



pdp11

AD01-D
analog-to-digital
conversion
subsystem
engineering drawings



DO NOT
REMOVE

digital

**AD01-D
analog-to-digital
conversion
subsystem
engineering drawings**

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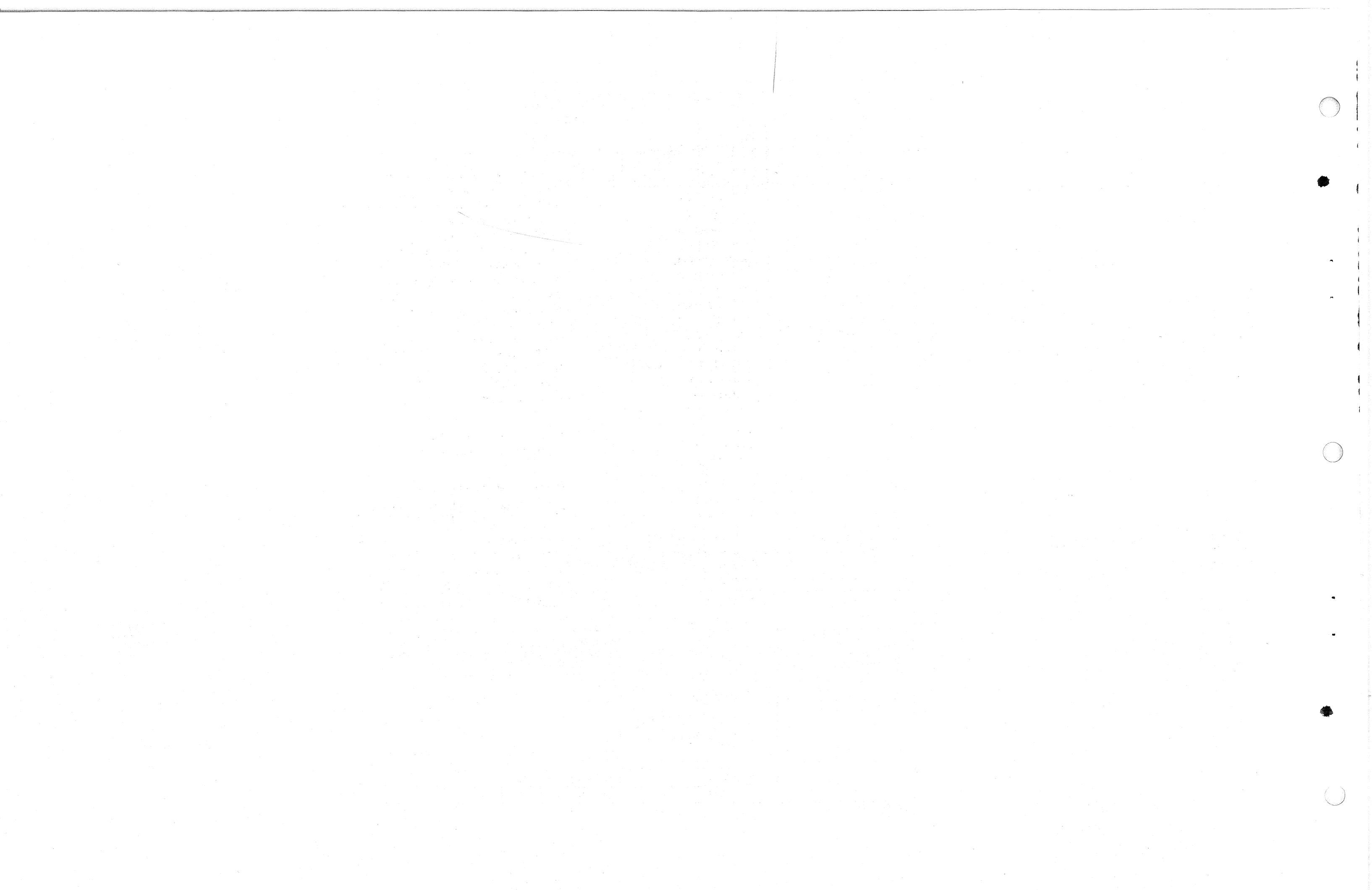
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DEC	PDP
FLIP CHIP	FOCAL
DIGITAL	COMPUTER LAB

AD01-D Subsystem

Drawing Number	Title
A-ML-AD01-DA	10 Bit ADC with Switch Gain (AD01-DA)
D-UA-AD01-0	10 Bit ADC with Switched Gain
A-PL-AD01-D-0	10 Bit ADC with Switched Gain (Parts List)
D-DI-AD01-D-1	Drawing Index List (AD01-D)
D-AD-7006919-0-0	Wired Assembly (AD01-D)
A-PL-7006919-0-0	Wired Assembly (Parts List) (AD01-D)
D-MU-AD01-D-02	Module Utilization (AD01-D)
A-PL-AD01-D-02	Module Utilization (Parts List) (AD01-D)
D-BS-AD01-D-03	Multiplexer
D-BS-AD01-D-04	Interface and CSR
D-BS-AD01-D-05	A/D Converter
D-IC-AD01-D-06	Analog Input Connectors
D-IC-AD01-D-09	Bus Connector
K-WL-AD01-D-0 (Complete)	Wire List (AD01-D)
A-AL-AD01-D-8	Accessory List
A-SP-AD01-D-10	Engineering Specifications
A-SP-AD01-D-12	Acceptance Procedure
A-ML-AH04-0	Sample and Hold Option AH04
A-PL-AH04-0-0	Sample and Hold (Parts List)
C-CS-A405-0-1	Sample and Hold
A-ML-AH05-0	One Bit Extender for AD01
A-PL-AH05-0-0	One Bit Extender for AD01 (Parts List)
D-CS-A862-0-1	11 Bit A/D Converter with Sign
D-CS-A812-0-1	A/D Converter
C-UA-H727-A-0	H727-A Power Supply, 115V
C-UA-H727-B-0	H727-B Power Supply, 230V
D-UA-H716-B-0	H716-B Power Supply, 115V
D-UA-H716-D-0	H716-D Power Supply, 230V



MASTER DRAWING LIST

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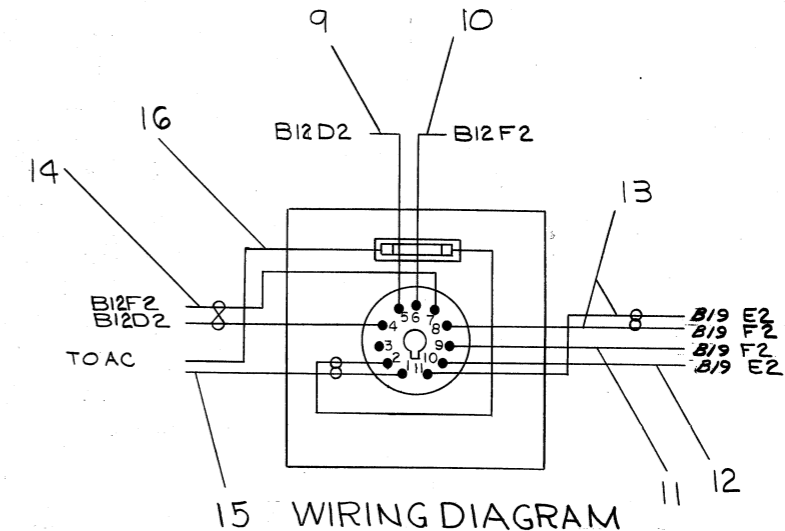
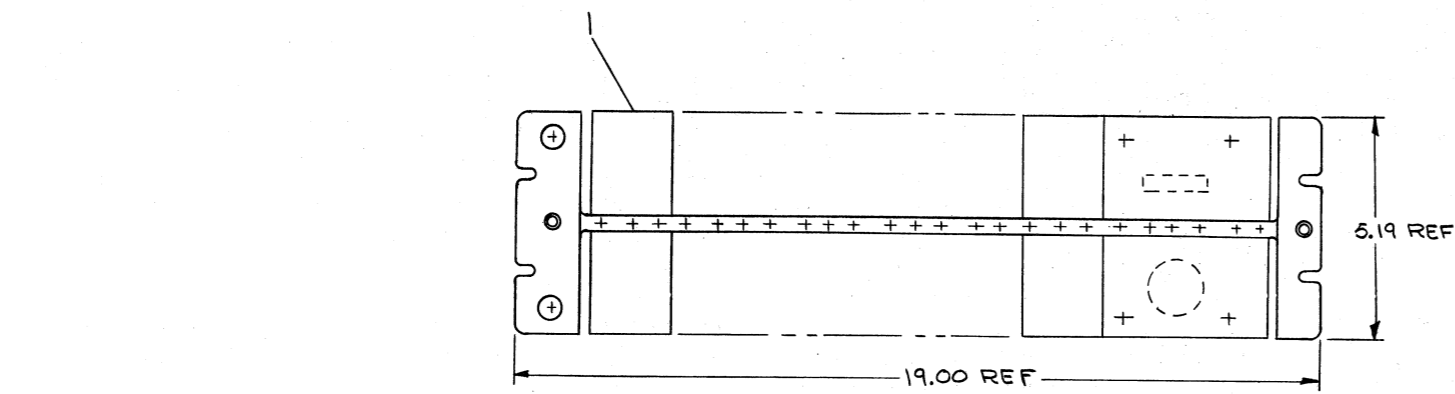
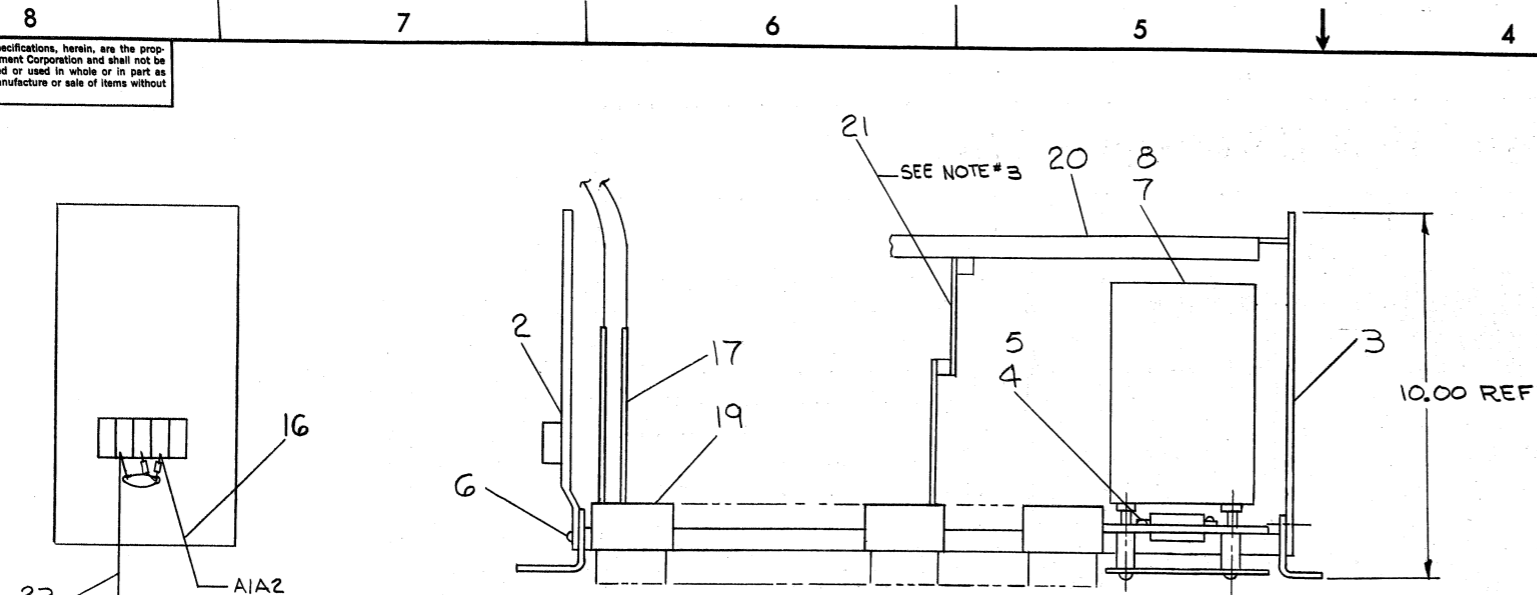
DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
D-UA-AD01-D-0	A	1	10 BIT ADC WITH SWITCHED GAIN
A-PL-AD01-D-0	A	2	10 BIT WITH SWITCHED GAIN
D-DI-AD01-D-1	C	1	DRAWING INDEX LIST (AD01-D)
D-AD-7006919-0-0	A	1	WIRED ASSY (AD01-D)
A-PL-7006919-0-0	A	1	WIRED ASSY (AD01-D)
D-MU-AD01-D-02	B	1	MODULE UTILIZATION (AD01-D)
A-LL-AD01-D-02	B	1	MODULE UTILIZATION (AD01-D)
D-BS-AD01-D-03	B	1	MULTIPLEXER
D-BS-AD01-D-04	A	2	INTERFACE & CSR
D-BS-AD01-D-05	A	2	A/D CONVERTER
D-IC-AD01-D-06	A	1	ANALOG INPUT CONNECTORS
D-IC-AD01-D-09		1	BUS CONNECTOR
K-WL-AD01-D-07	A		WIRE LIST (AD01-D)
A-AL-AD01-D-8		1	ACCESSORY LIST
A-SP-AD01-D-10		22	ENGINEERING SPECS.
A-SP-AD01-D-11		17	CALIBRATION PROCEDURE
A-SP-AD01-D-12	REF	8	ACCEPTANCE PROCEDURE
A-ML-AH04-0			SAMPLE & HOLD
A-ML-AH05-0			SIGN BIT EXTENSION
D-CS-A812-0-1			A/D CONVERTER

REVISIONS				DRN.	DATE	digital CORPORATION <small>MAYNARD, MASSACHUSETTS</small>
REV.	DATE	CHG. NO.	APP'D.	ELANDERS	DATE	
A	10/70	AD01D-1	P.S.	ELANDERS	5/5/70	TITLE 10 BIT ADC WITH SWITCH GAIN (AD01-DA)
B	1/71	AD01D-3	P.S.	NEALY	6/23/70	
C	3/71	AD01D-4	P.S.	<i>[Signature]</i>	<i>[Date]</i>	
D	3/71	AD01D-5	P.S.	<i>[Signature]</i>	<i>[Date]</i>	
				<i>[Signature]</i>	<i>[Date]</i>	
				PROJ. ENG.	DATE	
				PROD.	DATE	
				FIRST USED ON		
				FDP-11		
				SCALE		
				SHEET	1 OF 1	
				SIZE	CODE	NUMBER
				A	ML	AD01-DA
				DIST.		

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LEGEND	
NUMBER	VARIATION
ADØ1-DA	110V INPUT
ADØ1-DB	220V INPUT

- NOTES
- 1 FOR DWG INDEX LIST REFER TO DWG # D-DI-ADØ1-D-1.
 2. ITEM #18 & #22 NOT SHOWN (#18 USED WITH ADØ1-DB) (#22 USED WITH ADØ1-DA)
 3. IF OPTIONAL MODULES ARE USED ITEM #21 WILL BE REQ'D REFER TO D-MU-ADØ1-D-Ø2.



REV.	CHANGE NO.	DESCRIPTION
A	ADØ1-D-ØØØØ	
	10/21/70	
	P. SEVERTINO	

FIRST USED ON OPTION / MODEL
PDP-11

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSION IN INCHES
TOLERANCES
FINISH

QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST			
digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS			
TITLE 1Ø BIT ADC WITH SWITCHED GAIN			
NEXT HIGHER ASSY A-ML-ADØ1-DA		SIZE CODE DUA	NUMBER ADØ1-D-Ø
SCALE		DIST.	REV. A
SHEET	OF		

REV. A
NUMBER
ADØ1-D-Ø

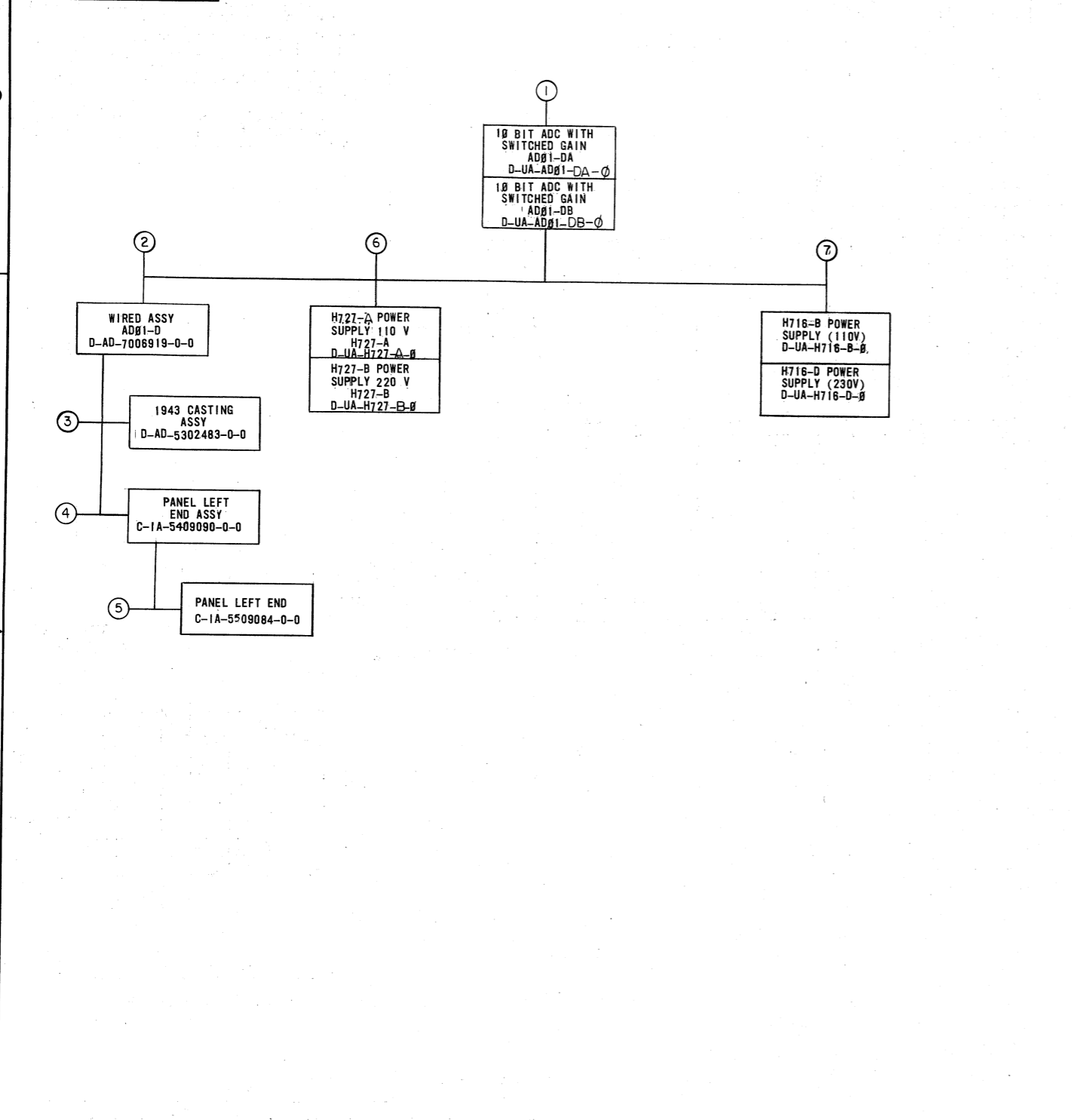
DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS				QUANTITY/VARIATION															
PARTS LIST				ADØ1-DA	ADØ1-DB														
MADE BY G. FLANDERS	CHECKED D. HEALY	SECTION																	
DATE 6/9/70	DATE 6/23/70	1																	
ENG	PROD A. Hirsch	ISSUED SECT.																	
DATE Paul J. Swain #2/2	DATE 8-25-70	1																	
ITEM NO.	DWG NO. / PART NO.	DESCRIPTION																	
1	D-AD-7006919-0-0	WIRED ASSY (ADØ1-D)		1	1														
2	C-IA-5409090-0-0	PANEL, LEFT END ASSY		1	1														
3	C-MD-5308898-0-0	PANEL, RIGHT END		1	1														
4	9006634	LOCK WASHER INT TOOTH #8		3	3														
5	9006210	SCR PHL, FIL HD #8-32 X 5/8 SST		3	3														
6	9006509	POP RIVET #AD43ABS U.S.M.C.		8	8														
7	C-UA-H727-A-Ø	H727-A POWER SUPPLY 110V		1															
8	C-UA-H727-B-Ø	H727-B POWER SUPPLY 220V			1														
9	9107350-99	#22 AWG STRD WIRE YEL		A/RA/R															
10	9107350-00	#22 AWG STRD WIRE BLK		A/RA/R															
11	9107350-11	#22 AWG STRD WIRE BRN		A/RA/R															
12	9107350-55	#22 AWG STRD WIRE GRN		A/R	A/R														
13	9107430-51	22 AWG TWP WIRE GRN/BRN		A/RA/R															
14	9107420-40	22 AWG TWP WIRE YEL/BLK		A/RA/R															
15	9107430-29	18 AWG TWP WIRE RED/WHT		A/RA/R															
16	9107360-22	18 AWG STRD KYNAR WIRE RED		A/RA/R															
17	D-UA-BC11A-Ø-Ø	BC11 CABLE (LGTH SPEC BY ENG)		2	2														
18	D-UA-H716-D-Ø	H716-D POWER SUPPLY (220V)			1														
19	A-MU-ADØ1-D-Ø2	MODULE UTILIZATION (PL)		1	1														
20	D-MAD-1945-19-1	1945 HOLD DOWN BAR (1943)		1	1														
21	A-BL-H85Ø-Ø-Ø	MODULE EXTENDER (H850)		11	11														
22	D-UA-H716-B-Ø	H716-B POWER SUPPLY (110V)		1															
TITLE		ASSY NO.		SIZE	CODE	NUMBER		REV.	ECO NO.										
1Ø BIT ADC WITH SWITCHED GAIN		D-UA-ADØ1-D-Ø		A	PL	ADØ1-D-Ø		A	ADØ1D 00001										
		SHEET 1 OF 2		DIST.	C														

DEC FORM NO.
DRA 110

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REV. C
NUMBER
D DIAD01-D-1
3000 3215

D
C
B
A



MECHANICAL			DEPT USAGE		
FIND NO.	DESCRIPTION	PART NO.	PROD	CUST	F/C
1.	10 BIT ADC WITH SWITCHED GAIN (AD01-DA)	D-UA-AD01-DA-0			
	10 BIT ADC WITH SWITCHED GAIN (AD01-DA) (PL)	A-PL-AD01-DA-0			
	10 BIT ADC WITH SWITCHED GAIN (AD01-DB)	D-UA-AD01-DB-0			
	10 BIT ADC WITH SWITCHED GAIN (AD01-DB) (PL)	A-PL-AD01-DB-0			
	PANEL, RIGHT END	C-MD-5308897-0-0			
	BC11A CABLE (LGTH. SPEC BY ENG)	C-MD-5308898-0-0			
	MODULE UTILIZATION (PL)	D-UA-BC11A-B-0			
		A-PL-AD01-D-02			
2.	WIRED ASSY (AD01-D)	D-AD-7006919-0-0			
	WIRED ASSY (AD01-D) (PL)	A-PL-7006919-0-0			
	288 PIN BLOCK TYPE H803	E-SC-1205348-0-0			
	21 POINT DECALS "A"	B-DC-5308753-0-2			
	21 POINT DECALS "B"	B-DC-5308753-0-4			
3.	1943 CASTING ASSY	D-AD-5302483-0-0			
	1943 CASTING ASSY (PL)	A-PL-5302483-0-0			
4.	PANEL LEFT END ASSY	C-IA-5409090-0-0			
5.	PANEL LEFT END POWER DECAL	C-IA-5509084-0-0			
		C-IA-5509084-0-1			
6.	H727-A POWER SUPPLY 110V	D-UA-H727-A-B			
	H727-A POWER SUPPLY 110 V (PL)	A-PL-H727-A-B			
	H727-B POWER SUPPLY 220 V	D-UA-H727-B-B			
	H727-B POWER SUPPLY 220 V (PL)	A-PL-H727-B-B			
7.	H716-B POWER SUPPLY (110V)	D-UA-H716-B-B			
	H716-B POWER SUPPLY (PL)	A-PL-H716-B-B			
	H716-D POWER SUPPLY (230V)	D-UA-H716-D-B			
	H716-D POWER SUPPLY (PL)	A-PL-H716-D-B			

ELECTRICAL			DEPT USAGE		
FIND NO.	DESCRIPTION	PART NO.	PROD	CUST	F/C
1.	10 BIT ADC WITH SWITCHED GAIN (AD01-DA)	A-ML-AD01-DA			
	10 BIT ADC WITH SWITCHED GAIN (AD01-DB)	A-ML-AD01-DB			
	MULTIPLEXER	D-BS-AD01-D-03			
	INTERFACE & CSR	D-BS-AD01-D-04			
	A/D CONVERTER	D-BS-AD01-D-05			
	ANALOG INPUT CONNECTORS	D-IC-AD01-D-06			
	WIRE LIST AD01-D	K-WL-AD01-D-07			
	MODULE UTILIZATION	D-MU-AD01-D-02			
	MODULE UTILIZATION (PL)	A-PL-AD01-D-02			
	BUS CONNECTOR	D-IC-AD01-D-09			
	ACCESSORY LIST	A-AL-AD01-D-08			
	ENG SPECS	A-SP-AD01-D-10			
	CALIBRATION PROCEDURE	A-SP-AD01-D-11			
	ACCEPTANCE PROCEDURE	A-SP-AD01-D-12			
	WIRED ASSY (AD01-D)	D-AD-7006919-0-0			
	WIRED ASSY (AD01-D) (PL)	A-PL-7006919-0-0			
2.					
6.	H727-A POWER SUPPLY 110 V CIRCUIT SCHEMATIC	CS-H727-A-1			
	H727-B POWER SUPPLY 220 V CIRCUIT SCHEMATIC	CS-H727-B-1			
7.	H716-B POWER SUPPLY CIRCUIT SCHEMATIC	C-CS-H716-B-1			
	H716-D POWER SUPPLY CIRCUIT SCHEMATIC	C-CS-H716-D-1			

REV.	CHANGE NO.	BY	DATE
A	0001	FV	10/21/70
B	0003	P. SEVERINO	1-29-71
C	0004	P. SEVERINO	3-71
		P. SEVERINO	5-28-71
		P. SEVERINO	5-27-71

FIRST USED ON OPTION/MODEL
AD01-D

DRN.	DATE
<i>[Signature]</i>	6/1/70
<i>[Signature]</i>	7-13-70
<i>[Signature]</i>	8-25-70
<i>[Signature]</i>	8-25-70
<i>[Signature]</i>	8-25-70

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE: **DRAWING INDEX LIST (AD01-D)**

SIZE CODE: **DDI AD01-D-1**

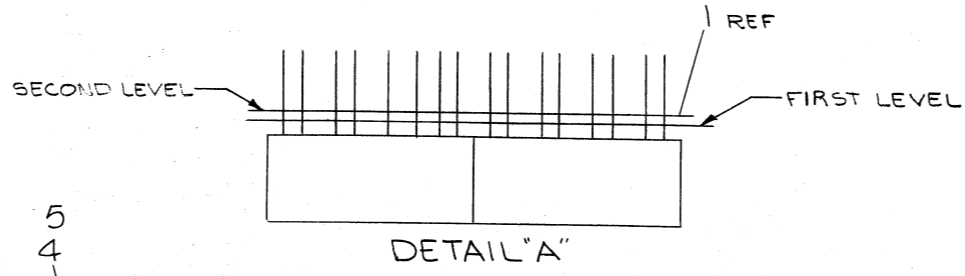
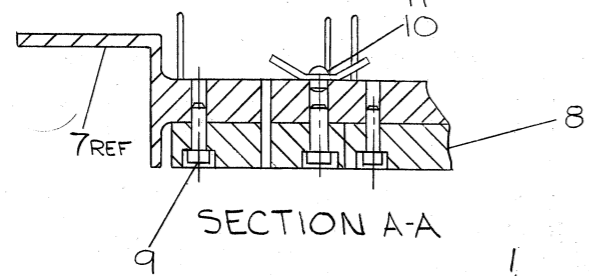
NUMBER: **1**

REV. **C**

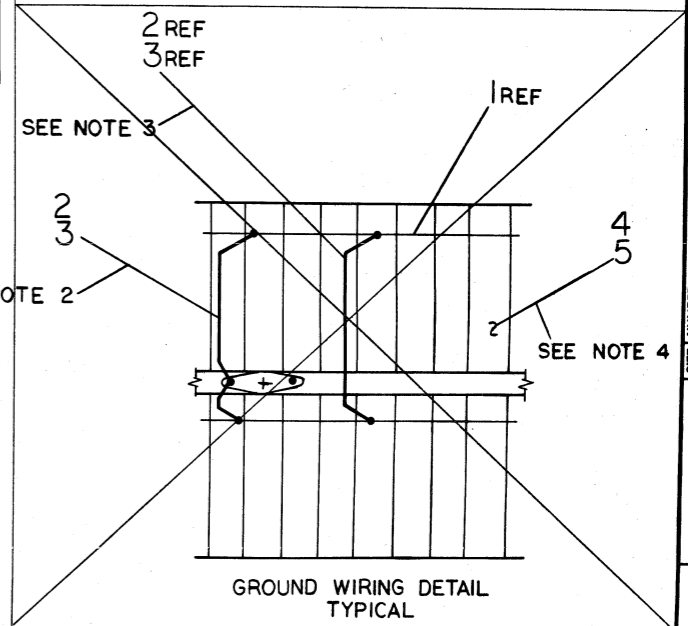
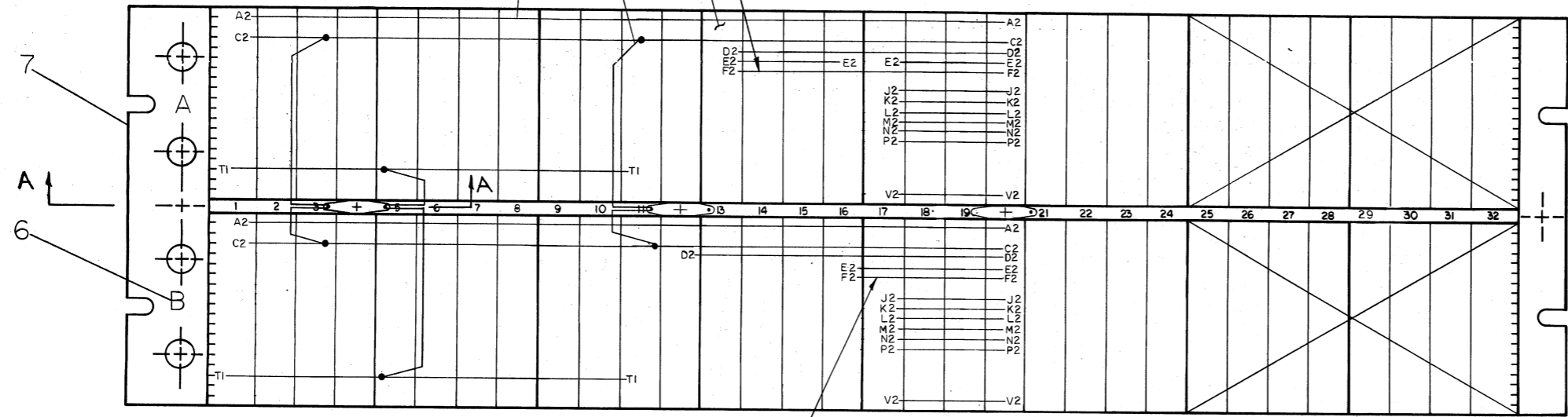
REV. C
NUMBER
D DIAD01-D-1
B

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REV. 1
AD-7006919-0-0



- NOTES:
1. CONNECTIONS ON ITEM NUMBER 1 & 2 TO BE LOCATED ~~AND SOLDERED~~ AT MINIMUM PRACTICAL HEIGHT ABOVE BLOCKS.
 2. ALL CONNECTOR BLOCKS TO BE GROUNDED TO GROUND LUGS AS SHOWN, 2 PLACES.
 3. JUMPER GROUND BUSSING AS SHOWN, 8 PLACES.
 2. USE YELLOW WIRE (ITEM #4) FOR MACHINE WRAPPED AND BLUE WIRE (ITEM #5) FOR HAND WRAPPED WIRING.



WIRE LIST					
ITEM NO	DESCRIPTION	SIGNAL	FROM PIN CONNECTION	TO PIN CONNECTION	REMARKS
13	24 RED	+5V	A06A2	B06A2	WIRE WRAP
13	24 RED	+5V	A20A2	A22A2	
14	24 BLK	GND	A06C2	B06C2	
14	24 BLK	GND	A06C2	B06C2	
16	24 YEL	+15	B12D2	A13D2	
16	24 YEL		B12D2	A24V2	
17	24 GRN	-20V	B19E2	A19E2	
17	24 GRN		B20E2	A20E2	
15	24 ORN	-15V	A24S2	A16E2	
15	24 ORN		A24S2	B12E2	WIRE WRAP
18	22 BRN	GND	B12F2	A24T2	SOLDER
18	22 BRN	GND	B12F2	B12C2	
18	22 BRN	GND	B12F2	B16F2	
18	22 BRN	GND	A13F2	B16F2	SOLDER

OPTION WIRE LIST					
ITEM NO	DESCRIPTION	SIGNAL	FROM PIN CONNECTION	TO PIN CONNECTION	REMARKS
5	30 BLU		B08P2	B08N2	
			A15S2	A15V2	
			A05D1	A05C2	
			A09A1	A08D1	
			A09C1	A08E1	
			A09D1	A08F1	
			A09F1	A08H1	
			A09E2	A08J1	
			A09J1	A08K1	
			A09H2	A08L1	
			A09L1	A08M1	
			A09K2	A08N1	
5	30 BLU		A09N1	A08P1	
5	30 BLU		A22R2	A22C2	

REV.	CHANGE NO.	DATE
1	0003	A

SEVERINO 8/5/71

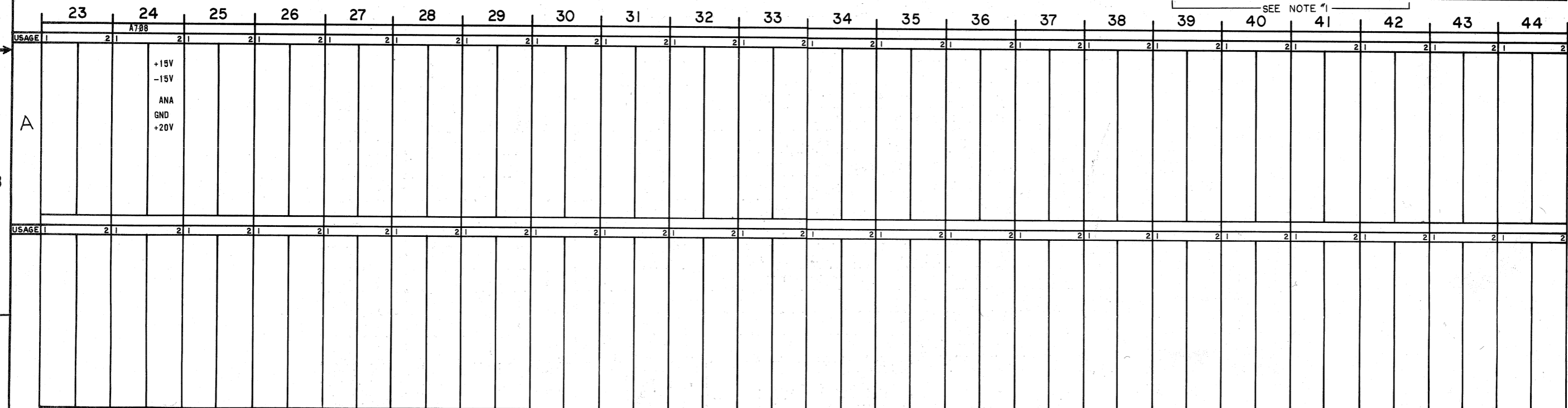
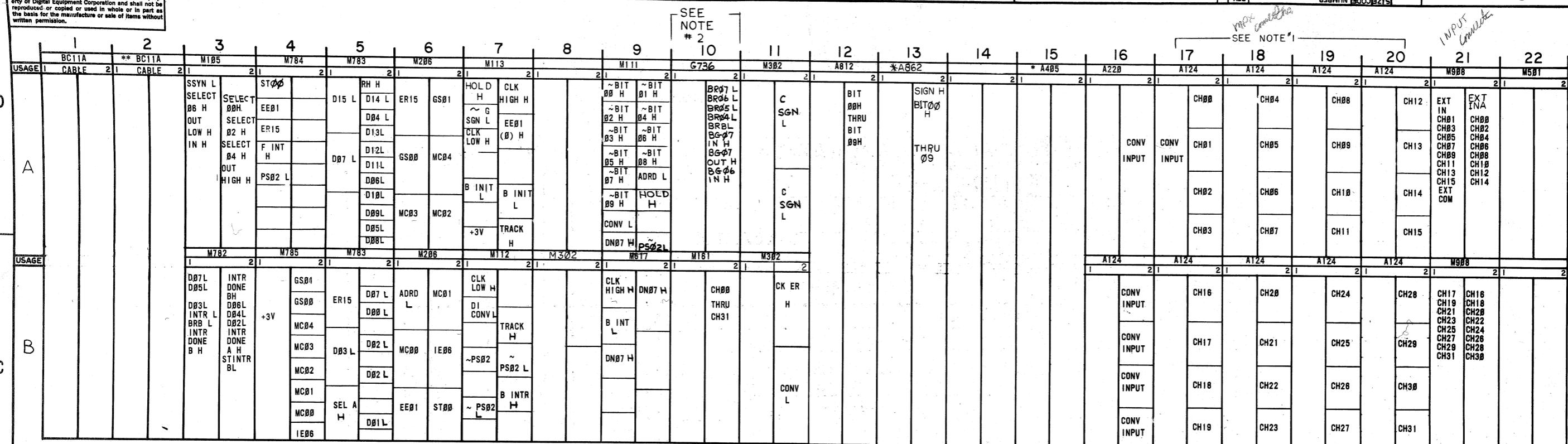
FIRST USED ON OPTION/MODEL AD01-D	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
DO NOT SCALE DRAWING	DRN.	DATE	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	CHKD.	DATE	TITLE	
TOLERANCES	ENG.	DATE	WIRED ASS'Y (AD01-D)	
DECIMALS FRACTIONS ANGLES	PROJ. ENG.	DATE	SIZE CODE NUMBER REV	
± .005 ± 1/64 ± 0°30'	PROD.	DATE	D AD 7006919-0-0 A	
FINAL SURFACE QUALITY	NEXT HIGHER ASSY			
REMOVE BURRS AND BREAK SHARP CORNERS	D-1A-AD01-D-0			
MATERIAL	SCALE NONE			
FINISH	SHEET OF			

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS					QUANTITY/VARIATION															
PARTS LIST																				
MADE BY G. FLANDERS		CHECKED D. HEALY		SECTION																
DATE 6/9/70		DATE 6/16/70		1																
ENG <i>Paul J. Sever</i>		PROD <i>A. Hush</i>		ISSUED SECT.																
DATE <i>8/25/70</i>		DATE 8-25-70		1																
ITEM NO.	DWG NO. / PART NO.	DESCRIPTION																		
1	1205541	BUS STRIP			A/R															
2	9107560-01	#22 AWG BUS WIRE			A/R															
3	9107265-09	#22 TUBING TEFLON (WHT)			A/R															
4	91057 40-44	#30 AWG SOLID KYNAR WIRE (YEL)			A/R															
5	9105740-66	#30 AWG SOLID KYNAR WIRE (BLU)			A/R															
6	B-DC-5308753-0-2	21 POINT DECALS, A			A/R															
6	B-DC-5308753-0-4	21 POINT DECALS, B			A/R															
7	D-AD-5302483-0-0	1943 CASTING ASSY			1															
8	E-SC-1205348-0-0	288 PIN BLOCK TYPE H8Ø3			6															
9	9006210	SCR PH HD, FIL #8-32 x 5/8			12															
10	9006035-1	SCR PHL HD PAN #8-32 x 1/4 LG			3															
11	9006634	WASHER INT TOOTH LOCK #8			3															
12	9007597	TERM #2116-08-00 SHAKEPROOF			3															
13	9107450-22	#24 AWG STRD TEF INS WIRE (RED)			A/R															
14	9107450-00	#24 AWG STRD TEF INS WIRE (BLK)			A/R															
15	9107450-33	#24 AWG STRD TEF INS WIRE (ORN)			A/R															
16	9107450-44	#24 AWG STRD TEF INS WIRE (YEL)			A/R															
17	9107450-55	#24 AWG STRD TEF INS WIRE (GRN)			A/R															
18	9107420-11	#22 AWG STRD TEF INS WIRE (BRN)			A/R															
TITLE				ASSY NO.		SIZE CODE		NUMBER				REV.		ECO NO.						
WIRED ASSY ADØ1-D				D-AD-7006919-0-0		A PL		7006919-0-0				A		ADØ1D-00003						
				SHEET 1 OF 1		DIST.														

DEC FORM NO.
DRA 110

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SIZE CODE 2
 NUMBER 1-02
 REV. B



REV.	CHANGE NO.	REV.
A	0003	A
B	0004	B
C	0005	C

SEVERINO 2-3-71
 AD01-D-0004 B
 SEVERINO 5-4-71

* OPTIONAL - SEE D-BS-AD01-D-05
 ** IF LAST PERIPHERAL ON BUS, USE M930 TERMINATOR CARD IN SLOT A802.
 NOTE: MODULE A124 SLOTS 17A THRU 20A & 17B THRU 20B ARE OPTIONAL AND INSERTED AS REQUIRED 4 CHANNELS PER MODULE.
 2. G736 REQUIRES ONE 5408778 PRIORITY JUMPER PLUGGED INTO BOARD TO BE OPERATIVE.

FIRST USED ON OPTION/MODEL
 AD01-D

DO NOT SCALE DRAWING
 UNLESS OTHERWISE SPECIFIED
 DIMENSION IN INCHES
 TOLERANCES
 DECIMALS FRACTIONS ANGLES
 ± .005 ± 1/64 ± 0°30'
 FINAL SURFACE QUALITY
 REMOVE BURRS AND BREAK SHARP CORNERS

MATERIAL
 FINISH

DRN: [Signature] DATE: 6/2/70
 CHKD: [Signature] DATE: 7-13-70
 ENG: [Signature] DATE: 7/2/70
 PROJ. ENGR: [Signature] DATE: 7/2/70
 PROD. [Signature] DATE: 8/12/70

digital EQUIPMENT CORPORATION
 MAYNARD, MASSACHUSETTS

TITLE
 MODULE UTILIZATION

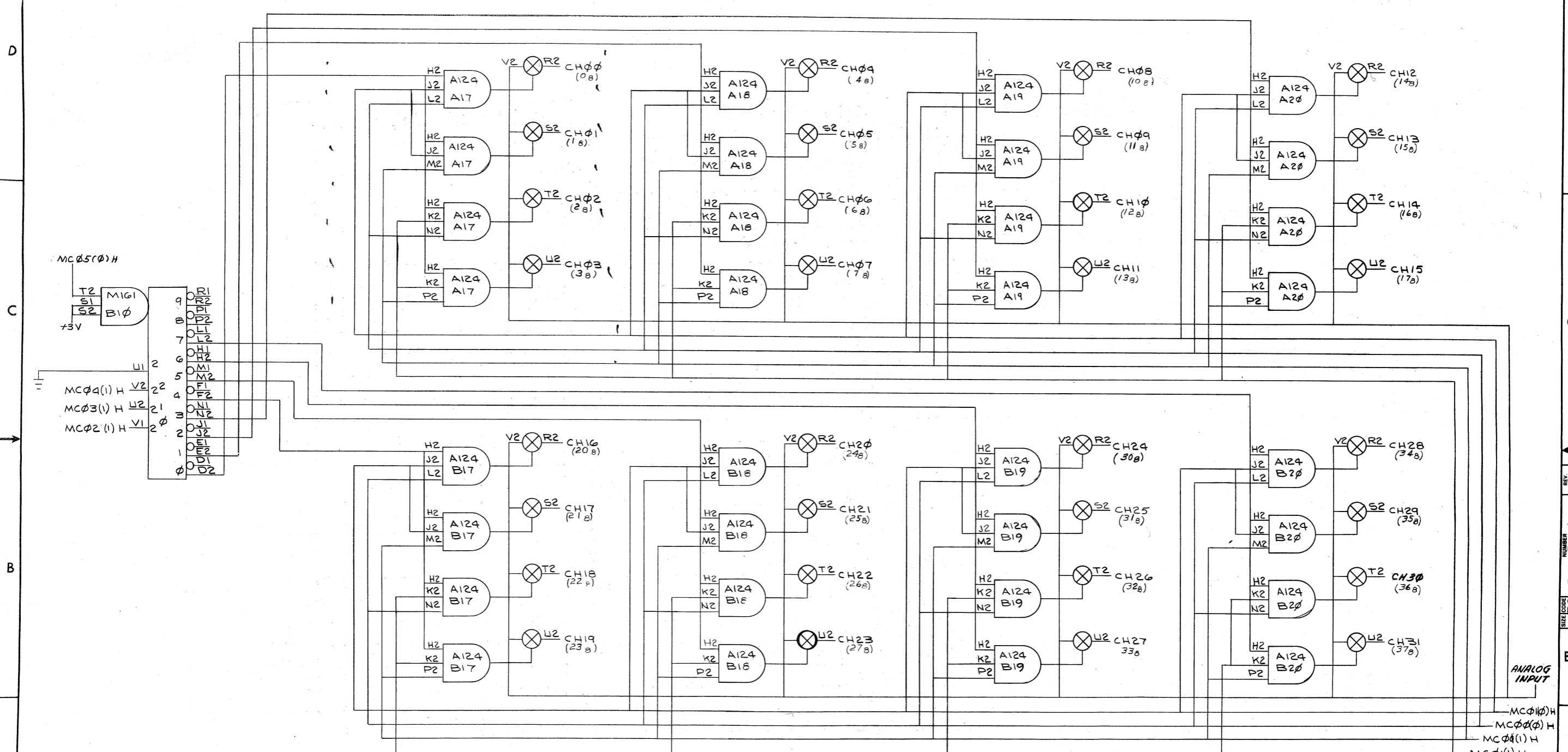
SIZE CODE: D MU AD01-D-02 NUMBER: REV. B

SHEET 1 OF 1 DIST.

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS PARTS LIST					QUANTITY/VARIATION																		
MADE BY G. FLANDERS		CHECKED D. HEALY		SECTION	AD01-D	* OPTIONAL																	
DATE 6/3/70		DATE 6/22/70		1																			
ENG <i>Paul Severino</i>		PROD <i>A. March</i>		ISSUED SECT.																			
DATE 8/25/70		DATE 8-25-70		1																			
ITEM NO.	DWG NO. / PART NO.	DESCRIPTION																					
	M105	ADDRESS SELECTOR M105			1																		
	M784	UNIBUS RECEIVERS M784			1																		
	M783	UNIBUS DRIVERS M783			2																		
	M206	SIX FLIP FLOPS M206			2																		
	M113	10-2 INPUT NAND GATES M113			1																		
	M111	INVERTER M111			1																		
	G736	REQUEST JUMPER			1																		
	A812	10 BIT ADC A812			1																		
	M302	DUAL DELAY MULTIVIBRATOR M302			3																		
	A220	SELECTABLE GAIN BUFF. AMP. A220			1																		
	A124	FOUR INPUT MULTIPLEX. SW. A124			1	8																	
	M908	CONNECTOR MODULE M908			2																		
	M782	INTERUPT CONTROL M782			1																		
	M785	UNIBUS TRANSCEIVERS M785			1																		
	A708	DUAL VOLT. REGULATOR A708			1																		
	M112	NOR GAT M112			1																		
	M617	6-4 INPUT MOR BUFFERS M617			1																		
	M161	TO OCTAL/DECIMAL DECODER M161			1																		
	M501	SCMITT TRIGGER			1																		
*	A405	SAMPLE & HOLD			0	1																	
	5408778-0-0	PRIORITY JUMPER USED ON G736			1																		
*	A862	10 BIT & SIGN ADC			0	1																	
TITLE				ASSY NO.	SIZE CODE	NUMBER				REV.	ECO NO.												
MODULE UTILIZATION LIST				D-MU-AD01-D-02	A PL	-AD01-D-02				B	AD01D-00004												
				SHEET 1 OF 1	DIST.																		

DEC FORM NO.
DRA 110

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REV	NO.	DATE	BY	CHK'D
A	1	5-1-71	SEVERINO	
B	1	5-2-71	SEVERINO	
C	1	6-2-71	SEVERINO	

DEC FORM NO. DRD 102A

QTY.	DESCRIPTION	PART NO.	ITEM NO.
	AD01-D		
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		DRN.	DATE
DIMENSION IN INCHES		DATE	DATE
TOLERANCES		DATE	DATE
DECIMALS	FRACTIONS	ANGLES	DATE
= .005	= 1/64	= 0°30'	DATE
FINAL SURFACE QUALITY		DATE	DATE
REMOVE BURRS AND BREAK SHARP CORNERS		DATE	DATE
MATERIAL		DATE	DATE
NEXT HIGHER ASSY		DATE	DATE
A-ML-AD01-DA		DATE	DATE
FINISH		DATE	DATE
SCALE		DATE	DATE
SHEET		DATE	DATE
OF		DATE	DATE
DIST.		DATE	DATE
REV. B		DATE	DATE

digital EQUIPMENT CORPORATION
 MAYNARD, MASSACHUSETTS

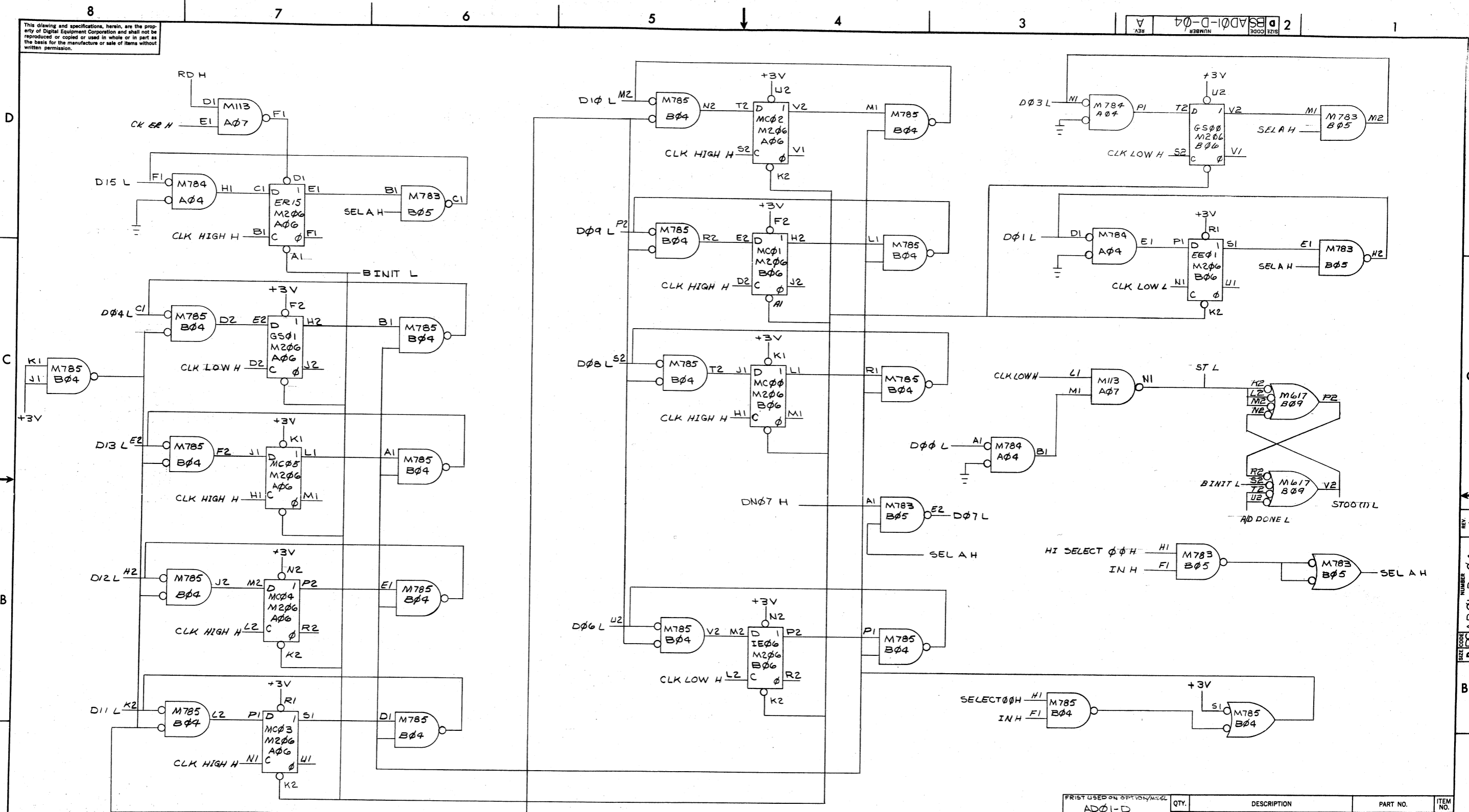
TITLE
 MULTIPLEXER

SIZE CODE
 D E S A D 0 1 - D - 0 3

A

A

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REV	CHG	NO.	DATE
A	AD01-D-00003		

SEVERINO
11/17

QTY.	DESCRIPTION	PART NO.	ITEM NO.
	AD01-D		

UNLESS OTHERWISE SPECIFIED	DRN	DATE	
DIMENSION IN INCHES	CHK'D	DATE	
TOLERANCES	ENG	DATE	
DECIMALS FRACTIONS ANGLES	PROJ. ENG	DATE	
± .005 ± 1/64 ± 0°30'	PROD.	DATE	
FINAL SURFACE QUALITY			
REMOVE BURRS AND BREAK SHARP CORNERS			

MATERIAL: A-ML-AD01-DA

FINISH: SCALE: SHEET 1 OF 2

SIZE CODE: DBSAD01-D-04

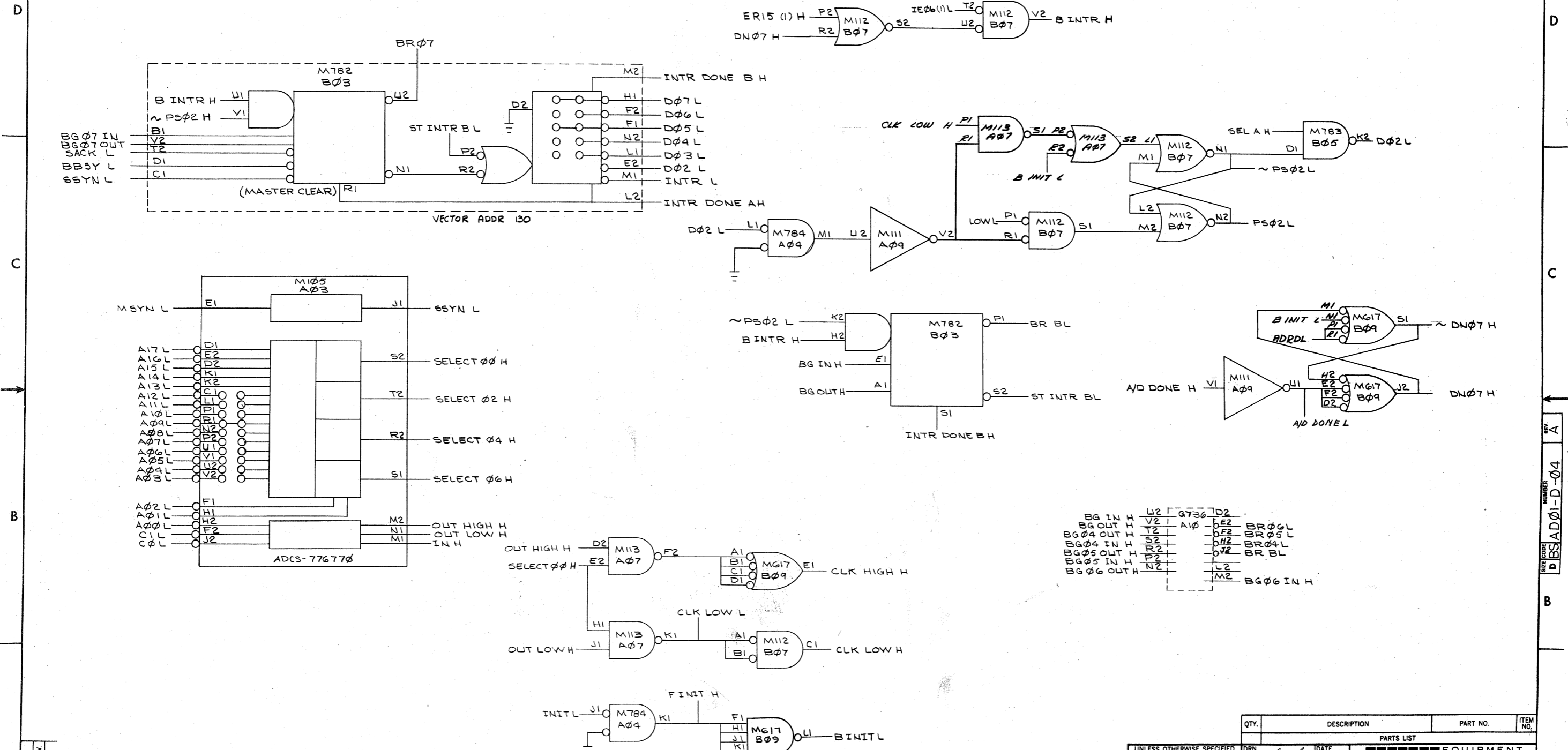
NUMBER: REV. A

TITLE: INTERFACE & CSR

REV. A
NUMBER DBSAD01-D-04

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REV. A
 NUMBER DBSAD01-D-04
 SIZE CODE 2

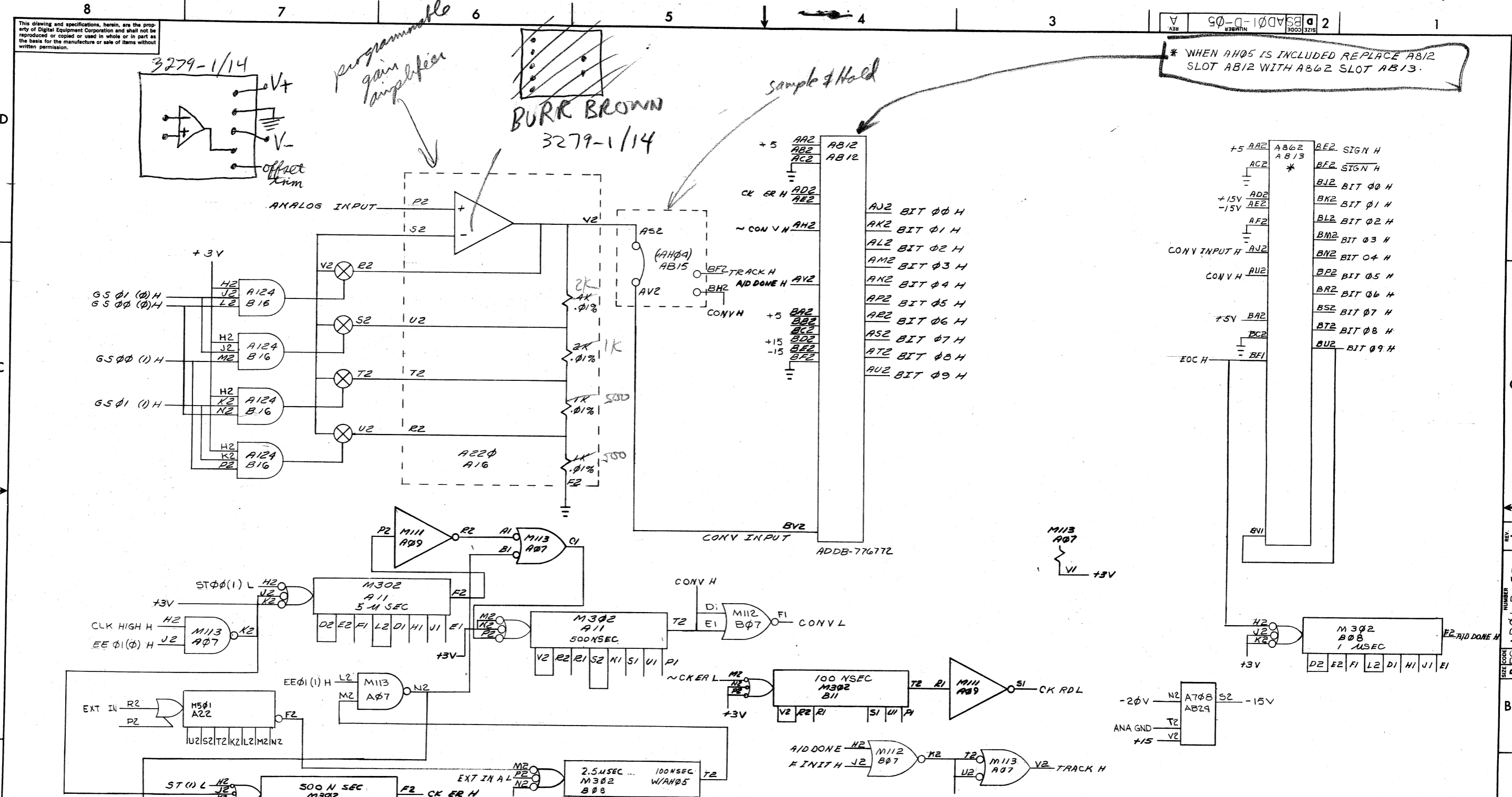


BG IN H	L2	G736	D2
BG OUT H	V2	A10	D2
BG04 OUT H	T2	D2	BR06L
BG04 IN H	S2	D2	BR05L
BG05 OUT H	R2	D2	BR04L
BG05 IN H	P2	D2	BR BL
BG06 OUT H	N2	L2	
	M2		BG06 IN H

REV.	
CHANGE NO.	
CHK	

UNLESS OTHERWISE SPECIFIED	DRN. <i>[Signature]</i>	DATE <i>2/1/70</i>	ITEM NO.
UNLESS OTHERWISE SPECIFIED	CHK'D. <i>[Signature]</i>	DATE <i>7-2-70</i>	
DIMENSION IN INCHES	EMC. <i>[Signature]</i>	DATE <i>1/15/70</i>	
TOLERANCES	PROJ. ENG. <i>[Signature]</i>	DATE <i>1/15/70</i>	
DECIMALS FRACTIONS ANGLES	PROD. <i>[Signature]</i>	DATE <i>1/15/70</i>	
± .005 ± 1/64 ± 0°30'			
FINAL SURFACE QUALITY			
REMOVE BURRS AND BREAK SHARP CORNERS			
MATERIAL	FIRST USED ON		
FINISH	SCALE		
	SHEET 2 OF 2		
PARTS LIST		TITLE	
QTY.	DESCRIPTION	PART NO.	ITEM NO.
digital EQUIPMENT CORPORATION		MAYNARD, MASSACHUSETTS	
SIZE CODE		NUMBER	REV.
DBSAD01-D-04			A
DIST.			

REV. A
 NUMBER DBSAD01-D-04
 SIZE CODE 2



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* WHEN AH05 IS INCLUDED REPLACE AB12 SLOT AB12 WITH AB62 SLOT AB13.

programmable gain amplifier

sample & hold

BURR BROWN
3279-1/14

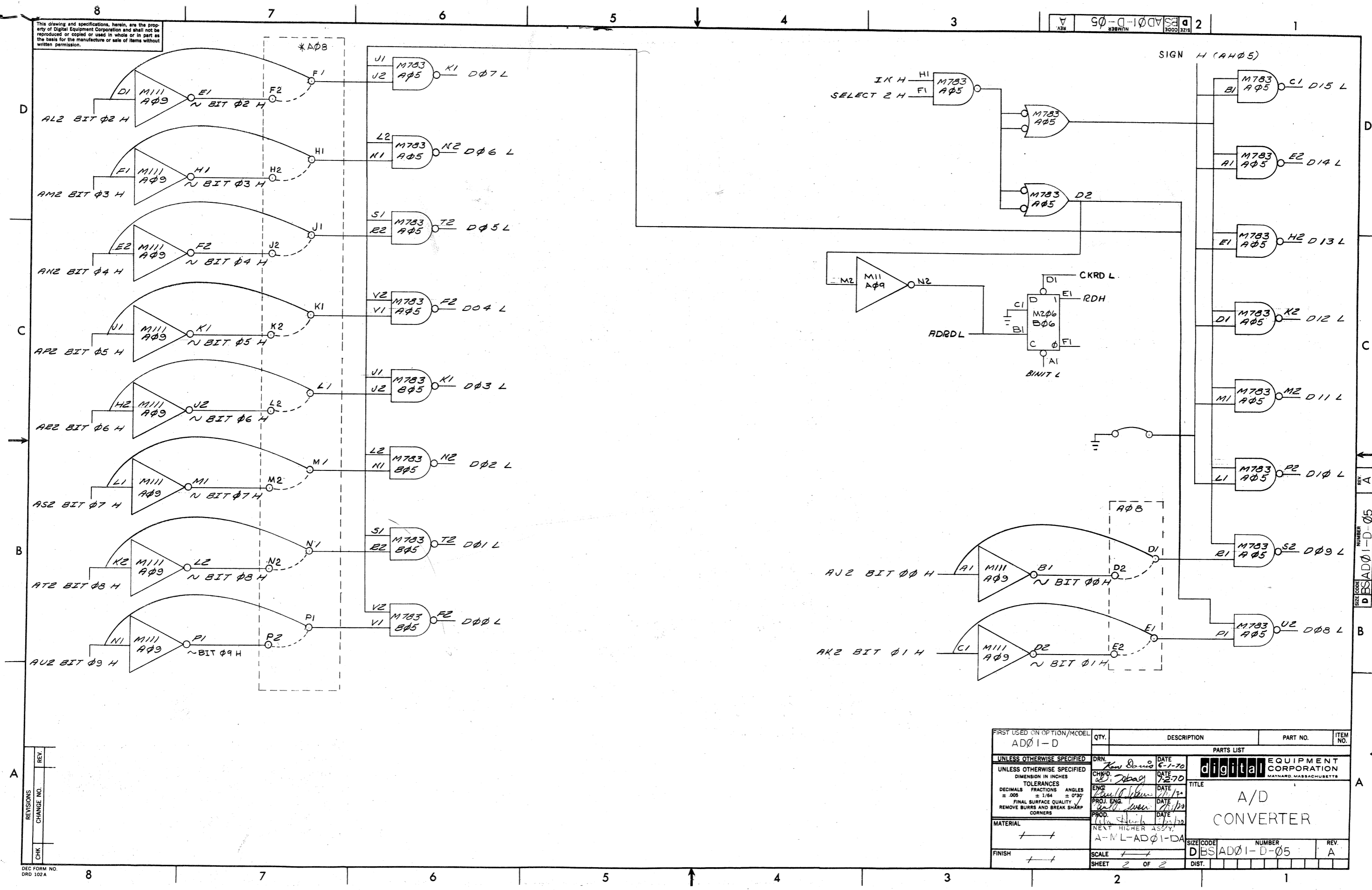
REV.	CHANGE NO.	DESCRIPTION
A	0003	ADD ID - 0003
		P. SEVERINO

FIRST USED ON OPTION/MODEL AD01-D	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± 1/64 ± 0°30'	DRN DATE 5/29/70	CHKD. DATE 7-2-70	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
MATERIAL FINISH	± .005 ± 1/64 ± 0°30' REMOVE BURRS AND BREAK SHARP CORNERS	ENG. DATE 1-17-70	TITLE A/D CONVERTER	
NEXT HIGHER ASSY. A-ML-AD01-DA		PROJ. ENG. DATE 1-17-70	SIZE CODE D BS AD01-D-05	NUMBER REV. A
SCALE SHEET 1 OF 2		DIST.		

REV. A
NUMBER
AD01-D-05
SIZE CODE
D BS

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REV. 1
 NUMBER 3300 3215
 2
 1

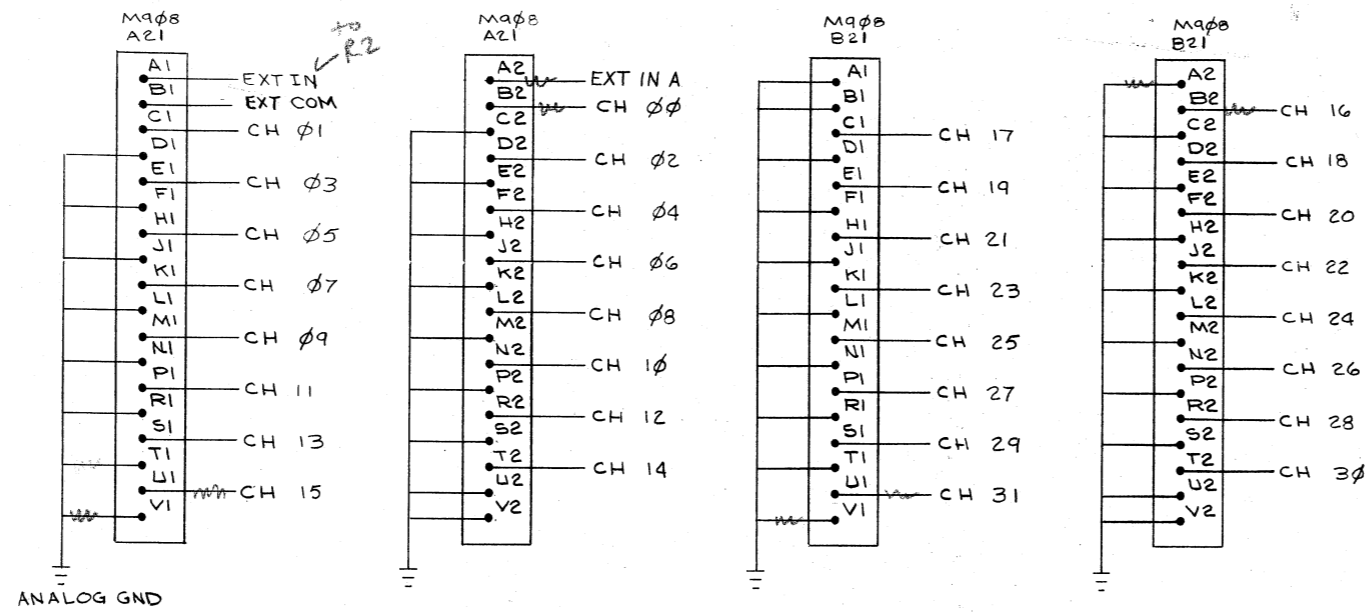


REVISIONS

REV.	CHANGE NO.

FIRST USED ON OPTION/MODEL AD01-D	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
UNLESS OTHERWISE SPECIFIED	CHKD	DATE	TITLE	
TOLERANCES	ENGR	DATE	A/D CONVERTER	
DECIMALS FRACTIONS ANGLES	PROJ. ENGR	DATE	NEXT HIGHER ASSY.	
± .005 ± 1/64 ± 0°30'	PROD.	DATE	A-M-L-AD01-DA	
FINAL SURFACE QUALITY			SIZE CODE	NUMBER
REMOVE BURRS AND BREAK SHARP CORNERS			D	ESAD01-D-05
MATERIAL			SCALE	REV.
+			+	A
FINISH			SHEET	DIST.
+			2 OF 2	

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REV. A	CHANGE NO. 0003	AD01-D-06
CHK	R. SEVERINO	2-3-71

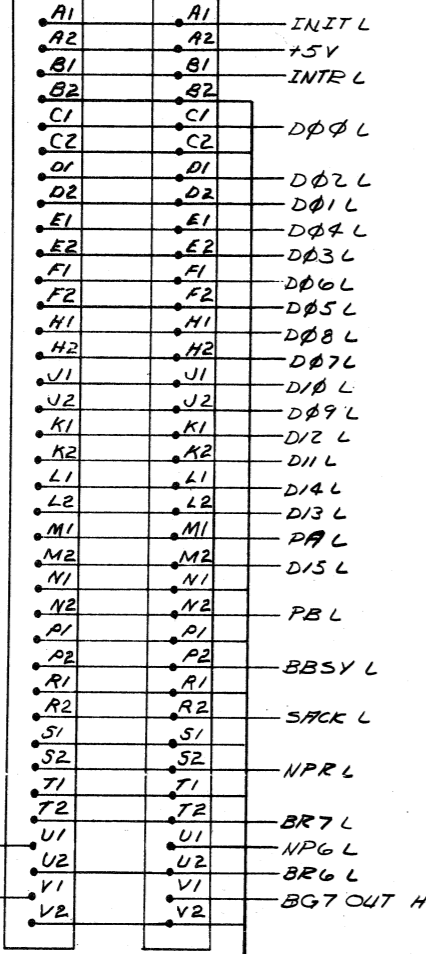
FIRST USED ON OPTION/MODEL AD01-D	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS	FRACTIONS	ANGLES		
± .005	± 1/64	± 0°30'		
FINAL SURFACE QUALITY				
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	NEXT HIGHER ASSEMBLY			
FINISH	SCALE			
DRN. DATE 6/5/70		DATE 7/2/70		
CHK. DATE 7/2/70		DATE 7/2/70		
ENG. DATE 7/2/70		DATE 7/2/70		
PROJ. ENG. DATE 7/2/70		DATE 7/2/70		
PROD. DATE 7/2/70		DATE 7/2/70		
TITLE				
ANALOG INPUT CONNECTORS				
MATERIAL		A-ML-AD01-DA		
SCALE		SIZE CODE NUMBER REV.		
SHEET 1 OF 1		D I C A D 0 1 - D - 0 6 A		

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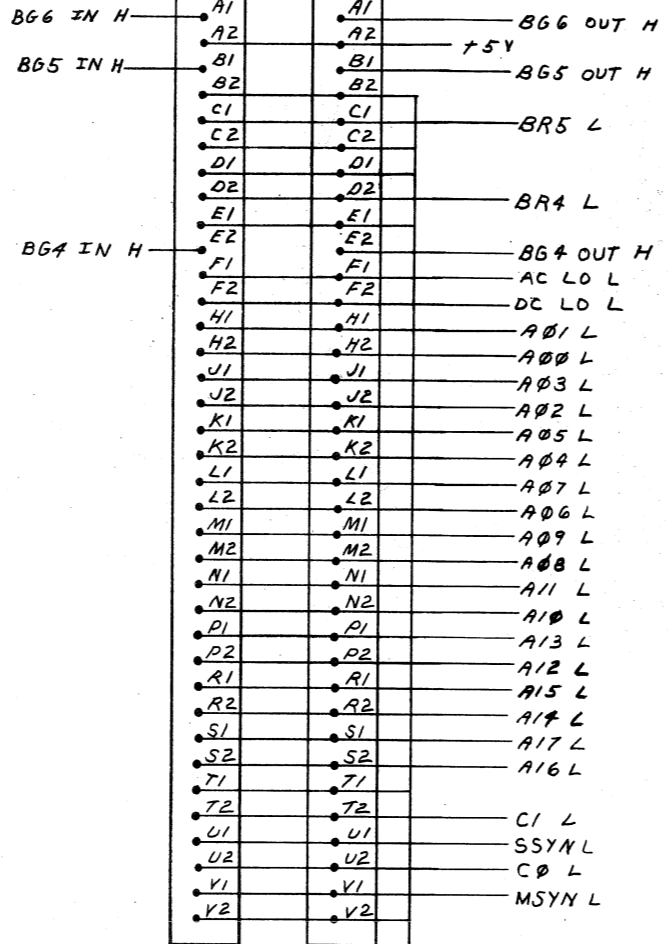
REV. 2
 SIZE CODE
 NUMBER
 60-D-100V

8 7 6 5 4 3 2 1

BC11A
 A01 * BUS CONNECTOR



BC11A
 B01 * BUS CONNECTOR



* NOTE:
 1. FOR A02/B02 IF A01-D
 LAST DEVICE ON THE BUS SLOT
 A02/B02 HAS IN IT AN M930,
 OTHERWISE IT HAS A BC11A.

REV.	
CHANGE NO.	
CHK	

DEC FORM NO. DRD 100

FIRST USED ON OPTION/MODEL
 PDP-11

DO NOT SCALE DRAWING
 UNLESS OTHERWISE SPECIFIED
 DIMENSION IN INCHES
 TOLERANCES
 DECIMALS FRACTIONS ANGLES
 ±.005 ± 1/64 ± 0'30"
 FINAL SURFACE QUALITY
 REMOVE BURRS AND BREAK SHARP CORNERS


QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST			
DRN <i>[Signature]</i> DATE 2/6/71		digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
CHWD <i>[Signature]</i> DATE 2-3-71		TITLE BUS CONNECTOR	
ENR <i>[Signature]</i> DATE 1-2-71		NEXT HIGHER ASSY A-ML-A001-D	
PROJ. ENG. DATE 1-2-71		SIZE CODE NUMBER REV. D I C A D 0 1 - D - 0 9	
PROD. DATE 2-10-71		DIST.	
MATERIAL		SCALE 1 OF 1	
FINISH		SHEET	

REV. 2
 NUMBER
 D I C A D 0 1 - D - 0 9

8 7 6 5 4 3 2 1

DRWG NO	REV LTR
K-WL-ADØ1-D-Ø7	A

REVISIONS			
REV LTR	ECO NO	DATE	ENG
A	00003	2-1-71	HS

DRAWN <i>A. Hauder</i>	DATE 6/10/70		TITLE WIRE LIST (ADØ1-D)		
CHECKED <i>K. Russ</i>	DATE 8/25/70		FOR TAPE # FILE #		
ENG <i>Paul J. Juen</i>	DATE 8/25/70		ASSY NO — / —	SIZE K	CODE WL
PROD ENG <i>Paul J. Juen</i>	DATE 8/25/70		SCALE — / —	DWG. NO. ADØ1-D-Ø7	REV LTR A
PROD <i>A. Hauder</i>	DATE 8/25/70	SHEET 1 OF 1	DIST.		

ADP1-D.A RUN NAME	HNDKRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q DRAW	RV PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	PAGE 3 EXCEPTIONS	RUN NUMBER
A07	A03P2		1-01		D02			1					19
A07	B02L1		1-02					2					19
A07	B01L1		1-03										19
A07			1								7-6/8		19
A07C1	A07C1		1-01					1					20
A07C1	A11P2		1-02								5-2/8		20
A07C1			1										20
A07F1	A06D1		1-01		D02			1					21
A07F1	A07F1		1-02		D02						3-0/8		21
A07F1			1										21
A07F2	A07F2		1-01		D02			2					22
A07F2	B09A1		1-02		D02			1					22
A07F2	B09B1		1-03		D02			2					22
A07F2	B09C1		1-04		D02			1					22
A07F2	B09D1		1-05		D02								22
A07F2			1								12-2/8		22
A07K2	A07K2		1-01		D03			2					23
A07K2	A11J2		1-02		D03			1					23
A07K2	B11J2		1-03										23
A07K2			1								9-4/8		23
A07N2	A07B1		1-01					2					24
A07N2	A07N2		1-02		D03			1					24
A07N2	B11K2		1-03										24
A07N2			1								9-2/8		24
A07S1	A07P2		1-01					1					25
A07S1	A07S1		1-02								2-6/8		25
A07S1			1										25
A07S2	A07S2		1-01		D02			1					26
A07S2	B07L1		1-02								4-4/8		26
A07S2			1										26
A08	A03N2		1-01		D02			1					27
A08	B02M2		1-02					2					27
A08	B01M2		1-03										27
A08			1								8-0/8		27
A09	A03R1		1-01		D02			1					28
A09	B02M1		1-02										28
A09	B01M1		1-03					2					28
A09			1								7-6/8		28

ADP1-D.A RUN NAME	HNDKRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q DRAW	RV PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	PAGE 4 EXCEPTIONS	RUN NUMBER
A09S2	A07A1		1-01					1					29
A09R2	A09R2		1-02										29
A09R2			1								4-4/8		29
A09V2	A09V2		1-01		D02			2					30
A09V2	A07R1		1-02					1					30
A09V2	B07R1		1-03		D02								30
A09V2			1								8-6/8		30
A10	A03P1		1-01		D02			1					31
A10	B02N2		1-02					2					31
A10	B01N2		1-03										31
A10			1								7-6/8		31
A11	A03L1		1-01		D02			1					32
A11	B02N1		1-02					2					32
A11	B01N1		1-03										32
A11			1								8-2/8		32
A11D1	A11D1		1-01		D03			1					33
A11D1	A11L2		1-02		D03						3-2/8		33
A11D1			1										33
A11D2	A11D2		1-01		D03			1					34
A11D2	A11E2		1-02		D03						2-4/8		34
A11D2			1										34
A11F2	A09P2		1-01		D03			1					35
A11F2	A11F2		1-02								3-6/8		35
A11F2			1										35
A11N1	A11N1		1-01		D03			1					36
A11N1	A11S2		1-02		D03						2-6/8		36
A11N1			1										36
A11R2	A11R2		1-01		D03			1					37
A11R2	A11V2		1-02		D03						2-6/8		37
A11R2			1										37
A12	A03C1		1-01		D02			1					38
A12	B02P2		1-02					2					38
A12	B01P2		1-03										38
A12			1								9-2/8		38

RUN NAME	A/P	PIN NAME	ORDER PIN	BAY ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	LENGTH	EXCEPTIONS	RUN NUMBER
A13	L	A03K2		1-01		D02					1				39
A13	L	R02P1		1-02							2				39
A13	L	R01P1		1-03									8-6/8		39
A14	L	A03K1		1-01		D02					1				40
A14	L	B02R2		1-02							2				40
A14	L	B01R2		1-03									8-4/8		40
A15	L	A03D2		1-01		D02					1				40
A15	L	B02R1		1-02							2				41
A15	L	B01R1		1-03									9-4/8		41
A16	L	A03E2		1-01		D02					1				42
A16	L	R02S2		1-02							2				42
A16	L	B01S2		1-03									9-2/8		42
A17	L	A03D1		1-01		D02					1				43
A17	L	B02S1		1-02							2				43
A17	L	B01S1		1-03									9-4/8		43
A22F2		A22F2		1-01							1				44
A22F2		B08M2		1-02											44
B INIT	L	A06A1		1-01 *							2				45
B INIT	L	A06K2		1-02 *							1				45
B INIT	L	A07R2		1-03 *							2				45
B INIT	L	B06A1		1-04 *							1				45
B INIT	L	B06K2		1-05 *							2				45
B INIT	L	B09L1		1-06 *							1				45
B INIT	L	B09N1		1-07 *							2				45
B INIT	L	B09S2		1-08 *									23-0/8		45
B INTR	H	B03H2		1-01							2				46
B INTR	H	B03U1		1-02							1				46
B INTR	H	B07V2		1-03									8-4/8		46

RUN NAME	A/P	PIN NAME	ORDER PIN	BAY ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	LENGTH	EXCEPTIONS	RUN NUMBER
BBSY	L	A01P2		1-01							2				47
BBSY	L	A02P2		1-02							1				47
BBSY	L	B03D1		1-03		D02							7-0/8		47
BG IN	H	A10U2		1-01							1				48
BG IN	H	B03E1		1-02									6-6/8		48
BG OUT	H	A10V2		1-01		D02					1				49
BG OUT	H	B03A1		1-02									6-4/8		49
BG4 IN	H	A10S2		1-01		D02					1				50
BG4 IN	H	B01E2		1-02									7-4/8		50
BG4 OUT	H	A10T2		1-01		D02					1				51
BG4 OUT	H	B02E2		1-02									7-0/8		51
BG5 IN	H	A10P2		1-01		D02					1				52
BG5 IN	H	B01B1		1-02									7-4/8		52
BG5 OUT	H	A10R2		1-01		D02					1				53
BG5 OUT	H	B02B1		1-02									7-2/8		53
BG6 IN	H	A10M2		1-01		D02					1				54
BG6 IN	H	B01A1		1-02									7-6/8		54
BG6 OUT	H	A10N2		1-01		D02					1				55
BG6 OUT	H	B02A1		1-02									7-2/8		55
BG7 IN	H	A01V1		1-01							1				56
BG7 IN	H	B03B1		1-02		D02							3-6/8		56
BG7 OUT	H	A02V1		1-01							1				57
BG7 OUT	H	B03V2		1-02		D02							5-4/8		57

ADM1-D.A RUN NAME	HND-RP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 15 RUN NUMBER
CH22	H B18T2		1-01 *		D04					1				TERM HERE? CABLE	148
CH22	H B21J2		1-02 *										4-2/8		148
CH23	H B18U2		1-01 *		D04					1				TERM HERE? CABLE	149
CH23	H B21K1		1-02 *										4-0/8		149
CH24	H B19R2		1-01 *		D04					1				TERM HERE? CABLE	150
CH24	H B21L2		1-02 *										3-4/8		150
CH25	H B19S2		1-01 *		D04					1				TERM HERE? CABLE	151
CH25	H B21M1		1-02 *										3-2/8		151
CH26	H B19T2		1-01 *		D04					1				TERM HERE? CABLE	152
CH26	H B21N2		1-02 *										3-4/8		152
CH27	H B19U2		1-01 *		D04					1				TERM HERE? CABLE	153
CH27	H B21P1		1-02 *										3-2/8		153
CH28	H B20R2		1-01 *		D04					1				TERM HERE? CABLE	154
CH28	H B21R2		1-02 *										2-6/8		154
CH29	H B20S2		1-01 *		D04					1				TERM HERE? CABLE	155
CH29	H B21S1		1-02 *										2-4/8		155
CH30	H B20T2		1-01 *		D04					1				TERM HERE? CABLE	156
CH30	H B21T2		1-02 *										2-6/8		156
CH31	H B20U2		1-01 *		D04					1				TERM HERE? CABLE	157
CH31	H B21U1		1-02 *										2-4/8		157
CK ER	H A07E1		1-01 *							2					158
CK ER	H A12D2		1-02 *						R1	1					158
CK ER	H B11F2		1-03 *						R1	2					158
CK ER	H B11M2		1-04 *						I				13-6/8		158

ADM1-D.A RUN NAME	HND-RP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 16 RUN NUMBER
CK RD	L A09S1		1-01 *							1					159
CK RD	L B06D1		1-02 *												159
CK RD													4-2/8		159
CLK HIGH	H A06B1		1-01 *						R1	1					160
CLK HIGH	H A06H1		1-02 *						R1	2					160
CLK HIGH	H A06L2		1-03 *						R1	1					160
CLK HIGH	H A06N1		1-04 *						R1	2					160
CLK HIGH	H A06S2		1-05 *						R1	1					160
CLK HIGH	H A07H2		1-06 *						R1	2					160
CLK HIGH	H B06D2		1-07 *						R1	1					160
CLK HIGH	H B06H1		1-08 *						R1	2					160
CLK HIGH	H B09E1		1-09 *						R1				27-0/8		160
CLK LOW	H B06S2		1-01 *						I	1					161
CLK LOW	H A06D2		1-02 *						I	2					161
CLK LOW	H A07L1		1-03 *						R1	1					161
CLK LOW	H A07P1		1-04 *						R1	2					161
CLK LOW	H B06L2		1-05 *						R1	1					161
CLK LOW	H B07C1		1-06 *						R1						161
CLK LOW													20-4/8		161
CLK LOW	L A07K1		1-01 *		D02					2					162
CLK LOW	L B07A1		1-02 *		D02					1					162
CLK LOW	L B07B1		1-03 *		D02					2					162
CLK LOW	L B07P1		1-04 *		D02					1					162
CLK LOW	L B06N1		1-05 *										13-0/8		162
CONV	H B07E1		1-01 *						I	1					163
CONV	H B07D1		1-02 *						I	2					163
CONV	H A13U2		1-03 *						I	1					163
CONV	H A11T2		1-04 *						I	2					163
CONV	H B15H2		1-05 *						I				16-6/8		163
CONV															163
CONV	L B07F1		1-01 *						R1	1					164
CONV	L A12H2		1-02 *						R1				6-0/8		164
CONV															164
CONV INPUT	H B12V2		1-01 *						R1	1					165
CONV INPUT	H A13J2		1-02 *						R1	2					165
CONV INPUT	H A15V2		1-03 *						I				10-4/8		165

ADP1-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71 LENGTH	EXCEPTIONS	PAGE 17 RUN NUMBER
C07	L	A03J2	1-01		D02					1				166
C07	L	B02U2	1-02							2				166
C07	L	B01U2	1-03											166
C07			1									9-2/8		166
C01	L	A03F2	1-01		D02					1				167
C01	L	B02T2	1-02							2				167
C01	L	B01T2	1-03											167
C01			1									9-2/8		167
DN07	H	B09J2	1-01		D02					1				168
DN07	H	B09M1	1-02		D02					2				168
DN07	H	B07R2	1-03		D02					1				168
DN07	H	B05A1	1-04		D02									168
DN07			1									10-6/8		168
DN07	L	B09H2	1-01		D02					1				169
DN07	L	B09S1	1-02		D02									169
DN07			1									3-4/8		169
D00	L	A01C1	1-01							1				170
D00	L	A02C1	1-02							2				170
D00	L	A04A1	1-03		D02					1				170
D00	L	B05F2	1-04		D03									170
D00			1									12-2/8		170
D01	L	A01D2	1-01							1				171
D01	L	A02D2	1-02							2				171
D01	L	A04D1	1-03		D03					1				171
D01	L	B05H2	1-04		D03					2				171
D01	L	B05T2	1-05		D03									171
D01			1									15-0/8		171
D02	L	A01D1	1-01							1				172
D02	L	A02D1	1-02							2				172
D02	L	A04L1	1-03		D03					1				172
D02	L	R03E2	1-04		D03					2				172
D02	L	B05N2	1-05		D03									172
D02	L	B05K2	1-06		D03					1				172
D02			1									17-6/8		172

AD01-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71 LENGTH	EXCEPTIONS	PAGE 18 RUN NUMBER
D03	L	A01E2	1-01 *							2				173
D03	L	A02E2	1-02 *							1				173
D03	L	R03L1	1-03 *							2				173
D03	L	B05K1	1-04 *							1				173
D03	L	B05M2	1-05 *							2				173
D03	L	A04N1	1-06 *											173
D03			1									20-0/8		173
D04	L	A01E1	1-01 *							1				174
D04	L	A02E1	1-02 *							2				174
D04	L	A05F2	1-03 *							1				174
D04	L	B03N2	1-04 *							2				174
D04	L	B04C1	1-05 *											174
D04			1									16-6/8		174
D05	L	A01F2	1-01							2				175
D05	L	A02F2	1-02							1				175
D05	L	A05T2	1-03							2				175
D05	L	B03F1	1-04											175
D05			1									11-6/8		175
D06	L	A01F1	1-01							2				176
D06	L	A02F1	1-02							1				176
D06	L	A05N2	1-03		D03					2				176
D06	L	B03F2	1-04		D03					1				176
D06	L	B04U2	1-05		D03									176
D06			1									16-0/8		176
D07	L	A01H2	1-01							2				177
D07	L	A02H2	1-02							1				177
D07	L	A05K1	1-03		D02					2				177
D07	L	B05E2	1-04		D02					1				177
D07	L	B03H1	1-05		D02									177
D07			1									15-0/8		177
D08	L	A01H1	1-01							2				178
D08	L	A02H1	1-02							1				178
D08	L	A05U2	1-03		D03					2				178
D08	L	B04S2	1-04		D02									178
D08			1									12-4/8		178
D09	L	A01J2	1-01							2				179
D09	L	A02J2	1-02							1				179
D09	L	A05S2	1-03		D03					2				179
D09	L	B04P2	1-04		D02									179
D09			1									11-6/8		179

ADD1-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN ORDER NAME	BAY - ORDER	Q	DRAW RV PG Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 19 RUN NUMBER
D10	L A01J1	1-01				2					180
D10	L A02J1	1-02				1					180
D10	L A05P2	1-03	D03			2					180
D10	L B04M2	1-04	D02			1			12-0/8		180
D11	L A01K2	1-01				2					181
D11	L A02K2	1-02				1					181
D11	L A05M2	1-03	D03			2					181
D11	L B04K2	1-04	D02			1			11-6/8		181
D12	L A01K1	1-01				2					182
D12	L A02K1	1-02				1					182
D12	L A05K2	1-03	D03			2					182
D12	L B04H2	1-04	D02			1			11-6/8		182
D13	L A01L2	1-01				2					183
D13	L A02L2	1-02				1					183
D13	L A05H2	1-03	D03			2					183
D13	L B04E2	1-04	D02			1			11-6/8		183
D14	L A01L1	1-01 *		R1		2					184
D14	L A02L1	1-02 *		R1		1					184
D14	L A05E2	1-03 *		R1		1					184
D15	L A05C1	1-01				1					185
D15	L A04F1	1-02	D02			2					185
D15	L A02M2	1-03	D02			1					185
D15	L A01M2	1-04				2					185
D15	L B05C1	1-05				1			14-0/8		185
EE01 (0)	H A07J2	1-01				1					186
EE01 (0)	H B06U1	1-02	D02			1					186
EE01 (0)		1-02	D02			1			6-4/8		186
EE01 (1)	H A07L2	1-01				1					187
EE01 (1)	H B05E1	1-02	D03			2					187
EE01 (1)	H B06S1	1-03	D02			1					187
EE01 (1)		1-03	D02			1			8-6/8		187
ADD1-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN ORDER NAME	BAY - ORDER	Q	DRAW RV PG Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 20 RUN NUMBER
E0C	H B13F1	1-01			I	1					188
E0C	H B08H2	1-02			I	1			4-6/8		188
E0C		1									188
ER15 (1)	H A06E1	1-01		D02		1					189
ER15 (1)	H B05B1	1-02		D02		2					189
ER15 (1)	H B07P2	1-03		D02		1			9-2/8		189
ER15 (1)		1									189
EXT COM	A21B1	1-01				1					190
EXT COM	A22C2	1-02				1			3-0/8		190
EXT COM		1									190
EXT IN	H A21A1	1-01	C			1				CABLE	191
EXT IN	H A22R2	1-02		D03		1				TERM HERE?	191
EXT IN		1							4-2/8		191
EXT IN A	A21A2	1-01				1					192
EXT IN A	B08P2	1-02			I	1					192
EXT IN A		1							10-6/8		192
F INIT	H A04K1	1-01		D02		1					193
F INIT	H B09H1	1-02		D02		2					193
F INIT	H B09J1	1-03		D02		1					193
F INIT	H B09K1	1-04		D02		2					193
F INIT	H B07J2	1-05		D03		1			14-0/8		193
F INIT		1									193
GND ?1	A01B2	1-01				1					194
GND ?1	A01C2	1-02				2					194
GND ?1	A01N1	1-03				1					194
GND ?1	A01P1	1-04				2					194
GND ?1	A01R1	1-05				1					194
GND ?1	A01S1	1-06				2					194
GND ?1	A01T1	1-07				1					194
GND ?1	A01V2	1-08				2					194
GND ?1	B01B2	1-09				1					194
GND ?1	B01C2	1-10				2					194
GND ?1	B01D1	1-11				1					194
GND ?1	B01E1	1-12				2					194
GND ?1	B01F1	1-13				1					194
GND ?1	B01V2	1-14				2			35-6/8		194

AD1-D.A RUN NAME	A/P	PIN	ORDER	PIN	BAY -	Q	DRAW	RV	PG	Y	X	Z	REMARKS	LENGTH	EXCEPTIONS	RUN NUMBER
GND 02		A02B2		1-01							1					195
GND 02		A02C2		1-02							2					195
GND 02		A02N1		1-03							1					195
GND 02		A02P1		1-04							1					195
GND 02		A02R1		1-05							1					195
GND 02		A02S1		1-06							1					195
GND 02		A02T1		1-07							1					195
GND 02		A02V2		1-08							1					195
GND 02		R02B2		1-09							1					195
GND 02		R02C2		1-10							1					195
GND 02		R02D1		1-11							1					195
GND 02		R02E1		1-12							1					195
GND 02		B02T1		1-13							1					195
GND 02		B02V2		1-14							1					195
				1										35-6/8		
GND 03		A03A1		1-01							2					196
GND 03		A03C2		1-02							1					196
GND 03		A03T1		1-03							1					196
GND 03		B03C2		1-04							1					196
GND 03		B03D2		1-05							1					196
GND 03		B03J2		1-06							1					196
GND 03		B03T1		1-07							1					196
				1										19-0/8		
GND 04		A04C2		1-01							1					197
GND 04		A04T1		1-02							2					197
GND 04		R04C2		1-03							1					197
GND 04		B04T1		1-04							1					197
				1										11-4/8		
GND 05		A05C2		1-01							1					198
GND 05		A05T1		1-02							2					198
GND 05		B05C2		1-03							1					198
GND 05		B05T1		1-04							1					198
				1										11-4/8		
GND 06		A06C2		1-01							1					199
GND 06		A06T1		1-02							2					199
GND 06		B06C2		1-03							1					199
GND 06		B06C1		1-04							1					199
GND 06		B06T1		1-05							1					199
				1										14-0/8		

AD1-D.A RUN NAME	A/P	PIN	ORDER	PIN	BAY -	Q	DRAW	RV	PG	Y	X	Z	REMARKS	LENGTH	EXCEPTIONS	RUN NUMBER
GND 07		A07C2		1-01							1					200
GND 07		A07T1		1-02							2					200
GND 07		B07C2		1-03							1					200
GND 07		B07T1		1-04							1					200
				1										11-4/8		
GND 08		A08C2		1-01							1					201
GND 08		A08T1		1-02							2					201
GND 08		B08C2		1-03							1					201
GND 08		B08T1		1-04							1					201
				1										11-4/8		
GND 09		A09C2		1-01							1					202
GND 09		A09T1		1-02							2					202
GND 09		B09C2		1-03							1					202
GND 09		B09T1		1-04							1					202
				1										11-4/8		
GND 10		A10C2		1-01							2					203
GND 10		A10T1		1-02							1					203
GND 10		B10C2		1-03							2					203
GND 10		B10T1		1-04							1					203
GND 10		B10U1		1-05							1					203
				1										14-0/8		
GND 11		A11C2		1-01							1					204
GND 11		A11T1		1-02							2					204
GND 11		B11C2		1-03							1					204
GND 11		B11T1		1-04							1					204
				1										11-4/8		
GND 12		A12C2		1-01							1					205
GND 12		B12C2		1-02							1					205
				1										5-0/8		
GND 13		A13C2		1-01							1					206
GND 13		B13C2		1-02							1					206
				1										5-0/8		
GND 14		A14C2		1-01							1					207
GND 14		B14C2		1-02							1					207
				1										5-0/8		
GND 15		A15C2		1-01							1					208
GND 15		B15C2		1-02							1					208
				1										5-0/8		

ADM1-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 27	RUN NUMBER
NPG	L	A01U1	1-01							1						237
NPG	L	A02U1	1-02										2-6/8			237
NPG			1													237
NPR	L	A01S2	1-01							1						238
NPR	L	A02S2	1-02										2-6/8			238
NPR			1													238
OUT HIGH	H	A03M2	1-01		D02					1						239
OUT HIGH	H	A07D2	1-02		D02											239
OUT HIGH			1										4-6/8			239
OUT LOW	H	A03N1	1-01		D02					1						240
OUT LOW	H	A07J1	1-02		D02											240
OUT LOW			1										4-4/8			240
PA	L	A01M1	1-01							1						241
PA	L	A02M1	1-02													241
PA			1										2-6/8			241
PB	L	A01N2	1-01							1						242
PB	L	A02N2	1-02													242
PB			1										2-6/8			242
PS02	H	B03K2	1-01		D02					1						243
PS02	H	B05D1	1-02		D02					2						243
PS02	H	B07N1	1-03		D02					1						243
PS02	H	B07L2	1-04		D02								10-0/8			243
PS02			1													243
PS02	L	B07N2	1-01		D02					1						244
PS02	L	B07M1	1-02		D02					2						244
PS02	L	B03V1	1-03		D02											244
PS02			1										7-2/8			244
RD	H	A07D1	1-01		D02					1						245
RD	H	B06E1	1-02		D03											245
RD			1										5-4/8			245
SACK	L	A01R2	1-01							2						246
SACK	L	A02R2	1-02							1						246
SACK	L	B03T2	1-03		D02											246
SACK			1										8-2/8			246

ADM1-D.A RUN NAME	HNDWRP.V04 6/4/70 A/P PIN NAME	ORDER PIN	BAY - ORDER	Q	DRAW	RV	PG	Y	X	Z	REMARKS	28-JAN-71	20149 LENGTH	EXCEPTIONS	PAGE 28	RUN NUMBER
SELECT 0	H	A07E2	1-01		D02					1						247
SELECT 0	H	A07H1	1-02		D02					2						247
SELECT 0	H	A03S2	1-03		D02					1						247
SELECT 0	H	B04H1	1-04		D02					2						247
SELECT 0	H	B05H1	1-05		D02								14-2/8			247
SELECT 0			1													247
SELECT 2	H	A03T2	1-01		D02					1						248
SELECT 2	H	A05F1	1-02		D03											248
SELECT 2			1										4-0/8			248
SELECT 4	H	A03R2			D02										1-PIN RUN	249
SELECT 6	H	A03S1			D02										1-PIN RUN	250
SIGN	H	A05M1	1-01 *							1						251
SIGN	H	A05L1	1-02 *						R1	2						251
SIGN	H	A05B1	1-03 *						R1	1						251
SIGN	H	A05A1	1-04 *						R1	2						251
SIGN	H	A05D1	1-05 *						R1	1						251
SIGN	H	A05E1	1-06 *						R9	2						251
SIGN	H	B13E2	1-07 *						R7							251
SIGN			1										21-2/8			251
SP		R01F2	1-01							1						252
SP		R02F2	1-02													252
SP			1										2-6/8			252
SSYN	L	A03J1	1-01		D02					2						253
SSYN	L	B03C1	1-02		D02					1						253
SSYN	L	B02U1	1-03							2						253
SSYN	L	R01U1	1-04										11-4/8			253
SSYN			1													253
ST	L	A07N1	1-01 *						I	1						254
ST	L	B09K2	1-02 *						I	2						254
ST	L	R09L2	1-03 *						I	1						254
ST	L	R09M2	1-04 *						I	2						254
ST	L	B11H2	1-05 *						I							254
ST			1										13-6/8			254
ST INTRB	L	R03P2	1-01		D02					1						255
ST INTRB	L	B03S2	1-02		D02											255
ST INTRB			1										2-4/8			255

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ACCESSORY LIST

LEGEND

- D DOCUMENT
- DN DOCUMENT CHANGE NOTICE
- PA PAPER TAPE ASCII
- PB PAPER TAPE BINARY
- PM PAPER TAPE READ-IN-MODE

QUANTITY / VARIATION

MADE BY DATE	CHECKED DATE	SECTION
ENG Paul Severino DATE 3/18/71	PROD Alan Hirsch DATE 3/18/71	ISSUED SECT.

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION
1	DEC11-HADA-D	AD01-D Maintenance Manual
2	C-13531	Schematic Deltron (DEC # 12-3185-2 H727-A) (DEC # 12-3185-4 H727-B)

QUANTITY / VARIATION											KIT CHECK BY	DATE	INSTALLATION CHECK BY	DATE
1														
1														

TITLE		ASSY. NO.	SIZE CODE	NUMBER	REV.	ECO NO
Accessory List			A AL	AD01-D-08		
SHEET 1 OF 1		DIST.				

DEC FORM NO. DRA 121

ENGINEERING SPECIFICATION



CONTINUATION SHEET

TITLE AD01-D Specifications

0.3 Conversion results are entered on the data lines of the unibus of the computer at the right most end. When bipolar operation is implemented, the sign bit is extended to the left to fill the remaining bits.

0.4 The AD01-D subsystem is contained in a single 5¼" high rack mounting panel. This includes an analog power supply sufficient for the basic unit and all prewired options. Also required is an externally mounted 5 volt power supply.

1.0 GENERAL SPECIFICATIONS

1.1 The AD01-D consists of several functional parts as enumerated in the following paragraphs:

1.1.1 A812 Analog to Digital Converter - (10 Bit Unipolar)
 When provided with an input voltage and start pulse the converter module produces ten output bits which correspond to the value of the input voltage. The successive (serial) approximation technique is used. When the ten output bits have been determined the converter module produces a done pulse. The input voltage range of the converter is 0 to +10 volts. The input resistance is 1250 ohms ±0.1%.

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION



CONTINUATION SHEET

TITLE AD01-D Specifications

1.1.2 Multiplexer Control

The six bit MUX channel address is received by the ADCS. An M161 octal decoder converts the three most significant of these bits to an enabling level for one of eight A124 multiplexer modules. The eight prewired slots provided for these modules are A17 through A20 and B17 through B20. When expanding the channel capacity modules must be added in the A level before the B level progressing from slot 17 toward slot 20. The last two bits of the channel address are decoded on the enabled A124 module. The sixth bit is included for future expansion to 64 channels.

1.1.3 Power Supplies

Analog power for the circuitry is furnished by an H727 power supply in conjunction with an A708 voltage regulator module. The H727 supplies +15VDC at 400ma and -20VDC at 400ma. The -20VDC power is used only by the A124 multiplexer modules (30ma each). All other A series modules use -15 volts derived from the negative regulator section of the A708. The maximum current drain on this -15 volt regulator is 200ma. The A708, when fully loaded, takes 200ma from the -20 volt output of the H727. The +15 volt output of the H727 provides

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Specifications

350ma to the analog modules.

1.1.4 Remote Gain Control Amplifier

The gain control bits are received from the accumulator through the gain and mux register. These bits are decoded and converted to gain switching action by an A124 multiplexer module. The operational amplifier used is an A220. The configuration is non-inverting with gains of 1, 2, 4 and 8. A truth table is given in the programming section of this document. The input impedance of the amplifier is greater than 1000 megohms in parallel with 20pF. Settling time to either a gain change or a 10 volt input change is less than 3 microseconds to within one count of the ADC.

1.2 Options

1.2.1 Multiplexer Modules

The A124 multiplexer switch selects one of four input channels on the basis of two input bits and an enabled input. These logic inputs are TTL compatible, and all represent less than one unit load. The analog switches are enhancement-mode mosfets, and all channels

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Specifications

are off when power is removed. The ON resistance is less than 2000 ohms. OFF resistance and capacitance are 200 megohms and 1 picofarad respectively. Normal operation requires that the input voltage be in the range of ± 10 volts. Input voltages up to 20 volts and input currents up to 3ma will cause no damage. Response time (including delay) is less than 1.2 microsecond in both the ON and OFF directions.

1.2.2 Sample and Hold Amplifier - AH04

The A405 Sample and Hold Module Specifications are enumerated here:

Acquisition Time

Within 5mv, 10v step input, max: 5usec

Aperture Time, max: 0.1usec

Gain -1.000 ($\pm 0.02\%$)

Input

Voltage range $\pm 10v$

Impedance 2K ohms $\pm 1\%$

Output

Voltage range, max: $\pm 10v$

Current, mas: 10ma

Impedance, Max: 0.1 ohm

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Specifications

Offset (between sample & hold modes): Less than or equal to 15mv

Temperature coefficient of offset, mx: 50uV per °C

Droop (max at 25°C, Note 1): 10mV/msec

Track-Hold Control

Level Control - Pin BF2 (jumper - W1) T²L compatible
1 unit load
Logic 0 or Low - Hold
Logic 1 or High - Track

Pulse Control - Pin BF2 (jumper - W2) - Pin BH2 Track - 1 unit load
Hold - 1 unit load

NOTE 1: Droop doubles for each 10°C increase in temperature.

1.2.3 AH05 Sign Option

Implementation of the AH05 option is accomplished by substituting the A812 module in slots AB12 with the A862 bipolar A-D converter module in slots AB13. Conversion time for this module is 24usec. giving 10 bits + sign in two's complement notation. Total system conversion time is 29usec with AH05.

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Specifications

1.3 Mechanical Configuration

The entire AD01-D is contained in an H911 logic rack with six H803 connector blocks. The right hand end (as viewed from the front of the rack) is occupied by the analog power supply. The 5 volt logic supply is also rack mount.

1.4 General Specifications

1.4.1 Power Requirements

1.4.1.1 AD01-DA:	110v, 60Hz
Analog Power Supply:	H727A
AC current:	less than ½ amperes
Power Dissipation:	less than 25 watts
Digital Logic Supply:	H716B
AC current:	less than 3 amperes

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION 000000 CONTINUATION SHEET

TITLE	AD01-D Specifications		
1.4.1.2	AD01-DB:	230V, 50Hz	
	Analog Power Supply:	H727B	
	AC Current:	less than ¼ amperes	
	Power Dissipation:	less than 25 watts	
	Digital Logic Supply:	H716D	
	AC Current:	less than 1.5 amperes	
	Power Dissipation:	less than 25 watts	
1.4.2	<u>Environmental Specification</u>		
	Temperature Range (operating):	0°C to 55°C	
	Temperature Range (storage):	-25°C to +85°C	
	Temperature Coefficient of Zero:	less than 30 microvolts per °C referred to input +100 microvolts per °C referred to output.	
	Temperature Coefficient of Gain:	less than 0.005% per °C.	
1.5	<u>General Performance Specifications</u>		
1.5.1	Number of Channels		
	Any number of channels up to 32 can be accommodated by the AD01-D. Expansion to 64 channels is possible with the addition of another 1943 rack.		

ENGINEERING SPECIFICATION 000001 CONTINUATION SHEET

TITLE	AD01-D Specifications		
1.5.2	<u>System Speed</u>		
	The AD01-D conversion time is 22usec ±lusec including response to new channel and gain selection. This time is measured from the initiation of new gain and channel address information or the setting of the A/D start bit in the control & status register. The conversion period is terminated by the done pulse, which sets the done bit. Conversion time with AH05 is 29usec ±lusec.		
1.5.3	<u>Input Specifications</u>		
1.5.3.1	<u>Configuration:</u> <u>Single-Ended</u>		
1.5.3.2	<u>Input Impedance</u>		
	Greater than 1,000 megohms in parallel with less than 20pF.		
1.5.3.3	<u>System Accuracy</u>		
	0.1% of full scale ±½LSB		
1.5.3.4	<u>Gain</u>		
	Gains of 1, 2, 4 and 8 are selectable by program control.		
1.5.3.5	<u>Gain Accuracy</u>		
	±0.05%		
1.5.3.6	<u>Input Voltage</u>		
	0 to 10 volts, 5 volts, 2.5 volts, and 1.25 volts.		
	These ranges are unipolar and positive on the basic		

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION



CONTINUATION SHEET

TITLE AD01-D Specifications

AD01-D and are bipolar two's complement on the AD01-D with sign and magnitude option.

1.5.4 Noise

The peak-to-peak noise including both line frequency and random components is less than 0.2 LSB on the 10 volt and 5 volt ranges, less than 0.4 LSB on the 2.5 volt range, and less than 0.8 LSB on the 1.25 volt range. These figures are to 99.7% confidence. When sample and hold is included, increase these figures by 20%.

1.5.5 Zero Offset

Adjustable to zero. Calibrated for first switching point at $+\frac{1}{2}$ LSB.

1.5.6 Resolution

One part in 1.024 of full scale (9.8mv).

2.0 SPECIFICATIONS OF VENDOR-SUPPLIED EQUIPMENT

2.1 Regulated DC analog power supply H727A. See DEC Purchase Specification 12-03185-2. Use H727B when 230VAC input is desired. See Purchase Specification 12-03185-4. Regulated DC 5v logic supply H716B. See DEC Purchase Specification 30-9282.

3.0 PROGRAMMING SPECIFICATIONS

3.1 Starting the Converter

In the AD01-D a conversion can be initiated in three different ways:

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION



CONTINUATION SHEET

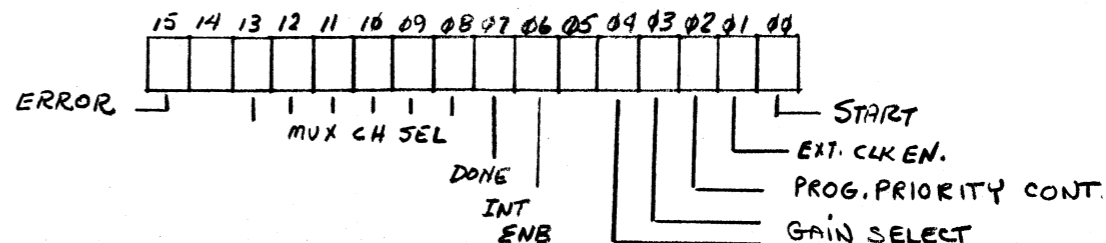
TITLE AD01-D Specifications

- 1) Set A/D start, Bit 00 ADSC.
- 2) Loading MUX channel address. However, if the External Clock is enabled the programmer must set A/D start to initiate a conversion under program control. This feature makes it possible to change gain and MUX address between External Clock pulses. It is noted here that if the error Bit(15) is set and causes an interrupt, it should not be reset until a new conversion is to be initiated as clocking any data into the upper byte of the ADCS will initiate a conversion.
- 3) External Clock, when enabled.

3.2 Device Registers

All software control of the AD01-D is done via two (2) register. The following presents the bit assignment within each register. All bits are read/write unless stated otherwise.

3.2.1 Control and Status Register (ADCS=776770)



SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION  CONTINUATION SHEET

TITLE AD01-D Specifications

- | <u>Bit</u> | <u>Meaning and Operation</u> |
|--|--|
| 15 | <u>ERROR</u> - indicates device has been issued a start command during the time between start conversion and read ADDB. Cleared by INIT. Set by Convert Command. Cleared under program control upon loading new Gain and MUX Channel data. |
| NOTE: The main purpose of the ERROR bit is to indicate timing problems that could occur if an external clock is starting conversions at certain intervals and conversions are being made underprogram control between the external clock pulses. | |
| 13-08 | <u>MUX CH</u> - Six bits to select 1 of 64 multiplexer channels. Cleared by INIT, loaded under program control. |
| 07 | <u>DONE</u> - indicates state of converter. Reset by init. Set by A/D Done. Reset by reading ADDB. Read Only. |
| 06 | <u>INT ENB</u> - Will allow interrupts on A/D Done or Error. Cleared by INIT, set under program control. |

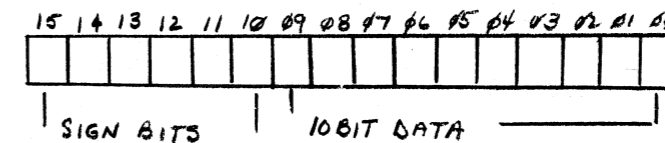
SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION  CONTINUATION SHEET

TITLE AD01-D Specifications

- | | |
|-------|--|
| 05 | UNUSED |
| 04-03 | <u>GAIN SELECT</u> - Gain select for programmable gain amplifier. Loaded under program control. Cleared by INIT. |
| 02 | <u>PROG-PRIORITY REQUEST</u> - Will allow selection of bus request line under program control. Bits 02=0 BR7 Bit 02=1 priority determined by bus grant jumper socket on G736 module. Cleared by INIT, set under program control. |
| 01 | <u>EXT CLK ENB</u> - Will allow converter to be controlled by external input. Cleared by A/D Done (Write Only). |

3.2 Data Buffer (ADDB=776772)



SIZE	CODE	NUMBER	REV
A	SP	AD01-D-10	

ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Specifications

<u>BIT</u>	<u>MEANING AND OPERATION</u>
15-10	<u>SIGN</u> - When AH05 Sign Bit option is installed bits will take on sign in two's complement. Read Only.
09-00	<u>DATA</u> - 10 bit data word. Read Only.

3.3 Interrupt
The converter interrupts when INT ENB=1, and DONE=1 or ERROR=1. Both become true. Vector Address=130

3.4 Timing
Figure 3.3 shows the timing operations within the AD01-D

3.5 Control
No operator controls are included in this device. Any trouble shooting or calibration procedures are carried out by the use of the computer console.

	SIZE A	CODE SP	NUMBER AD01=D-10	REV
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ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Specifications

3.6 External Clock Control
The AD01-D contains two inputs for external control of the conversion process.

3.6.1 Ext In
The EXT IN signal is brought into the converter on the M908 analog input module in slot A21 pins A1 and B1 (B1 is EXT common). Input signal conditioning is provided by the M501 Schmitt Trigger circuit. The upper and lower thresholds are set at 1.7 volts and 1.1 volts. Input signal swing is limited to ± 20 volts.

INPUT STANDARDS

Signal Swing = $\pm 20V$
Loading = 2.7K ohms to +5V or 1.8ma @GND

3.6.2 Ext In A
The EXT IN A signal is brought into the converter on the M908 analog input module in slot A21 pins A2 and B1 (B1 is EXT common). This input is T²L compatible. Triggèring is accomplished by a level change from high to low or a pulse to low whose duration is equal to or greater than 50 nanoseconds. The fall time of the input trigger should be less than 400 nanoseconds.

INPUT STANDARDS

Signal Swing = T²L logic levels
Timing = Level - high to low fall time $\leq 400nsec$
Pulse - high to low, duration $\geq 50nsec$

	SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

digital

CONTINUATION SHEET

TITLE AD01-D Specifications

Loading = 2½ unit loads

3.6.3 External Clock Timing Considerations

A timing diagram is given in Figure 3.6 to show the operation of the AD01-D under external clock control. In the external mode time is not allowed for the switch gain amplifier to settle. This is done in this manner so that a conversion is initiated at the time the external signal is applied. Thus it is the responsibility of the user to allow at least 5usec for settling of the input amplifier if necessary. A logic diagram of the external clock input circuitry is provided in Figure 3.6a

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

digital

CONTINUATION SHEET

TITLE AD01-D Specifications

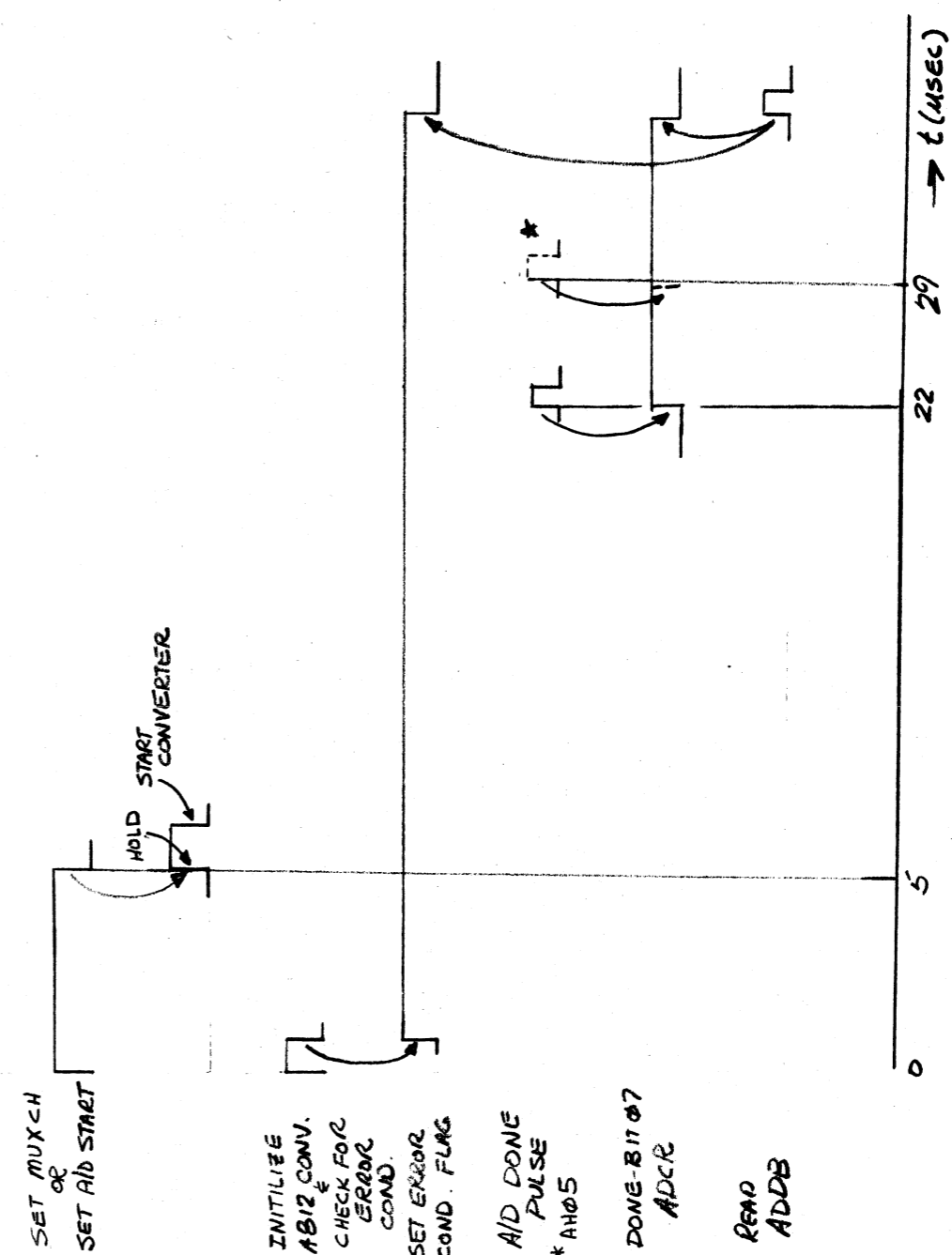


FIG 3.3 AD01-D SYSTEM TIMING

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

010101

CONTINUATION SHEET

TITLE AD01-D Specifications

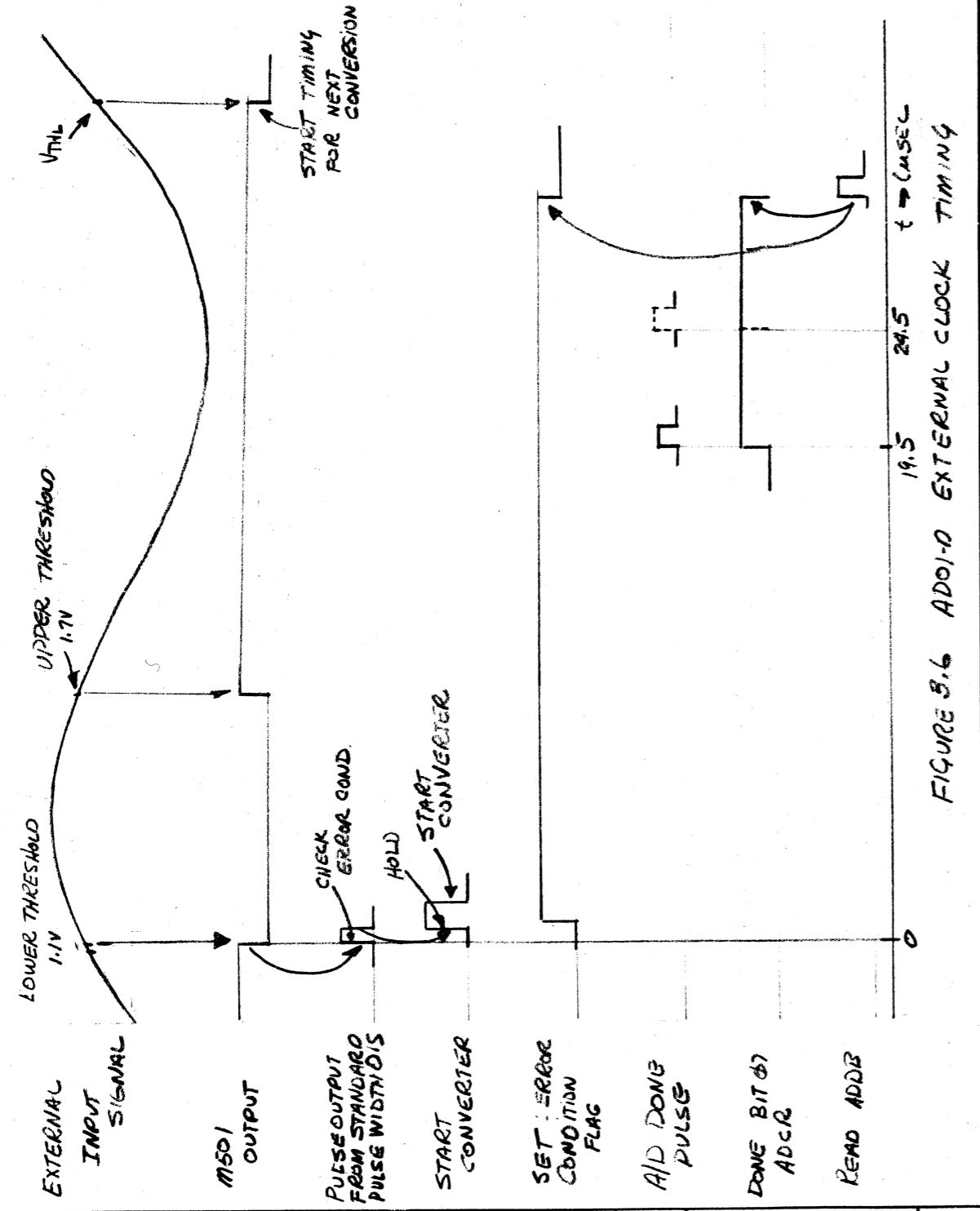


FIGURE 3.6 AD01-D EXTERNAL CLOCK TIMING

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

010101

CONTINUATION SHEET

TITLE AD01-D Specifications

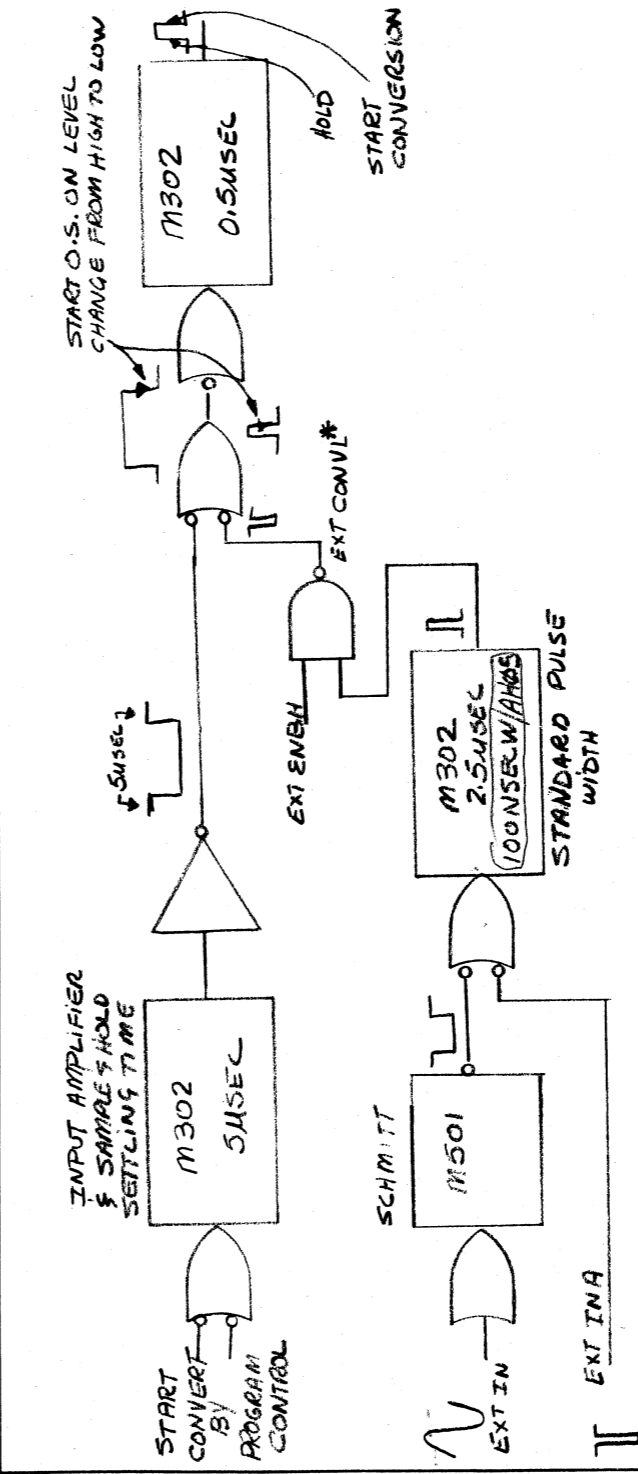


FIGURE 3.6a
EXTERNAL CLOCK INPUT SIGNAL CONDITIONING

* EXT CONV L SIGNAL BYPASSES 0.5μSEC DELAY FOR INPUT SETTLING

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Specifications

BIT 14	BIT 13	GAIN	FULL SCALE VOLTS
φ	φ	1	10
φ	1	2	5
1	φ	4	2.5
1	1	8	1.25

FIG 3.1.2 GAIN SELECT
TABLE

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Specifications

Analog-Channel Input
Pin Assignment

Channel Number		Input Pin	
Decimal	Octal	Connection	Gnd
00	00	A21B2	A21C2
01	01	A21C1	A21D1
02	02	A21D2	A21E2
03	03	A21E1	A21F1
04	04	A21F2	A21H2
05	05	A21H1	A21J1
06	06	A21J2	A21K2
07	07	A21K1	A21L1
08	10	A21L2	A21M2
09	11	A21M1	A21N1
10	12	A21N2	A21P2
11	13	A21P1	A21R1
12	14	A21R2	A21S2
13	15	A21S1	A21T1
14	16	A21T2	A21U2
15	17	A21U1	A21V1
16	20	B21B2	B21C2
17	21	B21C1	B21D1
18	22	B21D2	B21E2
19	23	B21E1	B21F1
20	24	B21F2	B21H2
21	25	B21H1	B21J1
22	26	B21U2	B21K2
23	27	B21K1	B21L1
24	30	B21L2	B21M2
25	31	B21M1	B21N1
26	32	B21N2	B21P2
27	33	B21P1	B21R1
28	34	B21R2	B21S2
29	35	B21S1	B21T1
30	36	B21T2	B21U2
31	37	B21U1	B21V1

SIZE A	CODE SP	NUMBER AD01-D-10	REV
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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

A124 Modules are:

<u>Slot</u> A17	CH00 - CH03	<u>Slot</u> B17	CH16 - CH19
A18	CH04 - CH07	B18	CH20 - CH23
A19	CH08 - CH11	B19	CH24 - CH27
A20	CH12 - CH15	B20	CH28 - CH31

2.0 Insure Flip-Chip module handle extenders and hold down bar in place.

3.0 Logic Testing
The logic testing is accomplished by loading the AD01D diagnostic Maindec-11-D6AB with the binary loader. The G735 test card should be inserted into slots AB21. Set the voltage standard (EDC) for 0.625V.

3.1 Running the diagnostic

3.1.1 Normal (Worst Case) Testing
The starting address is 200 and the program halts 3 times at the start.

- 1st Halt - Load initial channel number (SW0-SW05)
- 2nd Halt - Load number of channels to be tested (SW0 - SW05)
- 3rd Halt - Set SR option (if AH05 is ordered set SR 8=1 at this halt.

The continue switch should be hit after each halt. The program should now run testing all logic, control functions, gain, linearity and analog channels. If the AH05 option is installed the program will ask for the proper input voltage to test the sign. The gain linearity test may fail if external noise is excessive. However, the test should be

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	8

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

repeated as continued failures indicate non-linearity.

4.0 Channel Noise

This test is used primarily to locate excessively noisy channels. It should be noted here that this test is dependent on many factors, external noise generated at the voltage source, variations in power line voltages and radiated power line noises. Typeouts here do not necessarily indicate failures. When running the was-is test the main thing to watch for is excessively noisy channels. This is indicated by repeated typeouts on the same channel with 3-4 count spreads.

4.1 Running the Was-Is Test

1. Set EDC to "0" on polarity switch.
2. Load and start at SA270; the program will halt 3 times:
 - 1st Halt - Load initial channel in octal (Bits 05-00) and Gain (Bits 07-06)
 - 2nd Halt - Load number of channels (Bits 05-00)
 - 3rd Halt - Set SR option (refer to diagnostic for option settings). For acceptance purposes load SR0 at this halt.

Hit continue after each halt. The test should be run for each gain using the discussion in the previous Secion (4.0) as a guide. At the end of each pass (4096 conversions per channel) the teletype bell will ring. Test should run for a minimum of 5 minutes without errors.

4.2 Channel Continuity

With the Was-Is test running at a gain of 1 and the EDC set at 9:9900V. Set SW6=1. A table will print out

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	8

ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

giving the channel number, initial value and new value of the converted data. With the G735 test card in use each channel will be half of the previous channel value until at the tenth(8) channel, the full voltage will then repeat. For a full scale input as set above the printout for 10(8) channel will look like the following:

<u>Channel</u>	<u>Initial Value</u>	<u>Final Value</u>
CH00	1777	1777
CH01	1000	1000
CH02	0400	0400
CH03	0200	0200
CH04	0100	0100
CH05	0040	0040
CH06	0020	0020
CH07	0000	0000
CH10	1777	1777

If the G735 test card is not available each input should be given a known voltage and the results checked in the display conversion loop SA220.

5.0 Repeatability Test (3 Sigma)

This routine tests repeatability to specifications on the channels desired at gains of 4 and 8. Ten thousand conversions are taken at each gain. The specifications have been interpreted to mean that 35 conversions out of the ten thousand may be outside of 2 states at a gain of 4, and that 35 conversions out of ten thousand may be outside of 3 states at a gain of 8.

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	

ENGINEERING SPECIFICATION digital CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

5.1 Running the 3 Sigma Test

The Pass- Fail aspect of this test is based on the specification for repeatability of the converter, and requires that the input to each channel be grounded. This can be accomplished by setting the EDC to ZERO (0) at the polarity switch or by connecting the inputs to analog ground. The SA is 300. At the first halt set the initial channel number to be tested in SW05-SW00. At the second halt set the number of consecutive channels to be tested in SW05-SW00. The test will now run, ringing the bell after each successful pass. Again it should be noted here that this test is dependent on outside factors especially radiated power line noise and variations in power line voltages. This test should be run for a minimum of 5 min, without errors.

6.0 Accuracy

The accuracy specification for the AD01-D is 0.1% of F.S. This specification can be proved by checking switching points and comparing the values obtained against the proper calibration chart. (Unipolar chart for basic unit and Bipolar if AH05 is installed). Each switching point should be within the specified tolerance on each gain.

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	

ENGINEERING SPECIFICATION

digital

CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

6.1 Running the Accuracy Test

This is accomplished by using the display loop section of the diagnostic program. The SA is 220 and the program will immediately run upon starting. Channel and gain can be selected while the program is running. The following are the switch register settings:

Channel (Octal) - SW5-SW0
Gain (Octal) - SW7-SW6

The switching points should be checked at CH00 since the G735 acts as a voltage divider. All the switching points need not be checked for acceptance as production checkout has already been through the calibration sheet. However, six to eight readings on each gain should suffice. It should be noted here that the accuracy of the voltage standard should be considered in making the measurements. For example, if an EDC is used with an accuracy of $\pm 0.01\%$ of F.S. 10V, the EDC reading is good only to ± 1 millivolt. The accuracy test is the final part of the procedure. The G735 card should be removed from slot AB21 and the M908 cards replaced in slot AB22. The hold down bar should now be installed.

7.0 External Sync Test

The wave generator should be connected to the EXT. IN in slot A21. The jumper from Pin A22R2 to A22C2 should be

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	

ENGINEERING SPECIFICATION

digital

CONTINUATION SHEET

TITLE AD01-D Acceptance Procedure

removed.

7.1 External Conversion Test

This routine counts external conversions and prints out after every tenth conversion. The SA is 230 and the frequency of the input trigger signal should be set at about 1 cycle (1HZ).

Switch Register Settings

SW5-1. Causes the program not to set external enable thus no printout should occur.

SW6-1. Causes it to run internal conversions during external conversions. The proper error message will occur.

SW7-1. Prevents it from clearing done after each conversion thus an error printout will occur. It should also be noted that if the external trigger frequency is too fast error printouts will occur.

8.0 Documentation and Software

The following items should be complete and included:

- AD01-D Print Set
- Maintenance Manual or Engineering Specifications.
- Key sheets, checkout log, Q.C. status, accessories as stated on accessory check list.
- AD01-D Maindec-11-D6AB Diagnostic Program and Write-up
- AD01-D Calibration Procedure
- AD01-D Calibration Chart
- ECO Status Sheet

SIZE	CODE	NUMBER	REV
A	SP	AD01-D-12	

MASTER DRAWING LIST

	MAINTENANCE MANUALS	UNIT VARIATIONS																
NO.	TITLE	AH04-0																
	AH04-0 SAMPLE & HOLD OPTION X																	

USED ON OPTIONS							
ADOI-D							
ADOI-A							

REVISIONS	APP'D.	A. V.	DRN. SUTHERLAND	DATE 3/8/73	DIGITAL EQUIPMENT CORPORATION <small>MAINTENANCE MASSACHUSETTS</small>
	CHG. NO.	MISC-86	CHK'D SUTHERLAND	DATE 3/8/73	
	DATE	7/71	ENG D. SEVERI	DATE 3/9/73	
	REV.	A	PROJ. ENG. D. SEVERI	DATE 3/7/73	
			PROD. A. HIRSCH	DATE 3/9/73	
			FIRST USED ON	///	TITLE
			SCALE	///	SAMPLE & HOLD OPTION AH04
			SHEET	1 OF 2	SIZE CODE
					A ML
					NUMBER
					AH04-0
					REV
					A
					DIST.

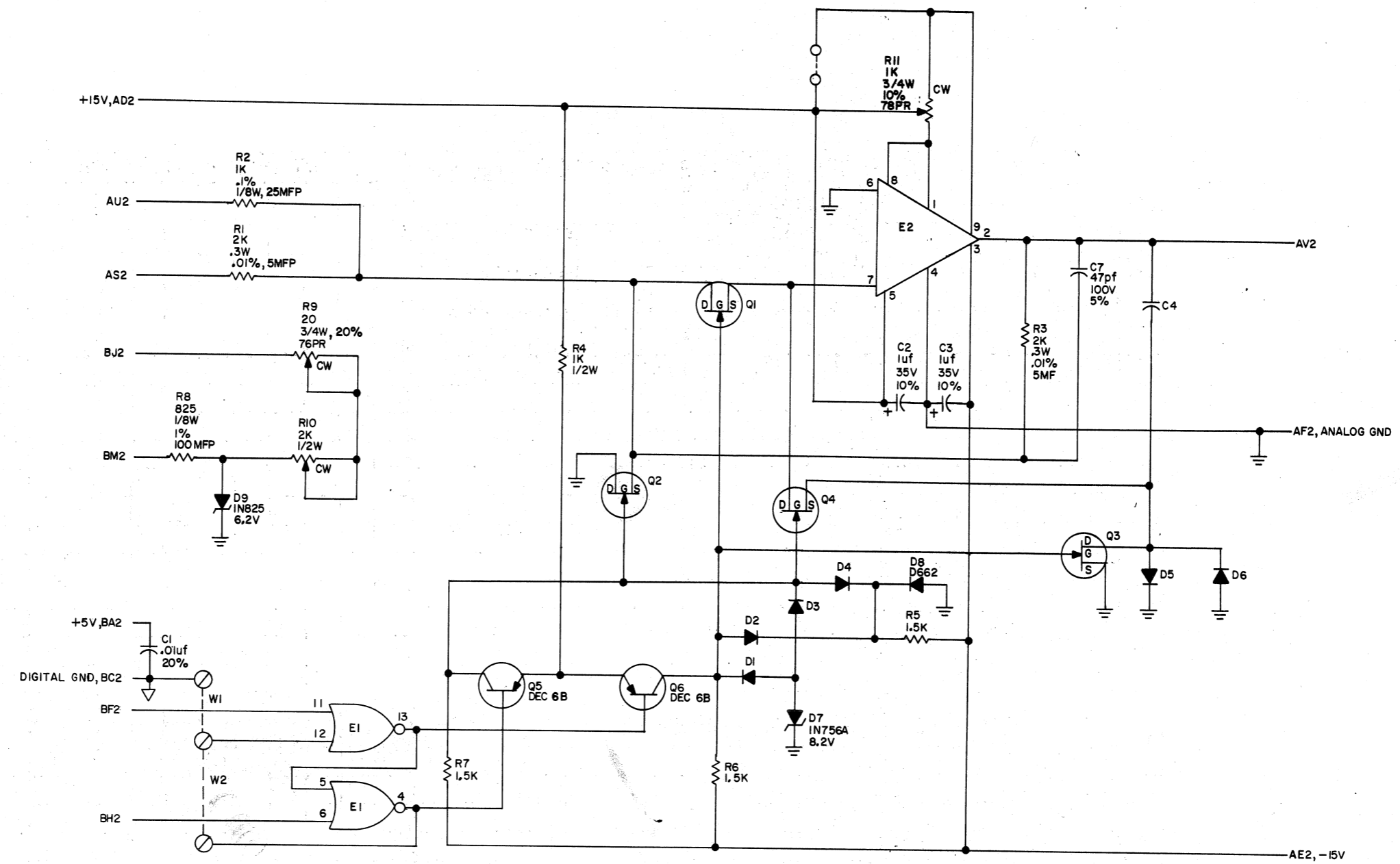
DRA 131
 Dec 16 (325)-1048-N471

PRINT SET					DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE	OPTION NO.	
AH04-Ø										
X					A-PL-AH04-0-0		1	SAMPLE & HOLD (PARTS LIST)		
X					C-CS-A405-0-1	B	1	SAMPLE & HOLD		
TITLE					SAMPLE & HOLD OPTION AH04		SHEET 2 OF 2	SIZE CODE A ML	NUMBER AH04-0	REV A

DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS PARTS LIST						QUANTITY / VARIATION									
MADE BY M. PORIER		CHECKED KAREN KRYSIAK		SECTION											
DATE 2/25/71		DATE 3/2/71													
ENG <i>P. Sever</i>		PROD <i>A. Hurd</i>		ISSUED SECT.											
DATE 3/2/71		DATE 3-2-71													
ITEM NO.	DWG NO. / PART NO.	DESCRIPTION													
1	A405	SAMPLE AND HOLD MODULE				1									
TITLE		ASSY NO.		SIZE	CODE	NUMBER			REV.	ECO NO.					
SAMPLE & HOLD				A	PL	AH04-0-0			0	ADOIA-00007					
		SHEET 1 OF 1		DIST.											

DEC FORM NO.16-1031
 DRA 110

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UNLESS OTHERWISE INDICATED:
 TRANSISTORS ARE 2N5245
 CAPACITORS ARE .001UF 100V, 10%
 RESISTORS ARE 1/4W, 5%
 DIODES ARE D664
 E1 IS DEC7402
 PIN 7 = GND ON E1
 PIN 14 = +5V ON E1
 ○--○ INDICATES JUMPER
 ⊗--⊗ SPLIT LUGS WITH JUMPER
 (CUSTOMER OPTION)
 E2 IS A 1909848-03

REV.	CHG NO.	REV.
A	00001	
B	00002	

DEC FORM NO. DRC 102

M5921-A

DRN. NANCY MOORE
 DATE 4/2/70
 CHK'D. Pat. Relucio 2/29/70
 ENG. M. S. Sullivan 1/14/70
 PROD. DATE

TRANSISTOR & DIODE CONVERSION CHART			
DEC	EIA	DEC	EIA
D664	IN3806	IN825	SAME
D662	IN645		
DEC6B	NONE		
2N5245	NONE		
IN756A	SAME		

digital
 EQUIPMENT CORPORATION
 MAYNARD, MASSACHUSETTS

TITLE SAMPLE AND HOLD
 A405
 SIZE CODE C CS
 NUMBER A405 -0-1
 REV. B
 PRINTED CIRCUIT REV. C

DIST. 324,434,435 3 5 P/NK-

REV. B
 NUMBER A405-0-1
 SIZE CODE C CS

MASTER DRAWING LIST

MAINTENANCE MANUALS		UNIT VARIATIONS																				
NO.	TITLE	AH05-0																				
AH05-0	SIGN BIT OPTION	X																				

USED ON OPTIONS						
AD01-A						
AD01-D						

REVISIONS		APP'D.	DATE	CHG. NO.	DATE	DRN.	DATE	<div style="font-weight: bold; font-size: 1.2em;">digital</div> EQUIPMENT CORPORATION <small>MAINTENANCE MASSACHUSETTS</small>
REV.	A B C	M.L. P.S. A.V.	5-70 2-71 7/71	AD01A-4 AD01A-7 MISC-86	21/70 2/5/70 2/6/70 2/6/70 2/13/70	ROBICHAUD J. MADDEN LINDHEIMER LINDHEIMER W. MILLER	TITLE SIGN BIT OPTION FOR AD01	

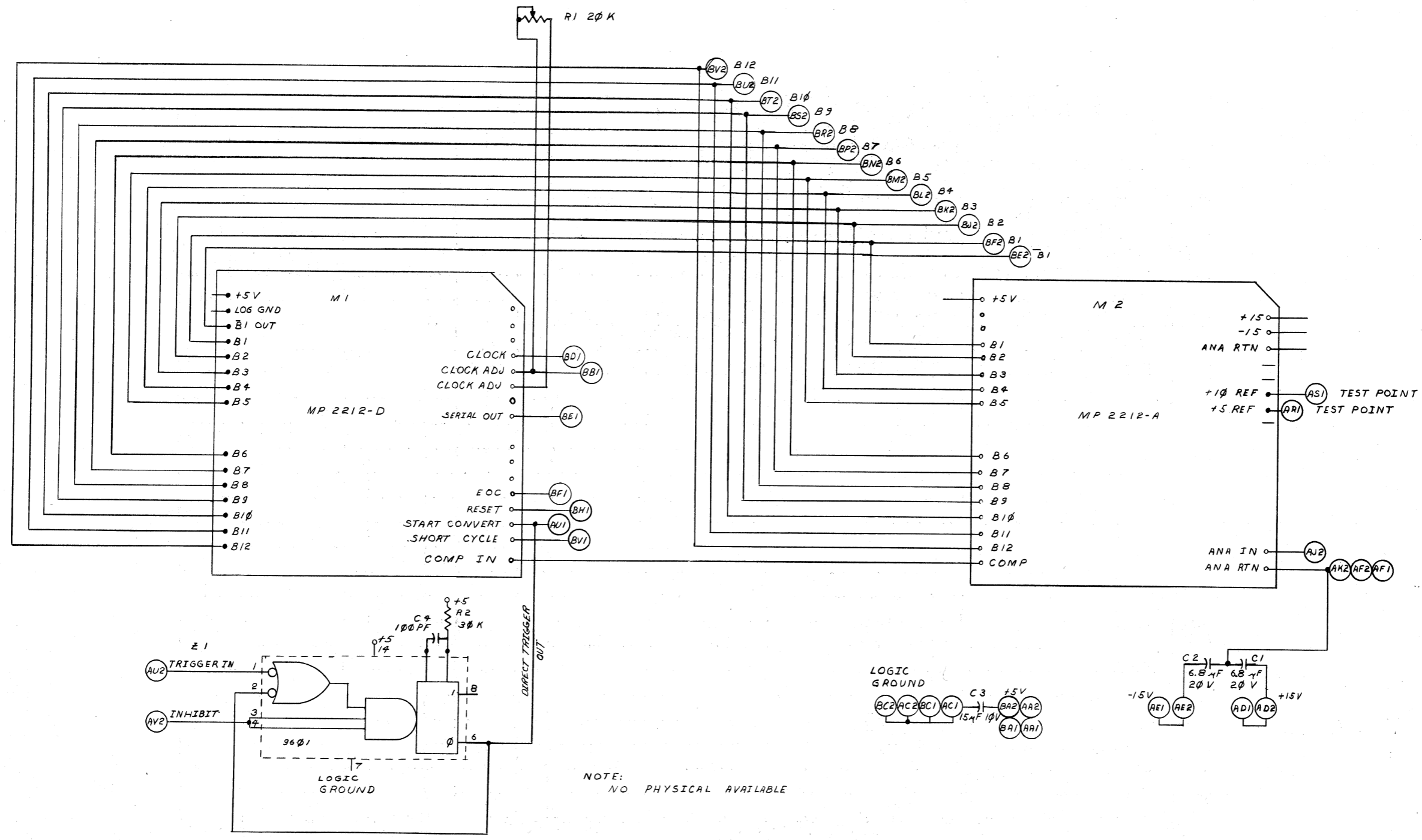
FIRST USED ON AD01-A	SIZE A	CODE ML	NUMBER AH05-0	REV. C
SCALE 	SHEET 1 OF 2	DIST.		

PRINT SET					DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE	OPT. NO.									
AH05-0																		
X					A-PL-AH05-0-0	B	1	SIGN BIT OPTION FOR AD01										
X					D-CS-A862-0-1		1	11 BIT A/D CONVERTER WITH SIGN	A862									
TITLE					ONE BIT EXTENDER FOR AD01		SHEET 2 OF 2		<table border="1"> <tr> <td>SIZE</td> <td>CODE</td> </tr> <tr> <td>A</td> <td>ML</td> </tr> </table>	SIZE	CODE	A	ML	<table border="1"> <tr> <td>NUMBER</td> <td>REV</td> </tr> <tr> <td>AH05-0</td> <td>C</td> </tr> </table>	NUMBER	REV	AH05-0	C
SIZE	CODE																	
A	ML																	
NUMBER	REV																	
AH05-0	C																	

DRA 132
 DEC 16- (325)-1048-1-N471

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REV. 2
 SIZE CODE DCS A862-0-01



NOTE:
 NO PHYSICAL AVAILABLE

REV.	1	10/19/70
CHK	1	10/19/70

QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST			
FIRST USED ON OPTION / MODEL		DRN	DATE
UNLESS OTHERWISE SPECIFIED		DATE	DATE
DIMENSION IN INCHES		DATE	DATE
TOLERANCES		DATE	DATE
DECIMALS FRACTIONS ANGLES		DATE	DATE
± .005 ± 1/64 ± 0°30'		DATE	DATE
FINAL SURFACE QUALITY		DATE	DATE
REMOVE BURRS AND BREAK SHARP CORNERS		DATE	DATE
MATERIAL	NEXT HIGHER ASSY	DATE	DATE
FINISH	SCALE	SHEET	OF
		1	1

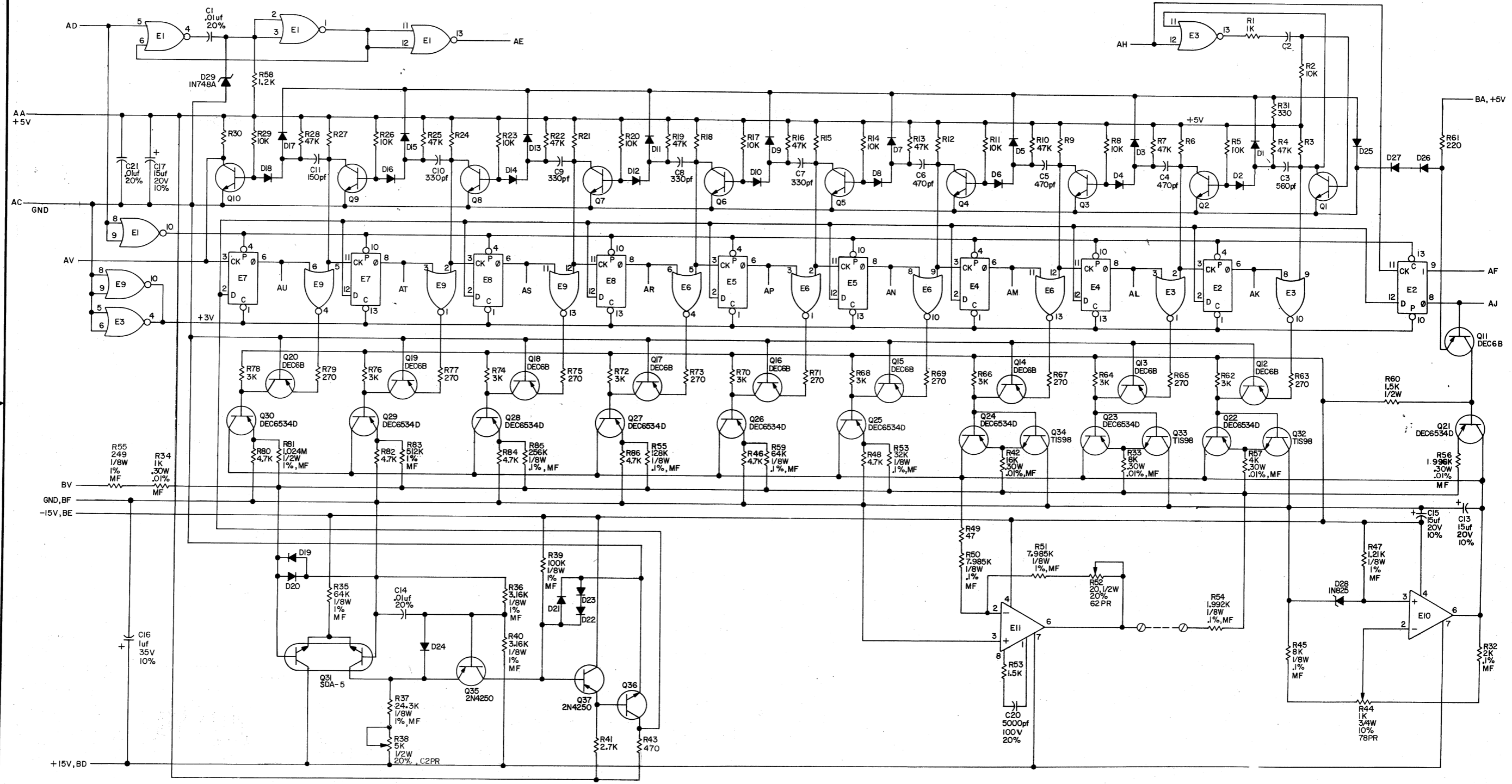
digital EQUIPMENT CORPORATION
 MAYNARD, MASSACHUSETTS

TITLE
HIGH SPEED A/D CONVERTER (A861 & A862)

SIZE CODE NUMBER REV.
 DCS A862-0-01 P03

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REV. 1-0-2 (REV. 3/70) SC D



UNLESS OTHERWISE INDICATED:
 RESISTORS ARE 2.2K, 1/4W, 5%
 CAPACITORS ARE 150pf, 100V, 5%
 DIODES ARE D664
 TRANSISTORS ARE DEC3009B
 E2, E4, E5, E7, E8 ARE DEC7474
 E1, E3, E6, E9 ARE DEC7402
 PIN 7 ON EACH IC = GND
 PIN 14 ON EACH IC = +5V
 E10, E11 ARE DEC1439
 --- INDICATES JUMPER (CUSTOMER OPTION)
 ⊗ INDICATES SPLIT LUGS

REV.	DATE	BY	CHKD.
1	12/13/70	ALLAN RITCEY	
2	2-27-76		
3	12/13/70		

TRANSISTOR & DIODE CONVERSION CHART			
DEC	EIA	DEC	EIA
D664	IN3606	TIS98	NONE
IN825	SAME	2N4250	NONE
DEC3009B	2N3009B	SDA-5	SDA-5
DEC6534D	MP6534		
DEC6B	NONE		

digital		TITLE	
EQUIPMENT CORPORATION		10 BIT ADC A812	
SIZE	CODE	NUMBER	REV.
D	CS	A812-0-1	B
MAYNARD, MASSACHUSETTS		PRINTED CIRCUIT REV.	C

DEC FORM NO. 580 114

MS424-P5

PINK BLUE

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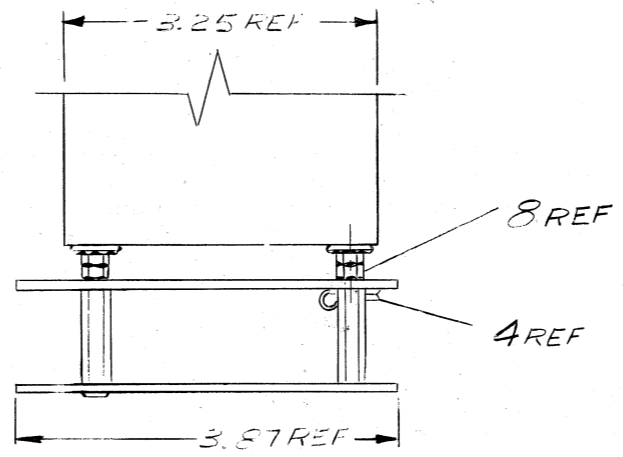
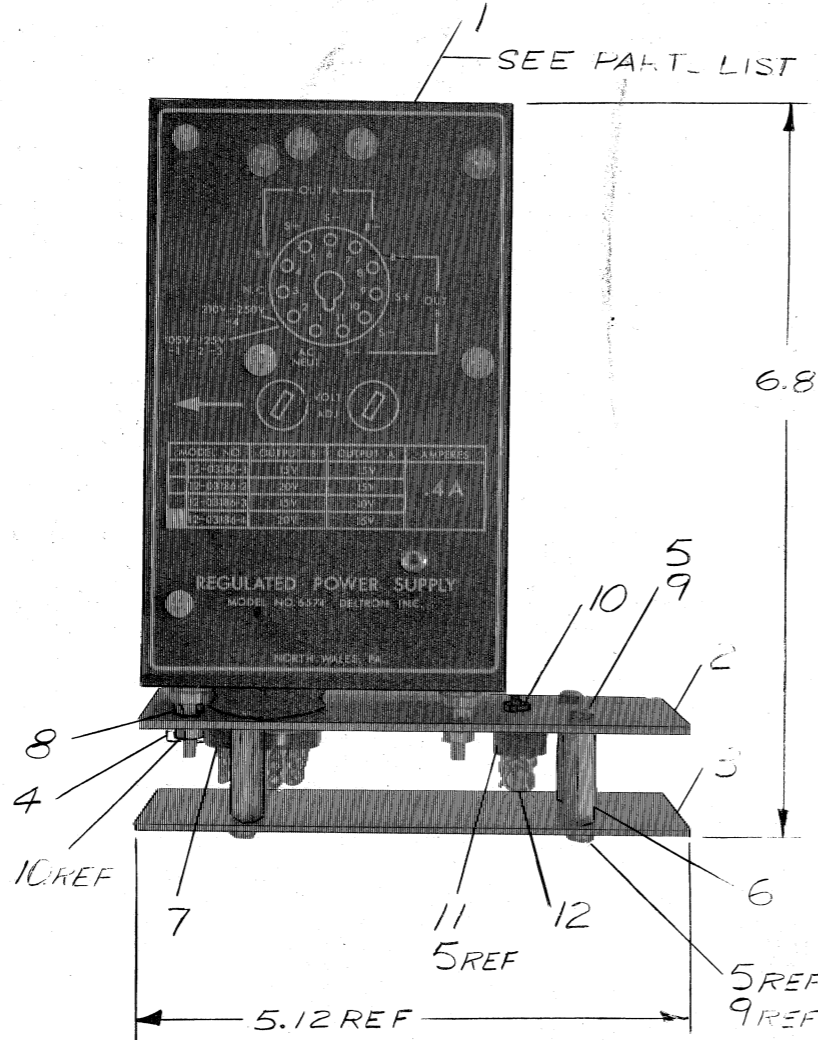
LEGEND	
PART NO	VARIATION
H727-A	115VAC (ITEM 1)
H727-B	230VAC (ITEM 1)

NOTES:

1. FOR CIRCUIT SCHEMATIC REFER TO DWG. D-CS-H727-01

~~See UD-11 book
brown with X-miss
low tower!
nu!~~

12-03186-2 for A001
20V, -15V



TOLERANCES

DECIMALS
.XXX = ± .005
.XX = ± .02
.X = ± .1

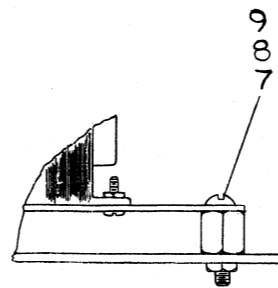
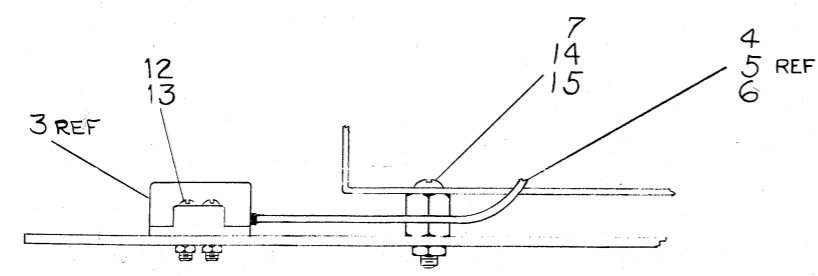
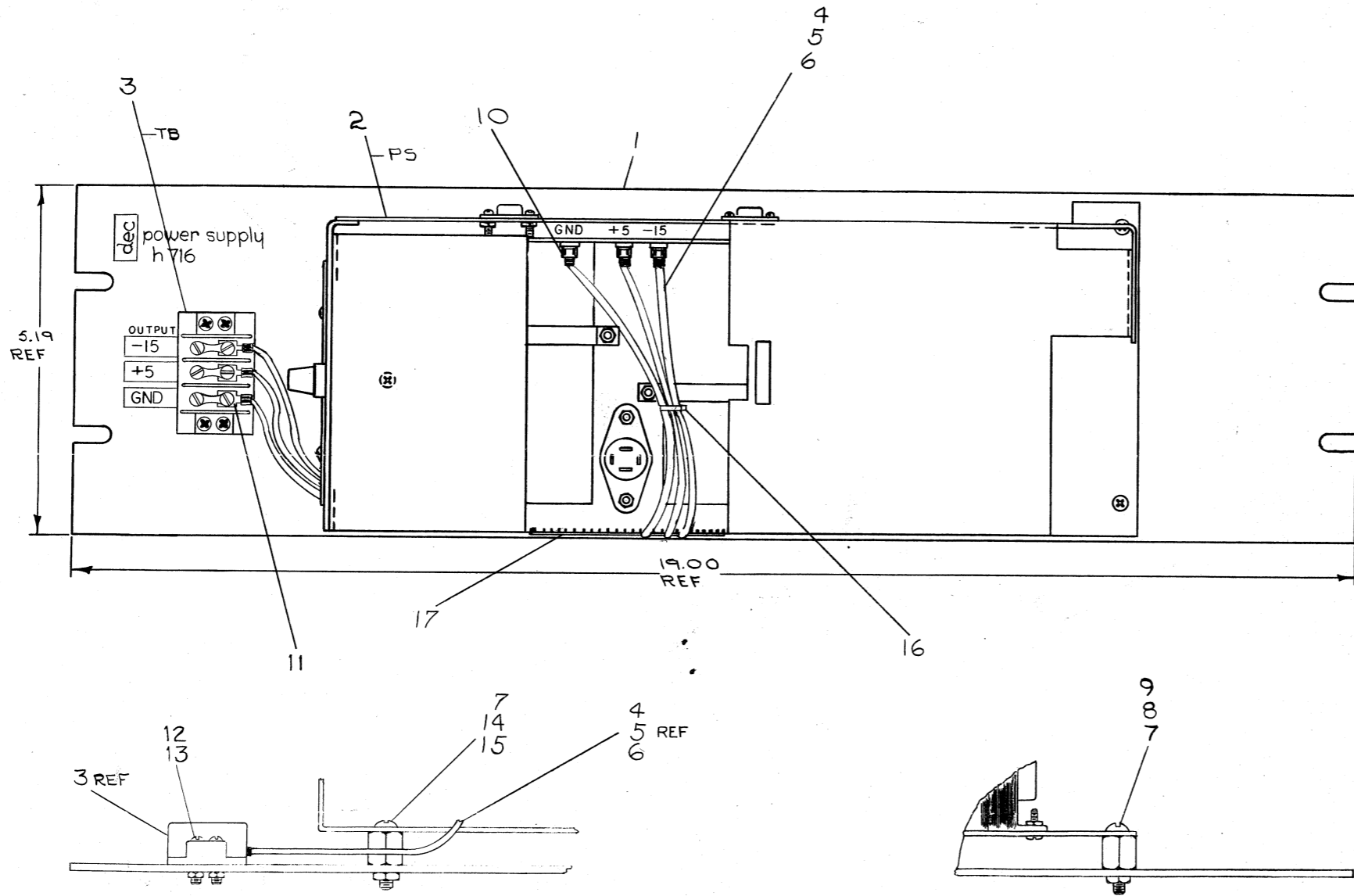
FIRST USED OR OPTIO ⁿ /NO. EL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
1121 P/S				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN. <i>L. Marini</i>	DATE <i>7/2/70</i>	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS TITLE DUAL D.C. POWER SUPPLY	
UNLESS OTHERWISE SPECIFIED	CHK'D. <i>F. Russ</i>	DATE <i>8/3/70</i>		
DECIMALS .XXX = ± .005	ENG. <i>Paul Sever</i>	DATE <i>8/5/70</i>		
FRACTIONS ± 1/64	PROJ. ENG. <i>(unintelligible)</i>	DATE <i>8/11/70</i>		
ANGLES ± 0°30'	PROD. <i>(unintelligible)</i>	DATE <i>8/6/70</i>		
FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS	NEXT HIGHER ASSY		SIZE CODE CUA NUMBER H727-0-0 REV.	
MATERIAL			DIST.	
FINISH	SCALE NONE			
	SHEET 1 OF 1			

REVISIONS	REV.
CHANGE NO.	
CHK	

REV. NUMBER
 CUA H727-0-0
 REV.

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WIRE TABLE						
ITEM NO.	AWG	COLOR	FROM CONNECTION	WITH	TO CONNECTION	WITH
6	18	BLK	PS-GND	10	TB-GND	11
4	18	RED	PS-+5	10	TB-+5	11
5	18	BLU	PS--15	10	TB--15	11



REV.	CHANGE NO.	DATE	BY	CHK'D.
A	H716B-00001	9/9/70	JODICE	
B	H716B-00002	10/1/70	JODICE	

FIRST USED ON OPTION / MODEL
DC04-C

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSION IN INCHES
TOLERANCES
NORMAL FRACTIONS ANGLES
FINAL SURFACE QUALITY
REMOVE BURRS AND BREAK SHARP CORNERS
MATERIAL
FINISH

QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST			
DRN	DATE	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
CHK'D.	DATE	TITLE POWER SUPPLY H716-B	
ENG	DATE	SIZE CODE NUMBER REV DUA H716-B-0	
PROJ. ENG.	DATE	SHEET OF	
PROD.	DATE	DIST.	
NEXT HIGHER ASSY			

DEC FORM NO. DRD 100

