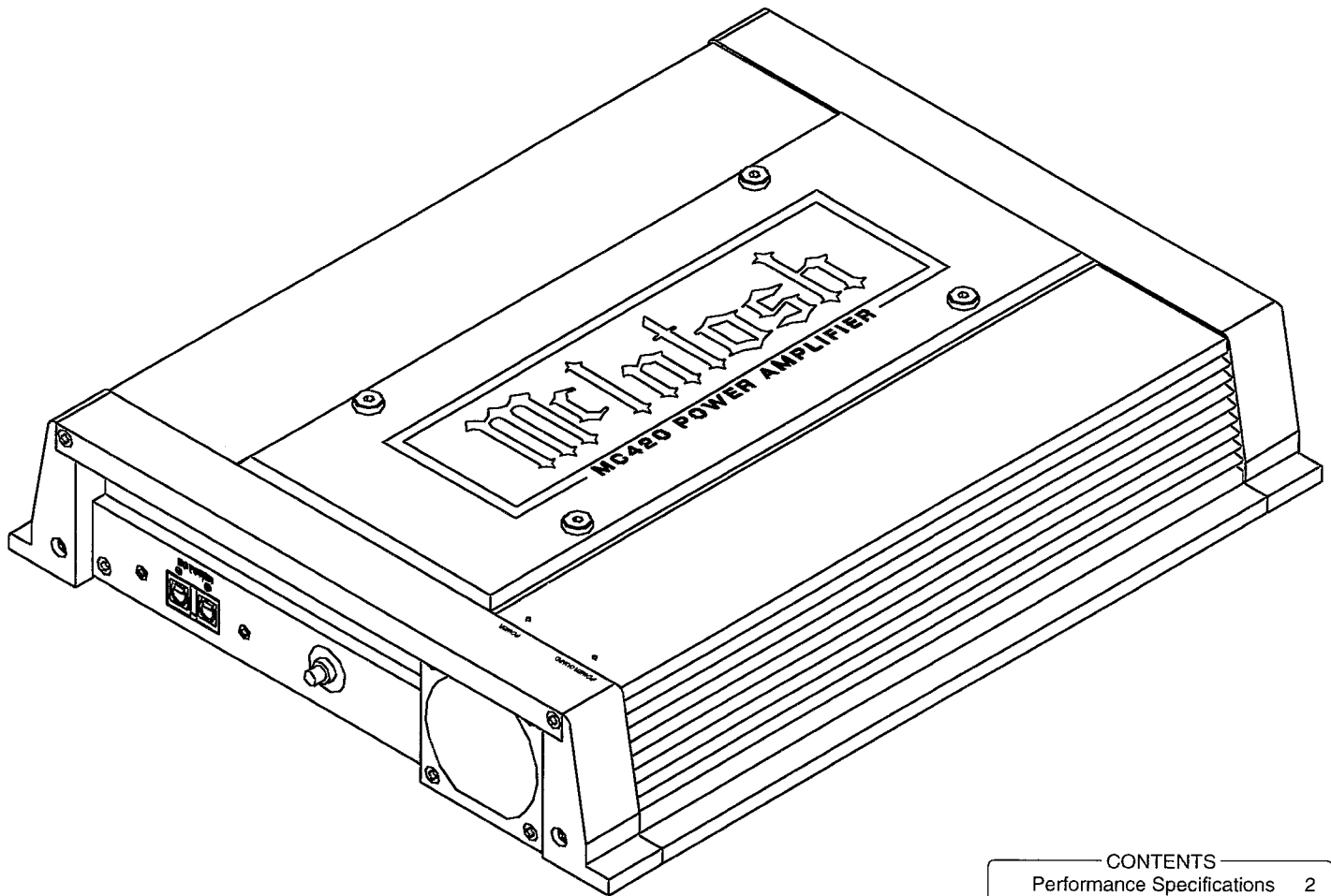


# MC420

## POWER AMPLIFIER



### CONTENTS

Performance Specifications	2
Notes	2
Block Diagram	3-4
◇ Interconnection Diagram	4-5
◇ Electronic Parts List	5-6
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# McIntosh

## Service Manual

# Performance Specifications

## POWER OUTPUT

Minimum sine wave continuous average power output per channel, all channels operating, into 4 ohm loads, 4 Channel Mode 50 Watts.

## RATED POWER BAND

20Hz to 20kHz

## TOTAL HARMONIC DISTORTION

Maximum harmonic distortion at any power level from 250 milliwatts to rated power output .005%

## DYNAMIC HEADROOM

1.3dB

## FREQUENCY RESPONSE

+0, -0.25dB from 20Hz to 20kHz  
+0, -3.00dB from 10Hz to 50kHz

## INPUT SENSITIVITY

0.3V to 2 Volts

## A-WEIGHTED, SIGNAL-TO-NOISE RATIO

110dB (2V)

## DC INPUT VOLTAGE

14.4 Volts

## CURRENT CONSUMPTION

Idle - 2.0 amps  
Rated Power - 31 amps

## LOAD STABILITY


2 ohms

## DIMENSIONS

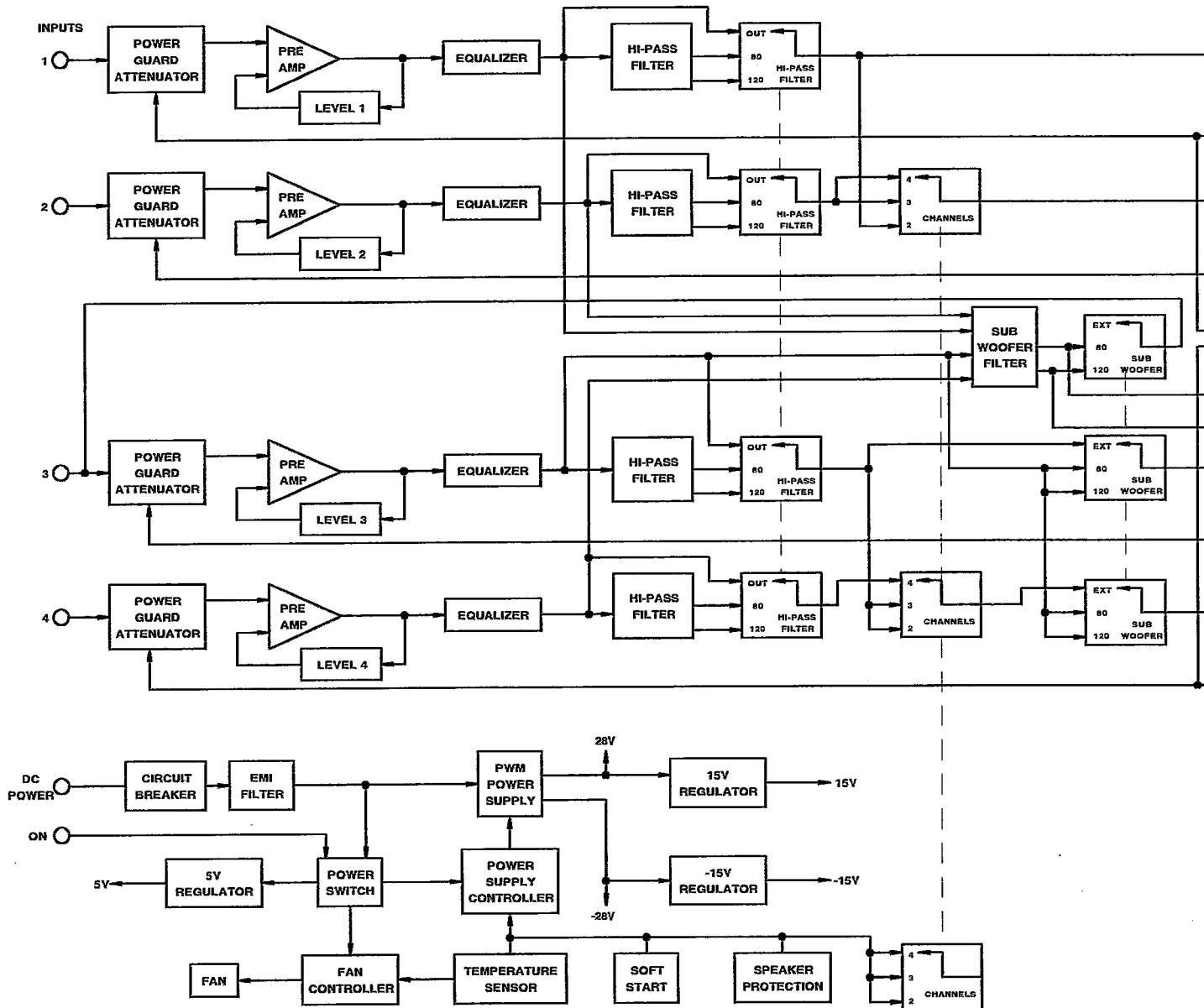
Width (mm) 14.25" (362)  
Height (mm) 2.75" (71)  
Depth (mm) 12.00" (305)

---

## Notes

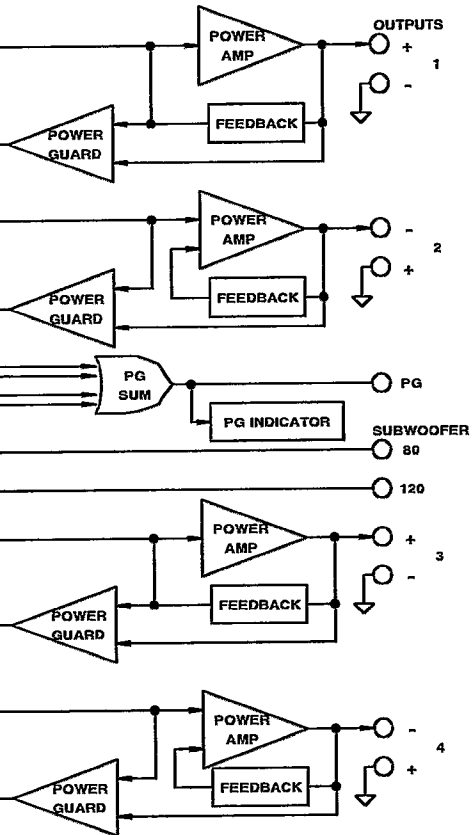
1. The heavy lines on the schematics denote the primary signal path.
2. Unless otherwise noted, all voltages indicated on the schematics are measured under the following conditions:
  - a. DC input at 14.4 volts.
  - b. ON connector at 14.4VDC.
  - c. All voltages are  $\pm 10\%$  with respect to ground, unless otherwise specified. A high impedance (10 megohm) voltmeter must be used.
3. Unless otherwise specified:
  - a. Resistor values are in ohms.
  - b. Capacitor values are in microfarads ( $\mu\text{F}$ ).
  - c. Inductor values are in microhenries ( $\mu\text{H}$ ).
4. The voltages enclosed in a box are signal voltages that are measured with a 0.3V, 1kHz signal connected to all channels at the input jacks.
5. On PC Board Drawings, Square Pad Indicates:
  - a. Polarized Capacitors - Positive
  - b. Diode - Cathode
  - c. Others - Pin 1
6. **WARNING:** Parts marked with the symbol  have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

EQUALIZER (45Hz) ..... FLAT  
EQUALIZER (150Hz) ..... FLAT  
CHANNELS ..... 4  
HI-PASS FILTER ..... OUT  
SUBWOOFER ..... EXT  
LEVEL (4) ..... .3V

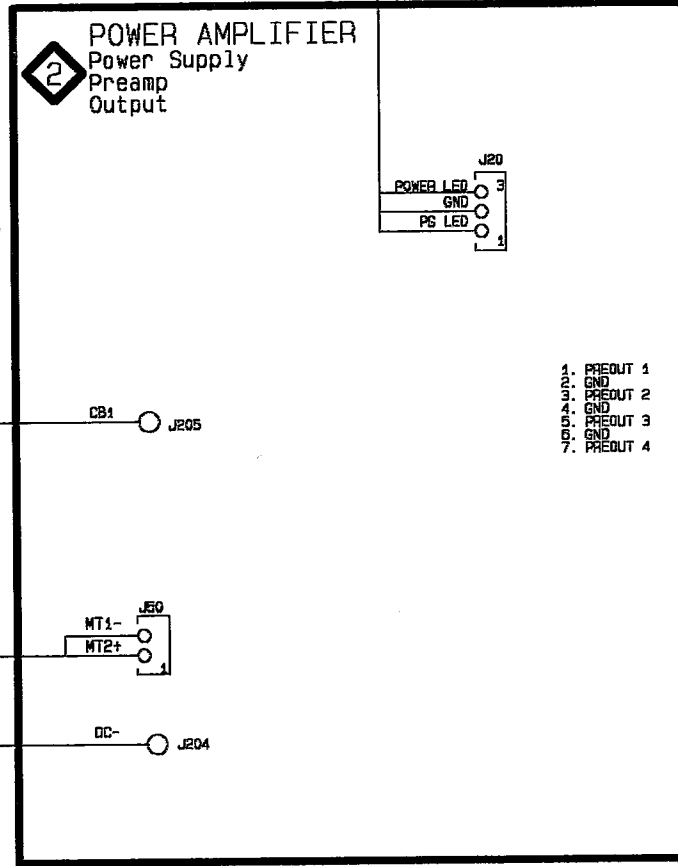
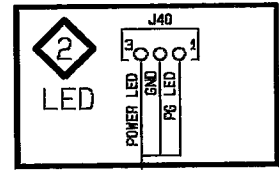
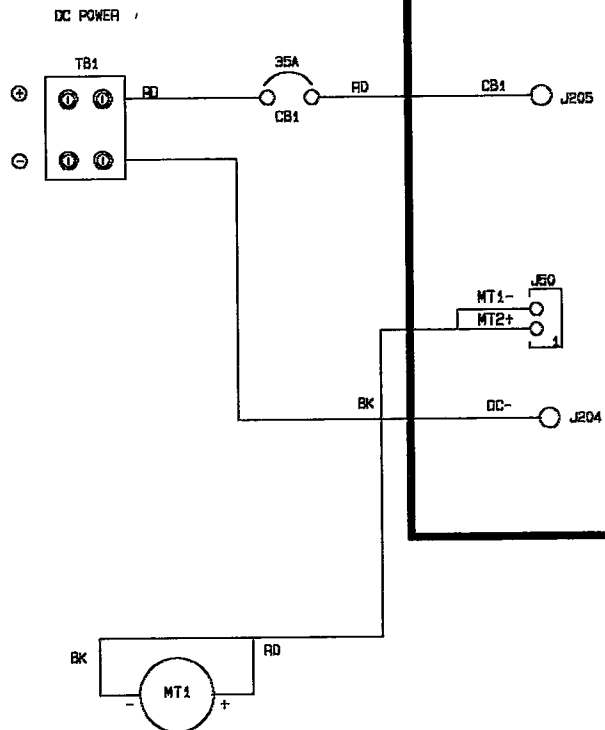


# Block Diagram

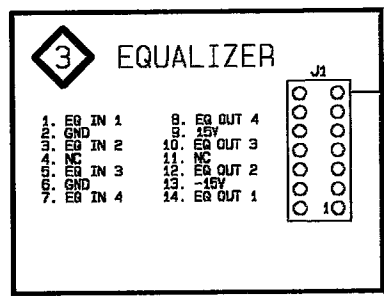
Interco



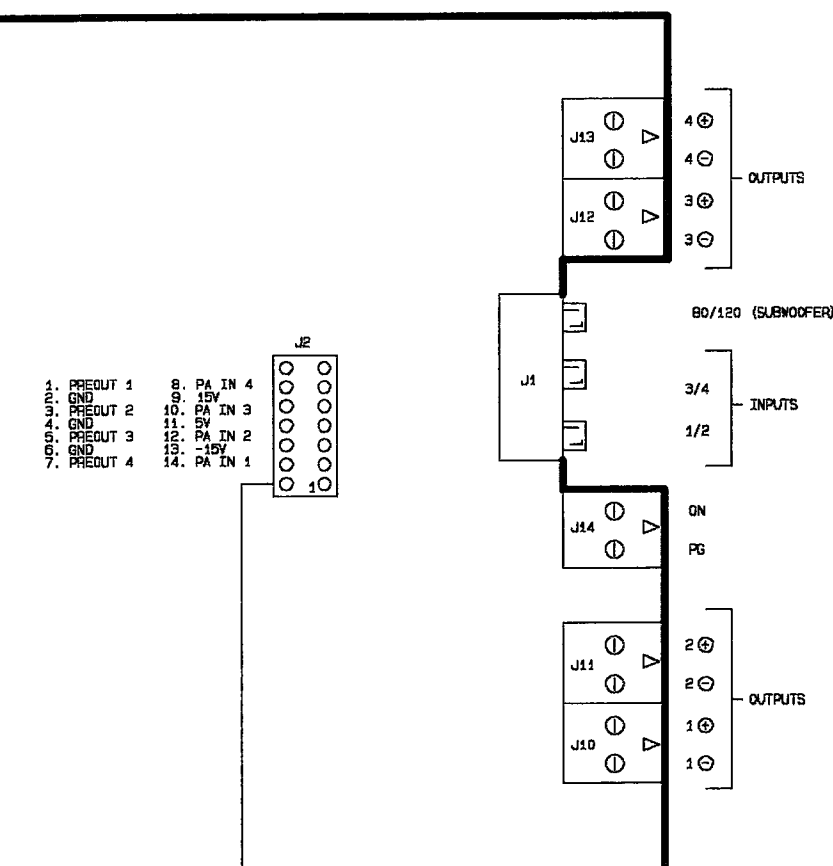
**WARNING:** Parts located in the below shaded area have critical characteristics. Use **ONLY** replacement parts recommended by the manufacturer.



- 1. PREAMP 1
- 2. GND
- 3. PREAMP 2
- 4. GND
- 5. PREAMP 3
- 6. GND
- 7. PREAMP 4



# Interconnection Diagram



## INTERCONNECTION PARTS LIST

Symbol	Part	Description
<b>CIRCUIT BREAKERS</b>		
CB1	088018	CB, 35A
<b>CONNECTORS</b>		
TB1	117541	DC Input Terminal
<b>MISCELLANEOUS</b>		
MT1	081008	Fan, 12V, 1.9W



## Power Amplifier

CF RES 5% 1/8W ARE NOT LISTED

Symbol No.	Part No.	Description	Qty.
C1,3,4,6,7,9, C10,12,14,42, C43,44,45,46, C48,49	066445	ELECT 10mF 50V	16
C13,15,47,86, C94,431,432, C433,434	066447	ELECT 100mF 16V	9
C16,17,18,19	061011	DISC 15pF 10% NPO	4
C21,22,23,39, 40,56,62,69, C71,75,166, C171,435,437	061248	DISC .1mF 24V Y5T	14
C24,25,26,28, C30,31,32,33, C34,35,36,37, C38,119,122, C251,252	064320	M POLY .047uF 5% 100V DC	17
C29	064312	M POLY .01uF 100V 5%	1
C41	064325	M POLY .1uF 5% 63V DC	1
C53,59,60,200	061150	CERAMIC .1mF +80 -20% .50V	4
C57,106,107, C108,109,110, C111,112,113, C114	061159	CERAMIC .01mF +80 -20% 50V	10
C67,68,100, C137,139,140, C142,144,145, C146,148,150, C152,153,157, C158,162,172	066446	ELECT 47mF 35V	18
C78	064302	POLY .0015uF 5% 63VDC	1
C79,163,436	066448	ELECT 3.3mF 50V NP	3
C85,138,151, C154,155,159, C160,250	066437	ELECT 10mF 50V LOW ESR	8
C91	066327	ELECT 470mF 10V	1
C101	061106	DISC .001mF 10%	1
C123,124,128, C132	061206	DISC 220pF 20% Z5F 50V	4
C125,126,130, C133	064308	.0047mF 5% 63V	4
C127,131,135, C136,500,501	061196	DISC 47pF 20% N470 50V	4
C156,161	066457	ELECT 100uF 50V	2
C168	066254	ELECT 220mF 25V	1
C300,301,302, C303	061199	DISC 100pF 10% N1500 50V	4
C421	061249	.47uF 50V MONOLITHIC	1
C423,424	066441	ELECT 2200uF 25V	2
C429,430	066439	ELECT 3300uF 35V	2
D1,2,3,4,7,9, D10,12,13,14, D16,17,18,19, D20,21,23,24, D25,26,27,28, D29,31,32,33, D34,39	070047	SIG 75V 150mA 1N4148	28
D5,6	070150	ZN 10V 5% 500mW	2
D8	070114	ZN 16V 5% 500mW	1
D35	070041	RECT 100V 3A 1N5401	1
D36	070131	RECT 400V 1A 1N4004	1
D37	070148	RECT FMG32R	1
D38	070149	RECT FMG32S	1
DS1	058115	LED Yellow,SLP-444B...SA	1
DS2	058078	LED Red SLP144B	1

IC11,  
IC15,  
IC16  
IC37  
J1  
J2  
J10,1  
J14  
L1,3  
L4,5,6  
Q1,2,  
Q5,23  
Q6,83  
Q86  
Q8,92  
Q11,1  
Q39,4  
Q47,4  
Q55,5  
Q87,8  
Q19,2  
Q37,4  
Q63,6  
Q24,2  
Q26,4  
Q33,3  
Q60,8  
Q64  
Q67,7  
Q68,7  
Q94,5  
Q98,2  
Q204  
Q99,2  
Q205  
R1,14  
R4,11  
R3,12  
R5,10  
R28,4  
R30,4  
R42,6  
R900  
R62,6  
R76,8  
R162,  
R109  
R132  
R148,  
R602,  
R702,  
R173,  
R200  
R205  
R206,  
R233  
R211,  
R350  
R223,  
R234  
R237  
R238,  
R241,  
R244,

# Electronic Parts List

Qty.				
16	IC11,13	133239	Dual Voltage Amp STK350-010...SA	2
	IC15,22	133250	5V Regulator MC78MO5CT...MO	2
	IC16	133253	-5V Regulator MC79M05CT...MO	1
9	IC37	133197	PWM Controller, TL598QN	1
	J1	117449	Phono Jack 6P Gold Plated	1
	J2	117527	CONN Header 14 POS	1
4	J10,11,12,13, J14	117522	Terminal Block	5
14	L1,3	122293	Choke	2
	L4,5,6,7	122297	Output Choke	4
17	Q1,2,3,4	132193	N JFET 2N4392	4
	Q5,23	132263	PNP 2SB892	2
	Q6,83,84,85, Q86	132257	NPN 2SC3792	5
	Q8,92	132171	NPN MPSA05	2
1	Q11,17,36,38, Q39,40,45,46, Q47,48,49,54, Q55,56,58,61, Q87,88,90,91	132224	PNP MPS4126	20
1	Q19,20,21,32, Q37,44,53,57, Q63,65,66	132223	NPN MPS4124	11
18	Q24,25,34,51	132233	NPN 2SC3423	4
	Q26,41,43,52	132262	NPN 2SC2705	4
	Q33,35,42,50	132261	PNP 2SA1145	4
	Q60,89	132172	PNP MPSA55	2
1	Q64	132090	NPN DAR MPSA25	1
3	Q67,74,75,79	132239	PNP 2SA1302	4
8	Q68,72,76,80	132238	NPN 23C3281	4
	Q94,95,96,97	132260	FET MTP50N05E	4
1	Q98,201,202, Q204	132231	NPN 2SC3298B-0	4
1	Q99,200,203, Q205	132232	PNP 2SA1306B-0	4
4	R1,14,21,29	144333	MF 2K ohm 1% 1/8W	4
	R4,11,18,25	144330	MF 100K ohm 1% 1/8W	4
4	R3,12,19,26	144329	MF 9.53K 1% 1/8W	4
	R5,10,17,24	144331	MF 16.5K ohm 1% 1/8W	4
2	R28,46,124	144316	MF 4.99K ohm 1% 1/8W	3
1	R30,45	144334	MF 2.32K ohm 1% 1/8W	2
4	R42,68,198, R900	141165	CF 10 ohms 5% 1/2W	4
1	R62,63,64,65	134465	Gain Control 20K ohm	4
2	R76,89,159, R162,180	144328	MF 14.3K 1% 1/8W	5
2	R109	144313	MF 11K ohm 1% 1/8W	1
28	R132	144317	MF 53.6K ohm 1% 1/8W	1
	R148,160,601, R602,700,701, R702,703	144332	MF 931 ohm 1% 1/8W	8
	R173,178	144333	MF 2K ohm 1% 1/8W	2
2	R200	141170	CF 100 ohm 5% 1/2W	1
1	R205	141051	CF 1.2K ohm 5% 1/4W	1
1	R206,225,231, R233	137033	FLAMEPROOF 22 ohm 5% 1/4W	4
1	R211,216,229, R350	137074	FLAMEPROOF 1K ohm 5% 1/4W	4
1	R223,224,232, R234	137050	FLAMEPROOF 100 ohm 5% 1/4W	4
1	R237	141381	CF 56 ohm 5% 1W	1
	R238,239,240, R241,242,243, R244,245	141204	CF 2.2 ohm 5% 1/2W	8

R247,248,250, R252	139196	VV .22 ohm 5% 5W	4
R254,255,256, R257	134470	POT 220 ohm	4
RT1,2	144279	Thermistor 100 ohm	2
S1,2,3	148062	Slide Switch 4P3T	11
T1	159244	Power	1



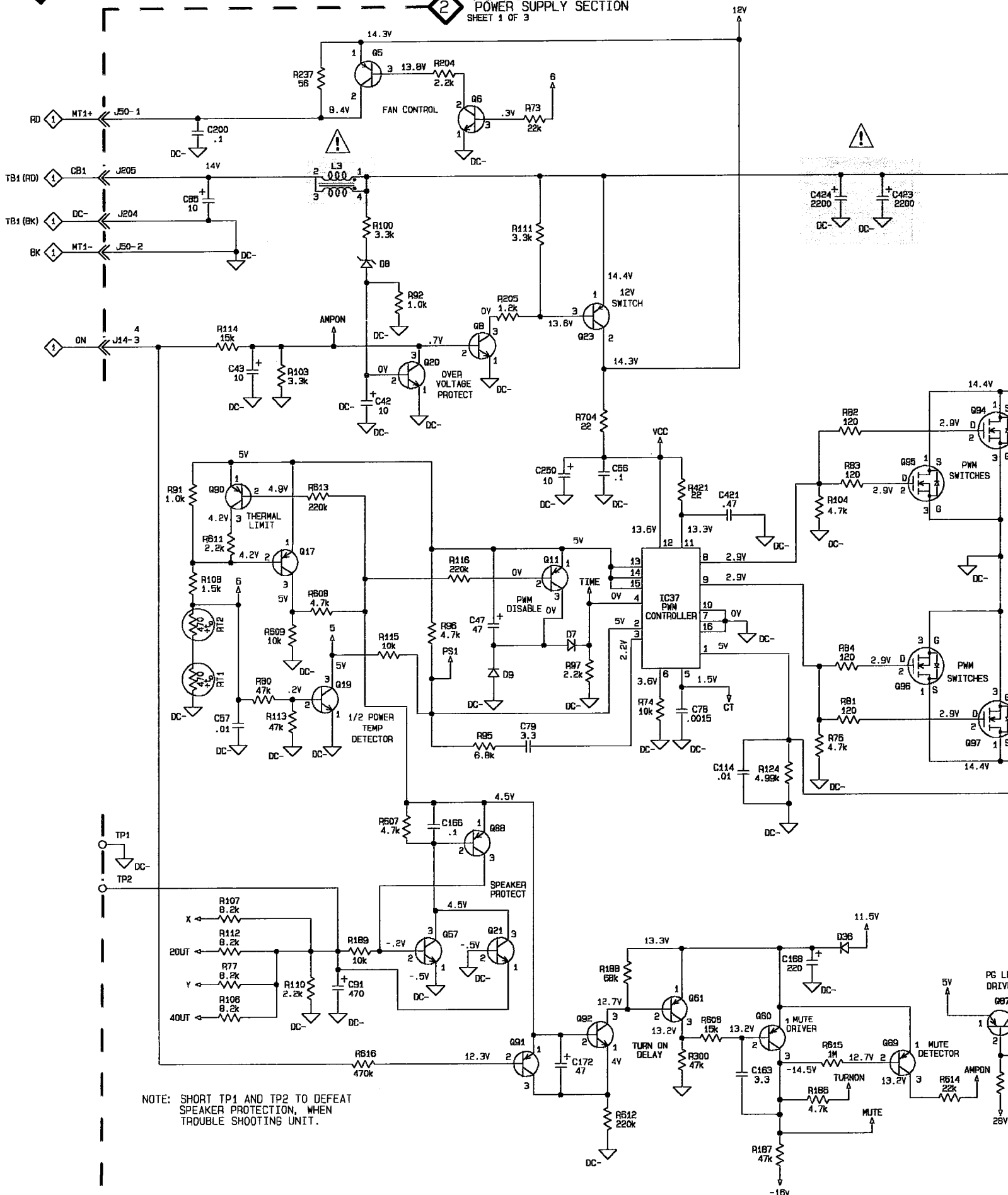
## Equalizer

CF RES 5% 1/8W ARE NOT LISTED

Symbol No.	Part No.	Description	Qty.
C1,3,6,8,10, C12,14,16	064320	M POLY .047uF 5% 100V DC	8
C2,4,5,7,9,11, C13,15	064325	M POLY .1uF 5% 63V DC	8
C17	066437	ELECT 10mF 50V LOW ESR	1
C18,19	061248	DISC CAP .1mF 25V Y5T	2
IC1,2	133260	Dual Op-Amp BA15532	2
J1	117526	CONN Socket 14 POS	1
S1,2	148062	Slide Switch 4P3T	2

# 2 Power Supply

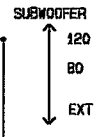
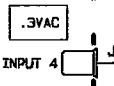
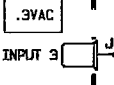
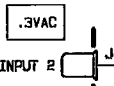
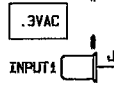
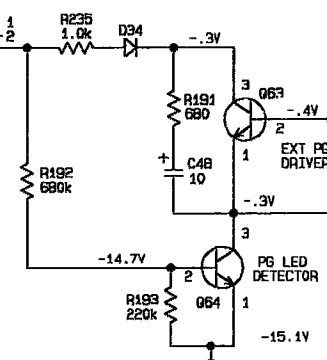
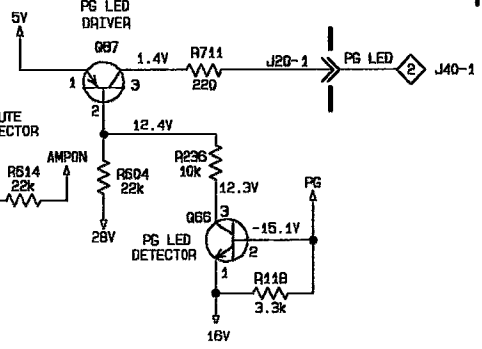
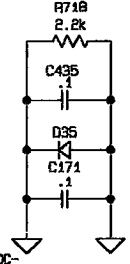
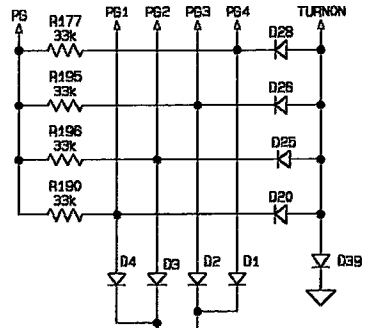
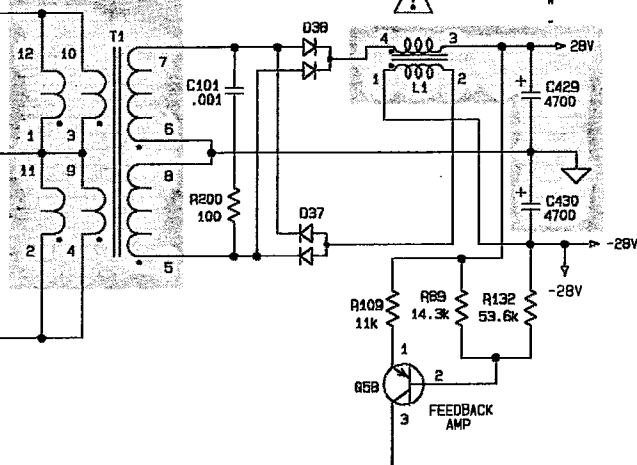
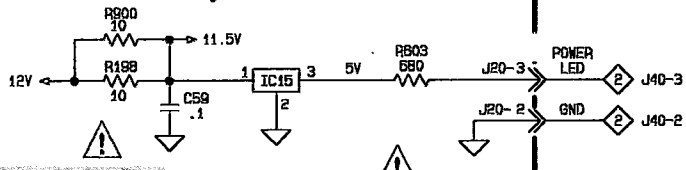
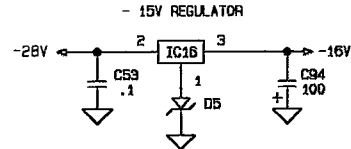
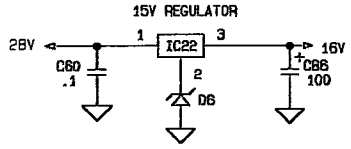
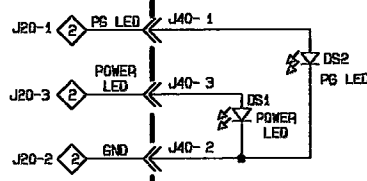
PC BOARD 048205  
POWER SUPPLY SECTION  
SHEET 1 OF 3



NOTE: SHORT TP1 AND TP2 TO DEFEAT SPEAKER PROTECTION, WHEN TROUBLE SHOOTING UNIT.

**⚠ WARNING:** Parts located in the below shaded areas have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

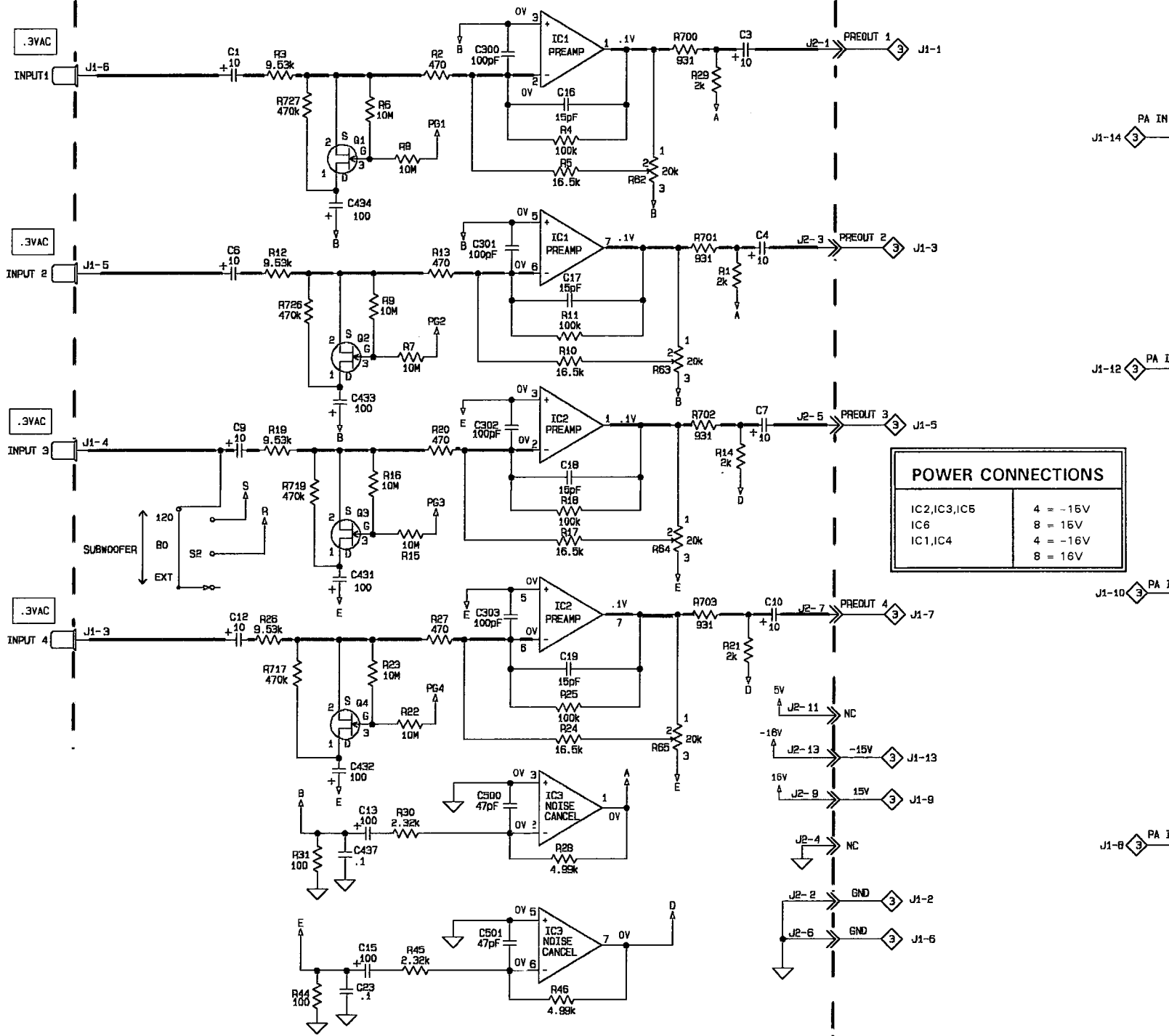
**LED**

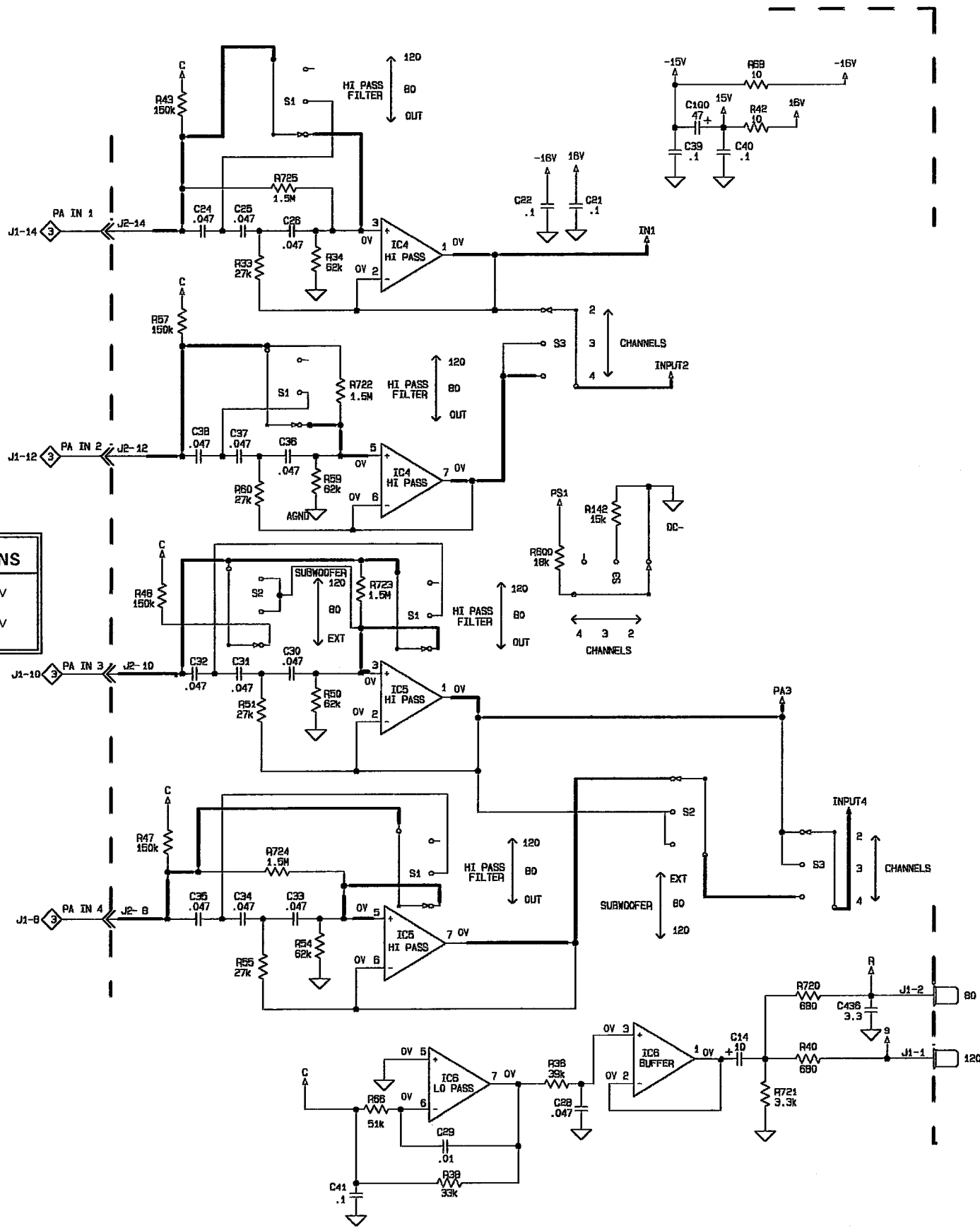




# 2 Preamplifier

PC BOARD 048205  
PREAMPLIFIER SECTION  
SHEET 2 OF 3





ASTERISKED (\*) COMPONENTS LOCATED ON THE REVERSE OR BACKSIDE OF THE BOARD

SUBWOOFER OUT

INPUT 4

INPUT 3

INPUT 2

INPUT 1

ON

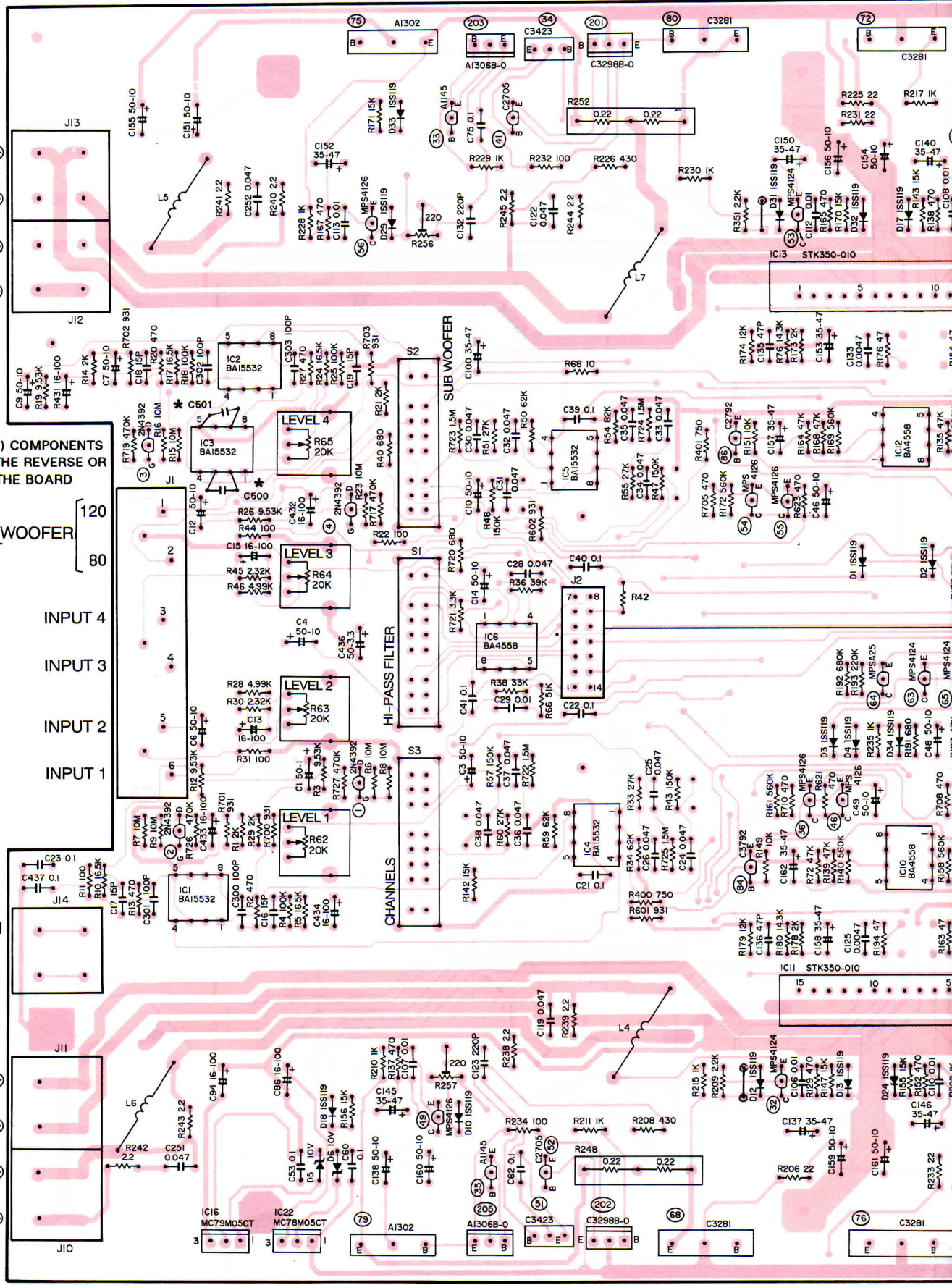
PG

2 ⊕

2 ⊖

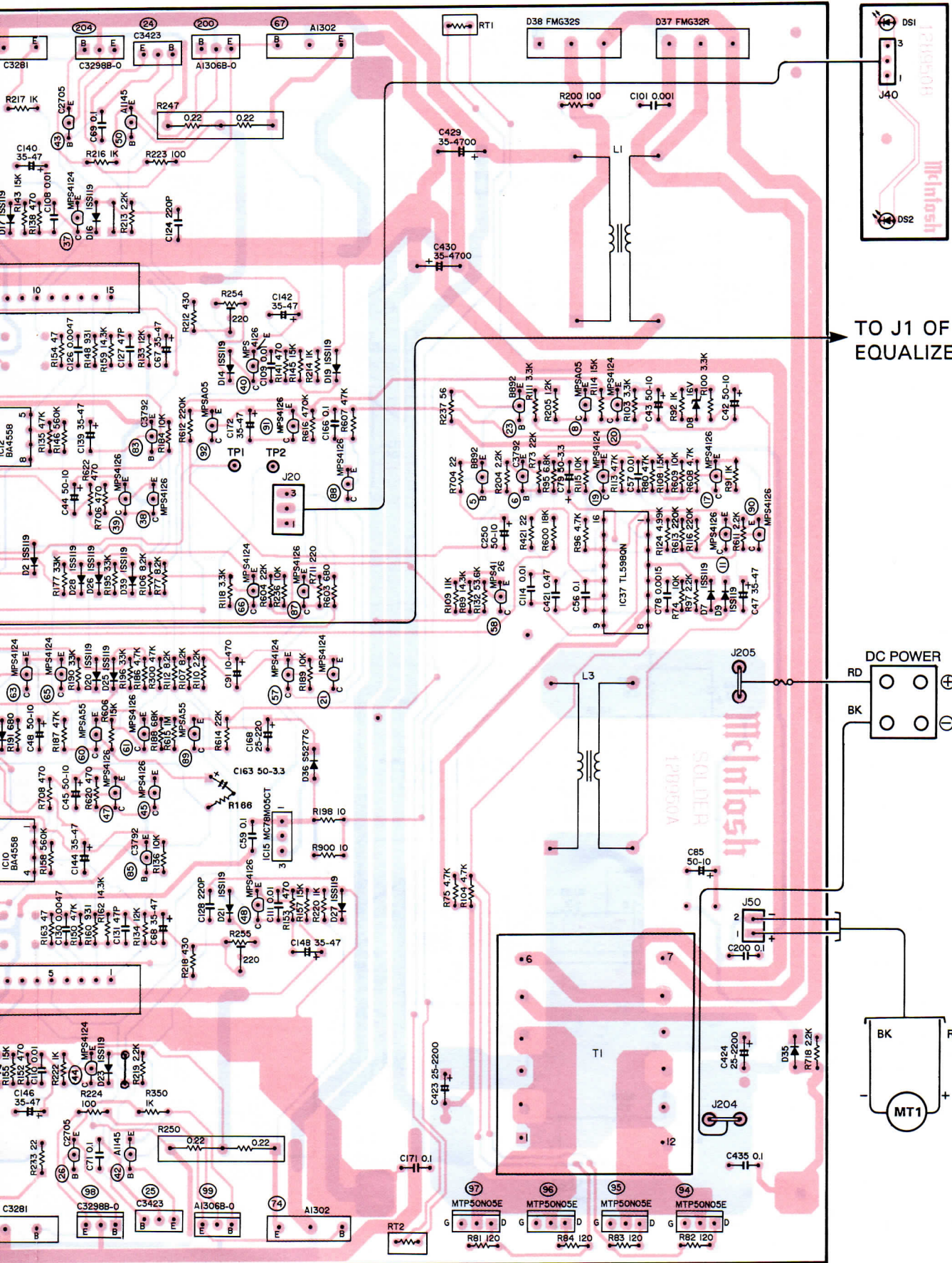
1 ⊕

1 ⊖

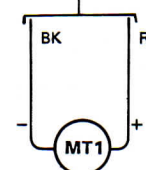
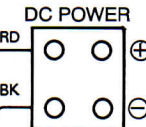


AMPLIFIER PCB 048207

LED PORTION  
OF PCB 048205

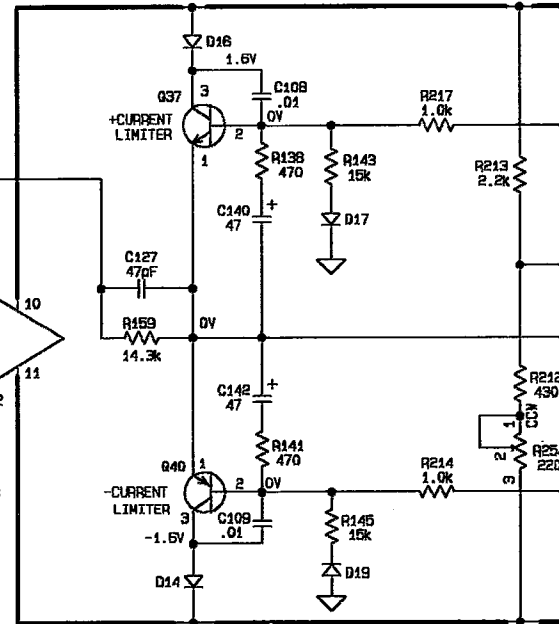
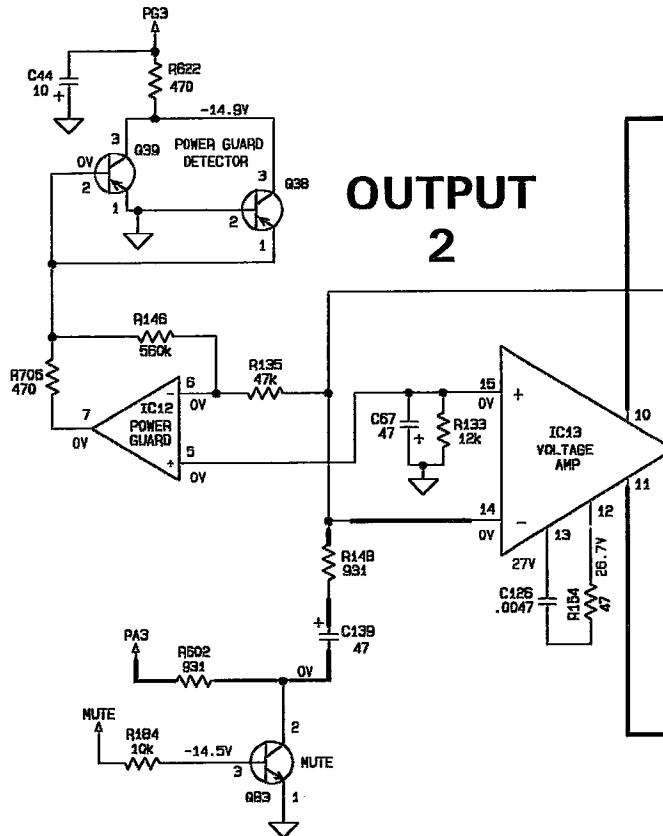
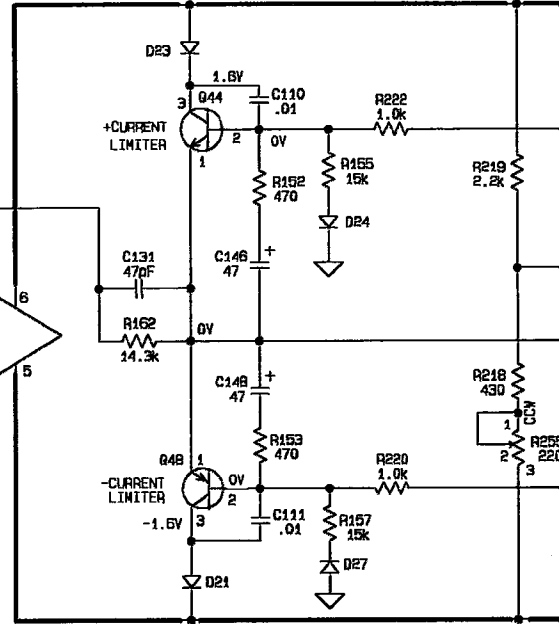
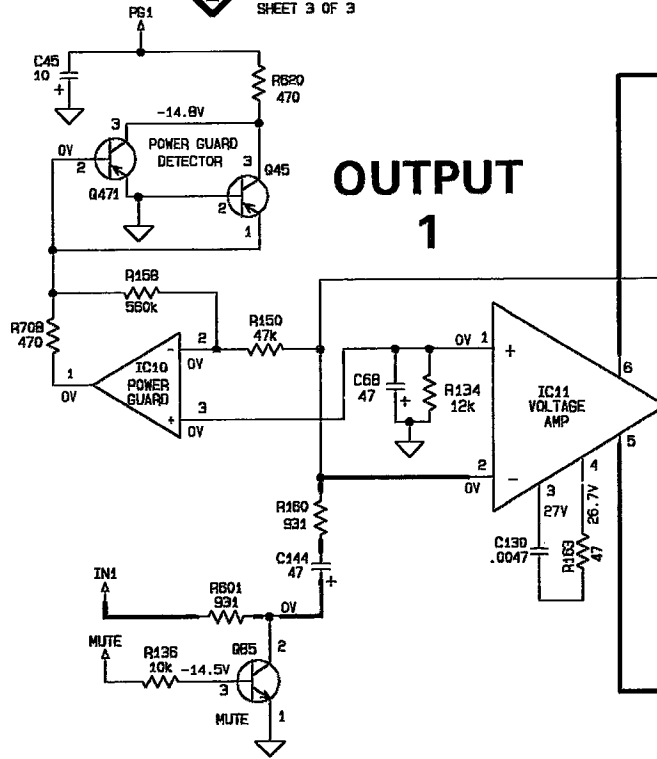


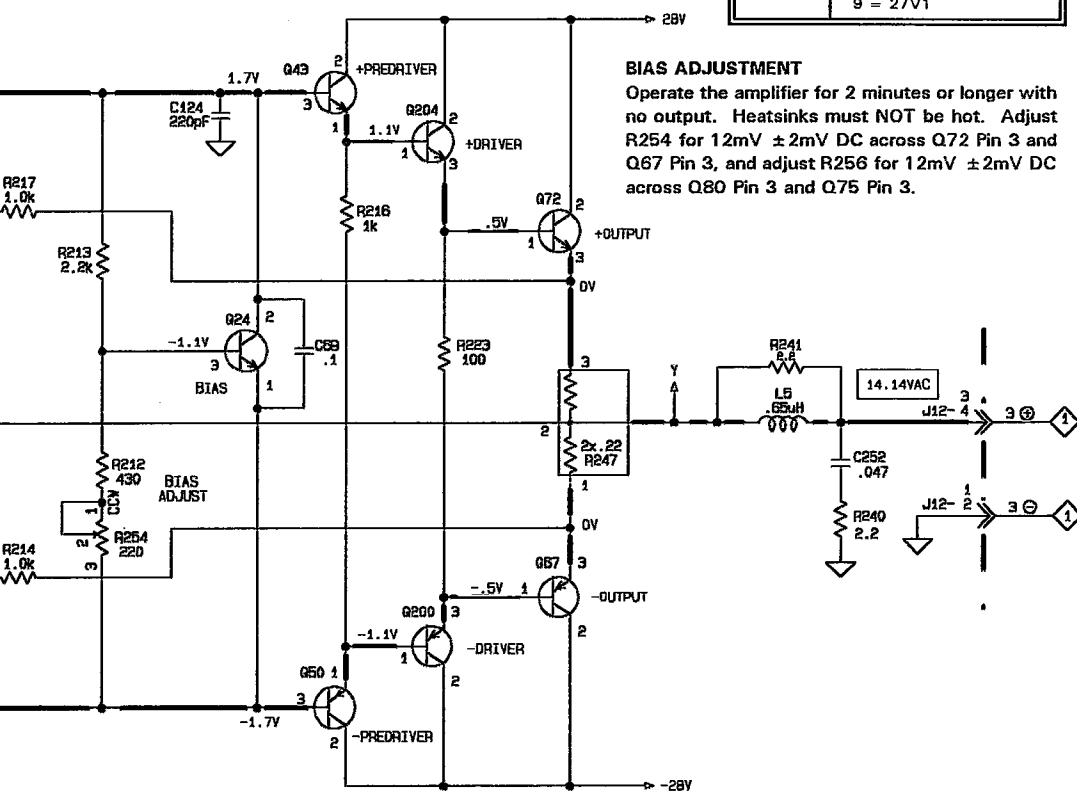
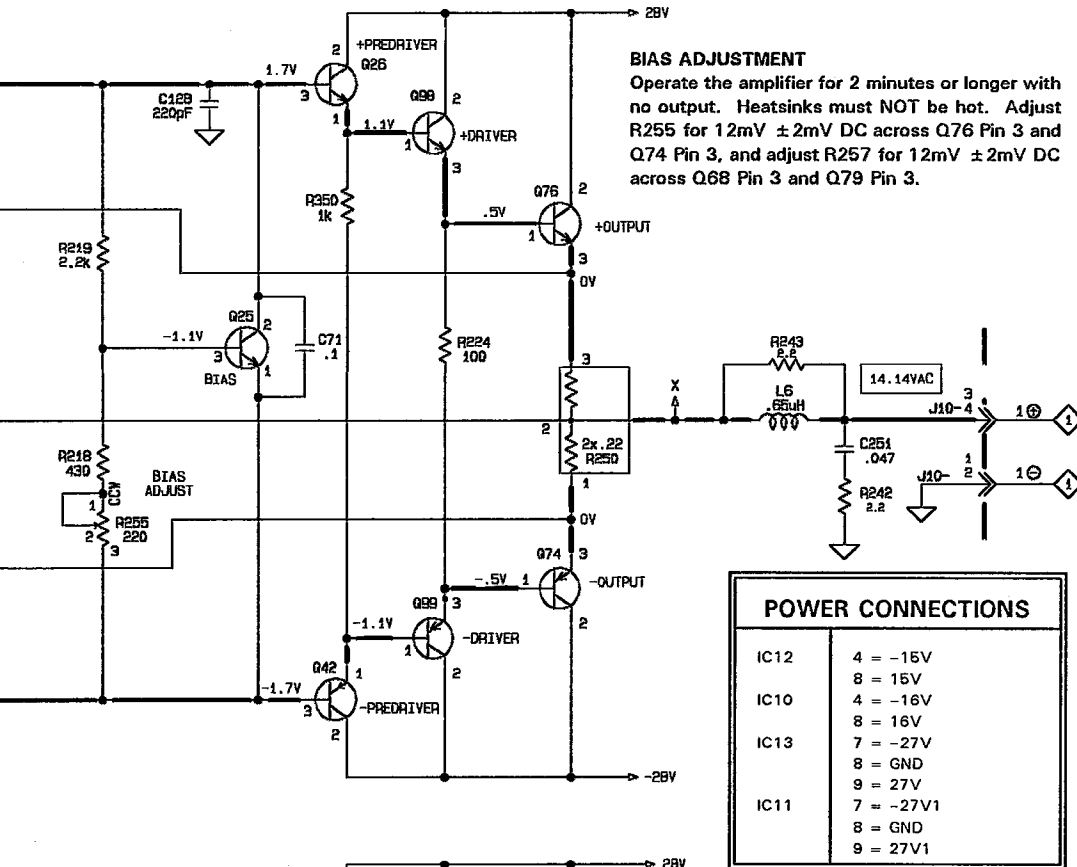
TO J1 OF THE  
EQUALIZER PCB



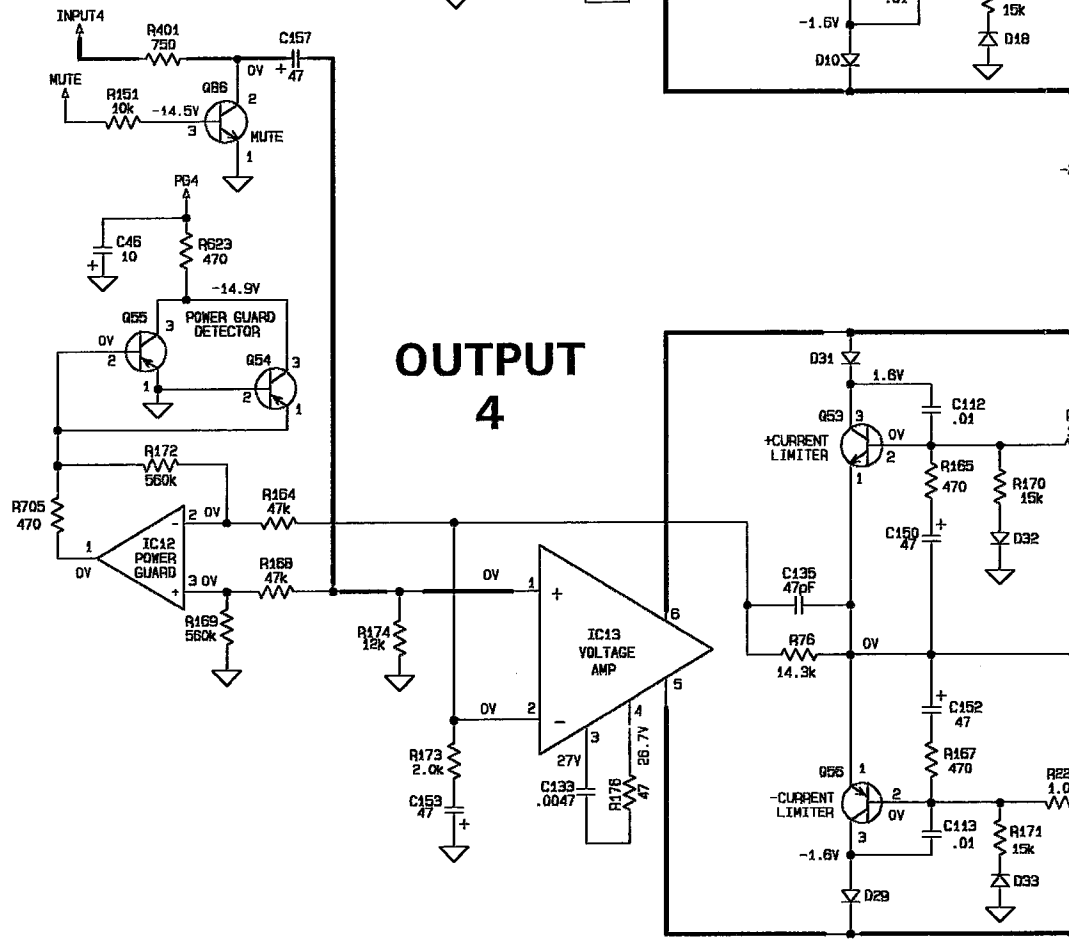
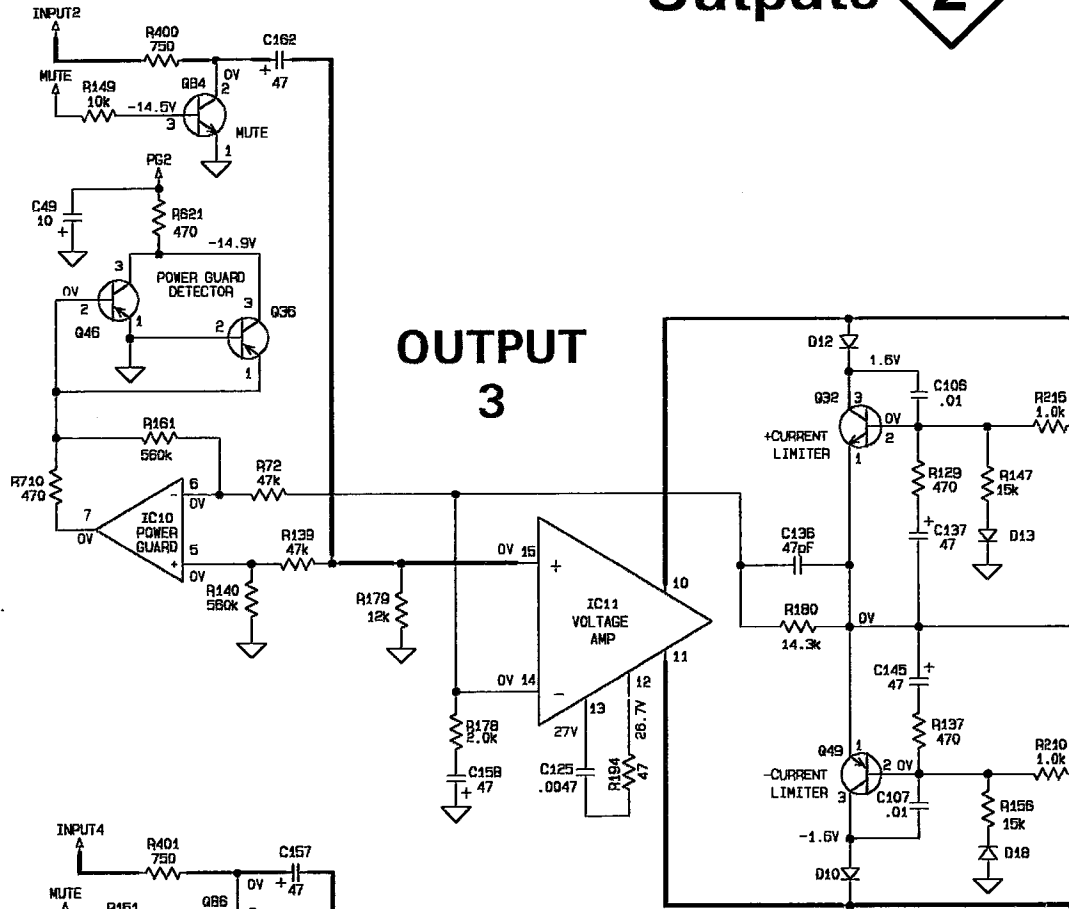
# 2 Outputs

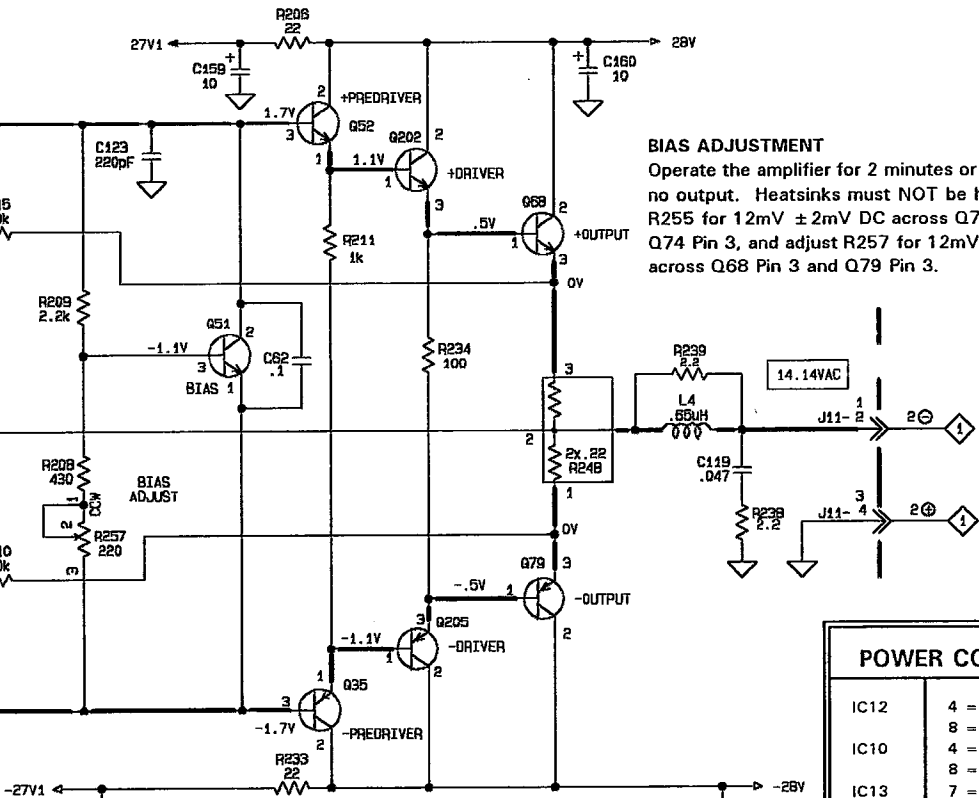
PC BOARD 048205  
 OUTPUTS SECTION  
 SHEET 3 OF 3





# Outputs 2

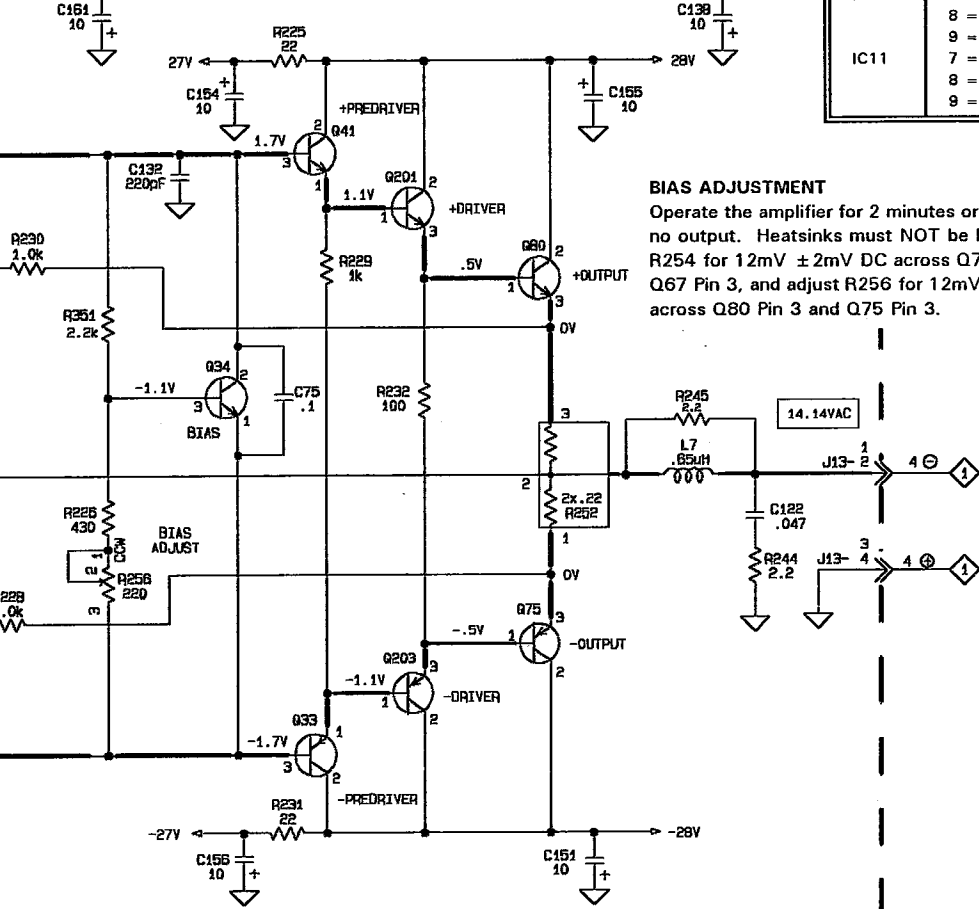




**BIAS ADJUSTMENT**

Operate the amplifier for 2 minutes or longer with no output. Heatsinks must NOT be hot. Adjust R255 for 12mV  $\pm$  2mV DC across Q76 Pin 3 and Q74 Pin 3, and adjust R257 for 12mV  $\pm$  2mV DC across Q68 Pin 3 and Q79 Pin 3.

POWER CONNECTIONS	
IC12	4 = -15V
	8 = 15V
IC10	4 = -16V
	8 = 16V
IC13	7 = -27V
	8 = GND
	9 = 27V
IC11	7 = -27V1
	8 = GND
	9 = 27V1

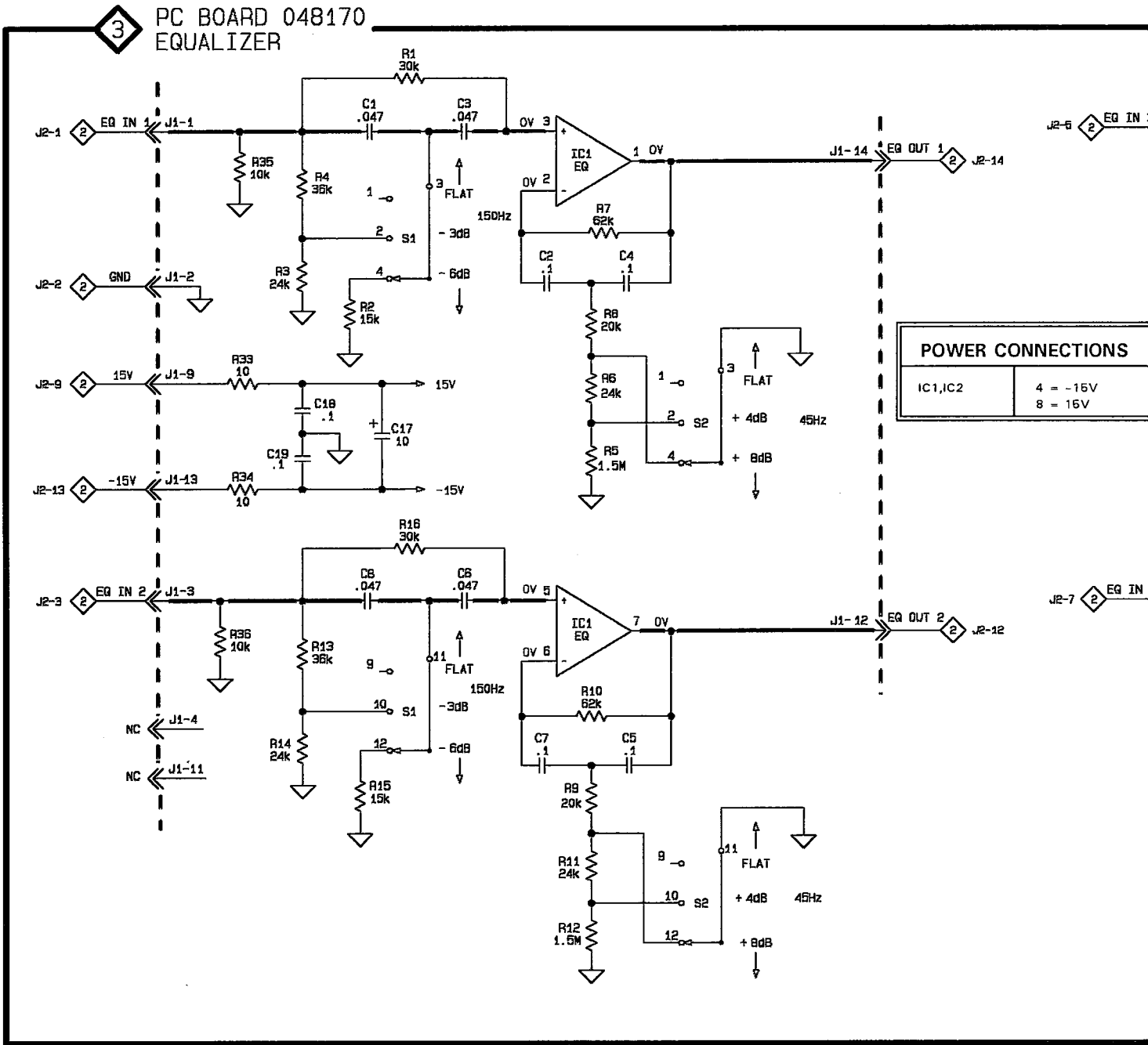


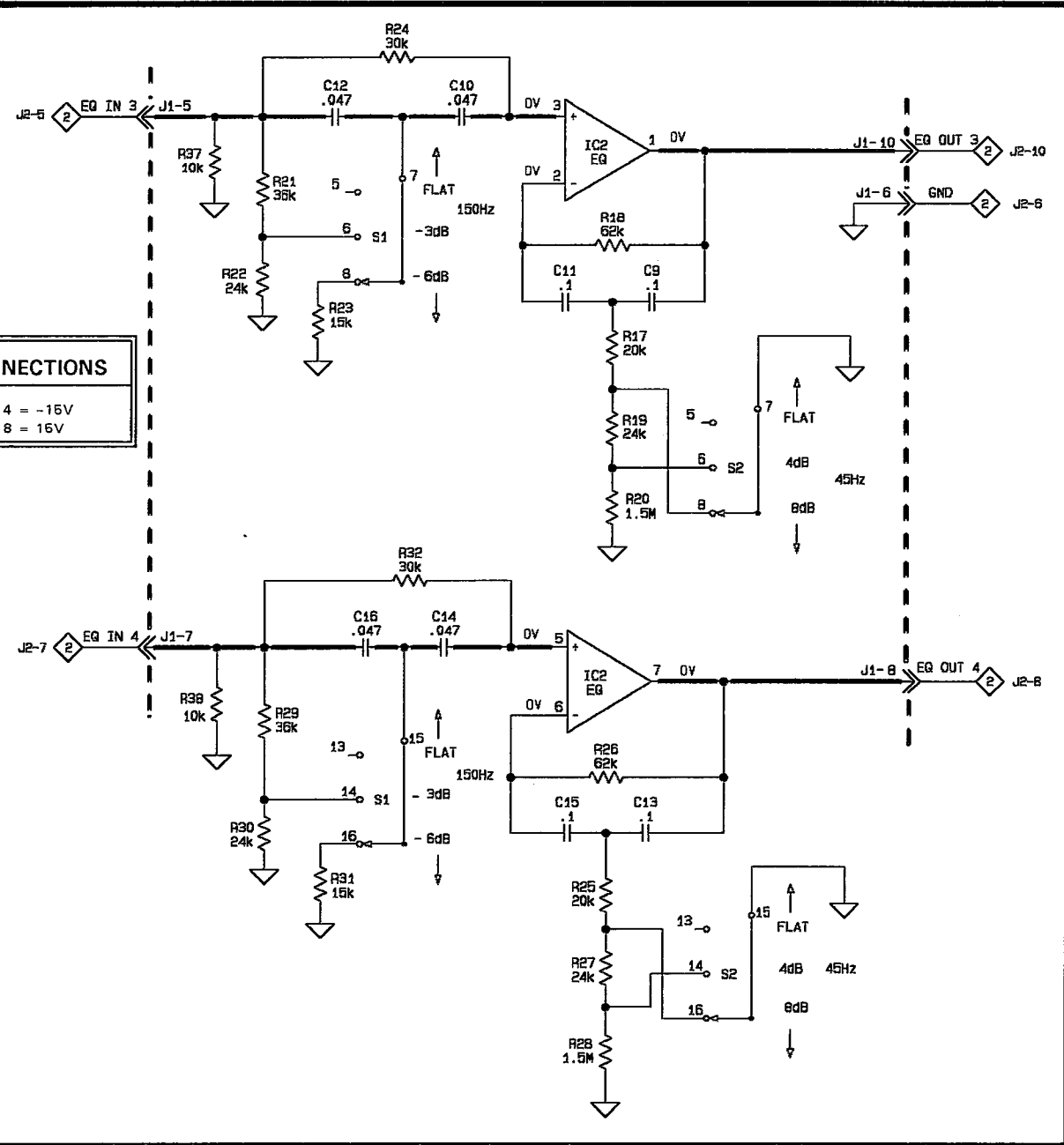
**BIAS ADJUSTMENT**

Operate the amplifier for 2 minutes or longer with no output. Heatsinks must NOT be hot. Adjust R254 for 12mV  $\pm$  2mV DC across Q72 Pin 3 and Q67 Pin 3, and adjust R256 for 12mV  $\pm$  2mV DC across Q80 Pin 3 and Q75 Pin 3.

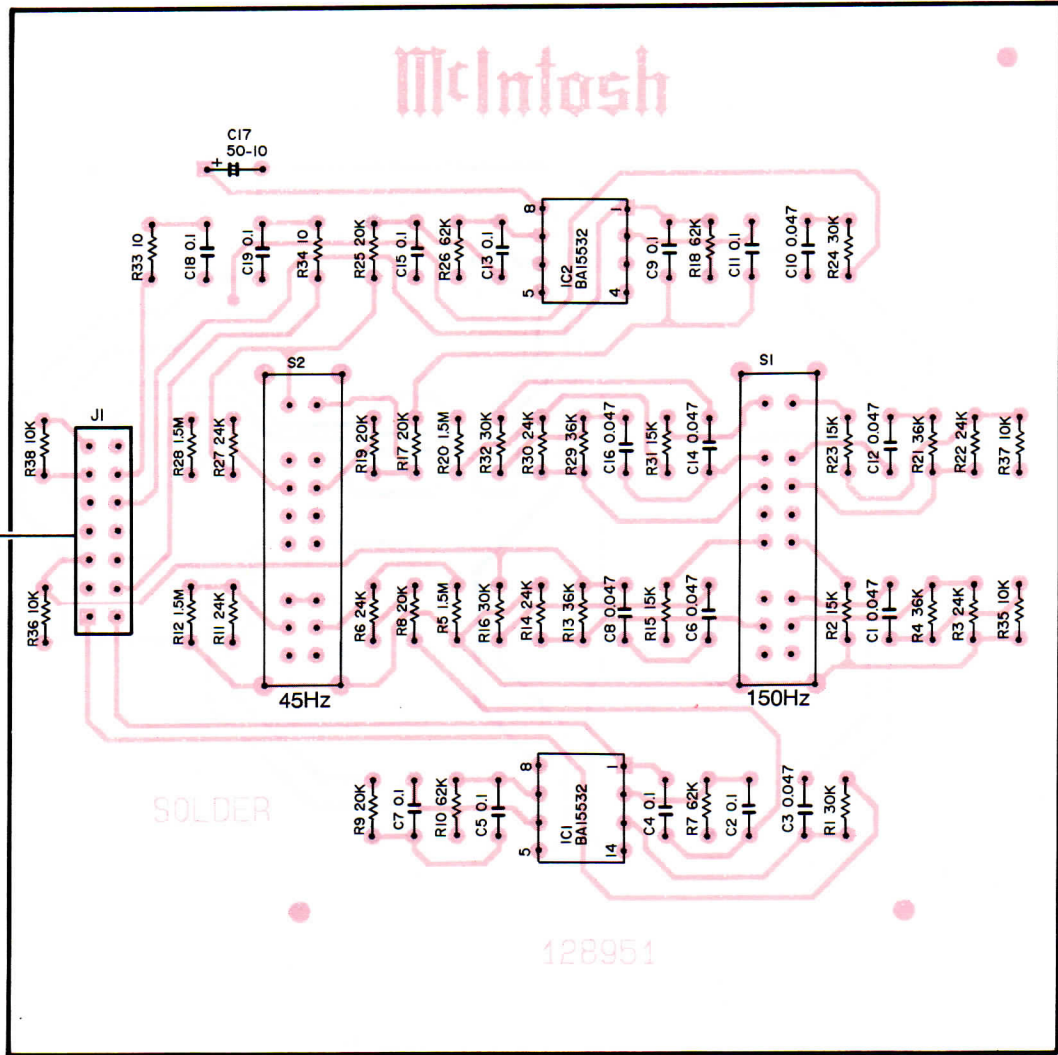


# 3 Equalizer





TO J2 OF THE  
AMPLIFIER PCB



EQUALIZER PCB 048107

# 4 Assembly Views

## ASSEMBLY PARTS LIST

<i>Reference Number</i>	<i>Part</i>	<i>Description</i>
1	048204	Fan End
2	078029	"O" Ring
3	004348	Terminal Bracket
4	088018	Circuit Breaker
5	117541	Terminal Block
6	015044	Fan Grille
7	081008	Fan
8	078030	"O" Ring
9	117540	Faston
10	112061	Standoff, Hex
11	020053	Right Corner Post
12	020054	Left Corner Post
13	018469	Heatsink
14	112058	Standoff, Hex
15	004350	Right Output Panel
16	004349	Left Output Panel
17	004351	Input Panel
18	018483	End Cover
19	017561	Corner Post Insert
20	018471	End Cover
21	004357	Control Plate
22	100243	Glass Screw
23	017560	Screw Sleeve
24	016319	Glass
25	094309	Glass Insulator
26	017559	Switch Ext
27	114119	Clip214
28	114118	Clip218
29	070148	Rectifier Diode Pair
30	144279	Thermistor
31	132239	Output Transistor
32	132267	Driver Transistor
33	132233	Bias Transistor
34	132268	Driver Transistor
35	132238	Output Transistor
36	132260	MOSFET Transistor
37	133250	15V Regulator Transistor
38	133253	-15V Regulator Transistor
39	018475	Left Sub H.S.
40	018476	Right Sub H.S.
41	117213	Friction Lock
42	122293	Choke
43	066441	Capacitor
44	066443	Capacitor
45	134470	Trim Pot
46	139196	Emitter Resistor
47	159244	Transformer
48	133239	Voltage Amp
49	117527	Header
50	122297	Choke
51	148062	Switch
52	134465	Gain Control
53	112057	Standoff, Hex
54	128950B	LED PCB
55	117522	Terminal Block
56	004389	Bracket
57	117535	Phono Jack
58	070149	Rectifier Diode Pair
59	004356	Bottom Cover
60	125896	EQ Decal
61	004377	EQ Top Cover
62	117526	Connector 14 Pos
63	128951	EQ PCB
64	004378	EQ Bottom Cover

# Assembly Views

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