

**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

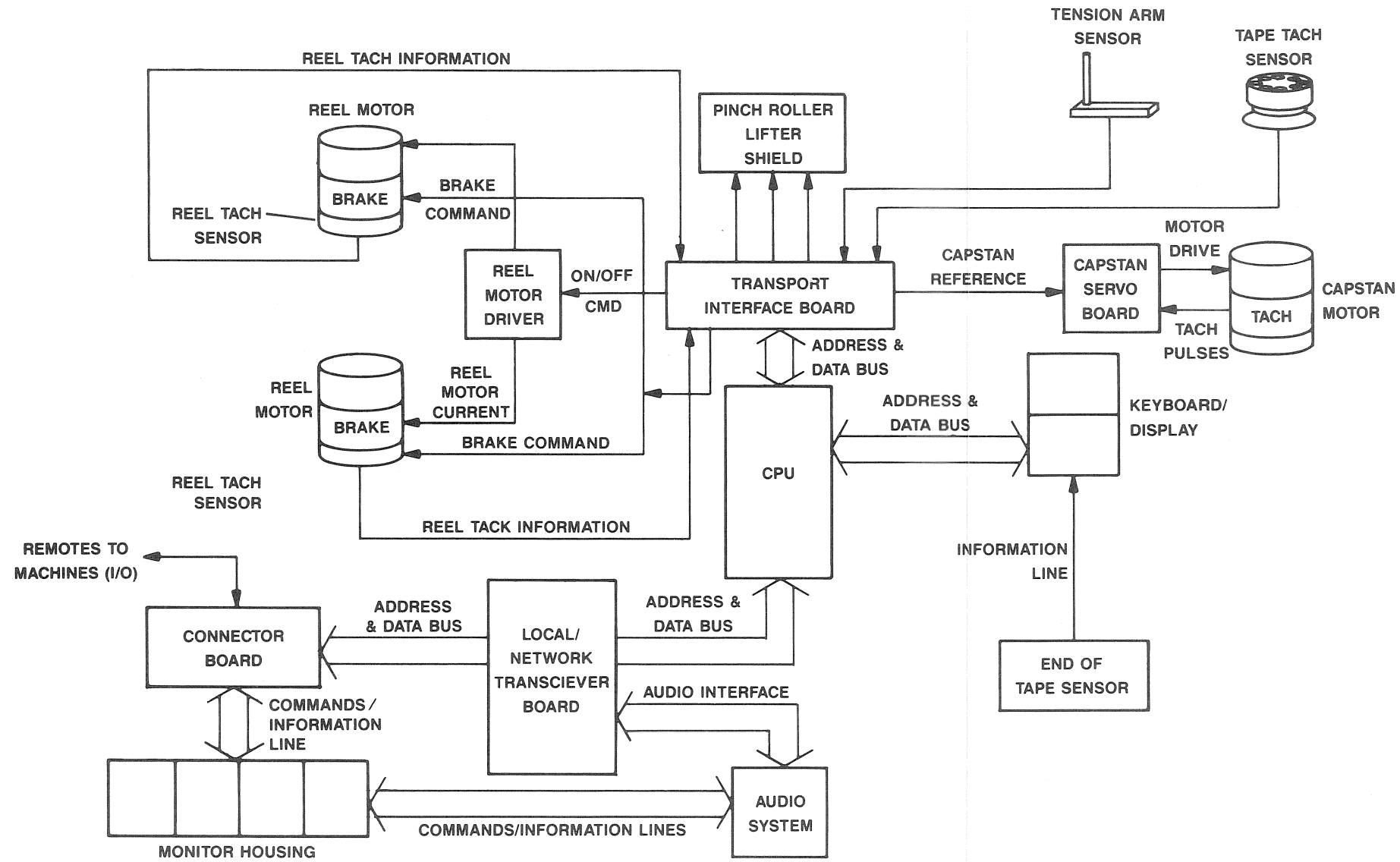
APR-5002 Serial No.20001 and Higher

APR-5003V Serial No.10001 and Higher

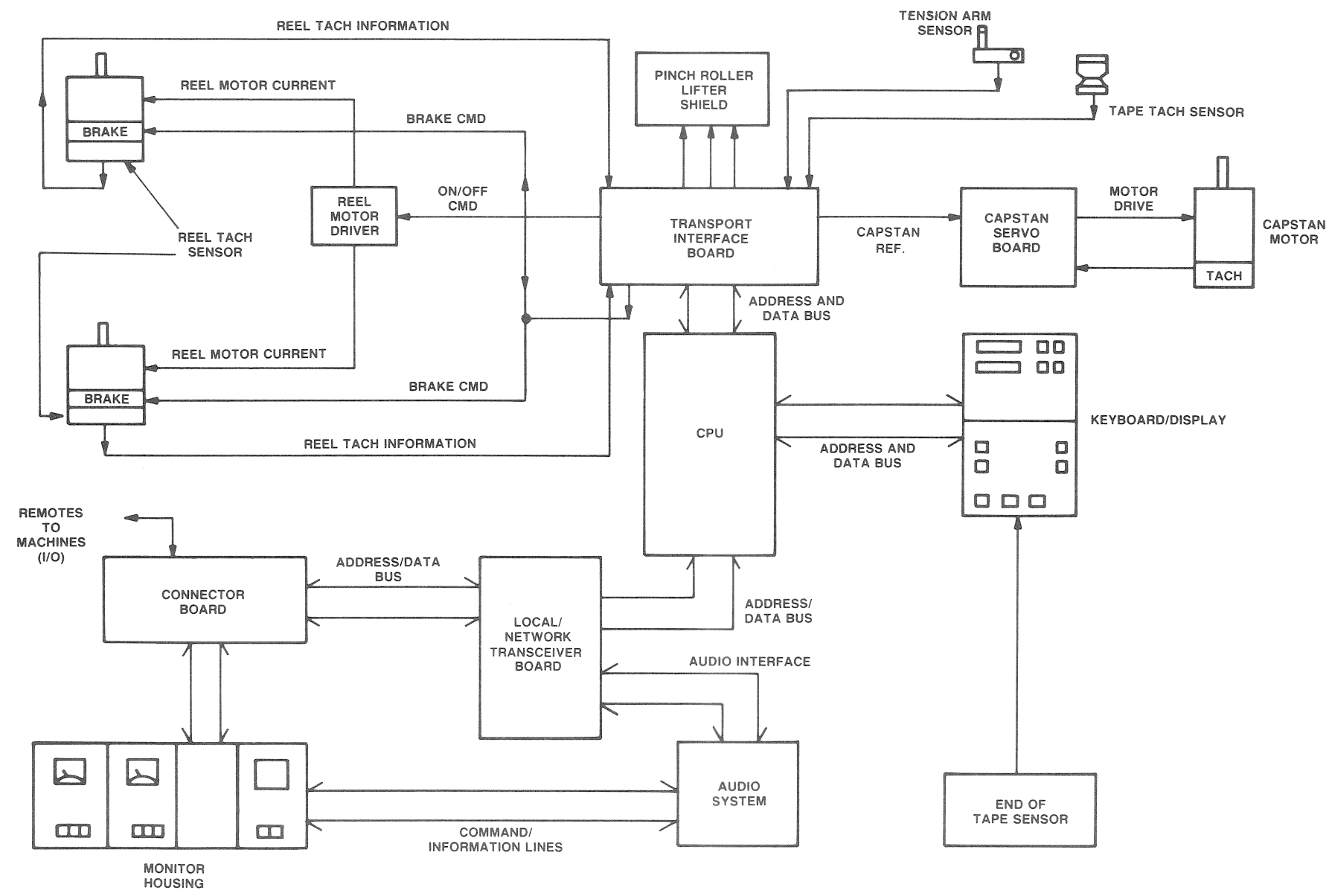


# SECTION 7 BLOCK DIAGRAMS

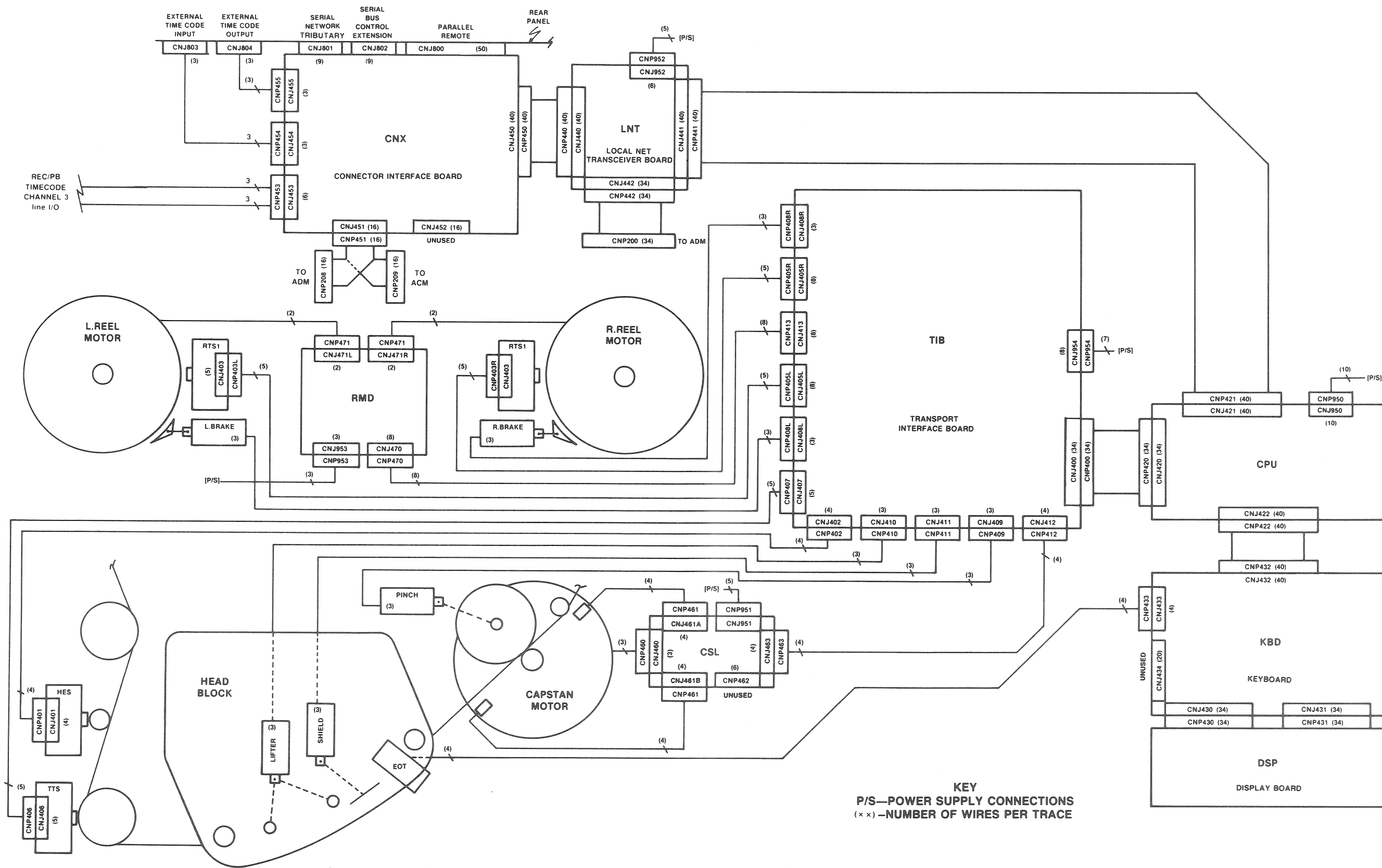
## SYSTEM BLOCK DIAGRAM



LOGIC FLOW DIAGRAM

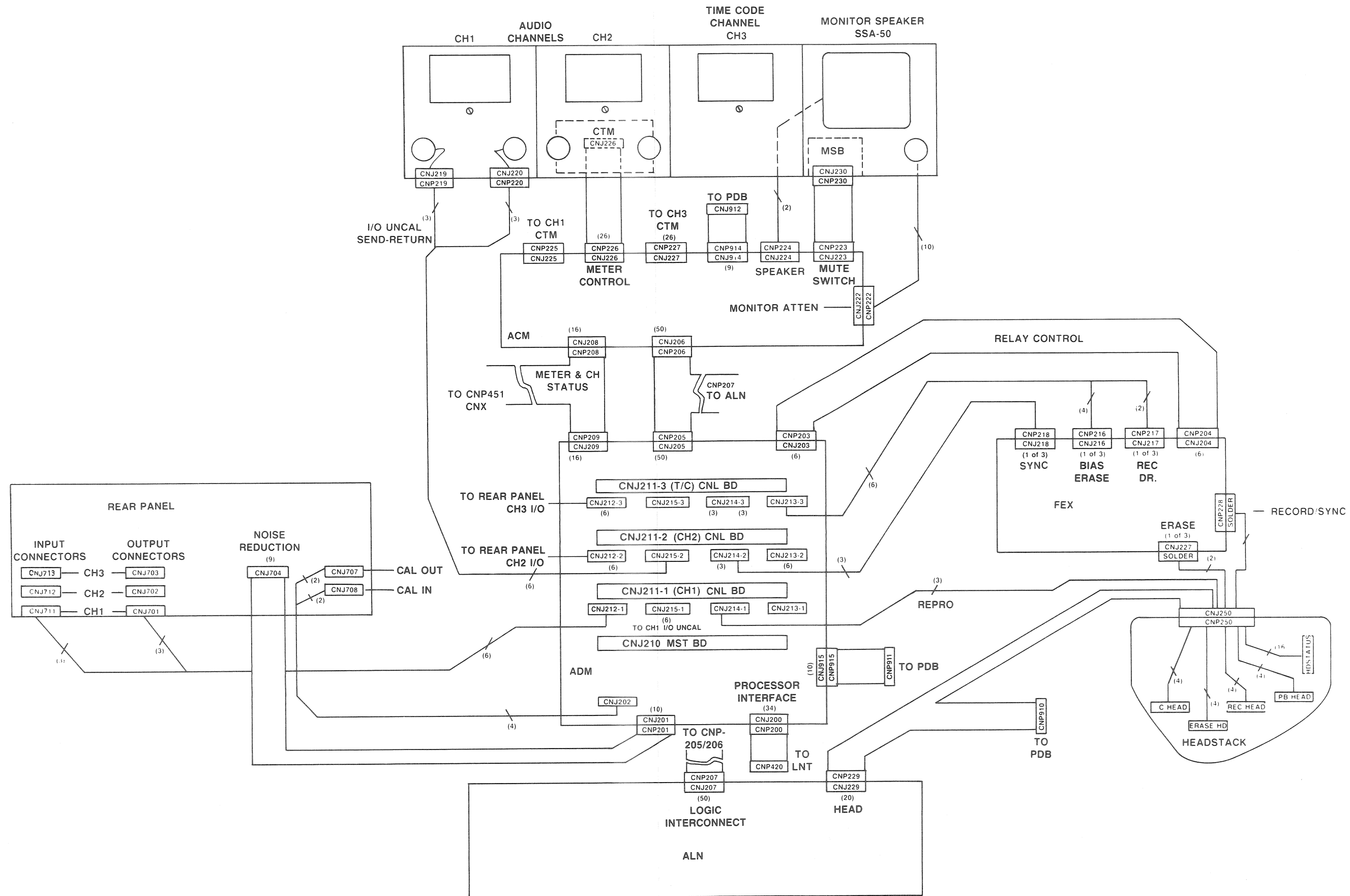


TAPE TRANSPORT BLOCK DIAGRAM



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

AUDIO SYSTEM BLOCK DIAGRAM



## SECTION 9 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

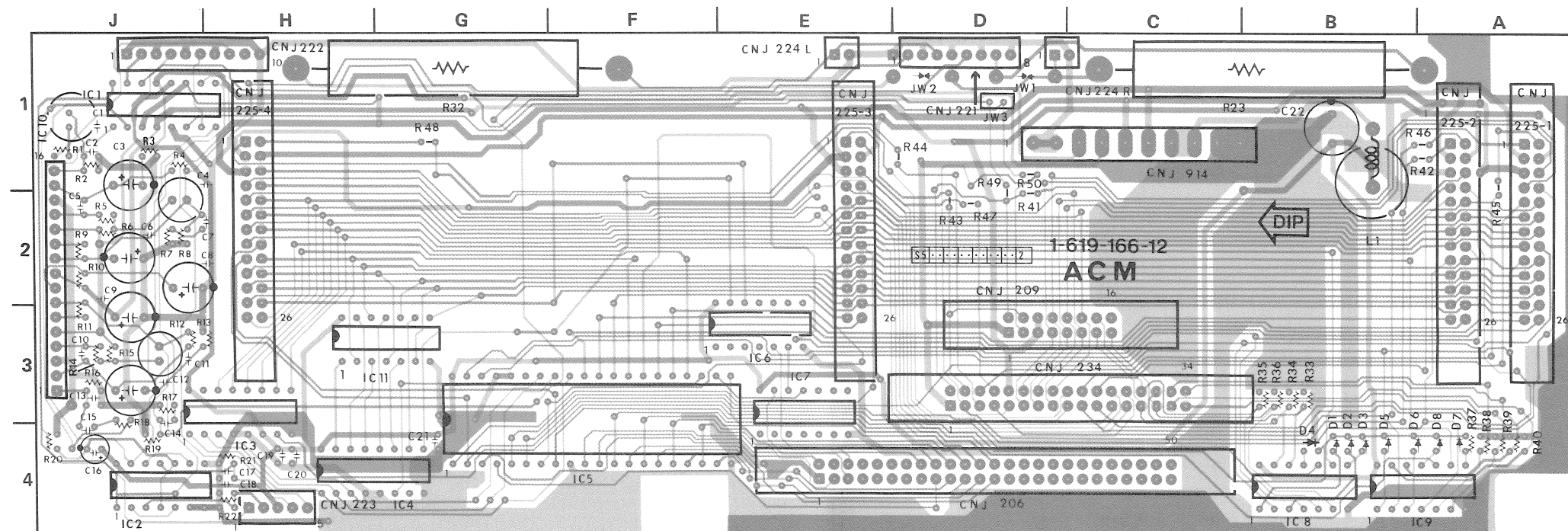
### 9-1 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

#### 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.

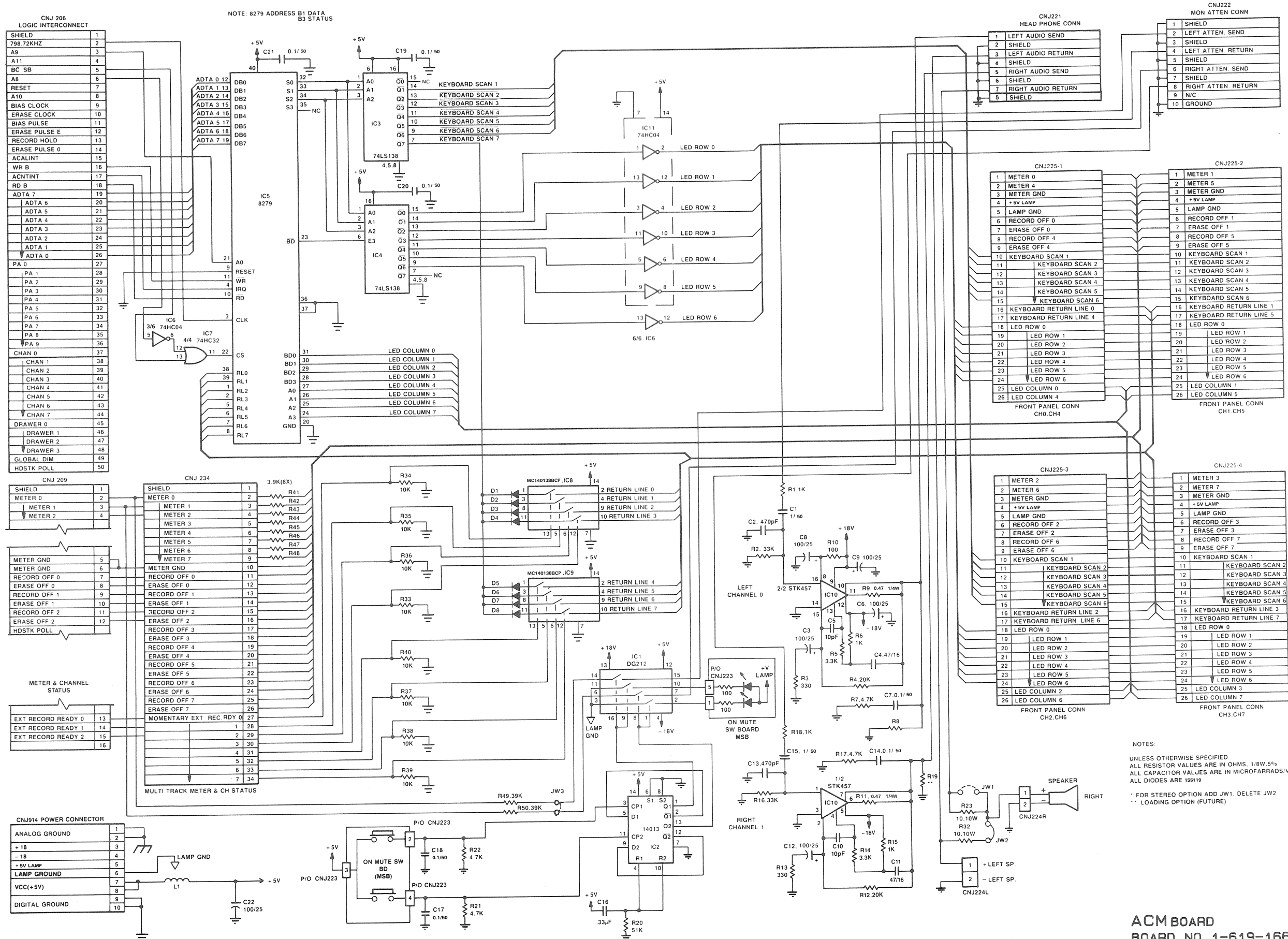
ACM BOARD (1-619-166-12)  
Component Side



■ SOLDER SIDE PATTERN 1-619-166-12  
■ COMPONENT SIDE PATTERN 1-619-166-12



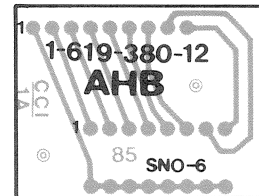
ACM BOARD



NOTES  
 UNLESS OTHERWISE SPECIFIED  
 ALL RESISTOR VALUES ARE IN OHMS. 1/8W 5%  
 ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS  
 ALL DIODES ARE 1SS119  
 \* FOR STEREO OPTION ADD JW1. DELETE JW2  
 \*\* LOADING OPTION (FUTURE)

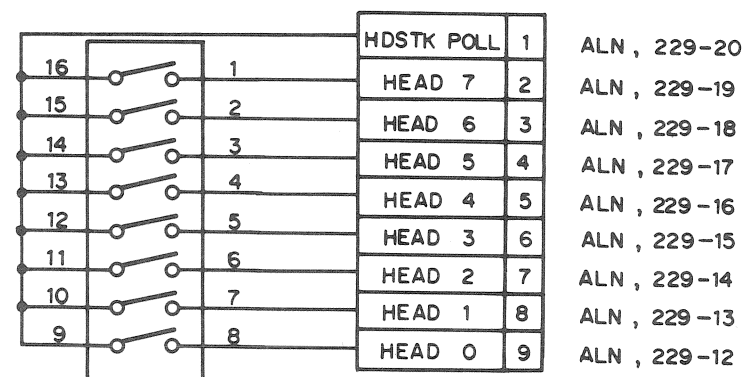
ACM BOARD  
 BOARD NO. 1-619-166-11 & HIGHER  
 APR-5002/5003V

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



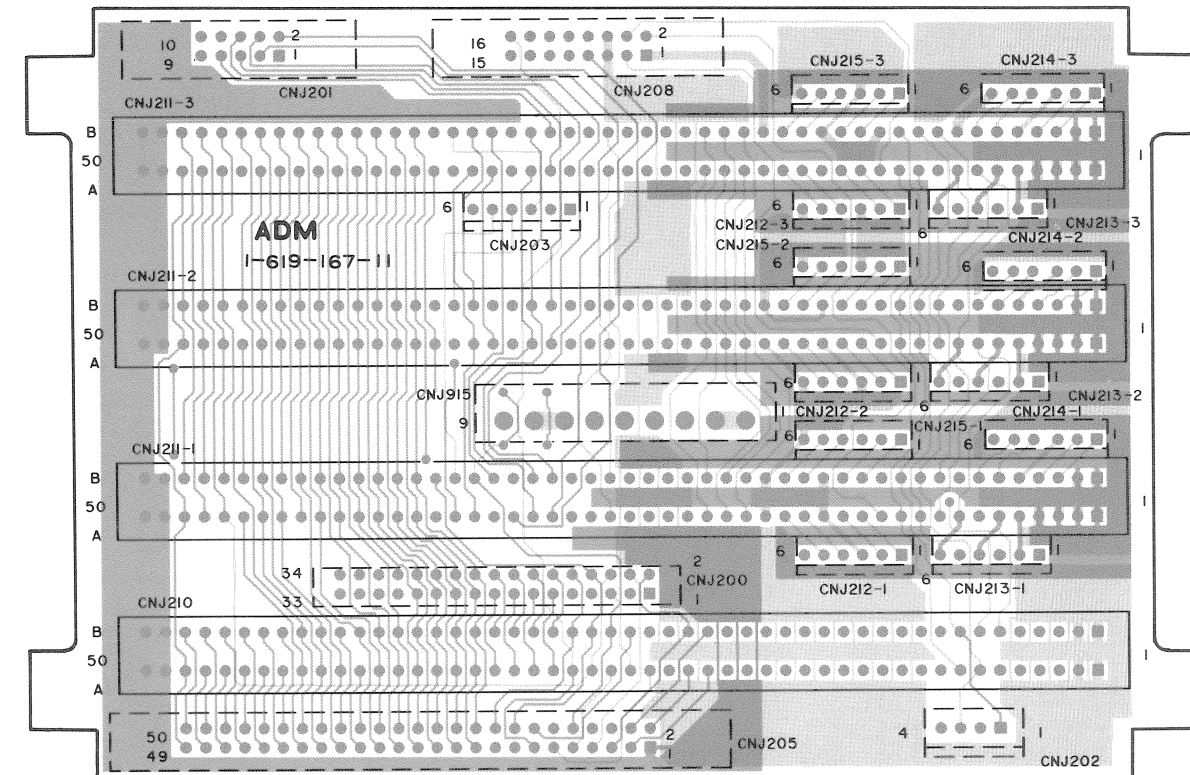
■ SOLDER SIDE PATTERN

AHB BOARD



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

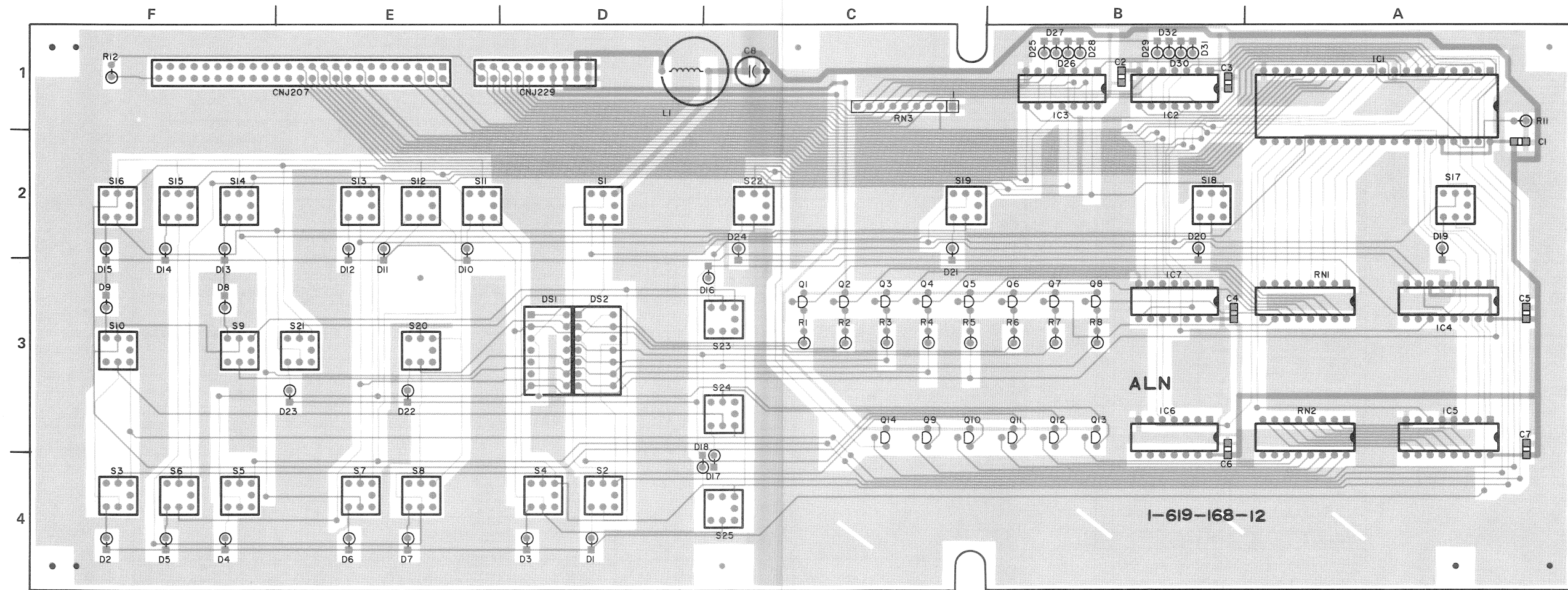
ADM BOARD (1-619-167-11)  
Component Side



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

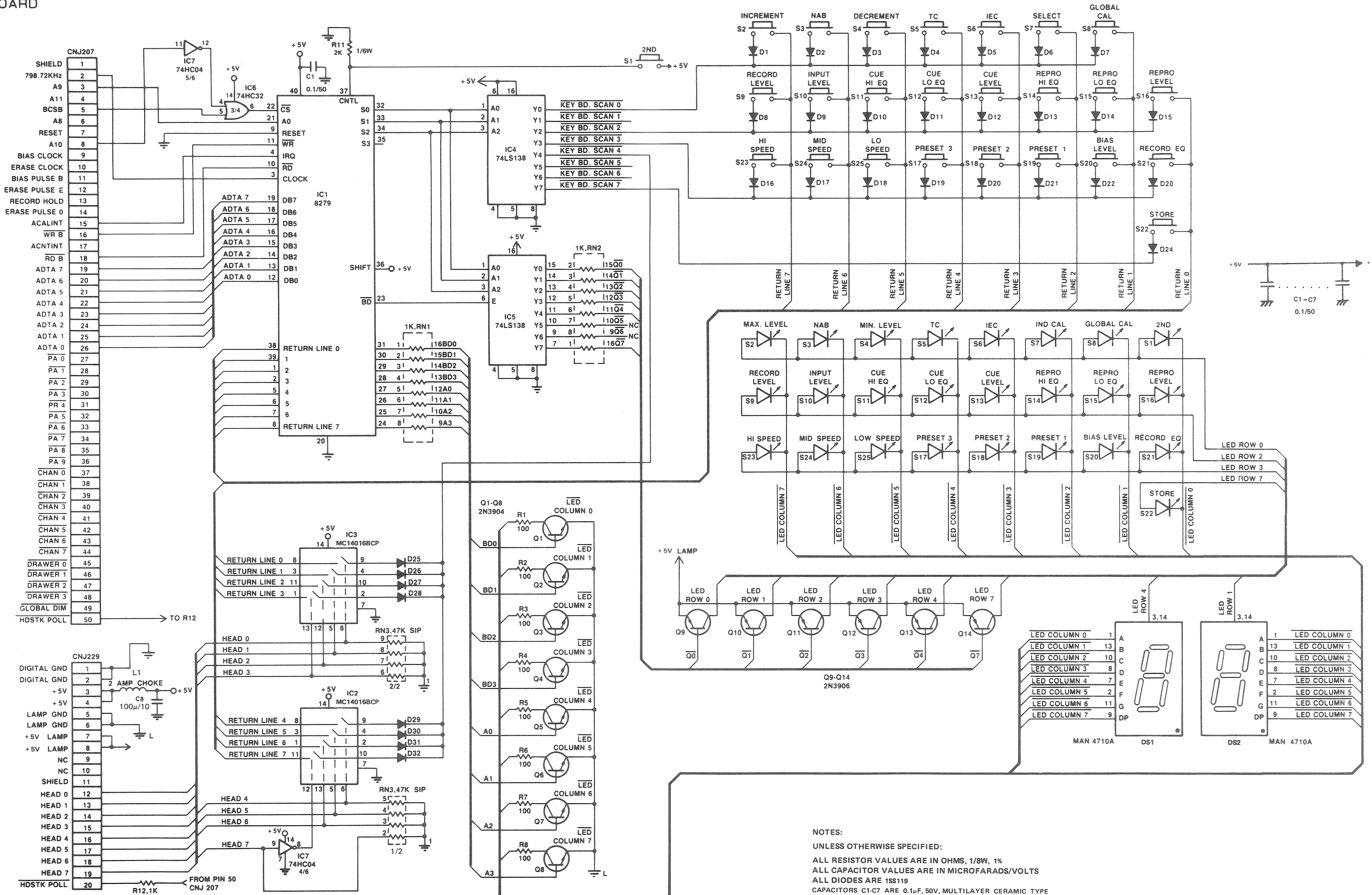


ALN BOARD (1-619-168-12)  
Component Side



■ SOLDER SIDE PATTERN 1-619-168-12  
 ■ COMPONENT SIDE PATTERN 1-619-168-12

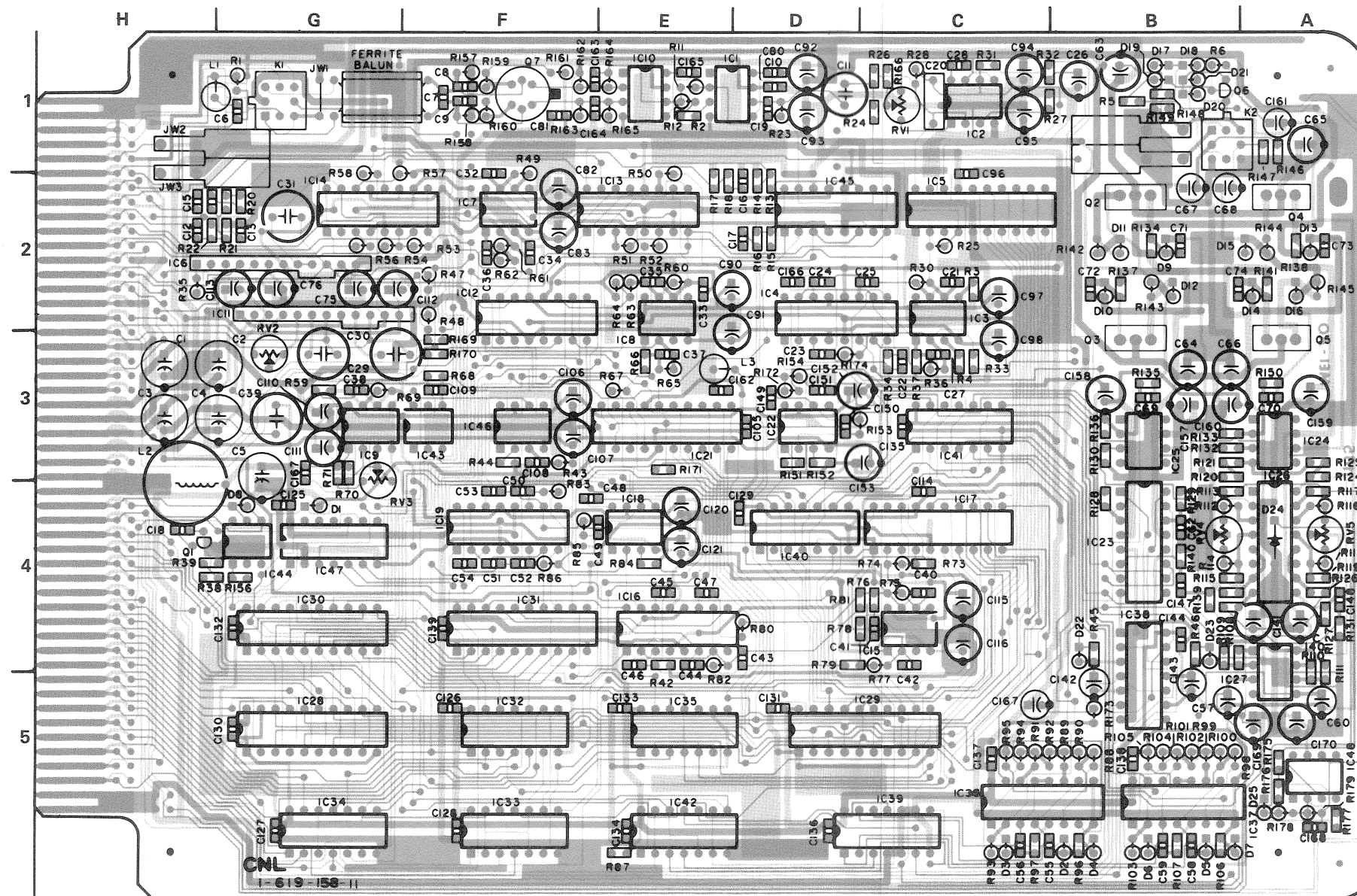
ALN BOARD



NOTES:  
 UNLESS OTHERWISE SPECIFIED;  
 ALL RESISTOR VALUES ARE IN OHMS, 1/8W, 1%  
 ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS  
 ALL DIODES ARE 1SS119  
 CAPACITORS C1-C7 ARE 0.1µF, 50V, MULTILAYER CERAMIC TYPE

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

S/N; APR-5002 20001 TO 20300

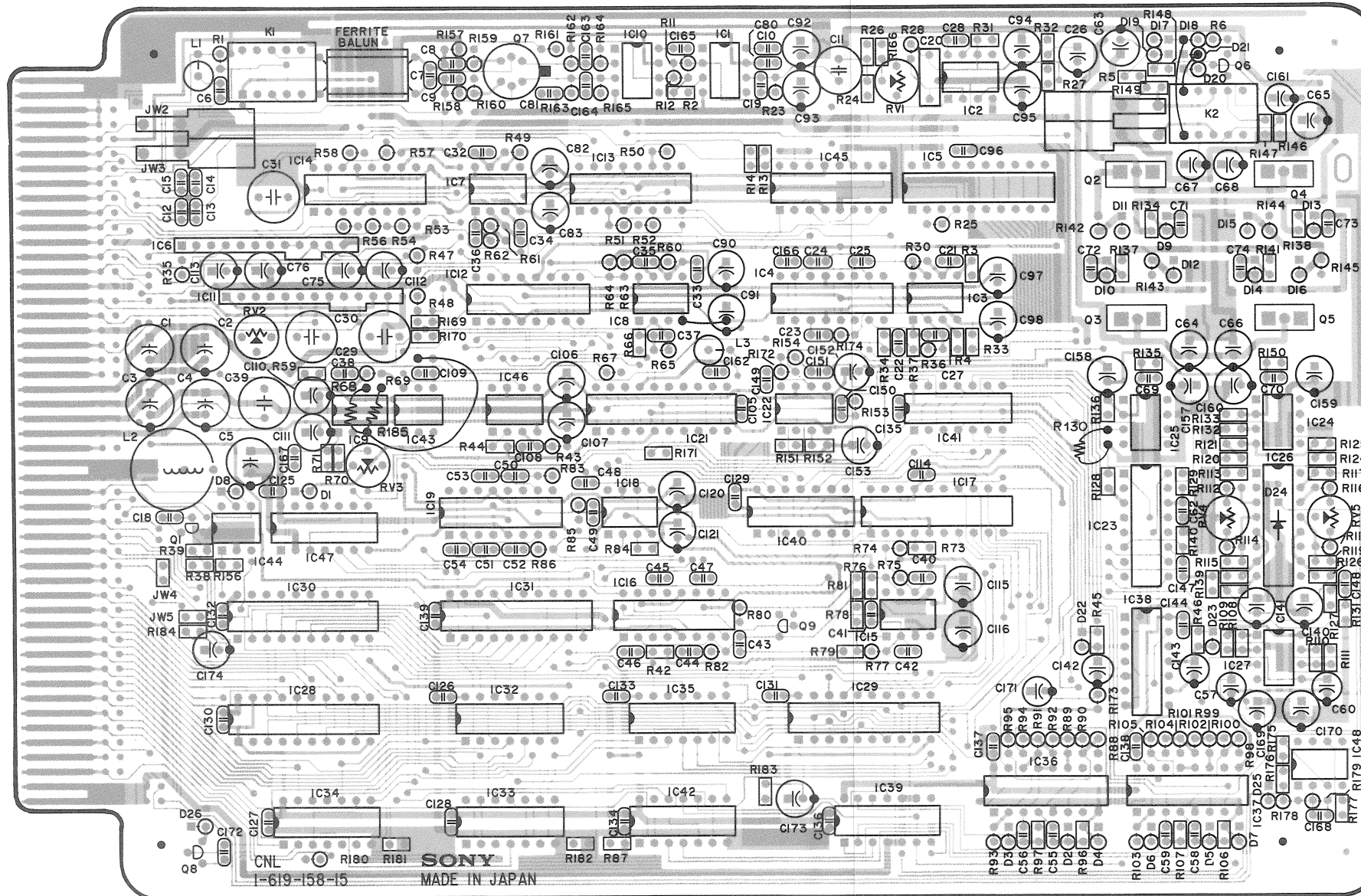


■ SOLDER SIDE PATTERN 1-619-158-11  
 ■ COMPONENT SIDE PATTERN 1-619-158-11



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

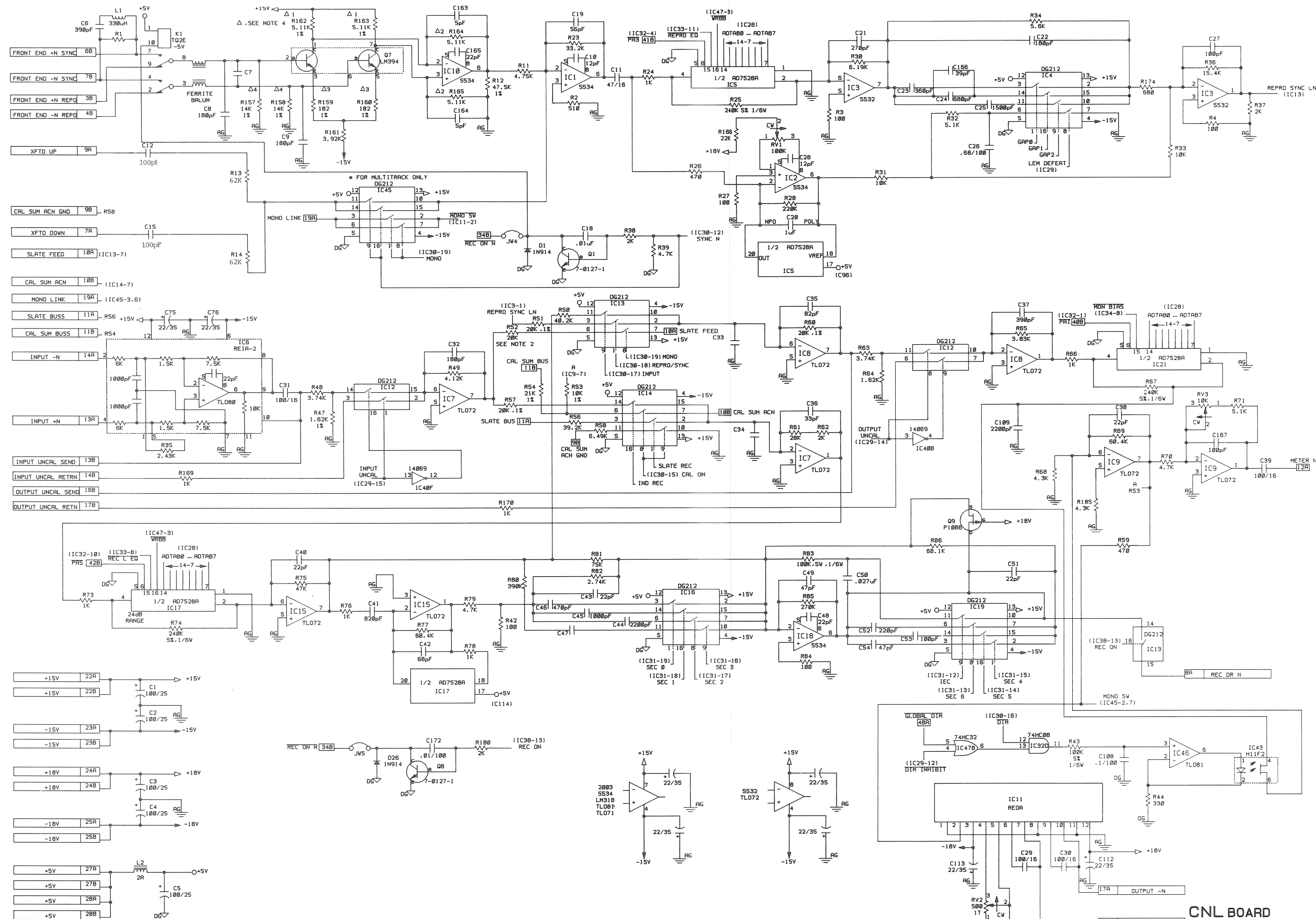
S/N; APR-5002 20301 AND HIGHER  
S/N; APR-5003V 10001 AND HIGHER



■ SOLDER SIDE PATTERN  
◆ COMPONENT SIDE PATTERN



CNL BOARD



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

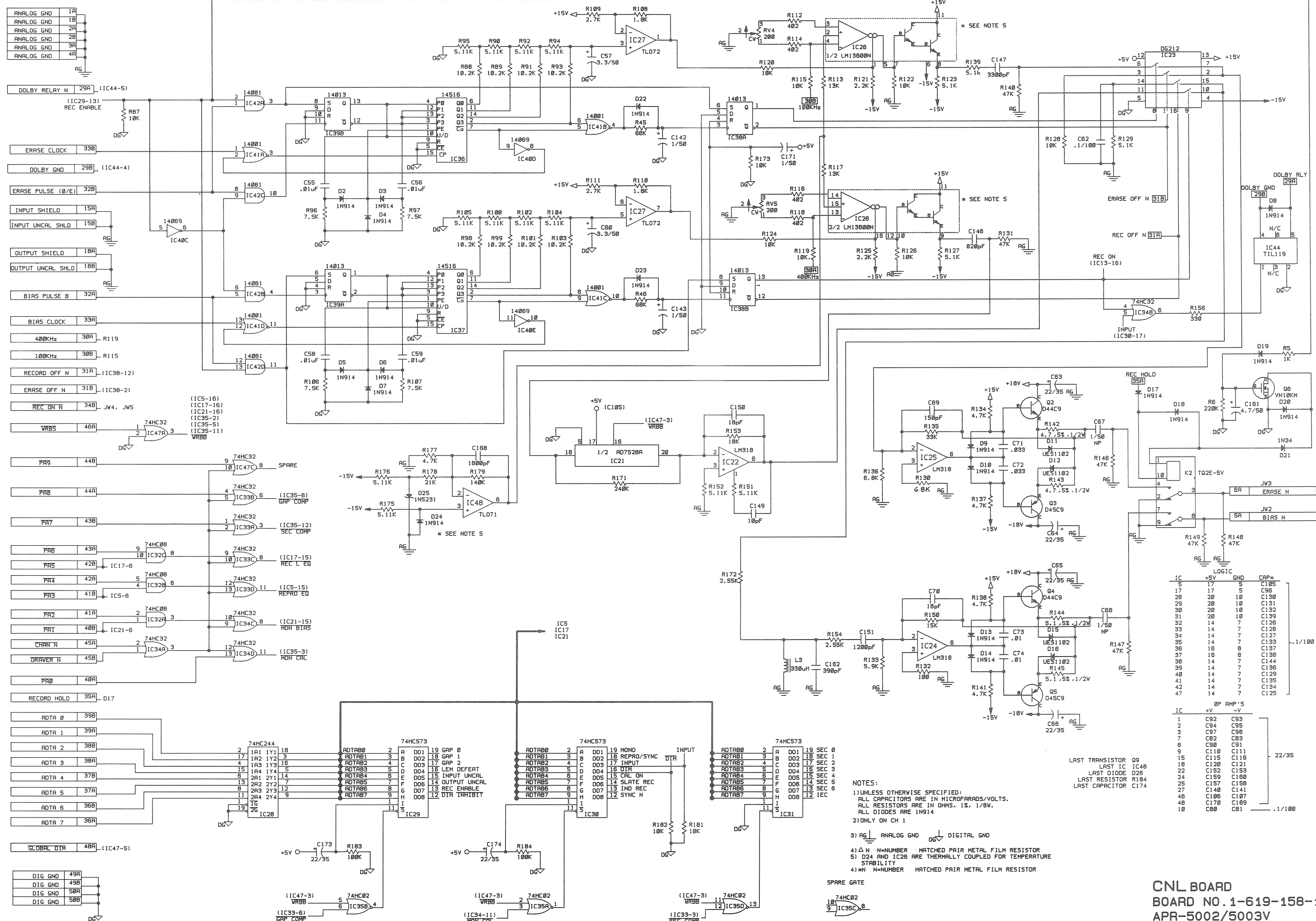


CNL BOARD

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

DOLBY RELAY N	29A	(IC44-5)
ERASE CLOCK	33B	
DOLBY GND	29B	(IC44-4)
ERASE PULSE (Ø/E)	32B	
INPUT SHIELD	15A	
INPUT UNCAL SHLD	15B	
OUTPUT SHIELD	18A	
OUTPUT UNCAL SHLD	18B	
BIAS PULSE B	32A	
BIAS CLOCK	33A	
400KHz	30A	R119
100KHz	30B	R115
RECORD OFF N	31A	(IC38-12)
ERASE OFF N	31B	(IC38-2)
REC ON N	34B	JW4, JW5
VRBS	46A	
FR9	44B	
FR8	44A	
FR7	43B	
FR6	43A	
FR5	42B	
FR4	42A	
FR3	41B	
FR2	41A	
FR1	40B	
CHAR N	45A	
DRAWER N	45B	
FR0	40A	
RECORD HOLD	35A	D17
ADTA 0	39B	
ADTA 1	39A	
ADTA 2	38B	
ADTA 3	38A	
ADTA 4	37B	
ADTA 5	37A	
ADTA 6	36B	
ADTA 7	36A	
GLOBAL DTH	48A	(IC47-5)

DIG GND	49A
DIG GND	49B
DIG GND	58A
DIG GND	58B



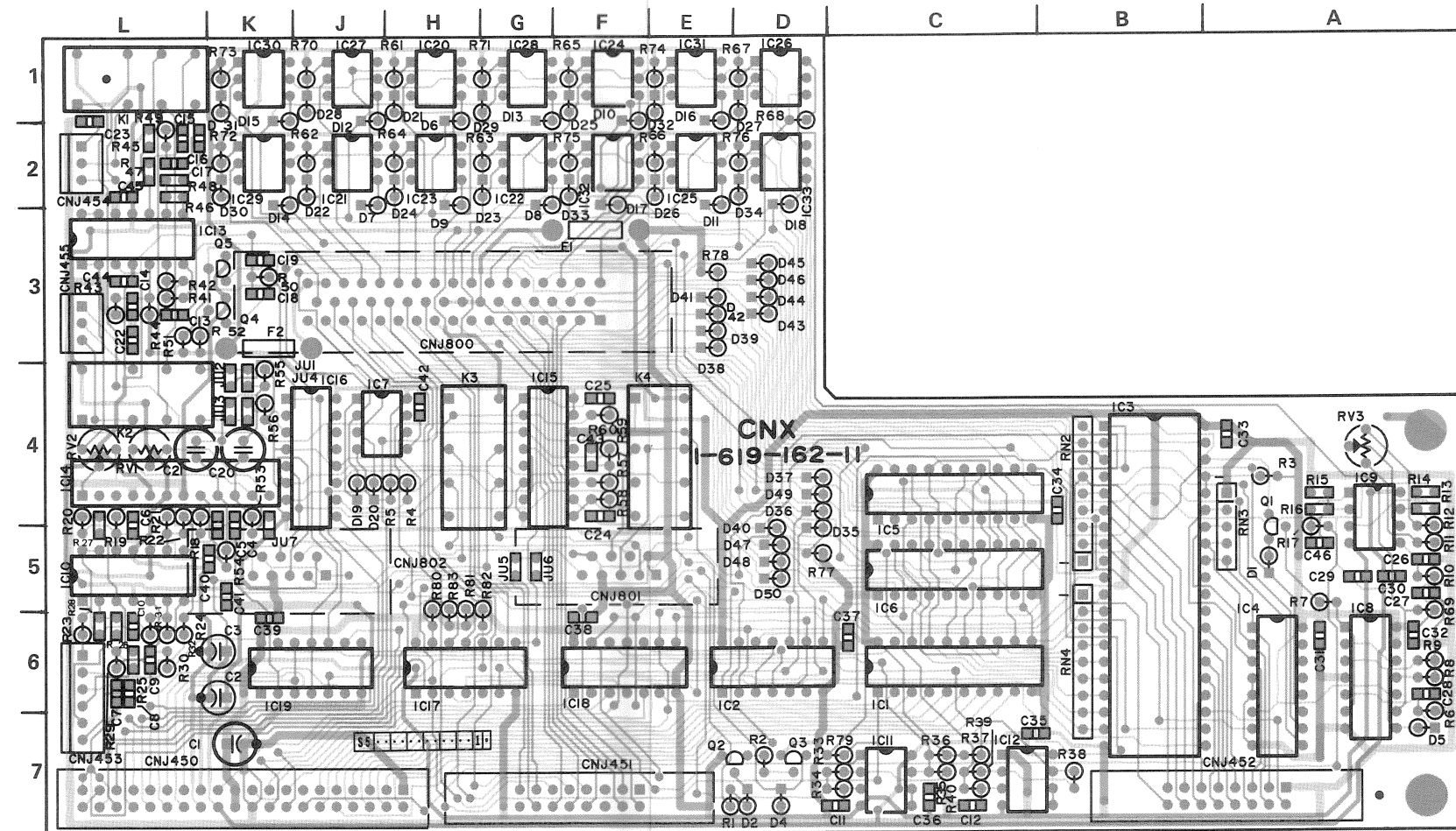
NOTES:  
 1) UNLESS OTHERWISE SPECIFIED:  
 ALL CAPACITORS ARE IN OHMS, P, N, OR µF.  
 ALL RESISTORS ARE IN OHMS, K, OR M.  
 ALL DIODES ARE 1N914  
 2) ONLY ON CH 1  
 3) AG = ANALOG GND, DG = DIGITAL GND  
 4) Δ N-NUMBER MATCHED PAIR METAL FILM RESISTOR  
 5) D24 AND IC26 ARE THERMALLY COUPLED FOR TEMPERATURE STABILITY  
 6) M-N-NUMBER MATCHED PAIR METAL FILM RESISTOR

IC	+5V	LOGIC	GND	CAP#
5	17	5	C105	
17	17	5	C96	
20	20	10	C130	
29	20	10	C131	
30	20	10	C132	
31	20	10	C139	
32	14	7	C126	
33	14	7	C128	
34	14	7	C127	
35	14	7	C133	
36	16	8	C137	
37	16	8	C138	
38	14	7	C144	
39	14	7	C136	
40	14	7	C129	
41	14	7	C135	
42	14	7	C134	
47	14	7	C125	

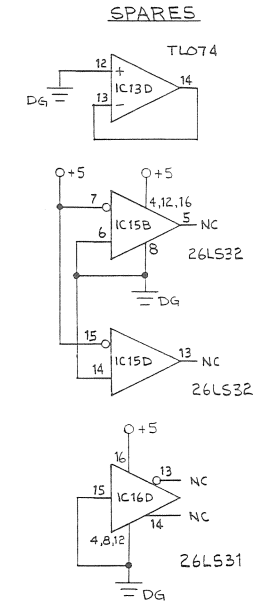
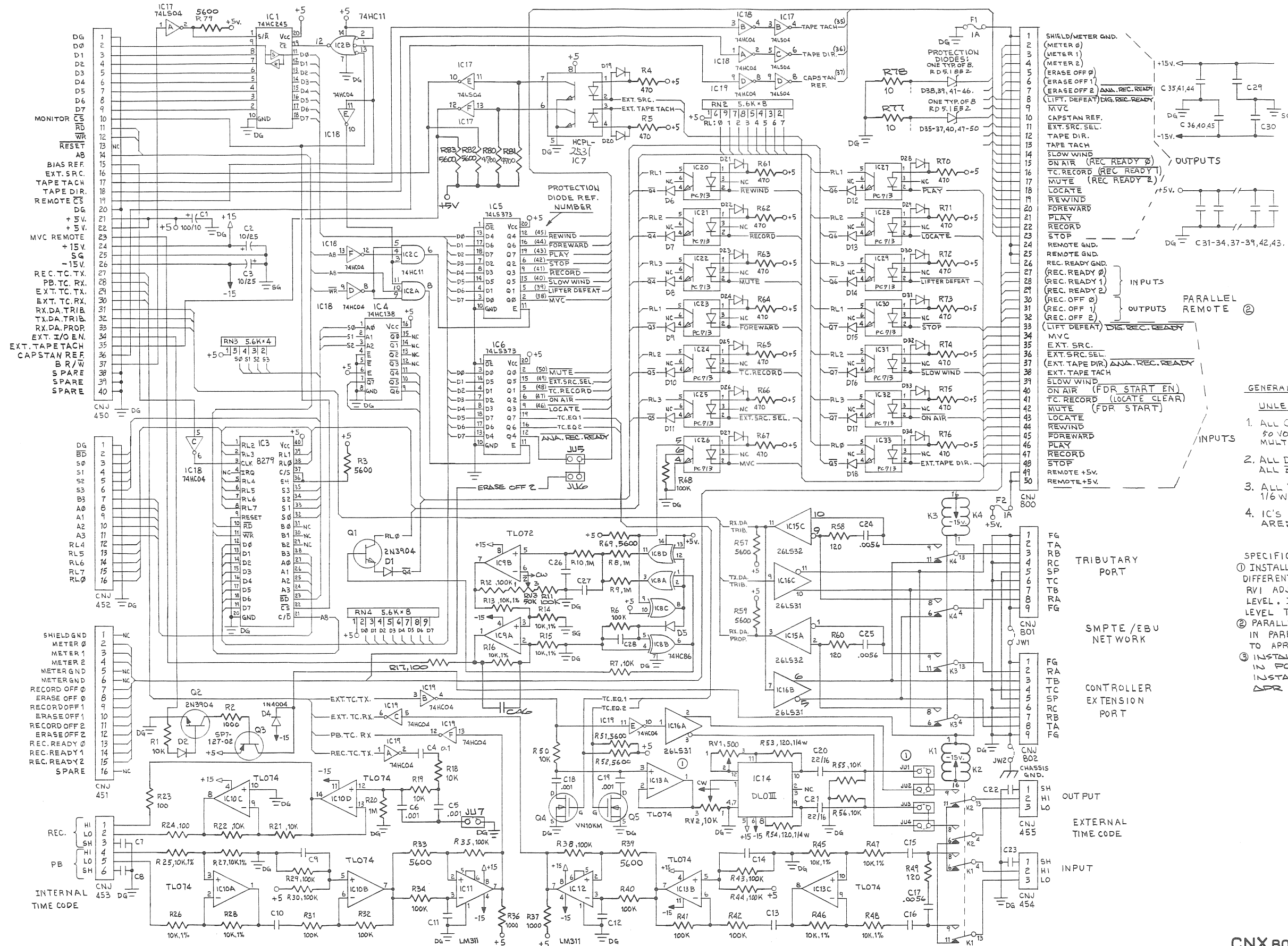
IC	+5V	ØP AMP	-5V
1	C92	C93	-
2	C94	C95	-
3	C97	C98	-
7	C02	C03	-
8	C90	C91	-
9	C110	C111	-
15	C115	C116	-
18	C120	C121	-
22	C152	C153	-
24	C159	C160	-
25	C157	C158	-
27	C140	C141	-
46	C106	C107	-
48	C170	C169	-
10	C00	C01	-

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



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

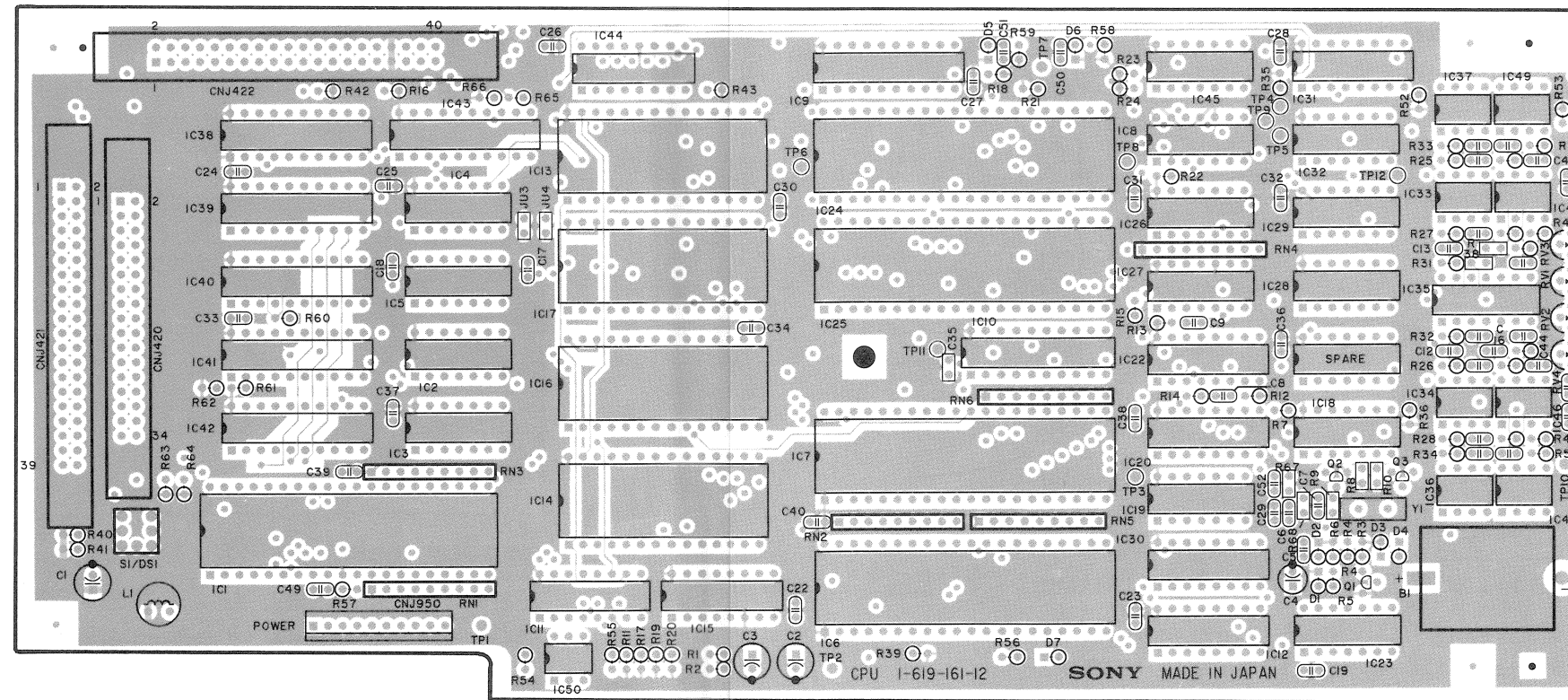
CNX BOARD



- GENERAL NOTES:**
1. ALL CAPACITORS ARE 0.1 MICROFARAD, 50 VOLTS, NONPOLARIZED, MULTILAYER CERAMIC TYPE.
  2. ALL DIODES ARE 1SS119 ALL ZENERS ARE RD5.1E2
  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.

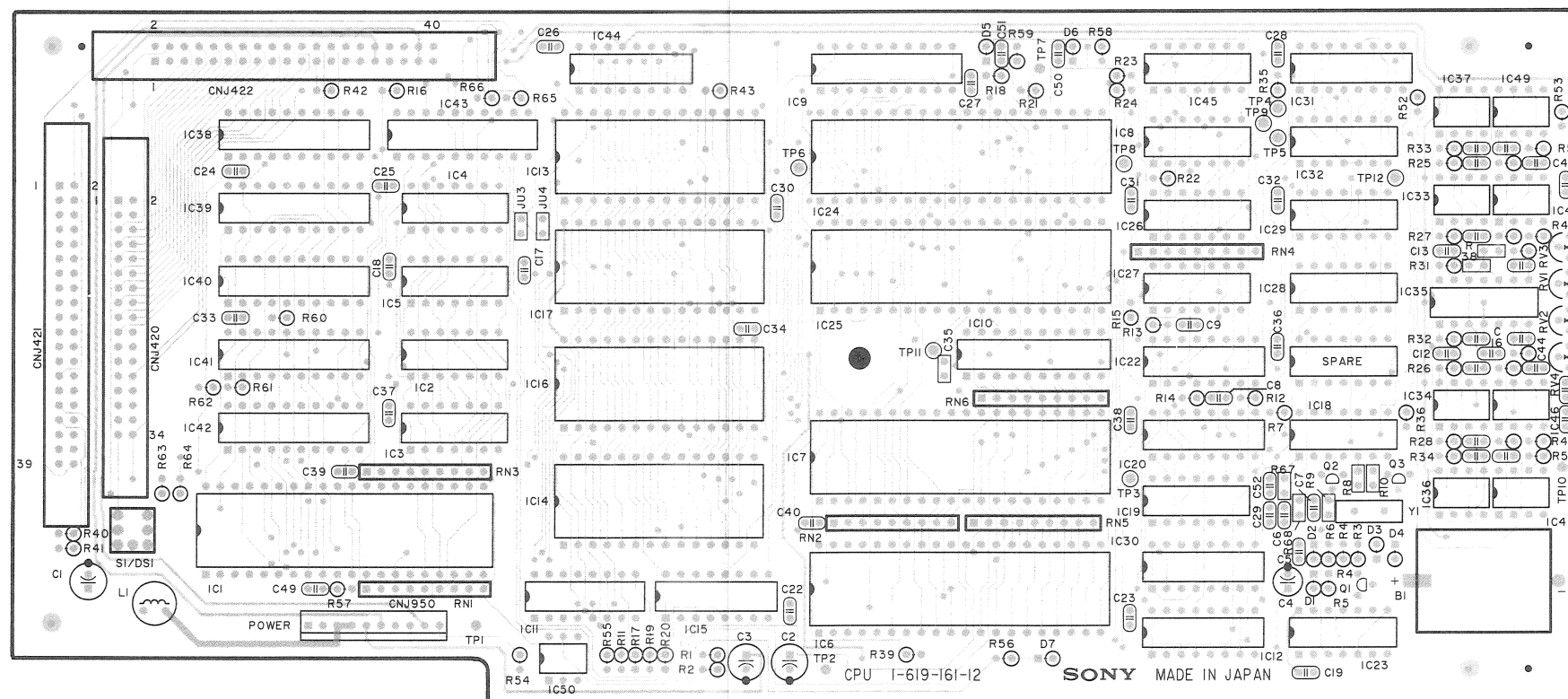
- SPECIFIC NOTES:**
1. INSTALL J1, J3 FOR BALANCED DIFFERENTIAL TIMECODE OUTPUT. RV1 ADJUSTS SYMMETRY, RV2 ADJUSTS LEVEL. INSTALL J2, J4, FOR RS-422 LEVEL TIMECODE OUTPUT.
  2. PARALLEL REMOTE FUNCTIONS IN PARENTHESIS ARE UNIQUE TO APR-5000 SERIES MACHINES.
  3. INSTALL J15 AND J17 FOR USE IN FCM SERIES MACHINES. INSTALL J16 FOR USE IN DPR SERIES MACHINES.

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



■ SOLDER SIDE PATTERN

☒ DRIFT



■ SOLDER SIDE PATTERN

☒ DRIFT

## TECHNICAL UPDATE

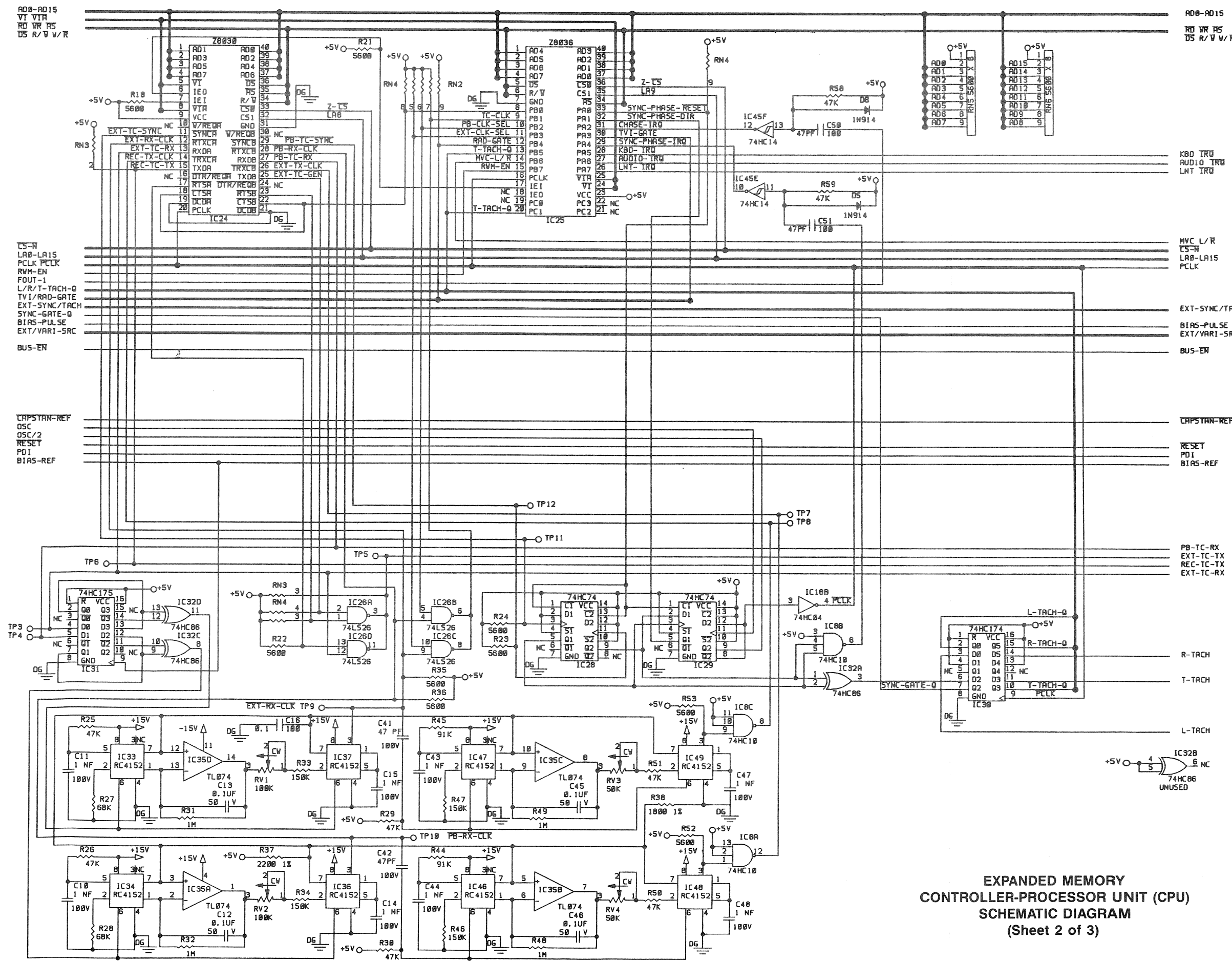
### APR-5000 SERIES RECORDERS/REPRODUCERS

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.

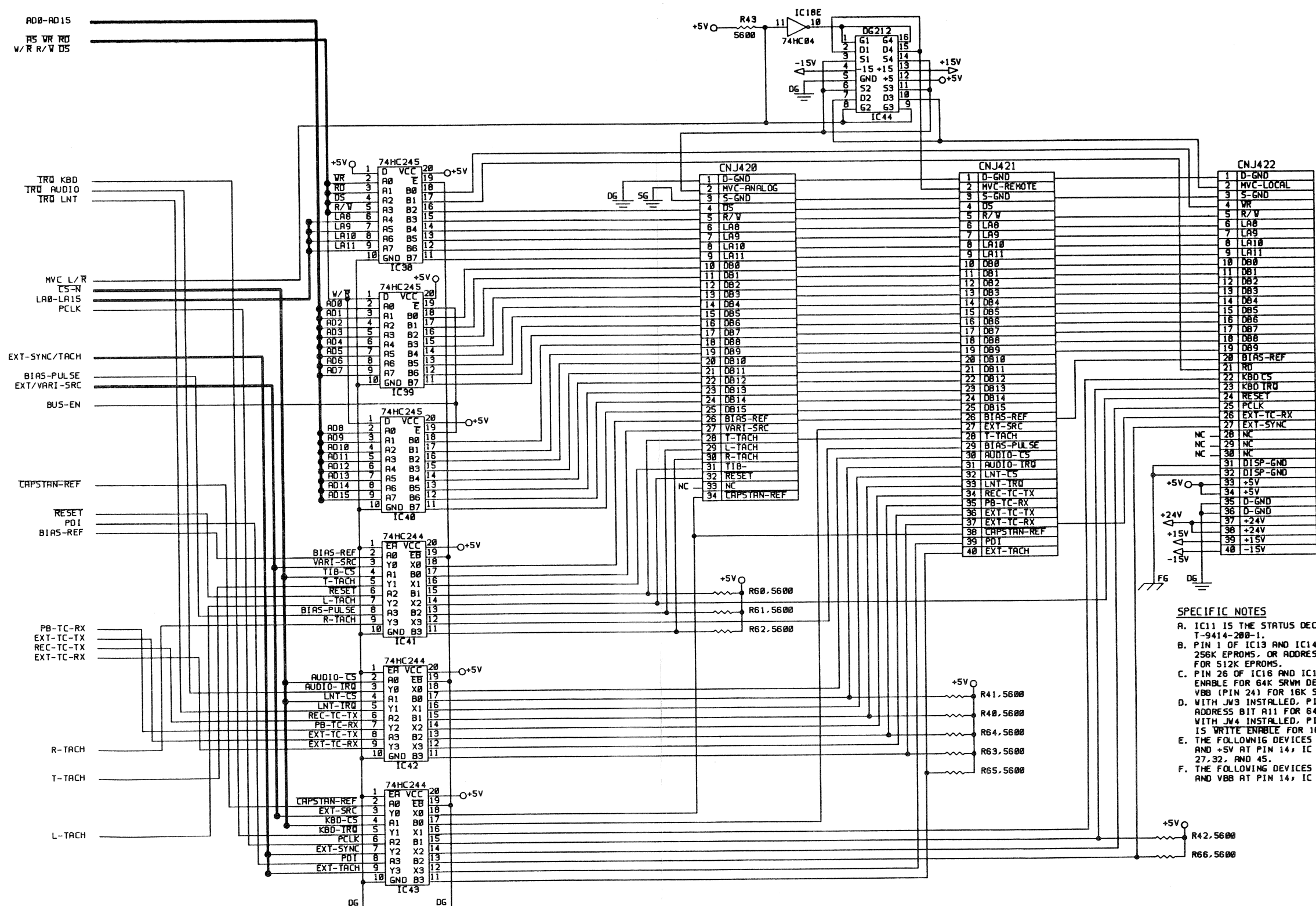
The Expanded-memory CPUs may be identified by their part numbers. Units manufactured in the United States are numbered T-9412-327-4, while units of Japanese manufacture are numbered 1-619-161-12.







EXPANDED MEMORY  
CONTROLLER-PROCESSOR UNIT (CPU)  
SCHEMATIC DIAGRAM  
(Sheet 2 of 3)



**SPECIFIC NOTES**

A. IC11 IS THE STATUS DECODER PROM, T-9414-200-1.

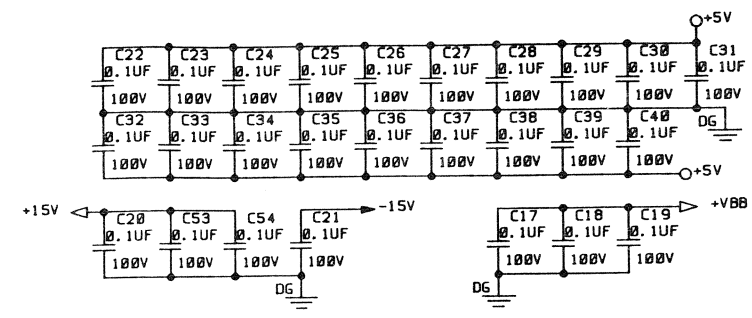
B. PIN 1 OF IC13 AND IC14 IS VPP FOR 256K EPROMS, OR ADDRESS BIT A15 FOR 512K EPROMS.

C. PIN 26 OF IC16 AND IC17 IS CHIP ENABLE FOR 64K SRWM DEVICES, OR VBB (PIN 24) FOR 16K SRWM DEVICES.

D. WITH JW3 INSTALLED, PIN 29 IS ADDRESS BIT A11 FOR 64K SRWM DEVICES, WITH JW4 INSTALLED, PIN 23 (PIN 21) IS WRITE ENABLE FOR 16K SRWM DEVICES.

E. THE FOLLOWING DEVICES HAVE DG AT PIN 7 AND +5V AT PIN 14; IC 2.3,4,8,10,26, 27,32, AND 45.

F. THE FOLLOWING DEVICES HAVE DG AT PIN 7 AND VBB AT PIN 14; IC 5.23.



**TEST POINTS**

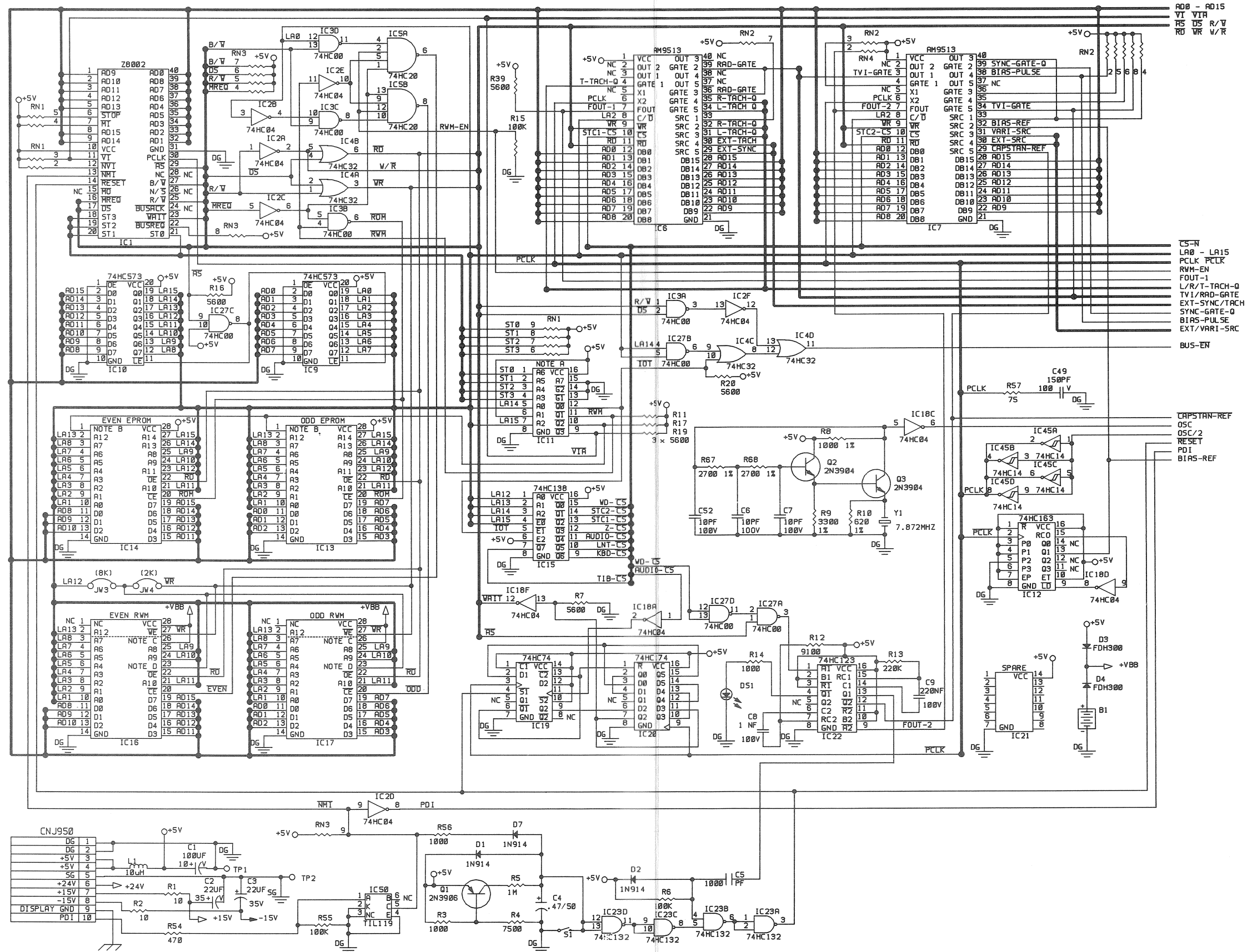
- |                   |                 |
|-------------------|-----------------|
| 1. DIGITAL GROUND | 7. EXT-TX-CLK   |
| 2. SIGNAL GROUND  | 8. REC-TX-CLK   |
| 3. EXT-TC-RX      | 9. EXT-RX-CLK   |
| 4. PB-TC-RX       | 10. PB-RX-CLK   |
| 5. EXT-TC-TX      | 11. EXT-TC-SYNC |
| 6. REC-TC-TX      | 12. PB-TC-SYNC  |

**NEXT DESIGNATIONS**

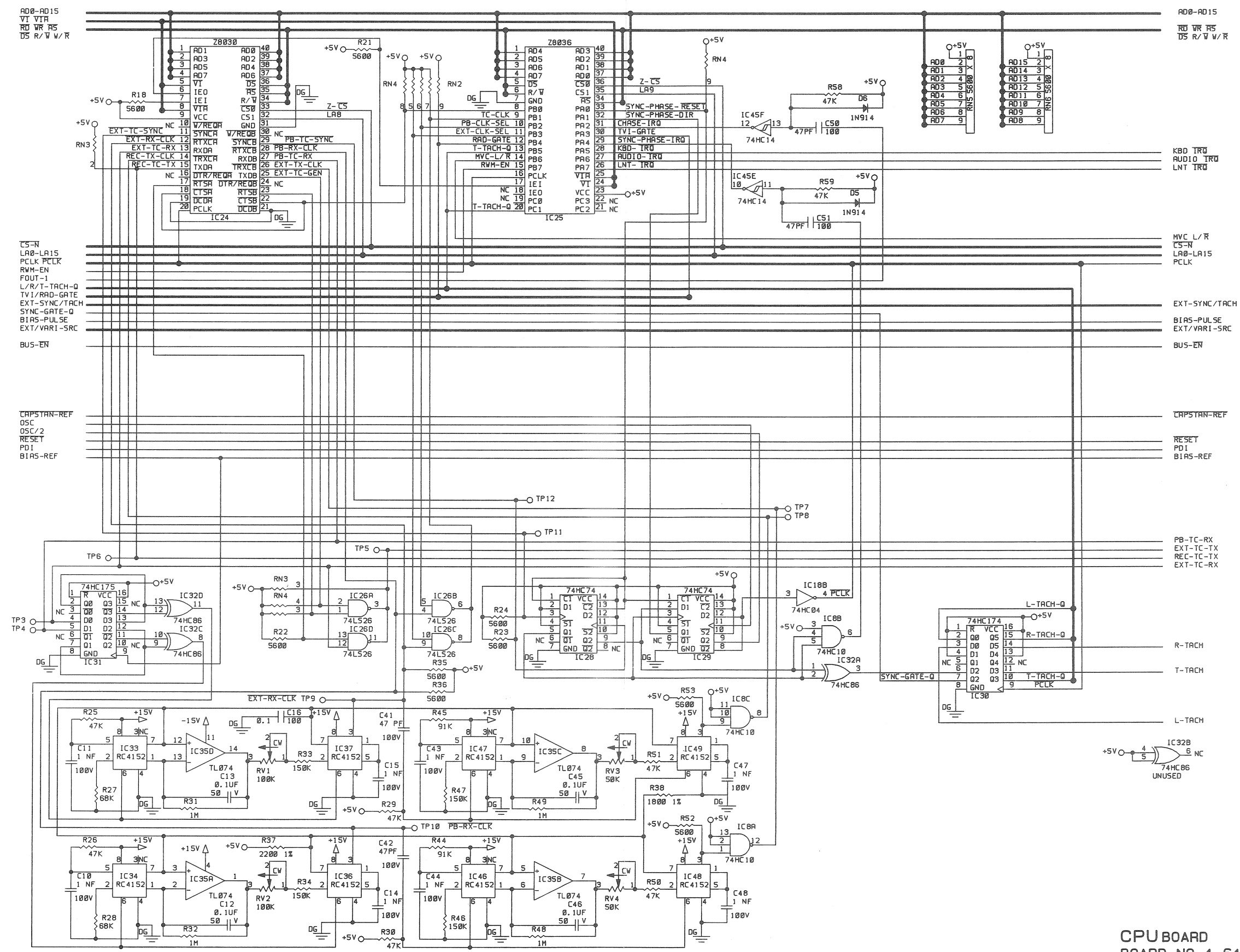
- |          |        |
|----------|--------|
| B: 2     | Q: 4   |
| C: 55    | R: 69  |
| D: 8     | RN: 7  |
| DS: 2    | RV: 5  |
| IC: 51   | S: 2   |
| JW: 13 m | TP: 13 |
| L: 2     | Y: 2   |

\* JW1, JW2, AND JW5 - JW11 HAVE BEEN RETIRED.

**EXPANDED MEMORY  
CONTROLLER-PROCESSOR UNIT (CPU)  
SCHEMATIC DIAGRAM  
(Sheet 3 of 3)**



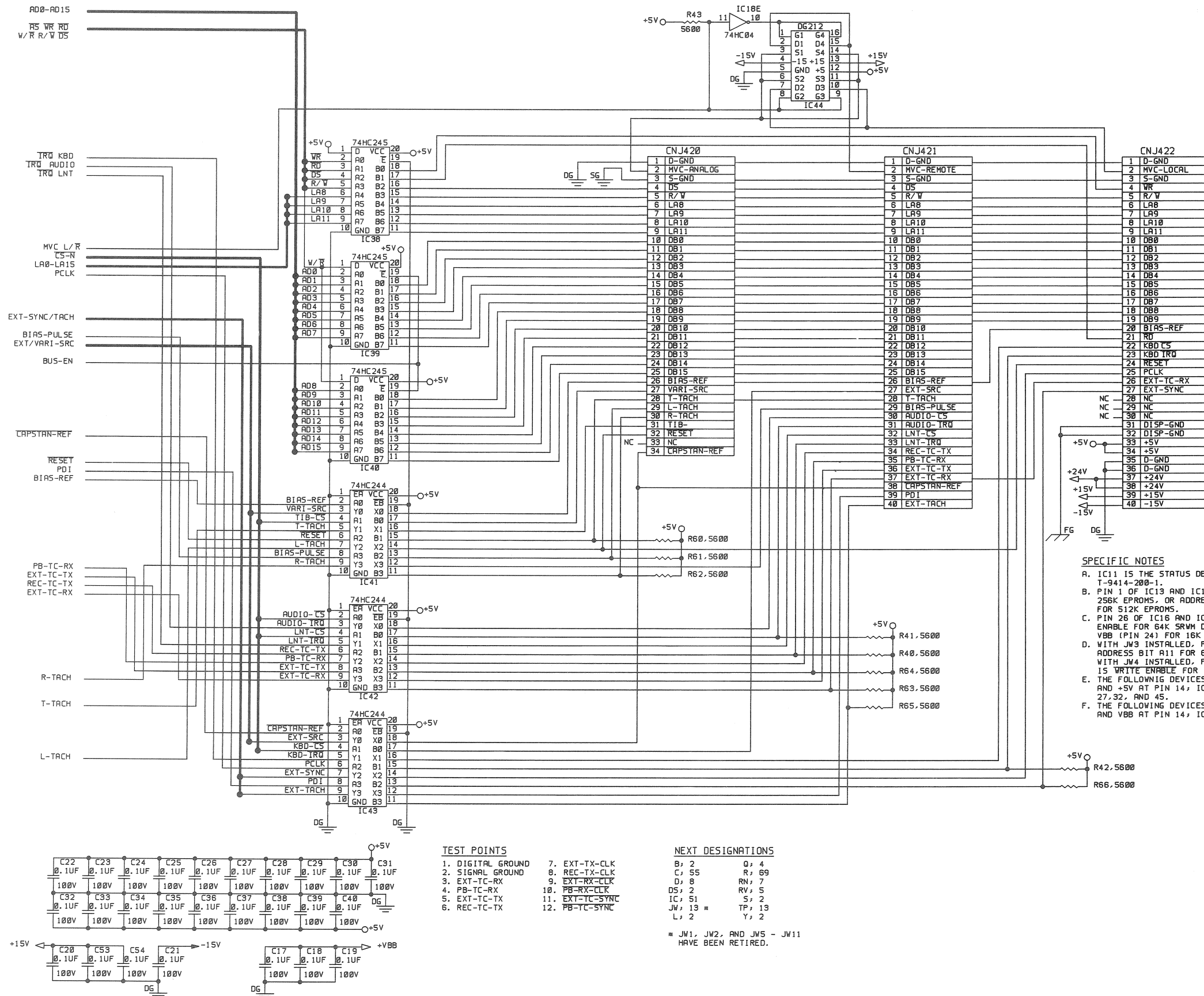




|



CPU BOARD



**SPECIFIC NOTES**

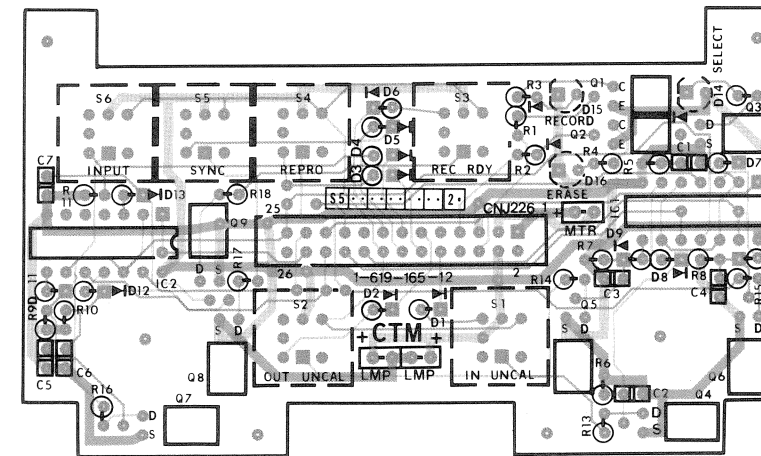
- IC11 IS THE STATUS DECODER PROM, T-9414-200-1.
- PIN 1 OF IC13 AND IC14 IS VPP FOR 256K EPROMS, OR ADDRESS BIT A15 FOR 512K EPROMS.
- PIN 26 OF IC16 AND IC17 IS CHIP ENABLE FOR 64K SRWM DEVICES, OR VBB (PIN 24) FOR 16K SRWM DEVICES.
- WITH JW3 INSTALLED, PIN 23 IS ADDRESS BIT A11 FOR 64K SRWM DEVICES. WITH JW4 INSTALLED, PIN 23 (PIN 21) IS WRITE ENABLE FOR 16K SRWM DEVICES.
- THE FOLLOWING DEVICES HAVE DG AT PIN 7 AND +5V AT PIN 14; IC 2,3,4,8,18,26, 27,32, AND 45.
- THE FOLLOWING DEVICES HAVE DG AT PIN 7 AND VBB AT PIN 14; IC 5,23.

- TEST POINTS**
- DIGITAL GROUND
  - SIGNAL GROUND
  - EXT-TC-GROUND
  - PB-TX-RX
  - EXT-TC-TX
  - REC-TC-TX
  - EXT-TX-CLK
  - REC-TX-CLK
  - EXT-RX-CLK
  - PB-RX-CLK
  - EXT-TC-SYNC
  - PB-TC-SYNC

- NEXT DESIGNATIONS**
- |        |        |
|--------|--------|
| B; 2   | Q; 4   |
| C; 55  | R; 69  |
| D; 8   | RN; 7  |
| DS; 2  | RV; 5  |
| IC; 51 | S; 2   |
| JW; 13 | TP; 13 |
| L; 2   | Y; 2   |

\* JW1, JW2, AND JW5 - JW11 HAVE BEEN RETIRED.

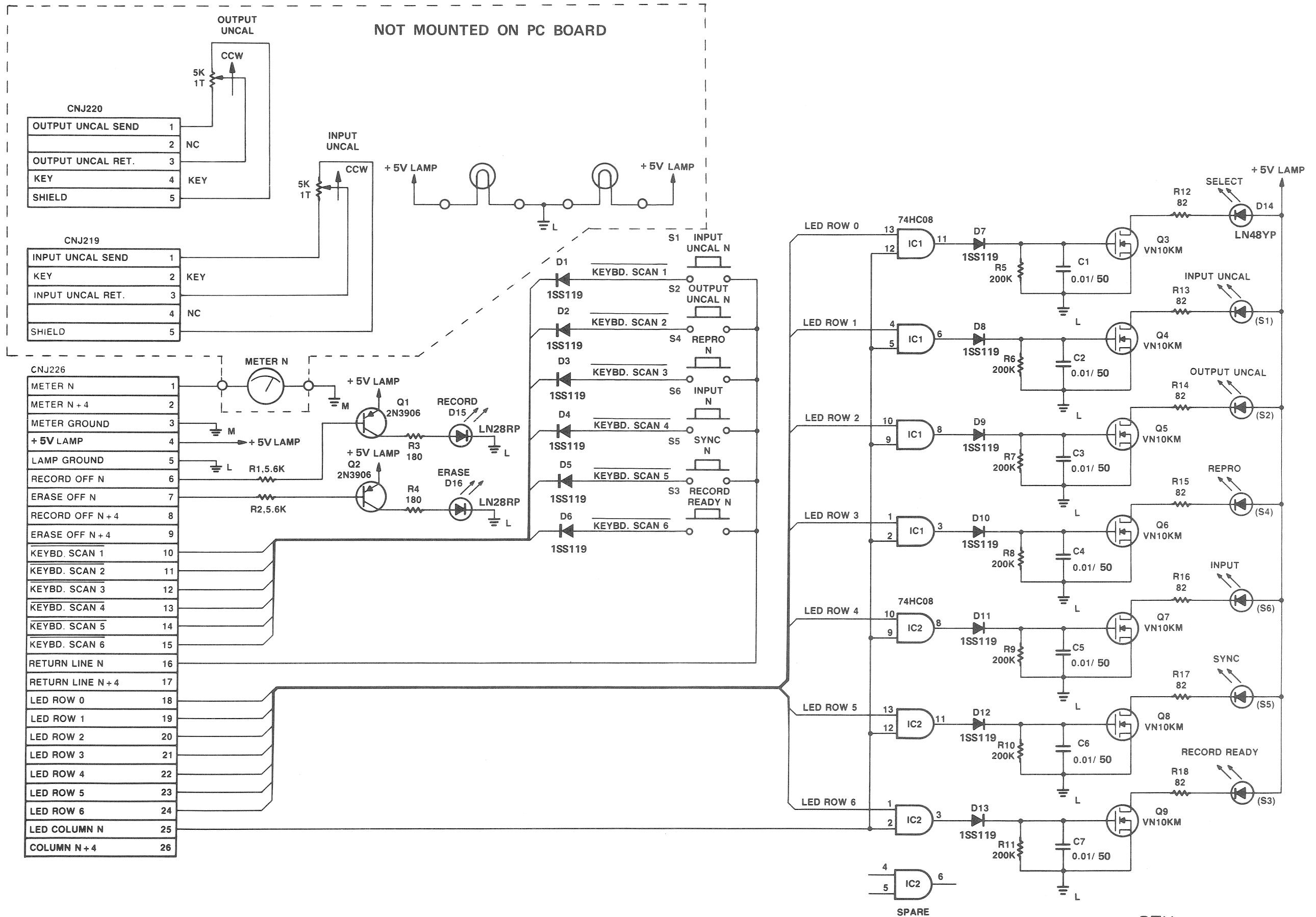
CTM BOARD (1-619-165-12)  
Component Side



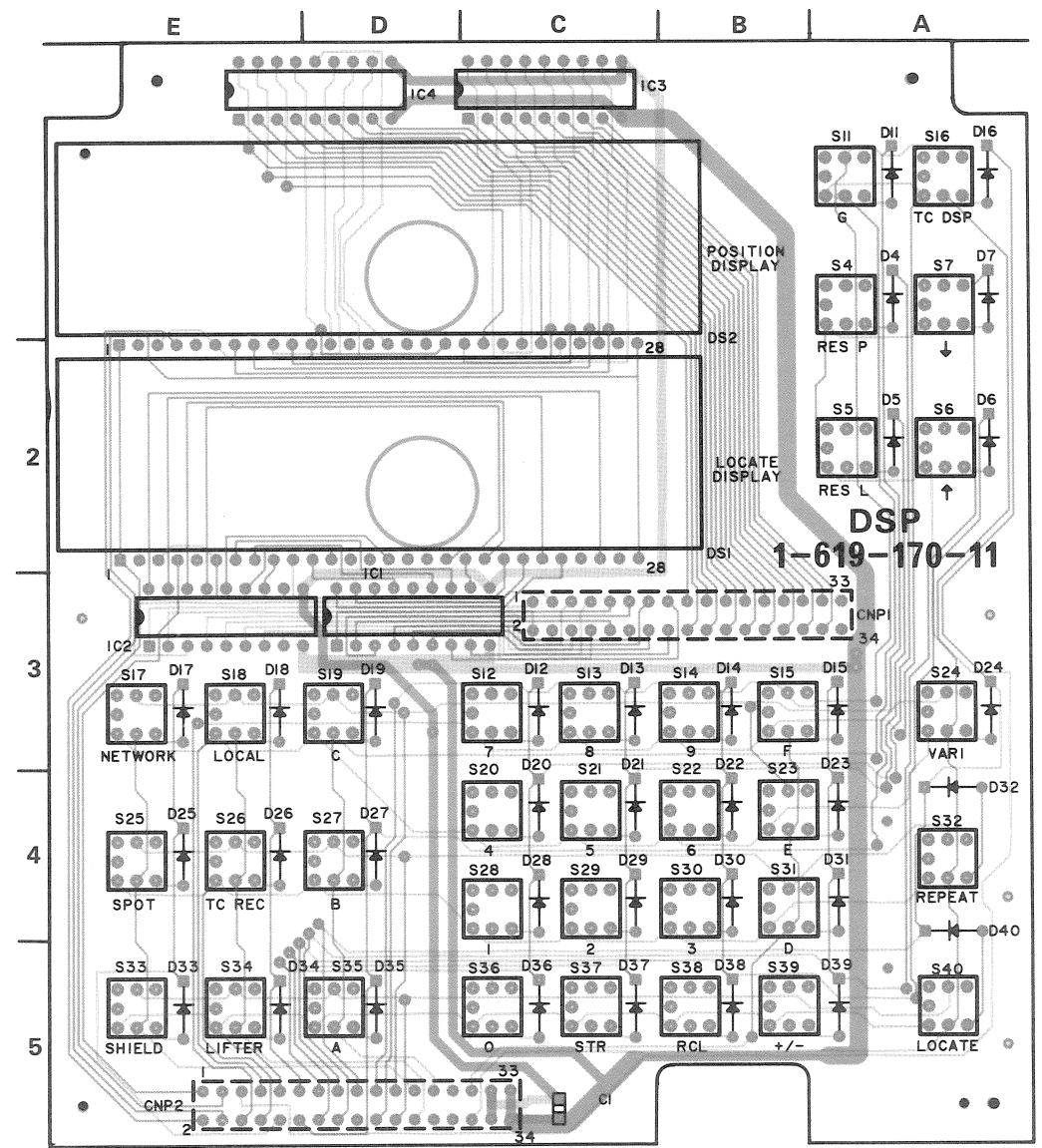
■ SOLDER SIDE PATTERN 1-619-165-12  
■ COMPONENT SIDE PATTERN 1-619-165-12



CTM BOARD

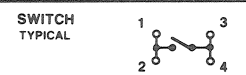
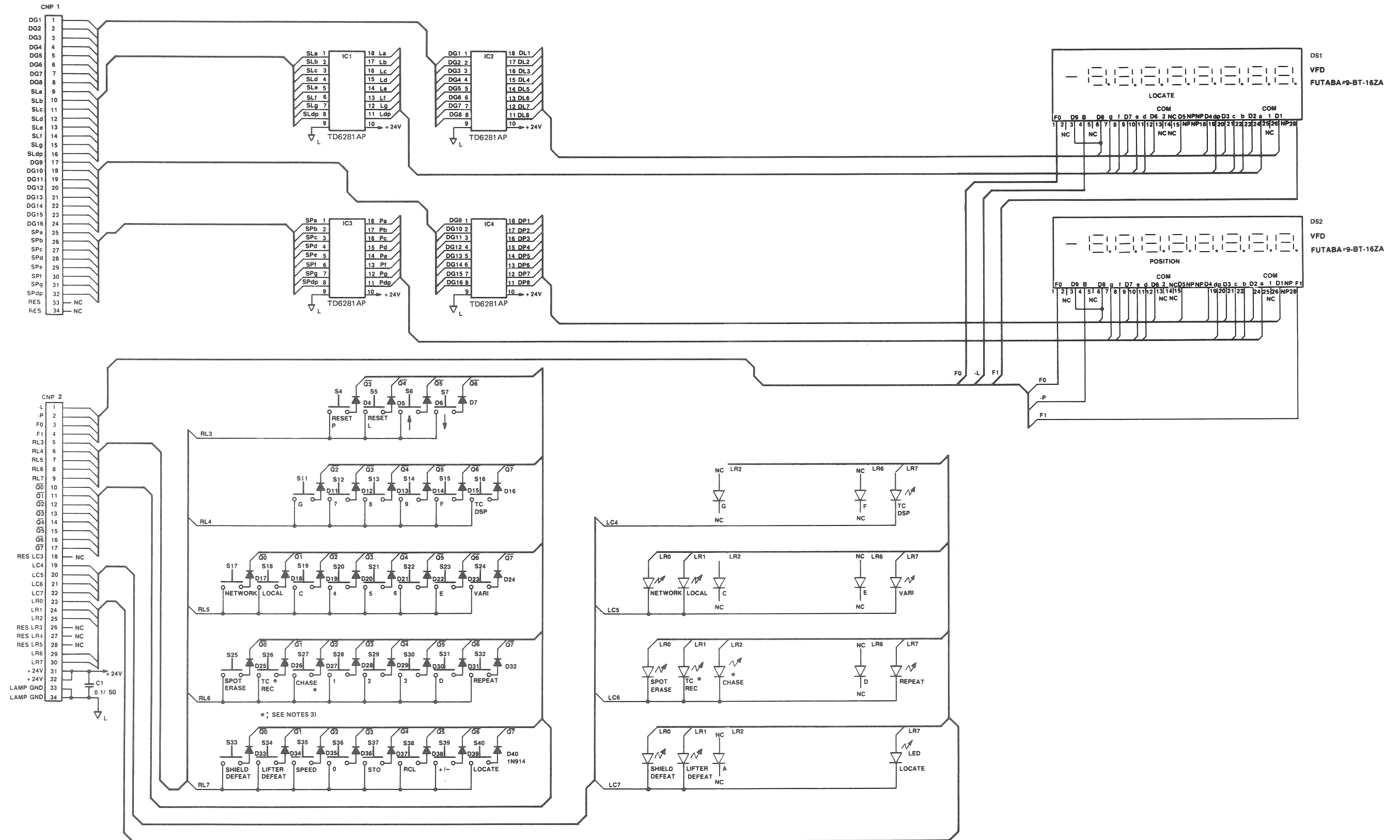


DSP BOARD (1-619-170-11)  
Component Side



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

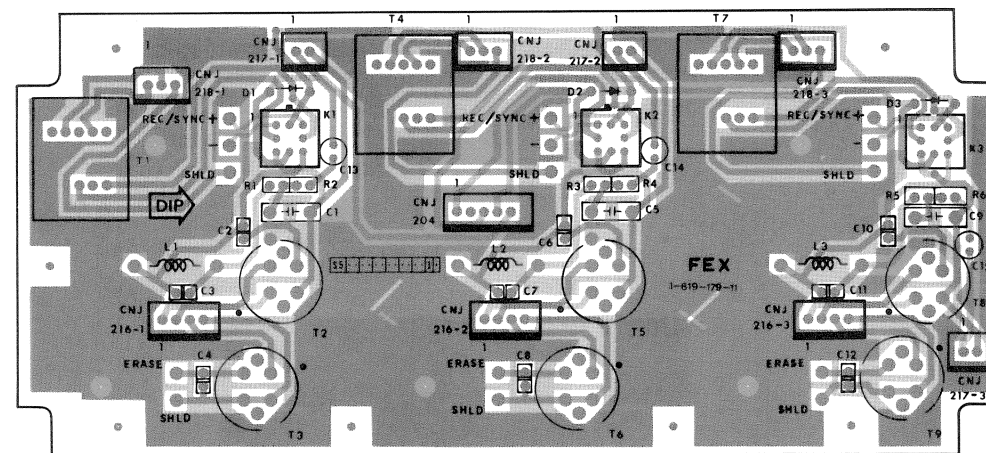
DSP BOARD



- 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.

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

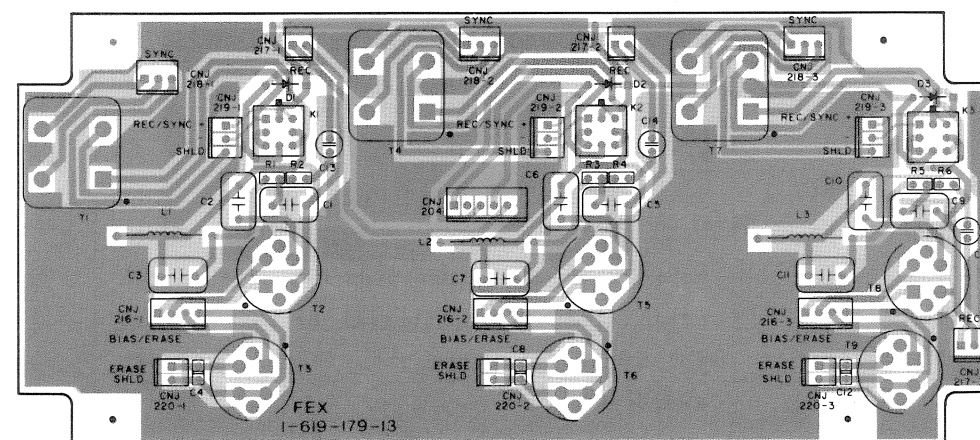
S/N; APR-5002 20001 TO 20300



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

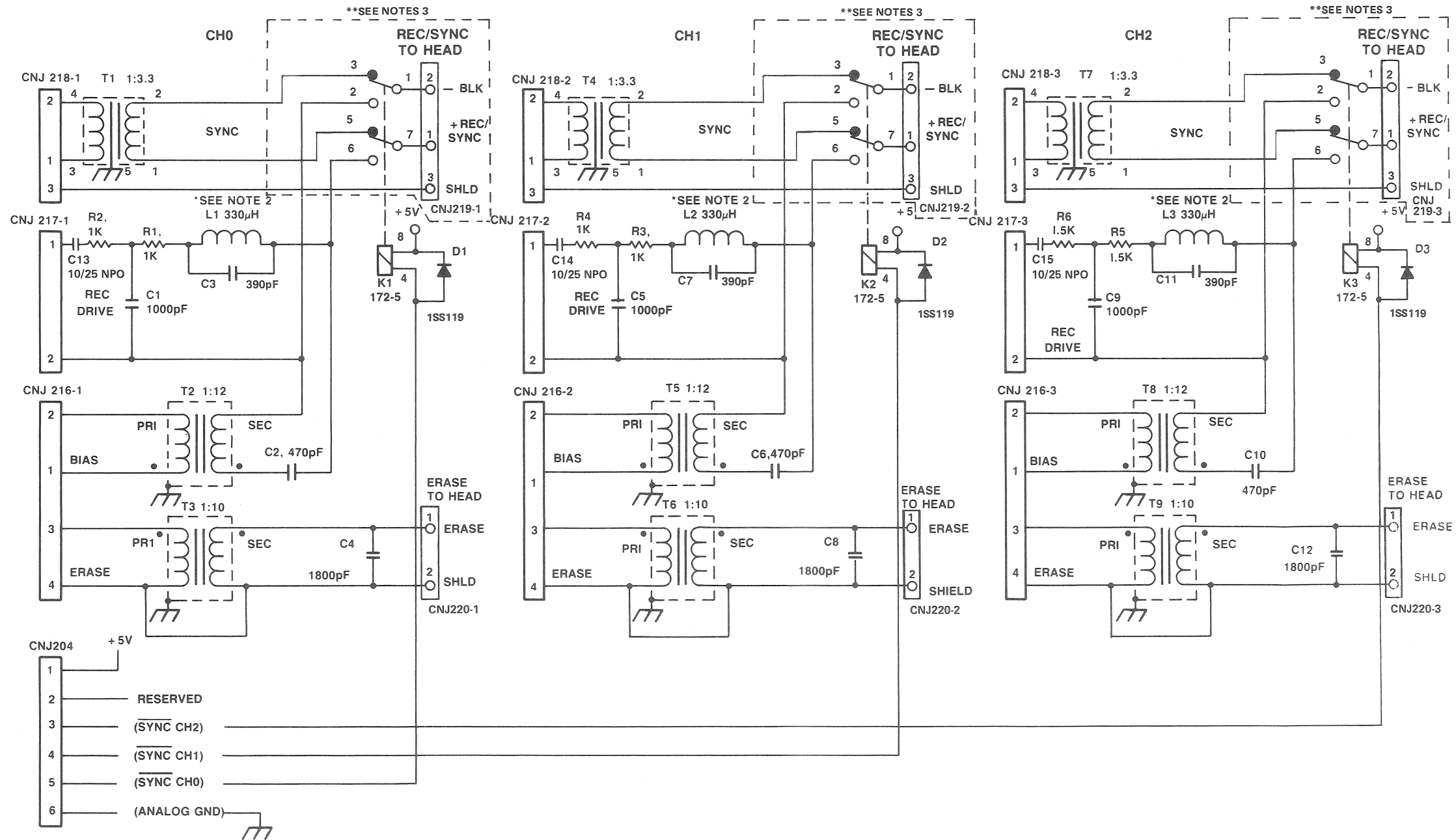
FEX BOARD (1-619-179-13)  
Component Side

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

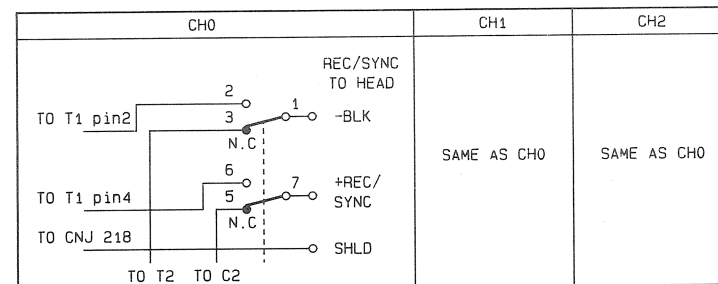


NOTES (UNLESS OTHERWISE SPECIFIED):

- 1. ALL RESISTOR VALUES ARE IN OHMS, 1/8 W, 1%.
- \*2. L1, L2 & L3 ARE SHIELDED BY WRAPPING EACH INDUCTOR WITH  $\mu$  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

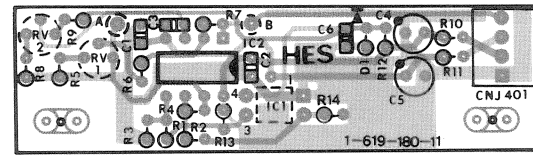


FEX CNL, TCC	1-619-179-11 -12	1-619-179-13 and higher
1-619-158-11 -12	No Problem	Can't use
1-619-158-13 and higher	Add: JW4 Q9 (P1086) Delete: JW5	Add: JW5 Delete: Q9 and JW4

Applicable Serial NO.	Parts that have been changed.		Pins that have been changed.	Parts that have been added.
	APR-5002	APR-5003		
20201 and higher	20401 and higher	C3, C7, C11 430pF $\rightarrow$ 390pF		
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

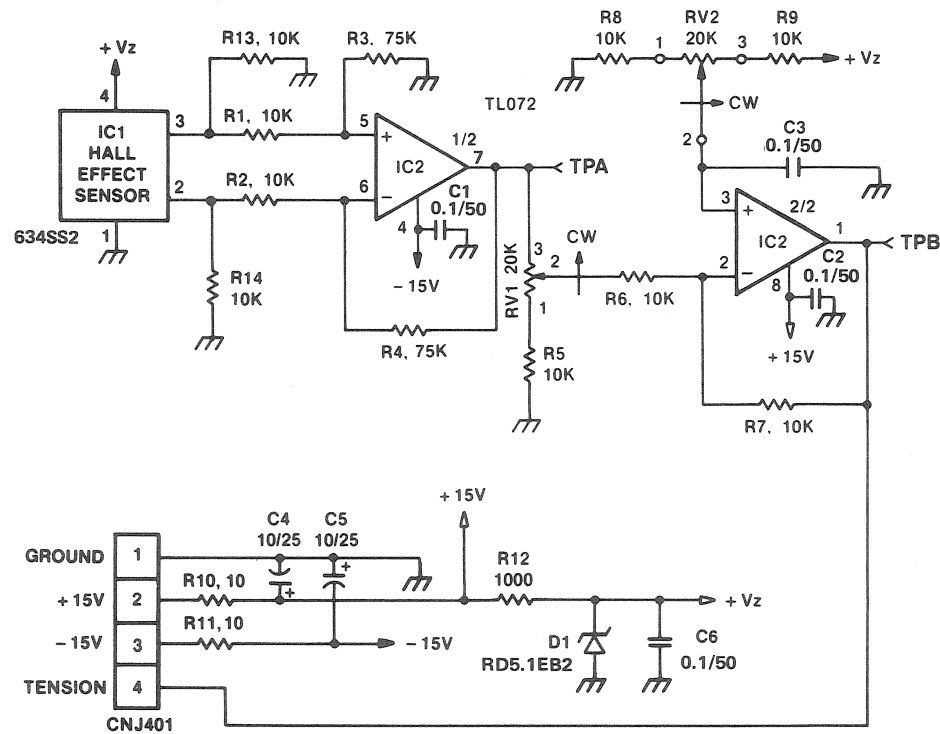
FEX BOARD  
 BOARD NO. 1-619-179-11 & HIGHER  
 APR-5002/5003V

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



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

HES BOARD

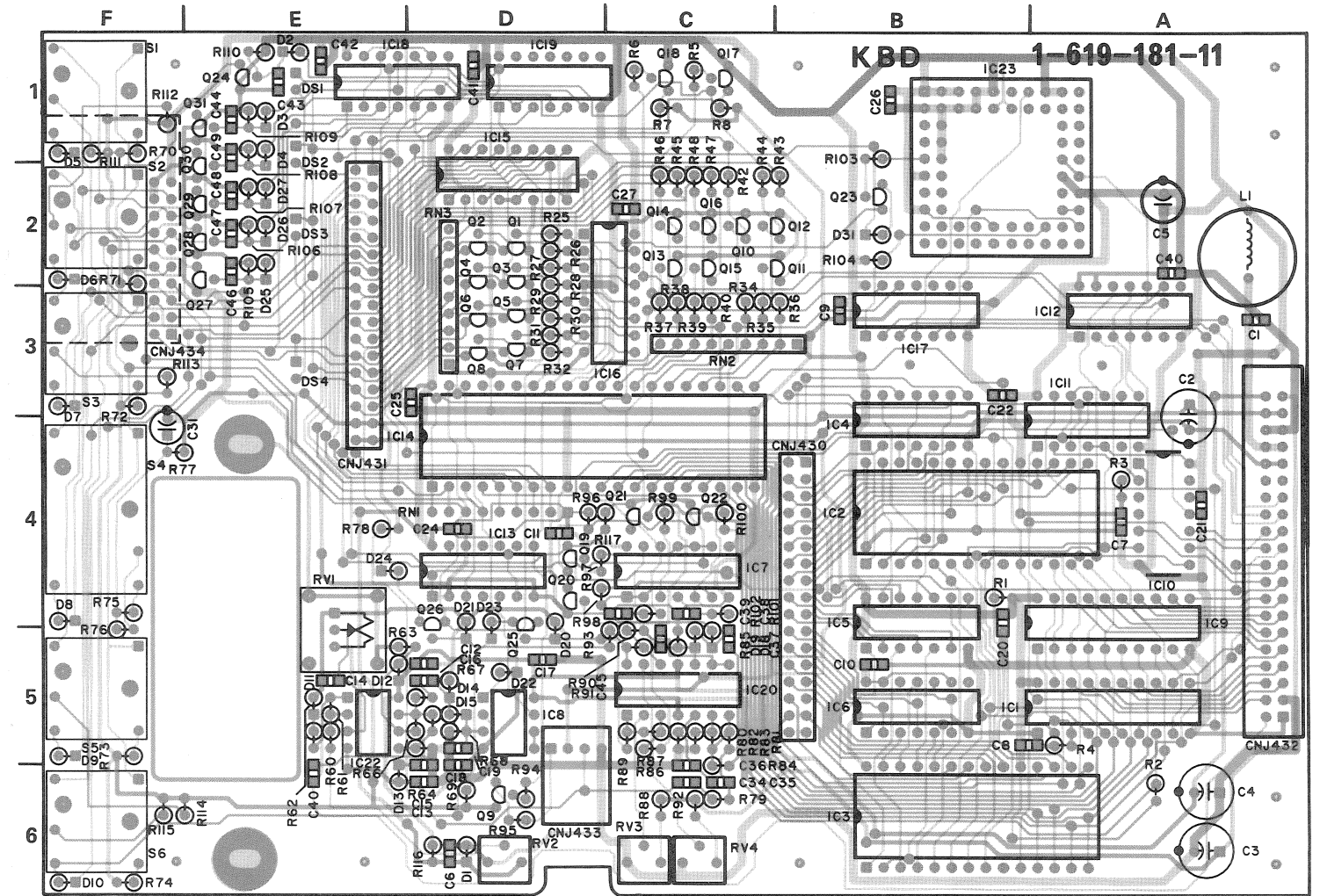


NOTES; UNLESS OTHERWISE SPECIFIED:

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.

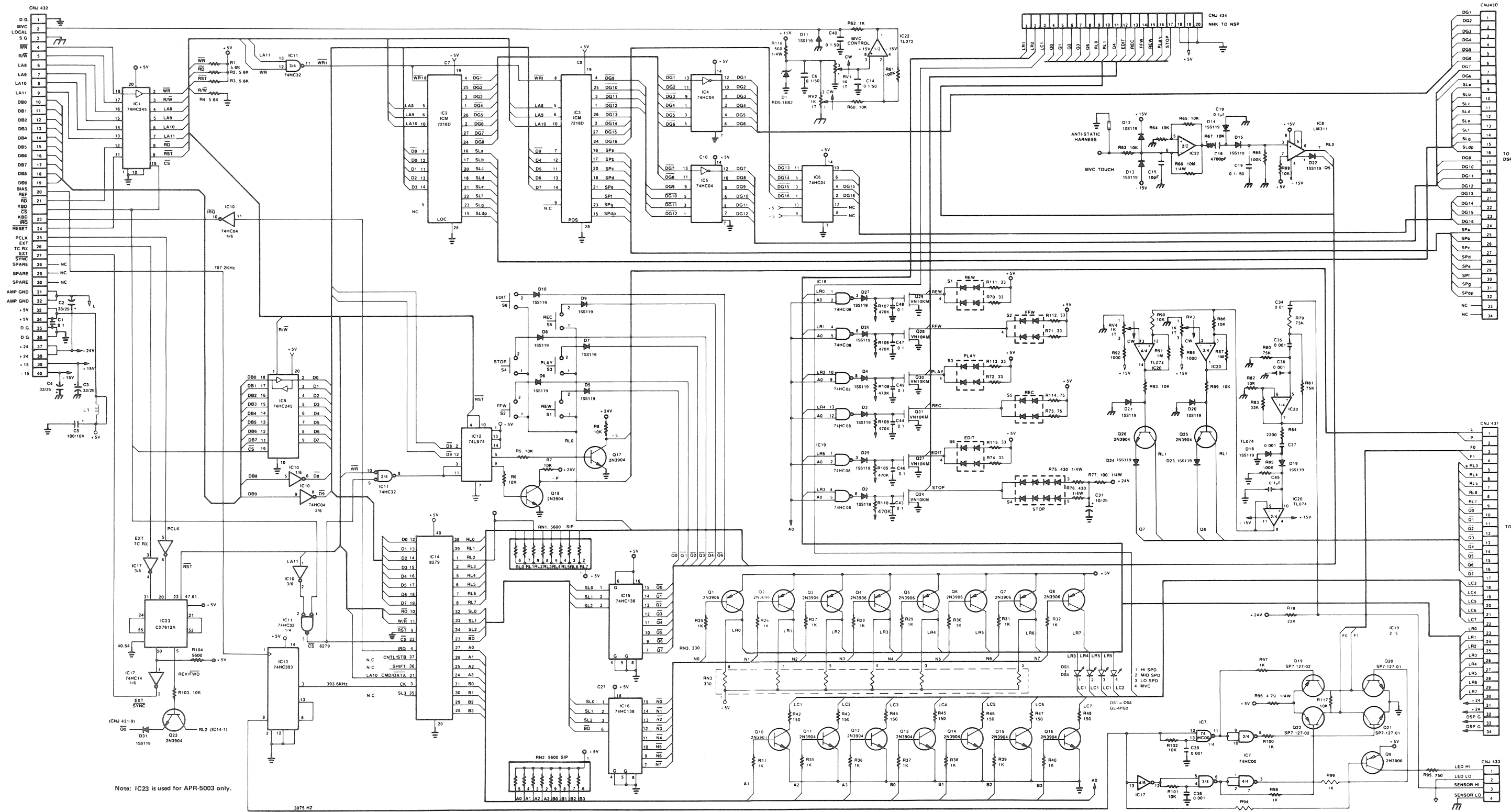
HES BOARD  
BOARD NO. 1-619-180-11 & HIGHER  
APR-5002/5003V

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



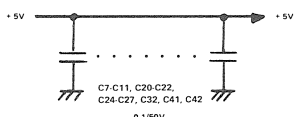
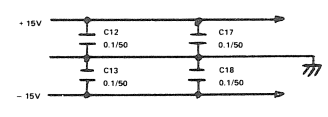
■ SOLDER SIDE PATTERN 1-619-181-11  
■ COMPONENT SIDE PATTERN 1-619-181-11

KBD BOARD



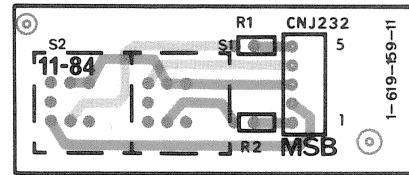
Note: IC23 is used for APR-5003 only.

- NOTES
- 1) ALL CHIPS ARE BYPASSED FROM POWER PINS TO GROUND WITH 0.1μF 50V CAPS
  - 2) THREE GND ARE USED  
A) DIGITAL GND (D.G.)  
B) SIGNAL GND (S.G.)  
C) DISPLAY GND (LAMP DSP G.)
  - 3) ALL DIODES 1SS119
  - 4) ALL RESISTORS 1/8W U.D.S



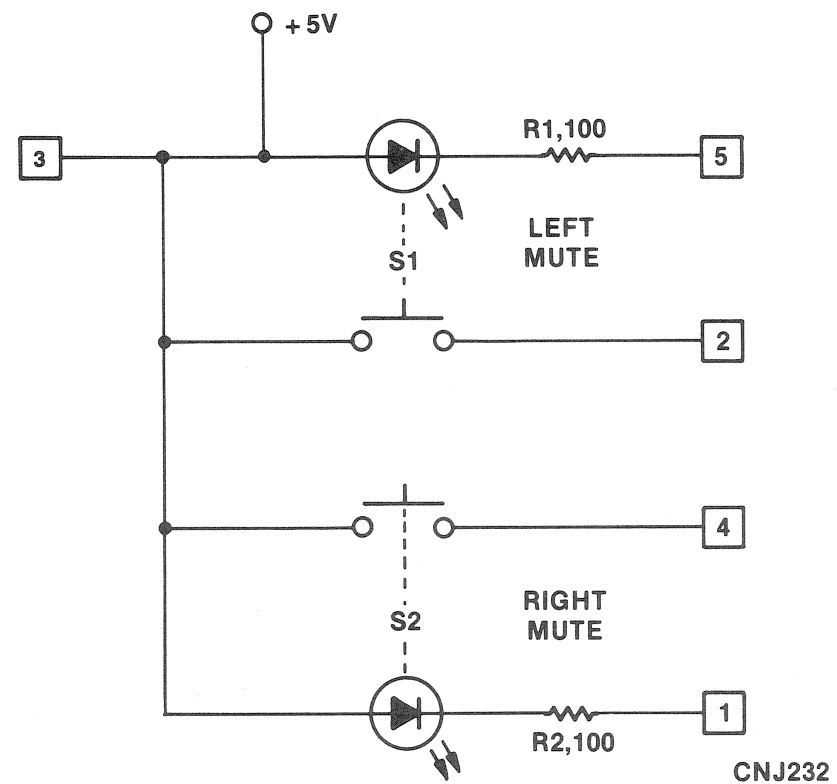
MSB BOARD (1-619-159-11)  
Component Side

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

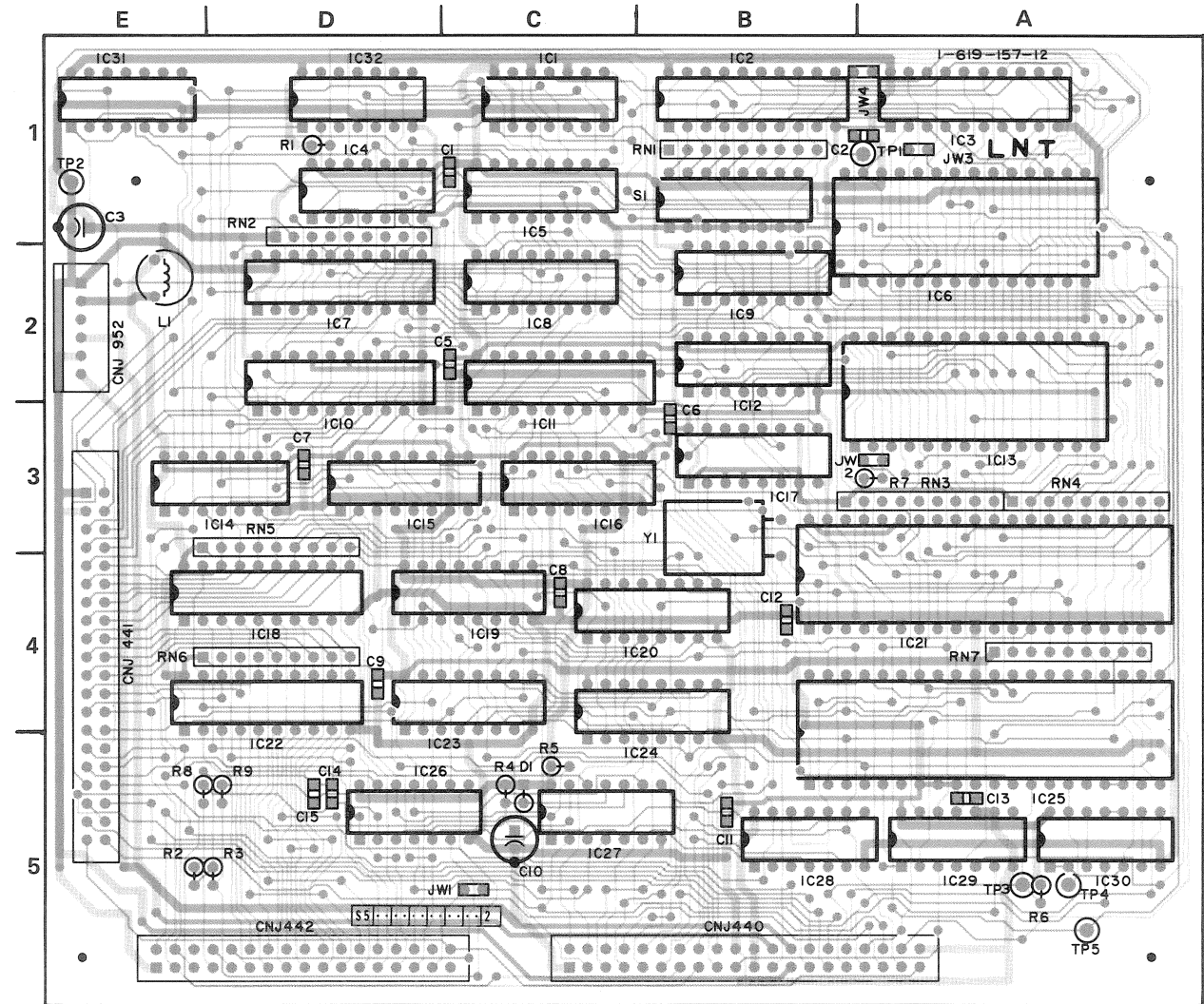


■ SOLDER SIDE PATTERN 1-619-159-11  
■ COMPONENT SIDE PATTERN 1-619-159-11

MSB BOARD



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

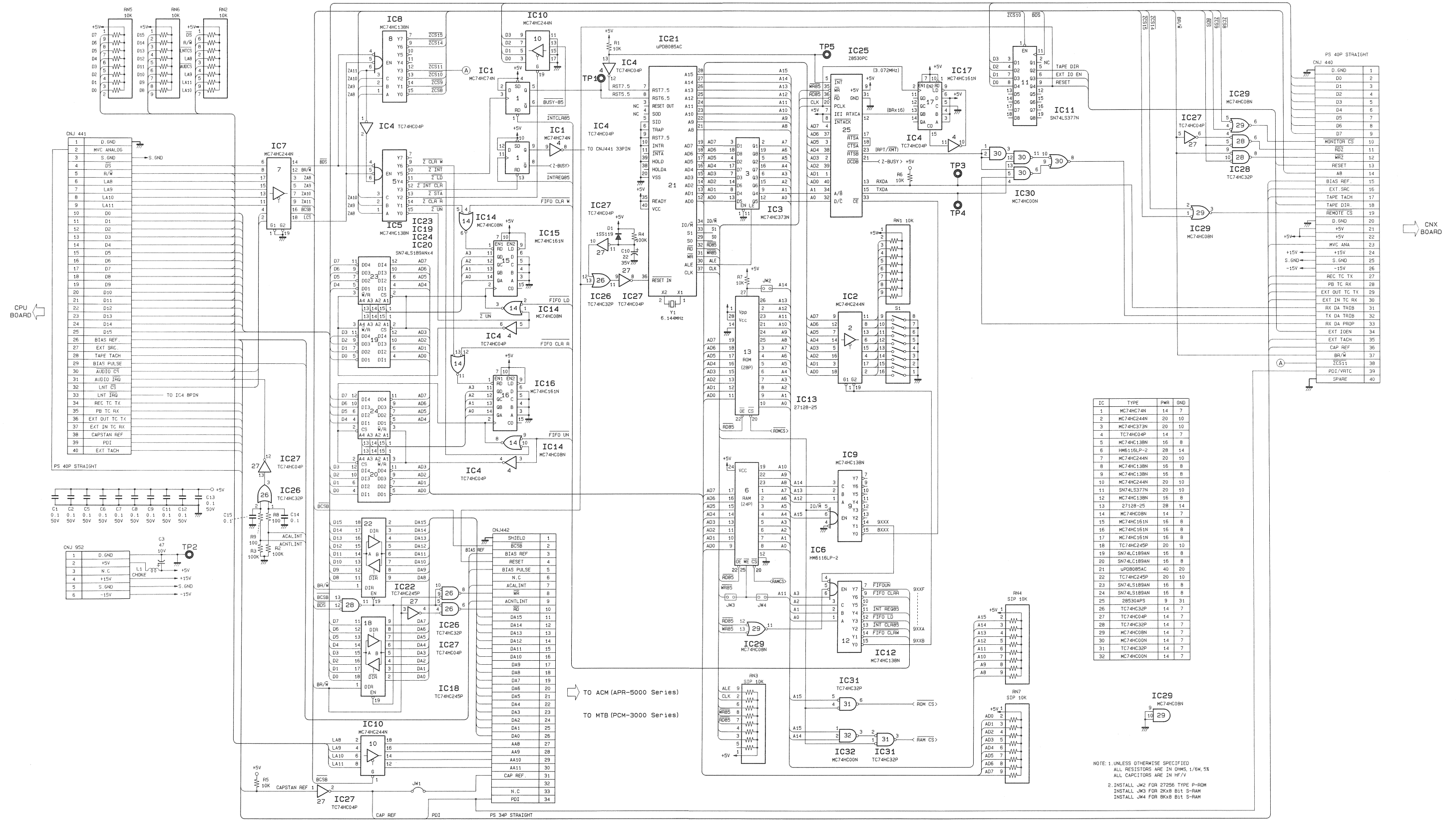


■ SOLDER SIDE PATTERN 1-619-157-12  
■ COMPONENT SIDE PATTERN 1-619-157-12

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

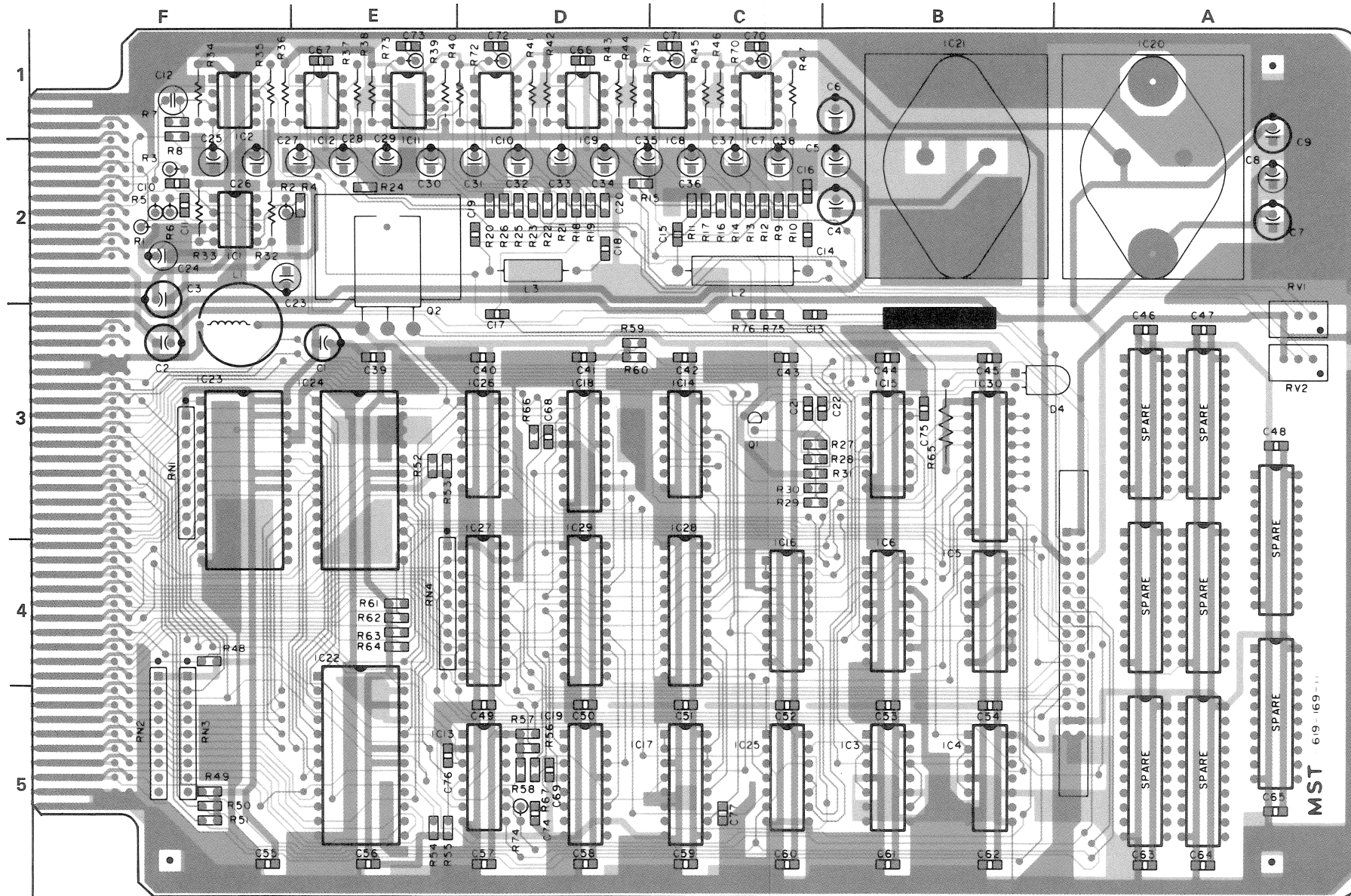


LNT BOARD

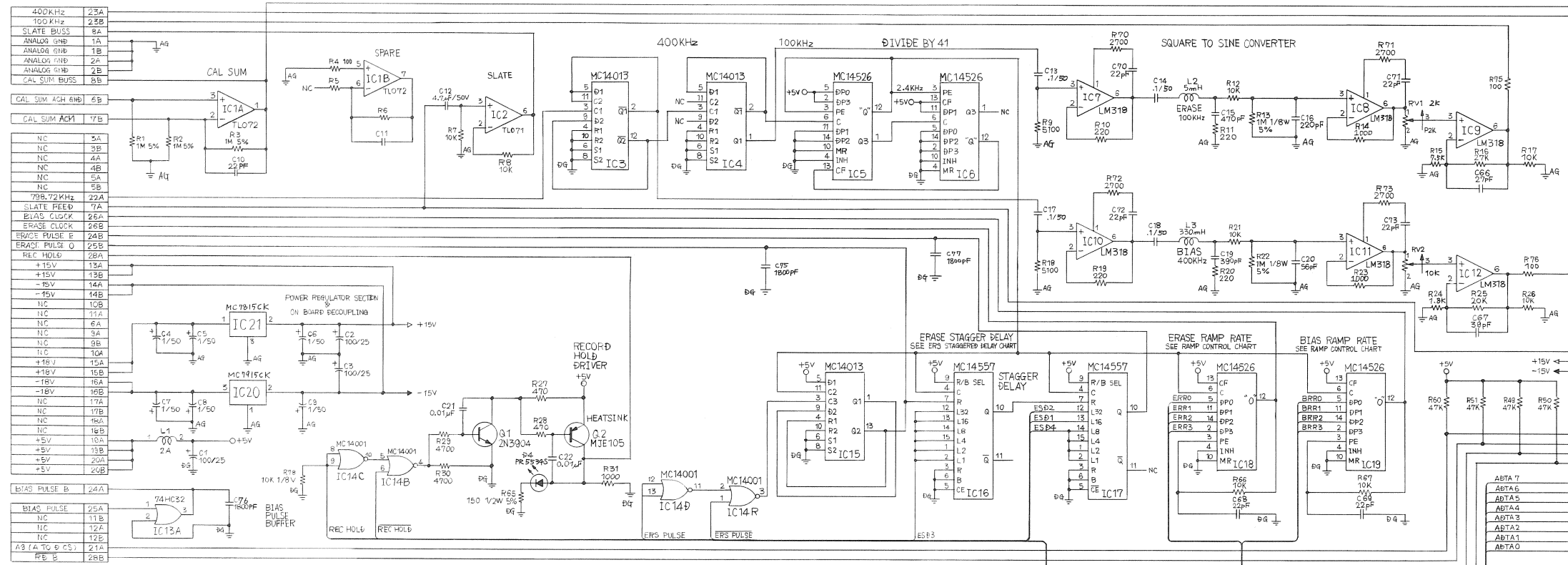


MST BOARD (1-619-169-11)  
Component Side

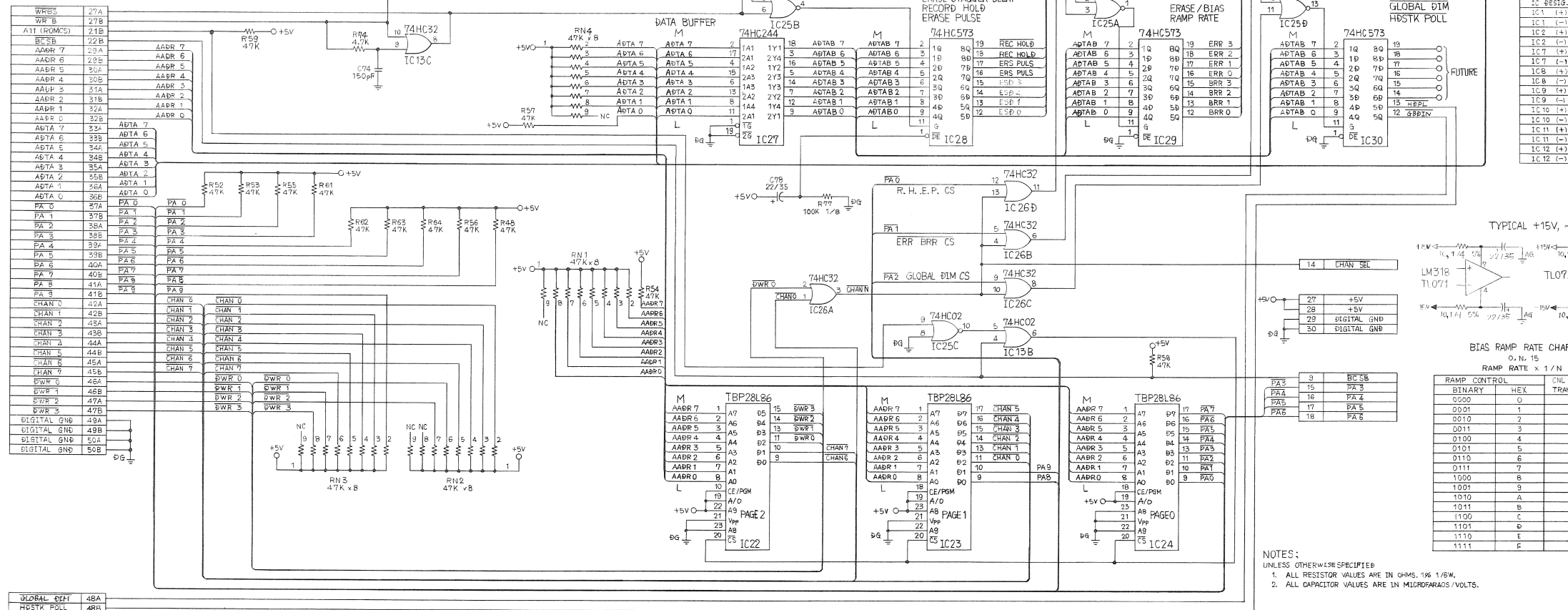
S/N: APR-5002 20001 TO 20615



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



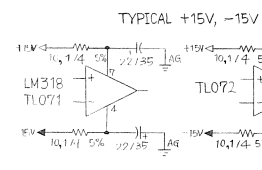
Applicable Serial NO.	Parts that have been changed.
APR-5002	APR-5003
20001 and higher	20401 and higher
	C15 560pF → 470pF
	C19 470pF → 390pF



4	CAL SUM BUSS
3	SLATE FEED
5	+15V
6	+15V
7	ANALOG GND
2	ANALOG GND
10	AG (A TO D CS)
13	RD B
12	WR B
11	WR B
19	ADTA 7
20	ADTA 6
21	ADTA 5
22	ADTA 4
23	ADTA 3
24	ADTA 2
25	ADTA 1
26	ADTA 0

+15V, -15V DECOUPLING COMPONENTS					
IC DESIGN.	CAP DESIGN.	VALUE	RES DESIGN.	VALUE	
IC1 (+)	C23	22/35F	R32	10.1/4W 5%	
IC1 (-)	C24	22/35F	R35	10.1/4W 5%	
IC2 (+)	C25	22/35F	R36	10.1/4W 5%	
IC2 (-)	C26	22/35F	R34	10.1/4W 5%	
IC7 (+)	C37	22/35F	R46	10.1/4W 5%	
IC8 (+)	C36	22/35F	R45	10.1/4W 5%	
IC8 (-)	C33	22/35F	R44	10.1/4W 5%	
IC9 (+)	C34	22/35F	R43	10.1/4W 5%	
IC9 (-)	C35	22/35F	R42	10.1/4W 5%	
IC10 (+)	C32	22/35F	R41	10.1/4W 5%	
IC10 (-)	C31	22/35F	R40	10.1/4W 5%	
IC11 (+)	C30	22/35F	R39	10.1/4W 5%	
IC11 (-)	C29	22/35F	R38	10.1/4W 5%	
IC12 (+)	C28	22/35F	R37	10.1/4W 5%	
IC12 (-)	C27	22/35F	R34	10.1/4W 5%	

+5V DECOUPLING CAPS			
IC DESIGN.	CAP DESIGN.	VALUE	
IC3	C81	1.1/50	
IC4	C62	1.1/50	
IC5	C54	1.1/50	
IC6	C53	1.1/50	
IC13	C57	1.1/50	
IC14	C42	1.1/50	
IC15	C44	1.1/50	
IC18	C52	1.1/50	
IC17	C59	1.1/50	
IC18	C41	1.1/50	
IC19	C58	1.1/50	
IC22	C56	1.1/50	
IC23	C55	1.1/50	
IC24	C39	1.1/50	
IC25	C60	1.1/50	
IC26	C40	1.1/50	
IC28	C50	1.1/50	
IC30	C45	1.1/50	



**BIAS RAMP RATE CHART**  
O. N. 15  
RAMP RATE x 1/N

RAMP CONTROL	HEX	CNL B0 ERASE BIAS TRANSITION TIME
0000	0	1.2ms
0001	1	5.8ms
0010	2	18ms
0011	3	38ms
0100	4	23ms
0101	5	30ms
0110	6	35ms
0111	7	40ms
1000	8	48ms
1001	9	52ms
1010	A	58ms
1011	B	59ms
1100	C	63ms
1101	D	76ms
1110	E	82ms
1111	F	86ms

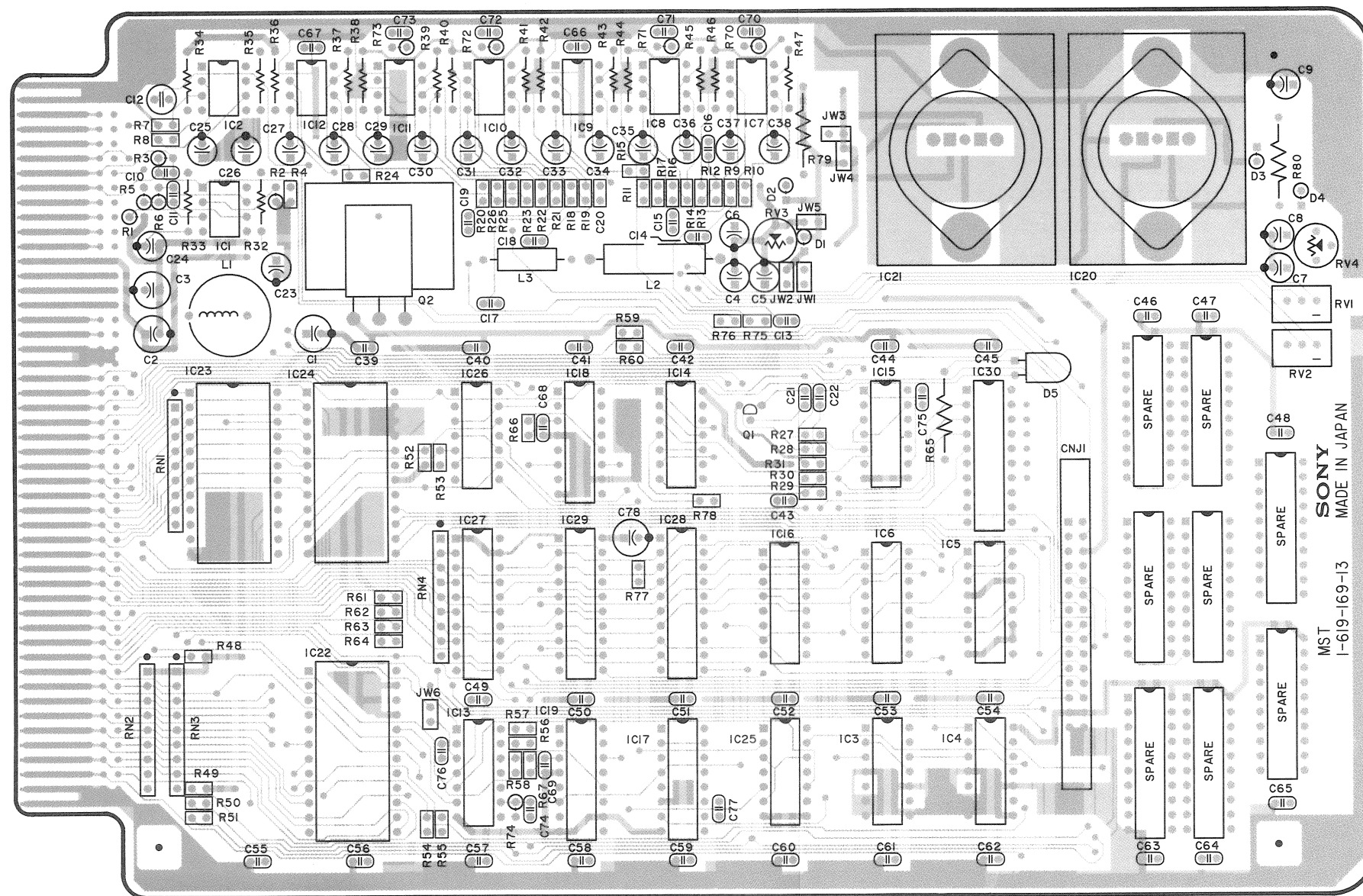
**ERS STAGGERED DELAY CHART**

ERS	BLY	CONTROL
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1

NOTES:  
UNLESS OTHERWISE SPECIFIED  
1. ALL RESISTOR VALUES ARE IN OHMS, 1% 1/5W.  
2. ALL CAPACITOR VALUES ARE IN MICROFARADS/VOLTS.

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

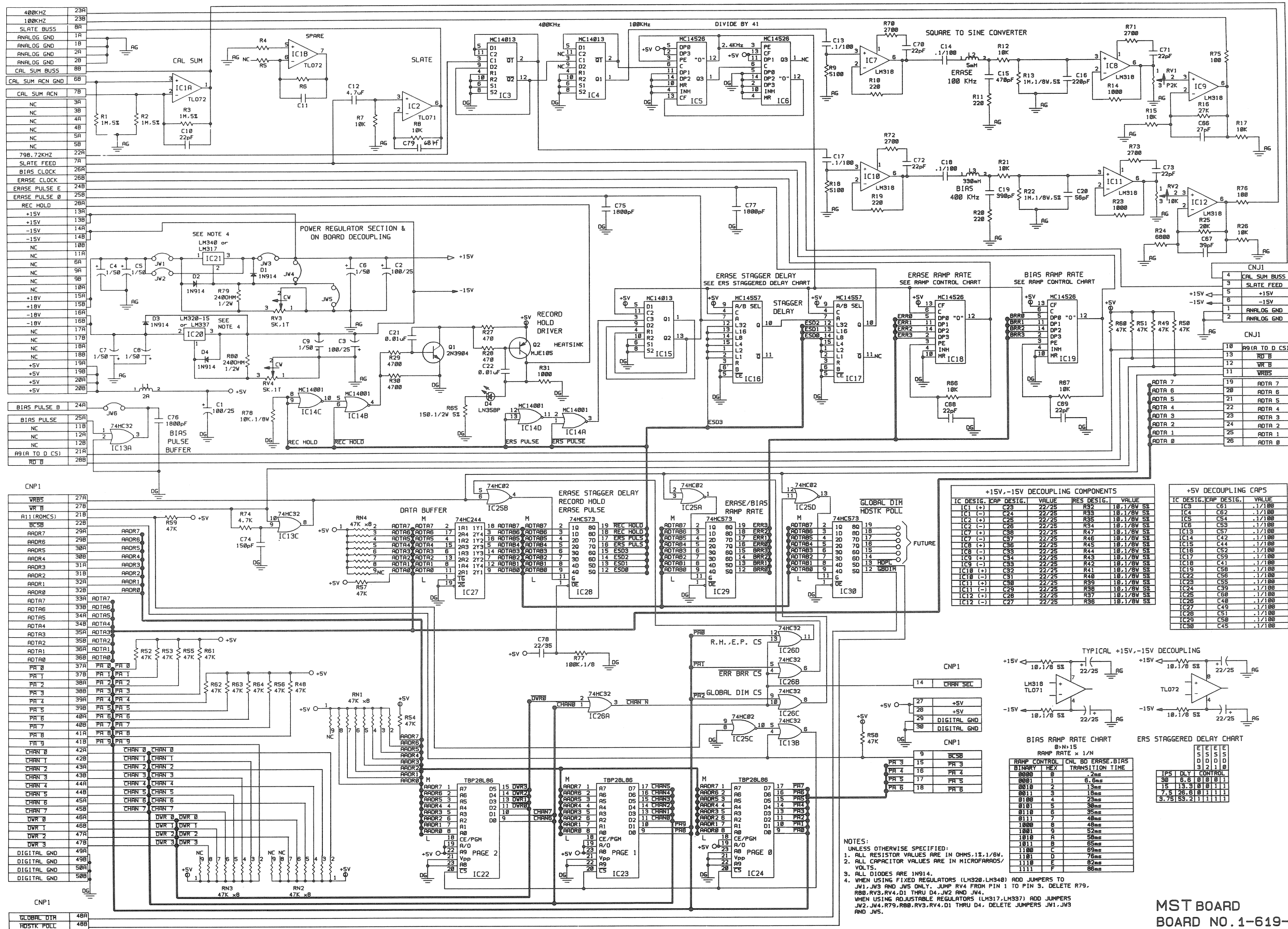
S/N: APR-5002 20701 AND HIGHER  
S/N: APR-5003V 10001 AND HIGHER



■ SOLDER SIDE PATTERN

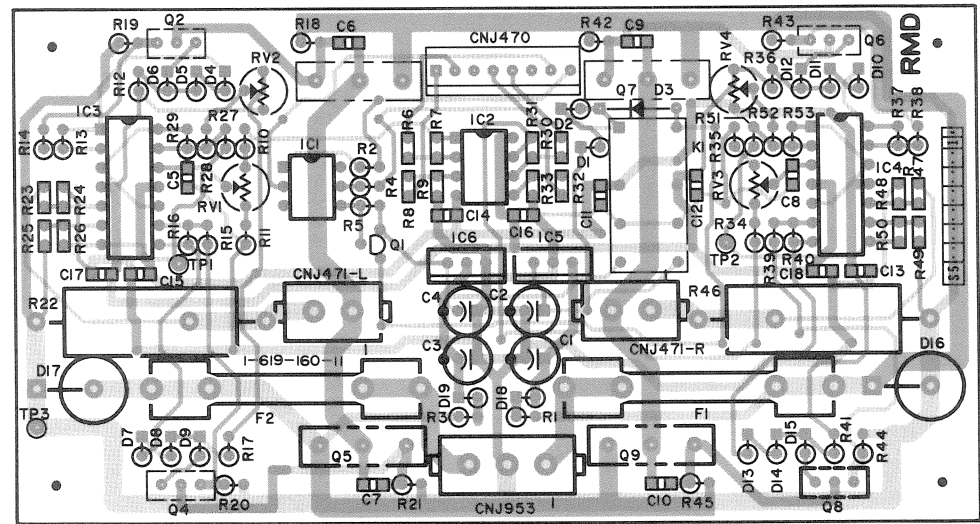
MST BOARD (1-619-169-12 & HIGHER)

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

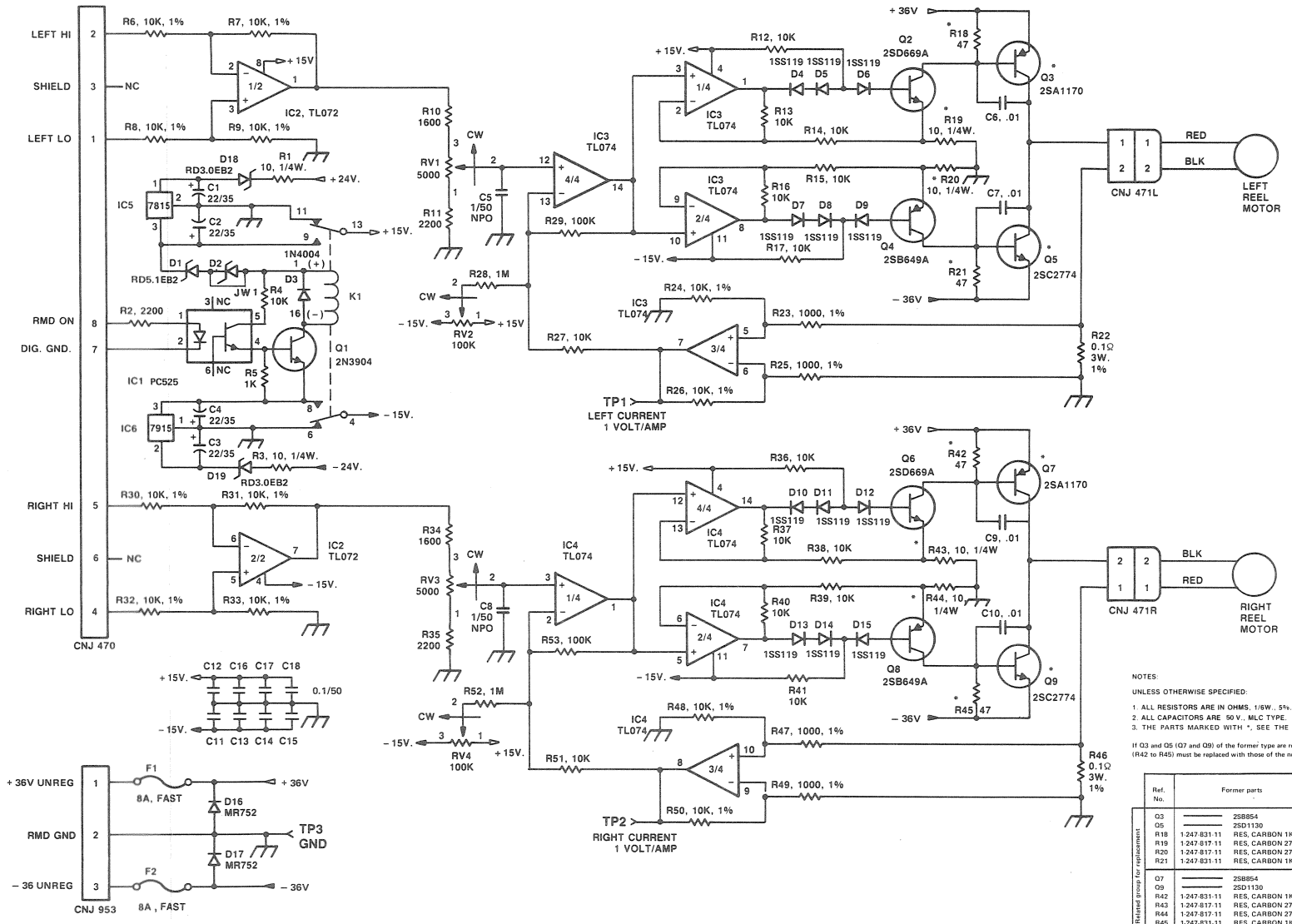


RMD BOARD (1-619-160-11)  
Component Side

RMD BOARD



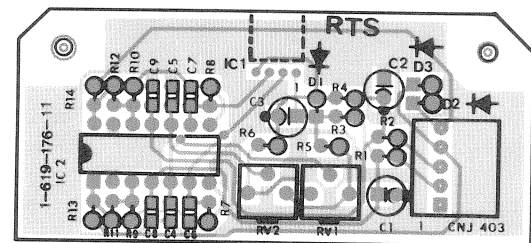
■ SOLDER SIDE PATTERN 1-619-160-11  
 ■ COMPONENT SIDE PATTERN 1-619-160-11



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	25B854	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	25B854	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

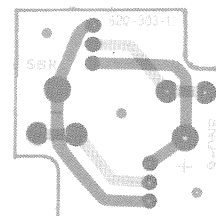
RTS BOARD (1-619-176-11)  
Component Side



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

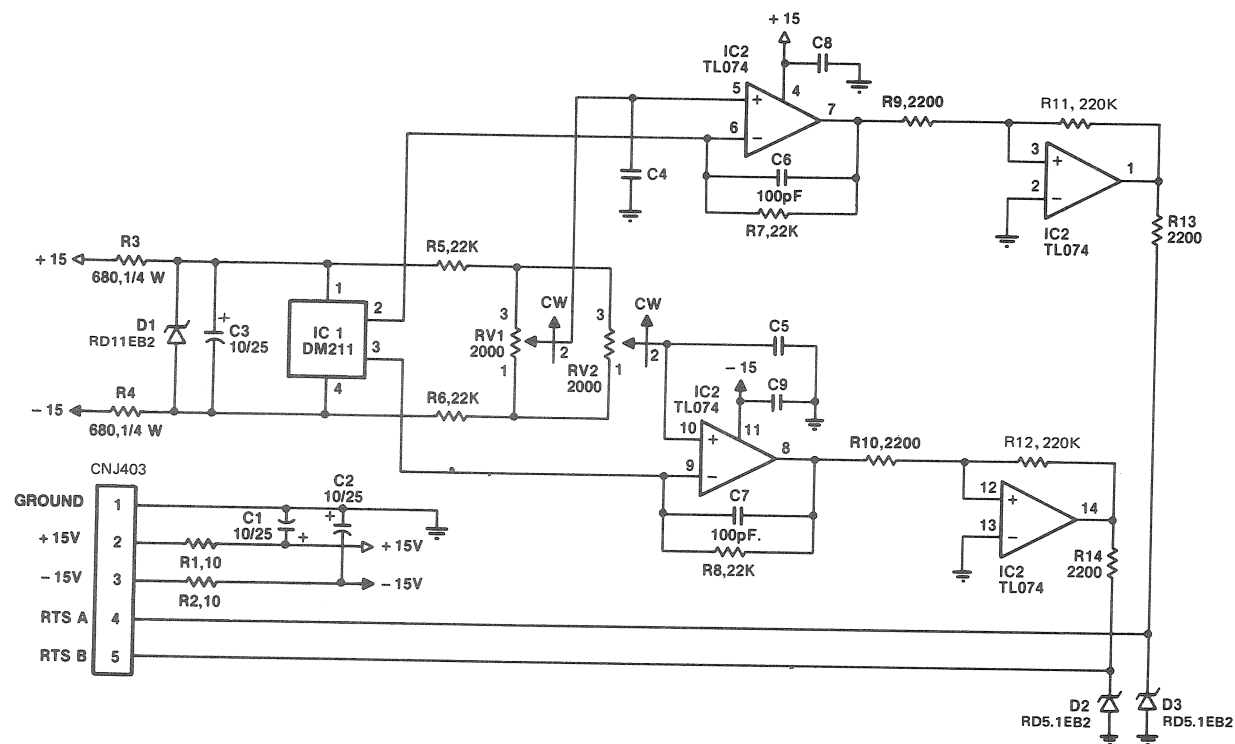
SBR BOARD (1-620-303-11)  
Component Side

S/N; APR-5002 20001 TO 20700 ONLY



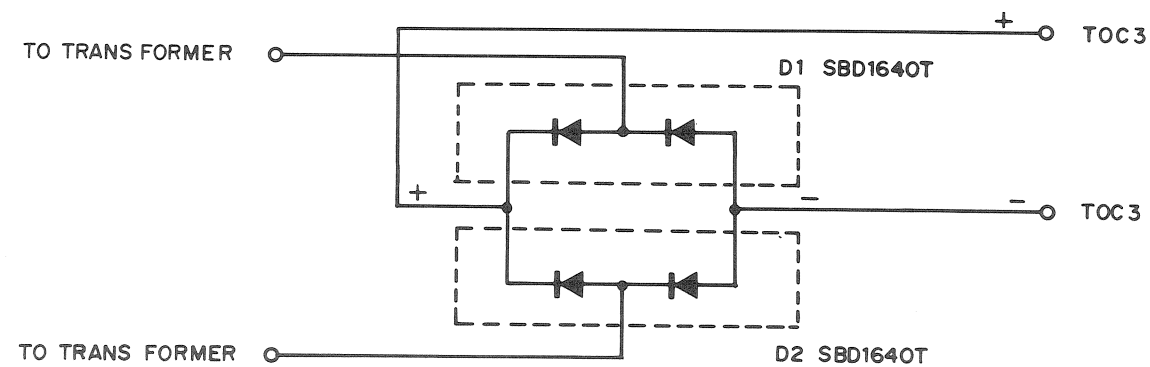
■ SOLDER SIDE PATTERN 1-620-303-11  
■ COMPONENT SIDE PATTERN 1-620-303-11

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.

SBR BOARD

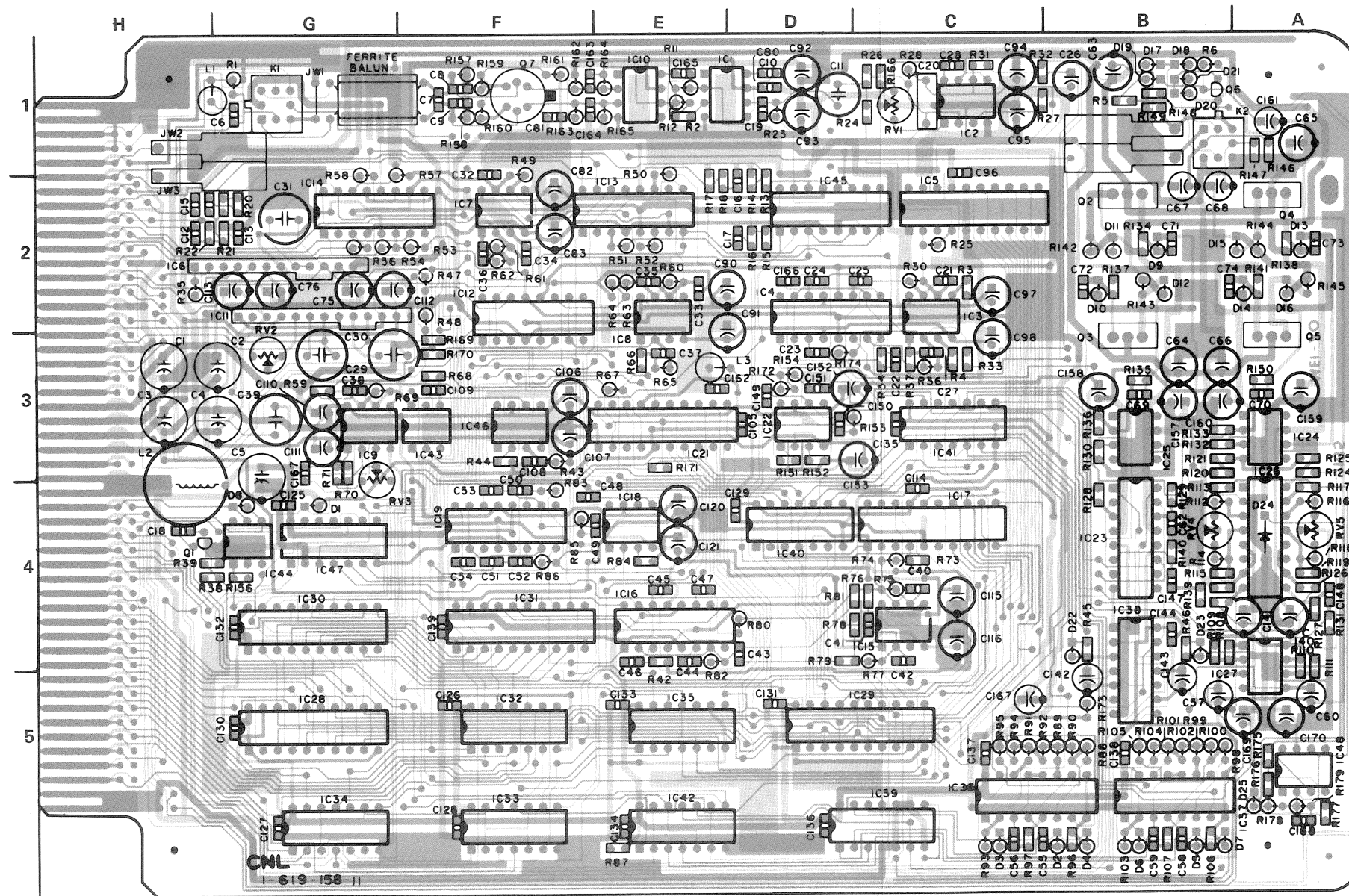


RTS BOARD  
BOARD NO. 1-619-176-11 & HIGHER  
APR-5002/5003V

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



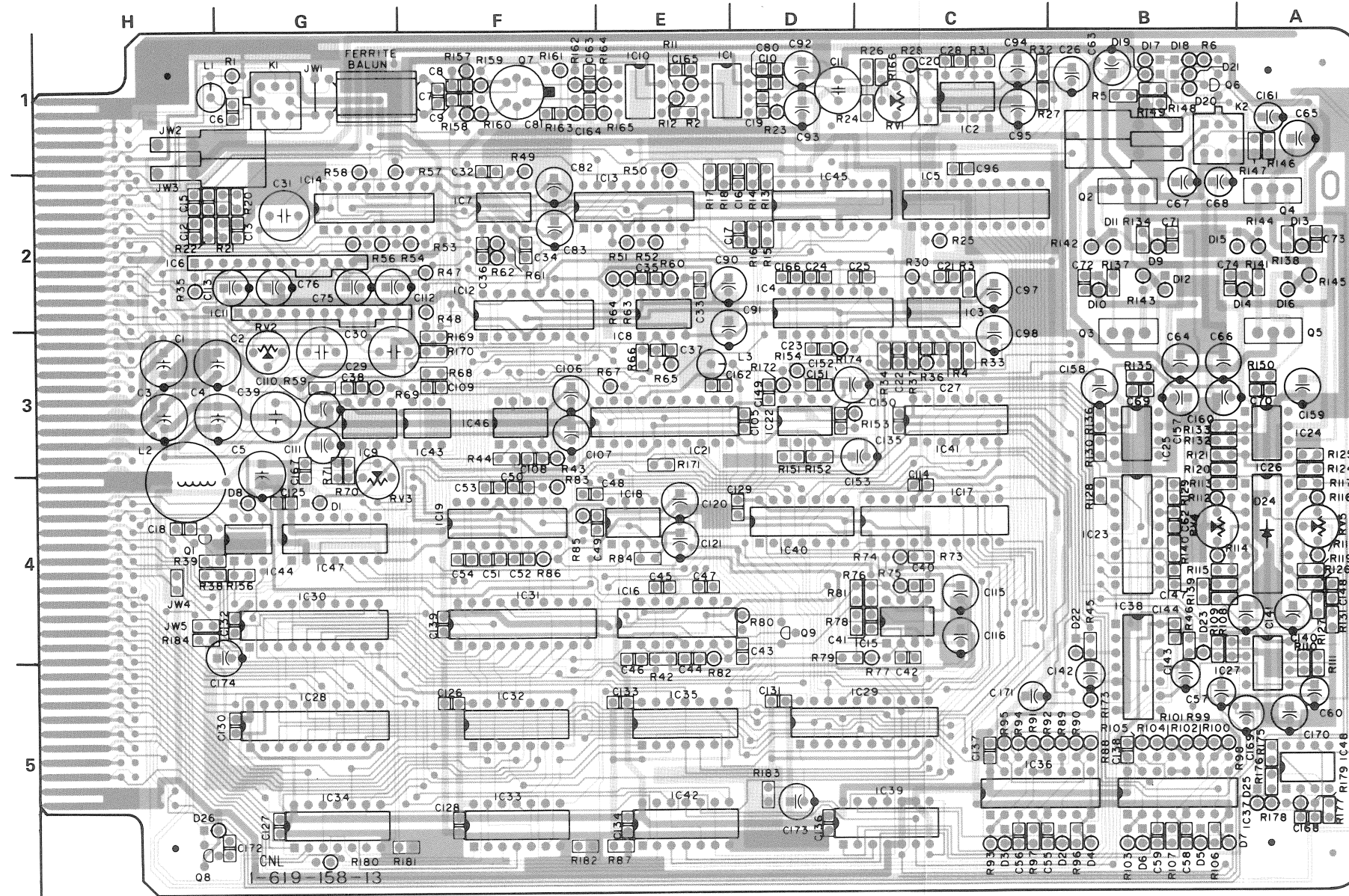
■ SOLDER SIDE PATTERN 1-619-158-11  
 ■ COMPONENT SIDE PATTERN 1-619-158-11





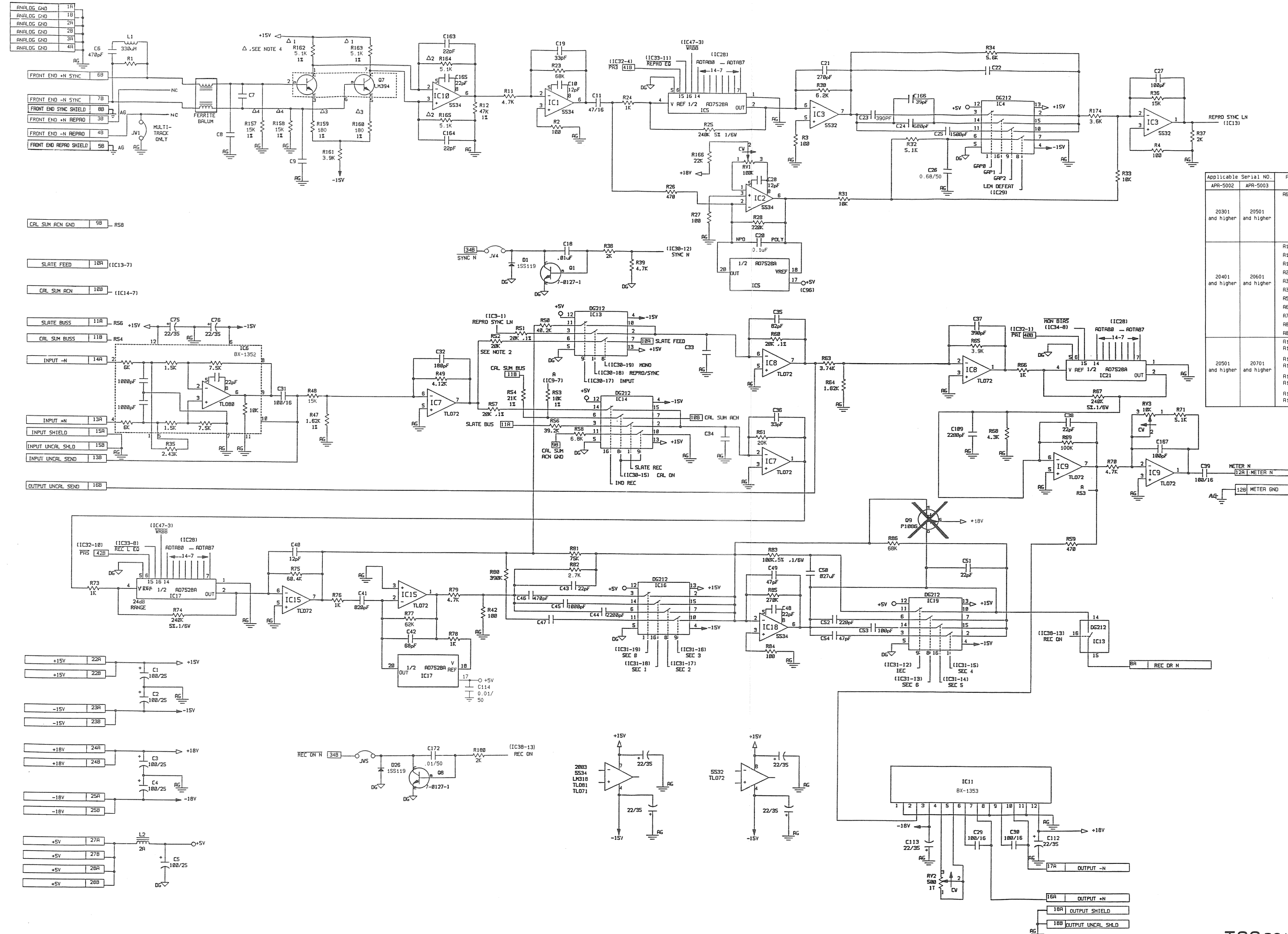
TCC BOARD (1-619-158-13)  
Component Side

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



■ SOLDER SIDE PATTERN 1-619-158-13  
 ▨ COMPONENT SIDE PATTERN 1-619-158-13

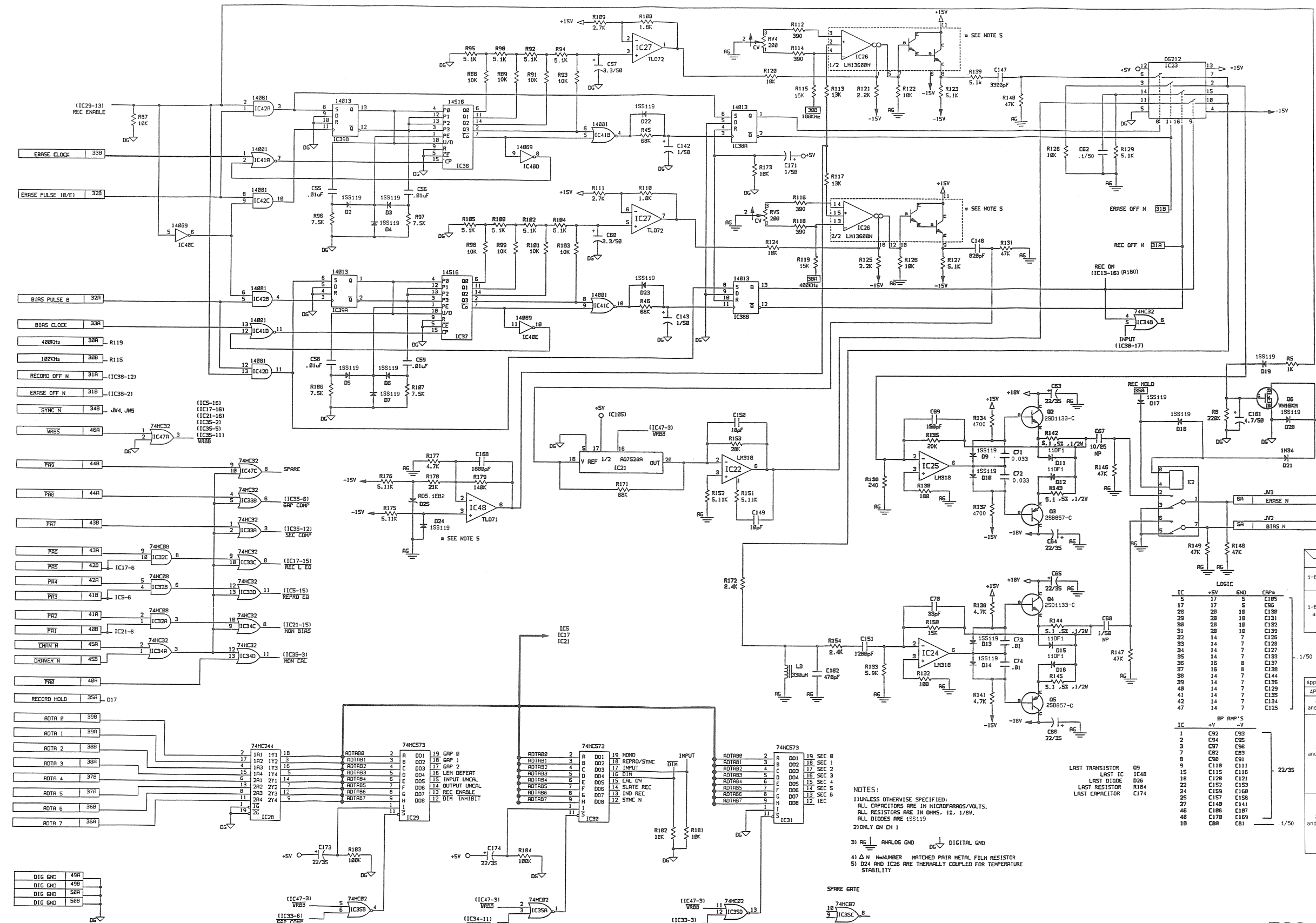
TCC BOARD



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	R69 60.4K → 100K	JM4 JMS D26 1M914 C172 .01/100 Q8 7-0127-1 R180 2K
20401 and higher	20601 and higher	R161 3.92K → 3.9K R12 47.5K → 47K R11 4.75K → 4.7K R23 55.5K → 56K R36 5.19K → 5.2K R36 15.4K → 15K R58 5.49K → 5.6K R65 3.83K → 3.9K R77 50.4K → 52K R82 2.74K → 2.7K R86 58.1K → 58K	
20501 and higher	20701 and higher	R162 5.11K → 5.1K R163 5.11K → 5.1K R159 182 → 180 R157 14K → 15K	



TCC BOARD



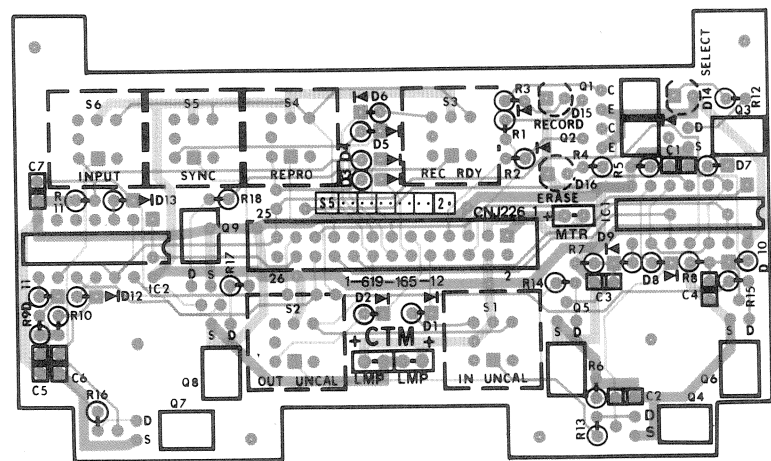
FEX CNL. TCC	1-619-179-11 -12	1-619-179-13 and higher
1-619-158-11 -12	No Problem	Can't use
1-619-158-13 and higher	Add: JW4 G9 (P1086) Delete: JW5	Add: JW5 Delete: G9 and JW4

Applicable Serial NO.	Pins that have been soldered.	Parts that have been changed.
APR-5002 and higher	APR-5003	D1 → J4, J5
20301 and higher	20501 and higher	
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, Q4 Q4C9 → 2S01133-C Q3, 5 Q4C5 → 2S8857-C D11, 12, 15, 16 UFS1102 → 110F1
20701 and higher	20901 and higher	

IC	+5V	GND	CP#
5	17	5	C185
17	17	5	C96
28	28	18	C138
29	28	18	C131
38	28	18	C132
31	28	18	C139
32	14	7	C126
33	14	7	C128
34	14	7	C127
35	14	7	C133
36	16	8	C137
37	16	8	C136
38	14	7	C144
39	14	7	C136
48	14	7	C129
41	14	7	C135
42	14	7	C134
47	14	7	C125

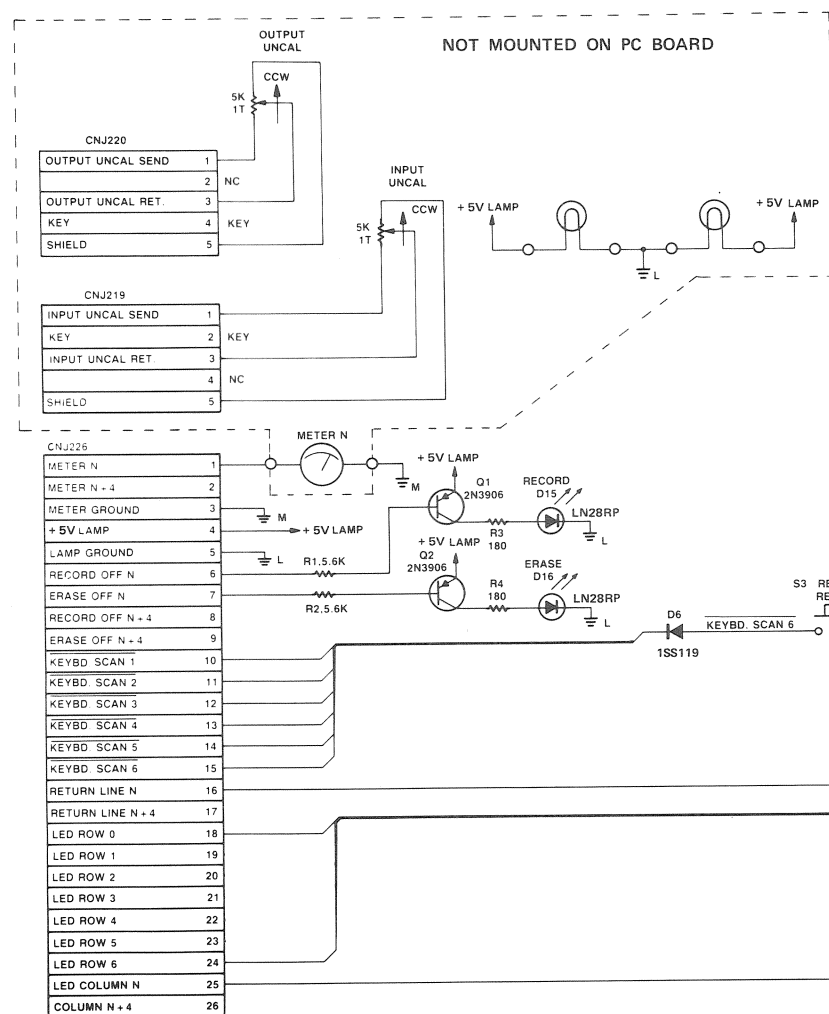
NOTES:  
 1) UNLESS OTHERWISE SPECIFIED:  
 ALL CAPACITORS ARE IN MICROFARADS/VOLTS.  
 ALL RESISTORS ARE IN OHMS. 1K, 1/5V.  
 ALL DIODES ARE 1SS119  
 2) ONLY ON CH 1  
 3) AG = ANALOG GND DC = DIGITAL GND  
 4) Δ N = NUMBER MATCHED PAIR METAL FILM RESISTOR  
 5) D24 AND IC26 ARE THERMALLY COUPLED FOR TEMPERATURE STABILITY

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



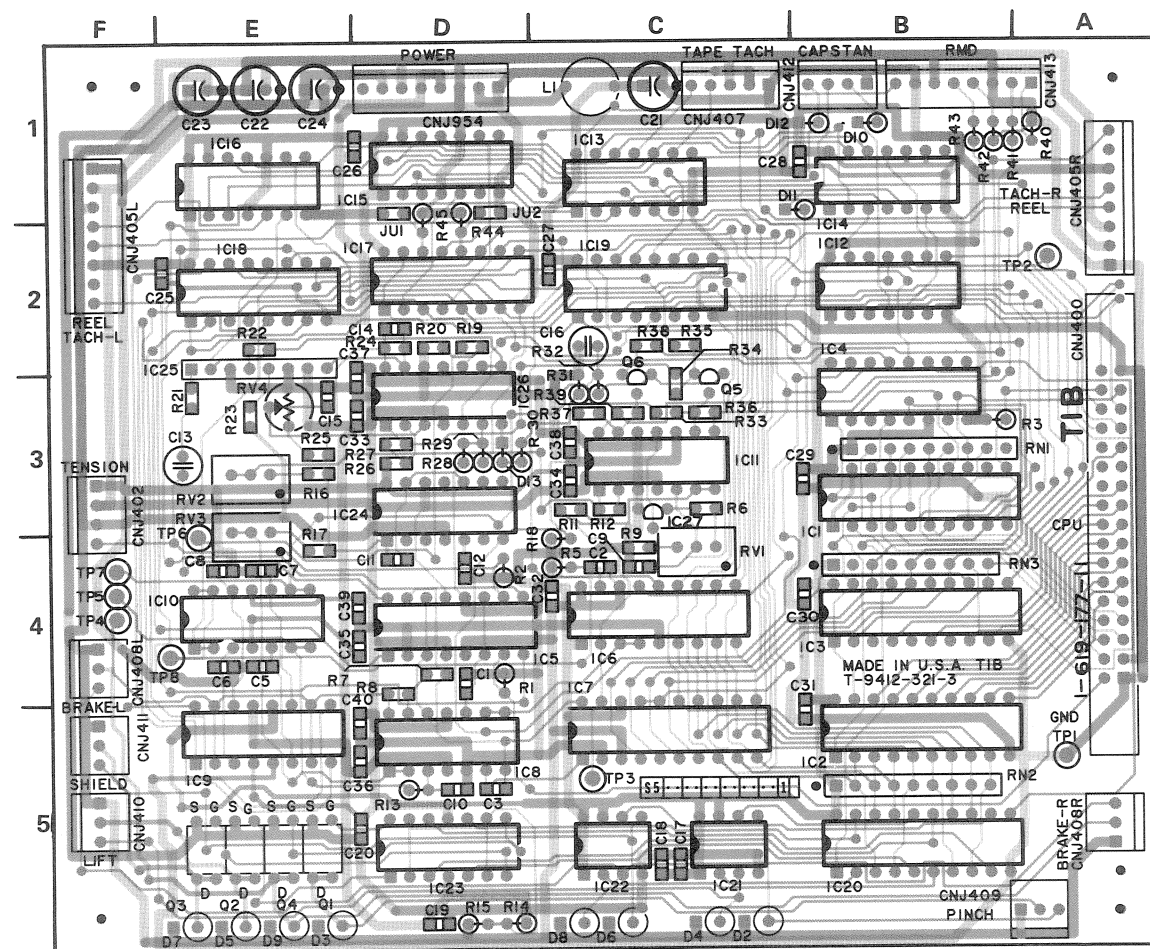
■ SOLDER SIDE PATTERN 1-619-165-12  
■ COMPONENT SIDE PATTERN 1-619-165-12

TCM BOARD



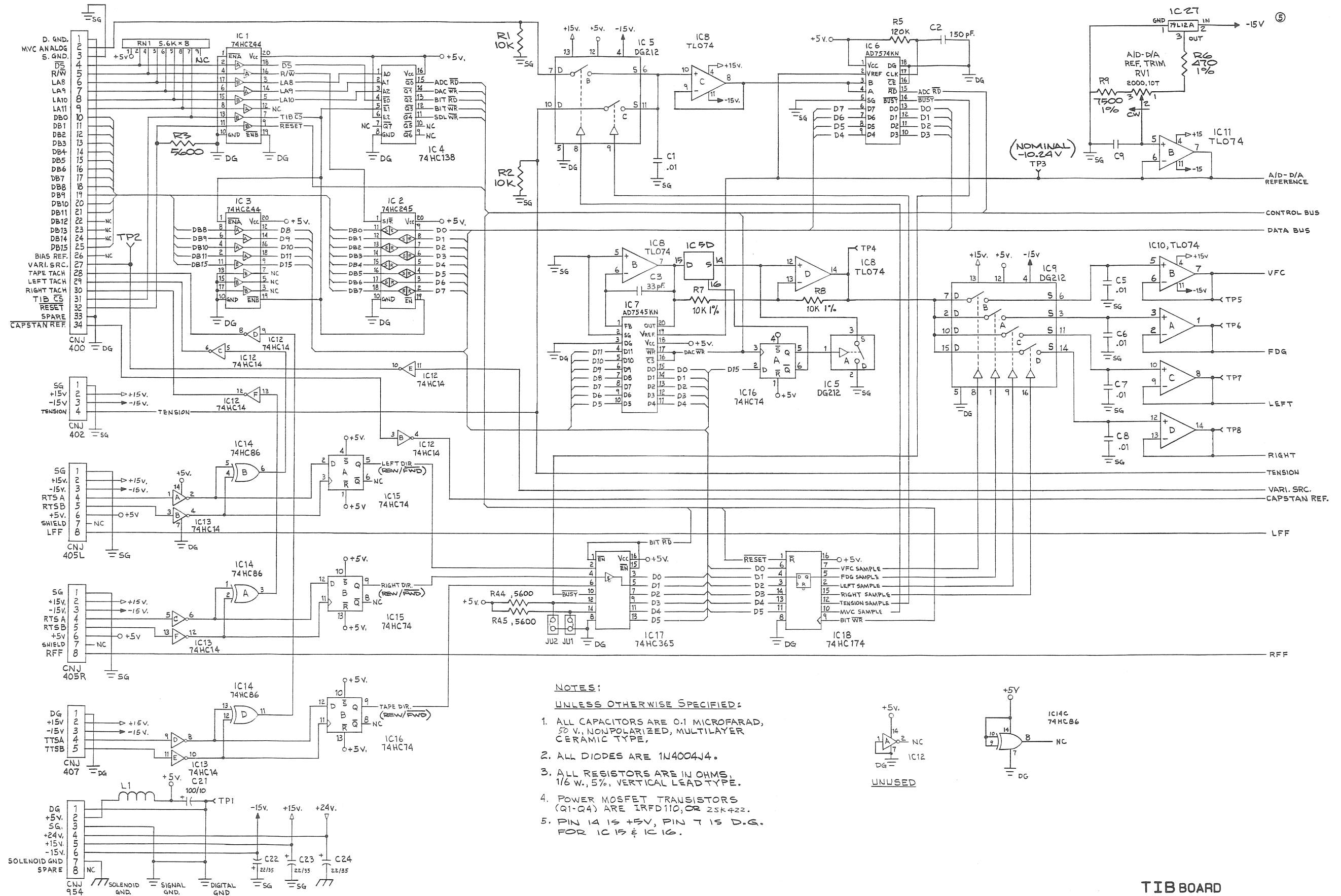
TCM BOARD  
BOARD NO. 1-619-165-12 & HIGHER  
APR-5003V ONLY

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



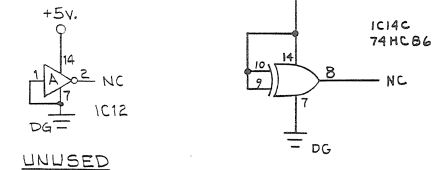
■ SOLDER SIDE PATTERN 1-619-177-11  
■ COMPONENT SIDE PATTERN 1-619-177-11

TIB BOARD



NOTES:

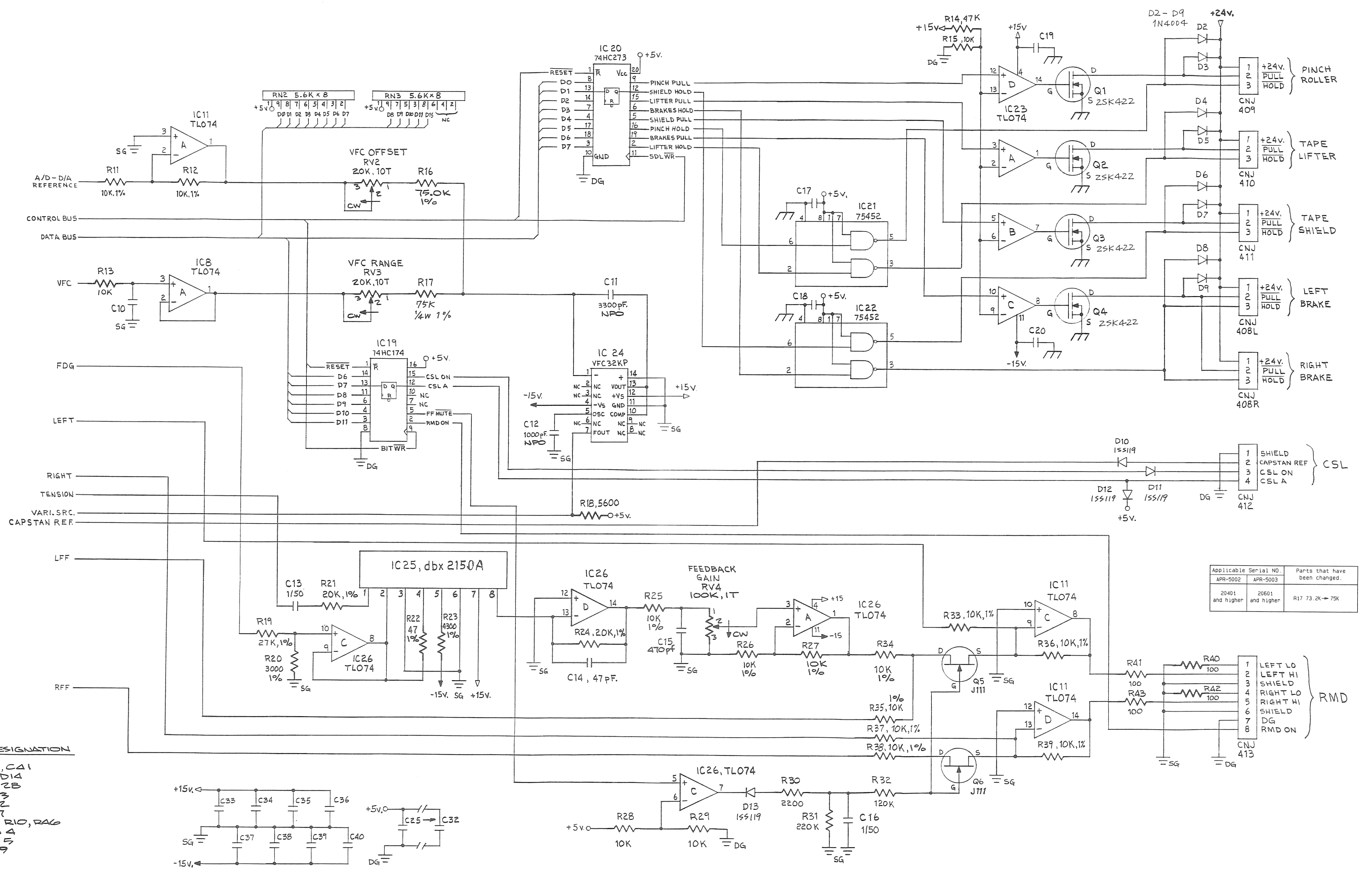
- UNLESS OTHERWISE SPECIFIED:
1. ALL CAPACITORS ARE 0.1 MICROFARAD, 50 V., NONPOLARIZED, MULTILAYER CERAMIC TYPE.
  2. ALL DIODES ARE 1N4004J4.
  3. ALL RESISTORS ARE IN OHMS, 1/6 W., 5%, VERTICAL LEAD TYPE.
  4. POWER MOSFET TRANSISTORS (Q1-Q4) ARE IRFD110, OR 25K422.
  5. PIN 14 IS +5V, PIN 7 IS D.G. FOR IC 15 & IC 16.







TIB BOARD

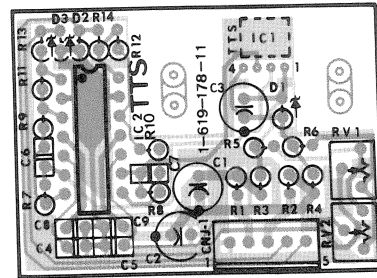


NEXT DESIGNATION  
 C4, C41  
 D1, D14  
 IC 2B  
 JL  
 L2  
 R2, R7, R10, R16  
 T0, T1, T2, T3, T4

Applicable Serial NO.		Parts that have been changed.
APR-5002	APR-5003	
20401 and higher	20601 and higher	R17 73.2K → 75K

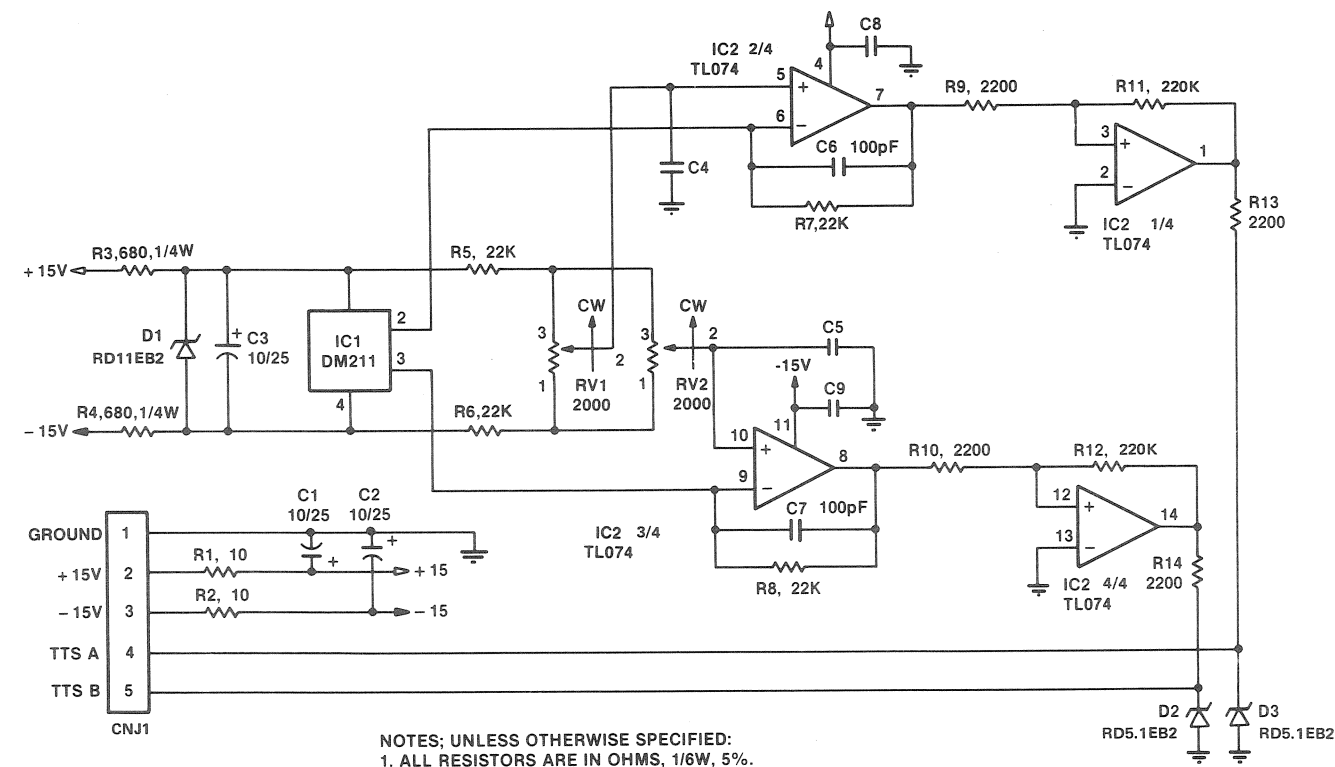
TTS BOARD (1-619-178-11)  
Component Side

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



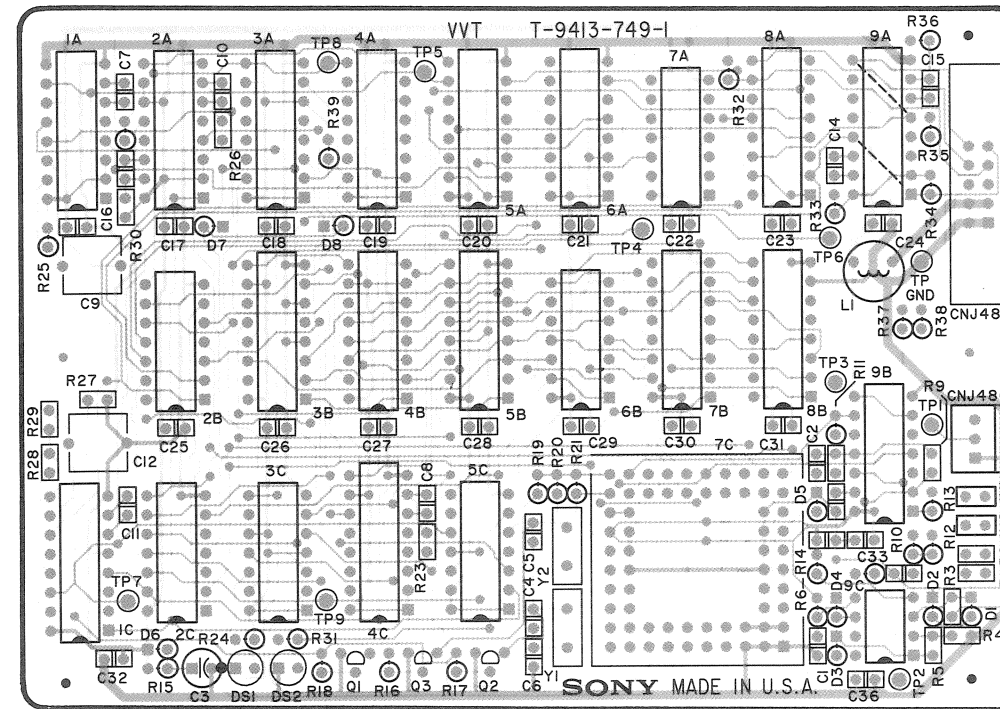
■ SOLDER SIDE PATTERN  
■ COMPONENT SIDE PATTERN 1-619-178-11

TTS BOARD

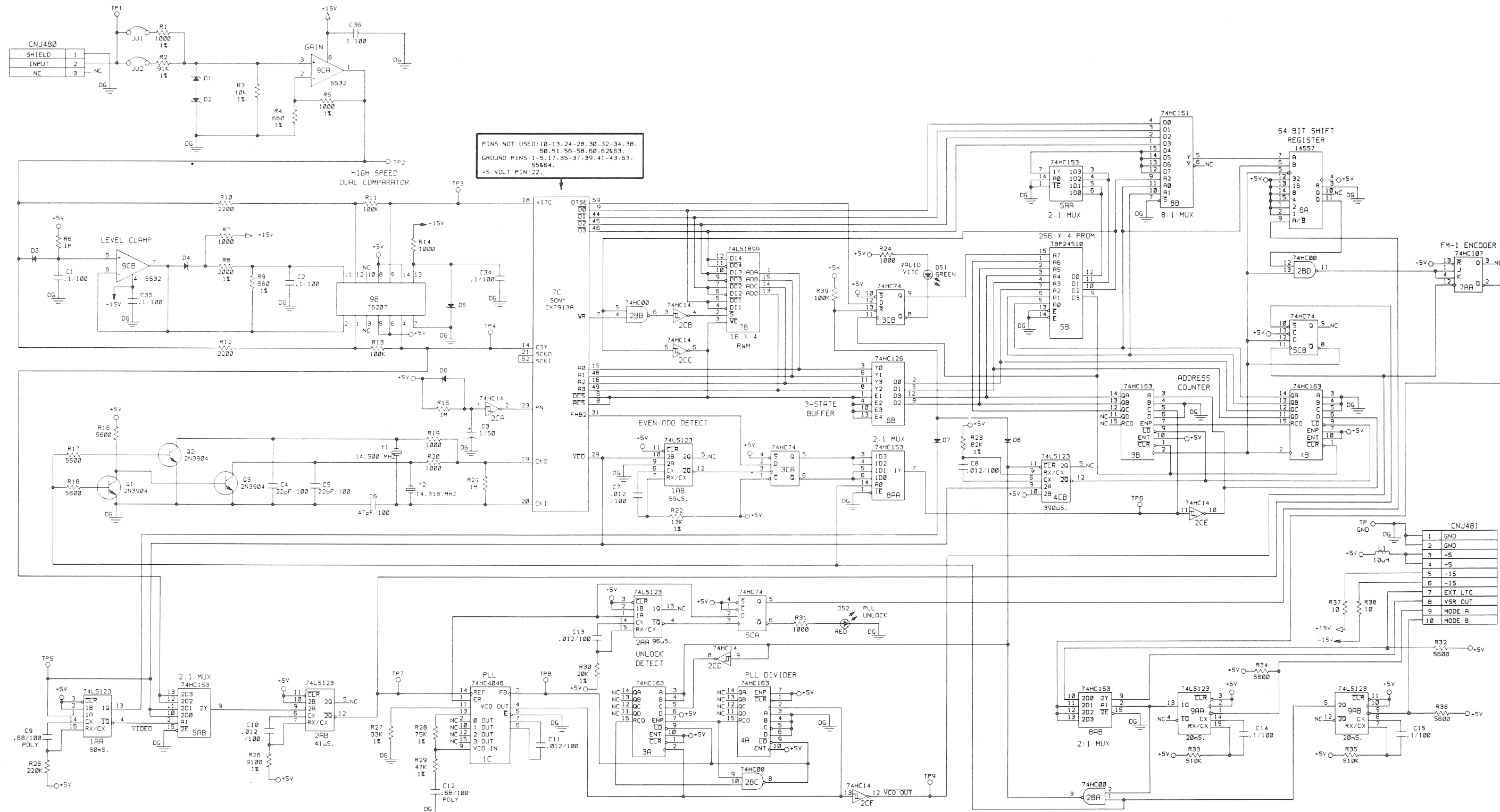


NOTES; UNLESS OTHERWISE SPECIFIED:  
1. ALL RESISTORS ARE IN OHMS, 1/6W, 5%.  
2. ALL CAPACITORS ARE 0.1μF, 50V . CERAMIC.  
3. C4, C5 ARE NOT INSTALLED.

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



■ SOLDER SIDE PATTERN  
■ COMPONENT SIDE PATTERN



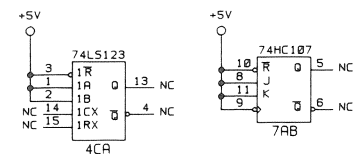
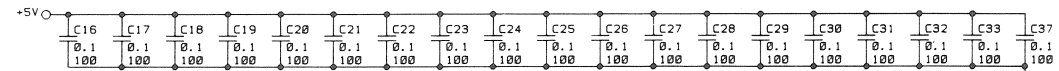
PINS NOT USED: 10-13, 24-28, 30, 32-34, 38, 50, 51, 56-58, 60, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.  
GROUND PINS: 1-5, 17, 35-37, 39, 41-43, 53, 55, 64, 64.  
+5 VOLT PIN: 22.

IC	+5V	+5V	GND
1A	C16, .1/100	16	8
2A	C17, .1/100	16	8
3A	C18, .1/100	16	8
4A	C19, .1/100	16	8
5A	C20, .1/100	16	8
6A	C21, .1/100	16	8
7A	C22, .1/100	14	7
8A	C23, .1/100	16	8
9A	C24, .1/100	16	8
2B	C25, .1/100	14	7
3B	C26, .1/100	16	8
4B	C27, .1/100	16	8
5B	C28, .1/100	16	8
6B	C29, .1/100	14	7
7B	C30, .1/100	16	8

IC	+5V	+5V	GND
8B	C31, .1/100	16	8
9B	C33, .1/100	14	7
1C	C32, .1/100	16	8
2C	-----	14	7
3C	-----	14	7
4C	-----	16	8
5C	-----	14	7
7C	C37, .1/100	47.61	40, 54
9C	-----	-----	-----

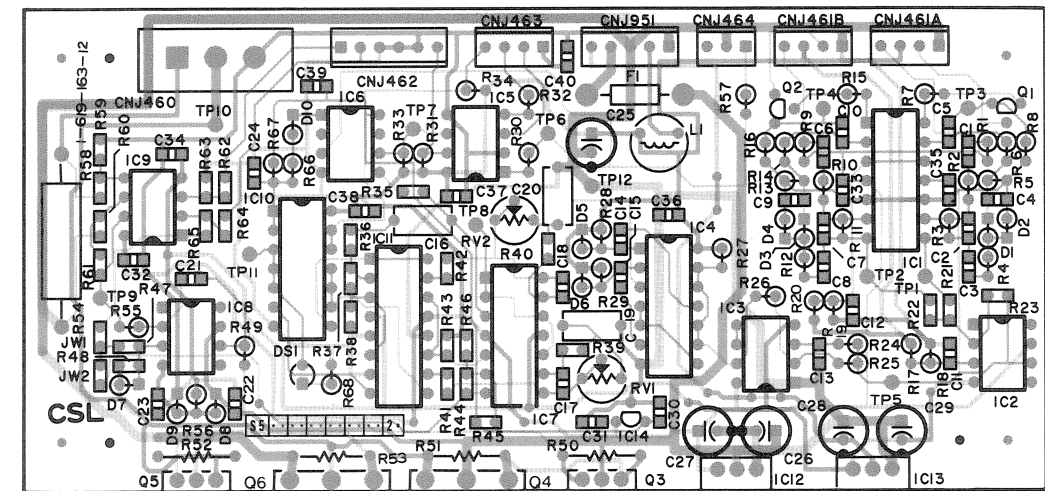
TEST POINTS	
1	INPUT SIGNAL
2	INPUT X GAIN/LOSS
3	LOGIC LEVEL VITC
4	LOGIC LEVEL SYNC
5	VERTICAL DETECT
6	FRAME DETECT
7	PLL REFERENCE
8	PLL FEEDBACK
9	VCO OUTPUT

MODE TABLE		
0	A	1
BY-PASS	PAL	EBU
NTSC	NTSC	FILM
SMPTE	-----	-----



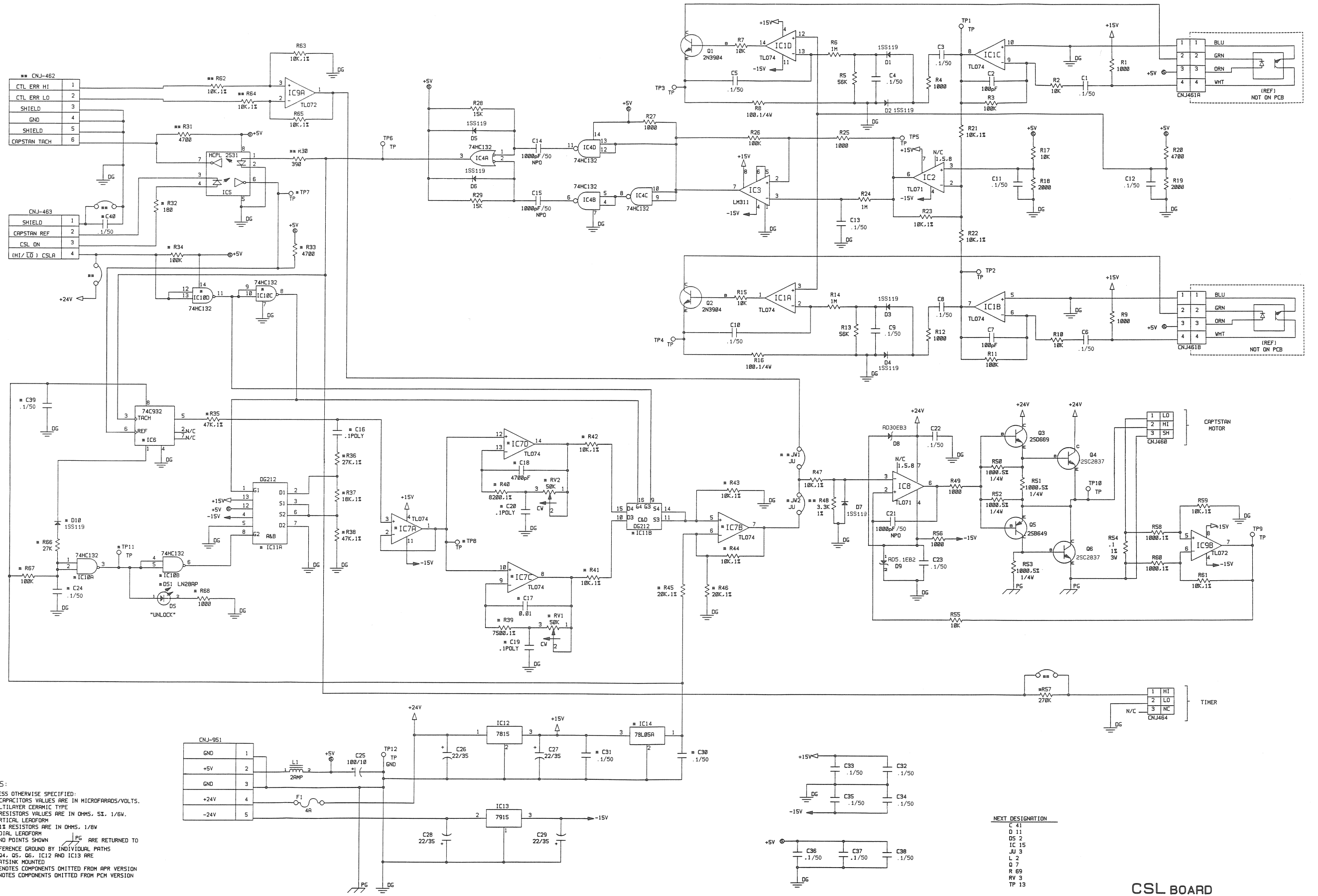
NOTES:  
1) UNLESS OTHERWISE SPECIFIED:  
ALL RESISTORS ARE IN OHMS, 5%, 1/6W.  
ALL CAPACITORS ARE IN MICROFARADS/VOLTS MLC TYPE  
ALL DIODES ARE 1N914  
ALL ZENERS ARE 1N5231B  
ALL 1% RESISTORS ARE RADIAL LEADFORM, 1/8W, METAL.

CSL BOARD (1-619-163-12)  
Component Side



■ SOLDER SIDE PATTERN 1-619-163-12  
■ COMPONENT SIDE PATTERN 1-619-163-12

CSL BOARD



NOTES:  
 UNLESS OTHERWISE SPECIFIED:  
 1) ALL CAPACITORS VALUES ARE IN MICROFARADS/VOLTS. MULTILAYER CERAMIC TYPE  
 2) ALL RESISTORS VALUES ARE IN OHMS. 5% 1/6W. VERTICAL LEADFORM  
 3) ALL 1% RESISTORS ARE IN OHMS. 1/6W RADIAL LEADFORM  
 4) GROUND POINTS SHOWN ARE RETURNED TO REFERENCE GROUND BY INDIVIDUAL PATHS  
 5) Q3, Q4, Q5, Q6, IC12 AND IC13 ARE HEATSINK MOUNTED  
 6) DENOTES COMPONENTS OMITTED FROM APR VERSION  
 DENOTES COMPONENTS OMITTED FROM PCM VERSION

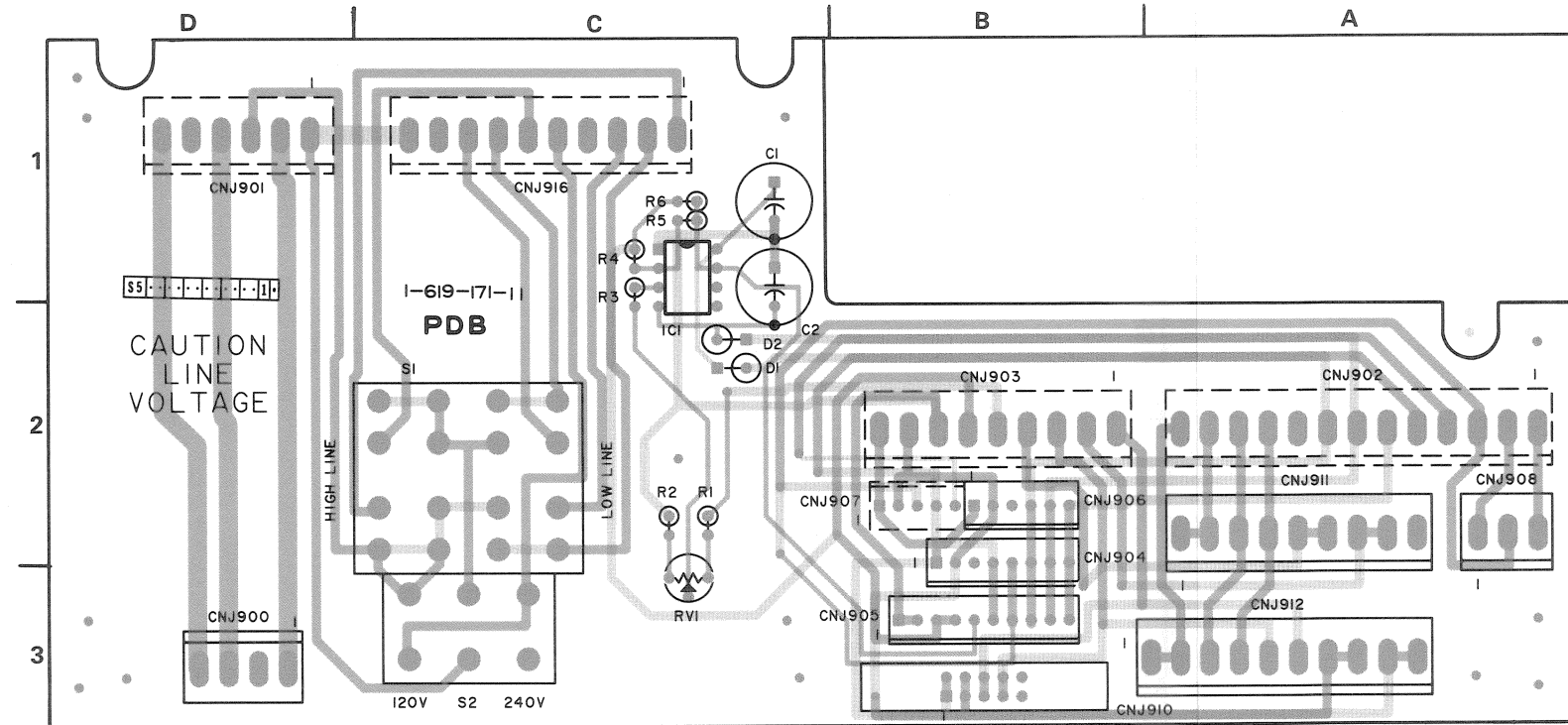
CNJ-951	
GND	1
+5V	2
GND	3
+24V	4
-24V	5

NEXT DESIGNATION

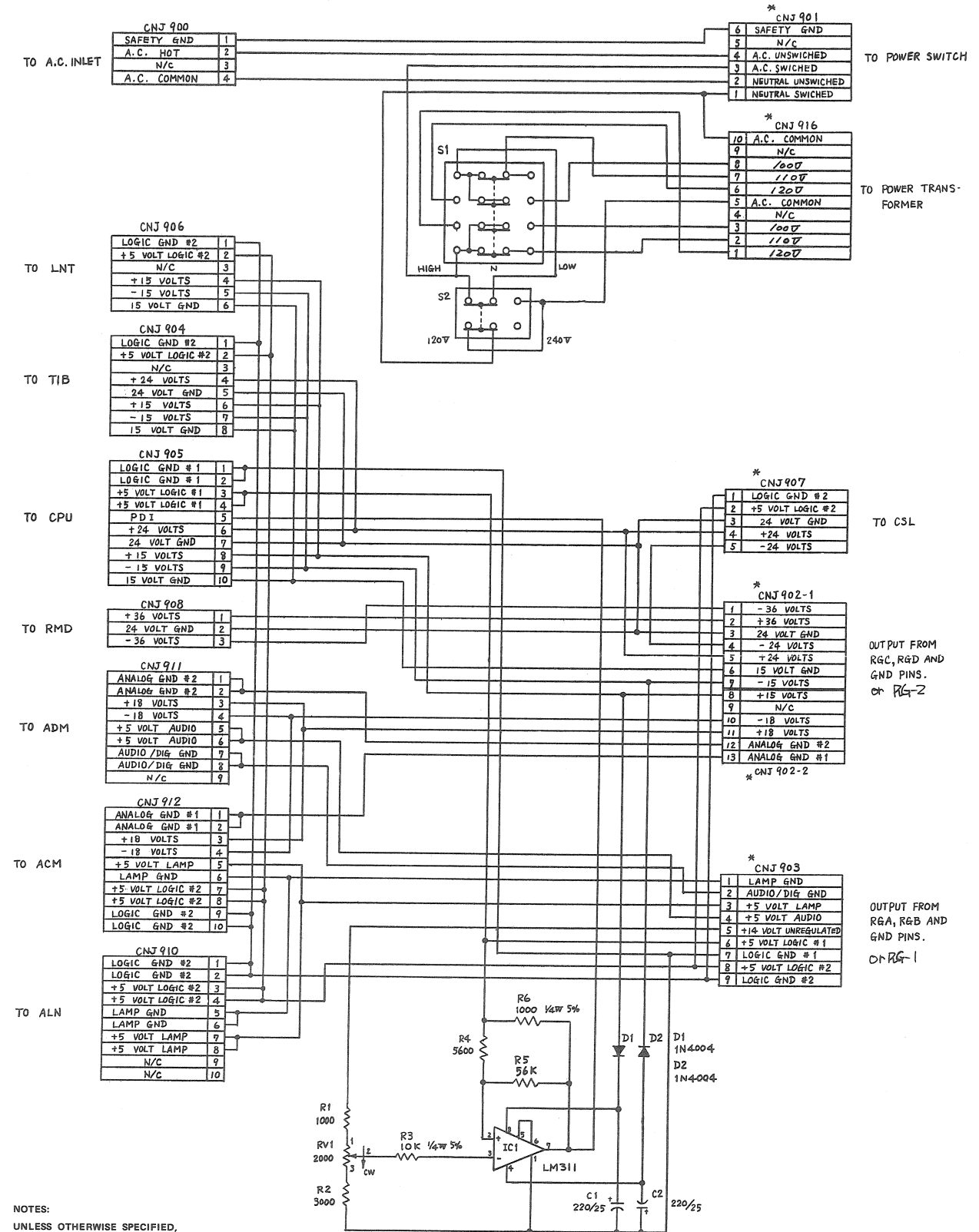
C	41
D	11
DS	2
JU	3
L	2
Q	7
R	69
RV	3
TP	13

CSL BOARD  
 BOARD NO. 1-619-163-11 & HIGHER  
 APR-5002/5003V

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



PDB BOARD



NOTES:  
 UNLESS OTHERWISE SPECIFIED,  
 1. ALL RESISTOR VALUES ARE IN OHMS, 1/8W, 1%.  
 2. CONNECTORS MARKED \* ARE LOCATED ON THE SOLDER SIDE OF THE P.C. BOARD.

CNJ 900

SAFETY GND	1
A.C. HOT	2
N/C	3
A.C. COMMON	4

\* CNJ 901

6 SAFETY GND	6
5 N/C	5
4 A.C. UNSWICHED	4
3 A.C. SWICHED	3
2 NEUTRAL UNSWICHED	2
1 NEUTRAL SWICHED	1

CNJ 906

LOGIC GND #2	1
+5 VOLT LOGIC #2	2
N/C	3
+15 VOLTS	4
-15 VOLTS	5
15 VOLT GND	6

\* CNJ 916

10 A.C. COMMON	10
9 N/C	9
8 100V	8
7 110V	7
6 120V	6
5 A.C. COMMON	5
4 N/C	4
3 100V	3
2 110V	2
1 120V	1

CNJ 904

LOGIC GND #2	1
+5 VOLT LOGIC #2	2
N/C	3
+24 VOLTS	4
24 VOLT GND	5
+15 VOLTS	6
-15 VOLTS	7
15 VOLT GND	8

\* CNJ 907

1 LOGIC GND #2	1
2 +5 VOLT LOGIC #2	2
3 24 VOLT GND	3
4 +24 VOLTS	4
5 -24 VOLTS	5

CNJ 905

LOGIC GND #1	1
LOGIC GND #1	2
+5 VOLT LOGIC #1	3
+5 VOLT LOGIC #1	4
PDI	5
+24 VOLTS	6
24 VOLT GND	7
+15 VOLTS	8
-15 VOLTS	9
15 VOLT GND	10

\* CNJ 902-1

1 -36 VOLTS	1
2 +36 VOLTS	2
3 24 VOLT GND	3
4 -24 VOLTS	4
5 +24 VOLTS	5
6 15 VOLT GND	6
7 -15 VOLTS	7
8 +15 VOLTS	8
9 N/C	9
10 -18 VOLTS	10
11 +18 VOLTS	11
12 ANALOG GND #2	12
13 ANALOG GND #1	13

CNJ 908

+36 VOLTS	1
24 VOLT GND	2
-36 VOLTS	3

\* CNJ 902-2

1 LAMP GND	1
2 AUDIO/DIG GND	2
3 +5 VOLT LAMP	3
4 +5 VOLT AUDIO	4
5 +14 VOLT UNREGULATED	5
6 +5 VOLT LOGIC #1	6
7 LOGIC GND #1	7
8 +5 VOLT LOGIC #2	8
9 LOGIC GND #2	9

CNJ 911

ANALOG GND #2	1
ANALOG GND #2	2
+18 VOLTS	3
-18 VOLTS	4
+5 VOLT AUDIO	5
+5 VOLT AUDIO	6
AUDIO/DIG GND	7
AUDIO/DIG GND	8
N/C	9

CNJ 912

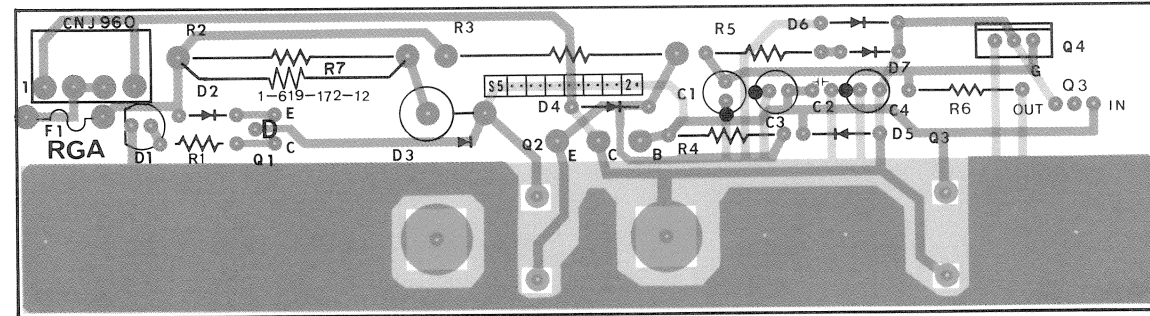
ANALOG GND #1	1
ANALOG GND #1	2
+18 VOLTS	3
-18 VOLTS	4
+5 VOLT LAMP	5
LAMP GND	6
+5 VOLT LOGIC #2	7
+5 VOLT LOGIC #2	8
LOGIC GND #2	9
LOGIC GND #2	10

CNJ 910

LOGIC GND #2	1
LOGIC GND #2	2
+5 VOLT LOGIC #2	3
+5 VOLT LOGIC #2	4
LAMP GND	5
LAMP GND	6
+5 VOLT LAMP	7
+5 VOLT LAMP	8
N/C	9
N/C	10

RG A BOARD (1-619-172-12)  
Component Side

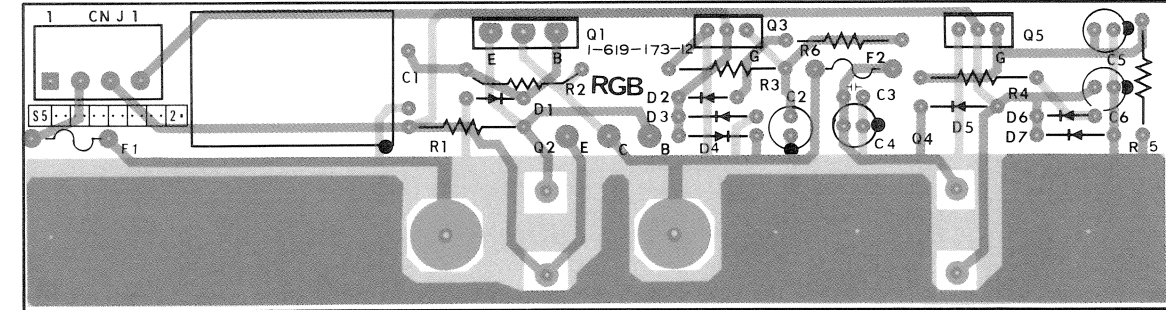
S/N; APR-5002 20001 TO 20615



■ SOLDER SIDE PATTERN 1-619-172-12  
■ COMPONENT SIDE PATTERN 1-619-172-12

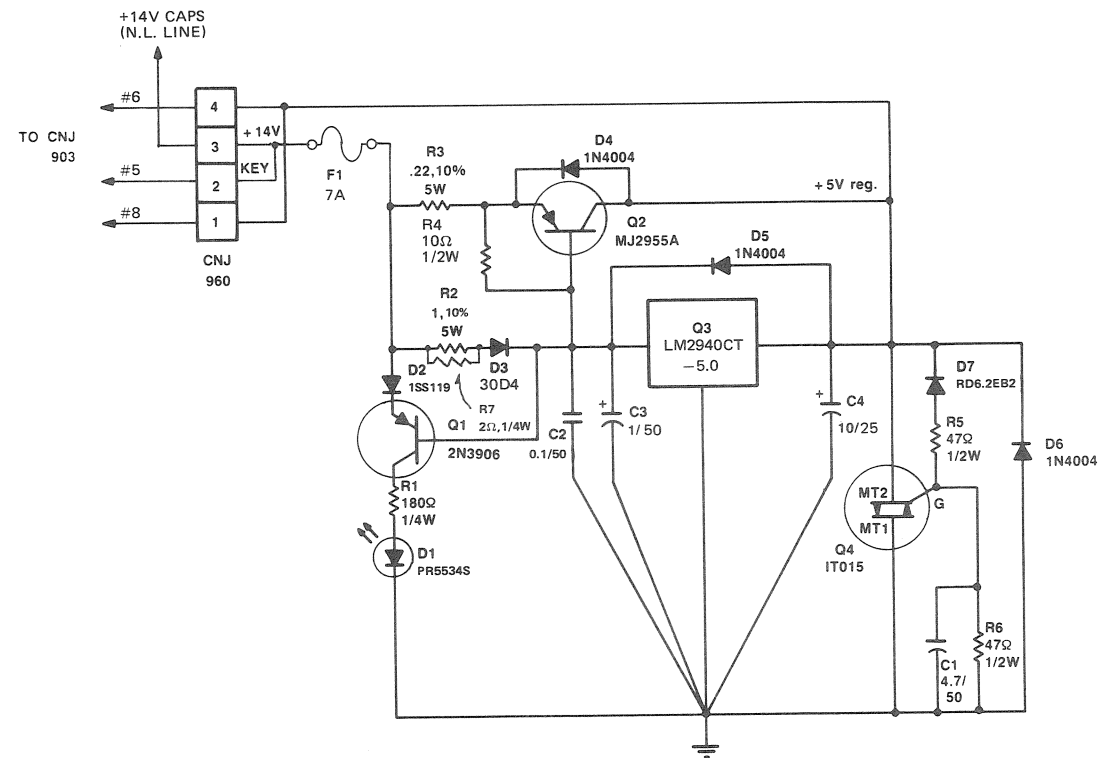
RGB BOARD (1-619-173-12)  
Component Side

S/N; APR-5002 20001 TO 20615



■ SOLDER SIDE PATTERN 1-619-173-12  
■ COMPONENT SIDE PATTERN 1-619-173-12

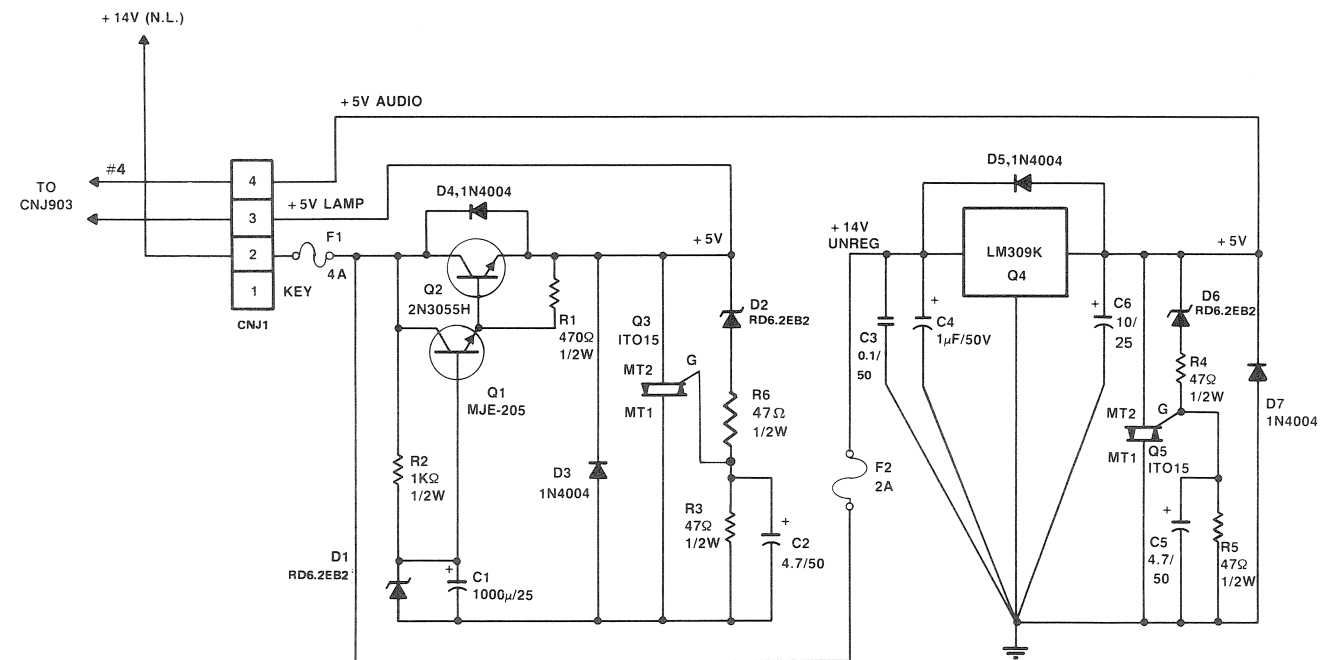
RG A BOARD



RG A BOARD  
BOARD NO. 1-619-172-12  
APR-5002

g-95 (a)

RGB BOARD



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

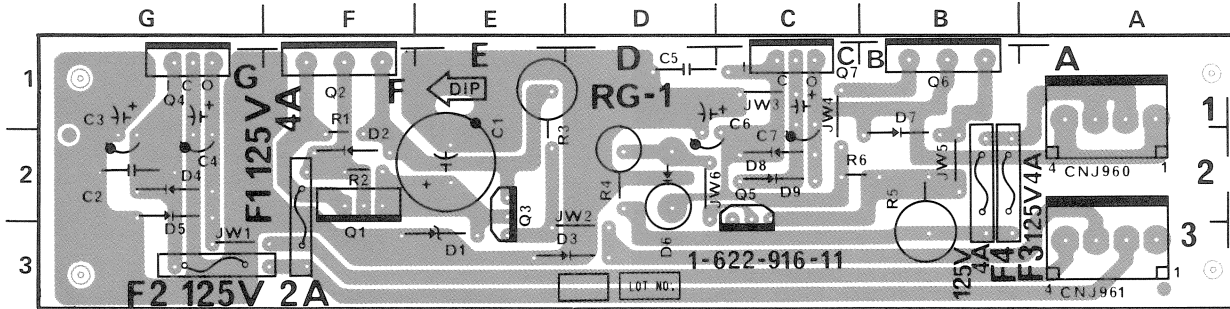
RGB BOARD  
BOARD NO. 1-619-173-12  
APR-5002

g-96 (a)



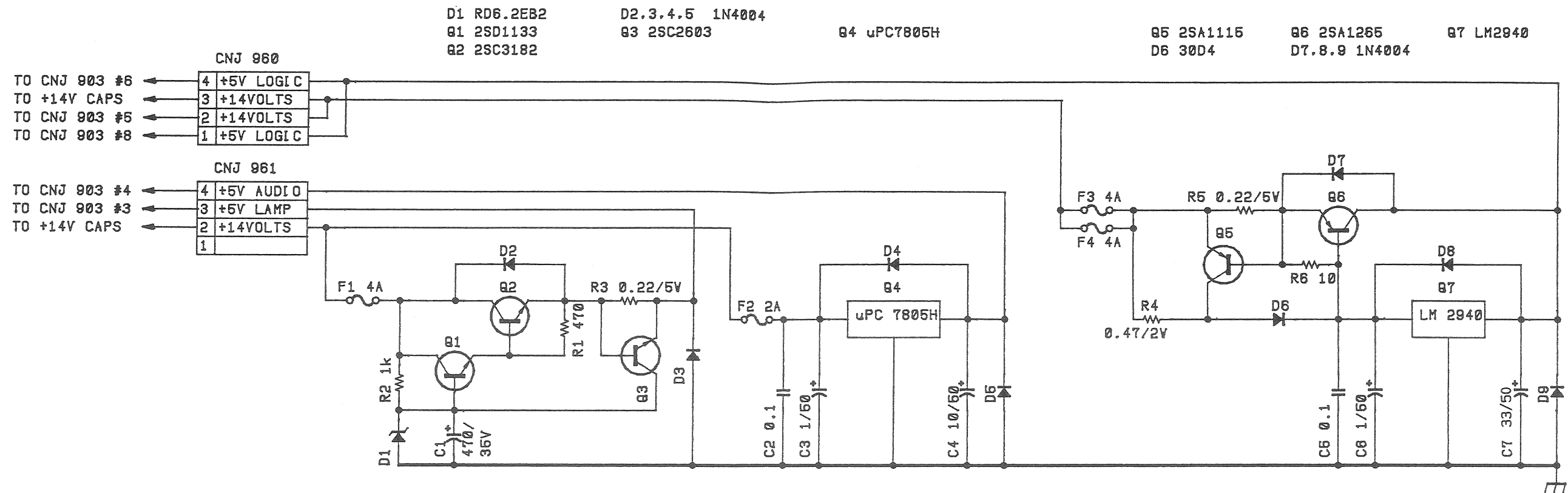
RG-1 BOARD (1-622-916-11)  
Component Side

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



■ SOLDER SIDE PATTERN 1-622-916-11

RG-1 BOARD

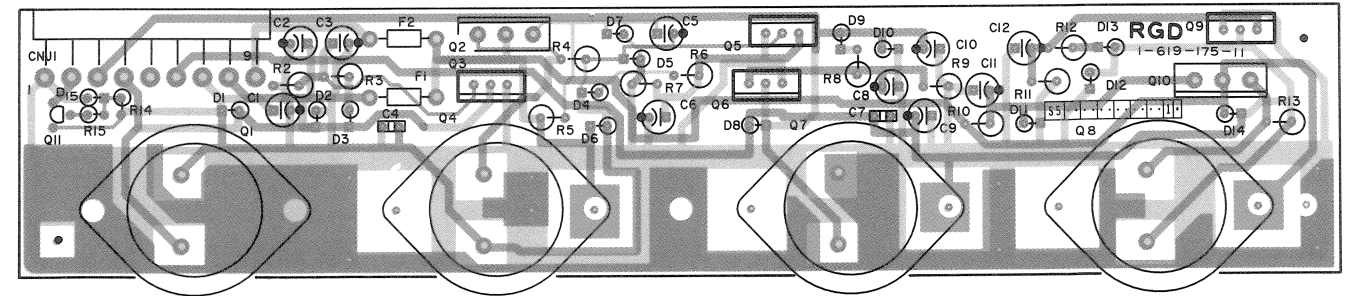
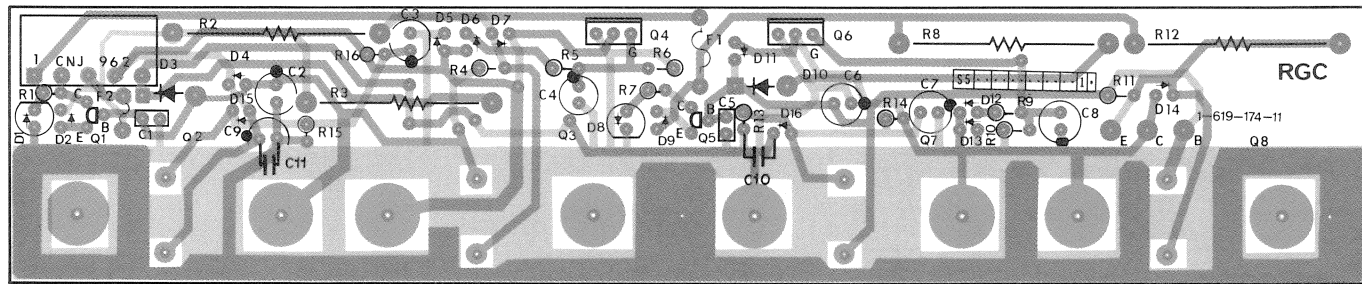


RGC BOARD (1-619-174-11)  
Component Side

S/N; APR-5002 20001 TO 20615

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

S/N; APR-5002 20001 TO 20615

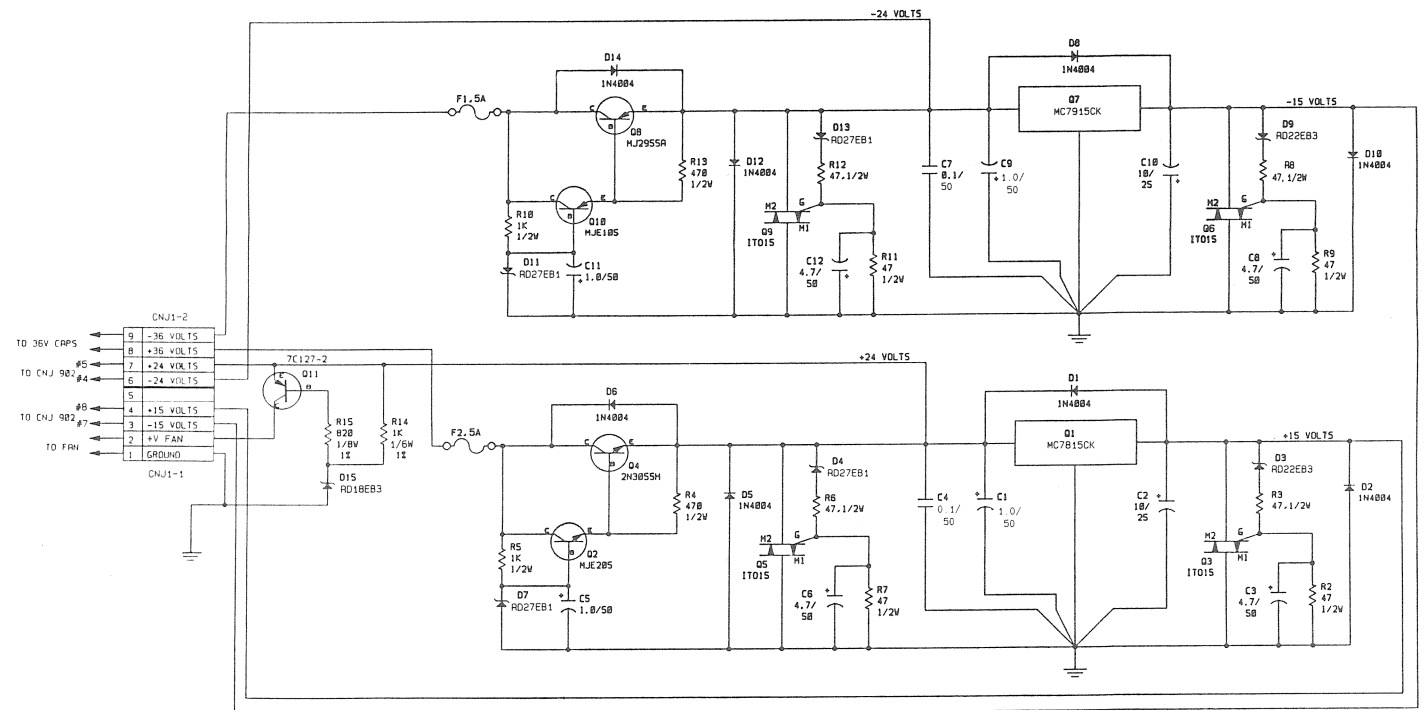
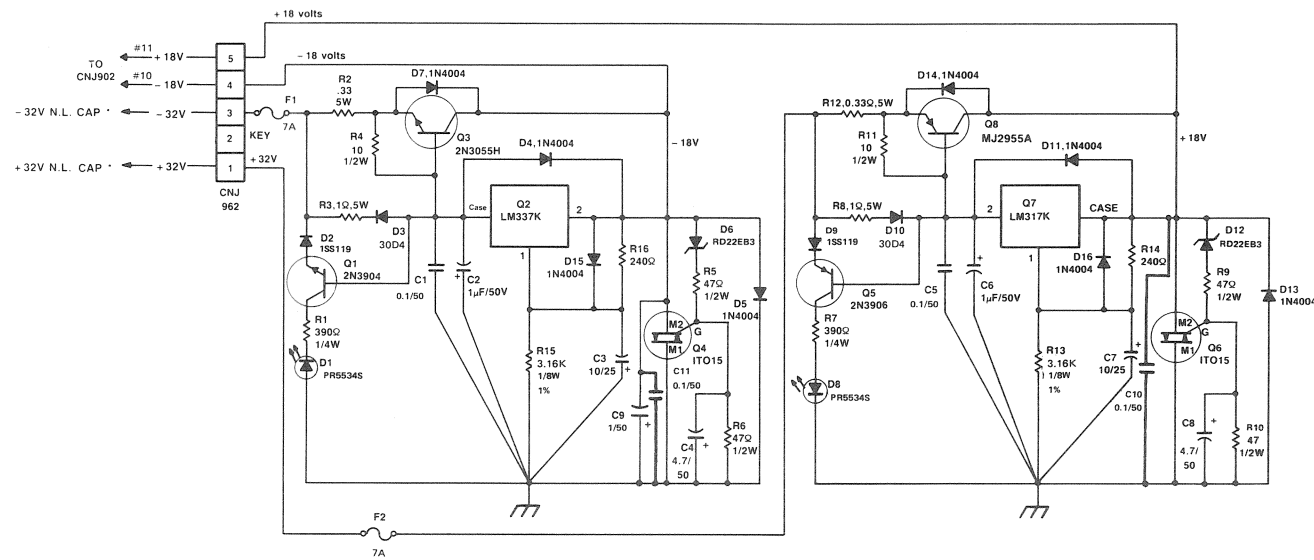


- SOLDER SIDE PATTERN 1-619-174-11
- COMPONENT SIDE PATTERN 1-619-174-11

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

RGC BOARD

RGD BOARD



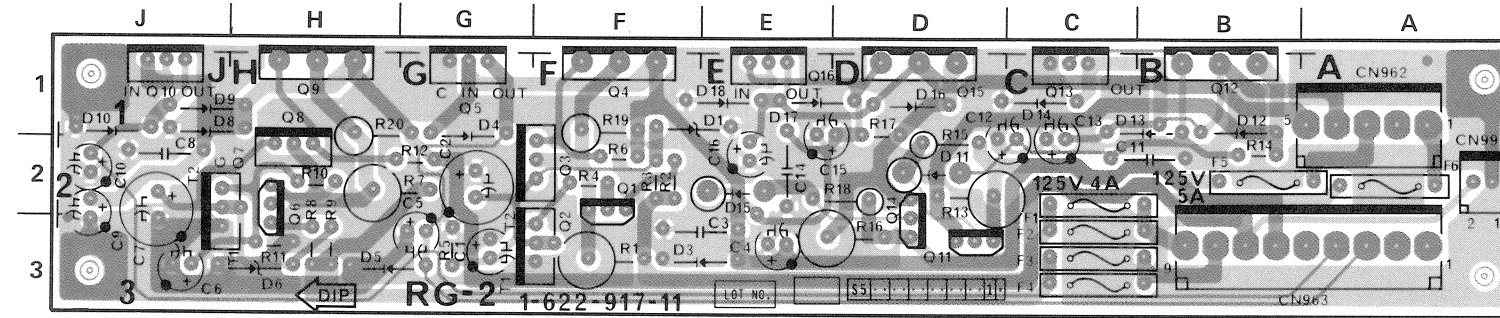
\* ALL UNREGULATED VOLTAGE LINES ARE REFERENCED NO LOAD (N.L.).

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

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

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

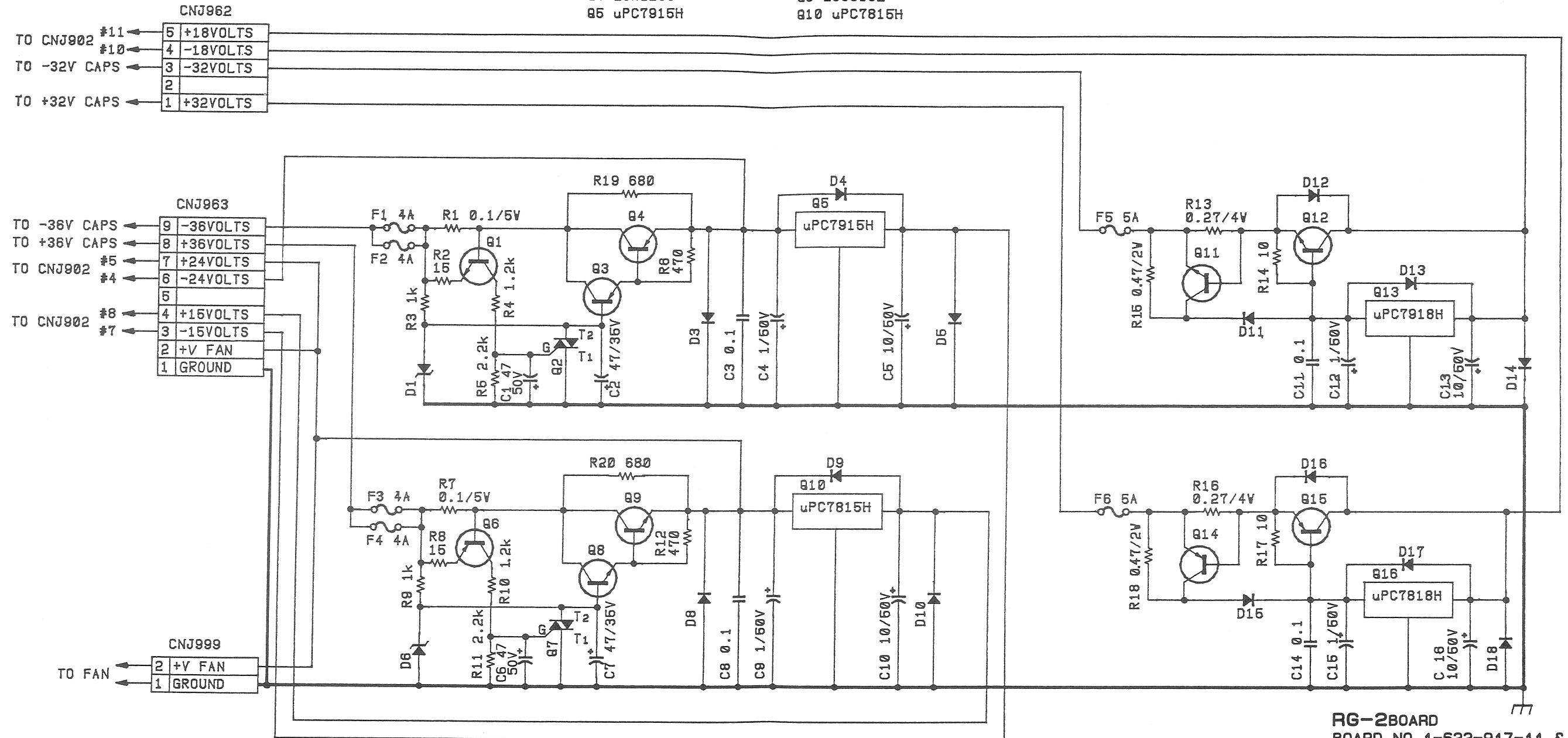
S/N; APR-5002 20701 AND HIGHER  
S/N; APR-5003V 10001 AND HIGHER



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	Q2 AC03FGMAY	Q7 AC03FGMAY	D12.13.14 1N4004	Q12 2SC3182	Q15 2SA1265
8.9.10	Q3 2SB857C	Q8 2SD1133	16.17.18	Q13 uPC7918H	Q16 uPC7818H
	Q4 2SA1265	Q9 2SC3182			
	Q5 uPC7915H	Q10 uPC7815H			



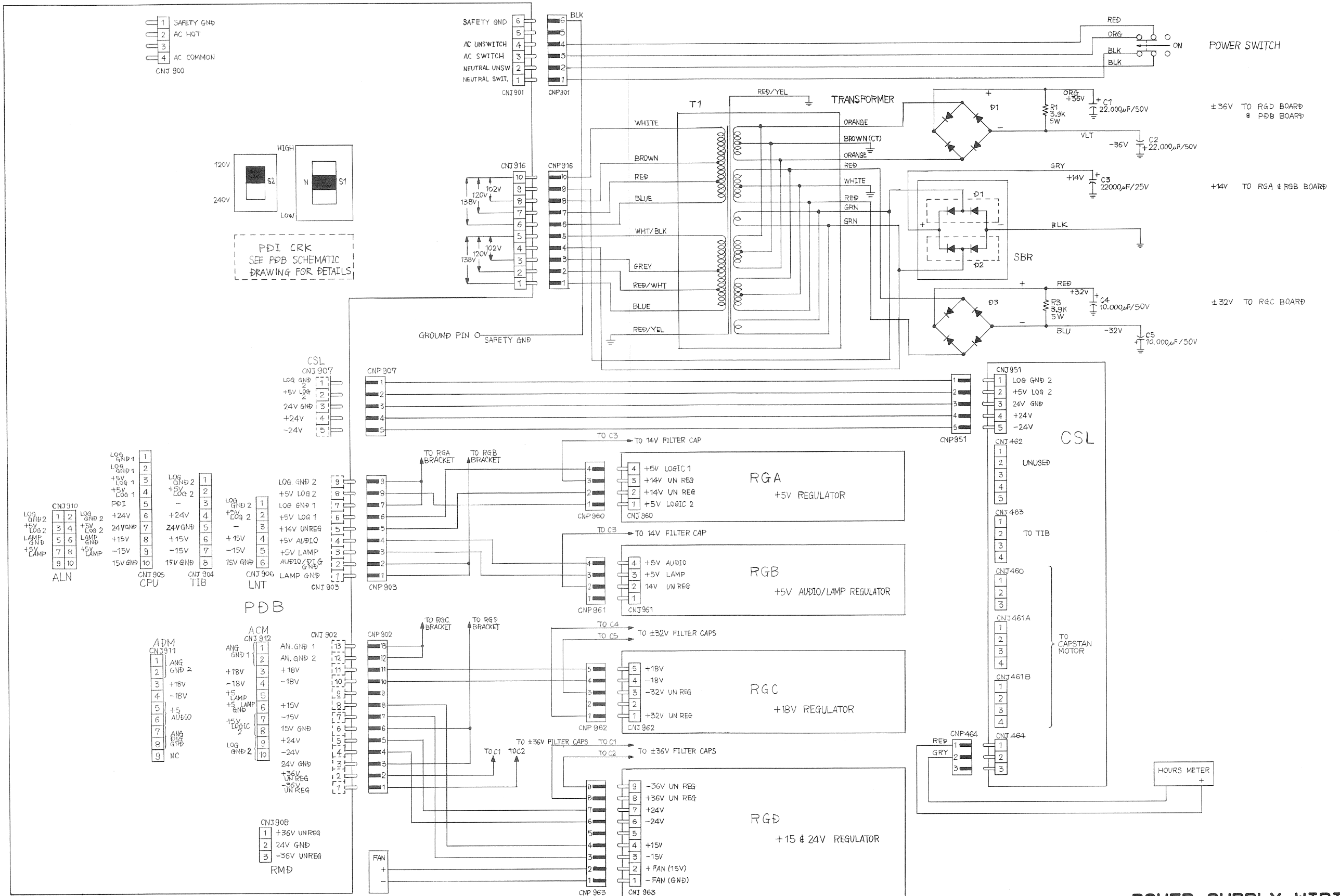
9-97 (b)

9-98 (b)

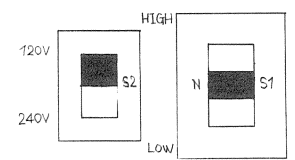
RG-2 BOARD  
BOARD NO. 1-622-917-11 & HIGHER  
APR-5002/5003V

POWER SUPPLY WIRING

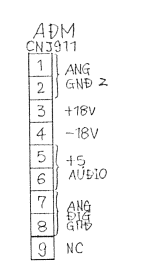
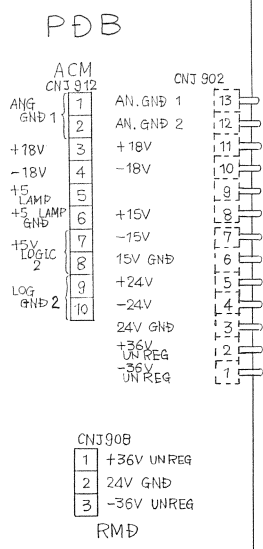
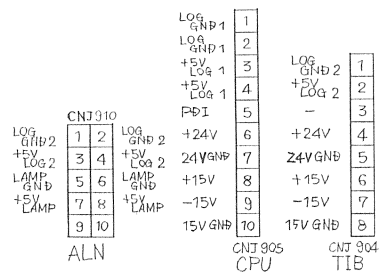
S/N; APR-5002 20001 TO 20615



- 1 SAFETY GND
  - 2 AC HOT
  - 3
  - 4 AC COMMON
- CNJ 900

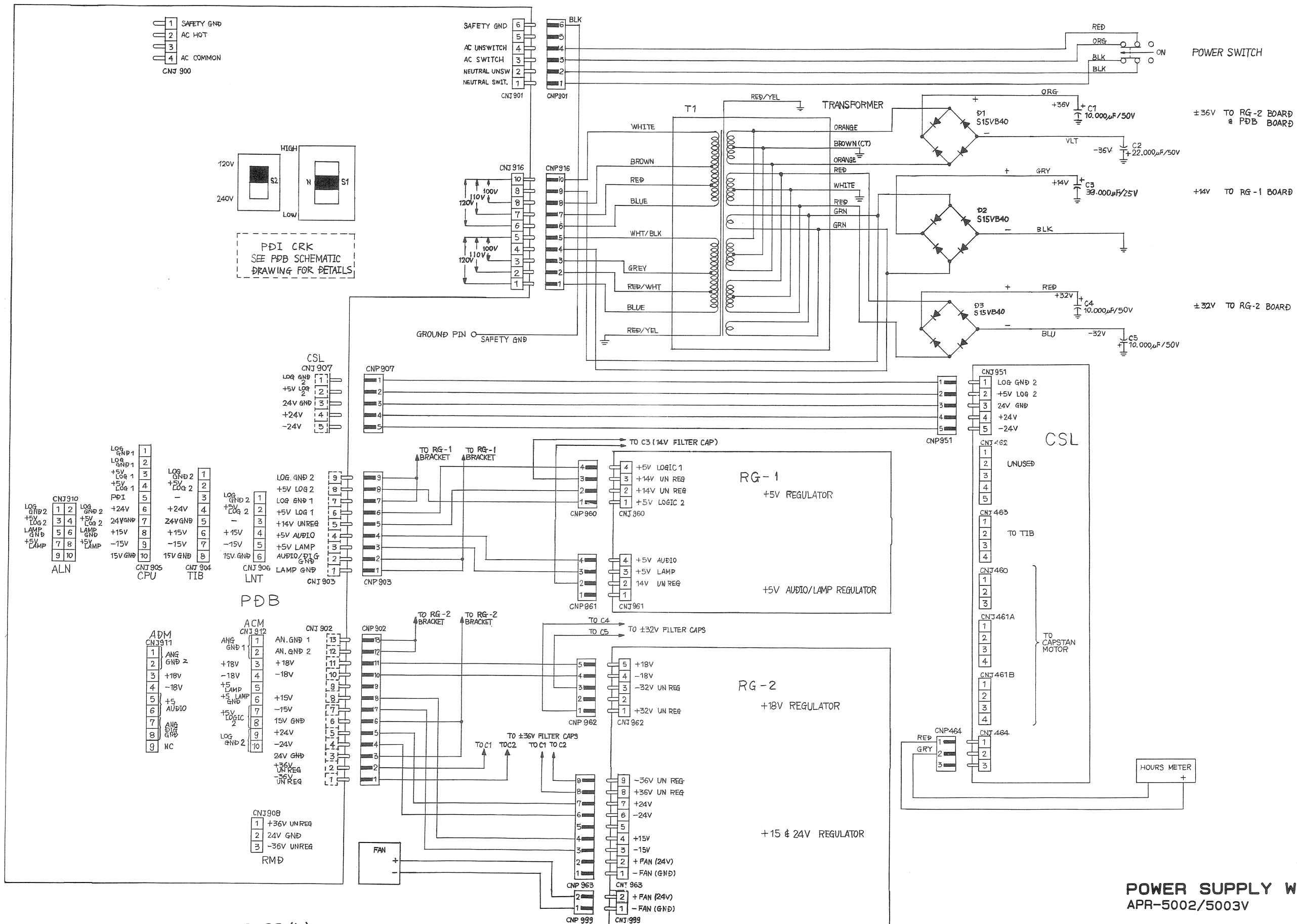


PDI CRK  
SEE PDB SCHEMATIC  
DRAWING FOR DETAILS



POWER SUPPLY WIRING

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



Vertical line on the left side of the page.

