

SONY®

ANALOG TAPE RECORDER

APR-5001

APR-5002

APR-5003V
Series

OPERATION AND MAINTENANCE MANUAL

1st Edition (Revised 1)

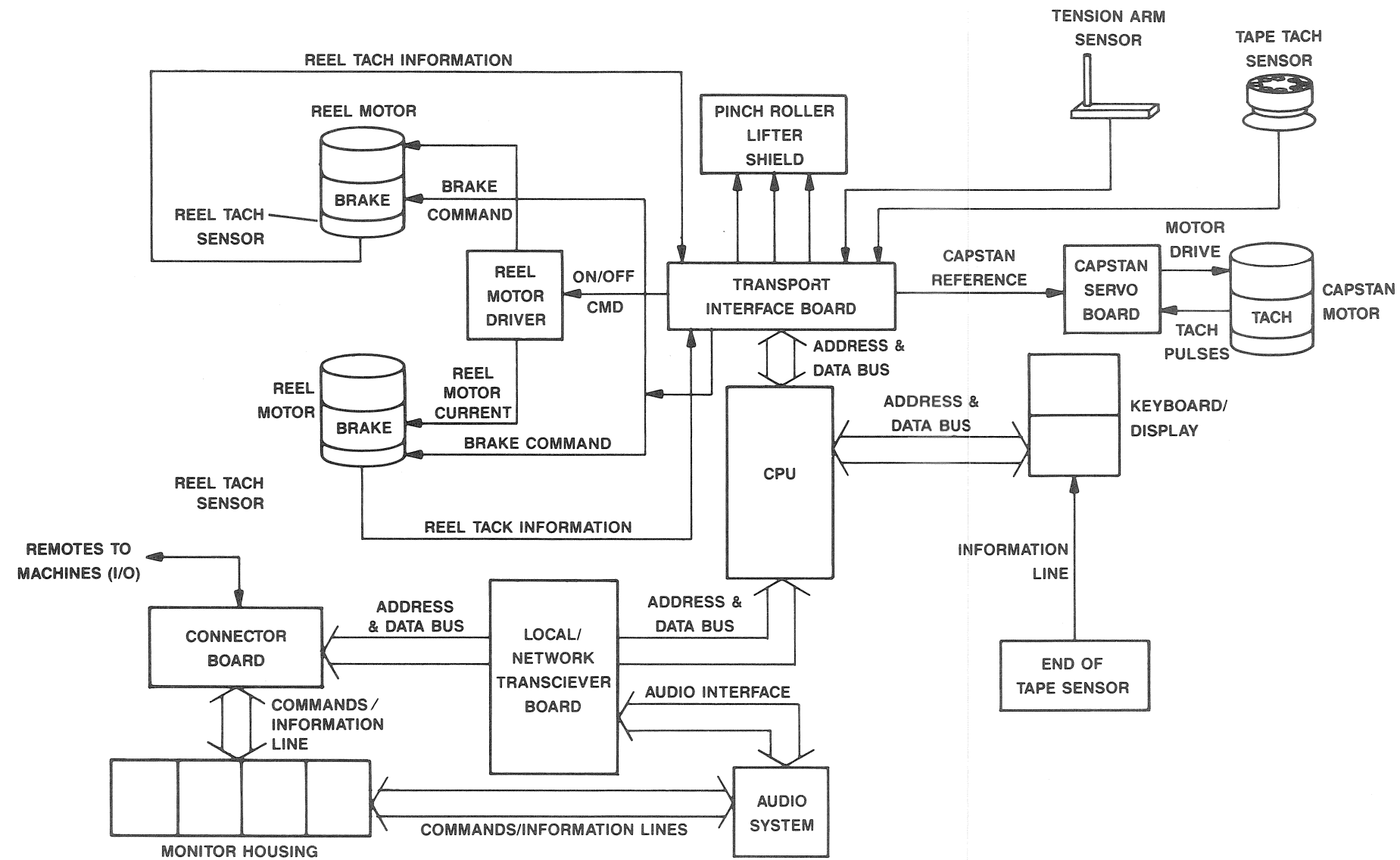
APR-5001 Serial No.10001 and Higher

APR-5002 Serial No.20001 and Higher

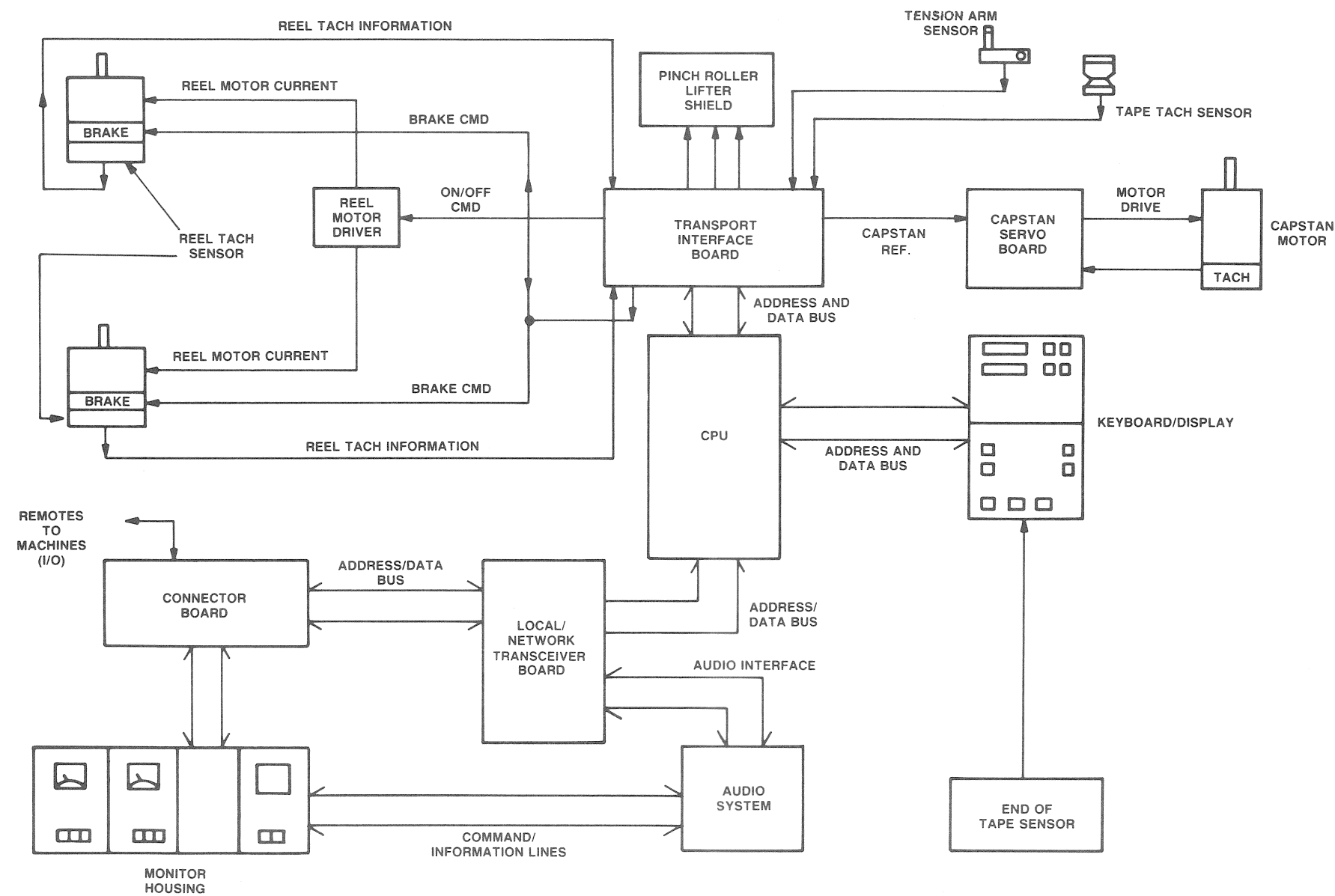
APR-5003V Serial No.10001 and Higher

SECTION 7 BLOCK DIAGRAMS

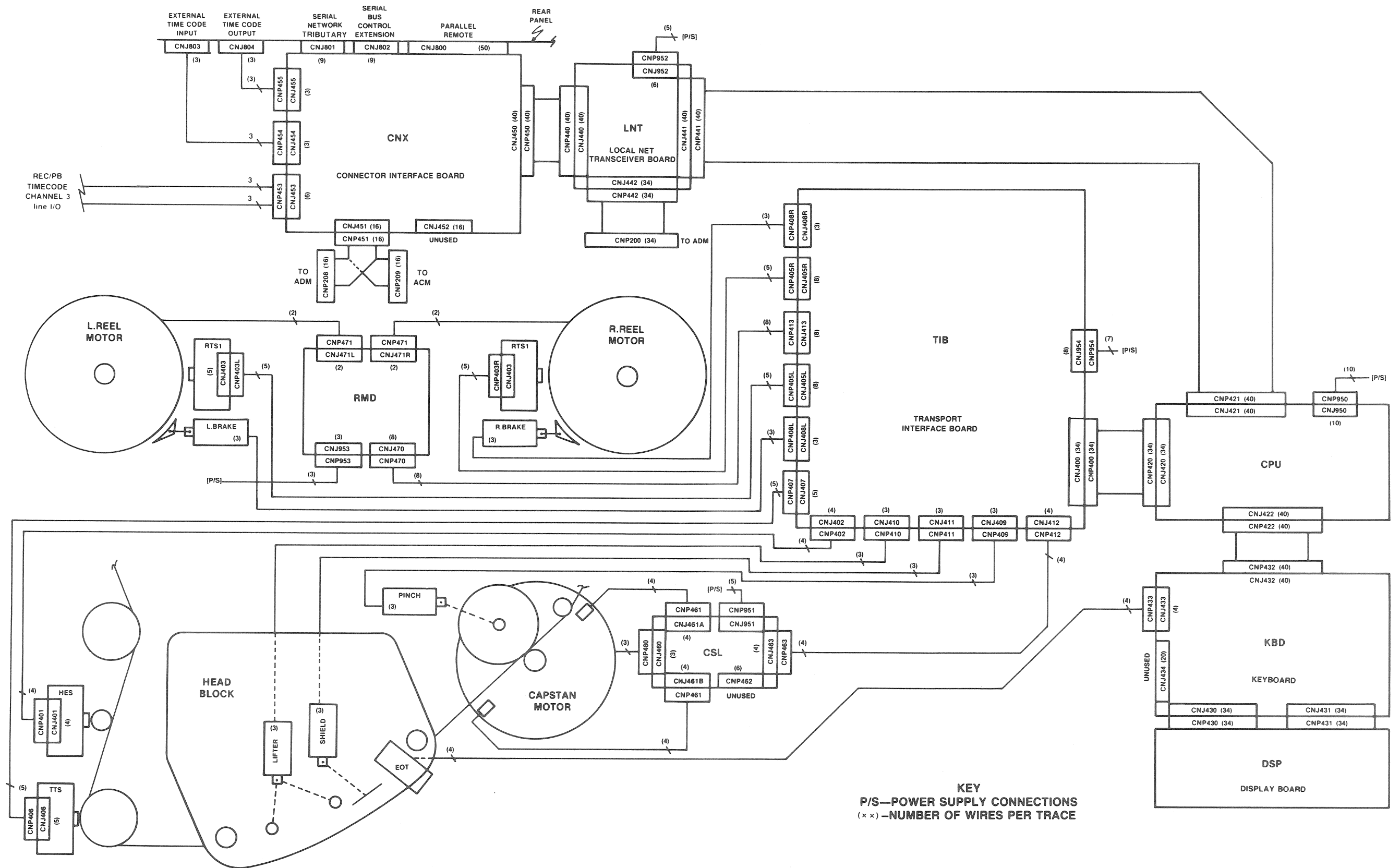
SYSTEM BLOCK DIAGRAM



LOGIC FLOW DIAGRAM

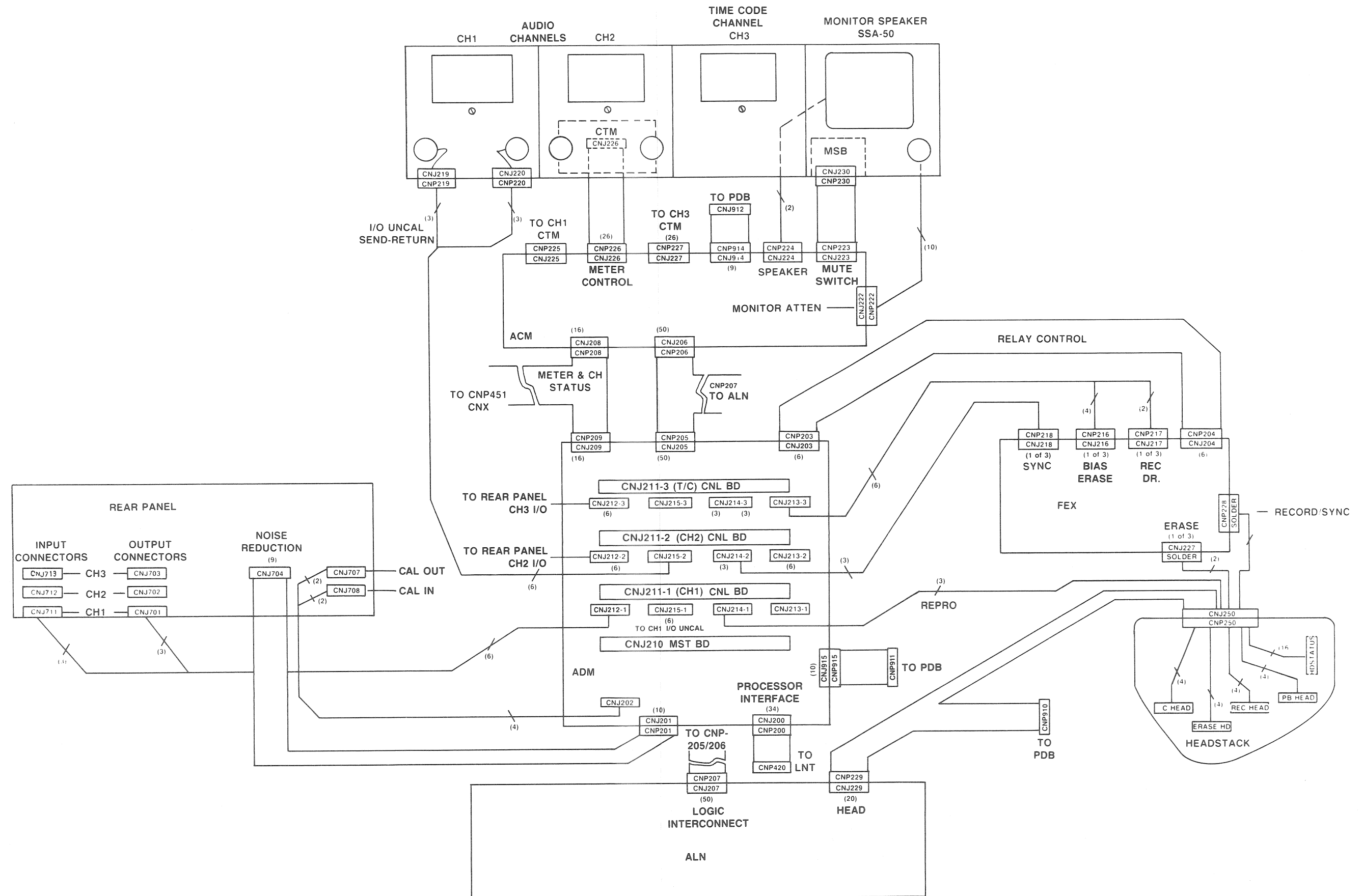


TAPE TRANSPORT BLOCK DIAGRAM



KEY
P/S—POWER SUPPLY CONNECTIONS
(x x)—NUMBER OF WIRES PER TRACE

AUDIO SYSTEM BLOCK DIAGRAM



SECTION 9

SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

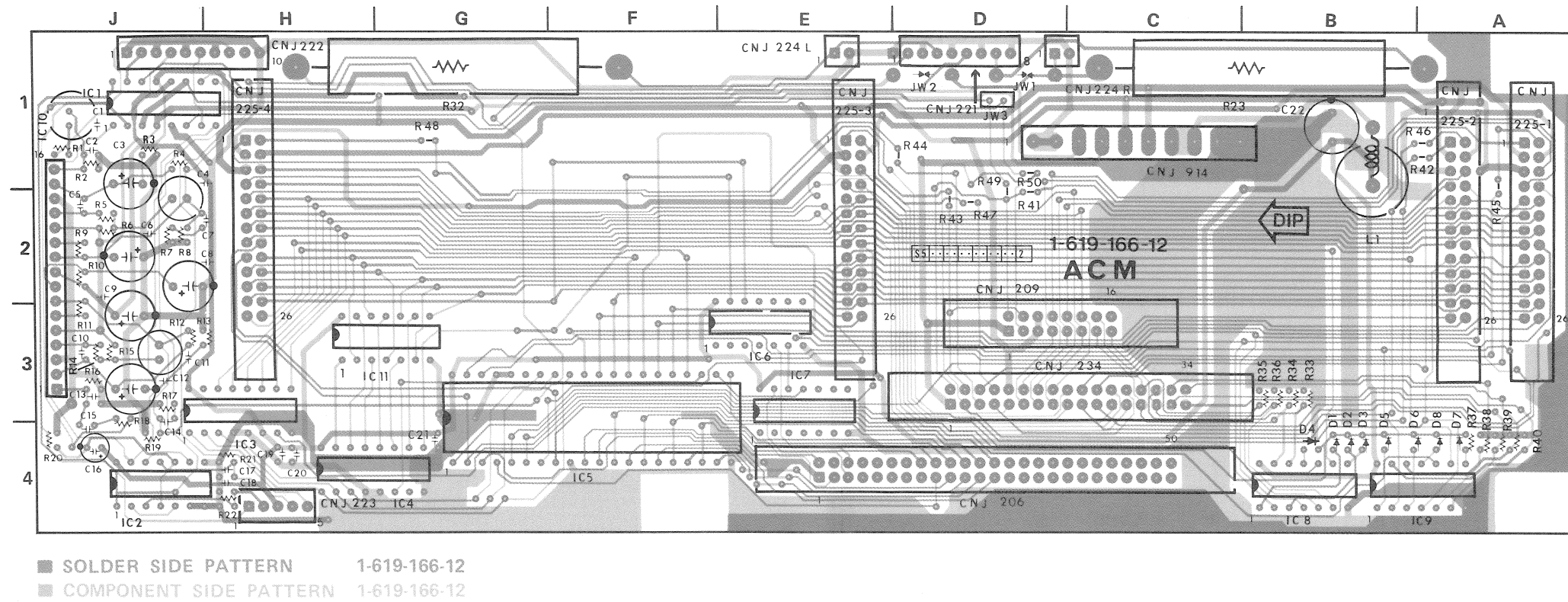
9-1 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

How to read the Schematic and Circuit Board Diagrams

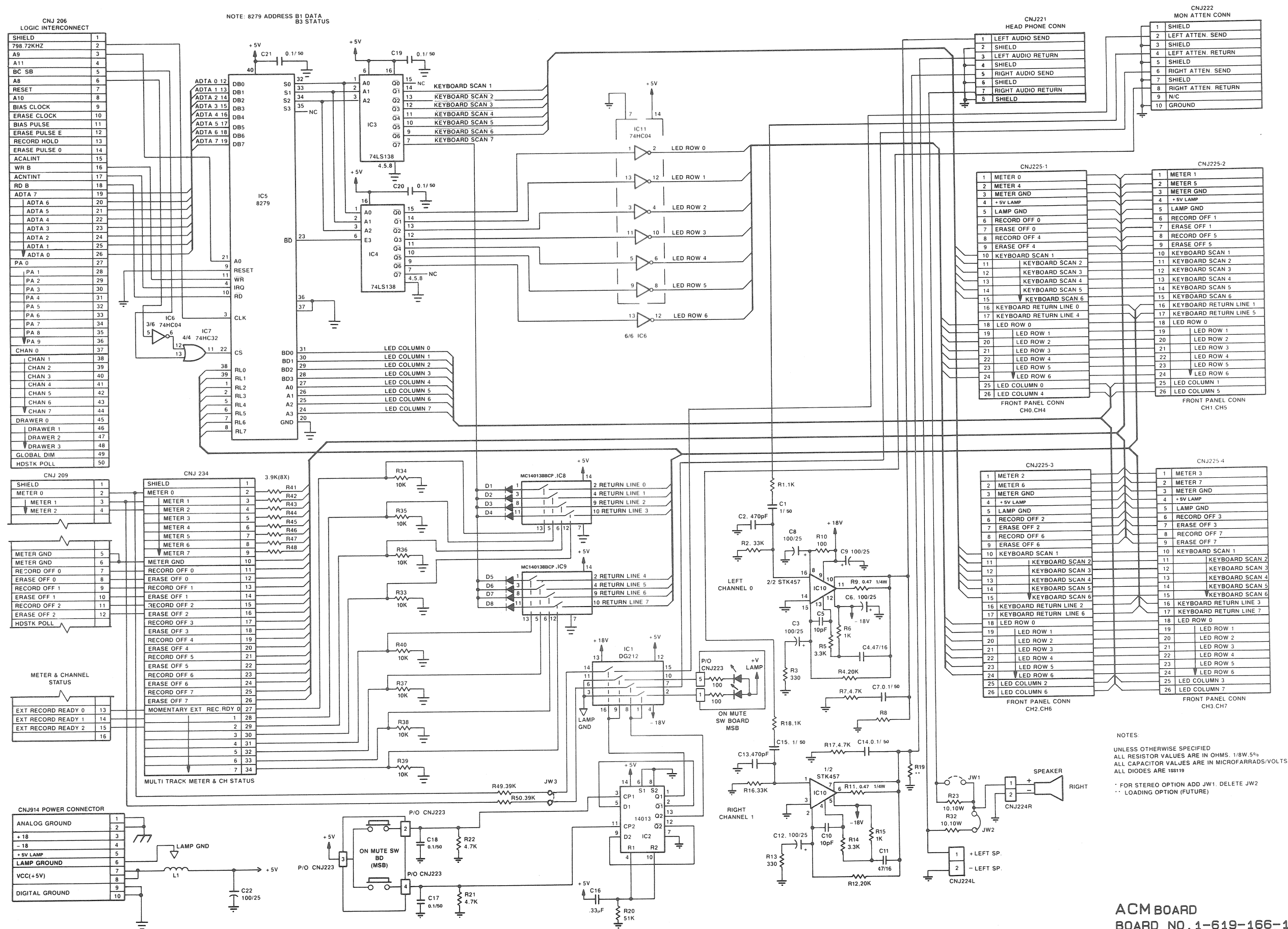
- Basically, the APR-5001/5002/5003V series schematic and circuit board diagrams are laid out facing each other on opposite pages.
- There are schematic and circuit board diagrams for two blocks in this order: Main Unit and Power Supply. Furthermore, each block is arranged in alphabetical order.
- Basically, the circuit board diagram symbols are the symbols viewed from the component side.
The circuit board diagrams that use both-side tracing are distinguished by the density of the black cross-hatching.
The solder side tracing is 40% and the component side tracing is 20%.
- The different schematic and circuit board diagrams for one board are identified by the suffix of the circuit board number, and are laid out in suffix order as necessary.
Therefore, when it is necessary to verify the contents of a board, identify the board not by the serial number of the APR-5001/5002/5003V series unit but rather by the suffix of the board number for the board used.

For ACM board, see pages 9-3 to 9-6.

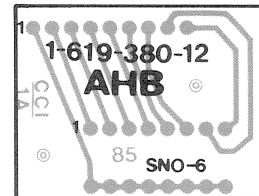
ACM BOARD (1-619-166-12)
Component Side



ACM BOARD

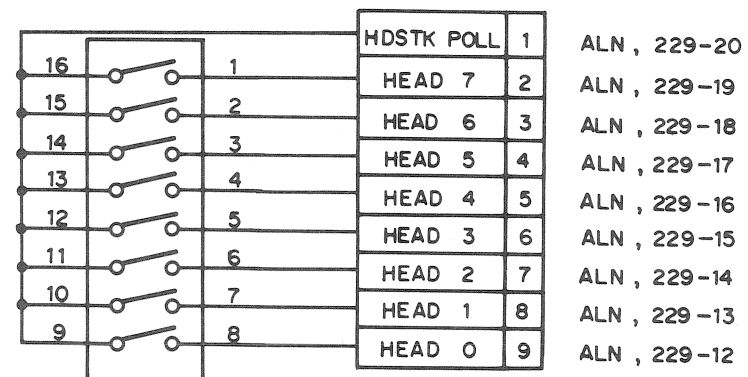


AHB BOARD (1-619-380-12)
Solder Side



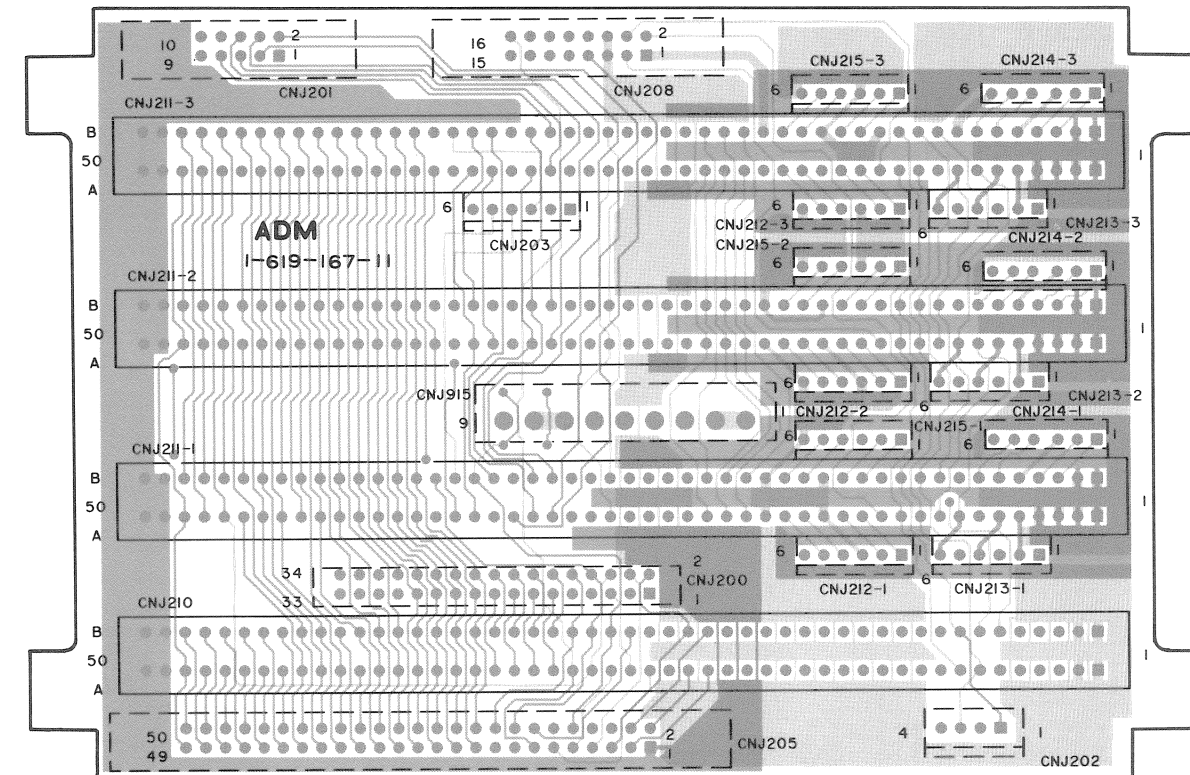
■ SOLDER SIDE PATTERN

AHB BOARD



AHB BOARD
BOARD NO. 1-619-380-11 & HIGHER
APR-5002/5003V

ADM BOARD (1-619-167-11)
Component Side



■ SOLDER SIDE PATTERN 1-619-167-11
 ■ COMPONENT SIDE PATTERN 1-619-167-11

ADM BOARD

CNJ214-1,2,3 REPRO AND CUE HEAD CONNECTOR			
1	+ REPRO N (``)		
2	- REPRO N (``)		
3	REPRO SHIELD N (``)		
4	+ CUE N (``)		
5	- CUE N (``)		
6	CUE SHIELD N (``)		

CNJ215-1,2,3 INPUT/OUTPUT UNCAL S/R CONNECTOR			
1	INPUT UNCAL SEND N (``)		
2	INPUT UNCAL RETURN N (``)		
3	INPUT UNCAL SHIELD N (``)		
4	OUTPUT UNCAL SEND N (``)		
5	OUTPUT UNCAL RETURN N (``)		
6	OUTPUT UNCAL SHIELD N (``)		

CNJ208 METER CHANNEL STATUS CONNECTOR			
2	METER 0	SHIELD	1
1	METER 2	METER 1	3
6	METER GND	METER GND	5
8	ERASE OFF 0	RECORD OFF 0	7
10	ERASE OFF 1	RECORD OFF 1	9
12	ERASE OFF 2	RECORD OFF 2	11
14	EXTERNAL R.R. 1	EXTERNAL R.R. 0	13
16	RECORD HOLD	EXTERNAL R.R. 2	15

CNJ201 NOISE REDUCTION CONNECTOR			
2	DOLBY RELAY LOW 0	SHIELD	1
4	DOLBY RELAY LOW 1	DOLBY GND 0	3
6	DOLBY RELAY LOW 2	DOLBY GND 1	5
8	RESERVED	DOLBY GND 2	7
10	N/C	RESERVED	9

CNJ211-1,2,3 CHANNEL BOARD 0-2 CONNECTOR			
1	ANALOG GROUND		1
2			2
3	+ REPRO N (``)	A. GND (``)	3
4	- REPRO N (``)	A. GND. (``)	4
5	REPRO SHIELD N (``)	BIAS N (``)	5
6	+ CUE N (``)	ERASE N (``)	6
7	- CUE N (``)	XFTD DOWN	7
8	CUE SHIELD (``)	REC DR N	8
9	CAL SUM ACN GND (++)	XFTD UP	9
10	CAL SUM ACN	SLATE FEED	10
11	CAL SUM BUSS	SLATE BUSS	11
12	METER GROUND	METER N (``)	12
13	INPUT UNCAL SEND N (``)	+ INPUT N (``)	13
14	INPUT UNCAL RETURN N (``)	- INPUT N (``)	14
15	INPUT UNCAL SHIELD N (``)	INPUT SHIELD N (``)	15
16	OUTPUT UNCAL SEND N (``)	+ OUTPUT N	16
17	OUTPUT UNCAL RETURN N (``)	- OUTPUT N (``)	17
18	OUTPUT UNCAL SHIELD N (``)	OUTPUT SHIELD N (``)	18
19			19
20			20
21			21
22	+15V		22
23	-15V		23
24	+18V		24
25	-18V		25
26	KEY	KEY	26
27			27
28	+5V		28
29	DOLBY GND N (``)	DOLBY RELAY LOW N (``)	29
30	100 KHZ	400 KHZ	30
31	ERASE OFF N (``)	RECORD OFF N (``)	31
32	ERASE PULSE (O/E) (+)	BIAS PULSE B	32
33	ERASE CLOCK	BIAS CLOCK	33
34	SYNC N	EXTERNAL R.R. N (``)	34
35	WR B	RECORD HOLD	35
36	ADTA 6	ADTA 7	36
37	ADTA 4	ADTA 5	37
38	ADTA 2	ADTA 3	38
39	ADTA 0	ADTA 1	39
40	PA 1	PA 0	40
41	PA 3	PA 2	41
42	PA 5	PA 4	42
43	PA 7	PA 6	43
44	PA 9	PA 8	44
45	DRAWER N	CHAN N (``)	45
46		WRBS	46
47			47
48	HD STK POLL	GLOBAL DIM	48
49			49
50	DIGITAL GROUND		50

CNJ213-1,2,3 RECORD AND ERASE HEAD	
1	BIAS SHIELD (``)
2	BIAS N (``)
3	ERASE SHIELD (``)
4	ERASE N (``)
5	SHIELD N
6	REC DR N

CNJ212-1,2,3 INPUT/OUTPUT CONNECTOR	
1	+ INPUT N (``)
2	- INPUT N (``)
3	INPUT SHIELD (``)
4	+ OUTPUT N (``)
5	- OUTPUT N (``)
6	OUTPUT SHIELD (``)

CNJ915 POWER SUPPLY CONNECTOR	
1	ANALOG GROUND
2	
3	
4	+18V
5	-18V
6	+5V
7	DIGITAL GROUND
8	
9	KEY

CNJ203 SYNC CONTROL CONNECTOR	
1	+5V
2	RESERVED
3	CH2 SYNC
4	CH1 SYNC
5	CHO SYNC
6	A. GND

CNJ200 PROCESSOR INTERFACE CONNECTOR			
2	BCSB (``)	SHIELD	1
4	RESET (``)	BIAS REF.	3
6	WRBS	BIAS PULSE	5
8	WR B	ACALINT	7
10	RD B	ACNTINT	9
12	AADR 6	AADR 7	11
14	AADR 4	AADR 5	13
16	AADR 2	AADR 3	15
18	AADR 0	AADR 1	17
20	ADTA 6	ADTA 7	19
22	ADTA 4	ADTA 5	21
24	ADTA 2	ADTA 3	23
26	ADTA 0	ADTA 1	25
28	A9	A8 (``)	27
30	A11	A10 (``)	29
32			31
34			33

CNJ210 AUDIO MASTER BOARD CONNECTOR			
1	ANALOG GROUND		1
2			2
3			3
4			4
5			5
6	CAL SUM ACN GND (++)		6
7	CAL SUM ACN	SLATE FEED	7
8	CAL SUM BUSS	SLATE BUSS	8
9			9
10			10
11			11
12			12
13	+15V		13
14	-15V		14
15	+18V		15
16	-18V		16
17	KEY	KEY	17
18			18
19	+5V		19
20			20
21	A11 (ROMCS) (``)	A9 (ATOD) (``)	21
22	BCSB (``)	BIAS REF.	22
23	100KHZ	400KHZ	23
24	ERASE PULSE E (+)	BIAS PULSE B	24
25	ERASE PULSE 0 (+)	BIAS PULSE	25
26	ERASE CLOCK	BIAS CLOCK	26
27	WR B	WRBS	27
28	RD B	RECORD HOLD	28
29	AADR 6 (``)	AADR 7 (``)	29
30	AADR 4 (``)	AADR 5 (``)	30
31	AADR 2 (``)	AADR 3 (``)	31
32	AADR 0 (``)	AADR 1 (``)	32
33	ADTA 6 (``)	ADTA 7 (``)	33
34	ADTA 4 (``)	ADTA 5 (``)	34
35	ADTA 2 (``)	ADTA 3 (``)	35
36	ADTA 0 (``)	ADTA 1 (``)	36
37	PA 1 (``)	PA 0 (``)	37
38	PA 3 (``)	PA 2 (``)	38
39	PA 5 (``)	PA 4 (``)	39
40	PA 7 (``)	PA 6 (``)	40
41	PA 9 (``)	PA 8 (``)	41
42	CHAN 1 (``)	CHAN 0 (``)	42
43	CHAN 3 (``)	CHAN 2 (``)	43
44	CHAN 5 (``)	CHAN 4 (``)	44
45	CHAN 7 (``)	CHAN 6 (``)	45
46	DRAWER 1 (``)	DRAWER 0 (``)	46
47	DRAWER 3 (``)	DRAWER 2 (``)	47
48	HDSTK POLL	GLOBAL DIM (``)	48
49			49
50	DIGITAL GROUND		50

CNJ202 ALIGNMENT I/O CONNECTOR	
1	CAL SUM BUSS
2	SHIELD
3	SLATE FEED
4	SHIELD

CNJ205 LOGIC INTERCONNECT CONNECTOR			
2	BIAS REF	SHIELD	1
4	A11	A9	3
6	A8	BCSB	5
8	A10	RESET	7
10	ERASE CLOCK	BIAS CLOCK	9
12	ERASE PULSE E	BIAS PULSE B	11
14	ERASE PULSE 0	RECORD HOLD	13
16	WR B	ACNLINT	15
18	RD B	ACNTINT	17
20	ADTA 6	ADTA 7	19
22	ADTA 4	ADTA 5	21
24	ADTA 2	ADTA 3	23
26	ADTA 0	ADTA 1	25
28	PA 1	PA 0	27
30	PA 3	PA 2	29
32	PA 5	PA 4	31
34	PA 7	PA 6	33
36	PA 9	PA 8	35
38	CHAN 1	CHAN 0	37
40	CHAN 3	CHAN 2	39
42	CHAN 5	CHAN 4	41
44	CHAN 7	CHAN 6	43
46	DRAWER 1	DRAWER 0	45
48	DRAWER 3	DRAWER 2	47
50	HDSTK POLL	GLOBAL DIM	49

NOTES

(``) REQUIRES PULL UP RESISTOR 10K SIP FROM +5 VOLTS

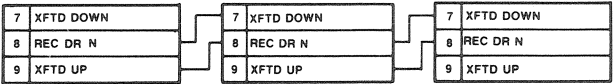
(``)N= CHANNEL NUMBER A=0, B=1, C=2

CHANNEL 0 TO PIN 45A OF CNJ211-1

EXAMPLE: CHANNEL 1 TO PIN 45A OF CNJ211-2

CHANNEL 2 TO PIN 45A OF CNJ211-3

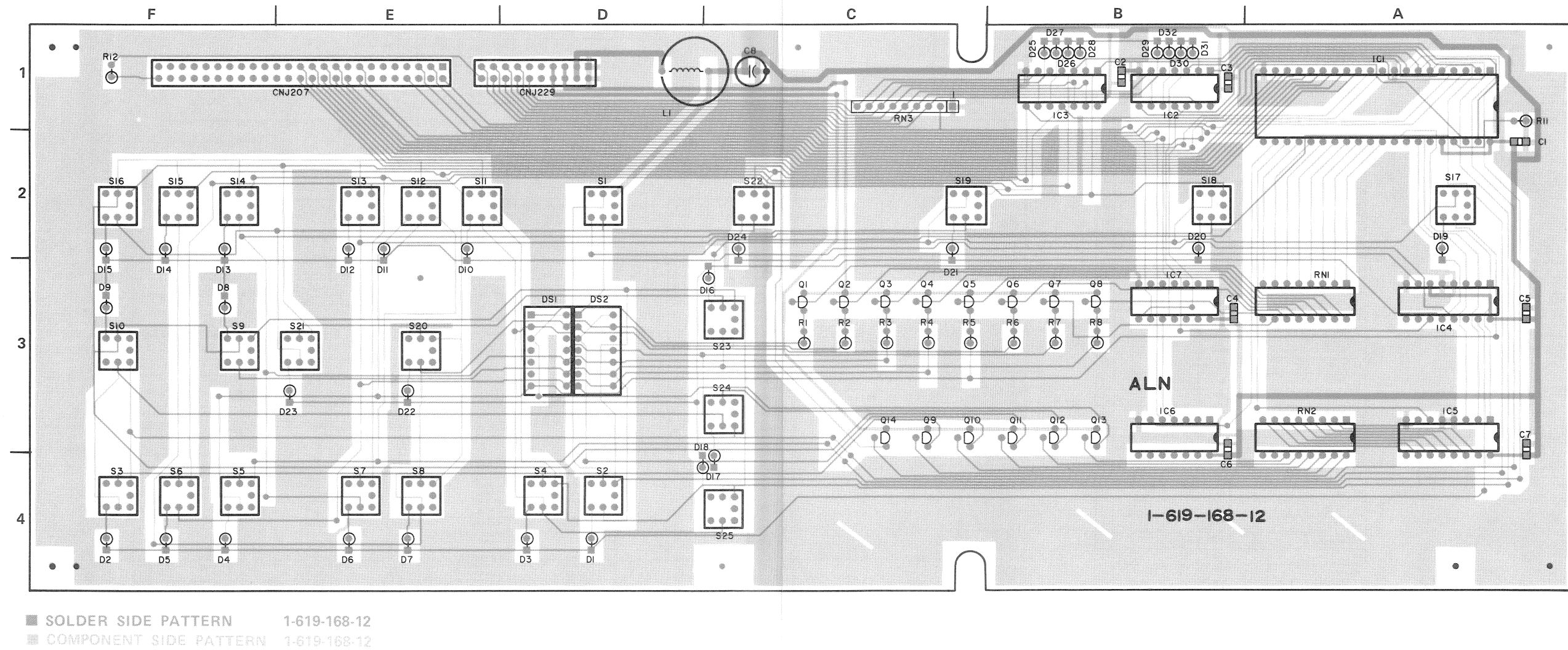
XFTD CHART



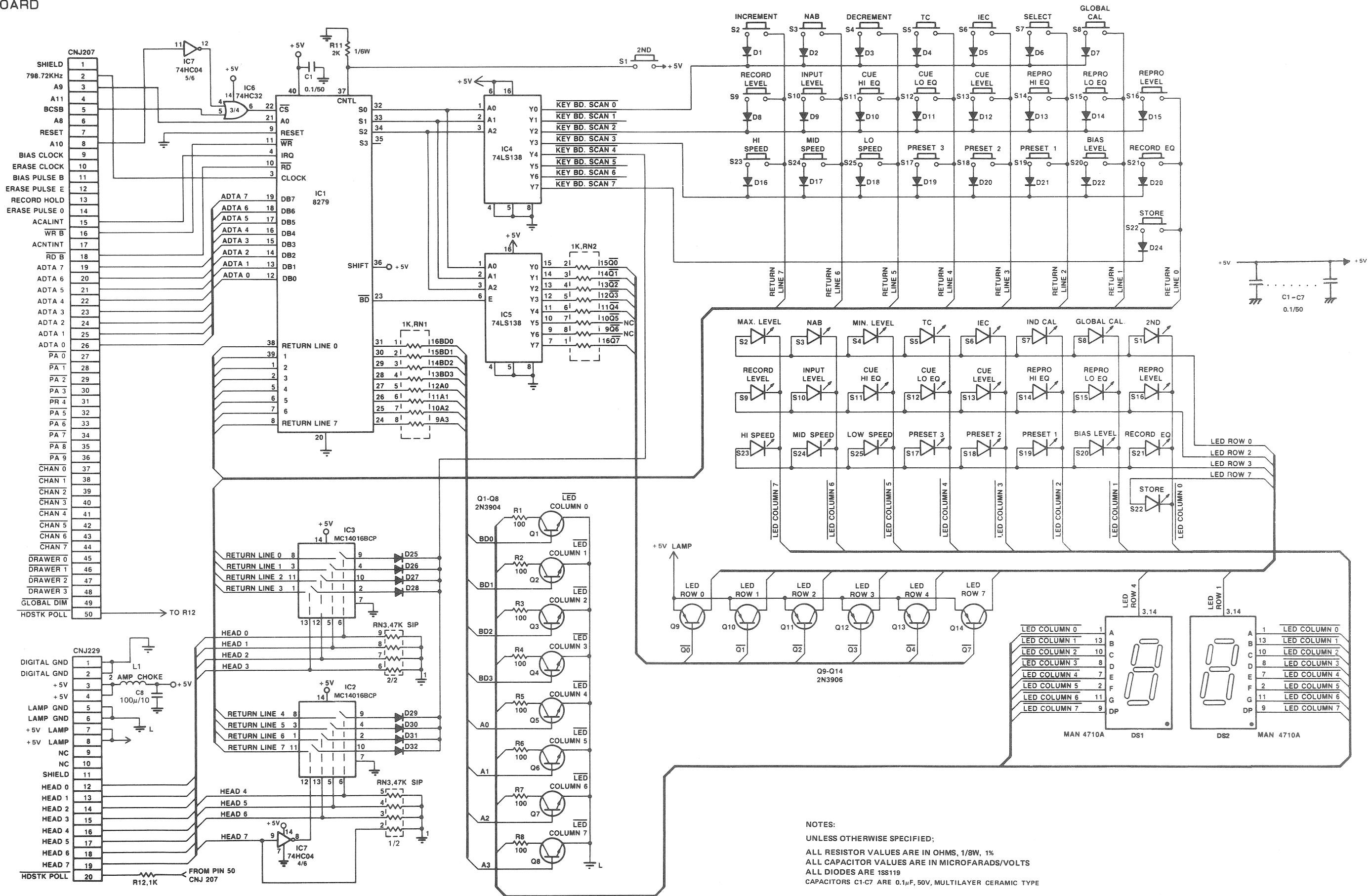
(++) ERASE E TO CNJ211-2 PIN 32B, ERASE 0 TO CNJ211-1,3 PIN 32B

(++)ALL CAL SUM ACN GNDs ARE BUSSED TOGETHER, NOT TO GROUND

ALN BOARD (1-619-168-12)
Component Side



ALN BOARD



S/N; APR-5002 20001 TO 20300





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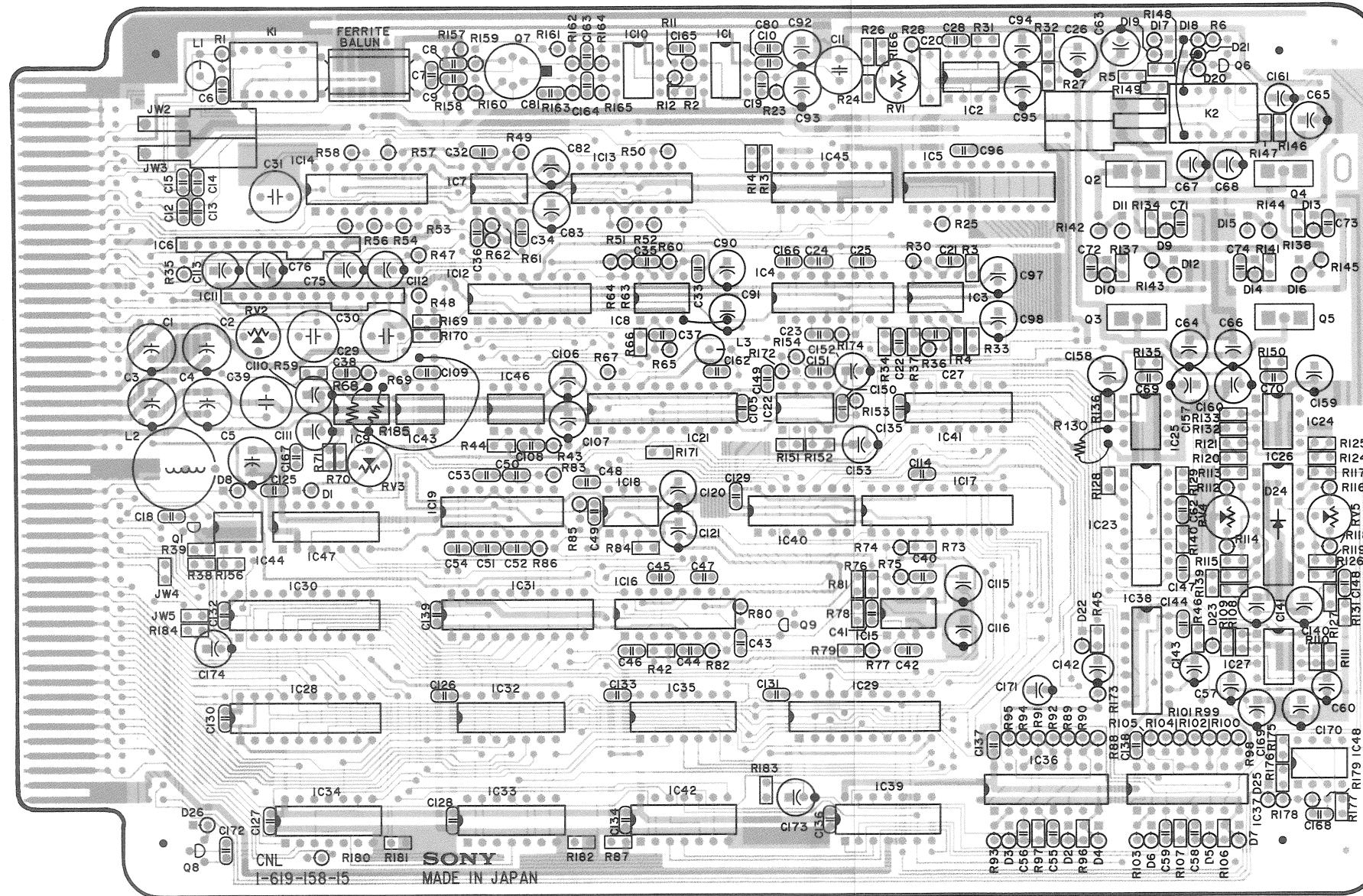
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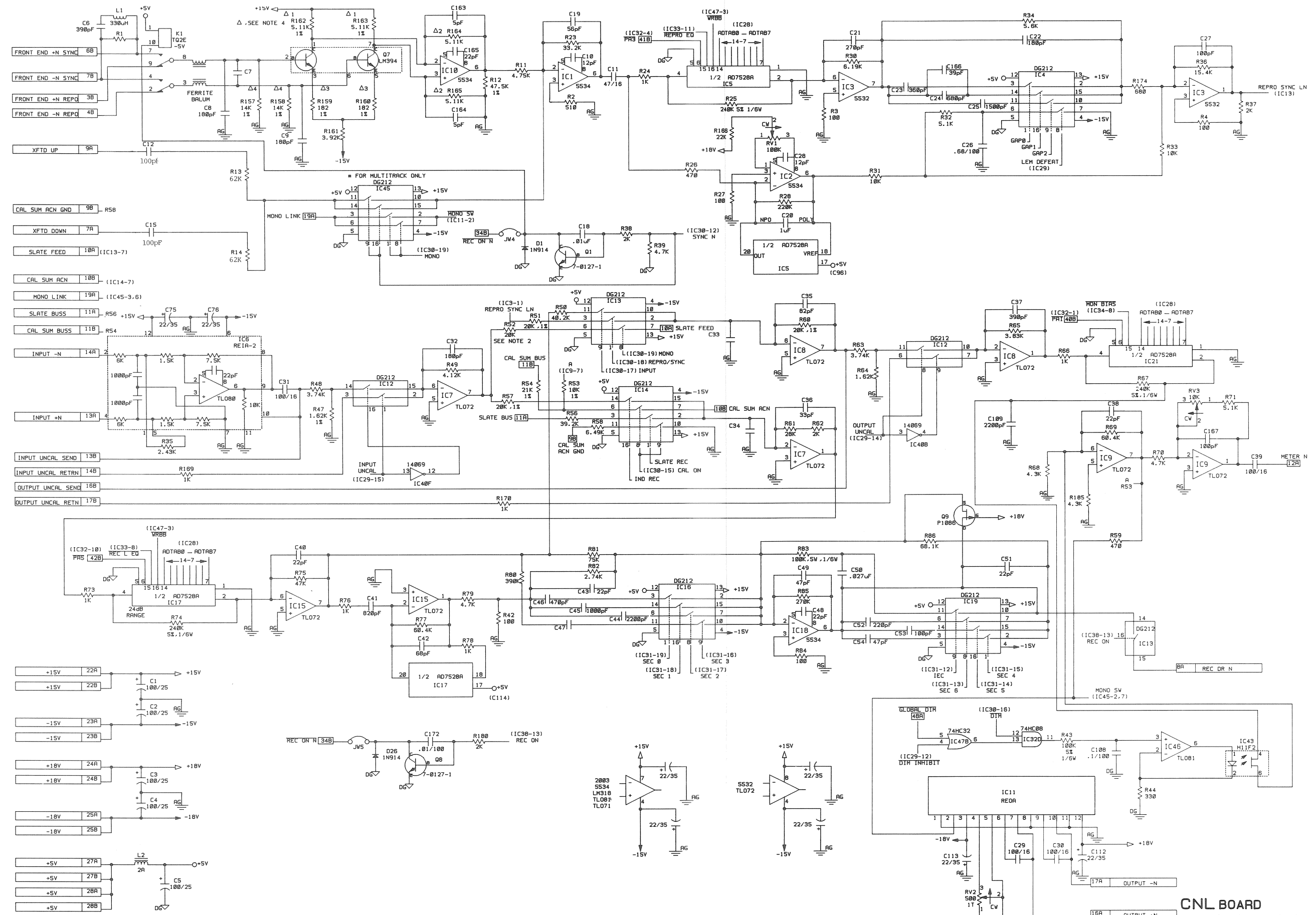
CNL BOARD (1-619-158-15)
Component Side

S/N: APR-5002 20301 AND HIGHER
S/N: APR-5003V 10001 AND HIGHER



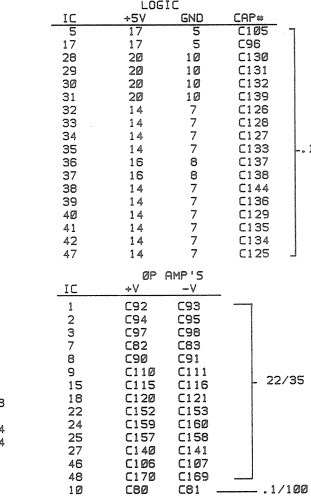
■ SOLDER SIDE PATTERN
■ COMPONENT SIDE PATTERN

CNL BOARD



CNL BOARD
BOARD NO. 1-619-158-11 & HIGHER
APR-5002/5003V

ANALOG GND	1A
ANALOG GND	1B
ANALOG GND	2A
ANALOG GND	2B
ANALOG GND	3A
ANALOG GND	4A

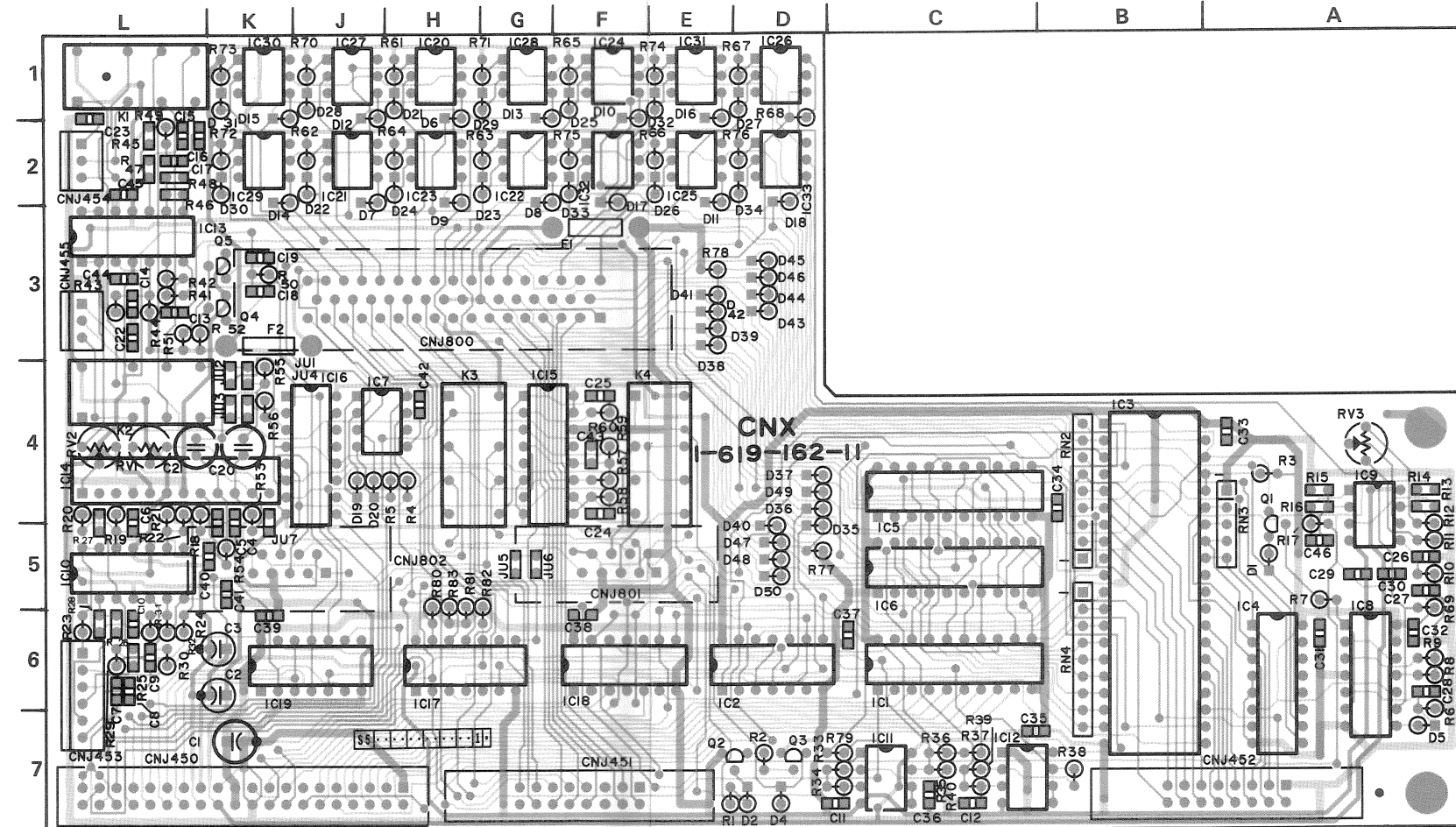


NOTES:

- 1) UNLESS OTHERWISE SPECIFIED:
 - ALL CAPACITORS ARE IN MICROFARADS/VOLTS.
 - ALL RESISTORS ARE IN OHMS, 1%, 1/8W.
 - ALL DIODES ARE 1N914
- 2) ONLY ON CH 1
- 3)  ANALOG GND  DIGITAL GND
- 4) ΔN = N-NUMBER MATCHED PAIR METAL FILM RESISTOR
- 5) □24 AND □126 ARE THERMALLY COUPLED TO TEMPERATURE STABILITY
- 6) ΔN = N-NUMBER MATCHED PAIR METAL FILM RESISTOR

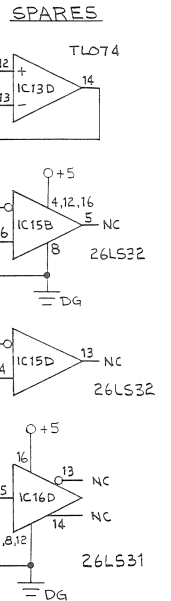
CNL BOARD
BOARD NO.1-619-158-11 & HIGHER
APR-5002/5003V

CNX BOARD (1-619-162-11)
Component Side



■ SOLDER SIDE PATTERN 1-619-162-11
■ COMPONENT SIDE PATTERN 1-619-162-11

CNX BOARD



GENERAL NOTES:

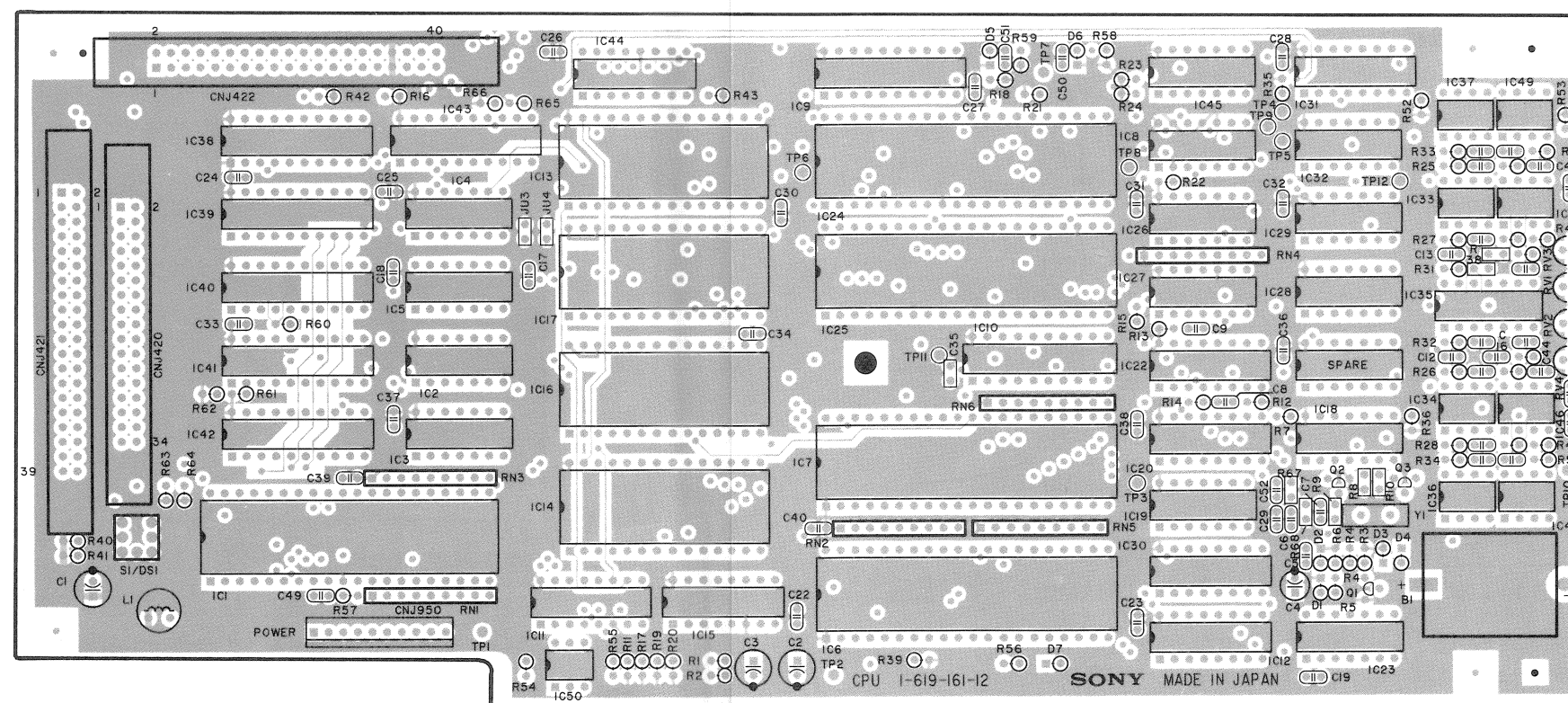
UNLESS OTHERWISE SPECIFIED:

1. ALL CAPACITORS ARE 0.1 MICROFARAD,
50 VOLTS, NONPOLARIZED,
MULTILAYER CERAMIC TYPE.
2. ALL DIODES ARE 1SS119
ALL ZENERS ARE RD5.1EB2
3. ALL RESISTORS ARE IN OHMS,
1/6 W., 5%, VERTICAL LEAD TYPE.
4. IC'S 17, 18, AND 19 POWER PINOUTS
ARE: PIN 14; +5V.
PIN 7; DG.

SPECIFIC NOTES:

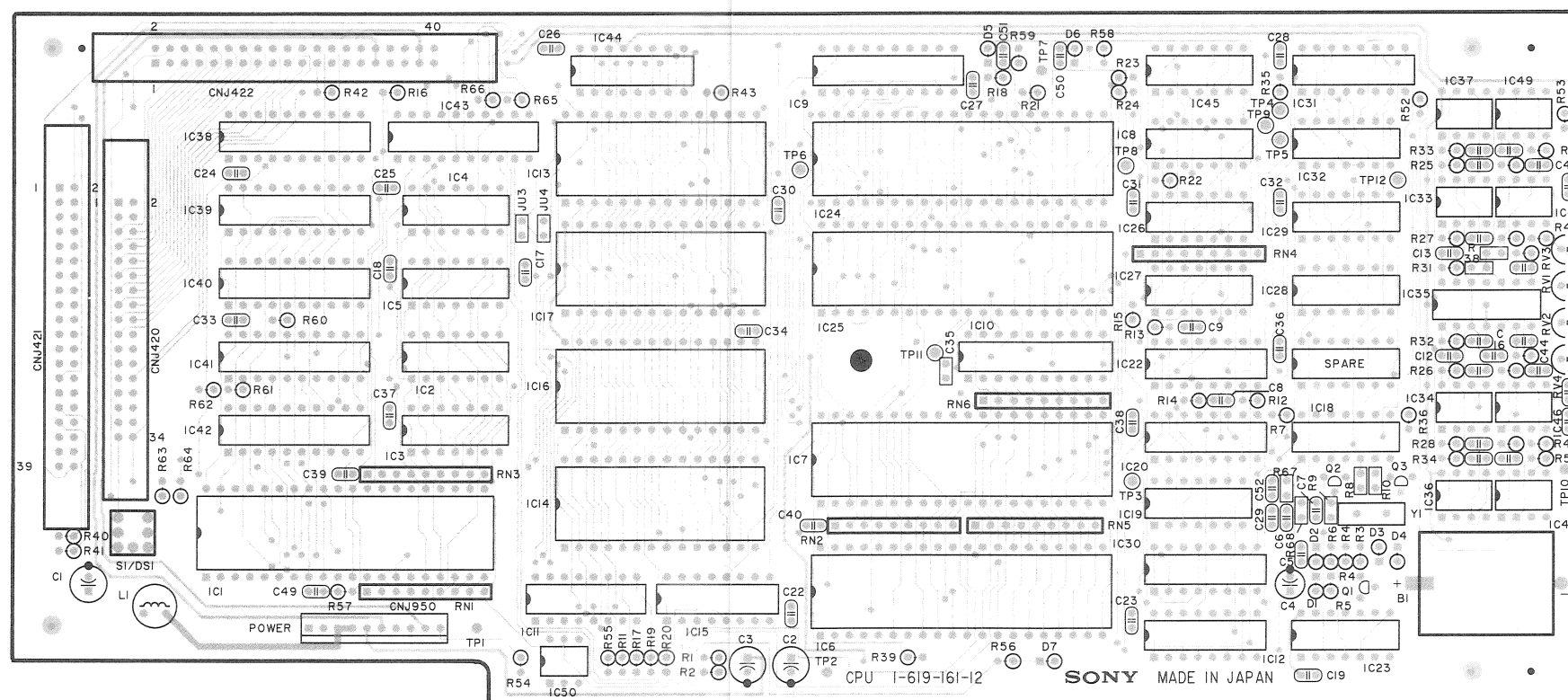
- ① INSTALL JU1, JU3 FOR BALANCED DIFFERENTIAL TIMECODE OUTPUT.
RV1 ADJUSTS SYMMETRY, RV2 ADJUSTS LEVEL. INSTALL JUR, JU4, FOR RS-422 LEVEL TIMECODE OUTPUT.
- ② PARALLEL REMOTE FUNCTIONS IN PARENTHESIS ARE UNIQUE TO APR-5000 SERIES MACHINES.
- ③ INSTALL JUS AND JUT FOR USE IN PCM SERIES MACHINES.
INSTALL JUG FOR USE IN DDR SERIES MACHINES.

CPU BOARD (1-619-161-12)
Component Side



■ SOLDER SIDE PATTERN

Year	Age	Sex	Location	Species	Number	Percentage	Notes
1985	10	M	1000	1	100		
1986	10	M	1000	1	100		
1987	10	M	1000	1	100		
1988	10	M	1000	1	100		
1989	10	M	1000	1	100		
1990	10	M	1000	1	100		
1991	10	M	1000	1	100		
1992	10	M	1000	1	100		
1993	10	M	1000	1	100		
1994	10	M	1000	1	100		
1995	10	M	1000	1	100		
1996	10	M	1000	1	100		
1997	10	M	1000	1	100		
1998	10	M	1000	1	100		
1999	10	M	1000	1	100		
2000	10	M	1000	1	100		
2001	10	M	1000	1	100		
2002	10	M	1000	1	100		
2003	10	M	1000	1	100		
2004	10	M	1000	1	100		
2005	10	M	1000	1	100		
2006	10	M	1000	1	100		
2007	10	M	1000	1	100		
2008	10	M	1000	1	100		
2009	10	M	1000	1	100		
2010	10	M	1000	1	100		
2011	10	M	1000	1	100		
2012	10	M	1000	1	100		
2013	10	M	1000	1	100		
2014	10	M	1000	1	100		
2015	10	M	1000	1	100		
2016	10	M	1000	1	100		
2017	10	M	1000	1	100		
2018	10	M	1000	1	100		
2019	10	M	1000	1	100		
2020	10	M	1000	1	100		



■ SOLDER SIDE PATTERN

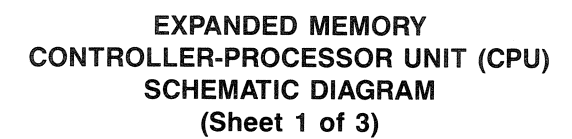
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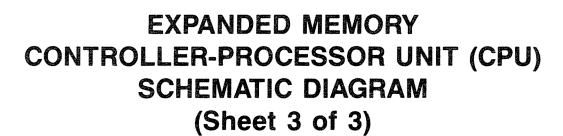
TECHNICAL UPDATE

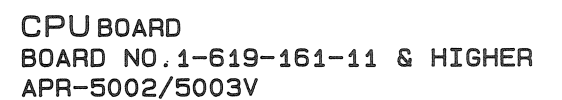
APR-5000 SERIES RECORDERS/REPRODUCERS

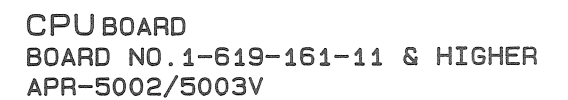
Recent versions of the subject Recorders/Reproducers are fitted with a new Controller/Processor Unit (CPU) with expanded memory capabilities. This document provides a schematic diagram (3 sheets) for the new CPU.

The Expanded-memory CPUs may be identified by their part numbers. Units manufactured in the United States are numbered T-9412-327-4, while units of Japanese manufacture are numbered 1-619-161-12.







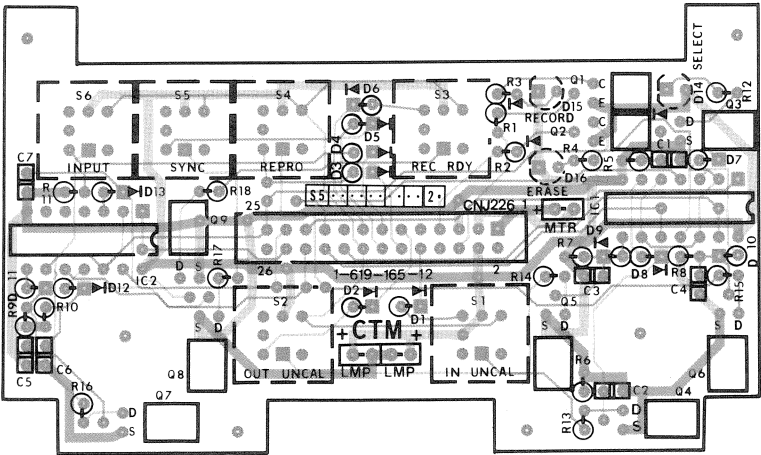




CPU BOARD

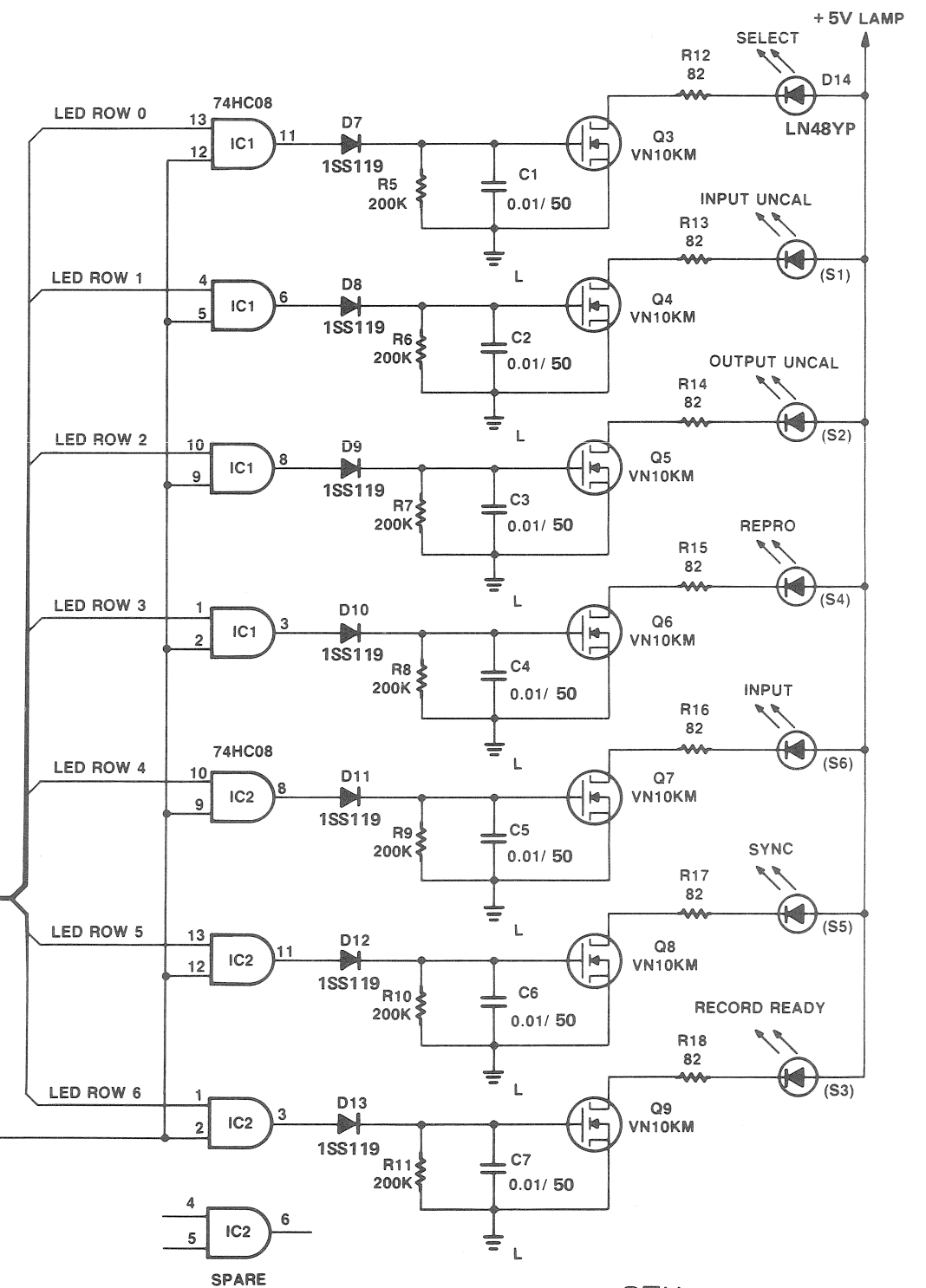
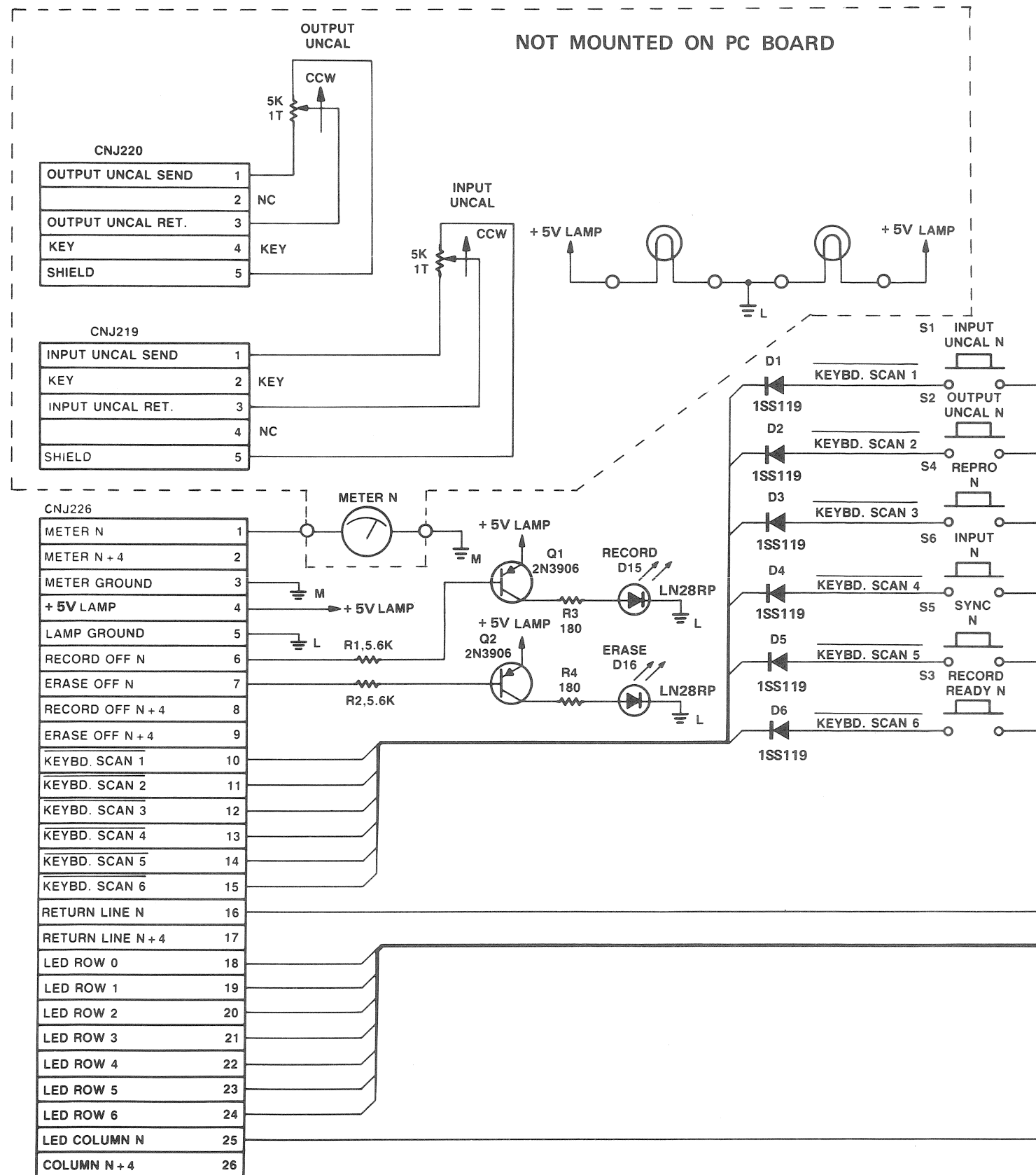
CPU BOARD
BOARD NO.1-619-161-11 & HIGHER
APR-5002/5003V

CTM BOARD (1-619-165-12)
Component Side



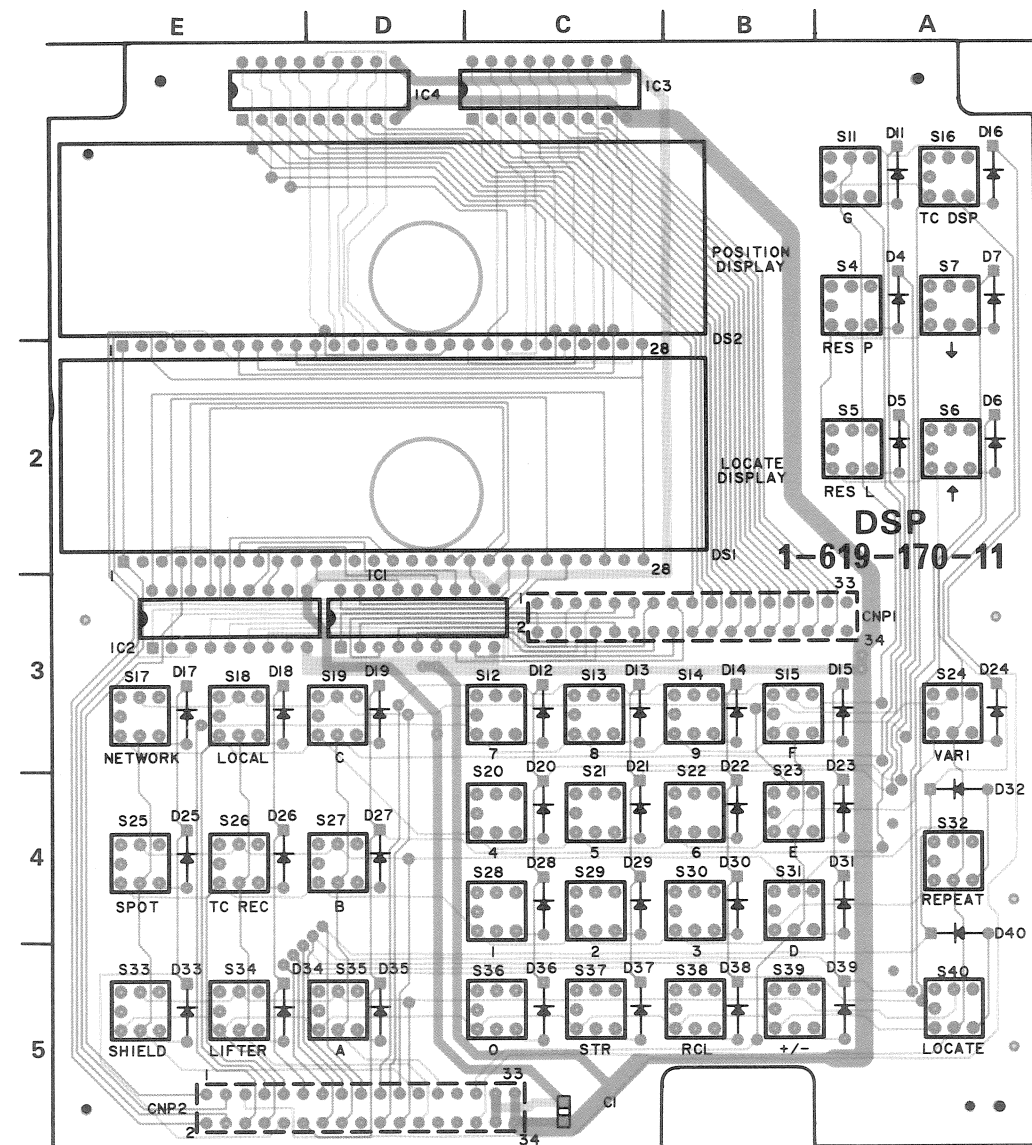
■ SOLDER SIDE PATTERN 1-619-165-12
■ COMPONENT SIDE PATTERN 1-619-165-12

CTM BOARD



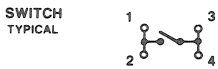
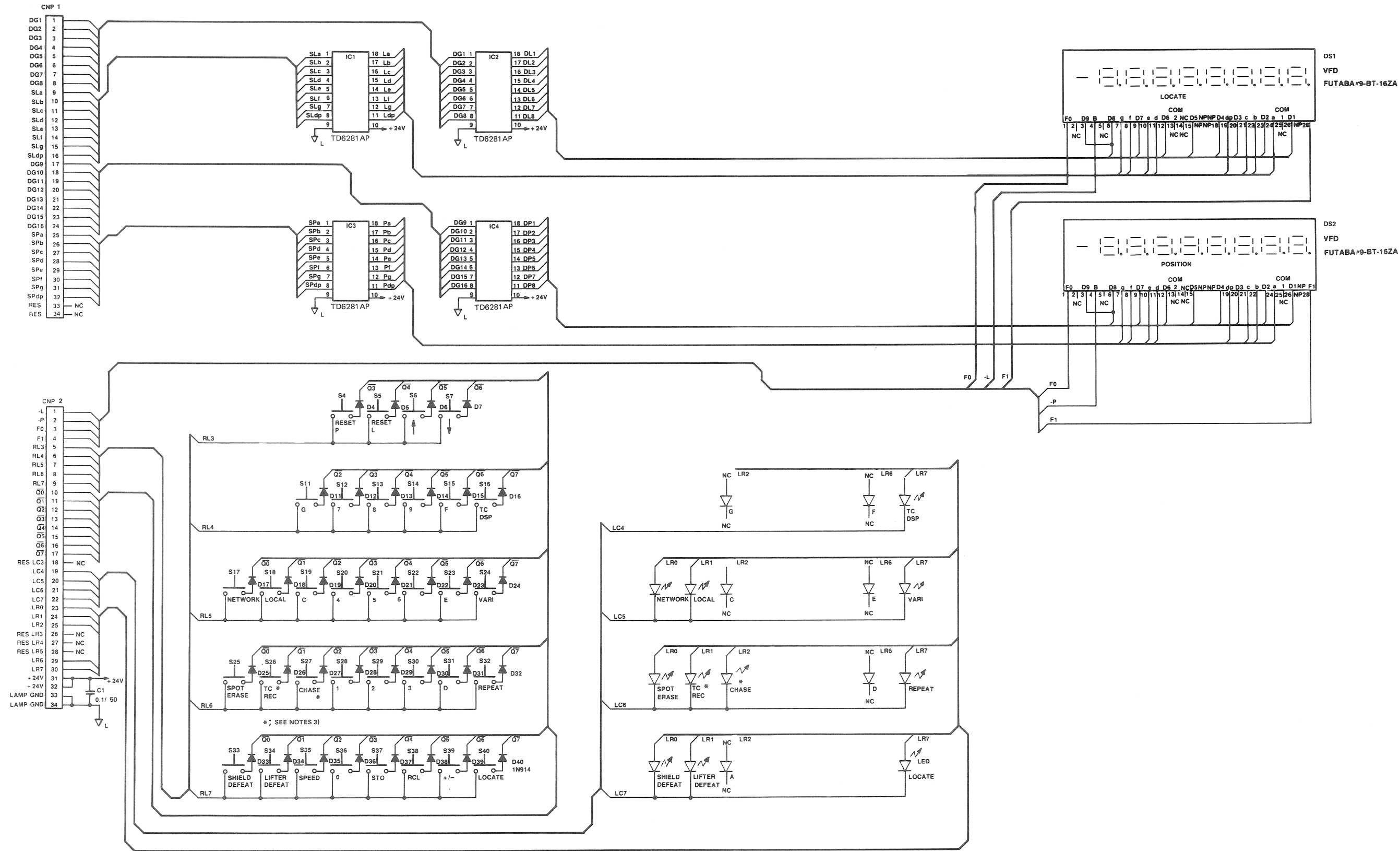
CTM BOARD
BOARD NO. 1-619-165-12 & HIGHER
APR-5002/5003V

DSP BOARD (1-619-170-11)
Component Side



■ SOLDER SIDE PATTERN 1-619-170-11
■ COMPONENT SIDE PATTERN 1-619-170-11

DSP BOARD

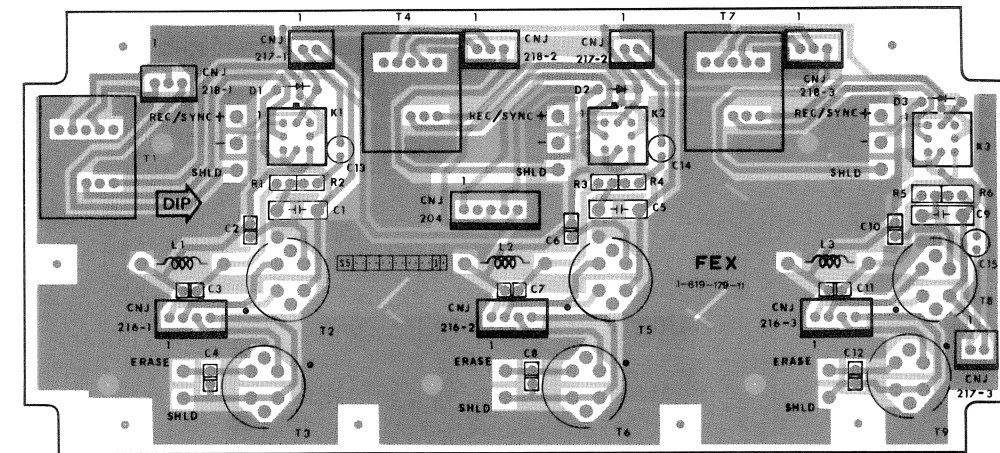


- NOTES:
- 1) SWITCHES S11, S15, S19, S23 and S31 are not used.
 - 2) DIODES D11, D15, D19, D23 and D31 are not used.
 - 3) * S26, S27, D26 and D27 are installed in APR-5003, but not installed in APR-5002.

DSP BOARD
BOARD NO. 1-619-170-11 & HIGHER
APR-5002/5003V

FEX BOARD (1-619-179-11)
Component Side

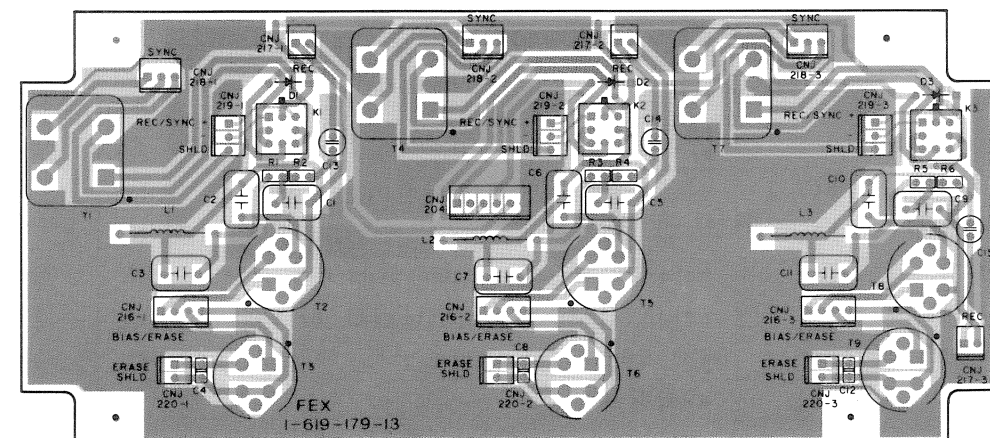
S/N: APR-5002 20001 TO 20300



■ SOLDER SIDE PATTERN 1-619-179-11
■ COMPONENT SIDE PATTERN 1-619-179-11

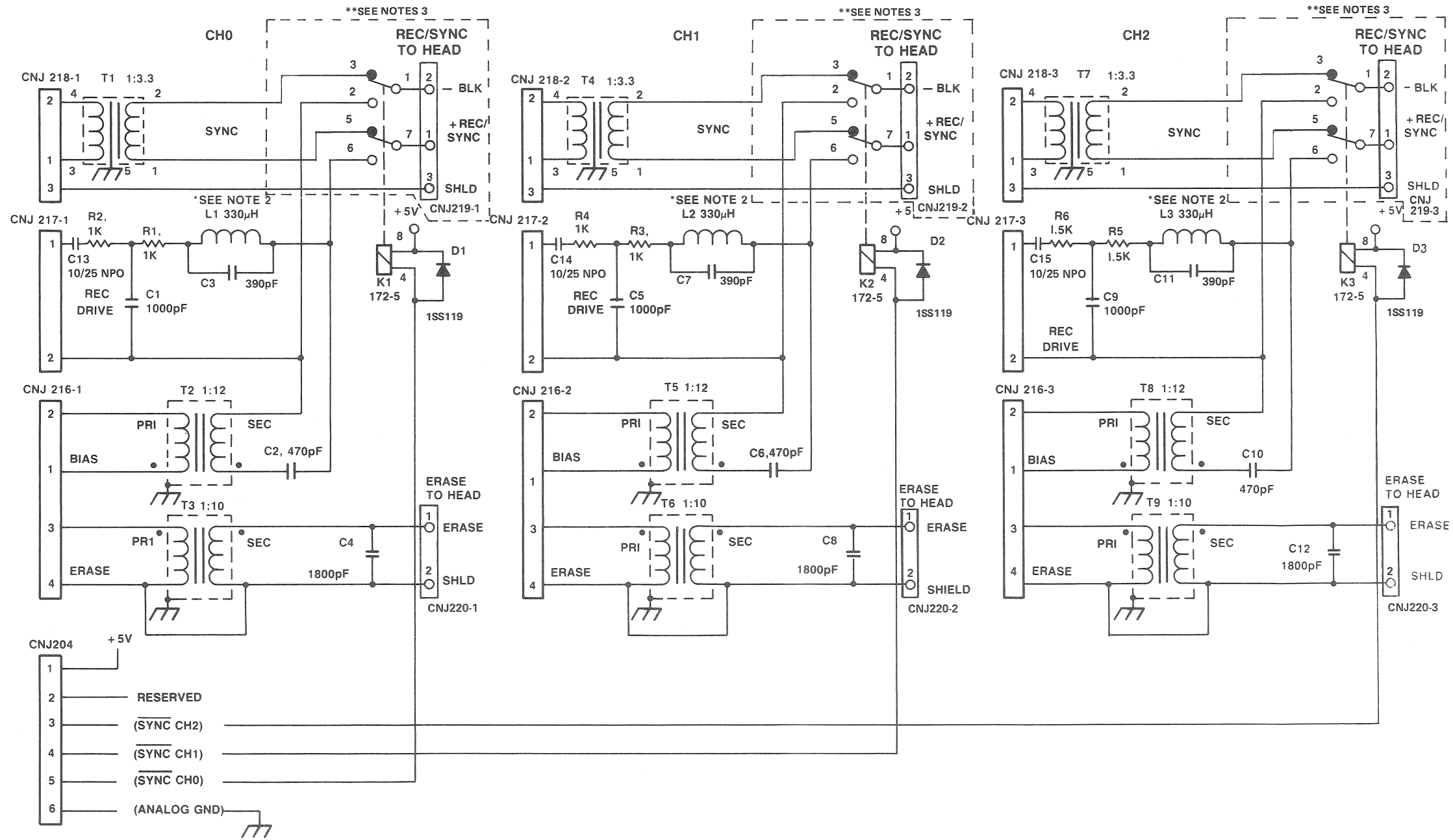
FEX BOARD (1-619-179-13)
Component Side

S/N; APR-5002	20301	AND HIGHER
S/N; APR-5003V	10001	AND HIGHER



■ SOLDER SIDE PATTERN 1-619-179-13
■ COMPONENT SIDE PATTERN 1-619-179-13

FEX BOARD

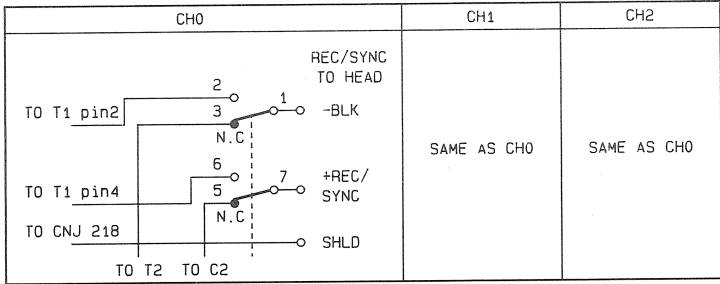


NOTES (UNLESS OTHERWISE SPECIFIED):

- 1. ALL RESISTOR VALUES ARE IN OHMS, 1/8 W, 1%.
- *2. L1, L2 & L3 ARE SHIELDED BY WRAPPING EACH INDUCTOR WITH μ METAL, THEN INCAPSULATE THE WRAPPED INDUCTOR IN SHRINK TUBING.

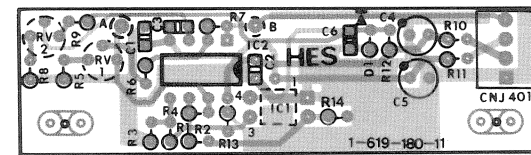
**3. The following circuit is only applicable to the FEX Board (Board No. 1-619-179-11 and -12 only).

Serial Nos:
APR-5002 20001 TO 20300



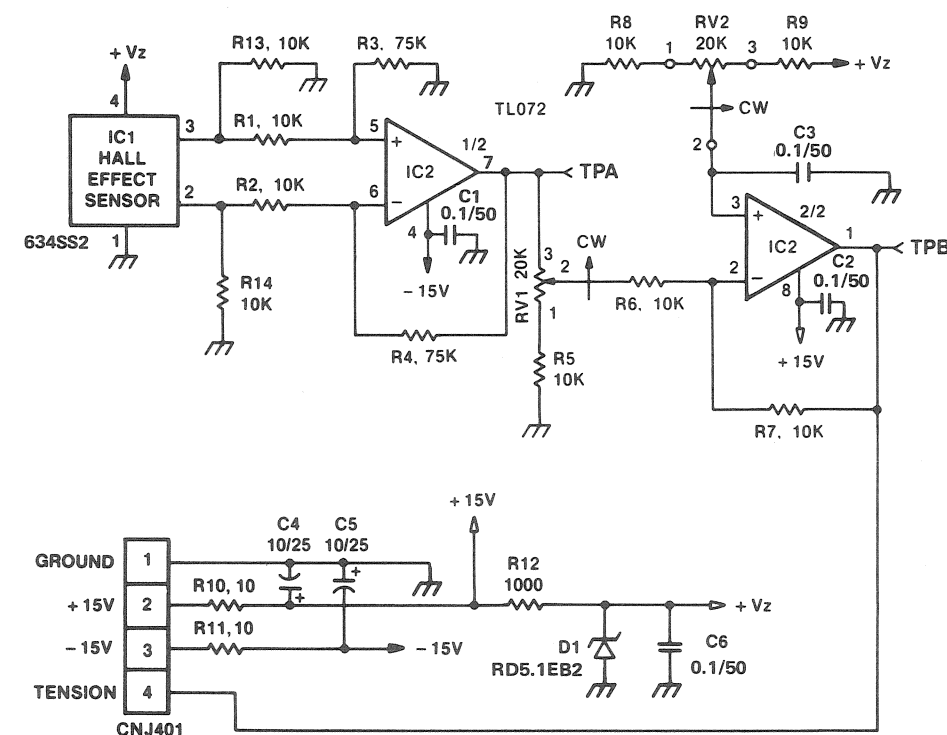
FEX CNL, TCC	1-619-179-11 -12	1-619-179-13 and higher	Applicable Serial NO.		Parts that have been changed.	Pins that have been changed.	Parts that have been added.
	1-619-158-11 -12		APR-5002	APR-5003			
1-619-158-11 -12	No Problem	Can't use	20201 and higher	20401 and higher	C3, C7, C11 430pF $\rightarrow$ 390pF		
1-619-158-13 and higher	Add; JW4 Q9 (P1086) Delete; JW5	Add; JW5 Delete; Q9 and JW4	20301 and higher	20501 and higher	R1, R2, R3, R4 1.5K $\rightarrow$ 1K	T1, T4, T7 8Pin $\rightarrow$ 4Pin 6Pin $\rightarrow$ 3Pin 4Pin $\rightarrow$ 1Pin GND $\rightarrow$ 5Pin	CNJ219 CNJ220

FEX BOARD
BOARD NO. 1-619-179-11 & HIGHER
APR-5002/5003V

HES BOARD (1-619-180-11)
Component Side

■ SOLDER SIDE PATTERN 1-619-180-11
■ COMPONENT SIDE PATTERN 1-619-180-11

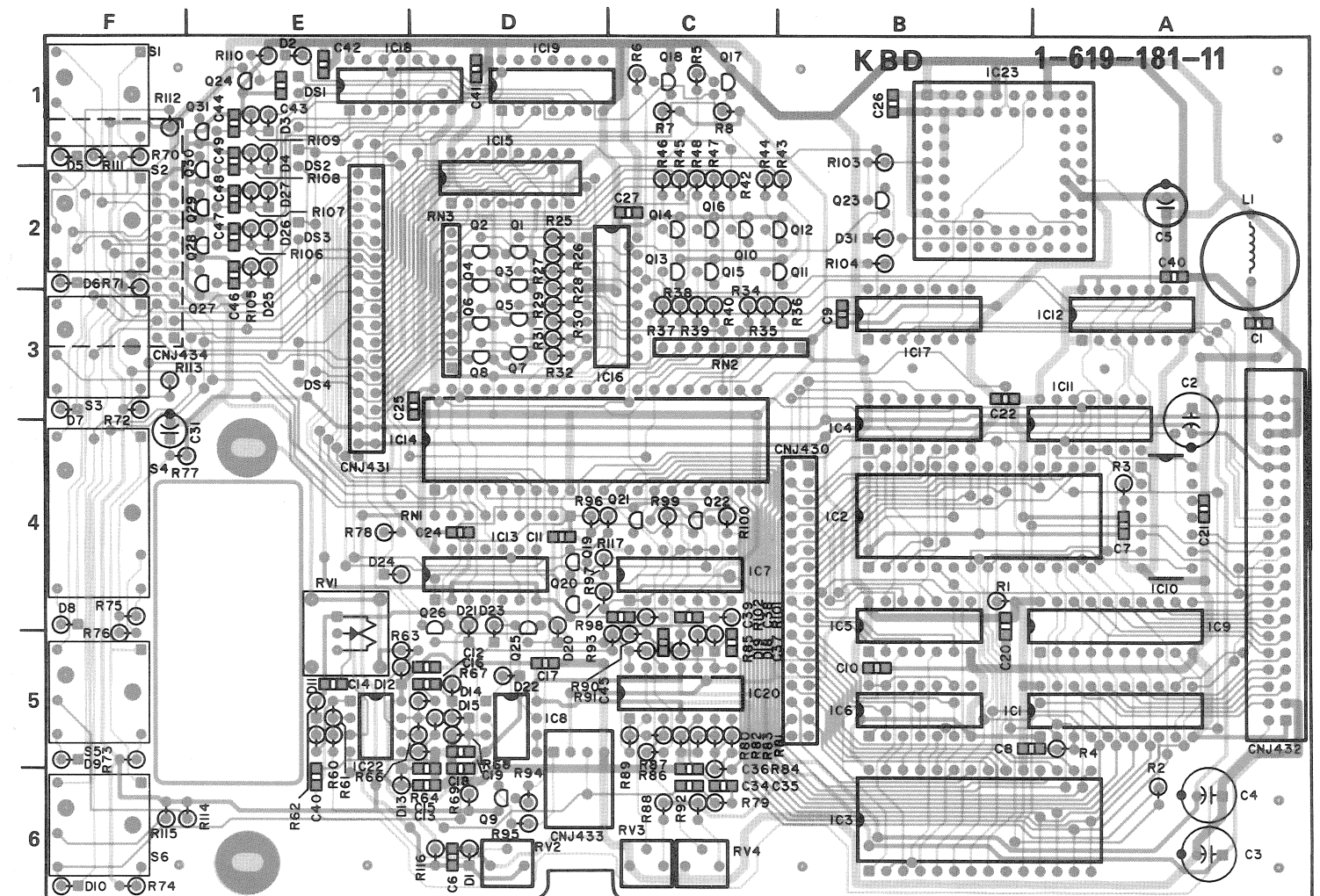
HES BOARD



NOTES; UNLESS OTHERWISE SPECIFIED:

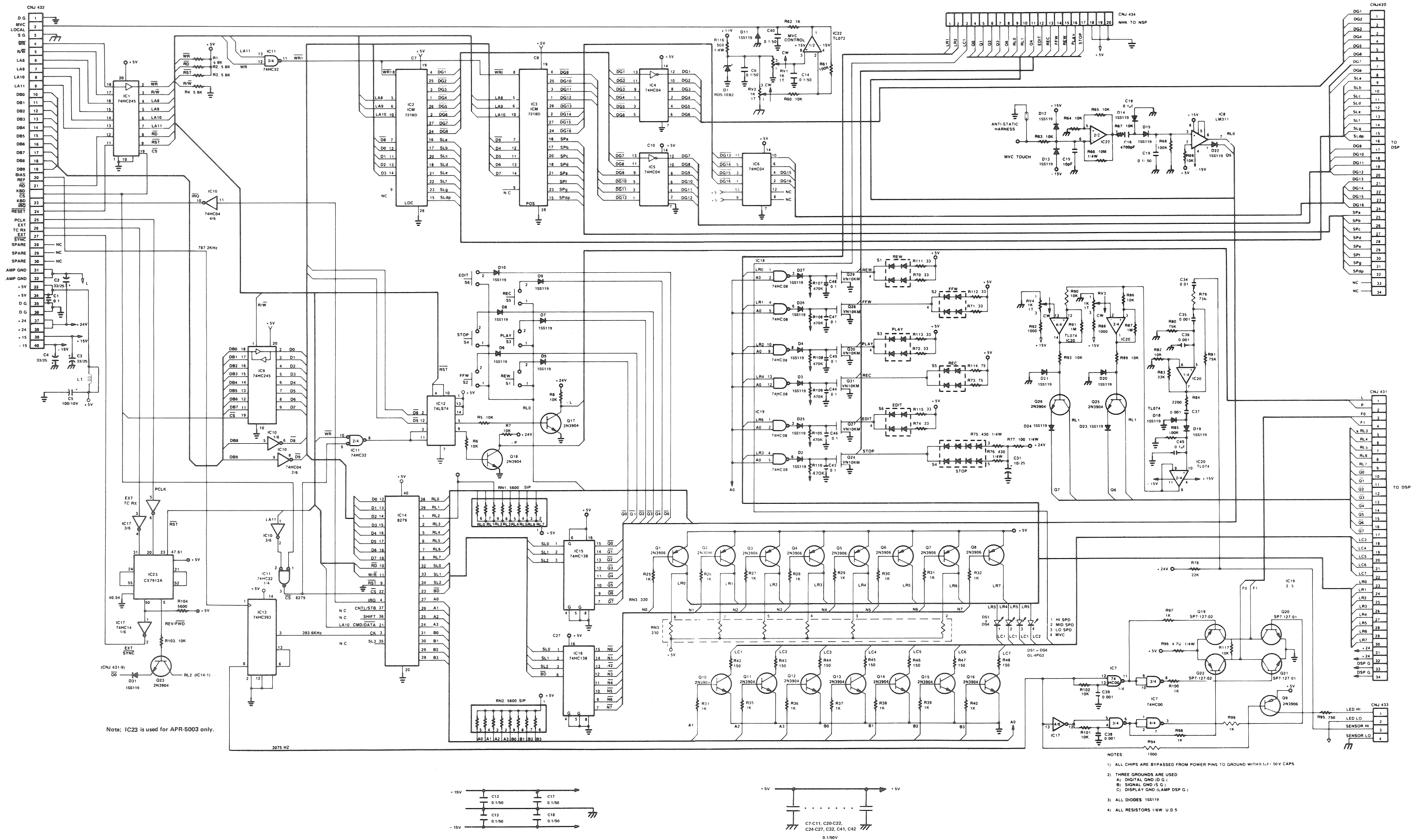
1. ALL RESISTOR VALUES ARE IN OHMS, 1/6W, 5%.
2. ALL CAPACITORS MEASURED IN MICROFARADS/VOLTS.
3. HALL EFFECT SENSOR IS 634SS2 OR EQUIVALENT.

HES BOARD
BOARD NO. 1-619-180-11 & HIGHER
APR-5002/5003V

KBD BOARD (1-619-181-11)
Component Side

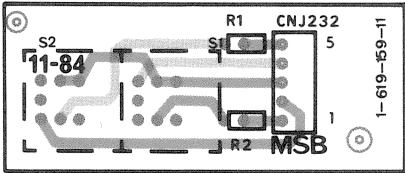
■ SOLDER SIDE PATTERN 1-619-181-11
■ COMPONENT SIDE PATTERN 1-619-181-11

KBD BOARD



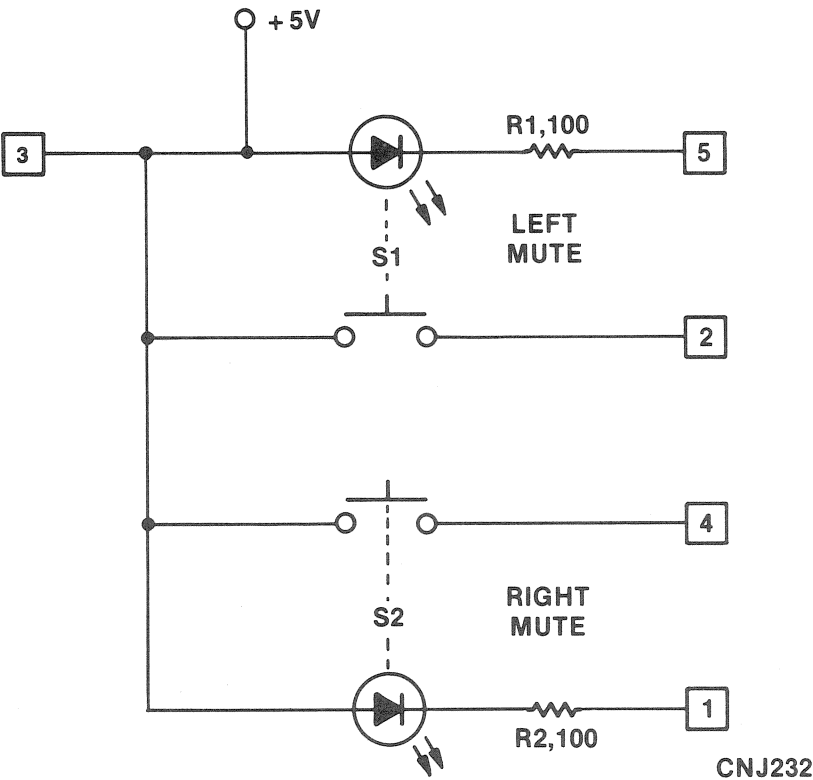
MSB BOARD (1-619-159-11)
Component Side

LNT BOARD (1-619-157-12)
Component Side



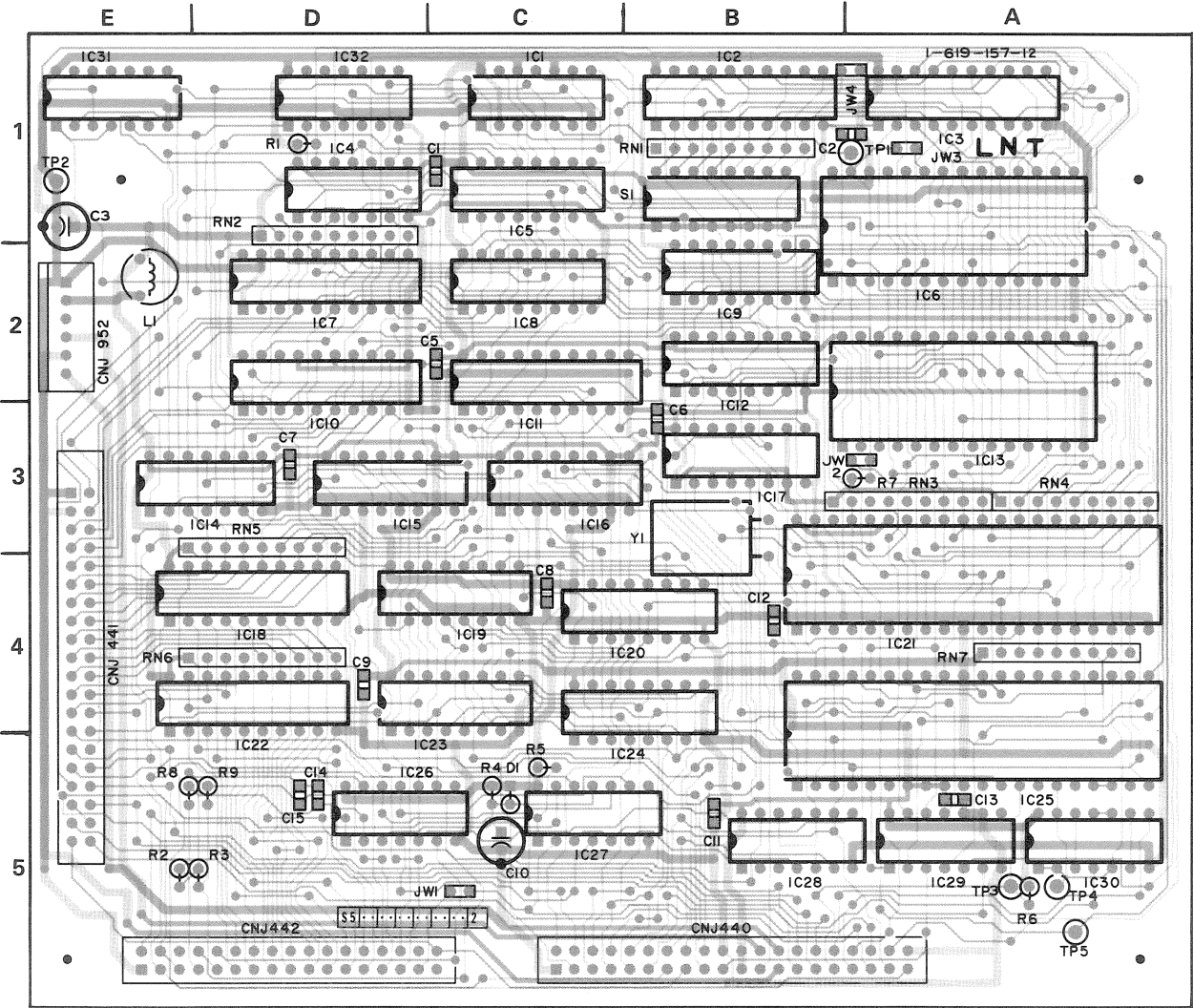
■ SOLDER SIDE PATTERN 1-619-159-11
■ COMPONENT SIDE PATTERN 1-619-159-11

MSB BOARD



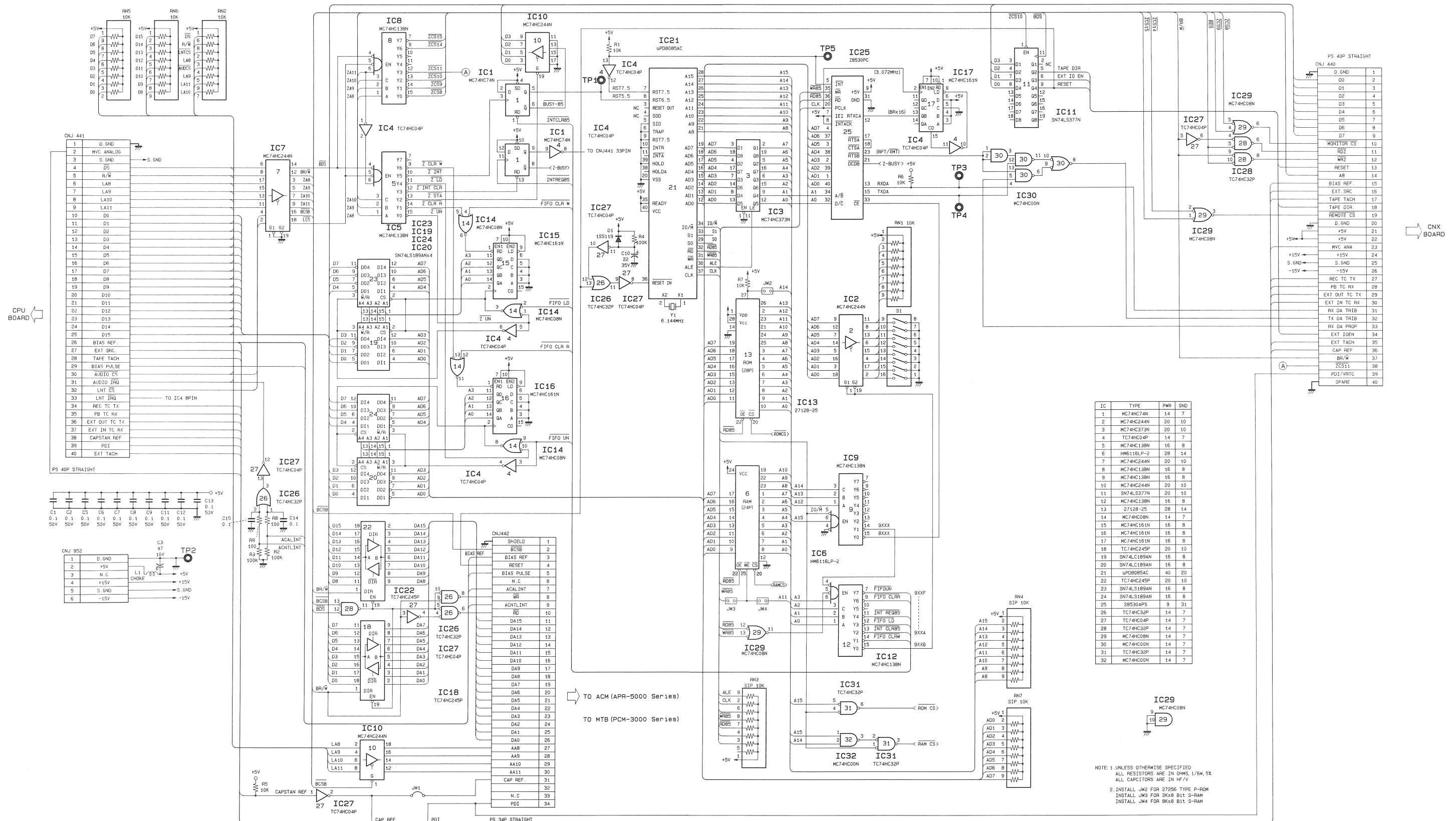
NOTES(UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTOR VALUES ARE IN OHMS, 1/6W,5%

MSB BOARD
BOARD NO.1-619-159-11 & HIGHER
APR-5002/5003V



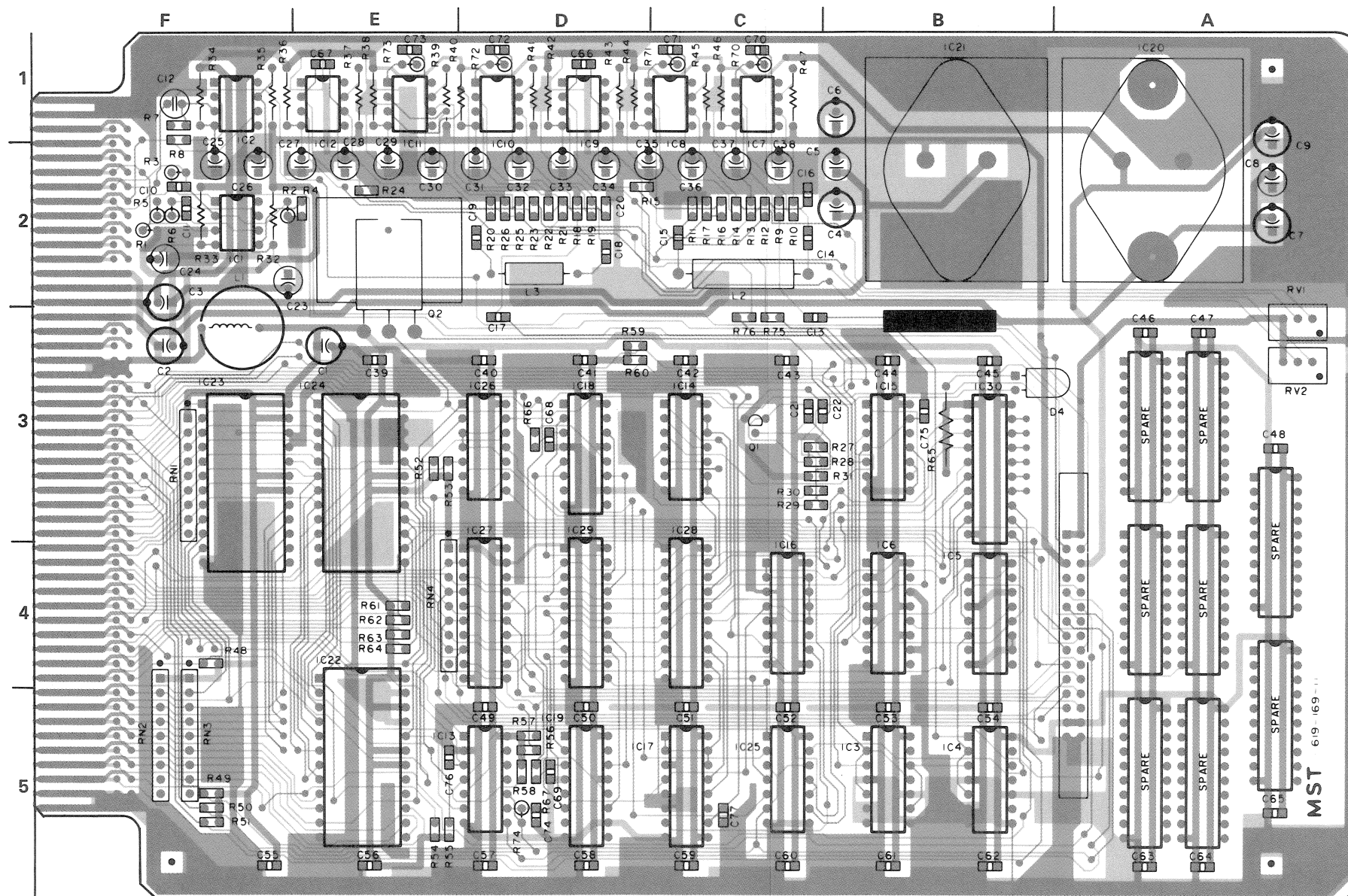
■ SOLDER SIDE PATTERN 1-619-157-12
■ COMPONENT SIDE PATTERN 1-619-157-12

LNT BOARD

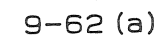


MST BOARD (1-619-169-11)
Component Side

S/N: APR-5002 20001 TO 20615

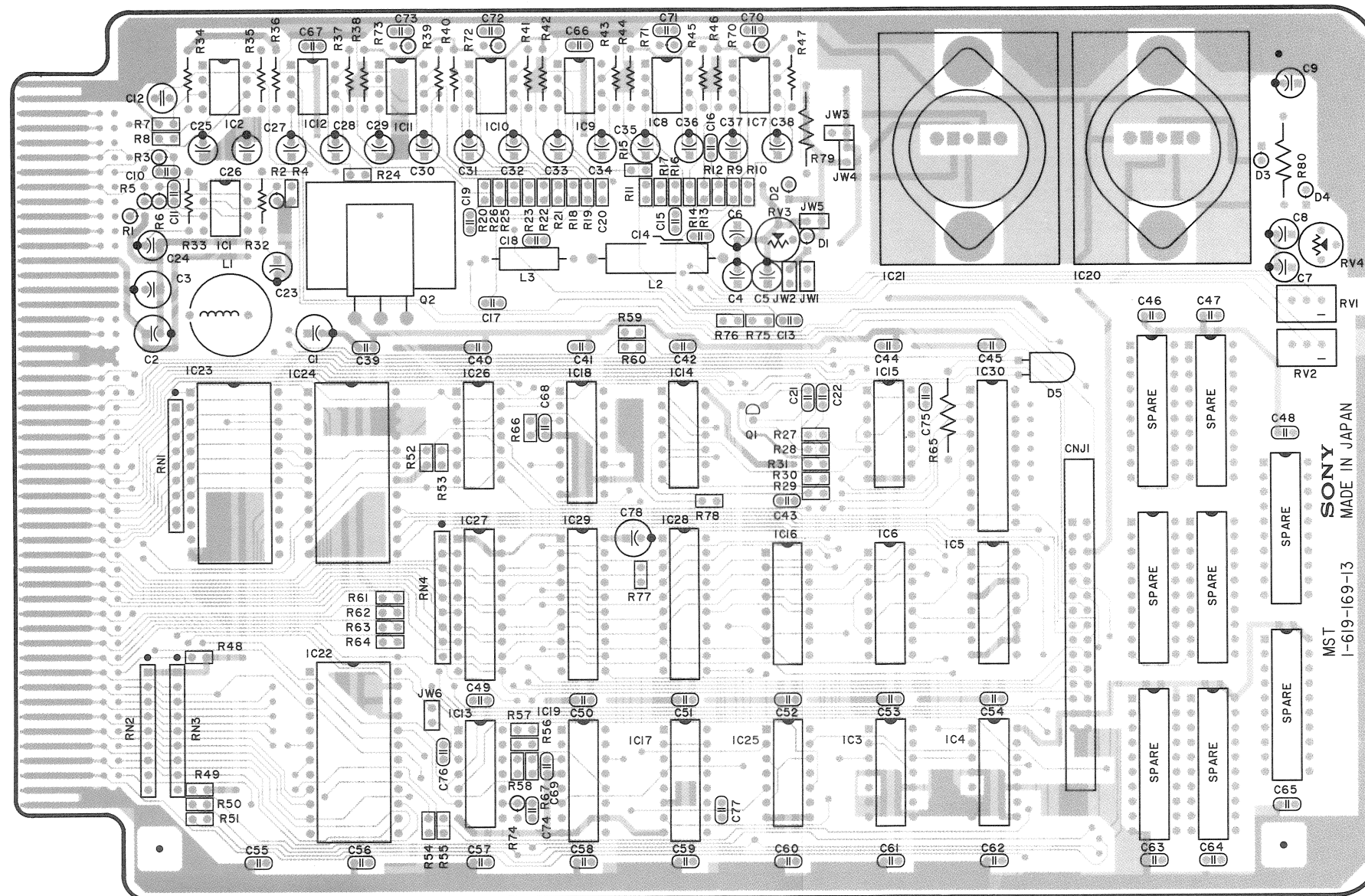


■ SOLDER SIDE PATTERN 1-619-169-11
■ COMPONENT SIDE PATTERN 1-619-169-11



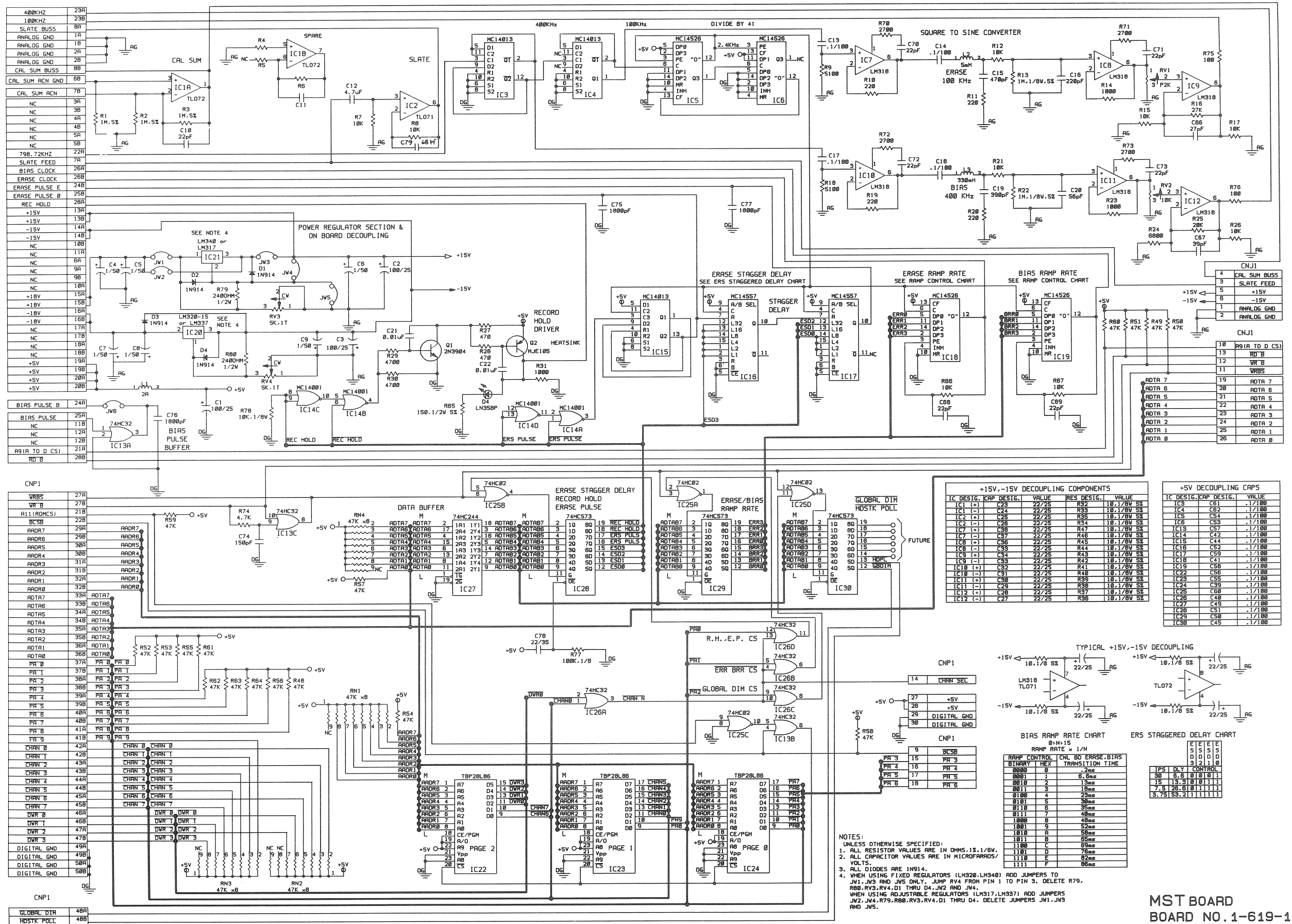
MST BOARD (1-619-169-13)
Component Side

S/N: APR-5002 20701 AND HIGHER
S/N: APR-5003V 10001 AND HIGHER

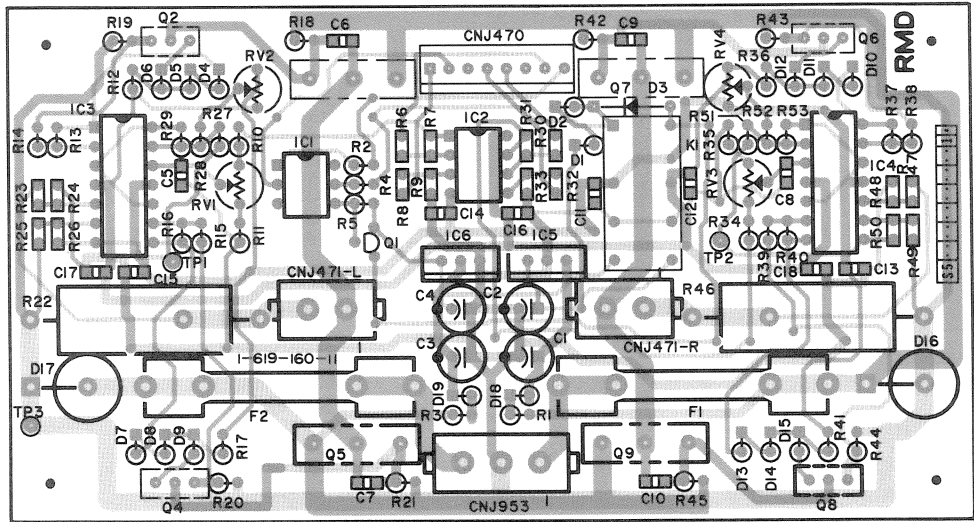


■ SOLDER SIDE PATTERN

S/N; APR-5002	20701	AND	HIGHER
S/N; APR-5003V	10001	AND	HIGHER

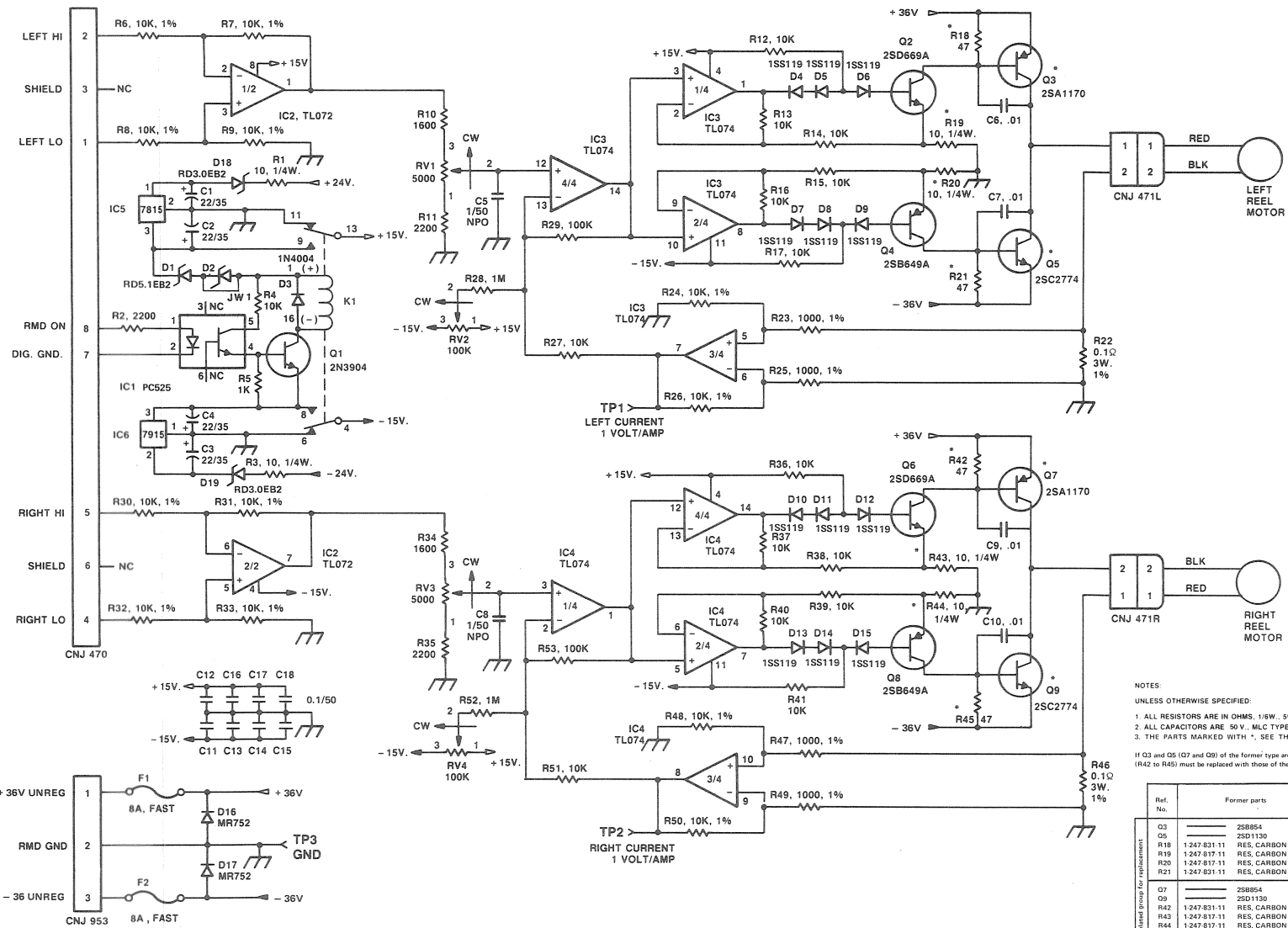


RMD BOARD (1-619-160-11)
Component Side



■ SOLDER SIDE PATTERN 1-619-160-11
■ COMPONENT SIDE PATTERN 1-619-160-11

RMD BOARD

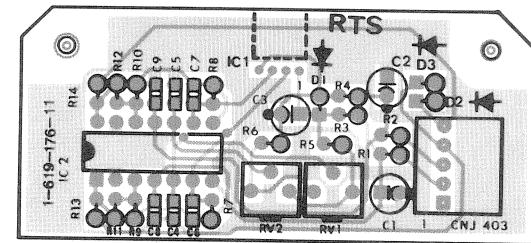


NOTES:
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS, 1/8W, 5%.
2. ALL CAPACITORS ARE 50V, MLC TYPE.
3. THE PARTS MARKED WITH * SEE THE FOLLOWING TABLE.

If Q3 and Q5 (Q7 and Q9) of the former type are replaced with those of the new type, R18 to R21 (R42 to R45) must be replaced with those of the new type at the same time.

Ref. No.	Former parts	New parts
Q3	258854	8-729-300-24 2SA1170
Q5	25D1130	8-729-300-18 2SC2774
R18	1-247-831-11 RES. CARBON 1K	1-249-401-11 RES. CARBON 47
R19	1-247-817-11 RES. CARBON 270	1-247-688-11 RES. CARBON 10
R20	1-247-817-11 RES. CARBON 270	1-247-688-11 RES. CARBON 10
R21	1-247-831-11 RES. CARBON 1K	1-249-401-11 RES. CARBON 47
Q7	258854	8-729-300-24 2SA1170
Q9	25D1130	8-729-300-18 2SC2774
R42	1-247-831-11 RES. CARBON 1K	1-249-401-11 RES. CARBON 47
R43	1-247-817-11 RES. CARBON 270	1-247-688-11 RES. CARBON 10
R44	1-247-817-11 RES. CARBON 270	1-247-688-11 RES. CARBON 10
R45	1-247-831-11 RES. CARBON 1K	1-249-401-11 RES. CARBON 47

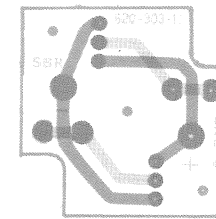
RTS BOARD (1-619-176-11)
Component Side



■ SOLDER SIDE PATTERN 1-619-176-11
■ COMPONENT SIDE PATTERN 1-619-176-11

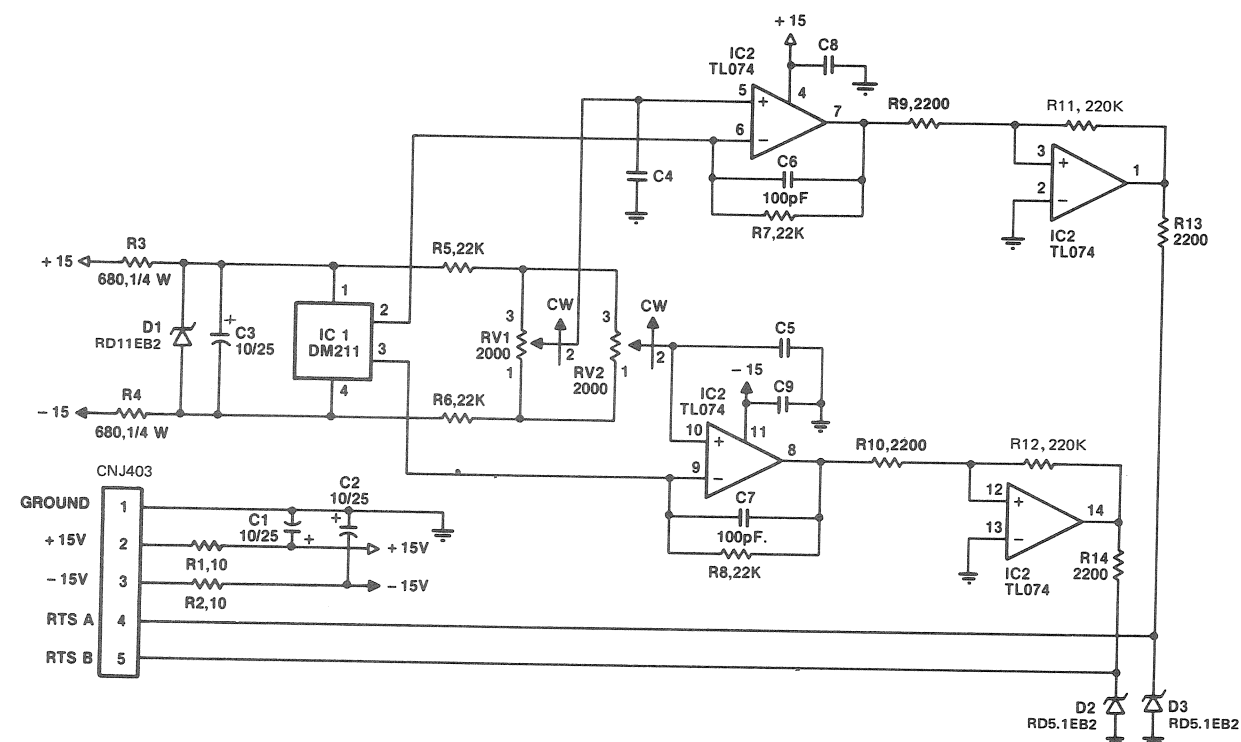
SBR BOARD (1-620-303-11)
Component Side

S/N; APR-5002 20001 TO 20700 ONLY



■ SOLDER SIDE PATTERN 1-620-303-11
■ COMPONENT SIDE PATTERN 1-620-303-11

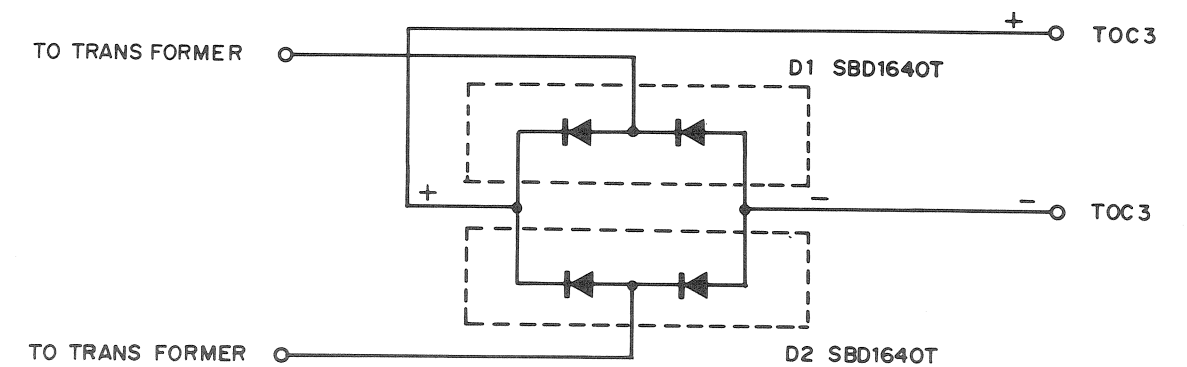
RTS BOARD



NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS, 1/8W, 5%.
2. ALL CAPACITORS ARE 0.1μF, 50V, CERAMIC.
3. C4, C5 ARE NOT INSTALLED.

RTS BOARD
BOARD NO. 1-619-176-11 & HIGHER
APR-5002/5003V

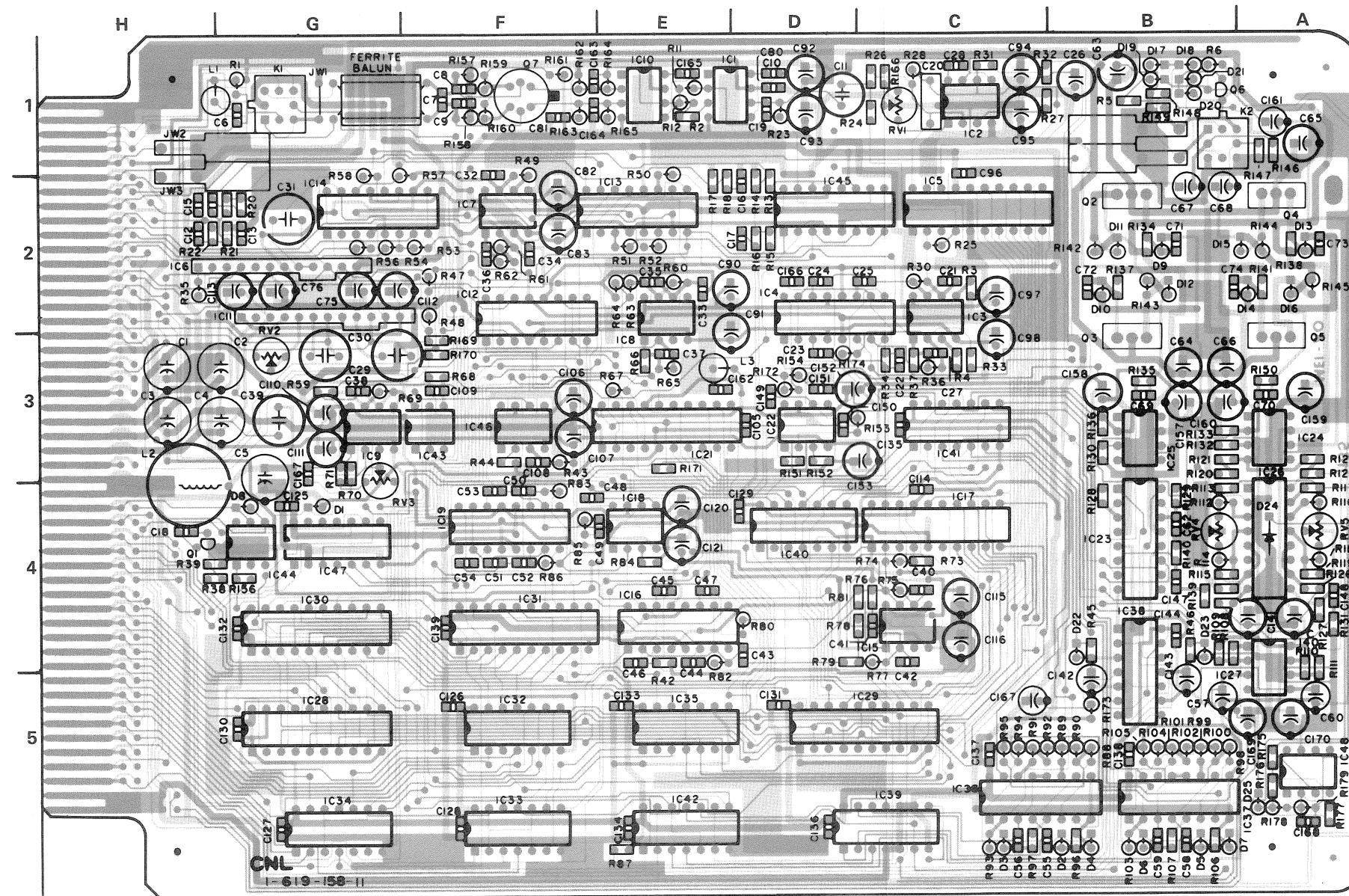
SBR BOARD



SBR BOARD
BOARD NO. 1-620-303-11
APR-5002

TCC BOARD (1-619-158-11)
Component Side

S/N: APR-5002 20001 TO 20300



■ SOLDER SIDE PATTERN 1-619-158-11

■ COMPONENT SIDE PATTERN 1-619-158-11

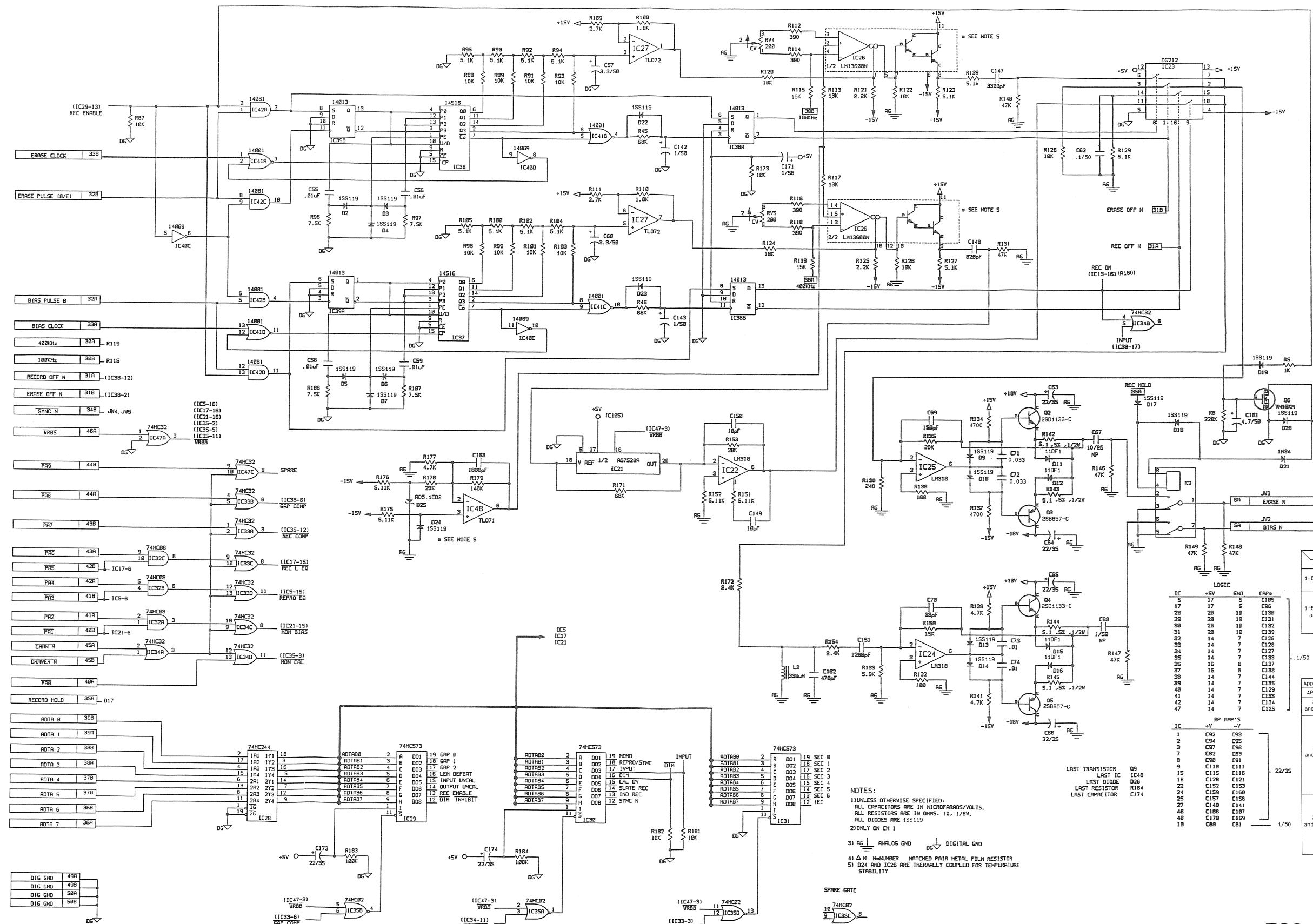


S/N: APR-5002	20301	AND HIGHER
S/N: APR-5003V	10001	AND HIGHER



Applicable Serial NO.		Parts that have been changed.	Parts that have been added.	Parts that have been deleted.
APR-5002	APR-5003			
20301 and higher	20501 and higher	R09 60.4K → 100K	JW4 JW5 D26 1M914 C172 .01/100 QB 7-0127-1 R180 2K	09 P1086
20401 and higher	20601 and higher	R161 3.92K → 3.9K R12 47.5K → 47K R11 4.75K → 4.7K R23 66.5K → 68K R30 6.19K → 6.2K R36 15.4K → 15K R58 6.49K → 6.8K R65 3.83K → 3.9K R77 60.4K → 62K R82 2.74K → 2.7K R86 68.1K → 68K	_____	_____
20501 and higher	20701 and higher	R162 R163 5.11K → 5.1K R164 R165 5.11K → 5.1K R159 R160 182 → 180 R157 R158 14K → 15K	_____	_____

TCC BOARD



FEX CNL, TCC	1-619-179-11 -12	1-619-179-13 and higher
1-619-158-11 -12	No Problem	Can't use
1-619-158-13 and higher	Add; JW4 Q9 (P1086) Delete; JW5	Add; JW5 Delete; Q9 and JW4

Applicable	Serial NO.	Pins that have been soldered.	Parts that have been changed.
APR-5002	APR-5003		
20301 and higher	20501 and higher	D1 → JN4, JN5	_____
20401 and higher	20601 and higher	_____	R90, R92, R94, R95, R100, R102, R104, R105 5.1K → 5.1K R88, R89, R91, R93, R98, R99, R101, R103 10.2K → 10K R112, R114, R116, R118 402 → 390 R154, R172 2.55K → 2.4K R115, R119 10K → 15K Q2, 4 D44C9 → 2SD1133-C Q3, 5 D4C9 → 2SB857-C D11, 12, 15, 16 U5S102 → 110F1
20701 and higher	20901 and higher	_____	

NOTES:
1) UNLESS OTHERWISE SPECIFIED:
ALL CAPACITORS ARE IN MICROFARADS/VOLTS.
ALL RESISTORS ARE IN OHMS, 1Z, 1/8V.
ALL DIODES ARE 1SS119
2) ONLY ON CH 1

3) AG  ANALOG GND DG  DIGITAL GND

4) Δ N N=NUMBER MATCHED PAIR METAL FILM RESISTOR

5) D24 AND IC26 ARE THERMALLY COUPLED FOR TEMPERATURE STABILITY

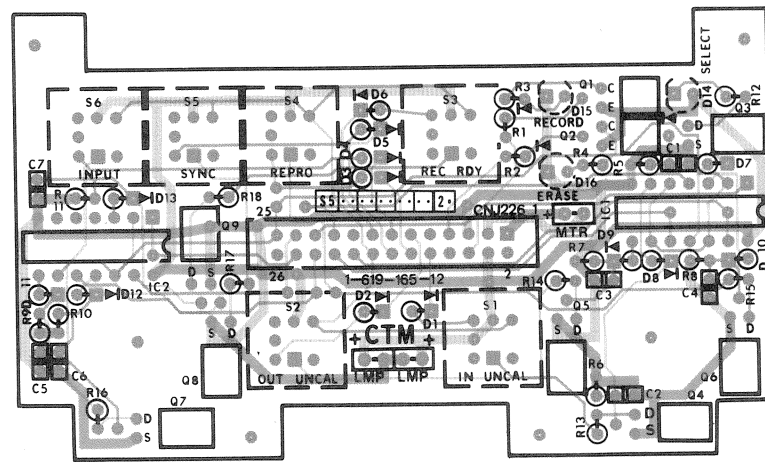
LAST TRANSISTOR	Q9
LAST IC	IC48
LAST DIODE	D26
LAST RESISTOR	R184
LAST CAPACITOR	C174

IC	BP AMP'S		
	+V	-V	
1	C92	C93	22/35
2	C94	C95	
3	C97	C98	
9	C82	C83	
8	C98	C91	
9	C110	C111	
15	C115	C116	
16	C120	C121	
22	C152	C153	
24	C159	C160	
25	C157	C158	1/50
27	C148	C141	
46	C186	C187	
48	C179	C169	
10	C80	C81	

20401 and higher	20601 and higher	_____
20701 and higher	20901 and higher	_____

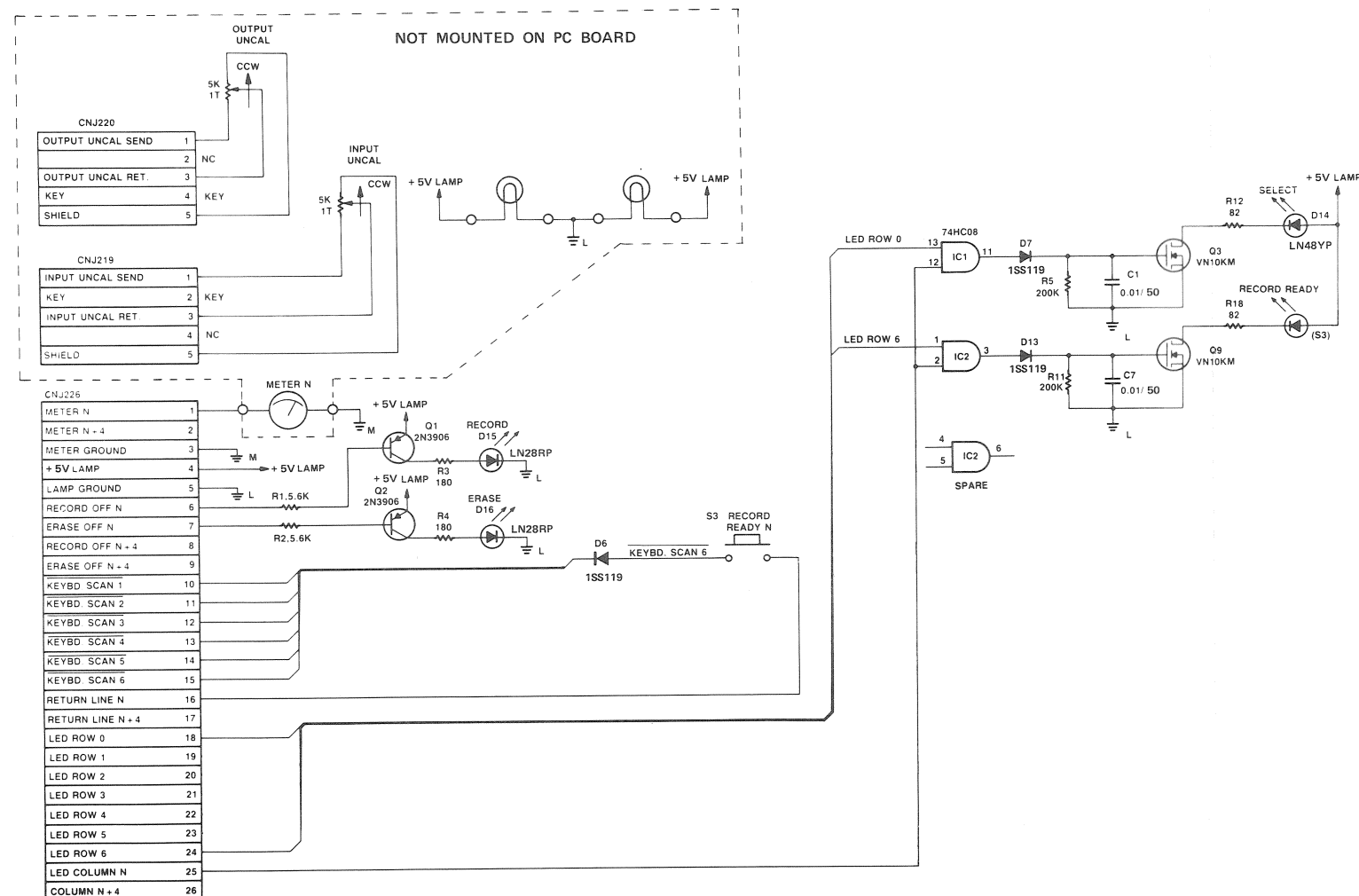
A90, A92, A94, A95, A100,
A102, A104, A105
5.11K → 5.1K
A88, A89, A91, A93, A98,
A99, A101, A103
10.2K → 10K
A112, A114, A116, A118
402 → 390
A154, A172
2.55K → 2.4K
A115, 119
10K → 15K
Q2, 4
Q44C9 → 2SD1133-C
Q2, 5

TCM BOARD (1-619-165-12) APR-5003V ONLY
Component Side



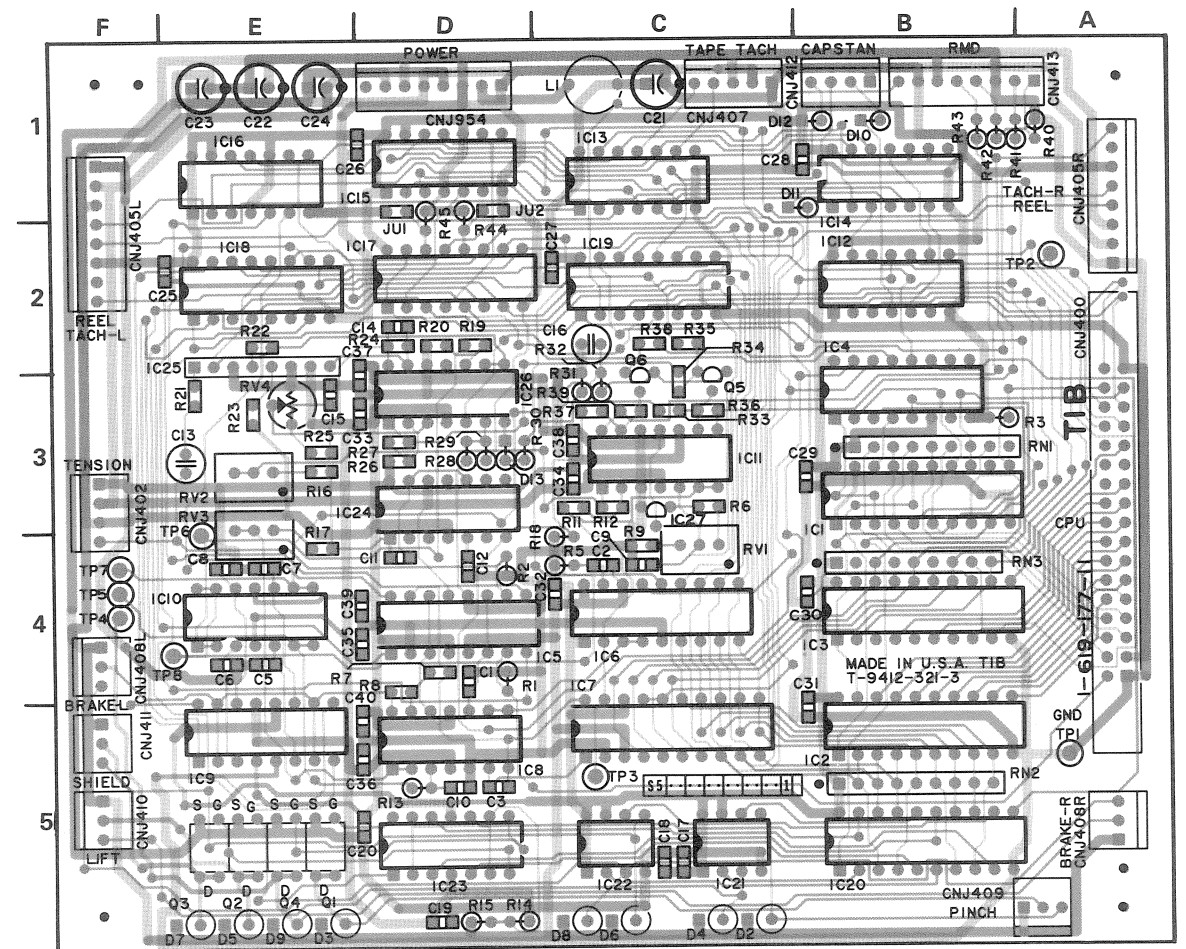
■ SOLDER SIDE PATTERN 1-619-165-12
■ COMPONENT SIDE PATTERN 1-619-165-12

TCM BOARD



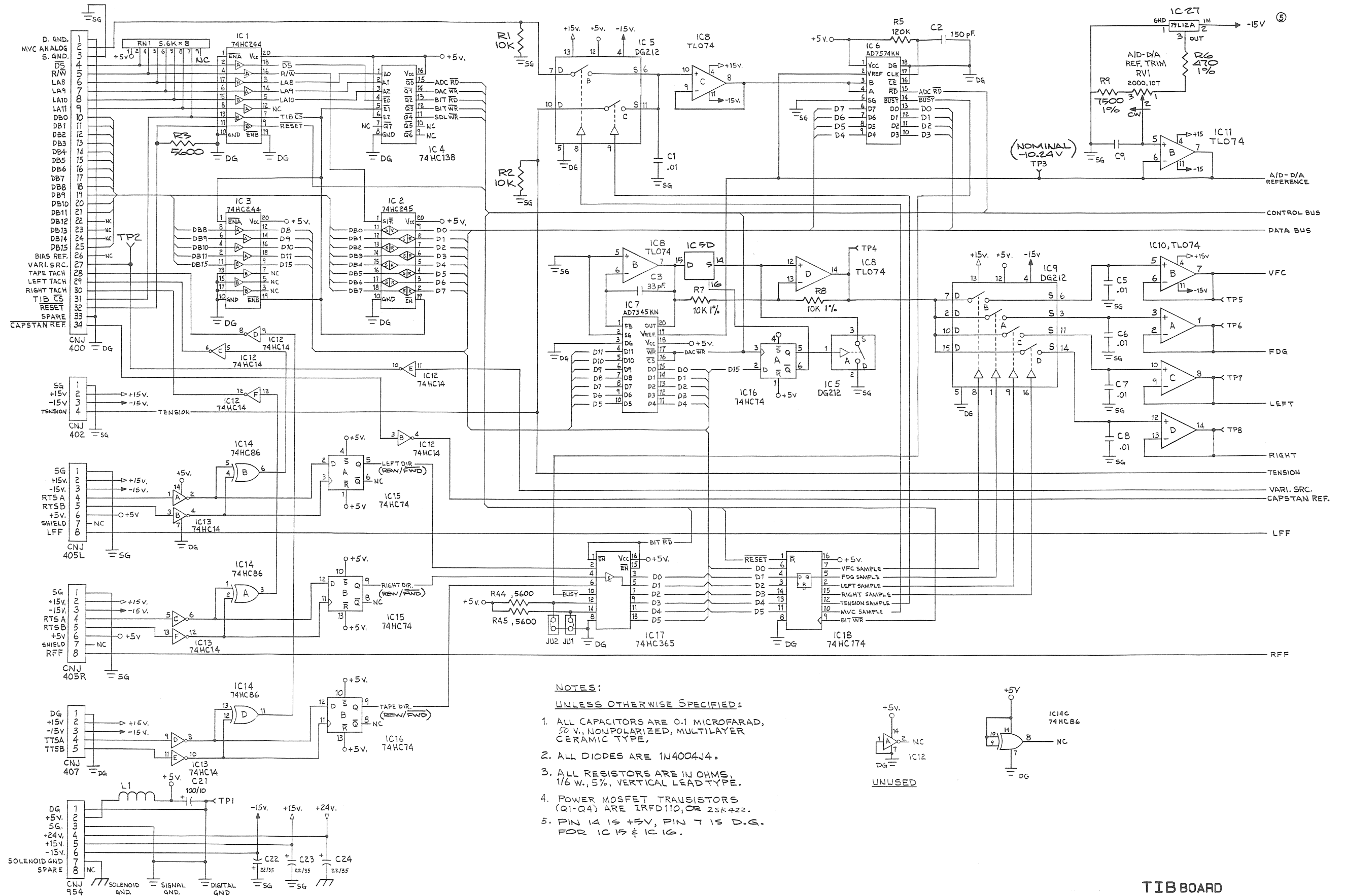
TCM BOARD
BOARD NO.1-619-165-12 & HIGHER
APR-5003V ONLY

TIB BOARD (1-619-177-11)
Component Side

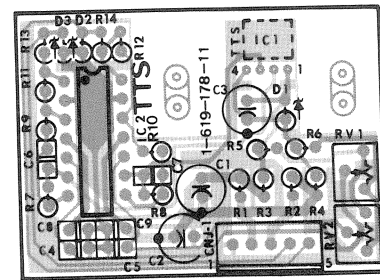


■ SOLDER SIDE PATTERN 1-619-177-11
 ■ COMPONENT SIDE PATTERN 1-619-177-11

TIB BOARD

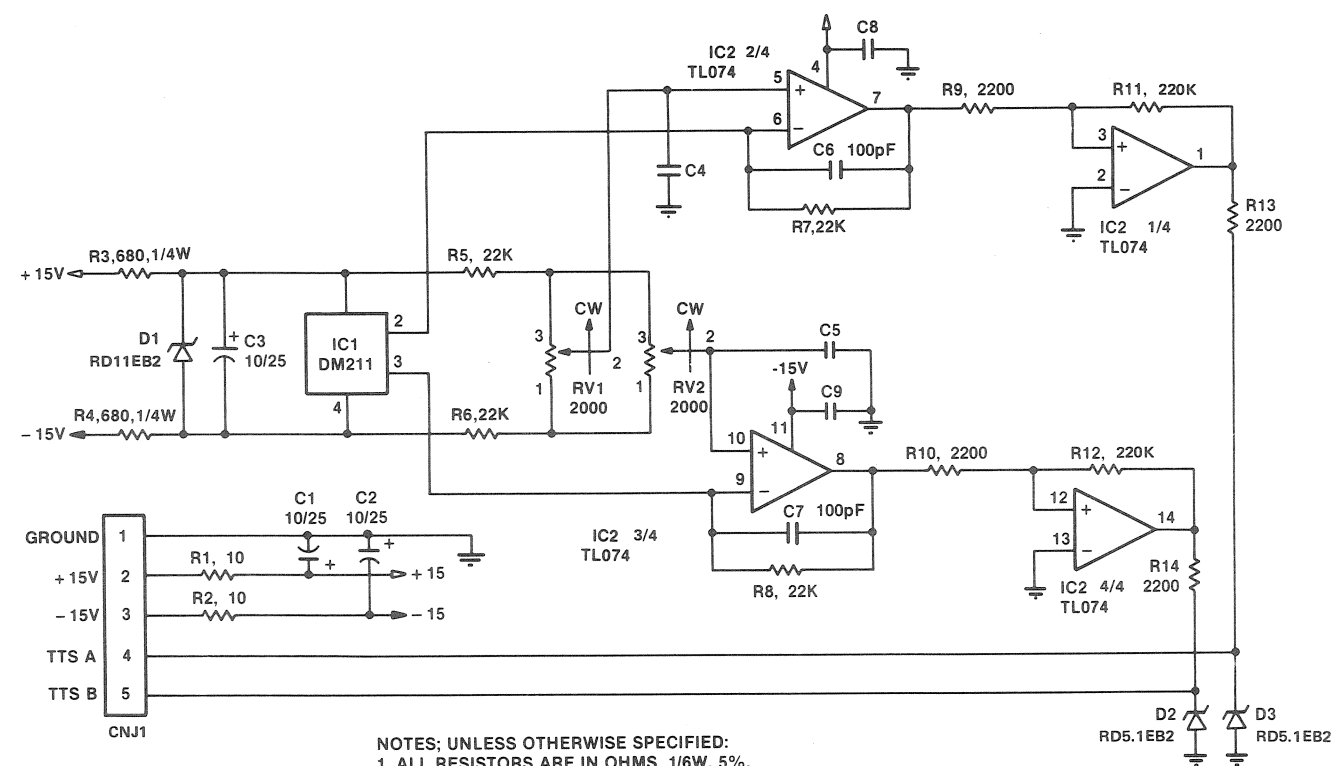


TTS BOARD (1-619-178-11)
Component Side



■ SOLDER SIDE PATTERN
■ COMPONENT SIDE PATTERN 1-619-178-11

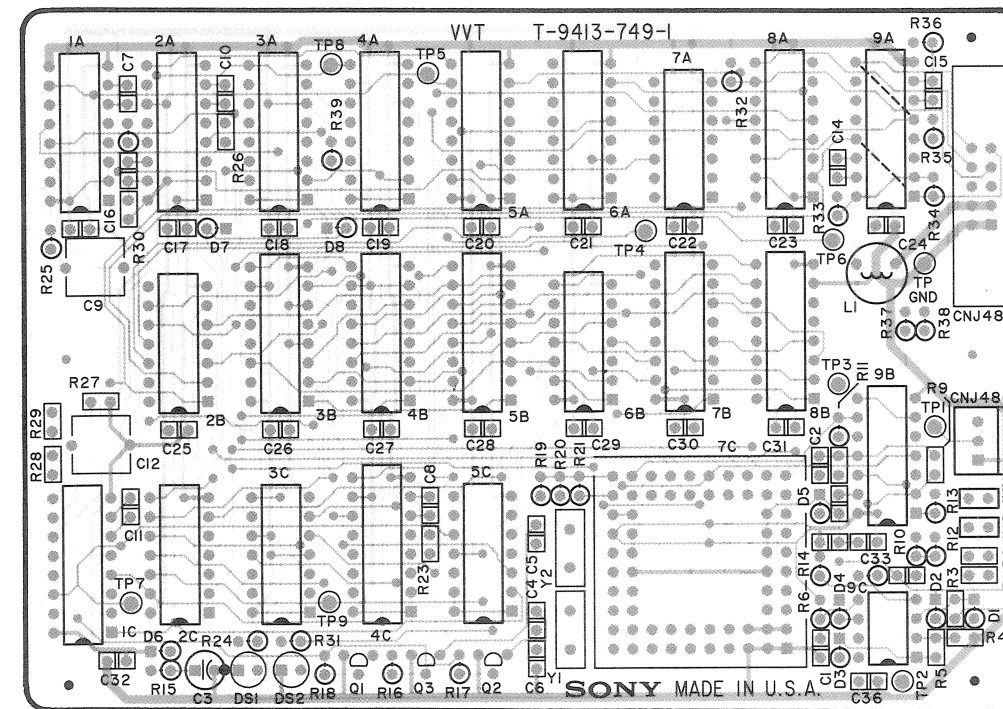
TTS BOARD



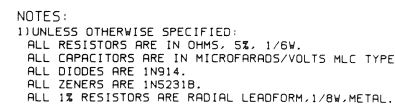
NOTES; UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE IN OHMS, 1/6W, 5%.
2. ALL CAPACITORS ARE 0.1μF, 50V, CERAMIC.
3. C4, C5 ARE NOT INSTALLED.

TTS BOARD
BOARD NO.1-619-178-11 & HIGHER
APR-5002/5003V

VVT BOARD (T-9413-749-1) APR-5003V ONLY
Component Side

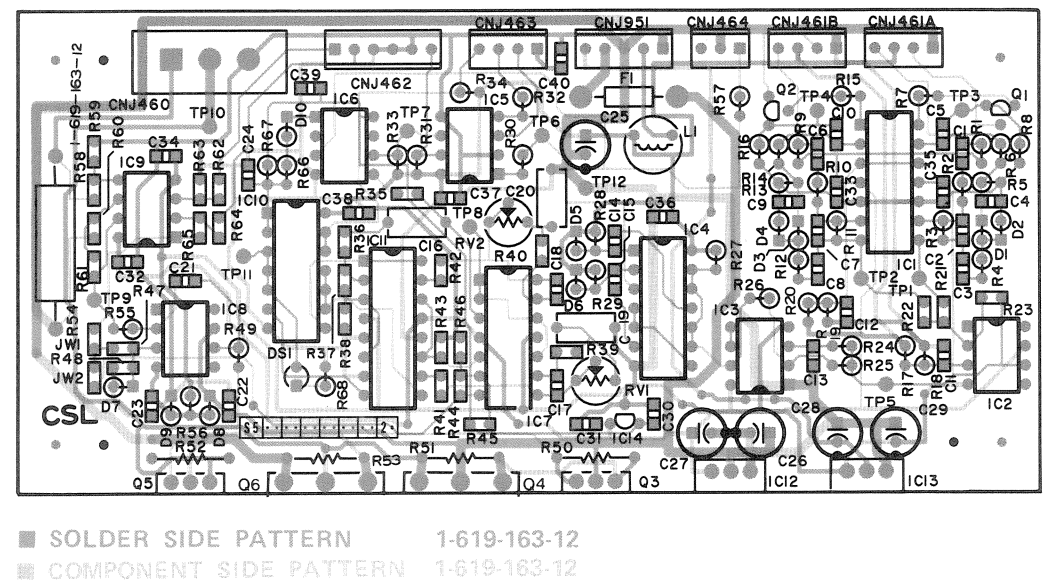


■ SOLDER SIDE PATTERN
■ COMPONENT SIDE PATTERN

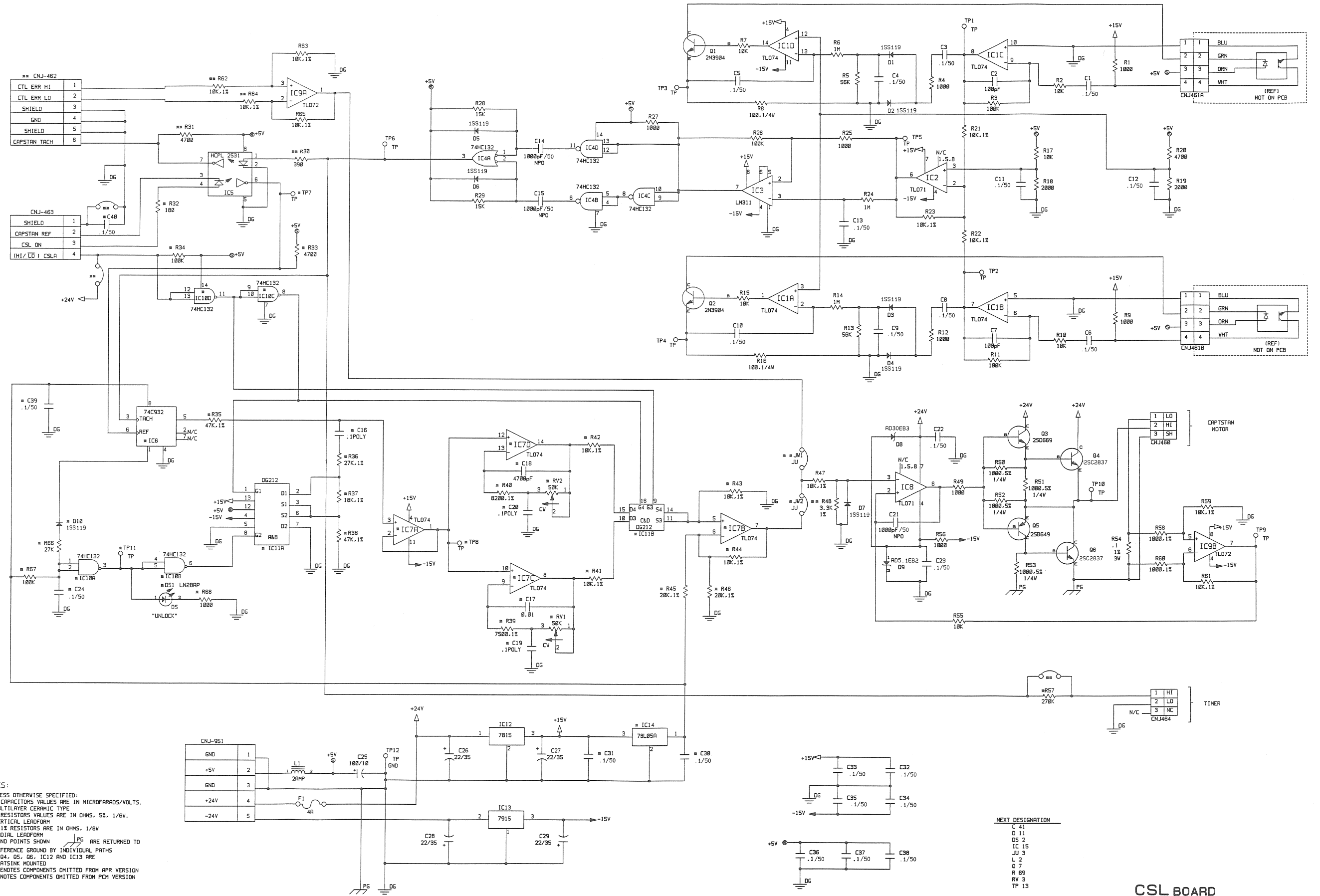


CSL BOARD (1-619-163-12)

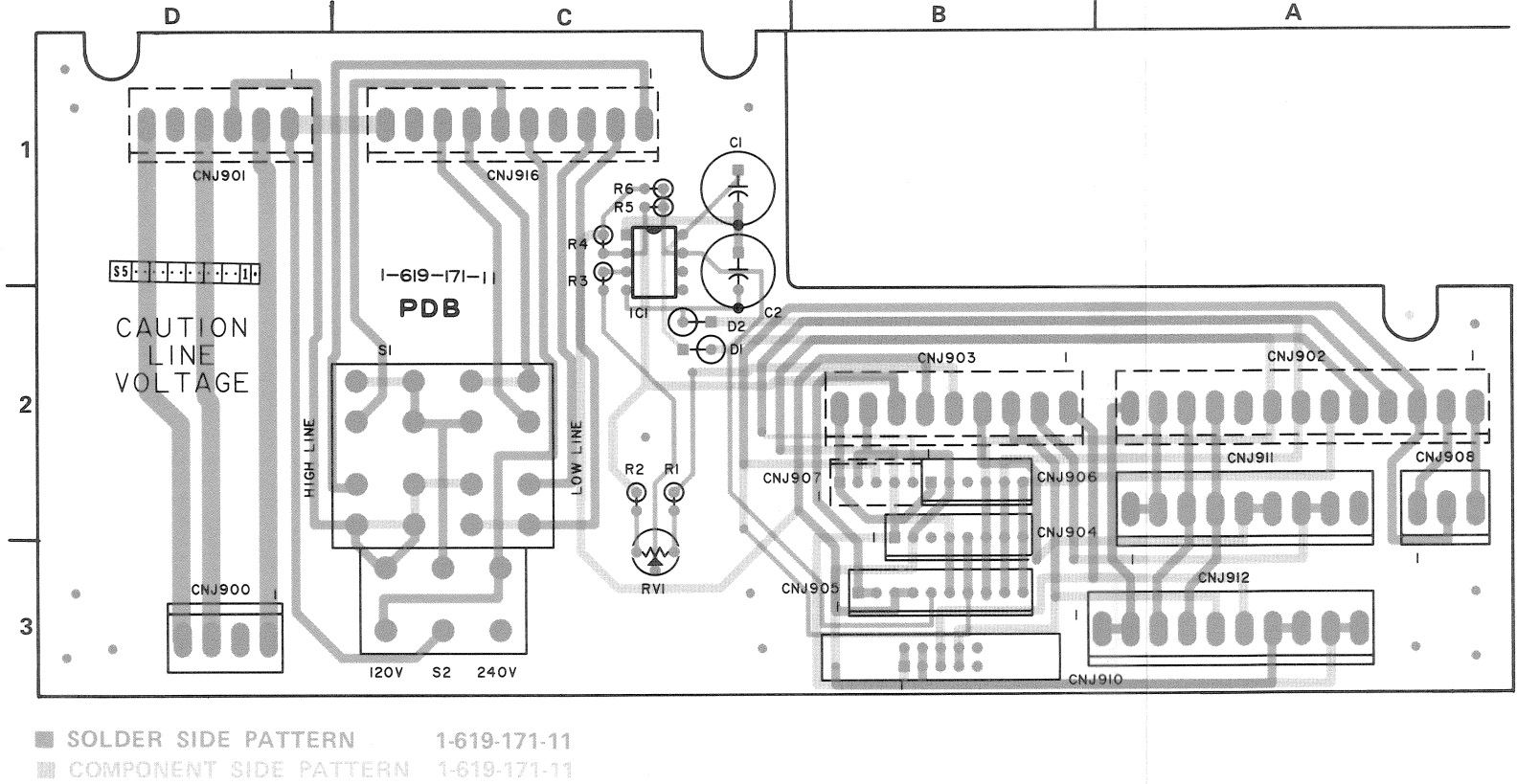
Component Side



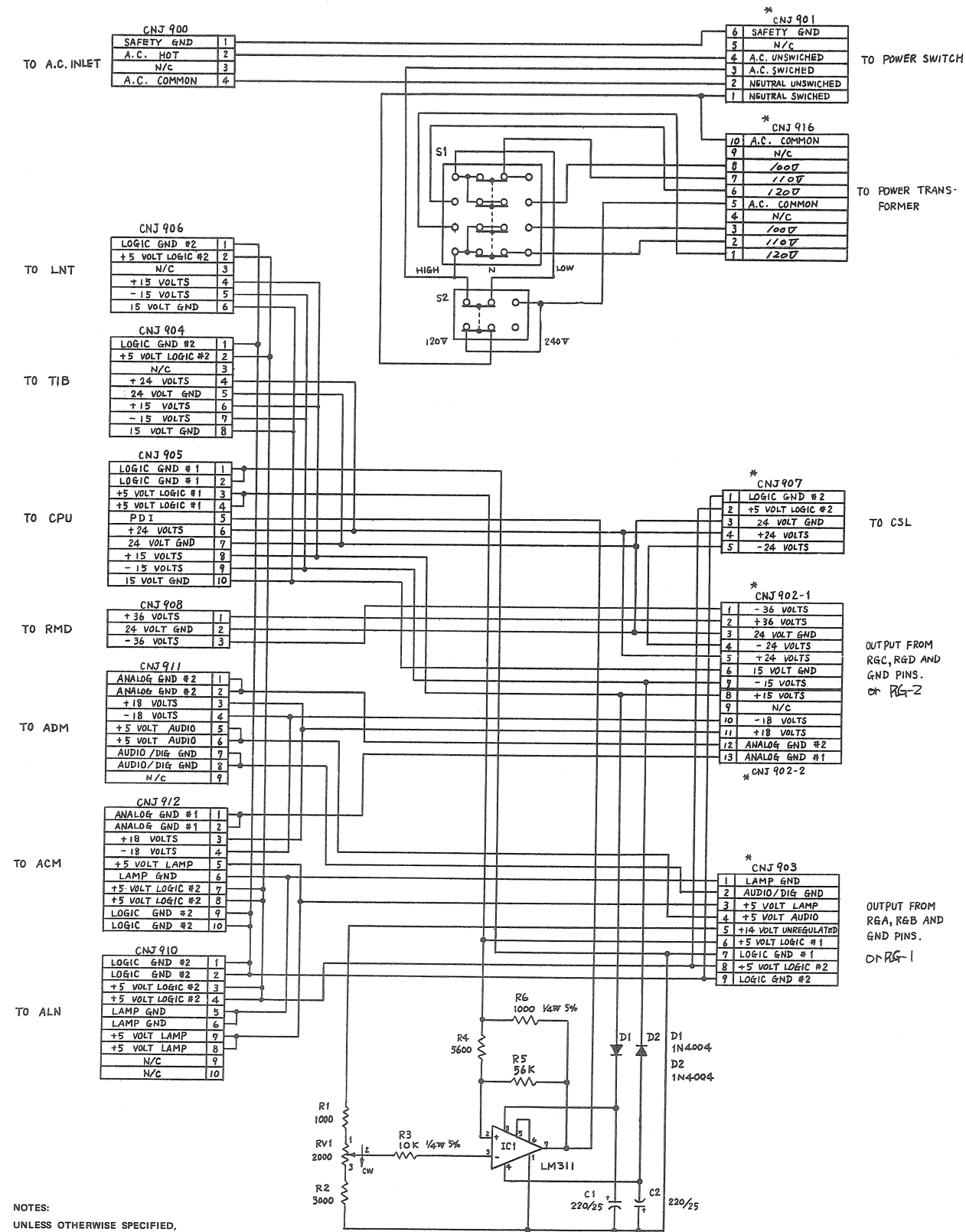
CSL BOARD



PDB BOARD (1-619-171-11)
Component Side

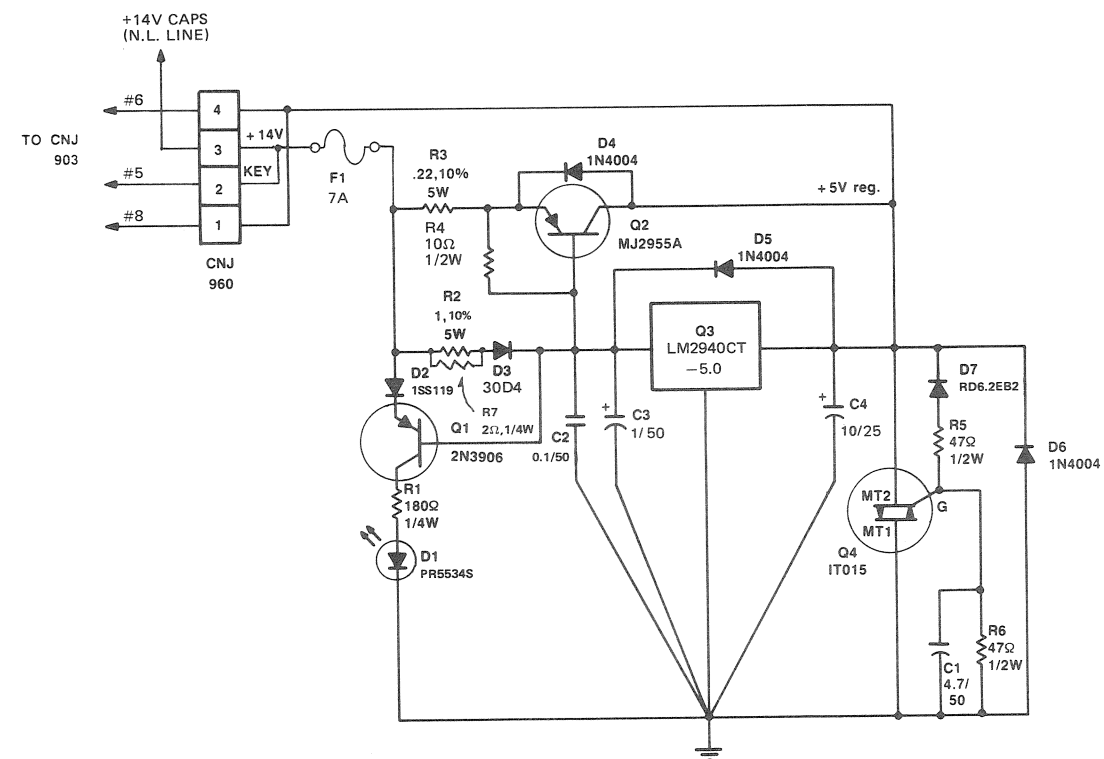


PDB BOARD



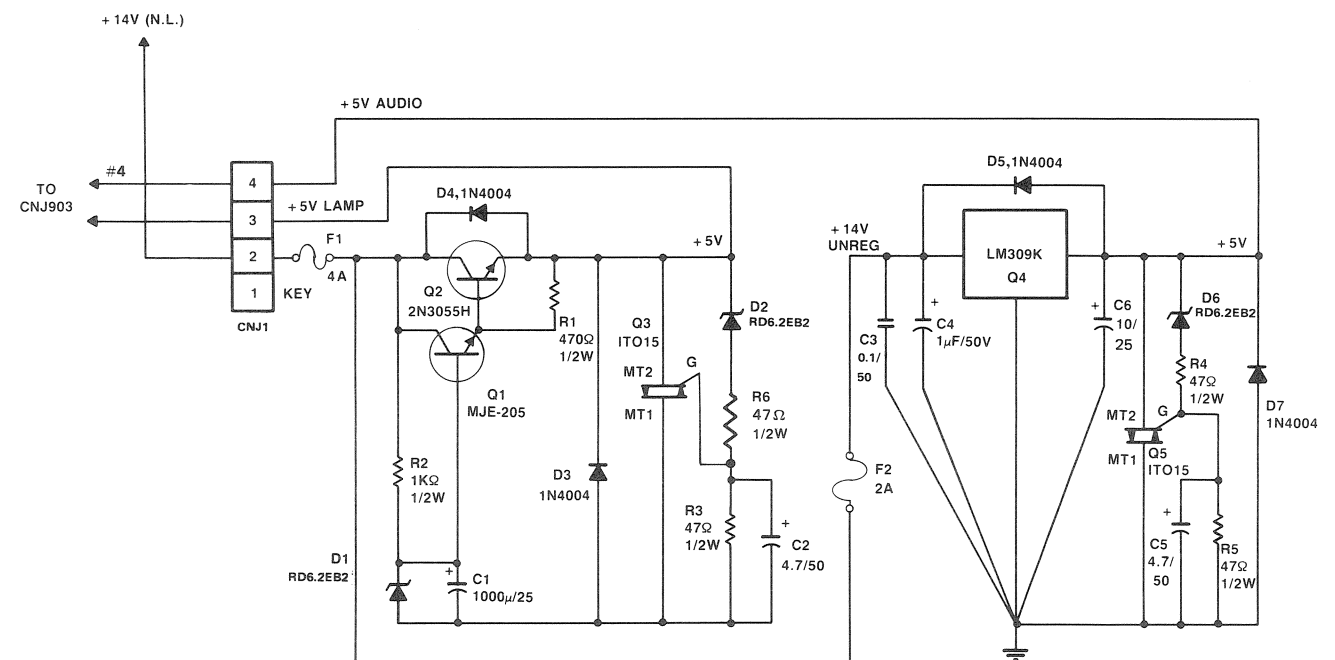
PDB BOARD
BOARD NO.1-619-171-11 & HIGHER
APR-5002/5003V

S/N; APR-5002 20001 TO 20615



9-95 (a)

RGABOARD
BOARD NO. 1-619-172-12
APR-5002



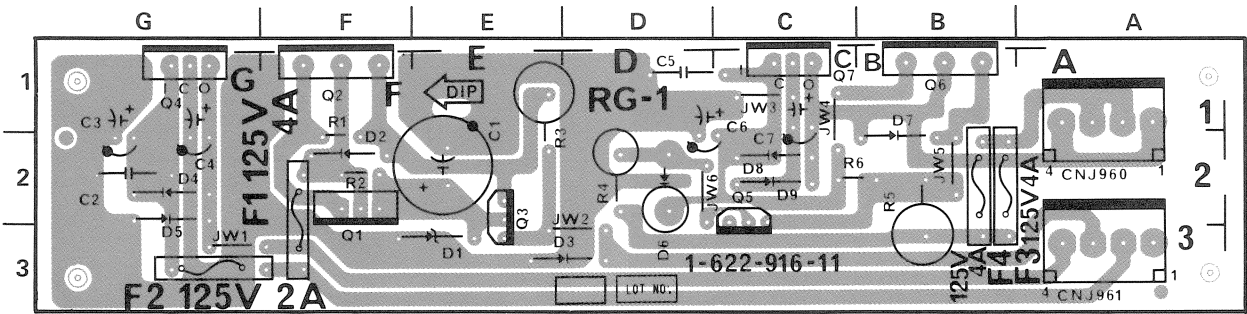
* ALL UNREGULATED VOLTAGE LINES
ARE REFERENCED NO LOAD (N.L.)

9-96 (a)

RGB BOARD
BOARD NO. 1-619-173-12
APR-5002

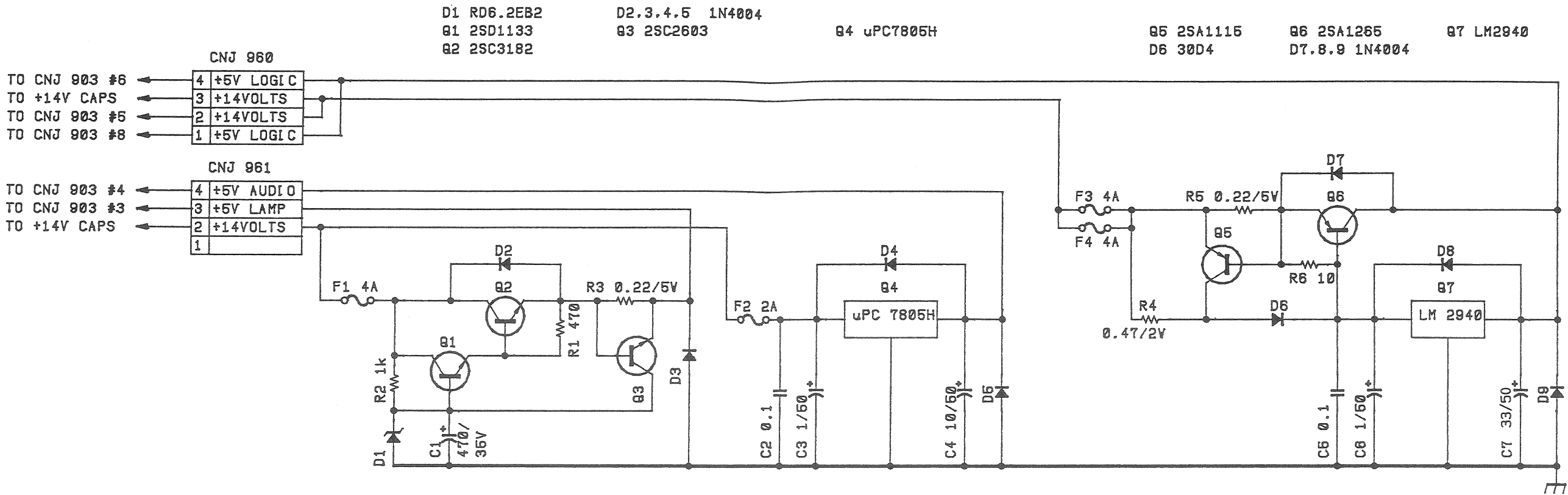
RG-1 BOARD (1-622-916-11)
Component Side

S/N; APR-5002 20701 AND HIGHER
S/N; APR-5003V 10001 AND HIGHER



■ SOLDER SIDE PATTERN 1-622-916-11

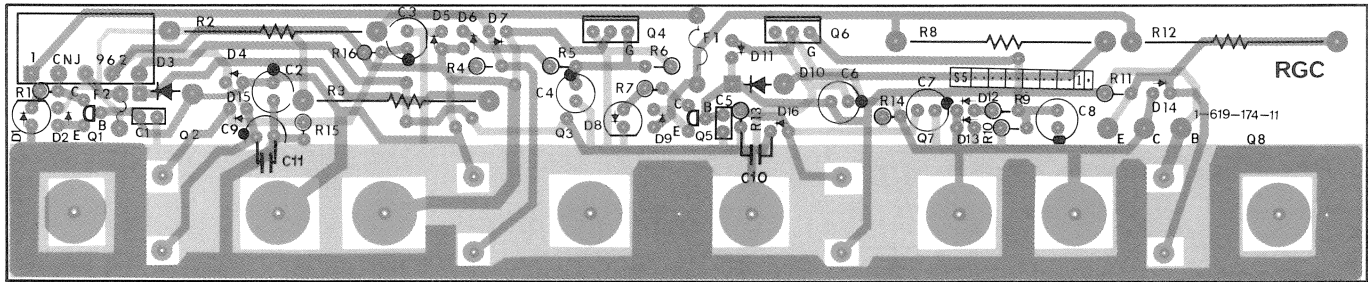
RG-1 BOARD



RG-1 BOARD
BOARD NO. 1-622-916-11 & HIGHER
APR-5002/5003V

RGC BOARD (1-619-174-11)
Component Side

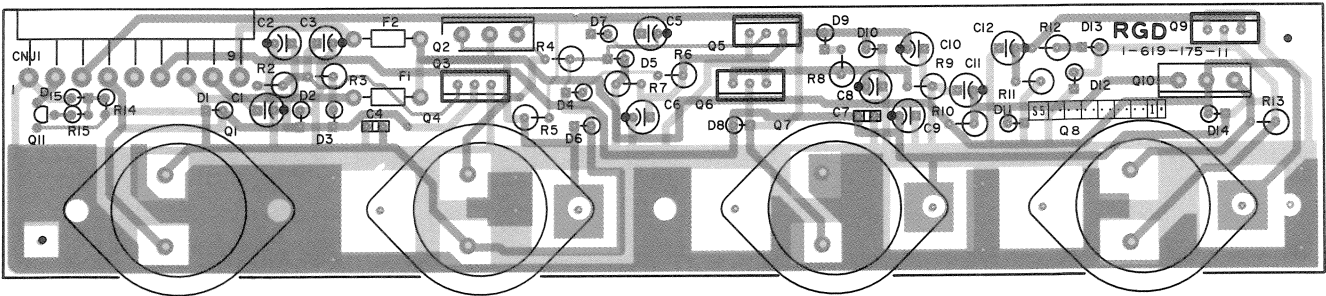
S/N; APR-5002 20001 TO 20615



■ SOLDER SIDE PATTERN 1-619-174-11
■ COMPONENT SIDE PATTERN 1-619-174-11

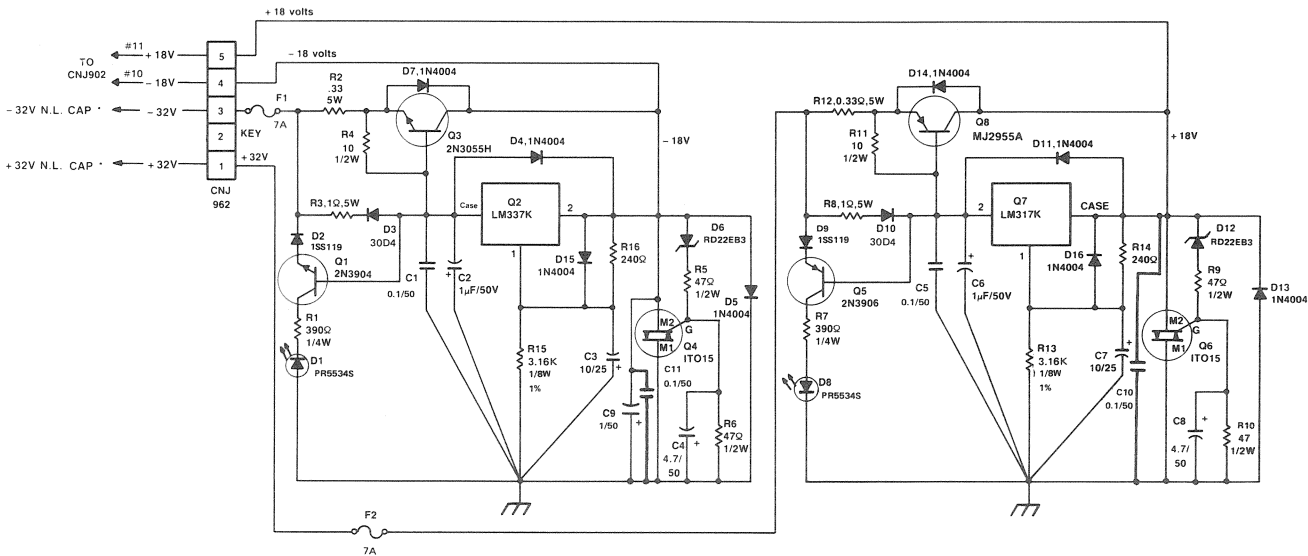
RGD BOARD (1-619-175-11)
Component Side

S/N; APR-5002 20001 TO 20615



■ SOLDER SIDE PATTERN 1-619-175-11
■ COMPONENT SIDE PATTERN 1-619-175-11

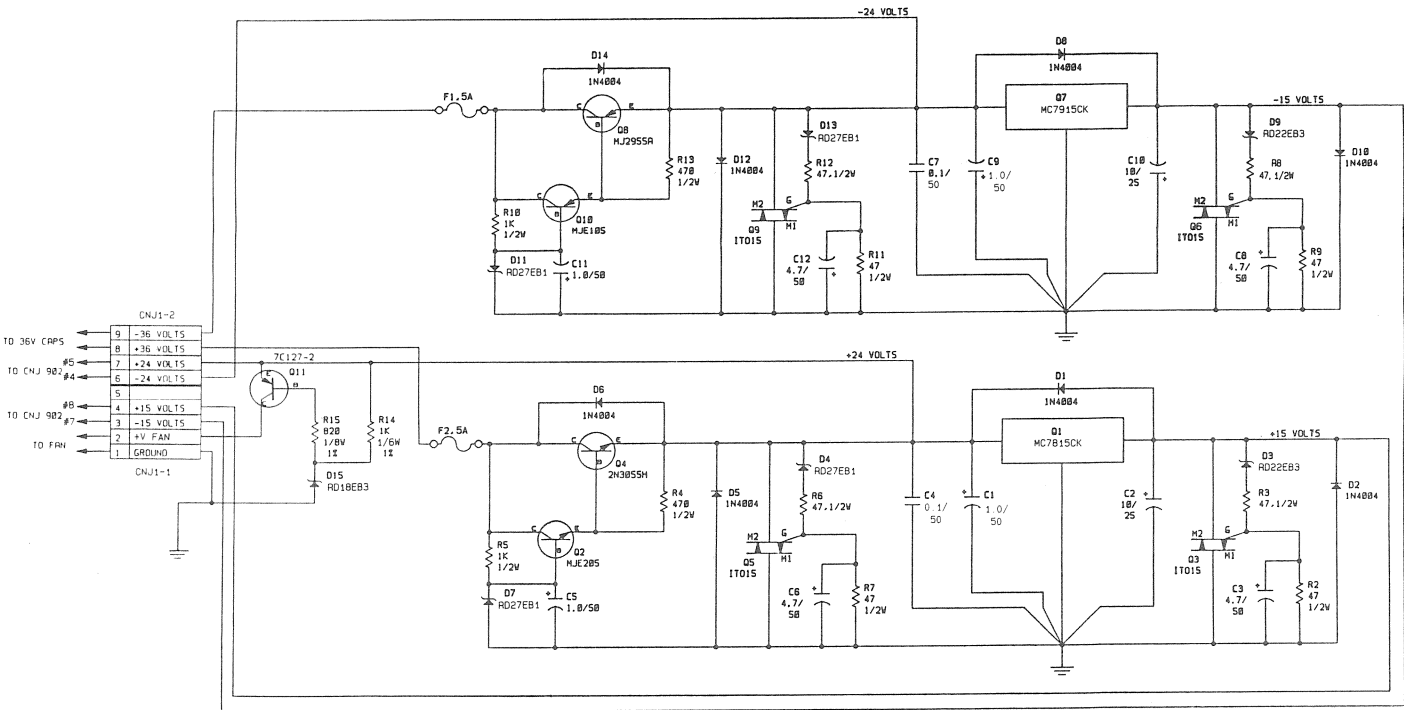
RGC BOARD



* ALL UNREGULATED VOLTAGE LINES ARE REFERENCED NO LOAD (N.L.).

RGC BOARD
BOARD NO. 1-619-174-11
APR-5002

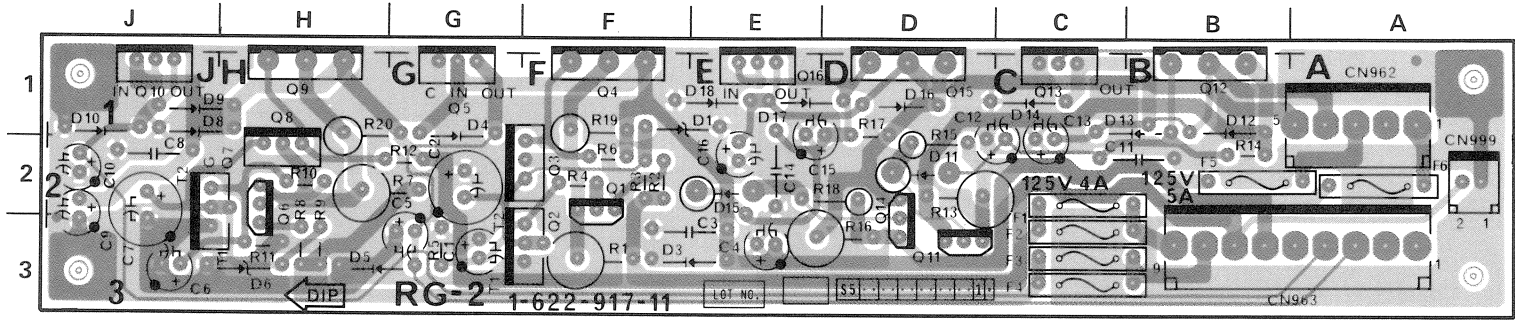
RGD BOARD



RGD BOARD
BOARD NO. 1-619-175-11
APR-5002

RG-2 BOARD (1-622-917-11)
Component Side

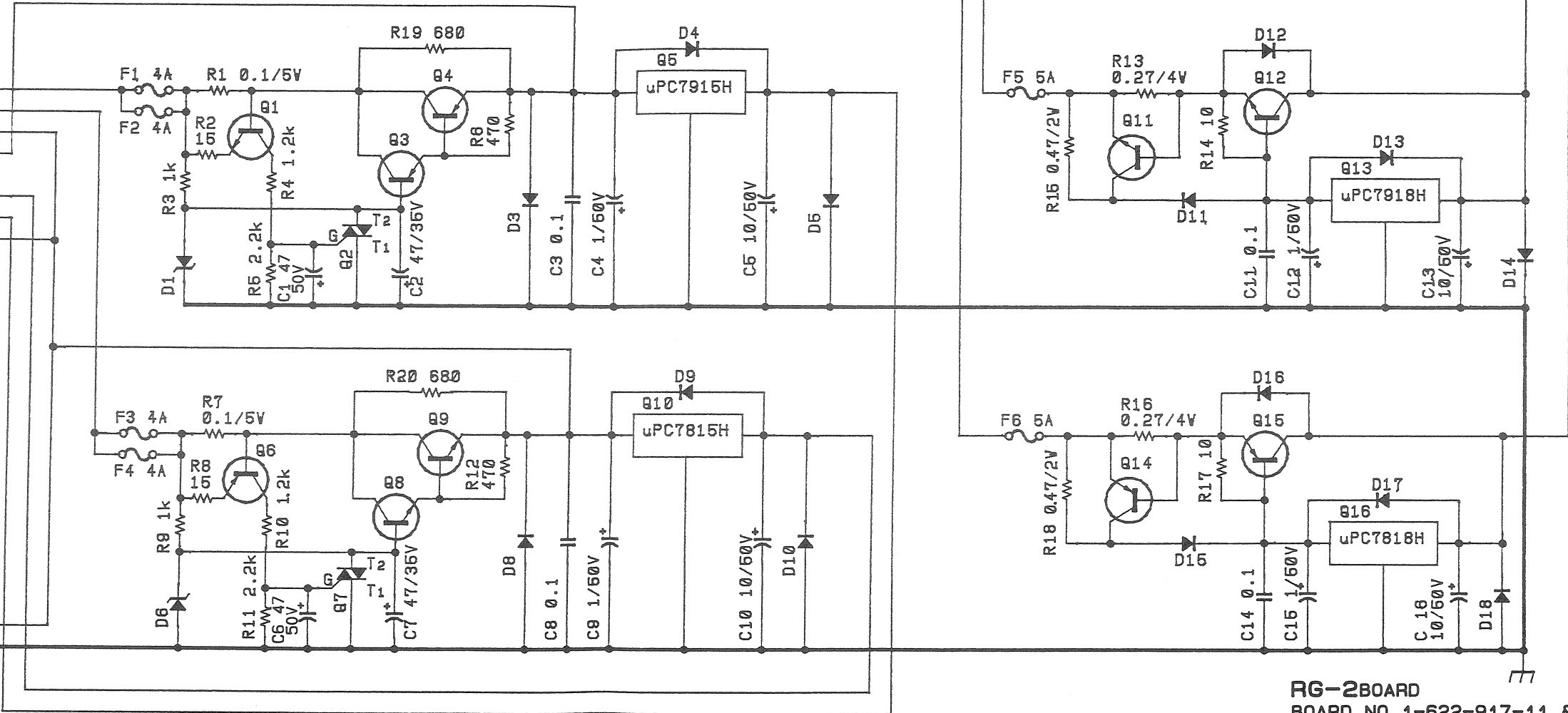
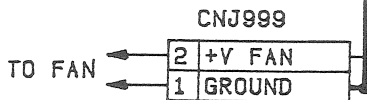
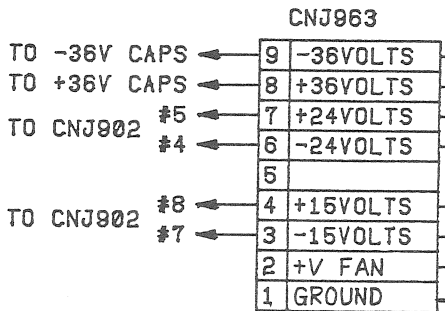
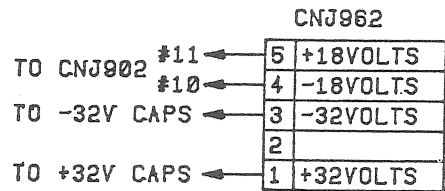
S/N; APR-5002 20701 AND HIGHER
S/N; APR-5003V 10001 AND HIGHER



RG-2 BOARD

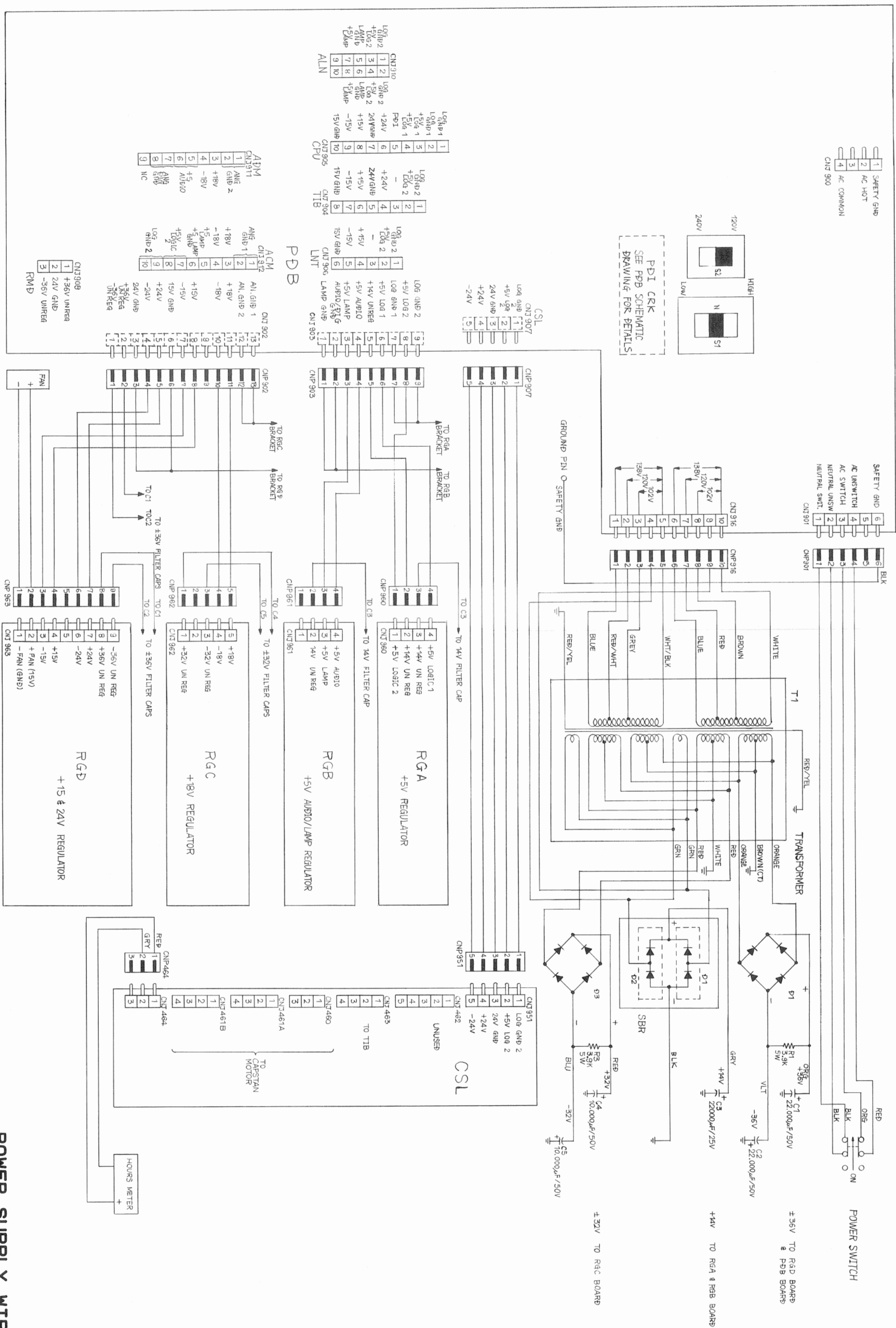
■ SOLDER SIDE PATTERN 1-622-917-11
■ COMPONENT SIDE PATTERN 1-622-917-11

D1.6 RD27FB2	Q1 2SD667	Q6 2SB647	D11.15 30D4	Q11 2SC2603	Q14 2SA1115
D3.4.5 1N4004 8.9.10	Q2 AC03FGMAY	Q7 AC03FGMAY	D12.13.14 1N4004 16.17.18	Q12 2SC3182	Q15 2SA1265
	Q3 2SB857C	Q8 2SD1133		Q13 uPC7918H	Q16 uPC7818H
	Q4 2SA1265	Q9 2SC3182			
	Q5 uPC7915H	Q10 uPC7815H			

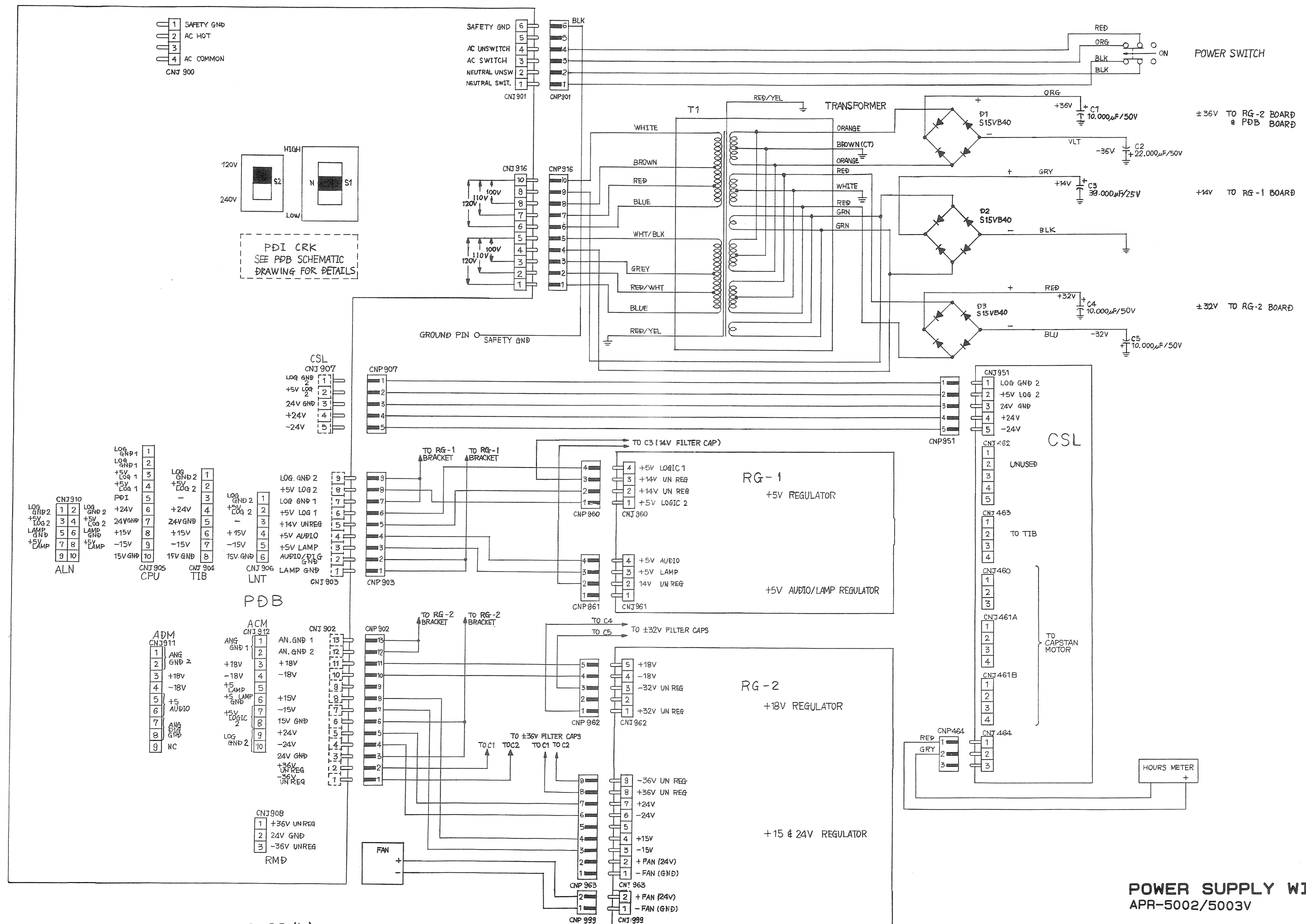


POWER SUPPLY WIRING

S/N: APR-5002 20001 TO 20615



S/N; APR-5002	20701	AND HIGHER
S/N; APR-5003V	10001	AND HIGHER



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