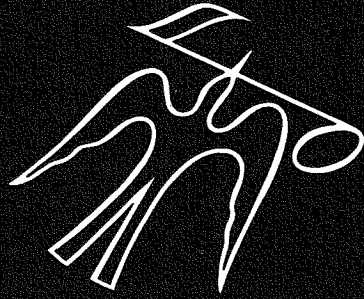


# SERVICE MANUAL



# The Fisher<sup>®</sup> 30 35A 50



WORLD LEADER IN HIGH QUALITY STEREO

## test equipment and service tips

The following equipment is required to completely test and align modern high-fidelity amplifiers, tuners, and receivers.

|   |   |
|---|---|
| Line Voltage Autotransformer or Voltage Regulator     | 10.7 MHz Sweep Generator                                    |
| DC Vacuum Tube Volt ohmmeter                          | Multiplex Generator<br>(preferably with RF output)          |
| Accurately Calibrated AC Vacuum Tube Voltmeter        | 455 kHz Sweep Generator                                     |
| Oscilloscope ((Flat to 100 kHz Minimum)               | Ferrite Test Loop Stick                                     |
| Low-Distortion Audio (Sine Wave) Generator            | 2 – Full Range Speakers for Listening Tests                 |
| Intermodulation Distortion Analyzer                   | Stereo Source – Turntable, Tape Recorder, etc.              |
| Harmonic Distortion Analyzer                          | Soldering Iron with Small Tip, Fully Insulated from AC Line |
| 2 – Load resistors, 8-Ohms, 100 Watt (Minimum Rating) | Suction Desoldering Tool                                    |
| AM/FM Signal Generator                                |   |

**CAUTION:** This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistor equipment and printed circuitry.

Many of these items are included only as a reminder — they are normal procedures for experienced technicians. Shortcuts may be taken, but these often cause additional damage to transistors, circuit components, or printed circuit boards.

**SOLDERING:** A well-tinned, hot, clean soldering iron tip will make soldering easier, without causing damage to the printed circuit board or the components mounted on it. Regular use of a sponge cleaner will maintain a clean soldering surface. The heat available at the tip, (not the wattage of the iron) is important. Some 50-watt irons reach temperatures of 1,000° F, while others will hardly melt solder. Small-diameter tips should be used for single solder connections, pyramid and chisel tips for large areas.

Always disconnect the AC power cord from the line when soldering. Turning the power switch OFF is not sufficient. Power-line leakage paths, through the heating element of the iron, may destroy transistors.

**PARTS REMOVAL:** If a part is not being returned for in-warranty factory replacement, it may be cut in half (with diagonal cutting pliers) to make removal easier. Multiple terminal parts, such as IF transformers, or electrolytic capacitors, should be removed using special de-soldering tips made especially for this purpose. Removing solder from terminals, reduces the possibility of breaking the printed circuit board when the part is removed.

**ACCIDENTAL SHORTS:** A clean working area, free of metal particles, screws, etc., is an important preventive in avoiding servicing problems. Screws, removed from the chassis during servicing, should be stored in a box until needed. While a set is operating, it takes only an instant for a base-to-collector short to destroy a transistor (and others direct-coupled to it). In the time it takes for a dropped machine screw, washer, or screwdriver, to contact a pair of socket terminals (or terminal and chassis), a transistor can be ruined.

**SOLID-STATE DEVICES:** Integrated Circuits contain the equivalent of many circuit parts, including transistors, diodes, resistors, and capacitors. The preferred troubleshooting procedure requires isolating the trouble to one stage using AC signal tracing methods. Once the suspected stage is located, the DC voltages at the input and output leads are measured to give an accurate indication of the operating conditions of the IC. DO NOT use an ohmmeter to check continuity with the IC mounted on the printed circuit board. Forward biasing the internal junctions within the IC may burn out the transistors. Do not replace a defective IC until all external resistors, capacitors, and transformers are checked first, to prevent the replacement IC from failing immediately due to a defect in the connecting components. Solder and unsolder each lead separately using a pliers or other heat sink on the lead to prevent damage from excessive heat. Check that the leads are

connected to the correct locations on the printed circuit board before turning the set on.

Whenever possible, a transistor tester should be used to determine the condition of a transistor or diode. Ohmmeter checks do not provide conclusive data, and may even destroy the junction(s) within the device.

Never attempt to repair a transistor power amplifier module until the power supply filter-capacitors are fully discharged.

If an output or driver transistor becomes defective (opens or shorts), always check ALL direct-coupled transistors and diodes in that channel. In addition, check the bias pot., and other parts in the bias network, before installing replacement transistors. All output and driver transistors in one channel may be destroyed if the bias network is defective. After parts replacement, always check the bias adjustment for specified idling current.

In some applications, replacement of transistors must be made from the same beta group as the original type. The beta group is indicated by a colored marking on the transistor. Be sure to include this information when ordering replacement transistors.

When mounting a replacement power transistor, be sure the bottom of the flange, mica insulator, and the surface of the heat sink, are free of foreign matter. Dust and grit will prevent flat contact, reducing heat transfer to the heat sink. Metallic particles can puncture the insulator, cause a short, and destroy the transistor.

Silicone grease must be used between the transistor and the mica insulator, and between the mica and the heat sink, for best heat transfer. Use Dow-Corning DC-3, or an equivalent compound made for power transistor heat conduction.

Use care when making connections to speakers and output terminals. To reduce the possibility of shorts, lugs should be used on the exposed ends, or stranded wire should be tinned to prevent frayed wire ends. Current in the speakers and output circuitry is quite high — poor contacts, or small sized wire, can cause significant power losses in the system. For wire lengths greater than 30 feet, 16 AWG, or heavier, should be used.

**VOLTAGE MEASUREMENTS:** All voltages are measured with the line voltage adjusted to 120 volts. All measured voltages are  $\pm 10\%$ . DC voltages are measured to ground with a VTVM, with no signal input unless otherwise noted. AC signal voltages are measured under the conditions specified on the schematic.

**ALIGNMENT PROCEDURES:** DO NOT attempt realignment unless the required test equipment is available, and the alignment procedure is thoroughly understood.

BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, FISHER RADIO RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION.

|                                 | PAGE     |                              | PAGE       |
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| <b>dial stringing</b>           | <b>4</b> | <b>fm/am tuner</b>           | <b>8-9</b> |
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## REMOVING MOTORBOARD

To gain access to the chassis for servicing, remove the motorboard using the following procedure:

- (1) Unplug AC power cord.
- (2) Unscrew the two large shipping screws (near the left-rear and right-front corners of the turntable baseplate) fully out to lock the changer to the motorboard.
- (3) Remove the four screws (two on each side) holding the motorboard to the wood side-panels.

**30 & 35A** Lift motorboard at rear (changer attached) and unplug power and audio cables from underside of changer.

**50** Remove two additional screws located between changer and recorder. Lift motorboard at rear (changer and recorder attached) and unplug power and audio cables from underside of changer. Unplug power and audio cables from back of recorder. Label recorder's audio cables for reference.

- (4) Remove motorboard from top of chassis.
- (5) To reinstall the motorboard, reverse procedure. Red plugs designate right channels.

## REMOVING DRESS PANEL

- (1) Unplug AC power cord.
- (2) Gently pull VOLUME, BALANCE, BASS, TREBLE, SELECTOR, and TUNING knobs from shafts. Remove hex nuts and remove panel by pulling forward.
- (3) Reverse procedure for reassembly.

## REMOVING P.C. BOARDS

To remove a board from nylon mounts, squeeze the loop of each mount (using pliers), and lift each corner of board. To remount board, align holes over clips and press firmly.

To remove the TUNER board, remove the seven mounting screws and washers. To gain access to the circuit side, remove cover plate on underside of chassis.

To remove the CONTROL AMPLIFIER board, use the following procedure:

- (1) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
- (2) Remove hex nuts from BASS, TREBLE, and BALANCE controls and lift out board.
- (3) Reverse procedure to reinstall board.
- (4) Reinstall dress panel.

## REPLACING DIAL GLASS

- (1) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
- (2) Carefully remove foam strips at ends of glass. Strips may be reused with replacement glass.
- (3) Carefully remove top retaining clips. Slide out glass.
- (4) Reverse procedure using replacement glass (AS4043-108).

## REPLACING DIAL LAMPS

- (1) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
- (2) Remove metal shade and defective lamp. Install replacement lamp (#1847 O.F.; FR 150009-8). Replace and adjust shade to direct light toward edge of glass.
- (5) Reinstall dress panel.

## REPLACING METER

- (1) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (2) Unsolder the two leads from meter terminals.

**WARNING:** Damage to the meter may result from excessive heating of terminals. When soldering or unsoldering, use a pair of pliers (as a heat sink) to hold each terminal.

- (3) Gently lift meter retainers and remove meter. Slide replacement (FR No. MC21611) behind retainers into panel cutout. Solder meter leads.
- (4) Reinstall motorboard.

## REPLACING STEREOBEACON LAMP

- (1) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (2) Unsolder the two leads from lamp assembly.

**WARNING:** Damage to the nylon holder may result from excessive heating of terminals. When soldering or unsoldering, use a pair of pliers (as a heat sink) to hold each terminal.

- (3) Pry out nylon holder. Press replacement assembly (FR AS51314) into mount and solder leads.
- (4) Reinstall motorboard.

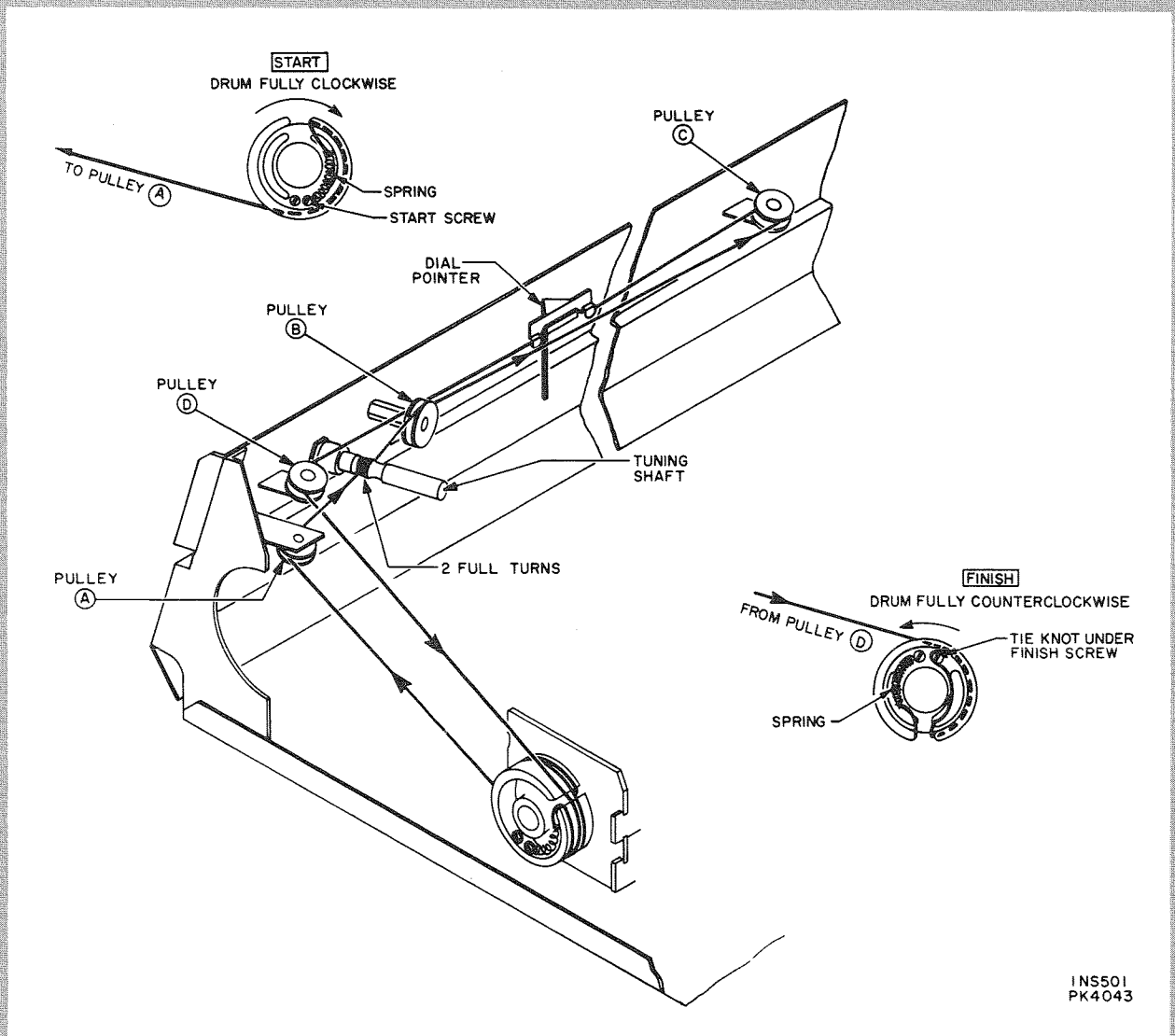
- (1) Remove motorboard and dress panel. Refer to REMOVING MOTORBOARD and REMOVING DRESS PANEL procedures.
- (2) Remove dial pointer from old dial cord.
- (3) Prop unit on its left side. Remove the right wood side-panel by removing the two slotted screws near the feet.
- (4) Rotate tuning capacitor fully CW. Loosen machine screws in drum and remove old dial cord.
- (5) Tie end of new cord to end of spring. Fasten spring to START screw inside drum. See illustration.
- (6) Run cord through slot in rim and wrap ½ turn CW around drum. Guide cord around pulley "A", and wrap 2 full turns (CCW viewed from back) around tuning shaft.
- (7) Guide cord over "B", and around pulleys "C" and "D". Rotate gang fully CCW, allowing cord to wind on drum.
- (8) Run cord over top of drum, around the other side, into rim slot. Tie a half-knot around FINISH screw.
- (9) Pull cord taut and tighten screw. Turn tuning shaft CW and CCW to distribute tensioning.
- (10) Repeat (9) until spring is tensioned.
- (11) Place pointer on rail and slip cord under tabs. Turn tuning shaft fully CCW. Slide pointer to (0) mark and cement to cord.
- (12) Check dial calibration.
- (13) Reinstall dress panel, side panel, and motorboard.

## CAUTION:

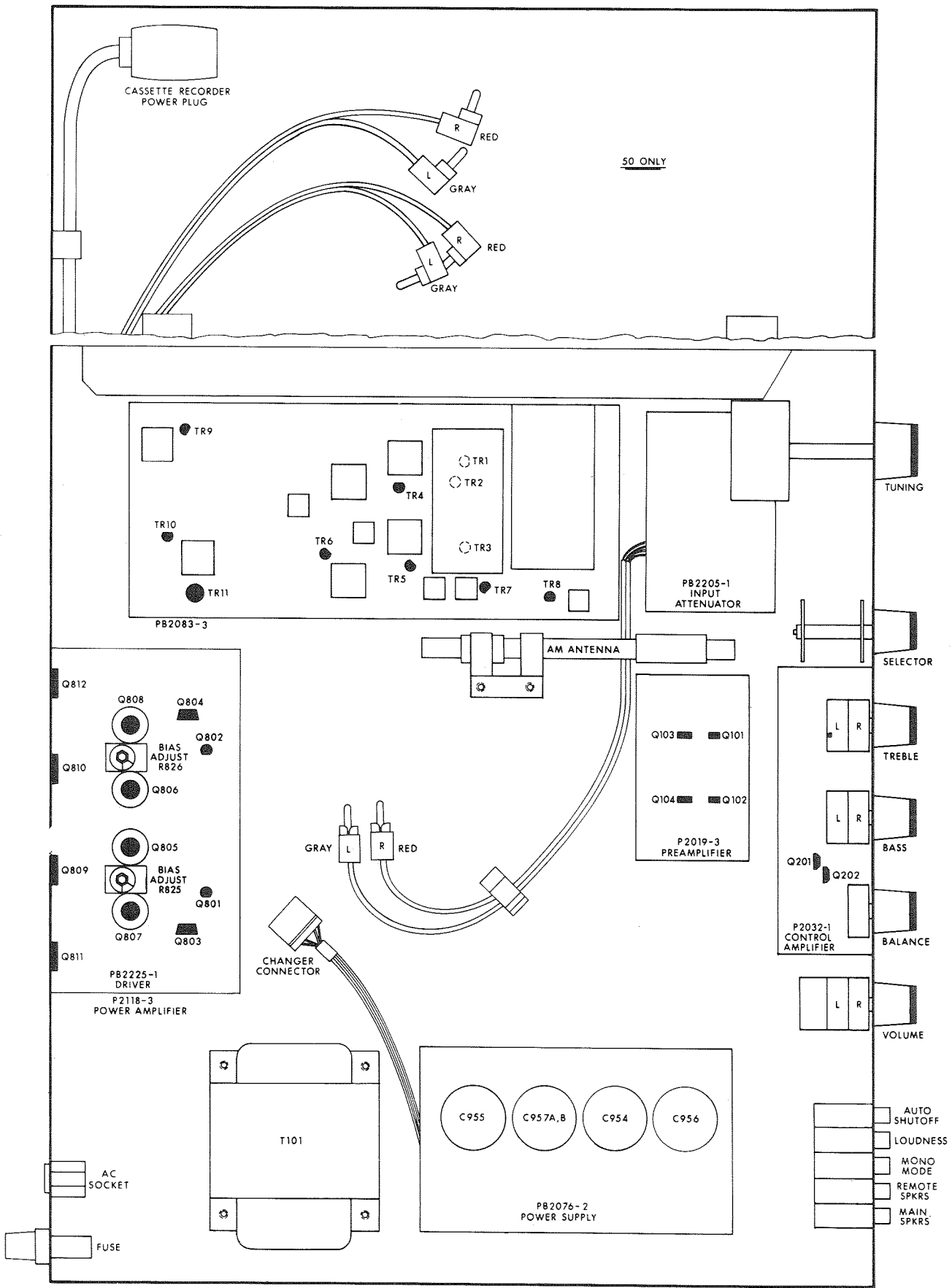
- (A) Measure the power of one channel at a time.
- (B) Limit measurements to 10 minutes.
- (C) Use a precision load with a 50-watt minimum rating.

Set BALANCE, BASS, and TREBLE controls to NORMAL. Set SELECTOR switch to AUX. Depress MAIN SPKRS switch. Unplug AC power cord.

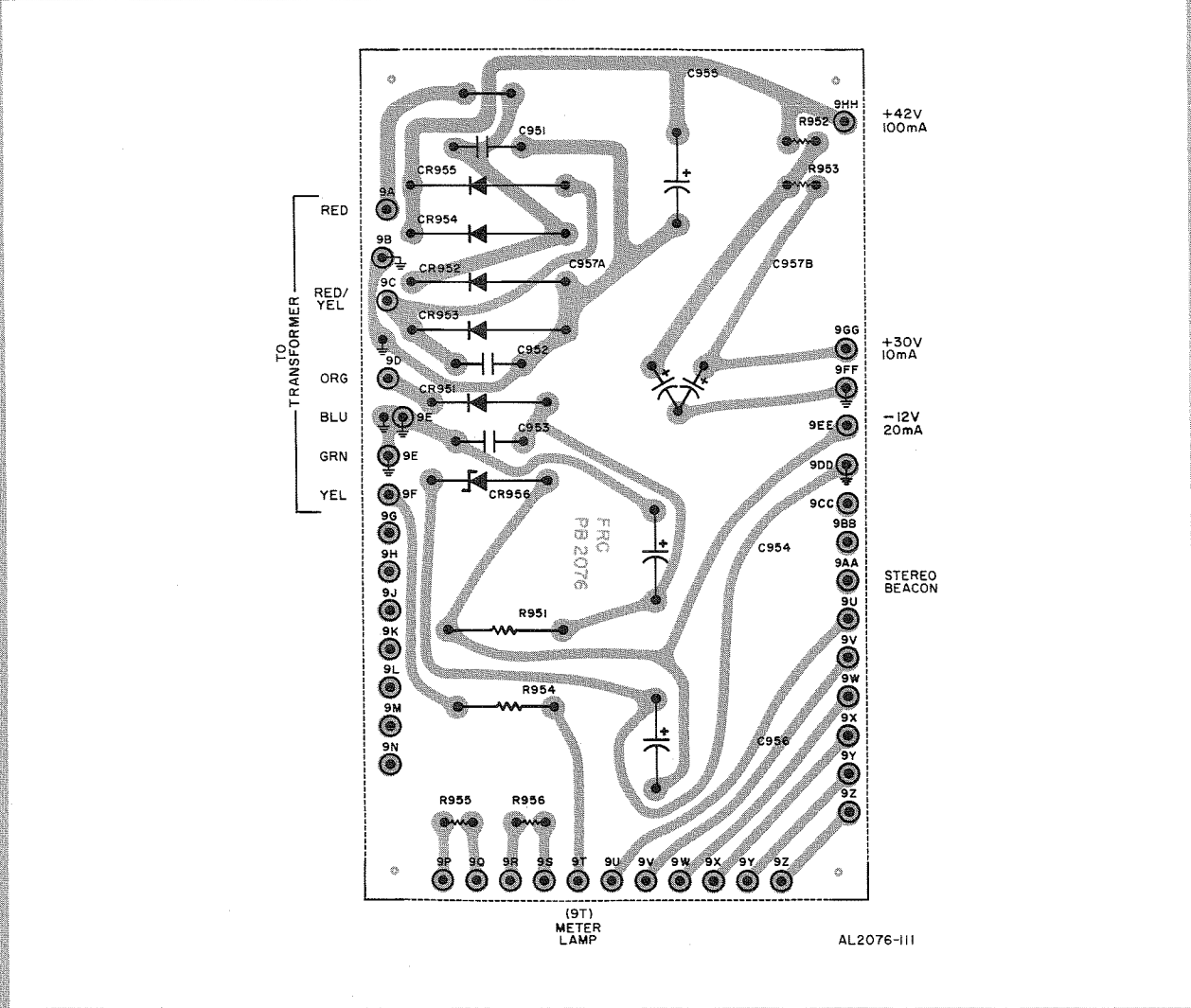
- (1) Connect a low-distortion audio generator to the LEFT AUX IN jack. Set generator frequency to 1,000 Hz, and output level to minimum.
- (2) Connect an 8-ohm load between the LEFT SPKRS MAIN and COMMON terminals. In parallel with the load, connect the inputs of an HD analyzer and a calibrated AC VTVM.
- (3) Connect AC power cord. Turn VOLUME to maximum.
- (4) Increase generator level for 14 watts output (10.6V RMS across 8-ohm load). HD meter should indicate 0.5% or less.
- (5) Repeat preceding steps for right channel.





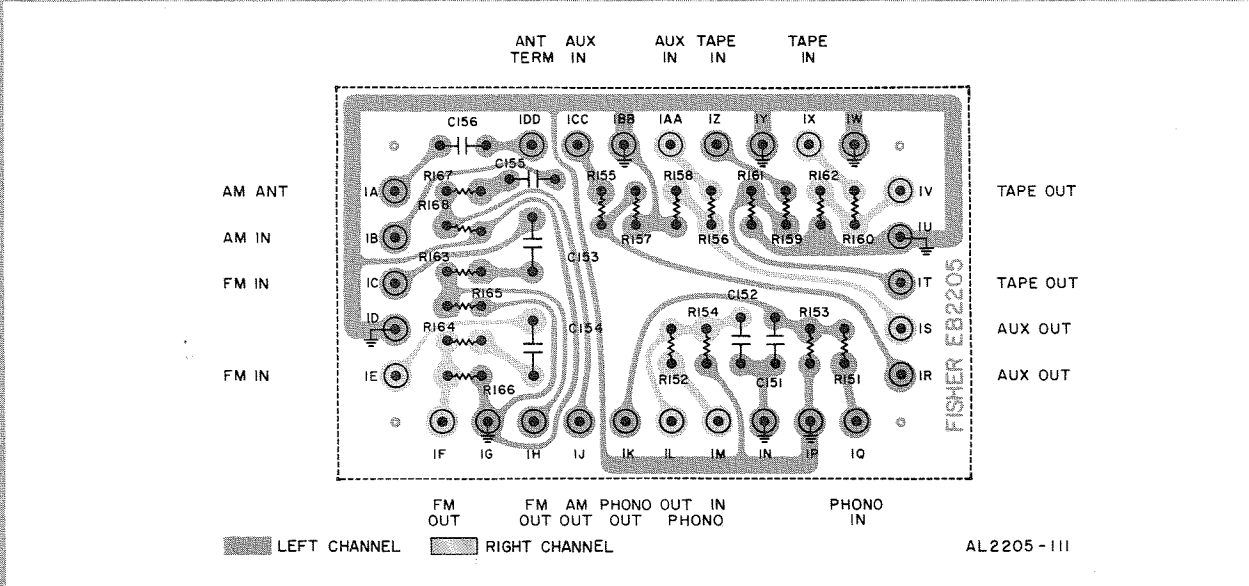


## power supply 2076-2

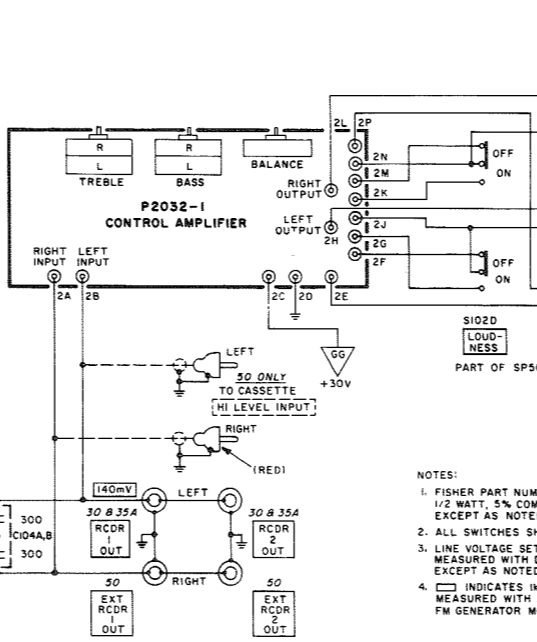
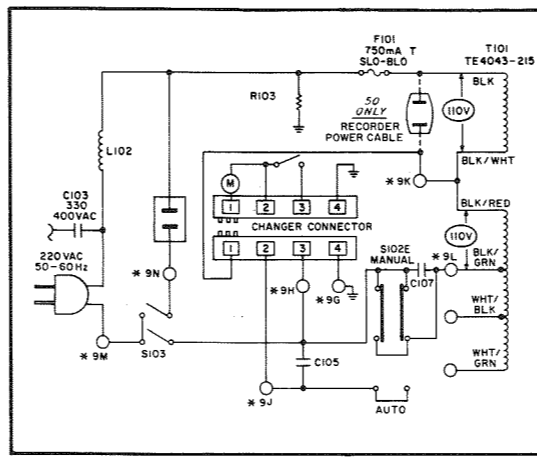
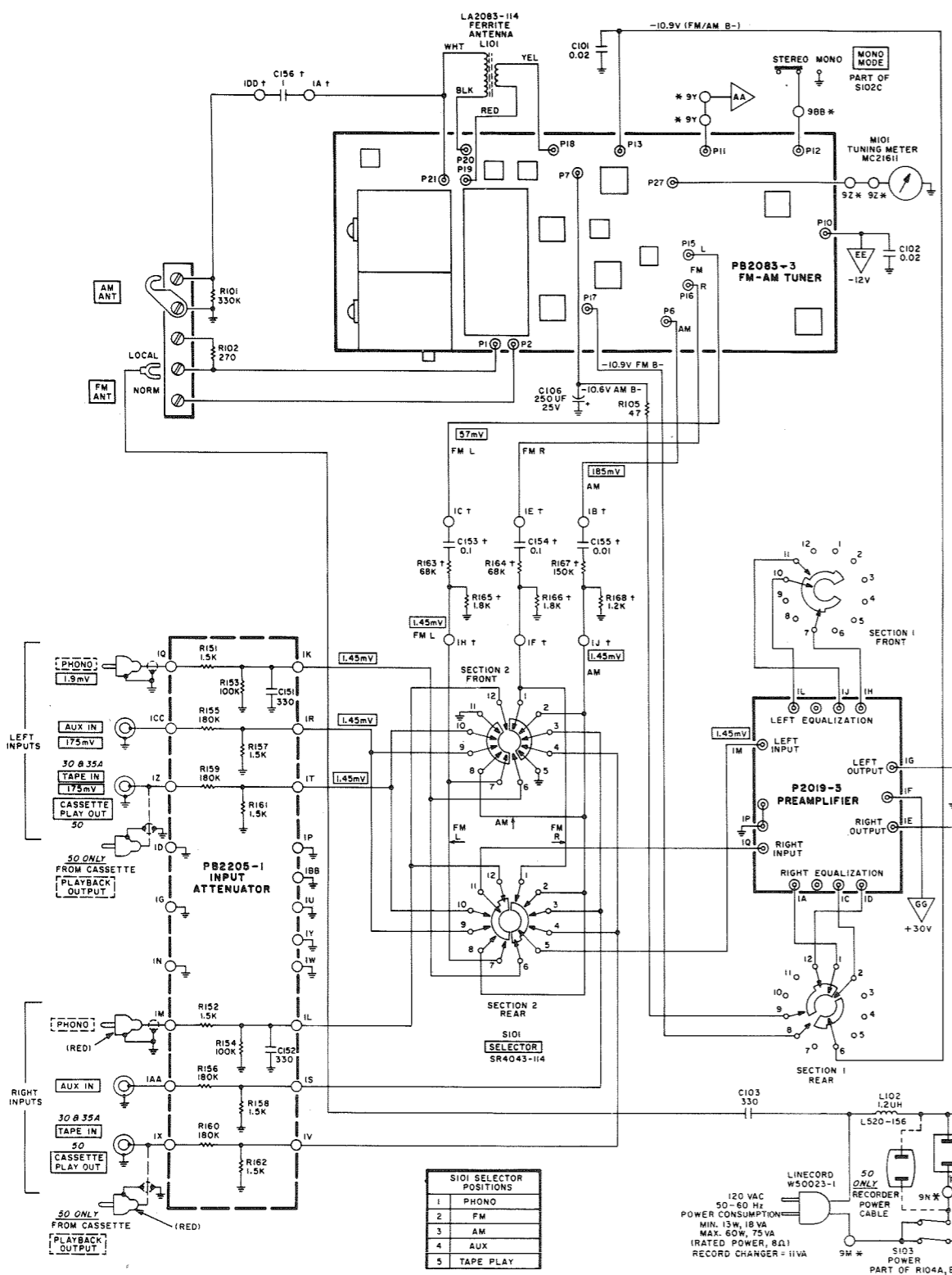


SCHEMATIC SHOWN ON MAIN CHASSIS DIAGRAM

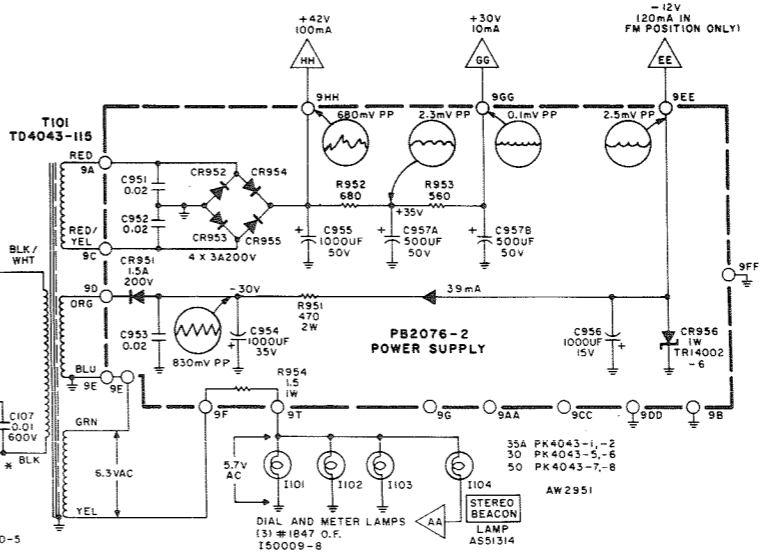
## input attenuator 2205-1



SCHEMATIC SHOWN ON MAIN CHASSIS DIAGRAM



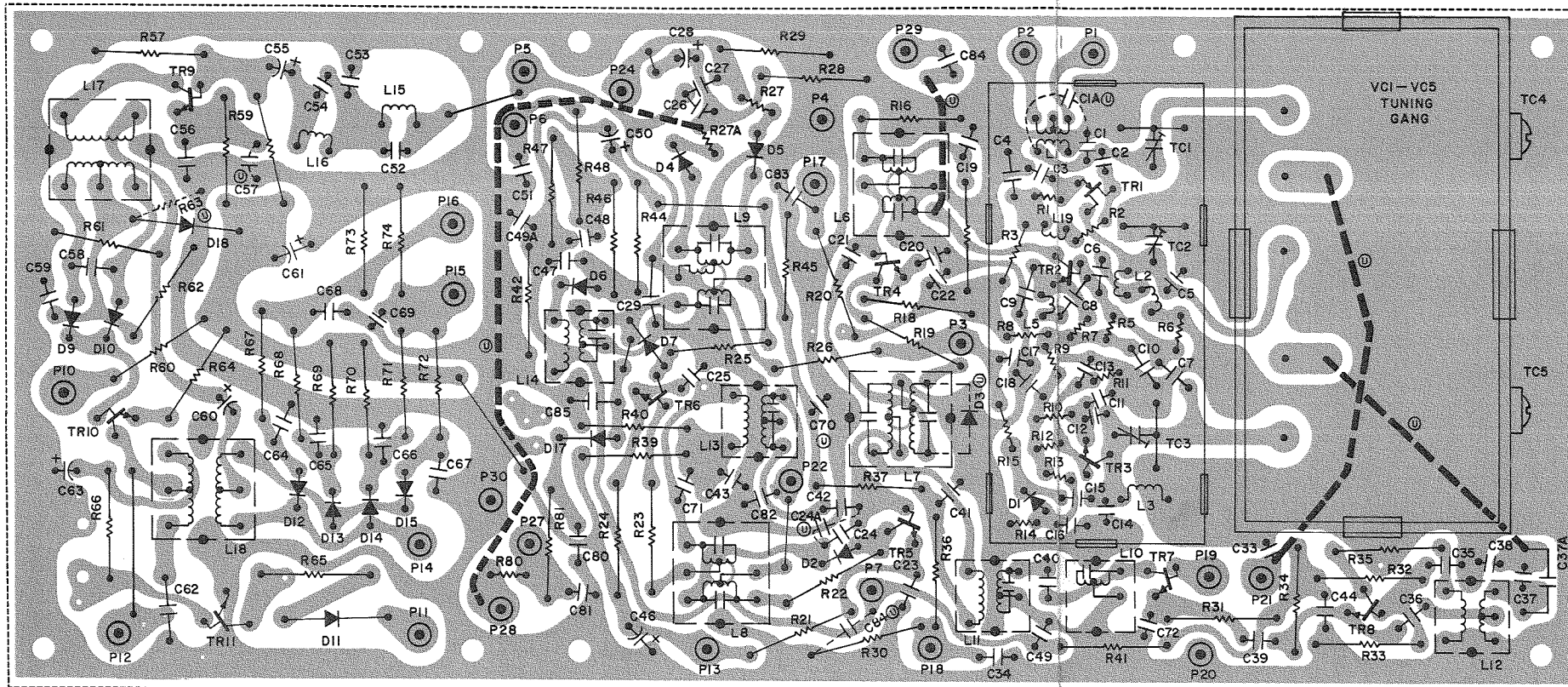
- NOTES:
1. FISHER PART NUMBER LISTED FOR PARTS SPECIALLY SELECTED FOR FISHER RADIO. 1/2 WATT, 5% COMPOSITION RESISTORS MAY BE USED FOR RESISTOR REPLACEMENT, EXCEPT AS NOTED.
  2. ALL SWITCHES SHOWN IN NORMAL OPERATING POSITIONS. VOLUME CONTROL MAXIMUM.
  3. LINE VOLTAGE SET TO 120VAC FOR ALL DC VOLTAGE MEASUREMENTS. DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO SIGNAL INPUT. ALL VOLTAGES ±10%, EXCEPT AS NOTED.
  4. □ INDICATES 1MHz SIGNAL LEVELS BETWEEN INPUTS AND POWER AMPLIFIER OUTPUT, MEASURED WITH AC VTVM. AM GENERATOR SIGNAL = 1MHz, 10mV, 13% MODULATION; FM GENERATOR MONO SIGNAL = 100MHz, 1mV, ±7.5kHz DEVIATION.



\* MOUNTED ON POWER SUPPLY BOARD  
 † MOUNTED ON INPUT ATTENUATOR BOARD

SI02E PART OF SP50200-50-5 [AUTO SHUTOFF]





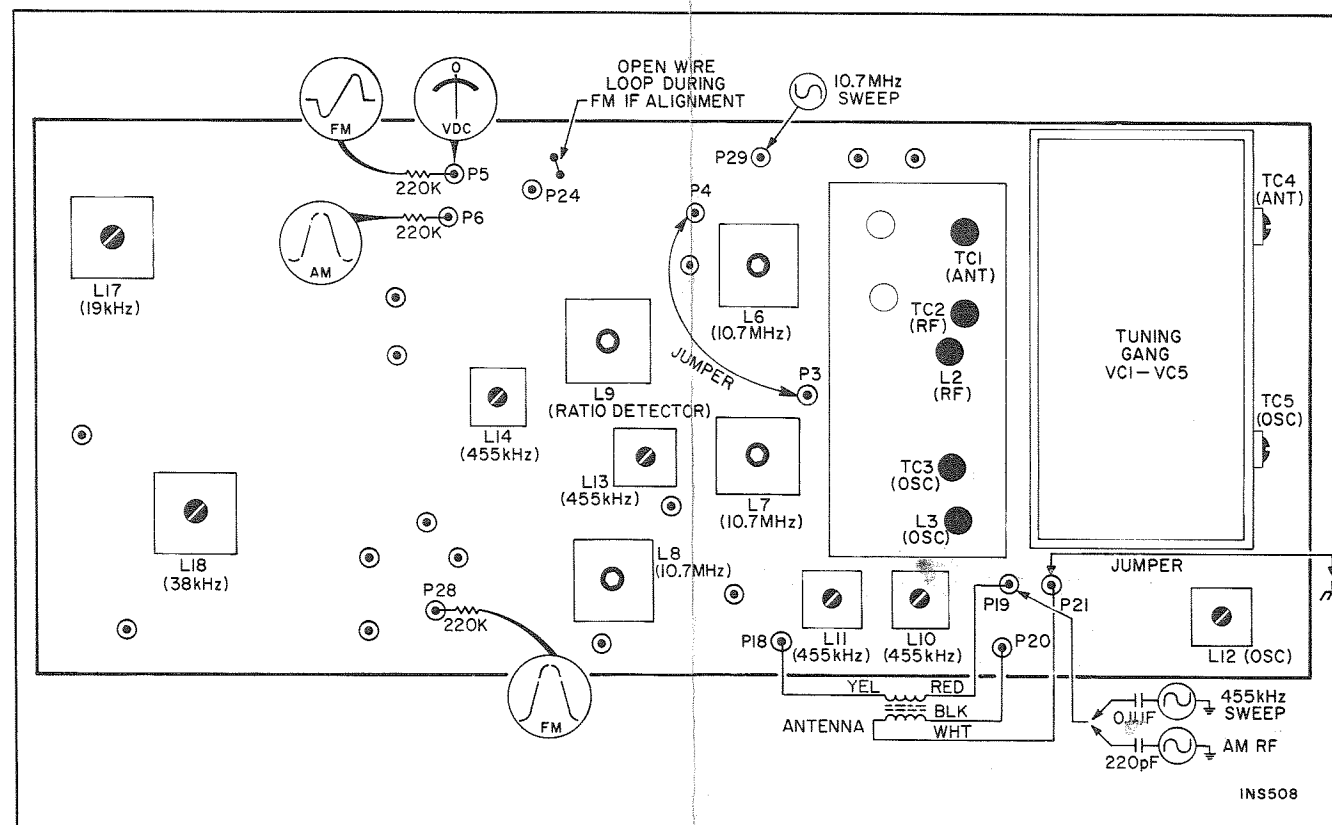
Ⓢ DENOTE PARTS MOUNTED ON UNDERSIDE OF BOARD

AL2083-112

Turn TUNING knob fully CCW. If pointer is not centered on (0), reposition and cement pointer. Except as noted, maintain generator level as low as possible during alignment.

### FM ALIGNMENT

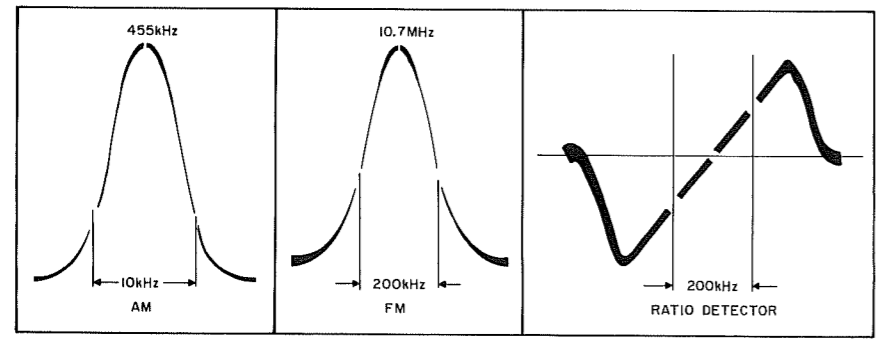
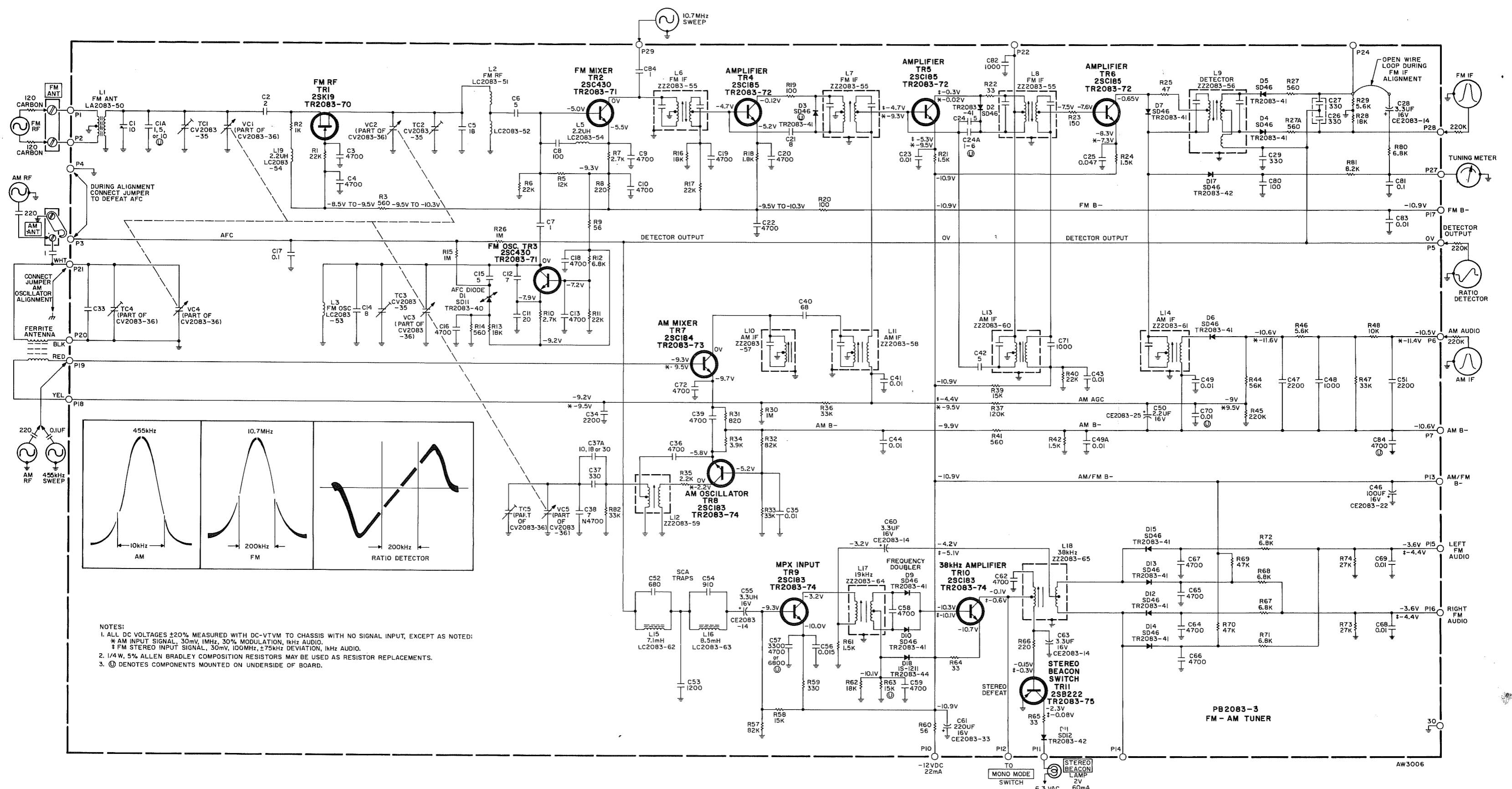
- (1) Set SELECTOR switch to FM. Turn VOLUME control to minimum. Connect jumper between P3 and P4 to defeat AFC.
- (2) Connect 10.7MHz sweep generator to P29. Connect scope through 220K to P28. Open wire loop at P24.
- (3) Adjust top and bottom cores of L8, L7, and L6, and bottom core of L9 for maximum gain and symmetry.
- (4) Reconnect wire loop at P24. Reconnect scope to P5. Adjust top and bottom cores of L9 for maximum linear amplitude.
- (5) Connect DC VTVM to P5. Readjust top core of L9 for 0 VDC. Disconnect sweep generator and DC VTVM. Connect FM RF generator through 120-ohm carbon composition resistors to FM ANT. terminals.
- (6) Set generator frequency and dial pointer accurately to 90MHz. Modulate generator with 400Hz,  $\pm 75$ kHz deviation. Bend oscillator coil L3, and RF coil L2 for maximum amplitude at P5.
- (7) Set generator frequency and dial pointer accurately to 106MHz. Adjust oscillator trimmer TC3, antenna trimmer TC1, and RF trimmer TC2 for maximum amplitude at P5.
- (8) Repeat (6) and (7) for maximum sensitivity and accurate dial calibration.
- (9) Reconnect DC VTVM to P5. Set generator level to 1mV. Tune receiver to generator frequency (106MHz) for OVDC at P5.
- (10) Connect an AC VTVM to the RIGHT RCDR OUT jack, and another AC VTVM to the LEFT RCDR OUT jack.
- (11) Connect MPX generator composite output to FM generator EXTERNAL MODULATION input. Modulate left and right channels with 400Hz ( $\pm 67.5$ kHz deviation/90%), and 19kHz pilot ( $\pm 7.5$ kHz deviation/10%).
- (12) Adjust top cores of L17 and L18 for maximum audio.
- (13) Modulate left channel only. Right channel AC VTVM should indicate at least 20dB below left channel output.
- (14) Modulate right channel only. Left channel AC VTVM should indicate at least 20dB below right channel output.
- (15) Disconnect MPX generator. Set RF generator output to 20mV, and modulate with 400Hz,  $\pm 75$ kHz deviation.
- (16) Detune generator frequency for +0.5VDC at P5. Disconnect jumper between P3 and P4 to turn AFC on. DC VTVM should indicate between +0.5 and OVDC.
- (17) Reconnect jumper between P3 and P4. Detune generator frequency for -0.5VDC at P5. Remove jumper. Meter should indicate between -0.5 and OVDC. Disconnect test equipment.



### AM ALIGNMENT

- (1) Set SELECTOR switch to AM. Turn VOLUME control to minimum.
- (2) Connect 455kHz sweep generator through 0.1uF to P19. Connect scope through 220K to P6.
- (3) Adjust cores of L14, L13, L11, and L10 for maximum gain and symmetry.
- (4) Disconnect sweep generator. Connect AM signal generator through 220pF to P19. Connect scope and AC VTVM to RIGHT RCDR OUT jack.
- (5) Set generator frequency and dial pointer accurately to 600kHz. Modulate generator with 400Hz, 30% modulation. Connect a short jumper between P21 and chassis. Adjust oscillator coil L12 for maximum amplitude.
- (6) Set generator frequency and dial pointer accurately to 1400kHz. Adjust oscillator trimmer TC5 for maximum amplitude.
- (7) Repeat (5) and (6) for accurate dial calibration and maximum gain.
- (8) Disconnect jumper connection P21 and chassis. Reconnect AM signal generator to AM ANT. terminal. Open GND link. Tune receiver to generator frequency at 600kHz. Modulate generator with 400Hz, 30% modulation.
- (9) Melt the wax holding the coil to the ferrite antenna. Shift the coil for maximum audio indication. To secure coil in position, remelt wax.
- (10) Tune receiver to generator frequency at 1400kHz. Adjust antenna trimmer TC4 for maximum audio.

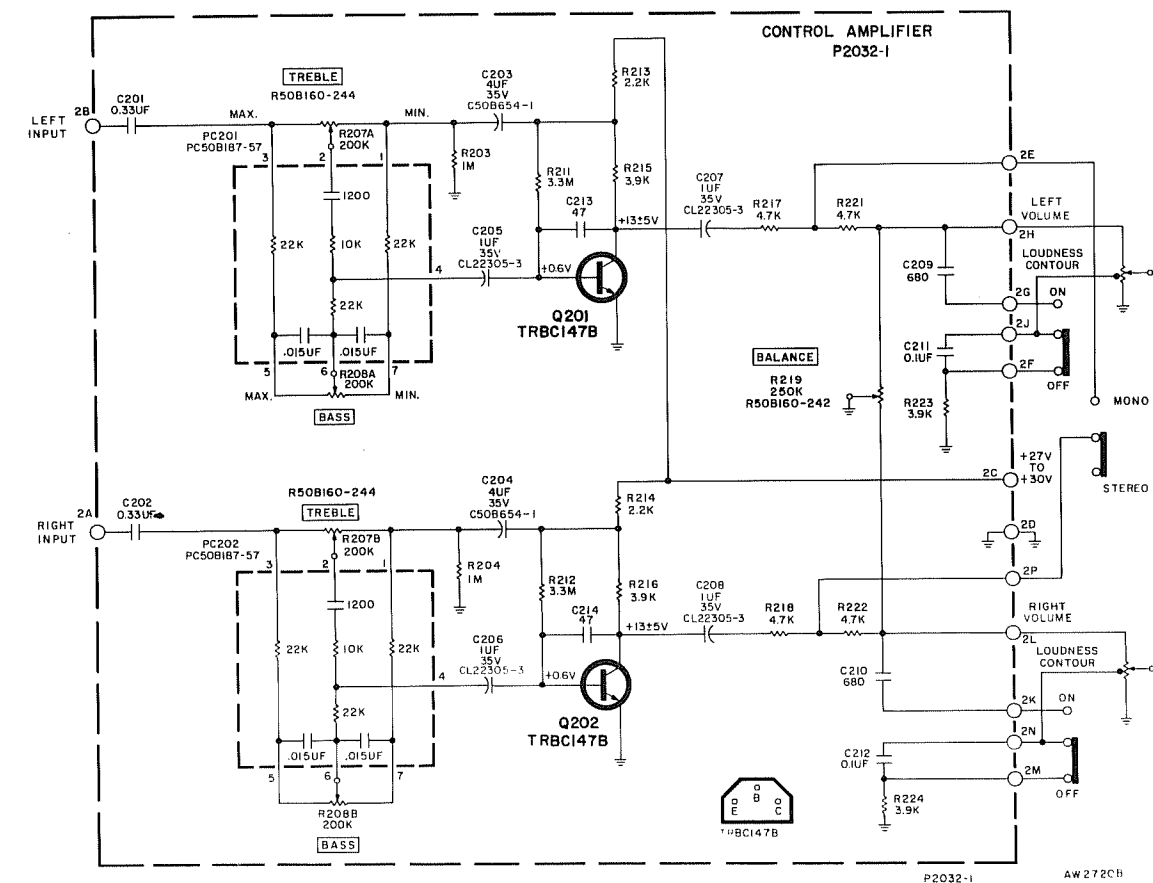
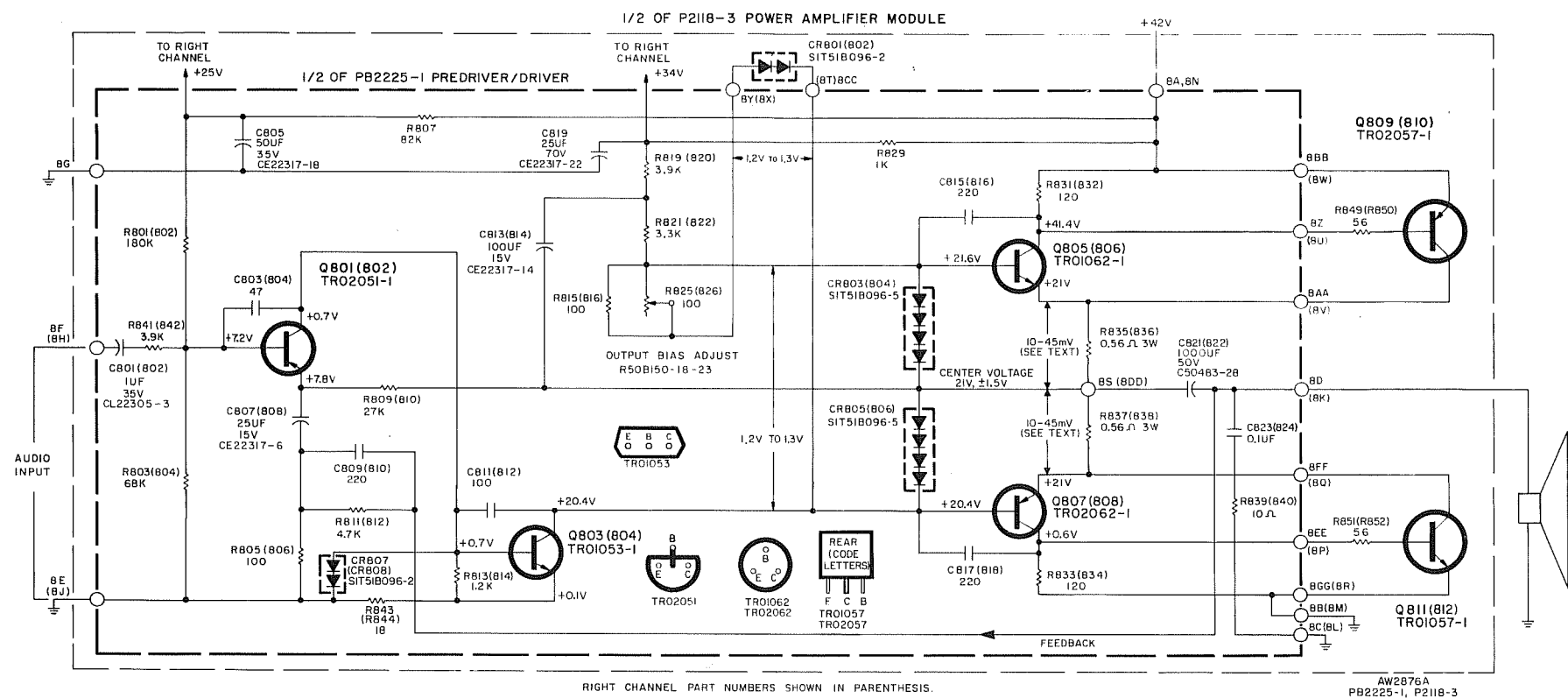




NOTES:  
 1. ALL DC VOLTAGES  $\pm 20\%$  MEASURED WITH DC-VTVM TO CHASSIS WITH NO SIGNAL INPUT, EXCEPT AS NOTED:  
 \* AM INPUT SIGNAL, 30mV, 1MHz, 30% MODULATION, 1kHz AUDIO.  
 † FM STEREO INPUT SIGNAL, 30mV, 100MHz,  $\pm 75$ kHz DEVIATION, 1kHz AUDIO.  
 2. 1/4W, 5% ALLEN BRADLEY COMPOSITION RESISTORS MAY BE USED AS RESISTOR REPLACEMENTS.  
 3. Ⓞ DENOTES COMPONENTS MOUNTED ON UNDERSIDE OF BOARD.

PB2083-3 FM-AM TUNER

AW3006

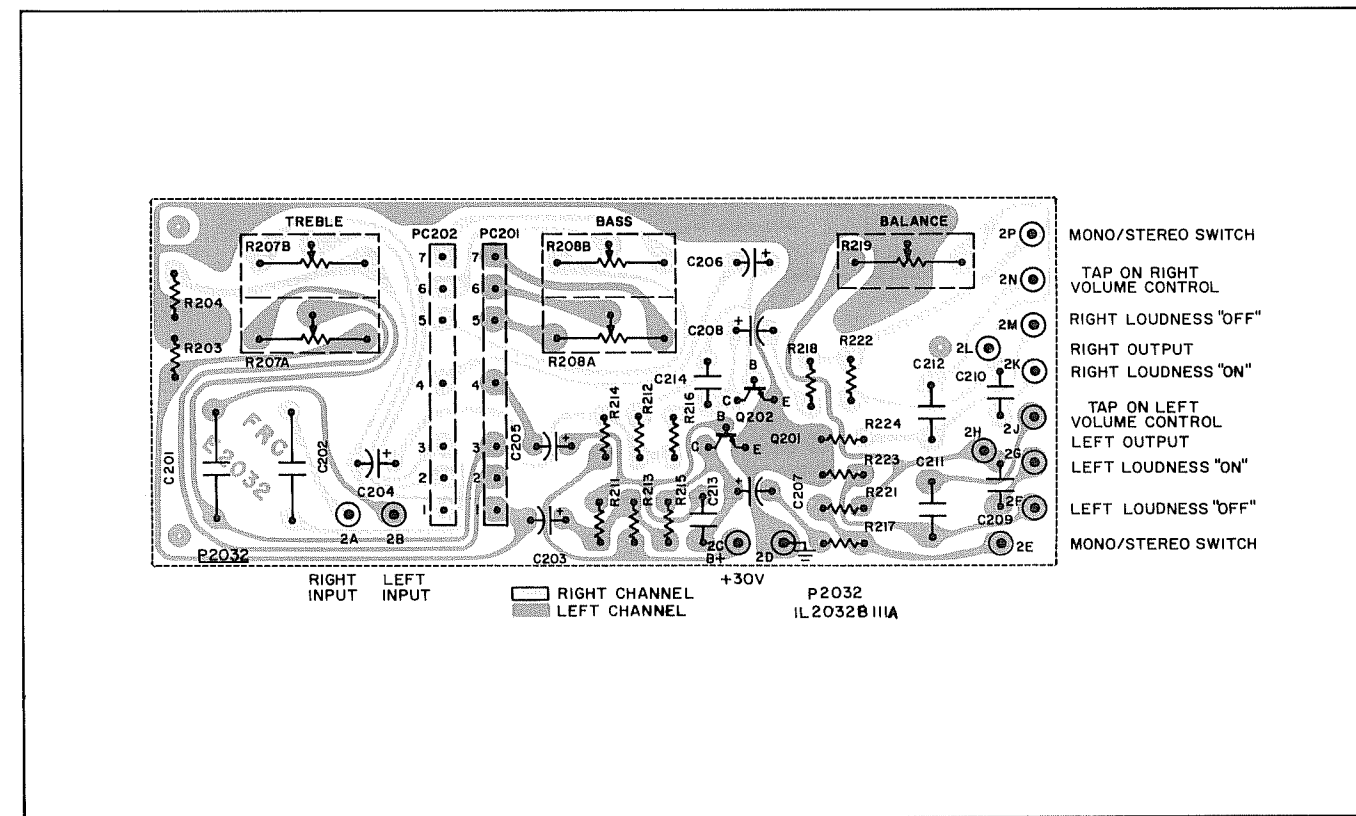
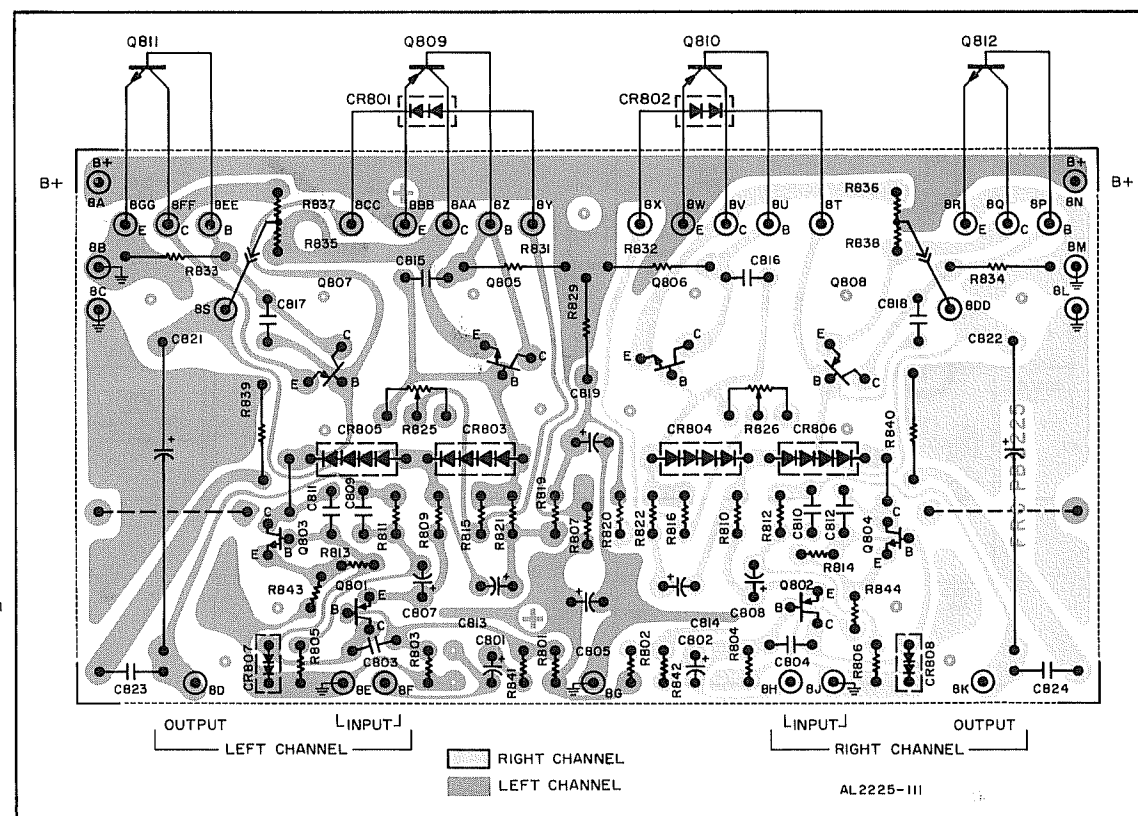


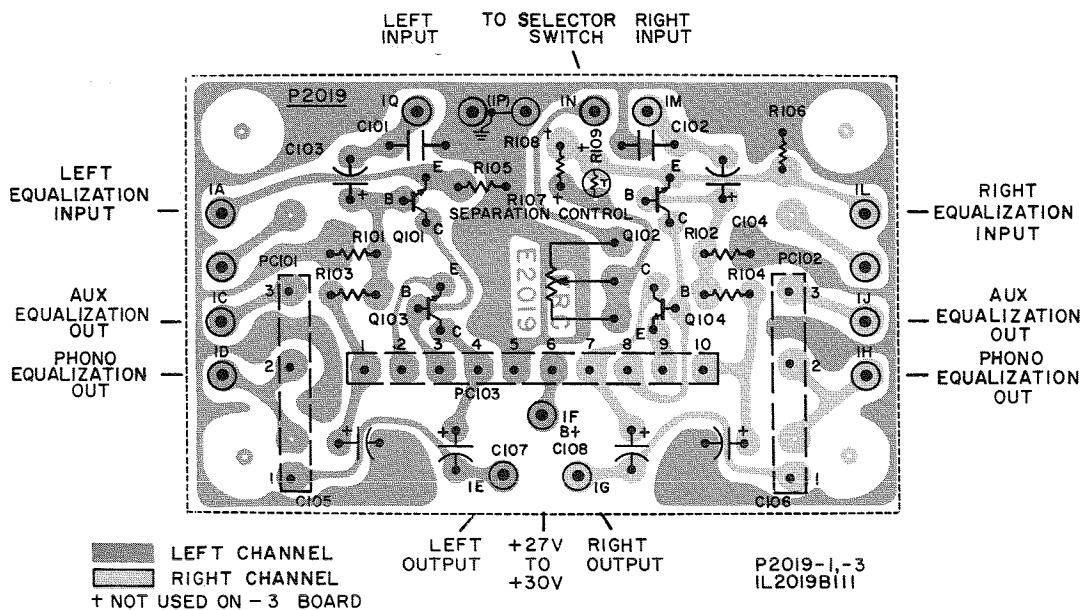
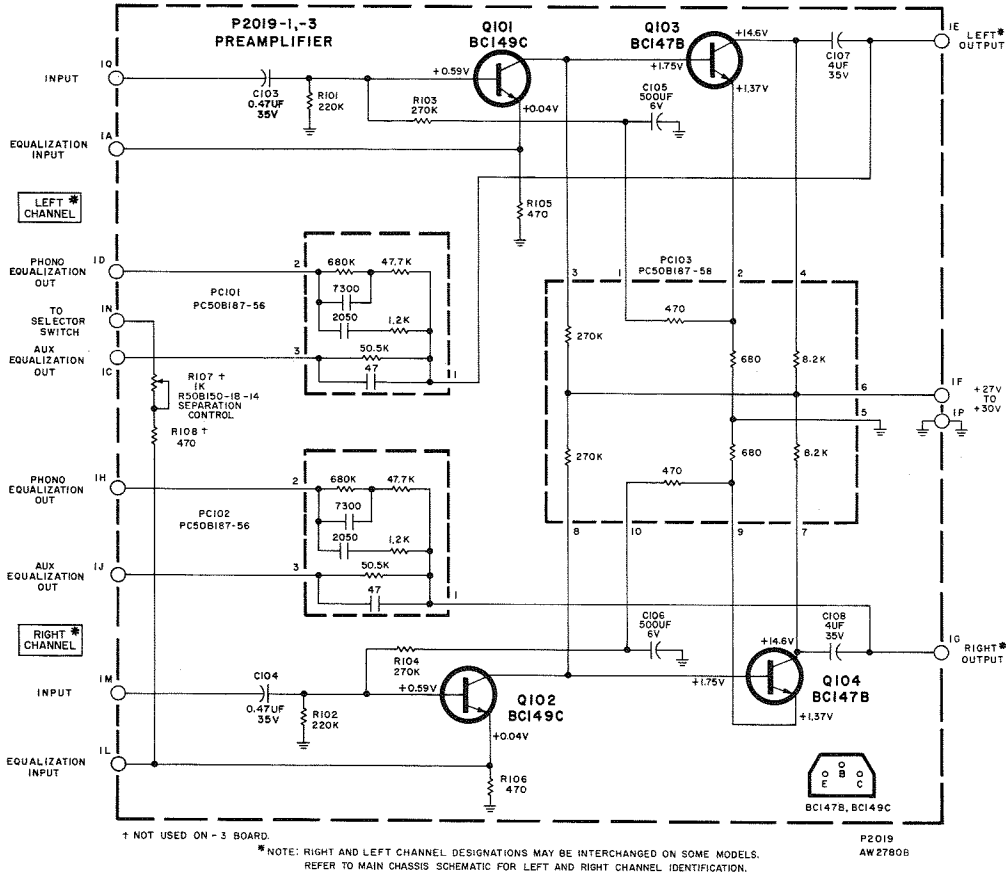
**CENTER VOLTAGE TEST**

- Turn VOLUME to minimum. Depress MAIN SPKRS switch.
- (1) Connect an 8-ohm resistor between LEFT SPKRS MAIN and COMMon terminals, and another 8-ohm resistor between RIGHT SPKRS MAIN and COMMon terminals.
  - (2) Temporarily connect two 10K ± 1% resistors in series between pins 9HH and 9B (on Power Supply board). Connect common lead of DC VTVM to junction of resistors.
  - (3) Connect probe of DC VTVM to pin 8S (on Driver board). Meter should indicate 0 VDC (± 1.5 volts).
  - (4) Reconnect the probe of the meter to pin 8DD. Meter should indicate 0 VDC (± 1.5 volts).
  - (5) Disconnect the 10K resistors.

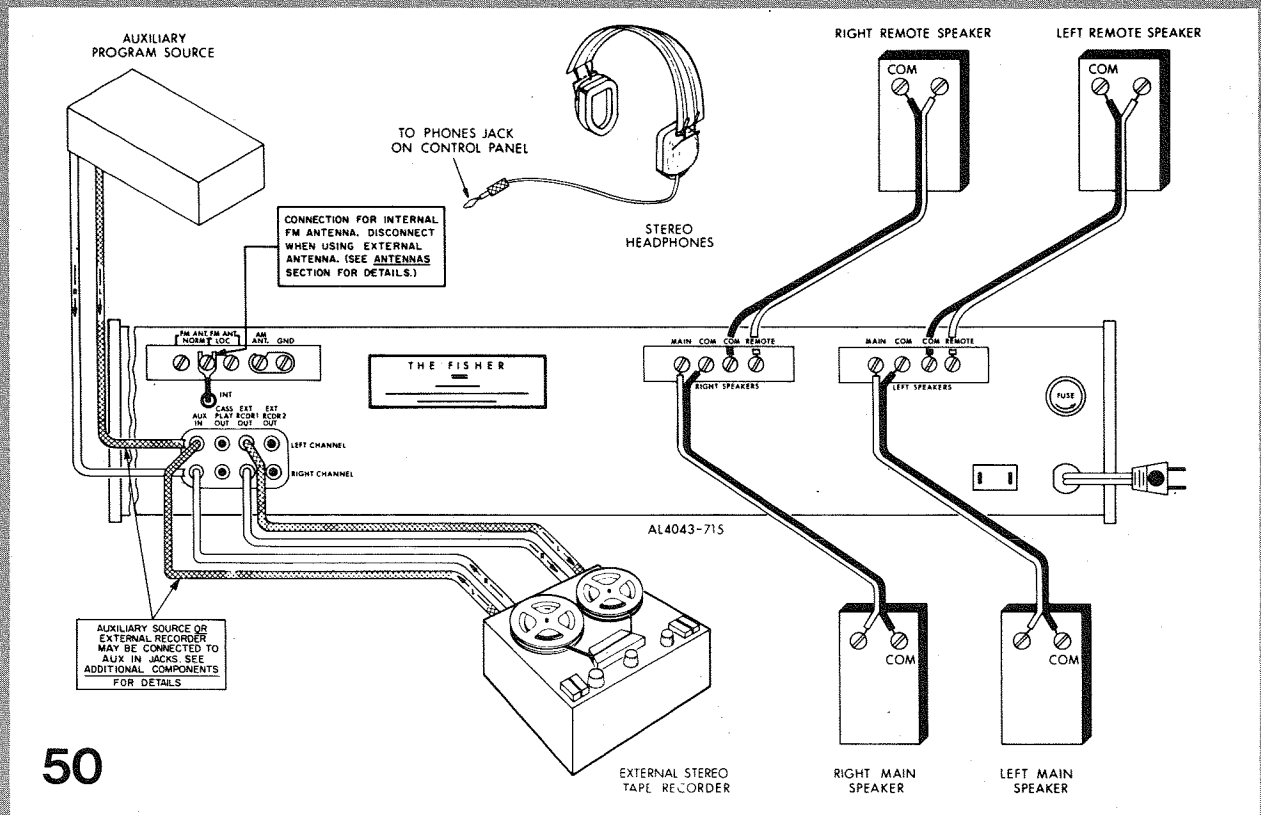
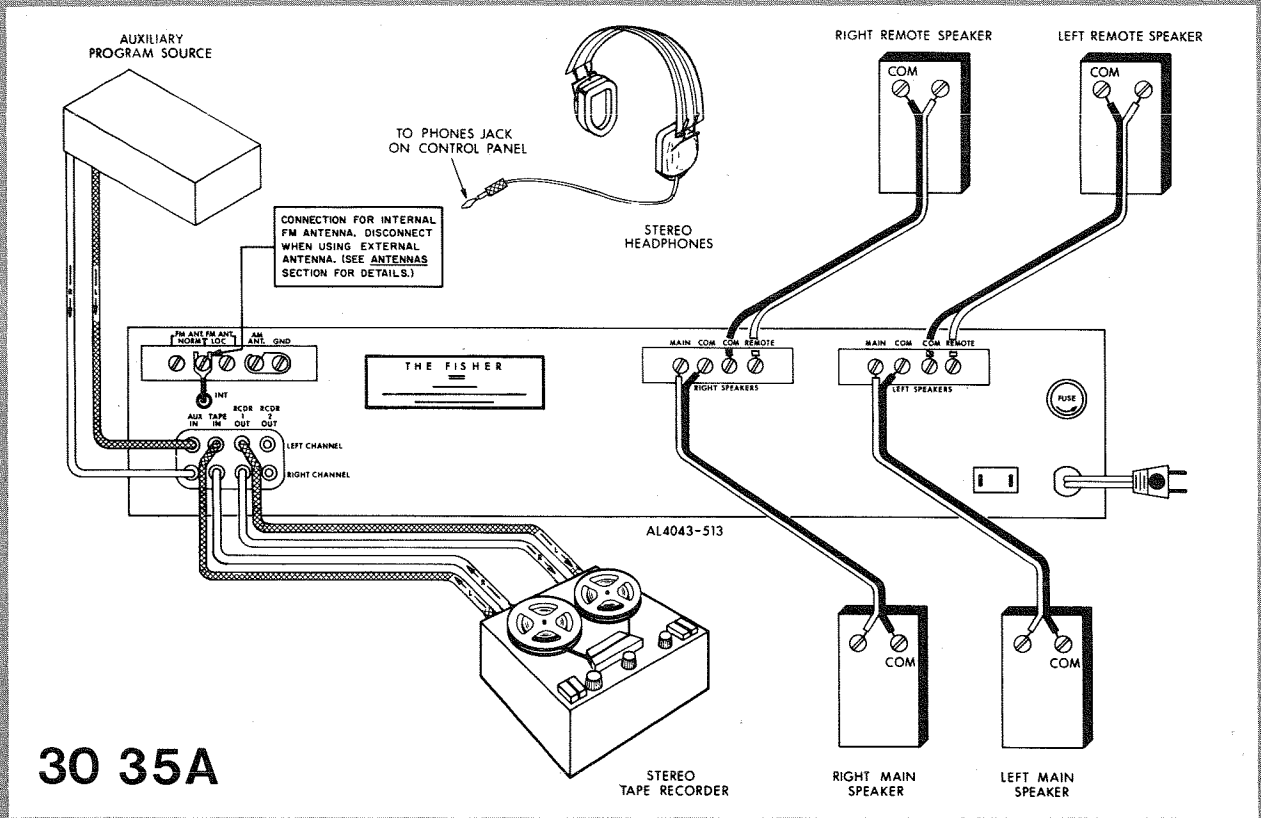
**IDLING CURRENT ADJUSTMENT**

- Turn unit on. Turn VOLUME control to minimum. Warm-up unit about 10 minutes.
- (1) Connect common lead of DC VTVM to pin 8S (on Driver board). Connect probe of meter to pin 8AA. **BE CAREFUL TO AVOID SHORTING ADJACENT PINS.** Meter should indicate 10mV to 45mV.
  - (2) If necessary, adjust R825 (on Driver board). 15mV provides optimum amplifier performance.
  - (3) Reconnect common lead of meter to pin 8DD. Reconnect probe to pin 8V. **BE CAREFUL TO AVOID SHORTING ADJACENT PINS.** Meter should indicate 10mV to 45mV.
  - (4) If necessary, adjust R826.









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