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1961

VOLUME R-21

RADIO
DIAGRAMS

and Servicing Information



Compiled by
M. N. BEITMAN

SUPREME PUBLICATIONS

VOLUME R-21

PRICE \$2⁵⁰

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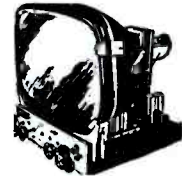
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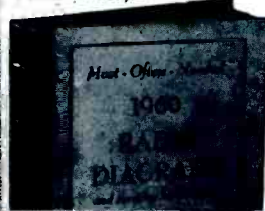
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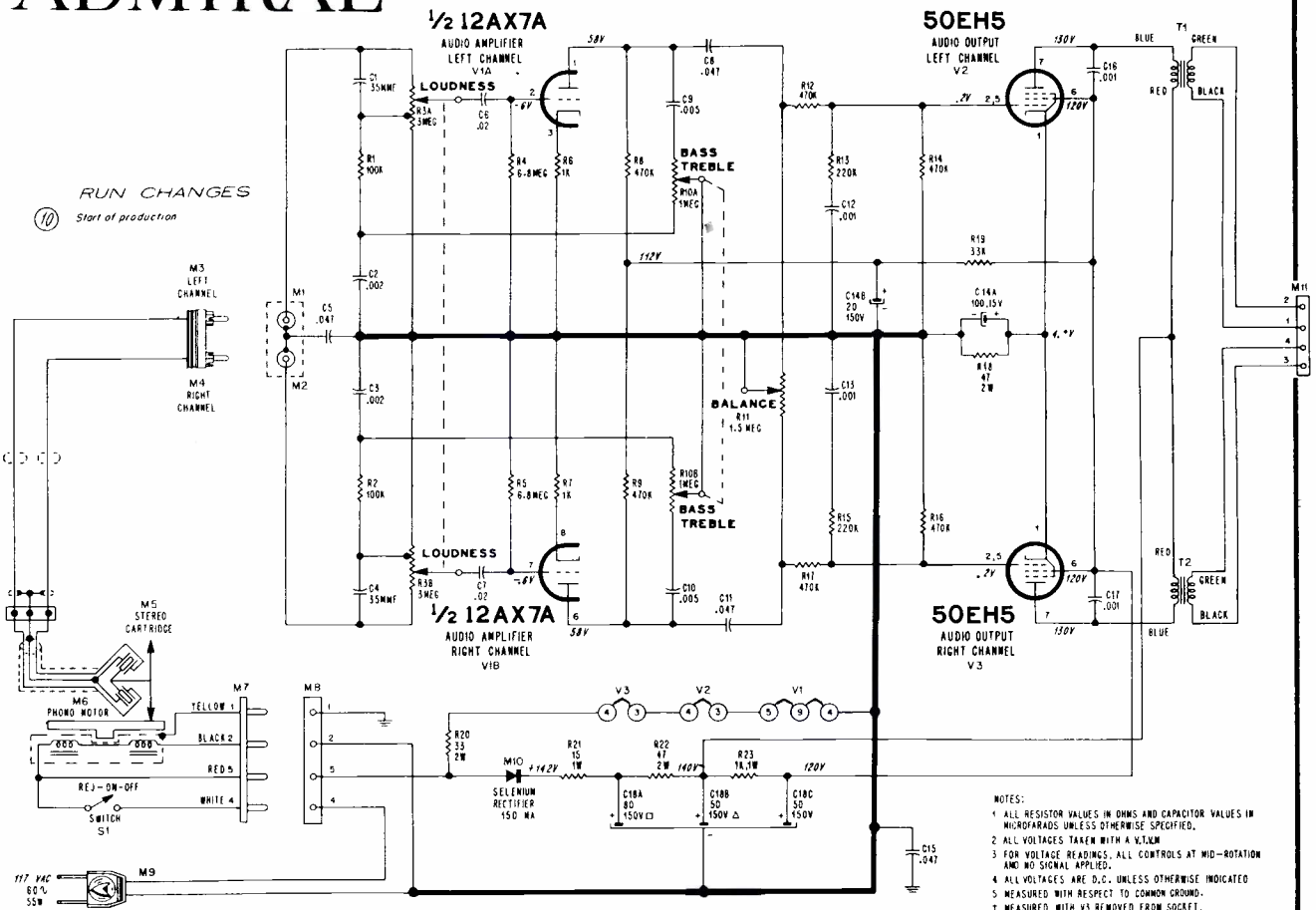
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ADMIRAL

CHASSIS 3N1A, MODELS Y4049, Y4071, Y4072, Y4073



Schematic of 3N1A Stereophonic High Fidelity Amplifier Stamped Run No. 10.

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

RUN 11 In All Sets

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

CHASSIS REMOVAL

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

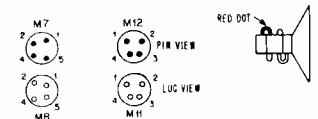
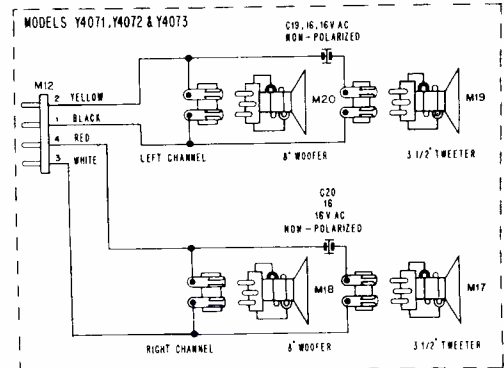
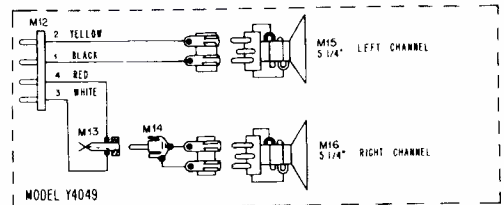
Disconnect the phono motor plug (M7), the two channel input plugs (M3 and M4), and speaker plug (M12). Remove the three control knobs by pulling them straight out from the control shafts.

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

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

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

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



ADMIRAL

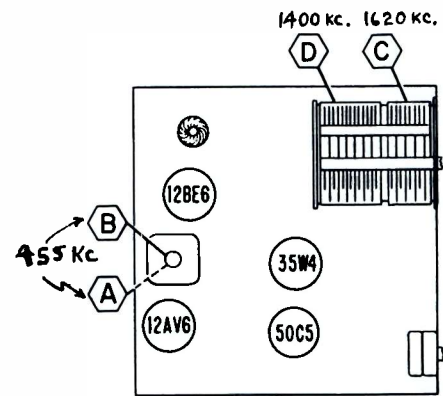
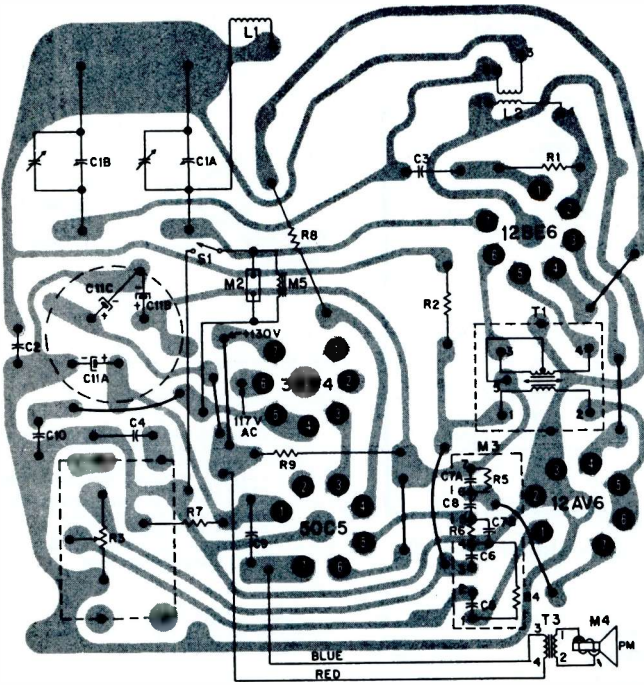
TABLE CLOCK RADIO

| MODEL | COLOR | CHASSIS |
|--------|------------|---------|
| Y1189A | Grey-Green | 4E3A |

CLOCK RADIO

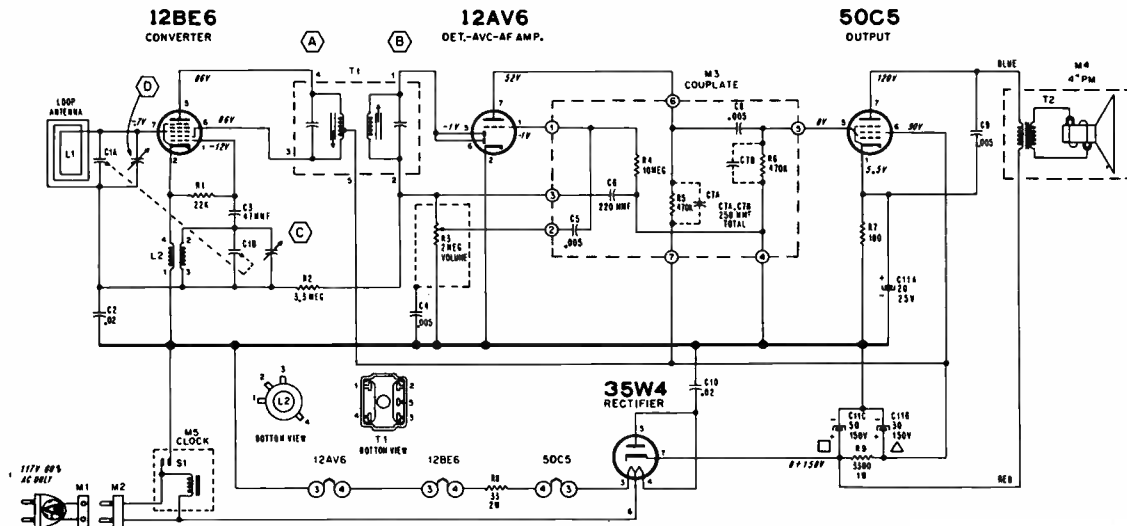
| MODEL | COLOR | NAME | CHASSIS |
|-------|---------------------|----------|---------|
| Y3037 | Beige and White | Sinclair | 4N3 |
| Y3038 | Turquoise and White | | |

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



Tube and Alignment Point Locations.

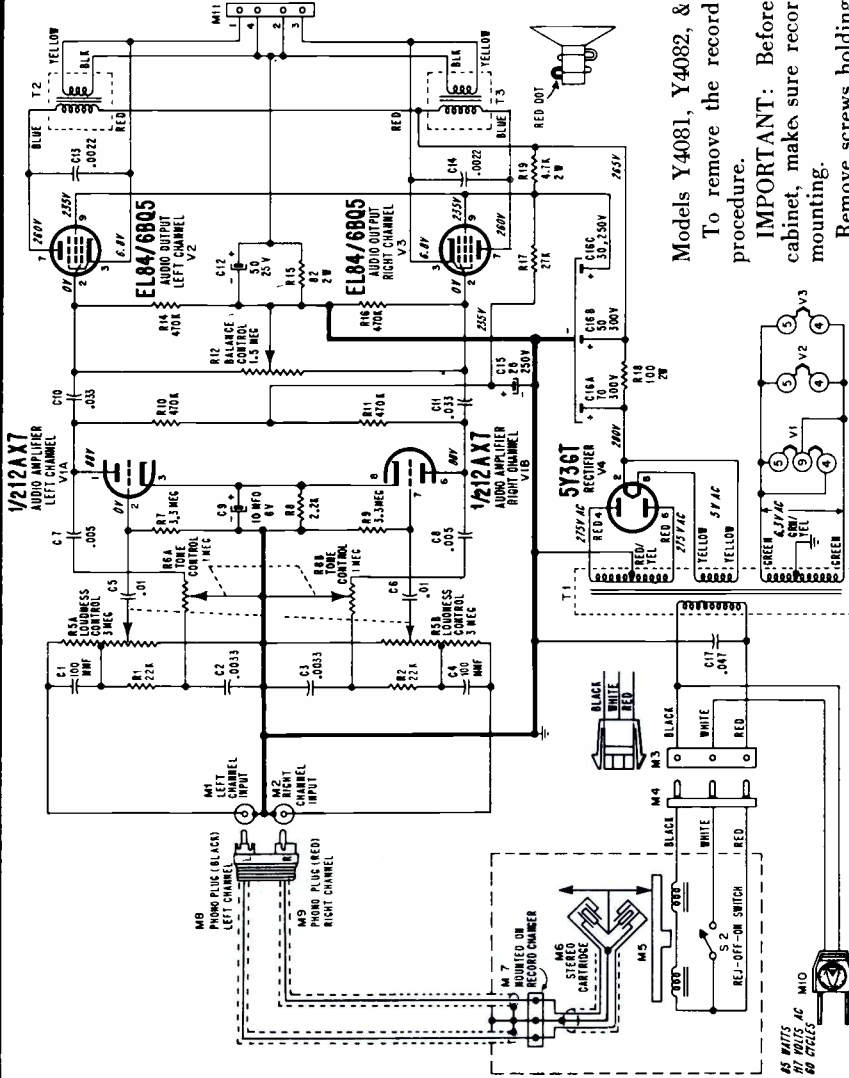
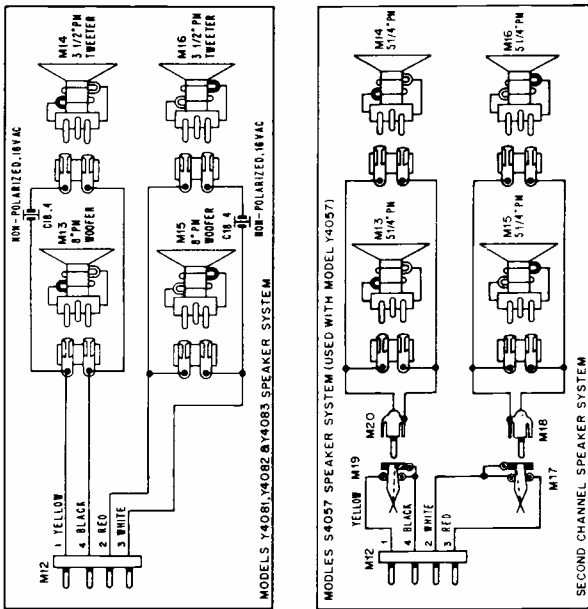
Rear View of Etched Circuit Board, Used in 4E3A Chassis.



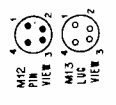
ADMIRAL

Chassis 4F3A

Models Y4057, Y4081,
Y4082, and Y4083



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



CHANGER REMOVAL

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

CHASSIS REMOVAL

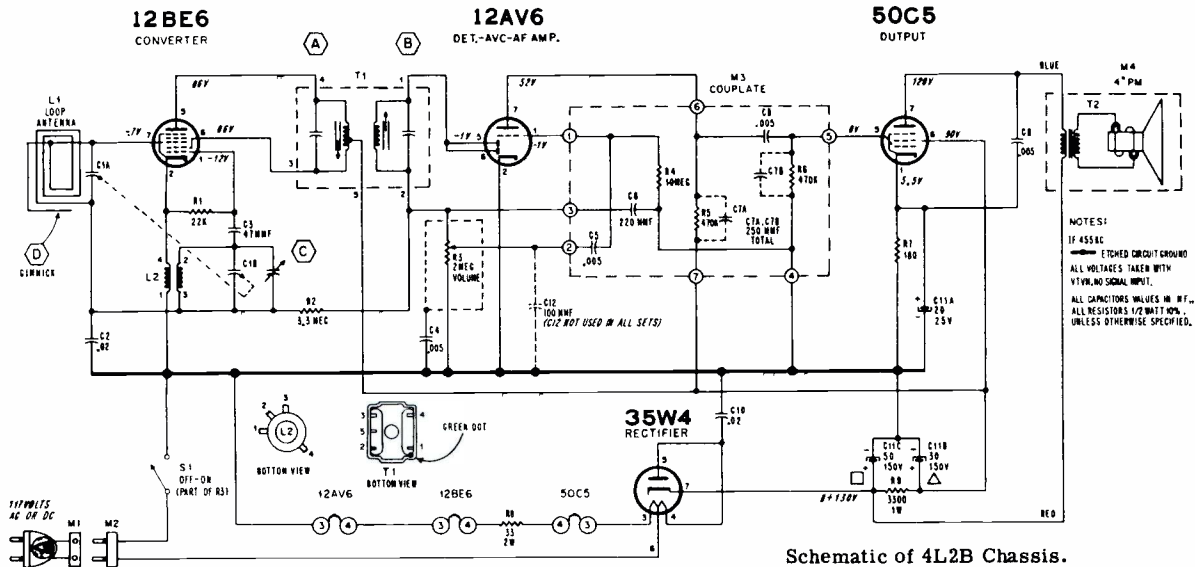
Disconnect line cord.
Remove three (3) amplifier control knobs. (Pull knobs straight off from control shafts.)
Remove record changer compartment back panel by removing screws. Lift out panel.
Disconnect changer phono output plug, speaker and changer power plug.
Remove two hexnuts to dismount interlock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

Models Y4081, Y4082, & Y4083:

To remove the record changer, perform the following procedure.
IMPORTANT: Before removing record changer from cabinet, make sure record changer "floats" on its spring mounting.
Remove screws holding the record changer compartment panel back and record changer bottom cover.
Speed clips (at bottom of each changer hold down screw) extend through holes in panel under changer. Press clip until it is perpendicular to the changer pan. Remove changer from cabinet for servicing. Disconnect all leads.

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

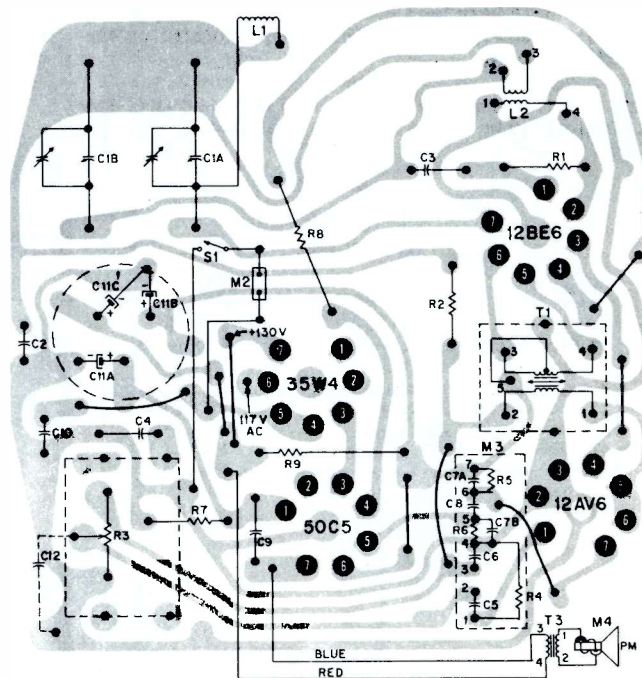
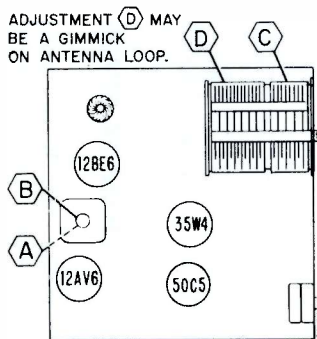


After start of production of the 4L2B chassis, two components were added to provide better shielding and better RF by-passing in the audio stages.

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.

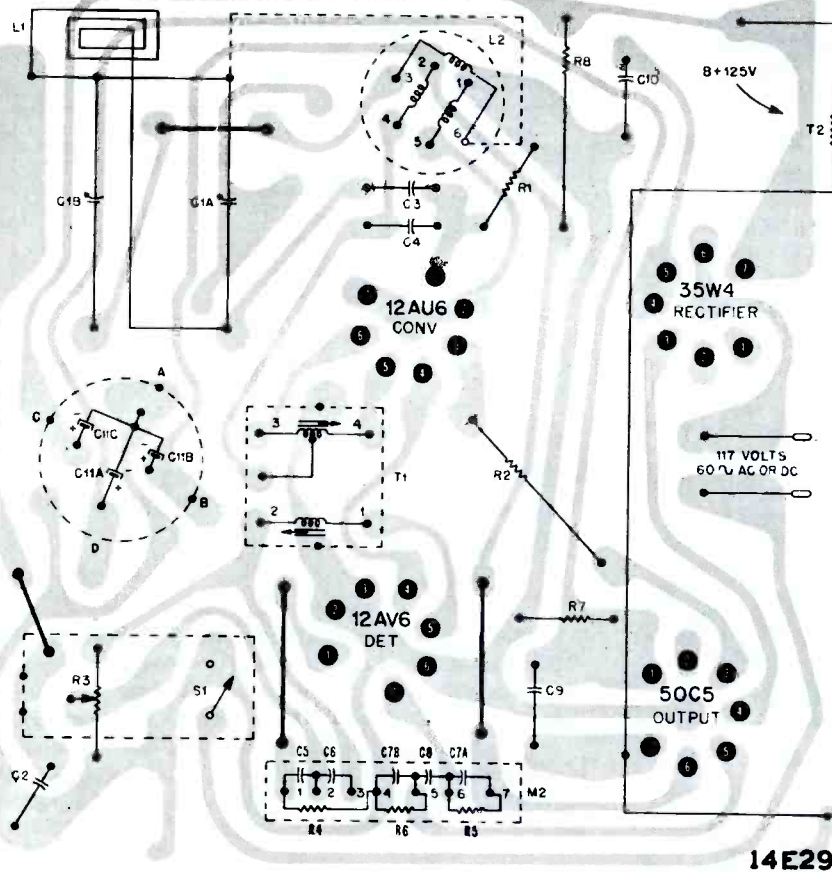


ADMIRAL

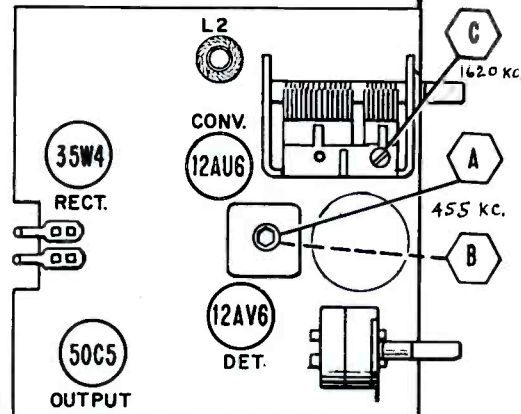
CHASSIS 4P3

MODELS Y2993, Y2996,
Y2998, and Y2999.

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

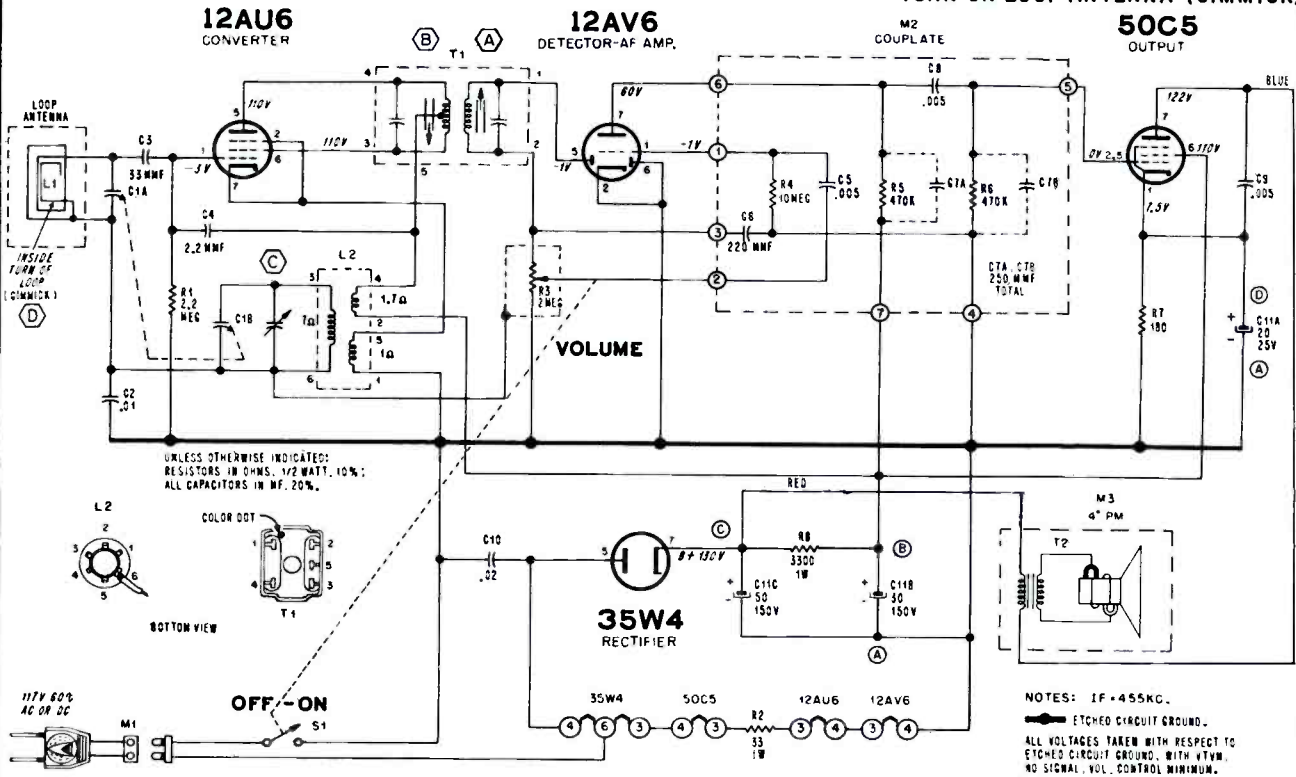


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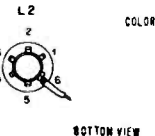


Rear View of Etched Circuit Board. Gray Area represents etched wiring; black symbols and lines represent components and connections on opposite side.

ALIGNMENT (400 KC, **D** IS AN INSIDE TURN ON LOOP ANTENNA (GIMMICK)



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



BOTTOM VIEW

NOTES: IF = 455 KC.
— ETCHED CIRCUIT GROUND.
ALL VOLTAGES TAKEN WITH RESPECT TO ETCHED CIRCUIT GROUND, WITH #7VM, NO SIGNAL, VOL. CONTROL MINIMUM.

Admiral

CORRECTION IN COMPONENT SYMBOLS ON THE ETCHED CIRCUIT BOARD

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

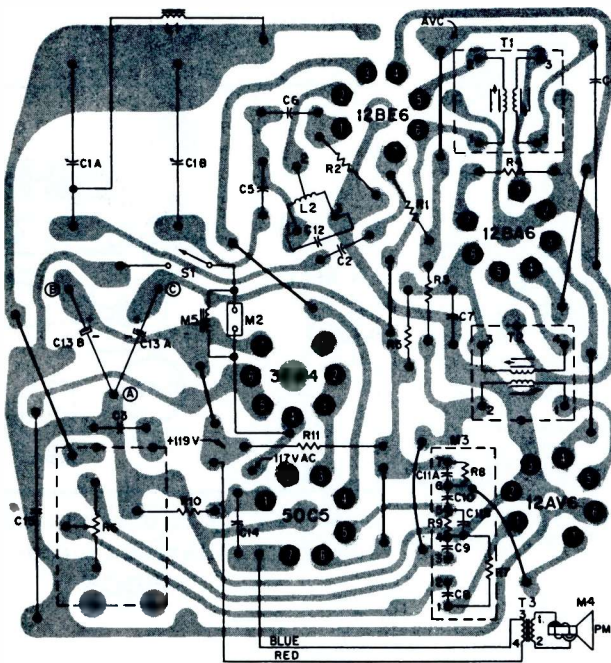
TABLE CLOCK RADIO

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

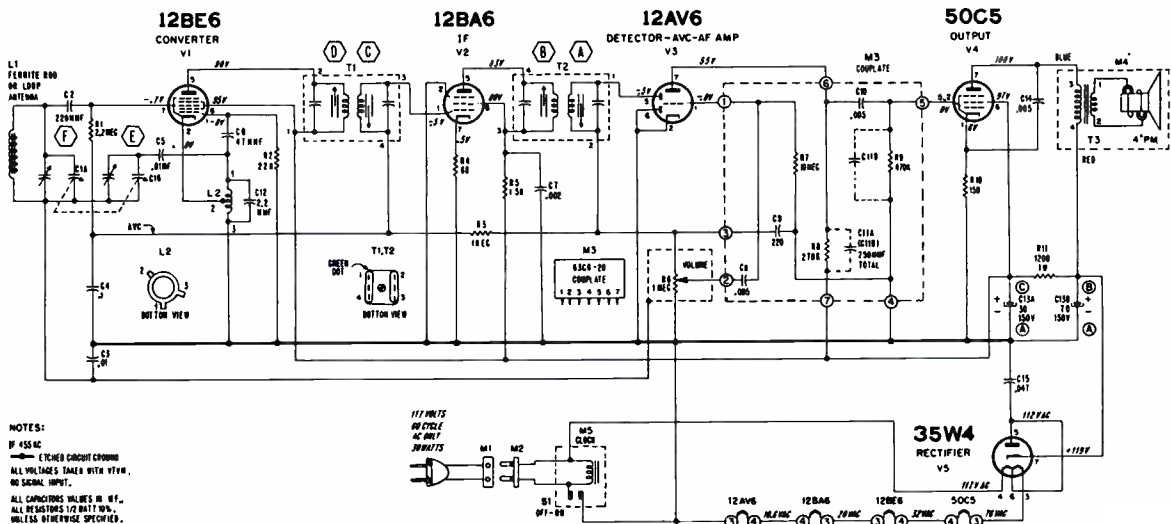
Both 5B5B and 5B5C chassis are very similar to Chassis 5B5, which is covered on page 5, of Vol. 20, 1960 Radio Diagrams manual, and these instructions may be used for alignment and chassis removal.

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

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



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



NOTES:
 IF 455 AC
 — ETCHED CIRCUIT GROUND
 ALL VOLTAGES TAKEN WITH 175Ω,
 NO SIGNAL INPUT.
 ALL CAPACITORS VALUES IN μF.,
 ALL RESISTORS 1/2 WATT UNLESS
 OTHERWISE SPECIFIED.

Schematic of 5B5B and 5B5C Chassis.

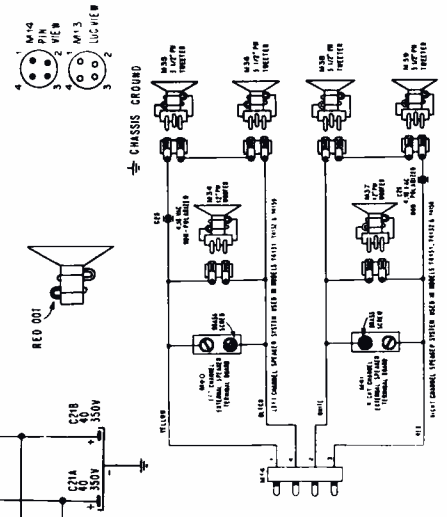
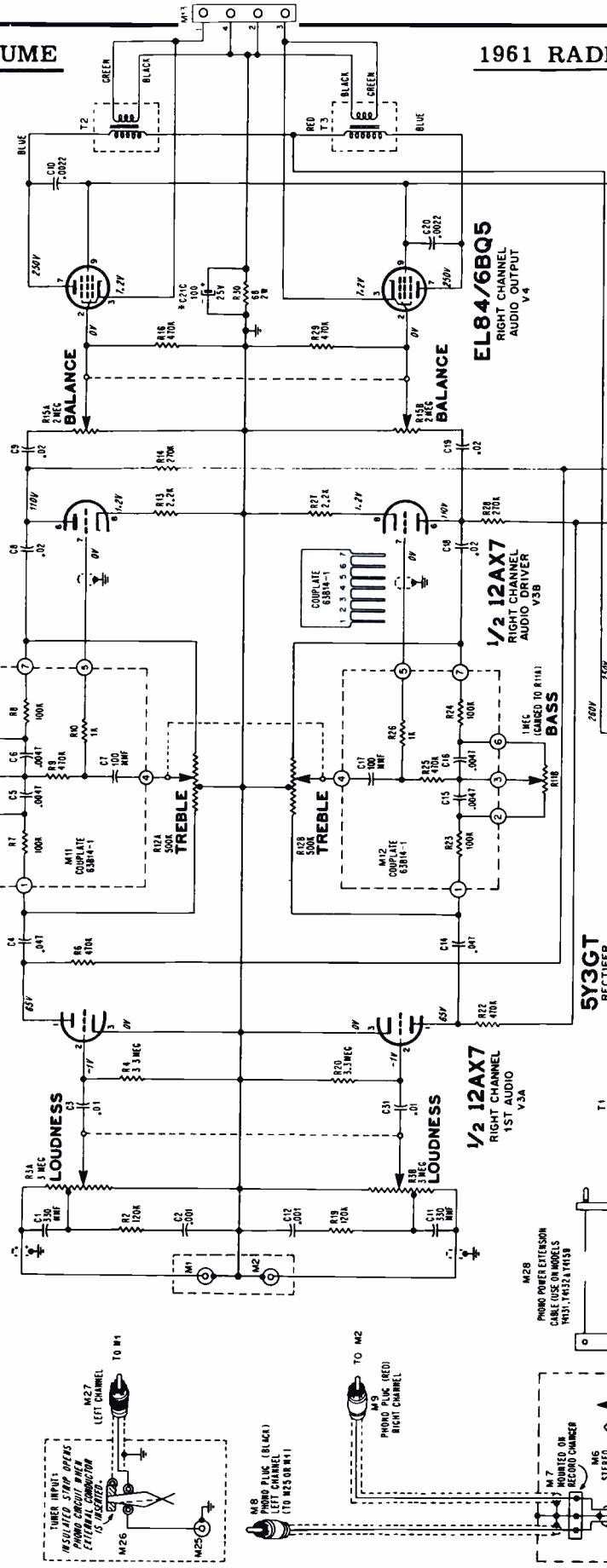
VOLUME

1961 RADIO SERVICING INFORMATION

EL84/6BQ5
LEFT CHANNEL
AUDIO OUTPUT
V2

1/2 12AX7
LEFT CHANNEL
AUDIO DRIVER
V1B

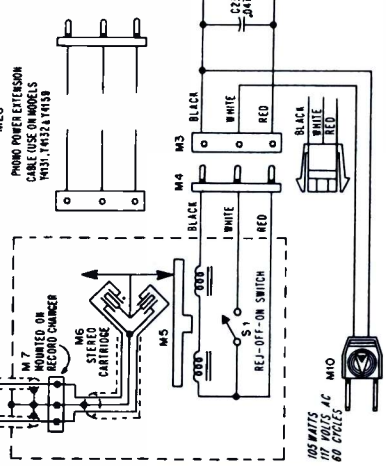
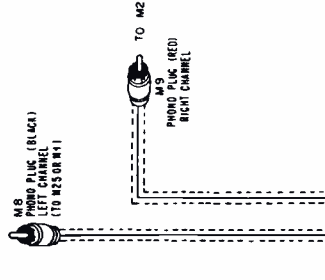
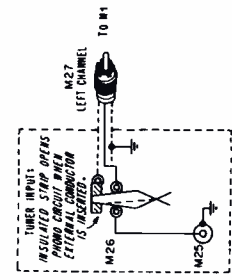
1/2 12AX7
LEFT CHANNEL
1ST AUDIO
V1A



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

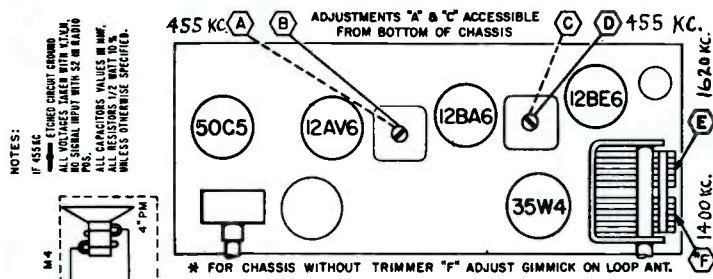
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- NOTES:
1. ALL RESISTOR VALUES IN OHMS AND CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 2. ALL VOLTAGE READINGS TAKEN WITH A VTVM. ALL CONTROLS AT MID-ROTATION AND NO SIGNAL APPLIED.
 3. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE INDICATED.
 4. VOLTAGE READINGS TAKEN WITH 117V AC LINE INPUT.
 5. VOLTAGE READINGS TAKEN WITH 117V AC LINE INPUT.
 6. * C22 IN EARLY PRODUCTION WAS 200 OHM IN PARALLEL.

Admiral

CHASSIS 5M5
MODEL Y4017



CHANGER REMOVAL

Disconnect line cord. Remove record changer compartment back panel by removing five (5) screws. Lift out panel.

Remove six motor board mounting screws.

Disconnect changer phono output plug and changer power plug.

Remove changer and motor board from cabinet.

CHASSIS REMOVAL

Remove three (3) amplifier control knobs. (Pull knobs straight off from control shafts.)

Remove record changer compartment back panel by removing five (5) screws. Lift out panel.

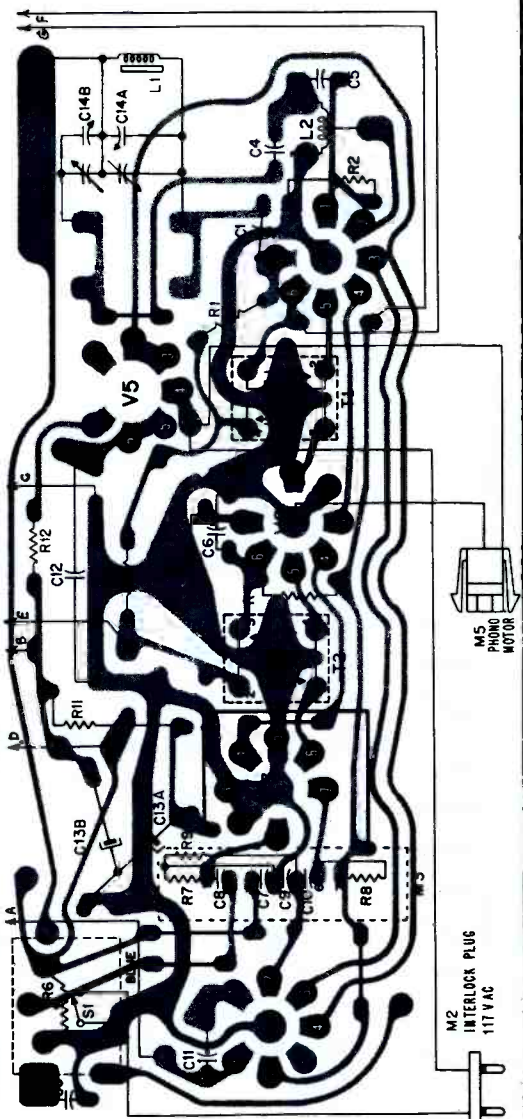
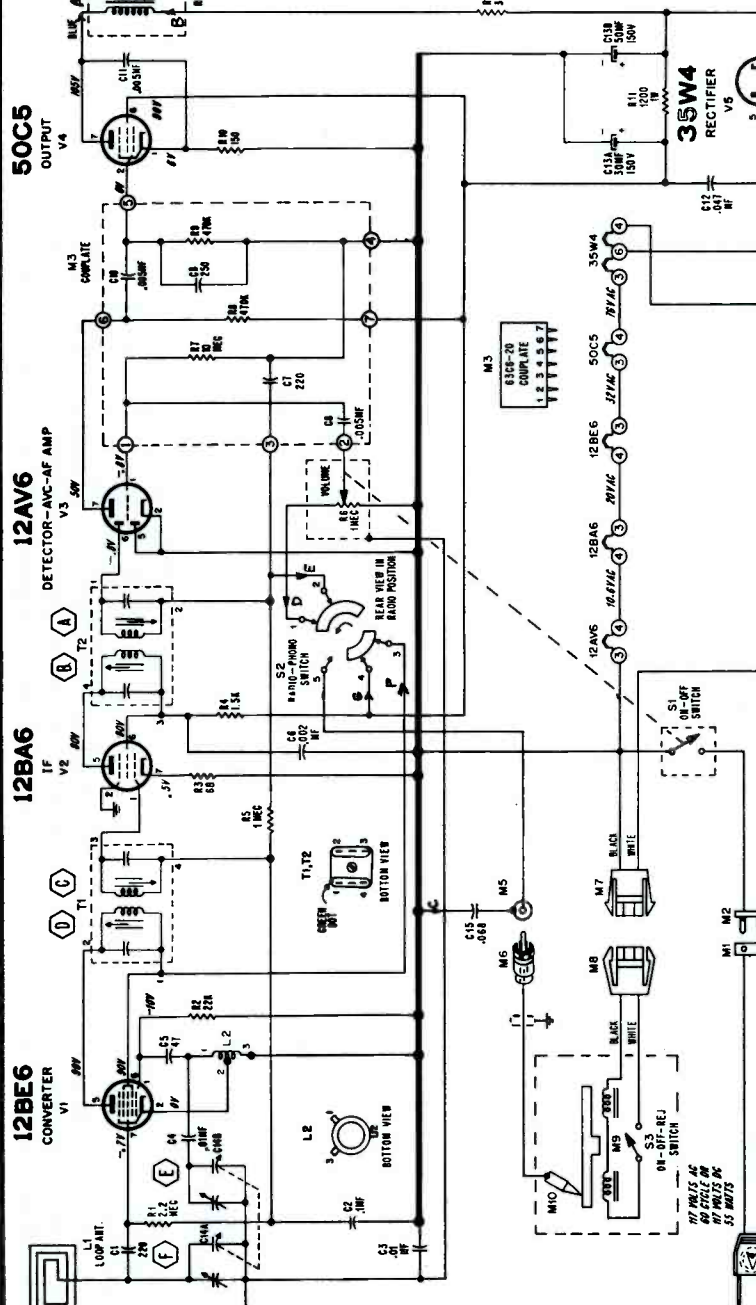
Disconnect changer phono output plug and changer power plug.

Remove two hexnuts to dismount speaker.

Remove two hexnuts to dismount interlock plug.

Remove four (4) hexnuts mounting the chassis; located on the antenna mounting board.

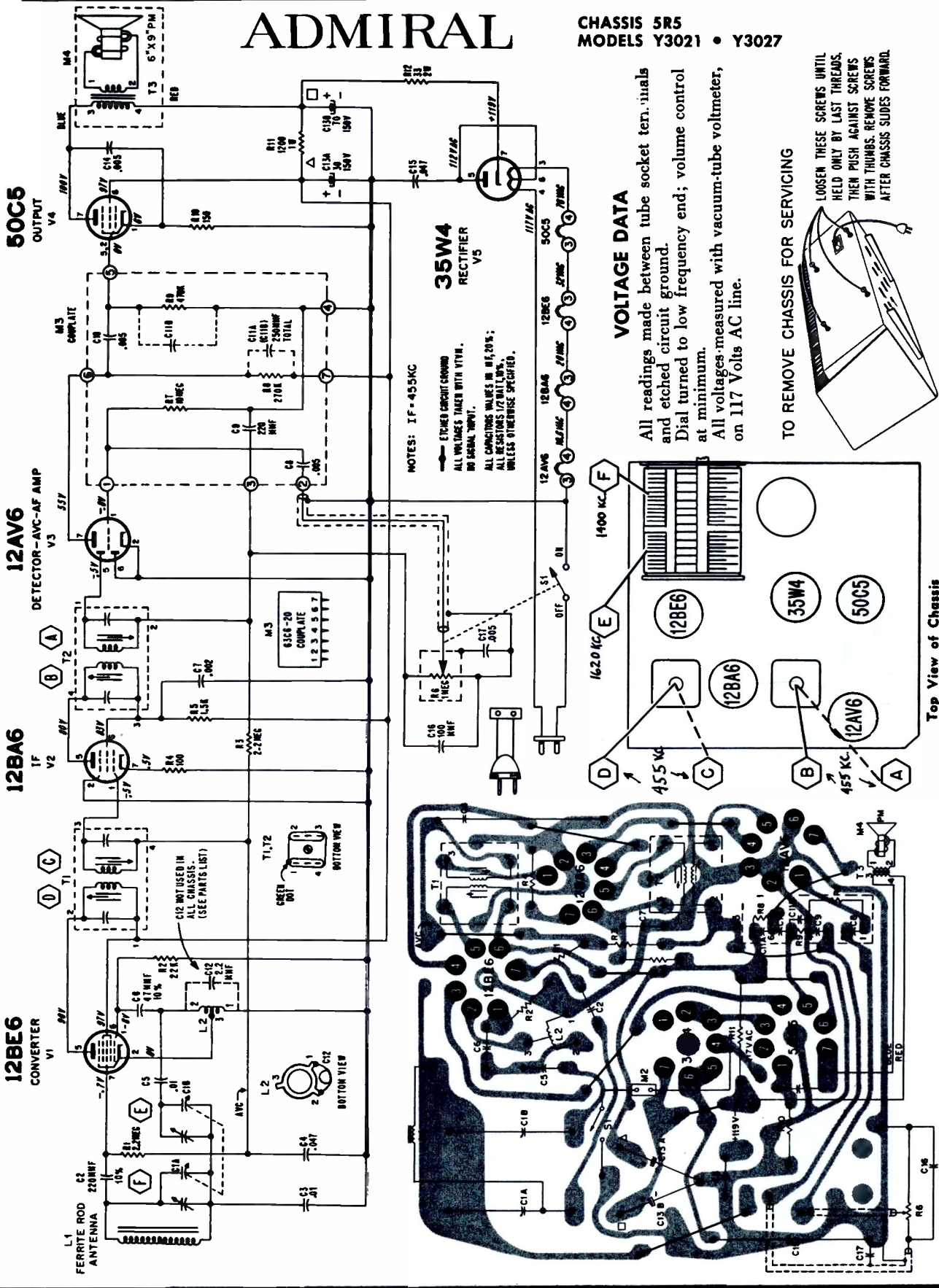
Lift entire assembly carefully from cabinet.



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

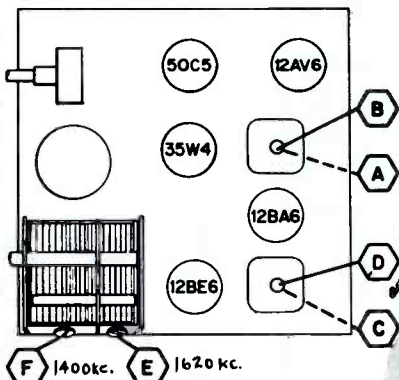
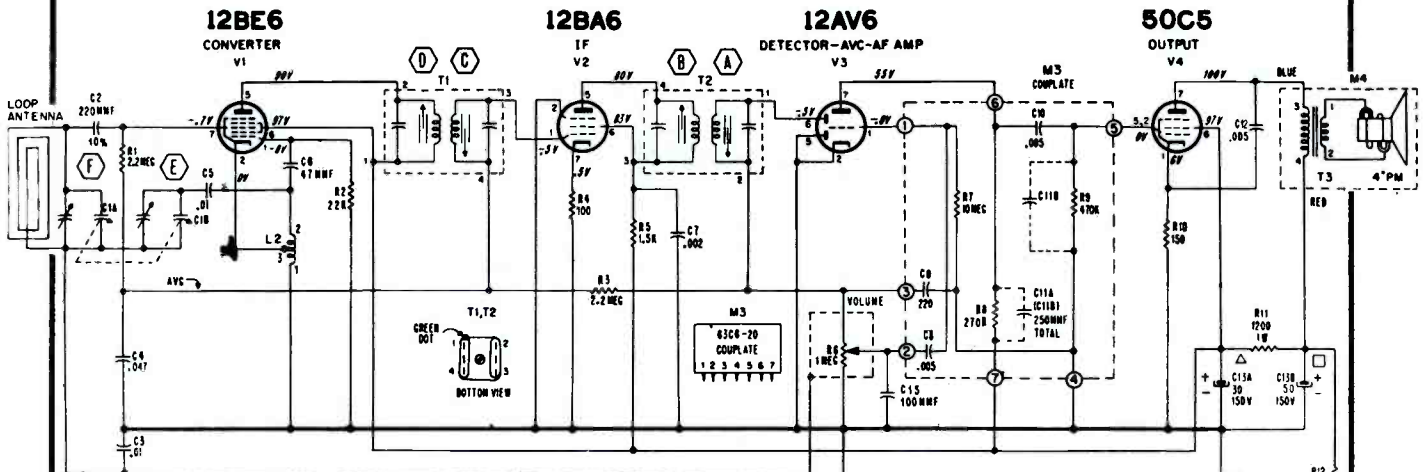
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CHASSIS 5R5
MODELS Y3021 • Y3027



ADMIRAL

CHASSIS 555
MODELS Y3046 - Y3048 - Y3049

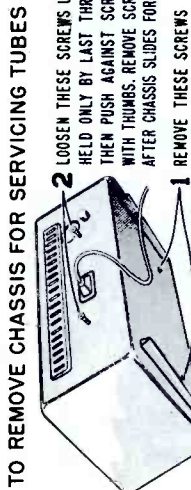


Top View of Chassis Showing Tube and Alignment Point Locations.

NOTES: IF = 455KC

ETCHED CIRCUIT GROUND
ALL VOLTAGES TAKEN WITH VFM.
NO SIGNAL INPUT.

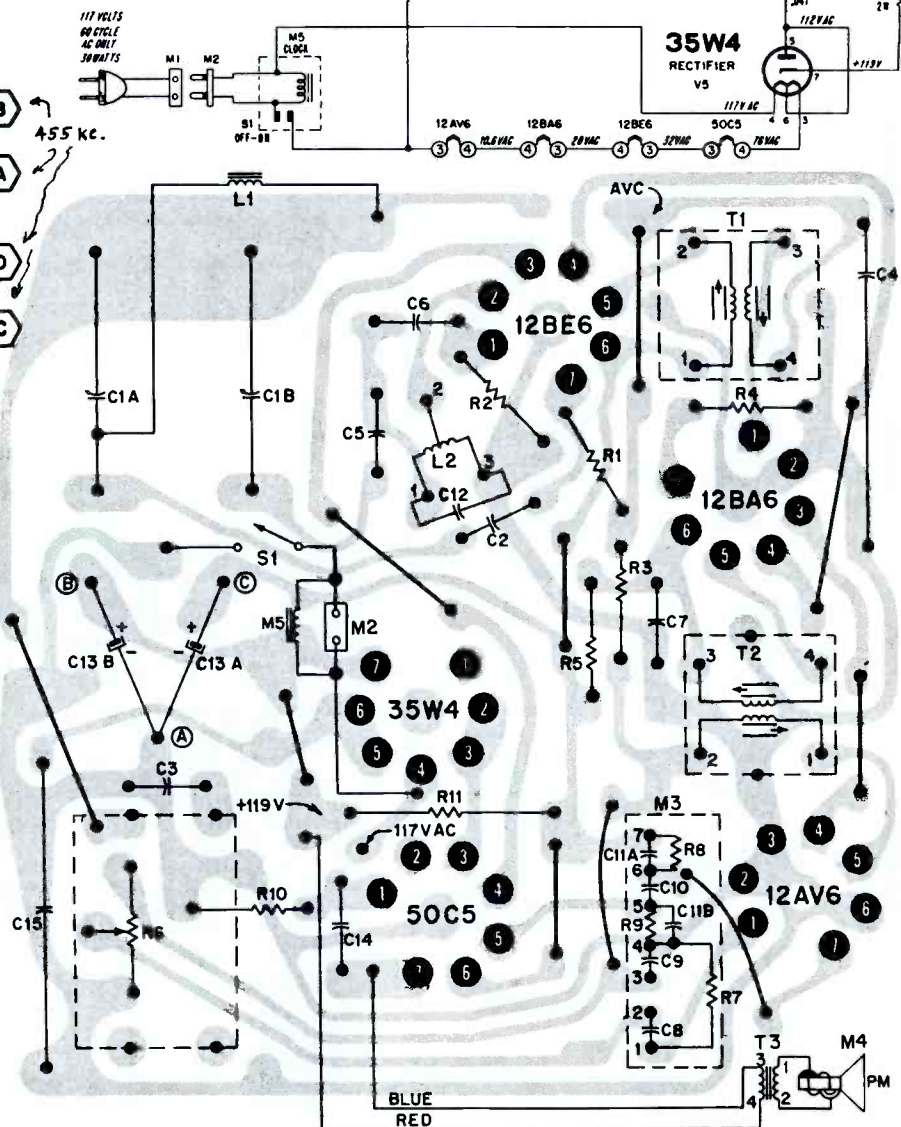
ALL CAPACITORS VALUES IN MF, 20%;
ALL RESISTORS 1/2WATT, 10%,
UNLESS OTHERWISE SPECIFIED.



TO REMOVE CHASSIS FOR SERVICING TUBES

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

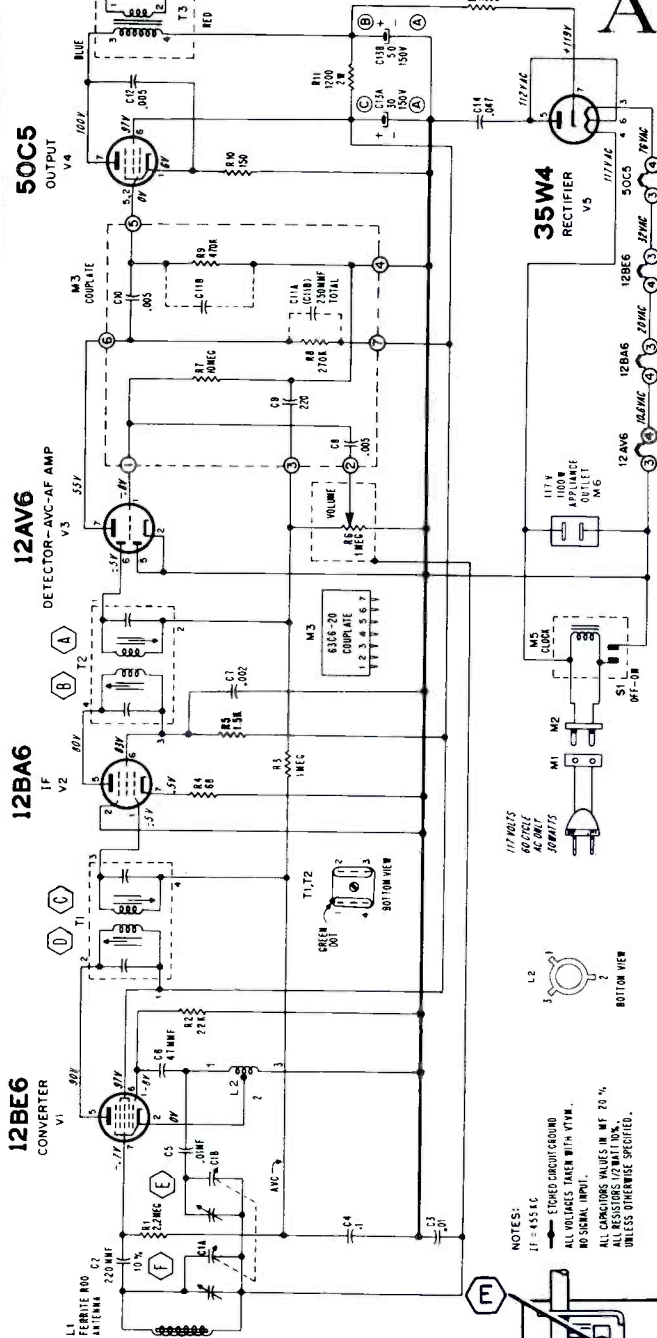
Rear View of Cabinet Showing Chassis Mounting Screws.



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



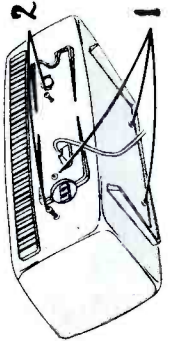
- All readings made between tube socket terminals and common etched circuit ground.
- Dial turned to low frequency end; volume control at minimum.
- All voltages measured with vacuum-tube voltmeter, on 117 Volts AC line.

ALIGNMENT PROCEDURE

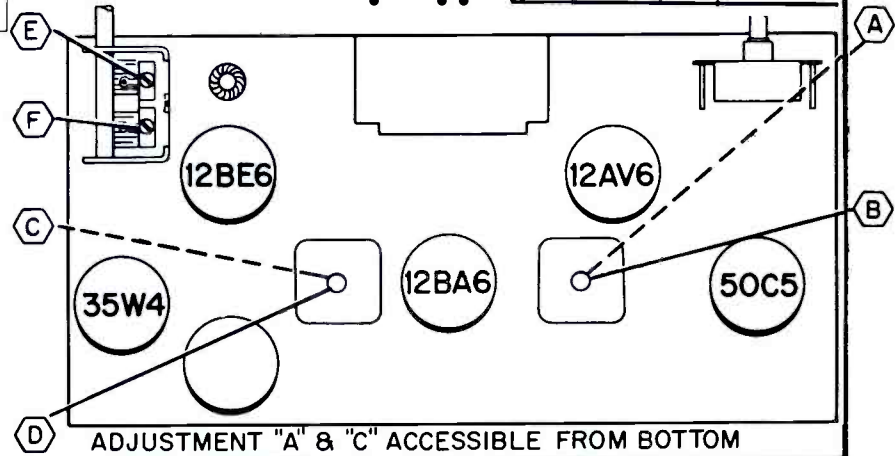
- Use an isolation transformer if available; otherwise, connect a .1 mf. capacitor in series with low side of signal generator and connect to common ground.
- Set volume control full on.
- Disconnect voice coil leads and connect output meter across output secondary. Use a 3.2 ohm load.
- Repeat adjustments to insure good results.

| STEP | CONNECTION OF SIGNAL GENERATOR | SIGNAL GENERATOR FREQUENCY | RECEIVER GANG SETTING | ADJUSTMENTS |
|------|---|----------------------------|-----------------------------|--|
| 1 | Through a .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 | Loop of several turns of wire, or place generator lead close to ferrite antenna for adequate signal pickup. | 1400 KC | Tune in on generator signal | "F" for maximum output |

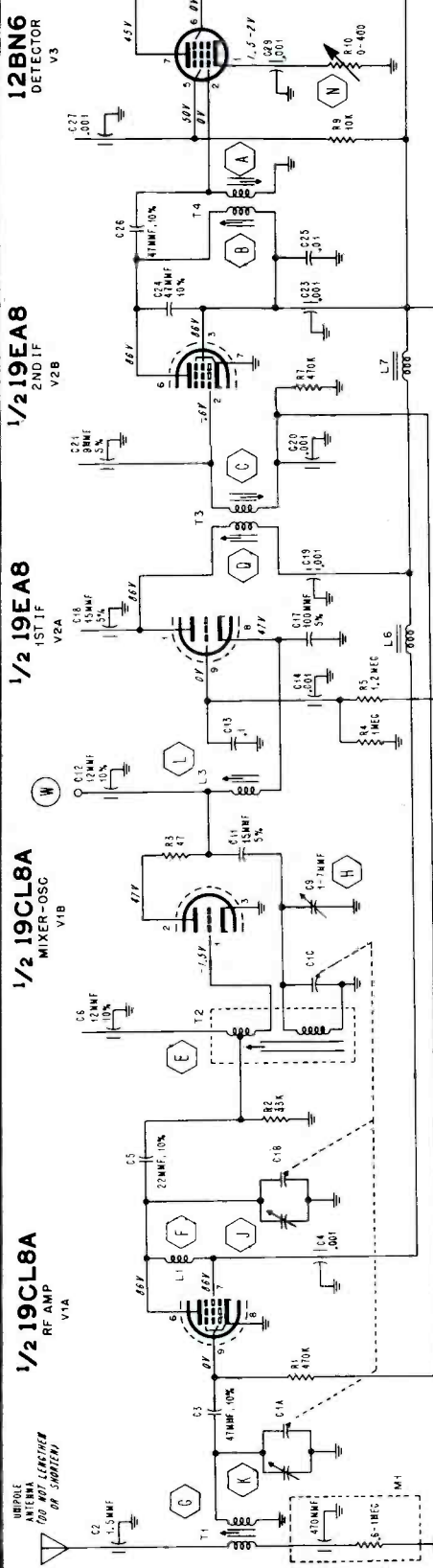
TO REMOVE CHASSIS



- 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



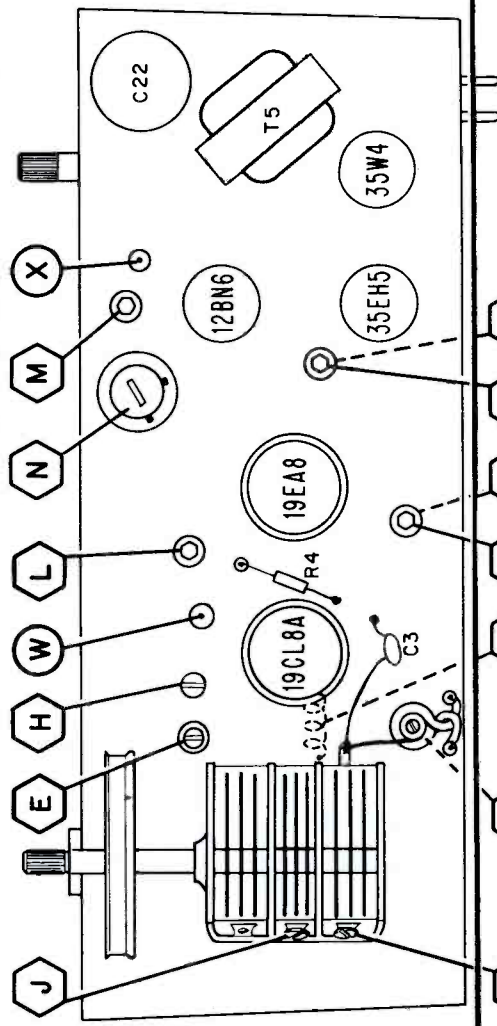
VOLTAGE DATA

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 USING VITVM, ON 120 VOLT, 60 CYCLE AC LINE. (VOL. CONTROL MIN. GANG FULLY CLOSED).



VOLTAGE PRECAUTION

Do Not Connect an Earth Ground To This Receiver

The chassis is connected directly to one side of the power line. To avoid possibility of damage to test equipment or to receiver, do not place the chassis directly on a metal service bench, tools, or other metal objects.

ADMIRAL

CHASSIS 5V5
MODEL Y3083

(Alignment continued on the next page)

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

IF ALIGNMENT CHECK USING SWEEP GENERATOR AND OSCILLOSCOPE

- | | |
|---|--|
| <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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.

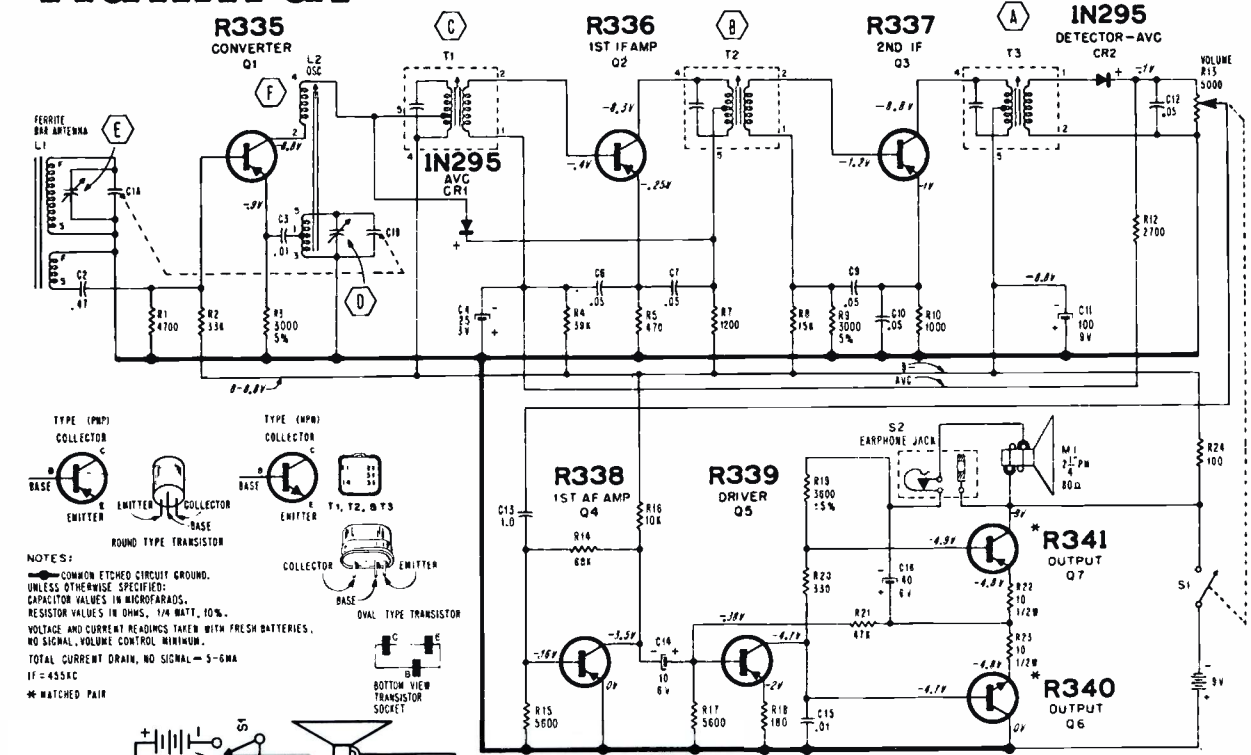
1. Turn set bottom side up and using a screw driver,

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



TYPE (PMPT)
COLLECTOR
EMITTER
BASE

TYPE (NPN)
COLLECTOR
EMITTER
BASE

TYPE (PNP)
COLLECTOR
EMITTER
BASE

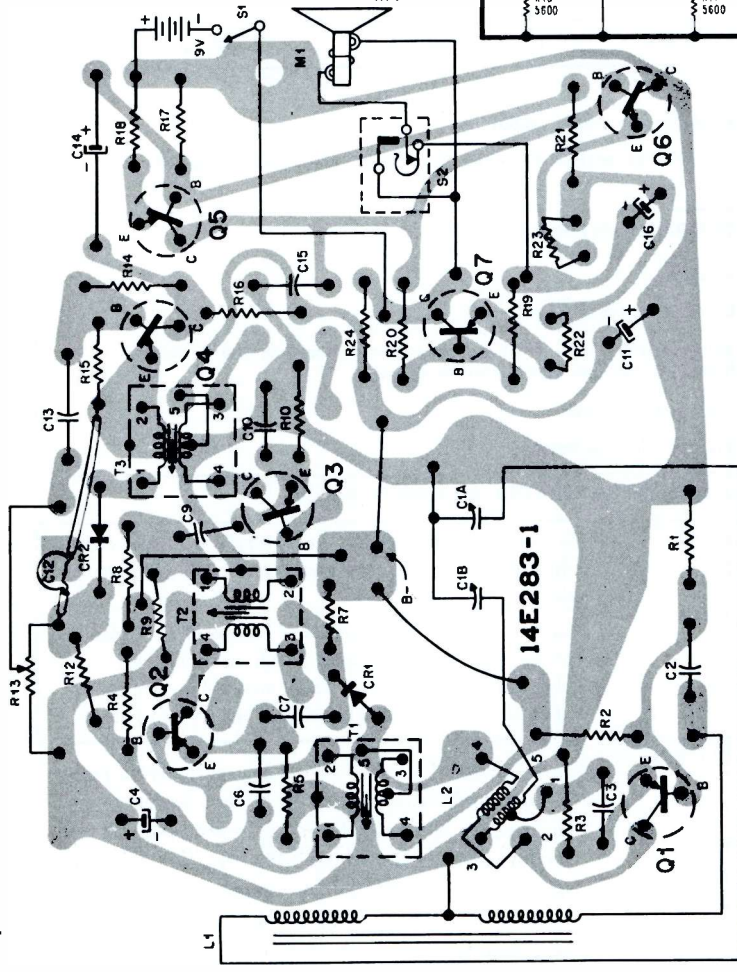
TYPE (NPN)
COLLECTOR
EMITTER
BASE

TYPE (PNP)
COLLECTOR
EMITTER
BASE

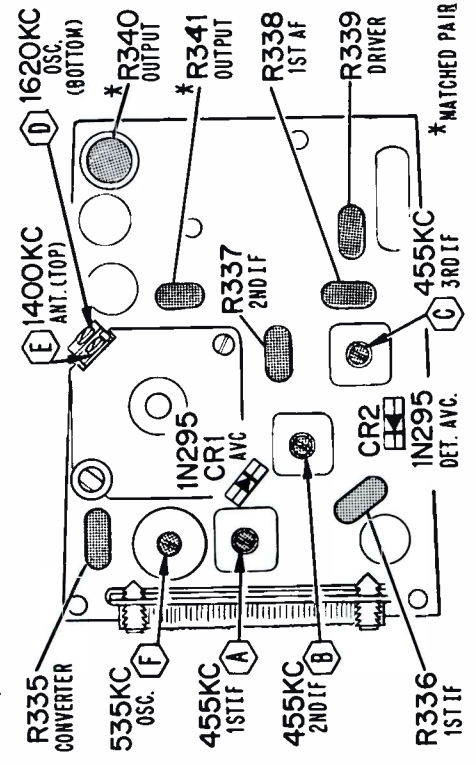
TYPE (NPN)
COLLECTOR
EMITTER
BASE

TYPE (PNP)
COLLECTOR
EMITTER
BASE

NOTES:
COMMON ETCHED CIRCUIT GROUND.
UNLESS OTHERWISE SPECIFIED:
CAPACITOR VALUES IN MICROFARADS.
RESISTOR VALUES IN OHMS, 1/4 WATT, 10%.
VOLTAGE AND CURRENT READINGS TAKEN WITH FRESH BATTERIES.
NO SIGNAL, VOLUME CONTROL MINIMUM.
TOTAL CURRENT DRAIN, NO SIGNAL—5-6MA
IF = 455KC
* MATCHED PAIR



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



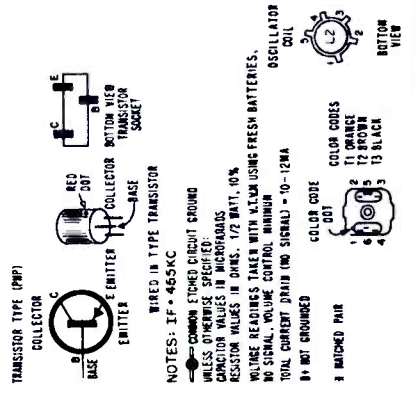
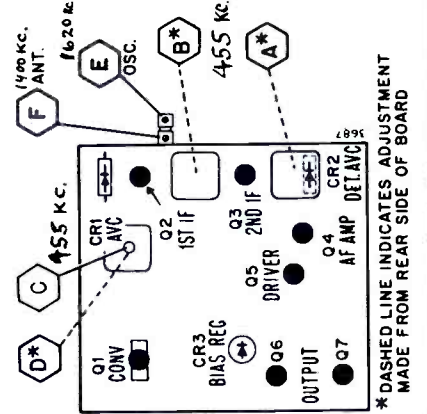
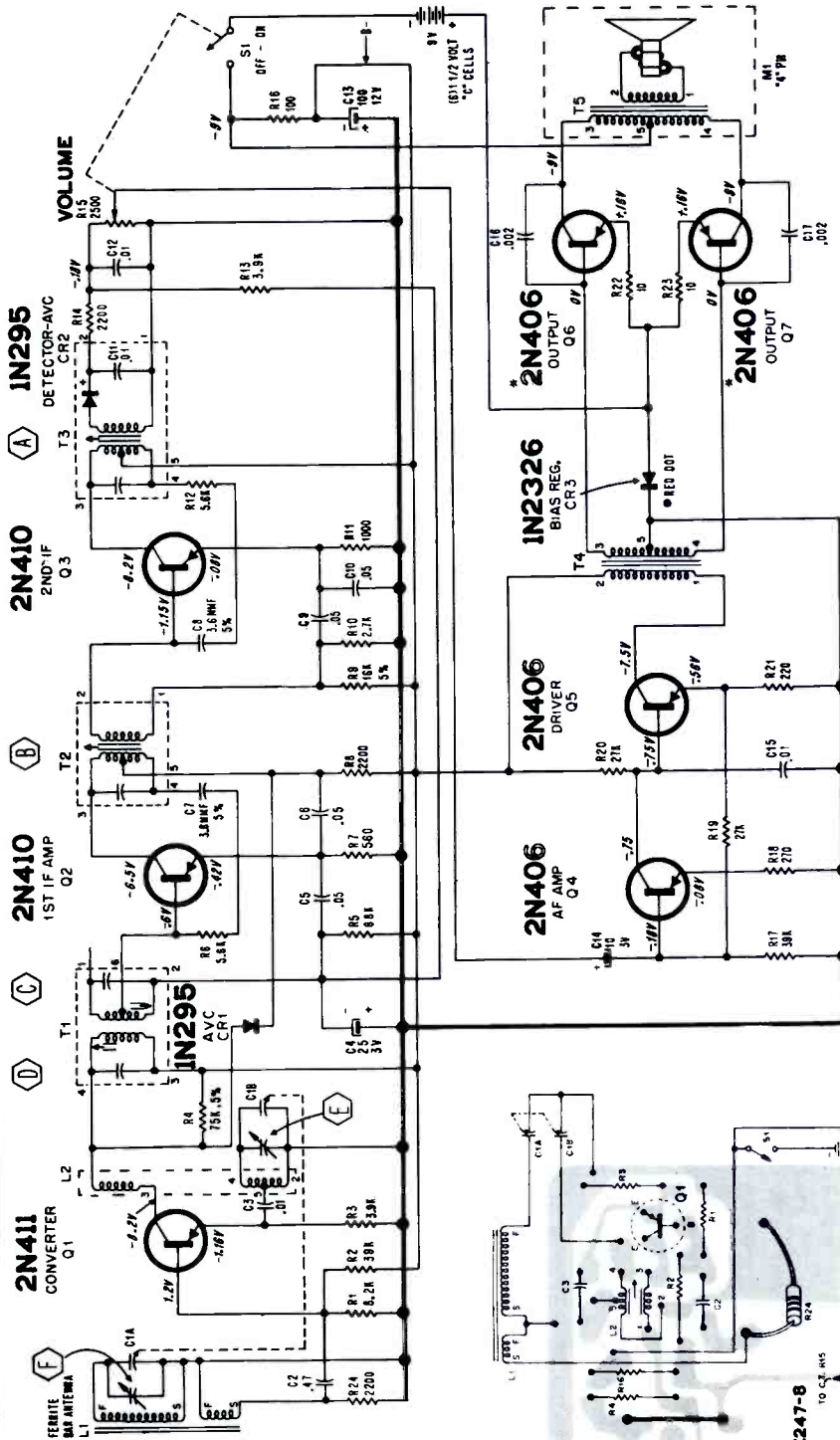
REMOVING CHASSIS FROM CABINET

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

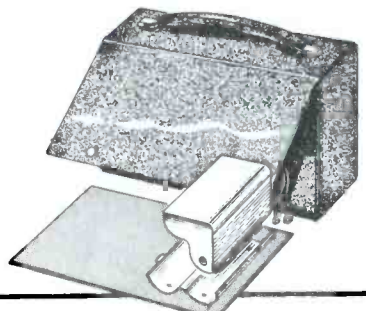
Transistor and Alignment Point Locations

Admiral

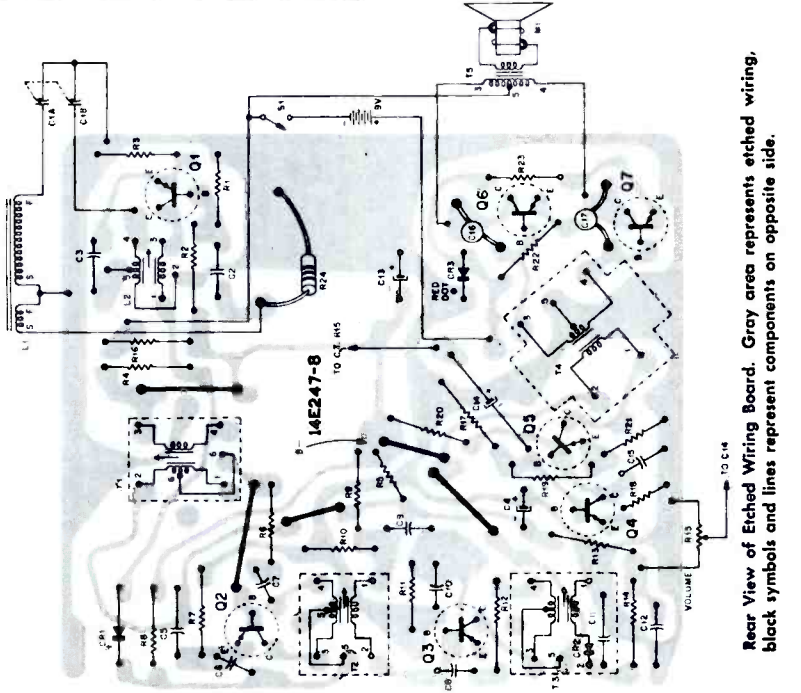
CHASSIS 7D2
MODEL Y2119



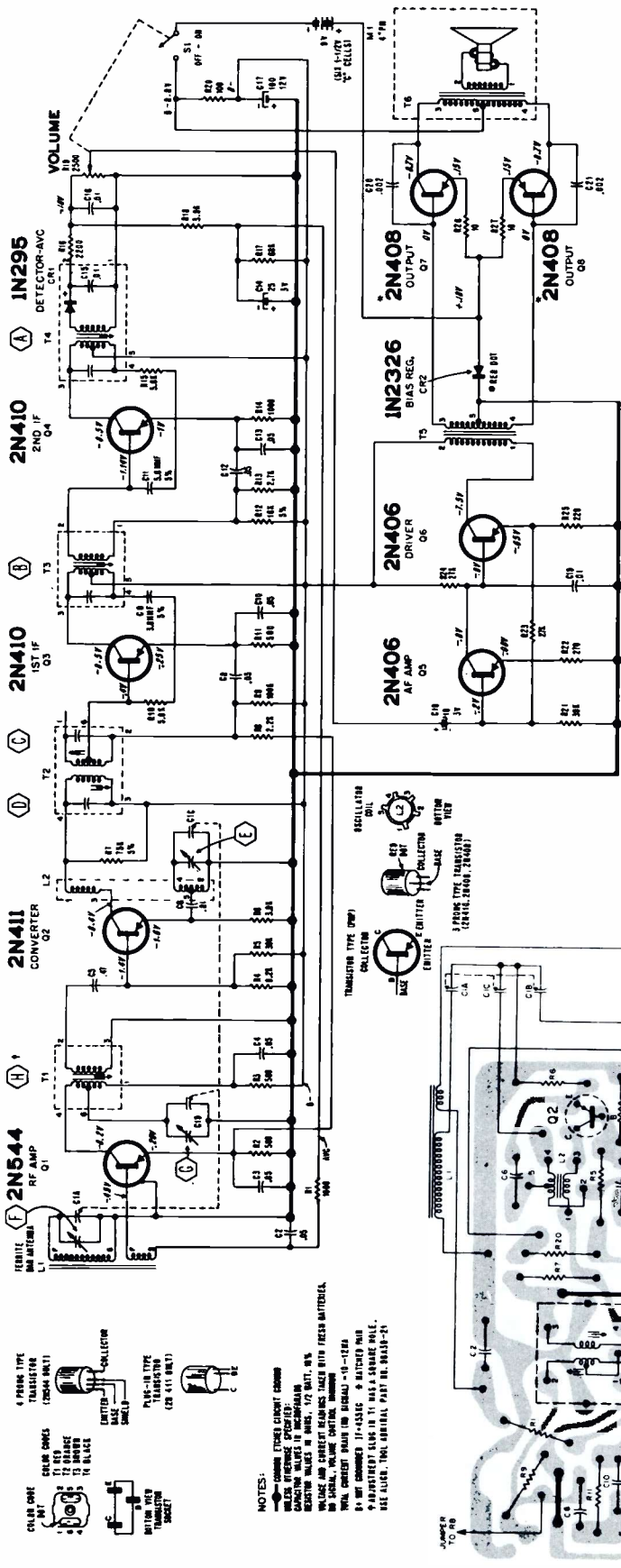
NOTES: IF * 465KC
COMMON ETCHED CIRCUIT GROUND
UNLESS OTHERWISE SPECIFIED
CAPACITOR VALUES IN MICROFARADS
RESISTOR VALUES IN OHMS, 1/2 BATT., 10%
VOLUME READINGS TAKEN WITH A.T.M.A. USING FRESH BATTERIES.
NO SIGNAL, VOLUME CONTROL MINIMUM
TOTAL CURRENT DRAIN (NO SIGNAL) = 10-12MA
B+ NOT GROUND
MATCHED PAIR
OSCILLATOR COIL



Rear View Showing Battery Case Removed.



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

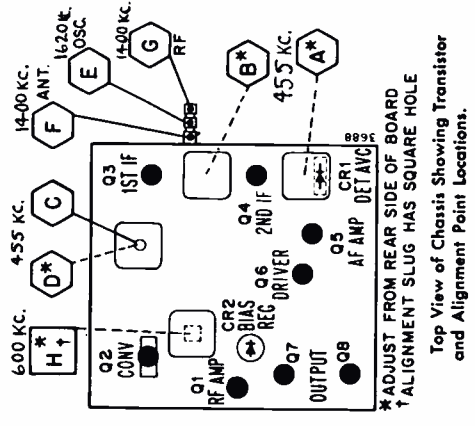


REMOVING CHASSIS FROM CABINET

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

NOTE: The left side of the chassis (from rear) is held only by two flanges on the chassis (from rear) is held on BATTERY HOLDER. NEVER ALLOW THE BATTERY CONNECTORS ON BATTERY HOLDER TO COME IN CONTACT WITH THE METAL CHASSIS.

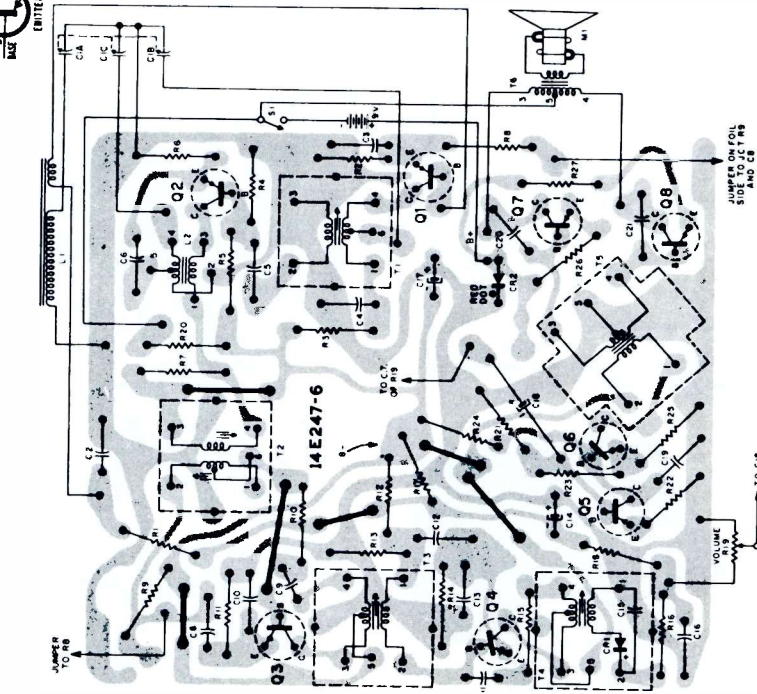
The contact of the negative clip to the metal chassis, even with the set turned off, can damage the "Battery Miser" diode.



Admiral
MODEL Y2127
CHASSIS 8D2

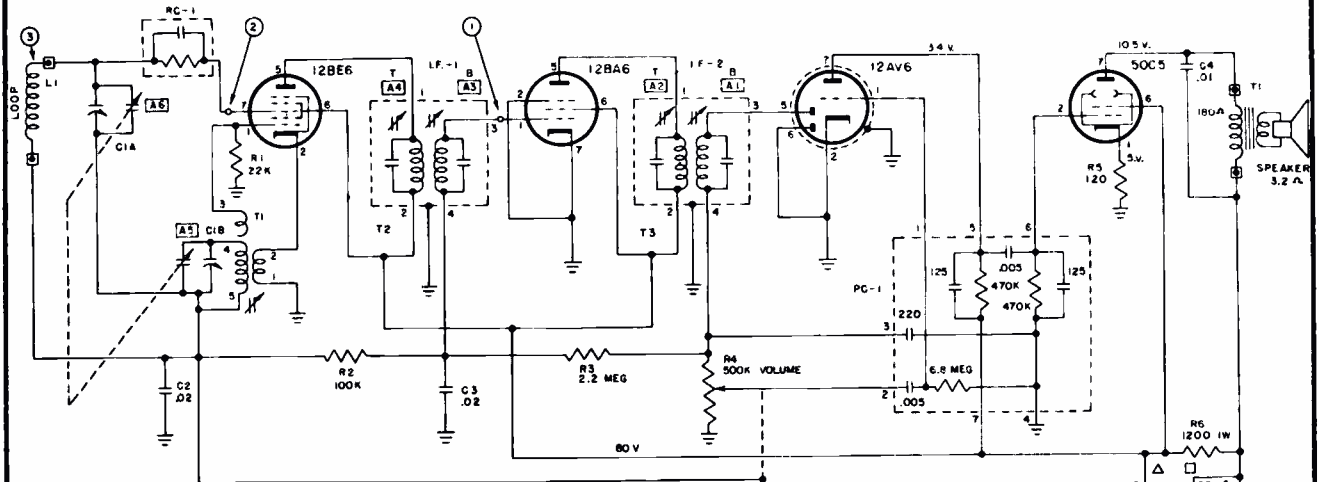
NOTES:

- 1. COMMON Emitter circuit common collector circuit.
- 2. TRANSISTOR TYPES: 2N406, 2N408, IN2326, IN295.
- 3. RESISTOR VALUES IN OHMS, 1/2 WATT, 5%.
- 4. CAPACITOR VALUES IN MICROFARADS.
- 5. ALL COMPONENTS 1/4 WATT, 5% TOLERANCE UNLESS OTHERWISE SPECIFIED.
- 6. IF NOT SHOWN, 1/4 WATT, 5% TOLERANCE UNLESS OTHERWISE SPECIFIED.
- 7. SEE ALUMINUM TUBULAR PART NO. 100-100-1.



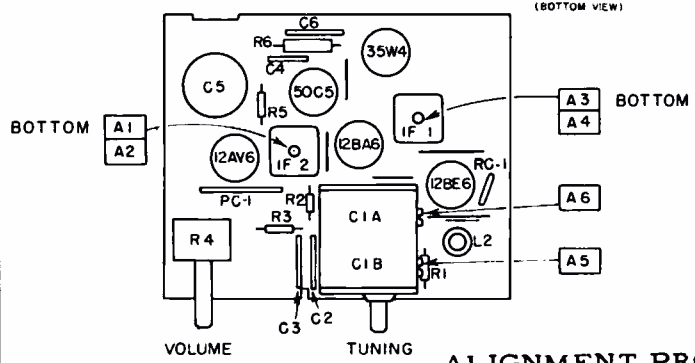
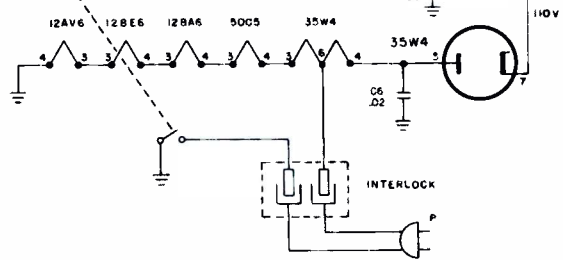
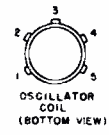
Rear View of Etched Wiring Board. Gray area represents etched wiring, black symbols and lines represent components on opposite side.

ARVIN RADIO MODELS 10R16 10R18 CODE 1.42202



⊕ - 8 -
 ⊕ - EXTERNAL CONNECTIONS TO PRINTED BOARD.
 VOLTAGES MEASURED WITH A V.T.V.M.

RESISTANCE VALUES ARE IN OHMS K=1,000, MEG=1,000,000.
 CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (μF),
 AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (μμF), UNLESS OTHERWISE INDICATED.



APPROXIMATE SENSITIVITIES

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

ALIGNMENT PROCEDURE

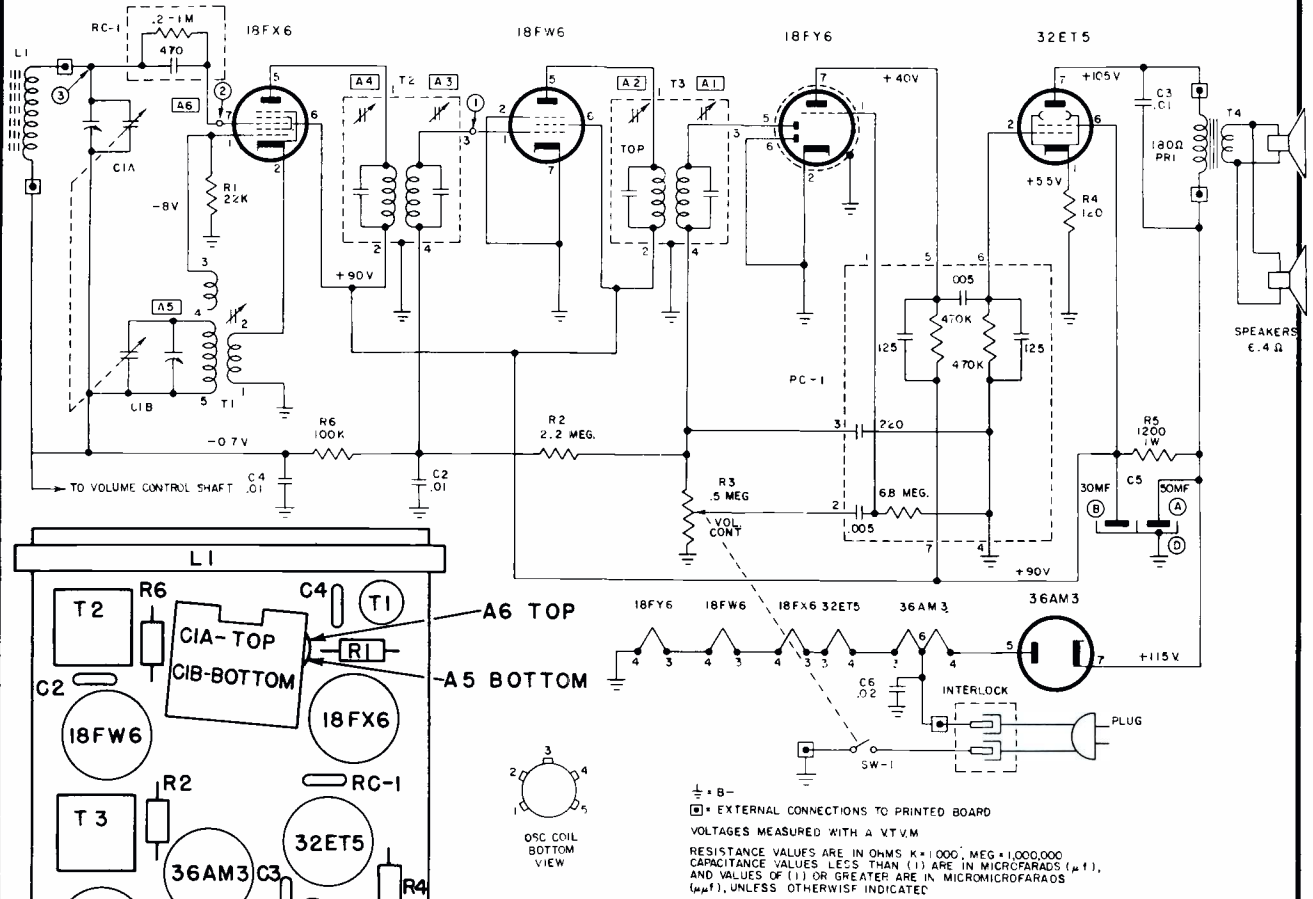
PRELIMINARY:

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

| Position of Variable | Frequency of Generator | Dummy Antenna | Generator Output Connection | Trimmers Adjusted in Order Shown for Maximum Output | Function of Trimmer |
|----------------------|------------------------|---------------|-----------------------------|---|--------------------------|
| Open | 455 Kc | .05 μ fd | Pin 7 12BE6 | A1, A2, A3, A4 | I. F. Oscillator Antenna |
| Open | 1670 Kc | | * Test Loop | A5 | |
| 1400 | 1400 Kc | | * Test Loop | A6 | |
| 1000 | 1000 Kc | | * Test Loop | Fan C1A Plates | |
| 600 | 600 Kc | | * Test Loop | Fan C1A Plates | |

* Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.
 The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

ARVIN MODELS 10R32 10R38 10R39 CHASSIS 1. 49801



⊕ + B-
 ⊞ = EXTERNAL CONNECTIONS TO PRINTED BOARD
 VOLTAGES MEASURED WITH A VTVM
 RESISTANCE VALUES ARE IN OHMS K=1,000, MEG=1,000,000
 CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (μf),
 AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS
 (μμf), UNLESS OTHERWISE INDICATED

ALIGNMENT PROCEDURE

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

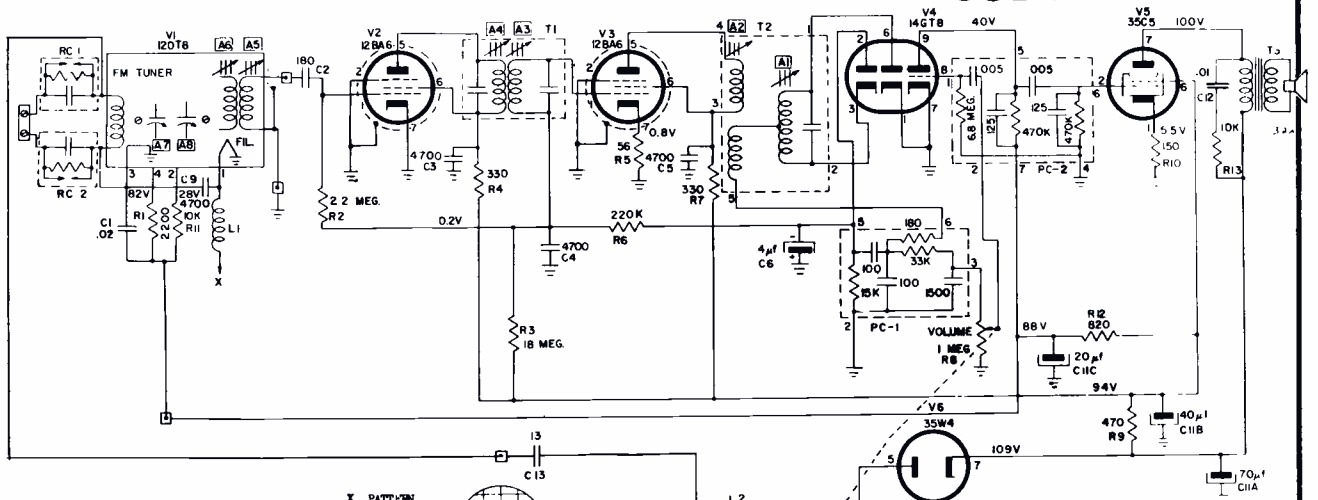
| Position of Variable | Frequency of Generator | Dummy Antenna | Generator Output Connection | Trimmers Adjusted in Order Shown for Maximum Output | Function of Trimmer |
|----------------------|------------------------|---------------|-----------------------------|---|---------------------|
| Open | 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.

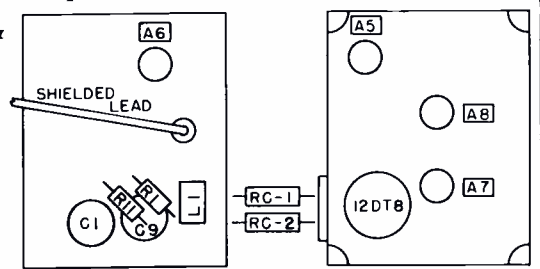
VOLTAGES MEASURED TO B- WITH A VTVM ± 20%, NO SIGNAL FIG. 1
RESISTANCE VALUES ARE IN OHMS K=1,000 MEG 1,000,000
CAPACITANCE VALUES LESS THAN (1) ARE IN MICROFARADS (μf),
AND VALUES OF (1) OR GREATER ARE IN MICROMICROFARADS (μμf),
UNLESS OTHERWISE INDICATED.



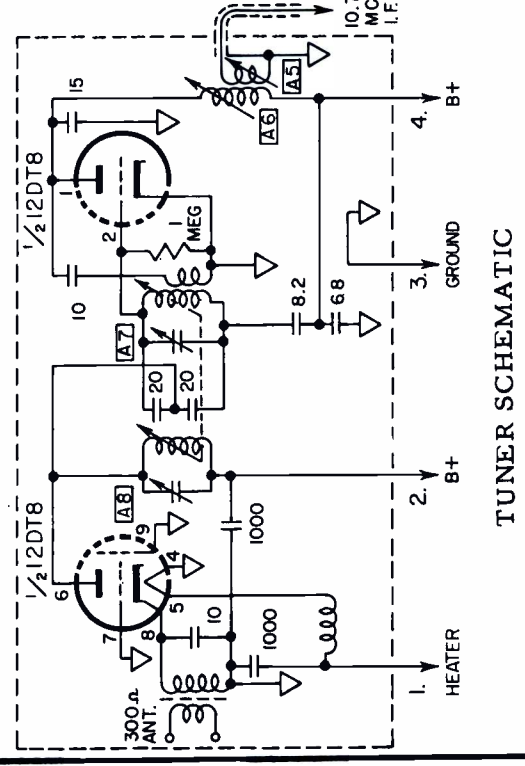
SMALL 'X' PATTERN ABOVE AND BELOW CENTER FREQUENCY
FIG. 2

ALIGNMENT PROCEDURE

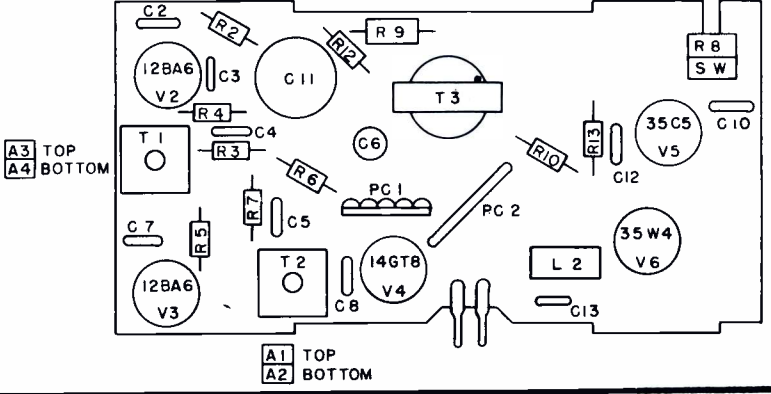
- Detector and I. F. alignment using signal Generator and Oscilloscope.
1. Connect FM Generator, High Side, to grid (pin 1) of 12BA6 2nd I. F. tube through .01 mfd. dummy.
 2. Set generator frequency to 10.7 Mc. modulated either 60 cycles or 400 cycles, 480 Kc sweep (240 Kc deviation)
 3. Connect vertical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



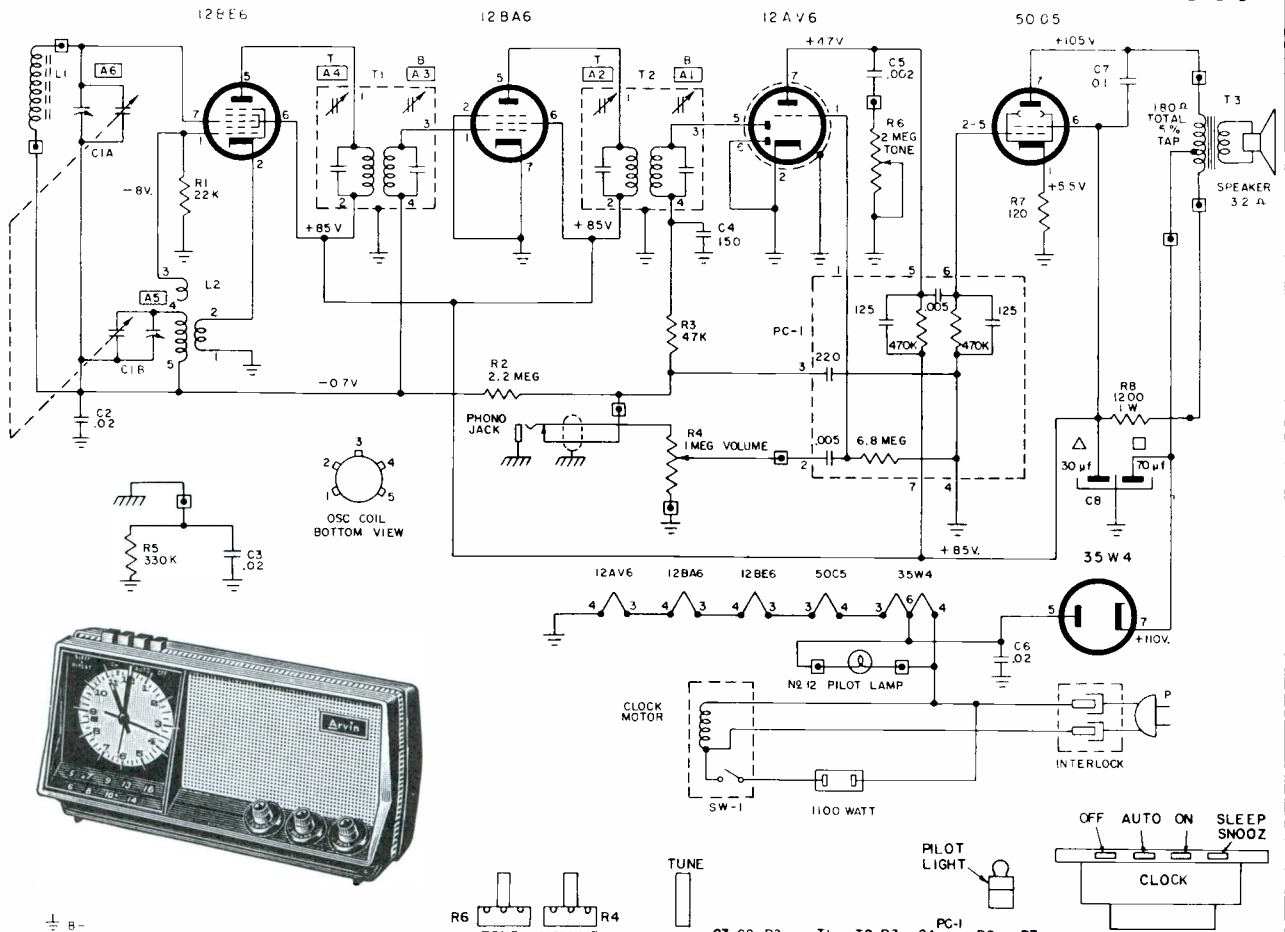
BOTTOM VIEW OF FM TUNER TOP VIEW OF FM TUNER



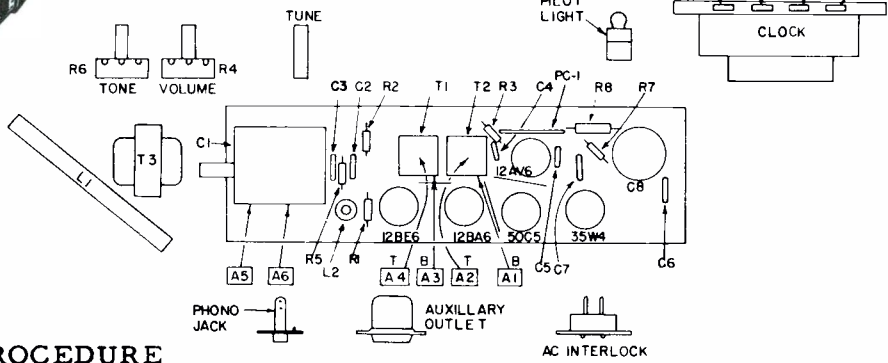
TUNER SCHEMATIC



ARVIN RADIO MODELS 50R65 50R67 CODE 1.47001



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

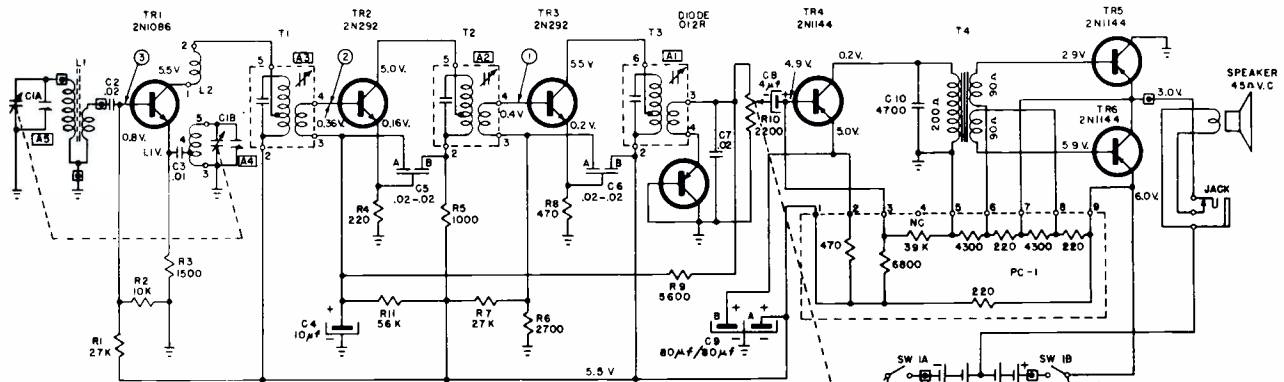


ALIGNMENT PROCEDURE

| Position of Variable | Frequency of Generator | Dummy Antenna | Generator Output Connection | Trimmers Adjusted in Order Shown for Maximum Output | Functions of Trimmer |
|----------------------|------------------------|---------------|-----------------------------|---|----------------------|
| Open | 455 | .05 μf | Pin 7 12BE6 | A1, A2, A3, A4 | I.F. |
| 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

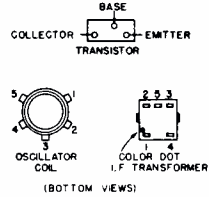


CAPACITANCE VALUES LESS THAN 10 ARE IN MICROFARADS (μ F), AND VALUES GREATER THAN 10 ARE IN MICRO-MICROFARADS (μ MF) EXCEPT WHERE NOTED

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

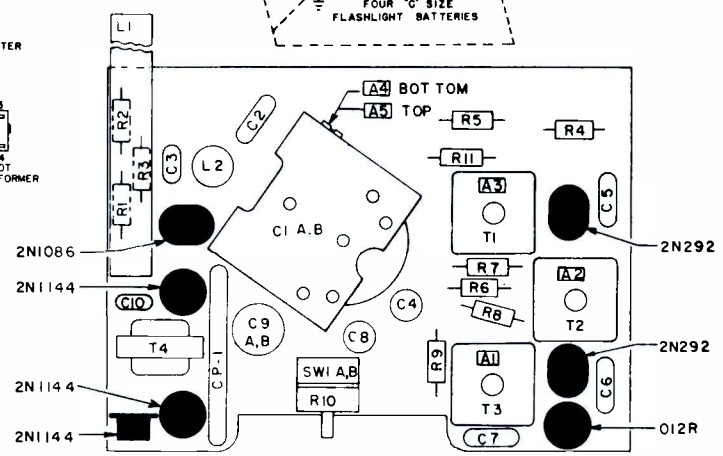
RESISTANCE VALUES ARE IN OHMS; K=1000

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

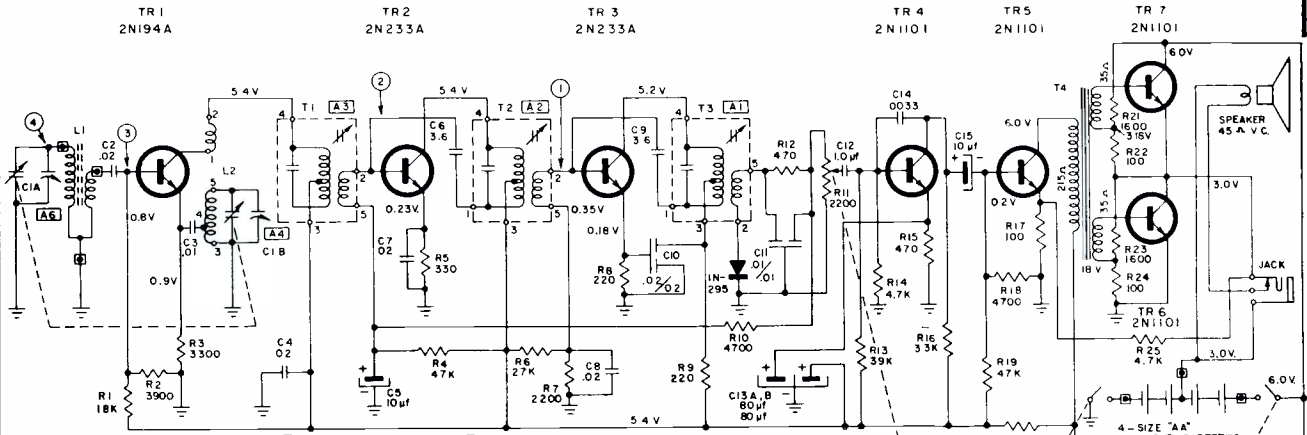


I. F. 455 KC.

| SIGNAL TEST POINTS | FREQUENCY | SERIES CAPACITOR TO GENERATOR | INPUT FOR 5MV OUTPUT (AT V ACROSS 45A) |
|--------------------|-----------|-------------------------------|--|
| ① | 455 KC | 0.5 μ f | 2000 μ V |
| ② | 455 KC | 0.5 μ f | 110 μ V |
| ③ | 455 KC | 0.5 μ f | 4 μ V |
| ④ | 1000 KC | STANDARD LOOP | 300 μ -V M |



Arvin MODELS 60R47 & 60R49 CHASSIS 1.50401



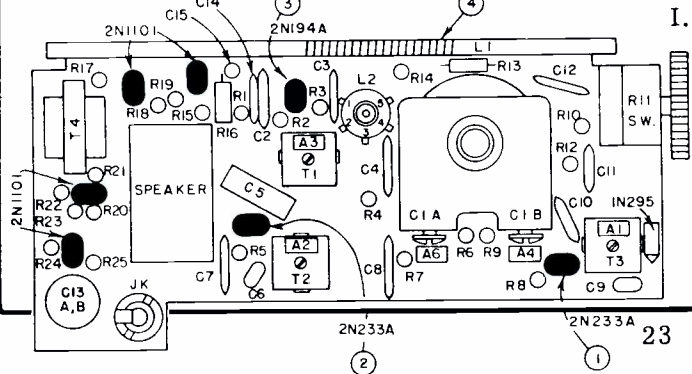
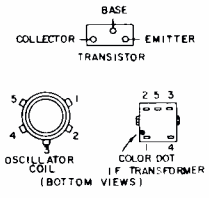
I. F. 455 KC.

CAPACITANCE VALUES LESS THAN 10 ARE IN MICROFARADS (μ F) AND VALUES GREATER THAN 10 ARE IN MICRO-MICROFARADS (μ MF) EXCEPT WHERE NOTED.

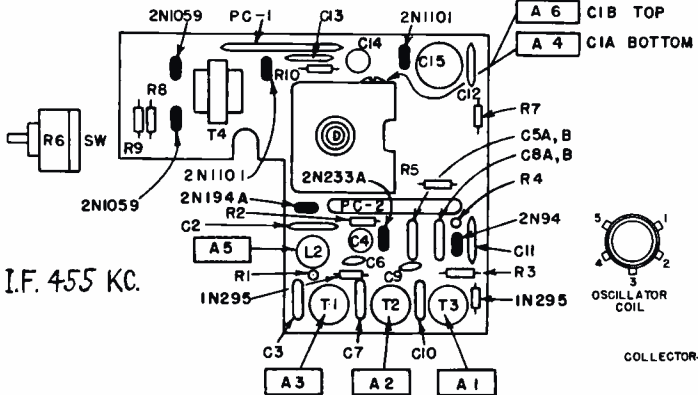
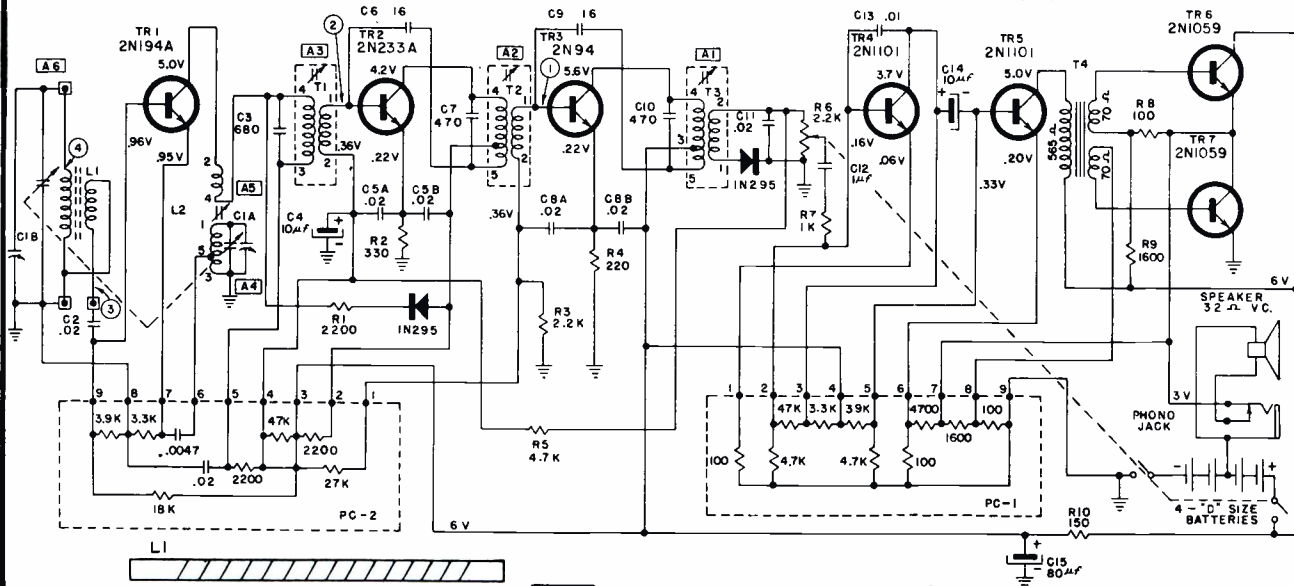
VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR CLOSED AND VOLUME CONTROL AT MAXIMUM CLOCKWISE ROTATION.

RESISTANCE VALUES ARE IN OHMS; K=1000

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

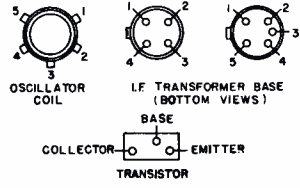


Arvin MODEL 60R58 CHASSIS 1.50300

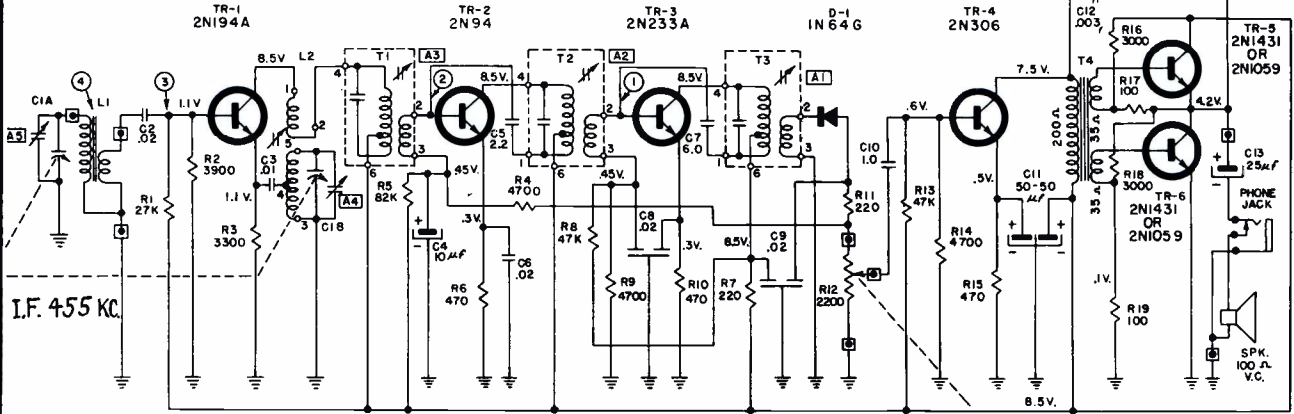


RESISTANCE VALUES ARE IN OHMS; K=1000.
 CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μF), & VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS ($\mu\mu F$) EXCEPT WHERE NOTED.
 VOLTAGE READINGS TO COMMON GROUND ARE MEASURED WITH VACUUM TUBE VOLTMETER UNDER NO SIGNAL CONDITIONS WITH TUNING CAPACITOR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

| SIGNAL TEST POINT | TEST FREQUENCY | SERIES CAPACITOR TO GENERATOR | INPUT FOR 50 MW OUTPUT (1.26 V ACROSS 32 Ω) |
|-------------------|----------------|-------------------------------|---|
| 1 | 455 KC | .05 μF | 900 μV |
| 2 | 455 KC | .05 μF | 30 μV |
| 3 | 455 KC | .05 μF | 5 μV |
| 4 | 1000 KC | STANLARD LOOP | 200 $\mu V/M$ |

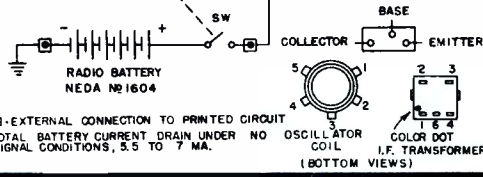


ARVIN MODELS 60R63 & 60R69 CHASSIS 1.50101 60R73 & 60R79



CAPACITANCE VALUES LESS THAN 1.0 ARE IN MICROFARADS (μF), AND VALUES GREATER THAN 1.0 ARE IN MICRO-MICROFARADS ($\mu\mu F$) 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 CLOCKWISE ROTATION.
 RESISTANCE VALUES ARE IN OHMS; K=1000.
 \perp - COMMON GROUND SYMBOL.

| SIGNAL TEST POINTS | TEST FREQUENCY | SERIES CAPACITOR TO GENERATOR | INPUT FOR 50 MW OUTPUT (.7 V ACROSS 100 Ω) |
|--------------------|----------------|-------------------------------|--|
| ① | 455 KC | .05 μF | 500 μV |
| ② | 455 KC | .05 μF | 50 μV |
| ③ | 455 KC | .05 μF | 2 μV |
| ④ | 1000 KC | STANDARD LOOP | 200 $\mu V/M$ |

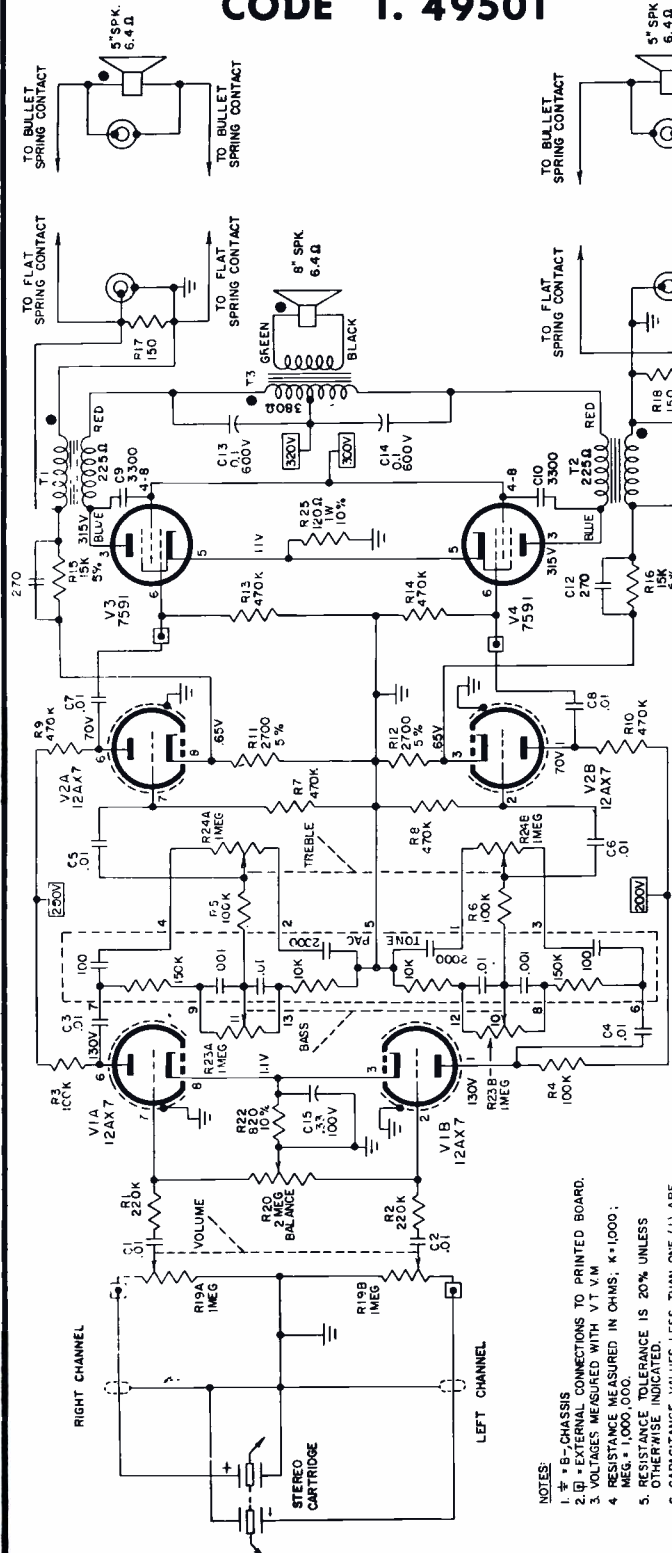


ARVIN PHONOGRAPH

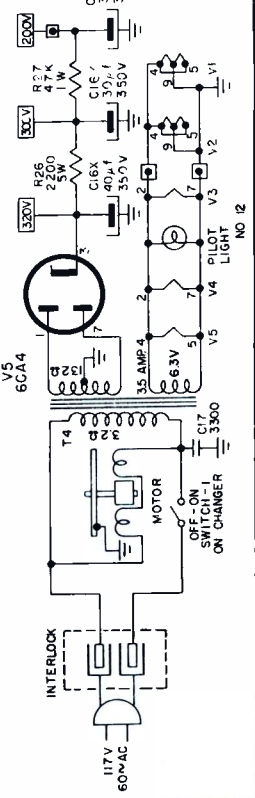
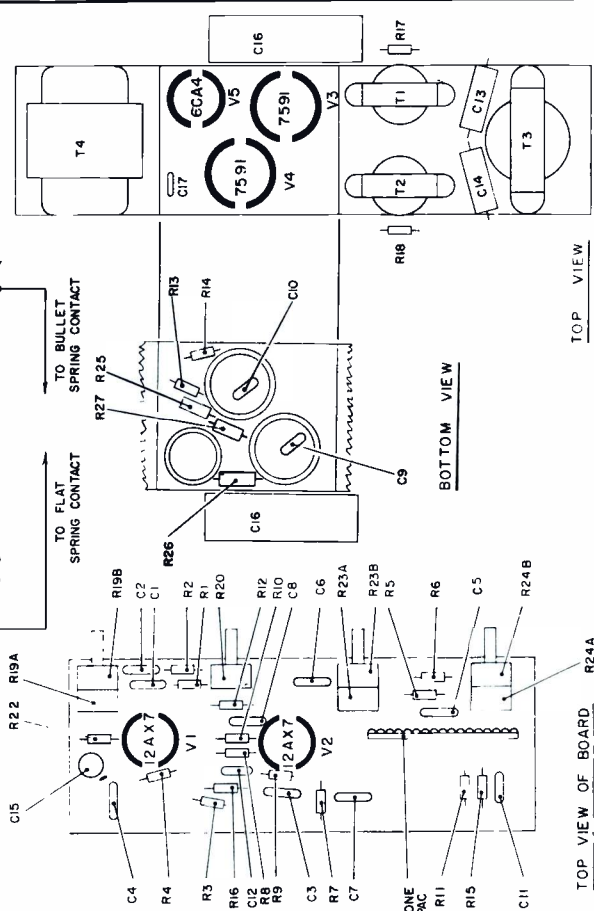
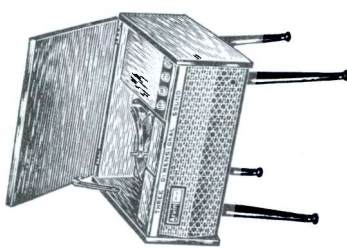
MODEL 90P53

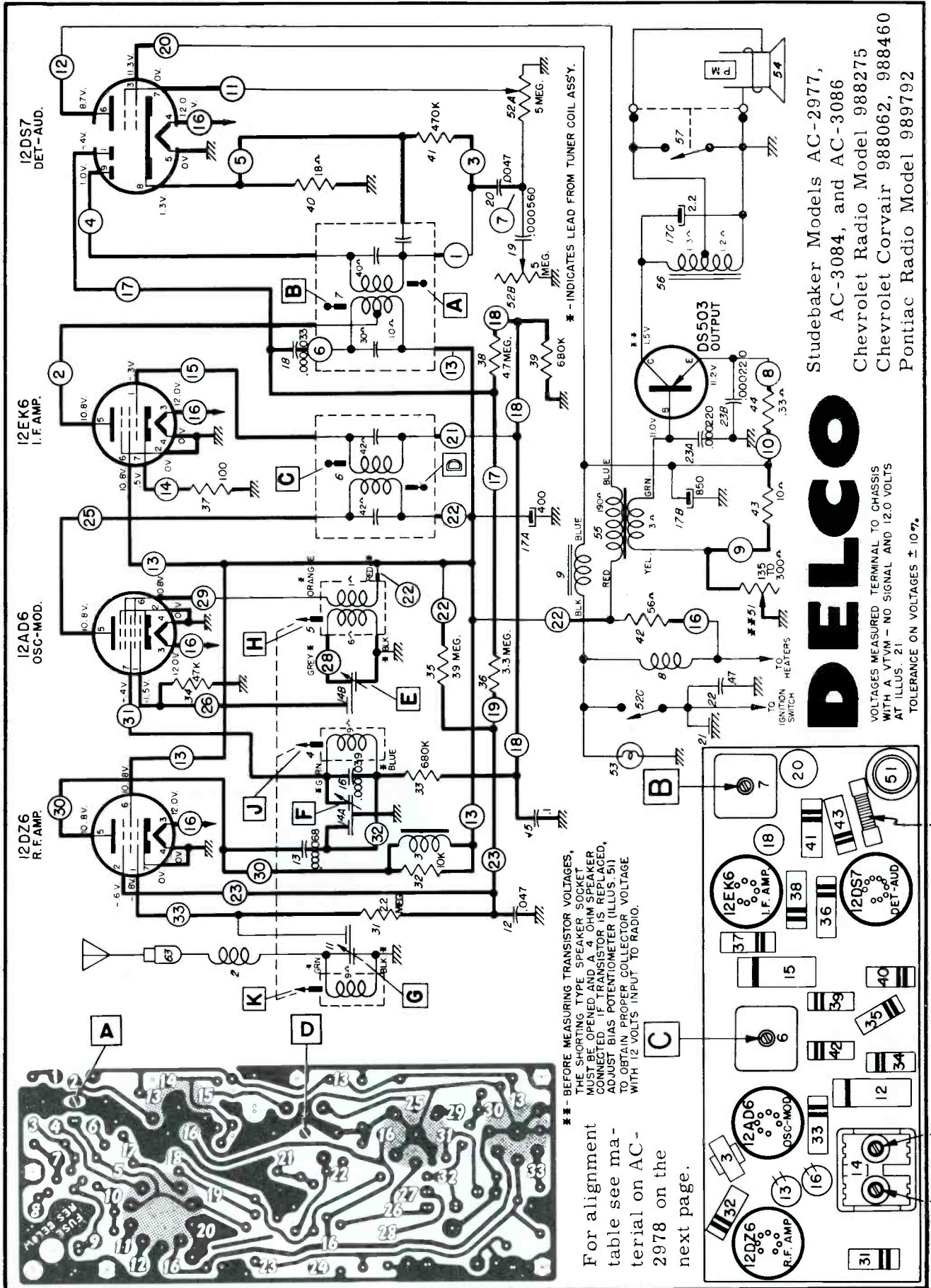
MODEL 90P58

CODE 1.49501



- NOTES:**
1. * B-CHASSIS
 2. (p) - EXTERNAL CONNECTIONS TO PRINTED BOARD.
 3. VOLTAGES MEASURED WITH VT V.M
 4. RESISTANCE MEASURED IN OHMS; K=1000; MEG.=1,000,000.
 5. RESISTANCE TOLERANCE IS 20% UNLESS OTHERWISE INDICATED.
 6. CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MICROFARADS AND VALUES OF ONE (1) OR GREATER ARE IN MICRO-MICROFARADS (μμf) UNLESS OTHERWISE INDICATED.
 7. COMPONENTS IN THIS AMPLIFIER ARE INTERCONNECTED TO RESULT IN A CONSISTENT PHASE RELATION BETWEEN APPLIED VOLTAGE AND VOICE COIL MOVEMENT (IE A POSITIVE INPUT VOLTAGE MOVES VOICE COIL OUTWARD IN RIGHT CHANNEL, INWARD ON LEFT CHANNEL) DO NOT DISTURB THIS PHASE RELATIONSHIP DURING SERVICING
 8. ● PHASING DOT.
TRANSFORMERS T1,T2 (IN PHASE WITH RED LEAD); T3 (IN PHASE WITH GREEN LEAD); SPEAKERS (POSITIVE VOLTAGE MOVES VOICE COIL OUTWARD)





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

DELCO

VOLTAGES MEASURED TERMINAL TO CHASSIS
 WITH A VTVM - NO SIGNAL AND 120 VOLTS
 AT 110V. 21
 TOLERANCE ON VOLTAGES ± 10%.

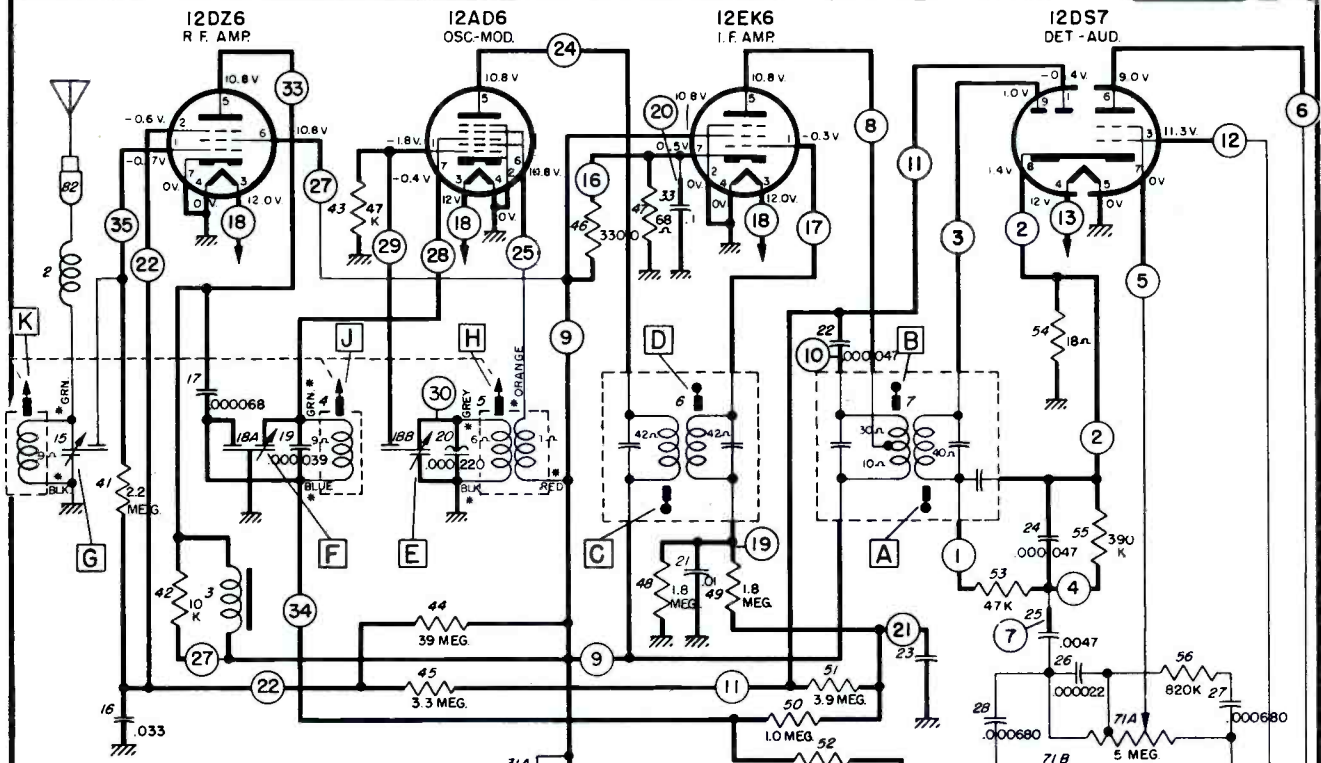
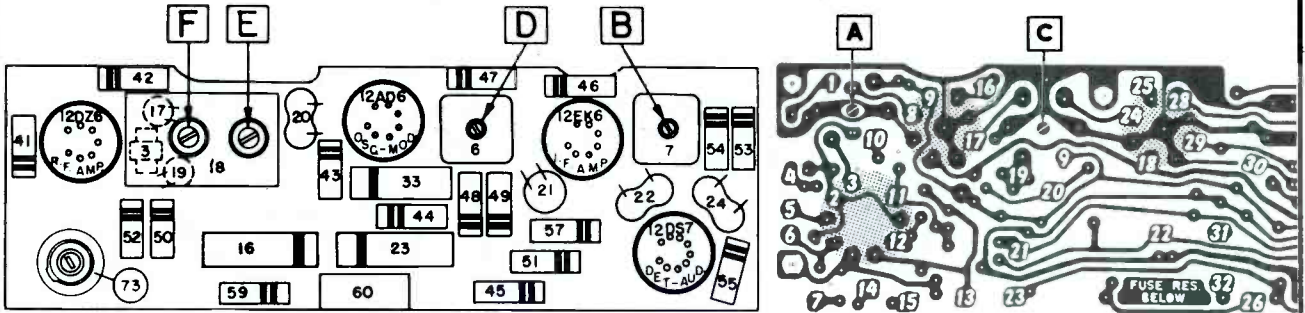
*** - BEFORE MEASURING TRANSISTOR VOLTAGES,
 THE SHORTING TYPE SPEAKER SOCKET
 MUST BE OPENED AND A 4 OHM SPEAKER
 CONNECTED. IF TRANSISTOR IS REPLACED,
 ADJUST BIAS POTENTIOMETER (ILLUS. 51)
 TO OBTAIN PROPER COLLECTOR VOLTAGE
 WITH 12 VOLTS INPUT TO RADIO.

For alignment
 table see ma-
 terial on AC-
 2978 on the
 next page.

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

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

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



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

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

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

TOLERANCE ON VOLTAGES ±10%

* - INDICATES LEAD FROM TUNER COIL ASSY.

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

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

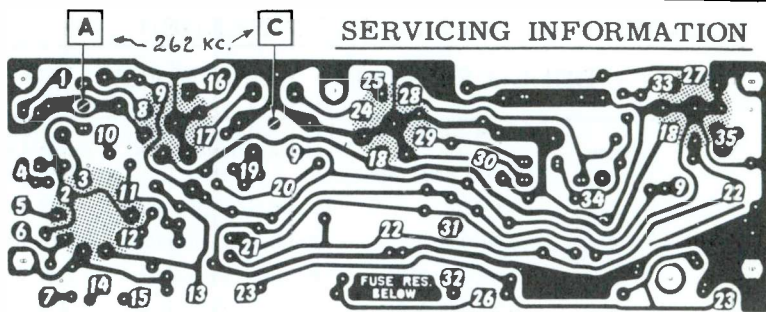
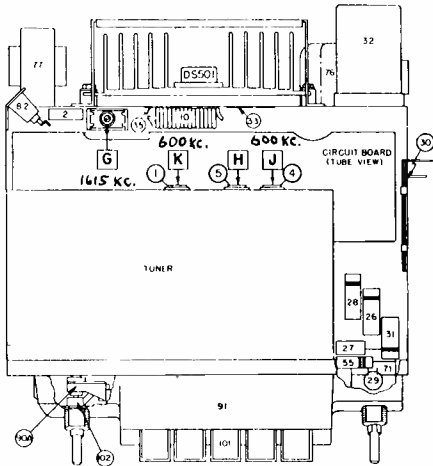
"A" LEAD TO HEATERS

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

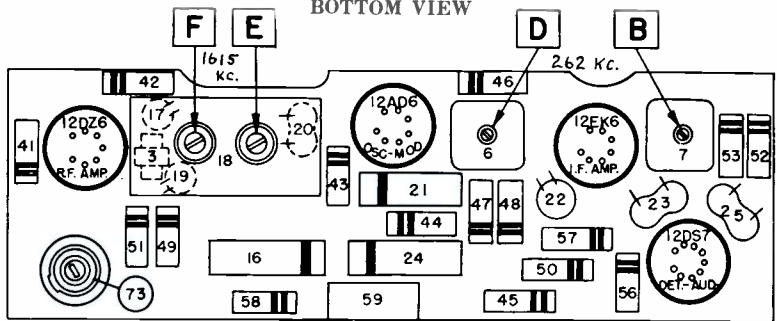
STUDEBAKER AC-2978—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

BUICK MODEL 980051

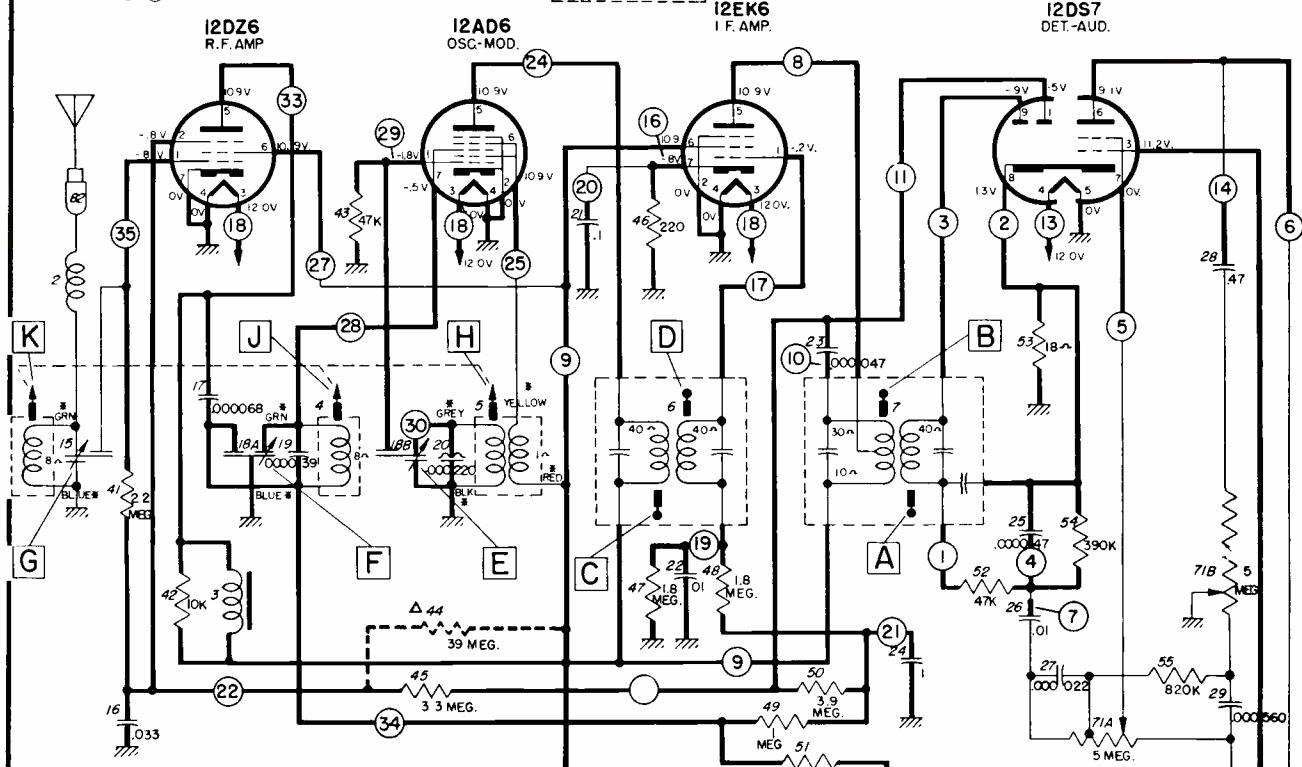


SERVICING INFORMATION



BOTTOM VIEW

TOP VIEW



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 1000KC

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

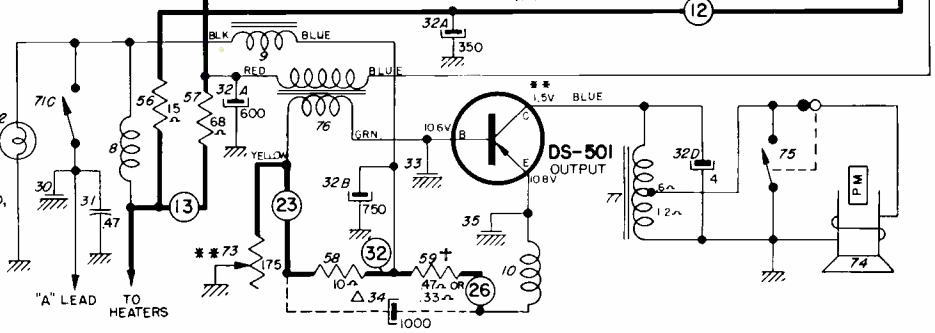
TOLERANCE ON VOLTAGES ± 10%

* - INDICATES LEAD FROM TUNER COIL ASSY.

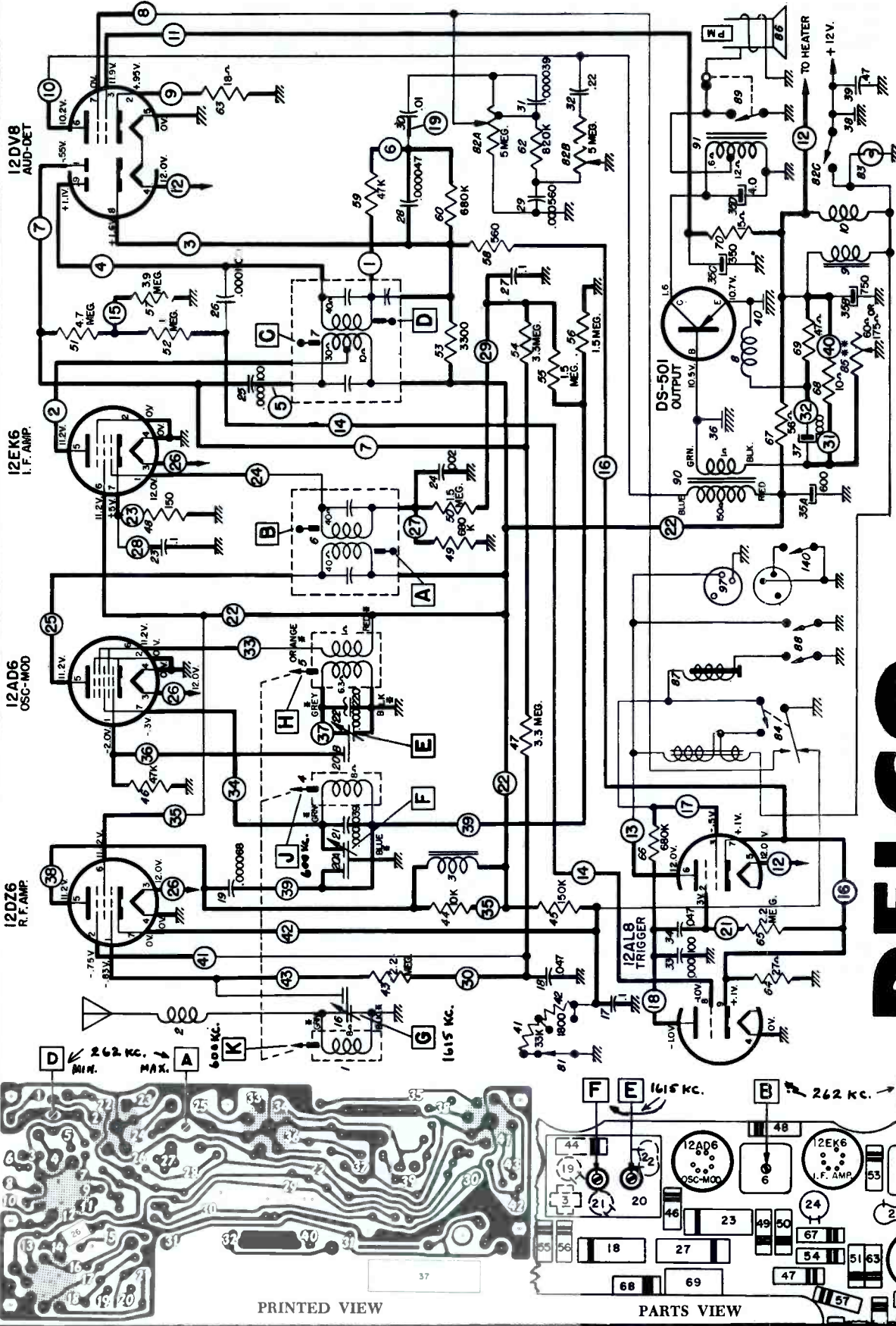
** - BEFORE MEASURING TRANSISTOR VOLTAGES THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

† - ILLUS 59 IS A FUSE RESISTOR FOR THE TRANSISTOR.

Δ - THIS PART WILL NOT APPEAR IN ALL RADIOS.



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

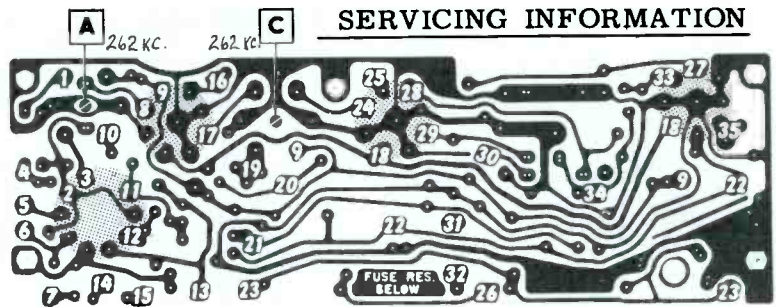
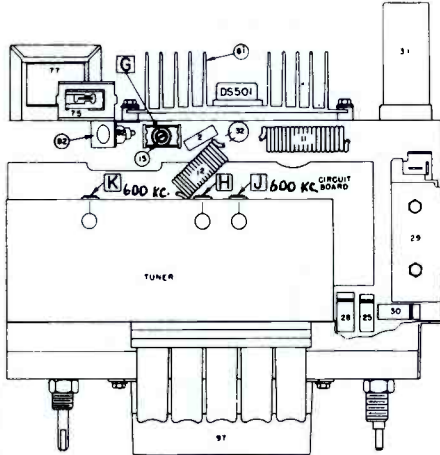


Voltages measured terminal to chassis with a VTVM - No Signal and 12.0 volts at Illustration 38.
 Oscillator grid voltage taken with set tuned to 1000 kc.
 Total "A" drain at 12 volts - 2.6 amps.
 Tolerance on voltages ± 10%.

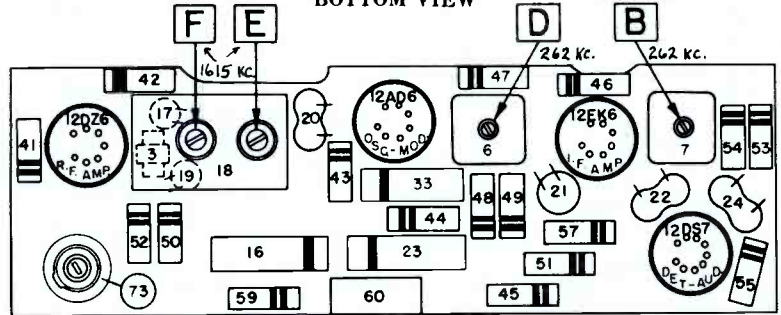
DELCO
 BUICK 980052 BUICK 980135
 PRINTED CIRCUIT SHOWN IN HEAVY LINES

DELCO

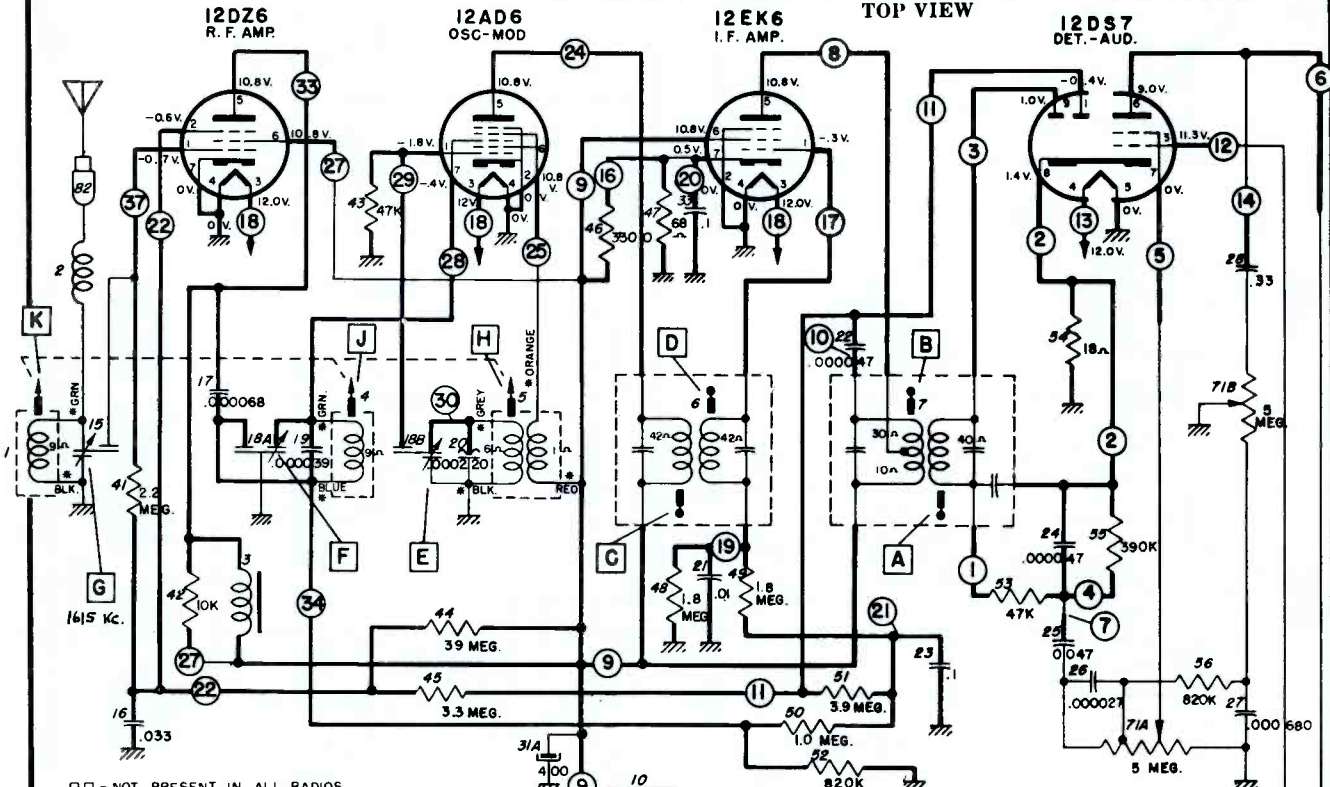
CHEVROLET MODEL 988276



BOTTOM VIEW



TOP VIEW



□ - NOT PRESENT IN ALL RADIOS.

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

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

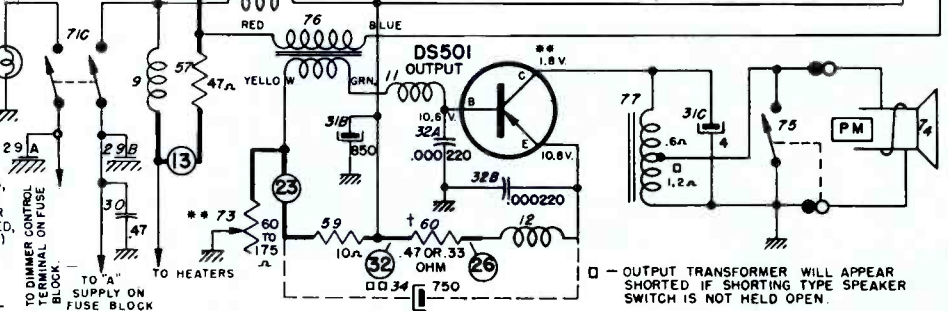
TOTAL "A" DRAIN AT 12 V - 2.2 AMPS.

TOLERANCE ON VOLTAGES ± 10%

* - INDICATES LEAD FROM TUNER COIL ASSY.

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

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

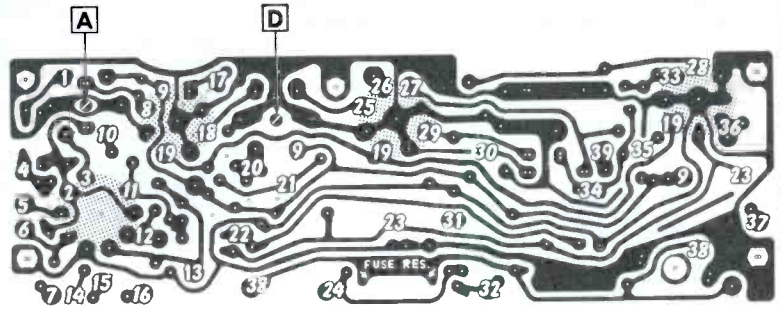


□ - OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.

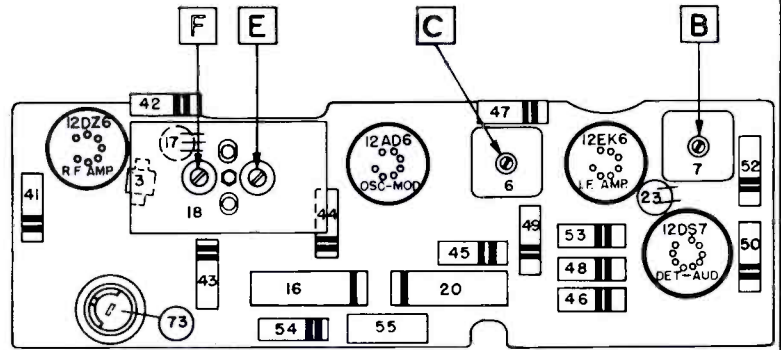
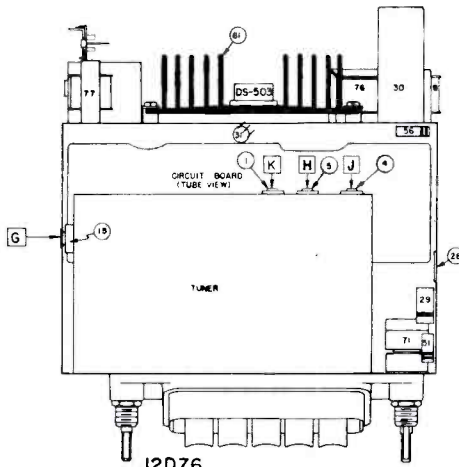
CHEVROLET 988276—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

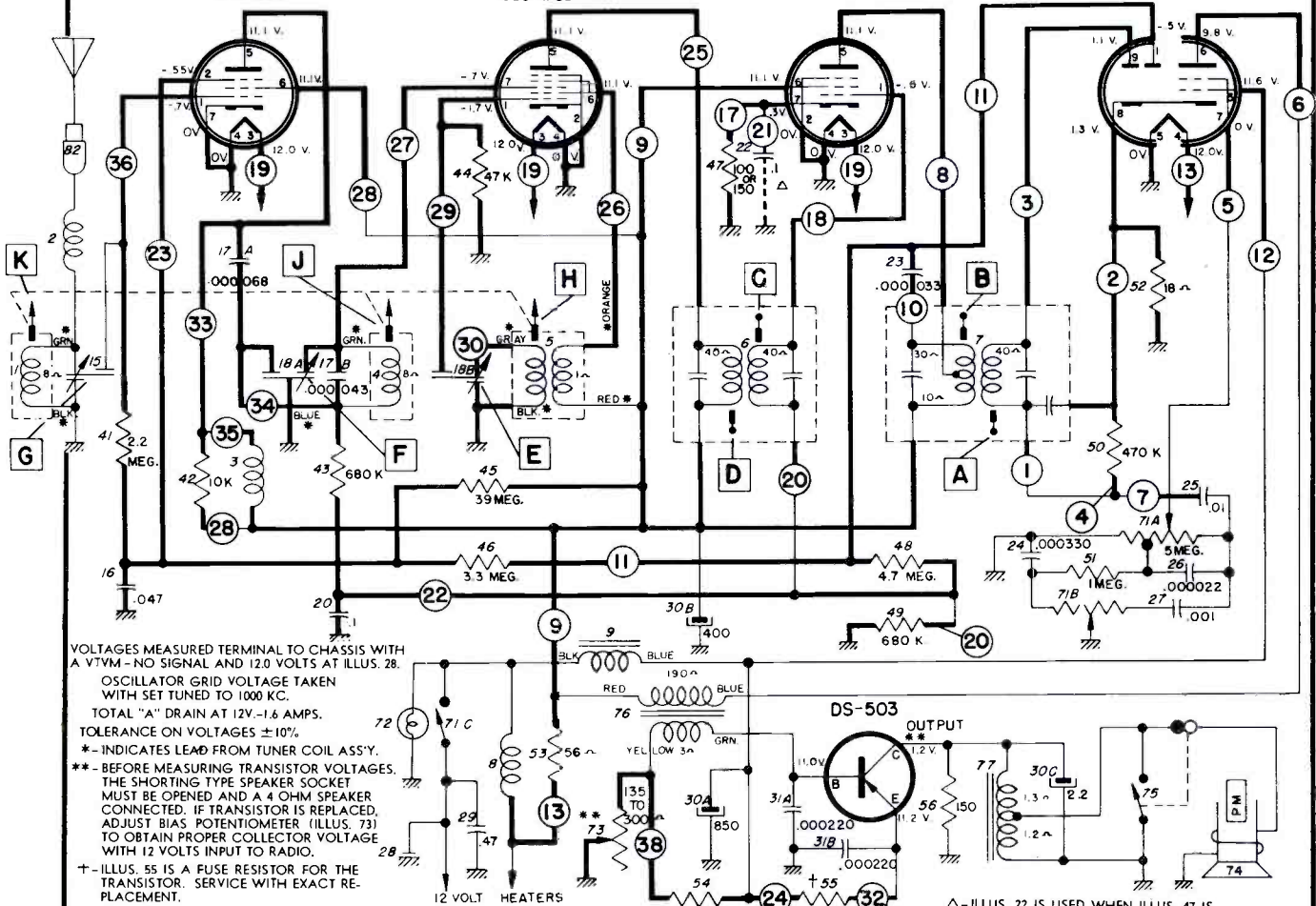
BUICK MODEL 980132
 OLDSMOBILE MODEL 989387
 Alignment in Table 3, Page 38



BOTTOM VIEW



TOP VIEW



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM—NO SIGNAL AND 12.0 VOLTS AT ILLUS. 28.
 OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
 TOTAL "A" DRAIN AT 12V.—1.6 AMPS.
 TOLERANCE ON VOLTAGES ±10%.
 *—INDICATES LEAD FROM TUNER COIL ASS'Y.
 **—BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 73) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.
 †—ILLUS. 55 IS A FUSE RESISTOR FOR THE TRANSISTOR. SERVICE WITH EXACT REPLACEMENT.
 ⊖—OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT HELD OPEN.

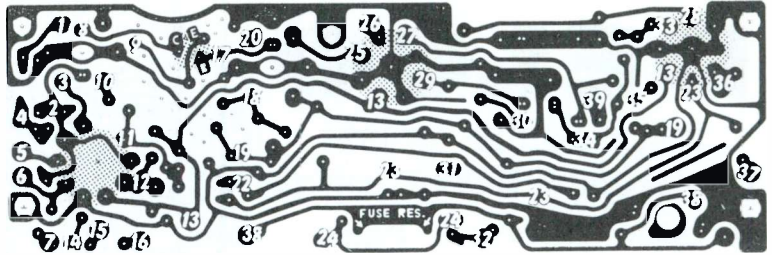
Δ—ILLUS. 22 IS USED WHEN ILLUS. 47 IS 150 OHMS.

BUICK 980132—PRINTED CIRCUIT SHOWN IN HEAVY LINES

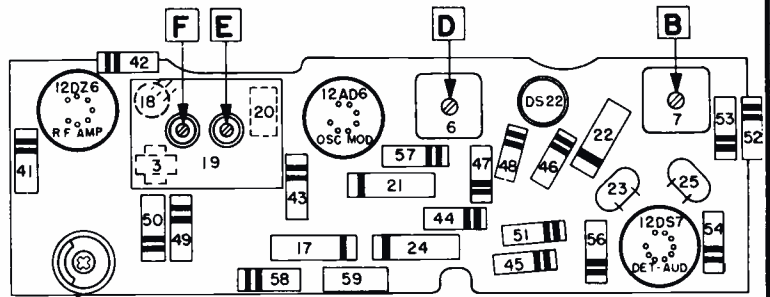
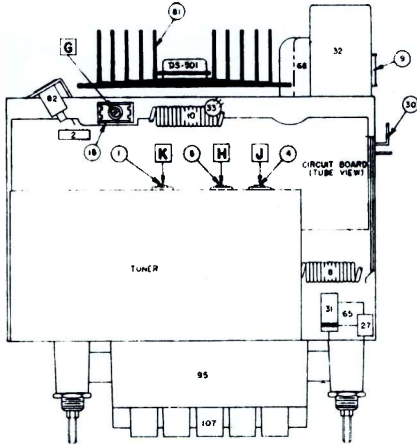
DELCO

NEEDED 1961 RADIO SERVICING INFORMATION

BUICK MODEL 980134
Alignment in Table 1, Page 38



BOTTOM VIEW



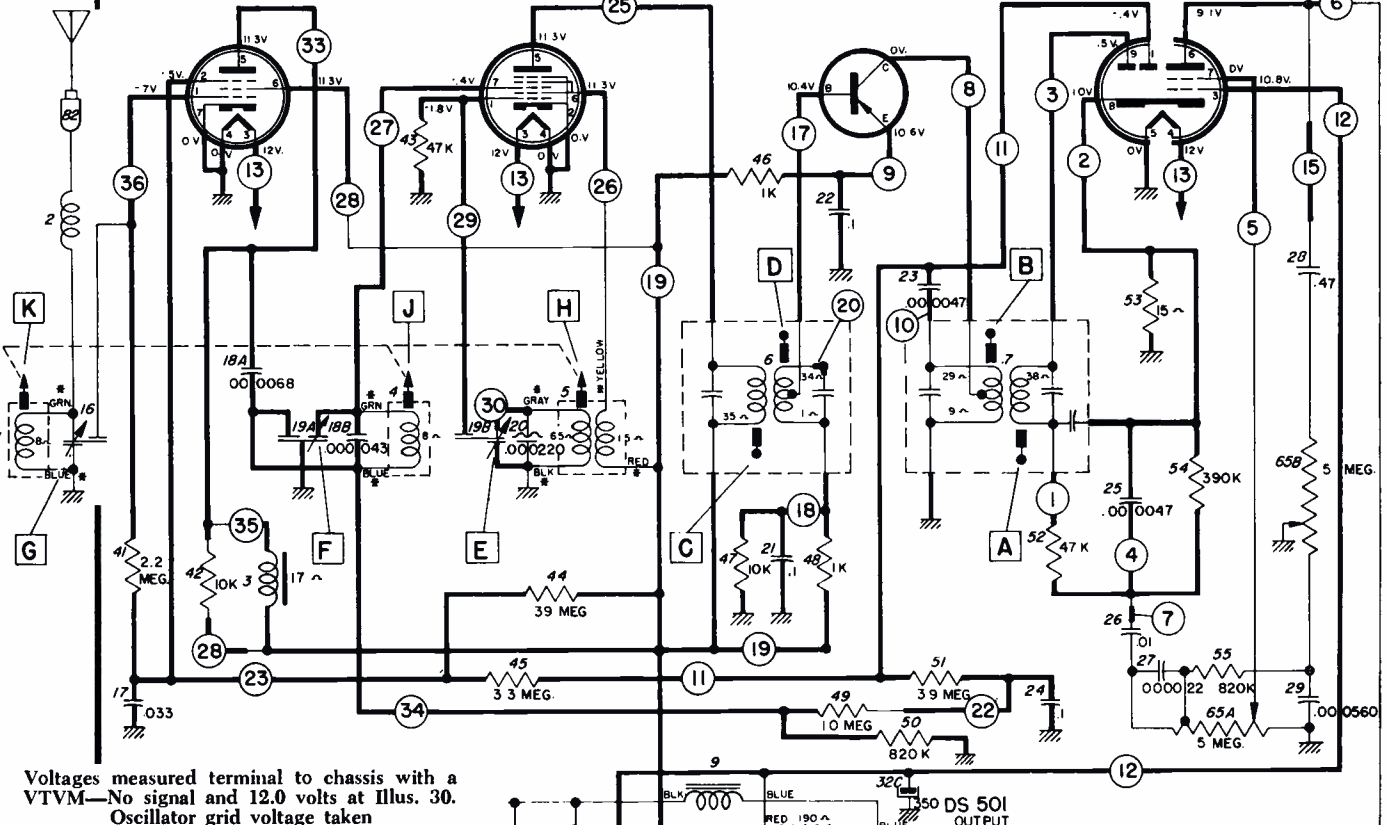
TOP VIEW

12DZ6 TUBE VIEW
R F AMP

12AD6
OSC - MOD.

DS 22
IF AMP

12DS7
DE T - 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.

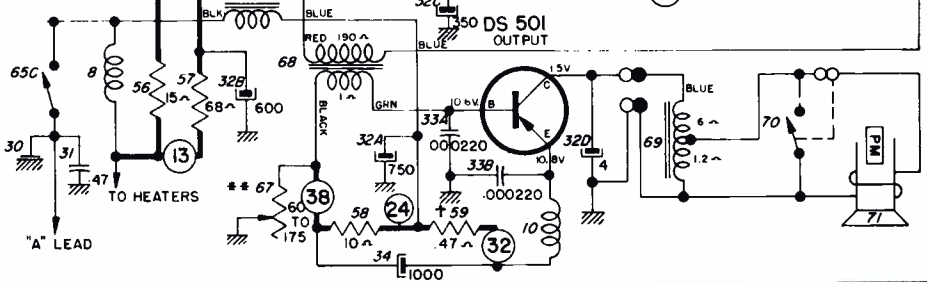
Total "A" drain at 12V. - 2.2 amps.

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.

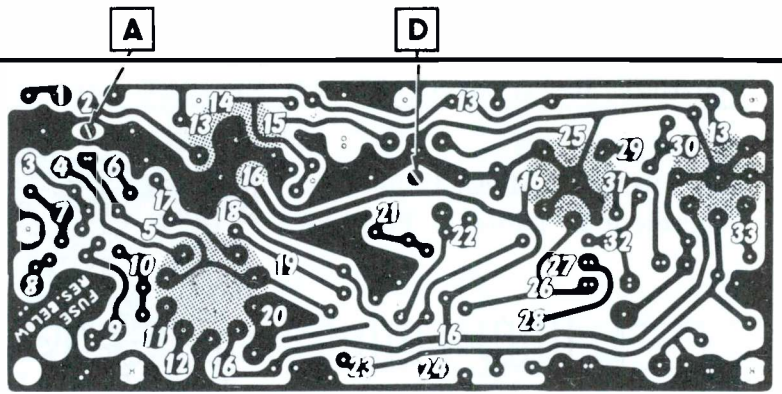
†—Illus. 59 is a fuse resistor for the transistor. Service with exact replacement.



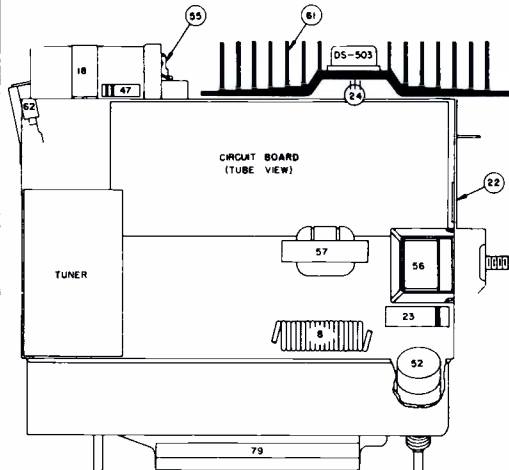
NUMBERS ON PRINTED CIRCUIT BOARD CORRESPOND WITH NUMBERS IN CIRCLES ON SCHEMATIC

DELCO

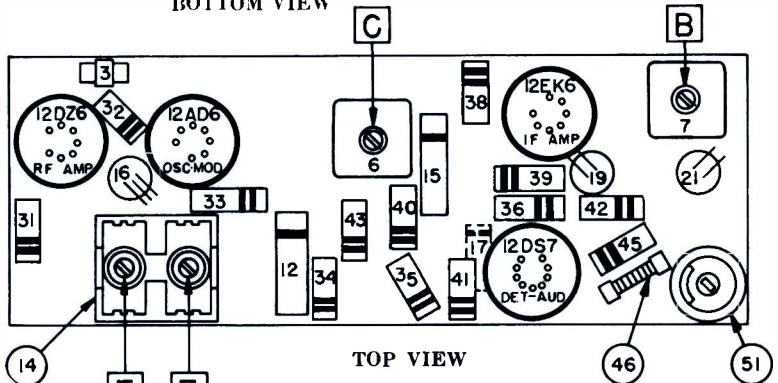
CHEVROLET MODEL 988413
Alignment in Table 4, Page 38



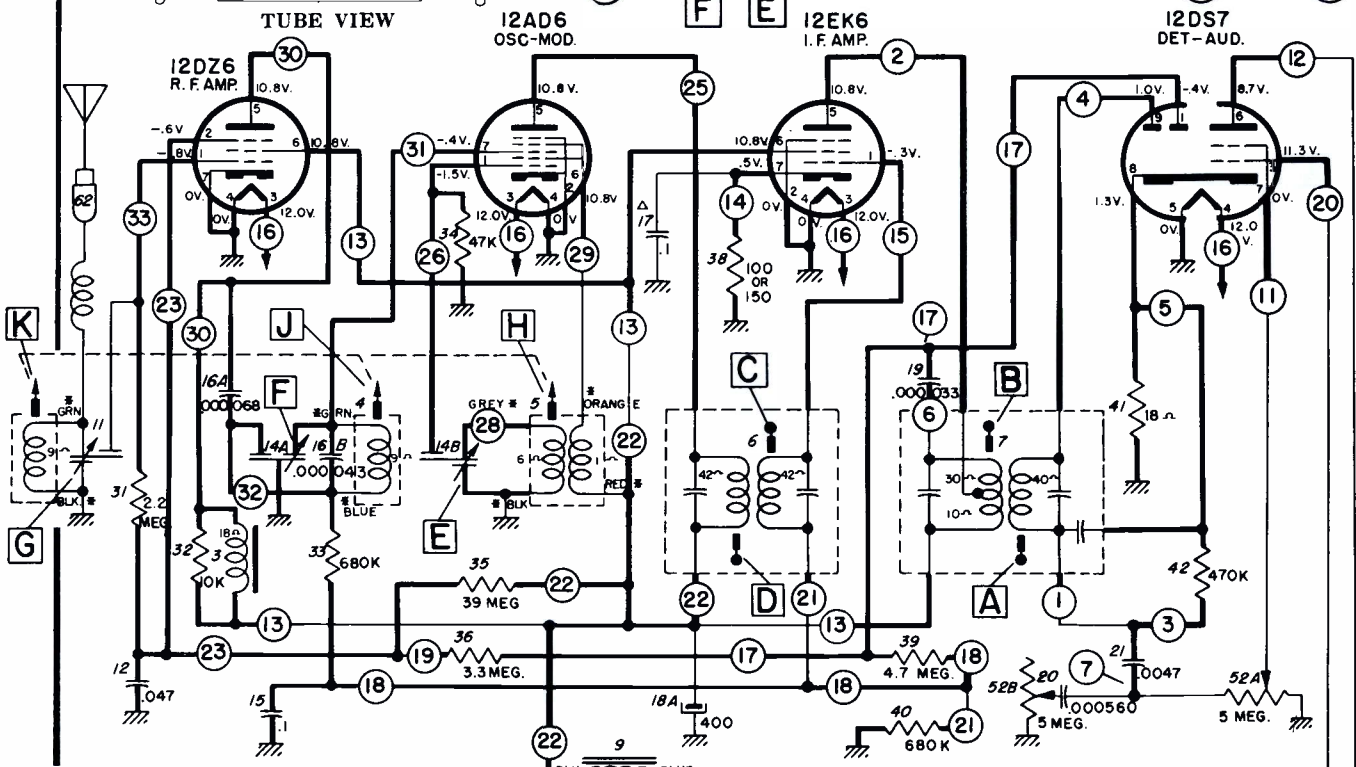
BOTTOM VIEW



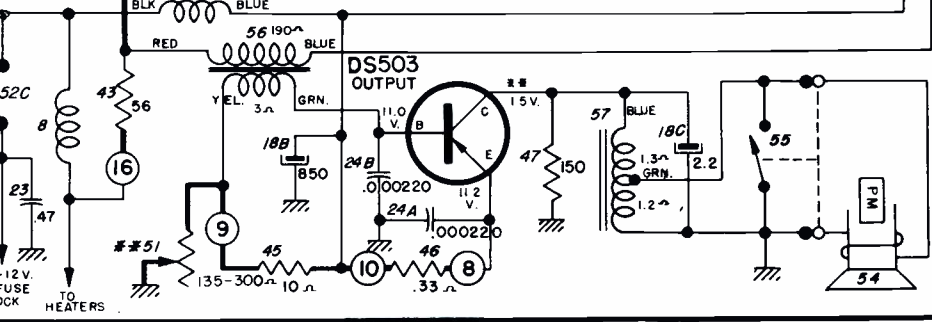
TUBE VIEW



TOP VIEW

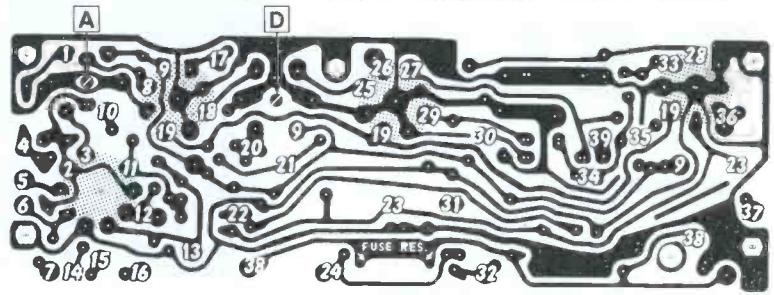
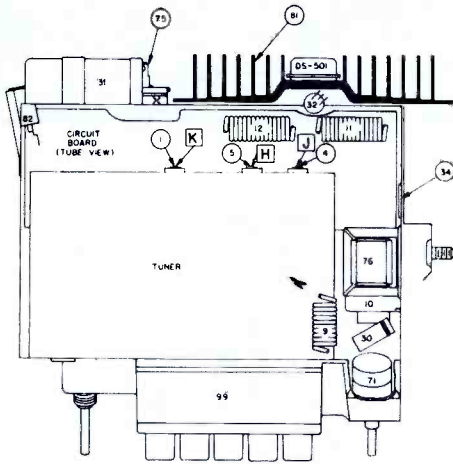


*- INDICATES LEAD FROM TUNER COIL ASS'Y.
 Δ- THIS CAPACITOR WILL NOT APPEAR IN ALL RADIOS. (USED WHEN ILLUS. 38 IS 150 OHMS)
 VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM-NO SIGNAL AND 12.0 VOLTS AT ILLUS. 22.
 OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
 TOTAL "A" DRAIN AT 12V. -1.6 AMPS.
 TOLERANCE ON VOLTAGES ± 10%
 **- BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 51) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.

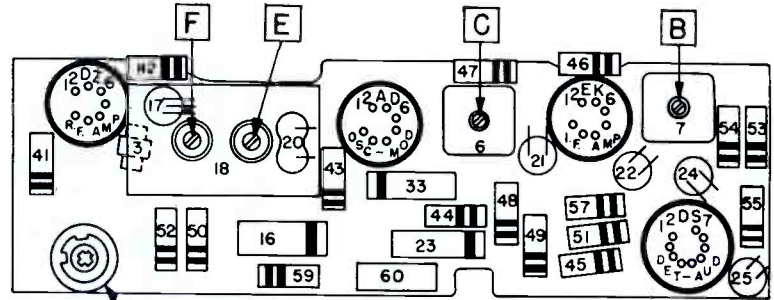


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

DELCO
CHEVROLET MODEL 988414
Alignment in Table 1, Page 38



BOTTOM VIEW



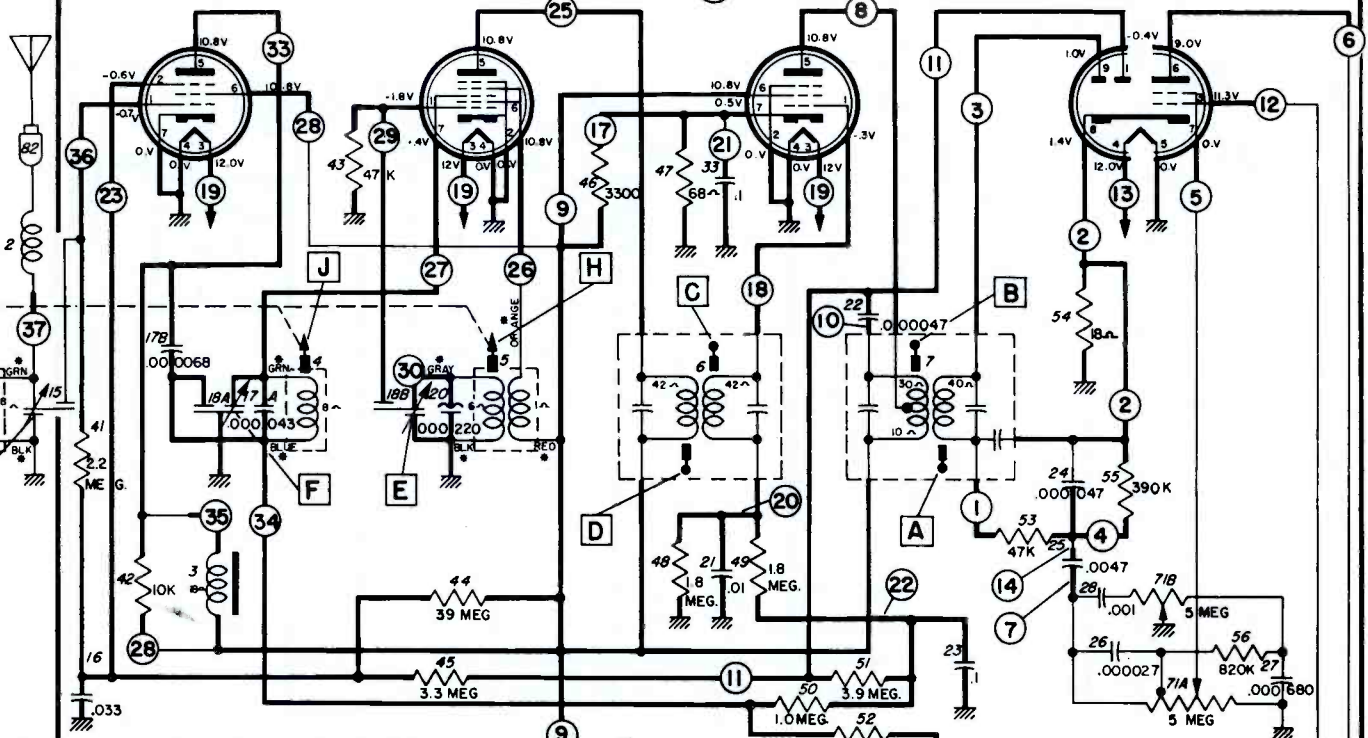
TOP VIEW

12DZ6
R.F. AMP.

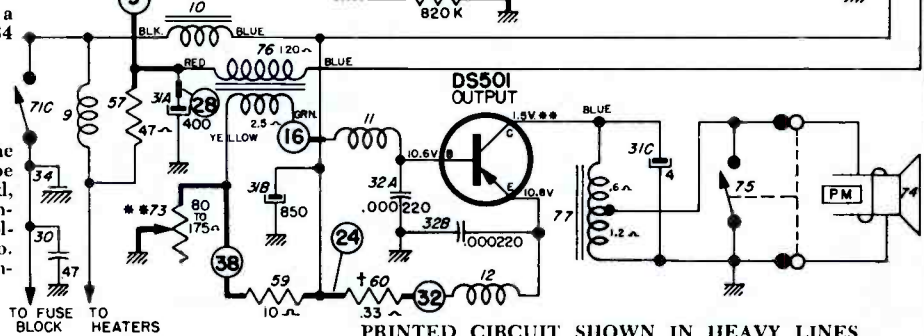
12AD6
OSC-MOD

12EK6
I.F. AMP.

12DS7
DET-AUD



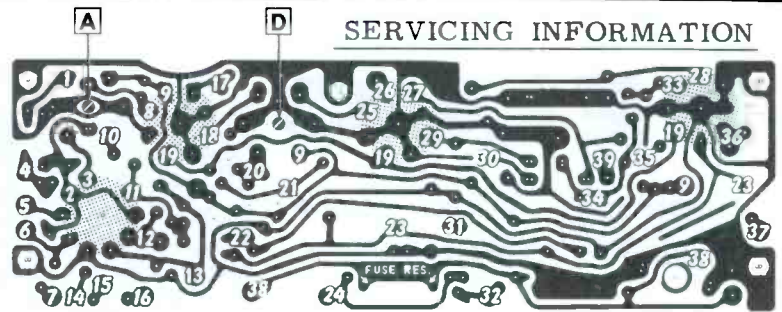
- Voltages measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 34
- Oscillator grid voltage taken with set tuned to 1000 KC.
- Total "A" drain at 12V. - 2.2 amps.
- Tolerance on voltages $\pm 10\%$.
- °—Indicates lead from tuner coil ass'y.
- °°—Before measuring transistor voltages, 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.



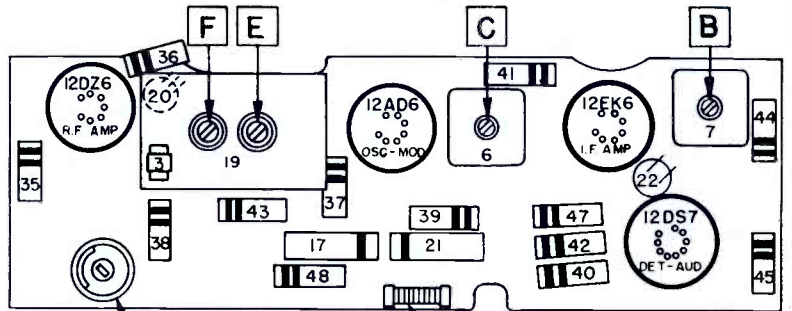
PRINTED CIRCUIT SHOWN IN HEAVY LINES.

CHEVROLET 988414

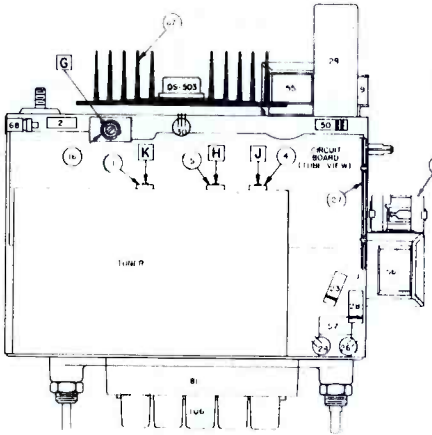
DELCO
CHEVROLET CORVAIR 988468
Alignment in Table 1, Page 38



BOTTOM VIEW



TOP VIEW
12DS7
DET-AUD

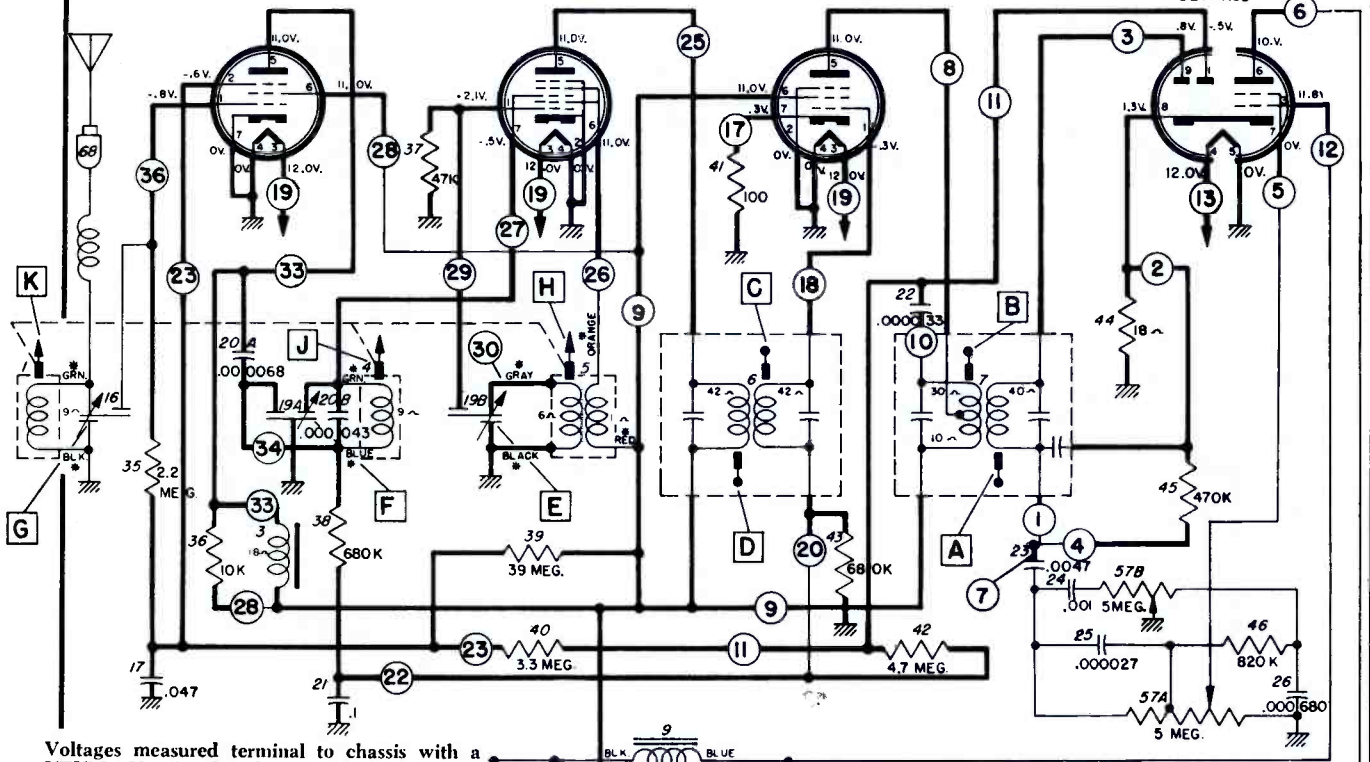


TUBE VIEW

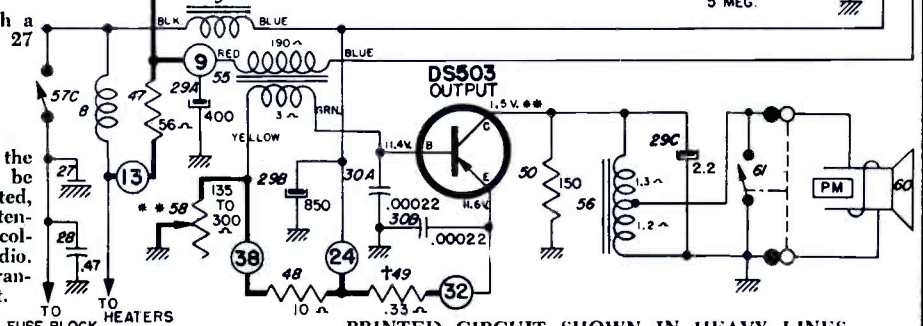
12DZ6
R.F. AMP

12AD6
OSC-MOD

12EK6
I.F. AMP



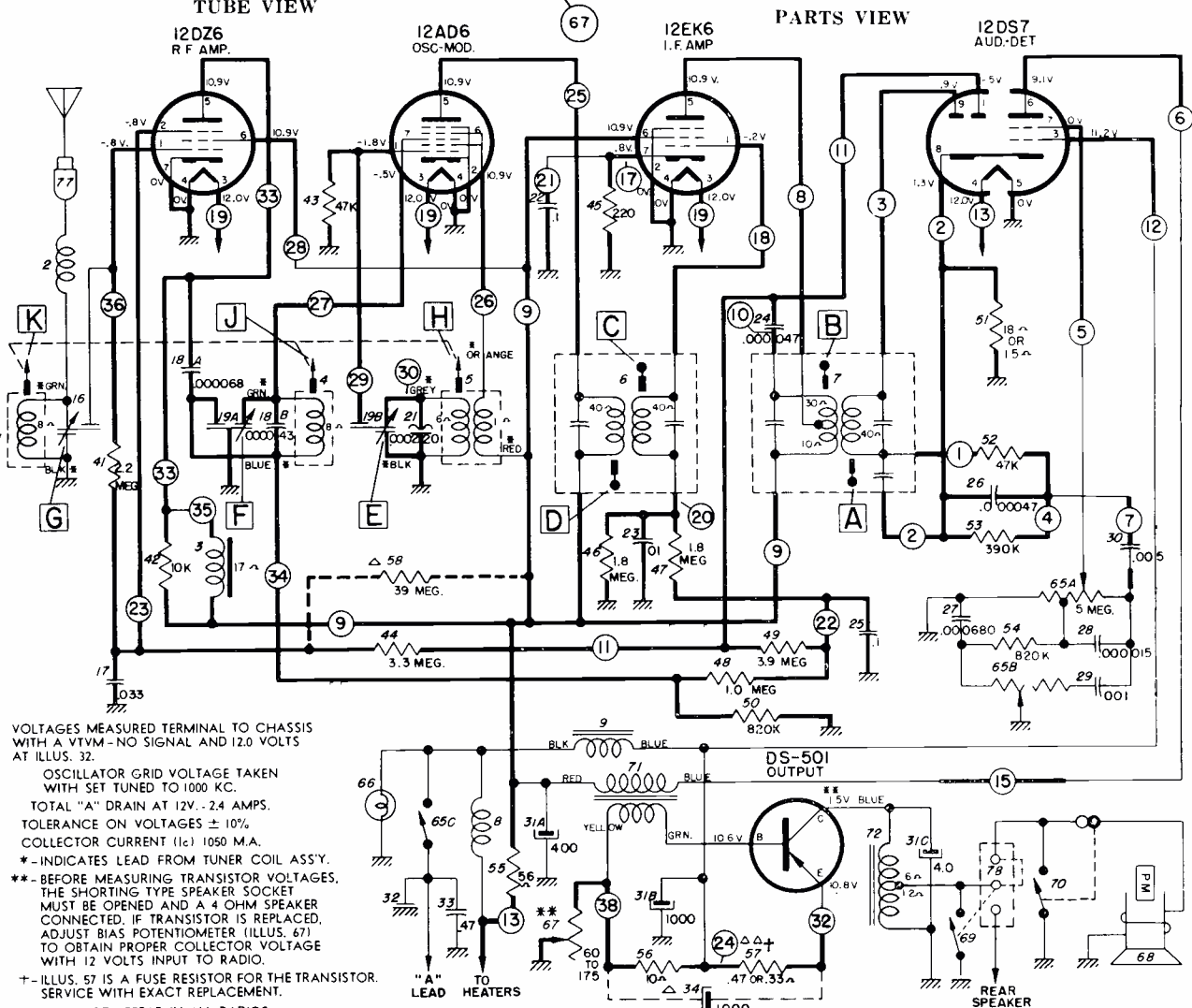
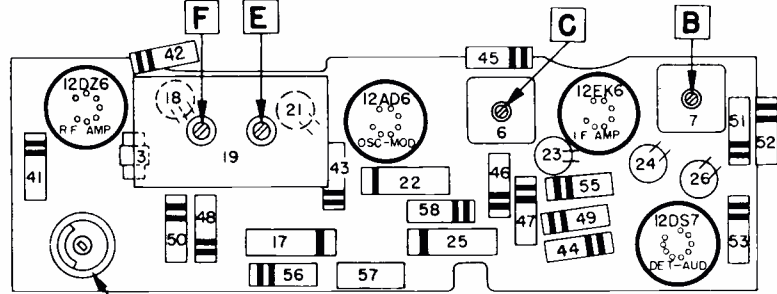
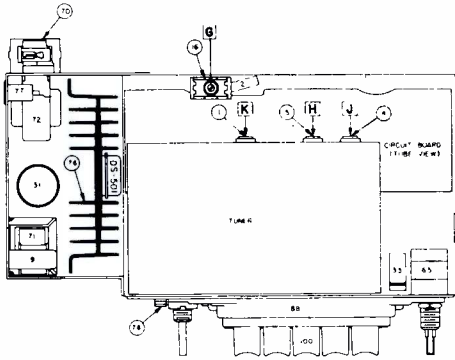
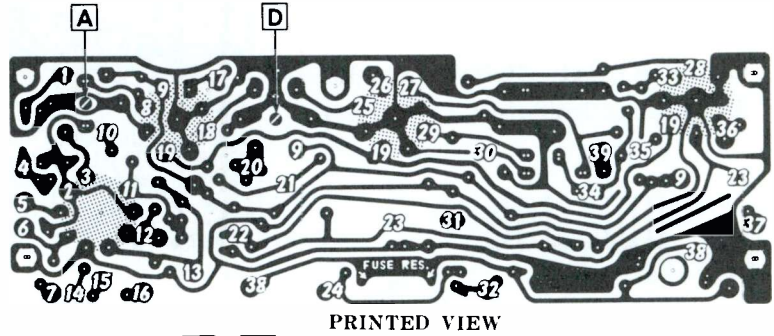
Volts measured terminal to chassis with a VTVM—No signal and 12.0 volts at Illus. 27
Oscillator grid voltage taken with set tuned to 1000 KC.
Total "A" drain at 12V. - 1.6 amps.
Tolerance on voltages $\pm 10\%$
—Indicates lead from tuner coil ass'y.
—Before measuring transistor voltages, the shorting 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



PRINTED CIRCUIT SHOWN IN HEAVY LINES.

DELCO

OLDSMOBILE MODEL 989392
Alignment in Table 2, Page 38



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

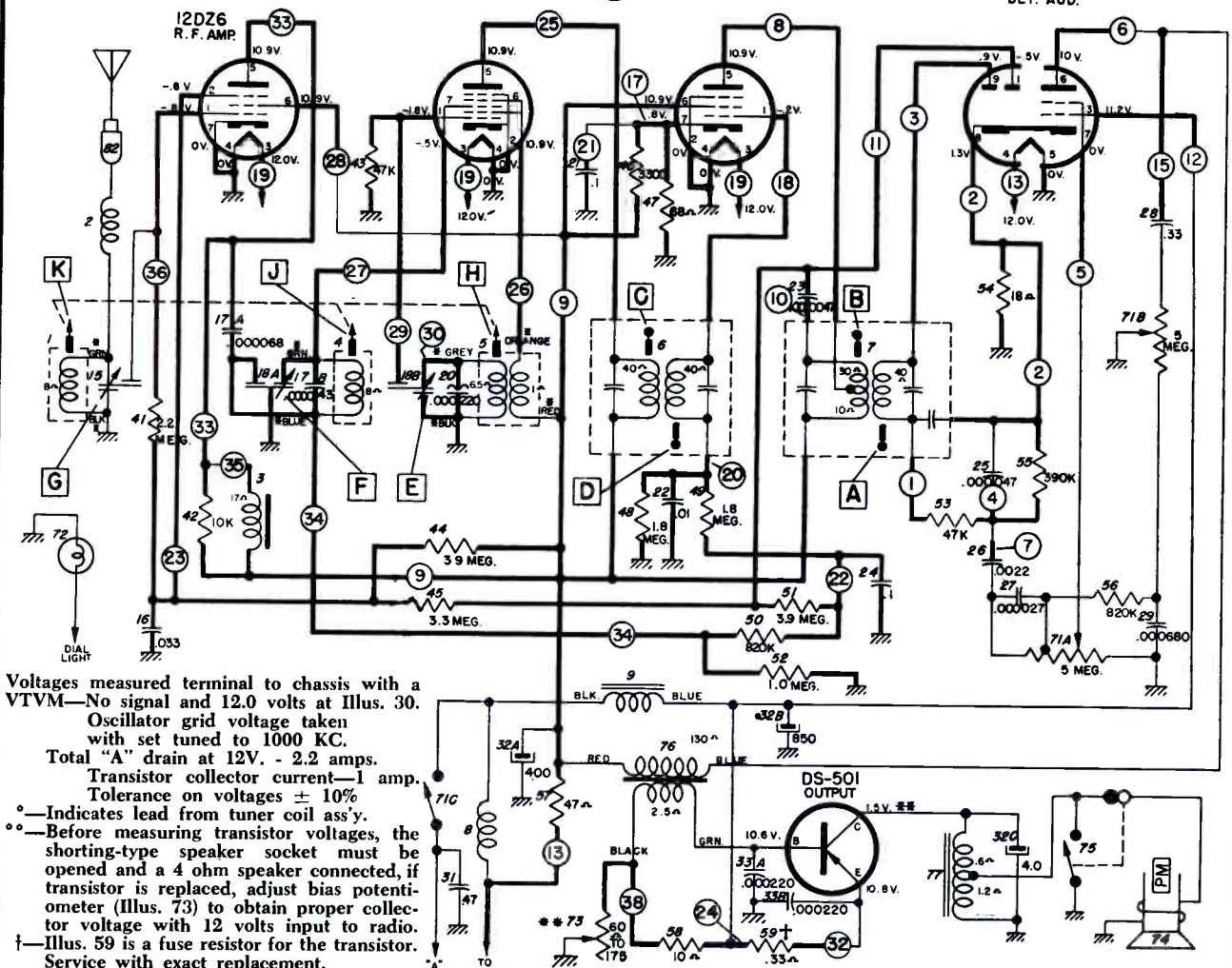
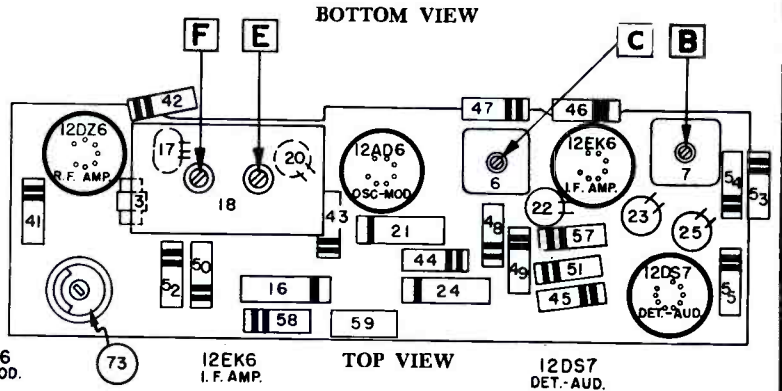
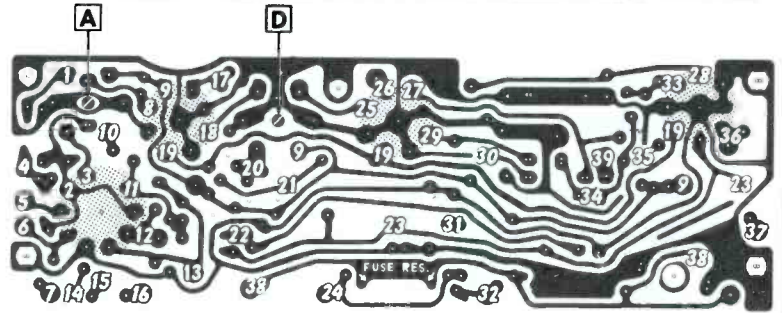
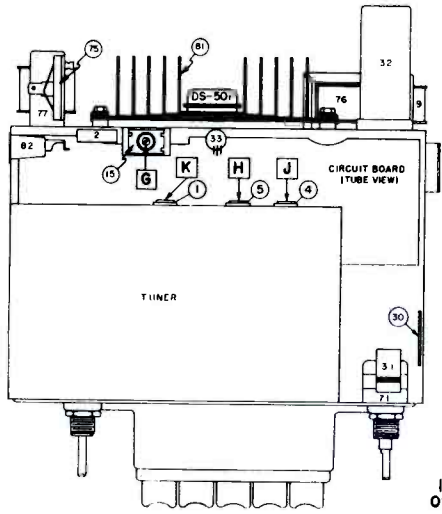
OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
TOTAL "A" DRAIN AT 12V.—2.4 AMPS.
TOLERANCE ON VOLTAGES ± 10%
COLLECTOR CURRENT (I_c) 1050 M.A.

*—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.
Δ—WILL NOT APPEAR IN ALL RADIOS
ΔΔ—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 1/8" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustment should be made with a non-metallic screw driver.

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

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

With the radio installed and the car antenna plugged in, adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station between 600 and 1000 KC (see sticker on case.)

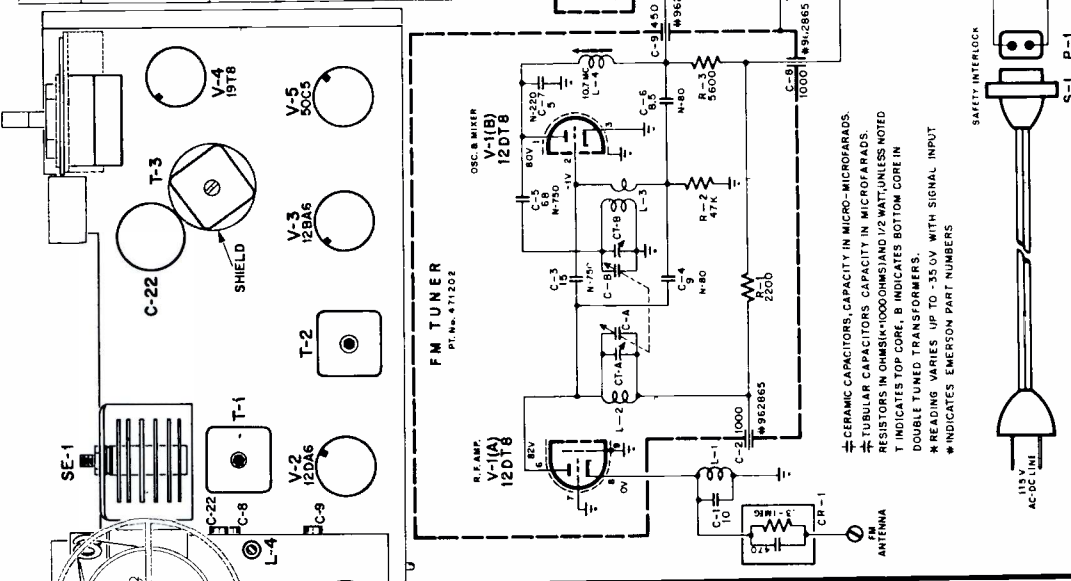
EMERSON RADIO
Models 920 and 925
Chassis 120494B

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

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

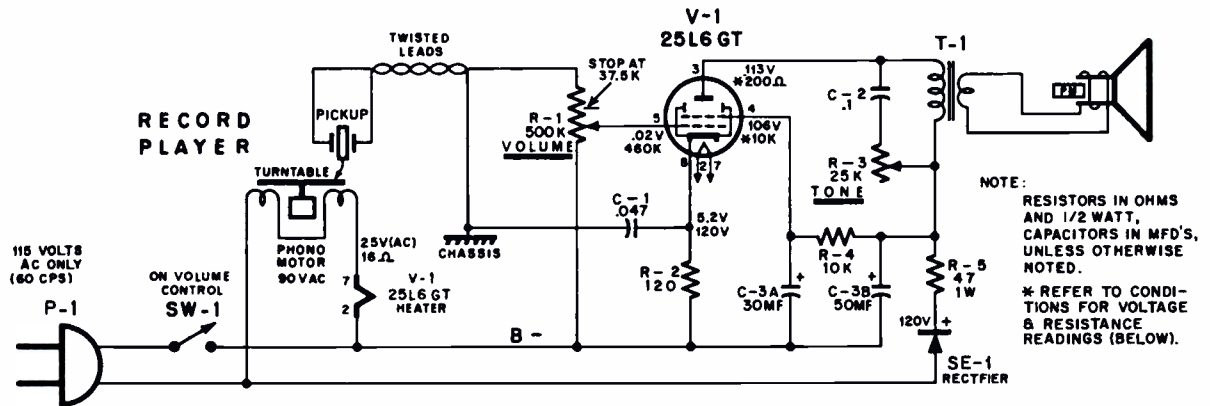
I.F. ALIGNMENT PROCEDURE USING R.F. GENERATOR AND VTVM

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



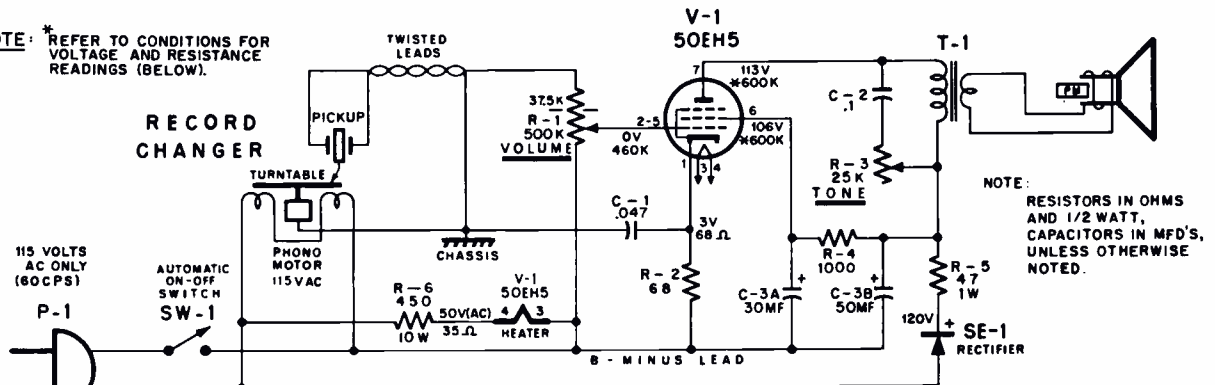
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

EMERSON RADIO Model 933B, Chassis 120547B



EMERSON RADIO Model 935B, Chassis 120548B

NOTE: * REFER TO CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS (BELOW).



CONDITIONS FOR VOLTAGE AND RESISTANCE READINGS

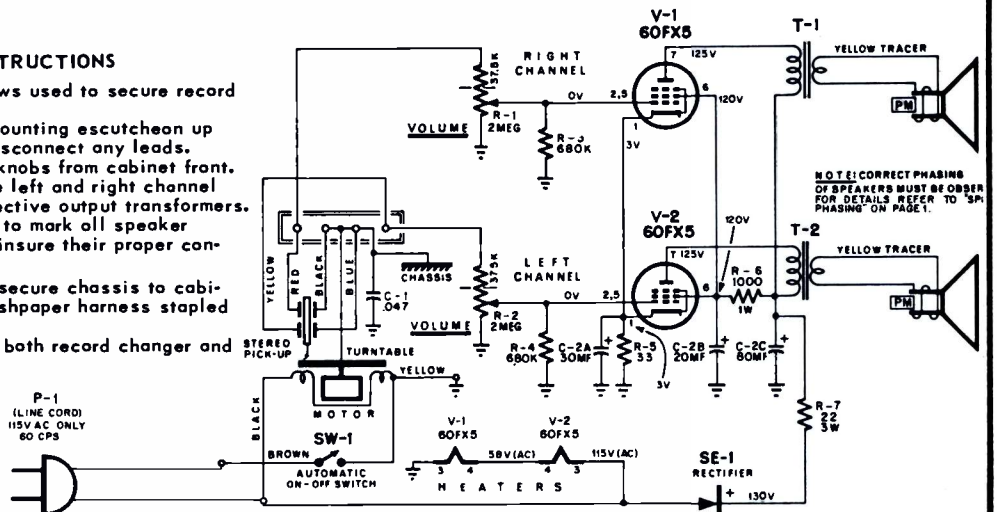
1. Voltages indicated are positive d.c., resistances in ohms, unless otherwise indicated.
2. Measurements made with voltohmmyst or equivalent.
3. All measurements taken from pin to B minus unless otherwise indicated.
4. Voltage measurements taken with:
 - a) Line voltage maintained at 115 volts a.c.
 - 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

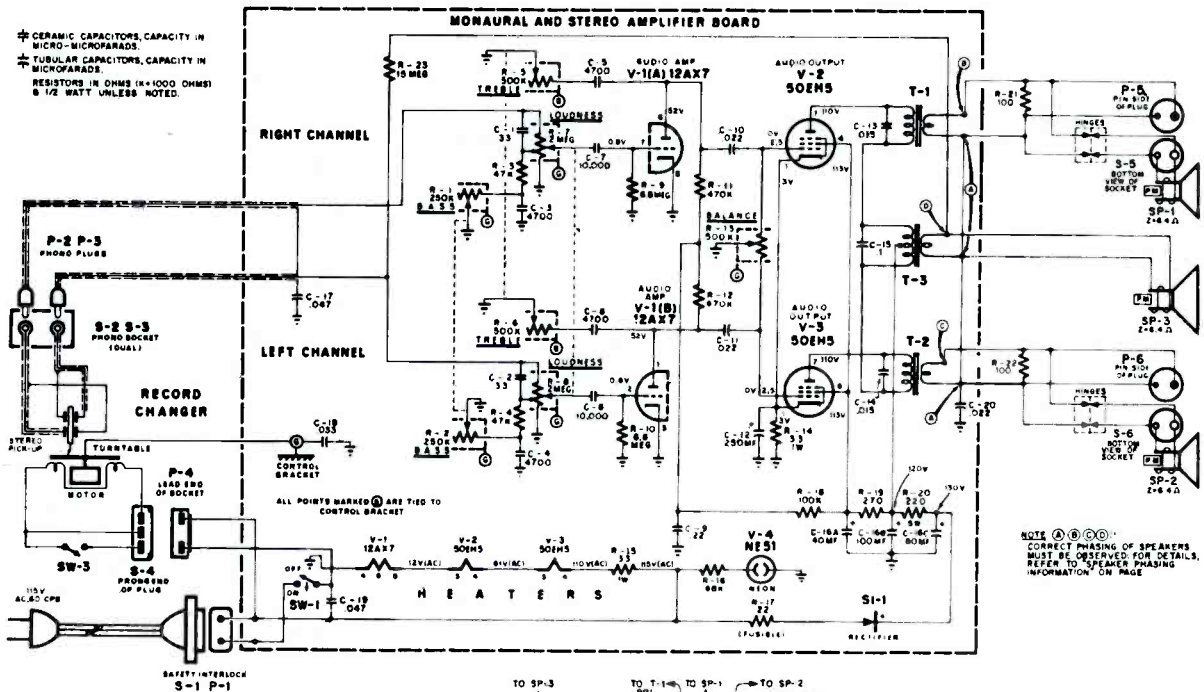
1. Remove 2 Phillips head screws used to secure record changer to cabinet.
2. Lift changer and cardboard mounting escutcheon up and tilt backwards. Do not disconnect any leads.
3. Remove both volume control knobs from cabinet front.
4. Disconnect leads for both the left and right channel loudspeakers 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 nuts 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 1/2 WATT UNLESS NOTED.
CAPACITORS IN MICROFARADS



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

EMERSON RADIO Model 938B, Chassis 120559B



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

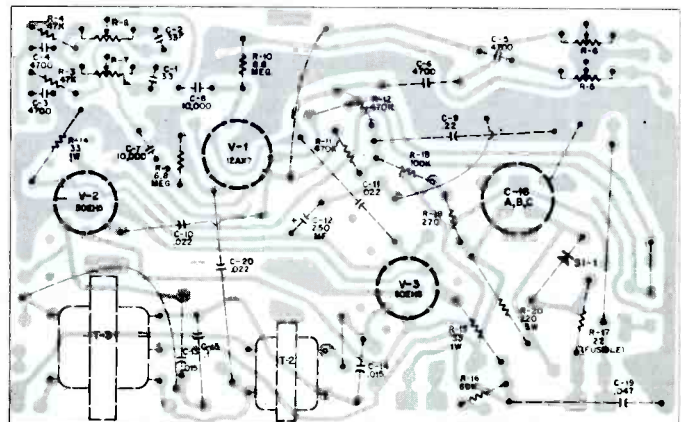
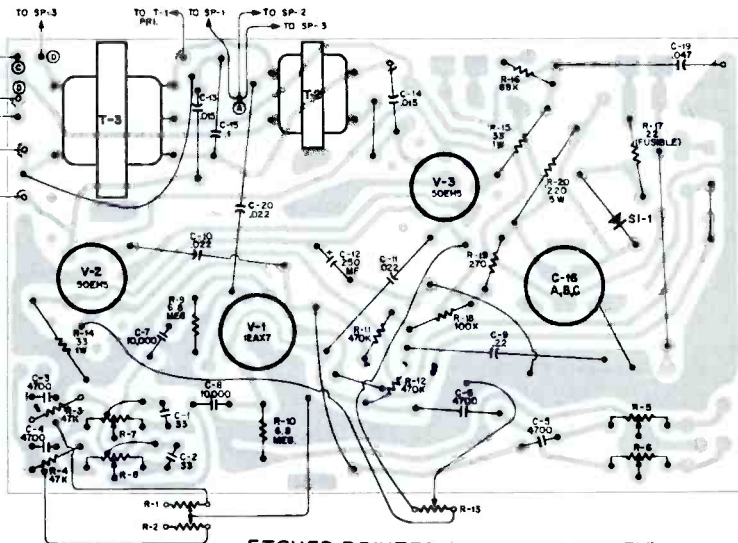
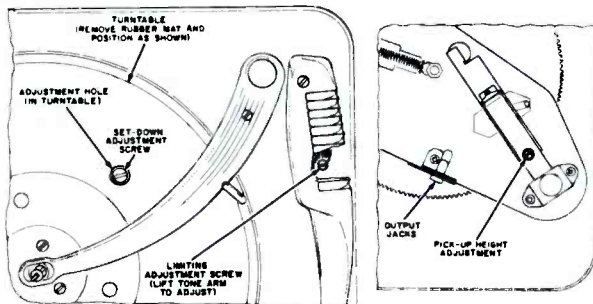
MODEL: 938-B
CHASSIS 120559-B

TO REMOVE CHASSIS

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

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

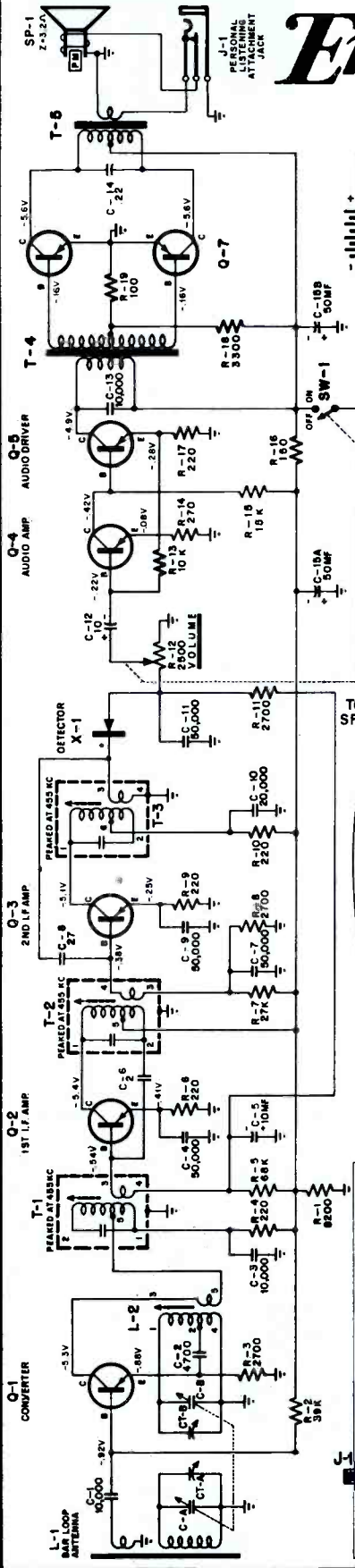
- Remove four Palnuts used to secure chassis and remove chassis from cabinet.
- Re-assemble in reverse order.



Emerson

MODEL: 977
 'FALCON'
 CHASSIS 120528

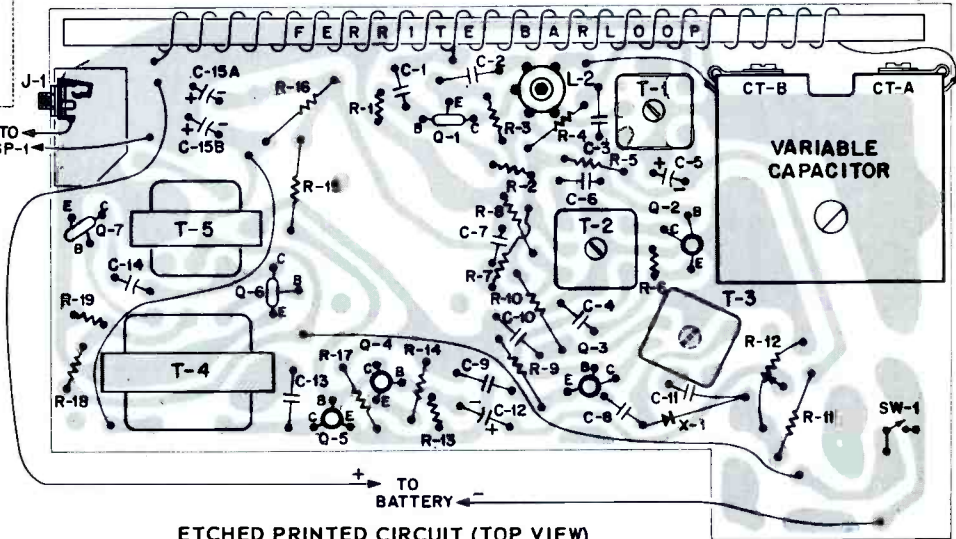
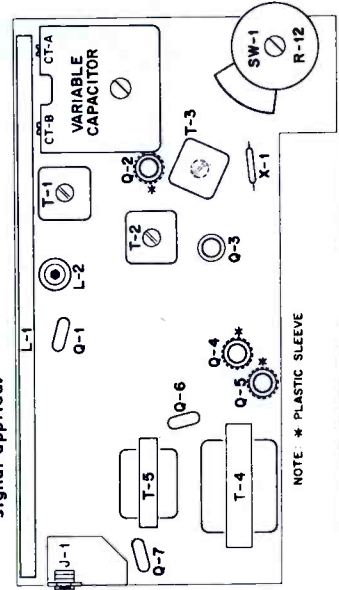
PUSH-PULL
 AUDIO OUTPUT
 Q-6



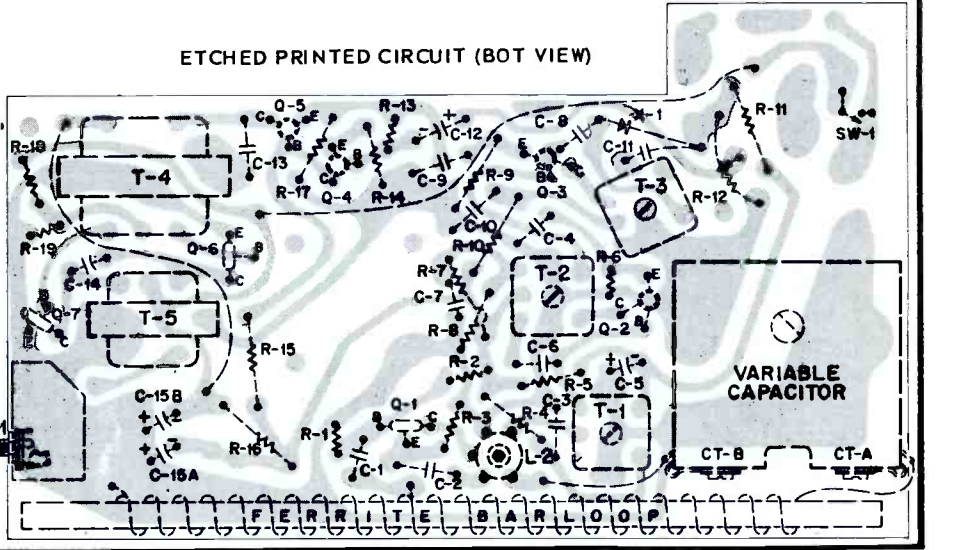
± SIGNIFIES CERAMIC CAPACITORS, CAPACITY IN MICRO MICROFARADS
 # IN MICROFARADS
 * IN MICROFARADS
 RESISTORS ARE IN OHMS (*1000 OHMS) AND 1/2 WATT

CONDITIONS FOR VOLTAGE READINGS, CHASSIS 120528

1. Voltages indicated are negative D.C.
 2. All measurements taken between points and chassis.
 3. Voltage measurements taken with:
 - (a) VTVM
 - (b) Fresh 6 Volt battery supply. Four 1½ Volt conventional penlight cells.
- NOTE: Should Mercury or Nickel-Cadmium batteries be used, an approx. 15% lower voltage reading will be obtained from the battery supply which is considered to be perfectly normal. Bear in mind that the voltage supply will vary slightly with the type and condition of batteries used.
- (c) Volume control set for maximum volume.
 - (d) Variable capacitor fully closed and no signal applied.



ETCHED PRINTED CIRCUIT (TOP VIEW)

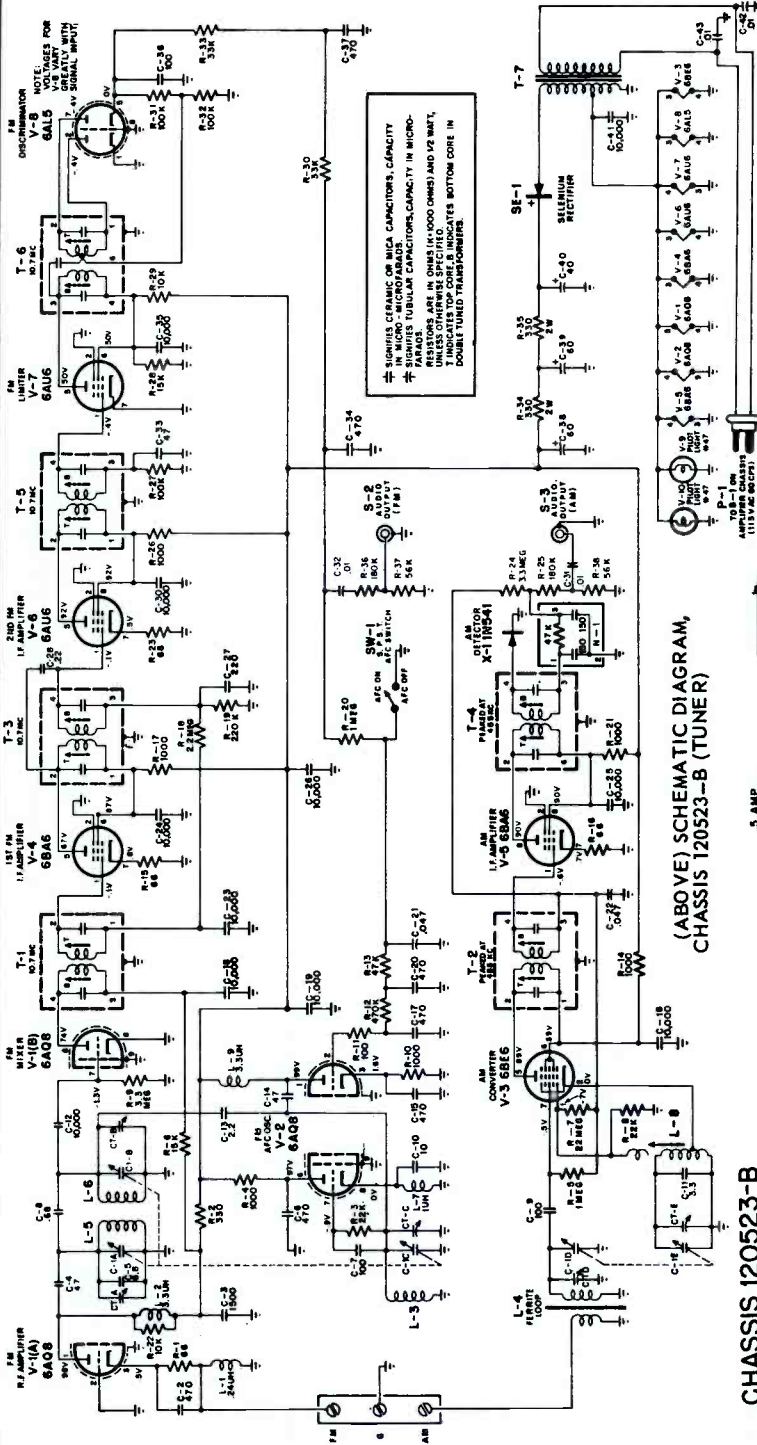


ETCHED PRINTED CIRCUIT (BOT VIEW)

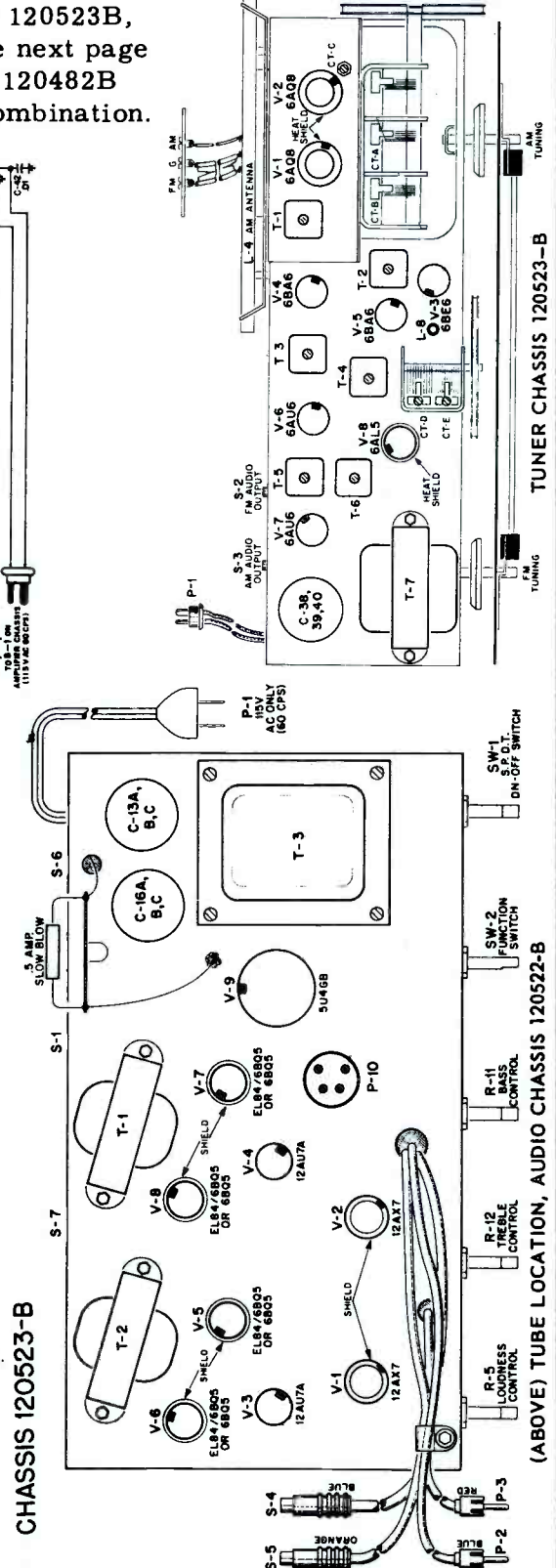
Emerson Radio

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

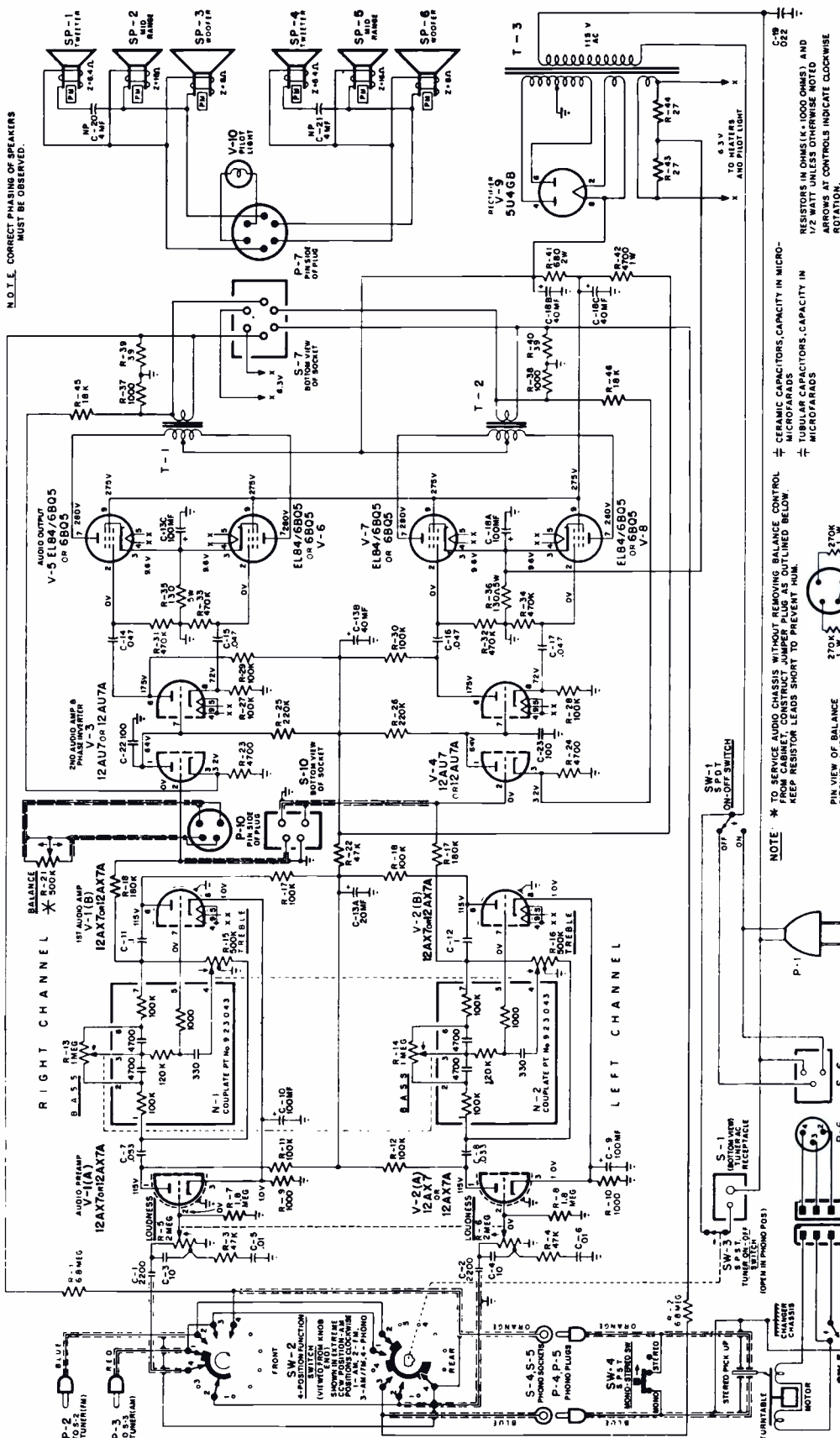
Model 944B, using Audio 120522B and Tuner 120523B, has essential information on this page and the next page adjacent at right. Model 914B, using Tuner 120482B and Audio 120483B, is very similar to this combination.



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



SCHEMATIC DIAGRAM, CHASSIS 120522-B (AUDIO)



N.O.I.E. CORRECT PHASING OF SPEAKERS MUST BE OBSERVED.

RESISTORS IN OHMS (K=1000 OHMS) AND TUBULAR CAPACITORS, CAPACITY IN MICROFARADS
ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION.

CHASSIS No.120522-B

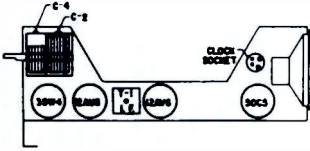
1. Voltages are positive DC, resistances in ohms, unless otherwise indicated.
2. All measurements taken with Voltohmyst or equivalent.
3. All measurements taken between tube pin and chassis unless otherwise noted.
4. Voltage measurements made with:
 - a) Line voltage maintained at 115 volts AC.
 - b) Loudness control set for minimum volume (max CCW), all others set at mid-range.
 - 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.

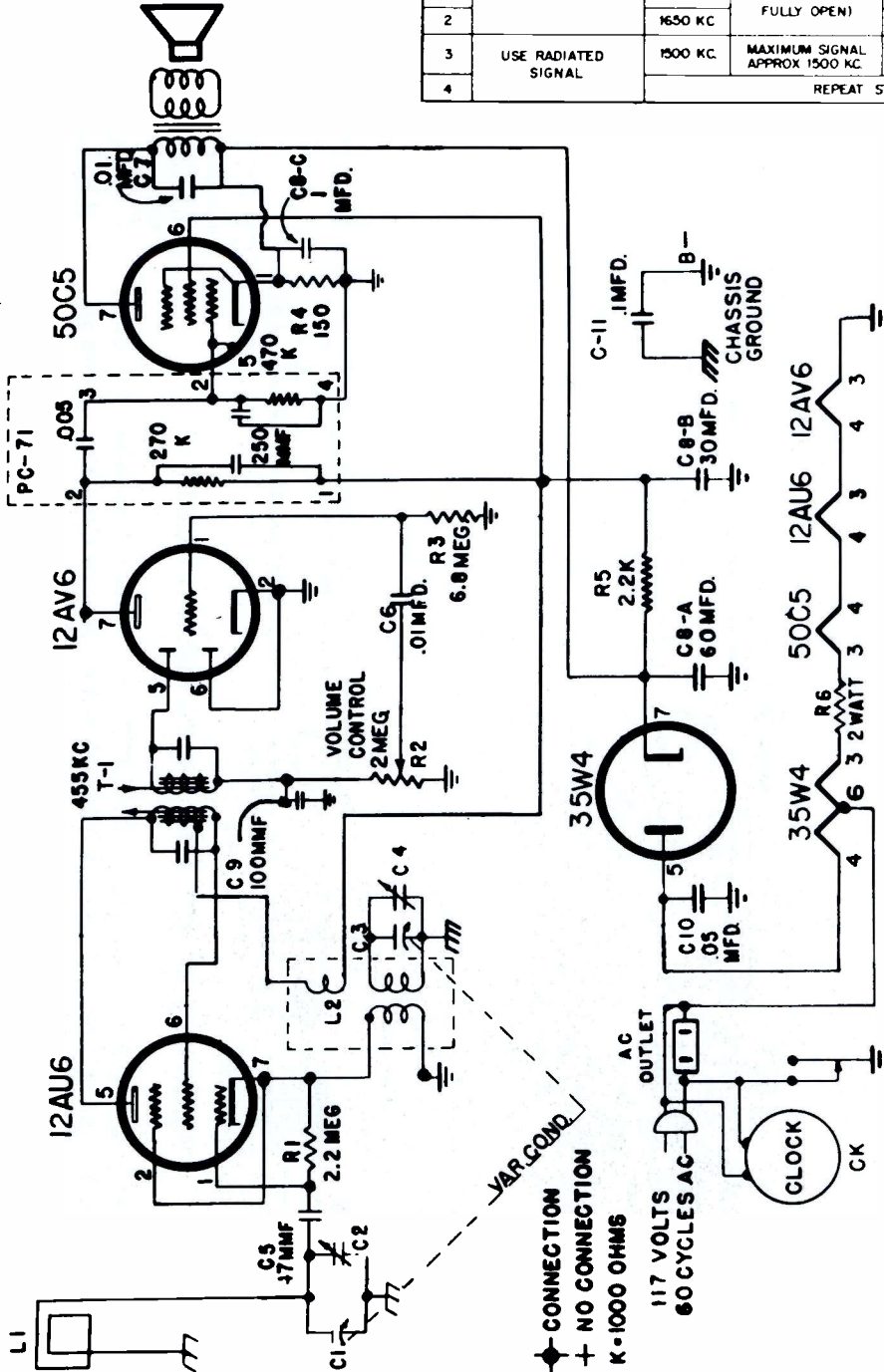
Gamble-Skogmo, Inc.

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 8 TOP OF T-1 IN SAME ORDER (IF 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 | |



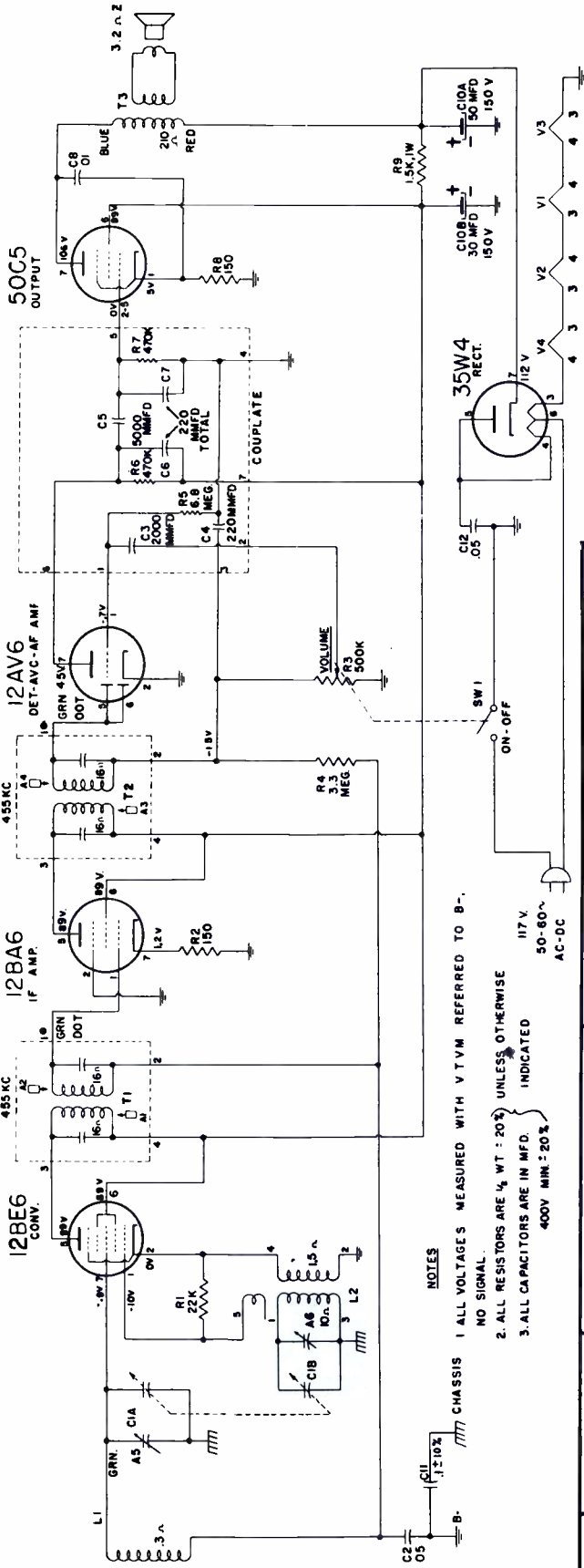
AS A MUSICAL WAKE-UP ALARM

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

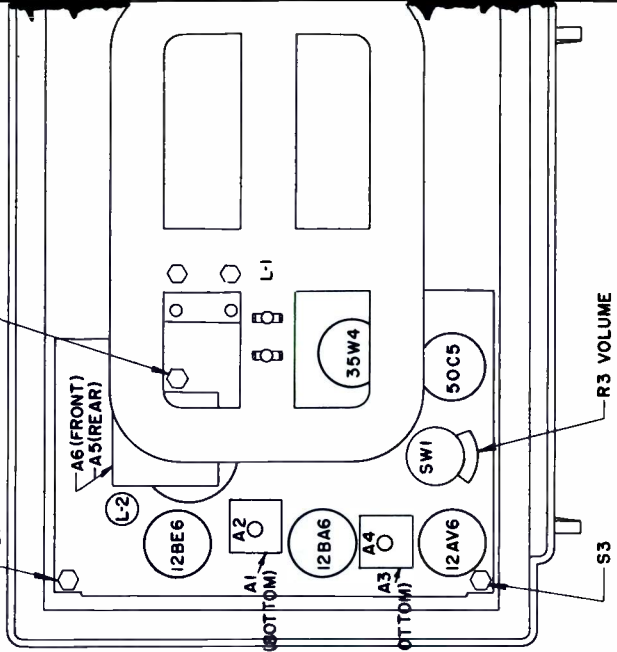


NOTES

1. ALL VOLTAGES MEASURED WITH VTVM REFERRED TO B-.
2. ALL RESISTORS ARE 1/4 WT. ± 20% UNLESS OTHERWISE INDICATED
3. ALL CAPACITORS ARE IN MFD. 400V MIN. ± 20%

| 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) | 1640 KC | Loosely couple generator output to loop antenna. Bring a short length of insulated hookup wire fashioned into a coil of a few turns close to the antenna loop and connect generator output to one end of this wire. Signal generator ground remains connected through .05 MFD condenser to chassis. | | Adjust trimmer A6 for maximum output. |
| 3. | 1400 KC | 1400 KC | Leave connected as above. | | Adjust trimmer A5 for maximum output. |

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

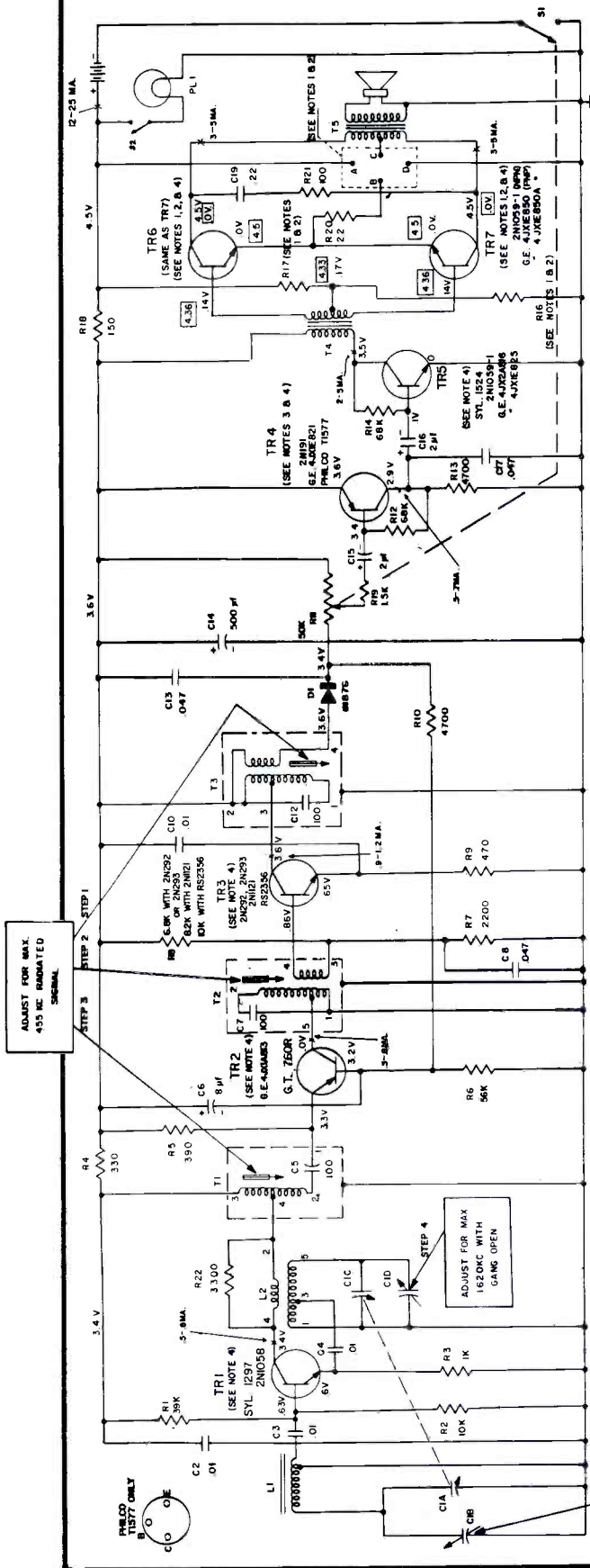


Gamble-Shogmo.

CORONADO MODELS
RA 50-8231 & RA 50-8232

GENERAL ELECTRIC

Radio Models T145A, T146A

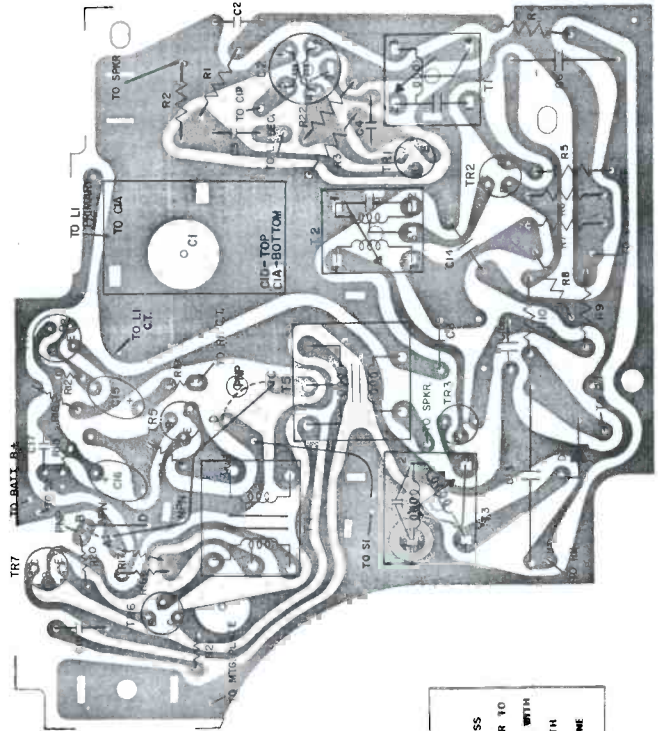


CAPACITORS

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

RESISTORS

- R1 -- 39K
- R2 -- 10K
- R3 -- 1K
- R4 -- 330
- R5 -- 390
- R6 -- 56K
- R7 -- 2.2K, 8.2K, or 10K
- 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 -- 2.2K
- R21 -- 100
- R22 -- 3.3K

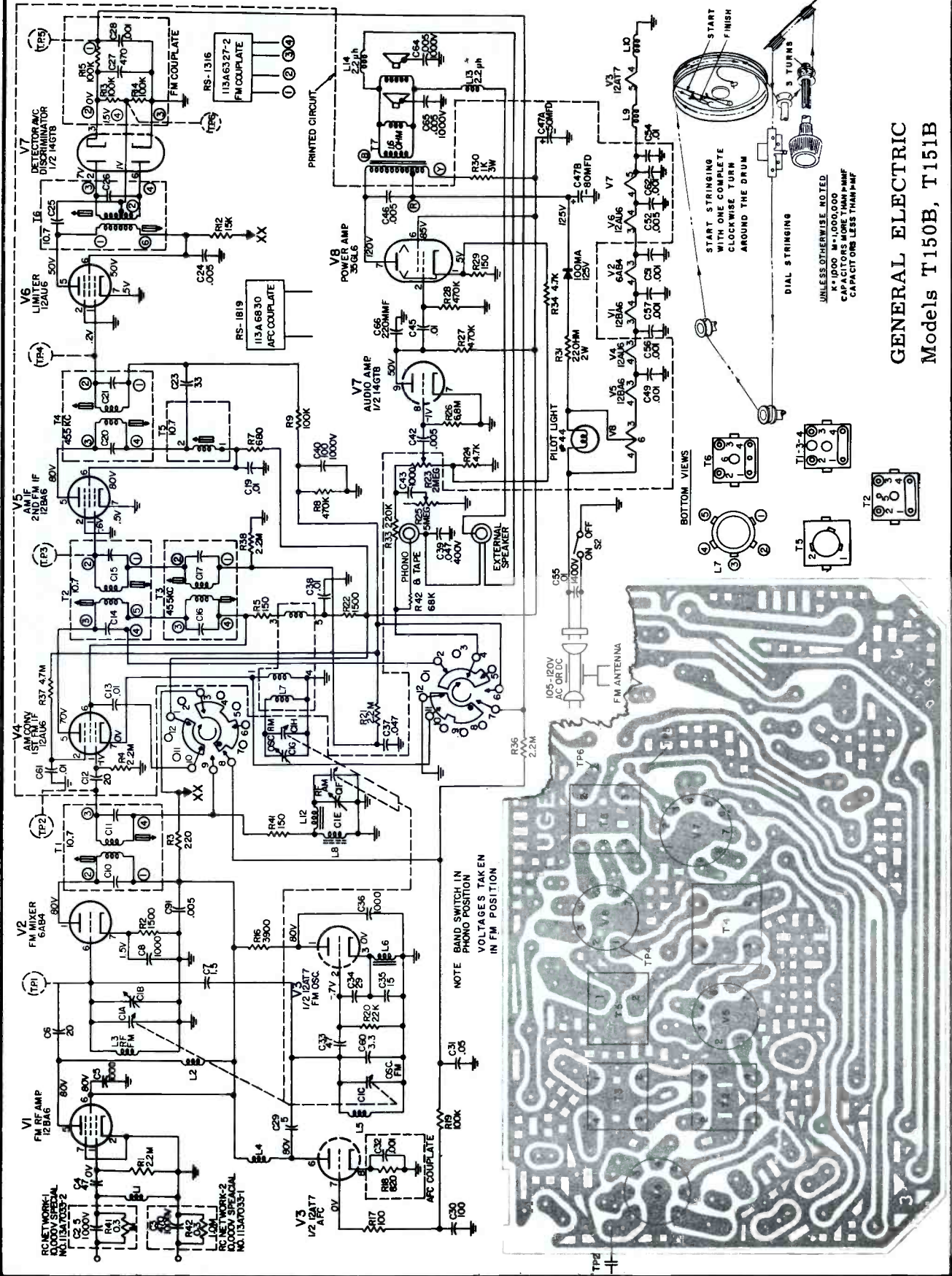


PHANTOM WIRING DIAGRAM

NOTES

1. FOR PH1 TR6 & TR7
 - A. CONNECT A JUMPER WIRE BETWEEN POINTS B & D. (SEE PHANTOM WIRING DIAGRAM)
 - B. R6 MUST BE 50 OHMS
 - C. R7 MUST BE 1K
2. FOR PMP TR6 & TR7
 - A. CONNECT A JUMPER WIRE BETWEEN POINTS A, B, C. (SEE PHANTOM WIRING DIAGRAM)
 - B. R6 MUST BE 1K
 - C. R7 MUST BE 50 OHMS
3. T1277 (PH100) TRANSISTOR BASE LEAD MUST BE SOLDERED INTO B2 AS SHOWN ON PHANTOM WIRING DIAGRAM. BASE LEAD OF ALL OTHER RECOMMENDED TRANSISTORS FOR TR4 MUST BE SOLDERED INTO B1.
4. REPLACE WITH TRANSISTOR TYPES SHOWN.
5. UNLESS OTHERWISE NOTED—CAPACITORS MORE THAN 1-MF. RESISTORS ARE 1/2 WATT
6. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS
7. VOLTAGES SHOWN IN ARE WITH TR6 & TR7 PMP.

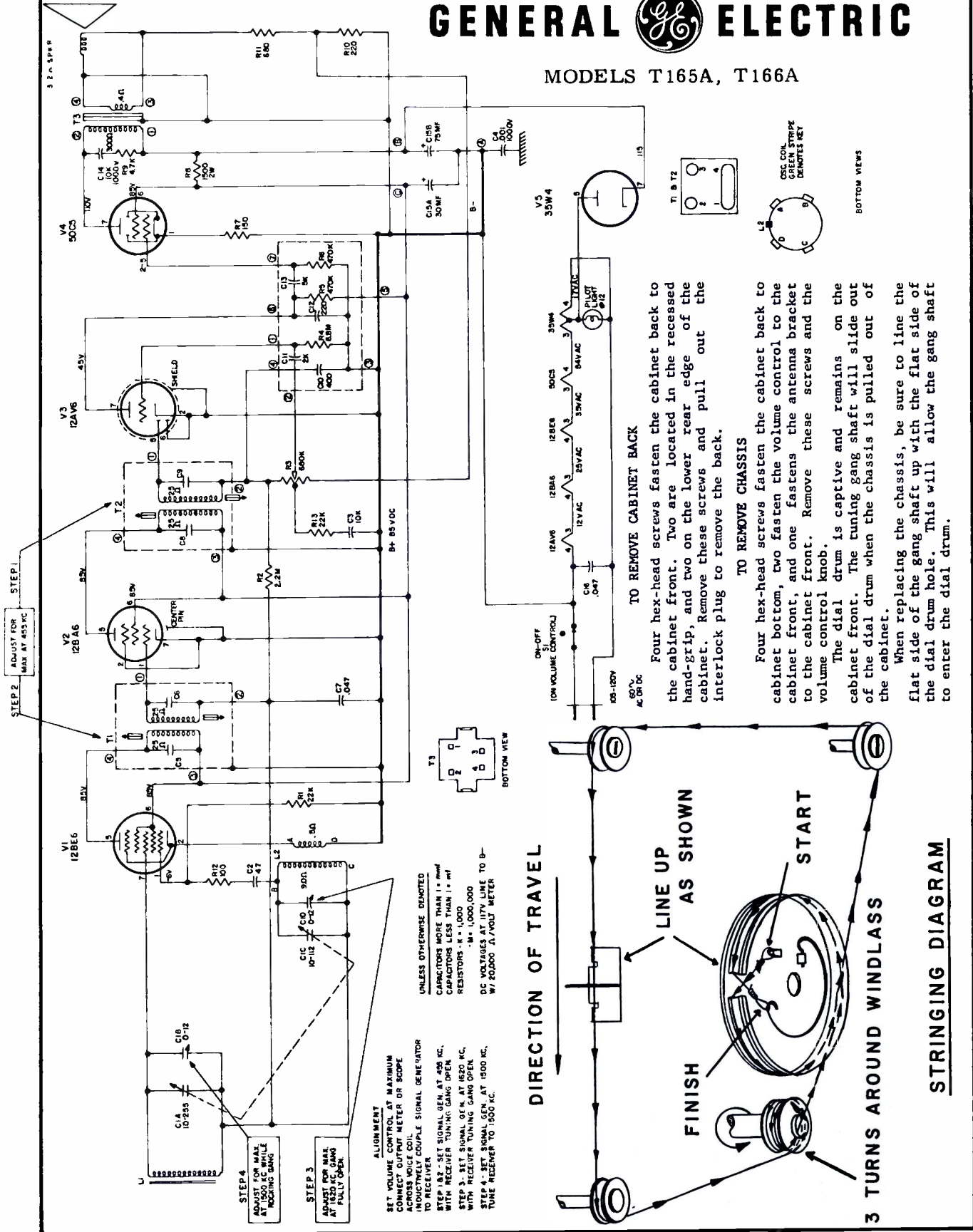
ALIGNMENT
 SET VOLUME CONTROL AT MAXIMUM
 CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
 PRODUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER
 SET SIG GEN AT 455 KC. WITH STAINER TUNING GANG OPEN
 STEP 4. SET SIG GEN AT 1620 KC. WITH RECEIVER TUNING GANG OPEN
 STEP 5. SET SIG GEN AT 1400 KC. TUNE RECEIVER TO MOD. KC



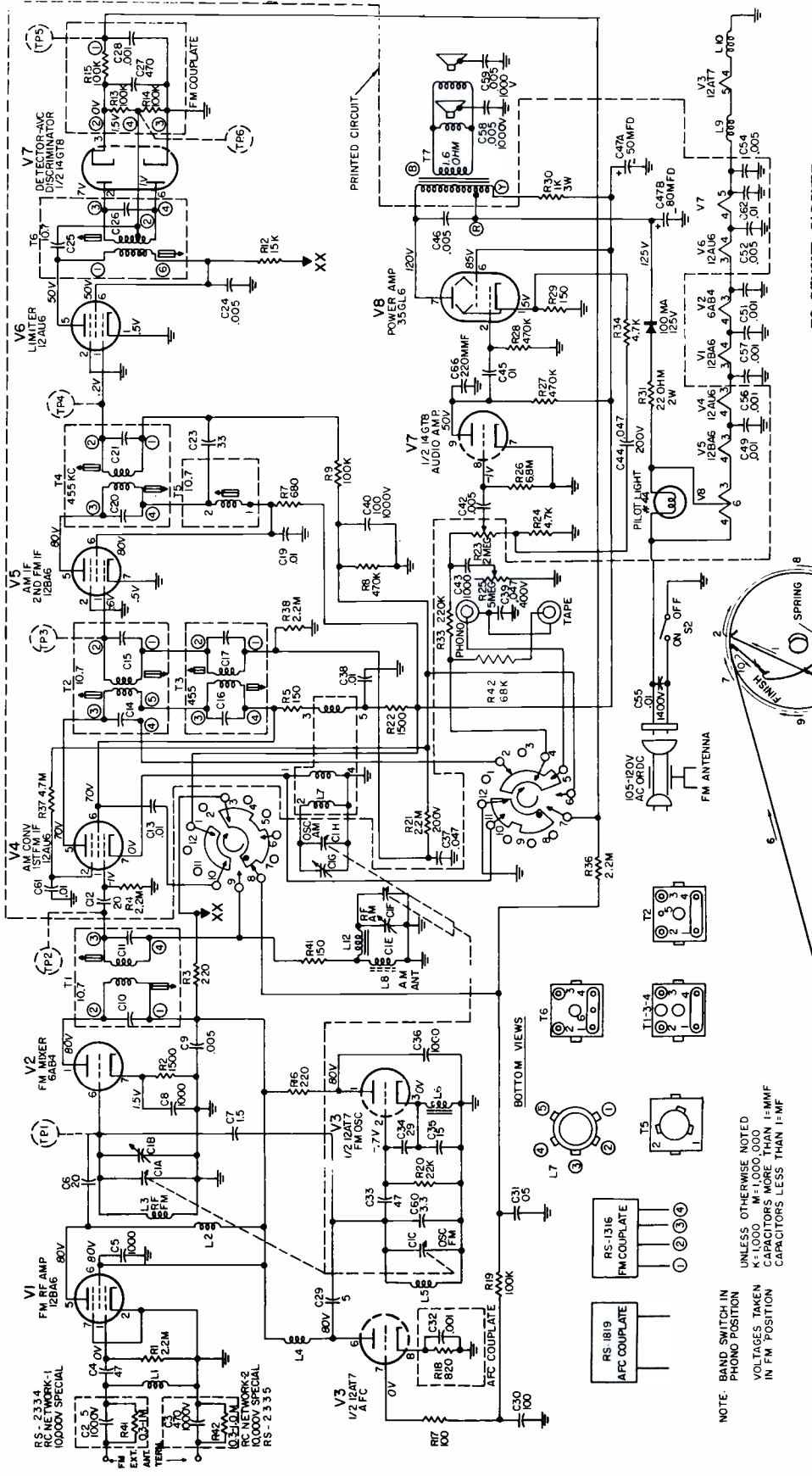
GENERAL ELECTRIC
Models T150B, T151B

GENERAL ELECTRIC

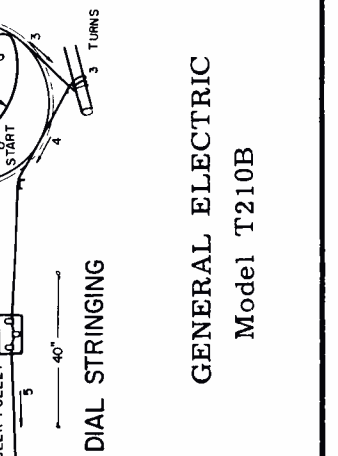
MODELS T165A, T166A



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



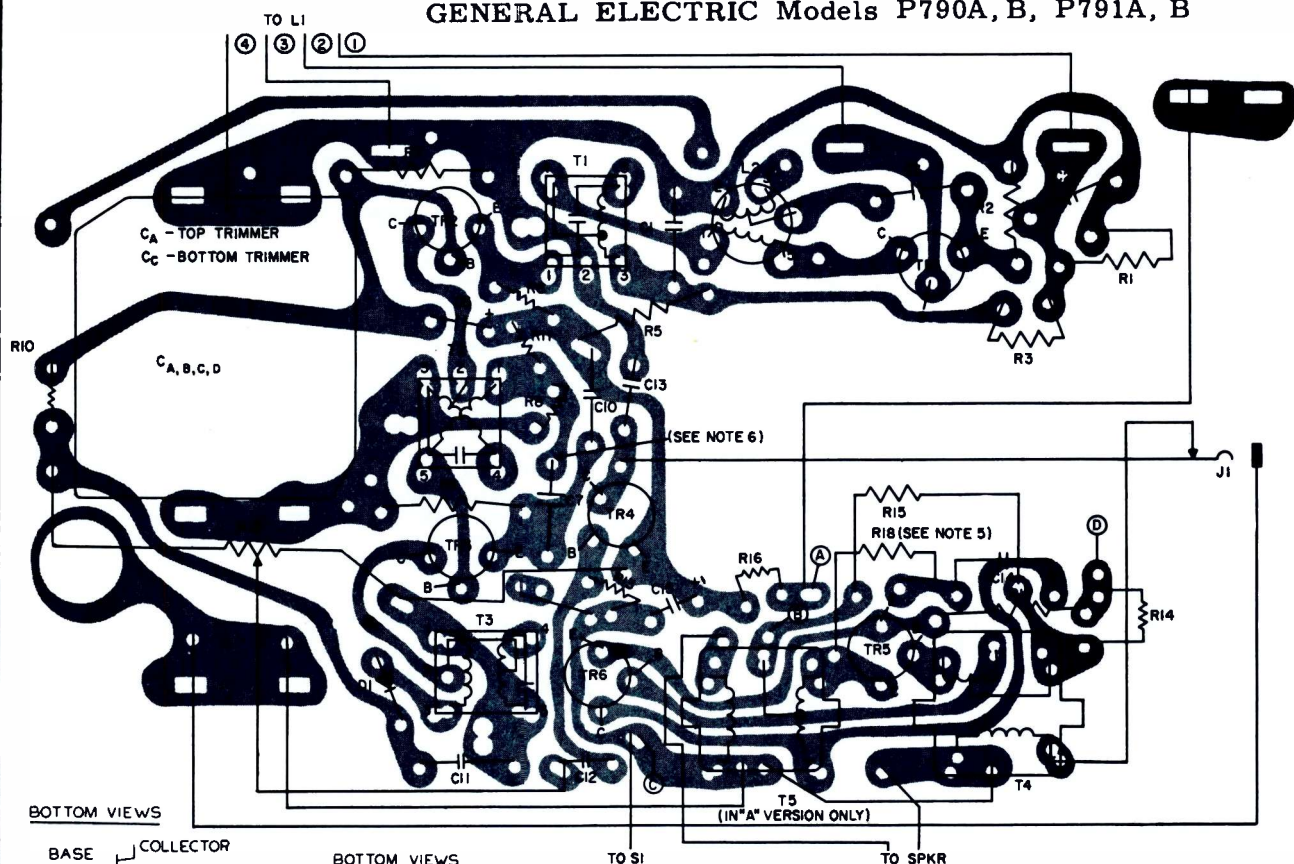
- FM OSCILLATOR COIL**
- The FM oscillator coil, L5, may require adjustment if components, other than tubes, are changed in the FM oscillator-mixer section. Check the band end frequencies. If the set tunes through 108 and 88 MC do not touch the coil. If the oscillator frequency is low, adjust L5 by spreading the turns slightly. (This raises the dial frequency.) If the oscillator frequency is high, adjust L5 by squeezing the turns together slightly. (This lowers the dial frequency.)
- NOTE:** A small change in the space between 2 turns of L5 shifts the frequency approximately 1 MC.
- TO REMOVE CABINET**
1. Remove 2 cab. rear screws & separate front & back. Chassis can remain on cabinet front for troubleshooting and alignment. (Knobs are removed by releasing captive clips with a screwdriver.)
 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

UNLESS OTHERWISE NOTED
VOLTAGES TAKEN IN FM POSITION
CAPACITORS MORE THAN 1-MMF
CAPACITORS LESS THAN 1-MMF

GENERAL ELECTRIC Models P790A, B, P791A, B



BOTTOM VIEWS

BASE COLLECTOR

EMITTER

NPN TRANSISTOR

BASE COLLECTOR

EMITTER

PNP TRANSISTOR

E - EMITTER

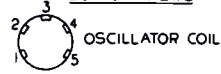
B - BASE

C - COLLECTOR

C B E

C B E

BOTTOM VIEWS



I.F. TRANSFORMERS



NOTES.

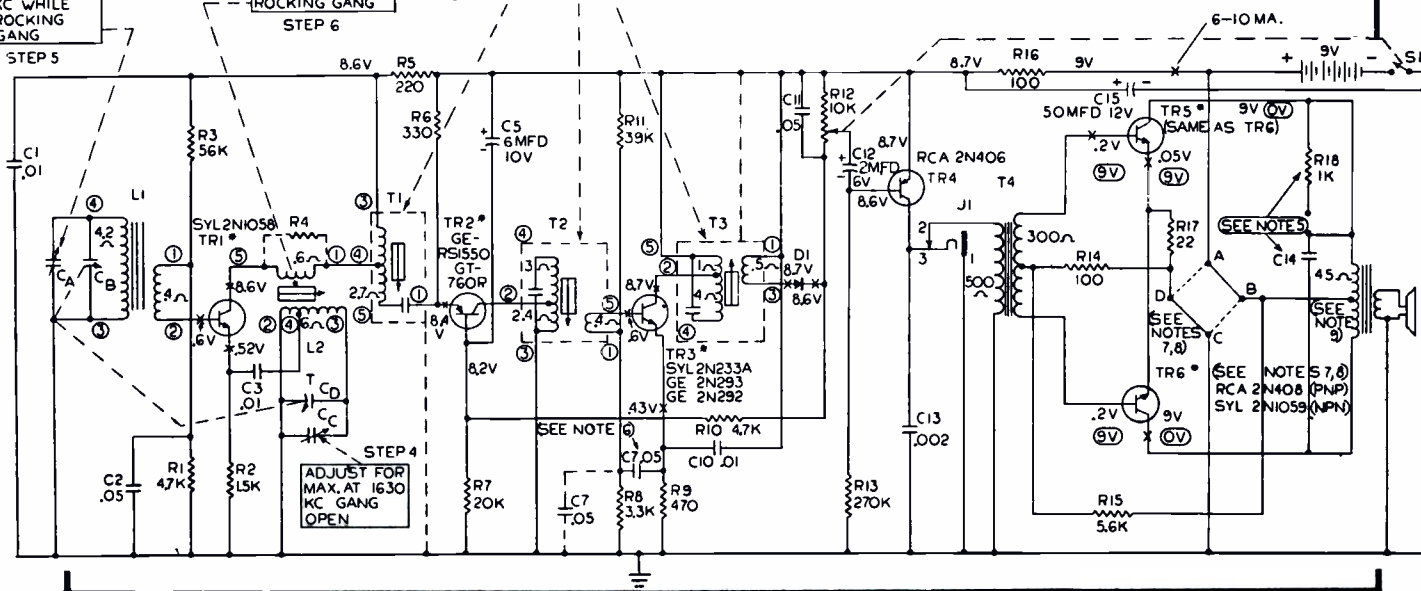
1. UNLESS OTHERWISE NOTED: CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE 1/2 WATT ± K=1000
2. VOLTAGE & CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND.
3. SIMILAR APPROVED TRANSISTORS MAY BE USED.
4. VOLTAGES SHOWN IN ○ ARE FOR 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.

ADJUST FOR MAX. AT 1400 KC WHILE ROCKING GANG

ADJUST FOR MAX. AT 580KC WHILE ROCKING GANG

PEAK AT 455KC

STEP 3 / STEP 2 / STEP 1



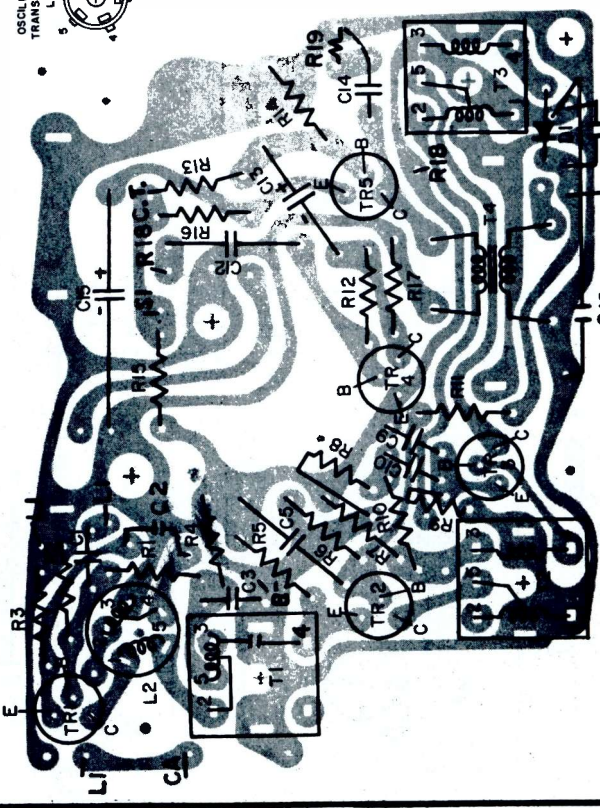
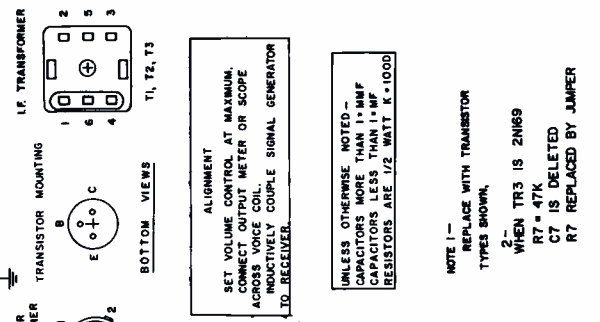
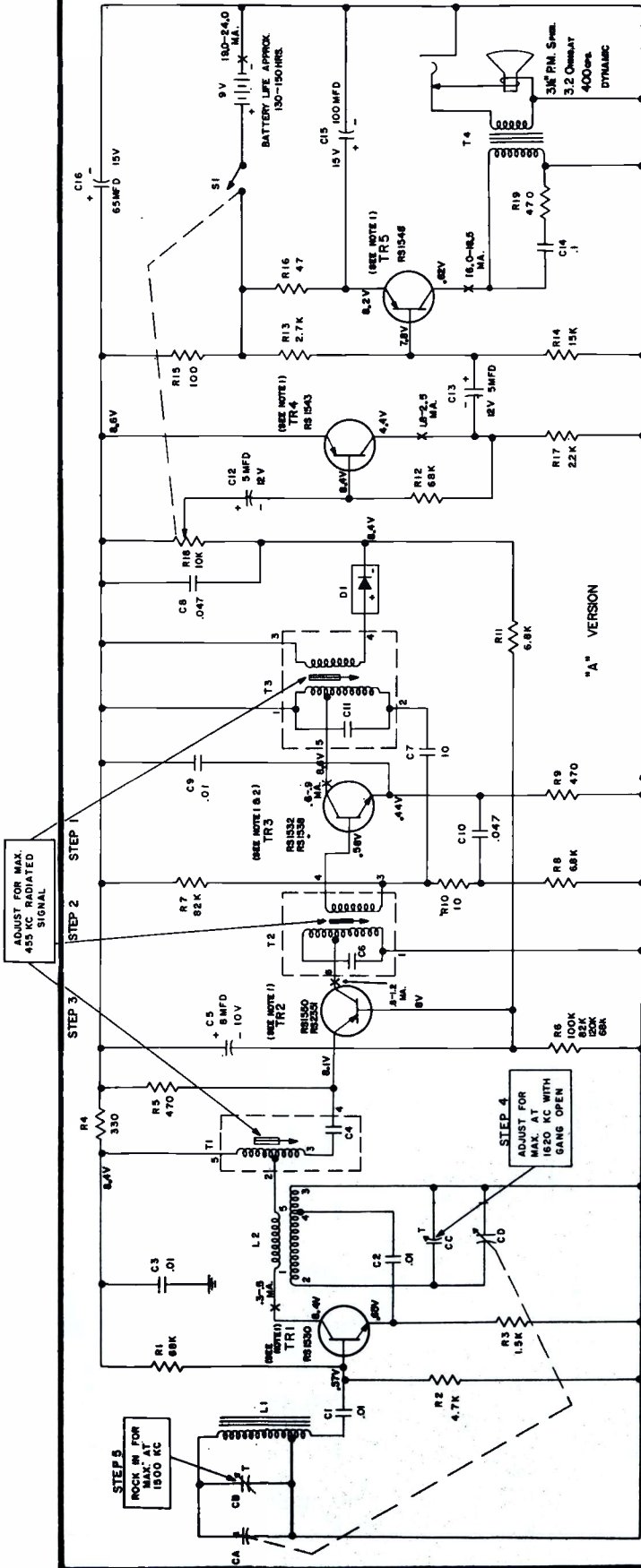
GENERAL ELECTRIC

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

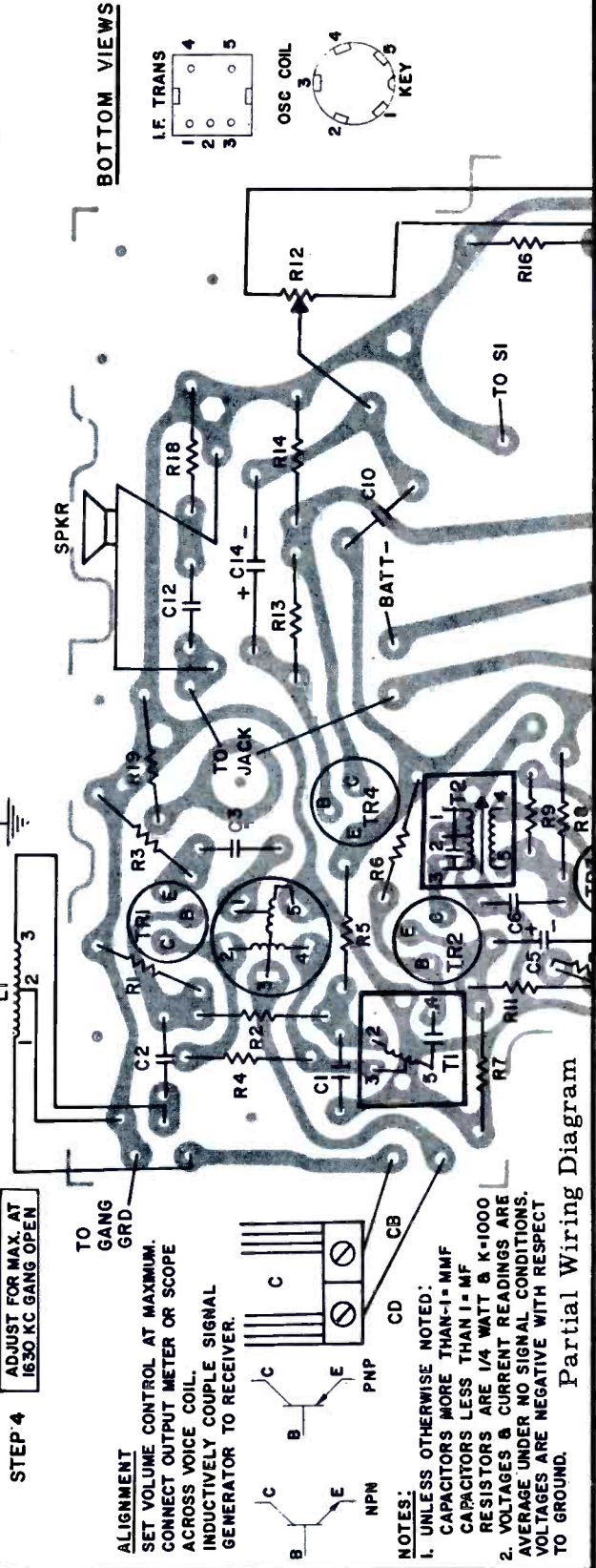
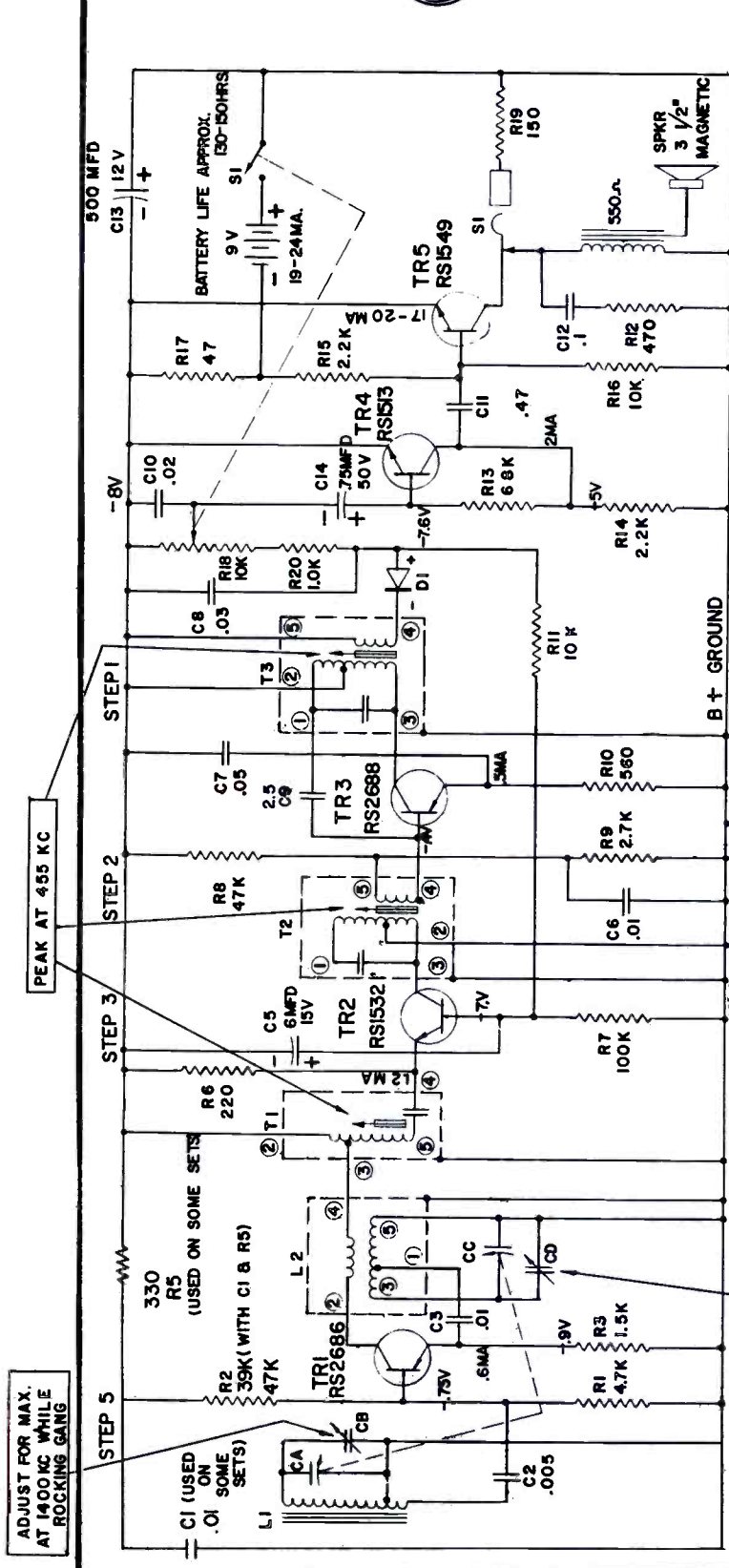
1. Turn screw in cabinet back counterclockwise until it becomes loose (this a captive screw and remains in the cabinet).
2. Insert a coin in either slot on the cabinet bottom and twist to remove the cabinet back.
3. Remove screw holding tuning dial.
4. Remove 3 screws under the tuning dial to release 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.



LATE PRODUCTION

GENERAL ELECTRIC

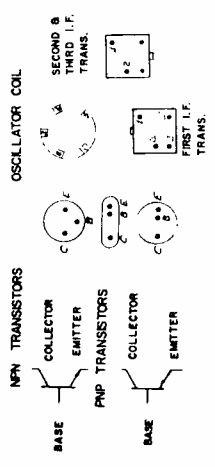
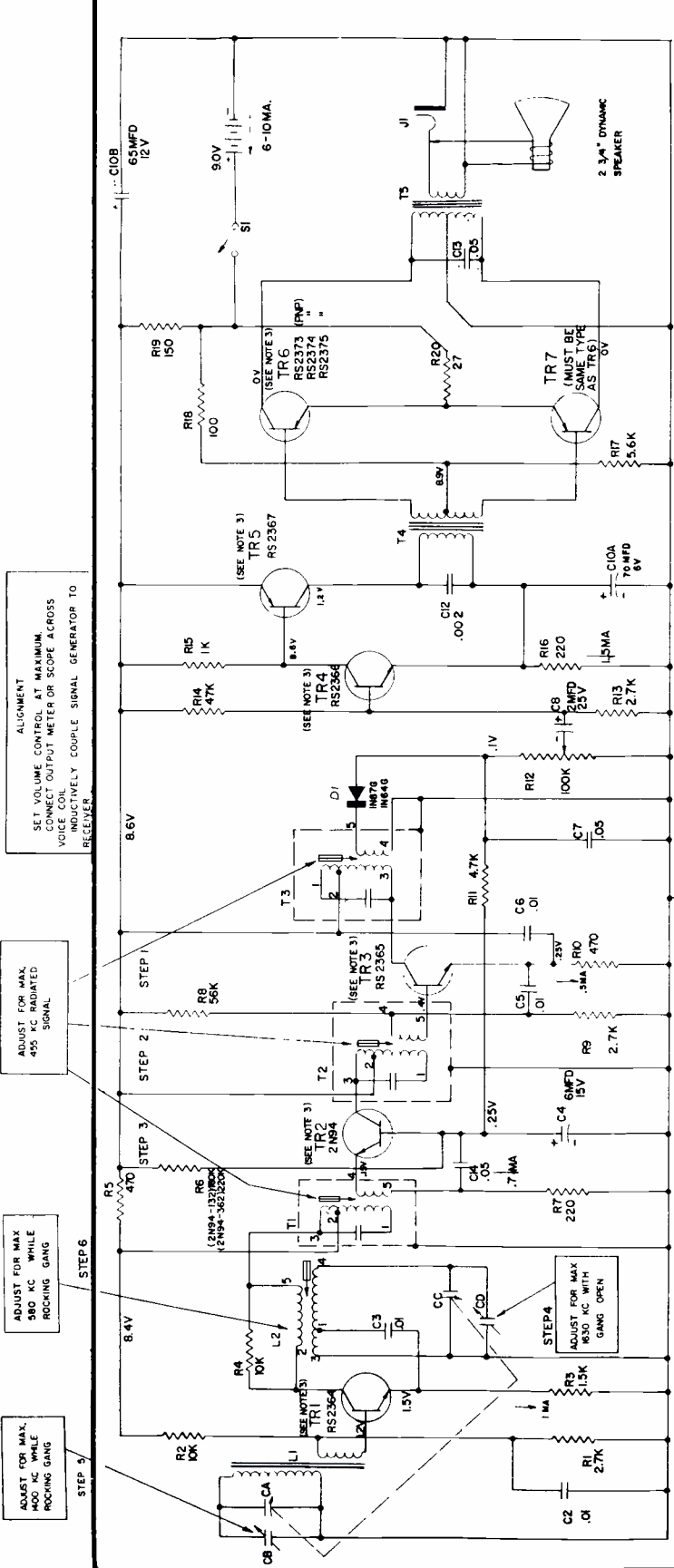
Radio Models P807B and P808B
(See preceding page for A version)



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

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

Partial Wiring Diagram



NOTES—

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

GENERAL ELECTRIC
Models P815A, P816A

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

- NO RECEPTION:**
- Check battery voltage and battery contacts.
 - Check on-off switch.
 - Check all antenna lead connections.
 - Check coil L2.

WEAK AUDIO:

- Check battery voltage for 9 volts.
- Check battery current.
- Check transistor collector currents.
- Check alignment.

INTERMITTENT:

- Check battery contacts for corrosion.
- 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.

TO REMOVE CHASSIS

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

TO REMOVE VOLUME CONTROL AND/OR TUNING CAPACITOR

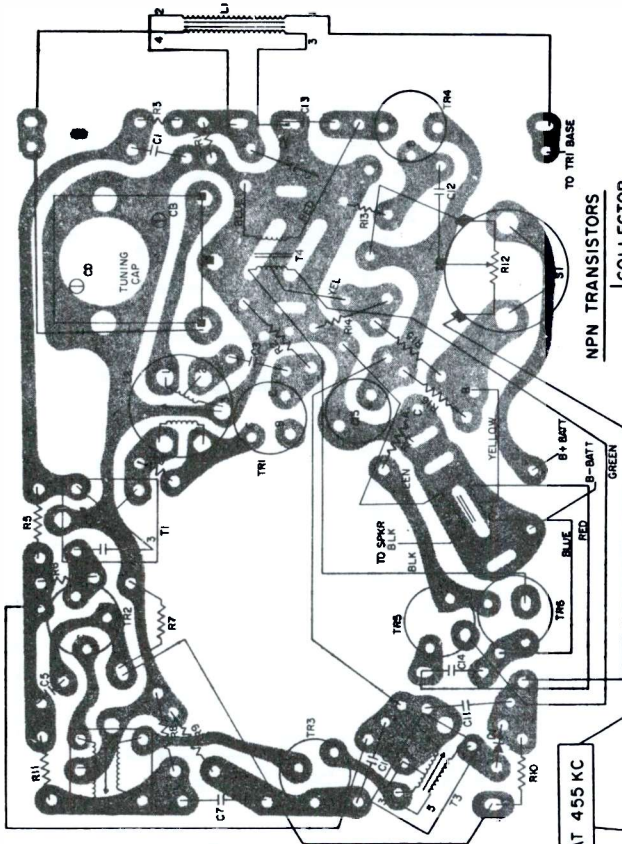
- Remove chassis.
- Remove volume control knob.
- Remove two screws holding tuning capacitor mounting plate to cabinet front.
- Unscrew metal stud holding mounting bracket near speaker and dial scale opening.
- Carefully lift out chassis and controls, tilt unit slightly to slide dial pointer out of opening.

TROUBLESHOOTING

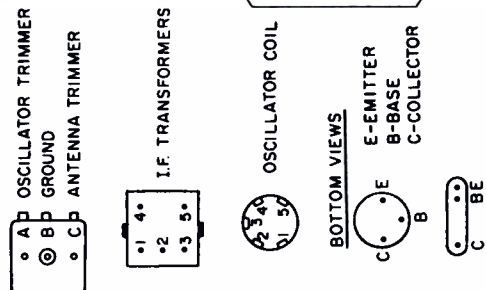
A check of battery condition and total current drain of the receiver should be made first. All current measurements are made at quiescence with the receiver turned on, volume control at minimum, tuning gang closed, and with no-signal conditions. The total receiver current drain is 6 to 10 mls. This is measured by inserting a milliammeter

GENERAL ELECTRIC

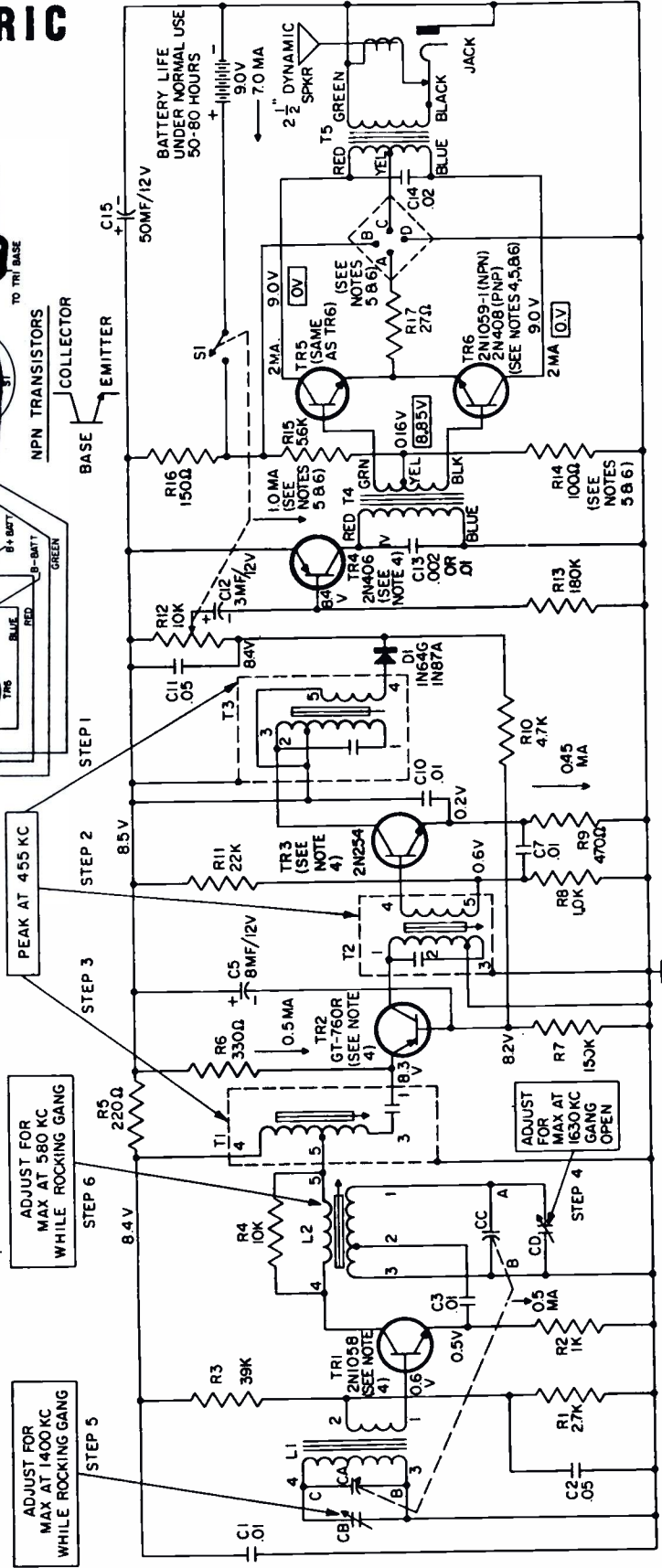
MODELS P830C and P831C



MOUNTING VIEW OF GANG



- NOTES:**
- UNLESS OTHERWISE NOTED-CAPACITORS MORE THAN 1=MMF CAPACITORS LESS THAN 1=MF RESISTORS ARE 1/2 WATT K=1000
 - VOLTAGE AND CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND.
 - VOLTAGES SHOWN IN [] ARE FOR PNP TRANSISTORS IN TR5 AND TR6
 - REPLACE WITH TRANSISTOR TYPES SHOWN, 4 FOR NPN TR5 AND TR6
 - FOR NPN TR5 AND TR6
 - CONNECT R17 ("A" SIDE) TO POINT "C"
 - CONNECT YELLOW LEAD FROM T5 TO POINT "B"
 - R14 MUST BE 100 ohms
 - R15 MUST BE 5.6K
 - FOR PNP TR5 AND TR6
 - CONNECT R17 ("A" SIDE) TO POINT "B"
 - CONNECT YELLOW LEAD FROM T5 TO POINT "C"
 - R14 MUST BE 5.6K
 - R15 MUST BE 100 OHMS



ADJUST FOR MAX AT 1400 KC WHILE ROCKING GANG

ADJUST FOR MAX AT 580 KC WHILE ROCKING GANG

ADJUST FOR MAX AT 455 KC

ADJUST FOR MAX AT 1630 KC GANG OPEN

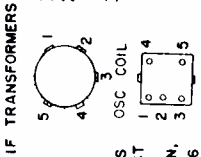
GENERAL ELECTRIC

MODELS
P830E
P831E

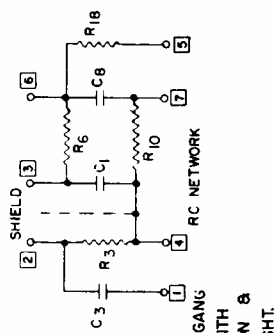
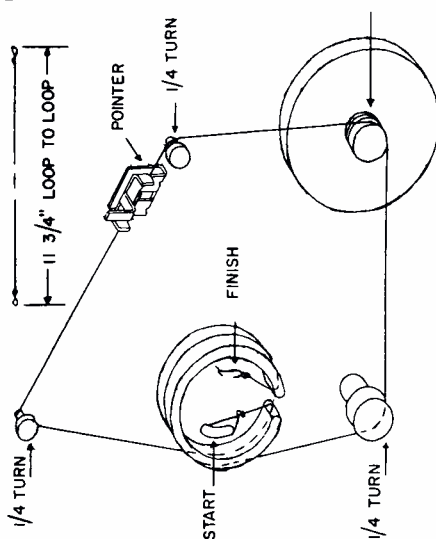
- TO REMOVE CIRCUIT BOARD**
1. Remove cabinet back.
 2. Remove screw that is mounted next to volume control.
 3. Place fingernail under phone jack and lift chassis up, then slide slightly in direction of cabinet bottom.
- When replacing chassis, carefully tilt chassis so that tuning knob fits into knob 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.



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

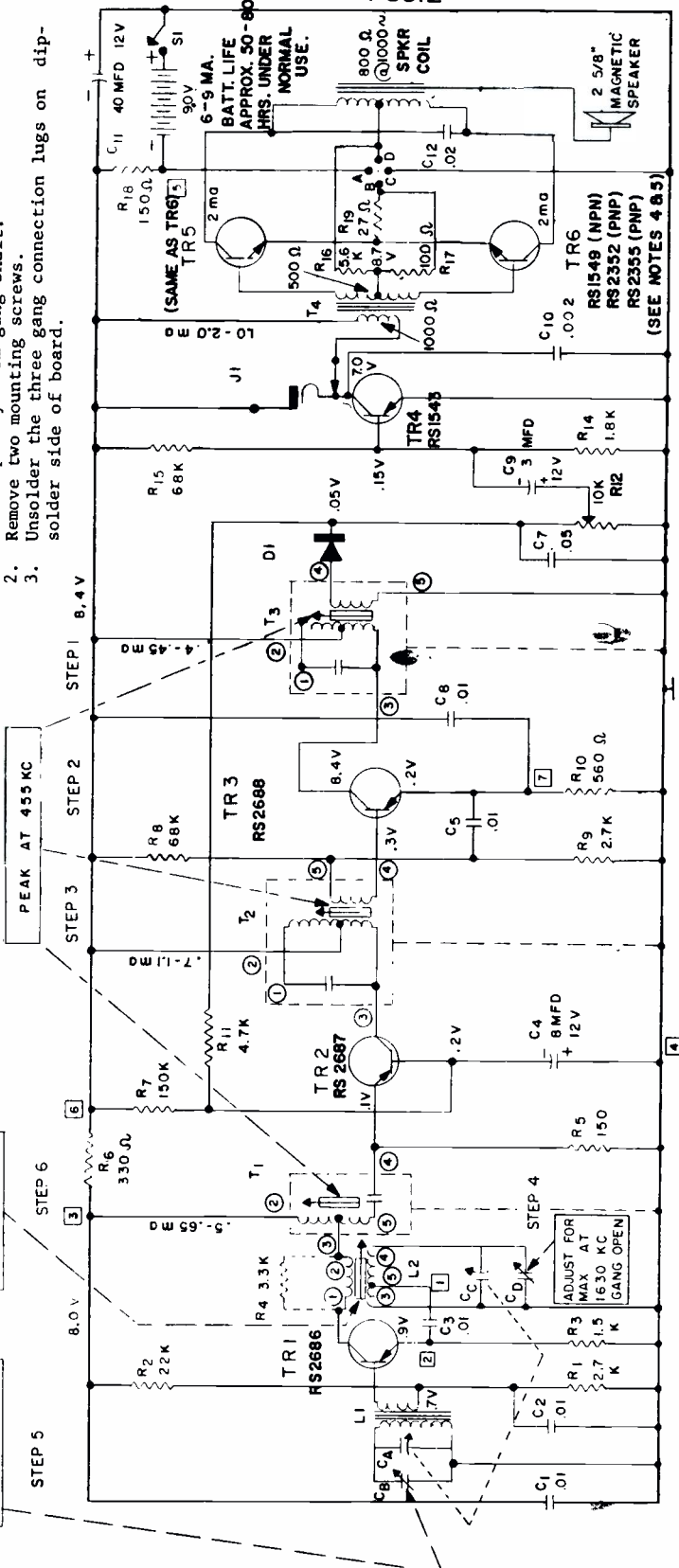


START STRINGING AT GANG DRUM AS INDICATED WITH GANG IN OPEN POSITION & POINTER AT THE RIGHT.

ADJUST FOR MAX. AT 1400 KC WHILE ROCKING GANG

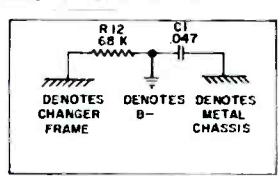
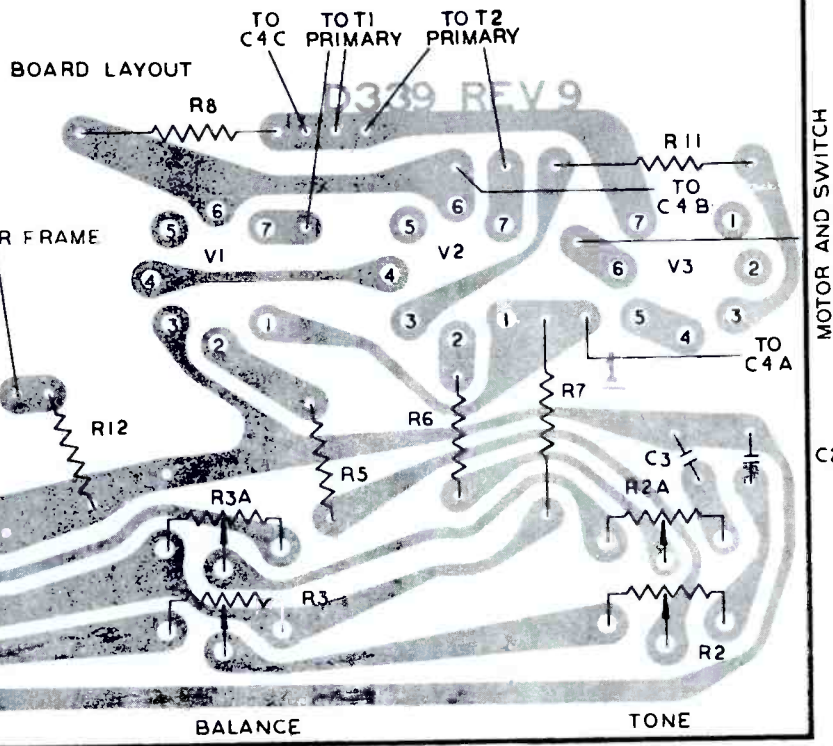
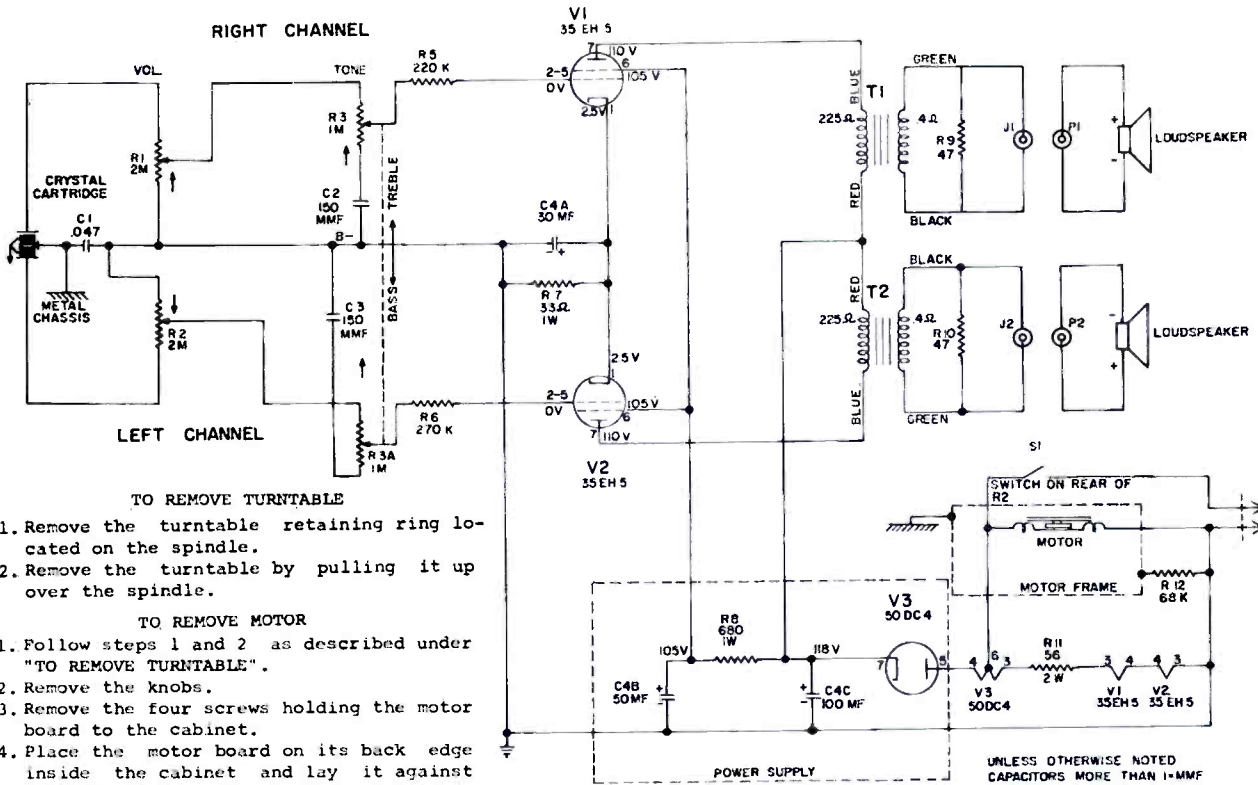
ADJUST FOR MAX. AT 580 KC WHILE ROCKING GANG

ADJUST FOR MAX. AT 455 KC





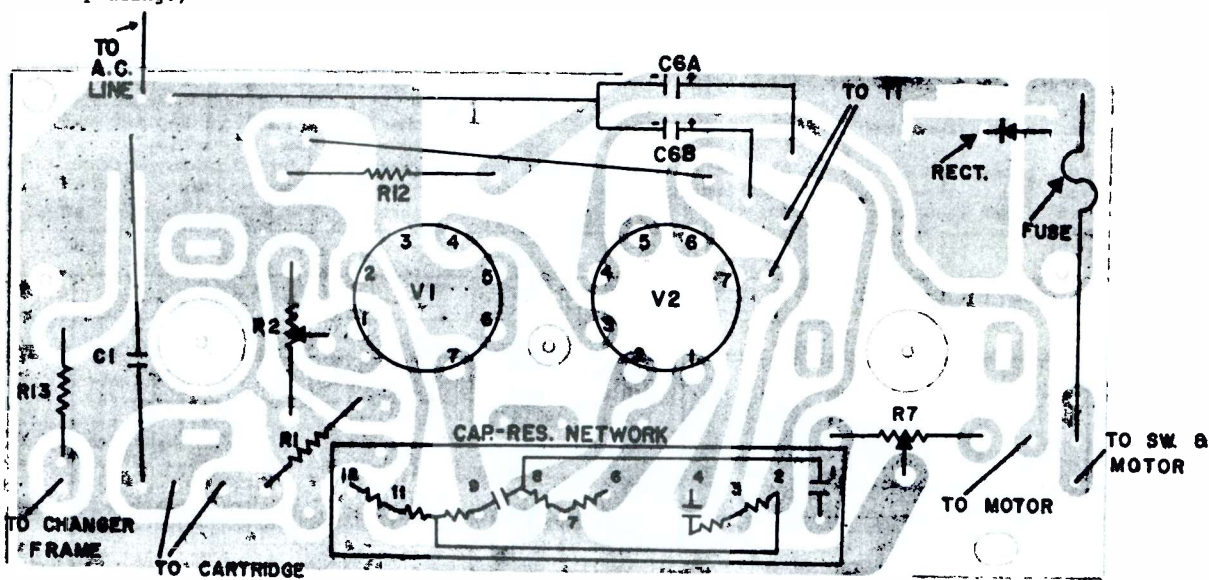
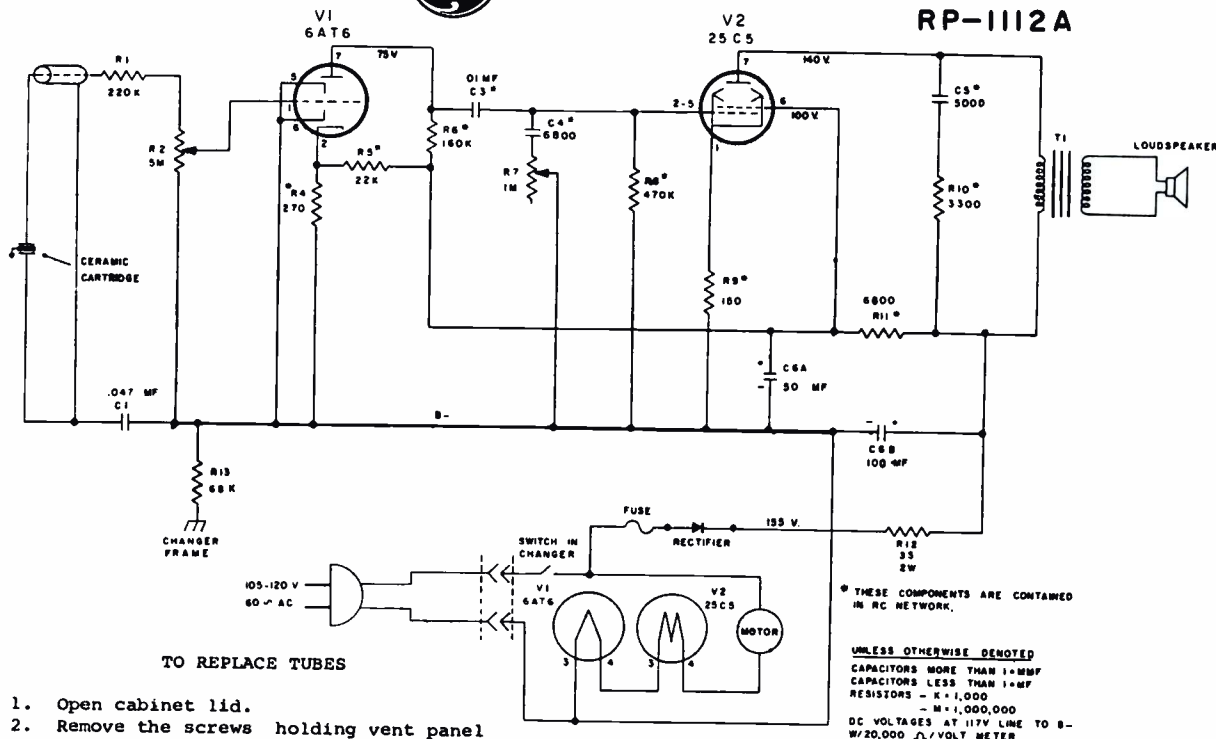
Exact material for Model RP1100A, Models RP1127A, RP1128A are similar.



RIGHT LEFT CHANNEL

GENERAL ELECTRIC

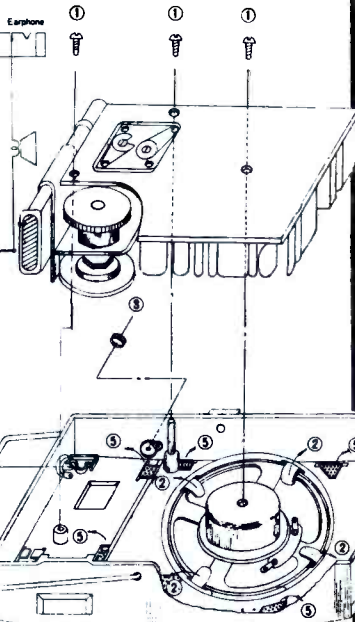
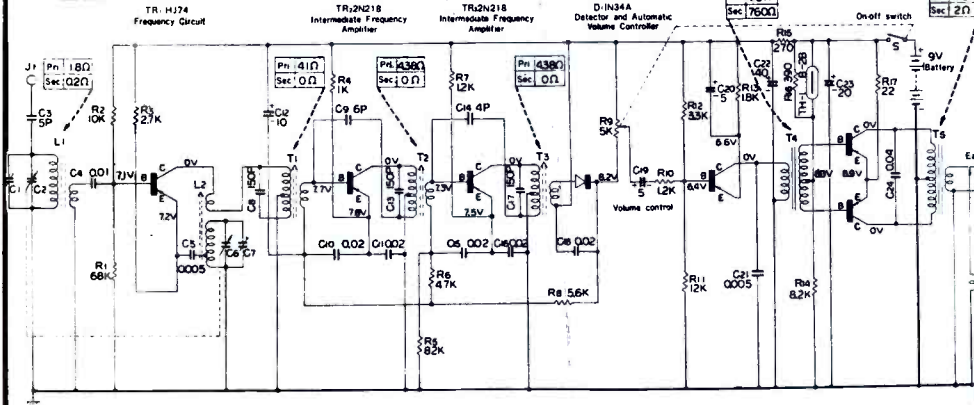
PHONO
MODEL
RP-1112A



VOLUME R-21, MOST-OFTEN-NEEDED

INFORMATION

Hitachi
MODEL TH-627R

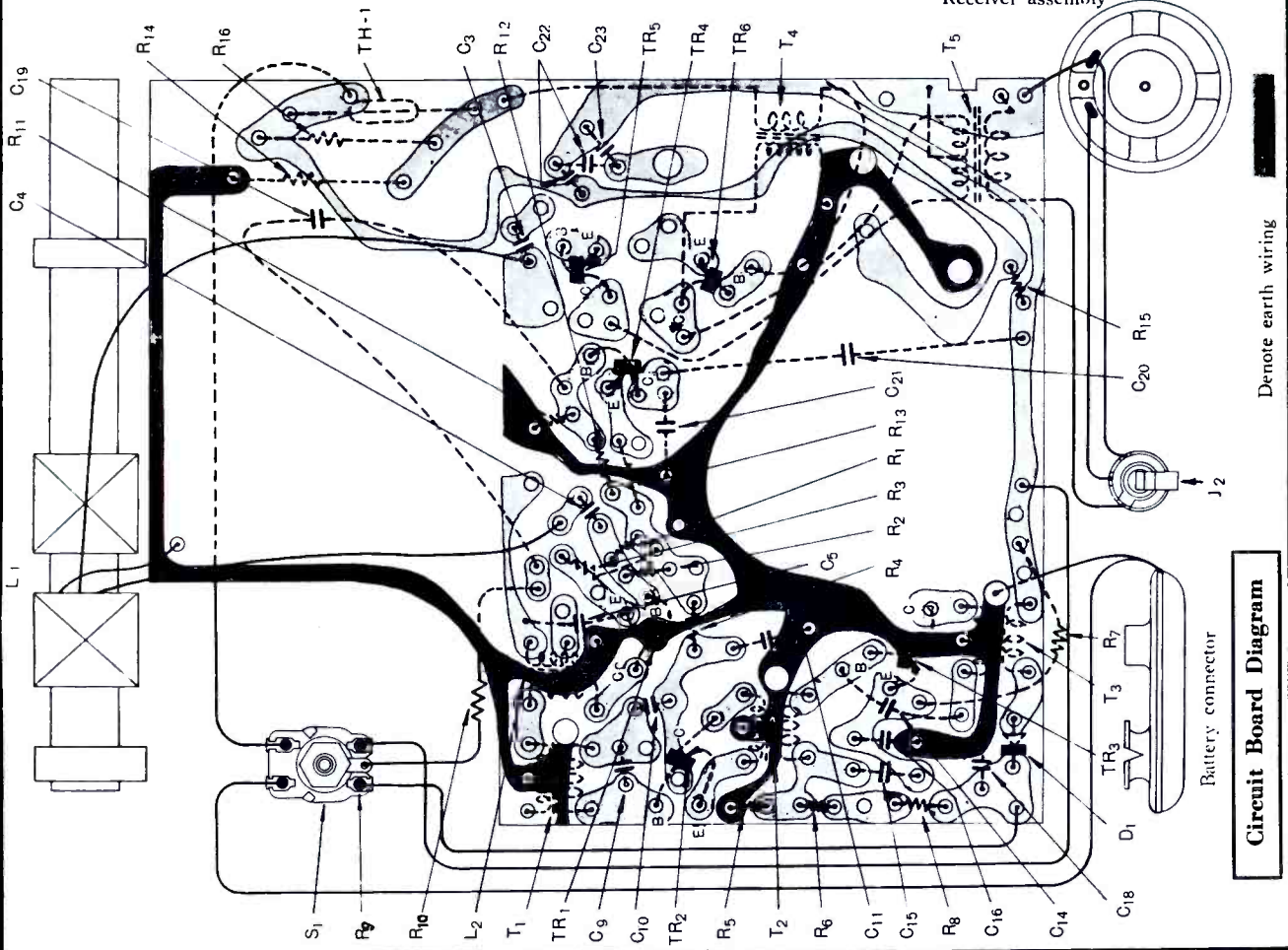


Hitachi, Ltd.
Tokyo Japan
MODEL TH-627R

Tuning range BC 535~1.605 kc,
Intermediate frequency 455 kc

Dial string assembly

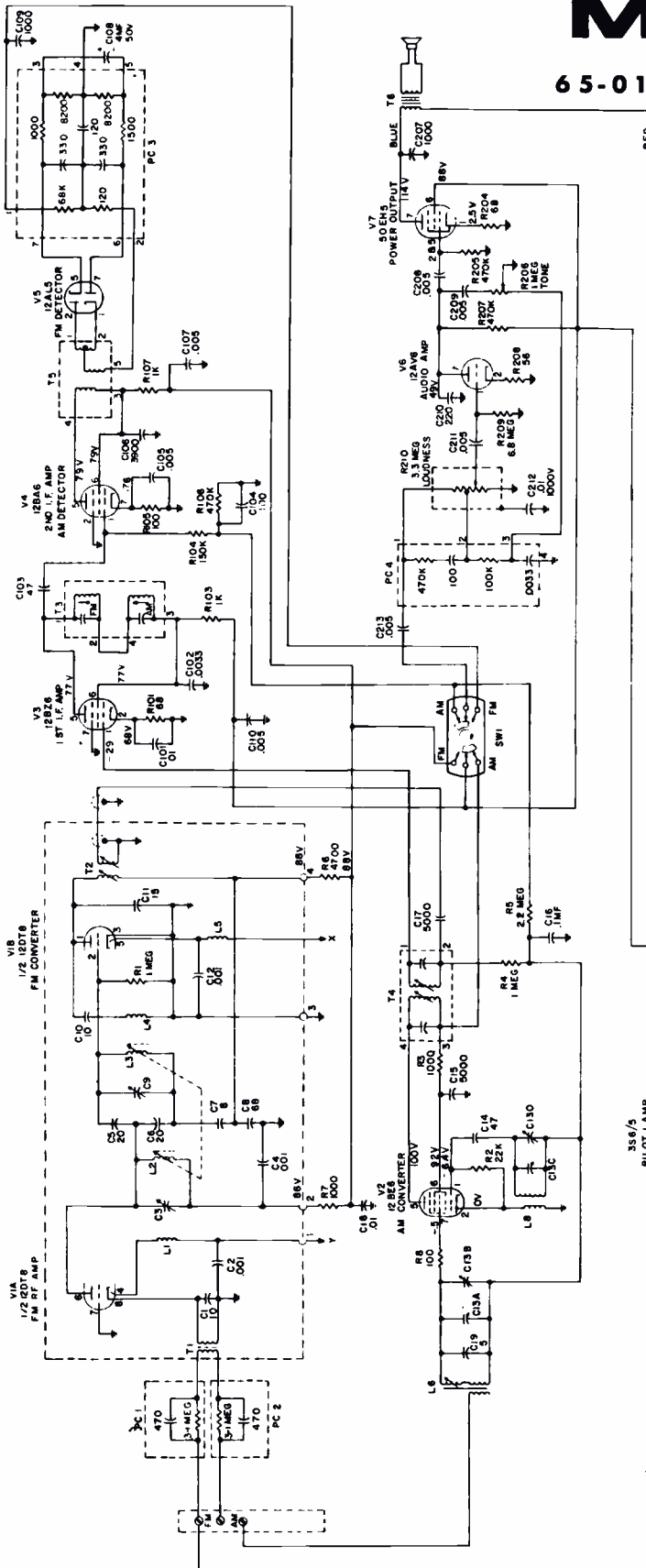
Receiver assembly



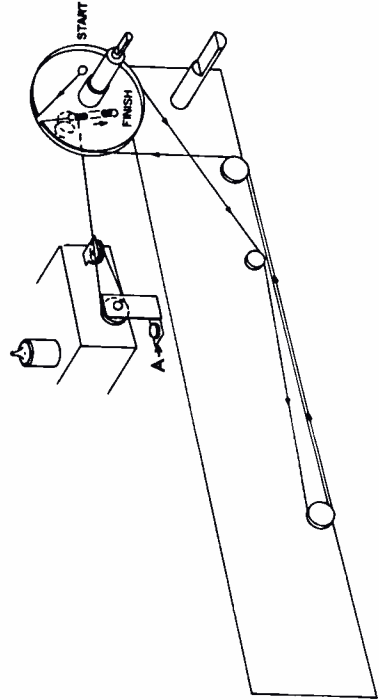
Circuit Board Diagram

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

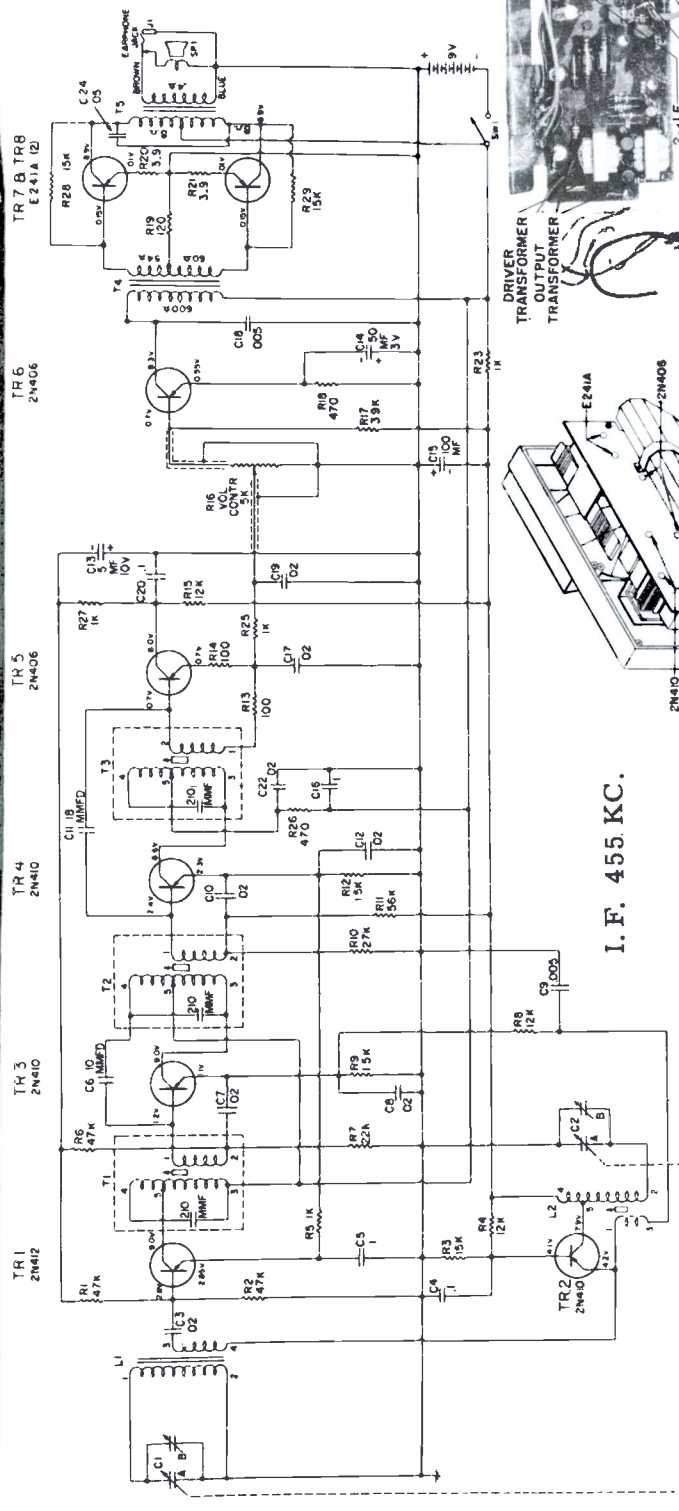
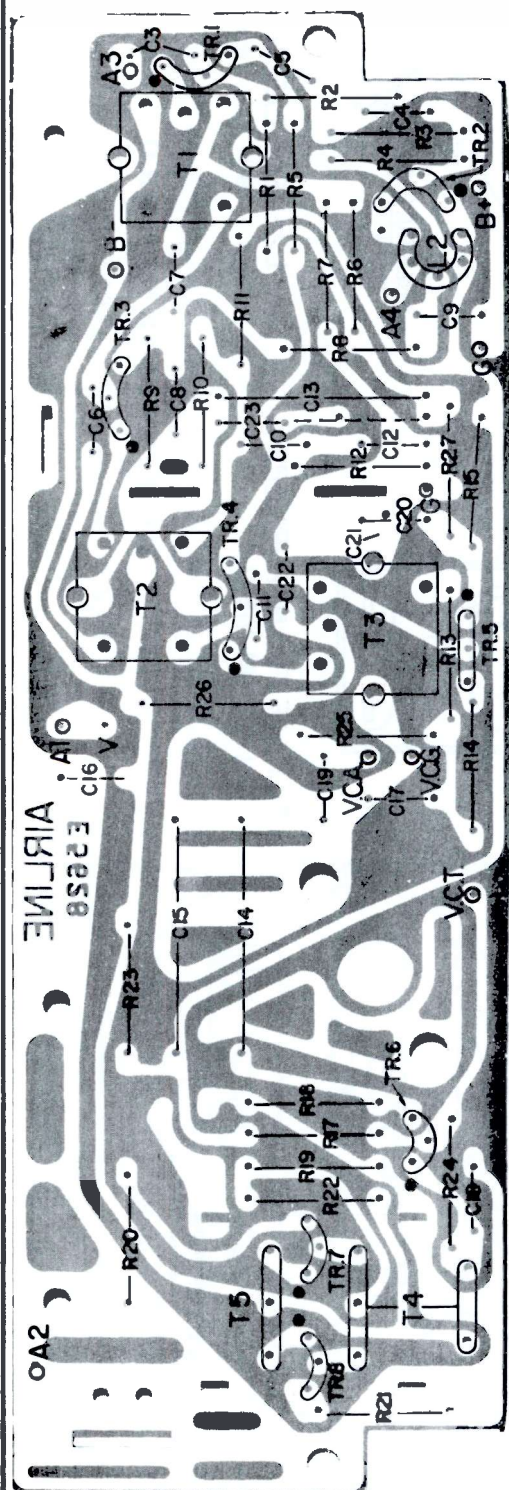
SPECIFICATIONS

| | |
|------------------------|------------|
| 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) | |

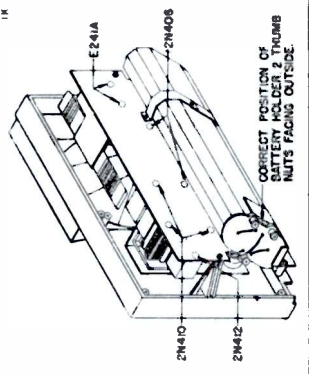
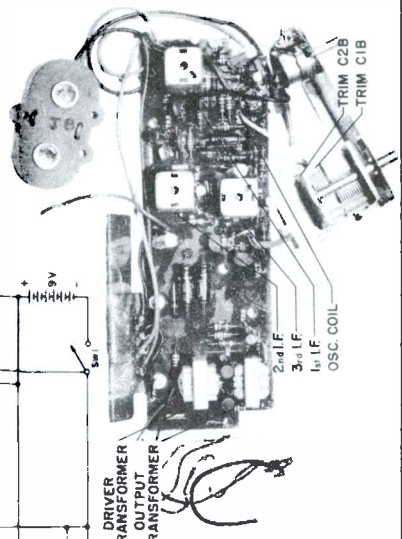
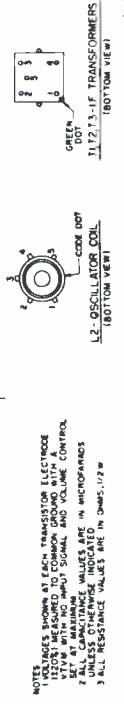
NOTES
 1 ALL VOLTAGES MEASURED IN FM POSITION EXCEPT 12BE6
 2 LINE VOLTAGE 117V

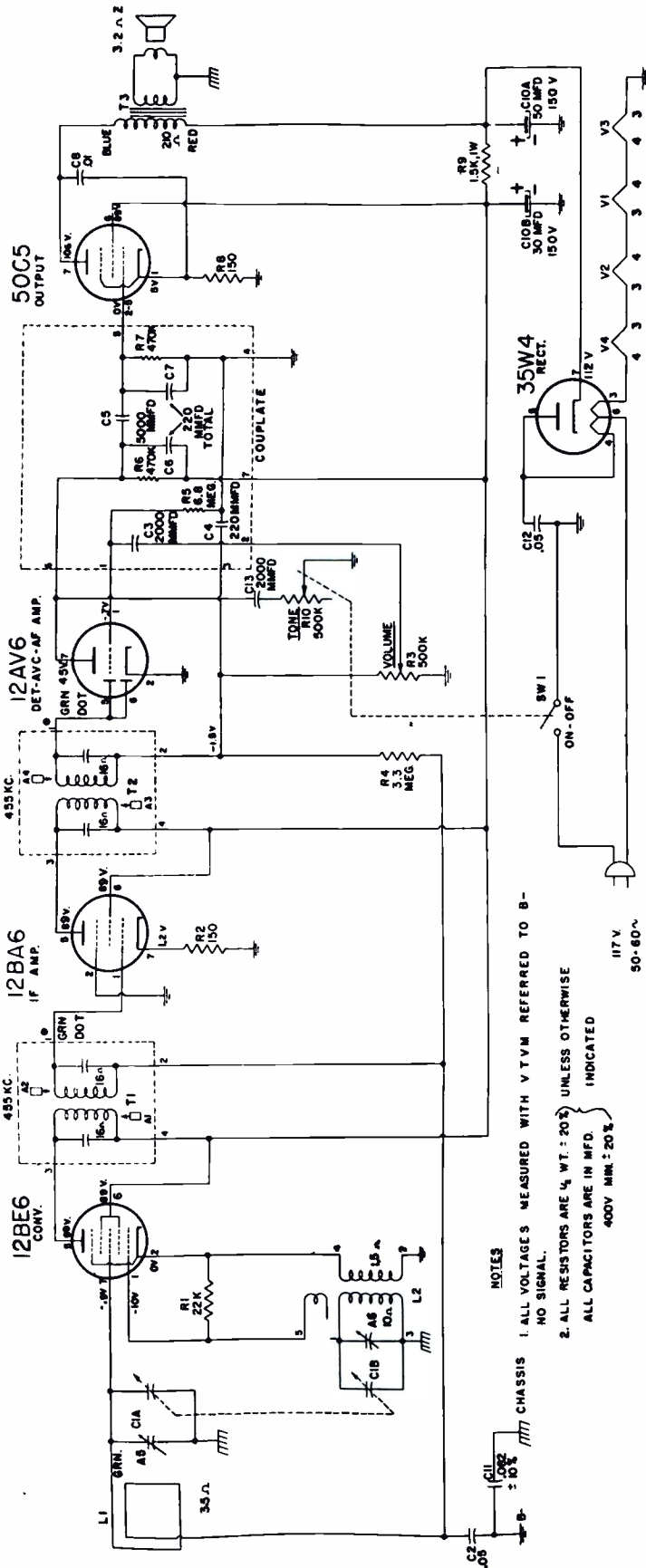
MONTGOMERY WARD

Radio Models GEN-2030A, GEN-2030B

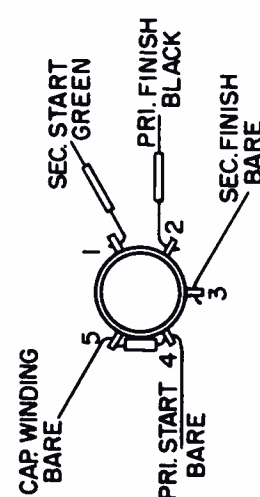


I. F. 455 KC.

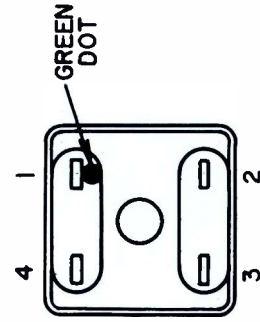




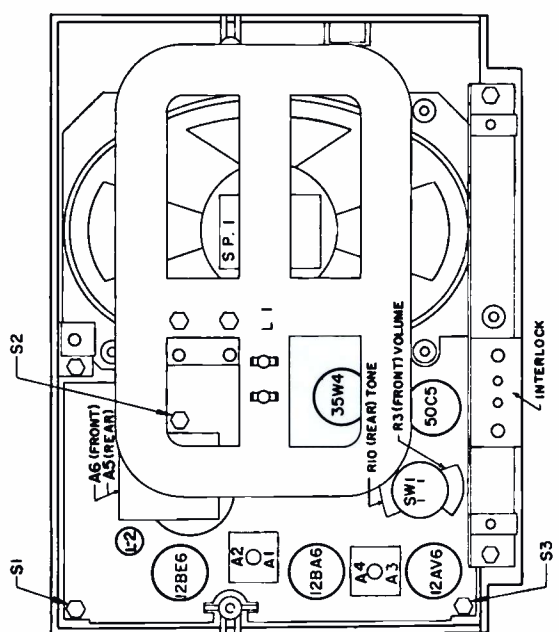
NOTES
 1. ALL VOLTAGES MEASURED WITH V T Y M REFERRED TO B- NO SIGNAL.
 2. ALL RESISTORS ARE 1/4 WT. 20% UNLESS OTHERWISE INDICATED
 400V MIN. 20%



L2-OSCILLATOR COIL (BOTTOM VIEW)



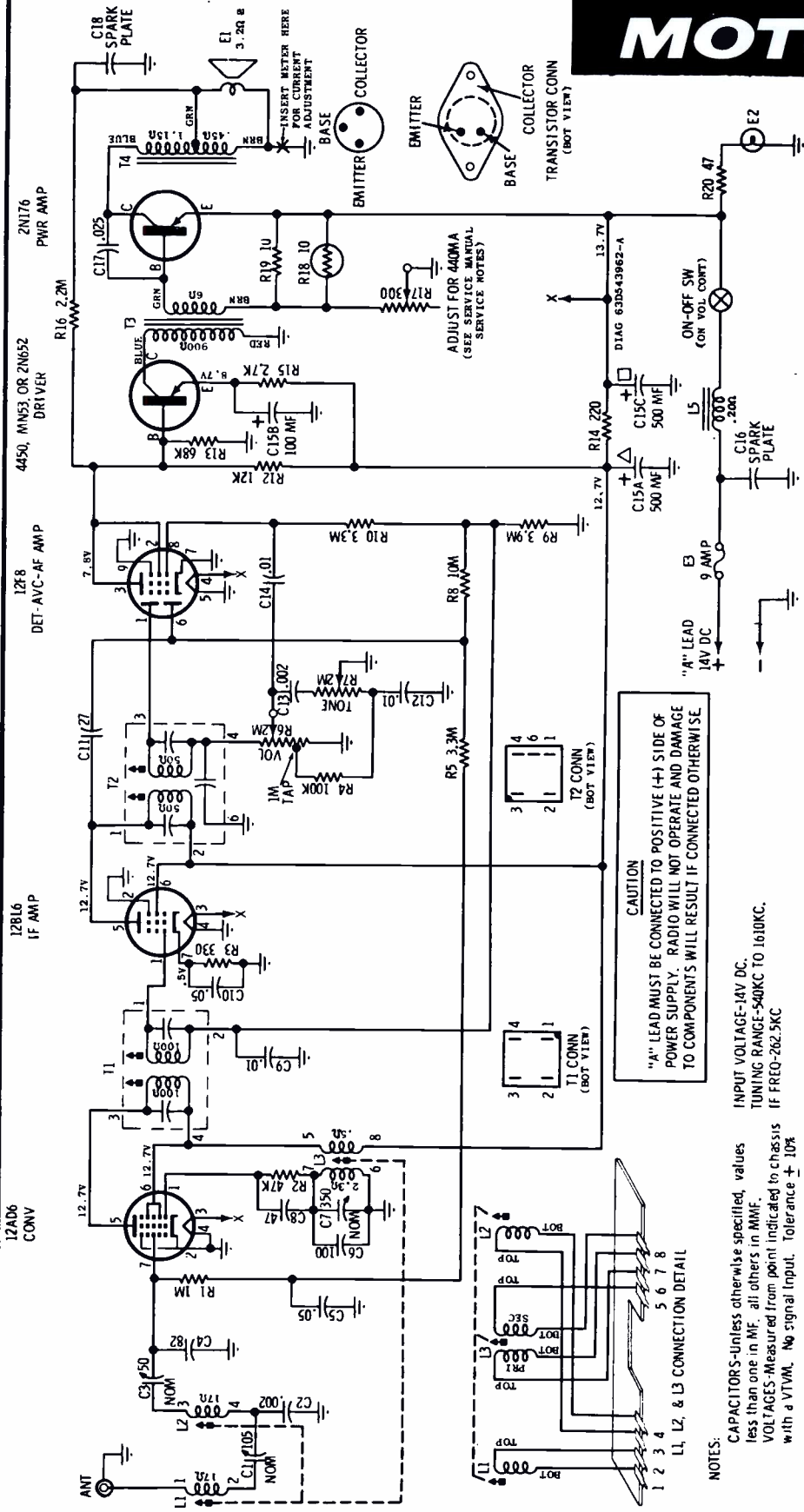
T1, T2-I-F TRANSFORMERS (BOTTOM VIEW)



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

MOTOROLA

MODEL
10AX



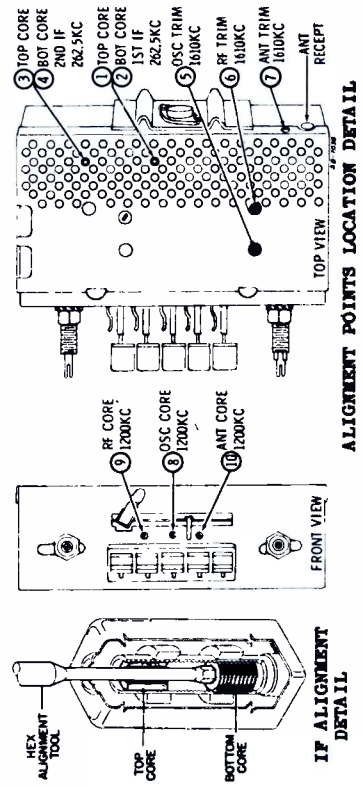
POWER TRANSISTOR CURRENT ADJUSTMENT - After a power transistor has been replaced, the collector current should be checked and adjusted for proper operation.

- 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.

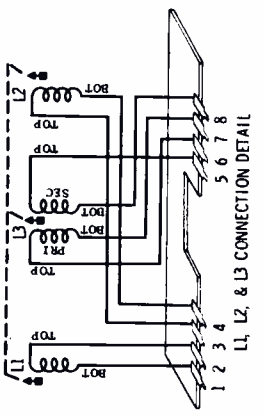
NOTE: Two values of radio input voltage are given as a convenience to service personnel in order to accommodate different power sources. The current value stated on the Schematic Diagram is for 14 volts input to the radio "A" lead.

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.

INPUT VOLTAGE-14V DC.
TUNING RANGE-540KC TO 1610KC.
IF FREQ-262.5KC

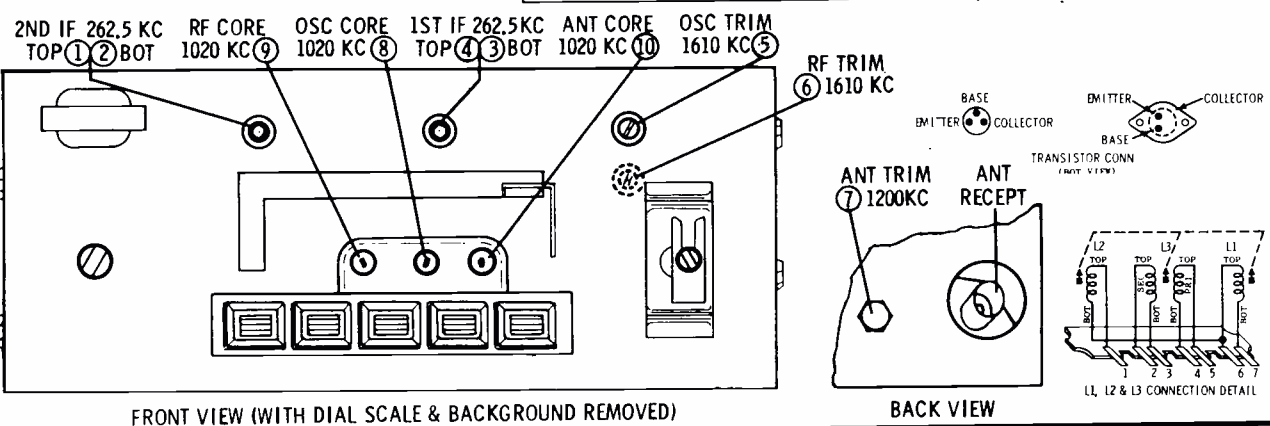
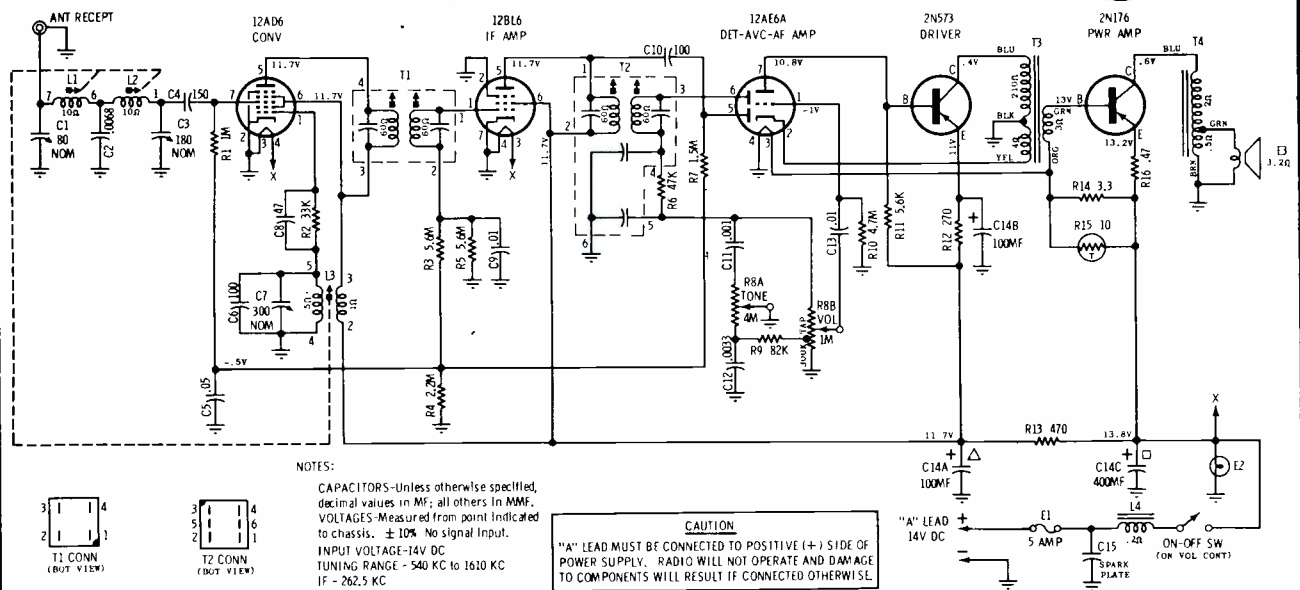
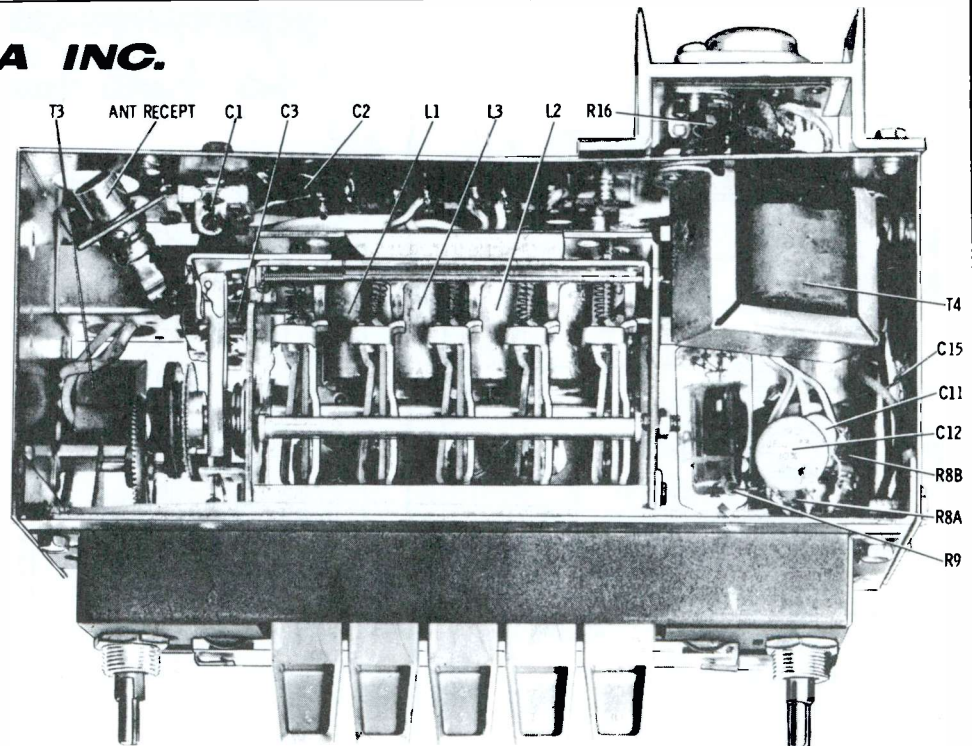


NOTES:
CAPACITORS-Unless otherwise specified, values less than one in MF. all others in MMF.
VOLTAGES-Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$



MOTOROLA INC.

AUTO RADIO
 MODEL
 MOTOROLA 13MA
 AMERICAN MOTORS
 8990832



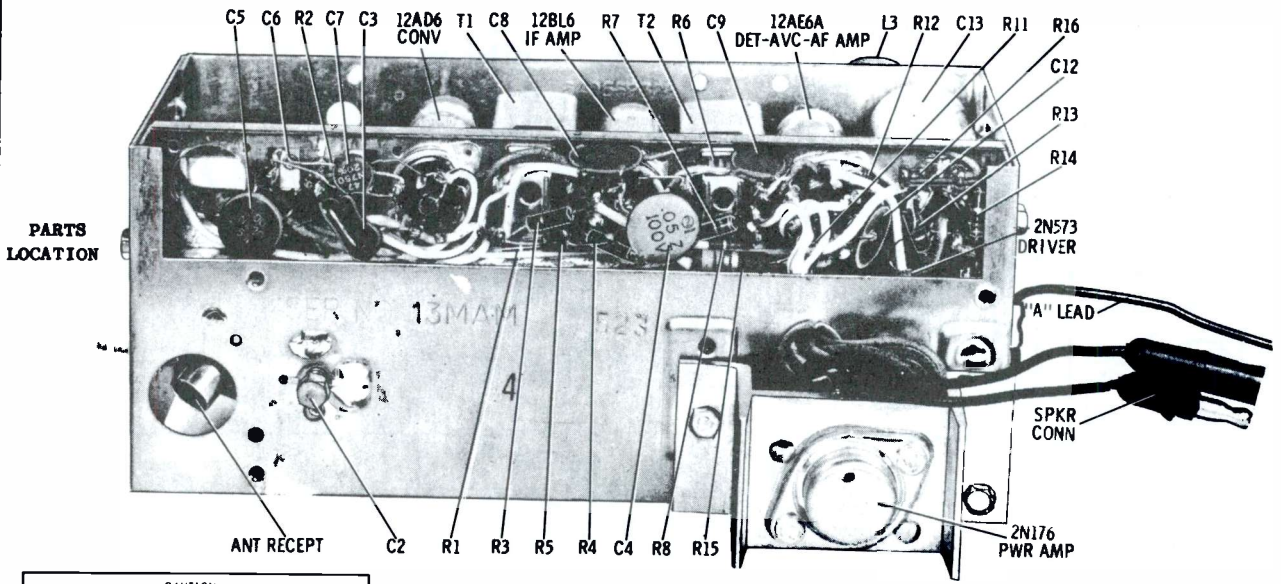
FRONT VIEW (WITH DIAL SCALE & BACKGROUND REMOVED)

BACK VIEW

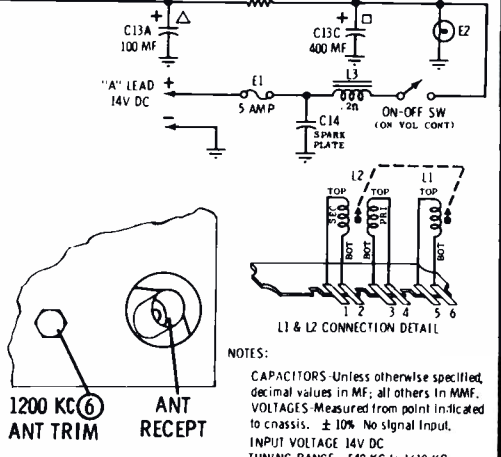
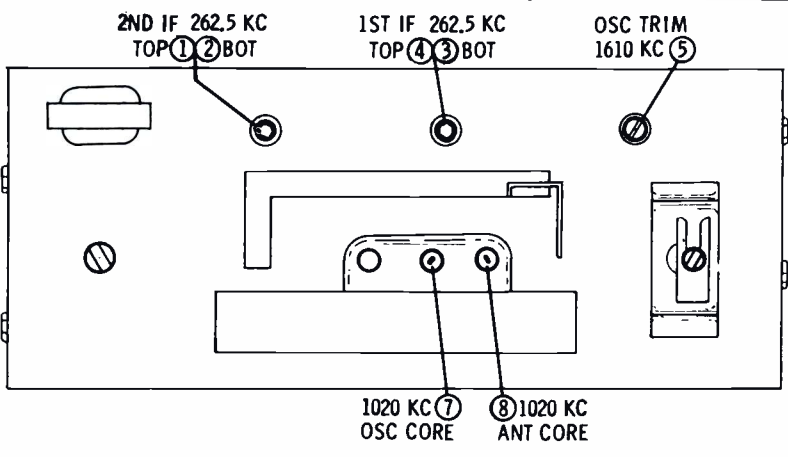
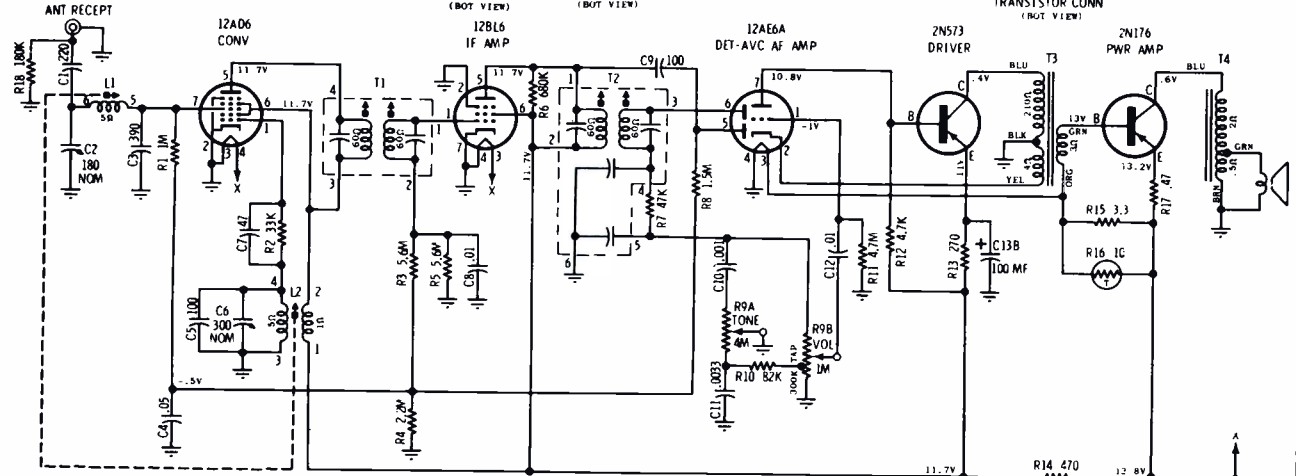
ALIGNMENT POINTS LOCATION DETAIL

MOTOROLA

MODEL
MOTOROLA 13MAM
AMERICAN MOTORS 8990831

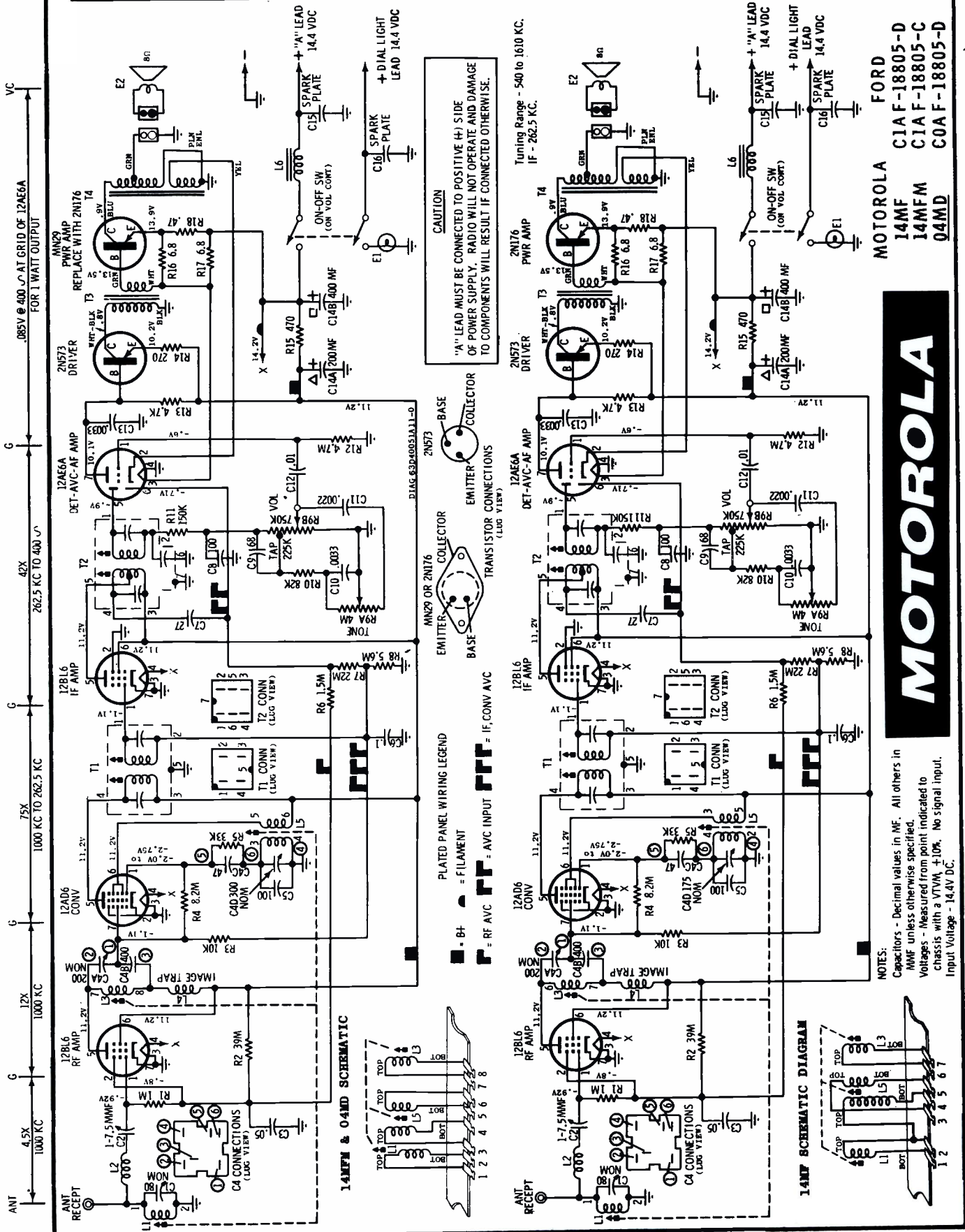


CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.



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

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



MOTOROLA
 14MF
 14MFM
 04MD

MOTOROLA

FORD
 CIAF-18805-D
 CIAF-18805-C
 COAF-18805-D

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

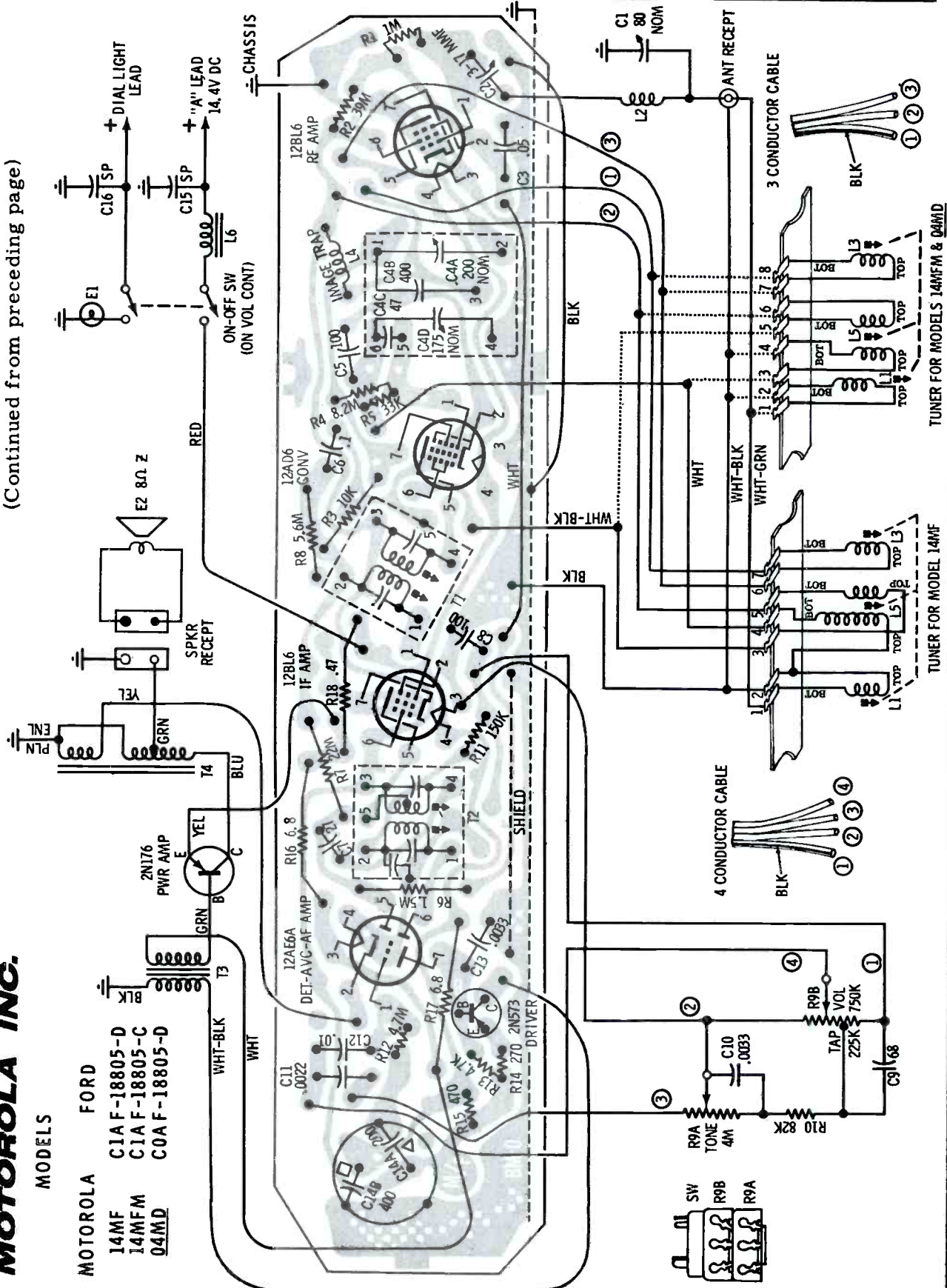
(Continued from preceding page)

MOTOROLA INC.

MODELS

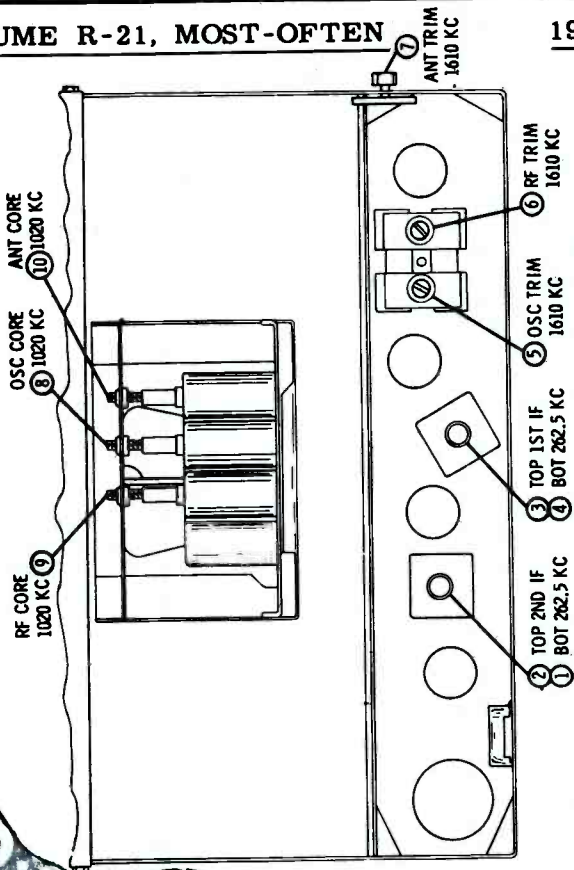
MOTOROLA FORD

- 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)

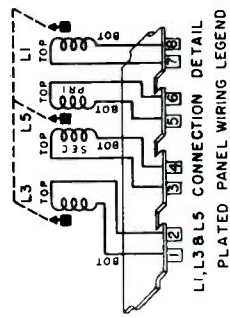
MOTOROLA Model 14MR
American Motors 8990833



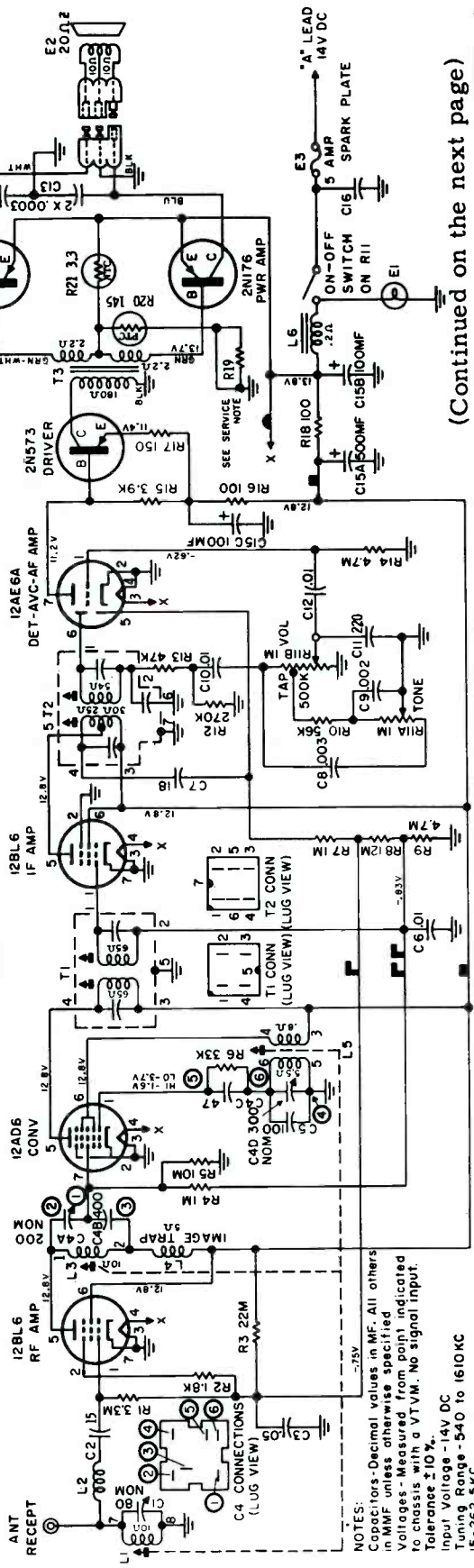
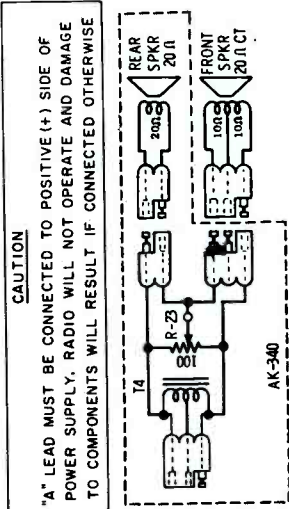
ALIGNMENT POINTS LOCATION DETAIL

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

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

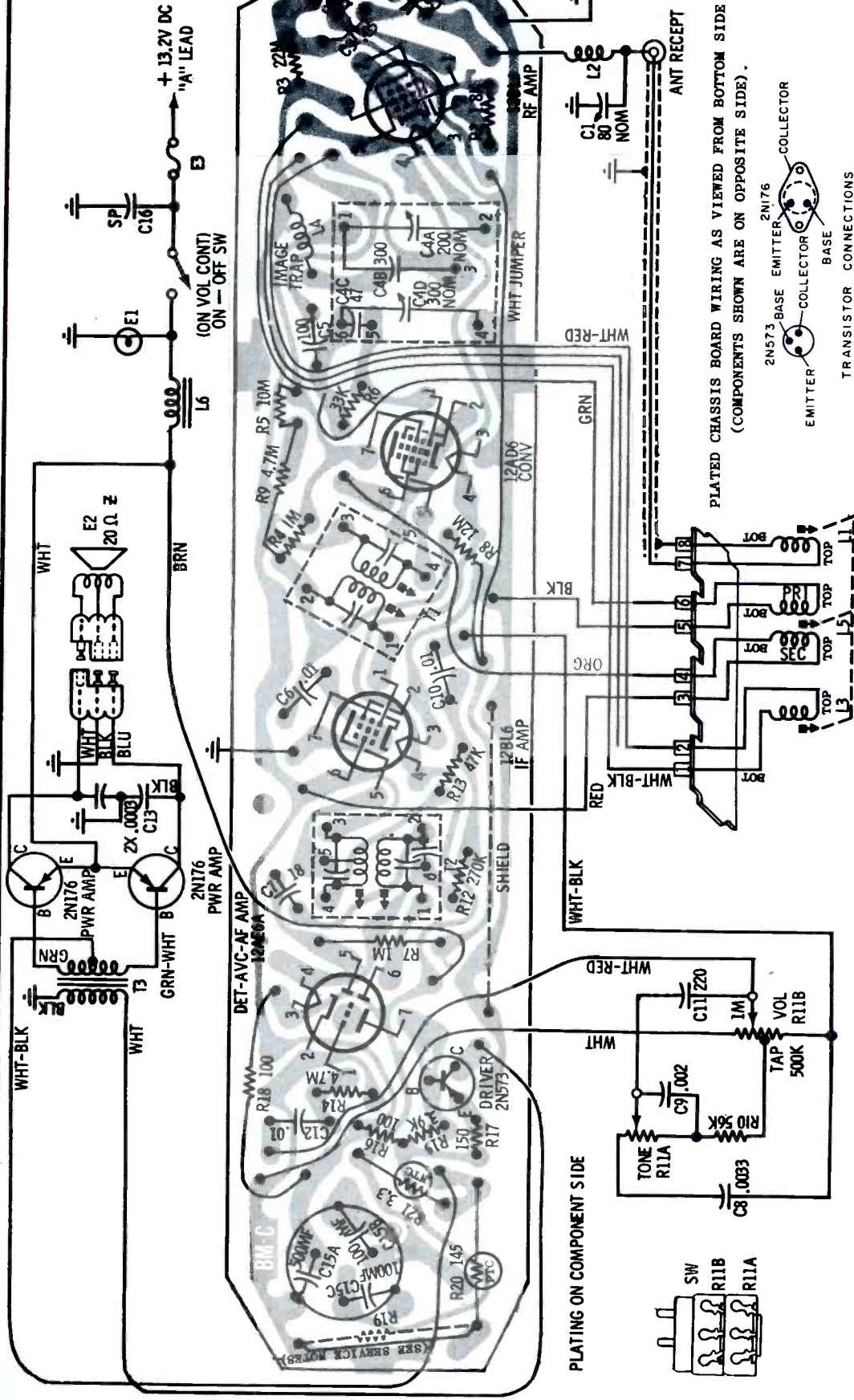


PLATED PANEL WIRING LEGEND
 L1, L3, L5, L7, L9, L11, L13, L15, L17, L19, L21, L23, L25, L27, L29, L31, L33, L35, L37, L39, L41, L43, L45, L47, L49, L51, L53, L55, L57, L59, L61, L63, L65, L67, L69, L71, L73, L75, L77, L79, L81, L83, L85, L87, L89, L91, L93, L95, L97, L99, L100
 ■ = B+ ■ = FILAMENT
 ■ = RF, AVC ■ = IF, CONV, AVC



NOTES:
 Capacitors-Decimal values in MF. All others in MUF unless otherwise specified.
 Voltages- Measured from chassis ground unless indicated otherwise.
 Tolerance ±10%.
 Input Voltage -14V DC
 Tuning Range -540 to 1610 KC
 P-262.5KC.

(Continued on the next page)



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

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

TO SET PUSHBUTTONS

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

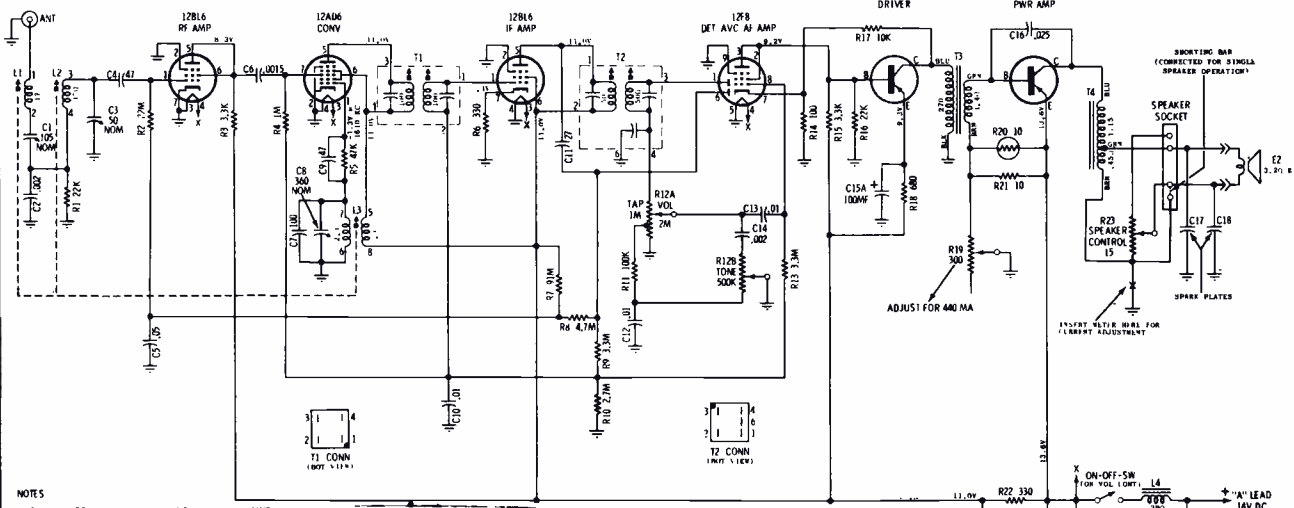
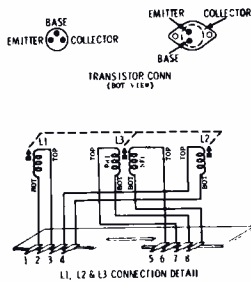
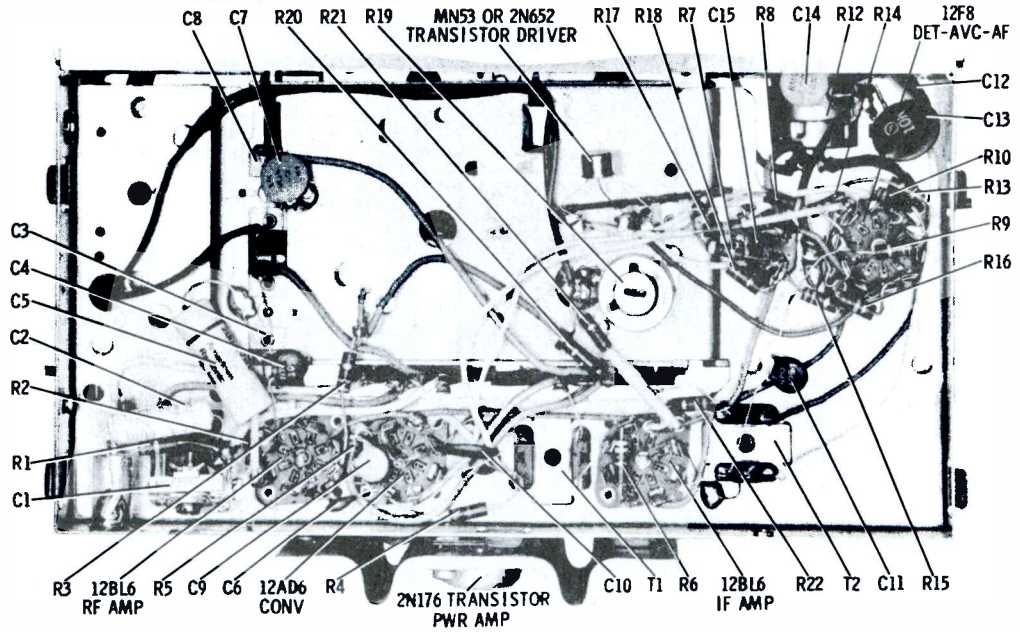
MODEL
MOTOROLA 14MR
AMERICAN MOTORS 8990833

(Continued from preceding page)

MOTOROLA

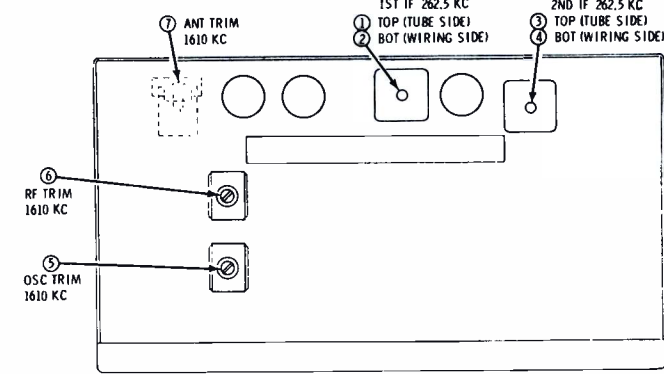
AUTO RADIO

MODELS
BKA60X
PCA60X

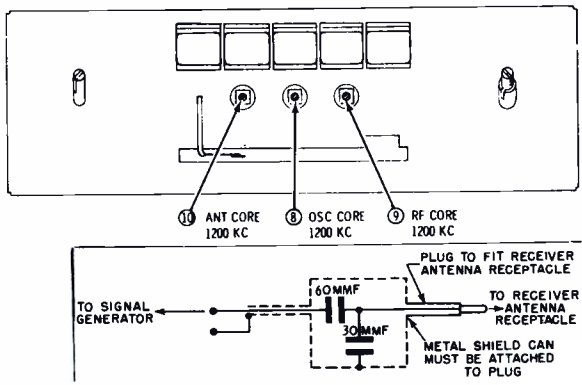


NOTES
CAPACITORS - Decimal values in μF , all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated to chassis with a VTVM. No signal input. Tolerance $\pm 10\%$.
INPUT VOLTAGE - 14V DC.
TUNING RANGE - 540 KC to 1610 KC.
IF FREQ - 262.5 KC.

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



ALIGNMENT LOCATION DETAIL



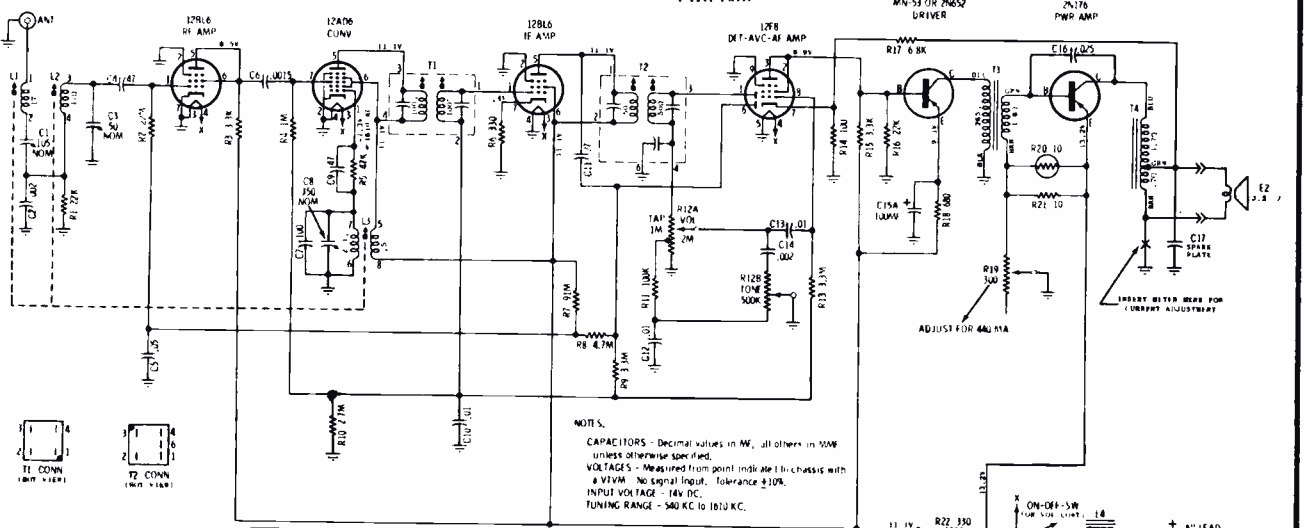
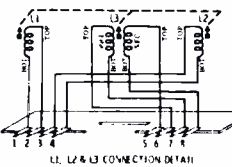
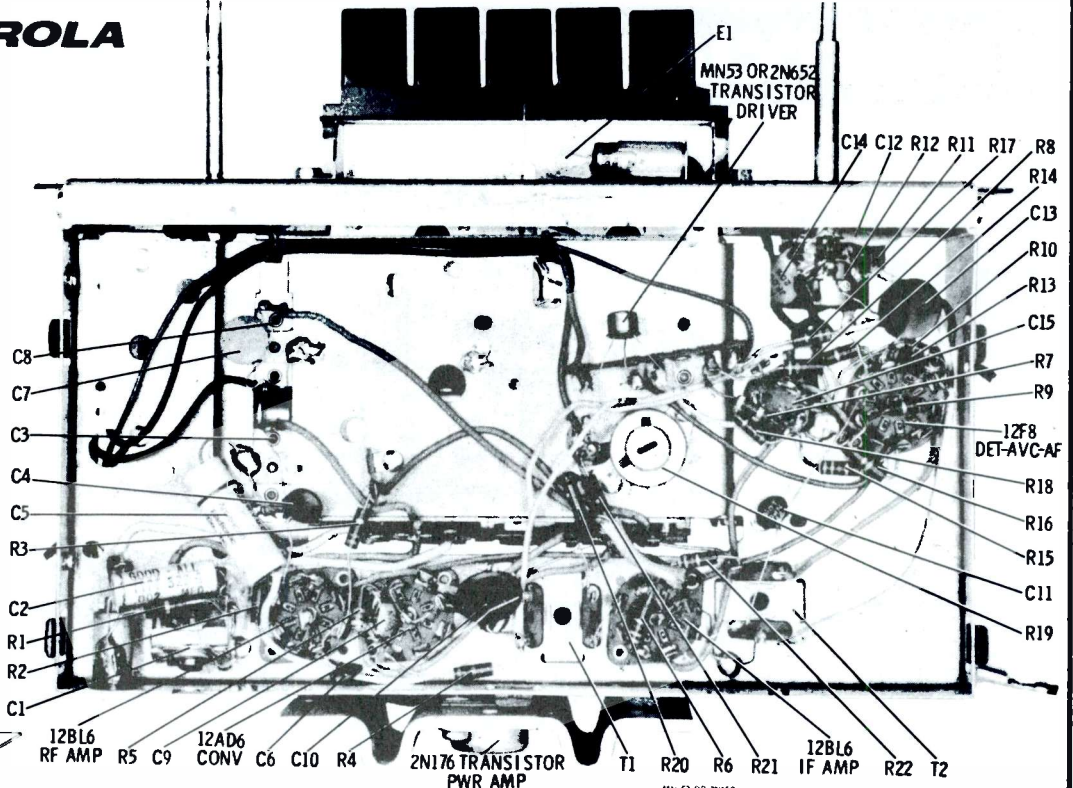
DUMMY ANTENNA

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

MOTOROLA

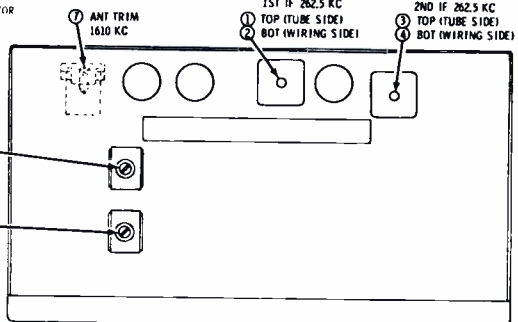
AUTO RADIO

MODEL
CRA60X

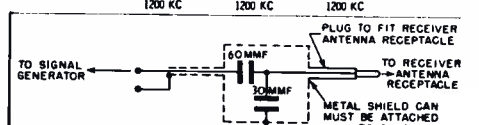
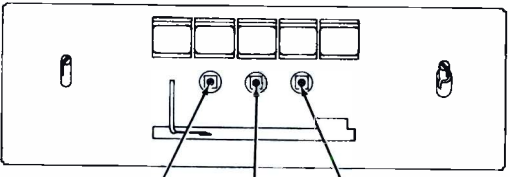


NOTES:
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTAGES - Measured from point indicated by chassis with a VOM. No signal input. Tolerance $\pm 10\%$.
INPUT VOLTAGE - 14V DC.
TUNING RANGE - 540 KC to 1610 KC.

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



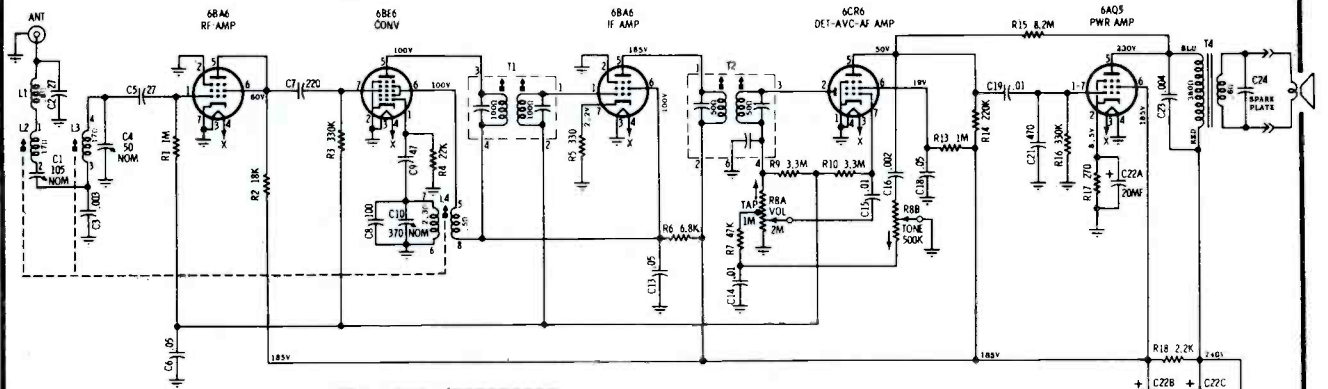
ALIGNMENT LOCATION DETAIL



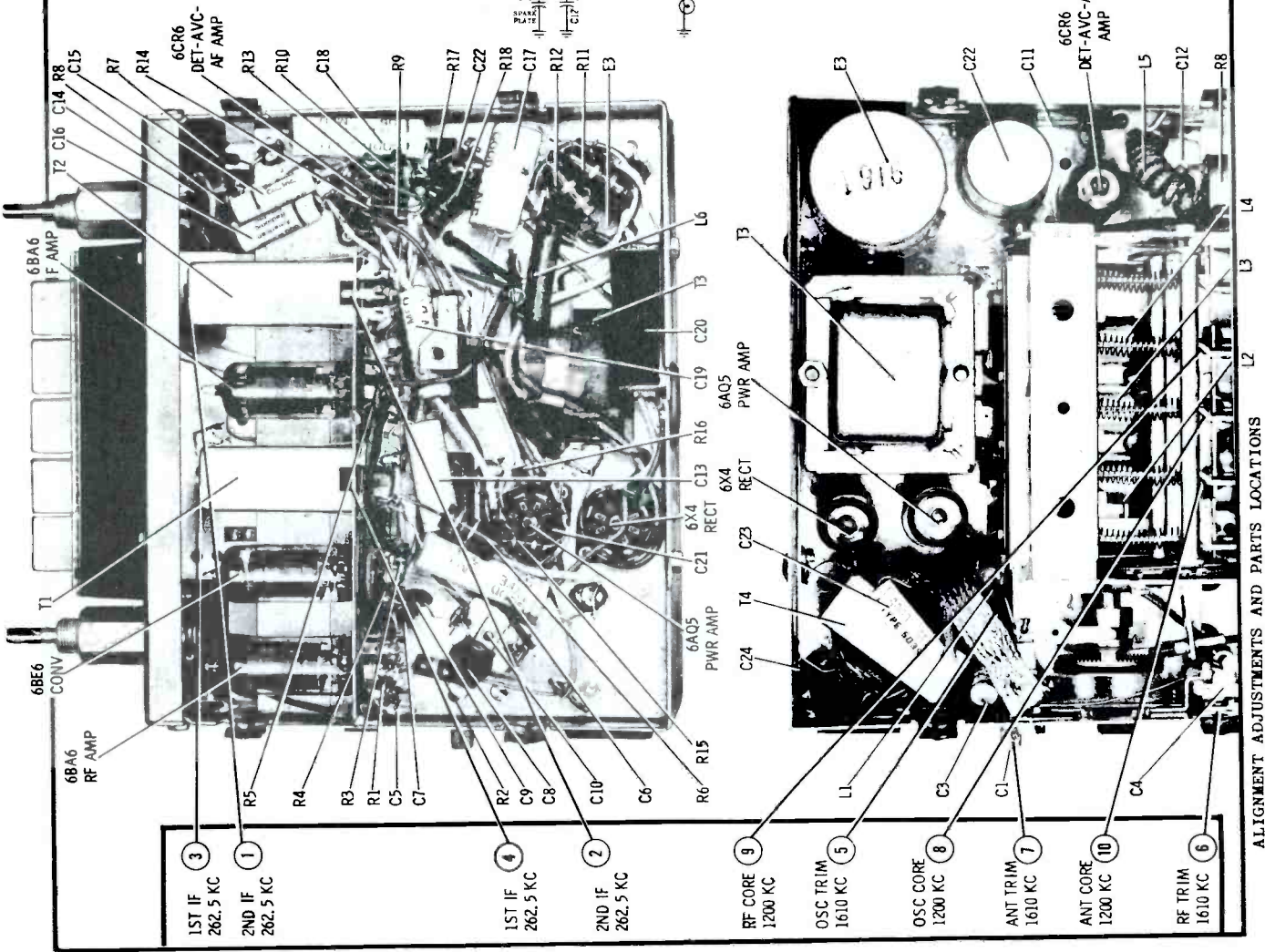
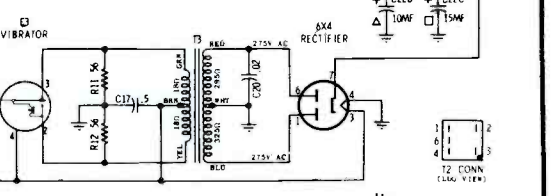
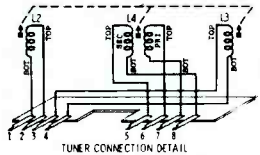
DUMMY ANTENNA

MOTOROLA

MODEL
VWA60



NOTES:
CAPACITORS - Decimal values in MF, others in MWF 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.



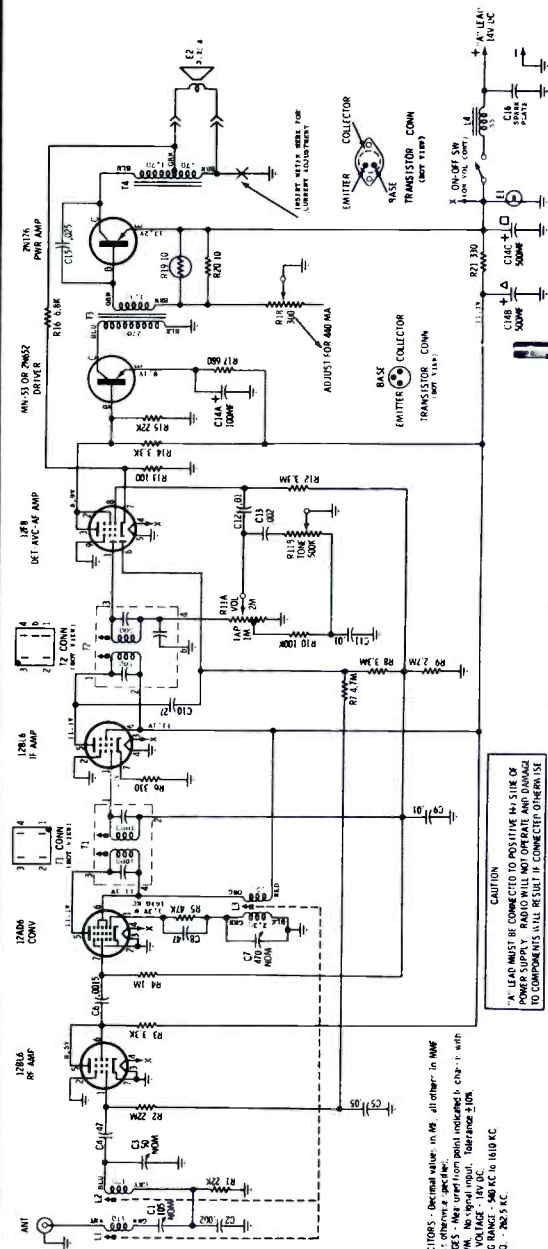
ALIGNMENT ADJUSTMENTS AND PARTS LOCATIONS

MOTOROLA

AUTO RADIO

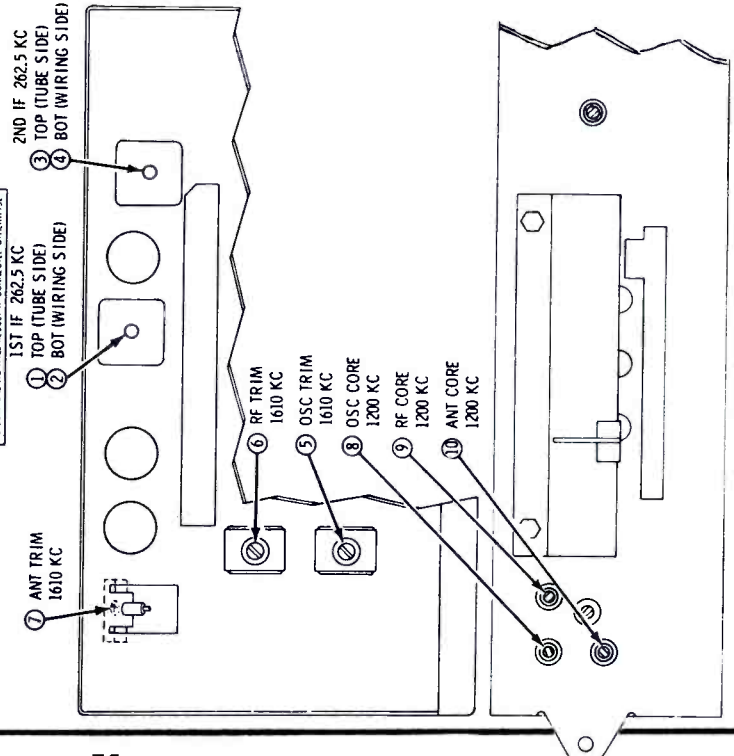
MODEL CRM60X

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.

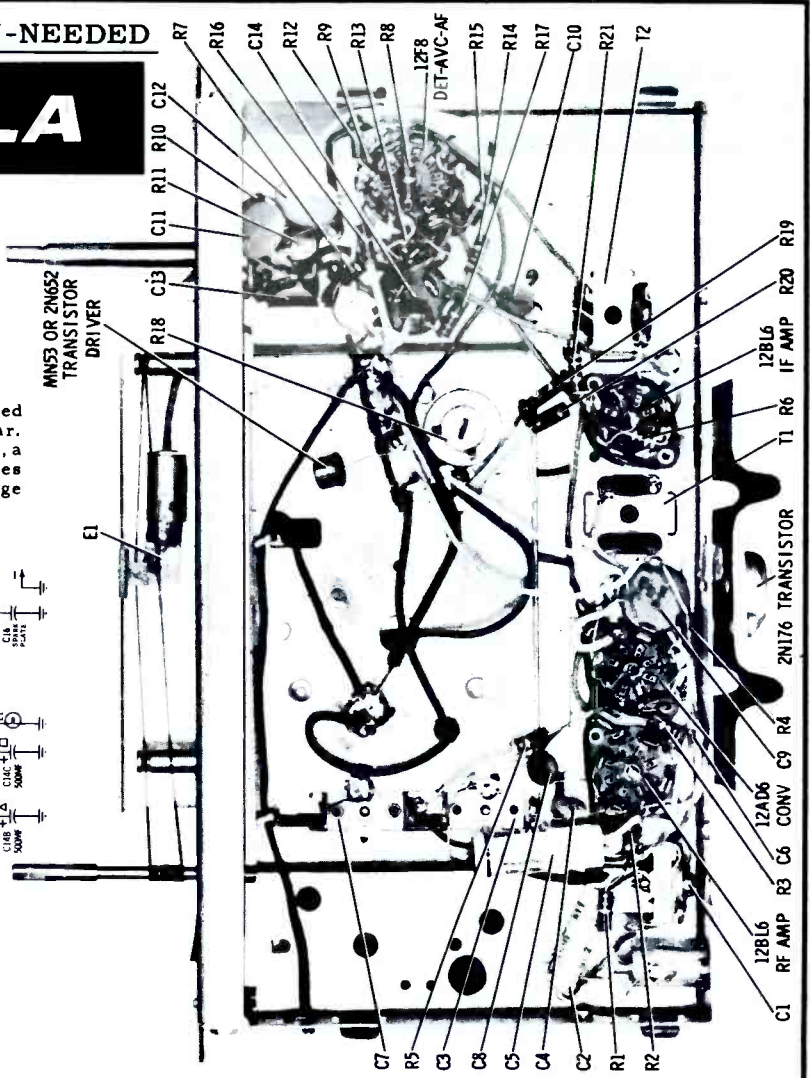


NOTES
 CAPACITORS - Check values in MFD. All other in MFD unless otherwise specified.
 VOLTAGES - Use test point indicated in circled numbers. No signal input. Tolerance ±10%.
 TUNING RANGE - 540 KC to 1610 KC.
 IF FREQ. - 262.5 KC.

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



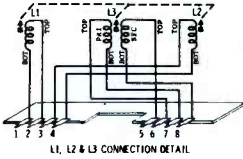
ALIGNMENT LOCATION DETAIL



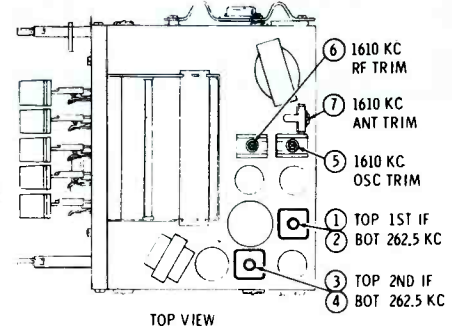
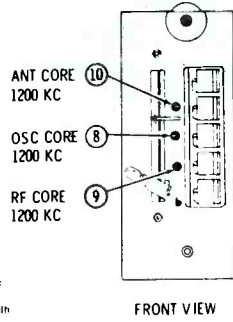
MOTOROLA

AUTO RADIO

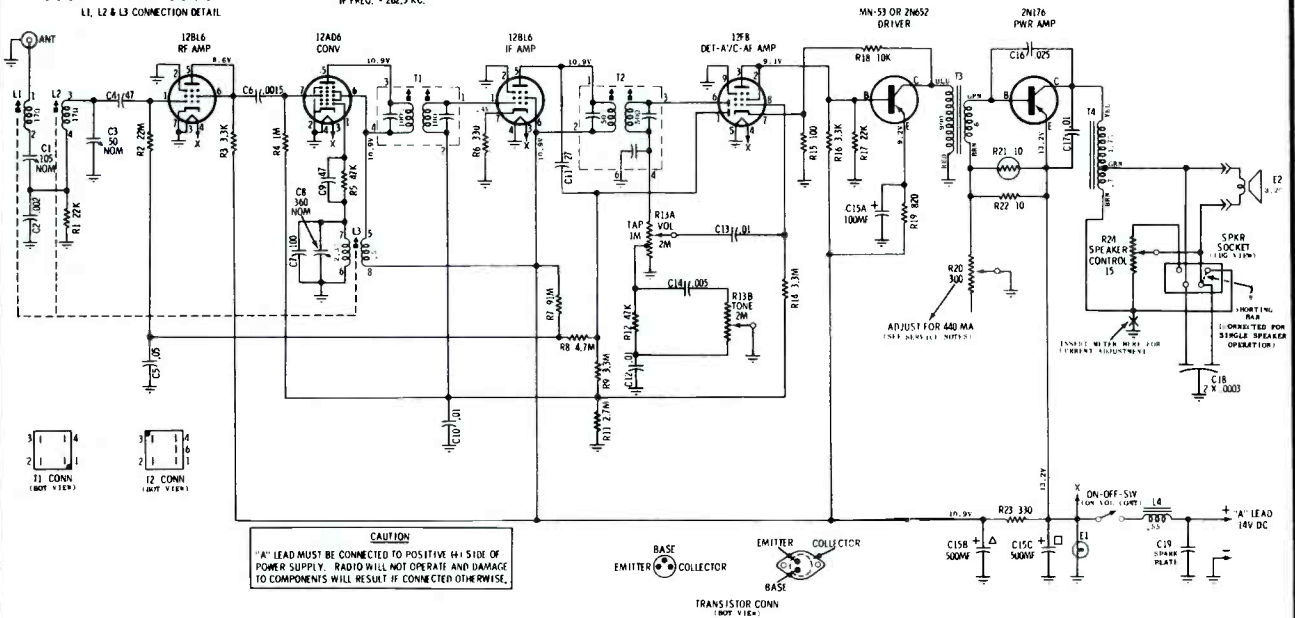
MODEL OEA60X



NOTES:
CAPACITORS - Decimal values in MF, all others in MMF unless otherwise specified.
VOLTS/GES - 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.



ALIGNMENT LOCATION DETAIL



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

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.

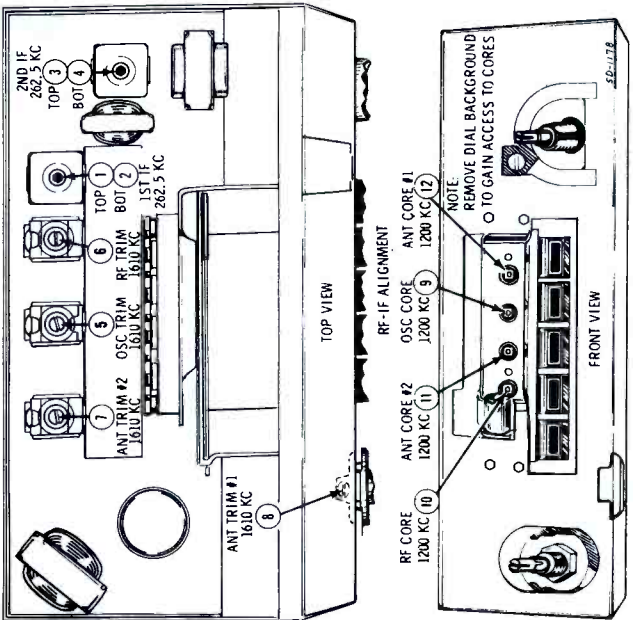
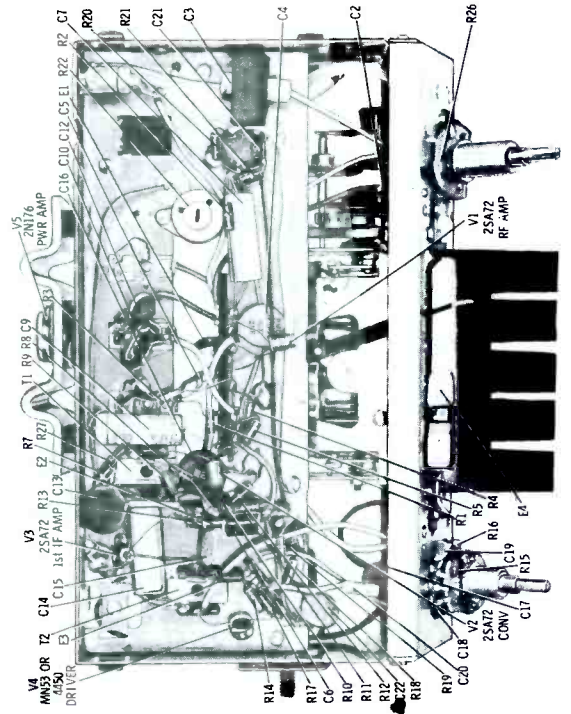
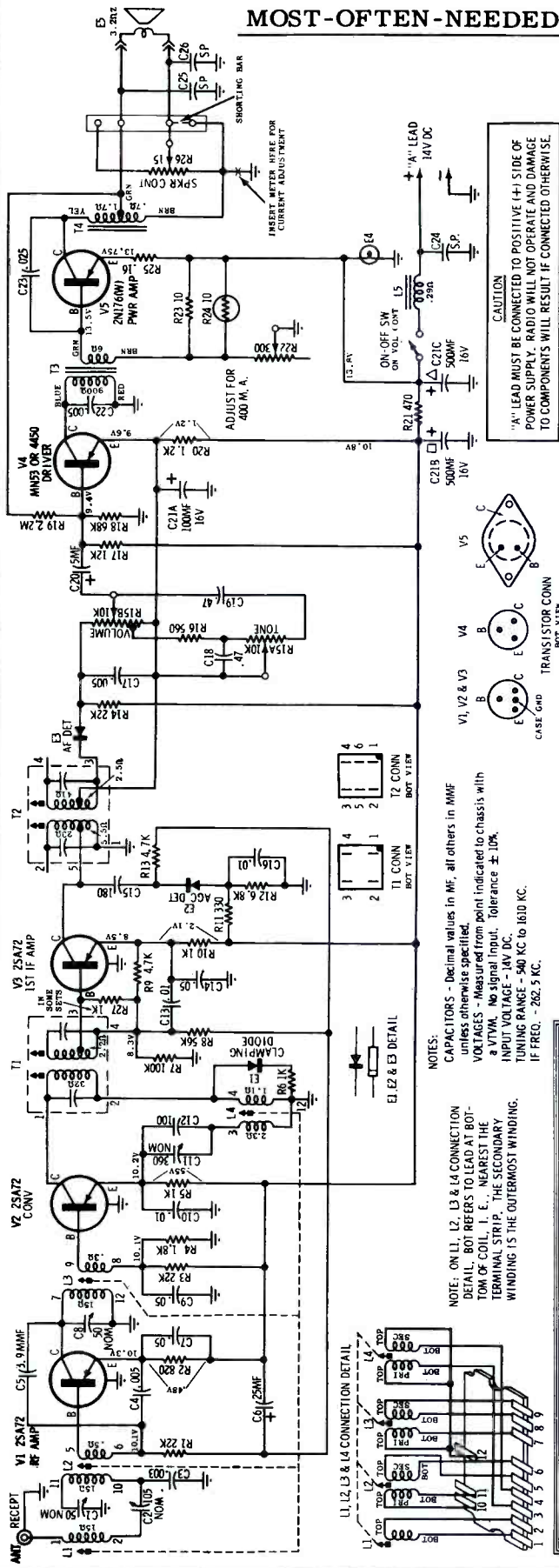
- a. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer (T4). Connect the negative post of the meter to ground. CAUTION: Be sure the speaker ground lead is connected in common with the transformer ground lead to the positive meter terminal (see 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.

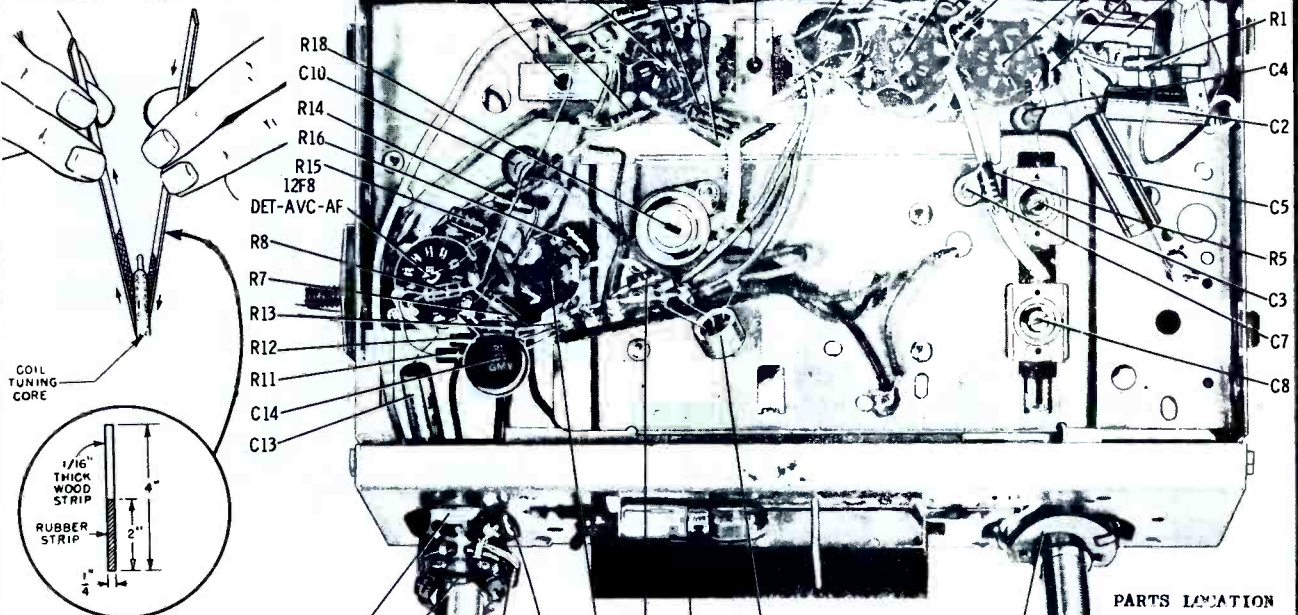
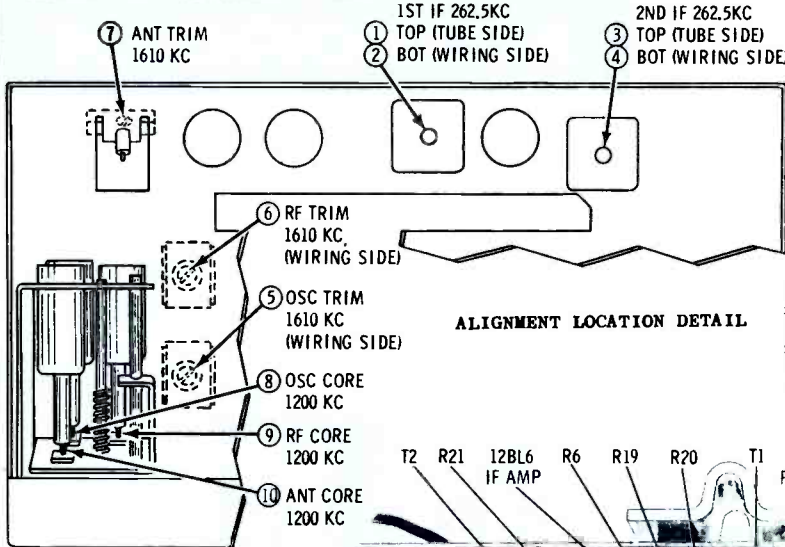


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

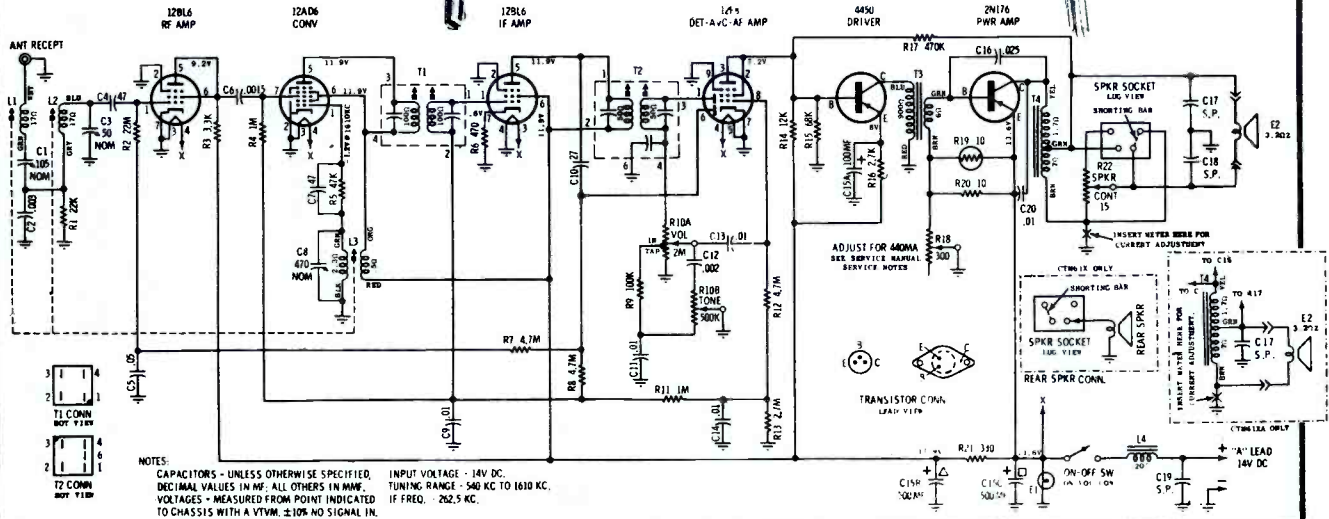
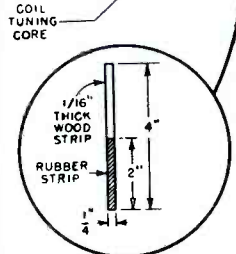
MOTOROLA

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.

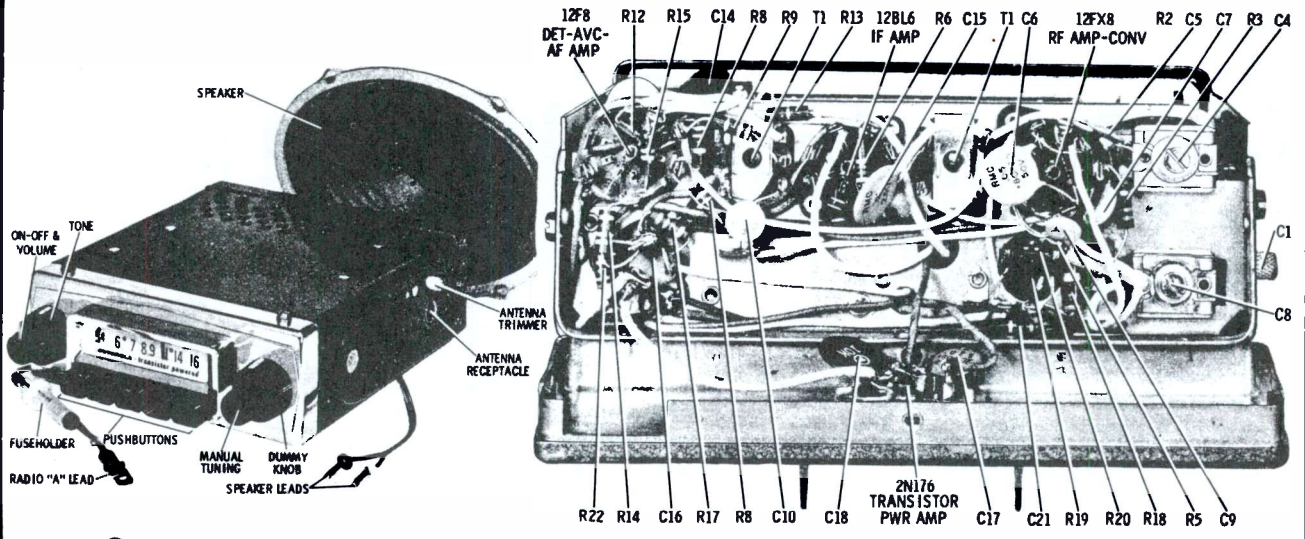


CORE ALIGNMENT TOOL DETAIL

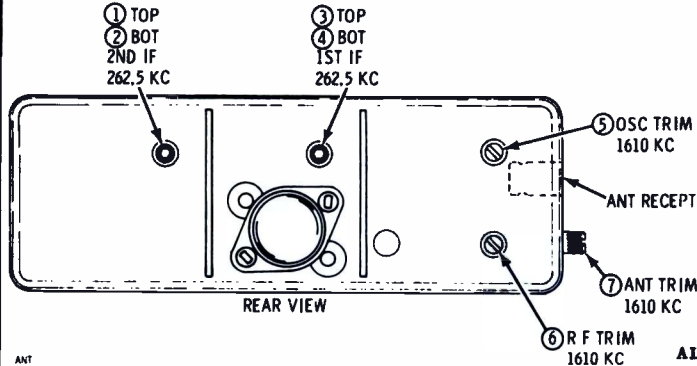


MOTOROLA

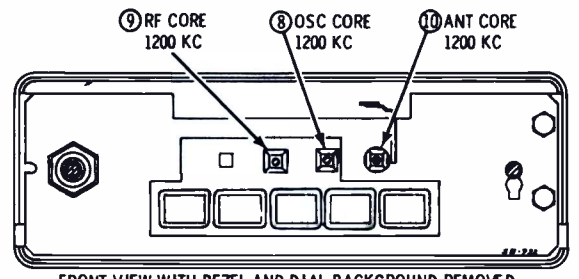
MODEL
500X



PARTS LOCATION

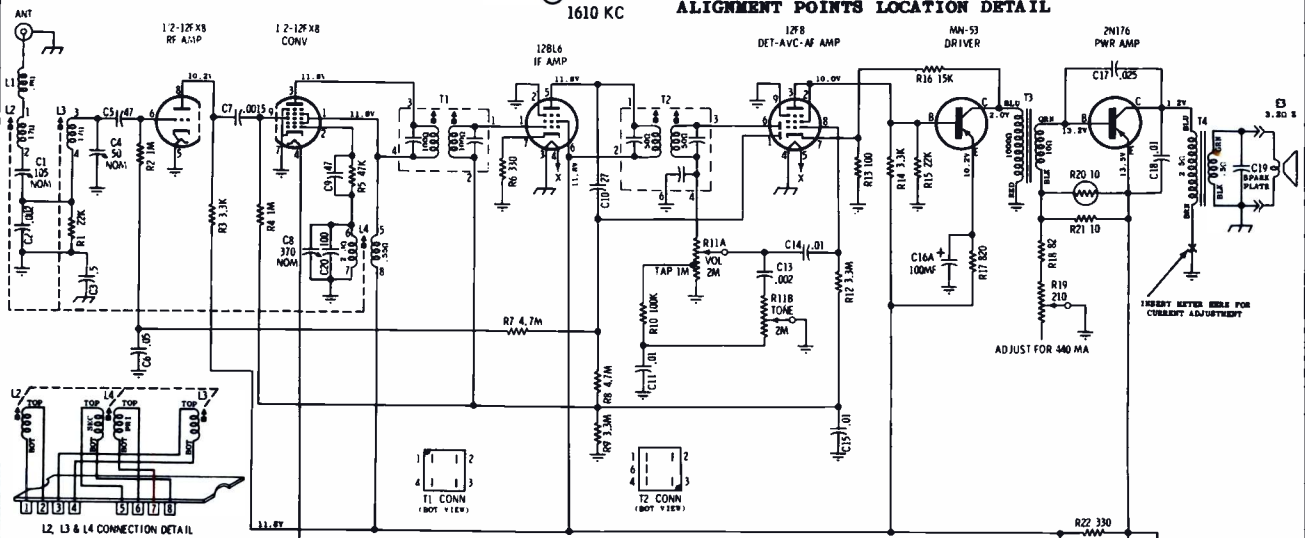


REAR VIEW



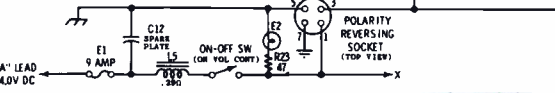
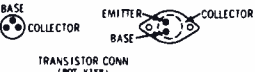
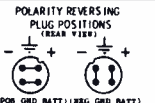
FRONT VIEW WITH BEZEL AND DIAL BACKGROUND REMOVED

ALIGNMENT POINTS LOCATION DETAIL



NOTES:
CAPACITORS - Decimal-values in MF, all others in Mmc unless otherwise specified.
VOLTAGE - 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.

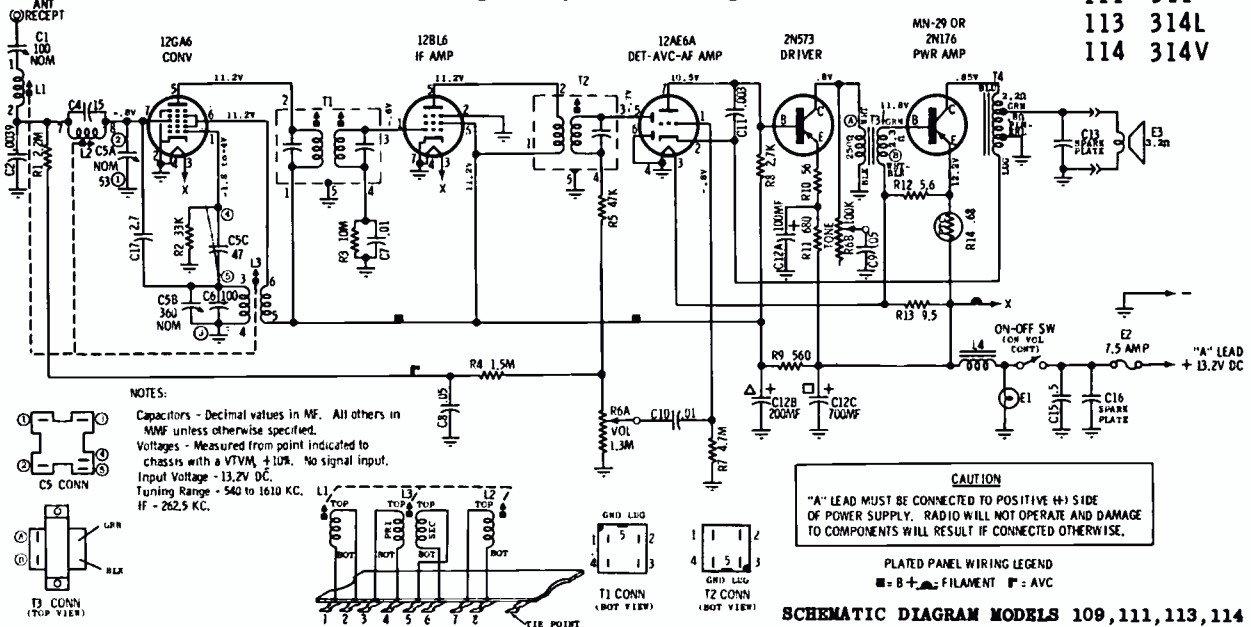
CAUTION
BEFORE CONNECTING 'A' LEAD, BATTERY POLARITY SHOULD BE CHECKED AND POLARITY REVERSING PLUG SHOULD BE CHANGED CORRESPONDINGLY. OTHERWISE SET WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT.



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 |



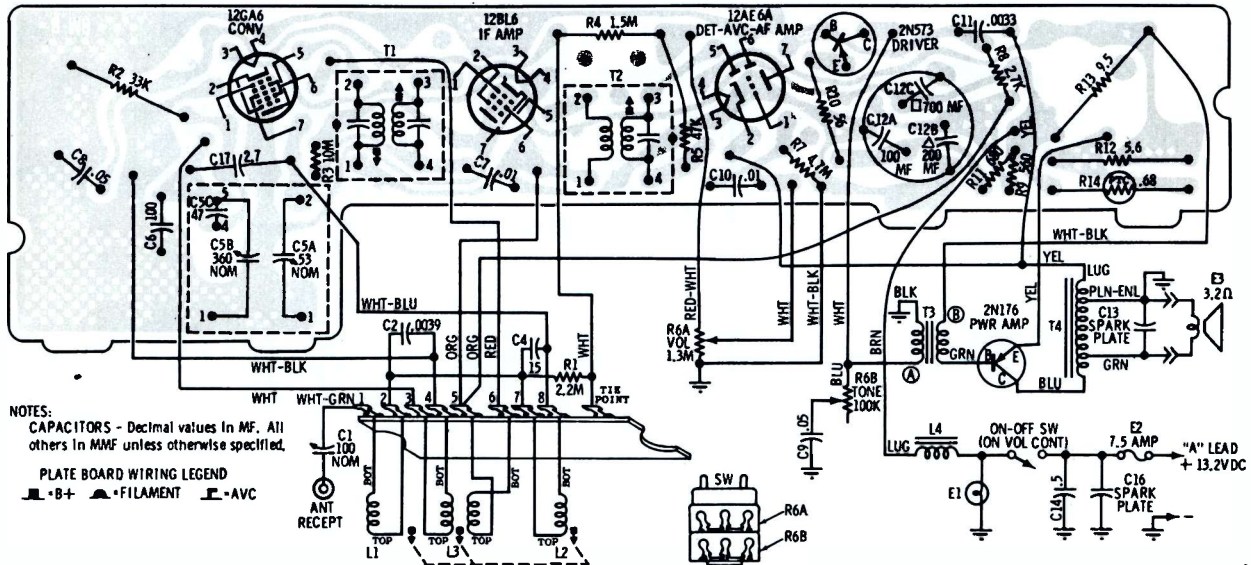
NOTES:

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 - 115.2V AC.
 Tuning Range - 540 to 1610 KC.
 IF - 262.5 KC.

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

PLATED PANEL WIRING LEGEND
 ■ = B+ ▲ = FILAMENT ▬ = AVC

SCHEMATIC DIAGRAM MODELS 109, 111, 113, 114

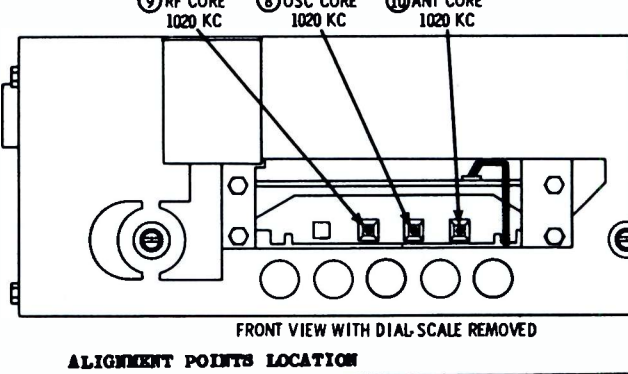
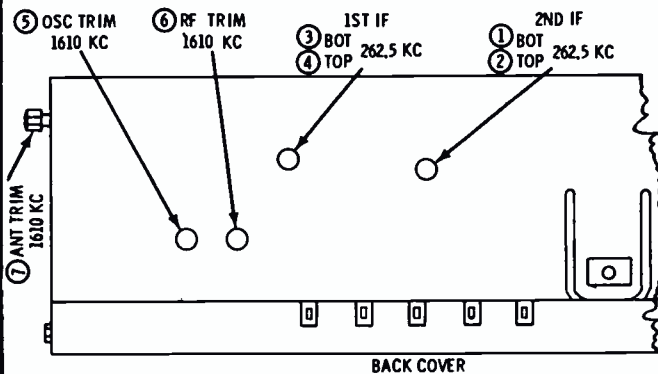


NOTES:

CAPACITORS - Decimal values in MF. All others in MMF unless otherwise specified.
 PLATE BOARD WIRING LEGEND
 ■ = B+ ▲ = FILAMENT ▬ = AVC

(COMPONENTS SHOWN ARE ON OPPOSITE SIDE).

PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM SIDE



FRONT VIEW WITH DIAL-SCALE REMOVED

ALIGNMENT POINTS LOCATION

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

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

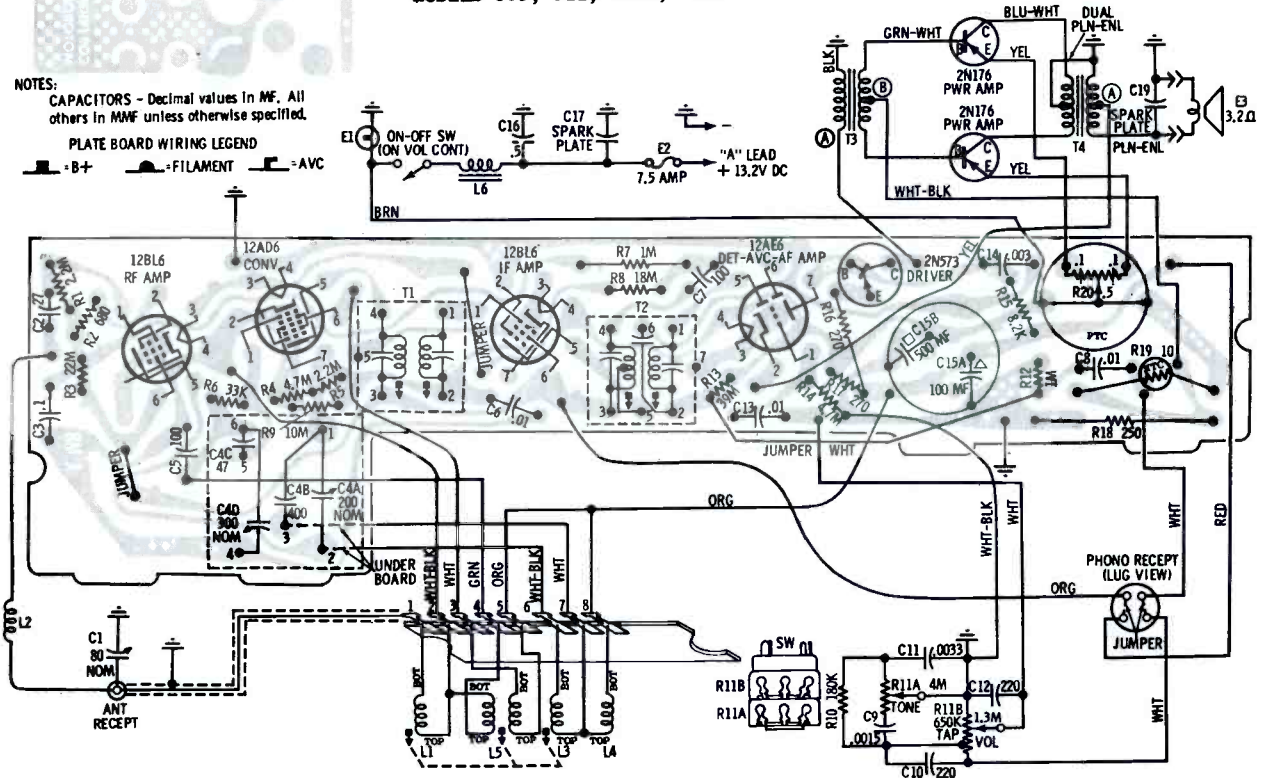
PLATED CHASSIS BOARD GROUND CONNECTIONS AS SEEN THRU BOARD FROM WIRING SIDE
MODELS 309, 311, 314L, 314V

NOTES:

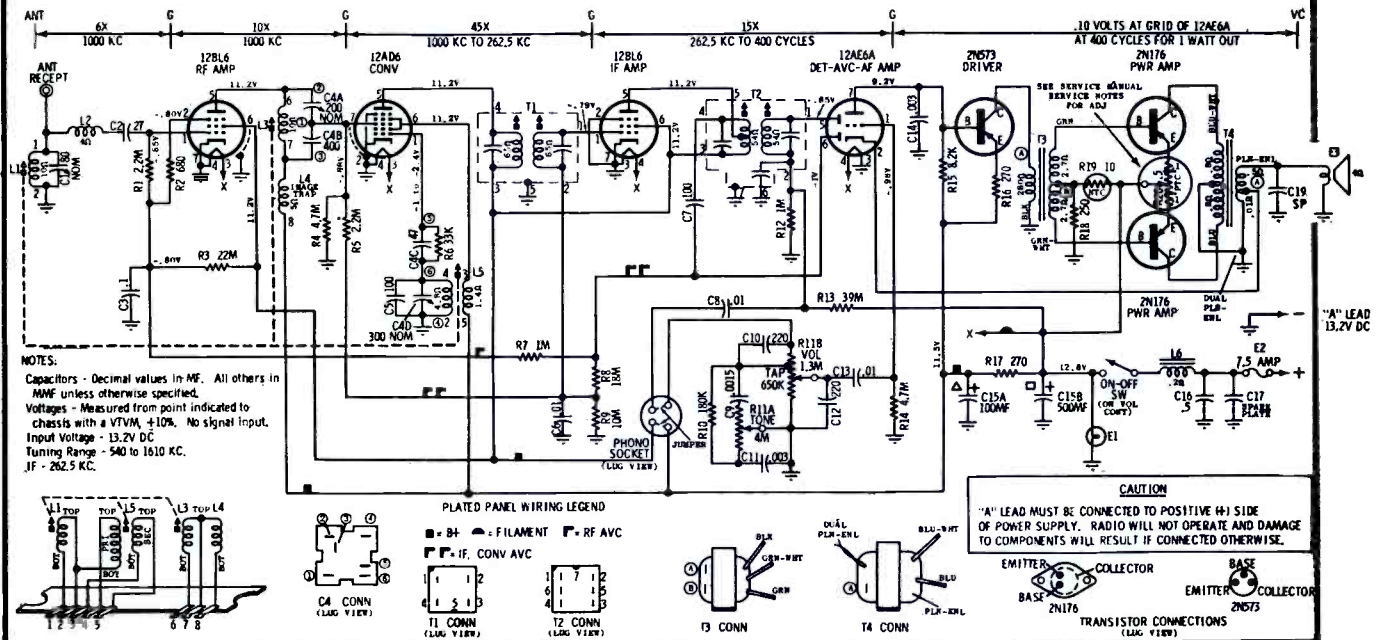
CAPACITORS - Decimal values in MF. All others in MMF unless otherwise specified.

PLATE BOARD WIRING LEGEND

• B+ • FILAMENT • AVC



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

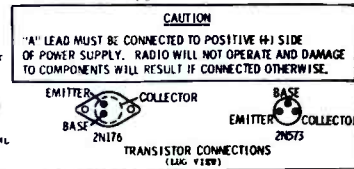


NOTES:
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, +10%. No signal input.
Input Voltage - 13.2V DC
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.

PLATED PANEL WIRING LEGEND

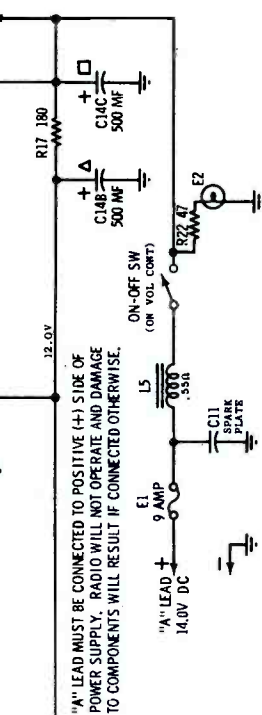
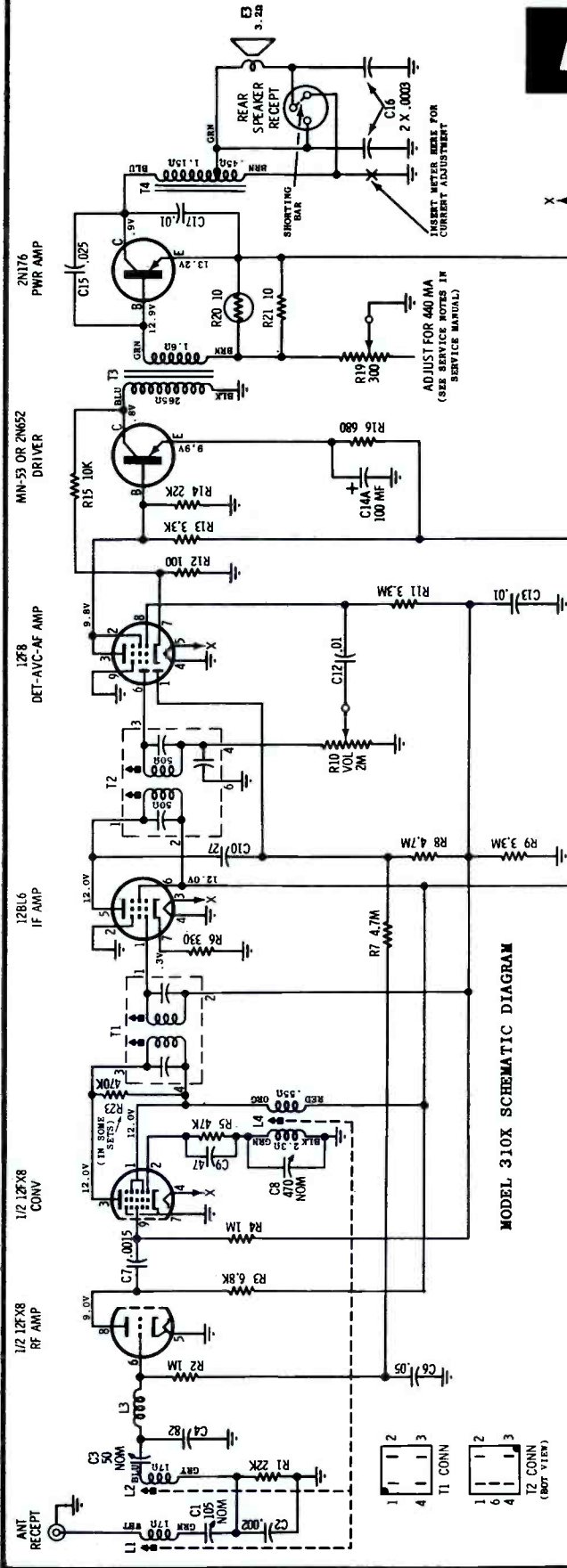
• B+ • FILAMENT • RF AVC

• IF, CONV AVC



MOTOROLA

MODELS 310X and 311X



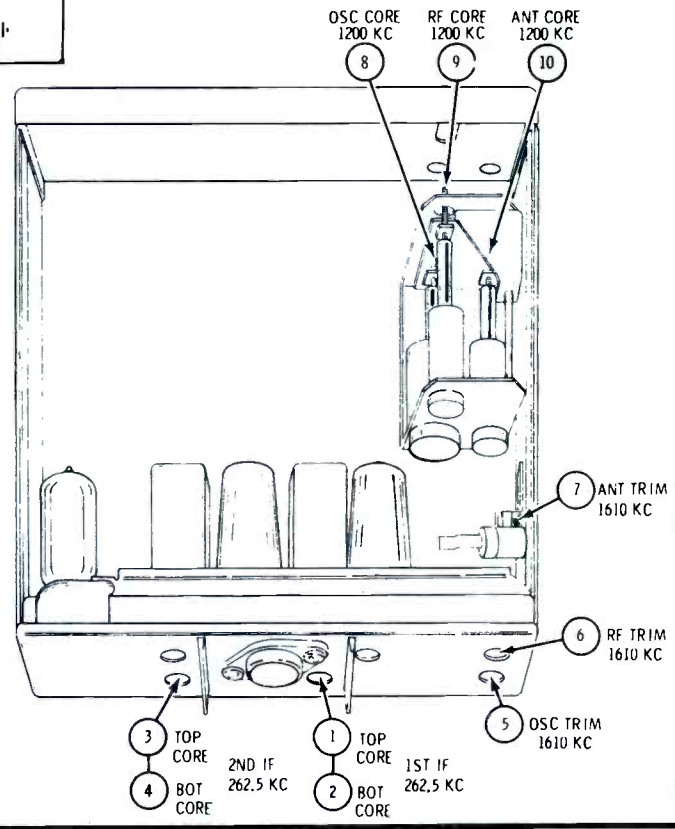
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

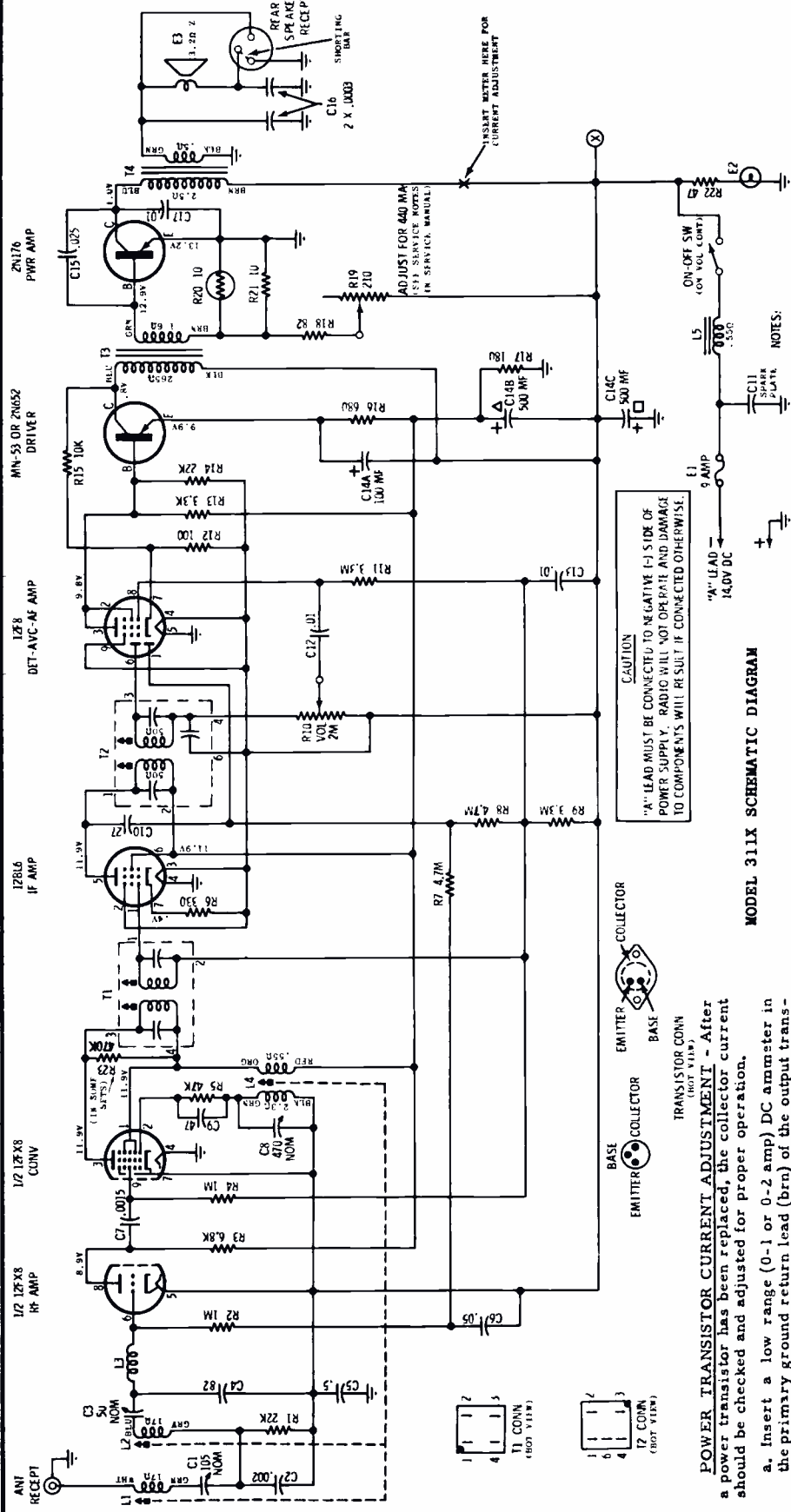
POWER TRANSISTOR INSULATOR - When replacing a power transistor or power transistor insulator, be sure to coat both sides of insulator with DC-4 grease (Motorola Part No. 11M490487) to insure proper heat dissipation.

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.

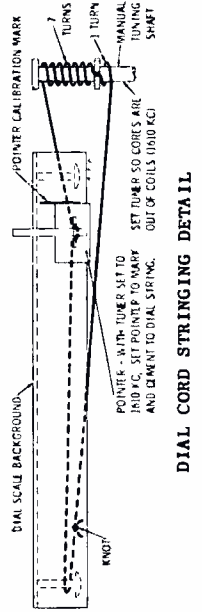




MODEL 311X SCHEMATIC DIAGRAM

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

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



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

a. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead (brn) of the output transformer (T4). See Schematic.
NOTE: In model 310X, connect both the transformer and speaker ground leads to the positive terminal of the meter; connect the negative meter terminal to chassis. In model 311X, connect the positive meter terminal to the brown transformer lead and negative meter terminal to the ON-OFF switch terminal.

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

c. Adjust R19 for a reading of 360 ma with 12.6 volts input to the radio "A" lead.

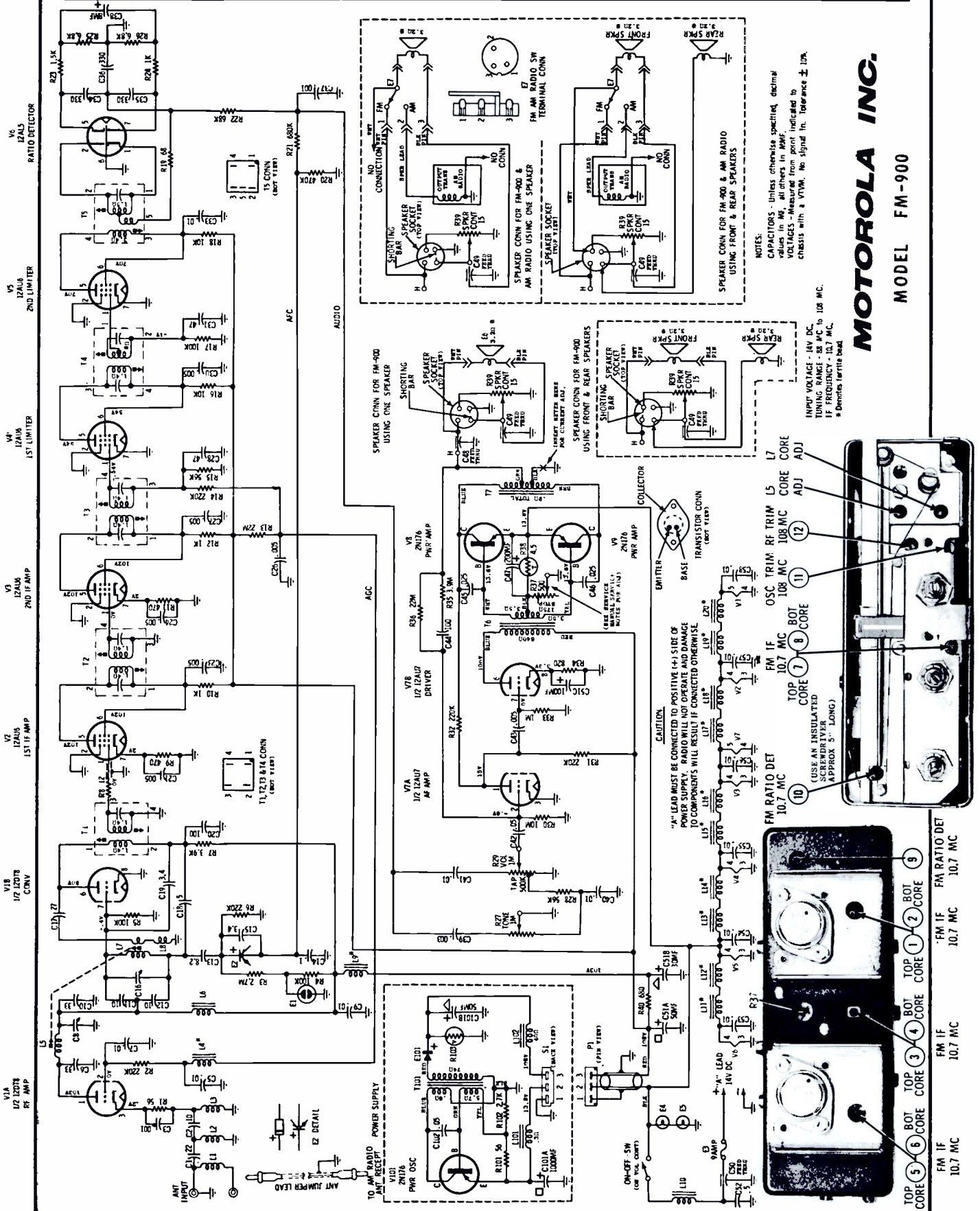
NOTE: Two values of radio input voltage are given as a convenience to service personnel in order to accommodate different power sources. The current value stated on the Schematic Diagram is for 14 volts input to the radio "A" lead.

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

MOTOROLA INC.
MODELS
310X & 311X

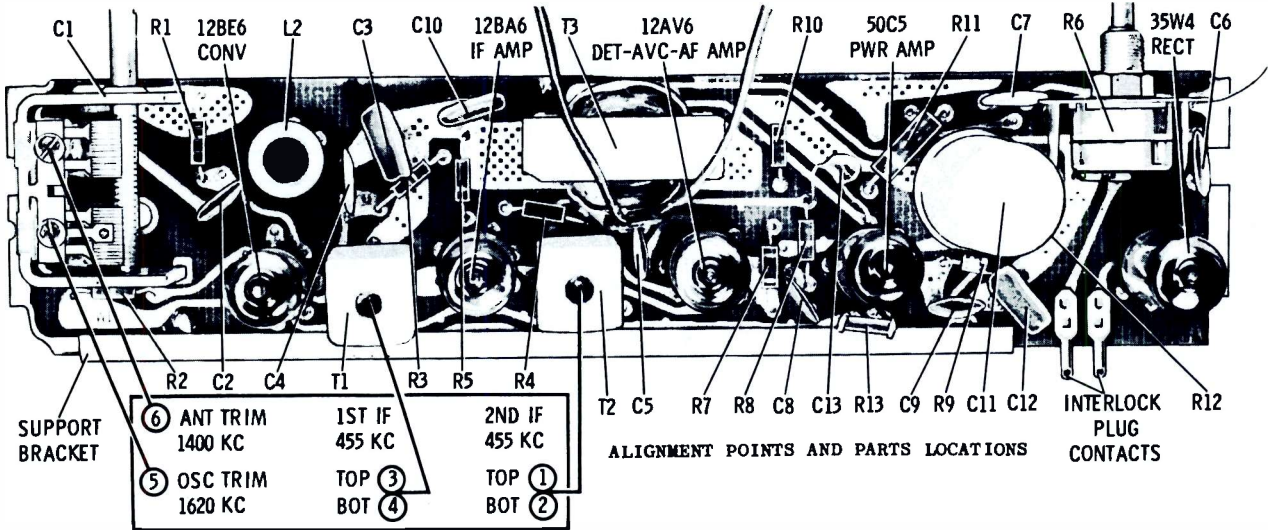
Circuit diagram of 311X is above, and 310X is on preceding page.

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



MOTOROLA

MODELS
A3B, N
CHASSIS
HS-746

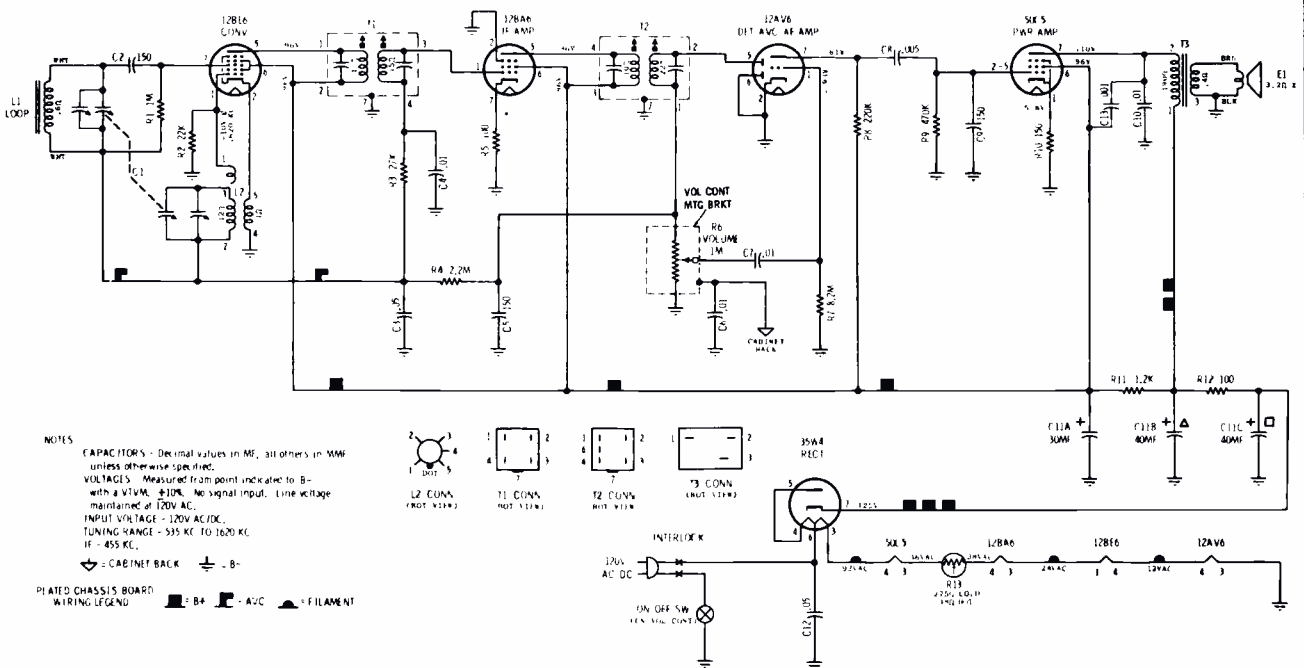


ALIGNMENT

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

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

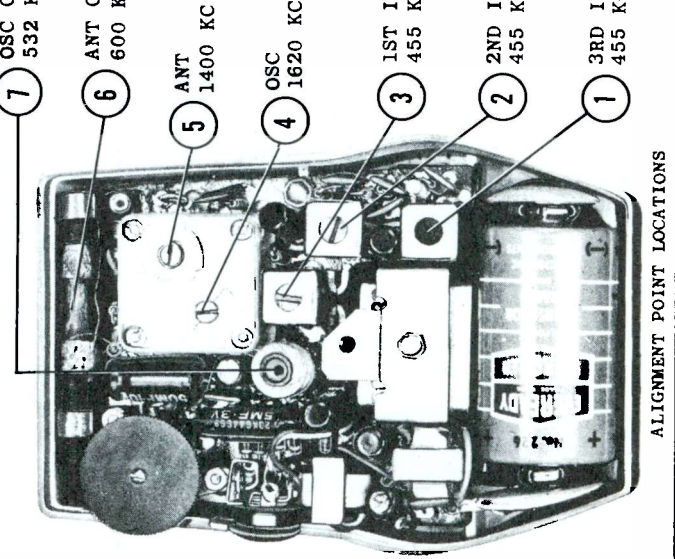
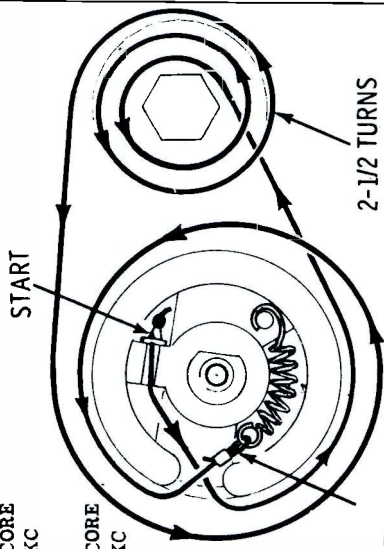
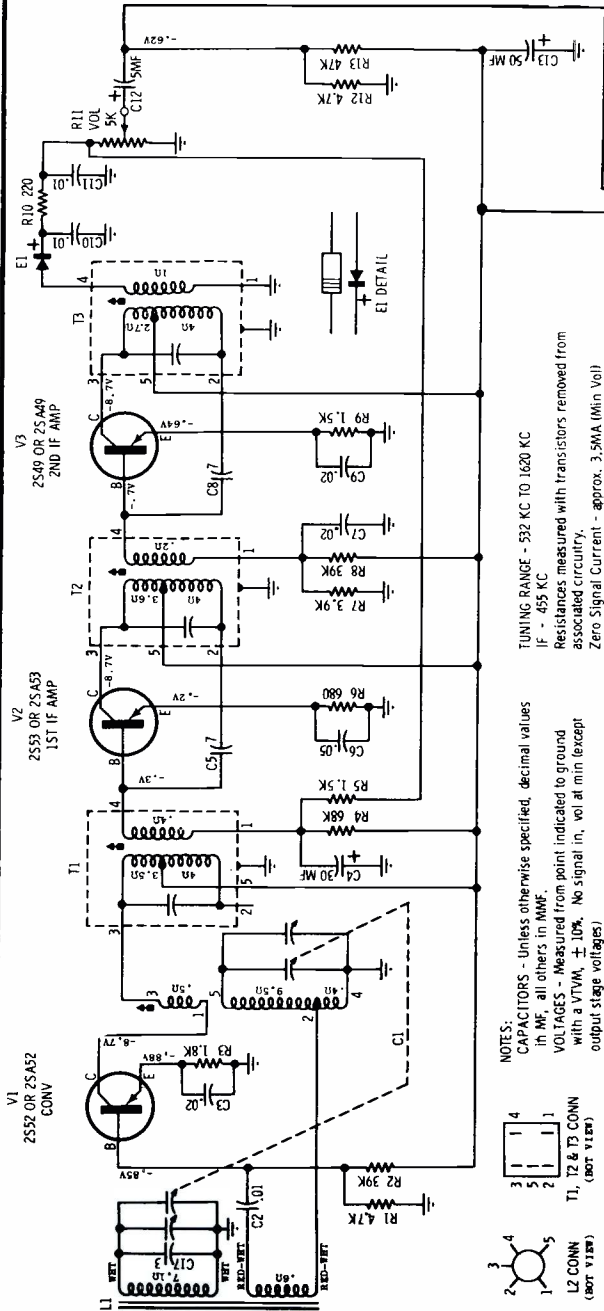
*Connect generator output across 5" diameter, 5 turn loop and couple inductively to receiver loop. Keep radiation loop at least 12" from receiver loop.



MOTOROLA

PORTABLE RADIO

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



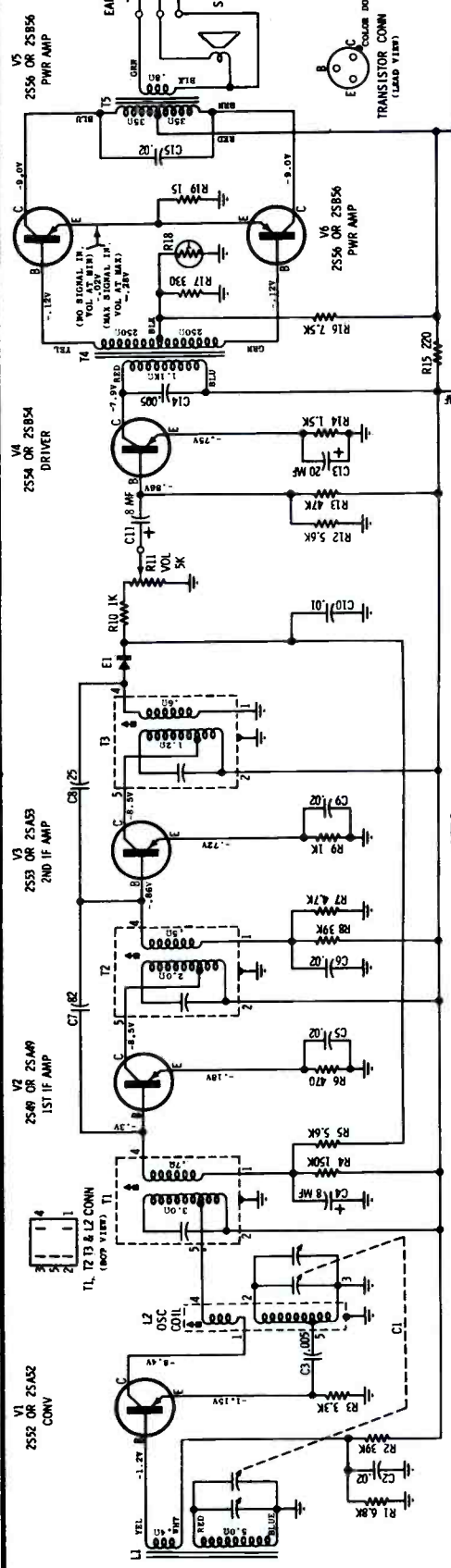
NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in, w/ at min except output stage voltages)
 T1, T2 & T3 CONN (BOT VIEW)
 L2 CONN (BOT VIEW)

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)

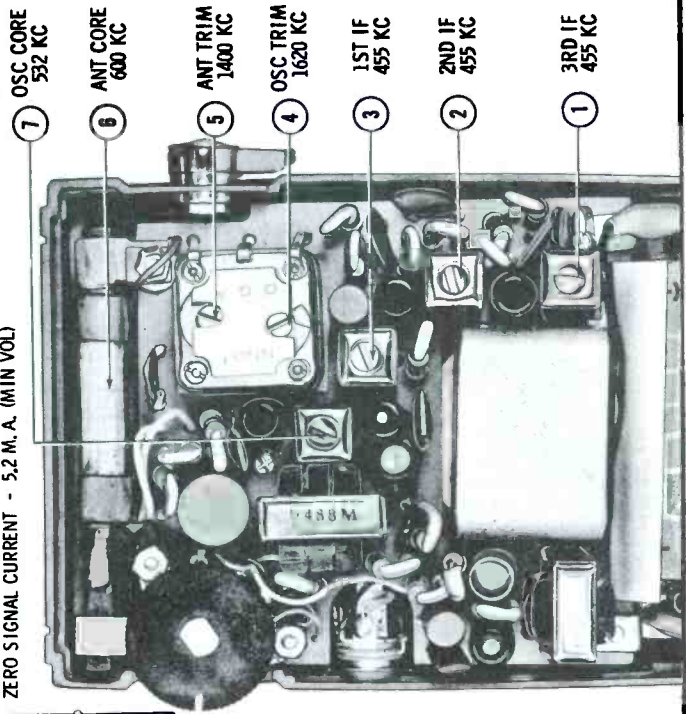
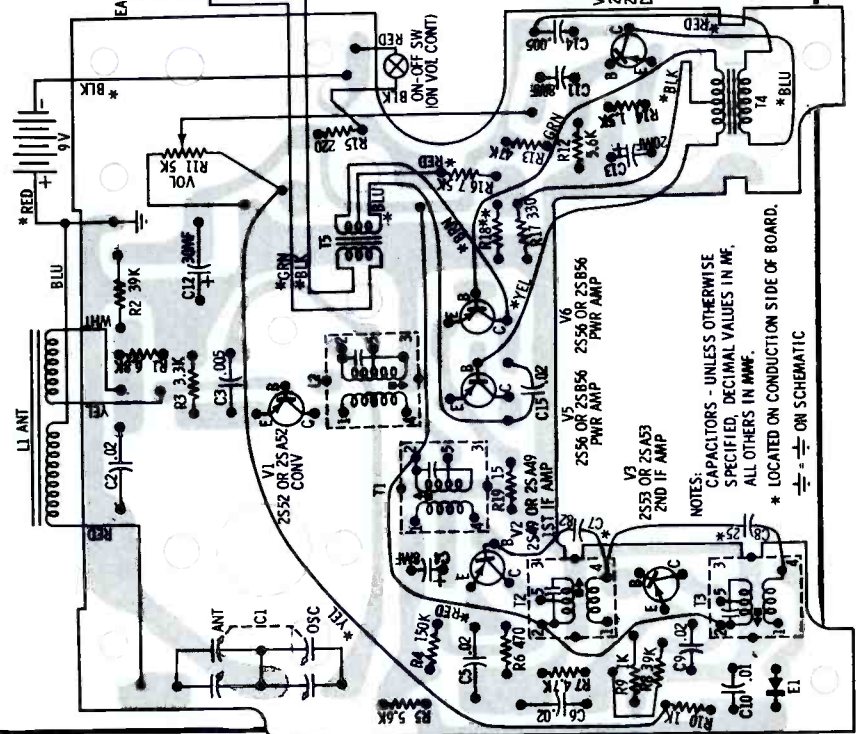
Battery Voltage - Normally this receiver should operate satisfactorily until the battery voltage reaches 6 volts; operation below 6 volts may be unsatisfactory due to increased distortion.
Battery Drain - 3 to 5 ma with no input signal and volume at minimum level.

MOTOROLA INC.

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



NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMEF.
 VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in, vol at min (except zero signal current - 5.2 M.A. (MIN VOL) in output stage).
 RESISTANCES - Measured with transistors removed from associated circuitry.



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

NEEDED 1961 RADIO SERVICING INFORMATION

MOTOROLA INC.

| MODEL | CHASSIS |
|-------|---------|
| X16B | HS-797 |
| X16G | HS-797 |
| X16N | HS-797 |

CHASSIS REMOVAL

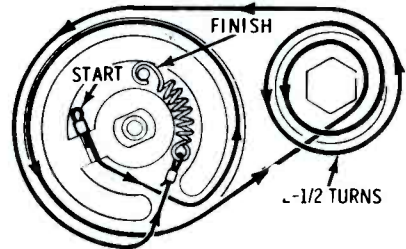
1. Rotate cabinet handle to its carrying position.
2. Loosen captivated back panel mounting screw completely and remove back panel.
3. Remove cabinet back mounting screw and cabinet back.
4. Remove carrying handle and On-Off and Volume knob.
5. Remove 3 chassis mounting screws (in doing so, the cabinet back mounting bracket will also come out).
6. Remove chassis from cabinet (lift up right side of chassis first, to allow the tuning knob to clear its cutout on the cabinet).

BATTERY DRAIN

10-14 ma (max) with no input signal

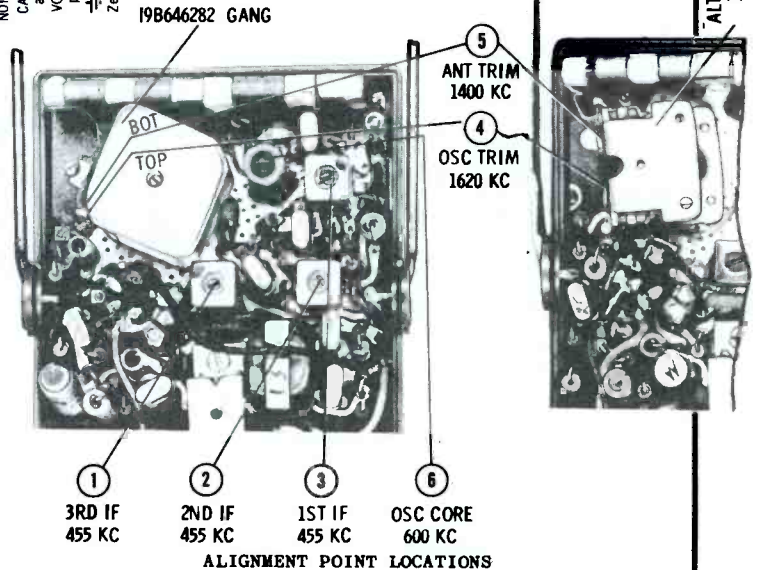
NOTE: Due to the type of circuitry involved, there are two separate battery current paths, therefore, a DPST on-off switch is used. This necessitates two current measurements.

A very simple, convenient method of measuring battery drain can be made without unsoldering any connections. The only items necessary are a low resistance DC milliammeter and a jumper wire or two milliammeters. With the receiver turned off, place a milliammeter across the open terminals of one section of the switch and the jumper across the other section of the switch; the receiver is automatically turned on at the minimum volume level. The meter should read 10-14 ma; then interchange jumper wire and milliammeter connections, the meter should read 10-14 ma. If two milliammeters are available, place one across each section of the switch; each meter should read 10-14 ma.

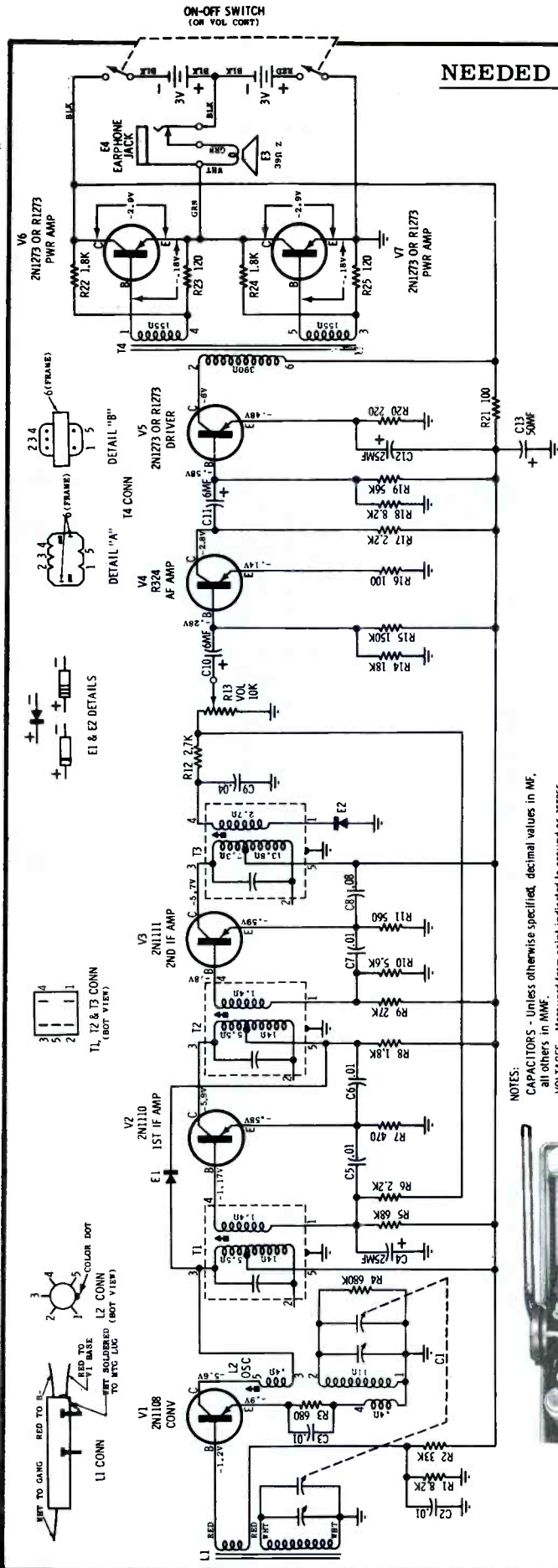


GANG SET TO HIGH END (1620 KC)

NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES - Measured from point indicated to ground or across points indicated with a VTVM, ±10%. No signal in.
 ⊕ = ground
 Zero Signal Current - approx. 12 MA (Min Vol)
 TUNING RANGE - 535 KC to 1620 KC
 IF - 455 KC
 Resistances measured with transistors removed from associated circuitry.

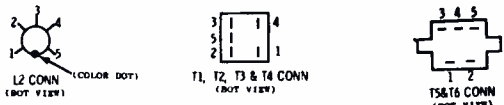
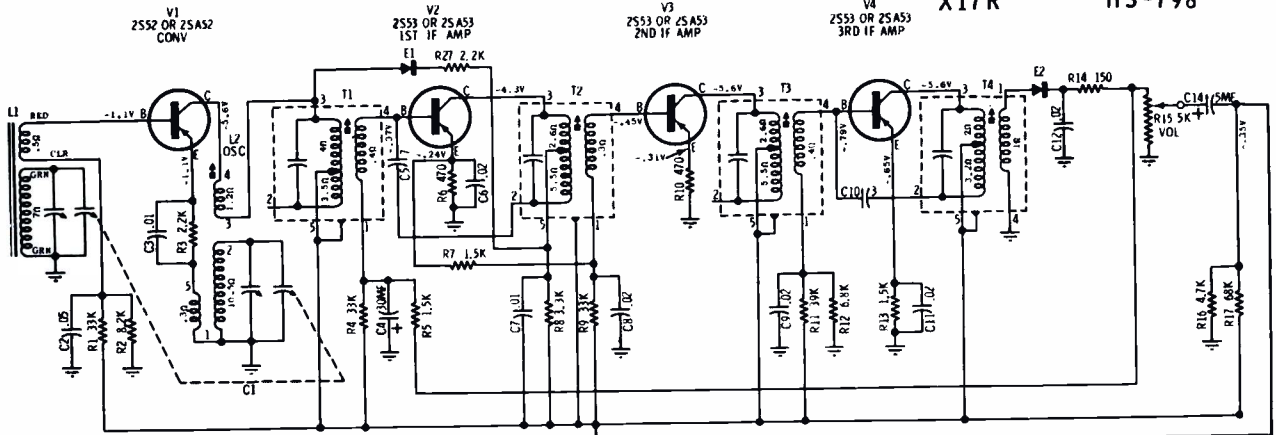


ALIGNMENT POINT LOCATIONS

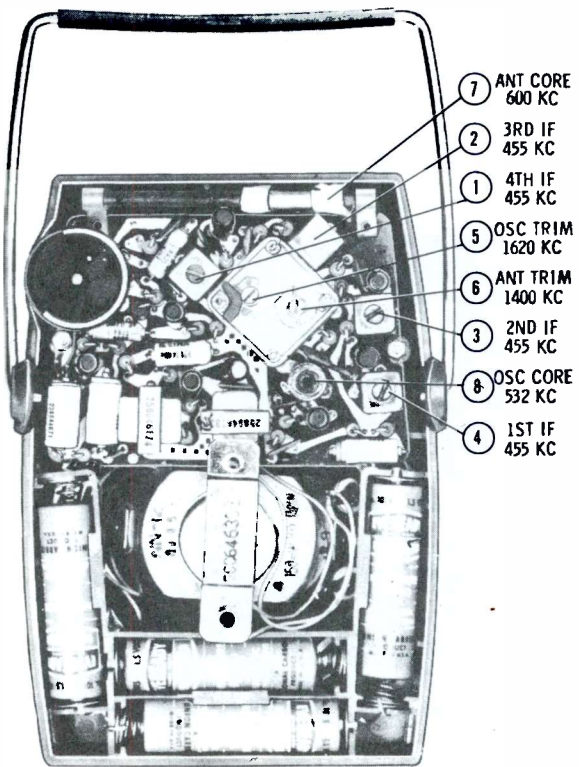
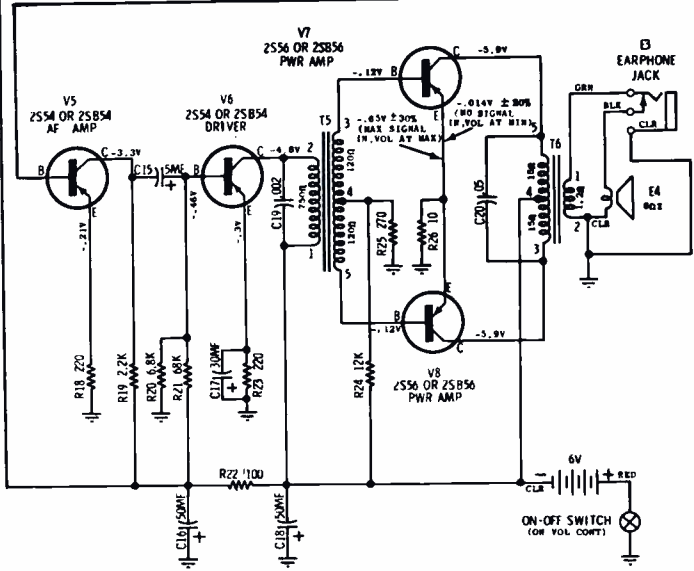
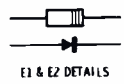


MOTOROLA

| | |
|-------|---------|
| 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



ALIGNMENT POINT LOCATIONS

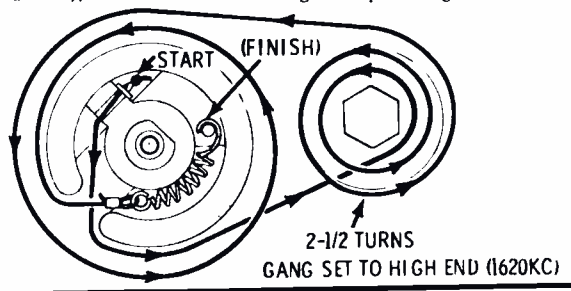
- 7 ANT CORE 600 KC
- 2 3RD IF 455 KC
- 1 4TH IF 455 KC
- 5 OSC TRIM 1620 KC
- 6 ANT TRIM 1400 KC
- 3 2ND IF 455 KC
- 8 OSC CORE 532 KC
- 4 1ST IF 455 KC

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.

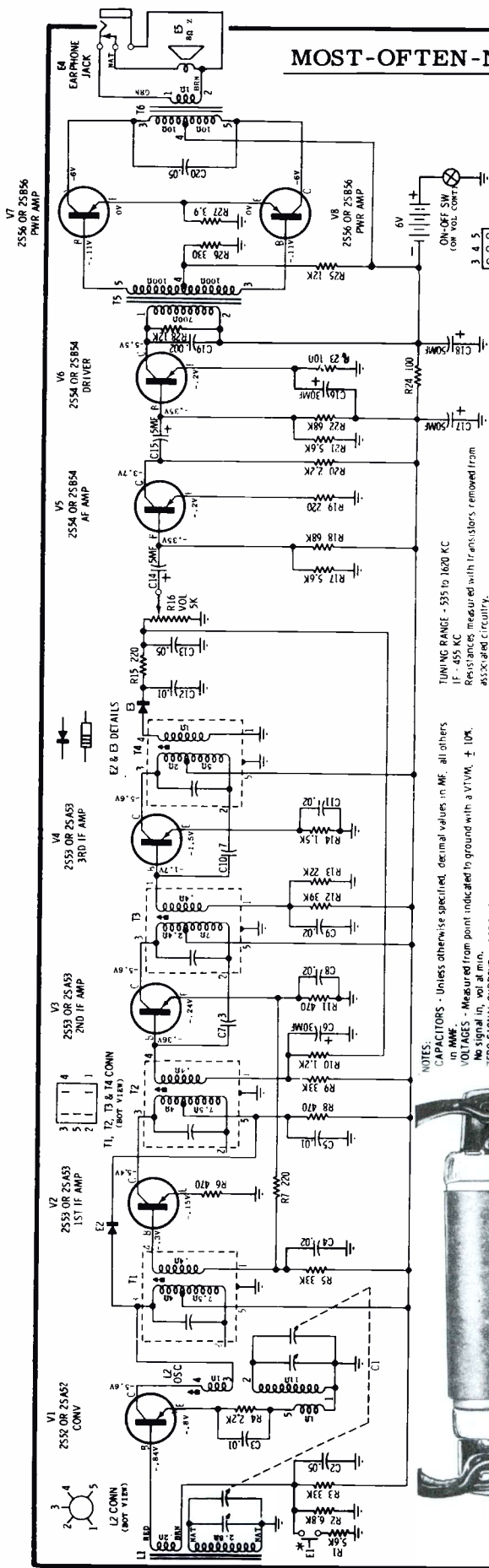
SPEAKER REMOVAL

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.



DIAL STRINGING DETAIL

MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



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.
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.

CHASSIS REMOVAL

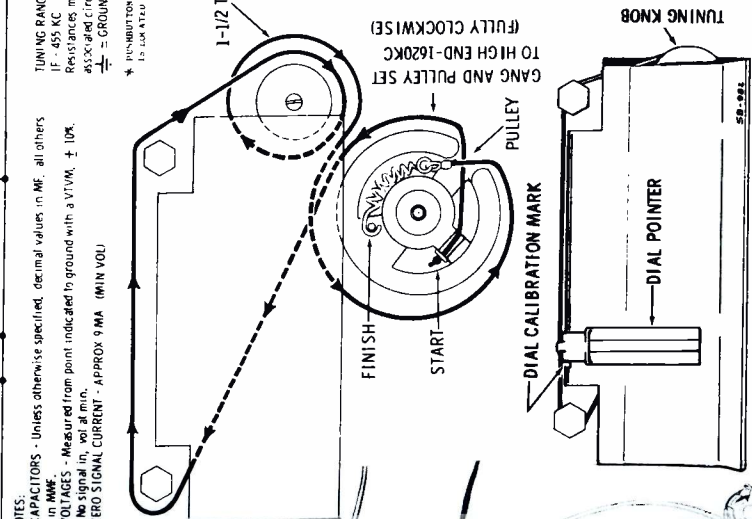
1. Lift off battery compartment cover and remove batteries.
2. Remove 2 cabinet back mounting screws located under batteries and remove cabinet back far enough to gain access to earphone jack; unscrew earphone jack mounting nut.
3. Unsolder battery leads connected to battery compartment on cabinet back.
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

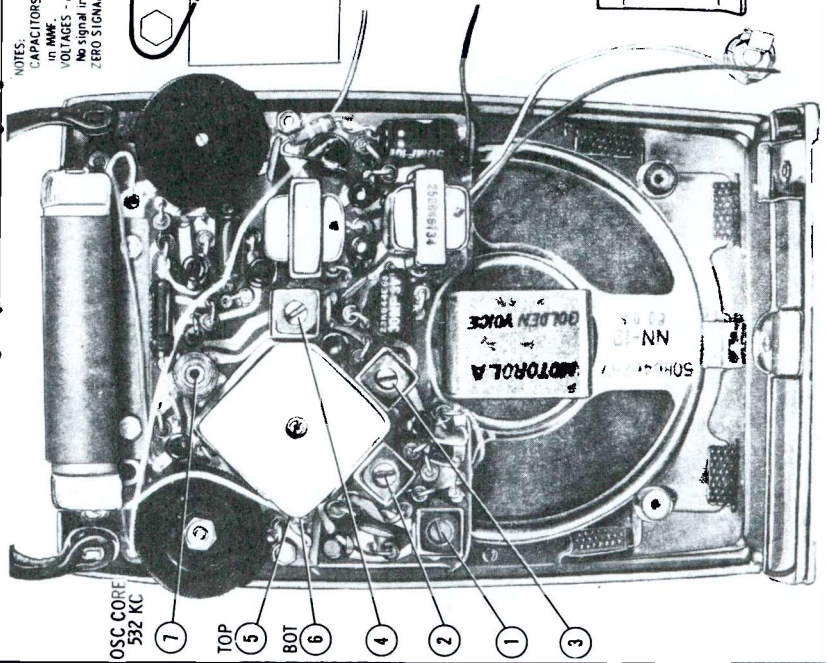
1. Remove chassis from cabinet (see Chassis Removal).
2. Remove decorative nut from cabinet front (on Battery Life Indicator Button).
3. From inside front cabinet, bend up the 8 speaker grille mounting tabs and then remove the grille and speaker gasket.
4. Bend up the 3 speaker mounting tabs and remove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

MOTOROLA INC.

MODEL CHASSIS
X19A HS-799
X19E HS-799



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



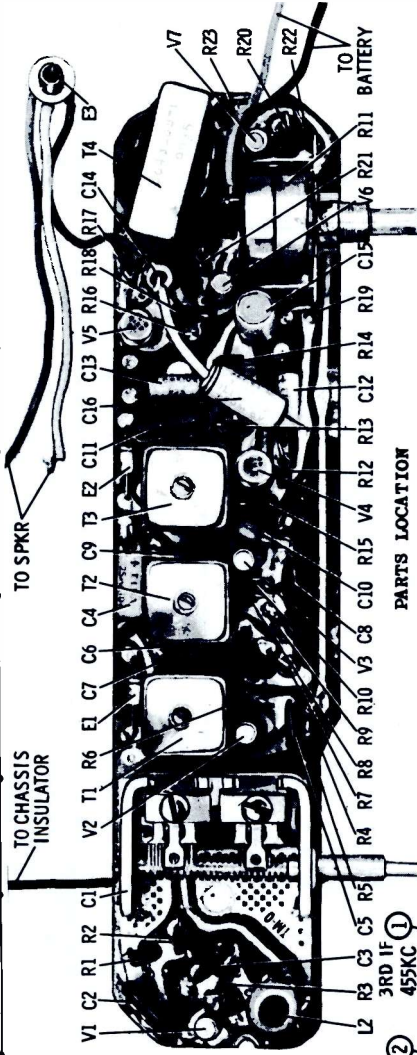
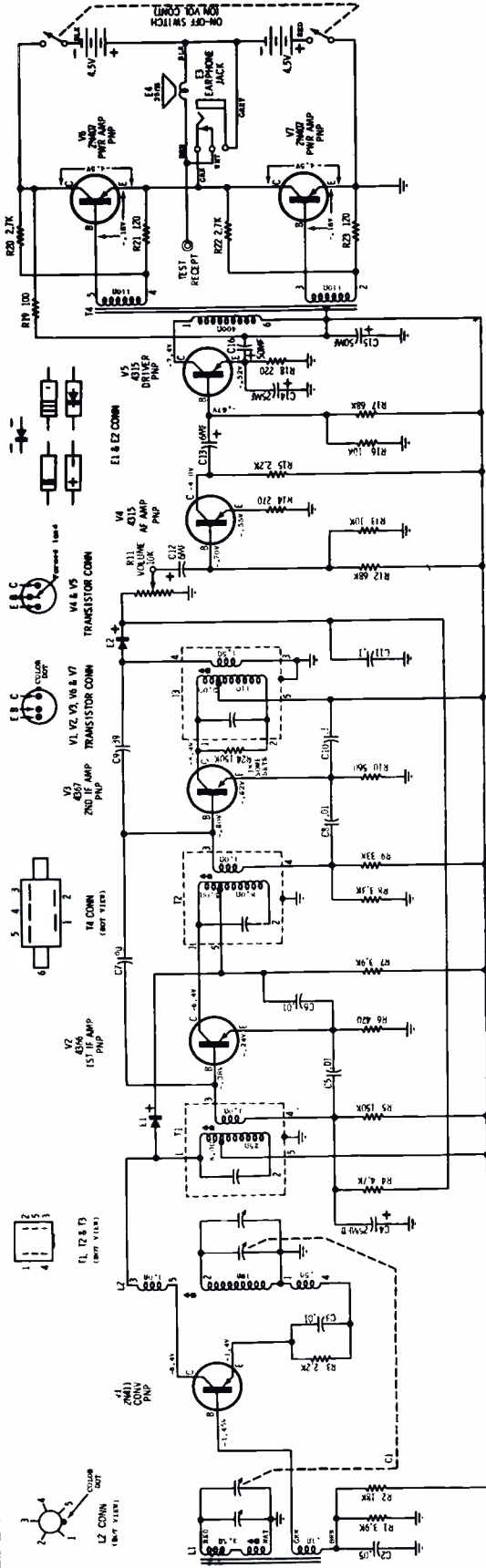
- OSC CORE 532 KC
- OSC TRIM 1620 KC
- ANT TRIM 1400 KC
- 1ST IF 455 KC
- 3RD IF 455 KC
- 4TH IF 455 KC
- 2ND IF 455 KC

ALIGNMENT POINT LOCATIONS

DIAL STRINGING DETAIL

MOTOROLA

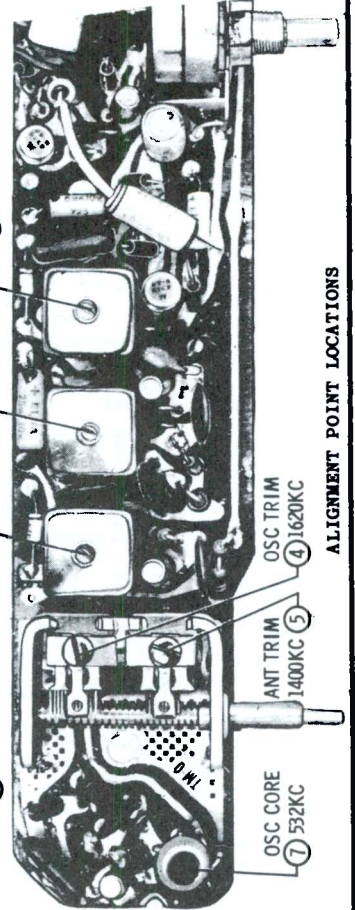
MODEL CHASSIS
L20E HS-800



PARTS LOCATION

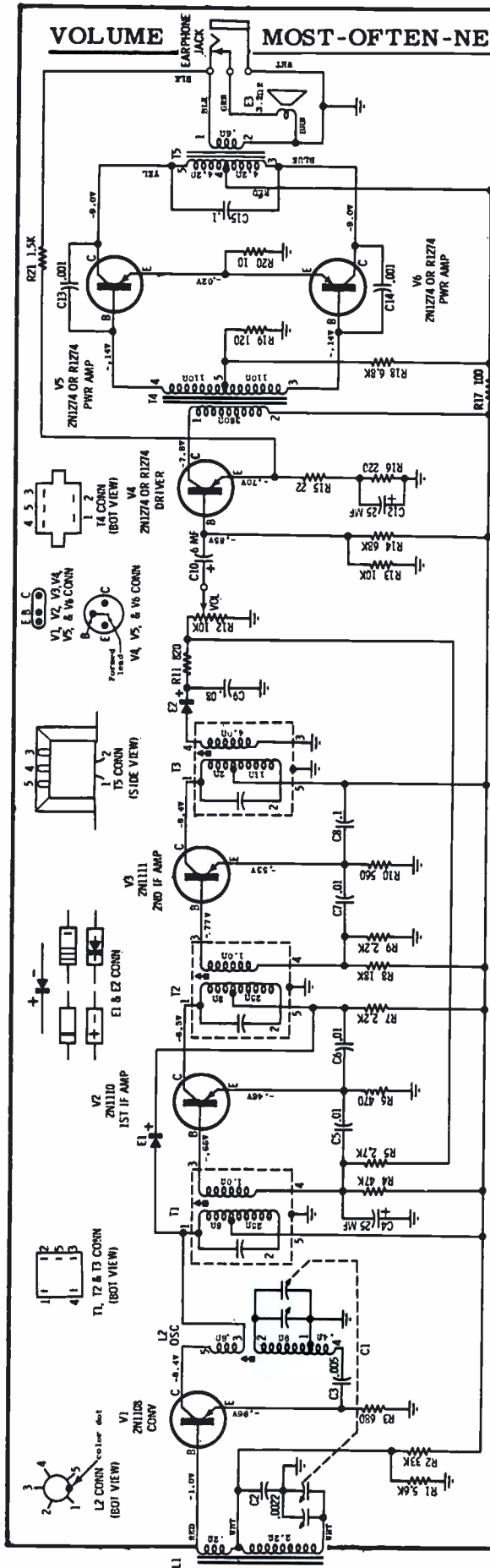
CHASSIS REMOVAL

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

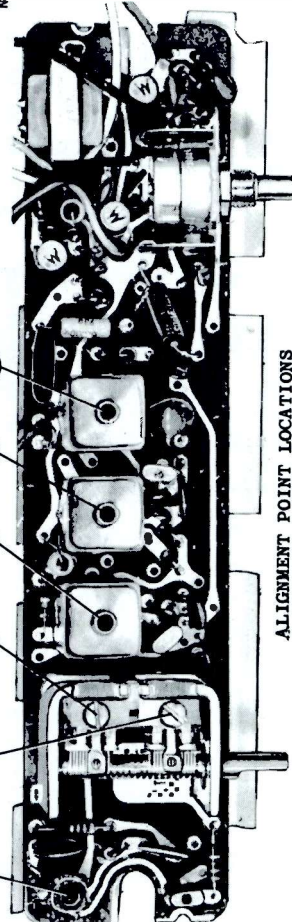


NOTES:
CAPACITORS - unless otherwise specified, nominal values in MK.
VOL RES - MK.
VOL RES - Measured from point indicated to ground or across points indicated with a VTVM. $\pm 1\%$. No signal in.
TUNING RANGE - 535 KC to 1625 KC.
IF - 455 KC.
Resistances measured with transistors removed from assembled circuitry.
 \perp - Ground
ZERO SIGNAL CURRENT - APPROX. 12-14 MA (MAX. VOLT)

VOLUME MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



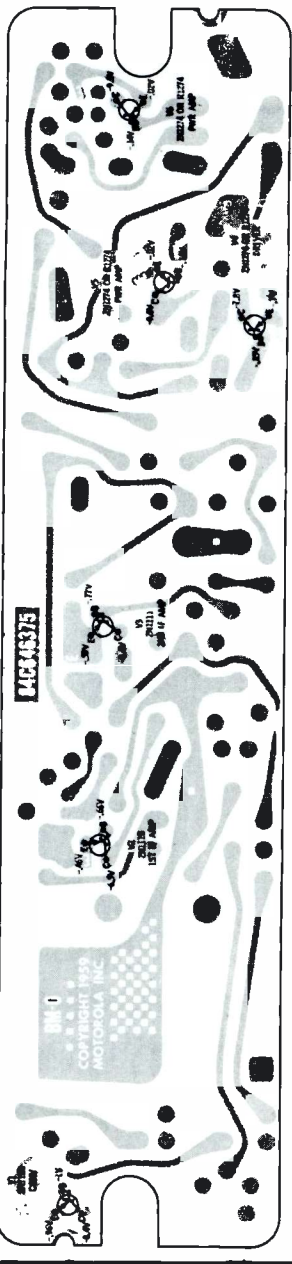
- OSC CORE 532 KC
- ANT TRIM 1400 KC
- 1ST IF 455 KC
- 2ND IF 455 KC
- 3RD IF 455 KC



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.
 TUNING RANGE - 535 KC to 1620 KC.
 IF - 455 KC.

CABINET BACK REMOVAL:

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



MOTOROLA INC.

PORTABLE / TABLE RADIO

MODEL CHASSIS
 XT18B HS-802
 XT18S HS-802

CORDLESS 1500 SERIES

MOTOROLA

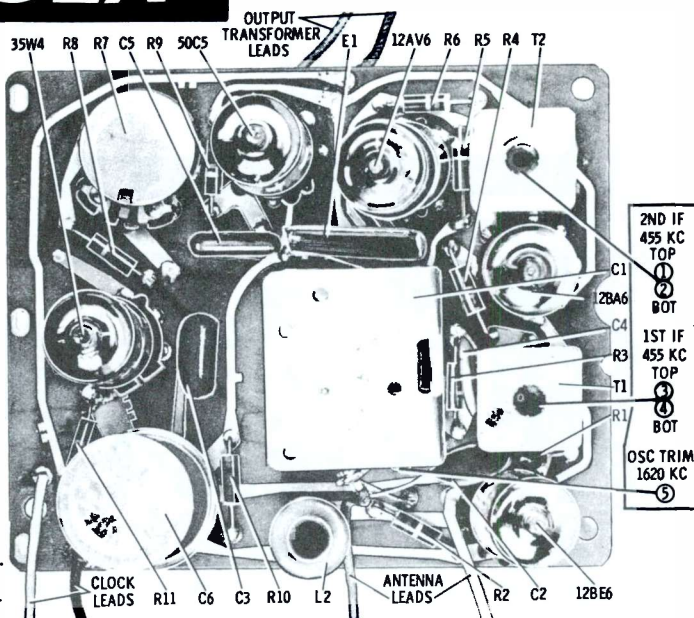
| MODELS | CHASSIS |
|--------|---------|
| C10N | HS-813 |
| C10P | HS-813 |
| C10W | HS-813 |

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

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

TO REMOVE CHASSIS FROM CABINET

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

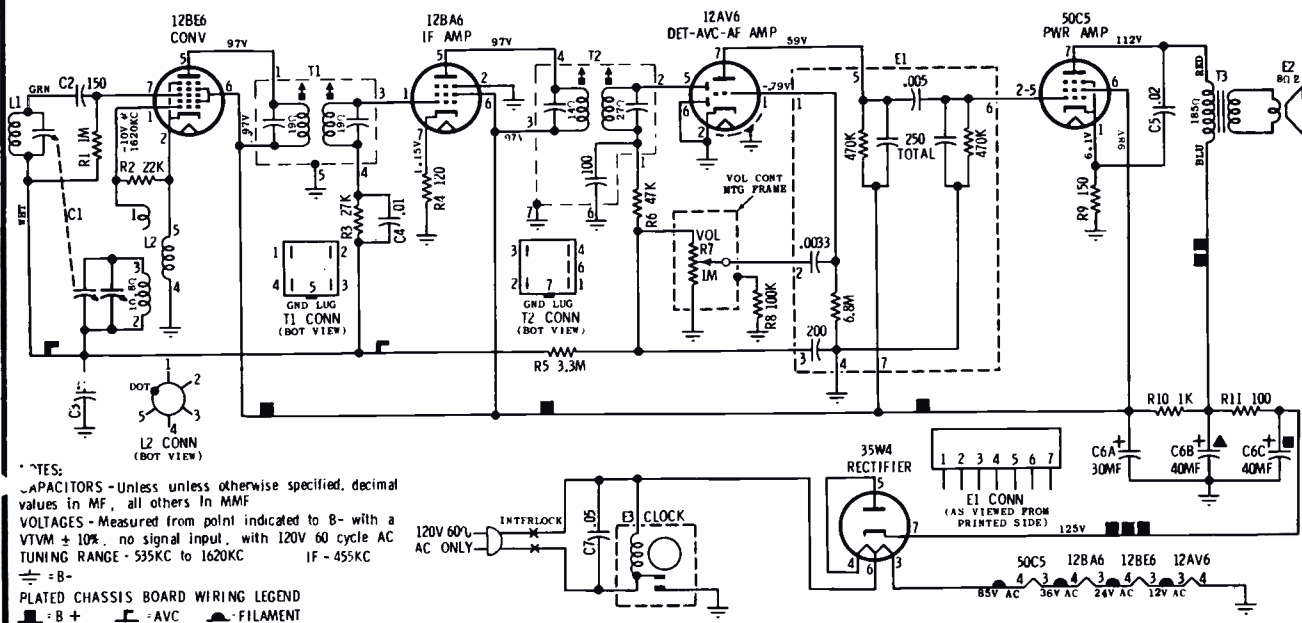


ALIGNMENT POINTS AND PARTS LOCATION

ALIGNMENT

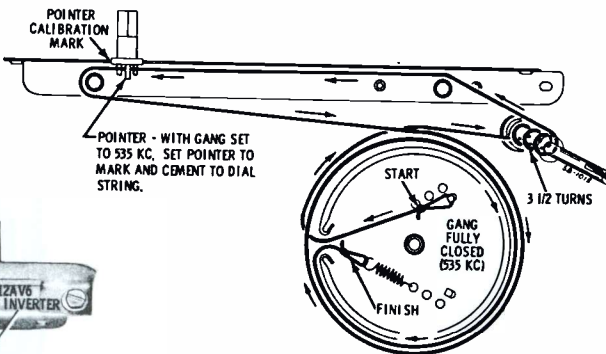
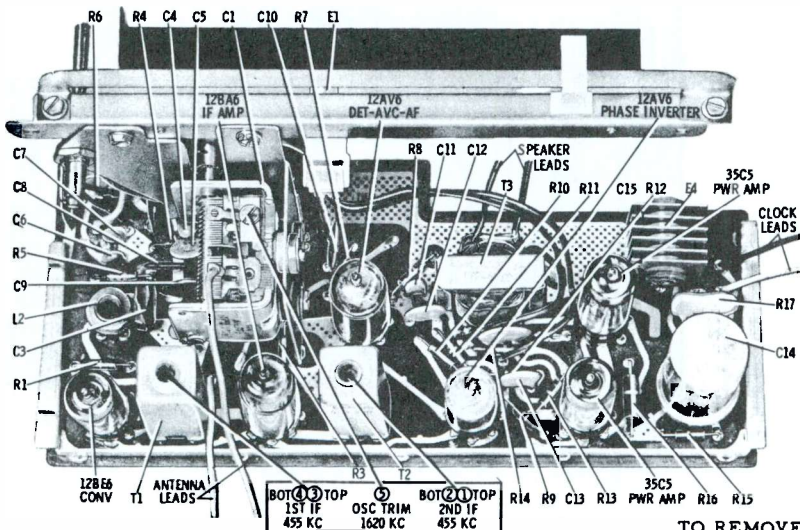
Use an isolation transformer between the power line and the receiver. If not available, connect low side of generator to B- through a .1 mf capacitor. Connect a low range output meter across speaker voice coil and set volume control to maximum. Attenuate generator output to maintain .64 volts on output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

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



MOTOROLA INC.

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



DIAL STRINGING DETAIL

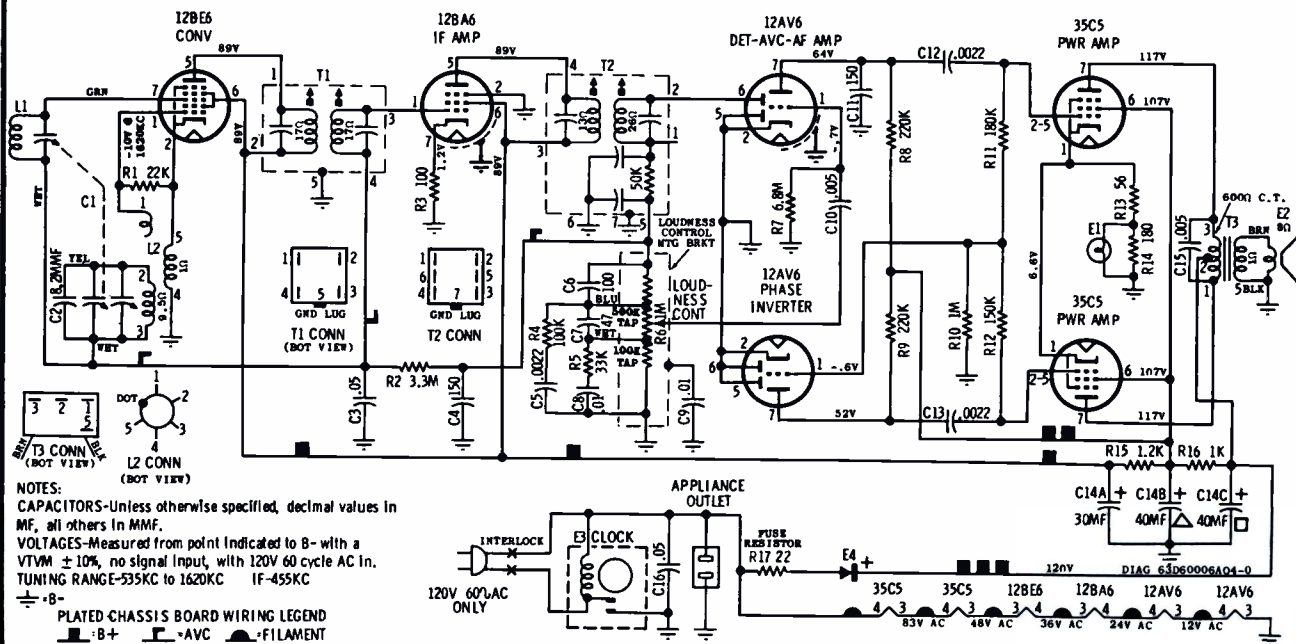
ALIGNMENT POINTS AND PARTS LOCATION

TO REMOVE 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

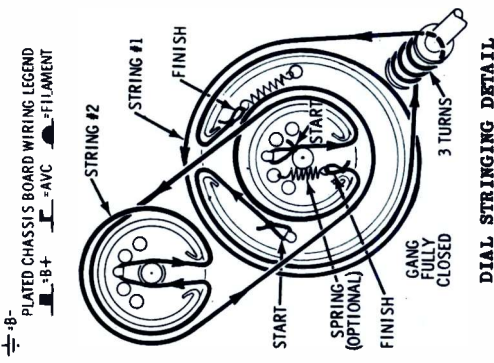
1. Remove cabinet back - 5 screws hold it in place.
2. Unsolder all leads connected to clock.
3. Remove 2 appliance outlet bracket mounting screws and remove bracket.
4. Insert a screwdriver between the cabinet and left edge of the clock crystal (near 9 o'clock on clock face) to release catch, then pry 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.



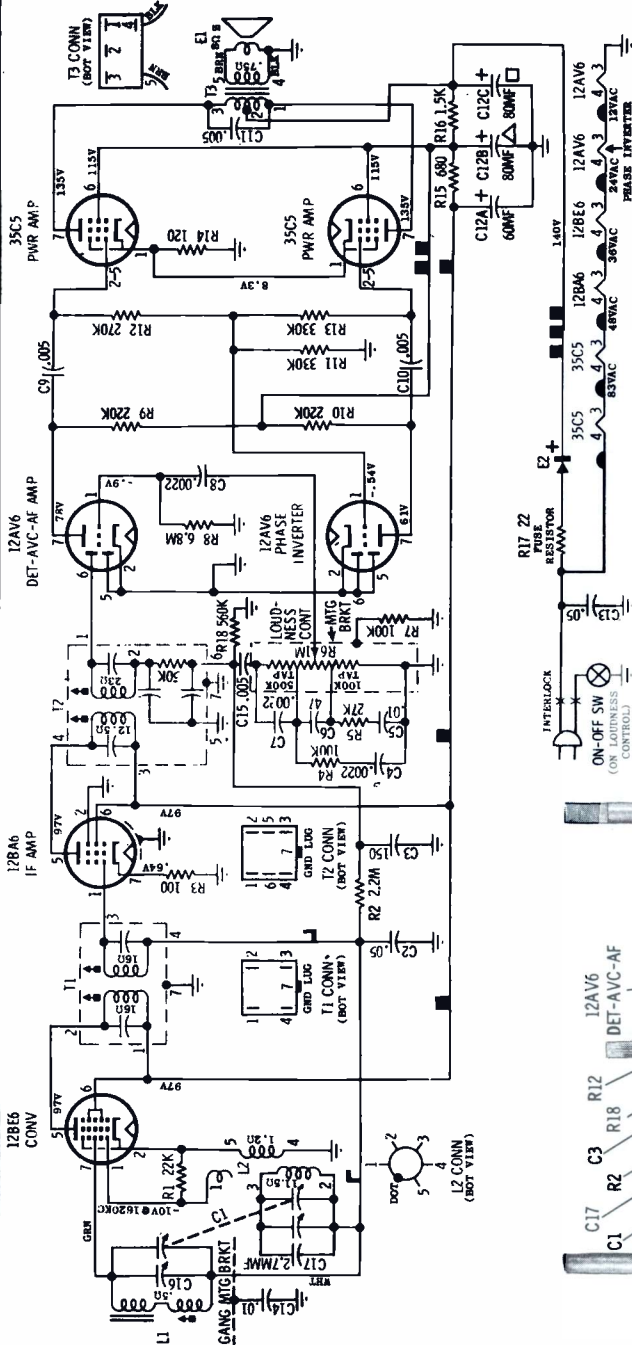
NOTES:
 CAPACITORS—Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES—Measured from point indicated to B- with a VTVM $\pm 10\%$, no signal input, with 120V 60 cycle AC in.
 TUNING RANGE—535KC to 1620KC IF—455KC
 B-
 PLATED CHASSIS BOARD WIRING LEGEND
 B+ AVc FILAMENT

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

NOTES: CAPACITORS—Unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES—Measured from point indicated to B— with a VTVM ± 10%, no signal input, with 120V 60 cycle AC in.
 TUNING RANGE 535KC to 1620KC (1F-455KC)
 PLATED CHASSIS BOARD WIRING LEGEND
 -B+ = FILAMENT



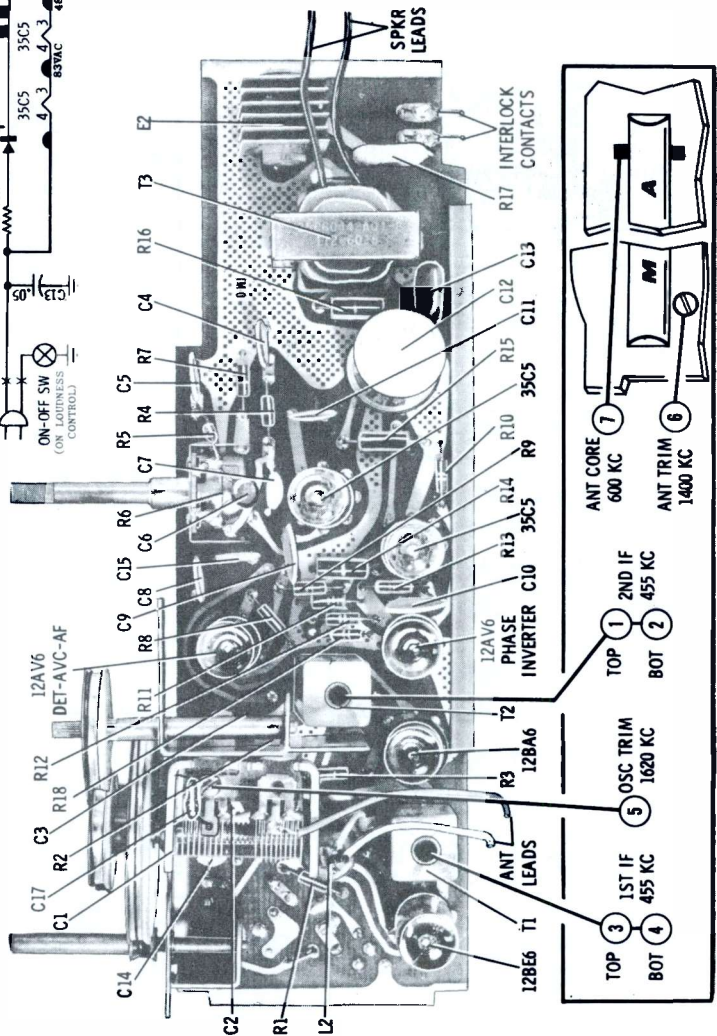
DIAL STRINGING DETAIL



| Ref. No. | Part Number | Description |
|----------|-------------|---|
| C-1 | 18B60323A01 | Capacitor, variable: 2 gang |
| C-2 | 8B128613 | Capacitor, mylar: .05 mf 400V |
| C-3 | 21K129650 | Capacitor, cer disc: 150 mf 500V |
| C-4 | 21K129665 | Capacitor, cer disc: .0022 mf 500V |
| C-5 | 21K129718 | Capacitor, cer disc: .01 mf 500V |
| C-6 | 21K115493 | Capacitor, cer disc: 400 mf 500V |
| C-7 | 21K129665 | Capacitor, cer disc: .0022 mf 500V |
| C-8 | 21K129665 | Capacitor, cer disc: .0022 mf 500V |
| C-9 | 21K129921 | Capacitor, cer disc: .005 mf 500V |
| C-10 | 21K129921 | Capacitor, cer disc: .005 mf 500V |
| C-11 | 21K129921 | Capacitor, cer disc: .005 mf 500V |
| C-12 | 23B60423A01 | Capacitor, electrolytic: 60-80-80 mf/150V |
| C-13 | 8B128613 | Capacitor, mylar: .05 mf 400V |
| C-14 | 21K129718 | Capacitor, cer disc: .01 mf 500V |
| C-15 | 21K129921 | Capacitor, cer disc: .005 mf 500V |
| C-16 | 20B60120A01 | Capacitor, mica trim: 1.3 mf to 11 mf |
| C-17 | 21A541621 | Capacitor, cer tub: 2.7 mf 500V NTC |

TO REMOVE CHASSIS FROM CABINET

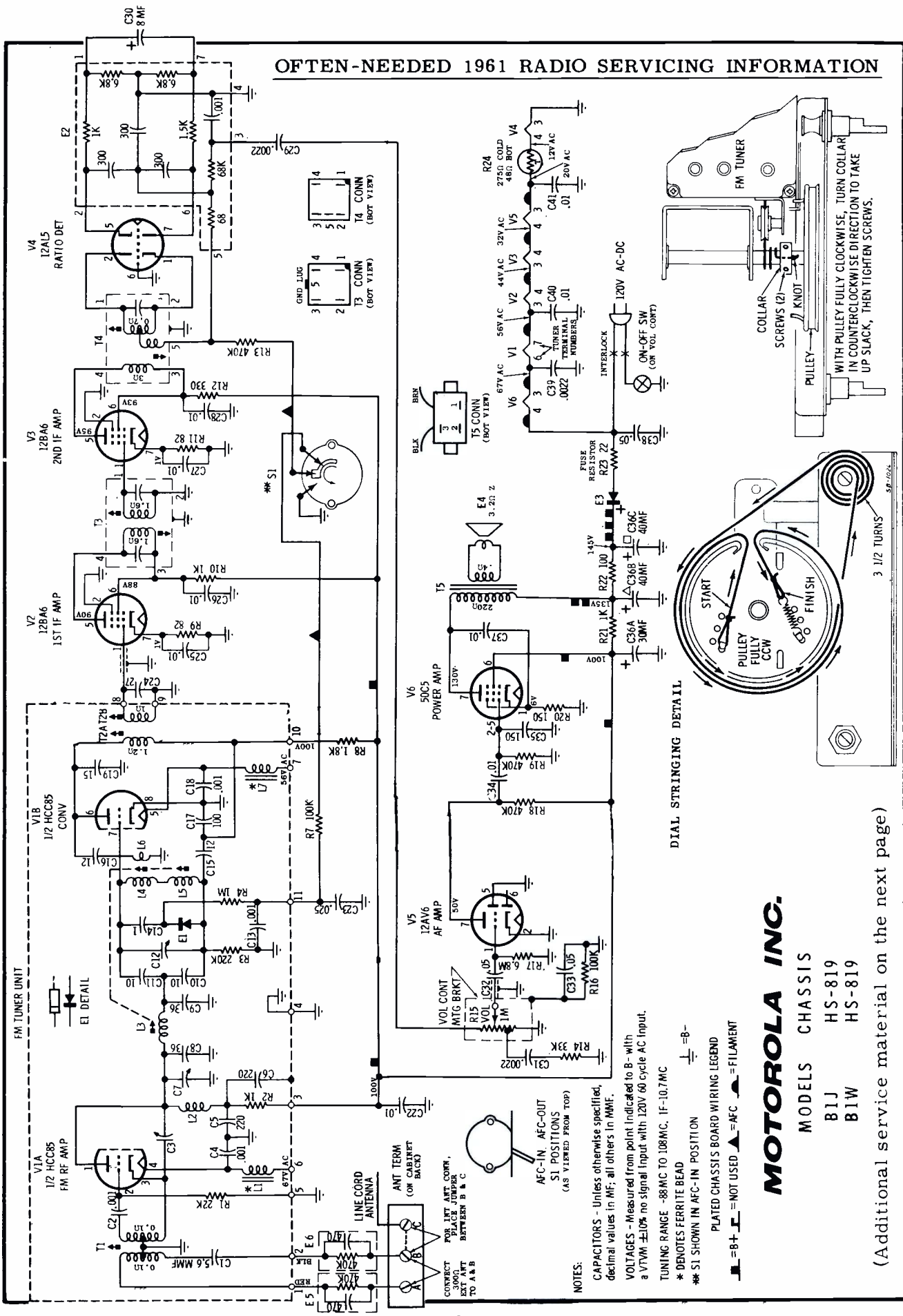
1. Remove back cover - 4 screws hold it in place.
2. From rear, remove 3 dial crystal mounting screws and 3 chassis mounting screws.
3. From front, remove 2 control knobs, dial crystal and dial pointer (observe dial calibration).
4. Unsolder 2 speaker leads and remove chassis from cabinet.



ALIGNMENT ADJUSTMENTS & PARTS LOCATION

MOTOROLA
 MODELS CHASSIS
 A11A HS-824
 A11W HS-824

OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



DIAL STRINGING DETAIL

MOTOROLA INC.

- MODELS CHASSIS
 B1J HS-819
 B1W HS-819

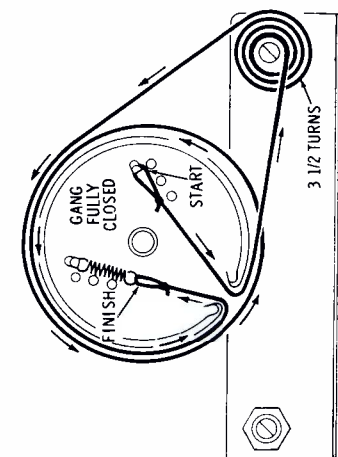
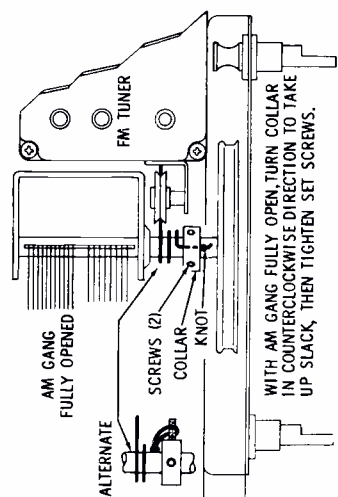
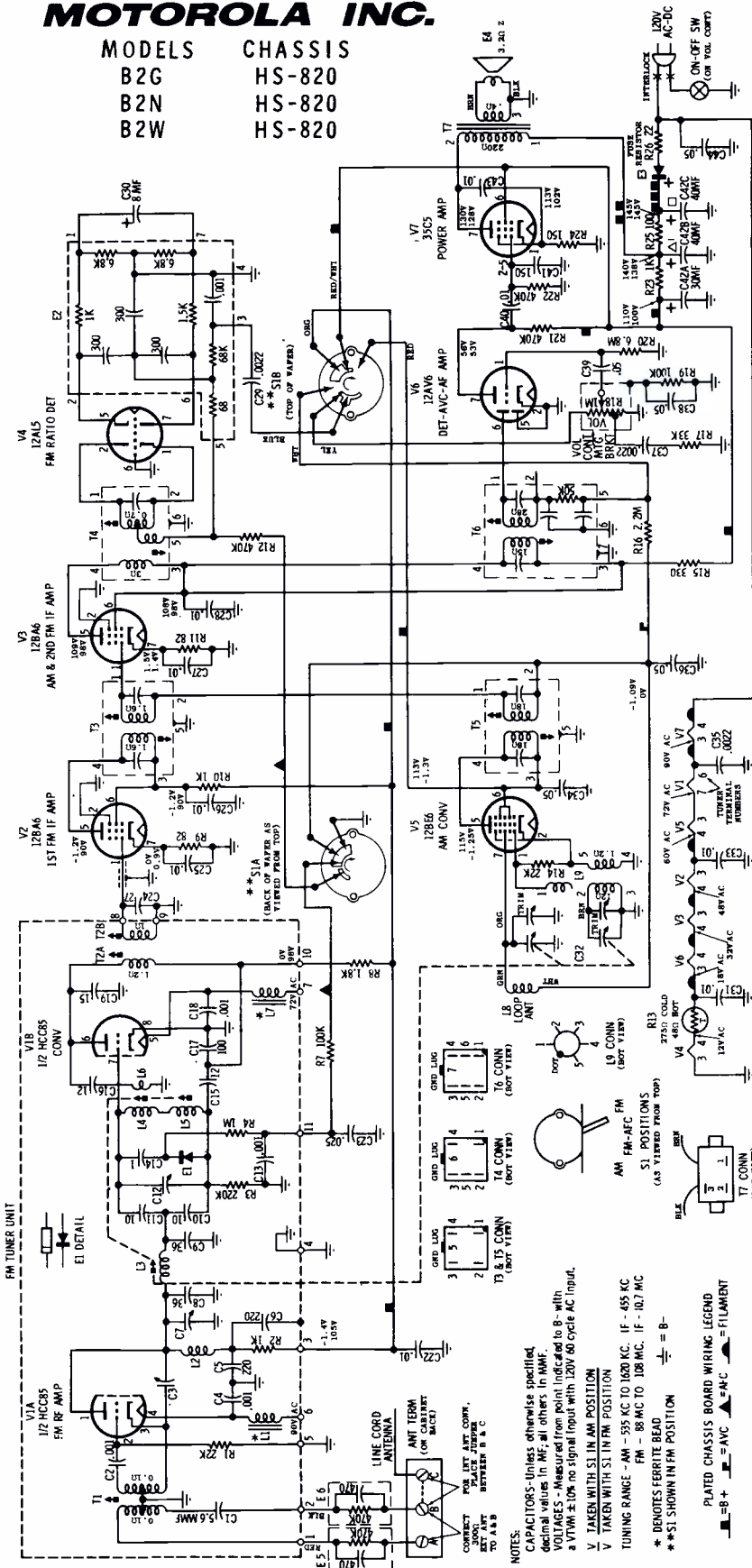
(Additional service material on the next page)

NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF; all others in MMF.
 VOLTAGES - Measured from point indicated to B - with a VTVM ±10% no signal input with 120V 60 cycle AC input.
 TUNING RANGE - 88MC TO 108MC. IF-10.7MC
 * DEVOTES FERRITE BEAD
 ** S1 SHOWN IN AFC-IN POSITION
 PLATED CHASSIS BOARD WIRING LEGEND
 —B+ — NOT USED ▲=AFC — FILAMENT

MOTOROLA INC.

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

(Continued on the next page)



(Continued on the next page)

DIAL STRINGING DETAIL

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

TO REMOVE CHASSIS FROM CABINET

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

NOTES:
 CAPACITORS: Unless otherwise specified, decimal values in MF, μ or others in MMF. Values in parentheses are optional. Indicated to B with a V in μ is 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 1600 KC. IF - 455 KC
 FM - 88 MC TO 108 MC. IF - 10.7 MC
 * DENOTES FERRITE BEAD
 = B -
 = B + = AVC = MC = FILAMENT

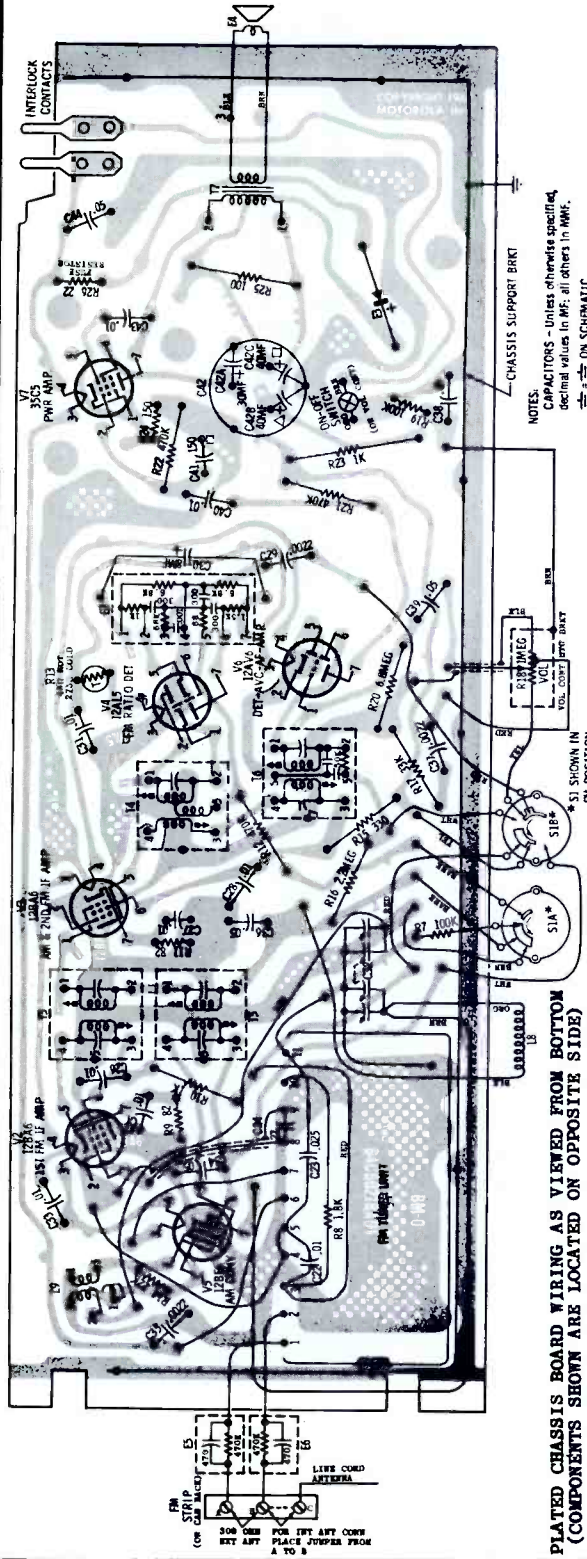
PLATED CHASSIS BOARD WIRING LEGEND
 = B + = AVC = MC = FILAMENT

PLATED CHASSIS BOARD

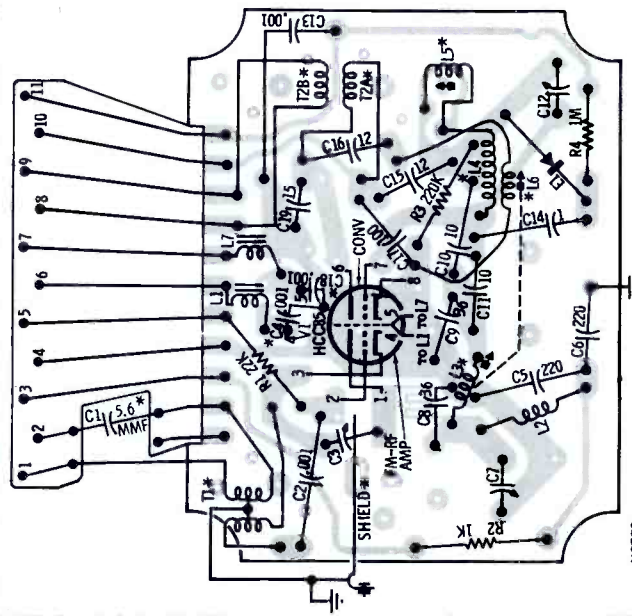
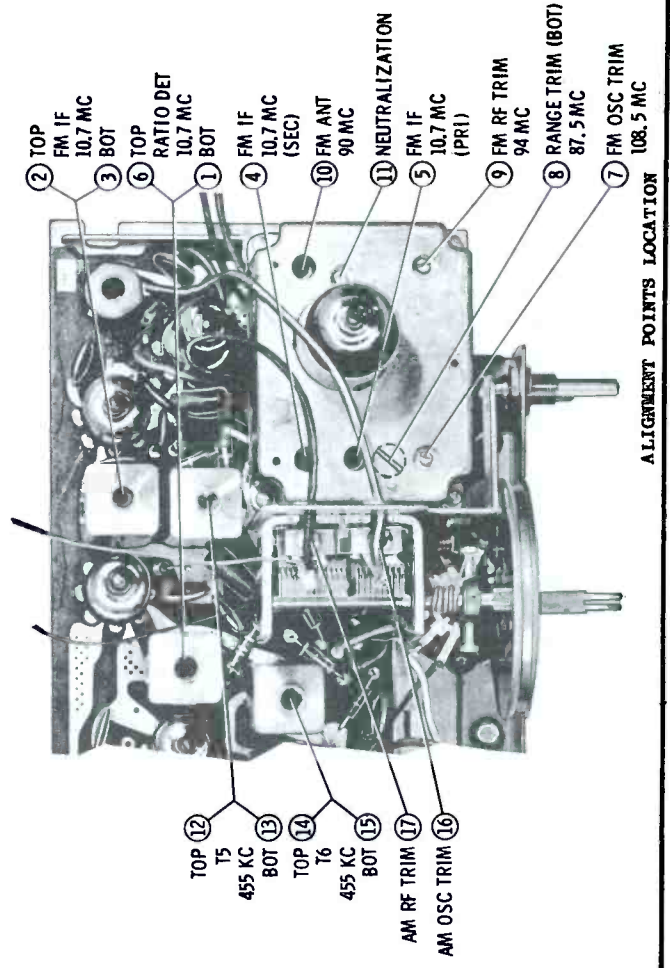
MOTOROLA

(Service material continued from preceding page)

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

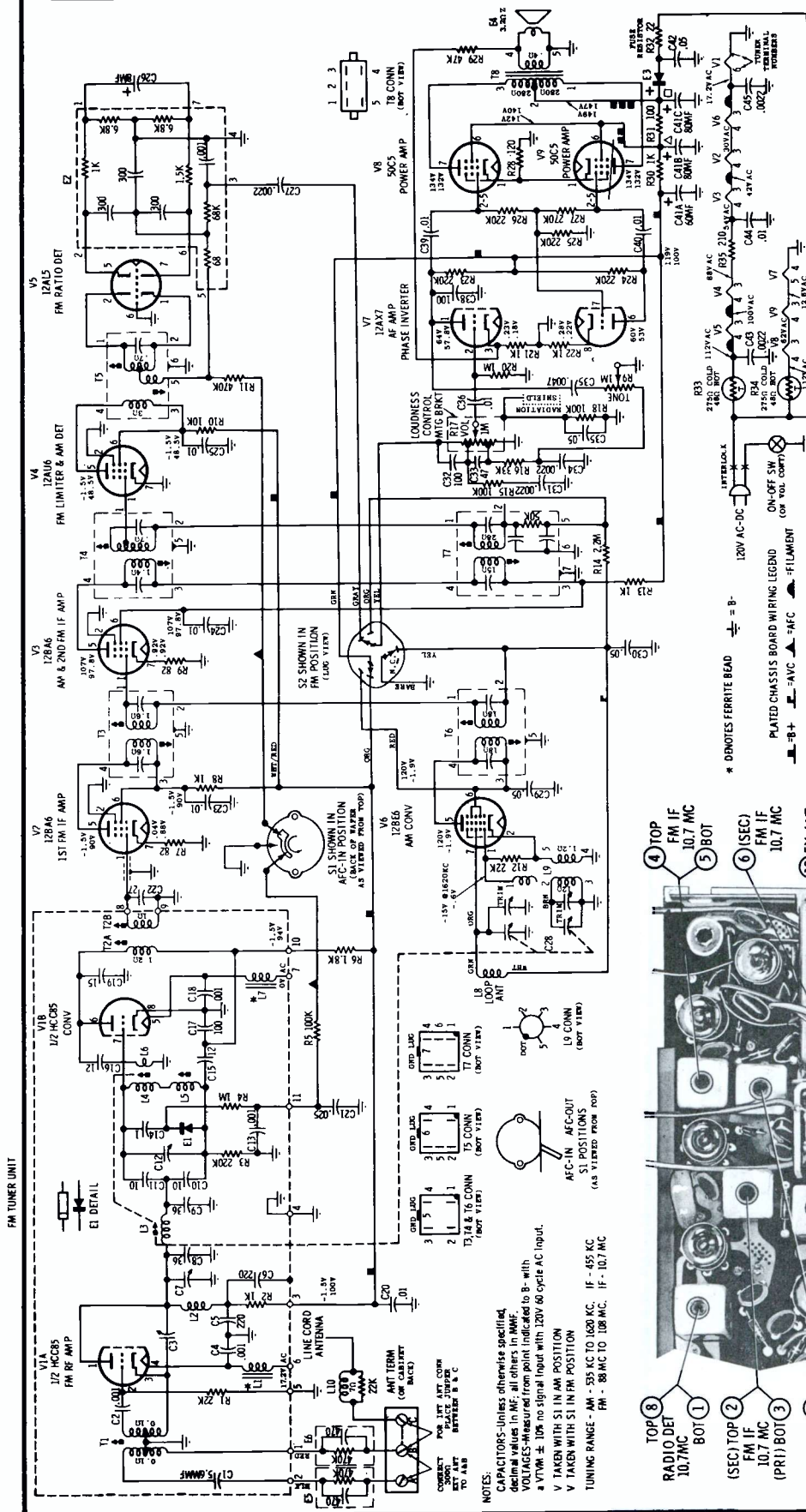


PLATED CHASSIS BOARD WIRING AS VIEWED FROM BOTTOM (COMPONENTS SHOWN ARE LOCATED ON OPPOSITE SIDE)



FM TUNER PLATED CHASSIS WIRING

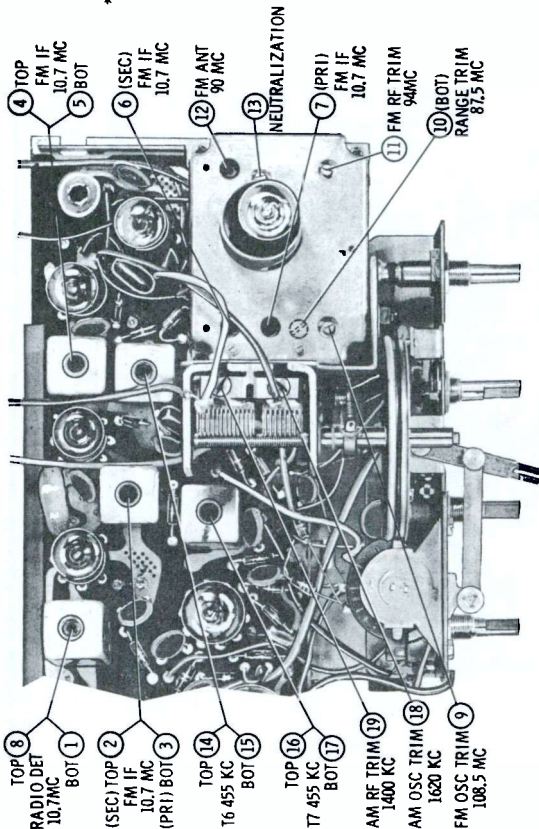
NOTES:
 CAPACITORS - Unless otherwise specified decimal values in MF; all others in MMF.
 * LOCATED ON CONDUCTION SIDE OF BOARD
 ON SCHEMATIC
 = = =



MOTOROLA

MODEL CHASSIS
 B3E HS-821
 B3W HS-821

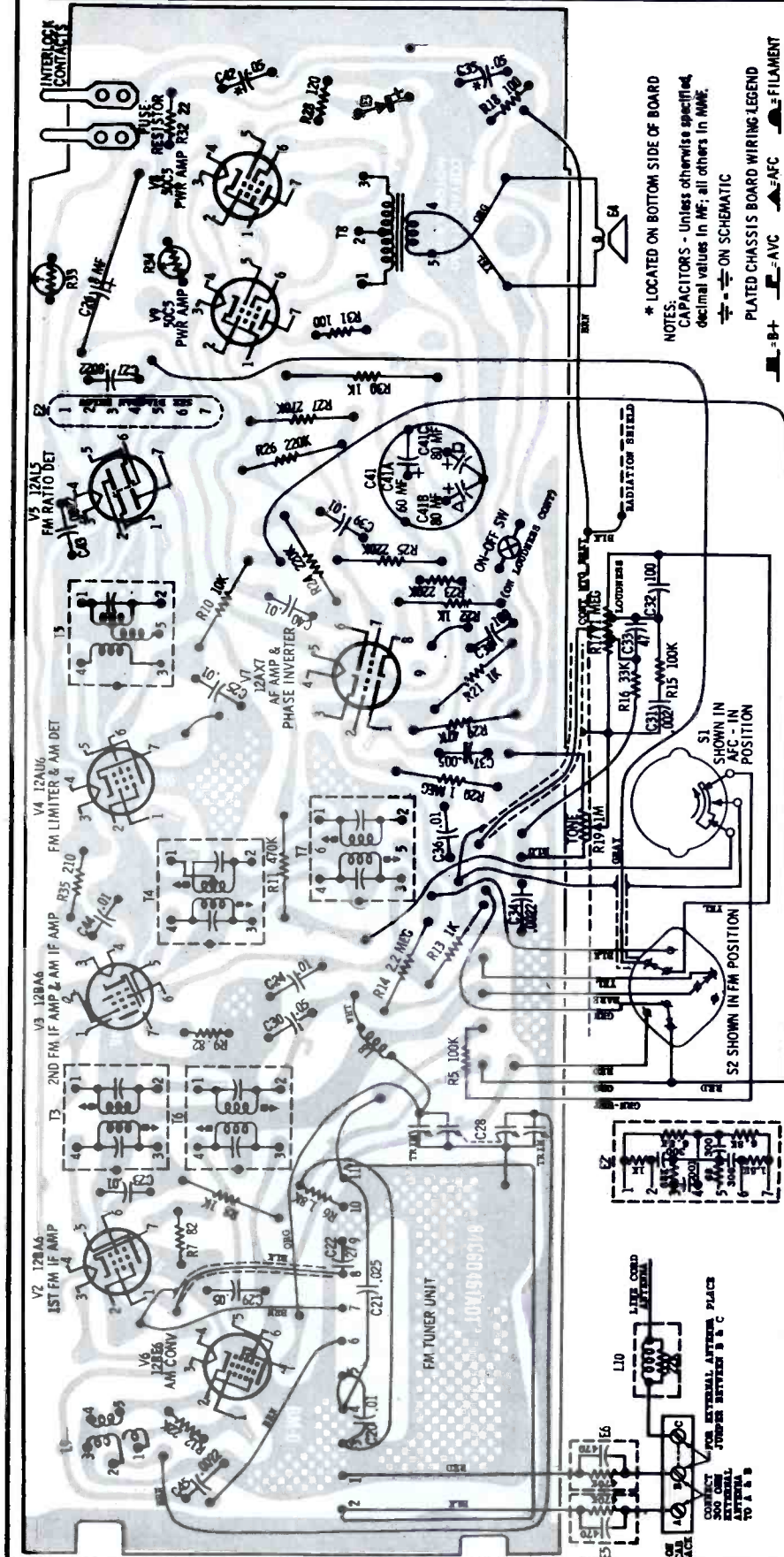
(Continued on the next page, adjacent at right)



ALIGNMENT POINTS LOCATION

NOTES:
 CAPACITORS—Unless otherwise specified, decimal values in MF; all others in MMF.
 VOLTAGES—Measured from point indicated to B— with a VTVM ± 10% no signal input with 120V 60 cycle AC input.
 V TAKEN WITH S1 IN AM POSITION
 V TAKEN WITH S1 IN FM POSITION
 TUNING RANGE—AM—595 KC TO 1620 KC. IF—455 KC
 FM—88 MC TO 108 MC. IF—10.7 MC

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

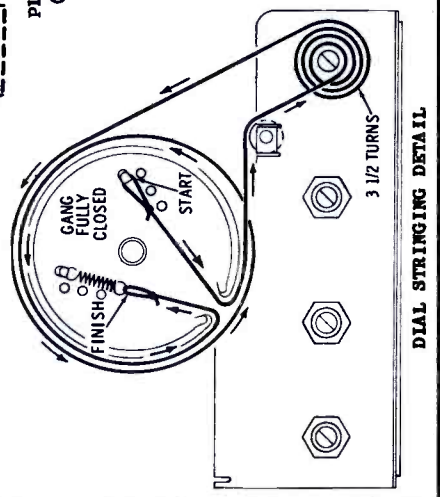
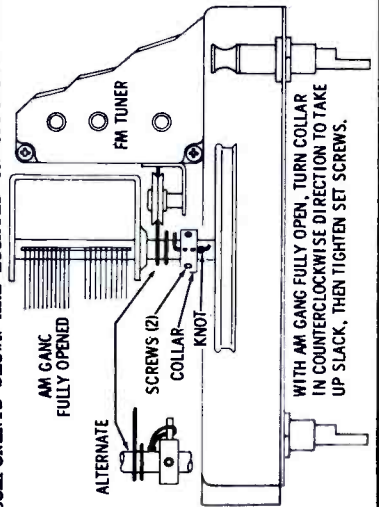


* LOCATED ON BOTTOM SIDE OF BOARD
 NOTES:
 CAPACITORS - Unless otherwise specified, decimal values in MF; all others in MMF.
 ⊕ = ON SCHEMATIC
 PLATED CHASSIS BOARD WIRING LEGEND
 —□— = B+ —▲— = AFC —■— = FILAMENT

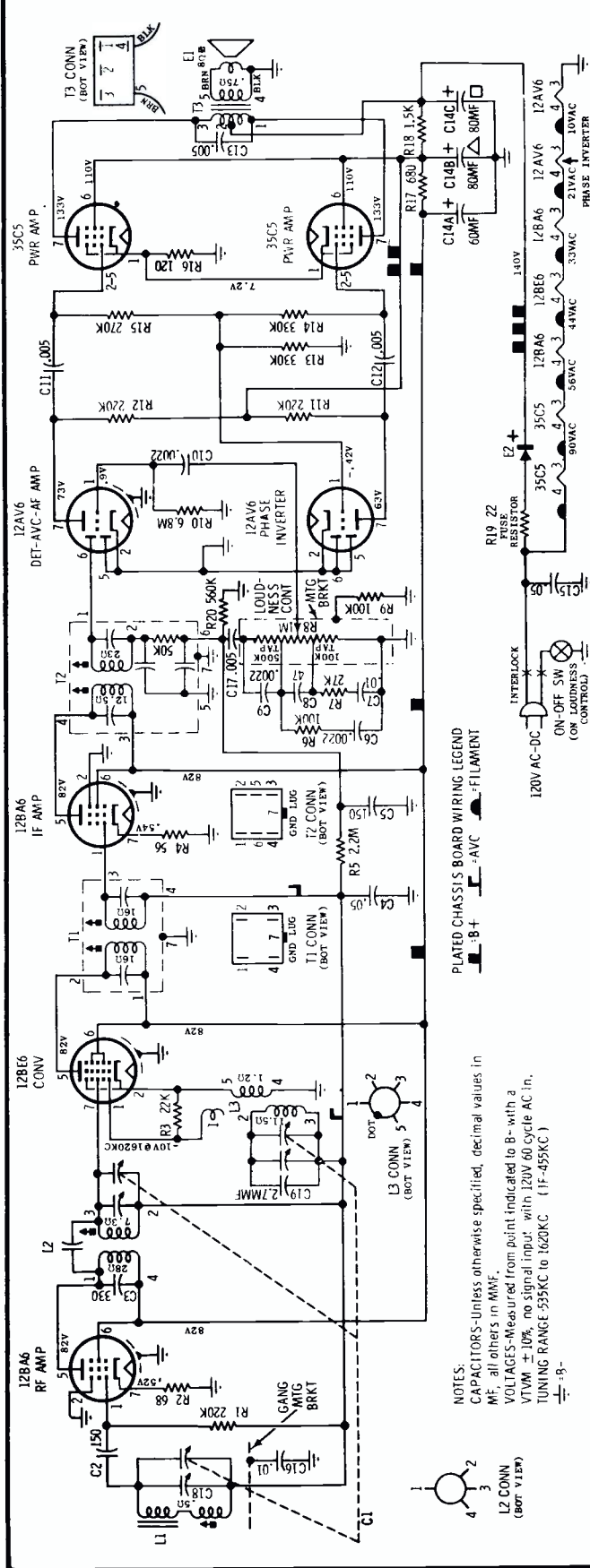
TO REMOVE CHASSIS FROM CABINET

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

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

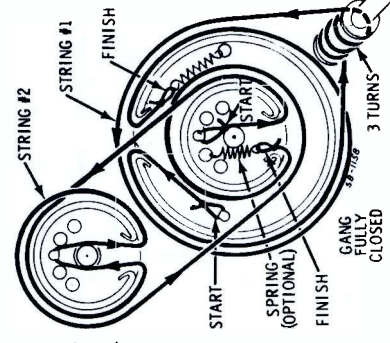


MOTOROLA Model B3E, W, Chassis HS-821
 (Material continued from preceding page)



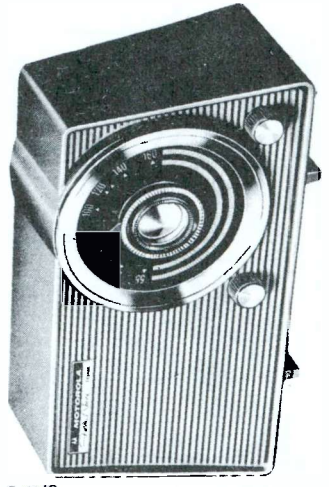
PLATED CHASSIS BOARD WIRING LEGEND

NOTES:
 CAPACITORS—Unless otherwise specified, decimal values in MF, all others in MME.
 VOLTAGES—Measured from point indicated to B— with a VTVM, ±10%, no signal input; with 120V 60 cycle AC in.
 TUNING RANGE—535KC to 1620KC (IF—455KC)
 —+9—

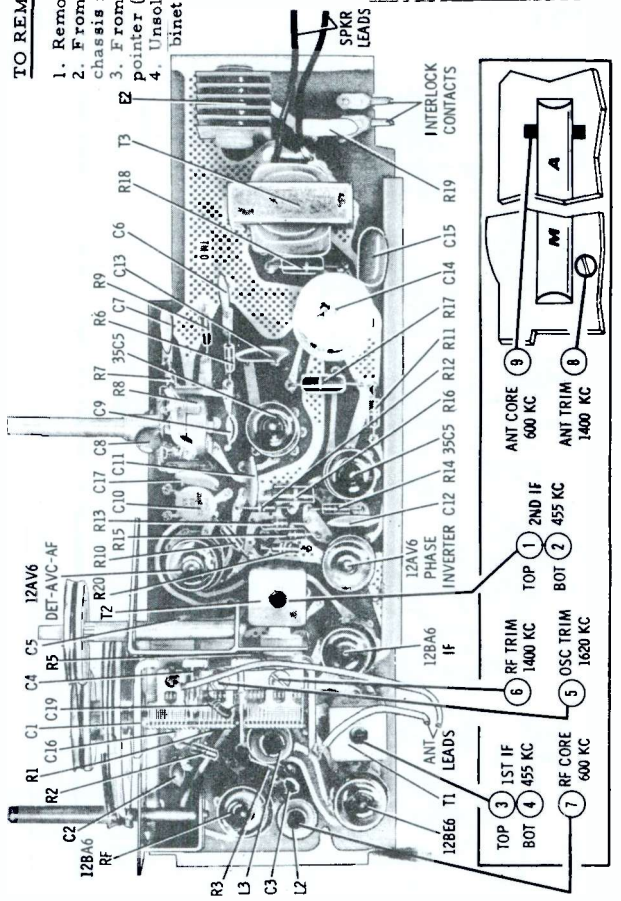


DIAL STRINGING DETAIL

MOTOROLA
 MODEL A12N CHASSIS HS-825



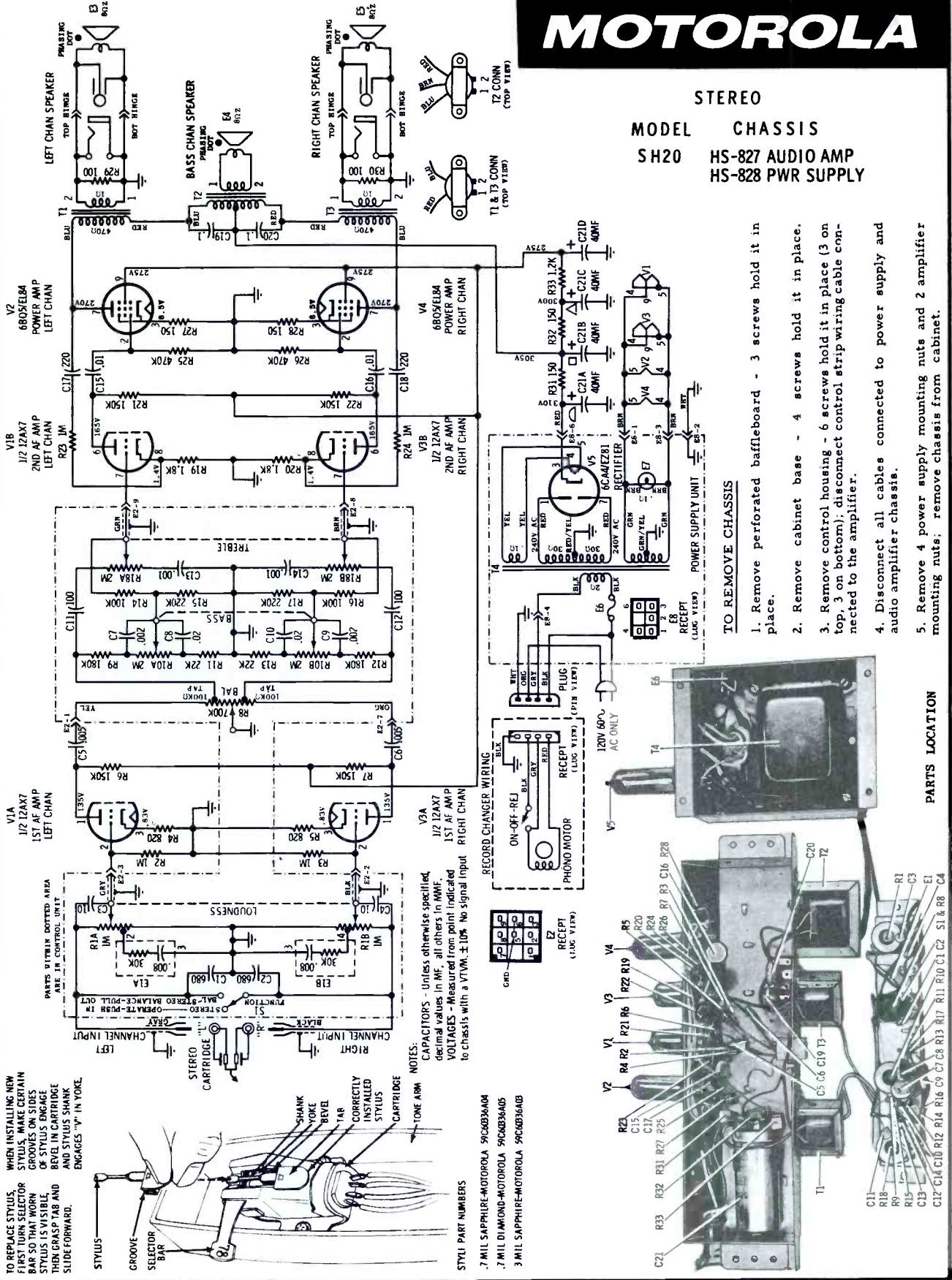
- TO REMOVE CHASSIS FROM CABINET**
1. Remove back cover - 4 screws hold it in place.
 2. From rear, remove 3 dial crystal mounting screws and 3 chassis mounting screws.
 3. From front, remove 2 control knobs, dial crystal and dial pointer (observe dial calibration).
 4. Unsolder 2 speaker leads and remove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



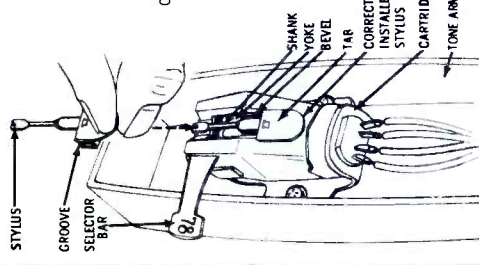
ALIGNMENT ADJUSTMENTS & PARTS LOCATION

MOTOROLA

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



TO REPLACE STYLUS, FIRST TURN SELECTOR BAR SO THAT WORN GROOVES ON SIDES OF STYLUS IS VISIBLE, THEN GRASP TAB AND SLIDE FORWARD. WHEN INSTALLING NEW STYLUS, MAKE CERTAIN GROOVES ON SIDES OF STYLUS ENGAGE BEVEL IN CARTRIDGE AND STYLUS SHANK ENDS FORWARD.



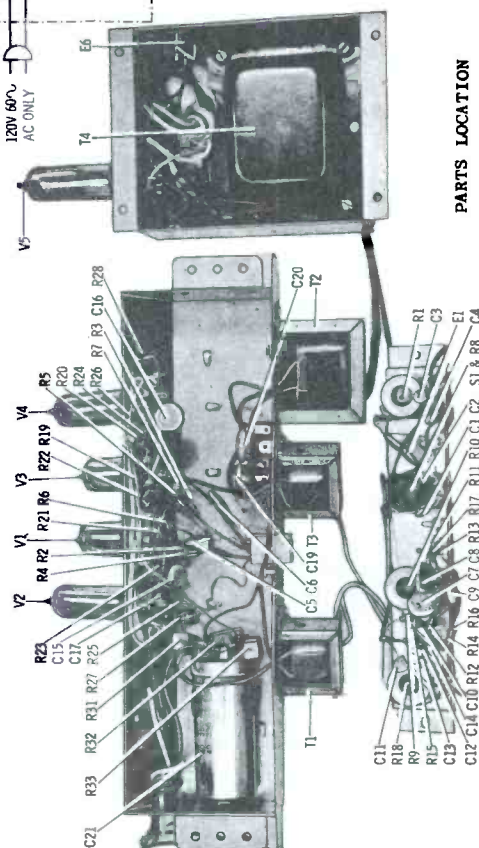
STYL PART NUMBERS
 .7 MILL SAPPHIRE-MOTOROLA 96C6B36A04
 .7 MILL DIAMOND-MOTOROLA 96C6B36A05
 3 MILL SAPPHIRE-MOTOROLA 96C6B36A06

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.

TO REMOVE CHASSIS

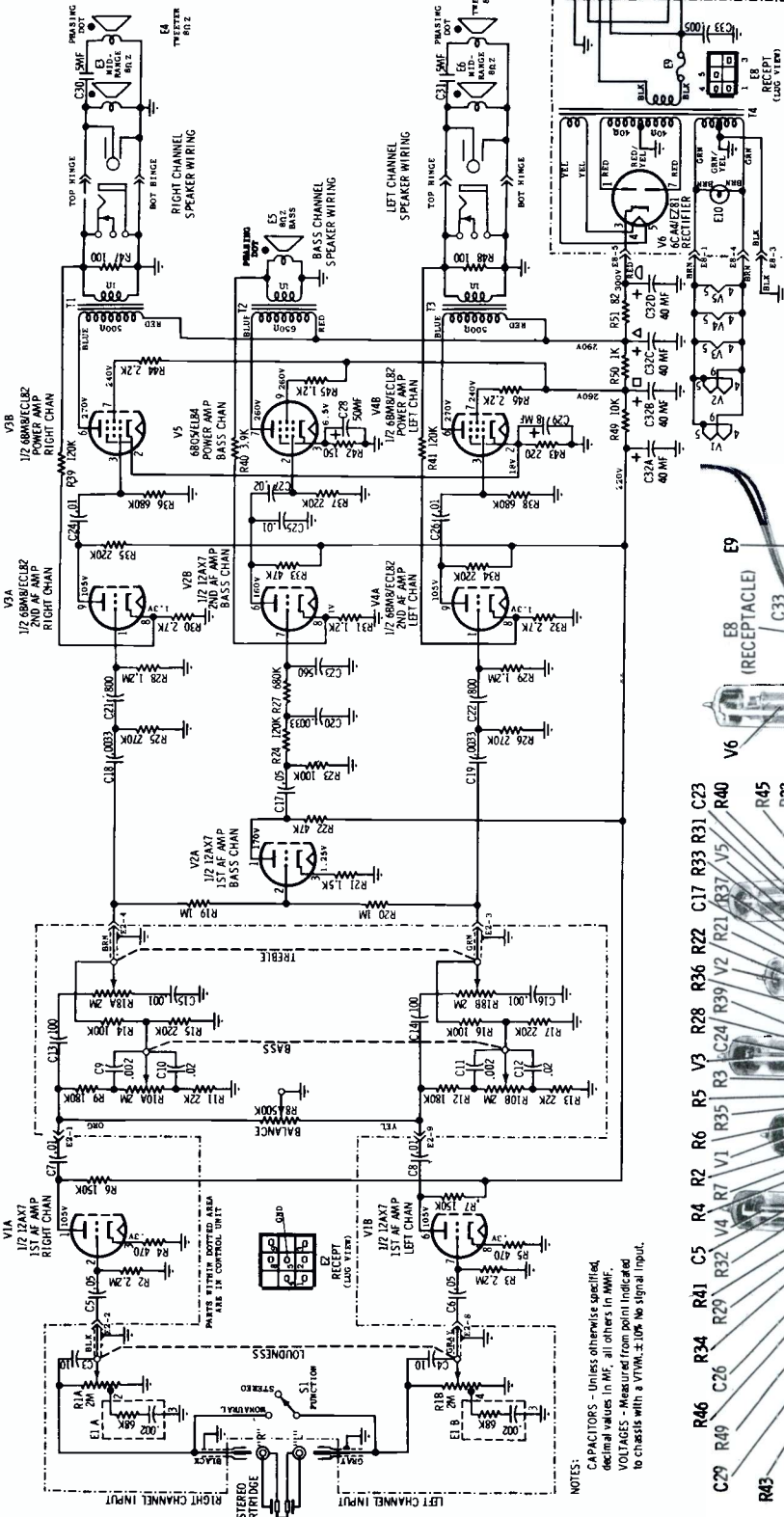
1. Remove perforated baffleboard - 3 screws hold it in place.
2. Remove cabinet base - 4 screws hold it in place.
3. Remove control housing - 6 screws hold it in place (3 on top, 3 on bottom); disconnect control strip wiring cable connected to the amplifier.
4. Disconnect all cables connected to power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

PARTS LOCATION



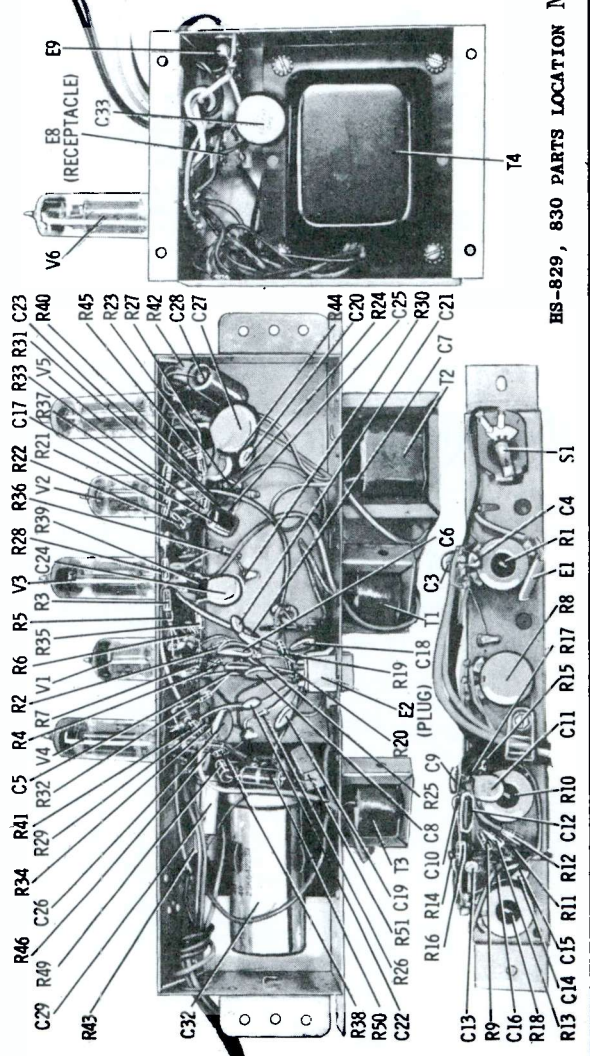
MOTOROLA

MODEL SH21 CHASSIS HS-829 AUDIO AMP HS-830 PWR SUPPLY



TO REMOVE CHASSIS

1. Remove perforated baffleboard - 3 screws hold it in place.
 2. Remove cabinet base - 4 screws hold it in place. escutcheon; then remove two control strip mounting nuts.
 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.

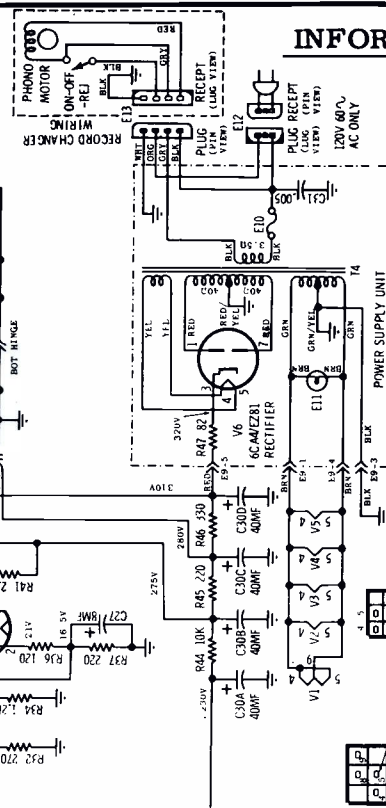
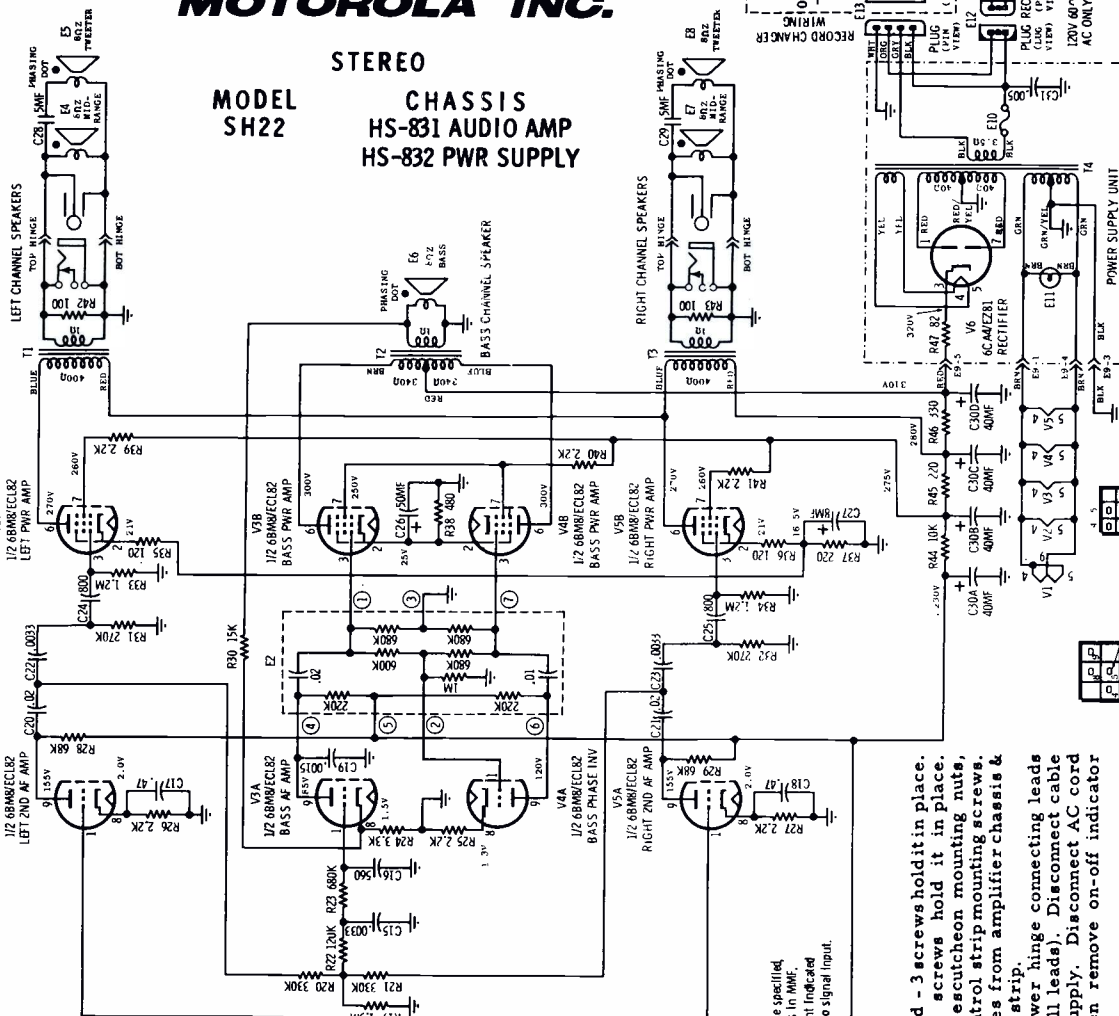


HS-829, 830 PARTS LOCATION Motorola Model SH21, Chassis HS-829, HS-830

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

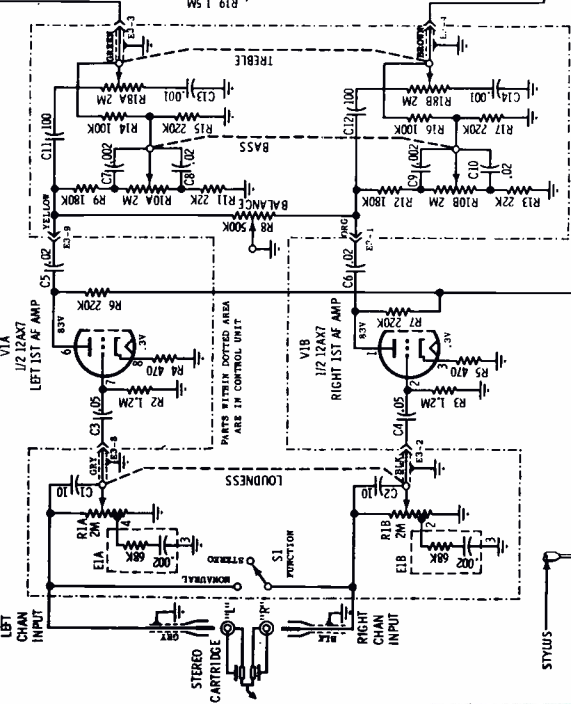
MOTOROLA INC.

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



TO REMOVE RECORD CHANGER

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

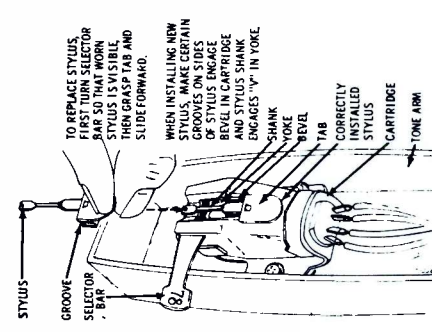


NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
VOLTAGES - Measured from point indicated to chassis with a VTVM, $\pm 10\%$ No signal input.

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.

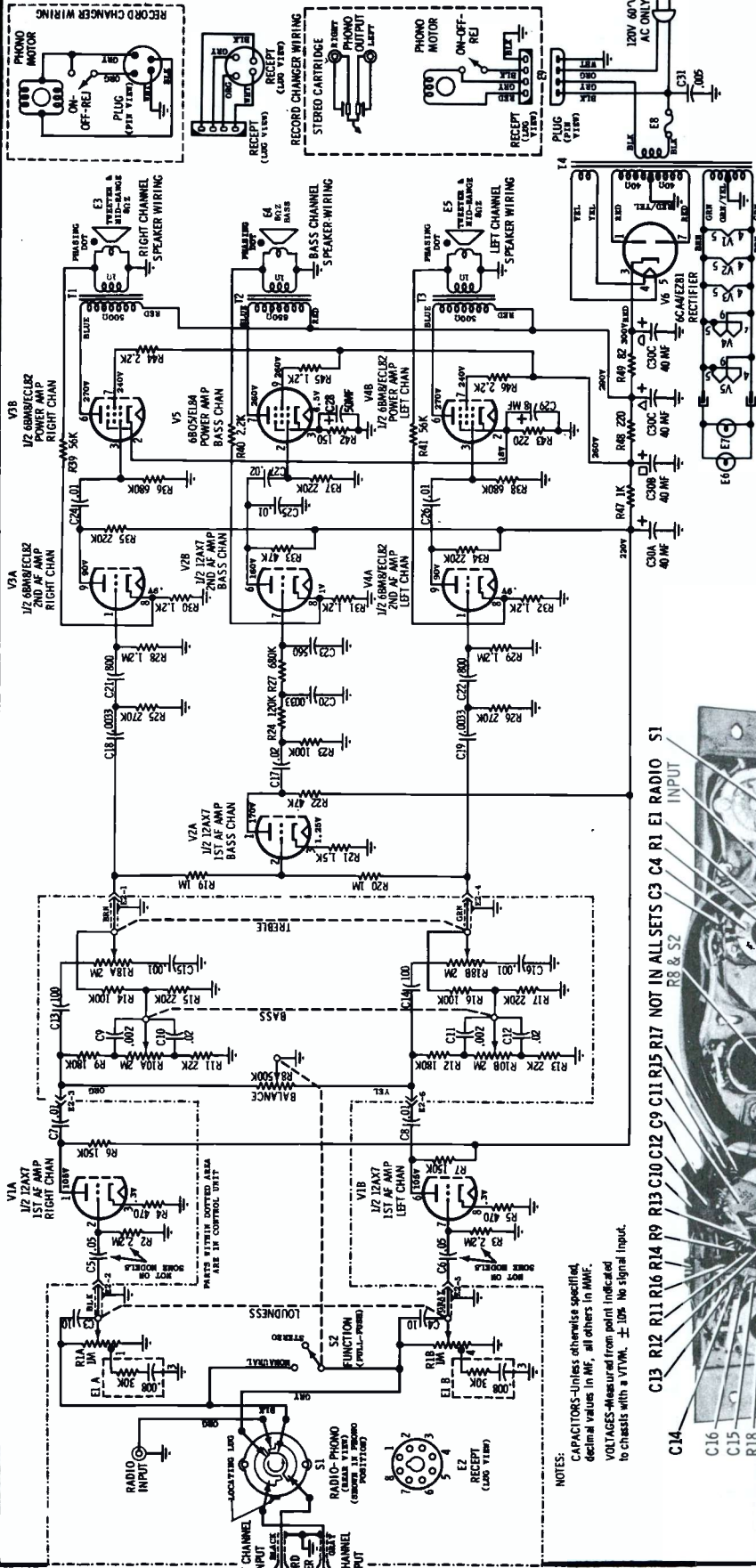
NOTE: Before replacing chassis into cabinet, remember: (1) to restape the interconnecting cables to their original locations, and (2) to push the perforated baffleboard into its mounting slot in the record changer mounting board as it is being installed.



- STYLUS PART NUMBERS**
- .7 MILL SAPPHIRE-MOTOROLA 99C036A04
 - .7 MILL DIAMOND-MOTOROLA 99C036A05
 - 3 MILL SAPPHIRE-MOTOROLA 99C036A06
- STYLUS REPLACEMENT**

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

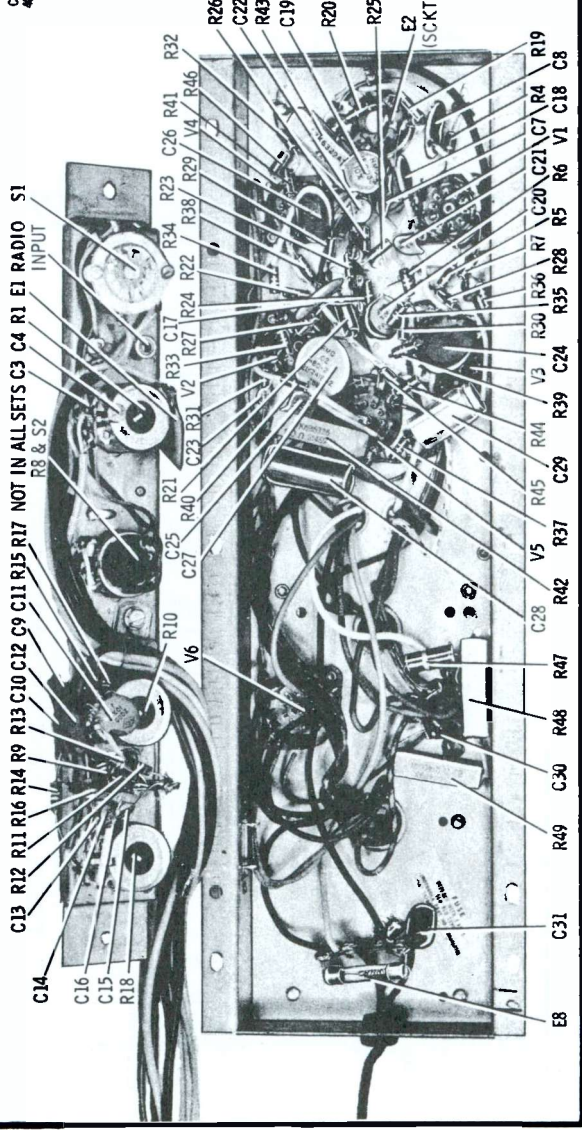
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION



PRODUCTION CHANGES

| Chassis Coding | Changes |
|----------------|---|
| HS-833A | Original chassis |
| HS-833B | TO REDUCE NOISY LOUDNESS CONTROL OPERATION: C-5 (.05 mf), C-6 (.05 mf), R-2 (470K), and R-3 (470K) added. |
| 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



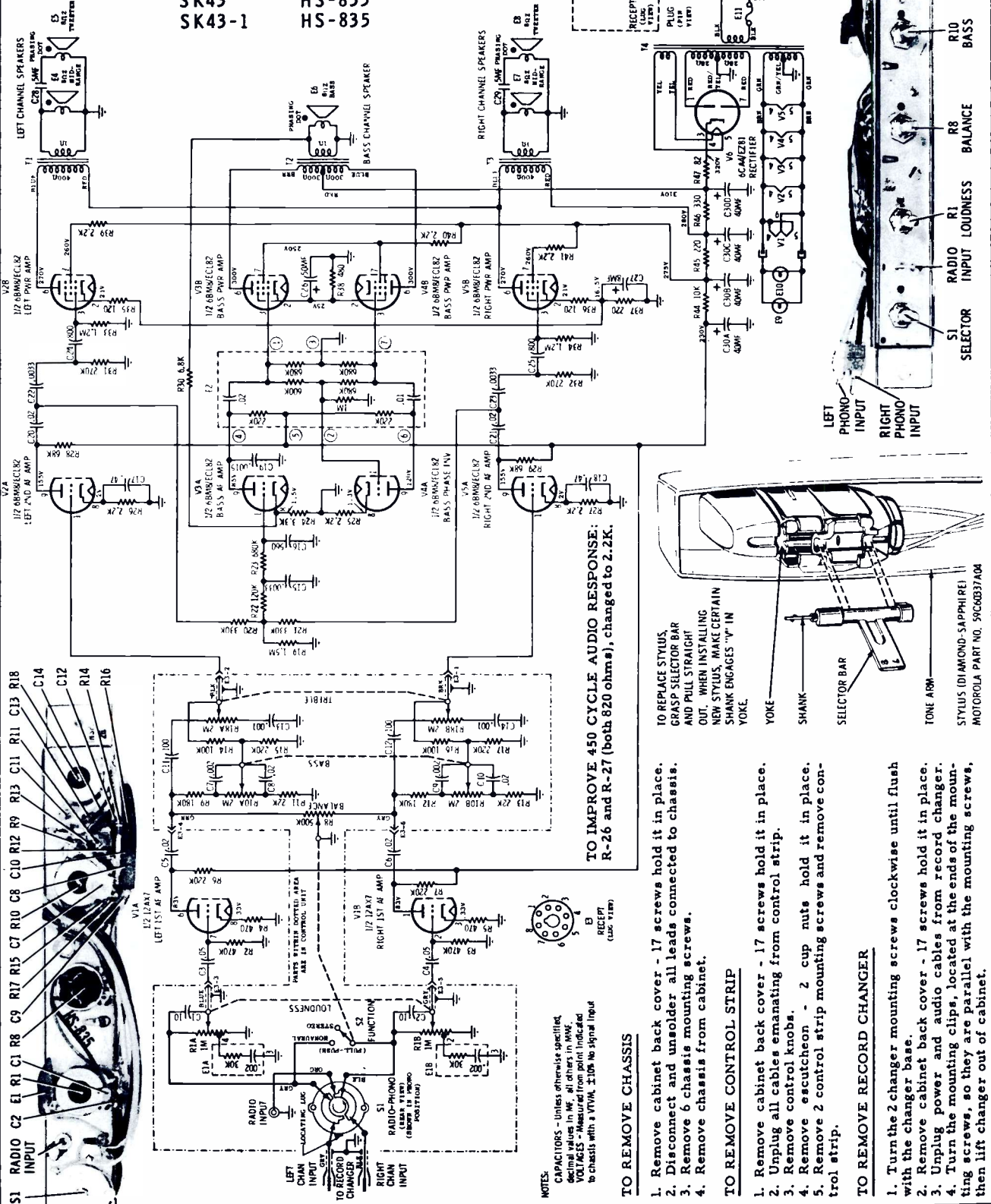
NOTES:
 CAPACITORS—unless otherwise specified, decimal values in MF, all others in MMF.
 VOLTAGES—measured from point indicated to chassis with a VTVM. $\pm 10\%$ No signal input.

ES-833A PARTS LOCATION (SEE PRODUCTION CHANGES)

MOTOROLA

MODEL SK43
SK43-1

CHASSIS HS-835
HS-835



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

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

TO REMOVE CHASSIS

TO REMOVE CONTROL STRIP

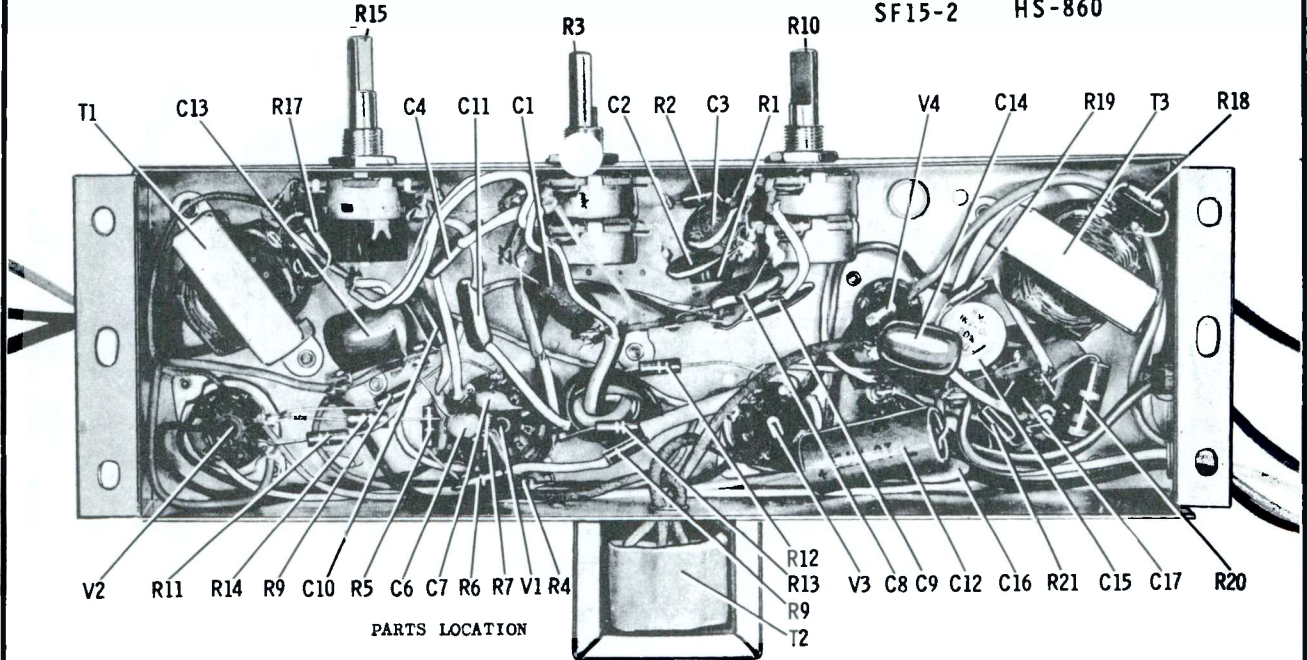
TO REMOVE RECORD CHANGER

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.
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.
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.

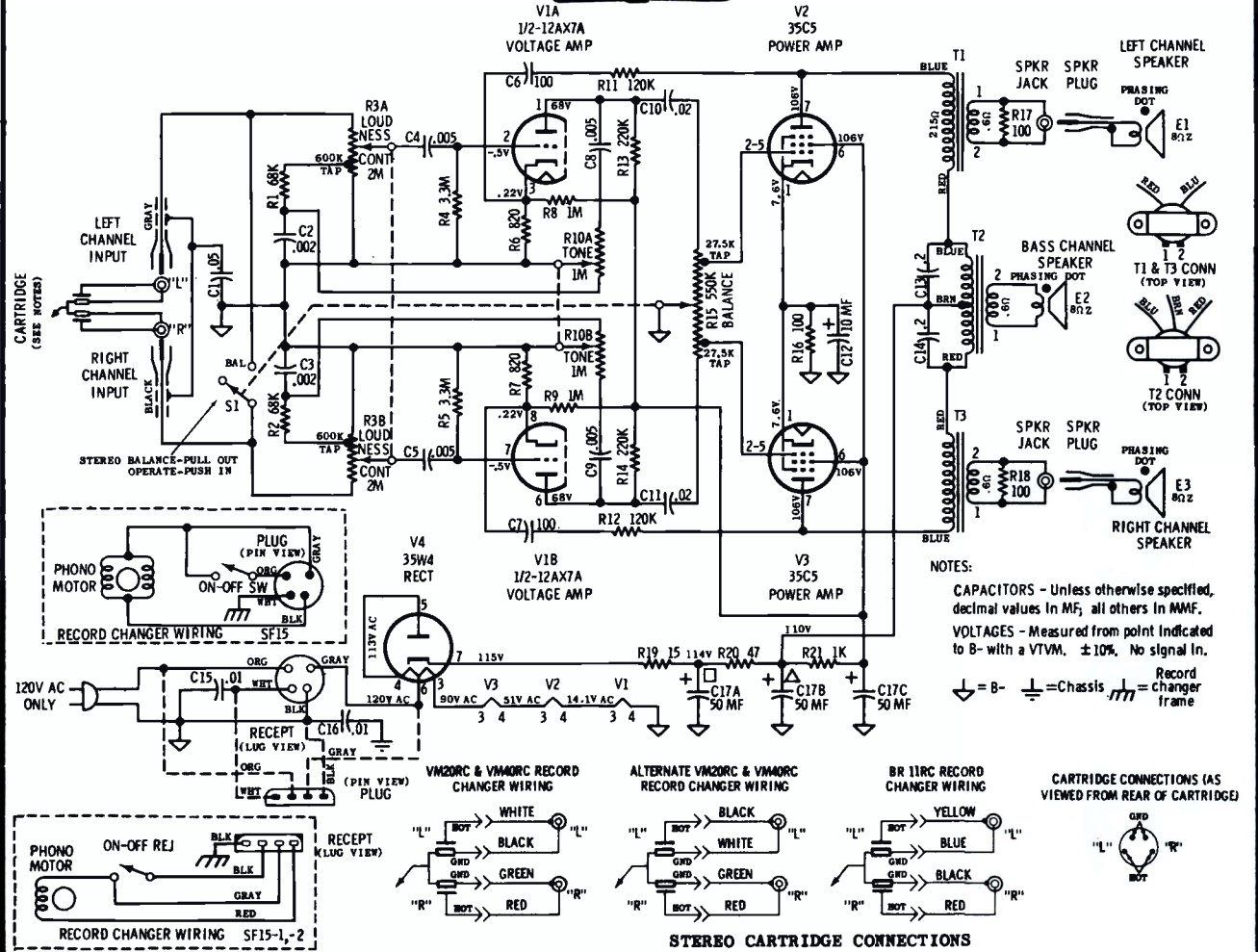
STYLUS REPLACEMENT SK43-1 SERIES

MOTOROLA

| | |
|--------|---------|
| MODEL | CHASSIS |
| SF15 | HS-860 |
| SF15-1 | HS-898 |
| SF15-2 | HS-860 |



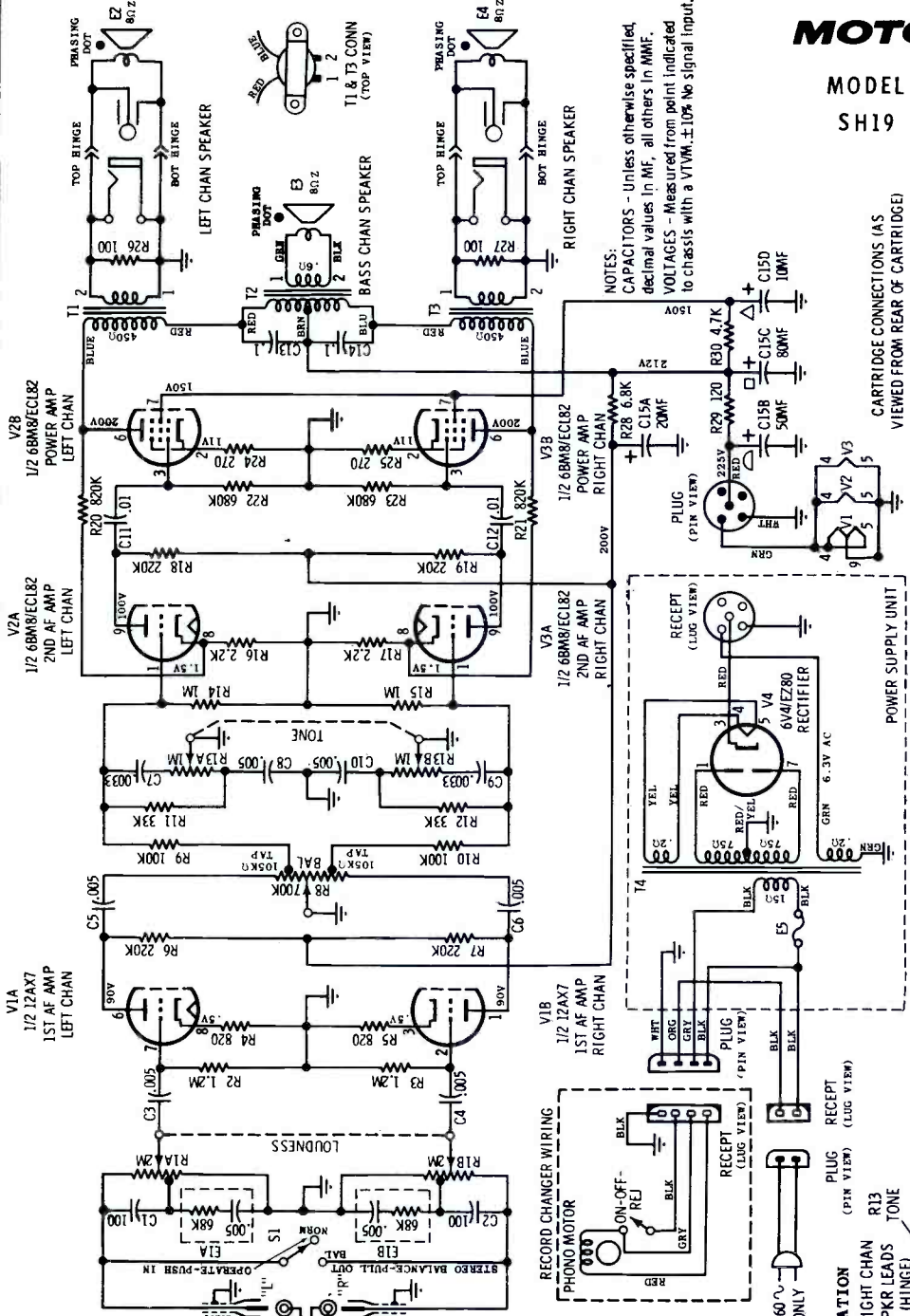
PARTS LOCATION



MOTOROLA INC.

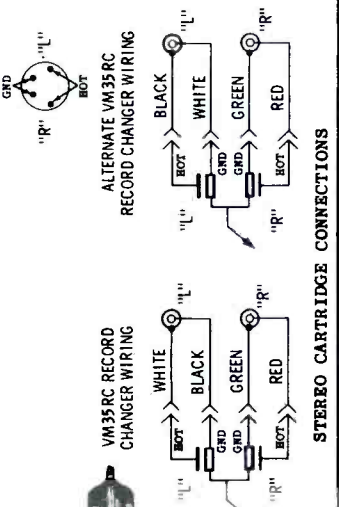
MODEL
SH19

CHASSIS
HS-861 AUDIO AMP
HS-869 PWR SUPPLY

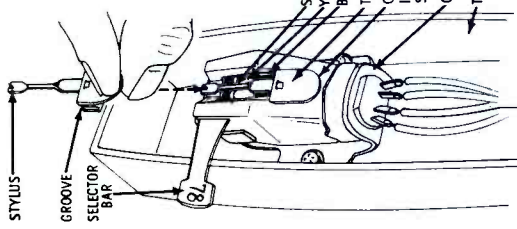


NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MF, all others in MMF.
VOLTAGES - Measured from point indicated to chassis with a VTVM, ±10% No signal input.

CARTRIDGE CONNECTIONS (AS VIEWED FROM REAR OF CARTRIDGE)

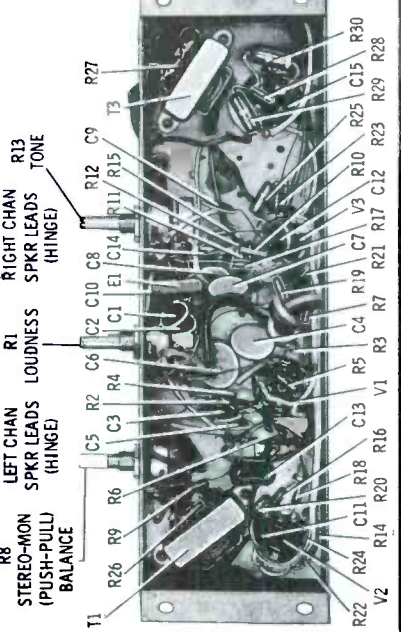


TO REPLACE STYLUS, FIRST TURN SELECTOR BAR SO THAT WORN STYLUS IS VISIBLE. THEN GRASP TAB AND SLIDE FORWARD.



- STYLUS REPLACEMENT
- STYLUS PART NUMBERS
 - .7 MIL SAPPHIRE-MOTOROLA 59C4036A04
 - .7 MIL DIAMOND-MOTOROLA 59C4036A05
 - 3 MIL SAPPHIRE-MOTOROLA 59C4036A03

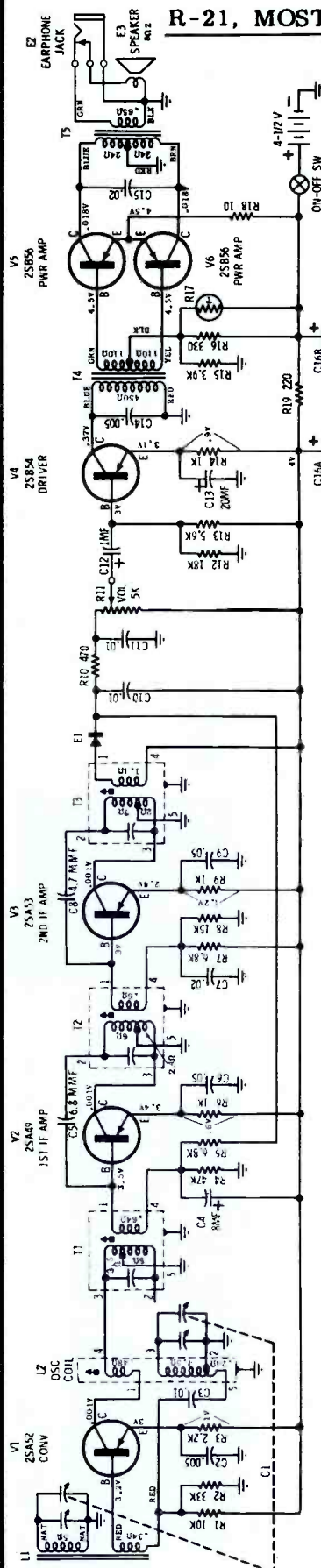
HS-861 - 869 PARTS LOCATION



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

MODEL CHASSIS
X21W HS-876

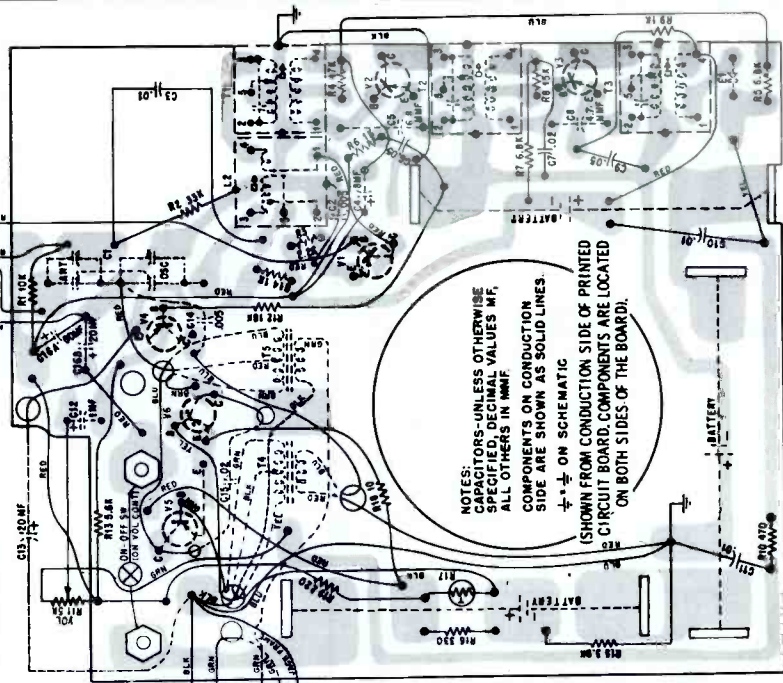
MOTOROLA



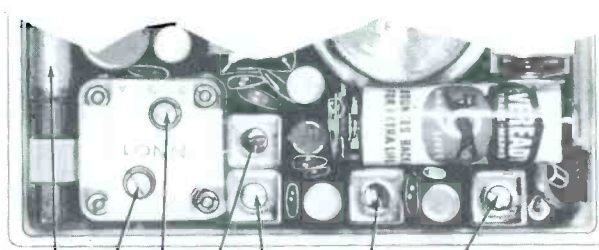
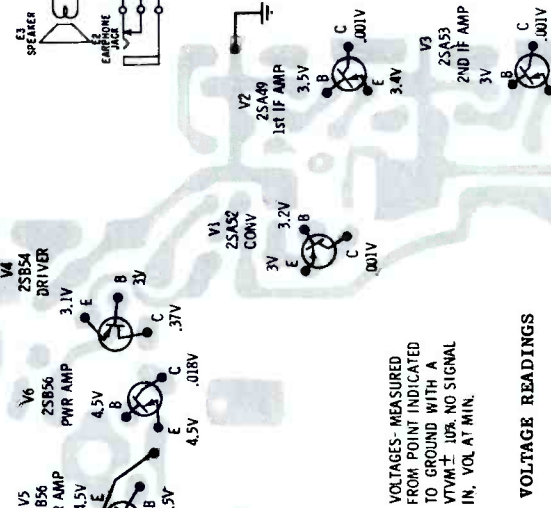
NOTES:
CAPACITORS - Unless otherwise specified, decimal values in MINTF, all others, in MINTF.
VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$. No signal in. ZERO SIGNAL CURRENT - 4.8M A. (MIN VOL)



PRINTED CIRCUIT BOARD



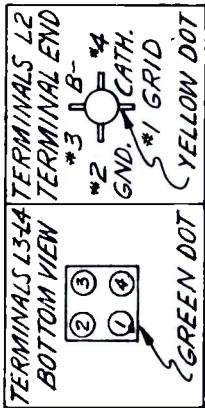
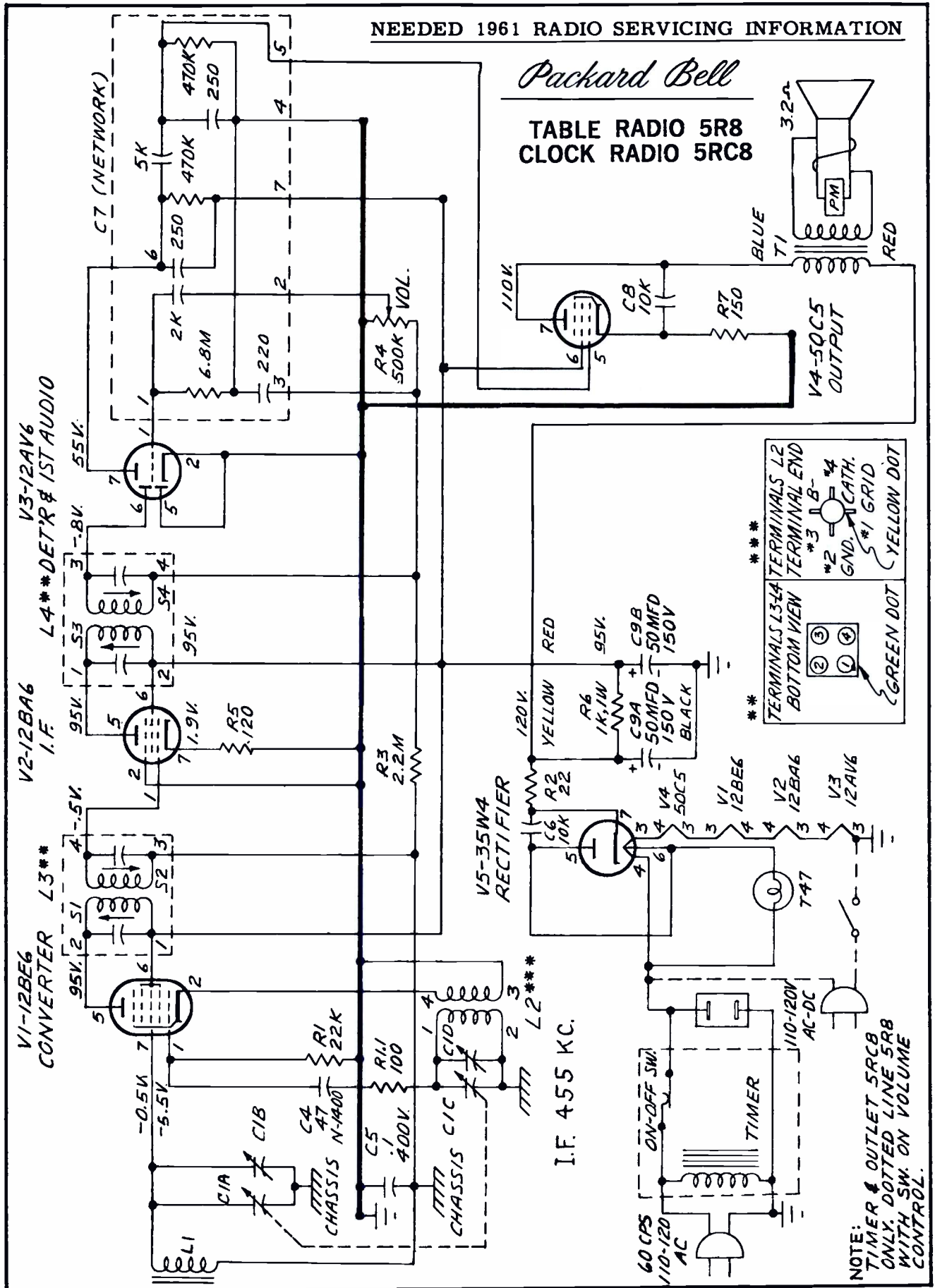
NOTES: - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MINTF, ALL OTHERS IN MINTF.
COMPONENTS ON CONDUCTION SIDE ARE SHOWN AS SOLID LINES.
* - ON SCHEMATIC
SHOWN FROM CONDUCTION SIDE OF PRINTED CIRCUIT BOARD. COMPONENTS ARE LOCATED ON BOTH SIDES OF THE BOARD.



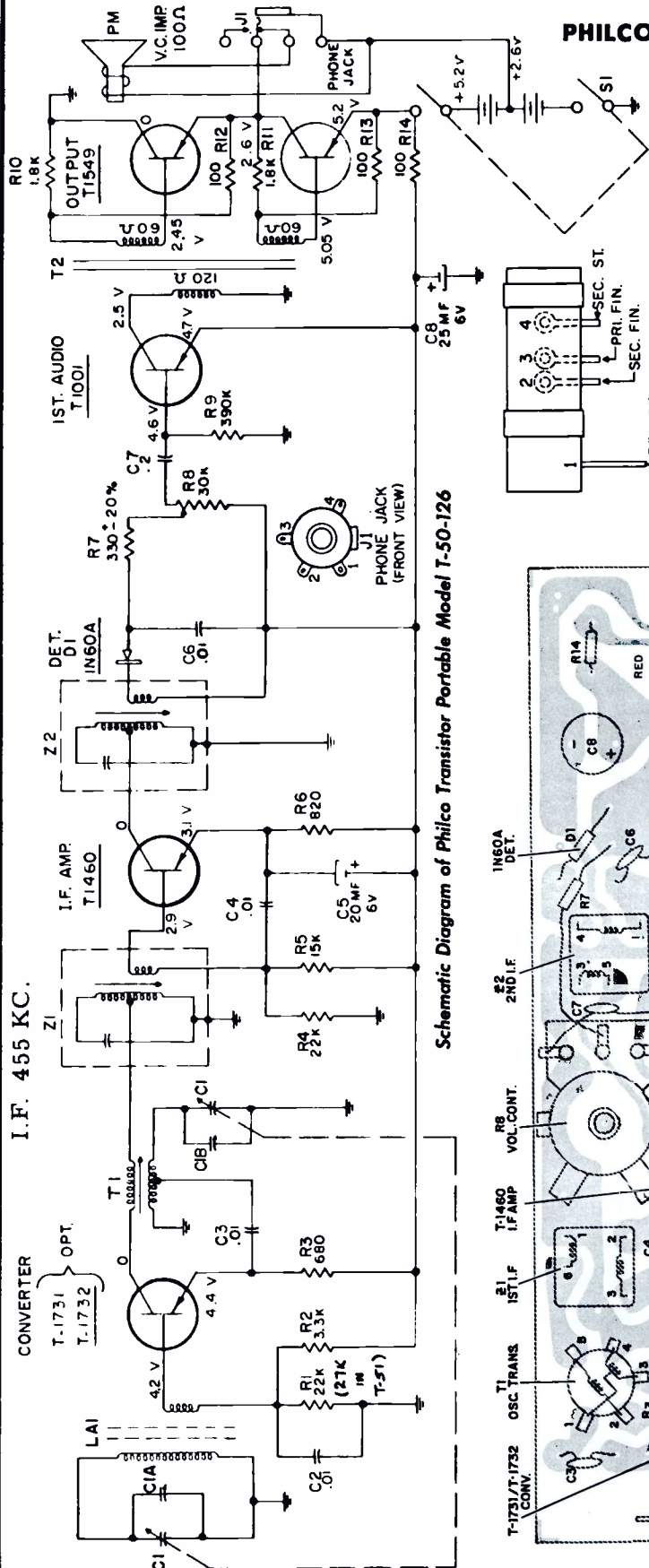
- ANT CORE 600 KC
- ANT TRIM 1400 KC
- OSC TRIM 1620 KC
- OSC CORE 532 KC
- 1ST IF 455 KC
- 2ND IF 455 KC
- 3RD IF 455 KC

ALIGNMENT POINT LOCATIONS

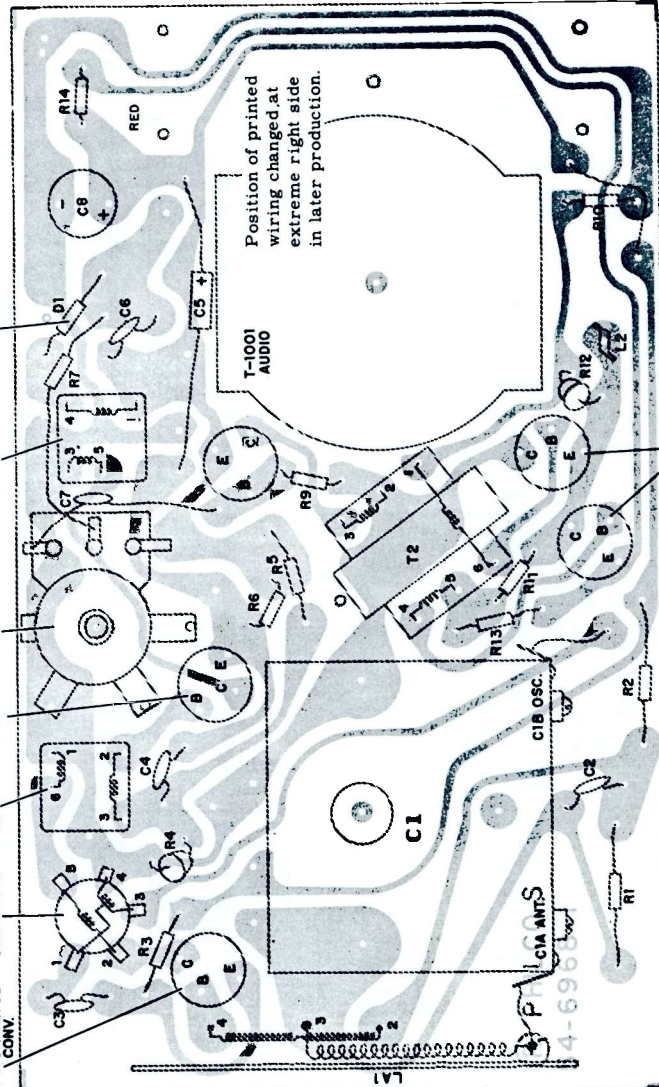
Packard Bell
TABLE RADIO 5R8
CLOCK RADIO 5RC8



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



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



Printed Wiring Panel—Under Side Showing Parts Location

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

PANEL LEAD CONNECTIONS

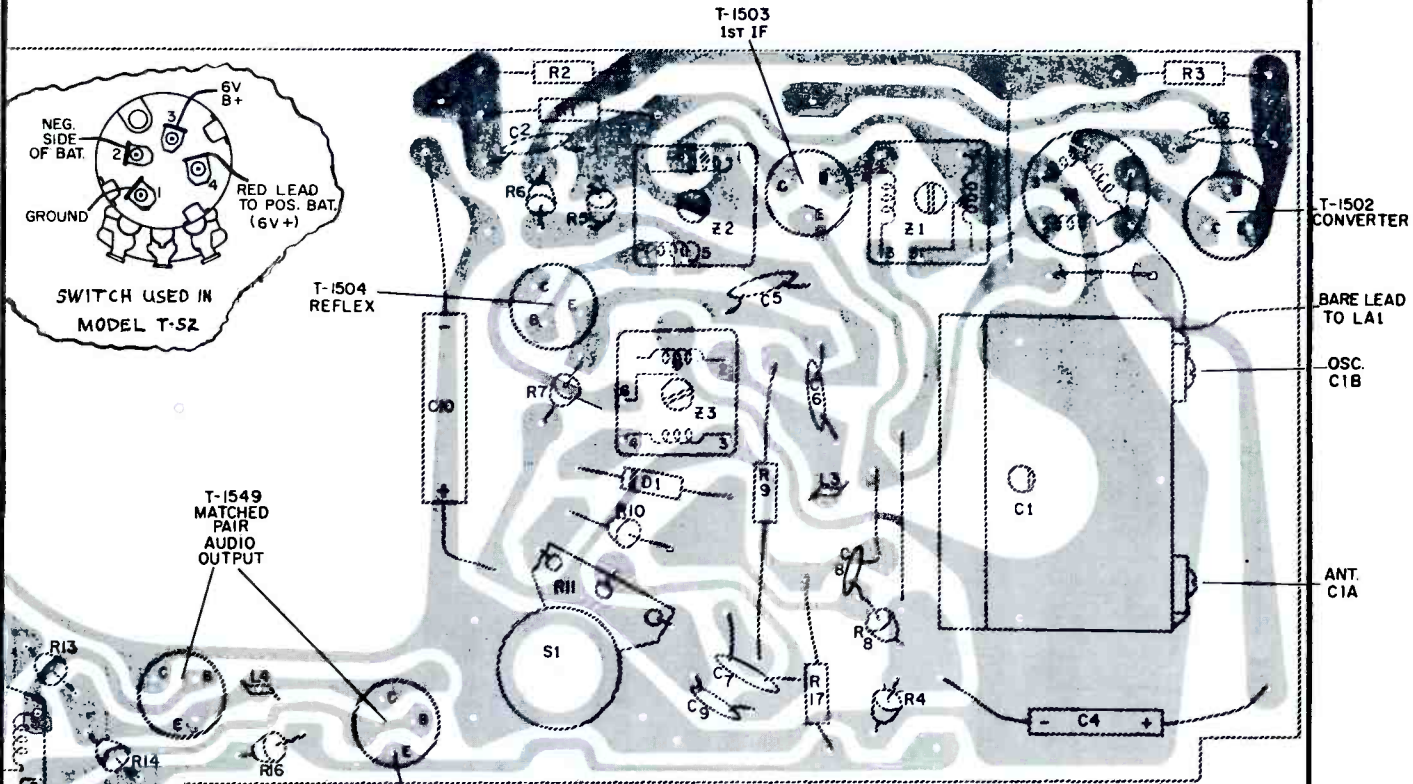
Black lead from negative battery contact to switch lug #7.
Bare wire from switch lug #6 to ground tab of volume control and to frame of gang.
Red lead from positive battery contact to switch lug #5.
Red lead from switch lug #4 to Panel.
White lead from voltage supply center-tap to J1, lug #1.
Blue lead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

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

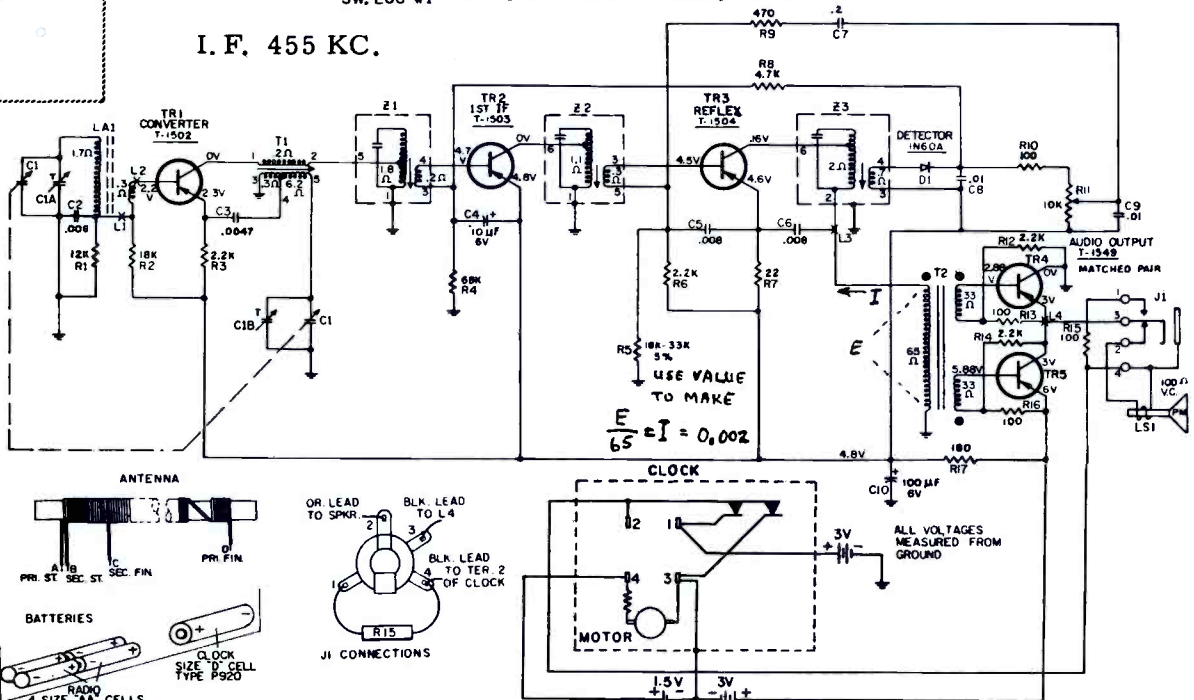
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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.

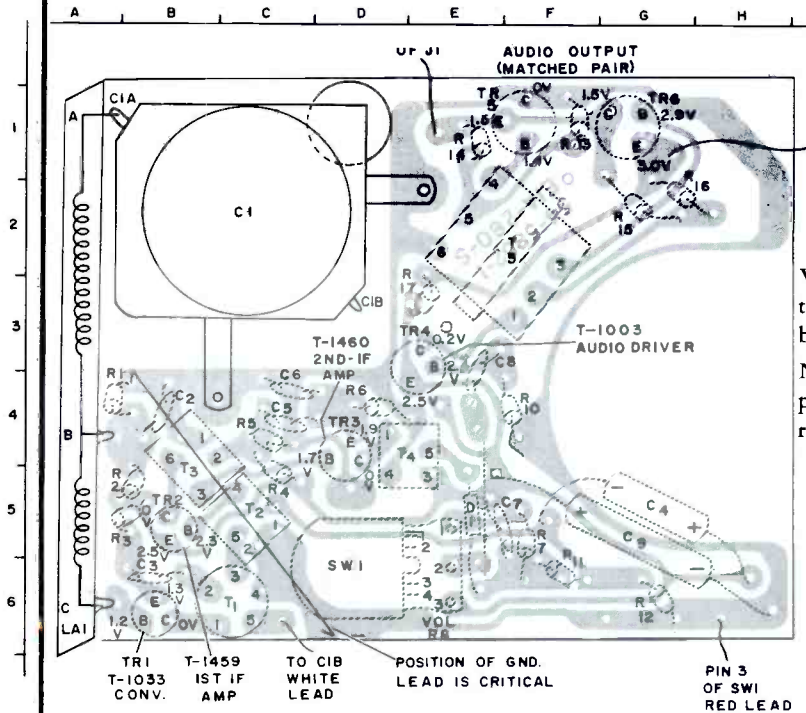


I. F. 455 KC.



Schematic Diagram, Model TC-57

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-66, CODE 124



NOTE:
 PIN 2 OF SW1 TO POS. TERM. YEL. LEAD
 PIN 4 OF SW1 TO NEG. TERM. RED LEAD
 PIN 1 OF SW1 YEL. LEAD
 PIN 3 OF SW1 RED LEAD

SERVICE NOTES

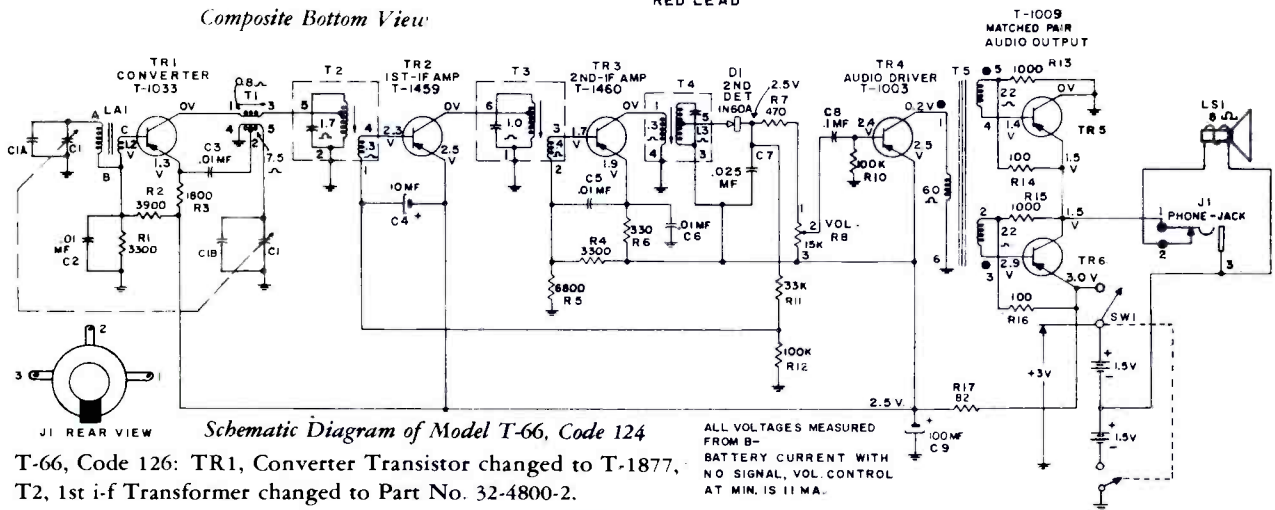
When signal tracing, inject signal at transistor collector and limit input to keep signal across speaker below .6 volt.

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.

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

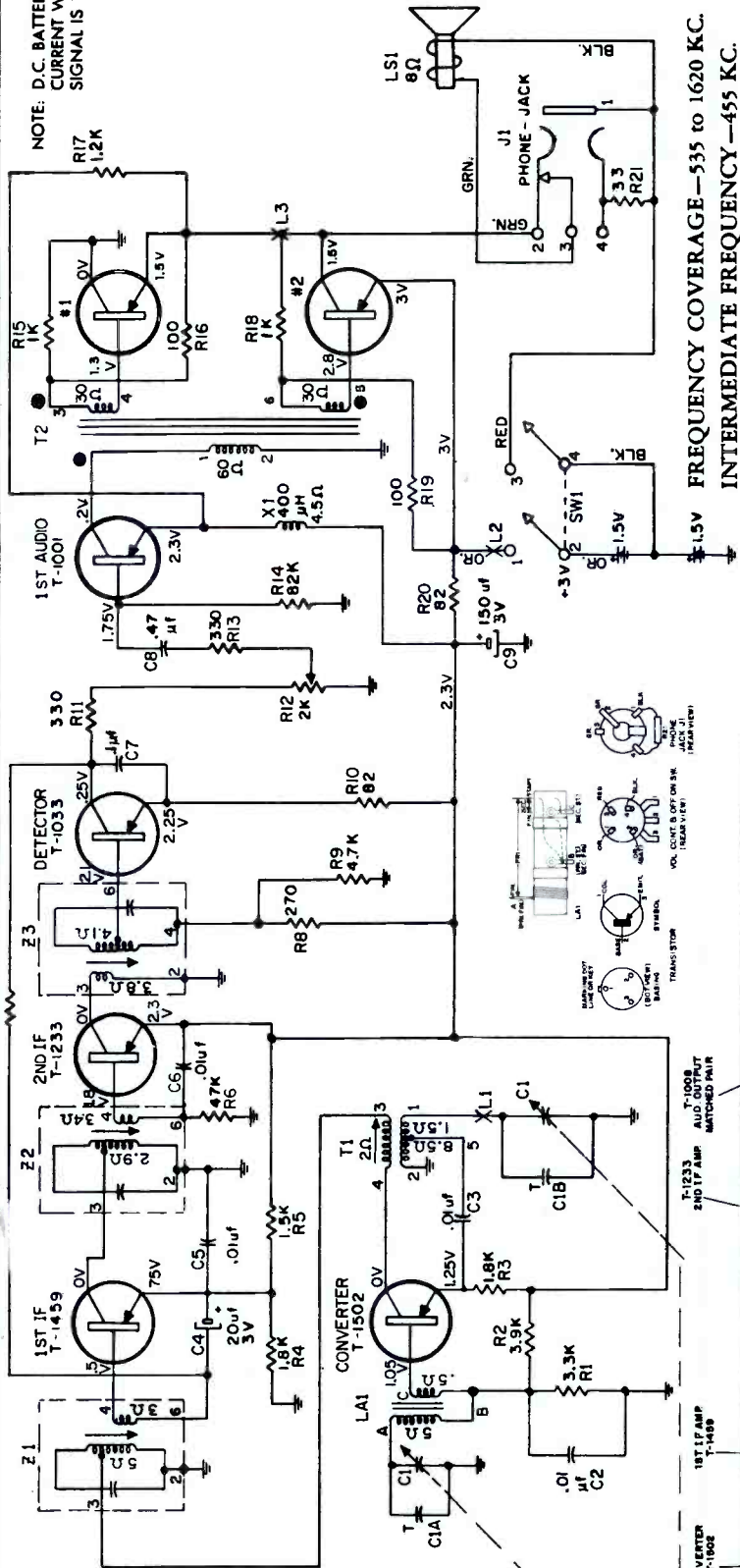
| STEP | SIGNAL GENERATOR | | RADIO | | ADJUST |
|------|--|--------------|-----------------------------------|---|--|
| | CONNECTION TO RADIO | DIAL SETTING | DIAL SETTING | SPECIAL INSTRUCTIONS | |
| 1 | Connect signal generator through a .1-uf. condenser to ant. section of gang. | 455 kc. | Tuning 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-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-70, CODE 124

AUDIO OUTPUT
T-100B
MATCHED PAIR

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



FREQUENCY COVERAGE—555 TO 1620 KC.
INTERMEDIATE FREQUENCY—455 KC.

TERMINAL LUG IDENTIFICATION

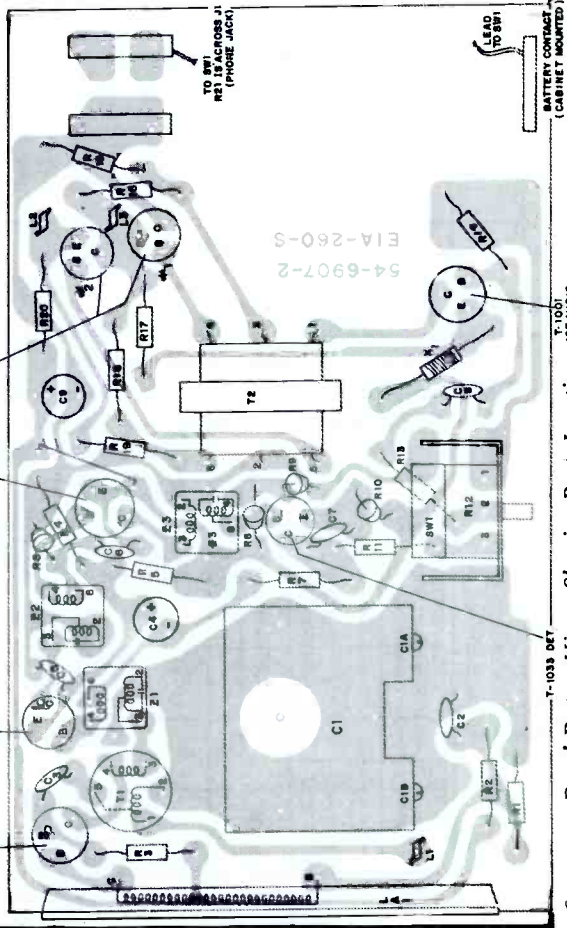
- L1—Lead from C1B Trimmer Capacitor Lug 1 of T1
- L2—Green Lead from Switch SW1, Lug 1
- L3—Green Lead from Phono Jack

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

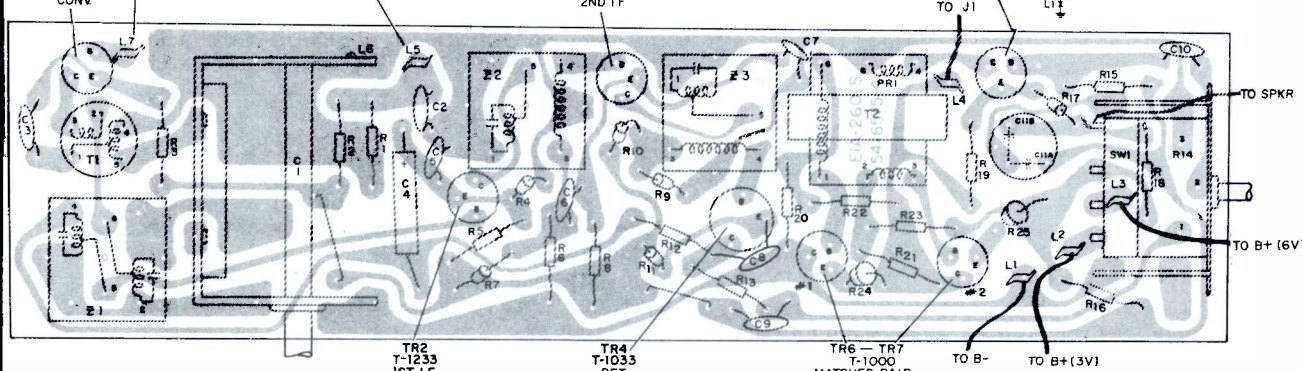
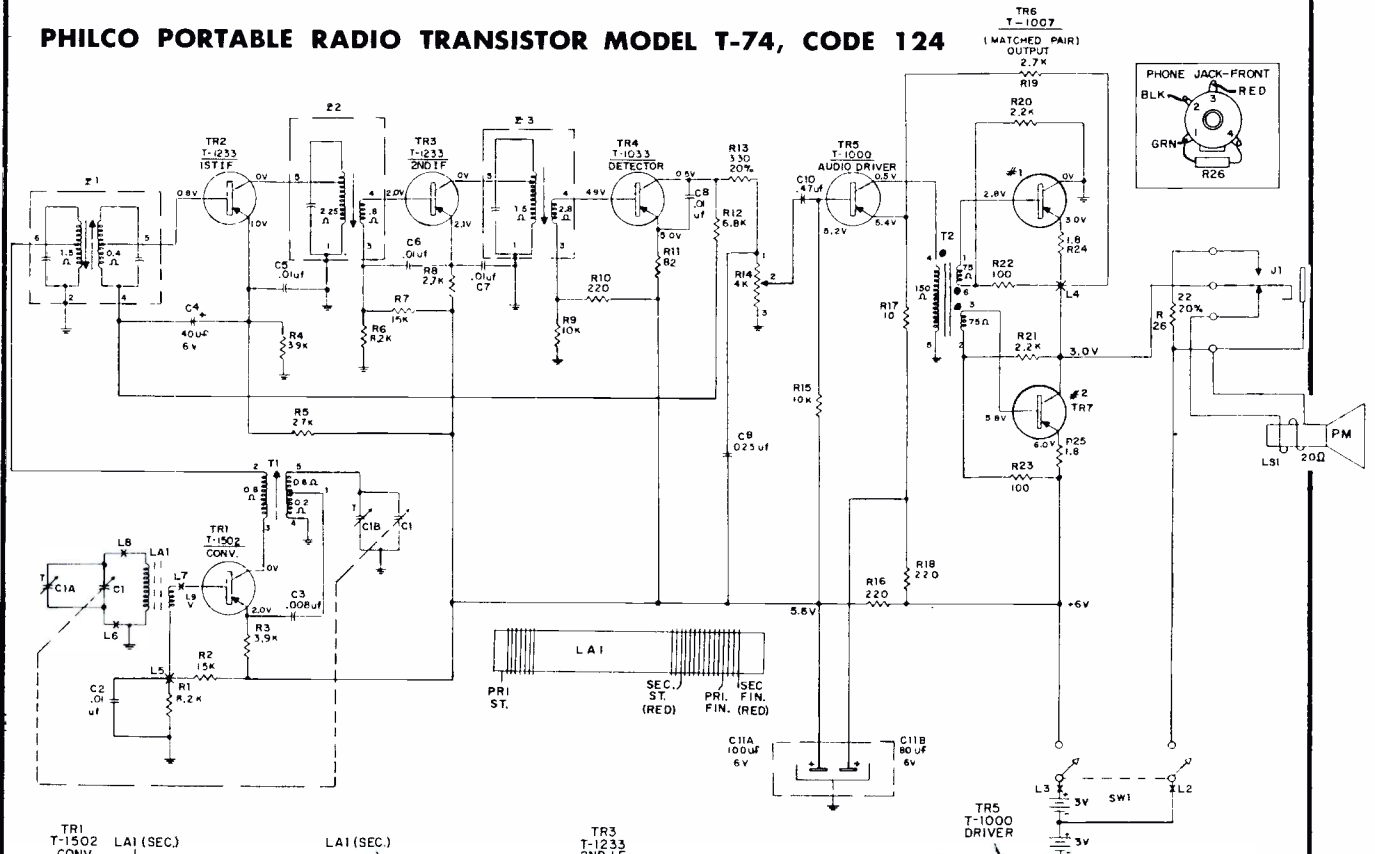
All voltages taken with a Philco Meter Model 8102, 20,000 ohms per volt. All measurements taken between ground and points indicated. Coil resistances read with coil in circuit.
●—Black dots located at (T2) Audio Transformer indicates phasing polarity of transformer.



Component Panel Bottom View—Showing Parts Location

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

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-74, CODE 124



Bottom Composite View of Perma-Circuit Panel

ALIGNMENT CHART

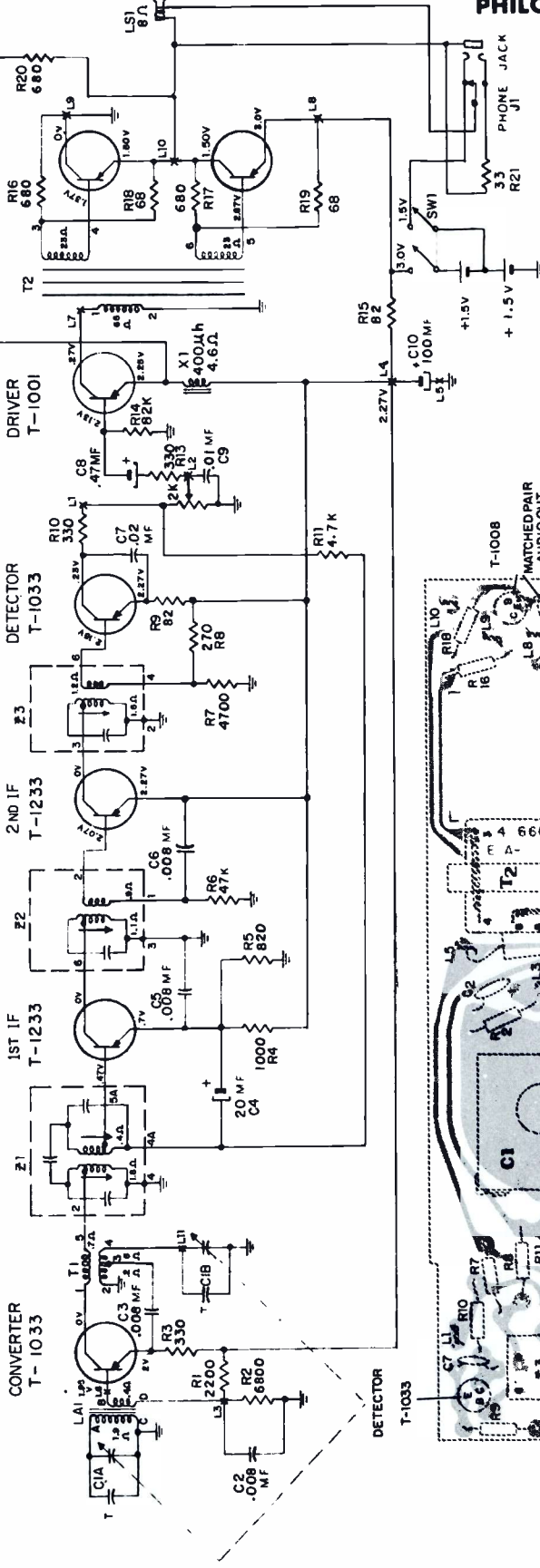
| STEP | SIGNAL GENERATOR | | RADIO | | ADJUST |
|------|--|--------------|-----------------------------------|---|--|
| | CONNECTION TO RADIO | DIAL SETTING | DIAL SETTING | SPECIAL INSTRUCTIONS | |
| 1 | Connect signal generator through a .1-uf. condenser to ant. section of gang. | 455 kc. | Tuning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

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

PHILCO PORTABLE RADIO MODEL T-76, CODE 124

AUDIO OUTPUT
T-1008, MATCHED PAIR

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-76, CODE 124



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

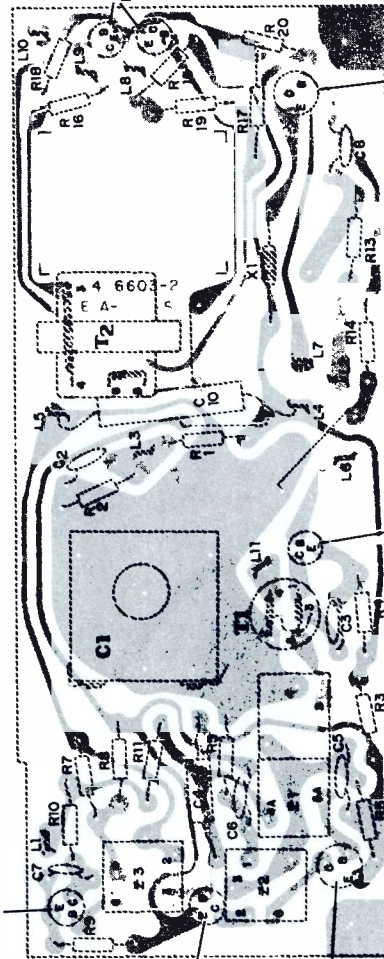
SERVICE NOTES

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.

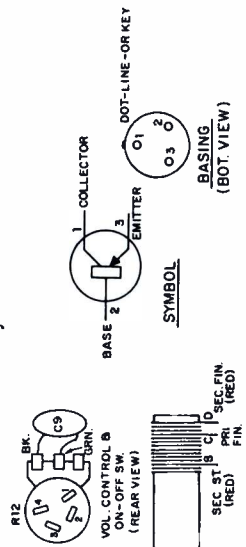
Dress of black lead from top, center, frame lug of gang to end ground lug is important to reduce beat. See base layout for lead dress.



Printed Wiring Panel, Foil Side, Showing Parts Location

PANEL LUG CONNECTION

- L1 Yellow wire from volume control
- L2 Green wire from volume control
- L3 Green wire from LA1 secondary
- L4 Positive lead of C10
- L5 Black lead from C1
- L6 Green lead from LA1 secondary
- L7 Red wire from T2
- L8 Red wire to lug 4 on switch
- L9 Black wire to chassis ground
- L10 Yellow wire to speaker
- L11 Yellow wire to private listening jack
- L12 Black & white wire to C11

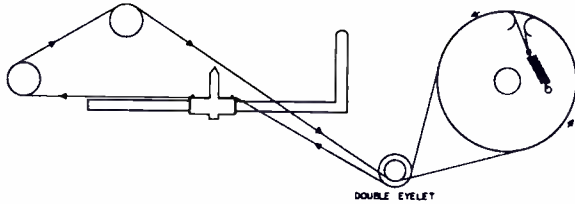


**PHILCO MODELS J-769 J-772 J-773 J-774 J-775
J-838 J-840 J-842 J-845 J-846**

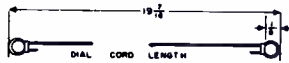
Material applicable to these sets is below and on pages 122 and 123.

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.



DOUBLE EYELET

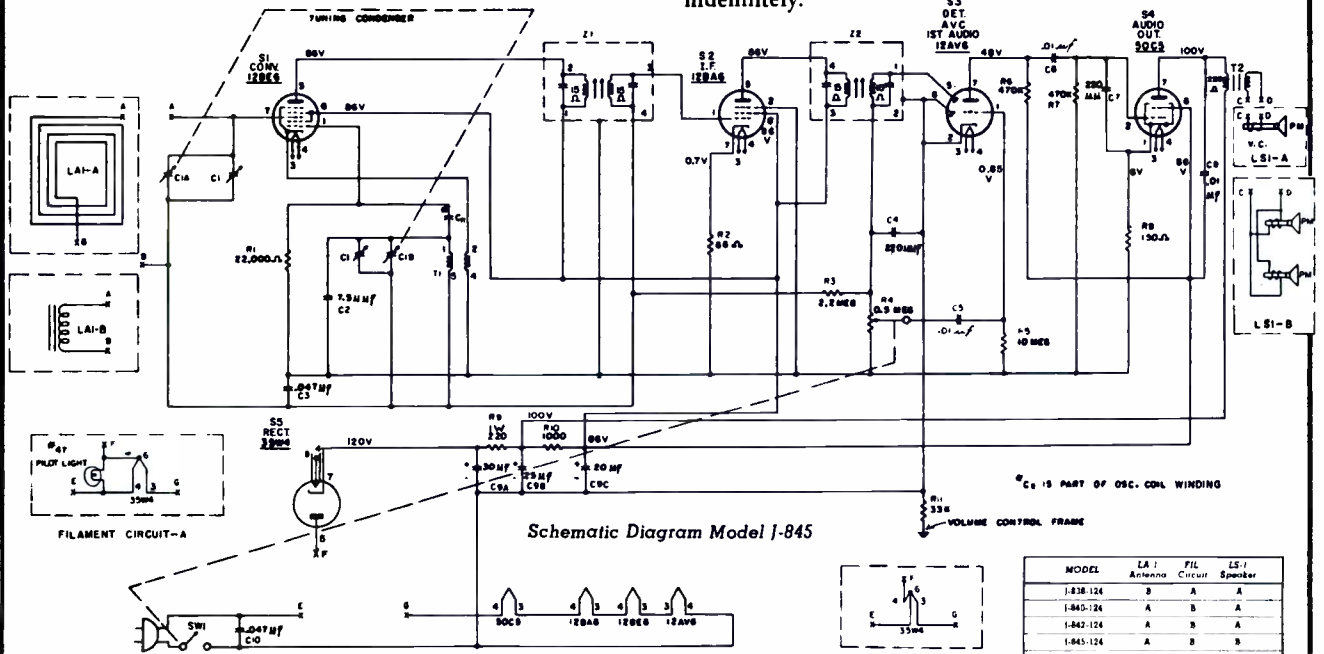


Dial Cord Installation—Model J-774 (Rear View)

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

MODELS J-774 J-775

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



Schematic Diagram Model J-845

| 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 | B |
| J-845-124 | A | B | B |
| J-846-124 | B | B | B |

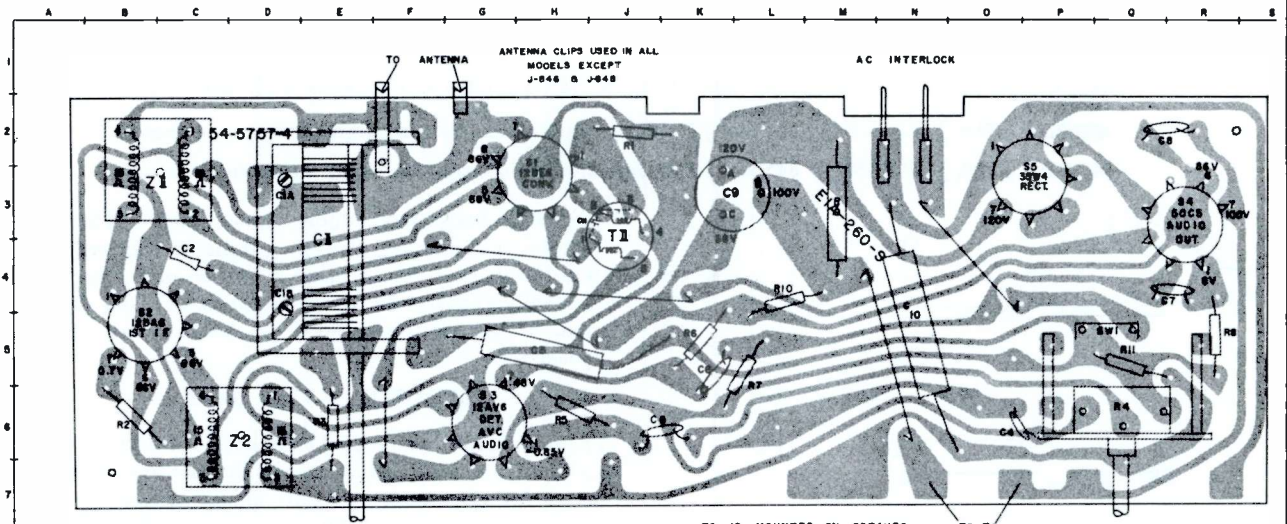
CIRCUIT DIFFERENCES FOR MODEL VARIATIONS

ALIGNMENT CHART

| STEP | SIGNAL GENERATOR | RADIO | | | ADJUST |
|------|---|--------------|-------------------------|--|--|
| | CONNECTION TO RADIO | DIAL SETTING | DIAL SETTING | SPECIAL INSTRUCTIONS | |
| 1. | Ground lead to B—; output lead through a .1 mf condenser to grid (pin 7) of 12BE6 or top 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.

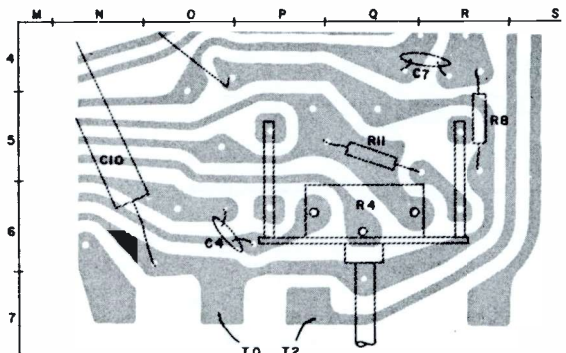
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION
 PHILCO Models J-769, J-772, J-773, J-774, J-775, J-838, J-840, etc., Continued



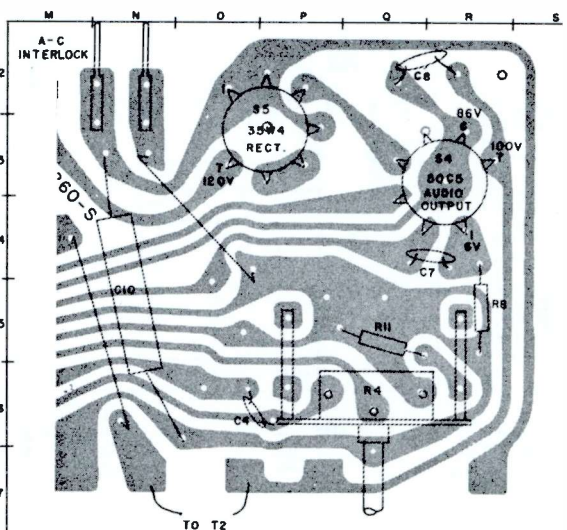
Bottom View of Perma Circuit Panel Component Layout Model J-838

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

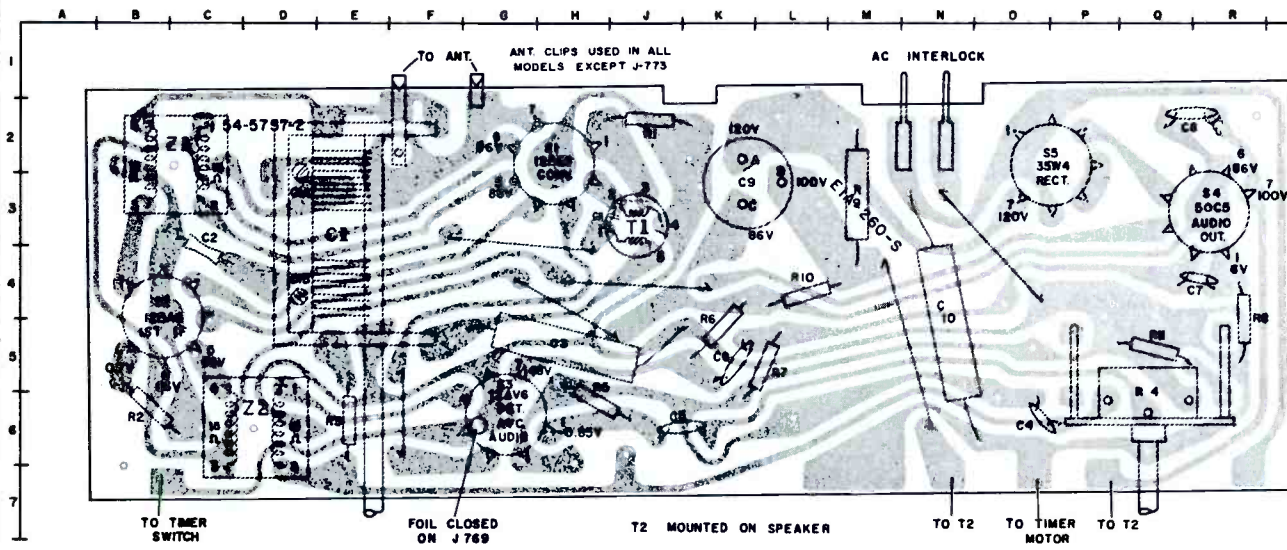
PARTS COMMON TO ALL MODELS

| 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 |

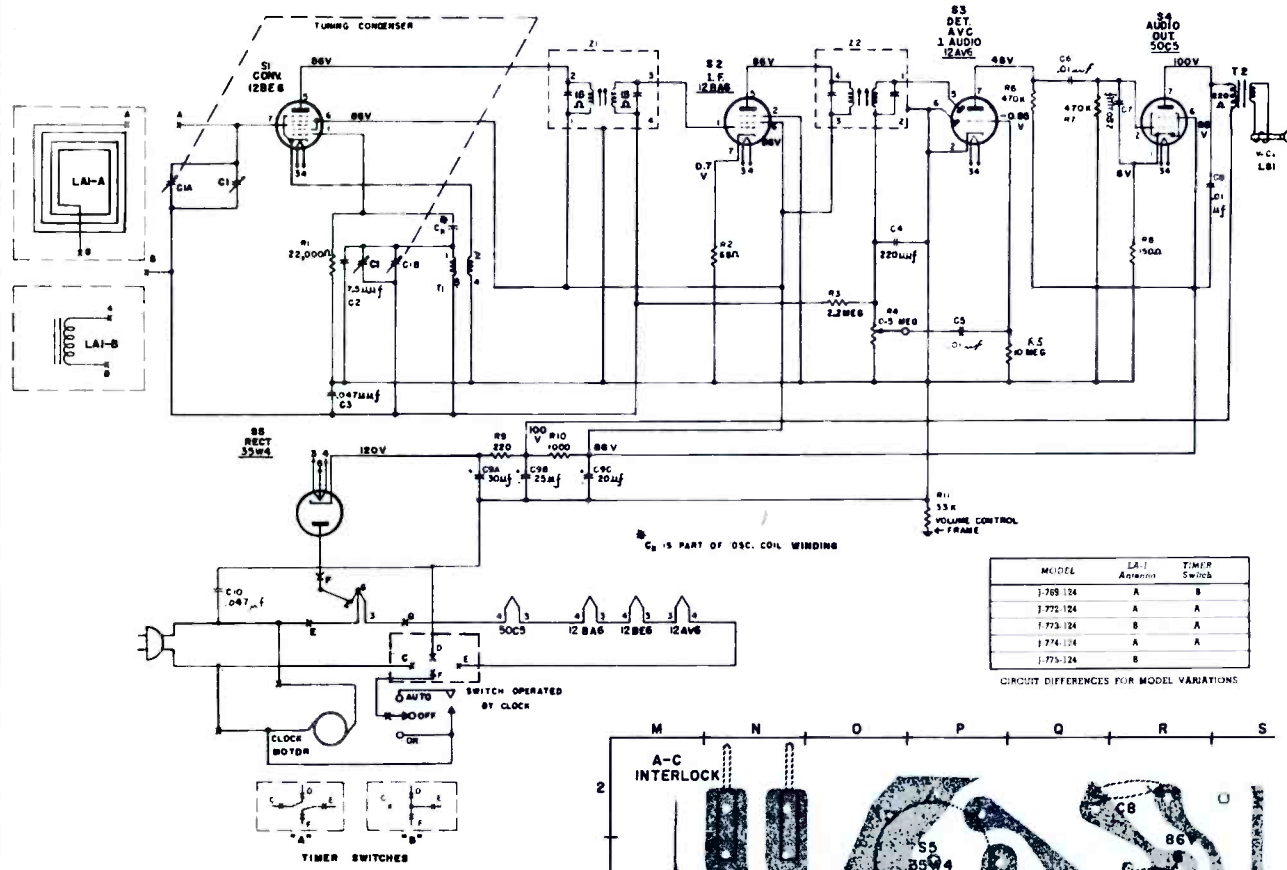
| Sym- bol | Loca- tion | Description | Service Part No. |
|-------------|---------------|---|---------------------|
| R4 | Q6 | Resistor, volume control, .5 megohms | |
| R5 | H6 | Resistor, 1st audio grid, 10 megohms. | 66-6108340 |
| R6 | K5 | Resistor, 1st audio plate, 470,000 ohms | 66-4478340 |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

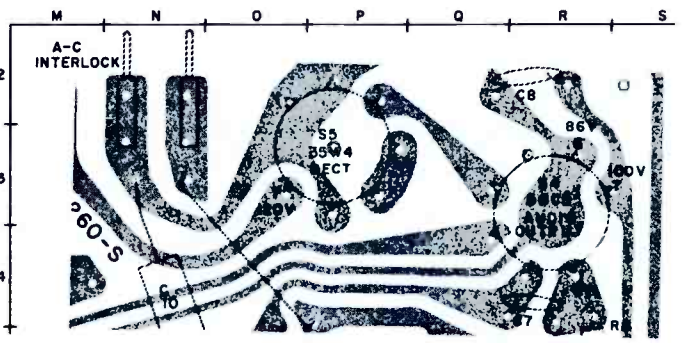
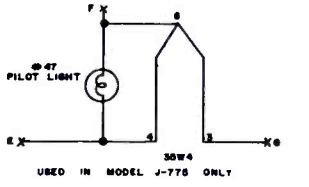
PHILCO Models J-769, J-772 thru J-775, J-838, J-840, J-842, etc., Continued



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

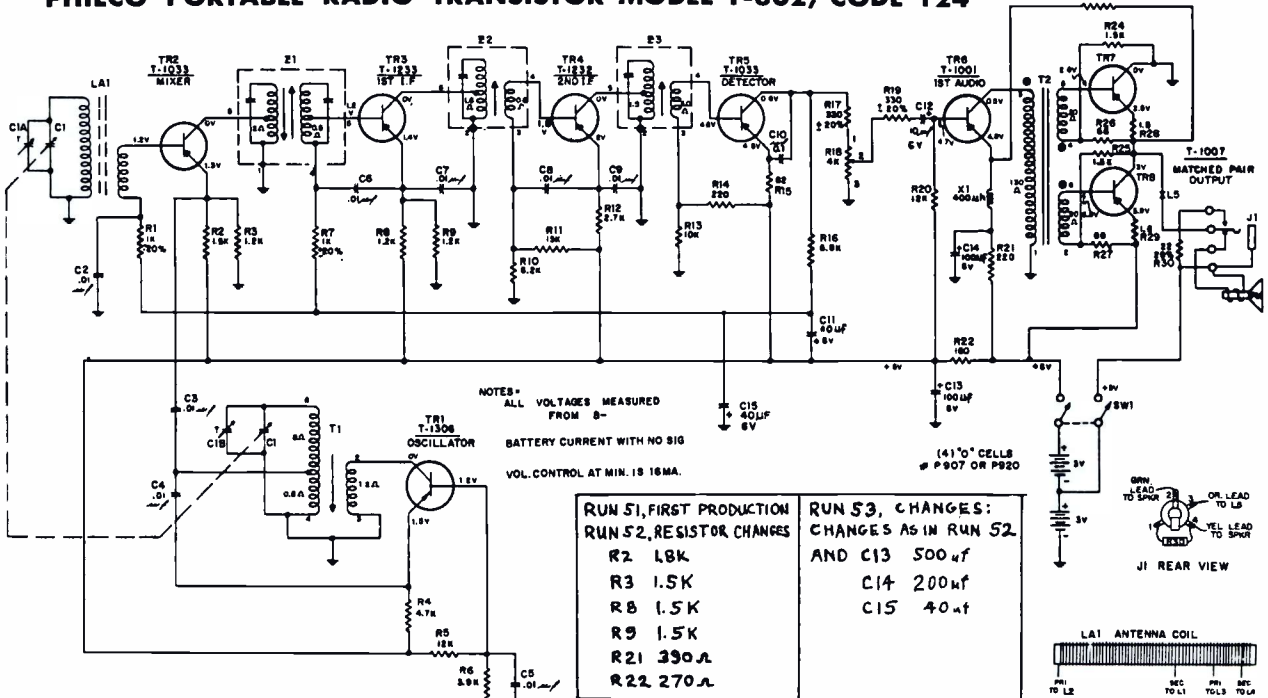


Schematic Diagram Model J-772



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



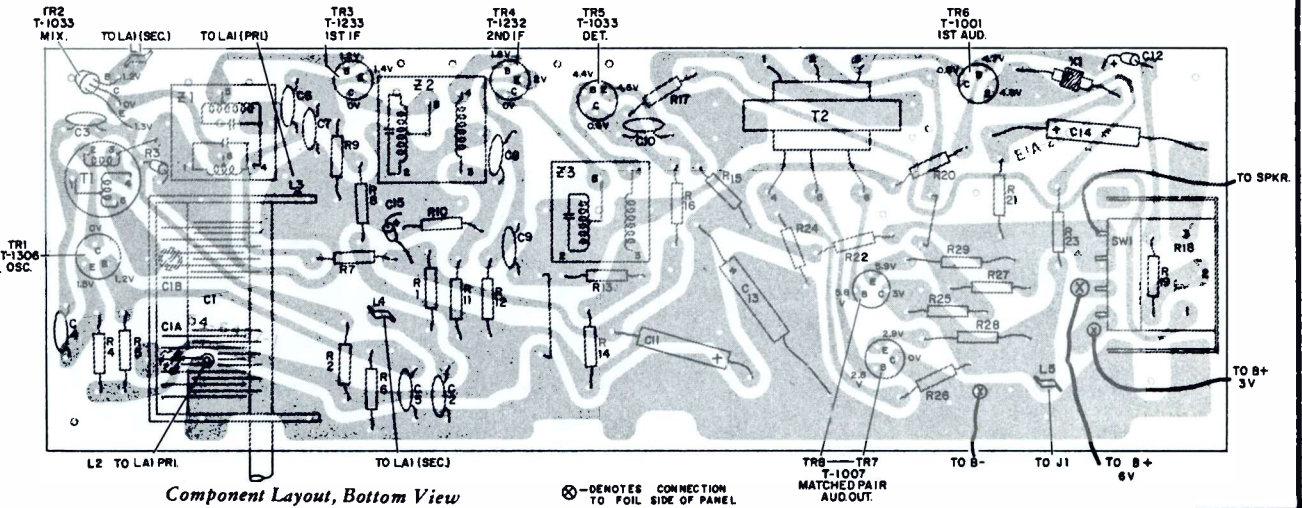
NOTES - ALL VOLTAGES MEASURED FROM B-
BATTERY CURRENT WITH NO SIG
VOL. CONTROL AT MIN. IS 18MA.

| | |
|---|--|
| <p>RUN 51, FIRST PRODUCTION RUN 52, RESISTOR CHANGES</p> <p>R2 1.8K R3 1.5K R8 1.5K R9 1.5K R21 330.Ω R22 270.Ω</p> | <p>RUN 53, CHANGES: CHANGES AS IN RUN 52 AND C13 500 μf C14 200 μf C15 40 μf</p> |
|---|--|

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—ocs. core |
| 3 | Same as step 2. | 1620 kc. | 1620 kc. (Tuning gang fully open) | Adjust for maximum output. | C1B—osc. trim. |
| 4 | Same as step 2. | 1400 kc. | 1400 kc. | Adjust for maximum output. | C1A—ant. trim. |
| 5 | Repeat steps 2, 3 and 4 until no further improvement is obtained. Always stop on step 4. | | | | |

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



Component Layout, Bottom View

⊗ DENOTES CONNECTION TO POIL SIDE OF PANEL

PHILCO PORTABLE RADIO TRANSISTOR MODEL T-901, CODE 124

| Reference Symbol | Location | Description | Reference Symbol | Location | Description | Reference Symbol | Location | Description |
|------------------|----------|--|------------------|----------|--|------------------|----------|--------------------------------|
| C1 | — | Capacitor, variable, tuning | R6 | B1 | Resistor, 1.0K Ω , r-f amp. base | R33 | J1 | Resistor, 22 Ω , jack |
| C2 | A6 | Capacitor, .008 mfd, r-f base | R7 | B5 | Resistor, 47K Ω , mixer base | SW1 | R21 | Switch |
| C3 | C8 | Capacitor, .008 mfd, r-f emitter | R8 | B2 | Resistor, 39K Ω , mixer base | I1 | 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 | K5 | Capacitor, .008 mfd, det. base | R17 | M4 | Resistor, 220 Ω , 2nd det. base | TR8** | R9 | Transistor, aud. out., T-1007 |
| C13 | J6 | Capacitor, .023 mfd, det. collector | R18 | K5 | Resistor, 8.2K 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 | | | |
| J1 | Case | Jack, listening | R25* | Q4 | Resistor, 220 Ω , aud. driver emit. | | | |
| LA1 | Case | Antenna coil | R26 | Q8 | Resistor, 2.7K Ω , aud. feed-back | | | |
| LS1 | Case | Speaker, 12 Ω V.C., 4 inch | R27 | P3 | Resistor, 1.5K Ω , aud. collector | | | |
| R1 | G8 | Resistor, 1.5K Ω , r-f amp. emit. | R28 | R5 | Resistor, 1.5K Ω , aud. output col. | | | |
| R2* | C9 | Resistor, 1.5K Ω , r-f amp. emit. | R29 | Q5 | Resistor, 68 Ω , TR8 base | | | |
| R3 | C8 | Resistor, 4.7K Ω , osc. emit. | R30 | S3 | Resistor, 68 Ω , TR9 base | | | |
| R4 | H8 | Resistor, 12K Ω , osc. base | R31 | S6 | Resistor, 1.8 Ω , TR8 emitter | | | |
| R5 | H6 | Resistor, 3.9 K Ω , osc. base | R32 | R5 | Resistor, 1.8 Ω , TR9 emitter | | | |

* RUN 2—CHANGE INFORMATION
 C16—deleted
 C18A—400 mfd
 C18B—300 mfd
 R2—1.8K Ω
 R11—1.5K Ω
 R12—1.5K Ω
 R23—12K Ω
 R24—270 Ω
 R25—390 Ω

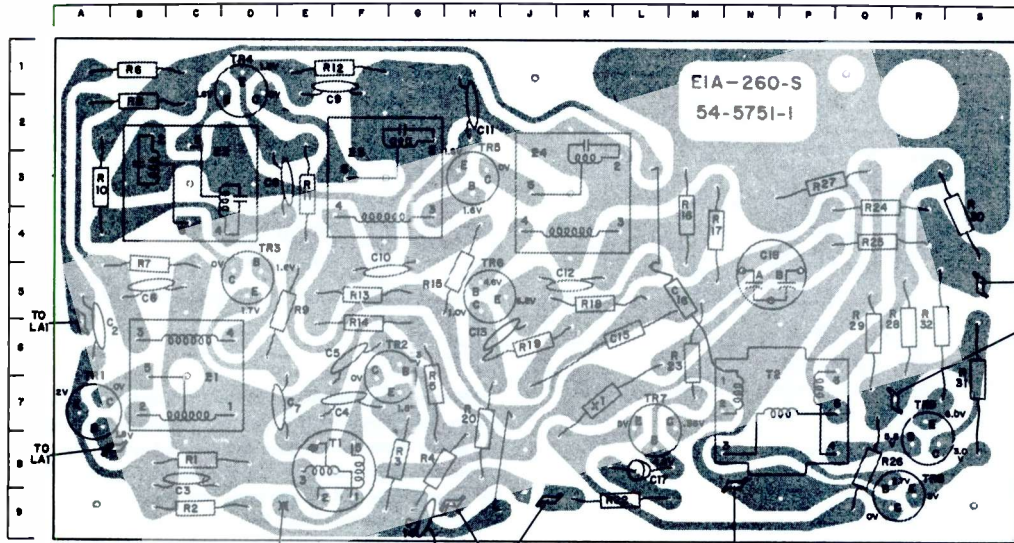
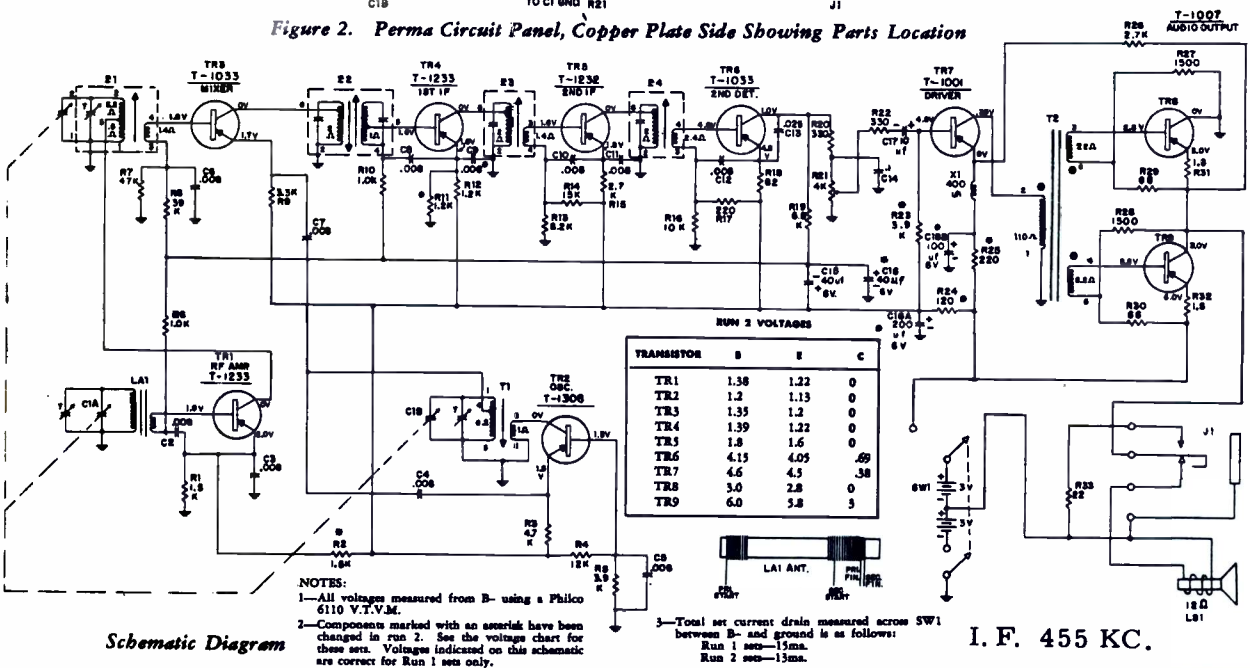


Figure 2. Perma Circuit Panel, Copper Plate Side Showing Parts Location

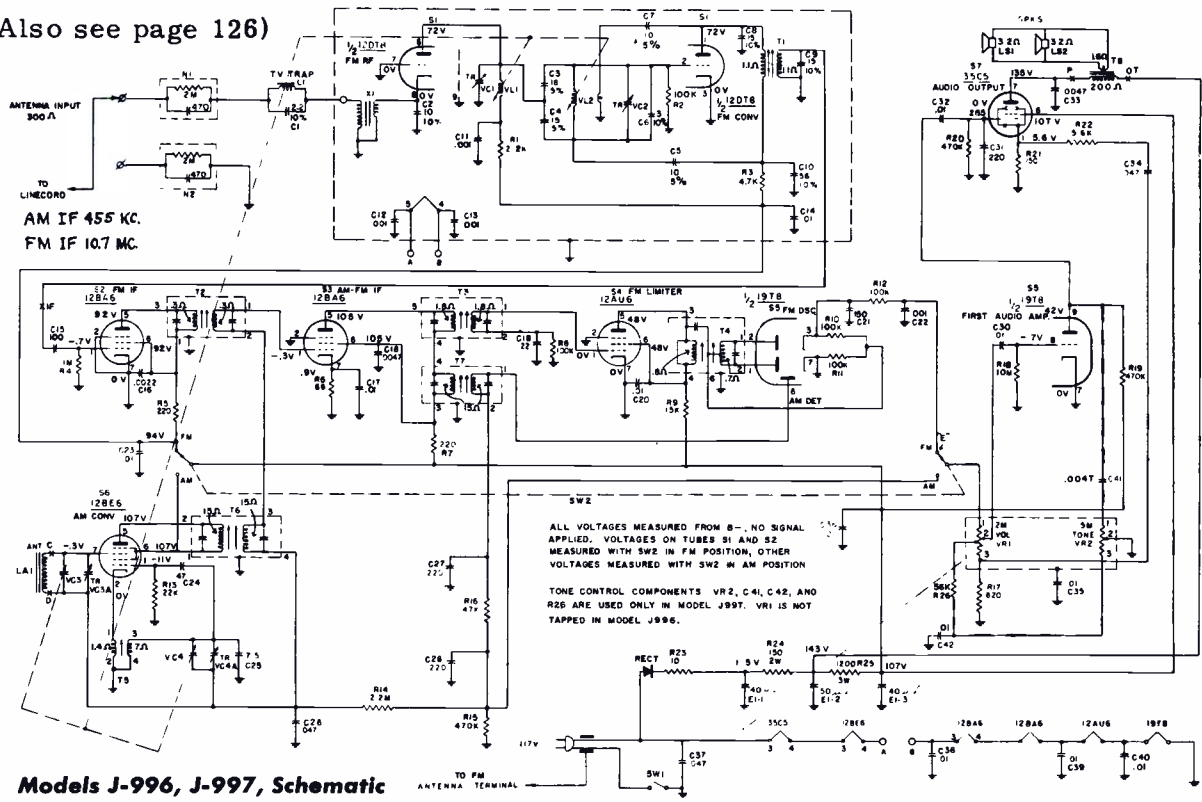


Schematic Diagram

I. F. 455 KC.

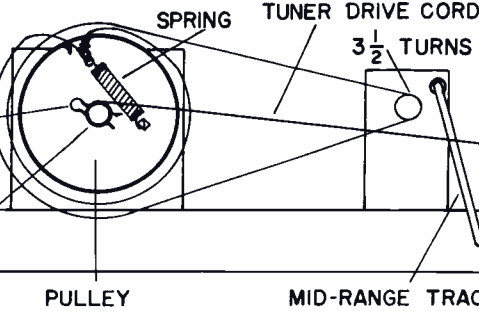
PHILCO AM/FM MODELS J-996, J-997

(Also see page 126)

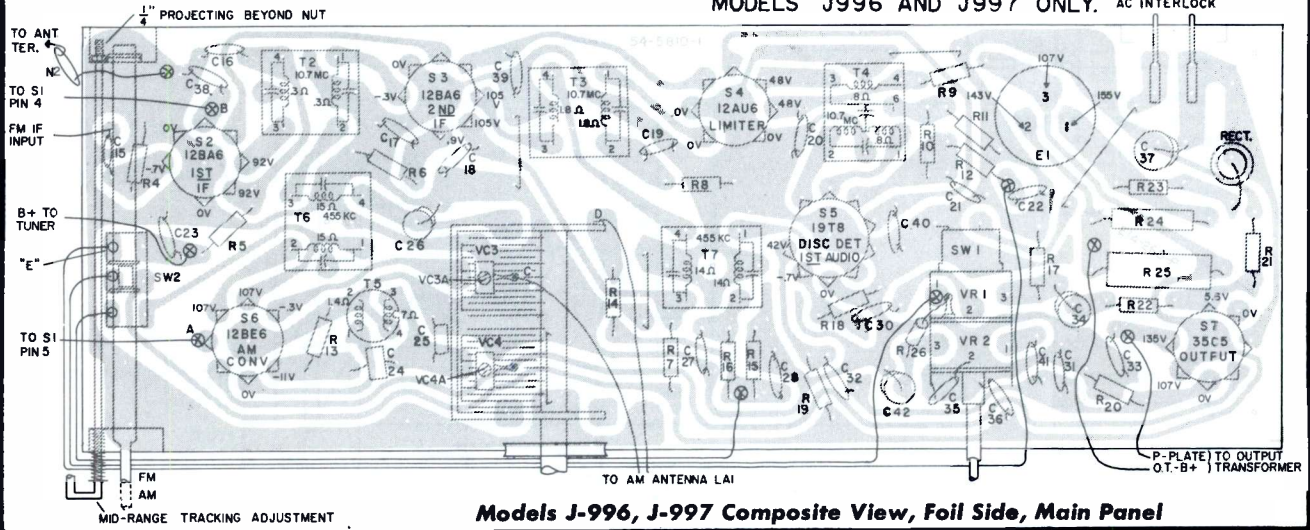


Models J-996, J-997, Schematic

Dial and Tuner Cords—
PULLEY CORD
FASTENER
**Cord Lifted Off Pulley;
Pulley in Counterclockwise Position**



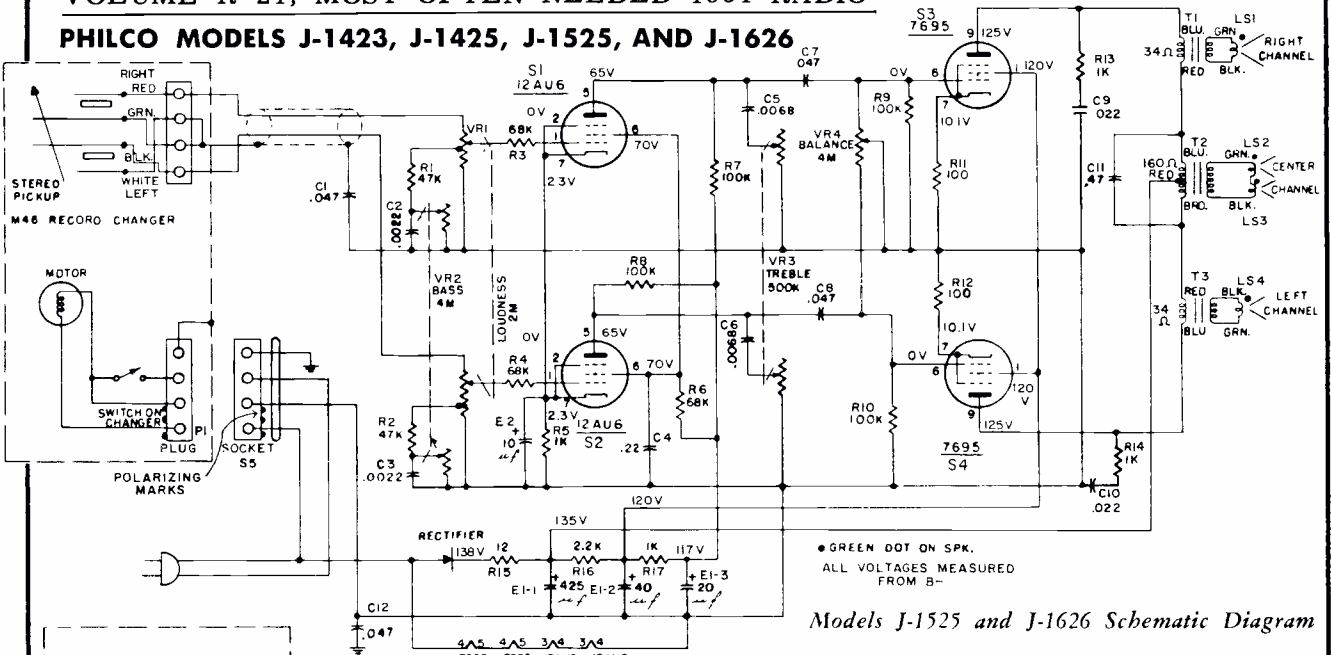
MID-RANGE TRACKING ADJUSTMENT
MODELS J996 AND J997 ONLY. AC INTERLOCK



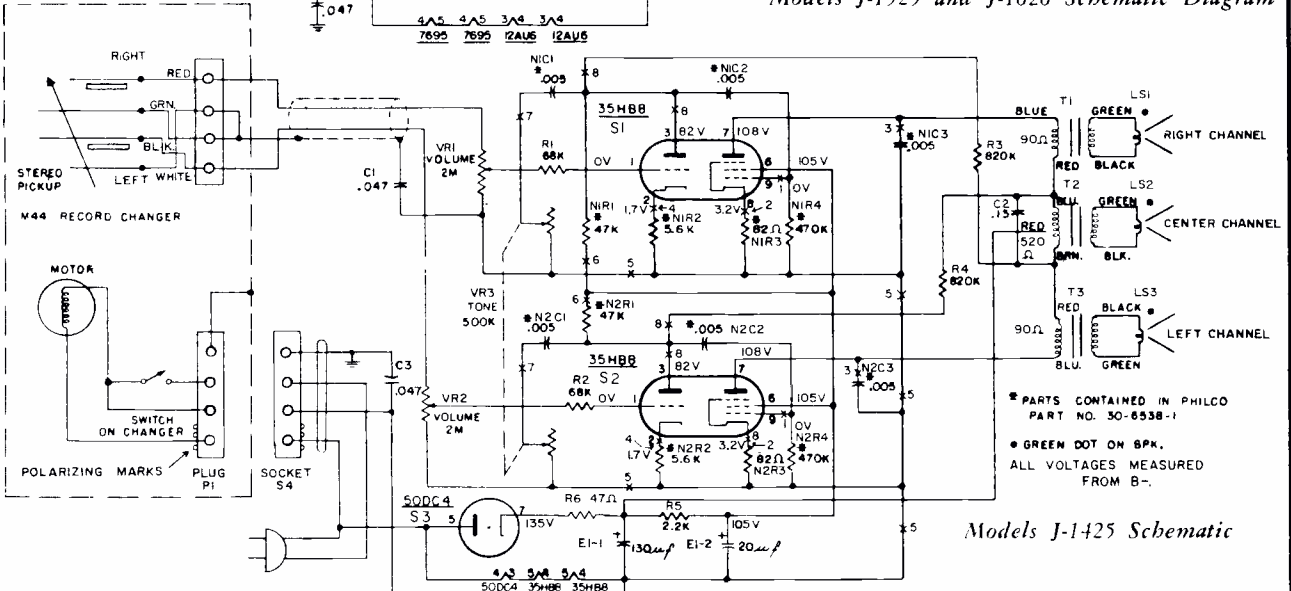
Models J-996, J-997 Composite View, Foil Side, Main Panel

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

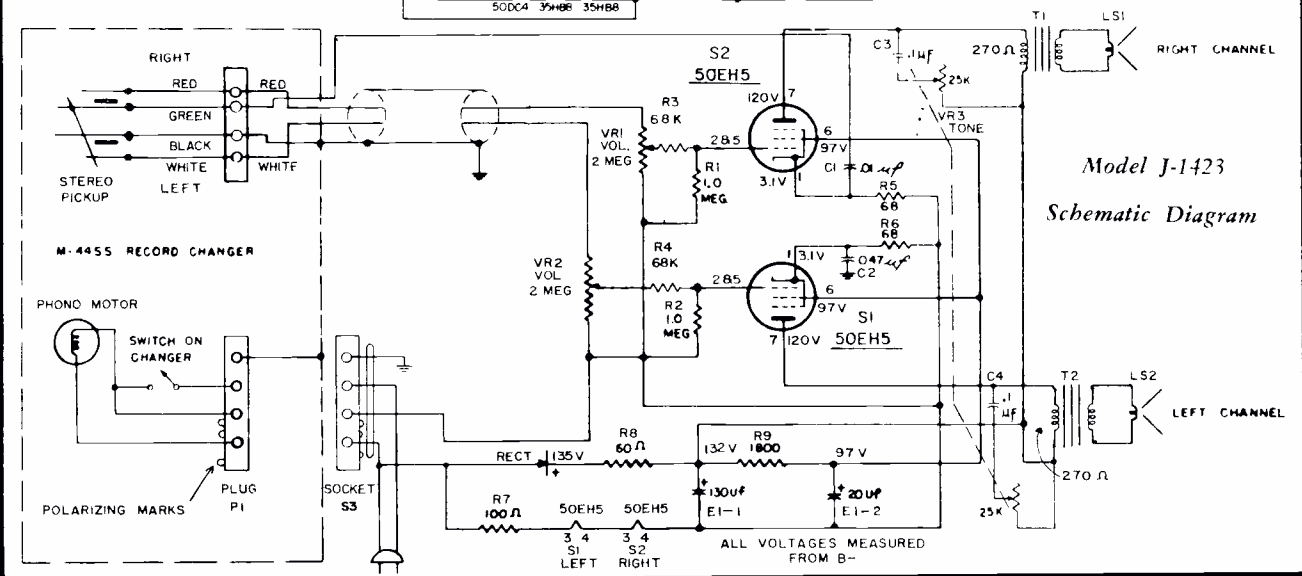
PHILCO MODELS J-1423, J-1425, J-1525, AND J-1626



Models J-1525 and J-1626 Schematic Diagram



Models J-1425 Schematic



Model J-1423 Schematic Diagram

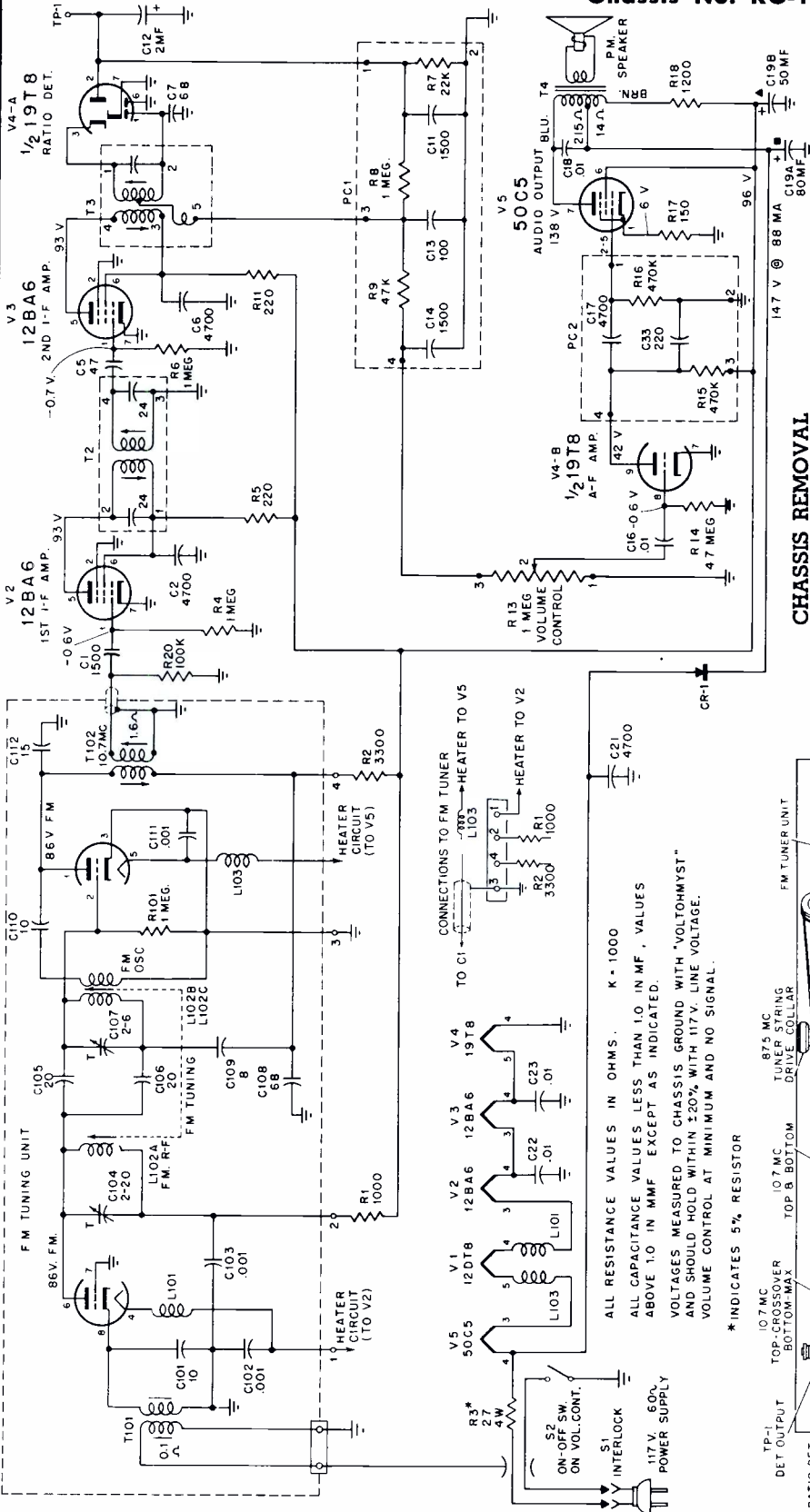
RCA VICTOR

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

Chassis No. RC-1201A

V101A
12DT8
F.M. CONV.

V101B
12DT8
F.M. CONV.



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.

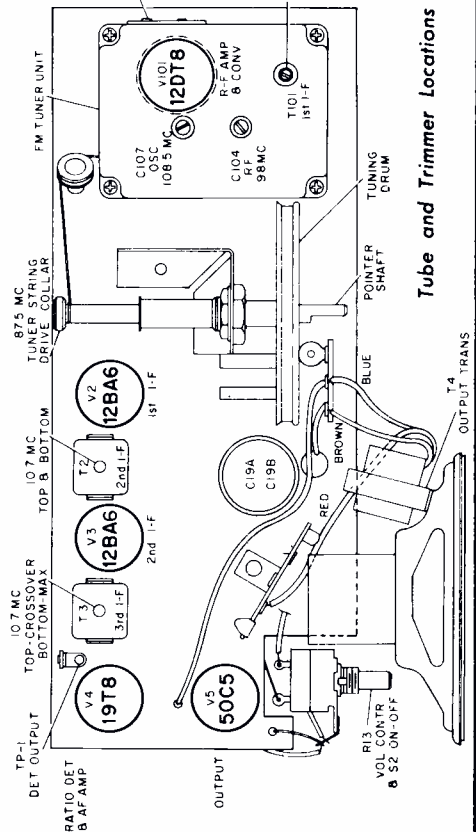
CHASSIS INSTALLATION

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

CONNECTIONS TO FM TUNER
TO C1 HEATER TO V5
TO C1 HEATER TO V2

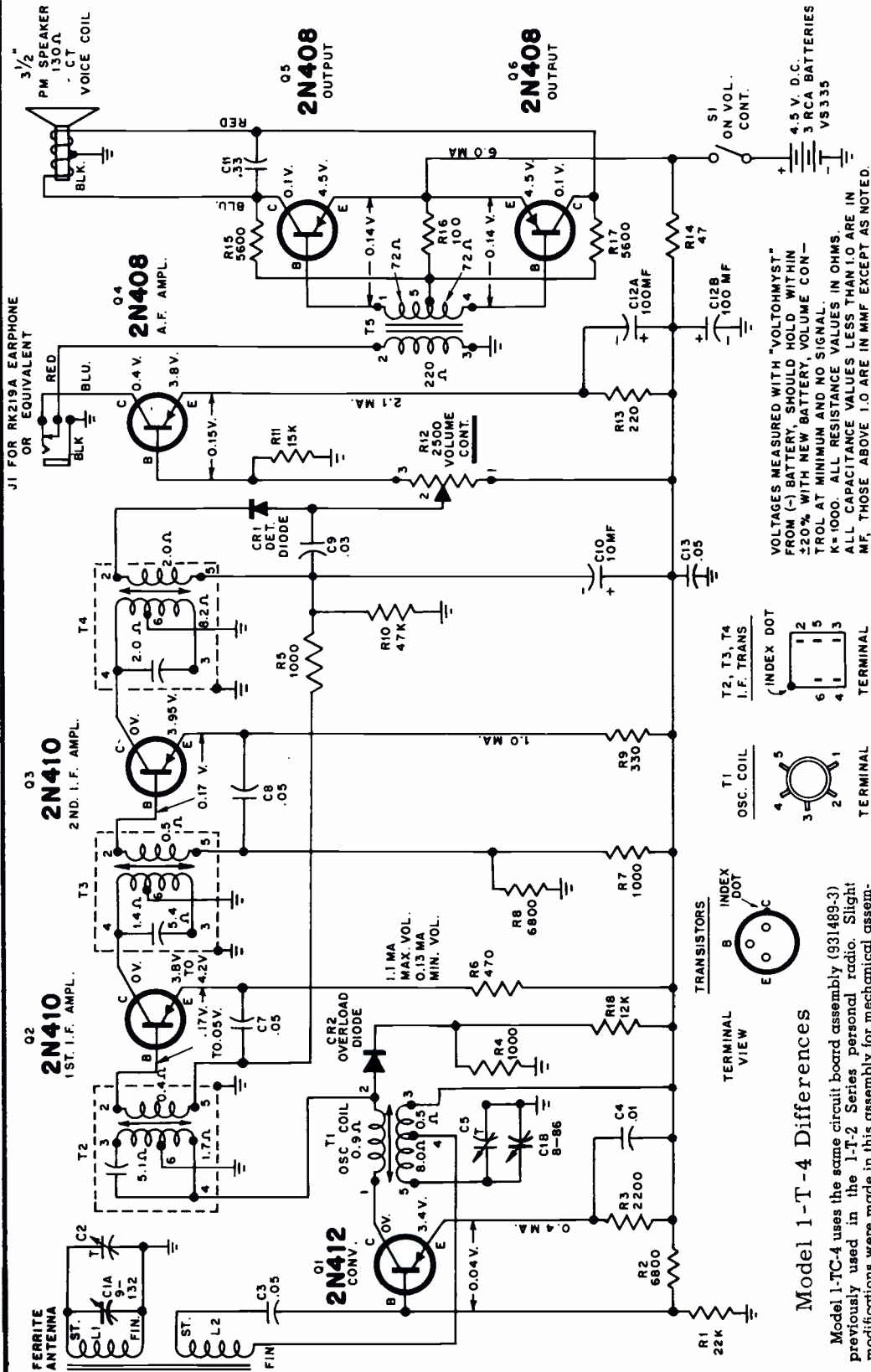
ALL RESISTANCE VALUES IN OHMS. K = 1000
ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. VALUES ABOVE 1.0 IN MMF EXCEPT AS INDICATED.
VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" AND SHOULD HOLD WITHIN ±20% WITH 117V. LINE VOLTAGE.
VOLUME CONTROL AT MINIMUM AND NO SIGNAL.
* INDICATES 5% RESISTOR



Tube and Trimmer Locations

RCA VICTOR

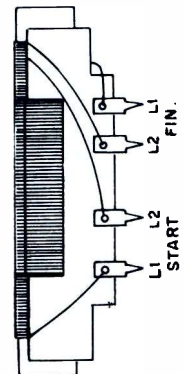
1-T-1, 1-T-2 Series, and Models 1-T-3, 1-TC-4
Chassis RC-1200 and RC-1200A
(Continued on the next page)



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-pole 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.

| 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 |

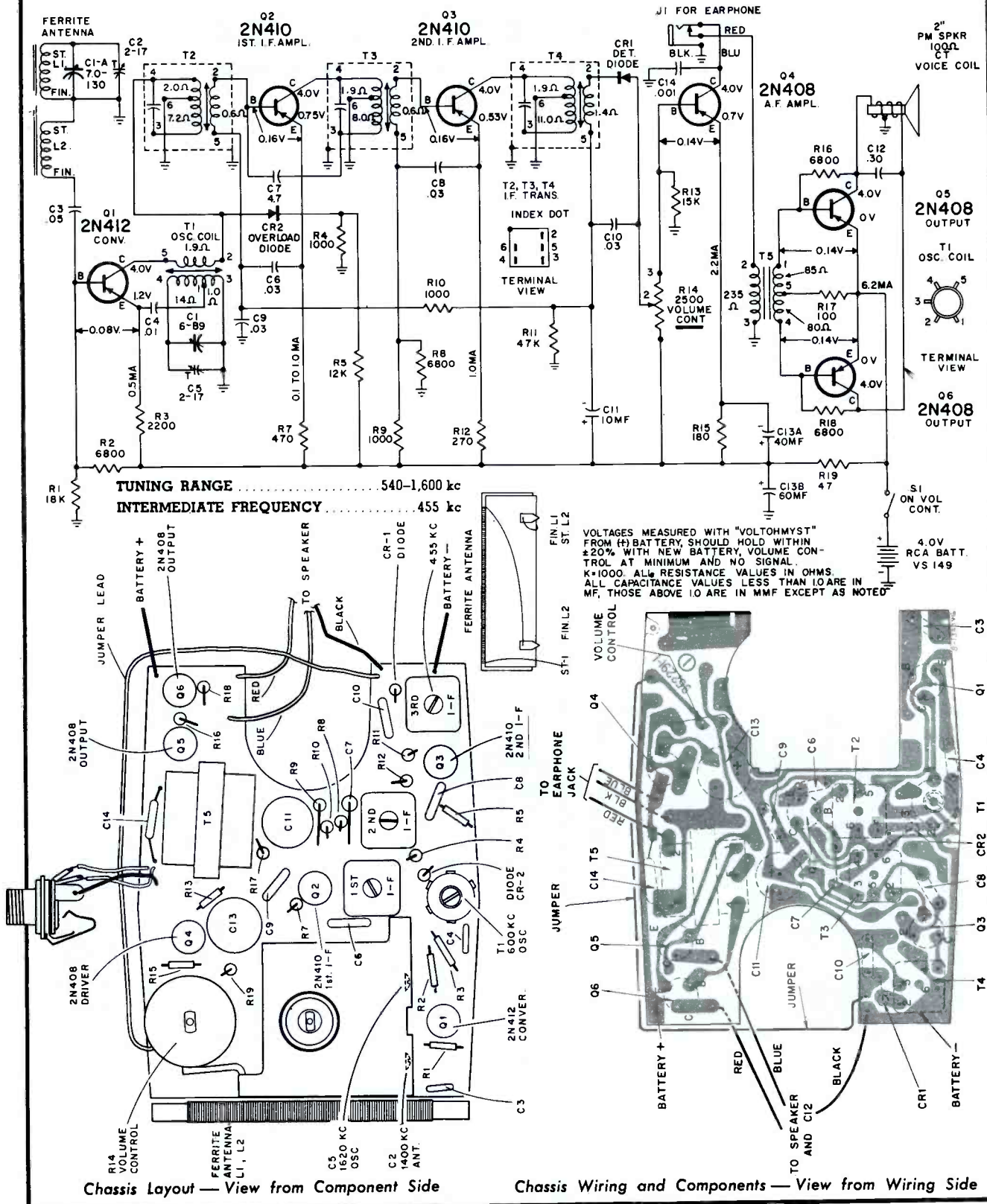


RCA VICTOR

(For later type see next page)

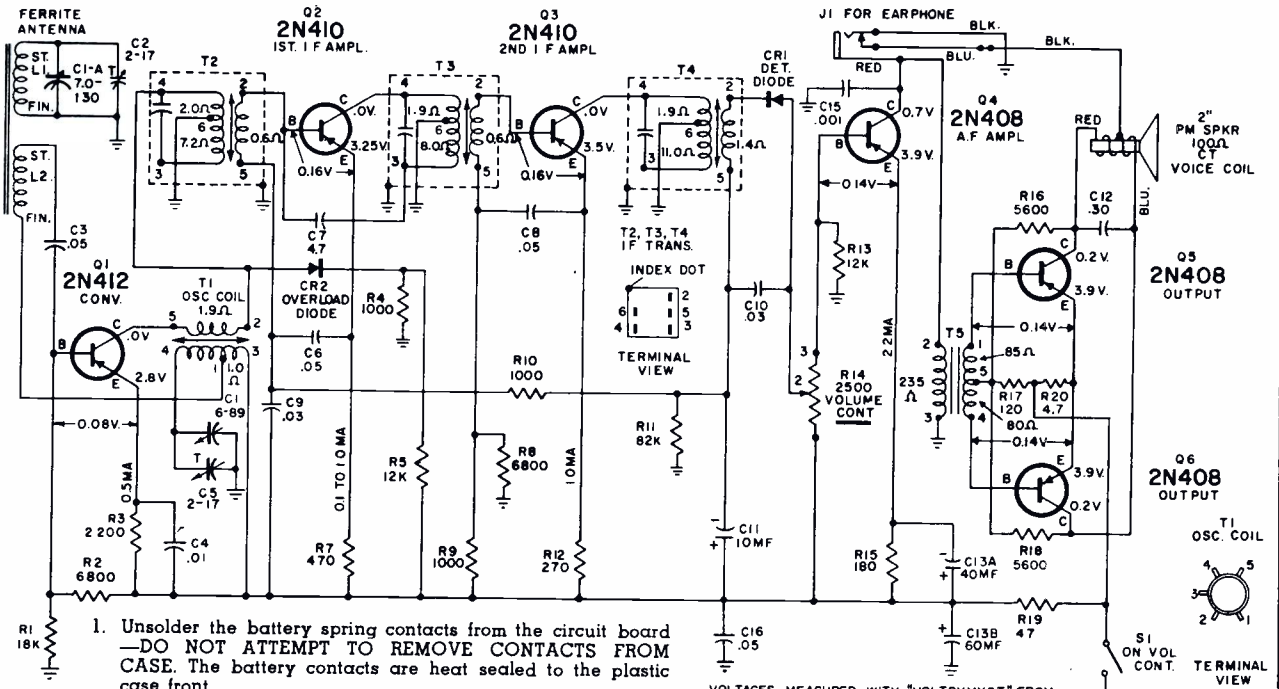
1-TP-1 SERIES, 1-TP-2 SERIES

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



RCA VICTOR 1-TP-1 SERIES

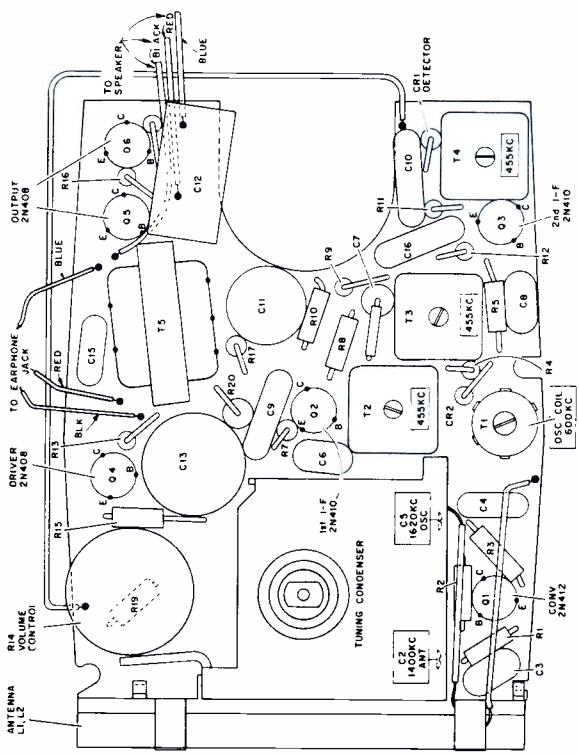
Chassis No. RC-1199B
Circuit Board No. 962537-1



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

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

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



Chassis Layout — View from Component Side



Wiring and Components — View from Wiring Side

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

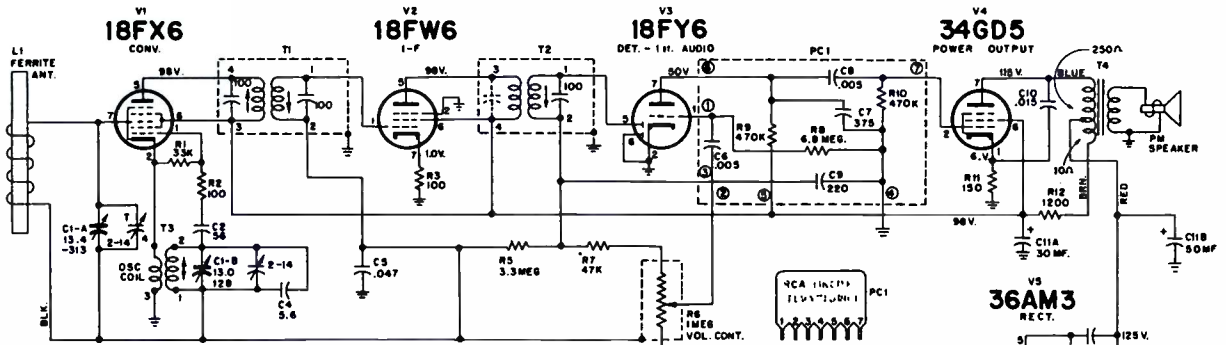
RCA

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

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

1-X-4 SERIES

Chassis No. RC-1202C



RC-1202 B
1-X-3 SERIES

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

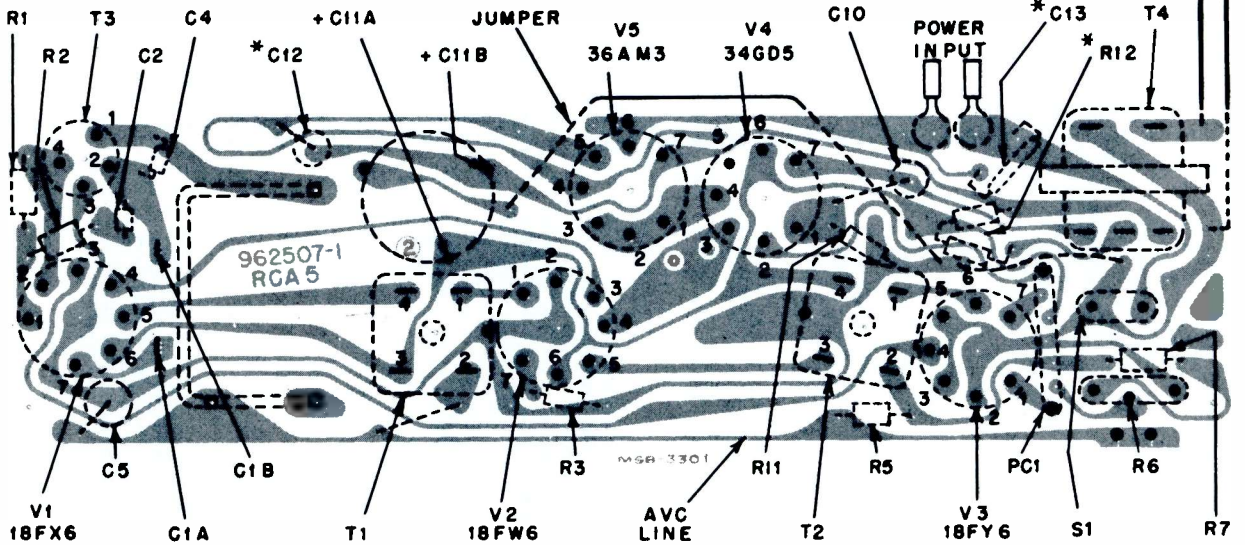
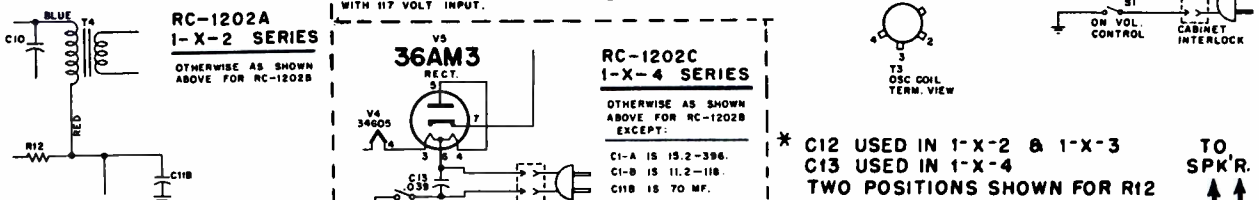
VOLTAGES MEASURED TO COMMON NEGATIVE (+) WITH "VOLTOHMV" AND SHOULD HOLD WITHIN 20% WITH 117 VOLT INPUT.

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

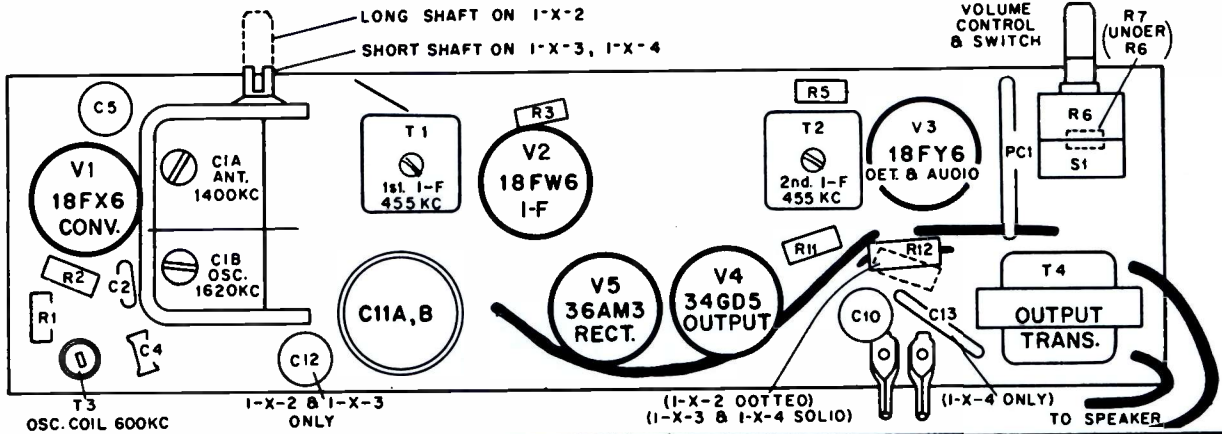
RC-1202C
1-X-4 SERIES
OTHERWISE AS SHOWN ABOVE FOR RC-1202B EXCEPT:

C1-A IS 15.2-39K.
C1-B IS 11.2-11B.
C1B IS 70 MF.
C12 IS NOT USED.

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



LONG SHAFT ON 1-X-2
SHORT SHAFT ON 1-X-3, 1-X-4



OSC. COIL 600KC

1-X-2 & 1-X-3 ONLY

(1-X-2 OMITTED)
(1-X-3 & 1-X-4 SOLID)

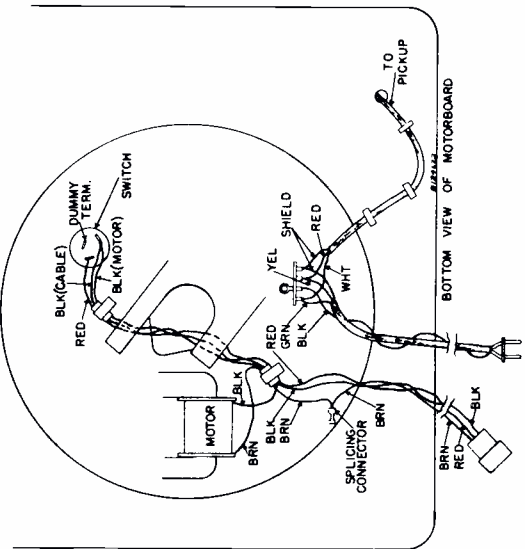
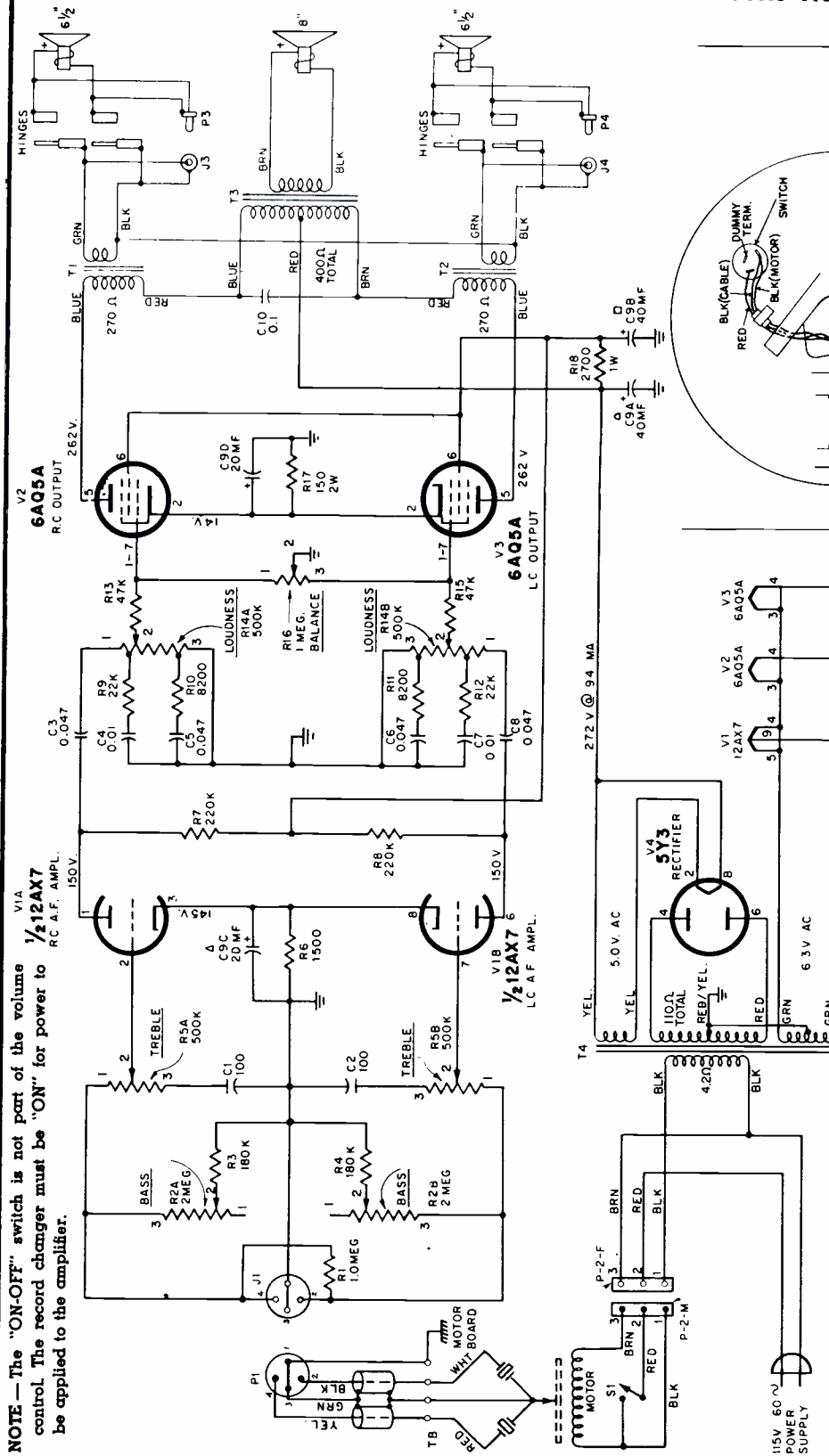
(1-X-4 ONLY)

TO SPEAKER

RCA VICTOR

VP-34 SERIES

Chassis No. RS-34P



Record Changer Wiring

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

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 "woofer" speaker are contained in the main unit. A 6 1/2" PM "Duo-cone" speaker and its 10' interconnecting cable, are contained in each of the hinged, swing-out side units.

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

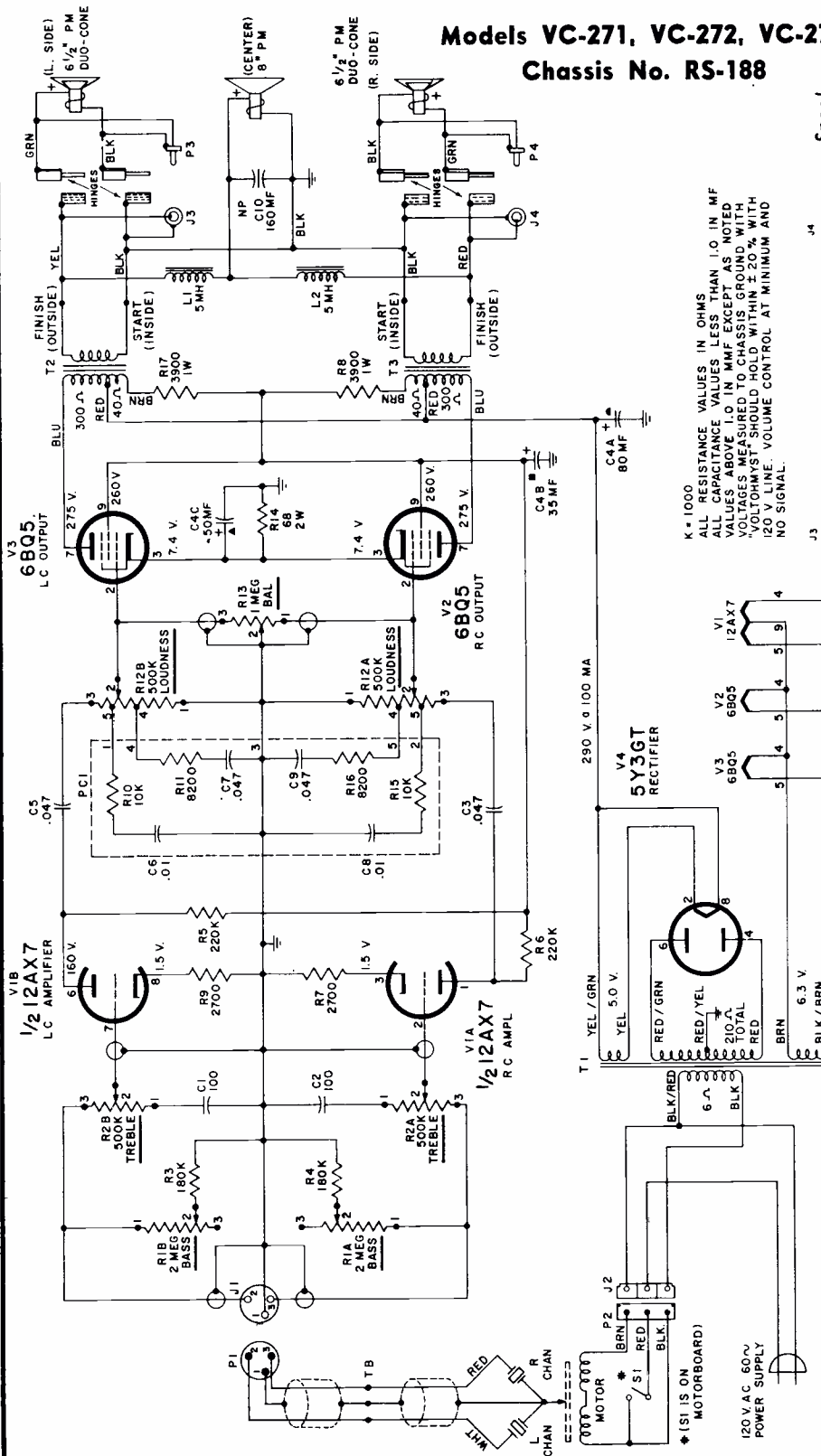
VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" SHOULD HOLD WITHIN $\pm 20\%$ WITH 115 V LINE VOLUME CONTROL AT MINIMUM NO SIGNAL

K=1000
ALL RESISTANCE VALUES IN OHMS
ALL CAPACITANCE VALUES LESS THAN 0.1 IN μ F, VALUES ABOVE 0.1 IN MMF, EXCEPT AS INDICATED.

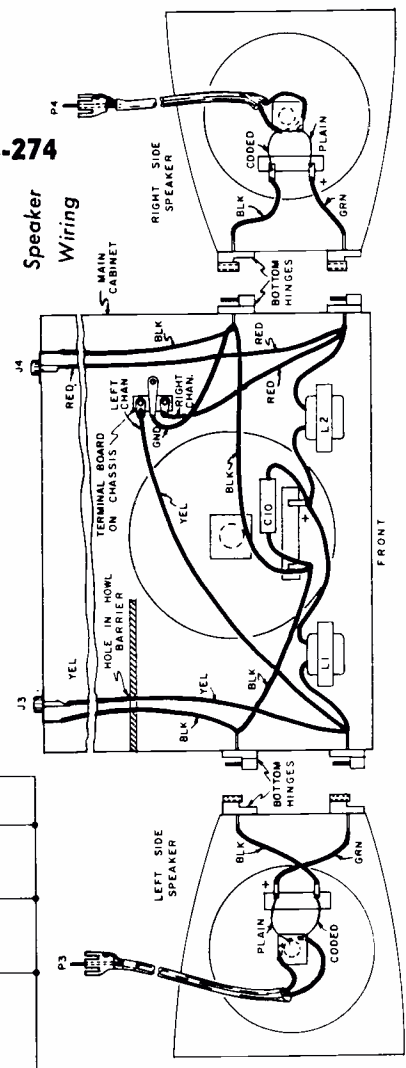
RCA VICTOR

VP-33 SERIES VC-270 SERIES

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



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



CHASSIS REMOVAL

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

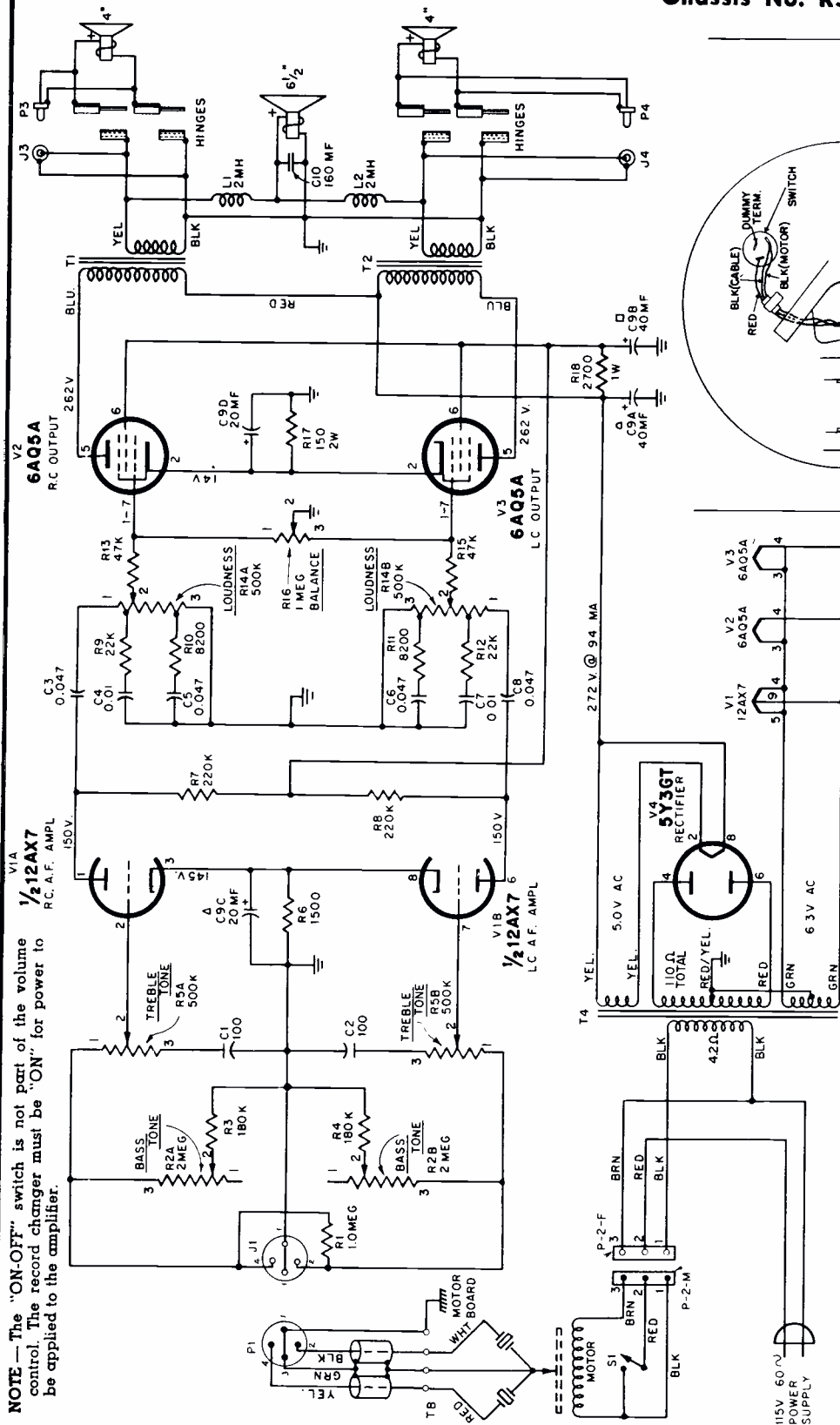
To remove the chassis—(1) remove the knobs, (2) remove the two screws holding the escutcheon and lift it off, (3) remove the two screws holding the changer, (4) unplug the two cables from the chassis and remove the changer, (5) remove the six screws holding the changer mounting board and the four screws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

To install the chassis, reverse the above procedure.

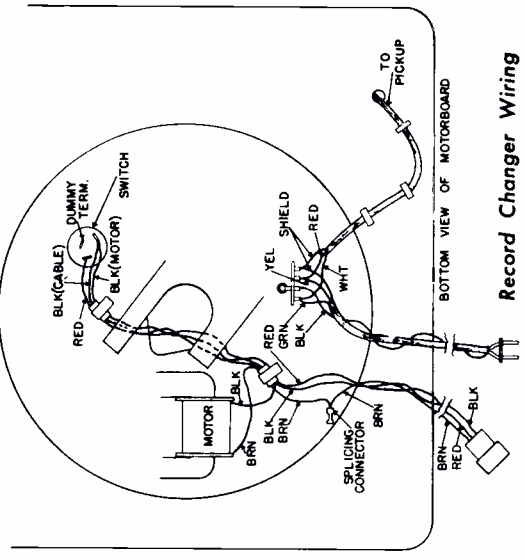
RCA VICTOR

MODEL VP-36

Chassis No. RS-182A



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



Record Changer Wiring

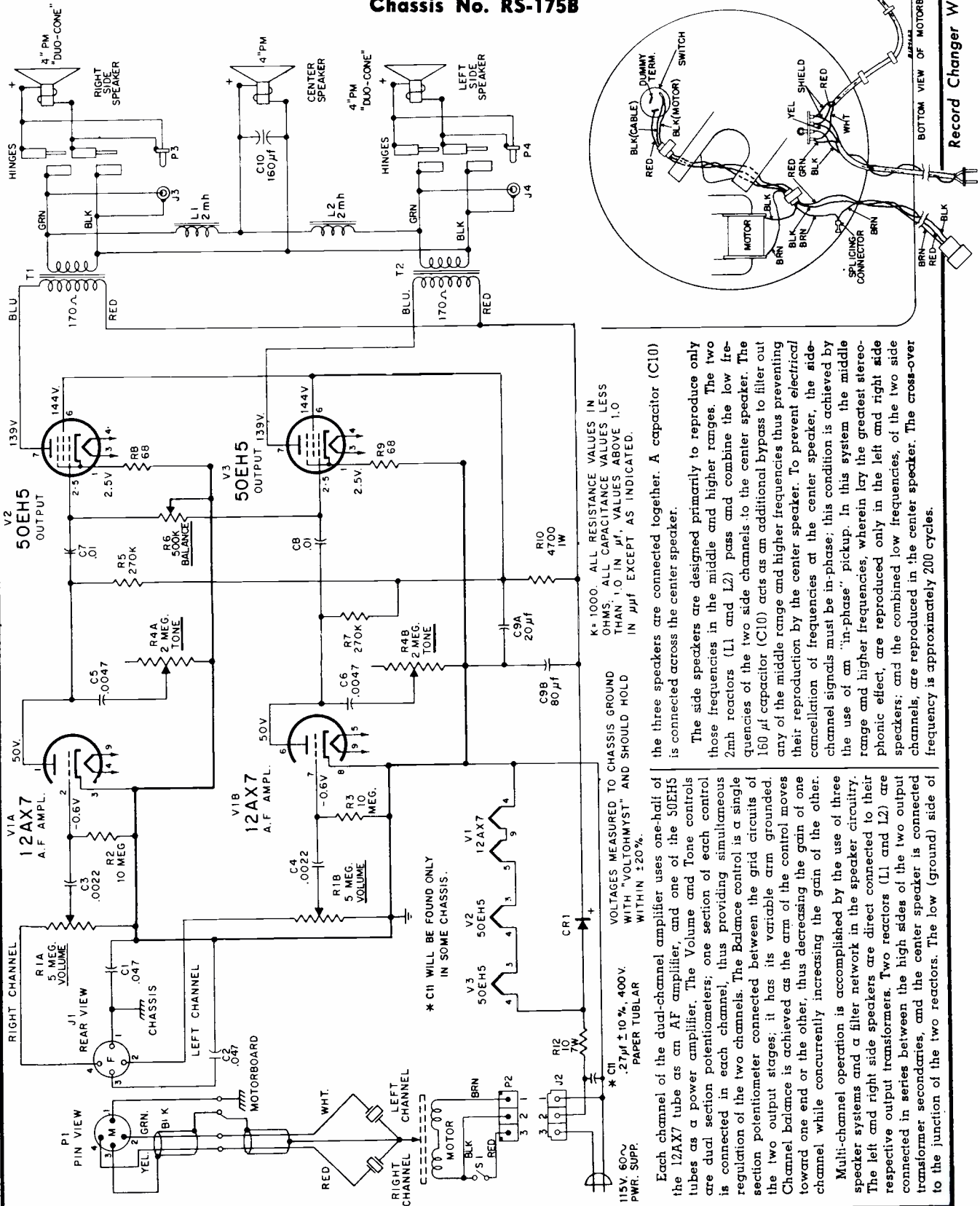
VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTOHMYST" SHOULD HOLD WITHIN $\pm 20\%$ WITH 115 V LINE.
 VOLUME CONTROL AT MINIMUM NO SIGNAL.
 K=1000
 ALL RESISTANCE VALUES IN OHMS.
 ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF, VALUES ABOVE 1.0 IN MMF, EXCEPT AS INDICATED

Model VP-36 is a portable stereo-orthophonic, hi-fidelity "Victrola." It is a complete multi-channel record playing system consisting of a record changer, an amplifier, and three speakers housed in a 3-piece luggage-type cabinet. The record changer, amplifier, and 6 1/2" PM "woofer" speaker are contained in the main unit. A 4" PM "Duo-cone" speaker, and its 10' interconnecting cable, are contained in each of the hinged swing-out side units.

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

RCA VICTOR MODEL VP-38

Chassis No. RS-175B



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

The side speakers are designed primarily to reproduce only those frequencies in the middle and higher ranges. The two 2mH reactors (L1 and L2) pass and combine the low frequencies of the two side channels to the center speaker. The 160 μf 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.

* C11 WILL BE FOUND ONLY IN SOME CHASSIS.

* C11 .27 μf ± 10%, 400V. PAPER TUBULAR

* C10 160 μf ± 10%, 400V. PAPER TUBULAR

* C9A 20 μf

* C9B 80 μf

* C7 .01

* C5 .0047

* C6 .0047 270K

* C4 .0022

* C3 .0022

* C1 .047

* R10 4700 1W

* R9 68

* R8 68

* R7 270K

* R6 500K BALANCE

* R5 270K

* R4 2 MEG. TONE

* R3 5 MEG. VOLUME

* R2 10 MEG.

* R1 5 MEG. VOLUME

* L1 2 mH

* L2 2 mH

* T1 170A

* T2 170A

* V1 12AX7

* V2 50EH5

* V3 50EH5

* V4 50EH5

* V5 50EH5

* V6 50EH5

* V7 50EH5

* V8 50EH5

* V9 50EH5

* V10 50EH5

* V11 50EH5

* V12 50EH5

* V13 50EH5

* V14 50EH5

* V15 50EH5

* V16 50EH5

* V17 50EH5

* V18 50EH5

* V19 50EH5

* V20 50EH5

* V21 50EH5

* V22 50EH5

* V23 50EH5

* V24 50EH5

* V25 50EH5

* V26 50EH5

* V27 50EH5

* V28 50EH5

* V29 50EH5

* V30 50EH5

* V31 50EH5

* V32 50EH5

* V33 50EH5

* V34 50EH5

* V35 50EH5

* V36 50EH5

* V37 50EH5

* V38 50EH5

* V39 50EH5

* V40 50EH5

* V41 50EH5

* V42 50EH5

* V43 50EH5

* V44 50EH5

* V45 50EH5

* V46 50EH5

* V47 50EH5

* V48 50EH5

* V49 50EH5

* V50 50EH5

* V51 50EH5

* V52 50EH5

* V53 50EH5

* V54 50EH5

* V55 50EH5

* V56 50EH5

* V57 50EH5

* V58 50EH5

* V59 50EH5

* V60 50EH5

* V61 50EH5

* V62 50EH5

* V63 50EH5

* V64 50EH5

* V65 50EH5

* V66 50EH5

* V67 50EH5

* V68 50EH5

* V69 50EH5

* V70 50EH5

* V71 50EH5

* V72 50EH5

* V73 50EH5

* V74 50EH5

* V75 50EH5

* V76 50EH5

* V77 50EH5

* V78 50EH5

* V79 50EH5

* V80 50EH5

* V81 50EH5

* V82 50EH5

* V83 50EH5

* V84 50EH5

* V85 50EH5

* V86 50EH5

* V87 50EH5

* V88 50EH5

* V89 50EH5

* V90 50EH5

* V91 50EH5

* V92 50EH5

* V93 50EH5

* V94 50EH5

* V95 50EH5

* V96 50EH5

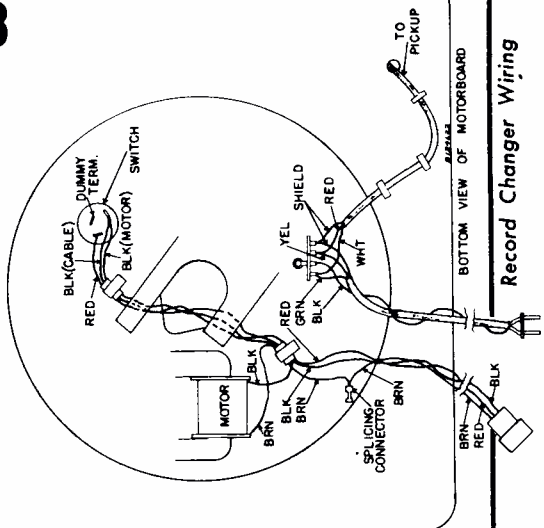
* V97 50EH5

* V98 50EH5

* V99 50EH5

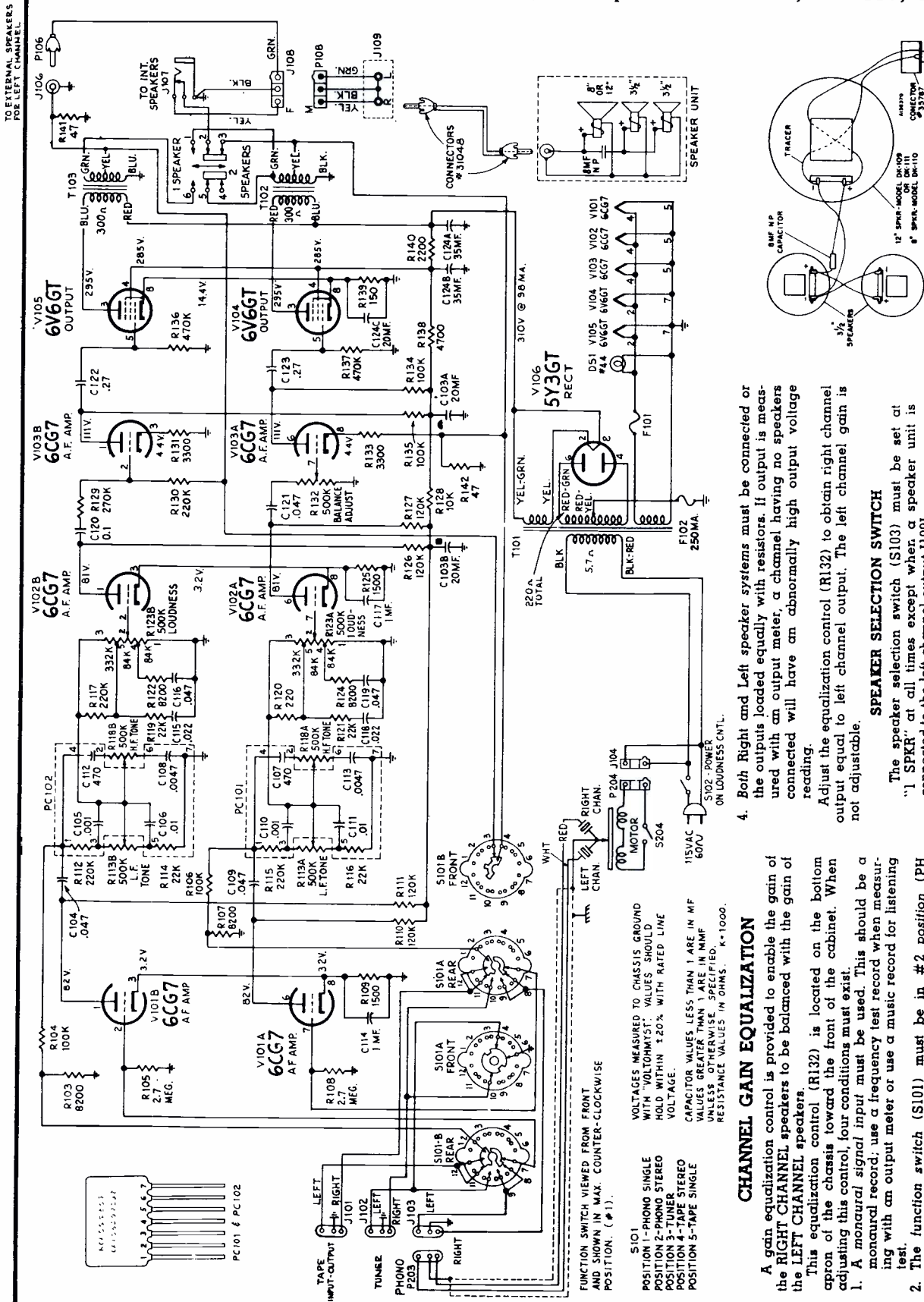
* V100 50EH5

Record Changer Wiring



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

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



Speaker Connection Diagram

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

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

SPEAKER SELECTION SWITCH

The speaker selection switch (S103) must be set at "1 SPKR" at all times except when a speaker unit is connected to the left channel output [J109].

When only one speaker unit is used it should be connected to J109.

For stereophonic reproduction, speaker units must be connected to both J109 and J109L. The speaker selection switch must be set at "2 SPKR".

CHANNEL GAIN EQUALIZATION

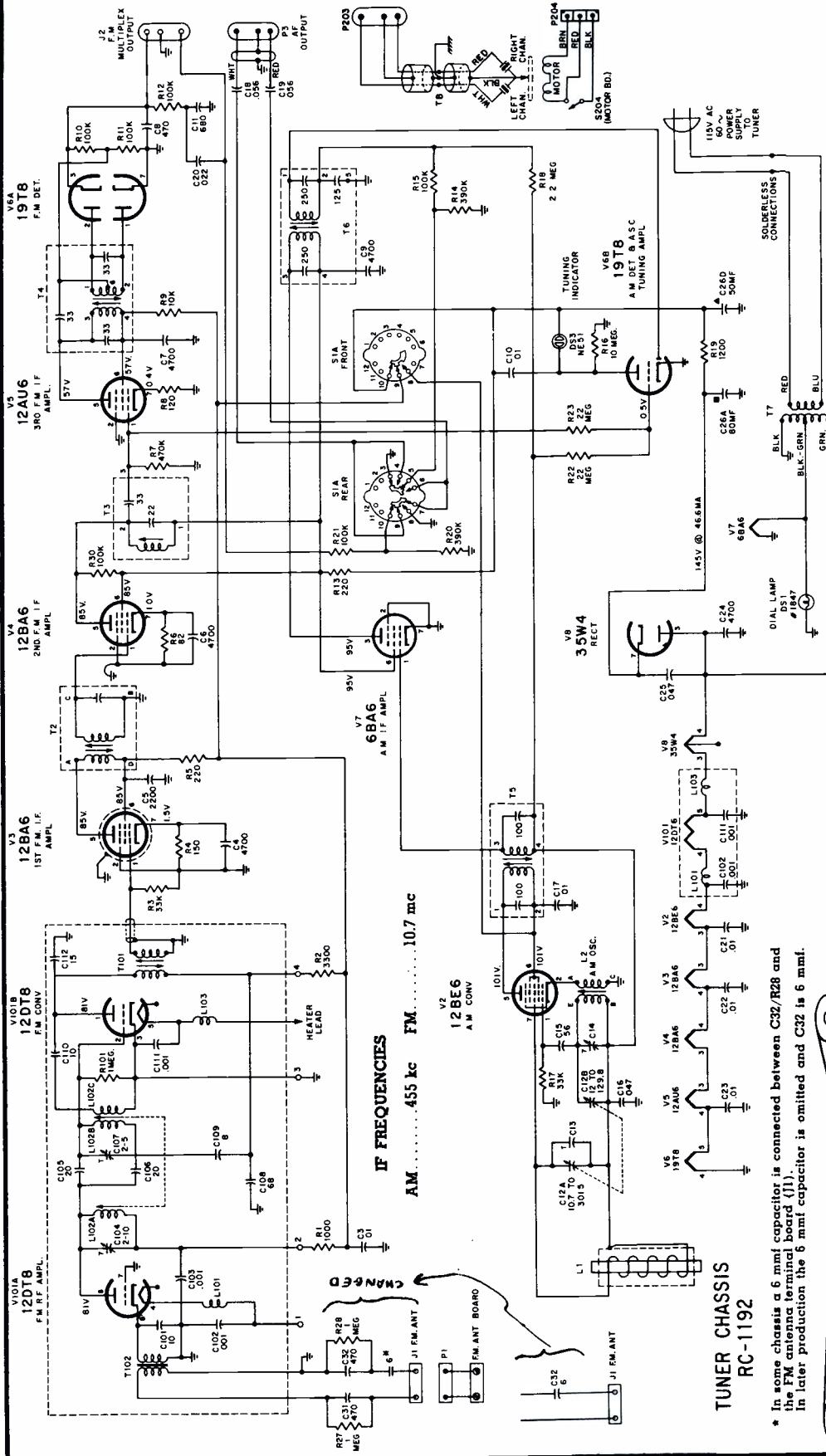
A gain equalization control is provided to enable the gain of the RIGHT CHANNEL speakers to be balanced with the gain of the LEFT CHANNEL speakers.

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

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

VOLTAGES MEASURED TO CHASSIS GROUND WITH "VOLTHMNST" VALUES SHOULD HOLD WITHIN ±20% WITH RATED LINE VOLTAGE.
CAPACITOR VALUES LESS THAN 1 ARE IN MF VALUES GREATER THAN 1 ARE IN MMF VALUES OTHERWISE SPECIFIED. *-1000.
RESISTANCE VALUES IN OHMS. *-1000.

- S101
POSITION 1-PHONO SINGLE
POSITION 2-PHONO STEREO
POSITION 3-TUNER
POSITION 4-TAPE STEREO
POSITION 5-TAPE SINGLE

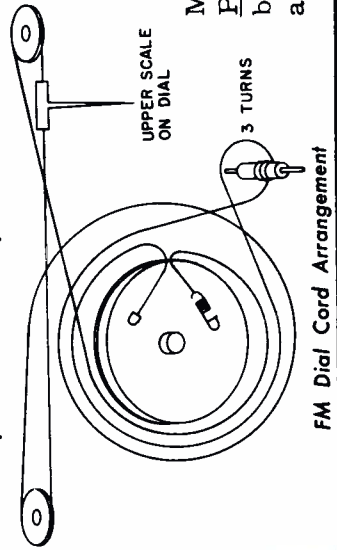


RCA VICTOR

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-1-1000
 ALL RESISTANCE VALUES IN OHMS.
 ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF.
 VALUES ABOVE 1.0 IN MF EXCEPT AS NOTED.
 VOLTAGES MEASURED TO CHASSIS GROUND WITH
 "VOLTOHMYST" SHOULD HOLD WITHIN ±20%
 AT 115V LINE. VOLUME CONTROL MINIMUM
 AND NO SIGNAL.

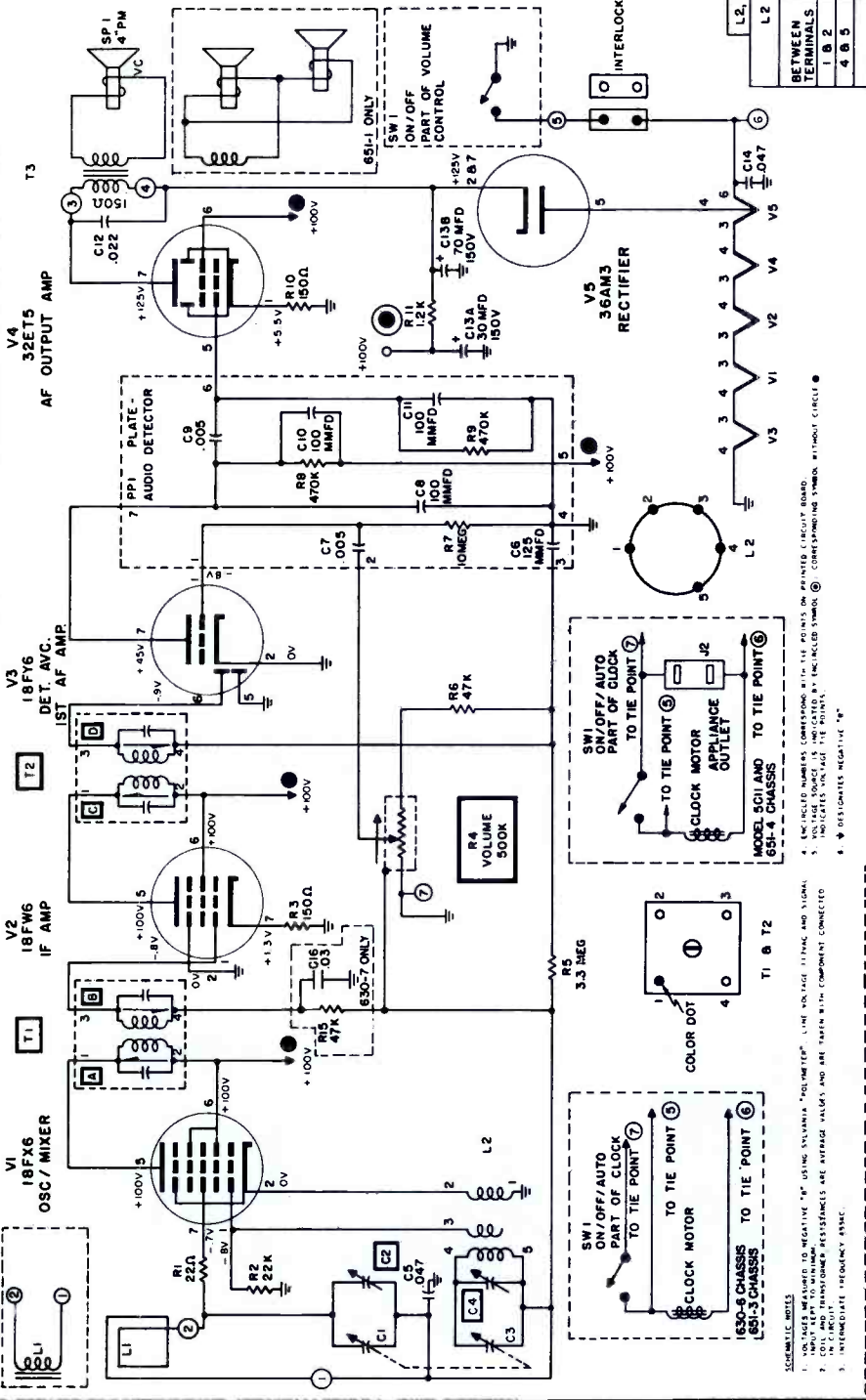
* In some chassis a 6 mmf capacitor is connected between C32/R28 and the FM antenna terminal board (J1). In later production the 6 mmf capacitor is omitted and C32 is 6 mmf.



SYLVANIA

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

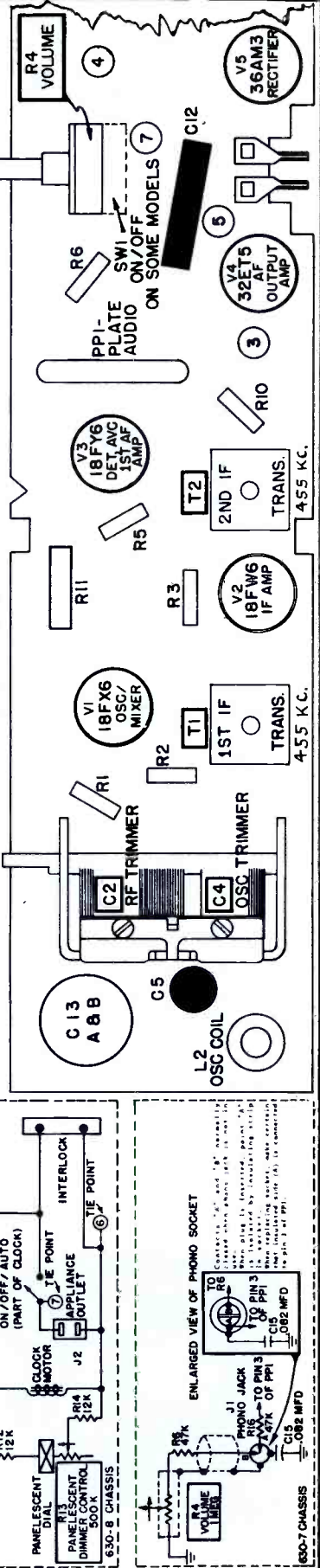
Models 5C10B, P, 5C11B, T, 5C12R, T, W, 5T10B, P, 5T11B, T, 5T12R, T, W, 1100, 1111, 1160, 1212, 1219, 1286, 1300, 1301, 1306, 1309, 1322, 1400, 1512, 1519, 1600, 1701, 1704, 1708, and 1709



L2, T1 & T2 RESISTANCE CHART

| T1 | | T2 | |
|-------------------|--------|-------------------|--------|
| BETWEEN TERMINALS | RES. Ω | BETWEEN TERMINALS | RES. Ω |
| 1 & 2 | 15 | 1 & 2 | 15 |
| 4 & 5 | 7 | 3 & 4 | 15 |
| | | 1 & 3 | 4 |
| | | 1 & 4 | 15 |

TOP PARTS LAYOUT



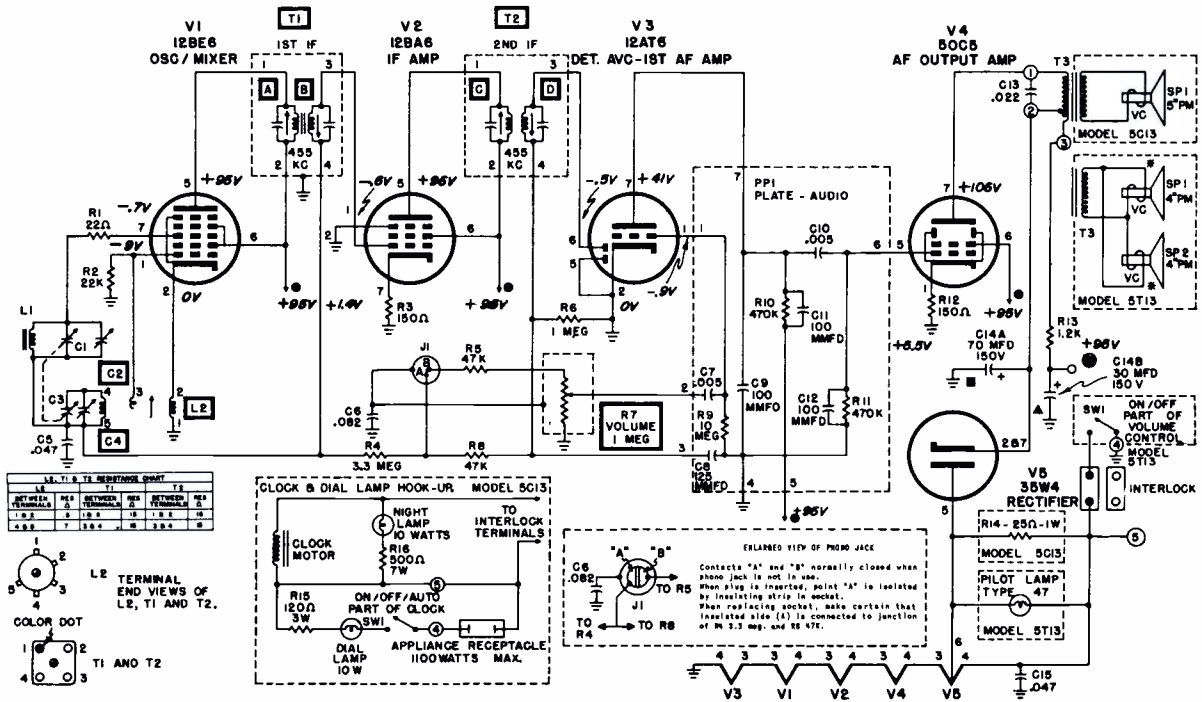
MODEL SCHEMATIC TO TIE POINT ⑥
 180-8 CHASSIS
 630-8 CHASSIS

MODEL SCHEMATIC TO TIE POINT ⑥
 180-8 CHASSIS
 630-8 CHASSIS

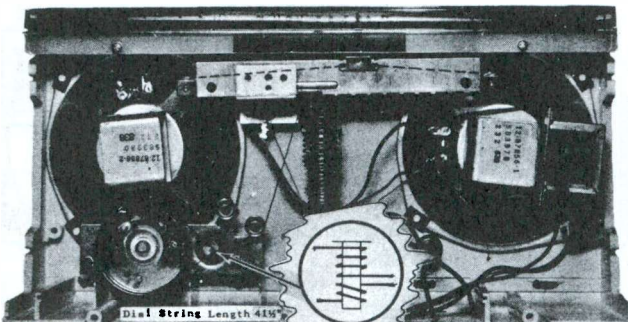
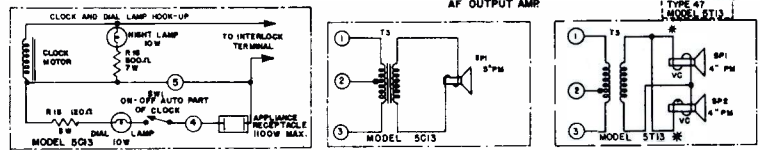
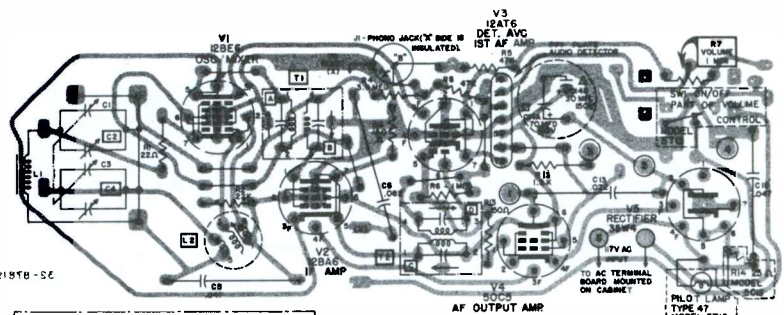
MODEL SCHEMATIC TO TIE POINT ⑥
 180-8 CHASSIS
 630-8 CHASSIS

SYLVANIA

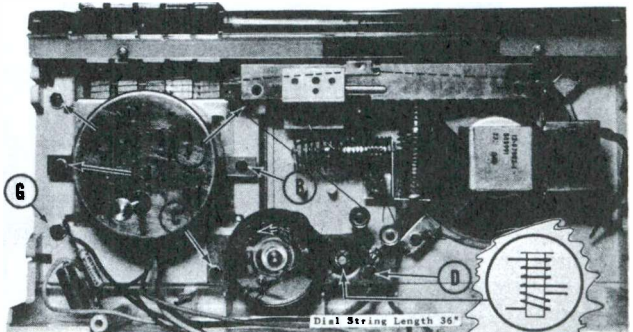
CHASSIS: 631-2,-3
MODELS: 5C13, 5T13



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.



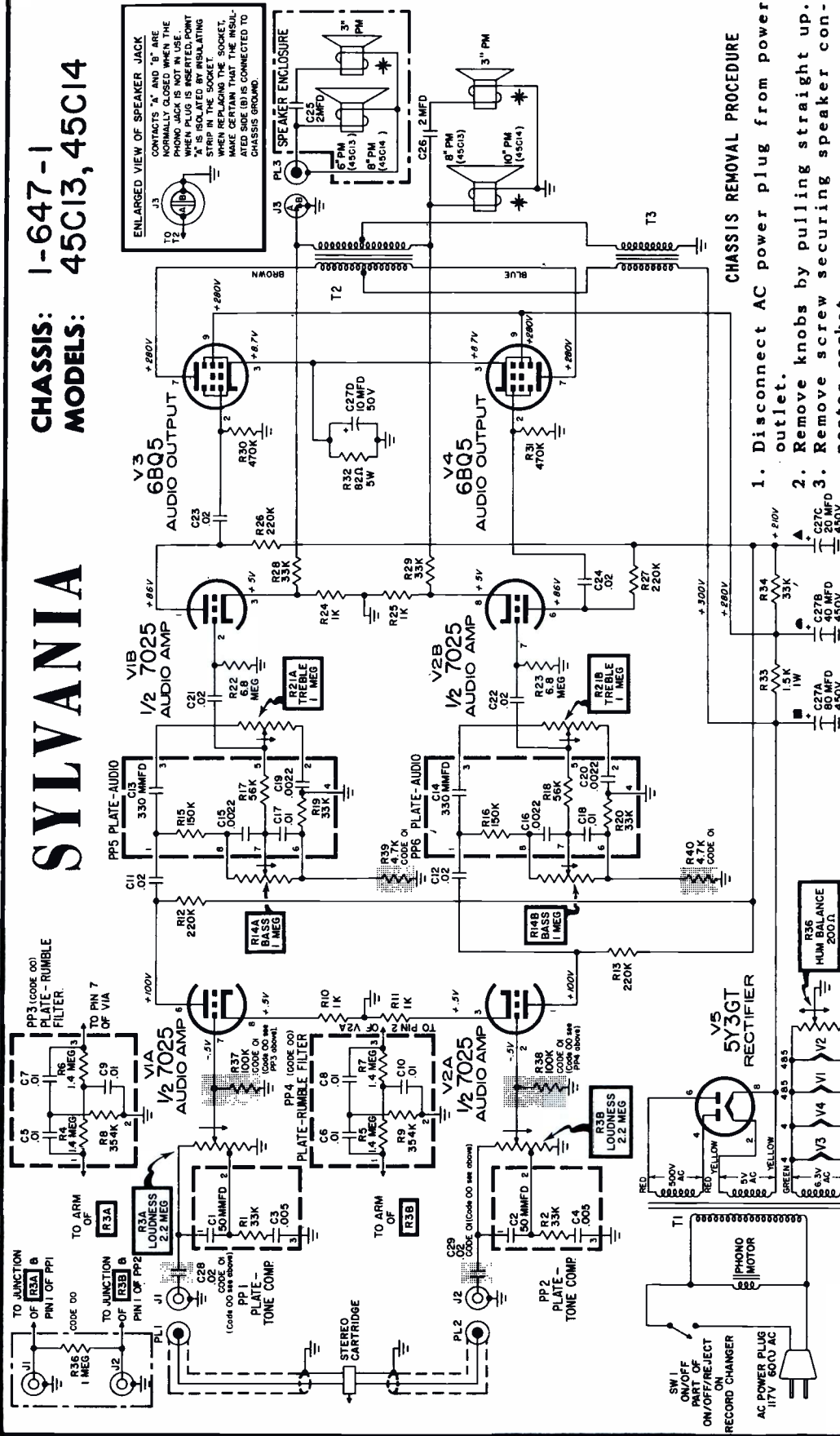
5T13 - Dial Drive & Speaker Assm.



5C13 - Clock, Dial Drive & Speaker Assm.

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

SYLVANIA



CHASSIS REMOVAL PROCEDURE

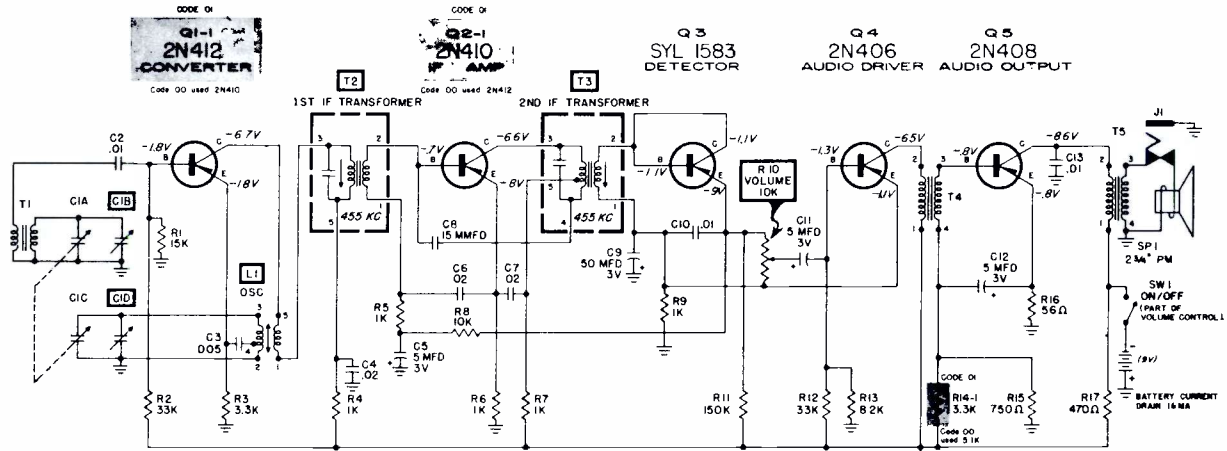
1. Disconnect AC power plug from power outlet.
2. Remove knobs by pulling straight up.
3. Remove screw securing speaker connector socket.
4. Identify and disconnect record changer motor leads, signal input leads and speaker leads.
5. While supporting chassis remove the three (3) screws securing chassis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

SCHEMATIC NOTES

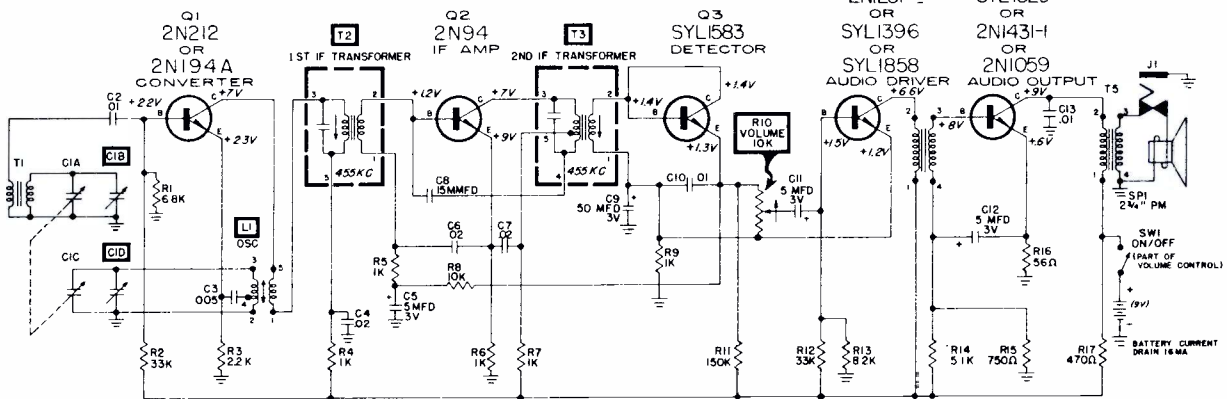
1. VOLTAGES SHOWN ARE AVERAGE READINGS MEASURED TO CHASSIS WITH NO SIGNAL INPUT. VARIATIONS MAYBE NOTED DUE TO NORMAL PRODUCTION TOLERANCES.
2. LINE VOLTAGE 117 VOLT 60 CYCLE.
3. LOUDNESS, BASS AND TREBLE CONTROLS ARE DUAL GANGED CONTROLS.
4. SHADED AREAS DESIGNATE CODE CHANGES.
5. ALL CAPACITORS IN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

SYLVANIA

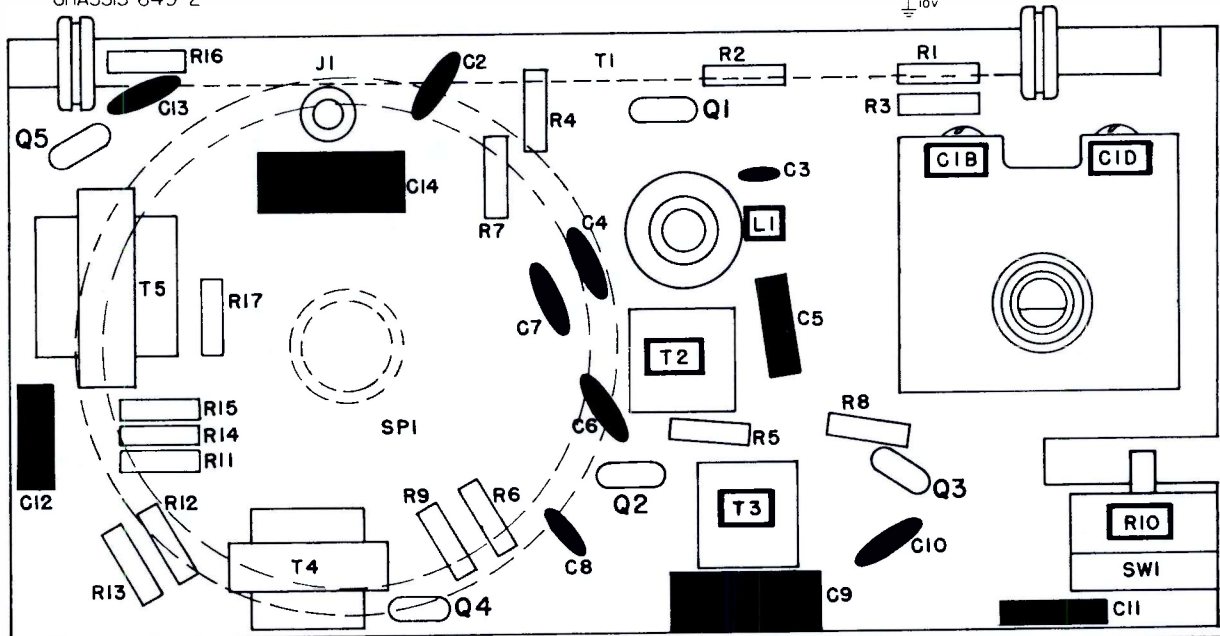
CHASSIS: 649-1,-2
MODELS: 5PI6
 2300, 2400, 2500,
 2600, 2700 SERIES

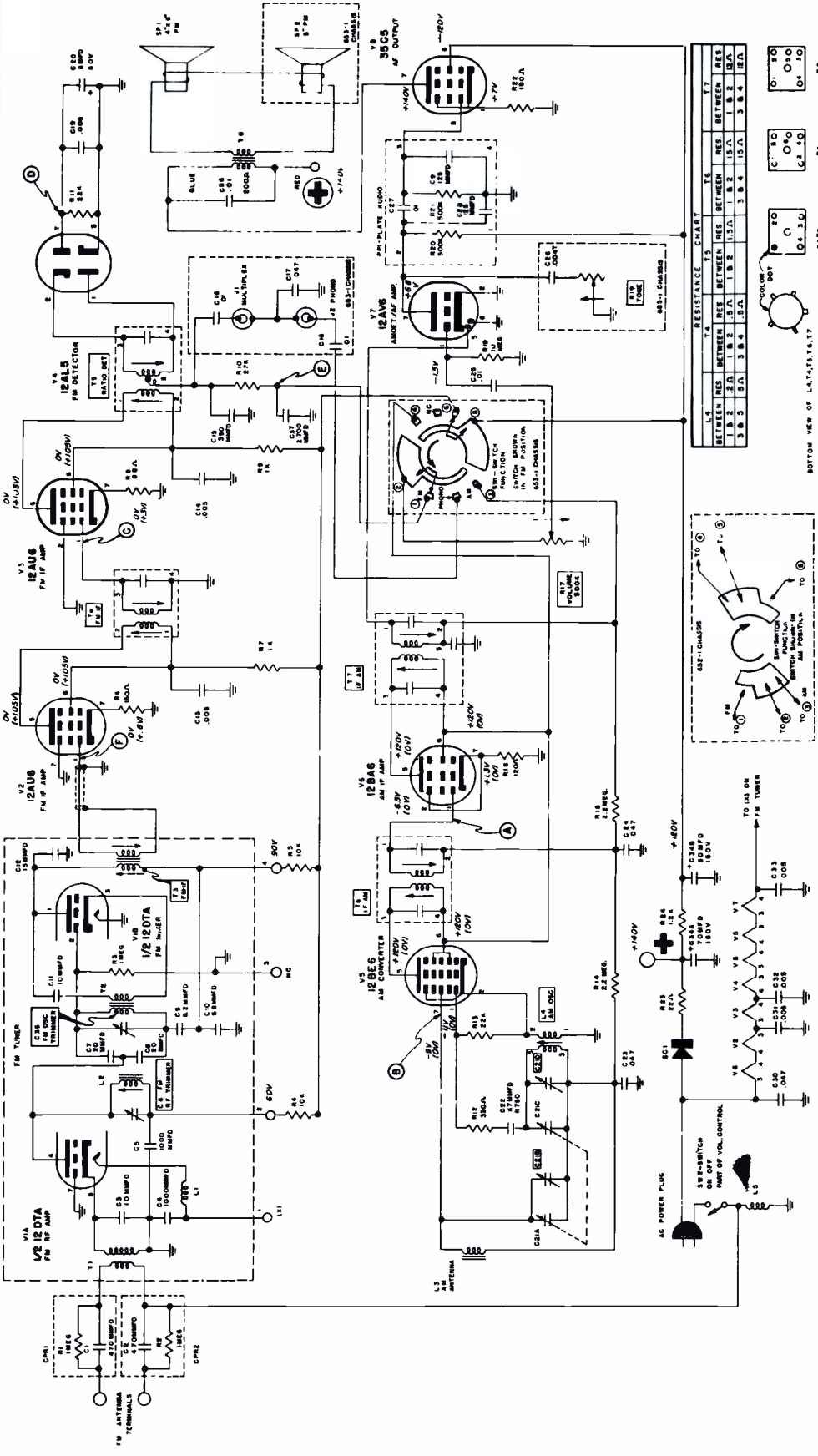


CHASSIS 649-1



CHASSIS 649-2





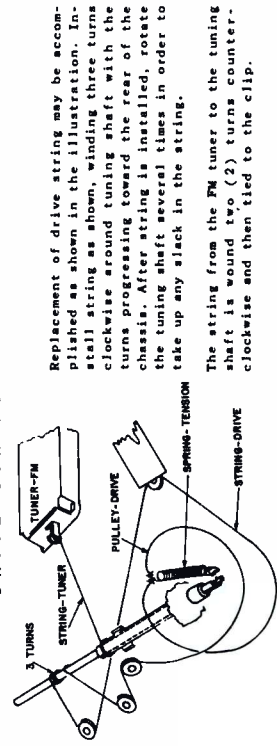
SYLVANIA

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

SPECIFICATIONS

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

DRIVE STRING REPLACEMENT



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 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.

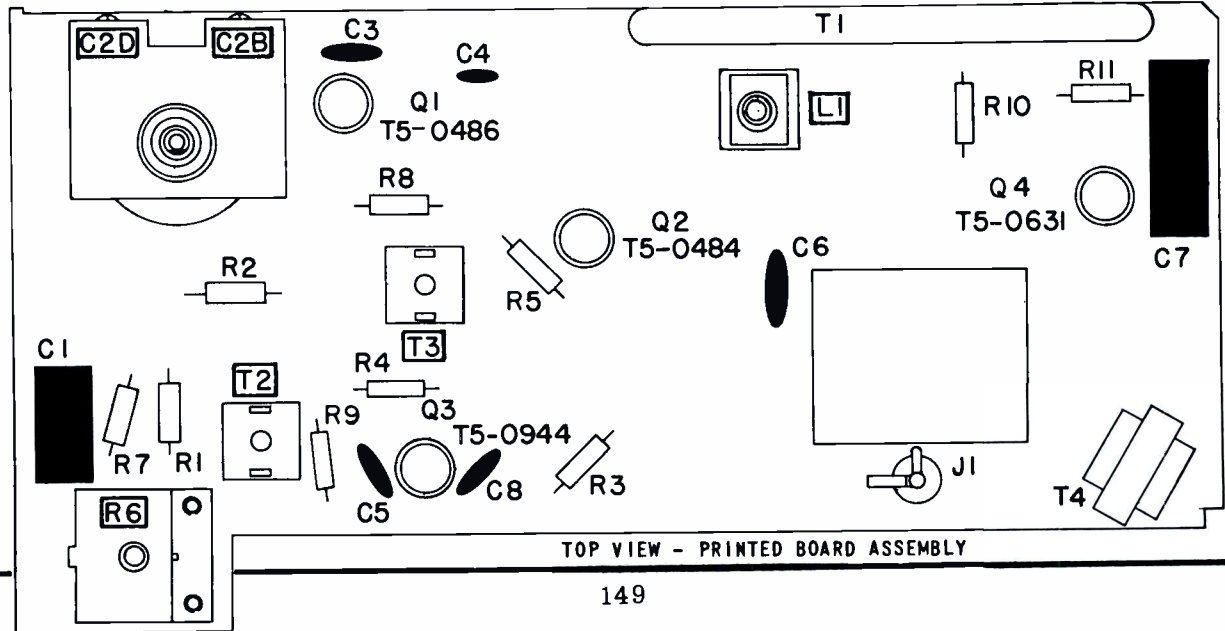
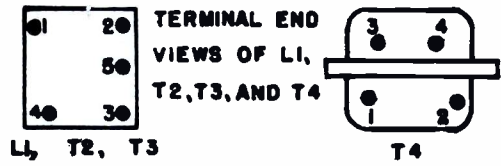
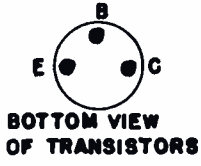
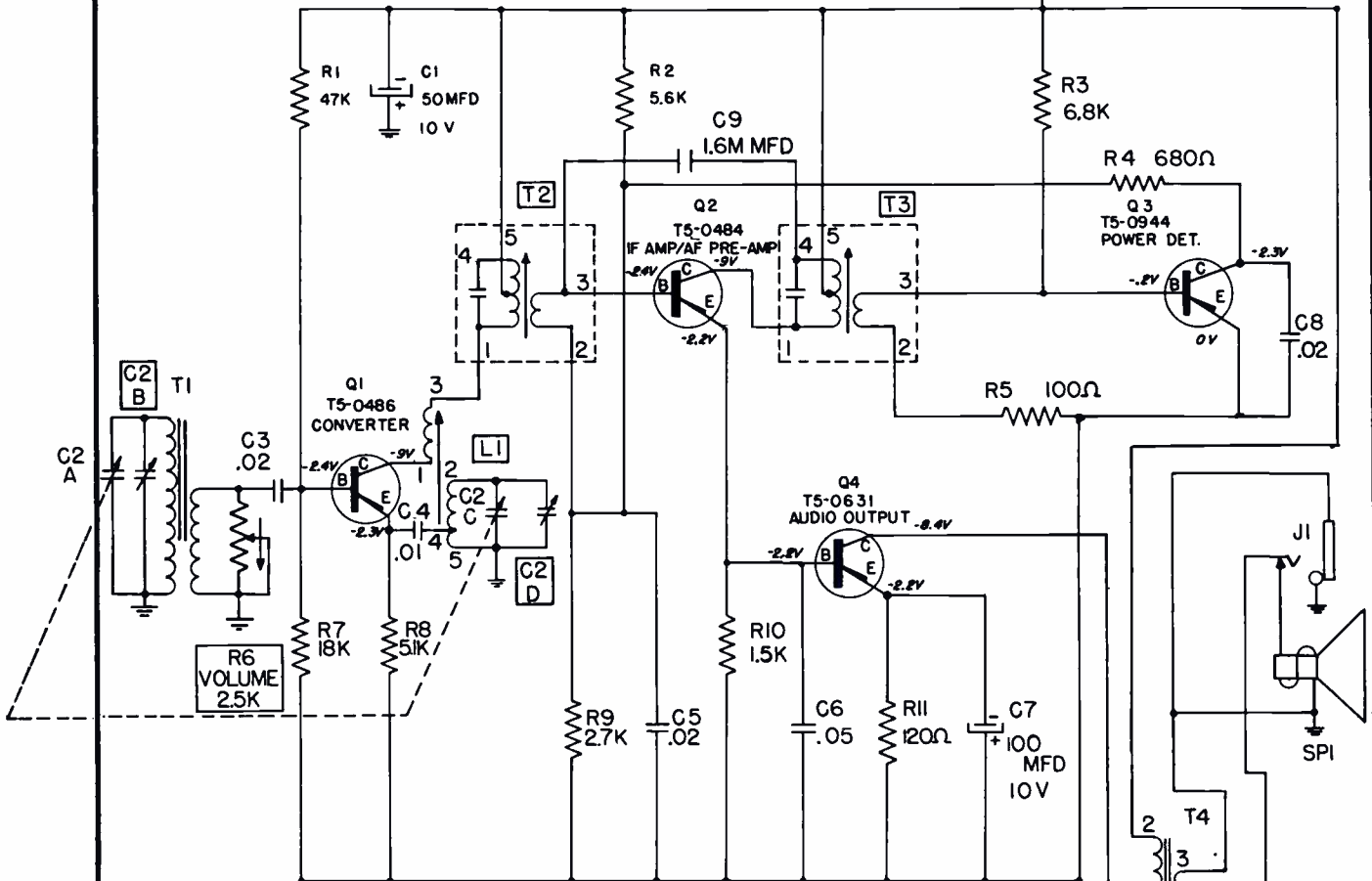
The string from the FM tuner to the tuning shaft is wound two (2) turns counter-clockwise and then tied to the clip.

SYLVANIA

CHASSIS: 661-1
MODEL 4P14, 4P15

9 VOLTS

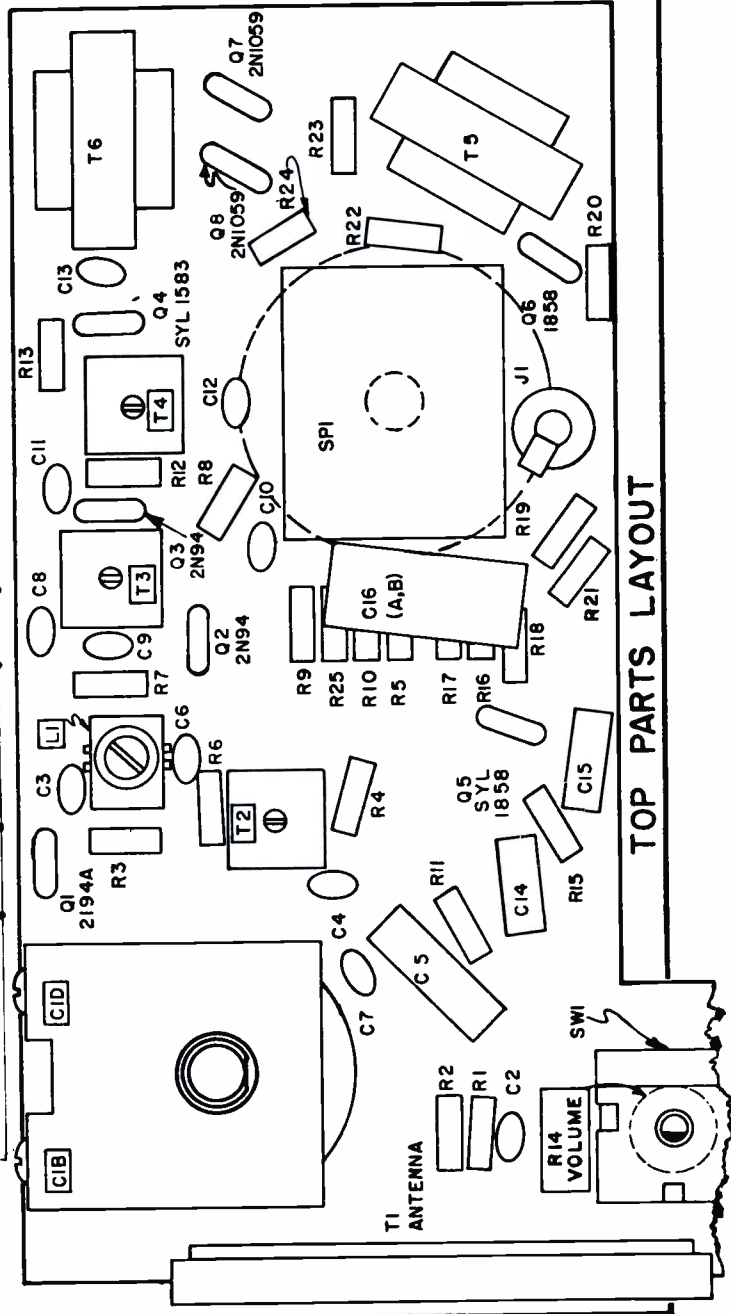
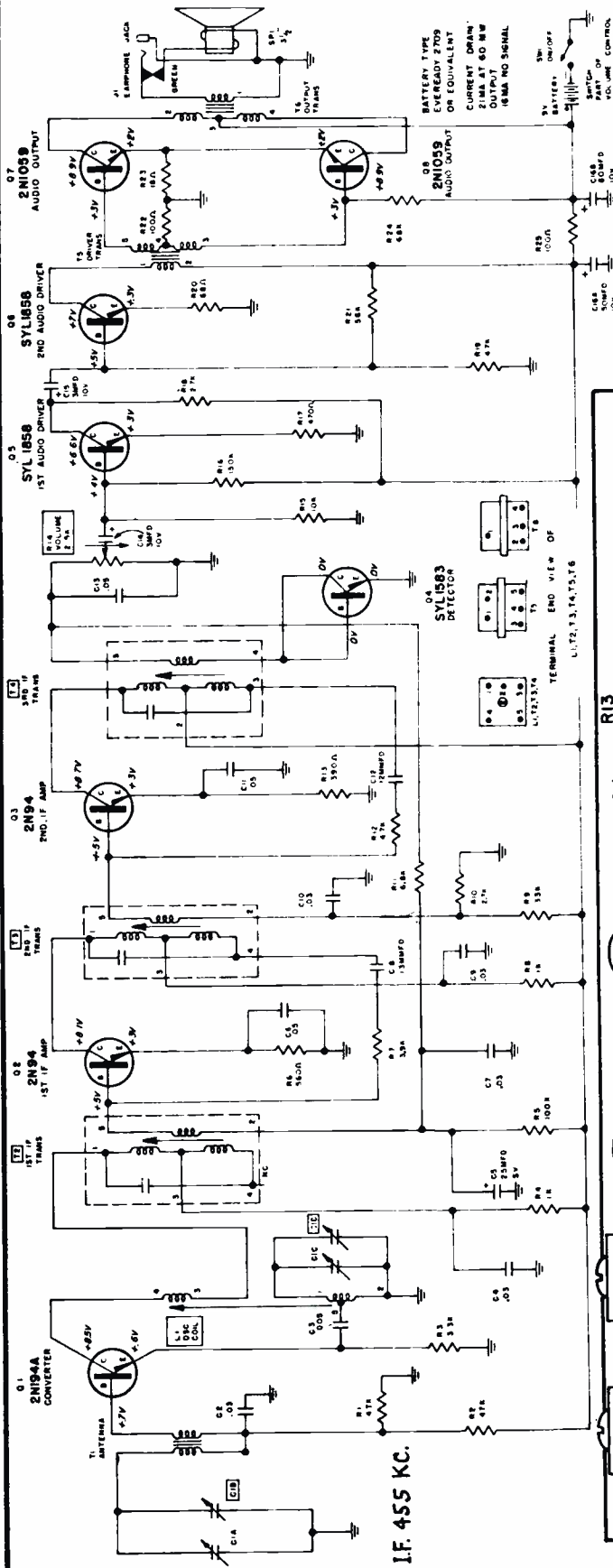
SWI ON/OFF
PART OF VOLUME CONTROL



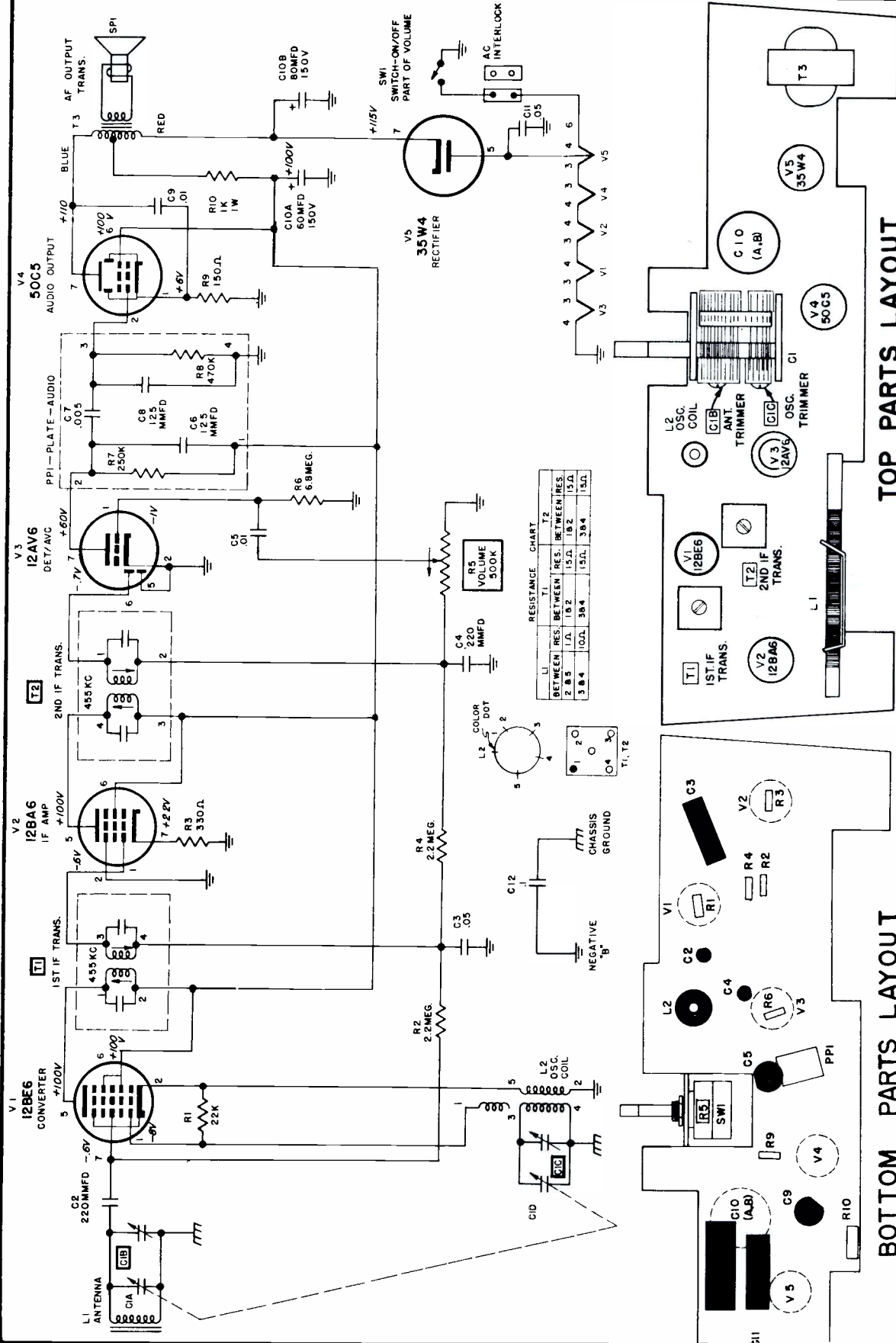
SYLVANIA

CHASSIS: 673-1
MODELS: 8P18 SERIES

| RESISTANCE CHART | | | | | | | | | | | |
|------------------|-----|---------|-----|---------|-----|---------|-----|---------|------|---------|------|
| L 1 | T 2 | | T 3 | | T 4 | | T 5 | | T 6 | | |
| BETWEEN | RES | BETWEEN | RES | BETWEEN | RES | BETWEEN | RES | BETWEEN | RES | BETWEEN | RES |
| 182 | 5Ω | 183 | 35Ω | 183 | 55Ω | 182 | 25Ω | 182 | 300Ω | 184 | 100Ω |
| 183 | 5Ω | 184 | 75Ω | 184 | 75Ω | 185 | 5Ω | 584 | 150Ω | 283 | 35Ω |
| 384 | Ω | 283 | Ω | 285 | Ω | 485 | Ω | 385 | 250Ω | | |



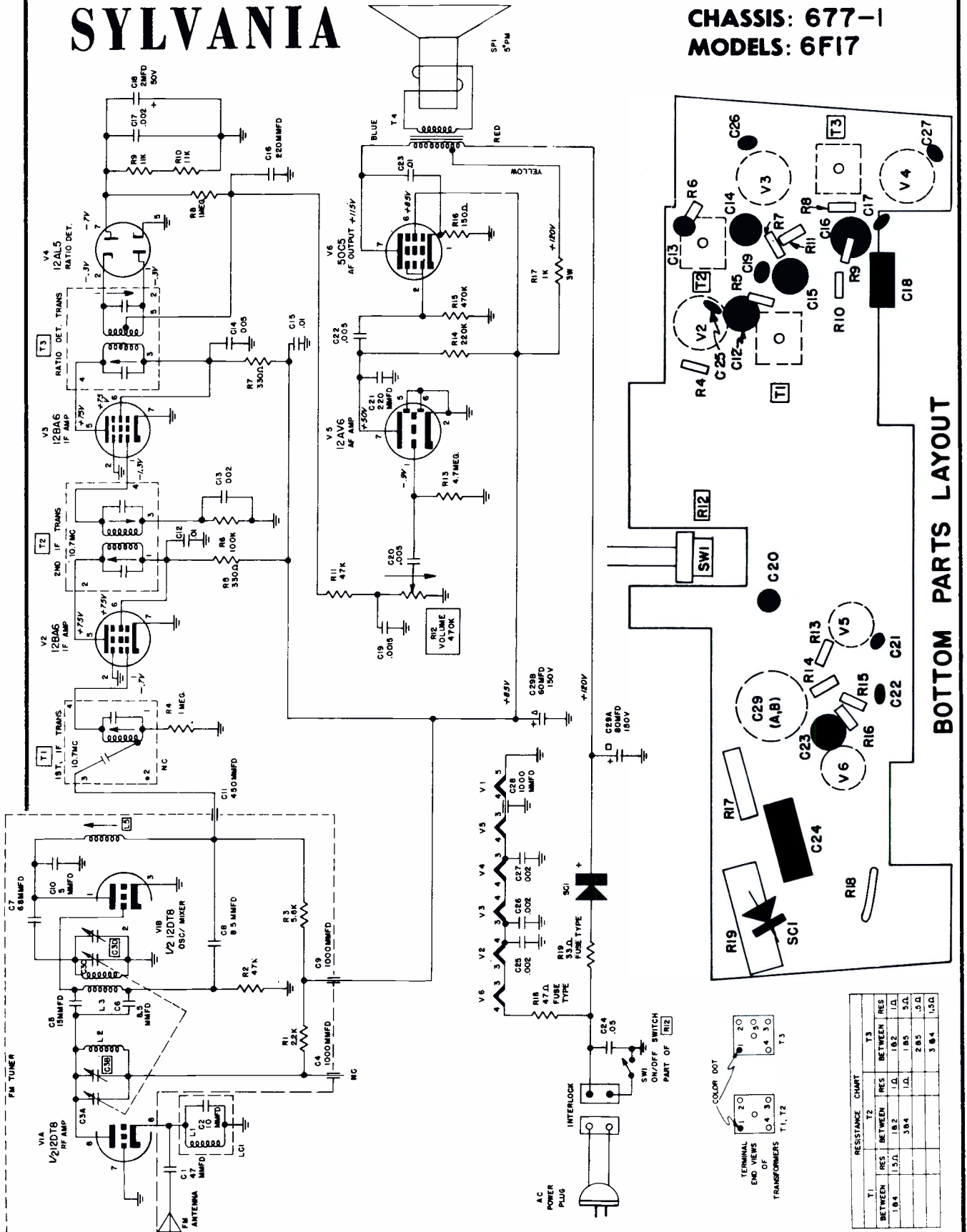
TOP PARTS LAYOUT



SYLVANIA
CHASSIS: 676-1
MODELS: 5T17

SYLVANIA

CHASSIS: 677-1
MODELS: 6F17



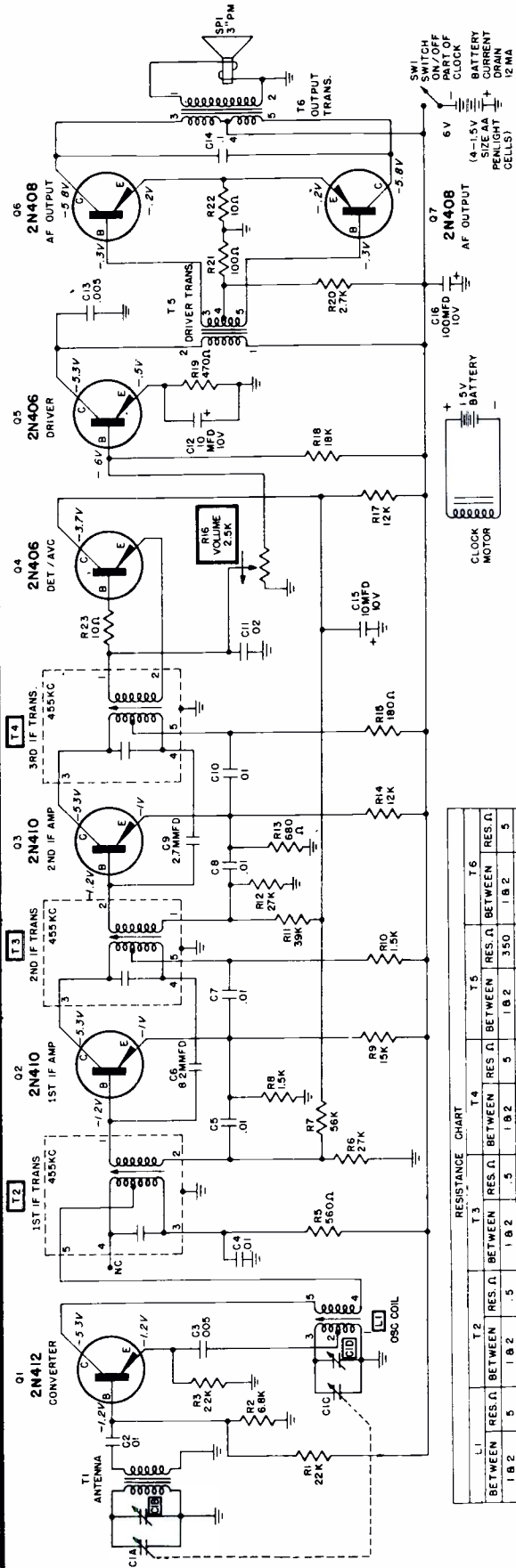
BOTTOM PARTS LAYOUT

RESISTANCE CHART

| T1 | T2 | T3 |
|-------------|-------------|-------------|
| RES BETWEEN | RES BETWEEN | RES BETWEEN |
| 1.0-4 | 1.0-2 | 1.0-3 |
| 5.0-4 | 5.0-2 | 5.0-3 |
| 1.0-5 | 1.0-3 | 1.0-4 |
| 5.0-5 | 5.0-4 | 5.0-3 |

SYLVANIA

CHASSIS: 679-1
MODELS: 7K10, 7K11 SERIES



CHASSIS REMOVAL

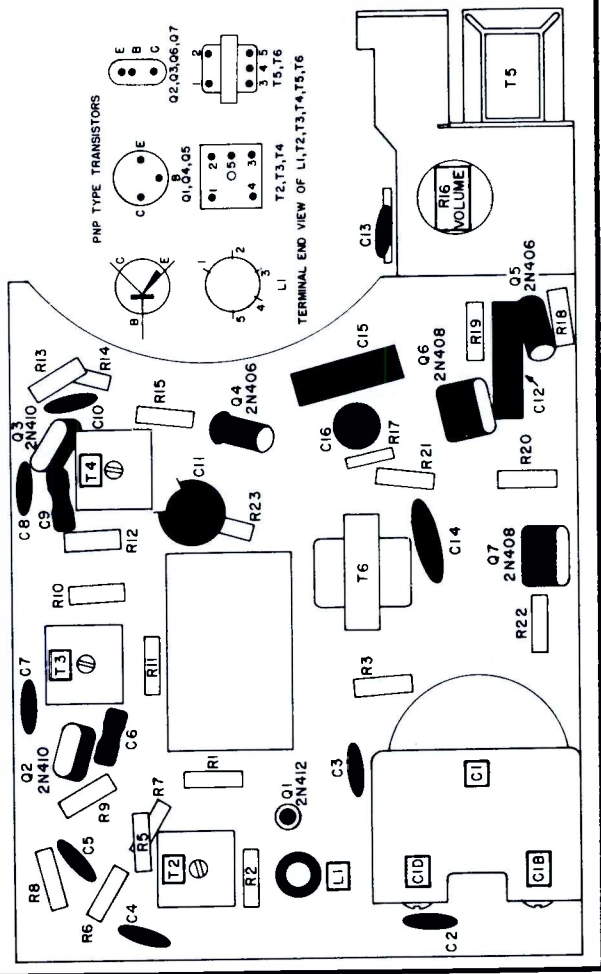
1. Remove volume and station selector knobs by pulling straight outward.
2. Press the right side of case to separate back cover from front of case. Remove back being careful to pass time set knob thru hole in back cover.
3. Remove two (2) screws securing clock battery holder to speaker. Remove holder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

NOTE: Do not operate receiver with speaker disconnected.

RESISTANCE CHART

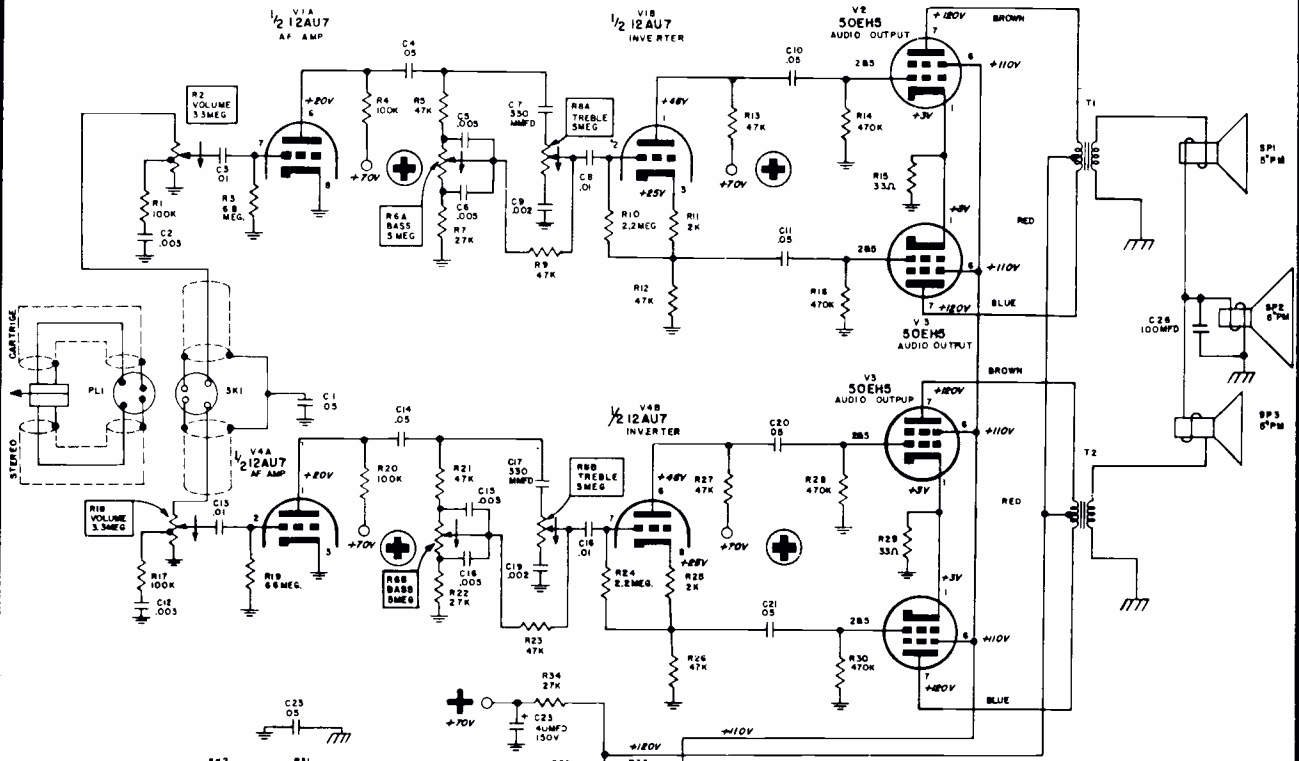
| | T2 | T3 | T4 | T5 | T6 |
|---------|--------|---------|--------|---------|--------|
| BETWEEN | RES. Ω | BETWEEN | RES. Ω | BETWEEN | RES. Ω |
| 1 & 2 | 5 | 1.8 2 | 5 | 1.8 2 | 5 |
| 1 & 3 | 5 | 3.8 4 | 7 | 3.8 4 | 85 |
| 2 & 3 | 4.5 | 3.8 5 | 2.5 | 3.8 5 | 140 |
| 4 & 5 | 4.8 5 | 1.5 | 4.8 5 | 4.5 | 4.8 5 |
| | | | | | 55 |
| | | | | | 4.8 5 |

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

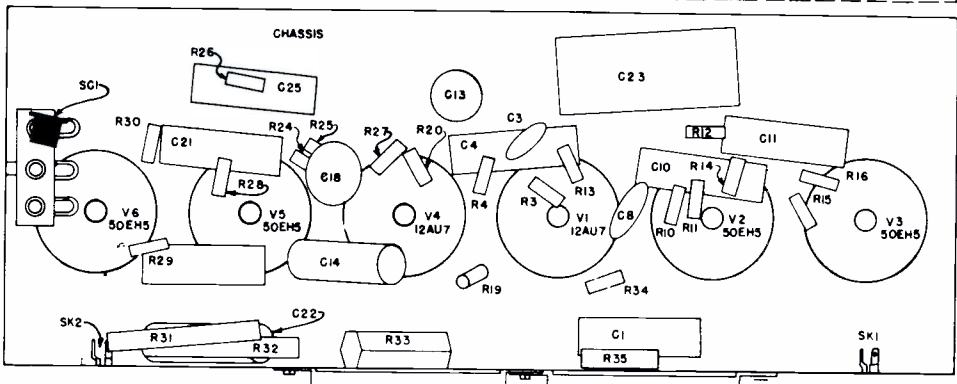
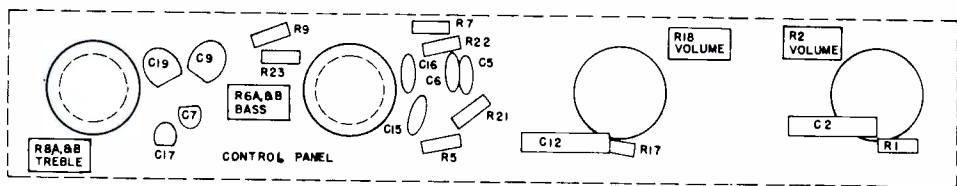
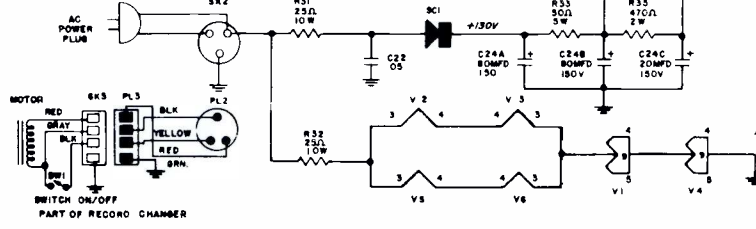


SYLVANIA

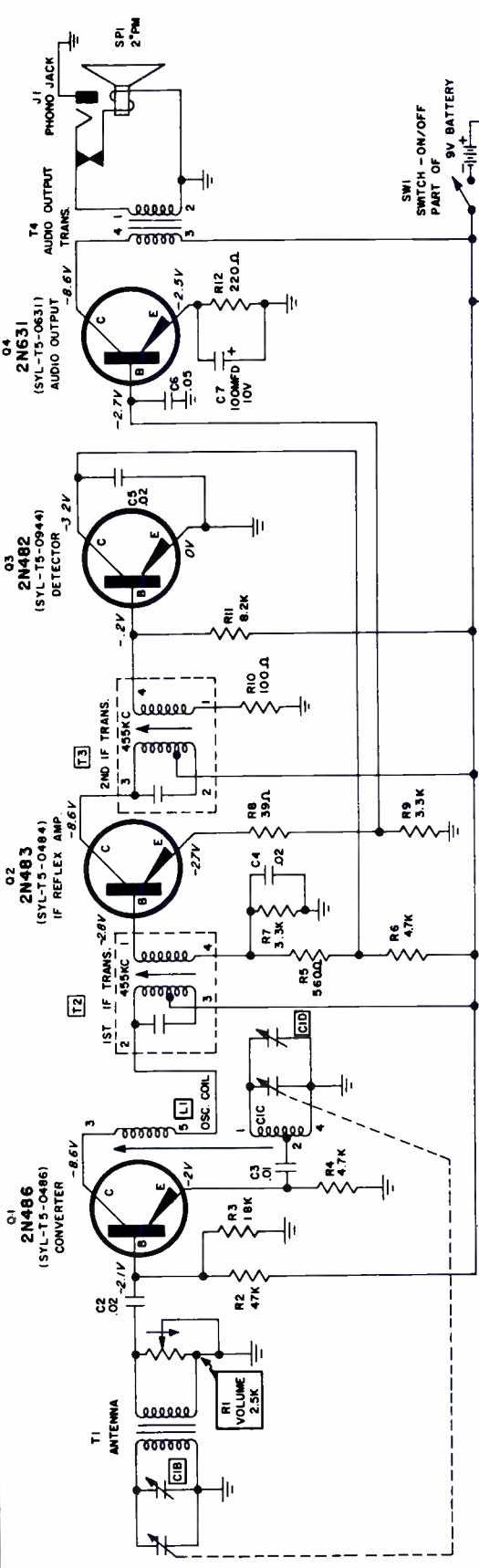
CHASSIS: 680-1
MODELS: 45P19



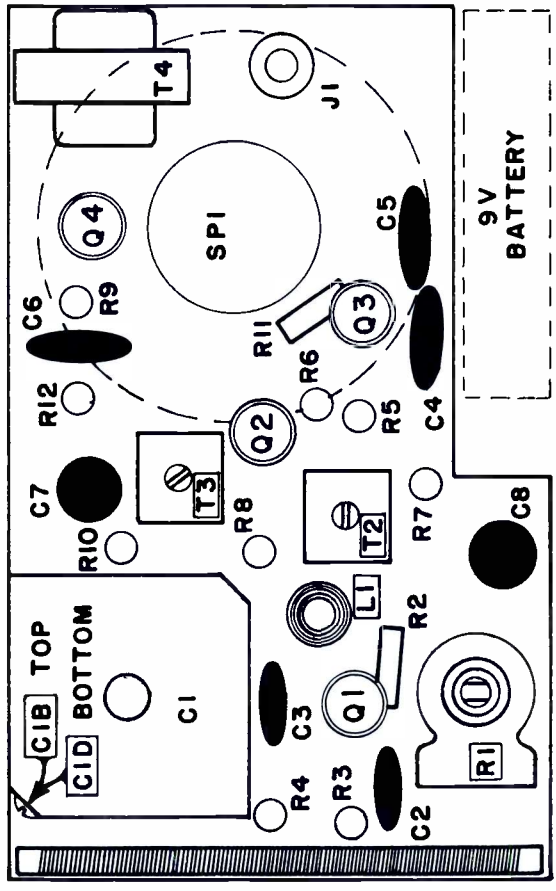
SCHEMATIC NOTES:
 1. VOLTAGES SHOWN ARE AVERAGE READINGS MEASURED TO NEGATIVE "B" WITH NO SIGNAL INPUT. VARIATIONS MAY BE NOTED DUE TO NORMAL PRODUCTION TOLERANCES.
 2. AC POWER SOURCE IS -117V 60% "VARIAC REGULATED".
 3. 5 VOLTAGE SOURCE IS INDICATED BY \oplus CORRESPONDING SYMBOL WITH CIRCLE \odot .
 4. \downarrow DESIGNATES NEGATIVE "B". \uparrow DESIGNATES CHASSIS GROUND.



TOP PARTS LAYOUT

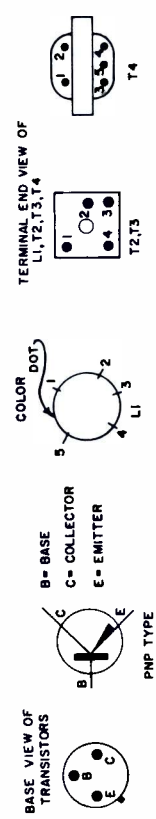


TOP PARTS LAYOUT



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

SYLVANIA



RESISTANCE CHART

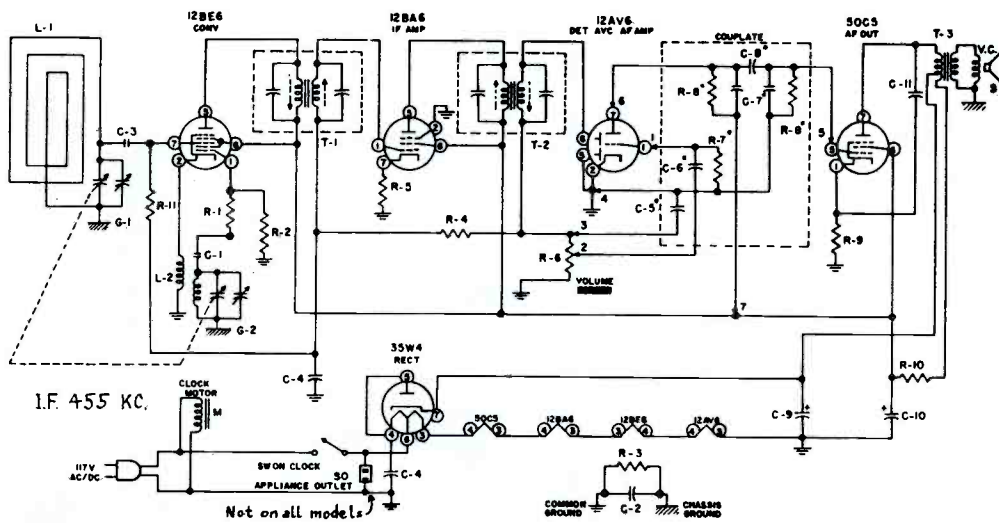
| LI | T2 | T3 | T4 |
|-------------|-------------|-------------|-------------|
| BETWEEN RES | BETWEEN RES | BETWEEN RES | BETWEEN RES |
| 1B2 | 8Ω | 1Ω | 1Ω |
| 1B4 | 18.4 | 1Ω | 1.02 |
| 2B4 | 8.5Ω | 5Ω | 2Ω |
| 3B5 | 5Ω | 1Ω | 3.84 |
| | | | 40Ω |

SCHMATIC NOTES

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

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

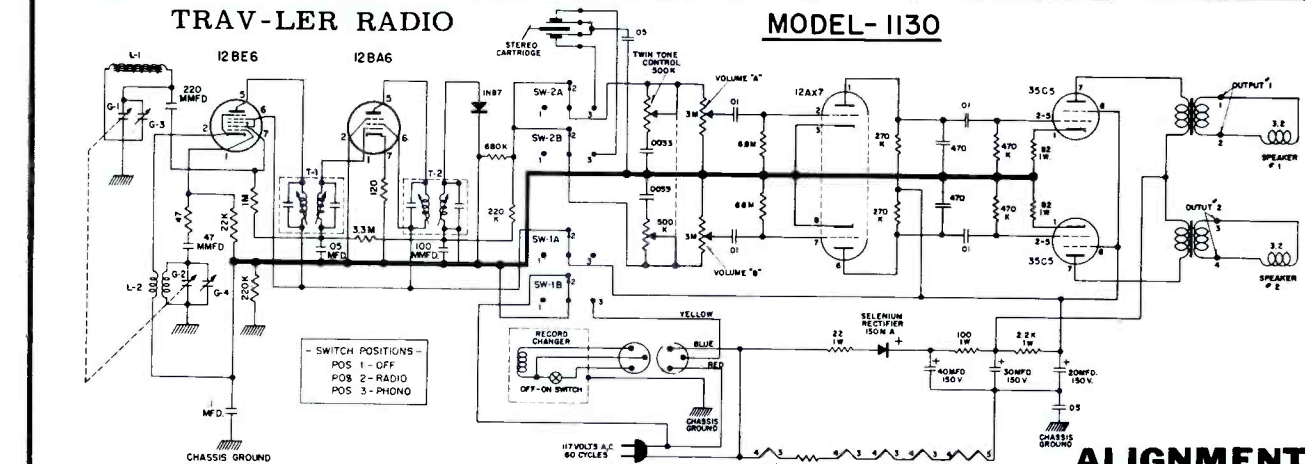
TRAV-LER Models 60C300, 60C301, 60C302, 60C303, 60C320, 60C321, 60C322, 60C323



| 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-55 X | S 4" P.M. SPEAKER |
| IR-45 | R-2 22MΩ RESISTOR 1/2W 10% | C-2 | 1 MFD. CONDENSER 400 V. | V.C. | VOICE COIL |
| IR-20 | R-3 220MΩ RESISTOR 1/2W 20% | CC-33 | 220 MMFD. 500V 20% CER. COND. | T-3 | OUTPUT TRANSFORMER |
| IR-23 | R-4 3.3MEG. RESISTOR 1/2W 20% | PC-5 | 05 MFD. CONDENSER 400 V. | L-1 | LOOP ANTENNA |
| IR-155 | R-5 120Ω RESISTOR 1/2W 10% | C-5 | 220 MMFD. | L-2 | OSC. COIL |
| VG-101 | R-6 1MEG. VOLUME CONTROL | C-6 | 002 MFD. | SO | APPLIANCE OUTLET SOCKET |
| MC-19 | R-7 6.8MEG. R-8 470MΩ | C-7 | 250 MMFD. | | |
| IR-98 | R-9 150Ω RESISTOR 1/2W 10% | C-8 | 005 MFD. | CK-7 | M ELECTRIC CLOCK |
| IR-42 | R-10 1000Ω RESISTOR 1W 10% | C-9 | 70 MFD. 150 V.V.D.C. ELECTROLYTIC | | |
| IR-12 | R-11 1MEG. RESISTOR 1/2W 20% | EC-68 | 40 MFD. | | |
| | | PC-47 | C-11 .02 MFD. CONDENSER 400V. | | |
| LI-19 | T-1 INPUT I.F. TRANSFORMER | GC-24 | C-12 47 MMFD. GERAMIC CONDENSER | | |
| | T-2 OUTPUT I.F. TRANSFORMER | | | | |

TRAV-LER RADIO

MODEL-1130

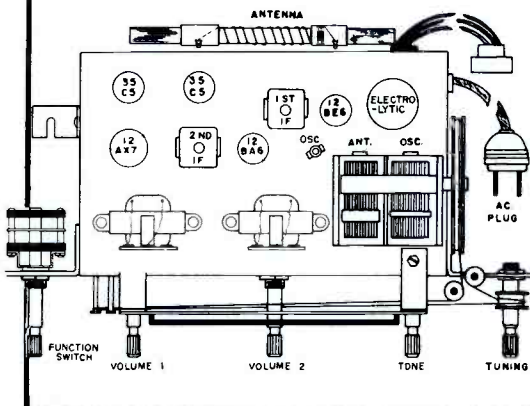


ALIGNMENT

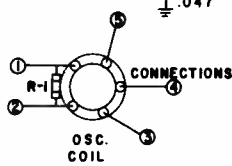
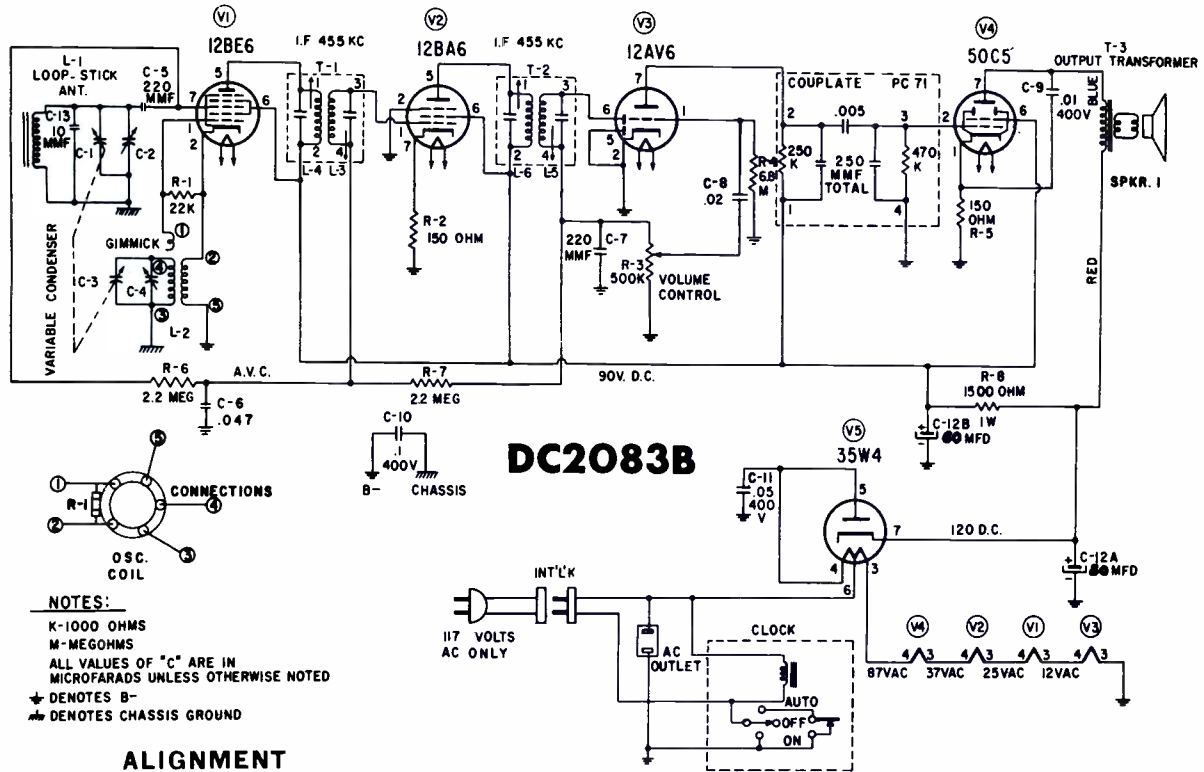
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the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



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.



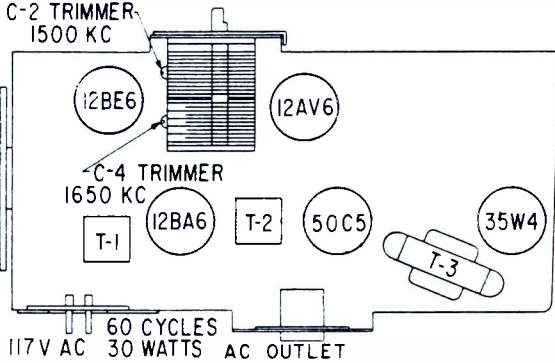
NOTES:
 K-1000 OHMS
 M-MEGOHMS
 ALL VALUES OF "C" ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 * DENOTES B-
 # DENOTES CHASSIS GROUND

ALIGNMENT

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

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

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



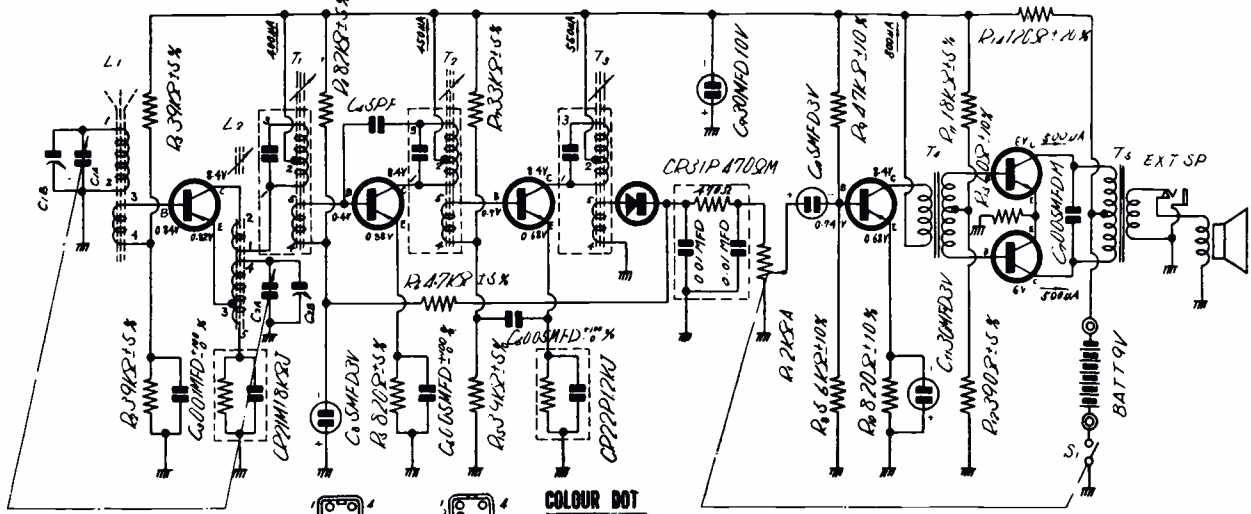
ALIGNMENT PROCEDURE CHART

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

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

WESTERN AUTO Model DC3160

TR-1 MC102 CONV
 TR-2 MC102 1ST IF AMP.
 TR-3 MC102 2ND IF AMP.
 D-1 0A70 DET & A.G.C.
 TR-4 0C71 AF AMP.
 TR-5 & TR-6 20C72 POWER OUTPUT

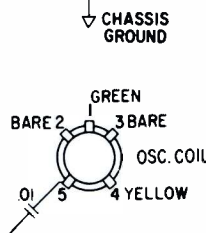
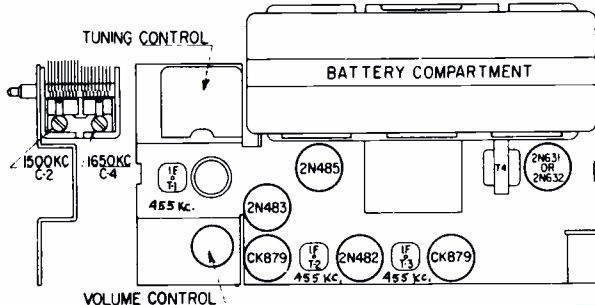
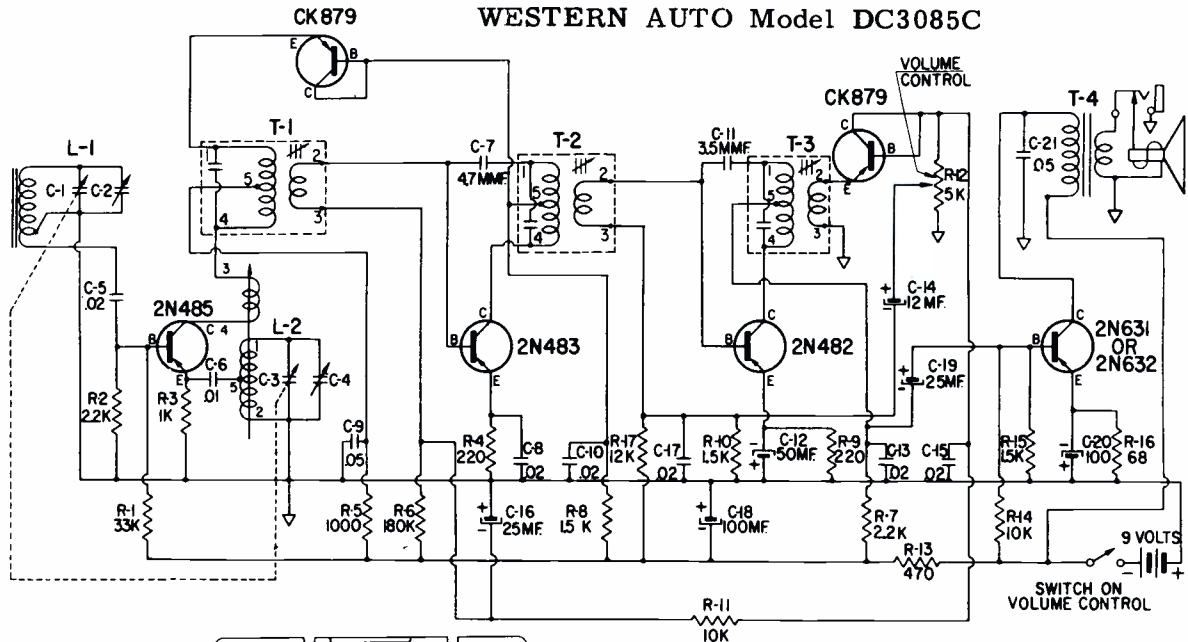


I. F. 455 KC.

MODEL NO. DC3160

L1: FERRITE ROD ANT COIL
 OSC COIL
 T1 T2 & T3 IF TRANS.
 TRANSISTOR

WESTERN AUTO Model DC3085C

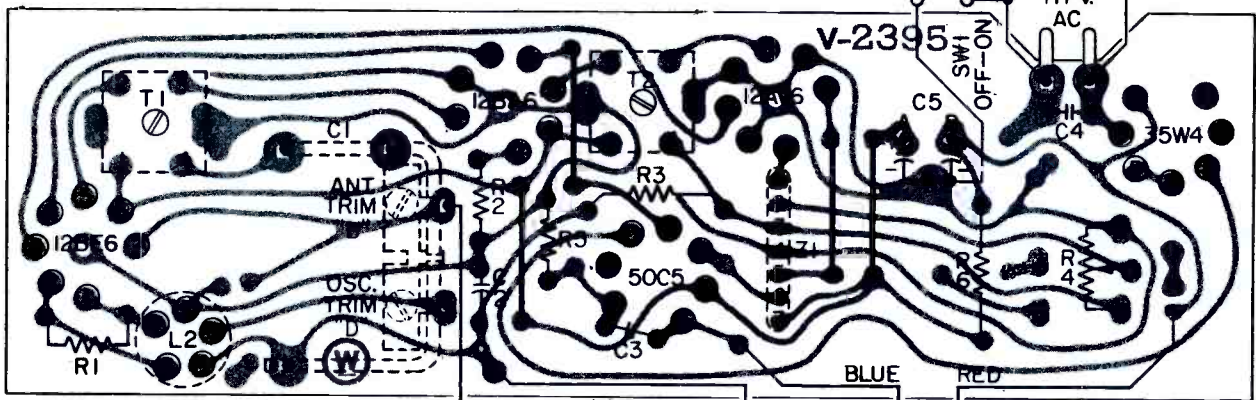


TRANSISTOR COMPLEMENT

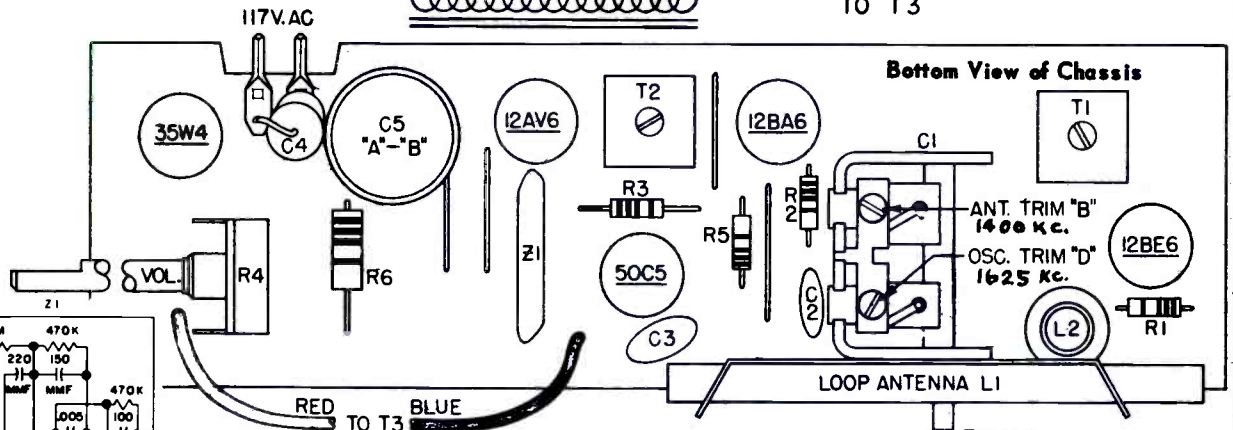
| RAYTHEON TYPE | FUNCTION |
|---------------|-------------------|
| 2N485 | Oscillator Mixer |
| 2N483 | I. F. Amplifier |
| CK879 | Detector |
| 2N482 | Reflex Amplifier |
| 2N631 | Audio Output |
| CK879 | Overload - A.G.C. |

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

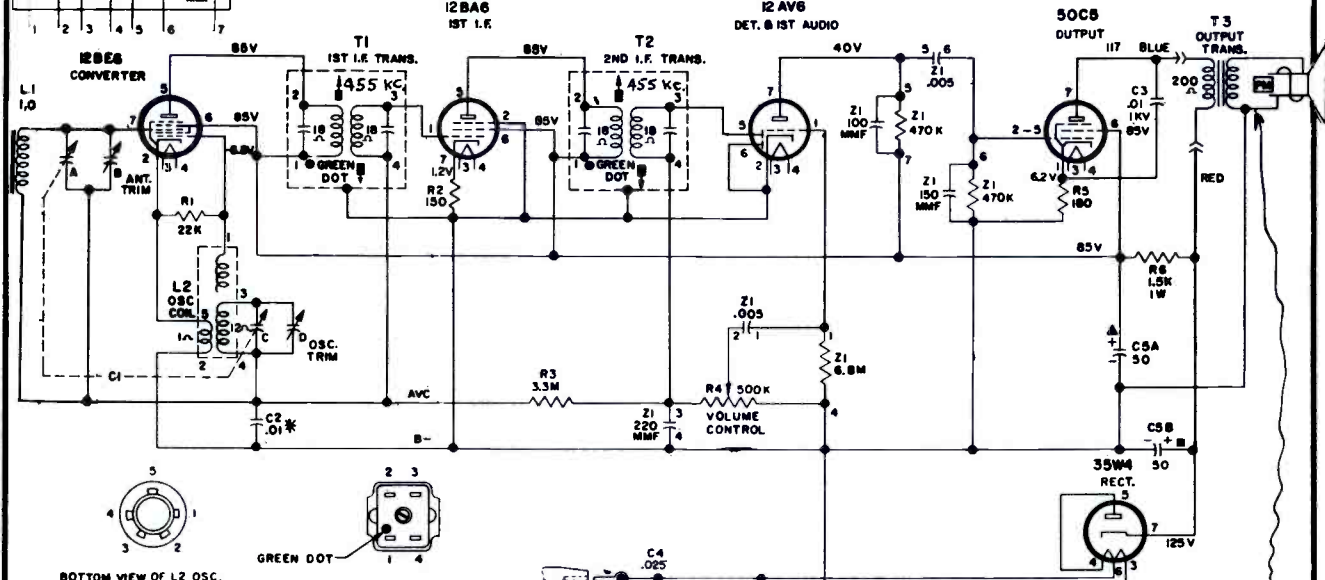
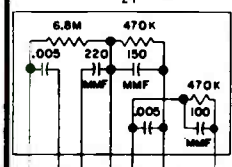
WESTINGHOUSE Chassis V-2395-3, Models H-753L5, H-755L5.
Chassis V-2395-2, Models H-748T5, H-749T5, H-750T5, differ
from V-2395-3 in audio circuit and omit clock and its circuit.



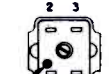
Top View of Chassis



Bottom View of Chassis



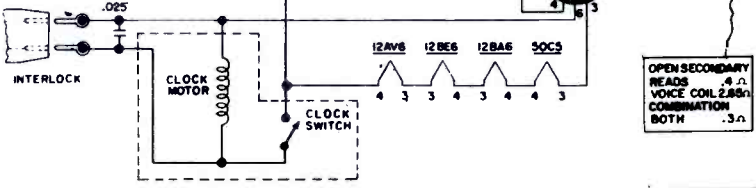
BOTTOM VIEW OF L2 OSC. COIL SHOWING CONNECTIONS



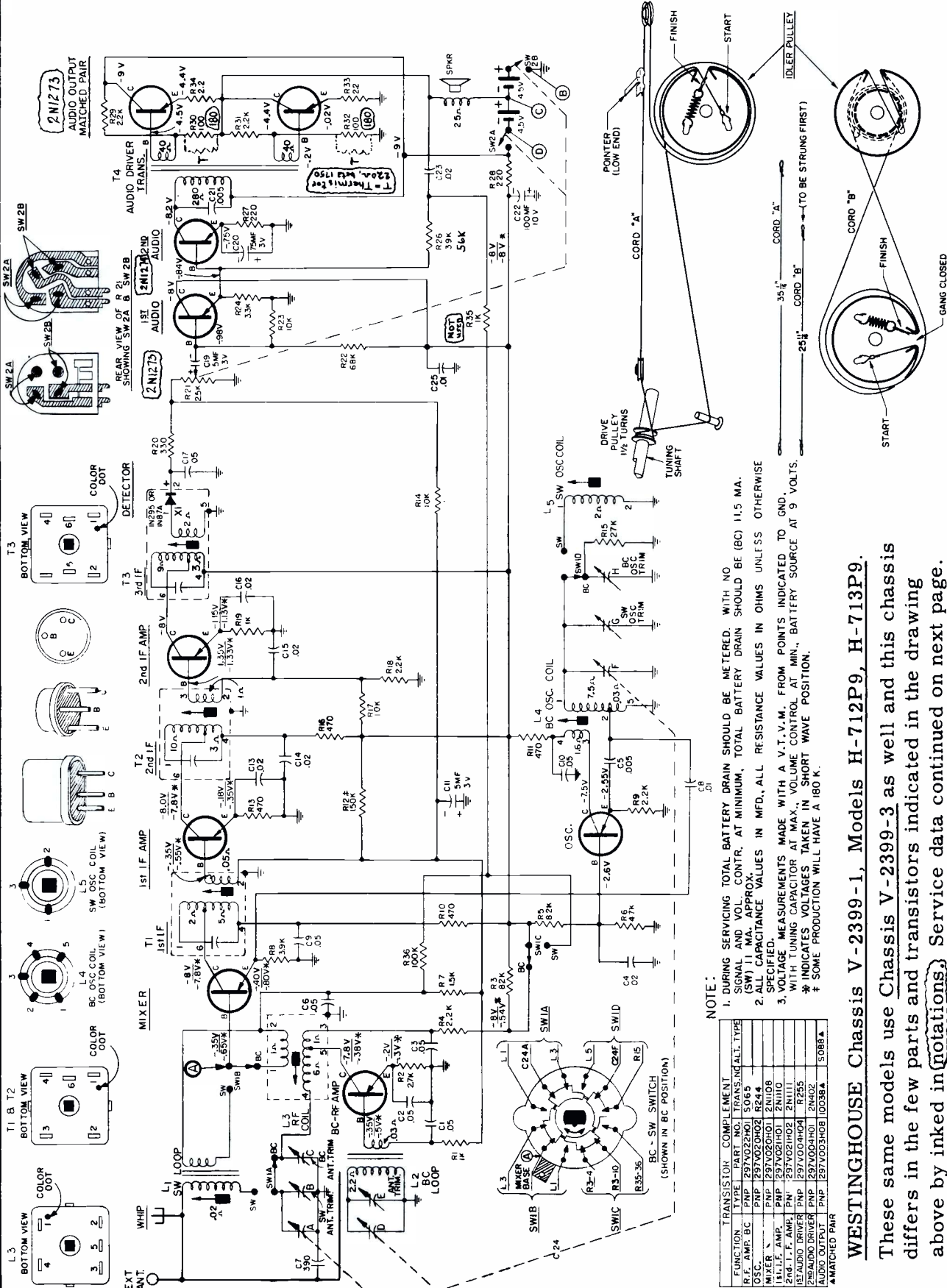
BOTTOM VIEW OF T1, T2, I.F. TRANS.

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.



OPEN SECONDARY
 READS .4 Ω
 VOICE COIL 2.65 Ω
 COMBINATION
 BOTH .3 Ω



NOTE:

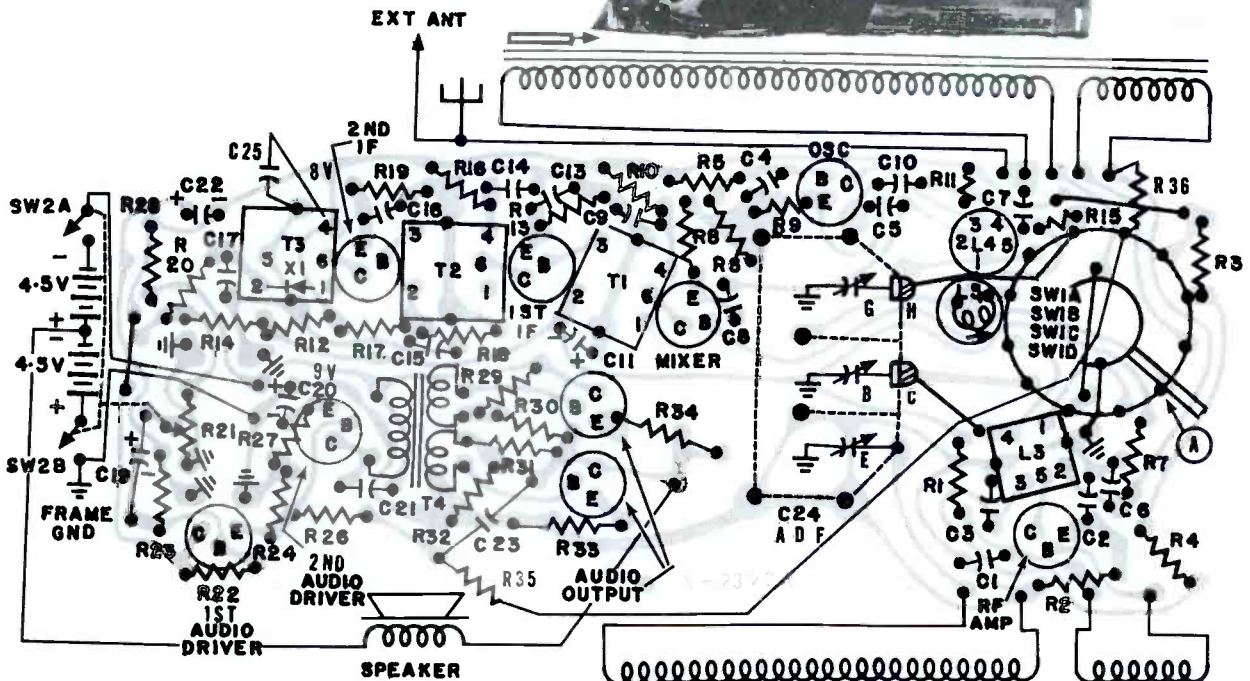
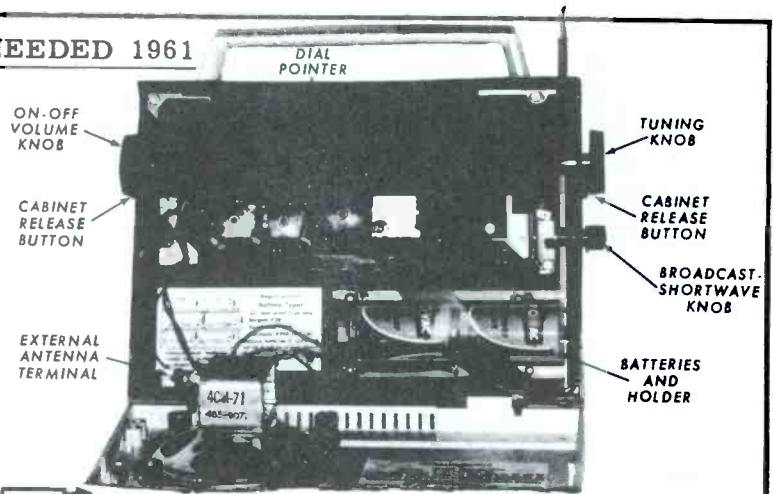
1. DURING SERVICING TOTAL BATTERY DRAIN SHOULD BE METERED. WITH NO SW1 AND NO CONTR. AT MINIMUM, TOTAL BATTERY DRAIN SHOULD BE (BC) 11.5 MA.
2. ALL CAPACITANCE VALUES IN MFD., ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
3. VOLTAGE MEASUREMENTS MADE WITH A V.T.V.M. FROM POINTS INDICATED TO GND. WITH TUNING CAPACITOR AT MAX. VOLUME CONTROL AT MIN., BATTERY SOURCE AT 9 VOLTS. * INDICATES VOLTAGES TAKEN IN SHORT WAVE POSITION. † SOME PRODUCTION WILL HAVE A 180 K.

| FUNCTION | TRANSISTOR | COMPLEMENT |
|------------------|----------------|------------|
| R.F. AMP. BC | PNP 297V022H01 | 5065 |
| OSC. | PNP 297V020H02 | R244 |
| MIXER | PNP 297V020H01 | 2N109 |
| 1st I.F. AMP. | PNP 297V021H01 | 2N110 |
| 2nd I.F. AMP. | PNP 297V021H02 | 2N111 |
| 1st AUDIO DRIVER | PNP 297V004H04 | R255 |
| 2nd AUDIO DRIVER | PNP 297V004H01 | 2N402 |
| AUDIO OUTPUT | PNP 297V003H01 | 10038A |
| 4 MATCHED PAIR | | 5088A |

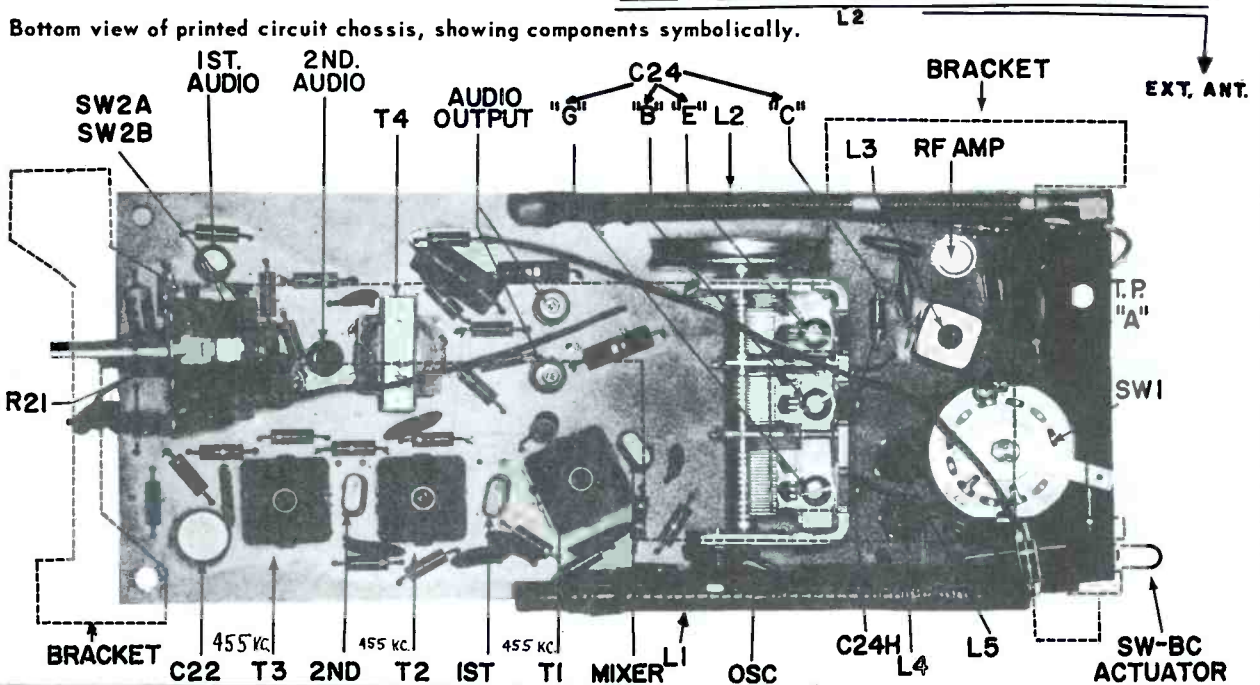
WESTINGHOUSE Chassis V-2399-1, Models H-712P9, H-713P9.
 These same models use Chassis V-2399-3 as well and this chassis differs in the few parts and transistors indicated in the drawing above by inked in (notations). Service data continued on next page.

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

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



Bottom view of printed circuit chassis, showing components symbolically.

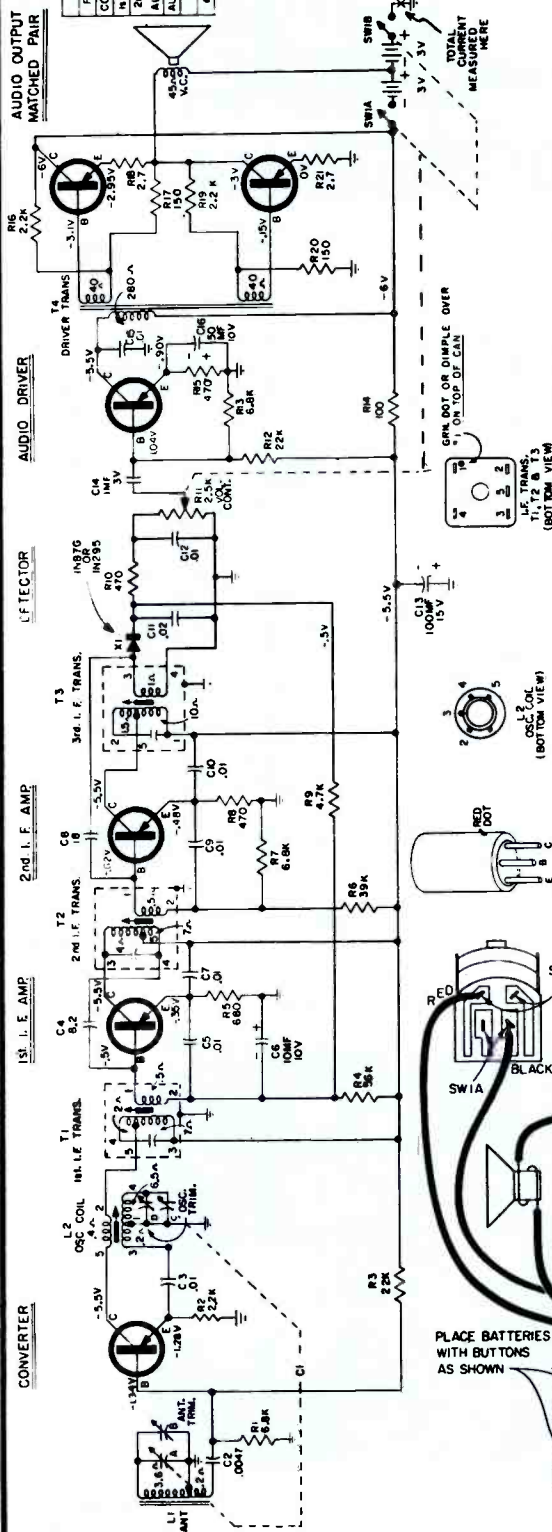


MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

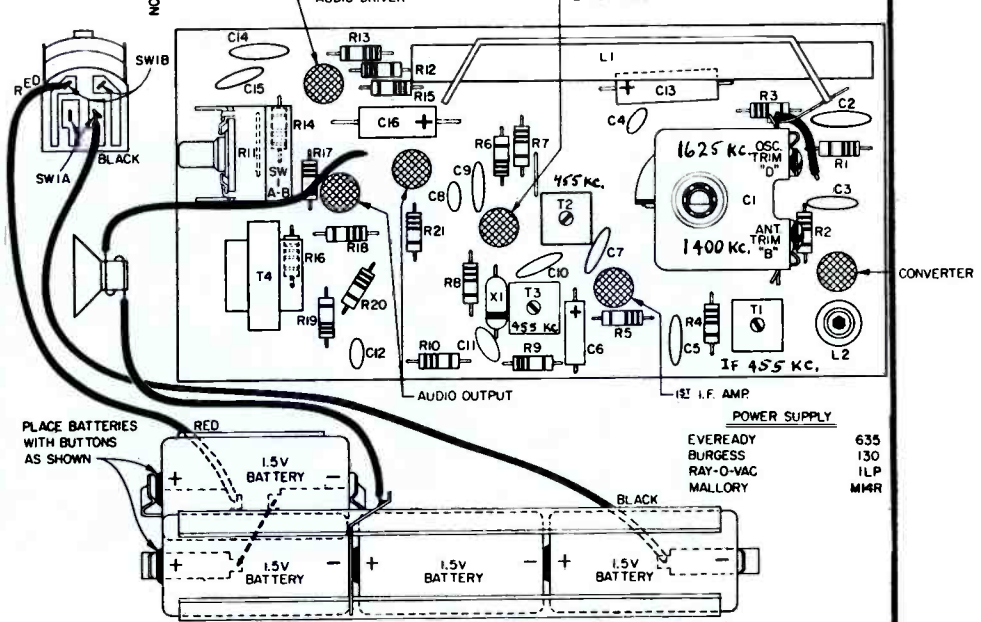
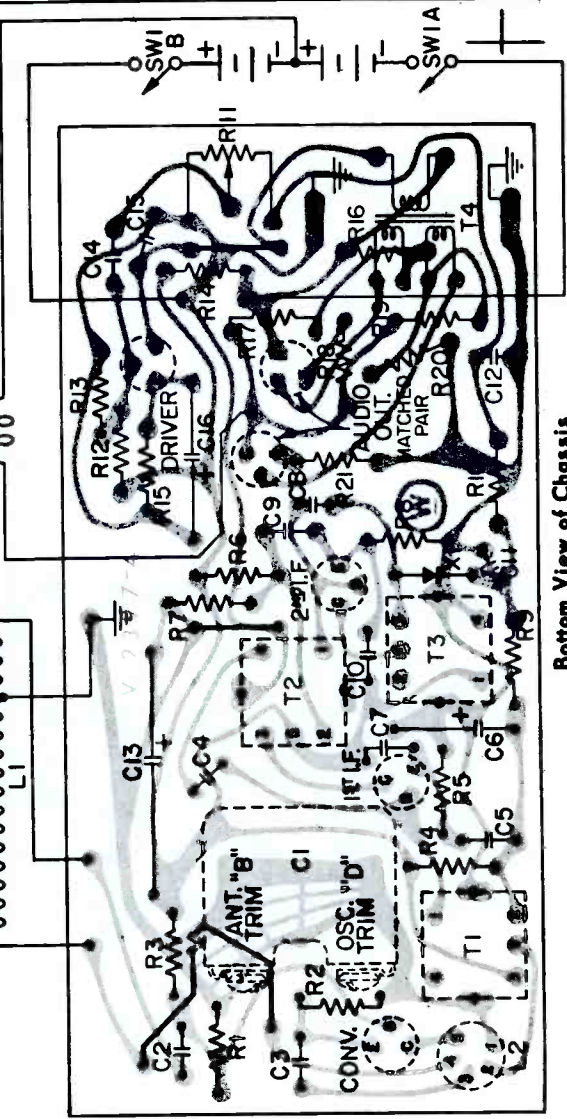
**Westinghouse Chassis V-2397-4,
Models H-725P6A, H-726P6A,
H-727P6A, H-728P6A, H-771P6,
H-771P6GP, H-772P6, -GP,
H-773P6, and H-773P6GP.**

| FUNCTION | TYPE | PART NO. | ALTERNATES |
|---------------------------|------|-----------|------------|
| CONVERTER | PNP | 237V02H03 | 2M42 |
| 1st I.F. AMP | PNP | 237V02H03 | 2M410 |
| 2nd I.F. AMP | PNP | 237V02H03 | 2M410 |
| AUDIO DRIVER | PNP | 237V02A03 | 2M408 |
| AUDIO OUTPUT MATCHED PAIR | PNP | 237V02A03 | 2M408 |

* MATCHED PAIR (SEE NOTES)



- NOTES:**
1. DURING SERVICING, TOTAL BATTERY CURRENT SHOULD BE METERED, WITH NO SIGNAL, AND VOLUME CONTROL AT MINIMUM. TOTAL BATTERY DRAIN SHOULD BE APPROX. 9 MA.
 2. VOLTAGE MEASUREMENTS MADE WITH A VTVM FROM POINTS INDICATED TO GROUND, WITH TUNING CAPACITOR AT MAXIMUM. VOLUME CONTROL AT MINIMUM & BATTERY SOAKED FOR 24 HOURS. SOME OF THE VOLTAGES SPECIFIED ARE IN MINFD UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
 3. ANY TWO AUDIO OUTPUT TRANSISTORS WITH IDENTICAL COLOR CODE ON TOP CAN BE USED AS A MATCHED PAIR.

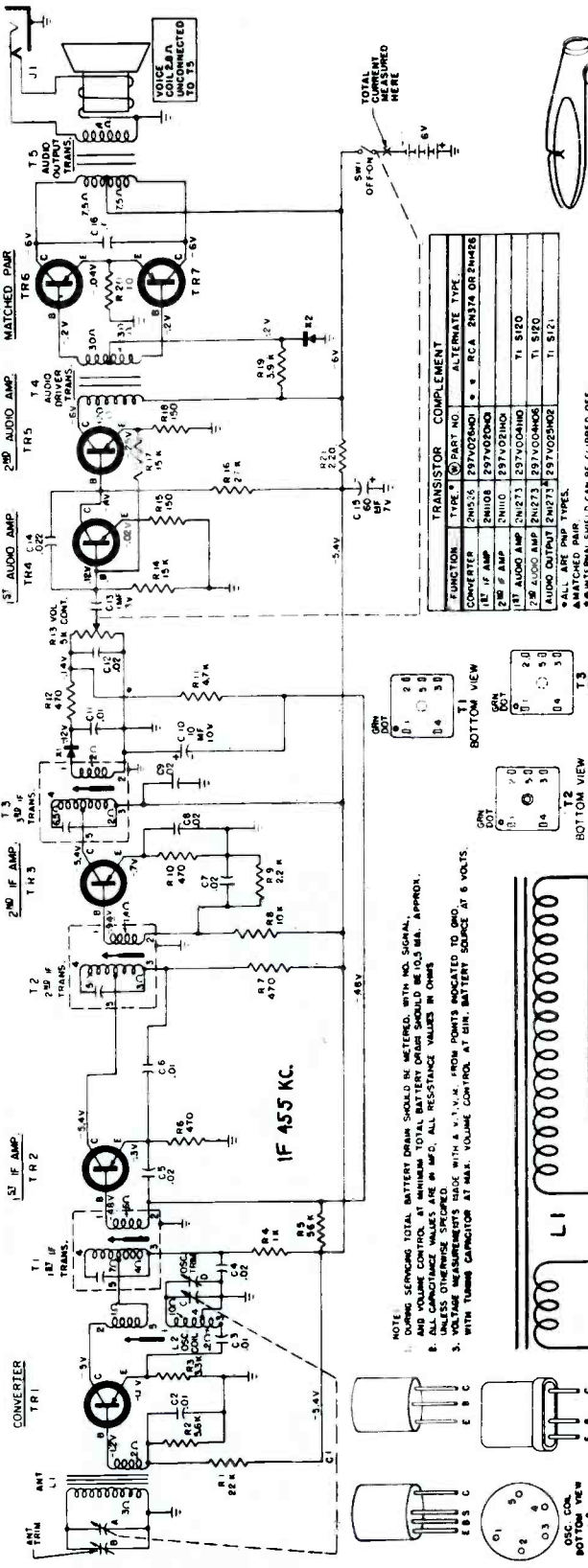


POWER SUPPLY
 EVEREADY 635
 BURGESS 130
 RAY-O-VAC 1LP
 MALLORY MM4R

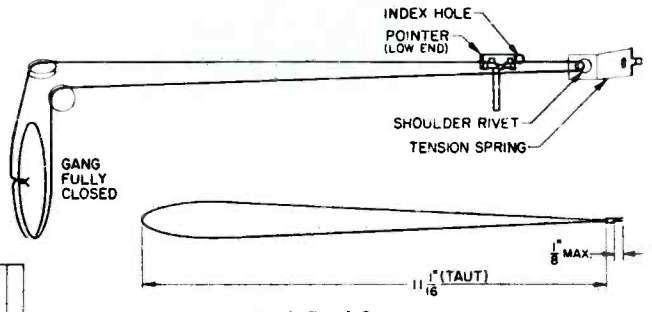
PLACE BATTERIES WITH BUTTONS AS SHOWN

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

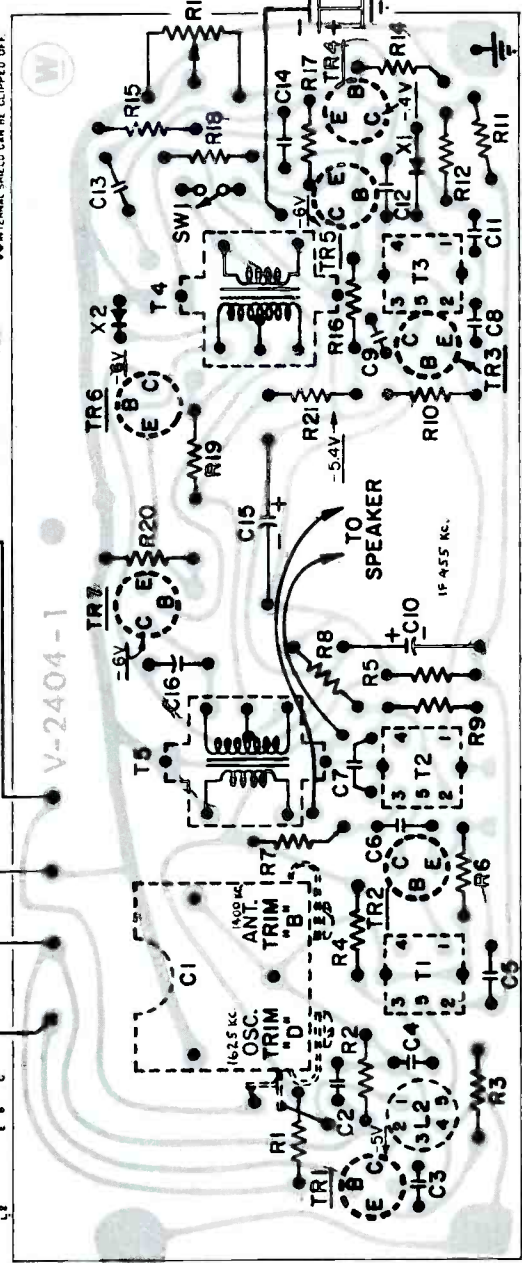
WESTINGHOUSE Chassis V-2404-1, Models H-737P7, H-738P7



| FUNCTION | TYPE | PART NO. | ALTERNATE TYPE |
|---------------------------|-------|-----------|---------------------|
| CONVERTER | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| 5T IF AMP | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| 2P0 IF AMP | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| 2B0 AUDIO AMP | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| 2B1 AUDIO AMP | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| 2B2 AUDIO AMP | 2N155 | 297M20200 | RCA 6N57A OR 2N1482 |
| AUDIO OUTPUT MATCHED PAIR | 6X4 | 297V02400 | 6X4 |



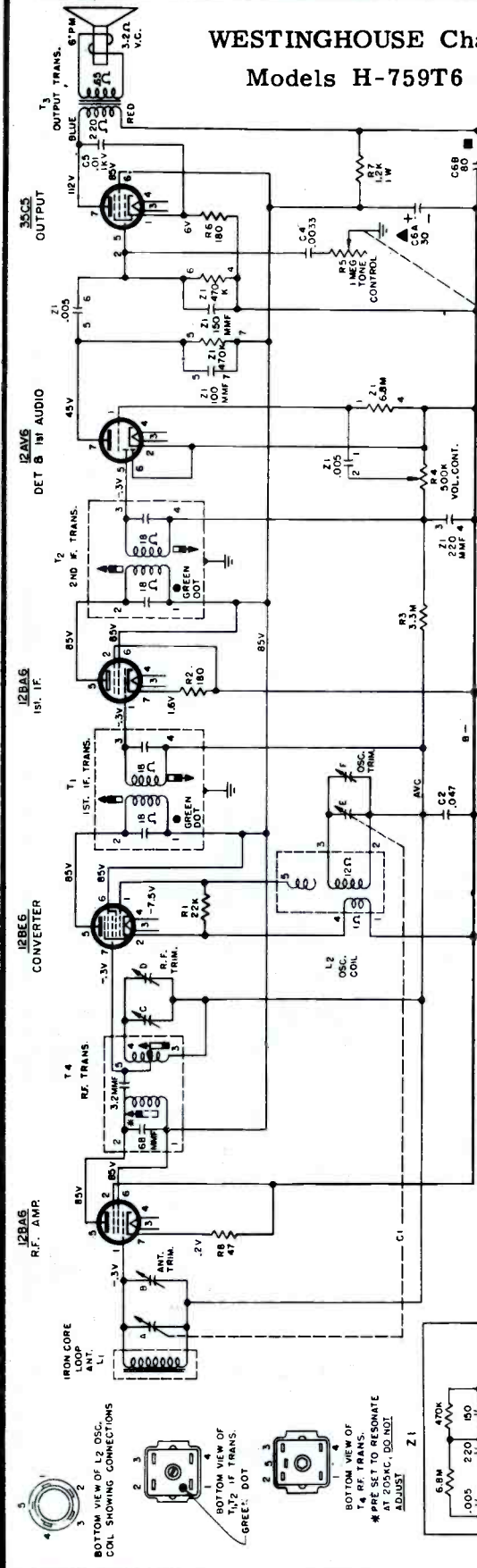
Dial Cord Stringing



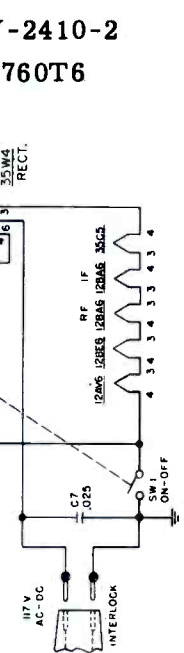
NOTE:
 1. DURING SERVICING TOTAL BATTERY DRAIN SHOULD BE MONITORED WITH NO SIGNAL.
 2. ANTENNA TRIMMER CONTROL AT MINIMUM TOTAL BATTERY DRAIN SHOULD BE 10.5 MA. APPROX.
 3. ALL CAPACITANCE VALUES ARE IN MICROFARADS, ALL RESISTANCE VALUES IN OHMS.
 4. ALL RESISTANCE VALUES ARE IN OHMS.
 5. VOLTAGE MEASUREMENTS MADE WITH A V.O.M. FROM POINTS INDICATED TO GND.
 6. VOLUME MEASUREMENTS MADE WITH A V.O.M. FROM POINTS INDICATED TO GND.
 7. WITH TUNING CAPACITOR AT MAX. VOLUME CONTROL AT MIN. BATTERY SOURCE AT 6 VOLTS.

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

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



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



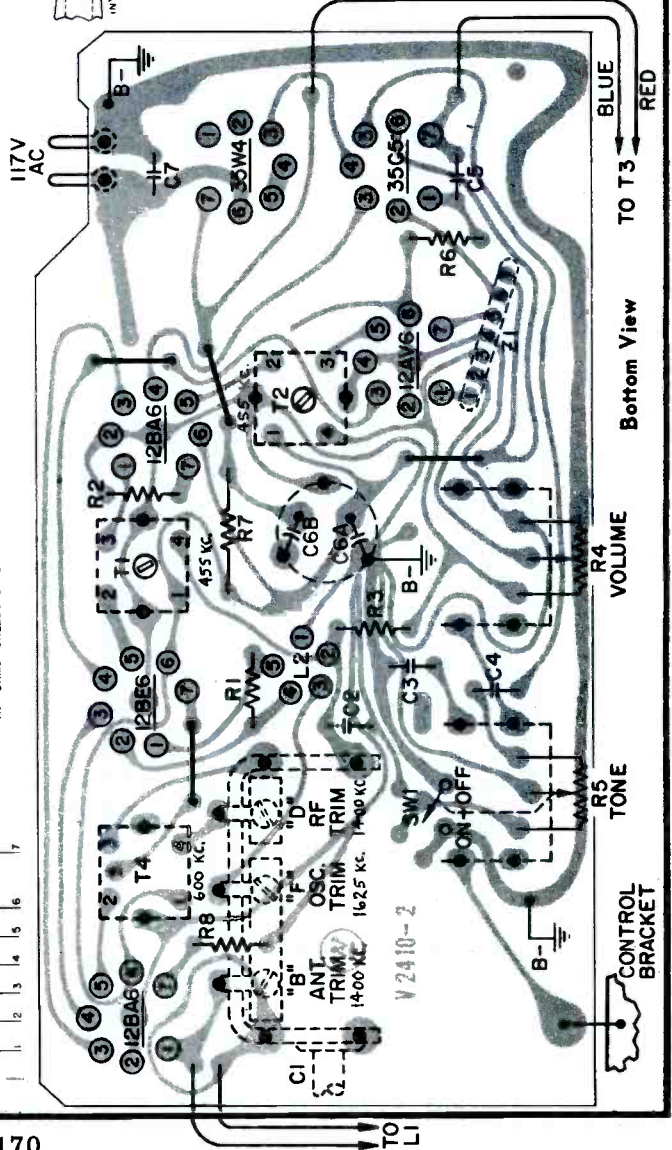
CHASSIS REMOVAL

1. Remove four screws, two from top corners on cabinet back and two from cabinet bottom.
2. Slide cabinet-front and attached chassis out from cabinet.

CHASSIS REPLACEMENT

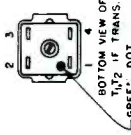
1. Slide chassis and attached cabinet-front into cabinet, making sure that etched circuit board enters the groove provided in the cabinet.
2. Replace screws removed in "Chassis Removal".

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

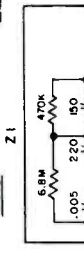


Bottom View

5
 4
 3
 2
 1
 BOTTOM VIEW OF L2 OSC. COIL SHOWING CONNECTIONS.

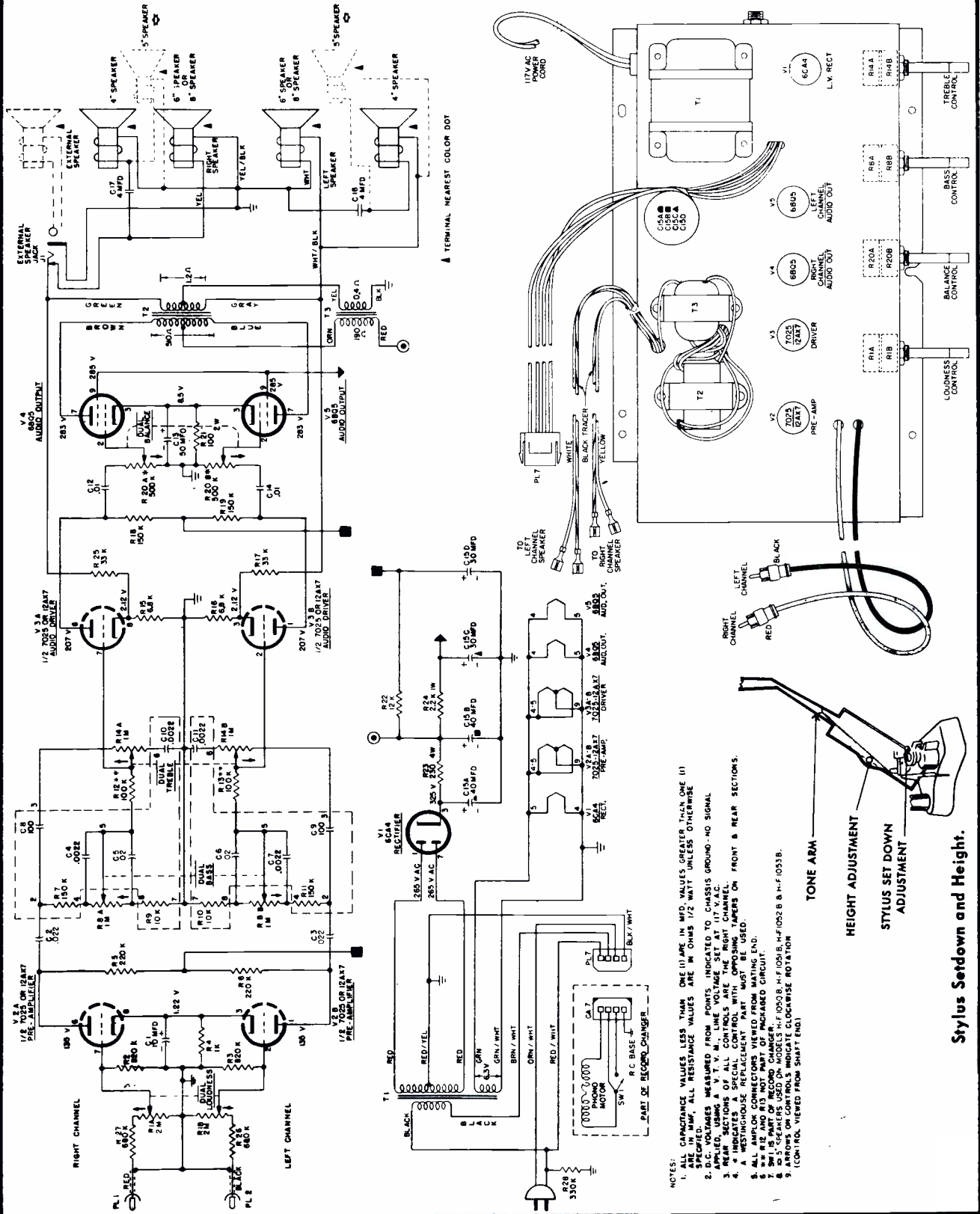


4
 3
 2
 1
 BOTTOM VIEW OF TUNING TRANS. *PRE SET TO RESONATE AT 205KC. DO NOT ADJUST.



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

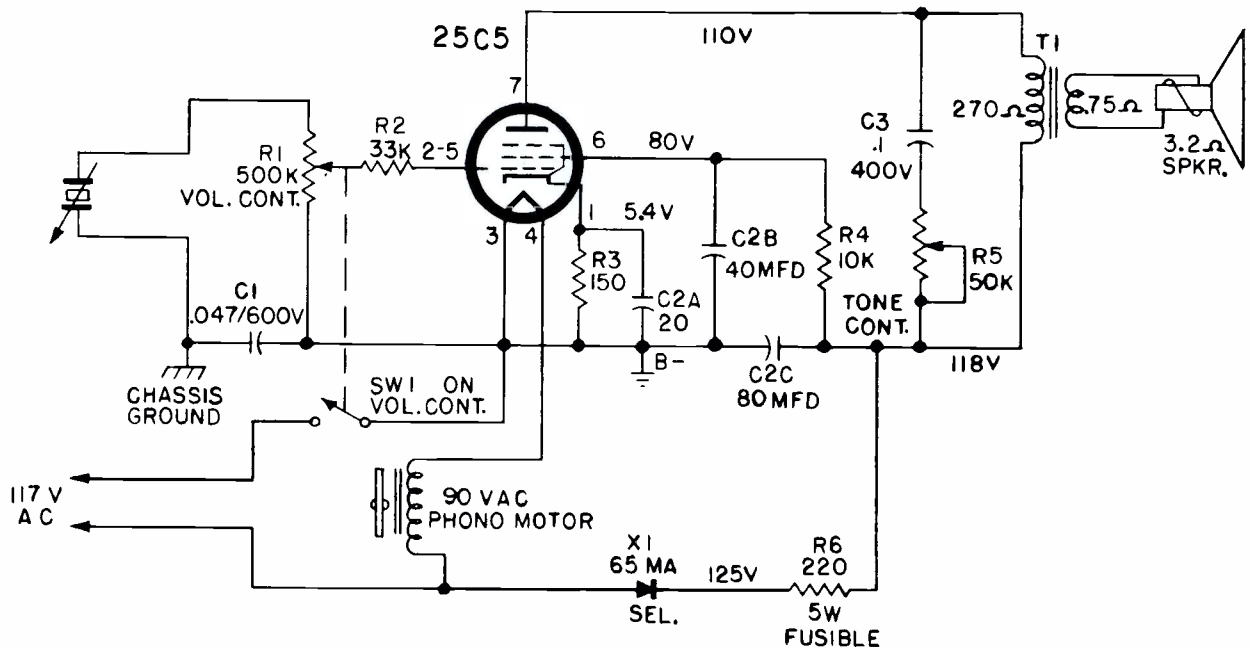
WESTINGHOUSE Chassis V-2512-3, used in Models H-F1010A, H-F1011A, H-F1012A, H-F1013A, H-F1050B, H-F1051B, H-F1052B, H-F1053B



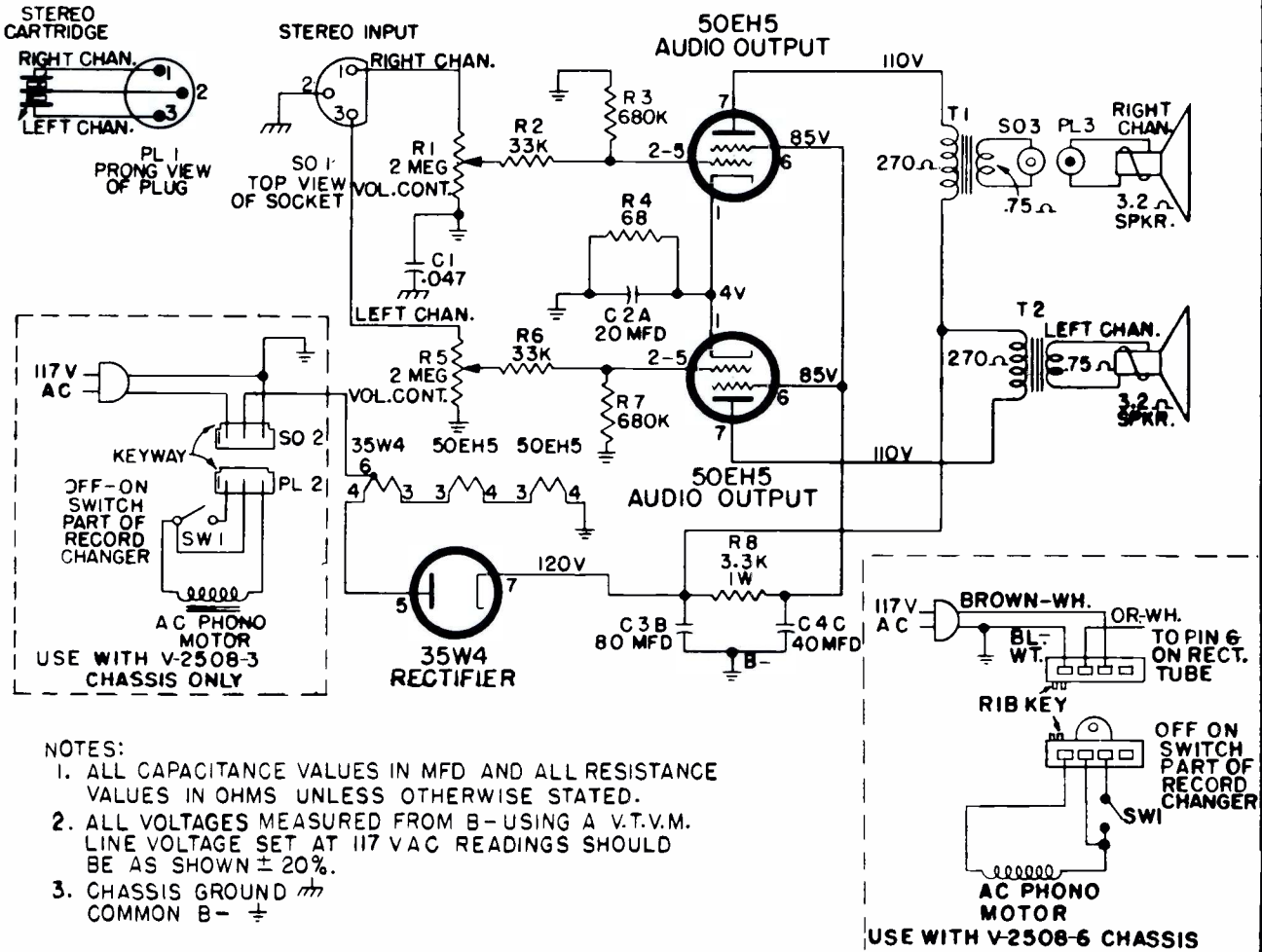
- NOTES:
1. ALL CAPACITANCE VALUES LESS THAN ONE (1) ARE IN MFD. VALUES GREATER THAN ONE (1) SPECIFIED. ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 2. D.C. VOLTAGES MEASURED FROM POINTS INDICATED TO CHASSIS GROUND - NO SIGNAL.
 3. ALL VOLTAGES MEASURED FROM POINTS INDICATED TO CHASSIS GROUND - NO SIGNAL.
 4. * INDICATES A SPECIAL CONTROL WITH OPPOSING TAPERS ON FRONT & REAR SECTIONS.
 5. A WESTINGHOUSE REPLACEMENT PART MUST BE USED.
 6. ALL SOLDER CONNECTIONS VIEWED FROM MATING END.
 7. SW1 IS PART OF RECORD CHANGER.
 8. D5 SPEAKERS USED ON MODELS H-F1050B, H-F1051B, H-F1052B & H-F1053B.
 9. CONTROL VIEWED FROM SHAWT END.

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

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

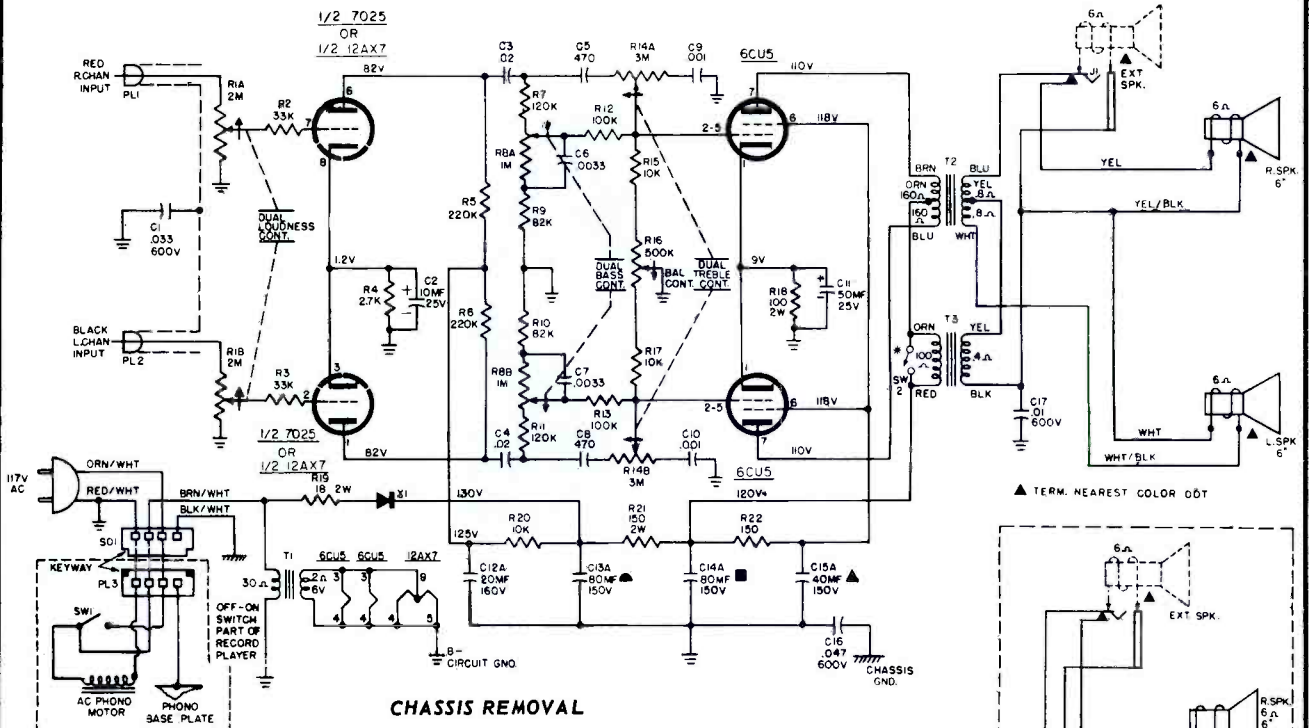


WESTINGHOUSE Chassis V-2508-3, V-2508-6, Models H-64ACS1, H-64ACS2



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

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

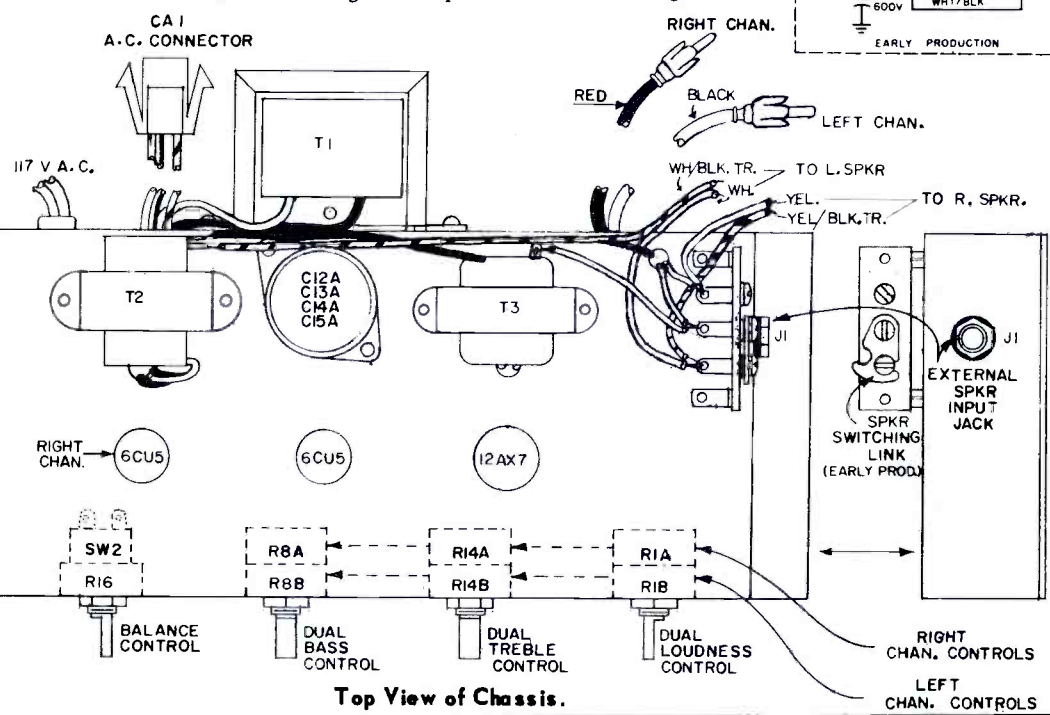
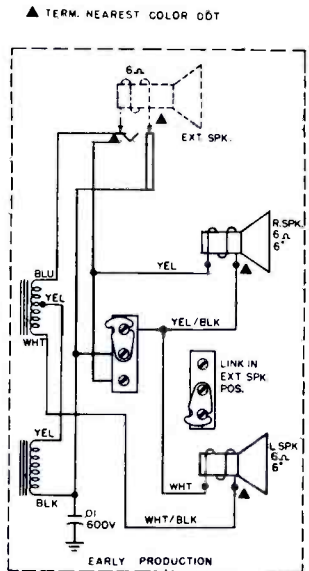


CHASSIS REMOVAL

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

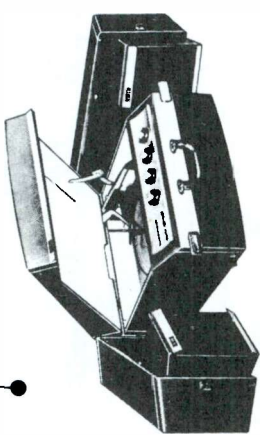
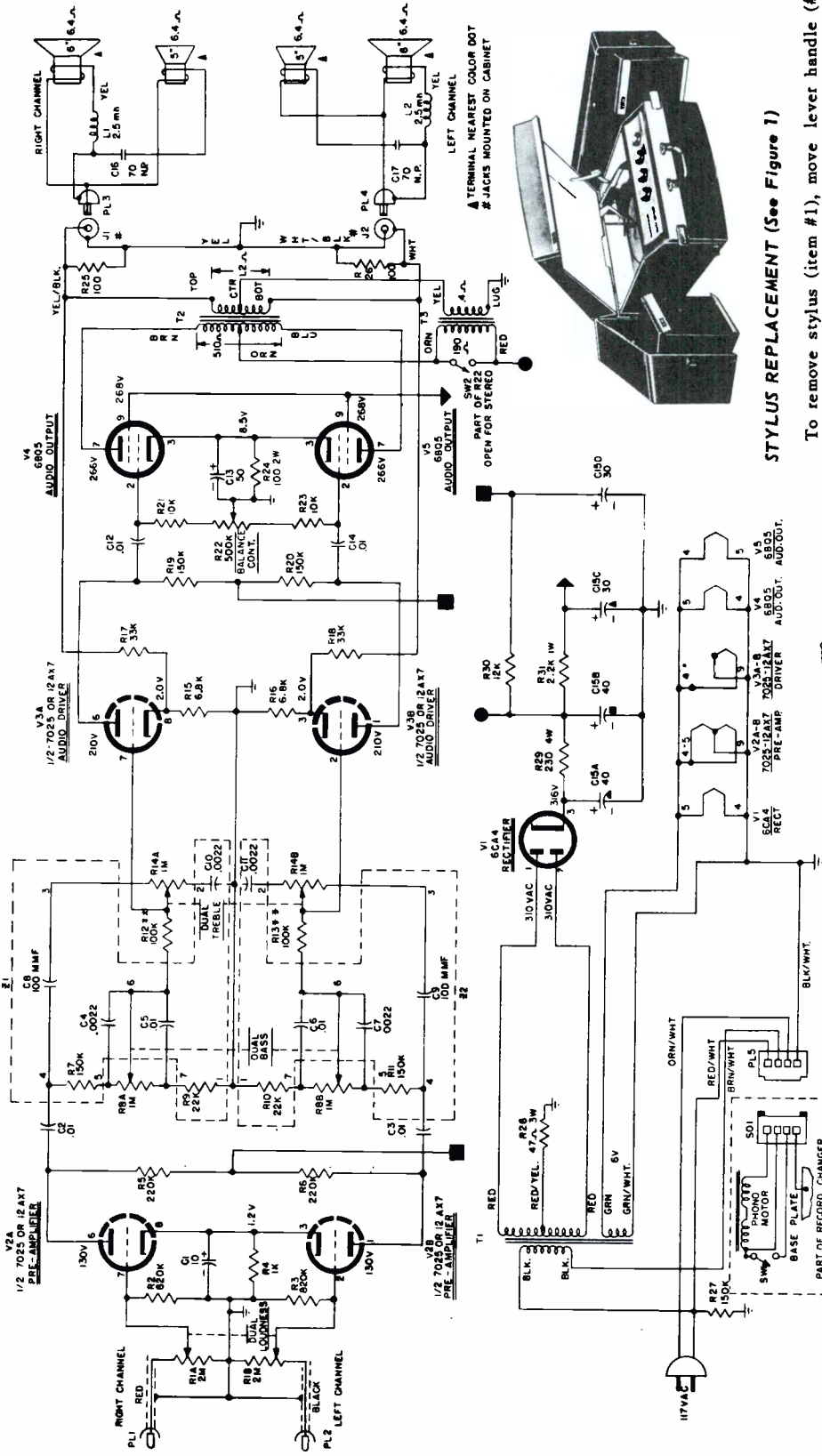
NOTES:

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



Top View of Chassis.

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



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).

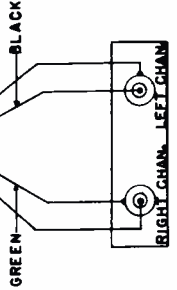
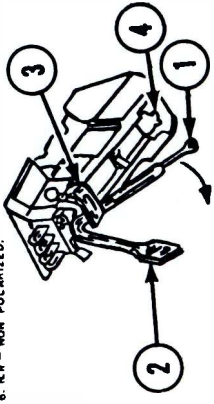
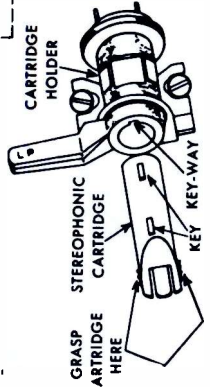
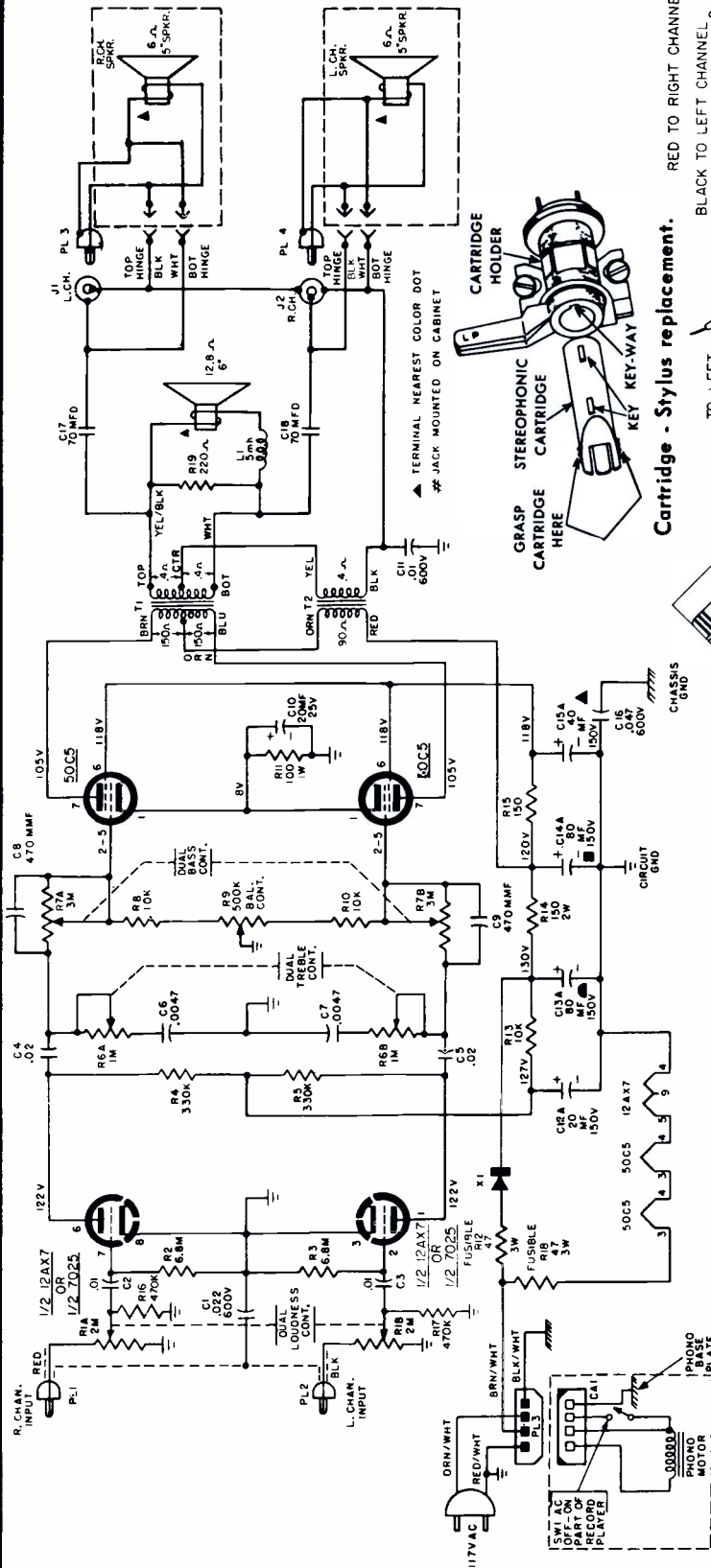


Figure 2 - Cartridge terminal wiring.

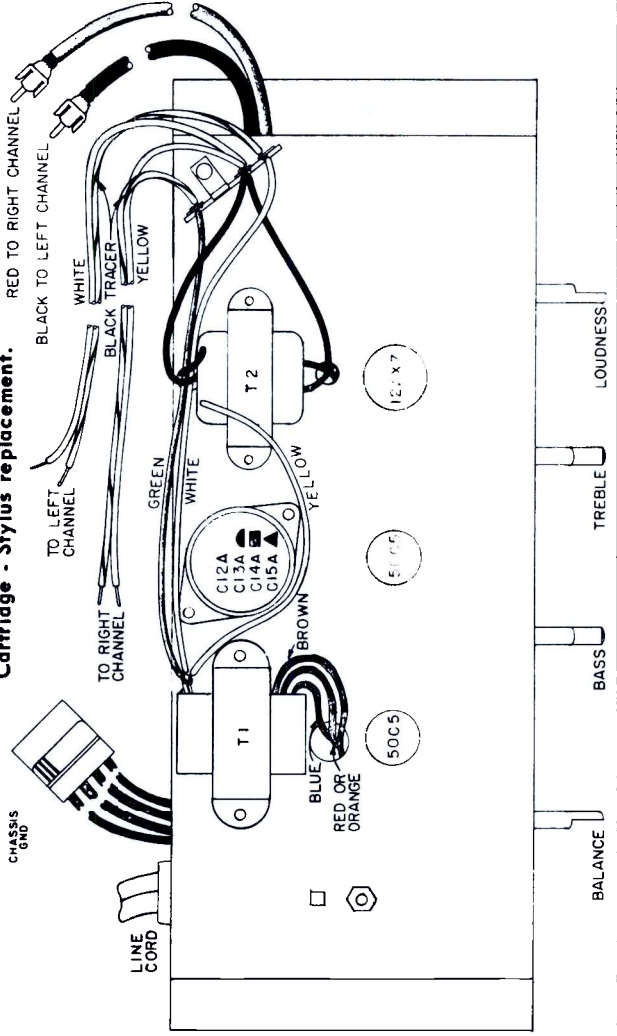
CARTRIDGE REPLACEMENT

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

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



Cartridge - Stylus replacement.



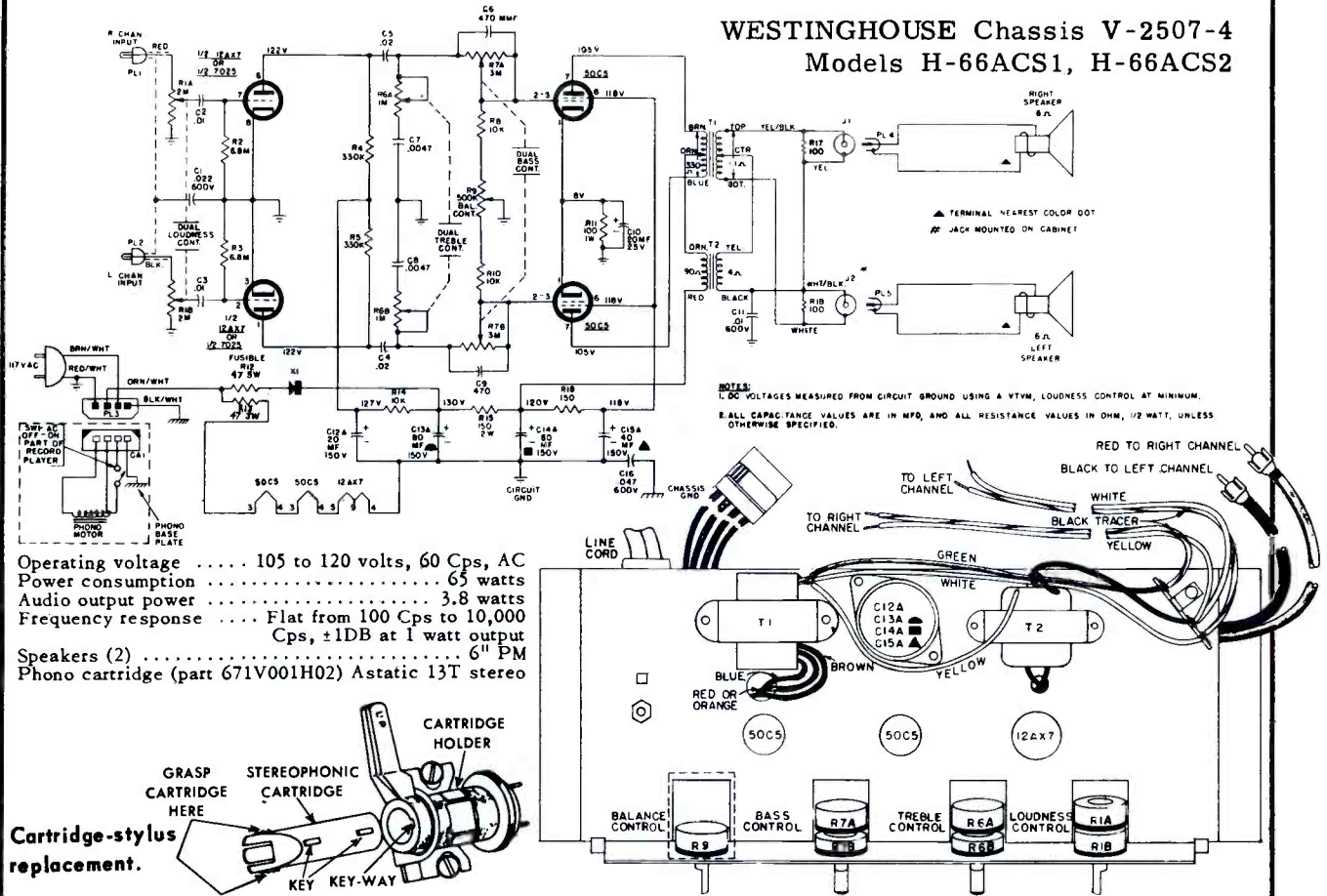
CHASSIS REMOVAL

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

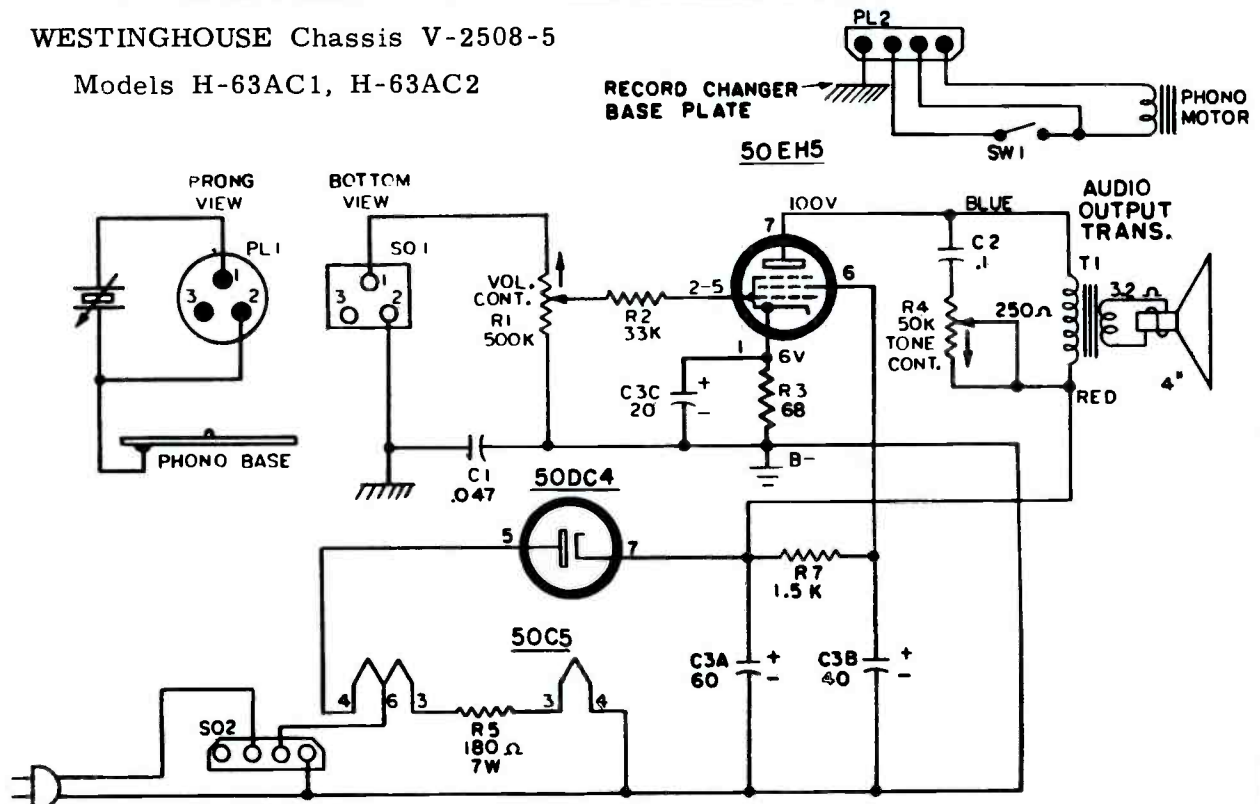
NOTES:
1. DC VOLTAGES MEASURED FROM CIRCUIT GROUND USING A VTVM, LOUDNESS CONTROL AT MINIMUM.
2. ALL CAPACITANCE VALUES ARE IN MFD, AND ALL RESISTANCE VALUES IN OHM, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.

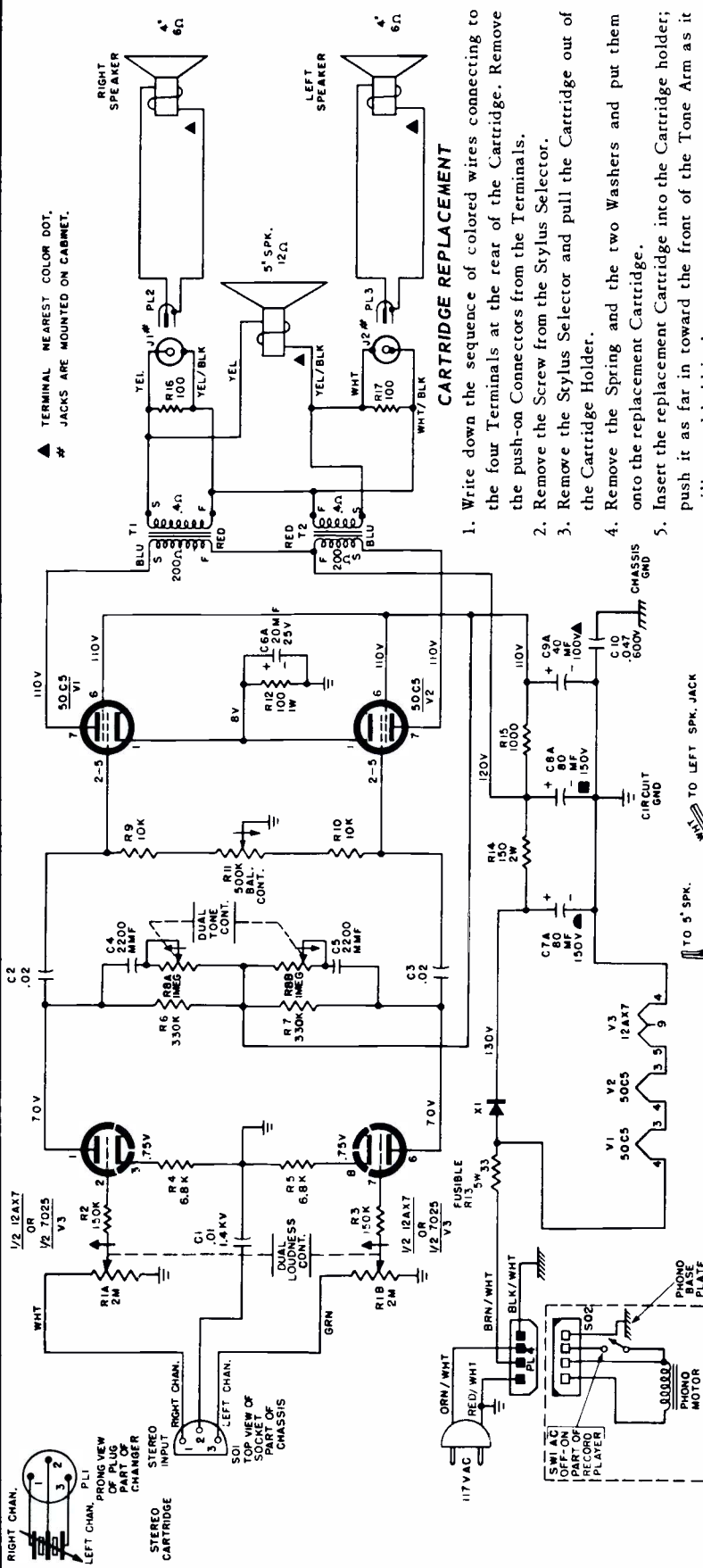
VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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



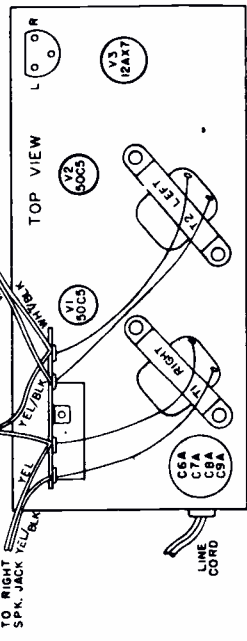
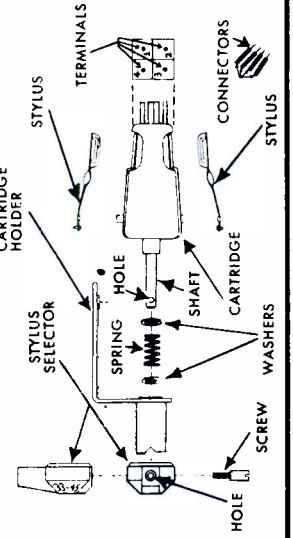
WESTINGHOUSE Chassis V-2508-5
Models H-63AC1, H-63AC2



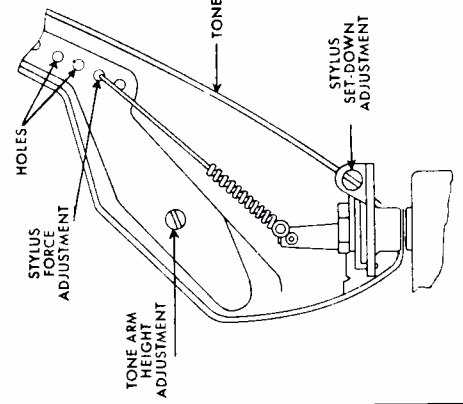


CARTRIDGE REPLACEMENT

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 Cartridge holder; with go and hold it there.
6. Put the Stylus Selector onto the Cartridge Shaft so that the Hole in the Stylus Selector lines up with the Hole in the Cartridge Shaft. Secure it in place with the Screw. Be sure that the "33-45" marking on the Stylus Selector faces upward and the Stylus marked SA-075 faces down.
7. Push the Connectors onto the Terminals with the wire colors in the sequence previously noted for the original cartridge.



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



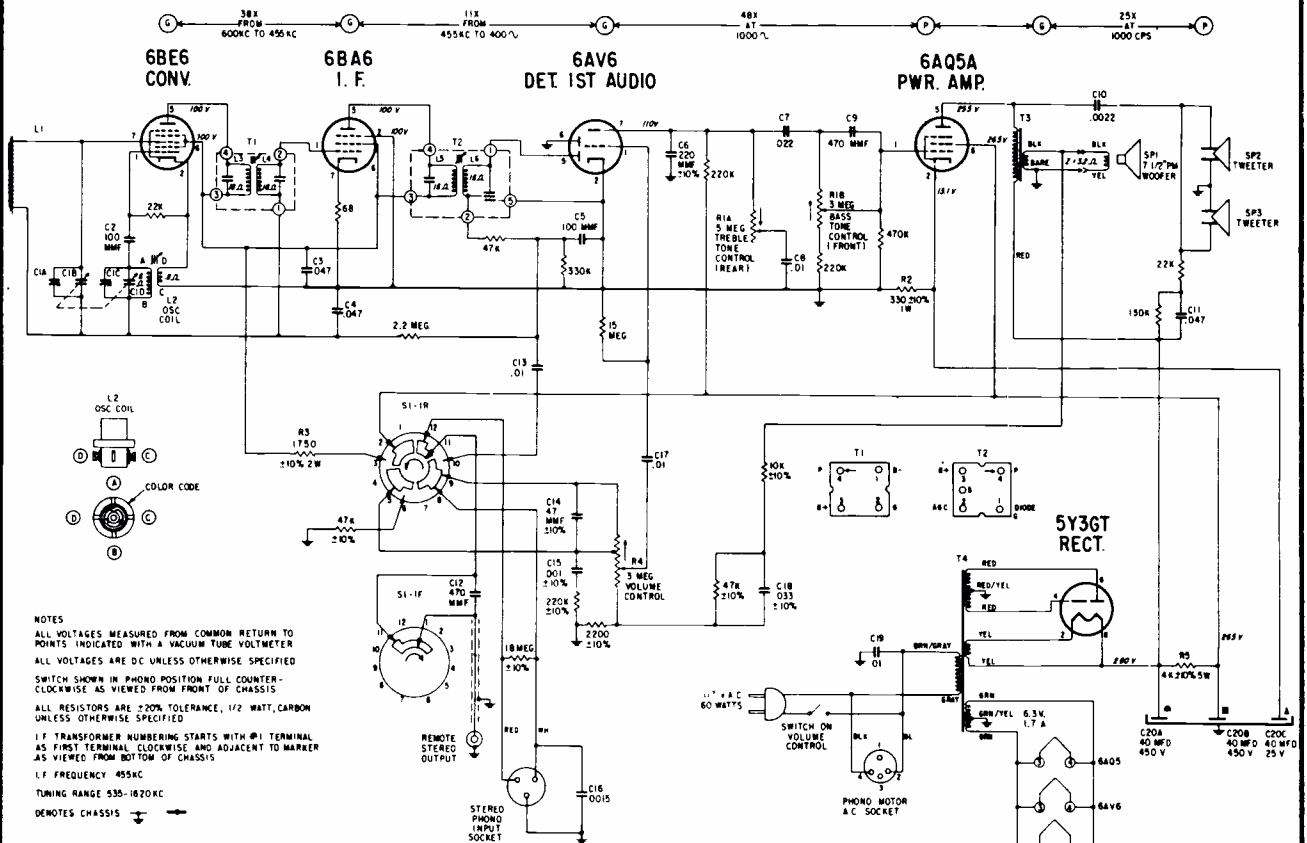
WESTINGHOUSE Chassis V-2506-5
Models H-65ACCS1, H-65ACCS2

Stylus Setdown.

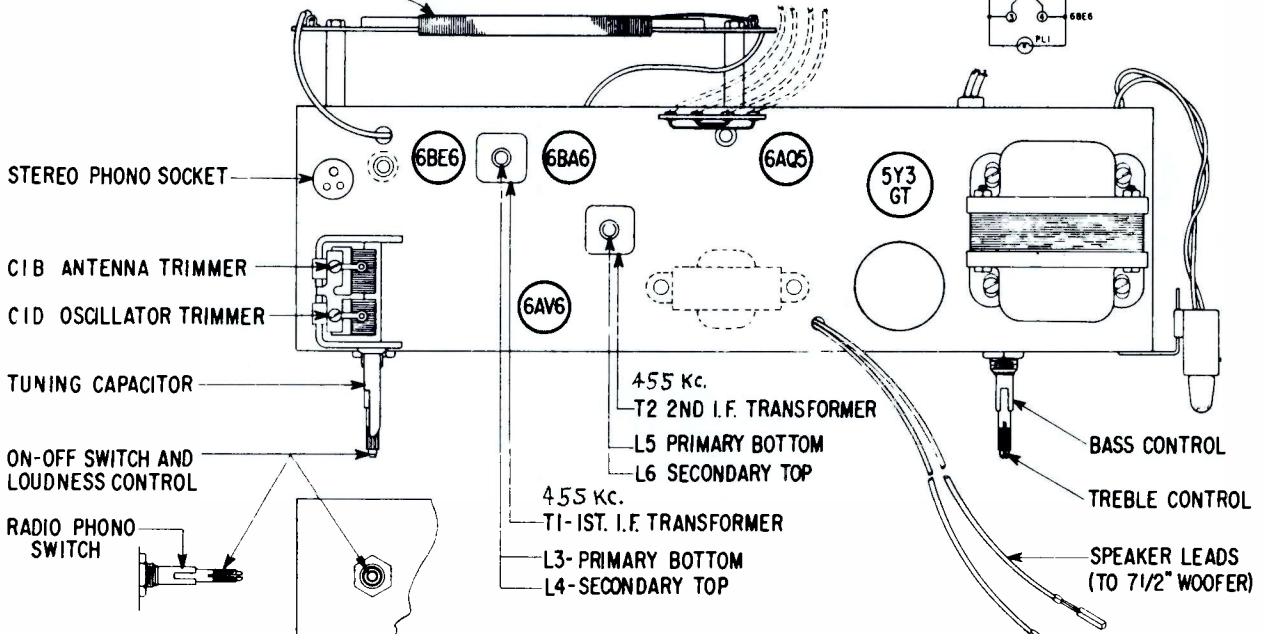
ZENITH RADIO CORPORATION

MODEL SFD-660 PORTABLE

STEREOPHONIC PHONOGRAPH CHASSIS 5D20

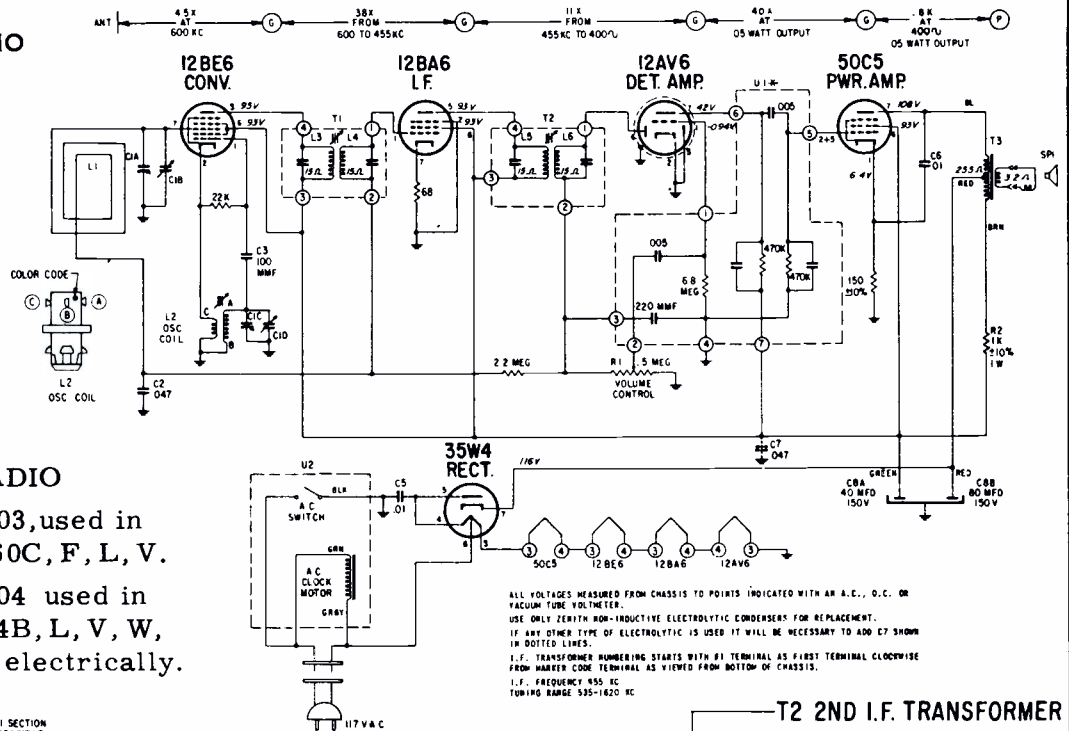


ANTENNA ASSEMBLY



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

ZENITH RADIO

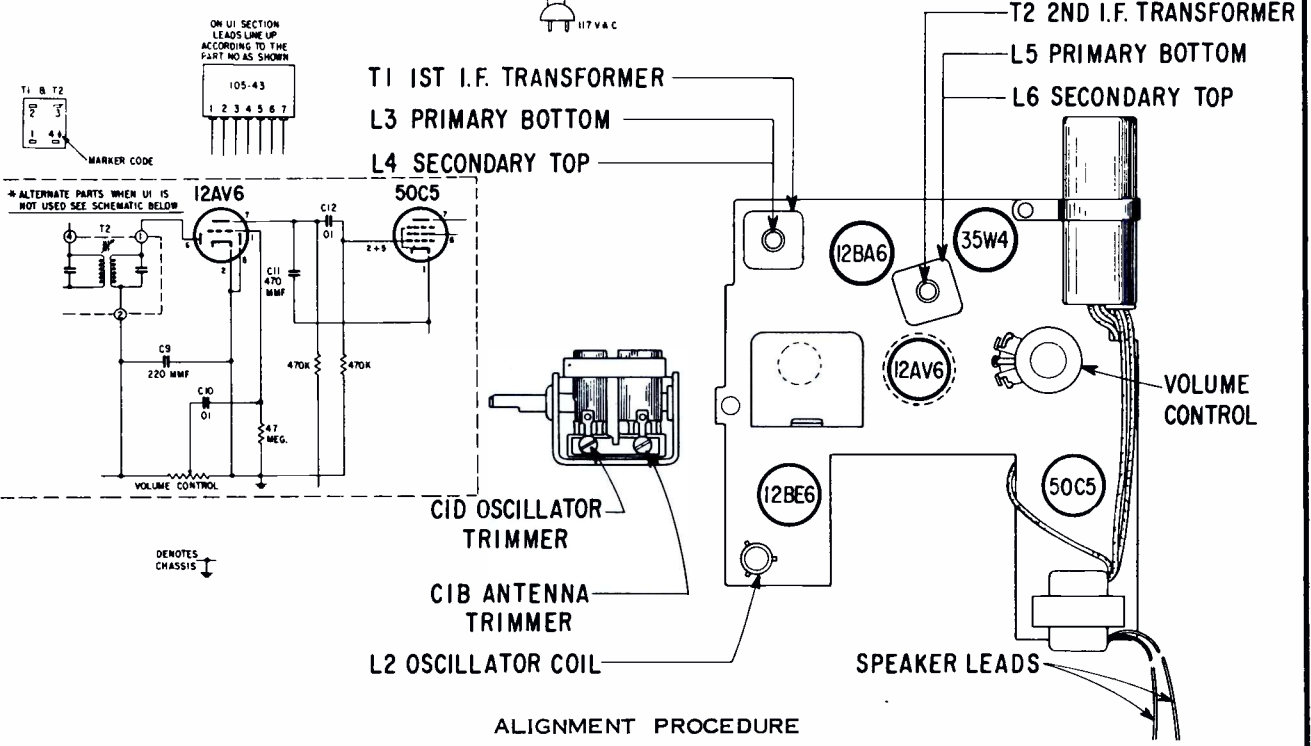


ZENITH RADIO

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

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

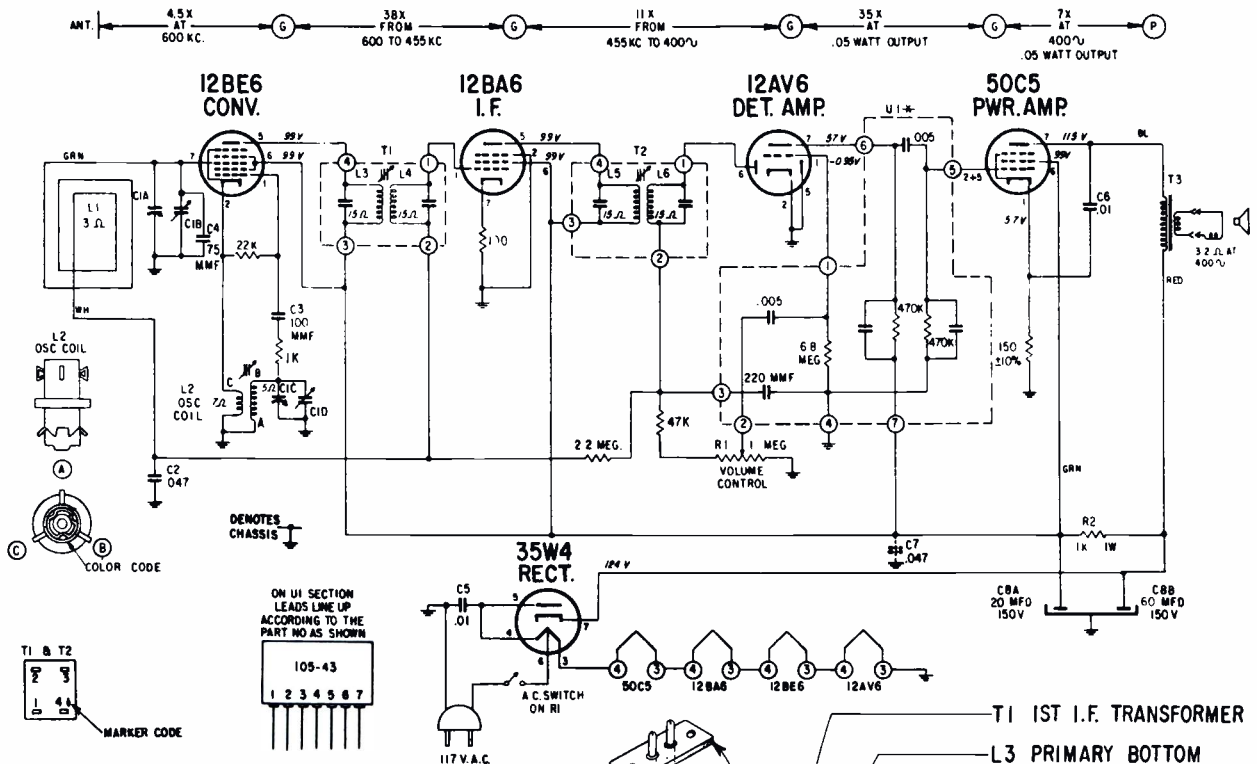
ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C7 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS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



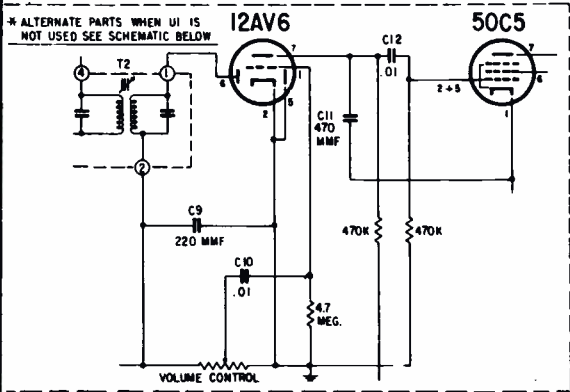
ALIGNMENT PROCEDURE

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

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

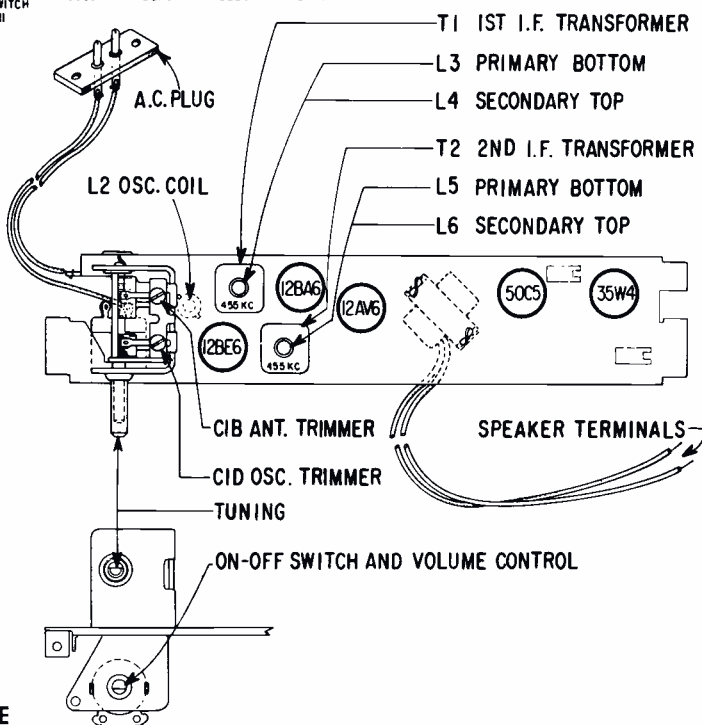


NOTES:
 ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
 USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT.
 IF ANY OTHER TYPE OF ELECTROLYTIC IS USED IT WILL BE NECESSARY TO ADD C7 SHOWN IN DOTTED LINES.
 I.F. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL AS FIRST TERMINAL CLOCKWISE FROM MARKER CODE TERMINAL AS VIEWED FROM BOTTOM OF CHASSIS.
 I.F. FREQUENCY 455 KC
 TUNING RANGE 535-1620 KC
 ALL RESISTORS ±20% TOLERANCE, 1/2 WATT, CARBON UNLESS OTHERWISE SPECIFIED.



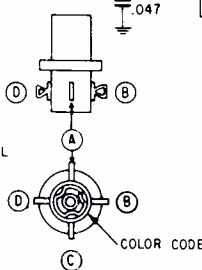
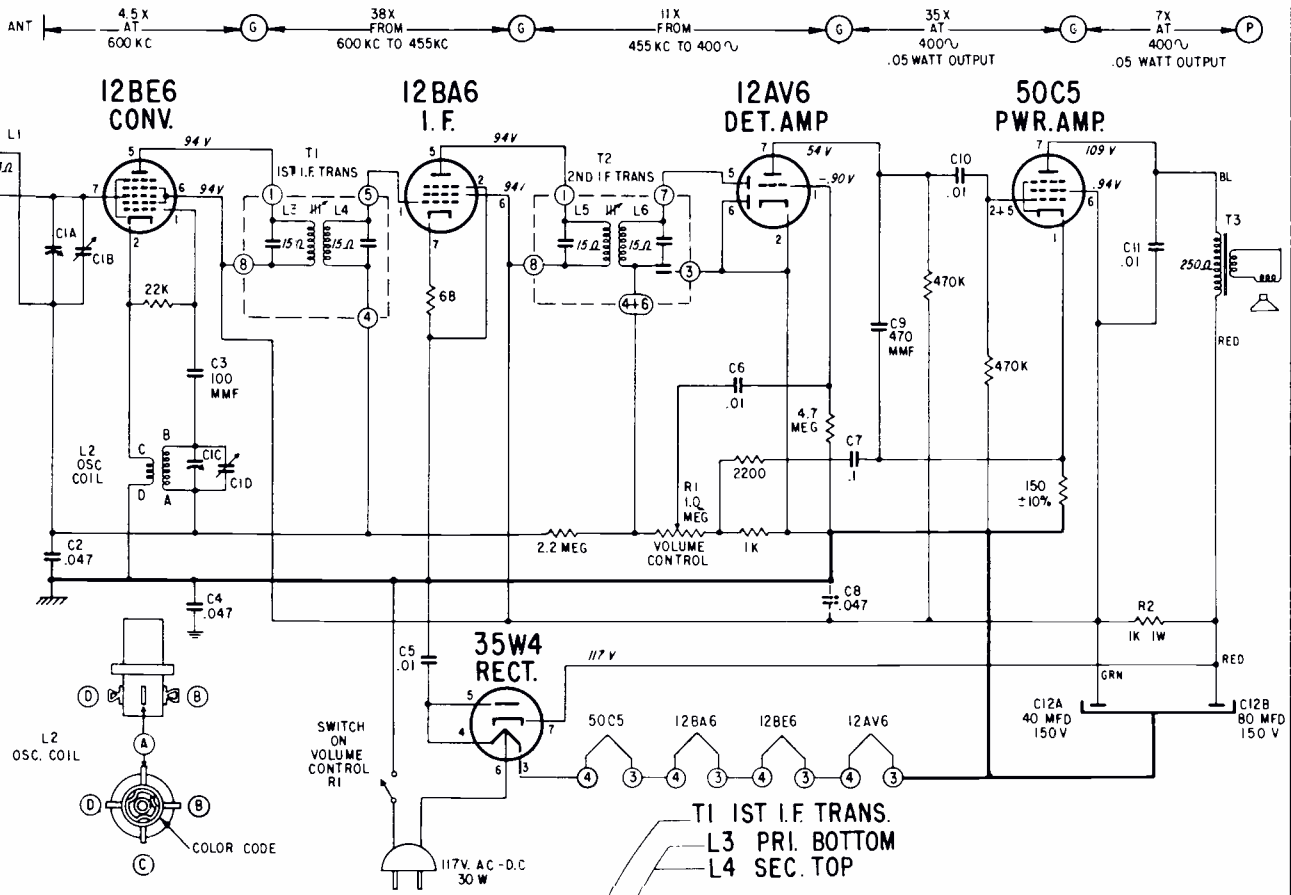
ALIGNMENT PROCEDURE

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

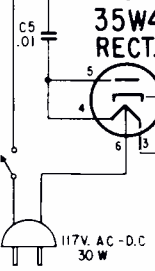


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

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



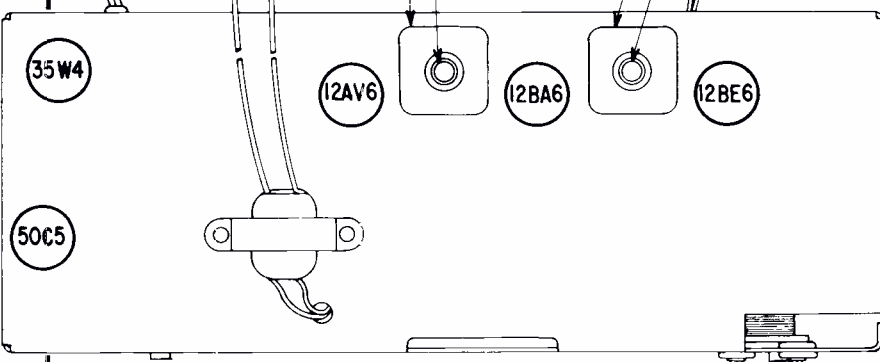
SPEAKER LEADS



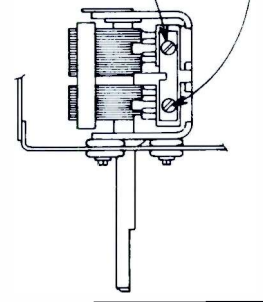
T2 2ND I.F. TRANS
L5 PRI. BOTTOM
L6 SEC. TOP

ANTENNA LEADS

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



CID OSCILLATOR TRIMMER
CIB ANTENNA TRIMMER

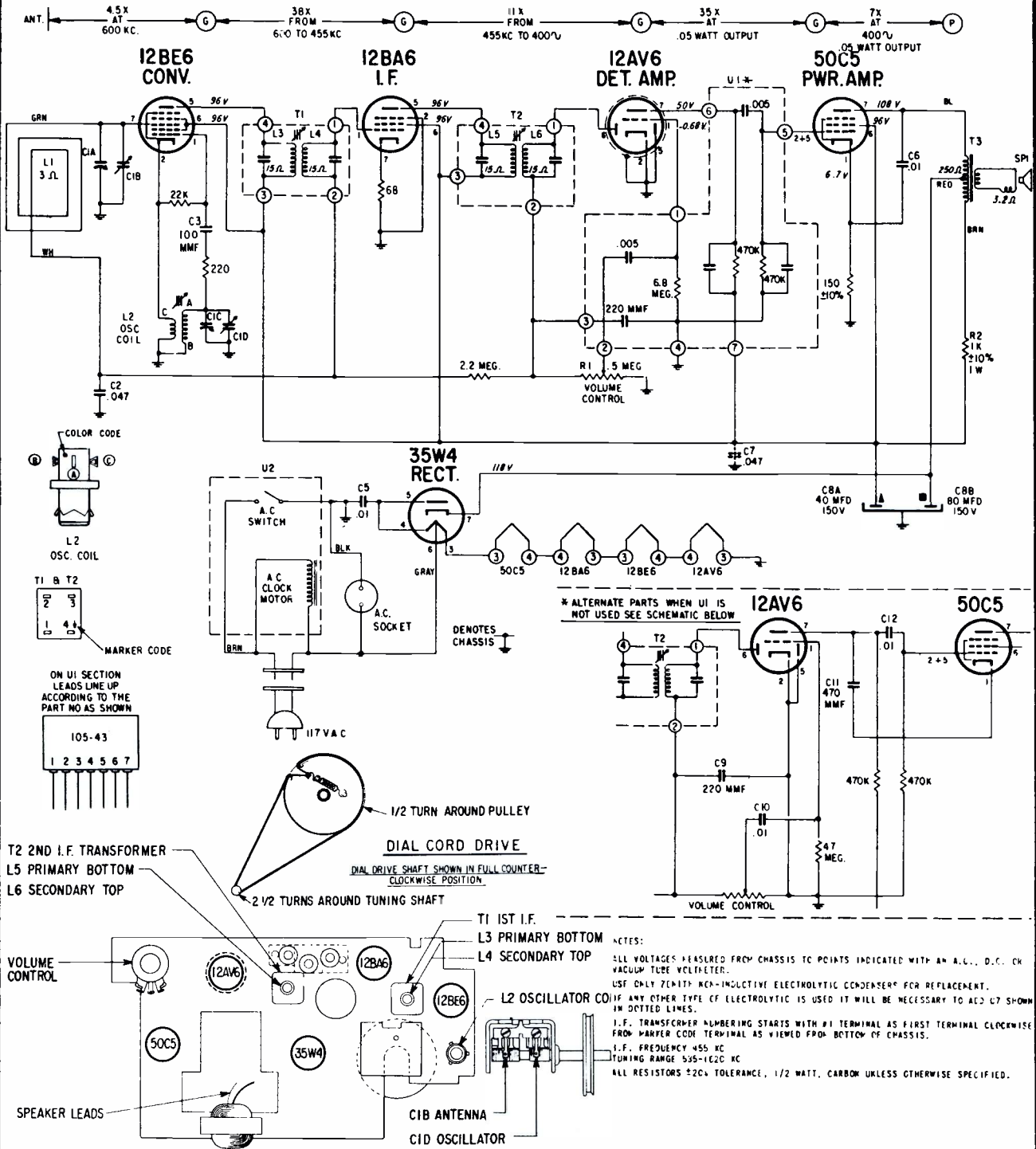


ALIGNMENT PROCEDURE

| 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. | 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

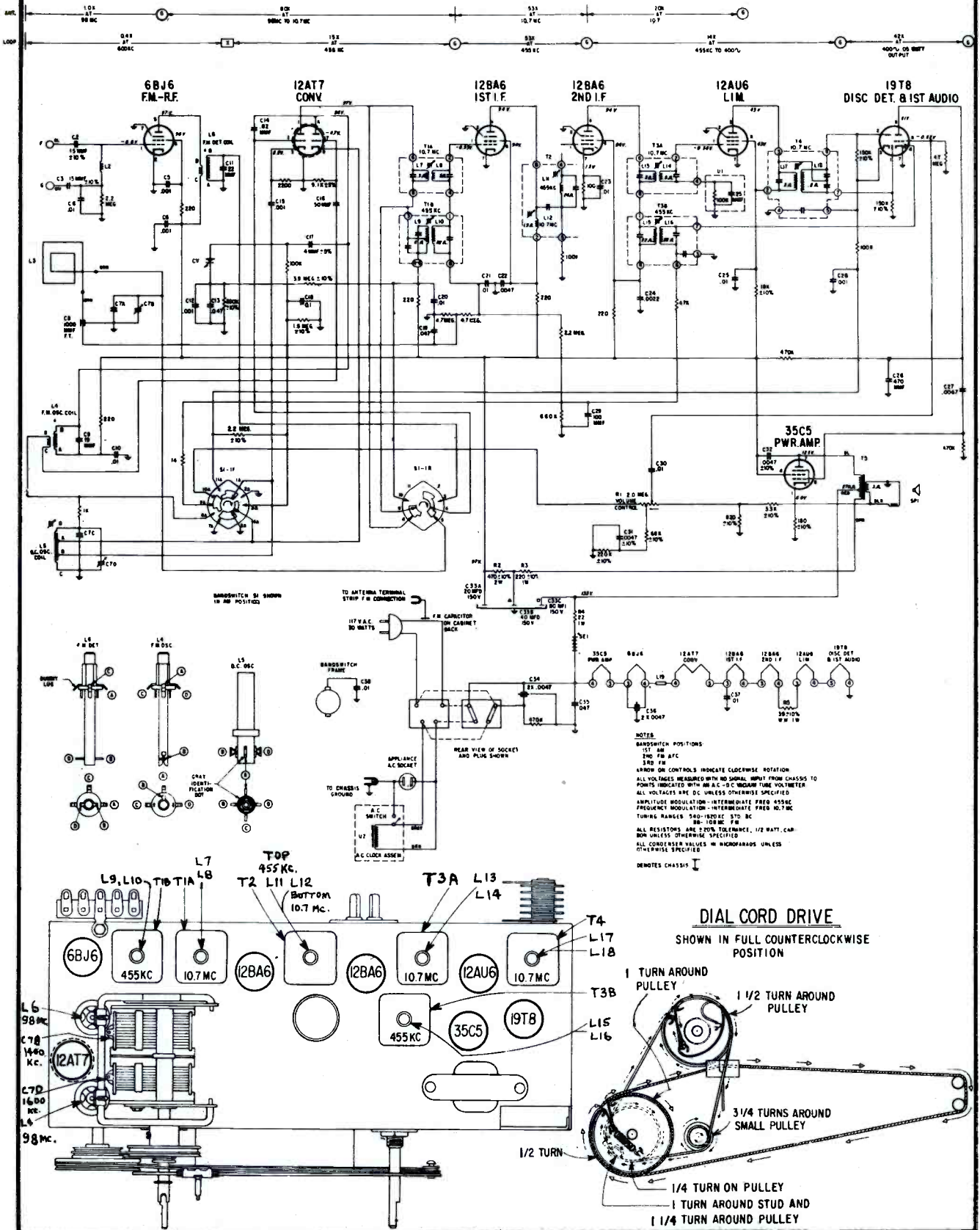
ZENITH RADIO Chassis 5G09, Models G516C, L, V, W



Alignment Procedure

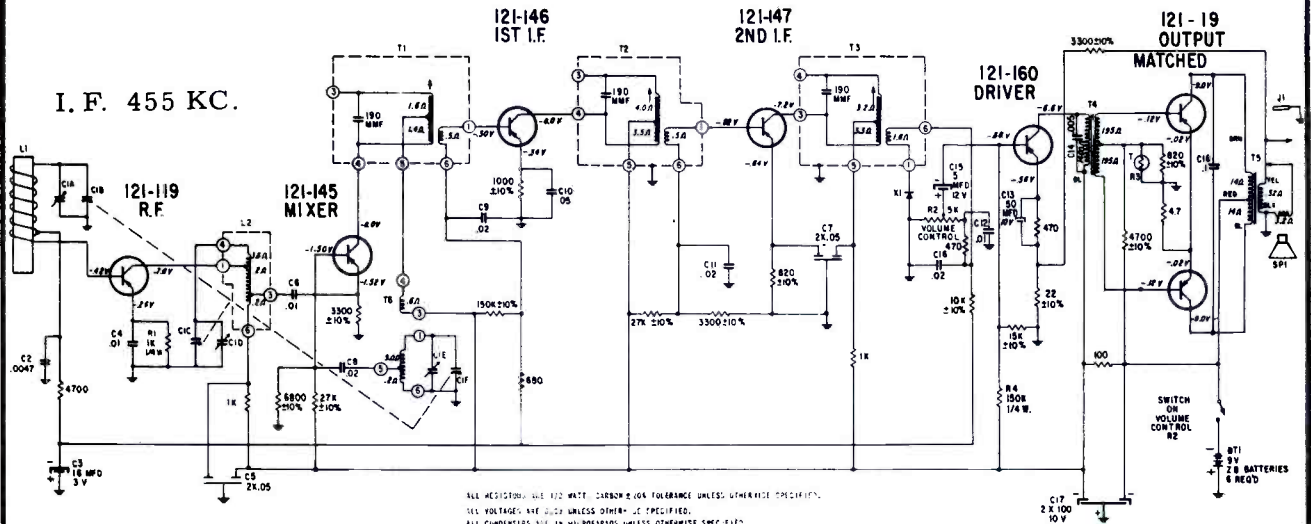
| OPERATION | CONNECT OSCILLATOR TO | DUMMY ANTENNA | INPUT SIG. FREQUENCY | SET DIAL AT | TRIMMERS | PURPOSE |
|-----------|--|---------------|----------------------|-------------|-------------|------------------------------|
| 1 | Converter Grid | .05 Mfd. | 455 Kc. | 600 Kc. | L3, 4, 5, 6 | For I.F. Alignment. |
| 2 | One Turn Loop Coupled Loosely to Wave Magnet | --- | 1600 Kc. | 1600 Kc. | CID | Set Oscillator to Dial Scale |
| 3 | | --- | 1400 Kc. | 1400 Kc. | C1B | Align Antenna Stage |

ZENITH MODEL F728C, L & W, CHASSIS 7F03

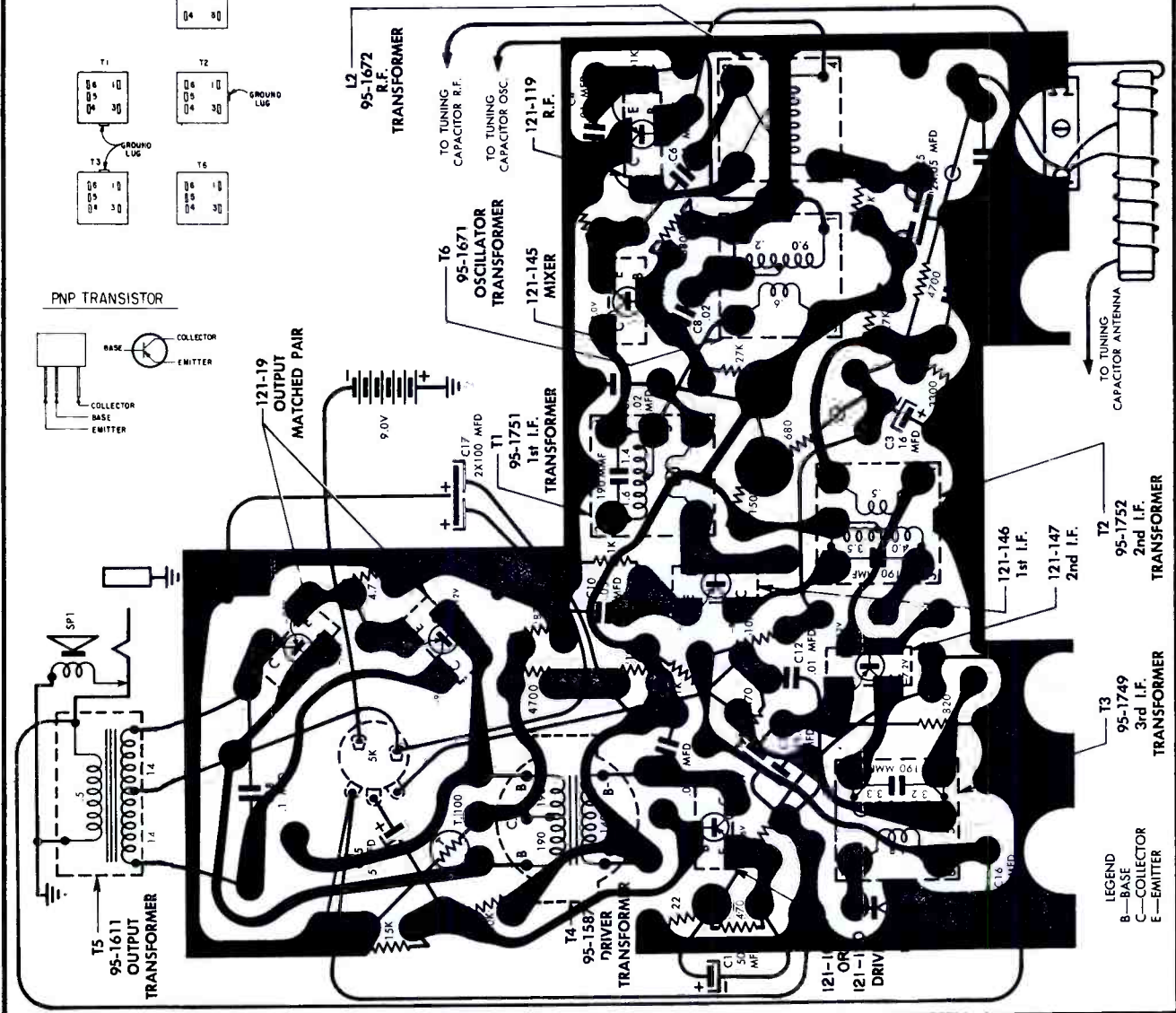
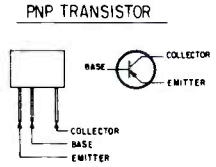
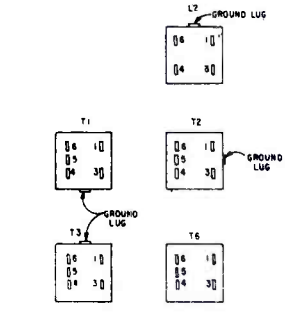


VOLUME R-21, MOST-OFTEN-NEEDED 1961 RADIO SERVICING INFORMATION

ZENITH RADIO Chassis 7FT45Z1, Model "Royal 475"



ALL RESISTORS ARE 1/2 WATT CARBON 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL PRESENT USING
 AN AC-DC OR VACUUM TUBE VOLTMETER.



LEGEND
 B—BASE
 C—COLLECTOR
 E—EMITTER

CHASSIS, WIRING AND COMPONENTS VIEWED FROM WIRING SIDE

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

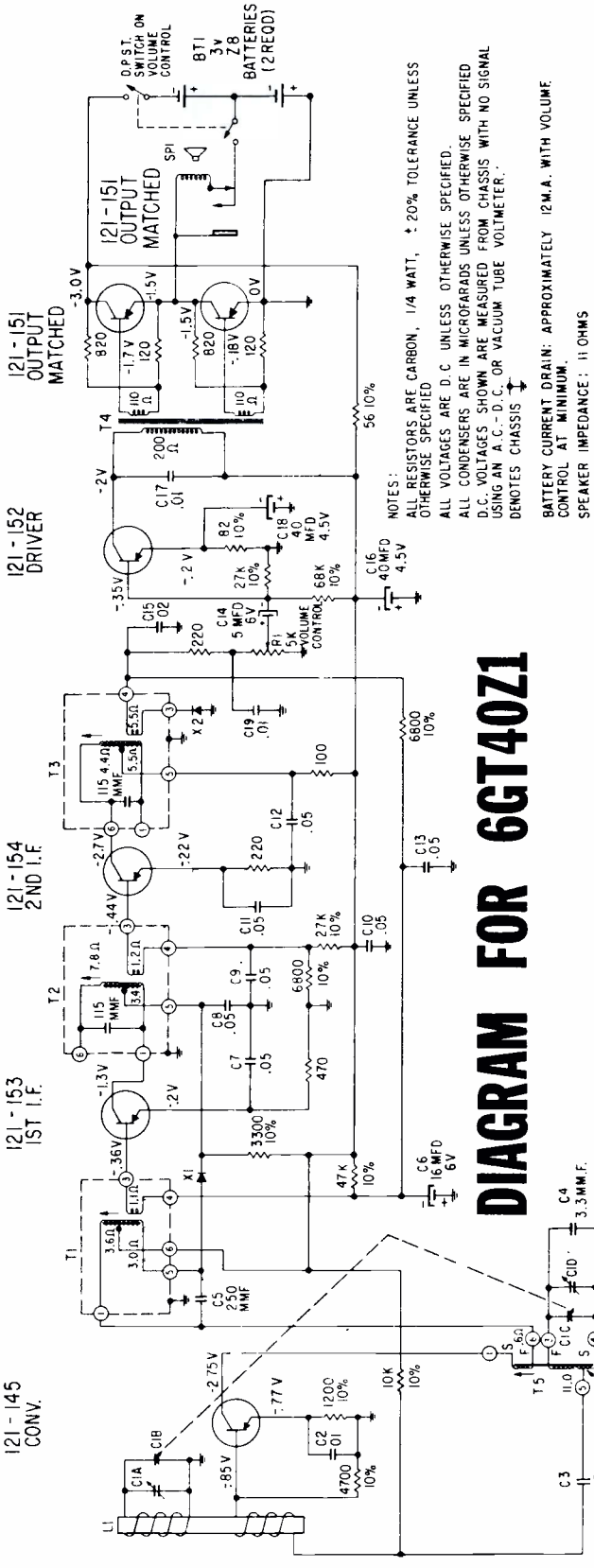


DIAGRAM FOR 6GT40Z1

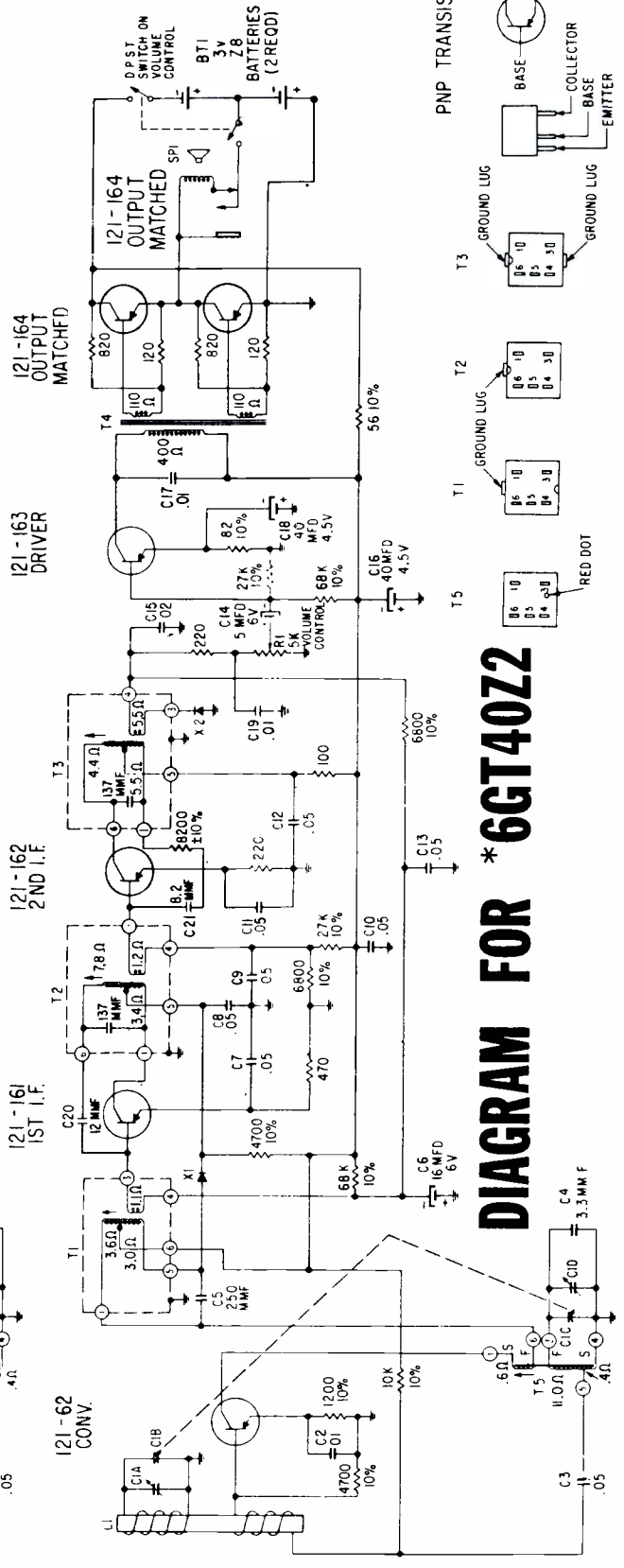


DIAGRAM FOR *6GT40Z2

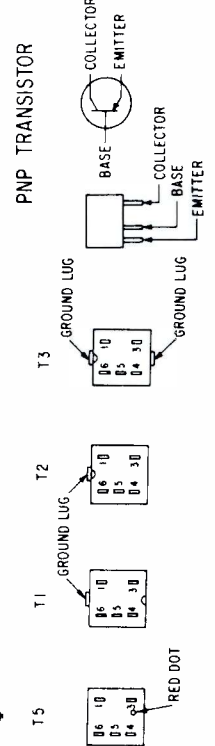
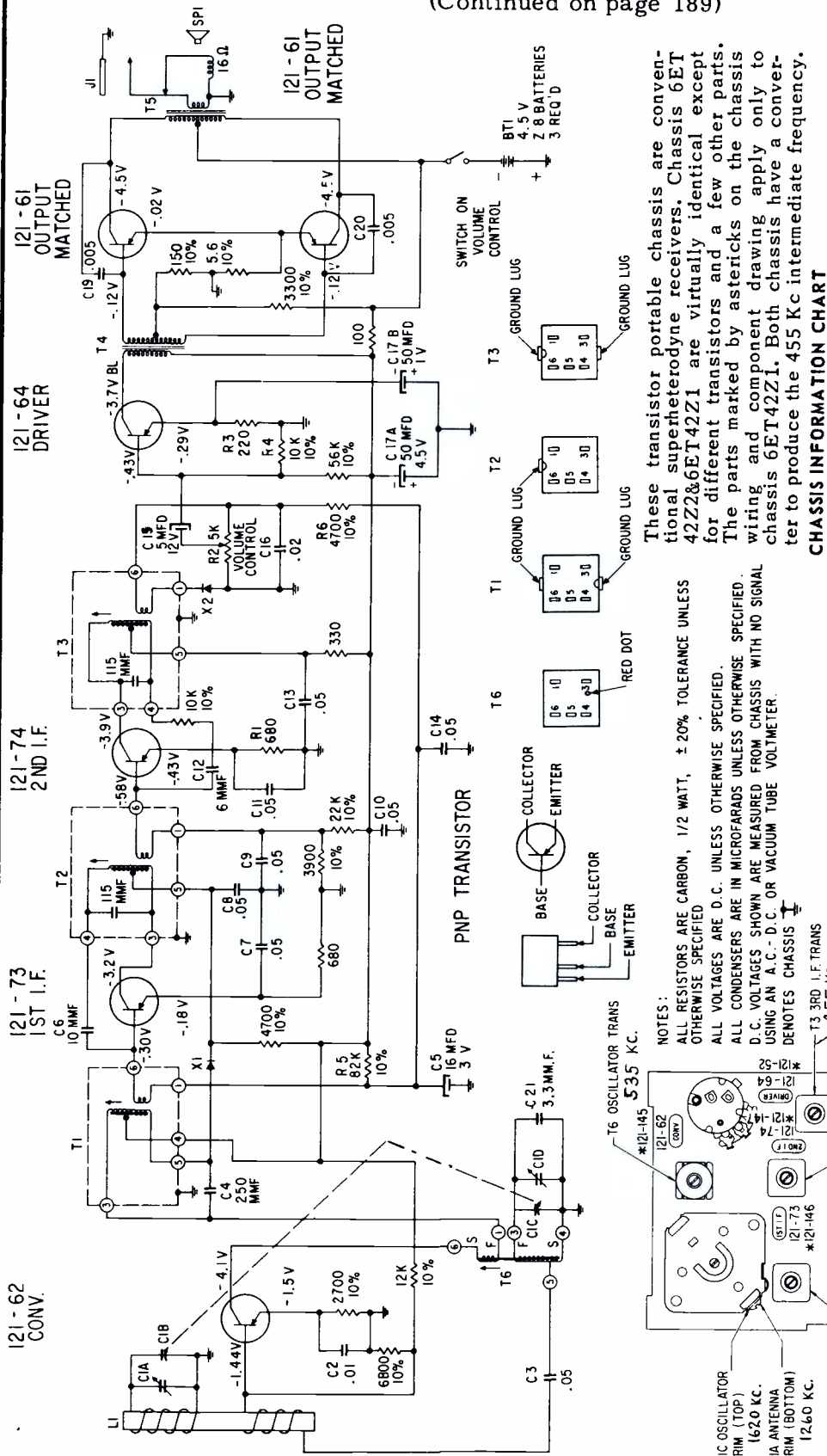


DIAGRAM FOR 6ET42Z2

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

ZENITH Chassis 6ET42Z1 & 6ET42Z2, Model "Royal 100"
(Continued on page 189)

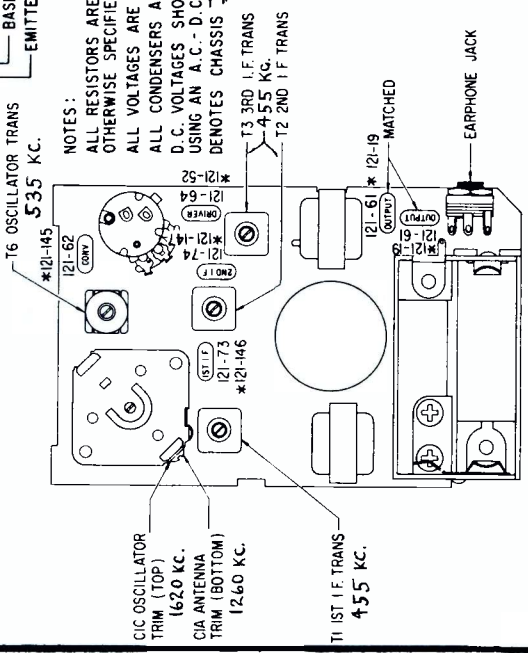


These transistor portable chassis are conventional superheterodyne receivers. Chassis 6ET42Z2 & 6ET42Z1 are virtually identical except for different transistors and a few other parts. The parts marked by asterisks on the chassis wiring and component drawing apply only to chassis 6ET42Z1. Both chassis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

CHASSIS INFORMATION CHART

| Chassis | Transistor Layout Label Color | Part No. | Conv. | 1st I.F. | 2nd I.F. | Crystal Diode Detector | Driver | Output-Output | Supplier |
|----------|-------------------------------|-------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|--|---------------------|
| *6ET42Z1 | Red 102-7651 | Zenith RETMA Type | 121-145 2N1108 PNP | 121-146 2N1110 PNP | 121-147 2N1111 PNP | 103-19 1N87G | 121-52 R120 PNP | 121-19 R16 Matched Pair PNP | 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 | R.C.A. |

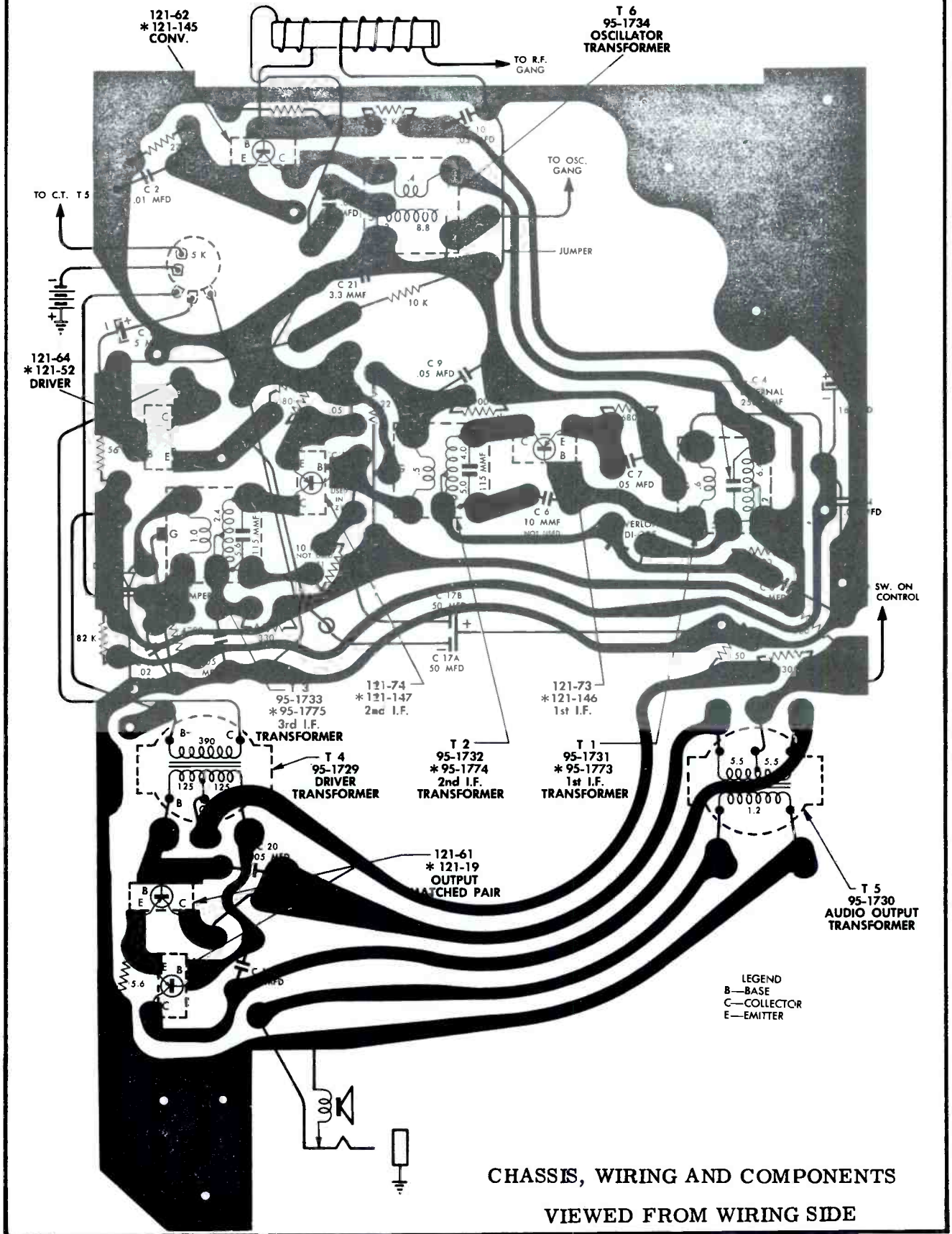
NOTES:
ALL RESISTORS ARE CARBON, 1/2 WATT, ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.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



TRANSISTOR & TRIMMER LAYOUT FOR CHASSIS 6ET42Z2 & 6ET42Z1

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

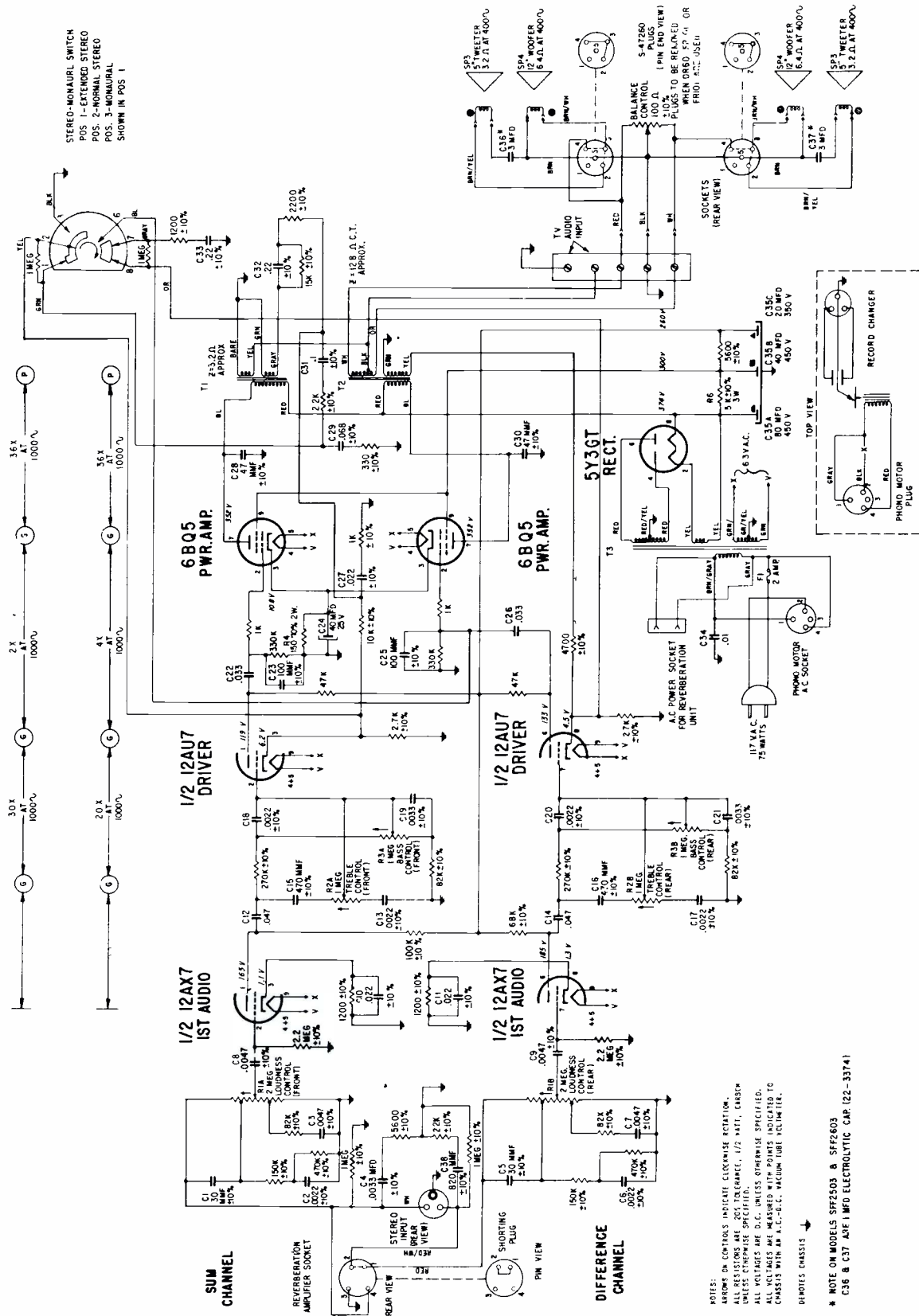
ZENITH Chassis 6ET42Z1 & 6ET42Z2, Model "Royal 100" Continued



CHASSIS, WIRING AND COMPONENTS
VIEWED FROM WIRING SIDE

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

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



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

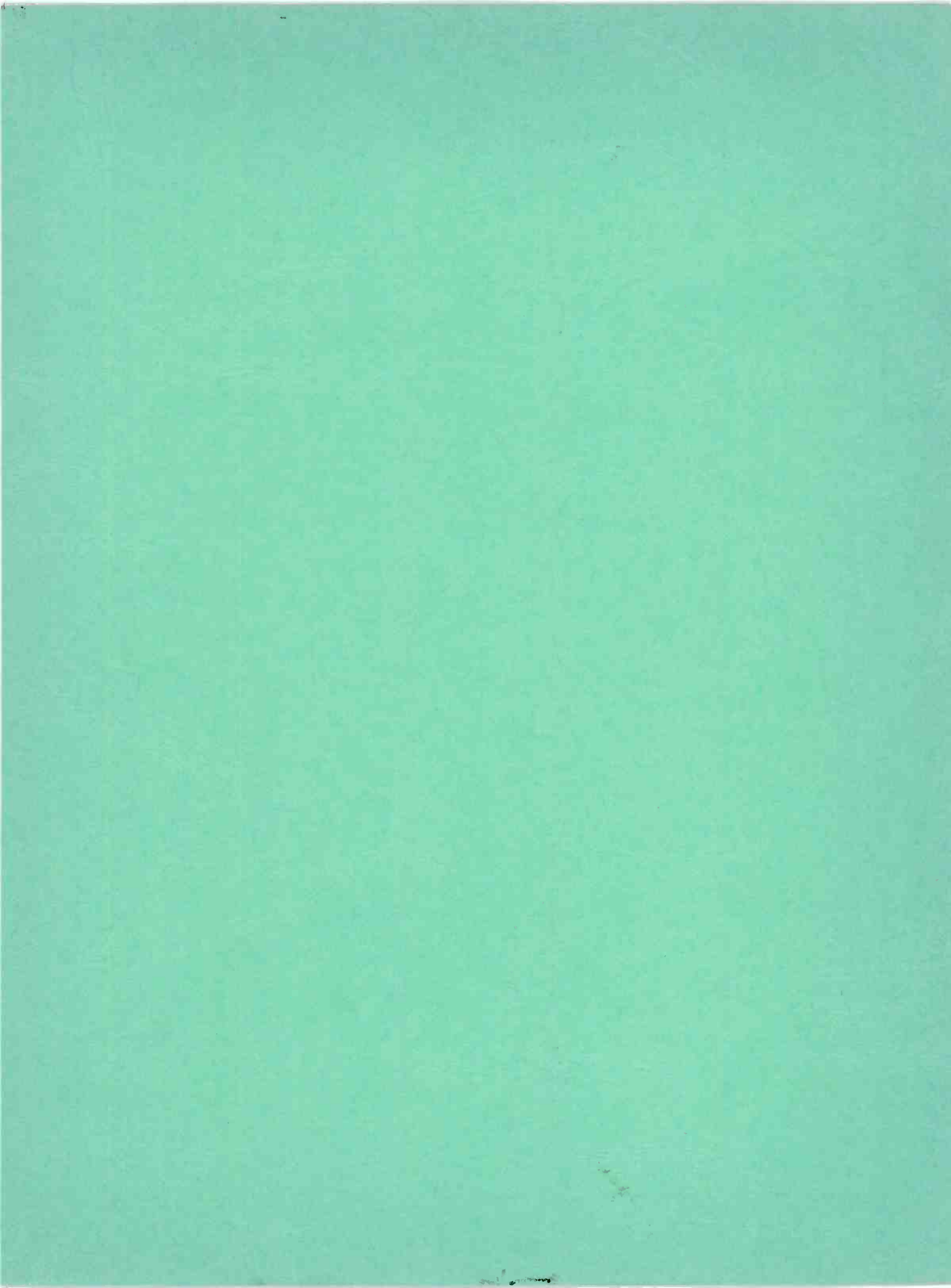
Index

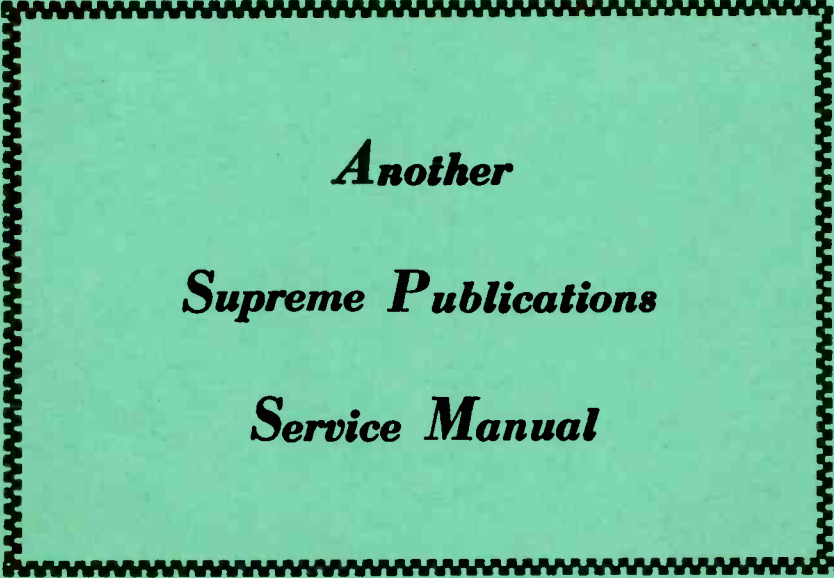
| Admiral Corp. | Admiral, Cont. | Chevrolet + | Gamble-Skogmo | Motorola, Cont. | Motorola, Cont. |
|---------------|------------------|----------------------|-----------------------|-----------------|---------------------|
| 3N1A 3 | Y4072 3 | 988414 34 | RA 48-8182A 46 | A11A 97 | 109 80 |
| 4E3A 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 | <u>Coronado</u> | | C10P 95 | 114 80 |
| 4L26B 6 | Y4083 5 | RA 48-8182A 46 | <u>General</u> | C10W 95 | 309 80 |
| 4L27B 6 | Y4131 9 | RA 50-8231 47 | <u>Electric</u> | C11B 95 | 310X 82 |
| 4L28B 6 | Y4132 9 | RA 50-8232 47 | T100A 48 | C11G 95 | 311 80 |
| 4L29B 6 | Y4159 9 | <u>Delco</u> | T145A 49 | C11S 95 | 311X 83 |
| 4N3 4 | | AC-2977 26 | T146A 49 | A12N 104 | 314L,V 80 |
| 4P3, -A 7 | <u>American</u> | AC-2978 27 | T150B 50 | C12B 96 | 500X 79 |
| 5B5B 8 | <u>Motors</u> | AC-3084 26 | T151B 50 | C12P 96 | HS-746 85 |
| 5B5C 8 | 8990831 67 | AC-3085 27 | T165A 51 | C12W 96 | HS-775 86 |
| 5K5A 9 | 8990832 66 | AC-3086 26 | T166A 51 | 13MA 66 | HS-776 86 |
| 5K5B 9 | 8990833 70 | AC-3087 27 | T210B 52 | 13MAM 67 | HS-778 86 |
| 5M5 10 | | 980051 28 | C403A 48 | 14MF 68 | HS-795 88 |
| 5R5 11 | <u>Arvin</u> | 980052 29 | P790A, B 53 | 14MPM 68 | HS-796 89 |
| 5S5 12 | 5R65 22 | 980132 31 | P791A, B 53 | 14MR 70 | HS-797 90 |
| 6T5 13 | 5R67 22 | 980134 32 | P805A 54 | X14B 88 | HS-798 91 |
| 5V5 14 | 10R16 19 | 980135 29 | P806A 54 | X14E 88 | HS-799 92 |
| 7A2 16 | 10R18 19 | 988062 26 | P807A 54 | X14R 88 | HS-800 93 |
| 7D2 17 | 10R32 20 | 988275 26 | P807B 55 | X14W 88 | HS-802 94 |
| 8D2 18 | 10R38 20 | 988276 30 | P808A 54 | SF15, -1 110 | HS-813 95 |
| Y853C 8 | 10R39 20 | 988413 33 | P808B 55 | SF15-2 110 | HS-814 95 |
| Y865B 8 | 30R12 21 | 988414 34 | P815A 56 | X15A 89 | HS-815 96 |
| Y866B 8 | 30R18 21 | 988460 26 | P816A 56 | X15E 89 | HS-819 98 |
| Y979 9 | 60R23 23 | 988468 35 | P830C 57 | X15N 89 | HS-820 100 |
| Y1002 9 | 60R28 23 | 989397 31 | P830E 58 | X16B 90 | HS-821 102 |
| Y1009 9 | 60R29 23 | 989392 36 | P831C 57 | X16G 90 | HS-824 97 |
| Y1021 9 | 60R47 23 | 989693 37 | P831E 58 | X16N 90 | HS-825 104 |
| Y1022 9 | 60R49 23 | 989792 26 | RP1100A 59 | X17B 91 | HS-827 105 |
| Y1023 9 | 60R58 24 | <u>Emerson Radio</u> | RP1112A 60 | X17N 91 | HS-828 105 |
| Y1189A 4 | 60R63 24 | 907B 39 | RP1127A 59 | X17R 91 | HS-829 106 |
| Y2061 16 | 60R69 24 | 914B 44 | RP1128A 59 | XT18B 94 | HS-830 106 |
| Y2063 16 | 60R73 24 | 920 40 | <u>Hitachi, Ltd.</u> | XT18S 94 | HS-831 107 |
| Y2067 16 | 60R79 24 | 925 40 | TH-627R 61 | SH19 111 | HS-832 107 |
| Y2068 16 | 90P53 25 | 926B 39 | <u>Magnavox</u> | X19A 92 | HS-833 108 |
| Y2119 17 | 90P58 25 | 933B 41 | 65-01 62 | X19E 92 | HS-835 109 |
| Y2127 18 | 1.42202 19 | 935B 41 | <u>Montgomery</u> | L20E 93 | HS-860 110 |
| Y2993 7 | 1.47001 22 | 937B 41 | <u>Ward</u> | SH20 105 | HS-861 111 |
| Y2996 7 | 1.48101 21 | 938B 42 | GEN-1667A 64 | SH21 106 | HS-869 111 |
| Y2998 7 | 1.48102 21 | 944B 44 | GEN-1668A 64 | X21W 112 | HS-876 112 |
| Y2999 7 | 1.49201 23 | 977 43 | GEN-203CA 63 | SH22 107 | HS-898 110 |
| Y3021 11 | 1.49501 25 | 120478B 39 | GEN-203CB 63 | SK32W 86 | FM-900 84 |
| Y3027 11 | 1.49801 20 | 120482B 44 | <u>Motorola, Inc.</u> | SK33W 86 | 1500 94 |
| Y3037 4 | 1.50101 24 | 120483B 44 | B1J 98 | SK35W 86 | <u>Oldsmobile</u> |
| Y3037A 7 | 1.50300 24 | 120494B 40 | B1W 98 | SK39MB 86 | 989387 31 |
| Y3038 4 | 1.50401 23 | 120505B 39 | B2G 100 | SK40, -1 108 | 989392 36 |
| Y3046 12 | | 120522B 44 | B2N 100 | SK41 108 | <u>Packard-Bell</u> |
| Y3048 12 | <u>Buick</u> | 120523B 44 | B2W 100 | SK43, -1 109 | 5R8 113 |
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| Y4071 3 | 988413 33 | | | CTM61XA 78 | |

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