

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

M F I I

FCR

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>1 G231-B0001 MAY 72 QUICK SYNOPSIS Prevents components on G231 shorting to module above it. QUICK CHECK Two phenolic 7/16" standoffs on module. NEW REVISION Rework etch B to CS C.</p> <p>2 G110-B0004 MAY 72 QUICK SYNOPSIS Corrects Delay line 3 termination on etch C G110's QUICK CHECK R115 changed from 3K to 1k ohms. NEW REVISION Rework etch C to CS D.</p> <p>3 G110-B0005 MAY 72 QUICK SYNOPSIS Corrects C152 insertion polarity (positive terminal) to +5V. QUICK CHECK Positive terminal of C152 goes to +5V NEW REVISION Rework etch C, D to CS E.</p> <p>4 G231-D0003 AUG 72 QUICK SYNOPSIS Improves -15V and strobe margins when operating at 55°C. QUICK CHECK Sixteen D672 diodes replace 330 ohm resistors. NEW REVISION Rework etch B to CS F.</p> <p>5 G231-A0005 AUG 72 QUICK SYNOPSIS Improves DC LO circuitry operation. QUICK CHECK Wire ADD from R89 to R93 NEW REVISION Rework etch C to CS E1.</p> | <p>6 G110-C0010 NOV 72 QUICK SYNOPSIS Data errors occur during the first DATI to any memory bank. QUICK CHECK Wire ADD E28 pin 13 to E15 pin 10. NEW REVISION Rework etch C, D, E to CS J.</p> <p>7 MF11L-A0001 NOV 72 QUICK SYNOPSIS Rearrangement of modules within bussed backpanel of MF11-L eliminates interaction and bit pickup between 8K memory banks. QUICK CHECK 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>• MF11L-C0003 MAR 73 QUICK CHECK Shields ADD ed between memory segments.</p> <p>8 G110-D0012 DEC 72 QUICK SYNOPSIS Provides print clarification affecting etch C G110's NEW REVISION CS E5.</p> <p>9 G110-D0013 DEC 72 QUICK SYNOPSIS Ensures PAL and PBL data bits gate high onto the bus. QUICK CHECK Wire ADD's E40 pin 4 to pin 13 and E40 pin 9 to pin 12. NEW REVISION Rework etch C to CS E6.</p> |
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|--|--|
| <p>10 G109-C0004 DEC 72 QUICK SYNOPSIS Replaces +3V with INIT L to reset STROBE one-shot. QUICK CHECK Wire ADD E28 pin 13 to E15 pin 10 NEW REVISION Rework etch C. E to CS E3</p> <p>11 G231-D0009 DEC 72 QUICK SYNOPSIS G231 prints redrawn to DEC standards. NEW REVISION CS E4</p> <p>12 G109-C0006 MAR 73 QUICK SYNOPSIS Lengthens memory cycle time. QUICK CHECK DL3 replaced with 125 nsec delay NEW REVISION Rework etch C to CS E4</p> <p>13 G109-C0007 MAR 73 QUICK SYNOPSIS Eliminates noise coupling onto BUS INIT etch from data line etches QUICK CHECK - Wire ADD E4 pin 4 to E7 pin 7 NEW REVISION Rework etch C to CS E5</p> <p>14 G110-C0015 MAR 73 QUICK SYNOPSIS Allows a longer memory cycle time on systems with high speed NPR devices. QUICK CHECK DL3 changed from 100 nsec to 125 nsec delay. NEW REVISION Rework etch C to CS E7</p> | <p>15 G110-C0016 MAR 73 QUICK SYNOPSIS Eliminates noise on BUS INIT etch. QUICK CHECK Wire ADD's E4 pin 4 to E7 pin 7; AA1 feed-thru to E7 pin 6 NEW REVISION Rework etch C to CS E8</p> <p>16 G110-B0018 APR 73 QUICK SYNOPSIS Eliminates noise on STROBE O H etch. QUICK CHECK Twisted pair ADD'ed E32 pin 6 feed-thru to E58 pin 4 feed-thru/E33 pin 7 to ground side of C44 NEW REVISION Rework etch C to CS E9</p> <p>17 MF11L-B0005 MAY 73 QUICK SYNOPSIS Removes special MSYNA signal between KD11-A processor and MF11-L memory. QUICK CHECK Black/white twisted pair deleted A07B1 of CPU to C01U1 of first MF11-L</p> <p>18 G109-C0010 JUL 73 QUICK SYNOPSIS Eliminates noise induced condition where memory randomly picks up and drops bits. QUICK CHECK Twisted pair E32 pin 6 feed-thru to E58 pin 14 feed-thru/E33 pin 7 to ground side of C44 NEW REVISION Rework etch C to CS E7</p> <p>19 M7259-B0004 OCT 73 QUICK SYNOPSIS Ensures module operation with worst case timing margins. QUICK CHECK R16 potentiometer is 20K NEW REVISION Rework etch B. C to CS D</p> |
|--|--|

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Considered in the Field Installation and Maintenance of This Option/Module/Power Supply**

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20 G110-C0019 NOV 73

QUICK SYNOPSIS

Widening R/W RESET L prevents memory skipping a Restore cycle

QUICK CHECK

E28 pin 8 goes to tap 10 of DL

NEW REVISION

Rework etch C to CS E10

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

M F I I L

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

| | | | | | |
|----------------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| digital | FIELD SERVICE TECHNICAL MANUAL | | | | 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. Larabel | Rev g |
| | 11/40 | 11/45 | | Approval B. Dimbat | Date 4/30/74 |
| | | | | | Cross Reference |

It seems that there has been some doubt as to exactly when and where the electro-magnetic 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 1/4" box), the hex shield should go between slots 7 and 8, which is between the M7261 and G110 modules; with multiple 8K banks, an additional shield should be placed between slots 4 and 5. On the 11/05, 10 1/4" box a quad shield should go between the H214 and the M7261 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 | | HOW TO DESTROY THE H744 | | Tech Tip | MF11 |
| | | | | Number | TT-3 |
| All 11's | Processor Applicability | | Author | Greg Redpath | Rev 0 |
| | | | Approval | William Dimbat | Date 02/24/76 |
| | | | | | Cross Reference |
| | | | | | PDP 11 INST.TT-5 |

This tech tip is for cross reference purposes only.

| | | | | | |
|-----------|-------------------------|---------------------------------------|----------|----------------|-----------------|
| Title | | MF11-LP/REMOVAL OF M7259 PARITY CARDS | | Tech Tip | MF11 |
| | | | | Number | TT-4 |
| All 11 | Processor Applicability | | Author | Skip Bollinger | Rev 0 |
| | | | Approval | William Dimbat | Date 02/24/76 |
| | | | | | Cross Reference |
| | | | | | |

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-UP only install jumper B01U1 to B02U1 (SSYN)
 Do not install A01A1 to A02V1.

DOL

3031 3338 R624

PROCESSOR TYPE PDP-11 Family

MF11L-A0001 CODE: DF DD: B

NOV 72 - PROBLEM 1 Interaction and bit pickup exists between the 8K memory banks of the MF11-L. A MOV instruction, its last DATO in one bank, has the inhibit signals turning off during the strobe of a FETCH from the next bank.

CORRECTION 1 Rearrange modules within the bussed back panel of the MF11-L as follows: 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, 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. Note that the STACK module, H214, of one bank, is isolated from the CONTROL AND DATA LOOPS module, G110, of the next bank.

PROBLEM 2: On power-up, the first memory cycle, if DATI or DATIP, may require 175 nsec of deskew from SSYN to good data, wrong data may be obtained.

CORRECTION 2: Install FCO G110-C010.
In-plant effectivity -03 Retrofit immediately.

Field effectivity -Retrofit all MF11-L's.

(Time To Install And Test 1.0 Hour) (Kit Contents -FCO-Prints)

MF11L-00002 CODE: M DD: C

FEB 73 - PROBLEM There is no Unit Assembly drawing showing retrofit of frame parts from ME11-L to MF11-L.

CORRECTION Make a Unit Assembly drawing for MF11-L assembly.
In-plant effectivity -03 documentation change previously implemented.

MF11L-C0003 CODE: F DD: D

MAR 73 - PROBLEM 1 Some adjacent 8K memory segments interact, alter data, on overlap operation, even after the module rearrangement of FCO MF11L-A0001. Module sections "C", "D", "E" and "F" of the G231 electrostatically radiate into the adjacent memory segment.

CORRECTION 1 Put shield #17-00021-02 between 8K memory segments in MF11-L memory.

PROBLEM 2 Software List and Accessory List not needed for MF11-L, provided by basic machine software package.

CORRECTION 2 Delete lists from MF11-L Drawing Directory.

NOTE 1 This FCO is to be installed immediately in any system that appears to have memory interaction.

NOTE 2 It is to be installed on all systems during the next service call or preventative maintenance procedure.

NOTE 3 A maximum of two shields is required for a full 24K MF11-L, no shields are required for a basic 8K system.

In-plant effectivity -03 * retrofit all memories with noise problem. Phase shields into system area by May 15, 1973.

Field effectivity -Retrofit all MF11-L's.

(Time To Install And Test 3 Hour) (Kit Contents -FCO-Prints And Parts)

MF11L-00004 CODE: D DD: E

APR 73 - PROBLEM 1 Construction drawing for #70-09103 Power Harness is incorrect with respect to lengths and breakout points. Harness names uninformative.

CORRECTION 1 Correct drawings; rename #70-09103 and #70-09104.

PROBLEM 2 Twisted pair cable used for MSYNA between KD11-A and MF11-L, now separate cable.

CORRECTION 2 Add twisted pair cable, noting backpanel pins in Wire Table.

PROBLEM 3 Harness #70-09103, used in PDP-11/40 for first memory, is not a general cable.

CORRECTION 3 Delete harness from MF11-L Drawing Directory and add to PDP-11/40 Drawing Directory; reference ECO 11/40-00005.

In-plant effectivity -02 Change prints immediately. Build all new harnesses with new prints. Change does not affect units already built.

MF11L-B0005 CODE: F DD: F

MAY 73 - PROBLEM The special MSYNA signal between the KD11-A processor and the MF11-L memory occurs approximately 75 nsec before UNIBUS MSYN. 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.

CORRECTION Delete the twisted pair wires for MSYNA from between the KD11-A processor and MF11-L memory, harness #70-09103. Do not add MSYNA backpanel wires to new MF11-L memories.

Quick Check Black/white twisted pair deleted from A07B1 of CPU to CPU1 of first MF11-L.

In-plant effectivity -03 * 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 the harness. On new assemblies, do not provide twisted pair in harness or wires in backpanel.

Field effectivity -Retrofit immediately MF11-L's on PDP-11/35 and PDP-11/40 with unexplainable problems, all others on next service call.

(Time To Install And Test 1.0 Hour) (Kit Contents -FCO-Prints)

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 & 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 | standoffs |
| | #3 | 16 | 11-05275 | diode |
| | #15 | A/R | 90-09185 | jumper wire |
| MF11-L | #3 | 1 | 17-00021-02 | shield |
| | | 2 | 12-09856-02 | module clip |

| ECO | | RELEASE DATE | CS | ETCH WL | ETCH | OPTION | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB | BOX | SYS. UNIT | SLOT | IPB | PAGE | |
|-------------------------|--------------|--------------|---------|---------------|--|--------|-----------------|-----|-----------------|----------|--|--------------------|-------------------|---------------------|----------------|--------|--|
| MF11-L 8K 16 BIT MEMORY | | | | | | MF11-L | | | | | | | | | | 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 UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAM | |
| 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 | 17-00021-02 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. | | | | | | | | | | | | |

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

| G110 CONTROL & DATA LOOPS | | ETCH | OPTION | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB | BOX | SYS. UNIT | SLOT | IPB | PAGE | | |
|---------------------------|--------------|------|---------|-----------------|--|-----------------|----------|----------------------|-------------------|-------------------|---------------------|----------------|---------|----|---|
| | | | | | | | | | | | | | 1 | 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 | | |
| 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 <u>DL3 CHANGED TO 125 N SEC. (P/N-322-1)</u> <u>AND/OR 1611327 BY ECO #15 +15A</u> | | | N11 | | | | | | | |
| 00003 | 08/72 | C | D | | R113 is a 120 ohm 1/2W 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 1/2W 5% resistor R115 is the 3rd resistor right of DL1-12 DL1 is the biggest delay line | | 1 | 13-00365 | | | | | | | |
| 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 4 | 10-05306 90-08213 | DZMMG DZMMI | | | | | | |

| G110 CONTROL & DATA LOOPS | | ETCH | OPTION | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB | BOX | SYS. UNIT | SLOT | IPB | PAGE | | |
|---------------------------|--------------|------|---------|-----------------|--|-----------------|----------|--|-------------------|-------------------|---------------------|----------------|---------|----|---|
| | | | | | | | | | | | | | 2 | CF | 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 | | |
| 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 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 | |
| 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 | IPE | 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 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 | 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 | R | E | | <u>NOTE:</u> Phase in jumper wire For current loops using teflon insulated wire | | | | N/A | | | | | | |

M214

DATA STORAGE REGISTER

| | | |
|--------|----------|-----|
| OPTION | SERIAL # | PO# |
|--------|----------|-----|

CUSTOMER:

PAGE
49

| NO- | RELEASE DATE | JS | WEL | WCO HRS. TIME | QUICK CHECK | QTY | PARTS REQUIRED | MATNDECS REQUIRED | PRINT REV UPDATE | ACTUAL INSTALL TIME | DASH INSTALLED | CS NAME |
|-------|--------------|----|-----|---------------|----------------------------|-----|----------------|-------------------|------------------|---------------------|----------------|---------|
| 00001 | 4/70 | B | B | | <u>NOTE: DESIGN CHANGE</u> | | N/A. | | | | | |

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 |

FCCO'S



ENGINEERING
CHANGE ORDER

ORIGINATOR J. O'Loughlin 1-2
TEL EXT 2654 DATE 11/13/72
DISC PROJ NO **E20-06251**
COST CENTER NO. 387
W.O. 1843

ECO NO. **MF11L-00001**
SHEET 1 OF
DATE RECEIVED **11-28-72**
FIRST ISSUE **11-28-72**
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.

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.

UNIT TO BE CHANGED

MF11-L
MEMORY

DISP CODE 02

OPTIONS AFFECTED

PRODUCT LINES
AFFECTED

PDP-11/40

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | 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 |
| 3 | MF11-L Memories | | | 02 | Add note: VIEW FROM WIRING SIDE 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 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 MODEL
- 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) R. C. Conroy
FIELD SERVICE (OPT) _____
CHIEF ENGR (MODULES ONLY) _____

DRA-111C



FIELD CHANGE ORDER

FCO MP11L-A 0001
PAGE 1 OF 1

DATA PROCESSING AND DEC ECO LOG ONLY POST THIS FCO WITH THE LEVEL OF URGENCY CODE REPLACING THE LEADING ZERO.

FIELD EFFECTIVITY
Retrofit all MP11-L's

- * LEVEL OF URGENCY CODE
- A MANDATORY - HIGH PRIORITY
 - B MANDATORY
 - C HIGH PRIORITY IF SPECIFIC HARDWARE, SOFTWARE, OR SYMPTOMS ARE PRESENT
 - D APPLICABLE IF SPECIFIC HARDWARE, SOFTWARE, OR SYMPTOMS ARE PRESENT
 - E PRODUCT IMPROVEMENT - OPTIONAL - LOW PRIORITY

FIELD RETROFIT IS ANTICIPATED IN 100 % OF UNITS DEFINED ABOVE

NO CHARGE TO CUSTOMER - ALL DEC INSTALLATION LABOR AND MATERIAL ARE TO BE REPORTED UNDER A "W" CHARGE CODE

STANDARD APPLICABILITY - THIS FCO IS TO BE INSTALLED AT NO CHARGE FOR WARRANTY AND MAINTENANCE CONTRACT CUSTOMERS IN ACCORDANCE WITH THE TECHNICAL EFFECTIVITY ABOVE, OTHERWISE AT CUSTOMER EXPENSE

DOCUMENTATION \$ _____ PARTS \$ _____ DEC ON-SITE LABOR \$ _____

DEC'S MINIMUM BILLING APPLIES IF THIS FCO IS INSTALLED BY DEC. THE DEC LABOR CHARGE ASSUMES FCO INSTALLATION DURING REGULAR WORKING HOURS. IF INSTALLATION OUTSIDE OF REGULAR WORKING HOURS IS ORDERED, DEC'S LATEST SCHEDULE OF HOURLY RATES WILL APPLY.

ENTER IT PROJECT NUMBER
(FOR FIELD SERVICE REPORTING)

| | |
|--------------------|----------|
| AVAILABILITY DELAY | NO PARTS |
| PARTS | X |

ESTIMATED DOWNTIME FOR INSTALLATION AND TESTING 1.0 HOURS

SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

FIELD OFFICE FCO DISTRIBUTION CODE

- F IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES
 DF IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

LAST PREVIOUS FCO'S None

RELATED OR PRE-REQUISITE FCO'S

FCO KIT DISTRIBUTION

KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED.

- MAINTENANCE CHANGE
 MAINTENANCE MANUAL CHANGE
 OPERATIONAL PROGRAMS AFFECTED

CONTENTS OF AN FSIC INITIATED KIT

| | | | |
|-----|-----|--------|-------|
| FCO | FCO | PRINTS | PARTS |
| | | | |

FSIC INITIATED FCO KITS WILL BE DISTRIBUTED FOR ALL UNITS LISTED ON THE FCO CONFIGURATION FILE WITH THE FOLLOWING SERVICE STATUS CODES

CONTENTS OF A FIELD ORDERED KIT

| | | | |
|-----|-----|--------|-------|
| FCO | FCO | PRINTS | PARTS |
| | X | X | |

D H A W

VERIFICATION MAINTENANCE

INSTALLATION AND TEST PROCEDURES

PARTS REQUIRED

NOTES

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

FIELD SERVICE APPROVAL

Wayne Grundy

WJG

(5) 12/1 75

digital**FIELD
CHANGE ORDER**FCO MP11L-C 0003PAGE OF DATA PROCESSING AND DEC ECO LOG WILL POST THIS
FCO WITH THE LEVEL OF URGENT CODE REPLACING
THE LEADING ZERO.*** LEVEL OF URGENT CODE**

- A** MANDATORY - HIGH PRIORITY
B MANDATORY
C HIGH PRIORITY IF SPECIFIC HARDWARE, SOFTWARE, OR SYMPTOMS ARE PRESENT
D APPLICABLE IF SPECIFIC HARDWARE, SOFTWARE, OR SYMPTOMS ARE PRESENT
E PRODUCT IMPROVEMENT - OPTIONAL - LOW PRIORITY

FIELD EFFECTIVITY

Retrofit all MP11-L's

FIELD RETROFIT IS ANTICIPATED IN 100% OF UNITS REFERRED ABOVE

 NO CHARGE TO CUSTOMER - ALL DEC INSTALLATION LABOR AND MATERIAL ARE TO BE REPORTED UNDER A "W" CHARGE CODE **STANDARD APPLICABILITY** - THIS FCO IS TO BE INSTALLED AT NO CHARGE FOR WARRANTY AND MAINTENANCE CONTRACT CUSTOMERS IN ACCORDANCE WITH THE TECHNICAL EFFECTIVITY ABOVE, OTHERWISE AT CUSTOMER EXPENSEDOCUMENTATION \$ PARTS \$ DEC ON-SITE LABOR \$

DEC'S MINIMUM BILLING APPLIES IF THIS FCO IS INSTALLED BY DEC. THE DEC LABOR CHARGE ASSUMES FCO INSTALLATION DURING REGULAR WORKING HOURS. IF INSTALLATION OUTSIDE OF REGULAR WORKING HOURS IS ORDERED, DEC'S LATEST SCHEDULE OF HOURS NOTES WILL APPLY.

**DESCRIBE PROJECT NUMBER
(FOR FIELD SERVICE REPORTING)**AVAILABILITY DELAY NO PARTS
PARTS May 1973ESTIMATED DOWN TIME FOR
INSTALLATION AND TESTING 0.5 HOURS

SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

FIELD OFFICE FCO DISTRIBUTION CODE **F** IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES
 IF IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT**FCO KIT DISTRIBUTION** **KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED****CONTENTS OF AN FSC INITIATED KIT**

| | | | |
|-----|-----|--------|-------|
| FCO | FCO | PRINTS | PARTS |
| | | | |

FSC INITIATED FCO KIT
WILL BE DISTRIBUTED
TO ALL UNITS LISTED ON
TOP OF CONFIGURATION
WITH THE FOLLOWING
SERVICE STATUS CODE**CONTENTS OF A FIELD ORDERED KIT**

| | | | |
|-----|-----|--------|-------|
| FCO | FCO | PRINTS | PARTS |
| | X | X | X |

D H K W

LAST PREVIOUS FCO'S A01

RELATED OR PREREQUISITE FCO'S

- MAINTENANCE CHANGE
 MAINTENANCE MANUAL CHANGE
 OPERATIONAL PROGRAMS AFFECTED

VERIFICATION MANDELSMD-11-DZQMB-B
8-124K Memory Exerciser**INSTALLATION AND TEST PRIORITIES**

Place shields between modules in slots 3&4 and modules in slots 6&7 of each MP11-L. Place standard module clips on modules to prevent shields from sliding out. No shield is required between adjacent MP11-L blocks.

PARTS REQUIREDQ1 17-00021-02 Memory Shield
Q2 12-09856-02 Module Clips

(per optional memory, 8K)

(see note #3 below)

- 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 MP11-L (24K).
 No shields are required for a basic 8K system

FIELD SERVICE APPROVALW. Dimhat*OK*(x) 4/12 (325/300) 625



**ENGINEERING
CHANGE ORDER**

ORIGINATOR J. F. O'Loughlin WM
TEL EXT 481 DATE 3/15/73
DISC PROJ NO. E20-06251
COST CENTER NO. 387
W.O. 2137

ECO NO. MF11L-00003
SHEET 1 OF
DATE RECEIVED 3-21-73
FIRST ISSUE 3-22-73
FINAL ISSUE 5/13/73

PROBLEM 1. Some adjacent 8K Memory Segments interact (alter data) on overlap operation even after the module rearrangement of ECO MF11 00001. Module sections C,D,E and F of the G231 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. | OLD REV | NEW 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. Change notes 1 & 3. | <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 Charge <input checked="" type="checkbox"/> Product Line Charge | <input checked="" type="checkbox"/> ELECTRICAL <input type="checkbox"/> MECHANICAL <input type="checkbox"/> MODULE |
| 2. | 17 00021-02 | - | - | 08 | New size (7 1/2" X 10" +1/8") copper shield. Add qty of AIR | | | |
| 3. | 12 09856-02 | - | - | 07 | Specify module holders; add. | | | |
| 4. | A-PL-MF11-L-0 | A | B | 06 | Add item 2 & 3 this ECO. | | | |
| 5. | B-DD-MF11-L | C | D | 06 | Update revisions, delete Software List and Accessory List prints. | | | |
| 6. | D-UA-MF11-L-0 | A | B | 06 | Update revision only | | | |

DISPOSITION CODES

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

APPROVAL SIGNATURES

Typewritten Hand Signature
DESIGN ENGR O'Loughlin
ENG MGR (OPT) _____
FIELD SERVICE (OPT) _____
CHIEF ENGR (MODULES ONLY) _____

DRA-111C

digitalENGINEERING
CHANGE ORDERORIGINATOR *Westmin.* J. F. O'Loughlin
TEL EXT WM 481 DATE 5/22/73
DISC PROJ NO E20 06251
COST CENTER NO 387
W.O. 2265ECO NO. MF11L-00005
SHEET 1 OF
DATE RECEIVED 5-31-73
FIRST ISSUE 5-31-73
FINAL ISSUE 7/9/73**PROBLEM** The special MSYNA signal between the KD11-A processor and the MF11-L memory occurs approximately 75 nanoseconds before Unibus MSYN. 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 stuck.UNIT TO BE CHANGED
7009103
FIRST MEMORY
POWER HARNESSDISP CODE *see Break*

OPTIONS AFFECTED

CORRECTION Delete the twisted pair wires for MSYNA from between the KD11-A processor and MF11-L memory (harness 7009103). Do not add MSYNA backpanel wires to new MF11-L memories.MF11-L
PDP11/35
PDP11/40**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 or wires to backpanels.PRODUCT LINES
AFFECTED
PDP11

| ITEM NO. | DOCUMENT PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE | DOCUMENTATION AFFECTED | FIELD SERVICE AFFECTED | TYPE OF CHANGE |
|----------|-------------------|---------|---------|-----------|--|---|---|--|
| 1. | D-MU-MF11-L-MU | B | C | 06 | Change document revision letter. Delete NOTE 3 about MSYNA. Erase note, do not renumber. | <input type="checkbox"/> MODEL | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO | <input checked="" type="checkbox"/> ELECTRICAL |
| 2. | B-DD-MF11-L | E | F | 06 | Change document revision. Change MU revision to C. | <input type="checkbox"/> DIAGNOSTICS | <input type="checkbox"/> Customer Charge | <input type="checkbox"/> MECHANICAL |
| 3. | 7008872 Backpanel | - | - | 02 | Do not rework existing units. Cease adding wires for MSYNA on all new units. | <input checked="" type="checkbox"/> TECH MANUAL | <input checked="" type="checkbox"/> Product Line Charge | <input type="checkbox"/> MODULE |
| 4. | D-IA-7009103-0-0 | B | C | 06 | Change document revision. Delete Iteng11 and 12 from Wire Table, Parts List and harness drawing. | <input type="checkbox"/> TESTER | | ORDER PR MODEL |
| 5. | 7009103 Harness | - | - | 03 | Delete twisted pair for MSYNA (Item 11) from cables per Break In above. | <input type="checkbox"/> TEST PROG | | <input type="checkbox"/> YES |
| 6. | 9107678-09 | - | - | 00 | Remove from unit. Use was A/R. | <input type="checkbox"/> TOOLING | | <input checked="" type="checkbox"/> NO |
| 7. | 9007655 | - | - | 00 | Remove 4 term-pt connectors. | <input type="checkbox"/> PKG INST | | |
| | | | | | | <input type="checkbox"/> FNG SPEC | | |
| | | | | | | <input type="checkbox"/> PURCH SPEC | | |

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) *J. M. Dumbat*
FIELD SERVICE (OPT) *J. M. Dumbat*
CHIEF ENGR (MODULES ONLY) _____

DRA-111C



FIELD CHANGE ORDER

FCO MF11L - B0005
PAGE 1 OF 1

DATA PROCESSING AND DEC ECOLOG WILL POST THIS FCO WITH THE LEVEL OF URGENCY CODE REPLACING THE LEADING ZERO.

FIELD EFFECTIVITY
Retrofit immediately MF11-L's on PDP-11/35 and PDP-11/40 with unexplainable problems; all others on next service call.*** LEVEL OF URGENCY CODE**

- A MANDATORY - HIGH PRIORITY
- B MANDATORY
- C HIGH PRIORITY IF SPECIFIC HARDWARE, SOFTWARE OR SYMPTOMS ARE PRESENT
- D APPLICABLE IF SPECIFIC HARDWARE, SOFTWARE, OR SYMPTOMS ARE PRESENT
- E PRODUCT IMPROVEMENT - OPTIONAL - LOW PRIORITY

FIELD RETROFIT IS ANTICIPATED IN 50 OF UNITS DEFINED ABOVE **ALL DEC INSTALLATION LABOR AND MATERIAL ARE TO BE PROVIDED UNDER A "W" CHARGE CODE** **STANDARD APPLICABILITY** THIS FCO IS TO BE INSTALLED AT NO CHARGE FOR WARRANTY AND MAINTENANCE CONTRACT CUSTOMERS IN ACCORDANCE WITH THE TECHNICAL EFFECTIVITY ABOVE, OTHERWISE AT CUSTOMER EXPENSEDOCUMENTATION 0 PARTS 0 DEC ON-SITE LABOR 0

DEC'S MINIMUM BILLING APPLIES IF THIS FCO IS INSTALLED BY DEC. THE DEC LABOR CHARGE ASSUMES FCO INSTALLATION DURING REGULAR BUSINESS HOURS. IF INSTALLATION OUTSIDE OF REGULAR BUSINESS HOURS IS ORDERED, DEC'S LATEST SCHEDULE OF HOURLY RATES WILL APPLY.

DESCRIBE PROJECT NUMBER
(FOR FIELD SERVICE REPORTING)AVAILABILITY DELAY _____ NO PARTS XESTIMATED QUANTITY FOR INSTALLATION AND TESTING 1.0 HOURS

SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

FIELD OFFICE FCO DISTRIBUTION CODE

- F** IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES
- R** IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

ROOM INSTRUCTIONS **KITS AS DEFINED BELOW MAY BE ORDERED AS REQUIRED:****CONTENT OF AN ASSEMBLY KIT**

| | | | |
|-----|--------|-------|-------|
| FCO | PRINTS | PARTS | TOOLS |
| | | | |

ALL INSTALLED PRODUCTS WILL BE DISTRIBUTED FOR ALL UNITS LISTED ON THE PROJECT DURATION FILE WITH THE FOLLOWING WAREHOUSE CODES:

| | | | |
|-----|--------|-------|-------|
| FCO | PRINTS | PARTS | TOOLS |
| X | X | | |

| | | | |
|---|---|---|---|
| D | H | A | M |
| | | | |

LAST PREVIOUS FCO'S C03, A01

RELATED OR PREREQUISITE FCO'S

- MAINTENANCE CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

VERIFICATION MAINDECS

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 REQUIRED**NOTES**

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

FIELD SERVICE APPROVAL

Greg Redpath

(x) 6-14 (400/200) 600

M F I I L P

NOV/74

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 |

ECO
QUICK
CHECK

MAR/76

MF11-LP FIELD CODED ECO'S

G109

- C4, C6, C7, C10, C11

G231

- B1, D3, A5, D9

M7259

- B4

DEC./75

MF11-LP ECO PARTS

| <u>NAME</u> | <u>ECO#</u> | <u>QTY</u> | <u>PART NUMBER</u> | <u>COMMENTS & 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 |
|--------------------------|--------------|------|---------|-----------------|--|-----------------|----------------|-------------------|-------------------|---------------------|----------------|---------|--------|
| | | | MF11-LP | | | | | | | | | | 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 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 |
| ME11-L - MF11-L ETCH BACKPLANE | | | | | | | | | | | | 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 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 |
|---------------------------|--------------|------|---------|-----------------|---|-----------------|------------------|---|-------------------|------------------|---------------------|----------------|-------------|
| 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 |
| 00001 | 12/72 | F | E | | 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 10-01610 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 | DZMGM 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 | H | | 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 | | | | | |

| | | | | | | | | | | | | | |
|------|----------------------|------|--------|----------------|-----|-----------------|----------|-----|-----|-----------|------|-----|-------------|
| G109 | CONTROL & DATA LOOPS | 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 | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |
|-------|--------------|----|---------|---------------|--|-----|----------------|-------------------|------------------|---------------------|----------------|---------|
| 00013 | 07/74 | E9 | C | | <u>NOTE:</u> Phase in DEC 8640 to replace DEC 380 and DEC 7380 chips. | 8 | 19-11469 | | | | | |
| 00014 | 05/76 | P | H | | <u>NOTE:</u> DEC 7438 allowable I.C. substitution for 74H01-1 at E5, E18 to 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 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 | 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 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 | | |
| 00008 | 9/72 | E1A E2A E3A | C C C | | C52 is a 470 pfd 100V 5% capacitor C52 is at the far left of DRI 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 | | | | | | | |

| 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 | 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 | R | 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 |
|-------------------------------|--|------|--------|-----------------|-----|-----------------|----------|-----|-----|-----------|------|-----|-------------|

| 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 | 7/73 | A | | | <u>NOTE:</u> Print change | | | | | | | |

| 7259 PARITY CONTROL | | | | 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 UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME | | |
| 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, 1/4W, 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 | 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 | | | | | | | |

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) MF11-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 & 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 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 & DESCRIPTION</u> |
|-------------|-------------|------------|--------------------|-----------------------------------|
| G114 | #8 | 1 | 13-00364 | Resistor |
| | | 1 | 13-02388 | Resistor |
| M7259 | #4 | 1 | 13-01874 | Resistor |
| | | 1 | 13-09143-11 | Resistor |

| MF11-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 WL | 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 SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB | BOX | SYS. UNIT | SLOT | IPB | PAGE 1 OF |
|------------------------|--------------|------|---------|-----------------|---|-----------------|----------|----------------|-------------------|-------------------|---------------------|----------------|-----------|
| 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 |
| 00001 | 10/73 | B | B | | NOTE: 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 OHM</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 | | NOTE: New Etch Rev. | | | NIL | | | | | |
| 00004 | 04/75 | E | C | | NOTE: Part substitution due to shortage | | | N/A | | | | | |
| I 00005 | 05/75 | F | C | .5 | NOTE: 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 | CI | |
| 00001 | 07/73 | D | D | | R35 is a 3.16K, 1/8W, 1Z 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 NOT a 330ohm, 1/2W, 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, 1/2W 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 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 | |
| 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 | ETCH WL | ECO HRS. TIME | QUICK CHECK CAUTION - NOT COMPLETE ECO | | QTY | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CS |
| 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 D29, 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 WL | ECO HRS. TIME | QUICK CHECK CAUTION - NOT COMPLETE ECO | | | QTY | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NA | |
| 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, 1/4W, 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 | | | | | | |
| 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

| 16K UNIBUS TIMING | | ETCH | OPTION | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB | BOX | SYS. UNIT | SLOT | IPB | PAGE 1 OF 1 |
|-------------------|--------------|------|---------|-----------------|---|-----------------|----------------|-------------------|------------------|---------------------|----------------|-------|-------------|
| M8293 | | | MF11-U | | | | | | | | | | |
| 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 | CH 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 AR1 | | 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 | | | | | | |