

# MF11

TECHNICAL  
**INFORMATION**  
DEC CONFIDENTIAL

EP-MF11-00-TI-A  
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FICHE 1 OF 1

JAN 1977  
**digital**  
MADE IN USA

MF11  
FCR

MF11-L  
TECH. TIPS  
DOL  
ECO QUICK CHECK  
FCO's

MF11-LP  
ECO QUICK CHECK

MF11-UP  
ECO QUICK CHECK

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**MF11**  
**CORE MEMORY AND CONTROL**  
**FCO Cross Reference**

A Chronological Listing of Field Retrofit FCO's Which Must Be  
Considered in the Field Installation and Maintenance of This Option/Module/Power Supply

• Indicates FCO Conjunction Must Be Considered With Prior FCO

- |   |  |
|---|--|
| <p><b>1</b> G231 B0001 MAY 72<br/><b>QUICK SYNOPSIS</b><br/>Prevents components on G231 shorting to module above it<br/><b>QUICK CHECK</b><br/>Two phenolic 7 16 standoffs on module<br/><b>NEW REVISION</b><br/>Rework etch B to CS C</p>        | <p><b>6</b> G110 C0010 NOV 72<br/><b>QUICK SYNOPSIS</b><br/>Data errors occur during the first DATI to any memory bank<br/><b>QUICK CHECK</b><br/>Wire ADD E28 pin 13 to E15 pin 10<br/><b>NEW REVISION</b><br/>Rework etch C D E to CS J</p>  |
| <p><b>2</b> G110 B0004 MAY 72<br/><b>QUICK SYNOPSIS</b><br/>Corrects Delay Line 3 termination on etch C G110s<br/><b>QUICK CHECK</b><br/>R115 changed from 3K to 1k ohms<br/><b>NEW REVISION</b><br/>Rework etch C to CS D</p>                    | <p><b>7</b> MF11L A0001 NOV 72<br/><b>QUICK SYNOPSIS</b><br/>Rearrangement of modules within bussed backpanel of MF11 L eliminates interaction and bit pickup between 8K memory banks<br/><b>QUICK CHECK</b><br/>Module arrangement slot 1 section C thru F H214 slot 2 Section A thru F G231 slot 3 Section A thru F G100 slot 4 Section A thru F G231 slot 5 etc</p> |
| <p><b>3</b> G110 B0005 MAY 72<br/><b>QUICK SYNOPSIS</b><br/>Corrects C152 insertion polarity (positive terminal) to +5V<br/><b>QUICK CHECK</b><br/>Positive terminal of C152 goes to +5V<br/><b>NEW REVISION</b><br/>Rework etch C D to CS E</p>  | <p>• MF11L C0003 MAR 73<br/><b>QUICK CHECK</b><br/>Sheds ADD ed between memory segments</p>  |
| <p><b>4</b> G231 D0003 AUG 72<br/><b>QUICK SYNOPSIS</b><br/>Improves 15V and strobe margins when operating at 55 C<br/><b>QUICK CHECK</b><br/>Sixteen D672 diodes replace 330 ohm resistors<br/><b>NEW REVISION</b><br/>Rework etch B to CS F</p> | <p><b>8</b> G110 D0012 DEC 72<br/><b>QUICK SYNOPSIS</b><br/>Provides print articulation affecting etch C G110s<br/><b>NEW REVISION</b><br/>CS E5</p>   |
| <p><b>5</b> G231 A0005 AUG 72<br/><b>QUICK SYNOPSIS</b><br/>Improves DC LO circuitry operation<br/><b>QUICK CHECK</b><br/>Wire ADD from R89 to R93<br/><b>NEW REVISION</b><br/>Rework etch C to CS E1</p>   | <p><b>9</b> G110 D0013 DEC 72<br/><b>QUICK SYNOPSIS</b><br/>Ensures PAL and PBL data bits gate high onto the bus<br/><b>QUICK CHECK</b><br/>Wire ADD s E40 pin 4 to pin 13 and E40 pin 9 to pin 12<br/><b>NEW REVISION</b><br/>Rework etch C to CS E6</p>  |

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|---|--|
| <p><b>10</b> G109 C0004 DEC 72<br/><b>QUICK SYNOPSIS</b><br/>Replaces +3V with INIT L to reset STROBE one shot<br/><b>QUICK CHECK</b><br/>Wire ADD E28 pin 13 to E15 pin 10<br/><b>NEW REVISION</b><br/>Rework etch C E to CS E3</p>                                | <p><b>15</b> G110 C0016 MAR 73<br/><b>QUICK SYNOPSIS</b><br/>Eliminates case BUS IN T etch<br/><b>QUICK CHECK</b><br/>Wire ADD's E4 pin 4 to E7 pin 7 AA1 feed thru to E7 pin 6<br/><b>NEW REVISION</b><br/>Rework etch C to CS E8</p>   |
| <p><b>11</b> G231 D0009 DEC 72<br/><b>QUICK SYNOPSIS</b><br/>G231 prints redrawn to DEC standards<br/><b>NEW REVISION</b><br/>CS E4</p>   | <p><b>16</b> G110 B0018 APR 73<br/><b>QUICK SYNOPSIS</b><br/>Eliminates noise on STROBE O H etch<br/><b>QUICK CHECK</b><br/>Twisted pair ADD ed E32 pin 6 feed thru to E58 pin 4 feed thru E33 pin 7 to ground side of C44<br/><b>NEW REVISION</b><br/>Rework etch C to CS E9</p>  |
| <p><b>12</b> G109 C0006 MAR 73<br/><b>QUICK SYNOPSIS</b><br/>Lengthens memory cycle time<br/><b>QUICK CHECK</b><br/>DL3 replaced with 125 nsec delay<br/><b>NEW REVISION</b><br/>Rework etch C to CS E4</p>   | <p><b>17</b> MF11L B0005 MAY 73<br/><b>QUICK SYNOPSIS</b><br/>Removes spurious MSYNA signal between KD11 A processor and MF11 L memory<br/><b>QUICK CHECK</b><br/>Black white twisted pair deleted A07B1 of CPU to C01U1. First MF11 L</p>   |
| <p><b>13</b> G109 C0007 MAR 73<br/><b>QUICK SYNOPSIS</b><br/>Eliminates noise coupling onto BUS INIT etch from data line etches<br/><b>QUICK CHECK</b><br/>- Wire ADD E4 pin 4 to E7 pin 7<br/><b>NEW REVISION</b><br/>Rework etch C to CS E5</p>                   | <p><b>18</b> G109 C0010 JUL 73<br/><b>QUICK SYNOPSIS</b><br/>Eliminates noise induced condition where memory randomly picks up and drops bits<br/><b>QUICK CHECK</b><br/>Twisted pair E32 pin 6 feed thru to E58 pin 14 feed thru E33 pin 7 to ground side of C44<br/><b>NEW REVISION</b><br/>Rework etch C to CS E7</p> |
| <p><b>14</b> G110 C0015 MAR 73<br/><b>QUICK SYNOPSIS</b><br/>Allows a longer memory cycle time on systems with high speed NPR devices<br/><b>QUICK CHECK</b><br/>DL3 changed from 100 nsec to 125 nsec delay<br/><b>NEW REVISION</b><br/>Rework etch C to CS E7</p> | <p><b>19</b> M7259 B0004 OCT 73<br/><b>QUICK SYNOPSIS</b><br/>Ensures module operation with worst case timing margins<br/><b>QUICK CHECK</b><br/>R16 potentiometer is 20K<br/><b>NEW REVISION</b><br/>Rework etch B C to CS D</p>  |

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**20** G110 C0019 NOV 73

**QUICK SYNOPSIS**

W dening R W RESET L prevents memory skipping a Restore cycle

**QUICK CHECK**

E28 p n 8 goes to tap 10 of DL

**NEW REVISION**

Rework etch C to CS F10

**21** G109 C0011 NOV 73

**QUICK SYNOPSIS**

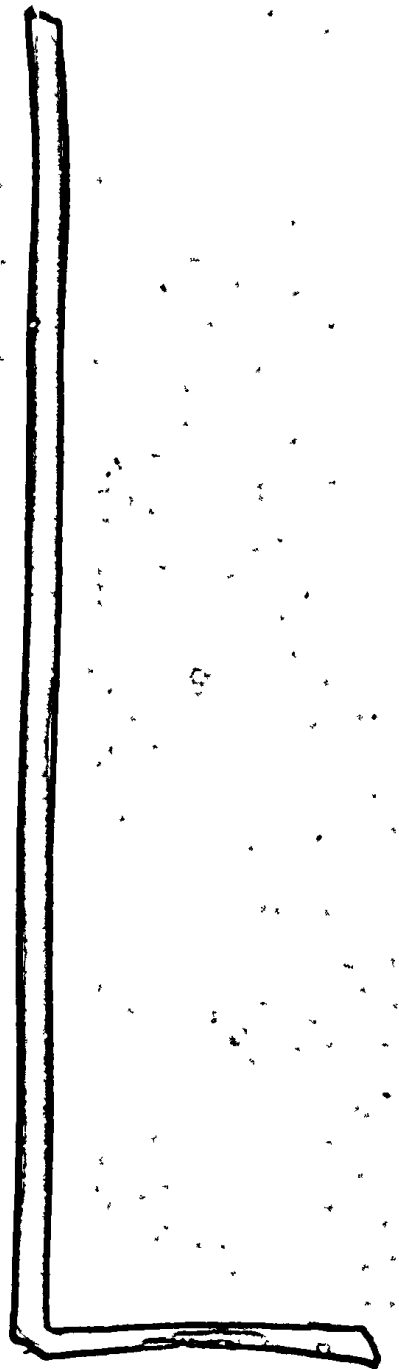
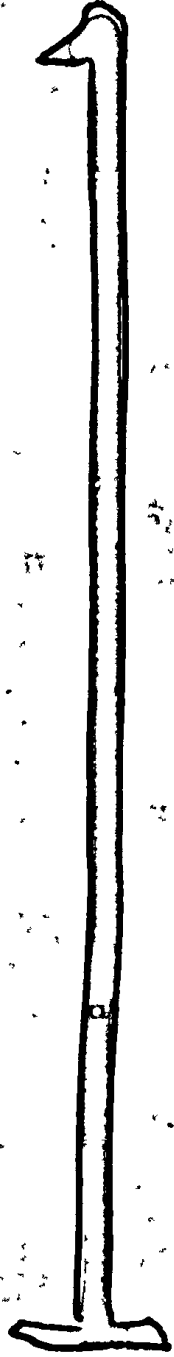
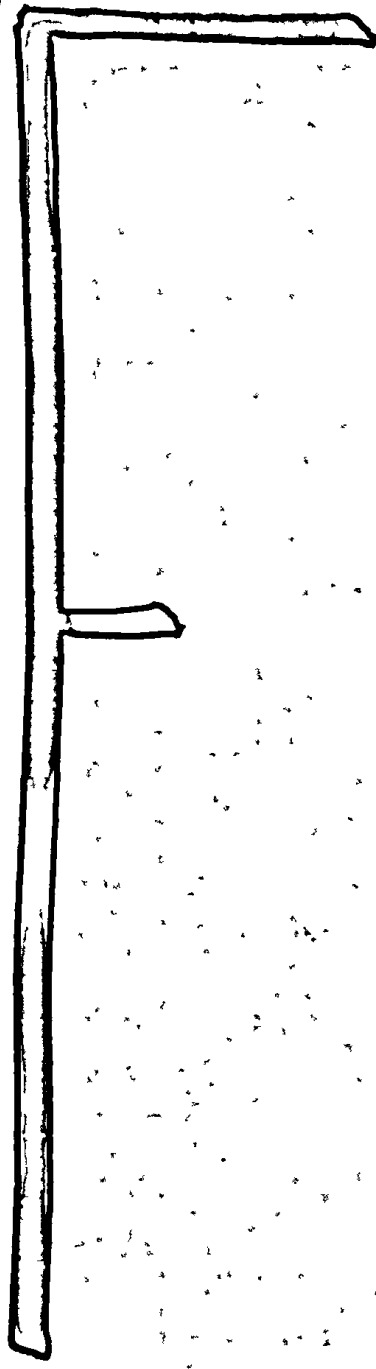
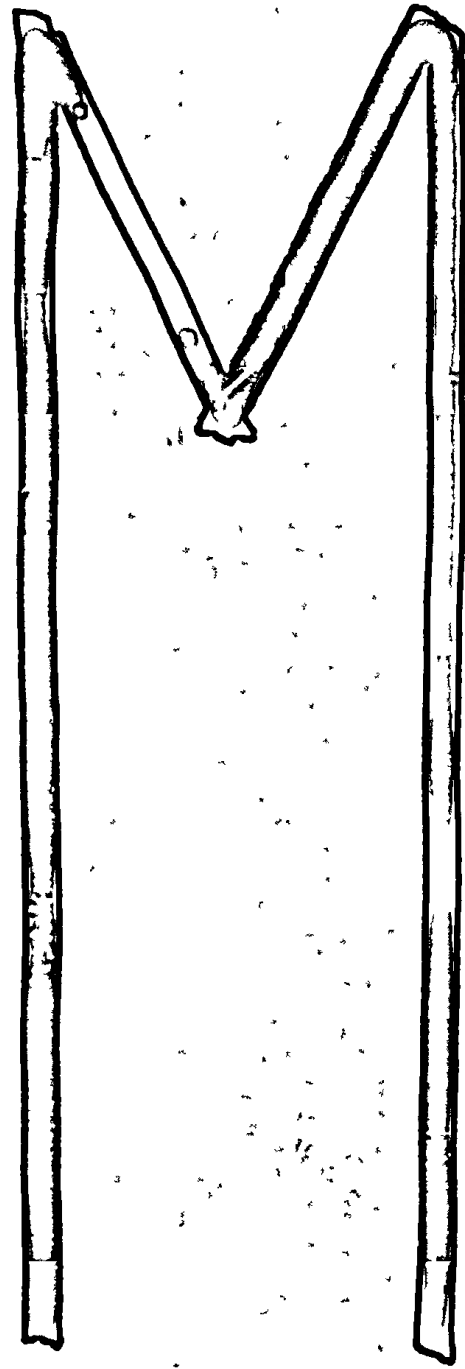
Lengthens R W flip flop reset input pulse and prevents skipped RESTORE CYCLES on a read

**QUICK CHECK**

E26 pin 8 goes to tap 10 of DL

**NEW REVISION**

Rework etch C to CS E8



MF11-L PARTS BREAKDOWN

5409959	- Back Panel Etch
5410331	- New Backplane Etch
7008872	- Backplane Assembly
7009103	- 11/40 First Memory Power Harness (old)
7009174	- MF11-L Power Harness (old)
7009193	- New Backplane Assembly
7009560	- MF11-L/LP Option Harness
7009565	- 11/40 1st Memory Power Harness
BC11-A	- Foamed Unibus Cable
G110	- Control and Data Loops
G231	- Memory Driver
H214	- 8K 16 Bit Memory Stack
M920	- Unibus Jumper
M981	- Unibus Card
MF11-L	- 1-MM11-L & Backplane
MM11-L	- 8K 16 Bit Bank of Memory

# TECH. TIPS



<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input type="checkbox"/>	36 Bit <input type="checkbox"/>	MF 11

Title Module Sequence in MF11-L				Tech Tip Number MF11-TT-1	
All	Processor Applicability			Author B. Dimbat	Rev g
	11/40	11/45		Approval C. Dewey	Date 3/15/73
					Cross Reference

ECO MF11-L00001 requires that the memory modules be in a specific order. This is to prevent a DATO to one 8K stack from affecting the next FETCH in an adjacent stack.

Modules positions for an MF11L with 24K are:

H214 - slots 1, 6, 9  
 G231 - " " 2, 4, 7  
 G110 - " " 3, 5, 8

Note - Slot 1 is toward the CPU

Repeat this order for each MF11L.

Title MF11-L and MF11-U Shield Placement				Tech Tip Number MF11-TT-2	
All	Processor Applicability			Author D. Lyubica	Rev j
	11/40	11/45		Approval B. Dimbat	Date 4/15/73
					Cross Reference

It seems that there has been some doubt as to exactly when and where the electromagnetic shield (17-00021-00) should be placed on the MF11-L and MF11-U memories.

The MF11-U memory does not require any shield because of its multilayer design.

The MF11-L, when used as a single 8K bank, does not require a shield, however one can be added, if preferred between the G110 and G231 modules. In multiple bank systems a hex shield should be placed on side 1 of the G231 modules, between slots 3 and 4 and slots 6 and 7. Refer to the memory module utilization page in the 11/35 and 11/40 engineering drawings.

In the 11/05 (5 1/2" box), the hex shield should go between slots 7 and 8, which is between the N7261 and G110 modules; with multiple 8K banks, an additional shield should be placed between slots 4 and 5. On the 11/05, 10 1/2" box a quad shield should go between the H214 and the N7261 modules between slots 3 and 4 and between slots 6 and 7 if another bank is used.

The location for the ME11 memory is the same as that for the MF11 memory.

Title		Tech Tip	
HOW TO TEST THE H744		MF11	
Processor Applicability		Number	
All 11's		TT-3	
Author		Rev	
Approval		Date	
Cross Reference		PDP 11 INS.	

This tech tip is for cross reference purposes only.

Title		Tech Tip	
MF11-LP/REMOVAL OF M7259 PARITY CARDS		Number	
Processor Applicability		Rev	
All 11's		Cross Reference	
Author		Date	
Approval		Date	

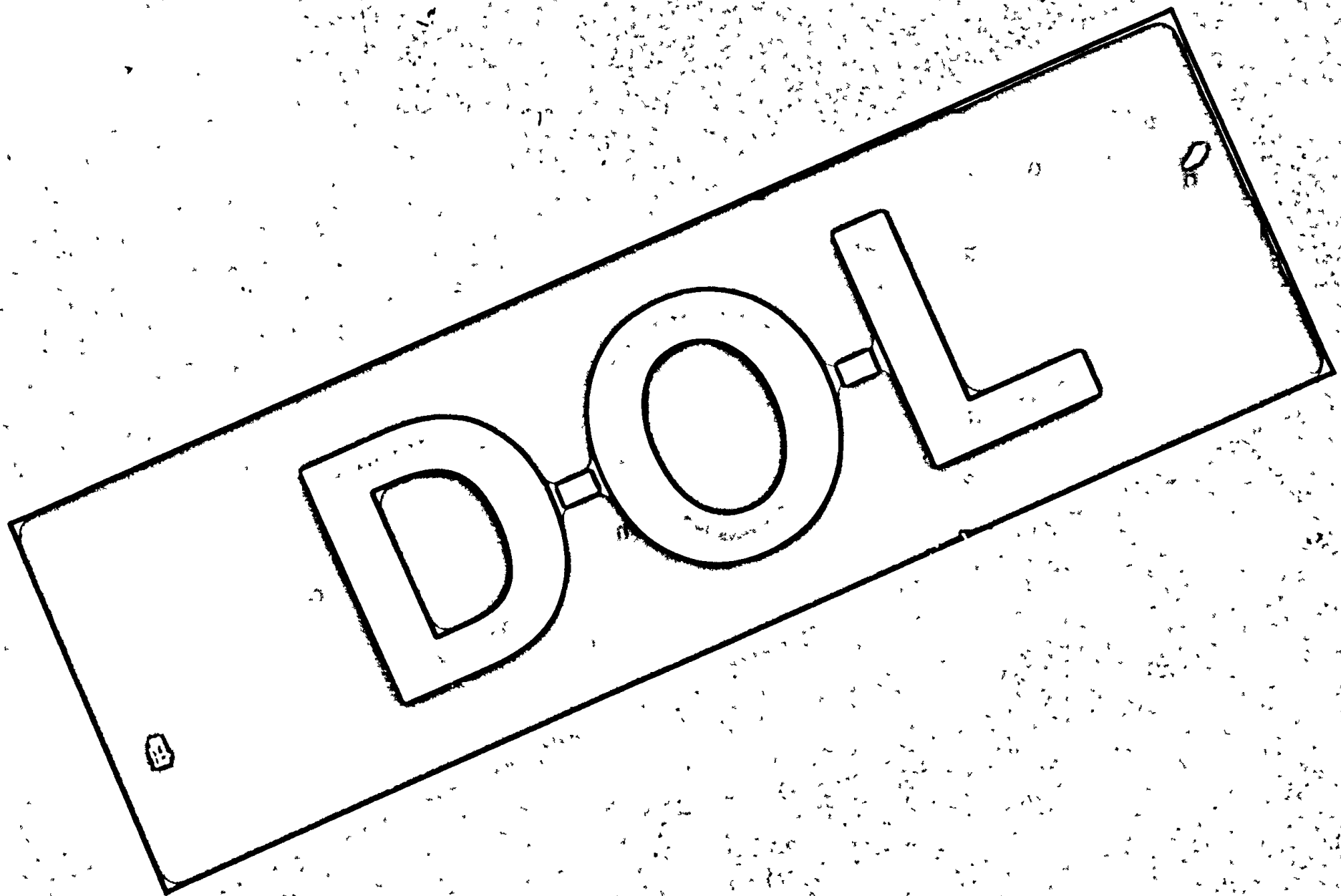
It is possible to operate the MF11-LP memory as a non-parity memory for troubleshooting purposes, or when the M7259 module is broken and you are waiting for a new one. The procedure is as follows:

Power System down  
 Remove M7259  
 Install Jumper from B01U1 to B02U1  
 Install Jumper from A01A1 to A02V1  
 Power System up and run

This procedure is recommended only as a temporary measure for troubleshooting and is not intended as a fix for parity problems.

CAUTION: Certain software may require a redefinition of parity/non parity memory or may have to be reloaded.

NOTE: For MF11-LP only install Jumper B01U1 to B02U1 (S3YN)  
 Do not install A01A1 to A02V1.



3031 3338 R624  
**PROCESSOR TYPE PDP 11 Family**

**MF11-0001 CODE D DD B**  
**NOTE - PROBLEM** In operation and in pickup exists between the BK  
 bus banks of the MF11-A MVA insertion to last DATA in one  
 bank has the inhibit signal timing off during the stroke of a PETCH  
 from the next bank.  
**COMPLETION** Rearrange modules in the board back panel of the  
 MF11-A as follows: Slot 1 section C thru F - H214 slot 2 section A thru  
 F - G21 slot 3 section A thru F - G180 slot 4 section A thru F -  
 G21 slot 5 section A thru F - G18 slot 6 section C thru F - H214  
 slot 7 section A thru F - G21 slot 8 section A thru F - G18 slot 9  
 section C thru F - H214 Note that the N7M8 module H214 of one bank  
 is isolated from the CONTROL AND DATA LATCH module G180 of the  
 next bank.  
**PROBLEM 2** On power up the first memory cycle of DATA or DATP  
 may require 175 msec of delay from MVA to good data wrong data  
 may be obtained.  
**COMPLETION 2** Install P10 G180-1000  
 In plant effectively all MVA's immediately.  
 Field effectivity Neutral all MF11's  
 Time To Install And Test 10 Hour Not Contests P10 Prints

**MF11-0005 CODE F DD F**  
**MAY 1 - PROBLEM** The spurious MVA signal between the MF11-A  
 processor and the MF11-L memory occurs approximately 300 nsec before  
 UNINH MVA on starting operations TRMP and P10 operation bus  
 transitions do not settle before the clocking signal improper PL or PS  
 data appears in lower byte is obtained.  
**COMPLETION** Delete the twisted pair wires for MVA's from between  
 the MF11-A processor and MF11-L memory harness (79-00-03) Do not add  
 MVA's backpanel wires to new MF11-L memories.  
 Check Check Backplane twisted pair dropped from PCB of CPU to  
 call of MF11-L  
 In plant effectively all Delete MVA's on all units with problems Delete  
 from harness prior to acceptance by 6/1/73 On retrofit remove only the  
 twisted pair in the harness the new assemblies do not provide twisted  
 pair in harness or wires in backpanel  
 Field effectivity Neutral immediately MF11's on P10 P11 and P12  
 Time To Install And Test 10 Hour Not Contests P10 Prints

**MF11-0002 CODE M DD C**  
**PPH 73 - PROBLEM** There is no listed assembly drawing showing retro  
 fit of frame parts from MF11 to MF1-L  
**COMPLETION** Make a list assembly drawing for MF1-L assembly  
 In plant effectively all documentation change previously implemented

**MF11-0003 CODE F DD D**  
**MARK 1 - PROBLEM** Some adjacent 8K memory segments overlap  
 after data on over operation even after the module rearrangement of  
 P10 MF1-L's. Module sections C, D, E, F and G of the  
 8K memory segments overlap in adjacent memory segments.  
**COMPLETION 1** Put shield around all connections between 8K memory segments in  
 MF1-L memory.  
**PROBLEM 2** Not wire list and Assembly list not needed for MF11-L  
 provided by back machine set wire package.  
**COMPLETION 2** Insert sets from MF1-L Drawing Inventory  
**NOTE** This P10 is to be installed immediately in any system that up  
 grade to have memory interaction.  
**NOTE 2** 1 is to be installed on all systems during the next service call  
 or preventative maintenance period.  
**NOTE 3** A maximum of 10 modules is required for a full 80K MF11-L  
 no shields are required for a base 8K system.  
 In plant effectively all retrofit all memories with same problem. Phase  
 should be in service area by May 1973.  
 Field effectivity Neutral all MF1-L  
 Time To Install And Test 2 Hour Not Contests P10 Prints And  
 Parts

**MF11-0004 CODE D DD F**  
**MARK 1 - PROBLEM** Missing or drawing for digital Power Har  
 ness is missing with respect to lengths and breakout points. Harness  
 wires unshielded.  
**COMPLETION 1** Correct drawings (rework 79-00-03 and 79-00-04)  
**PROBLEM 2** Twisted pair cable used for MVA's between MF11-A and  
 MF1-L now separate cable.  
**COMPLETION 2** Add twisted pair cable using backpanel pins in wire  
 harness.  
**PROBLEM 3** Harness shield used in P10 P11 for first memory is  
 not a general cable.  
**COMPLETION 3** Insert harness from MF11-L Drawing Inventory and add  
 a P10 to Drawing Inventory reference P10-11-0000.  
 In plant effectively all Change parts immediately. Shield of new harnesses  
 with new parts. Change does not affect units already built.

ECO  
QUICK  
CHECK

MF11-L PARTS BREAKDOWN

5409959	- Back Panel Etch
5410331	- New Backplane Etch
7008872	- Backplane Assembly
7009103	- 11/40 First Memory Power Harness (old)
7009174	- MF11-L Power Harness (old)
7009193	- New Backplane Assembly
7009560	- MF11-L/LP Option Harness
7009565	- 11/40 1st Memory Power Harness
BC11-A	- Foamed Unibus Cable
G110	- Control and Data Loops
G231	- Memory Driver
H214	- 8K 16 Bit Memory Stack
M920	- Unibus Jumper
M981	- Unibus Card
MF11-L	- 1-MM11-L & Backplane
MM11 L	- 8K 16 Bit Bank of Memory

Jan./75

MF11-L FIELD CODED ECO'S

G110	B4, B5, C9, C10 & A, D12, D13 & A, C15 & A, C16, B18, C19
G231	B1, D3, A5, D9
MF11-L	A1, C3, B5

MF11-L ECO PARTS

<u>NAME</u>	<u>ECO#</u>	<u>QTY.</u>	<u>PART NUMBER</u>	<u>COMMENTS &amp; DESCRIPTION</u>
G110	#4	1	13-00365	resistor
	#5	1	10-05306	capacitor
		4	90-08213	standoffs
	#9	A/R	17-00024	#10 black/wire ground wire
	#10	1	19-05547	I.C.
	#15	1	16-11327	delay
	#18	1	10-01610	capacitor
	G231	#1	2	90-06892
#3		16	11-05275	diode
#15		A/R	90-09184	jumper wire
MF11-L	#3	1	17-00021-02	shield
		2	12-09856-02	module clip

MF11-L 8K 16 BIT MEMORY		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF 1
ECO	RELEASE DATE	CS	ETCH IL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO		QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
A 00001	12/72			1.0	NOTE: Must have ECO G110-00010 H214 in slots 1, 6, 9 and in sections C-F								
C 00003	5/73			.5	Copper shield between each 8K of memory in between modules in slots 3 and 4 and modules in slots 6 & 7 of each MF11-L system unit		1 2	17-00C21-02 12-09856-02 Both per 8K bank	DZQMB-B DZQMB-C				
00004	5/73				NOTE: Phase in - 11/40 power harness change			See ECO 11/40-0005					
B 00005	7/73			1.0	Black & white twisted pair <u>deleted</u> from A07-B1 of CPU to C01-U1 of 1st MF11-L			NIL	DZQGA-C				
00007	1/74				NOTE: Not "F" coded New MF11-L/LP option harness in 11/40's with serial # greater than 6000, and 11/45's with serial # greater than 2000		1	70-09560					
00008	10/74				NOTE: Phase in of MF11-L & MF11-LP backplanes (7009193) that are identical except for ONE jumper. MF11-L has a jumper from B06-U1 to B06-V1			NIL					
00009	12/74				NOTE: Phase in support harness (7010167) to MF11-L Backplane.								

5409959	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAD	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
ME11-L - MF11-L ETCH, BACKPLANE												

ECO	RELEASE DATE	CS	ETCH .L	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CS NAME
00001	8/72	A	B		No quick check available, check if "B" etch		Nil					
00002	4/73	B	B		No quick check available, check if "B" etch		Nil					
00003	4/73	C	B		No quick check available, check if "B" etch.		Nil					

G110 CONTROL & DATA LOOPS		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAD	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 4
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ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	03/72	A	C		R118 is a 220 ohm resistor R118 is left of E28 and right of DL3 or possibly under DL3 E28 is the 6th I.C. from BE1 DL3 is the small delay line right of DL1 DL1 is the biggest delay line		N11					
00002	03/72	B	C		DL3 is a 100n sec. delay line with part number D-10100 and/or 1609559 DL3 is a small delay line just right of DL1-08 DL1 is the biggest delay line on board DL3 CHANGED TO 125 N SEC. (P/N-322-1) AND/OR 1611327 BY ECO #15 +15A		N11					
00003	08/72	C	D		R113 is a 120 ohm 1/4W 5% resistor R113 is located at AS1 below DL2 DL2 is between E1 and E2		N11					
B 00004	08/72	D	C	1.0	NOTE: This ECO affects only "C" etch modules R115 is a 1K 1/4W 5% resistor R115 is the 3rd resistor right of DL1-12 DL1 is the biggest delay line	1	13-00365					DZMMG DZMMI
B 00005	08/72	E	C	3.0	NOTE: This ECO affects only "C" etch modules C152 is a 6.8 ufd. capacitor with the cathode connected to the + etch on board. C152 is the capacitor right of DL1 -02 DL1 is the biggest delay line	1	10-05306 90-08213					

G110 CONTROL & DATA LOOPS

ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAD	BOX	SYS. UNIT	SLOT	PB	PAGE 2 OF 4
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ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CD NAME
00006	11/72	F	E		R123 is a 390 ohm 1/4W 5% resistor R123 is the closest resistor to BS1		N11					
00007	09/72	E1	C		4 - Standoffs <u>screwed</u> on		N11					
00008	10/72	E2	C		C47 is a .01 uf 100V 20% disc capacitor C47 is directly below E40 E40 is the 1st I.C. from CT1 DO NOT COUNT PULSE TRANSFORMER AS I.C.		N/A					
C 00009	12/72	E3	C	.5	Four #18 gauge black ground jumpers on SIDE ONE INSTEAD OF ON SIDE # TWO		17-00024 (#18 black & white teflon coated)					
C 00010 & 10A	11/72	E4	C	1.0	Jumper E15-10 to E28-13 E15 is the 4th I.C. from AV1. E28 is the 6th I.C. from BE1.	1	19-05547	DZQKB				
00011	12/72				<u>NOTE:</u> This ECO deleted		N/A					
D 00012	12/72	E5	C	N/A	<u>NOTE:</u> Print update affecting only "C" etch modules.		N11					

G110 CONTROL & DATA LOOPS		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 4	
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO		QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME	
D 00013 & 13A	01/73	E6	C	.5	NOTE: Rework only "C" etch modules Jumper pin 4 to 13 on spare I.C. slot above E40 E40 is the 1st I.C. from CT1			N11	DZQMB					
00014	03/73	K	F		NOTE: This ECO affects only CS "F" etch "E" modules Jumper E15-10 to E28-13 E15 is the 4th I.C. from AV1 E28 is the 6th I.C. from BE1			N/A						
00014A	03/73	K	F		NOTE: This ECO affects E & F etch revs modules DL3 is 125 n sec. delay line with P/N 1-322-1 and or 1611327 DL3 is small delay line right of the big delay line			N/A						
C 00015 & 15A	05/73	E7	C	1.0	NOTE: This ECO affects "C" etch rev modules DL3 is 125 n sec. delay line with P/N L-00-01 and/or 1611327 DL3 is small delay line right of the big delay line		1	16-11327	DZMMG DZQKB DZQGA					
C 00016	06/73	E8	C	2.0	NOTE: Rework only "C" etch rev modules Jumper E04-04 to E07-07			N11	DZMMG DZQKB DZQGA					
00017	12/73	L	F		NOTE: This ECO affect only "E" & "F" etch rev modules Jumper E04-04 to E07-07			N11						

CONTROL & DATA LOOP				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 4 OF 4
G110															
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME			
B 00018	10/73	E9	C	1.0	NOTE: Rework etch "C" Rev White wire of twisted pair from E32-06 feed through to E58-14 E32 is the 4th I.C from BS1 E58 is the 1st I.C from FC1	1	10-01610								
C 00019	12/73	E10	C	1.0	NOTE: Rework "C" etch rev Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter) E26 is the 4th I.C from BE1 DL1 is the biggest delay line		NIL	DZQMB							
00020 &A	01/74	M	H		NOTE: Affects "F" etch rev Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter) E26 is the 4th I.C from BE1 DL1 is the biggest delay line		N/A								
00021	07/74	N N E11 E11	H F E C		NOTE: Phase in DEC 8640's to replace DEC 380's		N/A								
00022	05/76	P	H		NOTE: DEC 7438 allowable I.C. substitution for 74H01-1 at E5, E18-E22		NIL								

G231 MEMORY DRIVER		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE
													1 OF 3
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CB NAME	
B 00001	6/72	C	C	3.0	Two standoffs to prevent shorting	2	90-06892						
00002	8/72	D	D		Four standoffs on module		Nil						
D 00003	8/72	E	D	4.0	NOTE: Rework only "C" etch modules D116 is a D672 diode instead of being a resistor D116 is the only diode right of E1	16	11-05275	DZMMI					
00004 & 4A	8/72	F	E		E2 is a DEC I.C. 1074H00 E2 is the I.C. closest to the top left corner.		Nil						
A 00005	8/72	E1	C	4.0	NOTE: Rework only G231's with etch rev "C" which are in 11/05 and ME11 systems. 11/45 memories do <u>not</u> need this ECO Jumper from R101 to Q7 R101 is the 3rd resistor from bottom left corner Q7 is the biggest transistor from EL1		Nil						
00006	8/72	E2	C		R170 is a 100 ohm 1/4W 5% resistor R170 is the 2nd resistor from top edge of board in the 1st row of resistors left of E1		Nil						
00007	9/72	E3	C		NOTE: Print update		Nil						

G231 MEMORY DRIVER				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IFE	PAGE 2 OF 3
ECO	RELEASE DATE	CS	ETCH	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME	
00008	9/72	E1A E2A E3A	C C C		C52 is a 470 pfd 100V 5% capacitor C52 is at the far left of DR1 and the only component between two transistors				Nil						
D 00009	12/12	E4	C	N/A	<u>NOTE:</u> Field service clarification for etch "C" modules				Nil						
00010	3/73	H	E		E1 is a DEC I.C. 4011 quad transistor				N/A						
00011	4/73	E5	C		E1 is a DEC I.C. 4011 quad transistor				N/A						
00012	4/73	J	E		<u>NOTE:</u> Affects etch "E" rev only R176 is a 4.7K 1/4W 5% resistor R176 is the 1st resistor below two transistors at the far left of EJ1				N/A						
00013	11/73	K	E		<u>NOTE:</u> I.C. substitution cancelled by ECO # 16				N/A						
00014	2/74	L	E		Q12 as snap-on heat sink Q12 is closest transistor to bottom left corner.				N/A						
00015	6/74	M	E ALL		<u>NOTE:</u> This ECO affects all etch rev modules. J1 & J2 have insulated jumper wire J1 & J2 are between E31 and E34 E31 is the last I.C. from CD slot				N/A						
00016	/74	N E6	E C		<u>NOTE:</u> I.C. 380 and 7380 are unsuitable E9, E15, E16, E17 are I.C. DEC 8640's E9 is the last I.C. from AV1 E15 is the 1st I.C. from BF1				N/A						

G231 MEMORY DRIVER				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY.	PARTS REQUIRED	MINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME	
00017	01/75	P	E		Q6 is a DEC 6534C transistor Q6 is the <u>last</u> transistor from EJ1				N/A						
00018	04/75	R	E		<u>NOTE:</u> Phase in jumper wire For current loops using teflon insulated wire				N/A						

M214  
DATA STORAGE REGISTER.

0001 0001 000

CUSTOMER:

PAGE

CHECK CHECK				QTY	PARTS REQUIRED	MATERIALS REQUIRED	PRINT NEW UPDATE	ACTUAL INSTALL TIME	LOG INSTALL	CO DATE
0001	4/70	B · B	<u>NOTE: DESIGN CHANGE</u>		AD.					

MF11-LP PARTS BREAKDOWN

5410331	-Back Panel Etch
7009193	-Back Plane Assembly
7009242	-11/45 Basic Box MF11-L/LP Harness (old)
7009395	-Expander Box DC Harness (old)
7009560	-MF11-L/LP Option Harness
BC11-A	-Foamed-Unibus Cable
G109	-Control and Data Loops
G231	-Memory Driver
H215	-8K 18 Bit Memory Stack
M920	-Unibus Jumper
M7259	• -Parity Control
MF11-LP	-1-MM11-LP & Backplane
MM11-LP	-1-8K 18 Bit Bank of Memory

FECOS'S



ORIGINATOR J. O'Loughlin 1-2  
 TEL EXT 2654 DATE 11/13/72  
 DISC PROJ NO **E20-06251**  
 COST CENTER NO 387  
 W/O 1893

ECO NO **MF11-L-00001**  
 SHEET 1 OF  
 DATE RECEIVED **11-28-72**  
 FIRST ISSUE **11-23-72**  
 FINAL ISSUE **12-7-72**

**PROBLEM**  
 1. Interaction (bit pickup) exists between the 8K memory banks of the MF11-L. A MOV instr (its last DATO) in one bank has the inhibit signals turning off during the strobe of a FETCH from the next bank.  
 2. On power up, the first memory cycle (if DATI or DATIP) may require 175 nanoseconds of deskew from SSYN to good data. Wrong data may be obtained.

UNIT TO BE CHANGED  
**MF11-L MEMORY**  
 INSP CODE 02  
 OPTIONS AFFECTED

**CORRECTION**  
 1. Rearrange modules within the bussed backplane of the MF11-L as noted below. The STACK module (H214) of one bank is isolated from CONTROL&DATA LOOPS module (G110) of the next bank.  
 2. Install **ECO#G110-00010**

**BREAK IN/EFFECTIVITY**  
 Immediately rework all memories in production prior to Acceptance. Rework units in Acceptance or in the field if problems exist.

PRODUCT LINES AFFECTED  
**PDP-11/40**

ITEM NO	DOCUMENT/PART NO	REV	NEW/ISS/REV	DESCRIPTION OF CHANGE
1	B-DD-MF11-L	A	B 06	Update revision numbers for Module Utilization print.
2	D-MU-MF11-L-MU	*	A 06	Reorder modules as follows: SLOT 1, Section C thru F: H214 SLOT 2, Section A thru F: G231 SLOT 3, Section A thru F: G110 SLOT 4, Section A thru F: G231 SLOT 5, Section A thru F: G110 SLOT 6, Section C thru F: H214 SLOT 7, Section A thru F: G231 SLOT 8, Section A thru F: G110 SLOT 9, Section C thru F: H214 Add note: VIEW FROM WIRING SIDE
3	MF11-L Memories		02	Rearrange modules as noted above. Verify installation of ECO#G110-10, do all units in house, prior to acceptance.

**DOCUMENTATION AFFECTED**  
 MODEL  
 DIAGNOSTICS  
 TECH MANUAL  
 TESTER  
 TEST PROC  
 TOOLING  
 PKG INST  
 P&G SPEC  
 PI RCH SPEC

**FIELD SERVICE AFFECTED**  
 YES  NO  
 Customer Change  
 Product Line Change

**TYPE OF CHANGE**  
 ELECTRICAL  
 MECHANICAL  
 MODULE

**ORDER PR MODEL**  
 YES  
 NO

- DISPOSITION CODES**
- 00 - RETURN TO STOCK (DELETED)
  - 01 - USE PRESENT STOCK UNTIL NEW STOCK AVAILABLE (PLEASE USE)
  - 02 - REWORK IMMEDIATELY (RETROFIT)
  - 03 - (DELETED)
  - 04 - (DELETED)
  - 05 - DOCUMENT CORRECTION
  - 06 - NEW ITEM (THIS ASSEMBLY)
  - 07 - NEW ITEM (THIS COMPANY)
  - 08 - SCRAP IMMEDIATELY

**APPROVAL SIGNATURES**

DESIGN ENGR **J. F. O'Loughlin**  
 ENG MGR (OPT) **R. C. ...**  
 FIELD SVRKE (OPT) **...**  
 CHIEF ENGR (MODULES ONLY) **...**



# FIELD CHANGE ORDER

ECO MP11L A 0001  
PAGE 1 OF 1

ATTENTION: PRINTING AND DEC ECOS ONLY POST THIS  
FORM WITH THE LEVEL OF PRIORITY TO BE REPLACING  
THE LEADING ZERO

FIELD TITLE AND  
Retrofit all MP11-L's

- LEVEL OF USER'S CONCERN
- MANDATORY HIGH PRIORITY
  - MANDATORY
  - HIGH PRIORITY IF SPECIFIC HARDWARE DEFECTS OR SYMPTOMS ARE PRESENT
  - APPROPRIATE IF SPECIFIC HARDWARE DEFECTS OR SYMPTOMS ARE PRESENT
  - PRODUCT IMPROVEMENT (OPTIONAL) LOW PRIORITY

FIELD RETRIEVAL COST: 100

MECHANICAL TECHNICIAN: ALL FIELD INSTALLATION LABOR AND MATERIAL ARE TO BE REPORTED UNDER A "A" CHANGE CODE

STANDARD APPLICABILITY: THIS ECO IS TO BE INSTALLED AT NO CHARGE FOR WARRANTY AND MAINTENANCE CONTRACT CUSTOMERS REGARDLESS OF WHETHER THE TECHNICAL EFFECTIVITY ABOVE OTHERWISE APPLIES TO THEIR EQUIPMENT

DOCUMENTATION: 0 PARTS: 0 DEC IN-SITE LABOR: 0

DECISION: WILL NOT APPLY IF THIS ECO IS INSTALLED BY DEC. THE DEC LABOR CHARGE AND MISCELLANEOUS INSTALLATION CHARGES WILL BE CHARGED AS IF INSTALLATION IS BEING PERFORMED BY A SERVICE DEC'S LATEST SCHEDULE. THE FOLLOWING WILL APPLY:

ITEM # PROJECT NUMBER  
FIELD OBSERVATION REPORTING

AVAILABLE TO DELAY: 0 PARTS: X

INSTALLATION TIME: 1.0 HOURS

SPECIAL TEST EQUIPMENT TOOLS OR SUPPLIES

FIELD OFFICE NO. DISTRIBUTION CODE

IMMEDIATE ECO DISTRIBUTION TO ALL DEC FIELD OFFICES  
 IMMEDIATE ECO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

ALL PREVIOUS ECOS: None

RELATED OR PREVIOUS ECOS: 0

ECO NOT DISTRIBUTION

THIS AS BEING BELOW MAY BE ORDERED AS REQUIRED

- WORKING CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

CONTENTS OF ANSIC STATEMENT			
FIG	REV	DATE	BY

STATE OF THIS  
ALL DEC STAFF SHOULD  
BE ADVISED OF THE  
FIELD CHANGE ORDER  
WITHIN THE  
FIELD

CONTENTS OF A PARTS STATEMENT			
FIG	REV	DATE	BY

STATE OF THIS  
ALL DEC STAFF SHOULD  
BE ADVISED OF THE  
FIELD CHANGE ORDER  
WITHIN THE  
FIELD

INSTALLATION AND TEST PROCEDURES

OPERATION MANUALS

PARTS REQUIRED

### NOTES

Even if ECO G110-00010 is not available, rearrange the modules as ordered by this ECO; install ECO G110-00010 subsequently.

FIELD SERVICE APPROVAL

Wayne Grundy

*Adi*

(5) 12/1 15



# FIELD CHANGE ORDER

FCO MF11-L 02003

FIELD TITLE/TYPE  
Retrofit all MF11-L's

REQUIREMENT 100

WITH THIS INSTALLATION, ALL THE DATA ON ALL MEDIA ARE TO BE MAINTAINED UNDER A CHANGE ORDER.

STANDARD SUPPORTABILITY: THIS FCO IS TO BE INSTALLED IN ACCORDANCE WITH THE TECHNICAL EFFECTIVITY ABOVE. OTHERWISE, AT THE OPERATOR'S DISCRETION.

DOCUMENTATION: S \_\_\_\_\_ PARTS: S \_\_\_\_\_ DECISIONS: LAB: S \_\_\_\_\_

NOTE: THIS FCO IS TO BE INSTALLED BY THE FIELD LABORER. NO SPECIAL TOOLS OR EQUIPMENT ARE REQUIRED. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION OF THE FCO. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER LABELING OF THE FCO. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER RECORDING OF THE FCO. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF THE FCO. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER STORAGE OF THE FCO. THE LABORER SHALL BE RESPONSIBLE FOR THE PROPER DISPOSAL OF THE FCO.

FIELD (BY THE FIELD) INSTRUCTIONS:

IMMEDIATE DISTRIBUTION TO ALL FIELD OFFICES

IMMEDIATE DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

NO NET DISTRIBUTION

ALL AS REQUIRED BELOW MAY BE ORDERED AS REQUIRED

CONTENTS W/ARRANTY BY DATE				ALL W/ARRANTY BY DATE			
FCO	DATE	BY	DATE	FCO	DATE	BY	DATE

INSTALLATION AND USE PRECAUTIONS

Place shields between modules in slots 3&4 and modules in slots 47 of each MF11-L. Place standard module clips on modules to prevent shields from sliding out. No shield is required between adjacent MF11-L blocks.

NOTES

- 1) This FCO is to be installed immediately in any system that appears to have memory interaction.
- 2) It is to be installed on all systems during a service call or P.M.
- 3) A maximum of two shields is required for a full MF11-L (24K). No shields are required for a basic 8K system

LEVEL OF TRAINING (SEE)

A. MAN AT THE WORKSTATION

B. MAN AT THE CONTROL PANEL

C. MAN AT THE HARDWARE SUPPORT STATION

D. MAN AT THE SOFTWARE SUPPORT STATION

E. MAN AT THE OPERATOR'S STATION

F. MAN AT THE MAINTENANCE STATION

G. MAN AT THE SERVICE STATION

H. MAN AT THE REPAIR STATION

I. MAN AT THE INSPECTION STATION

J. MAN AT THE TESTING STATION

K. MAN AT THE CALIBRATION STATION

L. MAN AT THE ADJUSTMENT STATION

M. MAN AT THE REPAIR STATION

N. MAN AT THE INSPECTION STATION

O. MAN AT THE TESTING STATION

P. MAN AT THE CALIBRATION STATION

Q. MAN AT THE ADJUSTMENT STATION

R. MAN AT THE REPAIR STATION

S. MAN AT THE INSPECTION STATION

T. MAN AT THE TESTING STATION

U. MAN AT THE CALIBRATION STATION

V. MAN AT THE ADJUSTMENT STATION

W. MAN AT THE REPAIR STATION

X. MAN AT THE INSPECTION STATION

Y. MAN AT THE TESTING STATION

Z. MAN AT THE CALIBRATION STATION

ISSUE BY: \_\_\_\_\_

DATE: May 1973

TIME: 0.5 HOURS

TEST EQUIPMENT TO BE USED:

LAST PAGE: A01

RELATED APPROVALS:

OPERATIONAL CHANGE

MAINTENANCE MANUAL CHANGE

OPERATIONAL PROGRAMS AFFECTED

FCO BY: \_\_\_\_\_

MD-11-D24MB-B  
#-124K Memory Exerciser

PARTS REQUIRED

Q1 17-00021-02 Memory Shield

Q2 12-09856-02 Module Clips

(per optional memory, 8K)

(see note #3 below)

FIELD SERVICE APPROVAL

W. Dirbat

*OK*

(X) 4/12 (325/300) 625



ENGINEERING CHANGE ORDER

ORIGINATOR J. F. O'Loughlin WM  
TELETYPE 481 DATE 3/15/73  
DISC PROJ NO L20-06251  
COST CENTER NO 357  
NO. C-2137

ECO NO MF11L-0003  
SHEET 1 OF  
DATE RECEIVED 3-21-73  
FIRST ISSUE 3-22-73  
FINAL ISSUE 5/3/73

**PROBLEM** 1. Some adjacent memory segments interact (interfere) on overlap operation even after the module rearrangement of ECO MF11 00001. Module sections C,D,E and F of the G331 electrostatically radiate into the adjacent memory segment.  
2. Software List and Accessory List not needed for MF11-L; provided by basic machine.

UNIT TO BE CHANGED

MF11-L  
MEMORY

SEE

D/SI CODE BELOW

OPTIONS AFFECTED

PDP11/40  
PDP11/45

**CORRECTION**

- Put shield (17 00021-02) between 8K memory segments in MF11-L memory.
- Delete Lists from Drawing Directory.

**BREAK IN/EFFECTIVITY**

Retrofit all memories with above noise problem. Phase shields into system area by May 15, 1973.

PRODUCT LINES AFFECTED

PDP11

ITEM NO	DOCUMENT PART NO	DISC NO	REV	DISP CODE	DESCRIPTION OF CHANGE	DOCUMENTATION AFFECTED	FIELD SERVICE AFFECTED	TYPE OF CHANGE
1.	D-MU-MF11-L-MU	A	B	06	Update revision. Add Notes 4 and 5: 4. Electromagnetic shields (1700021-02) are required between modules in slots 03 and 04, and slots 06 and 07 when optional memories are added. Shields are positioned in module sections C,D,E and F and held in with module clips noted. 5. Module Holders (12 09856-02) are positioned as noted. Position and number of holders depend upon whether optional memories installed. <b>Change notes 1 &amp; 3.</b>	<input type="checkbox"/> MODEL <input type="checkbox"/> DIAGNOSTICS <input type="checkbox"/> TECH MANUAL <input type="checkbox"/> TESTER <input type="checkbox"/> TEST PROG <input type="checkbox"/> TOOLING <input type="checkbox"/> PRG INST <input type="checkbox"/> ENG SPEC <input type="checkbox"/> PURCH SPEC	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Customer Change <input checked="" type="checkbox"/> Product Line Change	<input checked="" type="checkbox"/> ELECTRICAL <input type="checkbox"/> MECHANICAL <input type="checkbox"/> MODULE ORDER PR MODEL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
2.	17 00021-02	-	-	08	New size (7 1/2" X 10" +1/8") copper shield. <b>Add qty of AIR</b>			
3.	12 09856-02	-	-	07	Specify module holders, <b>add.</b>			
4.	A-PL-MF11-L-0	A	B	06	<b>Add item 2 &amp; 3 this ECO.</b>			
5.	B-DD-MF11-L	C	D	06	Update revisions, delete Software List and Accessory List prints.			
6.	D-CA-MF11-L-0	A	B	06	Update revision only			

DISPOSITION CODES

APPROVAL SIGNATURES

- 00 - RETURN TO STOCK
- 01 - (DELETED)
- 02 - USE PRESENT STOCK UNTIL NEW STOCK AVAILABLE (PHASE IN)
- 03 - BEGIN IMMEDIATELY (RETRQFIT)
- 04 - (DELETED)
- 05 - (DELETED)
- C - DOCUMENT CORRECTION
- 07 - NEW ITEM WITH THIS ASSEMBLY
- 08 - NEW ITEM WITH THIS COMPANY
- 09 - SCRAP IMMEDIATELY

DESIGN ENGR O'Loughlin  
 ENG MGR (OPT) J. F. O'Loughlin  
 FIELD SERVICE (OPT) W. J. [Signature]  
 CHIEF ENGR (MODULES ONLY) [Signature]

Typewritten

Hand Signature

**ENGINEERING CHANGE ORDER**

ORIGINATOR *Wes E. Min.* J. F. O'Loughlin  
 TEL EXT NO 451 DATE 5/22/73  
 DISC PROJ NO E70 06751  
 COST CENTER NO 357  
 W.O. 2265

ECO NO 1L-0000  
 SHEET 1 OF  
 DATE RECEIVED 5-31-73  
 FIRST ISSUE 5-31-73  
 FINAL ISSUE 7/2/73

**PROBLEM** The special MSYNA signal between the KD11-A processor and the MF11-L memory occurs approximately 75 nanoseconds before Unibus MSYNA on stacking operations (TRAP and EIS operation) bus transitions do not settle before this clocking signal. Improper PC or PS data (especially in lower byte) is stacked.

7009103  
 FIRST MEMORY  
 POWER HARNESS

DISP CODE *spe*  
 B-11-K  
 OPTIONS AFFECTED

**COACTION** Delete the twisted pair wires for MSYNA from between the KD11-A processor and MF11-L memory (harness 7009103). Do not add MSYNA back-panel wires to new MF11-L memories.

MF11-L  
 PDPH/35  
 PDPH/40

**BREAK IN EFFECTIVITY** Delete MSYNA on all units with problems. Delete from machines prior to acceptance by 6/1/73. On retrofit, remove only the twisted pair in harness. On new assemblies do not provide twisted pair in harness.

PRODUCT LINES AFFECTED  
 PDP11

ITEM NO	DOCUMENT PART NO	OLD REV	NEW REV	DISP CODE	DESCRIPTION OF CHANGE
1.	D-MU-MF11-L-00	B	C	06	Change document revision letter. Delete NOTE 3 about MSYNA. Erase note, do not renumber.
2.	B-DD-MF11-L	E	F	06	Change document revision. Change 'M' revision to C.
3.	7008872 Backpanel	-	-	02	Do not rework existing units. Cease adding wires for MSYNA on all new units.
4.	B-IA-7009103-0-0	B	C	06	Change document revision. Delete items 11 and 12 from Wire Table, Parts List and harness drawing. Delete twisted pair for MSYNA (item 11) from cables per Break In above.
5.	7009103 Harness	-	-	03	Remove from unit. Use was A/R.
6.	9107678-09	-	-	00	Remove 4 term-pt connectors.
7.	9007655	-	-	00	

- DOCUMENTATION AFFECTED
- MODFL
  - DIAGNOSTICS
  - TECH MANUAL
  - TESTER
  - TEST PROG
  - TOOLING
  - PKG INST
  - ENG SPEC
  - PURCH SPEC

- FIELD SERVICE AFFECTED
- YES  NO
  - Customer Charge
  - Product Line Charge

- TYPE OF CHANGE
- ELECTRICAL
  - MECHANICAL
  - MODULE
- ORDER PR MOD I
- YES
  - NO

**DISPOSITION CODES**

- 00 - RETURN TO STOCK
- 01 - (DELETED)
- 02 - USE PRESENT STOCK UNTIL NEW STOCK AVAILABLE (PHASE IN)
- 03 - REWORK IMMEDIATELY (RETROFIT)
- 04 - (DELETED)
- 05 - (DELETED)
- 06 - DOCUMENT CORRECTION
- 07 - NEW ITEM (THIS ASSEMBLY)
- 08 - NEW ITEM (THIS COMPANY)
- 09 - SCRAP IMMEDIATELY

**APPROVAL SIGNATURES**

DESIGN ENGR J.F. O'Loughlin  
 ENG MGR (OPT) *[Signature]*  
 FIELD SERVICE (OPT) *[Signature]*  
 CHIEF ENGR (MODULES ONLY)

DRA-111C



# FIELD CHANGE ORDER

FCO MF11L B0005  
PAGE 1 OF 1

FIELD DESCRIPTION  
Retrofit immediately MF11-L's on PDP-11/35 and PDP-11/40 with unexplainable problems; all others on next service call.

REASON FOR CHANGE AND RECOMMENDED POSTIVE ACTION AT THE LEVEL OF THE USER OR REPLACING FIELD NUMBER

LEVEL OF EMERGENCY (SEE)  
1. CRITICAL - HIGH PRIORITY  
2. MAJOR - MEDIUM PRIORITY  
3. MINOR - LOW PRIORITY  
4. SOFTWARE - SOFTWARE OR FIRMWARE  
5. HARDWARE - HARDWARE OR MECHANICAL

STANDARD OPERATING PROCEDURE TO BE INSTALLED AT THE USER'S FACILITY  
 DOCUMENTATION IS PARTS IS TO BE INSTALLED BY THE USER  
DELIVERY OF PARTS IS TO BE INSTALLED BY THE USER  
LABOR CHARGE IS TO BE INSTALLED BY THE USER  
IS INSTALLED BY THE USER  
LABOR CHARGE IS TO BE INSTALLED BY THE USER

PROJECT NUMBER  
PROJECT DESCRIPTION

AVAILABILITY DELAY  
PARTS X

INSTALLATION TESTS  
1.0 HOURS

SPECIAL TEST EQUIPMENT TOOLS OR SUPPLIES

IMMEDIATE DISTRIBUTION TO ALL FIELD OFFICES  
 IMMEDIATE TO DISTRIBUTION BY REGIONAL PRODUCTS POINT

LAST PREVIOUS WORK ORDER NO. C03, A01

ALL AS DEFINED WILL BE ORDERED AS REQUIRED

MAINTENANCE MANUAL CHANGE  
 OPERATIONAL PROGRAMS AFFECTED

CONTRACT NUMBER	ORDER NUMBER	DATE	TIME	BY
ORDER NUMBER	DATE	TIME	BY	

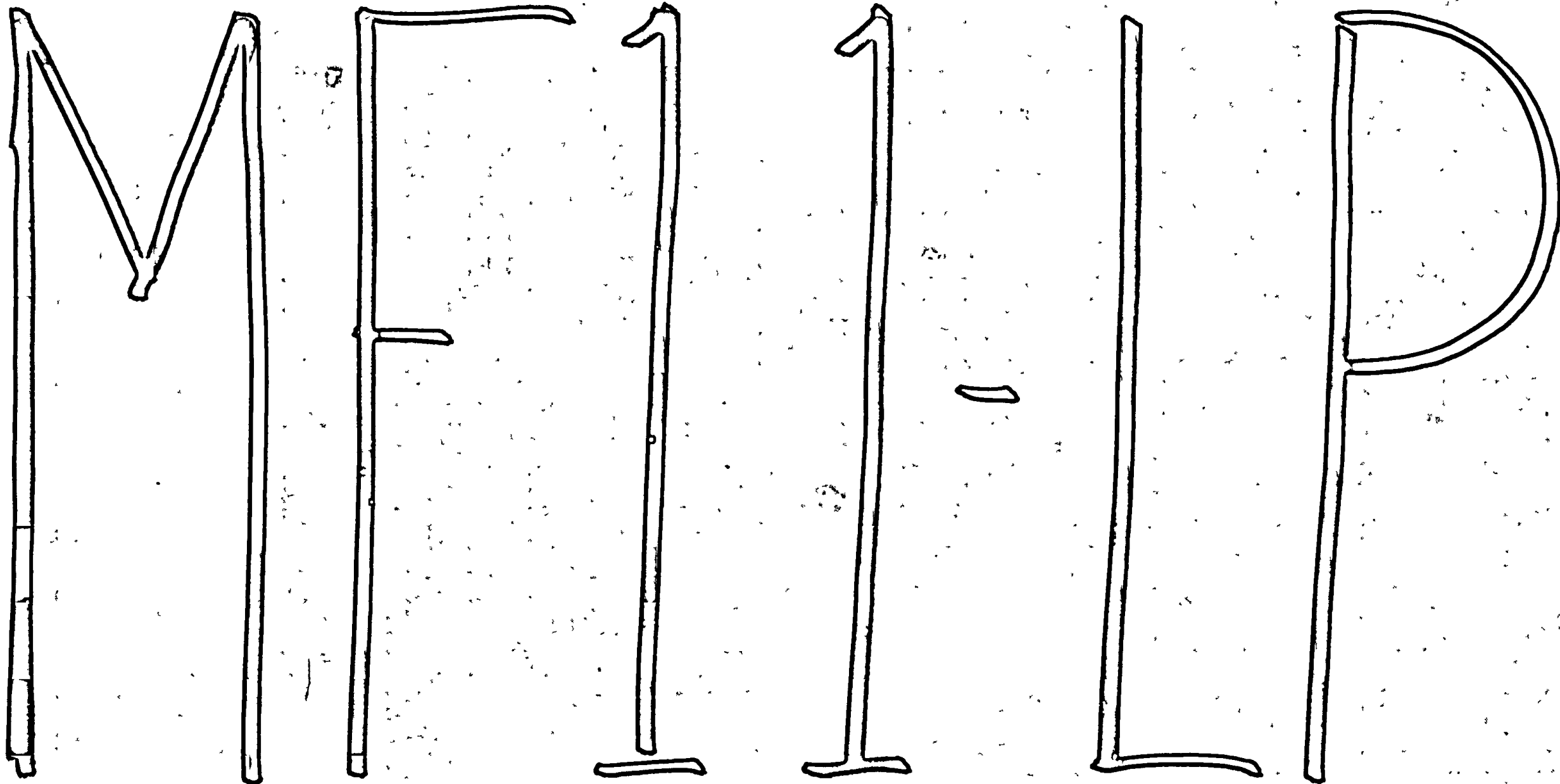
OPERATIONAL PROGRAMS AFFECTED  
GTP

INSTALLATION AND TEST PROCEDURES  
Delete black and white twisted pair from A07B1 of CPU to C01U1 of first MF11-L. Check CPU timing per sheet K4-2. If necessary, adjust S1 so that CL1 is less than 145 nsec but greater than 135 nsec.

PARTS RECEIVED

REMARKS  
Quick-Check - Black/white twisted pair deleted from A07B1 of CPU to C01U1 of first MF11-L

FIELD SERVICE APPROVAL  
Greg Redpath *GR*  
(x) -14 (400/400) -00



MF11-LP PARTS BREAKDOWN

5410331	-Back Panel Etch
7009193	-Back Plane Assembly
7009242	-11/45 Basic Box MF11-L/LP Harness (old)
7009395	-Expander Box DC Harness (old)
7009560	-MF11-L/LP Option Harness
BC11-A	-Foamed-Unibus Cable
G109	-Control and Data Loops
G231	-Memory Driver
H215	-8K 18 Bit Memory Stack
M920	-Unibus Jumper
M7259	-Parity Control
MF11-LP	-1-MM11-LP & Backplane
MM11-LP	-1-8K 18 Bit Bank of Memory

ECCO

QUICK

CHECK

MAR/76

MF11-LP FIELD CODED ECO'S

G109

- C4, C6, C7, C10, C11

G231

- B1, D3, A5, D9

M7259

- B4

MF11-LP ECO PARTS

<u>NAME</u>	<u>ECO#</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>COMMENTS &amp; DESCRIPTION</u>
G109	#6	1	16-11327	Delay
	#10	1	10-01610	Capacitor
		A/R	91-07720-09	White Wire
G231	#1	2	90-06892	Standoffs
	#3	16	11-05275	Diode
	#15	A/R	90-09185	Jumper Wire
M7259	#4	1	13-09143-11	Resistor
		1	13-01874	Resistor

MF11-LP 8K 18 BIT MEMORY		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
ECO	RELEASE DATE	CS	FROM TO	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO		QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	7/73				<u>NOTE:</u> Print update			Nil					
00002	1/74				MF11-L/LP option harness (7009560) in 11/45 CPU greater than # 2000 11/40 CPU greater than # 6000			N/A					
00003	6/74				<u>NOTE:</u> Adds software checklist			Nil					
00004	9/74		A		<u>NOTE:</u> MF11-L/LP backplane 7009193 difference MF11-LP on 7009193 backplane does not have a jumper from B06-U1 to B06-V1			Nil					
00005	1/75				<u>NOTE:</u> Phase in support harness (7010167) to backplane			N/A					

REVISION DATE

5409959	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
ME11-L - MF11-L ETCH BACKPLANE												

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	8/72	A	B		No quick check available, check if "B" etch		Nil					
00002	4/73	B	B		No quick check available, check if "B" etch		Nil					
00003	4/73	C	B		No quick check available, check if "B" etch.		Nil					

G109 CONTROL & DATA LOOPS				ETCH	OPTION	OPTION SERIAL#	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 3
ECC	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME	
00001	12/72	F	I		NOTE: New etch Rev				NIL						
00002 &A	12/72	E1	C		Standoffs are screwed on				N/A						
00003 &A	01/73	E2	C		C47 is a .01uf , 100V 20% disc capacitor C47 is directly below E40 E40 is the 1st I.C. from CT1 NOTE: DO NOT COUNT PULSE TRANSFORMER			8 4 1 5	10-000064 13-01610 13-00309 13-05324						
C 00004	01/73	E3	C	2.0	NOTE: Rework G109-YA only for parity memory Jumper from E15-10 to E28-13 E15 is the 4th I.C. from AV1 E28 is the 6th I.C. from BE1				NIL	DZMFA					
00005	05/73	K	F		NOTE: Affects etch "E" and "F" revs DL3 is 125 n sec. delay line with part number L-00-01 and/or 16-11327 DL3 is the small delay line left of E28 E28 is the 6th I.C. from BE1				NIL						
C 00006	05/73	E4	C	1.0	NOTE: Affects etch "C" revs DL3 is a 125 n sec. delay line part number L-00-01 and/or 16-11327 DL3 is a small delay line left of E28 E28 is the 6th I.C. from BE1			1	16-11327	DZMCG DZQMB					

G109 CONTROL & DATA LOOPS		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF 3
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO		QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
C 00007	05/73	E5	C	1.0	NOTE: Affects etch "C" rev G109 & G109-YA modules Jumper E04-04 to E07-07			NIL	DZQKB				
00008 & A	06/75	E6	C		NOTE: 1) Affects etch "C" revs. 2) Generate separate G109-YA documentation 3) Change component substitution list R96 is a 82 ohm 1/2W 5% resistor R96 is right of E44 E44 is the 2nd I.C. left of DA1			NIL					
00009	12/73	L	F		NOTE: Affects etch "E" & "F" rev - G109 and G109-YA. Jumper E04-04 to E07-07		1	10-01610					
C 00010	12/73	E7	C	1.0	NOTE: Affects etch "C" rev White jumper from E32-06 to E58-14 E32 is the 4th I.C. from BS1 E58 is the 1st I.C. from FC1		1 A/R	10-01610 91-07720-09					
C 00011	12/73	E8	C	1.0	NOTE: Rework etch "C" rev Jumper or etch run from E26-08 to tap 10 of DL1 E26 is the 4th I.C. from BE1 DL1 is the biggest delay line			NIL	DZQMB				
00012 & A	06/74	M	II		NOTE: Affects etch "F" rev Jumper E26-08 to DL1-10 E26 is the 3rd I.C. from BE1 DL1 is the biggest delay line			N/A					

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G109	CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL#	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3
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ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00013	07/74	E9	C		NOTE: Phase in DEC 8640 to replace DEC 380. and DEC 7380 chips.	8	19-11469					
00014	05/76	P	H		NOTE: DEC 7438 allowable I.C. substitution for 74H01-1 at E5, E18 to E22.		NIL					

3231 MEMORY DRIVER				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 3
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO				QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	6/72	C	C	3.0	Two standoffs to prevent shorting				2	90-06892					
00002	8/72	D	D		Four standoffs on module					Nil					
00003	8/72	E	D	4.0	NOTE: Rework only "C" etch modules D116 is a D672 diode instead of being a resistor D116 is the only diode right of E1				16	11-05275	DZMMI				
00004 & 4A	8/72	F	E		E2 is a DEC I.C. 1074H00 E2 is the I.C. closest to the top left corner.					Nil					
00005	8/72	E1	C	4.0	NOTE: Rework only G231's with etch rev "C" which are in 11/05 and ME11 systems. 11/45 memories do <u>not</u> need this ECO Jumper from R101 to Q7 R101 is the 3rd resistor from bottom left corner Q7 is the biggest transistor from E1					Nil					
00006	8/72	E2	C		R170 is a 100 ohm 1/4W 5% resistor R170 is the 2nd resistor from top edge of board in the 1st row of resistors left of E1					Nil					
00007	9/72	E3	C		NOTE: Print update					Nil					

G231 MEMORY DRIVER				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE		
															2	OF	3
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO				QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CB NAME		
00008	9/72	E1A E2A E3A	C C C		C52 is a 470 pfd .0V 5% capacitor C52 is at the far left of DR1 and the only component between two transistors					Nil							
D 00009	12/12	E4	C	N/A	NOTE: Field service clarification for etch "C" modules					Nil							
00010	3/73	H	E		E1 is a DEC I.C. 4011 quad transistor					N/A							
00011	4/73	E5	C		E1 is a DEC I.C. 4011 quad transistor					N/A							
00012	4/73	J	E		NOTE: Affects etch "E" rev only R176 is a 4.7K 1/4W 5% resistor R176 is the 1st resistor below two transistors at the far left of EJ1					N/A							
00013	11/73	K	E		NOTE: I.C. substitution cancelled by ECO # 16					N/A							
00014	2/74	L	E		Q12 as snap-on heat sink Q12 is closest transistor to bottom left corner.					N/A							
00015	6/74	M	E ALL		NOTE: This ECO affects all etch rev modules. J1 & J2 have insulated jumper wire J1 & J2 are between E31 and E34 E31 is the last I.C. from CD slot					N/A							
00016	/74	N E6	E C		NOTE: I.C. 380 and 7380 are unsuitable E9, E15, E16, E17 are I.C. DEC 8640's E9 is the last I.C. from AV1 E15 is the 1st I.C. from BF1					N/A							

0231 MEMORY DRIVER				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3
ECO	RELEASE DATE	CS	ETCH NO.	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME	
00017	01/75	P	E		Q6 is a DEC 6534C transistor Q6 is the <u>last</u> transistor from EJ1				N/A						
00018	04/75	A	E		<u>NOTE:</u> Phase in jumper wire For current loops using teflon insulated wire				N/A						

H215 8K x 18 BIT MEMORY STACK					ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF 1
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ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	7/73	A			<u>NOTE:</u> Print change							

259 PARITY CONTROL		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
			MF11										

ECO	RELEASE DATE	CS	ETCH .L	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	4/73	A	B		<u>NOTE:</u> New etch rev		Nil					
00002	6/73	B	C		R17 is a 10K pot R16 is located on far left from BV1 near handle R16 CHANGED TO 20K POT BY ECO # 4		Nil					
00003	7/73	C	C		<u>NOTE:</u> Rework "C" etch boards only R5 is a 8.2K ohm, 1/4W, 5% resistor R5 is left of E31 E31 is the 7th I.C. from BP1 R5 CHANGED TO A 56K RESISTOR BY ECO # 4		Nil					
00004	10/73	D	C	1.0	<u>NOTE:</u> Rework "C" etch boards only Jumper E31-03 to E31-07 E31 is the 7th I.C. from BP1	1 1	13-09143-11 13-01874					
00005	1/74	E	D		<u>NOTE:</u> Phase in M7259 in MF11-UP parity memories with CS "E" etch "D" or later		Nil					

M F I I U P

- NOTE: 1) MF11-U/UP are combined together for convenience  
(for MF11-U take out sheet on M7259)  
2) !M11-U kit required to convert MF11-L/LP to MF11-U/UP

MF11-U/UP PARTS BREAKDOWN

5410345	- etched backplane
7009295	- wire list assembly
7009535	- MF11-U/UP option harness
G114	- 16K Sense Memory
G235	- 16K X-Y driver
H217-C	- Parity Memory stack (16K X 18 Bit ) ( for parity only)
H217-D	- Memory stack (16K X 16 Bit)
M7259	- Parity controller (for parity only)
M8293	- 16K timing module
MF11-U/UP	- 16K & backplane

MF11-U/UP FIELD CODED ECO'S

G114	15,
G235	- 18,
M7259	- B4

MF11-U/UP ECO PARTS

<u>NAME</u>	<u>ECO#</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>COMMENTS &amp; DESCRIPTION</u>
G114	#8	1	13-00364	Resistor
		1	13-02388	Resistor
M7259	#4	1	13-01874	Resistor
		1	13-09143-11	Resistor

ECO  
QUICK  
CHECK

- NOTE: 1) MF11 U/UP are combined together for convenience  
 (for MF11-U take out sheet on M7259)  
 2) FM11-U kit required to convert MF11-L/LP to MF11-U/UP

MF11-U/UP PARTS BREAKDOWN

5410345	- etched backplane
7009295	- wire list assembly
7009535	- MF11-U/UP option harness
G114	- 16K Sense Memory
G235	- 16K X-Y driver
H217-C	- Parity Memory stack (16K X 18 Bit ) ( for parity only)
H217-D	- Memory stack (16K X 16 Bit)
M7259	- Parity controller (for parity only)
M8293	- 16K timing module
MF11-U/UP	- 16K & backplane

MF11-U/UP FIELD COD'D ECO's

G114	15,
G235	- 18,
M7259	- B4

MF11-U/UP ECO PARTS

<u>NAME</u>	<u>ECO#</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>COMMENTS &amp; DESCRIPTION</u>
G114	#8	1	13-00364	Resistor
		1	13-02388	Resistor
M7259	#4	1	13-01874	Resistor
		1	13-09143-11	Resistor

NF11-U/UP 16K SENSE MEMORY		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE
			MF11		11/								1 OF
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED		
00001	01/74				<u>NOTE:</u> Documentation Update		NIL						
00002	10/74				<u>NOTE:</u> Document Change		NIL						
00003	01/75				<u>NOTE:</u> Phase in of support harness (7010167) Support harness is present This is <u>NOT</u> a new cable just a support along the length of the backplane for fastening the harness		NIL						
00004	03/75				<u>NOTE:</u> Document update		NIL						
00005	11/75				<u>NOTE:</u> Introduction of MF11-W/WP variation		NIL						
00006 &A	02/76				<u>NOTE:</u> Stack Substitution		NIL						

G114 16K SENSE INHIBIT		ETCH	OPTION	OPTION SPECIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TIME	QUICK CHECK CALCULATION - NOT COMPLETE ECO		QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE
00001	10/73	B	B		<u>NOTE:</u> Cancelled By ECO# 1A			NIL					
00001A	10/73	B	B		Gnd Jumper from FT1 and along the bottom of the board		A/R	91-07470-00					
00002	11/73	C	B		R108 is a <u>56 00M</u> , 1/2W, 5% resistor R108 to the right of T103 T103 is a transformer along AC1 near handle side.			N/A					
00003	10/74	D	C		<u>NOTE:</u> New Etch. Rev.			NIL					
00004	04/75	E	C		<u>NOTE:</u> Part substitution due to shortage			N/A					
I 00005	05/75	F	C	.5	<u>NOTE:</u> Affects only etch "C" rev's Measure open circuit from the top left metal handle to ground			NIL					

G235 16K X-Y DRIVER		ETCH	OPTION	OPTION SERIAL#	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 2
			MF11-U										
ECO	RELEASE DATE	CS	ETCH WL	ECO HPS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	C	
00001	07/73	D	D		R35 is a 3.16K, 1/8W, 12 resistor R35 is located below W4 W4 is left of E2-01 E2 is the 2nd I.C. from AT1	1 1	13-00229 13-03045						
00002	09/73	E	D		R92 is <u>NOT</u> a 330ohm, 1/4W, 5% resistor R92 is the 4th component above R101 R101 is 220 ohm, 2W resistor left at AT1	1 2 1	11-03441 13-00271 13-02379						
00003	11/73	F	D		R29 is a 120K, 1/4W 5% resistor R29 is the 1st resistor above Q14 Q14 is the transistor above E4 E4 is the 2nd I.C. from BL1		N/A						
00004	01/74	H	D		D2, D3, D4 are deleted No diodes between E2 and R18 R18 is a 100ohm resistor, above E2	1 1	15-05321 19-10466						
00005	04/74	J	D		C47 is a .022 ufd capacitor C47 is the 1st capacitor below T2 T2 is a transformer at the far left of AN1	2 1	10-11683 13-04855						
00006	08/74	K	D		Delete C44 Only one 47ufd, 20V, 10% capacitor still present (not two) between Q12 and Q13 Q12 and Q13 are the 1st and 2nd transistors from AE1		NIL						

G235		16K X-Y DRIVER		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF 2
					MF11-U/UP										
ECO	RELEASE DATE	CS	ETCH	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CI	
			WL												
00007	04/75	L	D		NOTE: Parts substitution due to shortages				NIL						
I 00008	06/75	L	D		NOTE: Must have if used on MA20-M for PDP10 R23 is an 1K 1/2W resistor R23 is the only resistor left of AA1			1 1	13-00364 13-02388						
I 00009 &A	06/76	N	D		R103 is a 75 ohm 1W 5% resistor R103 is immediately right of Q12 Q12 is the 2nd transistor from AC1										

H217 16K STACK		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAD	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF
ECO	RELEASE DATE	CS	ECOH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO		QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CS NO
00001	05/74				NOTE: Manufacturing Change			NIL					
00002	07/74				NOTE: Document Change			NIL					
00003	10/74	B	E		NOTE: Rework H217-B and C (18 or 19 Bit) Diodes D29, D30 are deleted D2, D30 were Diodes left of CE1 but right of the resistor network			NIL					
00004	03/76	C	E		NOTE: Manufacturing change.			NIL					

M7259 PARITY CONTROL				ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF
ECO	RELEASE DATE	CS	ETCH #	ECO HRS. TYP.	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CS	
00001	4/73	A	B		NOTE: New etch rev				Nil						
00002	6/73	B	C		R17 is a 10K pot R16 is located on far left from BV1 near handle R16 CHANGED TO 20K POT BY ECO # 4				Nil						
00003	7/73	C	C		NOTE: Rework "C" etch boards only R5 is a 8.2K ohm, 1/2W, 5% resistor R5 is left of E31 E31 is the 7th I.C. from BP1 R5 CHANGED TO A 56K RESISTOR BY ECO # 4				Nil						
B 00004	10/73	D	C	1.0	NOTE: Rework "C" etch boards only Jumper E31-03 to E31-07 E31 is the 7th I.C. from BP1			1 1	13-09143-11 13-01874						
00005	1/74	E	D		NOTE: Phase in M7259 in MF11-UP parity memories with CS "E" etch "D" or later				Nil						

REVISION DATE MAY/76

M8293		16K UNIBLS TIMING		ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO			QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CI NA	
00001	10/73	B	B		NOTE: This is a mandatory ECO Measure continuity from E21-03 to E25-13 E21 is the 2nd I.C. from CL1 E25 is below E21				NIL						
00002	11/73	C	B		NOTE: This is a mandatory ECO Measure continuity from E03-05 to DL3-05 DL3 is the only delay line left of ARI				NIL						
00003 &A	06/74	D	C		NOTE: New etch rev				N/A						
00004	06/75	E	C		NOTE: Phase in DEC 8640 to replace DEC 380				N/A						
00005	06/76	F	C B		NOTE: Introduces M8293-YB for XM15 M8293-YB can be distinguished by checking for jumper from E38-12 to E38-13 E38 is the 4th I.C. from DT1				NIL						