

VLBA Technical Report No. 17

L107

SWITCH CONTROL MODULE

**REVISED
December 1993**

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Drawing List

<u>Description</u>	<u>Number</u>
Assembly Drawing	D53303A001
Wire-wrap Board Layout Drawing	A53303A003
Bill of Materials	A53303B001
Front Panel Silkscreen Artwork	B53303I001
Schematic Diagram	D53303S001
Wiring Harness Diagram	C53303W001
Wiring Harness List	A53303W002
Wire List	A53303W003
Standard Interface Board Schematic Diag.	D55002S002

Specifications

Maximum Voltage to Analog Inputs	± 20 VOLT
Analog Voltage Measurement Range	± 10 VOLT
Number of analog inputs	2
Number of internal analog measurements	5
Number of digital inputs	0
Number of digital readbacks	6
Number of digital command outputs	2
Module Ser. No. relative address	0E hexadecimal
Address ID code	14 hexadecimal
Analog monitor relative address range	00-07 hexadecimal
Digital monitor relative address range	08-0E hexadecimal
Command relative address range	10-1F hexadecimal
Power supply voltages required	+5, ±15, +28 VOLT

Module Replacement Procedure

I. Removal. Loosen the captivated screws and use the module puller to remove the module from the bin.

II. Replacement. To install a new module, simply insert the module into the bin and tighten the captivated screws.

SWITCH CONTROL MODULE (L107)
[ID No. 14₁₆]

COMMANDS FOR EACH POSITION ¹										
SWITCH	REL. ADDR.	TYPE	POS OFF	POS 0	POS 1	POS 2	POS 3	POS 4	POS 5	POS 6

S1	10	6-POS	00		01	02	04	08	10	20
S2	11	6-POS	00		01	02	04	08	10	20
S3	12	6-POS	00		01	02	04	08	10	20
S4	13	6-POS	00		01	02	04	08	10	20
S5	14	XFER		00	01					
S6	15	XFER		00	01					
S7	16	4-POS	00		01	02	04	08		
S8	17	4-POS	00		01	02	04	08		
S9	18	XFER		00	01					
S10	19	4-POS	00		01	02	04	08		
S11/12	1A	2-WAY			01	02				
S102AB	1B	2-WAY			01	02				
S102CD	1C	2-WAY			01	02				
S106AB	1D	2-WAY			01	02				
S106C	1E	XFER		00	01					

MONITOR RESULT RETURNED FOR EACH POSITION ¹										
SWITCH	REL. ADDR.	BITS	POS OFF	POS 0	POS 1	POS 2	POS 3	POS 4	POS 5	POS 6

S1	08	0-5	00		01	02	04	08	10	20
S2	09	0-5	00		01	02	04	08	10	20
S3	0A	0-5	00		01	02	04	08	10	20
S4	0B	0-5	00		01	02	04	08	10	20
S5	08	6		00	01					
S6	08	7		00	01					
S7	0C	0-3	00		01	02	04	08		
S8	0C	4-7	00		01	02	04	08		
S9	0D	0		00	01					
S10	0D	1-4	00		01	02	04	08		
S11/12	0D	5-6			01	02				
S102AB	09	6-7			01	02				
S102CD	0B	6-7			01	02				
S106AB	0A	6-7			01	02				
S106C	0D	7		00	01					

¹ ADDRESS, COMMAND, and RESULT values in hexadecimal.

SWITCH CONTROL MODULE (L107) (Continued)
 [ID No. 14₁₆]
MONITORS

No.	Relative Address (hex)	Type	Use	Multiplier*	Units
1.	00	Analog	+5 volt monitor	1.0	Volts
2.	01	Analog	+28 V (X .25) monitor	4.0	Volts
3.	02	Analog	+15 V #1 (X .5) monitor	2.0	Volts
4.	03	Analog	-5 volt monitor	1.0	Volts
5.	04	Analog	-15 volt (X .5) monitor	2.0	Volts
6.	05	Analog	Rear Panel Aux. In. #1	1.0	Volts
7.	06	Analog	Rear Panel Aux. In. #2	1.0	Volts
8.	07	Analog	+15 V #2 (X .5) monitor	2.0	Volts
9.	0E	Digital	Switch Module Ser. No. (Bits 0 - 7)		

* The analog data values can be converted directly to Volts by dividing them by 3276.8. To convert to the 'Units' relevant to the measurement, multiply by 'Multiplier'.

RF SWITCHES, POSITIONS AND FUNCTIONS

Connected to:	IFD	IFB	IFC	IFA	Syn1	Syn2	Syn3	RF1.5	RF1.5	RF8.4	RF8.4
Channel:	2(L)	1(R)	2(L)	1(R)				1 (R)	2 (L)	1 (R)	2 (L)
Switch:	S1	S2	S3	S4	S7	S8	S10	S11	S12	S106A	S106B

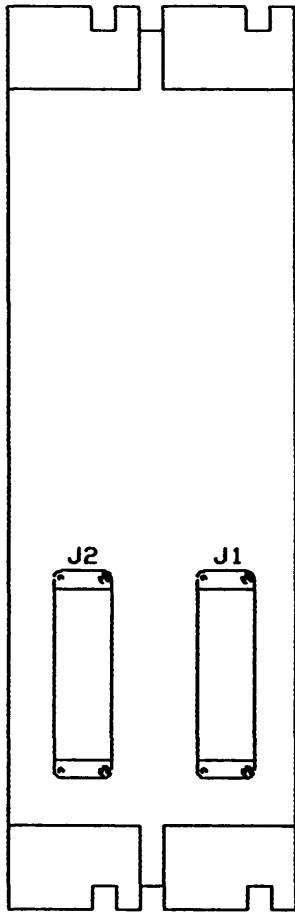
BAND:	*****										
.33/.61 GHz	5	5									
1.5 GHz			2	2		4		1	1		
2.3 GHz			3	3		2					
4.8 GHz			4	4		3					
8.4 GHz	3	3			2		2			1	1
10.7 GHz	2	2			3						
15 GHz	6	6			1						
23 GHz	3	3			2		3			2	2
SPARE			1	1		1					
Bin B SPARE	1	1			4						
43 GHz			1	1		1					
SPARE								2	2		

OTHER SWITCHES:

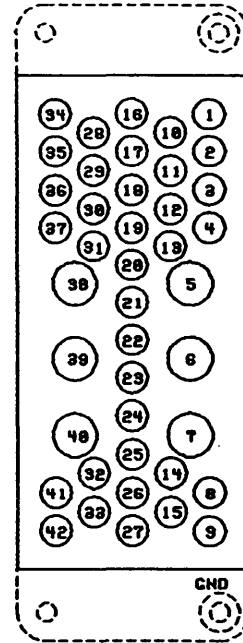
SWITCH	POSITION	FUNCTION

S5	0	Normal
"	1	IF Cables C and D (ifC, ifD above) are interchanged.
S6	0	Normal
"	1	IF Cables A and B (ifA, ifB above) are interchanged.
S9	0	Normal
"	1	Synthesizers 1 and 2 (syn1, syn2 above) are interchanged.
S106C	0	Normal Single LO in 8.4/23 GHz Converter
"	1	Dual LO in 8.4/23 GHz Conv from Synthesizers 1 and 3.
S102A/B	1	610 MHz Channel 1 (Right) Filter IN.
"	2	610 MHz Channel 1 (Right) Filter OUT.
S102C/D	1	610 MHz Channel 2 (Left) Filter IN.
"	2	610 MHz Channel 2 (Left) Filter OUT.

TOP

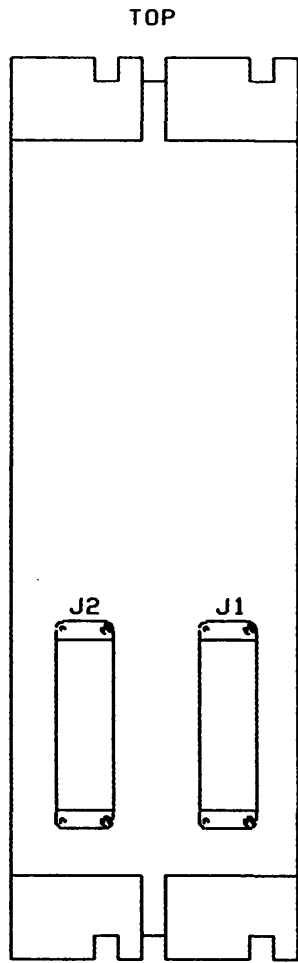


MODULE
(REAR VIEW)

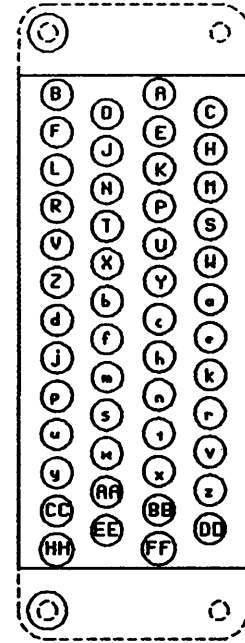


J1 (REAR VIEW)

J1					
PIN	FUNCTION	COMMENT	PIN	FUNCTION	COMMENT
1	AUX IN 1+		22		
2	AUX IN 1-		23		
3	AUX IN 2+		24		
4	AUX IN 2-		25		
5			26		
6			27	+15V SUPPLY (2)	MONITOR
7			28		
8	XMIT +		29	+28V SUPPLY	500 mA (max)
9	XMIT -		30		
10	+5V SUPPLY	950 mA	31		
11	-5V SUPPLY		32		
12			33	GROUND	
13			34		
14	RCV +		35		
15	RCV -		36		
16	+15V SUPPLY (1)	15 mA	37		
17	-15V SUPPLY	40 mA	38		
18			39		
19			40		
20			41		
21			42		



MODULE
(REAR VIEW)



J2 (REAR VIEW)

J2					
PIN	FUNCTION	COMMENT	PIN	FUNCTION	COMMENT
A	S1-1		d	S4-2	
B	S1-2		e	S4-3	
C	S1-3		f	S4-4	
D	S1-4		g	S4-5	
E	S1-5		h	S4-6	
F	S1-6		i	S102CD-1	
G	S5		j	S102CD-2	
H	S106AB-1		k	S7-1	
J	S2-1		l	S7-2	
K	S2-2		m	S7-3	
L	S2-3		n	S7-4	
M	S2-4		o	S8-1	
N	S2-5		p	S8-2	
P	S2-6		q	S8-3	
R	S102AB-1		r	S8-4	
S	S102AB-2		s	S9	
T	S3-1		t	S10-1	
V	S3-2		u	S10-2	
W	S3-3		v	S10-3	
X	S3-4		w	S10-4	
Y	S3-5		x	S1112-1	
Z	S3-6		y	S1112-2	
a	S6		z	S106C	
b	S106AB-2		AA		
c	S4-1		BB		
			CC		
			DD		
			EE		
			FF		
			HH		

Description of I/O Lines

42-PIN REAR PANEL CONNECTOR:

AUX IN 1+: Auxiliary differential analog input.
AUX IN 2+: Auxiliary differential analog input.
XMIT+, XMIT-: Monitor/Control transmit bus input from station computer.
+5 VOLT SUPPLY: +5 V input from power supply.
-5 VOLT SUPPLY: -5 V input from power supply.
RCV+, RCV-: Monitor/Control receive bus output to station computer.
+15 VOLT SUPPLY: +15 V input from power supply #1.
+15 VOLT SUPPLY: +15 V input from power supply #2.
-15 VOLT SUPPLY: -15 V input from power supply.
+28 VOLT SUPPLY: +28 V input from power supply.

50-PIN REAR PANEL CONNECTOR:

S1-1 to S1-6: Outputs to six solenoids of Switch S1.
S5: Output to solenoid of Switch S5.
S106AB-1: Output to solenoid 1 of Sw. S106A and S106B (8.4 GHz).
S2-1 to S2-6: Outputs to six solenoids of Switch S2.
S102AB-1: Output to solenoid 1 of Sw. S102A and S102B.
S102AB-2: Output to solenoid 2 of Sw. S102A and S102B.
S3-1 to S3-6: Outputs to six solenoids of Switch S3.
S6: Output to solenoid of Switch S6.
S106AB-2: Output to solenoid 2 of Sw. S106A and S106B (23 GHz).
S4-1 to S4-6: Outputs to six solenoids of Switch S4.
S102CD-1: Output to solenoid 1 of Sw. S102C and S102D.
S102CD-2: Output to solenoid 2 of Sw. S102C and S102D.
S7-1 to S7-4: Outputs to four solenoids of Switch S7.
S8-1 to S8-4: Outputs to four solenoids of Switch S8.
S9: Output to solenoid of Switch S9.
S10-1 to S10-4: Outputs to four solenoids of S10.
S11/12-1: Output to solenoid 1 of Switches S11 and S12.
S11/12-2: Output to solenoid 2 of Switches S11 and S12.
S106C: Output to solenoid of Switch S106C.

Related Documents

1. Specification of Monitor and Control Standard Interface, A55001N002-A, L. R. D'Addario, November, 1985.
2. Specification of Monitor and Control Bus at VLBA Stations, A55001N001, B. G. Clark, December 1984.

II. General Description.

The Switch Control (L107) module has the primary purpose of enabling the station computer to control the RF, IF, and LO coaxial electromechanical switches. This is done by latching the command bits for each switch and sending the outputs of each latch to the driver IC's which take TTL inputs and output 28 volts to each switch relay coil. The output of the drivers is divided down to be less than 5 volts and connected to input buffers which allow the individual outputs going the switches to be monitored.

Other purposes served by the switch control module include monitoring the power supply voltages in the B-rack.

III. Circuit Description.

Examining the circuit diagram of the wire-wrap board, the decoder and interface circuitry connected to the Standard Interface (SI) is in the upper right corner. The handshaking signals are controlled by IC's 7B, 7C, and 8A. The two address decoders are IC's 7D and 7A. The digital monitor address decoder 7D is selected by R/W, DEV REQ, and address 08 to 0F (Hex).

R/W and Address 00 to 07 (HEX) selects ANENB, so that the 8 analog monitors are located between 00₁₆ and 07₁₆. For analog monitors the digital monitor address decoder, 7D is deselected.

The write address decoder 7A is selected by R/W, DEV REQ, and address 10 to 1F (Hex). The outputs of the two address decoders go to the read and write latches. The write latches (flip-flops, actually) are IC's 4A - 4D, 5A, 5B, 4B, 3E, 3F, 5E, 4E, and 4F. These are connected to the 28 volt drivers, 3A - 3D, 2A and 2B on the left of the diagram. The 28 volt outputs (designated by 's' + switch number + '-' + switch solenoid number. These go to the switches externally and to voltage dividers internally. The outputs of the voltage

dividers are fed to the inputs of the monitor latches, 6A - 6E, and 5F. This allows the driver outputs to be monitored directly, rather than just the command latches.

IC 7E (middle right of diagram) enables the monitor standard interface to read the special ID number for the module, set by the jumpers in header 8B. This process is described in the standard interface specification, A5501N002.

IC 9C and DIP switch 9B allow the computer to read the serial number of the module, which is entered on the switch. This number should match the number on the front panel. IC5C provides a power-up reset pulse to reset all latches to the zero state. One percent resistors on chips 9A and 9D are used to divide the power supplies to fit in the $\pm 10V$ range of the SI card.

III. Test Procedure.

The test procedure for the L107 module is automated, for the most part, using a computer to 'exercise' the module.

REQUIREMENTS:

1. IBM PC or compatible. Must have serial port on COM1.
2. RS-232 to RS-422/485 converter.
3. F118/L107 Test Box.
4. MODTEST program.
5. Voltmeter, preferably digital.
6. Power supply to supply +5 V, ± 15 V and + 28 V power.
7. Cables to connect the Test Box to the power supply and to the L107 module.

Connect the power supply, the RS-422 converter and the module together with the cable as shown in the connection diagram. Boot the computer up normally, and put the disk with the MODTEST program into whichever disk drive is normally used for running external programs. The DOS disk need not be in the drive, and the MODTEST program can be copied onto a hard disk, if desired. Type 'MODTEST' to execute the program. The program will indicate what to do to check out the module.

L107 (SWITCH DRIVER) TEST SET UP

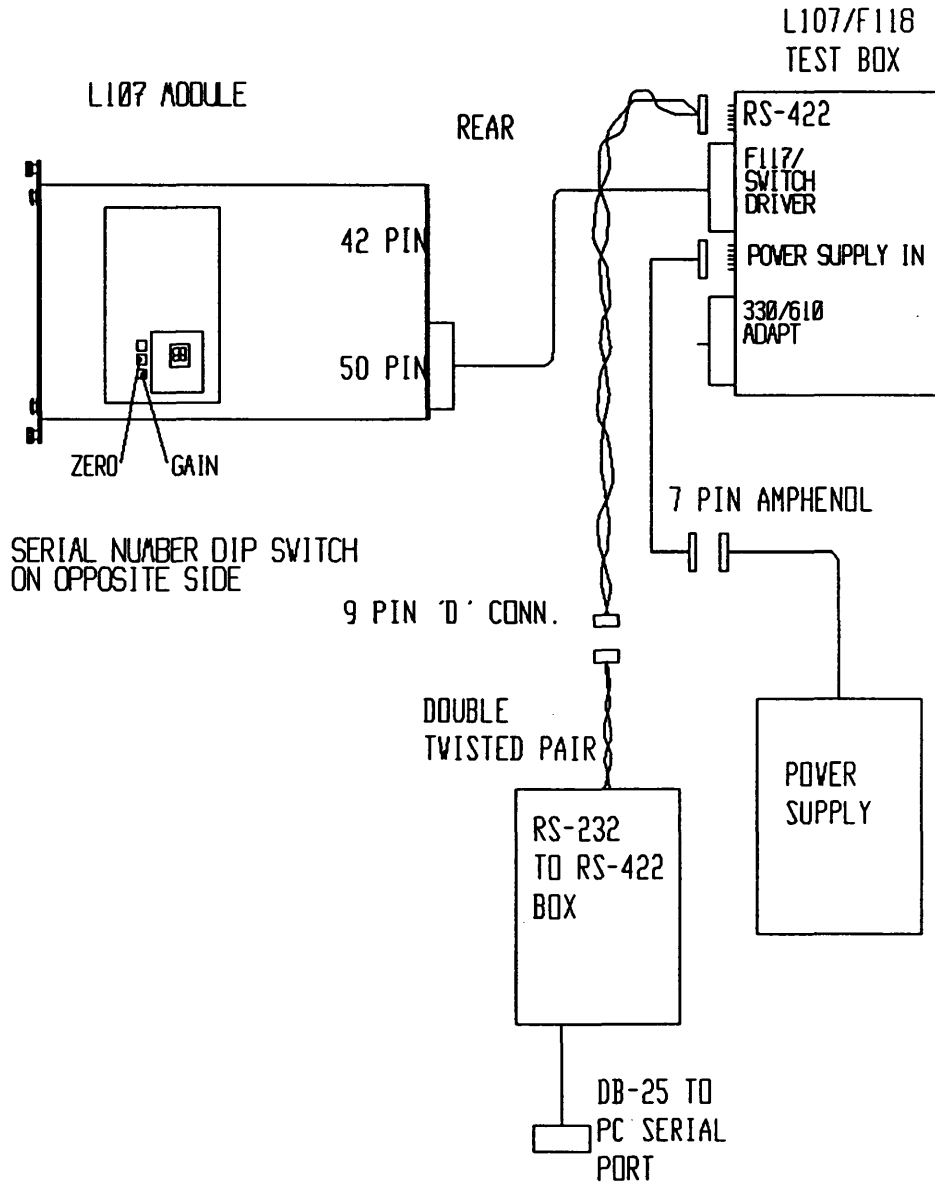


Figure 1. L107 Test Set-up.

L107 MODULE TEST CABLE

42-pin plug (to box)	----- COLOR	to	----- USE	42-pin socket (to module)
1	blue		AUX IN 1+	1
2	black		AUX IN 1-	2
3	black		AUX IN 2+	3
4	black		AUX IN 2-	4
8	red		XMIT +	8
9	black		XMIT -	9
10	orange		+5 V SUPP	10
11	blue		-5 V SUPP	11
14	white		RCV +	14
15	black		RCV -	15
16	red		+15 V SUPP	16
17	yellow		-15 V SUPP	17
29	gray		+28 V SUPP	29
34	black		GROUND	34

VLBA SWITCH DRIVER MODULE L107 INTERNAL WIRING HARNESS

JULY, 7, 1987

DRAWING: A53303W002

WILLIAM WIREMAN

REVISION: C

DATE: 1-11-88

NEUMONIC CHANGES TO W-12, 59, 60, 68, 77, 78 J2-J, S, T, b, k, m FT-8, 15, 16, 24, 31, 32

PART I-WIREWRAP CONNECTOR WIRING

PIN	FUNCTION	SOURCE	COLOR	GA.	PIN	FUNCTION	SOURCE	COLOR	GA.
1.	GND	TB1-1	BLK	22	2.	5V	TB1-7	ORG	22
3.	GND	CHASS.	BLK	22	4.	5V			
5.	S1-1	FT-1	WHT/BLU	26	6.	S1-2	FT-2	WHT/ORG	26
7.	S1-3	FT-3	WHT/GRN	26	8.	S1-4	FT-4	WHT/BRN	26
9.	S1-5	FT-5	WHT/GRY	26	10.	S1-6	FT-6	WHT/VIO	26
11.	S5	FT-7	WHT/YEL	26	12.	S106AB-1	FT-8	WHT/BLK	26
13.					14.	HI-LO SEL	P1-17	WHT/BLK	26
15.	DEV ACK	P1-36	WHT/VIO	26	16.	DEV REQ	P1-35	WHT/GRY	26
17.	ID READ	P2-9	WHT/RED	26	18.	ANENB	P1-37	WHT/YEL	26
19.	15V (1)	TB1-3	RED	22	20.	-15V	TB1-4	YEL	22
21.	7V	P1-2	WHT/ORG	26	22.	7.5V (1)	P1-3	WHT/GRN	26
23.	-7.5V	P1-5	WHT/BLK	26	24.	ADR 6	P1-42	WHT/GRN	26
25.	+7.5 (2)	P1-8	Wired	22	26.	ADR 7	P1-41	WHT/RED	26
27.	GND			22	28.	R/W	P1-49	WHT/YEL	26
29.	ADDR 0	P1-48	WHT/GRY	26	30.	ADDR 1	P1-47	WHT/BRN	26
31.	ADDR 2	P1-46	WHT/GRN	26	32.	ADDR 3	P1-45	WHT/ORG	26
33.	ADDR 4	P1-44	WHT/BLU	26	34.	ADDR 5	P1-43	WHT/BLK	26
35.	C/M 0	P1-33	WHT/BRN	26	36.	C/M 1	P1-16	WHT/YEL	26
37.	C/M 2	P1-32	WHT/GRN	26	38.	C/M 3	P1-15	WHT/VIO	26
39.	C/M 4	P1-31	WHT/ORG	26	40.	C/M 5	P1-14	WHT/GRY	26
41.	C/M 6	P1-30	WHT/BLU	26	42.	C/M 7	P1-13	WHT/BRN	26
43.	C/M 8	N/C			44.	C/M 9	N/C		
45.	C/M 10	N/C			46.	C/M 11	N/C		
47.	C/M 12	N/C			48.	C/M 13	N/C		
49.	GND	CHASS.	BLK	22	50.				
51.	C/M 14	N/C			52.	C/M 15	N/C		
53.	S2-1	FT-9	WHT/BLU	26	54.	S2-2	FT-10	WHT/ORG	26
55.	S2-3	FT-11	WHT/GRN	26	56.	S2-4	FT-12	WHT/BRN	26
57.	S2-5	FT-13	WHT/GRY	26	58.	S2-6	FT-14	WHT/VIO	26
59.	S102AB-1	FT-15	WHT/YEL	26	60.	S102AB-2	FT-16	WHT/BLK	26
61.	S3-1	FT-17	WHT/BLU	26	62.	S3-2	FT-18	WHT/ORG	26
63.	S3-3	FT-19	WHT/GRN	26	64.	S3-4	FT-20	WHT/BRN	26
65.	S3-5	FT-21	WHT/GRY	26	66.	S3-6	FT-22	WHT/VIO	26
67.	S6	FT-23	WHT/YEL	26	68.	S106AB-2	FT-24	WHT/BLK	26
69.	S4-1	FT-25	WHT/BLU	26	70.	S4-2	FT-26	WHT/ORG	26
71.	S4-3	FT-27	WHT/GRN	26	72.	S4-4	FT-28	WHT/BRN	26
73.	GND			22	74.				
75.	S4-5	FT-29	WHT/GRY	26	76.	S4-6	FT-30	WHT/VIO	26
77.	S102CD-1	FT-31	WHT/YEL	26	78.	S102CD-2	FT-32	WHT/BLK	26
79.	S7-1	FT-33	WHT/BLU	26	80.	S7-2	FT-34	WHT/ORG	26
81.	S7-3	FT-35	WHT/GRN	26	82.	S7-4	FT-36	WHT/BRN	26
83.	S8-1	FT-37	WHT/GRY	26	84.	S8-2	FT-38	WHT/VIO	26
85.	S8-3	FT-39	WHT/YEL	26	86.	S8-4	FT-40	WHT/BLK	26
87.	S9	FT-41	WHT/BLU	26	88.	S10-1	FT-42	WHT/ORG	26
89.	S10-2	FT-43	WHT/GRN	26	90.	S10-3	FT-44	WHT/BRN	26

INTERNAL WIRING HARNESS (cont.)

91. S10-4	FT-45	WHT/GRY	26	92. S11/12-1	FT-46	WHT/VIO	26
93. S11/12-2	FT-47	WHT/YEL	26	94. S106C	FT-48	WHT/BLK	26
95. +15v (2)	FT-52	WHT/RED	26	96. 28V	TB1-5	GRY	22
97. GND			22	98. 5V			
99. GND	TB1-1	BLK	22	100. 5V	TB1-7	ORG	22

PART II-STANDARD INTERFACE BOARD WIRING

JACK P1

PIN	FUNCTION	SOURCE	COLOR	GA
1.	5V	P1-50	ORG	26
2.	7V	W-21	WHT/ORG	26
3.	7.5V (1)	W-22	WHT/GRN	26
4.	-5V	TB1-2	BRN	26
5.	-7.5V	W-23	WHT/BLK	26
6.	AUX 1+	FT-63	WHT/BLU	26
7.	AUX 2+	FT-56	WHT/ORG	26
8.	7.5V (2)	W-25	W/RED	
9.	C/M 15			
10.	C/M 13			
11.	C/M 11			
12.	C/M 9			
13.	C/M 7	W-42	WHT/BRN	26
14.	C/M 5	W-40	WHT/GRY	26
15.	C/M 3	W-38	WHT/VIO	26
16.	C/M 1	W-36	WHT/YEL	26
17.	HI-LO SEL	W-14	WHT/BLK	26
18.	GND	P1-38	BUSS	26
19.	GND	P1-38	BUSS	26
20.	GND	P1-38	BUSS	26
21.	GND	P1-38	BUSS	26
22.	GND	P1-38	BUSS	26
23.	AUX 1-	FT-57	WHT/GRN	26
24.	AUX 2-	FT-49	WHT/GRY	26
25.	GND	P1-38	BUSS	26
26.	C/M 14			
27.	C/M 12			
28.	C/M 10			
29.	C/M 8			
30.	C/M 6	W-41	WHT/BLU	26
31.	C/M 4	W-39	WHT/ORG	26
32.	C/M 2	W-37	WHT/GRN	26
33.	C/M 0	W-35	WHT/BRN	26
34.	GND	TB1-1	BLK	22
35.	DEV REQ	W-16	WHT/GRY	26
36.	DEV ACK	W-15	WHT/VIO	26
37.	ANENB	W-18	WHT/YEL	26
38.	GND	P1-18,19,20,21,22,25	BUSS	26
39.	-15V	TB1-4	YEL	22
40.	15V	TB1-3	RED	22
41.	ADDR 7	W-26	WHT/RED	26

JACK P2

PIN	FUNCTION	SOURCE	COLOR	GA
1.	5V	TB1-7	ORG	22
2.	INT-2			
3.	INT-1			
4.				
5.	SYS RST+			
6.	SYS RST-			
7.	P1.7			
8.	P1.6			
9.	ID READ	W-17	WHT/RED	26
10.	DOUT			
11.	PARX			
12.	MSG			
13.	DIG GND			
14.	5V			
15.	15V	TB1-3	RED	22
16.	-15V	TB1-4	YEL	22
17.	GND	TB1-1	BLK	22
18.	X ACT			
19.	RCV+	FT-62	WHT-PR	26
20.	RCV-	FT-67	BLK-PR	26
21.	XMIT+	FT-61	RED-PR	26
22.	XMIT-	FT-66	BLK-PR	26
23.	RST SW			
24.	BUSY			
25.	GND			

INTERNAL WIRING HARNESS (cont.)

42.	ADDR 6	W-24	WHT/GRN	26
43.	ADDR 5	W-34	WHT/BLK	26
44.	ADDR 4	W-33	WHT/BLU	26
45.	ADDR 3	W-32	WHT/ORG	26
46.	ADDR 2	W-31	WHT/GRN	26
47.	ADDR 1	W-30	WHT/BRN	26
48.	ADDR 0	W-29	WHT/GRY	26
49.	R/W	W-28	WHT/YEL	26
50.	5V	TB1-7	ORG	22

PART III-REAR PANEL CONNECTOR WIRING

JACK 1 (AMP 42 PIN)

PIN	FUNCTION	SOURCE	COLOR	GA	PIN	FUNCTION	SOURCE	COLOR	GA
1.	AUX IN 1+	FT-63	WHT/BLU	26	2.	AUX IN 1-	FT-57	WHT/GRN	26
3.	AUX IN 2+	FT-56	WHT/ORG	26	4.	AUX IN 2-	FT-49	WHT/GRY	26
5.					6.				
7.					8.	XMIT+	FT-61	RED-PR	26
9.	XMIT-	FT-66	BLK-PR	26	10.	5V	FT-64	ORG	20
11.	-5V	FT-54	BRN	20	12.				
13.					14.	RCV+	FT-62	WHT-PR	26
15.	RCV-	FT-67	BLK-PR	26	16.	15V(1)	FT-59	RED	20
17.	-15V	FT-60	YEL	20	18.				
19.					20.				
21.					22.				
23.					24.				
25.					26.				
27.	+15v (2)	FT-52	WHT/RED	22					28.
29.	28V	FT-68	GRY	20	30.				
31.					32.				
33.					34.	GND	FT-55	BLK	20
35.					36.				
37.					38.				
39.					40.				
41.					42.				

JACK 2 (AMP 50 PIN)

PIN	FUNCTION	SOURCE	COLOR	GA	PIN	FUNCTION	SOURCE	COLOR	GA
A.	S1-1	FT-1	WHT/BLU	26	B.	S1-2	FT-2	WHT/ORG	26
C.	S1-3	FT-3	WHT/GRN	26	D.	S1-4	FT-4	WHT/BRN	26
E.	S1-5	FT-5	WHT/GRY	26	F.	S1-6	FT-6	WHT/VIO	26
H.	S5	FT-7	WHT/YEL	26	J.	S106AB-1	FT-8	WHT/BLK	26
K.	S2-1	FT-9	WHT/BLU	26	L.	S2-2	FT-10	WHT/ORG	26
M.	S2-3	FT-11	WHT/GRN	26	N.	S2-4	FT-12	WHT/BRN	26
P.	S2-5	FT-13	WHT/GRY	26	R.	S2-6	FT-14	WHT/VIO	26
S.	S102AB-1	FT-15	WHT/YEL	26	T.	S102AB-2	FT-16	WHT/BLK	26
U.	S3-1	FT-17	WHT/BLU	26	V.	S3-2	FT-18	WHT/ORG	26
W.	S3-3	FT-19	WHT/GRN	26	X.	S3-4	FT-20	WHT/BRN	26
Y.	S3-5	FT-21	WHT/GRY	26	Z.	S3-6	FT-22	WHT/VIO	26
a.	S6	FT-23	WHT/YEL	26	b.	S106AB-2	FT-24	WHT/BLK	26
c.	S4-1	FT-25	WHT/BLU	26	d.	S4-2	FT-26	WHT/ORG	26

INTERNAL WIRING HARNESS (cont.)

e. S4-3	FT-27	WHT/GRN	26	f. S4-4	FT-28	WHT/BRN	26
h. S4-5	FT-29	WHT/GRY	26	j. S4-6	FT-30	WHT/VIO	26
k. S102CD-1	FT-31	WHT/YEL	26	m. S102CD-2	FT-32	WHT/BLK	26
n. S7-1	FT-33	WHT/BLU	26	p. S7-2	FT-34	WHT/ORG	26
r. S7-3	FT-35	WHT/GRN	26	s. S7-4	FT-36	WHT/BRN	26
t. S8-1	FT-37	WHT/GRY	26	u. S8-2	FT-38	WHT/VIO	26
v. S8-3	FT-39	WHT/YEL	26	w. S8-4	FT-40	WHT/BLK	26
x. S9	FT-41	WHT/BLU	26	Y. S10-1	FT-42	WHT/ORG	26
z. S10-2	FT-43	WHT/GRN	26	AA. S10-3	FT-44	WHT/BRN	26
BB. S10-4	FT-45	WHT/GRY	26	CC. S11/12-1	FT-46	WHT/VIO	26
DD. S11/12-2	FT-47	WHT/YEL	26	EE. S106C	FT-48	WHT/BLK	26
FF.				HH.			

PART IV-REAR SHIELD PANEL, FILTER FEEDTHRU

INTERNAL CONNECTIONS

PIN	SOURCE	SOURCE	COLOR	GA
1.	S1-1	W-5	WHT/BLU	26
2.	S1-2	W-6	WHT/ORG	26
3.	S1-3	W-7	WHT/GRN	26
4.	S1-4	W-8	WHT/BRN	26
5.	S1-5	W-9	WHT/GRY	26
6.	S1-6	W-10	WHT/VIO	26
7.	S5	W-11	WHT/YEL	26
8.	S106AB-1	W-12	WHT/BLK	26
9.	S2-1	W-53	WHT/BLU	26
10.	S2-2	W-54	WHT/ORG	26
11.	S2-3	W-55	WHT/GRN	26
12.	S2-4	W-56	WHT/BRN	26
13.	S2-5	W-57	WHT/GRY	26
14.	S2-6	W-58	WHT/VIO	26
15.	S102AB-1	W-59	WHT/YEL	26
16.	S102AB-2	W-60	WHT/BLK	26
17.	S3-1	W-61	WHT/BLU	26
18.	S3-2	W-62	WHT/ORG	26
19.	S3-3	W-63	WHT/GRN	26
20.	S3-4	W-64	WHT/BRN	26
21.	S3-5	W-65	WHT/GRY	26
22.	S3-6	W-66	WHT/VIO	26
23.	S6	W-67	WHT/YEL	26
24.	S106AB-2	W-68	WHT/BLK	26
25.	S4-1	W-69	WHT/BLU	26
26.	S4-2	W-70	WHT/ORG	26
27.	S4-3	W-71	WHT/GRN	26
28.	S4-4	W-72	WHT/BRN	26
29.	S4-5	W-75	WHT/GRY	26
30.	S4-6	W-76	WHT/VIO	26
31.	S102CD-1	W-77	WHT/YEL	26
32.	S102CD-2	W-78	WHT/BLK	26
33.	S7-1	W-79	WHT/BLU	26
34.	S7-2	W-80	WHT/ORG	26

REAR PANEL CONNECTIONS

PIN	SOURCE	SOURCE	COLOR	GA
1.	S1-1	J2-A	WHT/BLU	26
2.	S1-2	J2-B	WHT/ORG	26
3.	S1-3	J2-C	WHT/GRN	26
4.	S1-4	J2-D	WHT/BRN	26
5.	S1-5	J2-E	WHT/GRY	26
6.	S1-6	J2-F	WHT/VIO	26
7.	S5	J2-H	WHT/YEL	26
8.	S106AB-1	J2-J	WHT/BLK	26
9.	S2-1	J2-K	WHT/BLU	26
10.	S2-2	J2-L	WHT/ORG	26
11.	S2-3	J2-M	WHT/GRN	26
12.	S2-4	J2-N	WHT/BRN	26
13.	S2-5	J2-P	WHT/GRY	26
14.	S2-6	J2-R	WHT/VIO	26
15.	S102AB-1	J2-S	WHT/YEL	26
16.	S102AB-2	J2-T	WHT/BLK	26
17.	S3-1	J2-U	WHT/BLU	26
18.	S3-2	J2-V	WHT/ORG	26
19.	S3-3	J2-W	WHT/GRN	26
20.	S3-4	J2-X	WHT/BRN	26
21.	S3-5	J2-Y	WHT/GRY	26
22.	S3-6	J2-Z	WHT/VIO	26
23.	S6	J2-a	WHT/YEL	26
24.	S106AB-2	J2-b	WHT/BLK	26
25.	S4-1	J2-c	WHT/BLU	26
26.	S4-2	J2-d	WHT/ORG	26
27.	S4-3	J2-e	WHT/GRN	26
28.	S4-4	J2-f	WHT/BRN	26
29.	S4-5	J2-h	WHT/GRY	26
30.	S4-6	J2-j	WHT/VIO	26
31.	S102CD-1	J2-k	WHT/YEL	26
32.	S102CD-2	J2-m	WHT/BLK	26
33.	S7-1	J2-n	WHT/BLU	26
34.	S7-2	J2-p	WHT/ORG	26

INTERNAL WIRING HARNESS (cont.)

35. S7-3	W-81	WHT/GRN	26	35. S7-3	J2-r	WHT/GRN	26
36. S7-4	W-82	WHT/BRN	26	36. S7-4	J2-s	WHT/BRN	26
37. S8-1	W-83	WHT/GRY	26	37. S8-1	J2-t	WHT/GRY	26
38. S8-2	W-84	WHT/VIO	26	38. S8-2	J2-u	WHT/VIO	26
39. S8-3	W-85	WHT/YEL	26	39. S8-3	J2-v	WHT/YEL	26
40. S8-4	W-86	WHT/BLK	26	40. S8-4	J2-w	WHT/BLK	26
41. S9	W-87	WHT/BLU	26	41. S9	J2-x	WHT/BLU	26
42. S10-1	W-88	WHT/ORG	26	42. S10-1	J2-y	WHT/ORG	26
43. S10-2	W-89	WHT/GRN	26	43. S10-2	J2-z	WHT/GRN	26
44. S10-3	W-90	WHT/BRN	26	44. S10-3	J2-AA	WHT/BRN	26
45. S10-4	W-91	WHT/GRY	26	45. S10-4	J2-BB	WHT/GRY	26
46. S11/12-1	W-92	WHT/VIO	26	46. S11/12-1	J2-CC	WHT/VIO	26
47. S11/12-2	W-93	WHT/YEL	26	47. S11/12-2	J2-DD	WHT/YEL	26
48. S106C	W-94	WHT/BLK	26	48. S106C	J2-EE	WHT/BLK	26
49. AUX IN 2-	P1-24	WHT/GRY	26	49. AUX IN 2-	J1-4	WHT/GRY	26
50.				50.			
51.				51.			
52. +15V (2)	W-95	WHT/RED	22	52. +15V (2)	P1-27	WHT/RED	22
53.				53.			
54. -5V	TB1-2	BRN	20	54. -5V	J1-11	BRN	20
55. GND	TB1-1	BLK	20	55. GND	J1-34	BLK	20
56. AUX IN 2+	P1-7	WHT/ORG	26	56. AUX IN 2+	J1-3	WHT/ORG	26
57. AUX IN 1-	P1-23	WHT/GRN	26	57. AUX IN 1-	J1-2	WHT/GRN	26
58.				58.			
59. 15V	TB1-3	RED	20	59. 15V	J1-16	RED	20
60. -15V	TB1-4	YEL	20	60. -15V	J1-17	YEL	20
61. XMIT+	P2-21	RED-PR	26	61. XMIT+	J1-8	RED-PR	26
62. RCV+	P2-19	WHT-PR	26	62. RCV+	J1-14	WHT-PR	26
63. AUX IN 1+	P1-6	WHT/BLU	26	63. AUX IN 1+	J1-1	WHT/BLU	26
64. 5V	TB1-7	ORG	26	64. 5V	J1-10	ORG	20
65.				65.			
66. XMIT-	P2-22	BLK-PR	26	66. XMIT-	J1-9	BLK-PR	26
67. RCV-	P2-20	BLK-PR	26	67. RCV-	J1-15	BLK-PR	26
68. 28V	TB1-5	GRY	20	68. 28V	J1-29	GRY	20

NOTE: WIRES ON FEEDTHRU'S 61 & 66, 62 & 67 ARE TWISTED PAIRS

PART V-POWER DISTRIBUTION TERMINAL BLOCK

POWER SUPPLY INPUT

POWER DISTRIBUTION

PIN	FUNCTION	SOURCE	COLOR	GA	SOURCE	COLOR	GA
TB1-1	GND	FT-55	BLK	20	P1-34, P2-17, W-1, W-99	BLK	22
TB1-2	-5V	FT-54	BRN	20	P1-4	BRN	26 TO 22
TB1-3	15V(1)	FT-59	RED	20	P1-40, P2-15, W-19	RED	22
TB1-4	-15V	FT-60	YEL	20	P1-39, P2-16, W-20	YEL	22
TB1-5	28V	FT-68	GRY	20	W-96	GRY	22
TB1-6							
TB1-7	5V	FT-64	ORG	20	P1-50; P2-14, W-2, W-100	ORG	22

Data Sheet - Selected Portions

1. UDN2981A Sprague

**SERIES UDN-2980A
HIGH-VOLTAGE, HIGH-CURRENT SOURCE DRIVERS**

**SERIES UDN-2980A
HIGH-VOLTAGE, HIGH-CURRENT SOURCE DRIVERS**

FEATURES

- TTL, DTL, PMOS, or CMOS Compatible Inputs
- 500 mA Output Source Current Capability
- Transient-Protected Outputs
- Output Breakdown Voltage to 80 V

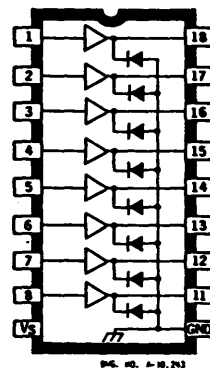
RECOMMENDED for applications requiring separate logic and load grounds, load supply voltage to +80 V, and load currents to 500 mA, Series UDN-2980A source drivers are used as interfaces between standard low-power digital logic and relays, solenoids, stepping motors, and LEDs.

Under normal operating conditions, these devices will sustain 120 mA continuously for each of the eight outputs at an ambient temperature of +50°C and a supply of +15 V. All devices in this series incorporate input current limiting resistors and output transient suppression diodes.

Type UDN-2981A and UDN-2983A drivers are for use with +5 V logic systems — TTL, Schottky TTL, DTL, and 5 V CMOS. Type UDN-2982A and UDN-2984A drivers are intended for MOS interface (PMOS and CMOS) operating from supply voltages

of 6 to 16 V. Types UDN-2981A and UDN-2982A will sustain a maximum output OFF voltage of +50 V, while Types UDN-2983A and UDN-2984A will sustain an output voltage of +80 V. In all cases, the output is switched ON by an active high input level.

Series UDN-2980A high-voltage, high-current source drivers are supplied in 18-lead dual in-line packages. On special order, hermetically-sealed versions of these devices (with reduced package power dissipation capability) can also be furnished.



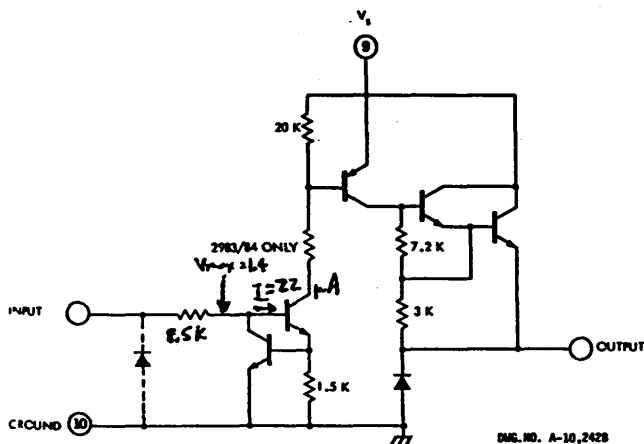
**ABSOLUTE MAXIMUM RATINGS
at 25°C Free-Air Temperature**

Output Voltage Range, V_{CE} (UDN-2981A & UDN-2982A)	+ 5 V to + 50 V
(UDN-2983A & UDN-2984A)	+ 35 V to + 80 V
Input Voltage, V_{in} (UDN-2981A & UDN-2983A)	+ 15 V
(UDN-2982A & UDN-2984A)	+ 30 V
Output Current, I_{out}	— 500 mA
Power Dissipation, P_D (any one driver)	1.1 W
(total package)	2.2 W*
Operating Temperature Range, T_A	— 20°C to + 85°C
Storage Temperature Range, T_S	— 55°C to + 150°C

*Derate at the rate of 18 mW/°C above + 25°C.

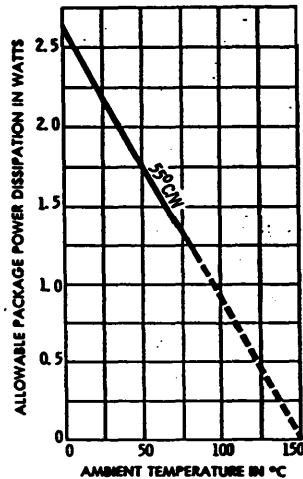
SERIES UDN-2980A
HIGH-VOLTAGE, HIGH-CURRENT SOURCE DRIVERS

ONE OF EIGHT DRIVERS



ENC. NO. A-10,2429

POWER DISSIPATION
AS A FUNCTION OF AMBIENT TEMPERATURE



Dwg. No. A-11,112A

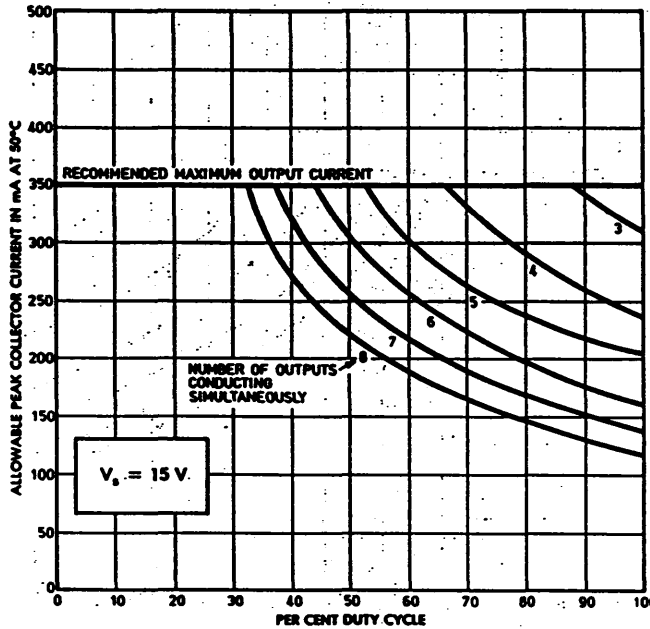
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ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$ (unless otherwise specified)

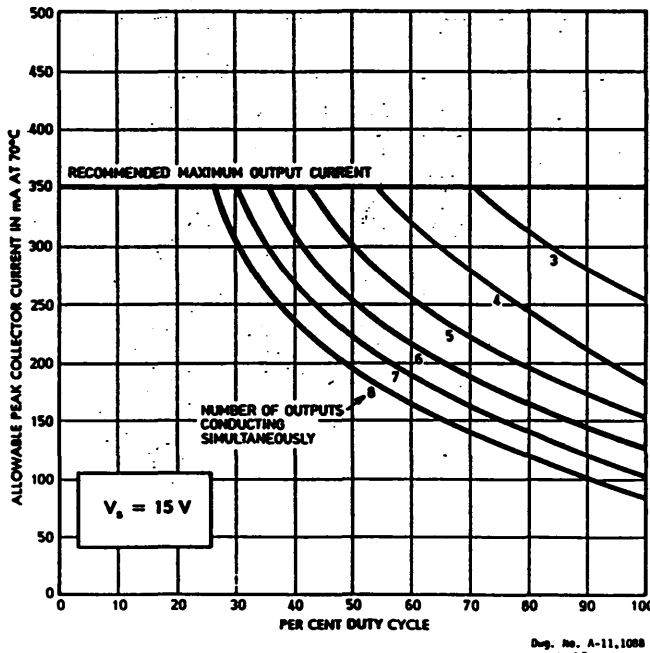
Characteristic	Symbol	Applicable Devices	Test Conditions	Test Fig.	Limit			Units
					Min.	Typ.	Max.	
Output Leakage Current	I_{CEX}	UDN-2981/82A	$V_M = 0.4\text{ V}^*$, $V_S = 50\text{ V}$, $T_A = +70^\circ\text{C}$	1	—	—	200	μA
		UDN-2983/84A	$V_M = 0.4\text{ V}^*$, $V_S = 80\text{ V}$, $T_A = +70^\circ\text{C}$	1	—	—	200	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	All	$V_M = 2.4\text{ V}$, $I_{OUT} = -100\text{ mA}$	2	—	1.6	1.8	V
			$V_M = 2.4\text{ V}$, $I_{OUT} = -225\text{ mA}$	2	—	1.7	1.9	V
			$V_M = 2.4\text{ V}$, $I_{OUT} = -350\text{ mA}$	2	—	1.8	2.0	V
Input Current	$I_{IN(20)}$	UDN-2981/83A	$V_M = 2.4\text{ V}$	3	—	140	200	μA
			$V_M = 3.85\text{ V}$	3	—	310	450	μA
		UDN-2982/84A	$V_M = 2.4\text{ V}$	3	—	140	200	μA
			$V_M = 12\text{ V}$	3	—	1.25	1.93	mA
Output Source Current	I_{OUT}	UDN-2981/83A	$V_M = 2.4\text{ V}$, $V_{CE} = 2.0\text{ V}$	2	-350	—	—	mA
		UDN-2982/84A	$V_M = 2.4\text{ V}$, $V_{CE} = 2.0\text{ V}$	2	-350	—	—	mA
Supply Current (Outputs Open)	I_S	UDN-2981/82A	$V_M = 2.4\text{ V}^*$, $V_S = 50\text{ V}$	4	—	—	10	mA
		UDN-2983/84A	$V_M = 2.4\text{ V}^*$, $V_S = 80\text{ V}$	4	—	—	10	mA
Clamp Diode Leakage Current	I_R	UDN-2981/82A	$V_R = 50\text{ V}$, $V_M = 0.4\text{ V}^*$	5	—	—	50	μA
		UDN-2983/84A	$V_R = 80\text{ V}$, $V_M = 0.4\text{ V}^*$	5	—	—	50	μA
Clamp Diode Forward Voltage	V_F	All	$I_F = 350\text{ mA}$	6	—	1.5	2.0	V
Turn-On Delay	t_{ON}	All	$0.5 E_M$ to $0.5 E_{OUT}$, $R_L = 100\Omega$, $V_S = 35\text{ V}$	—	—	1.0	2.0	μs
Turn-Off Delay	t_{OFF}	All	$0.5 E_M$ to $0.5 E_{OUT}$, $R_L = 100\Omega$, $V_S = 35\text{ V}$	—	—	5.0	10	μs

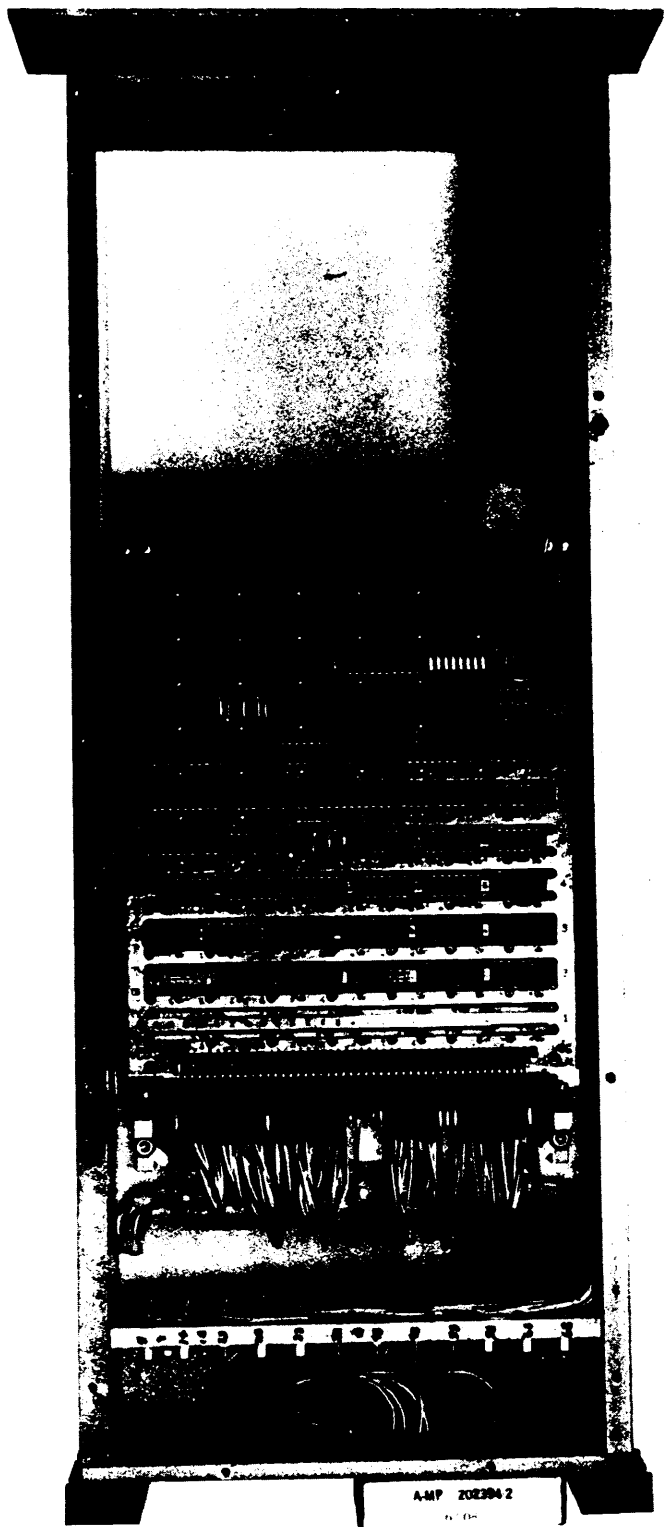
*All Inputs Simultaneously

ALLOWABLE PEAK COLLECTOR CURRENT
AS A FUNCTION OF DUTY CYCLE
TYPE UDN-2981A/82A

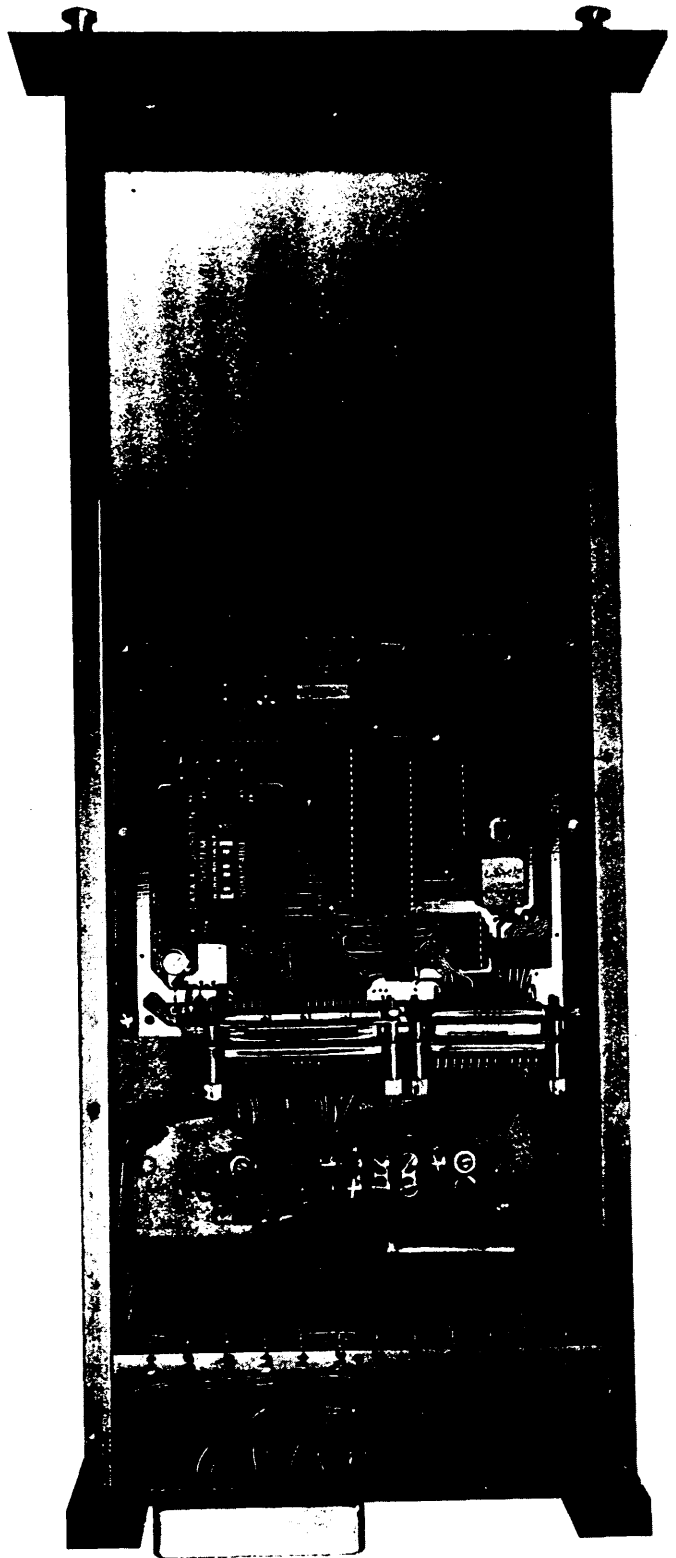


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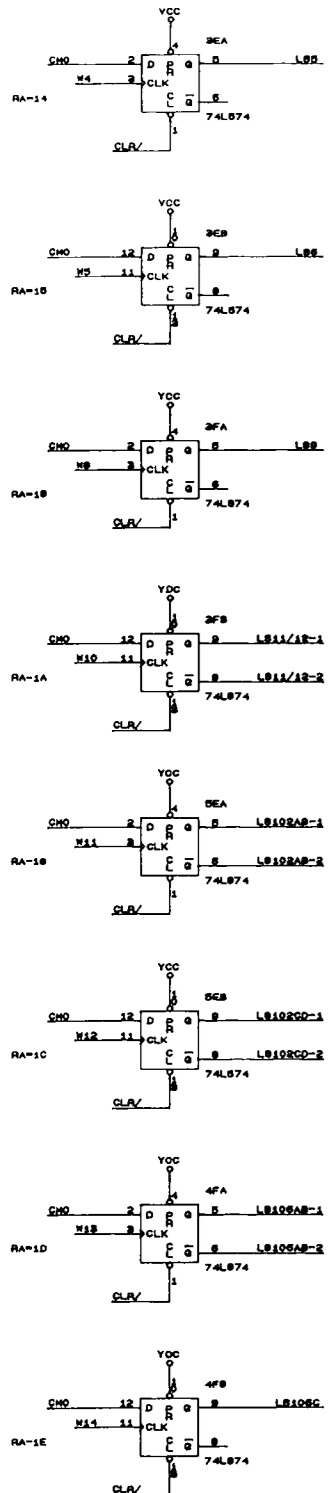
A-MP 202304 2
10-10



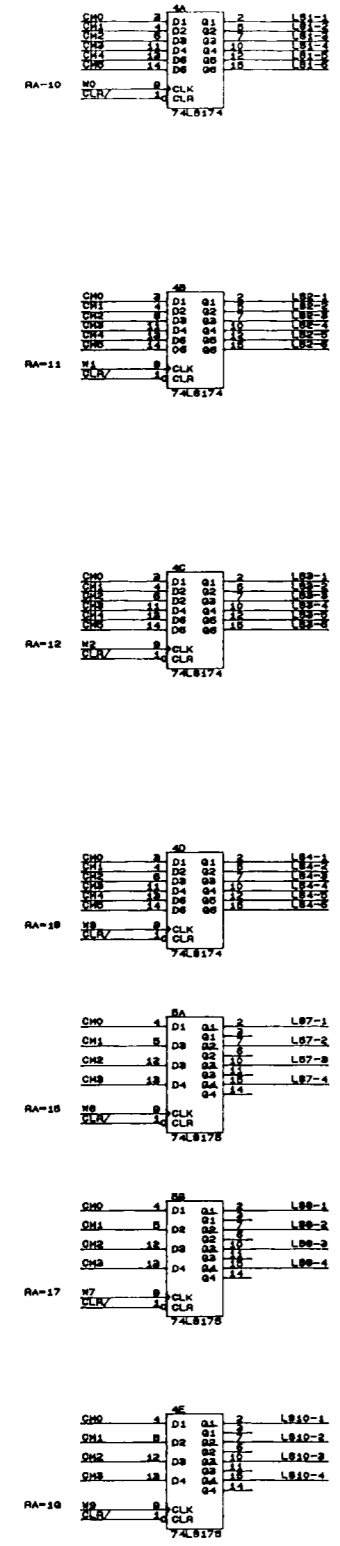
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10-10

REV.	DATE	DRAWN BY	APPROV'D BY	DESCRIPTION
0	1-88	K. TATE		UPDATED TO NRAO STANDARDS
H	8-88	K. TATE		ADDED R76, R77
J	7-88	K. TATE		MINOR CORRECTIONS

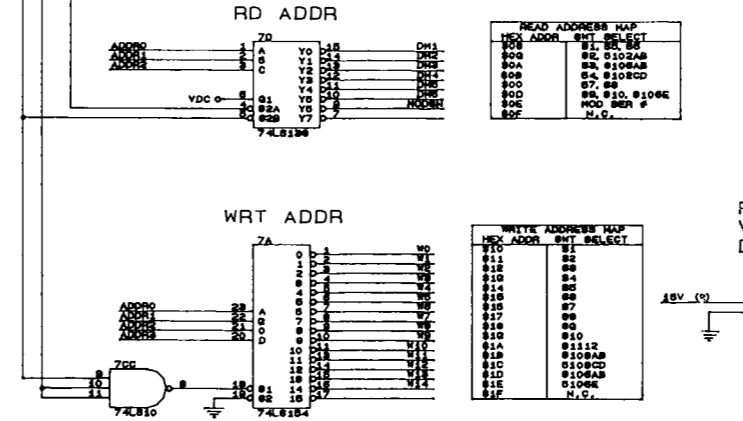
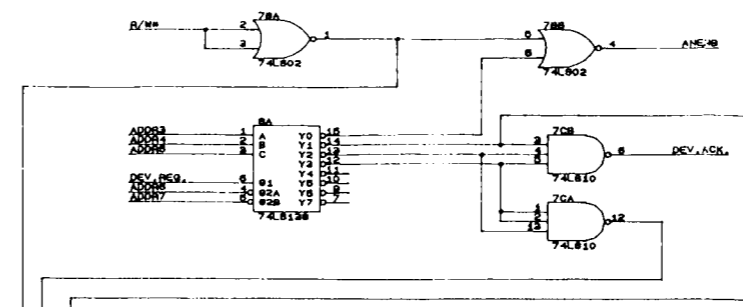
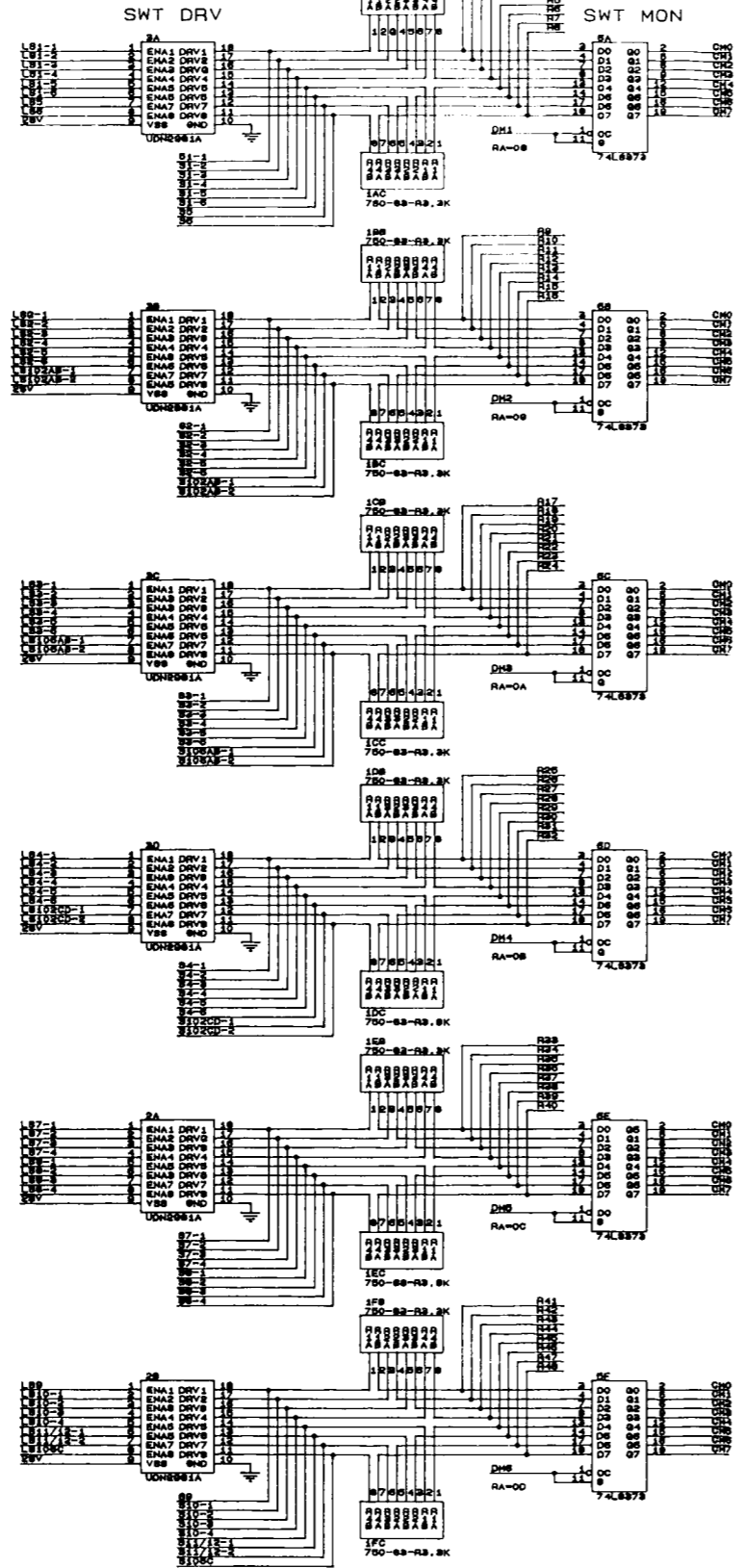
SWT LATCH



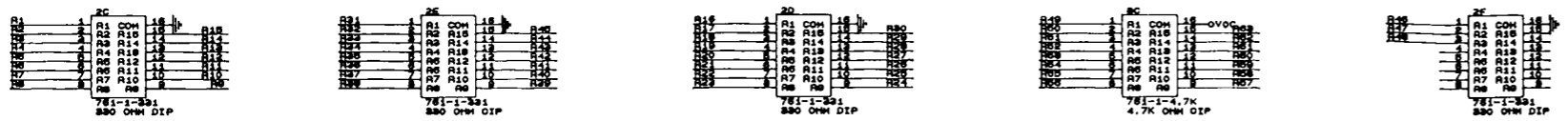
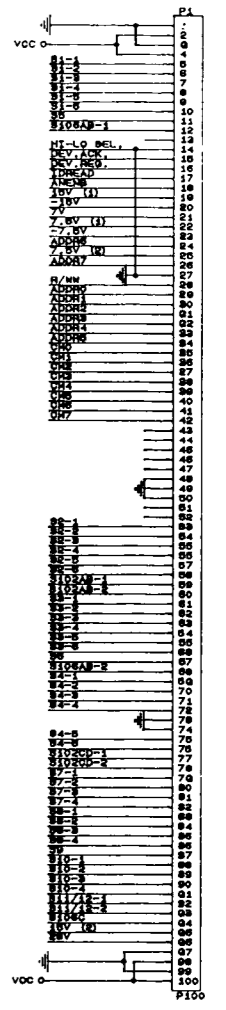
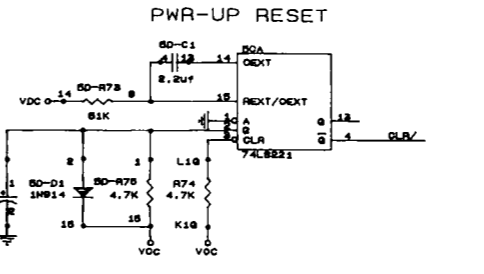
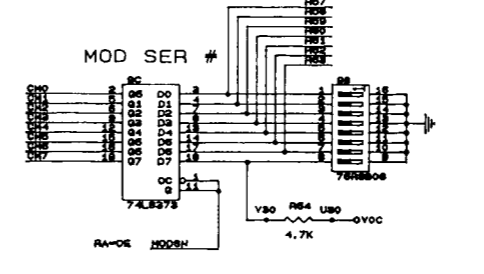
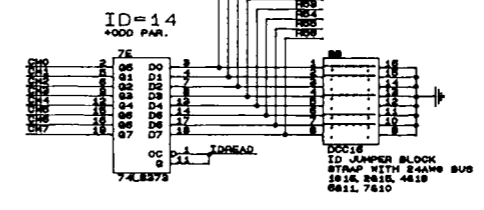
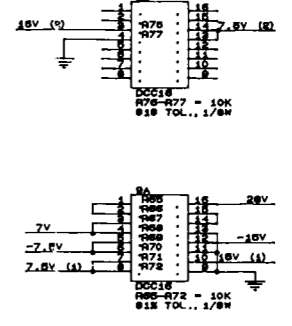
SWT LATCH



UDN8851A HIGH VOLTAGE DRIVER
TTL LOGIC HIGH ENA EQUALS
28 VOLTS OUT ON DRV.



PRECISION VOLTAGE DIVIDERS



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES: 2
8 PLACE DECIMALS (.0000) 2
6 PLACE DECIMALS (.000) 2
1 PLACE DECIMALS (.X) 2

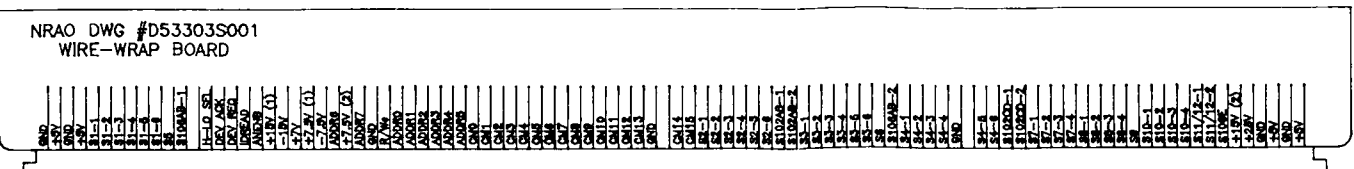
MATERIAL:

FINISH:

088080001	WIRE LIST
088080001	BOX
088080001	ASSEMBLY
NEXT ASSEMBLY	DWG TYPE

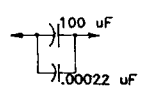
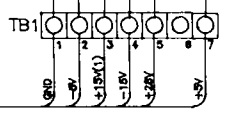
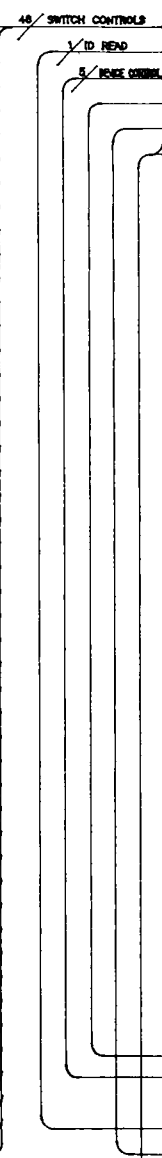
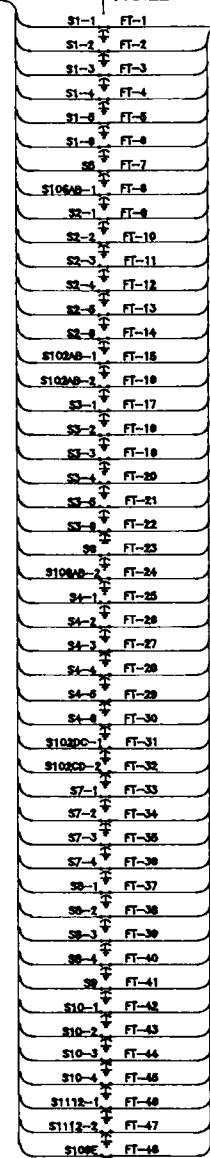
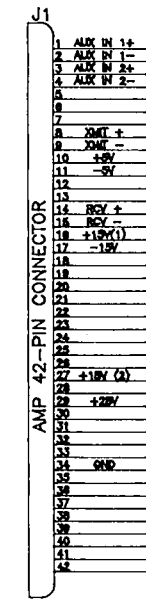
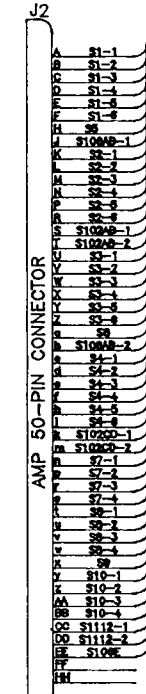
NATIONAL RADIO ASTRONOMY OBSERVATORY
30000RD, MENAHEXICO 87801
DRAWN BY: M. WINDHAM DATE: 2-88
DESIGNED BY: DATE:
APPROVED BY: DATE:
SHEET NUMBER: 1 OF 1 DRAWING NUMBER: 088080001 REV: J SCALE:

REV	DATE	DRAWN BY	APPRYD BY	DESCRIPTION
C	4-93	K. TATE	J. OTY	REVISED AND REDRAWN
D	5-93	K. TATE	J. OTY	MINOR CORRECTIONS

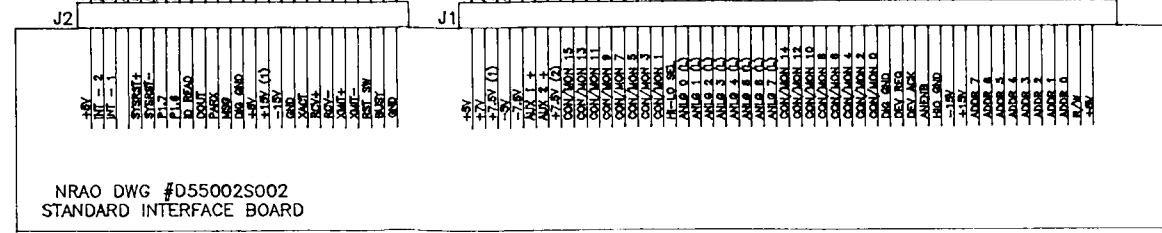


REAR PANEL

REAR SHIELD PANEL



NOTE:
ABOVE CAPACITOR COMBINATION CONNECTED
ACROSS EACH POWER SUPPLY AT TB1



NEXT ASSEMBLY	DWG. TYPE
---------------	-----------

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

V L B A

L107
SWITCH DRIVER
MODULE

NATIONAL RADIO
ASTRONOMY
OBSERVATORY
SOCORRO, NEW MEXICO 87801

DRAWN BY W. WIREMAN DATE 3-87

DESIGNED BY DATE

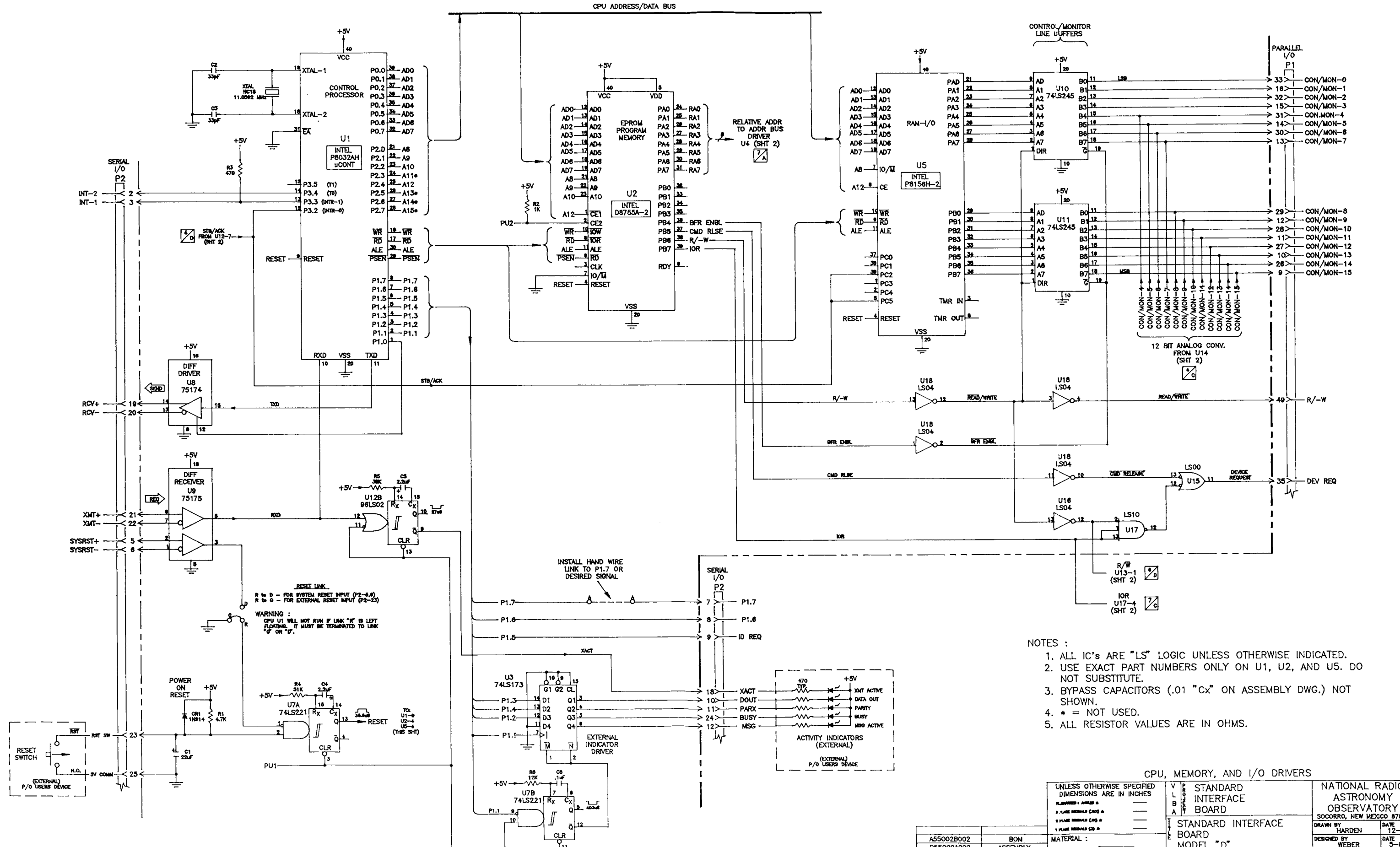
APPROVED BY DATE

MATERIAL :

FINISH :

SHEET NUMBER 1 OF 1 DRAWING NUMBER D53303W001 REV. D SCALE NONE

REV	DATE	DRAWN BY	APPRVD BY	DESCRIPTION
C	1-91	ANDREATA		REDRAWN WITH ACAD :



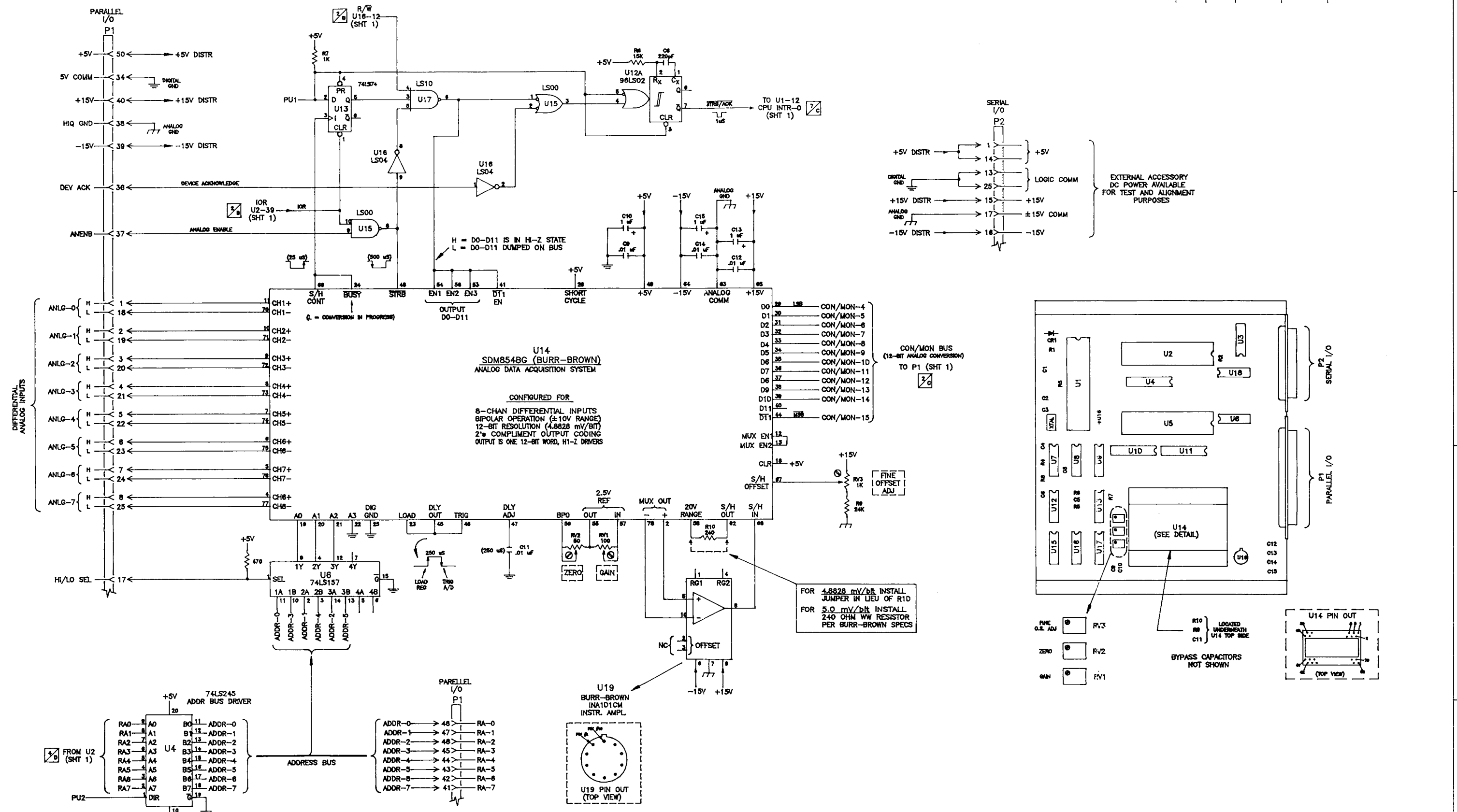
RESET LINK
 R to D - FOR SYSTEM RESET INPUT (P2-5,6)
 R to G - FOR EXTERNAL RESET INPUT (P2-23)

WARNING :
 CPU U1 WILL NOT RUN IF LINK "R" IS LEFT FLOTTING. IT MUST BE TERMINATED TO LINK "D" OR "G".

- NOTES :
- ALL IC'S ARE "LS" LOGIC UNLESS OTHERWISE INDICATED.
 - USE EXACT PART NUMBERS ONLY ON U1, U2, AND U5. DO NOT SUBSTITUTE.
 - BYPASS CAPACITORS (.01 "Cx" ON ASSEMBLY DWG.) NOT SHOWN.
 - * = NOT USED.
 - ALL RESISTOR VALUES ARE IN OHMS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		NATIONAL RADIO ASTRONOMY OBSERVATORY SOCORRO, NEW MEXICO 87801	
A55002B002	BOM	STANDARD INTERFACE BOARD	DRAWN BY HARDEN DATE 12-85
D55002A002	ASSEMBLY	BOARD	DESIGNED BY WEBER DATE 5-84
D55002P002	DRILL DWG.	MODEL "D"	APPROVED BY DATE
D55002Q002	ARTWORK	SCHEMATIC DIAGRAM	
NEXT ASSEMBLY	DWG. TYPE		

REV	DATE	DRAWN BY	APPRVD BY	DESCRIPTION
C	1-91	ANDREAITA		REDRAWN WITH ACAD



ACAD : SIBDSK-2

ANALOG CIRCUITRY		NATIONAL RADIO ASTRONOMY OBSERVATORY	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	V L B T	STANDARD INTERFACE BOARD	SOCORRO, NEW MEXICO 87801
3 PLAIN LAMINAR CASE #		STANDARD INTERFACE BOARD MODEL "D" SCHEMATIC DIAGRAM	DRAWN BY HARDEN DATE 12-85
1 PLAIN PERMAD CASE #			DESIGNED BY WEBER DATE 5-84
1 PLAIN PERMAD CASE #			APPROVED BY DATE
MATERIAL :			
FINISH :			
SHEET NUMBER 2 of 2	DRAWING NUMBER D55002S002	REV. C	SCALE

