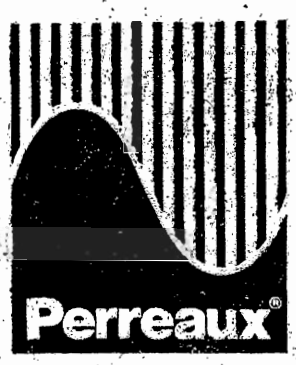


PERREAUX

PMF 2150 B

SERVICE MANUAL

MANUAL NUMBER 2

PSL 1116 (5-85)

CONTENTS

1. INTRODUCTION

This manual contains the technical information necessary for the ~~proper~~ service and repair of the Perreaux ~~PMF 2150B~~ 2350 power amplifier. Included are a description, specifications, test and adjustment procedures, ~~disassembly instructions~~, ~~trouble shooting guide~~, circuit diagrams, ~~transformer tappings~~, desired test equipment ~~and its use as well as a sample Service Report~~. Component l

Although every effort has been made to ensure that this manual is accurate ~~and complete~~ at the time of publication, the manufacturer will not be responsible for possible errors or omissions. Further, the manufacturer reserves the right to alter the design, specifications and prices of this product or any part without prior notice or obligation at any time.

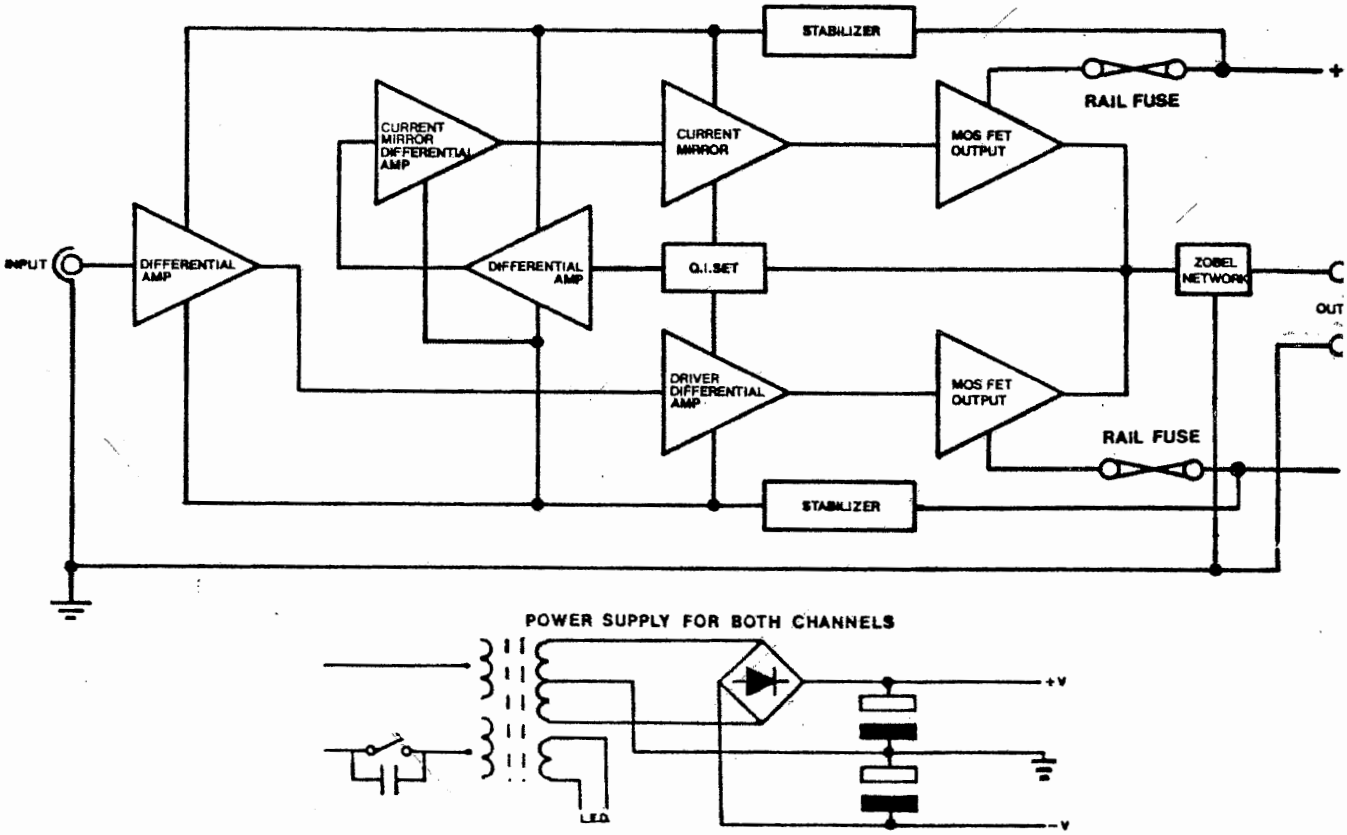
As this manual is designed for use by qualified service personnel, details as to the proper care in handling of the amplifier, use of proper tools, normal service procedures and standard safety practices have been omitted.

PROPRIETARY WARNING

2. DESCRIPTION

2350

The ~~PMF-2150B~~ is a dual channel stereo power amplifier designed to amplify audio signals with the absolute minimum addition of any kind of distortion. The unit is intended for use in domestic or professional environments in conjunction with very high quality ancillary equipment associated with the reproduction of music. It is capable of producing a relatively high level of voltage and current suitable for driving virtually any loudspeaker including full range electro-statics.



Each channel is identical and separate except for the common power supply.

Power output is realised via Power Mos Fets, which were chosen for their reliability and superb sonic performance.

The output stage operates in Class AB while the remainder of the circuit consists of Bipolar devices operating in pure Class A. A minimum number of stages are used in the input and driver circuitry. The protection diodes, which are not in the signal path, have no effect on the signal unless severe overdrive to the output devices occurs. The positive and negative rail fuses in each channel provide adequate protection for the output devices, even in the event of a dead short across the output terminals.

3. SPECIFICATIONS

Rated power:	200 watts RMS per channel continuous, both channels driven into 8 ohms 20Hz to 20,000Hz at no more than 0.009% THD from 0.25 watts to rated power.
Distortion:	0.009% THD and IM.
Dynamic headroom:	3 dB or greater with music
Bridged power:	More than 600 watts continuous, 20 to 20,000 Hz, into 8 ohms.
Amplifier saturation:	700 watts or greater per channel into 8 ohms.
Voltage swing:	164 volts peak to peak per channel
Maximum output current:	10 amperes continuous per channel, Power supply fuse limited
Rise time:	Typically less than 1 microsecond.
Bandwidth:	-0.1dB from 10Hz to 3 MHz at 1 watt.
Channel separation:	20Hz to 20,000Hz, greater than 60 dB
Hum and noise:	100 db below rated output, 20Hz to 20,000Hz unweighted.
Damping factor:	Over 500 from 10 to 1,000Hz.
Input sensitivity:	1.5 volts RMS for rated output at 1,000Hz.
Input impedance:	10,000 ohms.
Dimensions:	(WxHxD) 484 x 183 x 403mm. 19 1/16 x 7 5/16 x 15 7/8". Add 45mm (1 3/4") for front handles.
Rack Mounting:	Standard 19" x 4 units high.
Weight:	22kg (48lbs) net. 23.5kg (52 lbs) shipping.

Specifications subject to change without notice

ALL TESTS MUST BE PERFORMED AT THE RATED MAINS/LINE VOLTAGE.
For test equipment and hook-up, see section 8.

4-1 DISASSEMBLY FOR QI CHECK AND ADJUSTMENT:
Remove the top cover and the positive rail fuse from each channel.

4-2 FUSES AND TRANSFORMER TAPPINGS:
Mains fuse 100-125V 10A (20A Blow)
" " 200-250V 5A (10A Blow)
All rail fuses 5A (10A Blow)
If unsure of country where last used, check mains voltage label on rear panel and transformer primary tappings. (Refer to section 7)

4-3 TURN ON PROCEDURE:
With no input or load connected, connect the milliammeters in place of the positive rail fuses. Turn the variac up slowly until operating mains/line voltage is reached while observing that the milliammeters remain below 500 ma.
If only one milliammeter is available, remove both fuses from the channel not being monitored. Repeat for second channel with both fuses in the first.

4-4 QUIESCENT ADJUSTMENT:
Do not connect any inputs or outputs. Wait at least 3 minutes or until both meters stop rising. They should read 350 milliamperes for each channel. If not, adjust RV1, alternating between channels, until both meters read 350. Turn power off, remove both milliammeters and re-install both positive rail fuses.
If only one milliammeter is available, each channel must be adjusted in turn with both fuses installed in the other channel. This must be repeated to each channel until no further adjustment is necessary on either channel. Use a suitable paint to hold the trim pots in the adjusted position.

Do not use a digital meter for this adjustment.

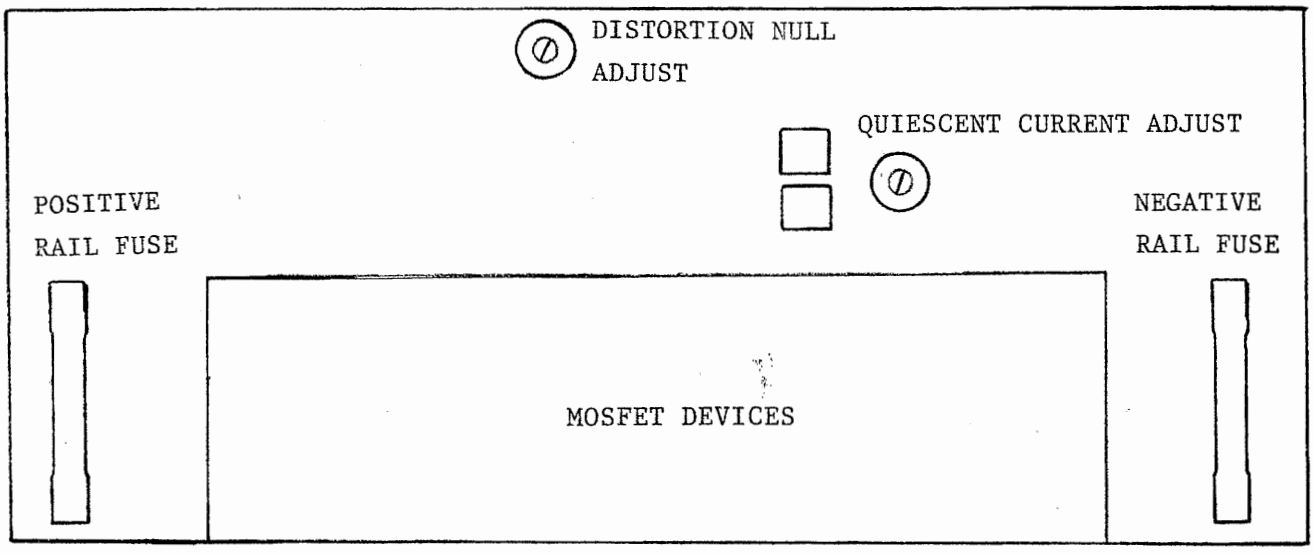
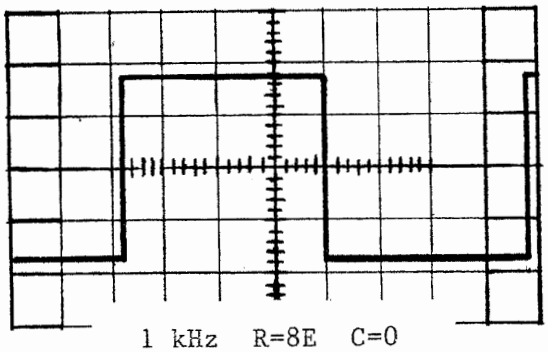


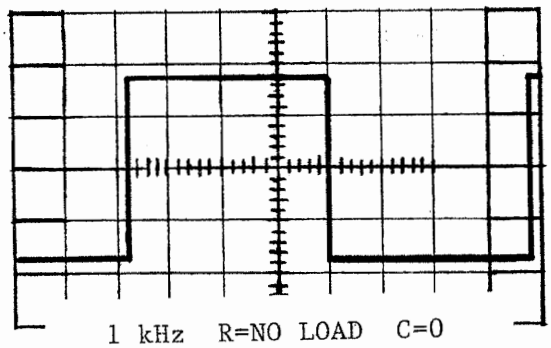
Figure 4-3 (Top View PCB)

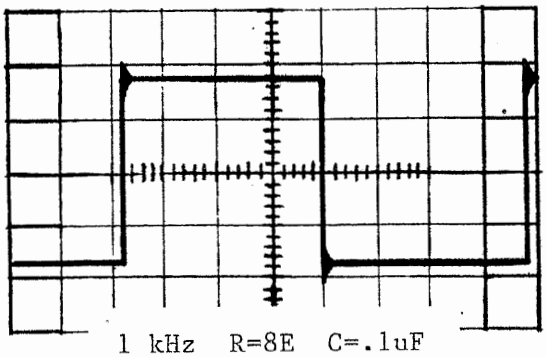
4-5 20 kHz SINE WAVE TEST/DISTORTION NULL:
Connect outputs to two 8 ohm resistive loads. Apply an input sine wave of 20 kHz and adjust the input level for 200 watts (40V RMS) output on each channel. THD should be 0.009% or less. Adjust RV2 on each channel for minimum distortion. Use a suitable paint to hold the trim pots in the adjusted position. If the wiring has been replaced or altered in any way it may be necessary to adjust slightly the position of the positive and/or negative power supply wires under each PCB. Placement and quality of test leads may effect the accuracy of measurements below 0.03% THD.

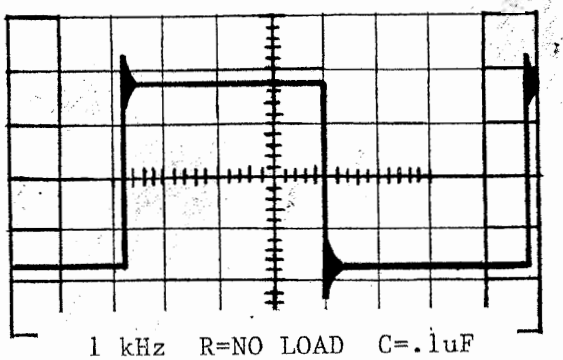
4-6 1 kHz SINE WAVE TEST:
Connect right and left channel outputs into 8E loads, and a 1 kHz signal to both inputs. Outputs (both channels driven) should be 200W RMS (40V RMS). Adjust inputs if necessary. THD should be less than .006%. Reduce output by 10dB and 20dB. THD should remain below .009%. Repeat the above with two 4 ohm loads. Output should be 400W RMS (40V RMS) and THD maximum of .02%.

4-7 1 kHz SQUARE WAVE TEST:
Observe both the input and output signals on a dual trace oscilloscope. The input square wave should be sharp and well defined with no tilt, overshoot or ringing. The 8 drawings in Figure 4-7 show the outputs with various combinations of R and C loads connected in parrallel.
With no C load connected (top 2 drawings) the output should be sharp and well defined with no tilt, overshoot or ringing. As the C load is increased only the ringing should increase. This will be more noticeable with no R load. In all cases the amplifier must remain stable.

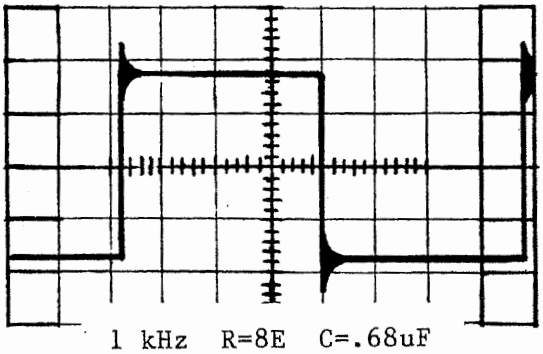

1 kHz R=8E C=0


1 kHz R=NO LOAD C=0

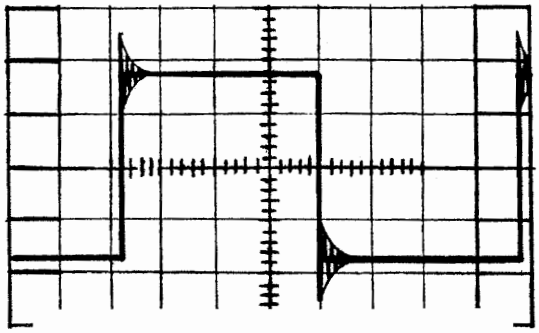

1 kHz R=8E C=.1uF


1 kHz R=NO LOAD C=.1uF

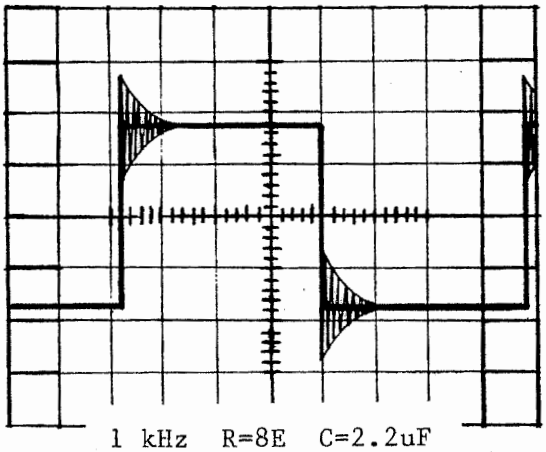
4-7 1 kHz SQUARE WAVE TEST (cont'd)



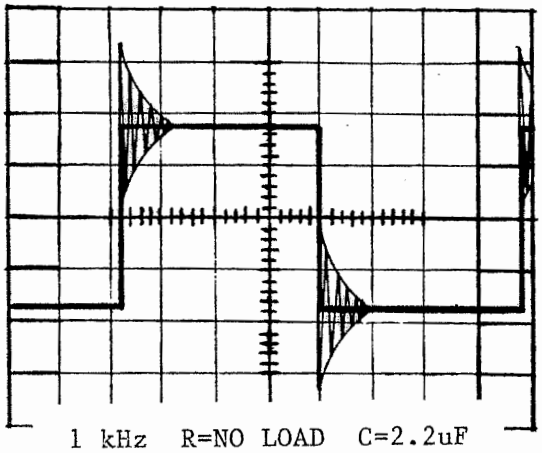
1 kHz R=8E C=.68uF



1 kHz R=NO LOAD C=.68uF



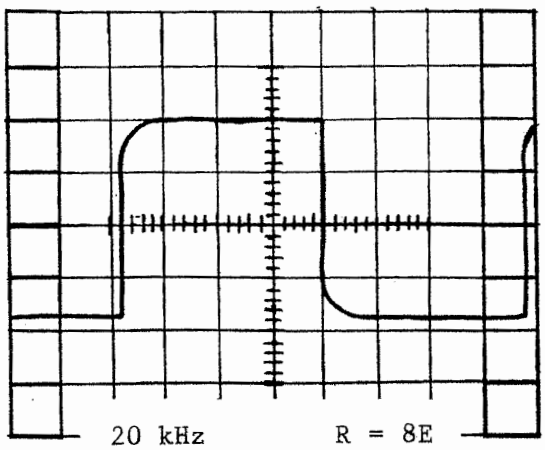
1 kHz R=8E C=2.2uF



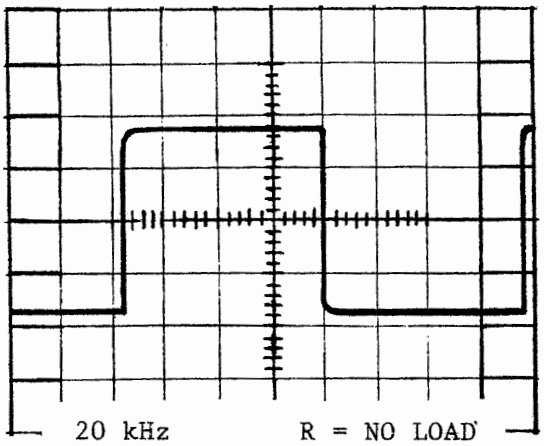
1 kHz R=NO LOAD C=2.2uF

Figure 4-7 (1 kHz Square Wave Test)

4-8 20 kHz SQUARE WAVE TEST:
Apply a 20 kHz Square Wave input at the previous level. Observe the output of each channel with and without the 8 ohm Loads. The displays should be as shown in Figure 4-8 or better. Remove input signals and turn amp power off.



20 kHz R = 8E



20 kHz R = NO LOAD

Figure 4-8 (20 kHz Square Wave Test)

4-9 1 kHz SINE WAVE BRIDGED MODE TEST:
Disconnect the right channel input as it is shorted in the bridged mode.
If a terminal box is used, switch R LOAD to "Bridged 8 ohm". Turn amp on and apply a 1 kHz Sine Wave to the "L" channel input only. Adjust input level for 800 watts output (80 Volts RMS). Half the output signal will be fed to the distortion analyser and scope. THD should be less than .02%. Remove input signal and turn power off. Switch stereo-bridged switch to "stereo 8 ohm" and R LOAD switch to "stereo 8 ohm" on the terminal box.
If a terminal box is not used, disconnect output terminals and R CH input. Switch Stereo-Bridged switch on amplifier rear panel to "Bridged". Connect output terminals, loads, distortion analyser and scope exactly as shown in Figure 4-9.

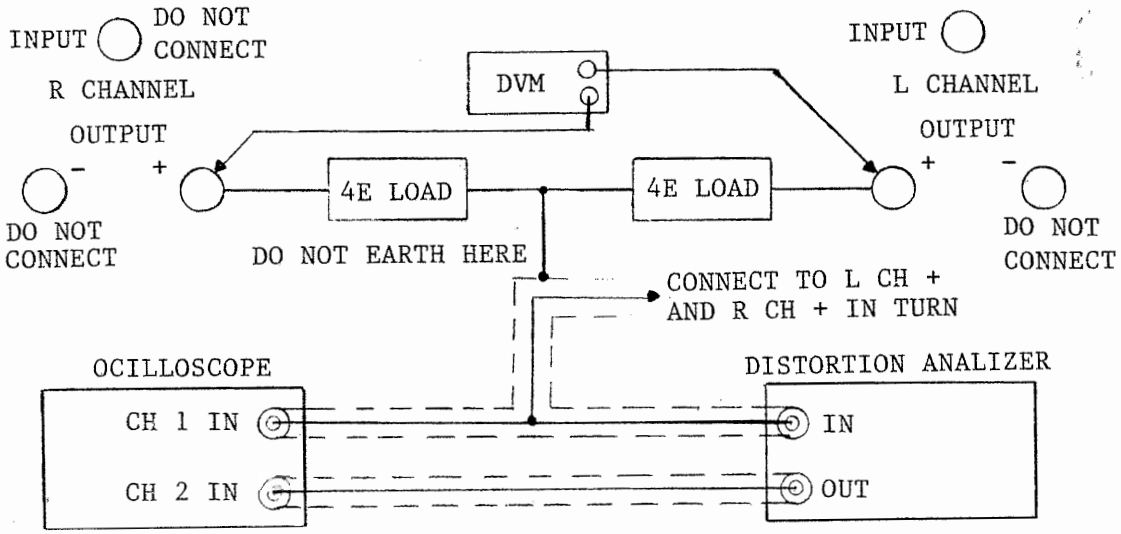


Figure 4-9 (Bridged Mode Test)

4-10 NOISE TEST:
Short L and R channel inputs. Turn amp on and measure the L and R outputs with the noise meter. They should read no more than 400 microvolts within 20Hz to 20 kHz Bandwidth. Turn power off and remove short from the L and R inputs.

4-11 DAMPING FACTOR TEST:
The damping factor can be conveniently tested on a stereo amplifier by using one channel as the driven channel while the other channel is under test. The damping factor is determined by using the following test circuit (Figure 4-11). Set 50 Hz input level of driven channel for a convenient out-put (10V RMS) using noise meter. Use noise meter to measure voltage between B and C.

$$\text{Damping Factor} = \frac{\text{Volts (A-C)}}{\text{Volts (B-C)}}$$

The damping factor if the PMF 2150B is in excess of 500.

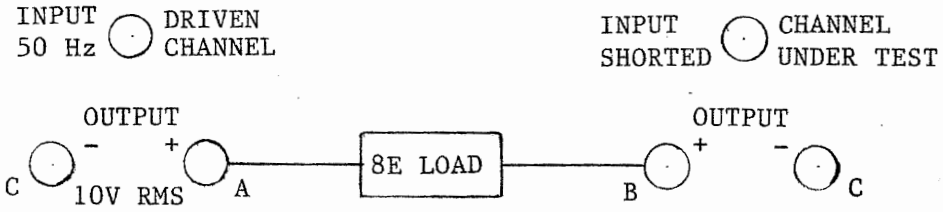


Figure 4-11 (Damping Factor Test)

4-12 SOUND TEST:
Having passed the previous objective tests, only the finest quality ancillary equipment and listening environment will truly test this amplifier.

END OF TEST

5-1 SERVICE REPORT
Before commencing any servicing start a service report (copy is provided in Section 10). When completed return a copy to Perreaux Sound Limited. This is of great value in assisting Perreaux Sound Limited's continuing efforts to improve our products. It is also a requirement for "Under Guarantee" servicing.

5-2 Check that the necessary up-date modifications are in place (Section 8-1).

5-3 In Section 6 (immediately following this section) is the circuit diagram, PCB Parts location, Parts List and Disassembly. The parts list is arranged to help with parts identification and reassembly.

5-4 Servicing of this amplifier is straight forward. Removal of the top and bottom covers will allow for access to most components and for a good visual check. Check for foreign material, broken, damaged or loose wiring, burnt or damaged fuses or components etc. Repair or replace as necessary.

If repairs were necessary, the fault may very well be corrected, in which case do the entire Test and Performance Verification in Section 4.

If no repairs were necessary and the fault is well described, turn the amplifier on using the variac or ballast network and refer to the relevant fault in Section 5-5.

If no repairs were necessary and the fault is not described well or not at all it is often quicker to perform the tests in Section 4.

If the fault is intermittent, the usual thumping and tapping may help but do not pull on any wires in such a way as to de-position any of those wires. This could adversely affect the 20kHz Distortion Test (Section 4-4).

If the fault is only when "hot" or "after being on for sometime" then perform the tests in Section 4 when hot. This amplifier should be within all specifications at the rated mains/line voltage even when the heat sinks are 80°C (176°F).

To help ensure customer satisfaction it is recommended that the entire Test Procedure in Section 4 is performed before the amplifier is returned.

If the amplifier is turned on with the rail fuses blown or removed, the filter caps will hold a charge for some time. Use the capacitor discharge resistor (see Section 9-1.K) to discharge each capacitor in turn. Do not short the capacitors to discharge them.

5-5 TROUBLE SHOOTING CHART

Amp Dead (No Output No LED)	Check primary circuit - mains plug, mains fuse, switch and associated wiring.
No output, LED on	Check power supply - transformer secondary, bridge rectifier, filter caps, rail fuses and associated wiring including earth.
No output one channel	Check rail fuses, output and input wiring including connections at the Bridge Mode switch. Q1, 2 and/or Q3, 4, 5. Input earth resistor (See up-date 8-4).
Both channels working but different temperatures	Check quiescent current in both channels. If one channel is low check mosfets. An open mosfet will "feel" cooler than the others. Can be verified by premature clipping on the positive portion of the sine wave (2SK135) or on the negative portion of the sine wave (2SJ50). If one channel has a high QI check R14 (see up-date 8-5) Q3, Q4 and Q5.
Badly distorted output and/or low output	One rail fuse open - replace both in that channel and check fuses in other channel for discolouration or sagging. Check mosfets, Q5, C23, zobel network, RV1, input earth resistor (see up-date 8-4).
Output distorted slightly and/or at high frequencies	Check C1 (input cap - see up-date 8-2), RV1, RV2 zobel network, C23, C5, C6, C7, C8, C9, C10, C11 and C12.
Intermittent faults	Check solder joints and "old" type, non-gold plated, input sockets (see up-date 8-2).
Large DC offset	Input earth resistor open. (See up-date 8-5). R14 (22K) OPEN (SEE UP-DATE 8-5.1)

6-3 PARTS LIST

This list is broken into sub-assemblies which can be of assistance both during re-assembly and when ordering parts, ie. the screws holding the Front Panel End Plates are listed just below the End Plate. Some sub assemblies may be ordered as complete assembled parts and are listed at the top of that section. When ordering state the model (PMF 2150B), Serial No, Part No, description and quantity required. There is a separate price list.

PART NO.	DESCRIPTION	QTY
PACKING & LABELLING		
PSP 1028	Carton Top	1
PSP 1029	Carton Bottom	1
PSP 764	Polystyrene (moulded)	2
PSP 195	Attention Label (shipping)	1
PSP 601	ID Label (PMF 2150B-shipping)	1
PSP 744	Warranty Card (Australia only)	1
PSP 453	Voltage/Hz Label 120V	
PSP 454	" " 220V	3
PSP 455	" " 230V	
PSP 456	" " 245V	
PSP 561	Factory Sealed Label	1
PSP 192	Proprietary Warning Label	1
PSP 427	Owners Manual	1
FINAL ASSEMBLY		
PSL 112	Top Cover	1
PSL 113	Bottom Cover	1
SS11R4A1B	No 6 x 1/2 Pan-Pozi Screw-Bk	16
FOOT-965	Black Plastic Foot	4
WF4E1Z	M4 x 11 Flat Washer-NP	4
SS12R4A1Z	No 8 x 1/2 Pan-Pozi Screw- ZP	4
PSL 439	Front Panel End Plate	2
SS11R4A1B	No 6 x 1/2 Pan-Pozi Screw-ZP	8
FRONT PANEL AND TRANSFORMER ASSEMBLIES		
PSL 124	Front Panel	1
PSL 153	Name Plate	1
PSL 545	Alloy Handles	2
SM5G16A1N	M5 x 16 Hex Hd Self-tap Screw	4
PSL 182	Mains Switch Assy	1
CY.01M250	Capacitor 0.01uF 250V	1
SP/L CA148	Spade Lug w/adaptor	4
SP/L CA142	Spade Lug	4
OE BL512-R	Red LED	1

PARTS LIST CONTD.

TX 2150B-M	Mains Transformer	1
PSL570	Transformer Mounting Bracket "L"	2
SM6K13B5Z	M6 x 100 Hex Head Bolt	4
REF 318	M6 Black Plastic Bush	4
REF 1155	M6 Nylon Washer	4
WB 6H3S	M6 x 14 Fibre Washer	2
WF 6K1Z	M6 Flat Washer - ZP	12
NM 6N1Z	M6 Nyloc Nut	8
SM6G13A5Z	M6 x 16 Hex Head Bolt	4
SO/L 1402	M6 Solder Lug	2
RMF1W560E	Resistor 1W 560E	1
PSL 204	Solder Tag Strip	1

FASTEN SIDE PANELS TO FRONT & REAR PANELS

SM6G13A5Z	M6 x 16 Hex Head Bolt-ZP	8
WF6K1Z	M6 x 16 Flat Washer-ZP	12
NM6N1Z	M6 Nyloc Nut - ZP	8

RECTIFIER ASSEMBLY

BR-354	Bridge Rectifier	1
SM6J13A1Z	M6 x 25 Hex Head Bolt - ZP	1
REF 1155	M6 Nylon Washer	1
WF6G1Z	M6 x 13 Flat Washer - ZP	1
NM6N1Z	M6 Nyloc Nut - ZP	1
SP/L CA142	Spade Lug	4

SIDE PANEL ASSEMBLIES (Note: Quantities listed in this section are for one channel only)

PSL 125	Heat Sink	2
SM6H13A5Z	M6 x 16 Hex Head Bolt - ZP	12
WF6G1Z	M6 x 13 Flat Washer - ZP	12
NM6N1Z	M6 Nyloc Nut - ZP	12
SO/L 1402	M6 Solder Lug	1
CM.12M100	Capacitor Mylar .12uF - 100V	1

PSL 1102	ONE CHANNEL (May be ordered as one part - factory assembled and tested - includes one complete PCB, Mosfets and PCB support "T" Rail - left and right channels identical)	

PARTS LIST CONTD.

PSL 077	PCB SUPPORT "T" RAIL - 6 WAY	1
2SJ50	Mosfet	3
2SK135	Mosfet	3
MICA/W	TO 3 Mica Washer	6
SC4H11A5Z	M4 x 20 Cap Screw - ZP	12
M4 BUSH LG	M4 Plastic Spacer - Ref 674	12
WF4C1Z	M4 x 9 Flat Washer - ZP (Max O.D. 9MM)	12
NM4A1Z	M4 Hex Nut - ZP	12
PSL 216	OUTPUT PCB ASSEMBLY (May be ordered as one part - factory assembled, only partially tested - includes all parts listed in this section)	1
PSP 133	PCB (Bare)	1
PSLN-3	Transistor	2
PSLP-3	"	3
BUSH MP-51	" Support Bush	3
6024 U-H/S	" Heat Sink	3
1N4004	Diode IN4004	4
1N4148	" IN4148	3
ZD 9.1-0.5	" ZENER 9.1V 500mW	2
F/HC F1	Fuse Clip (PC Mount)	4
F10A-C1	Fuse 5A (10A Blow) 6.5Ø x 32mm - 3AG	2
CH TD 115	Output Choke	1
CE220M50F	Capacitor Electrolytic 200uF - 50V	1
CE10M160P	" " 10uF - 160V	4
CW 6.8M63	Capacitor Wima 6.8uF - 63V	1
CW .1M250	" " 0.1uF - 250V	5
CR 47KP250	" Ero 0.047uF - 250V	2
CW 22KP100	" Wima 0.022uF - 100V	1
CD150P630	Capacitor Cermic Disc 150pF 630V	1
CD100P630	" " " 100pF "	1
CD47P630	" " " 47pF "	2
CD27P630	" " " 27pF "	2
CD10P630	" " " 10pF "	1
CD6.8P630	" " " 6.8pF "	2
RNI 4E7	Resistor Non-Inductive 5W 4E7	1
RNI 10E	" " " " 10E	1

PARTS LIST CONTD.

RMF 2W 10E	Resistor 2W 10E	1
RMF 2W 6K8E	" " 6K8E	2
RMF 2W 22KE	" " 22KE	1
RMF 100E	Resistor .33W 100E	2
RMF 180E	" " 180E	1
RMF 220E	" " 220E	6
RMF 270E	" " 270E	1
RMF 470E	" " 470E	1
RMF 680E	" " 680E	1
RMF 2K2E	" " 2K2E	1
RMF 3K3E	" " 3K3E	2
RMF 4K7E	" " 4K7E	1
RMF 10KE	" " 10KE	1
RMF 15KE	" " 15KE	2
RMF 39KE	" " 39KE	1
RMF 47KE	" " 47KE	2
RMF 2M2E	" " 2M2E	1
VTP 1KE	Trim Pot 1KE	1
VTP 100KE	" " 100KE	1
R3A 0E	Link 0E	1
PSL 160	REAR PANEL (W) PRINT - Otherwise Bare Note: See section 8-2.3 as new input sockets may be required to fit "new" size holes.	1
SKT TC1-G	Gold Plated Input Sockets	2
SW4/2 ROT-S	Rotary Switch 2POS/4POLE	1
KS2	" " Knob	1
RMF 10KE	Resistor .33W 10KE	1
TERM Z83B	Output Terminal Post (G.P.) Black	2
TERM Z83R	" " " " Red	2
F/H NF-011	Fuse Holder (Panel Mount) All Except Aust.	1
F/H NRF.31	" " " " Aust. Only	
F10A-C1	" 5A (10A Blow) 3AG - 200-250V Mains	1
F20A-C1	" 10A (20A Blow) 3AG - 100-125V Mains	
HNDL/IDEAL	Black Plastic Handle	2
SS12R4A1Z	No.8 x 1/2 Pan Pozi Screw - ZP	4

PARTS LIST CONTD.

CORD SET LP1.2 SJT	Mains Lead (Moulded Tapon) Aust & N.Z. " " (Moulded 3 Pin Plug) U.S.A	1
GROM TYP A	Grommet	1
SO/L CA121	M4 Crimp Lug - CA121 Red	2
SM4C4A1Z	M4 x 8 Pan Pozi Machine Screw - ZP	2
WL4X1Z	M4 Lock Washer - ZP	4
NM4A1Z	M4 Hex Nut - ZP	2
PSL 204	Solder Tag Strip	1
SC4H11A5Z	M4 x 20 Cap Screw - ZP	1
WL4X1Z	M4 Lock Washer - ZP	2
WB4D3X	M4 Fibre Washer	1
NM4A1Z	M4 Hex Nut - ZP	2
CE18KM 100X	Capacitor Electrolytic 18KuF - 100V (w/clamp)	2
SM4C10A1Z	M4 x 8 Pan Pozi Machine Screw - ZP	6
WL4X1Z	M4 Lock Washer - ZP	6
NM4A1Z	M4 Hex Nut - ZP	6
PSL 197	Aluminum Link	1
SC5C11A5Z	M5 x 8 Cap Screw - ZP	2
WL5X1Z	M5 Lock Washer - ZP	6
NM5A1Z	M5 Hex Nuts - ZP	2
SO/L CA123	M5 Crimp Lug - Red	7
SO/L CA323	M5 " "	1
CT BK 4"	Cable Ties	24

6-4 DISASSEMBLY

All work should be performed on a clean, dry, soft, flat surface, free of any loose or sharp materials that could scratch or damage the amplifier.

All screws used on the 2150B have POZI-DRIVE or ALLEN KEY type heads, all hardware sizes are in metric and all threads are isometrics.

Disassembly is straight forward but a few points which may not be apparent are listed below:

1. The power on LED is screwed into a R-H threaded hole in the front panel.

2. To remove the power switch first pull the button straight out and then loosen the nut behind the front panel and finally unscrew the button escutcheon being careful not to mark the front panel.

3. To remove the heat sinks from the front panel, first remove the front panel end cap. The bolt heads are held by the front panel channel, the nuts have to be loosened only and the bolt head will slide through the channel.

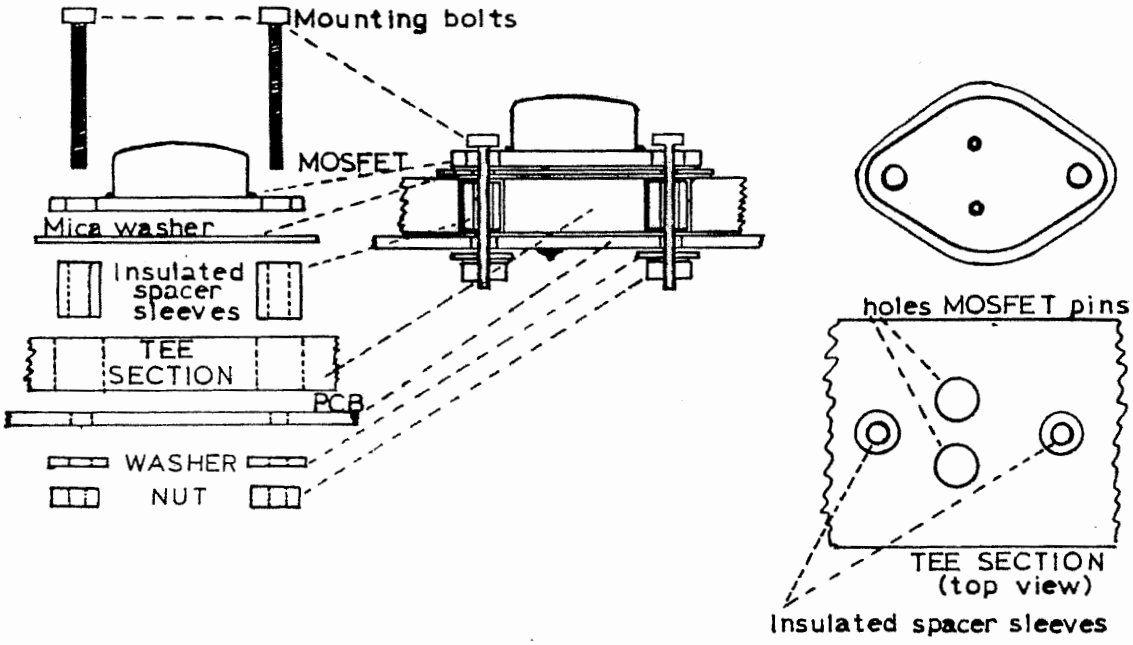
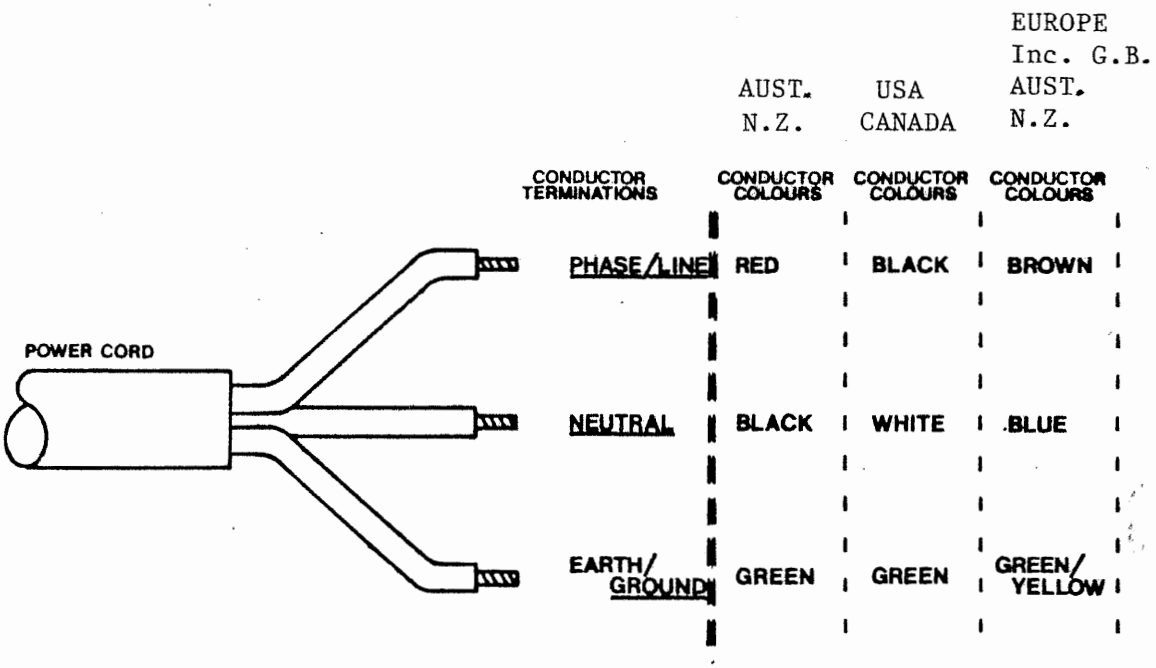


Figure 6-4 (MOSFET-PCB MOUNTING)

7. Mains Wiring

7-1. Mains Cord Wiring Colour Code.

Commonly used in the following Countries



POWER CORD CONNECTIONS

7-2. Transformer Primary Tappings.

All transformers have dual primary windings which are identical but separate and both are also isolated from the secondaries. The terminations of each are arranged in sequence according to the voltage that should be connected to that tap. In all cases both primaries must be used. When connected in parallel the same voltage taps must be used on both primaries. See drawings on the following pages.

Various primary tappings were used during production and are easily identified by the number of primary taps ie. 4, 6, or 8.

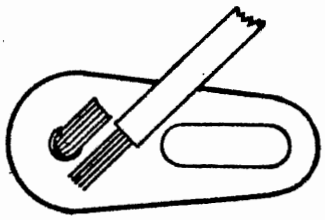
If any tap changes are made or if the transformer has been replaced the entire Test and Adjustment procedure should be carried out as the Quiescent Current will probably require adjustment.

Note: Any voltage change in the operating mains/line voltage of the amplifier must be noted on the rear panel by replacing the existing label with a new voltage label indicating the correct voltage and the mains fuse changed, if necessary, to the proper rating.

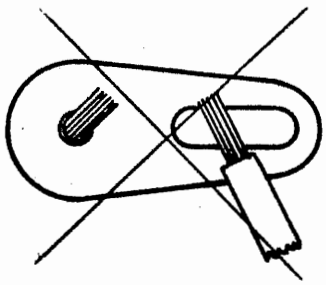
7-2. Transformer Primary Tappings. (cont'd)

To minimise voltage loss in the primary circuit heavy wiring is used. This can put extra stress on the transformer lugs. Soldering the wires in the positions labelled correct in the drawings below will help minimise any mechanical stress or voltage loss in the lug.

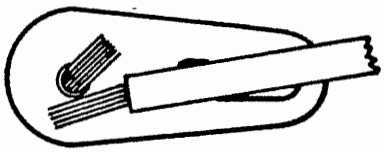
CORRECT



WRONG

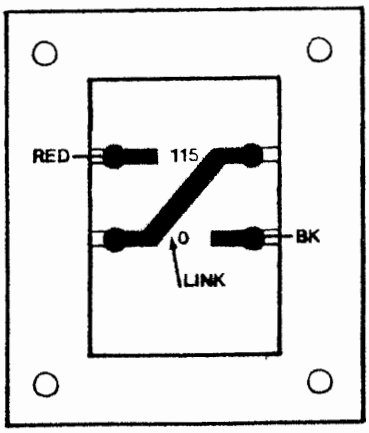


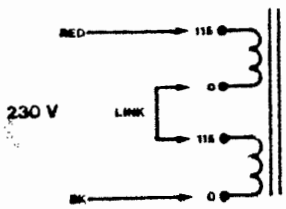
CORRECT



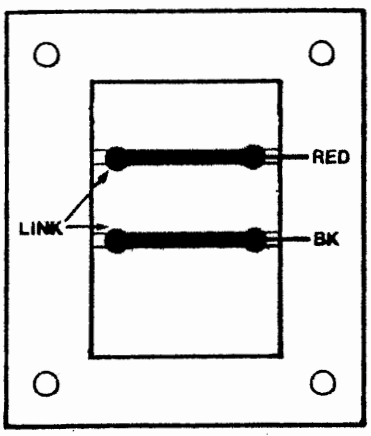
7-2. Transformer Primary Tappings, Four (4) Tap Model.

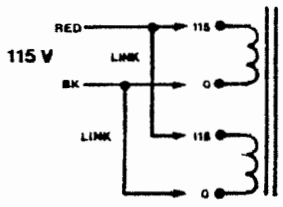
230 VOLT



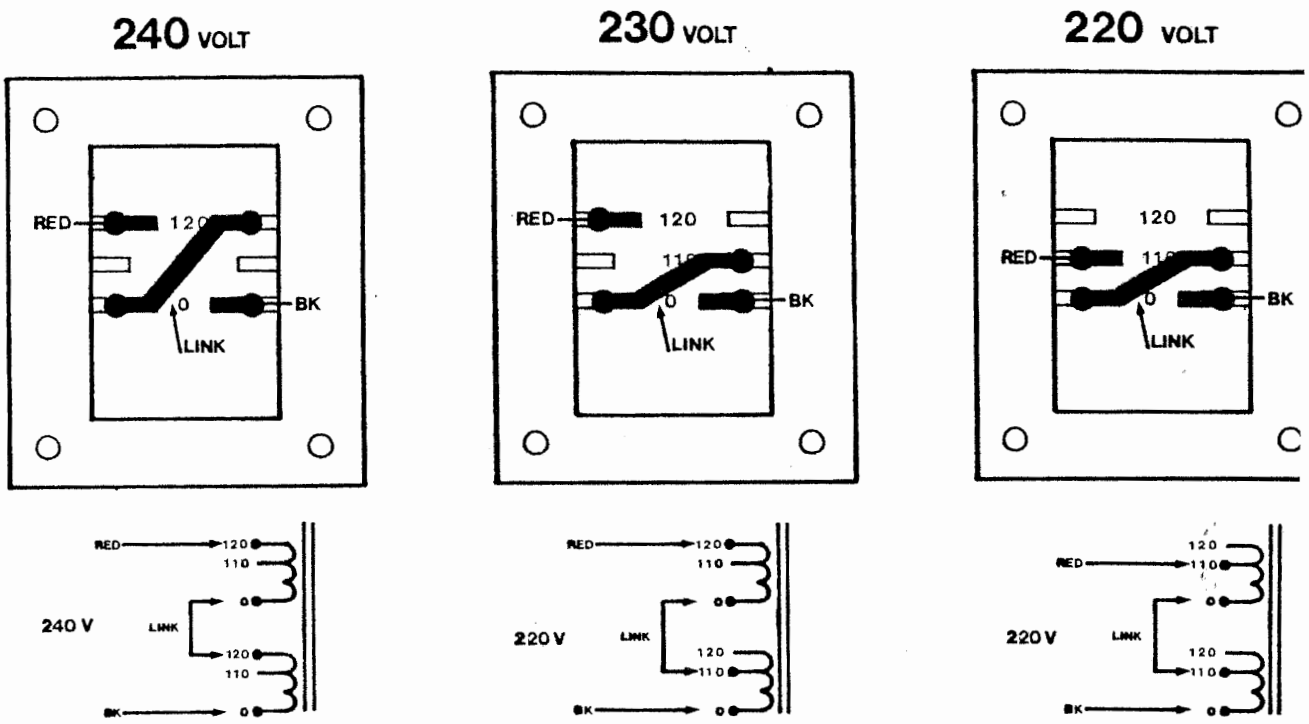


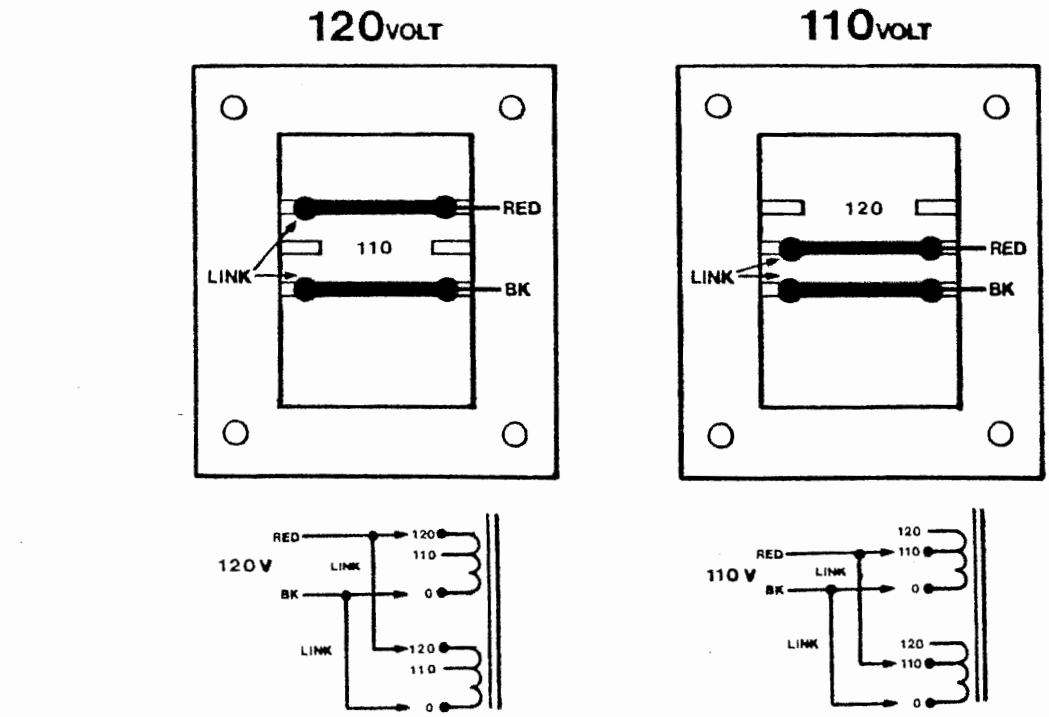
115 VOLT



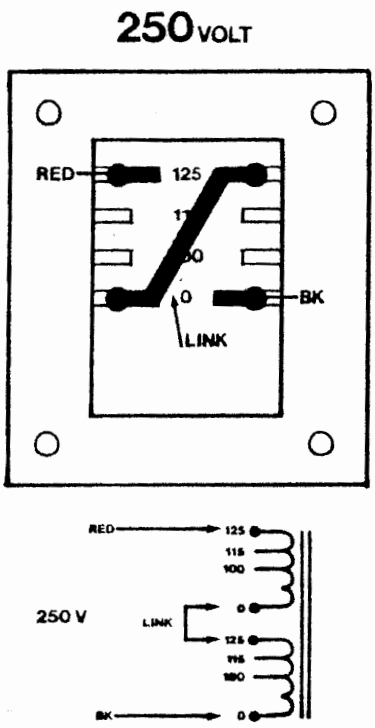


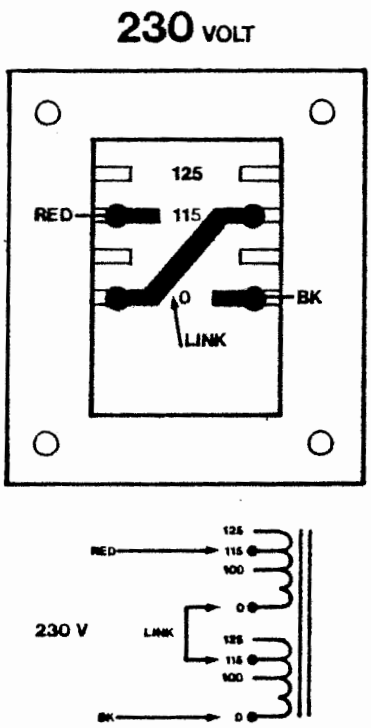
7-2. Transformer Primary Tappings, Six (6) Tap Model.

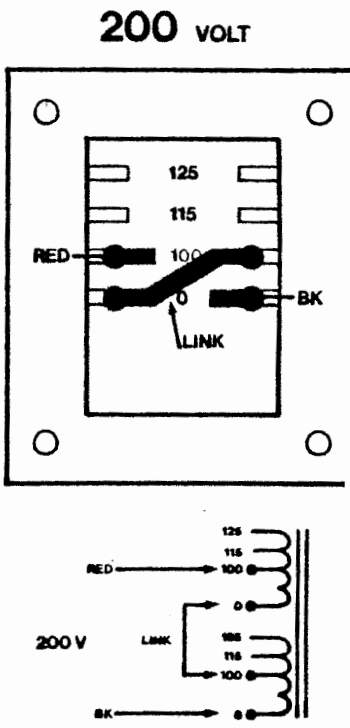


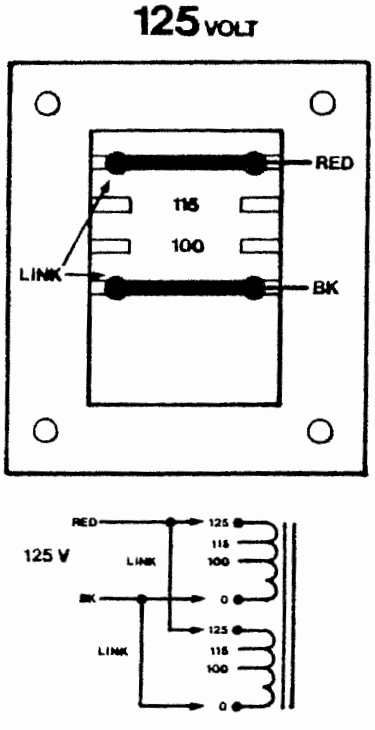


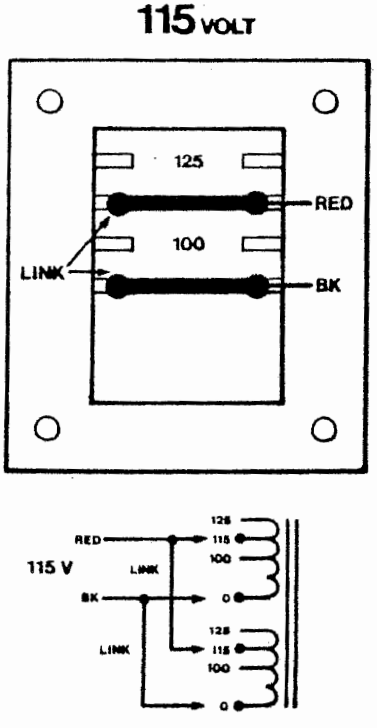
7-2. Transformer Primary Tappings, Eight (8) Tap Model.

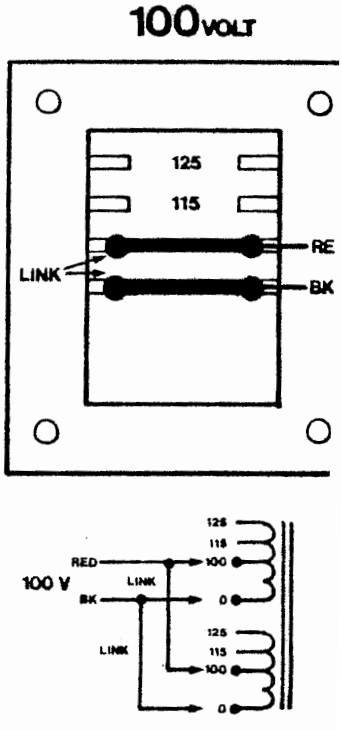












8 UPDATE INSTRUCTIONS

8-1 QUICK CHECK

Any PMF 2150B amplifier which requires checking and/or servicing should be checked for the following modifications.

A. End caps should be non-vented (8-2.1)
B. Output terminals should be gold plated (8-2.2)
C. Input sockets should be gold plated (8-2.3)
D. Input capacitor should be 6.8uF (8-2.4)
E. Zobel network should have two 5W resistors (8-3)
F. 5W input earth resistors should be replaced with wire (8-4)
G. R14 (22K) should be 2W (1W acceptable) (8-5.1)
H. Q3, Q4 and Q5 should have heat sinks (8-5.2)
I. U.S.A models should be wired for 120VAC (8-5.3)

Details of these changes follow.

8-2 1983 APPROVED UPDATE KIT:

The entire 1983 approved update kit instructions are included for reference although SECTION 3 HAS BEEN SUPERSEDED, AND IS SO MARKED. See parts list for up-to-dated information.

This update applies only to PMF 2150B amplifiers with serial numbers below P4719.

1. Vented to non-vented front panel end plates (end caps).
2. Output terminals.
3. Input jacks (sockets) - superseded by new gold plated input sockets. The hole diameter in the rear panel must be enlarged to 13mm (33/64 inch). Ideally two key ways in each hole should be made but if this is impracticable then the keys on the new sockets may be removed with a sharp knife. Both left and right channels have black plastic bazels. The soldering pins on the back of the socket should be shortened by about 1/2 before soldering.
4. Input capacitor.

8-3 ZOBEL NETWORK:

The power rating of the two Zobel network resistors were increased on both channels as follows:

R25	4E7	to	5W
R26	10E	to	5W

This update applies only to PMF 2150B amplifiers with serial numbers below P6016.

8-4 EARTH RESISTORS:

Remove R41 and R42 (4E7-5W) input earth resistors which, for convenience, were connected to the Bridge/Stereo switch. Replace with a 1mm square (14 GA) green insulated wire.

This update applies only to PMF 2150B amplifiers with serial numbers below P7000.

8-5 OVER-VOLTAGE UPDATE:

1. Replace R14 (22k) resistor with a 2 watt resistor - a 1 watt resistor is acceptable.
2. Install heat sinks on Q3, Q4 and Q5 on each channel and hold in place with "super glue" or equivalent.
3. Some of the earlier models were wired for 110VAC and should be changed to 120VAC especially if problems with high mains/line voltage occurs.

This update applies only to PMF 2150B amplifiers with serial numbers below P5000.

8-6 MINOR CHANGES:

Other changes have been made but are of little or no significance electronically or aesthetically. All are included in the parts list provided and require no electrical or mechanical modifications.

Perreaux PMF2150B Power Amplifier
1983 Approved Update Kit
PSL 529

INSTRUCTIONS

Following is a detailed instruction on the four modifcations required to update earlier PERREAUX PMF2150B Power Amplifiers to current specifications.

NOTE: The four modifications listed below may be carried out by any competant person, but in order to preserve any warranty that may exist on the PMF2150B Amplifier in question, we advise that these modifications be carried out by a Serviceman authorised by PERREAUX SOUND LTD or their Agents.

1. Replacement of ventilated front panel end plates with non-ventilated units. This is a cosmetic modification only.
2. Replacement of plastic Output Terminals with heavy duty Gold Plated Output Terminals.
3. Replacement of the Nickel Plated Input Jacks with Gold Plated units for improved contact reliability. SUPERSEDED
4. Replacement of Electrolytic can type Input capacitor with high quality Polycarbonate capacitor for improved high frequency performance and overall sonic performance of the Amplifier.

PERREAUX SOUND LIMITED
NIVEN STREET. P.O. BOX 847, NAPIER, NEW ZEALAND. TELEPHONE 435-219

Perreaux PMF2150B Power Amplifier

1983 Approved Update Kit

PSL 529

Kit Contents:

Quantity	Description
1	Instructions.
2	2150B End Caps (Anodised).
2	Gold Plated Terminal Posts Red.
2	Gold Plated Terminal Posts Black.
2	6.8 mfd, 63 volt Wima Capacitors.
2	Gold Plated Cinch Sockets and Lugs SUPERSEDED Nuts.
1	Plastic Bush Red SUPERSEDED (glued to Cinch Socket).
1	Plastic Bush White SUPERSEDED (glued to Cinch Socket).
1	Plastic Washer Red.SUPERSEDED
1	Plastic Washer White.SUPERSEDED
2	010 "O" Rings. SUPERSEDED

WARNING HAZARDOUS VOLTAGES

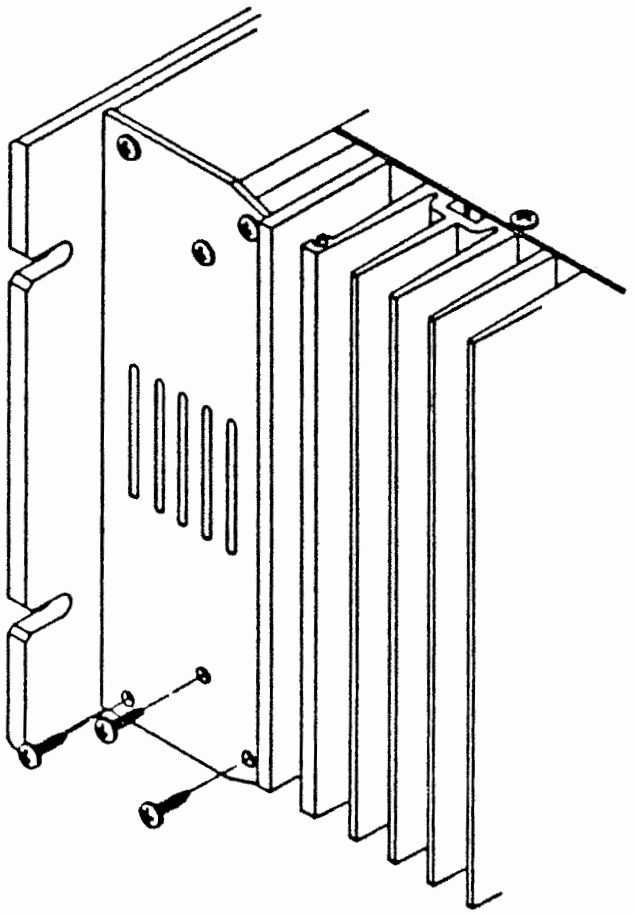
Remove the PMF2150B Power Amplifier from the mains/line supply before any cover is removed or modification attempted. Hazardous voltages inside.

** DISCONNECT THE AMPLIFIER FROM THE MAINS/LINE SUPPLY

1. Replacement of the front panel end plates is a task that is performed with use of a No. 1 Pozidrive screwdriver ONLY.

   * Remove all six screws from the end plate.

   * Remove end plate.



REMOVE EXISTING END PLATE

* Fit new end plate loosely with all FOUR screws as indicated by the number of holes in the new end plate.

* A small degree of play has been allowed in the size of the screw holes to allow the end plate to be moved to line up flush with the top and front edges.

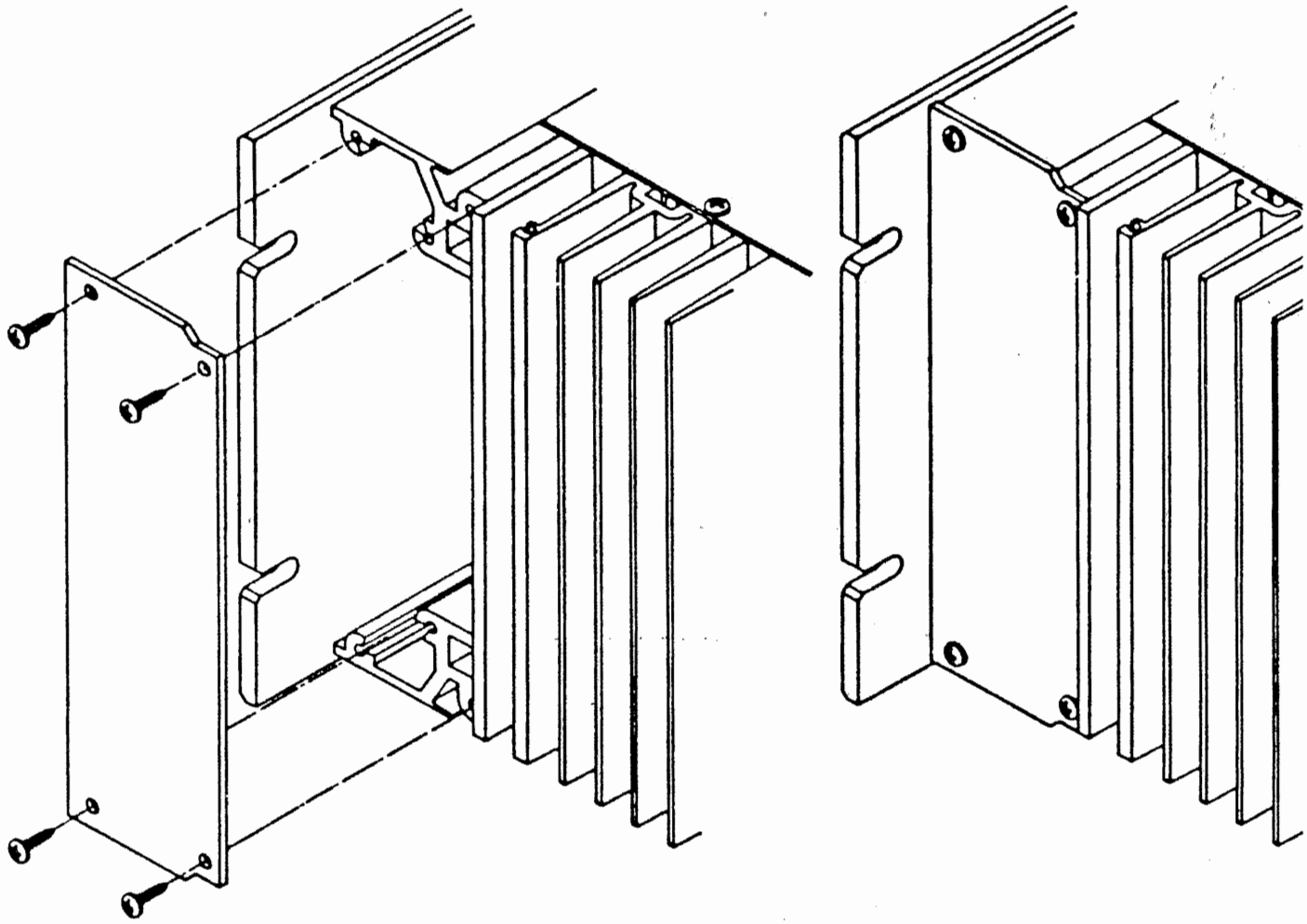
* Tighten each of the four screws progressively 1-2-3-4 until all screws are firm.

* Repeat this procedure for the other side.

PRECAUTION

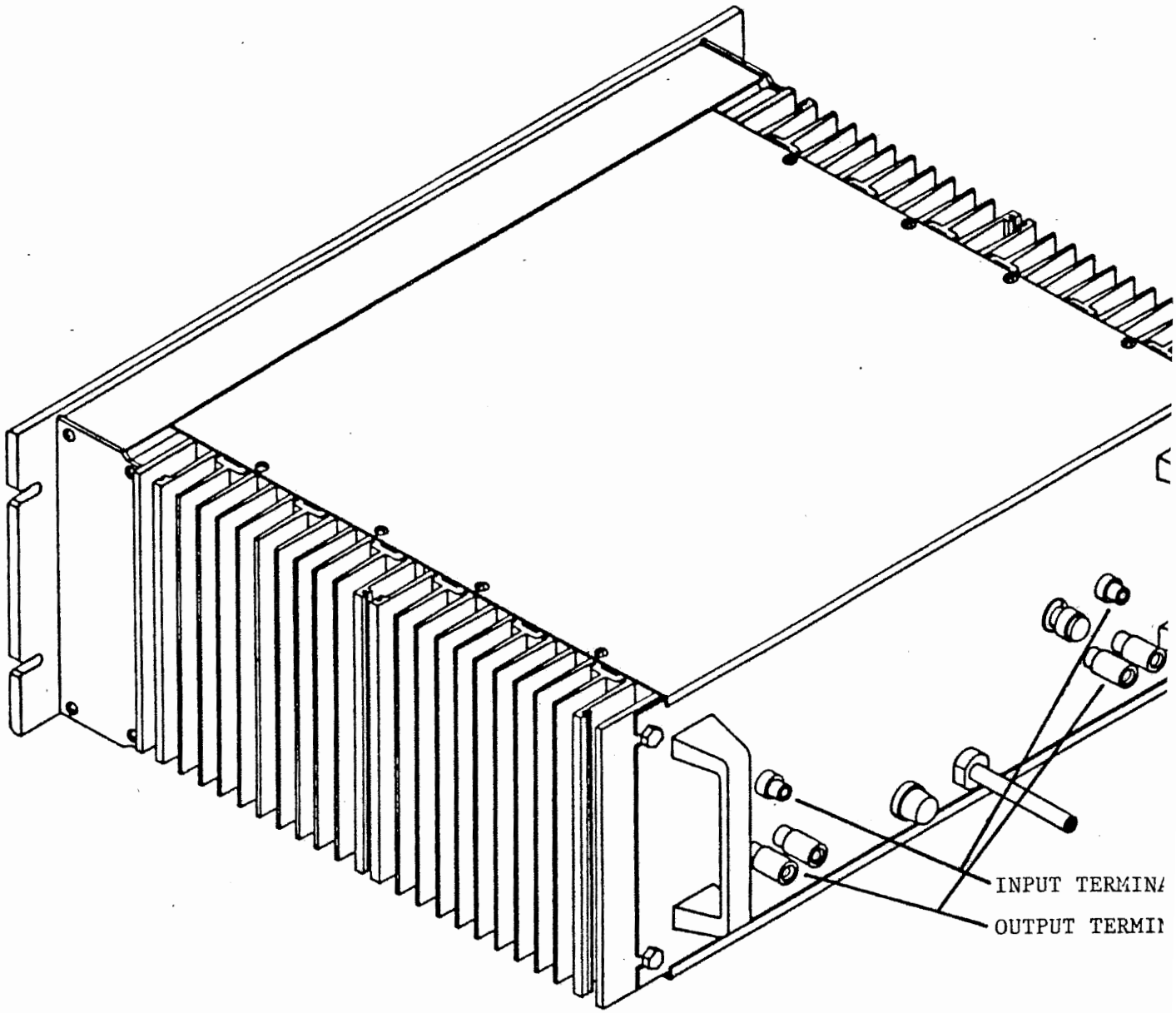
Use ONLY the prescribed screwdriver to avoid burring the screw heads.

DO NOT overtighten the screws.



FIT NEW FRONT PANEL END PLATES.

2. Replacement of the Output Terminals is slightly more difficult but is still within the capabilities of a reasonably experienced person. Gold Plated metal Output Terminals require a larger mounting hole in the rear panel of the PMF2150B and a different method of termination to that of the existing Output Terminals.

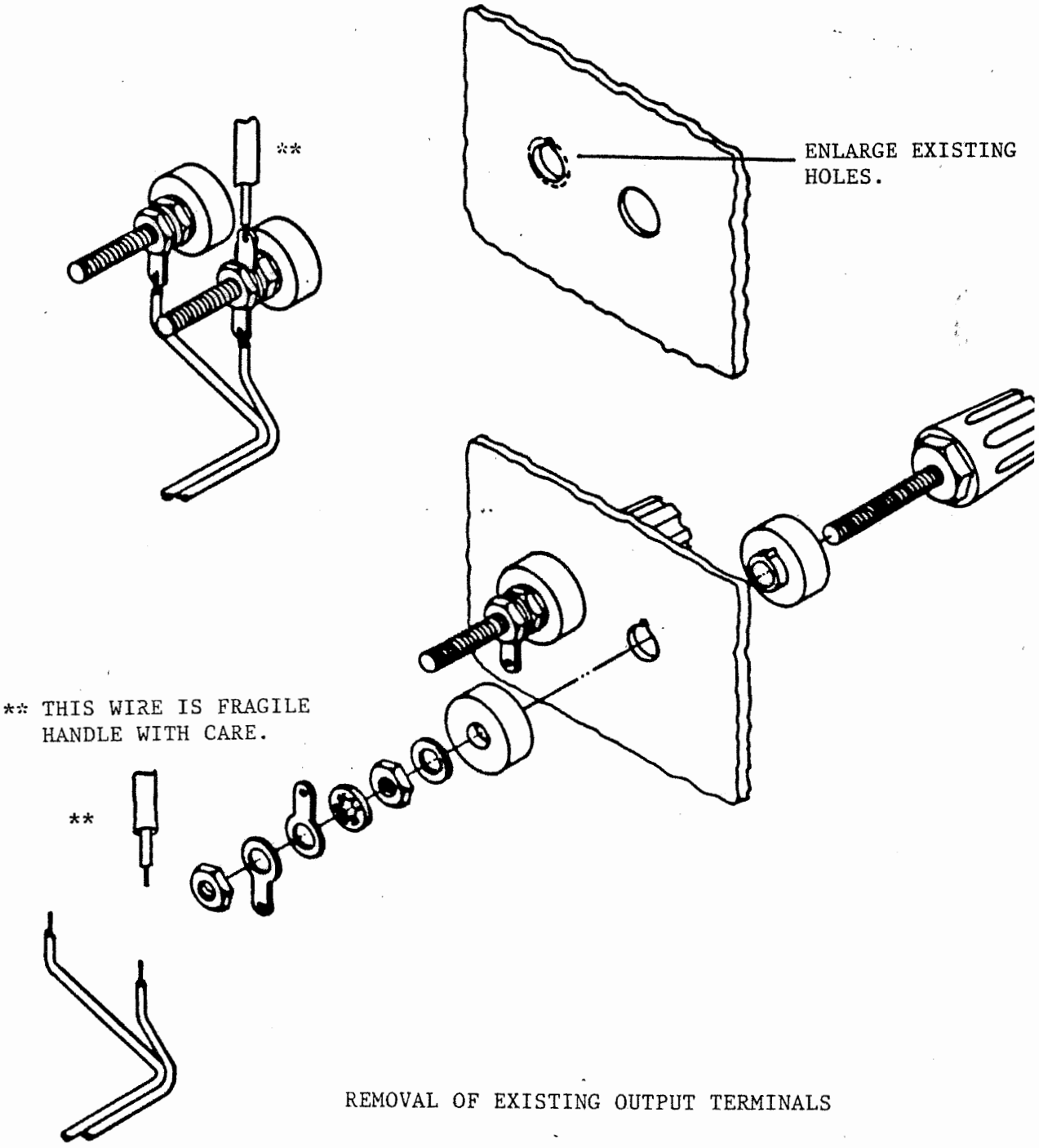


REAR PANEL VIEW OF PMF2150B.

** DISCONNECT THE AMPLIFIER COMPLETELY FROM THE MAINS/LINE SUPPLY

* Remove both Top and Bottom covers from the PMF2150B using a Pozi-drive screwdriver as in "FRONT PANEL END PLATE REPLACEMENT".

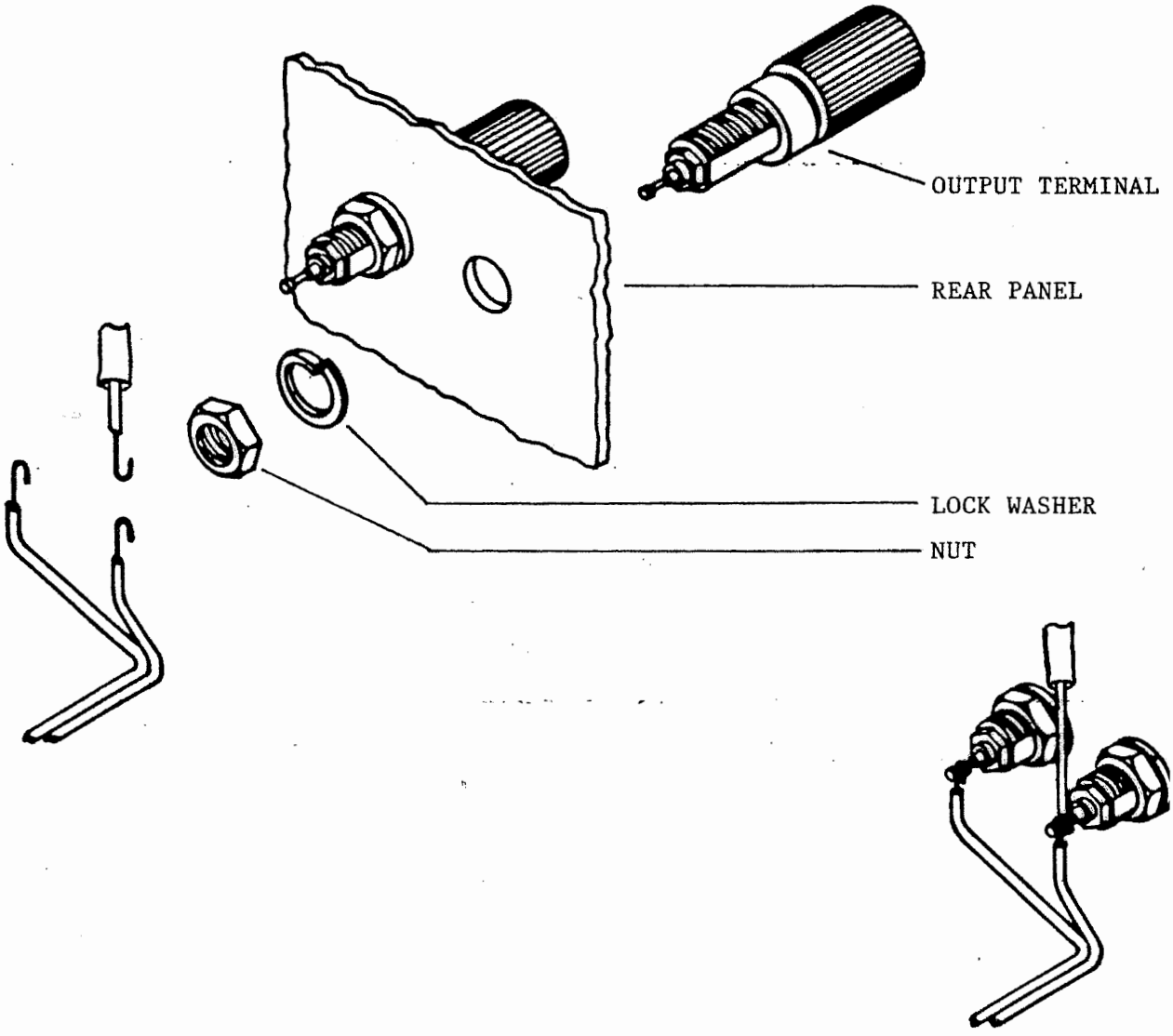
* Lay Amplifier flat down on a clean work area with the rear panel facing towards you. This will allow any swarf produced by enlarging the holes to fall out of the Amplifier. Ensure that the bottom edges of the Amplifier, particularly the front panel, are not allowed to come in contact with anything that may mark or damage them.



REMOVAL OF EXISTING OUTPUT TERMINALS

* Carefully remove the two small nuts, star washers and Terminals off the back (inside Amplifier) of each of the four Output Terminals. NOTE the exact location of each of the four Output wires IE: green Θ yellow Θ and the small resistor between the 'Stereo/Bridged' switch and the Θ Terminal.

* Remove all four plastic Output Terminals. Ensure none of the nuts, washers, solder lugs, blobs of solder etc are left inside the Amplifier.
* Remove the large nut and lockwasher from each of the four Gold Plated metal Output Terminals and place to one side.
* The holes in the rear panel are not large enough for the new Output Terminals. It is necessary to enlarge each of these four holes from 1/4" diameter to 5/16" diameter.



OUTPUT TERMINAL ORDER OF ASSEMBLY

Enlarging holes in metal panels will mean that swarf or small pieces of metal may get caught up in the wiring and/or components of the Amplifier and cause short circuits which may result in the subsequent failure of the Amplifier. To assist in eliminating the possibility we advise that you loosely cover each of the Output PC boards with a soft clean cloth to catch any metal swarf or filings that may fly about while you enlarge the holes.

The Amplifier (PMF2150B) must be allowed to sit flat on the work area during the entire operation.

Increasing the diameter of the four holes is a task that must be performed carefully, to avoid damaging the Amplifier, panel or yourself. We strongly recommend the use of a Tapered Reamer for this task. If a Reamer is not available a drill will have to be used.

A Tapered Reamer is a hand held device which when used carefully will gradually enlarge the holes until the new Terminals are a snug fit. Concentrate on one hole at a time, being very careful not to ream the hole too large.

When all four holes are the correct size, carefully remove burrs or jagged edges with a small sharp knife, or the tip off a drill bit 1/2" to 3/4" diameter.

Fit the four new Terminals and tighten the securing nuts firmly. Red Terminal in the + hole, Black Terminal in - hole.

To resecure the wiring you must first of all remove the existing solder or crimp lugs from the yellow and green wires by cutting the lugs off where the wi enters the body of the lug. Strip back the plastic sheathing 3/16" and solder tin the end of the wire. Tin the gold tip of the Output Terminal and now solder the wire to the Terminal. Be careful not to heat the Terminal more than is necessary to provide a good contact.

Check that all the wires are re-terminated in the correct positions including the small wire to the Stereo/Bridge switch.

Check all soldering for clean, shiny and positive connections.

Remove EVERY trace of swarf from within the Amplifier. A 1/2" soft paint brush and a vacuum cleaner with a small soft nozzel is ideal for this purpose.

3. Now is the time to fit the new Gold Plated Input jacks **SUPERSEDED**

Remove the coaxial lead from each Terminal of each Input Jack with a small soldering iron. Be careful not to use more heat than is necessary, this will avoid the plastic covering of the wire being melted. Note the position of each wire.

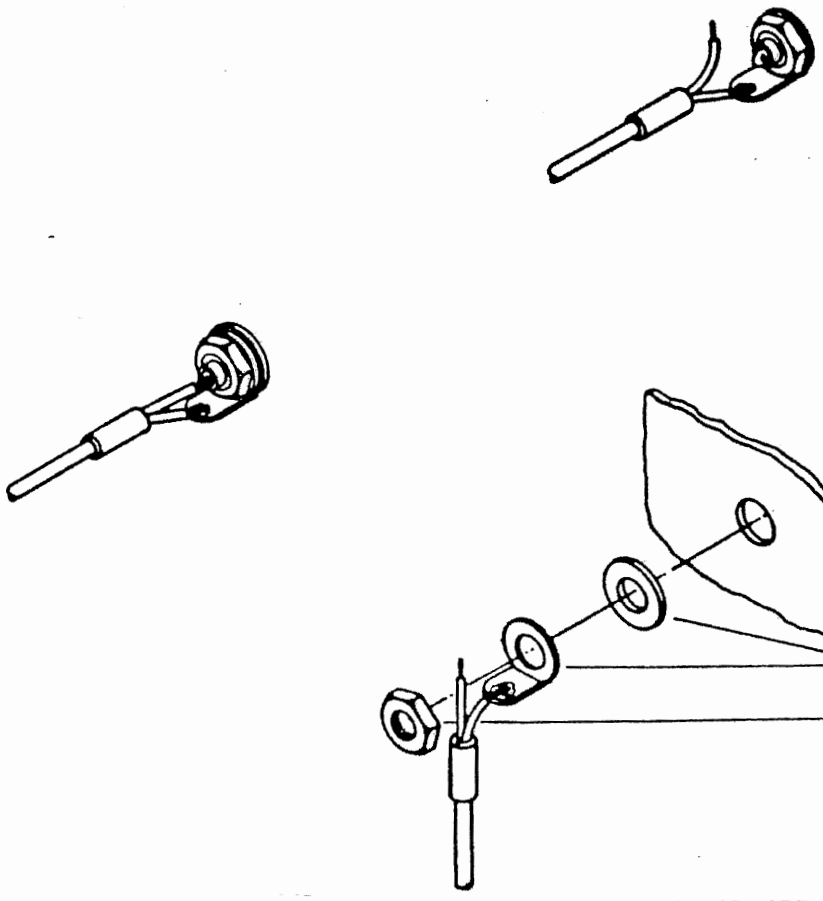
* Loosen and remove the large nut on the inside of the Jack socket using a properly fitting spanner. Carefully remove all parts of the Jack socket and place to one side.

WARNING HAZARDOUS VOLTAGE

Remove the PMF2150B Power Amplifier from the mains/line supply before any cover is removed or modification attempted. Hazardous voltages inside.

* Prepare the new Jack socket by ensuring the coloured plastic collar is in place and the rubber "O" ring is fitted up against the plastic collar. SUPERSED

* Insert the new Jack socket in the hole ensuring the "O" ring locates properly and check the colour is correct ie: RED collar for right channel. WHITE collar for left channel. SUPERSEDED



INPUT TERMINAL ORDER OF ASSEMBLY SUPERSEDED

* Fit the appropriate coloured nylon washer, solder lug and nut, on the inside. Tighten up with a properly fitting spanner. Do not overtighten as this will strip the thread. SUPERSEDED

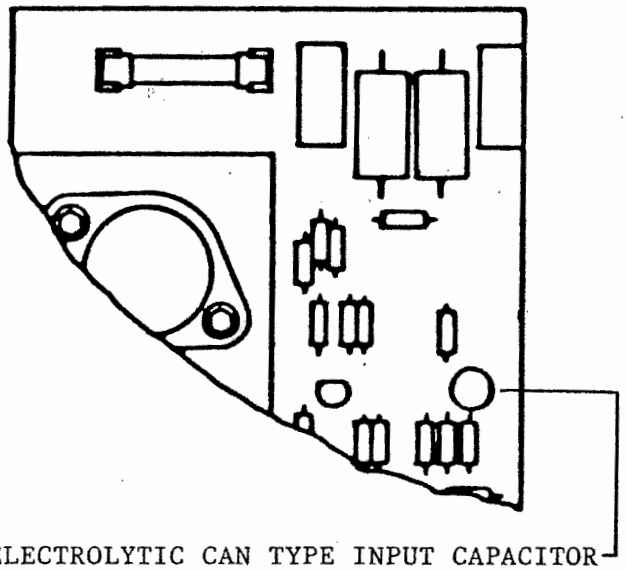
* Re-solder the coaxial leads as before (section 1). SUPERSEDED

* Check all solder connections are clean, shiny and positive and that there are no blobs of solder that may have dropped into the Amplifier. SUPERSEDED

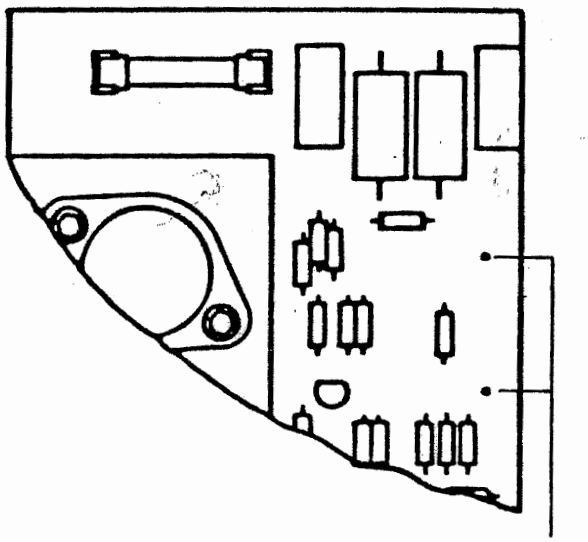
4. Replacement of Input Capacitor

The input Capacitor supplied with this kit is a polycarbonate device, much larger in dimensions than the Electrolytic device it replaces, because of this, attention to placement is very important (see illustration).

Provision for this modification has been allowed on some later production runs of this amplifier but not on earlier production runs.



ELECTROLYTIC CAN TYPE INPUT CAPACITOR

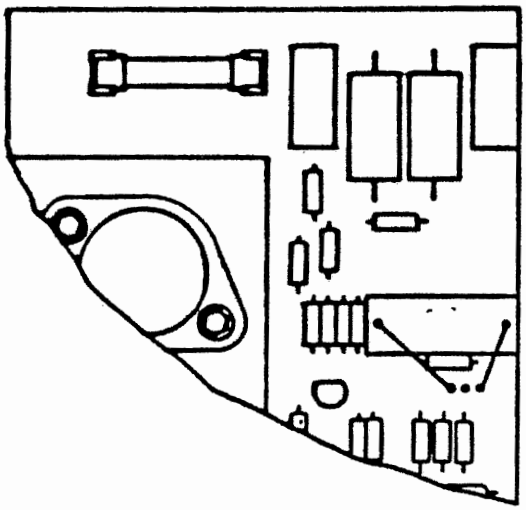


EXISTING PROVISION FOR POLYCARBONAT INPUT CAPACITOR.

* This task is best performed with the PMF2150B Amplifier standing up on it's front handles. It is therefore important that the surface on which the handles rest, is clean and free of any grit or materials that may mark the surface of the handles. The weight distribution of the amplifier will ensure that the amplifier will be quite stable providing the work surface is level and flat.
* Identify the input capacitor on each PC Board. (See illustration).
* Carefully identify the solder connections on the printed track side of the PC Board.
* Use a fine tip soldering iron to melt the solder on each connection while carefully removing the Electrolytic Capacitor.
* Clear the solder from the two holes which now exist in the PC Board.
* Identify whether or not provision for the new capacitor has been allowed.

If YES, then proceed with the installation by fitting the new Capacitor into the holes illustrated on each PC Board. Carefully re-solder both ends of each new capacitor and cut of the excess wire. Ensure soldering is clean, bright and secure. It does not matter which way round the new Capacitor, is fitted.

* If no provision for the new input capacitor is provided, and you wish to proceed with this modification, the most convenient method of installation is to "Super Glue" the capacitor upside down onto the top (or component) side of the PC Board and wire the two legs of the capacitor with short wires to the two holes in the PC Board vacated by the previous Electrolytic Capacitor. (See illustration).



POLYCARBONATE INPUT CAPACITOR GLUED IN PLACE AND WIRED TO THE P.C.BOARD

The new Capacitor is not polarised. Therefore it may be wired in either way round.

* Check that the Capacitor is firmly glued to the PC Board.
* Check that the wires between the Capacitor and PC Board are not so tight as to put strain on the capacitor which may cause it to fall off the PC Board and subsequently cause damage to the Amplifier.
* Check all solder joints are clean, bright and secure.

If you are now satisfied that all of the above modifications have been done satisfactorily it is time to thoroughly check throughout the inside of the Amplifier for any foreign materials such as pieces of wire, solder, swarf, tools, loose components etc. Refit the bottom and top covers in that order, ensure all the screws are done up firm but not overtight.

Lay the amplifier on its feet and reconnect it to your system.

Turn the power on to the whole system in your usual way, but ensure that the Pre Amplifier volume control is turned all the way down.

While playing a piece of known music increase the volume slowly and listen to your system. Check for good Bass response and stereo image. This will confirm the polarity of the Input and Output wiring and that all the modifications are in fact working correctly. There should also be an improvement in the detail and smoothness of the High Frequency performance of your PMF2150B Amplifier.

WARNING HAZARDOUS VOLTAGES

Remove the PMF2150B Power Amplifier from the mains/line supply before any cover is removed or modification attempted. Hazardous voltages inside.

9. TEST EQUIPMENT .

9-1 TEST EQUIPMENT

The equipment listed in this section will make it possible to test any Perreaux amplifier including the PMF 5150B.

A.	Oscilloscope:	Dual trace, 5 megahertz or better.
B.	Resistive Loads:	Eight 4ohm, non inductive resistors, each capable of dissipating 250W.
C.	Capacitive Loads:	0.1uF, 0.68uF and 2.2uF 400V - low loss, low internal inductance, capable of disspating 10 watts should be used, one of each is required for each channel.
D.	Digital Multimeter:	4 1/2 digit, ohms, DCV and RMS responding ACV with good audio range accuracy.
E.	Sine/Sq Wave Oscillator:	Minimum frequency range 20Hz to 20kHz, less than 0.002% THD and noise at any level, pure square wave with output attenuator and meter.
F.	Distortion Analyzer:	Able to measure 0.01% THD full scale, with a S/N ratio low enough not to effect readings on this scale, an input impedence of 10KE or higher. May also include a noise meter function (see 9-1.4)
G.	Variac	Minimum 3KVA.
H.	Load Switching Box:	See Figure 9-1.
I.	Noise Meter:	Capable of measuring 300uV full scale (-100dB below 30V) or lower, if not included in distortion analyzer.
J.	Milliammeters:	Two 0-500ma D.C. meters. One meter is acceptable but time consuming (see 4-4).
K.	Cap Discharge Resistor:	820E, 5W resistor with 150mm (6") leads and aligator clips on each end.
L.	Ballast Network:	As described in Figure 9-2.

TEST EQUIPMENT CONTD.

LOAD SWITCHING BOX

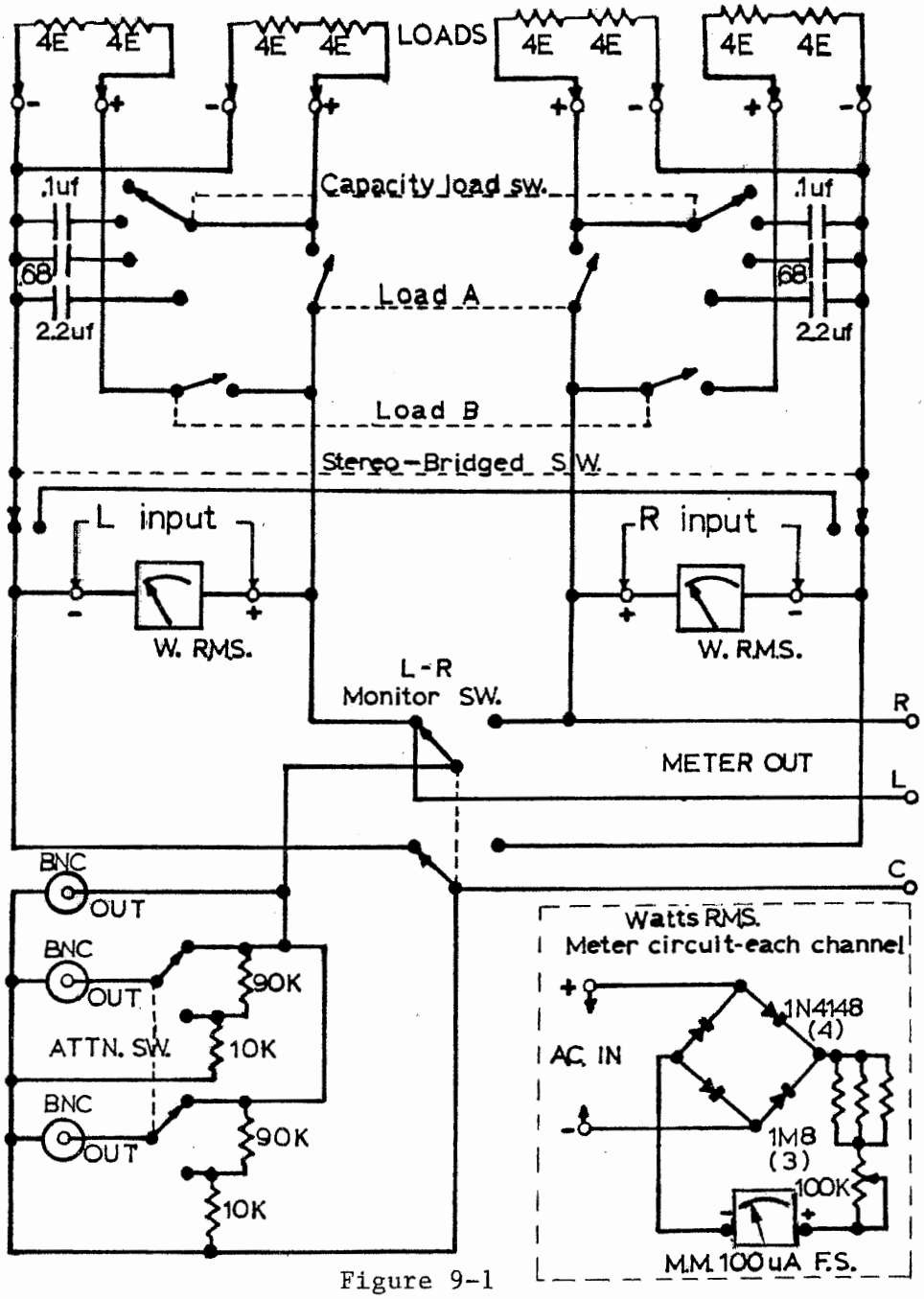


Figure 9-1

A load switching box may be made using Figure 9-1 as a guide. The meters are desirable but not necessary. Such a switching box will save time and make testing of any amplifier easier. The R loads should be kept separate and are described in 9-1.B. The C loads should be built into the switching box and are described in 9-1.C. All wiring, switches and connectors should be of a type suitable to handle the current and voltage of any amplifier likely to be tested. All parts of the circuit (including the BNC shields) must be isolated from the case and earth/ground. If a switching box is not used then any C or R load must be connected at the "speaker" end of the output cables. The bridge circuit is described in 4-9.

TEST EQUIPMENT CONTD.

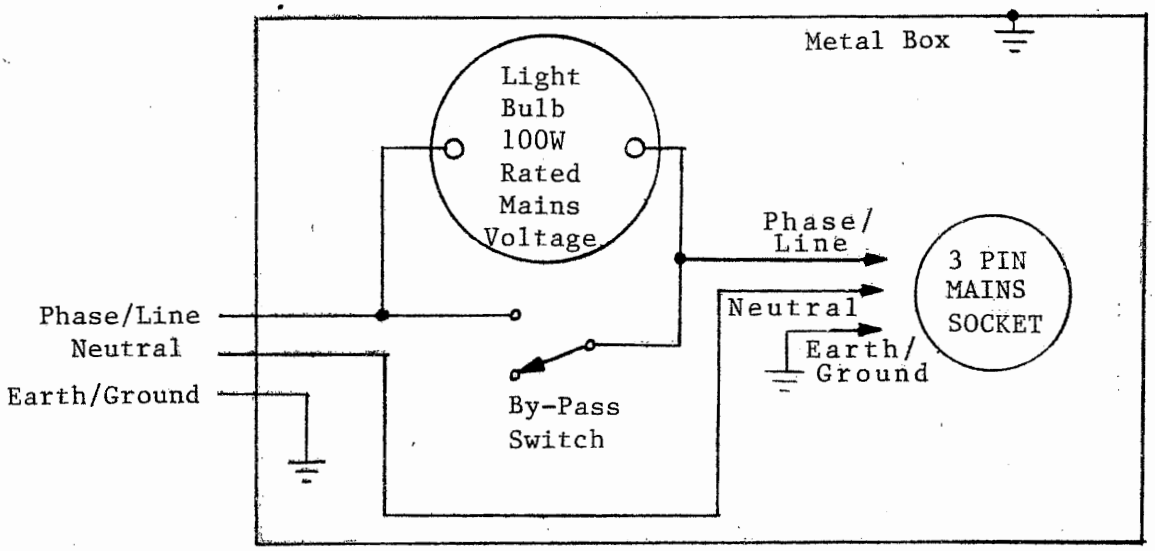


Figure 9-2 (Ballast Network)

A Ballast Network can be made up using figure 9-2. Such a ballast network is useful in fault finding when the problem is heavy mains/line current. If a variac is not available then the Ballast Network should be used to turn on the amplifier.

9-2 TEST EQUIPMENT HOOK-UP

This section applies whether a switching box is used or not.

It is essential that the amplifier and all test equipment be connected to the mains/line supply at the same point, as shown in figure 9-3. If the amplifier and test equipment are connected to different mains/line outlets earth loops may occur. The test equipment may still have to be isolated from mains/line earth.

The output cables from the amplifier to the switching box and from the switching box to the load resistors should be as heavy and as short as practicable. Signal path and measuring connectors should be shielded (coax) leads although the A.C. DVM may be standard DVM leads.

TEST EQUIPMENT CONTD.

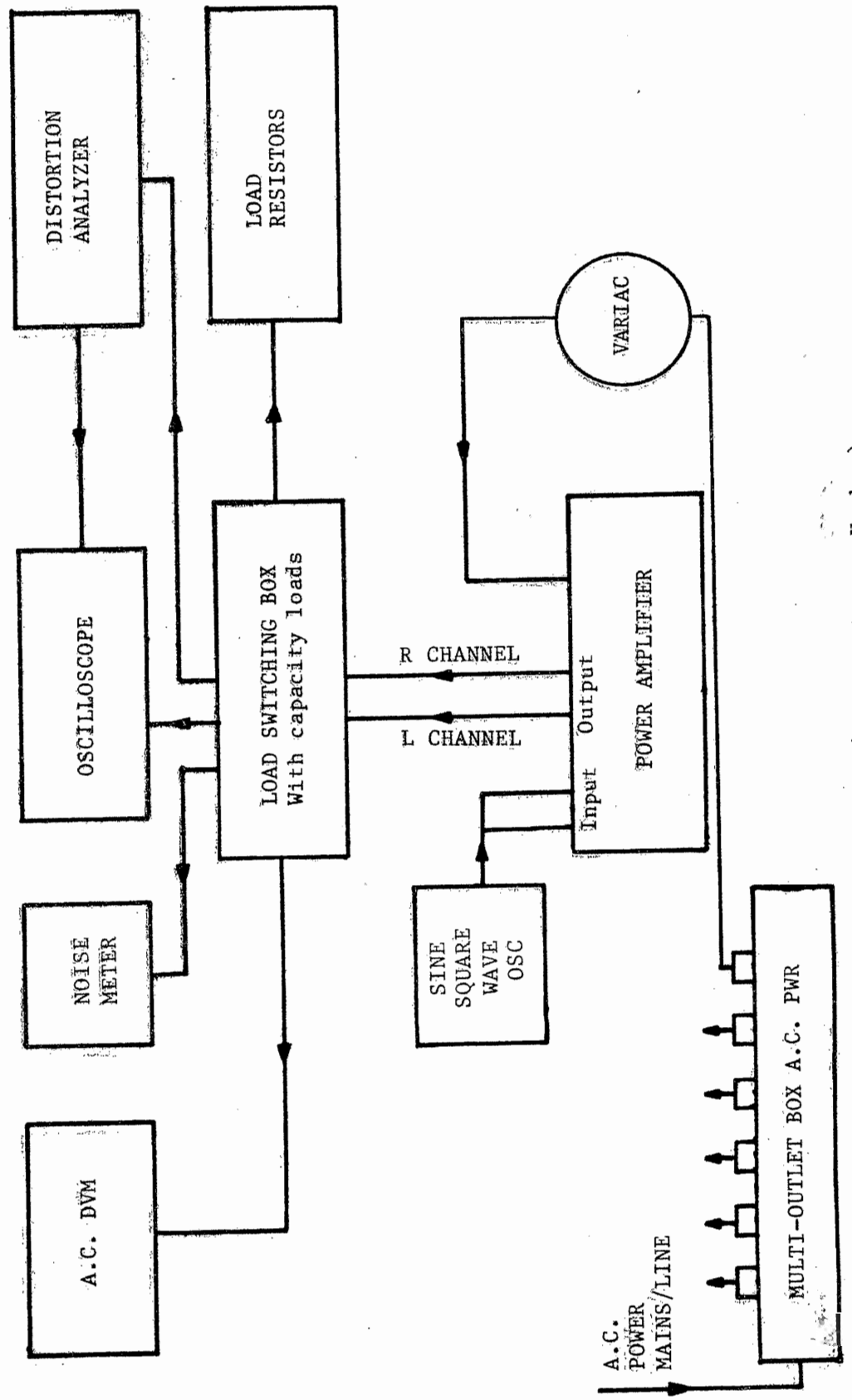


Figure 9-3 (Test Equipment Hookup)

REF Nº

MODEL: _____ SERIAL No: _____

DATE RECEIVED: ____/____/____ HOW RECEIVED: _____

CUST. O/N: _____ CONSIGNMENT NOTE No: _____

UNIT RECEIVED FROM DEALER/OWNER (STATE WHICH) _____

CONDITION WHEN RECEIVED: GOOD ☐ AVERAGE ☐ BAD ☐ (TICK)

PURPOSE OF SERVICE:

WARRANTY CLAIM ☐ TRANSIT DAMAGE ☐ OTHER ☐ (TICK)

DATE AND PROOF OF FIRST SALE: _____

SERVICE CENTRE: _____ TEL: _____

ADDRESS: _____

TECHNICIANS NAME: _____

DEALER NAME: _____ TEL: _____

ADDRESS: _____

OWNERS NAME: _____ TEL: _____

ADDRESS: _____

CLAIMED FAULT: _____

FAULT FOUND: _____

REMEDY: _____

PARTS REPLACED (DESC.)	CIRCUIT REF No.	QTY	SUPPLIER OF PARTS

LABOUR (Hours/Min): _____ DATE COMPLETED: _____

IMPORTANT

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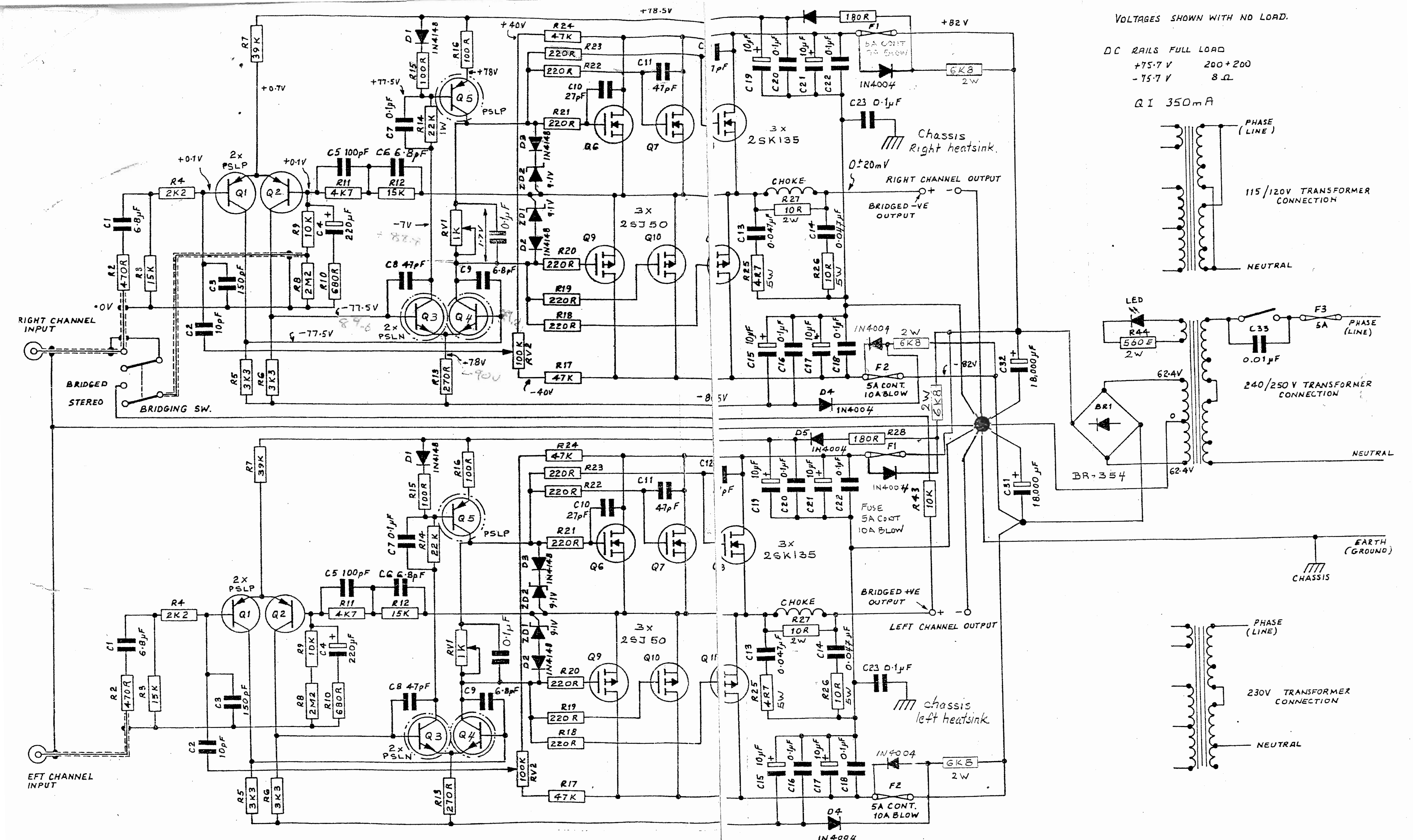
UPON COMPLETION.

Perreaux

Perreaux Sound Ltd.

Niven Street
P.O. Box 847 Napier
New Zealand.
Telephone (070) 435-219
Telex 31269 Perronz.



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CIRCUIT DIAGRAM

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