digital

KM8-A

Engineering Drawings

Digital Equipment Corporation

digital EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS

DRAWING DIRECTORY

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THIS IS PRINT SET

UNIT VARIATIONS

VAR	TITLE	PRINT SET MP-KM8-A
KM8-AA	8A INTERNAL OPTION #2	X
KM8-AB	KM8-AA W/O BOOTSTRAP ROMS	X

REVISIONS	REV	CHG. NO.	DATE

USED ON OPTION/MODEL	
PDP8A	

SHEET 1 OF 2

DRN. L.NARHI	DATE 11/1/74	TITLE 8A INTERNAL OPTION #2
CHK'D. S.Roberts	DATE 12-20-74	
PROJ ENG. Larry Harris	DATE 12/20/74	
PROD. Dan Dore	DATE 12-20-74	SIZE B / CODE DD / NUMBER KM8-A / REV
FIELD SERV. Carl Cole	DATE 12-20-74	DIST

DEC 16-13251-1062-1A-R972

DRB 106

ELECTRICAL

CUSTOMER PRINT SET MP-KM8-A	MFG. SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE
X		1	A-SP-KM8-A-1	*	2	FIELD INST. & ACCEPT. PROC.	
X			A-PL-KM8-A-2	*	1	SHIPPING LIST	
X			A-PL-KM8-A-3	*	1	SOFTWARE LIST	
X			D-TD-KM8-A-4	*	1	AUTO REST./BOOT START-UP SEQ.	
X			D-TD-KM8-A-5	*	1	BOOTSTRAP TIMING DIAGRAM	
X			D-FD-KM8-A-6	*	2	MEMORY EXT FLOW DIAGRAM	
X			A-SP-KM8-A-7	*	4	ROM PROGRAMMING DIRECTIONS	
			A-SP-KM8-A-8		8	ENG. SPECS	
X		2	D-CS-M8317-Ø-1	#	7	8A INTERNAL OPTION #2	M8317
			K-CO-M8317-Ø-4	#	1	X-Y COORDINATE HOLE LOCATION	
			D-AD-M8317-Ø-5	#	1	ASSY/DRILLING HOLE LAYOUT	
			B-MH-M8317-Ø-6	#	1	MODULE HISTORY	
X			K-RL-M8317-Ø-8	#	2	ROM PATT. SPEC.	
X			K-RL-M8317-Ø-9	#	9	ROM PATT. SPEC	
X			K-RL-M8317-Ø-1Ø	#	9	ROM PATT. SPEC	
X			K-RL-M8317-Ø-11	#	9	ROM PATT. SPEC	

MECHANICAL

CUSTOMER PRINT SET MP-KM8-A	MFG SET	FIND NO.	DRAWING NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE
X		1	A-PL-KM8-A-Ø	*	1	PARTS LIST	

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
8A INTERNAL OPTION #2	SHEET 2 OF 2	B	DD	KM8-A	

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION DATE 11/19/74

TITLE FIELD INSTALLATION & ACCEPTANCE PROCEDURE FOR KM8-A

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

ENG	APPD	SIZE	CODE	NUMBER	REV
Larry Martin 12/26/74		A	SP	KM8-A-1	

DEC 16-(392)-1079-N971
DRA 107

ENGINEERING SPECIFICATION [redacted] CONTINUATION SHEET

TITLE FIELD INSTALLATION & ACCEPTANCE PROCEDURE FOR KM8-A

I GENERAL

This procedure defines the performance standards required of the KM8A*, option board #2. This procedure refers to both system and add-on acceptance.

NOTE: If KM8A was shipped as part of a PDP-8A system, then proceed to installation procedure.

* Memory Extension & Time Share
Bootstrap Loaders
Power Fail/Auto Restart

II INSPECTION

After removing the KM8A from the packing material, inspect the module for the following:

1. Inventory hardware against shipping list.
2. Inventory software against software list, if ordered.
3. Inventory prints against shipping list, if ordered.
4. Check module for loose or broken components.

III INSTALLATION PROCEDURE

Install the equipment using the following procedure:

1. Set the switches as indicated by the diagnostic write up.

NOTE: Refer to Operator's Handbook for switch setting descriptions.

2. Insure that the PDP-8A power is removed from the Omnibus™.

3. Insert the KM8A into the second or third slot of the Omnibus™.

4. Turn the power back "ON".

IV ACCEPTANCE PROCEDURE

Perform the acceptance procedure defined in Table A. If abnormal indications are encountered, refer to the diagnostic listing for the type of error. Reference the diagnostic write ups and Operator's Manual for instructions for loading diagnostics.

SIZE	CODE	NUMBER	REV
A	SP	KM8-A-1	

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

IV ACCEPTANCE PROCEDURE (continued)

Equipment required:

1. PDP-8A with 1K min. R/W Memory
2. Paper Tape Input Device
3. Diagnostic and Listings
4. Programmer's Console (KC8-A & DKC8-A)
5. W987 Quad Extender

NOTE: If the programmer's console and paper tape input device are not available as part of the system being used, they must be supplied in good working order by the customer.

TABLE A

Acceptance of KM8A with 4K of R/W Memory

Program Name	Maindec #	Accept Time	Restrictions
KM8A Option Test #2	08-DJKMA-PB	30 min	4K R/W Memory Min

Acceptance of KM8A with Less than 4K R/W Memory

KM8A Option Test #2 Segment #1 (RIM)	08-DJKMA -PM1	10 min	1K R/W memory min
KM8A Option Test #2 Segment #2 (RIM)	08-DJKMA -PM2	10 min	1K R/W Memory Min
KM8A Option Test #2 Segment #4 (RIM)	08-DJKMA -PM4	10 min	1K R/W Memory Min

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

PARTS LIST

MADE BY Paul Gardner	CHECKED S. Roberts	SECTION
DATE 11/11/74	DATE 12-20-74	
ENG Larry Martin	PROD [illegible]	ISSUED SECT.
DATE 12-20-74	DATE 12-20-74	

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION KM8-AA	KM8-AB
1	MP-KM8-A	*KM8-A MAINTENANCE PRINT SET	0	0
2	A-PL-KM8-A-3	*KM8-A SOFTWARE LIST	0	0
3	DEC8A-HUMAA-A-D	*PDP8A USER'S MANUAL	0	0

* THIS ITEM IS AN OPTION AND IS TO BE SHIPPED ONLY WHEN PURCHASED AS A SEPARATE ITEM.

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.	ECO NO.
SHIPPING LIST, KM8-A		A	PL	KM8-A-2		
	SHEET 1 OF 1	DIST.				

DEC FORM DEC 16-(325)-1031-N87(
DRA 110

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

PARTS LIST

MADE BY Paul Gardner	CHECKED S. Roberts	SECTION
DATE 11/11/74	DATE 12-20-74	
ENG Larry Nacht	PROD [illegible]	ISSUED SECT.
DATE 12-20-74	DATE 12-20-74	

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION KM8-AA	KM8-AB
1	ZF209-RB/KM8-A	4K OPTION #2 SOFTWARE	1	1
2	ZF210-RB/KM8-A	1K-2K-3K OPTION #2 SOFTWARE	1	1

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.	ECO NO.
SOFTWARE LIST, KM8-A	SHEET 1 OF 1	A	PL	KM8-A-3		
		DIST.				

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

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

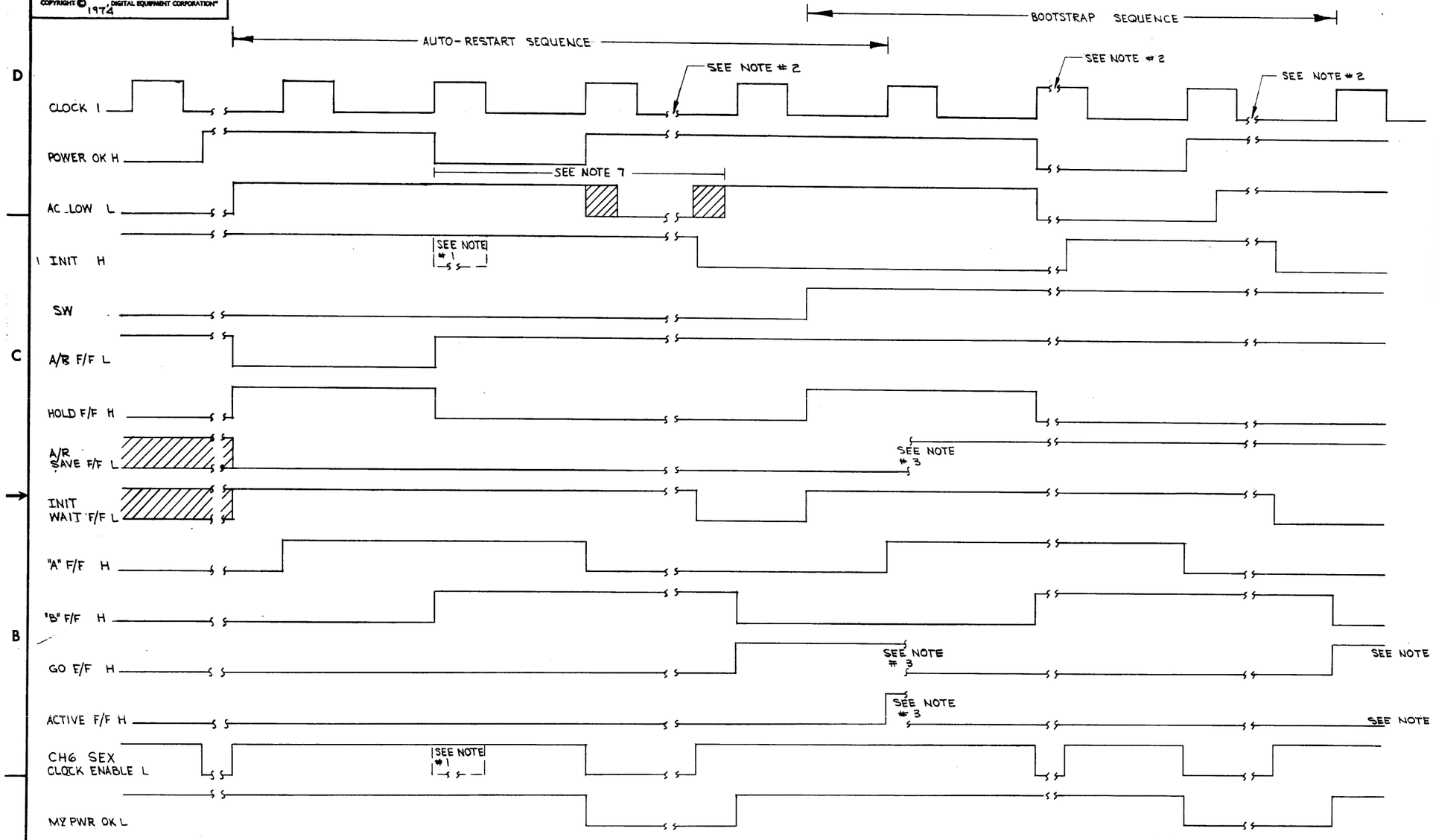
PARTS LIST

MADE BY Paul Gardner DATE 11/11/74	CHECKED S. Roberts DATE 12-20-74	SECTION
ENG Larry Marlin DATE 12-20-74	PROD [illegible] DATE 12-20-74	ISSUED SECT.

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION KM8-AA	KM8-AB
1	D-CS-M8317-Ø-1	8A INTERNAL OPTION #2	1	0
2	D-CS-M8317-YA-1	8A INT. OPTION #2, W/O BOOTSTRAP ROMS	0	1
3	A-PL-KM8-A-2	SHIPPING LIST, KM8-A	1	1

TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV.	ECO NO.
8A INTERNAL OPTION #2	SHEET 1 OF 1	A	PL	KM8-A-Ø		
		DIST.				

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



NOTES:

1. CLOCK ENABLE MAY BE FALSE AT THIS TIME, IF INIT H IS FALSE. CLOCK ENABLE THEN RETURNS HIGH (ASSERTED) WHEN INTH BECOMES TRUE
2. THE LOGIC WAITS FOR INITIALIZE TO START OR END BEFORE CONTINUING
3. THESE FLIP-FLOPS ARE CLEARED AT THE CONCLUSION OF THE AUTO RESTART CYCLE
4. ACTIVE SETS ON THE NEXT CLOCK PULSE THEN CLEARS AT THE END OF THE CYCLE
5. GO F/F CLEARS AT THE END OF CYCLE
6. SEE D-FD-KM8-A FOR DETAILED TIMING DATA AFTER AFTER ACTIVE IS SET
7. THE SWITCHING TIMES FOR AC LOW ARE A FUNCTION OF THE SLEW RATE OF THE CIRCUITS IN THE POWER SUPPLY

REVISIONS	REV.	CHANGE NO.	CHK

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8-A		PARTS LIST		

DIMENSIONAL TOLERANCE
DIMENSIONS ARE [redacted] UNLESS OTHERWISE SPECIFIED

MILLIMETERS	INCHES	ANGLES
X.XX ±0.10	X.XXX ±.005	±0° 30'
X.X ±0.5	X.XX ±.02	
X ±2	X ±.1	

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL —//—

FINISH —//—

DRN.	George Drayton	DATE 7/25/75
CHKD.	[redacted]	DATE
ENG.	[redacted]	DATE 10/75
PROJ. ENG.	[redacted]	DATE 10/75
PROD.	[redacted]	DATE 10/75

NEXT HIGHER ASSY. B-DD-KM8-A

SCALE —//—

SHEET 1 OF 1

digital

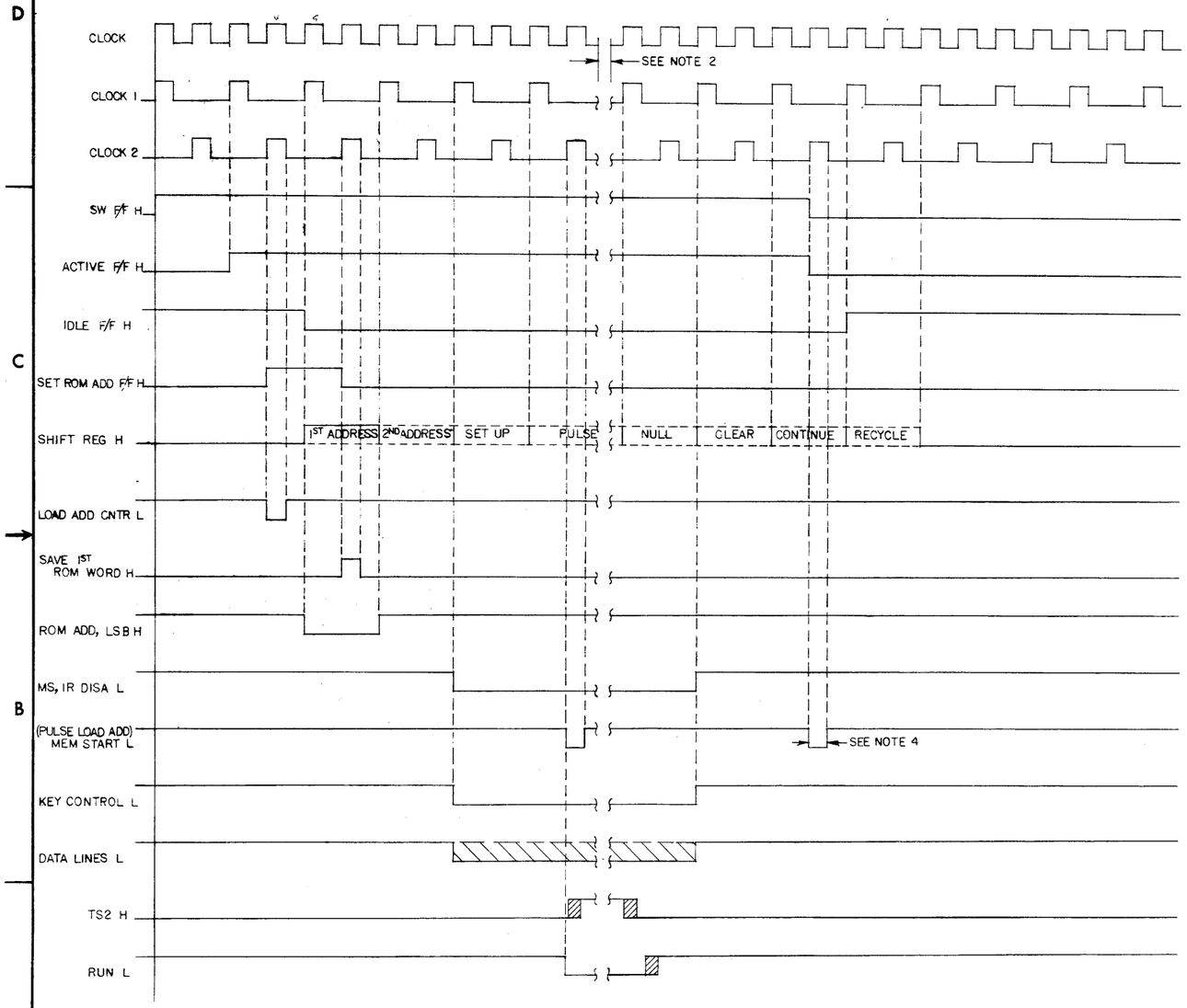
TITLE AUTO RESTART/ BOOTSTRAP START-UP SEQUENCE

SIZE	CODE	NUMBER	REV.
D	TD	KM8-A-4	

DIST.

DEC FORM NO. DRD 100-8

SIZE DTD NUMBER KM8-A-4 REV.



NOTES:

1. ONE "DEPOSIT" CYCLE IS SHOWN IN DIAGRAM.
2. WHEN "RUN" IS TRUE (LOW) ALL TIMING IS HELD OFF UNTIL THE NEXT CLOCK PULSE AFTER "RUN" GOES FALSE (HIGH).
3. FOR THE "LOAD ADD" CYCLE SIGNALS REMAIN THE SAME AS SHOWN EXCEPT THAT "PULSE LOAD ADD" REPLACES "MEM START" AND "KEY CONTROL" IS NEGATED. FOR "EXT LOAD ADD" KEY CONTROL IS TRUE.
4. MEM START APPEARS HERE ONLY FOR THE "START" FUNCTION. THE EARLIER MEM START IS FOR "DEPOSITS" ONLY.

REVISIONS	REV.	CHANGE NO.	CHK

B.L.M. P-624

DEC FORM NO. DRD 1020

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8-A		PARTS LIST		

DIMENSIONAL TOLERANCE
DIMENSIONS ARE MILLIMETERS / INCHES
UNLESS OTHERWISE SPECIFIED

MILLIMETERS	INCHES	ANGLES
X.XX = ±0.10	.XXX = ±.005	±0° 30'
X.X = ±0.5	.XX = ±.02	
X = ±2.	.X = ±.1	

THIRD ANGLE PROJECTION

REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓

MATERIAL —/—

FINISH —/—

DRN.	M White	DATE 7-31-74
CHKD.	Dick Glenn	DATE 8/7/74
ENG.	Larry Fiedler	DATE 1-8-75
PROJ. ENG.	Larry Fiedler	DATE 1-8-75
PROD.		DATE 1-8-75

NEXT HIGHER ASSY.
B-DD-KM8-A
SCALE NONE
SHEET 1 OF 1

digital

TITLE
BOOTSTRAP TIMING DIAGRAM

SIZE	CODE	NUMBER	REV.
D	TD	KM8-A-5	

DIST.

READ S.F. INTO AC 5-11 ACØ-4 ← CPU STATUS INFO

FC3 GTF

MD3-11 = ØØ4^ I/O PAUSE

ENA S.F. TO INT'L BUS
DISABLE I.F OUT
ENA INT'L BUS TO DATA 5-11. SEE ALSO CPU IOT 6ØØX FLOW CHART

TP3

AC GETS LOADED FROM DATA LINES Ø-11 IN CPU

LOAD UB, IB & DF FROM DATA 5-11

FC3 RTF

MD3-11 = ØØ5^ I/O PAUSE

DISABLE IF OUT
ENA DATA 5-11 TO INT'L BUS ENA INT'L BUS TO IB, UB & DF
SEE ALSO CPU IOT 6ØØX FLOW CHART

TP3

CLOCK UB, IB, DF & INT. INH. F/F

UB, IB & DF ← DATA 5-11
INT INHIBIT ← 1

TO UPDATE I.F. GO TO FC5V FC9

"OR" DATA FIELD INTO ACØ-5

FC3 RDF

MD3-11 = 214^ I/O PAUSE

ENABLE D.F. TO DATA LINES 6-8
INTERNAL I/O ← 1
C1 ← 1

TP3

AC GETS LOADED FROM DATA LINES Ø-11 IN CPU

"OR" SAVE FIELD AND USER MODE BIT INTO AC5-11

FC3 RIB

MD3-11 = 234^ I/O PAUSE

DISABLE I.F OUT
ENABLE S.F. OUT TO INTERNAL BUS
ENABLE INTERNAL BUS TO DATA LINES 5-11
INTERNAL I/O-1, C1 ← 1

TP3

AC GETS LOADED FROM DATA LINES Ø-11 IN CPU

CHANGE TO DATA FIELD "N"

FC3 CDF

MD3-11 = 2N1^ I/O PAUSE

DISABLE IF OUT ENA MD6-8 TO INT'L BUS ENA D.F. IN INTERNAL
INTERNAL I/O ← 1

TP3

CLOCK D.F.

D.F. ← INT'L BUS

FOR ENA ← DF SEE FC5V FC9

CHANGE TO INSTRUCTION FIELD "N"

FC3 CIF

MD3-11 = 2N2^ I/O PAUSE

DISABLE I.F. OUT
ENA MD 6-8 TO INT'L BUS ENA I.B IN INTERNAL I/O ← 1

TP3

CLOCK I.B.

I.B. ← INT'L BUS

TO UPDATE I.F. GO TO FC5VFC9

"OR" INSTRUCTION FIELD INTO AC6-8

FC3 RIF

MD3-11 = 224^ I/O PAUSE

DISABLE D.F. TO DATA LINES 9-11 ENABLE I.F TO DATA LINES 6-8
INTERNAL I/O ← 1
C1 ← 1

TP3

AC GETS LOADED FROM DATA LINES Ø-11 IN CPU

RESTORE I.B, DF & U.B FROM SAVE FIELD (S.F)

FC3 RMF

MD3-11 = 244^ I/O PAUSE

DISABLE I.F OUT
DISABLE D.F. OUT
ENA S.F TO INT'L BUS
ENA I.B, DF, & U.B IN INTERNAL I/O ← 1

TP3

CLOCK IB, D.F & U.B

LOAD D.F I.B & U.B FROM THE SAVE FIELD REGISTER

TO UPDATE I.F. GO TO FC5VFC9

REVISIONS | REV. | CHANGE NO. | CHK

DEC FORM NO. DRD 102A

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8A		PARTS LIST		

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

MATERIAL

FINISH

DRN.	KG	DATE 12/23/74
CHK.		DATE 12/27/74
ENG.		DATE 1-8-75
PROJ. ENG.		DATE 1-8-75
PROD.		DATE 1-8-75

NEXT HIGHER ASSY B-DD-KM8-A

SCALE

SHEET 1 OF 2

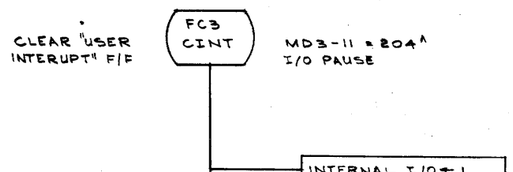
digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS

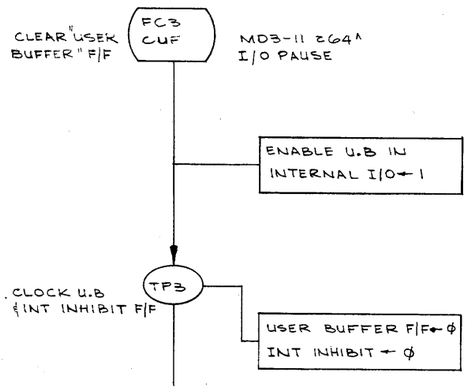
TITLE
FLOW CHART FOR OPTION BOARD #2 M8317

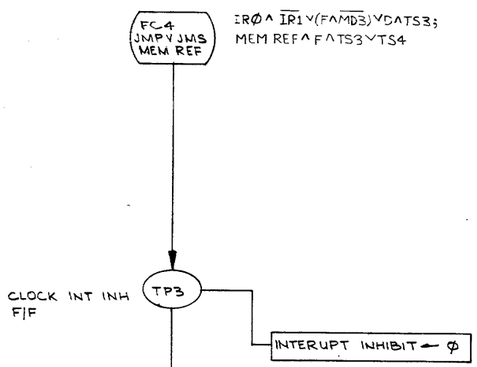
SIZE	CODE	NUMBER	REV.
D	FD	KM8-A-6	

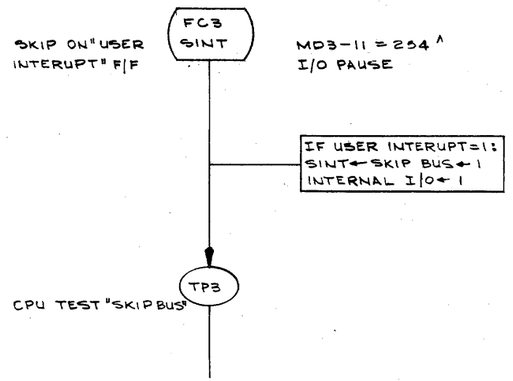
DIST.

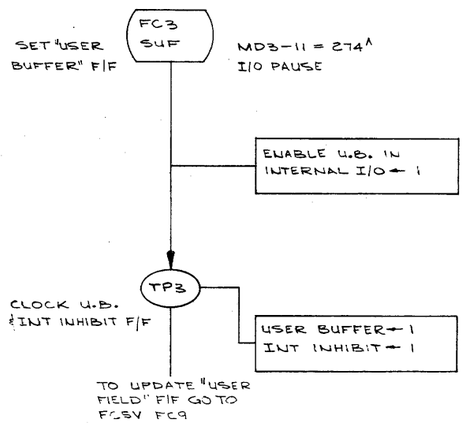
SIZE D CODE FD NUMBER KM8-A-6 REV.

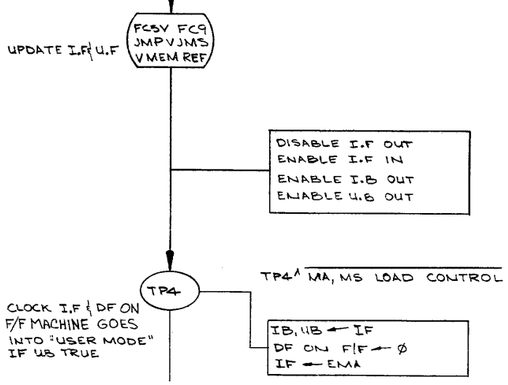












REVISIONS		
CHK	CHANGE NO	REV

TITLE	SIZE	CODE	NUMBER	REV.
FLOW CHART FOR OPTION BOARD #2 M8317	D	FD	KM8-A-6	.
SCALE —/— SHEET 2 OF 2	DIST.			

DEC FORM NO DPD 137

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 5/8/74

TITLE ROM PROGRAMMING DIRECTIONS FOR 8A OPTION BOARD #2 KM8-AB (M8317-YA)

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A	E.C.O. CHANGE	00001	L.NARHI	14MAY76	L. Narhi	21-MAY

ENG	APPD	SIZE	CODE	NUMBER	REV
Larry Narhi	Larry Narhi 12/20/74	A	SP	KM8-A-7	A

DEC FORM NO. DRA 107

ENGINEERING SPECIFICATION [redacted] CONTINUATION SHEET

TITLE ROM PROGRAMMING DIRECTIONS FOR 8A OPTION BOARD #2 KM8-AB (M8317-YA)

1. Introduction

This document describes the organization of the two 256 x 4 ROMs, hereafter called ROM #1 and ROM #2, that control and supply data for the Auto-Restart and Bootstrap portions of Option Board #2.

This information is made available to help users program their own ROMs for their specific Auto-Restart and/or Bootstrap program(s).

2. Organization

The two ROMs are connected as follows: the address lines are connected in parallel; i.e., two corresponding address lines of each ROM are connected together, the outputs are arranged in serial fashion forming an 8 bit word, 4 outputs from each ROM. Because 12 bits are required for data/address information, two sequential addresses must be accessed from the ROMs to form a 16 bit word. Where the first 8 bits are temporarily stored in a register, then the next 8 bits are accessed from the ROMs. At this point the control then decides what to do with 12 of the 16 bits. There are four possible actions that can take place at this time:

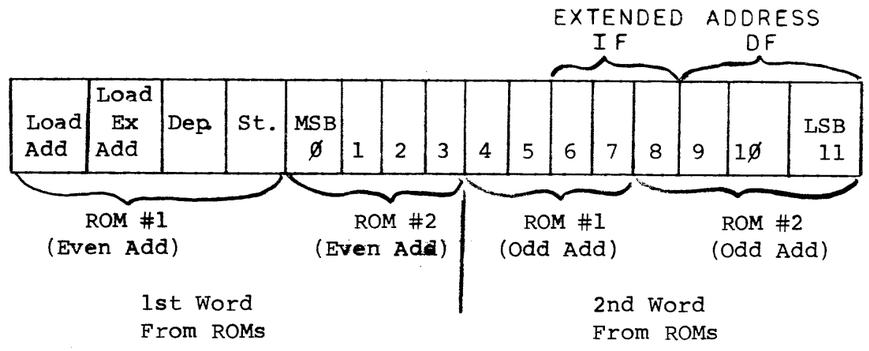
a) Load Address
b) Load Extended Address, IF AND DF
c) Deposit
d) Start

The remaining 4 bits of the 16 actually tell the control which of the four actions are to take place. So the 16 bit word would look like the word in Figure 1.

SIZE	CODE	NUMBER	REV
A	SP	KM8-A-7	A

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

Figure 1



The use of ROMs that have 256 addressable locations allows up to 128 words of ROM storage. These 128 locations may be used for Bootstrap and/or Auto-restart programs. Any Auto-restart or Bootstrap program may be located anywhere in the ROMs so long as the program starts in an even address in the ROM. If it is required that both Bootstrap and Auto-restart programs be accessible at the same time, activated by different signals; of course the Auto-restart program(s) must be located in addresses Ø through 15 in the ROMs. This is due to the addressing limits of the Auto-restart select switches.

3. Auto-Restart/Bootstrap Sequence

The following events should take place when an auto-restart is initiated:

a) Load a 12 bit address
b) LOAD THE IF AND DF AND START.

The following events should take place when the Bootstrap is initiated:

a) Load a 12 bit initial address.
b) Load the IF AND DF
c) Deposit 12 bit data words repeating as required by length of program to be deposited.
d) Load a 12 bit starting address and start.

The decision to do a Bootstrap or an auto-restart is directed by a set of switches on the module. The Bootstrap may be actuated by the transition of the signal AC Low from a logic low to a logic high or by a similar transition of the SW line on the OMNIBUS.

AN AUTO-RESTART MAY ONLY BE INITIATED BY THE AC LOW SIGNAL. IT SHOULD BE OBVIOUS THAT BOTH THE BOOTSTRAP OR AUTO-RESTART SHOULD NOT BE ACTIVATED BY THE SAME INITIALIZING SIGNAL.

4. ROM Programming Examples

Auto-restart example:

a) Load address Ø2ØØ
b) Load field Ø, start

Starting at ROM address ØØ4

Bootstrap example:

a) Load address ØØ23
b) Load field 7 (BOTH IF AND DF)
c) Deposit 2ØØØ
d) Deposit 6745
e) Deposit ØØ23
f) Deposit 765Ø
h) Deposit 5Ø24
j) Deposit 6733
k) Deposit 5Ø31
l) Load address ØØ24 and start

Starting at ROM address 124.

Auto-Restart example:

Bit / Add	ROM #1 4	3	2	1	ROM #2 4	3	2	1	
4	1	0	0	0	0	0	0	0	Load Address Ø2ØØ
5	1	0	0	0	0	0	0	0	
6	0	1	0	1	0	0	0	0	Load Ext. Add Ø and Start
7	0	0	0	0	0	0	0	0	

NOTE: Logic one (1) = +3V

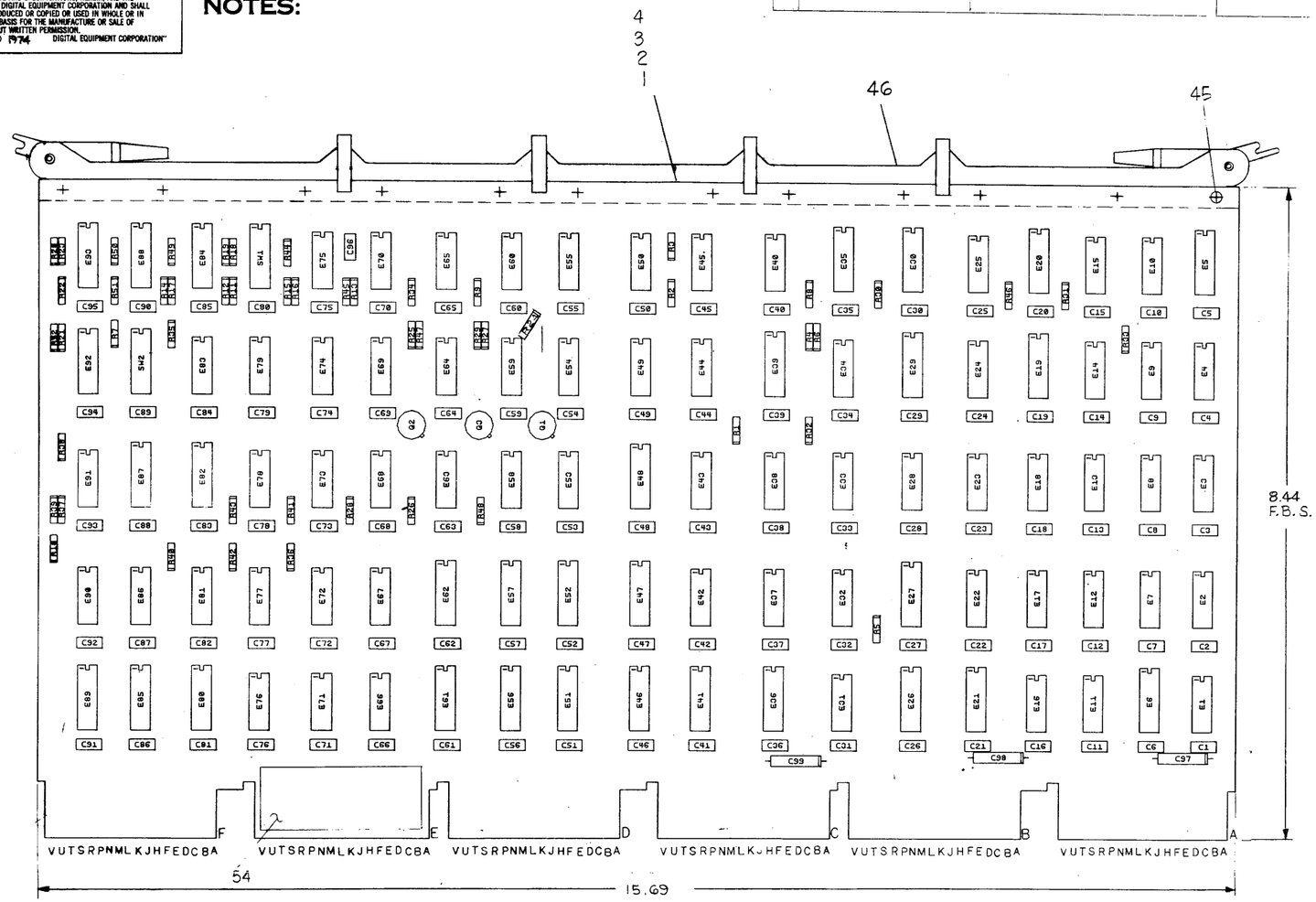
Bootstrap example:

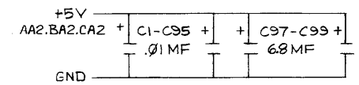
Bit / Add	ROM #1 4	3	2	1	ROM #2 4	3	2	1	
124	1	0	0	0	0	0	0	0	Load Add ØØ23
125	0	0	0	1	0	0	1	1	
126	0	1	0	0	0	0	0	0	Load Ext Add 7
127	0	0	1	1	1	1	1	1	
130	0	0	1	0	0	1	0	0	Dep 2ØØØ
131	0	0	0	0	0	0	0	0	Dep 6745
132	0	0	1	0	1	1	0	1	
133	1	1	1	0	0	1	0	1	Dep ØØ23
134	0	0	1	0	0	0	0	0	
135	0	0	0	1	0	0	1	1	Dep 765Ø
136	0	0	1	0	1	1	1	1	
137	1	0	1	0	1	0	0	0	Dep 5Ø24
140	0	0	1	0	1	0	1	0	
141	0	0	0	1	0	1	0	0	Dep 6733
142	0	0	1	0	1	1	0	1	
143	1	1	0	1	1	0	1	1	Dep 5Ø31
144	0	0	1	0	1	0	1	0	
145	0	0	0	1	1	0	0	1	Load Add 24 & Start
146	1	0	0	1	0	0	0	0	
147	0	0	0	1	0	1	0	0	

5. ROMs

Unprogrammed ROMs should be purchased by the user from Digital Equipment Corporation. The part number for an unprogrammed 256 x 4 ROM is 23-000A2.

NOTES:





IC 7442	8	16
IC 314	1	8
IC 8234	8	16
IC 74173	8	16
IC 74153	8	16
IC 74S257	8	16
IC 8837	8	16
IC 7473	11	4
IC 8266	8	16
IC 74175	8	16
IC TYPE	GND	+5V

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

IC PIN LOCATIONS

REF		X-Y COORDINATE HOLE LOCATION	K-CO-M8317-Ø-4	1
REF		ASSY/DRILLING HOLE LAYOUT	D-AH-M8317-Ø-5	2
REF		MODULE ECO HISTORY	B-MH-M8317-Ø-6	3
1		ETCHED CIRCUIT BOARD	5010938	4
1	C96	CAP 5ØØØ PF 100V DISC	1ØØ1765	5
95	C1-C95	CAP .01 MF 100V 20%	19Ø1618-01	6
3	C97-C99	CAP 6.8 MF 35V 10%	19Ø5396	7
2	SW1, SW2	DIP SWITCH	1211164-04	8
46	R1-R23,R26,R28-R43,R46, R49-R52,R24	RES. 1K 1/4W 5%	13ØØ365	9
1	R44	RES. 100 OHM 1/4W 5%	13ØØ229	10
4	R25,R27,R47,R48	RES. 27 OHM 1/4W 5%	13Ø1522	11
				12
3	Q1,Q2,Q3	TRANSISTOR DEC 3009B	1503100	13
6	E9,58,63,65,78,7Ø	I.C. 7474	19Ø5547	14
6	E12,13,28,54,73,75	I.C. 74ØØ	19Ø5575	15
1	E33	I.C. 741Ø	19Ø5576	16
2	E18,E49	I.C. 7420	19Ø5577	17
1	E11	I.C. 7430	19Ø5578	18
1	E90	I.C. 7473	19Ø5587	19
3	E14,E32,E69	I.C. 7402	19Ø9ØØ4	20
6	E31,34,44,45,60,86	I.C. 74S11	1910537	21
2	E46,E57	I.C. 74S257	1911641	22
1	E8	I.C. 74S74	1910544	23
6	E10,17,66,72,76,77	I.C. 8881	19Ø97Ø5	24
2	E4,E38	I.C. 7417	19Ø9929	25
2	E84,E92	I.C. 8266	1909934	26
1	E29	I.C. 74153	19Ø9937	27
1	E22	I.C. 74S2Ø	1910532	28
2	E83,E91	I.C. 74197	1910035	29
1	E79	I.C. 74164	1910841	30
2	E35,E39	I.C. 7442	1910846	31
3	E25,E71,E74	I.C. 7437	1910891	32
4	E40,E55,E64,E68	I.C. 7408	1910155	33
1	E37	I.C. 314	1909704	34
2	E80,E85	I.C. 74175	1910651	35
1	E24	I.C. 8093	1910837	36
2	E53,E81	I.C. 7427	1910878	37
2	E47,E52	I.C. 8234	1911315	38
6	E19,20,30,48,51,56	I.C. 74173	1911338	39
6	E15,E23,E43,E50,E59,E67	I.C. 7404	1909686	40
1	E82 SEE NOTE 2	I.C. MIKP ROM #1 (256 X 4)	23-158A2	41
1	E87 SEE NOTE 2	I.C. MIKP ROM #2 (256 X 4)	23-159A2	42
1	E26	I.C. MIKP ROM #3 (32 X 8)	23-084A1	43
1	E27	I.C. KMTS ROM #1 (256 X 4)	23-086A2	44
12		EYELET, HANDLE	9008732	45
1		HANDLE ASSY	1210711-2	46
4	E1,E2,E3,E7	I.C. 7412	1909955	47
6	E21,E36,E41,E61,E62,E6	I.C. 8837	1911116	48
1	E16	I.C. 74SØ4	1910534	49
1	E42	I.C. 74SIØ	1910536	50
4	E82,E87,E88,E93	SOCKET, 16 PIN	1211813	51
1	R45	RES. 220 1/4W 5%	1300271	52
A/R		WIRE #30 AWG.	9Ø-05740-55	53
.05		DECAL	7415856	54
QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

FIRST USED ON OPTION MODEL: KM8-A

PARTS LIST

ETCH BOARD REV. D

REV.	ORIGINATED / CHANGE NO. / REVISIONS	CHK	DEC NO.	EIA NO.	DEC NO.	EIA NO.
C	L.NARHI 1-SEPT-76					
B	L.NARHI 12-AUG-76 M8317-00006					
A	L.NARHI 28-JUL-76 M8317-00005					
K	L.NARHI 13-JAN-76 M8317-00004					
J	L.NARHI 11/12/75 M8317-00003					
H	L.NARHI 11/3/75 M8317-00002					
F	L.NARHI 11-DEC-74 M8317-00001					
E	L.NARHI 11/27/74					
D						

SEMICONDUCTOR CONVERSION CHART

DRN.	E. Hedeking	DATE 6-27-74
CHK'D.	Robert Hoppe	DATE 10-10-74
ENG.	Larry Marks	DATE 6-C-74
PROJ. ENG.		DATE 10-10-74
PROD.		DATE 10-10-74

NEXT HIGHER ASSY: B-DD-KM8-A

SCALE: NONE

SHEET 1 OF 7

digital

TITLE: OPTION BOARD #2

SIZE	CODE	NUMBER	REV.
D	CS	M8317-Ø-1	K

DIST.

REV. K | NUMBER M8317-Ø-1 | SIZE D CODE CS

DEC FORM NO. DRD 135.8

BOOTSTRAP/AUTO RESTART FUNCTIONAL SWITCH SETTINGS

DESIRED FUNCTION	ACTIVATING SIGNAL	S1-4	S1-5	S1-6	S1-7	S1-8	S2-1
BOOTSTRAP ENABLED	"BOOT" SW.	✳	↑	OFF	OFF	ON	N/A
AUTO-RESTART DISABLED	N/A						
BOOTSTRAP ENABLED	"BOOT" SW	✳		ON	ON	ON	N/A
AUTO-RESTART ENABLED	"AC LOW"						
BOOTSTRAP DISABLED	N/A	✳	STAKE	ON	ON	OFF	N/A
AUTO-RESTART ENABLED	"AC LOW"						
BOOTSTRAP ENABLED	"AC LOW"	✳		ON	OFF	OFF	N/A
AUTO-RESTART DISABLED	N/A						
BOOTSTRAP ENABLED	"AC LOW" OR "BOOT" SW	✳	↓	ON	OFF	ON	N/A
AUTO-RESTART DISABLED	N/A						
TIME SHARE DISABLED	N/A	N/A	N/A	N/A	N/A	N/A	ON
TIME SHARE ENABLED	N/A	N/A	N/A	N/A	N/A	N/A	OFF

NOTES:

✳ S1-4 "OFF" - BOOTSTRAP CAN BE ACTIVATED BY "BOOT" SW EITHER IN THE "RUN" OR "HALT" STATE
S1-4 "ON" - BOOTSTRAP CAN ONLY BE ACTIVATED BY "BOOT" SW IN THE "RUN" STATE

1. "AC LOW" WILL CAUSE AUTO-RESTART OR BOOTSTRAP, DEPENDING ON SWITCH SETTINGS, TO OCCUR ONLY IN THE "RUN" OR STOPPED STATE
   S1-6,7,8 "OFF" - BOOTSTRAP & AUTO-RESTART DISABLED
2. E82 & E87 ARE NOT ON THE YA VARIATION. ALL OTHER PARTS REMAIN THE SAME
3. IF AUTO-RESTART IS ENABLED, THE AUTO-START FEATURE OF THE CPU (M8315) MUST BE DISABLED

AUTO-RESTART SELECT SWITCH SETTINGS

RESTART ADDRESS	S2-2	S2-3	S2-4
Ø	OFF	OFF	OFF
200	OFF	ON	OFF
400	ON	OFF	OFF
600	ON	ON	OFF

4. AUTO-RESTART SELECT SWITCHES ARE DEFINED AS FOLLOWS:
   (a) ROM ADDRESS RANGE: Ø-16
   (b) ON = LOGIC 1 OR LOW; OFF = LOGIC Ø OR HIGH
   (c) ORDED OF SIGNIFICANCE
   $S_2 2 = 2^3 = 10$
   $S_2 3 = 2^2 = 4$
   $S_2 4 = 2^1 = 2$

BOOTSTRAP SELECT SWITCH SETTINGS

PROGRAM	S2-5	S2-6	S2-7	S2-8	S1-1	S1-2	S1-3	ROM ST ADD	MEM ADD START
HI-LO PT RDR	ON	ON	ON	OFF	ON	ON	ON	20	7734
RK8E	ON	OFF	ON	OFF	ON	OFF	ON	124	24
RX8E	ON	OFF	OFF	ON	OFF	ON	ON	150	33
RF08/DF32D	OFF	ON	OFF	ON	OFF	ON	OFF	252	7750
TA8E	OFF	ON	OFF	OFF	OFF	ON	OFF	272	4000

3. BOOTSTRAP SELECT SWITCHES ARE DEFINED AS FOLLOWS:
   (a) ROM ADDRESS RANGE: Ø-377
   (b) ON = LOGIC Ø OR LOW; OFF = LOGIC 1 OR HIGH
   (c) ORDER OF SIGNIFICANCE
   $S_2 5 = 2^7 = 200$ (MSB)
   $S_2 6 = 2^6 = 100$
   $S_2 7 = 2^5 = 40$
   $S_2 8 = 2^4 = 20$
   $S_1 1 = 2^3 = 10$
   $S_1 2 = 2^2 = 4$
   $S_1 3 = 2^1 = 2$
   THE LSB OF ADDRESS IS CONTROLLED BY THE BOOTSTRAP/AUTO-RESTART LOGIC

COMPONENT SUBSTITUTION CHART

PART CALLED FOR			SUBSTITUTE PART		
QTY	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION
95	1001610-01	.01 MFD DISC	95	1001610-00	.01 MFD GLASS
3	1503100	DEC 3009B	3	1509338	DEC 6531
6	1911330	74173	6	1911711	8T10
1	1909704	314	1	1910391	5314
			1	1909972	6314
			1	1910389	7314
6	1909705	8881	6	1909973	97401

REVISIONS		
CHK	CHANGE NO.	REV.

QTY	REF. DESIGNATION	DESCRIPTION	PART NO.	ITEM NO

TITLE: OPTION BOARD #2
SIZE: D | CODE: CS | NUMBER: M8317-Ø-1 | REV: K
SCALE: NONE | SHEET 2 OF 7 | DIST.

DEC FORM NO. DRD 130

INTERRUPT INHIBIT F/F

USER INTERRUPT FLIP-FLOP

KMTS 2 USER MODE H

BBUF MD0 H

BBUF MD1 H

BBUF MD3 H

BBUF MD2 H

BBUF TP2 H

TP FE1

BBUF MD3 H
BBUF MD4 H
BBUF MD5 H
BBUF MD9 H
BBUF MD10 H
BBUF MD11 H

+5V

R5 1K

23-086A2 E27 ROM#1 KMTS (256X4)

R1 1K
R2 1K
R3 1K
R4 1K

G2X4

BBUF MD6 H
BBUF MD7 H
BBUF MD8 H

CDF
CIF

I/O PAUSE L CDI

SINT
CINT
RIB
RIF
RDF
KMTS 1 RDF L

KMTS 2+1→INT IN H
BBUF TP3 H

INT IN PROG L
CPMA DISA. L
PULSE LOAD DR2 ADDRESS H
MA,MS LOAD BH2 CONTROL H
KMTS 1 EMA DIS (Ø) H
KMTS 1 DF ON (1) H
KMTS 1 DF ON (Ø) H
+3VB
RG 1K
BBUF INT IN PROG H
KMTS 1 I.F. CLK H
TP FH1
KMTS 1 DF, IB, UB CLK H
TP FD1
KMTS 1 CLR/CLK H
INT RQST L
BBUF INIT L
KMTS 2 TIME SHARE DISA. L
IND 1 L
IND 2 L
BBUF TS1 H
SKIP L
RUN H
BBUF POWER OK H

KMTS1 RLF L

RMF
SUF
CUF
GTF
RTF

LOAD ADD ENA L
KEY CONTROL L

KMTS 1 IF, DF OUT L
TP FC1
KMTS 1 DATA IN H
TP FS1
KMTS 1 ENA MUX OUT L
TP FJ1
KMTS 1 IB, IN L
TP FF1
KMTS 1 DF IN L
KMTS 1 IF IN L
TP FR1
KMTS 1 UB IN L

IR0 L
IR1 L
JMP + JMS
MD3 L
FETCH L
DEFER L
KMTS1 DF ON (1) H
F SET

KMTS 1 IB, UB OUT L

REVISIONS		
CHK	CHANGE NO.	REV.

MEMORY EXT/ TIME SHARE REGISTER CONTROL

TITLE	SIZE	CODE	NUMBER	REV.
OPTION BOARD #2 (KMTS 1)	D	CS	M8317-0-1	K
SCALE NONE	SHEET 3 OF 7		DIST.	

DEC FORM NO. DMD 1.30

SIZE D | CODE CS | NUMBER M8317-Ø-1 | REV K

KMTS1 ENA MUX OUT L
KMTS2 A H
KMTS2 B H
KMTS2 C H
KMTS1 IB IN L
KMTS1 DF IN L
KMTS1 DF IB UB CLK H
KMTS1 DATA IN H
KMTS1 RIF L
KMTS1 IF IN L
KMTS1 CLK IF H
KMTS1 CLR/CLK H
KEY CONTROL L
KMTS2 USER MODE H
KMTS2 TIME SHARE DISA L
KMTS1 IF,DF OUT L
KMTS1 RDF L
KMTS1 DF ON (Ø) H
KMTS1 EMA DIS (Ø) H
KMTS1 EMA ØL
KMTS1 EMA 1 L
KMTS1 EMA 2 L
BBUF TS1 H
+3VB
KMTS1 UB IN L
KMTS1 IB UB OUT L
KMTS1 IB IN L
KMTS2+1 → INT INH H
E93-9 TP
+5V
TIME SHARE DISA.

BBUF MD 6 H
BBUF DATA 6 H
BBUF MD 7 H
BBUF DATA 7 H
BBUF MD 8 H
BBUF DATA 8 H
BBUF DATA 5 H
BBUF DATA 9 H
BBUF DATA 10 H
BBUF DATA 11 H
DATA 6 H
DATA 7 H
DATA 8 H
DATA 9 H
DATA 10 H
DATA 11 H
DATA 5 H

REVISIONS		
CHK	CHANGE NO.	REV.

INSTRUCTION FIELD, DATA FIELD, IF & DF SAVE FIELD, INSTRUCTION BUFFER, USER BUFFER

TITLE	SIZE	CODE	NUMBER	REV.
OPTION BOARD #2 (KMTS2)	D	CS	M8317-Ø-1	K
SCALE NONE	SHEET 4 OF 7		DIST.	

DEC FORM NO. DRD 138

DCS M8317-Ø-1

SIZE D | CODE CS | NUMBER M8317-0-1 | REV. K

MIKP1 CLK H
E88-3 TP
MIKP 1 ENABLE
RESTART ADD L
E93-15 TP
E88-1 TP
E93-2 TP
E88-15 TP
AC LOW L BB1
B BUF TS 1 H
RUN H BU2
BBUF SW
POWER OK H BV2
MIKP1 CLR L TP E88-9
MIKP2 START H
MIKP2 LOAD ADD H
MIKP2 LOAD EXT ADDRESS H
MIKP2 DEPOSIT H
MIKP1 ADD LOAD L
MIKP1 ENA BOOT ADD L
B BUF POWER OK H
BBUF INIT H
BBUF INIT L
MIKP1 CLK H TP E88-6
CLK1
CLK2
CONT.
RECYCLE
SET-UP
PULSE
NULL
1ST ADD
CLR
INIT H CR1
DR2 PULSE LOAD ADD H
AJ2 MEM START L
MIKP1 LOAD ADD H
BM2 LOAD ADD ENA L
CU2 IND I L
DU2 KEY CNTR L L
CV1 MS, IR DIS L
MIKP1 LOAD 1ST ROM BYTE H
MIK P1 LSB ROM ADD L
MIKP1 ENA ADD DATA L
MIKP1 INCRMT ADD COUNTER L
TP E88-7 CLOCK DISABLE
TP E88-10 EXTERNAL CLOCK IN
TP E88-8

REVISIONS		
CHK	CHANGE NO.	REV.

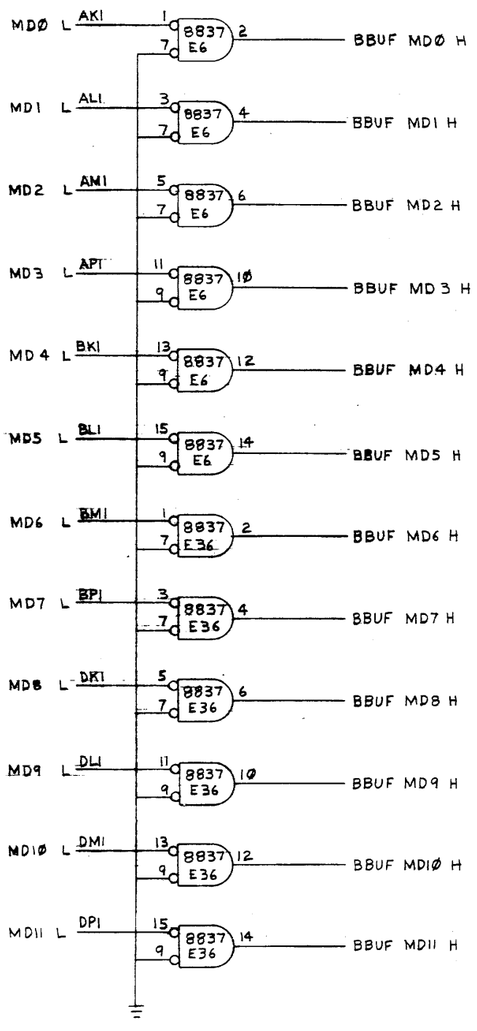
BOOTSTRAP/AUTORESTART CONTROL

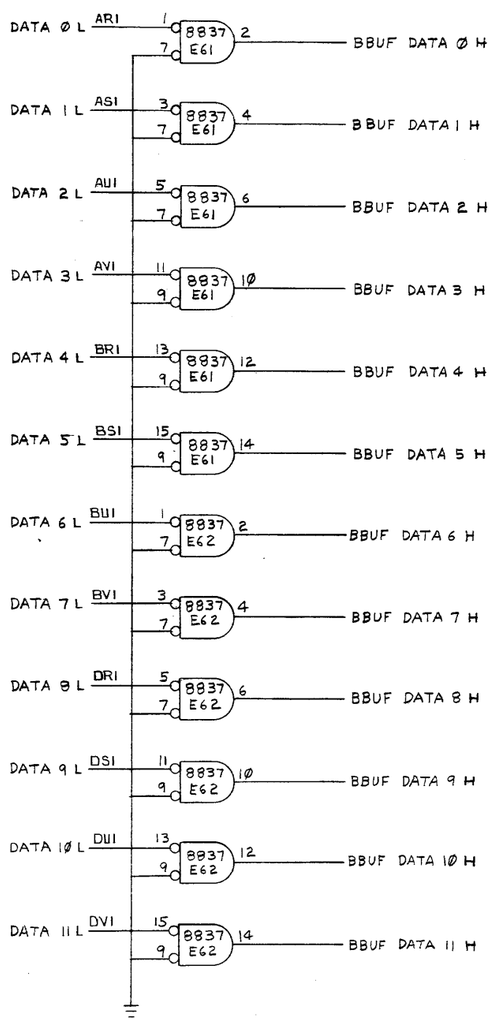
TITLE	SIZE	CODE	NUMBER	REV.
OPTION BOARD # 2 (MIKP1)	D	CS	M8317-0-1	K
SCALE	SHEET 5 OF 7	DIST.		

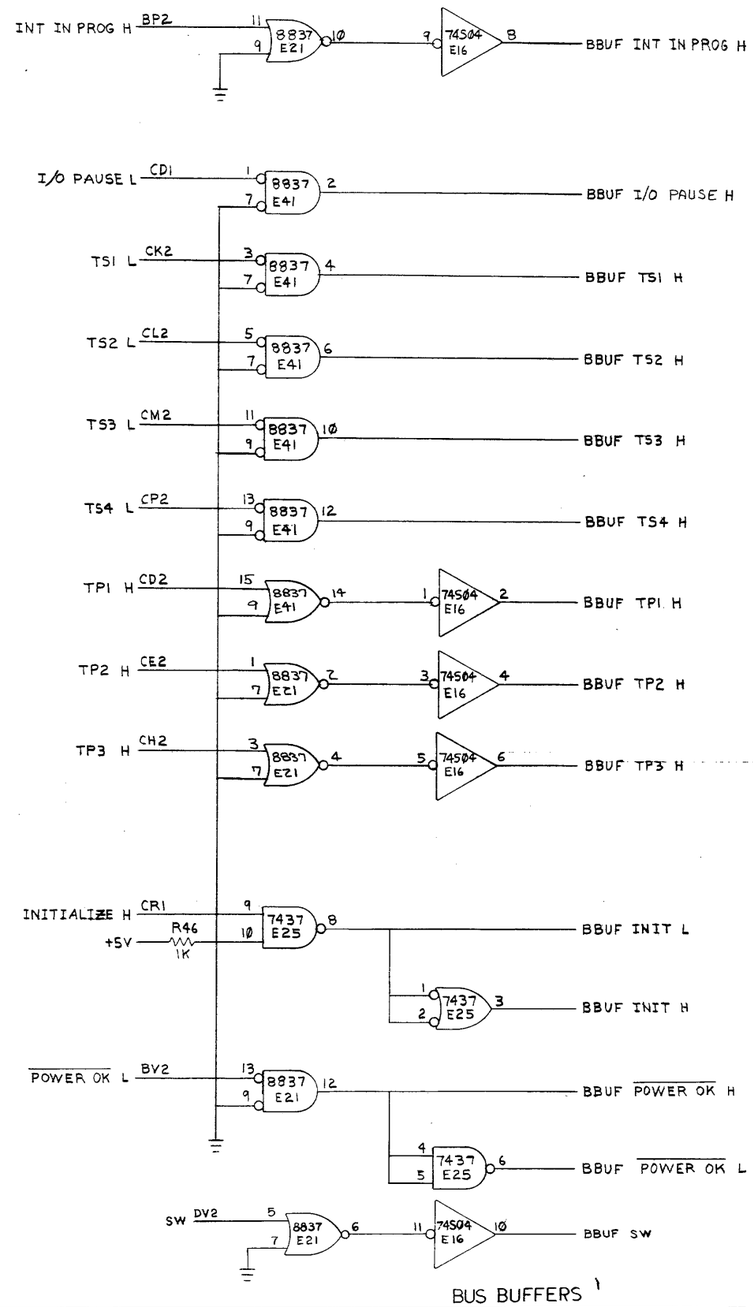
BOOTSTRAP SELECT
HI = "1"
LO = "0"
E93-5 TP
E93-6 TP
E93-8 TP
E93-4 TP
S2-5
S2-6
S2-7
S2-8
R20 1K
R21 1K
R22 1K
R23 1K
+5V
RS3 1K
8266 E82
A0 B0 A1 B1 A2 B2 A3 B3
F0 F1 F2 F3
(200)11
(100) 3
(40) 18
(20) 4
74197 E81 ADD CNTR
D3 D2 D1 D0
R3(1) R2(1) R1(1) R0(1)
CNT
CLR LD CLK1 CLK0
MIKP 1 LSB ROM ADD L
+3V B
R35 1K
+5V
TP FU2
TP FT2
TP FV2
TP FH2
E82 MSB ROM #1 MIKP (256X4) LSB
MIKP 1 LOAD IR FROM BYTE H
MIKP 1 CLR L
BBUF TS2 H
MIKP 1 ENA ADD DATA L
7437 E71
7437 E71
MIKP 2 DEPOSIT H
74175 E80
D0 D1 D2 D3
R0(0) R0(1) R1(0) R1(1) R2(0) R2(1) R3(0) R3(1)
MIKP 2 LOAD ADD H
MIKP 2 LOAD EXT ADD H
MIKP 2 START H
74175 E85
E87 MSB ROM #2 MIKP (256X4) LSB
AUTO RESTART SELECT
HI = "0"
LO = "1"
S2-2 S2-3 S2-4
R30 1K
R29 1K
R31 1K
E88-4 TP
E93-13 TP
E93-11 TP
BOOTSTRAP SELECT
S1-1
S1-2
S1-3
TP E88-5
TP E88-12
TP E88-11
8266 E84
74197 E83 ADD CNTR
(10)
(4)
(2)
R17 1K
R18 1K
R19 1K
+5V
MIKP 1 ENABLE RESTART ADD L
MIKP 1 ENA BOOT ADD L
MIKP 1 ADD LOAD L
MIKP 1 INCRMT. ADD COUNTER L
7404 E67
TP FS2
TP FP2
TP FR2
8881 E66 DATA 0 L
8881 E76 DATA 1 L
8881 E76 DATA 2 L
8881 E76 DATA 3 L
8881 E76 DATA 4 L
8881 E72 DATA 5 L
8881 E72 DATA 6 L
8881 E72 DATA 7 L
8881 E72 DATA 8 L
8881 E77 DATA 9 L
8881 E77 DATA 10 L
8881 E77 DATA 11 L
+5V
R36 1K
R37 1K
R38 1K
R39 1K
R40 1K
R41 1K
R42 1K
R43 1K
MD9L DL1
BBUF MD10 H
MD11L DP1
74S11 E31
MD3L AP1
MD4L BK1
BBUF I/O PAUSE H
74S11 E31
7404 E67
23-084A1 E26 ROM #3 MIKP (32X8) ENB
BBUF MD8 H
BBUF MD7 H
BBUF MD6 H
BBUF MD5 H
R32 1K
R31 1K
R30 1K
+5V
BATTERY EMPTY L
TP E93-16
R33 1K
+5V
7417 E4
7474 E9 BATT MT
BA1
AC LOW L
BBI
BBUF POWER OK L
R34 1K
+5V
7404 E15
8881 E10
TP E88-16
7417 E4
CPI INT RQST L
+3V B
7474 E9 AC LOW
8881 E10
CSI SKIP L
8881 E77
G10Z
7404 E15
BBUF POWER OK H
7402 E14
G10I
7442 E35
BBUF MD11 H
BBUF MD9 H
G10X
7404 E15
G10J
7408 E64
BBUF TP3 H
7417 E38
CLI INT I/O L

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE OPTION BOARD #2 (MXP 2)
BOOTSTRAP/AUTO-RESTART ROMS & AC LOW AND BATTERY EMPTY FLAGS
SIZE D | CODE CS | NUMBER M8317-0-1 | REV K
SCALE NONE | SHEET 6 OF 7 | DIST.







BUS BUFFERS 1

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE	CODE	NUMBER	REV.
8/A INTERNAL OPTION #2 (BBUF)	D	CS	M8317-Ø-1	K
SCALE NONE	SHEET 7 OF 7	DIST.		

DEC FORM NO. DRD 138

DCS M8317-Ø-1 REV K

REV.	NUMBER	SIZE	CODE
	M8317-Ø-8	K	RL

FIRST USED ON OPTION MODEL
PDP8-A

QTY.	DESCRIPTION	PART NO.	ITEM NO.
	PARTS LIST		

DRN.		DATE 1/24/74
CHK'D		DATE 1/24/74
ENG.	Larry Markin	DATE 12/20/74
PROJ. ENG.	Larry Markin	DATE 12/20/74
PROD		DATE 12-30-74

NEXT HIGHER ASSEMBLY
B-DD-KM8-A

SCALE

SHEET 1 OF 2

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE
ROM PATTERN SPEC.

SIZE	CODE	NUMBER	REV.
K	RL	M8317-Ø-8	

DIST.

REVISIONS	REV.	CHANGE NO.	CHK

DEC FORM NO.
DRB 109

ROM PATTERN SPEC

DEC PART NUMB: 23-084A1
ORIGINATOR: LARRY NAPHI
DATE OF ORIGIN: 6-22-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
0	00	11111111	377
1	01	11111111	377
2	02	11111111	377
3	03	11111111	377
4	04	11111111	377
5	05	11111111	377
6	06	11111111	377
7	07	11111111	377
8	10	11010111	327
9	11	11111111	377
10	12	11111111	377
11	13	11111111	377
12	14	11111111	377
13	15	11111111	377
14	16	11111111	377
15	17	11111111	377
16	20	11111111	377
17	21	11111111	377
18	22	11111111	377
19	23	11111111	377
20	24	11111111	377
21	25	11111111	377
22	26	11111111	377
23	27	11111111	377
24	30	11000111	307
25	31	11111111	377
26	32	11111111	377
27	33	11111111	377
28	34	11111111	377
29	35	11111111	377
30	36	11111111	377
31	37	11111111	377

digital EQUIPMENT CORPORATION

REV.		NUMBER	SIZE	CODE
		M8317-Ø-9	K	RL

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8-A		PARTS LIST		

DRN.	DATE	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS
CHK'D.	DATE	
ENG. Larry Narki	DATE 12/26/74	TITLE: ROM PATTERN SPEC.
PROJ ENG. Larry Narki	DATE 12/26/74	
PROD [illegible]	DATE 12-30-74	
NEXT HIGHER ASSEMBLY: 3-DD-KM8-A		SIZE K · CODE RL · NUMBER M8317-Ø-9 · REV.
SCALE		
SHEET 1 OF 9		DIST.

REVISIONS: REV. | CHANGE NO. | CHK

DEC FORM NO. DRB 109

ROM PATTERN SPEC PAGE 2 OF 9

DEC PART NUM0: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
0	000	1111	17
1	001	1111	17
2	002	1111	17
3	003	1111	17
4	004	1111	17
5	005	1111	17
6	006	1111	17
7	007	1111	17
8	010	1111	17
9	011	1111	17
10	012	1111	17
11	013	1111	17
12	014	1111	17
13	015	1111	17
14	016	1111	17
15	017	1111	17
16	020	1111	17
17	021	1111	17
18	022	1111	17
19	023	1111	17
20	024	1111	17
21	025	1111	17
22	026	1111	17
23	027	1111	17
24	030	1111	17
25	031	1111	17
26	032	1111	17
27	033	1111	17
28	034	1111	17
29	035	1111	17
30	036	1111	17
31	037	1111	17
32	040	1111	17
33	041	1111	17
34	042	1111	17
35	043	1111	17

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ROM PATTERN SPEC PAGE 3 OF 9

DEC PART NUM0: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
36	044	1111	17
37	045	1111	17
38	046	1111	17
39	047	1111	17
40	050	1111	17
41	051	1111	17
42	052	1111	17
43	053	1111	17
44	054	1111	17
45	055	1111	17
46	056	1111	17
47	057	1111	17
48	060	1111	17
49	061	1111	17
50	062	1111	17
51	063	1111	17
52	064	1111	17
53	065	1111	17
54	066	1111	17
55	067	1111	17
56	070	1111	17
57	071	1111	17
58	072	1111	17
59	073	1111	17
60	074	1111	17
61	075	1111	17
62	076	1111	17
63	077	1111	17
64	100	1111	17
65	101	1111	17
66	102	1111	17
67	103	1111	17
68	104	1111	17
69	105	1111	17
70	106	0011	03
71	107	1111	17

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ROM PATTERN SPEC PAGE 4 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
72	110	1111	17
73	111	1111	17
74	112	0101	05
75	113	1111	17
76	114	1111	17
77	115	1111	17
78	116	0001	01
79	117	1111	17
80	120	1111	17
81	121	1111	17
82	122	0110	06
83	123	1111	17
84	124	1111	17
85	125	1111	17
86	126	1111	17
87	127	1111	17
88	130	1111	17
89	131	1111	17
90	132	1111	17
91	133	1111	17
92	134	1111	17
93	135	1111	17
94	136	1111	17
95	137	1111	17
96	140	1111	17
97	141	1111	17
98	142	1111	17
99	143	1111	17
100	144	1111	17
101	145	1111	17
102	146	1111	17
103	147	1111	17
104	150	1111	17
105	151	1111	17
106	152	1111	17
107	153	1111	17

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ROM PATTERN SPEC PAGE 5 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
108	154	1111	17
109	155	1111	17
110	156	1111	17
111	157	1111	17
112	160	1111	17
113	161	1111	17
114	162	1111	17
115	163	1111	17
116	164	1111	17
117	165	1111	17
118	166	1111	17
119	167	1111	17
120	170	1111	17
121	171	1111	17
122	172	1111	17
123	173	1111	17
124	174	1111	17
125	175	1111	17
126	176	1111	17
127	177	1111	17
128	200	1111	17
129	201	1111	17
130	202	1111	17
131	203	1111	17
132	204	1111	17
133	205	1111	17
134	206	1111	17
135	207	1111	17
136	210	1111	17
137	211	1111	17
138	212	1111	17
139	213	1111	17
140	214	1111	17
141	215	1111	17
142	216	1111	17
143	217	1111	17

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ROM PATTERN SPEC PAGE 6 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
144	220	1111	17
145	221	1111	17
146	222	1111	17
147	223	1111	17
148	224	1111	17
149	225	1111	17
150	226	1111	17
151	227	1111	17
152	230	1111	17
153	231	1111	17
154	232	1111	17
155	233	1111	17
156	234	1111	17
157	235	1111	17
158	236	1111	17
159	237	1111	17
160	240	1111	17
161	241	1111	17
162	242	1111	17
163	243	1111	17
164	244	1111	17
165	245	1111	17
166	246	1111	17
167	247	1111	17
168	250	1111	17
169	251	1111	17
170	252	1111	17
171	253	1111	17
172	254	1111	17
173	255	1111	17
174	256	1111	17
175	257	1111	17
176	260	1111	17
177	261	1111	17
178	262	1111	17
179	263	1111	17

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ROM PATTERN SPEC PAGE 7 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
180	264	1111	17
181	265	1111	17
182	266	1111	17
183	267	1111	17
184	270	1111	17
185	271	1111	17
186	272	1111	17
187	273	1111	17
188	274	1111	17
189	275	1111	17
190	276	1111	17
191	277	1111	17
192	300	1111	17
193	301	1111	17
194	302	1111	17
195	303	1111	17
196	304	1111	17
197	305	1111	17
198	306	1111	17
199	307	1111	17
200	310	1111	17
201	311	1111	17
202	312	1111	17
203	313	1111	17
204	314	1111	17
205	315	1111	17
206	316	1111	17
207	317	1111	17
208	320	1111	17
209	321	1111	17
210	322	1111	17
211	323	1111	17
212	324	1111	17
213	325	1111	17
214	326	1111	17
215	327	1111	17

digital EQUIPMENT CORPORATION

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ROM PATTERN SPEC PAGE 8 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
216	330	1111	17
217	331	1111	17
218	332	1111	17
219	333	1111	17
220	334	1111	17
221	335	1111	17
222	336	1111	17
223	337	1111	17
224	340	1111	17
225	341	1111	17
226	342	1111	17
227	343	1111	17
228	344	1111	17
229	345	1111	17
230	346	1111	17
231	347	1111	17
232	350	1111	17
233	351	1111	17
234	352	1111	17
235	353	1111	17
236	354	1111	17
237	355	1111	17
238	356	1111	17
239	357	1111	17
240	360	1111	17
241	361	1111	17
242	362	1111	17
243	363	1111	17
244	364	1111	17
245	365	1111	17
246	366	1111	17
247	367	1111	17
248	370	1111	17
249	371	1111	17
250	372	1111	17
251	373	1111	17

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ROM PATTERN SPEC PAGE 9 OF 9

DEC PART NUMB: 23-086A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-12-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
252	374	1111	17
253	375	1111	17
254	376	1111	17
255	377	1111	17

K-RL-M8317-Ø-9

REV.	NUMBER	SIZE	CODE
	M8317-Ø-1Ø	K	RL

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8-A		PARTS LIST		

DRN. S. Roberts	DATE 12-20-74	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
CHK'D S. Roberts	DATE 12-20-74		
ENG. Larry Narlee	DATE 12/26/74	TITLE ROM PATTERN SPEC	
PROJ. ENG. Larry Narlee	DATE 12/26/74		
PROD.	DATE 12-20-74		
NEXT HIGHER ASSEMBLY B-DD-KM8-A		SIZE K / CODE RL / NUMBER M8317-Ø-1Ø / REV.	
SCALE		DIST.	
SHEET 1 OF 9			

REVISIONS	REV.	CHANGE NO.	CHK

DEC FORM NO. DRB 109

ROM PATTERN SPEC PAGE 2 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
0	000	1000	10
1	001	0000	00
2	002	0101	05
3	003	0000	00
4	004	1000	10
5	005	1000	10
6	006	0101	05
7	007	0000	00
8	010	1000	10
9	011	0000	00
10	012	0101	05
11	013	0000	00
12	014	1000	10
13	015	1000	10
14	016	0101	05
15	017	0000	00
16	020	1000	10
17	021	1101	15
18	022	0100	04
19	023	0000	00
20	024	0010	02
21	025	0000	00
22	026	0010	02
23	027	1111	17
24	030	0010	02
25	031	1101	15
26	032	0010	02
27	033	1101	15
28	034	0010	02
29	035	1111	17
30	036	0010	02
31	037	1110	16
32	040	0010	02
33	041	0000	00
34	042	0010	02
35	043	1110	16

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ROM PATTERN SPEC PAGE 3 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
36	044	0010	02
37	045	1111	17
38	046	0010	02
39	047	1111	17
40	050	0010	02
41	051	1111	17
42	052	0010	02
43	053	1110	16
44	054	0010	02
45	055	1110	16
46	056	0010	02
47	057	1110	16
48	060	0010	02
49	061	1111	17
50	062	0010	02
51	063	0001	01
52	064	0010	02
53	065	0001	01
54	066	0010	02
55	067	1110	16
56	070	0010	02
57	071	0001	01
58	072	0010	02
59	073	0100	04
60	074	0010	02
61	075	0000	00
62	076	0010	02
63	077	0100	04
64	100	0010	02
65	101	1111	17
66	102	0010	02
67	103	0000	00
68	104	0010	02
69	105	0001	01
70	106	0010	02
71	107	1111	17

K-RL-M8317-Ø-1Ø

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

ROM PATTERN SPEC

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
72	110	0010	02
73	111	0001	01
74	112	0010	02
75	113	0001	01
76	114	0010	02
77	115	1111	17
78	116	0010	02
79	117	1111	17
80	120	0010	02
81	121	1110	16
82	122	1001	11
83	123	1101	15
84	124	1000	10
85	125	0001	01
86	126	0100	04
87	127	0000	00
88	130	0010	02
89	131	0000	00
90	132	0010	02
91	133	1110	16
92	134	0010	02
93	135	0001	01
94	136	0010	02
95	137	1010	12
96	140	0010	02
97	141	0001	01
98	142	0010	02
99	143	1110	16
100	144	0010	02
101	145	0001	01
102	146	1001	11
103	147	0001	01
104	150	1000	10
105	151	1000	10
106	152	0100	04
107	153	0000	00

K-RL-M8317-Ø-1Ø

K-RL-M8317-Ø-1Ø

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

ROM PATTERN SPEC

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
108	154	0010	02
109	155	1111	17
110	156	0010	02
111	157	1001	11
112	160	0010	02
113	161	1111	17
114	162	0010	02
115	163	1111	17
116	164	0010	02
117	165	1000	10
118	166	0010	02
119	167	1001	11
120	170	0010	02
121	171	1000	10
122	172	0010	02
123	173	1000	10
124	174	0010	02
125	175	1001	11
126	176	1000	10
127	177	1110	16
128	200	0010	02
129	201	0111	07
130	202	0010	02
131	203	0111	07
132	204	1001	11
133	205	1000	10
134	206	1000	10
135	207	1110	16
136	210	0100	04
137	211	0000	00
138	212	0010	02
139	213	1000	10
140	214	0010	02
141	215	1000	10
142	216	0010	02
143	217	1001	11

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K-RL-M8317-Ø-1Ø

ROM PATTERN SPEC PAGE 6 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
144	220	0010	02
145	221	1110	16
146	222	0010	02
147	223	1110	16
148	224	1001	11
149	225	1110	16
150	226	1000	10
151	227	0000	00
152	230	0100	04
153	231	0000	00
154	232	0010	02
155	233	1001	11
156	234	0010	02
157	235	1000	10
158	236	0010	02
159	237	1100	14
160	240	0010	02
161	241	1100	14
162	242	0010	02
163	243	1100	14
164	244	0010	02
165	245	1000	10
166	246	0010	02
167	247	1011	13
168	250	0010	02
169	251	1100	14
170	252	0010	02
171	253	1000	10
172	254	0010	02
173	255	1000	10
174	256	0010	02
175	257	1001	11
176	260	0010	02
177	261	1000	10
178	262	0010	02
179	263	1100	14

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ROM PATTERN SPEC PAGE 7 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
180	264	0010	02
181	265	1100	14
182	266	0010	02
183	267	1100	14
184	270	0010	02
185	271	1000	10
186	272	0010	02
187	273	0000	00
188	274	0010	02
189	275	0001	01
190	276	0010	02
191	277	1001	11
192	300	0010	02
193	301	0001	01
194	302	0010	02
195	303	1001	11
196	304	0010	02
197	305	0001	01
198	306	0010	02
199	307	1001	11
200	310	0010	02
201	311	1001	11
202	312	0010	02
203	313	1000	10
204	314	0010	02
205	315	1110	16
206	316	0010	02
207	317	0000	00
208	320	0010	02
209	321	1001	11
210	322	0010	02
211	323	1000	10
212	324	0010	02
213	325	1101	15
214	326	0010	02
215	327	0110	06

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ROM PATTERN SPEC PAGE 8 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
216	330	0010	02
217	331	1101	15
218	332	1001	11
219	333	0000	00
220	334	0000	00
221	335	0000	00
222	336	0000	00
223	337	0000	00
224	340	0000	00
225	341	0000	00
226	342	0000	00
227	343	0000	00
228	344	0000	00
229	345	0000	00
230	346	0000	00
231	347	0000	00
232	350	0000	00
233	351	0000	00
234	352	0000	00
235	353	0000	00
236	354	0000	00
237	355	0000	00
238	356	0000	00
239	357	0000	00
240	360	0000	00
241	361	0000	00
242	362	0000	00
243	363	0000	00
244	364	0000	00
245	365	0000	00
246	366	0000	00
247	367	0000	00
248	370	0000	00
249	371	0000	00
250	372	0000	00
251	373	0000	00

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ROM PATTERN SPEC PAGE 9 OF 9

DEC PART NUMB: 23-087A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
252	374	0000	00
253	375	0000	00
254	376	0000	00
255	377	0000	00

K-RL-M8317-Ø-1Ø

REV.	NUMBER	SIZE	CODE
	M8317-Ø-11	K	RL

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP8-A		PARTS LIST		

DRN.	DATE 7/2/74	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
CHK'D.	DATE 7/25/74		
ENG. Larry Marbie	DATE 12/20/74	TITLE ROM PATTERN SPEC	
PROJ. ENG. Larry Marbie	DATE 12/20/74		
PROD.	DATE 12-2074		
NEXT HIGHER ASSEMBLY B-DD-KM8-A		SIZE K / CODE RL / NUMBER M8317-Ø-11	REV.
SCALE		DIST.	
SHEET 1 OF 9			

REVISIONS	REV.	CHANGE NO.	CHK

DEC FORM NO. DRB 109

ROM PATTERN SPEC PAGE 2 OF 9

DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
0	000	0000	00
1	001	0000	00
2	002	0000	00
3	003	0000	00
4	004	0000	00
5	005	0000	00
6	006	0000	00
7	007	0000	00
8	010	0100	04
9	011	0000	00
10	012	0000	00
11	013	0000	00
12	014	1000	10
13	015	0000	00
14	016	0000	00
15	017	0000	00
16	020	1111	17
17	021	1111	17
18	022	0000	00
19	023	0000	00
20	024	1100	14
21	025	1100	14
22	026	0001	01
23	027	1110	16
24	030	1110	16
25	031	0110	06
26	032	0010	02
27	033	1111	17
28	034	0100	04
29	035	1110	16
30	036	1010	12
31	037	0000	00
32	040	1100	14
33	041	1001	11
34	042	1010	12
35	043	1110	16

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ROM PATTERN SPEC PAGE 3 OF 9

DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
36	044	0110	06
37	045	0001	01
38	046	0010	02
39	047	0001	01
40	050	0110	06
41	051	1001	11
42	052	0010	02
43	053	0101	05
44	054	0110	06
45	055	1111	17
46	056	0010	02
47	057	0101	05
48	060	0110	06
49	061	0111	07
50	062	1100	14
51	063	1010	12
52	064	1100	14
53	065	1001	11
54	066	1010	12
55	067	1111	17
56	070	1100	14
57	071	1110	16
58	072	1110	16
59	073	0110	06
60	074	1110	16
61	075	0110	06
62	076	1111	17
63	077	1000	10
64	100	1010	12
65	101	1100	14
66	102	1110	16
67	103	0110	06
68	104	1100	14
69	105	1001	11
70	106	1010	12
71	107	0111	07

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ROM PATTERN SPEC PAGE 4 OF 9

DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
72	110	1100	14
73	111	1100	14
74	112	1111	17
75	113	0000	00
76	114	0111	07
77	115	1110	16
78	116	0110	06
79	117	1110	16
80	120	1010	12
81	121	1110	16
82	122	1111	17
83	123	1111	17
84	124	0000	00
85	125	0011	03
86	126	0000	00
87	127	0000	00
88	130	0100	04
89	131	0000	00
90	132	1101	15
91	133	0101	05
92	134	0000	00
93	135	0011	03
94	136	1111	17
95	137	1000	10
96	140	1010	12
97	141	0100	04
98	142	1101	15
99	143	0011	03
100	144	1010	12
101	145	1001	11
102	146	0000	00
103	147	0100	04
104	150	1111	17
105	151	1011	13
106	152	0000	00
107	153	0000	00

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ROM PATTERN SPEC PAGE 5 OF 9

DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
108	154	1101	15
109	155	1100	14
110	156	0010	02
111	157	0010	02
112	160	1101	15
113	161	0110	06
114	162	1101	15
115	163	1001	11
116	164	1010	12
117	165	1110	16
118	166	0010	02
119	167	0011	03
120	170	1010	12
121	171	1101	15
122	172	0001	01
123	173	0000	00
124	174	0000	00
125	175	0000	00
126	176	1111	17
127	177	1100	14
128	200	1111	17
129	201	1111	17
130	202	1111	17
131	203	1111	17
132	204	1111	17
133	205	1011	13
134	206	1111	17
135	207	1000	10
136	210	0000	00
137	211	0000	00
138	212	1111	17
139	213	0000	00
140	214	1101	15
141	215	0011	03
142	216	1101	15
143	217	0010	02

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DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
144	220	1010	12
145	221	1010	12
146	222	1011	13
147	223	1010	12
148	224	1111	17
149	225	1000	10
150	226	1000	10
151	227	0000	00
152	230	0000	00
153	231	0000	00
154	232	0010	02
155	233	1111	17
156	234	0010	02
157	235	0110	06
158	236	1101	15
159	237	0100	04
160	240	1101	15
161	241	0110	06
162	242	1101	15
163	243	0011	03
164	244	1010	12
165	245	0100	04
166	246	1110	16
167	247	0100	04
168	250	1101	15
169	251	0010	02
170	252	1111	17
171	253	1000	10
172	254	0110	06
173	255	1001	11
174	256	0111	07
175	257	1110	16
176	260	0010	02
177	261	0101	05
178	262	1101	15
179	263	0100	04

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DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
180	264	1101	15
181	265	0110	06
182	266	1101	15
183	267	0001	01
184	270	1010	12
185	271	1110	16
186	272	1110	16
187	273	0010	02
188	274	1111	17
189	275	1000	10
190	276	0011	03
191	277	1110	16
192	300	1110	16
193	301	0010	02
194	302	0111	07
195	303	1110	16
196	304	1111	17
197	305	0000	00
198	306	0100	04
199	307	1110	16
200	310	0010	02
201	311	1101	15
202	312	1010	12
203	313	1101	15
204	314	1110	16
205	315	0110	06
206	316	1110	16
207	317	0010	02
208	320	0110	06
209	321	1101	15
210	322	1010	12
211	323	0001	01
212	324	1111	17
213	325	1111	17
214	326	0111	07
215	327	1111	17

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DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
216	330	1111	17
217	331	1000	10
218	332	1000	10
219	333	0000	00
220	334	0000	00
221	335	0000	00
222	336	0000	00
223	337	0000	00
224	340	0000	00
225	341	0000	00
226	342	0000	00
227	343	0000	00
228	344	0000	00
229	345	0000	00
230	346	0000	00
231	347	0000	00
232	350	0000	00
233	351	0000	00
234	352	0000	00
235	353	0000	00
236	354	0000	00
237	355	0000	00
238	356	0000	00
239	357	0000	00
240	360	0000	00
241	361	0000	00
242	362	0000	00
243	363	0000	00
244	364	0000	00
245	365	0000	00
246	366	0000	00
247	367	0000	00
248	370	0000	00
249	371	0000	00
250	372	0000	00
251	373	0000	00

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DEC PART NUMB: 23-088A2
ORIGINATOR: LARRY NARHI
DATE OF ORIGIN: 7-16-74

DECIMAL LOC	OCTAL LOC	BINARY DATA	OCTAL DATA
252	374	0000	00
253	375	0000	00
254	376	0000	00
255	377	0000	00

digital EQUIPMENT CORPORATION

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