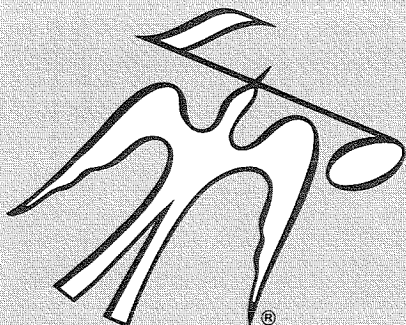
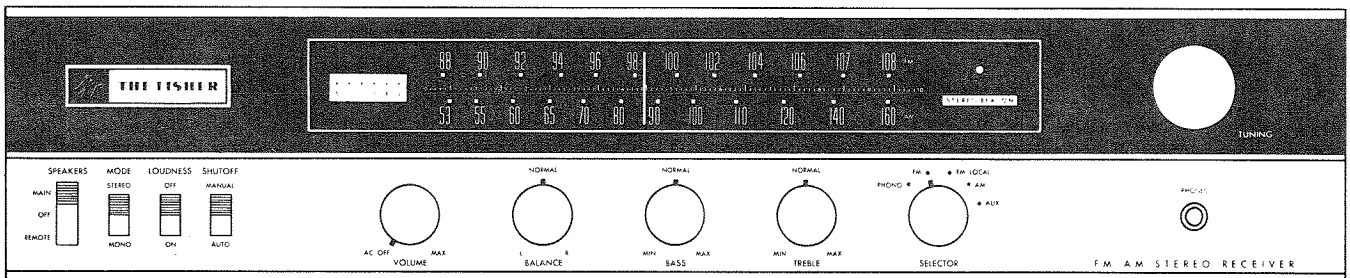
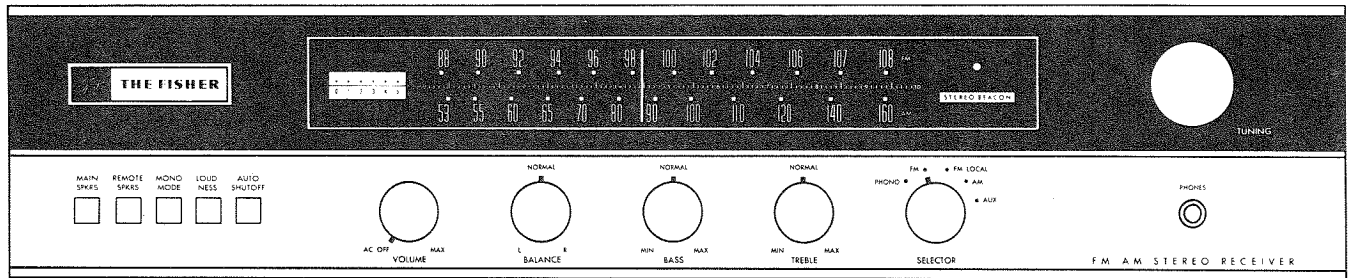


This Manual Also Covers  
125 Console Chassis

# Service Manual

# THE FISHER®



# 120™

CHASSIS SERIAL NUMBERS  
BEGINNING 10001

# 125™

CHASSIS SERIAL NUMBERS  
BEGINNING 10001

PRICE \$1.00

FISHER RADIO CORPORATION • 11-40 45th ROAD • LONG ISLAND CITY, N.Y. 11101

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

### TEST EQUIPMENT REQUIRED

The following are needed to completely test and align modern high-fidelity instruments such as amplifiers, tuners and receivers.

Vacuum-Tube Voltohmmeter (100-mV DC scale)	10.7-MHz Sweep Generator
Audio Vacuum-Tube Voltmeter (10-mV AC scale)	455-kHz Sweep Generator
Oscilloscope (Flat to 100 kHz Minimum)	Line Voltage Autotransformer or Voltage Regulator
Audio (Sine-Wave) Generator	2 — Load Resistors, 4 or 8 Ohm, 50 Watt
Intermodulation Distortion Analyzer	2 — Full Range Speakers for Listening Tests
Harmonic Distortion Analyzer	Stereo Source — Turntable or Tape Recorder for Listening Tests
AM/FM Signal Generator	Soldering Iron with Small Tip Fully Insulated from Power Line
Multiplex Generator (preferably with RF output — FISHER Model 300 or equal)	Suction Desoldering Tool

### PRECAUTIONS

Many of these items are included just as a reminder—they are normal procedures for experienced technicians. Short-cuts can be taken but often they cause additional damage — to transistors, circuit components or the printed-circuit board.

**Soldering**—A well-tinned, hot, clean soldering iron tip will make it easier to solder without damage to the printed-circuit board or the many circuit components mounted on it. It is not the wattage of the iron that counts — it is the heat available at the tip. Some 50-watt irons reach temperatures of 1,000° F — others will hardly melt solder. Small-diameter tips should be used for single solder connections — larger pyramid and chisel tips are needed for larger areas.

- When removing defective resistors, capacitors, etc., the leads should be cut as close to the body of the circuit component as possible. (If the part is not being returned for in-warranty factory replacement it may be cut in half — with diagonal-cutting pliers — to make removal easier.)

- Special de-soldering tips are made for unsoldering multiple-terminal units like IF transformers and electrolytic capacitors. By unsoldering all terminals at the same time the part can be removed with little chance of breaking the printed-circuit board.

- Always disconnect the chassis from the power line when soldering. Turning the power switch OFF is not enough. Power-line leakage paths, through the heating element, can destroy transistors.

**Transistors**—Never attempt to do any work on the transistor amplifiers without first disconnecting the AC linecord and waiting until the power supply filter-capacitors have discharged.

- Guard against shorts — it takes only an instant for a base-to-collector short to destroy that transistor and possibly others direct-coupled to it. (In the time it takes for a dropped machine screw, washer or even the screwdriver, to glance off a pair of socket terminals (or between a terminal and the chassis) a transistor can be ruined.)

- DO NOT bias the base of any transistor to, or near, the same voltage applied to its collector.

- DO NOT use an ohmmeter for testing transistors. The voltage applied through the test probes may be higher than the base-emitter breakdown voltage of the transistor.

**Output Stage and Driver — Replacements for output and**

driver transistors, if necessary, must be made from the same beta group as the original type. The beta group is indicated by a colored dot on the mounting flange of the transistor. Be sure to include this information, when ordering replacement transistors.

- If one output transistor burns out (open or shorts), always remove ALL output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All output transistors in one channel will be destroyed if the base-biasing circuit is open on the emitter end.

- When mounting a replacement power transistor be sure the bottom of the flange, the mica insulator and the surface of the heat sink are free of foreign matter. Dust and grit can prevent perfect contact reducing heat transfer to the heat sink. Metallic particles can puncture the insulator and cause shorts — ruining 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 conduction. (Use Dow-Corning DC-3 or C20194 or equivalent compounds made for power transistor heat conduction.)

- Use care when making connections to speakers and output terminals. Any frayed wire ends can cause shorts that may burn out the output transistors — they are direct-coupled to the speakers. To reduce the possibility of shorts at the speakers, lugs should be used on the exposed ends or at least the ends of the stranded wires should be tinned to prevent frayed wire ends. The current in the speakers and output circuitry is quite high. Poor contacts or small size wire can cause power losses in the speaker system. Use 14 or 16 AWG for long runs of speaker wiring.

**Voltage Measurements**—Voltage measurements are made with the line voltage adjusted to 117 volts and all readings are  $\pm 10\%$ . All voltages are DC, measured with a VTVM to ground, with no signal input unless otherwise noted.   indicates 1-kHz audio voltages, measured with an audio AC VTVM to ground at various points from the phono input to the power amplifier output.

**Alignment Procedures — Replacement of transistors and components in the front end, IF amplifier and multiplex decoder will normally not require realignment of these circuits. Realignment of these circuits, unless absolutely necessary, is not recommended. Do not attempt a 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 CORPORATION RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION.

## SERVICE PROCEDURES

### REMOVING MOTORBOARD

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

- (1) Disconnect AC power cord.
- (2) Unscrew the two 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 in the motorboard (two on each side) holding the board to the wood side-panels. Lift the motorboard at the front, and unplug the two audio cables and power plug from the underside of the changer.
- (4) Remove the motorboard from the top of the chassis.
- (5) To reinstall the motorboard, reverse the procedure. Be sure to reconnect the audio cable with the red plug to the changer phono jack labeled Right.

### REMOVING DRESS PANEL

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

### DIAL STRINGING

- (1) Disconnect AC power cord.
- (2) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (3) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
- (4) Remove the dial pointer from the dial cord.
- (5) Prop the unit on its left side. Remove the right wood side-panel by removing the two slotted screws near the feet on the right side.
- (6) Loosen the AM antenna bracket locking screw (see Figure 1) and lift antenna bracket away from drive-drum.
- (7) Rotate the tuning capacitor drive-drum to its maximum CW position. Loosen the machine screw in the center of the drum and remove the old dial cord.
- (8) Tie end of new dial cord to one end of dial spring. Fasten to top right ear inside drive-drum. See Figure 1.
- (9) Run the dial cord through the slot in the rim of the drum and set in the bottom of the outside groove. Guide the dial cord around pulley "A", across and underneath the tuning shaft. Wrap 2 full turns (CCW viewed from back) around the tuning shaft.
- (10) Guide the dial cord over pulley "B", across the front, around pulley "C", and back and around pulley "D". Keep the dial cord taut during this procedure.
- (11) Rotate the drive-drum to its maximum CCW position, allowing the cord to wind onto the drive-drum. Keep the dial cord taut during this procedure.
- (12) Run the dial cord over the top of the drive-drum (in inside groove) and into the rim slot. Bring the cord around the drive-drum ear and place the cord under the beveled washer.
- (13) With the machine screw loosened, pull the dial cord taut and tighten the screw.

- (14) Turn the tuning shaft to rotate the drive-drum fully CW and fully CCW to distribute the tensioning along the dial cord. Repeat steps (13) and (14) until spring is tensioned.
- (15) Rotate the AM antenna bracket back to its original position and tighten the locking screw.
- (16) Place the dial cord over and under the tabs on the rear of the dial pointer, and place the pointer on the top of the rail.
- (17) Turn the tuning shaft fully CCW. Slide the dial pointer to zero (0) calibration mark on logging scale while holding tuning shaft fully CCW. Cement dial pointer to dial cord to prevent slippage. Allow cement to thoroughly dry. Check dial calibration. Refer to FM FRONT END ALIGNMENT and AM RF ALIGNMENT.
- (18) Reinstall the dress panel.
- (19) Reinstall the wood side-panel and secure with the screws removed previously.
- (20) Reinstall the motorboard.

### REPLACING DIAL LAMPS

- (1) Disconnect AC power cord.
- (2) Remove dress panel. Refer to REMOVING DRESS PANEL procedure.
- (3) Remove the defective lamp (with its metal shade) from its bayonet base by pressing the lamp in, and rotating 1/8 turn CCW. Slide the metal shade off the lamp. Install the replacement lamp by pressing in, and turning CW 1/8 turn. Slide the shade onto the lamp and adjust it to direct the light towards the edge of the dial glass.
- (4) Reinstall the dress panel.

### REPLACING STEREO BEACON LAMP

- (1) Disconnect AC power cord.
- (2) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (3) Unsolder the two leads from the terminals on the rear of the STEREO BEACON lamp assembly.  
**WARNING:** Damage to the nylon lamp holder assembly may result from excessive heating of the terminals. Use a pair of pliers (as a heat sink) to hold each terminal when soldering or unsoldering leads.
- (4) Gently pry off the nylon lamp holder assembly. Press the replacement assembly into the mount and resolder the leads removed previously.
- (5) Reinstall the motorboard.

### REPLACING METER LAMP

- (1) Disconnect AC power cord.
- (2) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (3) Remove the defective meter lamp (with its metal shade) from its bayonet base by pressing the lamp in, and rotating 1/8 turn CCW. Slide the shade off the lamp. Install the replacement lamp by pressing in, and turning CW 1/8 turn. Slide the shade onto the lamp and adjust it to direct the light towards the back of the tuning meter.
- (4) Reinstall the motorboard.

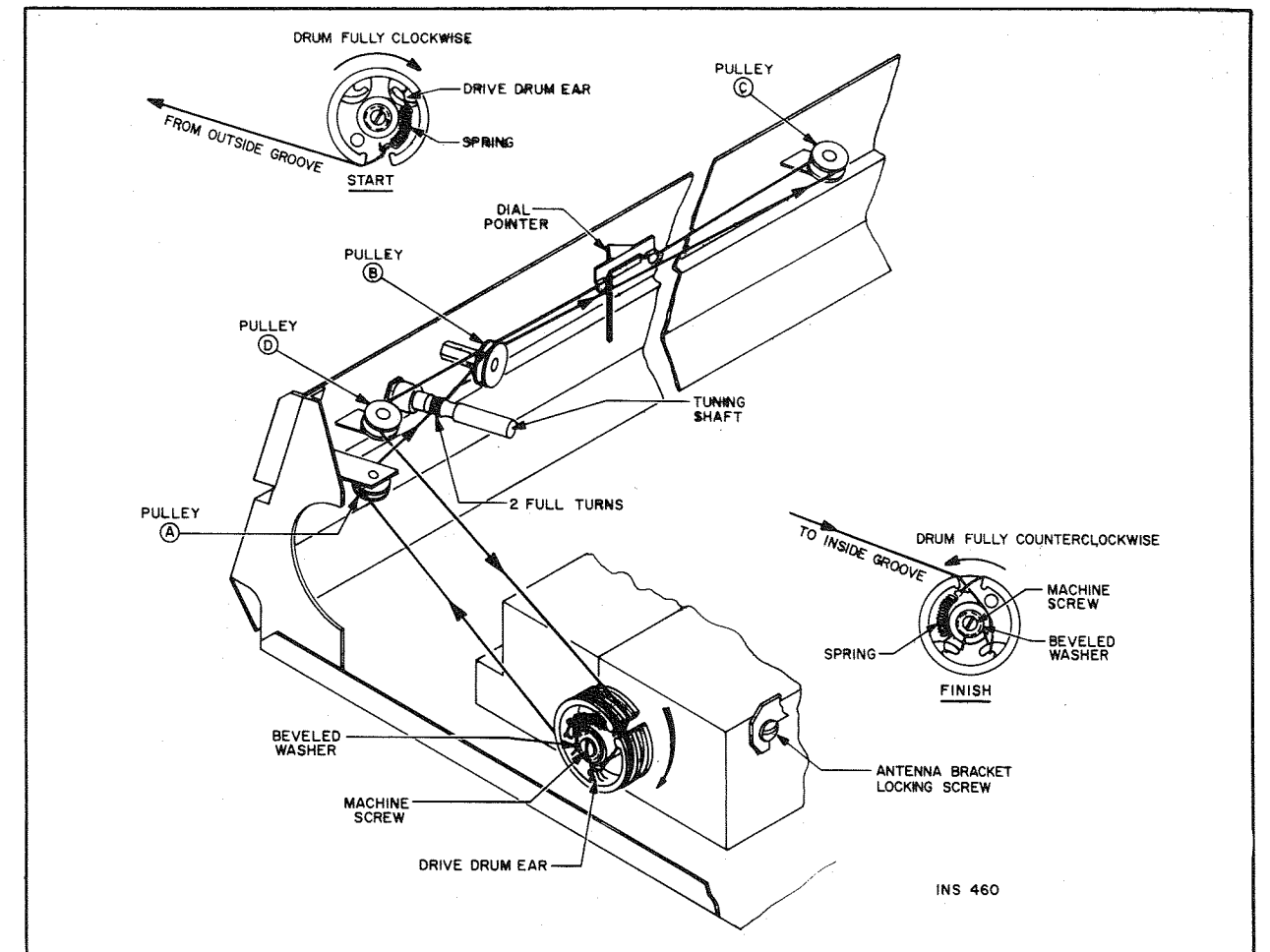


Figure 1.

### REPLACING METER

- (1) Remove motorboard. Refer to REMOVING MOTORBOARD procedure.
- (2) Unsolder the two leads from the terminals on the rear of the meter and label each wire with its associated pin location for easy replacement later.  
**WARNING:** Damage to the meter may result from excessive heating of the meter terminals. Use a pair of pliers (as a heat sink) to hold each terminal when soldering or unsoldering leads.
- (3) Gently pull the meter retainers away from the rear of the tuning meter and lift out the meter.
- (4) Slide the replacement meter behind the retainers and fit meter into panel cutout. Resolder the meter leads removed previously.
- (5) Reinstall the motorboard.

### REMOVING P.C. BOARDS

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

To remove the AUDIO CONTROL AMPLIFIER board from the chassis, use the following procedure:

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

### CLEANING FRONT PANEL

**WARNING:** Use only plain lukewarm water for moistening a freshly laundered, soft lint-free cloth to clean the front control panel.

### SERVICING INTEGRATED CIRCUITS

Integrated Circuits are used in this unit to approach the theoretical maximum of AM suppression and noise limiting. These IC's contain the equivalent of many circuit parts, including transistors, diodes, resistors, and capacitors. These integrated

## SERVICE PROCEDURES

Circuits are high-reliability devices, requiring minimum servicing. In the unlikely event that an IC requires servicing, it should be serviced in the same way as a transistor.

The preferred troubleshooting procedure requires isolating the trouble to one stage using AC signal tracing methods. Once the suspected stage is located, the integrated circuit can be checked by measuring the DC voltages at the input and output leads of the IC using a DC VTVM. These DC voltage measurements give the most accurate indications of the operating conditions of the integrated circuit.

**WARNING:** 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.

When replacing an integrated circuit, the following precautions should be observed:

- (1) Do not replace a defective IC until the cause of the trouble is found. All external resistors, capacitors, and transformers should be checked first to prevent the replacement integrated circuit from failing immediately due to a trouble in the connecting components.
- (2) Solder and unsolder each lead separately using a pliers or other heat sink on the lead to prevent damage from excessive heat.
- (3) Check that the leads of the replacement IC are connected to the correct locations on the printed circuit board before turning the set on.

### POWER AMPLIFIER CENTER VOLTAGE TEST

Turn VOLUME control to minimum. Set SPEAKERS switch to MAIN (on pushbutton models, depress MAIN SPKRS switch).

- (1) Connect an 8-ohm load resistor across the LEFT SPKRS MAIN terminals and an 8-ohm load resistor across the RIGHT SPKRS MAIN terminals.
- (2) Connect two 10k  $\pm 1\%$  resistors in series across capacitor C953 (1500  $\mu$ F). Connect the common lead of a DC VTVM to the junction of the two resistors.
- (3) Connect the probe of the DC VTVM to Test Point 8S (junction of R835 and R837) on left channel of dual-channel power amplifier module. Meter should read 0 volt ( $\pm 1.5$  volts).
- (4) Connect the probe of the DC VTVM to Test Point 8DD (junction of R836 and R838) on right channel of dual-channel power amplifier module. Meter should read 0 volt ( $\pm 1.5$  volts).
- (5) Disconnect the two 10k resistors.

### POWER AMPLIFIER IDLING CURRENT ADJUSTMENT

**NOTE:** Power amplifier center voltage test should be performed before starting the following procedure.

Turn VOLUME control to minimum.

- (1) Connect DC VTVM across resistor R835 (0.56-ohm) on left channel of dual-channel power amplifier module. Meter should read between 10 mV and 35 mV.
- (2) If necessary, adjust R825 (OUTPUT BIAS ADJUST) pot. on predriver/driver board for reading between 10 mV and 35 mV on DC VTVM. Optimum amplifier performance will be achieved with 15 mV setting.
- (3) Connect DC VTVM across resistor R836 on right channel

of dual-channel power amplifier module. Meter should read between 10 mV and 35 mV. If necessary, adjust R826 pot. on predriver/driver board for reading between 10 mV and 35 mV on DC VTVM.

### POWER OUTPUT MEASUREMENT

The output amplifier of this unit is designed to deliver its full-rated power with program material (voice or music) into 8-ohm loads for an indefinite period of time. When a constant audio tone is used as a signal to measure the maximum continuous RMS power output, the following precautions must be taken:

- (1) Measure the power output of one channel at a time.
  - (2) Limit the measurement period to 10 minutes with a load resistance of 8 ohms.
  - (3) Use a load resistor with a power rating of at least 50 watts.
- WARNING:** If the power output of both channels is measured simultaneously, use a load of 8 ohms per channel and limit measurements to a period not longer than 5 minutes.

### HARMONIC DISTORTION TEST

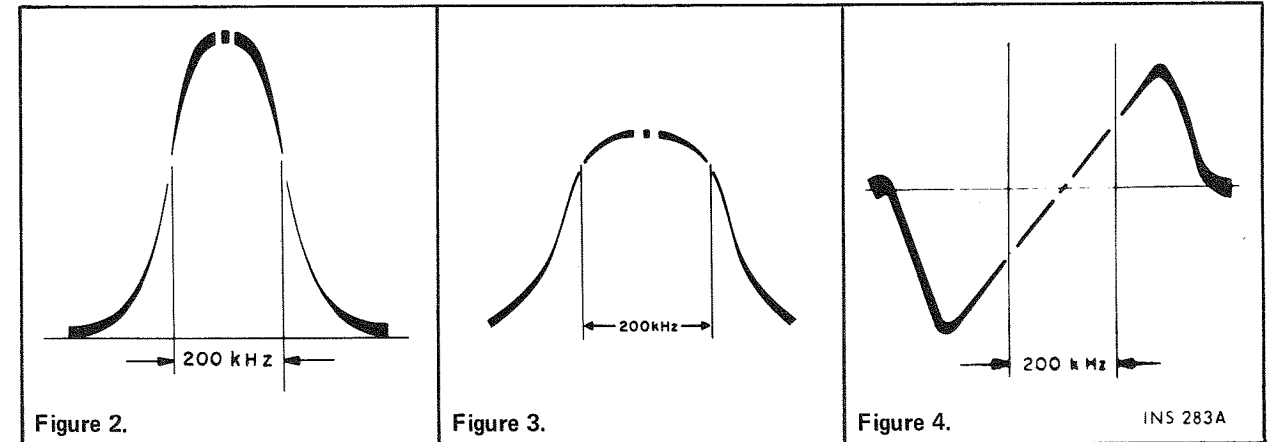
Set BALANCE, BASS, and TREBLE controls to their center positions. Set SELECTOR switch to AUX. Set LOUDNESS switch to OFF and MODE switch to STEREO (on pushbutton models MONO MODE and LOUDNESS pushbutton switches should be released to the out position). Set SPEAKERS switch to MAIN (on pushbutton models, depress MAIN SPKRS switch). Unplug AC power cord.

- (1) Connect an 8-ohm, 50-watt resistor across the LEFT SPKRS MAIN terminals. In parallel with the load resistor, connect the input leads of an HD analyzer and the input leads of an accurately calibrated AC VTVM.
- (2) Connect a low-distortion audio sine-wave generator, set for 1,000 Hz, to the Left channel AUX input.
- (3) Connect AC power cord and rotate VOLUME control to maximum.
- (4) Increase audio generator level for 14 watts output (10.6 V RMS across 8-ohm load). HD meter should read 0.5% or less.
- (5) Repeat preceding steps for right channel.

### INTERMODULATION DISTORTION TEST

Set BALANCE, BASS and TREBLE controls to their center positions. Set SELECTOR switch to AUX. Set LOUDNESS switch to OFF and MODE switch to STEREO (on pushbutton models, MONO MODE and LOUDNESS pushbutton switches should be released to the out position). Set SPEAKERS switch to MAIN (on pushbutton models, depress MAIN SPKRS switch). Unplug AC power cord.

- (1) Connect an 8-ohm, 50-watt resistor across the LEFT SPKRS MAIN terminals. In parallel with the load resistor, connect the input leads of an IM distortion analyzer and the input leads of an accurately calibrated AC VTVM.



- (2) Connect IM-analyzer generator output to the Left channel AUX input. Set level of IM-analyzer generator for 300 mV output.
  - (3) Connect AC power cord and adjust VOLUME control for 12 watts output (7.95 V RMS across 8-ohm load). AFTER ONE FULL MINUTE OF WARM-UP, PROCEED TO NEXT STEP.
  - (4) IM meter reading should be 0.8% or less.
  - (5) Repeat preceding steps for right channel.
- NOTE:** If any of the preceding instructions differ from those in the IM-analyzer instruction manual, it is best to follow those in the manual. If a load resistor of 50-watt rating is built into the IM analyzer, a separate load resistor is not required.

### FM IF AND DETECTOR ALIGNMENT

Set SELECTOR switch to FM. Turn VOLUME control to minimum.

- (1) Disconnect the jumper lead from FM Test Point 301 (pin 3N on AM/FM IF, MPX board) and connect vertical input of scope to Test Point 301. Connect ground lead of scope to nearest chassis ground.
- (2) Connect an 82k resistor across scope input and set scope input for AC. Adjust scope vertical sensitivity to approximately 100 mV/cm.
- (3) Connect 10.7 MHz sweep generator to Test Point 501 (pin 5F on FM RF board). Connect ground lead of generator to pin 5G. Adjust generator level and sweep to observe IF response curve.
- (4) Adjust top and bottom cores of Z305, Z304, and Z302 (on AM/FM IF, MPX board) for symmetry and maximum gain.
- (5) Adjust top and bottom cores of L505 (on FM RF board) for maximum gain and symmetry. Repeat alignment until maximum gain and symmetry are obtained (see Figure 2).
- (6) Increase generator level to full output (approximately 100,000  $\mu$ V). If necessary, slightly readjust top core of Z305 to center 10.7 MHz marker (see Figure 3).
- (7) Reconnect the jumper lead to FM Test Point 301 (pin 3N on AM/FM IF, MPX board) removed previously. Disconnect the 82k resistor across scope input connected previously.
- (8) Reduce generator sweep to zero (sweep off). Adjust FM

- METER ADJ. pot. R328 (on AM/FM IF, MPX board) for front panel tuning meter reading of 4.5.
- (9) Connect vertical input of scope to Test Point 3M (on AM/FM IF, MPX board). Use same scope sensitivity setting (100 mV/cm).
  - (10) Adjust generator level and sweep to observe detector "S" curve. Adjust bottom core of Z306 first, then top core for maximum gain and symmetry (see Figure 4).
  - (11) Connect DC VTVM to Test Point 3M. Use 1.5 volts DC meter scale or lower.
  - (12) Readjust top core of Z306 for zero (0) reading (within  $\pm 0.2$  volt) on DC VTVM.

### FM FRONT END ALIGNMENT

**NOTE:** FM IF alignment must be performed before starting this procedure.

- Set SELECTOR to FM. Turn VOLUME control to minimum. Set MODE switch to MONO (on pushbutton models, depress MONO MODE pushbutton switch).
- (1) Set TUNING dial pointer to zero (0) calibration mark on the logging scale. If the dial pointer is not centered on the 0 at the extreme end of the knob rotation, reposition the pointer assembly on the dial cord and cement the pointer in place to prevent slippage. Allow cement to thoroughly dry.
- NOTE:** Repositioning the dial pointer may require realignment of AM RF board (on Model 125 only) for correct AM station calibration.
- (2) Connect an FM generator to the FM ANTenna terminals. Use a 120-ohm composition resistor in series with each lead from the generator (see Figure 5).
  - (3) Connect a scope and an AC VTVM to either Left or Right RCDR OUT jack.
  - (4) Set FM generator frequency and TUNING dial pointer to 90 MHz. Modulate generator with 400 Hz,  $\pm 75$  kHz deviation. Set generator level as low as possible.
  - (5) Align (oscillator coil) L504 first, then (mixer coil) L503 and (RF L502 for maximum reading on AC VTVM and tuning meter, and maximum waveform amplitude and symmetry.
  - (6) Set generator frequency and TUNING dial pointer to 106 MHz.
  - (7) Align (oscillator trimmer) C512 first, then (mixer trimmer) C511 and (RF trimmer) C503 for maximum reading on AC VTVM and tuning meter, and maximum waveform amplitude and symmetry.
  - (8) Repeat alignment several times until accurate dial calibration and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.



## SERVICE PROCEDURES

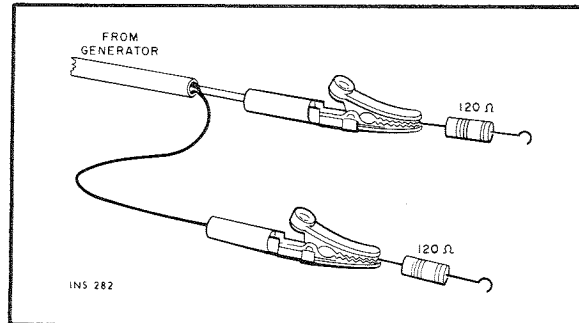


Figure 5. Connections To Provide 300-ohm Generator Output Impedance. Matching Resistors Reduce Generator Voltage By Half At Antenna Terminals.

### TUNING METER CALIBRATION

**NOTE:** Meter calibration should be performed after FM IF and RF alignment.

Set SELECTOR switch to FM. Turn VOLUME control to minimum.

(1) Connect an FM generator to the FM ANTenna terminals. Use a 120-ohm composition resistor in series with each lead from the generator (see Figure 5).

(2) Set generator frequency to same frequency as receiver. Set generator RF output level to full output (approximately 100,000  $\mu$ V) with audio modulation off.

(3) Adjust generator frequency for peak tuning meter reading.

(4) Adjust FM METER ADJ. pot. R328 (on AM/FM IF, MPX board) for tuning meter reading of 4.5.

### MULTIPLEX ALIGNMENT

Two methods of aligning the multiplex decoder are given. The preferred procedure uses a multiplex generator with RF and 19 kHz outputs and with 1 kHz modulation, such as the FISHER 300 Multiplex Generator. This is the better method of alignment because the front end and IF stages are also checked through the use of this procedure. An alternate procedure for use with multiplex generators not having an RF output is also given.

### PREFERRED ALIGNMENT PROCEDURE

**NOTE:** Check the alignment of the IF amplifier before aligning the multiplex decoder. Poor IF alignment can make proper MPX adjustment impossible.

Set SELECTOR switch to FM, and VOLUME control to minimum. Set MODE switch to STEREO (on pushbutton models, release MONO MODE pushbutton switch to out position).

(1) Connect RF output of multiplex generator to the FM ANTenna terminals. Use a 120-ohm composition resistor in series with each lead from RF output (see Figure 5). Set MPX generator for external modulation with 19 kHz pilot carrier,  $\pm 7.5$  kHz deviation (10% pilot, no audio). Tune receiver to RF frequency of MPX generator.

(2) Connect DC VTVM to Test Point 403 (pin 4G on AM/FM IF, MPX board).

(3) Adjust cores of Z401 and Z402 (on AM/FM IF, MPX board) for maximum reading on DC VTVM (2.5 to 4 VDC).

(4) Connect output of audio generator, set for 1 kHz, to the external modulation input of MPX generator and to external

sync input of an oscilloscope. Adjust audio generator level for composite signal  $\pm 75$  kHz deviation (10% pilot, 90% audio). Modulate right channel only.

(5) Connect AC VTVM to Left RCDR OUT jack. Connect scope through voltage divider probe (see Figure 6) to Test Point 402 (pin 4K on AM/FM IF, MPX board).

(6) Turn R107 SEPARATION CONTROL (on preamplifier board) CW to maximum resistance setting. Adjust core of Z403 (on AM/FM IF, MPX board) for maximum gain and as straight a base-line as possible on scope (see Figure 7). AC VTVM should read minimum.

(7) With MPX generator modulated on right channel only, connect AC VTVM to Right RCDR OUT jack. Record reading on AC VTVM.

(8) Set MPX generator to modulate left channel only. Adjust R107 SEPARATION CONTROL (on preamplifier board) for minimum reading on AC VTVM; at least 30 dB below reading recorded in step (7). Record reading.

(9) Connect AC VTVM to Left RCDR OUT jack. Same reading  $\pm 2$  dB as recorded in step (7).

(10) Set MPX generator to modulate right channel only. Same reading  $\pm 3$  dB as recorded in step (8).

**NOTE:** If equal readings cannot be obtained in steps (8) and (10), readjust Z402 slightly (on AM/FM IF, MPX board) and repeat steps (7) through (10).

### ALTERNATE ALIGNMENT PROCEDURE

Set SELECTOR switch to FM, and VOLUME control to minimum. Set MODE switch to STEREO (on pushbutton models, release MONO MODE pushbutton switch to out position).

(1) Disconnect the jumper lead going to pin 4A (on AM/FM IF, MPX board) and connect the output of the multiplex generator through a 15k resistor to pin 4A.

(2) Connect DC VTVM to Test Point 403 (on AM/FM IF, MPX board). Connect the vertical input of the scope to pin 4A.

(3) Set MPX generator for 19 kHz pilot carrier output only. Adjust pilot level for approximately 120 mV peak-to-peak input at pin 4A.

(4) Adjust cores of Z401 and Z402 (on AM/FM IF, MPX board) for maximum reading on DC VTVM (2.5 to 4 VDC).

(5) Connect output of audio generator, set for 1 kHz, to the external modulation input of MPX generator and to the external sync input of an oscilloscope. Adjust audio generator level for 1.2 volts peak-to-peak composite MPX input (10% pilot, 90% audio). See Figure 8. Modulate right channel only. Proceed with steps (5) through (10) of PREFERRED ALIGNMENT PROCEDURE.

(6) Reconnect the jumper lead going to pin 4A (on AM/FM IF, MPX board) removed previously.

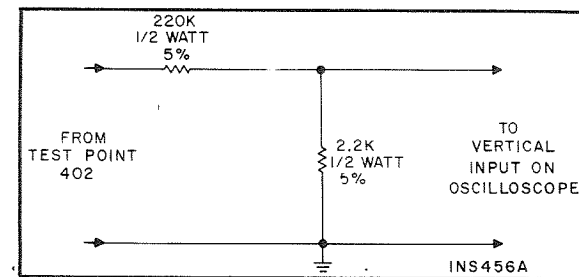


Figure 6. Voltage Divider Probe.

### AM IF ALIGNMENT

Set SELECTOR switch to AM, and VOLUME control to minimum.

(1) Connect 455 kHz sweep generator to pin 7A (on AM RF board). Use a 0.1  $\mu$ F capacitor in series with the generator

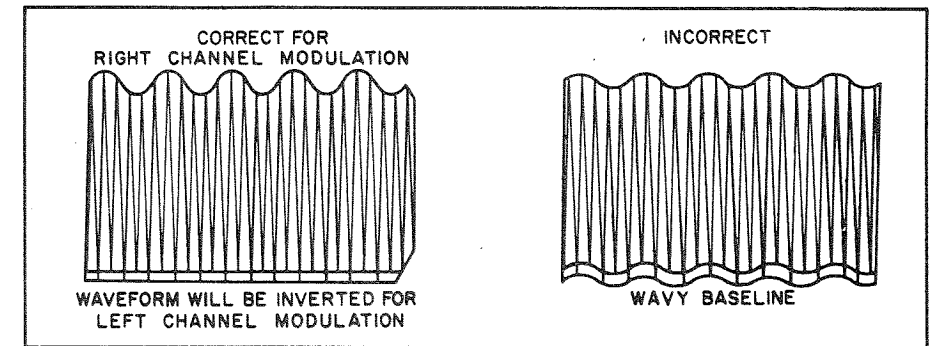


Figure 7. Waveform At Test Point 402.

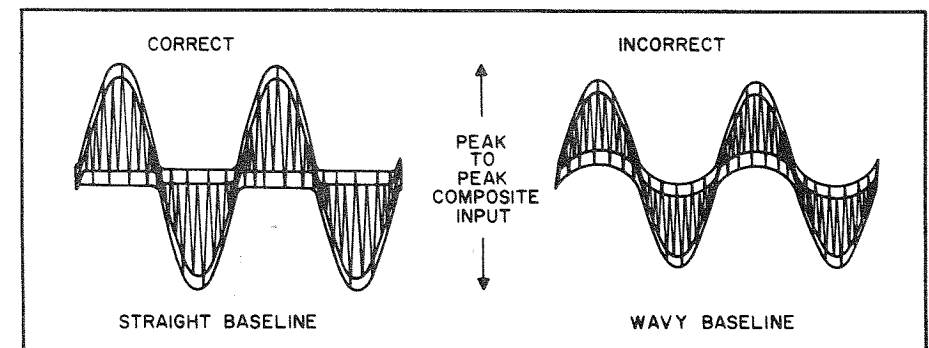


Figure 8. Composite Input To Multiplex Decoder.

lead. Connect generator ground to pin 7C.

(2) Connect vertical input of scope to Test Point 302 (pin 3Q on AM/FM IF, MPX board). Connect scope ground to pin 3G. Set scope vertical input sensitivity to approximately 200 mV/cm.

(3) Adjust generator level and sweep to observe IF response curve. Set generator output as low as possible.

(4) Adjust top and bottom cores of Z303, Z301 (on AM/FM IF, MPX board), and Z701 (on AM RF board) for maximum gain and symmetry. Repeat alignment until maximum gain and symmetry are obtained (see Figure 9).

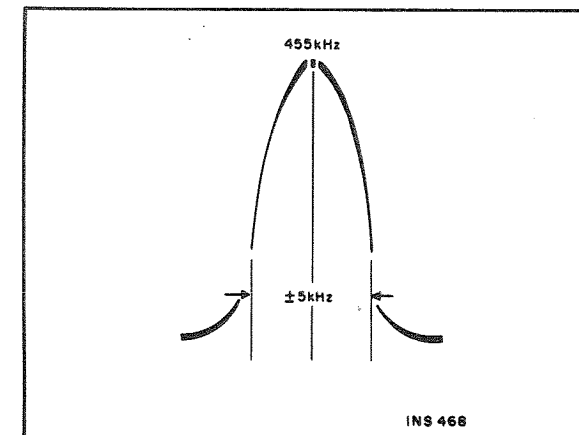


Figure 9.

### AM RF ALIGNMENT

**NOTE:** AM IF alignment must be performed before starting this procedure.

Set SELECTOR switch to AM, and VOLUME control to minimum.

(1) Set TUNING dial pointer to zero (0) calibration mark on the logging scale. If dial pointer does not coincide with the (0) at the extreme end of knob rotation, reposition the pointer assembly on the dial cord and cement the pointer in place to prevent slippage.

**NOTE:** Repositioning the dial pointer may require realignment of FM RF board for correct FM station calibration.

(2) Open the AM ANTenna GND link at the antenna terminals. Connect an AM generator to the AM ANTenna and GND terminals.

(3) Connect a scope and an AC VTVM to either the Left or Right RCDR OUT jack.

(4) Set AM generator frequency and TUNING dial pointer to 600 kHz. Use 30% modulation with 400 Hz. Set generator output as low as possible.

(5) Align oscillator coil Z701 (on AM RF board) for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.

(6) Set AM generator frequency and TUNING dial pointer to 1400 kHz. Adjust oscillator trimmer C703 (on AM RF board) for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.

(7) Repeat alignment several times until accurate dial calibration and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.

(8) Reset AM generator frequency and TUNING dial pointer to 600 kHz. Adjust the position of the small coil on the ferrite loop antenna for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.

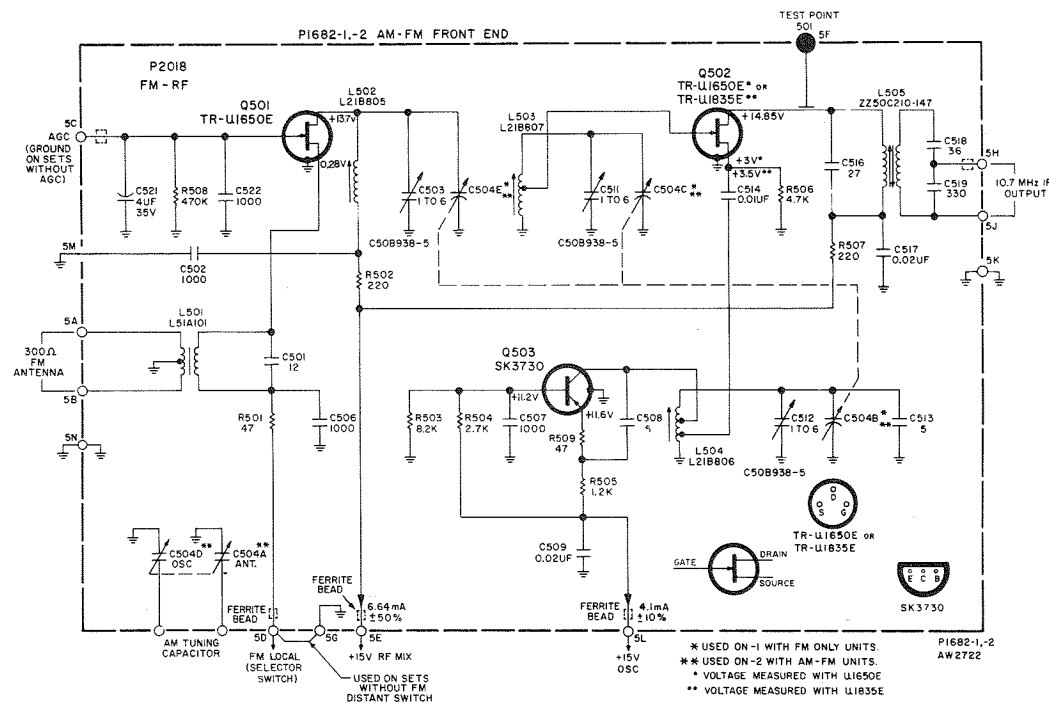
**NOTE:** To adjust the antenna coil, melt the wax holding the small coil to the end of the ferrite loop antenna. Shift the coil back and forth for maximum audio indication. To secure the coil in position, remelt the wax.

(9) Reset AM generator frequency and TUNING dial pointer to 1400 kHz. Adjust antenna trimmer C701 (on AM RF board) for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.

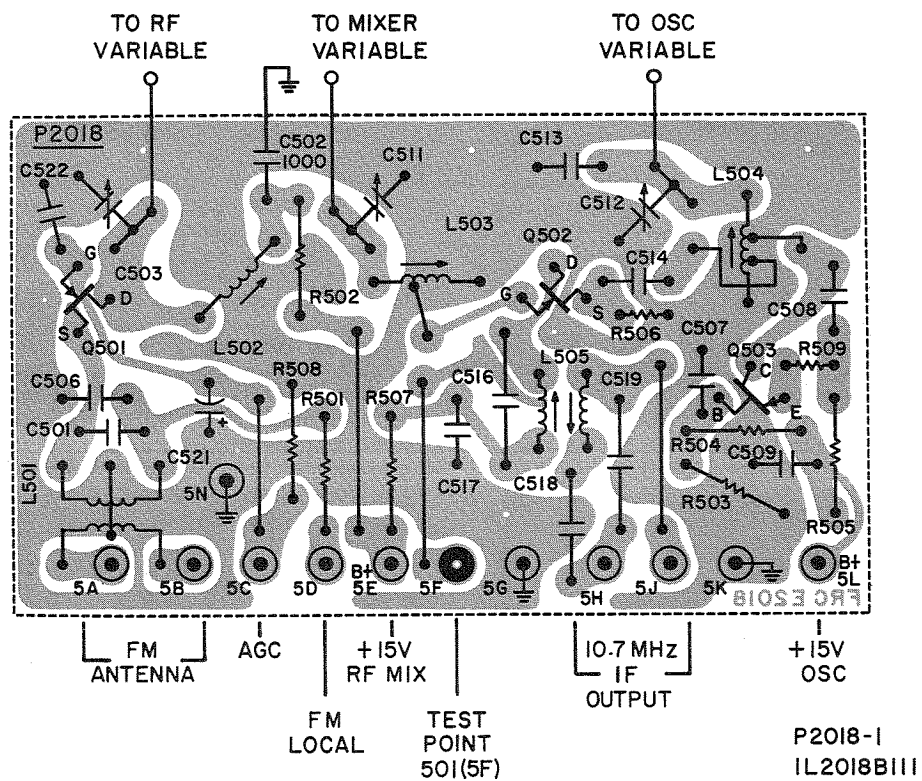
(10) Repeat steps (8) and (9) several times until maximum gain is obtained. Keep generator output as low as possible during all adjustments.

1682-1 FM FRONT END (120)

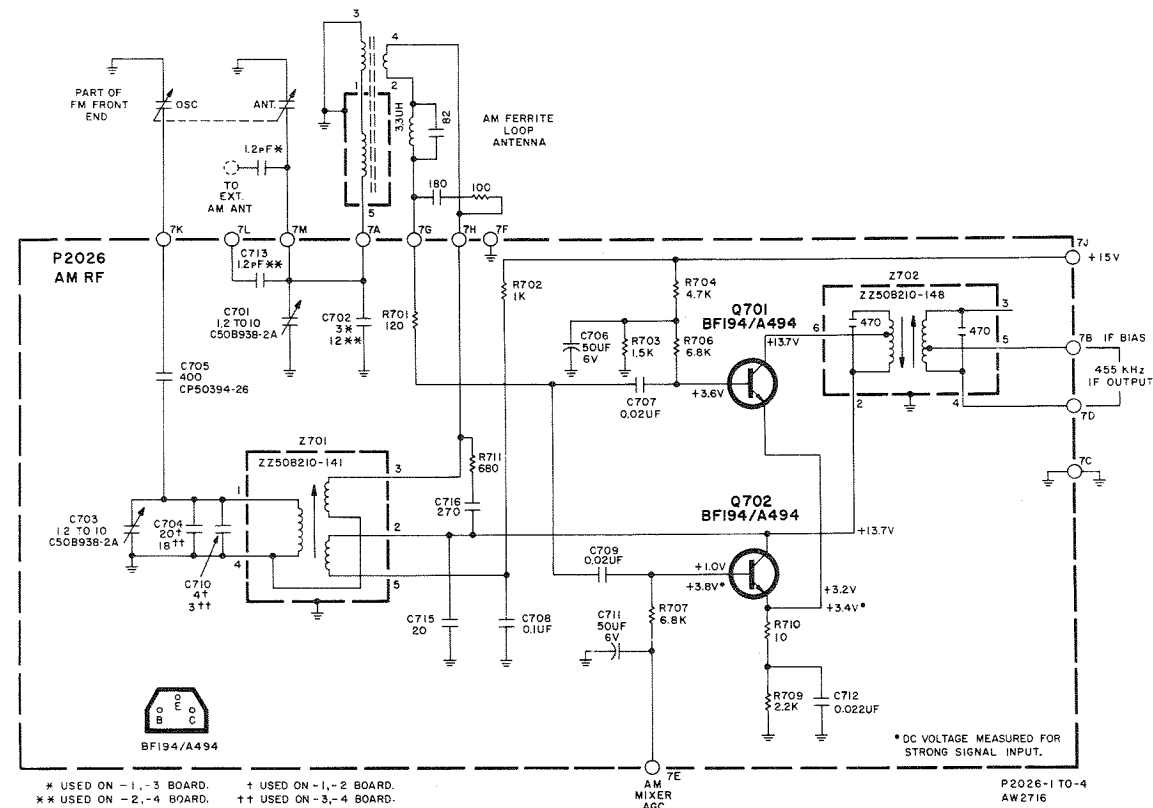
1682-2 AM-FM FRONT END (125)



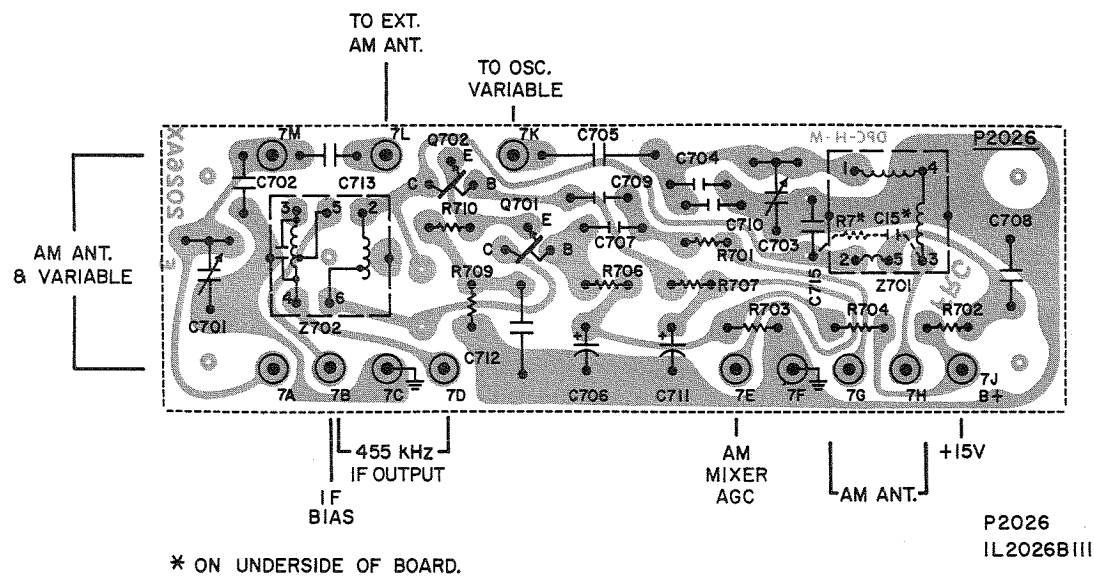
BOARD VIEWED FROM COMPONENT SIDE



2026-2 AM RF (125 ONLY)



BOARD VIEWED FROM COMPONENT SIDE

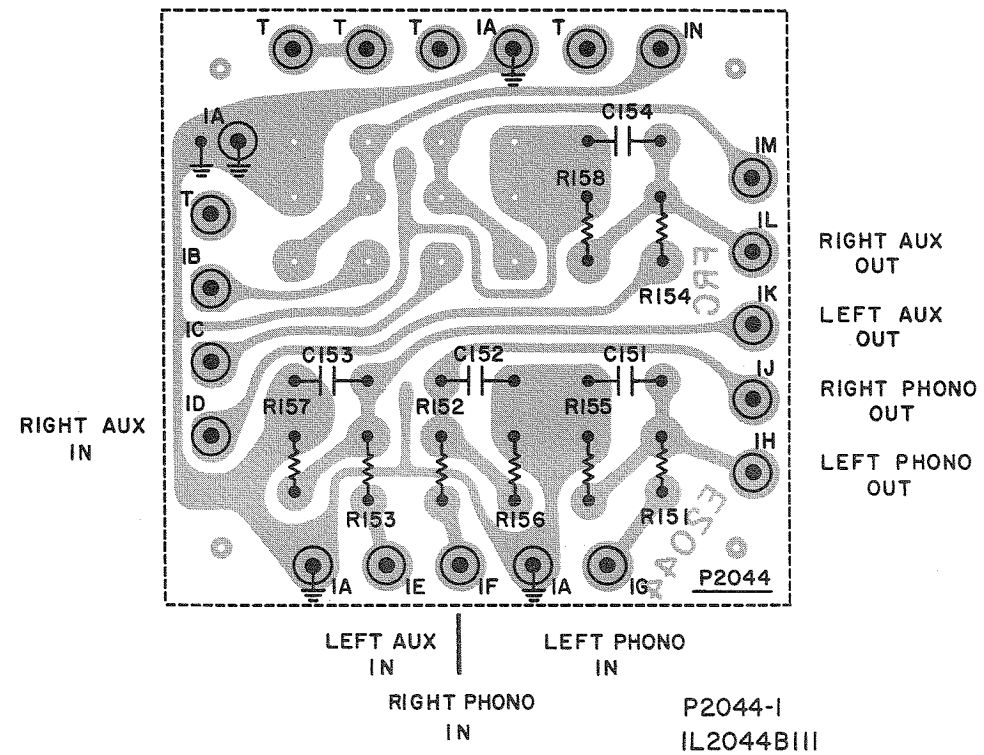


2044-1 AUDIO INPUT

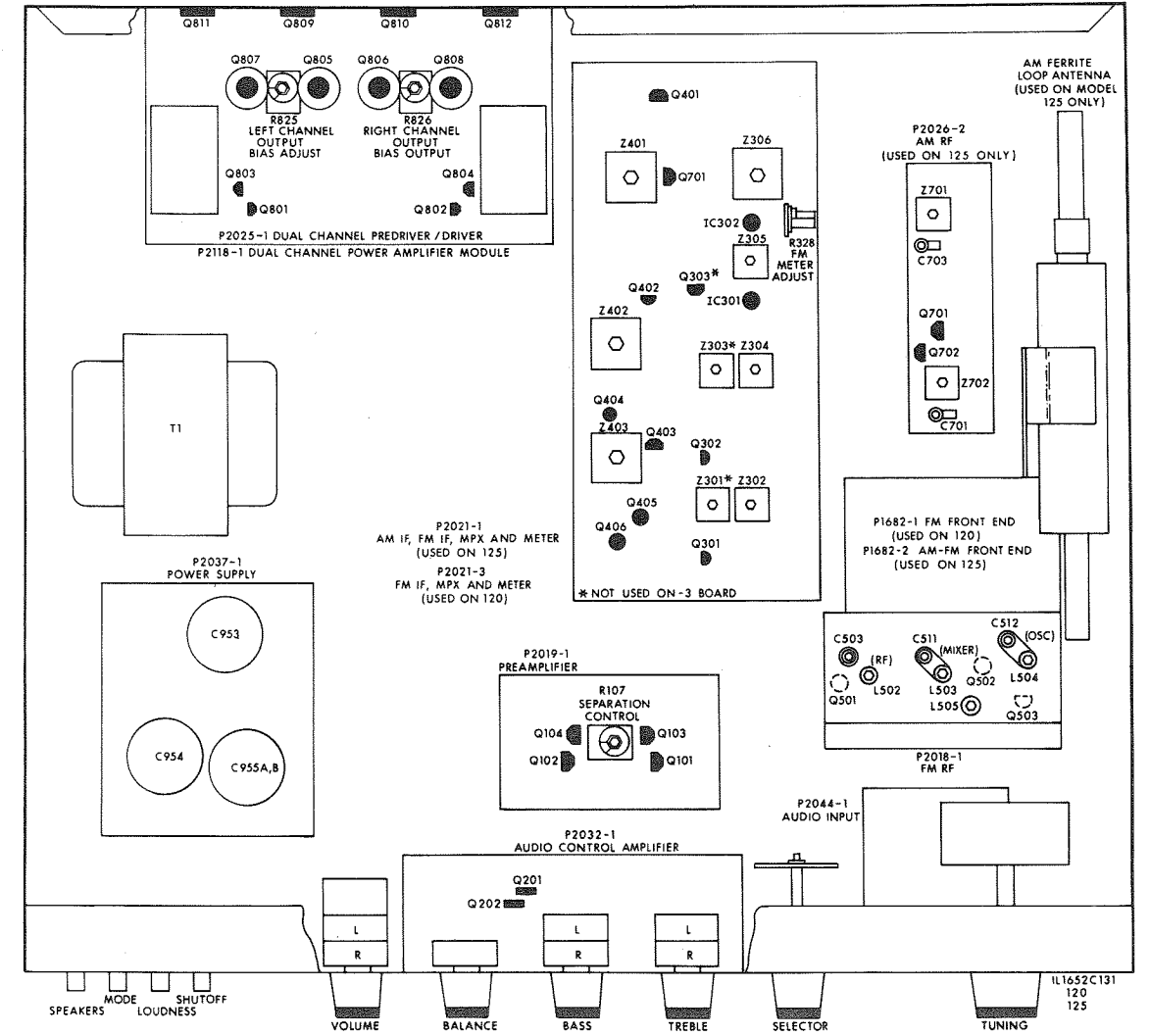
CHASSIS LAYOUT

SCHEMATIC SHOWN ON MAIN CHASSIS DIAGRAM

BOARD VIEWED FROM COMPONENT SIDE

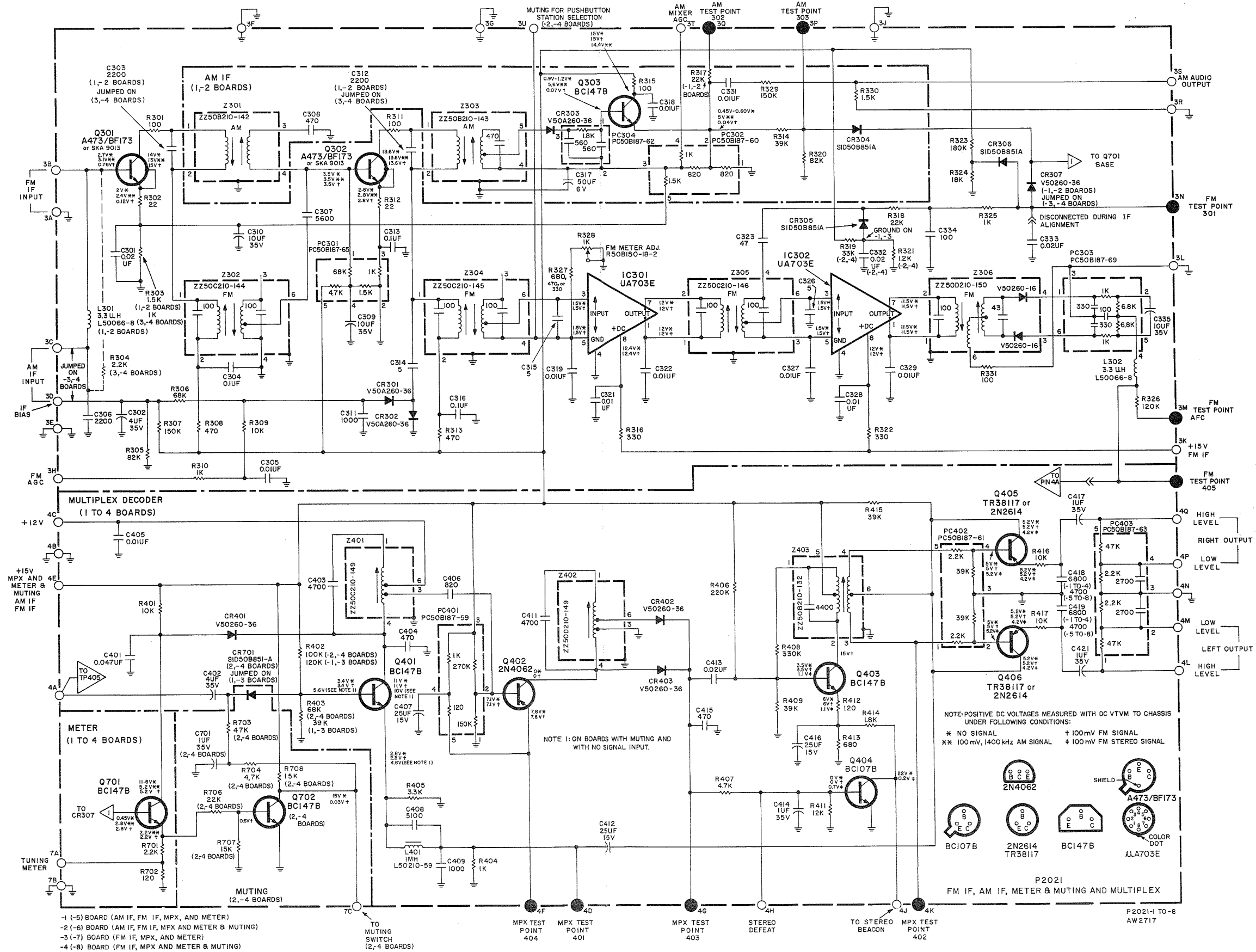


T= TERMINAL LUG USED FOR EASE IN WIRING.



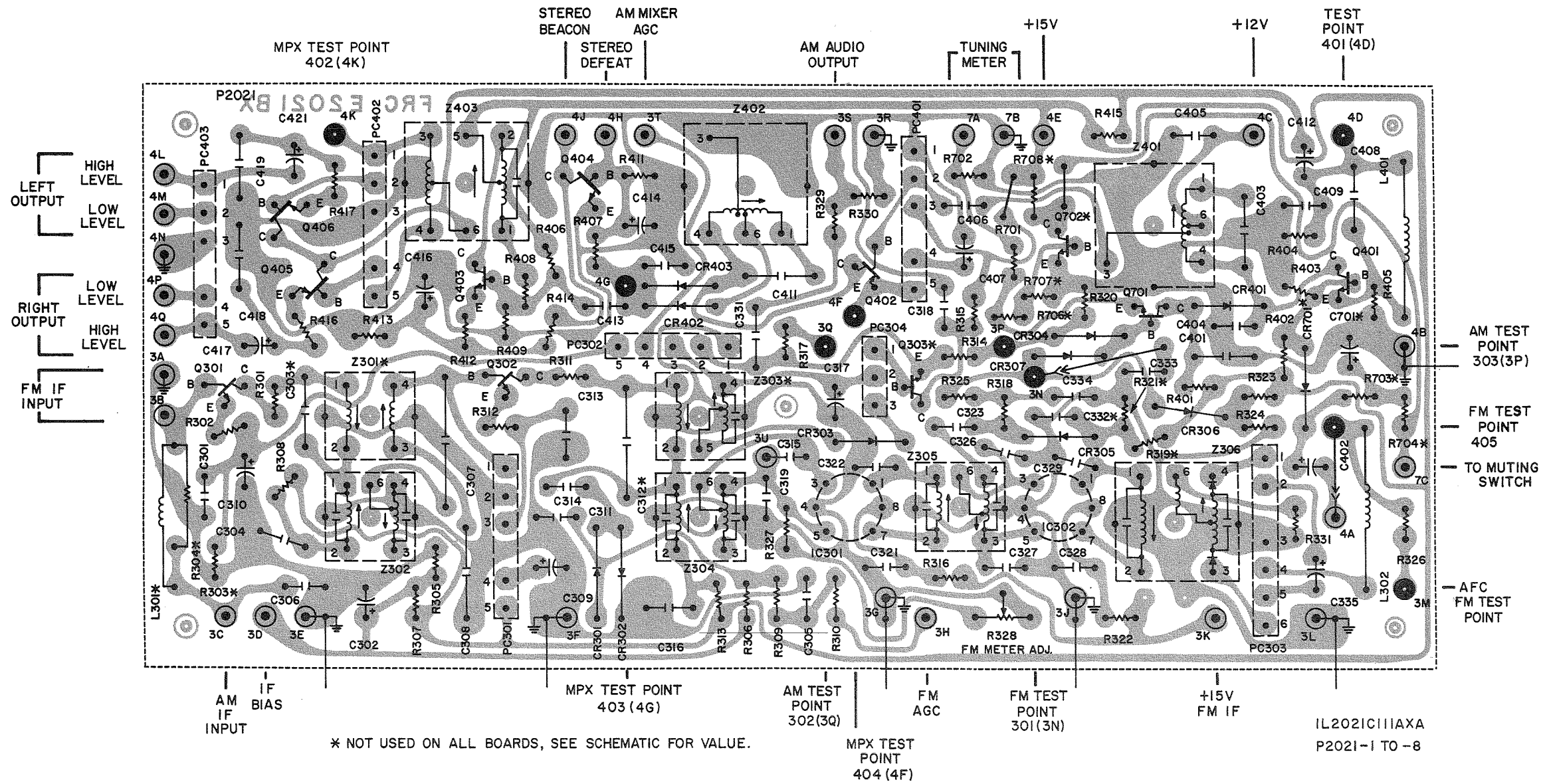
2021-1 AM-FM IF, MPX, METER (125)

2021-3 FM IF, MPX, METER (120)

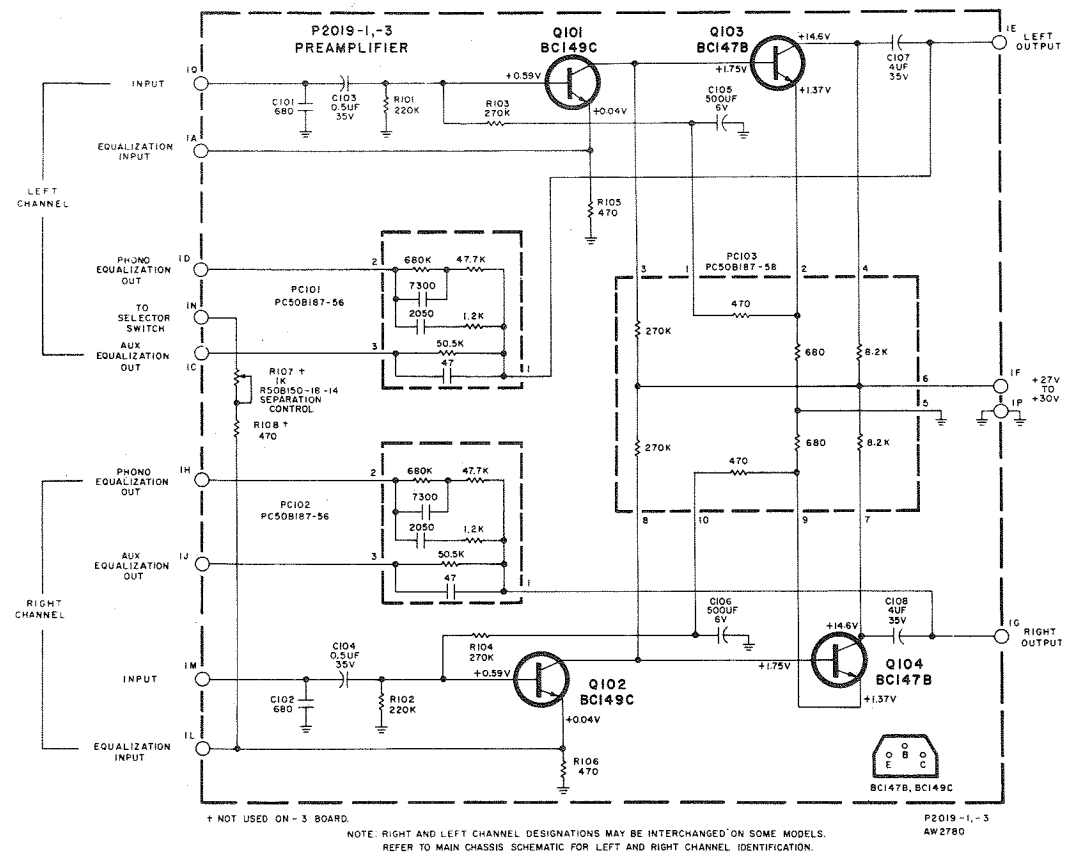




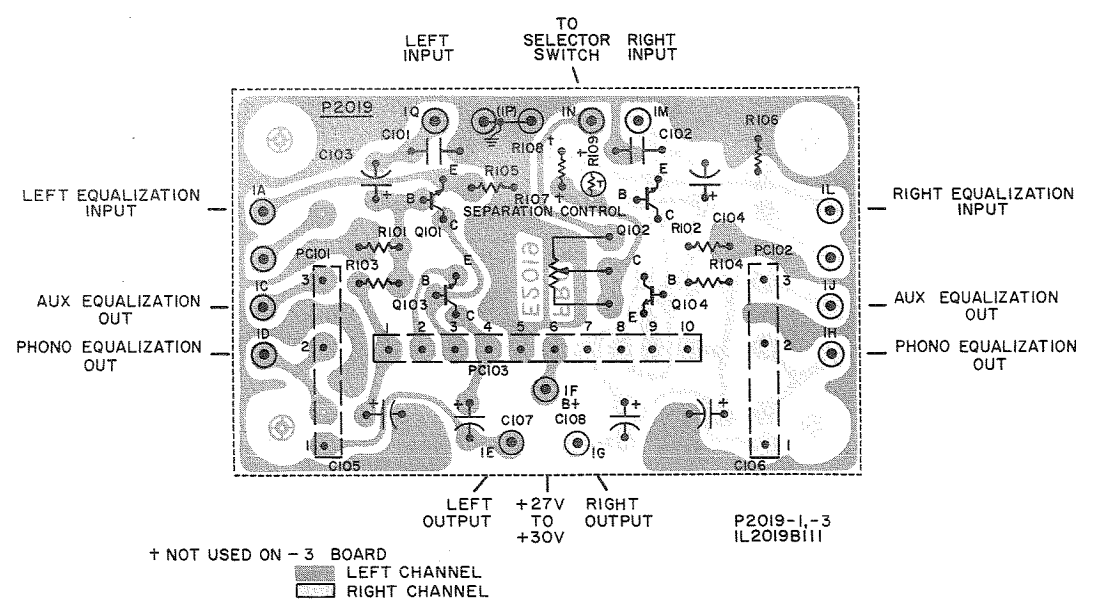
BOARD VIEWED FROM COMPONENT SIDE



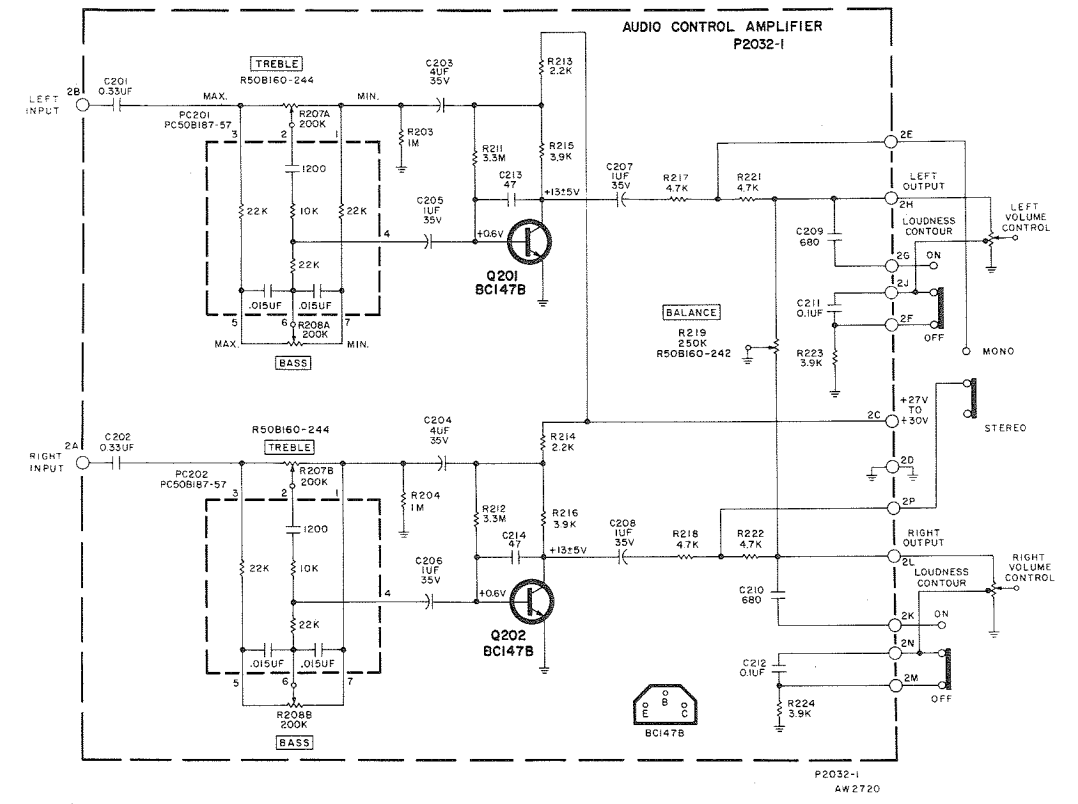
### 2019-1 PREAMPLIFIER



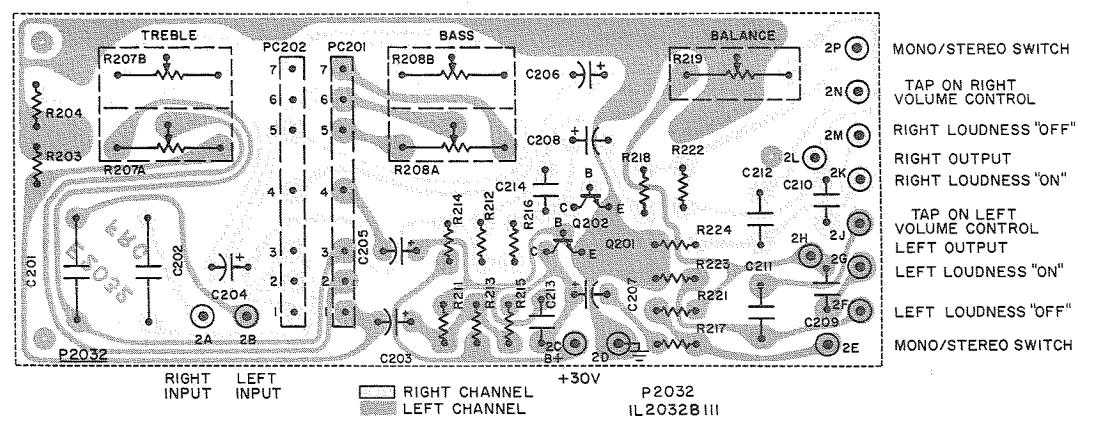
### BOARD VIEWED FROM COMPONENT SIDE



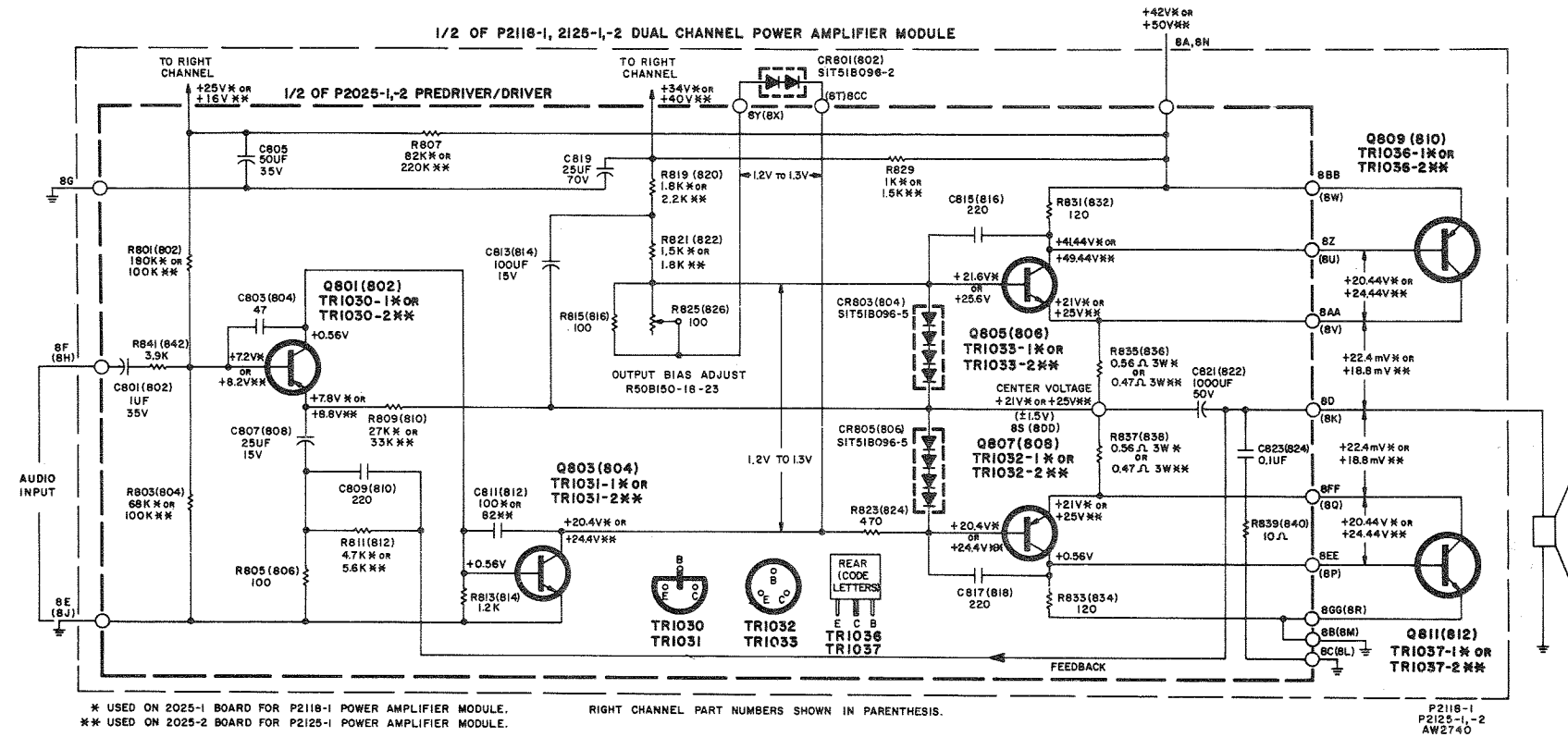
### 2032-1 AUDIO CONTROL AMPLIFIER



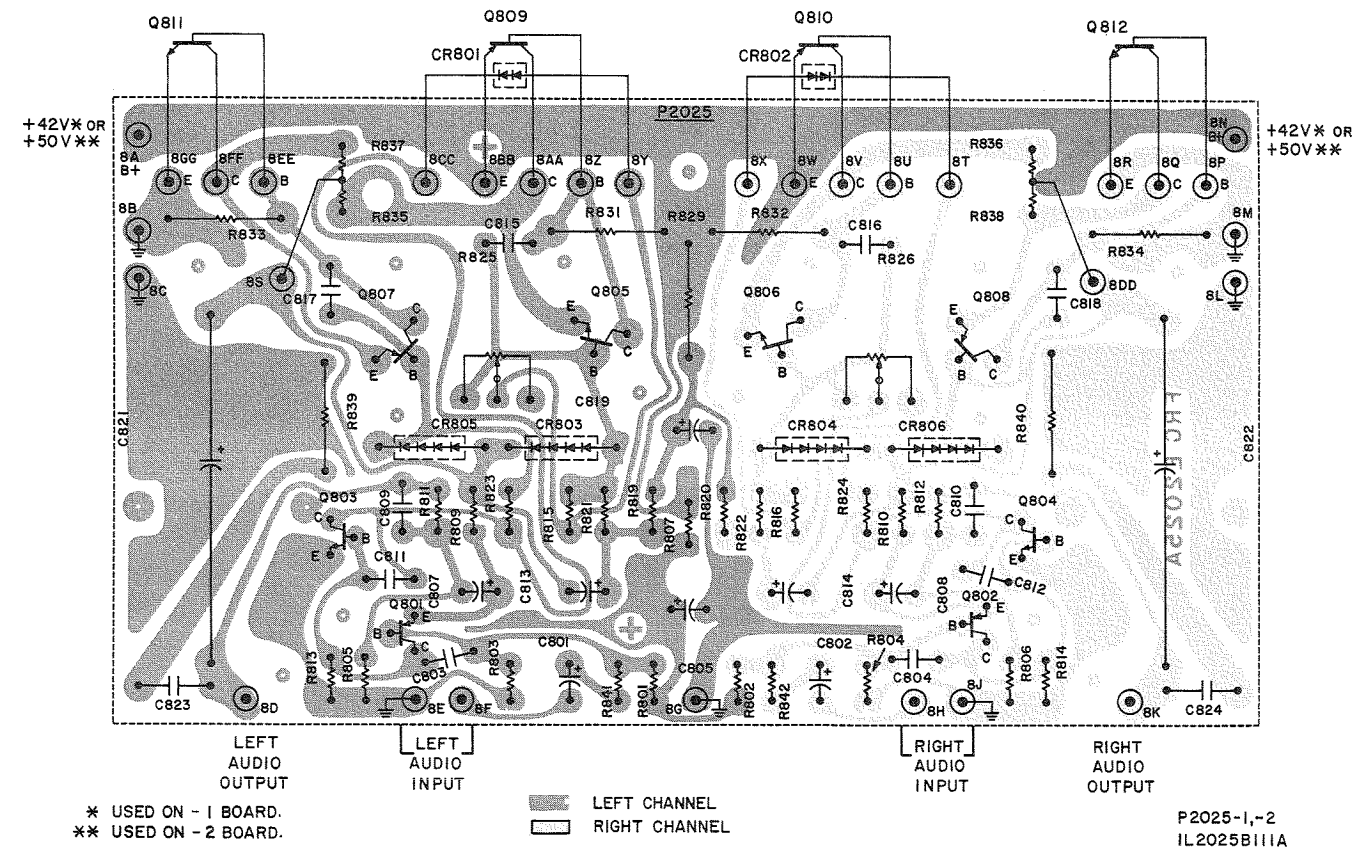
### BOARD VIEWED FROM COMPONENT SIDE



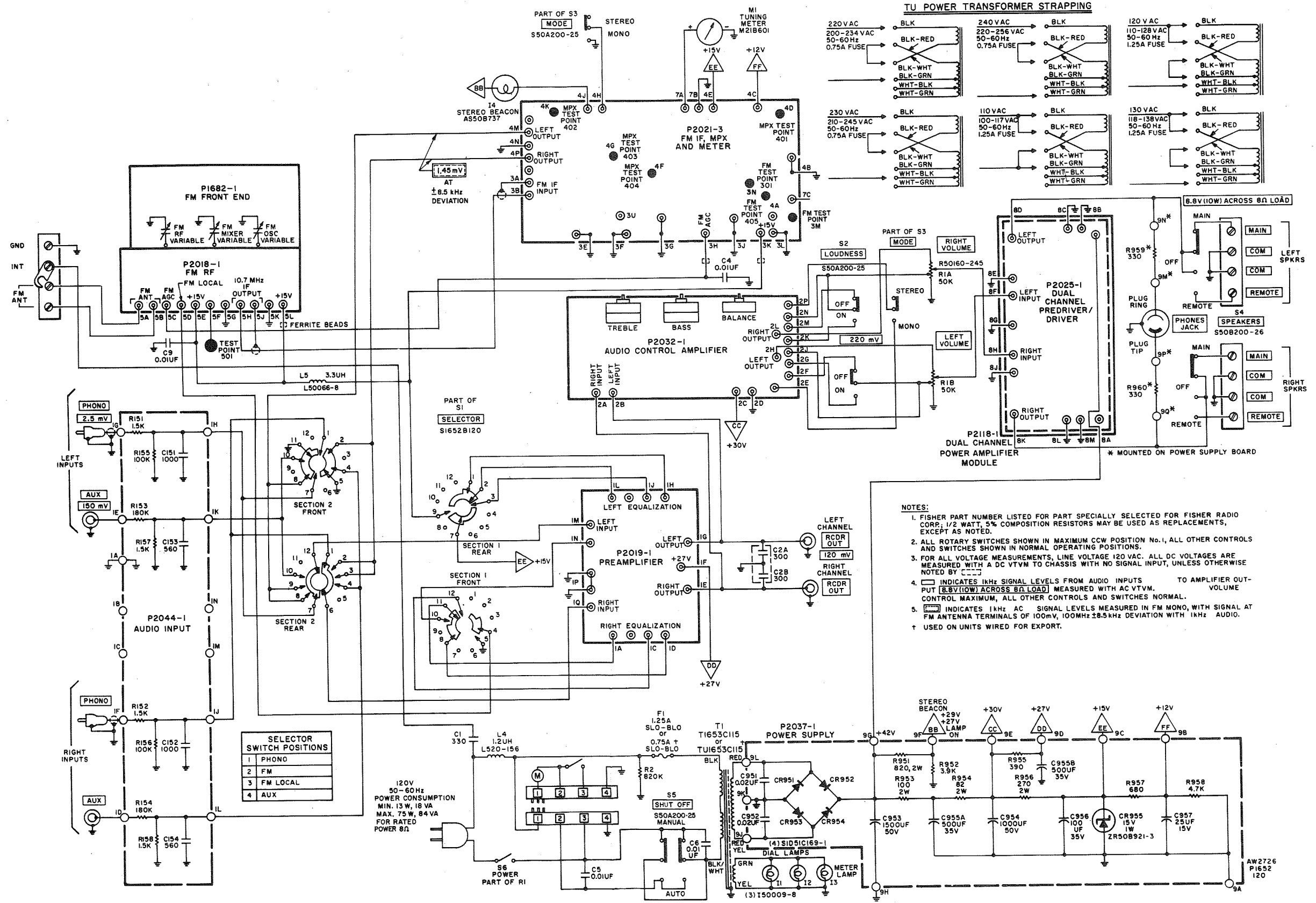
# 2118-1 DUAL CHANNEL POWER AMPLIFIER MODULE



## BOARD VIEWED FROM COMPONENT SIDE



(120) MAIN CHASSIS



- NOTES:
1. FISHER PART NUMBER LISTED FOR PART SPECIALLY SELECTED FOR FISHER RADIO CORP.; 1/2 WATT 5% COMPOSITION RESISTORS MAY BE USED AS REPLACEMENTS, EXCEPT AS NOTED.
  2. ALL ROTARY SWITCHES SHOWN IN MAXIMUM CCW POSITION No. 1, ALL OTHER CONTROLS AND SWITCHES SHOWN IN NORMAL OPERATING POSITIONS.
  3. FOR ALL VOLTAGE MEASUREMENTS, LINE VOLTAGE 120 VAC. ALL DC VOLTAGES ARE MEASURED WITH A DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, UNLESS OTHERWISE NOTED BY [ ]
  4. [ ] INDICATES 1kHz SIGNAL LEVELS FROM AUDIO INPUTS TO AMPLIFIER OUTPUT [8.8V(10W) ACROSS 8Ω LOAD] MEASURED WITH AC VTVM. CONTROL MAXIMUM, ALL OTHER CONTROLS AND SWITCHES NORMAL.
  5. [ ] INDICATES 1kHz AC SIGNAL LEVELS MEASURED IN FM MONO, WITH SIGNAL AT FM ANTENNA TERMINALS OF 100mV, 100MHz ±28.5kHz DEVIATION WITH 1kHz AUDIO.
- † USED ON UNITS WIRED FOR EXPORT.

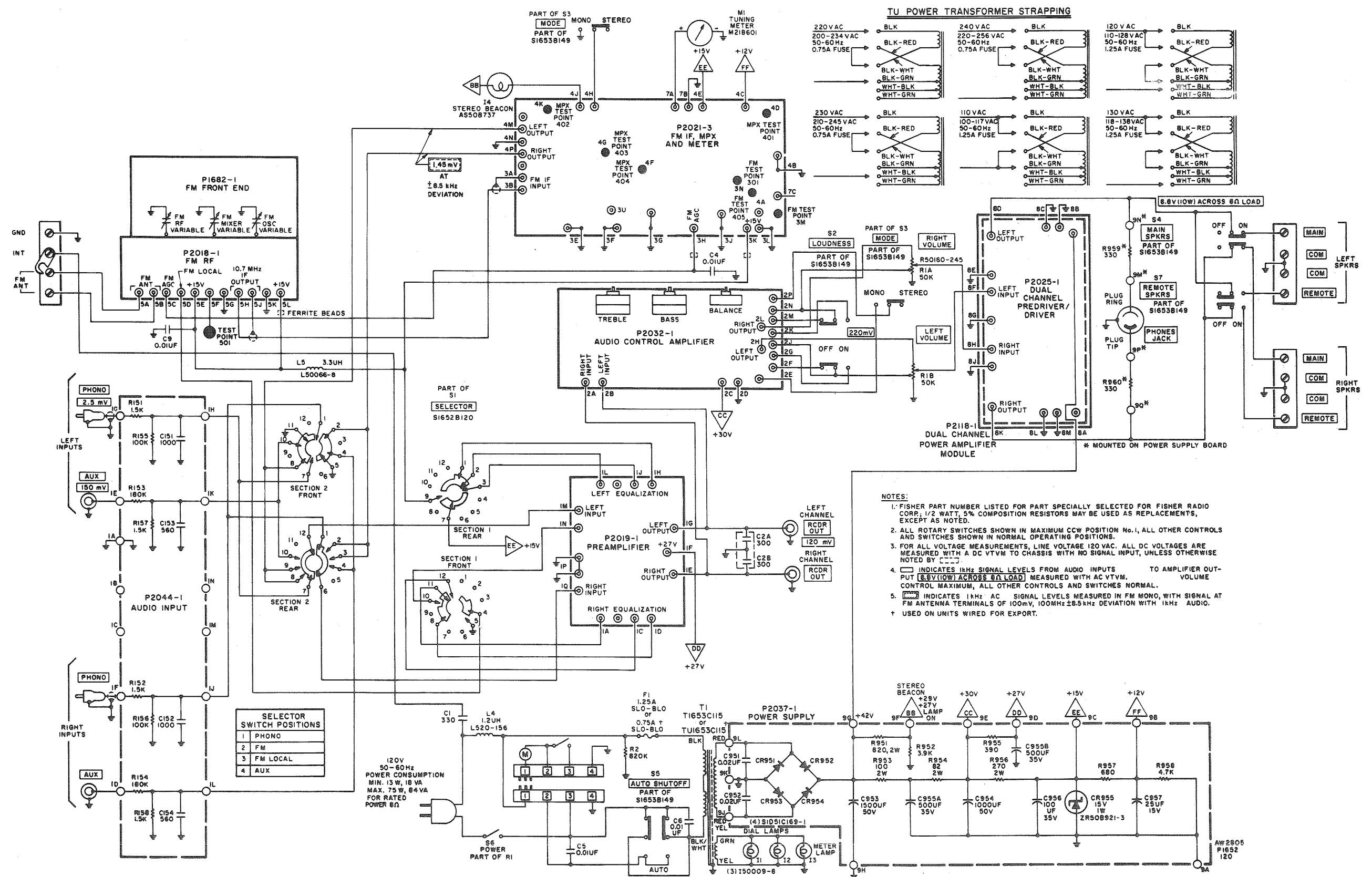
SELECTOR SWITCH POSITIONS

1	PHONO
2	FM
3	FM LOCAL
4	AUX

120V 50-60Hz  
POWER CONSUMPTION  
MIN. 13 W, 18 VA  
MAX. 75 W, 84 VA  
FOR RATED  
POWER 8/1

CHASSIS SERIAL NUMBERS 10001-11000

(120) MAIN CHASSIS



- NOTES:
1. FISHER PART NUMBER LISTED FOR PART SPECIALLY SELECTED FOR FISHER RADIO CORP.; 1/2 WATT, 5% COMPOSITION RESISTORS MAY BE USED AS REPLACEMENTS, EXCEPT AS NOTED.
  2. ALL ROTARY SWITCHES SHOWN IN MAXIMUM CCW POSITION No. 1, ALL OTHER CONTROLS AND SWITCHES SHOWN IN NORMAL OPERATING POSITIONS.
  3. FOR ALL VOLTAGE MEASUREMENTS, LINE VOLTAGE 120 VAC. ALL DC VOLTAGES ARE MEASURED WITH A DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, UNLESS OTHERWISE NOTED BY [---].
  4. [ ] INDICATES 1KHz SIGNAL LEVELS FROM AUDIO INPUTS TO AMPLIFIER OUTPUT [8.8V (10W) ACROSS 8Ω LOAD] MEASURED WITH AC VTVM. CONTROL MAXIMUM, ALL OTHER CONTROLS AND SWITCHES NORMAL.
  5. [ ] INDICATES 1KHz AC SIGNAL LEVELS MEASURED IN FM MONO, WITH SIGNAL AT FM ANTENNA TERMINALS OF 100mV, 100MHz 28.5kHz DEVIATION WITH 1KHz AUDIO.
- † USED ON UNITS WIRED FOR EXPORT.

SELECTOR SWITCH POSITIONS

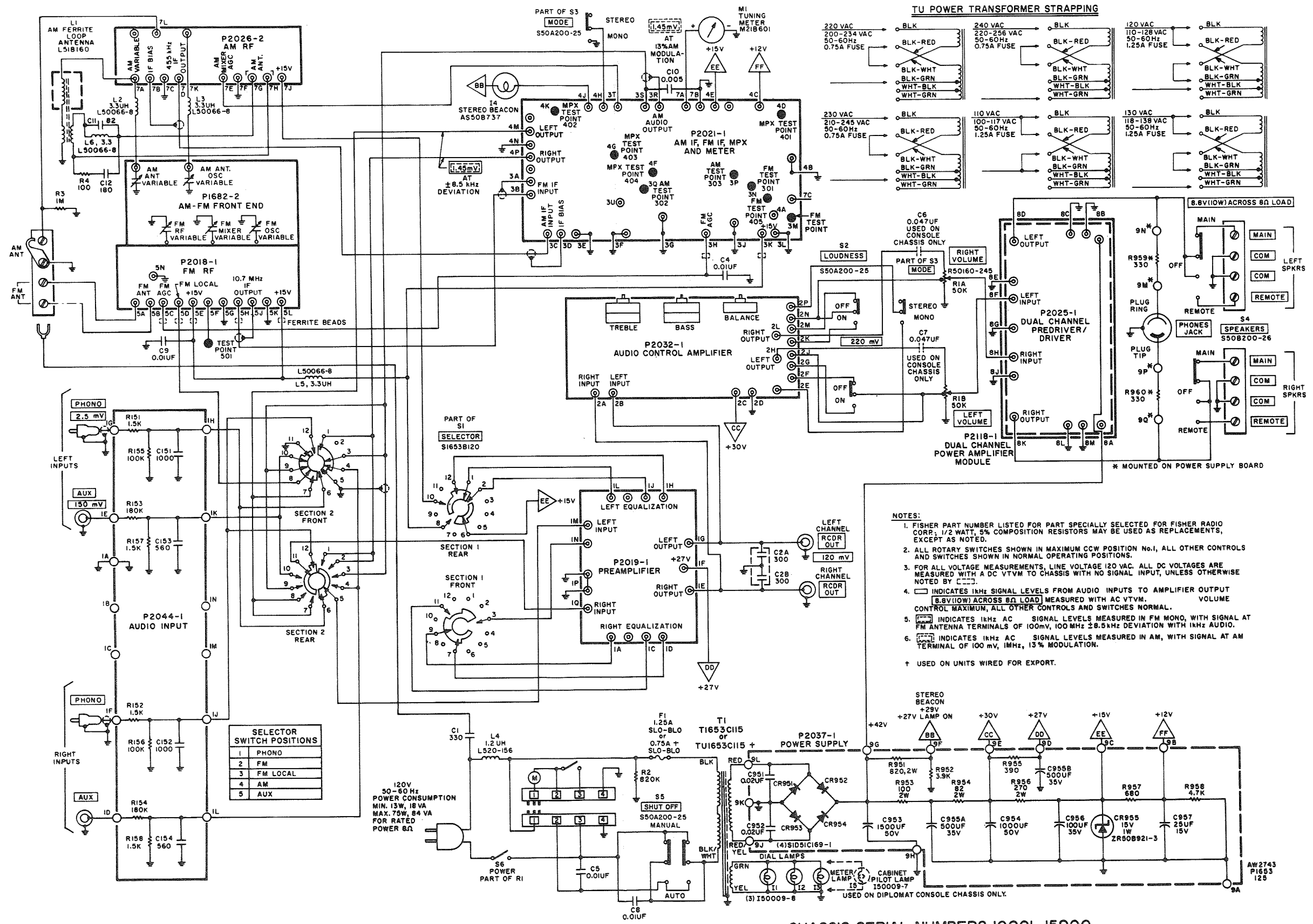
1	PHONO
2	FM
3	FM LOCAL
4	AUX

120V 50-60Hz  
POWER CONSUMPTION  
MIN. 13 W, 18 VA  
MAX. 75 W, 84 VA  
FOR RATED  
POWER 8Ω

CHASSIS SERIAL NUMBERS BEGINNING 11001



(125) MAIN CHASSIS



- NOTES:
1. FISHER PART NUMBER LISTED FOR PART SPECIALLY SELECTED FOR FISHER RADIO CORP. 1/2 WATT, 5% COMPOSITION RESISTORS MAY BE USED AS REPLACEMENTS, EXCEPT AS NOTED.
  2. ALL ROTARY SWITCHES SHOWN IN MAXIMUM CCW POSITION No.1, ALL OTHER CONTROLS AND SWITCHES SHOWN IN NORMAL OPERATING POSITIONS.
  3. FOR ALL VOLTAGE MEASUREMENTS, LINE VOLTAGE 120 VAC. ALL DC VOLTAGES ARE MEASURED WITH A DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, UNLESS OTHERWISE NOTED BY [Symbol].
  4. [Symbol] INDICATES 1kHz SIGNAL LEVELS FROM AUDIO INPUTS TO AMPLIFIER OUTPUT [Symbol] INDICATES 1kHz AC SIGNAL LEVELS MEASURED IN FM MONO, WITH SIGNAL AT FM ANTENNA TERMINALS OF 100mV, 100 MHz ± 8.5kHz DEVIATION WITH 1kHz AUDIO. [Symbol] INDICATES 1kHz AC SIGNAL LEVELS MEASURED IN AM, WITH SIGNAL AT AM TERMINAL OF 100 mV, 1MHz, 13% MODULATION.
  5. [Symbol] INDICATES 1kHz AC SIGNAL LEVELS MEASURED IN FM MONO, WITH SIGNAL AT FM ANTENNA TERMINALS OF 100mV, 100 MHz ± 8.5kHz DEVIATION WITH 1kHz AUDIO.
  6. [Symbol] INDICATES 1kHz AC SIGNAL LEVELS MEASURED IN AM, WITH SIGNAL AT AM TERMINAL OF 100 mV, 1MHz, 13% MODULATION.
- + USED ON UNITS WIRED FOR EXPORT.

SELECTOR SWITCH POSITIONS

1	PHONO
2	FM
3	FM LOCAL
4	AM
5	AUX

120V  
50-60 Hz  
POWER CONSUMPTION  
MIN. 13W, 18 VA  
MAX. 75W, 84 VA  
FOR RATED  
POWER & Ω

CHASSIS SERIAL NUMBERS 10001-15900

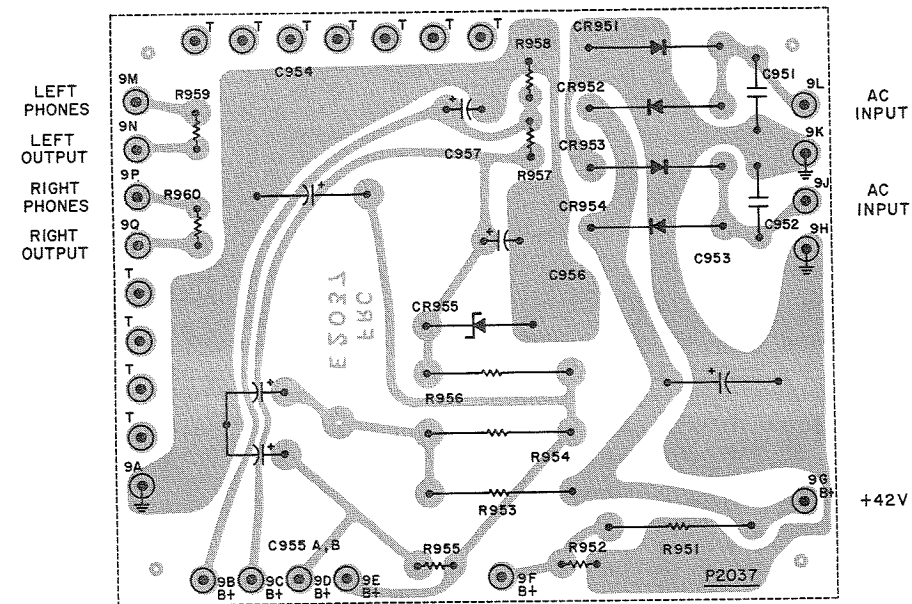
AW2743  
P1653  
125



2037-1 POWER SUPPLY

SCHEMATIC SHOWN ON MAIN CHASSIS DIAGRAM

BOARD VIEWED FROM COMPONENT SIDE

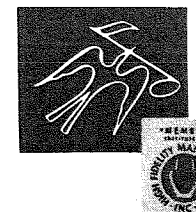
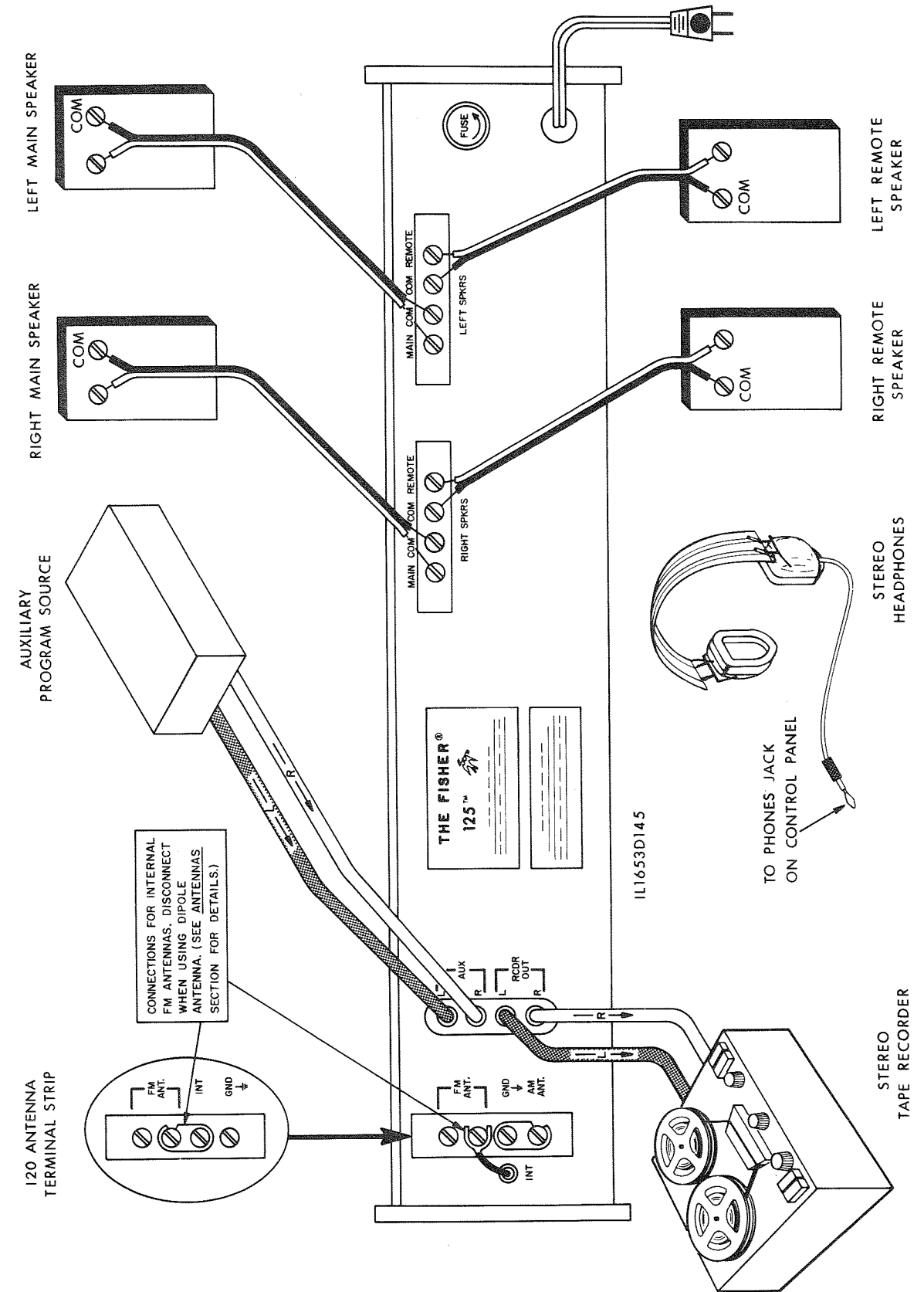


T=TERMINAL LUG USED FOR EASE IN WIRING.

STEREO BEACON LAMP ON

P2037 IL2037B111

COMPONENT CONNECTIONS



FISHER RADIO CORPORATION · NEW YORK