

5 Specifications

5.1 Performance

Note: 8 ohm loads were used unless specified otherwise.

Frequency Response: 3 Hz to 100 kHz bandwidth. \pm 0.1 dB 20 Hz to 20 kHz at 1 watt.

Signal to Noise Ratio: 120 dB (A-weighted) below rated output at 26 dB gain.

IM Distortion: Less than 0.005% from 760 watts through -10 dB, increasing smoothly to a maximum of 0.025% at -40 dB, measured at 26 dB gain.

Damping Factor: Greater than 20,000 from 10 Hz to 200 Hz. 1,800 at 1 kHz.

5.2 Power

Power Bandwidth:

10 Hz to 25 kHz -1.0 dB.

7 Hz to 27 kHz -1.5 dB.

5 Hz to 28 kHz -2.0 dB.

4 Hz to 30 kHz -3.0 dB.

Output Power:

Note: The following power specifications are for STEREO (two-channel) operation with a THD of 0.02% or less while both channels are driven.

760 watts per channel into 8 ohms.

1,160 watts per channel into 4 ohms.

1,500 watts per channel into 2 ohms.

Load Impedance: Rated for 16, 8, 4, and 2 ohm usage only. Safe with all types of loads, even reactive ones.

Required AC Mains: 50/60 Hz, at 100, 120, 200, 220/230, 240 VAC.) Draws 90 watts or less at idle. With a continuous 1 kHz sinewave output of 760 watts into 8 ohms in STEREO mode, as many as 26 amps are drawn from a 120 VAC source.

It is extremely important to have adequate AC power available to the amplifier. Power amplifiers can not create energy—they must have the required voltage and current to deliver the undistorted rated wattages you expect.

The amp is provided with the correct line cord for the rated line voltage.

5.3 Controls

Enable: A pushbutton located on the front panel to turn the amplifier on and off.

Level: A signal level control with 31 detents for each channel, located on the front panel.

Stereo-Mono: A three-position switch located on the back panel which selects between STEREO, BRIDGE-MONO, and PARALLEL-MONO modes of operation.

Input: A two-position switch located inside the amplifier selects between two input sensitivities. (A voltage gain of 26 dB or a sensitivity of .775 V for full rated output.)

Level / Dynamic Range Meter: A two-position switch located behind the front panel sets the display meter on the front panel as either a dB level meter or a Dynamic Range power meter.

5.4 Indicators

Enable: This amber indicator is on while the amplifier is on to show that the low-voltage power supply is operating.

ODEP: Two amber multifunction indicators which show the reserve energy status of each channel. Normally they are brightly illuminated to show that reserve energy is available. In the rare event there is no energy reserve, they will dim in proportion to ODEP limiting. They remain off if a tripped breaker, blown fuse or thermal shutdown occurs. (In the case of a thermal shutdown, the amplifier will return to normal operation after cooling down to a safe operating temperature.)

IOC: Two yellow indicators which are normally off. In the unlikely event the output waveform differs from that of the input by 0.05% or more, they will flash. In this way, they act as sensitive distortion indicators to provide proof of performance. **Note: It is normal for the Channel 2 IOC indicator to remain in PARALLEL-MONO mode.**

Signal: Two green Signal presence indicators flash in sync with the input signal to show its presence.

Dynamic Range / Level Meter: Two green five-segment meters (one per channel) display either the output dynamic range in dB or the output level in dB. (Your unit comes factory-set to display dynamic range.) As dynamic range meters they show the ratio of the peak to average power of each channel. As output level meters they show how high the output levels are relative to full power.

5.5 Input/Output

Input Connector: Balanced phone jacks on chassis and internal P.I.P. connector. (Balanced 3-pin XLR connectors are provided on P.I.P.-FX which is a standard feature.)

Input Impedance: Nominally 20 K ohms, balanced. Nominally 10 K ohms, unbalanced.

Input Sensitivity: Switchable between .775 V (unbalanced) for rated output or a voltage gain of 26 dB. (See section 4.5, Input Sensitivity Adjustment.)

Output Connector: Color-coded dual binding posts (banana jacks).

DC Output Offset: (Shorted input) ± 10 millivolts.

Output Signal

Stereo: Unbalanced, two-channel.

Bridge-Mono: Balanced, single-channel. Channel 1 controls are active; Channel 2 controls are inactive but not removed from operation.

Parallel-Mono: Unbalanced, single-channel. Channel 1 controls are active; Channel 2 controls are inactive but not removed from operation.

5.6 Protection

If unreasonable operating conditions occur the protection circuitry limits the drive level to protect the output transistor stages, particularly in the case of elevated temperature. Transformer overheating will result in a temporary shutdown of that particular channel. Controlled slew-rate voltage amplifiers protect the unit against RF burnouts. Input overload protection is furnished at the amplifier input to limit current.

Turn On: No dangerous transients. Four second turn-on delay. **Note:** This may be changed by resistor substitution. Contact Amcron Technical Services Department for details.

5.7 Construction

Black splattered-coat steel chassis and black powder-coated front panel for maximum durability. Chassis utilizes specially designed "flow-through" ventilation from front to side panels.

Cooling: Convection cooling with custom heat diffusers and infinitely variable on-demand forced air assistance.

Dimensions: 19 in. standard rack mount (EIA Std. RS-310-B), 7 in. height, 16 in. depth behind mounting surface, 2.75 in. in front of mounting surface.

Weight: 56.5 lbs. Center of gravity is approximately 6 in. behind front mounting surface.

6 Schematic Diagrams

J 0410-1 Display Circuit Schematic
 J 0411-9 Power Supply/Control Circuitry Schematic
 J 0412-7 Main Circuit Schematic

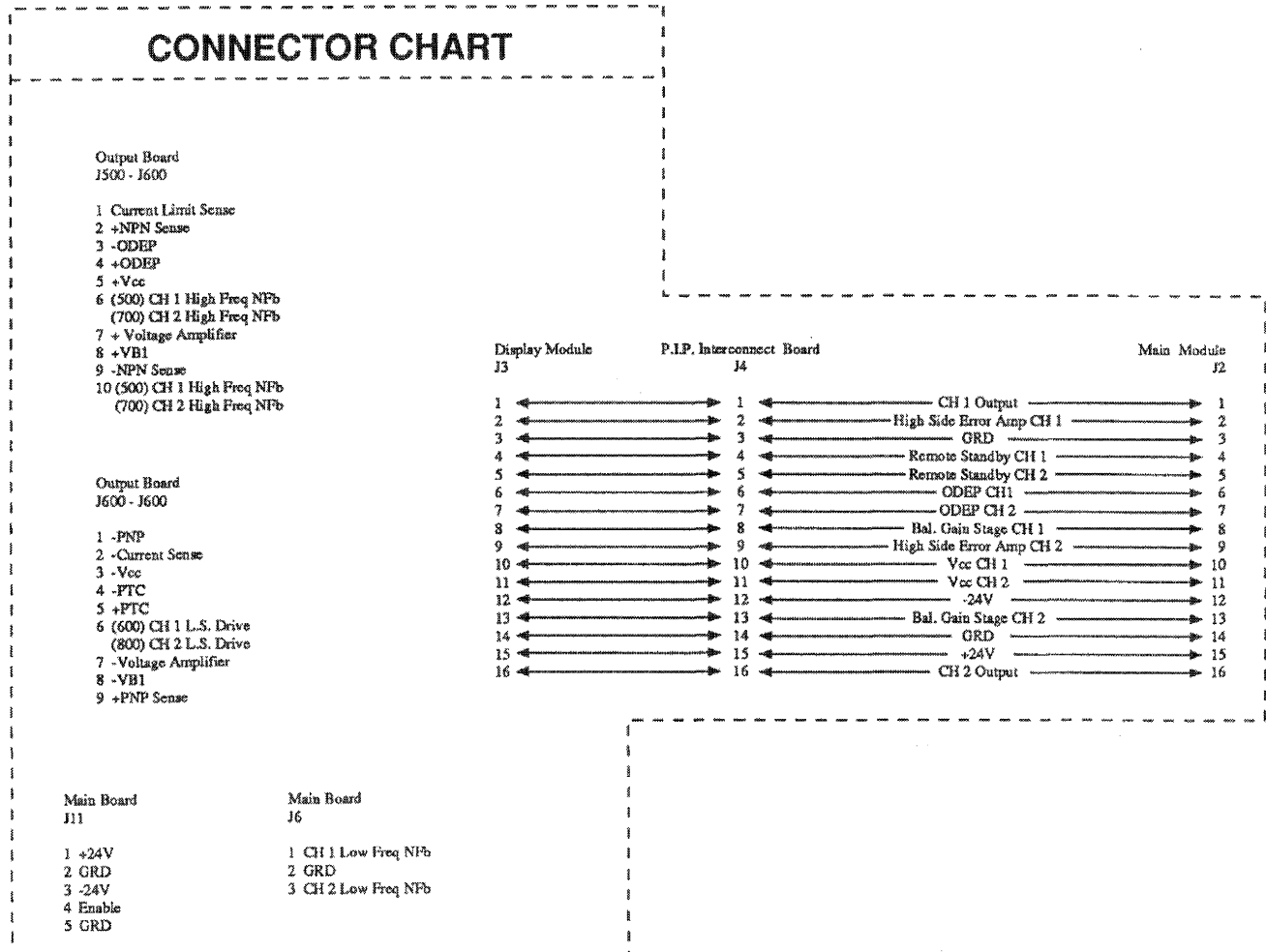
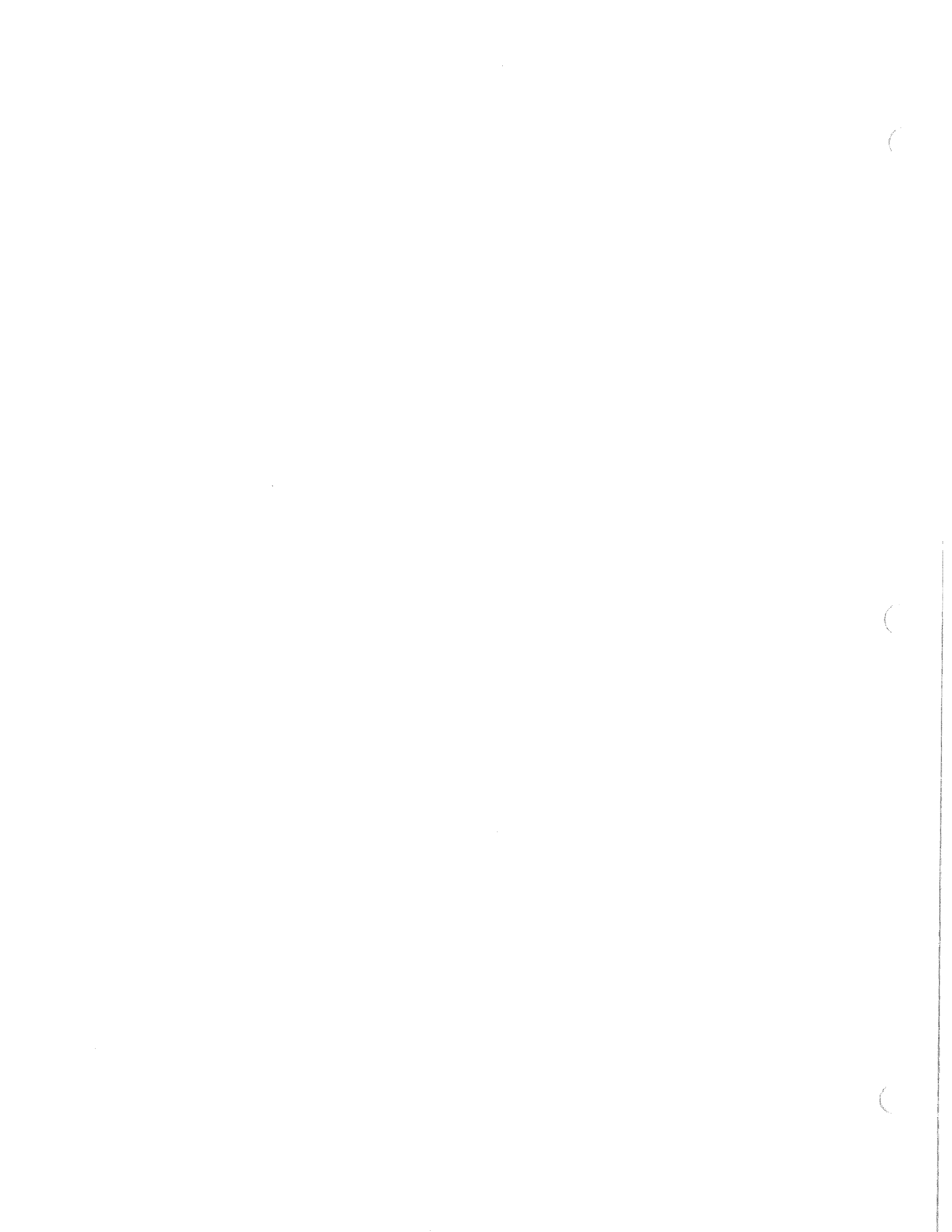


Fig. 6.1 Amplifier Interconnection Chart



PART II

Component Documentation

Parts

General Information

Sections 7 and 8 contain illustrations and parts lists for the Macro Reference power amplifier. This information should be used with the service, repair and adjustment procedure in Section 2.

Most of the mechanical and structural type parts are illustrated and indexed on exploded view drawings. Electrical and electronic parts on these illustrations are also identified by the circuit reference designation next to the illustration. Both the index number and the reference designation are included in the parts list in separate columns. The reference designations correspond to those shown in schematic diagrams.

Electrical and electronic parts located on printed circuit boards are illustrated by schematic symbols on the trace side and by component shape symbols on the component side. Reference designations also appear on these diagrams.

The quantity of each part used in each location is also shown in the parts listing.

Standard and Special Parts

Many electrical and electronic parts used in the Macro Reference are standard items stocked by and available from electronic supply houses. However, some electronic parts that appear to be standard, are actually special. A part ordered from Crown will assure an acceptable replacement. Structural items, covers and panels are available from Crown only.

Ordering Parts

When ordering parts, be sure to give the amplifier model and serial number and include the part description and Crown Part Number (CPN) from the parts list. Price quotes are available upon request.

Shipment

1. Shipment will be made by UPS or best method unless you specify a preferred method.
2. Shipments are made F.O.B. Elkhart, Indiana only.
3. Established Crown accounts will be freight prepaid and billed unless shipped by truck or air freight.
4. All others will be shipped freight collect.

Terms

1. Normal terms are C.O.D. unless the order is prepaid.
 2. Net 30 days terms apply only to those firms who have an established line of credit with Crown.
 3. If prepaying please add an amount for the freight charge. \$2.00 is average for an order under one pound.
- NOTE: Part prices are subject to change without notice.
4. New parts returned for credit are subject to a 10% restocking charge.
 5. You must receive authorization from the Parts Dept. before returning parts for credit.
 6. We are not a general parts warehouse! Parts are available for servicing Crown products only.

Illustrated Parts Lists

Contained within this section are the illustrated parts lists for the Macro Reference amplifier. Most of the mechanical and structural parts are illustrated and indexed in the main chassis illustration. The electrical and electronic parts in the assembly drawings are also shown in the circuit schematics (Figures 8.1 and 8.2) and are labeled in the parts list with both the schematic component number and the Crown Part Number (CPN).

Electric and electronic parts which are located on printed circuit boards are illustrated by schematic symbols on the trace side of the boards and by their component shape symbol on the component side of the boards. Schematic component numbers also appear on these drawings.

The quantity of each part used in each location is also shown in the parts list.

7 EXPLODED VIEW DRAWINGS

The *Exploded Views* section of this service manual is the compilation of drawings of chassis parts and components found within the Macro Reference amplifier. For schematic drawings see section 6 and for circuit board layouts along with parts lists see section 8.

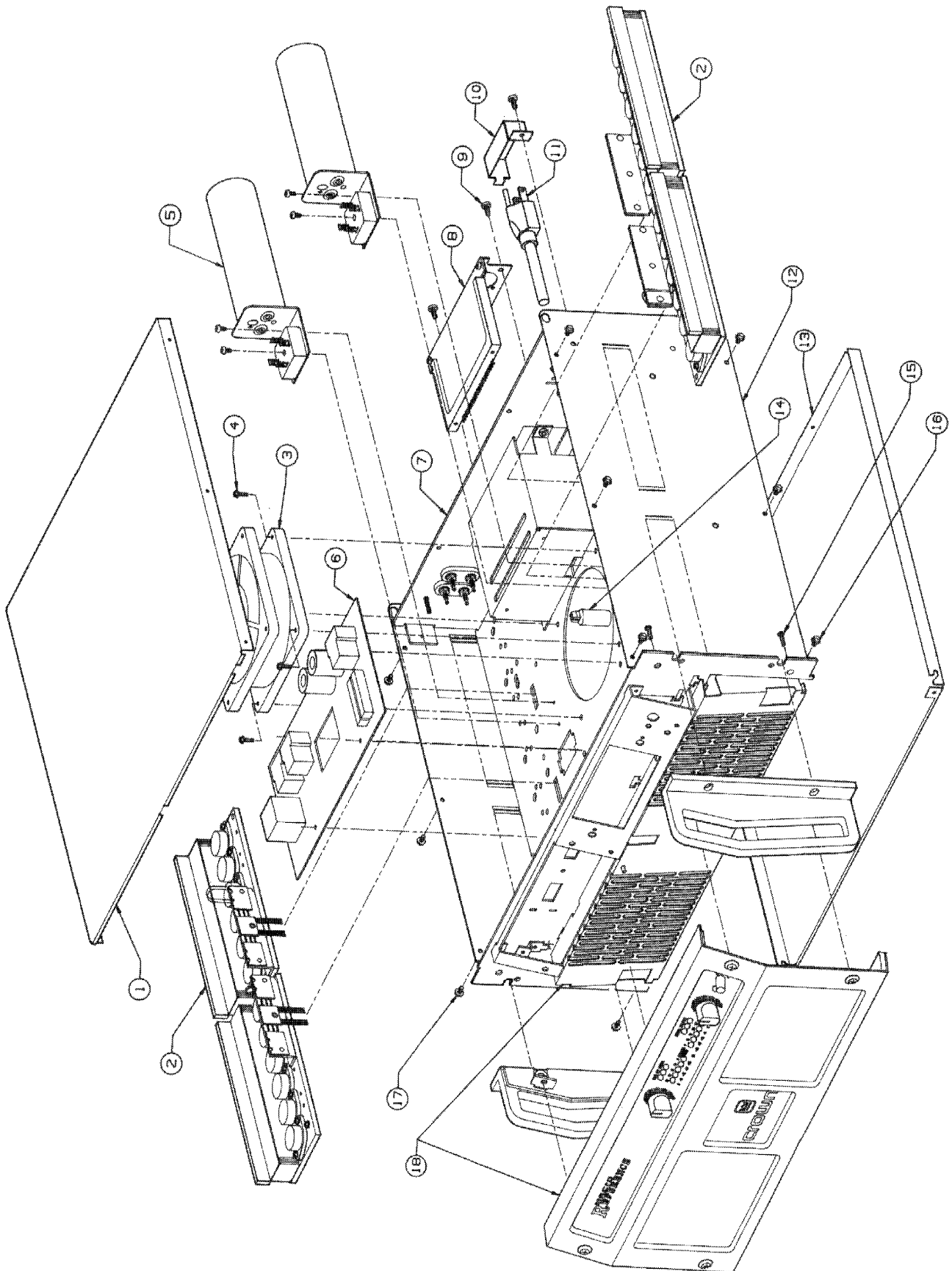


Fig. 7.1 Chassis Assembly (Top)

CHASSIS ASSEMBLY (TOP)

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	Top Cover	F11705J4	1	
2	Heatsink Assembly	_____	2	See Page 7-7
3	Fan	C 7858-1	1	
4	6-32 x .625 Screw	C 7864-9	16	
5	Capacitor Assembly	_____	2	See Page 7-11
6	Control Module	Q42834-4	1	See Page 8-2
7	Back Panel Assembly	_____	1	See Page 7-14
8	P.I.P. Card Assembly	_____	1	See Page 7-12
9	6-32 x .437 Screw	C 7601-5	24	
10	Circuit Breaker Cover	F 11624J7	1	
11	Power Cord	D 7538-8	1	
12	Chassis	M20752J7	1	
13	Bottom Cover	F11705J4	1	
14	.875" Toggle Nut	C 6873-1	2	
15	6-32 x .625 Screw	C 7864-9	2	
16	6-32 x .437 Screw	C 7601-5	6	
17	6-32 x .437 Screw	C 7601-5	6	
18	Front Panel Assembly	_____	1	See Page 7-9

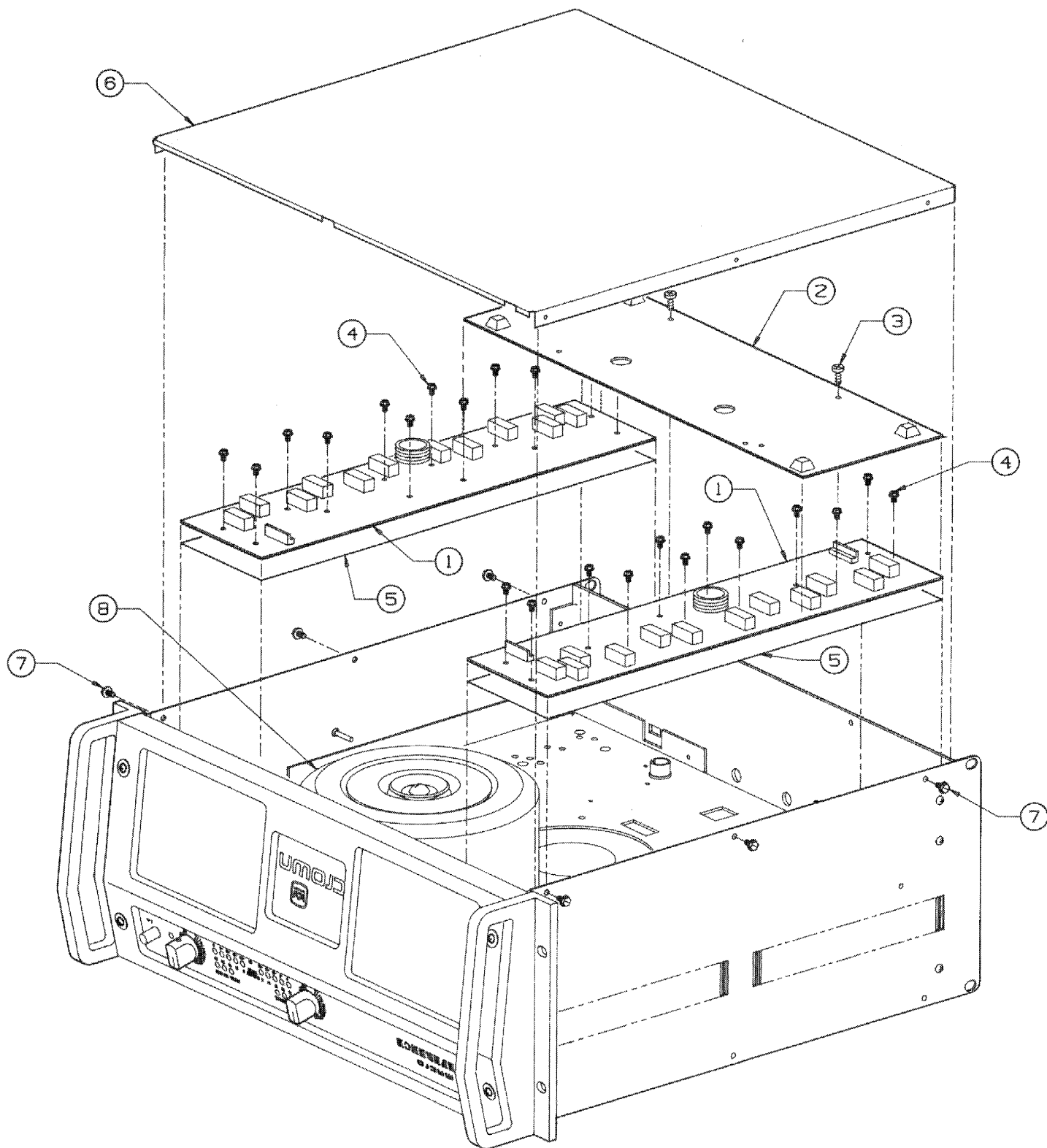


Fig. 7.2 Chassis Assembly (Bottom)

CHASSIS ASSEMBLY (BOTTOM)

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	<i>Output Module</i>	-----	2	See Page 8-16
2	<i>Main Module</i>	-----	1	See Page 8-22
3	6x32 1.25	D 6291-5	2	
4	Torx Screw	D 6315-2	24	
5	Output Pad	D 7060-3	2	
6	Bottom Cover	F11705J4	1	
7	Screw	D 7601-5	6	
8	Transformer	D 7102-3	1	

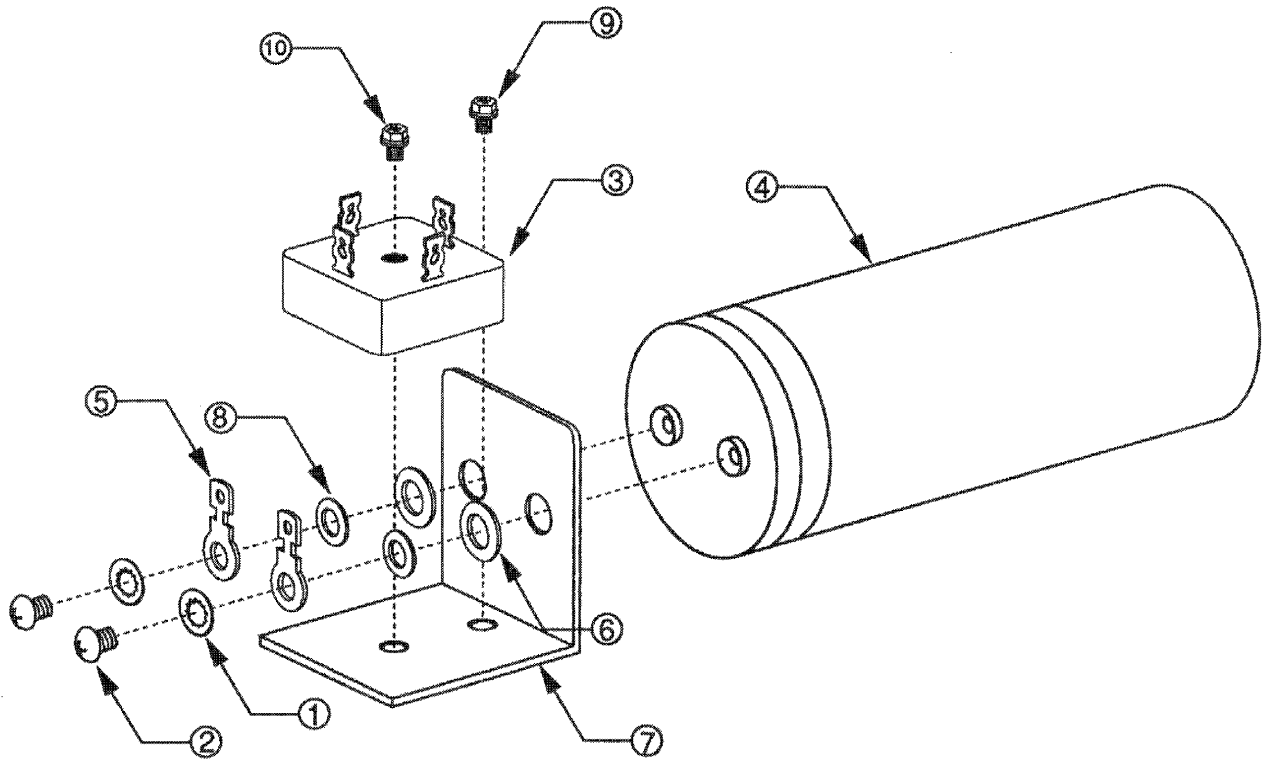


Fig. 7.3 Capacitor Assembly

CAPACITOR ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	Lockwasher	C 6860-8	2	
2	10-32 X .37 TRHD	C 4013-6	2	
3	35A Bridge Rectifier	C 4305-6	1	
4	6300 μ FD 150V	C 7068-7	1	
5	Solder Lug	D 2934-4	2	
6	Shoulder Washer	D 6764-1	2	
7	Capacitor Bracket	F10866-6	1	
8	Fiber Washer	D 7142-9	2	
9	.320 Hex Tri-Lob	D 6291-5	1	
10	6 x 32 x .75 Hex	C 6964-8	1	

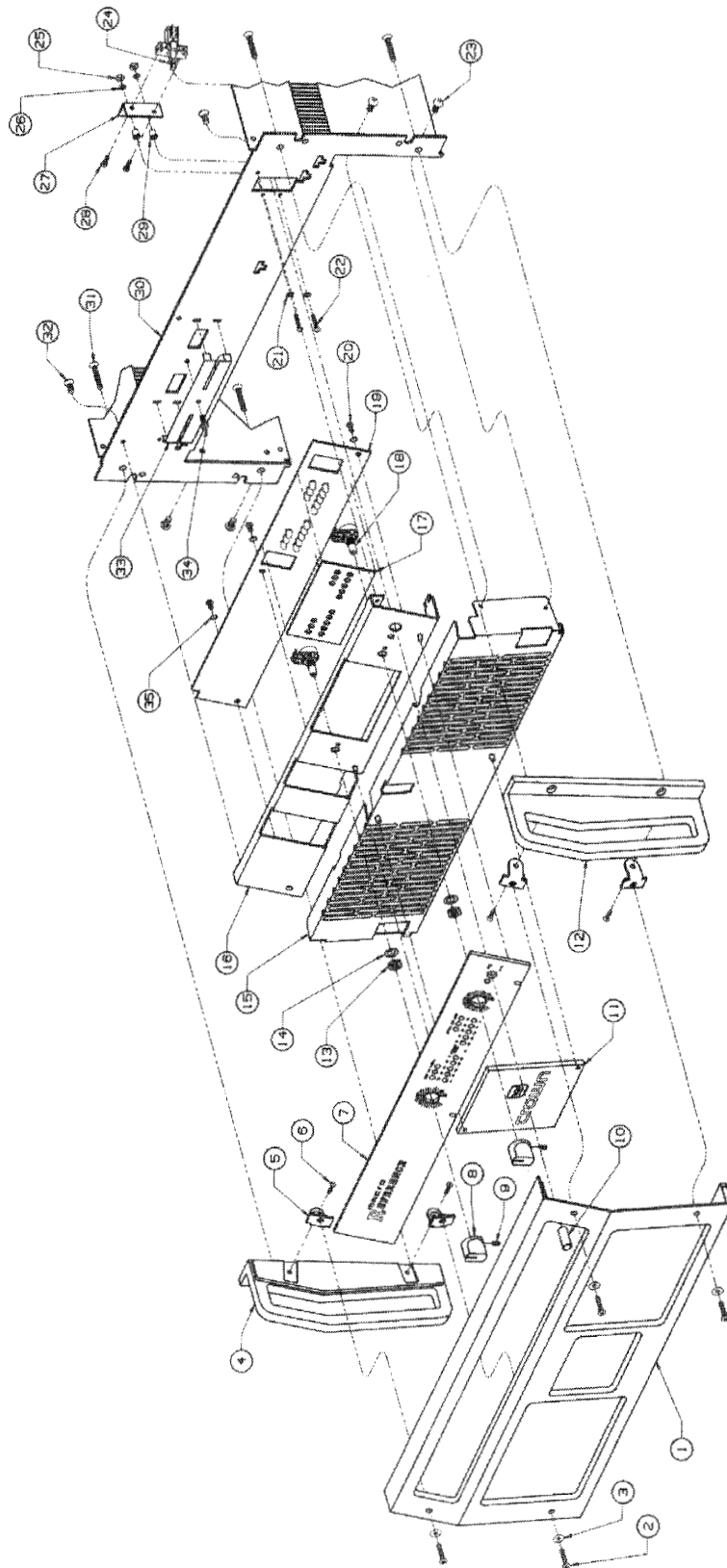


Fig. 7.4 Front Panel Assembly

FRONT PANEL ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	Front Panel	F11712J0	1	
2	8-32X.625 Screw	C 7828-4	4	
3	Nylon Washer	D 7317-7	4	
4	MR Left Handle	F11796J3	1	
5	Handle Mounting Bracket	M20921J8	2	
6	8-32 X .25 Fthd Ph	C 2136-7	2	
7	Front Panel Inset	- D 7430-8	1	
8	MR Level Control Knob	F11736J9	2	
9	6/32 x .18 Slug	C 6005-0	2	
10	On/Off Pushbutton	F11738J5	1	
11	Lower Front Panel Inset	- H43122-3	1	
12	MR Right Handle	F11795J51	1	
13	Level Control Hardware		2	Comes with Level Control
14	Level Control Hardware		2	Comes with Level Control
15	7" Finger Guard	M20881J4	1	
16	Display Board Bracket	M20971-4	1	
17	Display Board Insulator	F11787-3	1	
18	Level Control (5K ohm)	C 8401-9	2	
19	Display Module	Q42835-1	1	
20	6-32 x .3125 Screw	C 7009-1	3	
21	Lockwasher	C 1824-9	2	
22	4-40 x .62 Screw	C 3334-7	2	
23	6-32 x .437 Screw	C 7601-5	4	
24	On/Off Switch	C 5958-1	1	
25	4 x 40 Nut	C 1938-7	2	
26	Lockwasher	C 1824-9	2	
27	Power Switch Bracket	F11907-7	1	
28	4-40 x .375 Screw	C 5961-5	2	
29	6-32 x .625 Screw	C 8094-2	2	
30	MR Chassis	M20876J4	1	
31	8-32 x .5 Screw	C 8238-5	4	
32	6-32 x .437 Screw	C 7601-5	2	
33	Fishpaper Holder	F11787-3	1	
34	6-32 x .437 Screw	C 7601-5	1	
35	Star Washer	C 5594-4	3	

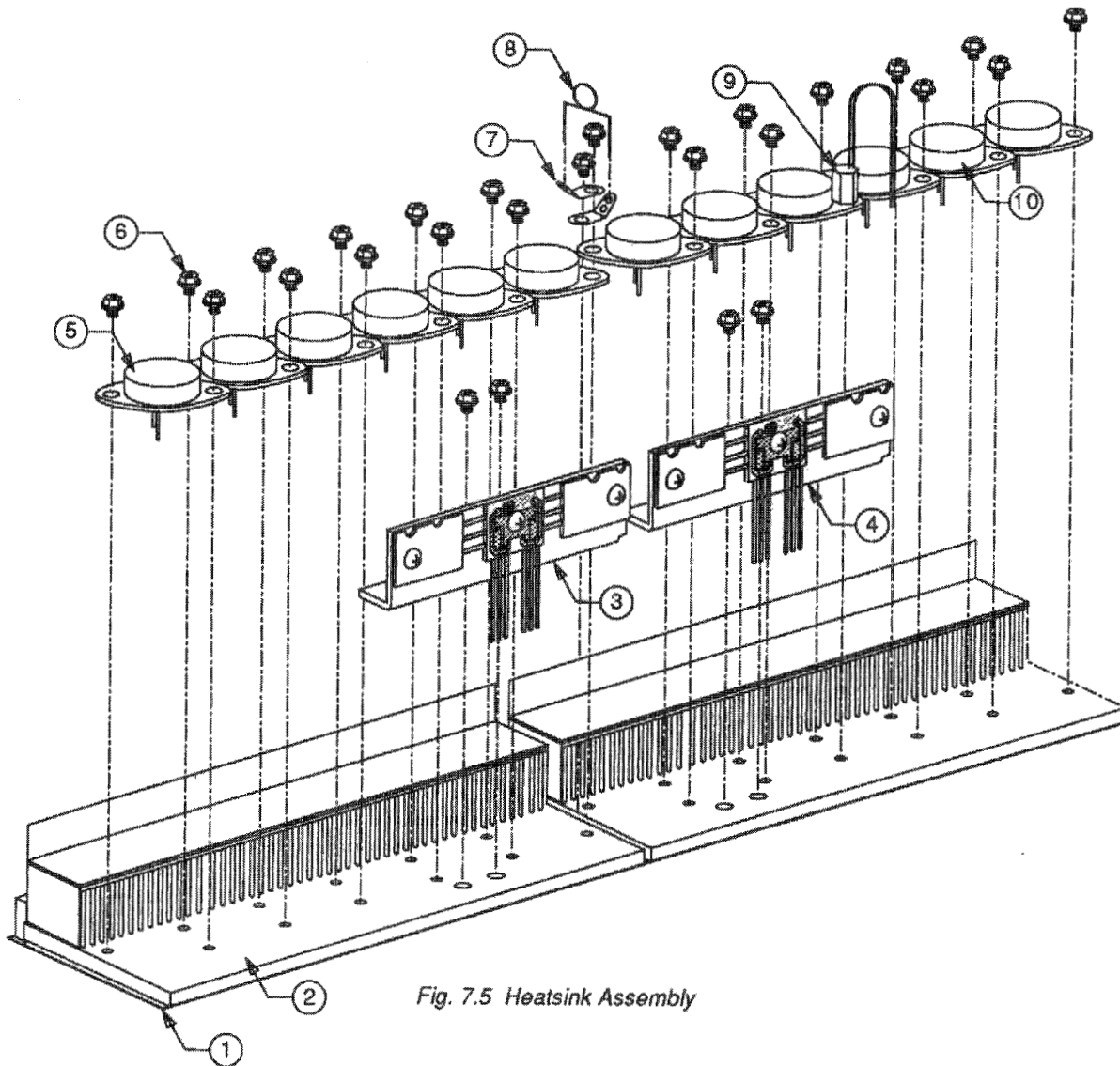


Fig. 7.5 Heatsink Assembly

HEATSINK ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	Silpad	D 6280-8		See Page 7-8 See Page 7-8 (MJ15003)
2	Heatsink	M20538-1		
3	NPN Driver Assembly	M44629-0		
4	PNP Driver Assembly	M44630-8		
5	NPN Output Device	D 6729-4		
6	6-32 X.235 Torx	D 6315-2		
7	Solder Lug	C 3163-0		
8	.01 MF 500V	C 7697-3		
9	PTC 95° C	D 6591-8		
10	PNP Output Device	C 7065-3		

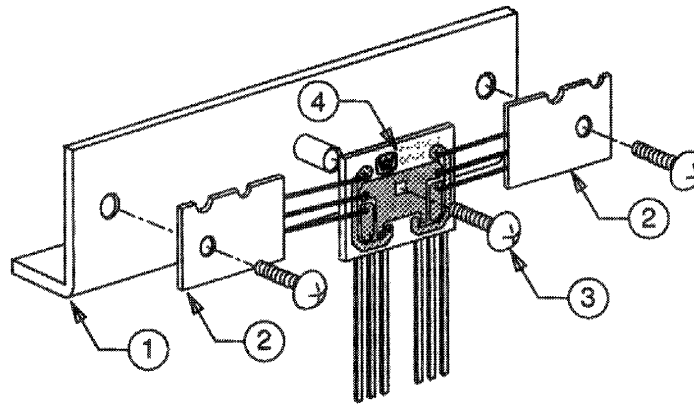


Fig. 7.6 Driver Transistor Assembly

DRIVER TRANSISTOR ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	NPN Driver Assembly	M44629-0	1	
1a	Driver Adapter Plate	M20840-1	1	
2a	2SC4029 NPN	C 8159-3	2	
3	6-32 X .3125	C 7009-1	3	
4	Driver Adapter #2	P10264-3	1	
1	PNP Driver Assembly	M44630-8	1	
1a	Driver Adapter Plate	M20840-1	1	
2b	2SA1553 PNP	C 8186-6	2	
3	6-32 X .3125	C 7009-1	3	
4	Driver Adapter #2	P10264-3	1	
	* Driver assembly is the same for both NPN and PNP stages. Only the transistor types differ.			

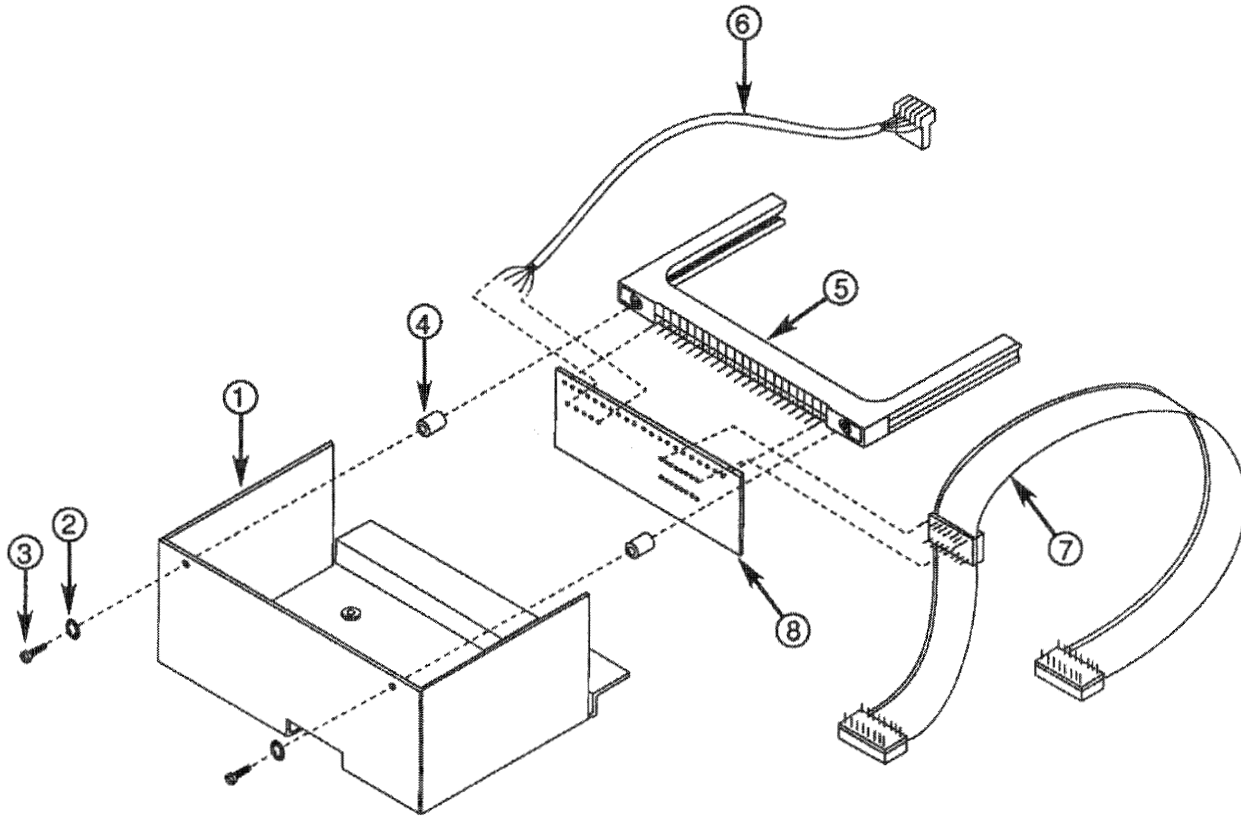


Fig. 7.7 P.I.P. Cage Assembly

P.I.P. CAGE ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	P.I.P. Card Shield Asm	F10777J3	1	
2	#4 Int.Star Lock	C 1824-9	2	
	Washer			
3	4-40 X .62	C 3334-7	2	
4	.25X.14X.375 RD SPC	C 6431-8	2	
5	22 Contact Edge Connector	C 6821-0	1	
6	P.I.P. Cable Assembly	D 6626-2	1	
7	P.I.P. Ribbon Conn.	D 6899-5	1	
8	P.I.P. Brd. Intercon.	P10094B0	1	

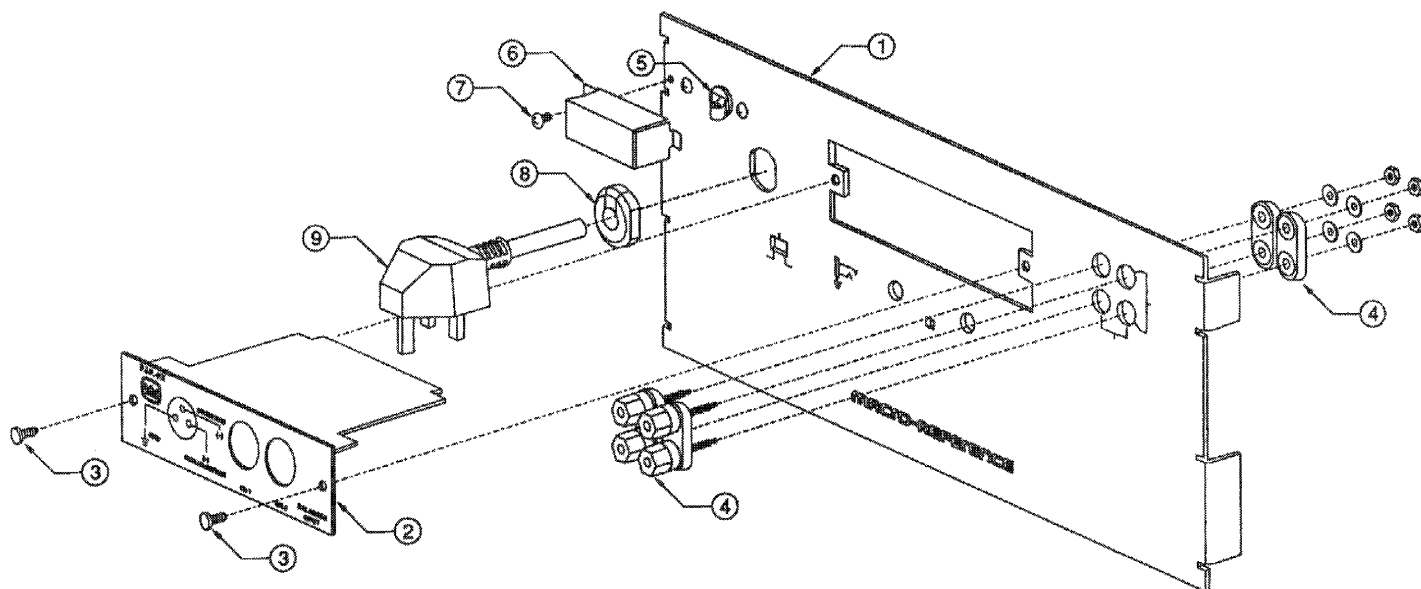


Fig. 7.8 Back Panel Assembly

BACK PANEL ASSEMBLY

ITEM#	DESCRIPTION	PART #	QTY	NOTES
1	Back Panel	M20803J8	1	
2	P.I.P.-FX Card	M44018-6	1	
3	6-32 x .437 Screw	C 7601-5	2	
4	Dual Binding Post	C 8013-2	2	
5	30A Circuit Breaker	C 7756-7	1	
6	Circuit Breaker Cover	F 11624J7	1	
7	6-32 x .437 Screw	C 7601-5	1	
8	Strain Relief	C 7315-2	1	
9	Power Cord	D 7538-8	1	

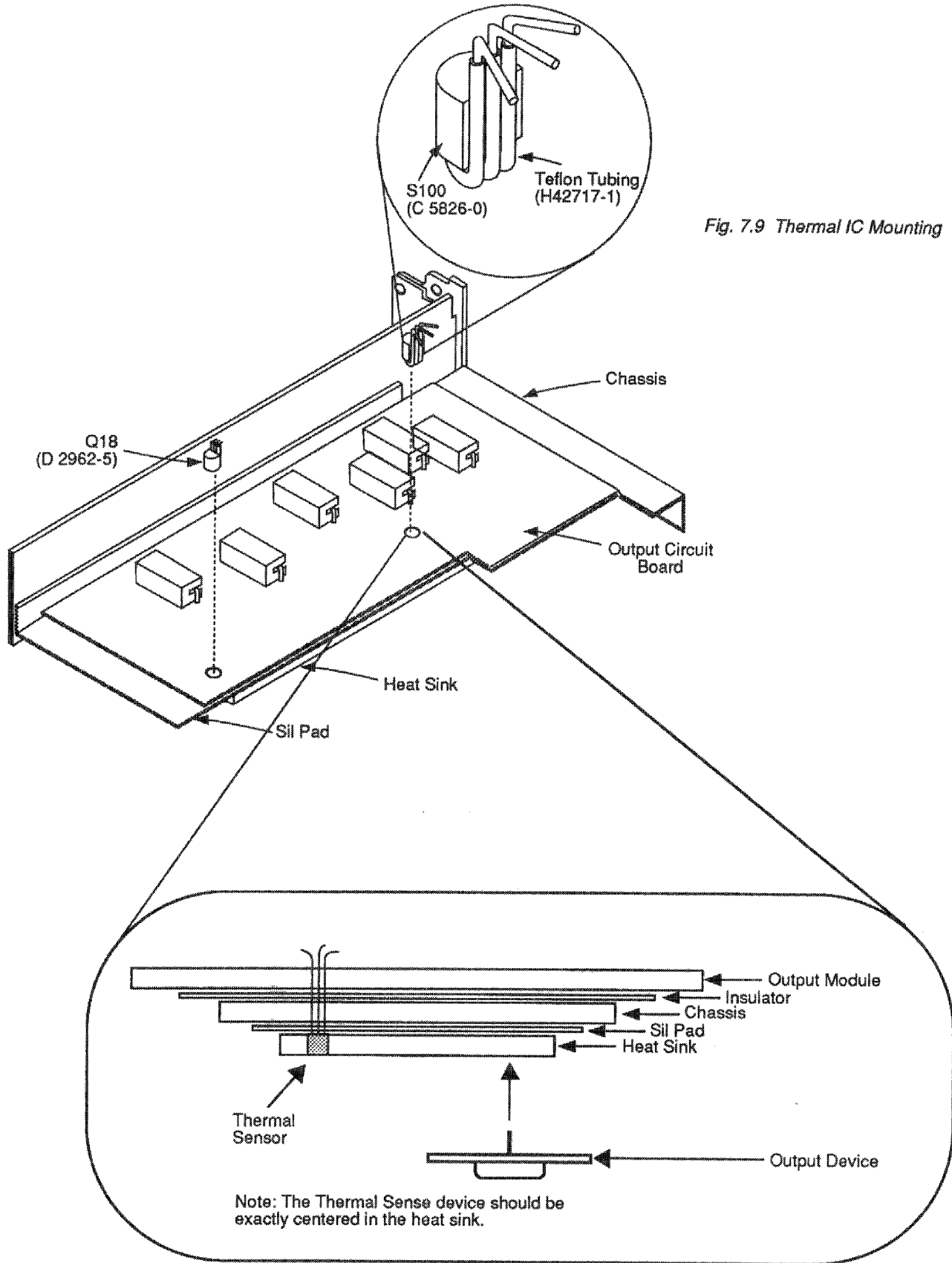


Fig. 7.9 Thermal IC Mounting

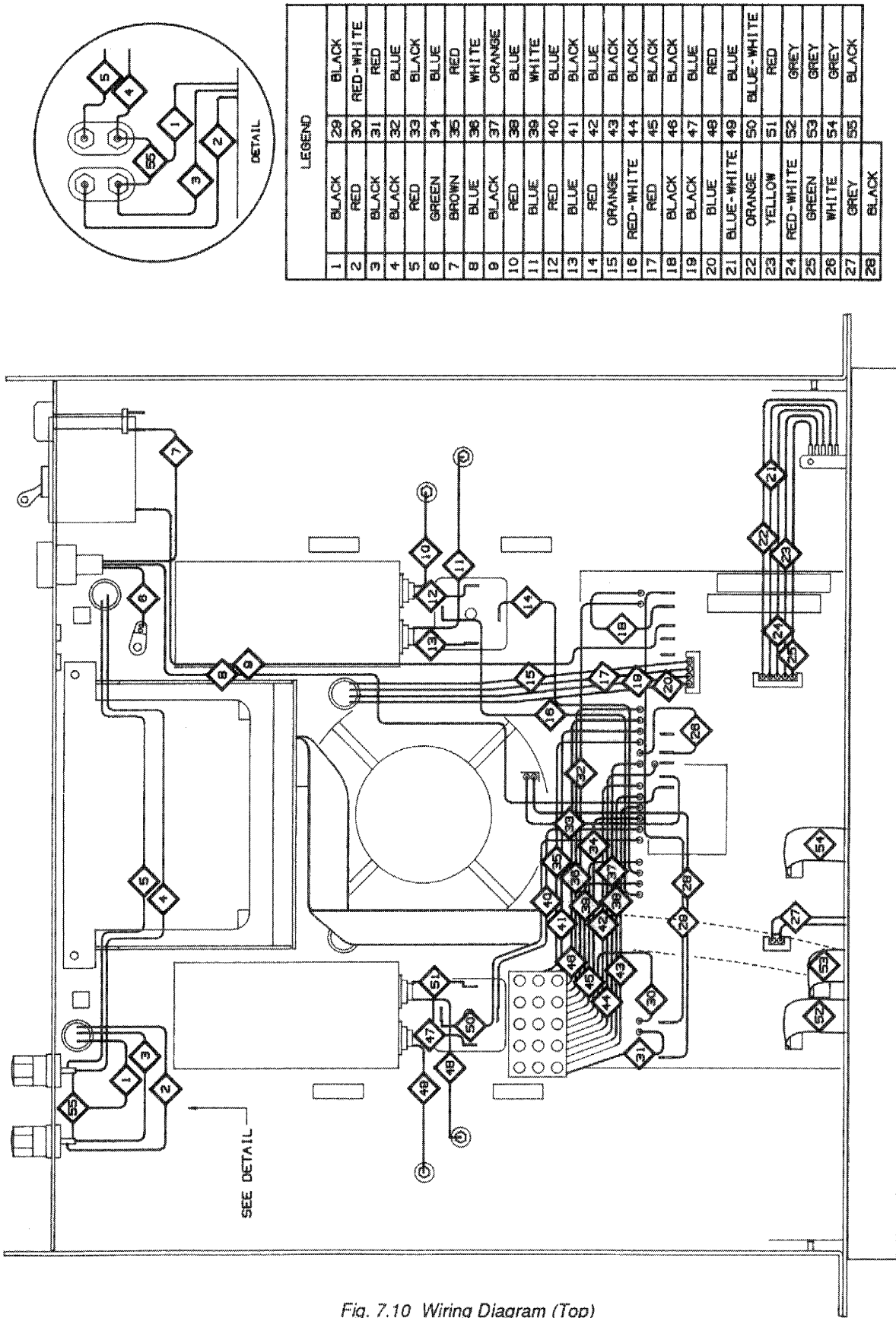


Fig. 7.10 Wiring Diagram (Top)

LEGEND	
1	GREY
2	GREY
3	GREY
4	BLACK
5	RED
6	GREY
7	GREY
8	GREY
9	BLUE
10	RED
11	BLACK
12	ORANGE
13	GREY
14	BLACK
15	RED
16	GREY
17	GREY
18	BLACK
19	BLACK
20	BLACK
21	BLACK
22	BLACK
23	GREY
24	GREY
25	GREY
26	BLACK
27	RED
28	GREY
29	GREY
30	BLACK
31	RED-WHITE
32	RED-WHITE

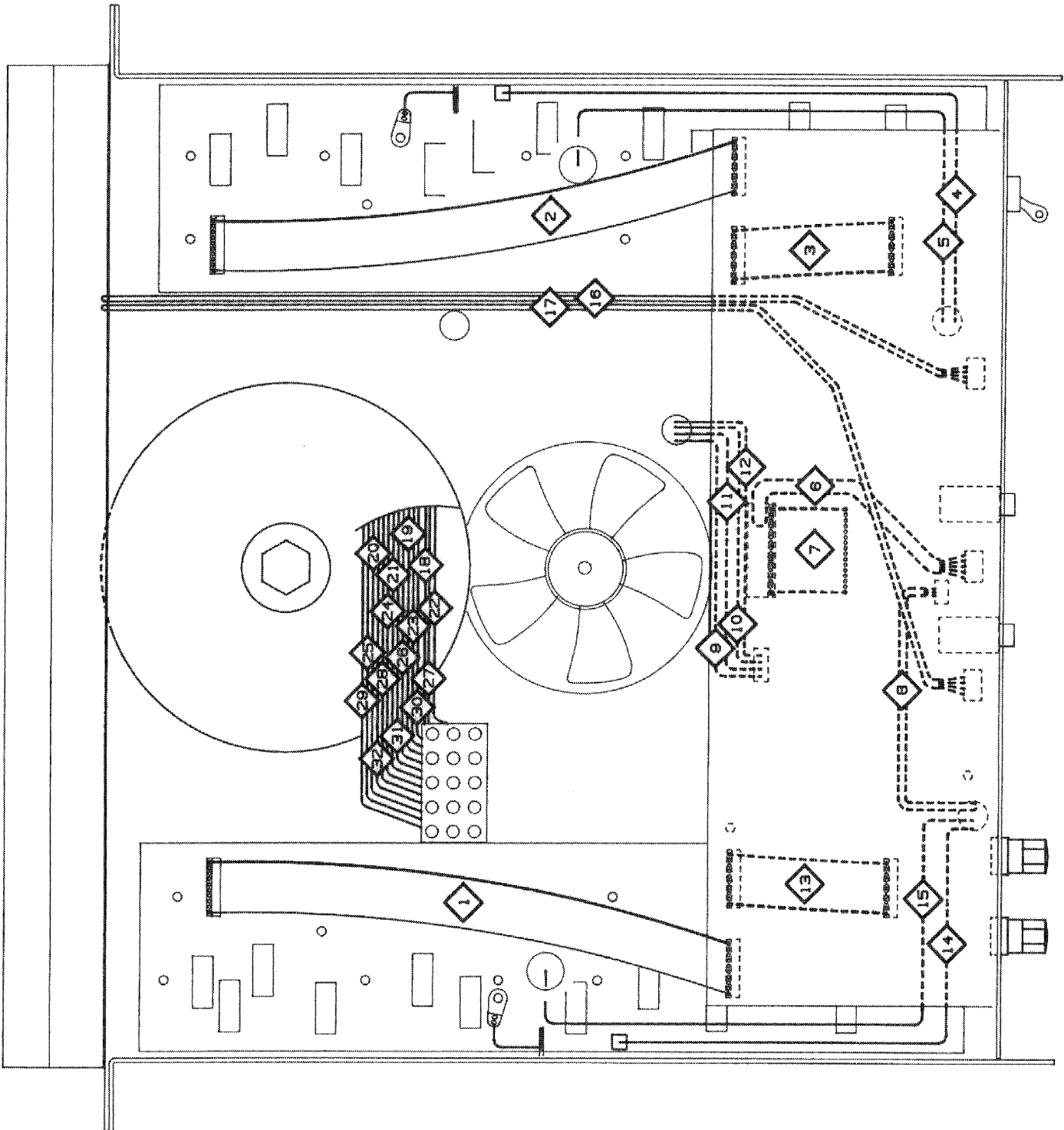


Fig. 7.11 Wiring Diagram (Bottom)

8 MODULE ARTWORK

The *Modules* section of this service manual is the compilation of artwork and circuit board layouts for the module found within the Model amplifier. For schematic diagrams see section 6 and for chassis parts drawings along with parts lists see section 7.

Note: A blank space in the right column of the following parts list means the component is the same as on the module listed immediately to the left!