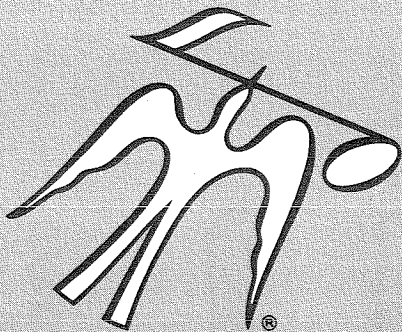
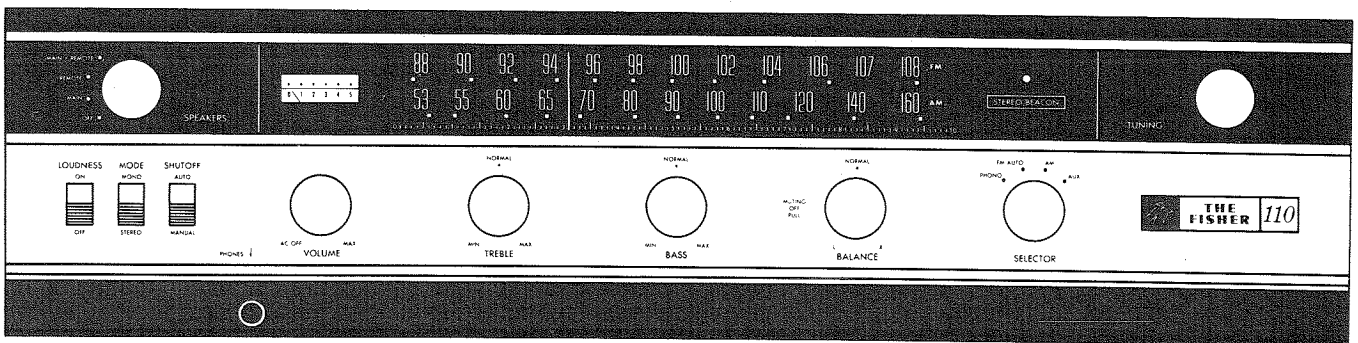
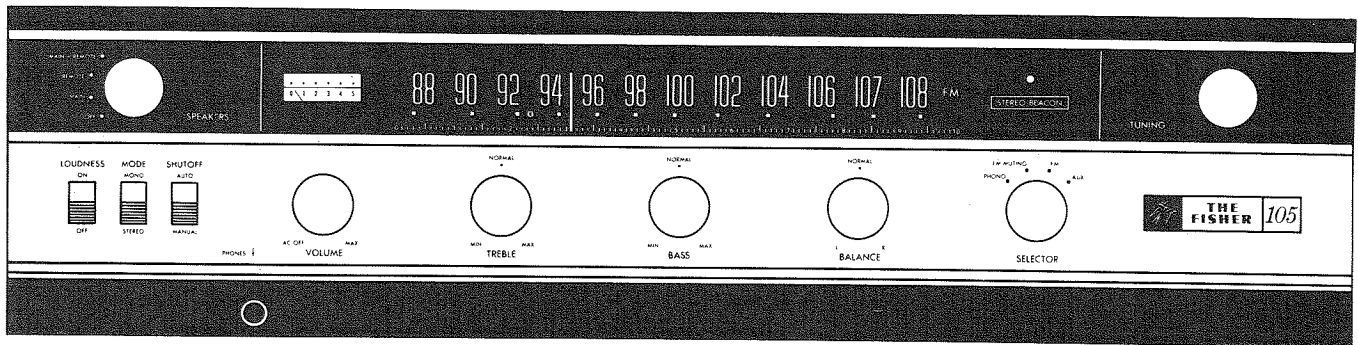


Service Manual

THE FISHER®



105™

CHASSIS SERIAL NUMBERS
BEGINNING 10001

110™

CHASSIS SERIAL NUMBERS
BEGINNING 50001

PRICE \$1.00

FISHER RADIO CORPORATION • LONG ISLAND CITY • NEW YORK 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

DIAL STRINGING

- (1) Disconnect AC power cord.
- (2) Prop the unit on its rear edge. Remove the four screws which hold the chassis to the cabinet, disconnect the audio and power cables from the record changer, and lift the chassis out of the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only).
- (3) Remove the dial cord from under the tabs on the rear of the dial pointer and remove the pointer from the set.
- (4) Loosen the set screw on the flywheel and lift it off the tuning shaft.
- (5) Rotate the tuning capacitor drive drum to its maximum clockwise position.
- (6) Tie the end of the dial cord to the end of the small spring. Fasten the spring to the ear inside the top of the drive drum (see start view).
- (7) Run the dial cord through the slot in the drive drum and set the cord in the underside of groove 5 (see start view).
- (8) Place the dial cord around pulley A. Wrap 3 full turns of the dial cord around the tuning shaft.
- (9) Guide the dial cord around pulleys B, C, D and E.
- (10) Rotate the tuning capacitor drive drum to its maximum counterclockwise position, allowing the dial cord to follow the grooves in the drive drum.
- (11) Place the dial cord over the top of the drive drum and into groove 2 (see finish view).
- (12) Pull the dial cord taut. Run the dial cord through the slot in the drive drum. Make a loop in the end of the dial cord and slip the loop over the ear inside the bottom rear of the drive drum (see finish view). Pull the loop tight to hold the dial cord taut.
- (13) Replace the flywheel on the tuning shaft and tighten the set screw.
- (14) Place the dial cord over and under the tabs on the rear of the dial pointer. Replace the dial pointer on the top of the dial glass panel.
- (15) Connect the audio and power cables to the record changer. Replace the chassis in the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only). Secure the chassis with the four screws removed previously.

REPLACING METER LAMP

- (1) Disconnect AC power cord.
- (2) Prop the unit on its rear edge. Remove the four screws which hold the chassis to the cabinet, disconnect the audio and power cables from the record changer, and lift the chassis out of the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only).
- (3) Gently push in on the lamp and turn it counterclockwise to disengage it. Remove the metal lamp shade.
- (4) Place the new lamp in the socket, push in gently and turn it clockwise to lock it in place. Slide the metal lamp shade onto the lamp so that the unshaded portion of the lamp faces the meter.
- (5) Connect the audio and power cables to the record changer. Replace the chassis in the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only.) Secure the chassis with the four screws removed previously.

REPLACING DIAL LAMPS

- (1) Disconnect AC power cord.
- (2) Gently pull all knobs off the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
- (3) Remove the metal lamp shade from the dial lamps located at either end of the dial glass. Gently push in on the lamp and turn it counterclockwise to disengage it.
- (4) Place the new lamp in the socket, push in gently and turn it clockwise to lock it in place. Slide the metal lamp shade onto the lamp so that the unshaded portion of the lamp faces the edge of the dial glass.
- (5) Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

REPLACING STEREO BEACON LAMP

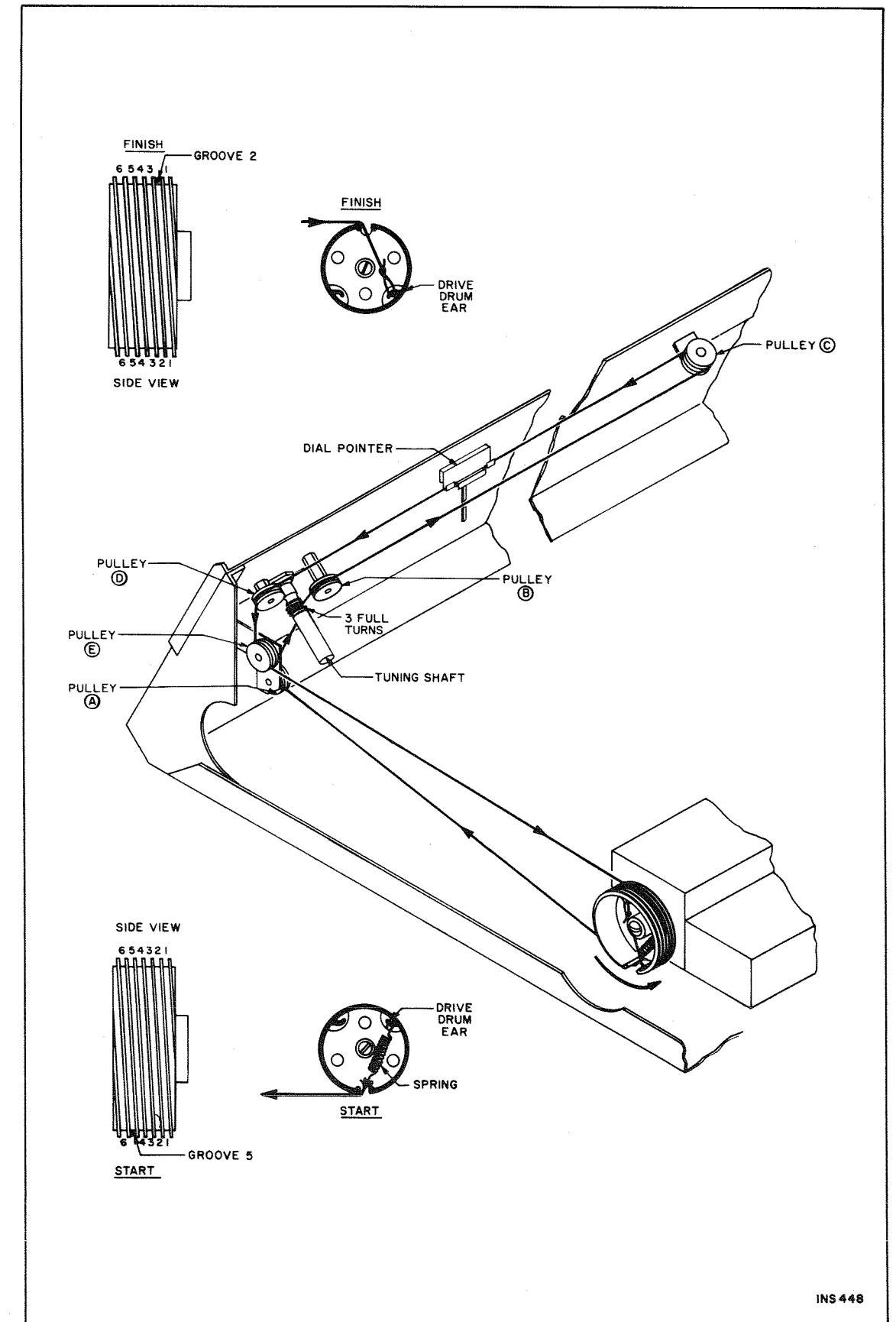
- (1) Disconnect AC power cord.
- (2) Prop the unit on its rear edge. Remove the four screws which hold the chassis to the cabinet, disconnect the audio and power cables from the record changer, and lift the chassis out of the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only).
- (3) Pry the plastic lamp holder from the lamp mount. Unsolder the leads from the lamp holder. Solder the leads to the rear terminals on the new lamp holder. Place new lamp holder in the mount.
- (4) Connect the audio and power cables to the record changer. Replace the chassis in the cabinet taking care to lift the flywheel over the end of the ferrite loop antenna (Model 110 only). Secure the chassis with the four screws removed previously.

CLEANING DIAL GLASS

- (1) Disconnect AC power cord.
 - (2) Gently pull all knobs off the front panel control shafts. Remove the hex nuts from the control shafts and lift off the front panel.
 - (3) Remove dust from the front surface of the dial glass with a soft, dry, lint-free cloth. If you wish to clean more thoroughly use only plain lukewarm water.
- CAUTION:** Do not attempt to remove dial glass from the chassis.
- (4) Replace the front panel and secure with the hex nuts removed previously. Replace the knobs on the control shafts.

CLEANING FRONT PANEL

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



SERVICE PROCEDURES

MULTIPLEX ALIGNMENT

Two methods of aligning the multiplex decoder are given. The preferred procedure uses a multiplex generator with RF and 19 kHz (kc) outputs and with 1 kHz (kc) modulation, such as the FISHER Model 300 Multiplex Generator. This is the better method of alignment since 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

Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110 only).

- Connect RF output of multiplex generator to the FM NORM antenna terminals. Set TUNING dial pointer to RF frequency of multiplex generator.
- Connect output of audio generator, set for 1 kHz (kc), to the external modulation input of multiplex generator and to the external sync input of an oscilloscope. Connect the vertical input of the scope to connection 4B on the multiplex board and adjust the output of the multiplex generator for 1.4 volts peak-to-peak composite multiplex input (see Figure 1).
- Ground connection 4C on the multiplex board to the chassis.
- Follow procedures given in Table 1 below.

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

ALTERNATE ALIGNMENT PROCEDURE

Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110 only).

- Connect output of audio generator, set for 1 kHz (kc), to the external modulation input of multiplex generator and to the external sync input of an oscilloscope. Connect the vertical input of the scope to the composite output of the multiplex generator and adjust the output of the multiplex generator for 2 volts peak-to-peak composite multiplex output (see Figure 1).
- Disconnect the lead going to connection 4B on the multiplex board. Connect the output of the multiplex generator through a 15K ohm resistor to connection 4B on the multiplex board. Ground connection 4C on the multiplex board to the chassis.
- Follow procedures given in Table 1 below.
- After alignment is complete, disconnect multiplex generator and resistor, and reconnect the lead going to connection 4B on the multiplex board.

INTERMODULATION DISTORTION TEST

Set BALANCE, BASS and TREBLE controls to their center positions. Set MODE switch to STEREO, LOUDNESS switch to OFF, SPEAKERS switch to MAIN and SELECTOR switch to AUX. Unplug AC power cord.

- Connect a 4-ohm, 25-watt resistor across the LEFT MAIN SPEAKERS terminals. In parallel with the load resistor, connect the input leads of an IM (Inter-Modulation) distortion analyzer and the input leads of an AC VTVM capable of reading 0.1 volts with accuracy.
- Connect IM-analyzer generator output to the L AUX IN jack.
- Connect AC power cord and rotate VOLUME control to its maximum clockwise position—full volume.
- Increase IM-analyzer generator input to set for 5 watts output (3.65 VAC across 4-ohm load resistor). AFTER ONE FULL MINUTE OF WARM-UP TIME, PROCEED TO NEXT STEP.

- IM meter reading should be 1.0% or less.
- Repeat preceding steps for right channel.

NOTE: If any of the preceding instructions are different from those supplied with the IM-analyzer instruction manual, it is best to follow those in the manual. If a load resistor of 25-watt rating is built into the IM analyzer, a separate load resistor is not required.

HARMONIC DISTORTION TEST

Set BALANCE, BASS and TREBLE controls to their center positions. Set MODE switch to STEREO, LOUDNESS switch to OFF, SPEAKERS switch to MAIN and SELECTOR switch to AUX. Unplug AC power cord.

- Connect a 4-ohm, 25-watt resistor across the LEFT MAIN SPEAKERS terminals. In parallel with the load resistor, connect the input leads of a harmonic distortion analyzer and the input leads of an AC VTVM capable of reading 0.1 volts with accuracy.
- Connect a low-distortion audio sine wave generator, set for 1000 Hz (cps), to the L AUX IN jack.
- Connect AC power cord and rotate VOLUME control to its maximum clockwise position—full volume.
- Increase audio generator input to set for 10 watts output (6.3 VAC across 4-ohm load resistor). Harmonic distortion meter should read 0.8% or less.
- Repeat preceding steps for right channel.

POWER OUTPUT MEASUREMENT

The output amplifier of this unit is designed to deliver its full-rated power with program material (voice or music) into 4- to 16-ohm loads for an indefinite period of time.

When a constant audio tone is used as a signal to measure the continuous RMS power output, the following precautions must be taken:

- Measure the power output of one channel at a time.
- Limit the measurement period to 10 minutes with a load resistance between 4 and 16 ohms.

WARNING: If the power output of both channels must ever be measured simultaneously, use a load of 4 to 8 ohms per channel and limit measurements to a period not longer than 3 minutes for a 4-ohm load and not longer than 5 minutes for an 8-ohm load.

PREDRIVER/DRIVER OUTPUT ADJUSTMENT

Set BALANCE, BASS and TREBLE controls to their center positions. Set MODE switch to STEREO, LOUDNESS switch to OFF, SPEAKERS switch to MAIN and SELECTOR switch to AUX. Unplug AC power cord.

- Connect a 4-ohm, 25-watt resistor across the LEFT MAIN SPEAKERS terminals. In parallel with the load resistor, connect the vertical input leads of an oscilloscope and harmonic distortion analyzer.
- Connect an audio sine wave generator, set for 1000 Hz (cps), to the L AUX IN jack.
- Connect AC power cord and rotate VOLUME control to its maximum clockwise position—full volume.
- Increase generator output until sine wave on scope just starts to clip. Adjust DC Bias Adjust Pot. R302 on the left channel predriver/driver board for equal clipping on the positive and negative half cycles of the signal with minimum reading on the harmonic distortion meter.
- Repeat preceding steps for right channel.

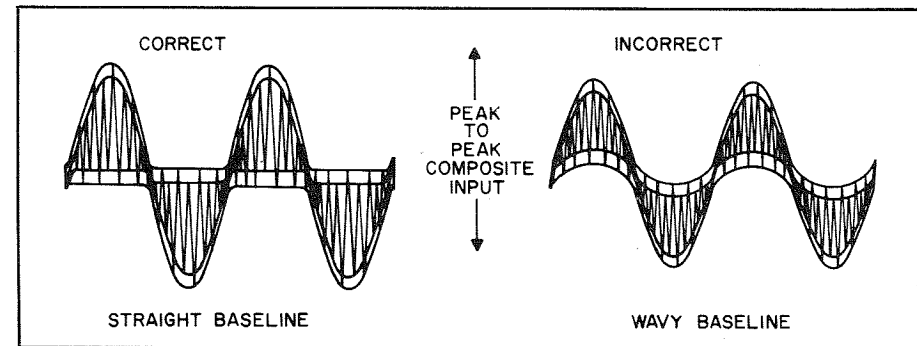


Figure 1. Composite Input To Multiplex Decoder.

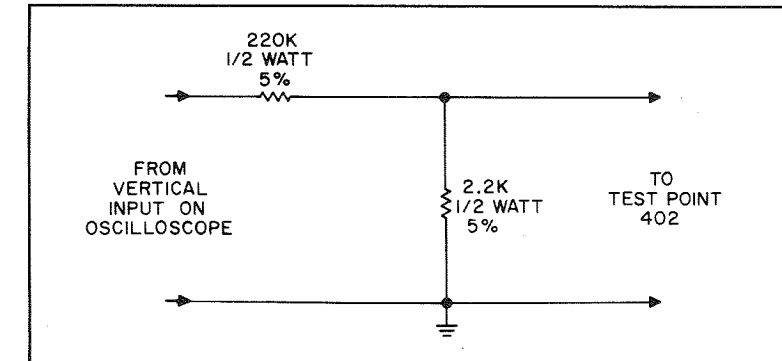


Figure 2. Voltage Divider Probe.

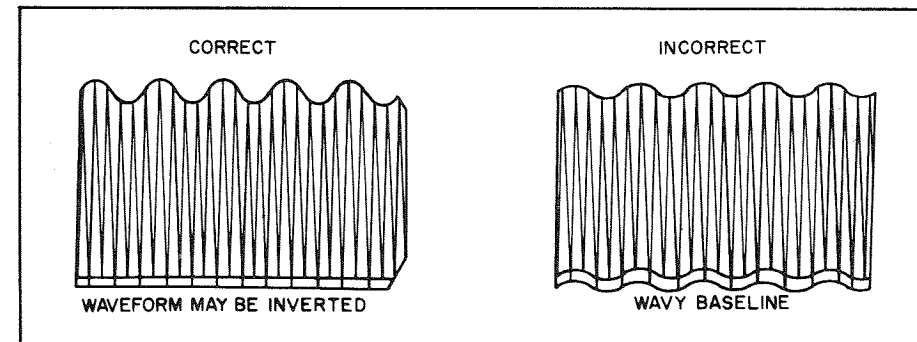


Figure 3. Waveform At Test Point 402.

TABLE 1. MULTIPLEX ALIGNMENT

STEP	Multiplex Generator Modulation	Indicator Type And Connection	Alignment	
			Adjust	Indication
1	Composite MPX signal modulated with 1 kHz (kc) on left channel only.	DC VTVM to Test Point 403.	Z401, Z402	Maximum reading on DC VTVM; approximately 3 VDC. Stereo Beacon should light.
2	Same as Step 1.	AC VTVM to left channel RCDR OUTPUT jack; scope thru voltage divider probe (see Figure 2) to Test Point 402.	Z403	Maximum waveform amplitude while maintaining straight baseline (see Figure 3) and maximum reading on AC VTVM. Record reading.
3	Same as Step 1.	AC VTVM to right channel RCDR OUTPUT jack.	Separation Control	Minimum reading on AC VTVM; at least 30 db below that recorded in Step 2. Record reading.
4	Composite MPX signal modulated with 1 kHz (kc) on right channel only.	Same as Step 3.	—	Same reading ± 2 DB on AC VTVM as recorded in Step 2.
5	Same as Step 4.	AC VTVM to left channel RCDR OUTPUT jack.	—	Same reading ± 2 db on AC VTVM as recorded in Step 3.*

* NOTE: If equal readings cannot be obtained in Steps 3 and 5, readjust Separation Control to make both readings approximately the same and 30 db below the readings in Steps 2 and 4.

SERVICE PROCEDURES

FM FRONT END ALIGNMENT

NOTE: FM IF alignment must be performed before starting this procedure.
Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110 only).
(1) Set TUNING dial pointer to zero (0) calibration mark on the logging scale. If the dial pointer does not coincide with 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.

NOTE: Moving dial pointer will make realignment of AM RF board necessary.
(2) Connect an FM generator to the FM NORM antenna terminals. Use a 120-ohm composition resistor in series with lead from the generator (see Figure 1).
(3) Connect a scope and an AC VTVM to either the L or R RCDR OUT jack.
(4) Set FM generator frequency and TUNING dial pointer to 90 MHz (Mc). Modulate generator with 400 Hz (cps) ± 75 kHz (kc) deviation. Use as low a generator output as possible.
(5) Align FM oscillator coil (L504) core first—then align the FM RF coil (L502) and the FM mixer coil (L503) cores for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.
(6) Set FM generator frequency and TUNING dial pointer to 106 MHz (Mc).
(7) Adjust FM oscillator trimmer (C507) first—then adjust the FM RF trimmer (C503) and the mixer trimmer (C506) for maximum reading on AC VTVM 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.

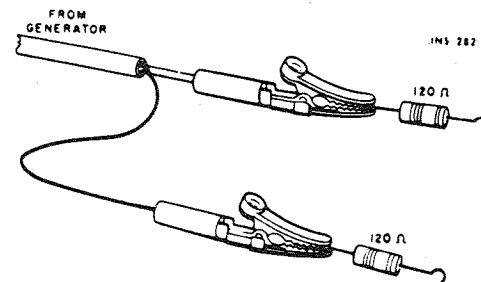


Figure 1. Connections To Provide 300-ohm Generator Output Impedance. Matching Resistors Reduce Generator Voltage By Half At The Antenna Terminals.

FM IF ALIGNMENT

Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110 only). Set MODE switch to MONO.
(1) Disconnect Test Point 501 on front end from ground.
(2) Connect 10.7-MHz (Mc) sweep generator to Test Point 501 on the front end. Connect scope's vertical input to Test Point 301 on the 10.7 MHz (Mc) IF amplifier board.
NOTE: Connect ground lead of generator to ground near Test Point 501 and ground of scope closest to the scope input.
(3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.

(4) Align core of L505 on front end for maximum gain and symmetry (see Figure 2).
(5) Align top and bottom cores of Z301 and Z302 on IF amplifier for maximum gain and symmetry (Figure 2).
(6) Connect scope's vertical input to pin 7Q on the meter and muting board. On Model 110, disconnect lead from pin 7Q before connecting scope.
(7) Align core of Z701 on meter and muting board for maximum gain and symmetry (see Figure 3).
(8) Set generator to 10.7 MHz (Mc) with no sweep. Increase generator output for reading on tuning meter.
(9) Realign slightly core of Z701 for maximum reading on tuning meter. Maximum meter reading should coincide with maximum gain and symmetry of waveform on scope in Step 7.
(10) Disconnect scope from pin 7Q on meter and muting board. Connect scope and AC VTVM to L or R RCDR OUT jack; set generator for sweep.
(11) Align top and bottom cores of Z303 on IF amplifier for maximum gain and symmetry (see Figure 4).
(12) After alignment, reconnect Test Point 501 on front end to ground. On Model 110, reconnect lead to pin 7Q on meter and muting board.

FM TUNING METER CALIBRATION

Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110 only). Set MODE switch to MONO.
(1) Connect an FM generator to the FM NORM antenna terminals. Use a 120-ohm composition resistor in series with each lead from the generator (see Figure 1).
(2) Connect scope to L or R RCDR OUT jack.
(3) Set FM generator frequency and TUNING dial pointer to 90 MHz (Mc). Modulate generator with 400 Hz (cps) ± 75 kHz (kc) deviation; set generator output voltage to 20 uV.
(4) Increase deviation to 180 kHz (kc); noise interference should be visible on waveform.
(5) Adjust generator frequency for equal amount of noise on both halves of the 400 Hz (cps) waveform on the scope.
(6) Decrease generator deviation to ± 22.5 kHz (kc) and increase generator output to 50 uV.
(7) Align core of Z701 for maximum reading on tuning meter.
(8) Increase generator to 200 mV. Adjust FM Meter Adjust Pot. R702 on meter and muting board for meter reading of 4.5.

FM MUTING TEST

Set SELECTOR switch to FM AUTO (Model 110) or FM (Model 105) and MUTING switch to OFF (Model 110)

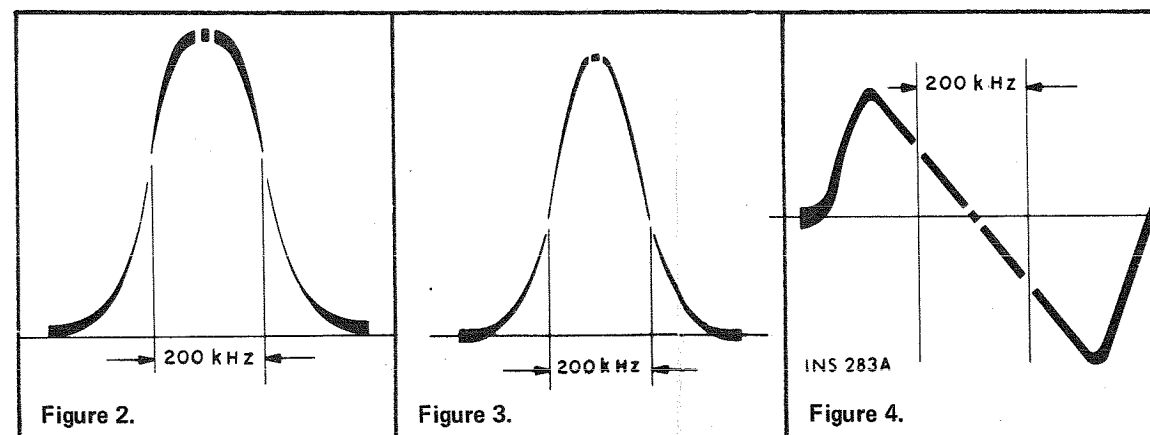


Figure 2.

Figure 3.

Figure 4.

only). Set MODE switch to MONO.
(1) Connect an FM generator to the FM NORM antenna terminals. Use a 120-ohm composition resistor in series with each lead from the generator (see Figure 1).
(2) Connect scope to L or R RCDR OUT jack.
(3) Set FM generator frequency and TUNING dial pointer to 90 MHz (Mc). Modulate generator with 400 Hz (cps) ± 22.5 kHz (kc) deviation.
(4) Adjust generator output until tuning meter reads 1.5.
(5) Set MUTING switch to ON (Model 110) or SELECTOR switch to FMMUTING (Model 105). Signal on scope should disappear.
(6) Increase generator output until signal reappears on scope; tuning meter should read between 2 and 3. Generator output should be between 8 and 30 uV.

AM RF ALIGNMENT

MODEL 110 ONLY

NOTE: AM IF alignment must be performed before starting this procedure.
Set SELECTOR switch to AM.
(1) Set TUNING dial pointer to zero (0) calibration mark on the logging scale. If the dial pointer does not coincide with 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.
NOTE: Moving dial pointer will make realignment of FM front end necessary.
(2) Connect an AM generator through a 220-pF capacitor to pin 5H on the AM RF board; generator ground to chassis.
(3) Connect a scope and an AC VTVM to either the L or R RCDR OUT jack.
(4) Set AM generator frequency and TUNING dial pointer to 600 kHz (kc). Use 30% modulation with 400 Hz (cps) and keep the generator output as low as possible during the alignment procedure.
(5) Align AM oscillator coil (Z502) core for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.
(6) Set AM generator frequency and TUNING dial pointer to 1400 kHz (kc). Adjust AM oscillator trimmer (C511) for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.
(7) Repeat Steps 4, 5 and 6 until accurate dial calibration and maximum gain are obtained.
(8) Disconnect AM generator and reconnect to AM antenna terminal; generator ground to chassis.
(9) Set AM generator frequency and TUNING dial pointer to 600 kHz (kc).
(10) Align AM mixer coil (Z501) and adjust the position of the small coil on the end of 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.
(11) Set the AM generator frequency and TUNING dial pointer to 1400 kHz (kc).
(12) Adjust the AM mixer trimmer (C506) and AM antenna trimmer (C502) for maximum reading on AC VTVM and maximum waveform amplitude and symmetry.
(13) Repeat Steps 9, 10, 11 and 12 until accurate dial calibration and maximum gain are obtained.

AM IF ALIGNMENT

MODEL 110 ONLY

Set SELECTOR switch to AM.
(1) Connect short jumper wire between pin 5H on AM RF board and ground.
(2) Connect 455-kHz (kc) sweep generator to Test Point 601 on the 455-kHz IF amplifier board. Connect scope's vertical input to Test Point 604 on the 455-kHz IF amplifier board.
(3) Adjust generator output voltage and frequency to observe IF response curve. Use as low a generator output as possible.
(4) Align top and bottom cores of Z601 and Z602 and core of Z603 for maximum gain and symmetry (similar to Figure 3).
(5) Repeat alignment several times until accurate dial calibration and maximum gain are obtained. Keep the generator output as low as possible during all adjustments.
(6) After alignment, disconnect jumper between pin 5H and ground.

SERVICING INTEGRATED CIRCUITS

Integrated circuits are used in the tuner section of this unit to provide the theoretical maximum of AM suppression and limiting. The uA703E integrated circuit used in the 10.7-MHz FM IF amplifier and in the meter and muting circuit contains the equivalent of 5 transistors and 2 resistors. The TR80073 integrated circuit used in the 10.7-MHz amplifier contains the equivalent of 10 transistors, 7 diodes and 11 resistors.

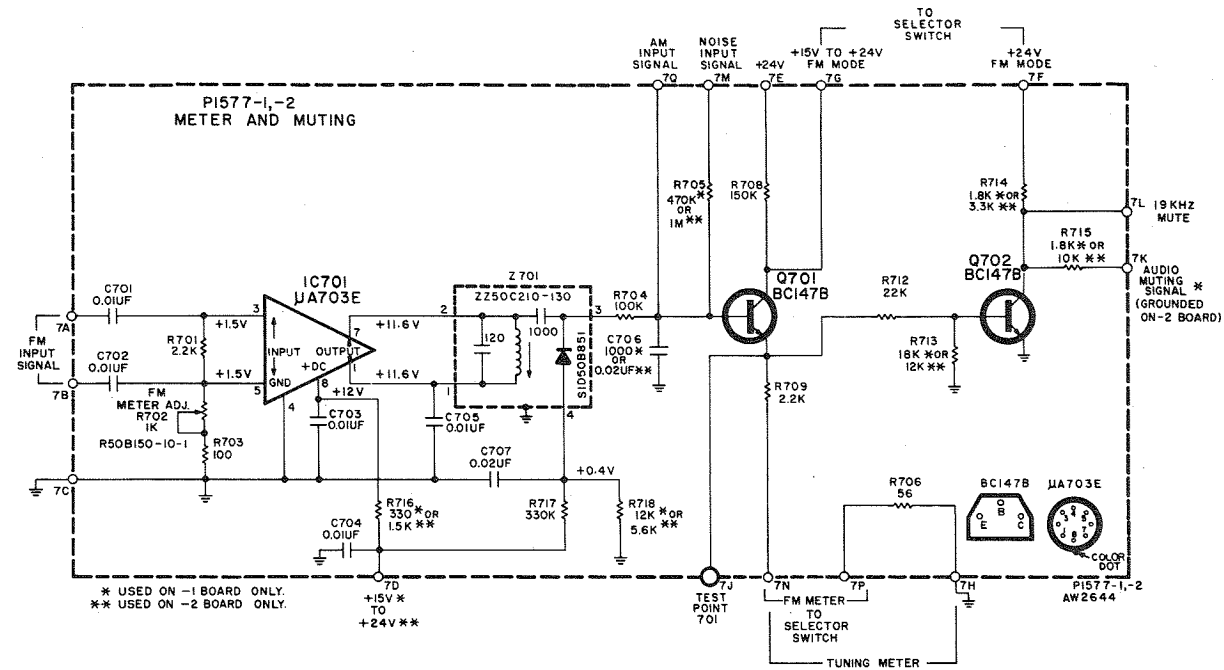
Both the uA703E and the TR80073 integrated circuits are high-reliability devices and should require a minimum of servicing. However, troubles may occur that will require servicing of these devices. In such an event, the integrated circuits should be serviced the same as a transistor. The preferred troubleshooting procedure is to first isolate 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 pins of the integrated circuits using a DC VTVM. These DC voltages are the most accurate indications of the operating condition of the integrated circuit.

WARNING: Do not use an ohmmeter to check continuity with the integrated circuit on the printed circuit board; forward biasing the internal junctions within the integrated circuit may burn out the transistors.

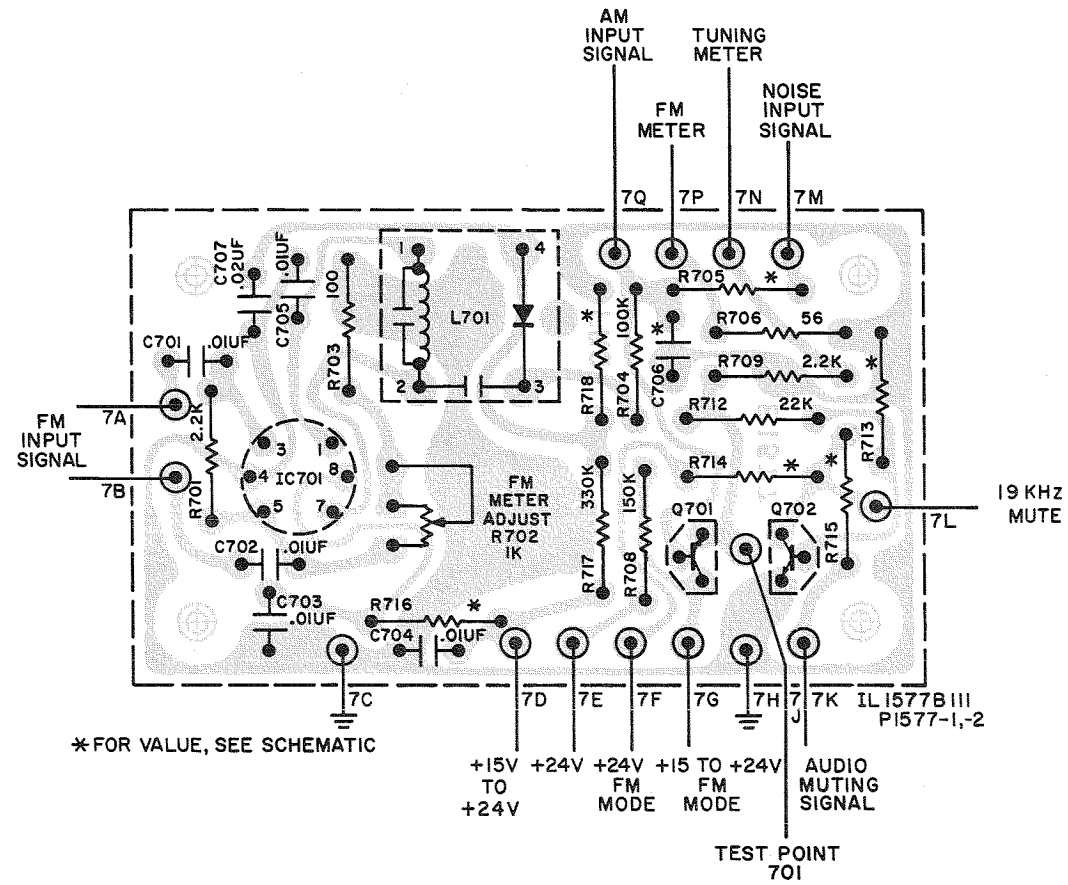
When replacing an integrated circuit, the following precautions should be observed:

- Do not replace a defective integrated circuit 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.
- 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 of the replacement integrated circuit are connected to the correct locations on the printed circuit board before turning the set on.

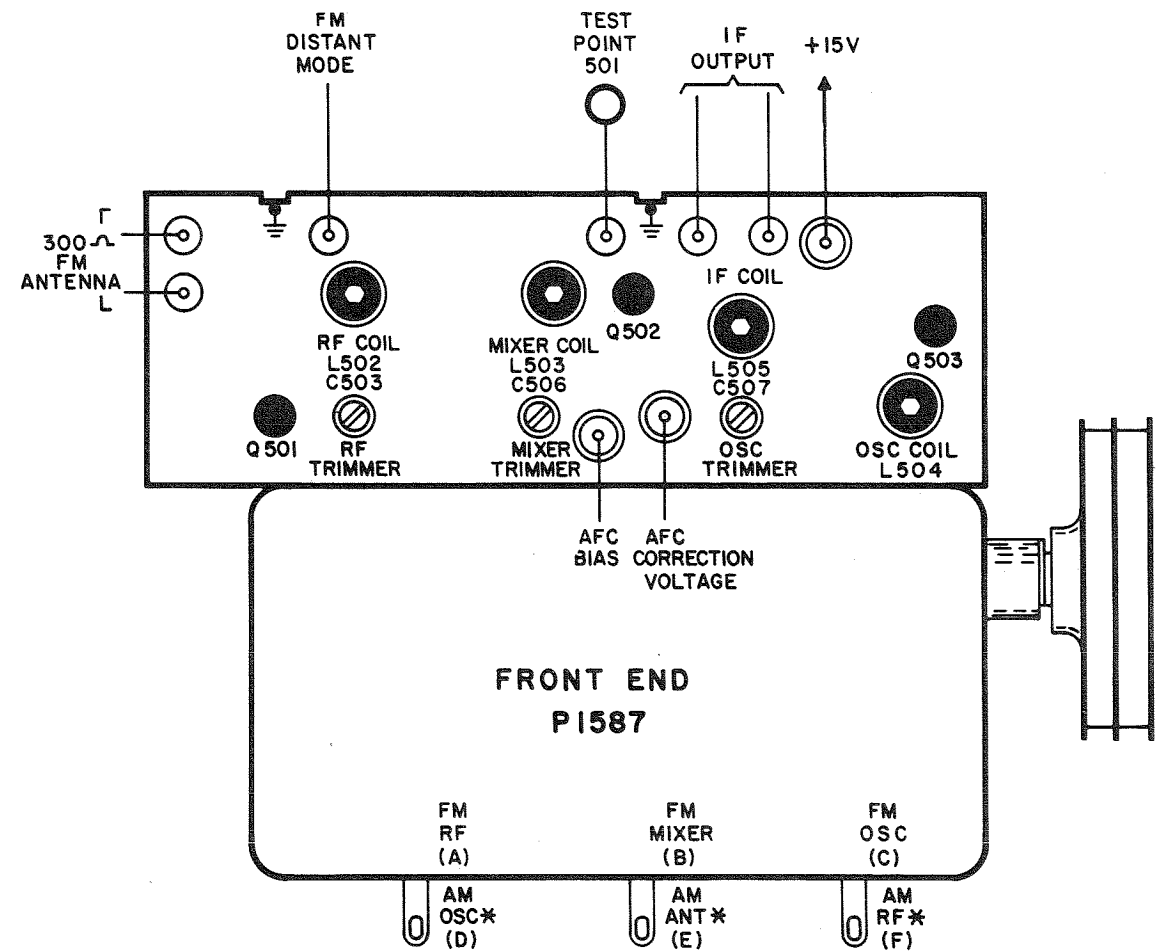
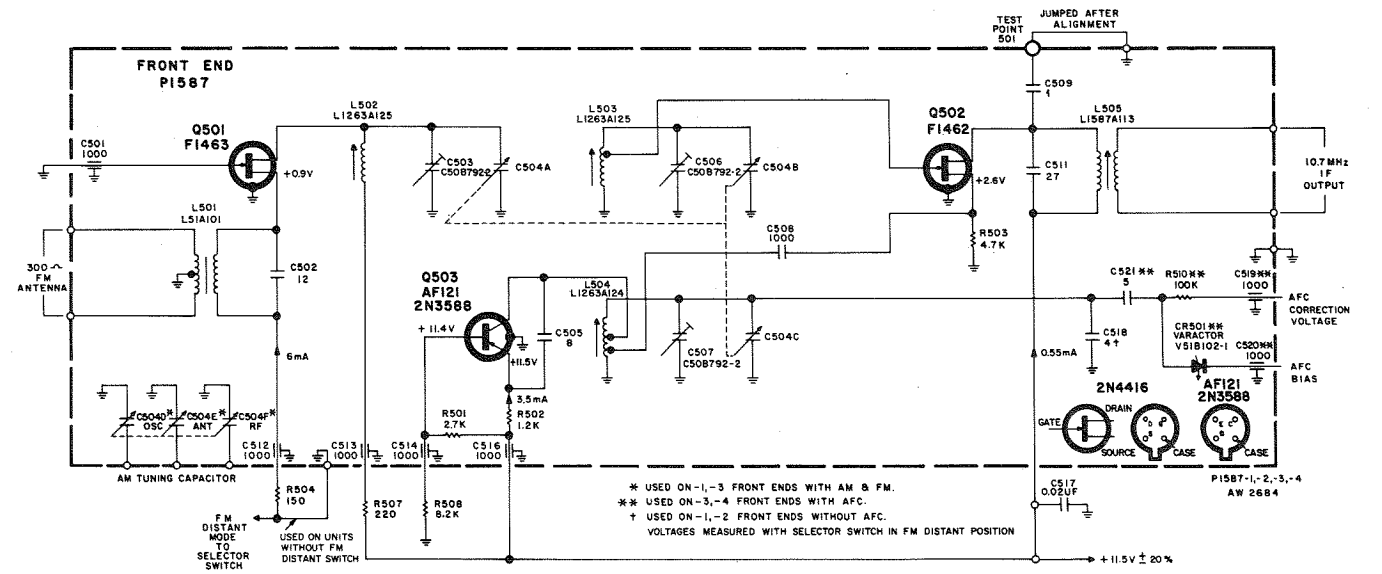
1577-1 METER AND MUTING



BOARD VIEWED FROM COMPONENT SIDE

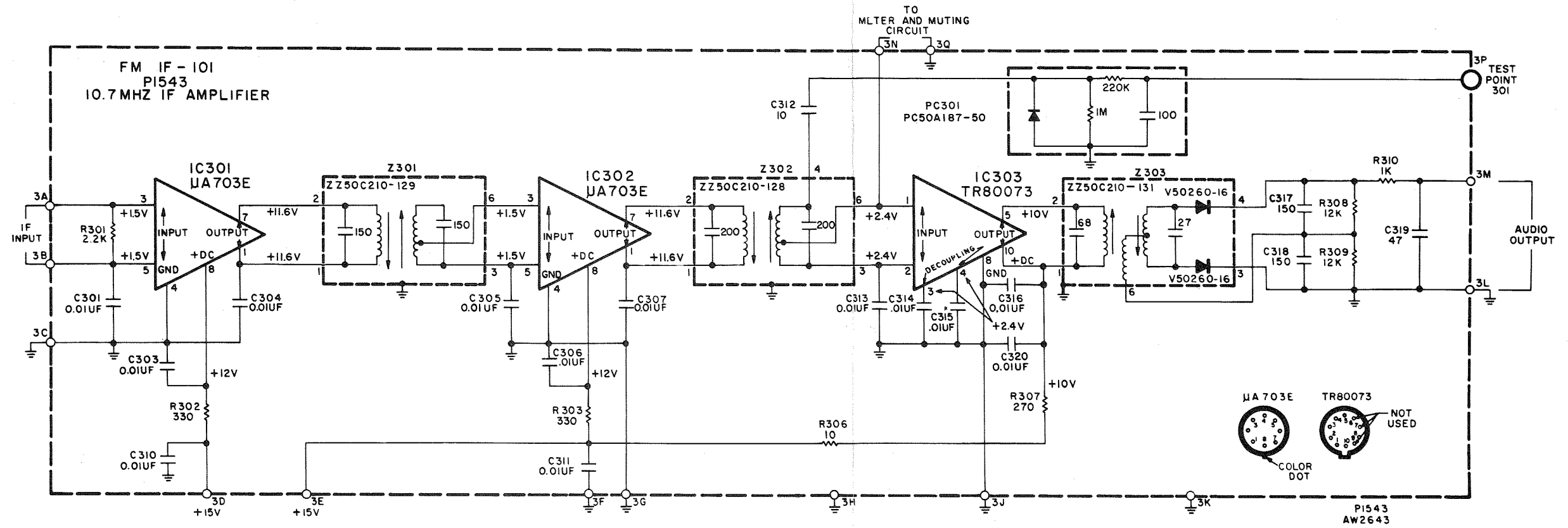


1587-7,-2 AM-FM FRONT END

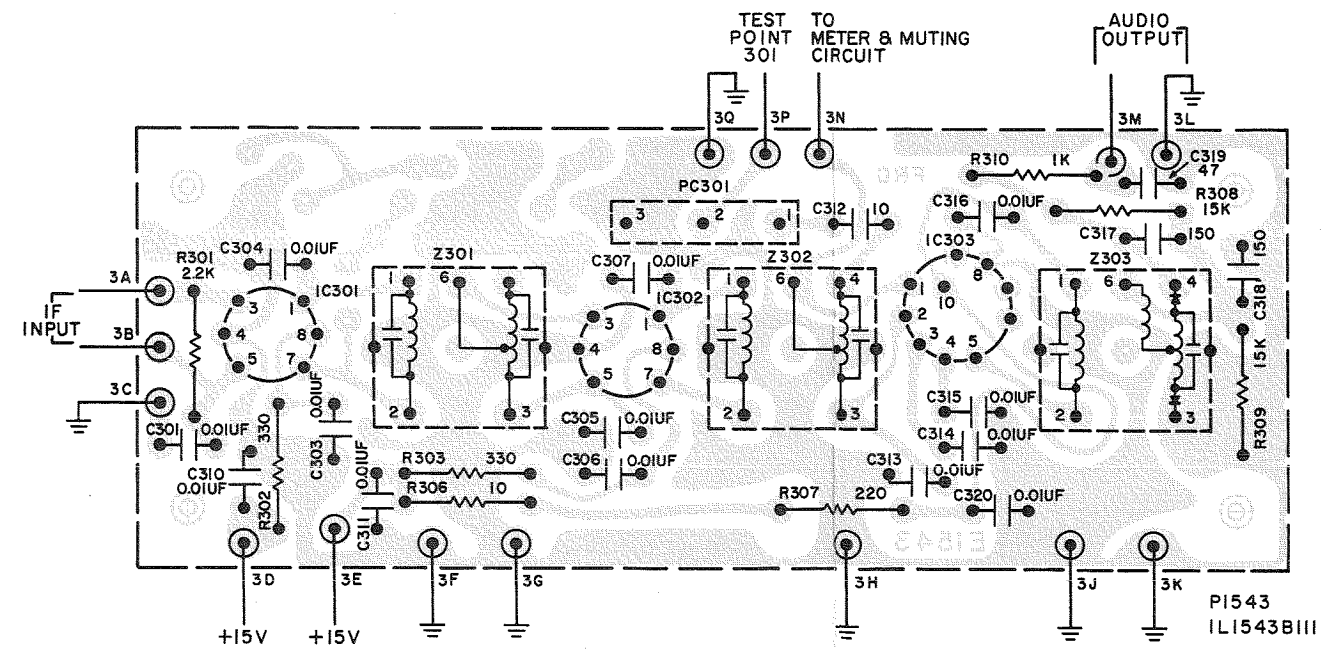


* USED ON -1,-3 FRONT ENDS

1543 10.7 MHz IF AMPLIFIER

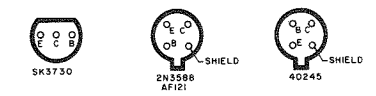
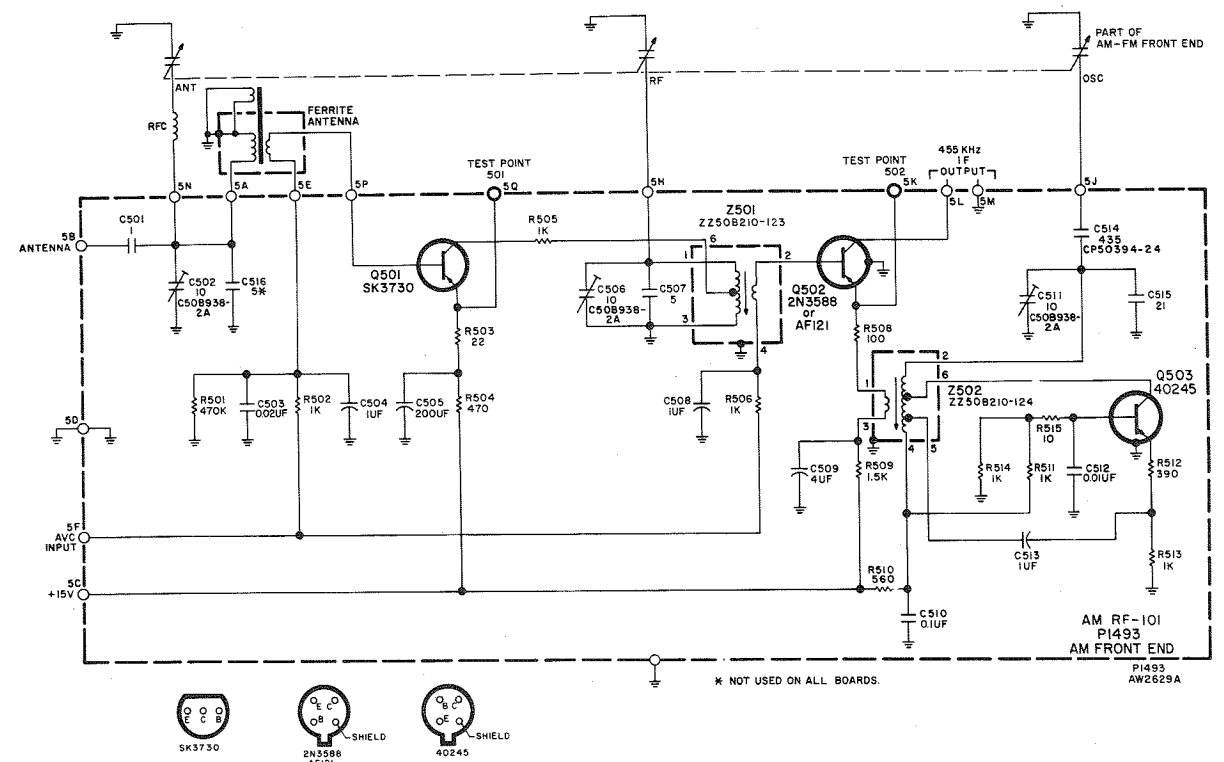


BOARD VIEWED FROM COMPONENT SIDE

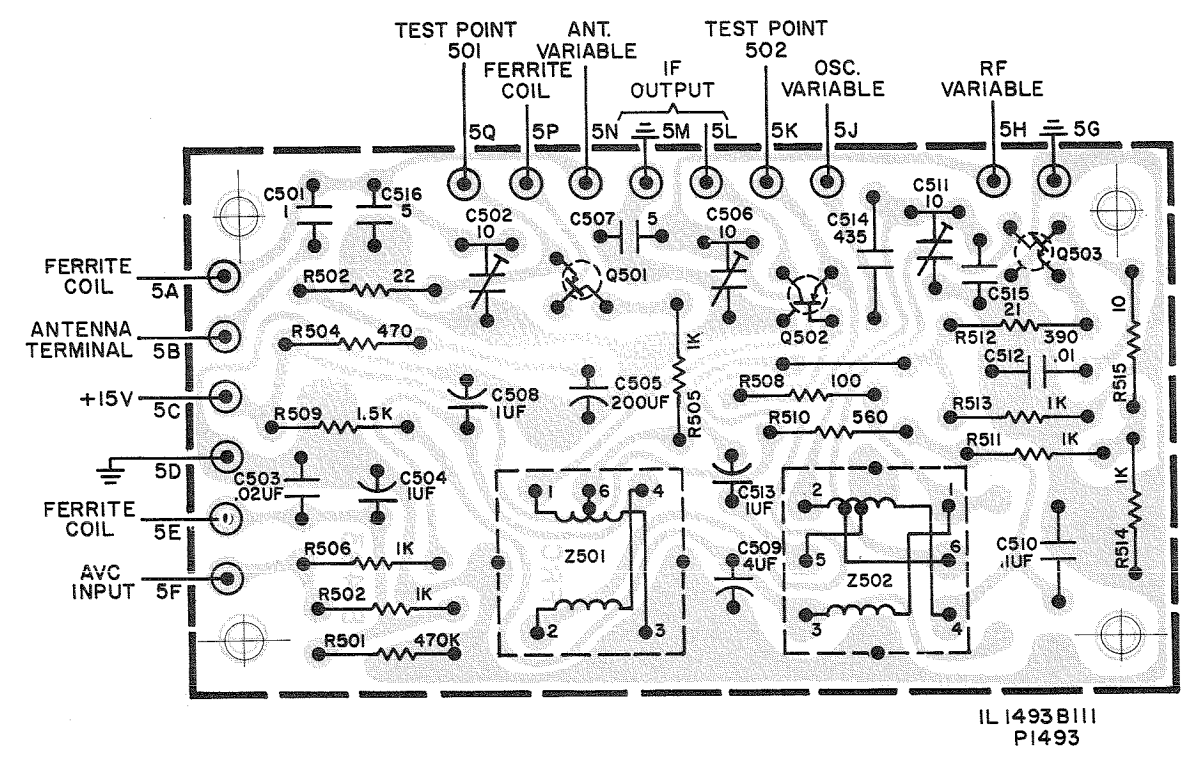


1493 AM RF

MODEL 110 ONLY

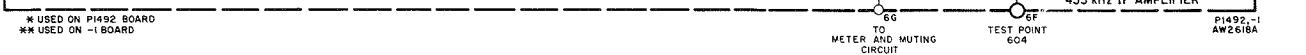
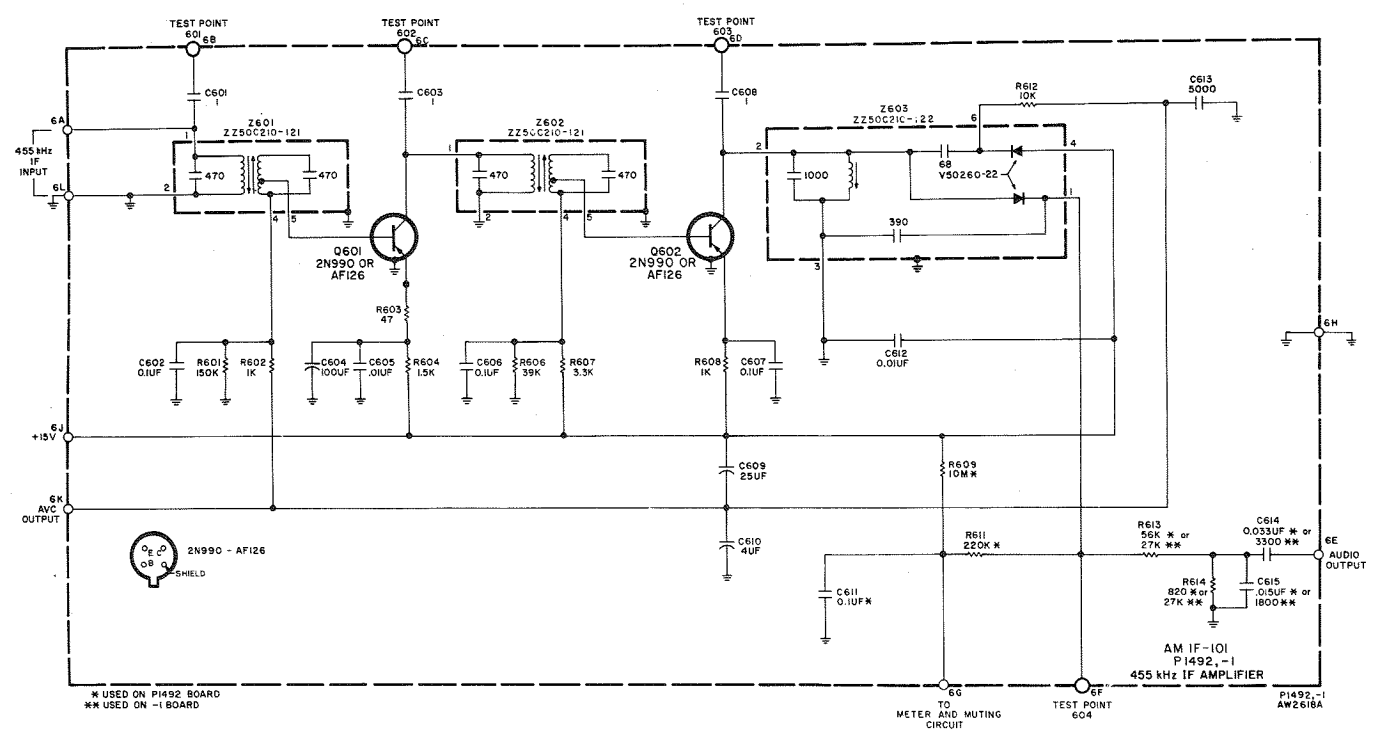


BOARD VIEWED FROM COMPONENT SIDE

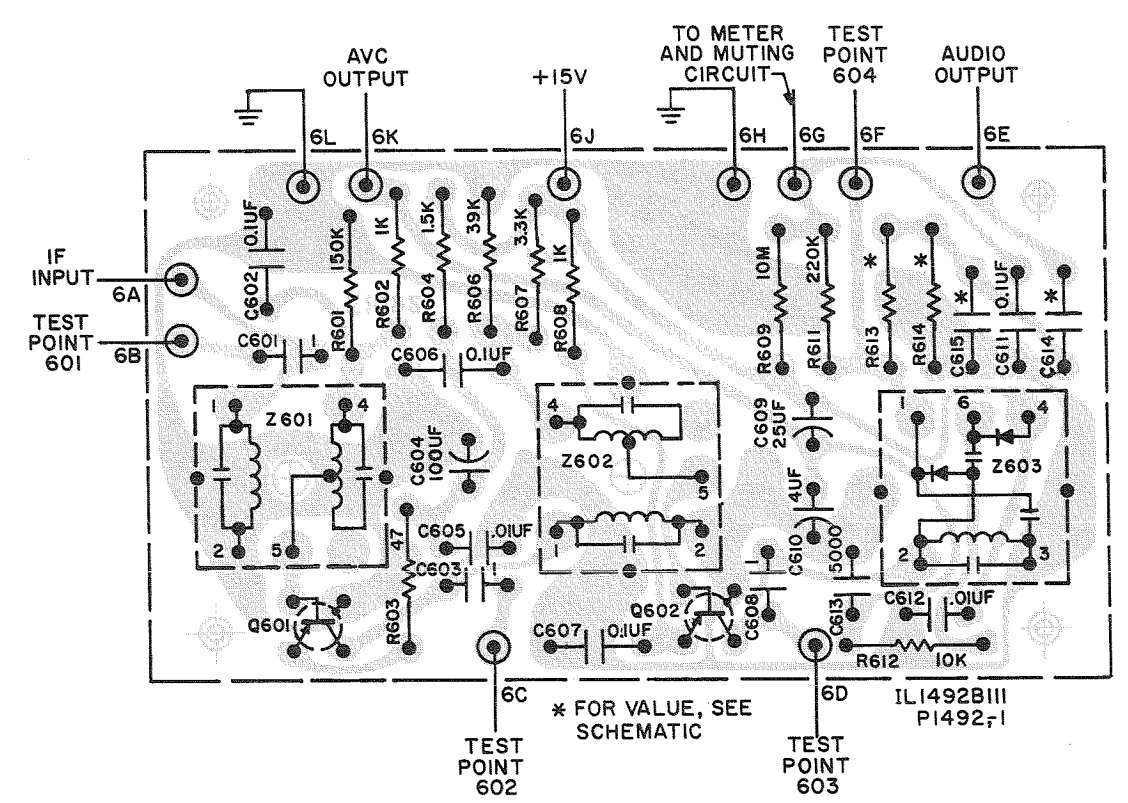


1492 AM IF AMPLIFIER

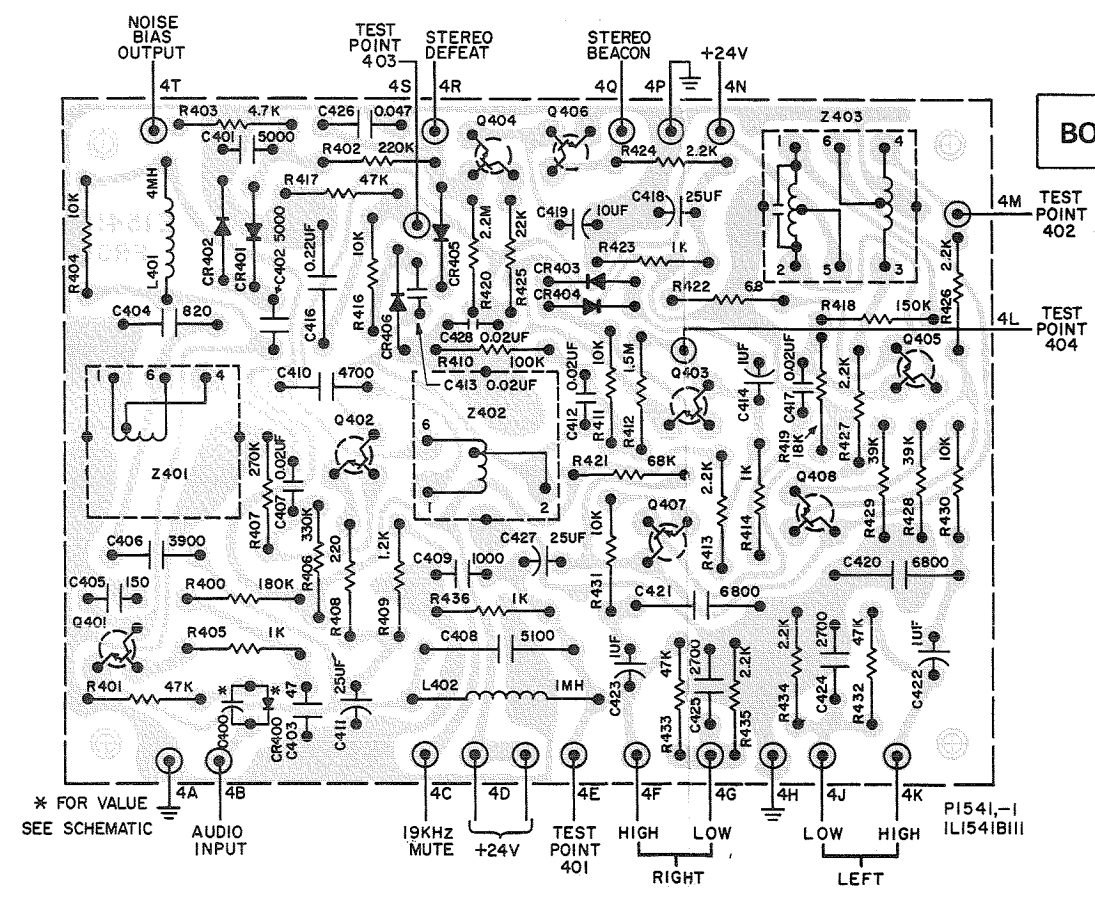
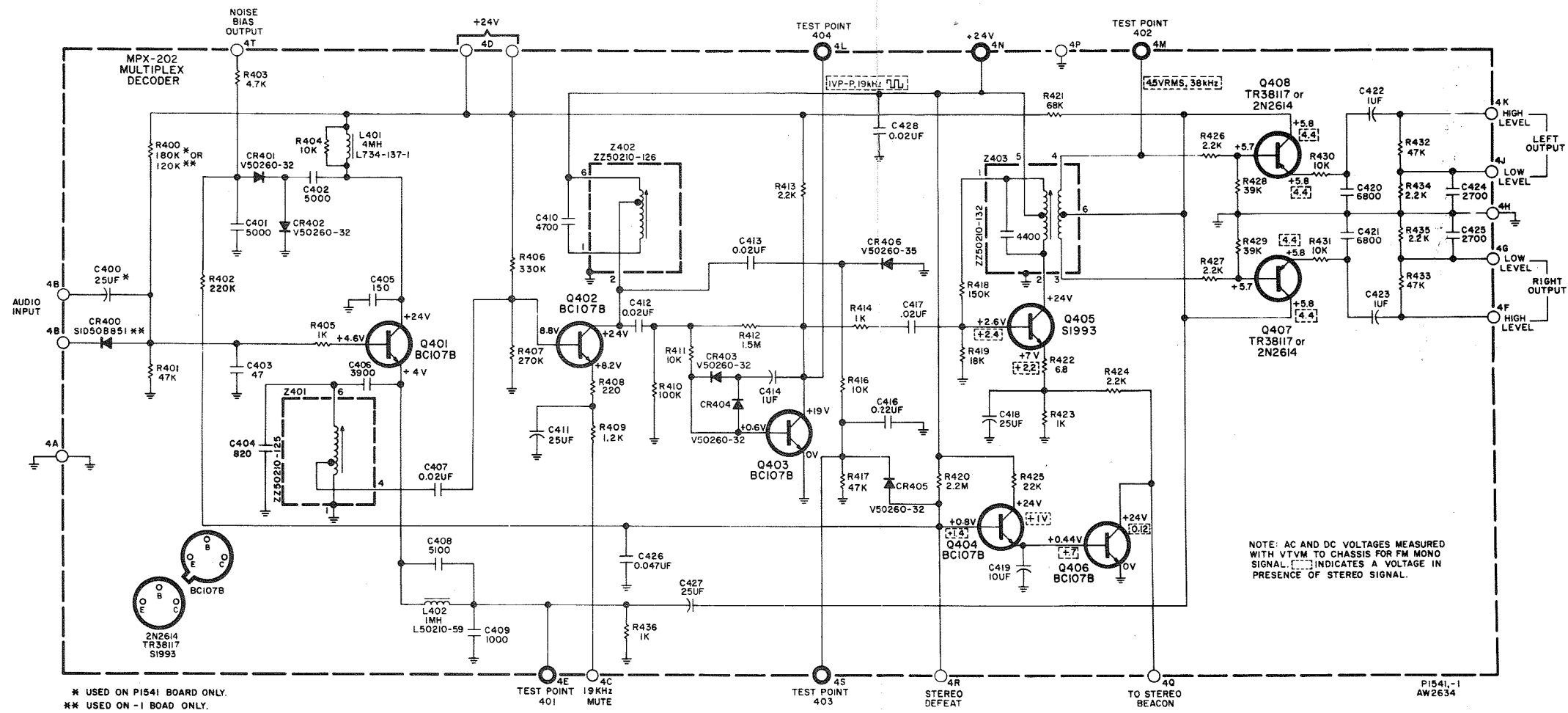
MODEL 110 ONLY



BOARD VIEWED FROM COMPONENT SIDE

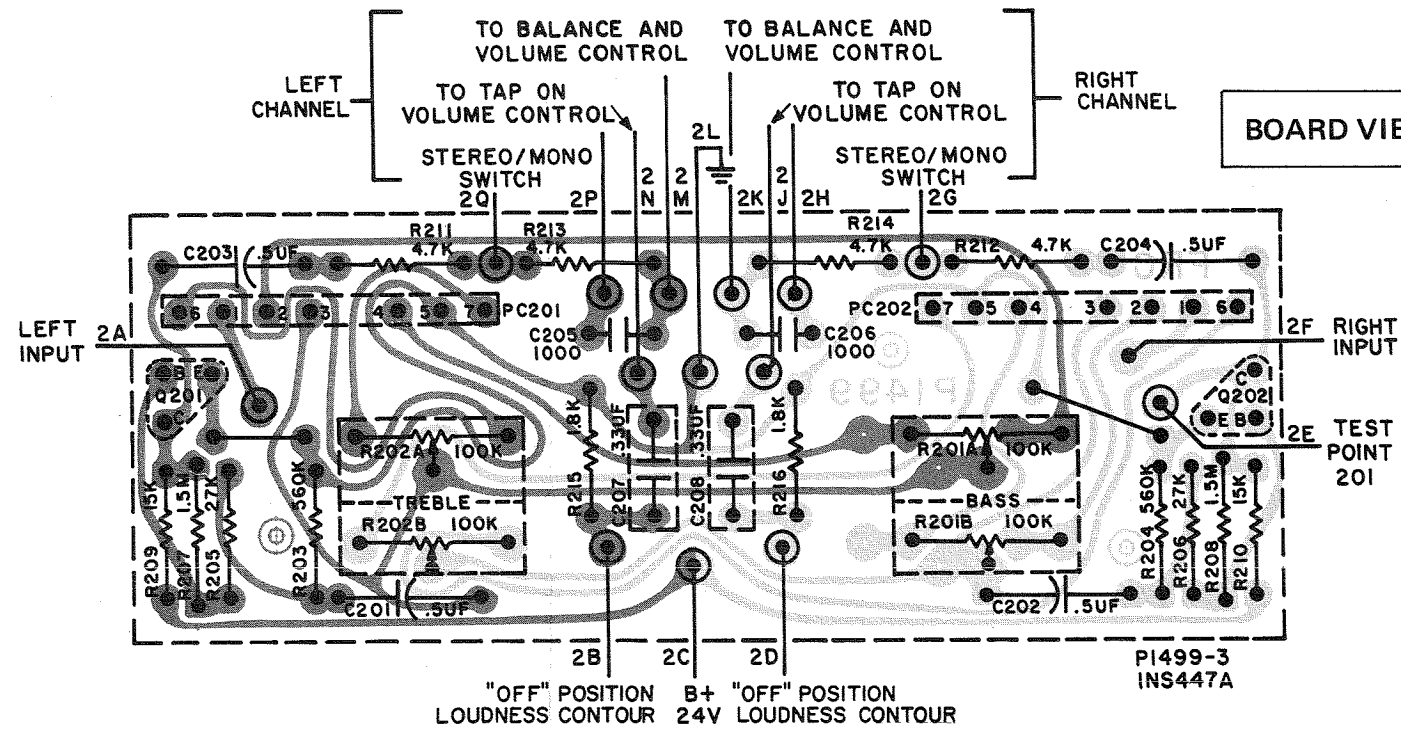
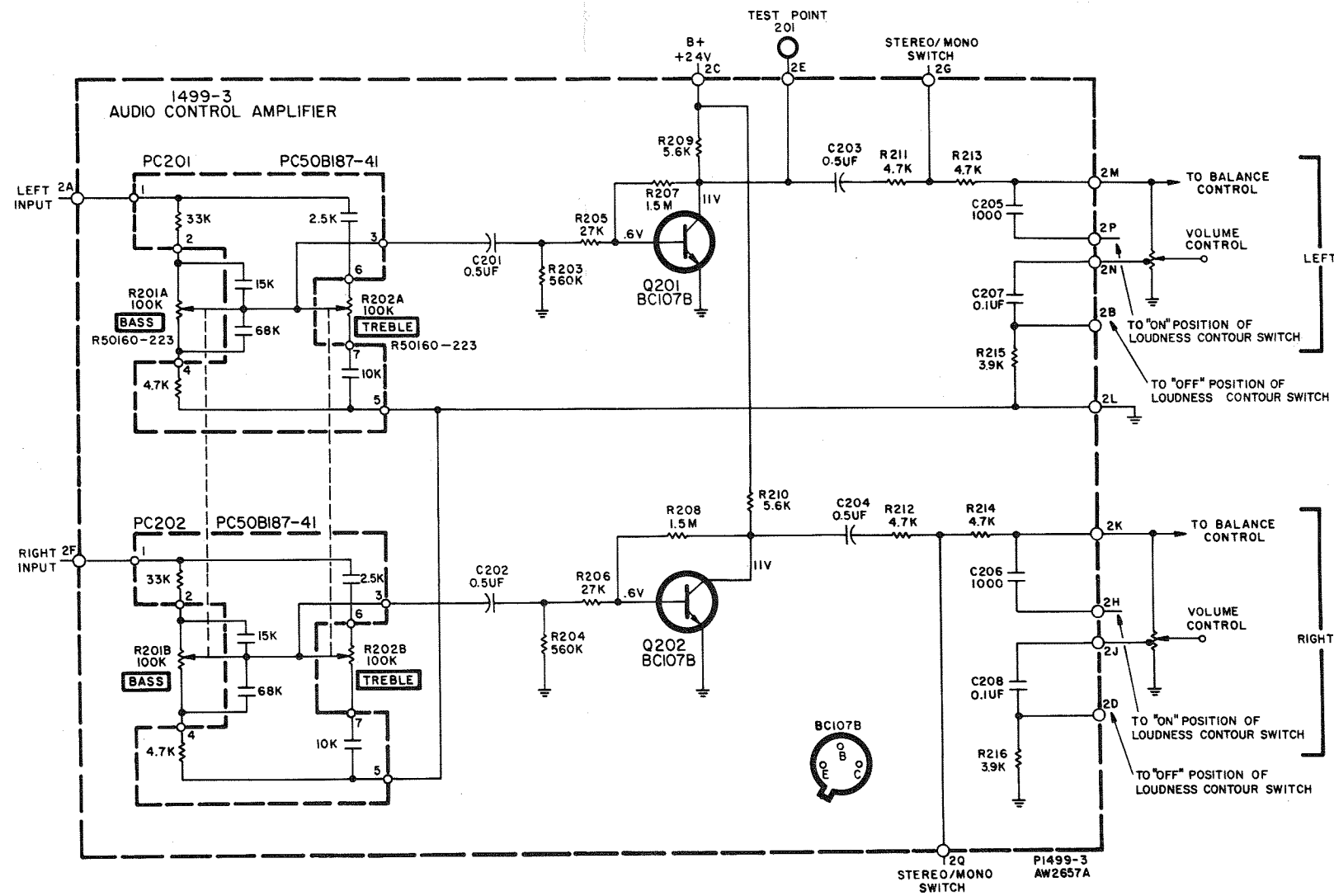


1541 MULTIPLEX DECODER



BOARD VIEWED FROM COMPONENT SIDE

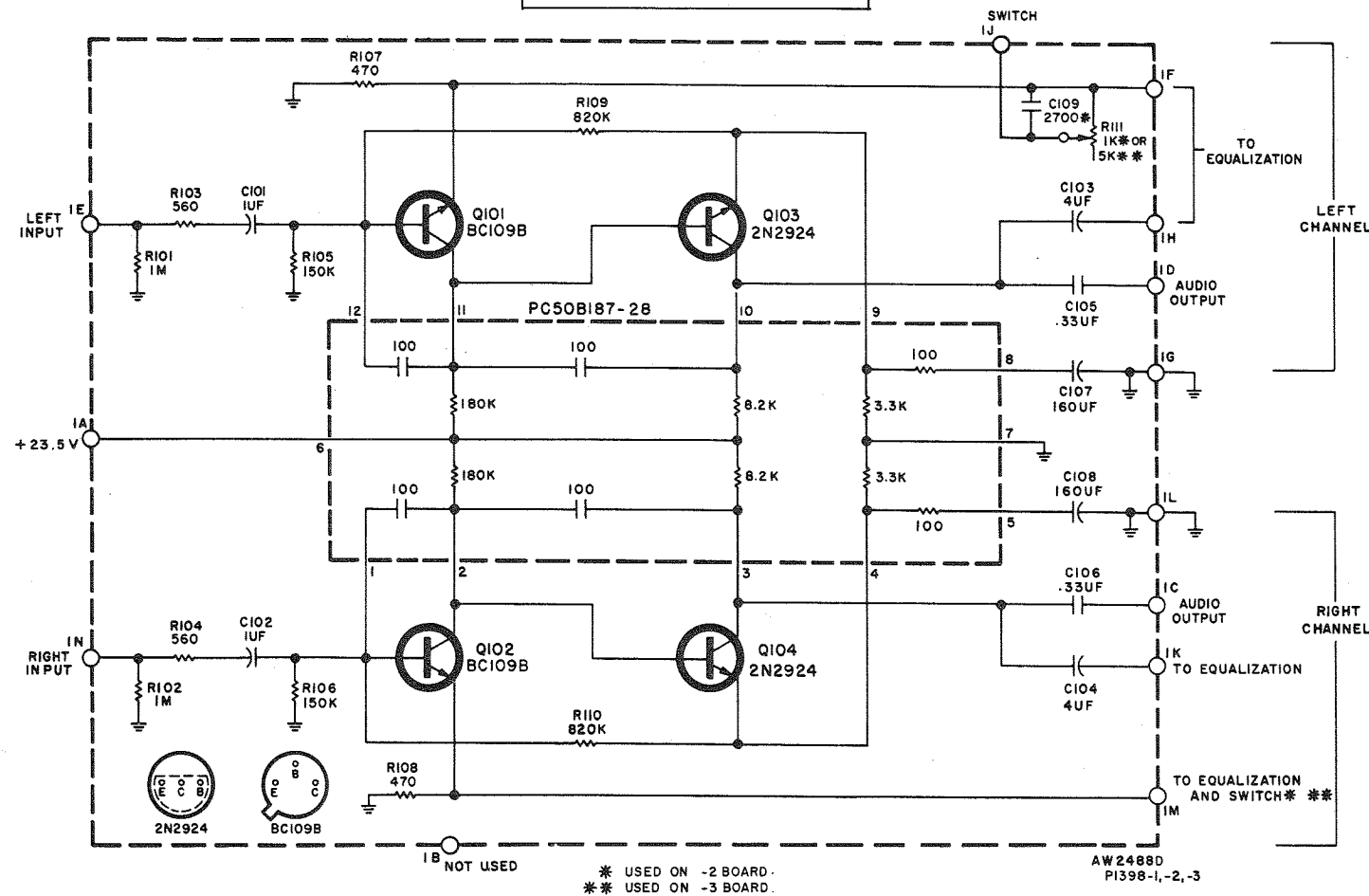
1499-3 AUDIO CONTROL AMPLIFIER



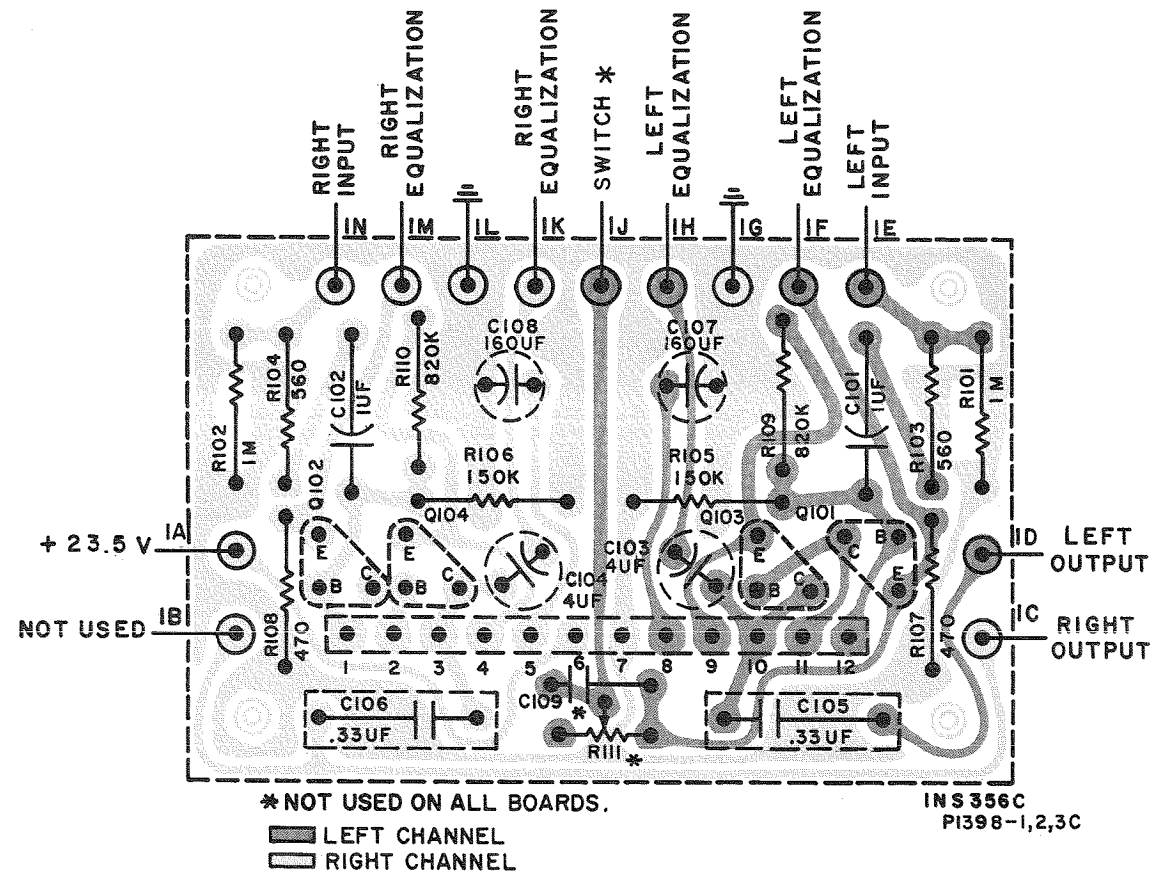
BOARD VIEWED FROM COMPONENT SIDE

LEFT CHANNEL
 RIGHT CHANNEL

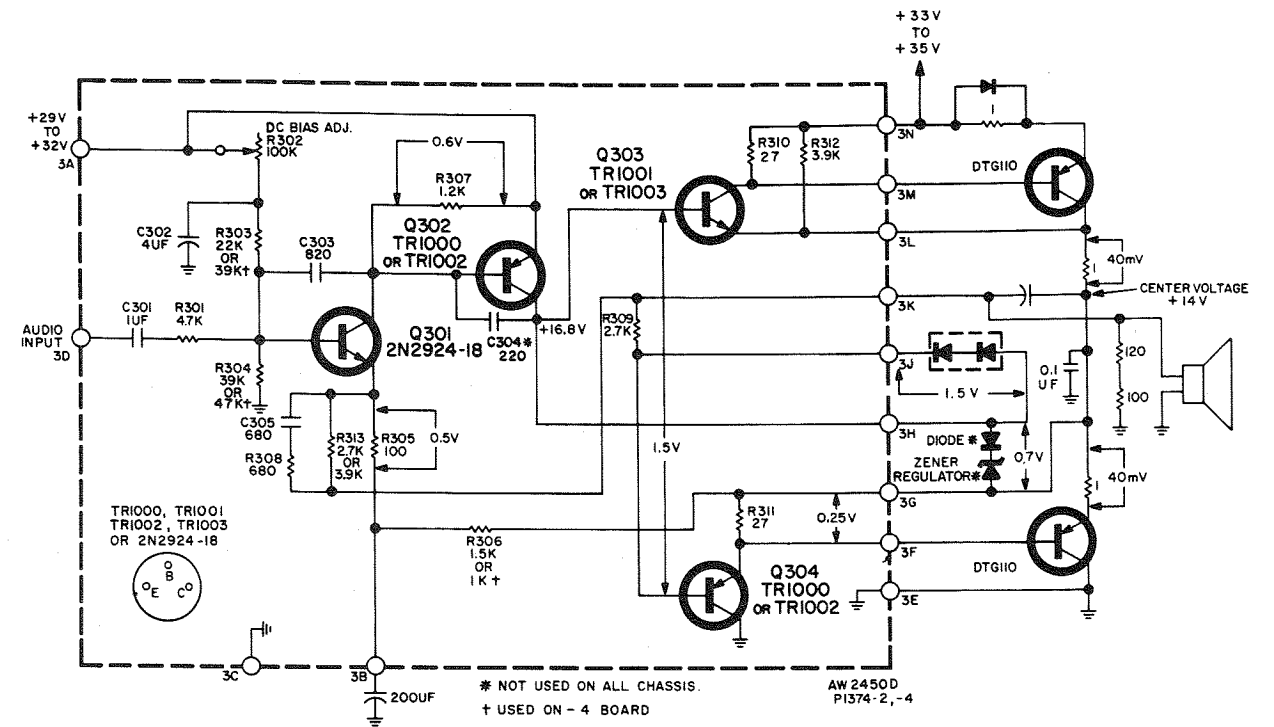
1398-3 PREAMPLIFIER



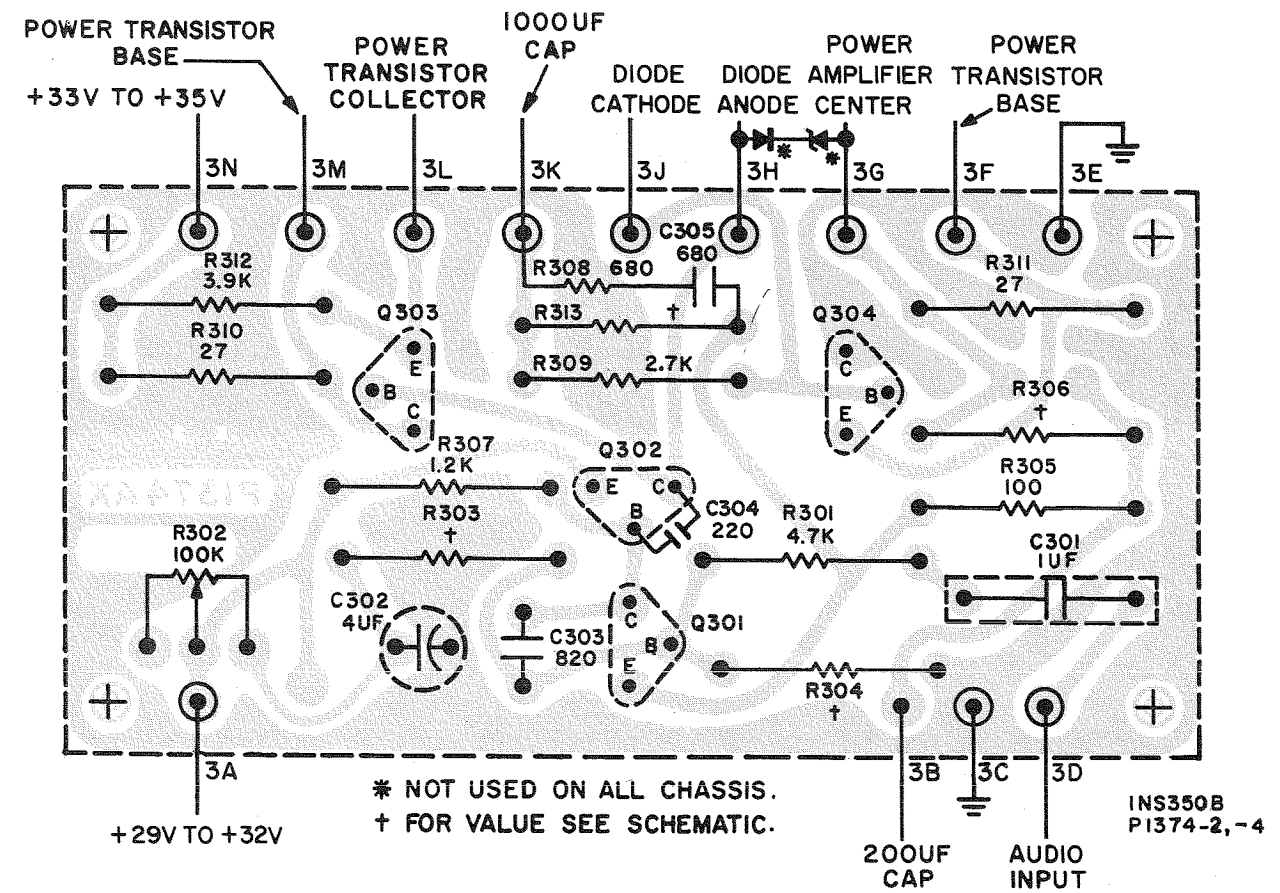
BOARD VIEWED FROM COMPONENT SIDE



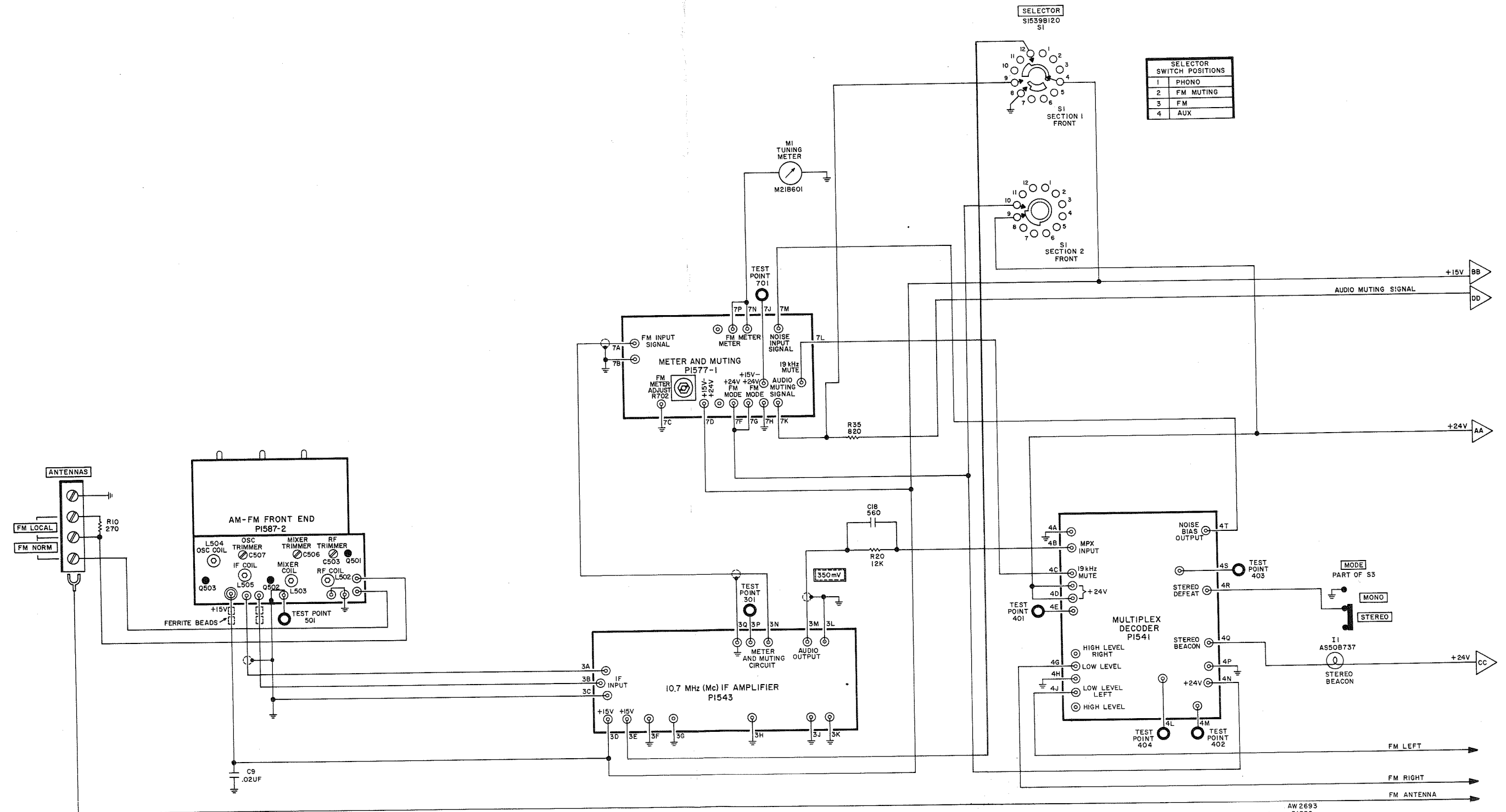
1374-4 PREDRIVER/DRIVER



BOARD VIEWED FROM COMPONENT SIDE

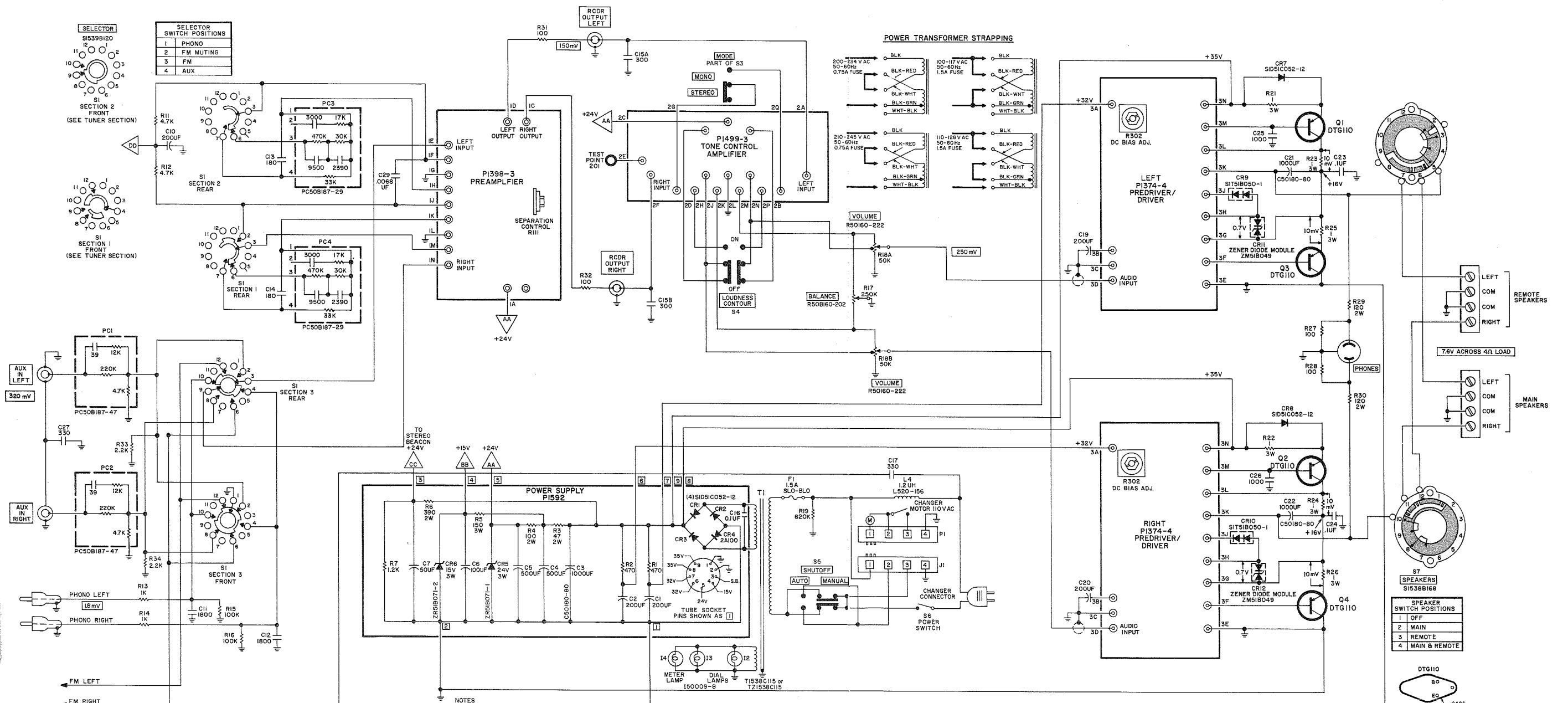


MODEL 105 MAIN CHASSIS—TUNER SECTION



SELECTOR SWITCH POSITIONS	
1	PHONO
2	FM MUTING
3	FM
4	AUX

MODEL 105 MAIN CHASSIS—AMPLIFIER SECTION



SELECTOR
S1539B120

1	PHONO
2	FM MUTING
3	FM
4	AUX

SELECTOR SWITCH POSITIONS

1	PHONO
2	FM MUTING
3	FM
4	AUX

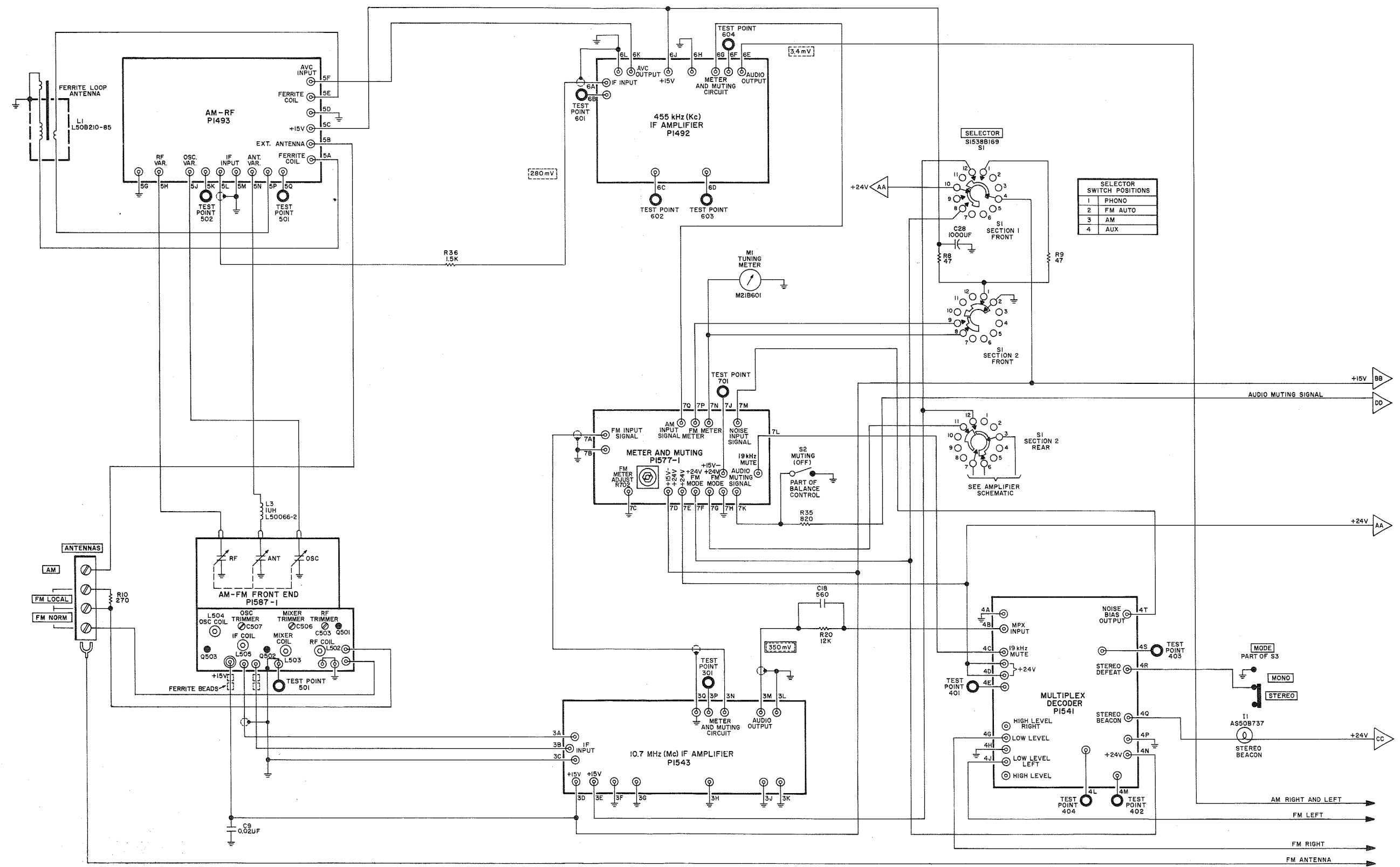
SPEAKER SWITCH POSITIONS

1	OFF
2	MAIN
3	REMOTE
4	MAIN & REMOTE

- NOTES**
1. VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, LINE VOLTAGE 120V AC.
 2. FISHER PART NUMBER LISTED FOR PARTS SPECIALLY SELECTED FOR FISHER RADIO CORPORATION; 1/2W, 5% COMPOSITION RESISTORS MAY BE USED AS REPLACEMENTS UNLESS OTHERWISE NOTED.
 3. ALL ROTARY SWITCHES SHOWN IN POSITION 1, ALL OTHER CONTROLS AND SWITCHES SHOWN IN NORMAL OPERATING POSITION.
 4. [Symbol] INDICATES 1KHz SIGNAL LEVELS FROM PHONO INPUT TO AMPLIFIER OUTPUT, MEASURED WITH AC VTVM TO CHASSIS, VOLUME CONTROL MAXIMUM, ALL OTHER CONTROLS AND SWITCHES NORMAL FOR 7.5 WATTS OUTPUT.
 5. [Symbol] INDICATES AC mV 1KHz SIGNAL LEVELS MEASURED IN FM MONO, MUTING ON WITH SIGNAL AT FM NORM ANTENNA TERMINALS OF 100mV, 100MHz, ± 75KHz DEVIATION WITH 1KHz AUDIO.
 6. [Symbol] INDICATES AC mV 1KHz SIGNAL LEVELS MEASURED IN AM WITH 1 mV SIGNAL AT AM ANTENNA TERMINALS.

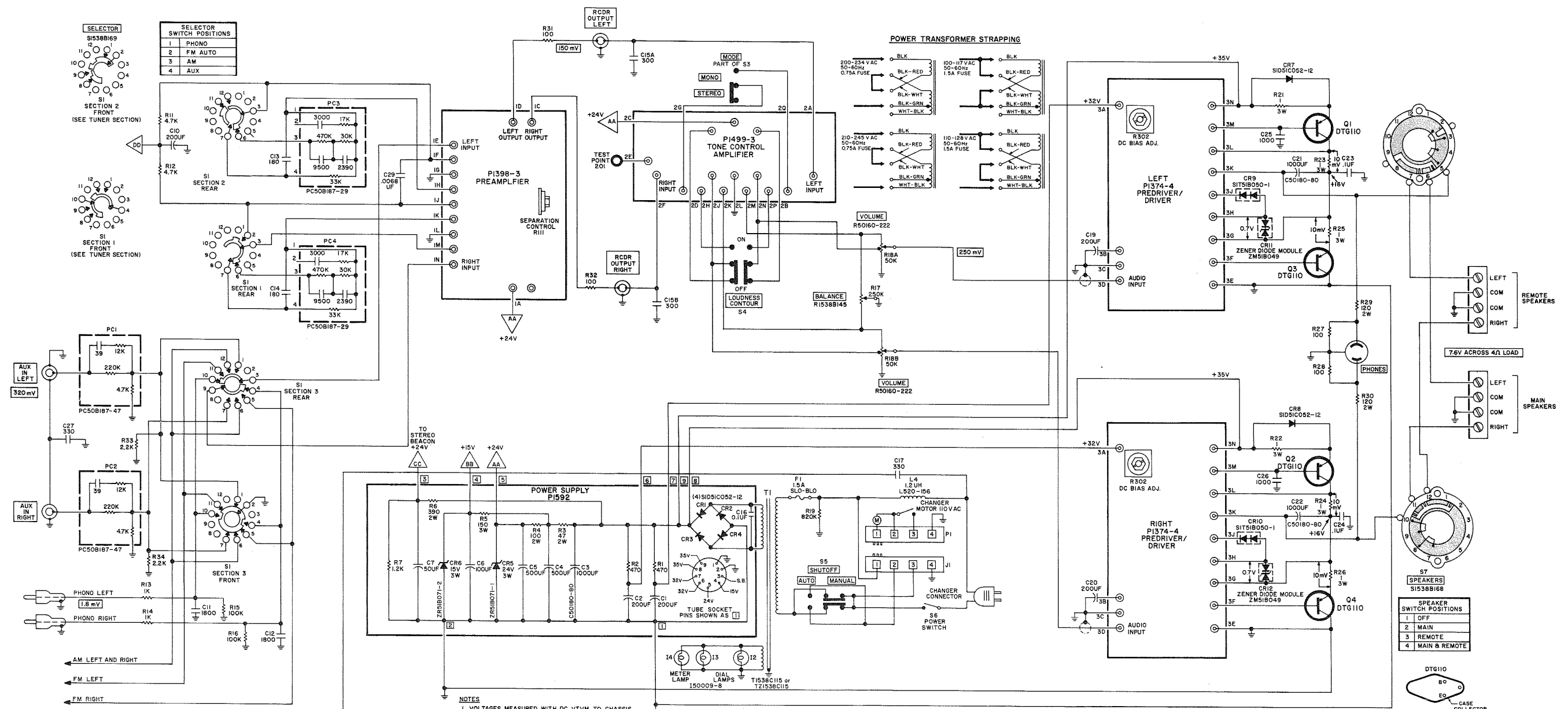
AW2695
P1550
105

MODEL 110 MAIN CHASSIS—TUNER SECTION



SELECTOR SWITCH POSITIONS	
1	PHONO
2	FM AUTO
3	AM
4	AUX

MODEL 110 MAIN CHASSIS—AMPLIFIER SECTION

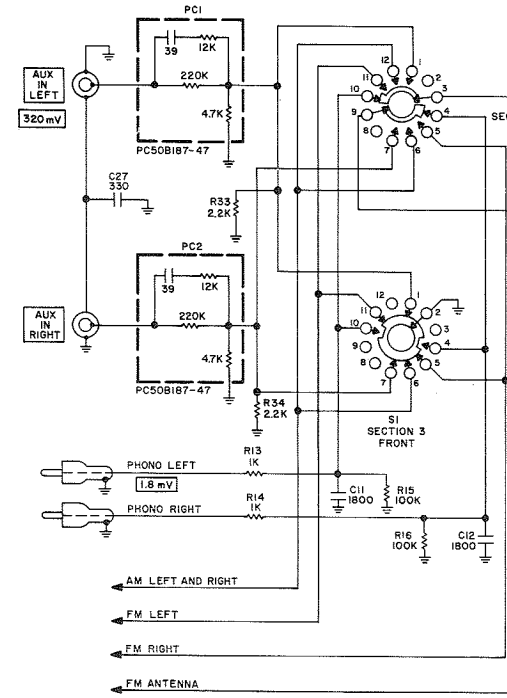
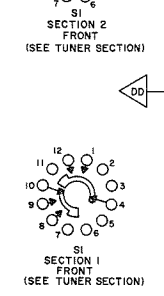


SELECTOR
S1538B169

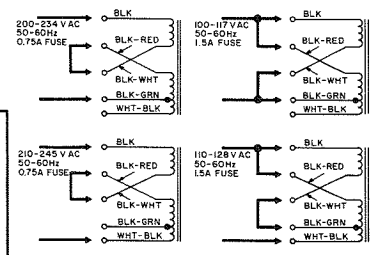
1	PHONO
2	FM AUTO
3	AM
4	AUX

SELECTOR SWITCH POSITIONS

1	PHONO
2	FM AUTO
3	AM
4	AUX



POWER TRANSFORMER STRAPPING



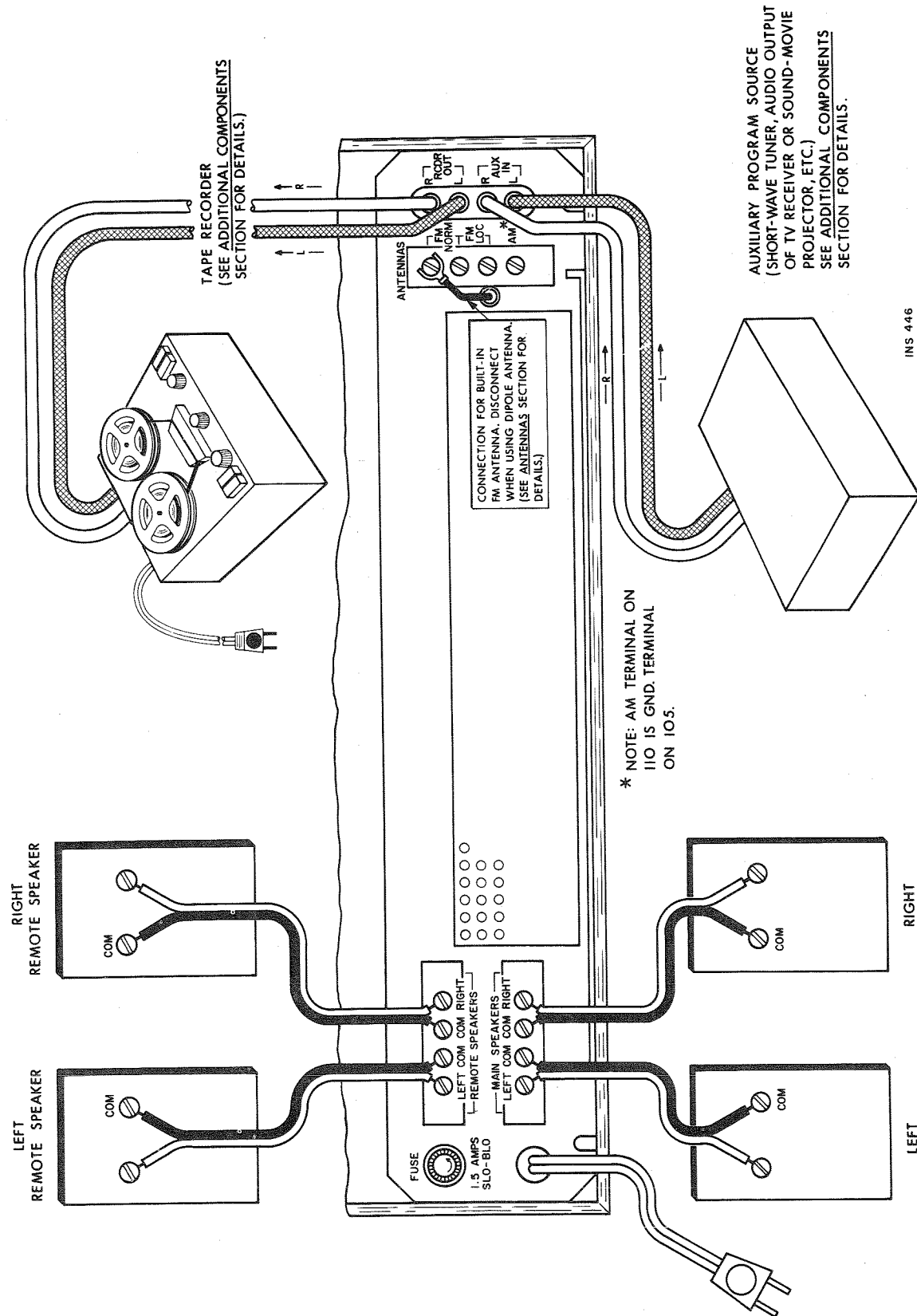
- NOTES**
1. VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO SIGNAL INPUT, LINE VOLTAGE = 120V AC.
 2. FISHER PART NUMBER LISTED FOR PARTS SPECIALLY SELECTED FOR FISHER RADIO CORPORATION, 1/2W 5% COMPOSITION RESISTORS MAY BE USED AS REPLACEMENTS UNLESS OTHERWISE NOTED.
 3. ALL ROTARY SWITCHES SHOWN IN POSITION 1, ALL OTHER CONTROLS AND SWITCHES SHOWN IN NORMAL OPERATING POSITIONS.
 4. [Symbol] INDICATES 1KHz SIGNAL LEVELS FROM PHONO INPUT TO AMPLIFIER OUTPUT, MEASURED WITH AC VTVM TO CHASSIS, VOLUME CONTROL MAXIMUM, ALL OTHER CONTROLS AND SWITCHES NORMAL FOR 7.6 WATTS OUTPUT.
 5. [Symbol] INDICATES AC mV 1KHz SIGNAL LEVELS MEASURED IN FM MONO, MUTING ON WITH SIGNAL AT FM NORM ANTENNA TERMINALS OF 100 mV, 100 MHz, ± 75 kHz DEVIATION WITH 1KHz AUDIO.

SPEAKER SWITCH POSITIONS

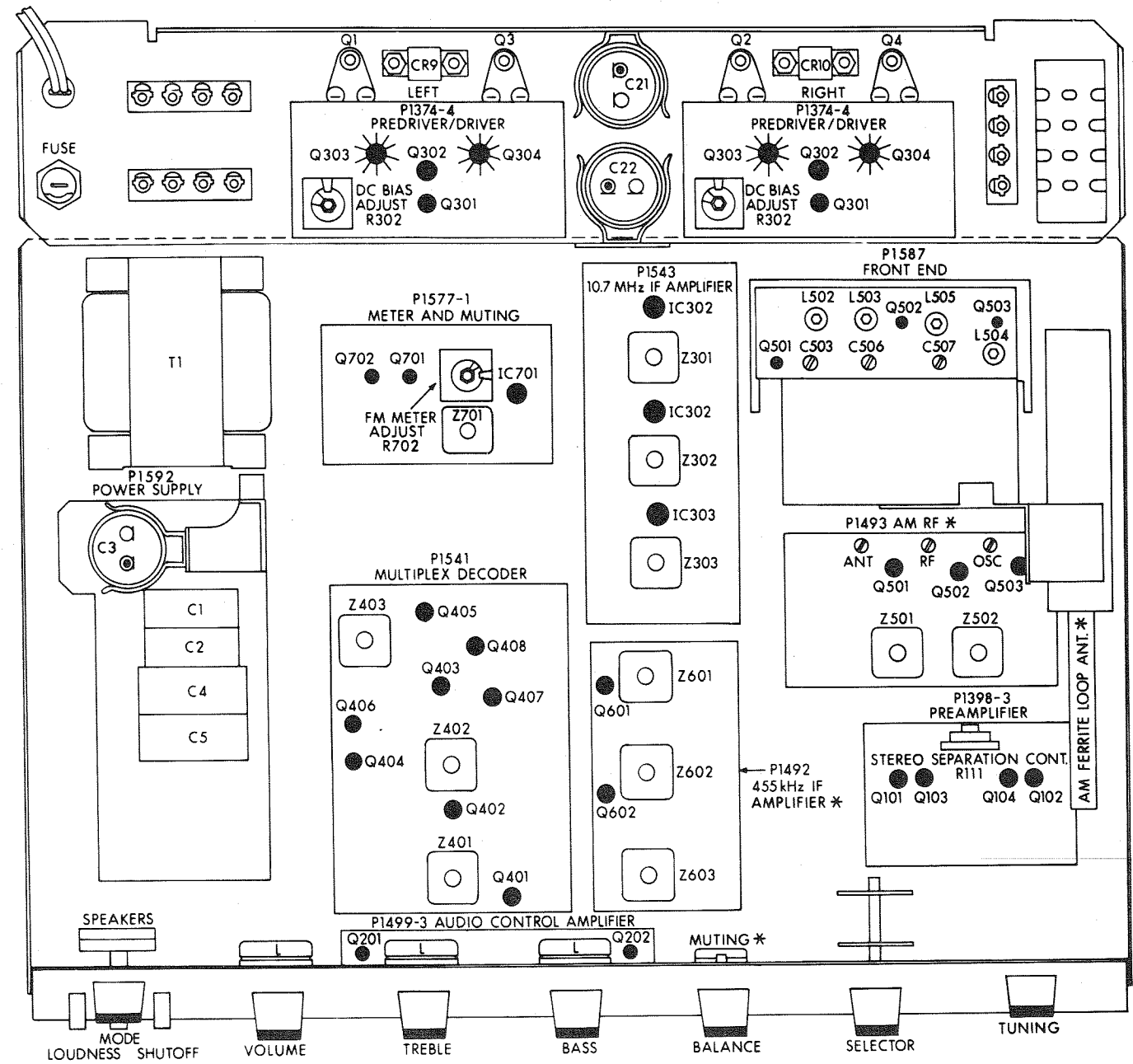
1	OFF
2	MAIN
3	REMOTE
4	MAIN & REMOTE

AW2639
P1465
110

COMPONENT CONNECTIONS



CHASSIS LAYOUT



11I538C130



FISHER RADIO CORPORATION · NEW YORK