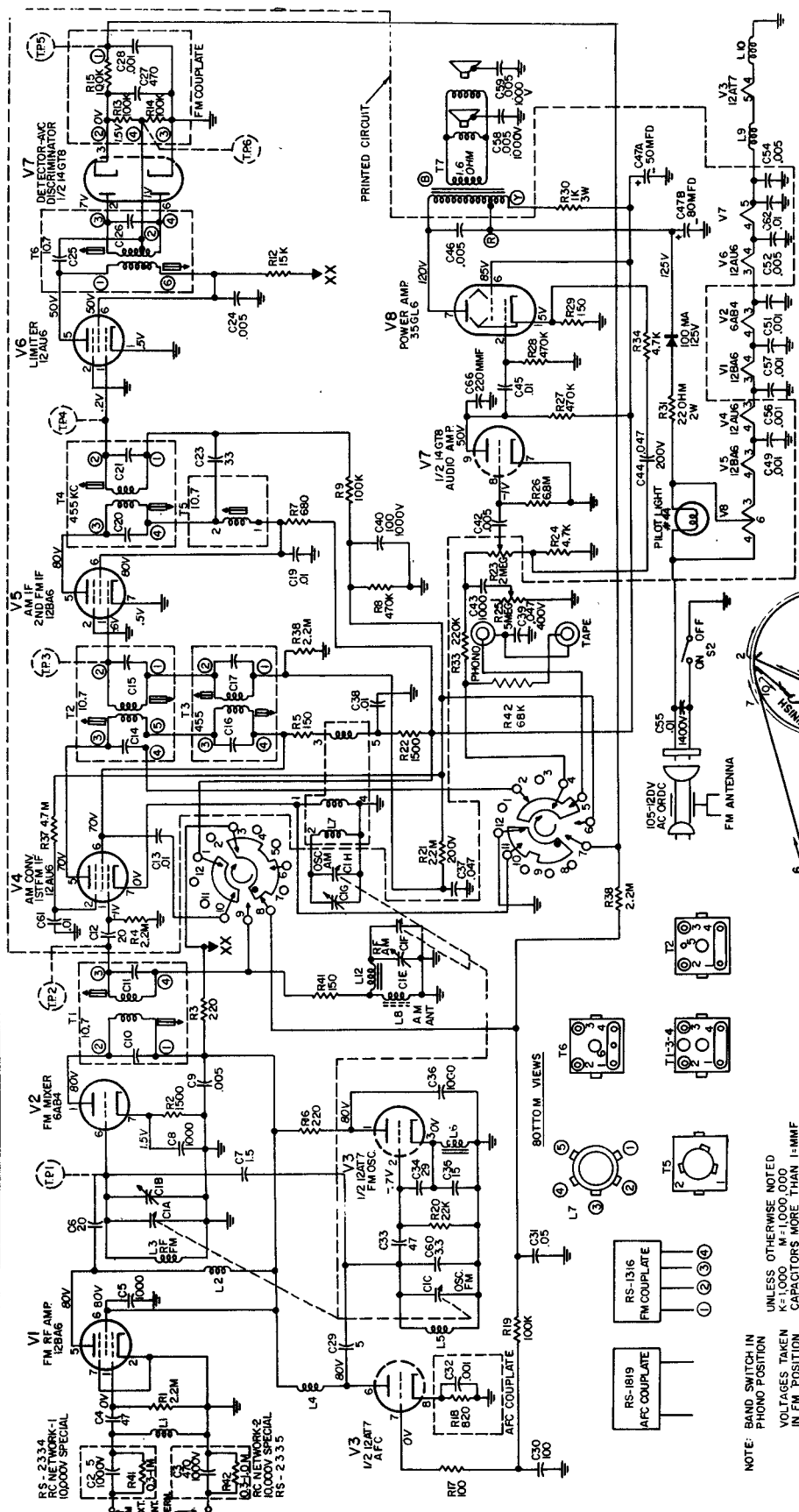


DIRECTION OF TRAVEL



STRINGING DIAGRAM



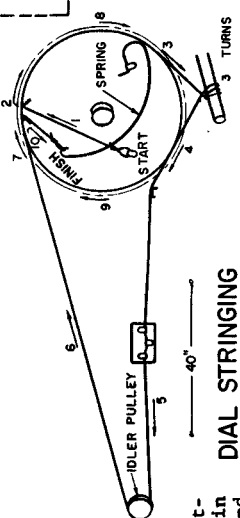


TO REMOVE CABINET

1. Remove 2 cab. rear screws & separate front & back.
2. Chassis can remain on cabinet front for trouble-shooting and alignment.

TO REMOVE A SPEAKER

1. Same as No. 1 above.
2. Unscrew the six hex-head screws holding the grille to the cabinet front.
3. Label and unsolder speaker leads from speaker terminals. Reversed speaker leads will cause distorted audio.
4. Unscrew the four screws around front of speaker and remove the speaker from cabinet front.



GENERAL ELECTRIC
Model T210B

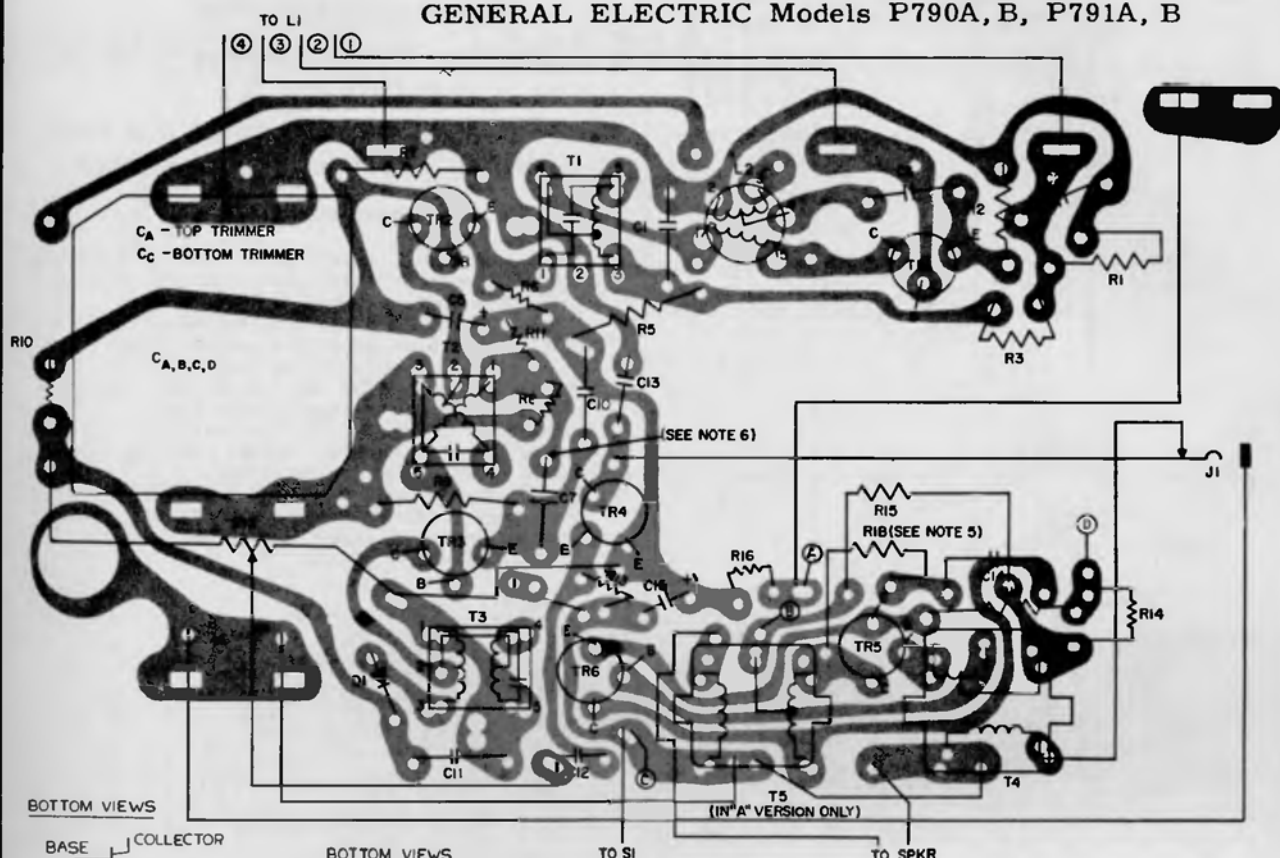
FM OSCILLATOR COIL

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.)

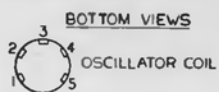
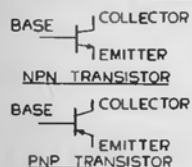
NOTE: A small change in the space between 2 turns of L5 shifts the frequency approximately 1 MC.

NOTE: BAND SWITCH IN PHONO POSITION
VOLTAGES TAKEN IN FM POSITION
UNLESS OTHERWISE NOTED
K=1,000 M=1,000,000
CAPACITORS MORE THAN 1-MMF
CAPACITORS LESS THAN 1-MPF

GENERAL ELECTRIC Models P790A, B, P791A, B



BOTTOM VIEWS

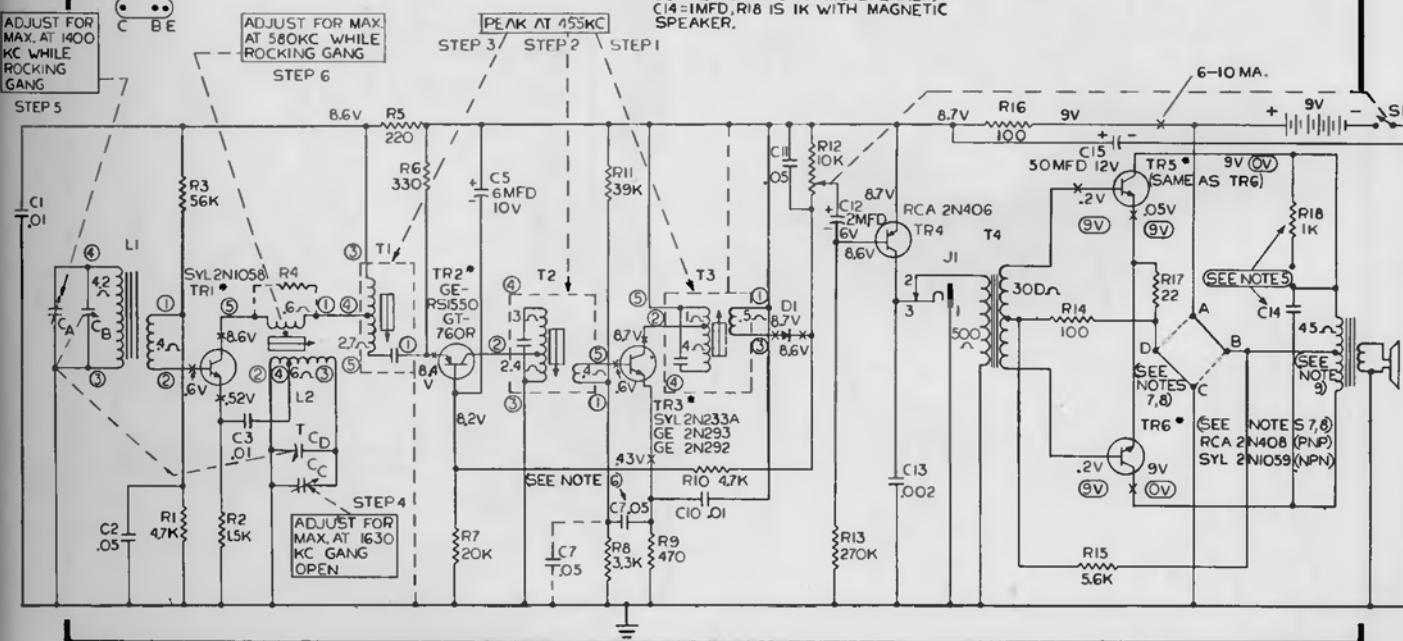


I.F. TRANSFORMERS



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 45Ω WITH DYNAMIC SPEAKER. READING WITH MAGNETIC SPEAKER IS 85Ω.



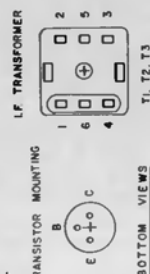
GENERAL ELECTRIC

Models P805A, P806A, P807A, B,
and P808A, B

"A" version diagrams on this page,
and "B" version on the next page.

TO REMOVE CIRCUIT BOARD

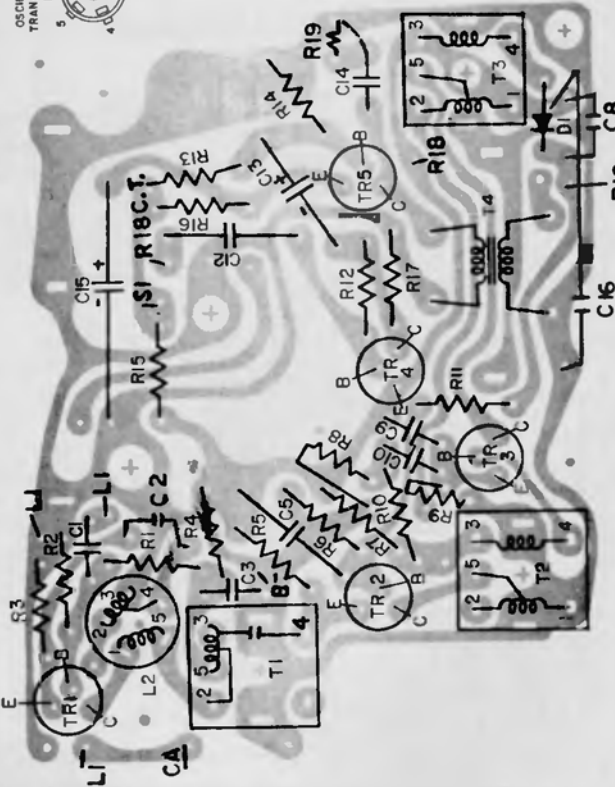
1. Turn screw in cabinet back counterclockwise until it becomes loose (this a captive screw and remains in the cabinet).
2. Insert a coin in either slot on the cabinet bottom and twist to remove the cabinet back.
3. Remove screw holding tuning dial.
4. Remove 3 screws under the tuning dial to release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



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

UNLESS OTHERWISE NOTED—
CAPACITORS MORE THAN 10 MF
CAPACITORS LESS THAN 10 MF
RESISTORS ARE 1/2 WATT 5% TOL

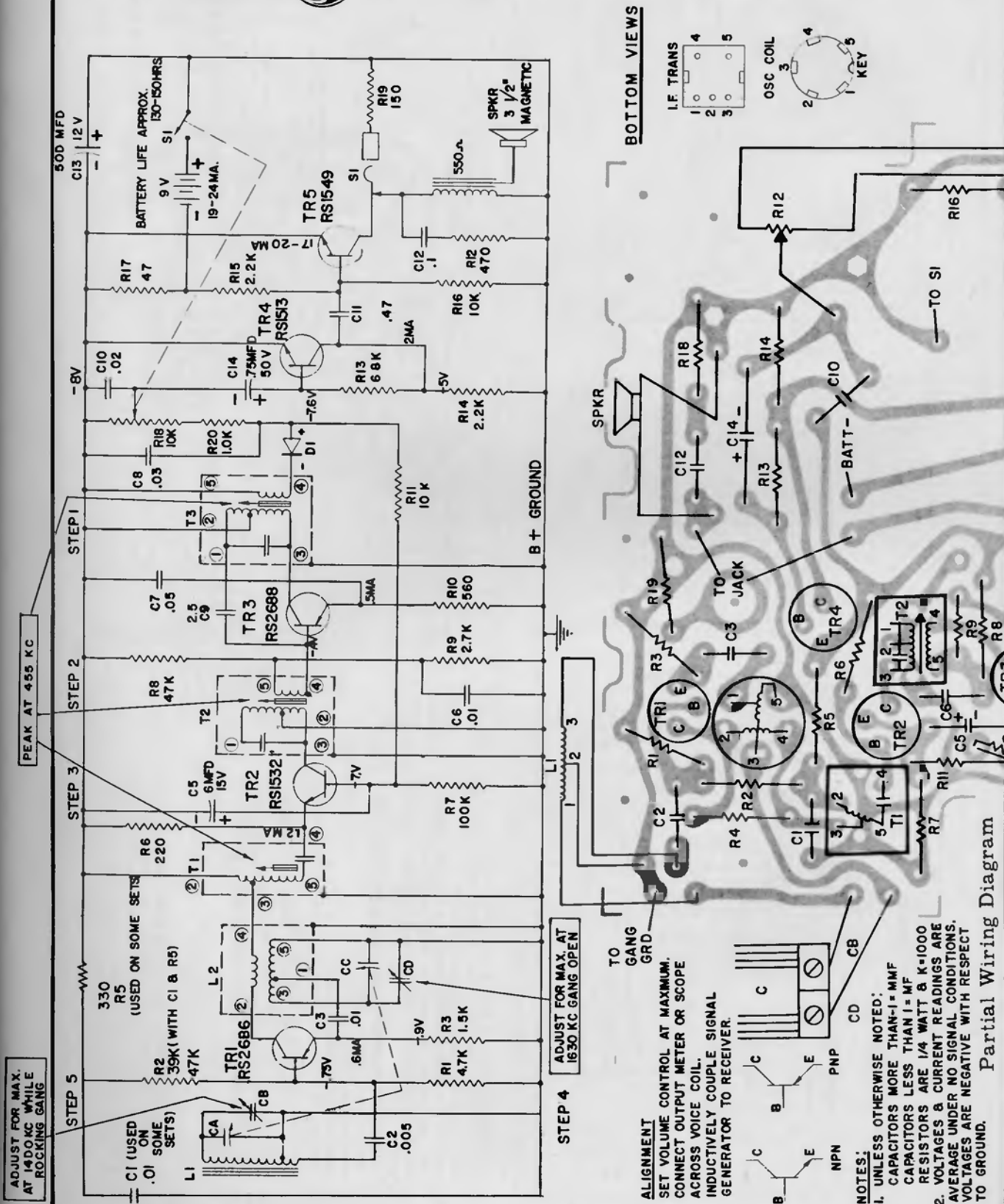
NOTE 1—
REPLACE WITH TRANSISTOR
TYPES SHOWN,
2—
WHEN TR3 IS 2N69
R7 = 47K
C7 IS DELETED
R7 REPLACED BY JUMPER

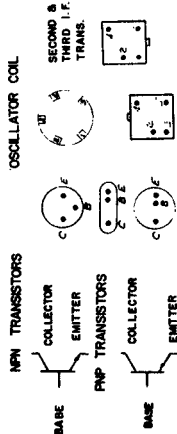
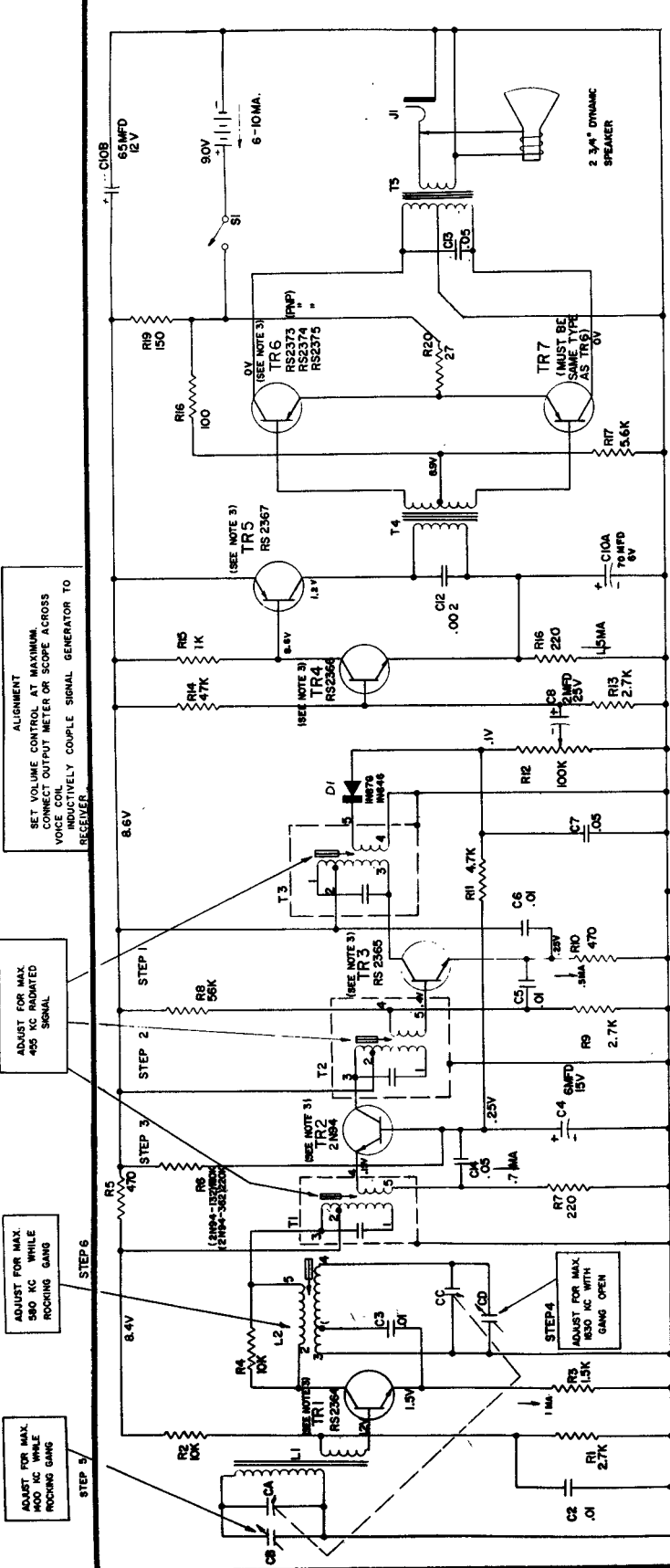


LATE PRODUCTION

GENERAL ELECTRIC

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





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.

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. 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 mills. This is measured by inserting a milliammeter

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:

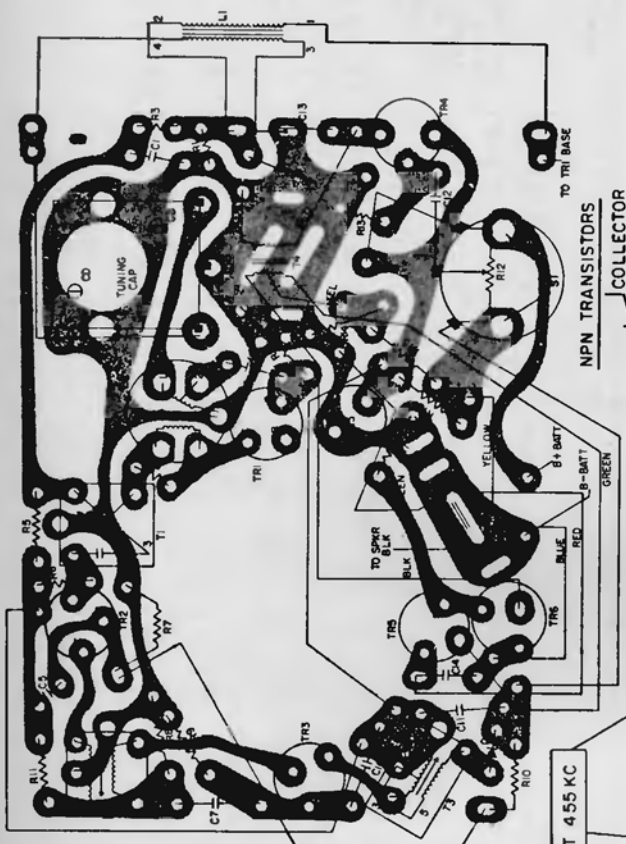
1. Check battery contacts for corrosion.
2. Check solder connections on dip-soldered side of circuit board.

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

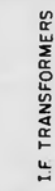
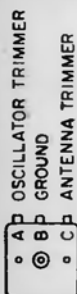
GENERAL ELECTRIC Models P815A, P816A

GENERAL ELECTRIC

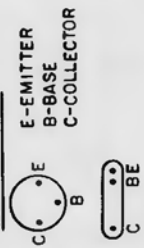
MODELS P830C and P831C



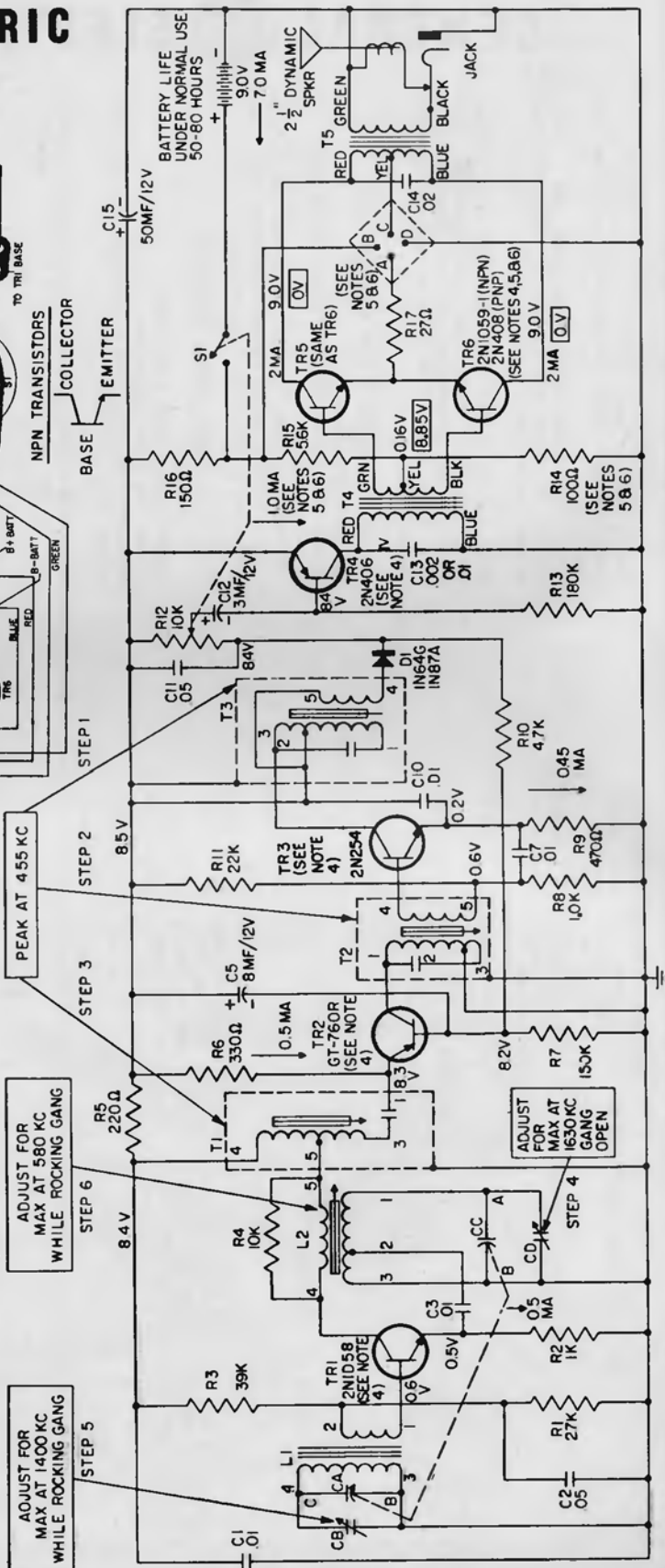
MOUNTING VIEW OF GANG



BOTTOM VIEWS



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

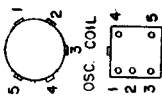
1. Remove tuning knob.
2. Remove two screws mounted under tuning knob.
3. Remove control.

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

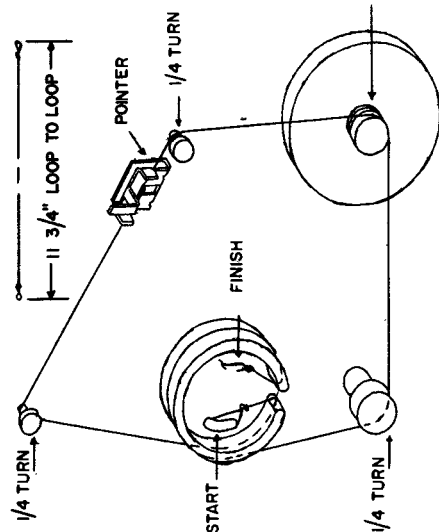
TO REMOVE TUNING CAPACITOR

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



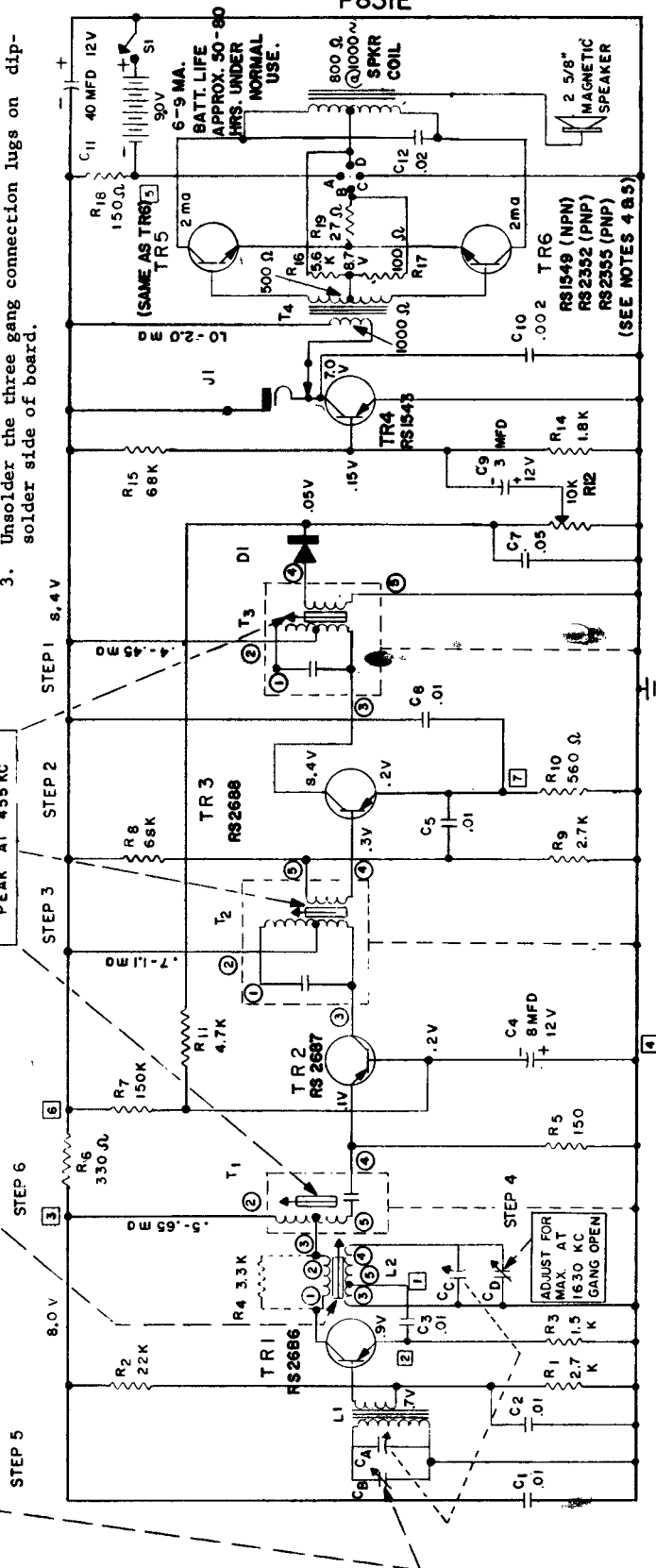
- NOTES:
1. UNLESS OTHERWISE NOTED - CAPACITORS MORE THAN 1 μF AND RESISTORS LESS THAN 100 Ω ARE 1/2 WATT & K-1000 VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND.
 2. VOLTAGES UNDER NO SIGNAL CONDITIONS ARE NEGATIVE WITH RESPECT TO GROUND.
 3. REPLACE WITH TRANSISTOR TYPES SHOWN.
 4. FOR NPN TRANSISTORS IN TR5 & TR6 (a) JUMPER C TO D (b) JUMPER A TO B (c) JUMPER A TO D (d) JUMPER C TO B



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

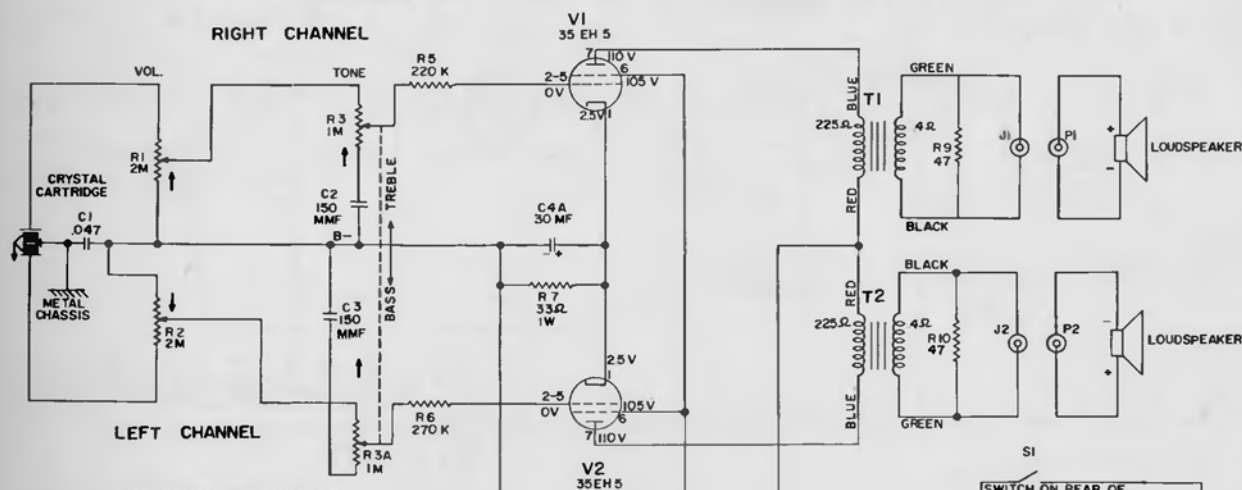
ADJUST FOR MAX. AT 580 KC WHILE ROCKING GANG

ADJUST FOR MAX. AT 1400 KC WHILE ROCKING GANG



GENERAL ELECTRIC

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

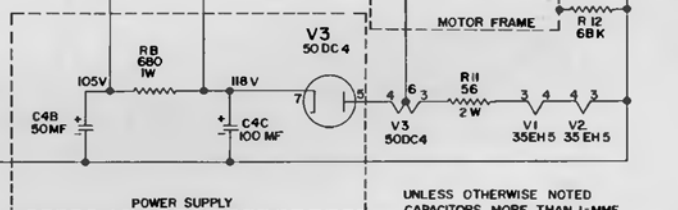


TO REMOVE TURNTABLE

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

TO REMOVE MOTOR

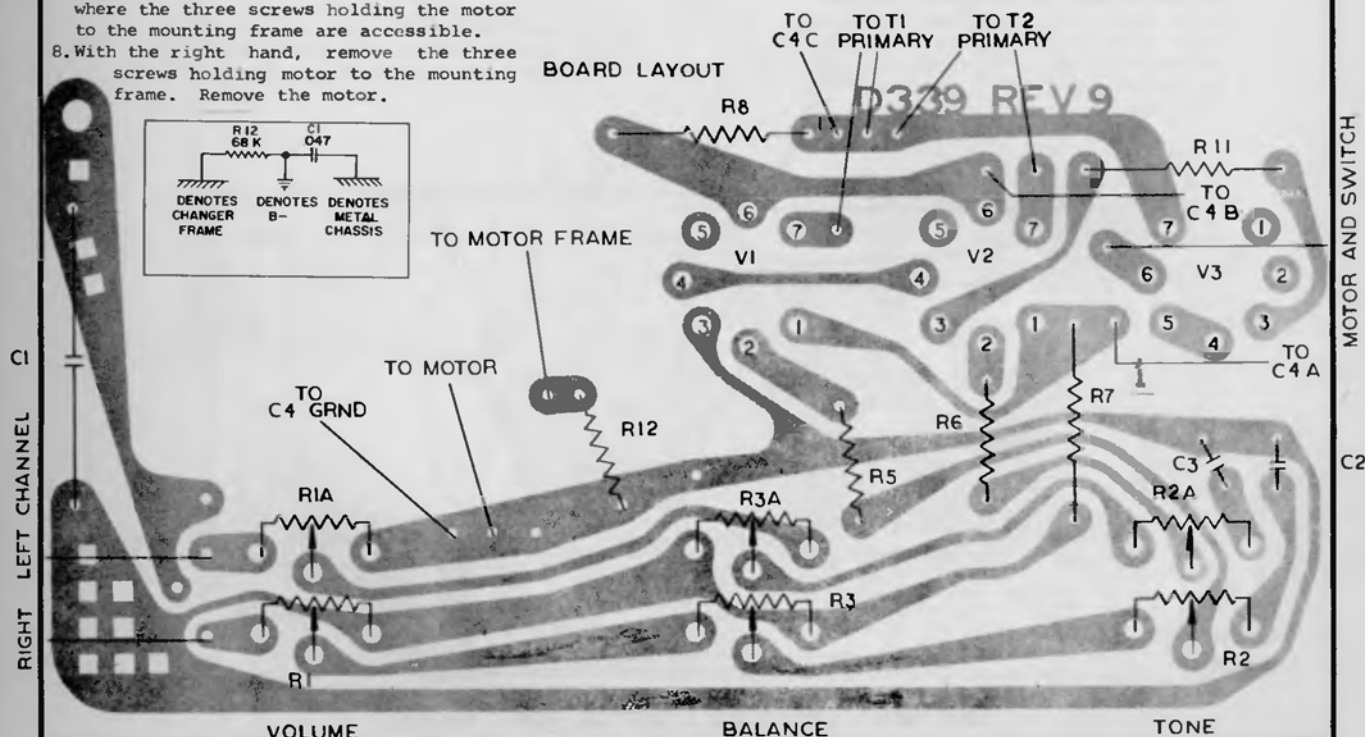
1. Follow steps 1 and 2 as described under "TO REMOVE TURNTABLE".
2. Remove the knobs.
3. Remove the four screws holding the motor board to the cabinet.
4. Place the motor board on its back edge inside the cabinet and lay it against the lid.
5. Remove the 5/16 inch nut holding the ground lug to the motor.
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 (1½V) 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.

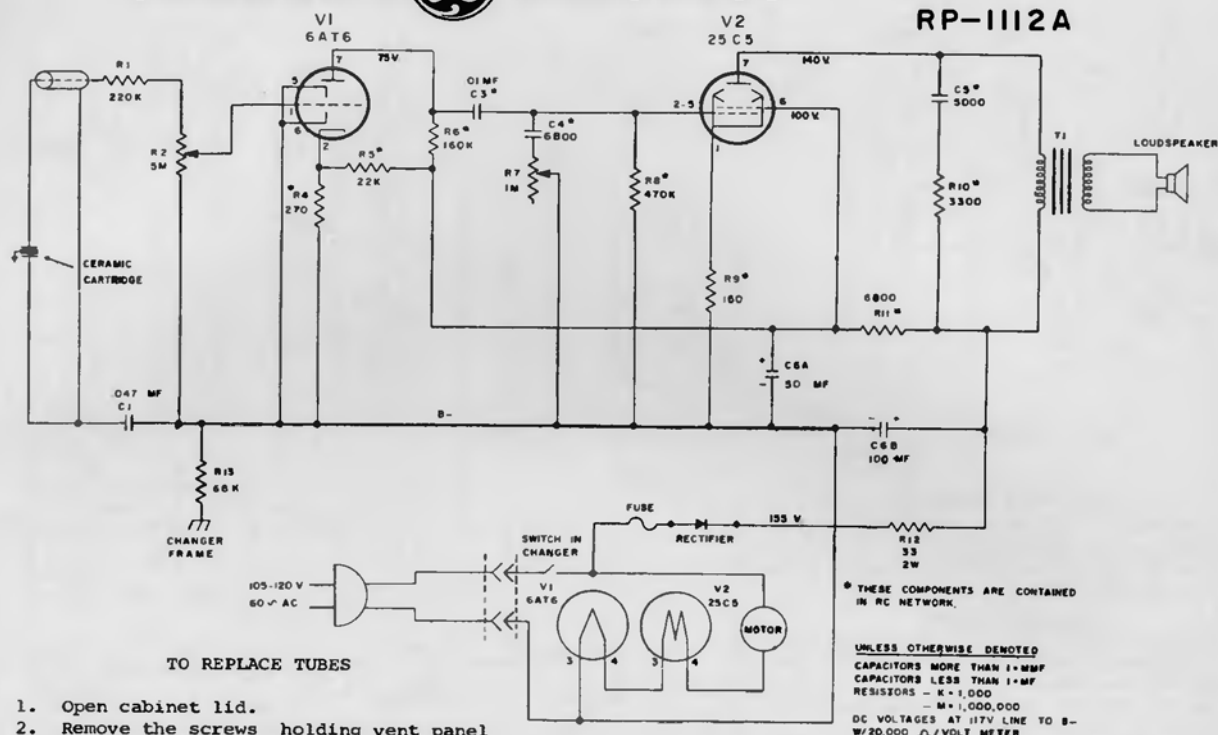
UNLESS OTHERWISE NOTED
CAPACITORS MORE THAN 1-MMF
CAPACITORS LESS THAN 1-MMF
RESISTORS K=1000
RESISTORS M=1,000,000
DC VOLTAGES AT 120V LINE TO B-
W/20,000Ω/VOLT METER
ARROWS INDICATE CLOCKWISE ROTATION

BOARD LAYOUT



GENERAL ELECTRIC

PHONO
MODEL
RP-III2A



TO REPLACE TUBES

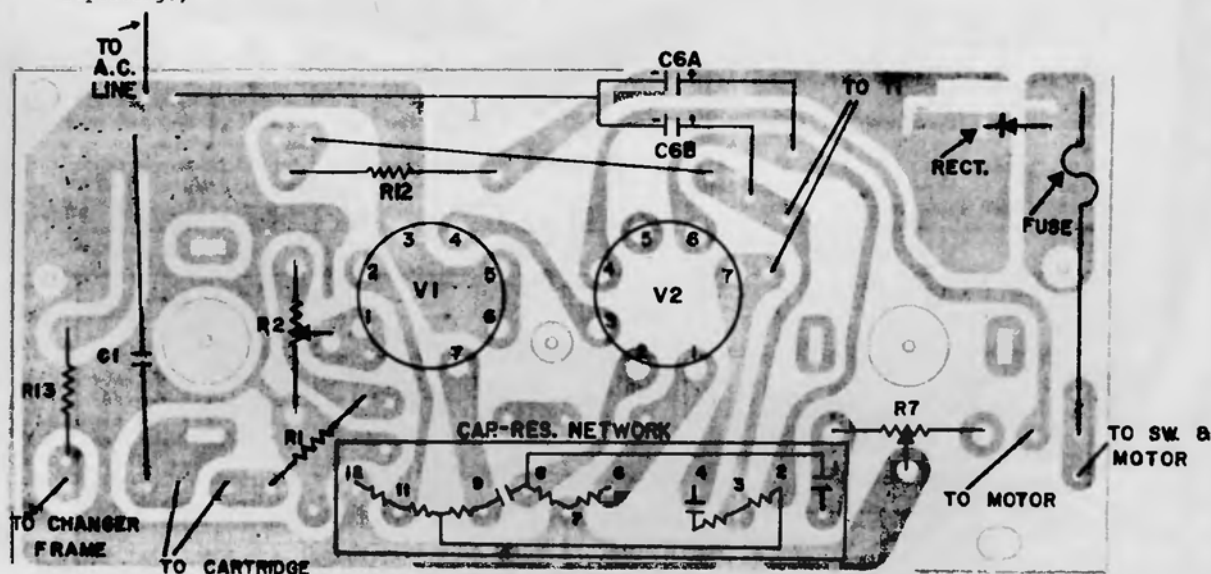
1. Open cabinet lid.
2. Remove the screws holding vent panel board and interlock.
3. Remove vent panel board. (Interlock is automatically disconnected.)

TO REMOVE AMPLIFIER CHASSIS

1. Follow steps 1 thru 3 as above.
2. Remove volume and tone knobs.
3. Loosen screws on interlock bracket, slide interlock out of mounting slot. (Mark location of bracket on cabinet before removing so that bracket can be "keyed" to correct location when replacing.)

4. Remove three screws on cabinet brace above speaker.
5. Lift out grille (with all electronic components) and place down in front of cabinet carefully.
6. Remove amplifier chassis by removing the three screws holding chassis to grille.

When replacing knobs, brace back of each control (volume and tone) with one finger as the knob is pressed on.

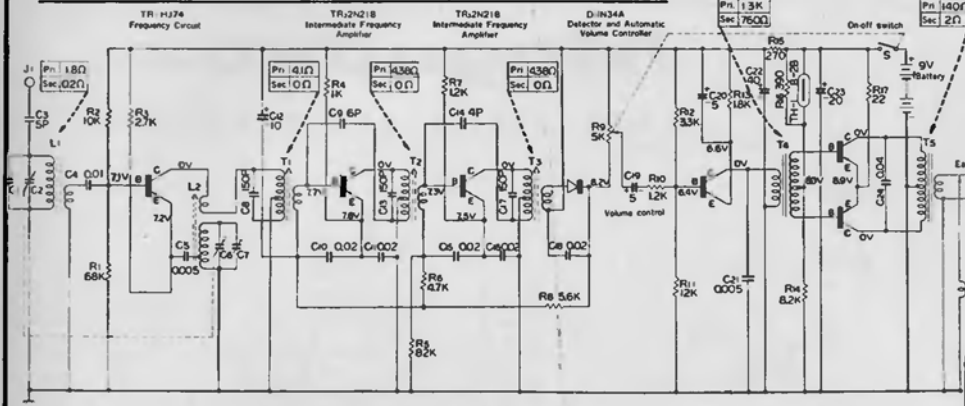


COMPONENT LOCATIONS - BOTTOM VIEW - RP-III2A

VOLUME R-21, MOST-OFTEN-NEEDED

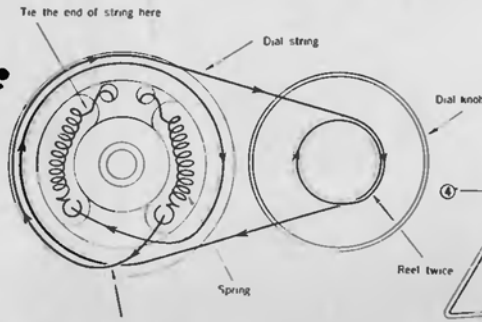
INFORMATION

Hitachi
MODEL TH-627R



Hitachi, Ltd.
Tokyo Japan

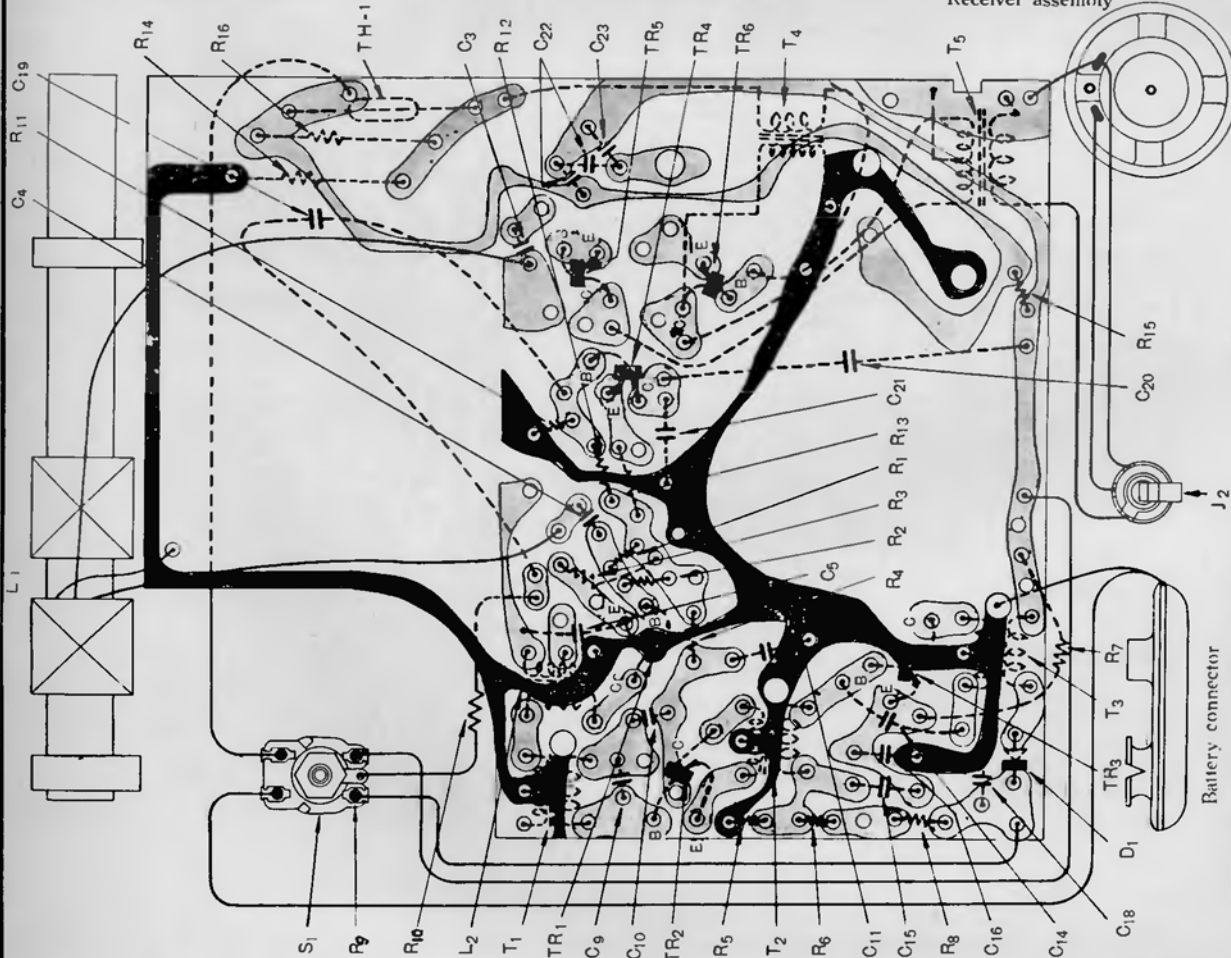
MODEL TH-627R



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

Dial string assembly

Receiver assembly

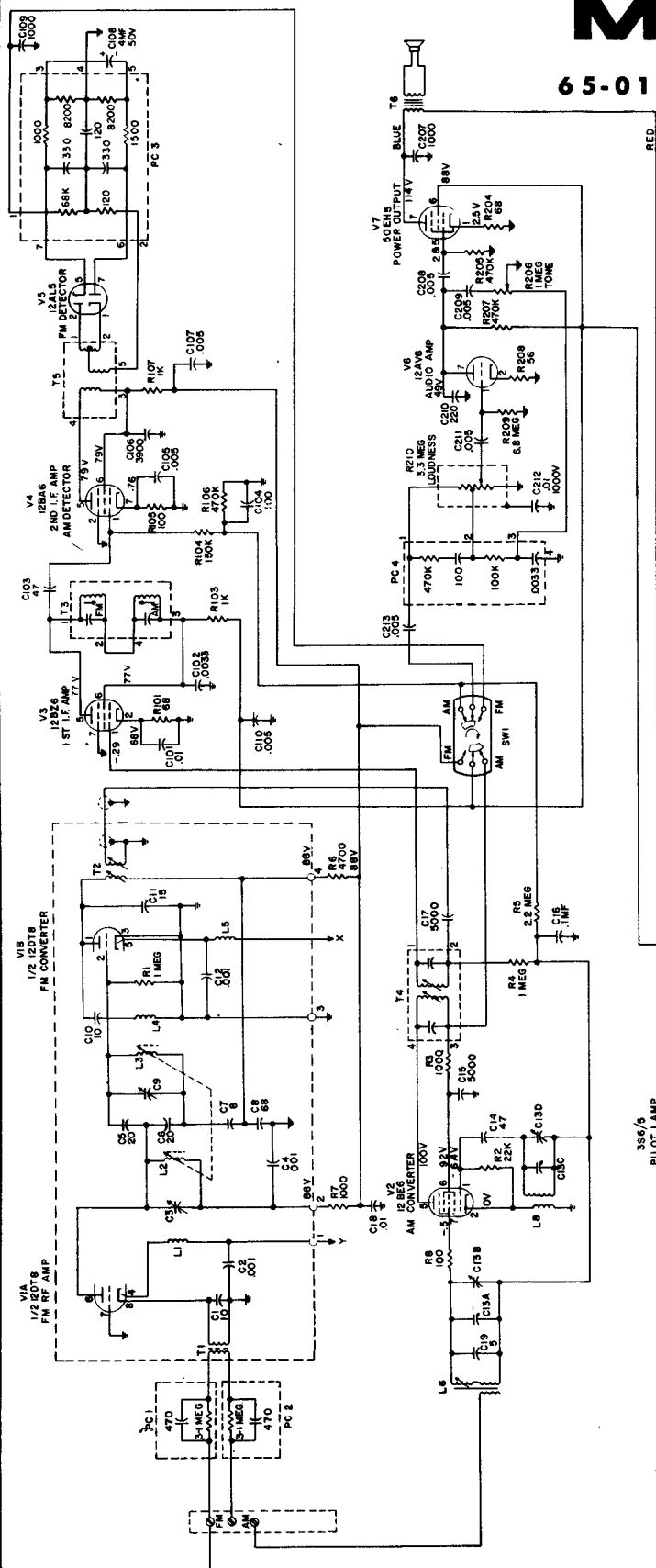


Denote earth wiring

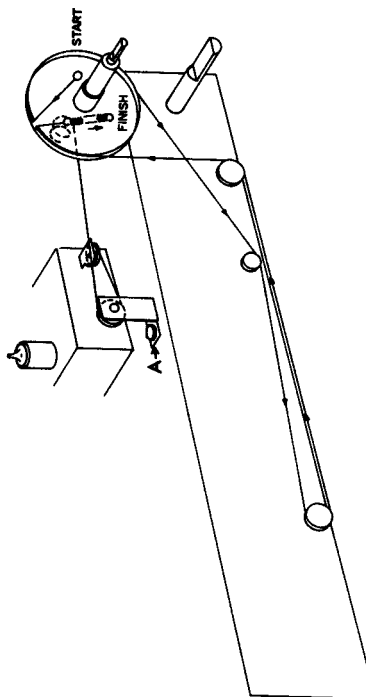
Circuit Board Diagram

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

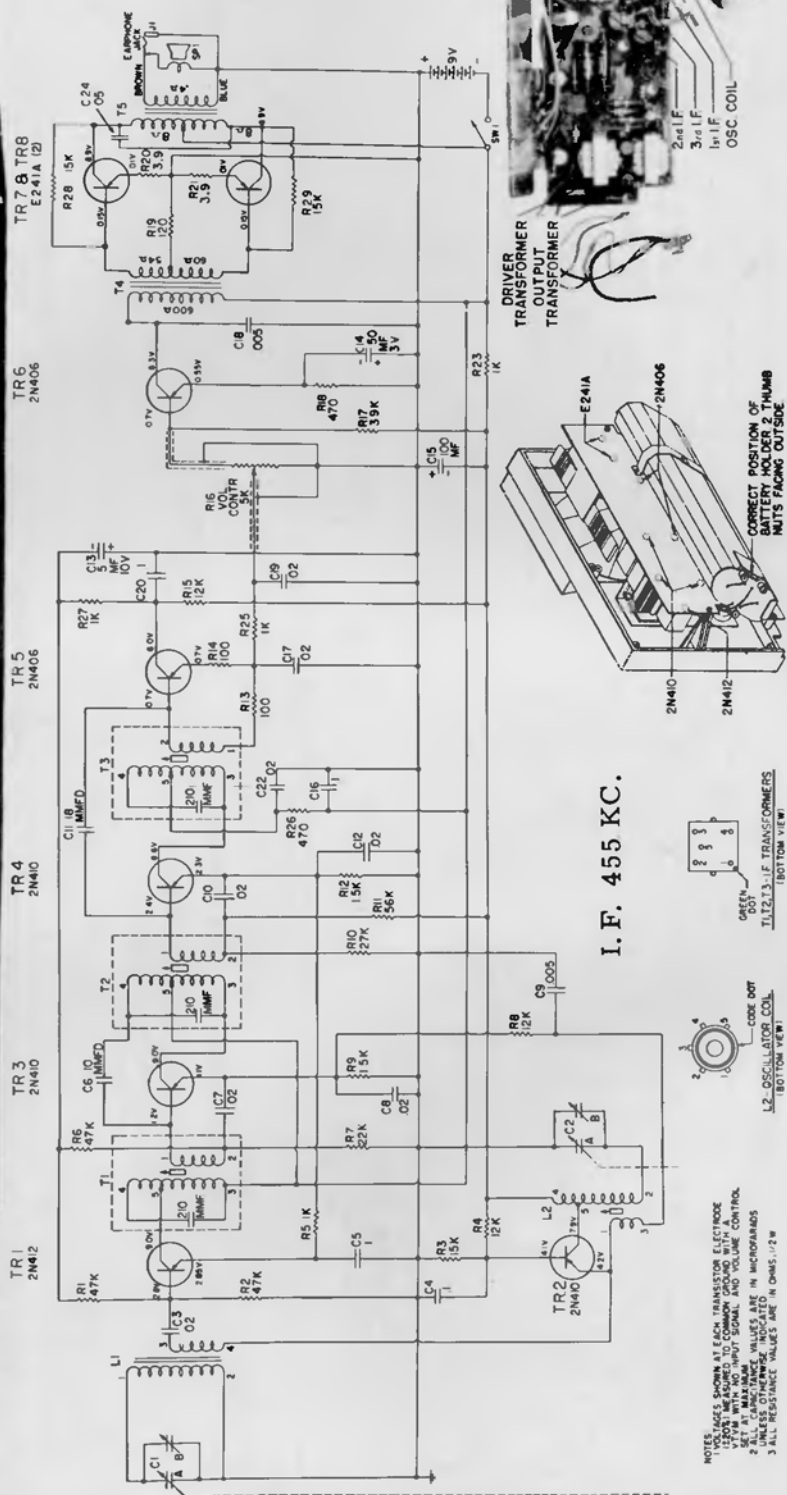
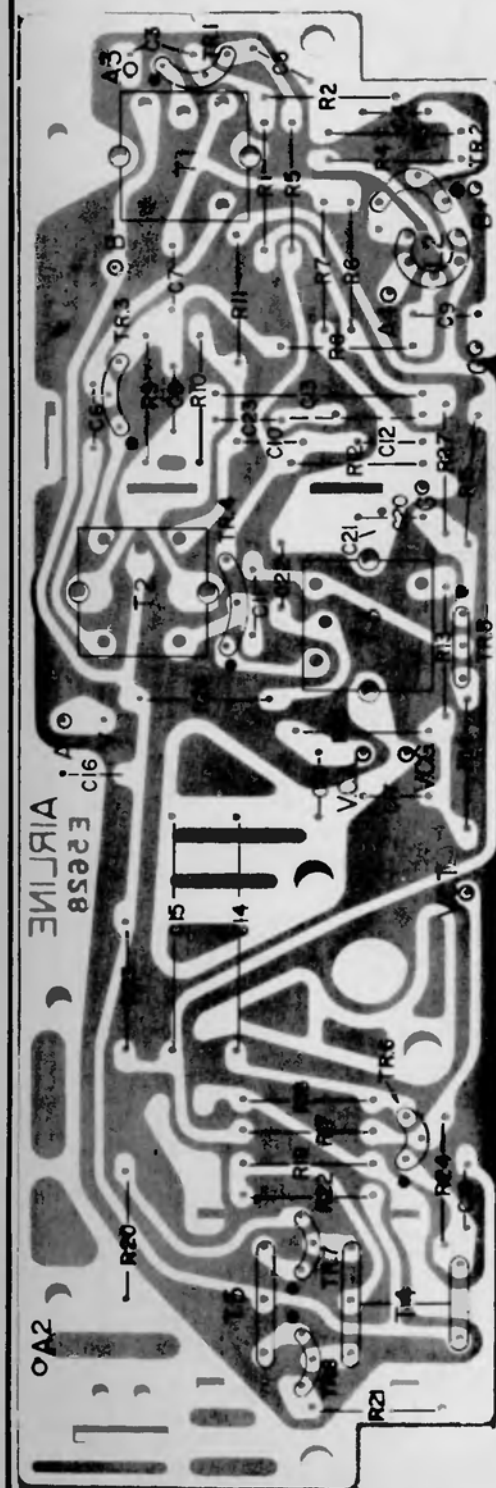
SPECIFICATIONS

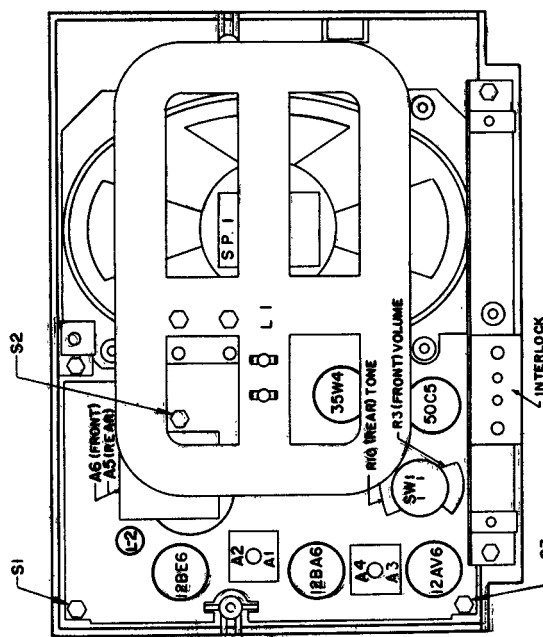
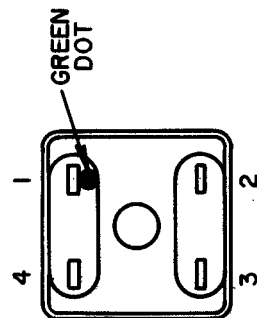
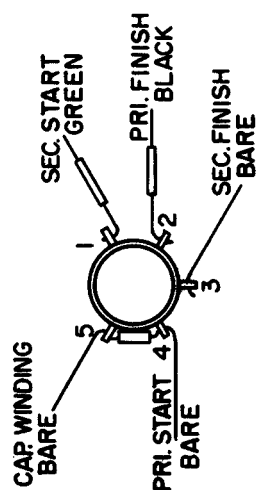
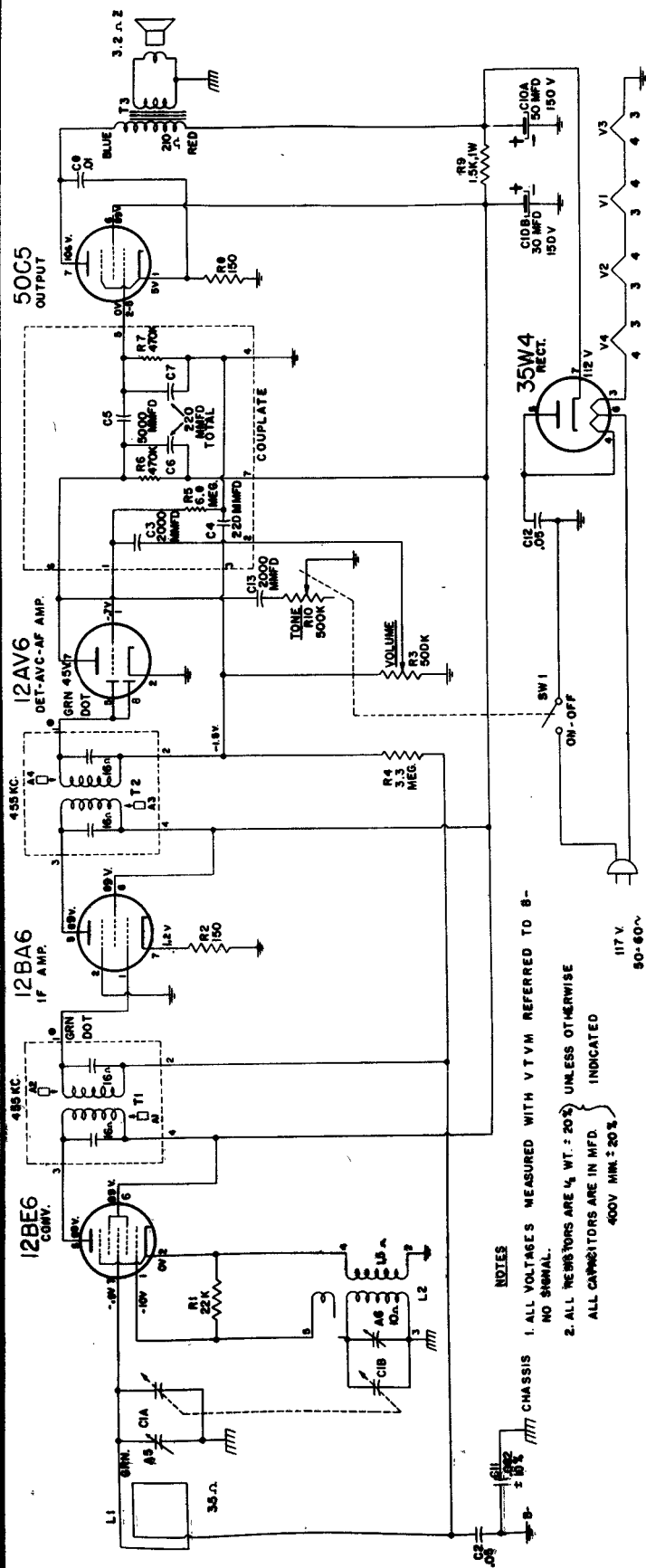
Power Source Rating	60 cps.
Frequency	117 volts
Voltage	60 watts
Wattage	
Tuning Frequency Range	540-1620KC
Broadcast Band	88-108MC
FM Band	455KC
IF Frequency (AM)	10.7MC
IF Frequency (FM)	

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

MONTGOMERY WARD

Radio Models GEN-2030A, GEN-2030B

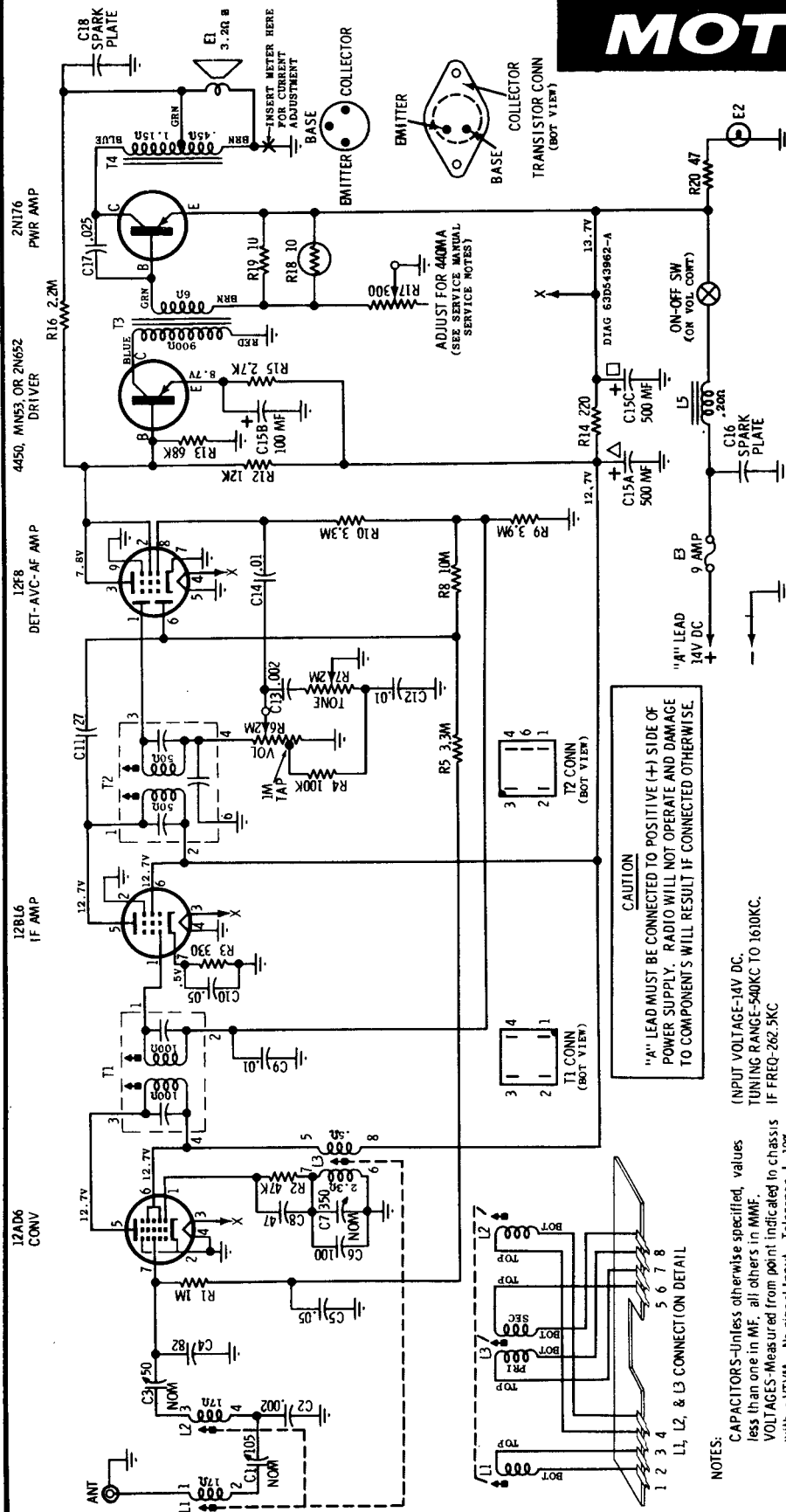




MONTGOMERY WARD
Radio Models GEN-1667A and GEN-1668A

MOTOROLA

MODEL
10AX

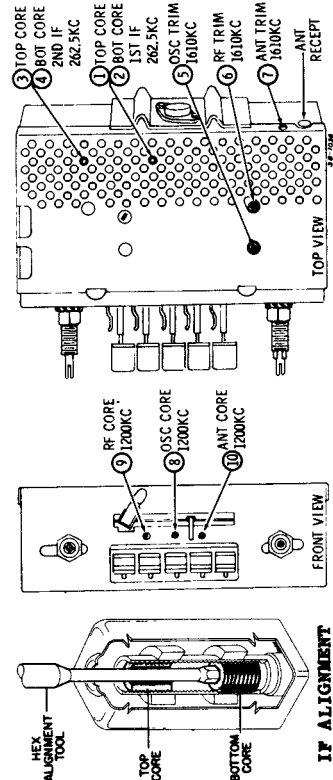


POWER TRANSISTOR CURRENT ADJUSTMENT - After a power transistor has been replaced, the collector current should be checked and adjusted for proper operation.

- Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer (T4). Be sure the speaker ground lead is connected in common with the transformer ground lead to the positive meter terminal. Connect negative terminal of the meter to ground.
 - Turn the radio on and allow it to heat up for about 15 minutes.
 - Adjust R17 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.

INPUT VOLTAGE-14V DC.
TUNING RANGE-500KC TO 1610KC.
IF FREQ-262.5KC

NOTES:
CAPACITORS-Unless otherwise specified, values less than one in MF, all others in MMF.
VOLTAGES-Measured from point indicated in chassis with a VTVM. No signal input. Tolerance $\pm 10\%$



ALIGNMENT POINTS LOCATION DETAIL

IF ALIGNMENT
DETAIL

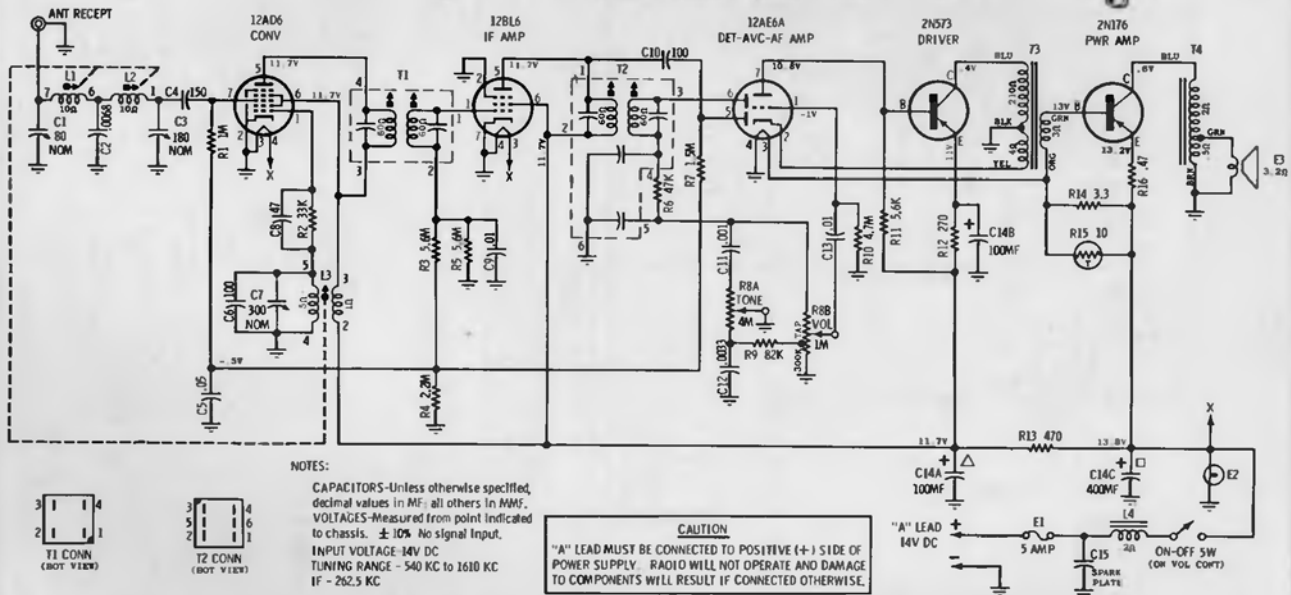
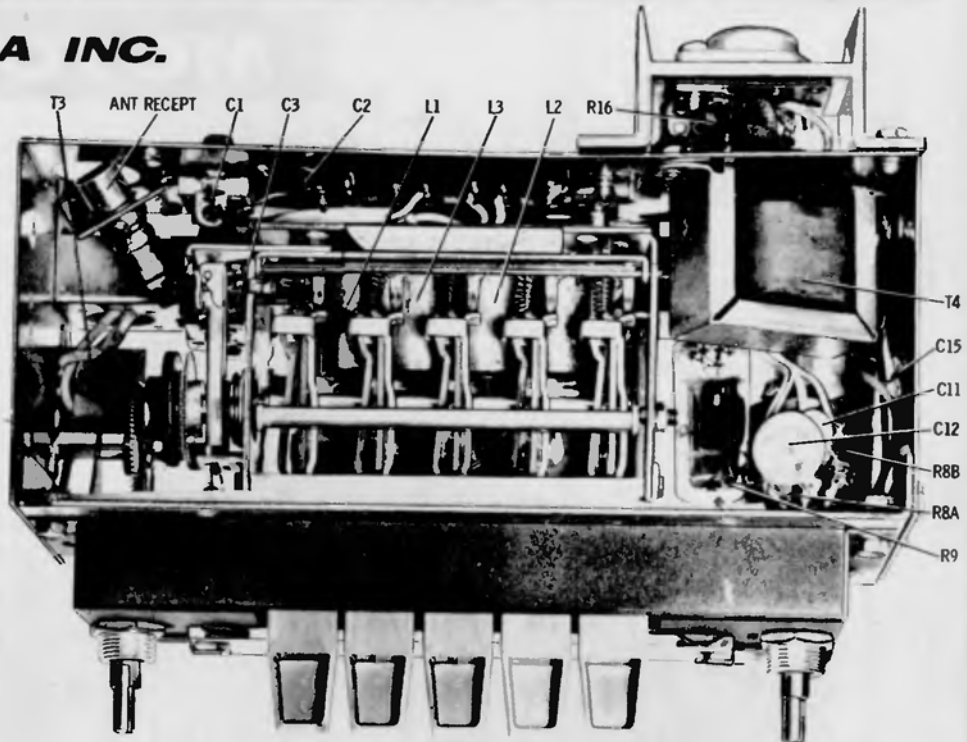
MOTOROLA INC.

AUTO RADIO

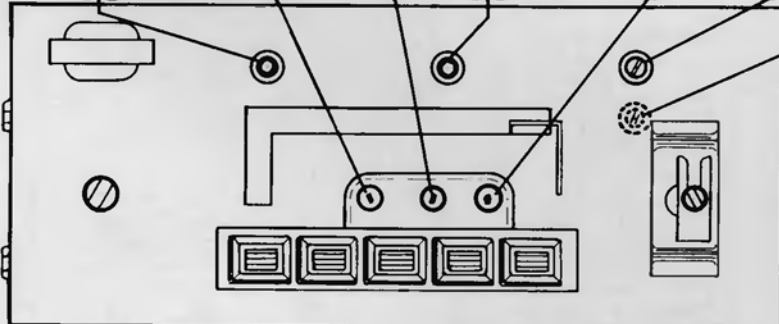
MODEL
MOTOROLA 13MA

AMERICAN MOTORS

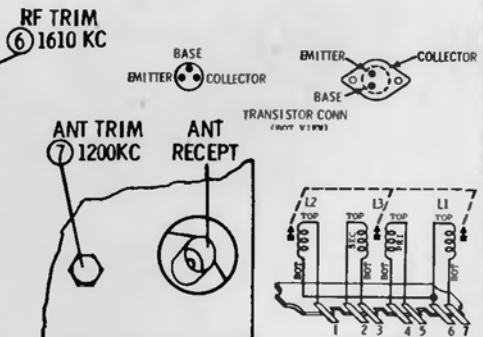
8990832



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



FRONT VIEW (WITH DIAL SCALE & BACKGROUND REMOVED)



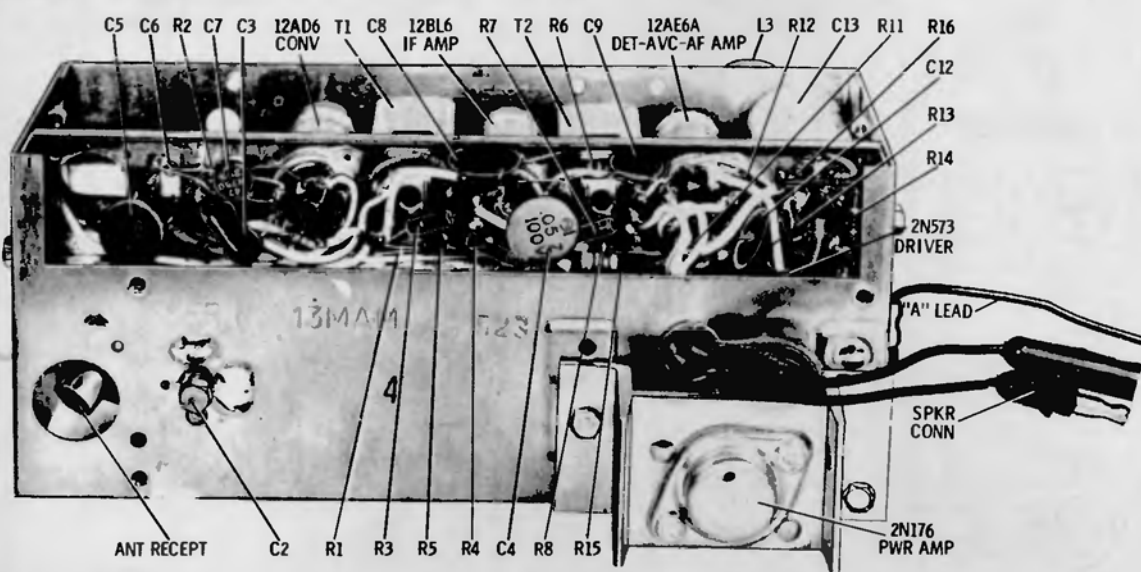
BACK VIEW

ALIGNMENT POINTS LOCATION DETAIL

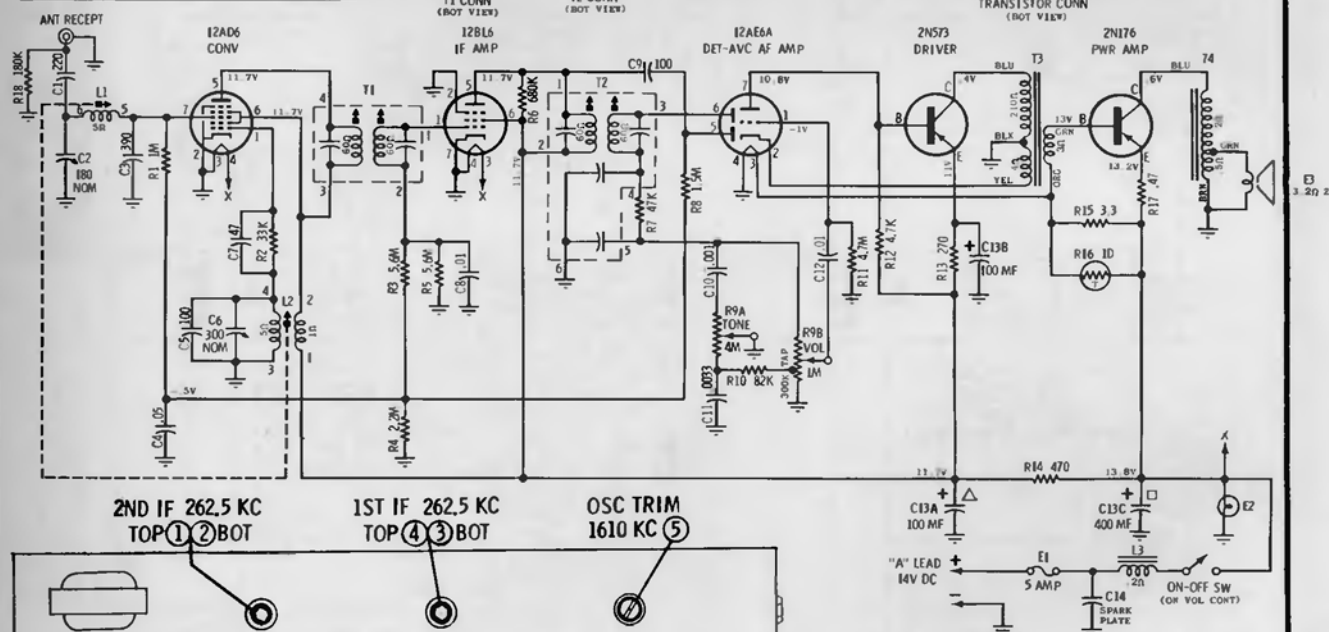
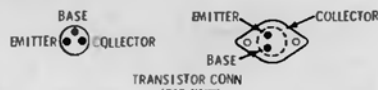
MOTOROLA

MODEL
MOTOROLA 13MAM
AMERICAN MOTORS 8990831

PARTS
LOCATION



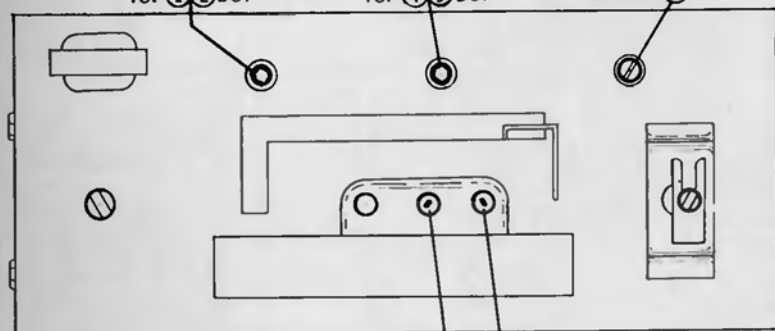
CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



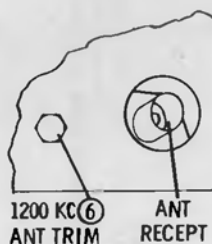
2ND IF 262.5 KC
TOP ① BOT ②

1ST IF 262.5 KC
TOP ④ BOT ③

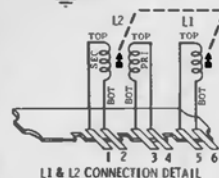
OSC TRIM
1610 KC ⑤



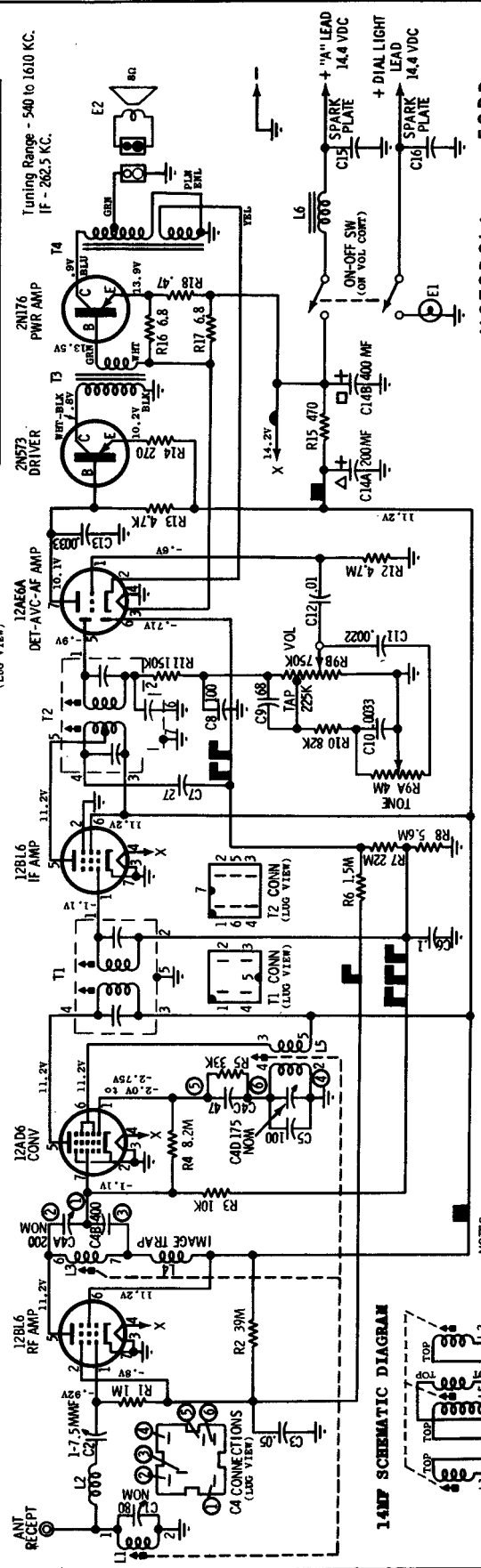
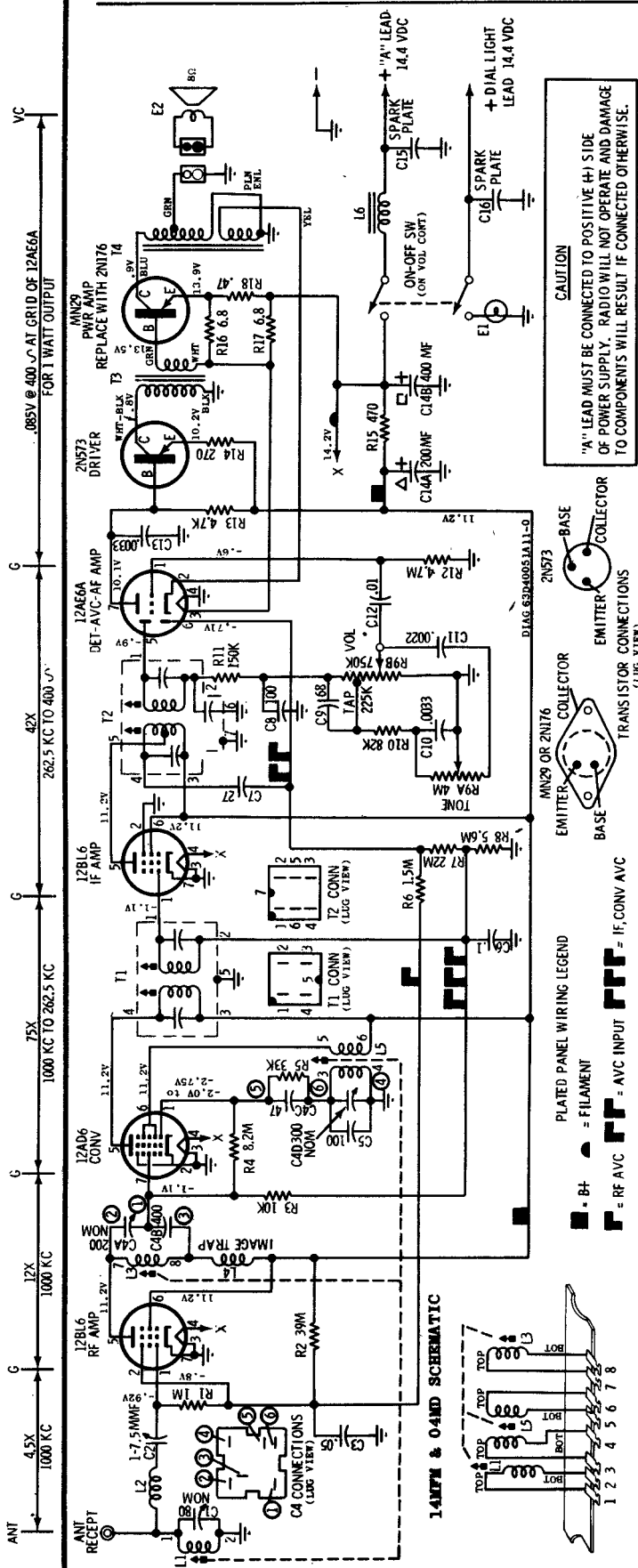
FRONT VIEW (WITH DIAL SCALE & BACKGROUND REMOVED)



BACK VIEW



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



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 - 14.4V DC.

MOTOROLA
14MF
14MF
04MD

FORD
CIAF-18805-D
CIAF-18805-C
C0AF-18805-D

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

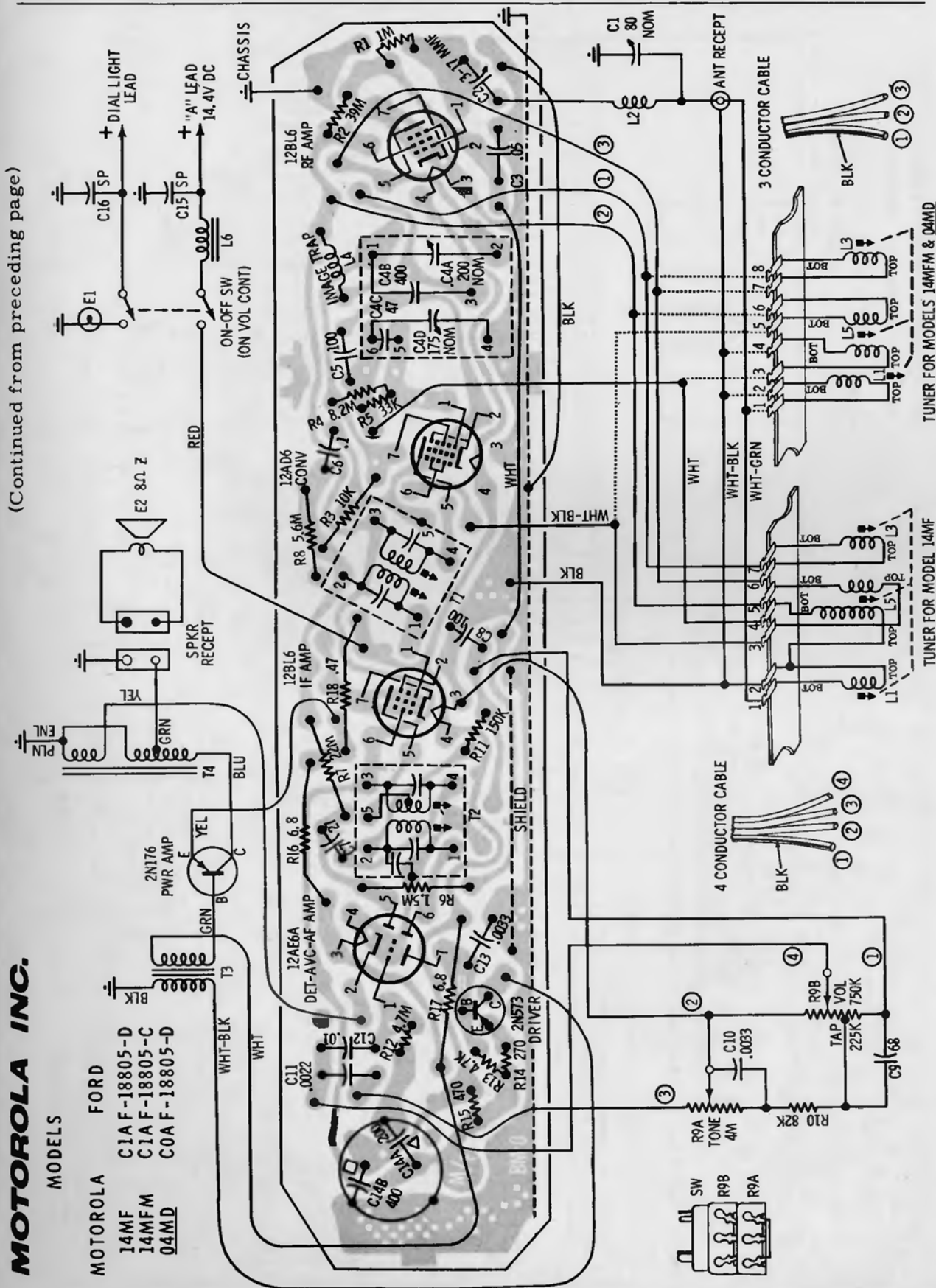
(Continued from preceding page)

MOTOROLA INC.

MODELS

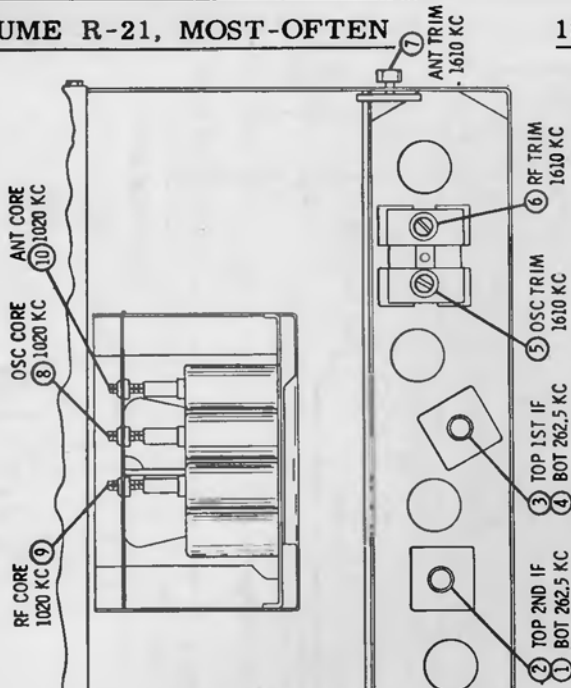
MOTOROLA FORD

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

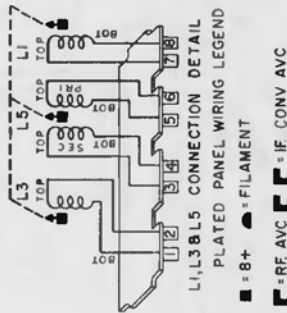


PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM SIDE (COMPONENTS SHOWN ARE ON OPPOSITE SIDE)

MOTOROLA Model 14MR
American Motors 8990833

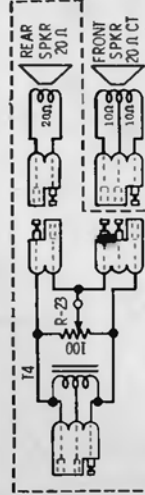


PLATED CHASSIS BOARD GROUND CONNECTIONS AS SEEN THRU BOARD FROM WIRING SIDE



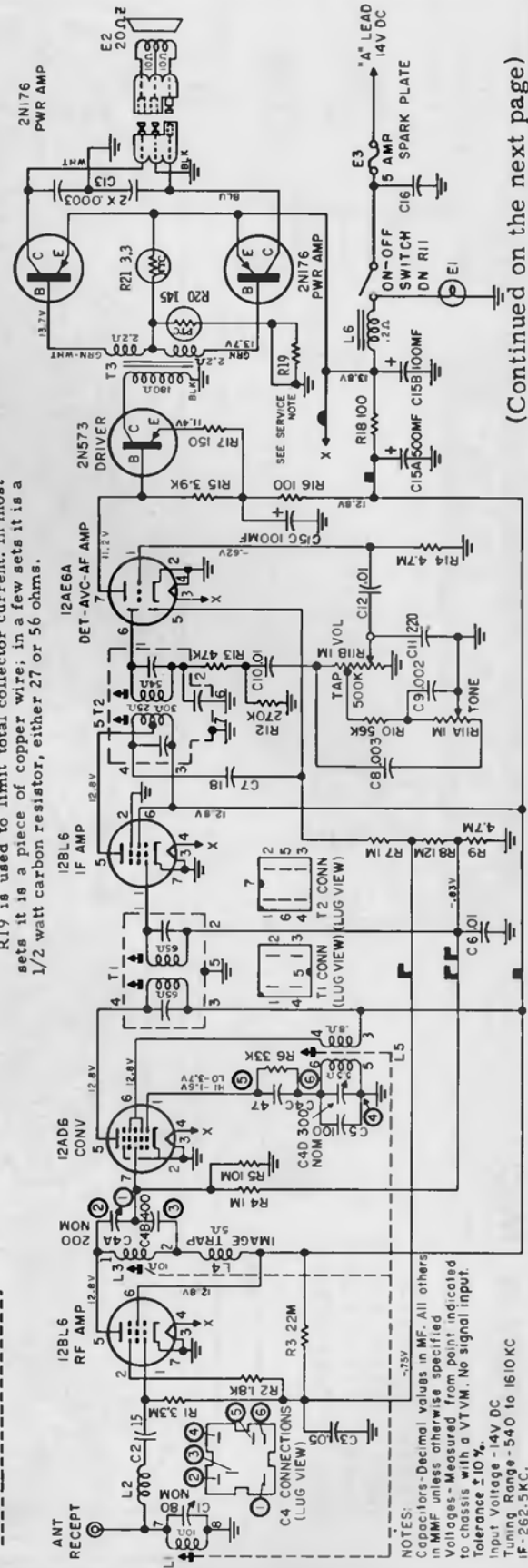
CAUTION

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

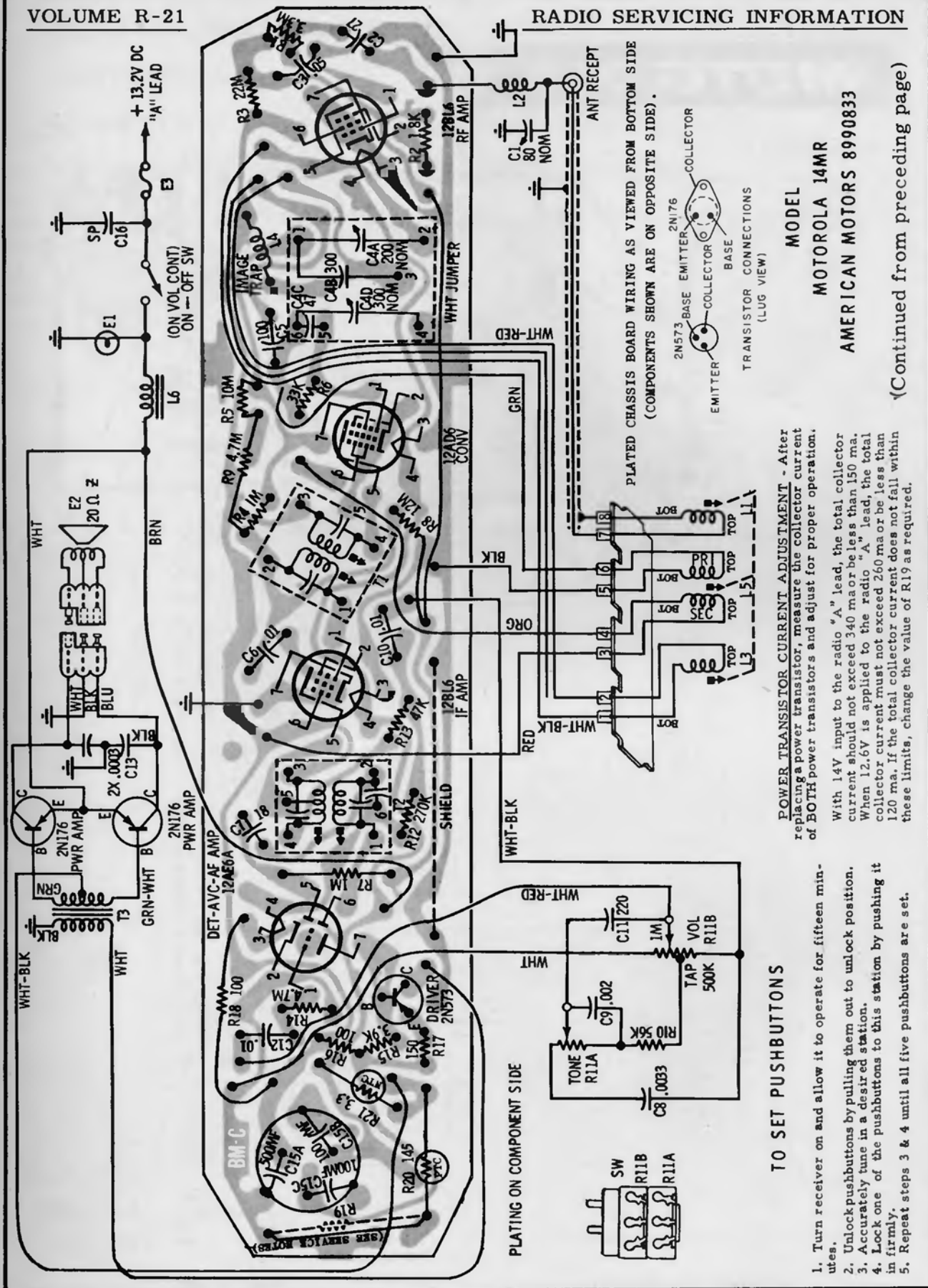


R19 is used to limit total collector current. In most sets it is a piece of copper wire; in a few sets it is a 1/2 watt carbon resistor, either 27 or 56 ohms.

ALIGNMENT POINTS LOCATION DETAIL



(Continued on the next page)

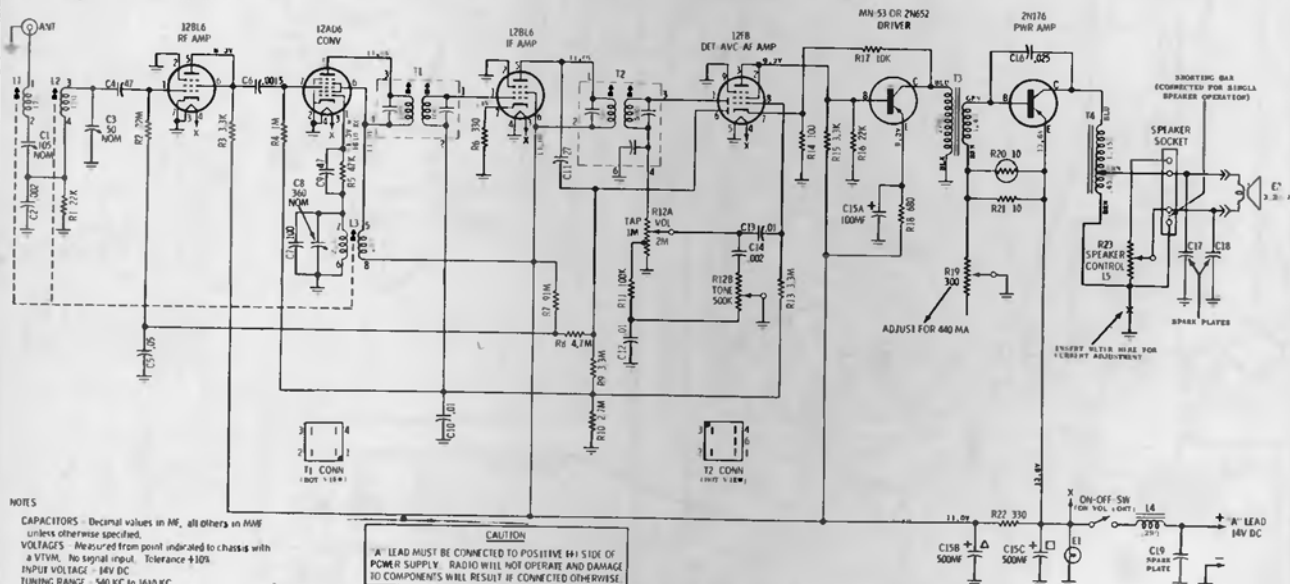
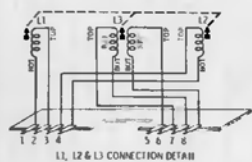
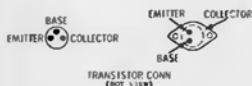
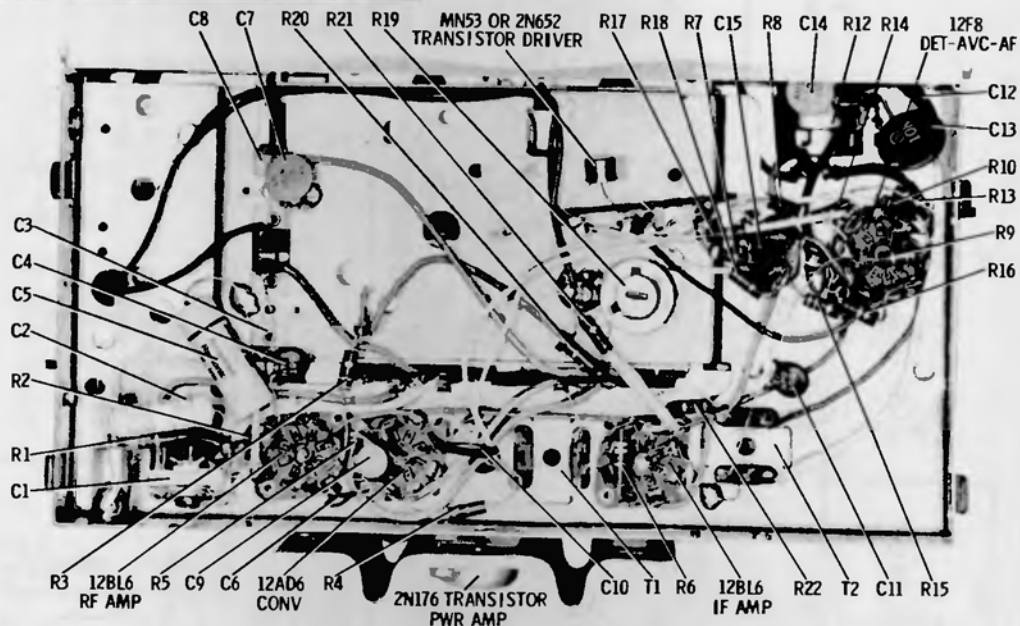


(Continued from preceding page)

MOTOROLA

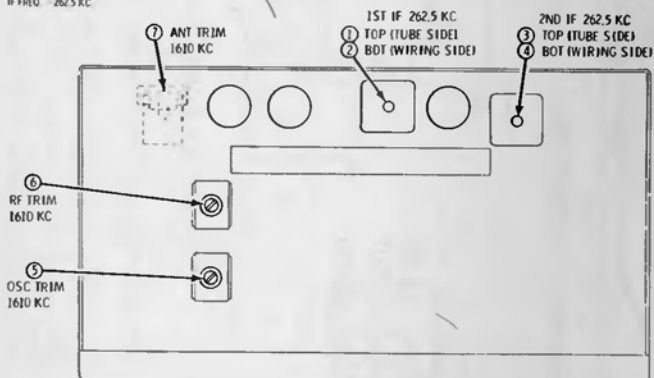
AUTO RADIO

MODELS
BKA60X
PCA60X

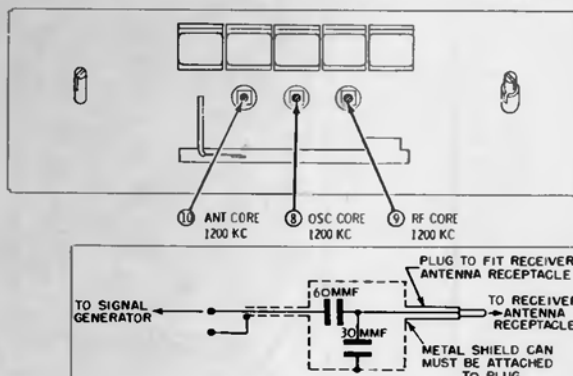


NOTES
CAPACITORS - Decimal values in μ F, all others in μ MM unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
INPUT VOLTAGE - 84V DC
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ. - 262.5 KC.

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

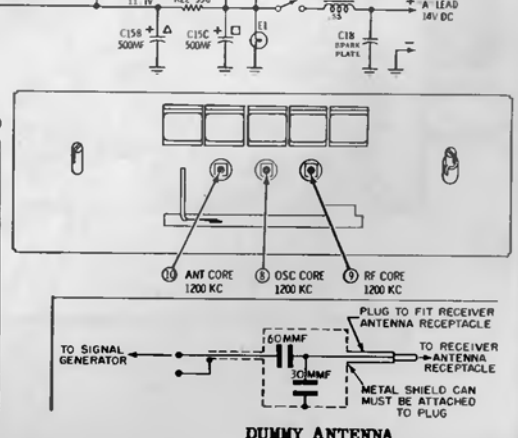
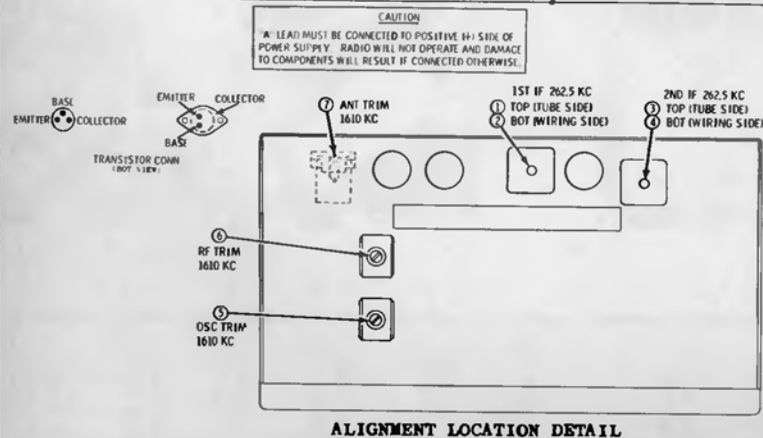
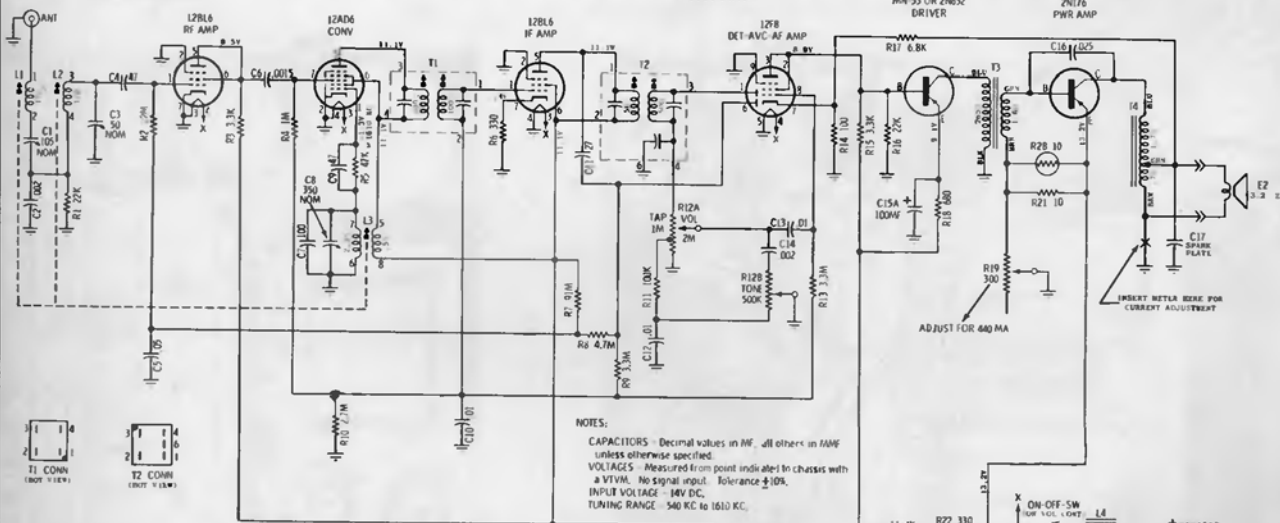
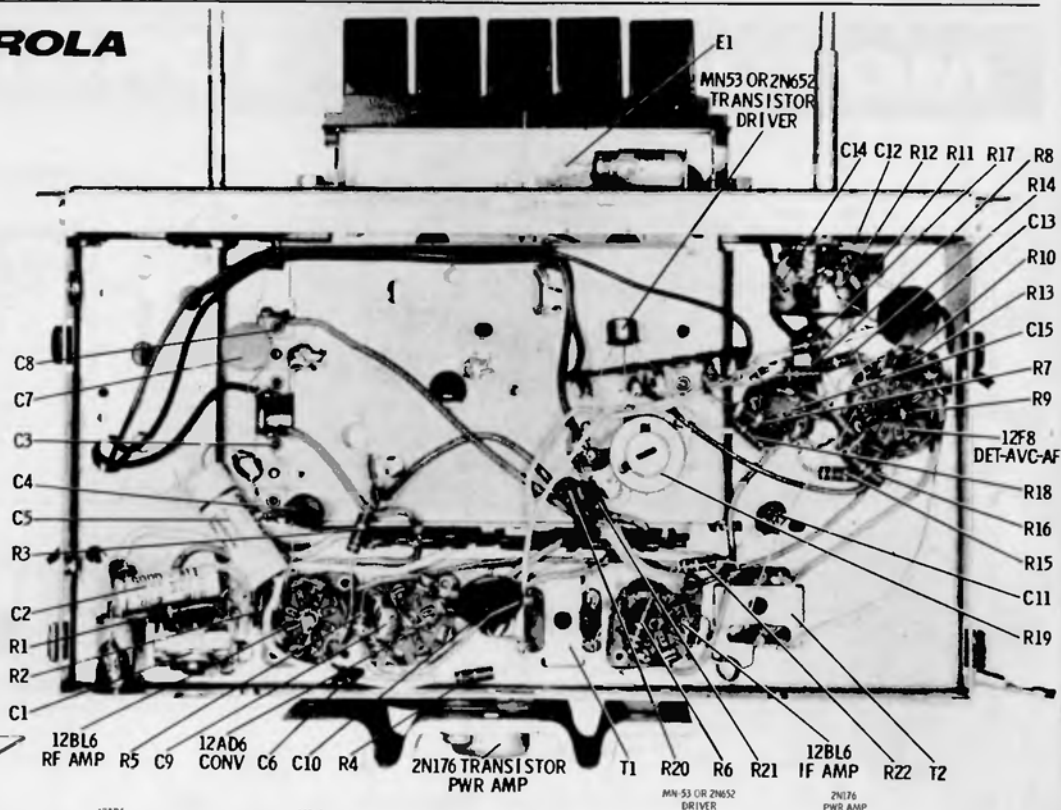


DUMMY ANTENNA

MOTOROLA

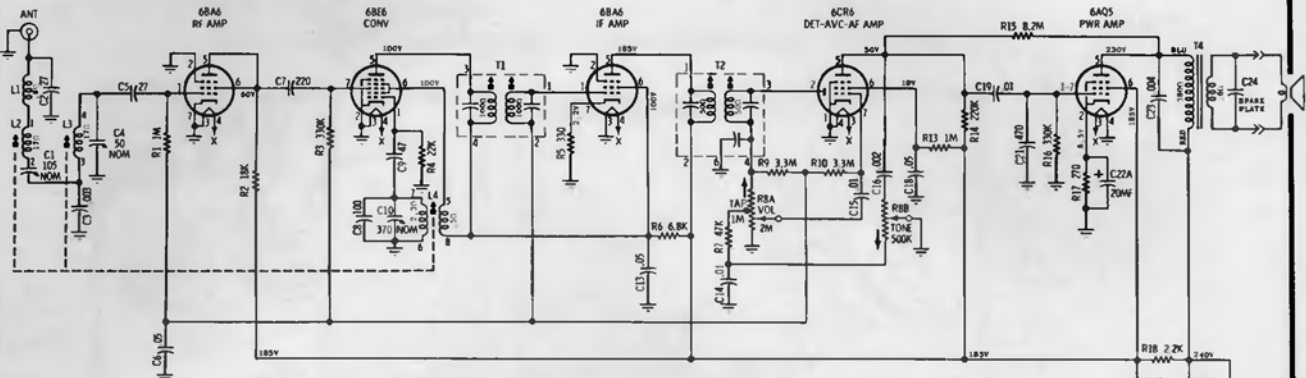
AUTO RADIO

MODEL
CRA60X

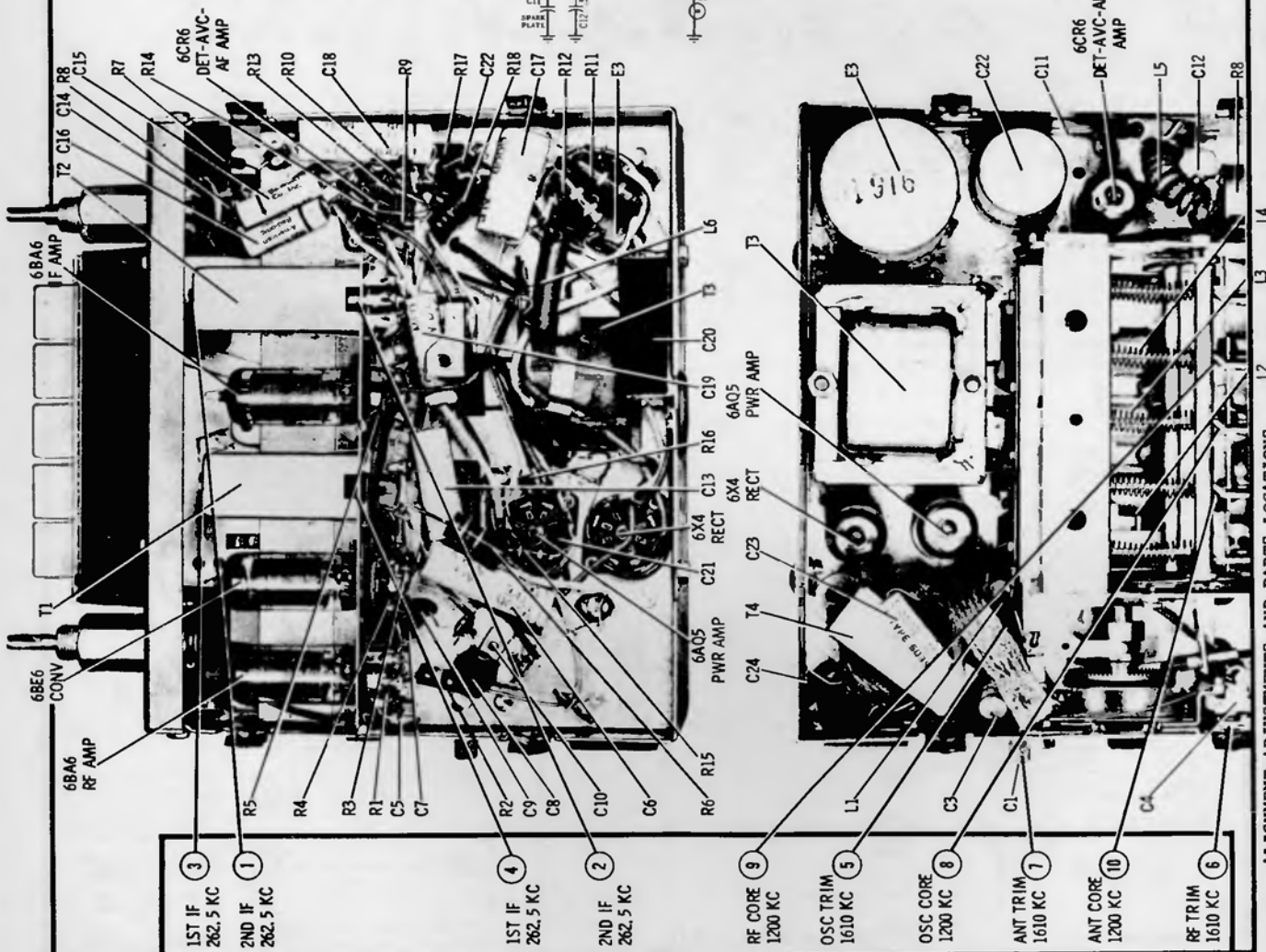
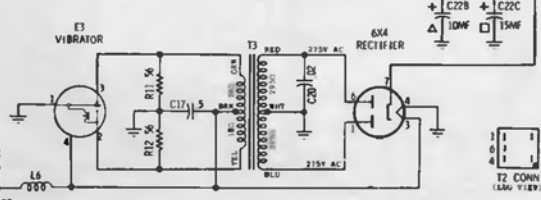
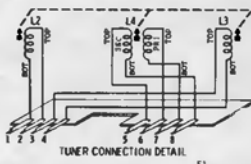


MOTOROLA

MODEL
VWA60



NOTES:
CAPACITORS - Decimal values in MF, others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM, 10% tolerance. No signal input.
INPUT VOLTAGE - 7V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQUENCY - 262.5 KC.
→ Indicates clockwise rotation of control.

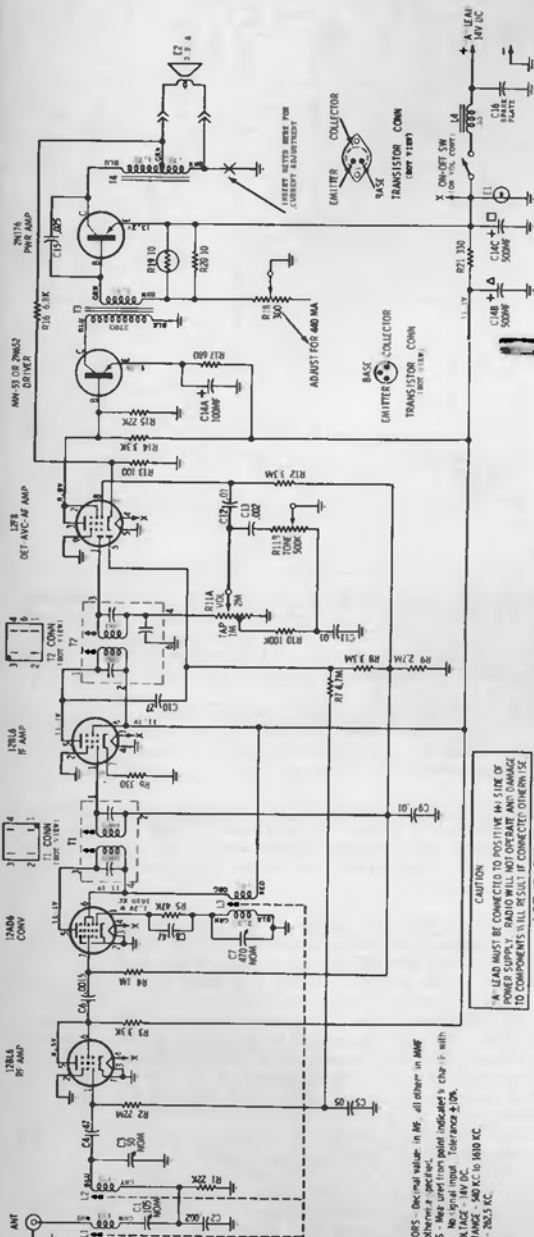


MOTOROLA

AUTO RADIO

MODEL CRM60X

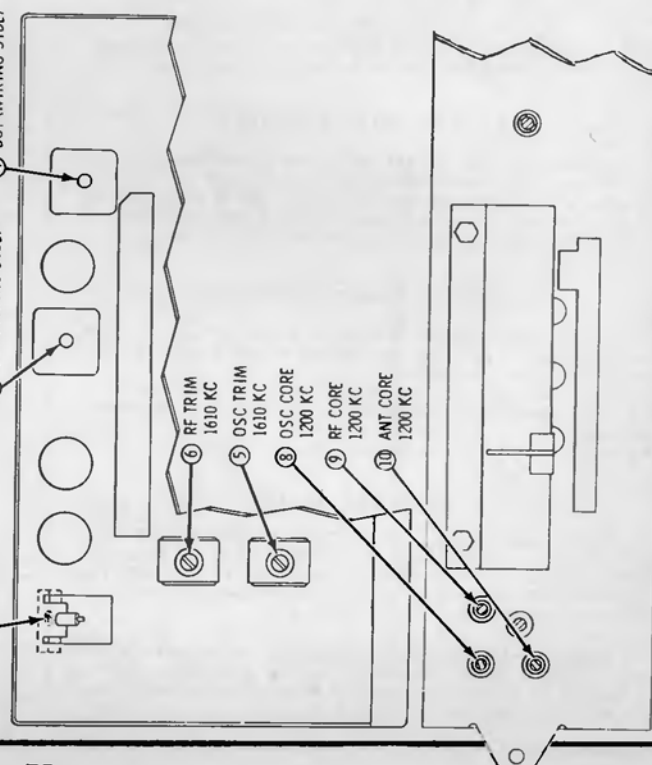
Automotive type superheterodyne receiver designed for custom installation in the 1960 Corvair car. This receiver contains a transistor driver stage, a transistor output stage, and four miniature tubes designed to operate directly from the car's storage battery.



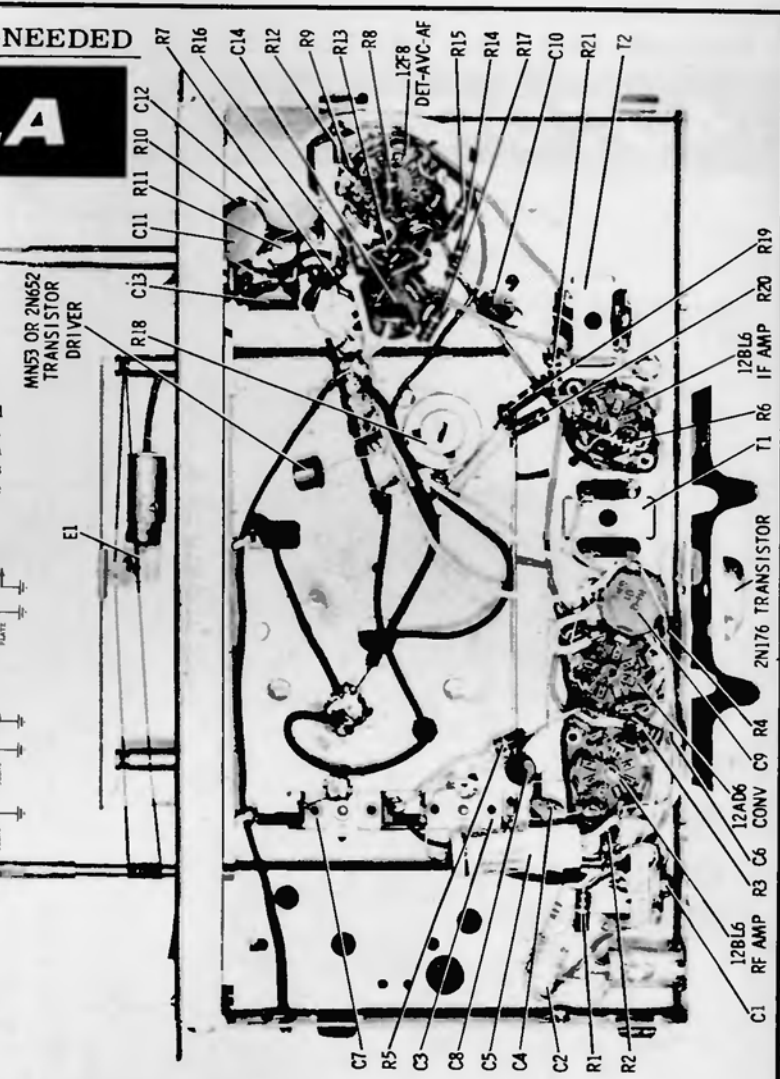
NOTES:
CAPACITORS - Denoted values in μF , all others in pF
RESISTORS - Denoted values in Ω , all others in $k\Omega$
VOLTAGE - Measured from point indicated by star (*) with respect to chassis ground
TUNING RANGE - 540 KC to 1600 KC
IF FREQ - 455 KC

CAUTION
NO LEAD MUST BE CONNECTED TO POSITIVE B+ SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE IF CONNECTED OTHERWISE.

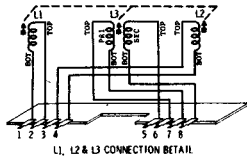
- 1ST IF 262.5 KC
 - 1 TOP (TUBE SIDE)
 - 2 BOT (WIRING SIDE)
- 2ND IF 262.5 KC
 - 3 TOP (TUBE SIDE)
 - 4 BOT (WIRING SIDE)
- ANT TRIM 1610 KC
- RF TRIM 1610 KC
- OSC TRIM 1610 KC
- OSC CORE 1200 KC
- RF CORE 1200 KC
- ANT CORE 1200 KC



ALIGNMENT LOCATION DETAIL

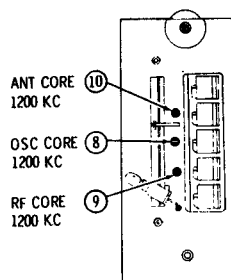


**MODEL
OE A60X**

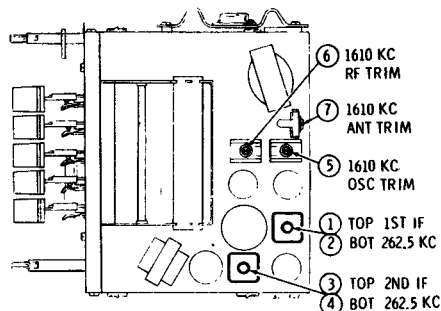


NOTES:

CAPACITORS - Decimal values in μF , 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.

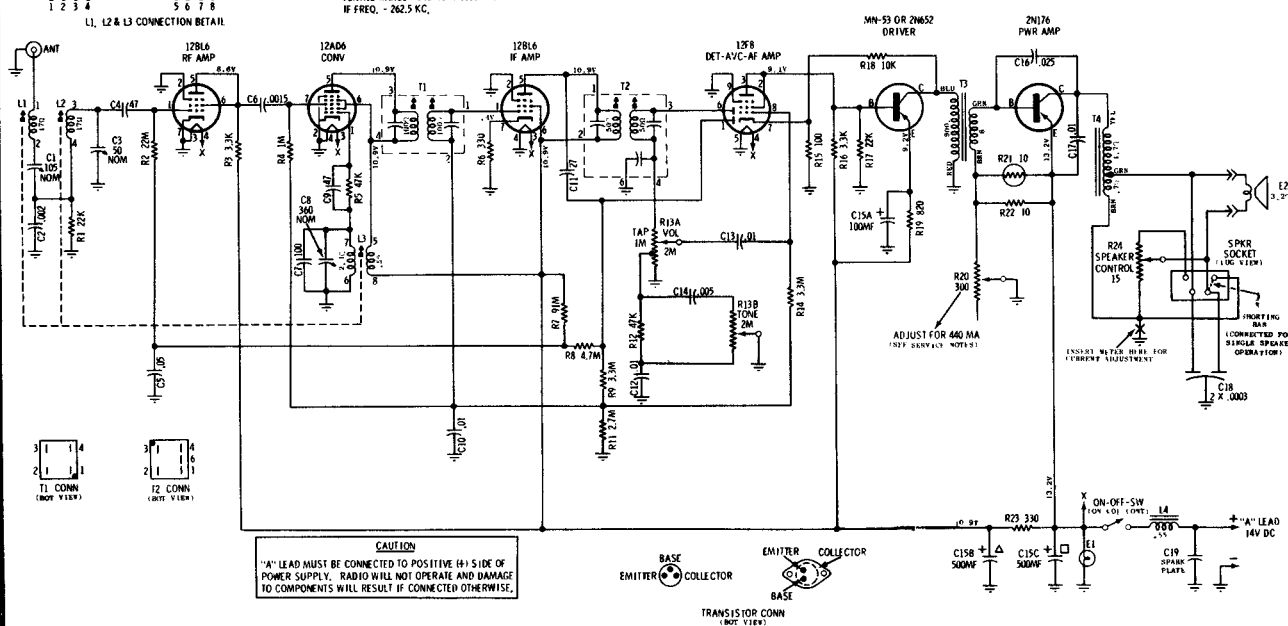


FRONT VIEW



TOP VIEW

ALIGNMENT LOCATION DETAIL



TO SET PUSHBUTTONS

Pushbuttons may 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.

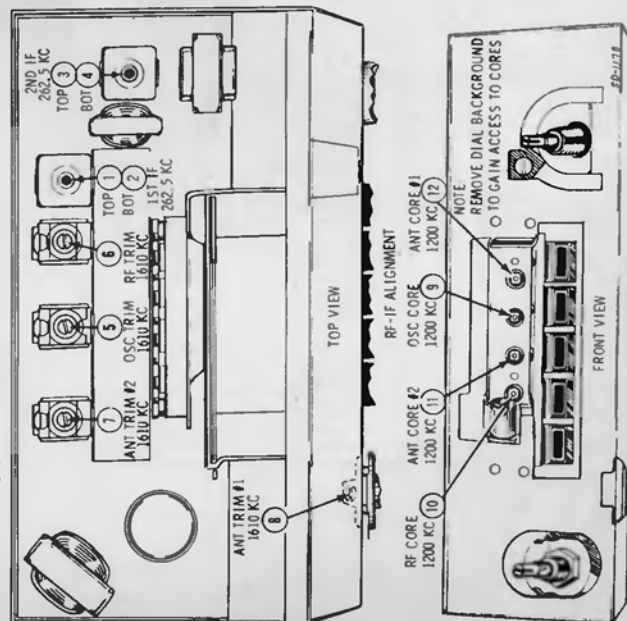
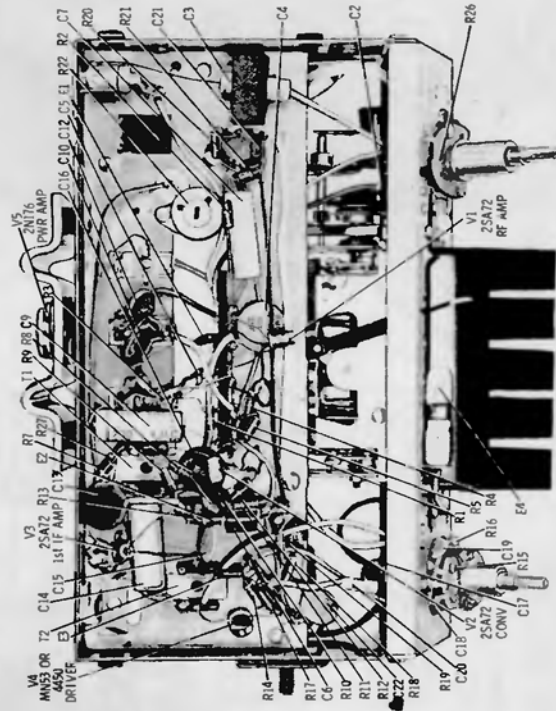
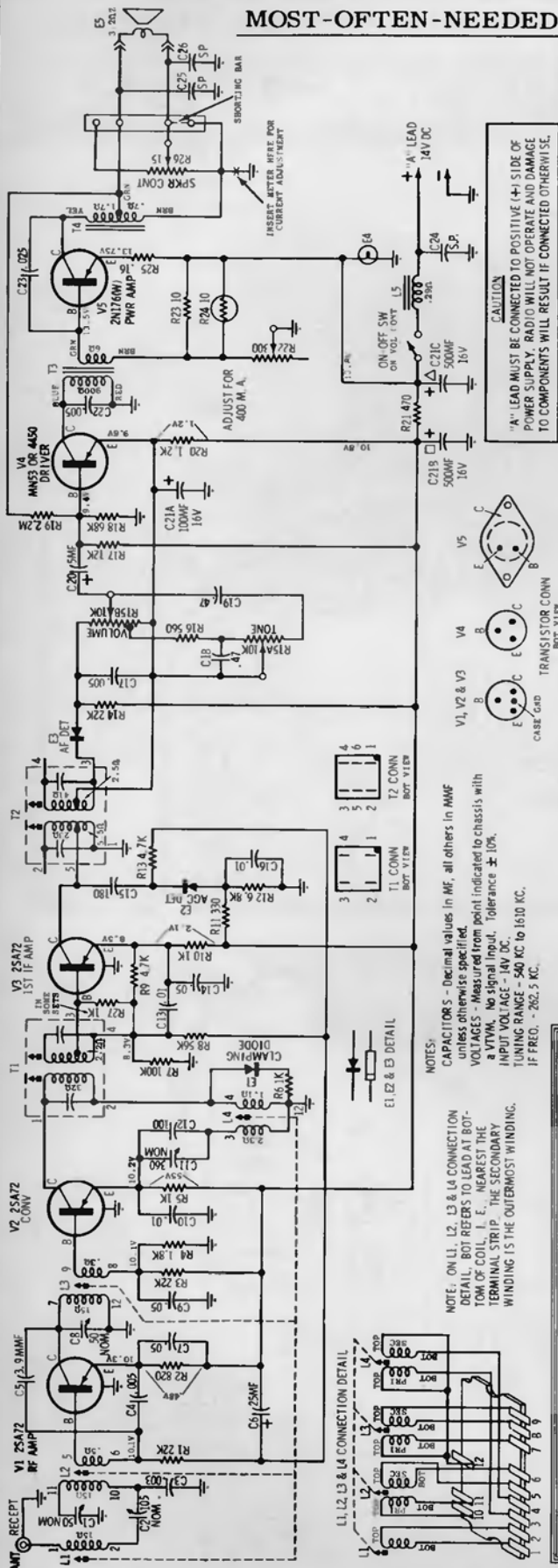
3. POWER TRANSISTOR REPLACEMENT - When replacing a power transistor, be sure transistor insulator is in place and well greased and that the mounting screws are securely and evenly tightened. Use only the transistor specified in the Replacement Parts List for replacement. See Notes 4 & 6.
4. POWER TRANSISTOR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



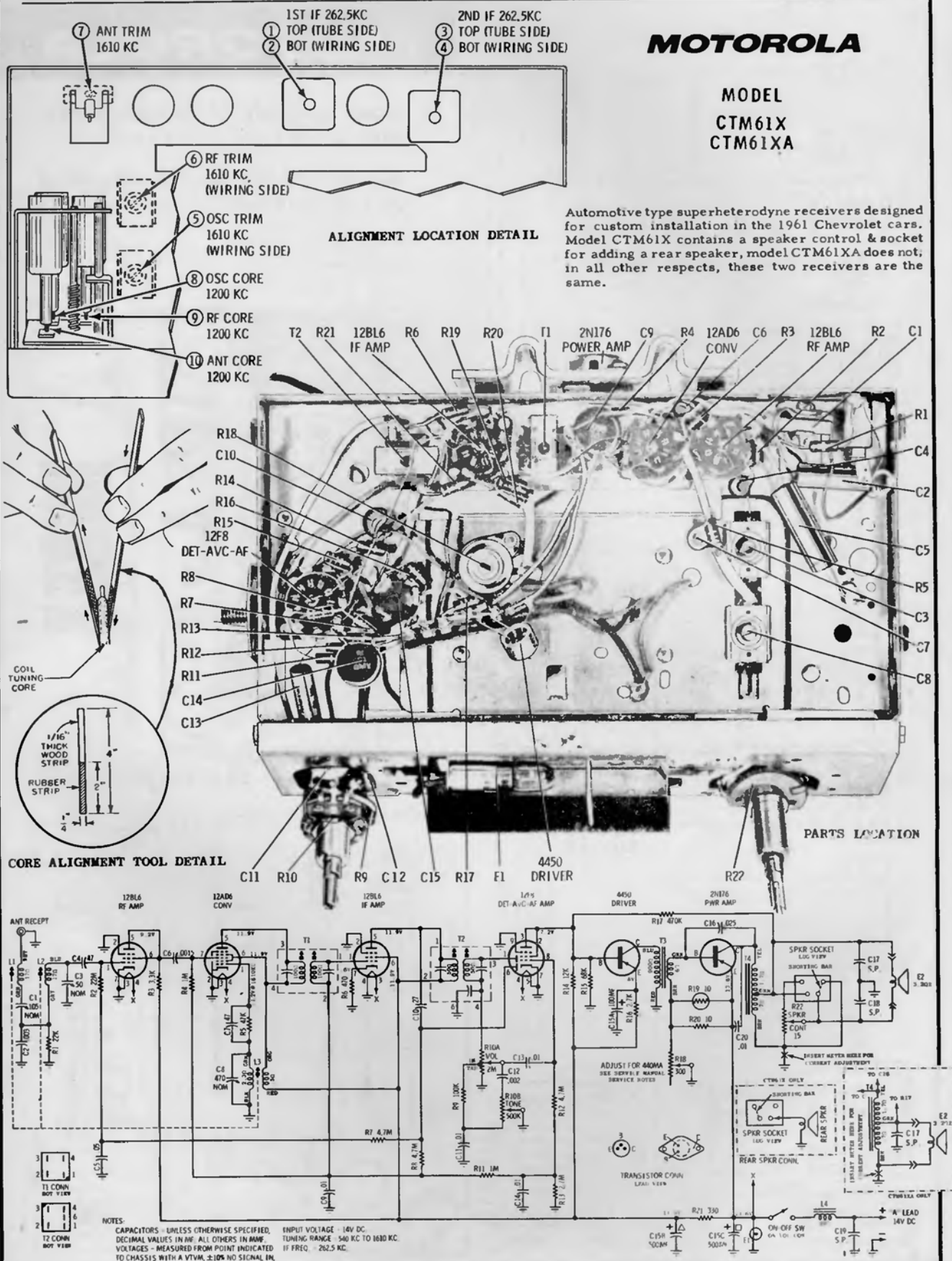
ALIGNMENT LOCATION DETAIL

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

MOTOROLA

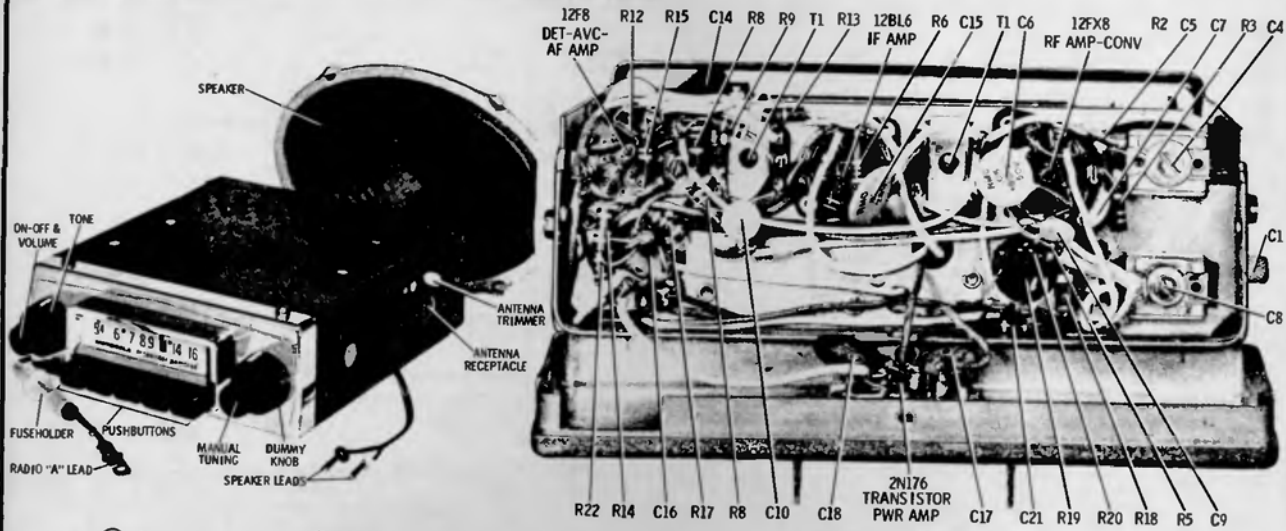
MODEL
CTM61X
CTM61XA

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.

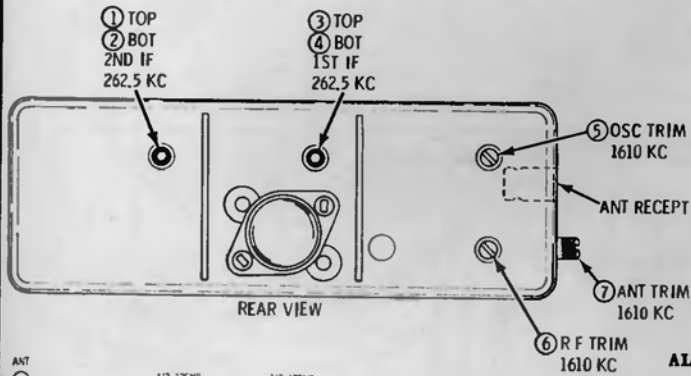


MOTOROLA

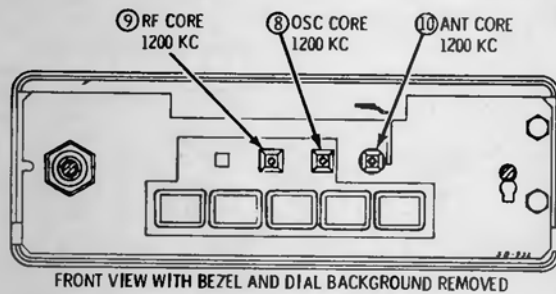
MODEL
500X



PARTS LOCATION

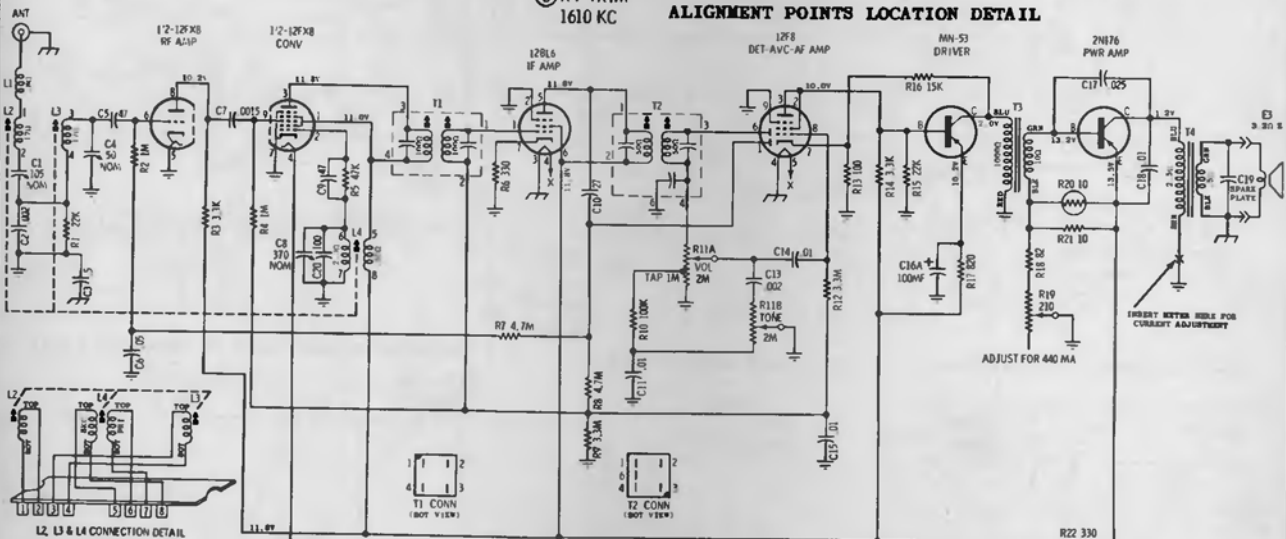


REAR VIEW



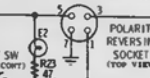
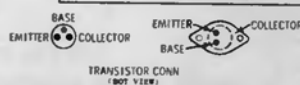
FRONT VIEW WITH BEZEL AND DIAL BACKGROUND REMOVED

ALIGNMENT POINTS LOCATION DETAIL



NOTES:
CAPACITORS - Decimal values in μ F; all others in M μ 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

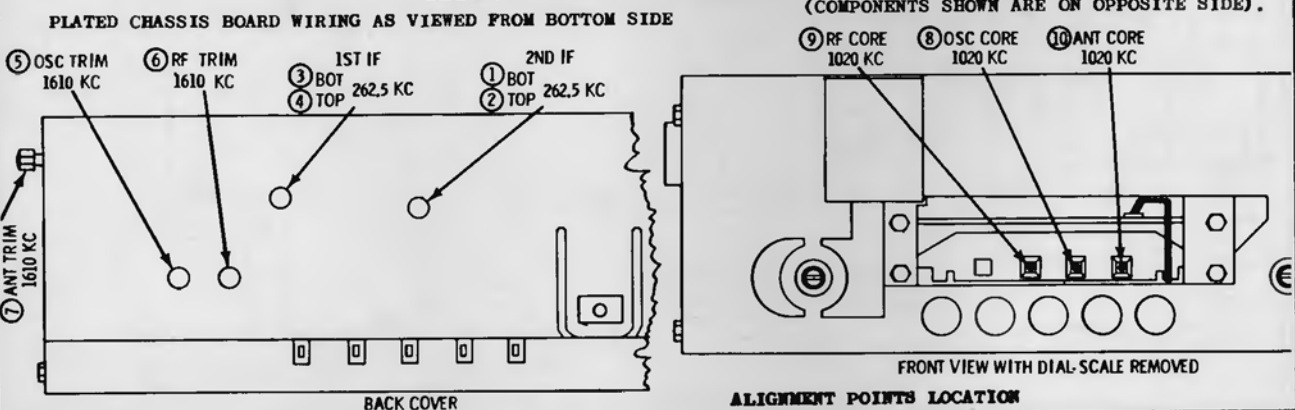
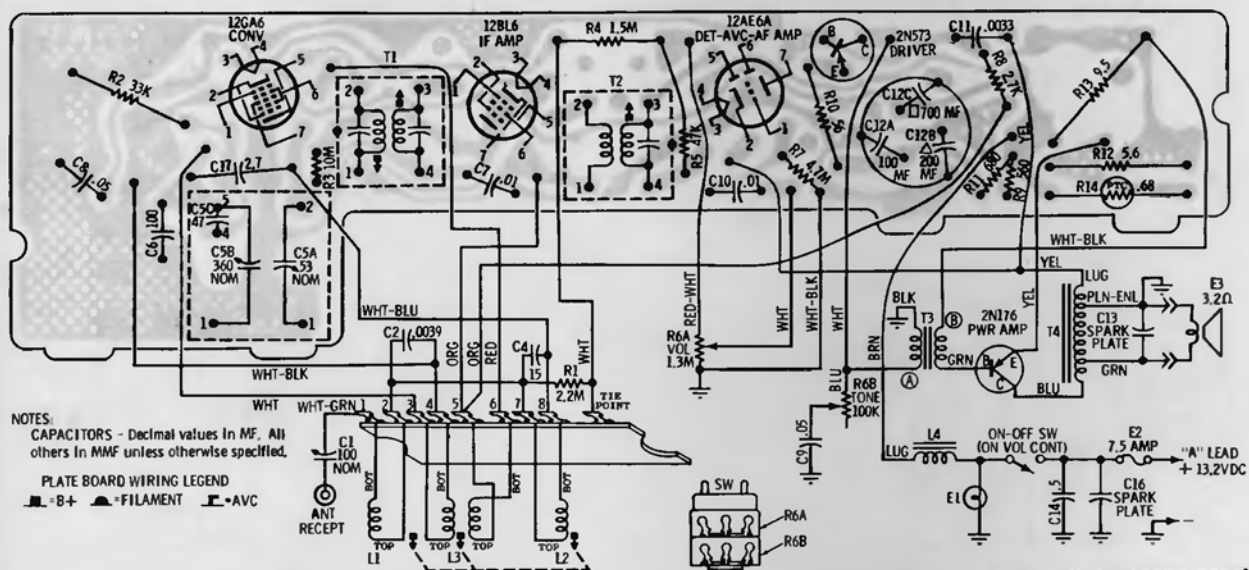
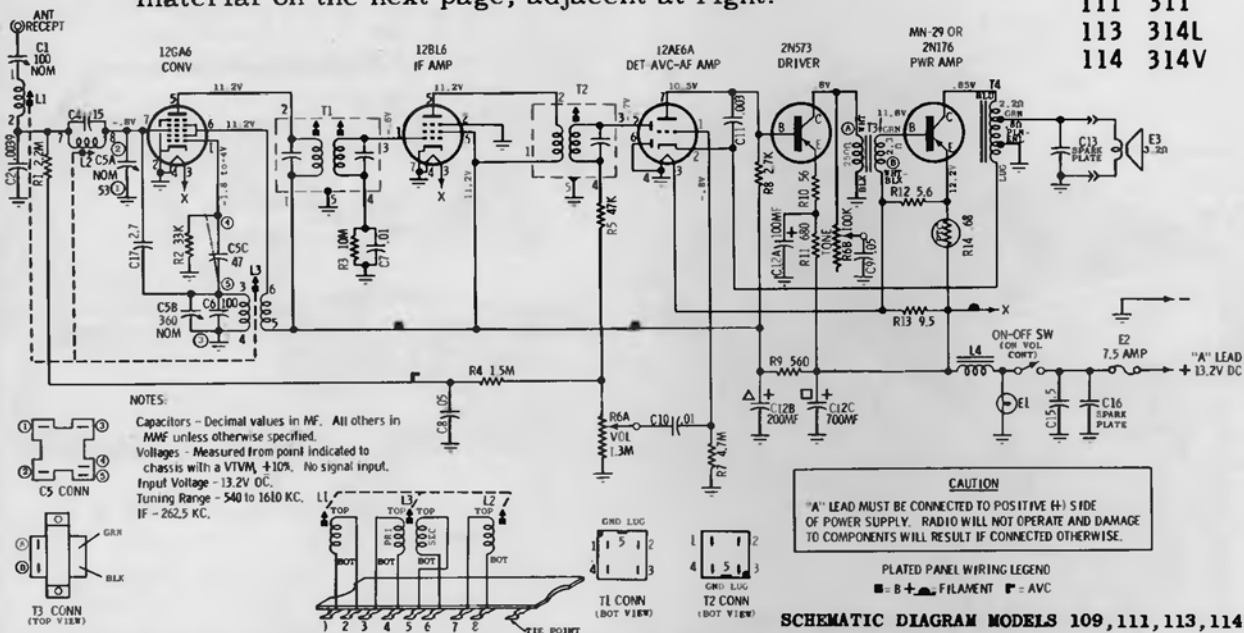
MoPar

109 309

111 311

113 314L

114 314V

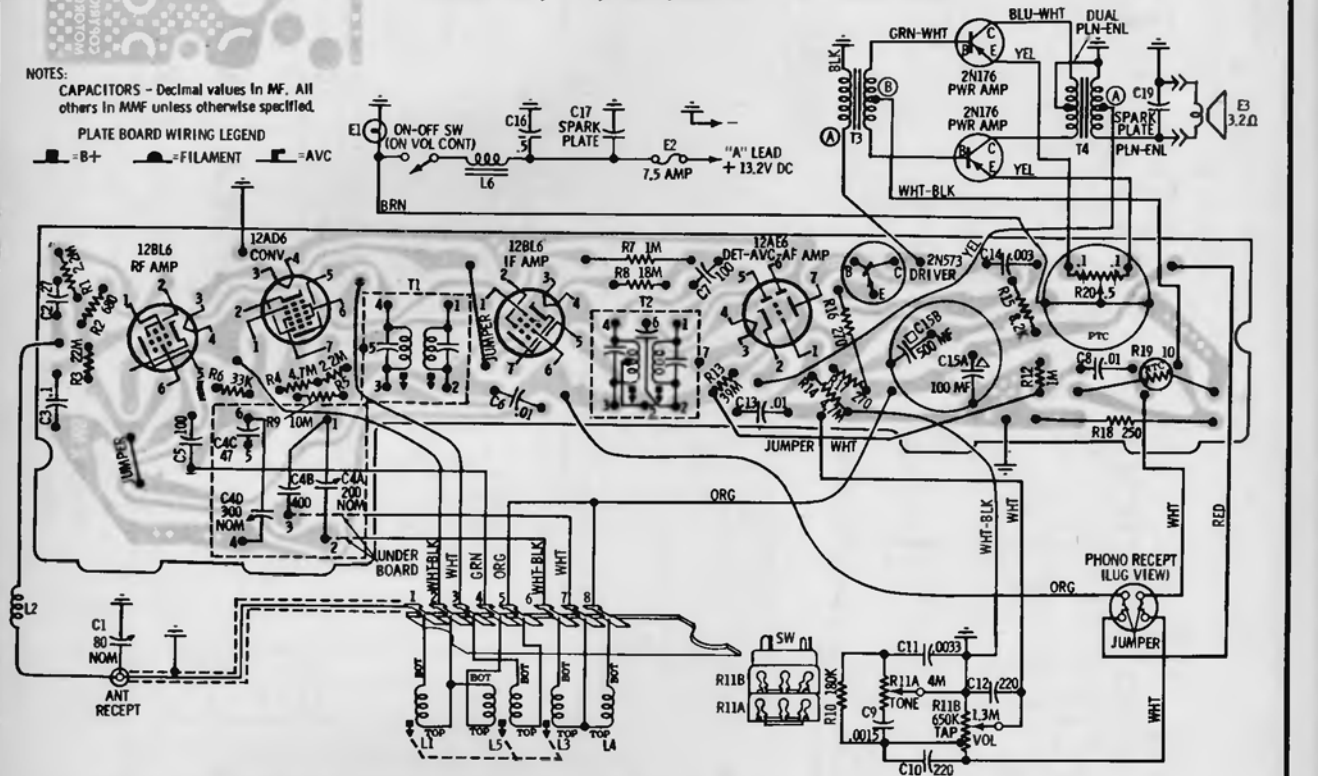


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

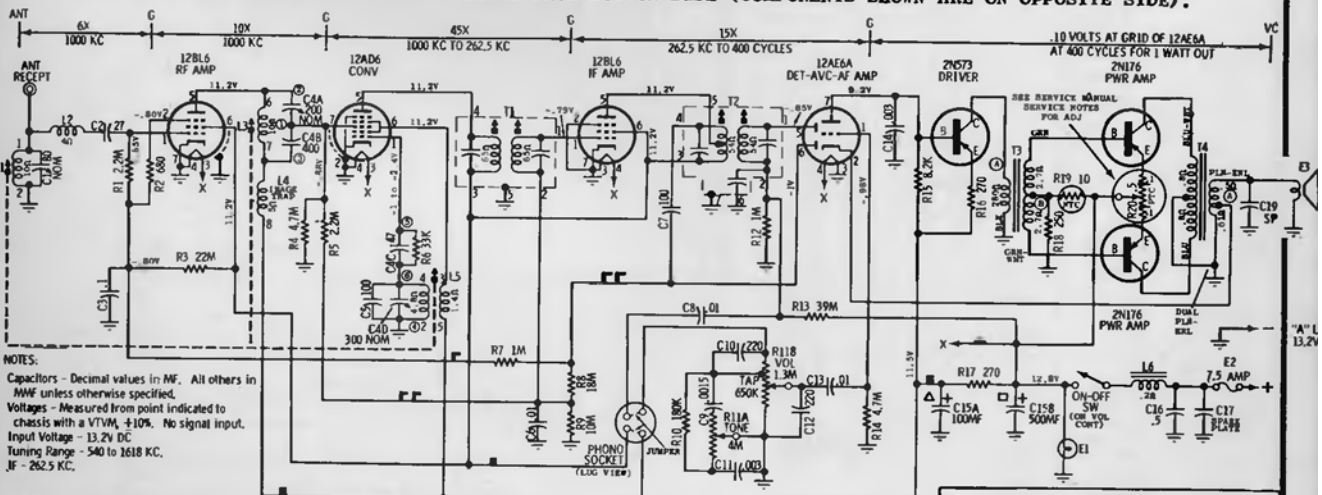
MOTOROLA Models 109, 111, 113, 114, 309, 311, 314L, 314V, Continued

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

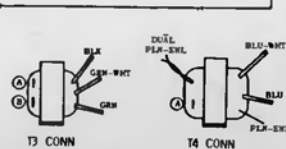
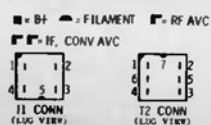


PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM SIDE (COMPONENTS SHOWN ARE ON OPPOSITE SIDE).



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.

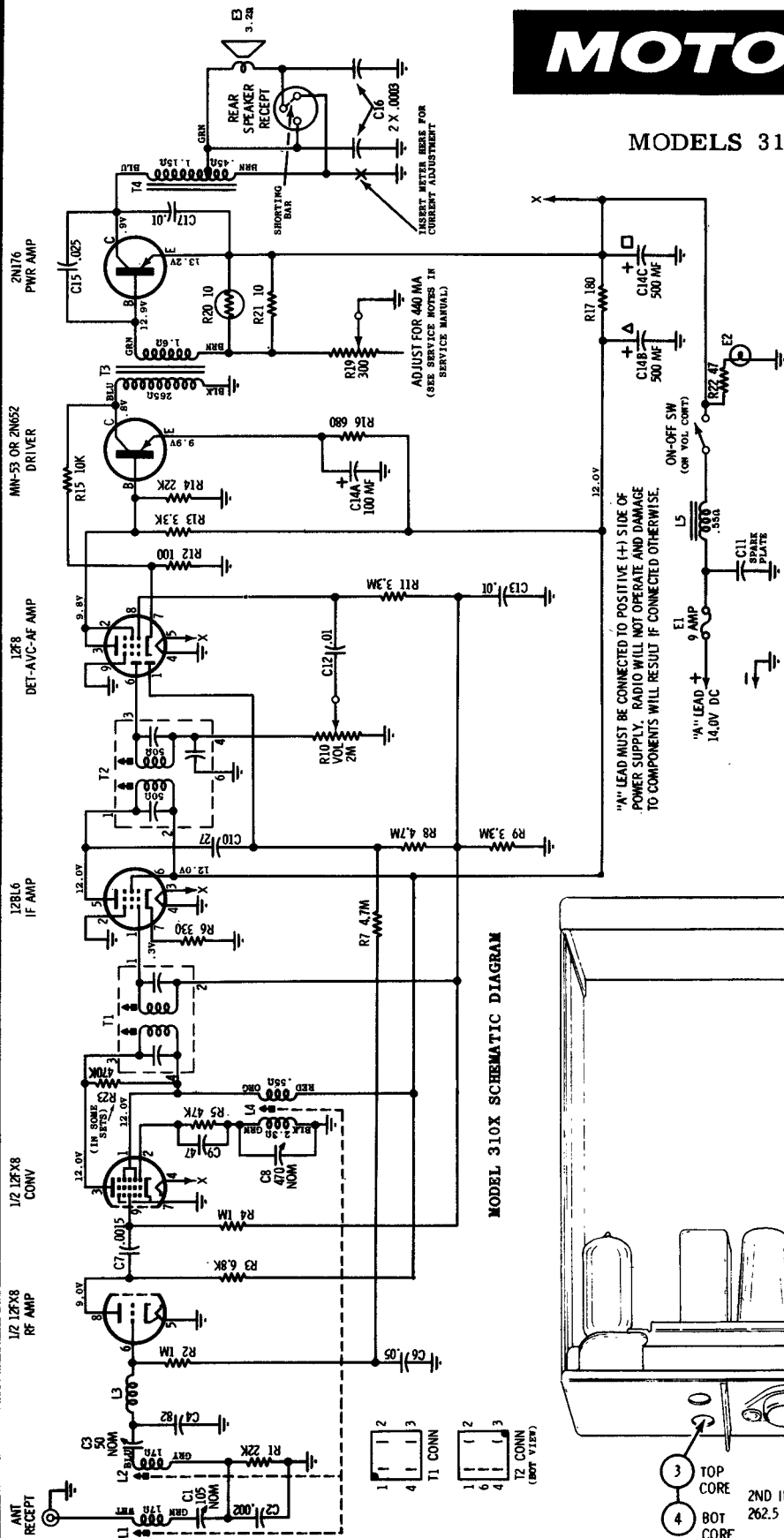
PLATED PANEL WIRING LEGEND



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.
EMITTER COLLECTOR BASE
2N176 TRANSISTOR CONNECTIONS (LOG VIEW)

MOTOROLA

MODELS 310X and 311X



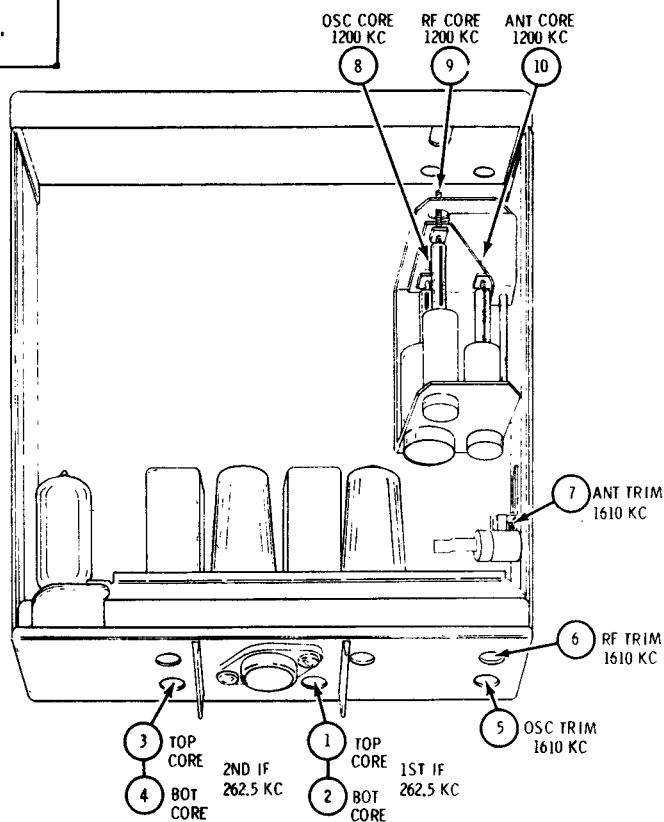
MODEL 310X SCHEMATIC DIAGRAM

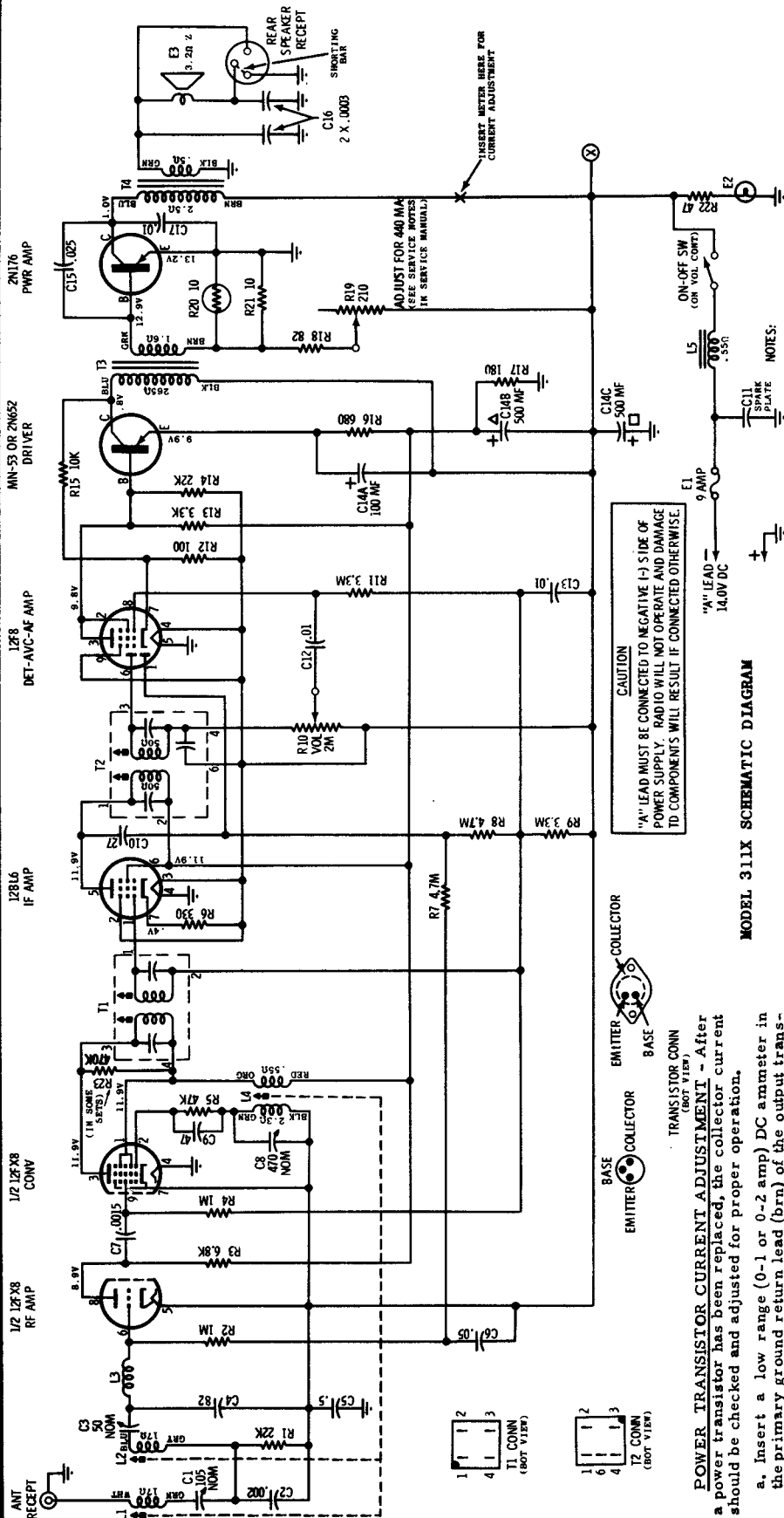
POWER TRANSISTOR INSULATOR - When replacing a power transistor or power transistor insulator, be sure to coat both sides of insulator with DC-4 grease (Motorola Part No. 11M490487) to insure proper heat dissipation.

MOTOROLA INC.

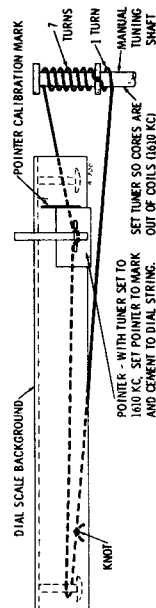
MODELS 310X and 311X

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





MODEL 311X SCHEMATIC DIAGRAM



DIAL CORD STRINGING DETAIL

MODELS

310X & 311X

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.

Circuit diagram of 311X is above,
and 310X is on preceding page.

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 ammeter; 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 INC.

MODEL FM-900



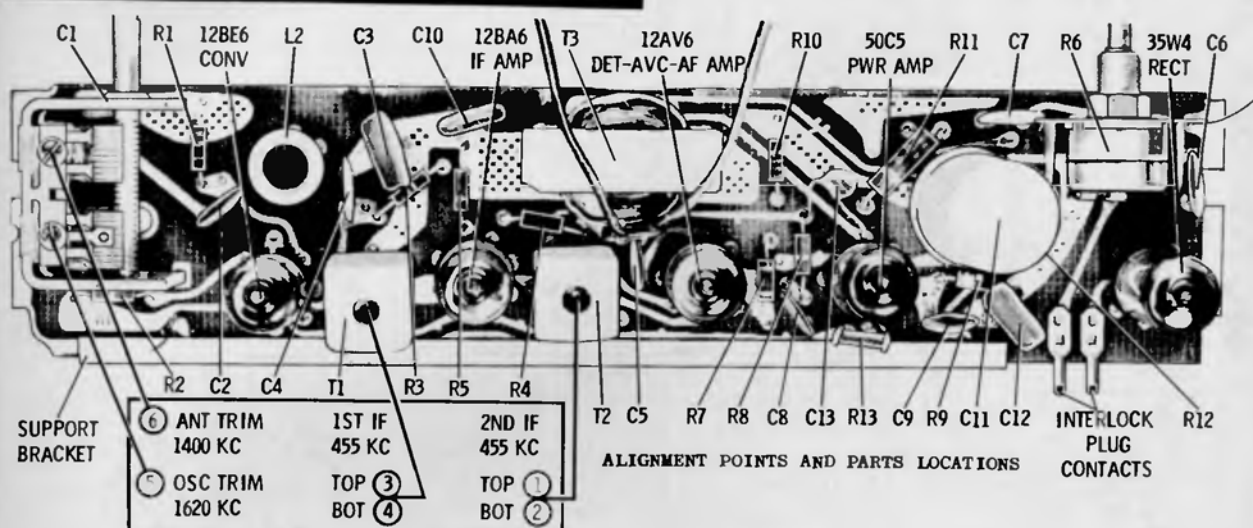
MOTOROLA

MODELS

A3B, N

CHASSIS

HS-746

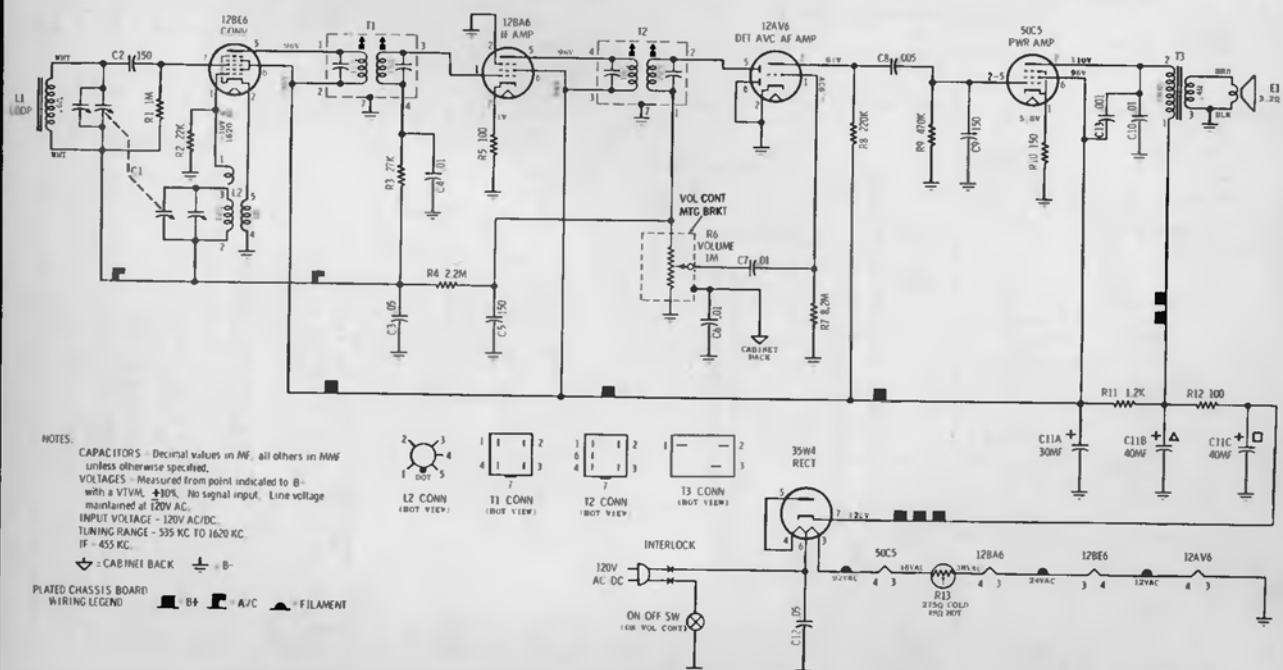


ALIGNMENT

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.

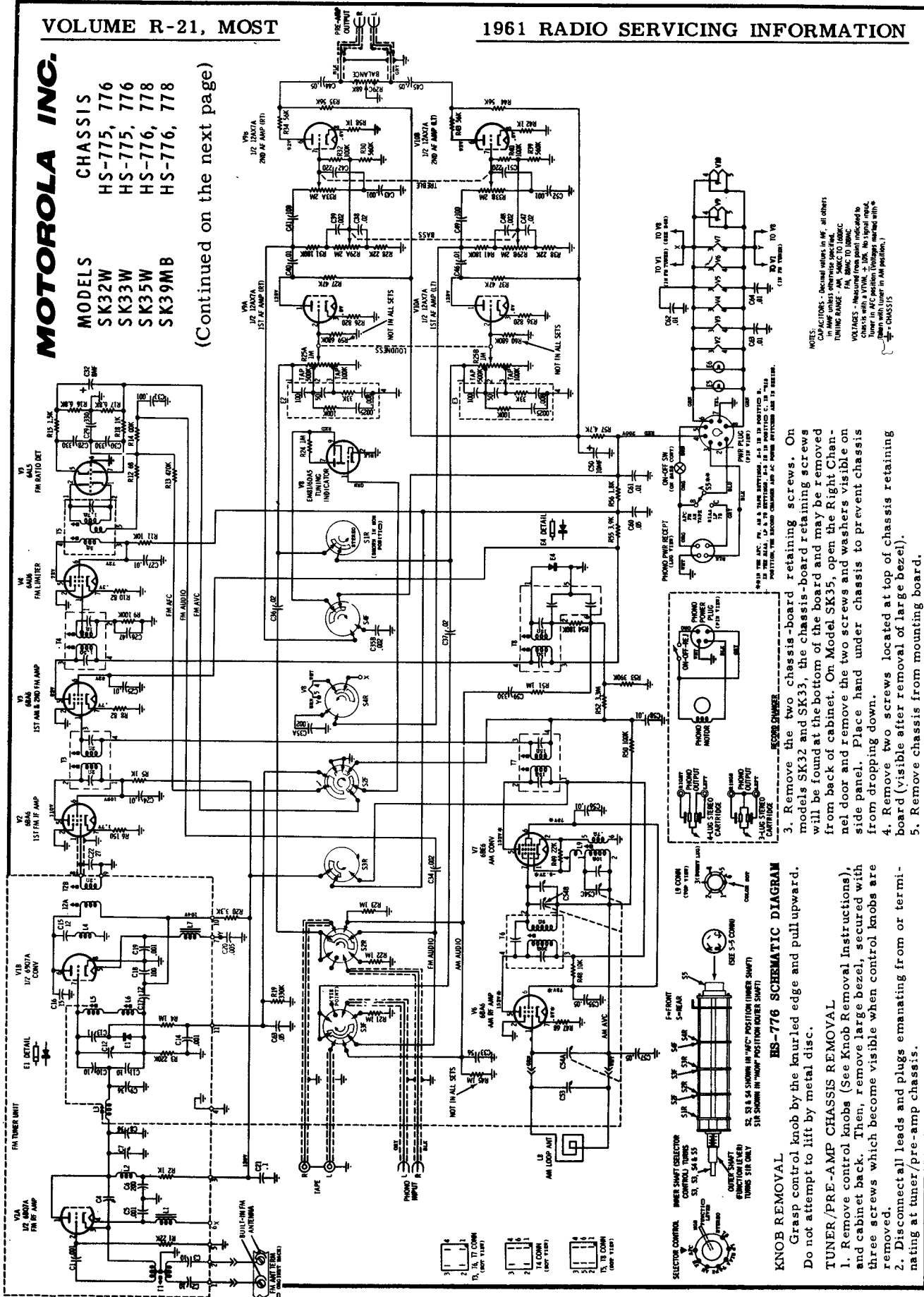
STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY (400 cycle mod)	GANG SETTING	ADJUST	REMARKS
1.	IF ALIGNMENT 12BE6 grid (pin 7) thru .1 mf & B-	455 Kc	Fully open	1, 2, 3 & 4	Adjust for maximum.
2.	RF ALIGNMENT Radiation loop*	1620 Kc	Fully open	5	Adjust for maximum.
3.	"	1400 Kc	Tune for max	6	"

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



CHASSIS
HS-775, 776
HS-775, 776
HS-776, 778
HS-776, 778

(Continued on the next page)



NOTES:
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
TUNING RANGE - AM, 540KC TO 1600KC FM, 88MHZ TO 108MHZ
VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$. No signal input. Tuner in AFC position (Voltages marked with * taken with tuner in AM position.)
 $\frac{1}{2}$ W = CHASSIS

HS-776 SCHEMATIC DIAGRAM

KNOB REMOVAL

Grasp control knob by the knurled edge and pull upward.
Do not attempt to lift by metal disc.

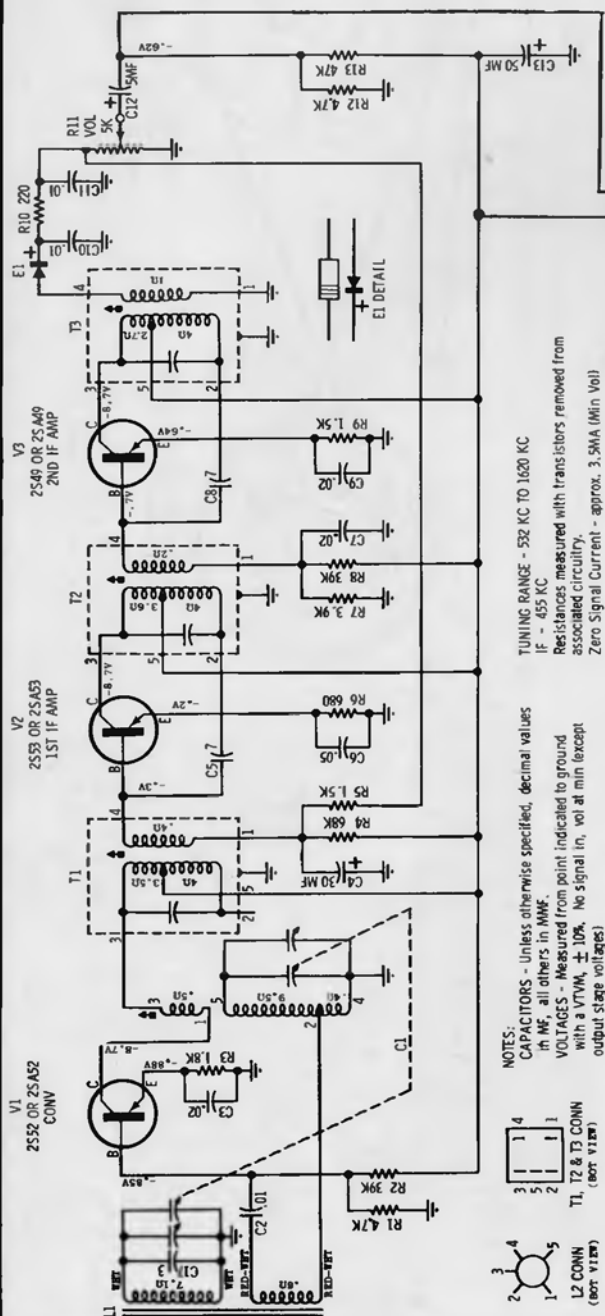
TUNER/PRE-AMP CHASSIS REMOVAL

1. Remove control knobs (See Knob Removal Instructions), and remove the control knob bezel, the control knob bezel and cabinet back. Then, remove large bezel, secured with three screws which become visible when control knobs are removed.

MOTOROLA

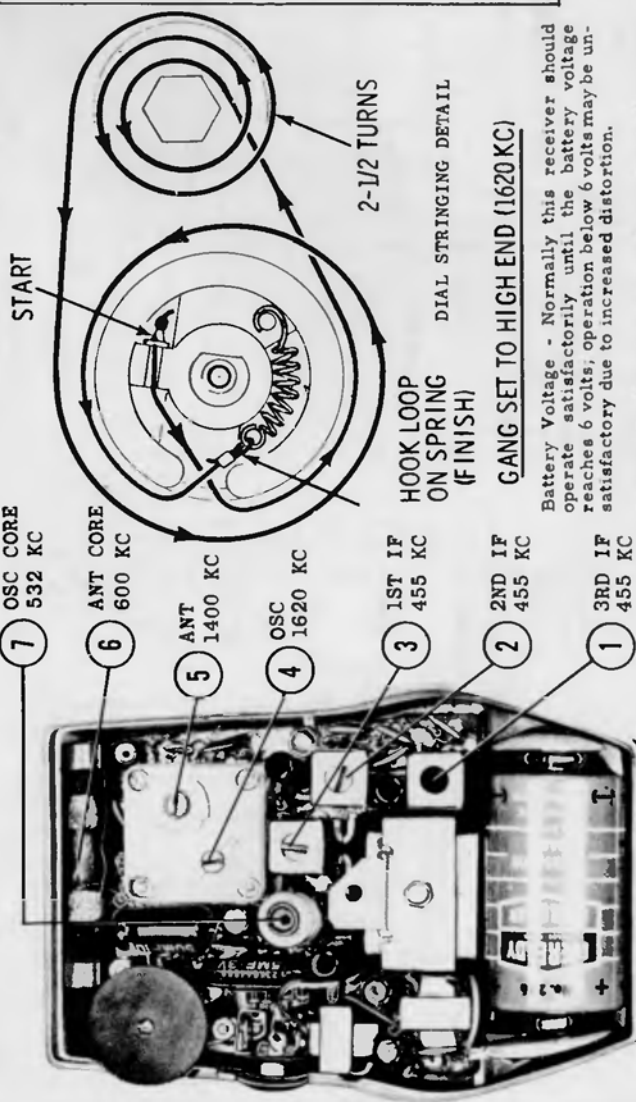
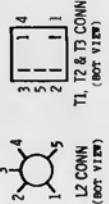
PORTABLE RADIO

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)

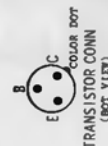
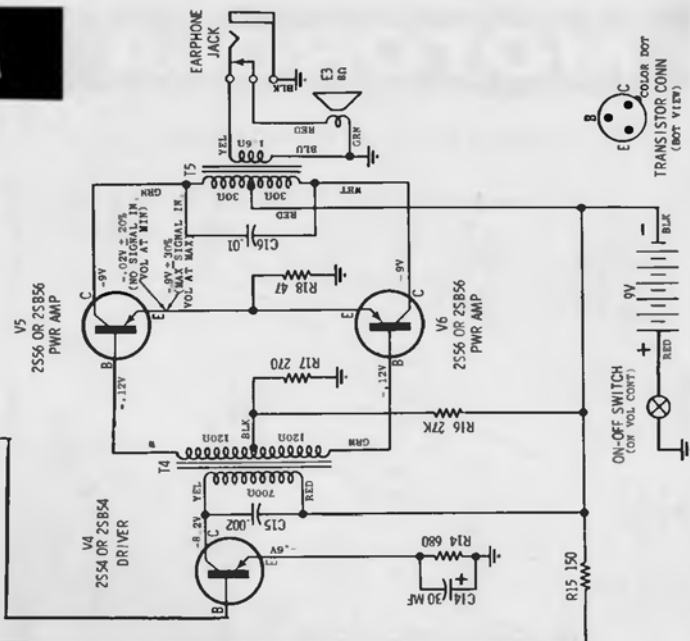
NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MME.
VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in, vol at min except output stage voltages.



ALIGNMENT POINT LOCATIONS

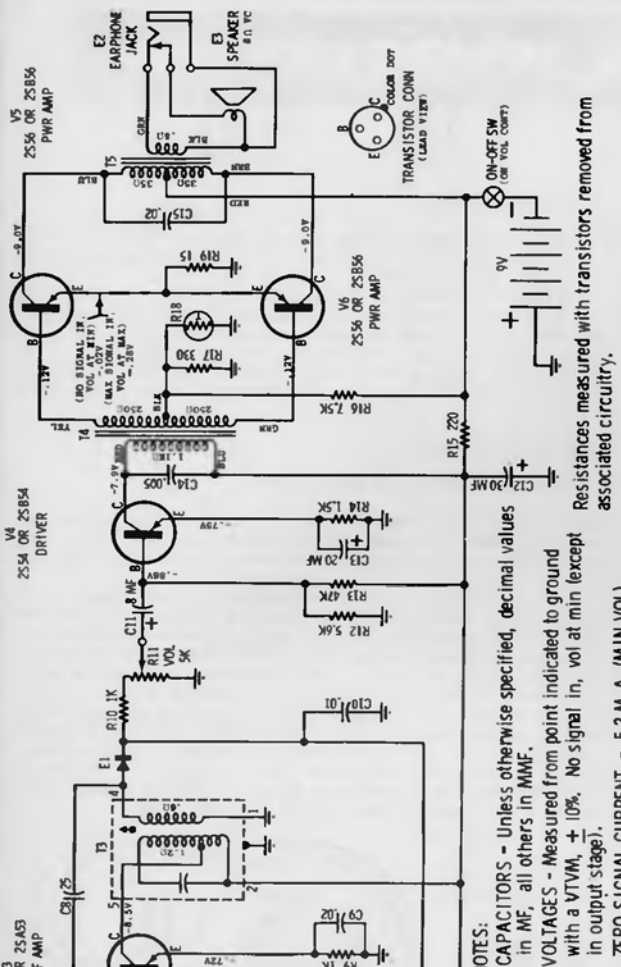
Battery Voltage - Normally this receiver should operate satisfactorily until the battery voltage reaches 6 volts; operation below 6 volts may be unsatisfactory due to increased distortion.

Battery Drain - 3 to 5 ma with no input signal and volume at minimum level.



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



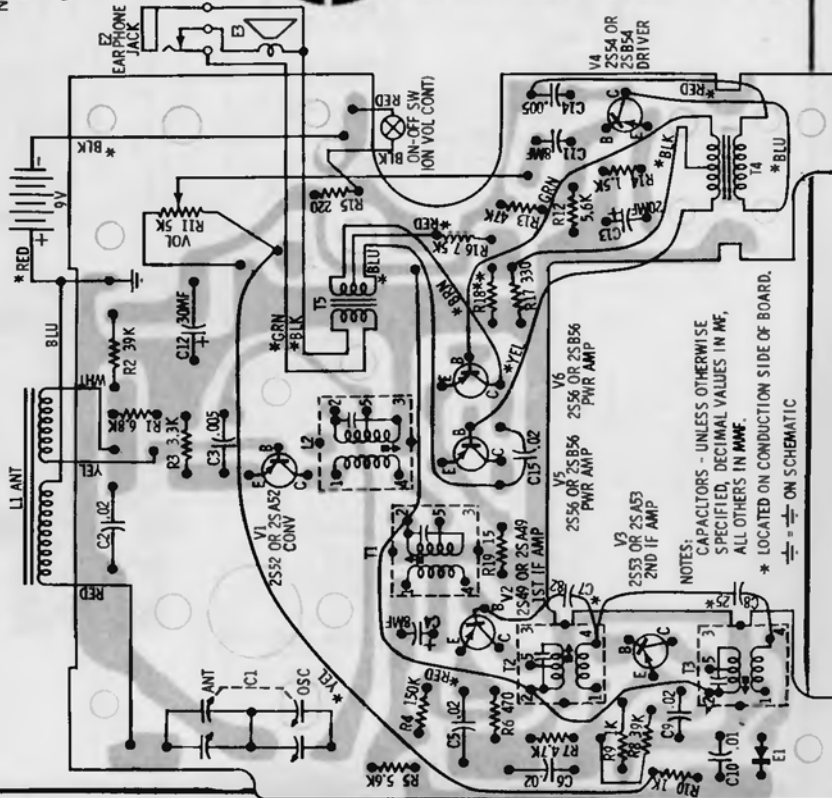
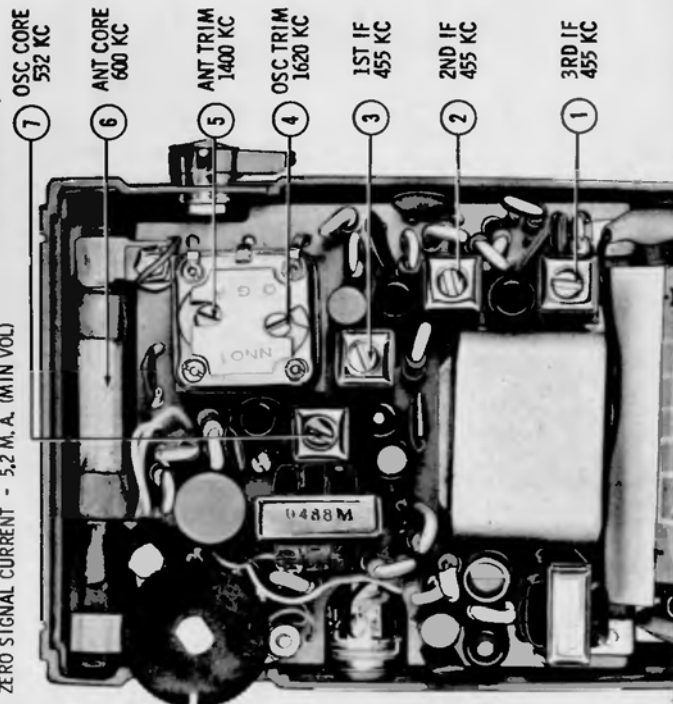
NOTES:

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)

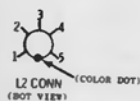
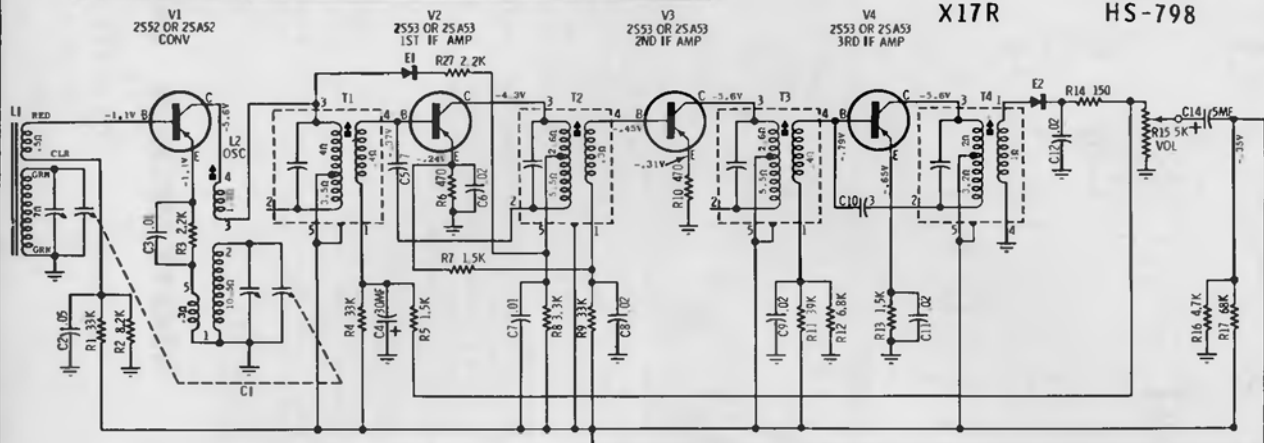
Resistances measured with transistors removed from associated circuitry.



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF, ALL OTHERS IN MMF.
* LOCATED ON CONDUCTION SIDE OF BOARD.
= = = ON SCHEMATIC

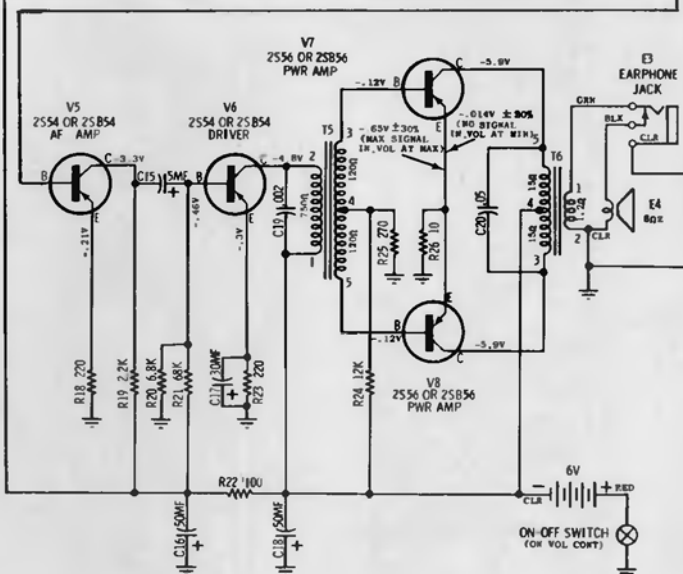
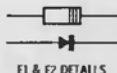
MOTOROLA

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

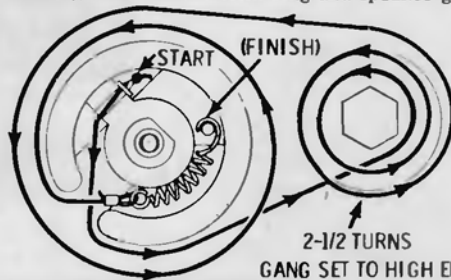


CHASSIS REMOVAL

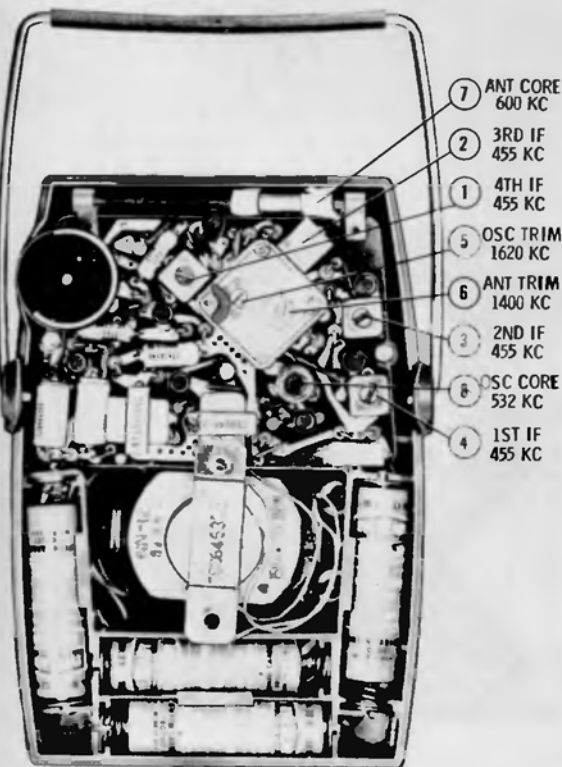
1. Loosen captivated cabinet back mounting screw and pull off cabinet back.
2. Remove 2 chassis mounting screws.
3. Slide chassis to the right and lift out of cabinet.

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.

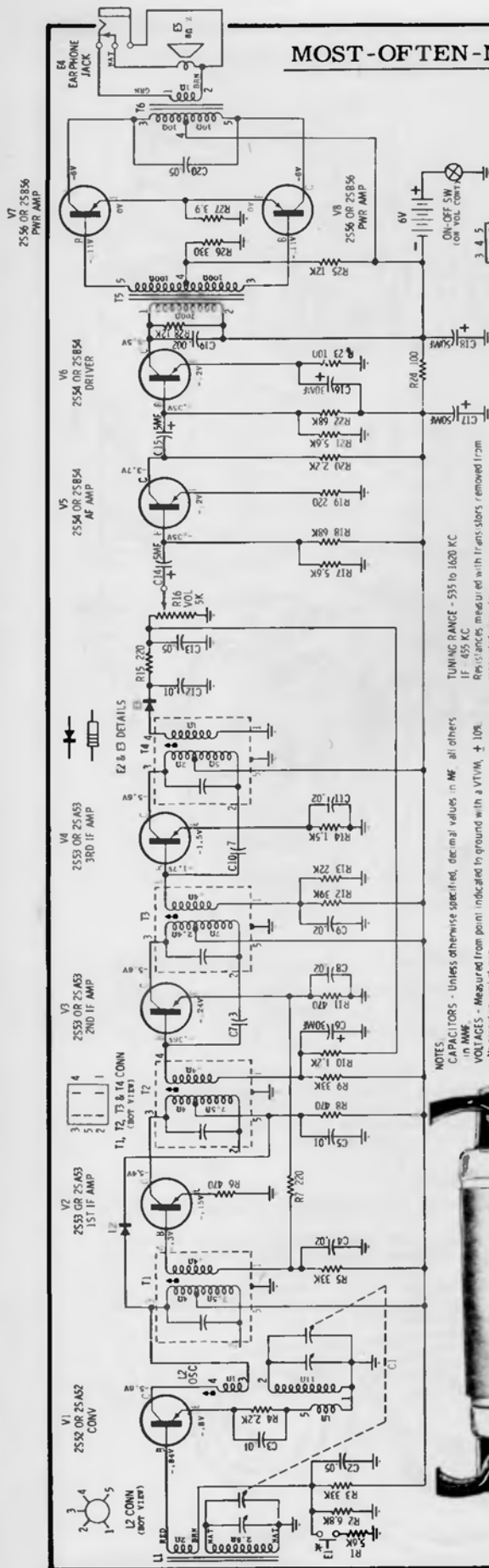


GANG SET TO HIGH END (1620 KC)



ALIGNMENT POINT LOCATIONS

MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



TUNING RANGE - 535 to 1620 KC
 IF 455 KC
 Resistances measured with Transistors removed from associated circuitry.
 = 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, vol at min.
 ZERO SIGNAL CURRENT - APPROX 9 MA. 100V 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.
 ZERO SIGNAL CURRENT - APPROX 9 MA. 100V 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.
 ZERO SIGNAL CURRENT - APPROX 9 MA. 100V 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.
 ZERO SIGNAL CURRENT - APPROX 9 MA. 100V VOL.

CHASSIS REMOVAL

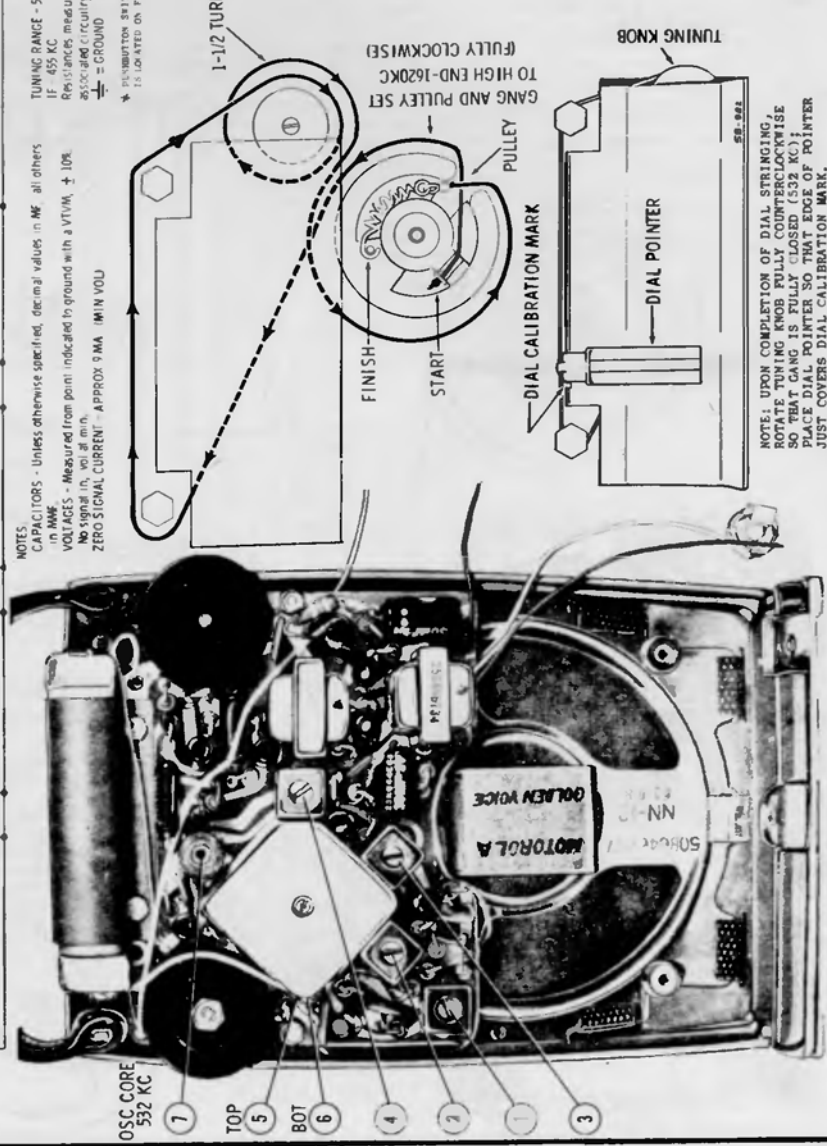
1. Lift off battery compartment cover and remove batteries.
2. Remove 2 cabinet back mounting screws located under batteries and remove cabinet back far enough to gain access to earphone jack; unscrew earphone jack mounting nut.
- NOTE: A special tool for removing the earphone jack is available. Order Motorola Part Number 66A46211.
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).

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MODEL CHASSIS
 X19A HS-799
 X19E HS-799

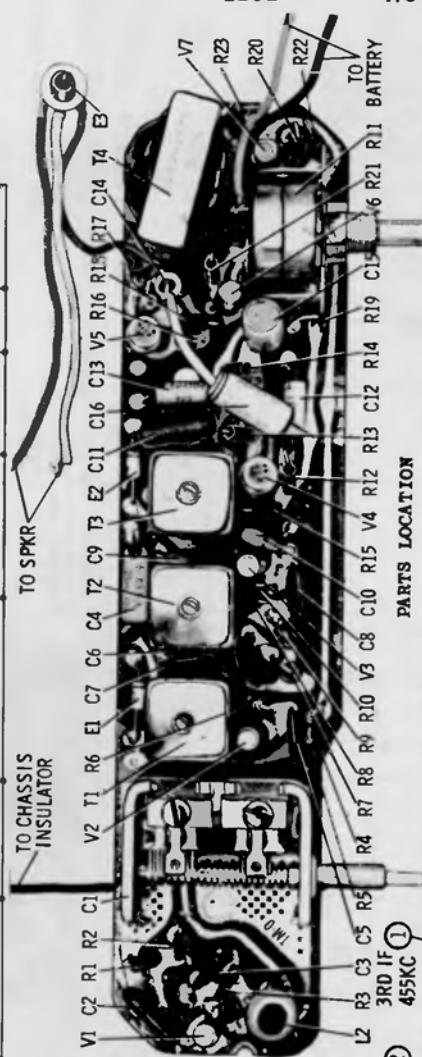
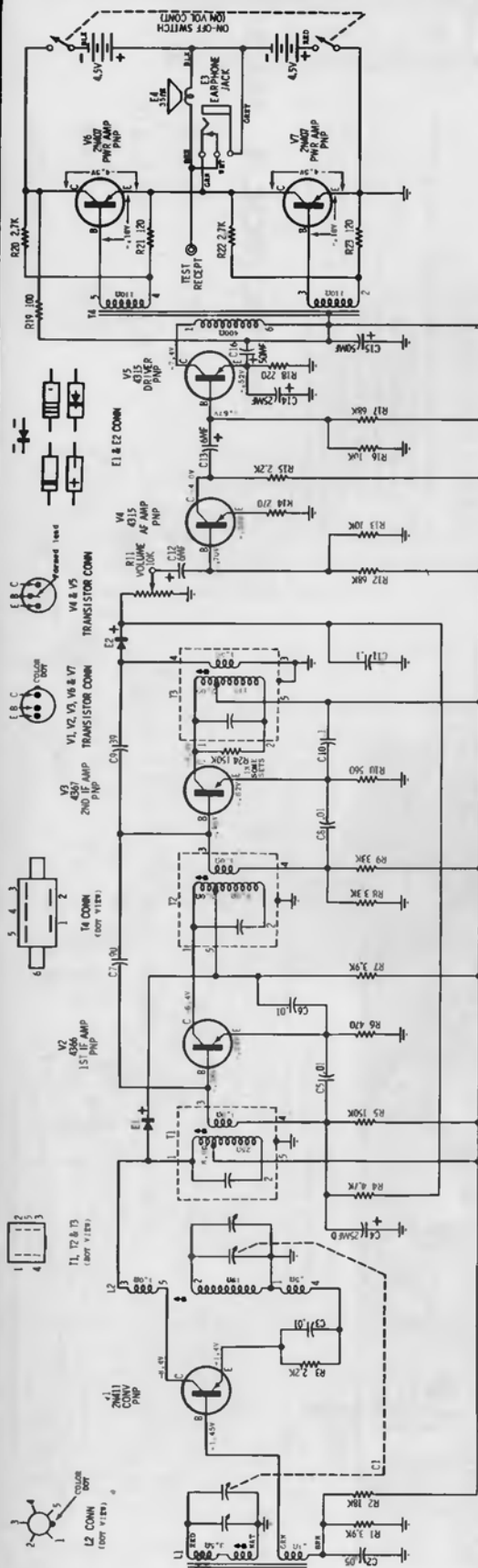


- OSC TRIM 1620 KC
- ANT TRIM 1400 KC
- 1ST IF 455 KC
- 3RD IF 455 KC
- 4TH IF 455 KC
- 2ND IF 455 KC

MOTOROLA

MODEL
L20E

CHASSIS
HS-800



PARTS LOCATION

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 and volume control mounting panel.
6. Unscrew earphone jack mounting nut.
7. Unsolder chassis leads.
8. Remove chassis from cabinet.



ALIGNMENT POINT LOCATIONS

NOTE: CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MME. VOLTAGES - Measured from point indicated to ground or across points indicated with $\pm$ VTM. $\pm$ 10%. No signal in. TUNING RANGE - 535 KC to 1620 KC. Resistances measured with transistors removed from associated circuitry.

ANT CORE 600 KC ⑥

1ST IF 455KC ③

2ND IF 455KC ②

3RD IF 455KC ①

OSC CORE 532KC ⑦

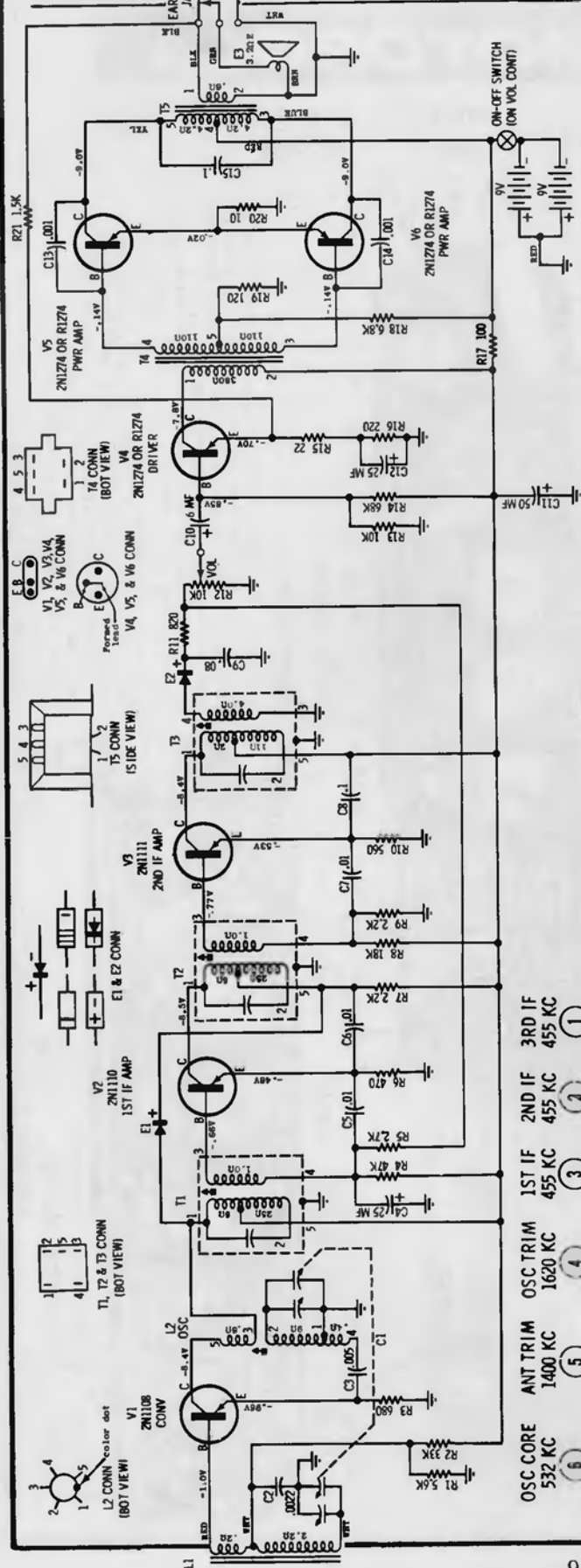
ANT TRIM 1400KC ⑤

OSC TRIM 1620KC ④

HANDLE

ZERO SIGNAL CURRENT - APPROX. 12-14 MA (MIN VOL)

VOLUME MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



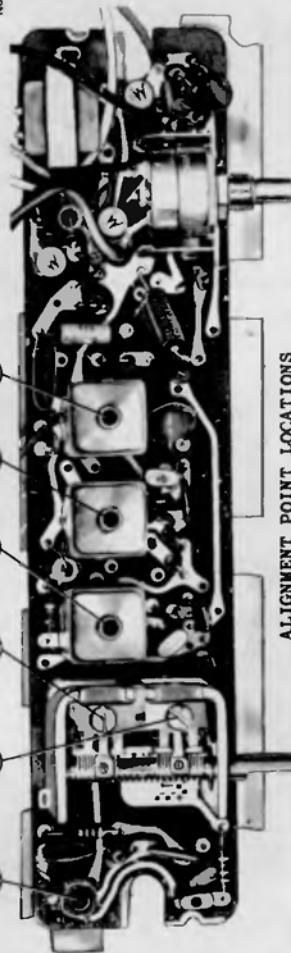
NOTES: CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF. VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in. TUNING RANGE - 535 KC to 1620 KC. IF - 455 KC.

Resistances measured with transistors removed from associated circuitry. $\square$ = Ground. ZERO SIGNAL CURRENT - APPROX 12MA. A. 0MIN VOL.

CABINET BACK REMOVAL

1. Loosen captive 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.

OSC CORE 532 KC
ANT TRIM 1400 KC
OSC TRIM 1620 KC
1ST IF 455 KC
2ND IF 455 KC
3RD IF 455 KC



ALIGNMENT POINT LOCATIONS



VOLTAGE READINGS TAKEN FROM BOTTOM SIDE OF CHASSIS

NOTES: VOLTAGES MEASURED FROM POINT INDICATED TO GROUND WITH A VTVM, $\pm 10\%$.

MOTOROLA INC.

PORTABLE / TABLE RADIO

MODEL CHASSIS

XT18B HS-802
XT18S HS-802

CORDLESS 1500 SERIES

MOTOROLA

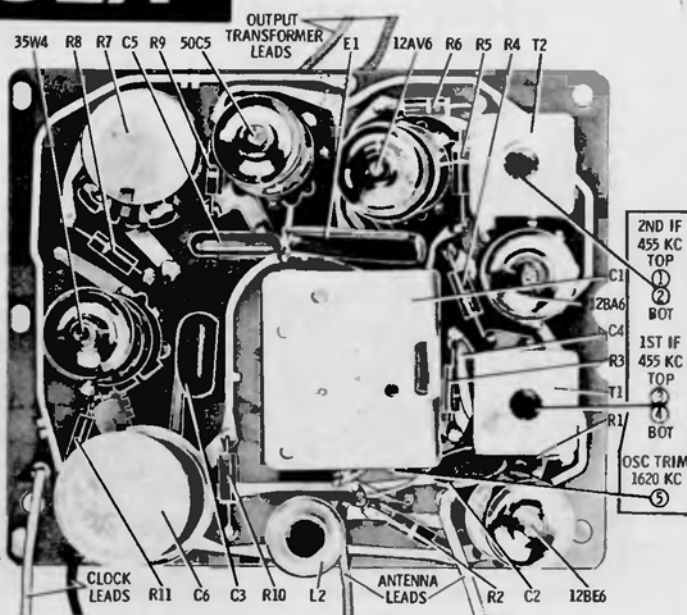
MODELS	CHASSIS
C10N	HS-813
C10P	HS-813
C10W	HS-813

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.

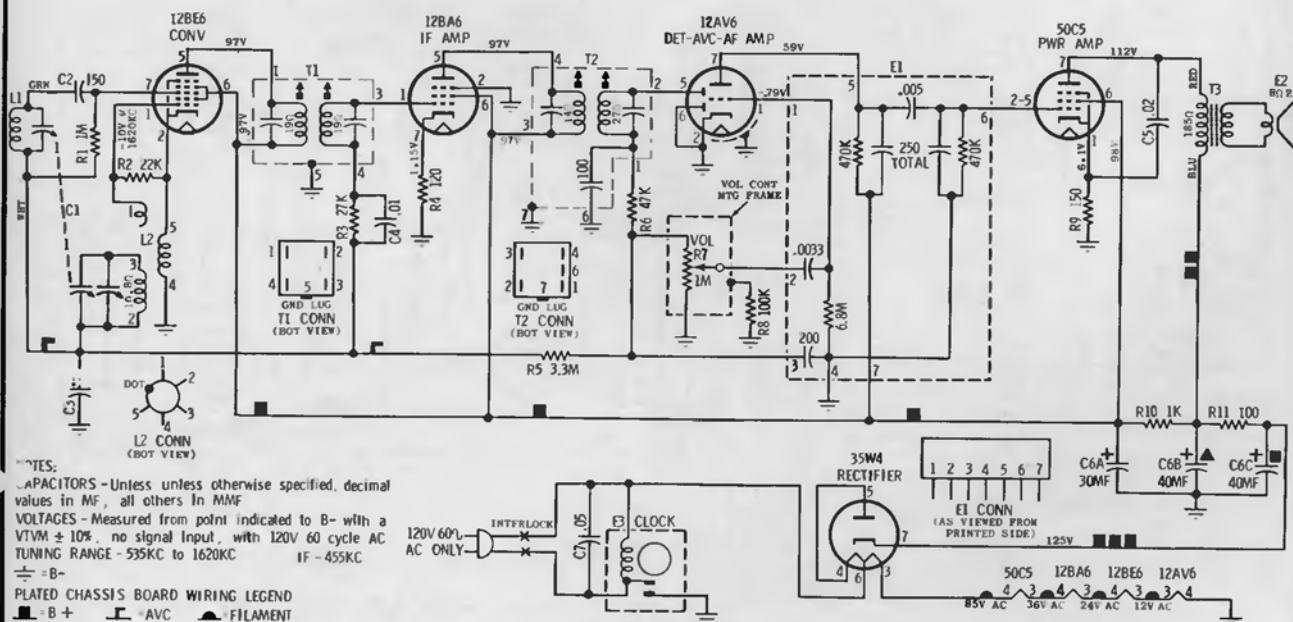


ALIGNMENT POINTS AND PARTS LOCATION

ALIGNMENT

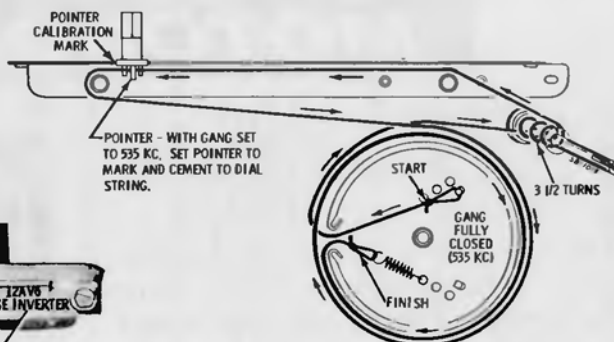
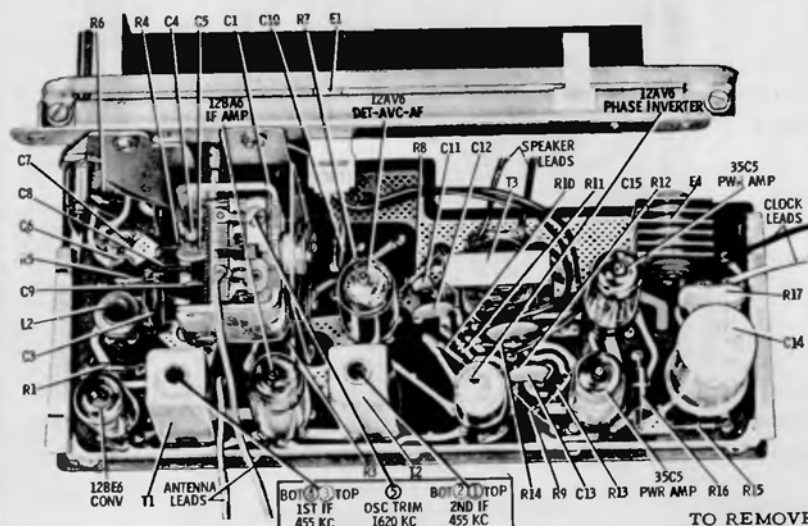
Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .64 volts on output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



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



DIAL STRINGING DETAIL

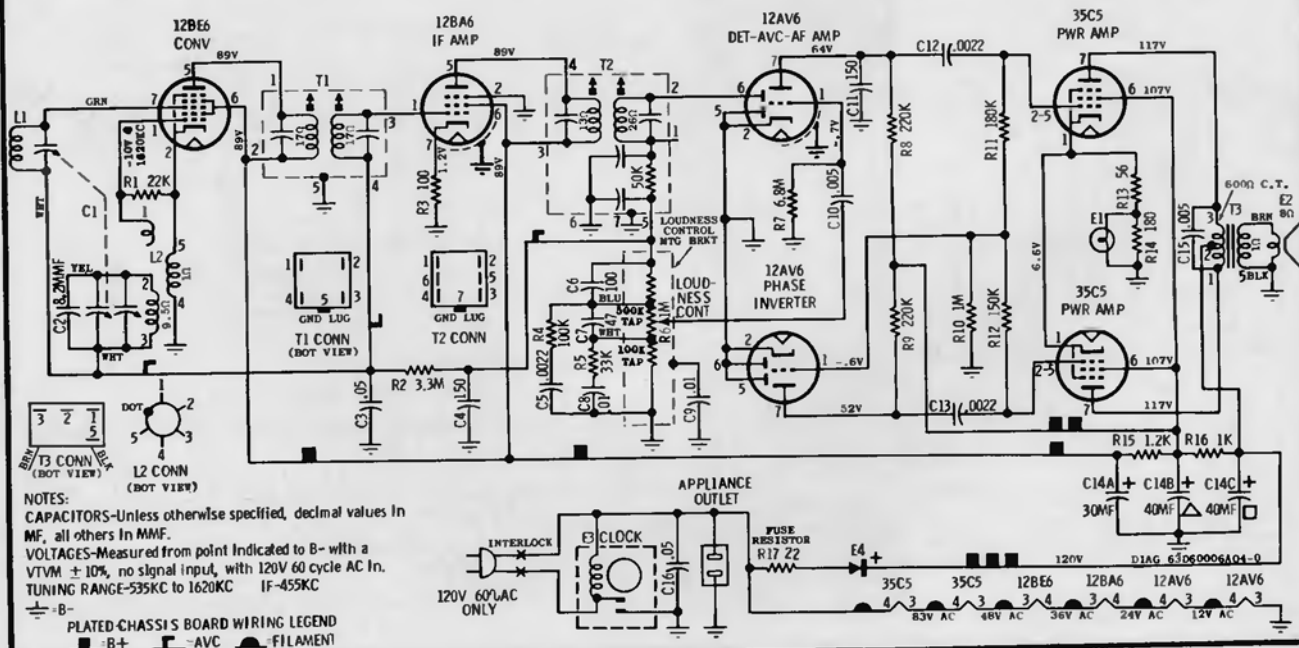
ALIGNMENT POINTS AND PARTS LOCATION

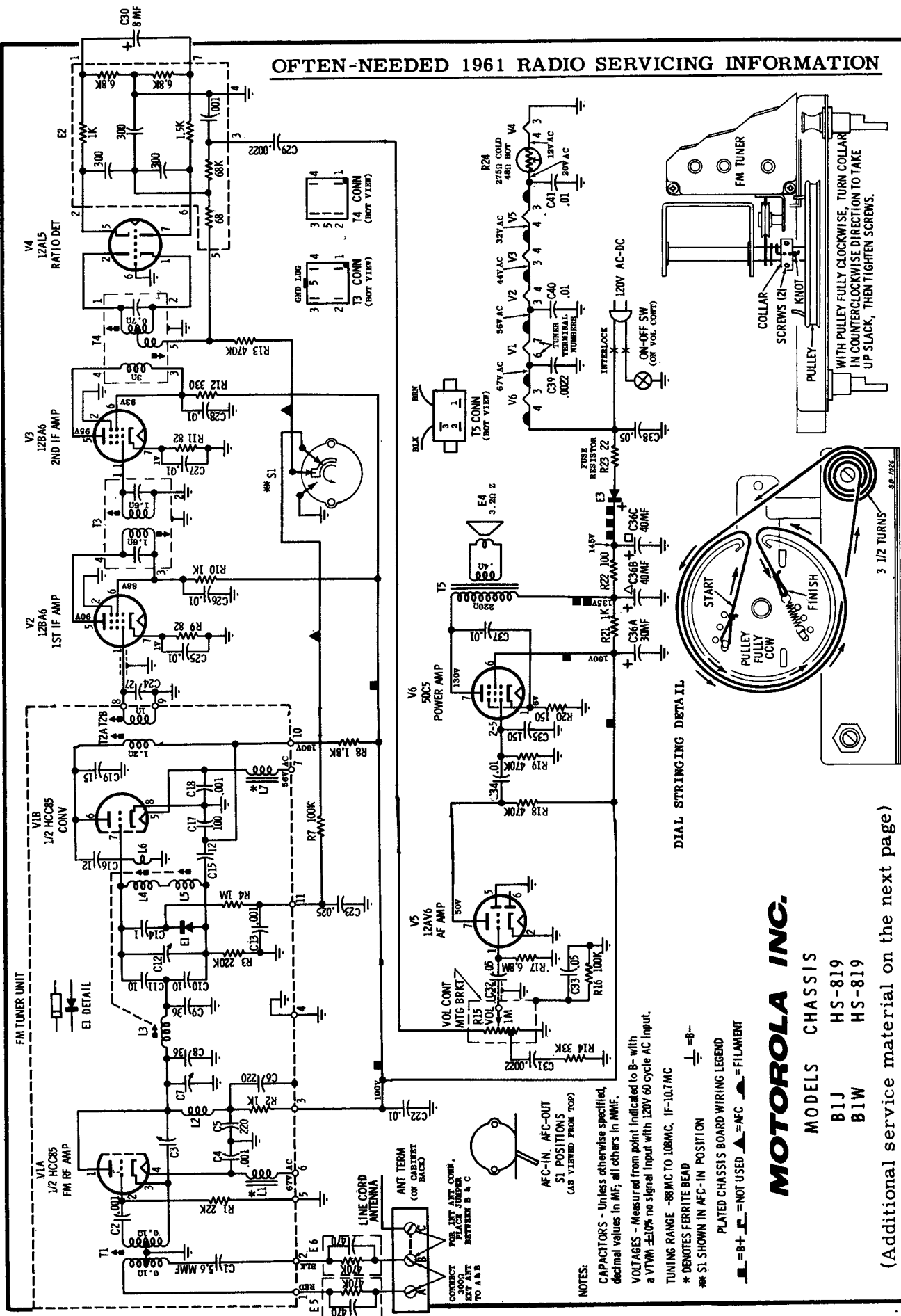
TO REMOVE CHASSIS FROM CABINET

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.

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.





MOTOROLA INC.

MODELS CHASSIS

- B1J HS-819
- B1W HS-819

(Additional service material on the next page)

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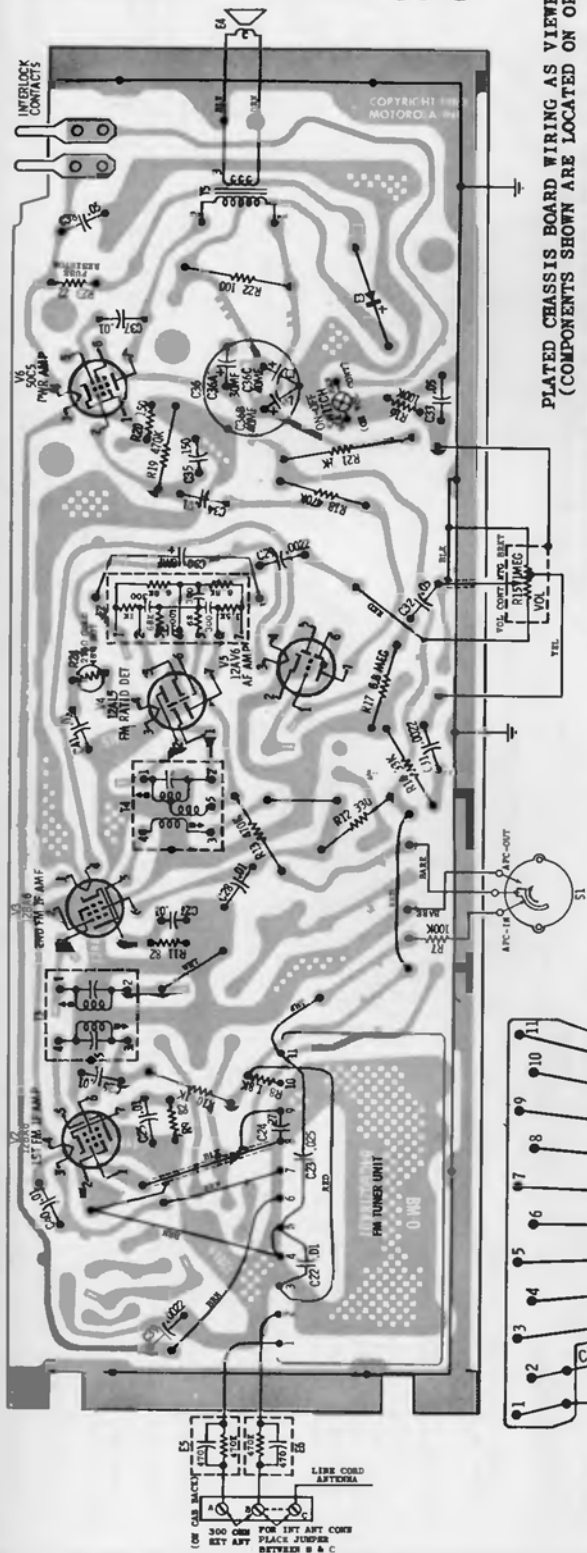
MODELS CHASSIS

B1J HS-819

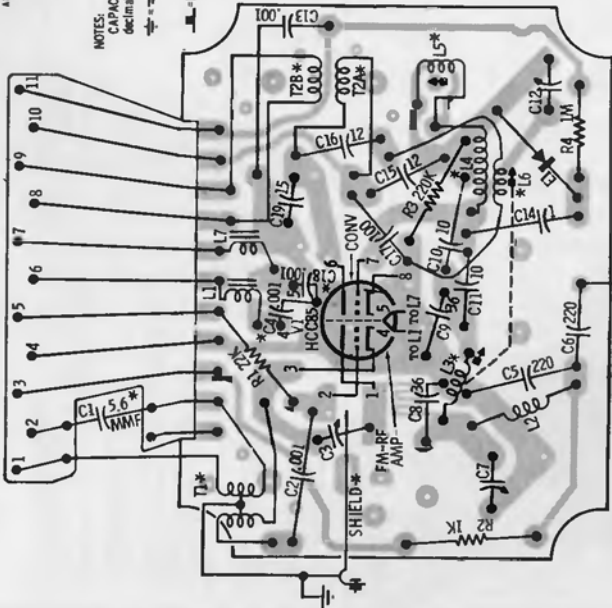
B1W HS-819

(Continued from preceding page)

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



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

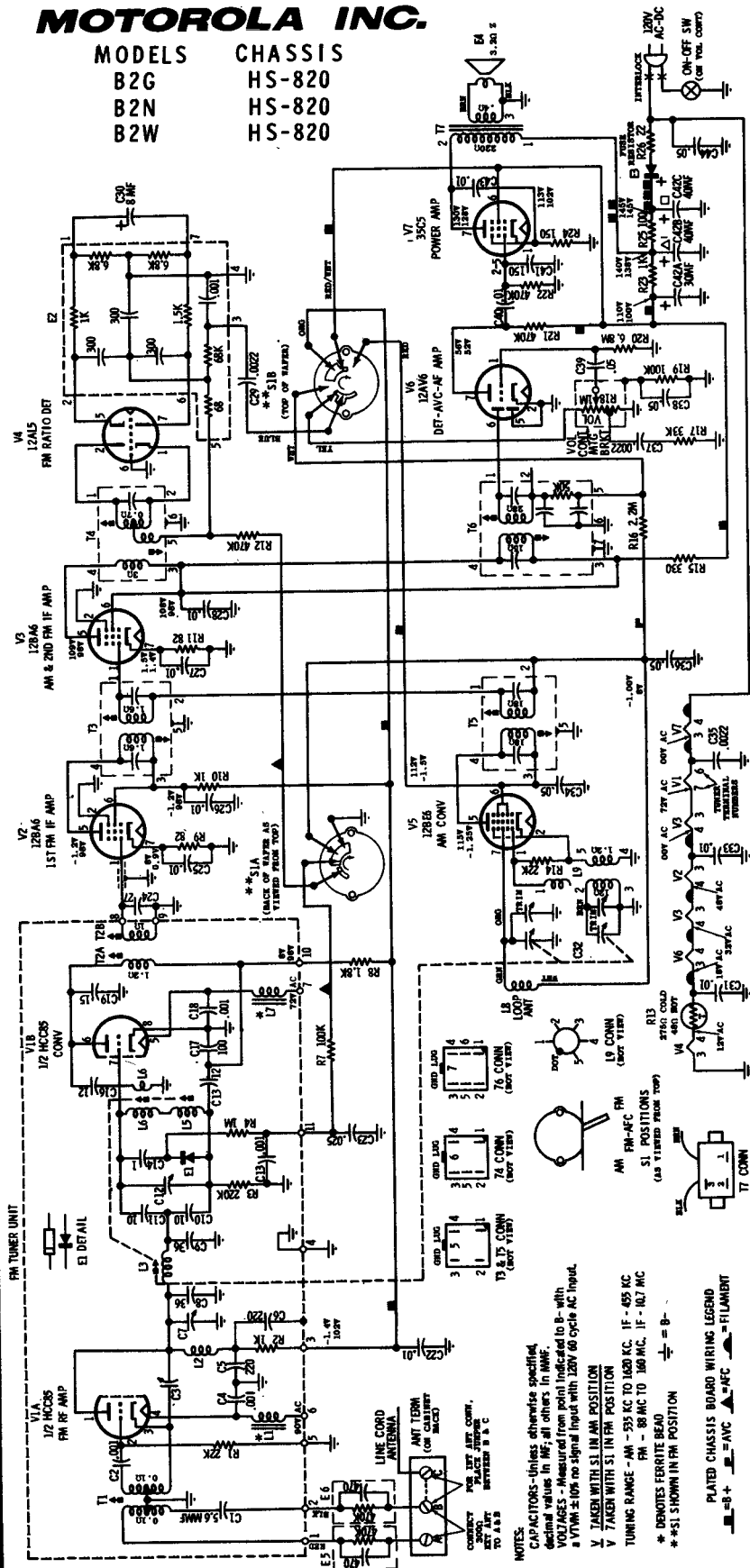


NOTES:
CAPACITORS - Unless otherwise
specified decimal values in MF,
all others in MMF.
ON SCHEMATIC
* LOCATED ON CONDUCTION SIDE OF BOARD
FM TUNER PLATED CHASSIS WIRING
(The view shown is from the conduction side of the board; the
components shown are actually located on the opposite side).

MOTOROLA INC.

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

(Continued on the next page)

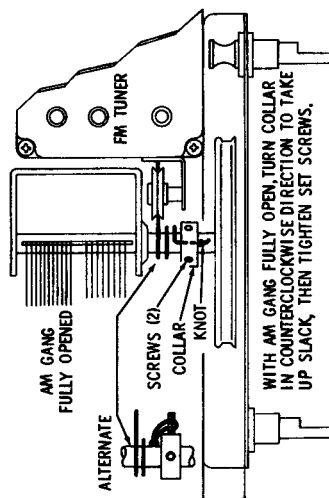


PLATED CHASSIS BOARD

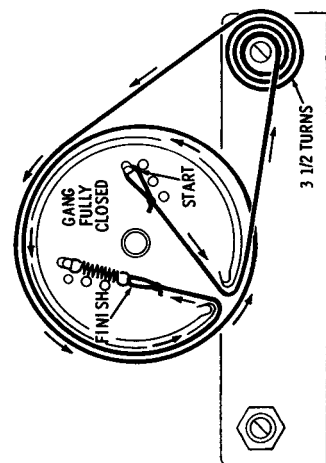
All plated circuit wiring is on bottom of board. The top side is for ground shielding only. No circuits are carried through holes and across the board underneath components. The plated chassis board wiring diagram is shown as viewed from bottom (wiring) side.

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.

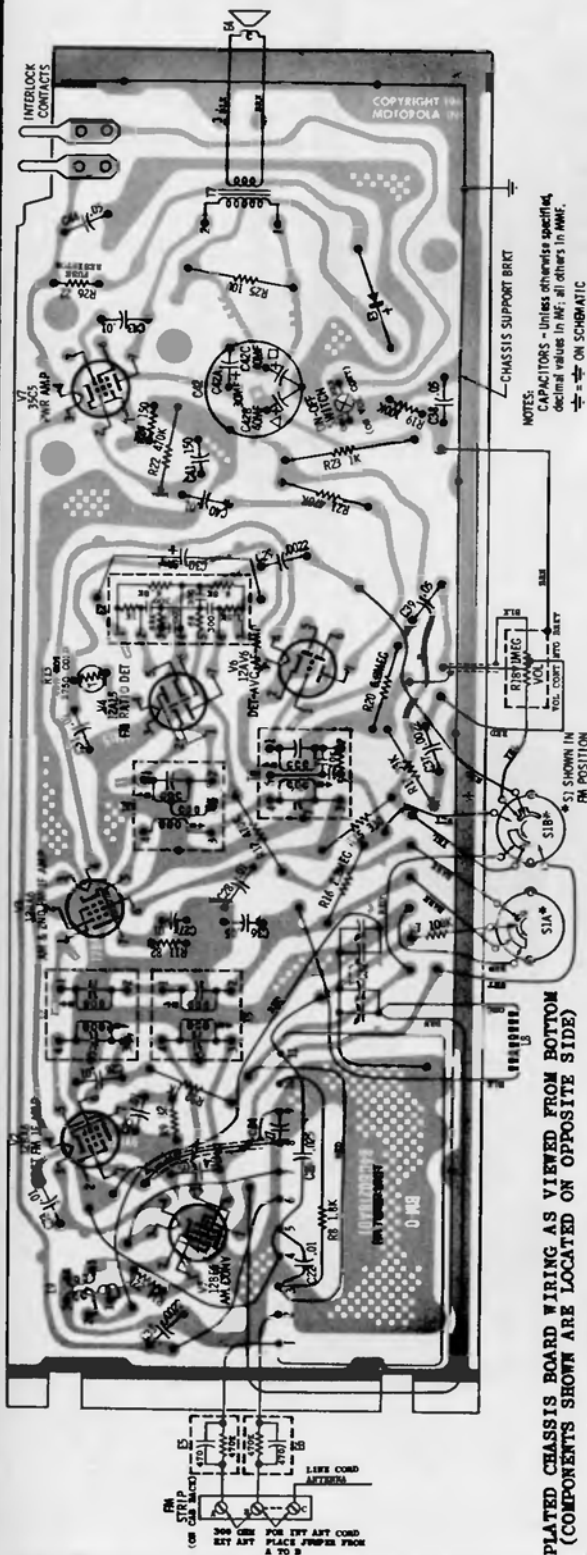


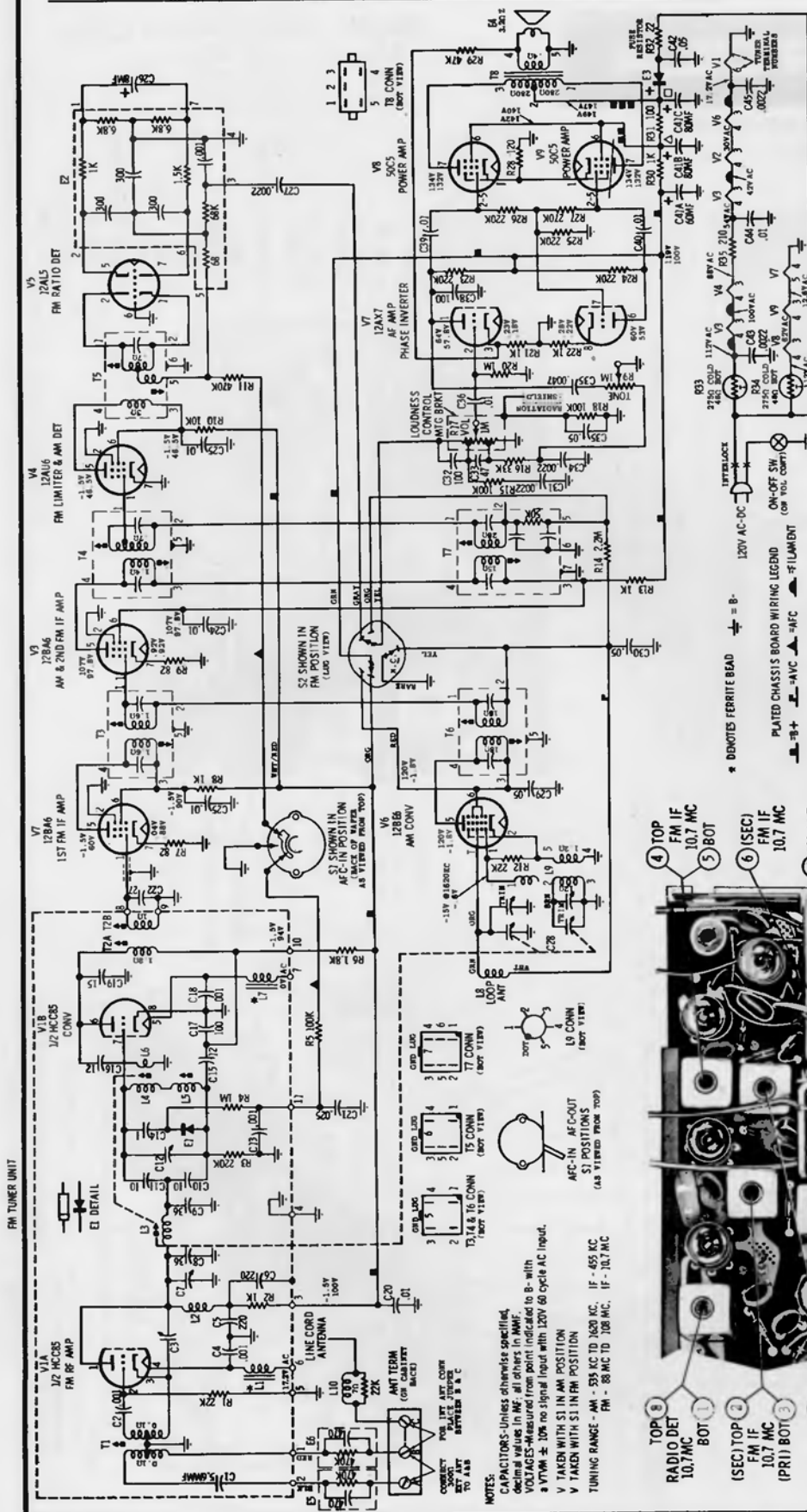
(Continued on the next page)



MOTOROLA

(Service material continued
from preceding page)

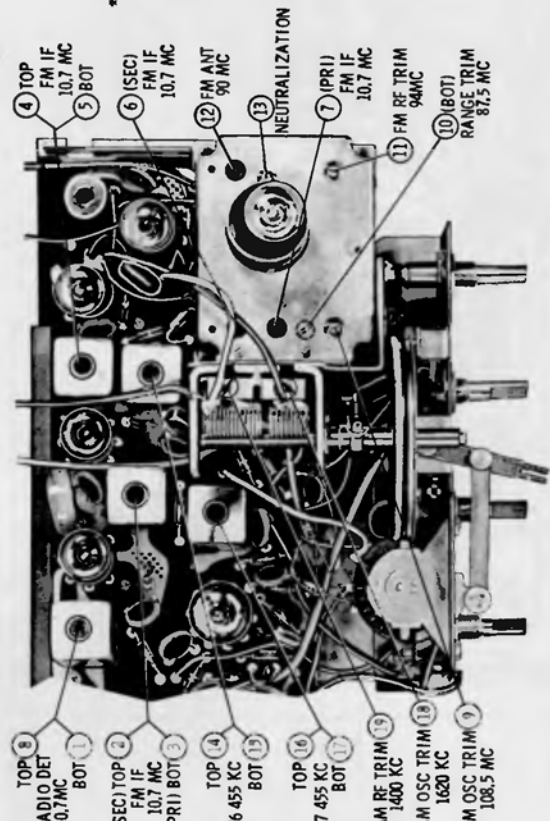




MOTOROLA

MODEL	CHASSIS
B3E	HS-821
B3W	HS-821

(Continued on the next page, adjacent at right)



NOTES:

CAPACITORS—Unless otherwise specified, decimal values in pF; all others in MUF.

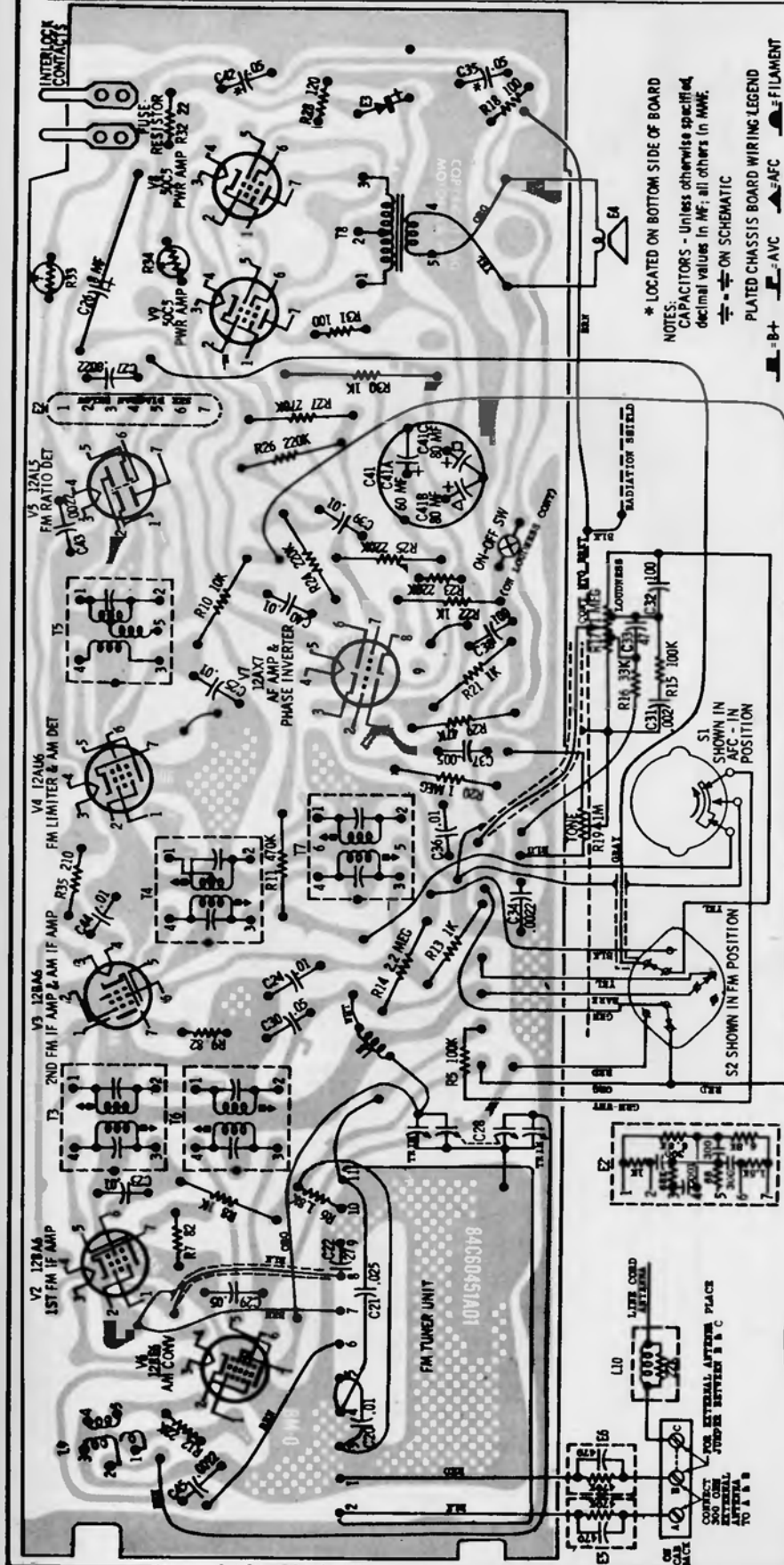
VOLTAGES—Measured from point indicated to B+ with a VTVM ± 10% no signal input with 120V 60 cycle AC input.

V TAKEN WITH S1 IN AM POSITION

V TAKEN WITH S1 IN FM POSITION

TUNING RANGE - AM - 535 KC TO 1620 KC, IF - 455 KC

FM - 88 MC TO 108 MC, IF - 10.7 MC



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

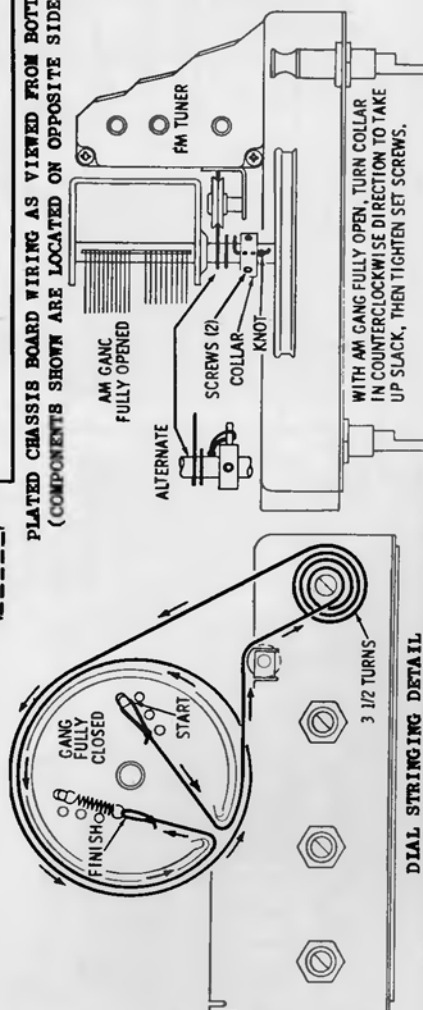
PLATED CHASSIS BOARD WIRING LEGEND
B+ = B+ AVC = AVC FILAMENT = FILAMENT

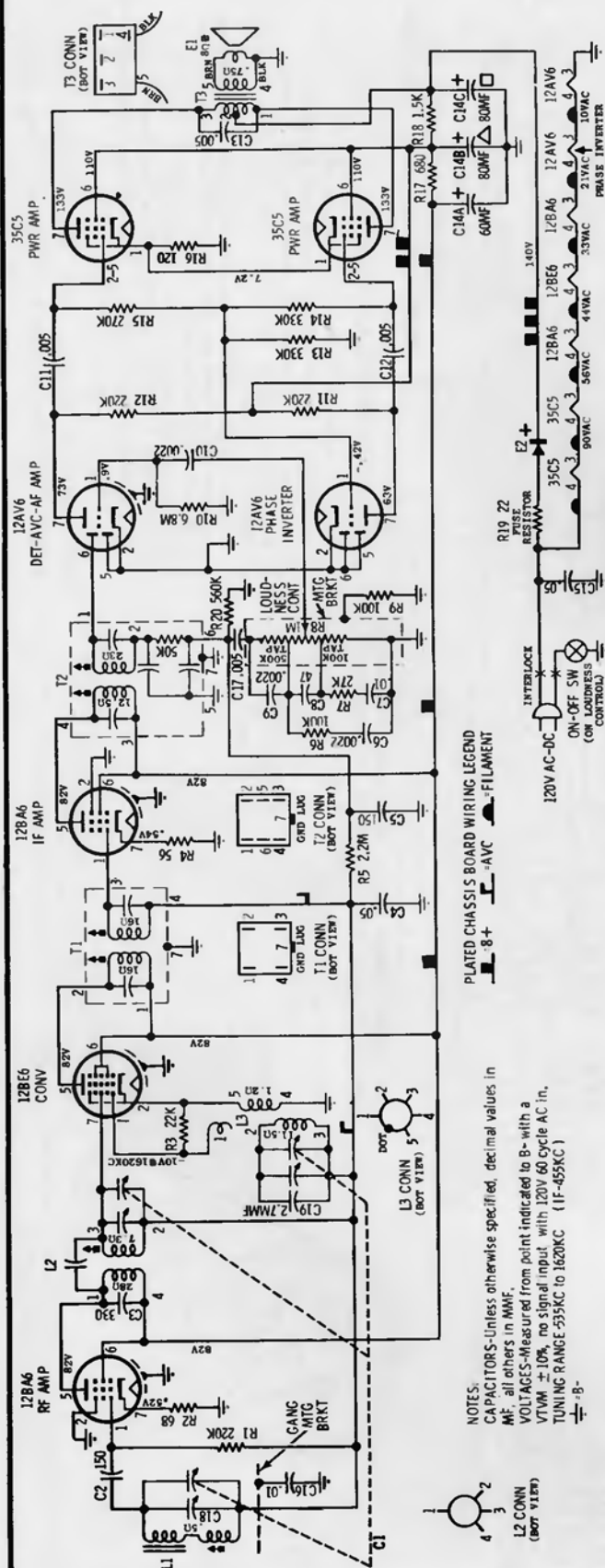
TO REMOVE CHASSIS FROM CABINET

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 palmuts from front of radio.
8. Unsolder speaker leads. 9. Unsolder lead of bottom shield.
10. Remove chassis from cabinet.

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

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

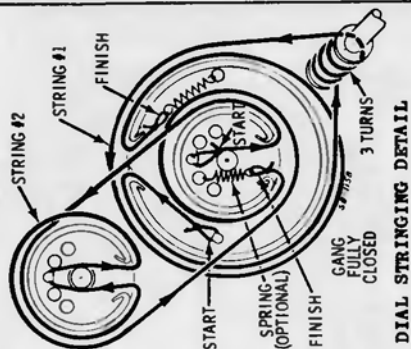
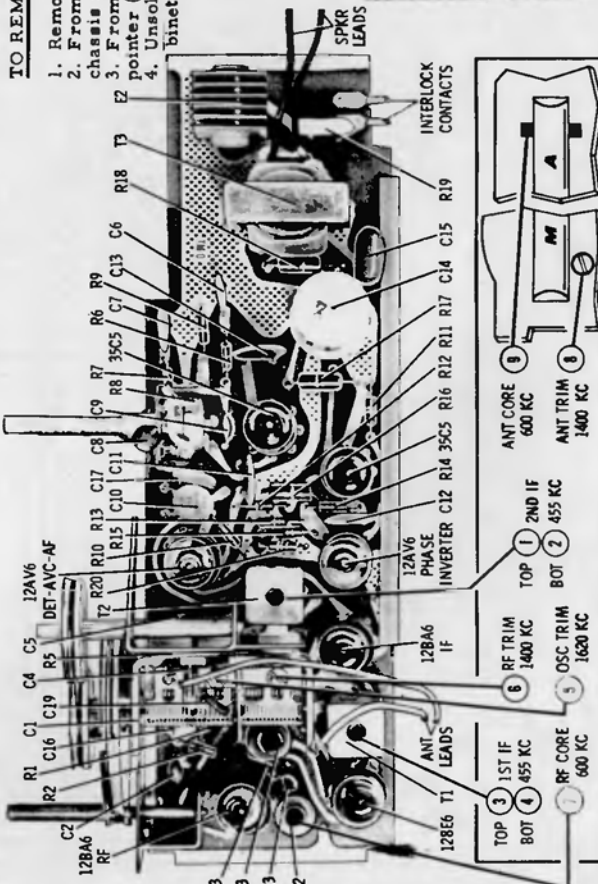




NOTES:
CAPACITORS—Unless otherwise specified, decimal values in M Ω , all others in M Ω .
VOLTAGES—Measured from point indicated to B— with a VTVM $\pm 10\%$, no signal input, with 120V 60 cycle AC in.
TUNING RANGE—535KC to 1620KC (1F—455KC) $\pm$ B—

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.



DIAL STRINGING DETAIL

MOTOROLA

MODEL	CHASSIS
A12N	HS-825



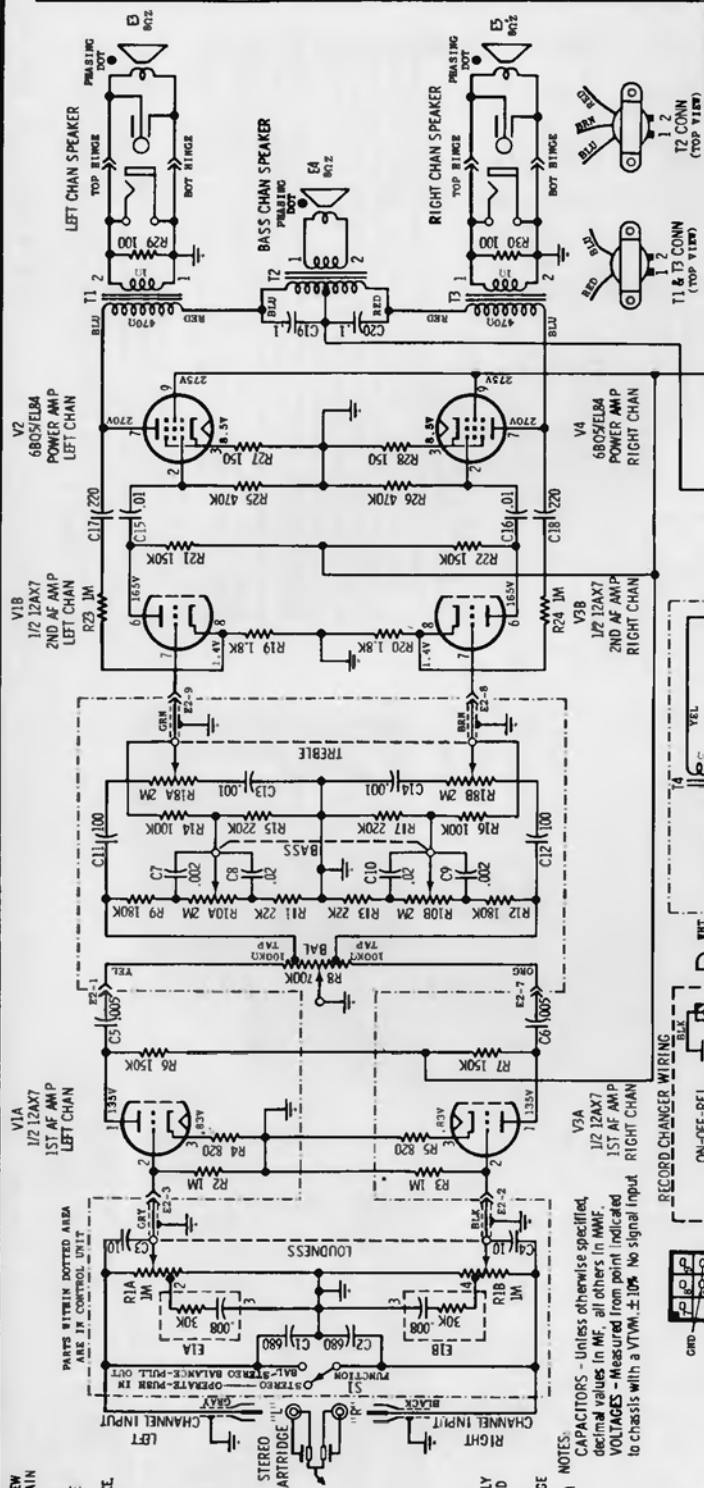
ALIGNMENT ADJUSTMENTS & PARTS LOCATION

MOTOROLA

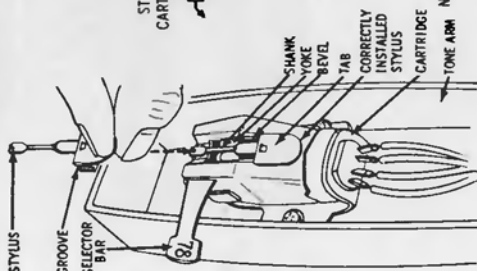
STEREO

MODEL CHASSIS

SH20 HS-827 AUDIO AMP
HS-828 PWR SUPPLY



WHEN REPLACING NEW STYLUS, FIRST TURN SELECTOR BAR SO THAT WORN GROOVES ON SIDES OF STYLUS ENGAGE. THEN GRASP TAB AND SLIDE FORWARD.

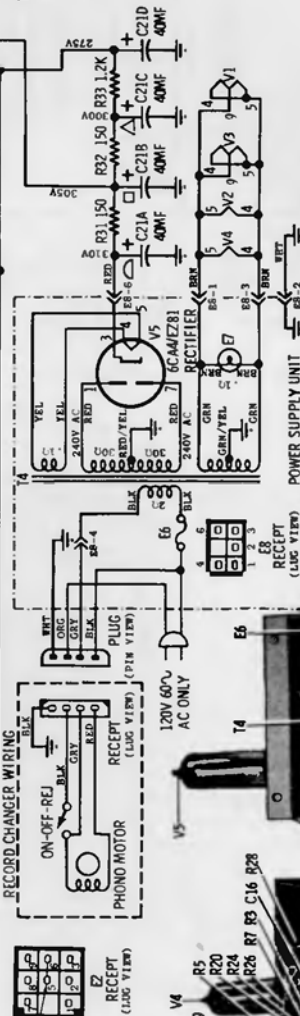


NOTES:

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

STYLUS PART NUMBERS

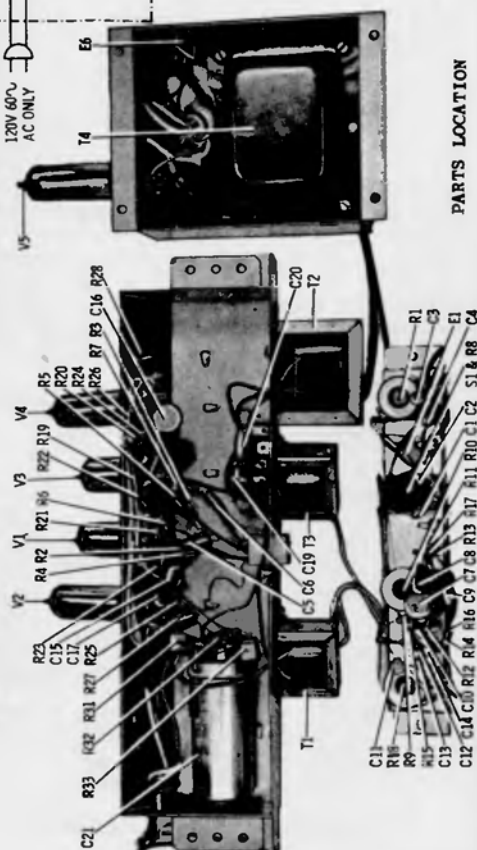
.7 MIL SAPPHIRE-MOTOROLA 96C836404
.7 MIL DIAMOND-MOTOROLA 96C836405
3 MIL SAPPHIRE-MOTOROLA 96C836406



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.

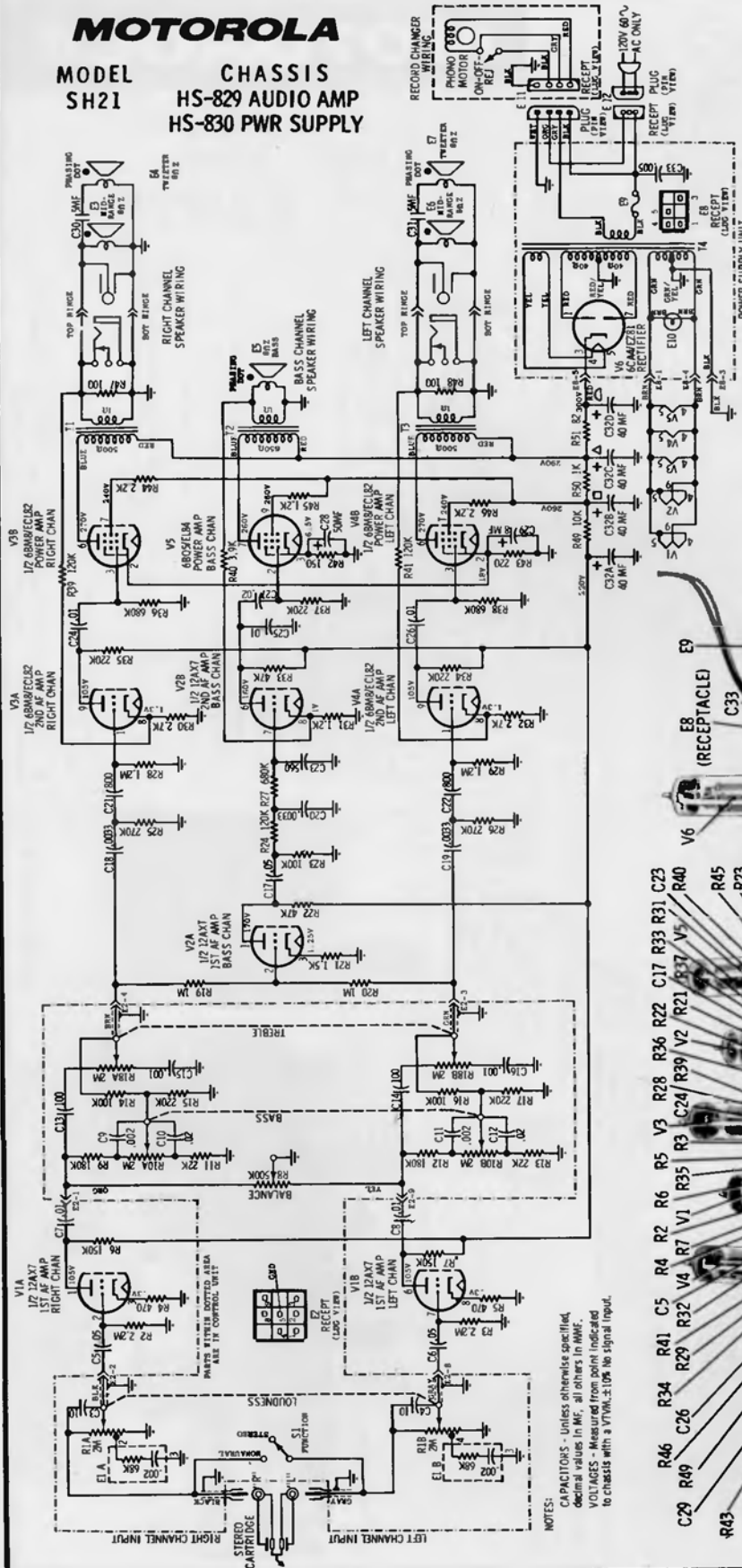
PARTS LOCATION



MOTOROLA

MODEL
SH21

CHASSIS
HS-829 AUDIO AMP
HS-830 PWR SUPPLY



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

TO REMOVE CHASSIS

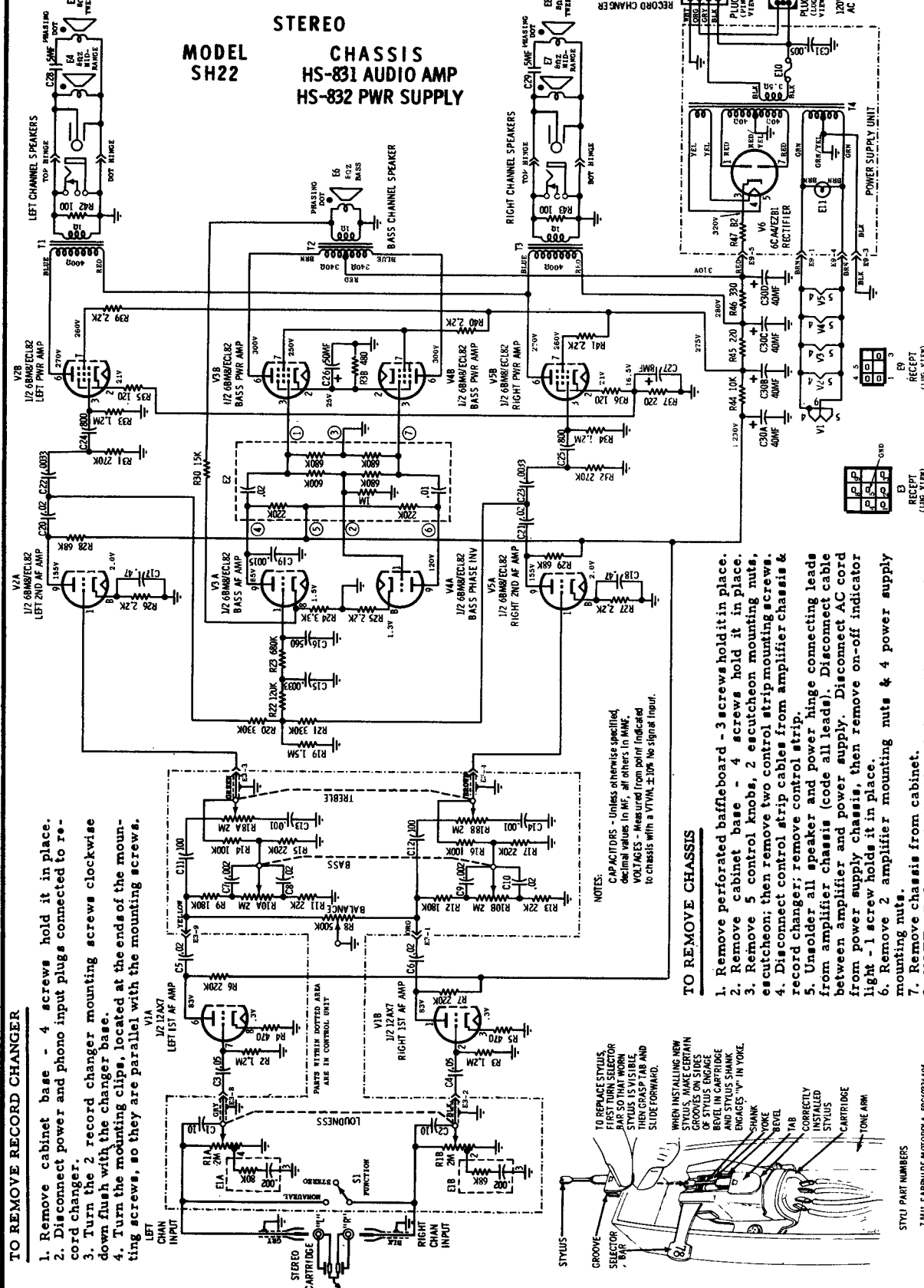
1. Remove perforated baffleboard - 3 screws hold it in place.
2. Remove cabinet base - 4 screws hold it in place.
3. Remove 5 control knobs, 2 escutcheon mounting nuts, escutcheon; then remove two control strip mounting screws.
4. Disconnect control strip cables from amplifier chassis & record changer; remove control strip.
5. 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.
6. Remove 2 amplifier mounting nuts & 4 power supply mounting nuts.
7. Remove chassis from cabinet.
8. 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.



HS-829, 830 PARTS LOCATION Motorola Model SH21, Chassis HS-829, HS-830

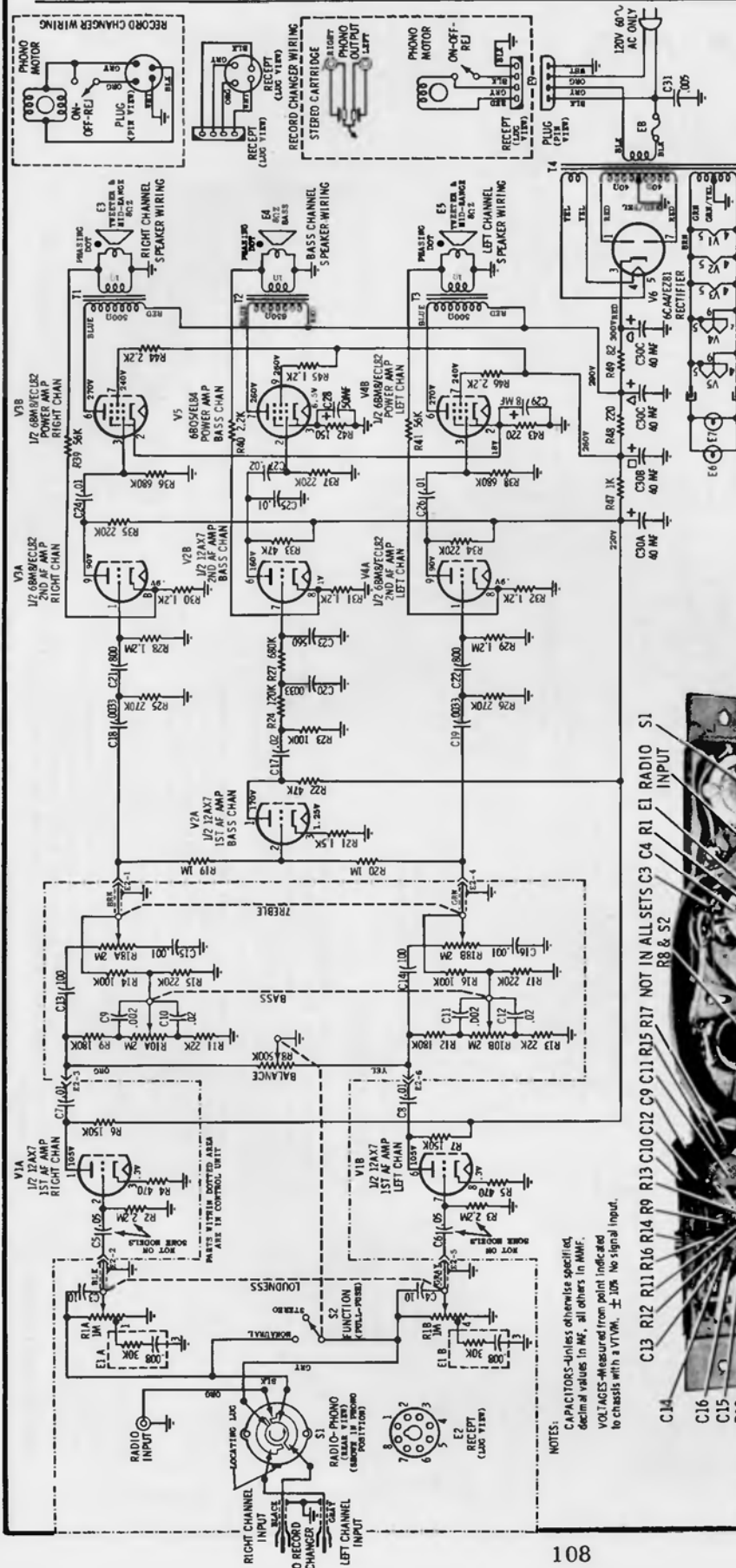
MOTOROLA INC.

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

**INFORMATION**

Motorola Model SH22, Chassis HS-831, HS-832

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



108

PRODUCTION CHANGES

Chassis Coding	Changes
HS-833A	Original chassis TO REDUCE NOISY LOUDNESS CONTROL OPERATION: C-5 (.05 mf), C-6 (.05 mf), R-2 (470K), and R-3 (470K) added.
HS-833B	
HS-833C	TO ADD BASS BOOST: R-2 and R-3 (both 470K) changed to 2.2 meg.
HS-833D	TO REDUCE LEAKAGE CURRENT: C-31 (.05 mf) changed to .005 mf.

MOTOROLA INC.

MODEL	CHASSIS
SK40	HS-833
SK40-1	HS-833
SK41	HS-833

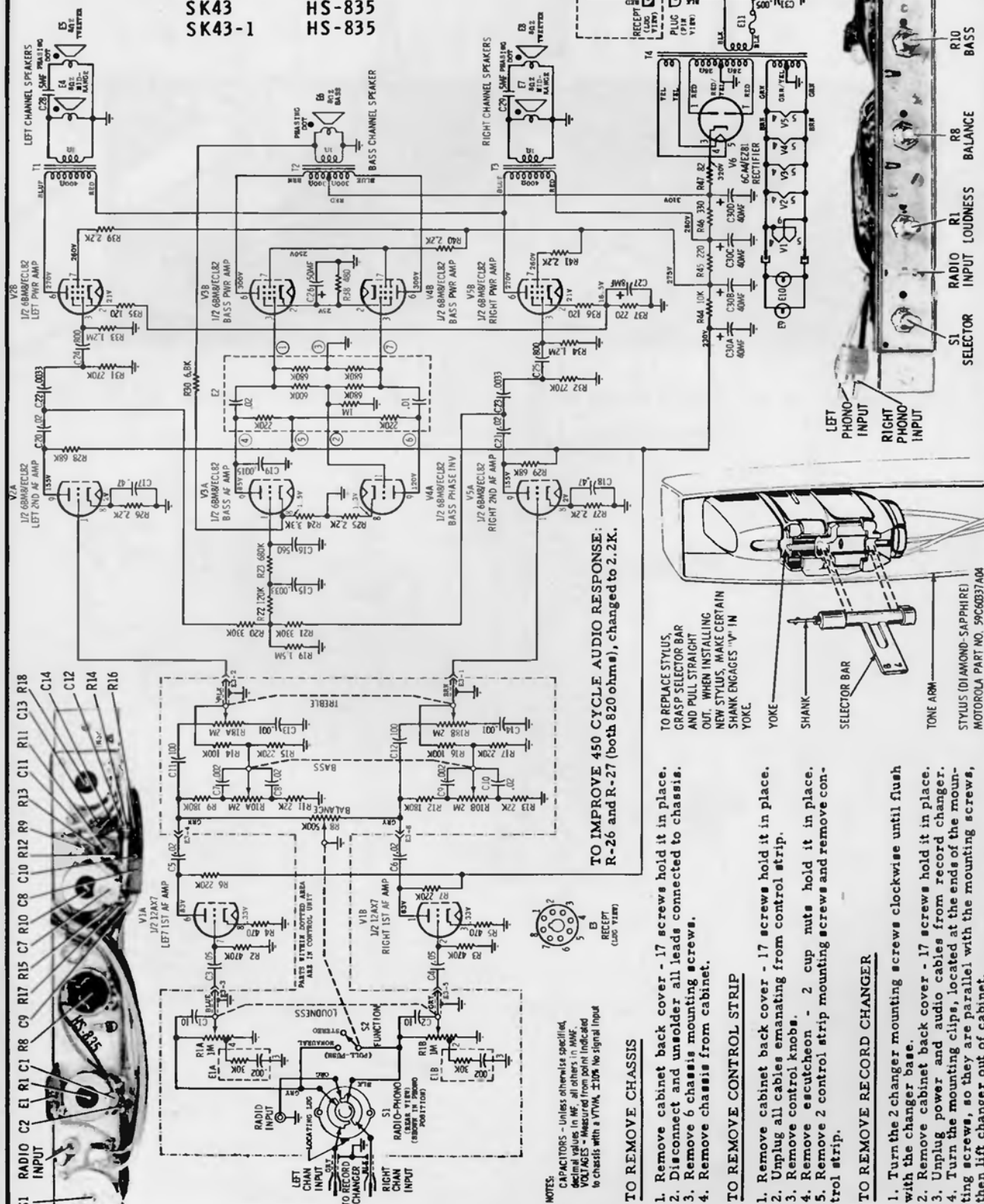


89-833A PARTS LOCATION (SEE PRODUCTION CHANGES)

MOTOROLA

MODEL SK43
SK43-1

CHASSIS HS-835
HS-835



NOTES:

CAPACITORS - Unless otherwise specified, all capacitors are electrolytic. All capacitors are 50VDC. CAPACITORS - Unless otherwise specified, all capacitors are electrolytic. All capacitors are 50VDC.

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.

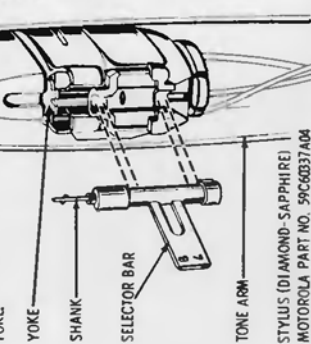
TO REMOVE CONTROL STRIP

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

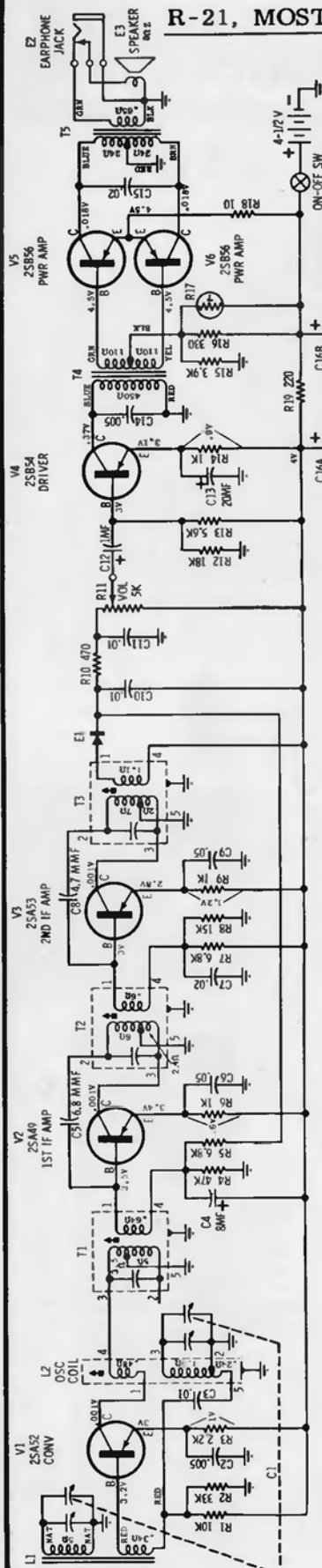
TO IMPROVE 450 CYCLE AUDIO RESPONSE: R-26 and R-27 (both 820 ohms), changed to 2.2K.

INFORMATION



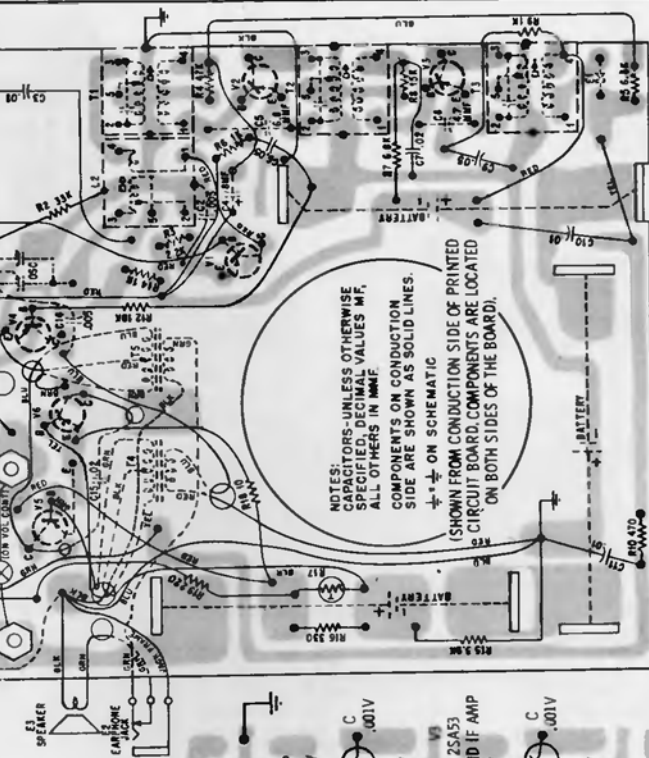
STYLUS REPLACEMENT SK43-1 SERIES

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

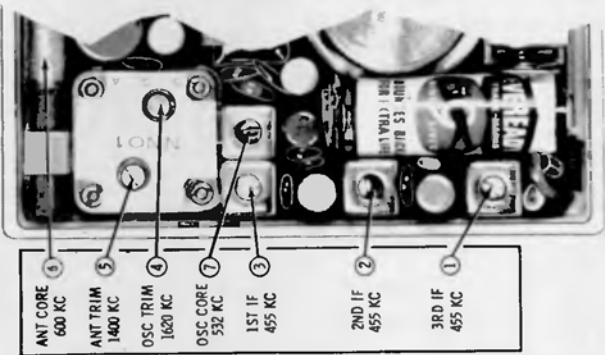


PRINTED CIRCUIT BOARD

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 - 4.8mA (MIN VOL)



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES MF, ALL OTHERS IN MMF.
COMPONENTS ON CONDUCTION SIDE ARE SHOWN AS SOLID LINES.
ON SCHEMATIC
+ - ON SCHEMATIC
(SHOWN FROM CONDUCTION SIDE OF PRINTED CIRCUIT BOARD, COMPONENTS ARE LOCATED ON BOTH SIDES OF THE BOARD.)

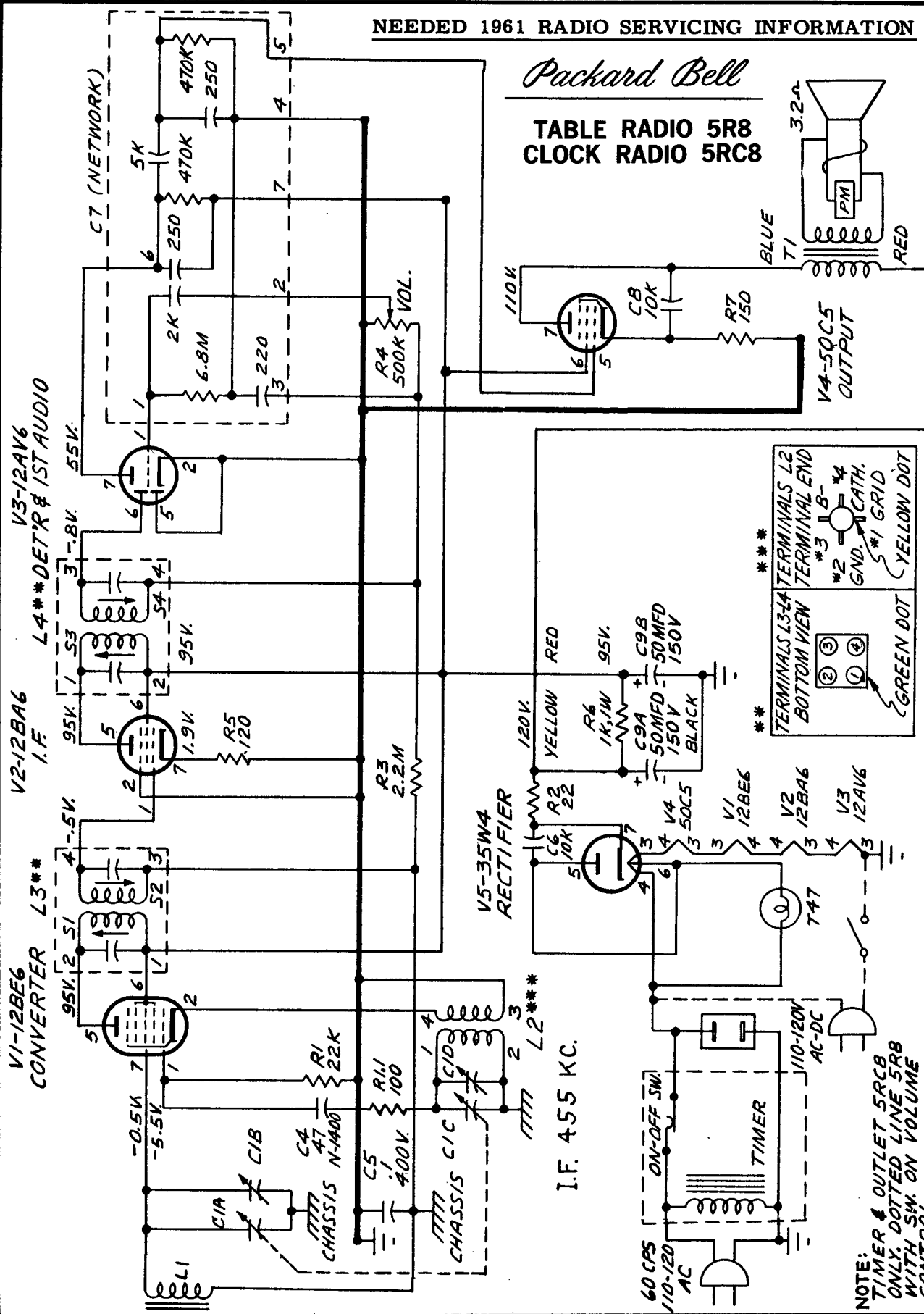


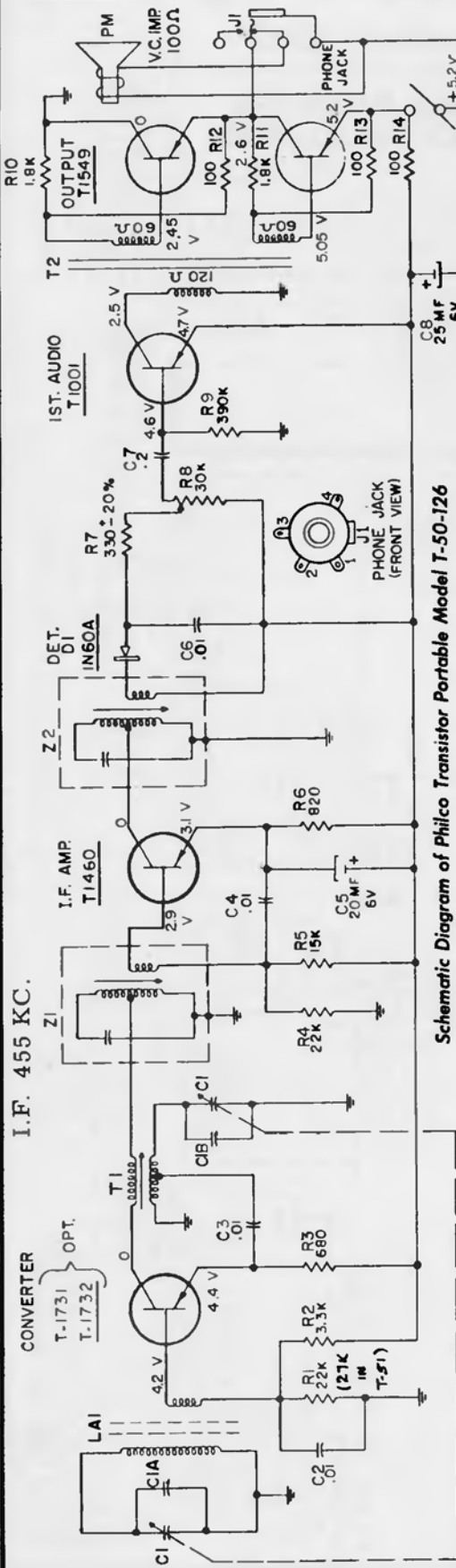
MODEL CHASSIS
X21W HS-876

MOTOROLA

ALIGNMENT
POINT LOCATIONS

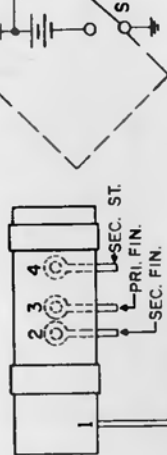
Packard Bell
TABLE RADIO 5R8
CLOCK RADIO 5RC8





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

PHILCO MODEL T-50-126 MODEL T51-124

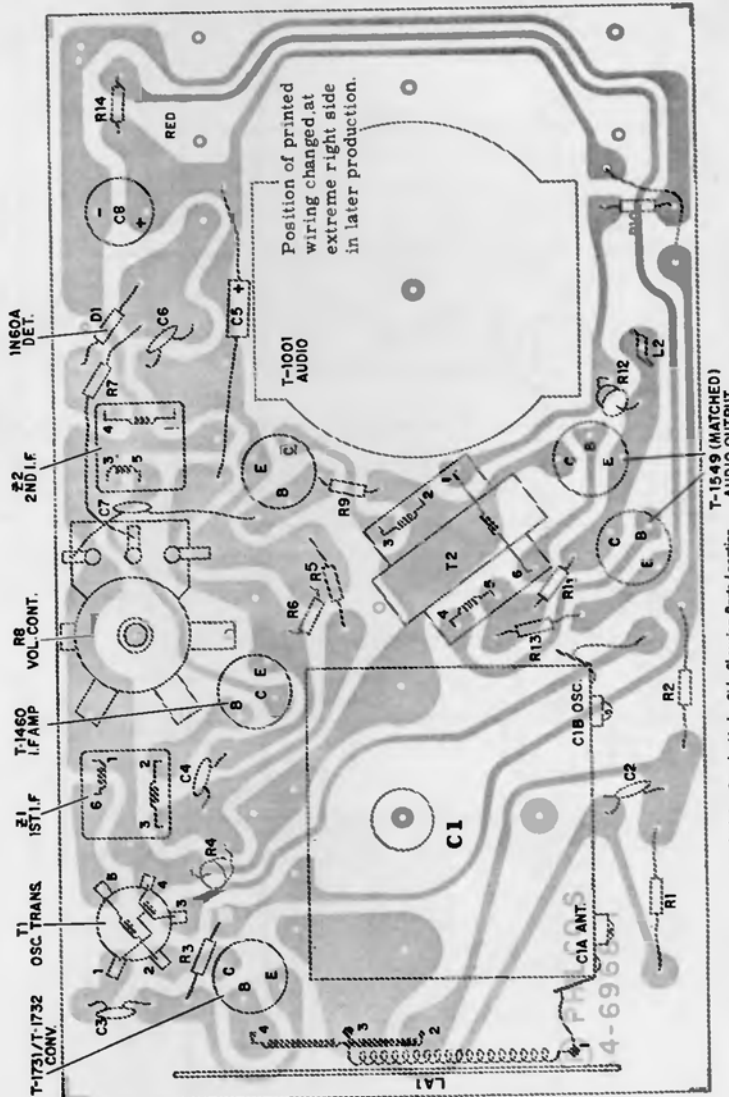


NOTES:
ALL RESISTORS 1/2W, 10%, CARBON.
VOLTAGES MEASURED TO GROUND WITH
A 20,000 Ω/VOLT METER UNDER
NO SIGNAL CONDITION.
COIL RESISTANCES READ WITH COIL
IN CIRCUIT.

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 volume 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.

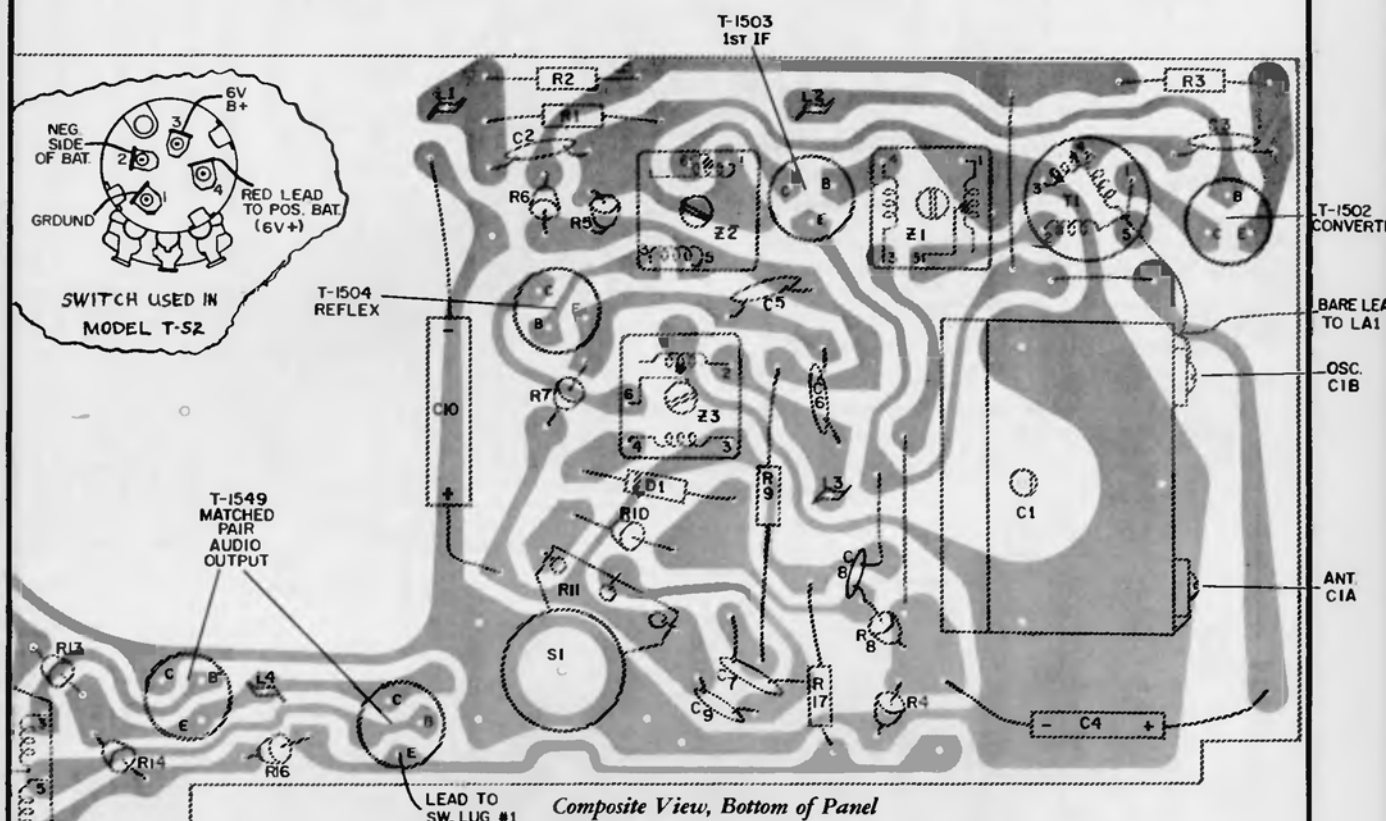
PHILCO Models T-50-126, T-51-124



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

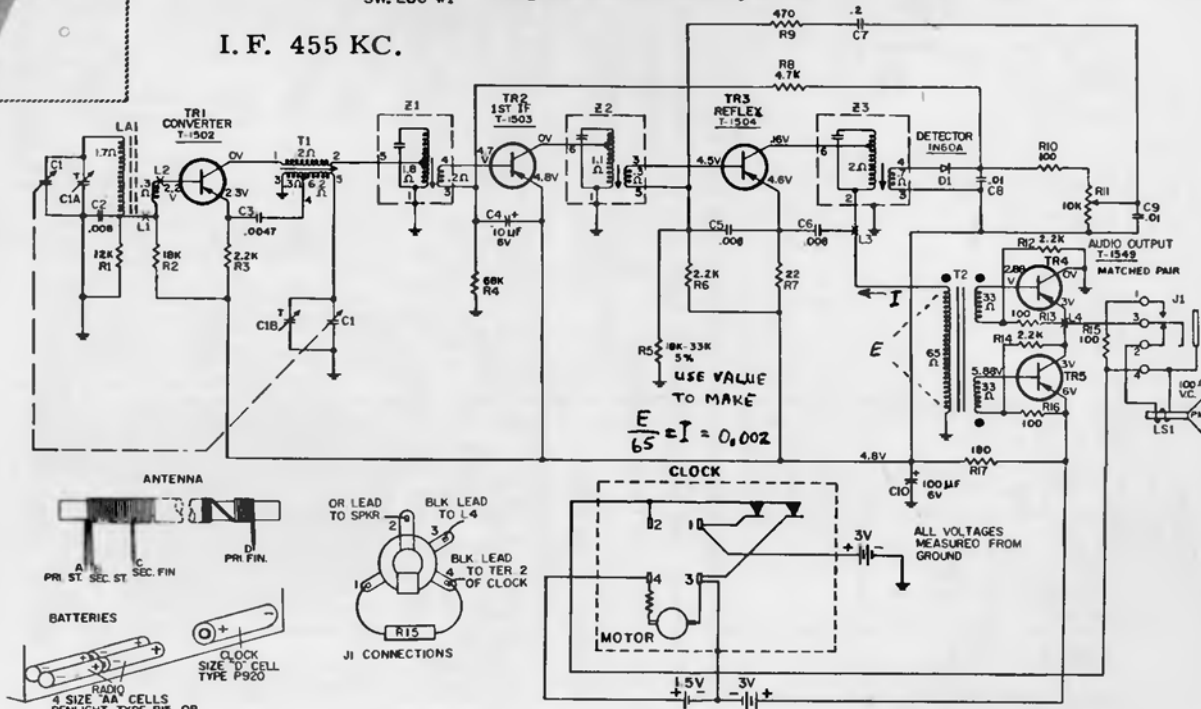
PHILCO MODEL T-52, CODE 124, and CLOCK RADIO MODEL TC-57

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

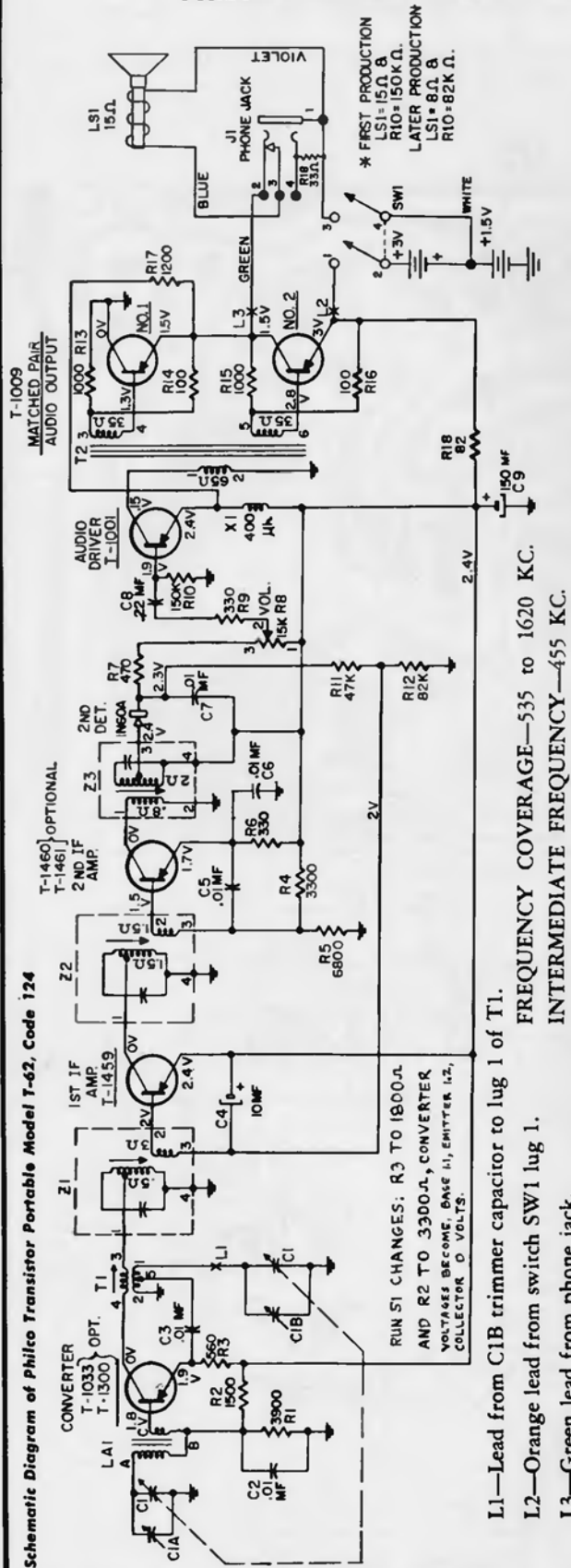


Composite View, Bottom of Panel

I. F. 455 KC.



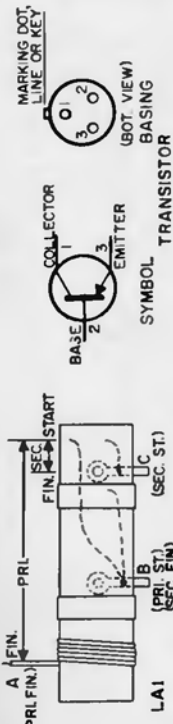
Schematic Diagram, Model TC-57

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-62, CODE 124

SERVICE NOTES

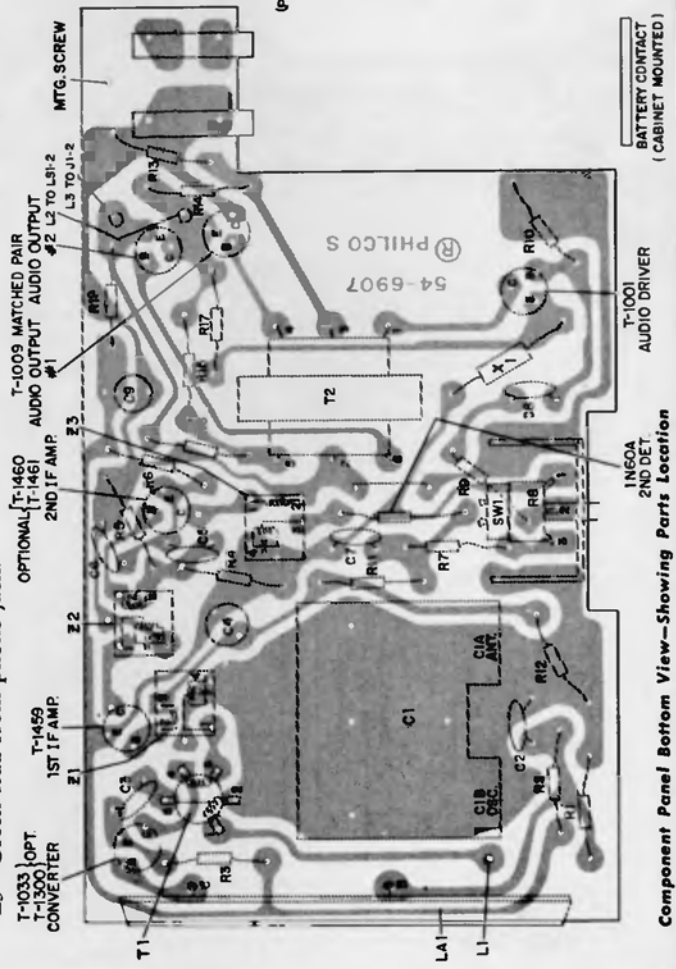
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

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

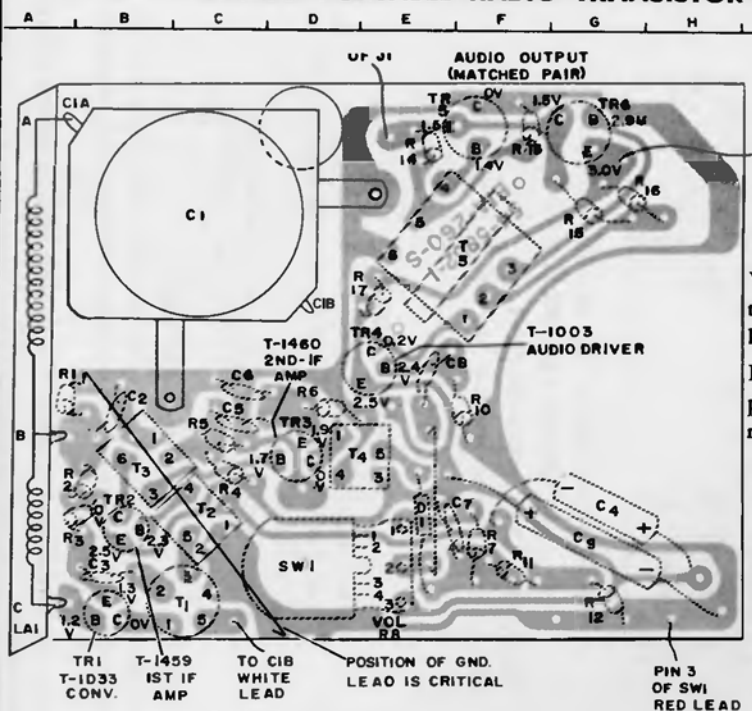


PRINTED-WIRE PANEL REMOVAL

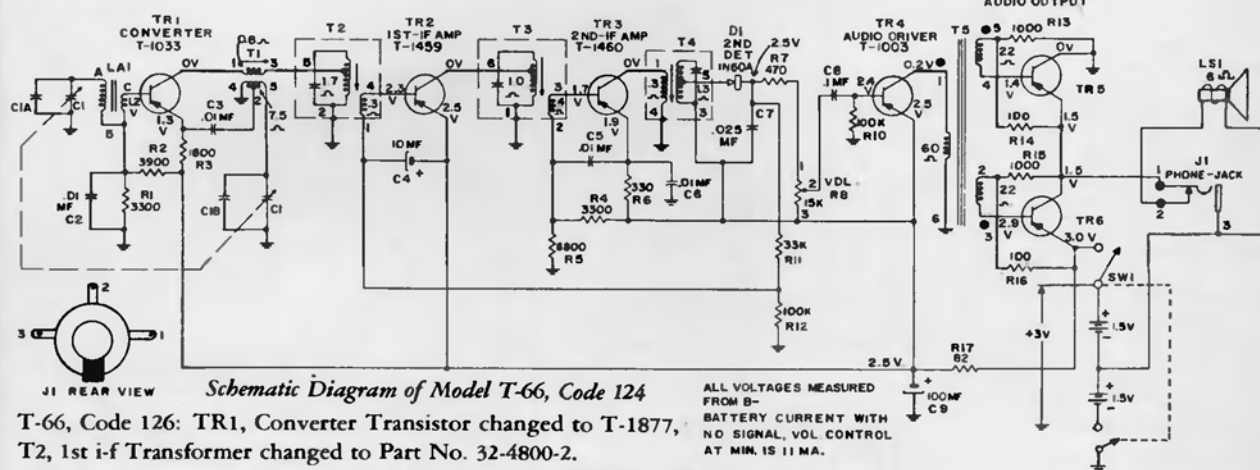
1. Remove the snap-on back of the cabinet and the batteries.
2. Remove the tri-mount fastener next to the battery clips.
3. Carefully spread the sides of the cabinet to free the panel from each of the 4 slotted cabinet supports.
4. Withdraw the panel assembly by sliding it toward the speaker end of the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



PHILCO PORTABLE RADIO TRANSISTOR MODEL T-66, CODE 124



Composite Bottom View



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-urn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

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

SERVICE NOTES

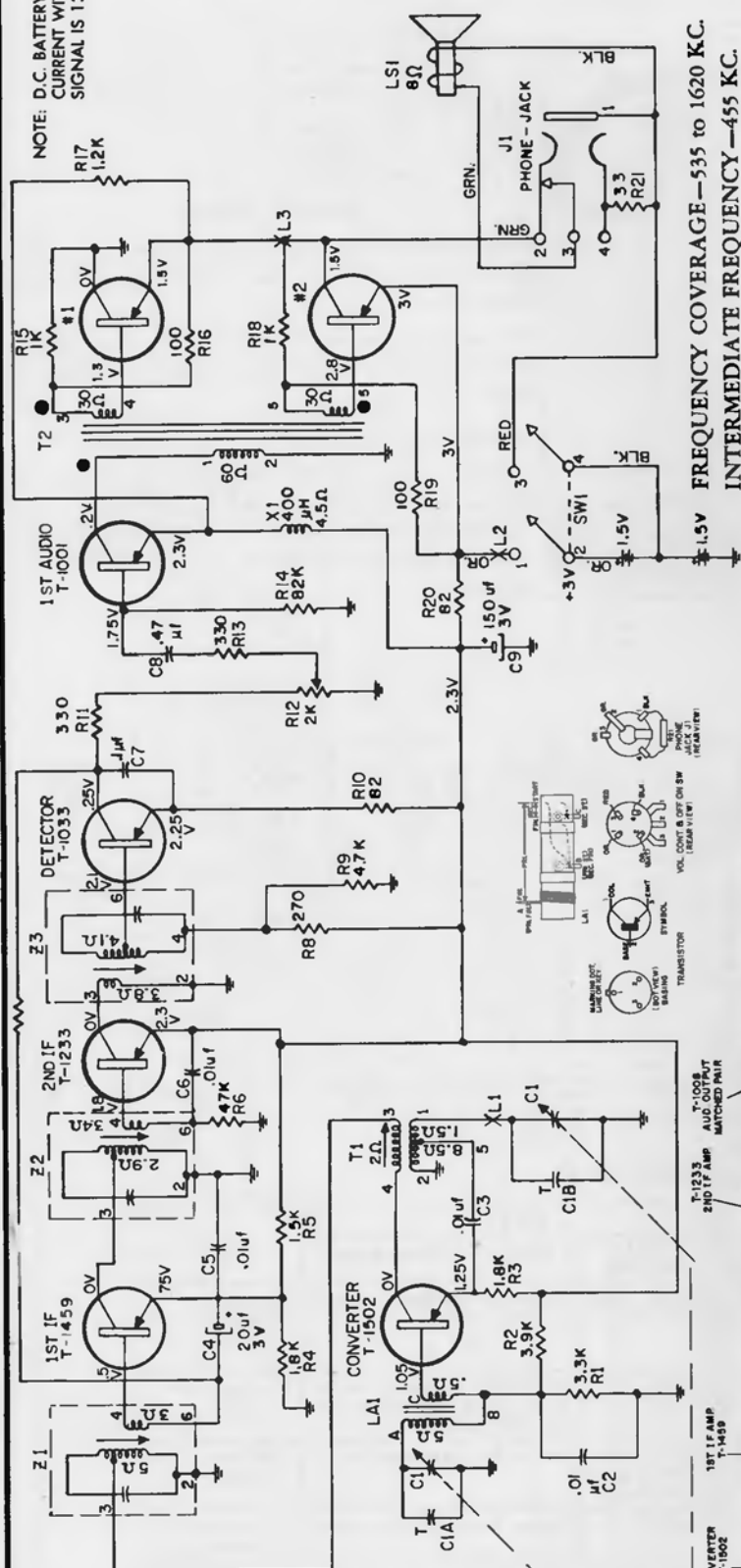
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

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.

NOTE: D.C. BATTERY
CURRENT WITH NO
SIGNAL IS 13mA.



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

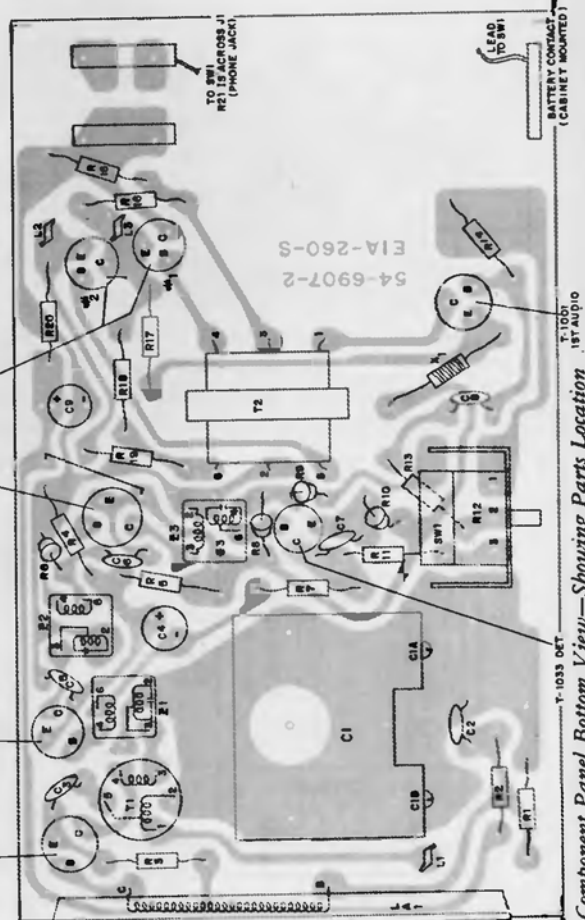
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

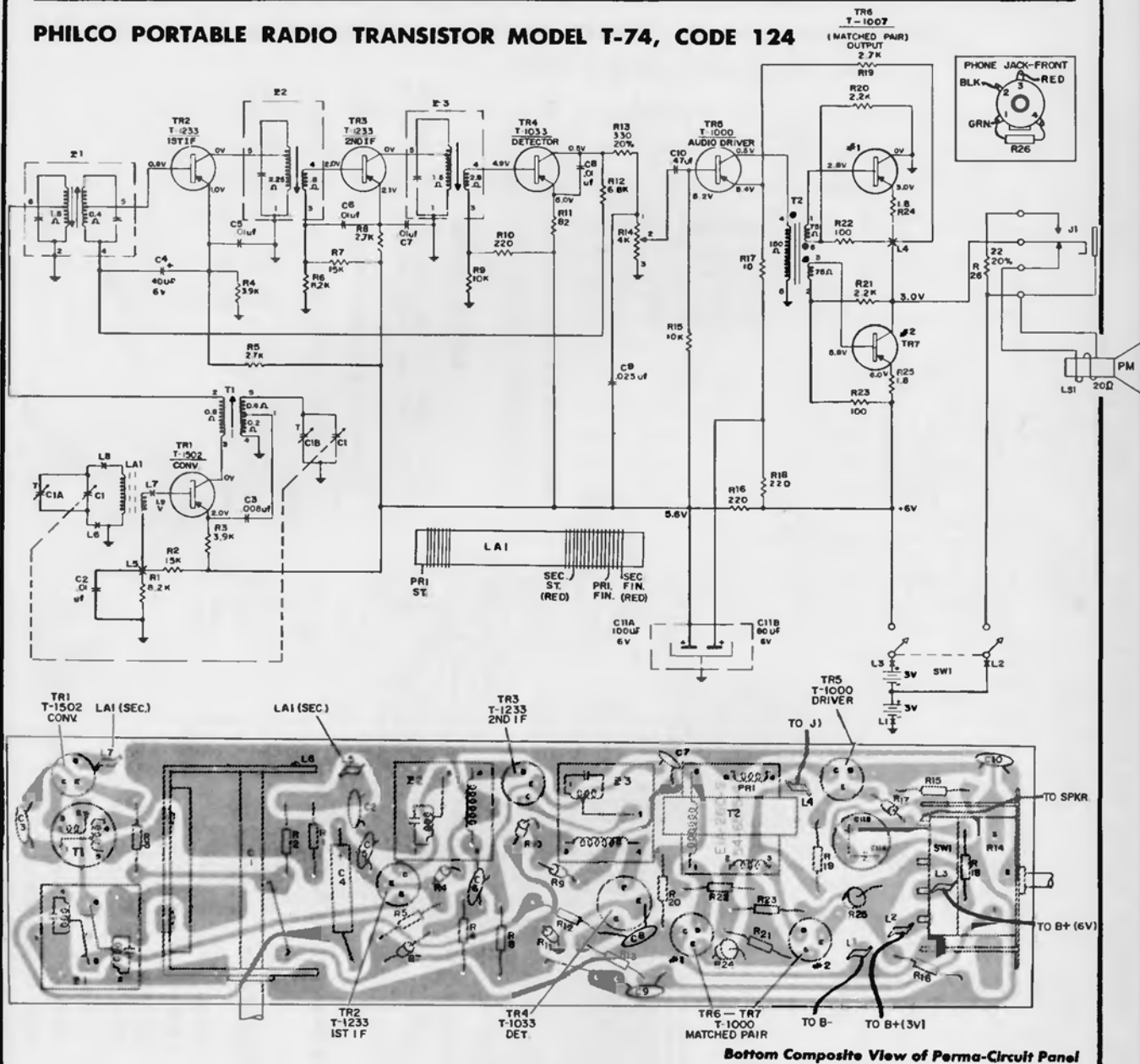
Normally, the transistors should be the last item suspected. If C9 opens serious audio oscillation will result.

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.

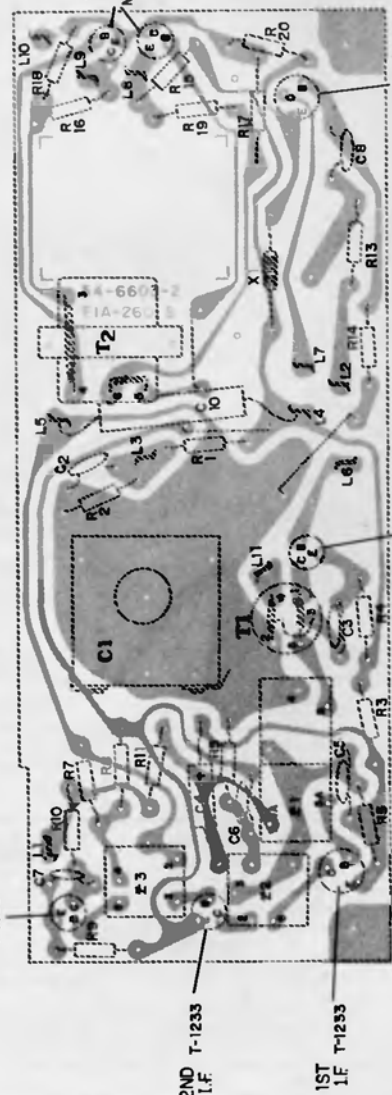
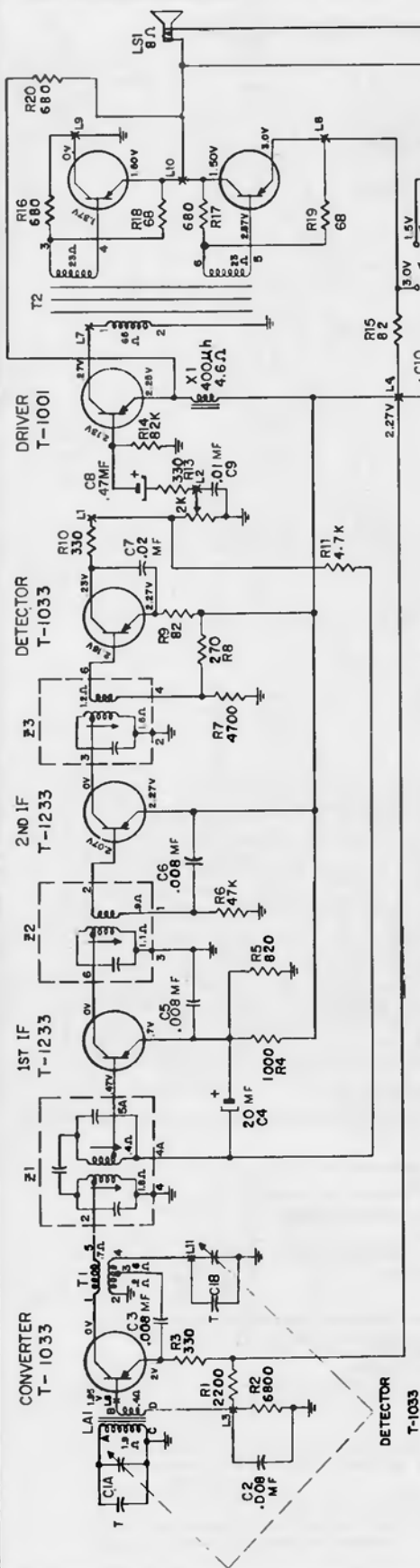


PHILCO PORTABLE RADIO TRANSISTOR MODEL T-74, CODE 124

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 PORTABLE RADIO MODEL T-76, CODE 124



Printed Wiring Panel, Foil Side, Showing Parts Location

PANEL LUG CONNECTION

- | | | | |
|----|---------------------------------|-----|---------------------------------------|
| L1 | Yellow wire from volume control | L6 | Green lead from LA1 secondary |
| L2 | Green wire from volume control | L7 | Red wire from T2 |
| L3 | Green wire from LA1 secondary | L8 | Red wire to lug 4 on switch |
| L4 | Positive lead of C10 | L9 | Black wire to chassis ground |
| | Black lead from C1 | L10 | Yellow wire to speaker |
| | Black lead from T2 | | Yellow wire to private listening jack |
| L5 | Negative lead from C10 | L11 | Black & white wire to C11 |

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

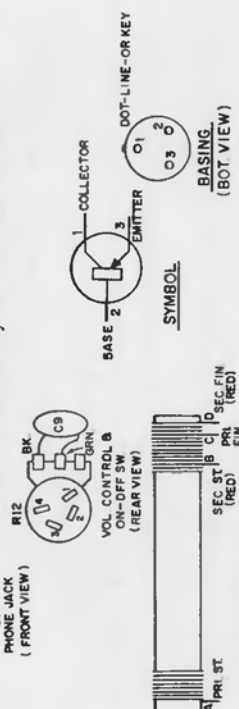
SERVICE NOTES

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

Normally, the transistors should be the last item suspected.

If C12 opens serious audio oscillation will result.

Dress of black lead from top, center, frame lug of gang to end ground lug is important to reduce beat. See base layout for lead dress.

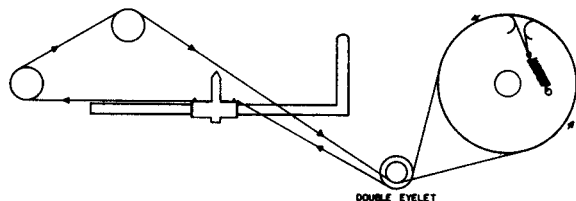


PHILCO MODELS J-769 J-772 J-773 J-774 J-775 **J-838 J-840 J-842 J-845 J-846**

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.

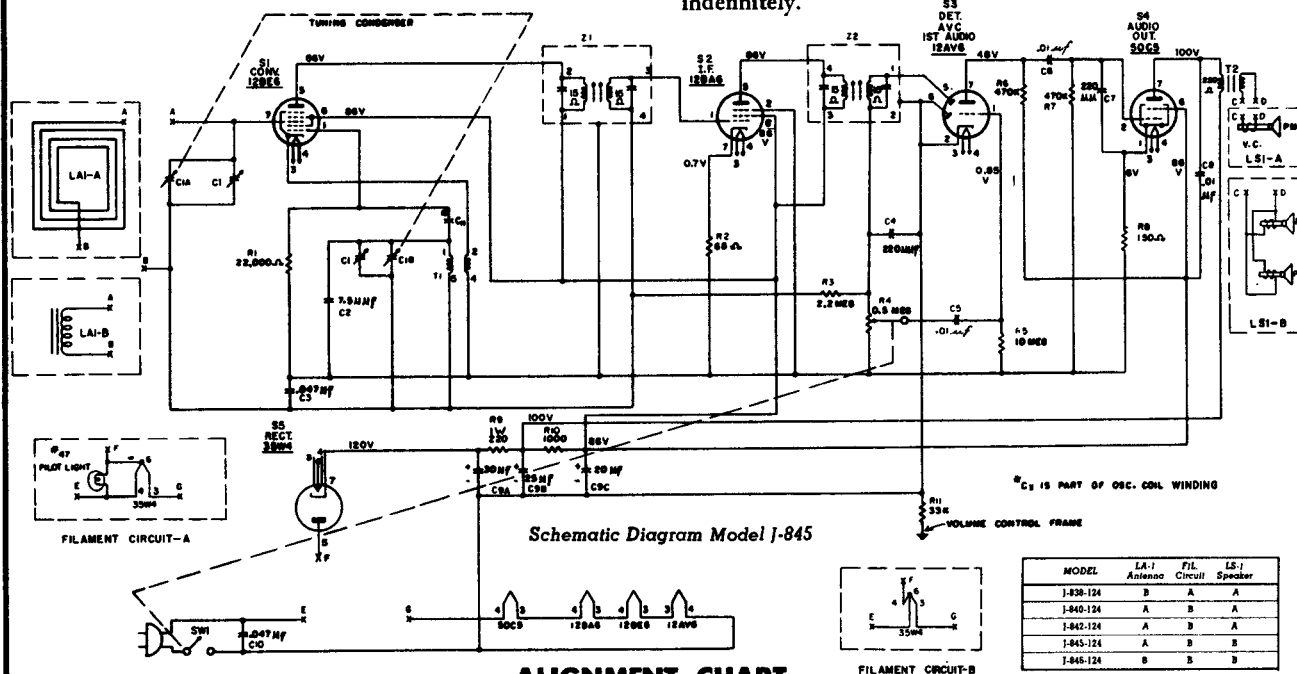


SPEAKER PHASING, Models J-845, J-846—When replacing or connecting the two paralleled speakers, it is possible that an out of phase condition may exist; this is readily apparent by weak output and serious distortion. To correct, interchange the leads to one of the speakers.

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.

Dial Cord Installation—Model J 774 (Rear View)



ALIGNMENT CHART

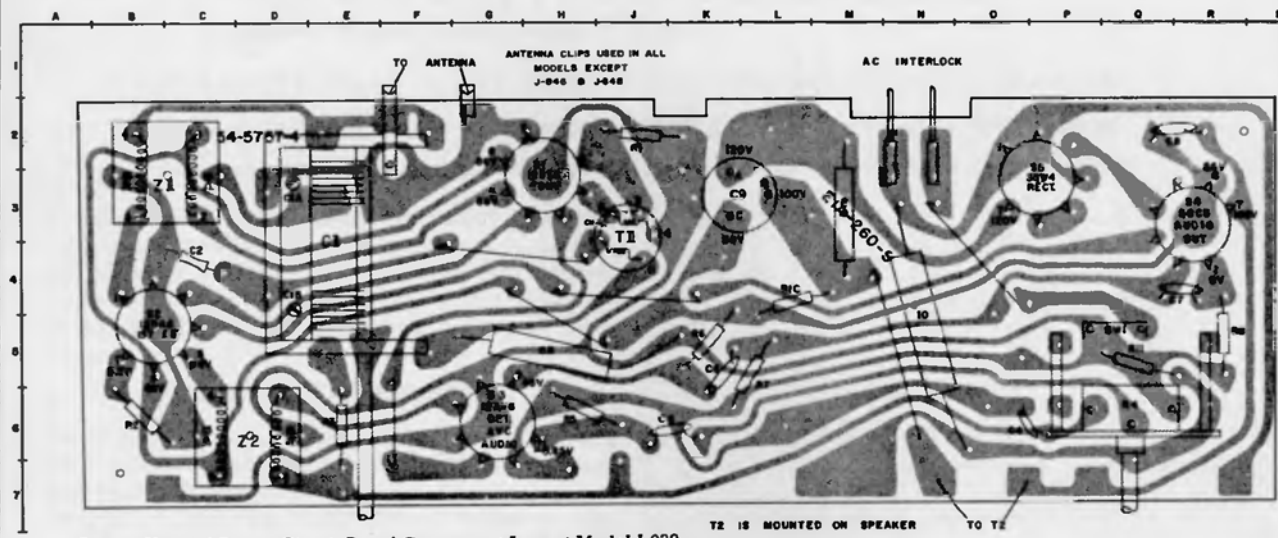
MODEL	LA-1 Antenna	Fil. Circuit	LS-1 Speaker
J-838-124	B	A	A
J-840-124	A	B	A
J-842-124	A	B	A
J-845-124	A	B	B
J-846-124	B	B	B

CIRCUIT DIFFERENCES FOR MODEL VARIATIONS

STEP	SIGNAL GENERATOR	RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to B—; output lead through a .1 mf condenser to grid (pin 7) of 12BE6 or top of r-f tuning condenser.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output.	Z2—top Z2—bottom Z1—bottom Z1—top
2.	Radiating loop (See Note below).	1620 kc.	1620 kc.	Adjust for maximum output.	C1-B—osc.
3.	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1-A—aerial

NOTE: Make up a 6-8 turn, 6 inch diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

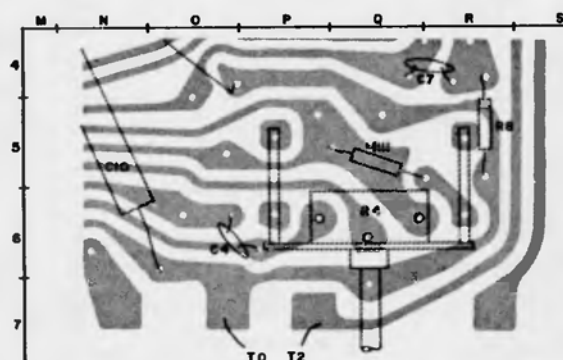
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION
PHILCO Models J-769, J-772, J-773, J-774, J-775, J-838, J-840, etc., Continued



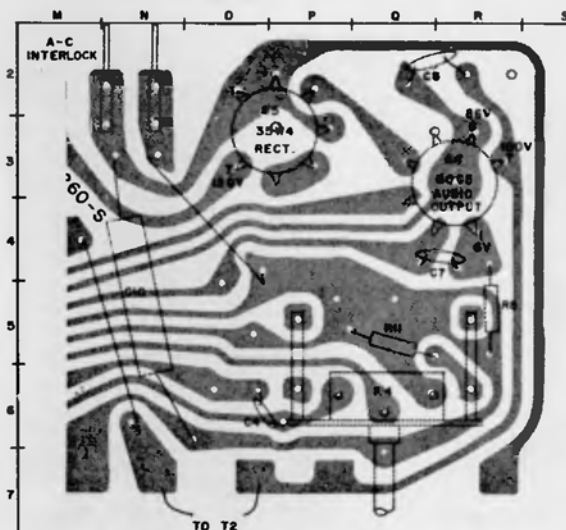
Bottom View of Perma Circuit Panel Component Layout Model J-838

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 Fil Circuit and Connections to T2

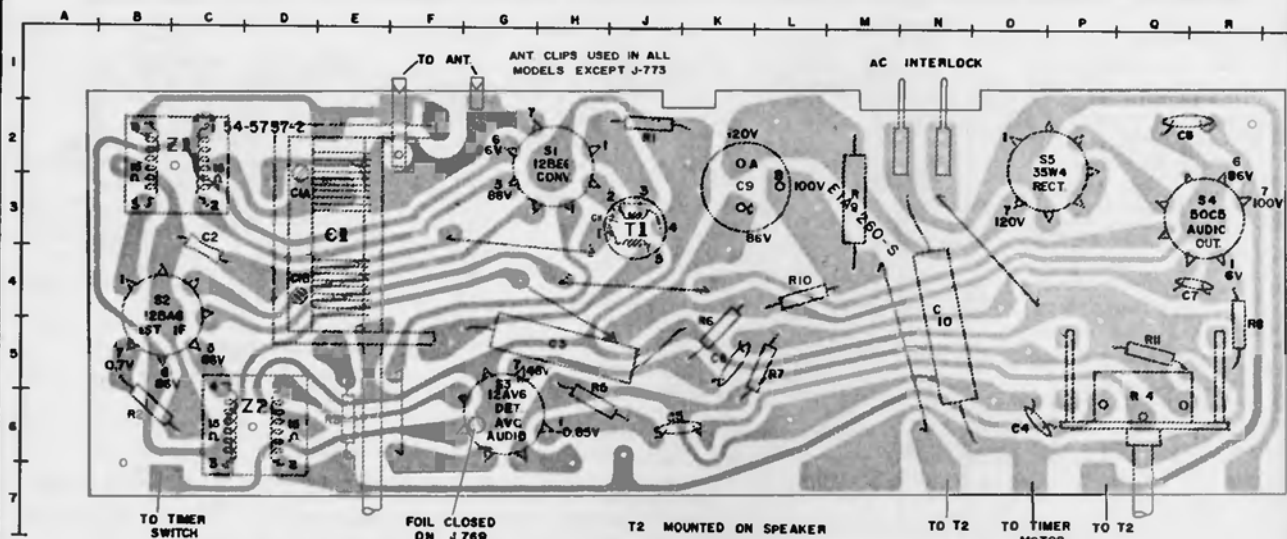
PARTS COMMON TO ALL MODELS

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

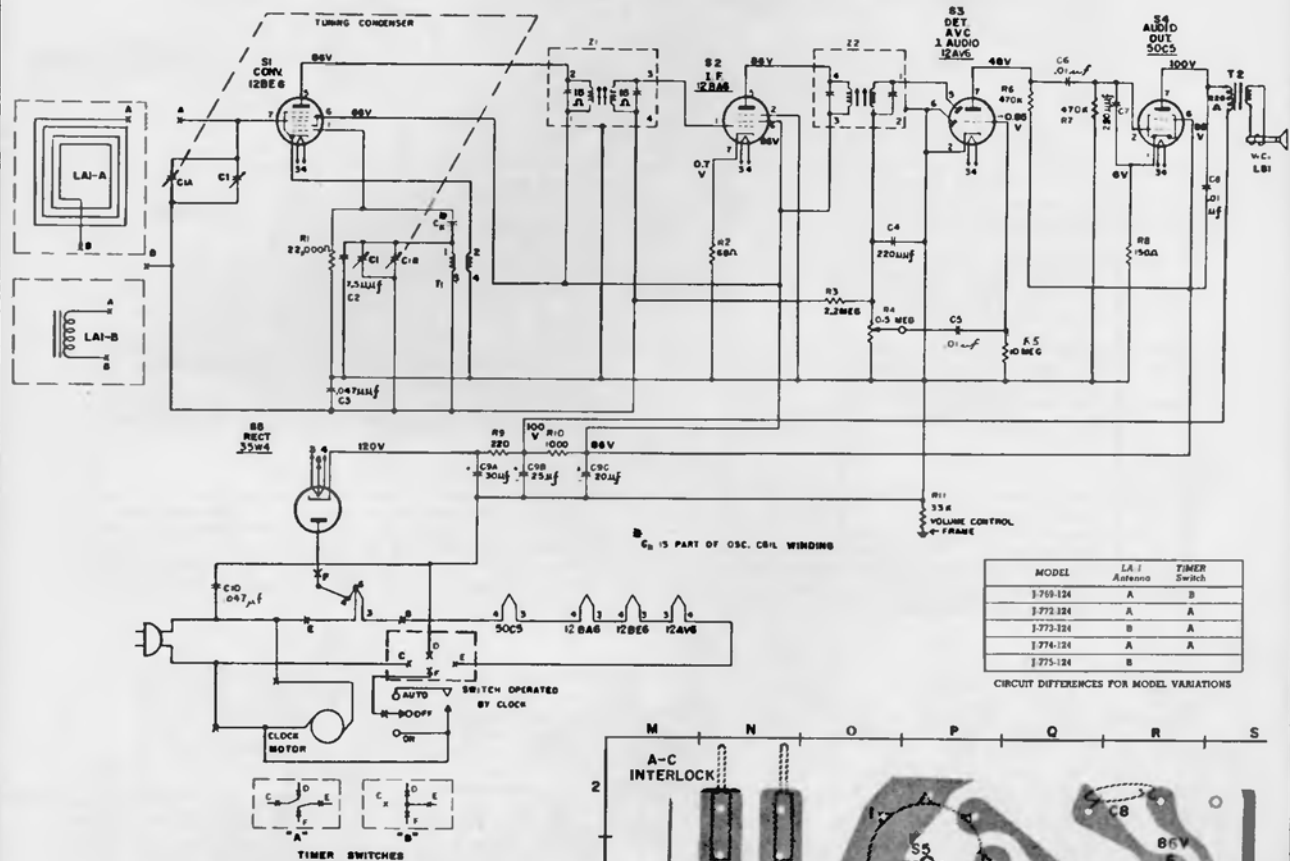
Sym- bol	Loca- tion	Description	Service Part No.
R4	Q6	Resistor, volume control, .5 megohms	
R5	H6	Resistor, 1st audio grid, 10 megohms	66-6108340
R6	K5	Resistor, 1st audio plate, 470,000 ohms	66-4478340
R7	L5	Resistor, audio output grid, 470,000 ohms	66-4478340
R8	R5	Resistor, audio output bias, 150 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

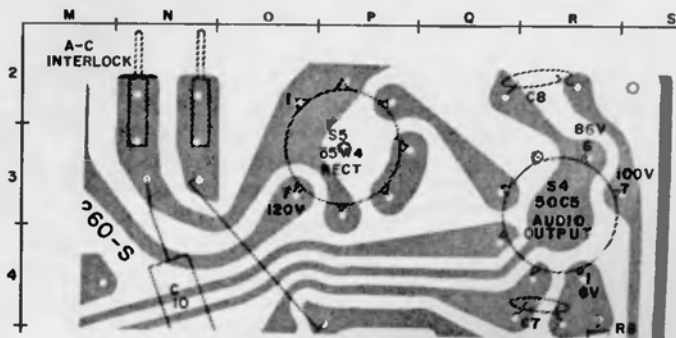
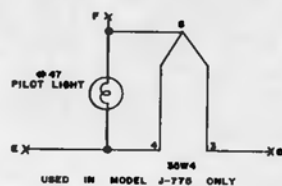
PHILCO Models J-769, J-772 thru J-775, J-838, J-840, J-842, etc., Continued



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

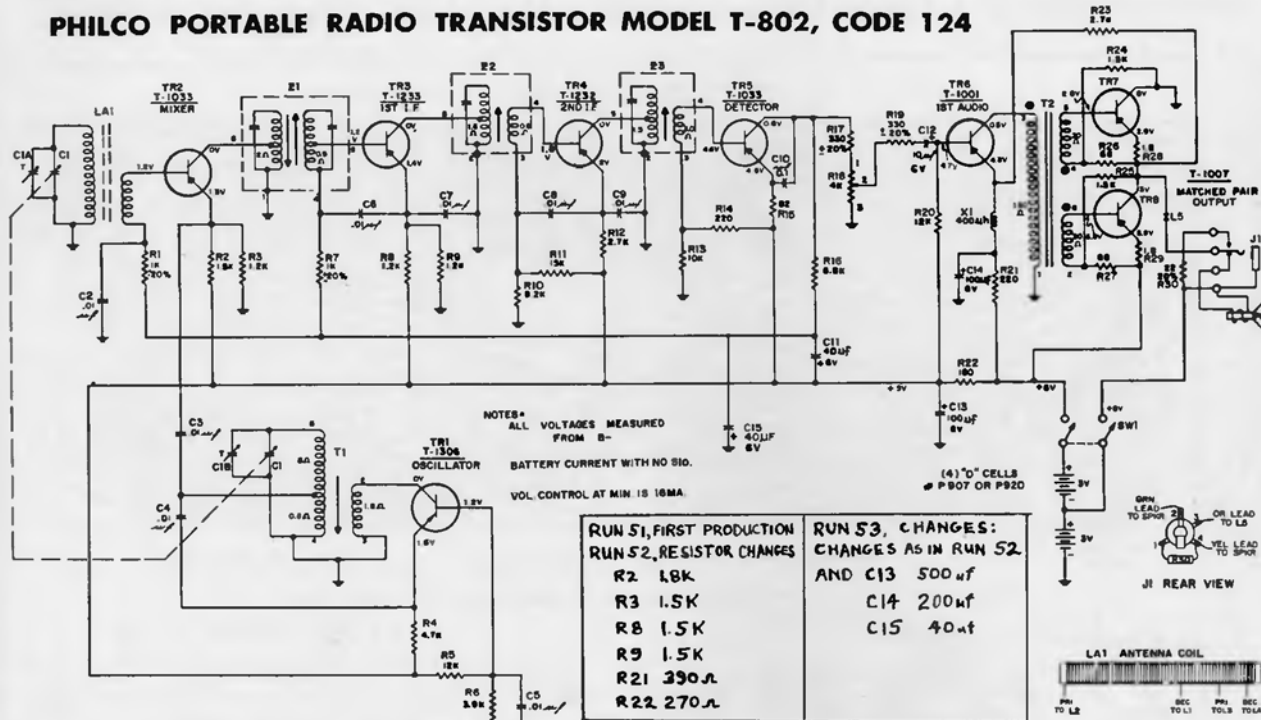


Schematic Diagram Model J-772



Bottom View, Partial Printed Panel Showing Models J-840, J-842, J-845, J-846. Foil Difference in Rect. Filament Circuit

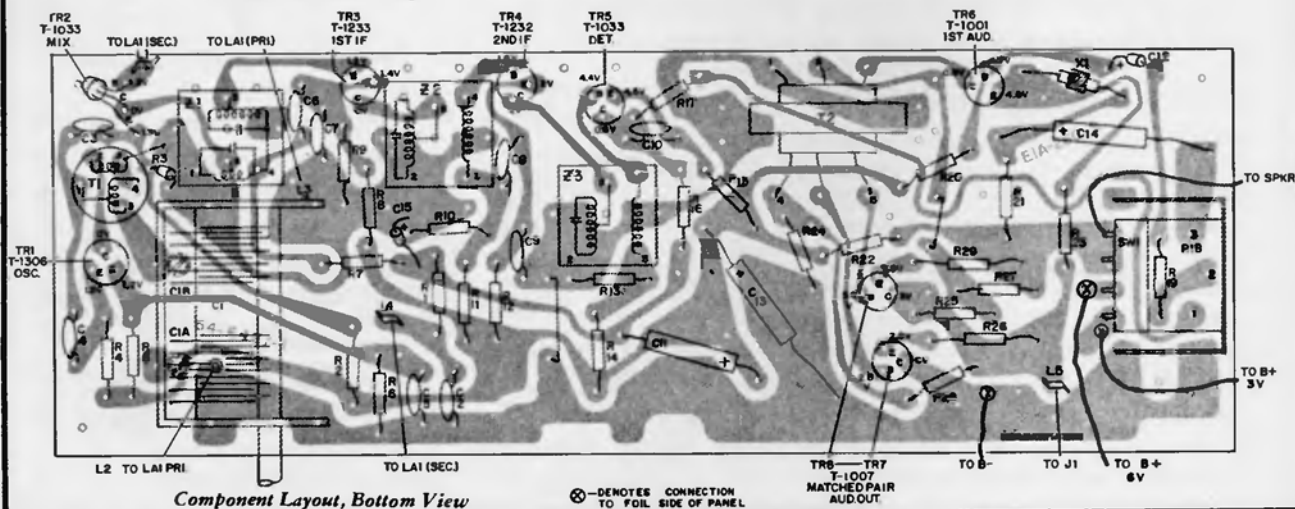
PHILCO PORTABLE RADIO TRANSISTOR MODEL T-802, CODE 124



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.



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	T1	E8	XFMR, osc.
C4	F7	Capacitor, .008 mfd, osc. emitter	R9	D5	Resistor, 3.3K Ω , mixer emitter	T2	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	K3	Capacitor, .008 mfd, det. base	R17	M4	Resistor, 220 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, B+ 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	* RUN 2—CHANGE INFORMATION C16—deleted C18A—400 mfd C18B—300 mfd R2—1.8K Ω R11—1.5K Ω		
J1	—	Jack, listening	R25*	Q4	Resistor, 220 Ω , aud. driver emit.			
LA1	—	Case	R26	Q8	Resistor, 2.7K Ω , aud. feed-back			
LS1	—	Case	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	R8	Resistor, 4.7K Ω , osc. emit.	R30	S3	Resistor, 68 Ω , TR9 base	R12—1.5K Ω R23—12K Ω R24—270 Ω R25—390 Ω		
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			

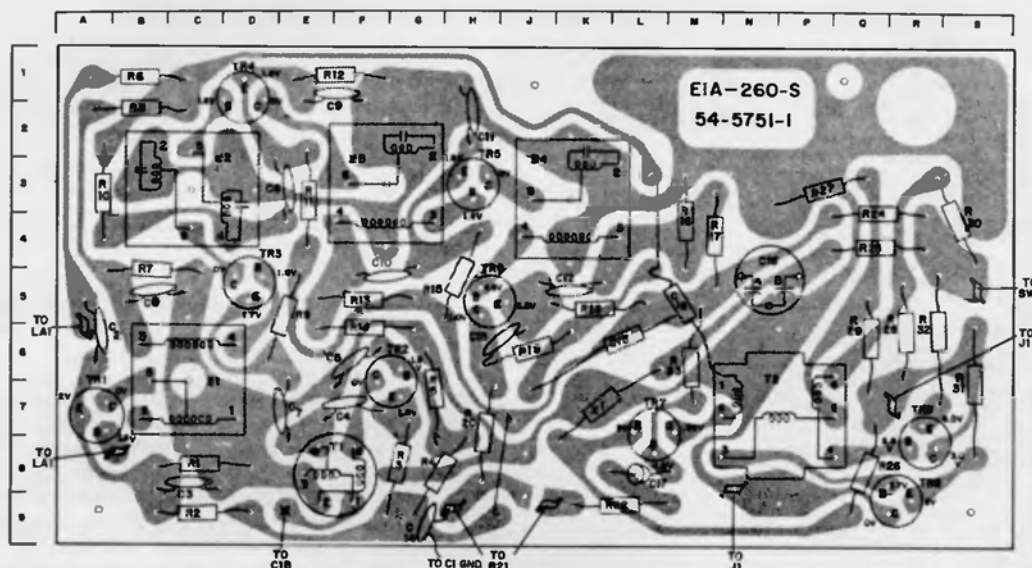
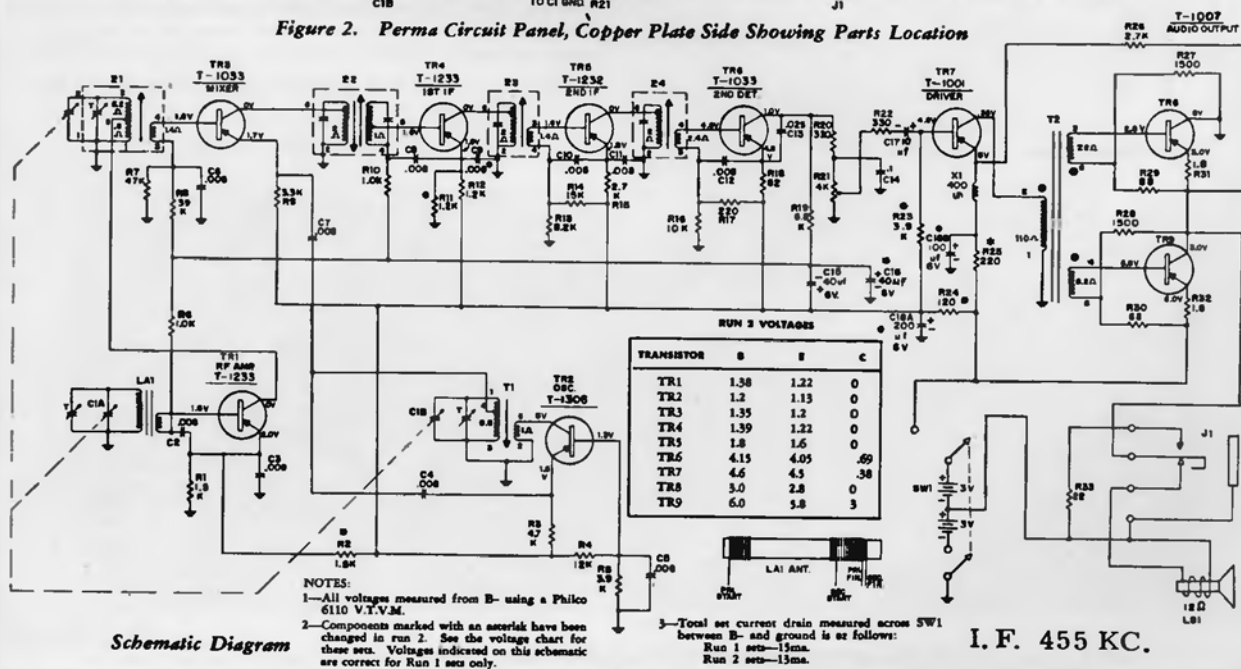
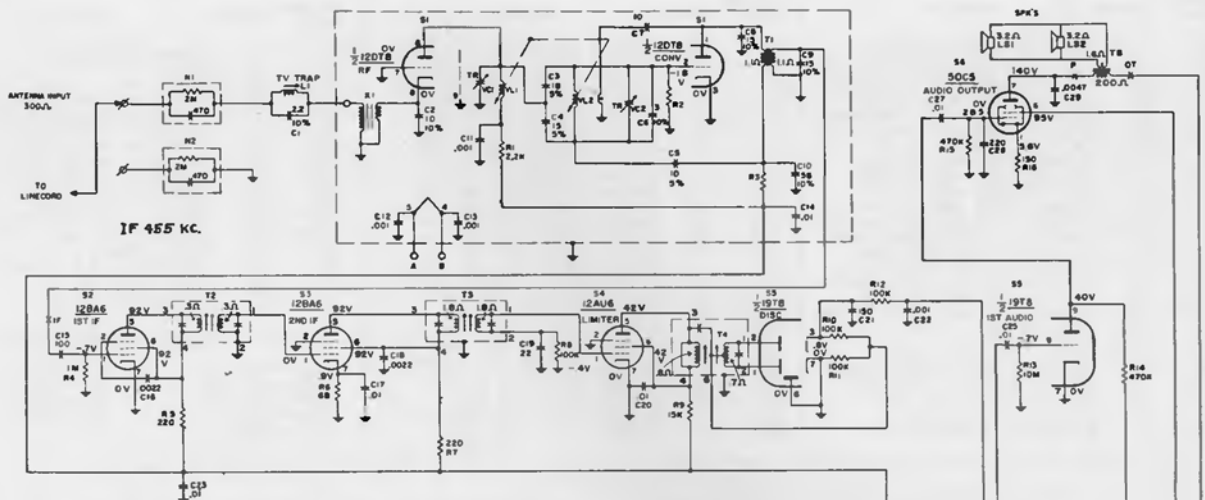


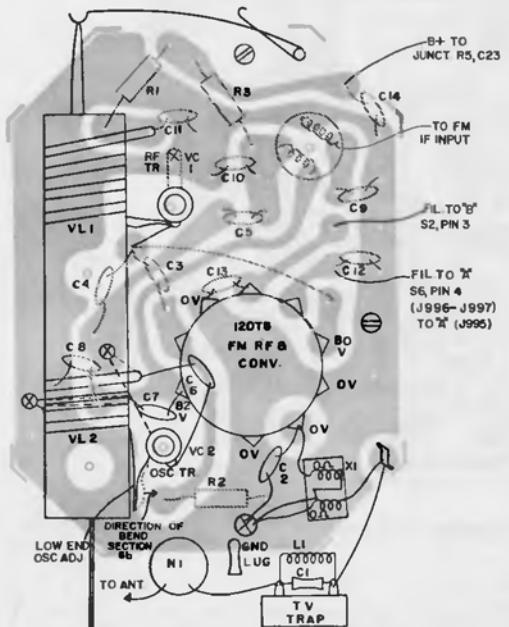
Figure 2. Perma Circuit Panel, Copper Plate Side Showing Parts Location



PHILCO FM MODEL J-995



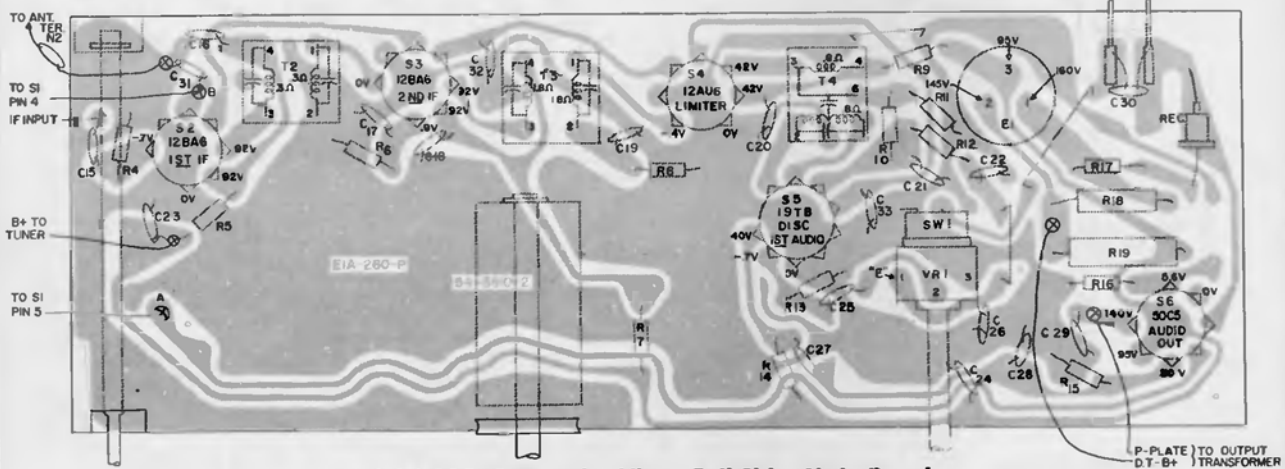
ALL VOLTAGES MEASURED FROM B+, NO SIGNAL APPLIED



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.

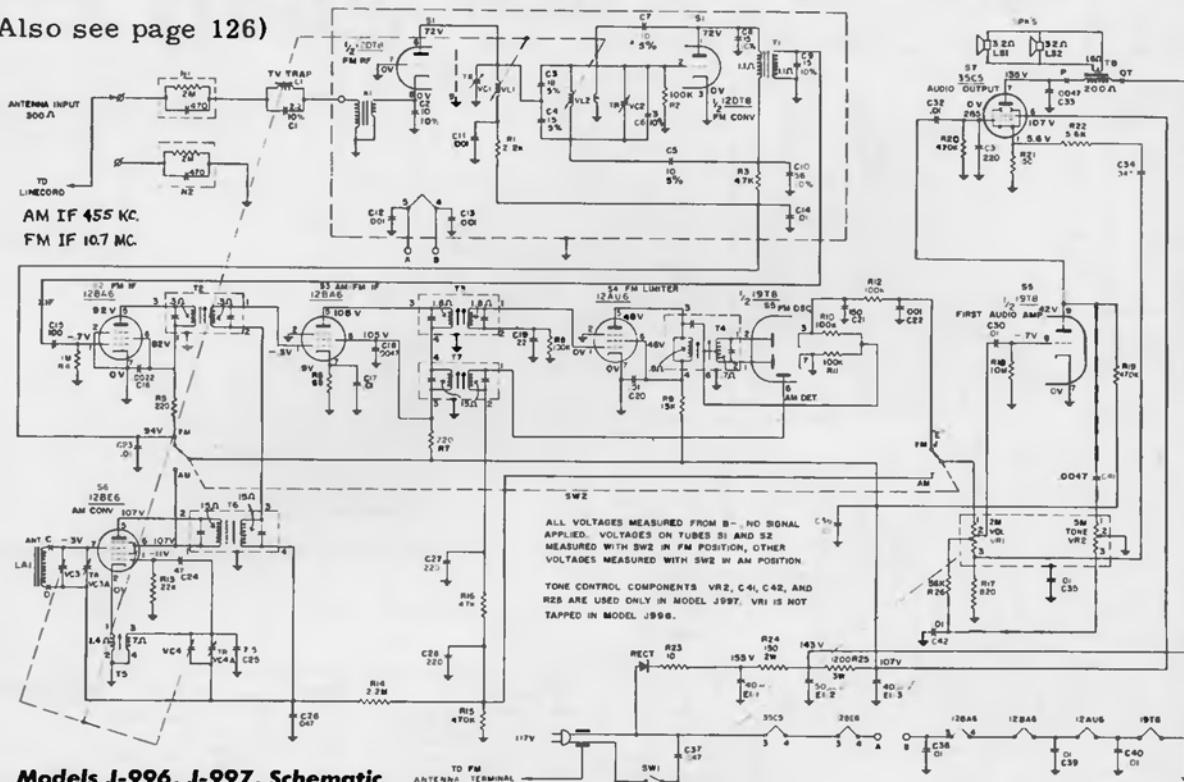
(For dial stringing see page 127)



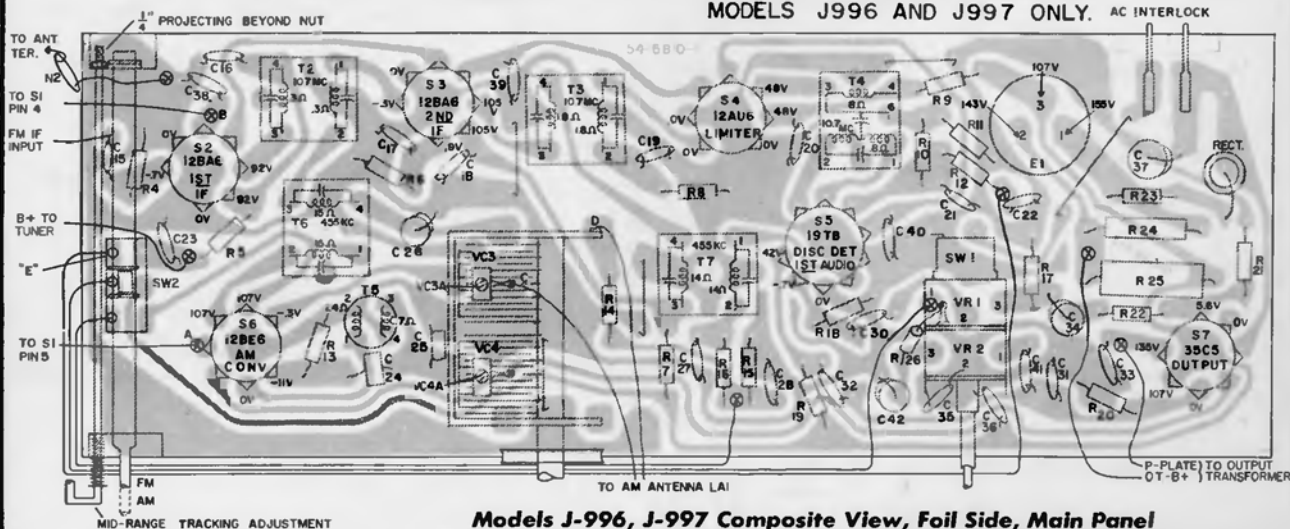
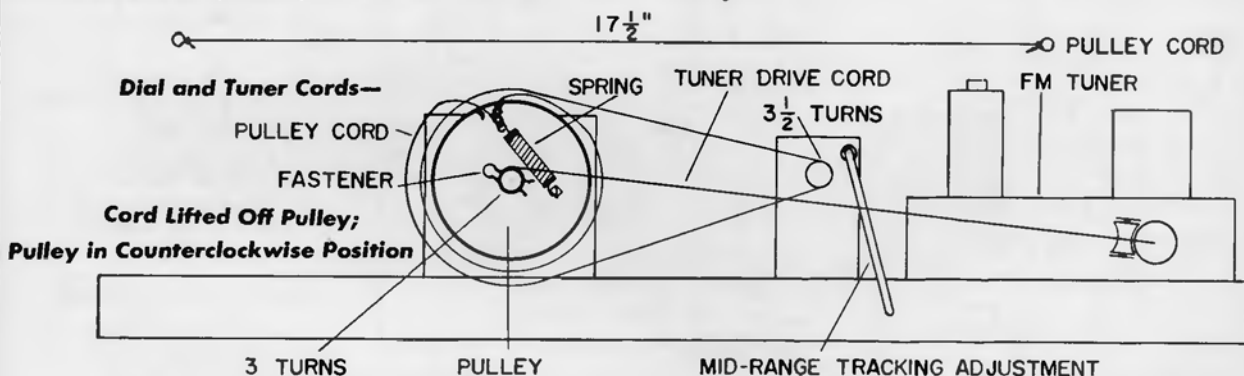
Model J-995, Composite View, Foil Side, Main Panel

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

(Also see page 126)



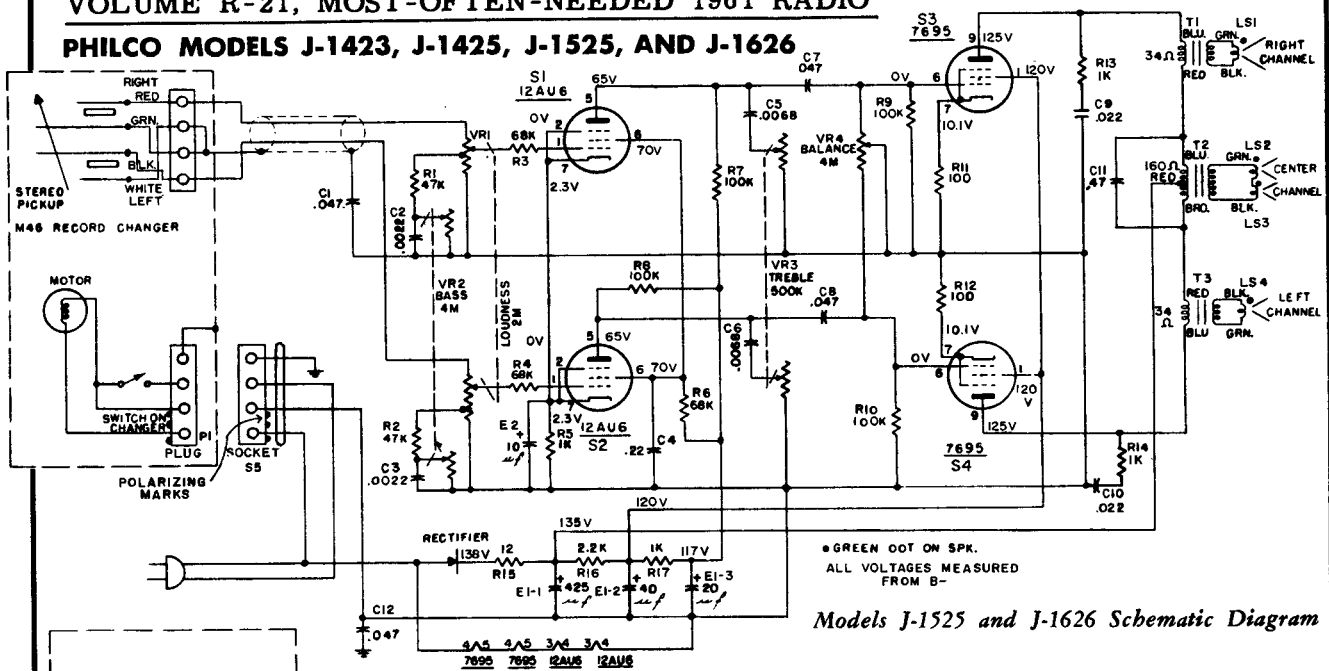
Models J-996, J-997, Schematic



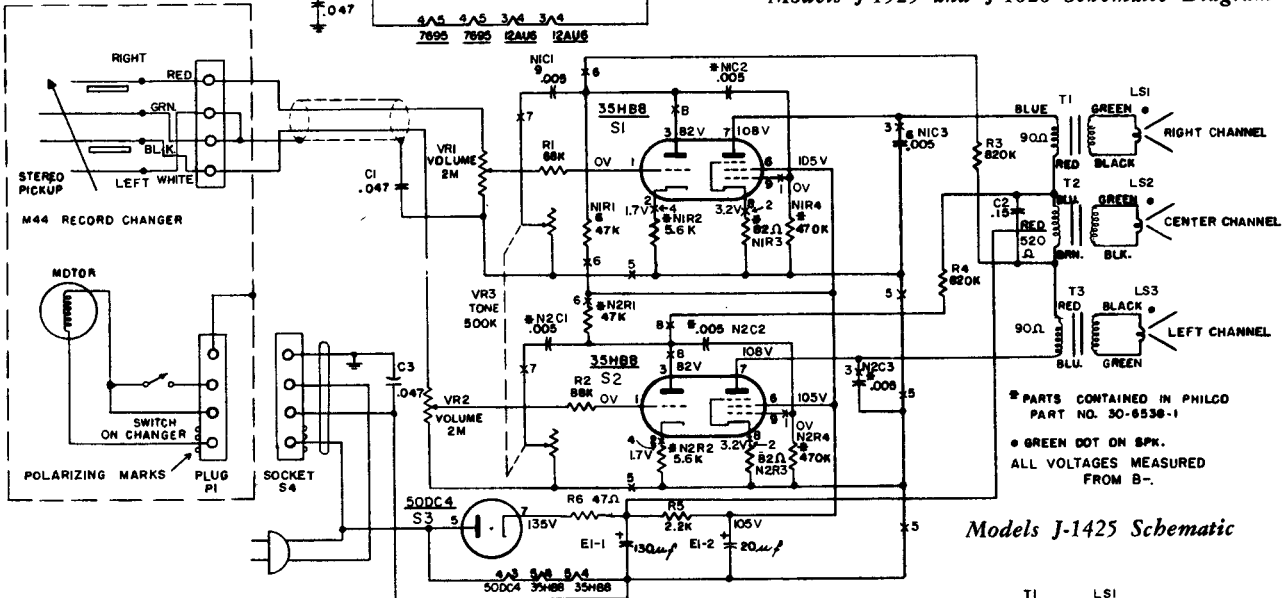
Models J-996, J-997 Composite View, Foil Side, Main Panel

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

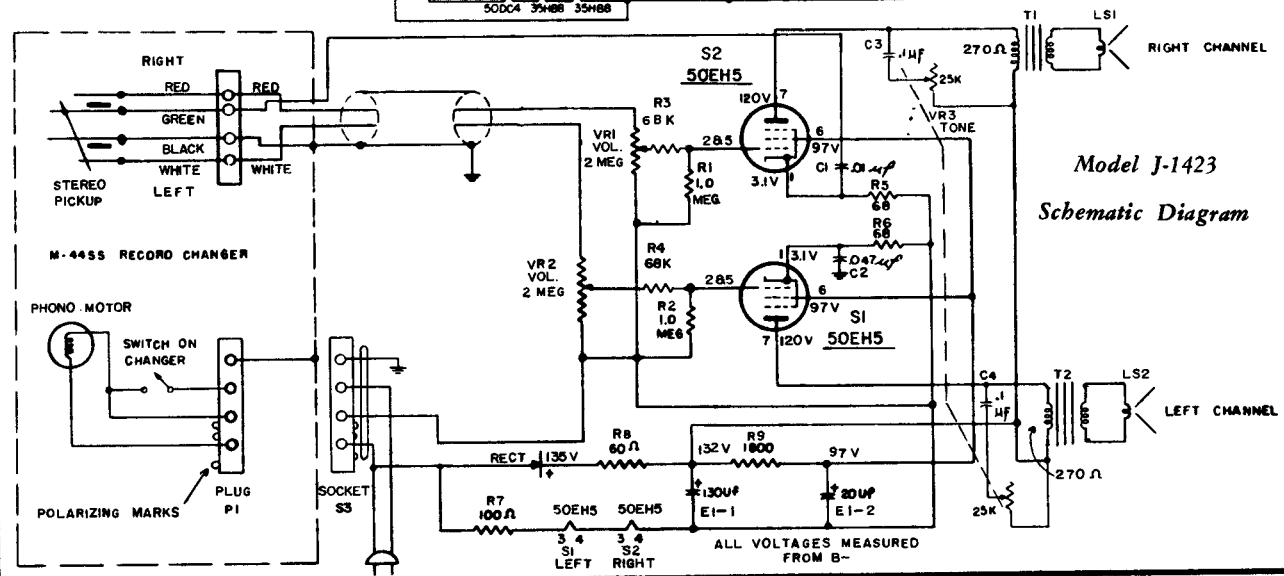
PHILCO MODELS J-1423, J-1425, J-1525, AND J-1626



Models J-1525 and J-1626 Schematic Diagram



Models J-1425 Schematic

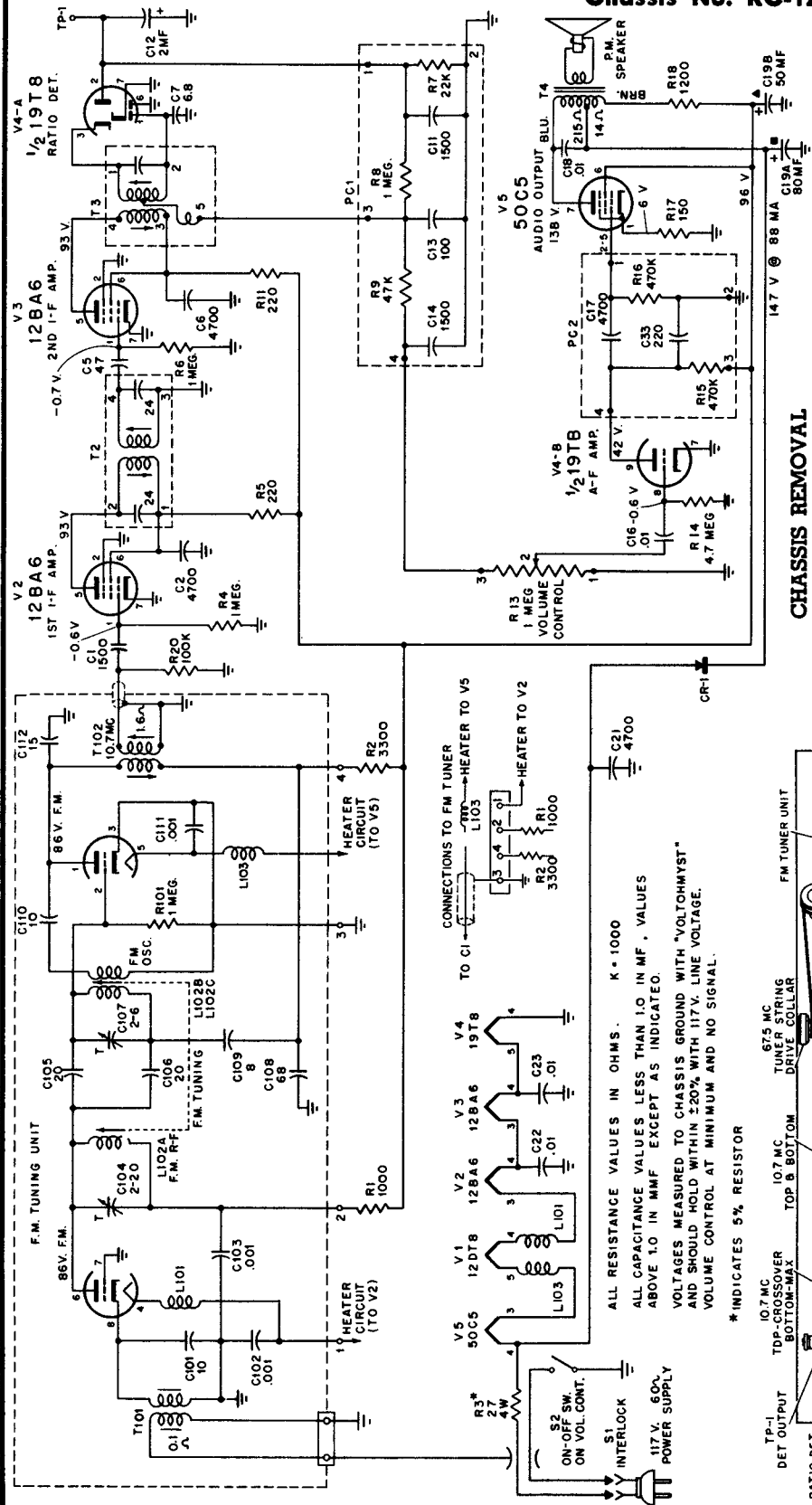


Model J-1423
Schematic Diagram

RCA VICTOR

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

Chassis No. RC-1201A



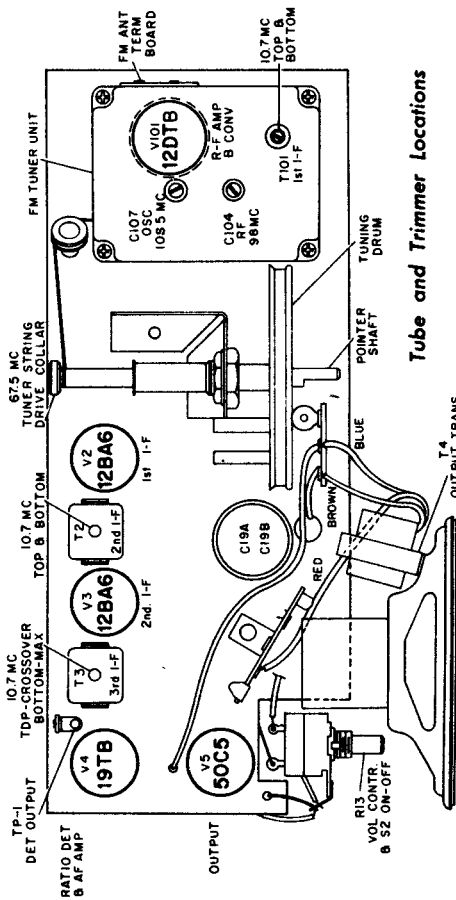
CHASSIS INSTALLATION

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

CHASSIS REMOVAL

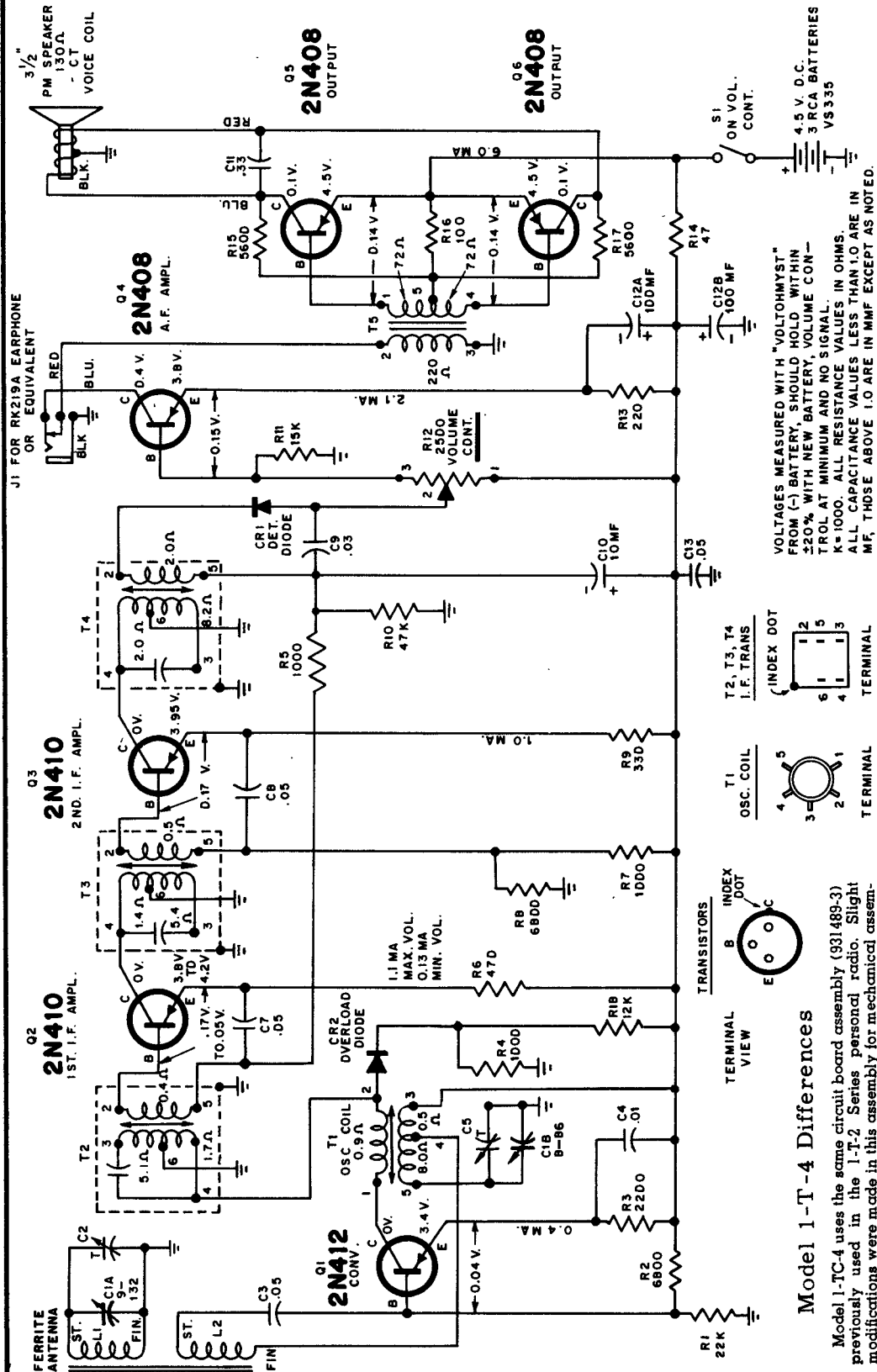
1. Remove two screws at bottom rear of cabinet and one screw at top center—this screw will remain with cabinet back.
2. Pull cabinet apart.
3. Pull off volume control knob and remove hex nut holding volume control to cabinet front.
4. Unhook dial drive cord and remove from drum.
5. Bend three retaining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



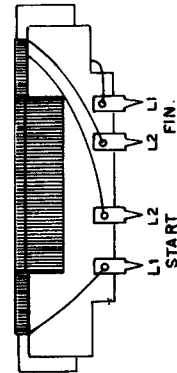
Tube and Trimmer Locations

RCA VICTOR

1-T-1, 1-T-2 Series, and Models 1-T-3, 1-TC-4
Chassis RC-1200 and RC-1200A
(Continued on the next page)



BATTERY CURRENT vs. OUTPUT		
Output Voltage Across Speaker (Blue to Red)		Approximate Battery Current
0		11 ma
1.14 r.m.s. — 3.2 p-p		24 ma
1.8 r.m.s. — 5.0 p-p		32 ma
2.5 r.m.s. — 7.0 p-p		42 ma
3.9 r.m.s. — 10.9 p-p		68 ma



Model 1-T-4 Differences

Model 1-TC-4 uses the same circuit board assembly (931489-3) previously used in the 1-T-2 Series personal radio. Slight modifications were made in this assembly for mechanical assembly and for clock operation. Major differences are as follows:

1. The battery contacts are attached to the bottom cover and not to the chassis.
2. There is no earphone jack.
3. The antenna is mounted on a fiber plate and is parallel to the lengthwise dimension of the chassis.
4. The switch on the volume control is a double-throw single-throw type and is used to select either RADIO or ALARM mode of operation. At maximum counterclockwise rotation S1A is open and S1B is closed. With the volume control in this position and the radio energized, audio regeneration occurs and a buzzing noise is reproduced by the speaker.

RCA VICTOR

(Continued from preceding page)

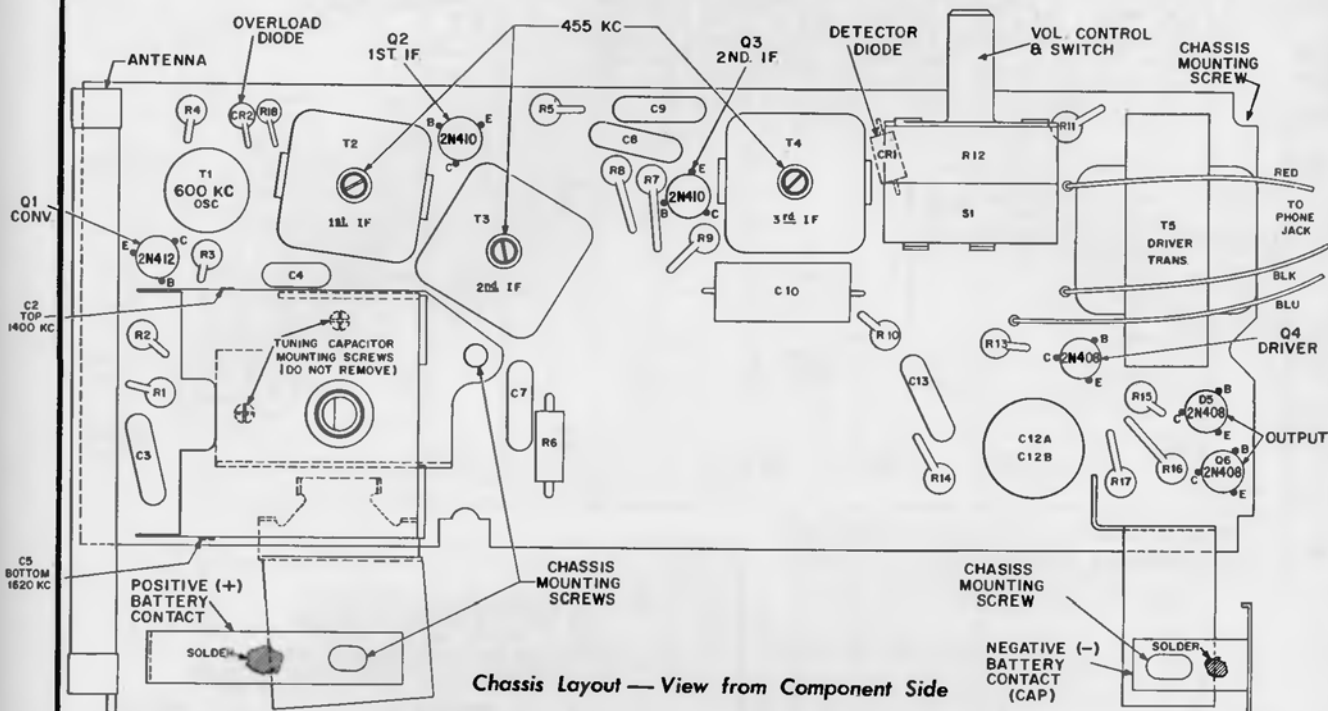
1-T-1 SERIES

Chassis No. RC-1200

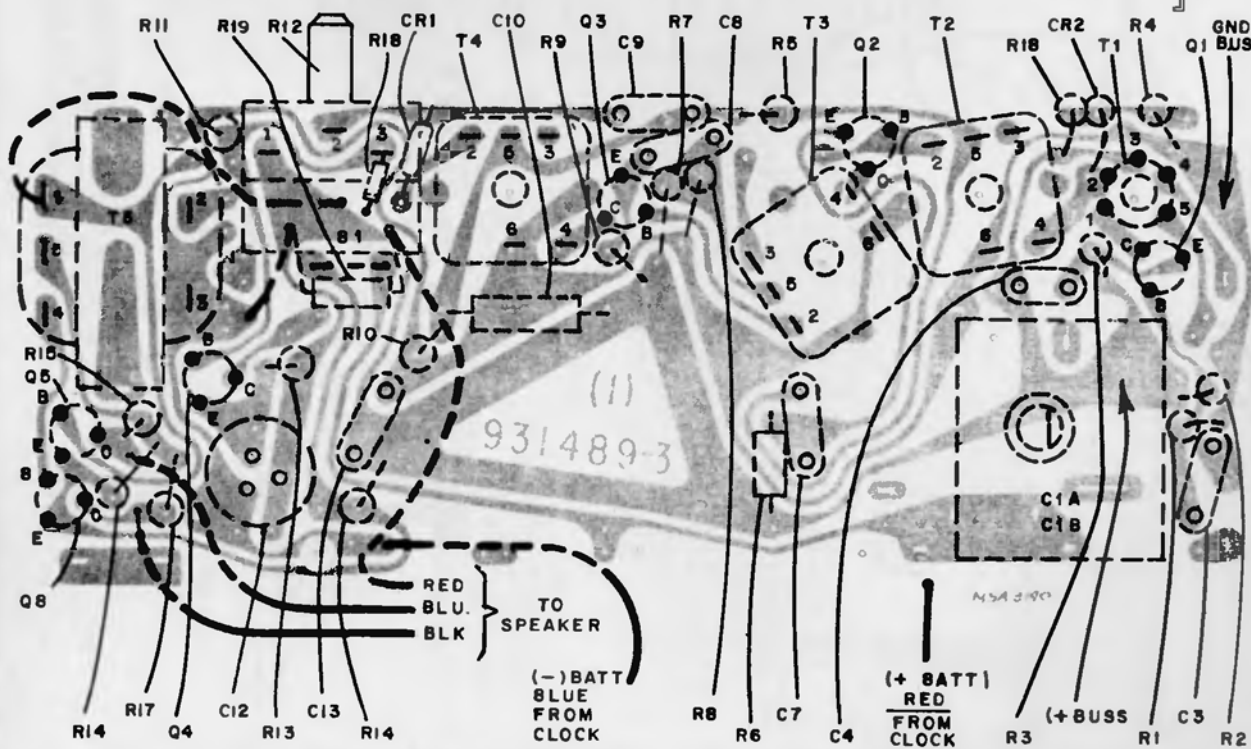
1-T-2 SERIES, MODEL 1-T-3 1-TC-4

Chassis No. RC-1200A

Circuit Board No. 931489-3



Chassis Layout — View from Component Side



Chassis Wiring and Components — View from Wiring Side

RCA VICTOR

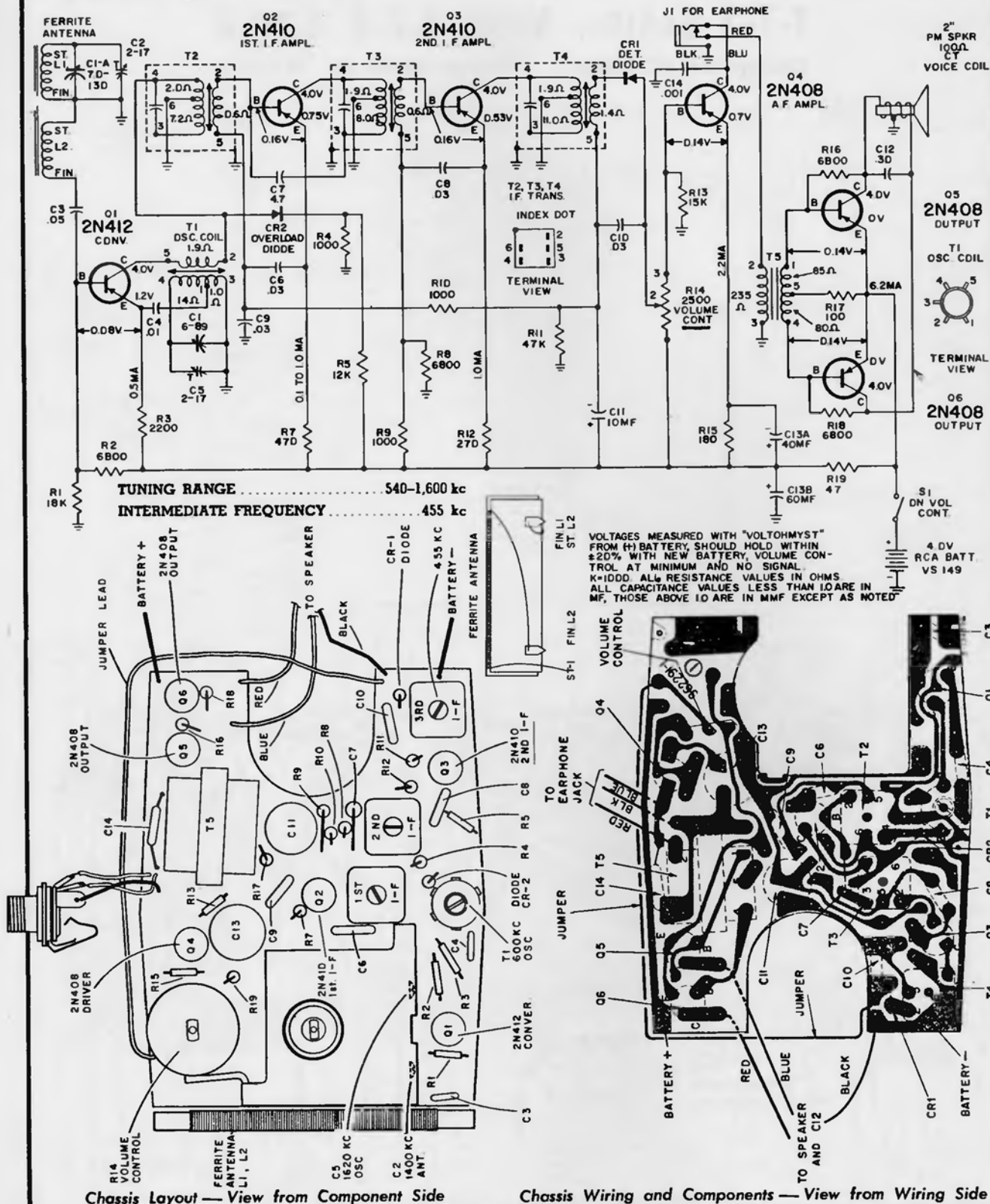
(For later type see next page)

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

Chassis No. RC-1199

RC-1199-A

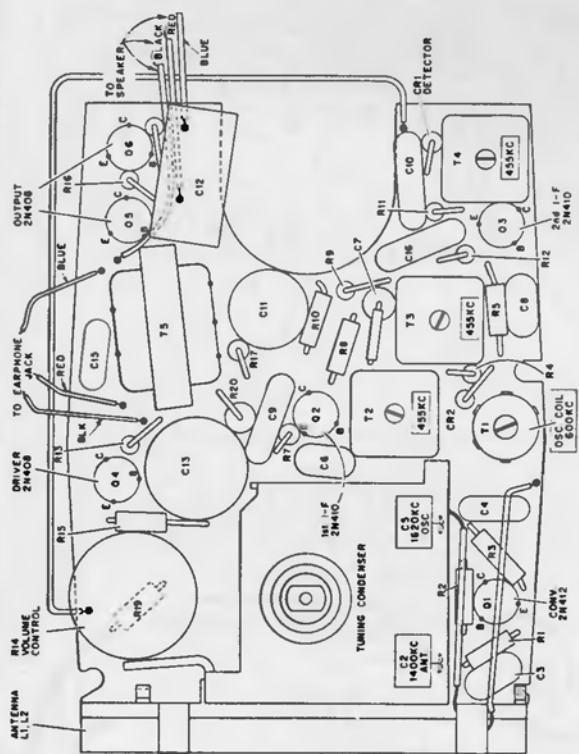
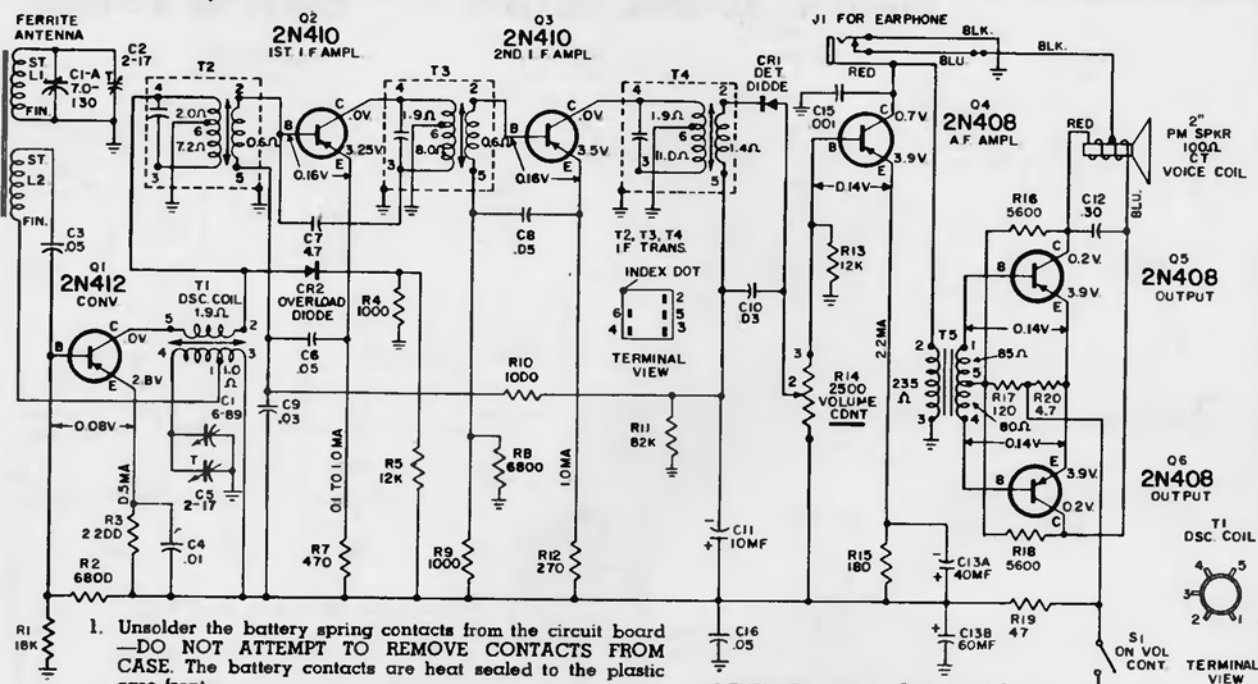
Circuit Board No. 962291-1



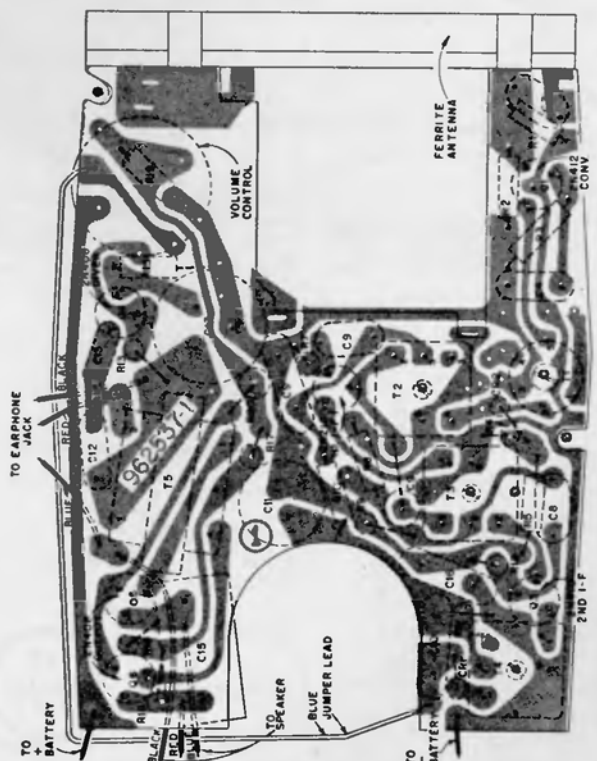
RCA VICTOR 1-TP-1 SERIES

Chassis No. RC-1199B

Circuit Board No. 962537-1



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.

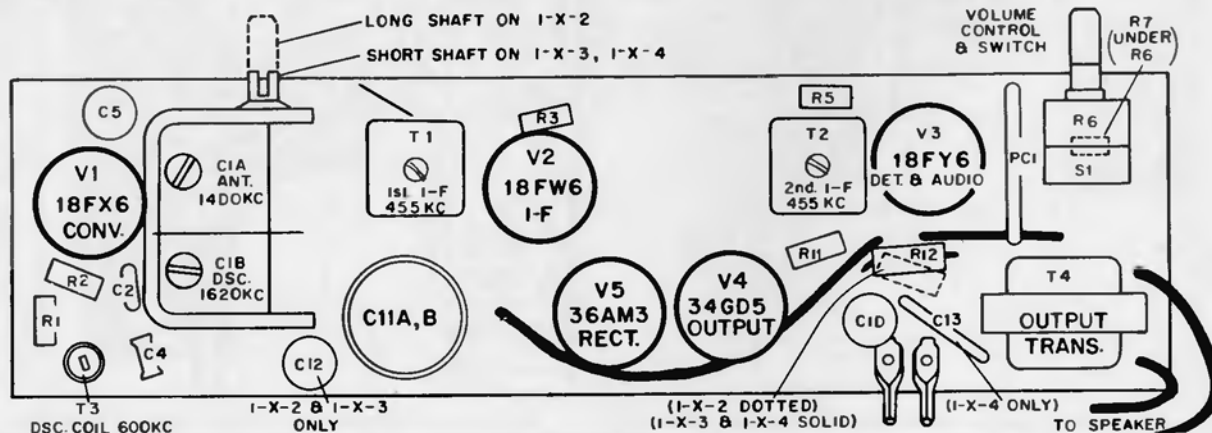
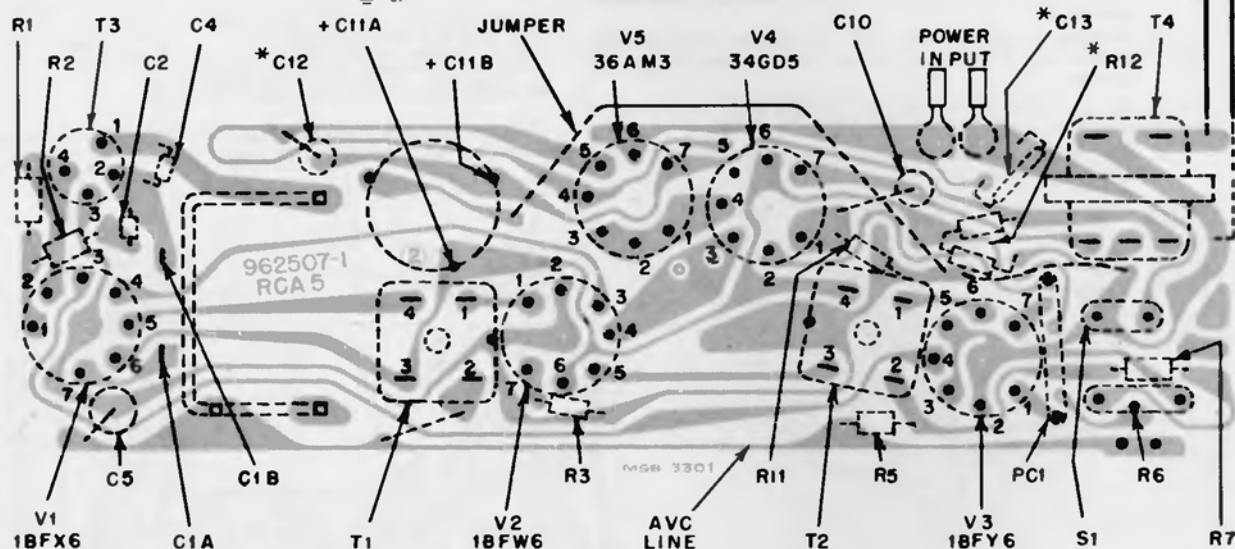
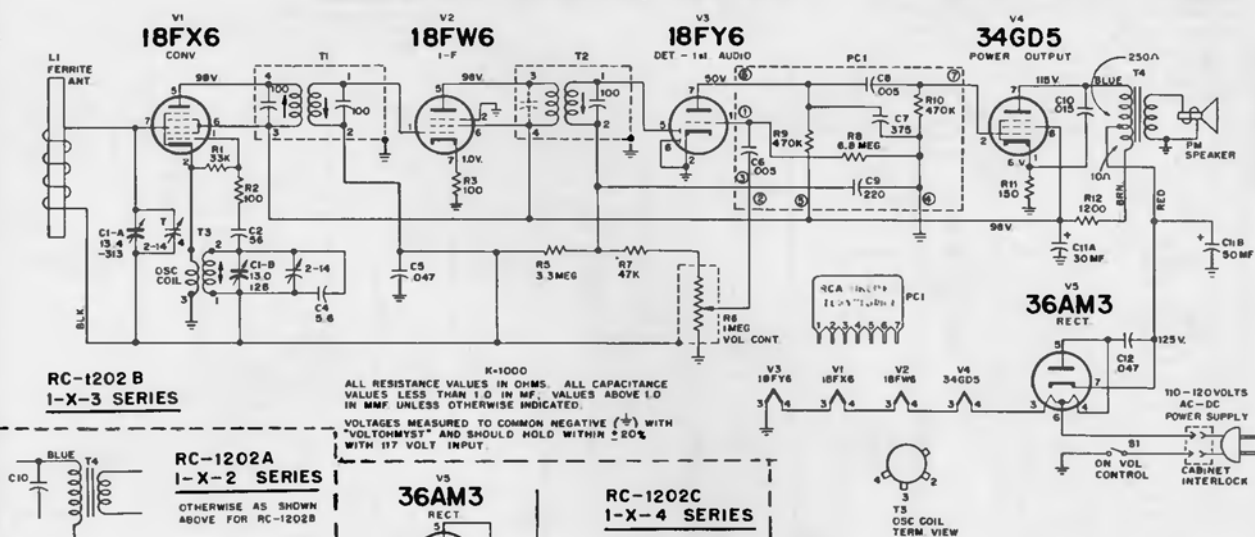
RCA

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

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

1-X-4 SERIES

Chassis No. RC-1202C





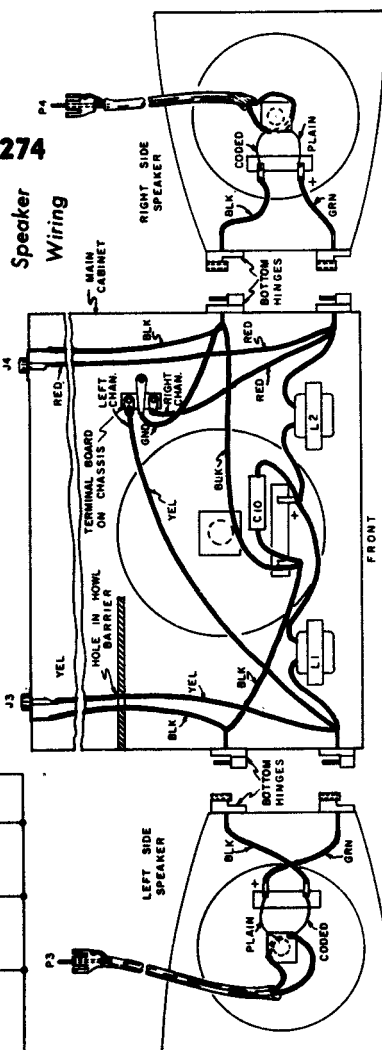
VOLTAGES MEASURED TO CHASSIS
GROUND WITH "VOLTIDHMYST"
SHOULD HOLD WITHIN $\pm 20\%$
WITH 115 V. LINE.
VOLUME CONTROL AT MINIMUM
NO SIGNAL

K=1000
ALL RESISTANCE VALUES

ALL CAPACITANCE VALUES
LESS THAN 1.0 IN MMF,
VALUES ABOVE 1.0 IN MMF,
EXCEPT AS INDICATED.

Model VP-34 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 8" PM "dual-cone" speaker are contained in the main unit. A 6½" PM "dual-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. When thus used, the interconnecting cables of the side units are plugged into the appropriate jacks



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 power 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 lugs 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

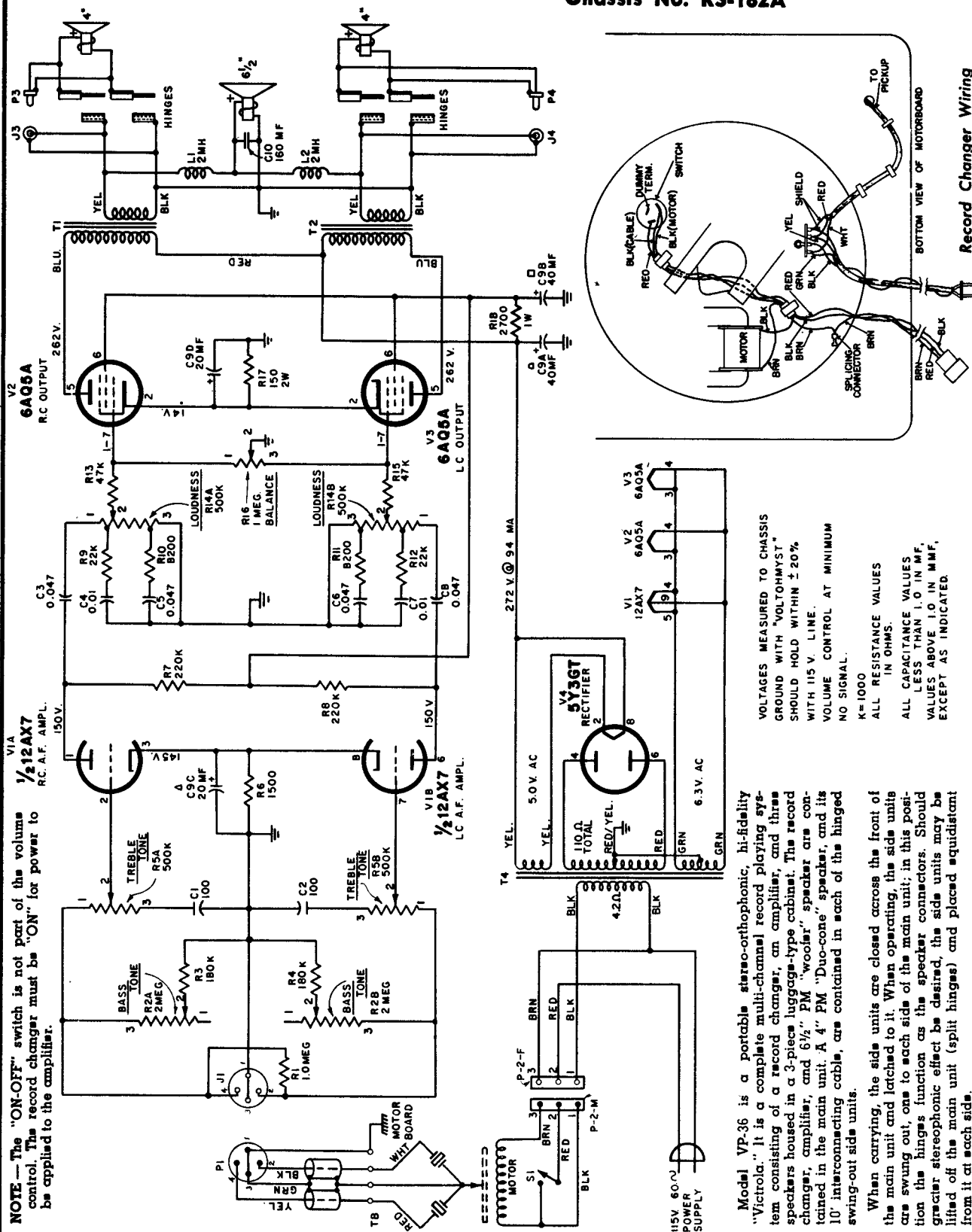
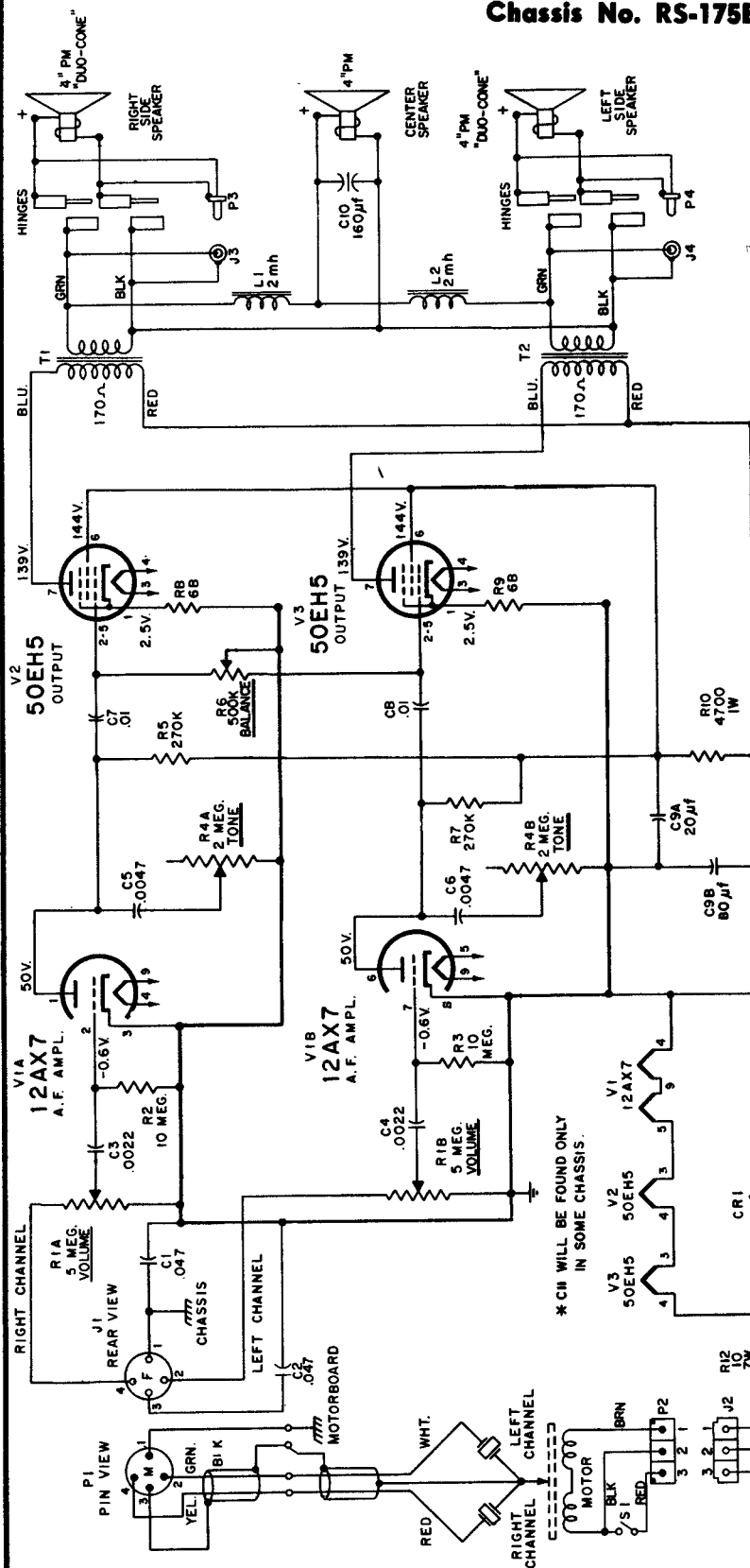


Diagram 3: BOTTOM VIEW OF MOTORBOARD

This diagram illustrates the wiring layout for the bottom view of the motorboard. The components and their connections are as follows:

- MOTOR:** Connected to the BLK (Black) and BRN (Brown) wires.
- SWITCH:** Connected to the BLK (Motor) and RED (Cable) wires. A DUMMY TERM. (Dummy Terminal) is also shown.
- PICKUP:** Connected to the RED, GRN (Green), BLK, and WHT (White) wires. A SHIELD is also indicated.
- SPlicing CONNECTOR:** Used to join the BLK, BRN, and GRN wires.
- TO PICKUP:** A cable leading from the pickup area towards the top right.



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 side speakers are designed primarily to reproduce only those frequencies in the middle and higher ranges. The two 2000-ohm 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.

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

15V. 60~
PWR. SUPP.
* CH
.27μf ± 10%, 400V.
PAPER TUBULAR

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

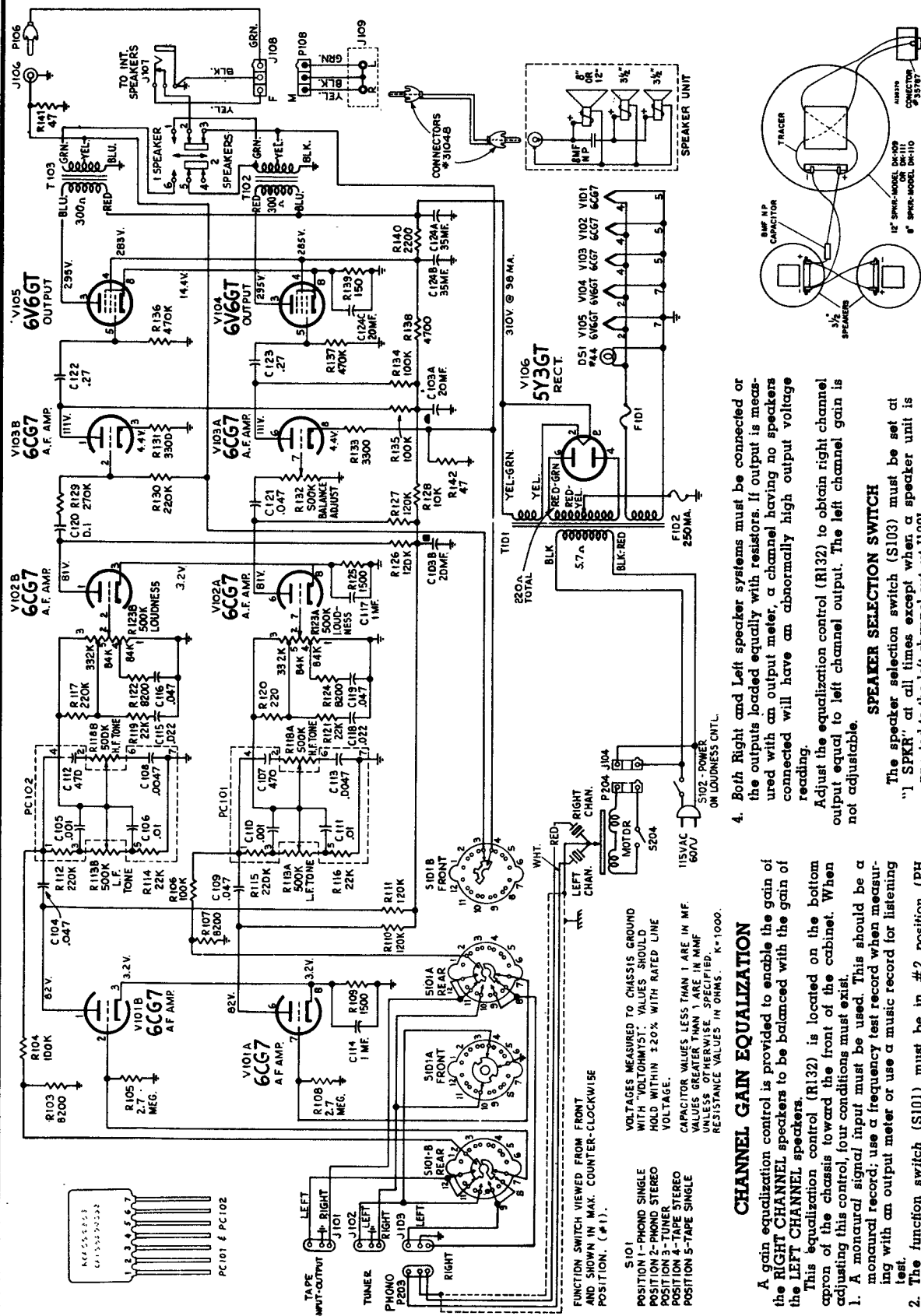
K $\times$ 1000. ALL RESISTANCE VALUES IN OHMS. ALL CAPACITANCE VALUES LESS THAN 1.0 IN μ f, VALUES ABOVE 1.0 IN μ mf EXCEPT AS INDICATED.

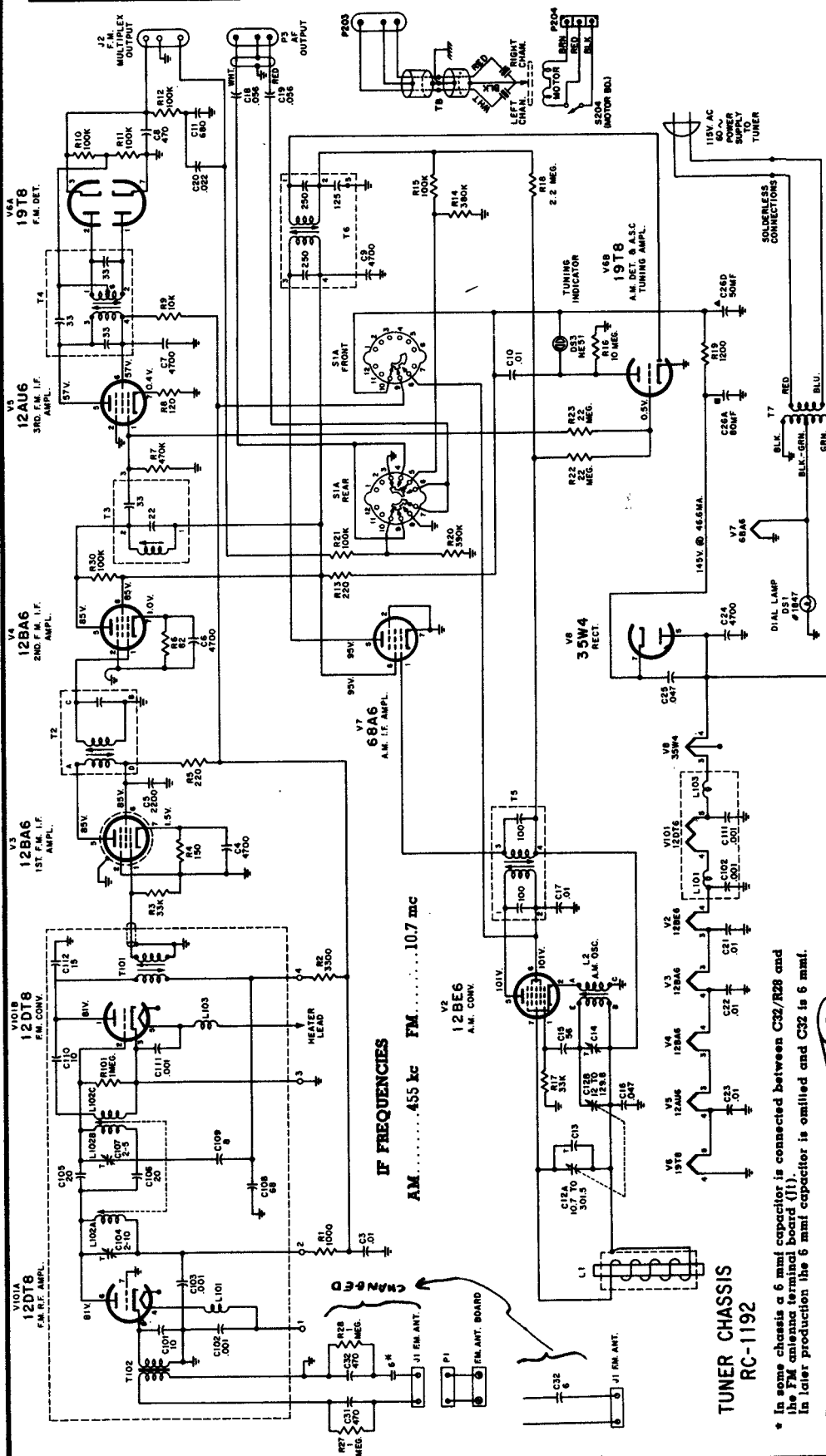
The three speakers are connected together. A capacitor (C10) is connected across the center speaker.

The side speakers are designed primarily to reproduce only those frequencies in the middle and higher ranges. The two 2mhz reactors (L1 and L2) pass and combine the low frequencies of the two side channels to the center speaker. The 160 μ i capacitor (C10) acts as an additional bypass to filter out many 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.

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

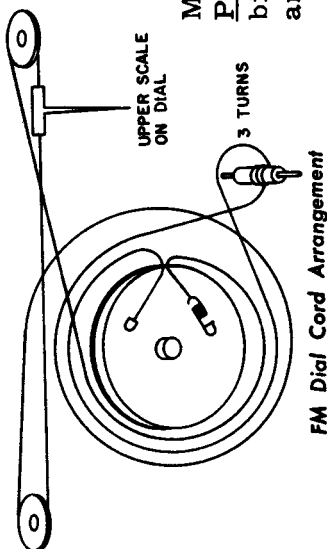


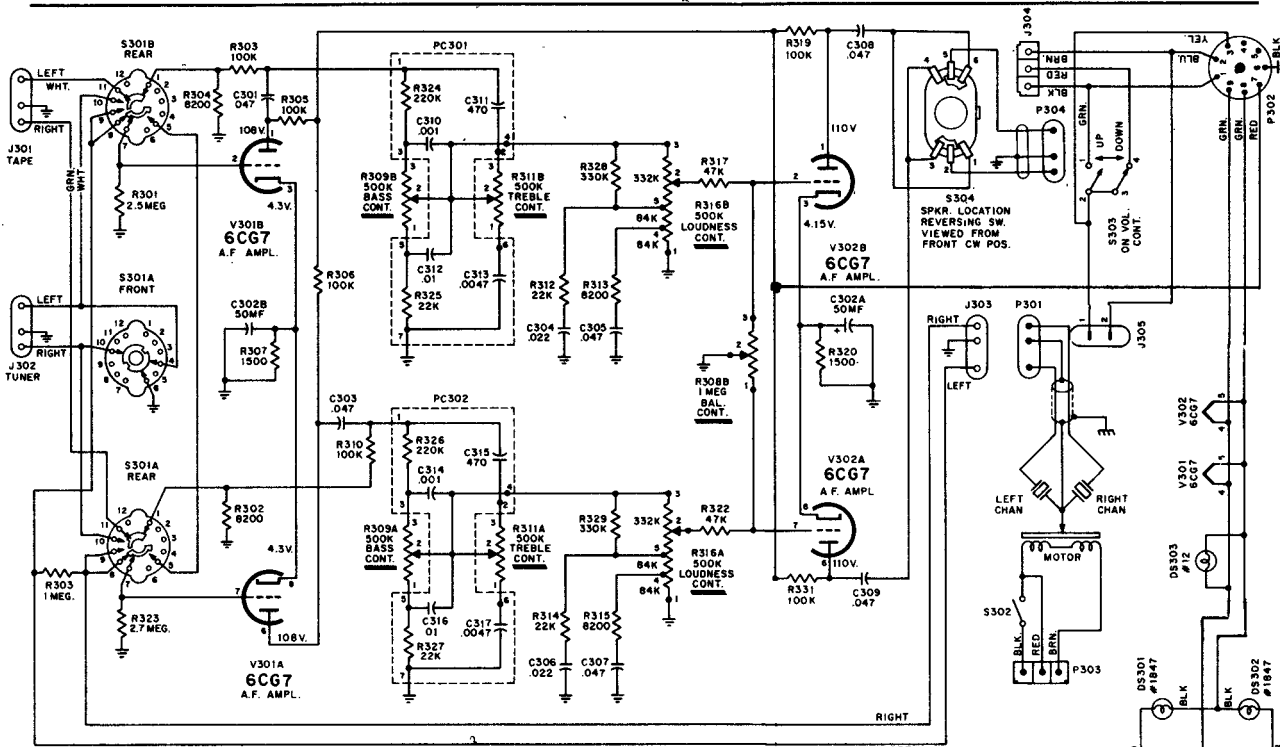


RCA VICTOR

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.

K=1000
 ALL RESISTANCE VALUES IN OHMS.
 ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF.
 VALUES ABOVE 1.0 IN MMF EXCEPT AS NOTED.
 VOLTAGES MEASURED TO CHASSIS GROUND WITH
 "VOLTOHMIST" SHOULD HOLD WITHIN $\pm 25\%$
 AT 115 V. LINE. VOLUME CONTROL MINIMUM
 AND NO SIGNAL.

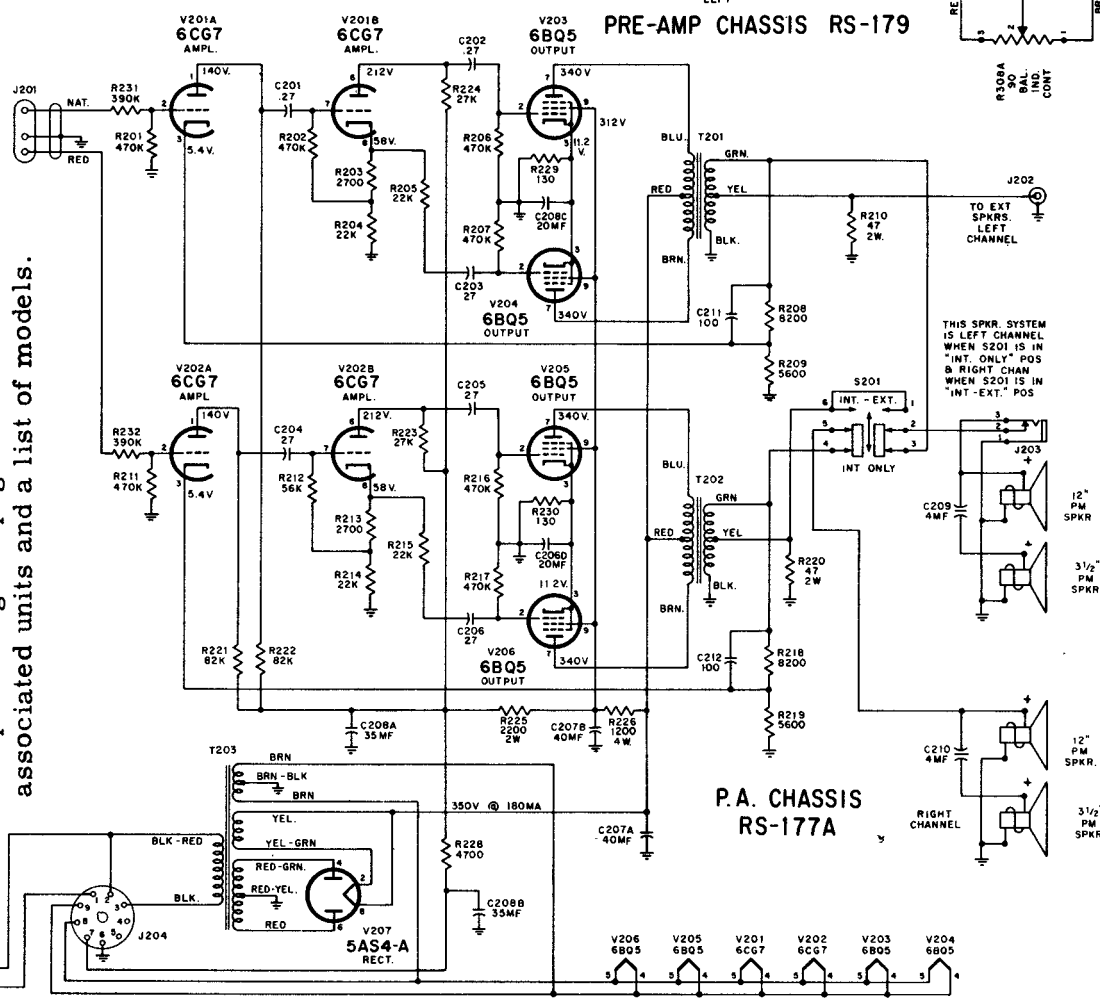




PRE-AMP CHASSIS RS-179

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

RCA VICTOR

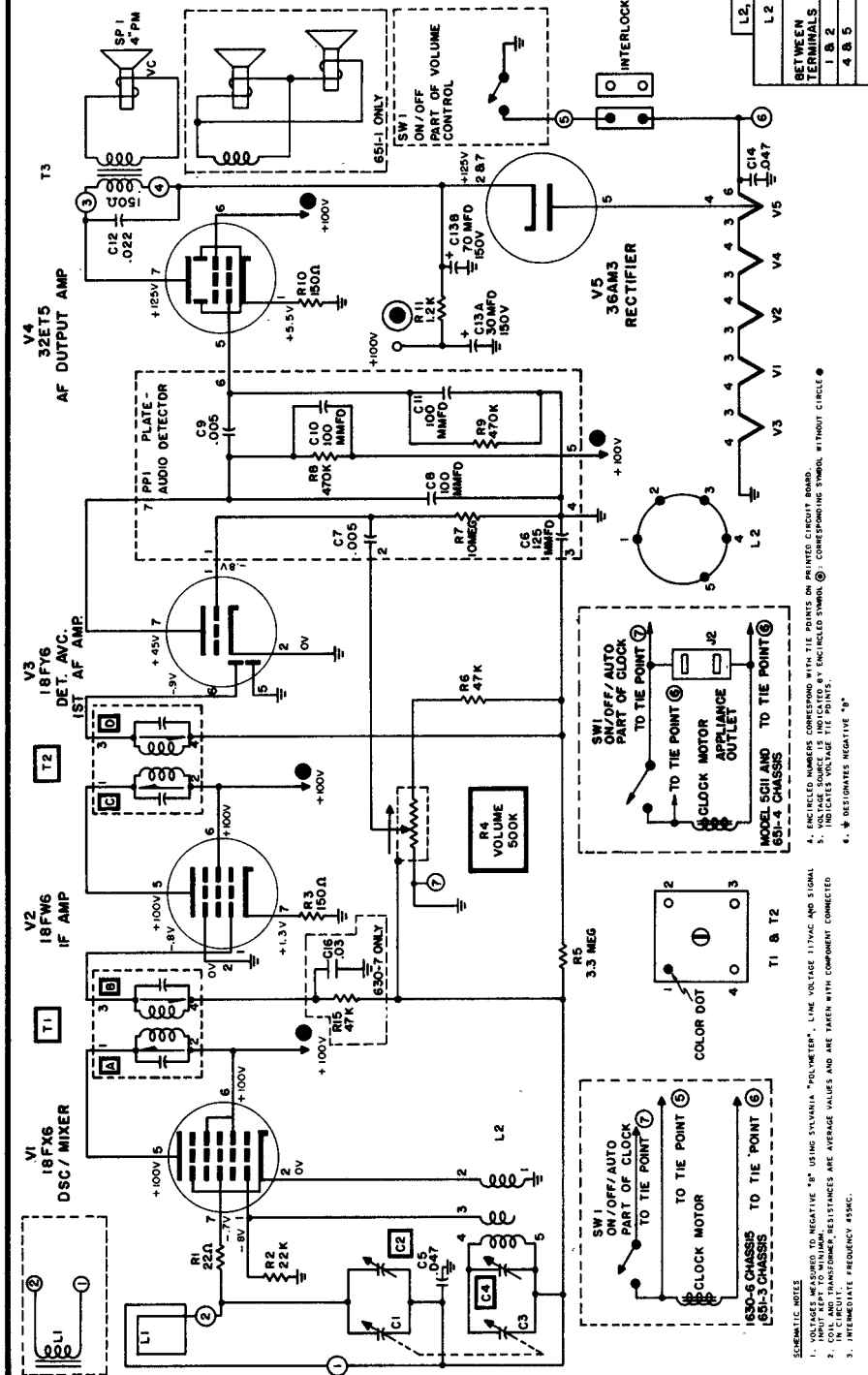


P.A. CHASSIS
RS-177A

SYLVANIA

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

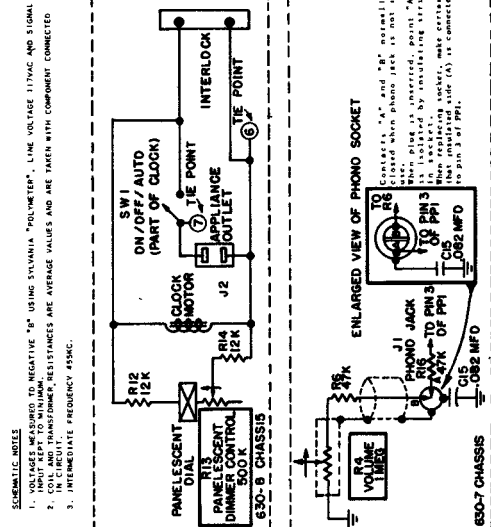
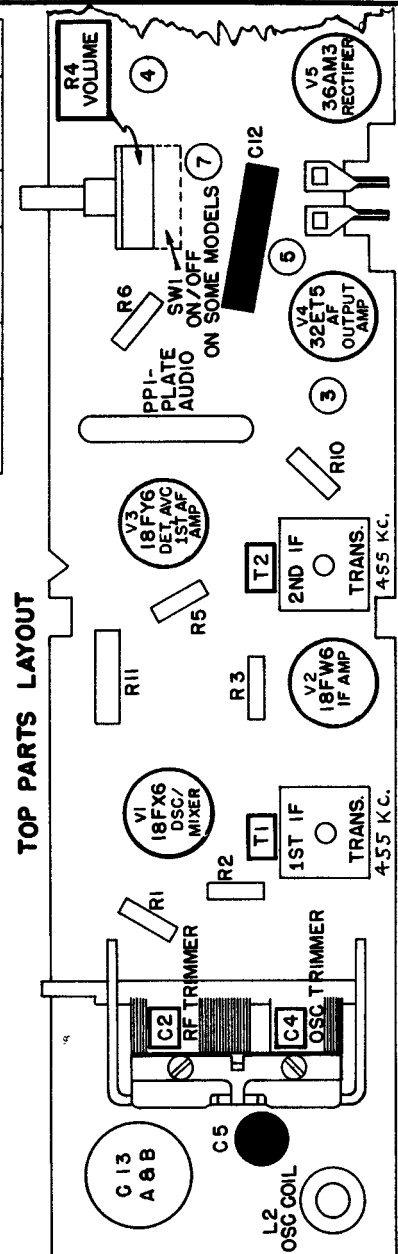
Models 5C10B, P, 5C11B, T, 5C12R, T, W, 5T10B, P, 5T11B, T, 5T12R, T, W, 1100, 1111, 1160, 1212, 1219, 1286, 1300, 1301, 1306, 1309, 1322, 1400, 1512, 1519, 1600, 1701, 1704, 1708, and 1709



L2, T1 & T2 RESISTANCE CHART

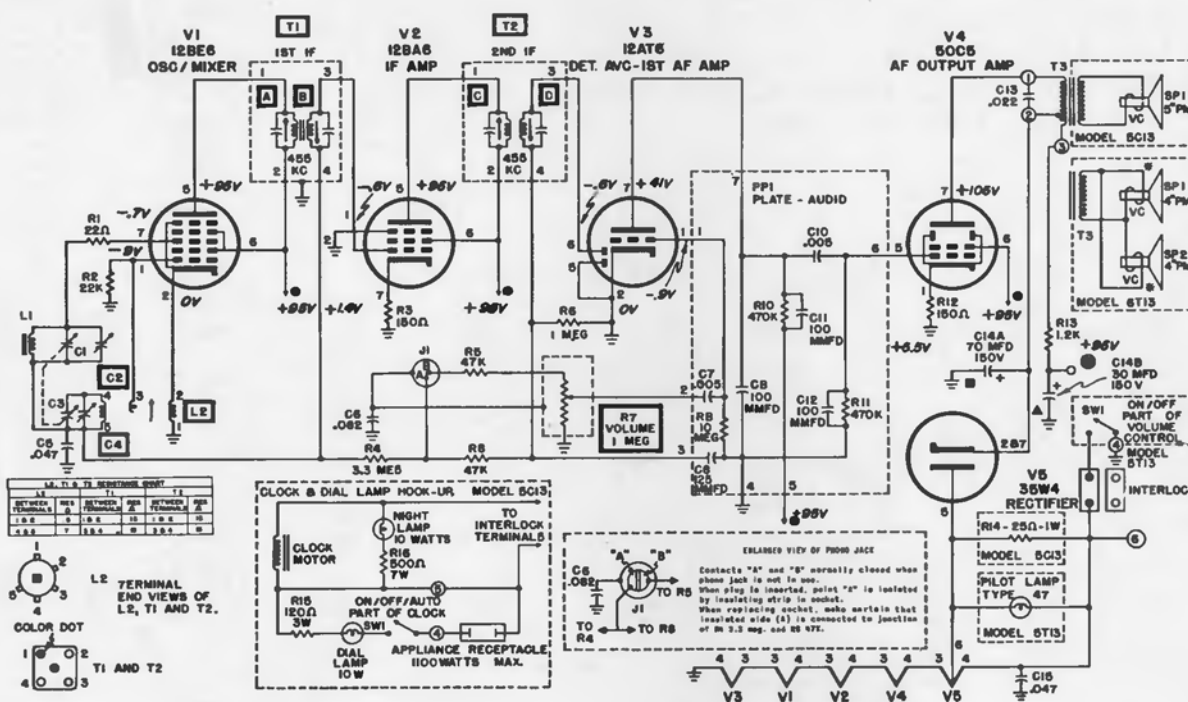
T1		T2	
BETWEEN TERMINALS	RES. Ω	BETWEEN TERMINALS	RES. Ω
1 & 2	1.8 2	1.8 2	15
3 & 4	3.8 4	3.8 4	15
4 & 5	7	3.8 4	15

TOP PARTS LAYOUT

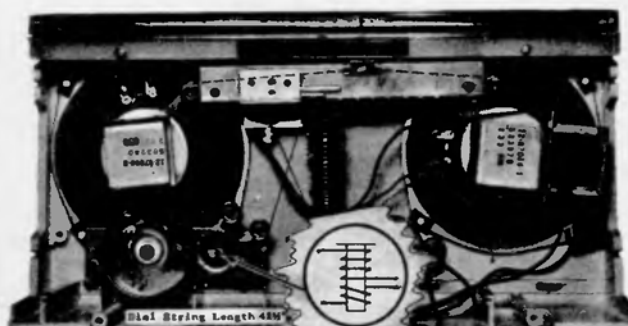
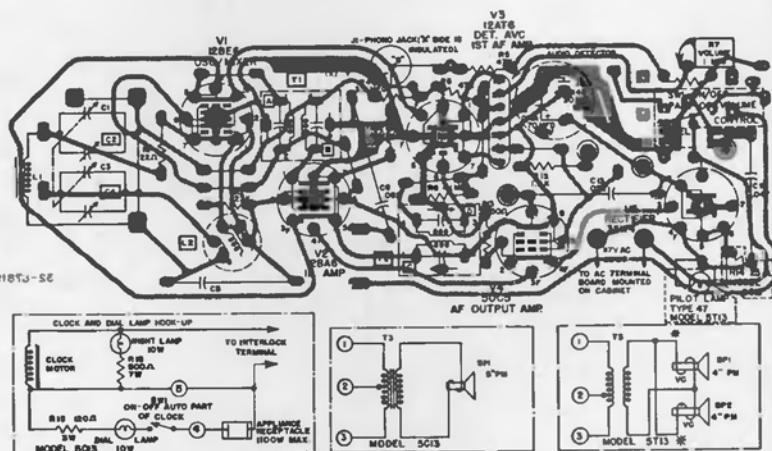


SYLVANIA

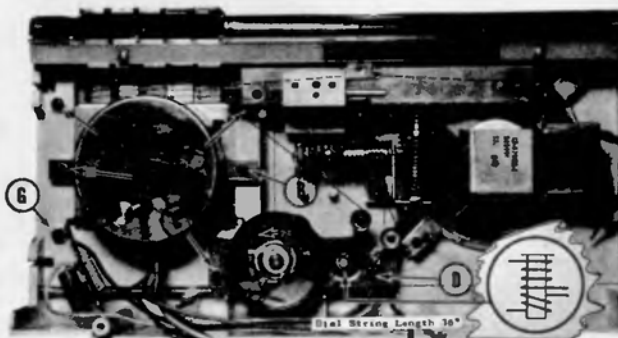
CHASSIS: 631-2, 3
MODELS: 5C13, 5T13



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.



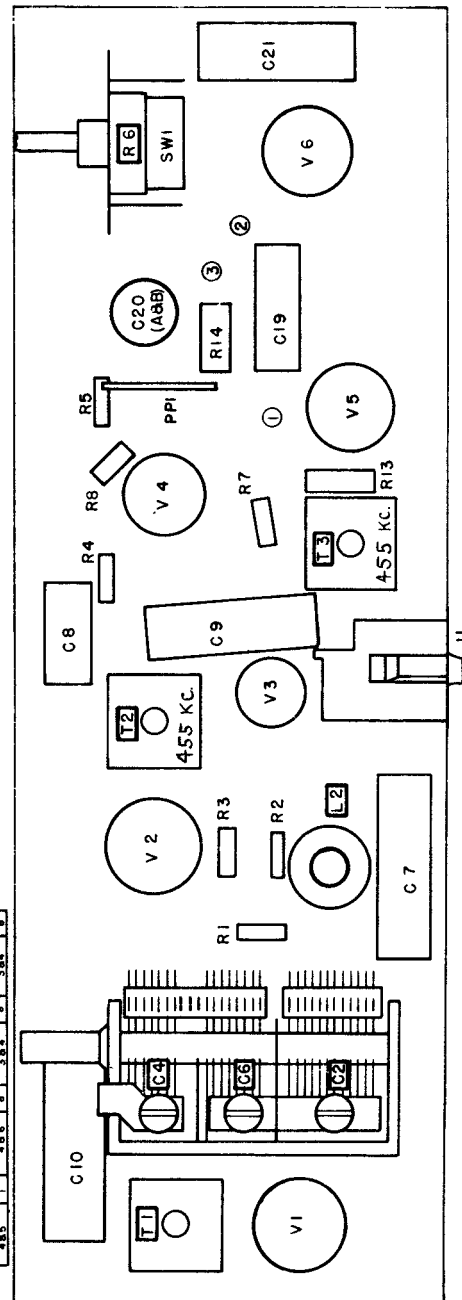
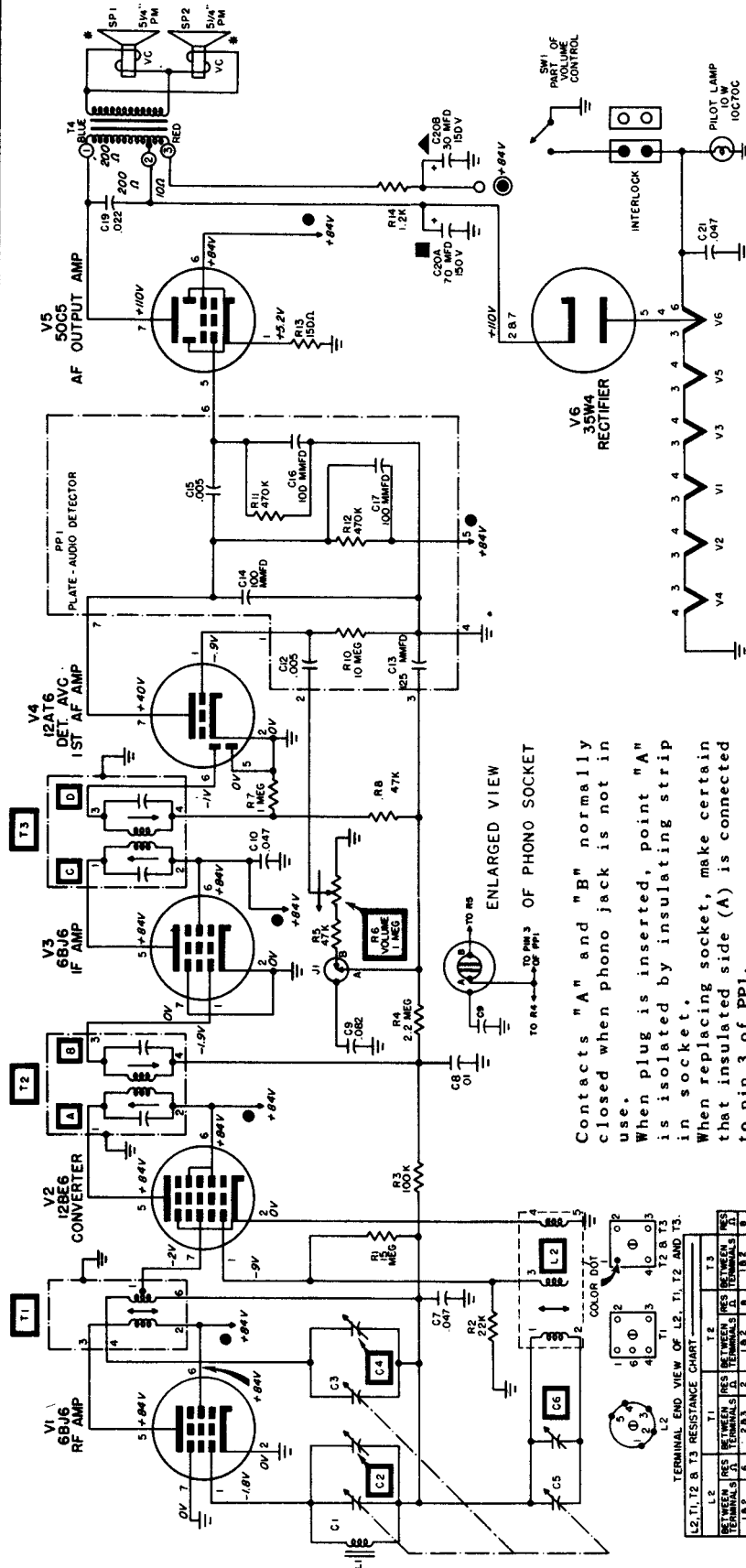
5T13 - Dial Drive & Speaker Assm.



5C13 - Clock, Dial Drive & Speaker Assm.

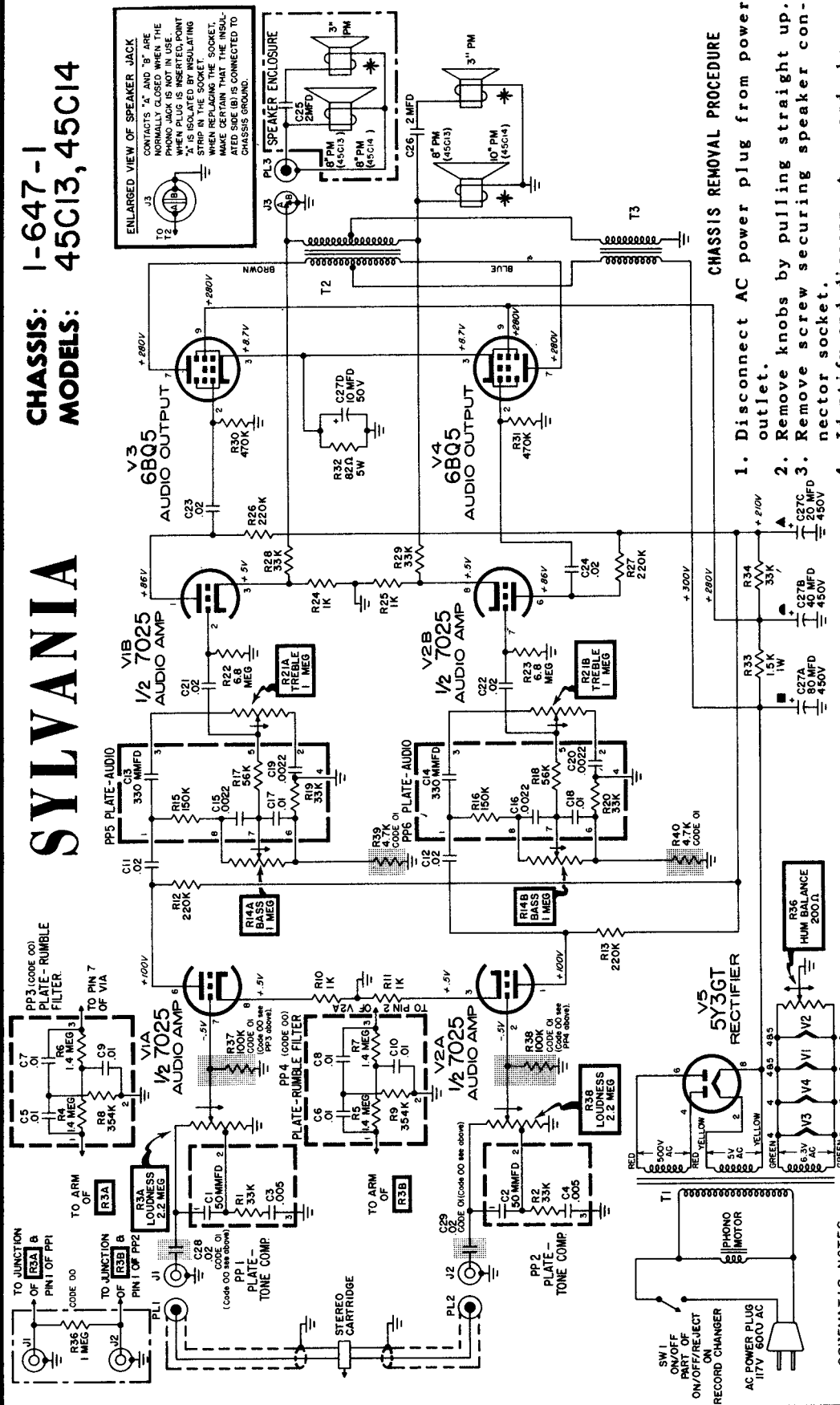
SYLVANIA

CHASSIS: 632-3
MODELS: 6T14 SERIES



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

SYLVANIA



SCHEMATIC NOTES

1. VOLTAGES SHOWN ARE AVERAGE READINGS MEASURED TO CHASSIS WITH NO SIGNAL INPUT.
2. VARIATIONS MAYBE NOTED DUE TO NORMAL PRODUCTION TOLERANCES.
3. LINE VOLTAGE 117 VOLT 60 CYCLE.
4. SHADDED AREAS DESIGNATE CODE CHANGES.
5. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
6. * INDICATE COLOR DOT ON SPEAKERS FOR CORRECT PHASING.
7. $\perp$ DESIGNATE CHASSIS GROUND.

CHASSIS REMOVAL PROCEDURE

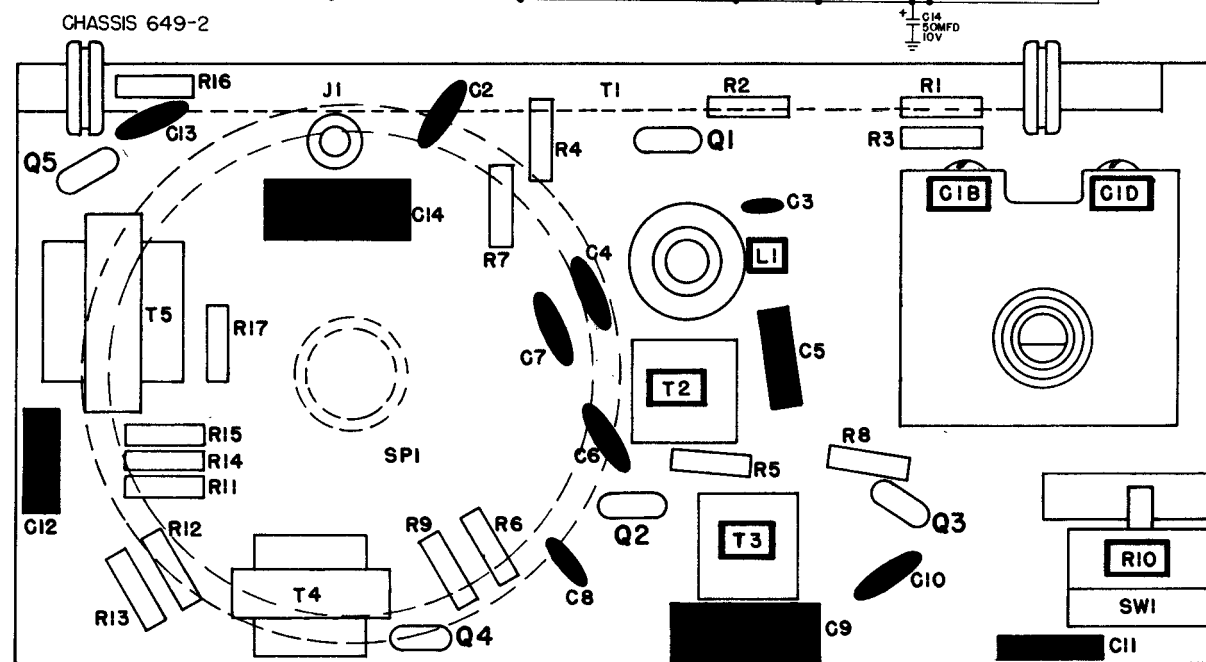
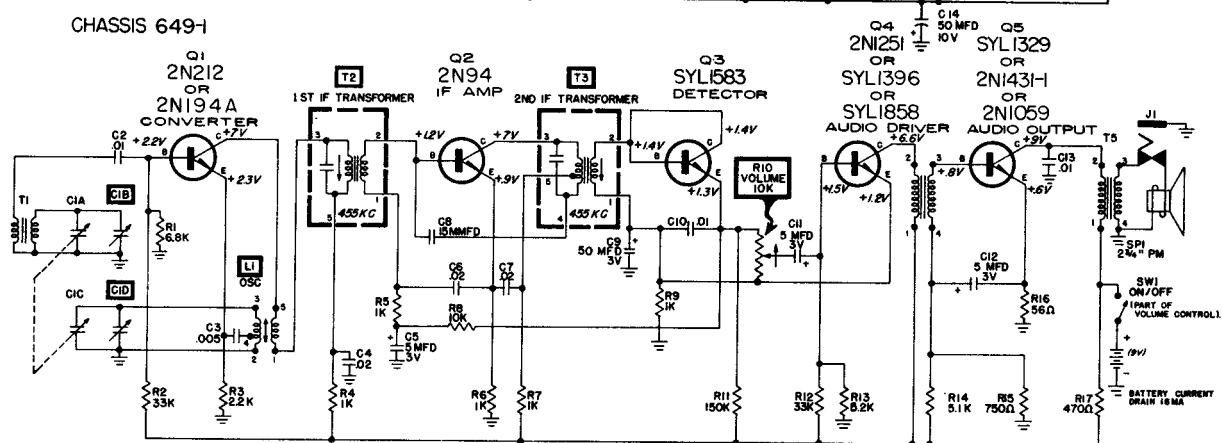
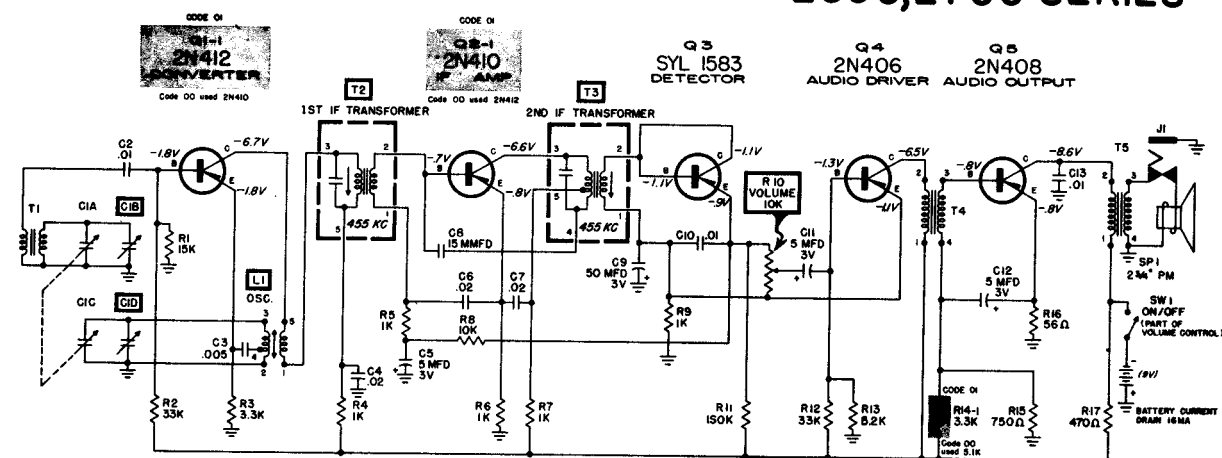
1. Disconnect AC power plug from power outlet.
2. Remove knobs by pulling straight up.
3. Remove screw securing speaker connector socket.
4. Identify and disconnect record changer motor leads, signal input leads and speaker leads.
5. While supporting chassis remove the three (3) screws securing chassis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

SYLVANIA

CHASSIS: 649-1,-2

MODELS: 5PI6

2300,2400,2500,
2600,2700 SERIES



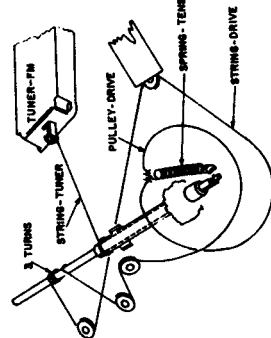
CHASSIS: 652-1/653-1
MODELS: 8F15, 8F16

SPECIFICATIONS

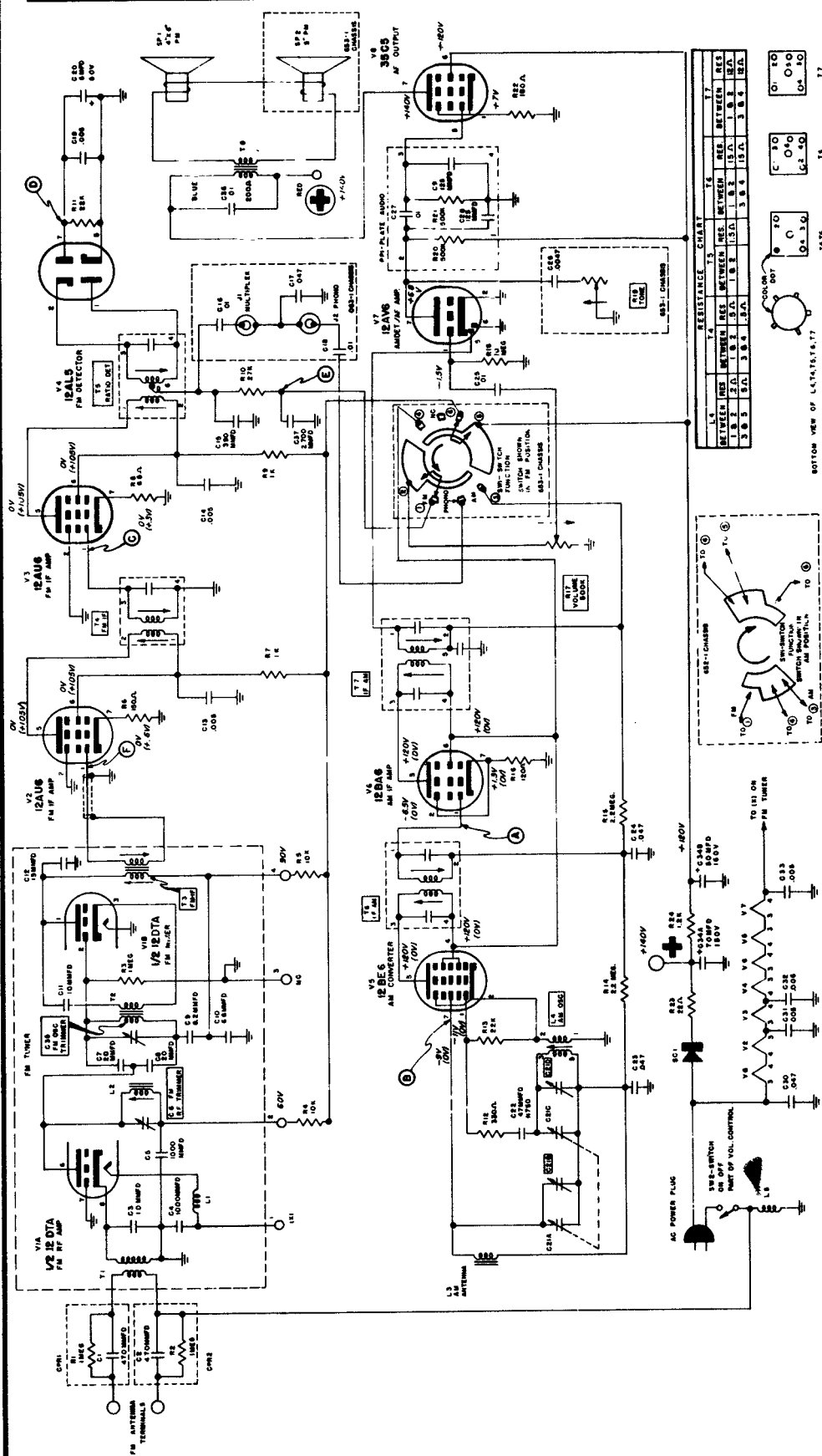
FREQUENCY RANGE (AM) 540KC to 1650KC
FREQUENCY RANGE (FM) 88MC to 108MC
POWER SUPPLY 117 VOLTS, 60 CYCLE (AC)
POWER CONSUMPTION..... 35 WATTS
INTERMEDIATE FREQUENCY (IF) AM 455KC
INTERMEDIATE FREQUENCY (IF) FM 10.7MC

DRIVE STRING REPLACEMENT

Replacement of drive string may be accomplished as shown in the illustration. Install string as shown, winding three turns clockwise around tuning shaft with the three turns progressing toward the rear of the chassis. After string is installed, rotate the tuning shaft several times in order to take up any slack in the string.



The string from the FM tuner to the tuning shaft is wound two (2) turns counter-clockwise and then tied to the clip.



RESISTANCE CHART									
L4		T4		T5		T6		T7	
BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES
1 0 2	2.0	1 0 2	5.0	1 0 2	15.0	1 0 2	15.0	1 0 2	15.0
3 0 5	5.0	3 0 4	8.0			3 0 4	15.0	3 0 4	15.0

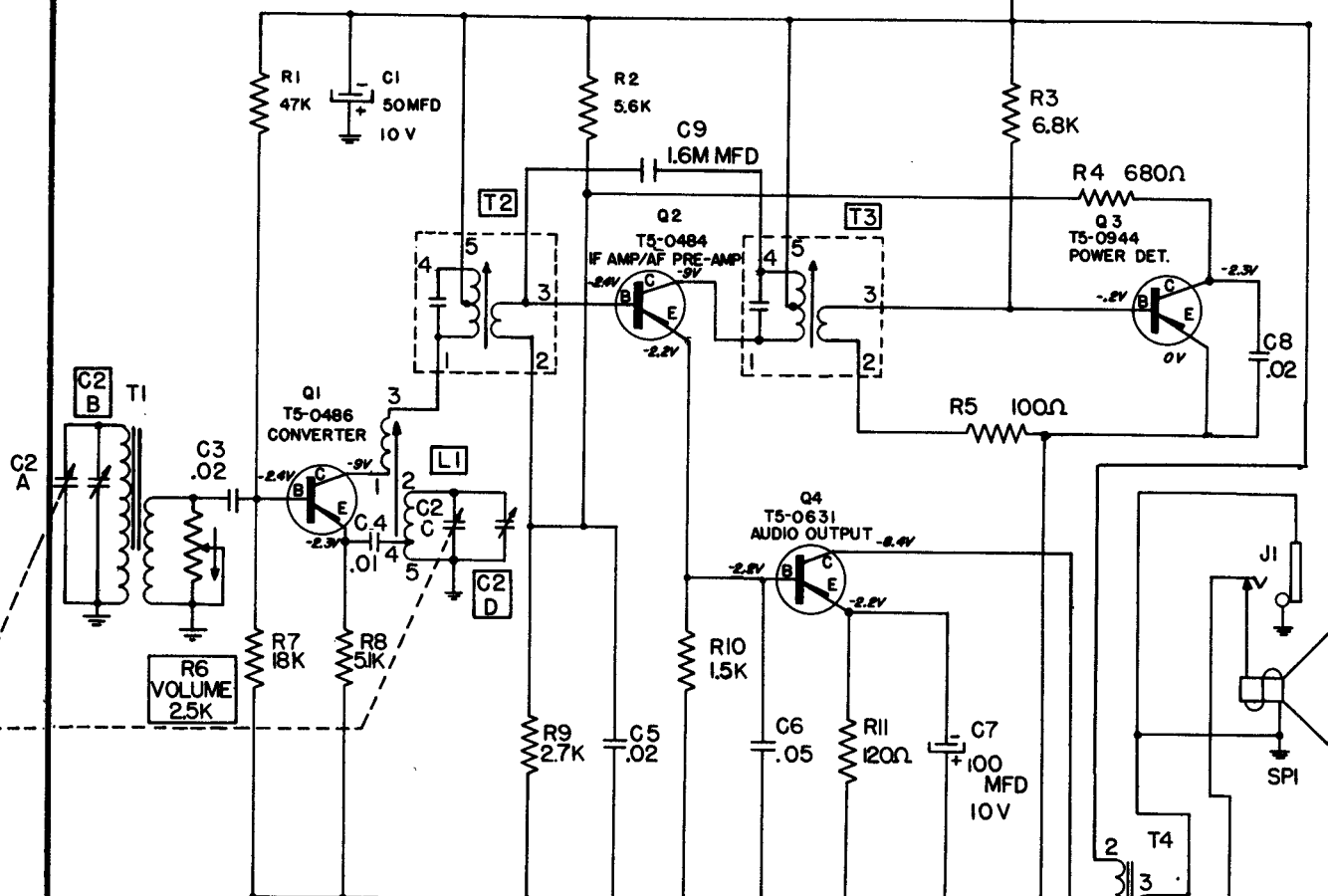
BOTTOM VIEW OF L 4, T4, T5, T6, T7

	T4	T7
	74.76	77

SYLVANIA

CHASSIS: 661-1
MODEL 4P14, 4P15

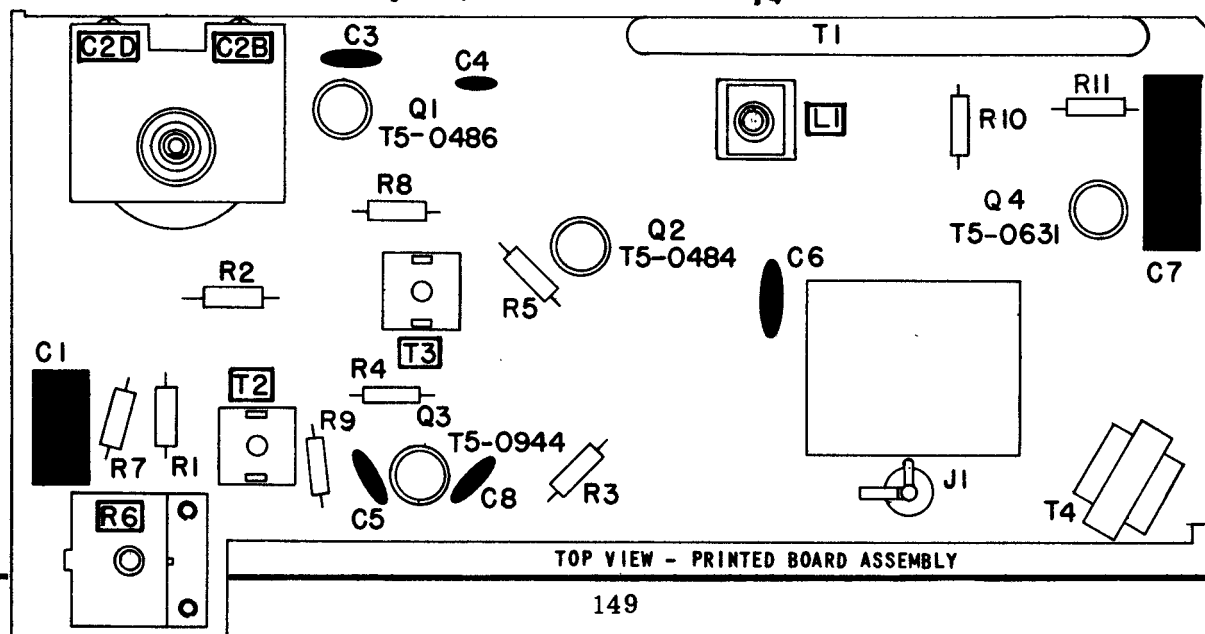
9 VOLTS
SWI ON/OFF
PART OF VOLUME
CONTROL



**BOTTOM VIEW
OF TRANSISTORS**

**TERMINAL END
VIEWS OF L1,
T2, T3, AND T4**

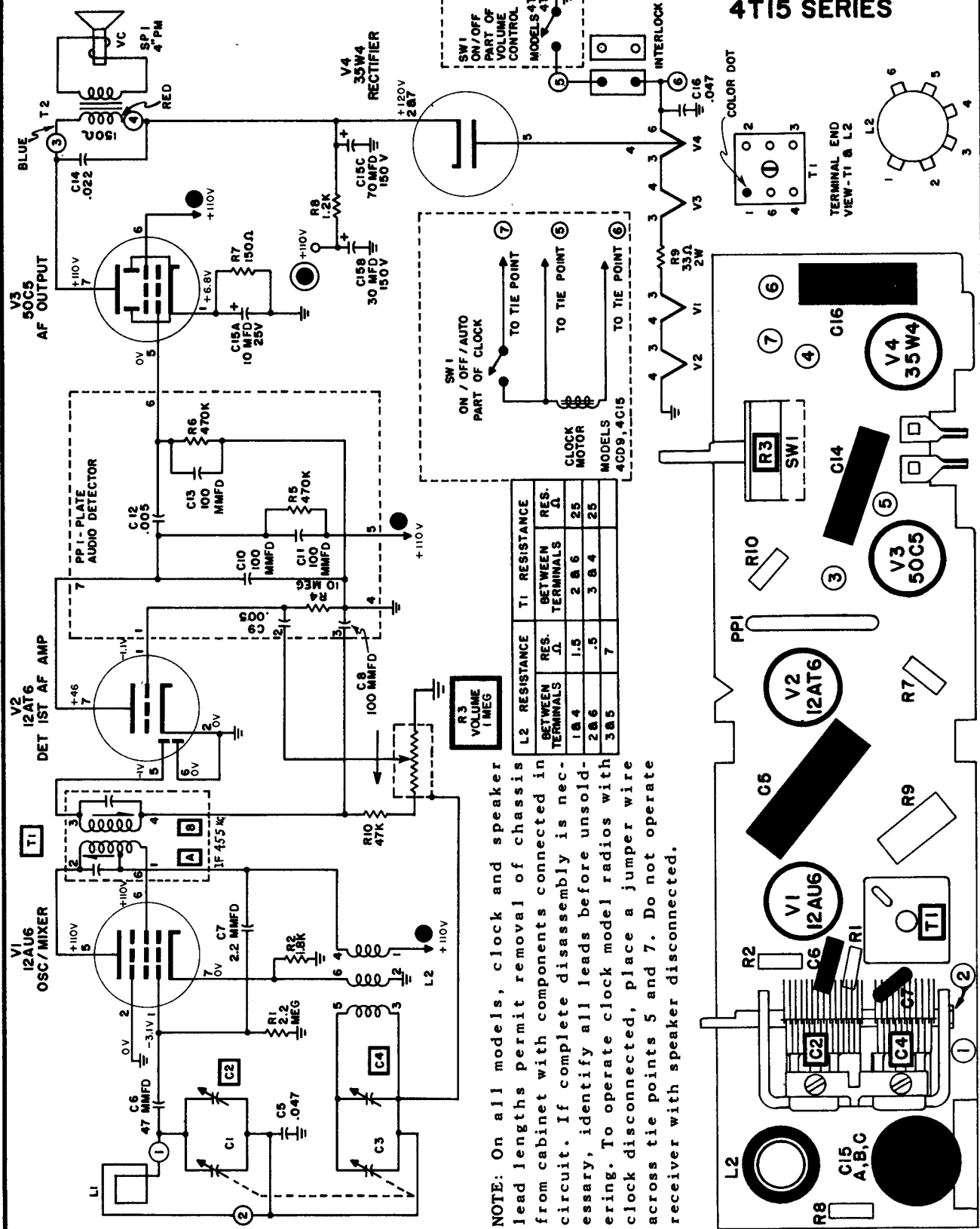
T4



TOP VIEW - PRINTED BOARD ASSEMBLY

SYLVANIA

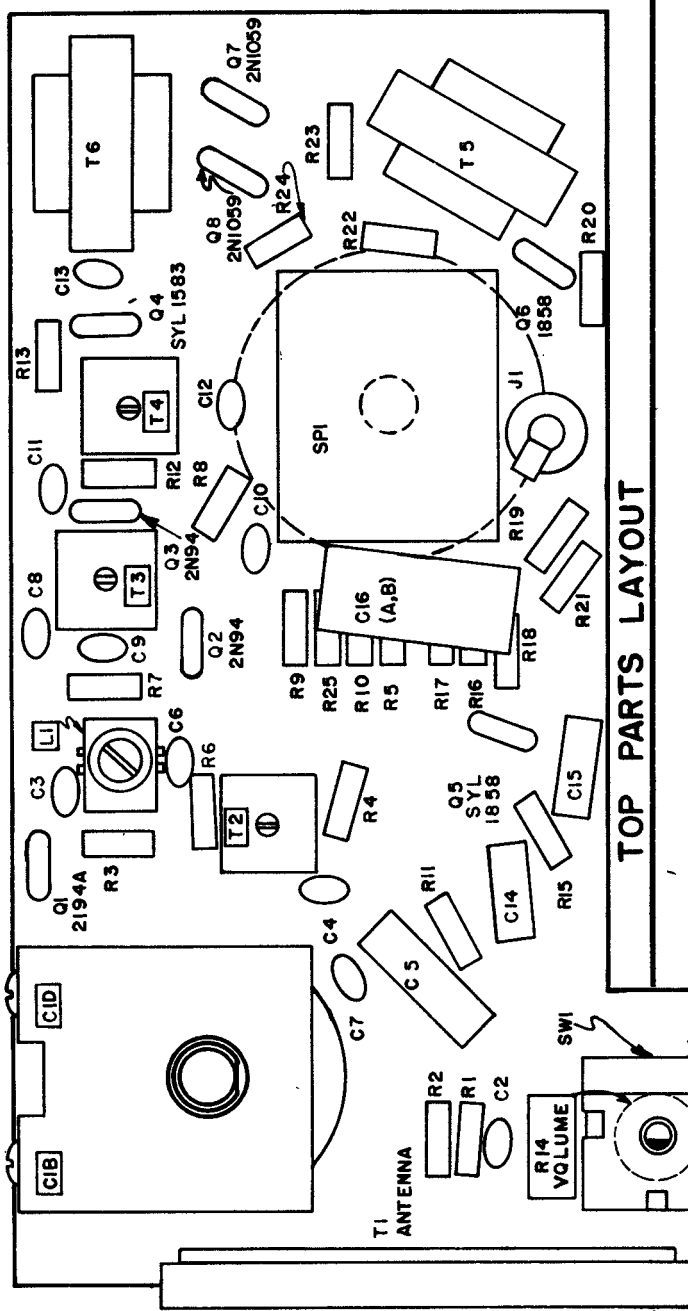
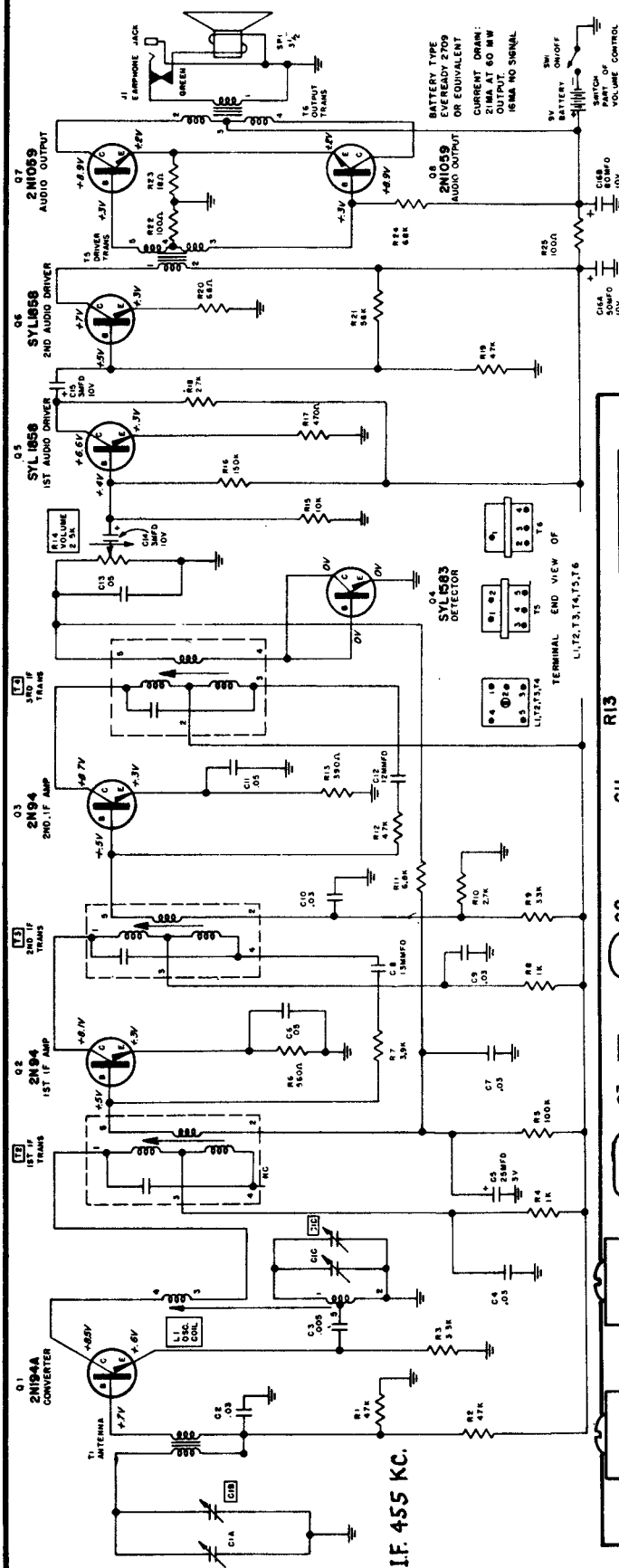
CHASSIS: 668-1,-2
MODELS: 4C09, 4C15, 4T09,
4T15 SERIES

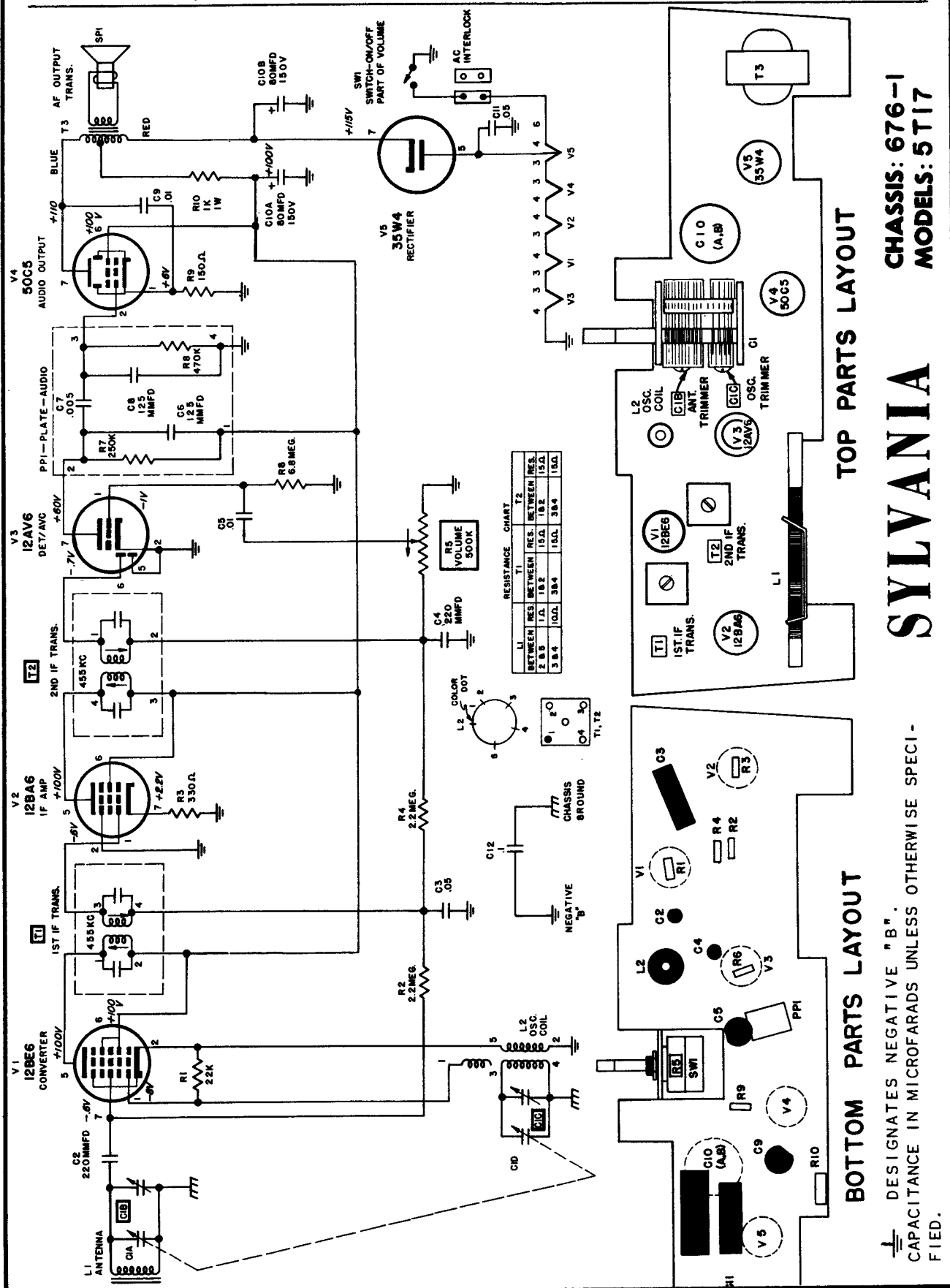


SYLVANIA

CHASSIS: 673-1
MODELS: 8P18 SERIES

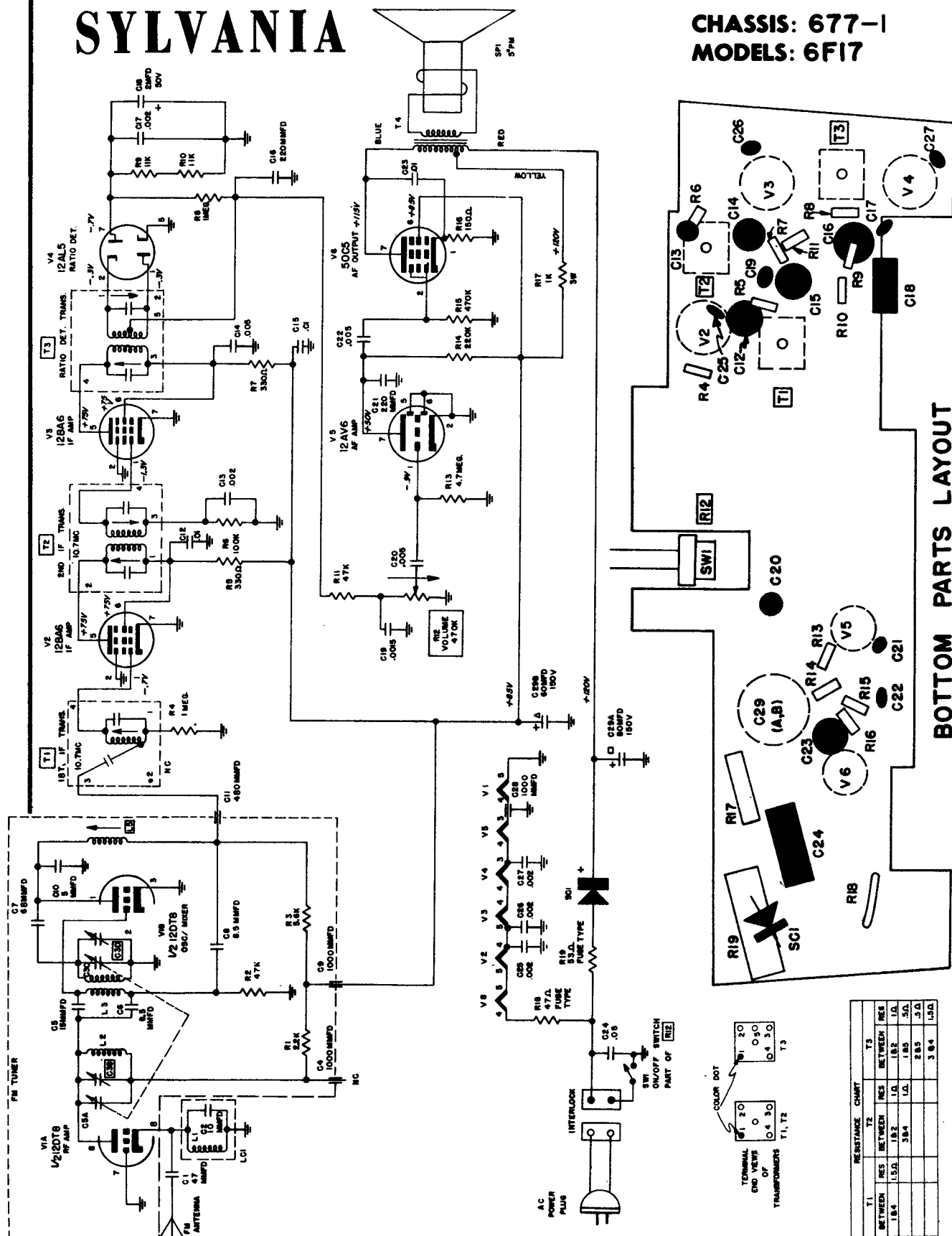
RESISTANCE CHART											
L1	T2	T3	T4	T5	T6	L1	T2	T3	T4	T5	T6
BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES	BETWEEN	RES
182	5Ω	183	35Ω	183	35Ω	182	25Ω	182	300Ω	284	100Ω
185	5Ω	184	75Ω	184	75Ω	183	5Ω	384	150Ω	283	55Ω
384	1Ω	285	1Ω	285	1Ω	485	1Ω	385	25Ω		





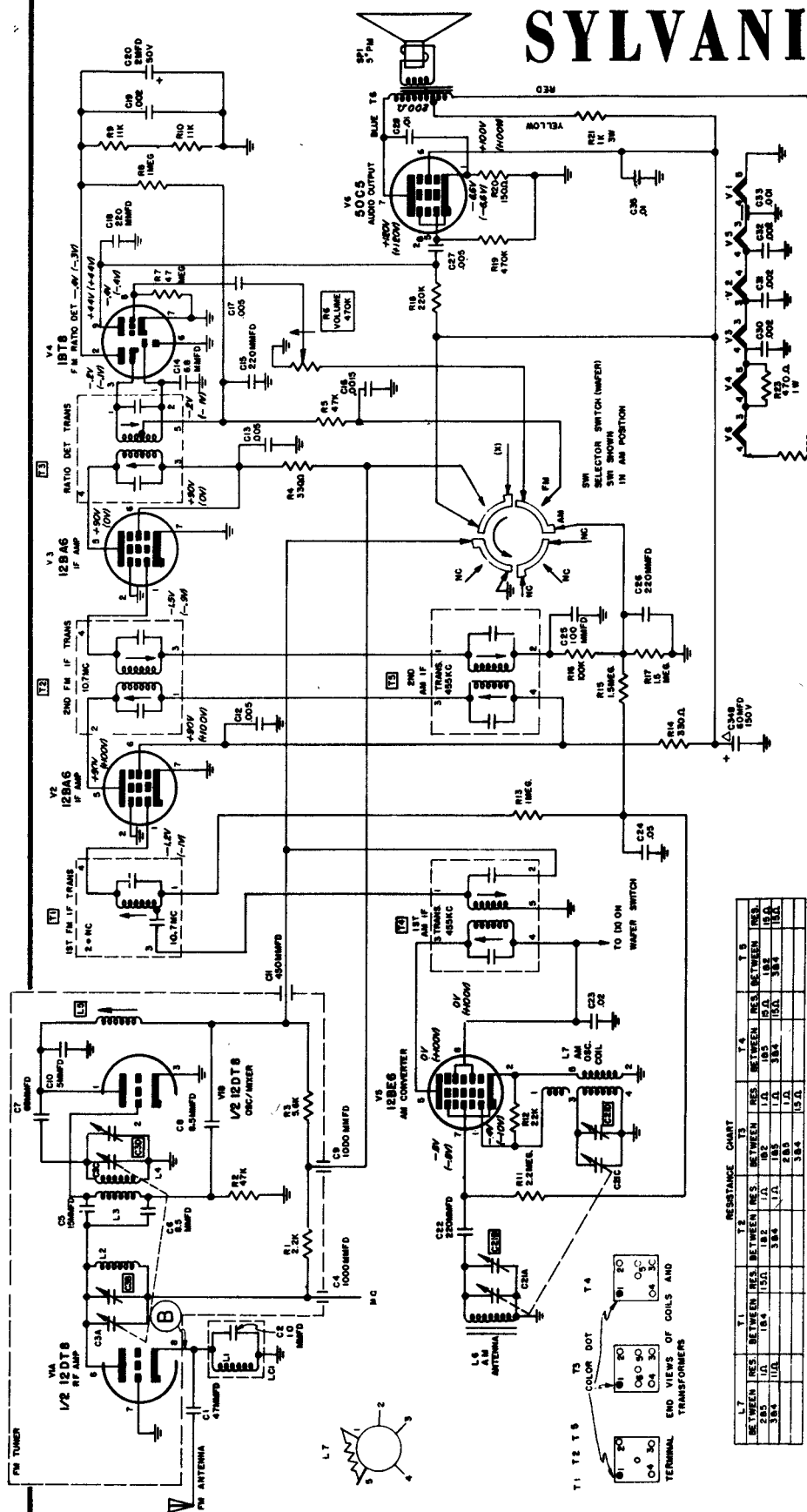
SYLVANIA

CHASSIS: 677-1
MODELS: 6F17

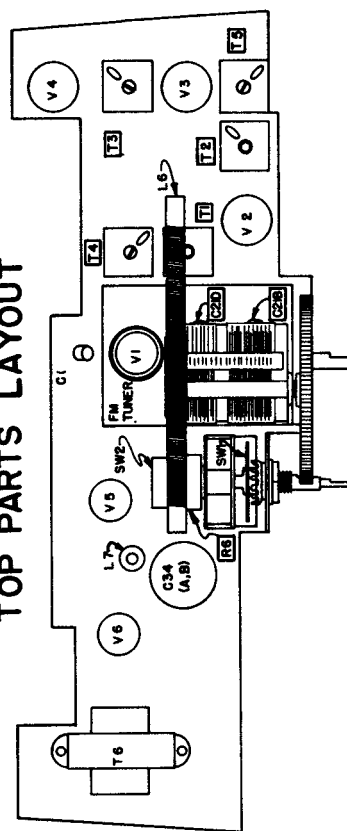


SYLVANIA

CHASSIS: 678-1
MODELS: 6F18



TOP PARTS LAYOUT



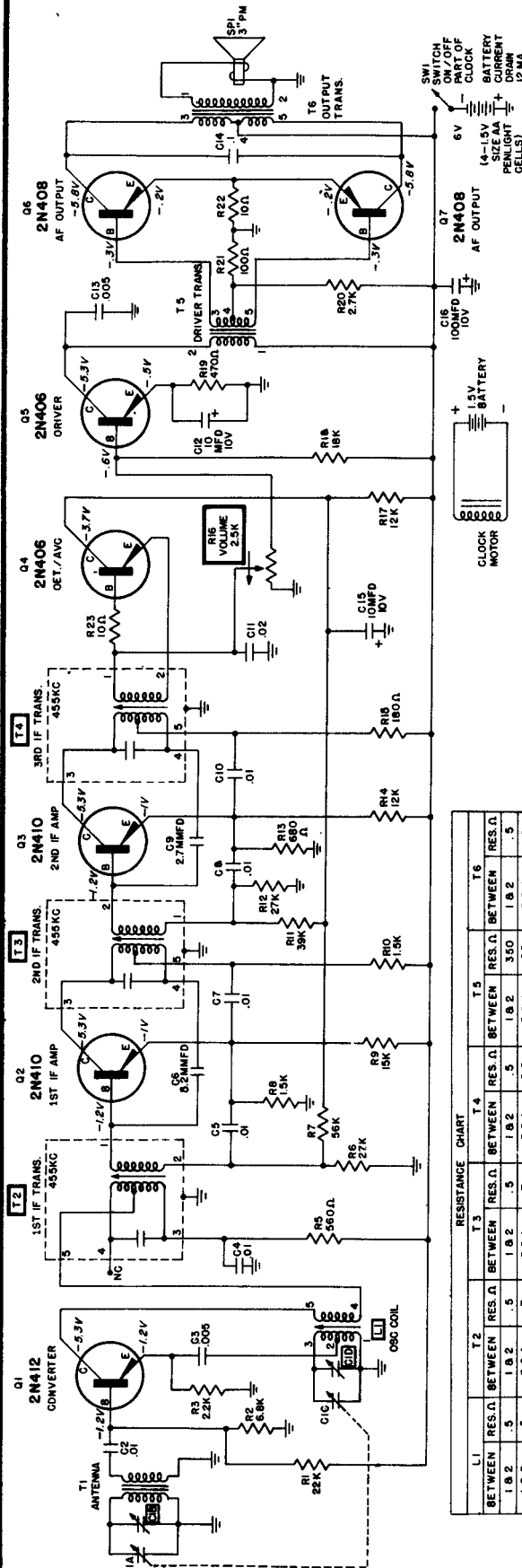
RESISTANCE CHART									
T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
RES	RES	RES	RES	RES	RES	RES	RES	RES	RES
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100

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.

SYLVANIA

CHASSIS: 679-1

MODELS: 7K10, 7K11 SERIES



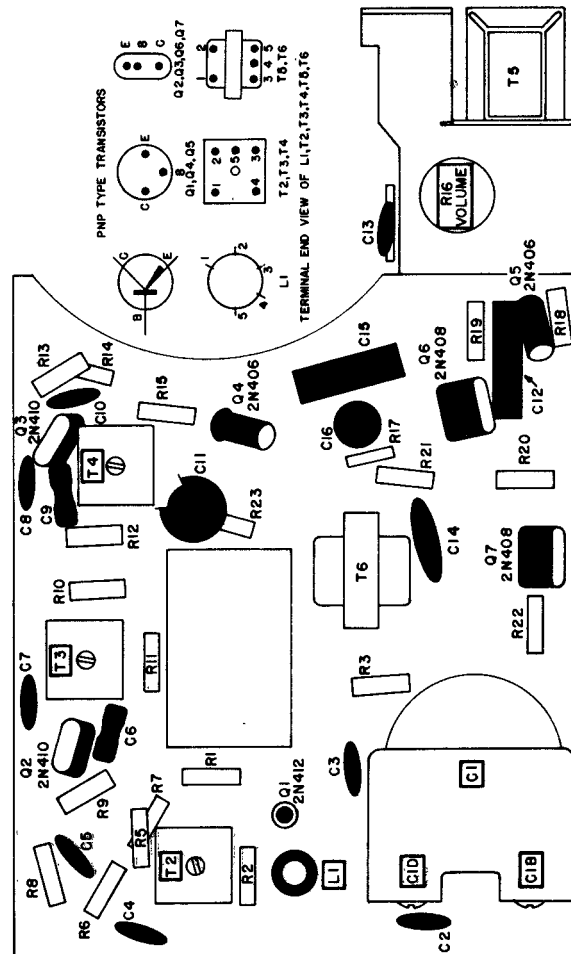
CHASSIS REMOVAL

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.

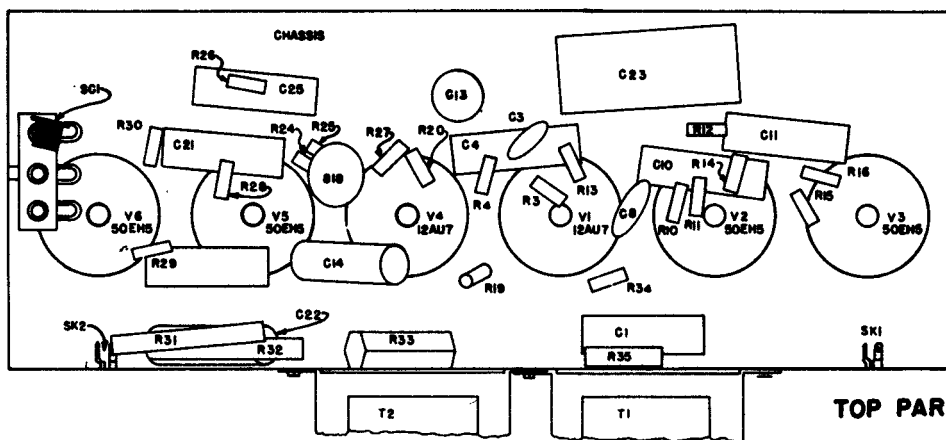
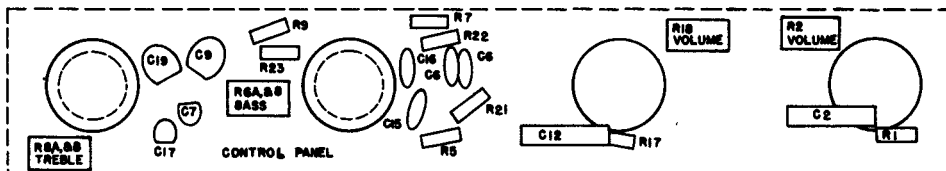
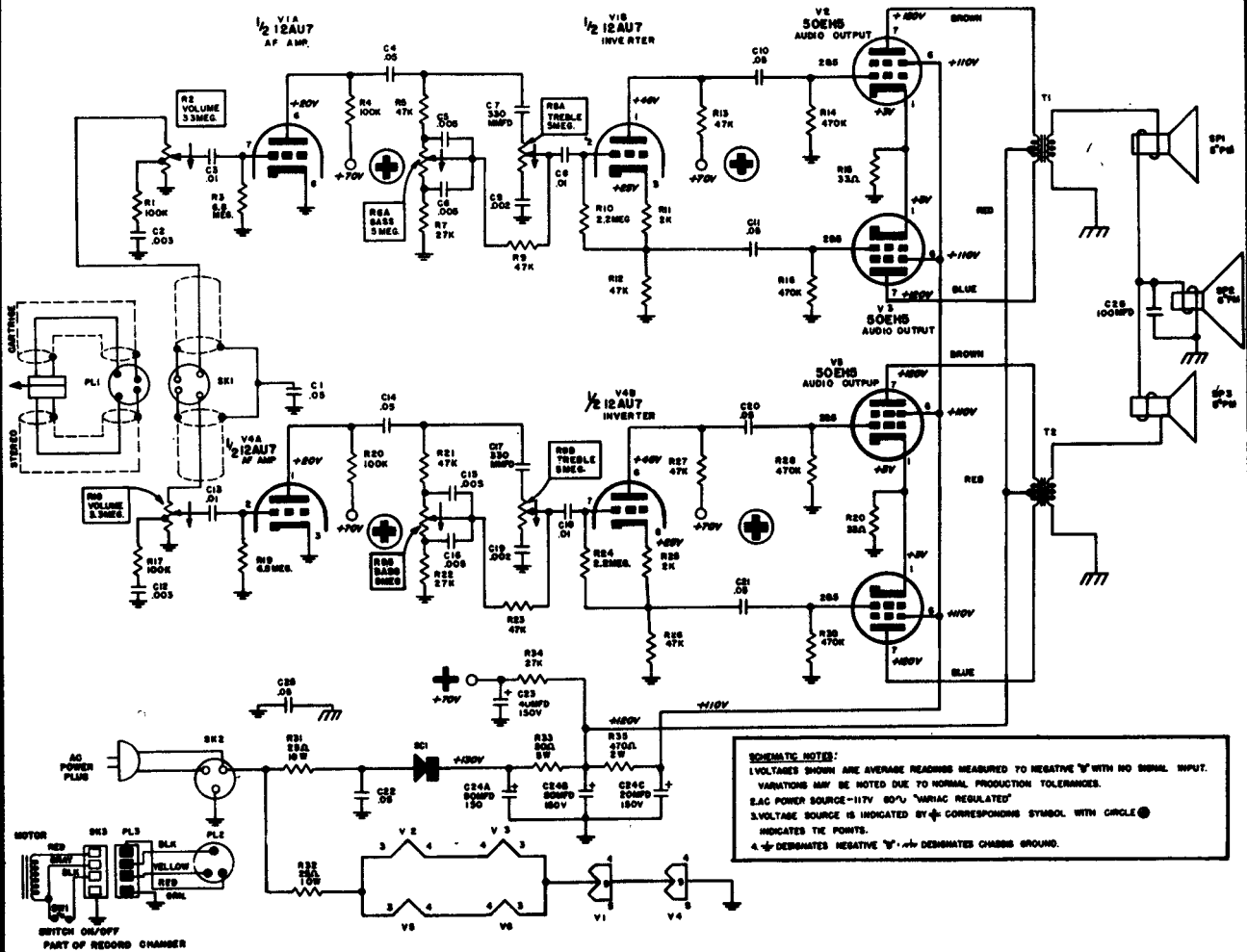
RESISTANCE VALUES TAKEN WITH COMPONENTS IN THE CIRCUIT.
ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

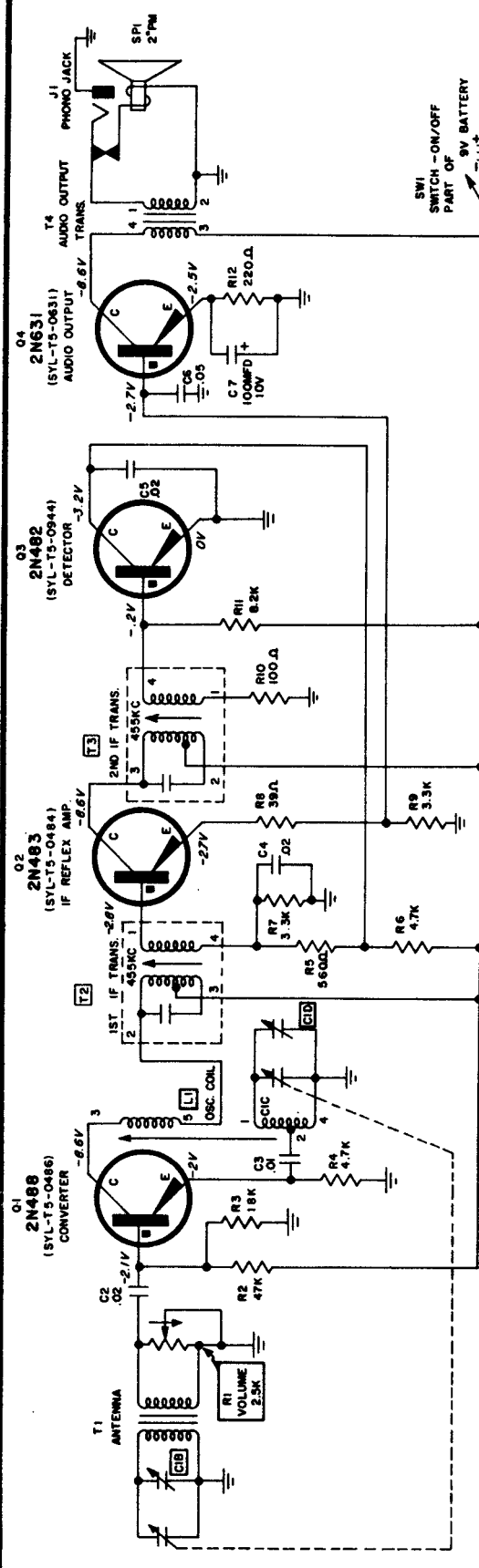
RESISTANCE CHART											
	T2	T3	T4	T5	T6						
BETWEEN	RES.Ω	BETWEEN	RES.Ω	BETWEEN	RES.Ω	BETWEEN	RES.Ω	BETWEEN	RES.Ω	BETWEEN	RES.Ω
1.8.2	5	1.8.2	5	1.8.2	5	1.8.2	5	1.8.2	5	1.8.2	5
1.8.3	5	3.8.4	7	3.8.4	7	3.8.4	7	3.8.4	7	3.8.4	7
2.8.3	4.5	3.8.5	5.5	3.8.5	1	3.8.5	140	3.8.5	12	3.8.5	12
4.8.5	5	4.8.5	1.5	4.8.5	4.5	4.8.5	55	4.8.5	6	4.8.5	6



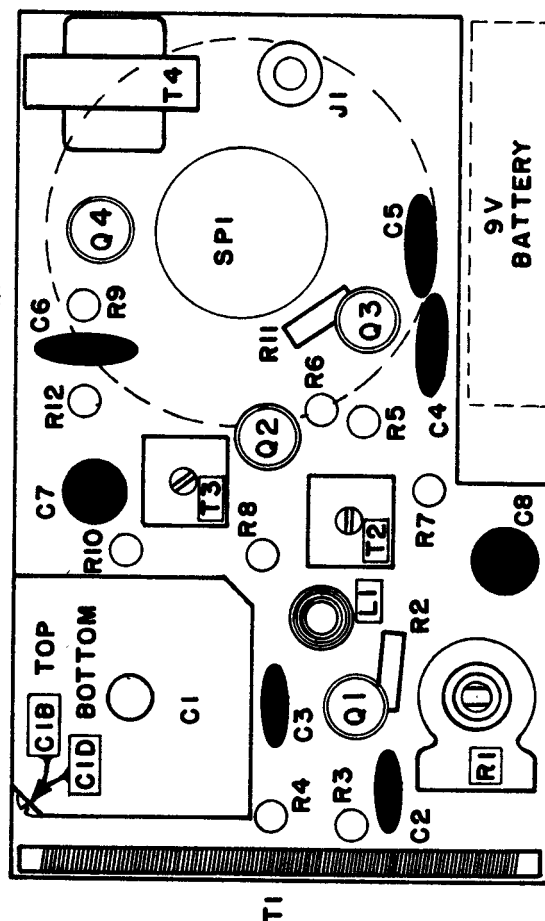
SYLVANIA

CHASSIS: 680-1
MODELS: 45P19

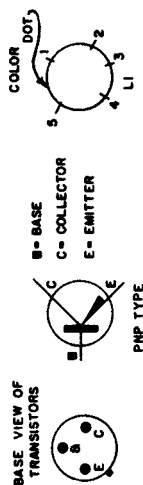




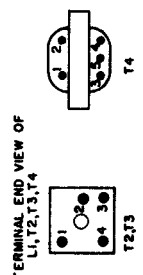
TOP PARTS LAYOUT



BASE VIEW OF TRANSISTORS



TERMINAL END VIEW OF L1, T2, T3, T4



RESISTANCE CHART			
L1	T2	T3	T4
BETWEEN RES. BETWEEN RES. BETWEEN RES.			
1.8 2	8.0	1.0	1.0
1.8 4	1.0	1.0	1.0
1.8 4	2.0	2.0	2.0
2.0 4	2.0	2.0	2.0
3.0 5	1.0		

SCHEMATIC NOTES

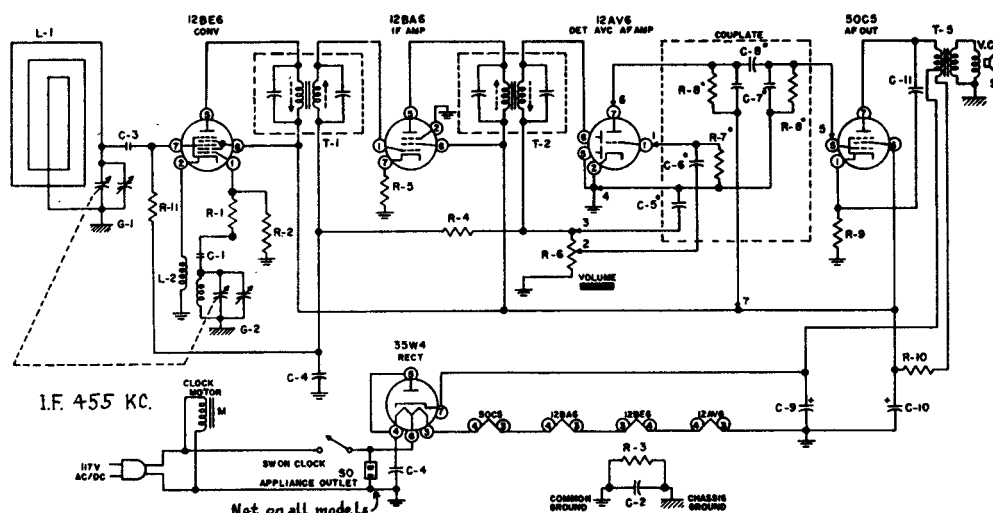
1. VOLTAGES MEASURED TO CHASSIS GROUND, WITH RECEIVER NOT TUNED TO ANY SPECIFIC STATION.
2. BATTERY VOLTAGE WITH RECEIVER OPERATING 9 VOLTS.
3. VOLTAGES SHOWN ARE AVERAGE READINGS. VARIATIONS MAY BE NOTED DUE TO NORMAL PRODUCTION TOLERANCE.
4. COIL AND TRANSFORMER RESISTANCE ARE TAKEN WITH COMPONENTS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

SYLVANIA

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

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

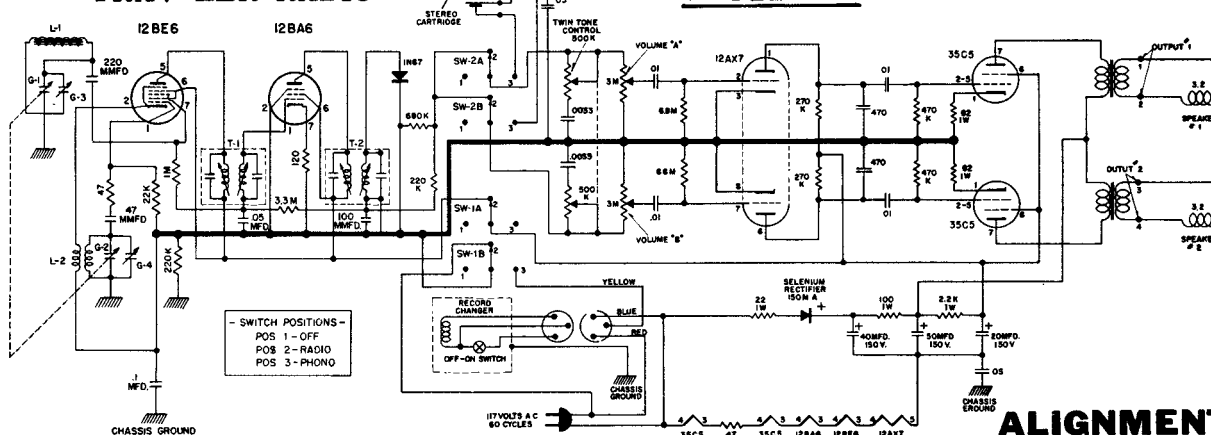
TRAV-LER Models 60C300, 60C301, 60C302, 60C303, 60C320, 60C321, 60C322, 60C323



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	4" P.M. SPEAKER
IR-45	R-2 22MΩ RESISTOR 1/2W. 10%	PC-8	C-2 .1 MFD. CONDENSER 400 V.	V.C.	VOICE COIL
IR-20	R-3 220MΩ RESISTOR 1/2W. 20%	CC-33	C-3 220 MMFD. 500V. 20% GER. COND.	T-3	OUTPUT TRANSFORMER
IR-23	R-4 3.3MEG. RESISTOR 1/2W. 20%	PC-5	C-4 .05 MFD. CONDENSER 400 V.	LL-48	LOOP ANTENNA
IR-155	R-5 20Ω RESISTOR 1/2W. 10%	C-5	C-5 220 MMFD.	LO-27	OSC. COIL
VC-101	R-6 1MEG. VOLUME CONTROL	C-6	C-6 250 MMFD.	L-2	APPLIANCE OUTLET SOCKET
MG-19	R-7 470MΩ.	C-7	C-7 .005 MFD.	CK-7	ELECTRIC CLOCK
IR-98	R-8 150Ω RESISTOR 1/2W. 10%	C-8	C-8 70 MFD. 150 W.V.D.C. ELECTROLYTIC		
IR-42	R-9 1000Ω RESISTOR 1W. 10%	EC-66	C-9 40 MFD.		
IR-12	R-11 1MEG. RESISTOR 1/2W. 20%	PC-47	C-10 .02 MFD. CONDENSER 400 V.		
LI-19	T-1 INPUT I.F. TRANSFORMER	GC-24	G-1 TUNING CONDENSER		
	T-2 OUTPUT I.F. TRANSFORMER		G-2		

TRAV-LER RADIO

MODEL-1130



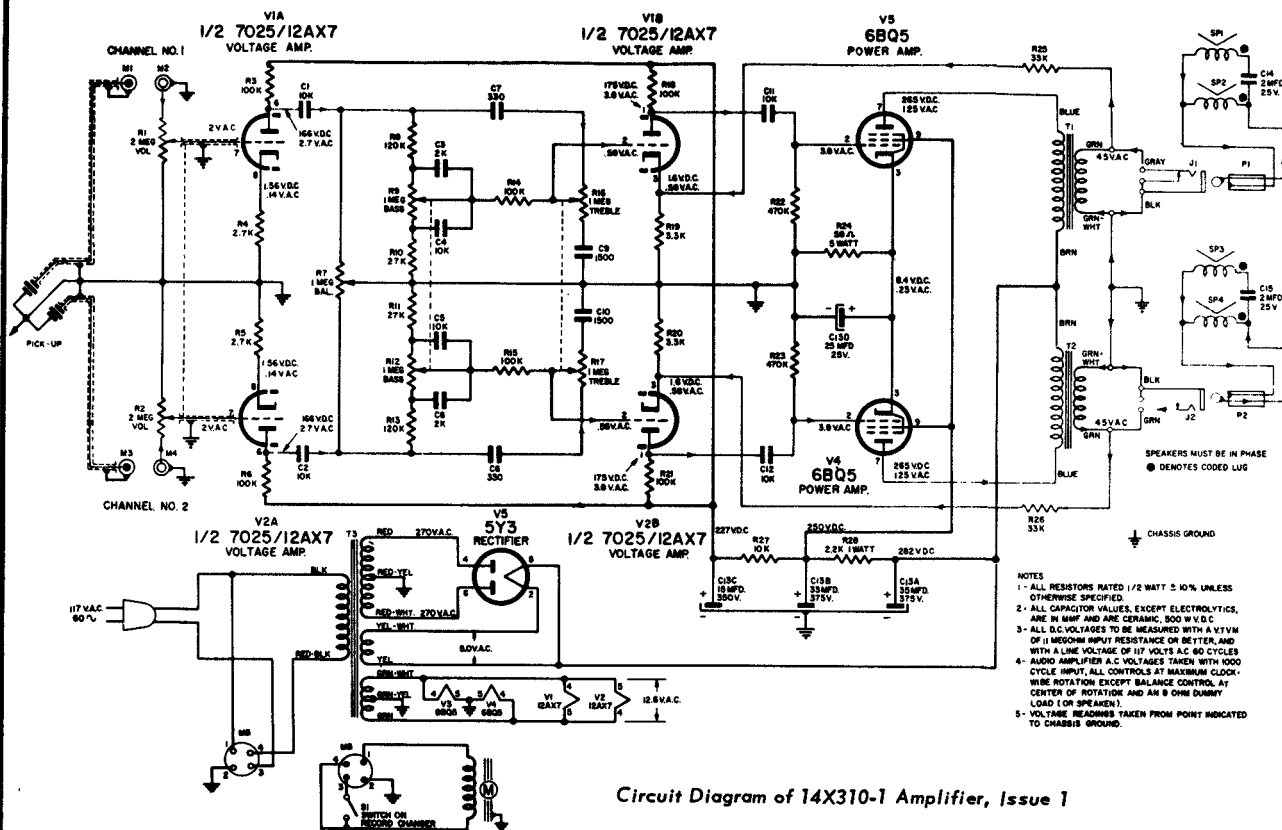
ALIGNMENT

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.

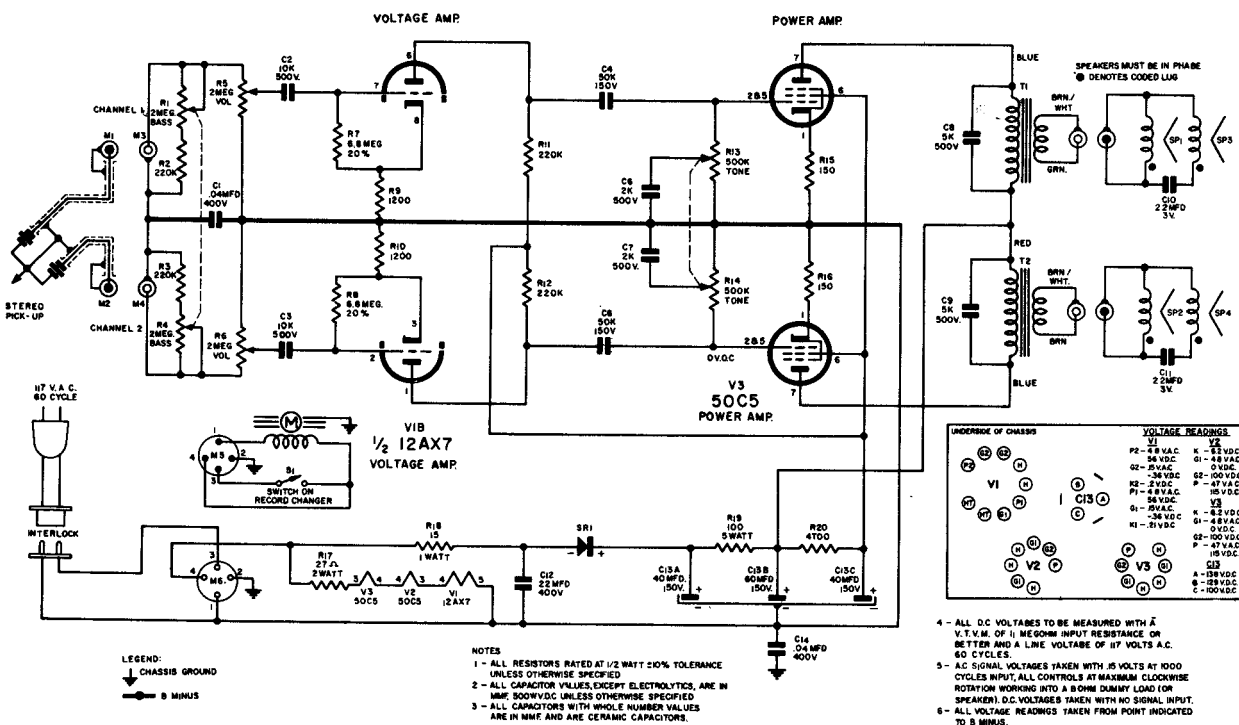
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1610 KC. Make sure that the gang condenser is turned to complete minimum capacity. Adjust the generator to 1610 KC. and adjust the oscillator trimmer of the receiver until the signal is tuned in.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

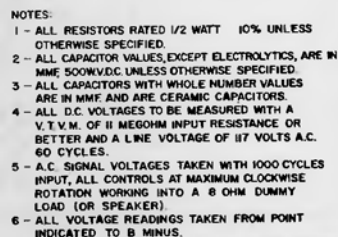
THIRD STEP: Remove the generator leads from the gang condenser and the chassis. Loosely couple the generator to the antenna by laying the hot generator lead near the antenna rod. Set the generator at 1400 KC. and tune in the 1400 KC. signal on the receiver. Adjust the ANT. trimmer until a maximum signal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

MODEL 1050-1A FONOGRAF

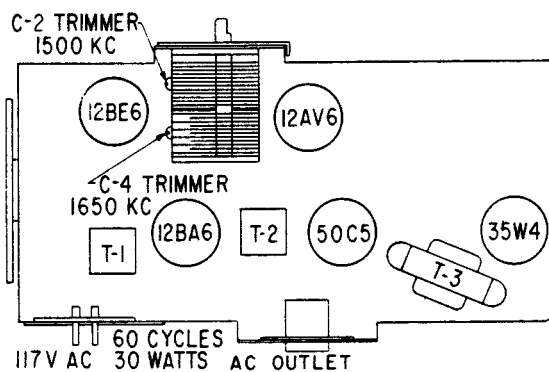
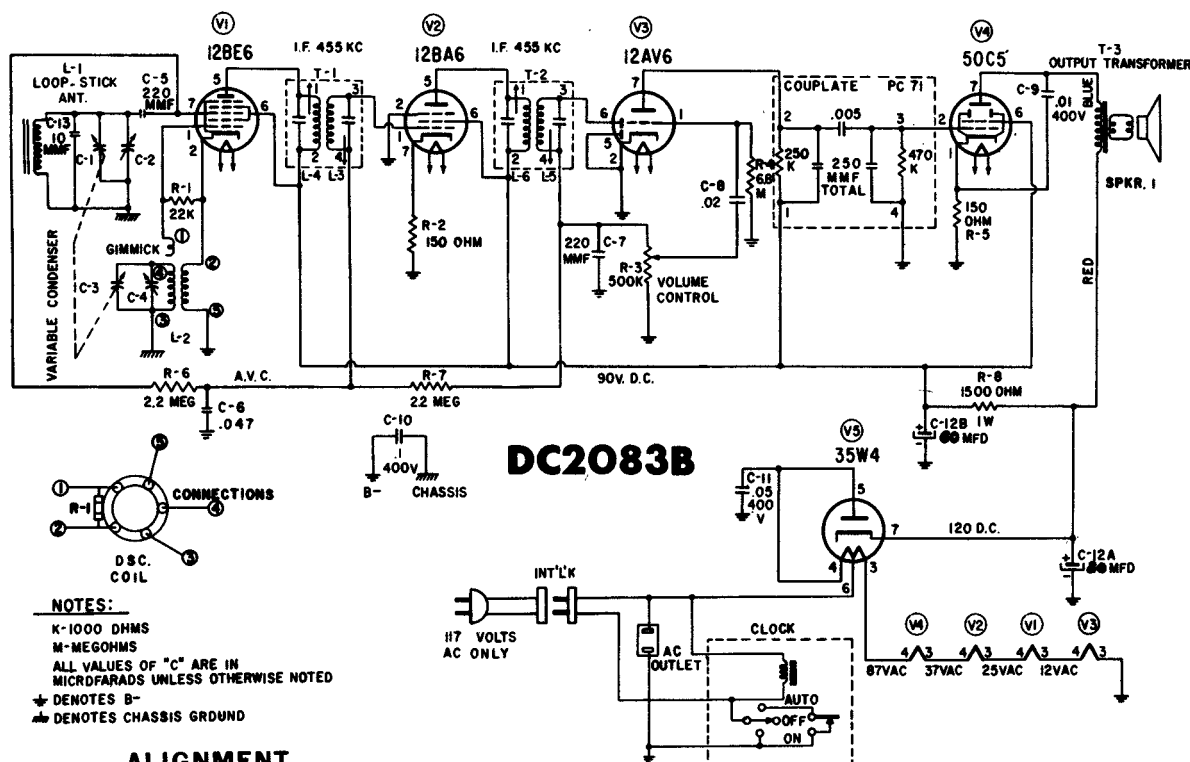


WEBCOR MODEL 1172-1 FONOGRAF



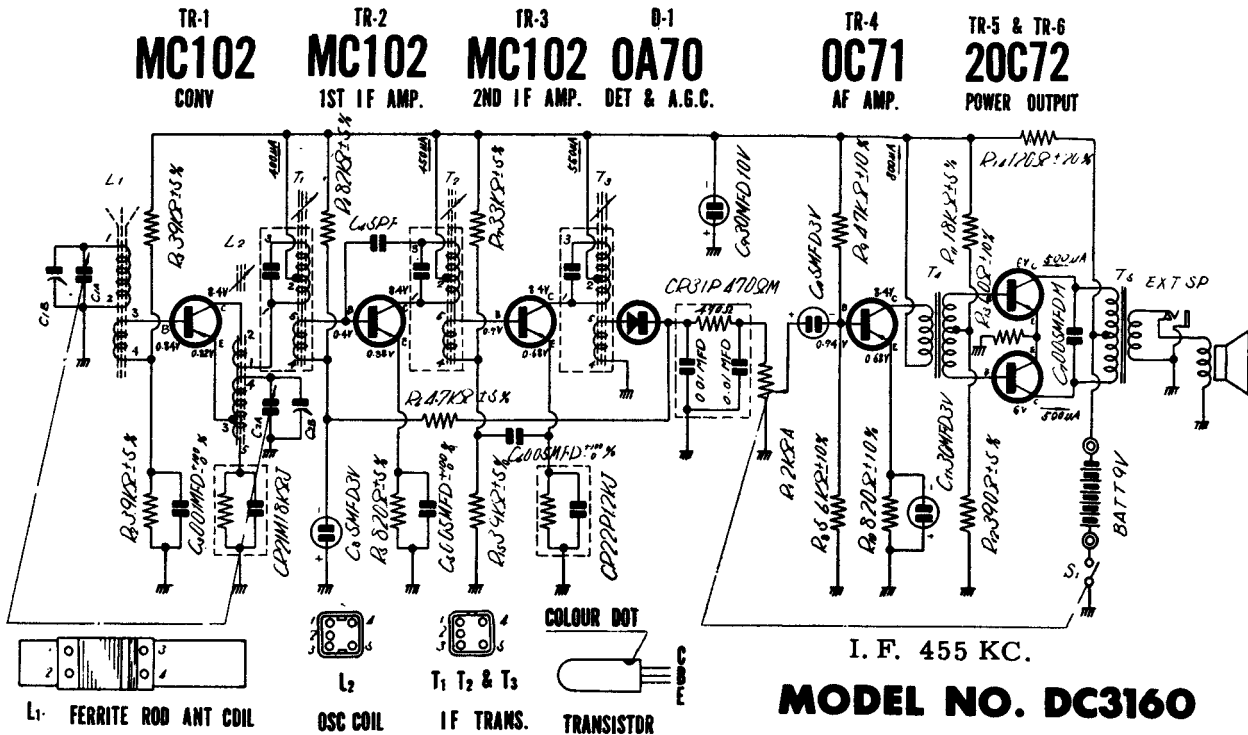


WESTERN AUTO Model DC2083B, Exact Service Material.
Model DC2173A is the same electrically, while additional
Models DC2082B and DC2172A are very similar electrically
 but do not use clock-switching network.

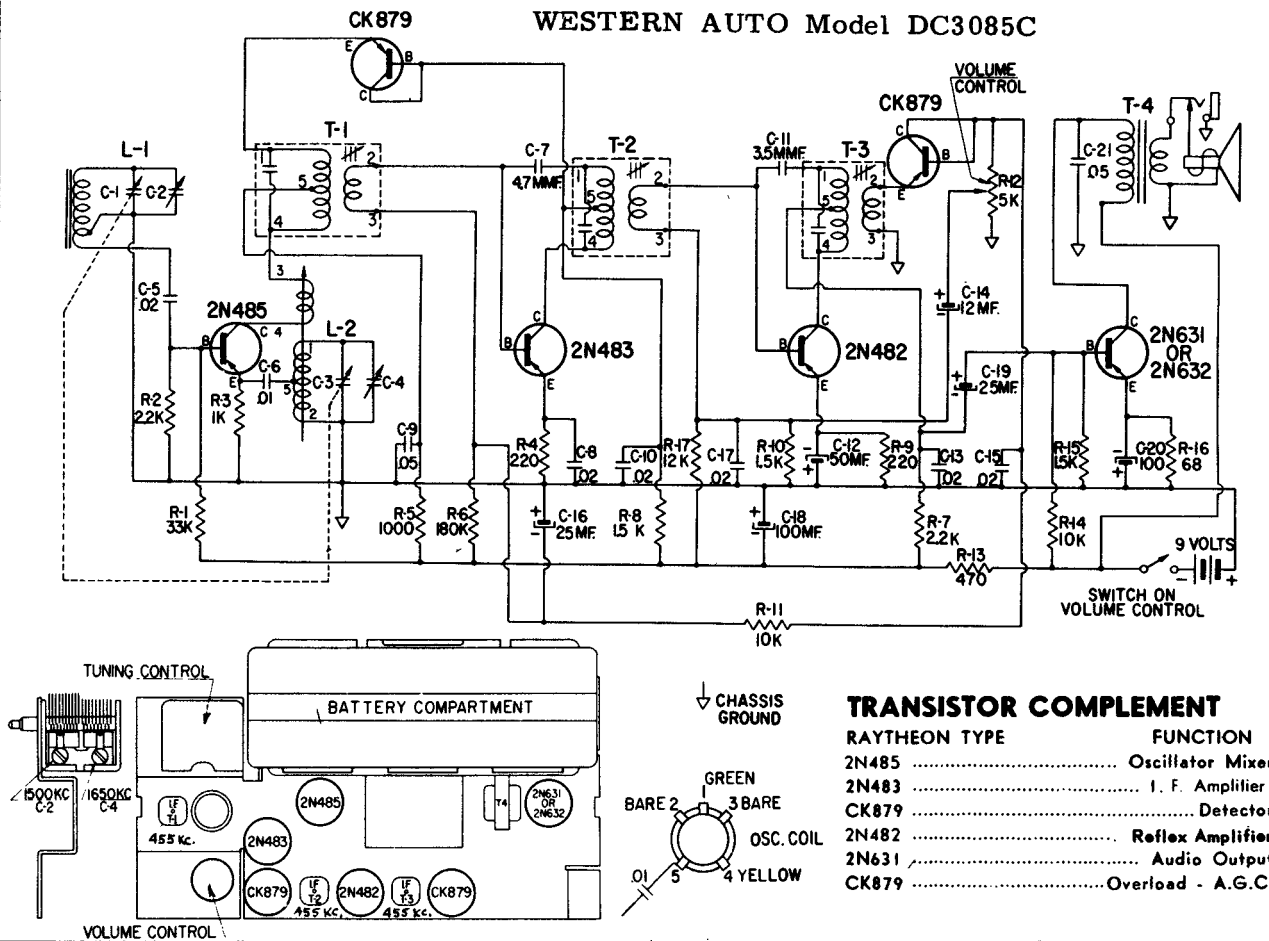


Step	Connect High Side of Signal Generator To--	Set Signal Generator To--	Turn Receiver Dial To--	Adjust The Following for Maximum Output (Keep Signal From Signal Generator As Low As Possible)
1	Antenna Section Tuning Condenser in Series with .1MFD. Cond.	455 KC.	Full Counter Clockwise (Condenser Plates 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	

WESTERN AUTO Model DC3160



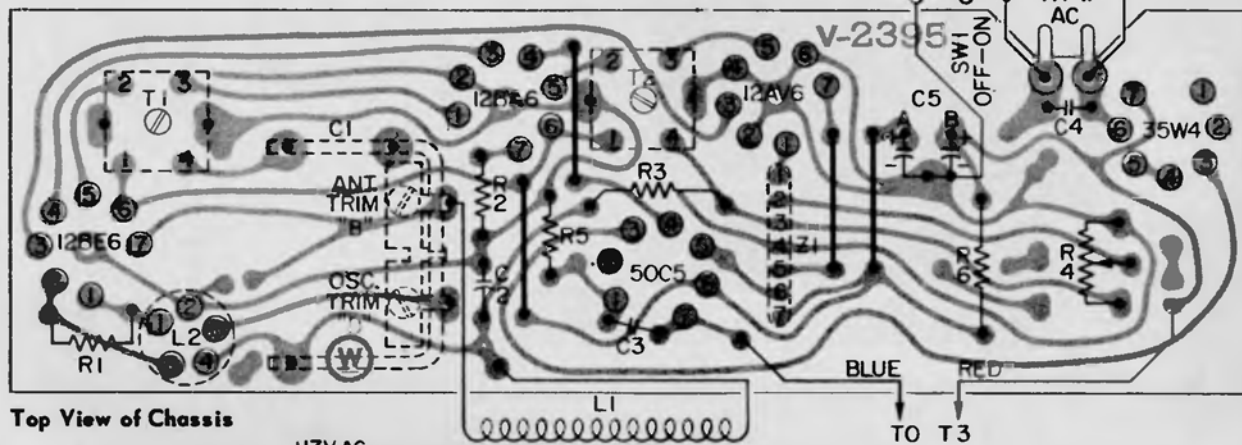
WESTERN AUTO Model DC3085C



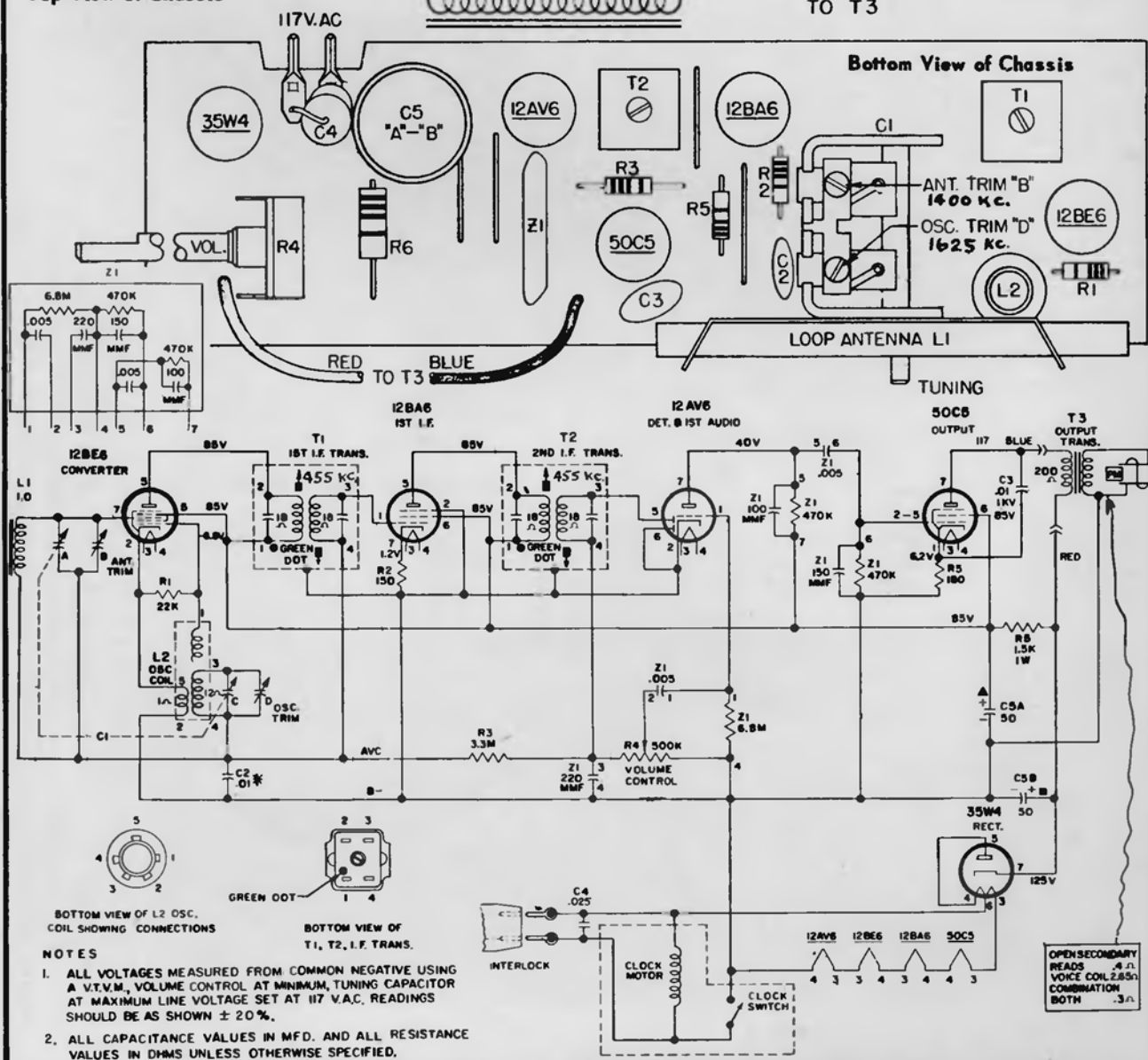
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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.



Top View of Chassis



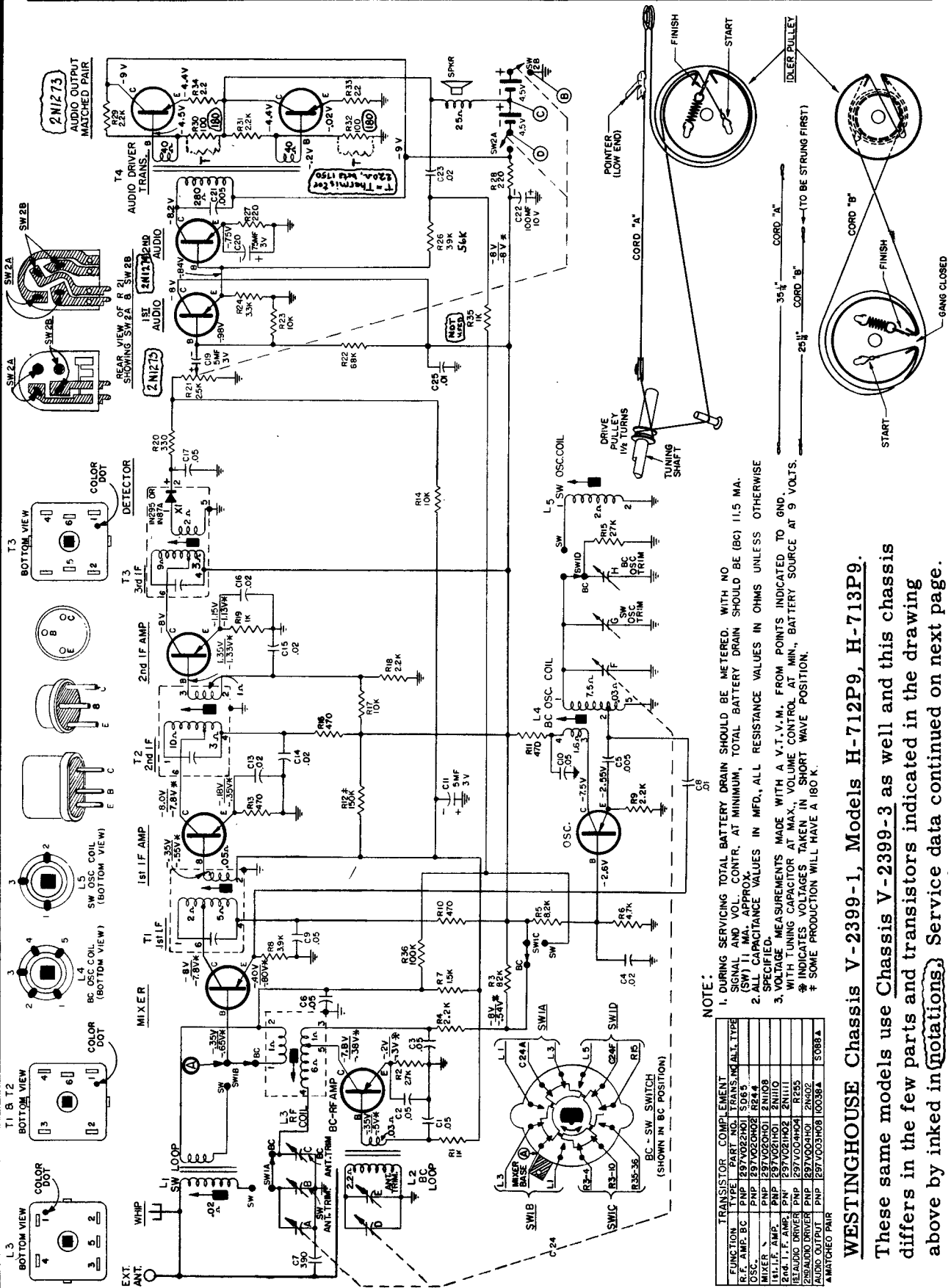
Bottom View of Chassis

BOTTOM VIEW OF L2 OSC. COIL SHOWING CONNECTIONS

GREEN DOT
BOTTOM VIEW OF T1, T2, I.F. TRANS.

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 117 V.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-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

ON-OFF
VOLUME
KNOB

CABINET
RELEASE
BUTTON

EXTERNAL
ANTENNA
TERMINAL

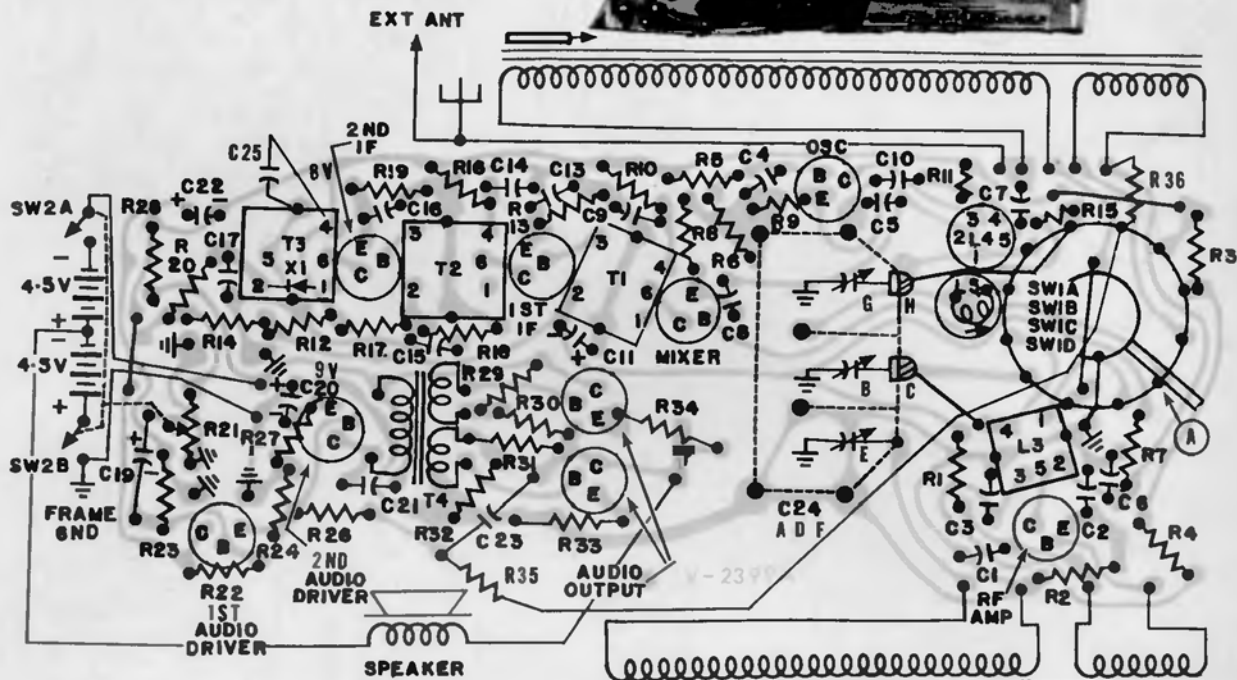
DIAL
POINTER

TUNING
KNOB

CABINET
RELEASE
BUTTON

BROADCAST-
SHORTWAVE
KNOB

BATTERIES
AND
HOLDER

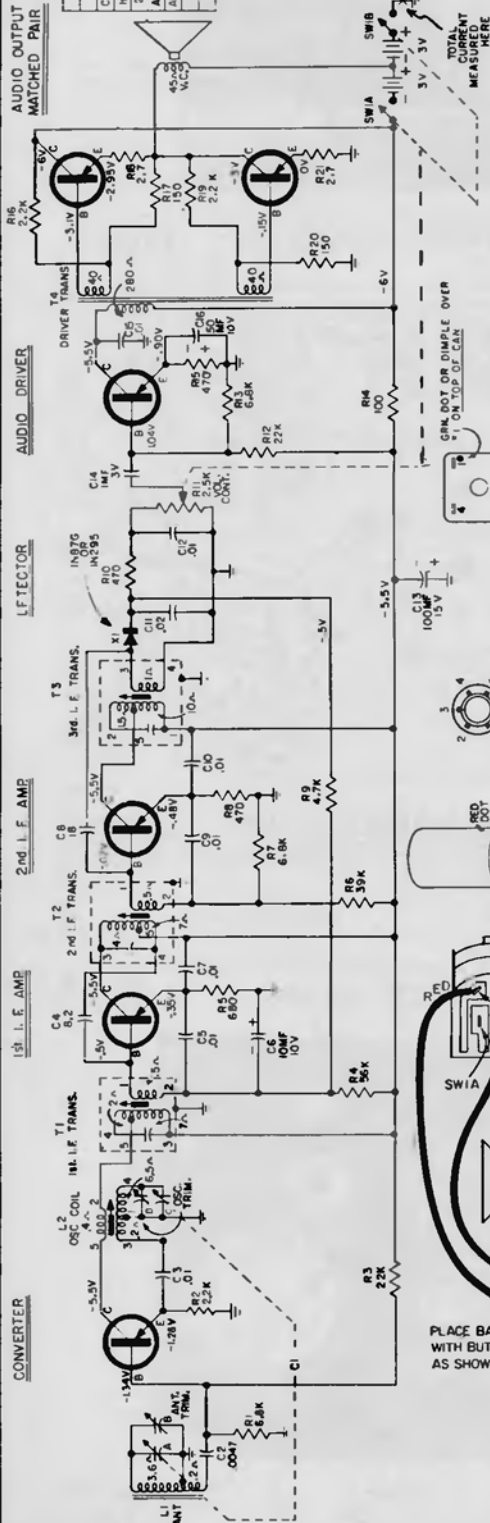


MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

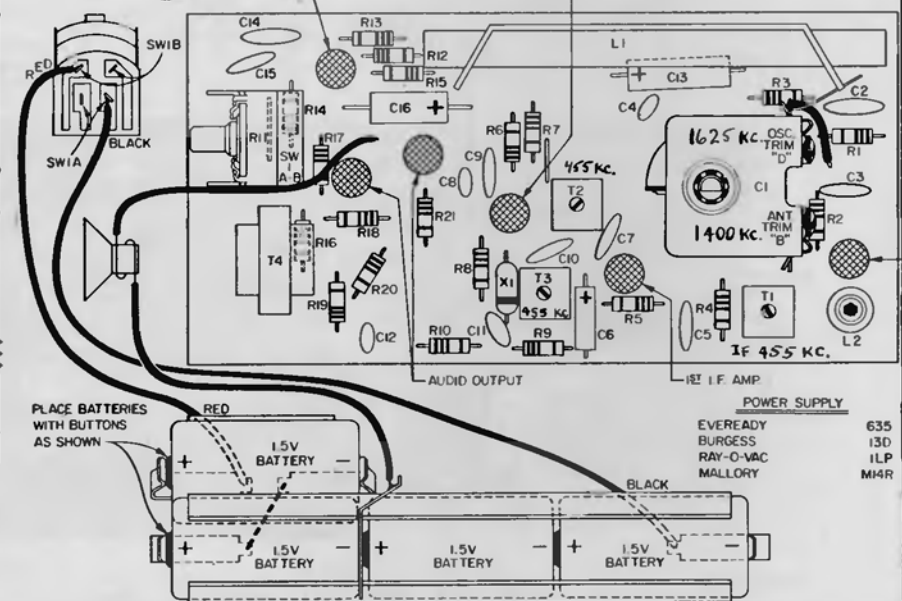
Westinghouse Chassis V-2397-4,
Models H-725P6A, H-726P6A,
H-727P6A, H-728P6A, H-771P6,
H-771P6GP, H-772P6, -GP,
H-773P6, and H-773P6GP.

FUNCTION	TRANSISTOR	COMPLEMENT
CONVERTER	PNP	297V0101 2N4102
1st I.F. AMP	PNP	297V02101 2N4102
2nd I.F. AMP	PNP	297V02102 2N4102
AUDIO DRIVER	PNP	297V03101 2N4102
AUDIO OUTPUT	PNP	297V03102 2N4102

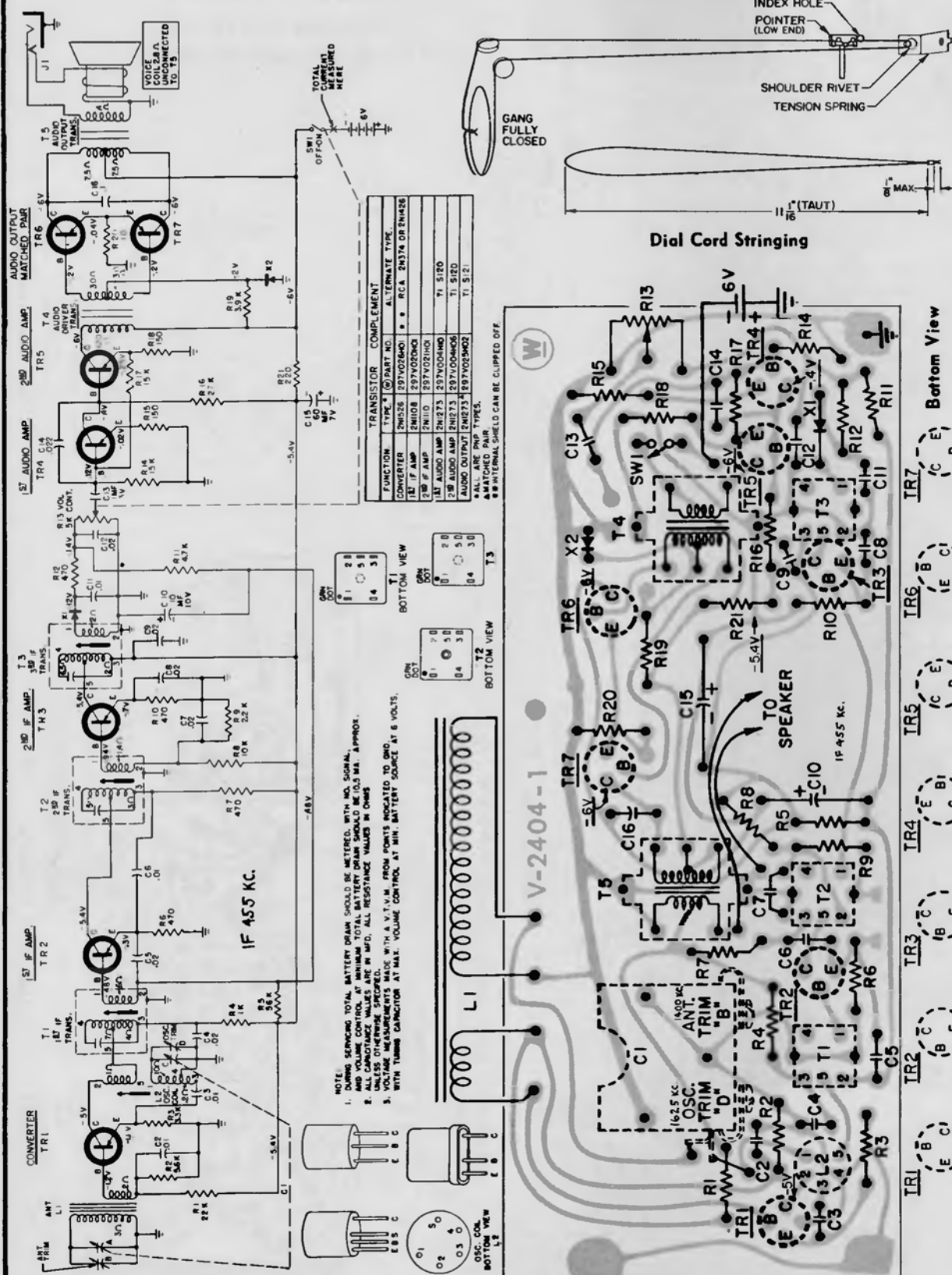
• MATCHED PAIR (SEE NOTES)



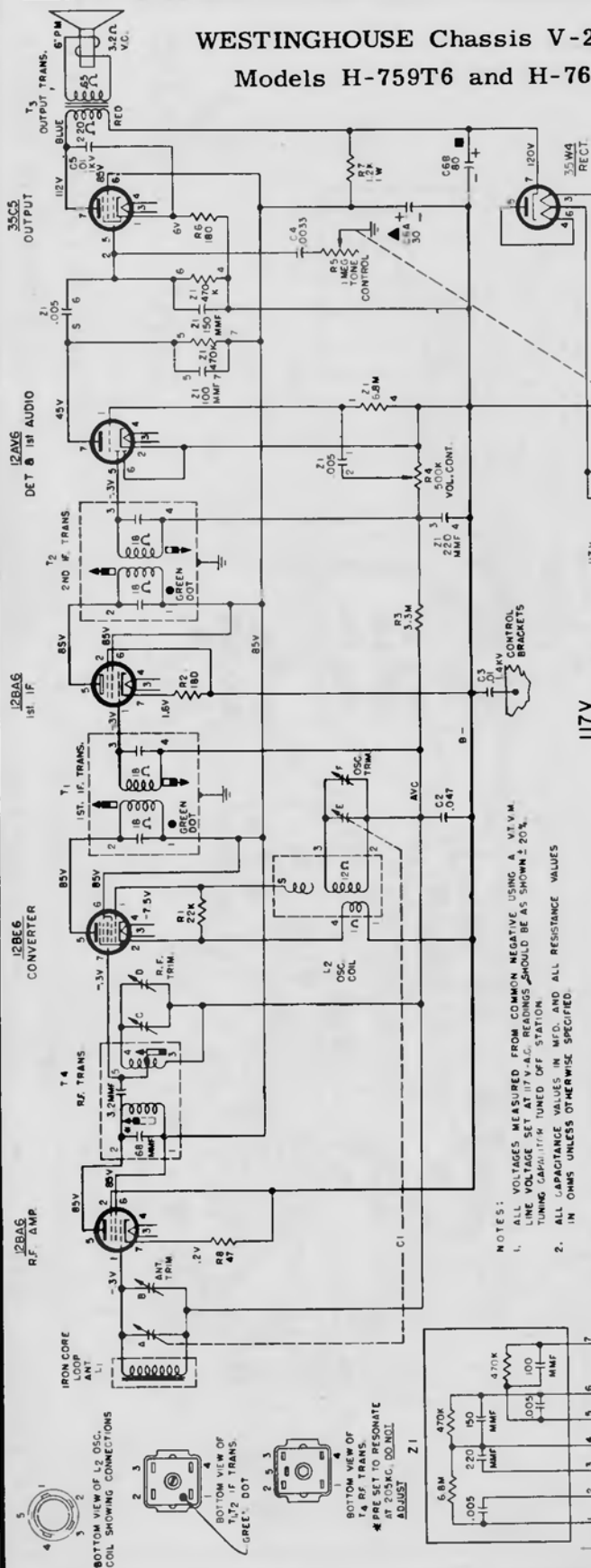
- NOTES:
1. DURING SERVICING, TOTAL BATTERY CURRENT SHOULD BE MONITORED. WITH NO SIGNAL, AND VOLUME CONTROL MEASUREMENTS MADE WITH VOLUME CONTROL AT MINIMUM, BATTERY CURRENT SHOULD BE APPROX. 5 MA TO GROUND. WITH TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM, BATTERY CURRENT SHOULD BE APPROX. 10 MA TO GROUND. IF BATTERY CURRENT IS GREATER THAN ONE OF THESE VALUES, CHECK FOR SHORTS OR EXCESSIVE RESISTANCE IN THE BATTERY CIRCUIT.
 2. ALL CAPACITORS LESS THAN ONE ARE IN MFD. ALL CAPACITORS GREATER THAN ONE ARE IN OHMS. WATT.
 3. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS. WATT.
 4. ANY TWO AUDIO OUTPUT TRANSISTORS WITH IDENTICAL COLOR CODE ON TOP CAN BE USED AS A MATCHED PAIR.



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



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

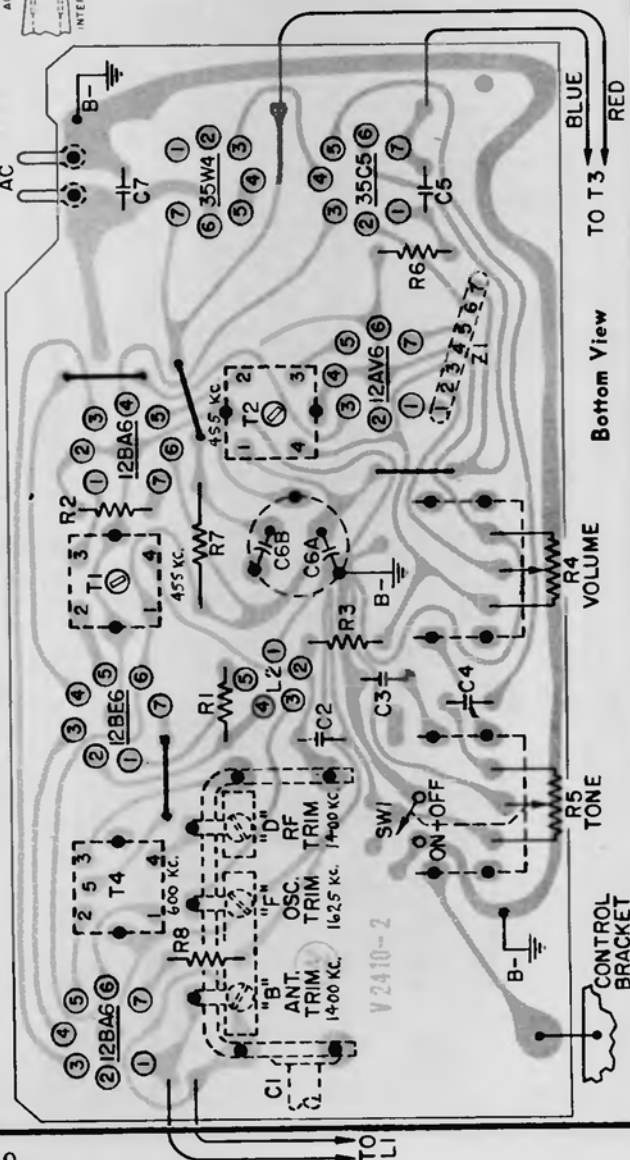


NOTES:
1. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A VTVM.
2. LINE VOLTAGE SET AT 117 V.-A.C. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
3. TUNING CAPACITIVITY TUNED OFF STATION.
4. ALL CAPACITANCE VALUES IN MFD. AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.

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.

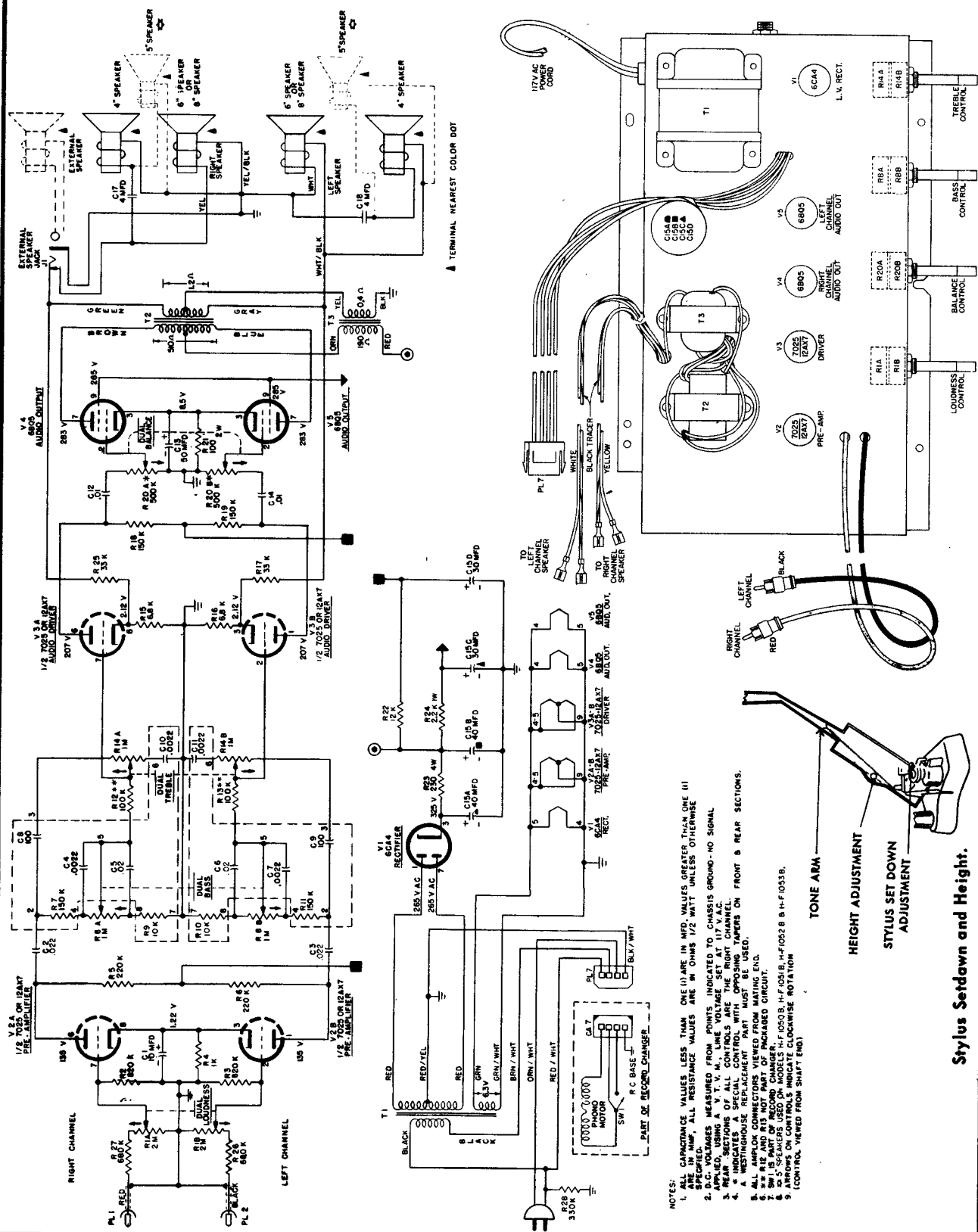
CHASSIS REPLACEMENT
1. Slide chassis and attached cabinet-front into cabinet, making sure that etched circuit board enters the groove provided in the cabinet.
2. Replace screws removed in "Chassis Removal".

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



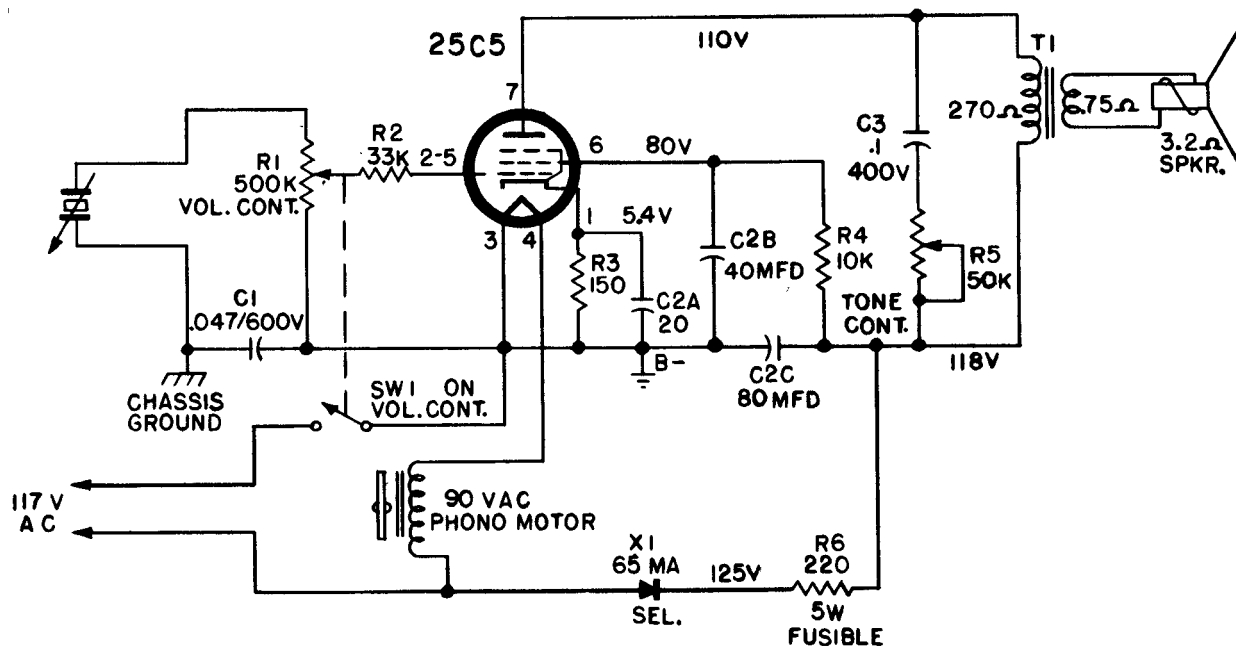
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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

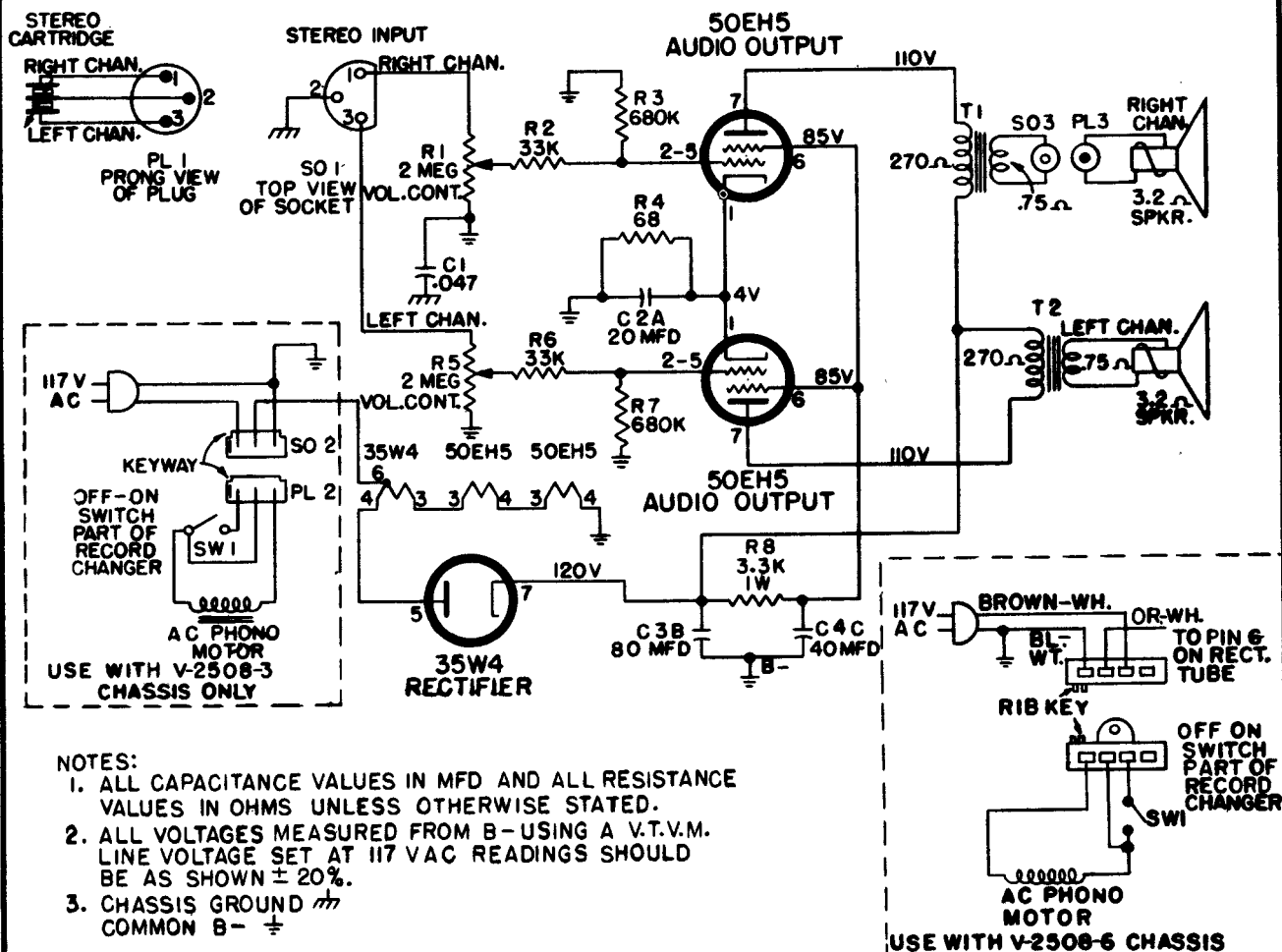


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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



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

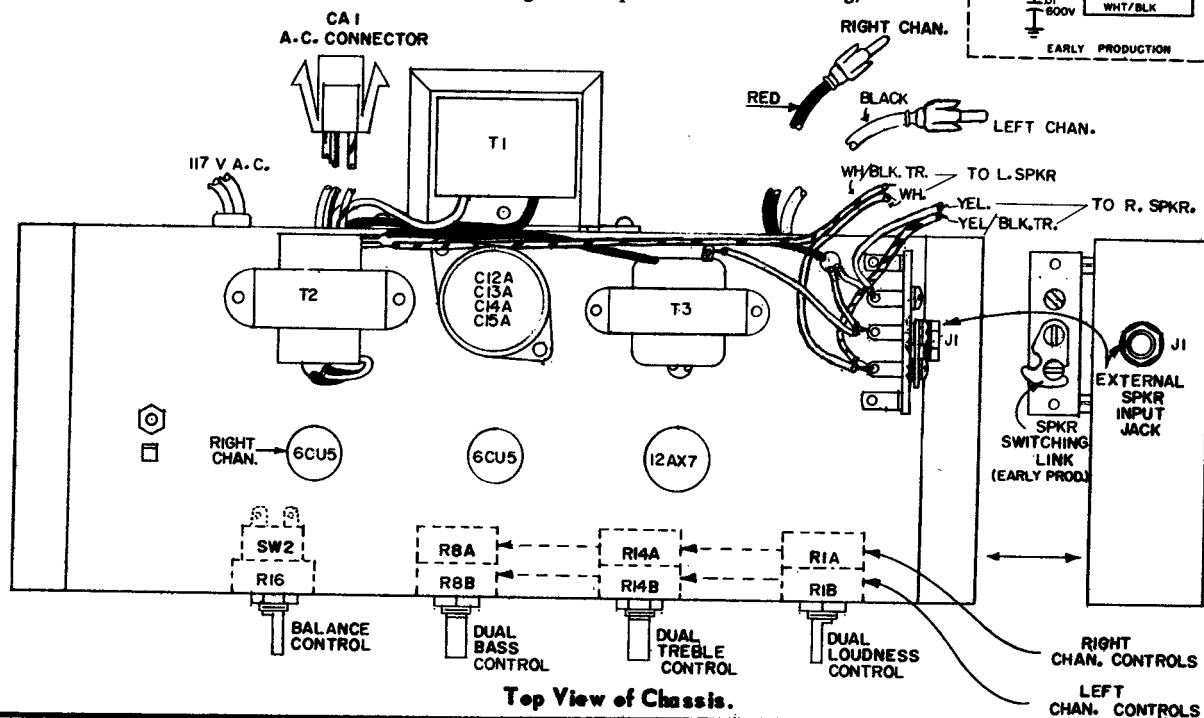
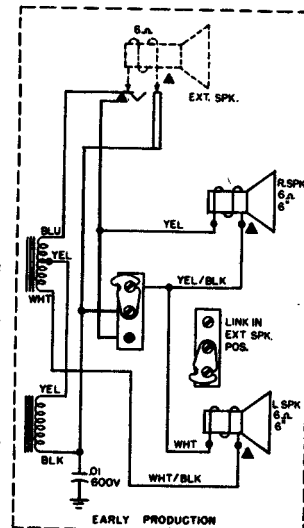
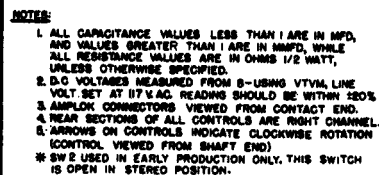


WESTINGHOUSE Chassis V-2507-8, Models H-70ACS1, H-70ACS3, H-70ACS4

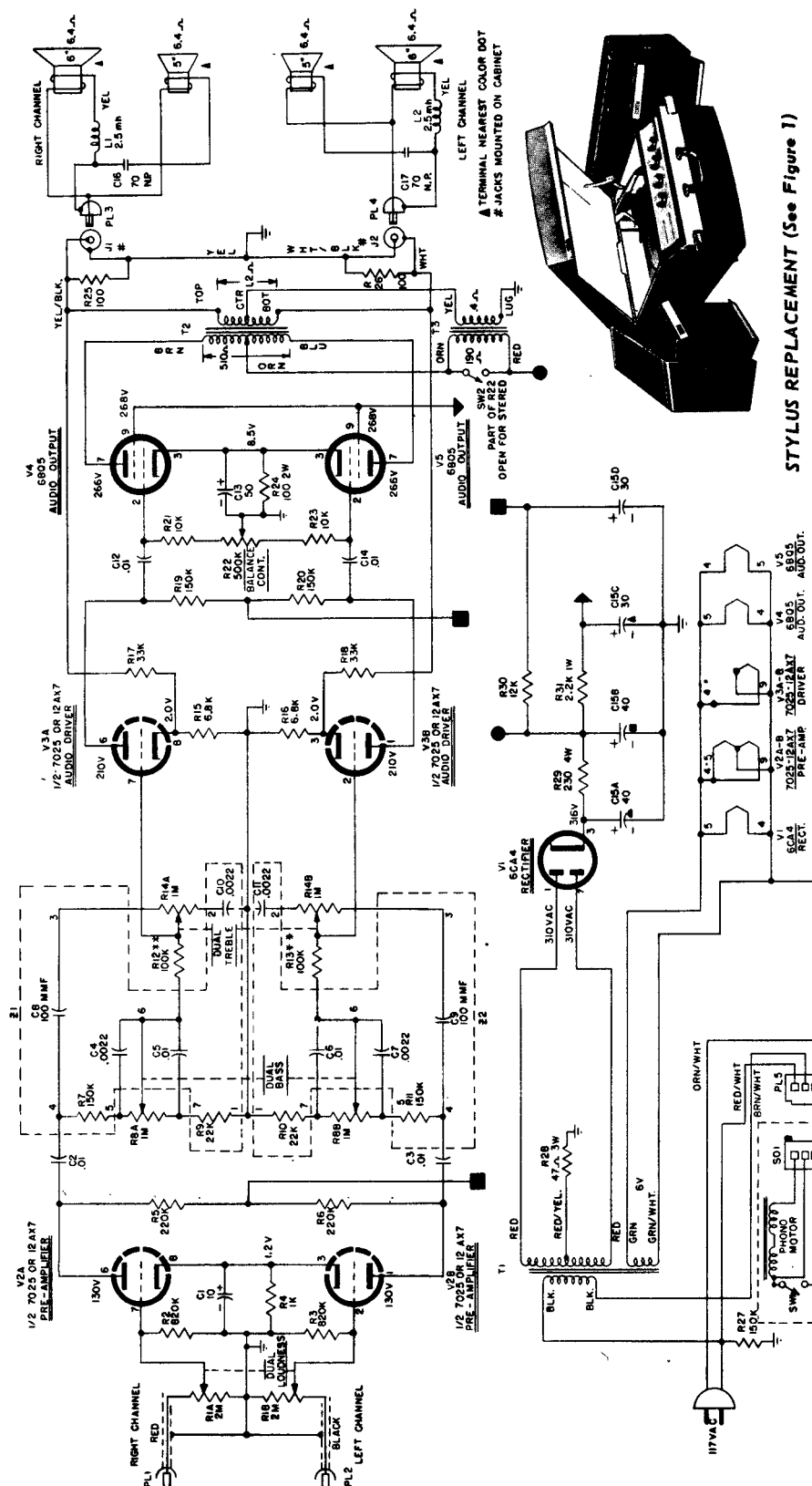


1. Remove control knobs.
 2. Disconnect Amp-Lok type plug from record changer.
 3. Remove phono plugs from record changer noting color of cables and their respective jacks.
 4. Disconnect speaker leads noting connections with regard to lead color and speaker phasing dots.
 5. Remove two nuts securing 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).

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).



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



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.

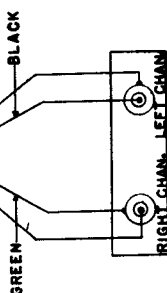
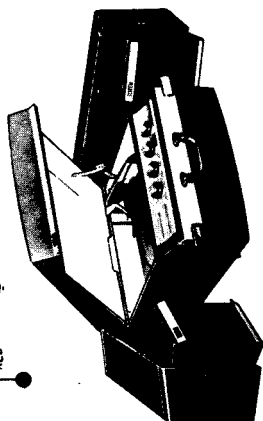
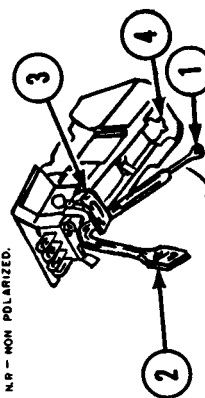
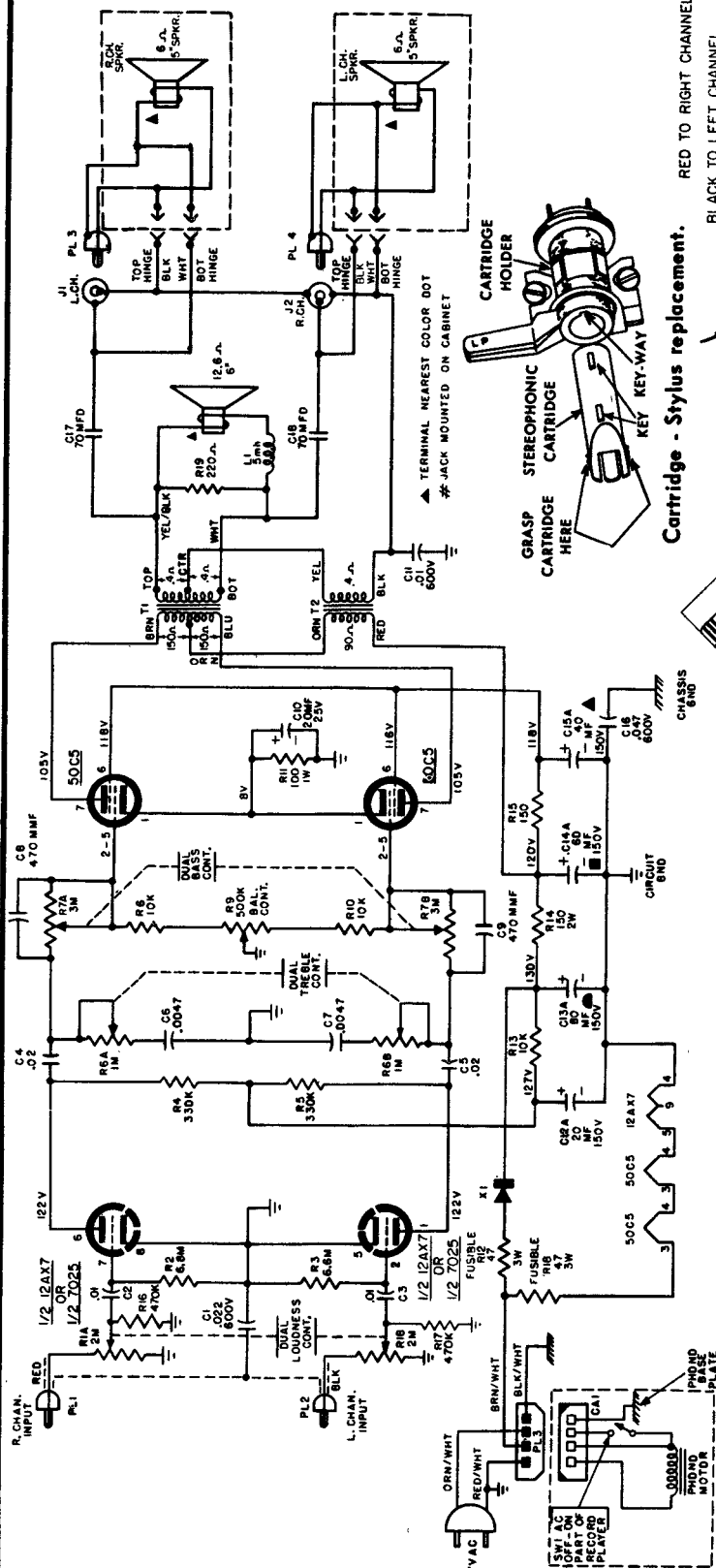


Figure 2 - Cartridge terminal wiring.

Figure 1
Stylus removal
and replacement.

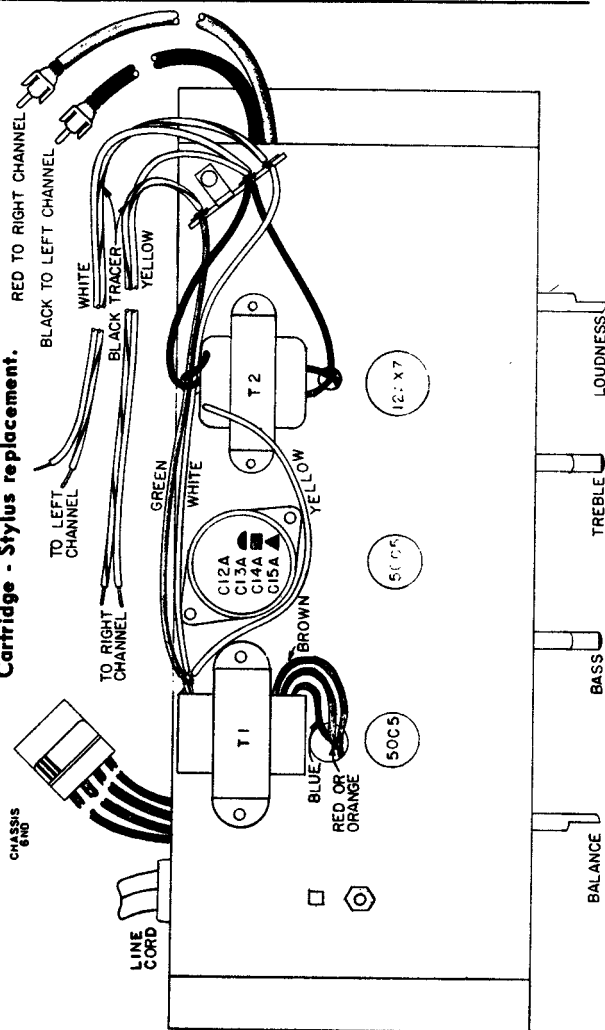
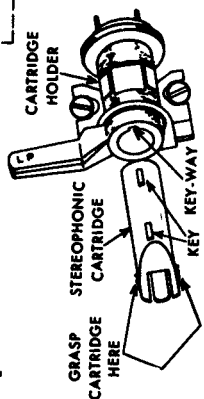


WESTINGHOUSE Chassis V-2507-5
Models H-67ACS1, H-67ACS2



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.

Cartridge - Stylus replacement.

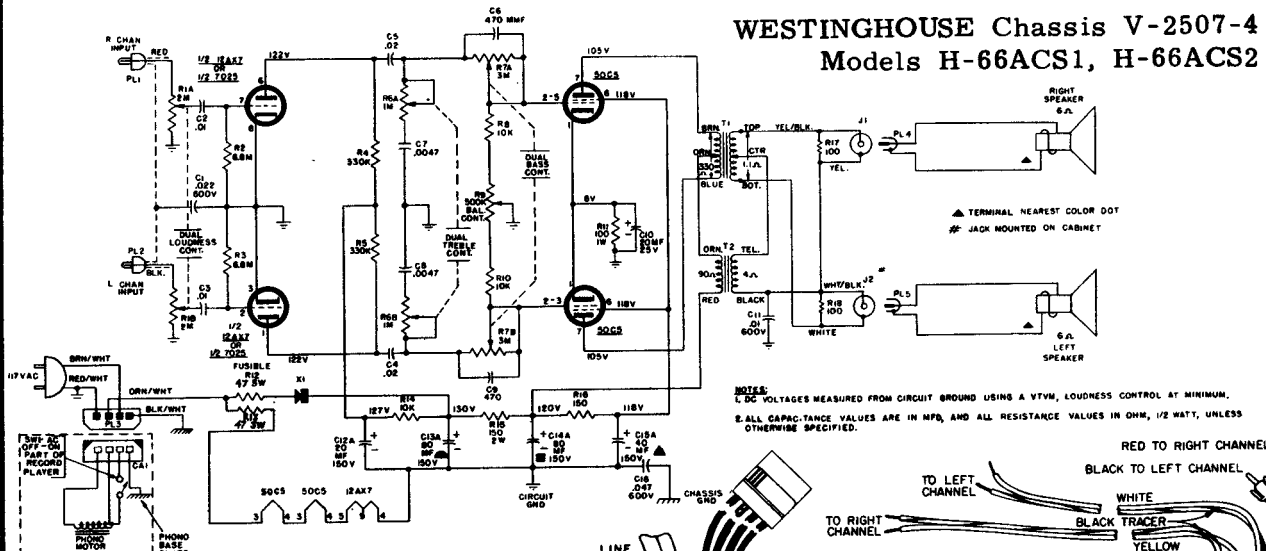


CHASSIS REMOVAL

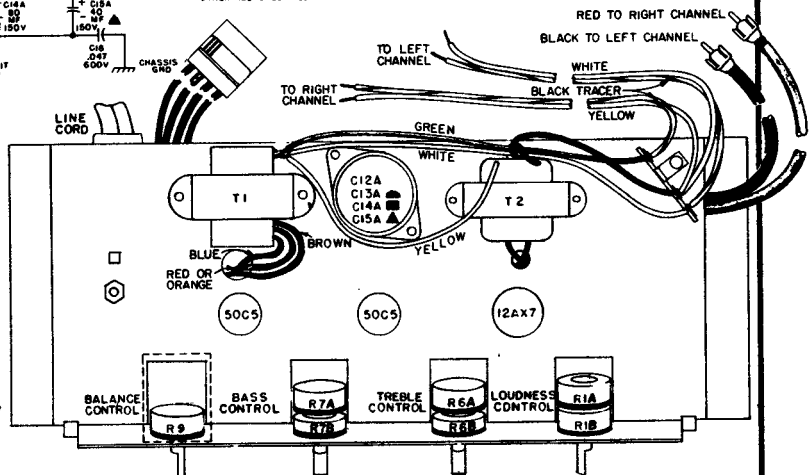
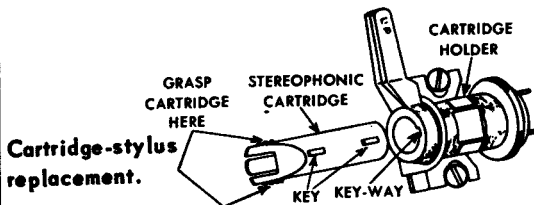
1. Remove control knobs. Remove the escutcheon mounting board attached to the cabinet by 4 Phillips screws. Remove the perforated tube service cover which is attached to the cabinet by 3 Phillips screws.
2. Remove the 4 Phillips screws holding the motorboard. Lift the motorboard.
3. Note the color and 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.

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

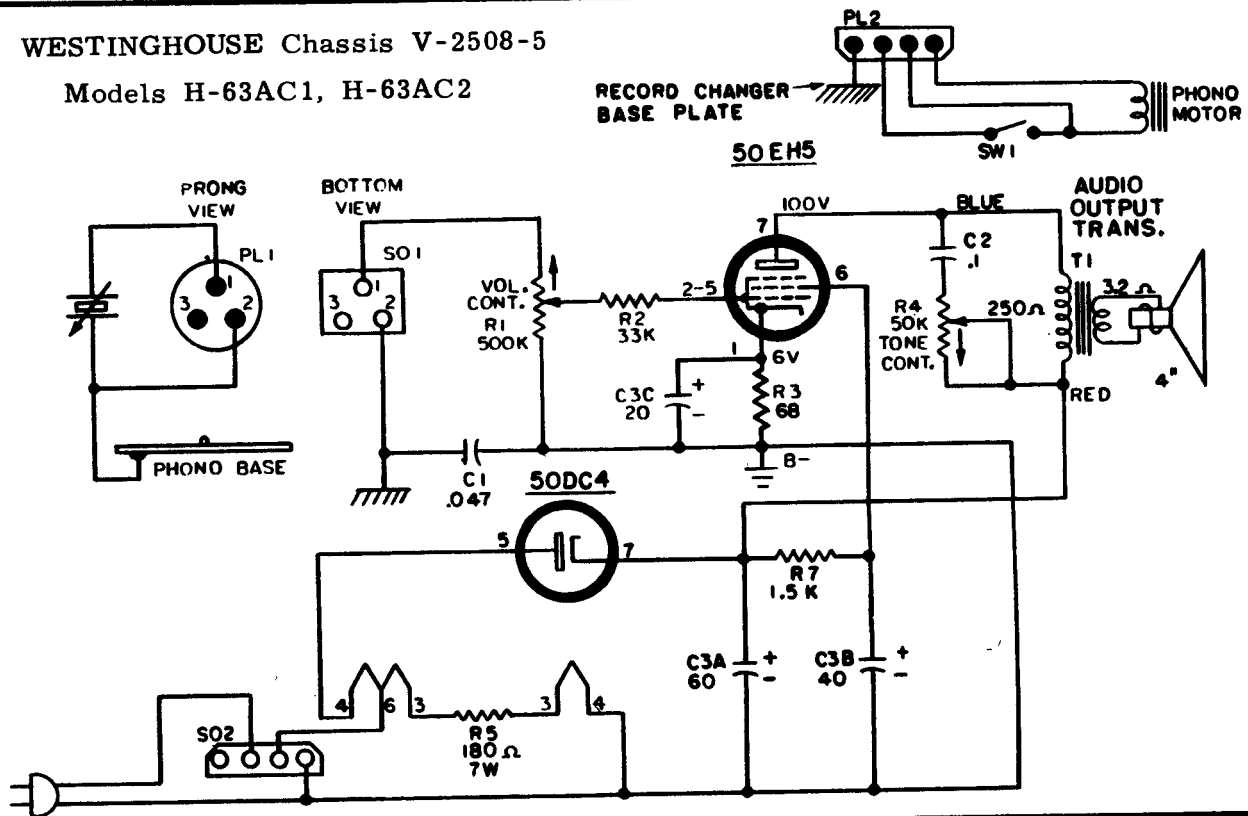
WESTINGHOUSE Chassis V-2507-4 Models H-66ACS1, H-66ACS2

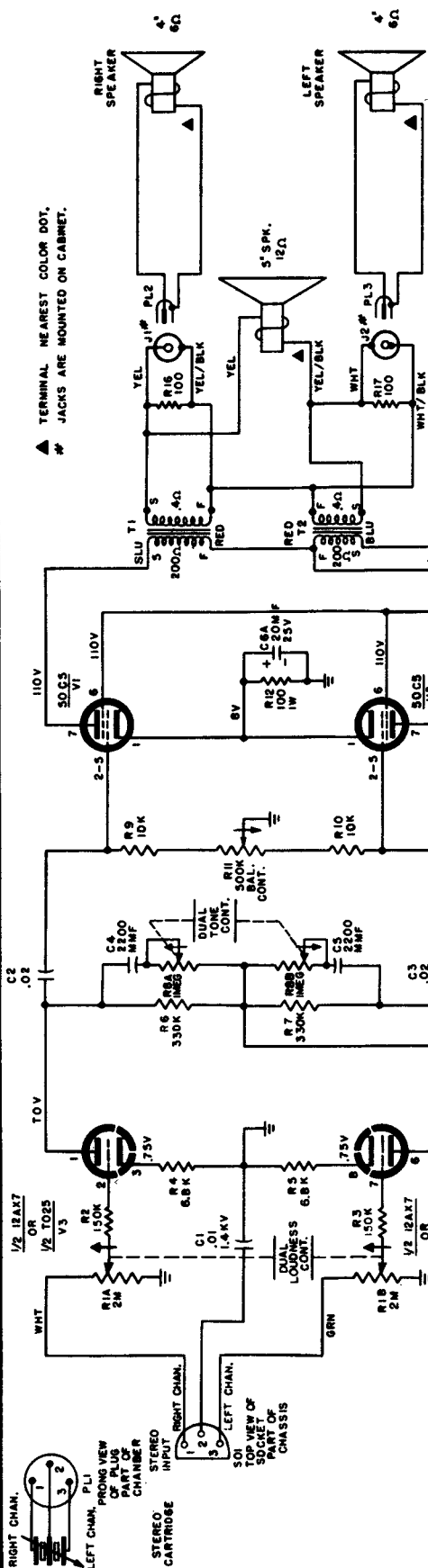


Operating voltage 105 to 120 volts, 60 Cps, AC
 Power consumption 65 watts
 Audio output power 3.8 watts
 Frequency response Flat from 100 Cps to 10,000 Cps, ± 1 dB at 1 watt output
 Speakers (2) 6" PM
 Phono cartridge (part 671V001H02) Astatic 13T stereo



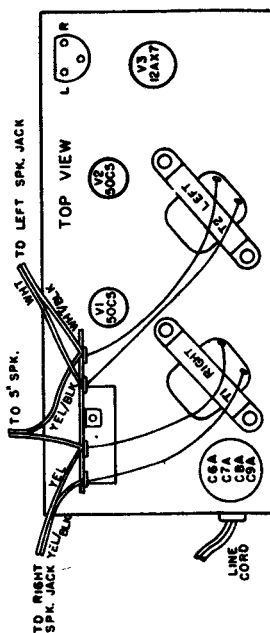
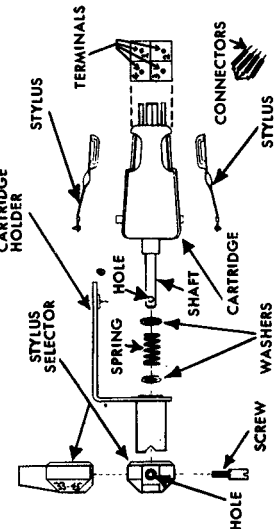
WESTINGHOUSE Chassis V-2508-5 Models H-63AC1, H-63AC2





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.
 2. LINE VOLTAGE SET AT 117V AC. READINGS SHOULD BE AS SHOWN $\pm 20\%$.
 3. ALL CAPACITANCE VALUES LESS THAN ONE (1) ARE IN PFD. VALUES GREATER THAN ONE (1) ARE IN MMF.
 4. ALL RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
 5. DUAL CONTROLS ARE WHEELED REAR SECOND CHANNEL. PANELED SECTION LEFT CHAN.
 6. ARROWS ON CONTROLS INDICATE COUNTERCLOCKWISE ROTATION VIEWED FROM SHAFT END.

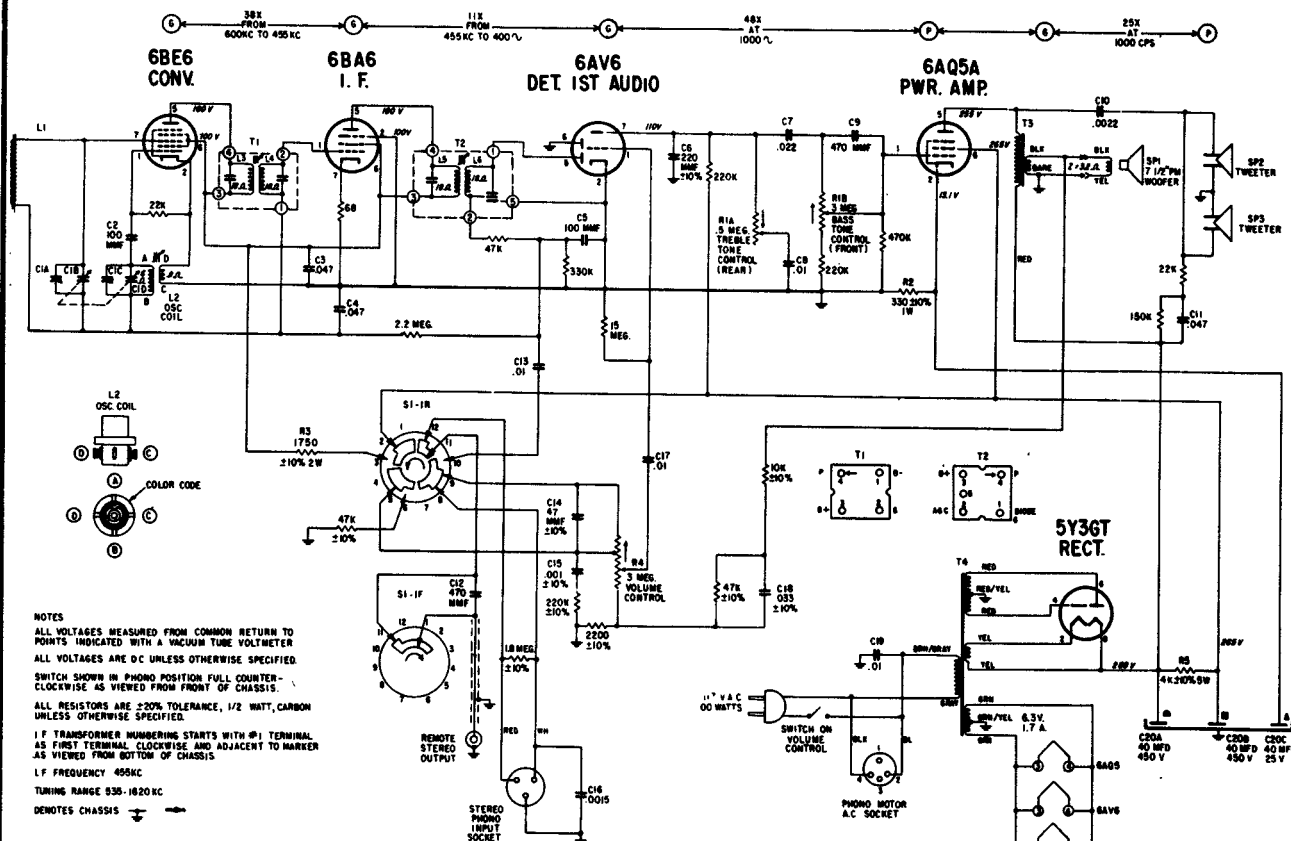
WESTINGHOUSE Chassis V-2506-5
Models H-65ACS1, H-65ACCS2

Stylus Setdown.

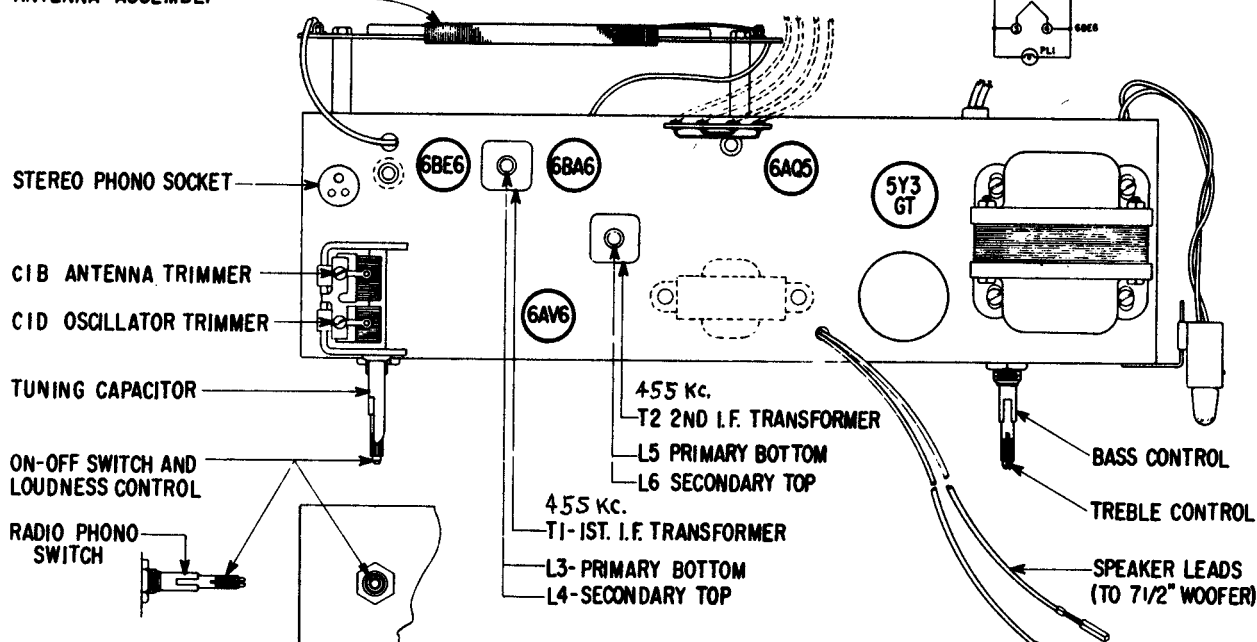
ZENITH RADIO CORPORATION

MODEL SFD-660 PORTABLE

STEREOPHONIC PHONOGRAPH CHASSIS 5D20



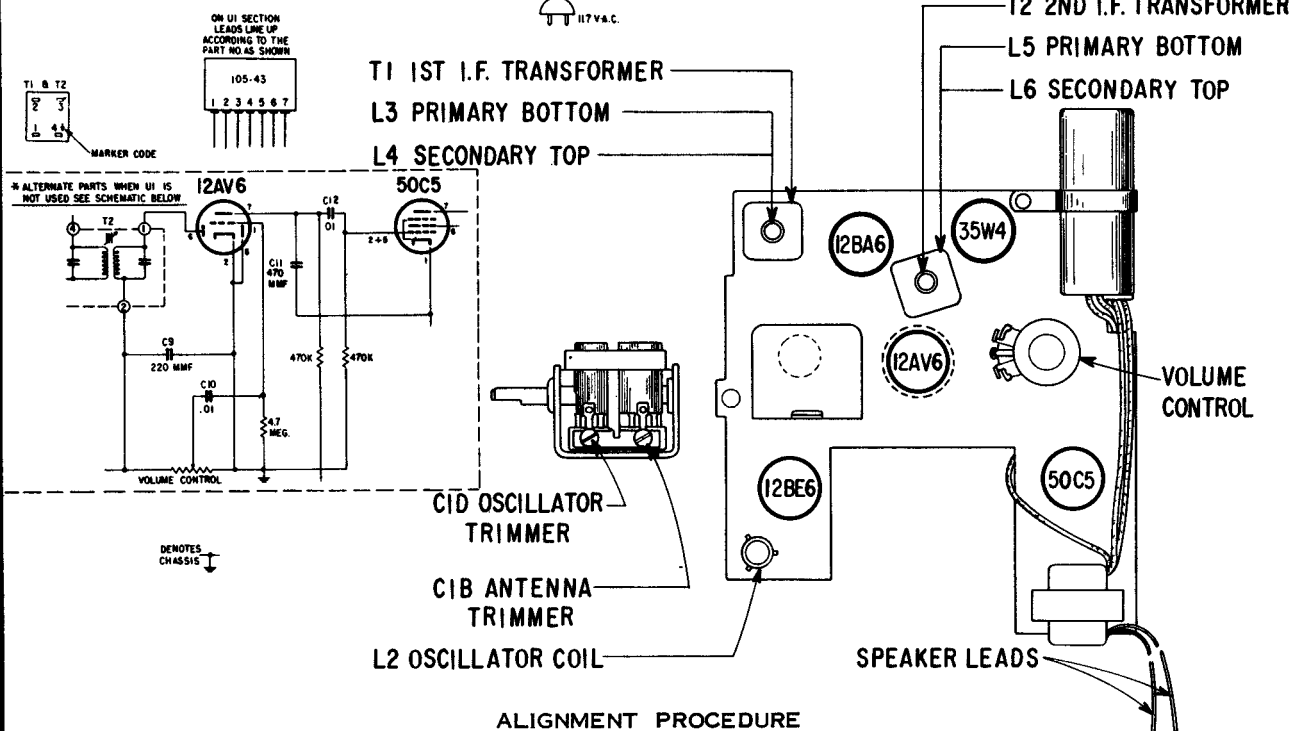
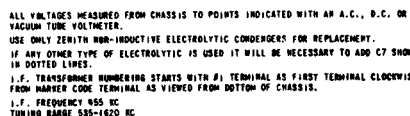
ANTENNA ASSEMBLY



ZENITH RADIO



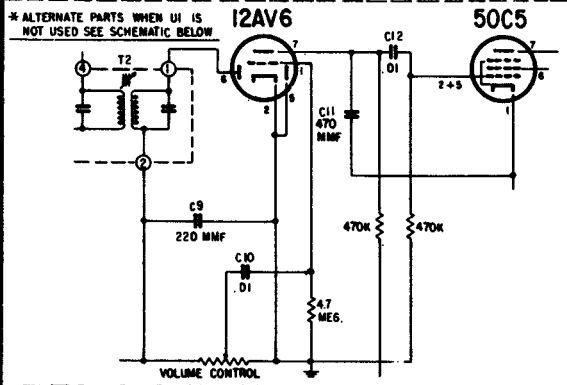
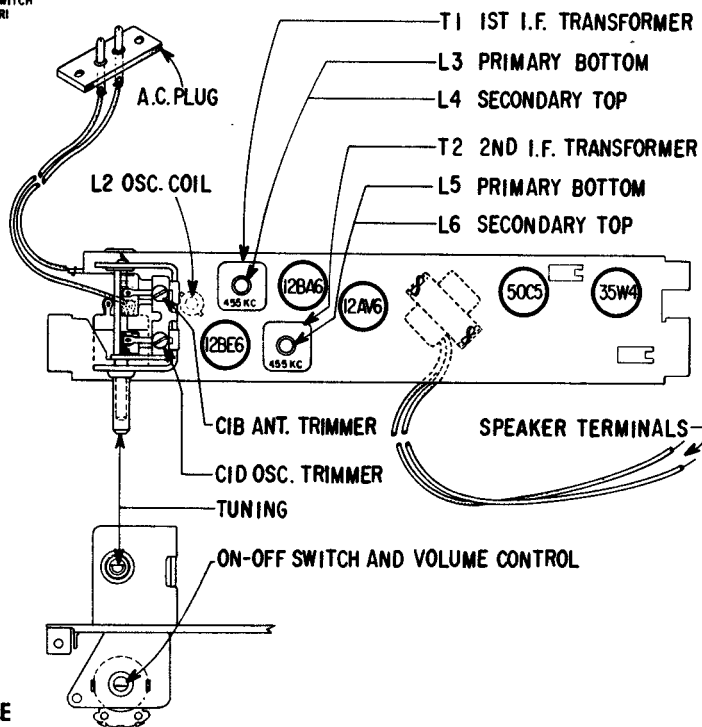
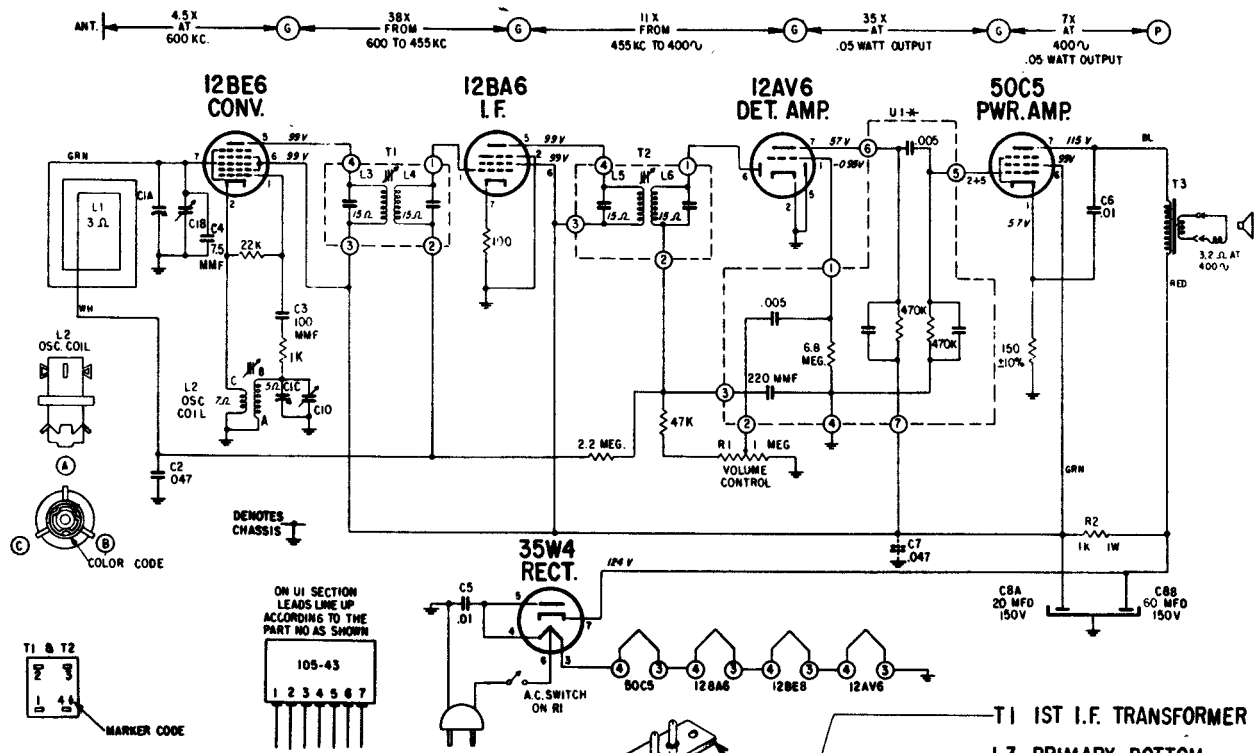
Chassis 5E04 used in
Models E514B, L, V, W,
is the same electrically.



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

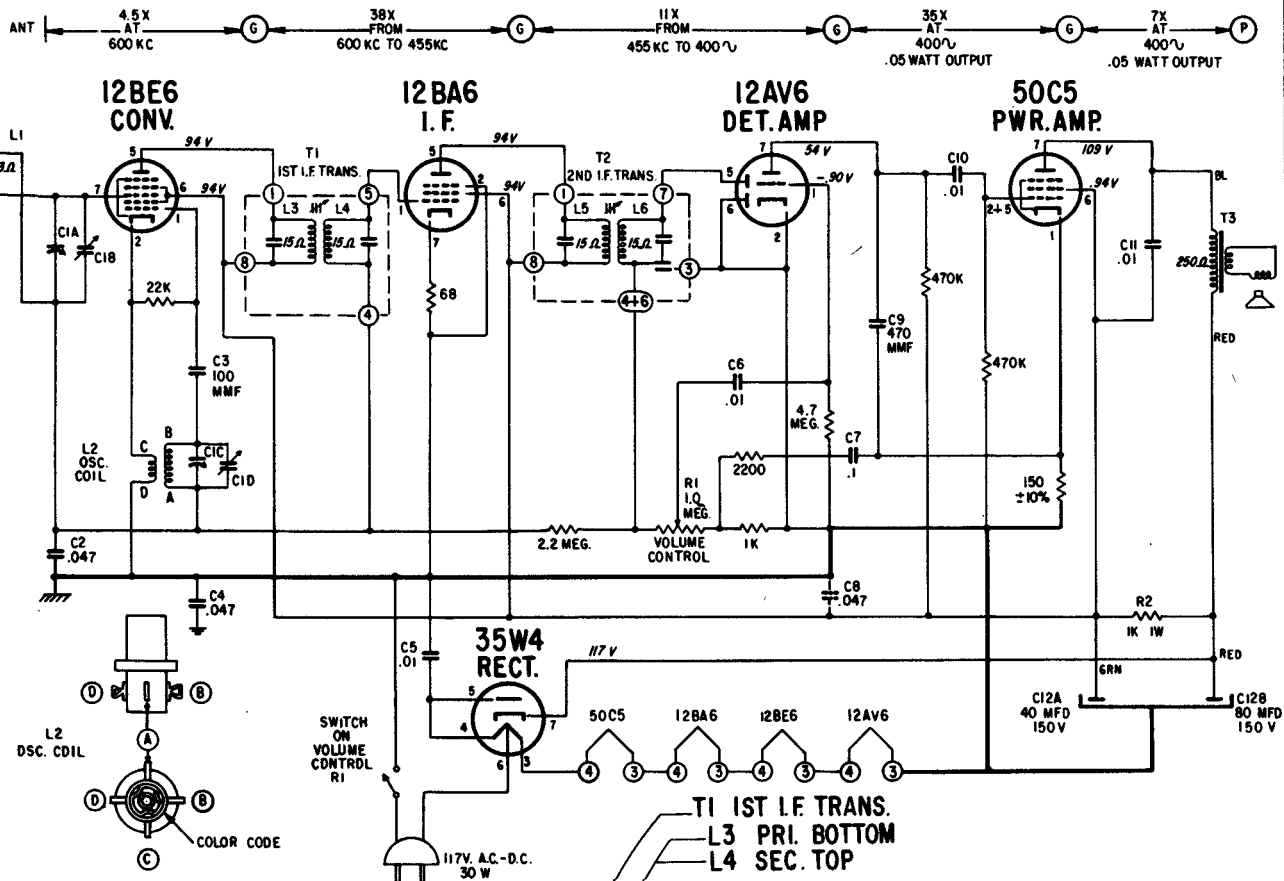


ALIGNMENT PROCEDURE

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.	C1D	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	C1B	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 VOLT-METER.
 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 $\pm 20\%$ TOLERANCE, $1/2$ WATT, CARBON UNLESS OTHERWISE SPECIFIED.
 I.F. FREQUENCY 455 KC.
 TUNING RANGE 535-1620 KC.
 $\perp$ DENOTES CHASSIS $\perp$ DENOTES COMMON RETURN 8-

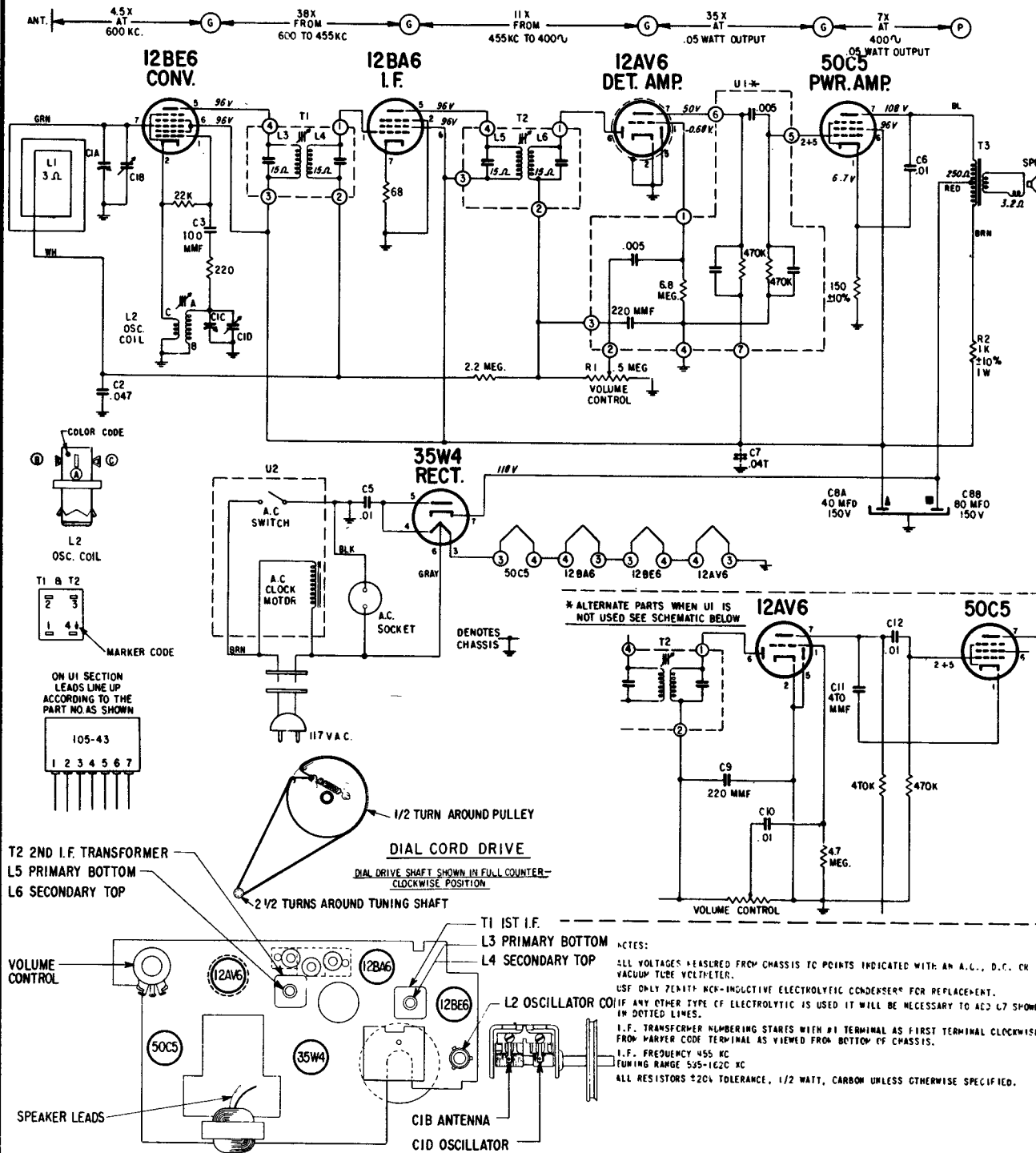
CID OSCILLATOR TRIMMER
CIB ANTENNA TRIMMER

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.	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 Chassis 5G09, Models G516C, L, V, W

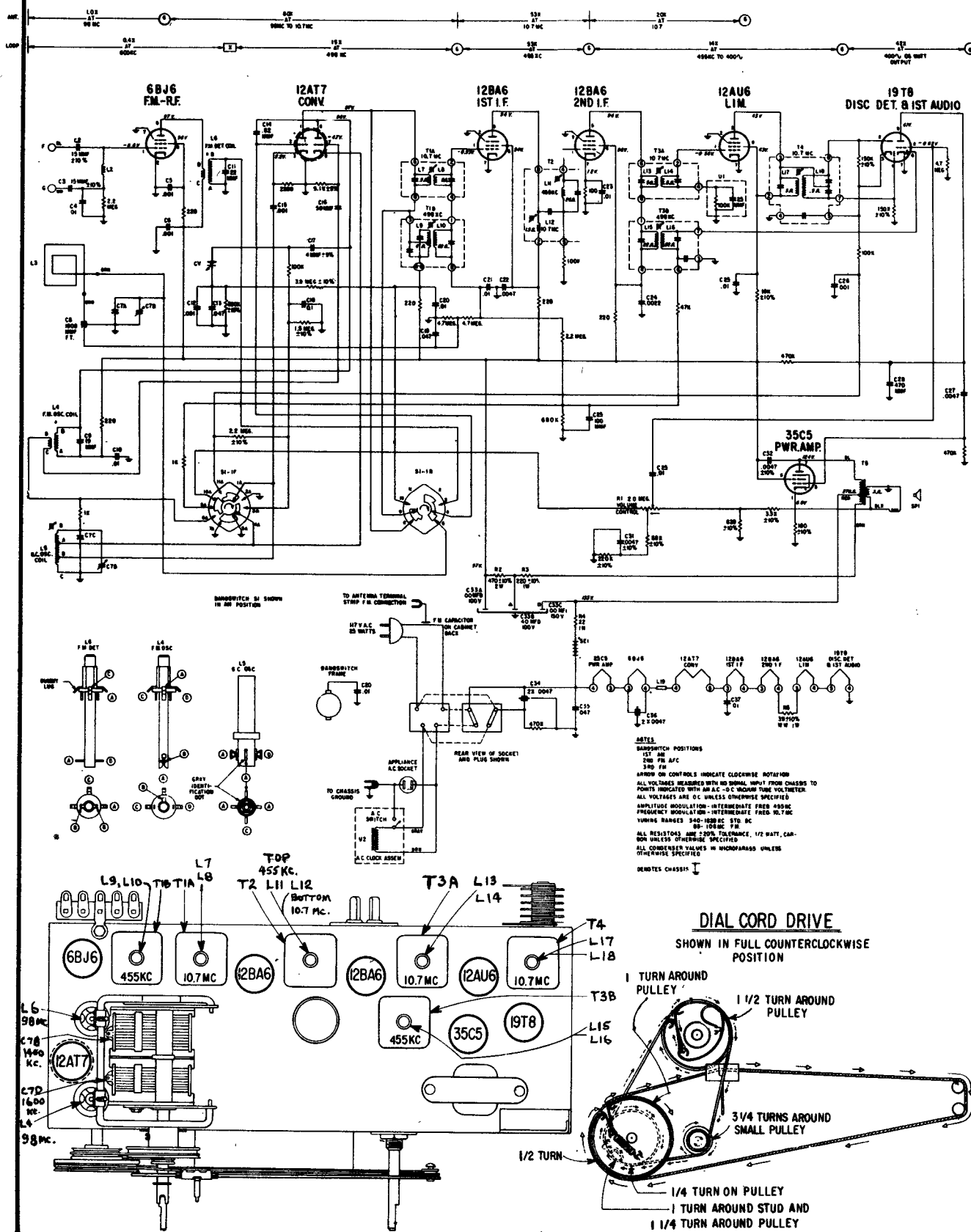


Alignment Procedure

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.	C1D	Set Oscillator to Dial Scale
3		—	1400 Kc.	1400 Kc.	C1B	Align Antenna Stage

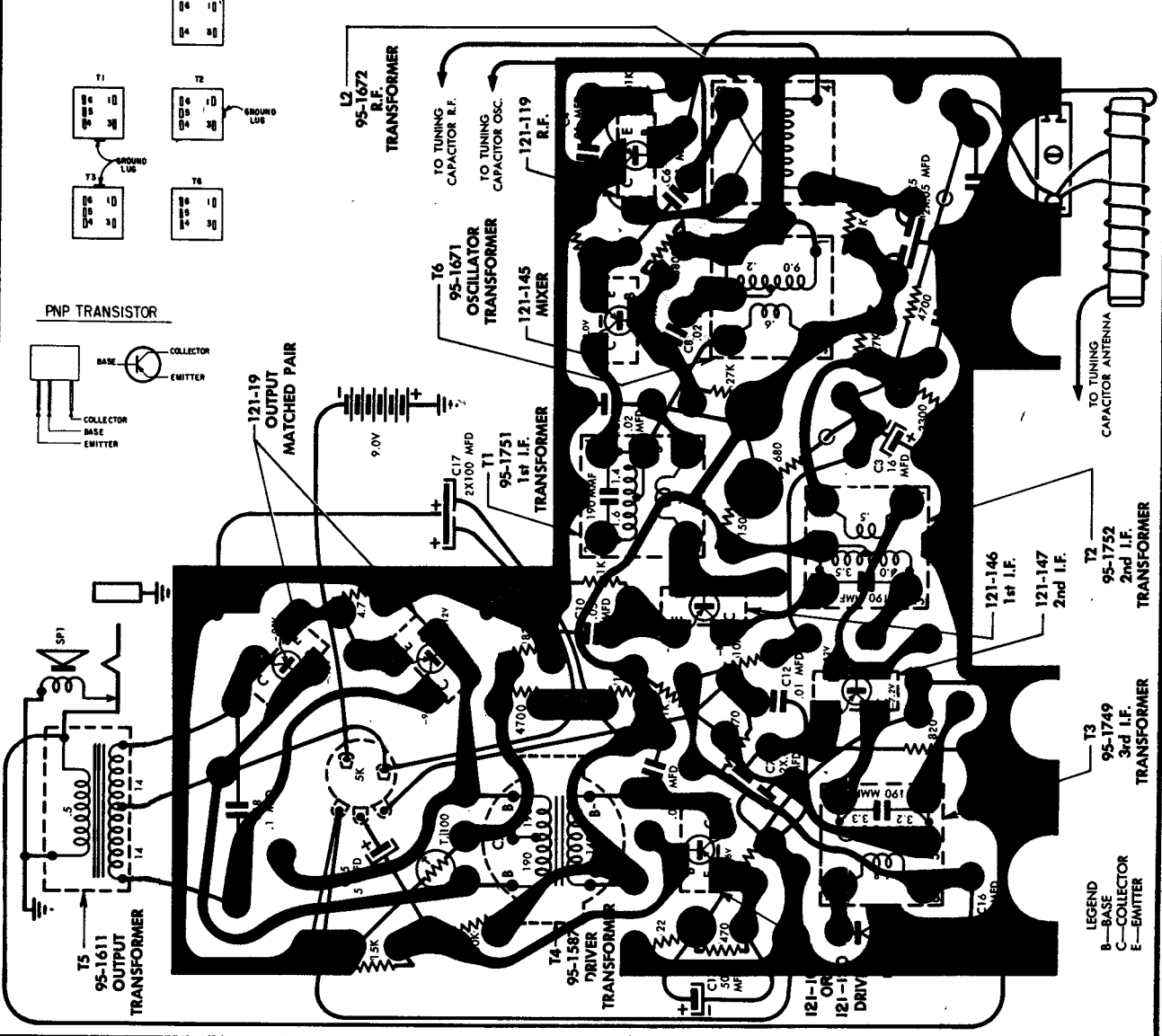
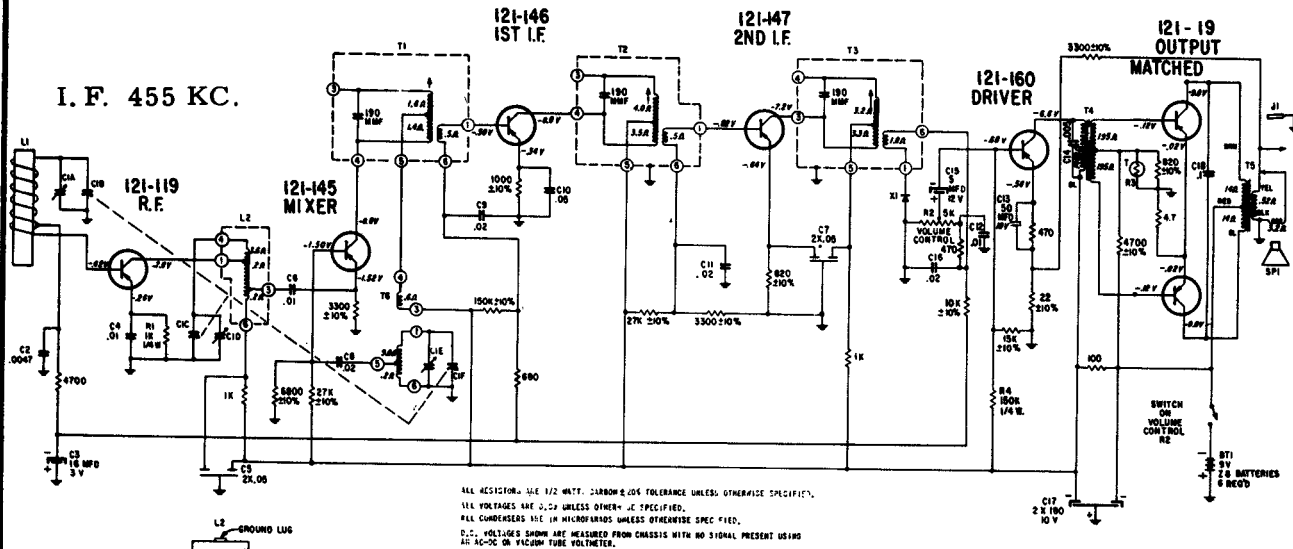


ZENITH MODEL F728C, L & W, CHASSIS 7F03



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

ZENITH RADIO Chassis 7FT45Z1, Model "Royal 475"



CHASSIS, WIRING AND COMPONENTS VIEWED FROM WIRING SIDE

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

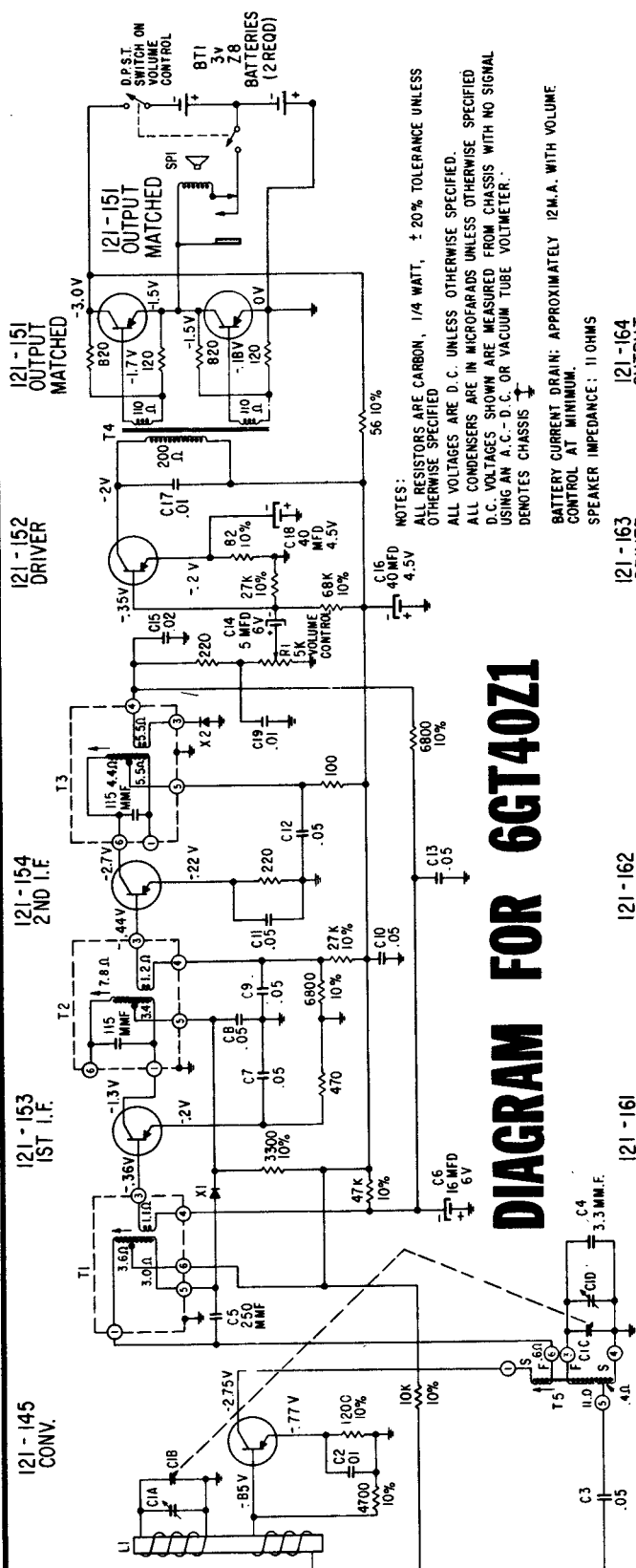


DIAGRAM FOR 6GT40Z1

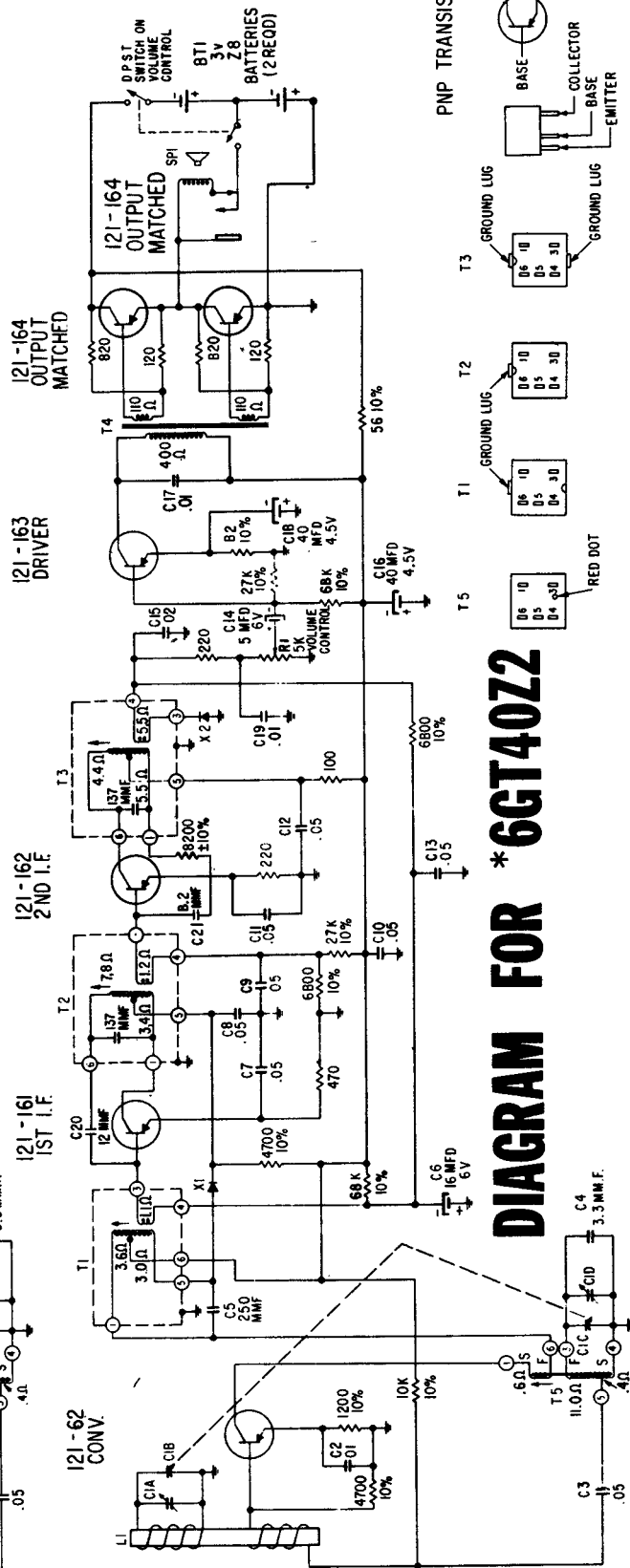
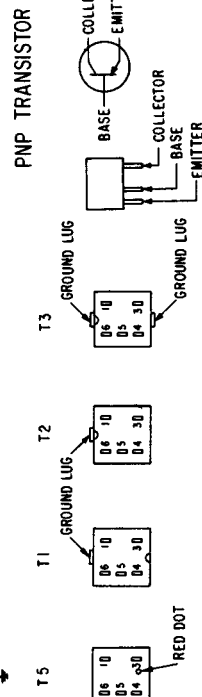
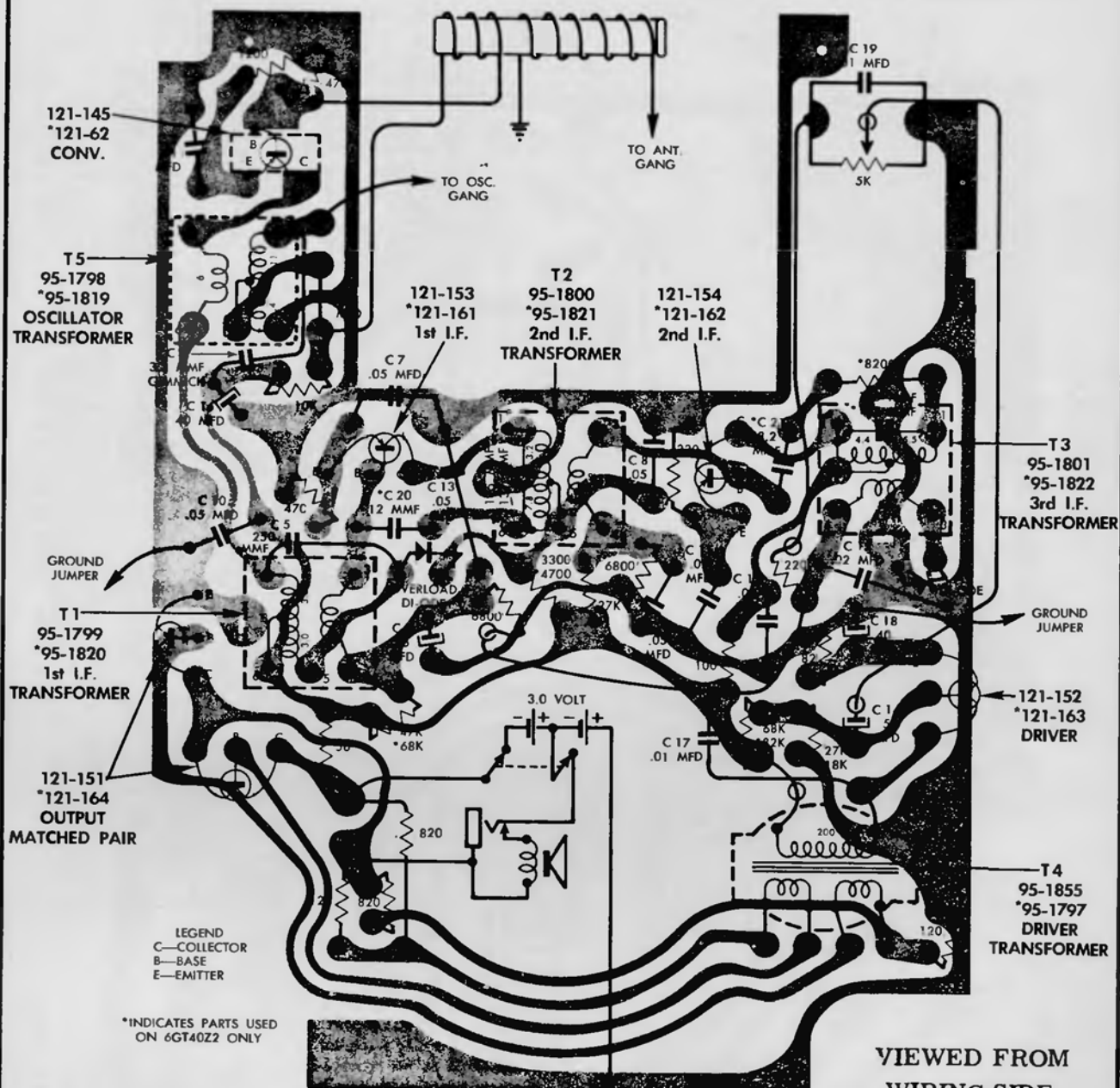


DIAGRAM FOR *6GT40Z2



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

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



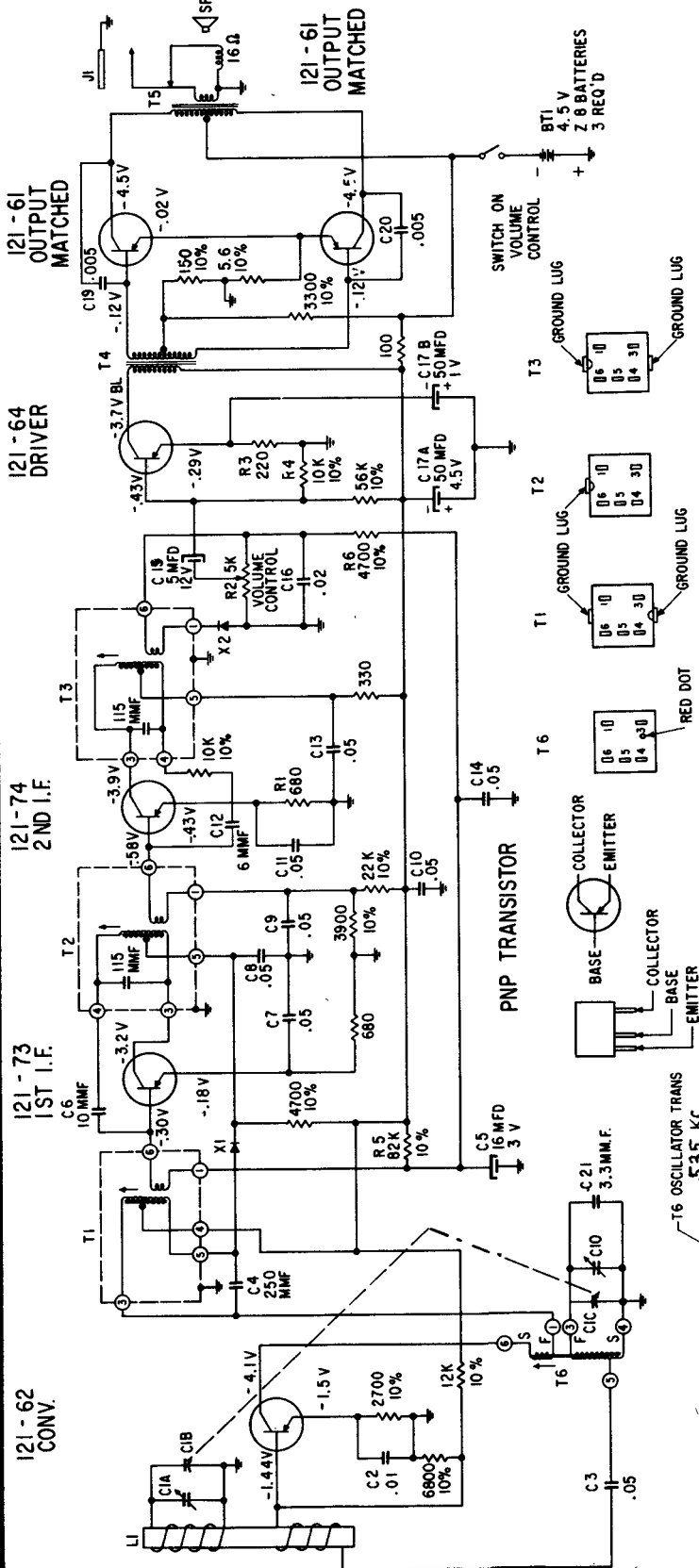
ALIGNMENT PROCEDURE

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)

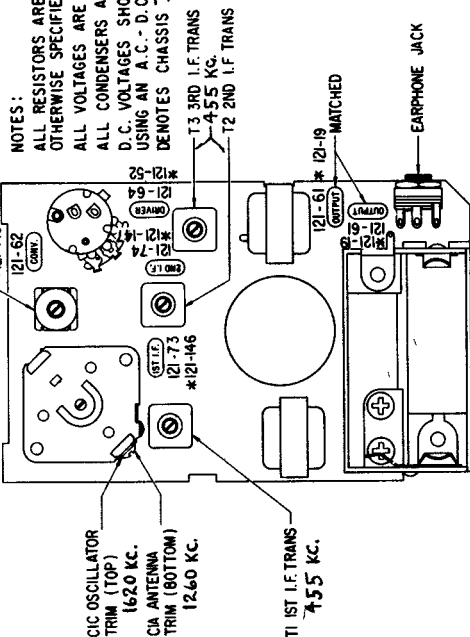


These transistor portable chassis are conventional superheterodyne receivers. Chassis 6ET42Z2 & 6ET42Z1 are virtually identical except for different transistors and a few other parts. The parts marked with asterisks on the chassis wiring and component drawing apply only to chassis 6ET42Z1. Both chassis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

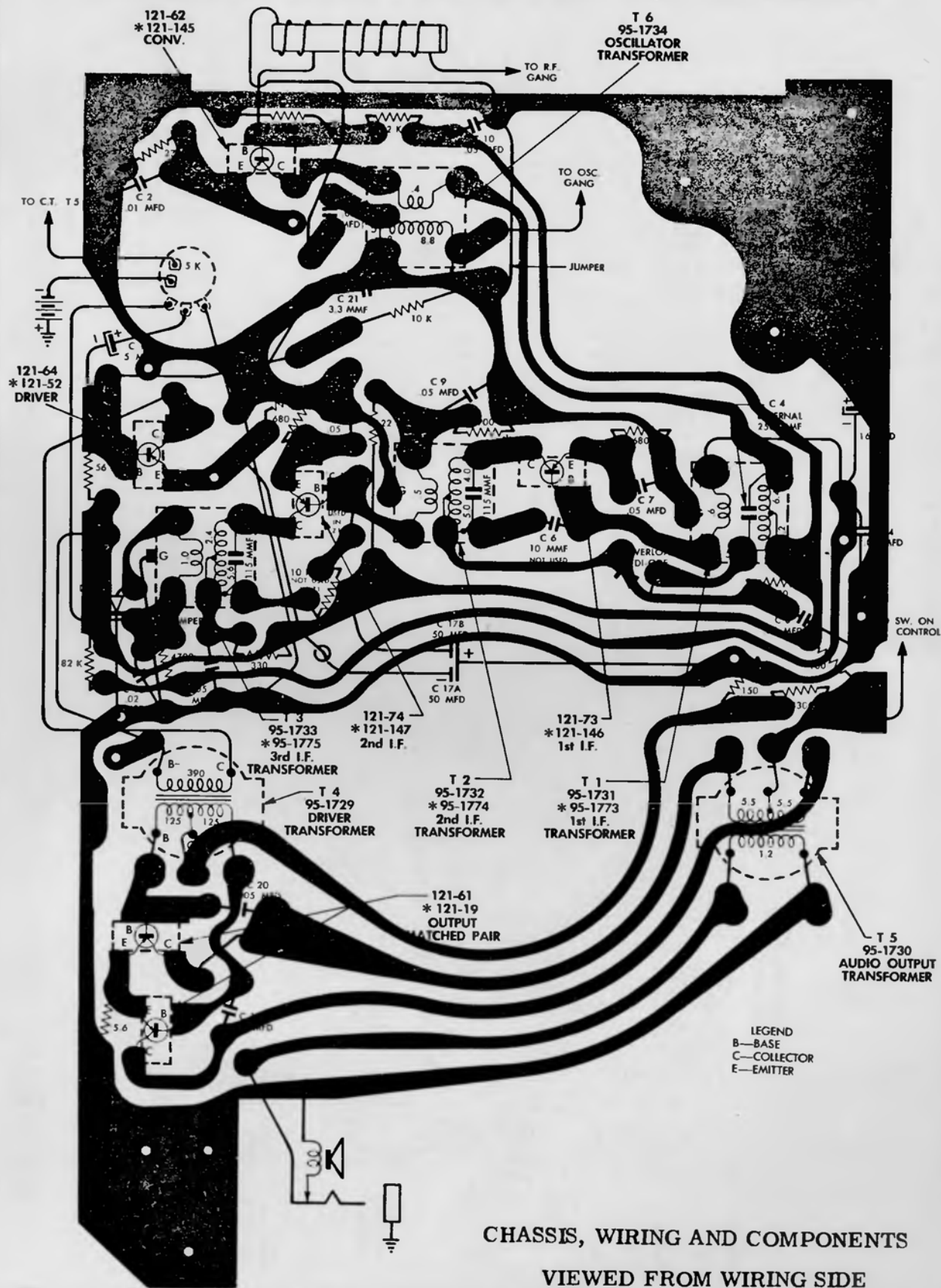
NOTES:
ALL RESISTORS ARE CARBON, 1/2 WATT, $\pm 20\%$ TOLERANCE UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.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

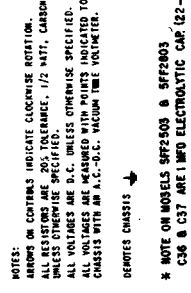


TRANSISTOR & TRIMMER LAYOUT
FOR CHASSIS 6ET42Z2 & 6ET42Z1

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

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





Index

Admiral Corp.	Admiral, Cont.	Chevrolet +	Gamble-Skogmo	Motorola, Cont.	Motorola, Cont.
3N1A 3	Y4072 3	988414 34	RA 48-8182A 46	A11A 97	109 80
4E3A 4	Y4073 3	988460 26	RA 50-8231 47	A11W 97	111 80
4F3A 5	Y4081 5	988468 35	RA 50-8232 47	C10N 95	113 80
4L2B 6	Y4082 5			C10P 95	114 80
4L26B 6	Y4083 5	<u>Coronado</u>		C10W 95	309 80
4L27B 6	Y4131 9	RA 48-8182A 46	<u>General</u>	C11B 95	310X 82
4L28B 6	Y4132 9	RA 50-8231 47	<u>Electric</u>	C11G 95	311 80
4L29B 6	Y4159 9	RA 50-8232 47	T100A 48	C11S 95	311X 83
4N3 4		<u>Delco</u>	T145A 49	A12N 104	314L,V 80
4P3, -A 7	<u>American</u>	AC-2977 26	T146A 49	C12B 96	500X 79
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