digital

TM8-E

Engineering Drawings

Digital Equipment Corporation

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

DRAWING DIRECTORY

CUSTOMER PRINT SET INDEX

THIS IS PRINT SET

SEQUENCE		SEQUENCE	
OUTPUT CONTROL	D-CS-M8321-0-1		
REGISTERS	D-CS-M8327-0-1		
CONTROL	D-CS-M8322-0-1		
TRANSPORT STATUS CONTROL	D-CS-M8323-0-1		
TERMINATOR CARD	D-CS-M989-0-1		
SIGNAL MAPPING (TM8-E)	D-MU-TM8-E-2		
CABLE INTERCONNECTING (TM8-E)	D-IC-TM8-E-3		
TIMING DIAGRAM (TM8-E)	D-TD-TM8-E-1		
MAG TAPE CONTROL	A-PL-TM8-E-0		
ENG. SPECIFICATION	A-SP-TM8-E-4		
SOFTWARE LIST	A-SL-TM8-E-7		
ACCESSORY LIST	A-AL-TM8-E-8		
ACCEPTANCE PROCEDURE	A-SP-TM8-E-9		

UNIT VARIATIONS

VAR	TITLE	PRINT SET
TM8-E	MAG TAPE CONTROL	X

REVISIONS		
REV	CHG. NO.	DATE
A	TM8E-1	4-73
B	TM8E-2	11-73

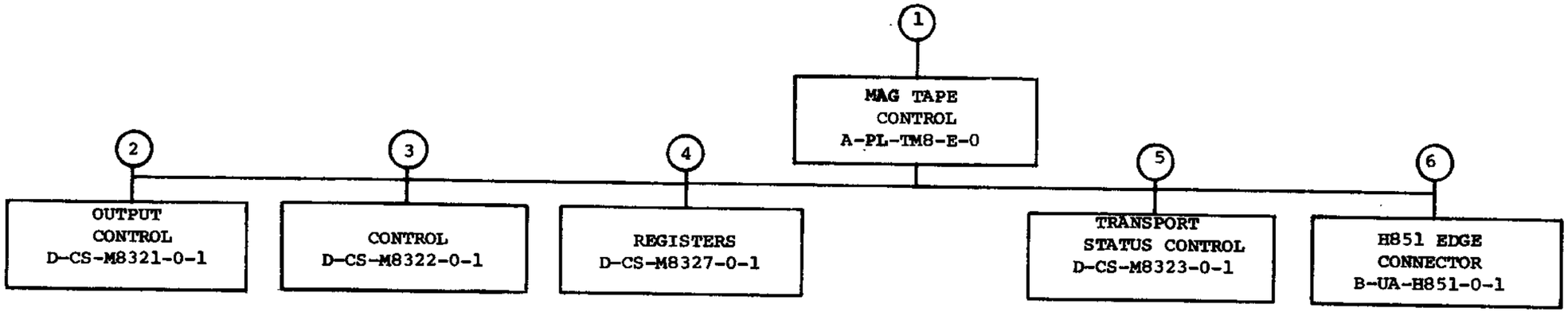
USED ON OPTION/MODEL

SHEET 1 OF 3

DRN. G. Marini	DATE 9/5/72	TITLE MAG TAPE CONTROL
CHK'D. J. Cahill	DATE 10/72	
PROJ ENG. A.Czajkowski	DATE 11/72	
PROD. D. Kaney	DATE 11/72	SIZE B / CODE DD / NUMBER TM8-E / REV B
FIELD SERV. C. Cline	DATE 11/72	DIST

DEC 16-12251-1062-1A-8972

DRB 106



TITLE		SIZE	CODE	NUMBER	REV
MAG TAPE CONTROL	SHEET 2 OF 3	B	DD	TM8-E	B

ELECTRICAL

CUSTOMER PRINT SET TM8-E	MFG. SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE
X		1	A-PL-TM8-E-0	*	1	MAG TAPE CONTROL	
X			D-TD-TM8-E-1	*	9	TIMING DIAGRAM (TM8E)	
X			D-MU-TM8-E-2	B	1	SIGNAL MAPPING (TM8E)	
X			D-IC-TM8-E-3	A	1	CABLE INTERCONNECTING (TM8-E)	
X			D-CS-M989-0-1	#	3	TERMINATOR CARD	
			D-UA-BCØ8L-0-0		1	I/O CABLE	
X			A-SP-TM8-E-4	A	21	ENG SPECIFICATIONS	
			A-SP-TM8-E-5	A	5	CHECKOUT PROCEDURE	
X			A-SL-TM8-E-7	A	1	SOFTWARE LIST	
X			A-AL-TM8-E-8		1	ACCESSORY LIST	
X			A-SP-TM8-E-9	A	8	ACCEPTANCE PROCEDURE	
X		2	D-CS-M8321-0-1	#	4	OUTPUT CONTROL	
X		3	D-CS-M8322-0-1	#	5	CONTROL	
X		4	D-CS-M8327-0-1	#	5	REGISTER	
X		5	D-CS-M8323-0-1	#	4	TRANSPORT STATUS CONTROL	
		6	B-UA-H851-0-0		1	H851 EDGE CONNECTOR	
			A-PL-H851-0-0		1	H851 EDGE CONNECTOR	
			D-IA-5008903-0-0		1	ETCH BOARD	

CUSTOMER PRINT SET TM8-E	MFG SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE
		1	A-PL-TM8-E-0	*	1	MAG TAPE CONTROL	
		6	B-UA-H851-0-0		1	H851 EDGE CONNECTOR	
			A-PL-H851-0-0		1	H851 EDGE CONNECTOR	
			B-MD-5509071		1	RECEP 36 PIN REWORK	

CUSTOMER PRINT SET CODES

X = PRINT OF DOCUMENT INCLUDED IN PRINT SET
C = INCLUDES ALL PRINTS INDICATED ON DOCUMENT
S = CONFIDENTIAL AUTHORIZED SIGNATURE REQUIRED

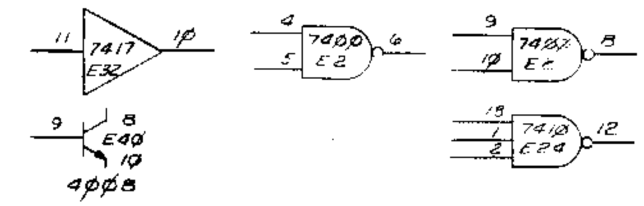
TITLE		SIZE	CODE	NUMBER	REV
MAG TAPE CONTROL	SHEET 3 OF 3	B	DD	TM8-E	B

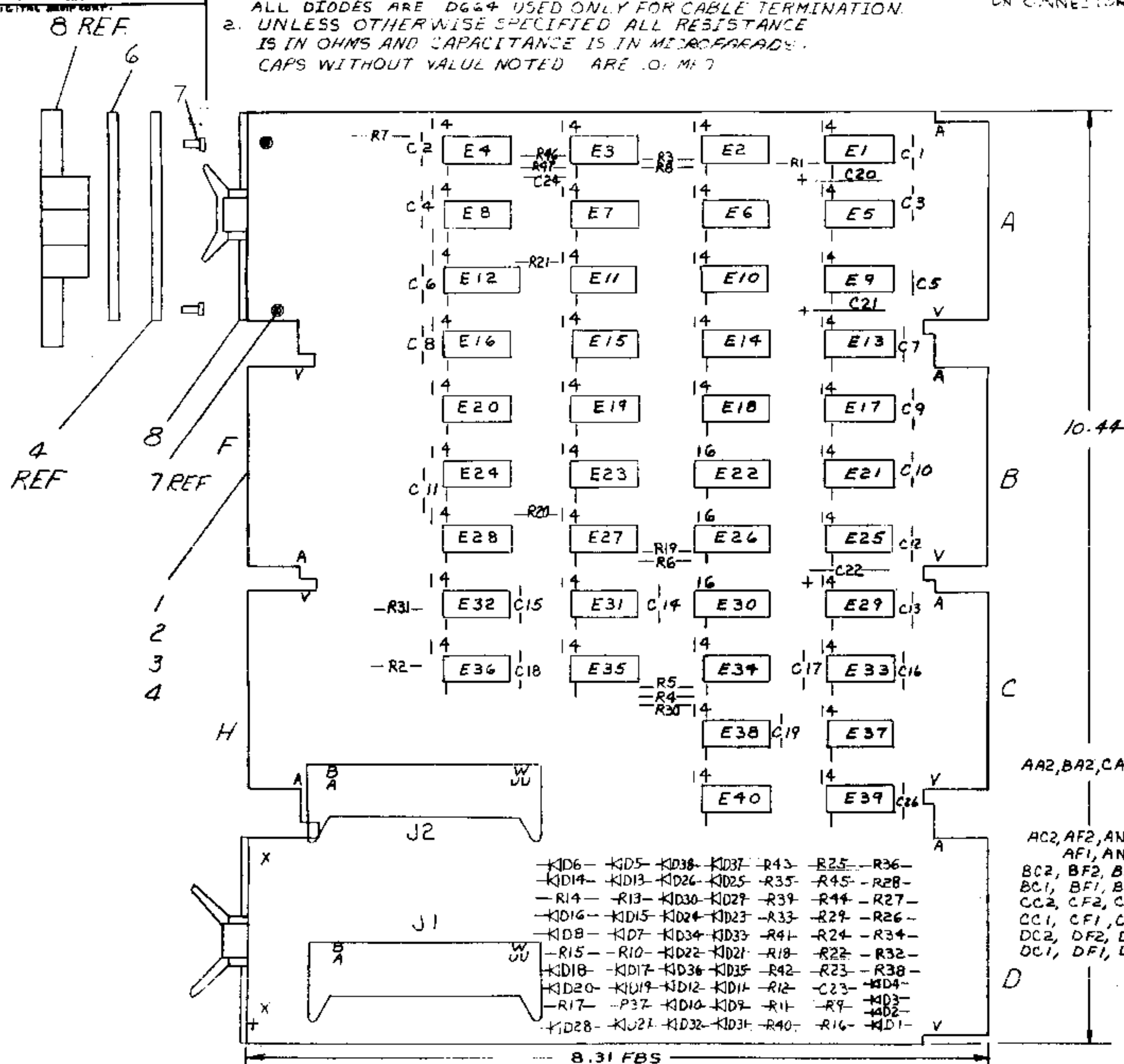
DEC 14-(325)-1062-2B-R972

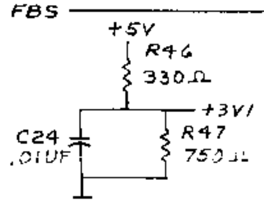
NOTES:

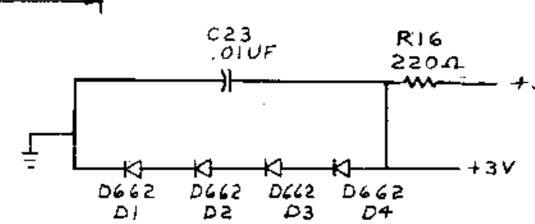
1. UNLESS OTHERWISE INDICATED ALL DIODES ARE D664 USED ONLY FOR CABLE TERMINATION.
2. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE IS IN OHMS AND CAPACITANCE IS IN MICROFARADS. CAPS WITHOUT VALUE NOTED ARE .01 MFD
3. GROUND PINS DD, FF, JJ, LL AND NN ON CONNECTOR J1. GROUND PIN J ON CONNECTOR J2.

SPARE GATES:









IC TYPE	GND	+5V
IC DEC 314	7	8
IC DEC 380		8
IC DEC 384	1	8
IC DEC 8251	8	16

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
1	R7	RES. 1K, 1/4W, 5%	1300365	38
A/R		WIRE 30 AWG KYNAR INS	9105740-44	37
22	C1 THRU C19, C23, 24, 26	CAP. .01 UF 100V 20% DISC	1001610	36
3	C20, C21, C22	CAP. 6.8 UF 35V 20% TANT	100067	35
34	D5 THRU D38	DIODE D664	1100114	34
4	D1, D2, D3, D4	DIODE D662	1100113	33
2	J1, J2	CONN, 40 PIN	1209941	32
7	R34, R32, R36, R38, R28, R26, R27	RES. 27 1/4 10%	1301420	31
8	R22, R23, R24, R25, R45, R29, R44, R47,	RES. 750 1/4 5%	1301401	30
11	R3, R8, R5, R4, R19, R20, R2, R21, R31, R30, R1	RES 470 1/4 10%	1300317	29
18	R11, R46, , R33, R39, R37, R40, R42, R35, R43, R41, R18, R17, R15, R10, R9, R14, R13, R12	RES 330 1/4 10%	1300293	28
2	R6, R16	RES 220 1/4 10%	1300275	27
3	E9, E17, E33	IC DEC 330	1909485	26
4	E13, E32, E38, E39	IC DEC 7417	1909929	25
2	E31, E28	IC DEC 7416	1909928	24
3	E10, E18, E34	IC DEC 8242	1909712	23
1	E29	IC DEC 8331	1909705	22
1	E21	IC DEC 314	1909704	21
2	E4, E7	IC DEC 7404	1909686	20
4	E12, E26, E30, E22	IC DEC 8251	1909694	19
1	E1	IC DEC 384	1909486	18
3	E6, E23, E16	IC DEC 74H11	1909267	17
1	E5	IC DEC 74H10	1909057	16
1	E25	IC DEC 74H00	1909056	15
2	E14, E15	IC DEC 7402	1909004	14
5	E35, E19, E36, E27, E11	IC DEC 7401	1905590	13
1	E24	IC DEC 7410	1905576	12
3	E8, E2, E20	IC DEC 7400	1905575	11
1	E3	IC DEC 7474	1905547	10
2	E40, E37	IC DEC 4008 TRANSISTOR PACK	1510015	9
2		HANDLE, FLIP CHIP-MAGENTA	9008337-06	8
4		EYELET (GS4-11)	9006750	7
2		SPACER (CABLE CLAMP)	1202704	6
A/R		GRIPLET	1210244	5
		ETCHED CIRCUIT BOARD	5010112	4
REF		MODULE ECO HISTORY	B-MH-M8321-0-6	3
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M8321-0-5	2
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8321-0-4	1

PARTS LIST

ETCH BOARD REV C

FIRST USED ON OPTION MODEL: TM8-E

DEC NO.	EIA NO.
D662	1N645
D664	1N3606

SEMICONDUCTOR CONVERSION CHART

CHANGE NO. | REVISIONS | ORIGINATED

DRN E. Wilson DATE 5/12/72
CHK'D DATE
ENG DATE
PROJ. ENG DATE

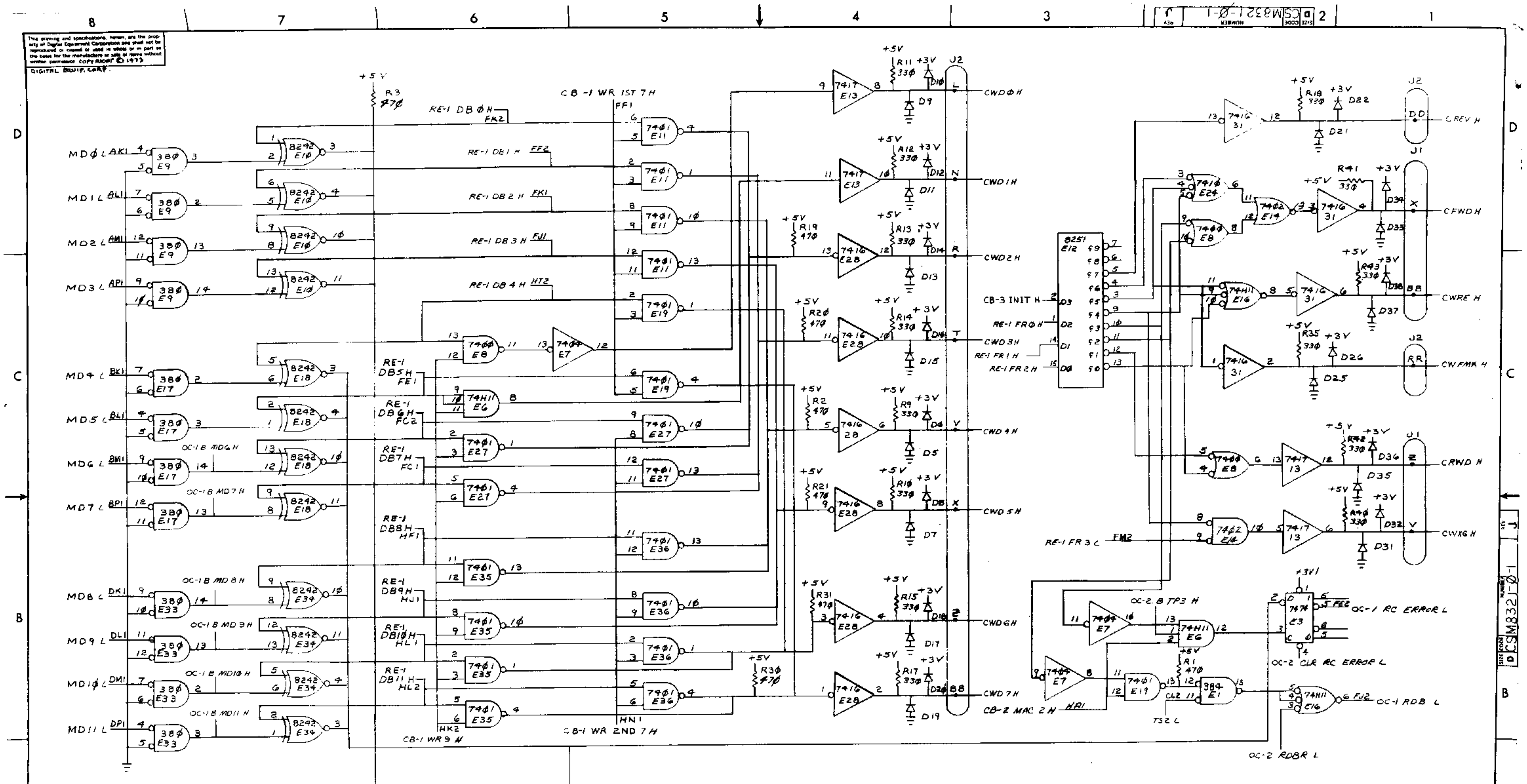
digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE: OUTPUT CONTROL TM8-E

NEXT HIGHER ASSY: B-DD-TM8-E

SIZE D | CODE CS | NUMBER M8321-Ø-1 | REV. J

SHEET 1 OF 3



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS .XXX ± .005 .XX ± .02 .X ± .1 — ANGLES ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL — / —
FINISH — / —

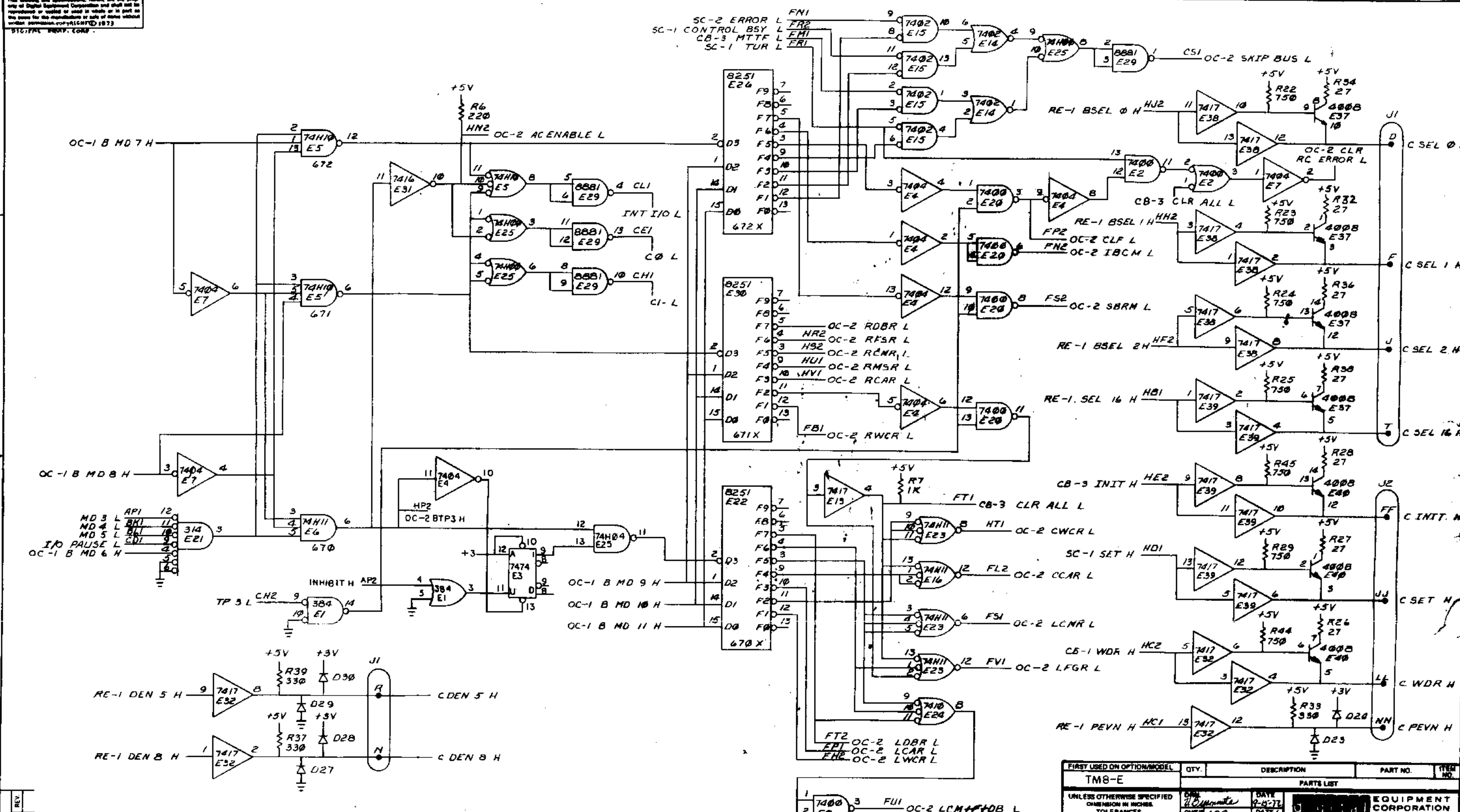
DRN F. Wilson DATE 4/5/72
CHKD DATE 10/4/72
ENG. DATE
PROJ. ENG. DATE
PROD. DATE

NEXT HIGHER ASSY B-DD-TM8-E
SCALE NONE
SHEET 2 OF 3

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE OUTPUT CONTROL TM8E (OC-1)

SIZE D CODE CS NUMBER M8321-0-1 REV. U



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E				

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES

DECIMALS: XXX = .005, .XX = .02, .X = .1 — ANGLES: ±0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY

MATERIAL

FINISH

NEXT HIGHER ASSY: B-DD-TM8-E

SCALE

SHEET 3 OF 3

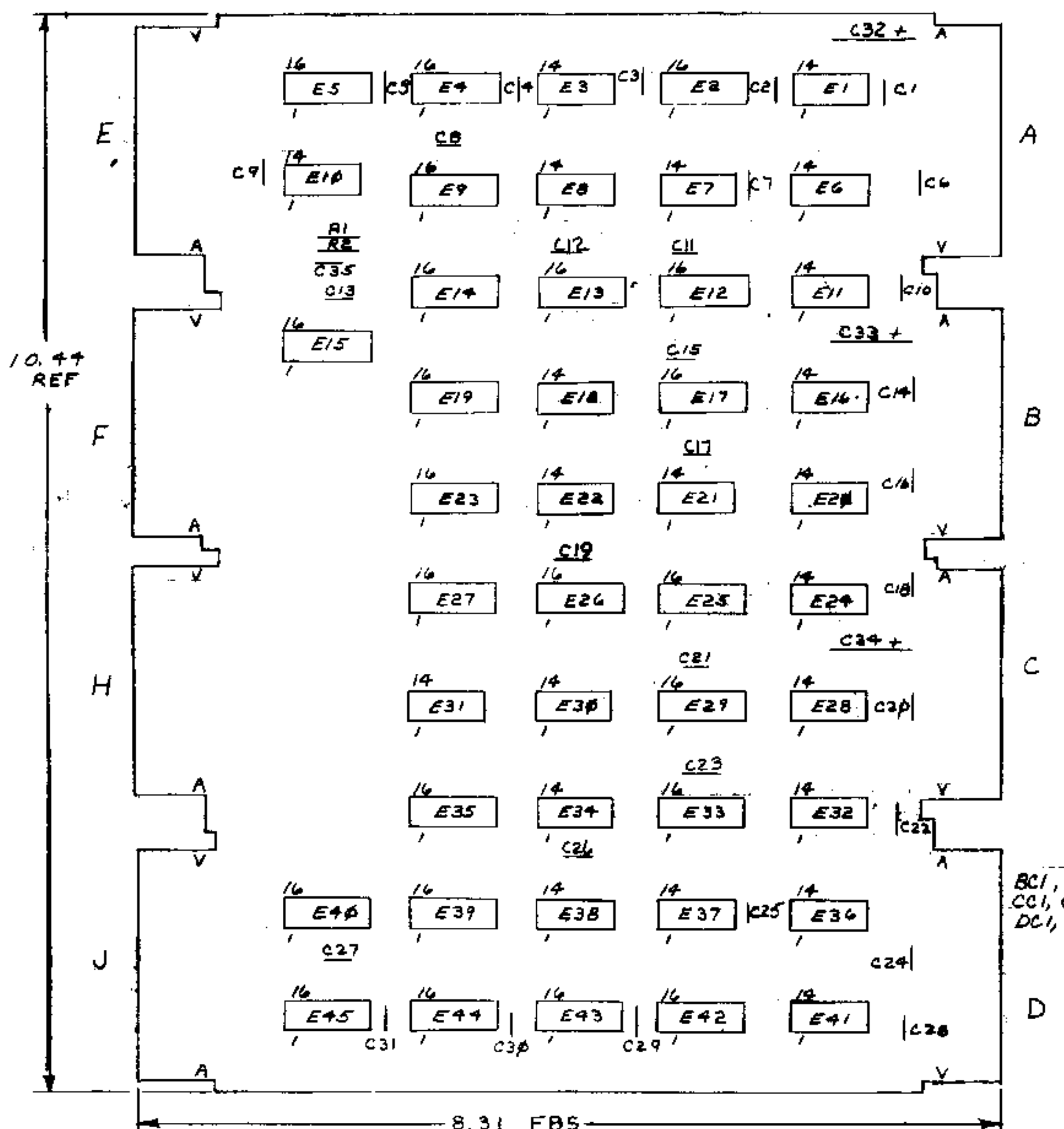
[redacted] EQUIPMENT CORPORATION

TITLE: OUTPUT CONTROL TM8-E (CC-2)

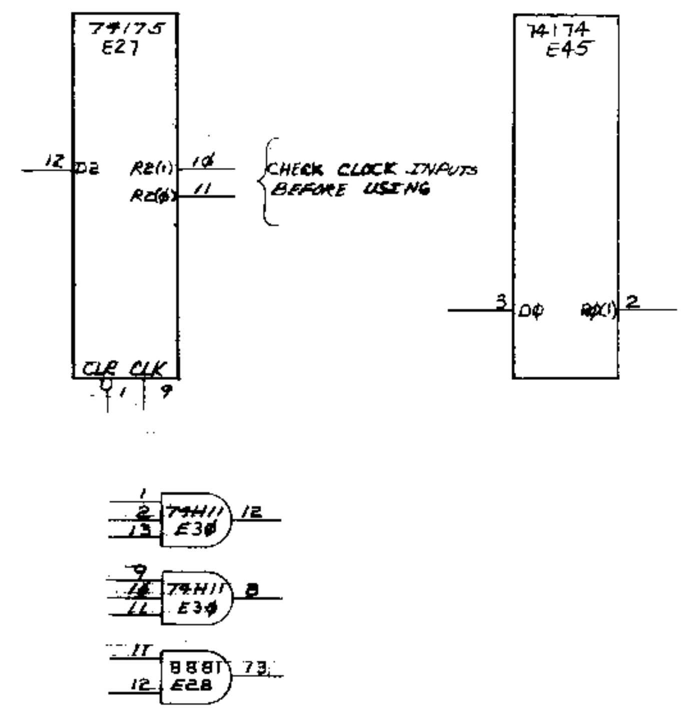
SIZE: D CODE: CS NUMBER: M8321-Ø-1 REV: J

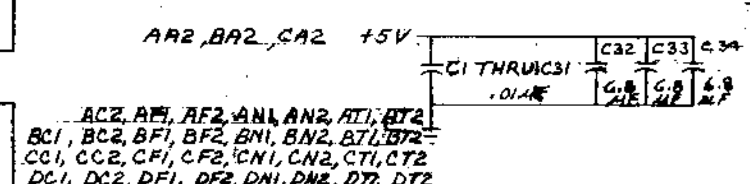
NOTES:

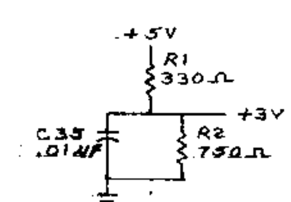
1. UNLESS OTHERWISE NOTED RESISTANCE IS IN Ω AND CAPACITANCE IS IN MICROFARADS
CAPS WITHOUT VALUE NOTED ARE .01MFD



SPARES







QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
A/R		WIRE 30 AWG-KYNAR INS.	9105740-44	19
32	C1 THRU C31, C35	CAP .01 MF 100V 20%	1001610	18
3	C32, C33, C34	CAP 6.8 MF 35V 20%	1000067	17
1	R2	RES 750 1/4W 5%	1301401	16
1	R1	RES 330 1/4W 10%	1300293	15
5	E2, E19, E39, E44, E45	IC DEC 74174	1910652	14
3	E14, E15, E27	IC DEC 74175	1910651	13
7	E3, E8, E18, E22, E31, E34, E38	IC DEC 74197	1910035	12
6	E12, E13, E25, E26, E42, E43	IC DEC 74153	1909937	11
9	E2, E4, E5, E17, E23, E29, E33, E35, E40	IC DEC 8235	1909935	10
4	E1, E16, E28, E32	IC DEC 8881	1909708	9
3	E7, E21, E37	IC DEC 7404	1909686	8
6	E6, E11, E20, E24, E36, E41	IC DEC 380	1909485	7
1	E30	IC DEC 74H11	1909267	6
1	E10	IC DEC 7495	1909055	5
		ETCHED CIRCUIT BOARD	5010103	4
		MODULE ECO HISTORY	B-MH-M8327-0-6	3
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M8327-0-5	2
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8327-0-4	1

PARTS LIST

IC TYPE	GND	+5V
IC DEC 74174	8	16
IC DEC 74153	8	16
IC DEC 8235	8	16
IC DEC 380	1	8

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

FIRST USED ON OPTION MODEL: TM8-E

ETCH BOARD REV: B C

REVISIONS: ORIGINATED A; M8327-00002 C; M8327-00003 D

SEMICONDUCTOR CONVERSION CHART (DEC NO. / EIA NO.)

DRN: E. Wilson — DATE 5/2/72

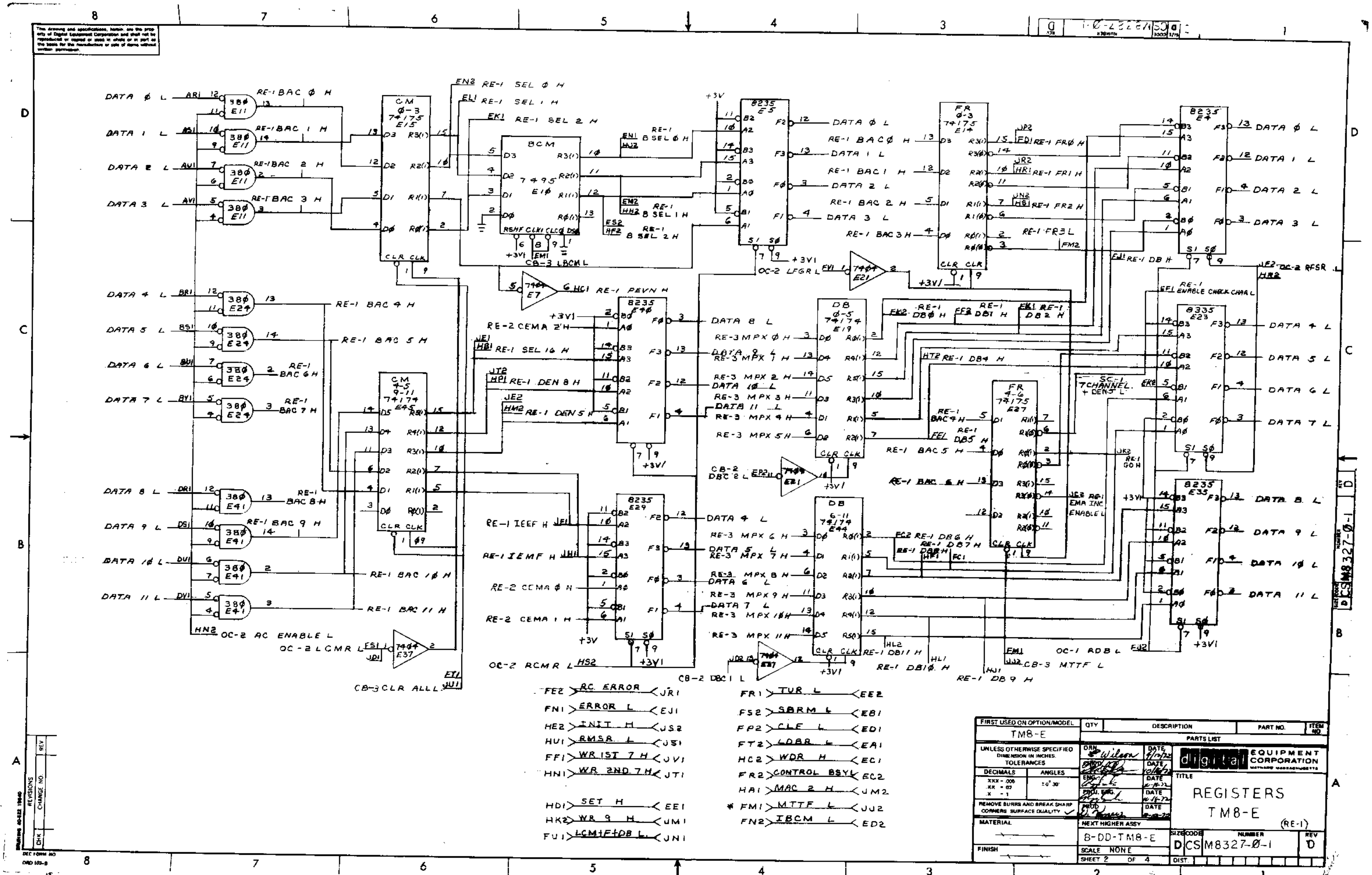
NEXT HIGHER ASSY: B-DD-TM8-E

SCALE: NONE — SHEET 1 OF 4

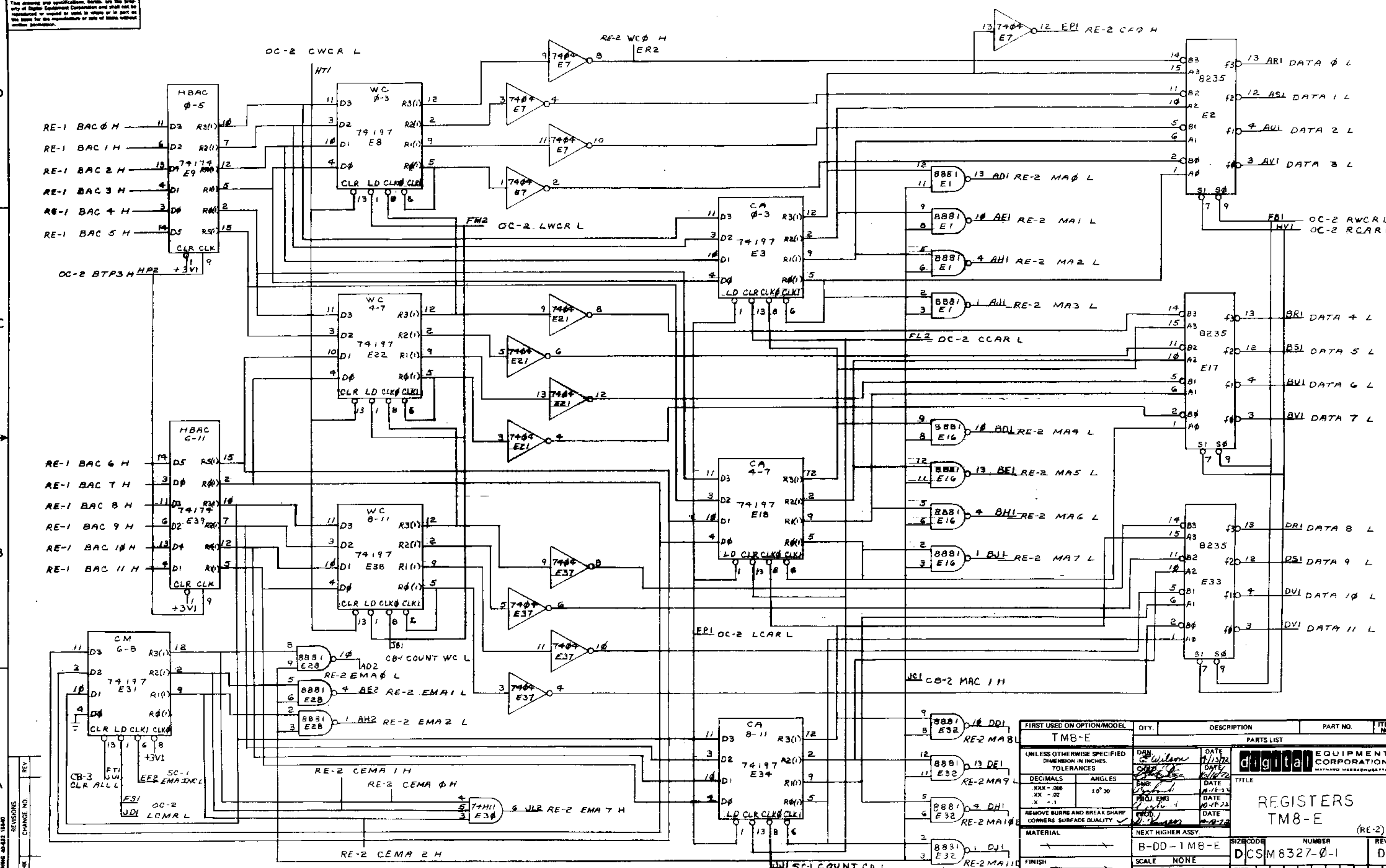
DIGITAL EQUIPMENT CORPORATION, MAYNARD MASSACHUSETTS

TITLE: TM8-E REGISTERS

SIZE D — CODE CS — NUMBER M8327-0-1 — REV. D



REGISTERS
TM8-E
(RE-1)
TM8-E
B-DD-TM8-E
D CS M8327-Ø-1
REV D
SCALE NONE
SHEET 2 OF 4
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY
FIRST USED ON OPTION/MODEL
NEXT HIGHER ASSY
PARTS LIST
digital EQUIPMENT CORPORATION



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES

DECIMALS	ANGLES
.XXX ± .005 .XX ± .02 .X ± .1	± 0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL

FINISH

DRN. C. Wilson DATE 9/13/72
CHKD. DATE 10/11/72
ENG. DATE 10-16-72
PROJ. ENG. DATE 10-17-72
PROD. DATE 10-18-72

NEXT HIGHER ASSY. B-DD-TM8-E

SCALE NONE

SHEET 3 OF 4

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE REGISTERS TM8-E (RE-2)

SIZE D CODE CS NUMBER M8327-∅-1 REV. D

DIST.

REVISIONS: REV | CHANGE NO. | CHK

DEC FORM NO DRD 102-B

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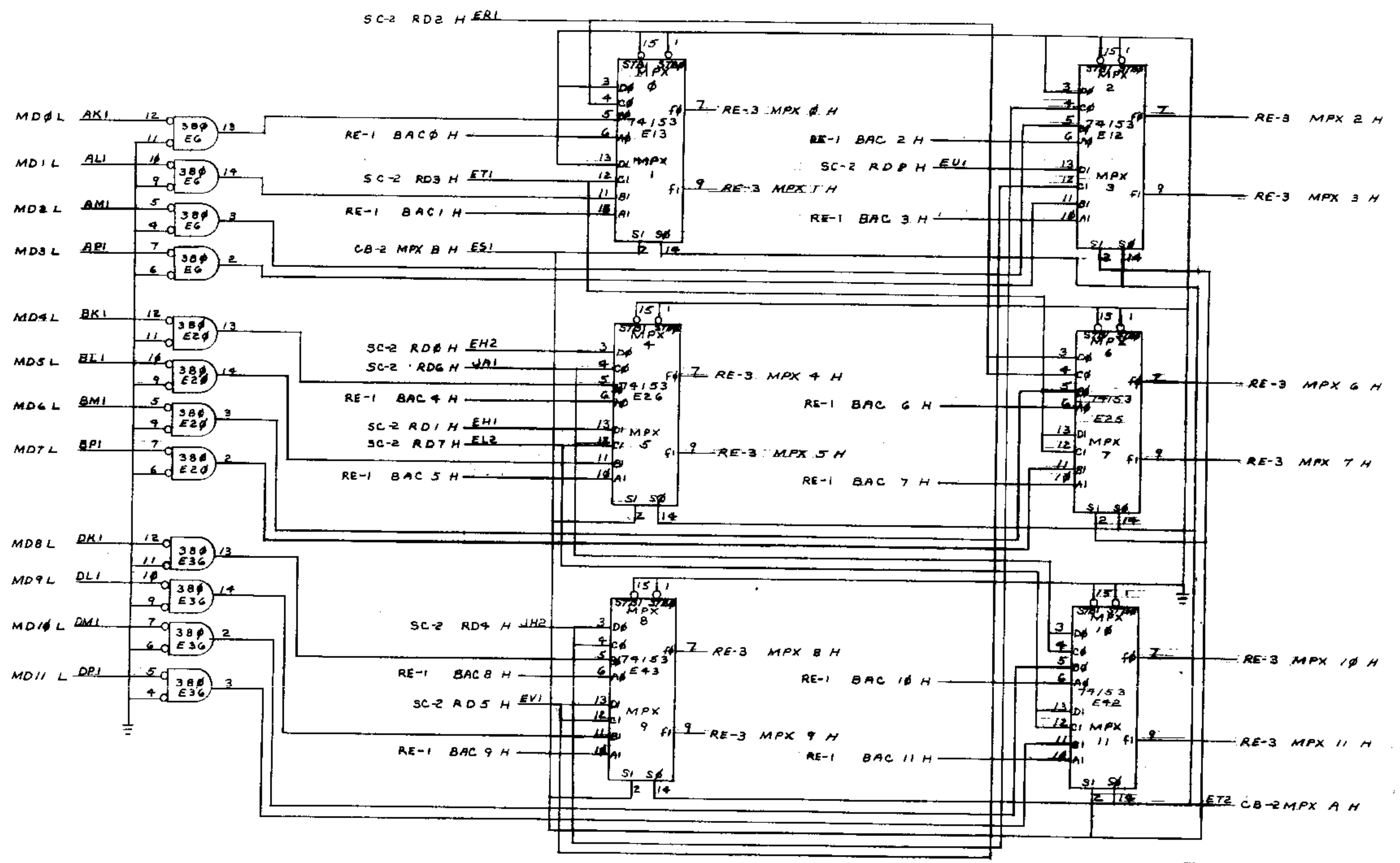
NOTE: FORM CB

MPX	PIN 2	PIN 14
MPX	B	A
LOAD DB	L	L
WRITE	L	H
R7 cH	H	L
R9 cH	H	H



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS .XXX ± .005, .XX ± .02, .X ± .1 — ANGLES ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE: REGISTERS TM8-E (RE-3)

NEXT HIGHER ASSY.: B-DD-TM8-E

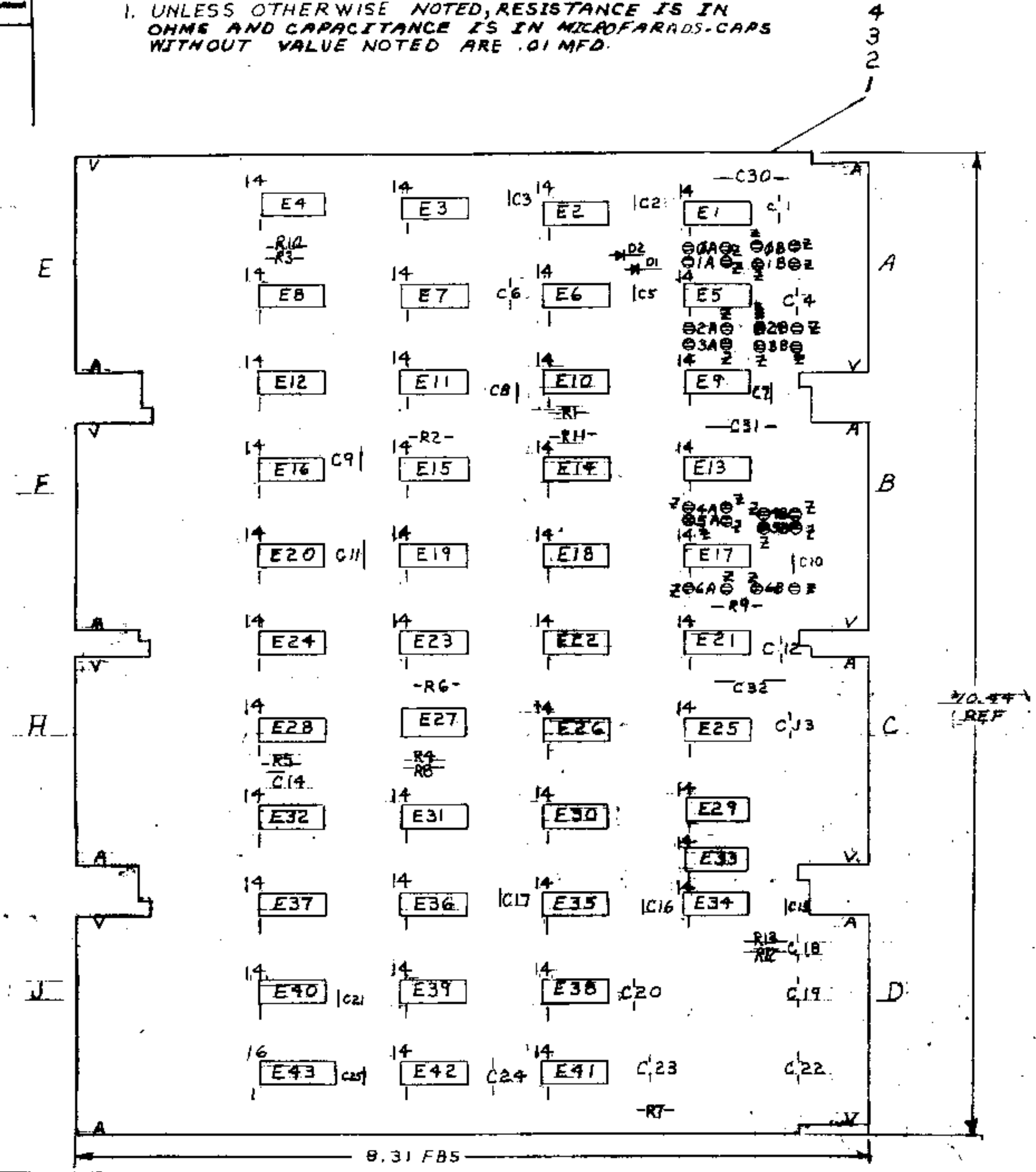
SIZE: D CODE: CS NUMBER: M8327-Ø-1 REV.: D

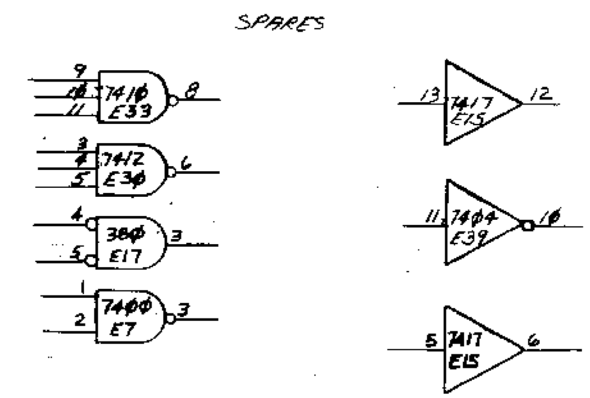
SCALE: NONE SHEET 4 OF 4

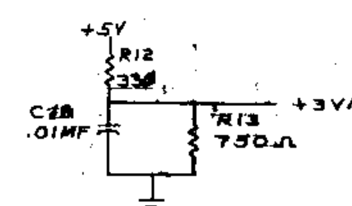
D CS M8327-Ø-1 D

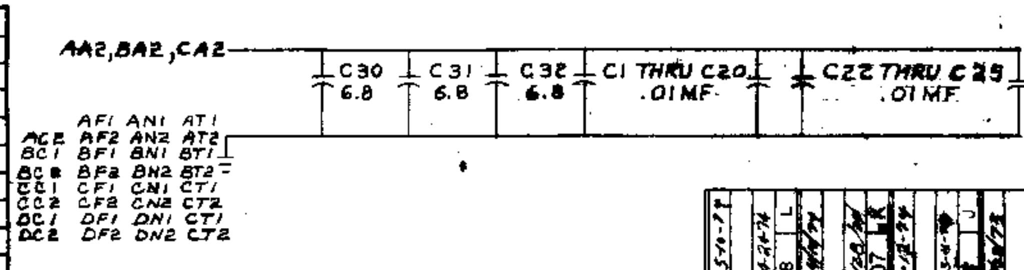
NOTES:

1. UNLESS OTHERWISE NOTED, RESISTANCE IS IN OHMS AND CAPACITANCE IS IN MICROFARADS - CAPS WITHOUT VALUE NOTED ARE .01 MFD.









IC TYPE	GND	+ 5V
IC DEC 8251	8	16
IC DEC 314	1	8
IC DEC 384	1	8
IC DEC 380	1	8

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
2	D1, D2	DIODE D664	1100114	32
1	R1	RES 1.5K, 1/4 5%	1300391	31
A/R		WIRE 30 AWG KYNAR INS	9105740-44	30
A/R		INSULATED JUMPER L-2007	9009185	29
3	C30, C31, C32	CAP 6.8UF 35V 20% STANT	1000067	28
25	C1 THRU C25	CAP .01UF 100V 20% DISC	1001610	27
1	R13	RES 750 1/4 5%	1301401	26
10	R2 THRU R11	RES 470 1/4 10%	1300317	25
1	R12	RES 330 1/4 10%	1300293	24
~~1~~	~~R2~~	~~RES 220 1/4 10%~~	~~1300275~~	~~23~~
1	E43	IC DEC 8251	1909594	22
2	E22, E26	IC DEC 74H74	1909667	21
1	E30	IC DEC 7412	1909955	20
1	E15	IC DEC 7417	1909929	19
1	E4	IC DEC 8242	1909712	18
3	E13, E29, E34	IC DEC 8881	1909705	17
1	E9	IC DEC 314	1909704	16
3	E12, E18, E39	IC DEC 7404	1909686	15
1	E25	IC DEC 384	1909486	14
3	E5, E16, E17	IC DEC 380	1909485	13
6	E2, E20, E21, E28, E38, E41	IC DEC 74H11	1909267	12
1	E31	IC DEC 74H21	1909058	11
2	E6, E36	IC DEC 7402	1909004	10
2	E14, E27	IC DEC 7401	1905590	9
3	E19, E33, E37	IC DEC 7410	1905576	8
4	E7, E11, E32, E42	IC DEC 7400	1905575	7
8	E1, E3, E8, E10, E23, E24, E35, E40	IC DEC 7474	1905547	6
28		SPLIT LUGS	9006735	5
1		ETCHED CIRCUIT BOARD	5010105	4
REF		MODULE ECO HISTORY	B-MH-M8322-0-0	3
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M8322-0-5	2
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8322-0-4	1

PARTS LIST

FIRST USED ON OPTION MODEL: TM8-E

ETCH BOARD REV: E

REVISIONS: ORIGINATED; M8322-00002; M8322-00003; M8322-00004; M8322-00005; M8322-00006; M8322-00007; M8322-00008 (G. LORD, KOWALSKI)

SEMICONDUCTOR CONVERSION CHART (DEC NO. / EIA NO.)

DRN DATE 5/10/72

NEXT HIGHER ASSY: B-DD-TM8-E

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE: CONTROL & BREAK TM8-E

SIZE D CODE CS NUMBER M8322-Ø-1 REV L

SHEET 1 OF 4

SC-1 SET H
CB-1 R+RC SET H
CB-1 WCOV H
RE-1 GO H
RE-1 ENABLE CHECK CHAR L
RE-2 WC Ø H
CB-3 CLR STATUS L
CB-1 WCOV L
CB-1 R+RC W
CB-1 OVER L
CB-2 MRC ACC L
CB-1 FINISH L
SC-1 DATA LATE L
CB-1 WRITE H
CB-1 SET WRITE L
CB-1 R+RC+WR L
OC-2 SBRM L
CB-1 R9CH L
CB-1 R2ND7 L
CB-1 BRK RQST H
SC-2 ERROR L
CB-1 ERROR H
SC-1 WRS L
CB-1 R+RC+WR L
CB-1 R+RC+WR+WFM L
SC-1 RDS+R+RC H
CB-1 SPACE H
SC-1 FM L
CB-1 R+RC+SP FWD H
CB-1 WRS H
CB-1 R IST 7 L
CB-1 STATUS L
CB-1 R 2ND 7 L
CB-1 R 9 CH L
CB-1 WR IST 7 H
CB-1 WR 2ND 7 H
CB-1 WR 9 H
+3V
SC-1 7 CHANNEL+DENS L
CB-1 WRITE H
CB-1 REWIND H
CB-17 CHANNEL+DENS H
CB-3 BTP4 H
CB-3 REWINDING H
CB-1 REWINDING-CHG TRANS L
+5V
CB-1 SP REV L
CB-1 WRITE L
CB-1 READ L
CB-1 REWIND L
CB-1 OFF LINE L
RE-1 BRB H
RE-1 ER1 H
RE-1 ER2 H
CB-1 SET WRITE L
CB-1 WCOV L
CB-1 WRS H
RE-1 GO H
SC-1 DATA LATE L
SC-2 ERROR L
SC-1 7 CHANNEL+DENS L
RE-1 SEL 16 H
FOR FUTURE USE
OC-2 SBRM L
SC-2 BLRCS L
CB-1 SPACE H
SC-1 FM L
CB-2 MRC ACC L
CB-1 COUNT WC L
CB-1 OVER L
SC-1 PRESET H
SC-1 RECORD LENGTH INCORRECT H
CB-3 CLR ALL L
CB-1 FINISH L
CB-1 WDR H
EC2 CONTROL BSY L FT2
EP1 CAØ H FK2
EH2 RD Ø H FP2
EH1 RD 1 H FM2
ER1 RD 2 H FJ2
ET1 RD 3 H FH2
JH2 RD 4 H HL2
EV1 RD 5 H FF2
JA1 RD 6 H HR2
EL2 RD 7 H FL2
JS1 RM SR L HD2
EU1 RDP H FE2
EF2 EMA INC L FR2
JC2 EMA INC ENABLE L HP2
JL2 EMA 7 H HH2
UF2 RES R L HM2
JN1 LCM+F+DB L HF2
EK2 FN2
JE2 DEN 5 H HN2
ED2 ICBM L FS2
JT2 DEN 8 H HC2
JR1 RC ERROR L HE2
JJ1 COUNT CAL HJ2

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS: XXX = .005, XX = .02, X = .1; ANGLES: ±0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY
MATERIAL
FINISH

DRN E. Wilson 4/21/72
SPEC'D
ENG
PROJ. ENG
MFG
DATE 4/21/72, 5/16/72, 10-17-72, 11-11-72, 10-27-72

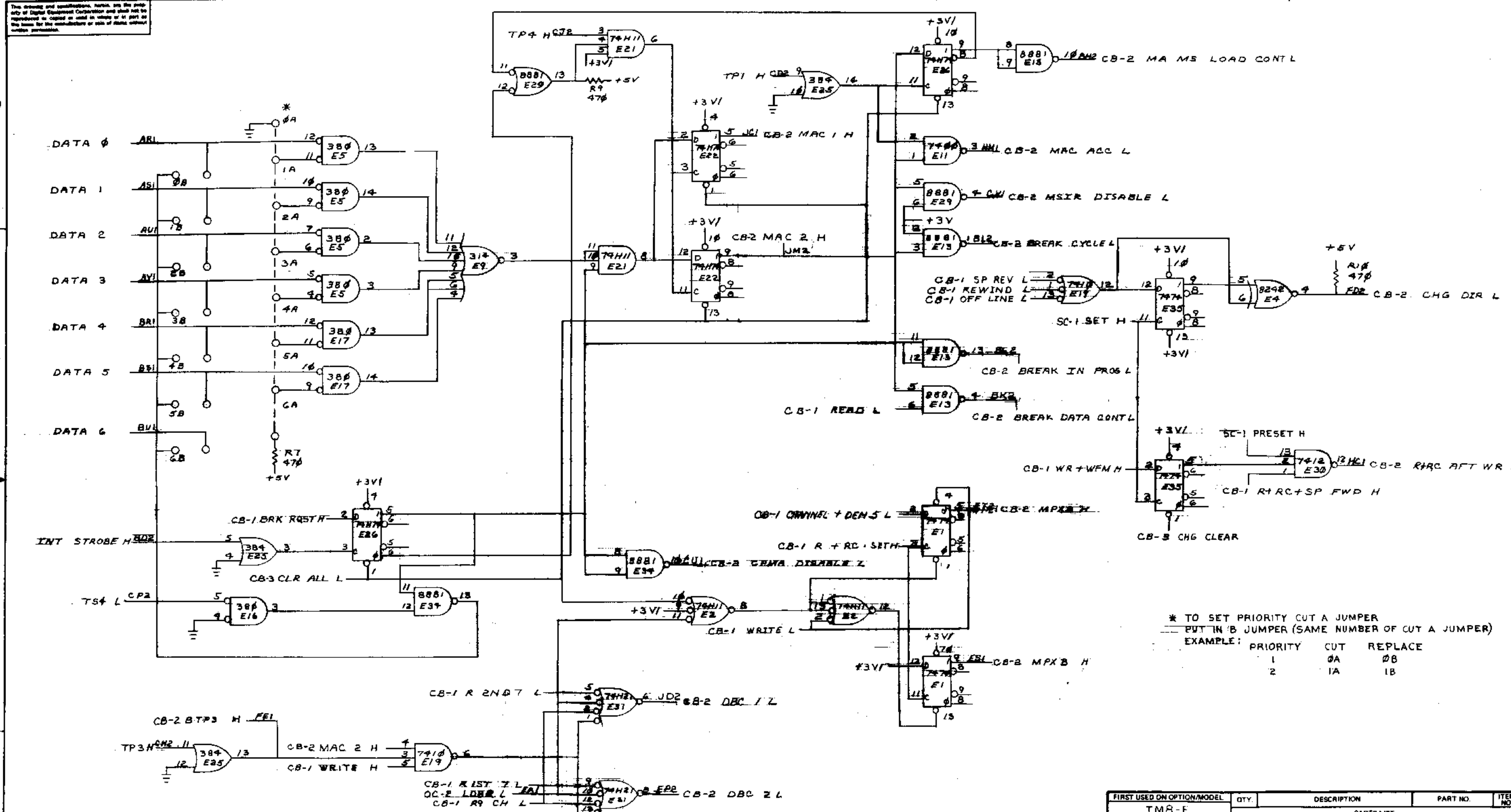
digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE: CONTROL & BREAK TM8-E (CB-1)

NEXT HIGHER ASSY. B-DD-TM8-E
SIZE D CODE DCSM8322-Ø-1 REV. L
SCALE NONE
SHEET 2 OF 4
DIST.

REVISIONS: REV. / CHANGE NO / CHK

DEC FORM NO DRD 183-B



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
DECIMALS .XXX ± .005 .XX ± .02 .X ± .1 — ANGLES ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL — FINISH —

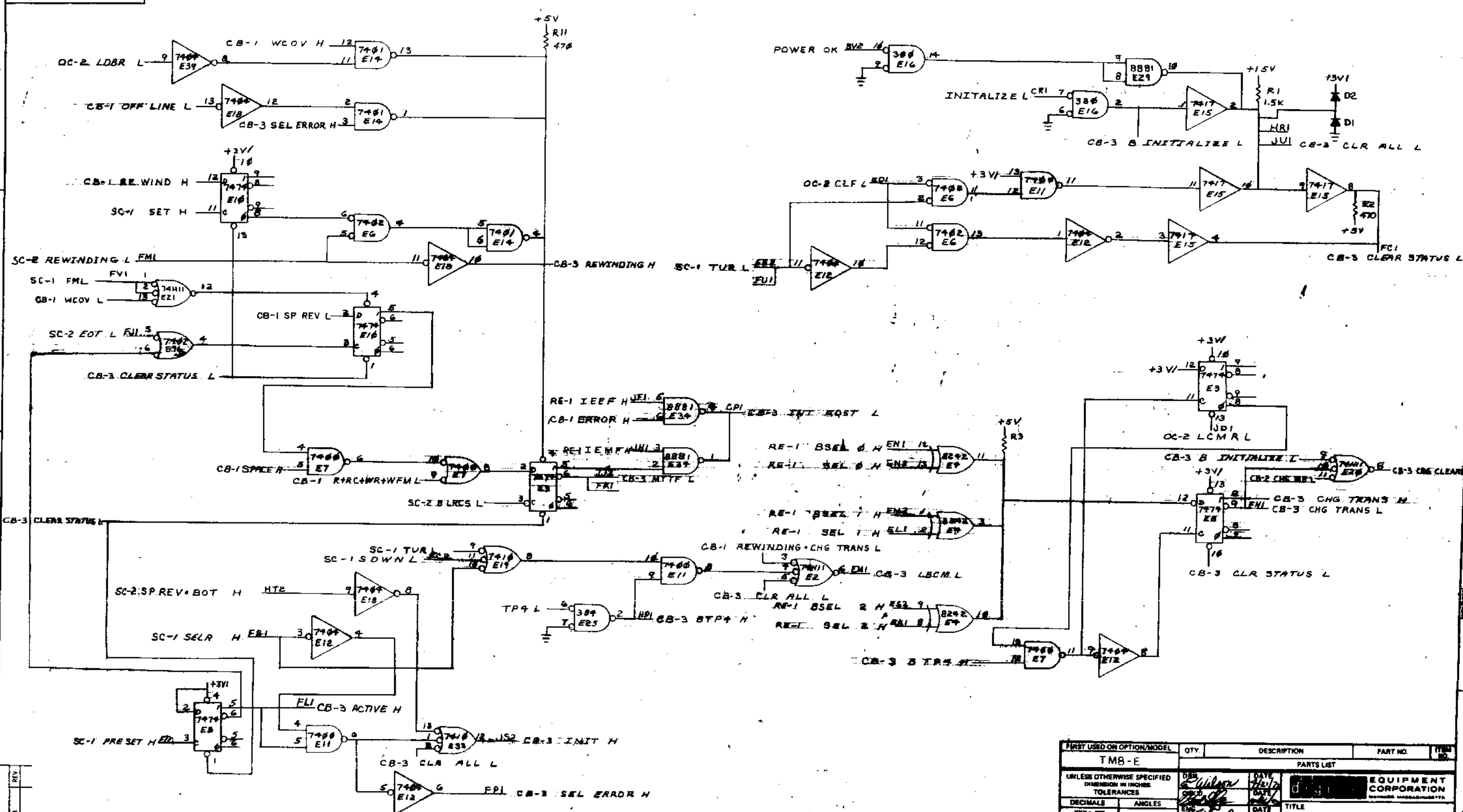
digital EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS

TITLE: CONTROL & BREAK TM8-E (CB-2)

NEXT HIGHER ASSY. B-DD-TM8-E

SIZE D CODE CS NUMBER M8322-Ø-1 REV. L

SCALE NONE SHEET 3 OF 4



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
DECIMALS .XXX ± .005 .XX ± .02 .X ± .1 — ANGLES ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

[redacted] EQUIPMENT CORPORATION

TITLE: CONTROL & BREAK TM8-E (CB-3)

NEXT HIGHER ASSY. B-DD-TM8-E
SCALE NONE
SHEET 4 OF 4

SIZE D — CODE CS — NUMBER M8322-0-1 — REV. L

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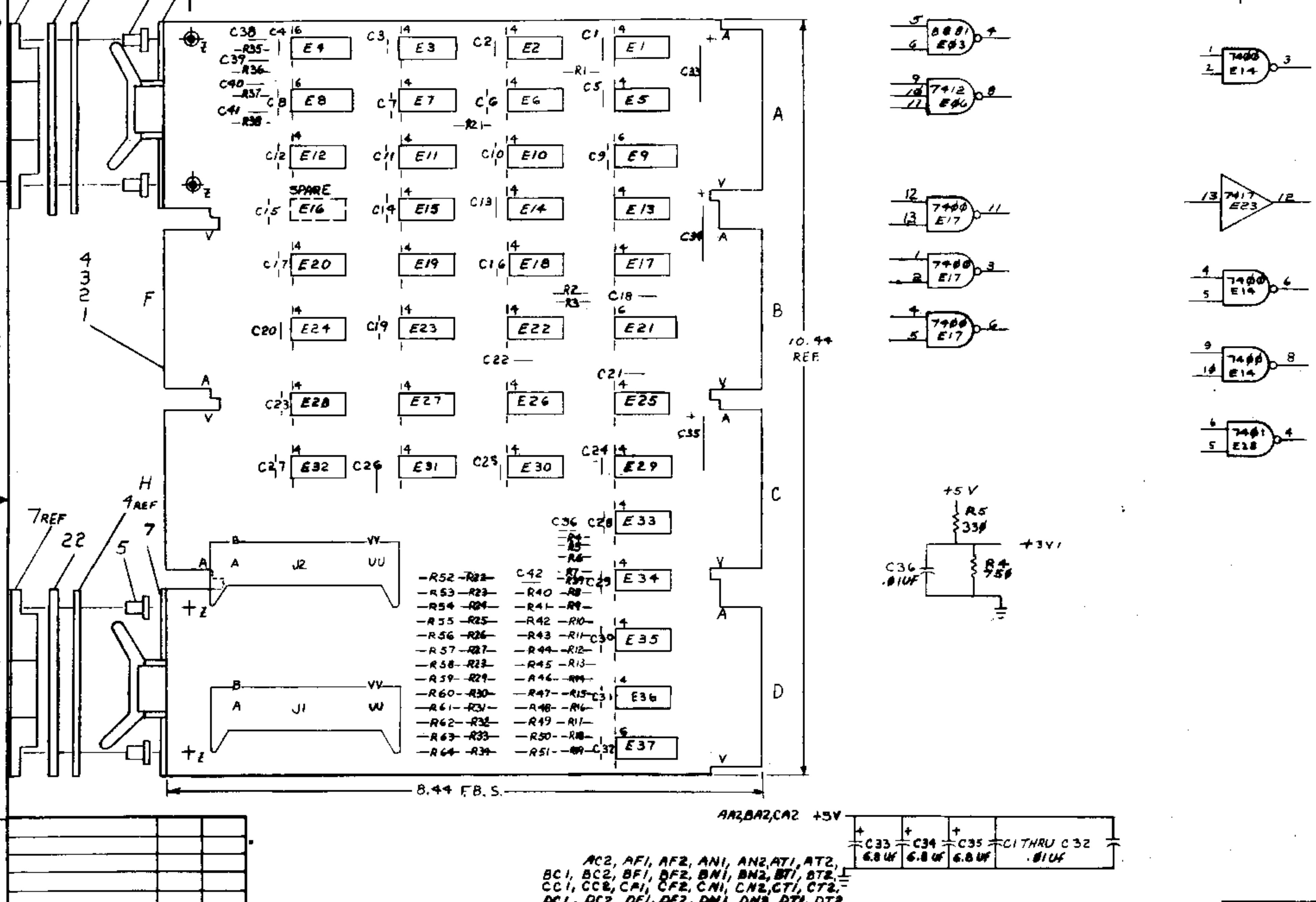
NOTES:

1. UNLESS OTHERWISE STATED ALL RESISTORS ARE 220 Ω 1/4 W. ALL RESISTANCE IS IN OHMS.
2. CAPACITANCE IS IN MICROFARADS CAPS WITHOUT VALUE NOTED ARE .01 MFD.
3. GROUND PINS J' AND TT ON CONNECTOR J2. L, N, AND NN ON J1.



QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
1	C40	CAP. .1 Uf, 50v, 10%, CER	1010978-36	39
1	C41	CAP. 270PF 100V 5% MICA	1000022	38
25	R8-R19, R22-R34	RES. 120 1/4 10%	1301418	37
A/R		WIRE 30 AWG KYNAR INS	9105740-44	36
1	C39	CAP. 1000PF 100V 5% MICA	1000042	35
1	C38	CAP. 15 PF 100V 5% D.M	1000007	34
25	R40 THRU R64	RES 220 1/4 10%	1300275	33
1	R36	RES. 8.2K 1/4 10%	1301316	32
1	R37	RES 20K 1/4 5%	1302391	31
1	R38	RES 10K 1/4 10%	1300481	30
1	R35	RES. 4.7K 1/4 10%	1300448	29
1	R4	RES. 750 1/4 5%	1301401	28
6	R1, R2, R3, R6, R7, R21	RES. 470 1/4 10%	1300317	27
1	R5	RES. 330 1/4 10%	1300293	26
				25
1	R39	RES 47 1/4 10%	1300204	24
2	J1, J2	40 PIN RIGHT ANGLE HEADER	1209941	23
2		MOUNT SPACER	1202704	22
2	E27, E33	IC DEC 7402	1909004	21
2	E4, E8	IC DEC 74123	1910436	20
1	E6	IC DEC 7412	1909955	19
3	E9, E21, E37	IC DEC 8235	1909935	18
1	E23	IC DEC 7417	1909929	17
3	C33, C34, C35	CAP 6.8 MF 35V 20% S. TANT	1000067	16
1	E3	IC DEC 8881	1909705	15
4	E19, E24, E31, E32	IC DEC 7404	1909686	14
3	E10, E20, E25	IC DEC 74H11	1909267	13
1	E28	IC DEC 7401	1905590	12
1	E22	IC DEC 7430	1905578	11
1	E29	IC DEC 7410	1905576	10
5	E5, E14, E17, E18, E30	IC DEC 7400	1905575	9
11	E1, E2, E7, E11, E12, E13, E15, E26, E34, E35, E36	IC DEC 7474	1905547	8
2		HANDLE, FLIPCHIP MAGENTA	9008337-06	7
34	C1 THRU C32, C36, C42	CAP. .01 UF 100 V 20% DISC	1001610	6
4		EYELET	9006750	5
1		ETCHED CIRCUIT BOARD	5010111	4
REF		MODULE ECO HISTORY	B-MH-M8323-0-6	3
REF		ASSY/DRILLING HOLE LAYOUT	D-RH-M8323-0-5	2
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8323-0-4	1

PARTS LIST

ETCH BOARD REV: B C D E

IC TYPE	GND	+ 5V
IC DEC 74123	8	16
IC DEC 8235	8	16

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

FIRST USED ON OPTION MODEL: TM8-E

SEMICONDUCTOR CONVERSION CHART (DEC NO. / EIA NO.)

REVISIONS: CHANGE NO. / CHK — ORIGINATED; M8323-00001; M8323-00003; M8323-00004; M8323-00005; M8323-00006; M8323-00007; M8323-00008; M8323-00009; M8323-00010 (G. LORD, A. CZAJKOWSKI)

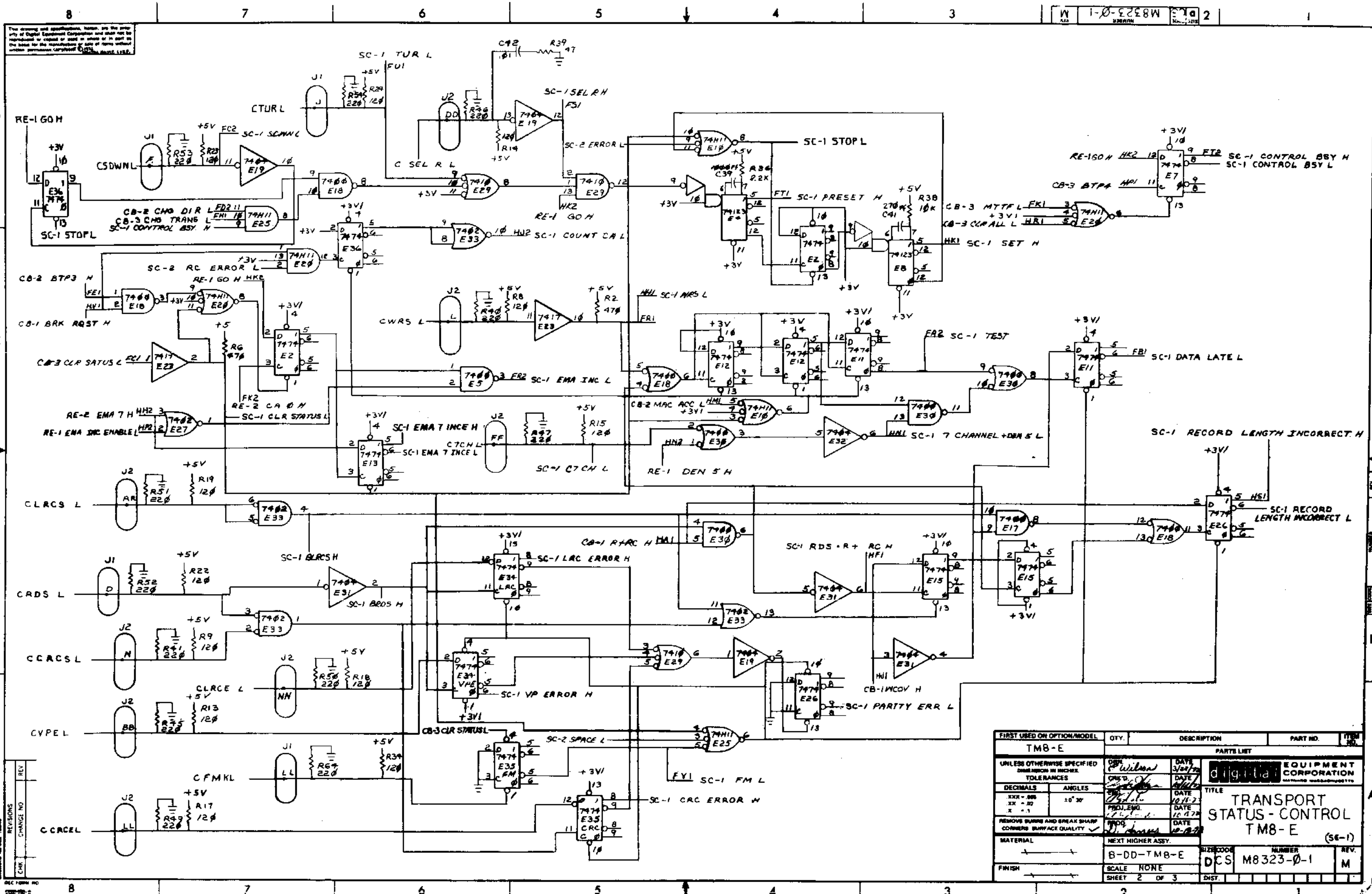
DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS

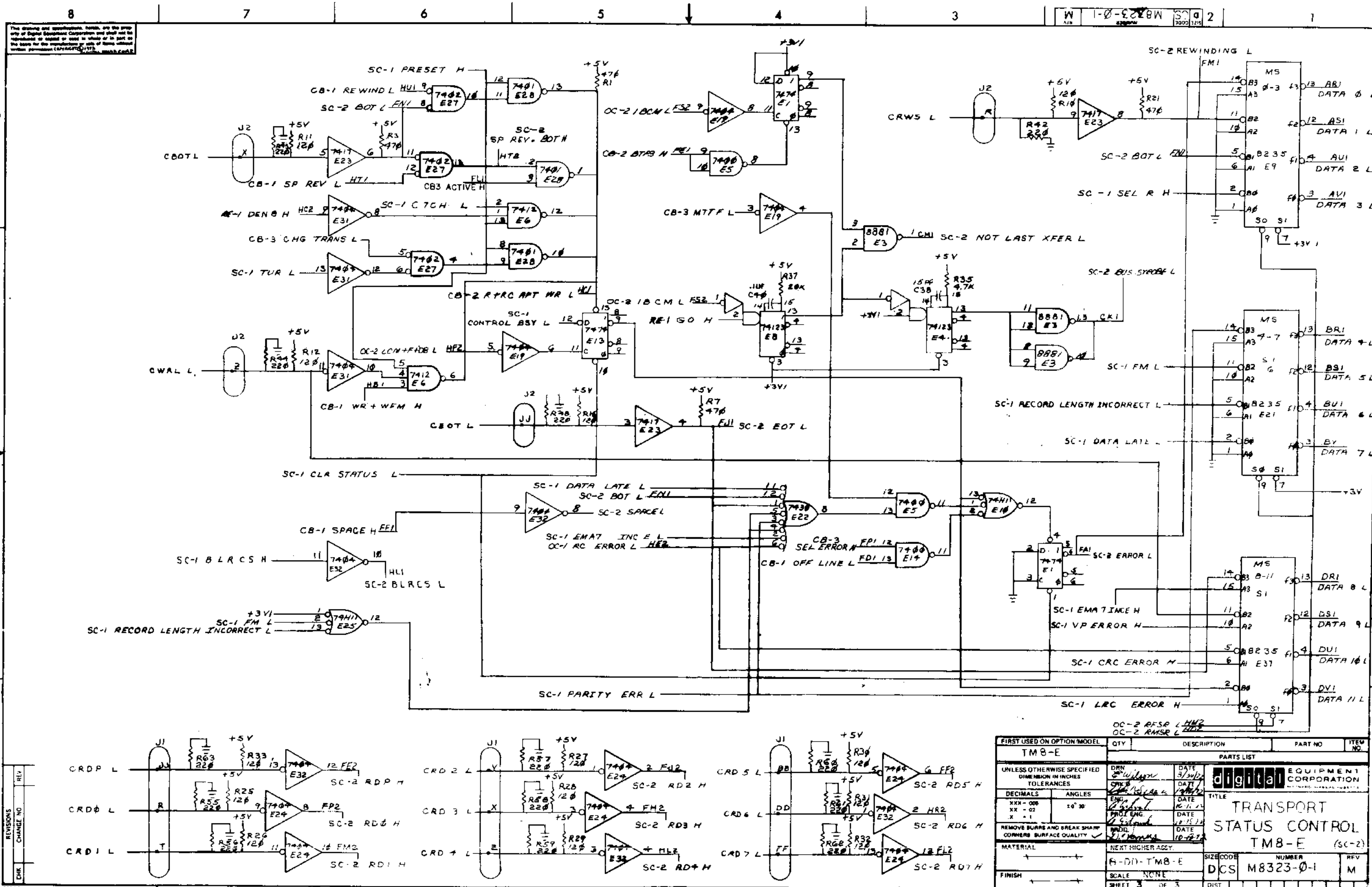
TITLE: TRANSPORT STATUS-CONTROL TM8-E

NEXT HIGHER ASSY: B-DD-TM8-E

SCALE: NONE — SHEET 1 OF 3

SIZE: D — CODE: CS — NUMBER: M8323-0-1 — REV: M


RE-1 GO H
CSDWNL
SC-1 SCMWNL
SC-1 STOPL
CTUR L
SC-1 TUR L
C SEL R L
SC-1 SEL R H
SC-2 ERROR L
SC-1 STOP L
CB-2 CHG DIR L
CB-3 CHG TRANS L
SC-1 CONTROL BSY H
RE-1 GO H
SC-1 COUNT CA L
SC-1 PRESET H
SC-1 SET H
CB-3 MTTF L
CB-3 CLR ALL L
RE-1 GO H
CB-3 BTP4
SC-1 CONTROL BSY H
SC-1 CONTROL BSY L
CB-2 BTP3 H
SC-2 RC ERROR L
CB-1 BRK RQST H
CB-3 CLR SATUS L
CWRS L
SC-1 WRS L
SC-1 EMA INC L
SC-1 TEST
SC-1 DATA LATE L
RE-2 CA 0 H
SC-1 CLR STATUS L
RE-2 EMA 7 H
RE-1 EMA INC ENABLE L
SC-1 EMA 7 INCE H
SC-1 EMA 7 INCE L
C7CH L
SC-1 C7 CH L
CB-2 MAC ACC L
SC-1 7 CHANNEL + DEN 5 L
RE-1 DEN 5 H
SC-1 RECORD LENGTH INCORRECT H
CLRCS L
SC-1 CLRCS H
CB-1 R+RC H
SC-1 RDS + R + RC H
SC-1 RECORD LENGTH INCORRECT L
CRDS L
SC-1 RDS H
SC-1 LRC ERROR H
CCRCS L
CLRCE L
SC-1 VP ERROR H
CB-1 WCOV H
SC-1 PARITY ERR L
CVPE L
CB-3 CLR STATUS L
SC-2 SPACE L
CFMK L
SC-1 FM L
CCRCE L
SC-1 CRC ERROR H
FIRST USED ON OPTION/MODEL TM8-E
digital EQUIPMENT CORPORATION
TITLE TRANSPORT STATUS - CONTROL TM8-E (SC-1)
NEXT HIGHER ASSY. B-DD-TM8-E
SIZE D CODE CS NUMBER M8323-0-1 REV. M
SCALE NONE
SHEET 2 OF 3



M8323-Ø-1
TM8-E
digital EQUIPMENT CORPORATION
TRANSPORT STATUS CONTROL TM8-E (SC-2)
D CS M8323-Ø-1 M
SCALE NONE
SHEET 3 OF 3
A-DD-TM8-E
SC-2 NOT LAST XFER L
SC-2 EOT L
SC-2 SPACE L
SC-2 BLRCS L
SC-2 ERROR L
SC-1 CLR STATUS L
SC-1 PARITY ERR L
DATA Ø L
DATA 1 L
DATA 2 L
DATA 3 L

PAGE REVISION CONTROL SHEET

SH NO.	PAGE REVISIONS		REMARKS
1	*	A	
2	*	A	
3	*	A	

ECO NO.		
ETCH REV.	A	A
ENG.		
DATE		

FIRST USED ON OPTION/MODEL: TM8-E

DRN. E. Wilson	DATE 10/16/72	
CHK'D [signature]	DATE 10/17/72	
ENG. [signature]	DATE 10/18/72	
PROJ. ENG. [signature]	DATE 10/18/72	
PROD. D. [signature]	DATE 10-18-72	

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE: TERMINATOR CARD TM8-E

NEXT HIGHER ASSY.: B-DD-TM8-E

SIZE	CODE	NUMBER	REV.
B	CS	M989-Ø-1	A

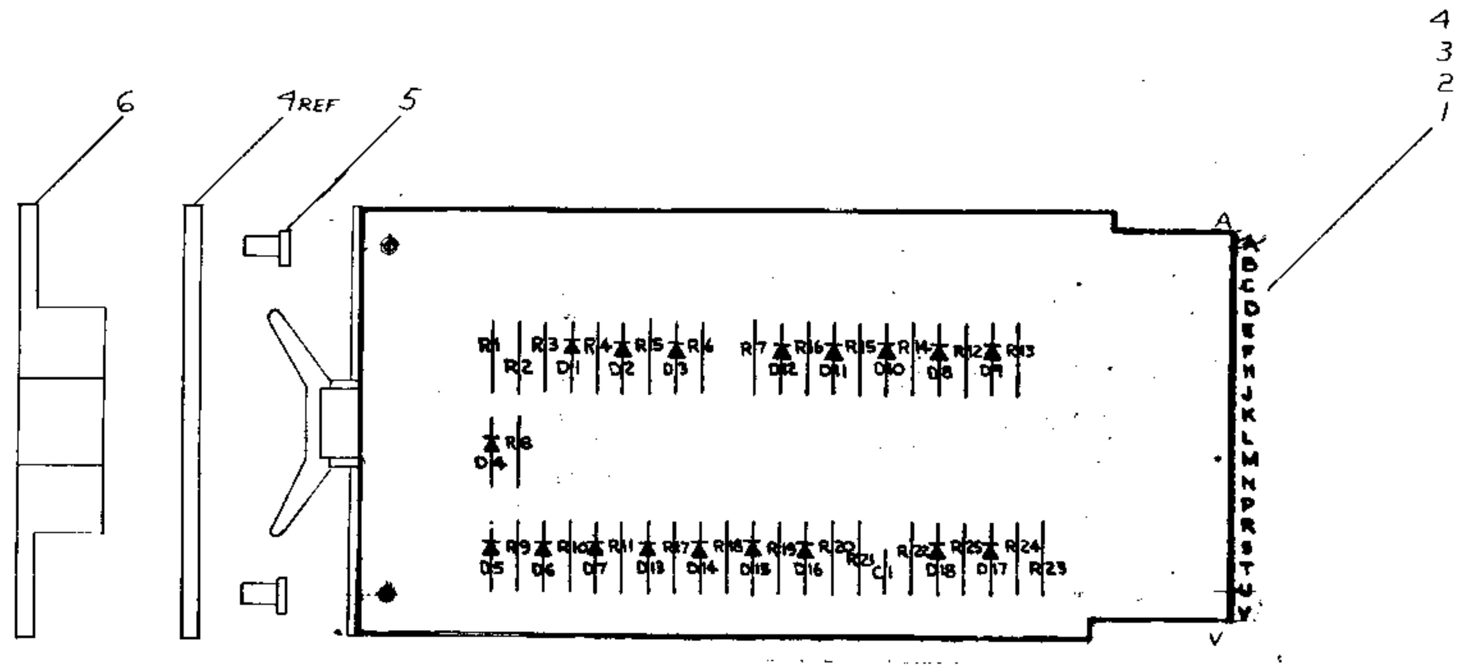
SCALE: —

SHEET 1 OF 3

DIST.

NOTES:

1. UNLESS OTHERWISE NOTED RESISTANCE IS IN OHMS CAPACITANCE IS IN PICOFARADS CAPS WITHOUT VALUE NOTED ARE .01 MFD.



QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
18	R4, R5, R6, R8 THRU R20, R24, R25	RESISTER 750Ω 1/4 5%	1301401	10
7	R1, R2, R3, R7, R21 R22, R23	RESISTER 100Ω 1/4 5%	1300229	9
18	D1 THRU D18	DIODE D664	1100114	8
1	C1	CAP. .01UF 100V 20% DISC	1001610	7
1		HANDLE FLIP CHIP MAGENTA	9008337-6	6
2		EYELET #654-7 E.B. STIMPSON	9006732	5
1		ETCHED CIRCUIT BOARD	5010147	4
REF		MODULE ECO HISTORY	B-MH-M989-0-6	3
REF		ASSY/DRILLING HOLE LAYOUT	C-AH-M989-0-5	2
REF		X-Y COORDINATE HOLE LOCATION	K-CO-M989-0-4	1

PARTS LIST

IC TYPE	GND	+ 5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY EXCEPTIONS ARE STATED ABOVE

IC PIN LOCATIONS

FIRST USED ON OPTION MODEL: TMB-E

ETCH BOARD REV: A B

DEC NO.	EIA NO.	DEC NO.	EIA NO.
		D664	IN6306

SEMICONDUCTOR CONVERSION CHART

REV	CHANGE NO.	ORIGINATED	CHK
A	M989-0001	G. LORD	

REVISIONS

DRN. E. Wilson DATE 8/1/72
CHKD. DATE 10/16/72
ENG. DATE 10/18/72
PROJ. ENG. DATE 10/18/72
PROD. DATE 10-18-72

NEXT HIGHER ASSY: B-DD-TM8-E

SCALE: NONE

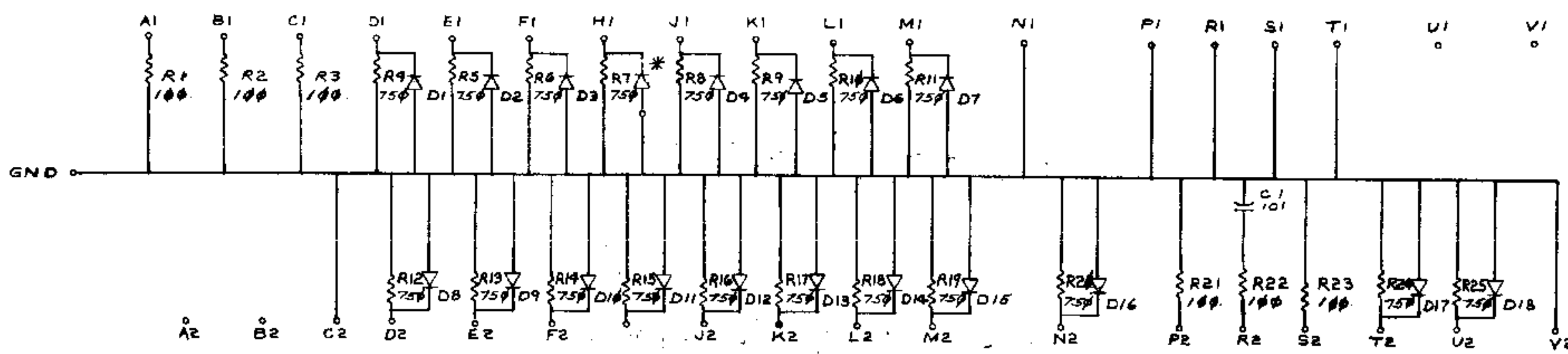
SHEET 2 OF

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE: TERMINATOR CARD TM8-E

SIZE D CODE CS NUMBER M989-Ø-1 REV. A

DIST.



NOTE:
* ETCHED FOR FUTURE DIODE

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E	PARTS LIST			

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
DECIMALS: .XXX = .005, .XX = .01, X = 1 — ANGLES: ±0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

DRN. / CHKD. / ENG. / PROJ. ENG. / PROD. — DATE
NEXT HIGHER ASSY. B-DD-TM8E
SCALE NONE
SHEET 3 OF

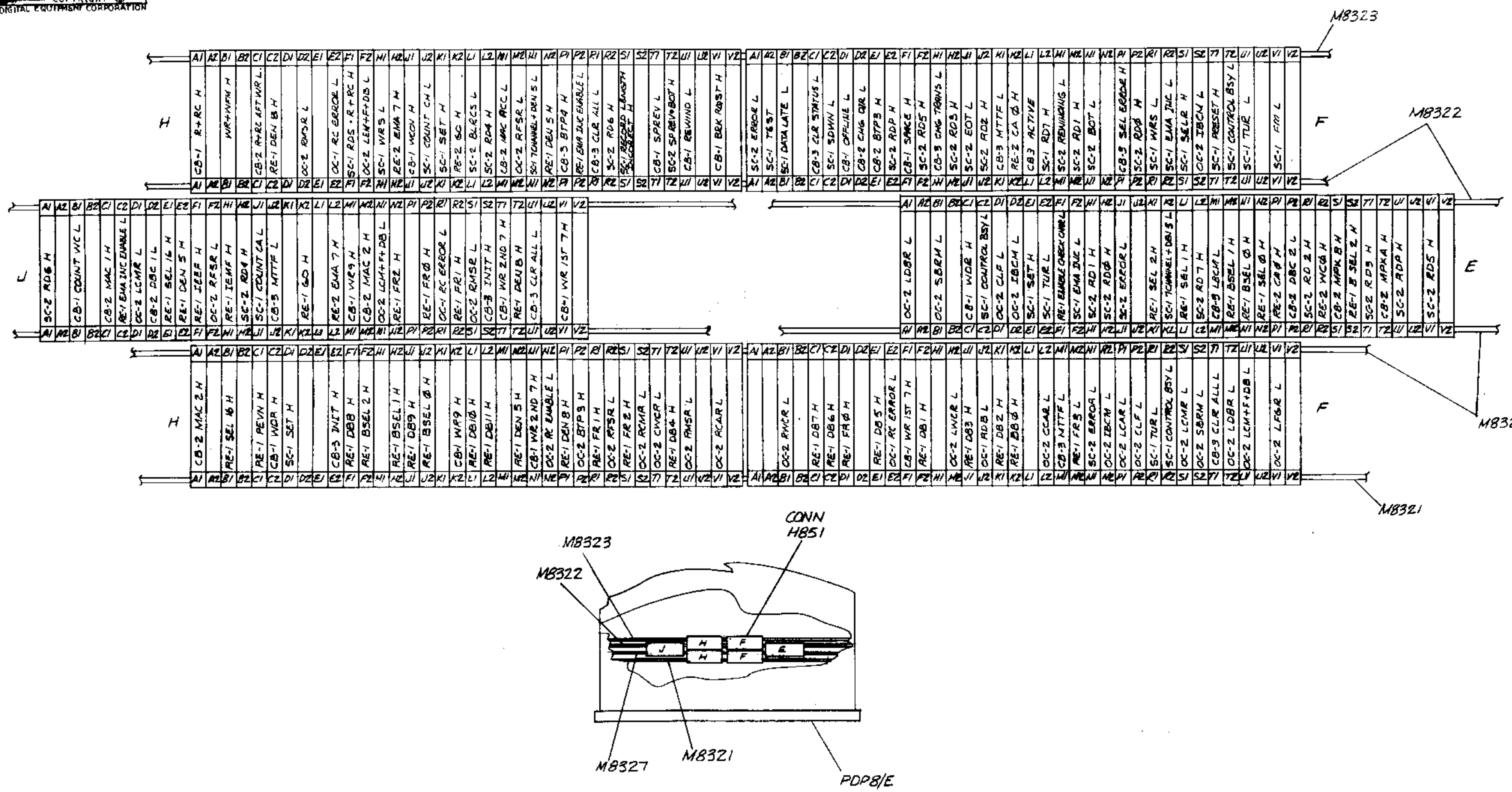
digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE: TERMINATOR CARD FOR TM8-E

SIZE	CODE	NUMBER	REV
D	CS	M989-0-1	A

DIST.

REVISIONS — REV — CHANGE NO — CHK
DEC FORM NO



FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E	PARTS LIST			

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES

DECIMALS	ANGLES
.XXX ± .005 .XX ± .02 .X ± .1	± 0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL —

FINISH —

DRN / CHKD / ENG / PROJ. ENG. / PROD. (signatures and dates)

NEXT HIGHER ASSY. B-DD-TM8-E

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE: SIGNAL MAPPING (TM8-E)

SIZE	CODE	NUMBER	REV.
D	MU	TM8-E-2	B

SCALE — SHEET 1 OF 1

REVISIONS

REV	CHANGE NO	CHK
A	TM8E-00001	A. CZAJKOWSKI
B	TM8E-00002	LORD

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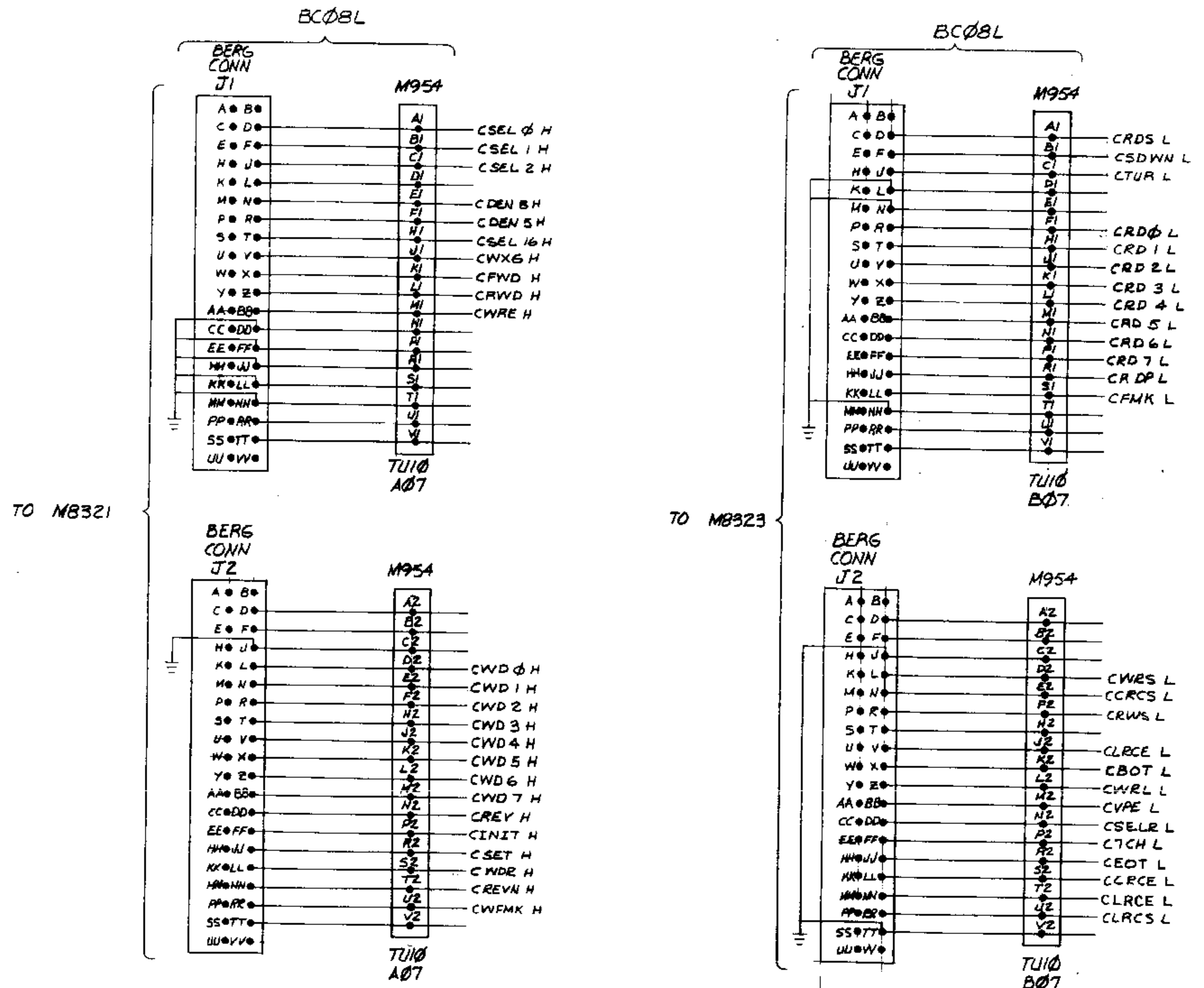


REV.	CHANGE NO.	CHK
A	TM8E-00001 A. CZAJKOWSKI 4-26-73 5-4-73	

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

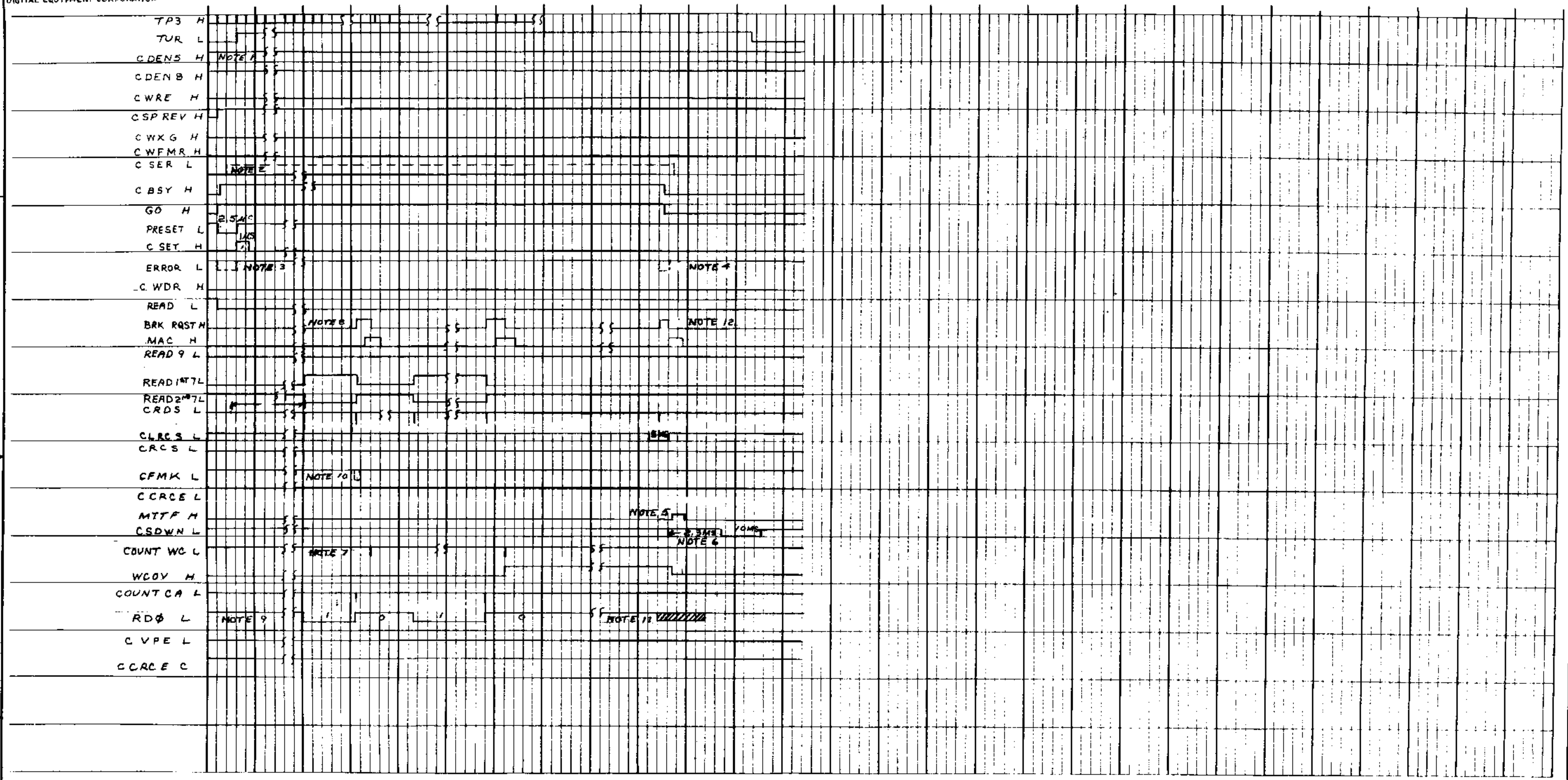
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS: .XXX ± .005, .XX ± .02, X ± .1 — ANGLES: ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS. SURFACE QUALITY ✓

MATERIAL: —
FINISH: —
NEXT HIGHER ASSY: B-DD-TM8-E
SCALE: —
SHEET 1 OF 1

DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS

TITLE: CABLE, INTERCONNECTING (TM8-E)

SIZE	CODE	NUMBER	REV.
D	IC	TM8-E-3	A



READ 7 TRACK
FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	TM8-E
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES	DECIMALS .XXX ±.005 .XX ±.02 .X ±.1; ANGLES ±0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	✓
MATERIAL	—
FINISH	—

QTY.	DESCRIPTION	PART NO.	ITEM NO.

PARTS LIST

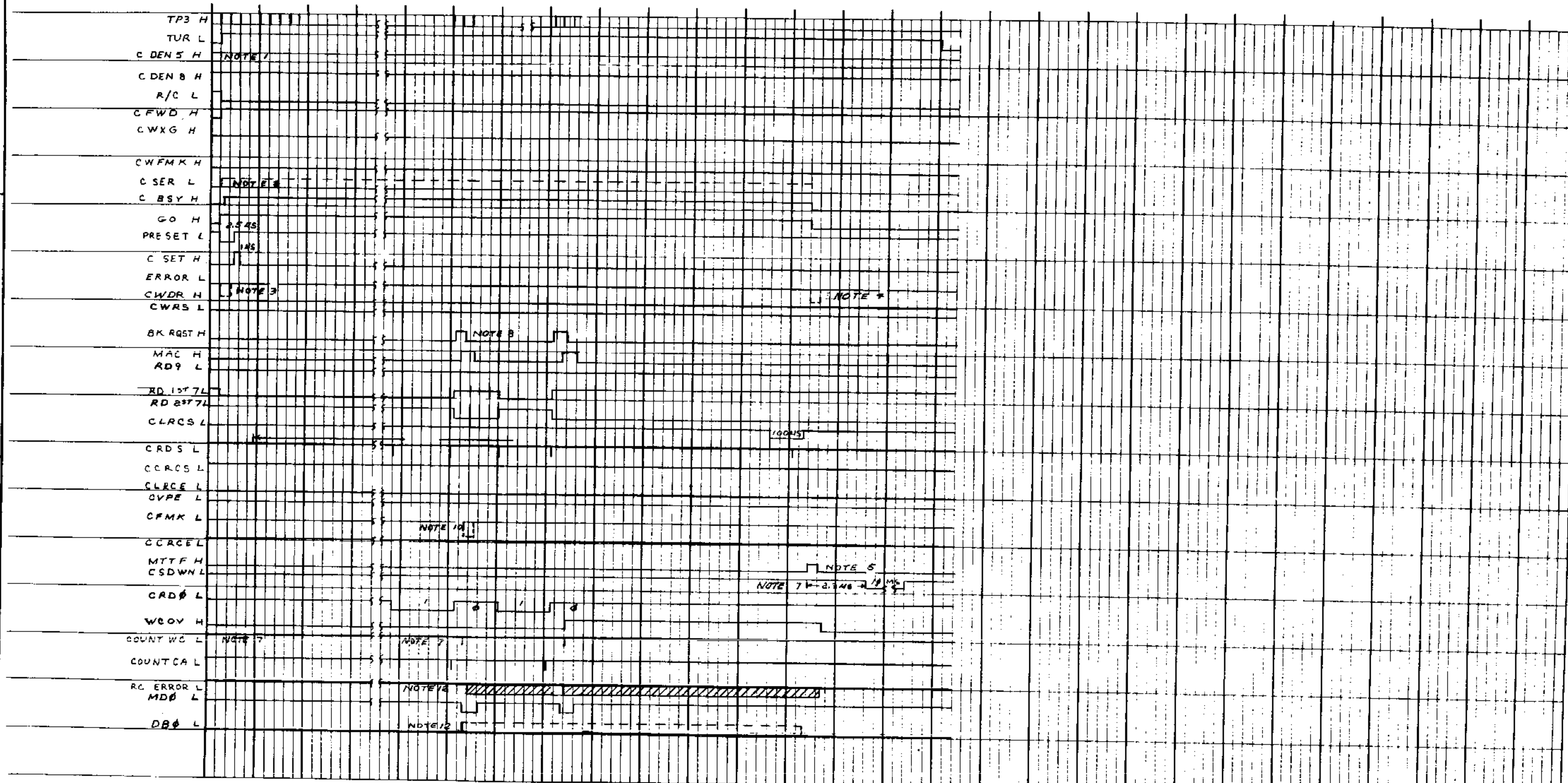
DRN. E. Wilson DATE 5/19/72
CHKD. DATE
ENG. DATE 9/23/73
PROJ. ENG. DATE 9/23/73
PROD. DATE
NEXT HIGHER ASSY. B-DD-TM8-E
SCALE NONE
SHEET OF 9

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE
TIMING DIAGRAM
TM8-E

SIZE	CODE	NUMBER	REV.
D	TD	TM8-E-1	

REVISIONS: REV. | CHANGE NO. | CHK



READ/COMPARE
FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS: .XXX ± .005, .XX ± .02, .X ± .1
ANGLES: ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

DRN: E. Wilson — DATE 6/26/72
CHKD — DATE
ENG — DATE
PROJ. ENG. — DATE
PROD. — DATE

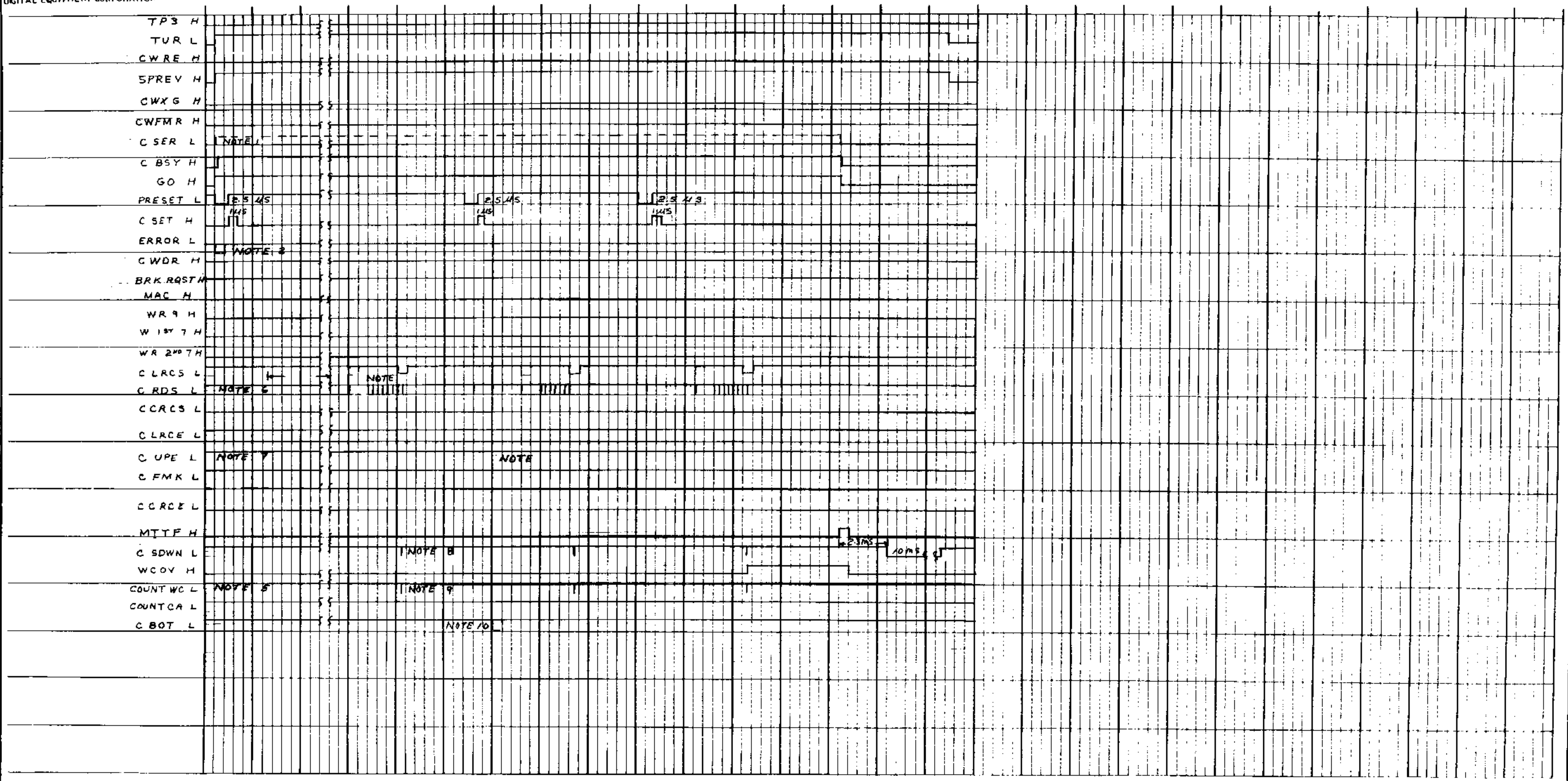
digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE
TIMING DIAGRAM
TM8-E

NEXT HIGHER ASSY. B-DD-TM8-E
SCALE NONE
SHEET 9 OF
SIZE D CODE TD NUMBER TM8-E-1 REV.
DIST.

REVISIONS | CHANGE NO. | REV. | CHK

D TD TM8-E-1



SPACE REVERSE

FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES

DECIMALS	ANGLES
.XXX ± .005 .XX ± .02 X ± 1	± 0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL

FINISH

DRN. E. Wilson DATE 6/21/72
CHK'D DATE
ENG. DATE
PROJ. ENG. DATE
PROD. DATE

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE TIMING DIAGRAM TM8-E

NEXT HIGHER ASSY. B-DD-TM8-E

SIZE D CODE TD NUMBER TM8-E-1 REV

SCALE NONE

SHEET 3 OF 9

DIST.

REVISIONS: REV / CHANGE NO. / CHK.

D TD TM8-E-1

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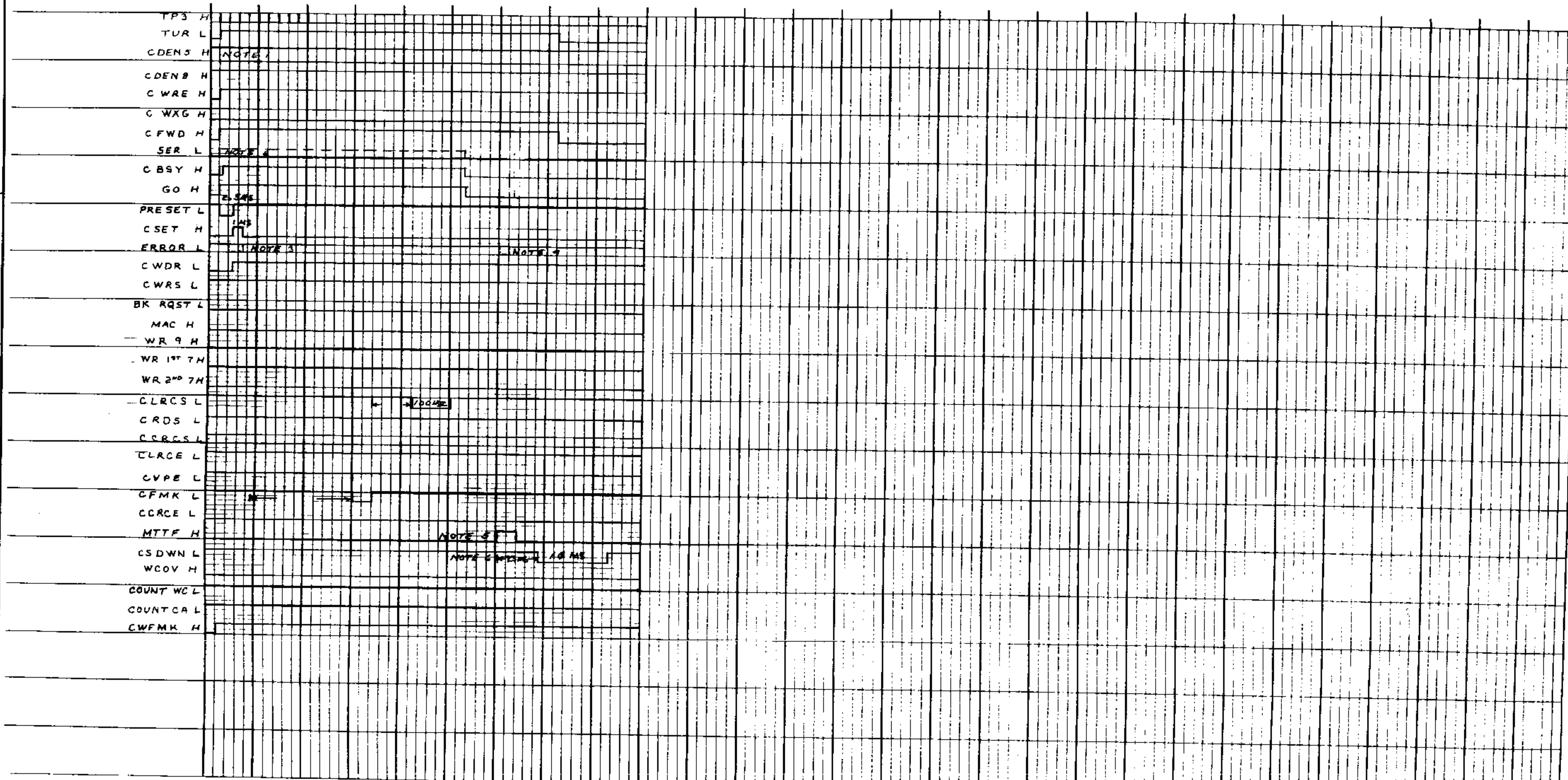


WRITE END OF FILE
FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS .XXX ± .005 .XX ± .02 .X ± .1 — ANGLES ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

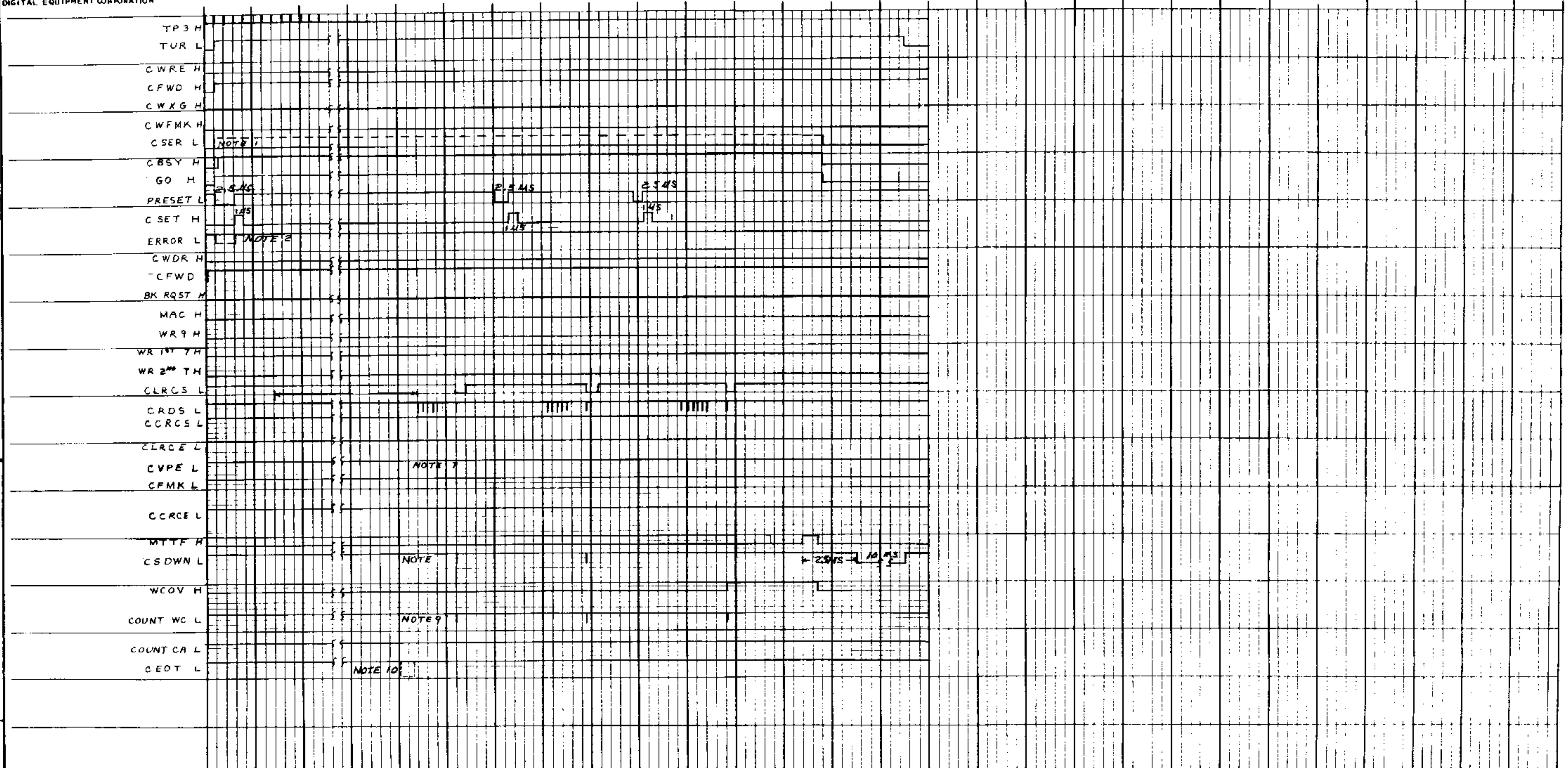
DRN. / CHK'D / ENG. / PROJ. ENG. / PROD. — DATE

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

TITLE
TIMING DIAGRAM TM8-E

NEXT HIGHER ASSY. B-DD-TM8-E
SIZE D CODE TD NUMBER TM8-E-1 REV.
SCALE NONE
SHEET 4 OF 9
DIST.

REVISIONS — REV. — CHANGE NO. — CHK



SPACE FORWARD
FOR NOTES SEE SHEET 9 of 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

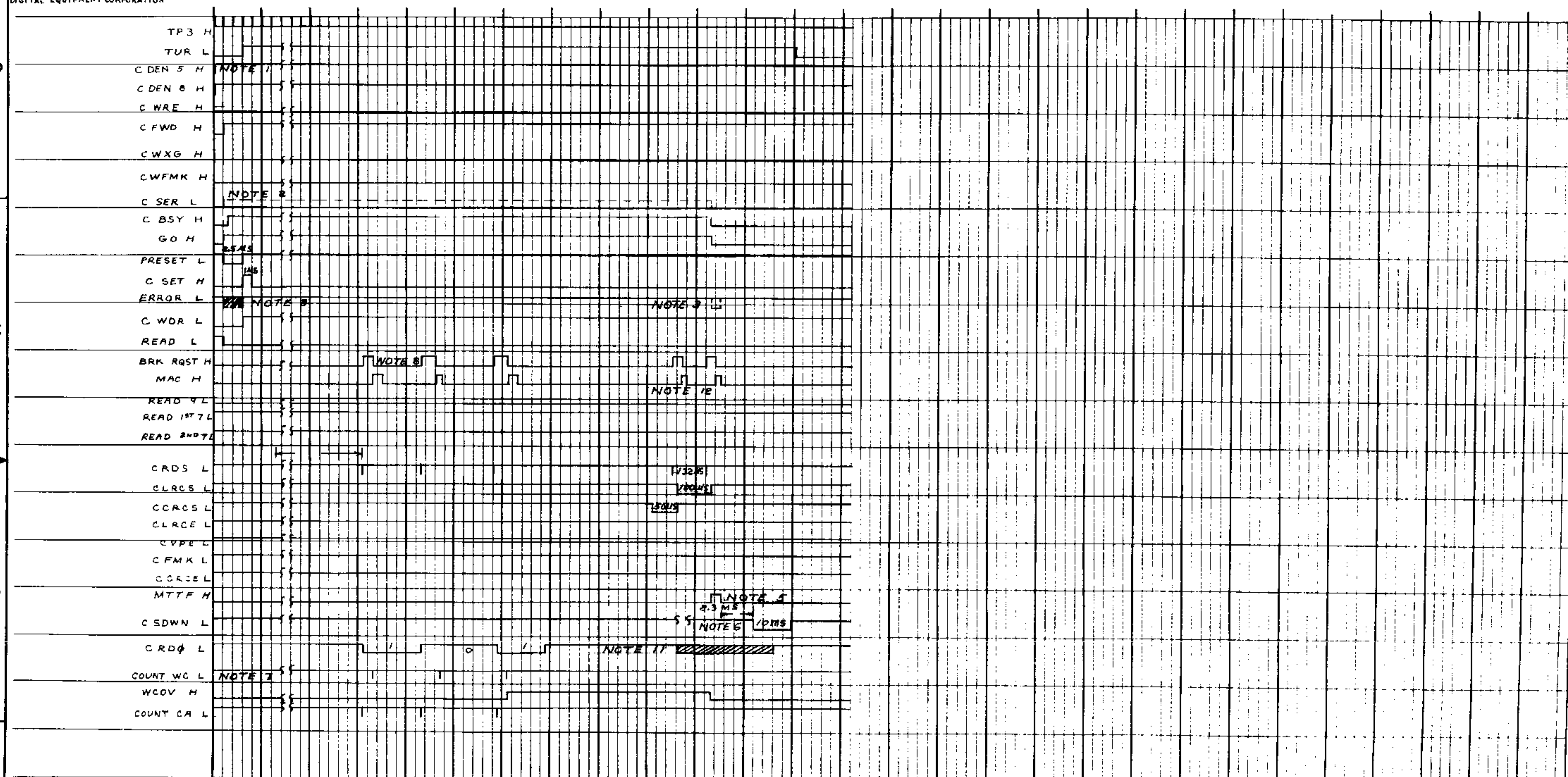
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
DECIMALS: .XXX ± .005, .XX ± .02, .X ± .1 — ANGLES: ± 0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

DRN. E. Wilson — DATE 6/22/72
CHK'D. — DATE 10/16/72
ENG. — DATE 4/23/73
PROD. ENG. — DATE 4/23/73
PROD. — DATE 4/23/73
NEXT HIGHER ASSY. B-DD-TM8-E
SCALE NONE
SHEET 5 OF 9

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE
TIMING DIAGRAM TM8-E

SIZE D CODE TD NUMBER TM8-E-1 REV.
DIST



NOTE:
LCR AND CRC CHARACTERS DETERMINES WHAT IS READ FROM RDO AT THIS TIME.

READ 9 TRACK
FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES
DECIMALS .XXX = .005 .XX = .02 .X = .1 — ANGLES ±0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

DRN. E. Wilson — CHKD. — ENG. — PROJ. ENG. — PROD.
NEXT HIGHER ASSY. B-DD-TM8-E

digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

TITLE
TIMING DIAGRAM
TM8-E

SIZE D CODE TD NUMBER TM8-E-1 REV.
SCALE NONE
SHEET 6 OF 9

TP 3
TUR L
C DEN 5 H
C DEN 8 H
C WRE H
C FWD H
C [illegible] H
C WFMX H
C SER L
C BSY H
GO H
PRESET L
C SET H
ERROR L
C WDR H
C WRS L
BRK RQST H
MAC H
WR 9 H
WR 1ST 7 H
WR 2ND 7 H
CRDS L
CLRCS L
CVPE L
CFMK L
MTTF H
CS DWN L
CCRLE L
CCRCS L
CWDØ H (NOTE 10)
COUNT WC L
COUNT CA L
WCOV H

NOTE 1
NOTE 2
2.5 MS
1 MS
NOTE 3
NOTE 4
NOTE 5
12 MS
28 MS 28 MS 28 MS 132 MS
NOTE 11
1.88
3.5 MS
10 MS
NOTE 6
NOTE 7

WRITE 7 TRACK
FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES
DECIMALS: XXX ± .005, XX ± .02, X ± .1 — ANGLES: ±0° 30'
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓
MATERIAL
FINISH

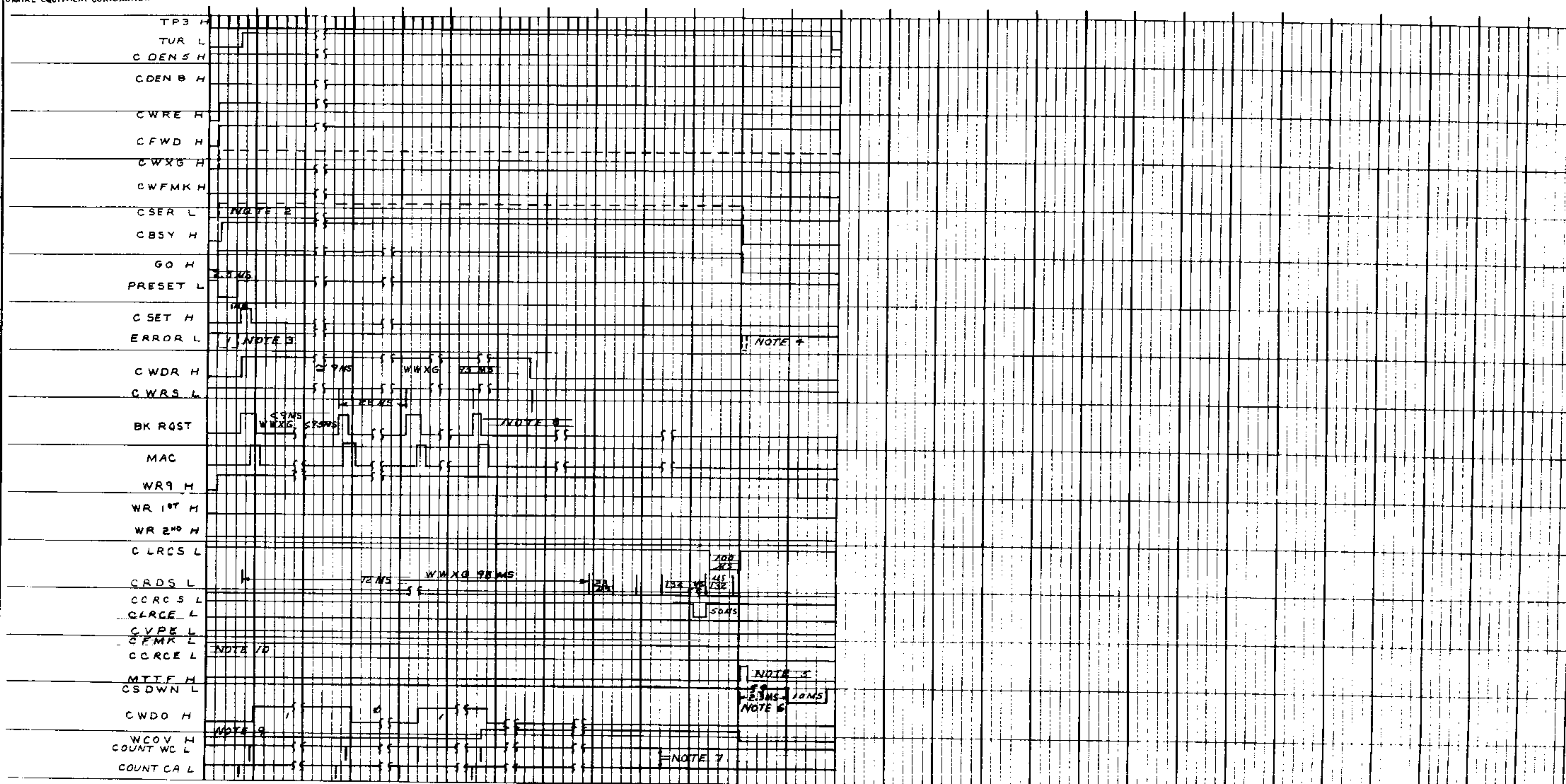
DRN. C. Wilson	DATE 4/28/72	digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS
CHKD.	DATE	
ENG.	DATE	
PROJ. ENG.	DATE	
PROD.	DATE	

TITLE: TIMING DIAGRAM TM8-E

NEXT HIGHER ASSY: B-DD-TM8-F
SIZE D | CODE TD | NUMBER TM8-E-1 | REV
SCALE NONE
SHEET 7 OF 9
DIST

REVISIONS: REV. | CHANGE NO. | CHK.

DEC FORM NO. DRD 121



WRITE 9 TRACK

FOR NOTES SEE SHEET 9 OF 9

FIRST USED ON OPTION/MODEL	TM8-E
NEXT HIGHER ASSY.	B-DD-TM8-E
TITLE	TIMING DIAGRAM TM8-E
SIZE / CODE / NUMBER	D TD TM8-E-1
SCALE	NONE
SHEET	8 OF 9

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES. TOLERANCES

DIGITAL EQUIPMENT CORPORATION

READ 7 TRACK

NOTE 1. C SER L (SELECT REMOTE) WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 2. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 3. THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRESS IS COMPLETED. THE STATUS REGISTERS MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 4. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 5. WRITE SHUT DOWN TIME IS 2.3MS..

NOTE 6. COUNT CA AND COUNT WC PULSES ARE 100 NS

NOTE 7. TP3 ENABLES BRK RQST LOGIC WHEN TM8-E HAS HIGHEST PRIORITY. LENGTH OF PULSE DETERMINED BY TIME IT. OCCURS IN RELATION TO TP3 AND THE NUMBER OF PERIPHERALS WITH HIGHER PRIORITY THAN THE TM8-E MAKING BREAK REQUESTS.

NOTE 8 THE OTHER PARALELL LINES ARE IDENTICAL TO RD0.

NOTE 9 IF A FILE MARK (EOF) IS DETECTED THE OPERATION STOPS.

NOTE 10. UNKNOWN DATA.

NOTE 11. AN ADDITIONAL SINGLE CYCLE DATA BREAK IS PERFORMED AFTER WORD COUNT OVERFLOW TO TRANSFER THE LRCS CHARACTER TO MEMORY IF BIT 4 IN THE FUNCTION REGISTER IS A ONE (SEE TABLE 3-2).

READ/COMPARE

NOTE 1. C SER L (SELECT REMOTE) WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 2. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 3. THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRESS IS COMPLETED. THE STATUS REGISTERS MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 4. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 5. WRITE SHUT DOWN TIME IS 2.3MS.

NOTE 6. COUNT CA AND COUNT WC PULSES ARE 100 NS

NOTE 7. TP3 ENABLES BRK RQST LOGIC WHEN TM8-E HAS HIGHEST PRIORITY. LENGTH OF PULSE DETERMINED BY TIME IT OCCURS IN RELATION TO TP3 AND THE NUMBER OF PERIPHERALS WITH HIGHER PRIORITY THAN THE TM8-E MAKING BREAK REQUESTS.

NOTE 8. THE OTHER PARALELL LINES ARE IDENTICAL TO WD0.

NOTE 9. IF A FILE MARK (EOF) IS DETECTED THE OPERATION STOPS.

NOTE 10. IF A READ/COMPARE ERROR IS DETECTED THE READ/COMPARE OPERATION STOPS AND THE CA REGISTER CONTAINS THE ADDRESS OF THE DATA THAT PRODUCED THE ERROR. TAPE MOTION CONTINUES UNTIL WC OVERFLOW OCCURS OR AN EOF IS DETECTED.

NOTE IF WD0 AND DB0 ARE DIFFERENT R/C ERROR IS GENERATED BY THE READ/COMPARE LOGIC.

SPACE REVERSE

NOTE 1. C SER L (SELECT REMOTE) IS ASSERTED WHEN SELECTED TRANSPORT IS ON LINE.

NOTE 2. SEE TABLE 3-3 BITØ, ERROR FLAG.

NOTE 3. SEE TABLE 3-3 BITØ, ERROR FLAG.

NOTE 4. MTTF REMAINS SET UNTIL THE PROGRAM EXECUTES A CLF INSTRUCTION TO CLEAR ALL FLAGS.

NOTE 5. COUNT WC PULSES ARE 100NS

NOTE 6. CRDSL PULSES OCCUR AFTER EACH CHARACTER IS READ FROM THE TAPE BUT HAVE NO AFFECT IN THE SPACE OPERATION.

NOTE 7. VPE LOGIC IS DISABLED IN THE TM8-E DURING A SPACE OPERATION.

NOTE 8. C SDWN L IS ASSERTED FOR APPROXIMATELY 100 M SEC EACH TIME A C LRC S PULSE IS GENERATED AT THE END OF A RECORD

NOTE 9. WORD COUNT IS INCREMENTED AFTER EACH RECORD DURING A SPACE OPERATION

NOTE 10. IF BOT IS DETECTED BY THE TU1Ø THE OPERATION STOPS.

END OF FILE

NOTE 1. SEE TABLE 3-1 AND FIGURE 3-2 AS SHOWN A DENSITY OF 800 BPI IS SELECTED.

NOTE 2. C SER L (SELECT REMOTE) IS ASSERTED WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 3.. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 4 THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRESS IS COMPLETED. THE STATUS REGISTER MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 5. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 6. WRITE SHUT DOWN TIME IS 2.3MS.

SPACE FORWARD

NOTE 1. C SER L (SELECT REMOTE) IS ASSERTED WHEN SELECTED TRANSPORT IS ON LINE.

NOTE 2. SEE TABLE 3-3 BITØ, ERROR FLAG

NOTE 3. SEE TABLE 3-3 BITØ, ERROR FLAG.

NOTE 4. MTTF REMAINS SET UNTIL THE PROGRAM EXECUTES A CLF INSTRUCTION TO CLEAR ALL FLAGS.

NOTE 5. COUNT WC PULSES ARE 100 NS.

NOTE 6. CRDSL PULSES OCCUR AFTER EACH CHARACTER IS READ FROM THE TAPE BUT HAVE NO AFFECT ON THE SPACE OPERATION.

NOTE 7. VPE LOGIC IS DESABLED IN THE TM8-E DURING A SPACE OPERATION.

NOTE 8. C SDWN L IS ASSERTED FOR APPROXIMATELY 100 NSEC EACH TIME A C LRC S PULSE IS GENERATED AT THE END OF A RECORD.

NOTE 9. WORD COUNT IS INCREMENTED AFTER EACH RECORD DURING A SPACE OPERATION.

NOTE 10. IF EOT IS DETECTED BY THE TU1Ø THE OPERATION STOPS.

READ 9 TRACK

NOTE 1 C SER L (SELECT REMOTE) WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 2. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 3. THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRESS IS COMPLETED. THE STATUS REGISTERS MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 4. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 5 WRITE SHUT DOWN TIME IS 2.3MS.

NOTE 6.. COUNT CA AND COUNT WC PULSES ARE 100 NS.

NOTE 7. TP3 ENABLES BRK RQST LOGIC WHEN TM8-E HAS HIGHEST PRIORITY. LENGTH OF PULSE DETERMINED BY TIME ITS OCCURS IN RELATION TO TP3 AND THE NUMBER OF PERIPHERALS WITH HIGHER PRIORITY THAN THE TM8-E MAKING BREAK REQUESTS.

NOTE 8. THE OTHER PARALELL LINES ARE IDENTICAL TO RD0.

NOTE 9. IF A FILE MARK (EOF) IS DETECTED THE OPERATION STOPS.

NOTE 10 UNKNOWN DATA

NOTE 11. TWO MORE BRK RQST ARE EXECUTED AFTER WORK COUNT OVERFLOW TO TRANSFER THE LRCS AND CRCS CHARACTERS TO MEMORY IF THE ENABLE CHECK CHARACTER BIT IN THE FUNCTION REGISTER IS SET (SEE FIGURE 3-3).

WRITE 7 TRACK

NOTE 1. C SER L (SELECT REMOTE) WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 2. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 3. THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRESS IS COMPLETED. THE STATUS REGISTERS MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 4. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 5. WRITE SHUT DOWN TIME IS 2.3MS.

NOTE 6. COUNT CA AND COUNT WC PULSES ARE 100 NS

NOTE 7. TP3 ENABLES BRK RQST LOGIC WHEN TM8-E HAS HIGHEST PRIORITY. LENGTH OF PULSE DETERMINED BY TIME IT OCCURS IN RELATION TO TP3 AND THE NUMBER OF PERIPHERALS WITH HIGHER PRIORITY THAN THE TM8-E MAKING.BREAK REQUESTS.

NOTE 8. THE OTHER PARALELL LINES ARE IDENTICAL TO WD0.

NOTE 9. IF A FILE MARK (EOF) IS DETECTED THE OPERATION STOPS.

NOTE 10. THESE PULSES ARE SEEN ONLY IF THE OPERATION IS LONG ENOUGH TO ALLOW THE TAPE TO MOVE FROM WRITE HEAD TO READ HEAD OR TAPE CONTINUES TO MOVE FORWARD AS IN CONTINOUS MODE OF OPERATION

WRITE 9 TRACK

NOTE 1. C SER L (SELECT REMOTE) WHEN THE SELECTED TRANSPORT IS ON LINE.

NOTE 2. IF THE ERROR FLAG IS SET AT THE BEGINNING OF AN OPERATION BY A SELECT ERROR THE OPERATION STOPS.

NOTE 3. THE TM8-E IGNORES THE ERROR FLAG UNTIL THE OPERATION IN PROGRSS IS COMPLETED. THE STATUS REGISTERS MUST BE READ BY THE PROGRAM TO DETERMINE WHAT CAUSED THE ERROR.

NOTE 4. MTTF REMAINS SET UNTIL IT IS CLEARED BY THE PROGRAM.

NOTE 5. WRITE SHUT DOWN TIME IS 2.3MS.

NOTE 6. COUNT CA AND COUNT WC PULSES ARE 100 NS.

NOTE 7. TP3 ENABLES BRK RQST LOGIC WHEN TM8-E HAS HIGHEST PRIORITY. LENGTH OF PULSE DETERMINED BY TIME IT OCCURS IN RELATION TO TP3 AND THE NUMBER OF PERIPHERALS WITH HIGHER PRIORITY THAN THE TM8-E MAKING BREAK REQUESTS.

NOTE 8 THE OTHER PARALELL LINES ARE IDENTICAL TO WD0.

NOTE 9. IF A FILE MARK (EOF) IS DETECTED THE OPERATION STOPS

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
TM8-E		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES — DECIMALS XXX ± .005, XX ± .02, X ± .1; ANGLES ± 0° 30'

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS

TITLE: TIMING DIAGRAM TM8-E

NEXT HIGHER ASSY: B-DD-TM8-E

SIZE	CODE	NUMBER	REV.
D	TD	TM8-E-1	

SCALE: NONE — SHEET 9 OF 9

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

PARTS LIST

MADE BY P.MARCOTTE DATE 7/27/72	CHECKED J.CAHILL DATE 10/22/72	SECTION 1
ENG DATE 11-10-72	PROD D. Raney DATE 11-10-72	ISSUED SECT. 1

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION TM8-E
1	D-CS-M8321-Ø-1	OUTPUT CONTROL, TM8-E	1
2	D-CS-M8322-Ø-1	CONTROL & BREAK, TM8-E	1
3	D-CS-M8323-Ø-1	TRANSPORT STATUS CONTROL, TM8-E	1
4	D-CS-M8327-Ø-1	REGISTERS, TM8-E	1
5	B-UA-H851-Ø-Ø	EDGE CONNECTOR (H851)	6
6	D-CS-M989-Ø-1	TERMINATOR CARD	1
7	D-UA-BCØ8L-10-Ø	I/O CABLE	2
8	D-MU-TM8-E-2	SIGNAL MAPING (TM8-E)	REF
9	D-IC-TM8-E-3	CABLE INTERCONECTION (TM8-E)	REF
10	D-DD-TM8-E	DRAWING DIRECTORY (TM8-E)	REF
		NOTE: FOR DRAWING DIRECTORY REFER TO "B-DD-TM8-E	

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.	ECO NO.
MAG TAPE CONTROL	NONE	A	PL	TM8-E-Ø		
	SHEET 1 OF 1	DIST.				

DEC FORM DEC 16-(325)-1031-N870
DRA 110

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 9/28/72

TITLE TM8-E SPECIFICATIONS FOR THE MAGNETIC TAPE CONTROL

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A	ELIMINATE BAD TAPE	TM8E-00001	CZAJKOWSKI	4/73		

ENG	APPD	SIZE	CODE	NUMBER	REV
A. Czajkowski		A	SP	TM8-E-4	A

DEC FORM NO. DRA 107

ENGINEERING SPECIFICATION [redacted] CONTINUATION SHEET

TITLE TM8-E SPECIFICATIONS FOR THE MAGNETIC TAPE CONTROL

1.0 General Description

The TM8-E control provides the interface between the PDP8/E and the TU10 master-slave magnetic tape transport system. The TU10 master can control eight (8) slaves, so the TM8-E is capable of controlling eight (8) transports.

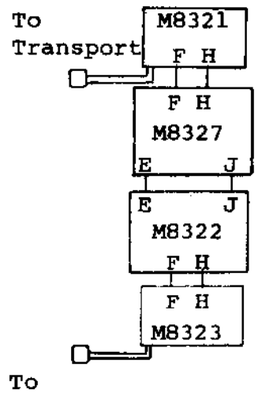
The data transfer is via single cycle data break with a transfer rate of 36K Hz. The transport operates at 45 ips and uses 7 channel formats at 200, 556 or 800 bpi, or 9 channel format at 800 bpi.

1.1 Hardware Description

The TM8-E consists of four quad modules:

M8321 TM8-E Output Control
M8322 TM8-E Control and Break
M8323 TM8-E Transport Status Control
M8327 TM8-E Registers
M989 Terminator board plugs into TU10 (A6)
and two BC08L cables not to exceed 15 feet.

The four quad modules will plug into the OMNIBUS as per PDP8/E option priority designation list. The priority of the TM8-E module must be one of two ways.



	SIZE	CODE	NUMBER	REV
	A	SP	TM8-E-4	A

DEC FORM NO DEC 16-(381)-1022-N370 DRA 108

The signals needed to communicate between boards pass through top connectors. The signals needed to communicate with the transport pass through the connector located on the upper left corner of the modules M8323 and M8321.

2.0 Electrical Requirements

The power requirement is as follows:

M8321	+5V	1000	MA
M8322	+5V	775	MA
M8323	+5V	900	MA
M8327	+5V	1500	MA
Total	+5V	4175	MA

No power will be supplied to the transport from the TM8-E.

3.0 Environment

Temperature:	A.	Operating	45°F - 95°F
	B.	Non-operating	-30°F - 150°F
Humidity:	A.	Operating	20% - 80% with no condensation.
	B.	Non-operating	5% - 95%

4.0 Software Documents

The following diagnostics and programs are available for the TM8-E:

1. TM8-E Control Test Part 1 MAINDEC-08-DHTMA-A
2. TM8-E Control Test Part 2 MAINDEC-08-DHTMB-A
3. Drive Function Timer, MAINDEC-08-DHTML-A-
4. TM8-E Data Reliability Test - 9 Track, MAINDEC-08-DTMD-A
5. TM8-E Data Reliability Test- 7 Track, MAINDEC-08-DTME-A
6. TM8-E Random Exerciser, MAINDEC-08-DHTMF-A
7. TM8-E DEC Magtape System Module for DEC/8X, MAINDEC-8X-DHTMA-A

5.0 Instructions

6701 LWCR Load Word Count Register & Clear the AC
AC ⟶ WC, 0 ⟶ AC

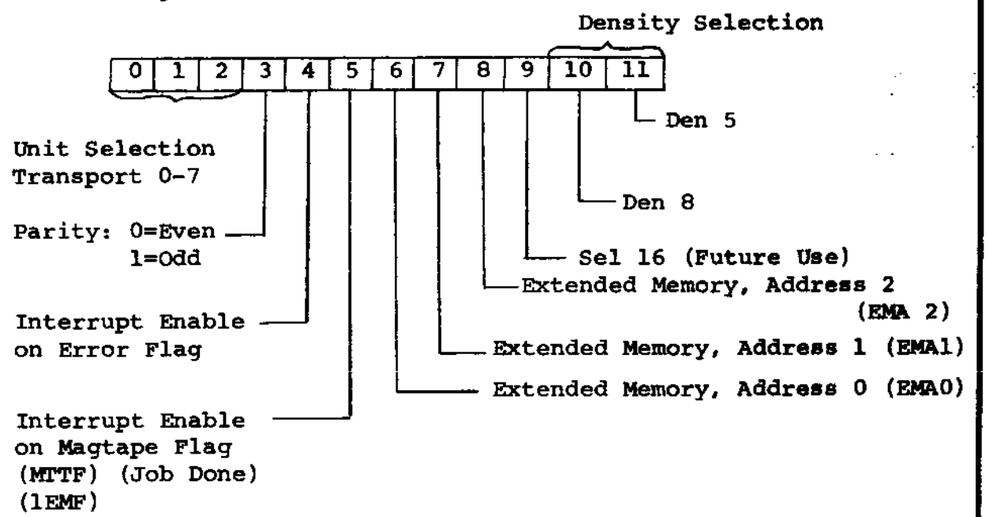
6702 CWCR Clear Word Count Register

6703 LCAR Load Current Address Register & Clear the AC
AC ⟶ CA, 0 ⟶ AC

6704 CCAR Clear Current Address

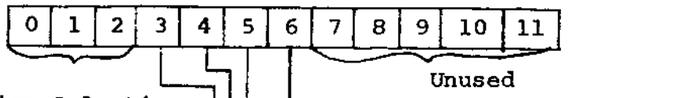
6705 LCMR Load Command Register & Clear the AC
AC ⟶ CM, 0 ⟶ AC

Command Register Bits



6706 LFGR Load Function Register (GO bit) & Clear AC
AC ⟶ Function Register 0 ⟶ AC

Function Register



Function Selection

ØØØ Off Line
ØØ1 Rewind
Ø1Ø Read
Ø11 Read/Compare
1ØØ Write
1Ø1 Write File Mark
11Ø Space Forward
111 Space Reverse

EMA Inc Enable

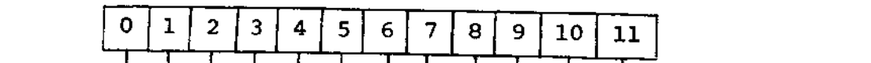
GO when equal to a one

Enable Check Character

Extend Gap

6707	LDBR	Load Data Buffer Register & Clear AC AC ⟶ DB, Ø ⟶ AC
6711	RWCR	Clear AC and Read Word Count Register Ø ⟶ AC WC ⟶ AC
6712	CLT	Clear Transport
6713	RCAR	Clear AC and Read Current Address Register Ø ⟶ AC CA ⟶ AC
6714	RMSR	Clear AC and Read Main Status Register Ø ⟶ AC MS ⟶ AC

Main Status Register Bits



Error Flag

Tape Rewinding

Beginning of Tape (BOT)

Select Remote

Parity Error (Vertical Longitudinal or CRC Error

File Mark (FM) EOF)

Illegal Function

Read Compare Error

File Protect

End of Tape (EOT)

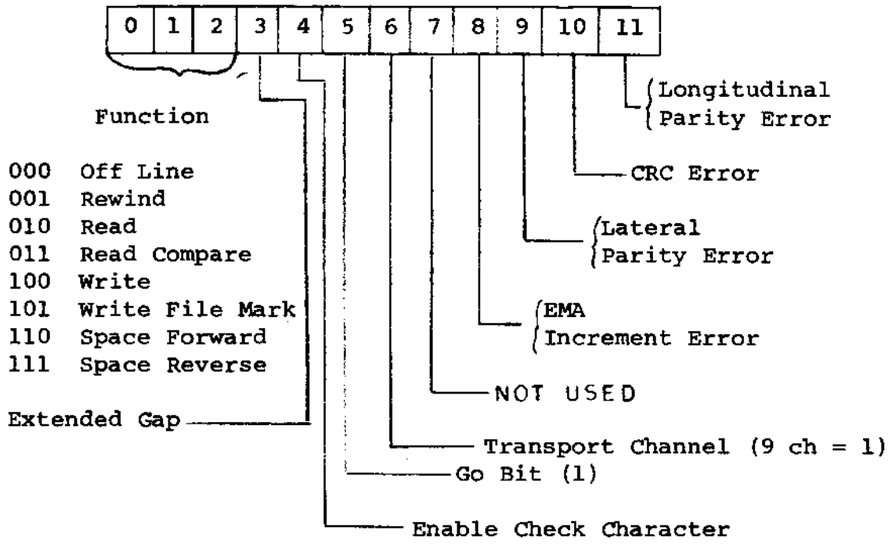
Data Request Late

Record Length Incorrect

6715	RCMR	Clear AC and Read Command Register Ø ⟶ AC, CM ⟶ AC

Bits are same as LCMR

6716	RFSR	Clear AC Read Function Register and Status 1 Ø ⟶ AC, Function and 2nd Status ⟶ AC



6717	RDBR	Clear AC Read Data Buffer Ø ⟶ AC, DB ⟶ AC
6721	SKEF	Skip if error flag is set +1 ⟶ PC
6722	SKCB	Skip if Control is not busy +1 ⟶ PC
6723	SKJD	Skip if the job is done (MTTF is set) +1 ⟶ PC
6724	SKTR	Skip if tape unit is ready +1 ⟶ PC
6725	CLF	Clear the Controller and Transport Master if TUR, if not clear MTTF, EF and Status Registers. Ø ⟶ Control Registers
6726	CKDL	Check for Data Late Error
6727	SBRM	Set Break Request for one Data Break 1 ⟶ BR

Instructions and Status Bits

The following instructions are used to program the TM8-E. Refer to the appropriate table for the status bits associated with each instruction.

Load Word Count Register (LWCR)

Octal Code: 6701

Operation: Load the Word Count Register with the contents of the AC and clear the AC. The Word Count Register should not be loaded when the control is busy. If the register is loaded during Control Busy data reliability tape compatability are not assured. The word count is loaded with the 2's complement of the number of words to be transferred or number of blocks to be spaced. The Word Count Register is incremented at TP1 of a Data Break Cycle during data transfers, at LRCS during a Space Forward; or at the first word of a record during a Space Reverse operation.

Recommended block length is per USA Standards, Document USAS X3.22-1967, Recorded Magnetic Tape for information interchange (800 cpi, NRZ1).

Clear Word Count Register (CWCR)

Octal Code: 6702

Operation: Clear the Word Count Register. This instruction is used primarly in maintenance operations and should never be used during Control Busy (CNTL BSY).

Load Current Address Register (LCAR)

Octal Code: 6703

Operation: Load the Current Address Register with the contents of the AC and clear the AC. The Current Address Register is loaded to one less than the memory address of the first word to be transferred. If this instruction is executed during Control Busy, one of the following occurs:

1. In the wrap around modes (Function bit 6=0) location of the data transfer cannot be assured within the selected memory field.

2. In the EMA INC ENABLE MODE (Function Bit 6=1) location of the data transfer cannot be assured within memory. The current Address Register is incremented at each BRK RQST.

Clear Current Address Register (CCAR)

Octal Code: 6704

Operation: Clear the Current Address Register. This instruction is used primarily for maintenance and should never be used during Control Busy.

Load Command Register (LCMR):

Octal Code: 6705

Operation: Load the Command Register with contents of the AC and clear the AC. This instruction must not be issued during Control Busy. The LCMR instruction selects tape transport, Parity mode, enables or disables interrupts, selects a memory field, and recording densities.

Command Register Contents and Function

Bit No.	Function
Bits 0,1 & 2	Unit selection of transports 0 through 7 as shown.

SEL 0 Bit 0	SEL 1 Bit 1	SEL 2 Bit 2	
0	0	0	Transport 0
0	0	1	Transport 1
0	1	0	Transport 2
0	1	1	Transport 3
1	0	0	Transport 4
1	0	1	Transport 5
1	1	0	Transport 6
1	1	1	Transport 7

Bit 3 — 0 = Even Parity 1 = Odd Parity

Bit 4 — If Bit 4 is a one, enable Interrupt on Error flag.

Bit 5 — Enable interrupt on job done (MTTF) if Bit 5 is a one.

Bits 6,7, & 8 — Extended Memory Address (EMA), these bits determine which memory field the controller uses for data transfer operations during a data break. Function Register bit 6 determines if EMA address is to be incremented or used in the wrap around mode.

Bit 6 (EMA0)	Bit 7 (EMA1)	Bit 8 (EMA2)	
0	0	0	Field 0
0	0	1	Field 1
0	1	0	Field 2
0	1	1	Field 3
1	0	0	Field 4
1	0	1	Field 5
1	1	0	Field 6
1	1	1	Field 7

Bit 9 — Reserved for future use.

Bits 10 & 11 — Density Bits, these bits select the density for tape transport operation and are referred to as Den 8 (bit 10) and Den 5 (bit 11).

Bits 10 and 11 select the tape density and core dump on 9 channel transports.

Bit 10 Den 8	Bit 11 Den 5	
0	0	200 bpi, 7 channel
0	1	556 bpi, 7 channel
1	0	*800 bpi, 7 channel
1	1	800 bpi, 9 channel

*This mode is also referred to as Core Dump Mode. When this command is issued to a 9-channel transport zeros are written on tracks 0 and 1 of the DEC magtape and the 9-track transport operates as a 7-track transport.

Load Function Register (LFGR)

Octal Code: 6706

Operation: Load the Function Register with the contents of the AC and clear the AC. The Function Register is the last register loaded because it contains the GO bit. This instruction determines what function the transport is to do.

Function Register Contents and Functions

Bit No.	Function
0,1,2	Function Selection: These bits determine what function the transport is to perform.

Bit 0	Bit 1	Bit 2	
0	0	0	OFFLINE: The selected transport is taken OFFLINE and rewound to BOT. The MTTF is set when the transport responds to this function and the controller can select and use another transport. The transport must be manually reset to the on-line state. The Word Count and Current Address Registers need not be loaded.
0	0	1	REWIND: The transport rewinds at high speed (150 ips) to BOT and stops. The MTTF is set when the transport responds to the Rewind Function. The controller can select and use another transport. The Word Count and Current Address Registers need not be loaded.
0	1	0	READ: Data is transferred from the tape to memory in the forward direction only. All registers must be loaded.
0	1	1	READ/COMPARE: Tape data is compared to data in core memory. All registers must be loaded. If there is a comparison error, CA incrementation ceases, and the R/C Error bit is set and tape motion continues to the end of the record. The CA register contains the address of the word that produced the error.

Bit 0	Bit 1	Bit 2	
1	0	0	WRITE: Data is written on the tape in the forward direction only. All registers must be loaded. The Write Function is controlled By WC OVERFLOW, which disables the Write and the transport writes the appropriate check characters to end the block.
1	0	1	WRITE END OF FILE (File Mark): The transport writes the File Mark which consists of a one word record. The CA and WC registers need not be loaded.
1	1	0	SPACE FORWARD: The transport moves forward at 45 ips the number of records specified by the WC register, or until a File Mark is read. If End of Tape is read, Space Forward stops at the first inter-record gap. The CA register need not be loaded for a Space Forward.
1	1	1	SPACE REVERSE: The transport moves in the reverse direction at 45 ips the number of blocks specified by the WC Register or until a File Mark or BOT marker is read. The CA Register need not be read during a Space Reverse.

Bit 3 EXTENDED GAP: When bit 3 is a one the transport writes an additional 3 inch gap between records.

4 ENABLE CHECK CHARACTER: When this bit is set (1) it allows the check characters to be read into the computer during a read function. When the Word Count Overflows, this bit allows two breaks during 9 track operation for the CRC and LRC. If a RECORD LENGTH INCORRECT error occurs, the check character is considered bad and is not used. This bit is used primarily for 9 track error correction.

Bit 5 GO: This bit causes the controller to issue a SET command to the transport when the transport is capable of accepting it. The transport is capable of accepting it. The SET is not issued if the specified function is illegal.

6 EMA INC ENABLE: If this bit is not set (1) the TM8-E treats the extended memory the same way any other PDP8 Family data break option would, i.e., each 4K block is used in a wrap around mode. If this bit is set (1) the Extended Memory is treated as a continuous memory rather than 4K blocks. When the last location in one Field is reached, the EMA bits are incremented and the transfer continues in the next field, i.e.,: If a word is placed in Field 2, location 7777, the following word will be placed in Field 3, location 0000 if the EMA increment bit is set. If Bit 6 is not set the word is placed in Field 2, location 0000. In both modes of operation, the Current Address is set to one less than the first location to be accessed. In the EMA Increment mode the 120bit CA register with the EMA bits most significant. For example, to access field 2, location 20, load EMA=2 and CA=0017: to access field 2, location 0, load EMA=1 and CA=7777. If memory field 7 is selected, the EMA cannot increment, but wraps around in field 7 and an EMA 7 INCREMENT ERROR occurs.

Load Data Buffer Register (LDBR)

Octal Code: 6707

Operation: Load the Data Buffer Register with the contents of the AC. Clear the AC and set MTTF flag. This instruction is used for maintenance.

Read Word Count Register (RWCR)

Octal Code: 6711

Operation: Clear the AC and transfer the contents of the Word Count Register into the AC. This instruction is used primarily for maintenance, but it can also be used during error check routines.

Clear Transport (CLT)

Octal Code: 6712

Operation: Clear the transport master registers and clear all TM8-E registers and flags.

Read Current Address Register (RCAR)

Octal Code: 6713

Operation: Clear the AC and transfer the contents of the Current Address register to the AC. This instruction is used primarily for maintenance, but it may be used for error check routines.

Read Main Status Register (RMSR)

Octal Code: 6714

Operation: Clear the AC and transfer the contents of the Main status register into the AC. The 12-bit status register contains the status of the transport and control logic (see Table 3-3 and Figure 3-4). The status register is read at any time (control Busy or Not Busy).

Table 3-3

Main Status Register Contents and Indications

Status Indication	
Bit 0	ERROR: The ERROR flag interrupts the processor if bit 4 in the Command Register is set (1). An ILLEGAL FUNCTION, BAD TAPE, or SELECT ERROR sets the MTTF flag immediately and stops Data Break operations. The following errors sets the ERROR flag after the MTTF flag is set if they occur during any operation. a. BOT b. EOT c. READ/COMPARE ERROR d. Parity Error (VPE, CRCE, or LRCE) e. RECORD LENGTH INCORRECT f. File Mark (EOF) g. DATA LATE h. EMA 7 INCREMENT ERROR
1	Rewind Status (RWS): A one indicates the selected transport is rewinding.
2	Beginning of Tape (BOT): A one indicates the BOT reflective strip is sensed by the selected transport.

Main Status Register Contents and Indications

Status Indication

Bit 3 SELECT REMOTE: A one indicates the selected transport is not on-line.

4 PARITY ERROR: A one indicates a longitudinal parity error, vertical parity error, or CRC error has been detected.

5 File Mark (FMK): A one indicates the selected transport detected a File Mark during a Write FMK, Space, Read, or Read/Compare operation.

6 RECORD LENGTH INCORRECT: A one indicates that during a Read or Read/Compare operation, the record length was different from the contents of the WC Register. The Word Count Register is read to determine whether the record was long or short.

7 DATA REQUEST LATE: A one indicates the computer failed to service the break request before the next data transfer to or from the transport.

8 END OF TAPE (EOT): A one indicates the EOT reflective strip has been sensed by the selected transport.

9 FILE PROTECT: A one indicates the selected transport has a write lockout ring removed and no write functions are accepted.

10 R/C ERROR: A one indicates a comparison failure occurred during the Read/Compare function. The CA Register contains the address of the word which produced the error.

Bit 11 A one indicates one of the following ILLEGAL FUNCTIONS has been programmed.

1. Execution of LCMR, LFGR, or LDBR while the control is busy.
2. Specifying any density but 800 bpi for a 9 channel transport.
3. A Space Reverse function when the transport is at BOT.
4. Read, Read/Compare or Space Forward after a Write or Write End of File (WEOF) command on same transport.
5. Changing to transports which are not ready (TUR is false) when preset is issued.
6. Attempting to Rewind when tape is at BOT.
7. Attempting to write when the transport is write protected.

Read Command Register (RCMR)

Octal Code: 6715

Operation: Clear the AC and transfer the contents of the Command Register to the AC. The contents of the Command Register for this instruction are the same as that for the Load Command Register instruction.

Read Function Register and Second Status Register (RFSR)

Octal Code: 6716

Operation: Clear the AC and transfer the contents of the Function Register and Second Status Register to the AC.

Second Status Register Contents and Functions

Bit No.	Function
7	NOT USED
8	EMA 7 INC ERROR: EMA 7 INC ERROR occurs if you attempt to increment the EMA from Field 7 to Field 0. The data wraps around in Field 7.
9	VERTICAL PARITY ERROR (VPE): A one indicates a VPE Error has been detected. This bit is set only on the character that is bad and cleared by the next good character.
10	CRC ERROR (CRCE): A one indicates a CRC Error has been detected.
11	LONGITUDINAL PARITY ERROR (LRCE): A one indicates a longitudinal parity error has been detected.

Read Data Buffer Register (RDBR)

Octal Code: 6717

Operation: Clear the AC and transfer the contents of the Data Buffer Register to the AC. This instruction may be used in an error check routine to read the contents of the LRC Register.

Skip If ERROR Flag Is Set (SKEF)

Octal Code: 6721

Operation: Skip the next instruction if the ERROR flag is set.

Skip Control Not Busy (SKCB)

Octal Code: 6722

Operation: Skip the next instruction if the control is not busy. Control is busy when the transport is in a GO condition and becomes not busy when MTTF is set at the End of Job (data transfer completed).

Skip Job Done (SKJD)

Octal Code: 6723

Operation:1 Skip the next instruction if the MTTF is set under following conditions.

a. When the Job Done (MTTF) is set at LRC's time of a Read, Read/Compare, Write, or Write File Mark operation.

b. At the LRC's time following EOT, FMK, or WCOV during spare operations.

c. MTTF is set by OFFLINE Function, SELECT ERROR.

d. MTTF is set by a LDBR (Load Data Buffer Register) instruction and WCOV.

e. When Rewinding Status & Rewind Function.

Skip if Tape Unit Ready (SKTR)

Octal Code: 6724

Operation: Skip the next instruction if the Tape Unit is Ready (TUR is true).

Clear All Register and Flag (CLF)

Octal Code: 6725

Operation: Clear all TM8-E registers and flags if TUR is true. If TUR is false clear MTTF, ERROR flag and Status Registers.

Check Data Late Error (CKDL)

Octal Code: 6727

Operation: Force a DATA LATE error condition during a data transfer. This instruction is used only for maintenance.

Set Break Request (SBRM)

Octal Code: 6727

Operation: Set BRK RQST for one Data Break. This instruction is used for maintenance only.

6. Power Failure

6.1 Computer power failure will cause the TU10's to shut down through the use of a power control. Restart of the transport will be manual. Refer to Par. 3.2.3 TU10 Maintenance Manual, in addition to Par. 3.2.3:

When it is desired to continue operation the tape must be returned to a reference point such as BOT.

6.2 Transport Power Failure

Refer to Par. 3.2.3 and 3.2.4 TU10 Maintenance Manual, plus the addition in Par. 6.1 of this document.

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

SOFTWARE LIST

MADE BY J. CAHILL DATE 10/27/72	CHECKED DATE	SECTION 1
ENG DATE 10-10-72	PROD D. Kenney DATE 11-10-72	ISSUED SECT. 1

LEGEND

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

ITEM NO.	DWG NO./PART NO.	DESCRIPTION	QUANTITY/VARIATION TM8-E
1	MAINDEC-08-DHTMA-A-D	TM8-E CONTROL TEST PART I	1
2	MAINDEC-08-DHTMA-A-PB	TM8-E CONTROL TEST PART I	1
3	MAINDEC-08-DHTMB-A-D	TM8-E CONTROL TEST PART II	1
4	MAINDEC-08-DHTMB-A-PB	TM8-E CONTROL TEST PART II	1
5	MAINDEC-08-DHTMC-A-D	DRIVE FUNCTION TIMER	1
6	MAINDEC-08-DHTMC-A-PB	DRIVE FUNCTION TIMER	1
7	MAINDEC-08-DTMD-A-D	TM8-E DATA RELIABILITY TEST 9 TRACK	1
8	MAINDEC-08-DTMD-A-PB	TM8-E DATA RELIABILITY TEST 9 TRACK	1
9	MAINDEC-08-DTME-A-D	TM8-E DATA RELIABILITY TEST 7 TRACK	1
10	MAINDEC-08-DTME-A-PB	TM8-E DATA RELIABILITY TEST 7 TRACK	1
11	MAINDEC-08-DHTMF-B-D	TM8-E RANDOM EXERCISER	1
12	MAINDEC-08-DHTMF-B-PB	TM8-E RANDOM EXERCISER	1

KIT CHECK BY _____ DATE _____

INSTALLATION CHECK BY _____ DATE _____

TITLE	ASSY. NO.	SIZE	CODE	NUMBER	REV.	ECO NO
TM8-E SOFTWARE LIST	SHEET 1 OF 1	A	SL	TM8-E-7	A	TM8E-00002
		DIST.				

DEC FORM NO.
DRA 120

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ACCESSORY LIST

MADE BY D.KANEY DATE 10/9/72	CHECKED A.S.L. DATE 11-10-72	SECTION 1
ENG A.S.L. DATE 11-10-72	PROD D. Kaney DATE 11-10-72	ISSUED SECT. 1

LEGEND

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

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION TM8-E
1	B-DD-TM8-Ø	PRINT SET	1
2	LIBKIT TM8-E	SOFTWARE KIT	1
3	DEC-8E-HR3B-D-TM8E	MAINTENANCE MANUAL *	1

* UNTIL MAINTENANCE MANUAL BECOMES AVAILABLE SHIP ENGINEERING SPECS. FOR TM8-E.

KIT CHECK BY _____ DATE _____

INSTALLATION CHECK BY _____ DATE _____

TITLE: TM8-E ACCESSORY LIST	ASSY. NO. //	SIZE A	CODE AL	NUMBER TM8-E-8	REV.	ECO NO
	SHEET 1 OF 1	DIST.				

DEC 16-(325)-1075-N172 DRA 121

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

DATE 03/13/73

TITLE TM8E ACCEPTANCE PROCEDURE

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A	UPDATE PER ECO	TM8E-00002	LORD	11/73	[signature]	2/74

ENG	APPD	SIZE	CODE	NUMBER	REV
Carl Cline	[signature]	A	SP	TM8-E-9	A

DEC FORM NO. DRA 107A

ENGINEERING SPECIFICATION CONTINUATION SHEET

TITLE TM8E ACCEPTANCE PROCEDURE

1.0 SCOPE

To define the criteria necessary to accept for shipment of the TM8E magtape control.

2.0 TEST SOFTWARE

Control Test Part 1	MAINDEC-08-DHTMA
Control Test Part 2	MAINDEC-08-DHTMB
Drive Function Timer	MAINDEC-08-DHTMC
Data Reliability 9 CH	MAINDEC-08-DHTMD
Data REliability 7 CH	MAINDEC-08-DHTME
Random Exerciser	MAINDEC-08-DHTMF
DEC/X8 Module TM8EMT	MAINDEC-X8-DHTMA

3.0 TEST HARDWARE

3.1 Computer

PDP8E,M,F with a standard programmer's console and at least 4K of read/write memory and a teletype.

3.2 Tape Unit

TU10 Master

4.0 PROCEDURE

4.1 Install TM8E (M8321, M8322, M8323, M8327) into omnibus, refer to PDP8E Maintenance Manual, Vol. 1 for module priority.

4.2 Install BC08L cable between control and TU10 Master, BC08L to be correct length for system not to exceed 15 feet. Also install M989 terminator in Slot A06 or A07 of TU10 Master.

4.3 Install six (6) H851 top connectors.

4.4 Run Control Test Part 1, MAINDEC-08-DHTMA for 2 complete long passes without any errors.

4.5 Run Control Test Part 2, MAINDEC-08-DHTMB

4.5.1 Run each transport selected to unit zero for one complete long pass without any errors. (Tests 15 through 30. This includes manual intervention.)

SIZE	CODE	NUMBER	REV
A	SP	TM8-E-9	A

DEC FORM NO 16-1022

4.0 PROCEDURE (Continued)

4.5 Run Control Test Part 2, MAINDEC-08-DHTMB (Con't)

4.5.2 Run each transport one quick verify pass for each unit select position. (Unit 0-7). Tests 15 through 27, Manual intervention need not be run.

4.6 Run Drive Function Timer through two complete passes insuring no drastic changes in timing, these printouts to be shipped with transports. See Note 4.

4.7 Unit Compatibility

Using previously generated test tape run Data Reliability 7 or 9 depending upon type of unit being tested to insure compatibility. Use Test 9, Pattern 5, odd parity, max to min and set switch 4, no non-recoverable read errors are allowed and no more than two recoverable read errors are allowed. Repeat this for each unit in the system.

Test	Pattern	Parity	Density	RLS	WMO	RMO
9	5	1	800	3	1	1

5.0 RUN DATA RELIABILITY TEST

Use the following test on all 7 or 9 channel units respectively. See Notes 1 and 2.

7 CH Unit

Test	Pattern	Parity	Density	RLS	WMO	RMO
4	6	1	800	2	1	1
5	7	1	556	3	2	2
5	5	1	200	1	0	0

9 CH Unit

Test	Pattern	Parity	Density	RLS	WMO	RMO
4	6	1	800	2	1	1
5	7	1	800	3	2	2
5	5	1	800	1	0	0

6.0 Run Random Exerciser for 2 hours per unit. See Note 1.

7.0 SYSTEM EXERCISER - DEC/X8

7.1 Run DEC/X8 using TM8EMT module for the prescribed time to accept a system with a Data Break. See Note 3. Refer to Engineering Specification "DEC/X8 System Checkout and Acceptance Procedure for 8 Family Systems" for exact time to be run.

8.0 SHIPPING SOFTWARE

Manual: TM8E Maintenance Manual

Print Set: TM8-E-0

Programs:
Control Test Part 1 - MAINDEC-08-DHTMA
Control Test Part 2 - MAINDEC-08-DHTMB
Drive Function Timer- MAINDEC-08-DHTMC
Data Reliability 9CH- MAINDEC-08-DHTMD
Data Reliability 7CH- MAINDEC-08-DHTME
Random Exerciser - MAINDEC-08-DHTMF

9.0 SHIPPING HARDWARE

9.1 (2) BC08L cables, length as required not to exceed 15 feet.

9.2 (1) M8321 Output Control

9.3 (1) M8332 Control Board

9.4 (1) M8323 Input Control

9.5 (1) M8327 Register Board

9.6 (1) M989 Terminator Board

9.7 (6) H851 Top Connector

NOTE 1: a) Tape must be of known condition and unit must be clean.

b) No more than 7 WRITE status errors per pass of tape. A permanent WRITE error (written with XIRG four times and still bad) means that the tape is physically bad and must be replaced. See Note 1A.

c) No more than 2 recoverable read errors in a pass of tape.

d) No non-recoverable read errors.

e) No mechanical or control failures.

f) No DATA errors without parity and error flag.

NOTE 2: DATA RELIABILITY

a) READ Errors are the total number of READ errors including errors on rereads.

b) NON-Recoverable Error is encountered when an attempt to read a record fails after 2 rereads.

c) Data Errors are the total number of Read/Compare errors not including rereads.

d) Data No Status is the total of data errors not accompanied by any error status flags. This condition should be regarded as non-recoverable.

NOTE 3: ERROR ECPLANATION DEC/X8

a) Total number of write parity errors not to exceed seven per pass of tape.

b) Total number of read parity errors not to exceed four per pass of tape.

c) No fatal errors are allowed.

d) To determine if the TM8E is acceptable, refer to the following information to decipher the print-outs from DEC/X8.

Following is a chart of the possible error conditions that can exist. The type of error is listed to the right. (WRITE, READ and FATAL) and an explanation of each condition is following.

ERROR CONDITIONS	CODE 4000 WRITE PARITY ERRORS	CODE 3000 READ/COMPARE PARITY ERRORS	CODE 2000 READ PARITY ERRORS	CODE 2000 READ DATA ERROR	ECT	MULTI	TYPE
1	0	0	0	0	1	1	OK
2	1	X	X	X	0	1	WRITE
3	0	X	X	0	0	X+X	READ
4	0	X	1	1	0	TALLY	READ
5	0	X	0	1	0	1	FATAL

X = May or may not be true 0 = A false Condition

1 = A true condition

MULTI = The number of errors (READ, WRITE or Fatal) per condition to be added to the total allowable errors per pass of tape.

Condition One: The End-of-Tape (EOT) is detected generally during a WRITE operation; however, it may occur during either Read Compare or Read Operations. The status is typed out at this time indicating the magtape has reached the end of tape. The transport will then be rewound to BOT and continue until an error or EOT is encountered. This condition is not an error, it is only an indication of the number of passes of tape.

Condition Two: A WRITE status error may occur seven times per pass of tape. Condition two indicates a write status error has occurred. The SA and SJ register must be examined to guarantee only a parity error was encountered. A Read/Compare and/or a Read Status Error may follow the WRITE status printout. If the CNTR number and the SL number are the same as the previous WRITE status printouts, disregard the READ error and Read/Compare and count this condition as ONE WRITE PARITY ERROR. If,however, an error status bit other than a parity or Read/Compare error is encountered, this condition should be regarded as FATAL.

Condition Three: Per pass of tape only four read errors are allowed.

Condition three will involve a parity error on either read or read/compare operation; this condition should be counted as one READ ERROR. However, if both Read and Read/Compare operations encountered parity errors and the CNTR number and SL number for each are the same, this condition should be counted as two READ errors. In both of the preceding examples, if any error status bit other than a parity or Read/Compare error is set, then a FATAL error was encountered.

Condition Four: Condition 4 is the same as Condition 3 with the exception that the TALLY will equal the number of READ errors for both Read/Compare and READ operations.

Condition Five: Condition 5 involves a DATA error without any parity or error status bits set. This type error should be considered Fatal.

NOTE 4: TIME LIMITS SPECIFICATION

The table below lists the time limits in the same format as they are printed on the TTY. Times listed under Unit Ø are 9 track times, and those under Unit 1 are 7 track times. All times are in milliseconds.

FUNCTION	(9 Track)	+/-	(7 Track)	+/-
8ØØ BPI	Unit 0		Unit 1	
WR FM BOT Delay	185	15	185	15
WRITE SHUTDOWN	2.7	0.5	2.7	0.5
WRITE START	8.9	1.0	12.6	1.0
WR NONSTOP GAP	11.5	2.0	14.5	2.0
BKSP SHOWN+SDWN	15	5	19	5
READ SHUTDOWN	1.8	0.5	1.8	0.5
WRITE XRIG	95	10	95	10
LAST CHR TC CUR	0.3	0.1	0.3	0.1
RD FM BOT DELAY	185	15	185	15
SPCE SHDWN+SDWN	14	5	14	5
WRITE EOF	100	10	105	10
ER TO EF SP TME	100	10	105	10
WR TO ERASE HEAD	12	5	12	5
1 INCH DATA TIME	22	1	22	1
GAP 1				
GAP 2				
GAP 3				
GAP 4	GAPS: 8>7>6>5>4>1; 1-2<3,7; 2>3			
GAP 5				
GAP 6				
GAP 7				
GAP 8				

556 BPI	Unit 1	+/- (7 Track)
WR FM BOT DELAY	185	15
WRITE SHITDOWN	2.7	0.5
LAST CHR TO CUR	0.35	0.1
BKSP SHDWN+SDWN	19	5
READ SHUTDOWN	1.8	0.5
1 INCH DATA TIME	22	1

200 BPI	Unit 1	+/- (7 Track)
WR FM BOT DELAY	185	15
WRITE SHUTDOWN	2.7	0.5
LAST CHR TO CUR	1.05	0.2
BKSP SHDWN+SDWN	19	5.0
READ SHUTDOWN	1.8	0.5
1 INCH DATA TIME	22	1