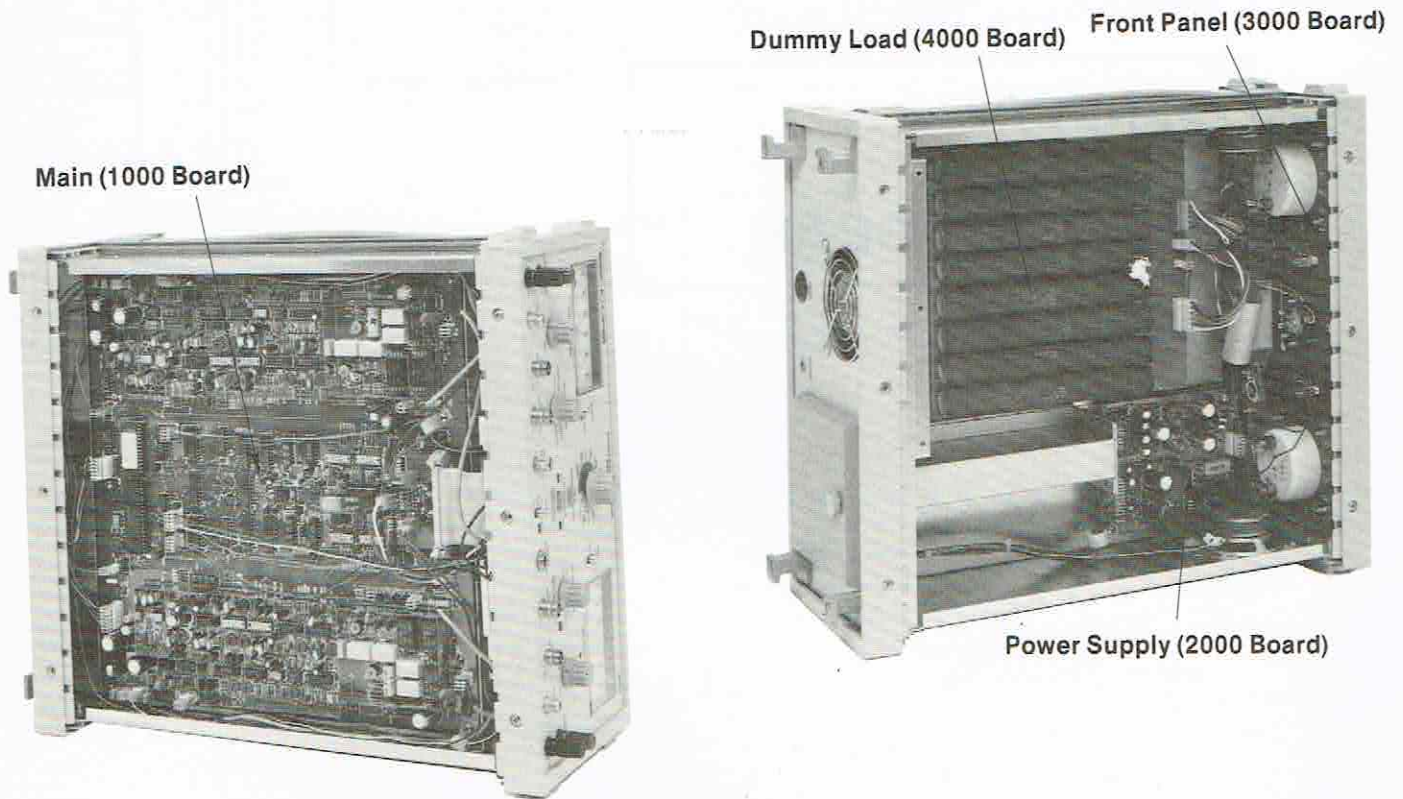


# PA81

## Audio Power Analyzer

### Schematic & Parts List



## SHEET 1

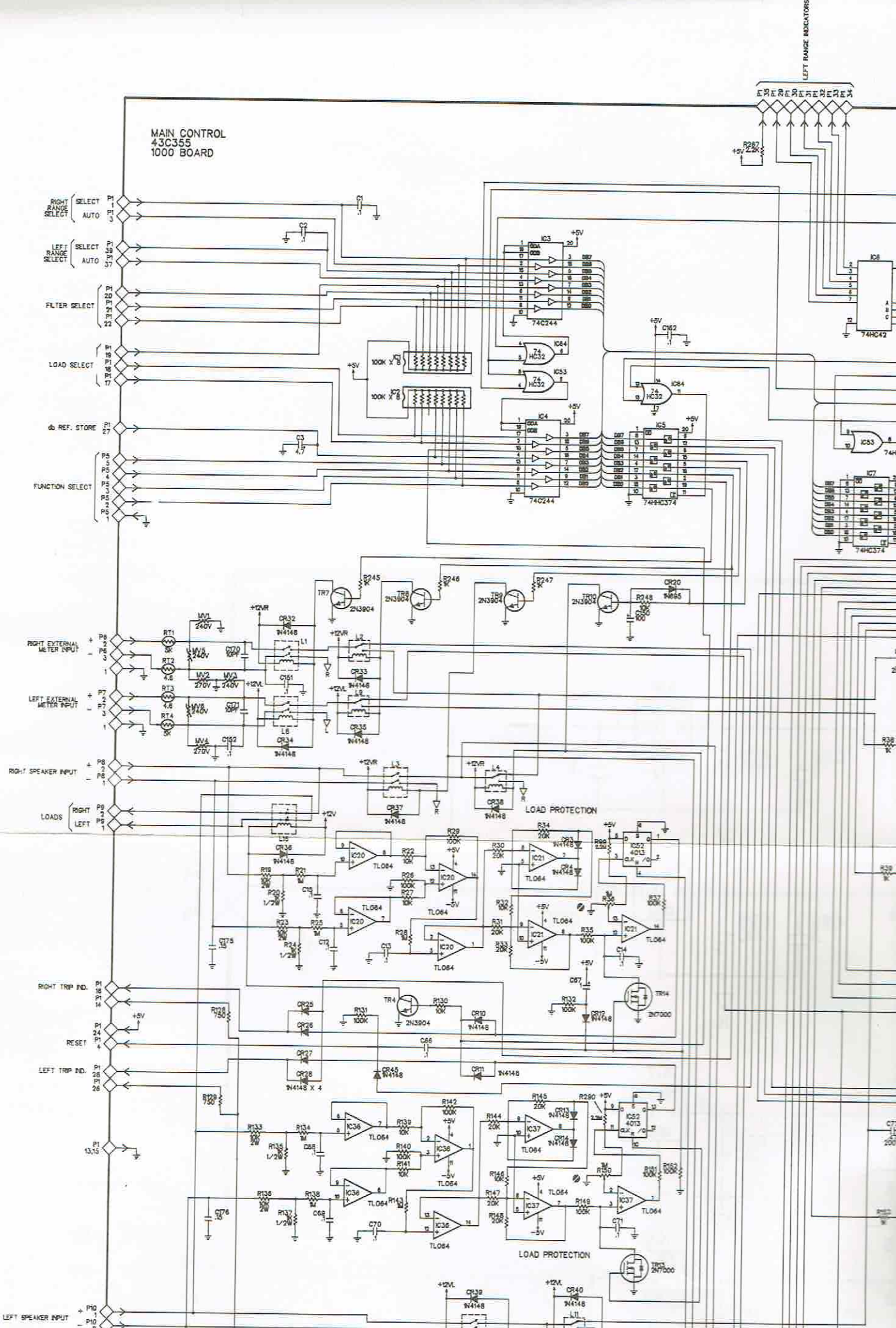
### Index

	Board No.	See Sheet #
This sheet in-	1000	2
cludes parts list	2000	2
& block diagram.	3000	3



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MAIN CONTROL  
43C355  
1000 BOARD

LEFT RANGE INDICATORS

RIGHT RANGE SELECT  
SELECT AUTO  
PI 1  
PI 3

LEFT RANGE SELECT  
SELECT AUTO  
PI 19  
PI 37

FILTER SELECT  
PI 20  
PI 21  
PI 22

LOAD SELECT  
PI 19  
PI 18  
PI 17

db REF. STORE  
PI 27

FUNCTION SELECT  
PI 5  
PI 4  
PI 3  
PI 2  
PI 1

RIGHT EXTERNAL METER INPUT  
+ P6  
- P6

LEFT EXTERNAL METER INPUT  
+ P7  
- P7

RIGHT SPEAKER INPUT  
+ P8  
- P8

LOADS  
RIGHT P9  
LEFT P8

RIGHT TRIP IND.  
PI 16  
PI 14

RESET  
PI 24  
PI 1

LEFT TRIP IND.  
PI 18  
PI 26

PI 13,15

LEFT SPEAKER INPUT  
+ P10  
- P10

IC6  
74HC42

IC5  
74HC42

IC7  
74HC374

IC8  
74HC374

IC9  
74HC374

IC10  
74HC374

IC11  
74HC374

IC12  
74HC374

IC13  
74HC374

IC14  
74HC374

IC15  
74HC374

IC3  
74C244

IC4  
74C32

IC5  
74C32

IC6  
74C32

IC7  
74C32

IC8  
74C32

IC9  
74C32

IC10  
74C32

IC11  
74C32

IC12  
74C32

IC13  
74C32

IC14  
74C32

IC15  
74C32

IC16  
74C32

IC17  
74C32

IC18  
74C32

IC19  
74C32

IC20  
74C32

IC21  
74C32

IC22  
74C32

100K X 8

100K X 8

LOAD PROTECTION

LOAD PROTECTION

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+5V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

+12V

-5V

-5V

-5V

-5V

-5V

-5V

-5V

-5V

-5V

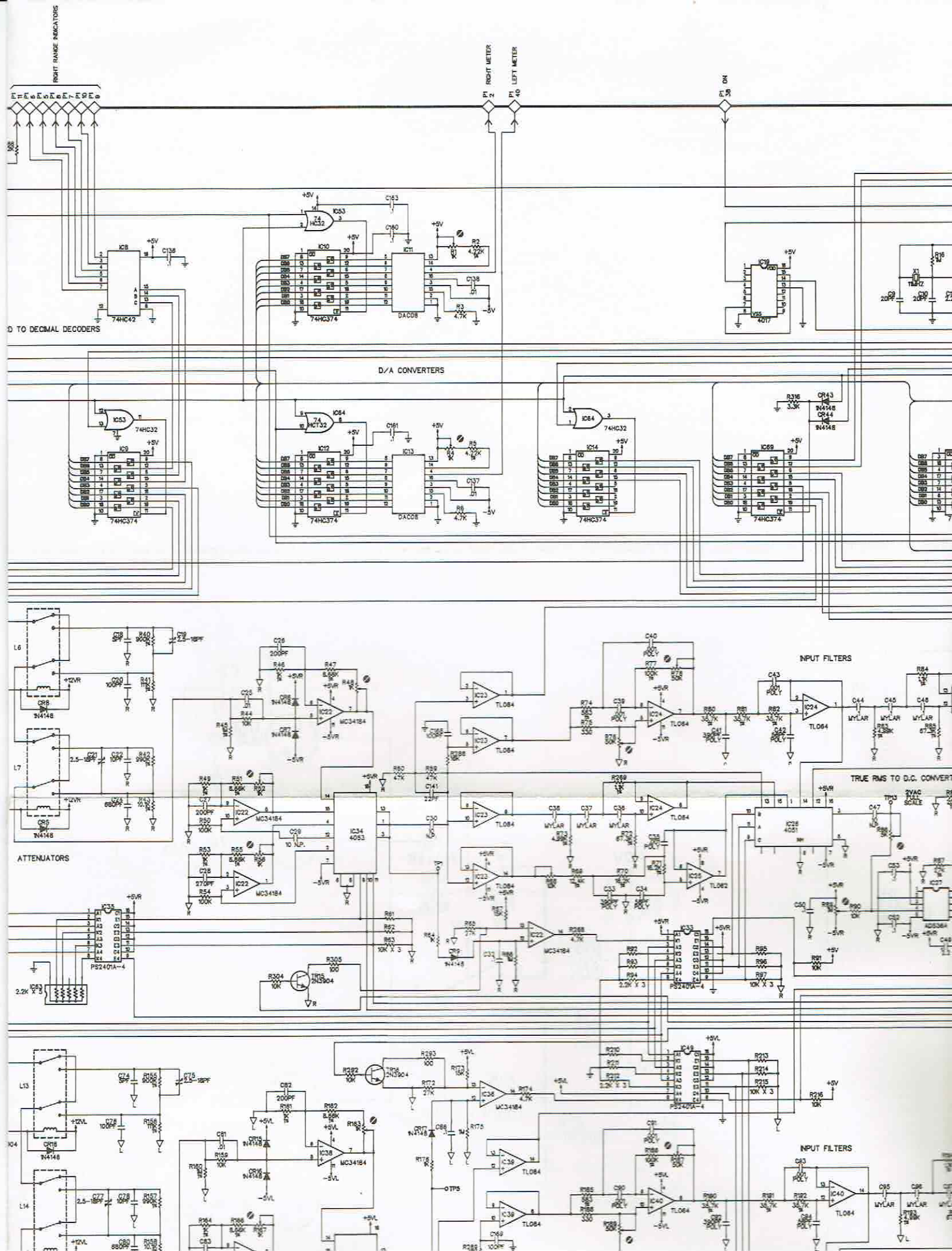
-5V

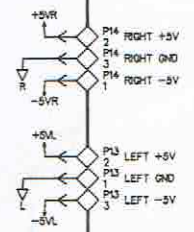
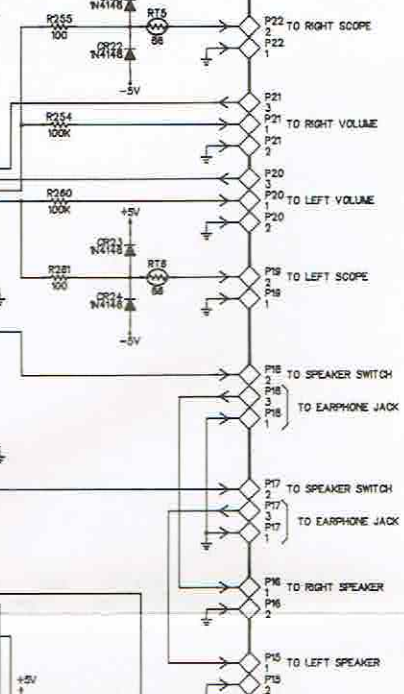
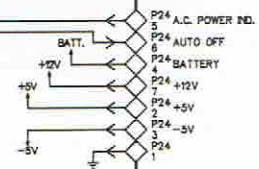
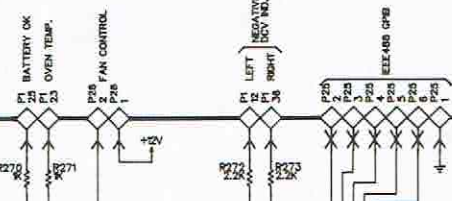
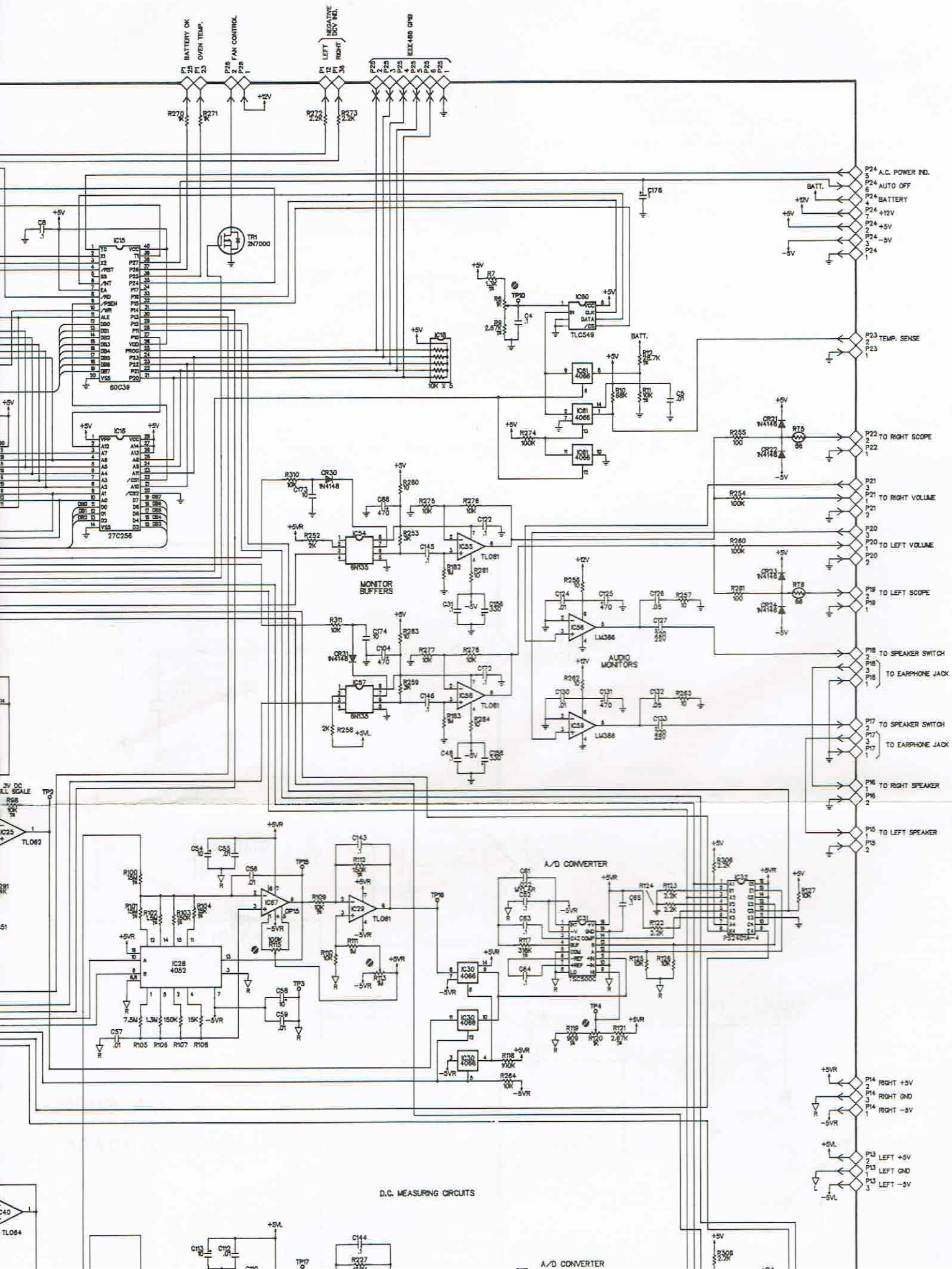
-5V

-5V

-5V





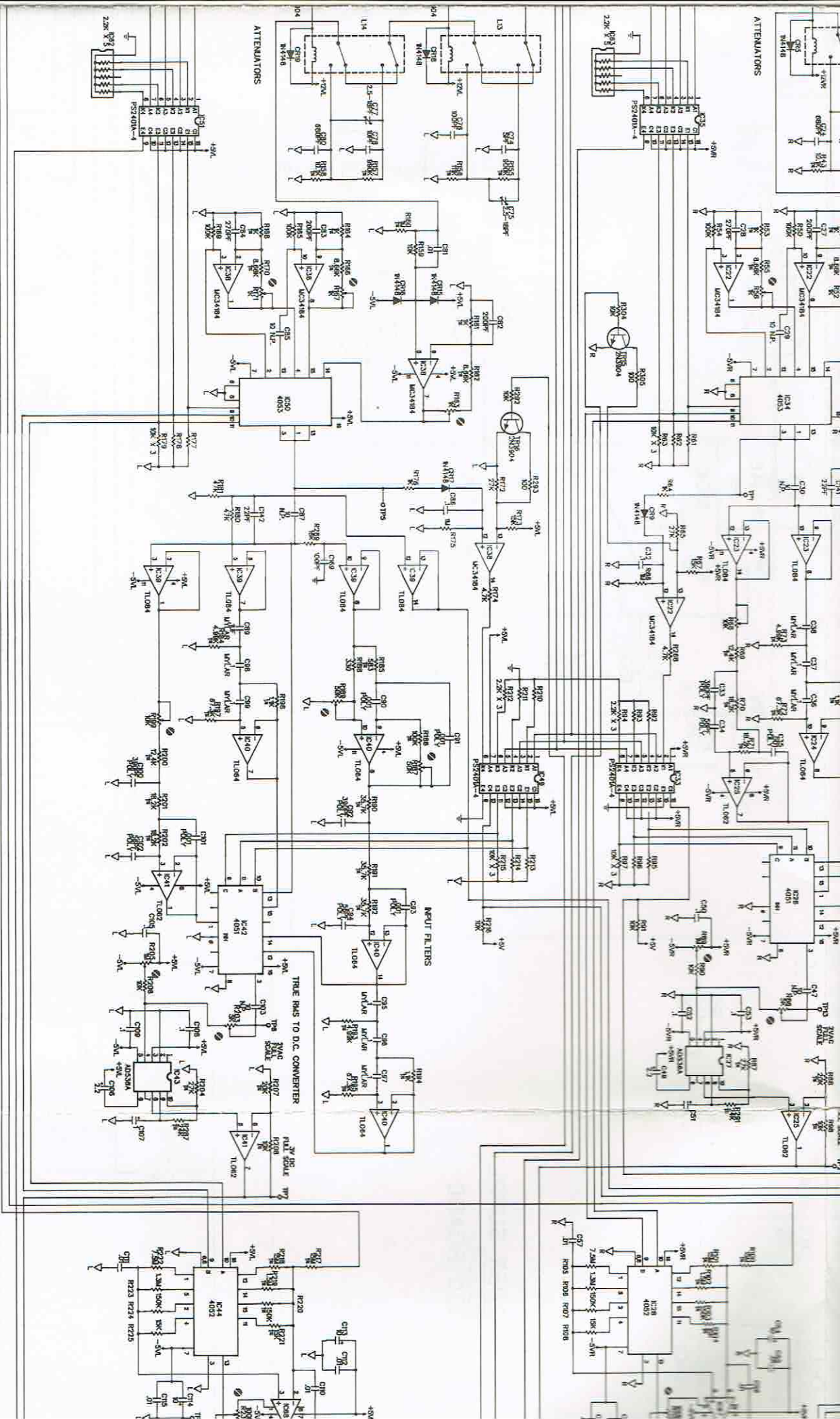


D.C. MEASURING CIRCUITS

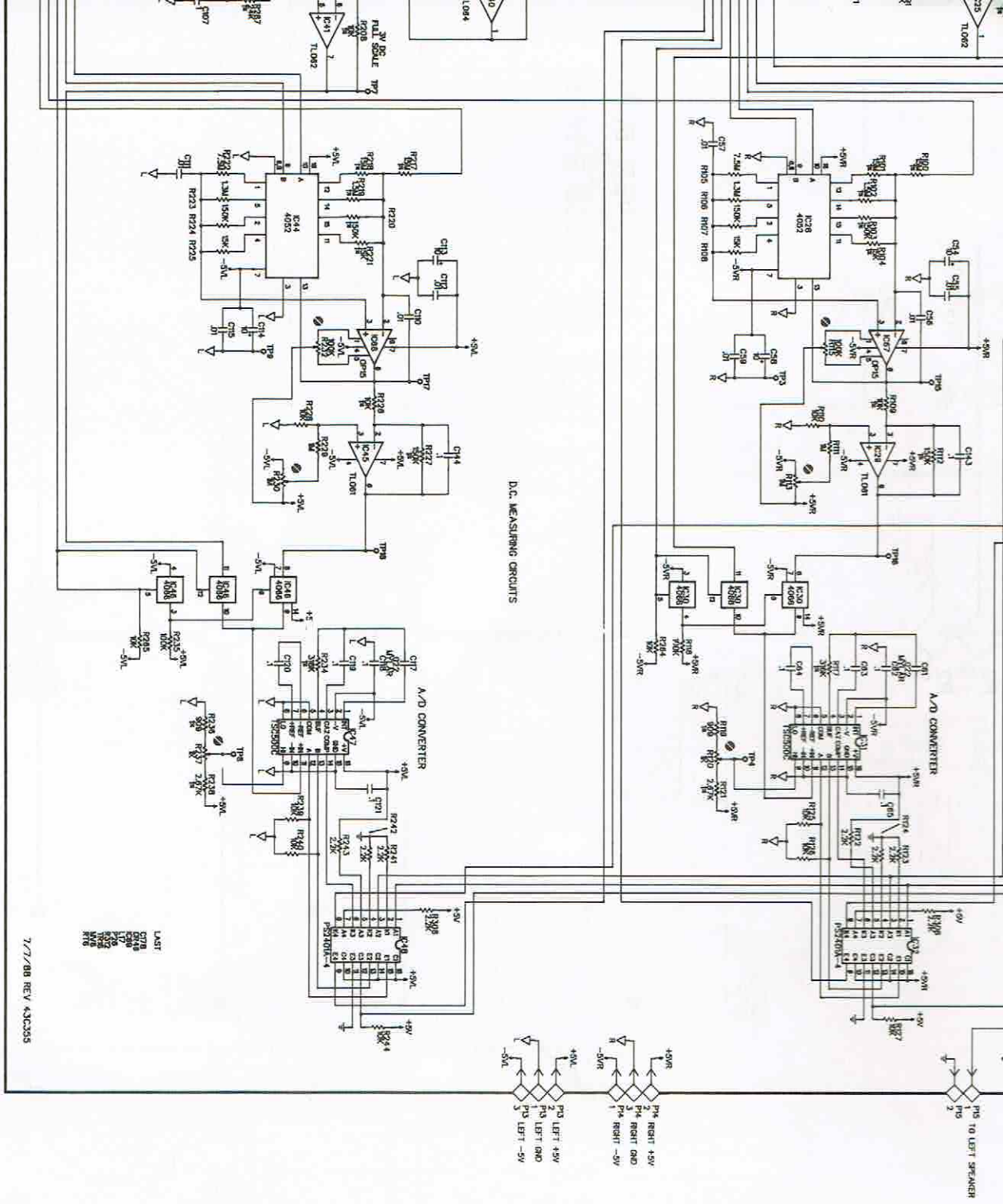
A/D CONVERTER







1000 Main Board Schematic



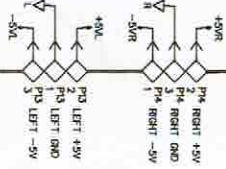
D.C. MEASURING CIRCUITS

A/D CONVERTER

A/D CONVERTER

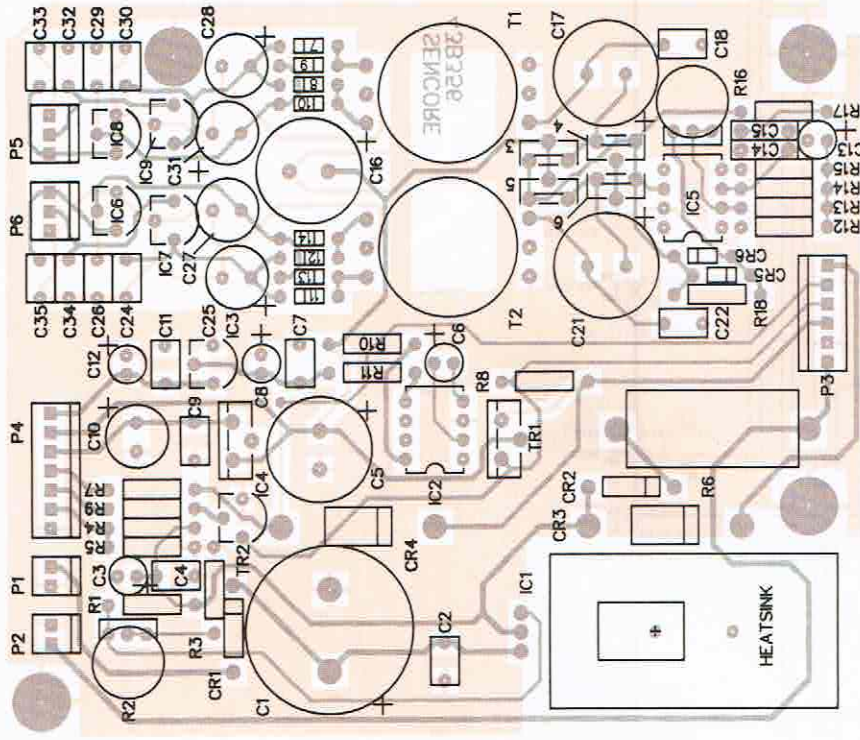
7/77/88 REV 43C355

LAST  
 C77B  
 C78B  
 P70  
 R72  
 R76  
 R78

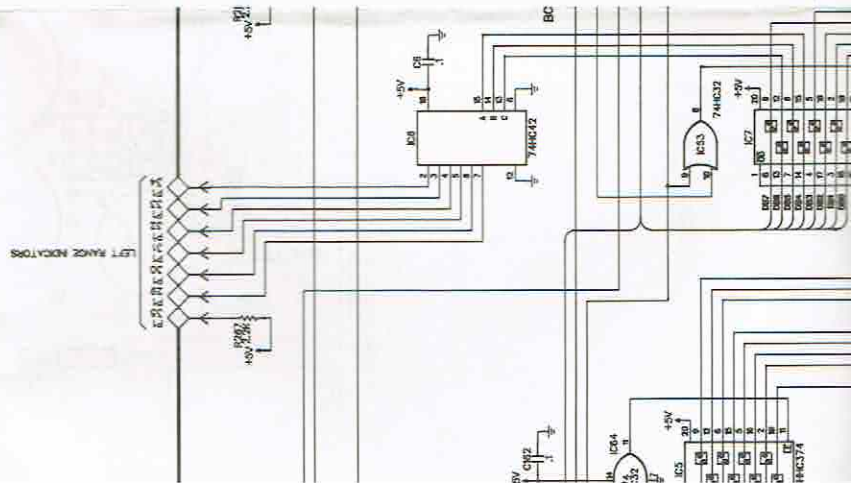




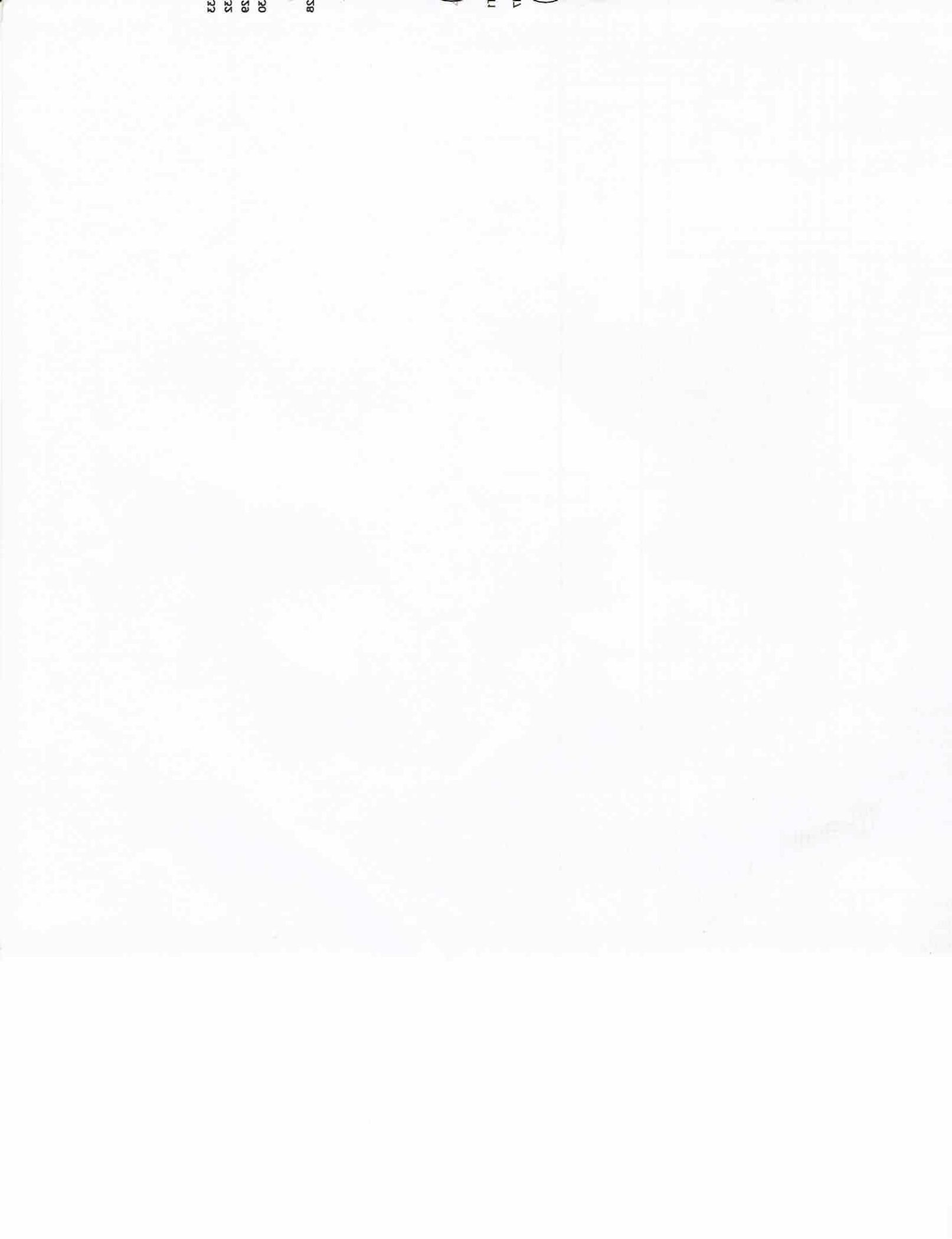
SC43B356



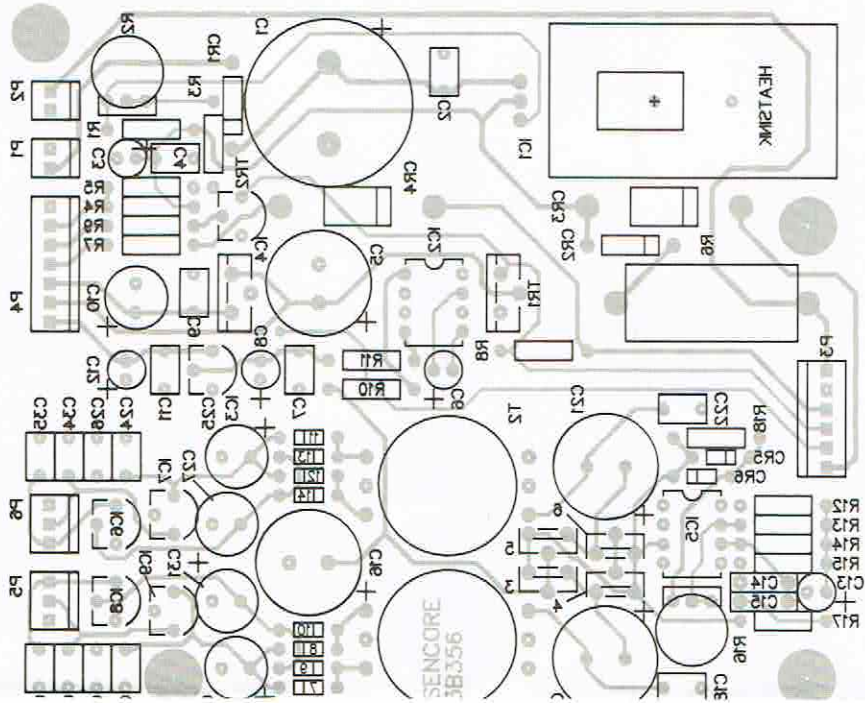
2000 Power Supply Board Component View





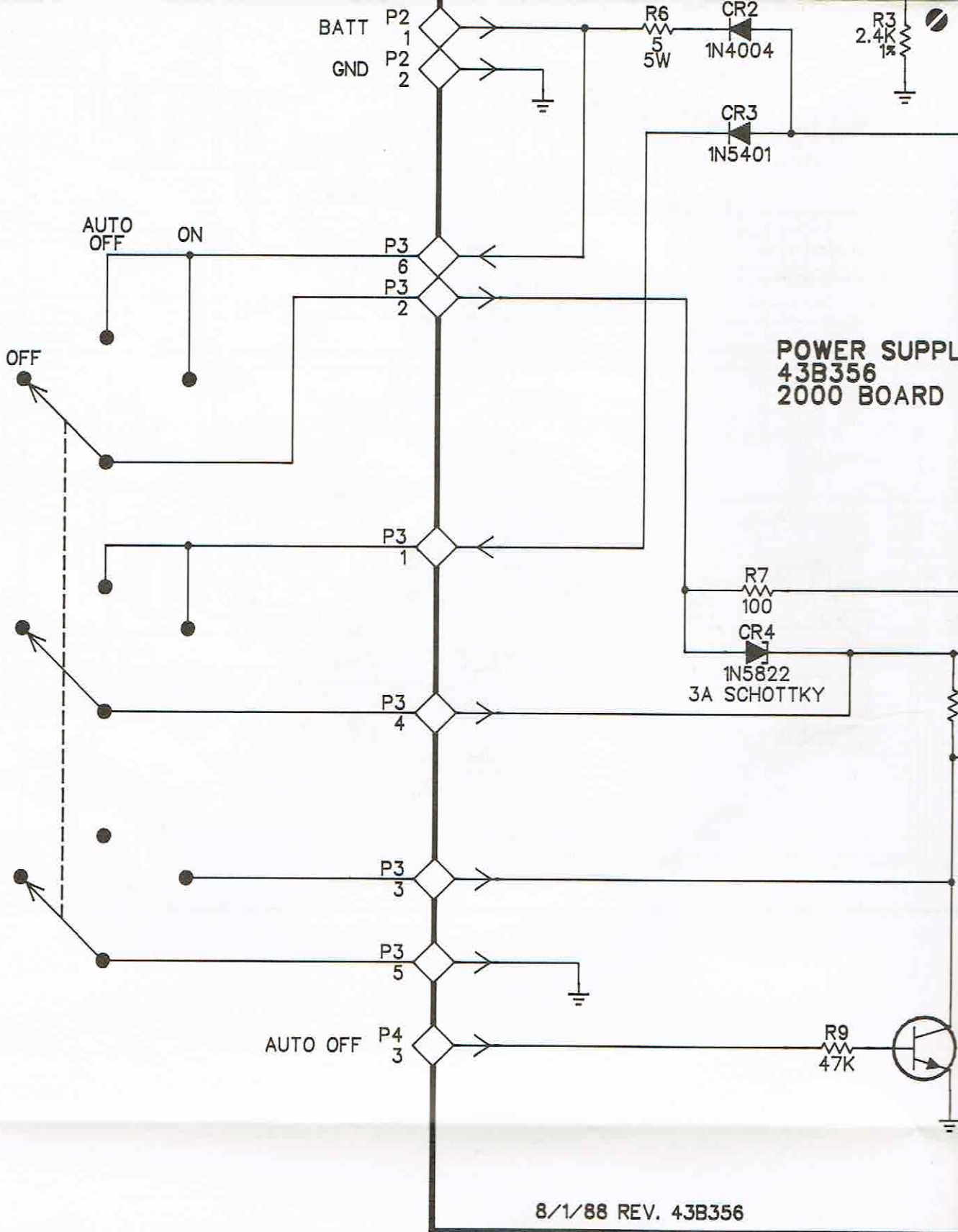


2C43B32E

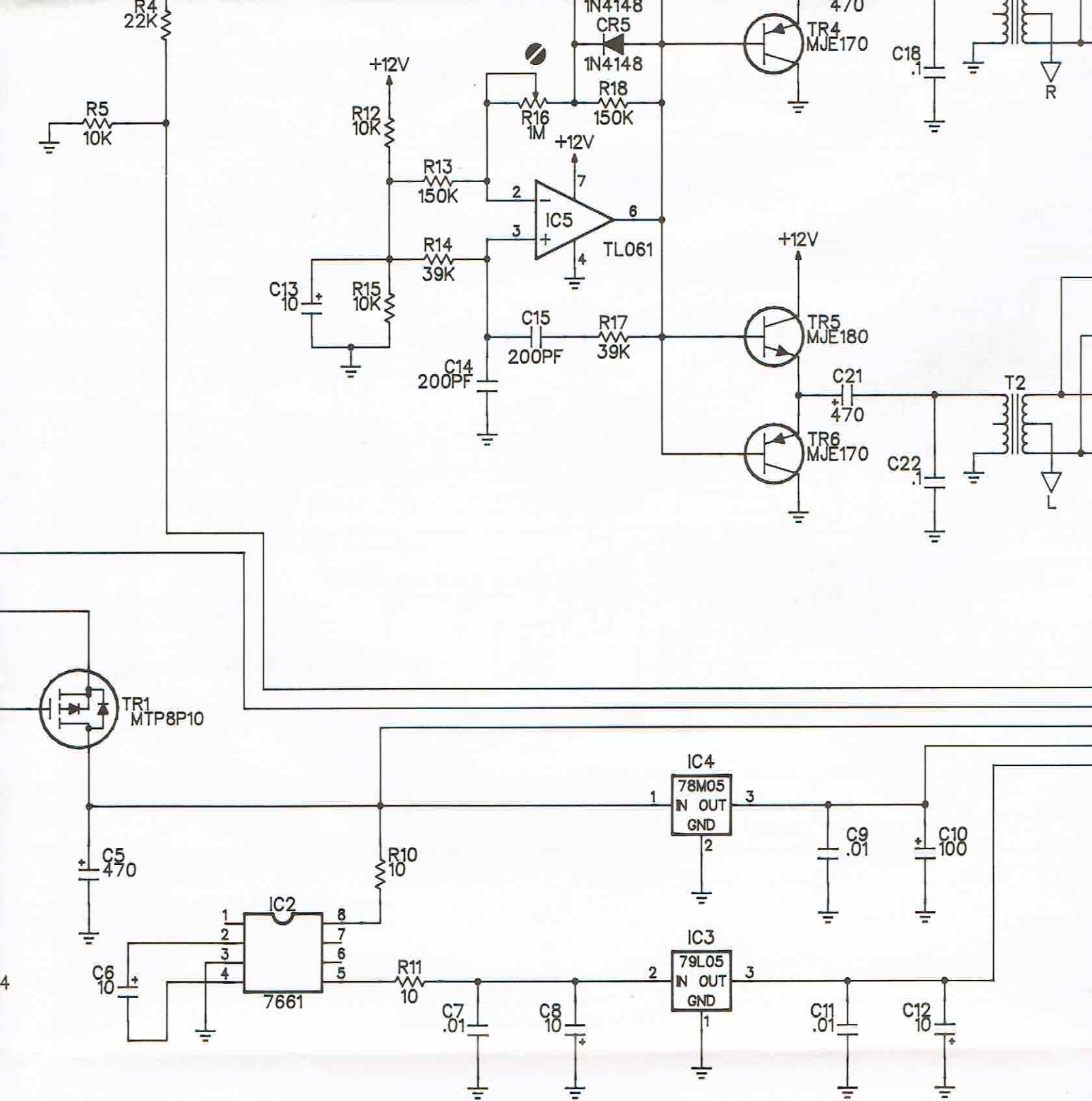


2000 Power Supply Board Foil View



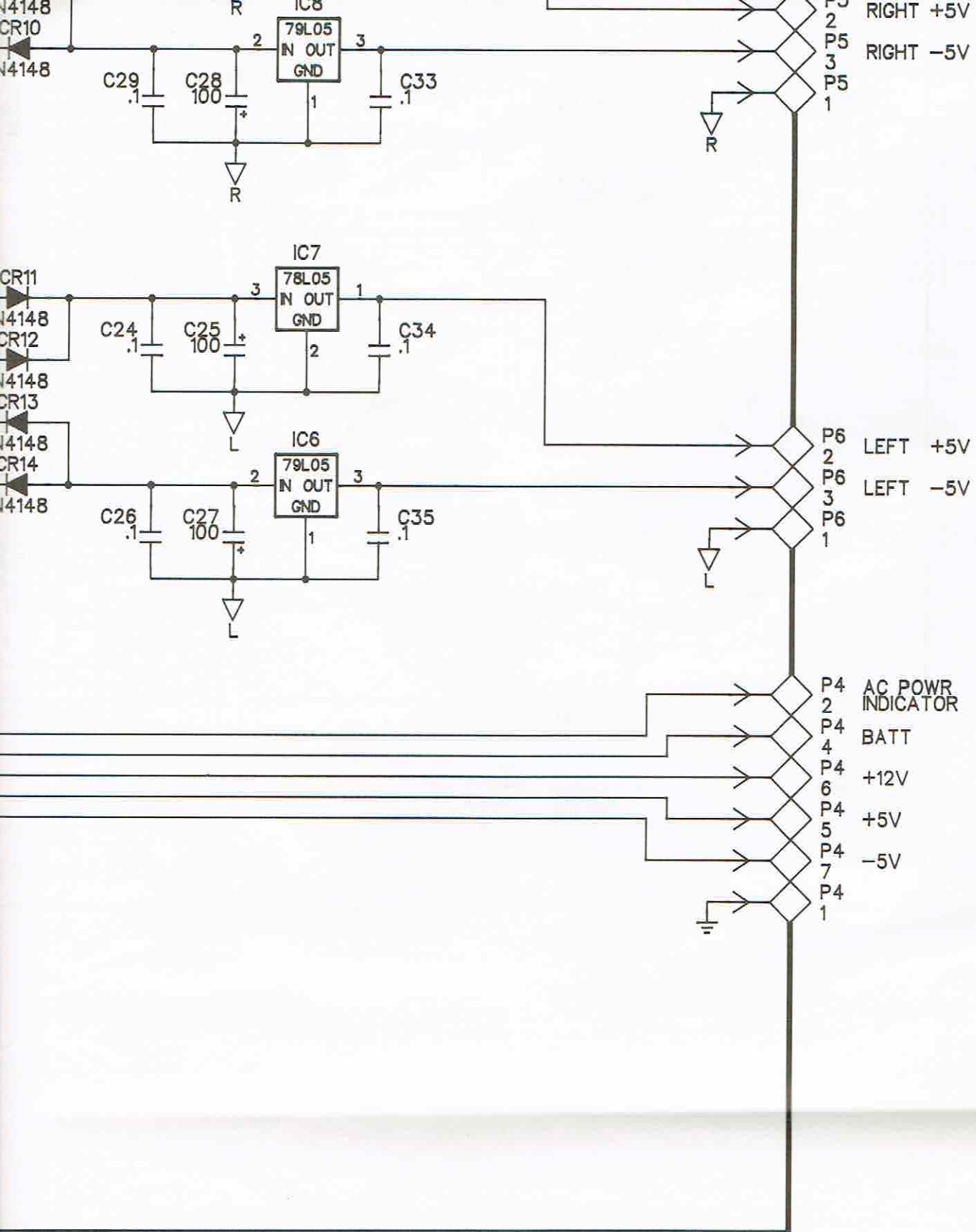


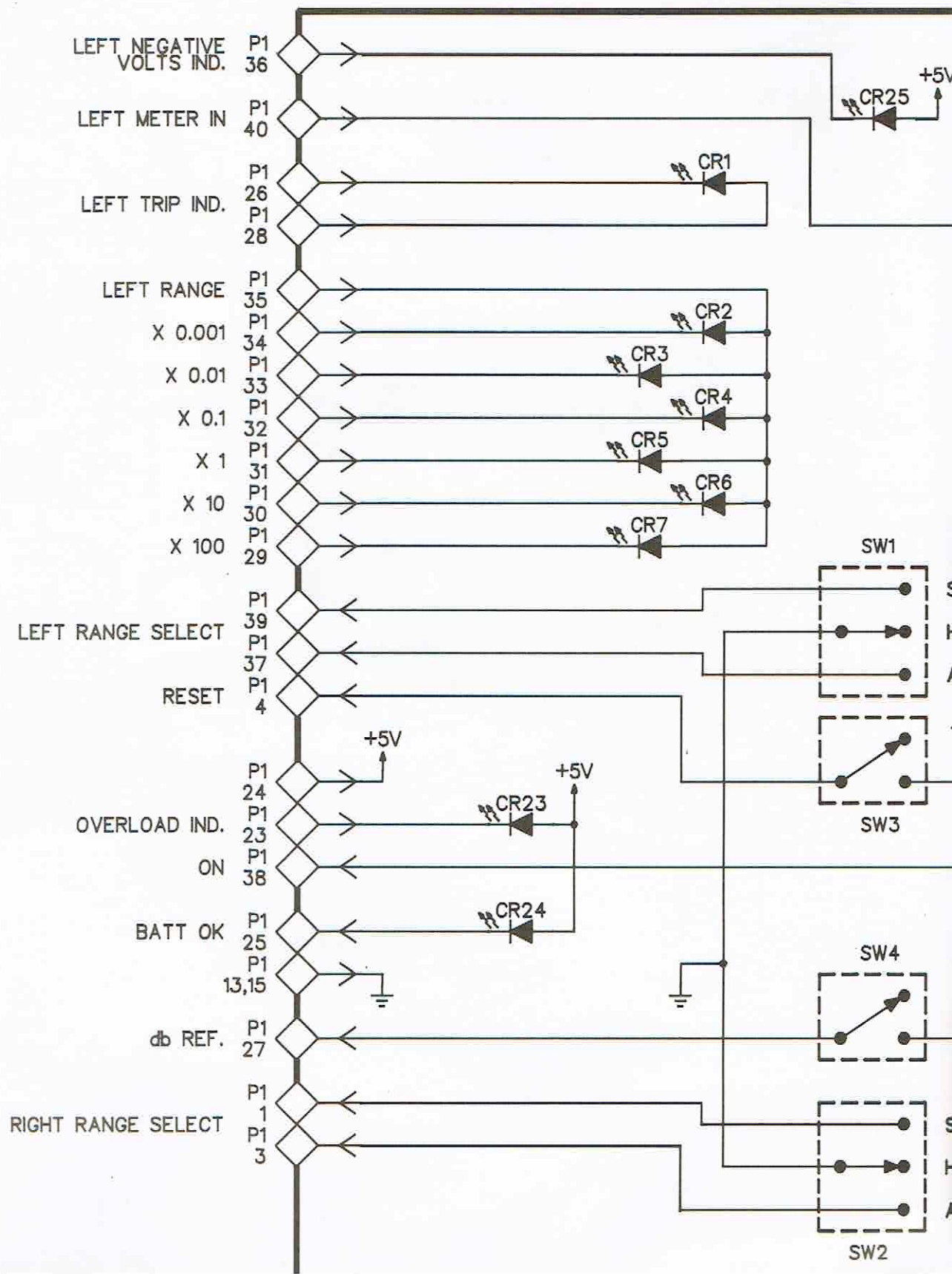
8/1/88 REV. 43B356



2000 Power Supply Board Schematic

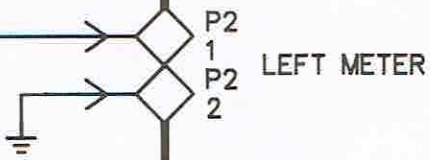




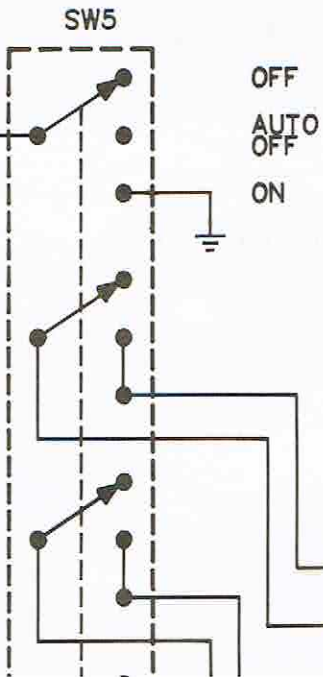




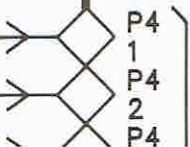
PA81 FRONT PANEL  
43C378  
3000 BOARD

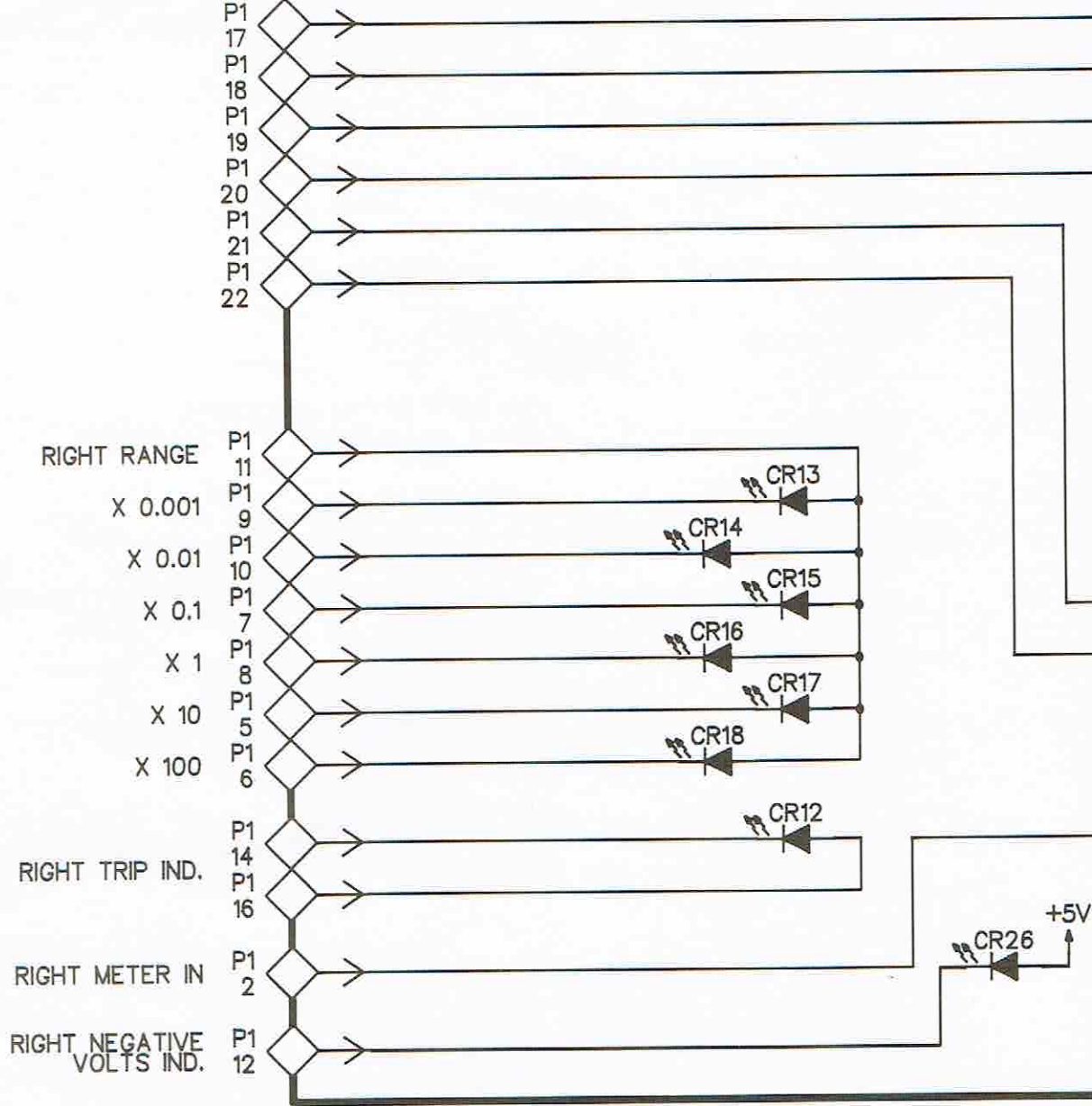


LECT  
LD  
TO  
V

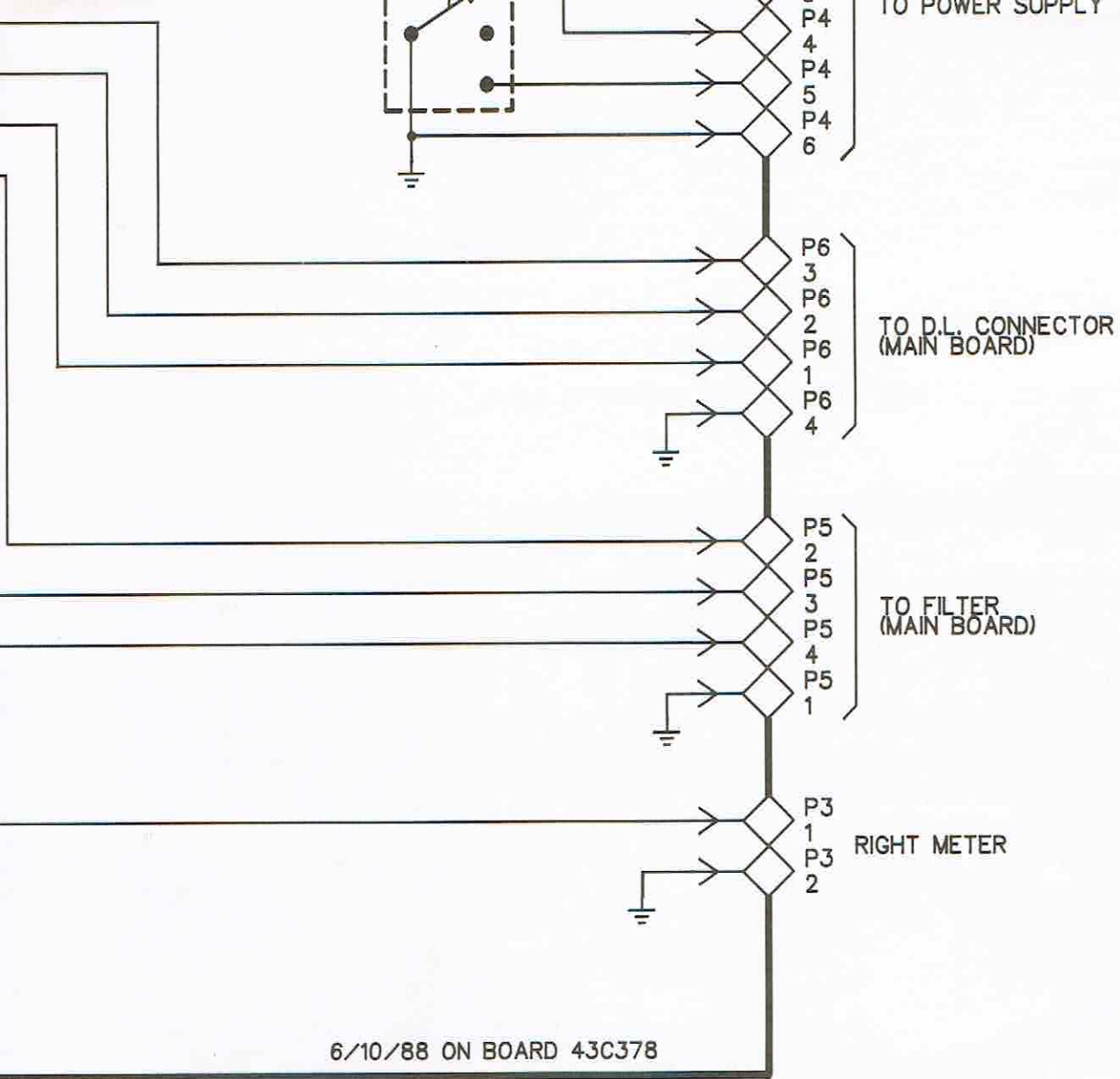


LECT  
LD  
TO





3000 Front Panel



Board Schematic



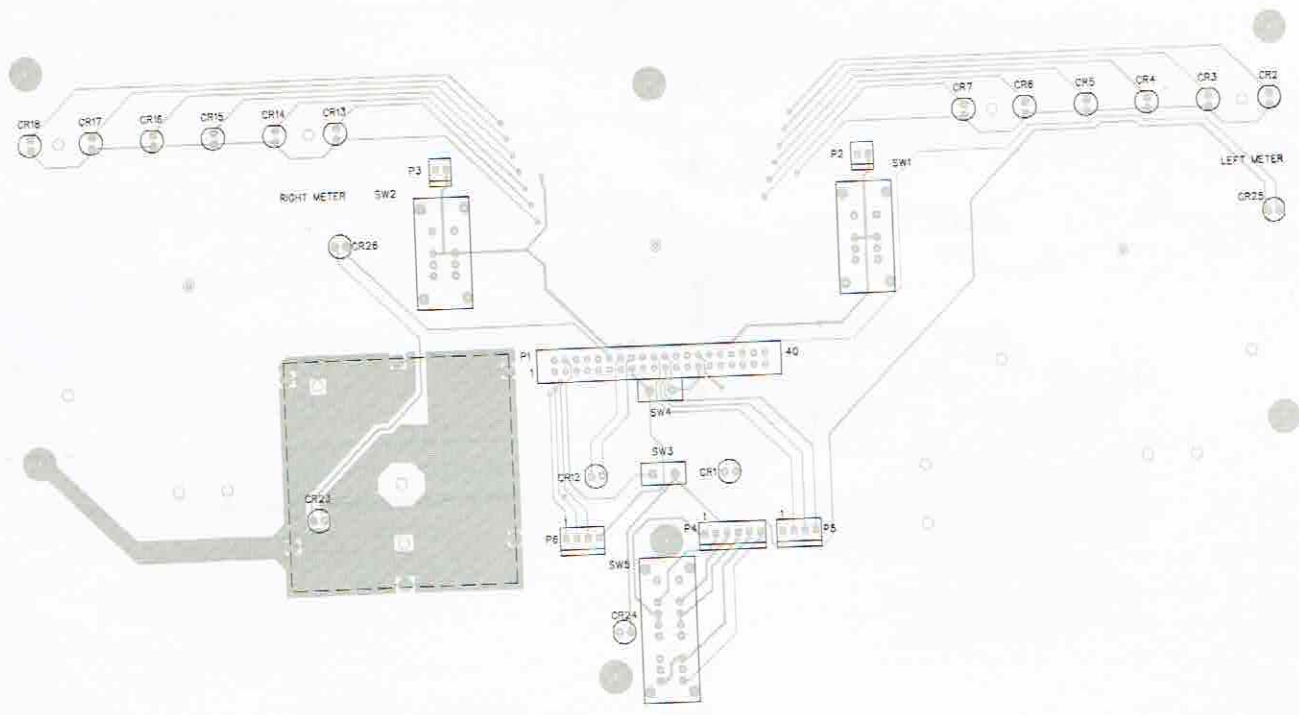
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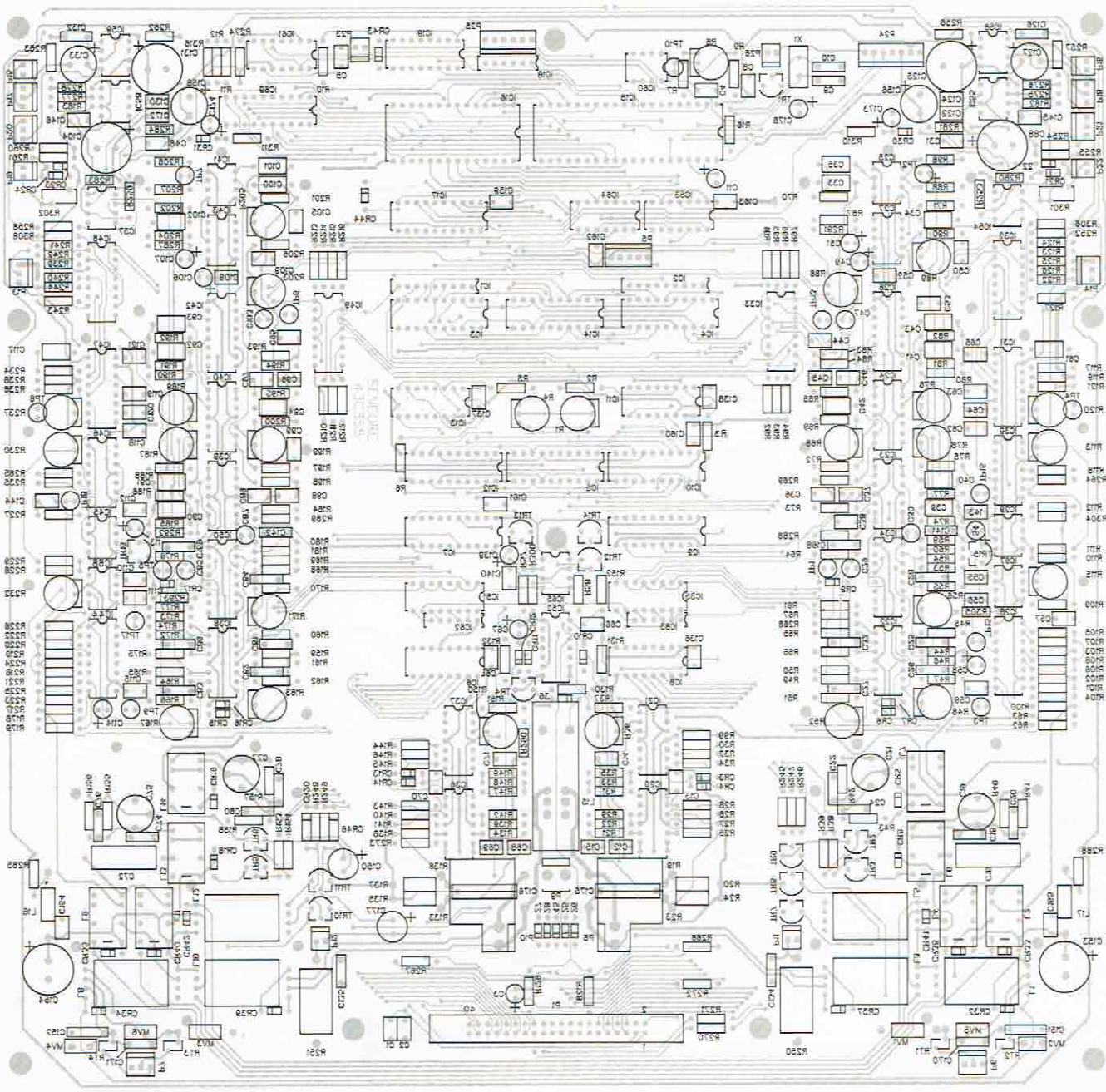
# SHEET 3

This sheet includes 1000 and 3000 board PC layouts and 3000 board schematic.



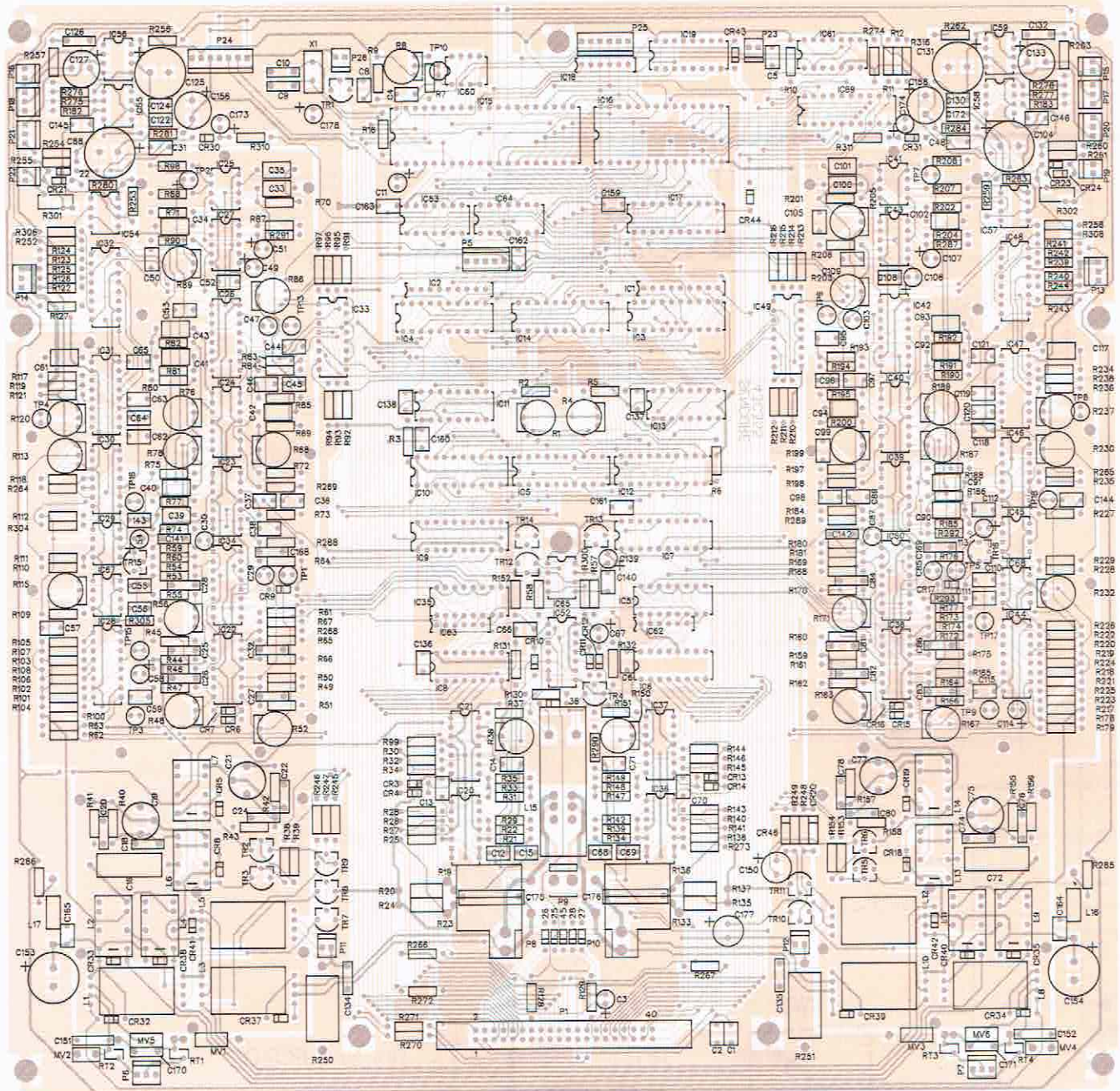


3000 Front Panel Foil View



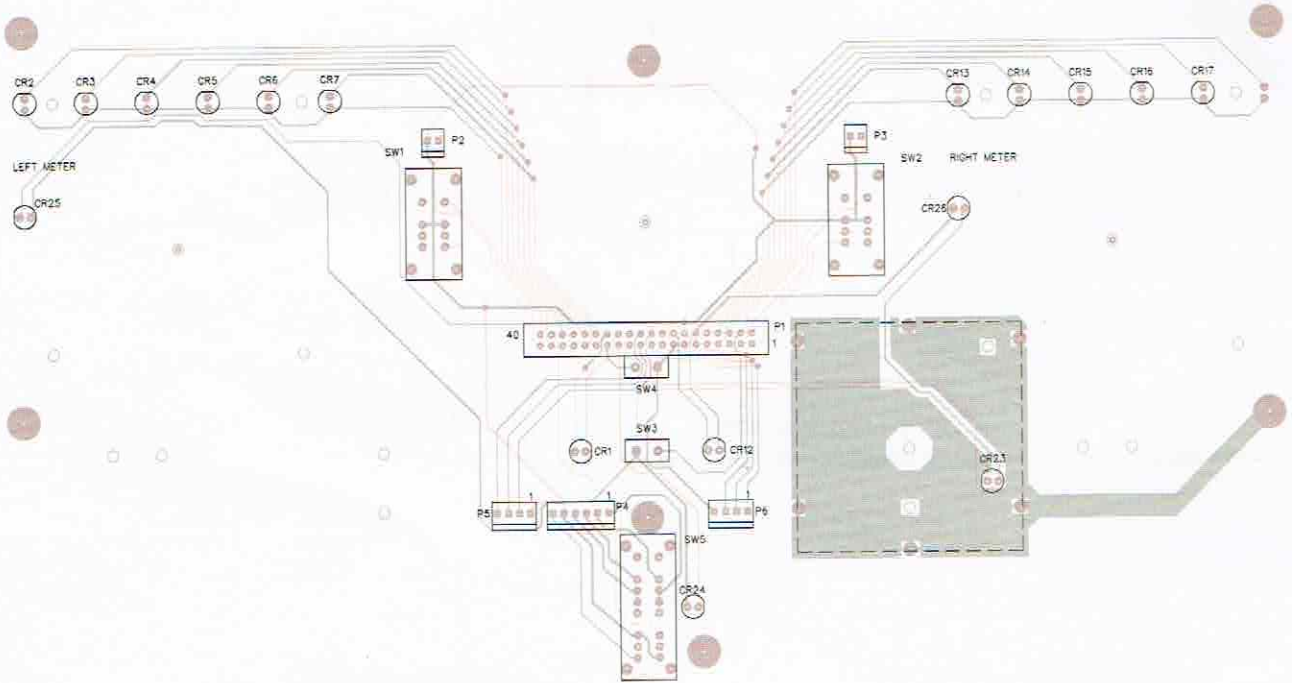
1000 Main Board Foil View





1000 Main Board Component View





**3000 Front Panel Component View**

Schematic Reference	Part No.	Description
<b>Main(1000 Board)</b>		
C1,2,4,6,8,12-15,31, 32,36-38,44-46,48,50, 52,53,62,65,66,68-70, 86,89,95-99,105,108, 109,118-122,136, 143-146,160,161,164, 165,172	24G482	Cap, Mylar, .1uF, 50V, 5%
C3	24G491	Cap, Lytic, 4.7uF, 25V, +100/-20%
C5,25,55-57,59,81, 110-112,115,124,130, 137,138,140	24G207	Cap, Disc, .01uF, 100V, +80/-20%
C9,10	24G77	Cap, Disc, 20pF, 500V, 5%, NPO
C11,49,106	24G384	Cap, Lytic, 2.2uF, 50V, 20%
C16,72	24G146	Cap, Mylar, .47uF, 200V, 10%
C18,74	24G153	Cap, Disc, 5pF, 500V, 5%, NPO
C19,21,75,77	24G387	Cap, Trim, 2.5-18pF
C20,76,134,168,169, 135	24G82	Cap, Disc, 100pF, 500V, 20%, NPO
C22,78,170,171	24G86	Cap, Disc, 10pF, 500V, 10%, NPO
C24,80	24G350	Cap, Poly, 680pF, 33V, 5%
C26,27,82,83	24G178	Cap, Poly, 200pF, 125V, 5%, N150
C28,84	24G113	Cap, Disc, 270pF, 500V, 10%
C29,30,47,85,87,103	24G506	Cap, Lytic, 10uF, 16V, N.P.
C33,41,92,100	24G105	Cap, Poly, 390pF, 125V, 5%
C34,42,94,102	24G378	Cap, Poly, 56 pF, 160V, 2.5%
C35,39,40,43,101	24G188	Cap, Poly, .001uF, 33V, 5%
C51,67	25G450	Cap, Lytic, 1uF, 50V, 20%
C54,58,139,113,114, 173,174	24G382	Cap, Lytic, 10uF, 16V, 20%
C61,117	24G195	Cap, Mylar, .022uF, 250V, 10%
C88,104,125,131,153, 154	24G437	Cap, Lytic, 470uF, 25V, +100/-20%
C90,91,93	24G18	Cap, Poly, .001uF, 33V, 5%
C107,178	24G450	Cap, Lytic, 1uF, 50V, 20%
C126,132	24G59	Cap, Disc, .05uF, 75V, +80/-30%
C127,133	24G410	Cap, Lytic, 220uF, 25V, +50/-10%
C141,142	24G151	Cap, Disc, 22pF, 500V, 5%, NPO
C150,177	24G442	Cap, Lytic, 100uF, 16V, +50/-10%
C151,152	24G512	Cap, Met. Poly, .1uF, 250V, 10%
C156,158	24G248	Cap, Lytic, 330uF, 10V, 20%
C175,176	24G511	Cap, Met. Poly, .15uF, 250V, 10%
CR3-19,21-26,30-44	50C5-2:A	Diode, Sil, 1N4148
CR20,46	50C3-1	Diode, Germ, 1N34A
IC1,2,25	69G238	IC, Res Net, 8X100K
IC3,4	69G347	IC, Octal Buffer, 74HC244
IC5,7,9,10,12,14,69	69G302	IC, "D" Flip Flop, Tri-S, 74HC374
IC6,8	69G304	IC, BCD-DEC Decoder, CMOS, 74HC42
IC11,13	69G130	IC, D/A Conv, 8-Bit, .1%, DAC-0802
IC15	69G207	IC, Micro, MC80C39
IC16	69G266	IC, EPROM, 27C256/12.5 Prgmng.
IC17	69G202	IC, "D" F-Flop, Octal, 74C373
IC18	69G172	IC, Res Net, 5X10K
IC19	69G45-B	IC, Decade Counter, 4017B
IC20,21,24,36,37,40	69G134	IC, Op Amp, Quad, BiFet, TL064CN
IC22	69G35	IC, Op Amp, MC34184
IC23,39	69G46	IC, Op Amp, Quad, BiFet, TL084
IC26,42	69G65-B	IC, Switch, 1X8, 4051B
IC27,43	69G67	IC, RMS/DC Converter, AD536AJH
IC28,44	69G183	IC, Multiplexer, CA4052
IC29,45	69G136	IC, Op Amp, Single, BiFet, TL061

## Schematic Reference

## Part No.

## Description

### Main(1000 Board)

IC30,46,61	69G123-B	IC, Switch, Quad, 4066B
IC31,47	69G230	IC, A/D Convertor, TSC500CPE
IC32,33,35,48,49,51	69G310	IC, Opto Coupler, Quad, PS2401A-4
IC34,50	69G64-B	IC, Switch, Triple, 4053B
IC38	69G335	IC, Op Amp, MC34184
IC41	69G239	IC, Op-Amp, Dual Lo Pwr, TLO62I
IC52	69G8-B	IC, "D" Flip Flop, Dual, 4013B
IC53,64	69G324	IC, Or, Quad, 74HC32,
IC54,57	69G311	IC, Opto Coupler, 6N135
IC55,58	69G63	IC, Op-Amp, Single, Bifet, TL081
IC56,59	69G146	IC, Power Amp, Lo-V, LM386
IC60	69G309	IC, A/D Converter, TLC549
IC62,63	69G315	IC, Res, SIP, 5X2.2K
IC65	69G279	IC, Timer, 555CN
IC67,68	69G99	IC, Op Amp, Single, JFET, Op-15
L1,3,5,8,10,12	41G26	Relay, Reed, 2P1T, 12V
L2,4,6,7,9,11,13,14	41G25	Relay, 2P2T, 12 V
L15	41G21	Relay, Reed, DPDT, 12V, 8A, N.C.
L16,17	46G129	Inductor, Axial, 500uH, 20%
MV1,3,5,6	33G256	Varistor, 270V
MV2,4	33G302	Surgeactor, 270V, 130 MA
R1,4,8,48,52,56,120, 163,167,171,237	15C26-15	Pot, 1K, 1/2W, 20%
R11,109,121,158,208, 226	14A38-1004A	Res, 10K, 1/4W, 1%
R12	14A38-2874A	Res, 28.7K, 1/4W, 1%
R7	14A38-1303A	Res, 1/3K, 1/4W, 1%
R9,121,238	14A38-2673A	Res, 2.67K, 1/4W, 1%
R19,23,133,136,250, 251	14C10-103	Res, 10K, 2W, 5%
R36,89,113,150,205, 230	15C26-23	Pot, 1M, 1/2W, 20%
R40,155	14A38-9005A	Res, 900K, 1/4W, 1%
R41,156	14A38-1115A	Res, 111K, 1/4W, 1%
R42,157	14A38-9905A	Resistor, 990K, 1/4W, 1%
R43	14A38-1014A	Res, 10.1K, 1/4W, 1%
R45,160	14A38-1006A	Res, 1M, 1/4W, 1%
R46,49,53,161,164,168	14A38-1003A	Res, 1K, 1/4W, 1%
R47,51,55,162,166,170	14A38-8663A	Res, 8.66K, 1/4W, 1%
R68,199	15C26-24	Pot, 10K, 1/2W, 20%
R69,200	14A38-1244A	Res, 12.4K, 1/4W, 1%
R70,71,201,202	14A38-1824A	Res, 18.2K, 1/4W, 1%
R72,85,195,197	14A38-6734A	Res, 67.3K, 1/4W, 1%
R73,83,184,193	14A38-4993A	Res, 4.99K, 1/4W, 1%
R74,185	14A38-5832A	Res, 583, 1/4W, 1%
R76,78,187,189	15C26-19	Pot, 50K, 1/2W, 20%
R77,186	14A38-1005A	Res, 100K, 1/4W, 1%
R80,81,82,190,191,192	14A38-3574A	Res, 35.7K, 1/4W, 1%
R84,194,198,269	14A38-1103A	Res, 1.1K, 1/4W, 1%
R86,203	15C26-20	Pot, 5K, 1/2W, 20%
R87,204	14A38-2704A	Res, 27K, 1/4W, 1%
R88,207	14A38-2004A	Res, 20K, 1/4W, 1%
R100,101	14A38-1507A	Res, 15M, 1/4W, 1%
R102,219	14A38-1506A	Res, 1.5M, 1/4W, 1%
R103,104,112,220,221, 227	14A38-1504A	Res, 15K, 1/4W, 1%
R115,232	15C26-14	Pot, 100K, 1/2W, 20%
R117,234	14A38-3165A	Res, 316K, 1/4W, 1%
R119,236	14A38-9092A	Res, 909, 1/4W, 1%
R217,218	14A38 <sup>5</sup> 1507A	Res, 15M, 1/4W, 1%



R287,291	14A38-2404A	Res, 24K, 1/4W, 1%
RT1,3	33G299	Therm, PTC, 5K, 500V
RT2,4	33G301	Therm, PTC, 4.6 Ohm, 60V
RT5,6	33G294	Therm, PTC, 860 Ohms, 60MA, 150V
TR1	19G70	Trans, N-Chan, 2N7000
TR2-12,15,16,	19A33-1	Trans, NPN, 2N3904
TR13,14	19G70	Trans, N-Chan, 2N7000
X1	47A50	Crystal, 11 MHz, HC-181U

### Power Supply(2000 Board)

C1	24G424	Cap, Lytic, 2200uF, 25V, +30/-10%
C2,4,18,22,24,26,29, 30,32-35	24G482	Cap, Mylar, .1uF, 50V, 5%
C3,6,8,12,13	24G382	Cap, Lytic, 10uF, 16V, 20%
C5,16,17,21	24G437	Cap, lytic, 470uF, 25V, +100/-20%
C7,9,11	24G207	Cap, Disc, .01uF, 100V, +80/-20%
C10,25,27,28,31	24G442	Cap, Lytic, 100uF, 16V, +50/-10%
C14,15	24G178	Cap, Poly, 200pF, 125V, 5%, N150
CR1,2	16G10	Diode, Sil, 1N4004
CR3	16G14	Diode, Pwr Comp, 1N5401
CR4	16G24	Diode, Schottky, 1N5822
CR5-14	50C5-2:A	Diode, Sil, 1N4148
IC1	69G212	IC, Adj Reg, 1.5A, LM317
IC2	69G306	IC, +/- Voltage Converter, 7661
IC3,6,8	69G116	IC, -5V Reg, 100MA, 79L05
IC4	69G70	IC, +5V Reg, 500MA, UA78M05UG
IC5	69G191	IC, Op-Amp, Single, Bifet, TL061
IC7,9	69G29	IC, +5V Reg, 100 MA, 78L05
R1	14A38-2402A	Res, 240, 1/4W, 1%
R3	14A38-2403A	Res, 2.4K, 1/4W, 1%
R6	14B49-18	Res, WW, 5 Ohm, 5W, 10%
R16	15C26-23	Pot, 1M, 1/2W, 20%
R2	15C26-3	Pot, 500, 1/2W, 20%
T1,2	28A110	Transf, Switching, CT 9V, 40MA
TR1	19G75	Trans, P-Chan, MTP8P10
TR2	19A33-1	Trans, NPN, 2N3904
TR3,5	19A29-1	Trans, NPN, MJE180
TR4,6	19A30-1	Trans, PNP, MJE170,

### Front Panel(3000 Board)

CR1,12,23,24	20G27	LED, Rectangular
CR2-7,13-18,25,26	20G29	Lamp, LED, Hi-Efficiency
SW1,2	25G395	Switch, Alco, #CST-023TA
SW3,4	25G396	Switch, Alco #APA1CG-PC
SW5	25G355	SW, Toggle, 4P3T, Spring, 1Side

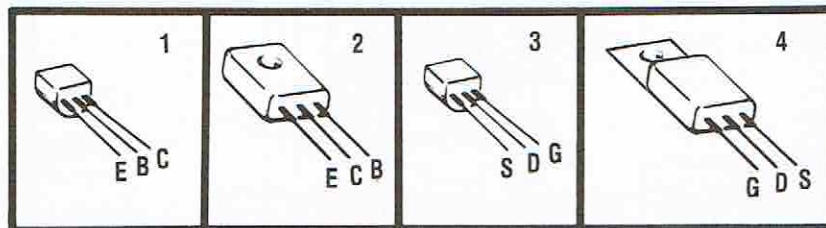
### Dummy Load (4000 Board)

R1,9	14A95-3.9	Res, WW, 3.9 Ohm, 100W, 1%
R2,8	14A95-7.95	Res, WW, 7.95 Ohm, 100W, 1%
R3,7	14A95.15.9	Res, WW, 15.9 Ohm, 100W, 1%
R4,6	14A95-16	Res, WW, 16, 100W, 1%
R5	14G90	Res, Therm, 200K, 25 DEG-C

### Miscellaneous Chassis Components

15C10-4:C	Pot, Volume, 10K, +/-30%
23C89	Meter
25A392:A	Switch, Function, 4P11T
25A398	Switch, Filters, 3P5T
25A394:D	Switch, Loads, 8P4T
26G354	Jack, 8-Pin DIN, Snap-In
33G251	Varistor, 390V, +/-10%
48G5	Speaker, 2 1/2", 8 Ohm

### TRANSISTOR SPECIFICATIONS AND BASING DIAGRAMS

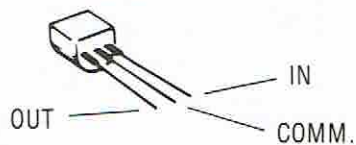


Sencore Part No.	Transistor No.	Basing	Polarity	*Beta/GM	Max I <sub>CS0</sub> /I <sub>SS</sub>
19A29-1	MJE180	2	NPN	50-250	.1
19A30-1	MJE170	2	PNP	30-180	.1
19A33-1	2N3904	1	NPN	100-300	.05
19G70	2N7000	3	N-Chan	2000-8000	0.0
19G75	MTP8P10	4	P-Chan	2000-15000	0.0

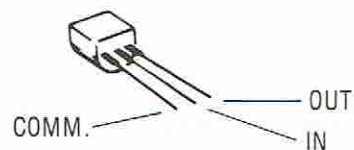
\*Tested with the Sencore TF46.

### IC REGULATOR PACKAGE DIAGRAMS

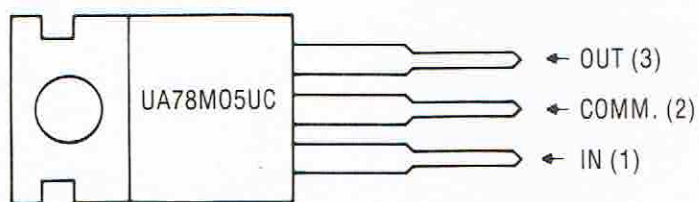
78L SERIES



79L SERIES

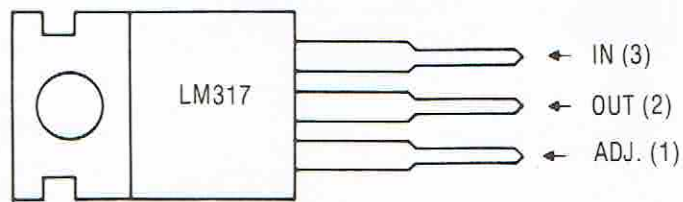


COMMON



TOP VIEW

COMMON TO OUT

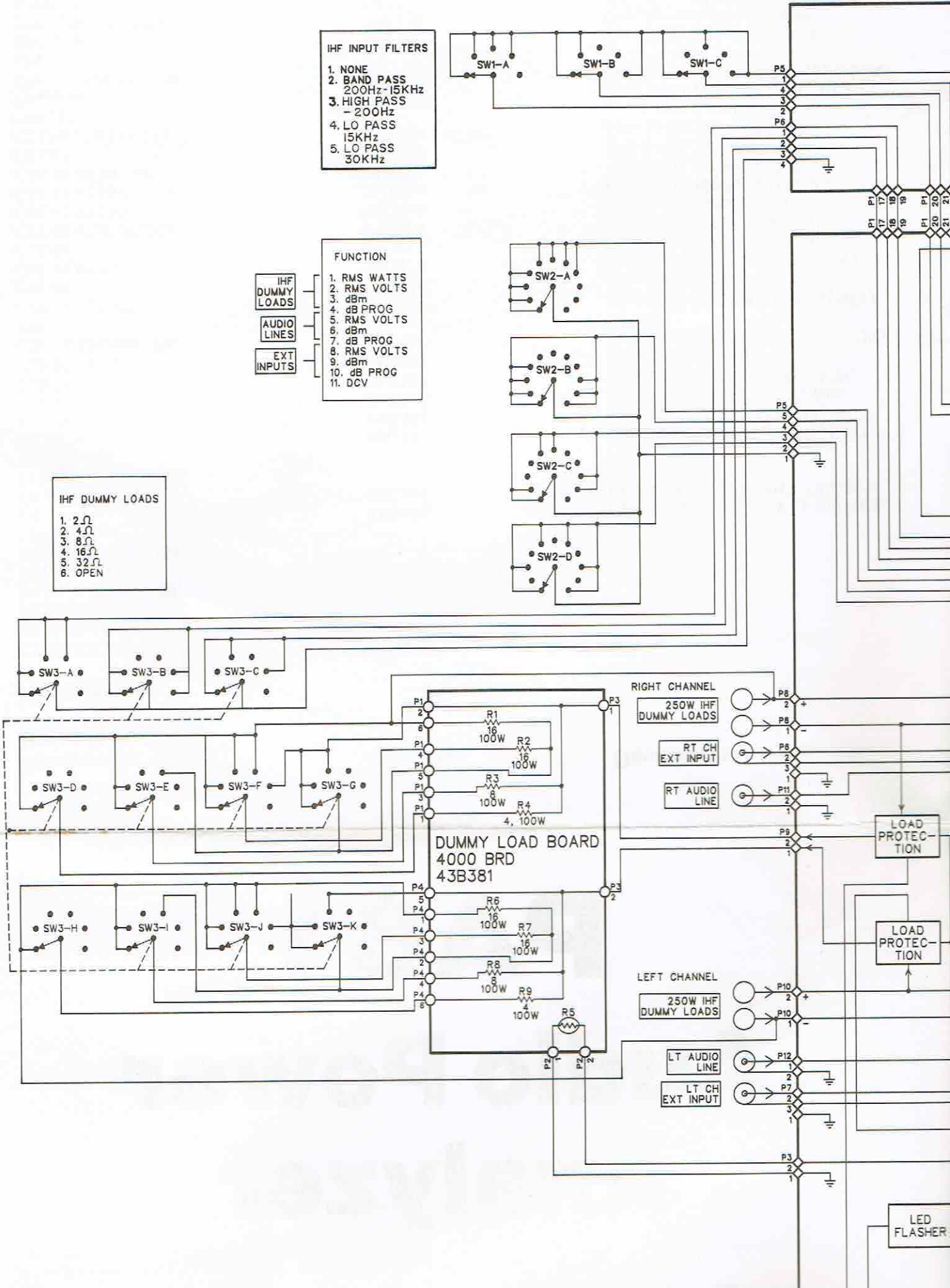


TOP VIEW

- IHF INPUT FILTERS**
1. NONE
  2. BAND PASS  
200Hz-15KHz
  3. HIGH PASS  
-200Hz
  4. LO PASS  
15KHz
  5. LO PASS  
30KHz

- |                 | FUNCTION     |
|-----------------|--------------|
| IHF DUMMY LOADS | 1. RMS WATTS |
|                 | 2. RMS VOLTS |
|                 | 3. dBm       |
|                 | 4. dB PROG   |
| AUDIO LINES     | 5. RMS VOLTS |
|                 | 6. dBm       |
|                 | 7. dB PROG   |
| EXT INPUTS      | 8. RMS VOLTS |
|                 | 9. dBm       |
|                 | 10. dB PROG  |
|                 | 11. DCV      |

- IHF DUMMY LOADS**
1. 2Ω
  2. 4Ω
  3. 8Ω
  4. 16Ω
  5. 32Ω
  6. OPEN





dB PROG  
REF STORE

RANGE

LEFT

RIGHT

SELECT

HOLD

AUTO

LEFT RANGE  
INDICATORS

RIGHT RANGE  
INDICATORS

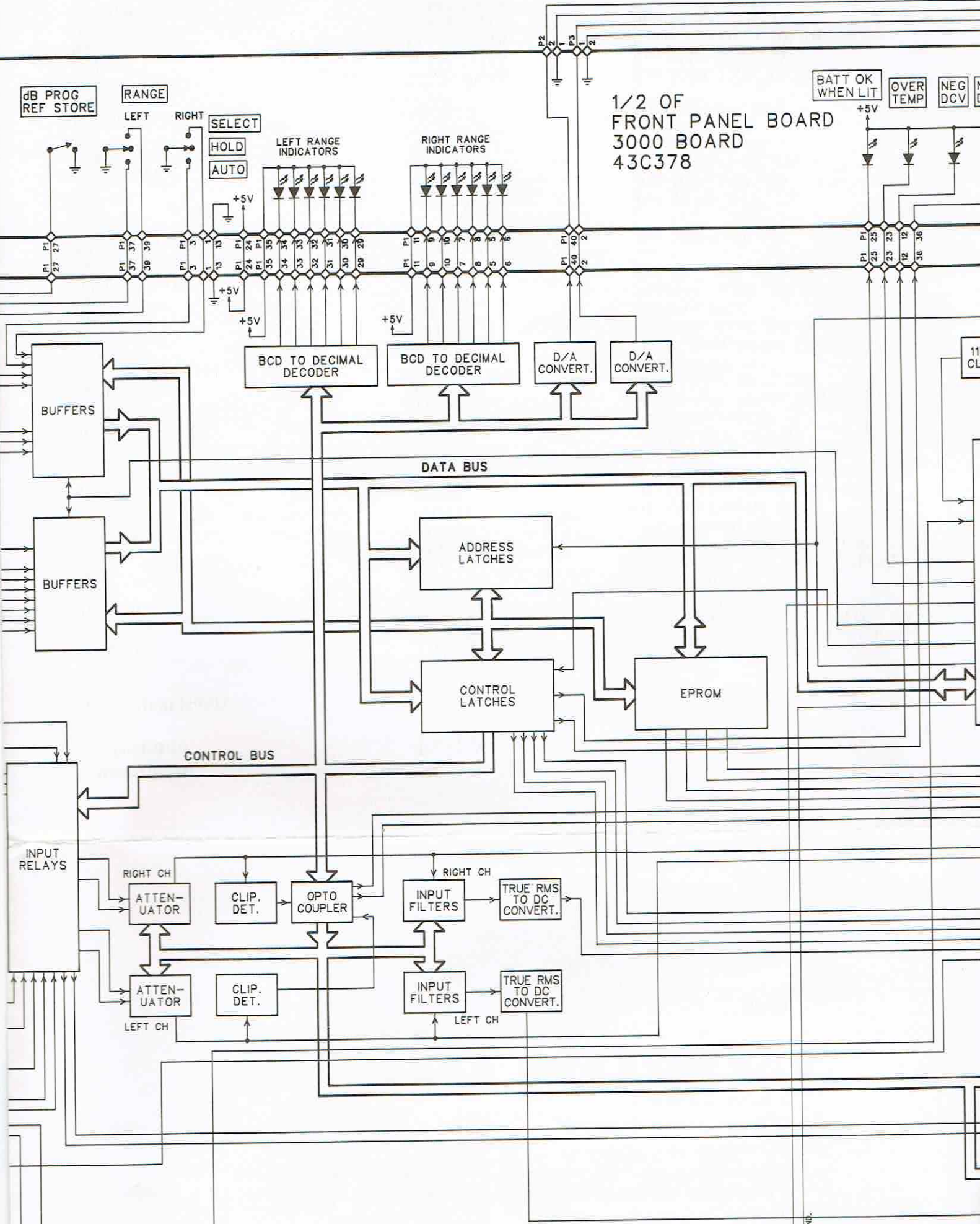
1/2 OF  
FRONT PANEL BOARD  
3000 BOARD  
43C378

BATT OK  
WHEN LIT

OVER  
TEMP

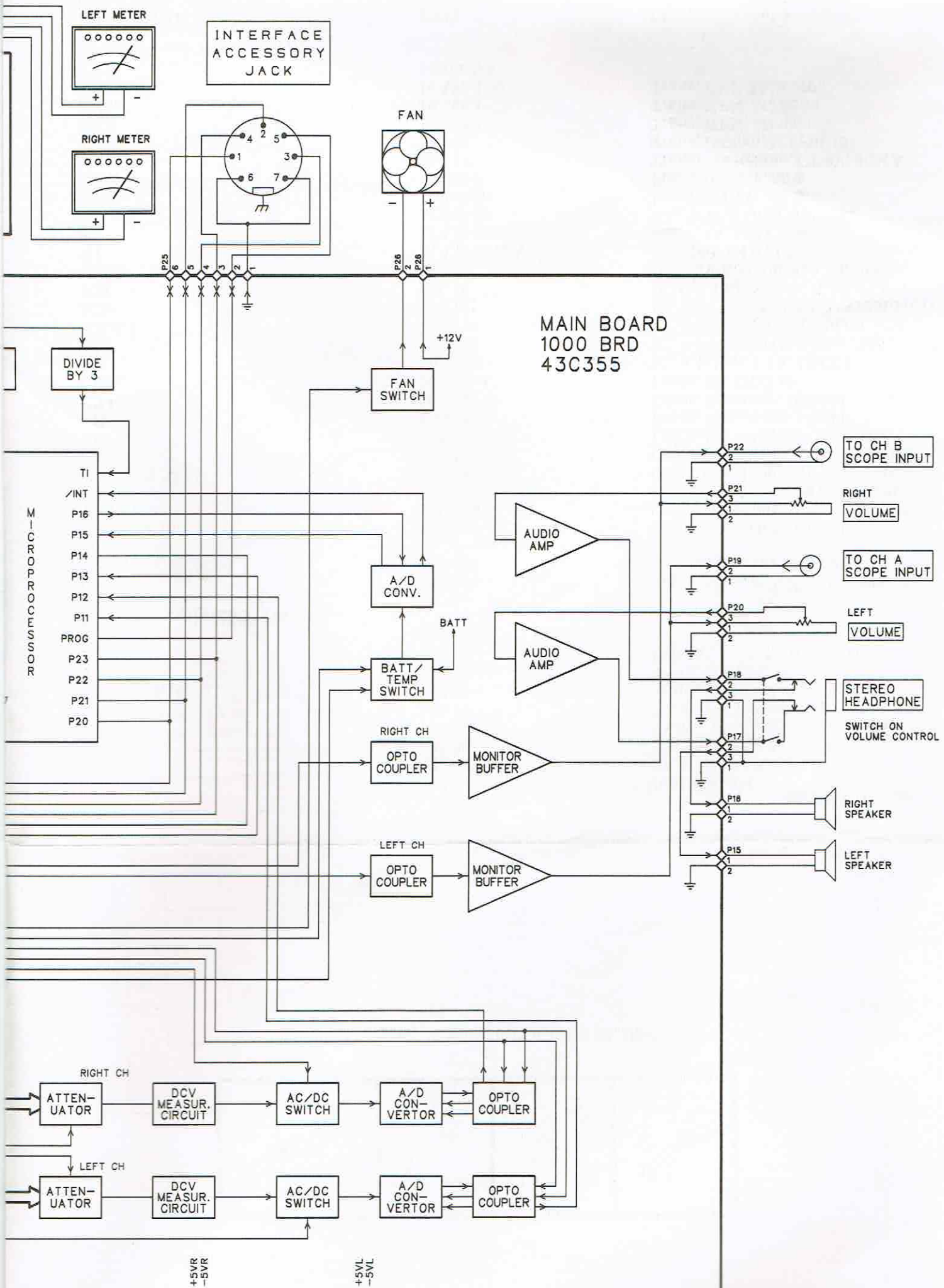
NEG  
DCV

N  
D



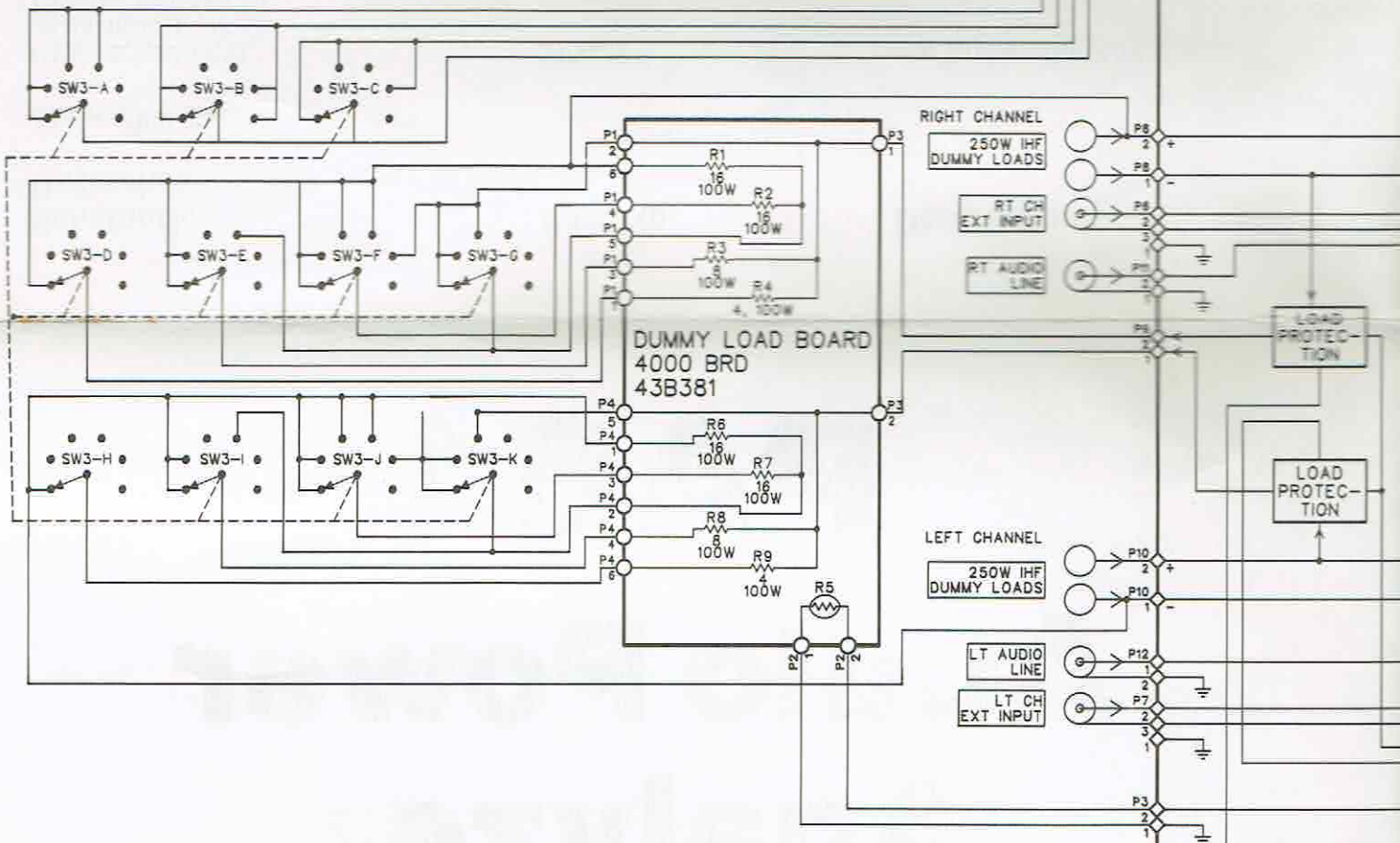
BATT  
+12V  
+5V  
-5V

© POWER INC.



- AUDIO LINES
- 4. dB PROG
  - 5. RMS VOLTS
  - 6. dBm
  - 7. dB PROG
  - 8. RMS VOLTS
  - 9. dBm
  - 10. dB PROG
  - 11. DCV
- EXT INPUTS

- IHF DUMMY LOADS
- 1. 2Ω
  - 2. 4Ω
  - 3. 8Ω
  - 4. 16Ω
  - 5. 32Ω
  - 6. OPEN

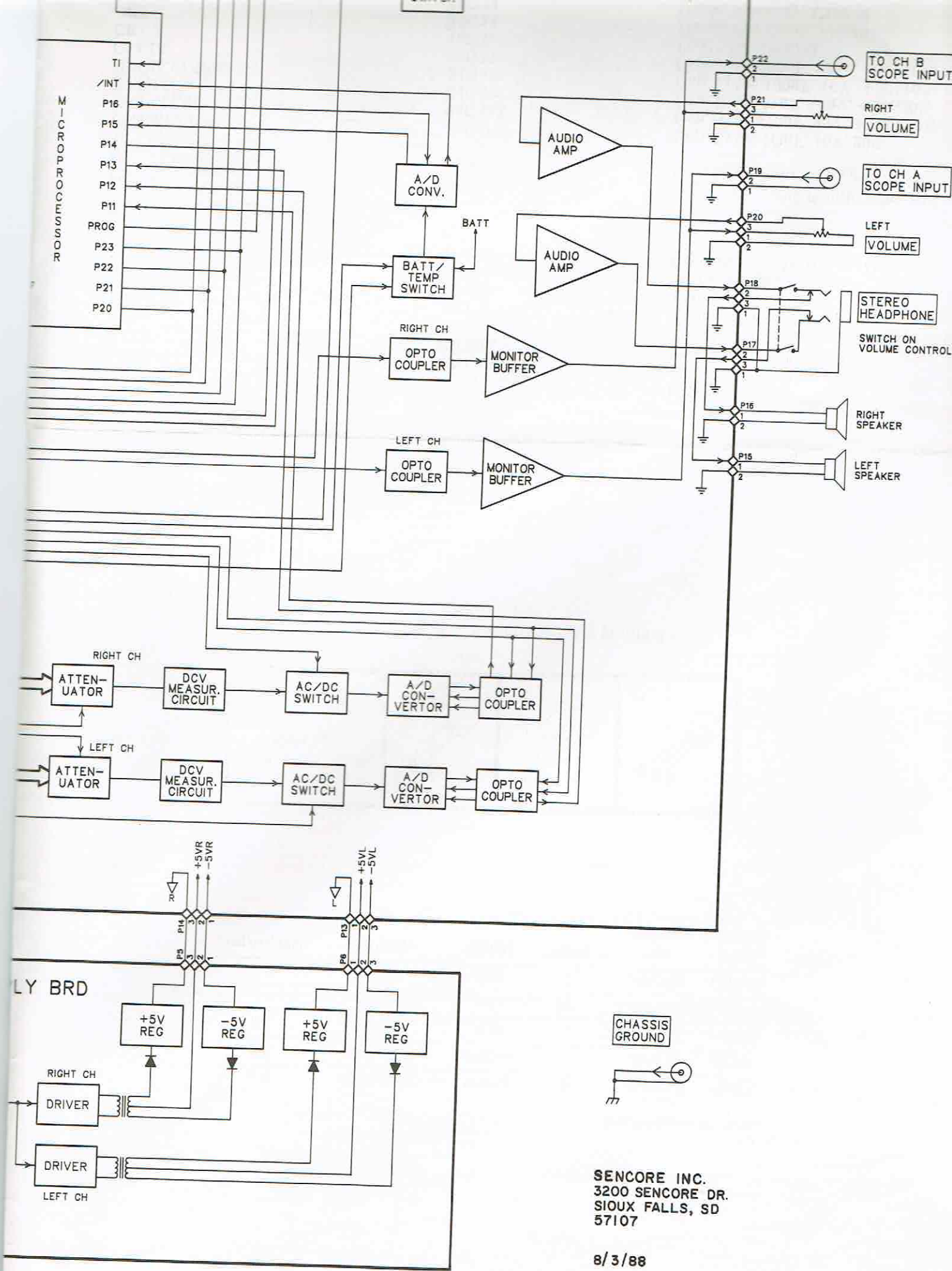


**SENCORE  
PA81  
BLOCK DIAGRAM**

1/2 OF FRONT PANEL  
3000 BOARD  
43C378







SENCORE INC.  
 3200 SENCORE DR.  
 SIOUX FALLS, SD  
 57107

8/3/88