

THIS MANUAL ALSO COVERS THE  
37 STEREO HOME MUSIC CENTER

# SERVICE MANUAL

PRICE \$1.00

**36**

SERIAL NUMBERS  
BEGINNING 10001

# The Fisher<sup>®</sup> 36



## Stereo Home Music Center

WORLD LEADER IN HIGH QUALITY STEREO

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**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 elements 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 screw, washer, or screw-driver, to contact a pair of 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 many 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, check bias 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. Include this information when ordering replacements.

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 wire, can cause significant power losses. 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  $\pm 20\%$ . DC voltages are measured to chassis 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.

The following equipment is required to completely test and adjust the 36 Home Music Center

- Line Voltage Autotransformer or Voltage Regulator
- DC Vacuum Tube Voltohmmeter
- Accurately Calibrated AC Vacuum Tube Voltmeter
- Oscilloscope (Flat to 100 kHz Minimum)
- Low-Distortion Audio (Sine Wave) Generator
- Harmonic Distortion Analyzer
- 2—Load Resistors, 4-Ohms, 100 Watt (Minimum Rating)
- AM-FM Signal Generator
- 10.7 MHz Sweep Generator (Fisher 3024\*)
- Multiplex Generator (Fisher 1536\*)
- 455 KHz Sweep Generator (Fisher 3025\*)
- Soldering Iron with Small Tip, Fully Insulated from AC Line
- Suction Desoldering Tool

\* with Power Supply (Fisher 1561)

## REMOVING MOTORBOARD

- (1) Unplug AC power cord.
- (2) Unscrew two large shipping screws near left-rear and right-front corners of the turntable baseplate so that they are fully out. This will lock the turntable to motorboard.
- (3) Remove four screws (two on each side) holding the motorboard to chassis. Remove two screws from top of dress panel in front of motorboard.
- (4) Lift motorboard at rear and disconnect motor connector and audio cables from underside of changer. Remove motorboard from top of chassis.
- (5) Reverse procedure to reinstall motorboard. Red plug designates the right channel.

## REMOVING DRESS PANEL

- (1) Unplug AC power cord.
- (2) Gently pull VOLUME, BALANCE, BASS, TREBLE, MODE/TAPE MONITOR, SELECTOR and TUNING knobs from their shafts.
- (3) Remove motorboard. Remove three screws from bottom of dress panel and remove dress panel.
- (4) Reverse procedure for reassembly.

## REPLACING DIAL AND METER LAMPS AND METER

The dial glass assembly must be removed for access to dial lamps, dial pointer assembly (and lamp), tuning meter, and STEREOBEACON and meter lamps.

- (1) Remove dress panel.
- (2) Remove four screws securing dial glass assembly to supporting bracket on front panel.
- (3) Label and disconnect lamp and meter wires to permit the dial glass assembly to swing forward for access or to be removed.
- (4) To replace dial lamps, label and disconnect lamp leads, snap out defective lamp assembly from the rear of dial glass bracket and insert a new one.
- (5) To replace dial pointer assembly or dial pointer lamp, label and disconnect lamp leads, carefully disengage pointer assembly and pull it free of bracket. Snap out lamp housing and remove. Check pointer adjustment after reassembly. Refer to DIAL STRINGING procedure.
- (6) To replace STEREOBEACON or meter lamps, the lampholder assembly must be replaced as a unit. Label and disconnect lampholder leads, pull up lampholder retaining spring, and remove lampholder. Install a new lampholder and insert retaining spring to hold it against rear of meter.
- (7) To replace tuning meter, label and disconnect meter leads, remove lampholder assembly from rear of meter, and gently pry meter from back of panel. Scrape residual adhesive from panel. Transfer meter leads to new meter. Use new adhesive pad. Align meter face over panel cutout and press firmly to back of panel. Reinstall lampholder at rear of meter. Check meter calibration after reassembly. Refer to TUNER ALIGNMENT.

- (8) Replace dial glass assembly, dress panel and motorboard.

## REPLACING DIAL GLASS

- (1) Remove dress panel.
- (2) Remove left and right dial glass retainers and remove dial glass.

## REMOVING PC BOARDS AND SWITCH ASSEMBLIES

Remove the motorboard for access to boards. To remove boards, disconnect leads and remove screws securing the board to its mounts. Label all wires for reference. Points to note are as follows:

The power amplifier heat sink is secured to the rear skirt of the chassis with five screws. These must be removed to remove the board. When removing the tuner board, access to the dial drum is required. Remove the AM antenna mounting plate for access. Remove the dial cord. Refer to DIAL STRINGING procedure to replace the dial cord.

## PREAMP/CONTROL AMP

The preamp/control amp requires additional procedures for its removal as follows:

- (1) Remove the motorboard.
- (2) Label and disconnect the wires from pins 50 and 51 on power supply board, and pins 28, 56, and DD from preamp/control amp board. These are the wires interconnecting the terminal board at rear of front panel assembly.
- (3) Tape dial cord to pulleys at tuner and at rear panel of assembly. This will keep dial cord in place during removal of panel assembly (otherwise dial cord will have to be restrung).
- (4) Remove left side wood panel (facing the unit).
- (5) Remove speed clip holding the front panel assembly to chassis flange at the left side. Remove two screws securing front panel to chassis at the right side and place assembly on top of chassis.
- (6) Label all wiring to preamp/control amp and disconnect.
- (7) Remove four screws securing the bracket which mounts the front panel controls to front chassis skirt.
- (8) Remove screws securing preamp/control amp board to its mounts. Carefully lift it clear of chassis.
- (9) Replace in reverse order. Refer to DIAL STRINGING procedure if necessary.

## PUSHBUTTON SWITCH ASSEMBLY AND VOLUME/BALANCE BOARD

For access to or removal of pushbutton switch assembly or volume/balance board, follow steps (1) through (5) of preamp/control amp removal. Label all wires for reference and disconnect. Remove screws securing the switch assembly or volume/balance board to the front chassis skirt. Replace in reverse order.

**PLEASE READ CAREFULLY:** The parts lists on this and following pages do not include shipping charges. Please include the serial number of the Fisher equipment for which the part(s) are intended. Send your order to:  
PARTS DEPARTMENT, FISHER RADIO,  
11-40 45th Road, Long Island City, N. Y. 11101.

MAIN CHASSIS			
Symbol	Description	Part No.	Sug. Ret.
—	AC Outlet	JK20665	.65
—	Adhesive Pad (for Meter)	EM51293	.30
—	Antenna, Dipole, FM	LA51319-1	1.45
—	Cartridge, Phono (Pickering V15/AT2)	GT21352	20.25
—	Connector, Turntable (4 Terminal)	J50375-4	.45
—	Dial Drum Assembly (Tuner)	AS2287-23400011	.85
—	Dial Glass, Screened	AS4058-108	.60
—	Dial Pointer Assembly	AS20506	2.90
—	Dress Panel Assembly (36)	AS4057-109	20.00
—	Dress Panel Assembly (37)	AS4057-509	20.00
—	Foot, Molded	A51A147	.45
—	Fuse Holder	X51B080	1.35
—	Grommet, Rubber	A1059-119	.35
—	Jack, FM Detector Out	J50465	.40
—	Jack, Phones, Ext Recorder Out	JK20627-5	1.10
—	Jack Strip, Input-Output — (12 jacks)	JK20691	3.00
—	Knob:		
—	Pushbutton	EK20021-3	.50
—	Volume, Balance	EK20040	.60
—	Tuning	EK20035	.50
—	Mode/Tape Monitor, Selector	EK20036	.50
—	Dual Outer — Bass, Treble	EK20037	.50
—	Dual Inner — Bass, Treble	EK20038	.70
—	Lamp Assembly, Dial Glass	AS21410-5	1.05
—	Lamp Assembly, Dial Pointer	AS21413-2	1.05
—	Lamp Assembly, Stereobeacon, Meter	AS21419-3	3.85
—	Line Cord	W50023-1	1.25
—	Motor Board Assembly	AS4058-138	5.00
—	Nameplate '36'	NP22641-2	1.25
—	Nameplate '37'	NP22641-9	1.25
—	Nameplate 'Turntable (BSR) Panel, Left Side (Walnut)	N20A267	.40
—	Nameplate 'Turntable (BSR) Panel, Right Side (Walnut)	KE4058-109-1	6.30
—	PCB AM-FM Tuner	KE4058-109-2	6.30
—	PCB Preamp/Control Amplifier	PB2287-2	104.50
—	PCB Volume/Balance Control	PB2285-1	59.60
—	PCB Power Amplifier	PB2291-1	10.90
—	PCB Power Supply	PB2245-3	45.70
—	PCB Power Supply	PB2245-4	24.90
—	Retainer, Dial Glass	PB2245-4	25.35
—	Retainer Wire (Meter)	AB4058-125	.40
—	Rubber Strip (Dial Glass)	AN4058-147	.35
—	Speed Clip (Front Panel Assy)	EM51290-4	.40
—	Spring, Dial Drum	H50A885-4	.40
—		AN2287-11403381	.35
—	*Switch, Voltage Selector	SR51304-1	1.65
—	Terminal Board, Antenna	ET51394	1.15
—	Terminal Board, Speakers	ET51340-2	3.10
—	Tuning Shaft Assembly	AS20719	2.25
C1A, B	Ceramic, Dual, 680pF, 20% 500 V	C50B644-2	.45
C50	Ceramic 1pF, ± 0.25pF, 500V	C51188-1	.35
F1	Fuse, 1.5A, 125V, Slo-Blo	FL51313-20	.60
*F1	Fuse, 1.6A, 250V, Slo-Blo	F51B247-17	.60
*F1	Fuse, 800mA, 250V, Slo-Blo	F51B247-13	.60
L9	Antenna, Ferrite (AM)	LA2287-116-1	2.65
L10	Choke, RF, 3.3 uH	LC21814-2	.55
M1	Meter, Indicating	MC21613	7.10
R61	Composition, 270, 10% 1/2 W	RC20BF271K	.30
R62	Composition, 330K, 10%, 1/2 W	RC20BF334K	.30
S1, 2, 3, 4, 5	Switch Assembly, Power Speakers, Muting Off, Loudness (5-switch Assembly)	SP50200-53-1	4.70
T1	Transformer, Power	TD4057-115	12.80
*T1	Transformer, Power	TE4057-215	14.45

\*Used in Export Units Only

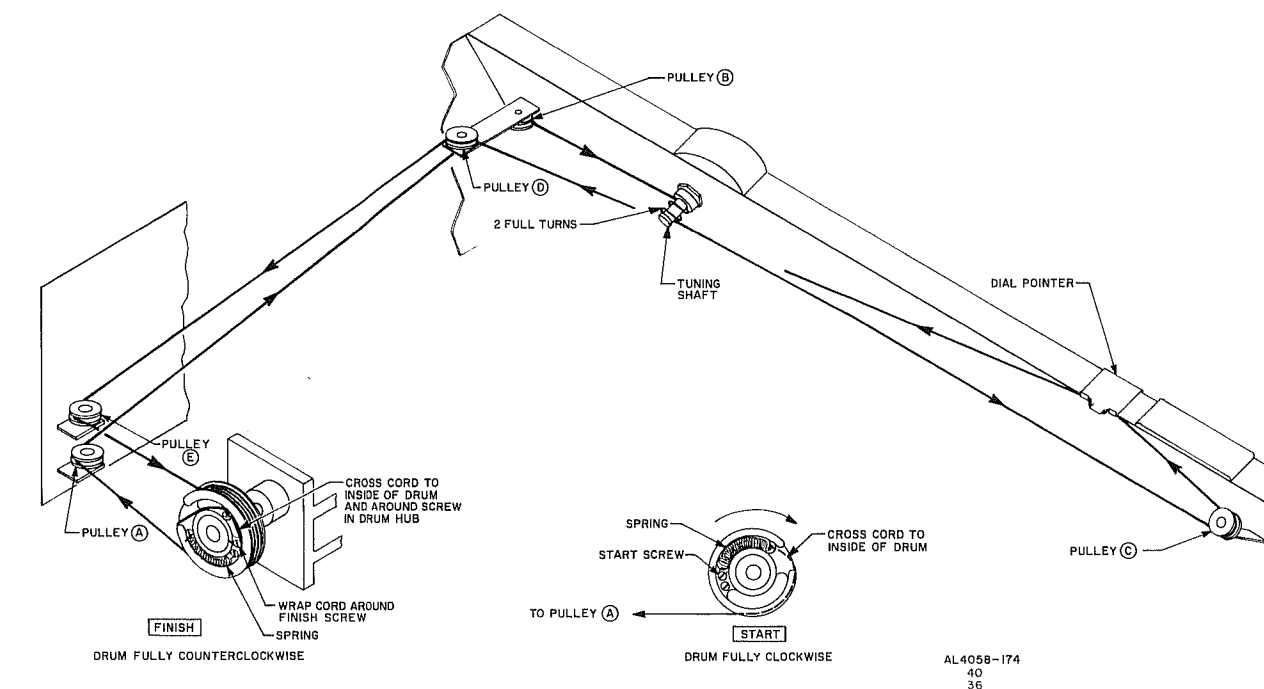
- (1) Remove motorboard. Refer to disassembly procedures.
- (2) Remove dial pointer from old dial cord.
- (3) Remove AM loop antenna mounting plate for access to dial drum.
- (4) Rotate tuning capacitor drum fully clockwise. Loosen machine screws in drum and remove old dial cord.
- (5) Tie new dial cord to end of spring. Fasten spring to START screw. See illustration.
- (6) Cross the cord to inside of drum, then run cord through slot in rim and wrap 1/2 turn clockwise around drum. Guide cord around pulleys 'A' and 'B' and wrap 2 full turns (counter-clockwise viewed from back) around tuning shaft.
- (7) Guide cord under pulley 'C' and around pulleys 'D' and 'E.' Rotate drum fully counterclockwise allowing cord to wind on drum.
- (8) Run cord over drum and around the other side into the rim slot. Cross cord to inside of drum and around screw on drum hub, then wrap cord around FINISH screw.
- (9) Pull cord taut and tighten screw. Turn tuning shaft clockwise and counterclockwise several times to distribute tensioning.
- (10) Place pointer on rail and slip cord over tabs. Turn tuning shaft fully counterclockwise, slide pointer to (0) mark on logging scale, and cement to cord.
- (11) Check dial calibration. Refer to TUNER ALIGNMENT.
- (12) Reinstall antenna mounting plate and motorboard.

## CAUTION:

- (A) Test one channel at a time.
- (B) Limit tests to 10 minutes.
- (C) Use a load with a minimum power rating of 100 watts.

Unplug AC power cord and release all pushbuttons. Slide VOLUME control to MIN. Set BASS, TREBLE and BALANCE to their center positions. Set MODE/TAPE MONITOR to STEREO, SELECTOR to AUX 1 and depress MAIN SPKRS pushbutton.

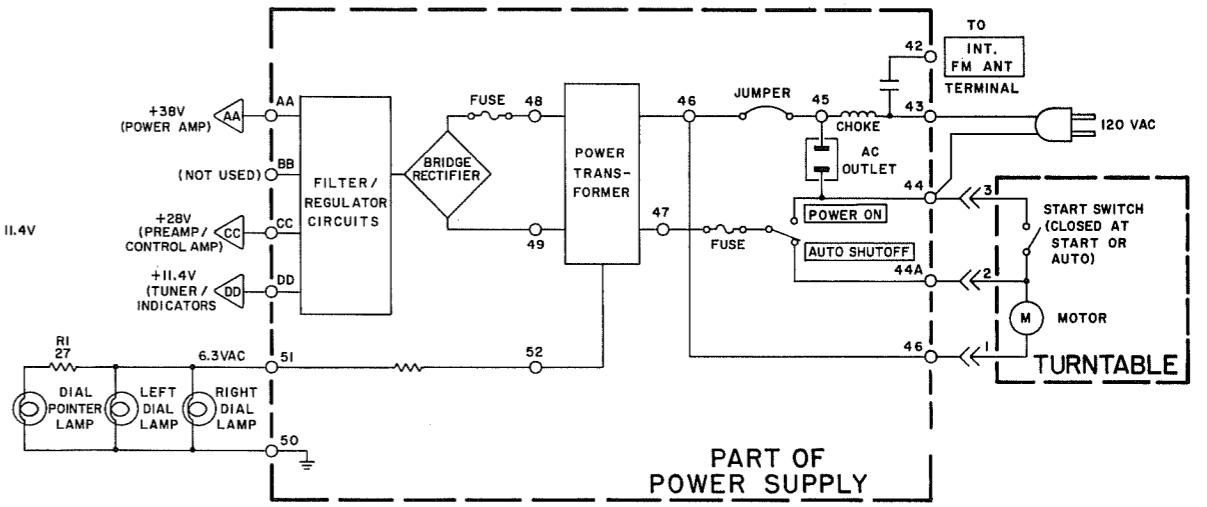
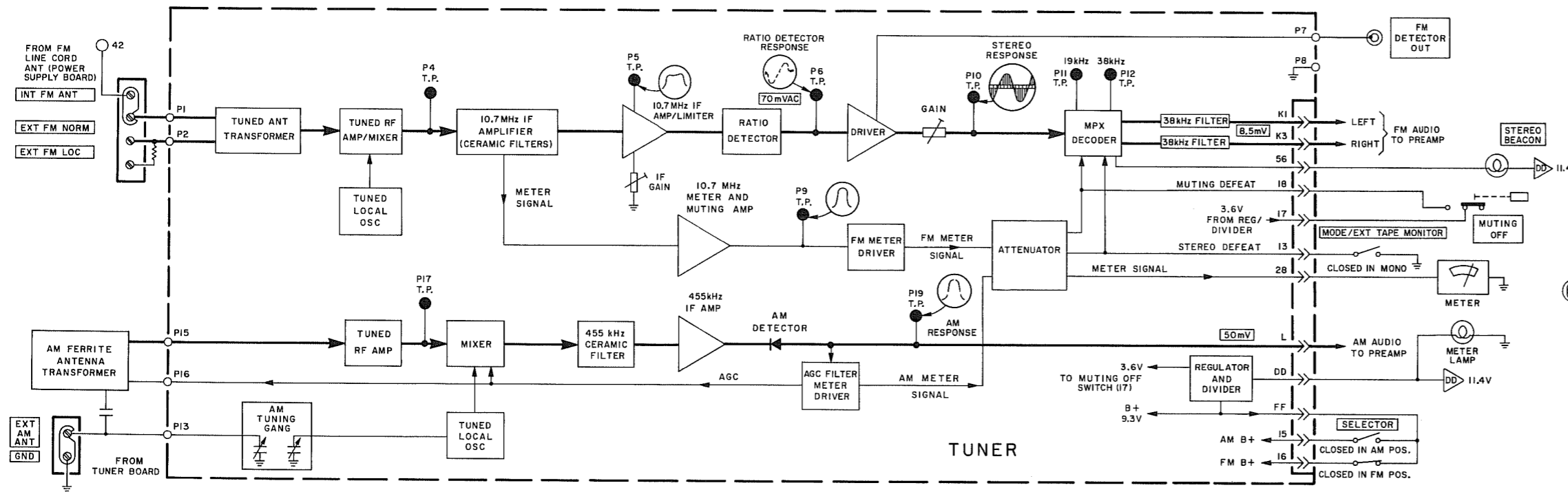
- (1) Connect a low-distortion sine wave generator to the LEFT CHANNEL AUX 1 IN jack. Set generator frequency to 1kHz, and the output level to minimum.
- (2) Connect a 4-ohm load resistor between MAIN SPKRS LEFT and COMMON terminals. Connect a harmonic distortion analyzer across the load.
- (3) Connect AC power cord and depress POWER ON pushbutton. Slide VOLUME to MAX.
- (4) Increase generator output for 20 watts RMS (8.9V across 4-ohm load). HD meter should indicate 1% or less.
- (5) Repeat preceding steps for right channel.



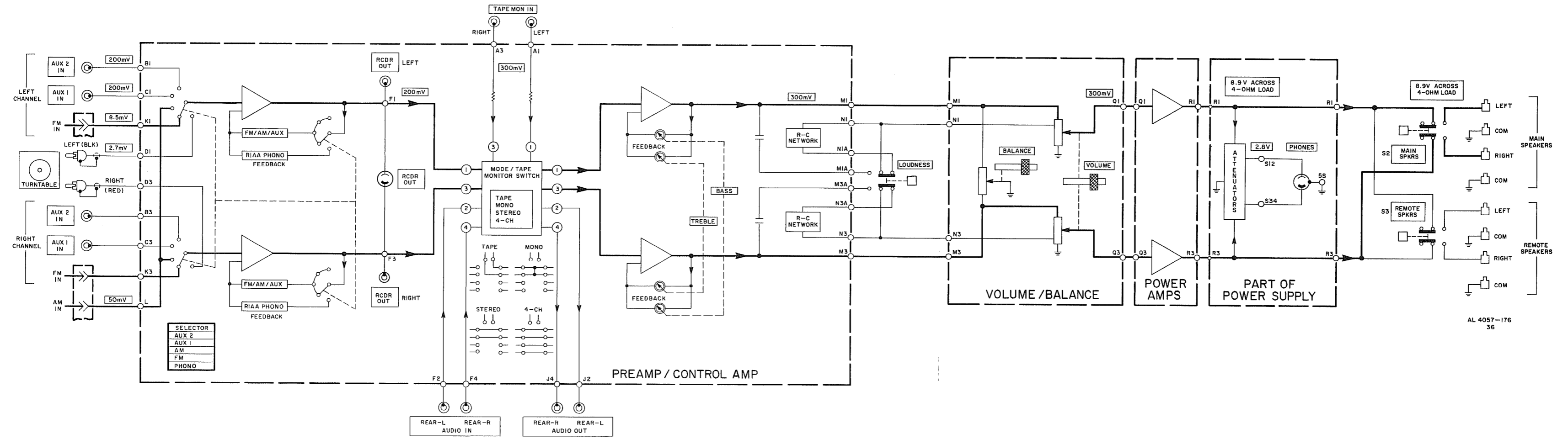
AL4058-174  
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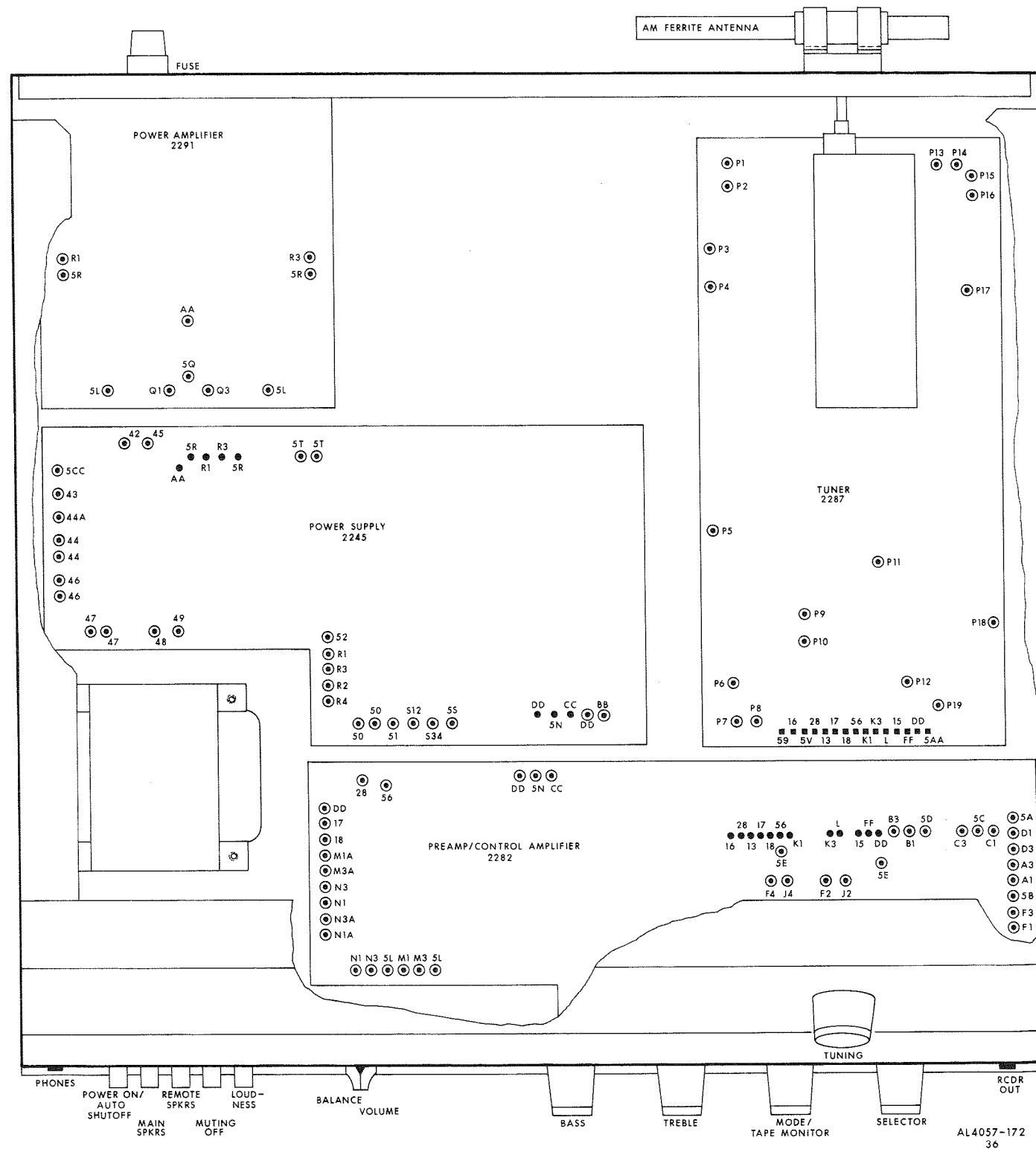
BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, FISHER RADIO RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION.

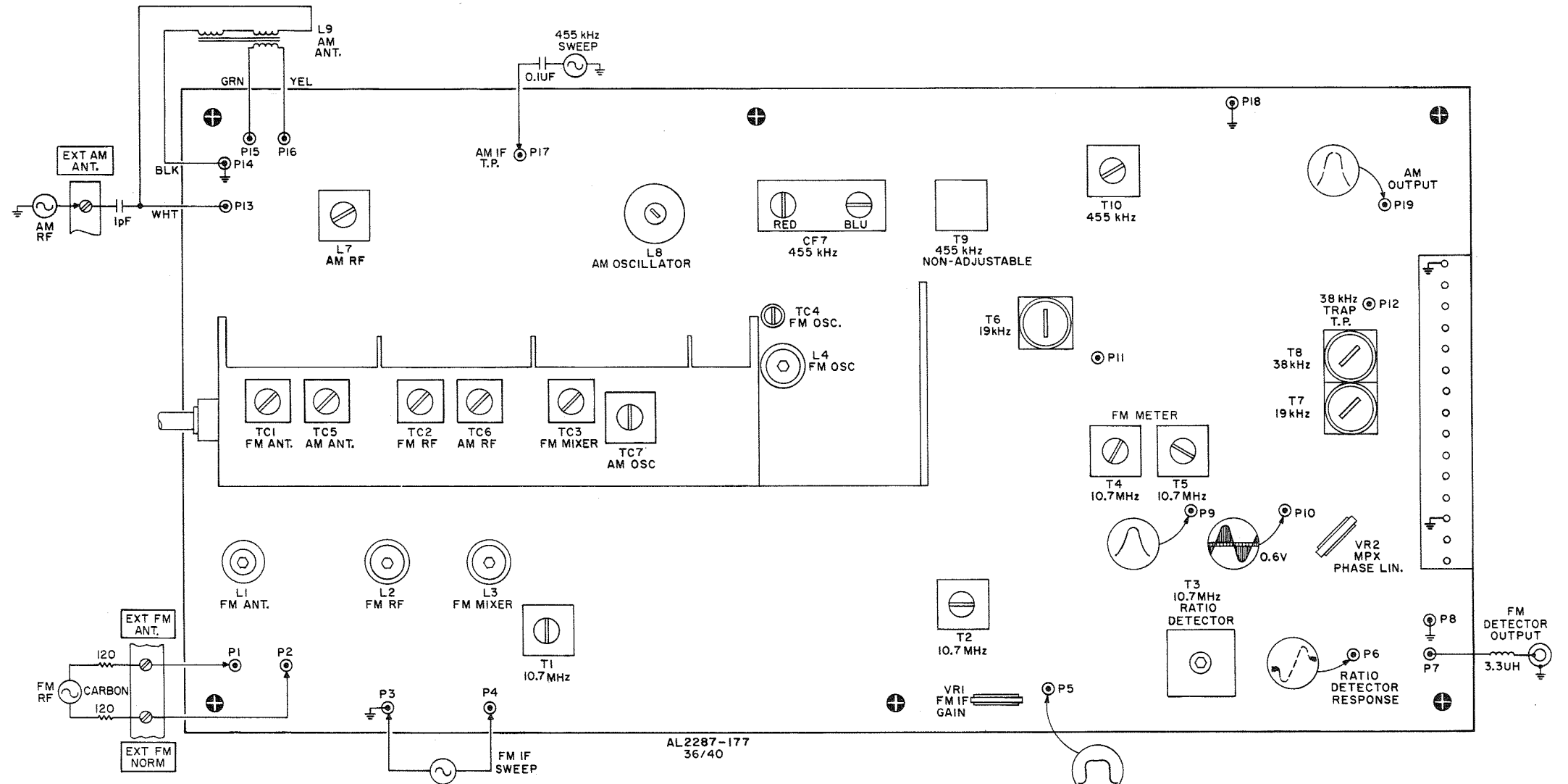
PRICES SUBJECT TO CHANGE WITHOUT NOTICE



NOTES:  
 1. LINE VOLTAGE SET TO 120VAC FOR ALL VOLTAGE MEASUREMENTS. EXCEPT AS NOTED, ALL MEASUREMENTS ±20%.  
 2. □ DENOTES 1kHz SIGNAL LEVEL (IN MILLIVOLTS) FOR 8.9V OUTPUT ACROSS 4-ΩHM LOAD, ONE CHANNEL DRIVEN, CONTROLS AND SWITCHES NORMAL, VOLUME MAXIMUM, 10mV FM, 1kHz AUDIO, ±13kHz DEVIATION AT EXT FM NORM TERMINALS; 100mV AM, 1kHz AUDIO, 13% MODULATION AT EXTERNAL AM ANTENNA TERMINAL.

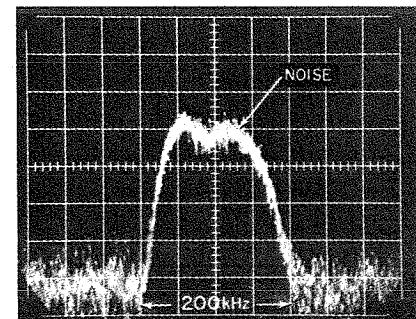




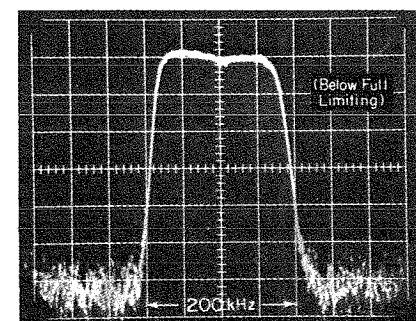


NOTE: CHASSIS GROUNDS ARE COMPLETED THROUGH MOUNTING SCREWS  $\oplus$  TIGHTEN BEFORE ATTEMPTING ALIGNMENT OR TEST.

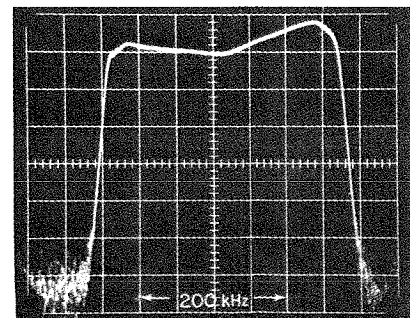
USE DIODE DETECTOR PROBE (FISHER 3084-16 or EQUIVALENT)



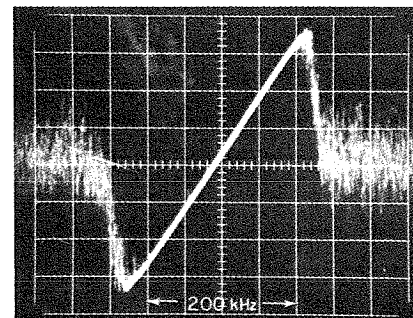
FM IF : A



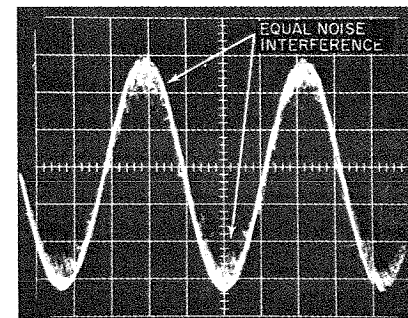
FM IF : B



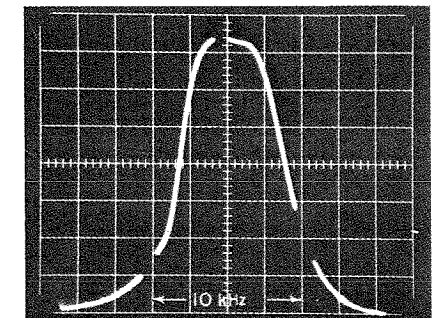
FM IF LIMITED



FM DETECTOR



SYMMETRICAL TUNING



AM IF

# TUNER ALIGNMENT

FM ALIGNMENT – SELECTOR to FM, MODE/ TAPE MONITOR to MONO, MUTING OFF depressed, VOLUME to 0.

Maintain generator output as low as possible for suitable indication.

GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
<p><b>Note:</b> FM IF circuits utilize non-tunable ceramic filters which establish the IF bandpass. To insure symmetrical tuning and selectivity, the IF's must be aligned precisely to the center of the IF bandpass, rather than to 10.7 MHz as in conventional LC circuits.</p>			
1. IF	Connect 10.7MHz sweep to pin P4, gnd to P3. Markers are not required.	Position of non-interference	Scope vert input to pin P5, gnd to P3. Use diode detector probe.* Adjust FM IF GAIN VR1, T1 and T2 for max gain and best symmetry. Keep signal low enough for noise on response as shown in FM IF, RESPONSE A.
2.	Increase output for signal just below full limiting.	Position of non-interference	Scope vert input to pin P5, gnd to P3. Use diode detector probe.* If necessary readjust T1 and T2 for good symmetry. SEE FM IF, RESPONSE B.
3. DETECTOR	10.7 MHz sweep to P4, gnd to P3. Adjust for S-curve display.	Position of non-interference	Scope vert input to pin P6 through 100K resistor, gnd to P8. Adjust T3 bottom and top slugs for max gain and best symmetry. SEE FM DETECTOR RESPONSE. Note: Minimum THD and Maximum Meter alignment must be performed as part of Detector alignment.
<p>NOTE: 120-ohm composition resistors in series with each lead from RF generator match 50-ohm output to 300-ohm input impedances. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages are generator output levels, not antenna voltages.</p>			
4. METER	Sweep generator as connected in step 2. FM generator to FM ANTenna terminals through 120-ohm resistors. Turn modulation off. Slowly increase output and vary frequency for marker at center of IF response curve. Turn off sweep and adjust FM generator output for panel meter reading of approx 3.	Position of non-interference	Front panel meter Adjust T4 and T5 for max deflection. Reduce generator output to keep meter at approx 3.
5. FRONT END		Tuning knob fully CCW.	Center dial pointer on 0 and cement.
6.	FM generator to FM ANTenna terminals through 120-ohm resistors. Set to 90 MHz. Adjust output for approx 3 on meter.	Center of 90 MHz calibration mark on dial.	Front panel meter Adjust L4, L3, L2, L1 for max deflection. Reduce generator output to keep meter at approx 3.
7.	Set to 106 MHz	Center of 106 MHz calibration mark on dial.	Front panel meter Adjust TC4, TC3, TC2, TC1 for max deflection. Reduce generator output to keep meter at approx 3. Repeat steps 6 and 7 for max signal and accurate dial calibration.
8. MAX METER	Set to position of non-interference near 98 MHz. Modulate with 400 Hz, $\pm 75$ kHz deviation. Vary frequency to peak meter reading. Keep output at approx 3.5.	Tune to generator.	Scope vert input to LEFT RCDR OUT jack. Reduce generator output for noise visible on sine wave. Readjust generator frequency to center noise on positive and negative half cycles. SEE SYMMETRICAL TUNING RESPONSE.
9.	Set generator for CW output at 2 mV.	Tune to generator.	Front panel meter Meter deflection should be between 4 and 5. (No adjustment.) Note: Do not change generator or receiver tuning; proceed with Min THD adjustment.
10. MINIMUM THD	Modulate with 400 Hz, $\pm 75$ kHz deviation.		HD analyzer to LEFT RCDR OUT jack. Adjust T3 top and bottom for max output and minimum distortion. Output should be from 0.8 to 1.8 VRMS; distortion should be below 0.8%.

\* See schematic for Fisher probe.

GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
11. MUTING	Position of non-interference near 98 MHz. Modulate with 400 Hz, $\pm 22.5$ (or 25) kHz deviation. Set output at 2 mV.	Tune to generator	AC VTVM and scope vert input to FRONT RCDR OUT jack. Release MUTING OFF pushbutton. Panel meter should be between 4 and 5.  Reduce generator output until audio signal disappears on scope trace; generator output should be less than 45 $\mu$ V. Increase generator output to 60 $\mu$ V, audio should reappear. Depress MUTING OFF pushbutton.
12. 19 kHz PILOT	FM generator with composite multiplex signal at EXTERNAL MODULATION input. Modulate with 19 kHz pilot (10%), 400 Hz audio (90%), left channel only. Set for 42.5 kHz deviation and 2 mV output.	Tune to generator	Scope vert AC input to pin P11. Set MODE/ TAPE MONITOR to STEREO. Adjust T6 and T7 for max amplitude.
13. 38 kHz TRAP, STEREO-BEACON	FM generator with composite multiplex signal at EXTERNAL MODULATION input. Modulate with 19 kHz pilot (10%), 400 Hz audio (90%), left channel only. Set for 42.5 kHz deviation and 2 mV output.	Tune to generator	Scope vert input to P12. Adjust T8 for max amplitude. STEREOBEACON lamp should be on.
14. SEPARATION	FM generator with composite multiplex signal at EXTERNAL MODULATION input. Modulate with 19 kHz pilot (10%), 400 Hz audio (90%), left channel only. Set for 42.5 kHz deviation and 2 mV output.	Tune to generator	AC VTVM to LEFT RCDR OUT jack, another to RIGHT RCDR OUT jack. Readjust T6 for max on left channel. Adjust T8 and VR2 (MPX PHASE LINEARITY) for best separation.  Modulate right channel only. If necessary, readjust T8 and VR2 for best separation.

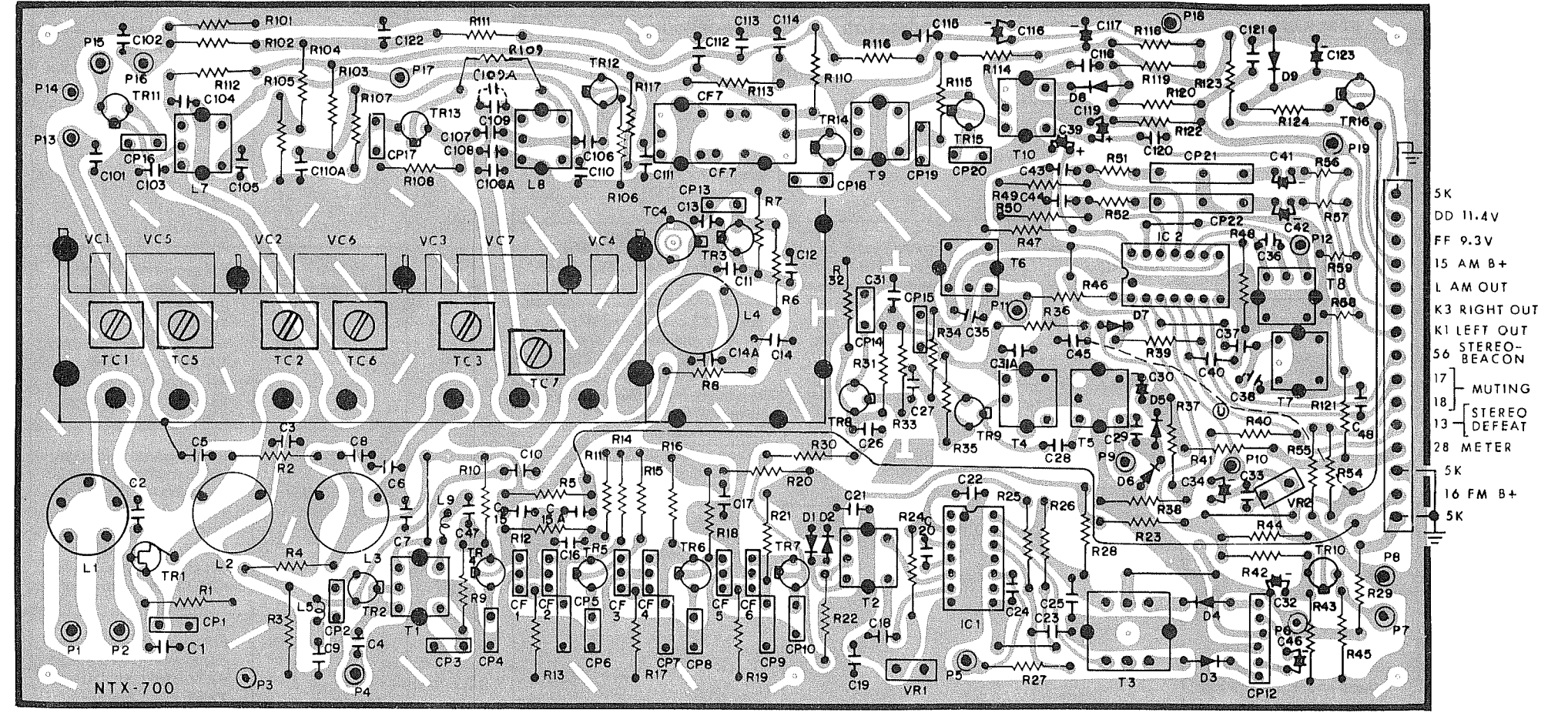
AM ALIGNMENT – SELECTOR to AM, MODE/ TAPE MONITOR to MONO, VOLUME to 0.

Maintain generator output as low as possible for suitable indication.

GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. IF	455 kHz sweep generator to pin P17, gnd to P14. Use 0.1 $\mu$ F capacitor in series with generator lead.	Position of non-interference.	Scope to pin P19, gnd to P18. Use low capacitance probe. Adjust both T10 and CF7 for max gain and best symmetry. Maximum response can be $\pm 2.5$ kHz from IF center frequency (455 kHz). See AM IF RESPONSE.
2. FRONT END	AM generator to EXT AM ANT and GND terminals. Open GND link. Set to 600 kHz. Modulate with 400 Hz, 30% modulation.	Center of 600 kHz calibration mark on dial.	Front panel meter. Adjust L7 and L8 for max deflection. Reduce generator output to keep panel meter at approx 3.
3.	Set to 1400 kHz	Center of 1400 kHz calibration mark on dial.	Front panel meter. Adjust TC7, TC5, TC6 for max gain. Keep meter at approx 3. Repeat steps 2 and 3.

AM-FM TUNER PB2287-2

Symbol	Description	Part No.	Sug. Ret.	Symbol	Description	Part No.	Sug. Ret.
C1, C108A	Ceramic, 10pF, ±0.5pF, 50V, N330	CK2287-42333017	.40	C123	Electrolytic, 100uF, 16V	CE2287-43001061	.70
C2	Ceramic, 27pF, ±0.5pF, 50V	CK2287-42333033	.40	CF1, 2, 3, 4, 5, 6	Ceramic Filter, 10.7MHz	ZK2287-61136001	1.35
C3	Ceramic, 8pF, ±0.5pF, 50V	CK2287-42333015	.40	CF7	Ceramic Filter, 455kHz	ZK2287-61131001	2.95
C4, C10	Ceramic, 1pF, ±0.25pF, 50V	CK2287-42331001	.35	CP1	Printed Circuit	EP2287-39050003	.45
C5, 8, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 31, 31A, 45	Ceramic, 0.01uF, +80-20%, 25V	CK2287-42103004	.35	CP2, 10	Printed Circuit	EP2287-39050019	.45
C6	Ceramic, 12pF, 5%, 50V	CK2287-42333025	.40	CP3	Printed Circuit	EP2287-39050024	.45
C7	Ceramic, 5pF, ±0.5pF, 50V	CK2287-42333012	.40	CP4, 6, 16, 18, 20	Printed Circuit	EP2287-39050015	.45
C9, 47	Ceramic, 100pF, 5%, 50V	CK2287-42333047	.40	CP5, 7, 9	Printed Circuit	EP2287-39051001	.80
C11	Ceramic, 12pF, 10%, 50V, NPO	CK2287-42332046	.40	CP8, 14	Printed Circuit	EP2287-39050012	.45
C12	Ceramic, 20pF, 5%, 50V, NPO	CK2287-42332028	.40	CP12	Printed Circuit	EP2287-39053001	1.30
C13	Ceramic, 10pF, 1%, 50V	CK2287-42336021	.40	CP13	Printed Circuit	EP2287-39050027	.45
C14, 14A	Ceramic, 1000pF, +80-20%, 25V	CK2287-42103001	.35	CP15	Printed Circuit	EP2287-39050011	.45
C28	Ceramic, 10pF, ±0.5pF, 50V or 12pF, ±pF, 50V	CK2287-42333017	.40	CP17	Printed Circuit	EP2287-39050029	.40
C30, 34, 39, 41, 42, 46, 116, 119	Electrolytic, 2.2uF, 16V	CE2287-43001054	.50	CP19	Printed Circuit	EP2287-39050030	.40
C32	Electrolytic, 10uF, 16V	CE2287-43001057	.50	CP21, 22	Printed Circuit	EP2287-39050030	1.30
C33, 36	Polyethylene, 2200pF, ±10%, 50V	CP2287-42749217	.45	D1, 2, 5, 6, 7, 8	Diode SD-46	TR2287-36002003	.55
C35, 38	Polyethylene, 0.01uF, 10%, 50V	CP2287-42749225	.45	D3, 4	Diode SD-46(1)	TR2287-36002004	.65
C37	Mylar, 0.047uF, 20%, 50V	CY2287-42701023	.50	D9	Zener, Diode, RD11AM	TR2287-36003026	1.70
C40, 48	Ceramic, 0.1uF, +80-20%, 12.5V	CK2287-42104005	.50	IC1	Integrated Circuit LA1201	TR2287-79905696	6.15
C43, 44	Mylar, 6800pF, 10%, 50V	CY2287-42701118	.40	IC2	Integrated Circuit MC1305P	TR2287-37001004	13.15
C102, 104, 105, 110, 110A, 111, 112, 113, 114, 115, 120, 121, 122	Ceramic, 0.01uF, +80-20%, 25V	CK2287-42103004	.35	L1	FM Antenna Coil	LC2287-60723001	2.05
C106, 107	Mylar, 4700pF, 10%, 50V	CY2287-42701117	.40	L2, 3	FM RF, Mixer Coil	LC2287-60724001	1.30
C108	Ceramic, 18pF, 10%, 50V, N1500	CK2287-42930009	.50	L4	FM Osc Coil	LC2287-60782001	1.30
C109	Polyethylene, 430pF, 5%, 50V or 390pF, 5%, 50V	CP2287-42749316	.45	L5, 9	RF Choke, 2.2uH	LC2287-61052009	.55
C109A	Ceramic, 18pF, 5%, 50V or 27pF, 5%, 50V or 39pF, 5%, 50V or 56pF, 5%, 50V or 68pF, 5%, 50V or 82pF, 5%, 50V	CK2287-42333029	.40	L7	AM RF Coil	LC2287-60700010	1.00
C117	Electrolytic, 10uF, 16V	CE2287-43001057	.50	L8	AM Osc Coil	LC2287-60779001	1.00
C118	Ceramic, 2200pF, +80-20%, 25V	CK2287-42103002	.35	R1, 38, 101	220K	RF25DC224J	.30
				R2, 44	470	RF25DC471J	.30
				R3, 32	6.8K	RF25DC682J	.30
				R4, 54	12K	RF25DC123J	.30
				R5, 36, 46	220	RF25DC221J	.30
				R6, 42, 102, 111, 115	22K	RF25DC223J	.30
				R7, 33, 123	1.2K	RF25DC122J	.30
				R8	56	RF25DC560J	.30
				R9, 22, 103, 108, 121	1K	RF25DC102J	.30
				R10, 37, 107	33K	RF25DC333J	.30
				R11, 20, 23	33	RF25DC330J	.30
				R12, 15, 18, 48, 124	330	RF25DC331J	.30
				R13, 17, 19, 113	820	RF25DC821J	.30
				R14, 16, 104, 116, 119	56K	RF25DC563J	.30
				R21	8.2K	RF25DC822J	.30
				R24	18K	RF25DC183J	.30
				R25, 26, 27	1.5K	RF25DC152J	.30
				R28, 114	560	RF25DC561J	.30
				R29, 47, 55, 122	4.7K	RF25DC472J	.30



AL2287-111

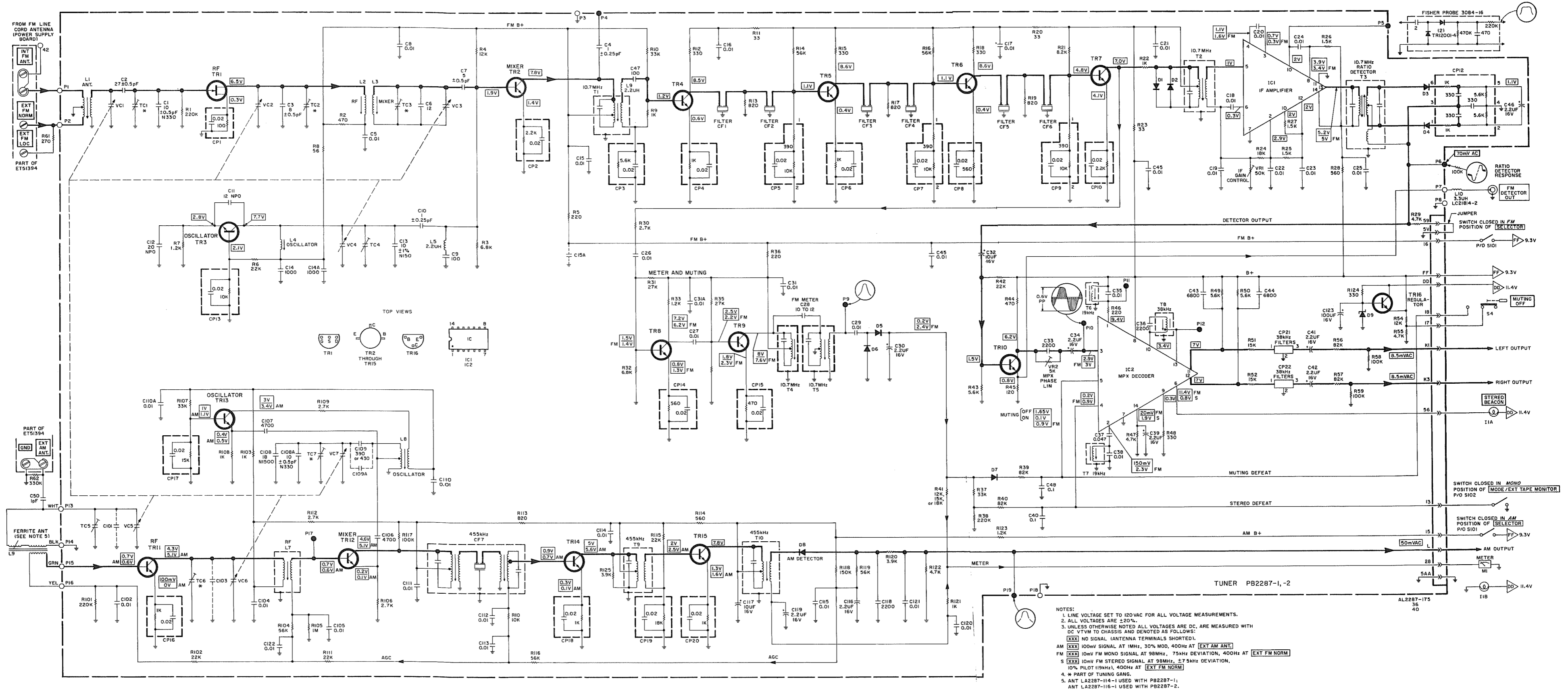
U DENOTES WIRING ON UNDERSIDE OF BOARD

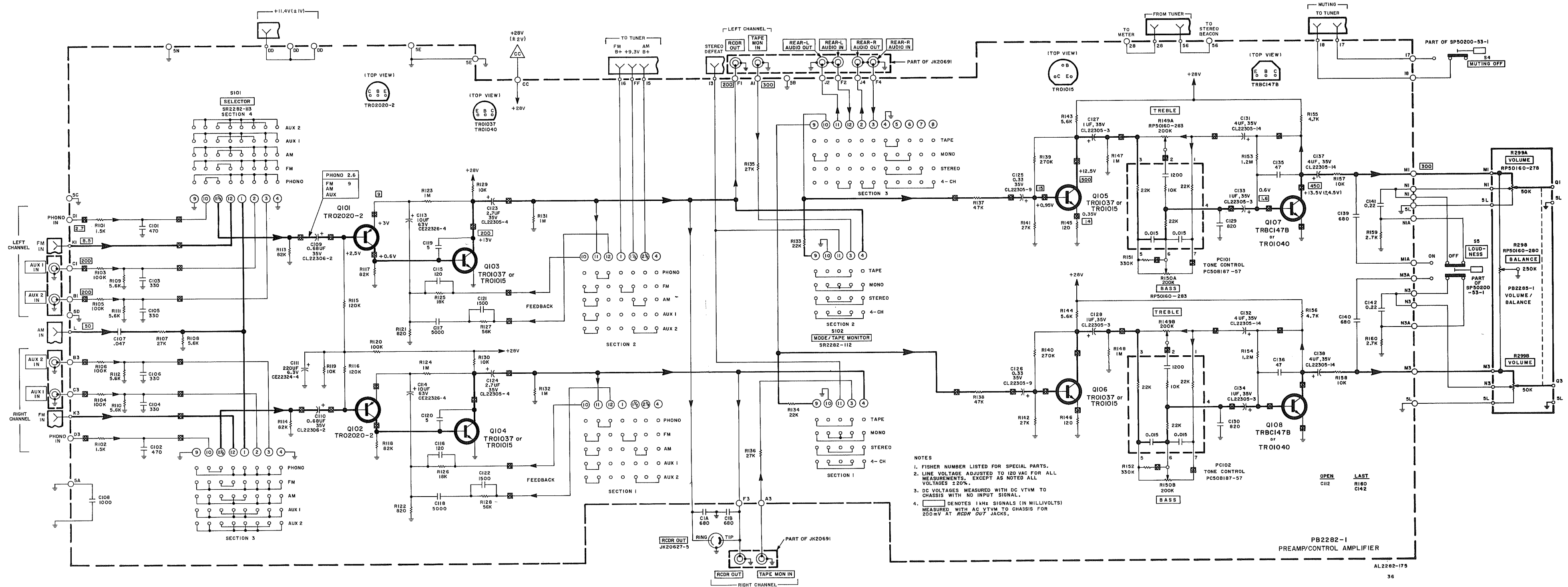
Symbol	Description	Part No.	Sug. Ret.	Symbol	Description	Part No.	Sug. Ret.
R30	2.7K or 2.2K or 3.3K or 3.9K or 4.7K	RF25DC272J	.30	T9	IF Trans, 455kHz	LC2287-60812001	1.15
R31, 35	27K	RF25DC273J	.30	T10	IF Trans, 455kHz	LC2287-60802010	1.05
R34	15K	RF25DC153J	.30	TC1, 2, 3, 5, 6, 7	Trimmer (Part of Tuning Gang Assembly)		
R39, 40	82K	RF25DC823J	.30	TC4	Trimmer	CT2287-44316001	.85
R41	15K or 12K or 18K	RF25DC153J	.30	TR1	FET 2SK19	TR2287-35120325	4.40
R43, 49, 50	5.6K	RF25DC562J	.30	TR2, 3	Transistor 2SC921K	TR2287-35046011	1.55
R45	120	RF25DC121J	.30	TR4, 5, 6, 8, 9, 11, 12, 14	Transistor 2SC920Q	TR2287-35048617	1.10
R51, 52	15K	RF25DC153J	.30	TR7, 10, 13, 15	Transistor 2SC920R	TR2287-35048618	1.10
R56, 57	82K	RF25DC823J	.30	TR16	Transistor 2SC815K	TR2287-35045311	1.50
R58, 59, 117	100K	RF25DC104J	.30	VC1, 2, 3, 4, 5, 6, 7	Tuning Gang Assembly	CV2287-44019001	19.05
R105	1M	RF25DC105J	.30	VR1	Variable Resistor, 50K	RV2287-41950006	.80
R106, 109, 112	2.7K	RF25DC272J	.30	VR2	Variable Resistor, 5K	RV2287-41950005	.80
R110	10K	RF25DC103J	.30	T3	Ratio Det, 10.7MHz	ZZ2287-60828102	2.15
R118	150K	RF25DC154J	.30	T4	IF Trans, 10.7MHz	ZZ2287-60830001	1.25
R120, 125	3.9K	RF25DC392J	.30	T6, 7	Coil, 19kHz	LC2287-61905003	1.80
T1, 2, 5	IF Trans, 10.7MHz	ZZ2287-60828102	1.25	T8	Coil, 38kHz	LC2287-61905004	1.80

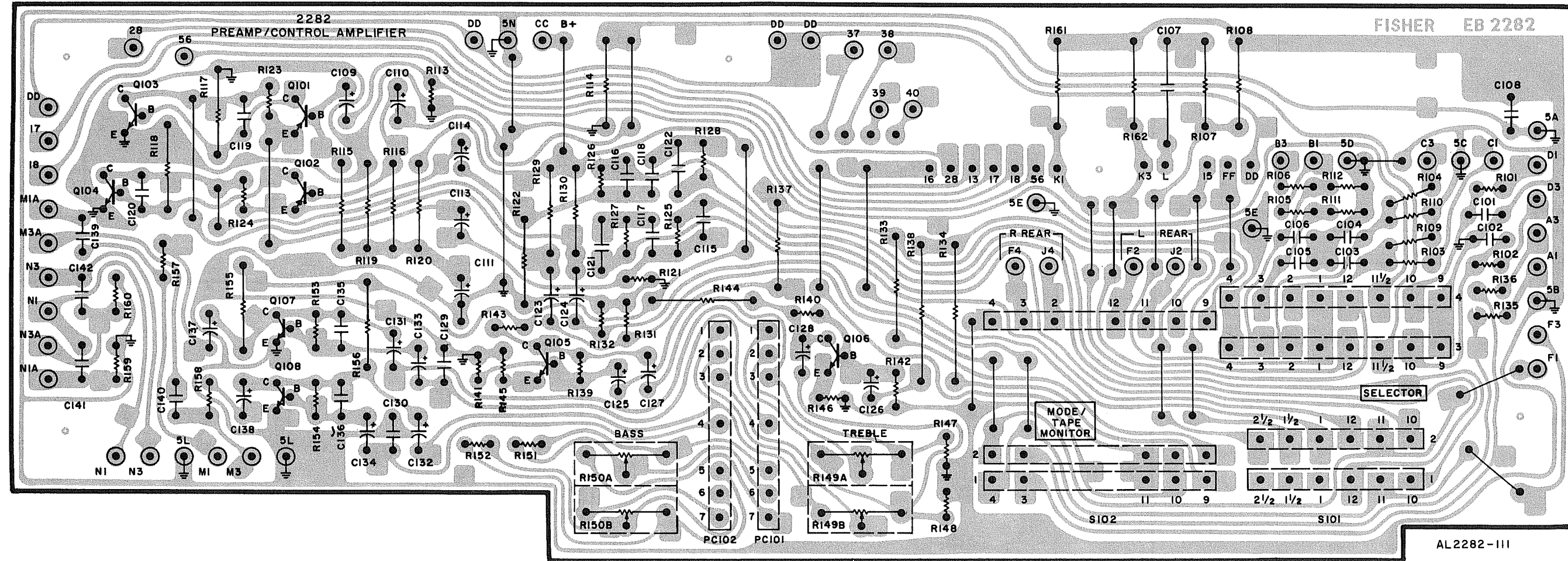
Symbol	Description	Part No.	Sug. Ret.
C50	Ceramic, 1pF, ±0.25pF, 500V, P100	C51188-1	.35
I1A,B	Lampholder (Stereobeacon, Meter)	LM21420-3	2.00
L9	AM Antenna	LA2287-116-1	2.60
L10	RF Choke, 3.3uH	LC21814-2	.55
M1	Meter, Indicating	MC21613	7.10
R61	Composition, 270, 10%, 1/2W	RC208F271K	.30
R62	Composition, 330K, 10%, 1/2W	RC208F334K	.30
S4	Muting Off Switch (Part of 5 Switch assembly)	SP50200-52-1	6.10
S101	Selector Switch	SR2247-115	16.40
S102	Mode/ Tape Monitor Switch	SR2247-116	9.20
--	Jack, FM Detector Out	J50465	.40
--	Terminal Board, Antenna	ET51394	1.15

Note: Unless otherwise specified, all resistors are Carbon Film in ohms, 10%, 1/2W. K = Kiloohms, M = Megohms









PREAMP-CONTROL AMP PB2282-1

Symbol	Description	Part No.	Sug. Ret.
C101, 102	Ceramic, 470pF, 10%, 500V	C50B651-13	.35
C103, 104, 105, 106	Ceramic, 330pF, 10%, 500V	C50B651-1	.30
C107	Mylar, 0.047uF, 10%, 250V	C50B574-5	.50
C108	Ceramic, 1000 pF, 10%, 500V	C50B651-3	.30
C109, 110	Tantalum, 0.68uF, 20%, 35V	CL22306-2	.75
C111	Electrolytic, 220uF, 6.3V	CE22324-4	.70
C113, 114	Electrolytic, 10uF, 63V	CE22326-4	.35C
C115, 116	Ceramic, 120pF, 10%, 500V	C50B651-16	.30
C117, 118	Ceramic, 5000pF, 20%, 500V	C50B567-2	.30
C119, 120	Ceramic, 5pF, 5%, 500V	C50B652-21	.35
C121, 122	Ceramic, 1500pF, 10%, 1000V	C50B576-4	.45
C123, 124	Tantalum, 2.7uF, 20%, 35V	CL22305-4	.45
C125, 126	Tantalum, 0.33uF, 20%, 35V	CL22305-9	.80
C127, 128, 133, 134	Tantalum, 1.0uF, 20%, 35V	CL22305-3	.80
C129, 130	Ceramic, 820pF, 10%, 500V	C50B651-6	.30
C131, 132, 137, 138	Tantalum, 4uF, 20%, 35V	CL22305-14	.80
C135, 136	Ceramic, 47pF, 10%, 500V	C50B652-19	.30
C139, 140	Ceramic, 680pF, 10%, 500V	C50B651-2	.30
C141, 142	Mylar, 0.22uF, 10%, 250V	C50B575-2	.60
PC101, 102	Encapsulated Tone Control Network	PC50B187-57	1.60
Q101, 102	Transistor	TR02020-2	.55
Q103, 104, 105, 106	Transistor	TR01037 or TR01015	1.00
Q107, 108	Transistor	TRBC147B or TR01040	.60

Symbol	Description	Part No.	Sug. Ret.
R101, 102	1.5K	R33DC152J	.30
R103, 104, 105, 106, 120	100K	R33DC104J	.30
R107, 135, 136, 141, 142	27K	R33DC273J	.30
R108, 109, 110, 111, 112, 143, 144	5.6K	R33DC562J	.30
R113, 114, 117, 118	82K	R33DC823J	.30
R115, 116	120K	R33DC124J	.30
R119, 129, 130, 157, 158	10K		
R121, 122	820	R33DC821J	.30
R123, 124, 131, 132, 147, 148	1M	R33DC105J	.30
R125, 126	18K	R33DC183J	.30
R127, 128	56K	R33DC563J	.30
R133, 134	22K	R33DC223J	.30
R137, 138	47K	R33DC473J	.30
R139, 140	270K	R33DC274J	.30
R145, 146	120K	R33DC121J	.30
R149A, B, 150A, B	Potentiometer, Dual-Bass Treble, 200K	RP50160-283	3.00

Symbol	Description	Part No.	Sug. Ret.
R151, 152	330K	R33DC334J	.30
R153, 154	1.2M	R33DC125J	.30
R155, 156	4.7K	R33DC472J	.30
R159, 160	2.7K	R33DC272J	.30
S101	Selector Switch	SR2282-113	11.00
S102	Mode/Tape Monitor Switch Connector, 15-pin, female	HH20683-15	.65

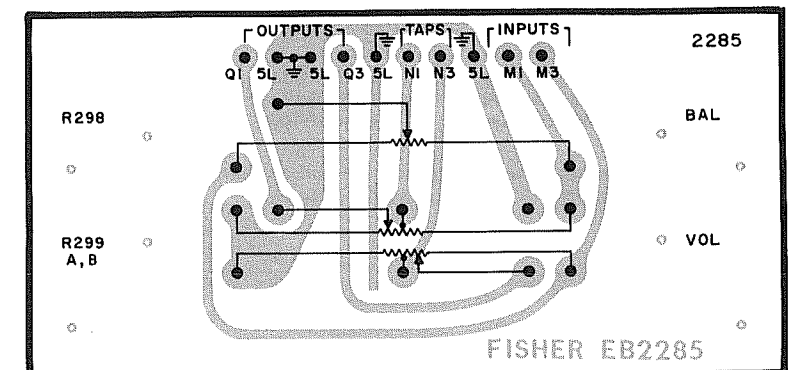
VOLUME / BALANCE PB2285-1

Symbol	Description	Part No.	Sug. Ret.
R229A, B	Potentiometer, Dual Slide 50K	RP50160-278	5.75
R288	Potentiometer, Balance	RP50160-280	2.65

MISCELLANEOUS

Symbol	Description	Part No.	Sug. Ret.
	Jack, Recorder Out	JK20627-5	1.10
	Jack Strip, Input-Output (12 Jack)	JK20691	3.00
C1A, B	Ceramic, Dual, 680pF, 20%, 500V	C50B644-2	.45
S4, S5	Switch, Muting Off, Loudness (Part of 5 switch assembly)	SP50200-53-1	4.70

## VOLUME/BALANCE 2285-1



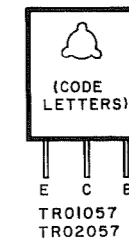
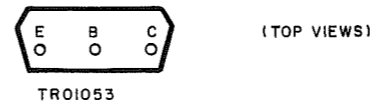
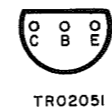
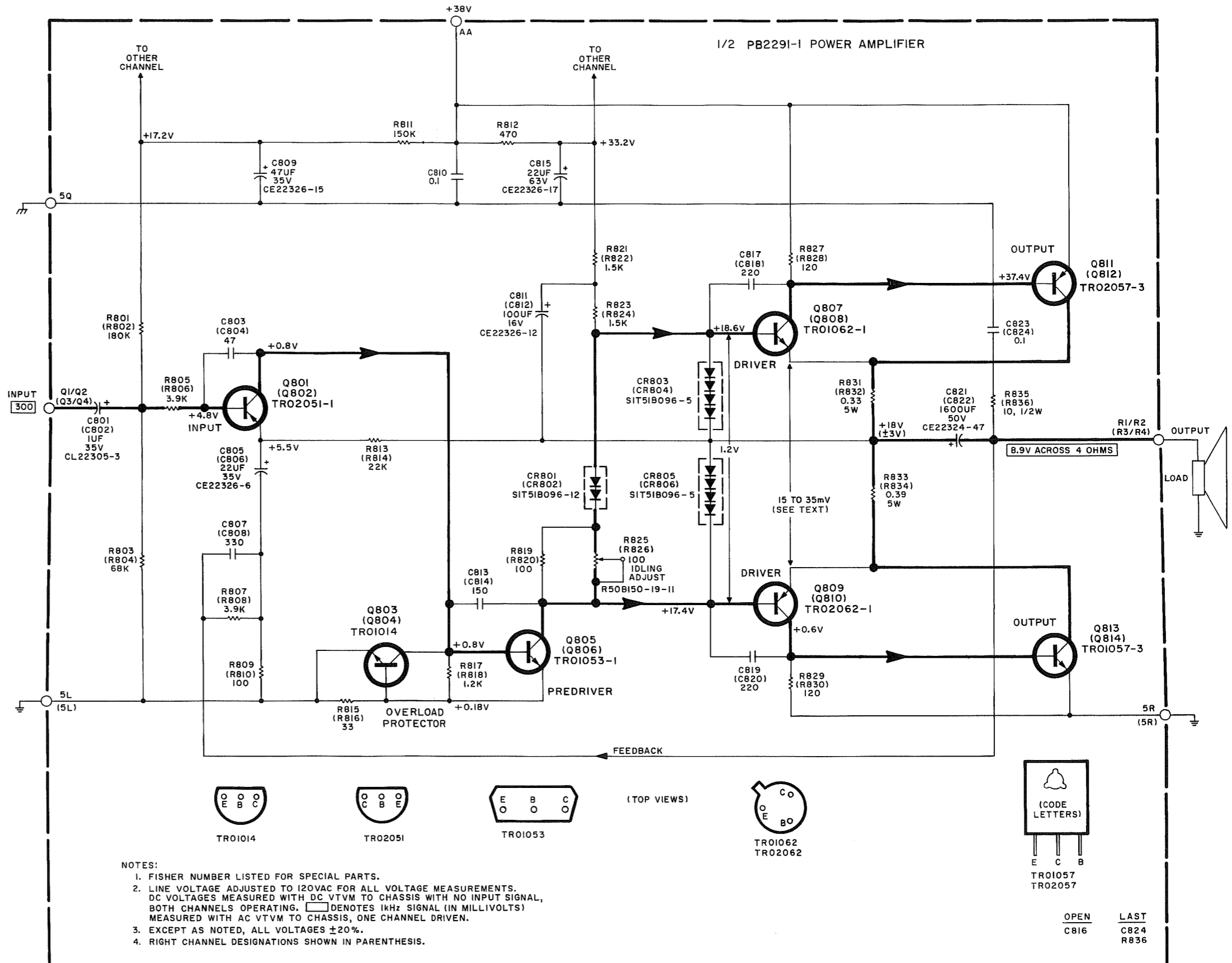
AL2285-111

NOTE: Unless otherwise specified, all resistors are Carbon Film in ohms, 5%, 1/3 Watt. K = Kiloohms M = Megohms

POWER AMPLIFIER PB2291-1

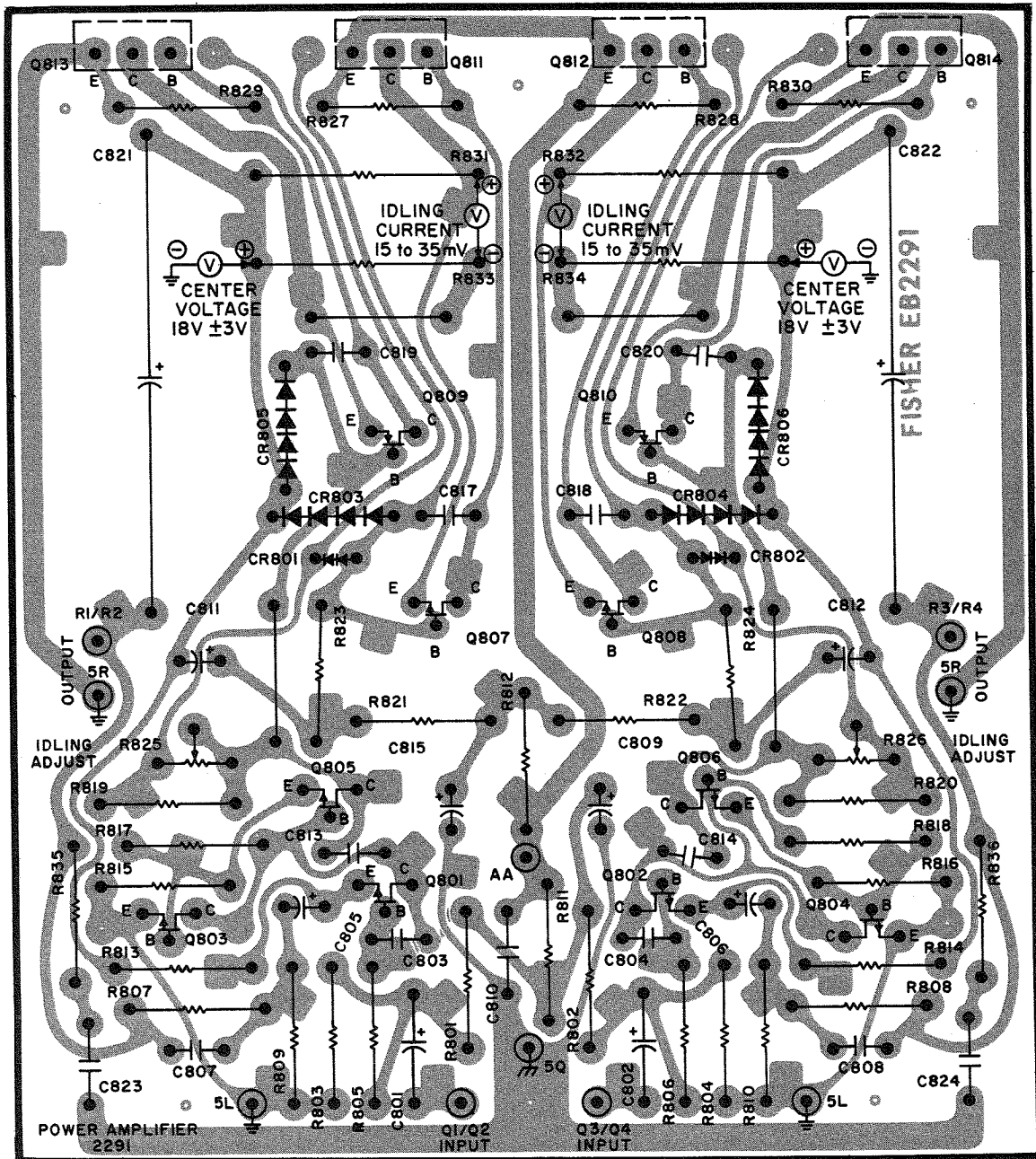
Symbol	Description	Part No.	Sug. Ret.
C801, 802	Tantalum, 1uF, 35V	CL22305-3	.80
C803, 804	Ceramic, 47pF, 10%, 500V, N330	C50B652-19	.30
C805, 806	Electrolytic, 22uF, 35V	CE22326-6	.40
C807, 808	Ceramic, 330pF, 10%, 500V	C50B651-1	.30
C809	Electrolytic, 47uF, 35V	CE22326-15	.70
C810, 823, 824	Ceramic, 0.1uF, 35%, 100V	C51163-1	.80
C811, 812	Electrolytic, 100uF, 16V	CE22326-12	.40
C813, 814	Ceramic, 150pF, 10%, 500V	C50B651-9	.30
C815	Electrolytic, 22uF, 63V	CE22326-17	.40
C817, 818, 819, 820	Ceramic, 220pF, 10%, 500V	C50651-15	.30
C821, 822	Electrolytic, 1600uF, 50V	CE22324-47	2.15
CR801, 802	Silicon Stabistor	SIT51B096-12	1.00
CR803, 804, 805, 806	Silicon Stabistor	SIT51B096-5	.95
Q801, 802	Transistor	TR02051-1	.75
Q803, 804	Transistor	TR01014	.50
Q805, 806	Transistor	TR01053-1	1.45
Q807, 808	Transistor	TR01062-1	1.90
Q809, 810	Transistor	TR02062-1	2.00
Q811, 812	Transistor	TR02057-3	3.70
Q813, 814	Transistor	TR01057-3	3.40
R801, 802	180K	R33DC184J	.30
R803, 804	68K	R33DC683J	.30
R805, 806, 807, 808	3.9K	R33DC392J	.30
R809, 810, 819, 820	100	R33DC101J	.30
R811	150K	R33DC154J	.30
R812	470	R33DC471J	.30
R813, 814	22K	R33DC223J	.30
R815, 816	33	R33DC330J	.30
R817, 818	1.2K	R33DC122J	.30
R821, 822, 823, 824	1.5K	R33DC152J	.30
R825, 826	Variable, 100	R50B150-19-11	.70
R827, 828, 829, 830	Composition, 120, 5%, 1/2W	RC20BF121J	.30
R831, 832	Wirewound, 0.33, 5%, 5W	RW5WR33J	.50
R833, 834	Wirewound, 0.39, 5%, 5W	RW5WR39J	.50
R835, 836	Composition, 10, 5%, 1/2W	RC20BF100J	.30

NOTE: Unless otherwise specified, all resistors are Carbon Film in ohms, 5%, 1/3 Watt. K = Kilohms, M = Megohms



- NOTES:
1. FISHER NUMBER LISTED FOR SPECIAL PARTS.
  2. LINE VOLTAGE ADJUSTED TO 120VAC FOR ALL VOLTAGE MEASUREMENTS. DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO INPUT SIGNAL, BOTH CHANNELS OPERATING. □ DENOTES 1KHz SIGNAL (IN MILLIVOLTS) MEASURED WITH AC VTVM TO CHASSIS, ONE CHANNEL DRIVEN.
  3. EXCEPT AS NOTED, ALL VOLTAGES ±20%.
  4. RIGHT CHANNEL DESIGNATIONS SHOWN IN PARENTHESIS.

OPEN LAST  
C816 C824  
R836



AL2291-111A

### CENTER VOLTAGE TEST

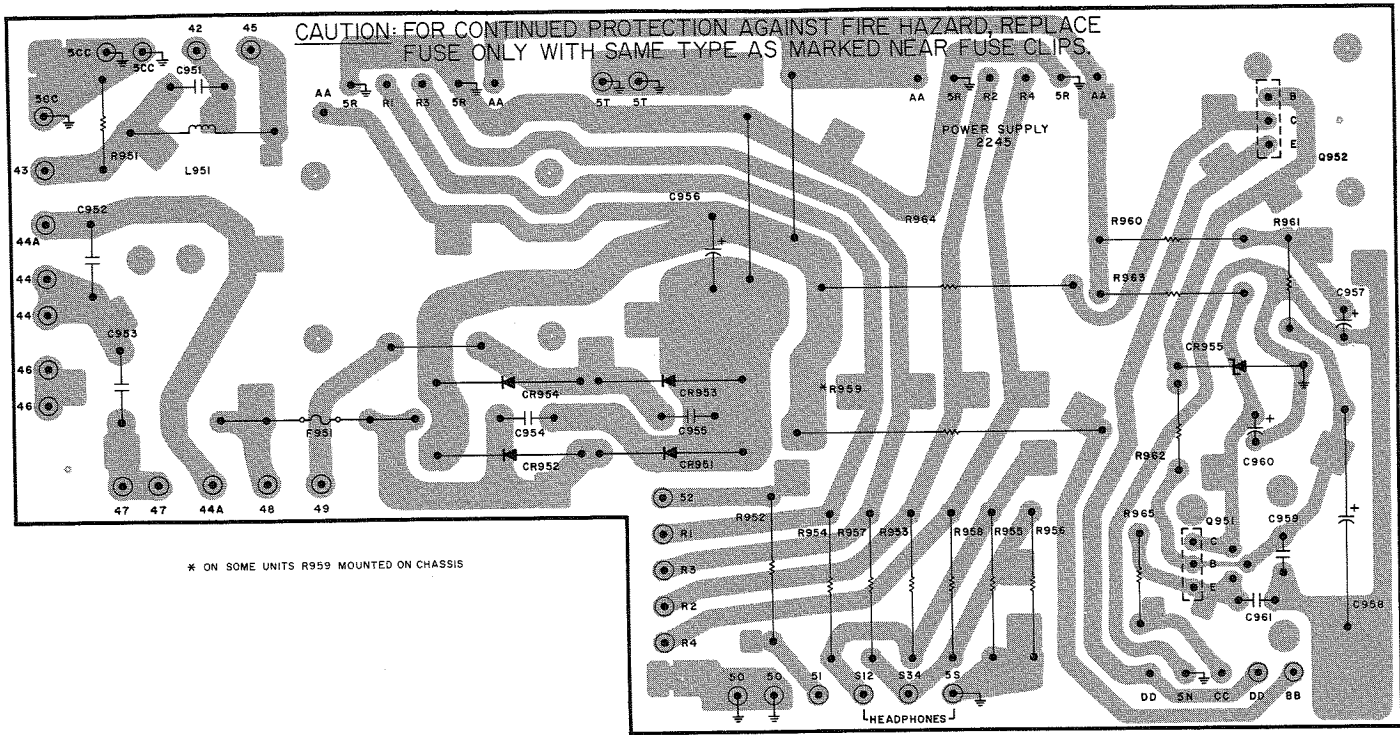
Slide VOLUME control to 0. Warm-up unit about 10 minutes. Set line voltage to 120 VAC.

Connect common lead of DC VTVM to pin 5R (or chassis). Connect probe to the junction of R831 - R833 (left channel) and R832 - R834 (right channel). Meter should indicate 18V  $\pm$  3V at each junction.

### IDLING CURRENT ADJUSTMENT

Slide VOLUME control to 0. Warm-up unit about 10 minutes. Set line voltage to 120 VAC.

- (1) Connect DC VTVM across R831 and R833. See illustration. Set IDLING ADJ R825 for indication of 15 to 35 mV.
- (2) Connect DC VTVM across R832 and R834 and adjust R826 for 15 to 35 mV indication.



\* ON SOME UNITS R959 MOUNTED ON CHASSIS

POWER SUPPLY PB2245-3, 4

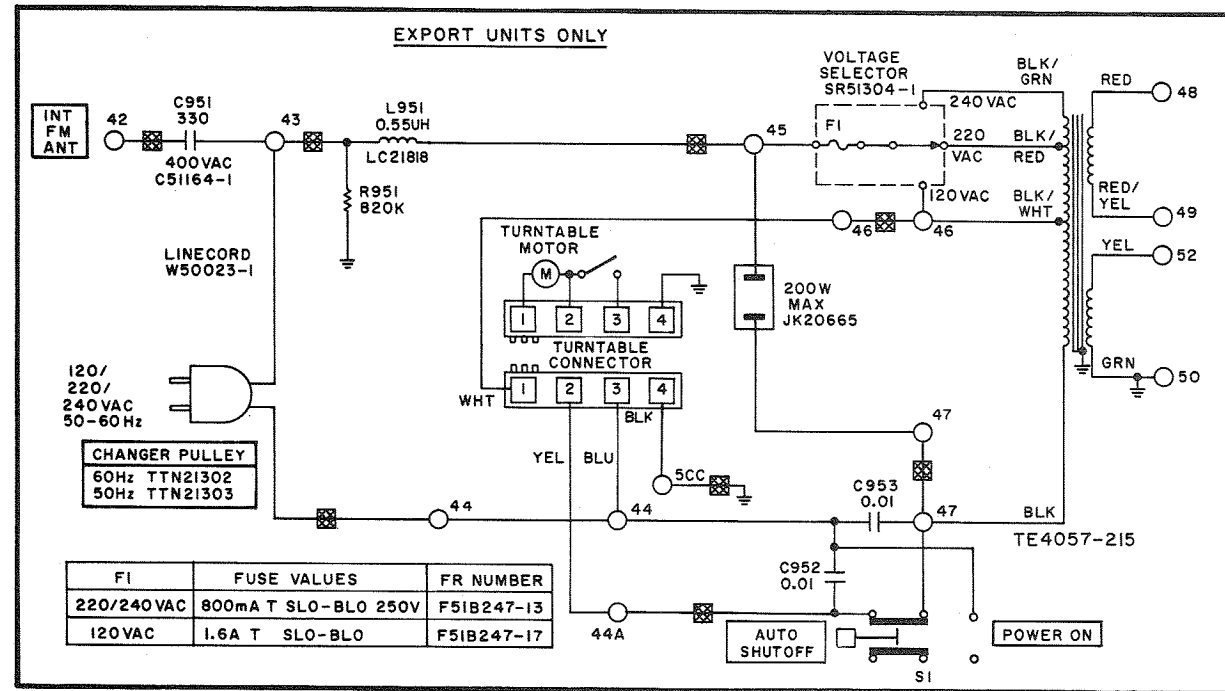
AL2245-111A

Symbol	Description	Part No.	Sug. Ret.
C951	Ceramic, 330pF, + 80-20%, 1400V	C50404-3	.45
*C951	Ceramic, 330pF, 20%, 400VAC	C51164-1	.90
C952, 953	Ceramic, 0.01uF, + 80-20%, 150V	C50404-4	.50
C954, 955	Ceramic, 0.02uF, 20%, 500V	C50B567-3	.35
C956	Electrolytic, 3500uF, 50V	CE22323-20	4.20
C957, 960	Electrolytic, 100uF, 50V	CE22326-20	.50
C958	Electrolytic, 220uF, 63V	CE22324-32	.60
C959, 961	Ceramic, 0.01 uF, + 80-20%, 100V	C50B570-1	.40
CR951, 952, 953, 954	Silicon Diode	SID51C169-1	.75
CR955	Zener Regulator 12V, 5%, 1W	TR14002-6	1.05
F951	Fuse, Slo-Blo, 5A, 125V	FL51313-10	.70
L951	RF Choke, 0.55uH	LC21818	.60
Q951	Transistor	TR01053-1	1.45
Q952	Transistor	TR01057-1	2.75
R951	Composition, 820K, 10%, 1/2W	RC20BF824K	.30
R952	Wirewound, 0.51, 5%, 2W	RW200WR51J	.60
954, 957	Wirewound, 220, 5%, 2W	RW200W221J	.45
R955, 956	Composition, 100, 5%, 1/2W	RC20BF101J	.30
R960, 961	Film, 330, 5%, 1/3W	R33DC331J	.30
R962	Composition, 1.2K, 5%, 1/2W	RC20BF122J	.30
R963	Wirewound, 270, 5%, 2W	RW200W271J	.55
R964	Wirewound, 68, 5%, 7W	RW7W680J	.50
R965	Composition, 10, 5%, 1/2W	RC20BF100J	.30

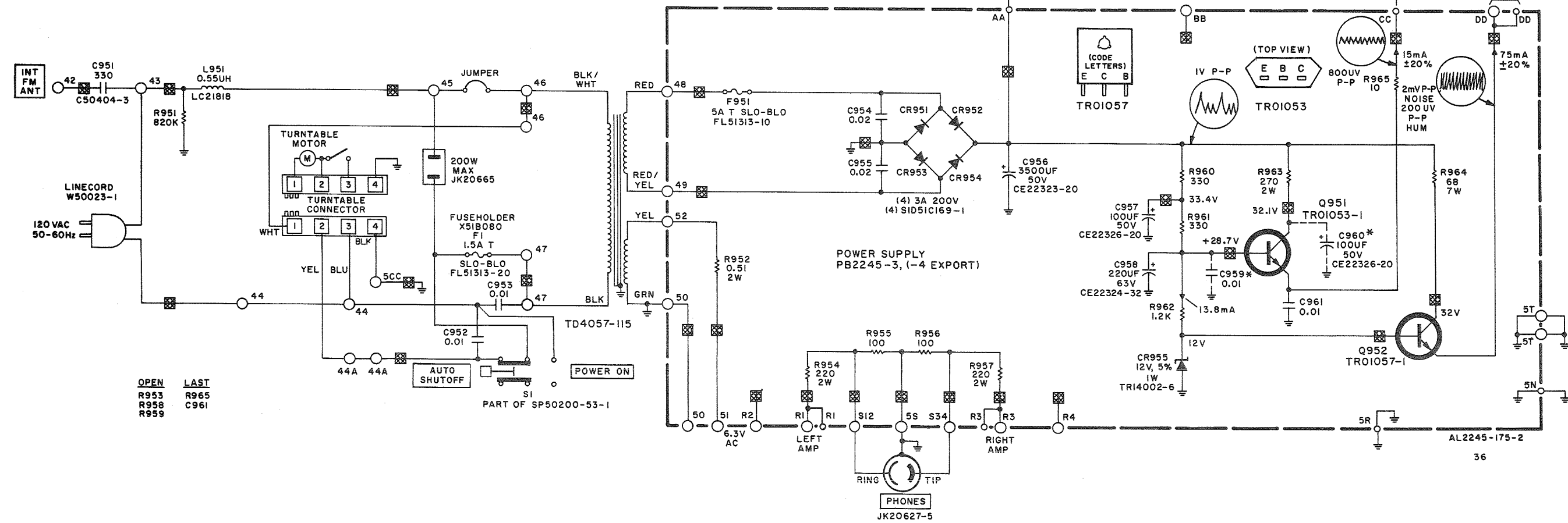
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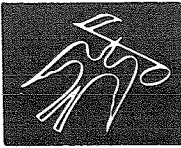
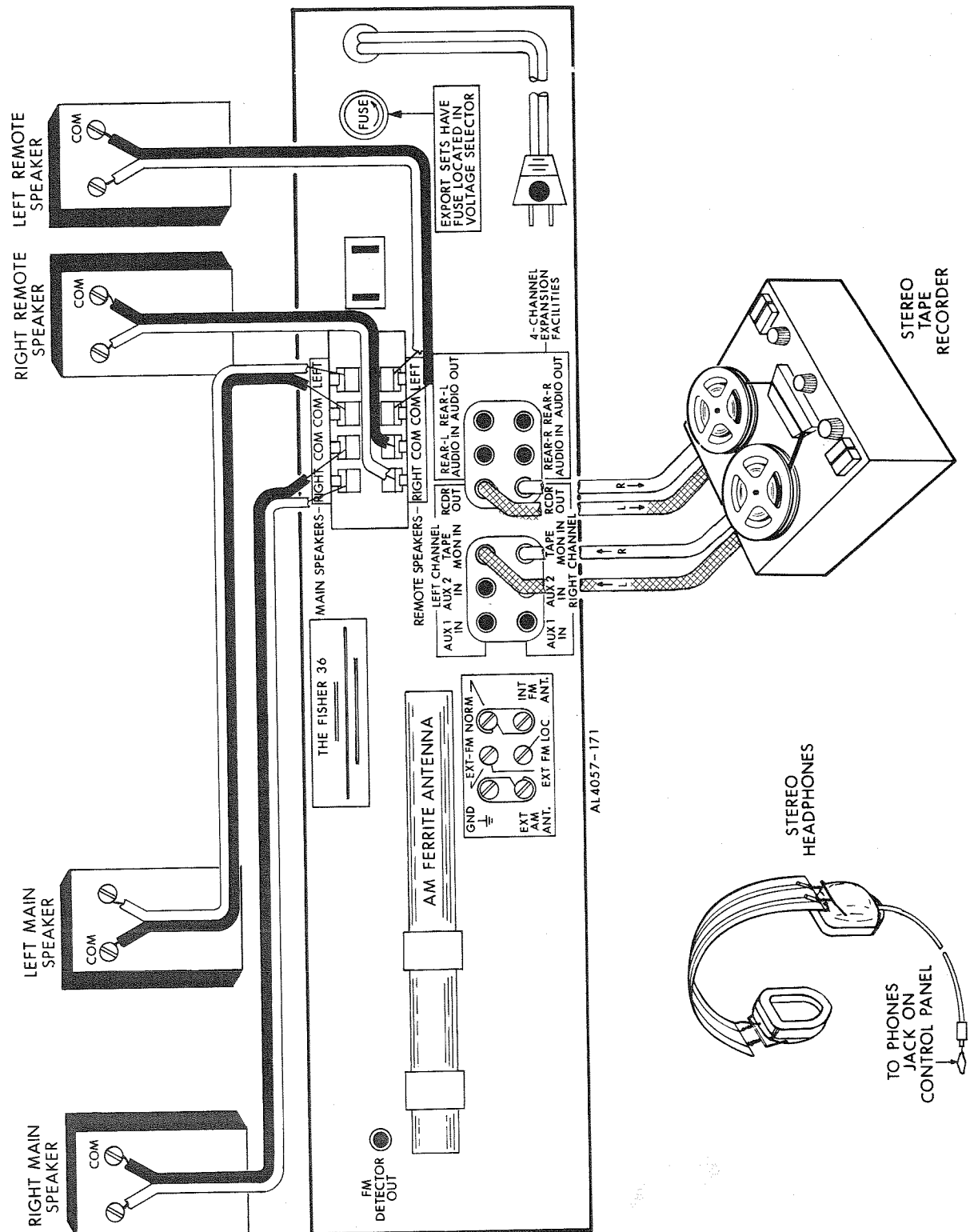
Symbol	Description	Part No.	Sug. Ret.
F1	Fuse, Slo-Blo, 1.5 A, 125V	FL51313-20	.65
*F1	Fuse, Slo-Blo, 800mA 250V	F51B247-13	.60
*F1	Fuse, Slo-Blo, 1.6A, 120V	F51B247-17	.60
S1	Switch, Power On (Part of 5-switch assembly)	SP50200-53-1	4.70
	*Switch, Voltage Selector	SR51304-1	1.90
	AC Outlet	JK20665	.65
	Connector, turntable, 4-terminal	J50375-4	.45
	Fuseholder	X51B080	1.35
	Line Cord	W50023-1	1.25
	Transformer, Power	TD4057-115	12.80
	*Transformer, Power	TE4057-215	14.45

\*Used in PB2245-4 only



- NOTES:
1. LINE VOLTAGE SET TO 120VAC FOR ALL DC VOLTAGE MEASUREMENTS.
  2. EXCEPT AS NOTED, ALL VOLTAGES  $\pm 20\%$ .
  3. DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO INPUT SIGNALS, SELECTOR IN AUX POSITION.
  4. \*C960 NOT USED IN ALL UNITS.





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