

pdp11



digital

MS11-B
MOS memory
engineering drawings



DRAWING DIRECTORY

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CUSTOMER PRINT SET INDEX

THIS IS PRINT SET

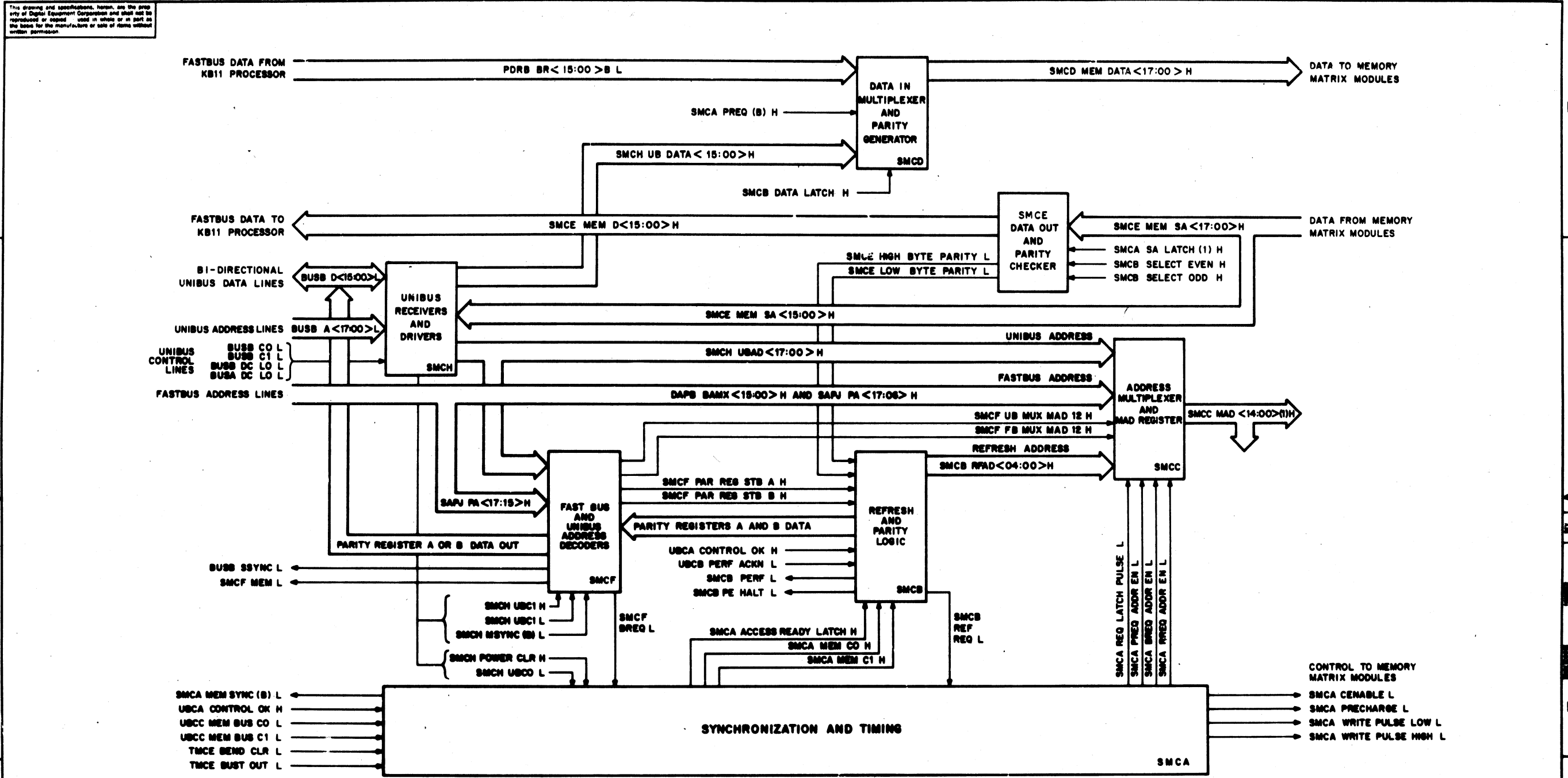
PRINT SET #1	SEQUENCE	SEQUENCE
DRAWING DIRECTORY	B-DD-MS11-B	(SHEET ONE ONLY)
BLOCK DIAGRAM	D-BD-MS11-0-1	
MOS/BIPOLAR MEMORY CNTL	E-CS-M8110-0-1	
ACCESSORY LIST	A-AL-MS11-0-2	
MOS/BIPOLAR MEMORY CNTL	E-CS-M8110-0-1	
SPECIAL REVISION		
PRINT SET #2		
DRAWING DIRECTORY	B-DD-MS11-B	(SHEET ONE ONLY)
HIGH SPEED MOS MEMORY	E-CS-G401-0-1	
ACCESSORY LIST	A-AL-MS11-0-2	
HIGH SPEED MOS MEMORY	E-CS-G401-0-1	
SPECIAL REVISION		
PRINT SET #3		
DRAWING DIRECTORY	B-DD-MS11-B	(SHEET ONE ONLY)
MOS MEMORY W/PARITY	E-CS-G401-YA-1	
ACCESSORY LIST	A-AL-MS11-0-2	
MOS MEMORY W/PARITY	E-CS-G401-YA-1	
SPECIAL REVISION		

UNIT VARIATIONS		PRINT SET		
VAR	TITLE	MS11-B1	MS11-B2	MS11-B3
MS11-BC	1ST MOS CONTROLLER	X		
MS11-BD	2ND MOS CONTROLLER	X		
MS11-BR	MOS MATRIX		X	
MS11-BT	MOS MATRIX W/PARITY			X

DEC 16 (3251-1062-1A-R972

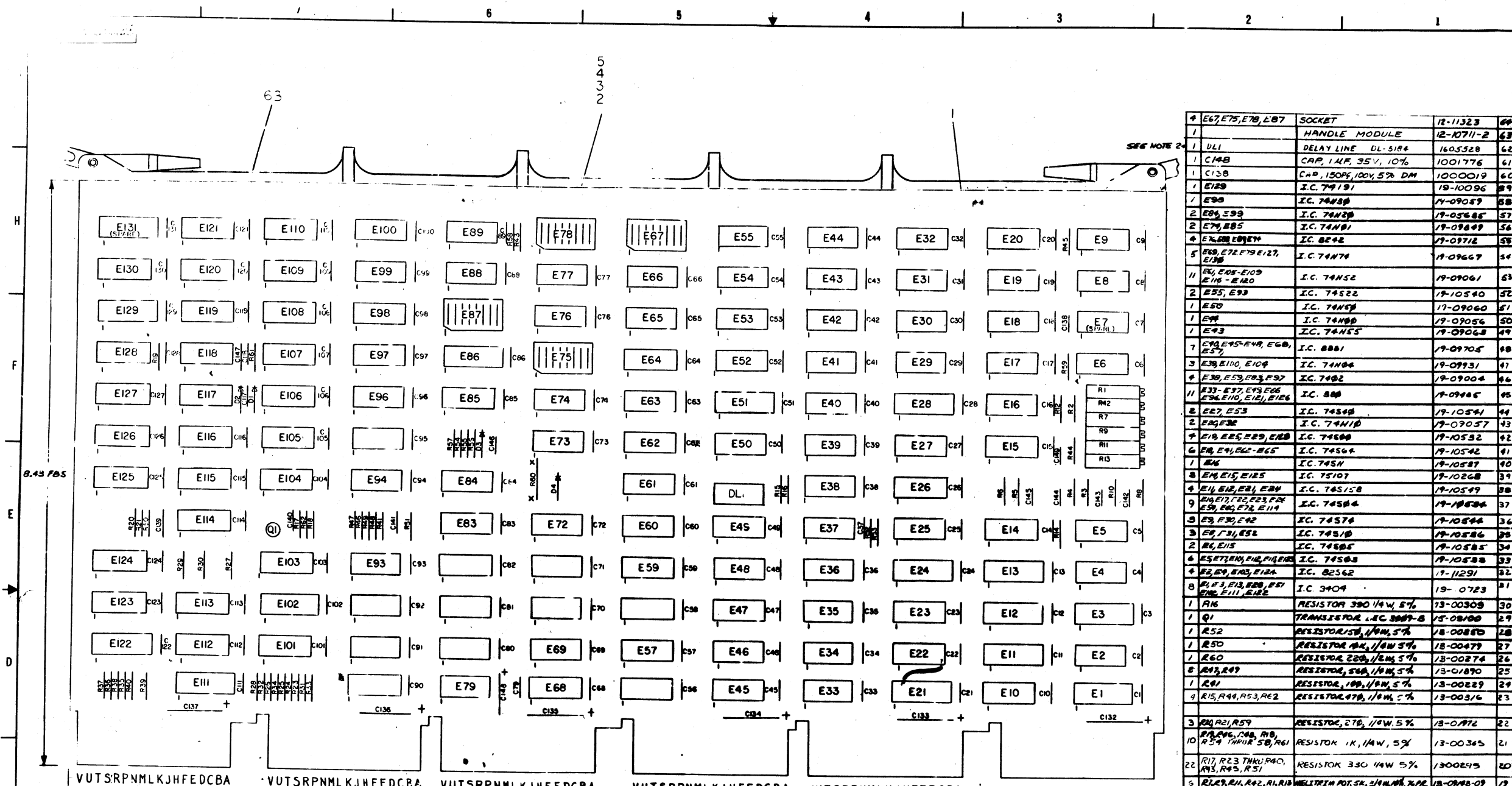
REVISIONS	CHG. NO.	DATE	REV	USED ON OPTION/MODEL	DRN. R. COOK	DATE	TITLE	SIZE	CODE	NUMBER	REV
	MS11B-1	6/72	A	11/45	CHK'D.	3/30/72	MOS MEMORY	B	DD	MS11-B	B
	MS11B-2	12/73	B		R. COOK	3/30/72					
					PROJ ENG.	3/30/72					
					PROD.	3/30/72					
					FIELD SERV.	3/30/72					
				SHEET 1 OF 3	J. ZEE	3/30/72	DIST				

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REV.	QTY.	DESCRIPTION	PART NO.	REV.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES	DATE		
± .005	± 30'	10/22/73	EQUIPMENT CORPORATION	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY				
MATERIAL		NEXT HIGHER ASSY.		
FINISH		8-00-MS11-C		
		D8D MS11-0-1		

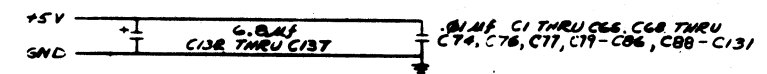
REV. CHANGE NO. 1



NOTES:
 1. UNLESS OTHERWISE NOTED, RESISTANCE IS IN Ω AND CAPACITANCE IS IN PICOFARADS. CAPS WITHOUT VALUE NOTED ARE .01 MFD.
 2. SECURE DELAY LINE ITEM #2 TO BOARD WITH ADHESIVE, LEADING PART # SIDE UP.
 3. ADD JUMPER FROM E21-PIN 15 TO E22-PIN 7

ALL PV, BAC BV,
 C82, C83, D82, D83,
 C84, E81, F81

ACB, ANE, ANE, AT1,
 BC3, BND, BND, BT1,
 CC3, CNE, CN1, CT1,
 DC3, DNE, DN1, DT1,
 EC3, ENE, EN1, ET1,
 FC3, FNE, FN1, FT1



DATE	REV	BY	CHKD
DEC 390	1	B	
DEC 3404	8	16	
DEC 74191	8	16	
DEC 74548	8	16	

ITEM NO.	QTY	FROM	TO
1	1	PT	PT

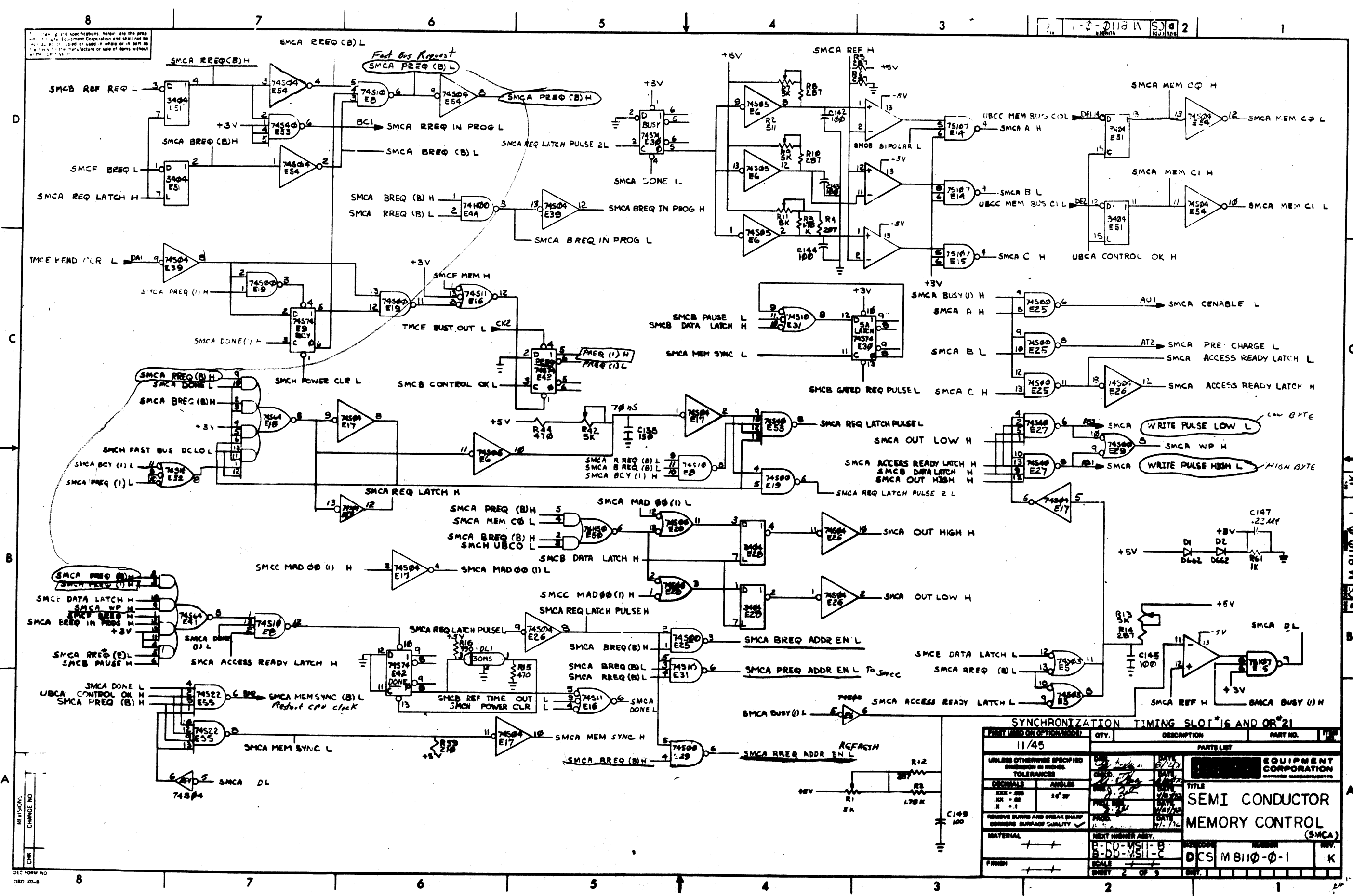
DATE	REV	BY	CHKD
DEC 390	1	B	
DEC 3404	8	16	
DEC 74191	8	16	
DEC 74548	8	16	

ITEM NO.	QTY	FROM	TO
1	1	PT	PT

DATE	REV	BY	CHKD
DEC 390	1	B	
DEC 3404	8	16	
DEC 74191	8	16	
DEC 74548	8	16	

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	REV
4	E67, E75, E78, E87	SOCKET	12-11323	64
1	DL1	HANDLE MODULE	12-10711-2	63
1	DL1	DELAY LINE DL-5184	1605328	62
1	C148	CAP, 14K, 35V, 10%	1001776	61
1	C138	CAP, 150PF, 100V, 5% DM	1000019	60
1	E129	I.C. 74191	19-10096	59
1	E98	I.C. 74438	17-09057	58
2	E84, E99	I.C. 74438	17-05685	57
2	E74, E85	I.C. 74438	17-09887	56
4	E7, E20, E29, E32	I.C. 8242	17-09712	55
5	E19, E22, E27, E28, E30	I.C. 74474	17-09667	54
11	E4, E05-E109, E116-E120	I.C. 74452	17-09061	63
2	E55, E93	I.C. 74522	17-10540	52
1	E50	I.C. 74458	17-09060	51
1	E44	I.C. 74488	17-09056	50
1	E43	I.C. 74455	17-09063	49
7	C04, E45-E48, E60, E57	I.C. 8881	17-09705	48
3	E38, E100, E104	I.C. 74484	17-09731	47
4	E30, E59, E83, E97	I.C. 74482	17-09004	46
11	E33-E37, E39-E42, E46, E110, E121, E126	I.C. 888	17-09485	45
2	E27, E53	I.C. 74548	17-10541	44
2	E42, E43	I.C. 74418	17-09057	43
1	E18, E25, E29, E28	I.C. 74588	17-10532	42
6	E8, E9, E62-E65	I.C. 74564	17-10542	41
1	E4	I.C. 74544	17-10587	40
8	E15, E18	I.C. 75107	17-10268	39
4	E14, E12, E21, E24	I.C. 745158	17-10547	38
9	E11, E12, E22, E23, E24, E25, E26, E27, E114	I.C. 74584	17-10584	37
3	E3, E30, E42	I.C. 74574	17-10584	36
3	E7, E31, E52	I.C. 74518	17-10586	35
2	E6, E15	I.C. 74585	17-10585	34
6	E5, E7, E10, E11, E12, E13	I.C. 74583	17-10583	33
4	E2, E9, E13, E12A	I.C. 82562	17-11291	32
8	E13, E12, E22, E23, E24, E25, E111, E122	I.C. 3404	17-0723	31
1	R16	RESISTOR 390 1/4W 5%	13-00308	30
1	Q1	TRANSISTOR I.C. 8887-B	15-08100	29
1	R52	RESISTOR 150 1/4W 5%	13-00850	28
1	R50	RESISTOR 10K 1/4W 5%	13-00477	27
1	R60	RESISTOR 220 1/4W 5%	13-00274	26
6	R43, R47	RESISTOR 500 1/4W 5%	13-01870	25
1	R81	RESISTOR 100 1/4W 5%	13-00227	24
4	R15, R44, R53, R62	RESISTOR 470 1/4W 5%	13-00316	23
3	R21, R21, R57	RESISTOR 270 1/4W 5%	13-01912	22
10	R46, R48, R49, R54 THRU R58, R61	RESISTOR 1K 1/4W 5%	13-00365	21
22	R17, R23 THRU R40, R43, R43, R51	RESISTOR 330 1/4W 5%	1300293	20
5	R12, R14, R42, R41, R18	MELTIN POT 50 3/4W 1/2W 5%	13-0818-07	19
7	R45, R46, R47, R48, R49	RESISTOR 20T 1% 1/4W	13-0818-08	18
2	R3, R2	RESISTOR 170K 1% 1/4W	13-08612	17
1	E86	I.C. 74565	19-10543	15
1	D3	DIODE 4MS, 1A21 ZENK	11-05878	14
1	D4	DIODE 0662	11-00118	13
2	D1, D2	DIODE 0662	11-00118	12
1	C141	CAP, 470PF, 100V, 5% DM	1000084	11
2	C146, C177	CAP, 390PF, 100V, 5% DM	1000276	10
1	C139	CAP, 150PF, 100V, 5% DM	1000054	9
5	C104, C102 THRU C106	CAP, 100PF, 100V, 5% DM	1000016	8
6	C132 THRU C137	CAP, 6.8NF, 35V, 10% STANT	1006306	7
1	C166, C168, C170, C76, C77, C79-C85, C88-C131, C140	CAP, 0.1UF, 50V, 20% AXIAL CBR	1001610-00	6
1		ETCHED CIRCUIT BOARD	5009798	5
REF		MODULE ECO HISTORY	8-81-8818-8-6	4
REF		ASSEMBLING HOLE LAYOUT	8-81-8818-8-5	3
REF		D-Y COORDINATE HOLE LOCATION	8-81-8818-8-4	2
1		EYELET	9006732	1

EQUIPMENT CORPORATION
 MOS/BIPOLAR
 MEMORY CONTROL
 B-DD-1145-8
 ICSM8118-8-1

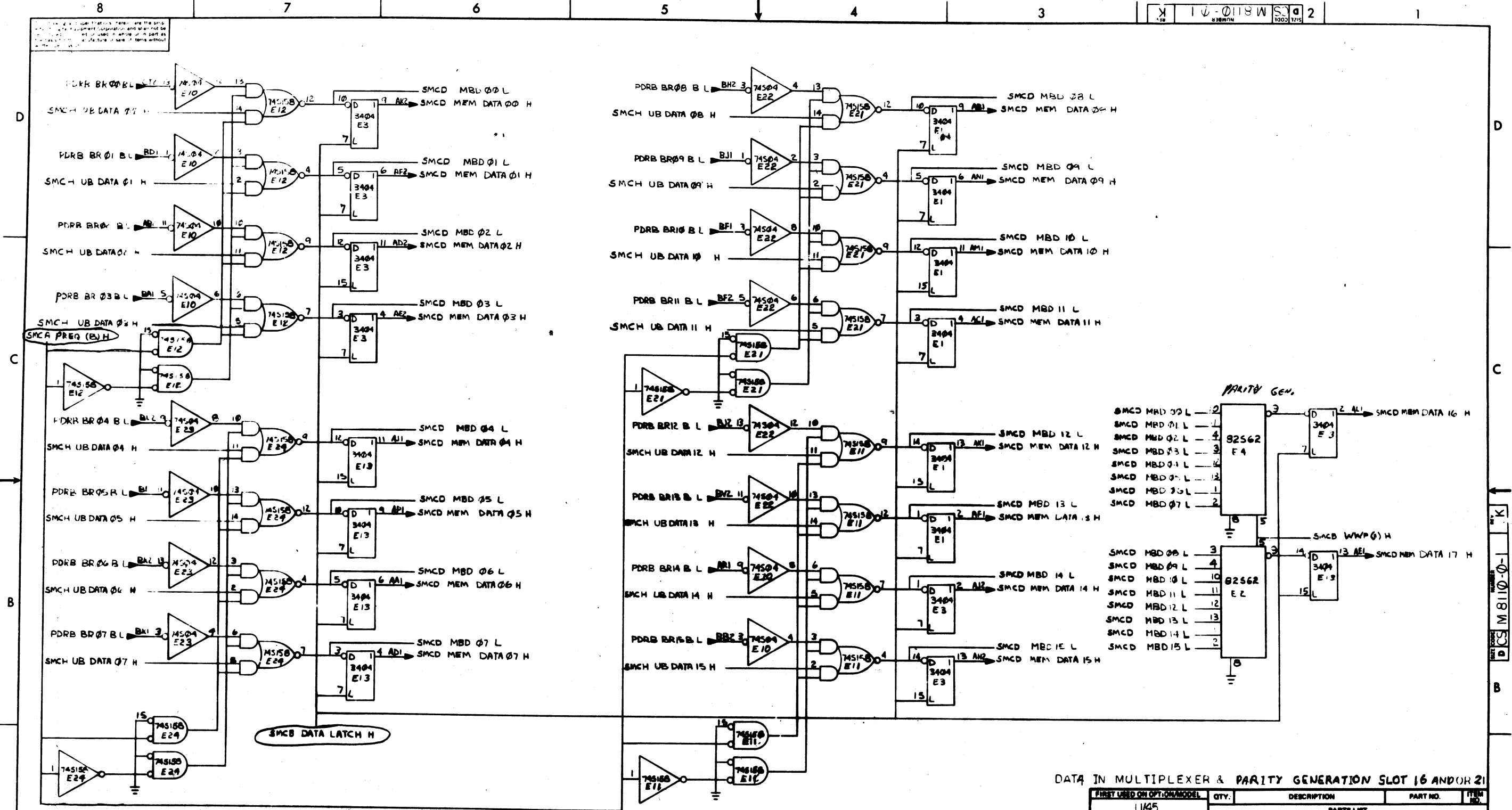


SYNCHRONIZATION TIMING SLOT*16 AND OR*21

PART LIST	QTY.	DESCRIPTION	PART NO.
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES			
DECIMALS		ANGLES	
.XXX - .000		10° 30'	
.XXX - .00			
.XXX - .1			
MATERIAL		REMOVE BURRS AND BREAK SHARP EDGES SURFACE QUALITY	
FINISH			
EQUIPMENT CORPORATION			
TITLE			
SEMI CONDUCTOR MEMORY CONTROL (SMCA)			
PART NO.		REV.	
B-00-M511-B		K	
SCALE		SHEET 2 OF 3	
DATE		DWG.	
7/2/70		SMC	

REV. NO. CHANGE NO. DATE

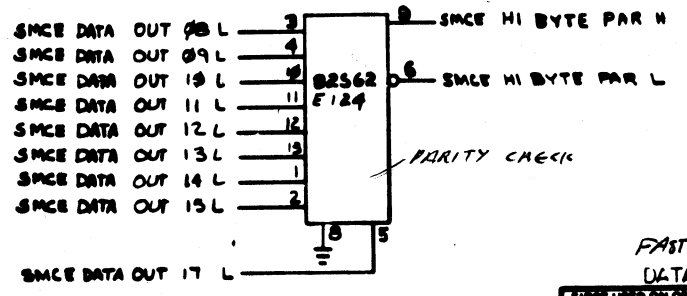
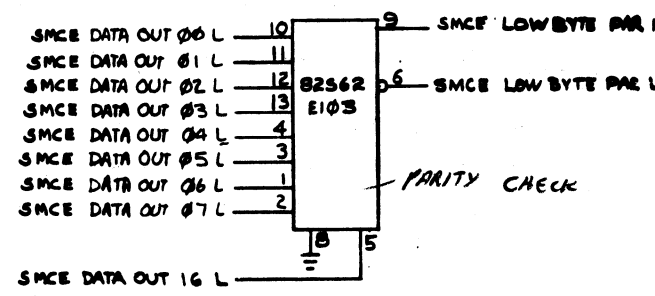
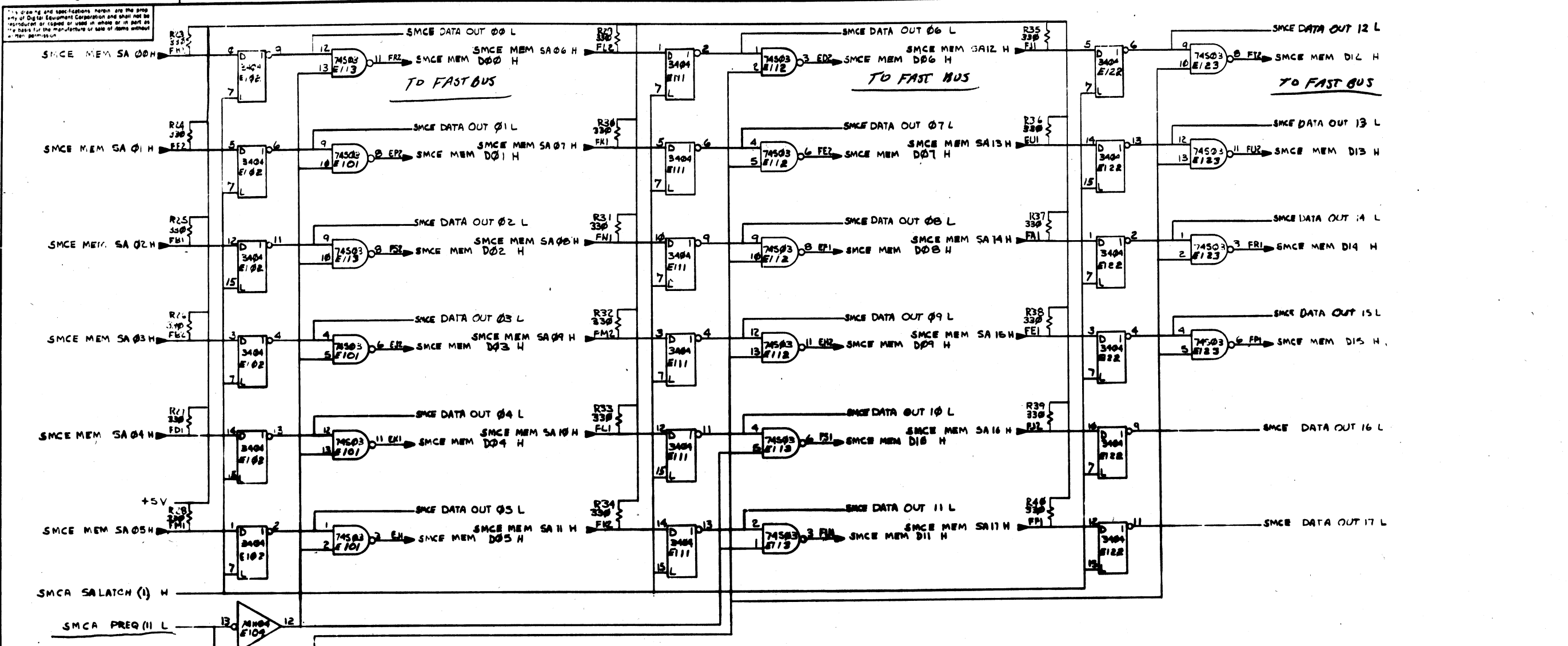
DEC 102-B



DATA IN MULTIPLEXER & PARITY GENERATION SLOT 16 AND/OR 21

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
1145				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES	DATE 9/17/71	EQUIPMENT CORPORATION WATFORD MASSACHUSETTS		
DECIMALS ANGLES	DATE 11/17/71			
XXX - 000 XX - 00 X - 1	10° 30'	DATE 12/22/71	TITLE SEMI CONDUCTOR MEMORY CONTROL (SMCD)	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	10° 30'	DATE 1/23/72		
MATERIAL	NEXT HIGHER ASSY.	DATE 4/23/72	NUMBER DCS M8110-0-1	
FINISH	SCALE	DATE		
SHEET 5 OF 9		DIST.		

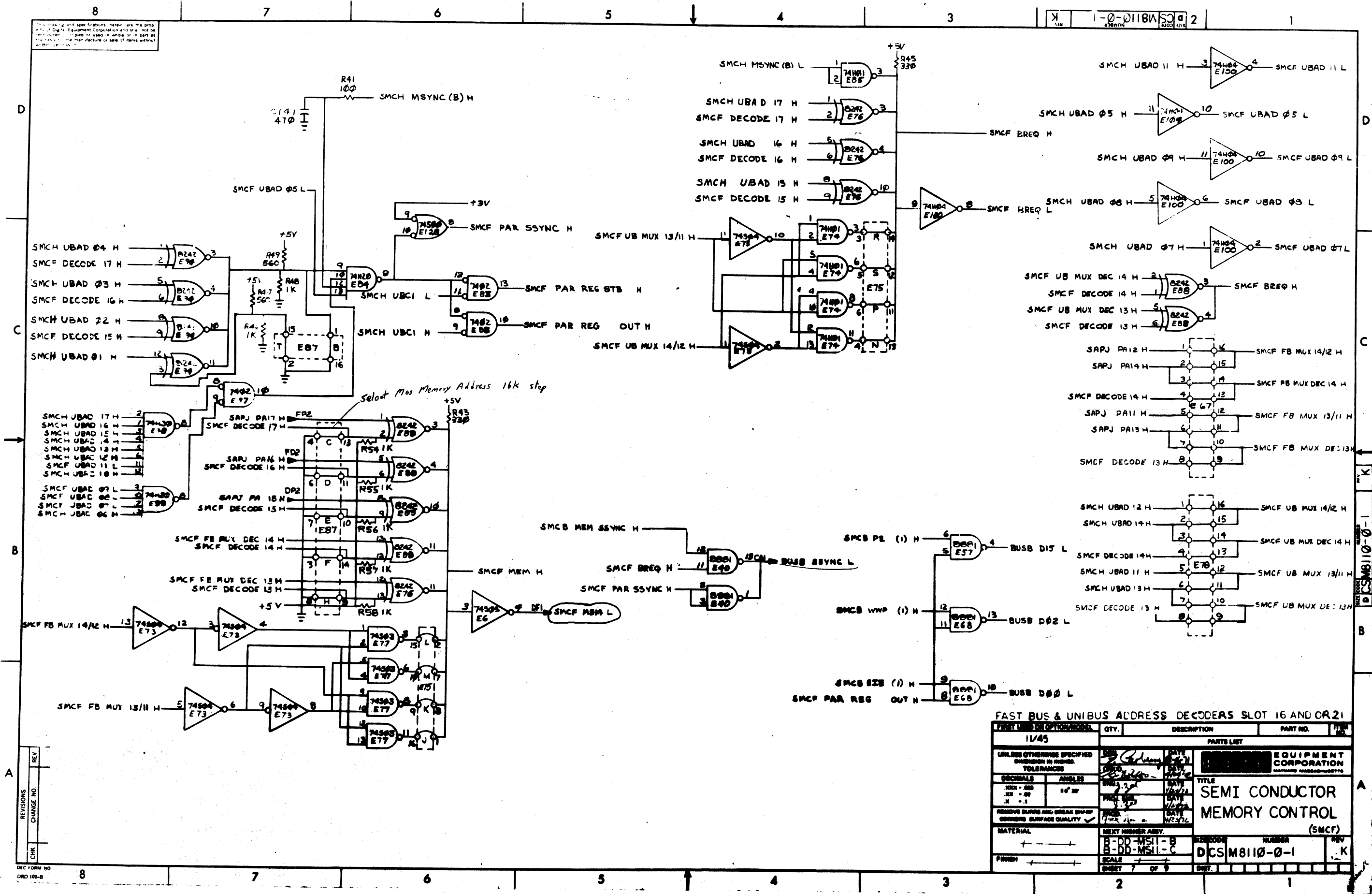
REV	CHANGE NO



FAST BUS
DATA OUT & PARITY CHECK SLOT 16 AND OR 21

PART NO.	QTY.	DESCRIPTION	PART NO.
11/45			
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES			
DECIMALS	ANGLES	DATE	
±.005	±0°30'	DATE	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY			
MATERIAL	NEXT HIGHER ASSY.	TITLE	
+	B-DD-MSI I-B	SEMI CONDUCTOR MEMORY CONTROL (SMCE)	
FINISH	B-DD-MSI I-C	REVISION	NUMBER
+	SCALE	DCS M 8110-0-1	K
	SHEET 6 OF 9	REV.	

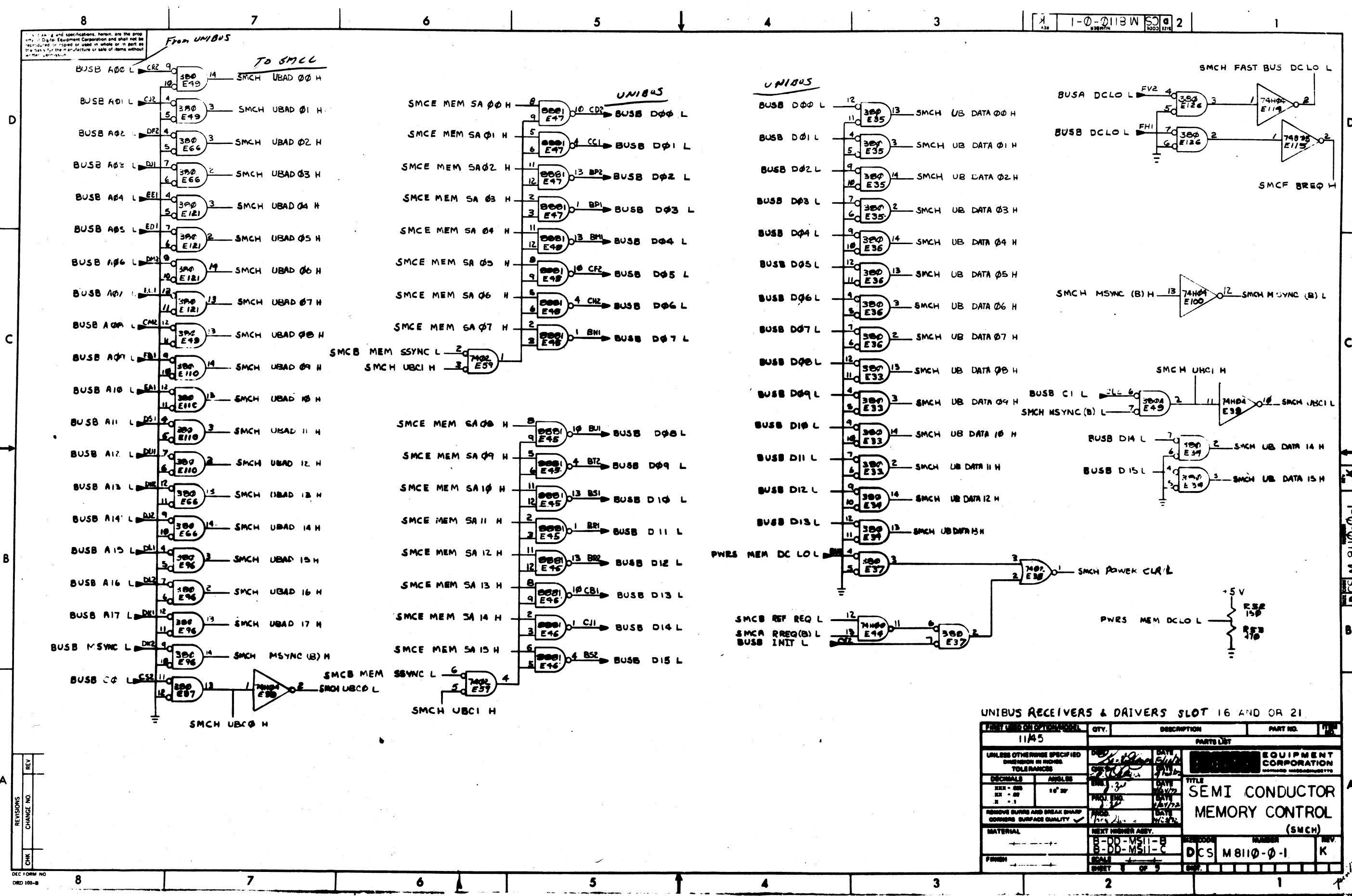
REVISIONS
CHANGE NO.
CHK



FAST BUS & UNIBUS ADDRESS DECODES SLOT 16 AND OR21

REV	QTY.	DESCRIPTION	PART NO.
11/45			
UNLESS OTHERWISE SPECIFIED			
TOLERANCES			
DECIMALS	ANGLES	TITLE	
.010 - .015	16° 30'	SEMI CONDUCTOR	
.015 - .030		MEMORY CONTROL	
.030 - .045		(SMCF)	
MATERIAL			
NEXT HIGHER ASSY.			
B-DD-MS11-B			
B-DD-MS11-C			
SCALE			
SHEET 7 OF 9			
DCS M8110-0-1			
REV. K			

REV	QTY.	DESCRIPTION	PART NO.
11/45			



UNIBUS RECEIVERS & DRIVERS SLOT 16 AND OR 21

PART NO.	QTY.	DESCRIPTION	PART NO.
1145			
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES			
DECIMALS	ANGLES	TOLERANCES	
±.005	±.005	±.005	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY			
MATERIAL			
FINISH			
NEXT NUMBER ASSY.			
B-DD-MS11-B			
B-DD-MS11-C			
TITLE			
SEMI CONDUCTOR MEMORY CONTROL (SMCH)			
DRAWING NO.			
DCS M8110-0-1			
REV.			
K			

REV.	CHANGE NO.

A
TO SET UP MEMORY CONTROL FOR BIPOLAR MEMORY

1) CUT JUMPERS IN THE FOLLOWING LOCATIONS:

E8702	E7802
E8704	E7804
E8706	E7806
E8708	E7808

2) DECODE ADDRESS BITS 17-13 BY CUTTING THE FOLLOWING JUMPERS FOR A ONE AND LEAVING IN JUMPERS FOR A ZERO.

ADDRESS BIT	JUMPER	LOCATION
17	C	E8704
16	D	E8706
15	E	E8707
14	F	E8708
13	H	E8709

3) DECODE ADDRESS BITS 11 AND 12 FOR THE FAST BUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

12	11	JUMPER	LOCATION
0	0	J	E7801
0	1	K	E7802
1	0	L	E7802
1	1	M	E7807

4) DECODE ADDRESS BITS 11 AND 12 FOR THE UNIBUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

12	11	JUMPER	LOCATION
0	0	N	E7804
0	1	P	E7806
1	0	R	E7803
1	1	S	E7806

5) CUT JUMPER T LOCATED AT E8702 TO SELECT PARITY REGISTER ADDRESS BIT 1 AS A 1. LEAVE IN FOR A 0.

6) TO ENABLE PARITY CONTROL REG. CUT JUMPER B LOCATED AT E8701.

7) CUT THE FOLLOWING RESISTORS OUT:
R2
R3

8) TIMING ADJUSTMENT
A) SYNC PROBE 1
B) ALL MEASUREMENTS AT THE 1.5V POINTS OF LOW GOING EDGES UNLESS OTHERWISE NOTED.
C) Δ POS TRANSITION
D) * ADJUST WIDTH OF PULSE
E) • LOOP ON DATA

TO ADJUST	PROBE 1	PROBE 2	ADJUST	FOR
ADDRESS SET-UP	E18 PIN 8	E25 PIN 8	R42	95 NS
PRE-CHARGE	E25 PIN 8		R9	88 NS
ACCESS TIME	E25 PIN 8	Δ E27 PIN 13	R11	98 NS
MEM SYNC	E25 PIN 8	E55 PIN 6	R1	60/30 NS SEE NOTE 2
WRITE	E27 PIN 8		R13	60 NS

NOTE 2: ADJUSTMENT FOR SINGLE/DOUBLE SYNCHRONIZING.
M109 REV C ETCH - IF JUMPERS HAVE BEEN INSTALLED ON THE PREVIOUSLY UNUSED HALF (PINS 11, 12 ETC) OF THE FLIP FLOP AT E8 OF THE M8109, R1 OF THE M8110 SHOULD BE ADJUSTED TO 30NS. IF THE FLIP FLOP IS UNUSED, ADJUST R1 TO 60NS.
M109 REV F ETCH - OBSERVE JUMPERS W6 AND W5 ON THE M8109. IF W6 IS IN AND W5 IS OUT, ADJUST R1 OF THE M8110 TO 60NS. IF W6 IS OUT AND W5 IS IN, ADJUST R1 FOR 30NS.

B
TO SET UP MEMORY CONTROL FOR MOS MEMORY

1) CUT JUMPERS IN THE FOLLOWING LOCATIONS:

E8701	E7801
E8703	E7803
E8706	E7806
E8707	E7807

E8705 (JUMPER A)

2) DECODE ADDRESS BITS 17-15 BY CUTTING THE FOLLOWING JUMPERS FOR A ONE AND LEAVING IN JUMPERS FOR A ZERO.

ADDRESS BIT	JUMPER	LOCATION
17	C	E8704
16	D	E8706
15	E	E8707

3) DECODE ADDRESS BITS 13 AND 14 FOR THE FAST BUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

14	13	JUMPER	LOCATION
0	0	J	E7801
0	1	K	E7802
1	0	L	E7802
1	1	M	E7807

4) DECODE ADDRESS BITS 13 AND 14 FOR THE UNIBUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

14	13	JUMPER	LOCATION
0	0	N	E7804
0	1	P	E7806
1	0	R	E7803
1	1	S	E7806

5) CUT JUMPER T LOCATED AT E8702 TO SELECT PARITY REGISTER ADDRESS BIT 1 AS A 1. LEAVE IN FOR A 0.

6) TO ENABLE PARITY CONTROL REG. CUT JUMPER B LOCATED AT E8701.

7) CUT THE FOLLOWING RESISTORS OUT:
R12
R4

8) TIMING ADJUSTMENT
A) SYNC PROBE 1
B) ALL MEASUREMENTS AT THE 1.5V POINTS OF LOW GOING EDGES UNLESS OTHERWISE NOTED
C) Δ POS TRANSITION
D) * ADJUST WIDTH OF PULSE
E) • LOOP ON DATA

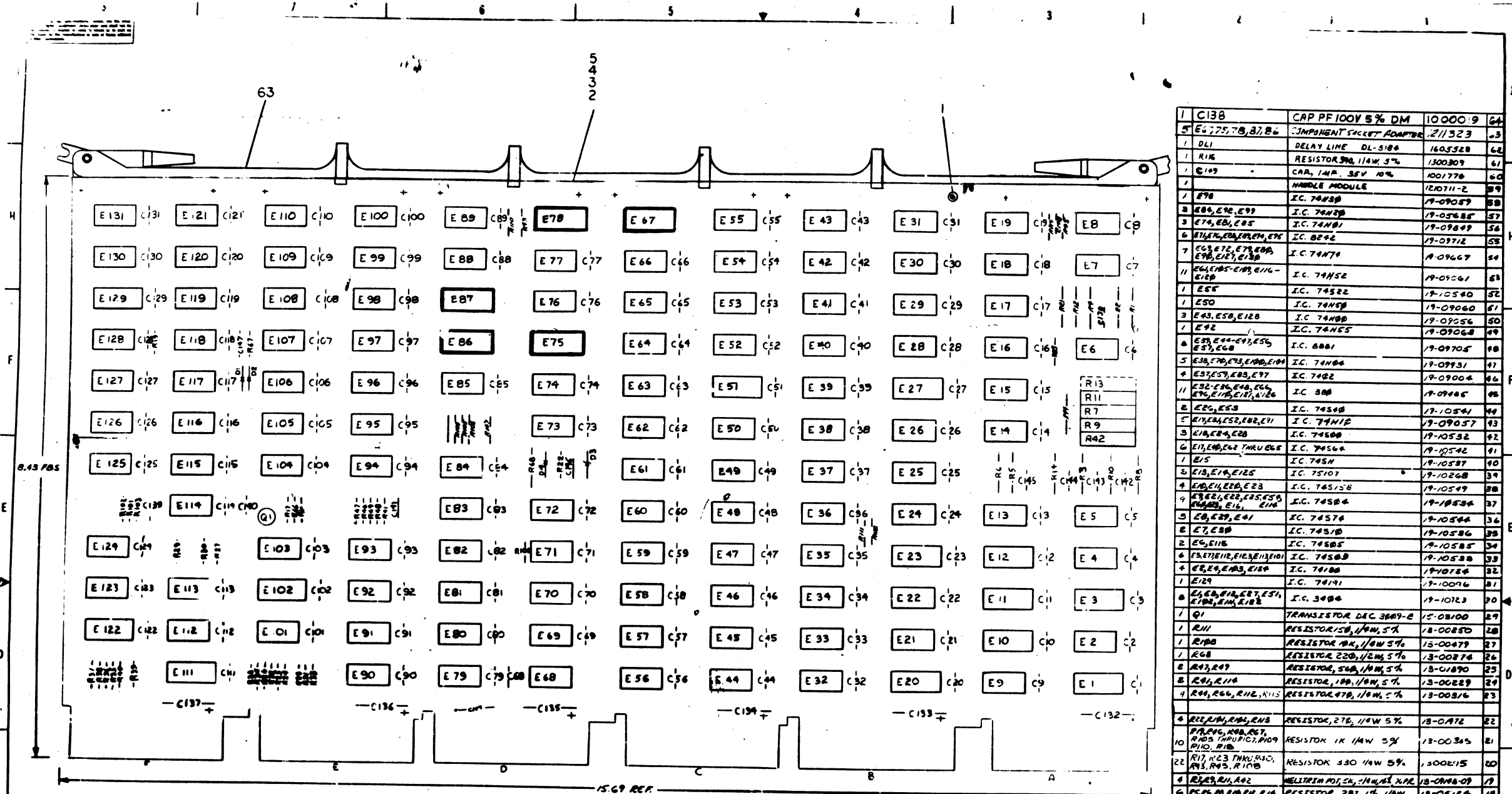
TO ADJUST	PROBE 1	PROBE 2	ADJUST	FOR
ADDRESS SET-UP	E18 PIN 8	E25 PIN 8	R42	95 NS
CHARGE	E25 PIN 8	E25 PIN 8	R7	70 NS
PRE-CHARGE	E25 PIN 8		R9	88 NS
ACCESS TIME	E25 PIN 8	Δ E27 PIN 13	R11	75 NS
MEM SYNC	E25 PIN 8	E55 PIN 6	R1	250/210 NS SEE NOTE 1
WRITE PULSE	E27 PIN 8		R13	60 NS

JUMPER NOTES SLOT#16 AND OR#21

REV	QTY	DESCRIPTION	PART NO	REV
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES	TITLE		
FRACTIONS		EQUIPMENT CORPORATION		
RESISTOR VALUES AND BREAK SYMBOLS CORRECTED SURFACE QUALITY				
MATERIAL				
NEXT NUMBER ASSY				
B-DD-MS11-B				
E-DD-MS11-C				
FINISH				
DRAWN				
CHECKED				
DATE				
SCALE				
SHEET 5 OF 5				
PART NO				
REV				
DCS M8110-0-1 K				

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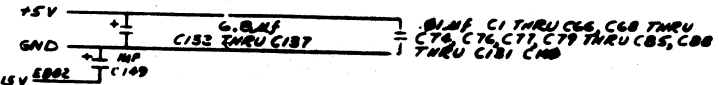
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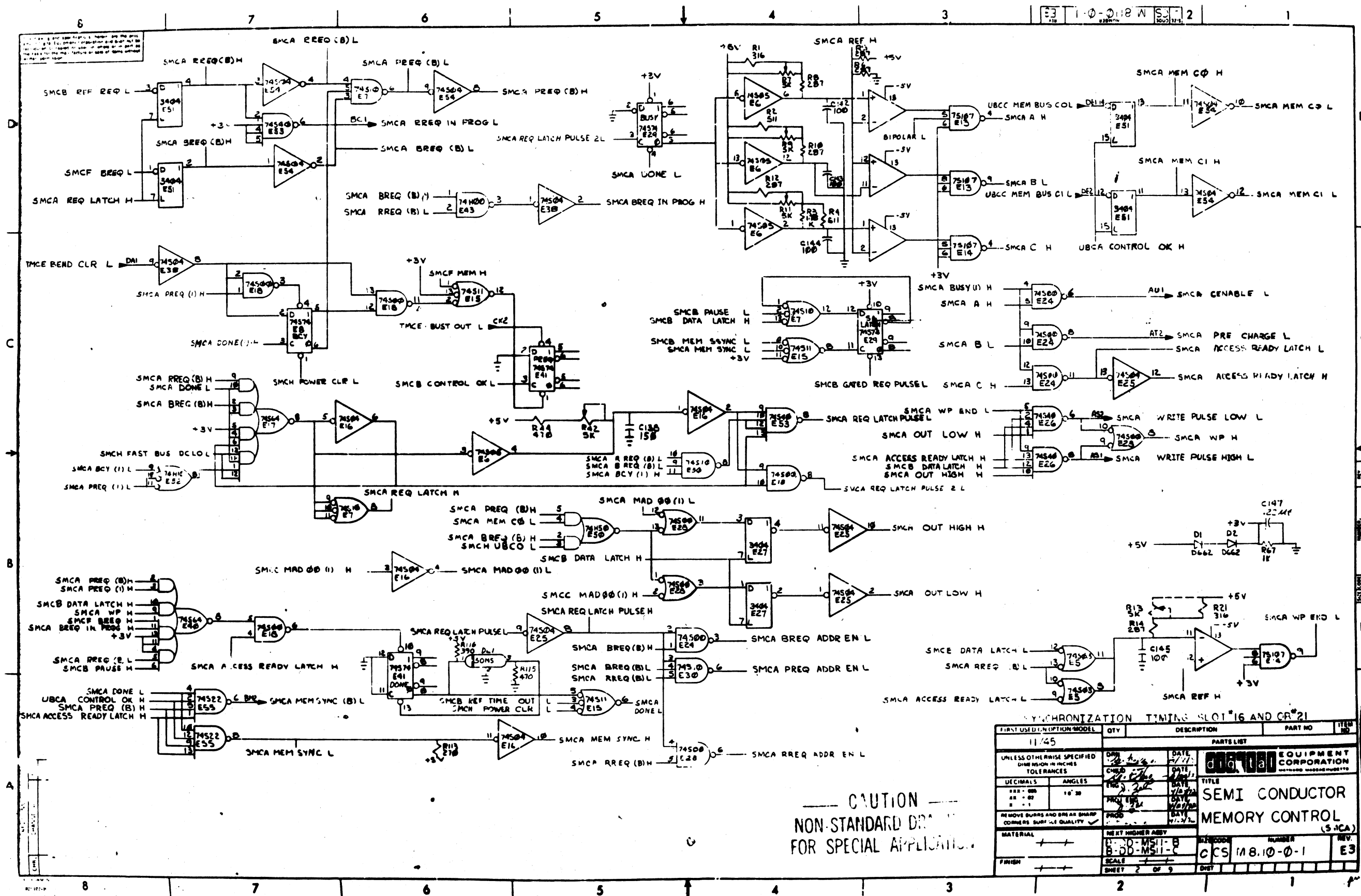
NOTES:
 1 UNLESS OTHERWISE NOTED RESISTANCE IS IN Ω AND CAPACITANCE IS IN PICOSECONDS.
 CAPS WITHOUT VALUE NOTED ARE 0.1MFD.

RES, PVI, BAE, BV,
 CBI, CVI, DAE, DV,
 CEI, EVI, FAE, FV

ACI, AVE, AVI, ATV,
 BCI, BVE, BVV, BTV,
 CCI, CVE, CVV, CTV,
 DCI, DVE, DVV, DTV,
 ECI, EVE, EVV, ETV,
 FCI, FVE, FVV, FTV

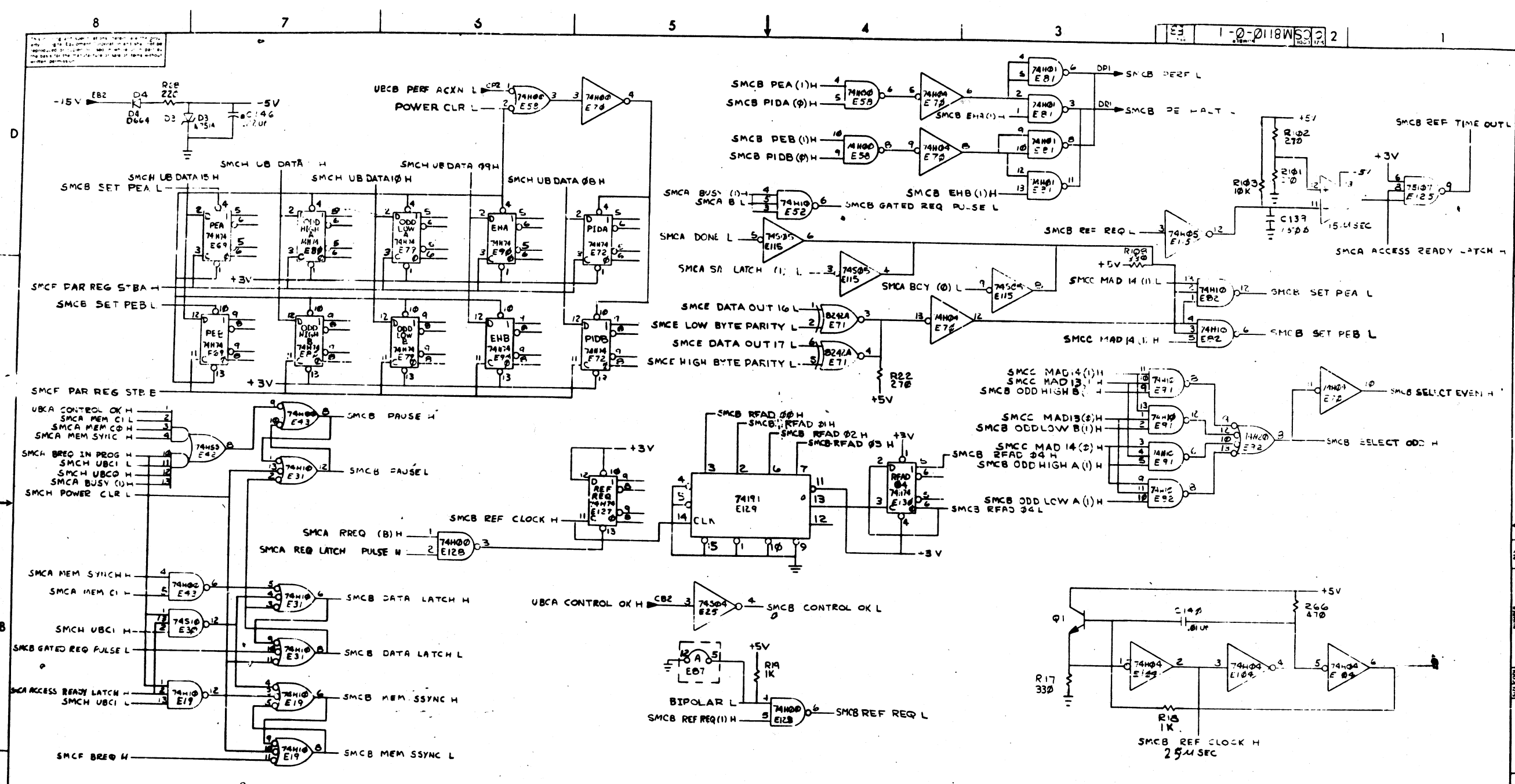


QTY	REF DESIGNATION	DESCRIPTION	PART NO	QTY
1	C138	CAP PF 100V 5% DM	10000-9	64
5	E6775, E78, B7, B6	COMPONENT SOCKET ADAPTER	2/1323	63
1	DL1	DELAY LINE DL-5186	1605528	62
1	R1K	RESISTOR 500, 1/4W 5%	1300309	61
1	C109	CAP, 1M, 35V 10%	1001776	60
1		HANDLE MODULE	120711-2	59
1	E78	I.C. 74H50	19-09089	58
3	E80, E79, E77	I.C. 74H50	19-09089	57
3	E74, E71, E75	I.C. 74H50	19-09089	56
6	E167, E168, E169, E76	I.C. 8242	19-09712	55
7	E63, E72, E73, E80, E70, E127, E130	I.C. 74H71	19-09667	54
11	E105, E106, E107, E108, E109, E110, E111, E112, E113, E114	I.C. 74H52	19-09061	53
1	E55	I.C. 74S22	19-10540	52
1	E50	I.C. 74H50	19-09060	51
3	E43, E58, E128	I.C. 74H50	19-09060	50
1	E72	I.C. 74H55	19-09068	49
6	E104, E105, E106, E107, E108, E109, E110, E111, E112, E113, E114	I.C. 8001	19-09705	48
5	E30, E70, E71, E72, E73, E74, E75, E76, E77, E78, E79, E80, E81, E82, E83, E84, E85, E86, E87, E88, E89, E90, E91, E92, E93, E94, E95, E96, E97, E98, E99, E100, E101, E102, E103, E104, E105, E106, E107, E108, E109, E110, E111, E112, E113, E114	I.C. 74H04	19-09931	47
4	E37, E77, E83, E77	I.C. 7402	19-09004	46
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FOR SPECIAL APPLICATIONS

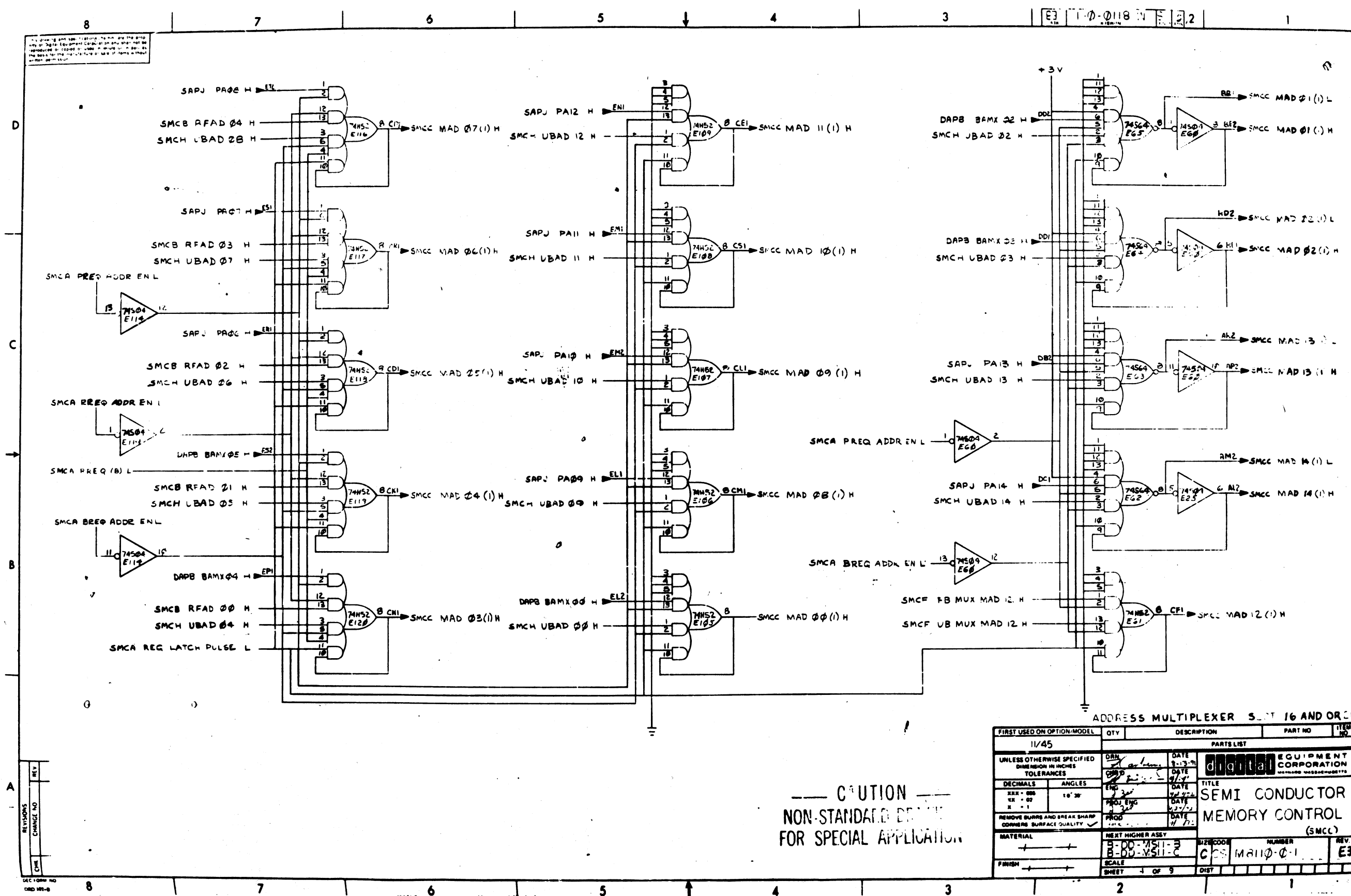
SYNCHRONIZATION TIMING SLOT 16 AND CR 21		QTY	DESCRIPTION	PART NO	ITEM NO
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UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES					
DECIMALS	ANGLES				
±0.005	±0.005				
±0.01	±0.01				
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY					
MATERIAL					
FINISH					
PARTS LIST					
DATE					
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MATERIAL					
FINISH					
SCALE					
SHEET					
REV					
TITLE		SEMICONDUCTOR MEMORY CONTROL (SMCA)			
NUMBER		CCS 118.10-0-1			
REV		E3			



CAUTION
NON-STANDARD DRG
FOR SPECIAL APPLICATION

1 REFRESH & PARITY LOGIC SLOT 16 AND OR 21			
FIRST USED ON OPTION MODEL	QTY	DESCRIPTION	PART NO
11/45			
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES	DRN	DATE	 DIGITAL EQUIPMENT CORPORATION CORPORATION
DECIMALS	CHFD	DATE	
ANGLES	ENG	DATE	
XXX - 000 XX - 00 X - 0	PROJ ENG	DATE	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	PROD	DATE	
MATERIAL	NEXT HIGHER ASSY		
	B-00-VS11-B	SIZE CODE	NUMBER
	B-00-MS11-C		REV
FINISH	SCALE		
	SHEET 3 OF 3	DIST	

11-0-0118W5002
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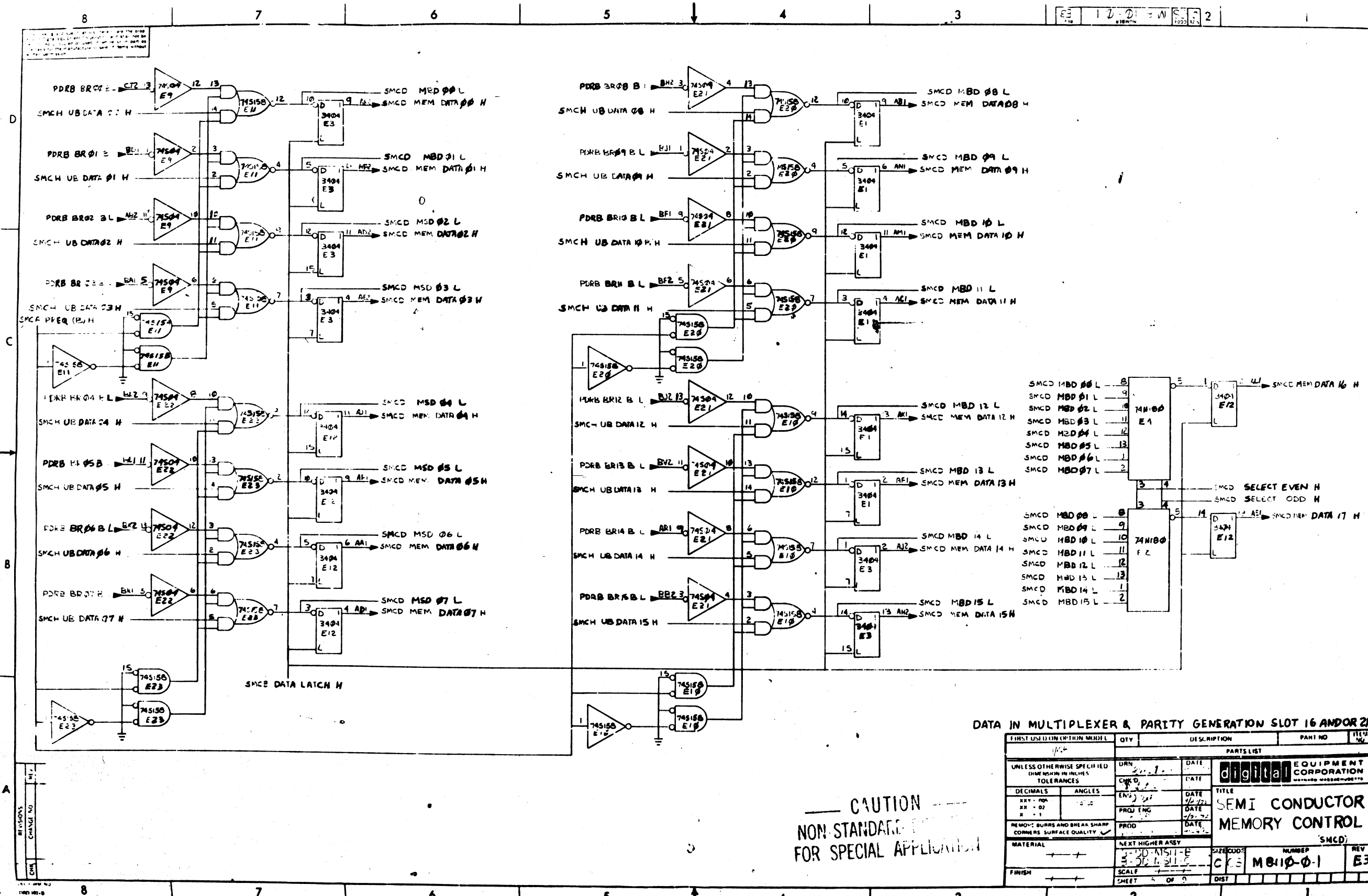
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CAUTION
NON-STANDARD DEVICE
FOR SPECIAL APPLICATION

FIRST USED ON OPTION/MODEL	QTY	DESCRIPTION	PART NO	ITEM NO
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES		DATE	PARTS LIST	
DECIMALS	ANGLES	DATE	digital EQUIPMENT CORPORATION	
XXX - .005	10° 30'	DATE	TITLE	
XX - .01		DATE	SEMICONDUCTOR MEMORY CONTROL	
X - .02		DATE	(SMCL)	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		DATE	NUMBER	
MATERIAL		DATE	REV	
NEXT HIGHER ASSY		DATE	E3	
FINISH		DATE	SCALE	
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B-00-VSII-C		DATE	DIST	

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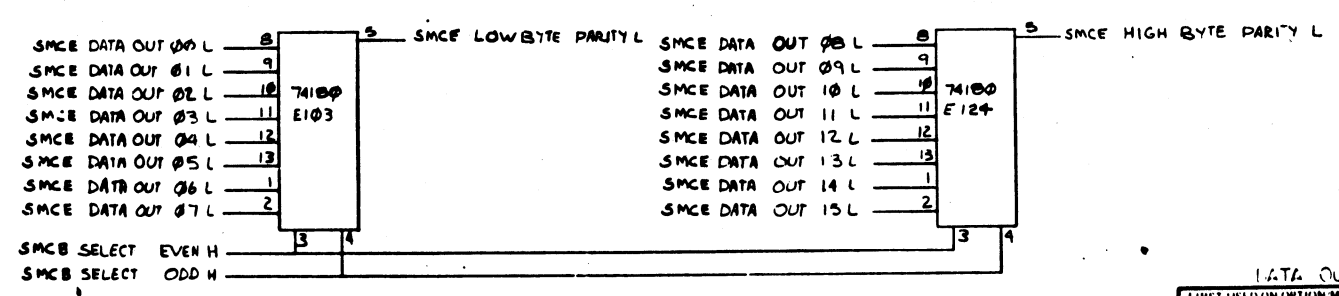
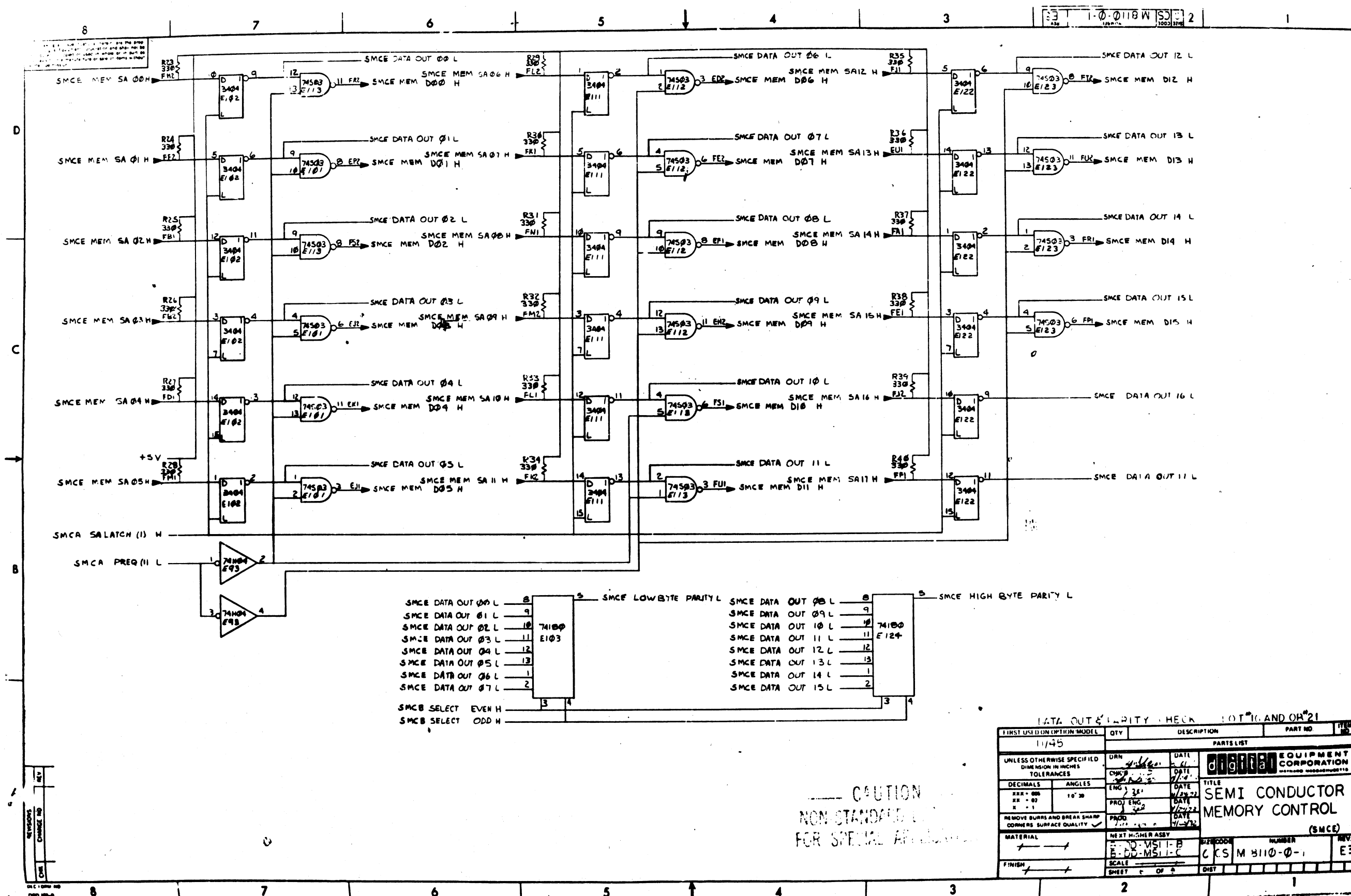
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DATA IN MULTIPLEXER & PARITY GENERATION SLOT 16 AND/OR 21

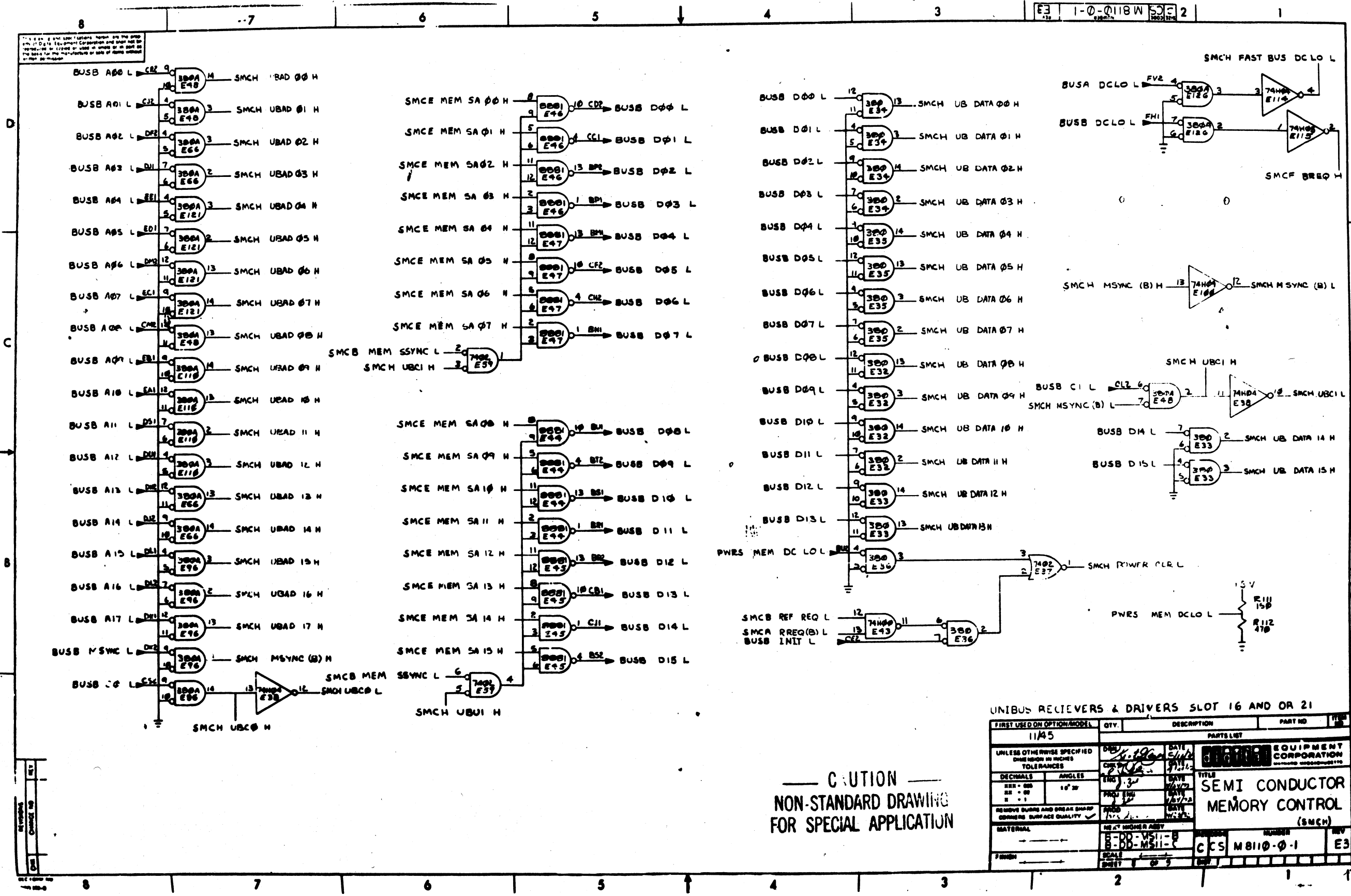
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DECIMALS ANGLES	CHK'D	DATE		
REVISIONS	ENG	DATE	TITLE SEMI CONDUCTOR MEMORY CONTROL	
REV - 00	PROJ ENG	DATE		
REWORK	PROD	DATE	SMCD	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY				
MATERIAL	NEXT HIGHER ASSY	SIZE CODE	NUMBER	REV
FINISH	3-30-MS1-E	CCE	MB10-0-1	E3
	SCALE	SHEET	DIST	
	5 OF 9			

CAUTION
NON-STANDARD
FOR SPECIAL APPLICATION



CAUTION
NON-STANDARD
FOR SPECIAL APPLICATIONS

FIRST USED IN OPTION MODEL		QTY	DESCRIPTION	PART NO	ITEM NO
11/45					
PARTS LIST					
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES		URN	DATE	ORIGINAL EQUIPMENT CORPORATION	
DECIMALS	ANGLES	CHK'D	DATE	TITLE	
XXX - 000	10' 30"	ENG	DATE	SEMI CONDUCTOR	
XX - 02		PROJ ENG	DATE	MEMORY CONTROL	
X - 1		PROD	DATE	(SMCE)	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		NEXT HIGHER ASSY		REV CODE	NUMBER
MATERIAL		E-00-VST1-B		CCS M 8110-0-1	REV. E3
FINISH		E-00-MS11-C		SCALE	
		SHEET 1 OF 5		DIST	



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E3 1-0-0118W S3E 2

CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	TITLE
1145				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES	PARTS LIST		
FR - 0.01	16° 30'	EQUIPMENT CORPORATION		
FR - 0.005		TITLE		
FR - 0.002		SEMI CONDUCTOR MEMORY CONTROL (SMCH)		
FR - 0.001		NUMBER		
FR - 0.0005		C/S M 8110-0-1		
FR - 0.0002		REV		
FR - 0.0001		E3		

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A
TO SET UP MEMORY CONTROL FOR BIPOLAR MEMORY

1) CUT JUMPERS IN THE FOLLOWING LOCATIONS.

E8782	E7802	E8803
E8784	E7804	E8804
E8786	E7806	E8807
E8788	E7808	E8808
	E8701	

2) DECODE ADDRESS BITS 17-13 BY CUTTING THE FOLLOWING JUMPERS FOR A ONE AND LEAVING IN JUMPERS FOR A ZERO.

ADDRESS BIT	JUMPER	LOCATION
17	C	E8783
16	D	E8784
15	E	E8786
14	F	E8782
13	M	E8788

3) DECODE ADDRESS BITS 11 AND 12 FOR THE FAST BUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

12	11	JUMPER	LOCATION
0	0	J	E7501
0	1	K	E7508
1	0	L	E7502
1	1	M	E7507

4) DECODE ADDRESS BITS 11 AND 12 FOR THE UNIBUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

12	11	JUMPER	LOCATION
0	0	N	E7504
0	1	P	E7506
1	0	R	E7503
1	1	S	E7505

5) USE ETCH REV C OR LATER FOR PARITY CONTROL.

6) CUT THE FOLLOWING RESISTORS OUT:

- R1
- R2
- R12
- R3

7) TIMING ADJUSTMENT.
A) SYNC PROBE 1
B) ALL MEASUREMENTS AT THE 1.5V POINTS OF LOW GOING EDGES UNLESS OTHERWISE NOTED.

TO ADJUST	PROBE 1	PROBE 2	ADJUST	FOR
ADDRESS SET-UP	E17 PIN 8	E24 PIN 8	R42	95 NS
PRE-CHARGE	E24 PIN 8		R8	80 NS
ACCESS TIME	E24 PIN 8	E55 PIN 6	R11	80 NS

* ADJUST WIDTH OF PULSE.

B
TO SET UP MEMORY CONTROL FOR MOS MEMORY

1) CUT JUMPERS IN THE FOLLOWING LOCATIONS:

E8781	E7801	E8803
E8783	E7803	E8804
E8785	E7805	E8807
E8787	E7807	E8808
	E8701	

E8705 (JUMPER A)

2) DECODE ADDRESS BITS 17-15 BY CUTTING THE FOLLOWING JUMPERS FOR A ONE AND LEAVING IN JUMPERS FOR A ZERO.

ADDRESS BIT	JUMPER	LOCATION
17	C	E8783
16	D	E8784
15	E	E8786

3) DECODE ADDRESS BITS 13 AND 14 FOR THE FAST BUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

14	13	JUMPER	LOCATION
0	0	J	E7501
0	1	K	E7508
1	0	L	E7502
1	1	M	E7507

4) DECODE ADDRESS BITS 13 AND 14 FOR THE UNIBUS BY CUTTING THE JUMPERS FOR THE ADDRESS COMBINATION WHERE MEMORY EXISTS.

14	13	JUMPER	LOCATION
0	0	N	E7504
0	1	P	E7506
1	0	R	E7503
1	1	S	E7505

5) USE ETCH REV C OR LATER FOR PARITY CONTROL.

6) CUT THE FOLLOWING RESISTORS OUT:

- R1
- R2
- R12
- R4

7) TIMING ADJUSTMENT.
A) SYNC PROBE 1
B) ALL MEASUREMENTS AT THE 1.5V POINTS OF LOW GOING EDGES UNLESS OTHERWISE NOTED.

TO ADJUST	PROBE 1	PROBE 2	ADJUST	FOR
ADDRESS SET-UP	E17 PIN 8	E24 PIN 8	R42	95 NS
CHARGE	E24 PIN 8	E24 PIN 8	R7	70 NS
PRE-CHARGE	E24 PIN 8		R8	80 NS
ACCESS TIME	E24 PIN 8	E55 PIN 6	R11	240/210 NS SEE NOTE 1.

* ADJUST WIDTH OF PULSE.

NOTE 1: ADJUSTMENT FOR SINGLE/DOUBLE SYNCHRONIZING. MB109 REV C ETCH - IF JUMPERS HAVE BEEN INSTALLED ON THE PREVIOUSLY UNUSED HALF (PINS 11,12 ETC.) OF THE FLIP FLOP AT ER OF THE MB109, R11 OF THE MB118 SHOULD BE ADJUSTED TO 210NS. IF THE FLIP FLOP IS UNUSED, ADJUST R11 TO 240NS.
MB109 REV F ETCH - OBSERVE JUMPERS W6 AND W5 ON THE MB109. IF W6 IS IN AND W5 IS OUT ADJUST R11 OF THE MB110 TO 240NS. IF W6 IS OUT AND W5 IS IN, ADJUST R11 TO 210 NS.

CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

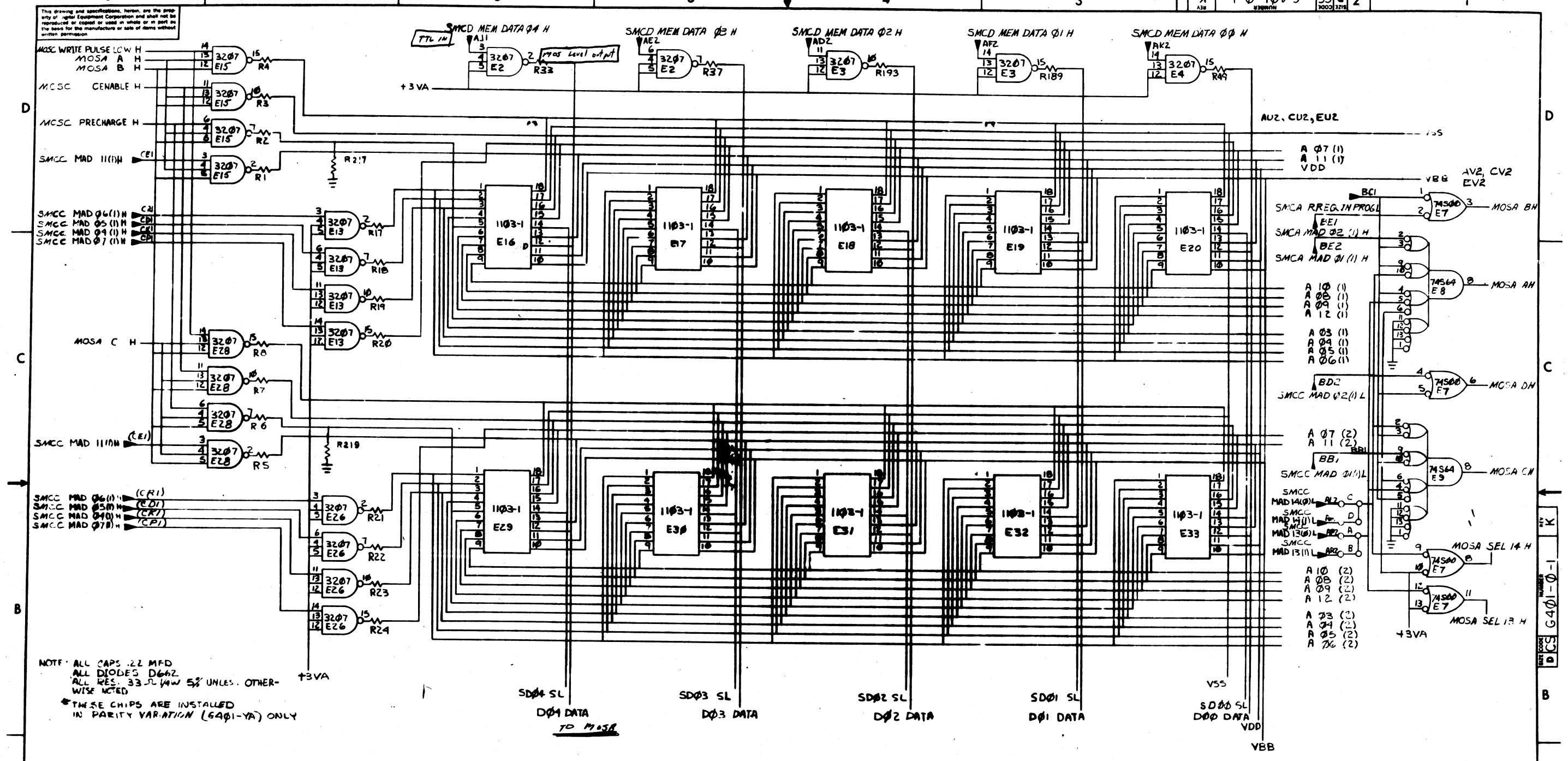
JUMPER NOTES SLOT #6 AND OR #21

FIRST USED ON OPTION MODEL	QTY	DESCRIPTION	PART NO	ITEM NO
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES	TITLE		
±.000	±0°30'	SEMICONDUCTOR MEMORY CONTROL		
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY				
MATERIAL	NEXT HIGHER ASSY			
±.000	B-00-MS11-B			
±.000	B-00-MS11-C			
FINISH	SCALE	STOCK NO	NUMBER	REV
±.000	DRAWING	CCS M8110-0-1		E3
	SHEET 5 OF 5	DATE		

REV C
CHANGE NO
REV

MOS
H +1
L +19

1-0-01079
2



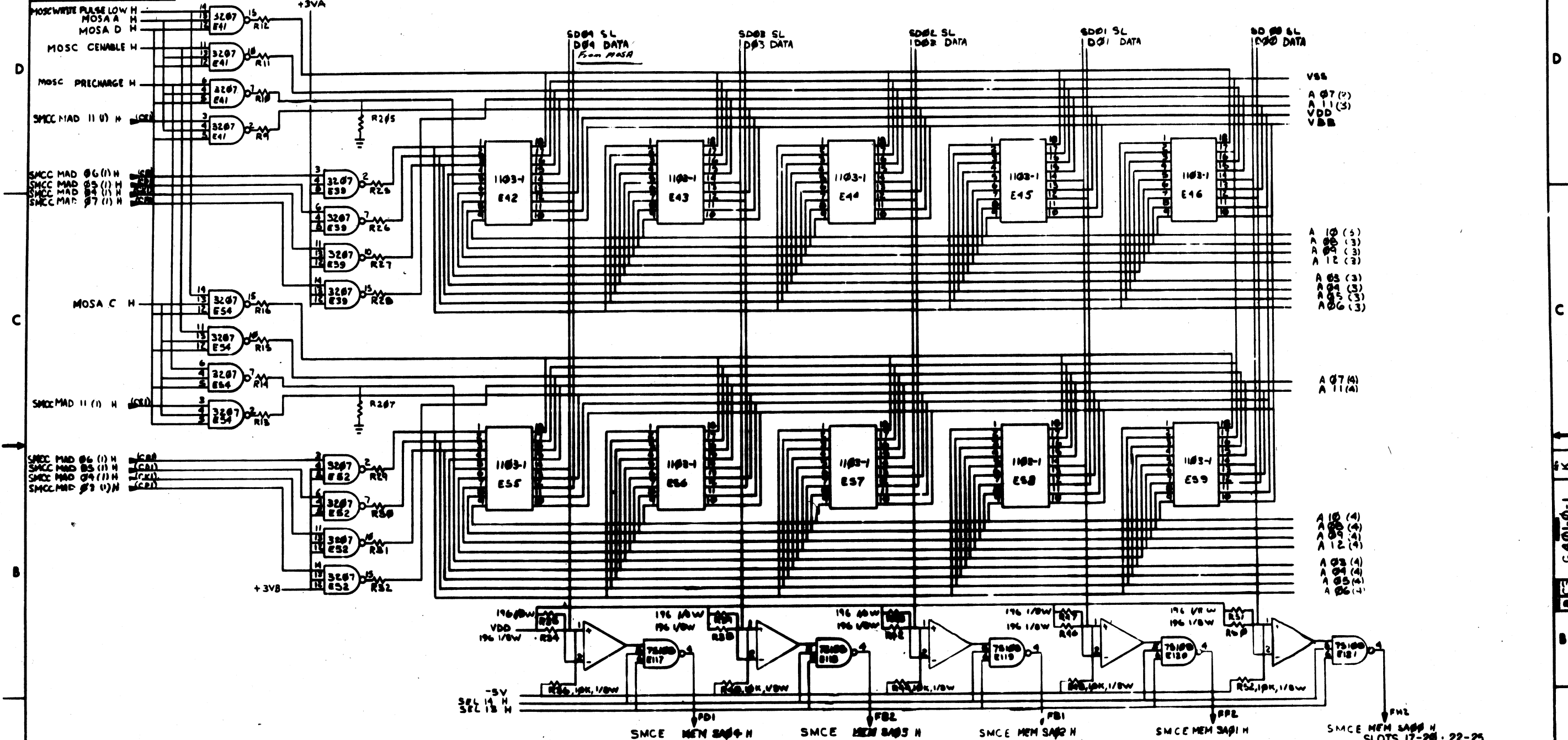
NOTE: ALL CAPS .22 MFD
ALL DIODES D64Z
ALL RES. 33Ω UNLESS OTHERWISE NOTED
* THESE CHIPS ARE INSTALLED IN PARITY VARIATION (G401-YA) ONLY

JUMPER CONFIGURATION	
OUT JUMPERS	FOR
B,D	1ST 4K OF 16K BANK
A,D	2ND 4K OF 16K BANK
B,C	3RD 4K OF 16K BANK
A,C	4TH 4K OF 16K BANK

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
11/45		PARTS LIST		
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES				
DECIMALS	ANGLES	TITLE		
.XX - .00	± 0° 30'	HIGH SPEED MOS MEMORY MATRIX (MOSA)		
.XX - .02		REMOVES BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		
.X - .1		MATERIAL		
		NEXT HIGHER ASSY.		
		FINISH		
B-DD-11/45-0		SCALE	NUMBER	REV.
SHEET 2 OF 9		DIST.	G401-0-1	K

REV.	CHANGE NO.	REVISIONS

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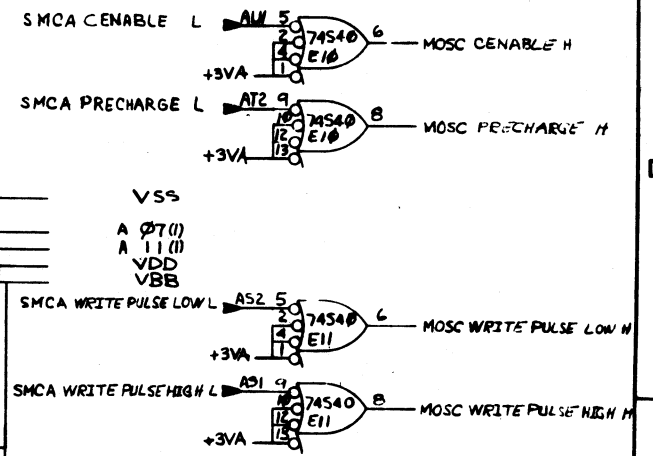
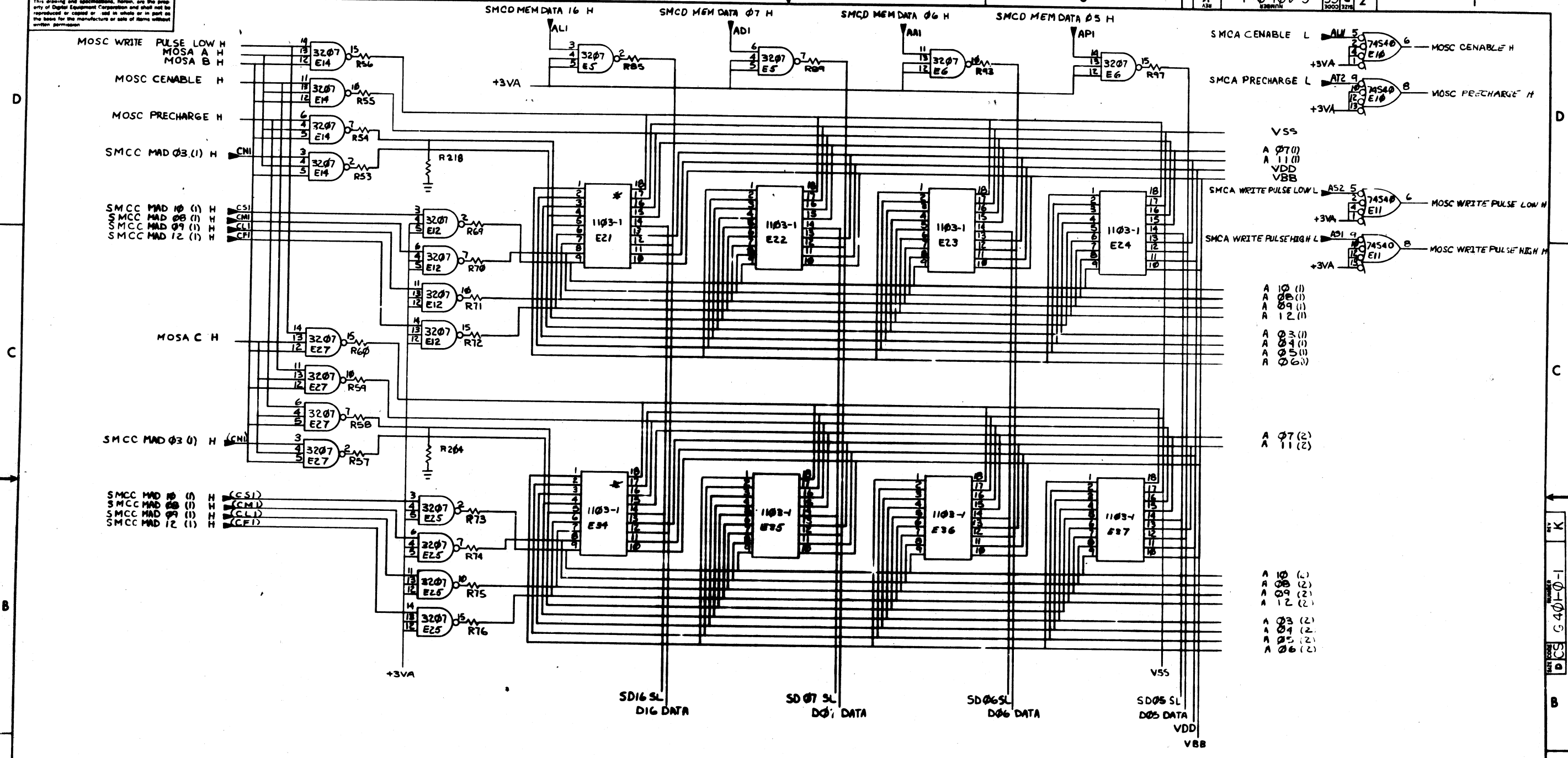
REV	DESCRIPTION	PART NO.
1	11/45	
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES		
FINISH		
MATERIAL		
PHENIX		
EQUIPMENT CORPORATION		
HIGH SPEED MOS MEMORY MATRIX (MOS)		
B-DD-11/45-0		DCS G401-0-1

REV
CHANGE NO
KEY

DCS G401-0-1

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1-0-1019 SCIC 2



- A 07 (1)
- A 11 (1)
- VDD
- VBB
- A 03 (1)
- A 04 (1)
- A 05 (1)
- A 06 (1)

- A 07 (2)
- A 11 (2)

- A 03 (2)
- A 04 (2)
- A 05 (2)
- A 06 (2)

REV	CHANGE NO

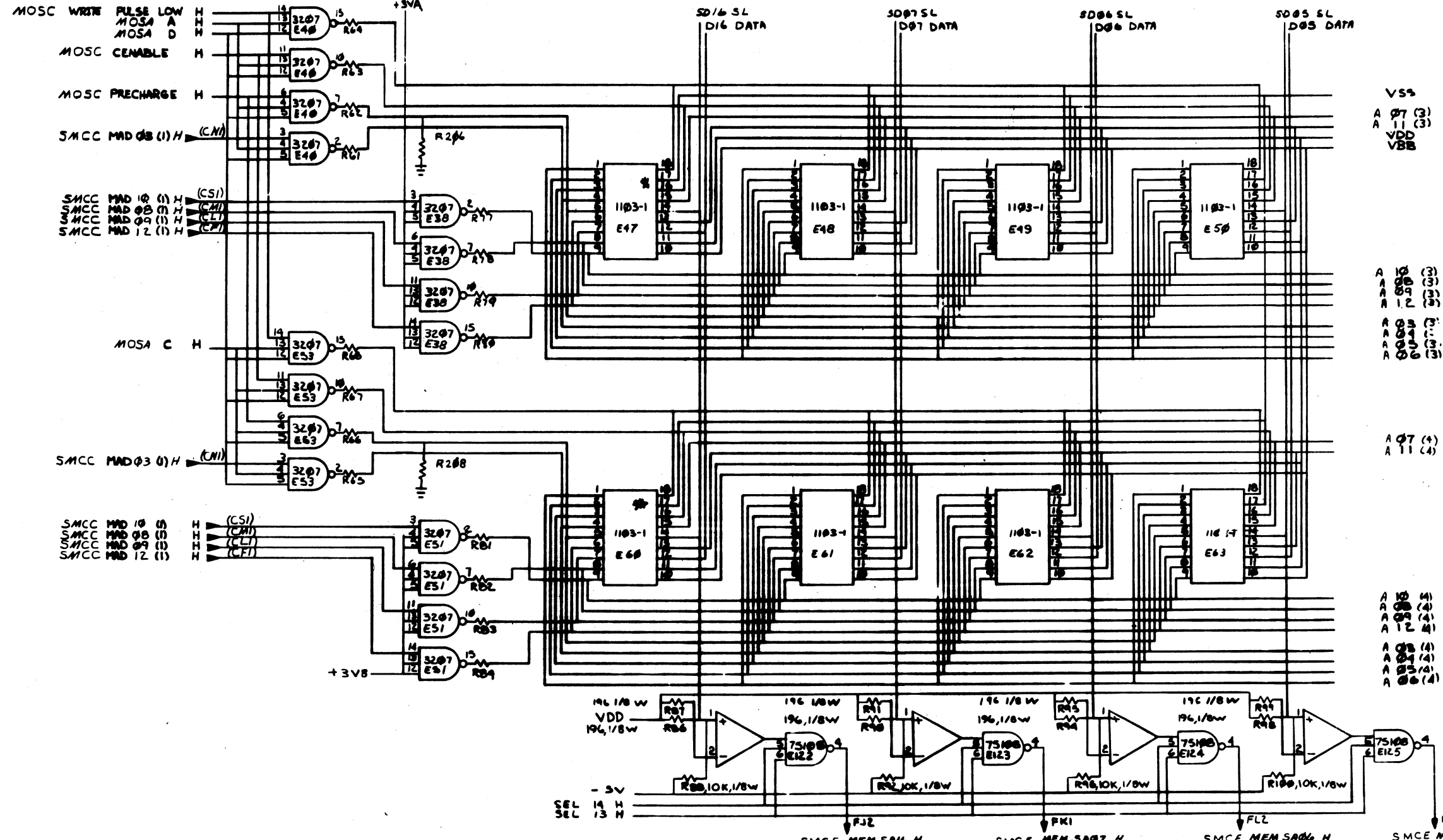
8 7 6 5 4 3 2 1

SLOTS 17-20, 22-25

FIRST USED ON OPTIMUM MODEL	QTY.	DESCRIPTION	PART NO.	REV.
11/45				
PARTS LIST				
EQUIPMENT CORPORATION				
TITLE				
HIGH SPEED MOS MEMORY MATRIX (MOSC)				
MATERIAL		NEXT HIGHER ASSY.	RECORD NUMBER	REV.
+		B-DD-1145-0	DCS G 401-0-1	M
FINISH		SCALE	DIST.	
+		SHEET 4 OF 9		

8 7 6 5 4 3 2 1

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VSS
A 07 (3)
A 11 (3)
VDD
VSB

A 10 (3)
A 08 (3)
A 12 (3)
A 05 (3)
A 04 (3)
A 06 (3)

A 07 (4)
A 11 (4)

A 10 (4)
A 08 (4)
A 12 (4)
A 05 (4)
A 04 (4)
A 06 (4)

SLOTS 17-20; 22-25

REV	CHG	DESCRIPTION	DATE

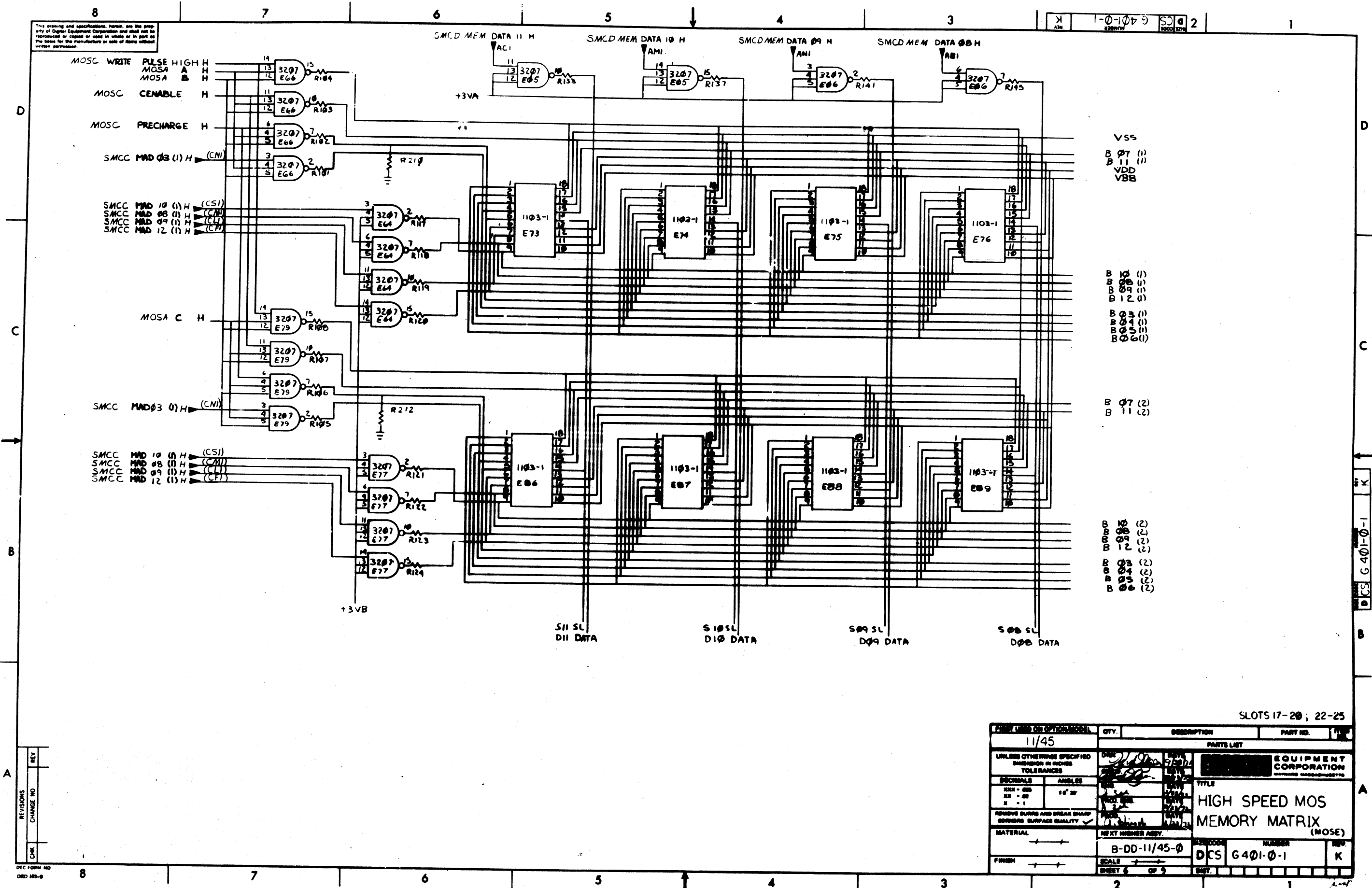
QTY.	DESCRIPTION	PART NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES	DECIMALS ANGLES	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		
MATERIAL	NEXT HIGHER ASSY.	
FINISH	SCALE	

TITLE	
EQUIPMENT CORPORATION	
HIGH SPEED MOS MEMORY MATRIX (MOS3D)	
B-DD-11/45-0	
DCS G 401-0-1	

REV	CHG	DESCRIPTION	DATE

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VSS
B 07 (1)
B 11 (1)
VDD
VBB

B 07 (1)
B 08 (1)
B 09 (1)
B 12 (1)
B 03 (1)
B 04 (1)
B 05 (1)

B 07 (2)
B 11 (2)

B 07 (2)
B 08 (2)
B 12 (2)
B 03 (2)
B 04 (2)
B 05 (2)

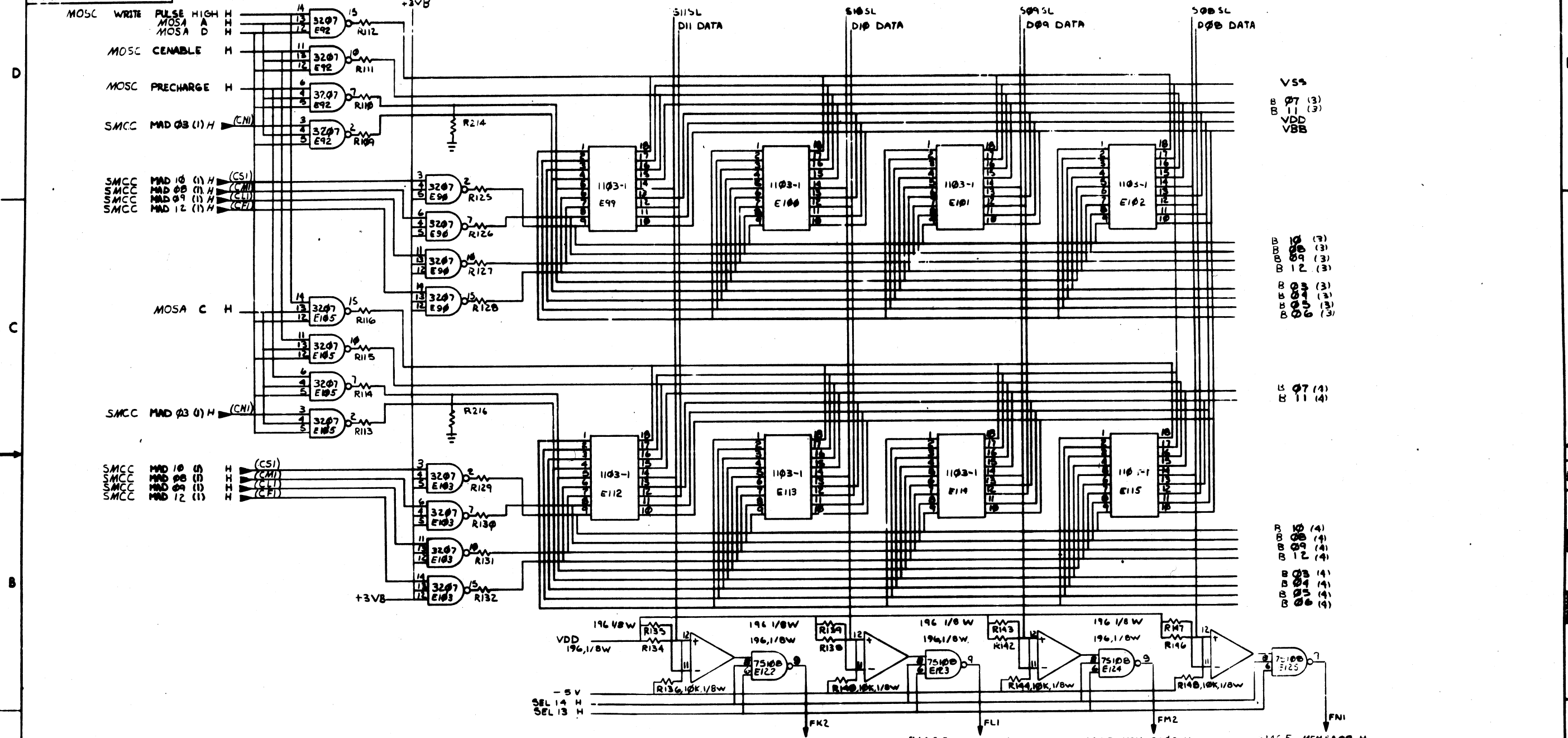
DCS G401-0-1

SLOTS 17-20; 22-25

REV	QTY	DESCRIPTION	PART NO.
11/45			
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES			
DECIMALS	ANGLES		
FRACTIONS	FRACTIONS		
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY			
MATERIAL		NEXT HIGHER ASSY.	
FINISH		SCALE	
SHEET 6 OF 5		SHEET	
B-DD-11/45-0		DCS G401-0-1	
EQUIPMENT CORPORATION		HIGH SPEED MOS MEMORY MATRIX (MOSE)	
REV. 1		REV. 1	
REV. 2		REV. 2	
REV. 3		REV. 3	
REV. 4		REV. 4	
REV. 5		REV. 5	

REV	DESCRIPTION
1	REVISIONS
2	CHANGE NO
3	CHK

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V55
B 07 (3)
B 11 (3)
VDD
VBB

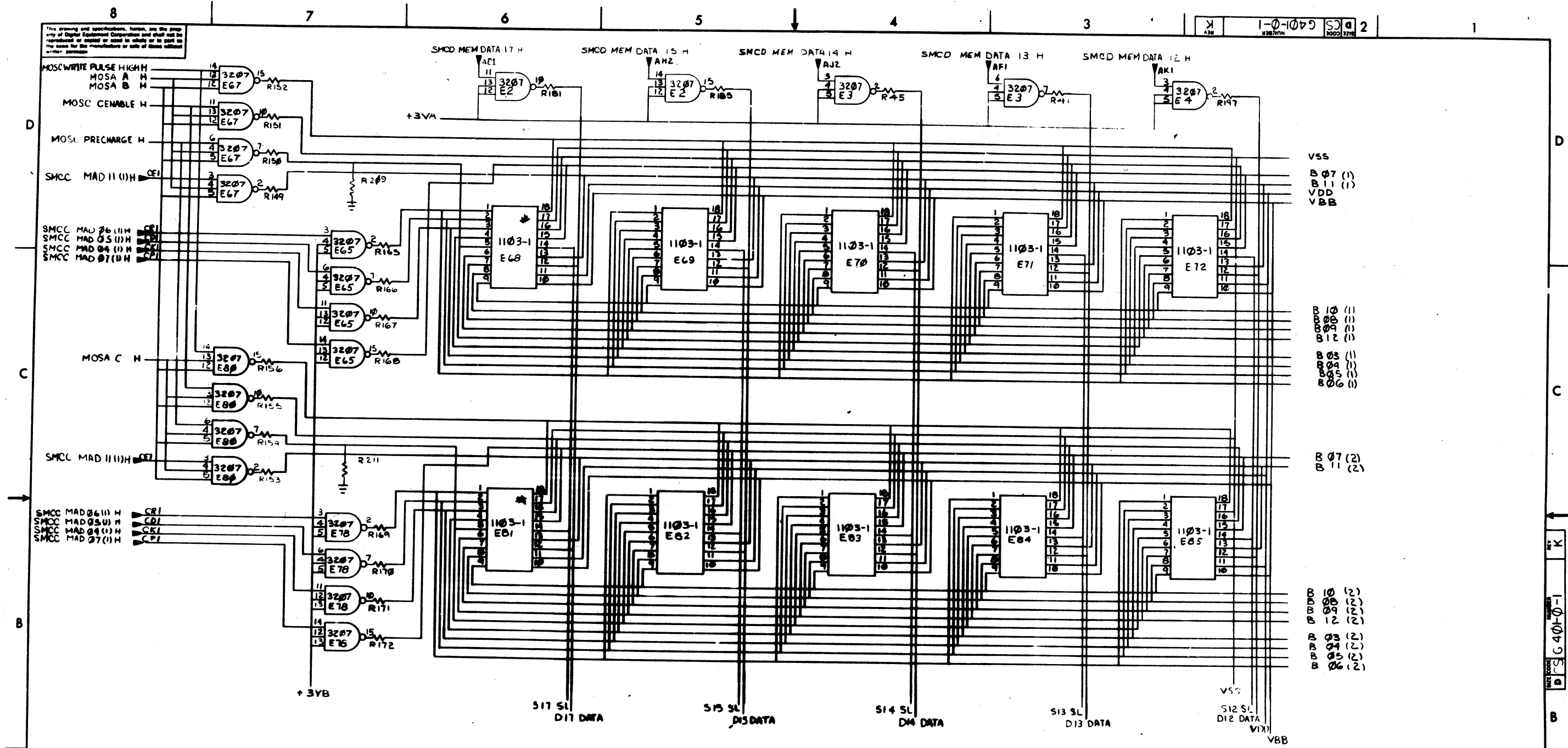
B 0006 (3)
B 0007 (3)
B 12 (3)
B 0008 (3)
B 0009 (3)
B 0010 (3)

B 07 (4)
B 11 (4)

B 0006 (4)
B 0007 (4)
B 12 (4)
B 0008 (4)
B 0009 (4)
B 0010 (4)

REV.	NO.
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.
11/45			
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES			
DECIMALS	ANGLES	TITLE	
.XXX - .000	± 0° 30'	HIGH SPEED MOS MEMORY MATRIX (MOSF)	
.XX - .00		REMOVES BURRS AND BREAK SHARP EDGES SURFACE QUALITY	
.X - .1		MATERIAL	
		NEXT HIGHER ASSY.	
		FINISH	
		SCALE	
		SHEET 7 OF 9	
EQUIPMENT CORPORATION		PART NO. G 401-0-1	
REV. K		REV. K	



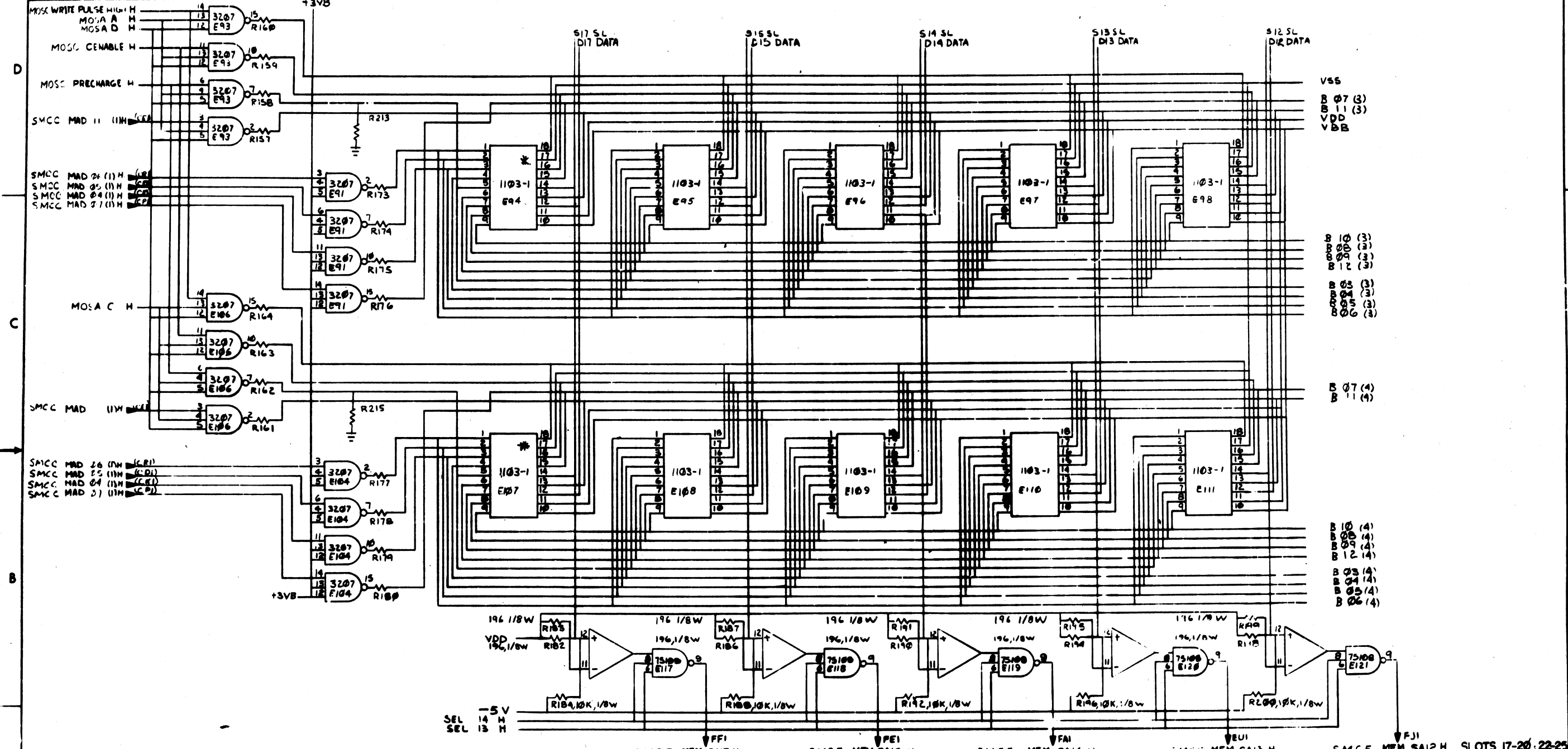
- VSS
- B 07 (1)
- B 11 (1)
- VDD
- VBB
- B 07 (1)
- B 08 (1)
- B 09 (1)
- B 12 (1)
- B 03 (1)
- B 04 (1)
- B 05 (1)
- B 06 (1)
- B 07 (2)
- B 11 (2)
- B 07 (2)
- B 08 (2)
- B 09 (2)
- B 12 (2)
- B 03 (2)
- B 04 (2)
- B 05 (2)
- B 06 (2)
- VSS
- S12 SL D12 DATA
- VDD
- VBB

REV	
CHG	
DEC FORM NO	DRD 102-B

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES				
DECIMALS	ANGLES	DATE		
XXX - .00	10° 30'	DATE	EQUIPMENT CORPORATION	
XX - .01		DATE	MAY 1968	
X - .1		DATE	2/22/72	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY				
MATERIAL	NEXT HIGHER ASSY.	TITLE		
1	B-DD-11/45-C	HIGH SPEED MOS MEMORY MATRIX (MOSH)		
FINISH	SCALE	BOOK	NUMBER	REV.
+		DCS	G40-0-1	K
SHEET 8 OF 9				

SLOTS 17-20; 22-25

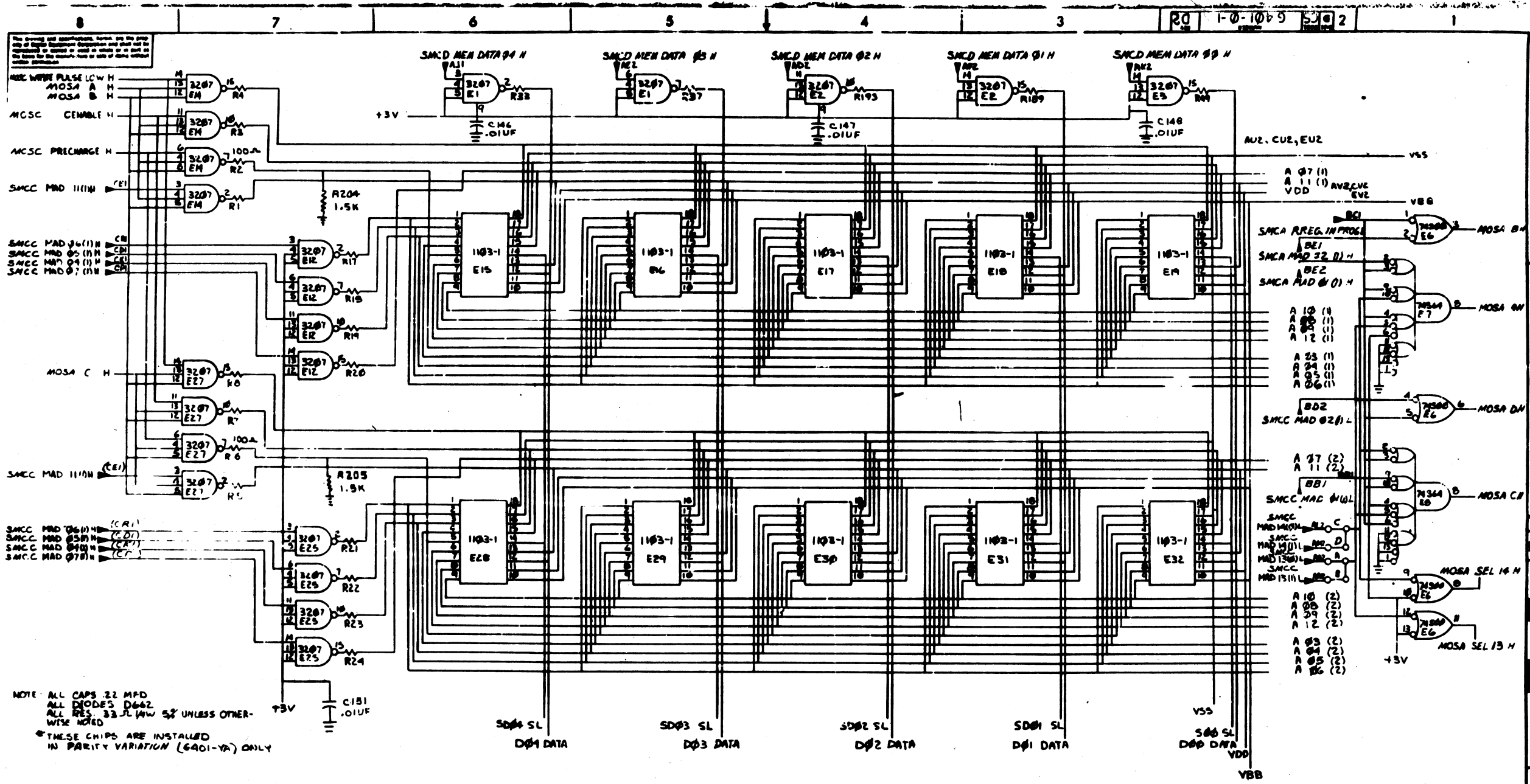
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REV	
CHANGE NO.	
BY	
DATE	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.
11/45			
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES			
DECIMALS	ANGLES		
XXX - 000	10° 30'		
XX - 00			
X - 0			
REMOVES BURRS AND BREAK SHARP CHAMFERS SURFACE QUALITY			
MATERIAL			
NEXT HIGHER ASSY.			
FINISH			

PARTS LIST		EQUIPMENT CORPORATION MILWAUKEE, WISCONSIN	
TITLE			
HIGH SPEED MOS MEMORY MATRIX (MOSJ)			
REVISION	NUMBER	REV.	
B-DD-11/45-0	DCS G401-0-1	K	
SCALE	SHEET	OF	
	2	9	



JUMPER CONFIGURATION

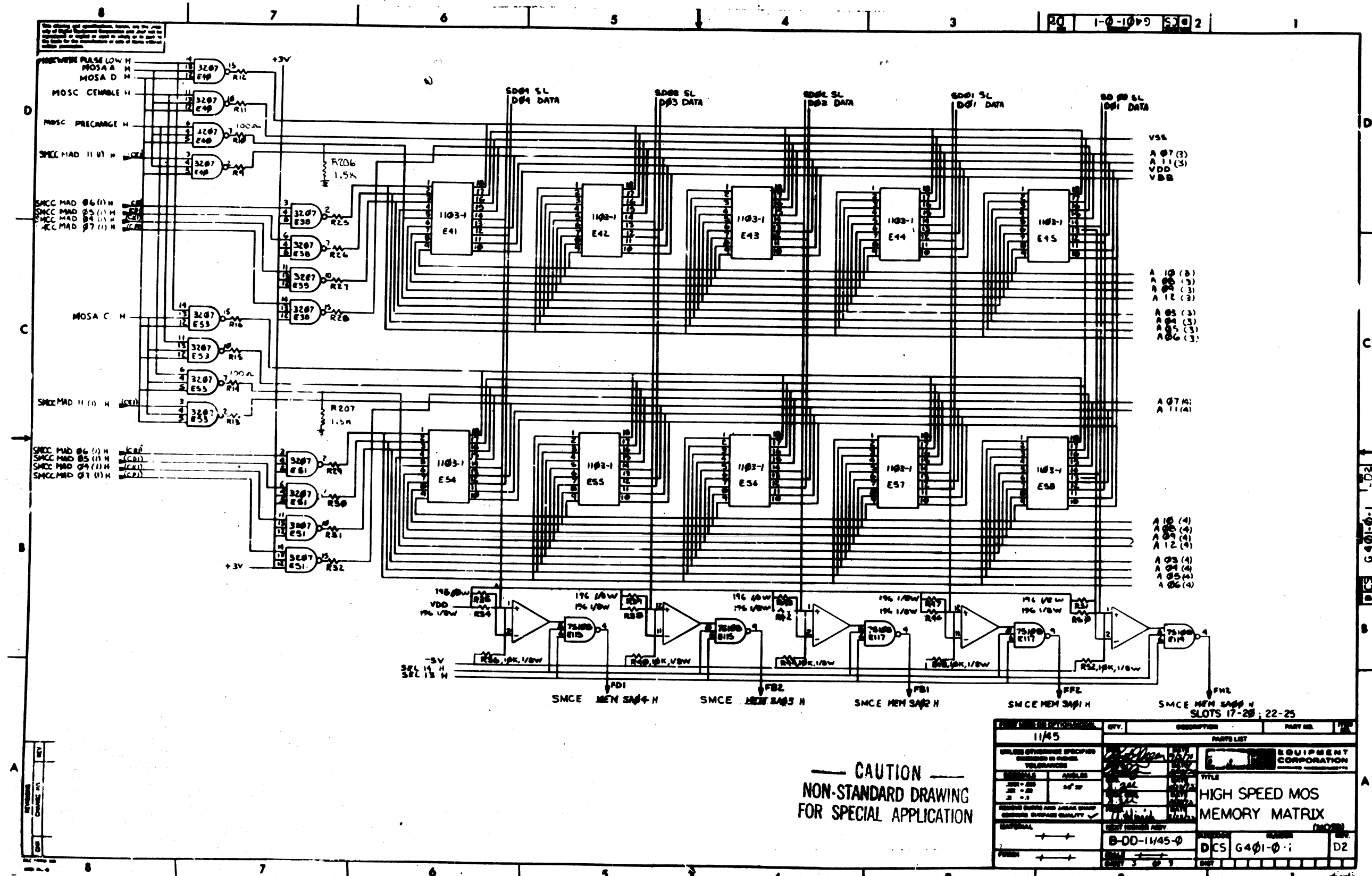
OUT JUMPERS	FOR
B,D	1ST 4K OF 16K BANK
A,D	2ND 4K OF 16K BANK
B,C	3RD 4K OF 16K BANK
A,C	4TH 4K OF 16K BANK

CAUTION
 NON-STANDARD DRAWING
 FOR SPECIAL APPLICATION

FIRST LINE NO. OF MODEL	QTY.	DESCRIPTION	PART NO.	ITEM
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
FINISH				
REMOVE BURRS AND BREAK SHARP EDGES TO IMPROVE AIR QUALITY				
MATERIAL				
EQUIPMENT CORPORATION				
TITLE: HIGH SPEED MOS MEMORY MATRIX (MOSA)				
PART NO.: DCS G401-0-i				
REV. D?				

DCS G401-0-i

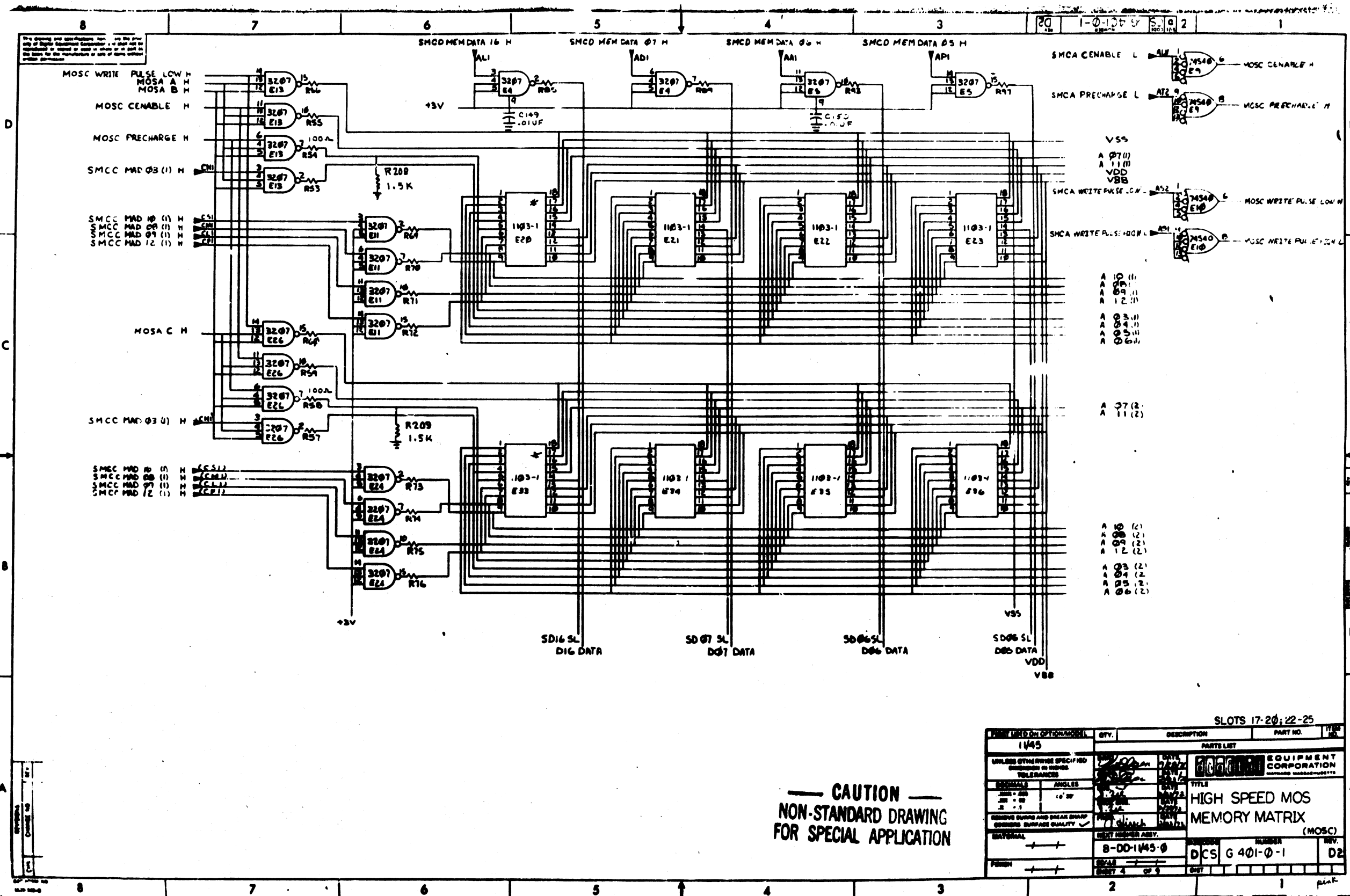
SLOTS 17-20; 22-25



CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

PARTS LIST		QTY.	DESCRIPTION	PART NO.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
FINISH	APPROVAL			
DATE	BY			
REVISIONS				
NO.	DESCRIPTION	DATE	BY	
1	ISSUED			
GENERAL				
DRAWN BY: B-DD-11/45-0				
CHECKED BY: DCS G401-0-1				
APPROVED BY: D2				

EQUIPMENT CORPORATION
HIGH SPEED MOS
MEMORY MATRIX



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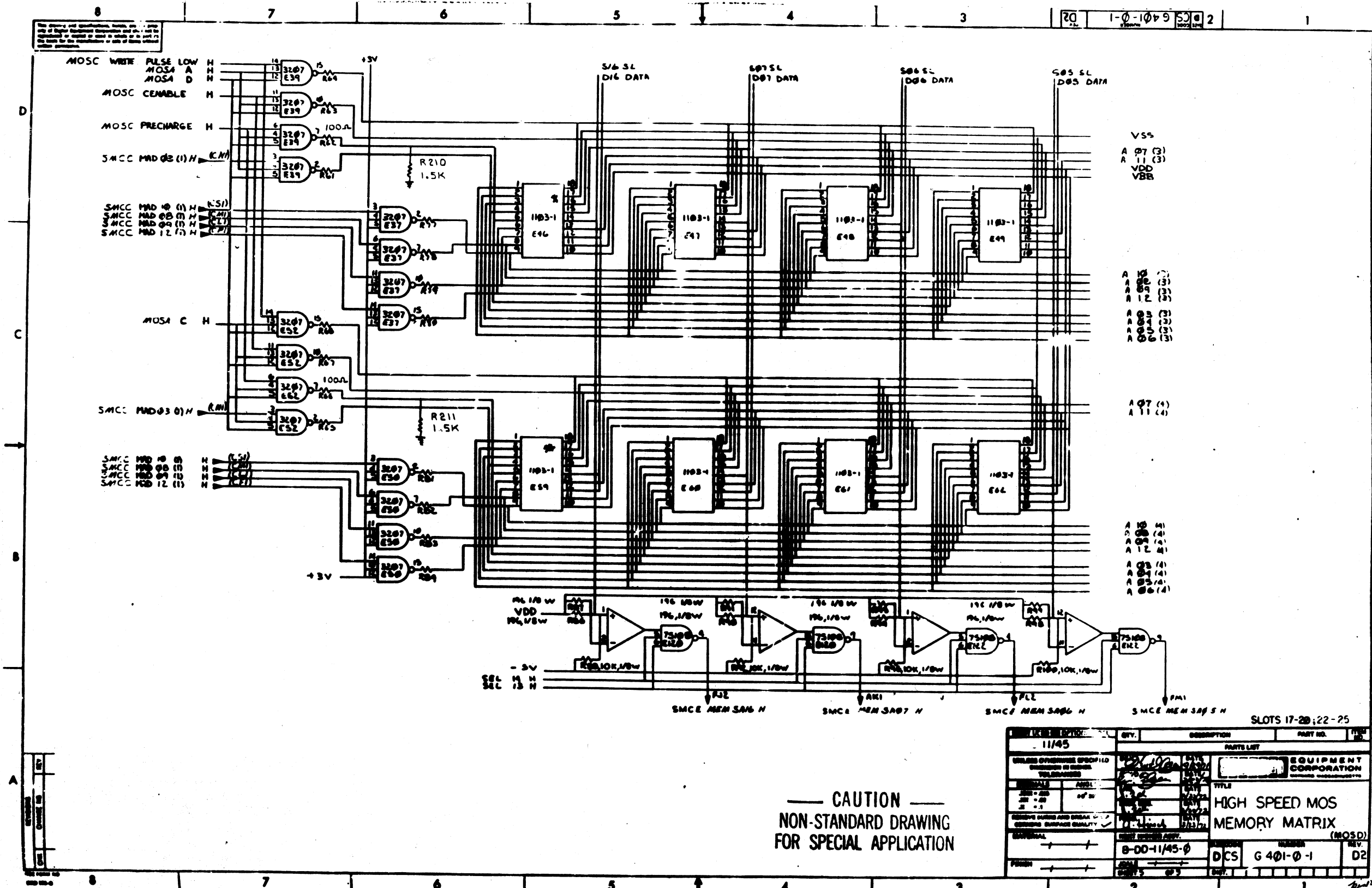
CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

PART NO.		QTY.	DESCRIPTION	PART NO.	REV.
1145					
UNLESS OTHERWISE SPECIFIED, DIMENSIONS IN DIMS. TOLERANCES					
FINISH	ANGLE				
REMOVE BURRS AND BREAK SHARP EDGES					
GENERAL					
BEST MEMBER ASSY.					
+			B-00-1145-0	DCS G 401-0-1	D2
-					
-					

SLOTS 17-20; 22-25

EQUIPMENT CORPORATION
HIGH SPEED MOS
MEMORY MATRIX
(MOSC)

DCS G 401-0-1



1. This drawing is a schematic diagram of a High Speed MOS Memory Matrix. It is intended for use in the design and construction of a High Speed MOS Memory Matrix. It is not to be used for any other purpose. 2. This drawing is a schematic diagram of a High Speed MOS Memory Matrix. It is intended for use in the design and construction of a High Speed MOS Memory Matrix. It is not to be used for any other purpose.

D2 2 1-0-1 G401-0-1

VSS
A 07 (3)
A 11 (3)
VDD
VBB

A 05 (3)
A 09 (3)
A 12 (3)
A 03 (3)
A 04 (3)
A 05 (3)
A 06 (3)

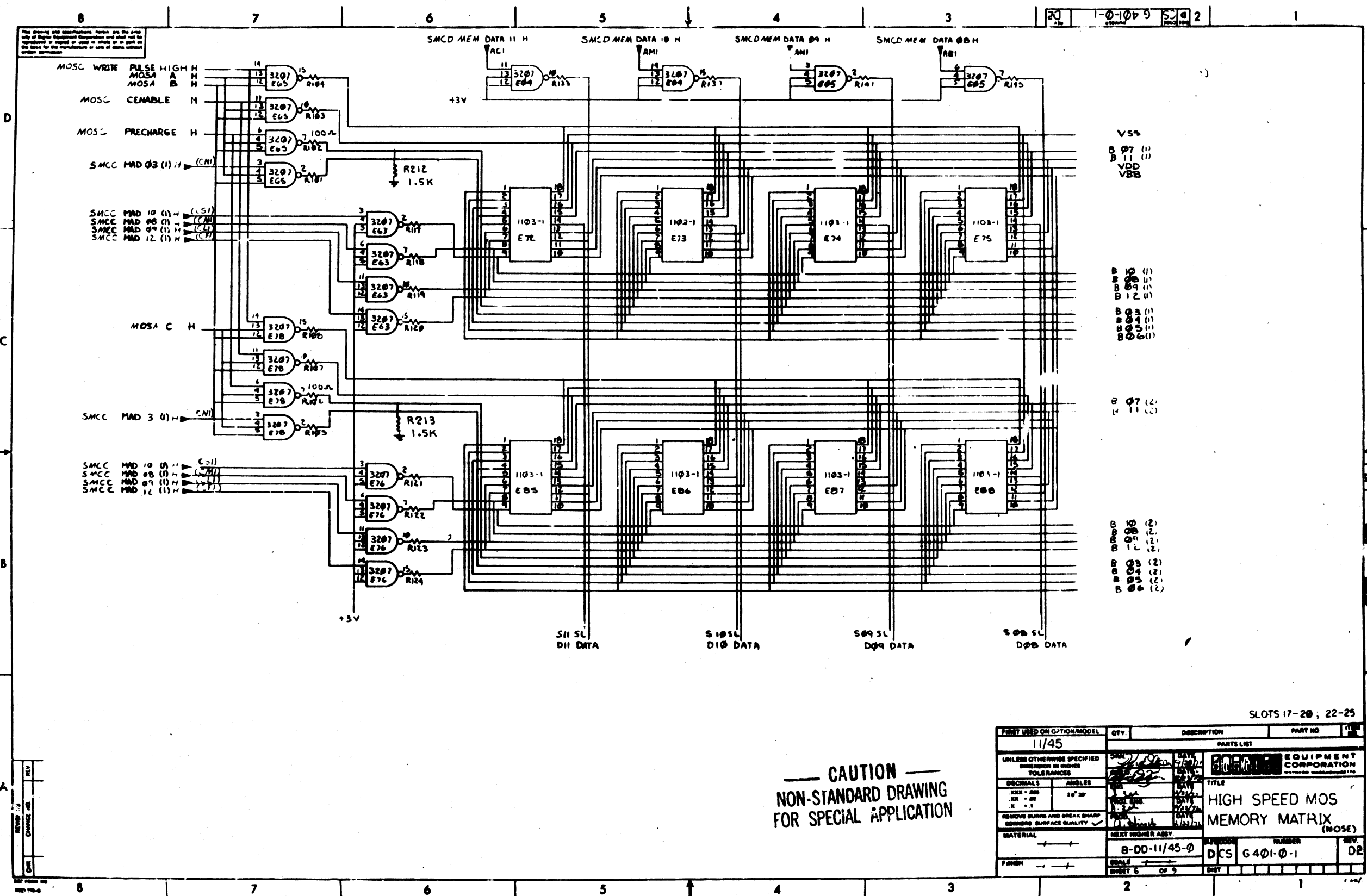
A 07 (4)
A 11 (4)

A 05 (4)
A 09 (4)
A 12 (4)
A 03 (4)
A 04 (4)
A 05 (4)
A 06 (4)

SLOTS 17-20; 22-25

CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

REV.	QTY.	DESCRIPTION	PART NO.	REV.
11/45				
EQUIPMENT CORPORATION				
TITLE: HIGH SPEED MOS MEMORY MATRIX (MOSD)				
DCS			G 401-0-1	D2



DCS G401-01 2

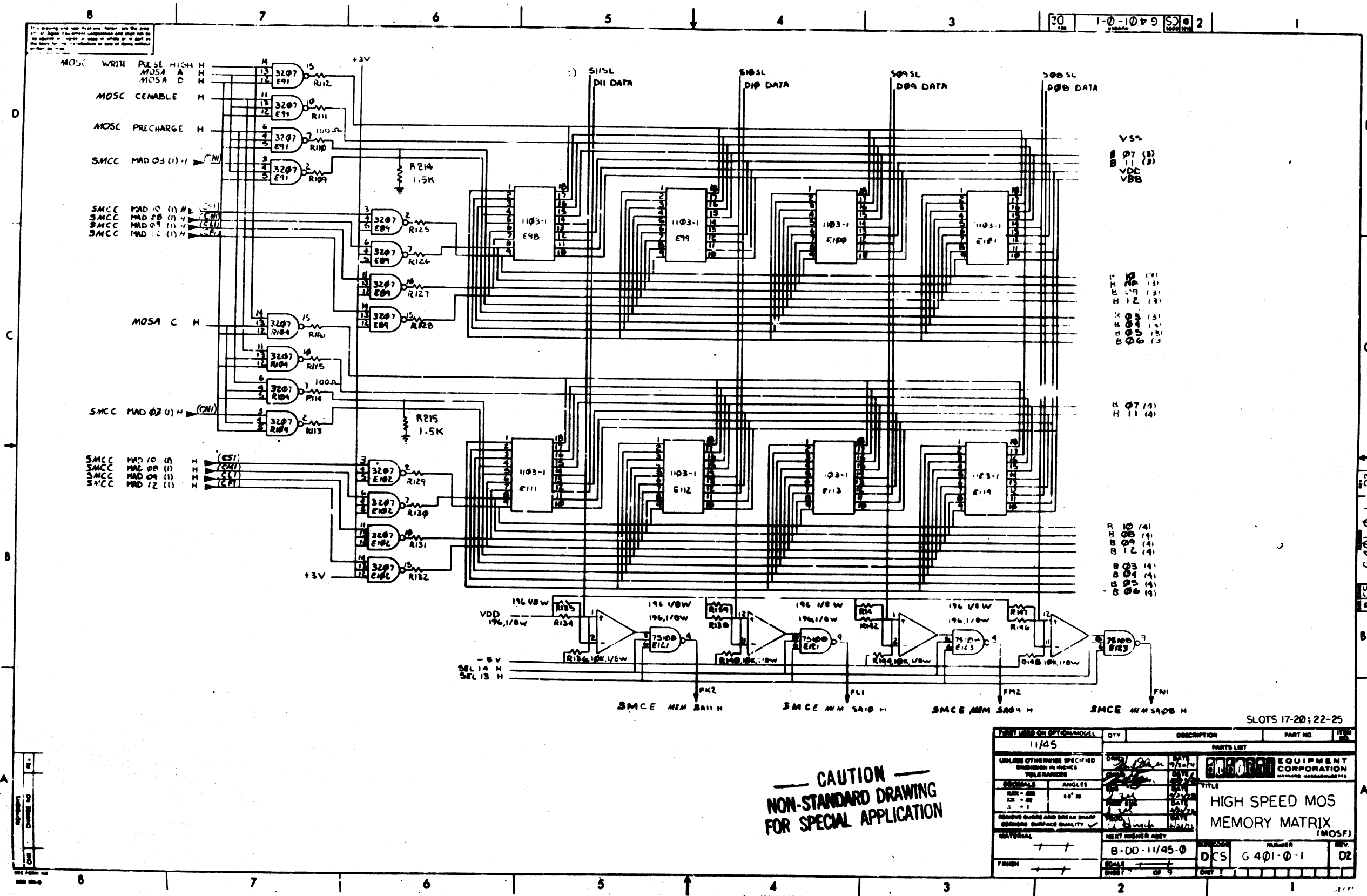
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- VSS
- B 07 (1)
- B 11 (1)
- VDD
- VBB
- B 05 (1)
- B 06 (1)
- B 09 (1)
- B 12 (1)
- B 03 (1)
- B 04 (1)
- B 05 (1)
- B 06 (1)
- B 07 (2)
- B 11 (2)
- B 05 (2)
- B 06 (2)
- B 09 (2)
- B 12 (2)
- B 03 (2)
- B 04 (2)
- B 05 (2)
- B 06 (2)

SLOTS 17-20; 22-25

CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

FIRST USED ON Q-TION/MODEL	QTY.	DESCRIPTION	PART NO.	REV.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES	PARTS LIST		
.XXX - .000	10° 30'	EQUIPMENT CORPORATION		
.XX - .00		TITLE		
.X - .0		HIGH SPEED MOS MEMORY MATRIX (MOSE)		
REMOVE BURRS AND BREAK SHARP EDGES SURFACE QUALITY		MATERIAL		
		NEXT HIGHER ASBY.		
		B-DD-11/45-0		
		DCS G401-01		
		D2		
		SCALE		
		SHEET 6 OF 9		



1-0-1079 SC 2

VSS
B 07 (3)
B 11 (3)
VDC
VBB

B 07 (3)
B 11 (3)
B 07 (3)
B 11 (3)
B 07 (3)
B 11 (3)

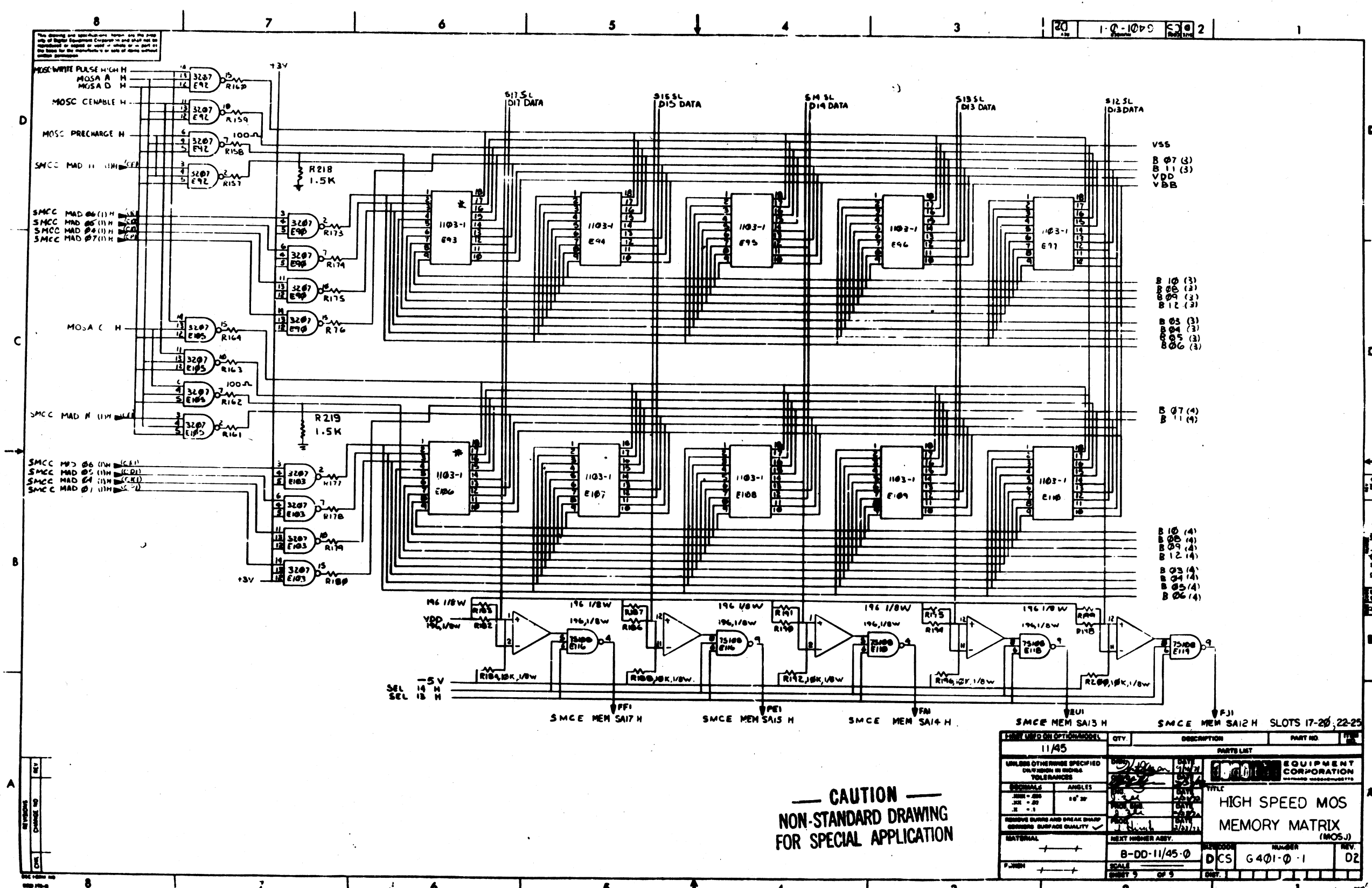
B 07 (4)
B 11 (4)

B 07 (4)
B 08 (4)
B 12 (4)
B 03 (4)
B 04 (4)
B 05 (4)

SLOTS 17-20; 22-25

TYPE	QTY	DESCRIPTION	PART NO.	REV.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
FINISH				
EQUIPMENT CORPORATION				
HIGH SPEED MOS MEMORY MATRIX (MOSF)				
B-DD-11/45-0		DCS		D2
G 401-0-1				

CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION



CAUTION
NON-STANDARD DRAWING
FOR SPECIAL APPLICATION

ITEM NO.	DESCRIPTION	QTY.	PART NO.	REV.
11/45				
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES TOLERANCES				
DECIMALS	ANGLES			
FRACTIONS	16° 30'			
RESOLVE BURRS AND BREAK SHARP CORNER SURFACE QUALITY				
MATERIAL				
NEXT HIGHER ASSY.				
DRAWING NUMBER				
B-DD-11/45-0				
SCALE				
SHEET 5 OF 5				
EQUIPMENT CORPORATION WALTHAM, MASSACHUSETTS				
TITLE				
HIGH SPEED MOS MEMORY MATRIX (MOSJ)				
REV.				
D2				

DCS G401-0-1 D2



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**DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS 01754**