

Technical Manual



JBL MPA600

SPECIFICATIONS

	4 ohm/ch	8 ohm/ch	8 ohm/Br	4 ohm Br
Rated Power:	600 W	400 W	1200 W	—
Midband Power:	674 W	450 W	—	1600 W
Rated Power:	is minimum continuous sine wave output per channel, with both channels driving their rated load over a power bandwidth of 20 Hz to 15 kHz, as the amplifier's output protective circuitry prevents full power output above 15 kHz. THD = 0.1%.			
Midband Power:	is maximum output power per channel @ 1 kHz, with both channels driven to the onset of clipping. THD > 1%.			
Distortion:	SMPTE-1M, less than 0.05%			
Frequency Response:	20 Hz to 20 kHz, ± 0.1 dB 8 Hz to 100 kHz, +0/-3 dB			
Damping Factor:	Greater than 200			
Dynamic Headroom:	3 dB at 4 ohms			
Noise:	100 dB below rated output (20 Hz to 20 kHz)			
Sensitivity:	1 Vrms for rated power (8 ohms)			
Voltage Gain:	56 (35 dB)			
Input Impedance:	Line: 10 kilohms unbalanced, 20 kilohms balanced			

Controls: Front: AC switch, Ch. 1 & Ch. 2 Gain (2 dB detents)
Rear: Mode select switch (Bridge, Parallel, Stereo)

Indicators: Power, Signal Present (2), -20 dB (2), -10 dB (2), Clip (2), Protect (2)

Connectors: Input: Barrier Strip & XLR connectors
Output: 5-Way Binding Posts & Neutrik Speakons

Cooling: Continuously variable speed fan, rear-to-front air flow

Amplifier Protection: Full short circuit, open circuit, ultrasonic, and RF protection; thermal limiting/muting; stable into reactive or mismatched loads

Load Protection: On/Off muting, clip limiting, DC-fault load-grounding relay with internal fault fuses

Output Circuit Type: Complementary 2-step linear high efficiency outputs

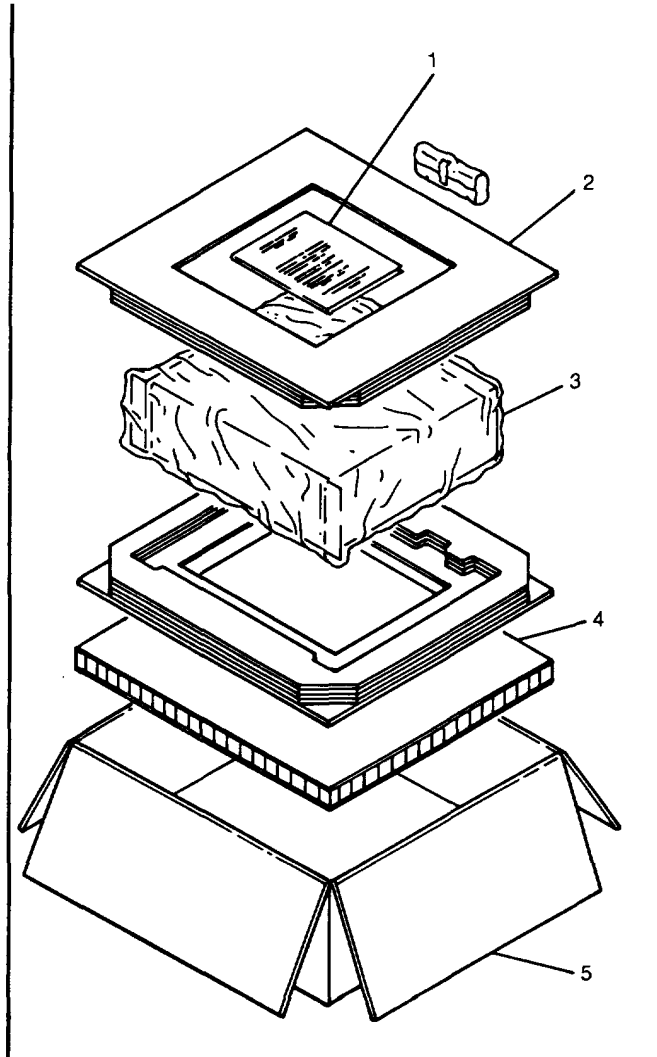
Power Requirements: 100, 120, 220-240 VAC, 50-60 Hz

Power Consumption: Please refer to chart in MPA Series Owner's Manual

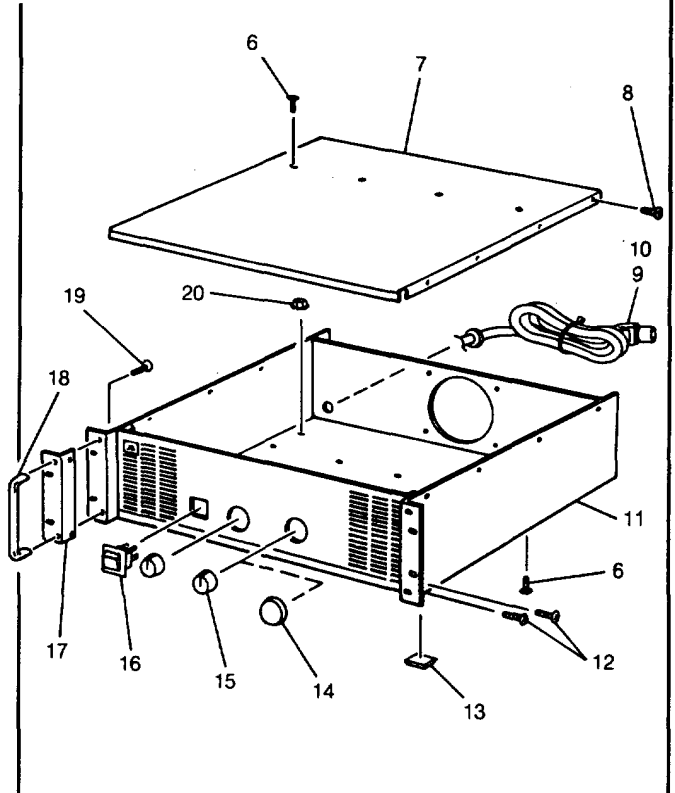
Dimensions: 48.3 cm (19") rack mounting
45.5 cm (17.9") deep (rear support ears)
8.9 cm (3.5") high (2 spaces)

Weight: 20 kg. (44 lbs.) net, 22.2 kg. (49 lbs.) shipping

PACKAGE



CABINET COMPONENTS



COMPONENT PARTS LIST

Item	Part No.	Qty.	Description	Ref. Des.
COMPLETE ASSEMBLIES				
A	WP-004106-00	1	AC PCB Ass'y, MPA 2 spc	
C	FG-004102-00	2	Main PCB Ass'y, MPA600	
D	WP-004108-00	1	Output PCB Ass'y, MPA 2 spc	
E	WP-004005-01	1	Std. Input PCB Ass'y, MPA Series	
G	WP-002753-00	1	Display PCB Ass'y, MPA Series	

JBL MPA600 REV B

JBL MPA600

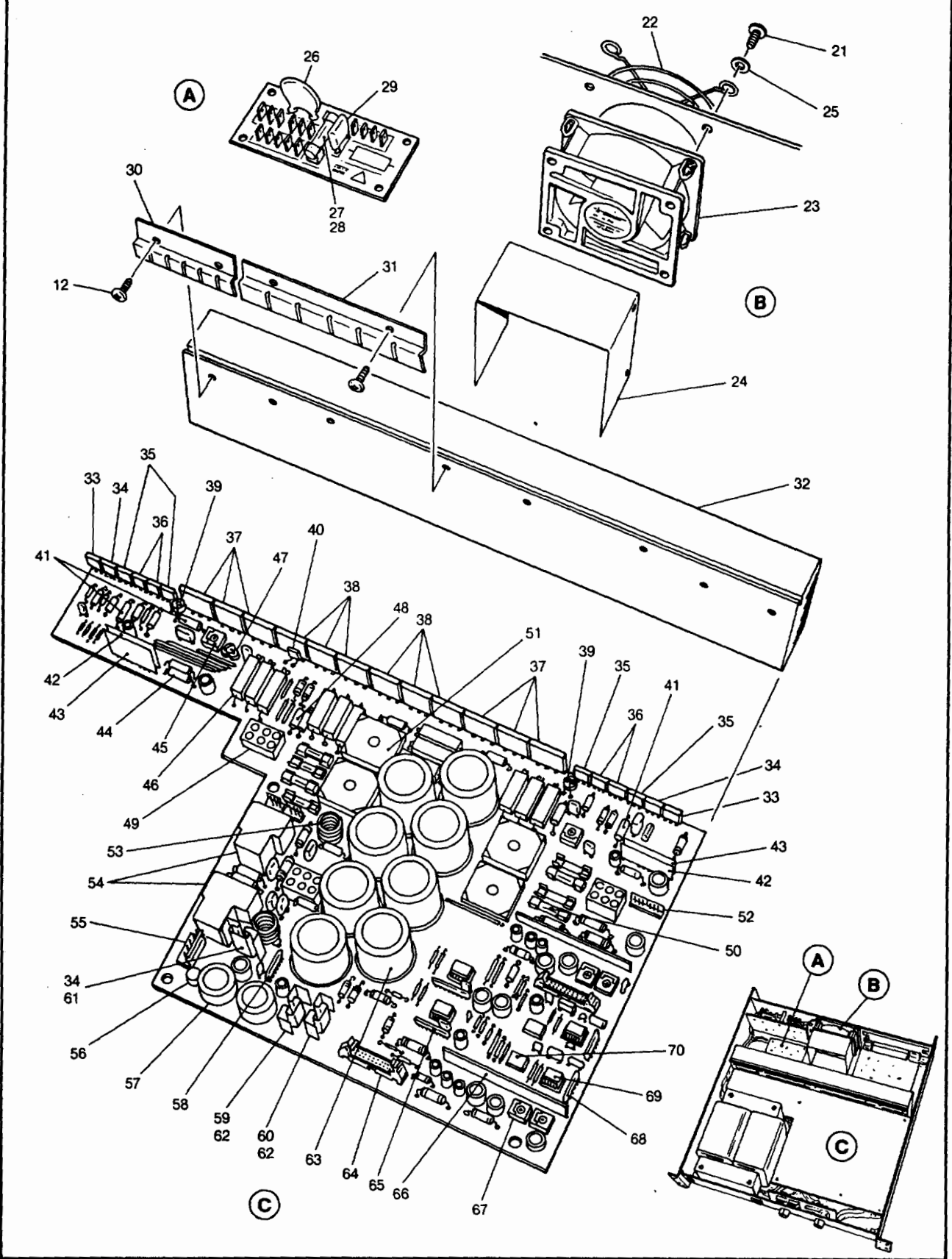
COMPONENT PARTS LIST

Item	Part No.	Qty.	Description	Ref. Des.
INDIVIDUAL ASSEMBLIES				
0	MPA-MPA SVC	1	MPA Service Manual	
1	TD-007500-00	1	Owner's Manual, MPA Series	
2	PM-004003-00	2	Shipping Insert	
3	PM-004000-00	1	Shipping Bag	
4	PM-004001-00	1	Shipping Pad	
5	PM-002750-00	1	Shipping Carton, MPA 2 spc	
6	SC-082051-PL	10	Scrw, Tap, PHP, 8 x 5/16", Blk	
7	CH-002750-00	1	Top Cover	
8	SC-083061-PF	9	Scrw, #8 x 3/8", FHP, Blk	
9	WC-003053-00	1	AC Cord (100/120V)	
10	WC-003069-00	1	AC Cord (230V)	
11	CH-002751-00	1	Chassis, MPA 2 spc	
12	SC-100061-PS	8	Scrw, 10-32 x 3/8", PHP, SEMS, Blk	
13	PL-000000-AF	4	Adhesive Foot	
14	PL-002753-00	2	Security Cover	
15	PL-002752-00	2	Knob, MPA Series	
16	SW-002750-00	1	Power Switch	
17	CH-002752-00	2	Rack Ear, MPA 2 spc	
18	CH-002753-00	2	Handle, MPA 2 spc	
19	SC-100000-SC	4	Scrw, 10-32 x 1/4", PPH, Blk	
20	NW-080500-KP	11	8-32 Keps Nut	
21	PL-000045-PL	4	Rivet, Plastic, Screw Type	
22	MS-000071-00	1	Fan Guard, MPA 2 spc	
23	MS-000052-MS	1	3.5" Fan, 24 VDC	
24	PL-000018-00	1	Fan Shroud	
25	NW-080002-00	4	Washer, #8 Flat	
26	RE-000170-NR	1	Thermistor, NTC, 30A Cur. Lim (100 & 120V models only)	R901
26	RE-000160-NR		Thermistor, NTC, 15A Cur. Lim (230V models only)	R901
27	MS-000055-MS	1	Fuse, 30A, 250V (100 & 120V models only)	F901
28	MS-150250-FU	1	Fuse, 15A, 250V (230V models only)	F901
29	CA-368250-AS	1	Cap, Surge, 0.068 μ F 250VAC	C901
30	CH-400003-00	2	Clamp, TO-220	
31	CH-000624-AX	2	Clamp: T03, 6 Finger	
32	CH-410008-00	1	Heatsink, MPA 2 spc	
33	QD-000019-QD	2	Xstr, PNP TO-220, 230V, 1A	Q501, Q601
34	QD-000018-QD	3	Xstr, NPN TO-220, 230V, 1A	Q51, Q502, Q602
35	QD-000810-DX	4	Diode, Rectifier, TO-220, 100V, 8A	D501, D502, D601, D602
36	QD-000031-QD	4	FET, NCHAN, TO-220, 60V, 50A	Q503, Q504, Q603, Q604
37	QD-003281-NP	6	Xstr, NPN, TO-3P, 200V, 15A	Q505, Q506, Q507, Q605, Q606, Q607
38	QD-001302-PN	6	Xstr, PNP, TO-3P, 200V, 15A	Q508, Q509, Q510, Q608, Q609, Q610
39	QD-004004-VP	4	Diode, D041, 400V, 1A	D505, D506, D605, D606
40	RW-000006-VP	2	Res., PTC, 60C, 0.1K max cold	R598, R698
41	RE-27005-EM	4	Res., MF, 2.7, 5%, 2W	R509, R512, R609, R612
42	IC-000009-00	2	SMT Module, Neg. Step Driver	U502, U602
43	IC-000008-00	2	SMT Module, Pos. Step Driver	U501, U502
44	RE-130005-EM	4	Res. MOFP, 3K, 5%, 2W	R514, R526, R614 R626
45	PT-110000-AT	2	Var. Res., 100, 20%, 0.15W	VR501, VR601

Item	Part No.	Qty.	Description	Ref. Des.
46	RE-02205-FW	24	Res., WW, 0.22, 10%, 3W	R515, R516, R517, R520, R521, R522, R615, R616, R617, R620, R621, R622
47	RE-000050-NR	2	Thermistor, NTC, 50 ohm	R599, R699
48	QD-005402-DX	4	Diode, Rectifier, D027, 200V, 3A	D507, D508, D607, D608
49	CO-000047-CO	3	Header, Vert. Pin, 6p	J52, J501, J601
50	MS-15.125-MS	8	Fuse, 15A, 125V, 5mm x 20mm	F501-504, F601-604
51	QD-400400-BX	4	Diode, Bridge Rect., 400V, 40A	BR501, BR502, BR601, BR602
51	CO-000074-00	2	Header, Polarized, 8p	J502, J602
53	XF-200014-CR	2	Inductor, 2 μ H, 14 AW	L501, L601
54	SW-000029-SW	2	Relay, Spkr Prot., SPDT, 24 VDC	K501, K601
55	CO-000046-CO	1	Header, .156, 5p	J51
56	QD-1.5200-BX	1	Diode, Bridge Rect., 200V, 1.5A	BR51
57	CA-822035-AE	2	Cap, EL, 2200 μ F 35V	C53, C54
58	RN-127002-BM	1	Res. Ntwk., 8 pin SIP, 2.7K	RN51
59	QD-007815-QD	1	Regulator, Pos 15V, TO-220	U52
60	QD-007915-QD	1	Regulator, Neg 15V, TO-220	U51
61	MS-000048-HS	1	Heatsink, TO-220 Isol.	
62	MS-001220-HS	2	Heatsink, TO-220 AAVID 5939B	
63	CA-912063-AE	8	Cap, EL, 12000 μ F 63V	C508, C509, C510, C511, C608, C609, C610, C611
64	CO-000055-CO	2	14p Header/Locking Std.	J503, J603
65	RN-110002-BM	2	Res. Ntwk., 8p, SIP, 1K	RN502, RN602
66	IC-000010-00	2	SMT Module, Housekeeping	U503, U603
67	PT-250000-AT	4	Res., Var., 5K, 20%, 0.15W CF	VR502, VR503, VR602, VR603
68	RN-210002-BM	2	Res. Ntwk., 8p, SIP, 10K	RN501, RN601
69	IC-005532-OP	4	IC, Dual OpAmp, NE5532	U505, U506, U605, U606
70	QD-000009-VT	2	Vactrol VTL5C4	U504, U604
71	CO-000001-DB	2	Dual 5-Way Binding Post	
72	HW-060150-SO	2	Standoff, 6-32 x 29/32"	
73	NW-100700-NW	4	#10 Flat Washer	
74	NW-100710-NW	4	#10 Ext. Flatwasher	
75	SC-100000-SC	4	Scrw, 10-32 x 1/4", PPH, Blk	
76	SC-060042-PP	5	Scrw, 6-32 x 1/4", PHP, SEMS, Blk	
77	CO-000036-CO	3	Neutrik Speakon, 4p, PC mt	J74, J706, J806
78	CA-147100-BD	2	Cap, Ceramic, 470pF 100V	C701, C801
79	CH-400016-00	1	Blank Upper Input Panel	
80	SC-080051-PS	4	Scrw, 8-32 x 5/16", PHP, SEMS, Blk	
81	CO-000035-CO	1	Barrier Strip, Rt. Angle, PC mt	J31
82	SW-000041-SW	1	DPDT Toggle Sw, Rt. Angle, PC mt	SW31
83	SC-030000-SC	4	Scrw, 3mm x 4mm, PHP, Blk	
84	NW-04041-NW	4	#4 Flat Washer	
85	CO-000037-CO	2	XLR Recept., Horiz., PC mt	J301, J401
86	CO-000049-CO	1	5p Header, 0.1 ctr	J33
87	CO-000057-CO	1	26p Header/Locking Std.	J32
88	XF-001000-00	1	Xfmr, MPA400	
89	SC-100061-PS	4	Scrw, 10-32 x 3/8", PHP, SEMS, Blk	
90	CO-000043-CO	1	Box Header, 26p	J1
91	WC-000026-WC	1	26p Ribbon Cable Ass'y	
92	CO-000044-CO	2	Box Header, 14p	J101, J201
93	WC-000015-WC	2	14p Ribbon Cable Ass'y	

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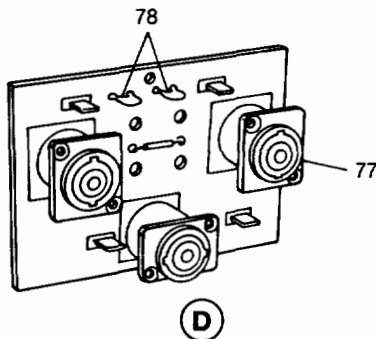
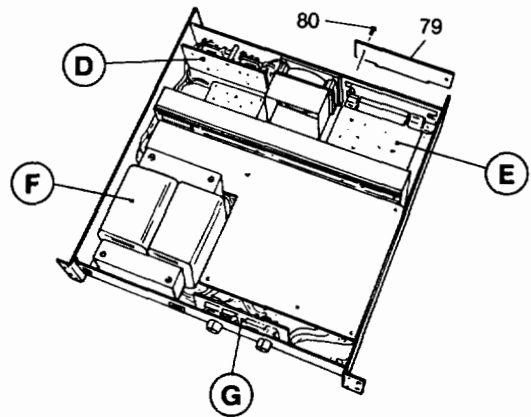
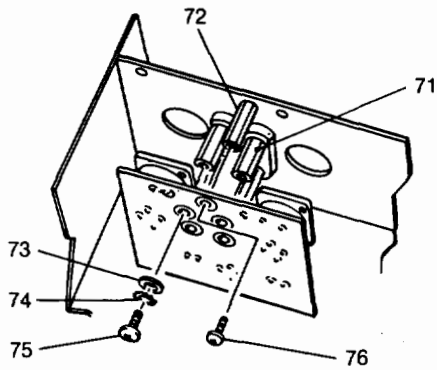
COMPONENT EXPLODED VIEW



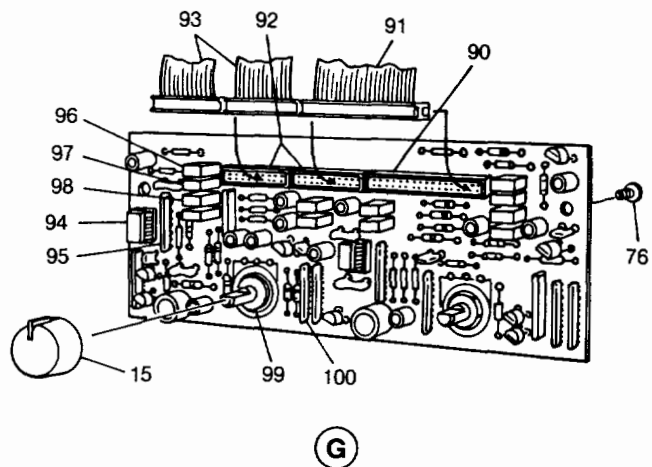
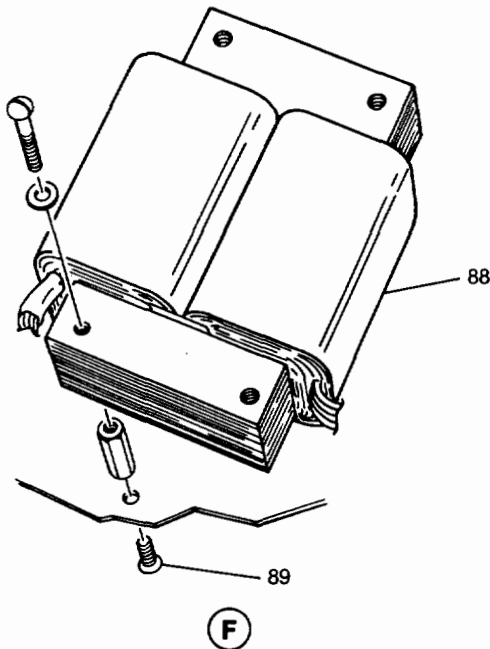
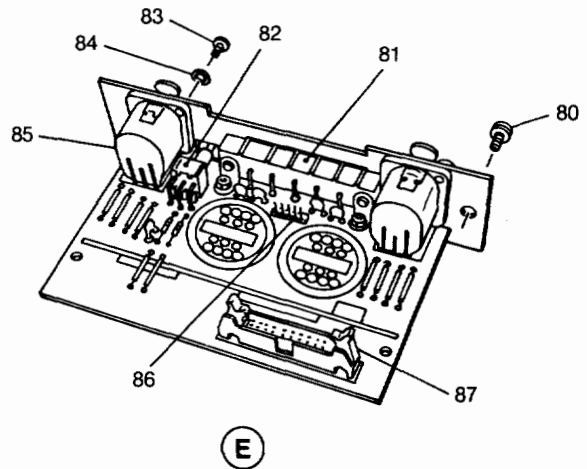
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CIRCUIT BOARDS



Front and Rear View



JBL MPA600 COMPONENT PARTS LIST

Item	Part No.	Qty.	Description	Ref. Des.
94	IC-000012-00	2	IC, Dual OpAmp, OP275	U101, U201
95	RN-210002-BM	4	Res. Ntwk., 8p, SIP, 10K	RN101, RN102 RN201, RN202
96	QD-002750-00	4	LED, Red, .125" x .245", Capped	LD101.1, LD103.1, LD201.1, LD203.1
97	QD-002752-00	2	LED, Yellow, .125" x .245", Capped	LD101.2, LD201.2

Item	Part No.	Qty.	Description	Ref. Des.
98	QD-002751-00	6	LED, Green, .125" x .245", Capped	LD102.1, LD102.2, LD103.2, LD202.1, LD202.2, LD203.2
99	PT-310000-CR	2	Potentiometer, 10K, 0.2W	VR101, VR201
100	RN-110002-BM	4	Res. Ntwk., 8p, SIP, 1K	RN103, RN104, RN203, RN204

MPA Series Power Amplifiers

General Test Procedures

Test Procedure

Test Equipment Requirements & Set-Up

Connect a test load to the output terminals of the amplifier. Test loads must handle at least 200W-8 Ω , 300W - 4 Ω , and 400W - 2 Ω .

Connect a distortion analyzer with a resolution of 0.05%, 20-20kHz or better to the output terminals of the amplifier.

Connect the output of a signal generator to the input terminals of the amplifier, and select an output voltage of 1 Vrms @ 2kHz.

Connect a dual channel oscilloscope to the following test points:

- - a 10x scope probe to the channel speaker output - sensitivity 2V/cm
- - a 1x scope probe to the distortion analyzer output - sensitivity 0.1V/cm

Ground the oscilloscope and distortion analyzer to the amplifier's input ground.

Power Up

Set the amplifier's gain controls to full clockwise.

Slowly increase the variac voltage and watch for excessive current draw (Line current greater than 0.75 amps at 120V.) NOTE: MPA 750 & 1100 - make sure the fan is ON by the time line voltage reaches 120VAC. MPA 275, 400, & 600 - fan will remain off until unit heats up.

Turn the unit on and off several times to verify the 1.5 second power-up delay-

Check both channels for normal output signal.

Bias Adjustment

Apply a 20kHz input signal and select an 8 Ω output load.

Adjust the input signal or CH1 gain control for an output level of 20dB below full output.

Using the analyzer's distortion output, set the crossover trimpot TR3 (a&b) for a crossover spike barely

protruding from the noise signal. (distortion must be less than 0.08% THD.) Repeat for channel two.

Set the output loads to 4 Ω and verify that the output distortion is less than 0.1%.

NOTE: If a distortion analyzer is not available, a less accurate distortion setting can be made by monitoring the driver transistor bias current. With the unit at operating temperature and no input signal, adjust TR3 (a&b) to obtain a voltage of 90mVDC across the emitter resistors of the drivers.

2 Ω Short Circuit

Select a 4 Ω load and verify even clipping on both channels. Select a 2 Ω load, which will show substantial clipping. Adjust the GAIN control to the threshold of clipping. Adjust trimpots TR1 (a&b) and TR2 (a&b) for a small amount of current limiting at the peaks of the output waveform.

Apply a short circuit to the output of the channel. The AC line current draw should be approximately 3 - 4.5 amps (rms) per channel.

Frequency Response

Select an 8 Ω load on both channels. Note the output level just before clipping.

Note the exact 2kHz level, and compare it to the 20Hz and 20kHz output (20Hz -0.4dB max, 20 kHz -0.5dB typical, 1dB max.)

Thermal Shutdown

Set the oscillator frequency to 2kHz and short the output of both channels. The AC current draw should be between 5 and 6.5 amps. Do not allow the test to continue if the AC current rises above 9 amps. Recheck the bias setting if this occurs.

When the thermal shutdown occurs, verify an AC idle current of 0.75 - 1A. Allow the amplifier to cool down and recover from the thermal cycle. The amplifier must be able to recover into a 4 Ω load.

Return the output load impedance to 8 Ω .

crossover distortion (both often show some ringing,) and overall distortion.

•Signal distorted. with some high frequency oscillation on the waveform. usually worse at some particular point on the waveform:

This is often created by a change in the output impedance. Look for: open/short C914-916, 951 bad U901-902, or contaminated sockets

•Excessive crossover spike or oscillation at zero crossing:

Look for:

- shorted bias diodes D903-904
- defective trimpot VR901
- open pull up resistors on the output, R927 & R955

If the distortion is present with no output/no load, check the feedback components. The amplifier will not provide full power into a load. Look for:

- current limiting (VR902 & 903) set too low
- open output transistors (base-emitter or emitter-collector)
NOTE: check the driver transistor gain. Check voltage dropped across the output transistor emitter resistors, R927-928, with an input signal and an output load. Any resistor that has a significantly different voltage drop indicates a defect in the corresponding output transistor or the emitter resistor.
- shorted D951,965
- shorted FETs
- Bad step SMT board

•No output signal from a single channel with all power supplies balanced:

Often caused by a failure in the input circuitry.

- defective U901 - It is not practical to test the IC, but it is possible to check for signal presence at the input and output terminals of the IC
- damaged or defective resistor network RN909
- defective input connector or input wiring multi-conductor cable

Protection/Limiting Circuit Problems

NOTE: the output of these amplifiers is AC coupled through the filter capacitors. This eliminates the need for DC load protection. A PTC (Positive Temperature Coefficient) sensing resistor is mounted on the main heatsink. This component's resistance increases with increasing temperature. When the resistance of these temperature dependent resistors increases to approximately 10k Ω , the protection circuit will disable both channels. Look for:

- bad U901 -902, U101 (on display board)
- bad U910
- shorted Q934

U910 is an SMT board that houses most of the parts of the protection circuitry. If there is a problem with the board, the proper solution is to replace the board. This can be done, but extreme care must be given to this operation. There are delicate traces and eyelets that will be permanently damaged if this board is not removed properly, with the right desoldering equipment.

The protection circuit functions performed within this board are muting, thermal shutdown, DC, and high frequency shutdown. Refer to the schematic for the connect/sense pins on U910.

These pins have signals that monitor and control the status of the amplifier's protect and limit features. Pin T1 is powered by an unregulated power supply through B901. If one channel does not come out of mute, T1 may not be receiving the voltage necessary to bias the transistors in U910, leaving the channel disengaged via the output relay.

Troubleshooting Information

Please refer to the schematic diagrams for the component identification numbers used in this troubleshooting guide. The information provided in this section applies to all MPA Series Amplifiers.

Dead Channel (No Display Lights)

When all lights are out on a channel, this usually indicates a blown internal fuse on the power supply PCB. Replace this fuse with an appropriate fuse only. Be sure the AC cord is unplugged from the wall.

When a fuse is blown, it may be an indication of excessive current draw within the channel. After replacing a fuse, use a variac to power up the unit slowly to prevent immediately blowing the fuse again. See below for information regarding troubleshooting AC power supply problems.

Power Supply Problems

• **Stable, hard current draw: increases rapidly at only a few volts AC:**

The unit draws high current when the AC voltage is first applied (with signal but no load.) This indicates a short in the power supply. Remove the fuses for each channel, one at a time, to isolate the problem to an individual channel. Look for:

- shorted main bridge rectifier
- both supply clamping diodes (D907 & 908) shorted
- driver transistors shorted
- main output power transistors shorted
- shorted power supply capacitor(s): C929, 930, 935, 936 a&b

• **Medium-hard, fairly stable current draw, increasing more slowly, may reach 25-30VAC before current draw becomes excessive:**

The amplifier draws high current when the AC supply voltage is near 120VAC, but the current increases gradually as the supply voltage is increased. This indicates that the driver/output circuits are turning on due to incorrect biasing. Look for:

- shorted driver or output transistor
- shorted single-supply clamping diode, D6-7
- open bias diodes, D1-2, or resistive bias components, TR3 & R38
- poor FET isolation from the main heatsink via the Teksil insulator

• **Soft current draw, above 60VAC before current begins to increase, unit may pass signal:**

Unit draws high current when AC supply voltage is near 120VAC, but the current increases quickly as the supply

voltage passes through a breakdown point. This indicates that a component is failing from voltage breakdown (VCEO) or a low voltage component failure. Look for:

- severely maladjusted bias circuit
- severe oscillation, causing current drain, possibly caused by a defective feedback component
- one or both pull up resistors, R17-18, is open

• **Motor-Boating:**

A slow, pulsing 2-5 amp current draw may indicate a break in the bias circuit, often an open bias diode or a break in the circuit between diodes.

• **High voltage power supplies severely unbalanced:**

May be caused by either an AC feedback defect or a DC component failure. Begin by removing IC1 and remeasuring the power supplies. If the supplies are balanced with the op amp removed, the fault is in the feedback loop. Check op amps, U901 & 902, and FET switches, Q901-904 & 91 7-920.

If the DC supplies remain offset with the op amp removed, inspect the +/-15VDC supplies. If either one is at or near OV, the 15V zener, Z1 or 2, or the 15V capacitor is shorted. If both supplies are above 3-4 volts, check the op amp second stage output voltage and the driver transistor base voltages.

If the +/- high voltage supplies are both near 0 V, the power supply transformer or it's connections may be defective. Inspect the AC voltage at the transformer secondary connections on the 8 pin IDC connector, J2. If 45VAC is present on the secondary, inspect the supply fuse, F1. If the 45VAC is not present, the transformer or the IDC (Insulation Displacement Connector) may be defective.

• **Uneven Voltage Rails:**

- shorted D939-940, D953-954
- open FET switches

Signal Amplification Problems

• **Unstable Output:**

NOTE: Do not confuse instability with 120Hz noise in the signal, which evenly spreads the trace vertically. To find this signal, sync the oscilloscope to the AC line and reduce the scope sweep rate to 10 mS, and look for 60/120 Hz frequencies.

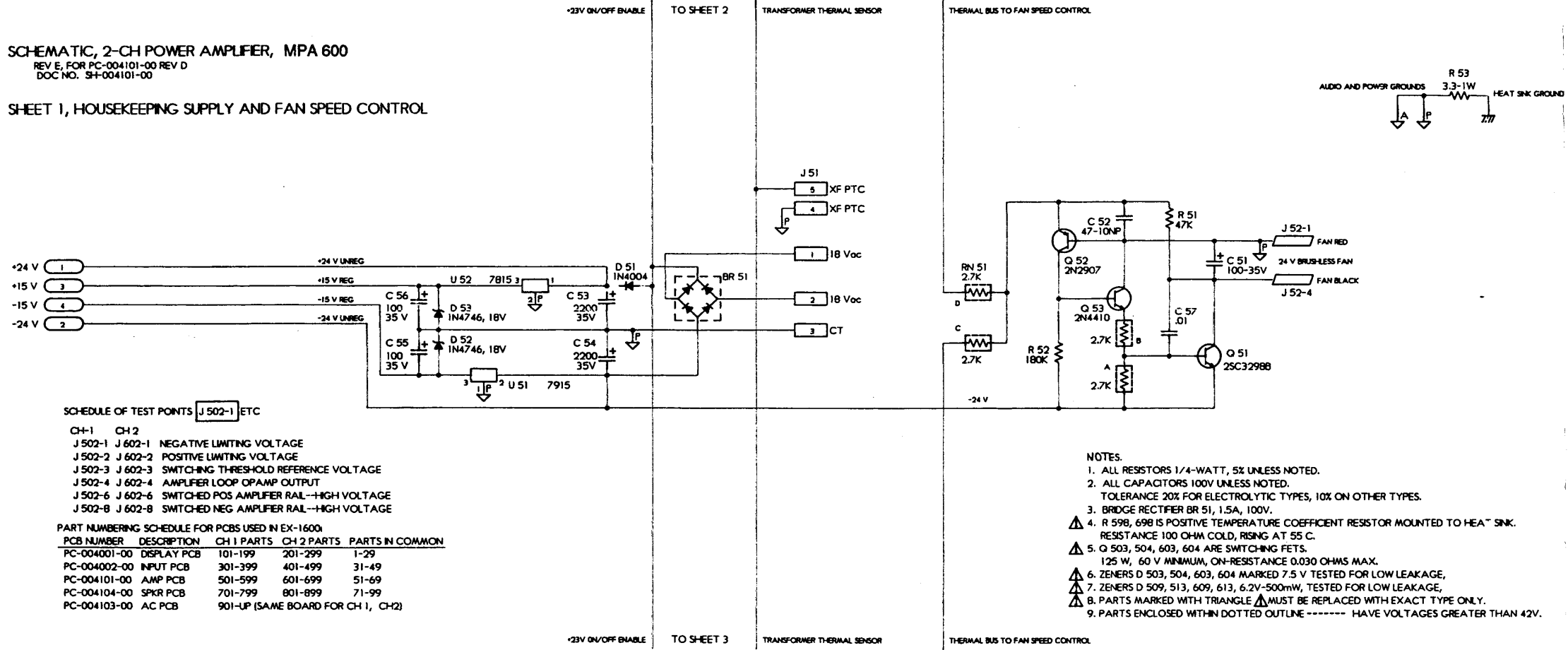
Distinguish between instability (fuzziness), ringing, which is momentary instability after a transition, step distortion,

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REVISIONS			
Z/ME	REV	DESCRIPTION	DATE
	B	PROD RELEASE PER ECO 1107 GLF	5-29-91
	C	REVISED PER ECO 1126 RDS	7-26-91
	D	REVISED PER ECO 1262 LG	10-9-91
	E	REVISED PER ECO 1289 PHQ	11-6-91
	F	REVISED PER ECO 1508 SGM	6-10-92
	G	REVISED PER ECO 1602 WR	6-10-92

SCHEMATIC, 2-CH POWER AMPLIFIER, MPA 600
REV E, FOR PC-004101-00 REV D
DOC NO. SH-004101-00

SHEET 1, HOUSEKEEPING SUPPLY AND FAN SPEED CONTROL



- SCHEDULE OF TEST POINTS J 502-1 ETC**
- CH-1 CH-2
 - J 502-1 J 602-1 NEGATIVE LIMITING VOLTAGE
 - J 502-2 J 602-2 POSITIVE LIMITING VOLTAGE
 - J 502-3 J 602-3 SWITCHING THRESHOLD REFERENCE VOLTAGE
 - J 502-4 J 602-4 AMPLIFIER LOOP OPA/AMP OUTPUT
 - J 502-6 J 602-6 SWITCHED POS AMPLIFIER RAIL--HIGH VOLTAGE
 - J 502-8 J 602-8 SWITCHED NEG AMPLIFIER RAIL--HIGH VOLTAGE

PART NUMBERING SCHEDULE FOR PCBs USED IN EX-1600:

PCB NUMBER	DESCRIPTION	CH 1 PARTS	CH 2 PARTS	PARTS IN COMMON
PC-004001-00	DISPLAY PCB	101-199	201-299	1-29
PC-004002-00	INPUT PCB	301-399	401-499	31-49
PC-004101-00	AMP PCB	501-599	601-699	51-69
PC-004104-00	SPKR PCB	701-799	801-899	71-99
PC-004103-00	AC PCB	901-UP (SAME BOARD FOR CH 1, CH2)		

LAST USED REF. DESIGN.

- BR 502, 602, BR 51
- C51 - 57, C526, 626
- D51 - 53, D513, 613
- F504, 604
- J51, 52, J503, 603
- K501, 601
- L501, 601
- Q51 - 53, Q510, 610
- R51 - 53, R544, 644, R598, 698, R599, 699
- RN51, RN502, 602
- U51, 52, U506, 606
- VR503, 603

- NOTES:**
- ALL RESISTORS 1/4-WATT, 5% UNLESS NOTED.
 - ALL CAPACITORS 100V UNLESS NOTED. TOLERANCE 20% FOR ELECTROLYTIC TYPES, 10% ON OTHER TYPES.
 - BRIDGE RECTIFIER BR 51, 1.5A, 100V.
 - R 598, 698 IS POSITIVE TEMPERATURE COEFFICIENT RESISTOR MOUNTED TO HEAT SINK. RESISTANCE 100 OHM COLD, RISING AT 55 C.
 - Q 503, 504, 603, 604 ARE SWITCHING FETS. 125 W, 60 V MINIMUM, ON-RESISTANCE 0.030 OHMS MAX.
 - ZENERS D 503, 504, 603, 604 MARKED 7.5 V TESTED FOR LOW LEAKAGE.
 - ZENERS D 509, 513, 609, 613, 6.2V-500mW, TESTED FOR LOW LEAKAGE.
 - PARTS MARKED WITH TRIANGLE Δ MUST BE REPLACED WITH EXACT TYPE ONLY.
 - PARTS ENCLOSED WITHIN DOTTED OUTLINE ----- HAVE VOLTAGES GREATER THAN 42V.

JAN 15 1993

PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX	±	
	.XXX	±	
MATERIAL		APPROVALS	DATE
WP-004101-00		PHQ	5-15-91
NEXT ASSY USED ON		CHECKED	SGM
APPLICATION		ISSUED	5-29-91
DO NOT SCALE DRAWING		SIZE (PSCH NO.)	D
SH-1600F1.FCD		DWG NO.	SH-004101-00
SCALE		FILE NO.	SH-1600G1.FCD
SHEET		1 OF 3	

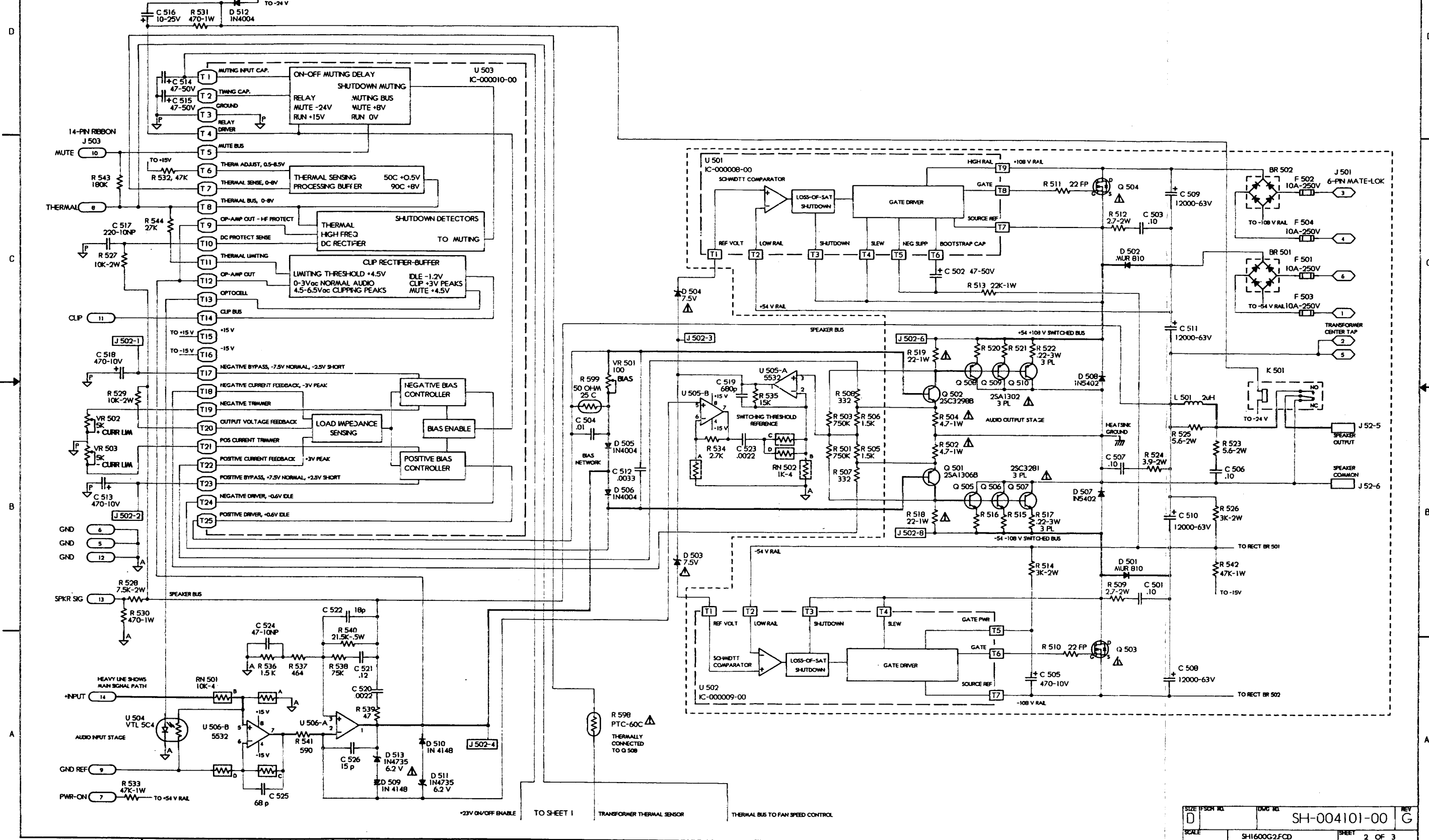
JBL Professional Products
Northridge, California

SCHEMATIC MPA - 600
DRAWING

SHEET 1 OF 3

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SCHEMATIC, 1600, SHEET 2, AMPLIFIER CHANNEL A

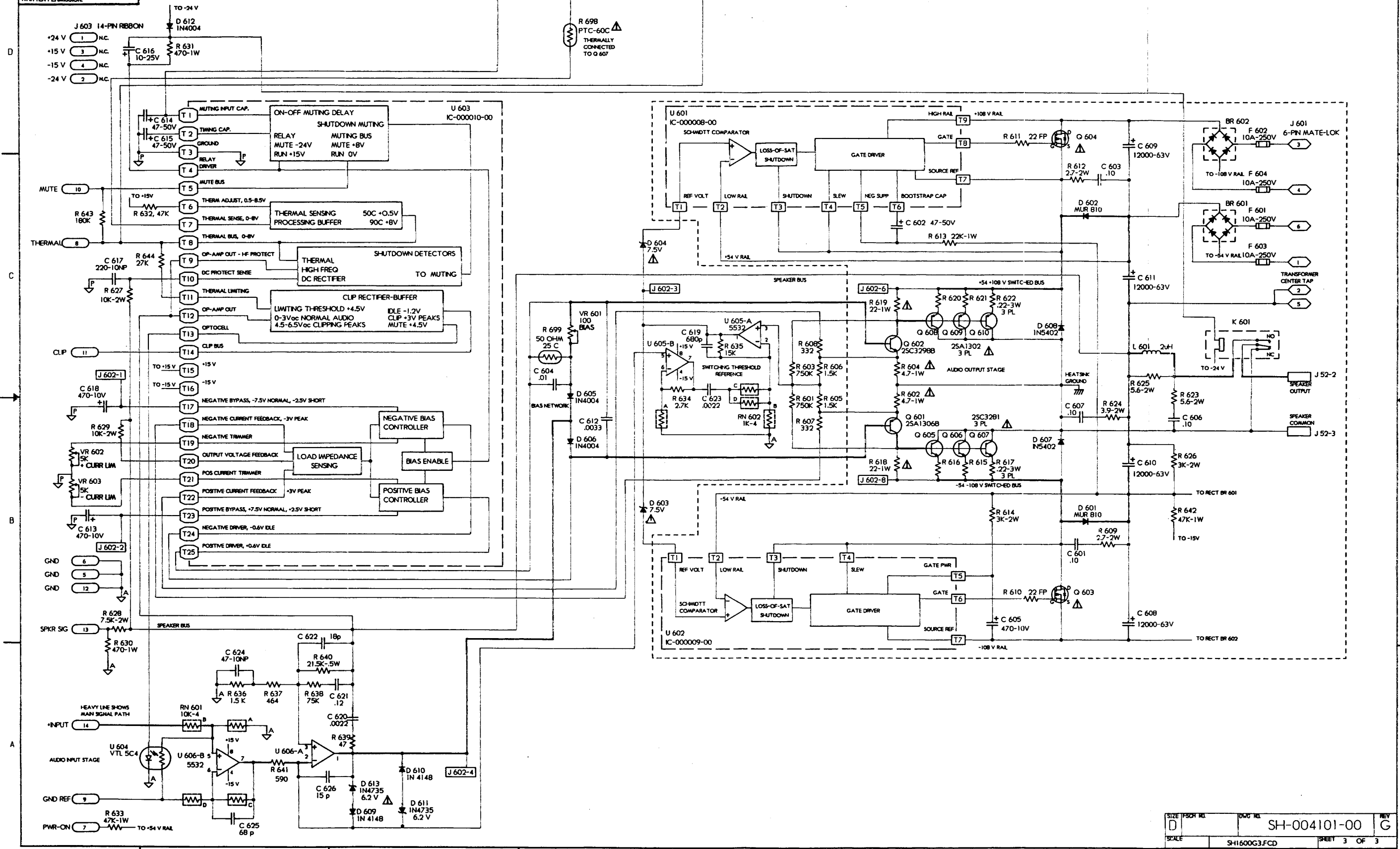


SHEET 2 OF 3

SCHEMATIC, M 500, SHEET 3, AMPLIFIER CHANNEL B

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+23V DV OFF ENABLE TO SHEET 1 TRANSFORMER THERMAL SENSOR THERMAL BUS TO FAN SPEED CONTROL



SIZE	PSORT NO.	DWG NO.	REV
D		SH-004101-00	G
SCALE	SH1600G3.FCD		SHEET 3 OF 3

SHEET 3 OF 3

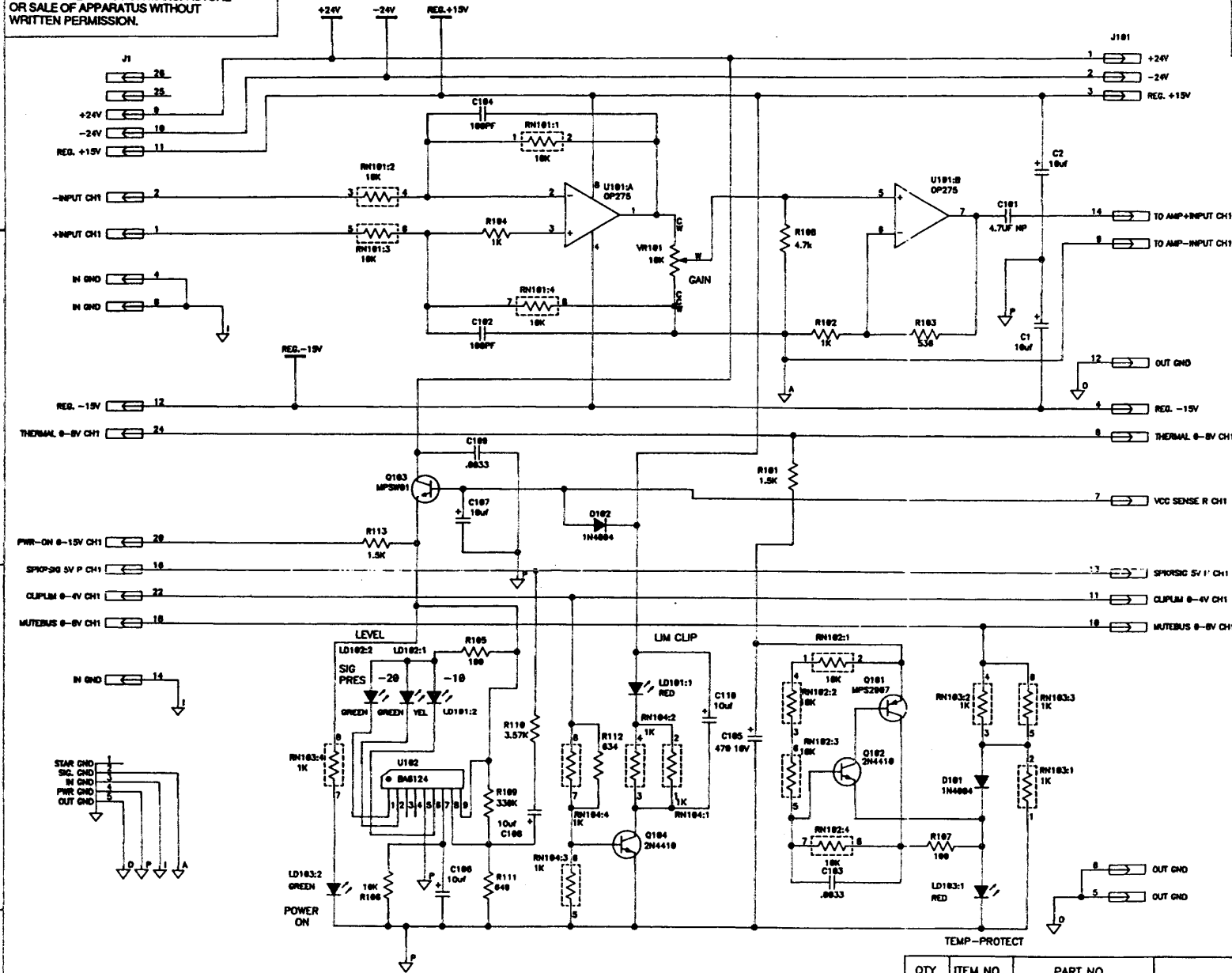
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MPA SERIES DISPLAY BOARD

PC-002750-00, REV B FILE: PC2750B2.P3B

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PROD REL PER ECO 1671	12\1\92	SGM
	B	REVISED PER ECO 1721 AC	12\23\92	SGM
	C	REVISED PER ECO 1696 AC	1-19-93	SGM

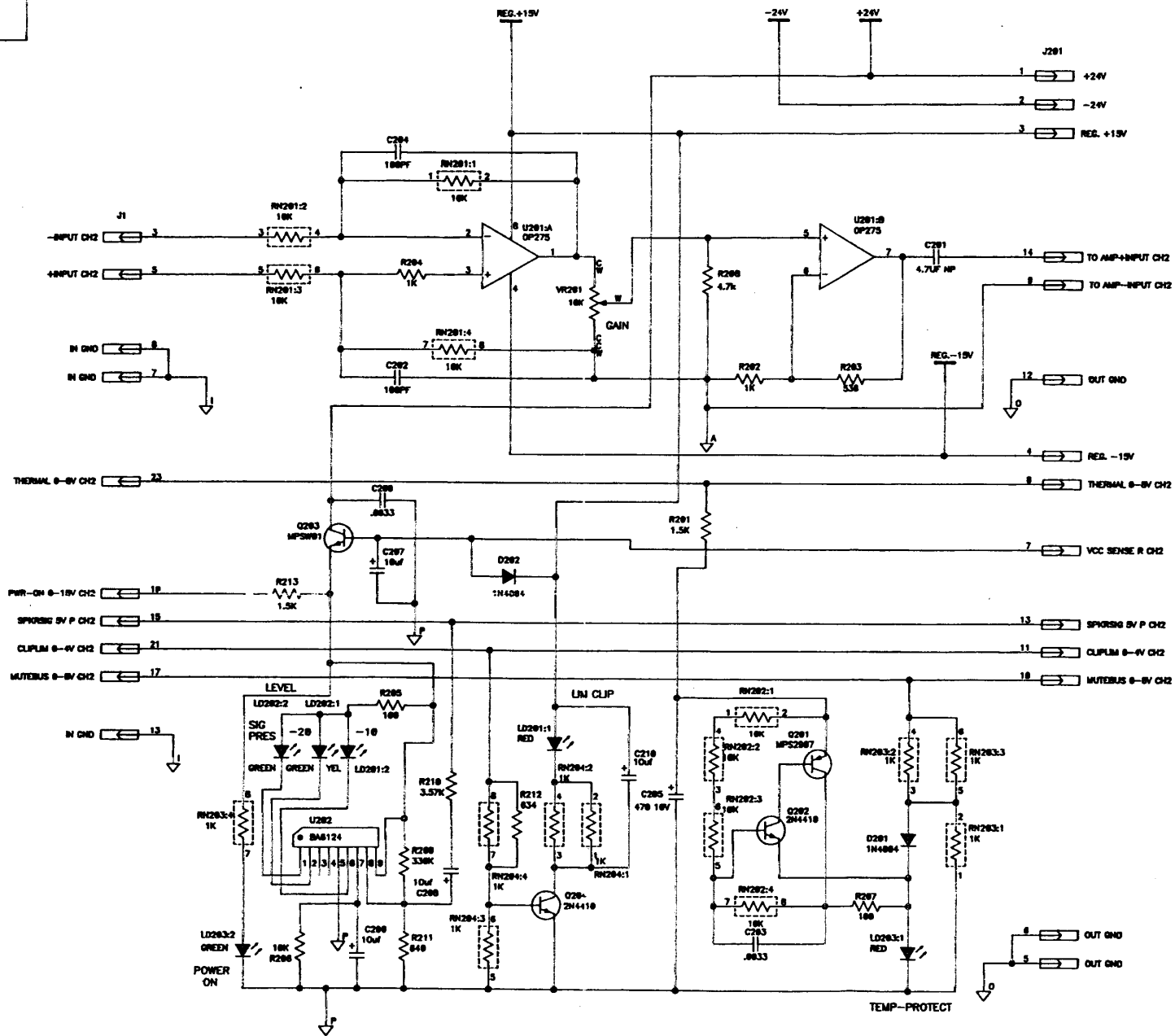


NOTES:

1. ALL RESISTORS 1/4 WATT UNLESS SPECIFIED
2. ALL CAPACITORS 25V UNLESS SPECIFIED.
3. CH 1 COMPONENTS NUMBERED 101-199
4. CH 2 COMPONENTS NUMBERED 201-299
5. PARTS IN COMMON TO BOTH CHANNELS NUMBERED 1-99.
6. U102, 202 ROHM BA6124 OR SAMSUNG KA2284/85.
7. LD 101:1, 201:1, 103:1, 203:1, HIGH-EFFICIENCY RED LED.
8. LD 101:2, 201:2, HIGH-EFFICIENCY YELLOW LED.
9. LD 102:1, 102:2, 103:2, 202:1, 202:2, 203:2, HIGH-EFFICIENCY GREEN LED.

QTY	ITEM NO.	PART NO.	DESCRIPTION	VENDOR
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. DIMENSIONS PER ANSI Y14.5-1982 TOLERANCES ARE: DECIMALS DECIMALS ANGLES .XX ± .XXX ± 0 DEBURR EDGES .XXX R MAX MATERIAL			CONTRACT NO.	
FINISH			APPROVALS	DATE
NEXT ASSY USED ON			 Northridge, California	
APPLICATION				
DO NOT SCALE DRAWING			ISSUED	DATE
CAD SEED FILE NO.			<p style="text-align: center;">SH-002750-00</p>	
SCALE			FSCM NO.	DWG NO.
CAD FILE NO. SH2750C.S01			REV C	
SHEET			1 OF 2	

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SIZE	FSCM NO.	DWG NO.	REV
C		SH-002750-00	C
SCALE	CAD FILE NO.	SHEET	2 OF 2
	SH2750C.S02		