



MJ 11-A

# MJ11-A

THE FOLLOWING MODULES/ASSEMBLIES ARE CONTAINED IN THIS DEVICE.  
EACH MAY HAVE ASSOCIATED TECH TIPS, DEC-O-LOG AND FCO's DOCUMENTED  
IN THE MODULE/ASSEMBLY CATEGORY OF THE MICROFICHE LIBRARY

G114

G235

H217

H744

H745

M8148

M8149

54-11086

54-11553

54-11581

54-11583

70-06501

70-09769

70-10208

70-10214

70-10497

70-10498

70-10532

70-10580

70-10581

70-10694

70-10695

70-10780

70-10791

70-10824

70-10826

70-10974

70-10975

70-11027

70-11222

70-11223

# TECH. TIPS.

|         |                                       |  |                                 |                                 |                      |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| digital | <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"/> | MJ11<br>MEMORY       |

|  |  |          |                      |                 |              |
|--|--|----------|----------------------|-----------------|--------------|
| Title <b>MJ11-U/UP MEMORIES FAILING HIGH CURRENT MARGINS</b> |  |          |                      | Tech Tip Number | MJ11<br>TT-2 |
| All Processor Applicability                                  |  | Author   | Jim Holderby         | Rev             | g            |
| 11/70  |  | Approval | Lee Mickle <i>LM</i> | Date            | 9-13-76      |
|  |  |          |                      | Cross Reference | MJ11-TT-15   |

This Tech Tip is issued for cross reference purposes only.

|   |  |          |                        |                 |              |
|---|--|----------|------------------------|-----------------|--------------|
| Title <b>INTERMITTENT PARITY ERRORS AND/OR SYSTEM SOFTWARE FAILURES</b> |  |          |                        | Tech Tip Number | MJ11<br>TT-3 |
| All Processor Applicability   |  | Author   | Jim Holderby <i>JH</i> | Rev             | g            |
| 11/70   |  | Approval | Lee Mickle <i>LM</i>   | Date            | 9-15-76      |
|   |  |          |                        | Cross Reference |              |

Intermittent parity errors and/or system software failures have been caused by the H873 memory bus terminator (in M8149 Rev. "A" board only) not seated in connector properly. ECO M8149-0004 corrects this problem. Therefore, if any of these systems occur and the M8149 module is an etch Rev. "A", install ECO M8149-0004 or swap this Rev. "A" module for a Rev. "C" module.

A quick check for this ECO is to see if the H873 terminator is secured to the M8149 by nylon screws.

|                                 |   |              |                      |                 |                         |
|---------------------------------|---|--------------|----------------------|-----------------|-------------------------|
| Title <b>MEMORY BUS CABLING</b> |   |              |                      | Tech Tip Number | MJ11-TT-4               |
| Author                          |   | JIM HOLDERBY | F.S. Office          | MAYNARD         | Date                    |
| All Processor Applicability     |   | Mgr./Sup.    | LEE MICKLE <i>LM</i> | Date            | 9-13-77                 |
| 1                               | 1 | /            | 7                    | 0               |                         |
|                                 |   |              |                      | Approval        | LEE MICKLE Date 9-13-77 |
|                                 |   |              |                      | Revision        | g                       |
|                                 |   |              |                      | Cross Reference |                         |

THE MJ11 MAINTENANCE MANUAL AND THE 11/70 SYSTEMS INSTALLATION MANUAL ARE NOT VERY CLEAR ON THE INSTALLATION OF THE BC06-R MEMORY BUS CABLES. THESE CABLES SHOULD BE INSTALLED IN THE MJ11 BOX WITH THE RED STRIPE FACING THE FRONT OF THE MJ11 BOX. AT THE PROCESSOR, THE CABLES SHOULD BE INSTALLED WITH THE RED STRIPE FACING THE MODULE HANDLES.

FCR

**MJ11  
MEMORY TIMING 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

- 1** **M8148-S0003 OCT 75**  
**QUICK SYNOPSIS**  
Eliminates timing drift of READ TIMING  
DELAY LINE DRIVER.  
**QUICK CHECK**  
Wire between C94 and D2 (cathode)  
**NEW REVISION**  
Rework etch A to CS C
- 2** **M8149-S0004 JUL 76**  
**QUICK SYNOPSIS**  
Eliminates intermittent system software  
failures.  
**QUICK CHECK**  
Nylon screws hold H873 to M8149.  
**NEW REVISION**  
Rework etch A to CS A1.
- 3** **G235-S0009 SEP 76**  
**QUICK SYNOPSIS**  
Memory is marginal due to high drive current.  
**QUICK CHECK**  
75 ohm resistor at + symbol near large etch.  
**NEW REVISION**  
Rework etch D to CS N.
- 4**

MM11

THE FOLLOWING MODULE/ASSEMBLIES ARE CONTAINED IN THIS DEVICE. EACH MAY HAVE ASSOCIATED TECH TIPS,  
DEC-O-LOG AND FCO's DOCUMENTED IN THE MODULE/ASSEMBLY CATEGORY OF THE MICROFICHE LIBRARY.

70-06468  
70-07263  
70-09562

G102  
G103  
G109  
G110  
G225  
G226  
G231  
G615  
G616  
G645

H213  
H214

M109  
M229  
M1091  
M7290

# TECH TIPS

|         |                                       |  |                                 |                                 |                      |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| digital | <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"/> | MM11                 |

|  |                         |  |                             |  |                 |
|--|-------------------------|--|-----------------------------|--|-----------------|
| Title <b>QUALADYNE 1540 SENSE AMPS</b> |                         |  |                             | Tech Tip <b>MM11</b><br>Number <b>01</b> |                 |
| All                                    | Processor Applicability |  | Author <b>DON ZERESKI</b>   | Rev <b>A</b>                             | Cross Reference |
|  |                         |  | Approval <b>CHUCK DEWEY</b> | Date <b>6/27/72</b>                      |                 |

The Qualadyne 1540 sense amps have had bonding problems. The unit is used in most current DEC sense amplifier boards. The Motorola 1540 should be used as its replacement when necessary. Most of the defective units have been replaced during production. These were used in MM11-E and F memories.

Since the Motorola 1540 units are in short supply, Production is only replacing failing units and are not retrofitting all boards in all product lines. Machines in the field that exhibit strange memory problems that can be localized to sense amp problems should be checked for Qualadyne units with the following date codes: 7014, 7016, 7020, 7022, 7024, 7031, and 7032. These units may be defective and should be replaced as a last resort. We are not suggesting a purge of all Qualadyne units of the above mentioned date codes or future Qualadyne units.

|                                 |                         |  |                             |  |                 |
|---------------------------------|-------------------------|--|-----------------------------|--|-----------------|
| Title <b>H207E MEMORY STACK</b> |                         |  |                             | Tech Tip <b>MM11</b><br>Number <b>02</b> |                 |
| All                             | Processor Applicability |  | Author <b>TOM KARPOMSKI</b> | Rev <b>A</b>                             | Cross Reference |
|                                 |                         |  | Approval <b>CHUCK DEWEY</b> | Date <b>6/27/72</b>                      |                 |

The MM11-E memory will be using a new stack, RCA's H207E. This stack can only be used in an MM11-E. The H207 stack can be used in an MM11-E and MM11-F.

|  |                         |  |                             |  |                 |
|--|-------------------------|--|-----------------------------|--|-----------------|
| Title <b>MM11-E &amp; F/G102 MODULES</b> |                         |  |                             | Tech Tip <b>MM11</b><br>Number <b>03</b> |                 |
| All                                      | Processor Applicability |  | Author <b>TOM KARPOMSKI</b> | Rev <b>B</b>                             | Cross Reference |
|  |                         |  | Approval <b>CHUCK DEWEY</b> | Date <b>6/1/72</b>                       |                 |

ECO G102-00005 has been written to make the G102 module capable of running in the MM11-F memory. This ECO makes this module CS revision D. It has to be at least revision D to run in an MM11-F. This revision can also be used in MM11-E's. Please see that your spares are modified accordingly.

|   |                         |  |                             |  |                 |
|---|-------------------------|--|-----------------------------|--|-----------------|
| Title <b>INTERLEAVING THE MM11-E MEMORY</b> |                         |  |                             | Tech Tip <b>MM11</b><br>Number <b>04</b> |                 |
| All   | Processor Applicability |  | Author <b>JOHN BUZYNSKI</b> | Rev <b>g</b>                             | Cross Reference |
|   |                         |  | Approval <b>CHUCK DEWEY</b> | Date <b>6/1/72</b>                       |                 |

Interleaving is simply addressing the memory such that adjacent memory banks are selected on alternate cycles. Thus, it is interleavable in 8K increments or blocks. This is implemented by interchanging BUS A01L and BUS A13L inputs to the memory between the bus inputs and memory device select and control. The memory being addressed, for example, in a DAT1 mode is free to complete its cycle after the MSYN L-SSYN I dialog and as soon as the setup times for the bus are satisfied, MSYN L can be reasserted to

|   |                         |  |  |                           |             |
|---|-------------------------|--|--|---------------------------|-------------|
| Title INTERLEAVING THE M11-E MEMORY (Continued) |                         |  |  | Tech Tip M11<br>Number 04 |             |
| All   | Processor Applicability |  |  | Author JOHN BUZYNSKI      | Rev g       |
|   |                         |  |  | Approval CHUCK DEWEY      | Date 6/1/72 |
| Cross Reference                                 |                         |  |  |                           |             |

start a memory cycle in the adjacent memory bank while the first memory bank is completing its cycle. A significant increase in memory throughput occurs.

In the M11-E the two address bits have to be physically interchanged on the back-plane. It is also necessary to modify N729 control logic module to speed up the SSYNL reset circuit. (Refer to ECO's M11-E Numbers 17, 19, and 20; N729 number 2; and ECO M1091 number 1).

Remember, when troubleshooting an interleaved memory, that successive addresses reference alternate memory banks.

|  |                         |  |  |                           |             |
|--|-------------------------|--|--|---------------------------|-------------|
| Title FIELD INSTALLATION OF M11-E ON PDP-11/45 |                         |  |  | Tech Tip M11<br>Number 05 |             |
| All  | Processor Applicability |  |  | Author ANDY VEROSTIC      | Rev g       |
|  | 11/45                   |  |  | Approval ART ZINS         | Date 6/7/72 |
| Cross Reference                                |                         |  |  |                           |             |

HARDWARE

Existing N729 control must have ECO #N729-~~0000~~3 installed for operation on 11/45.

DIAGNOSTICS

All present memory tests will run on the 11/45.

|  |                         |  |  |                           |             |
|--|-------------------------|--|--|---------------------------|-------------|
| Title FIELD INSTALLATION OF M11-F ON PDP-11/45 |                         |  |  | Tech Tip M11<br>Number 06 |             |
| All  | Processor Applicability |  |  | Author ANDY VEROSTIC      | Rev A       |
|  | 11/45                   |  |  | Approval ART ZINS         | Date 6/7/72 |
| Cross Reference                                |                         |  |  |                           |             |

HARDWARE

Existing N7290 control must have ECO's #N7290-~~0000~~2 and ~~0000~~3 installed for proper operation on the 11/45.

DIAGNOSTICS

All present memory tests run on the 11/45.

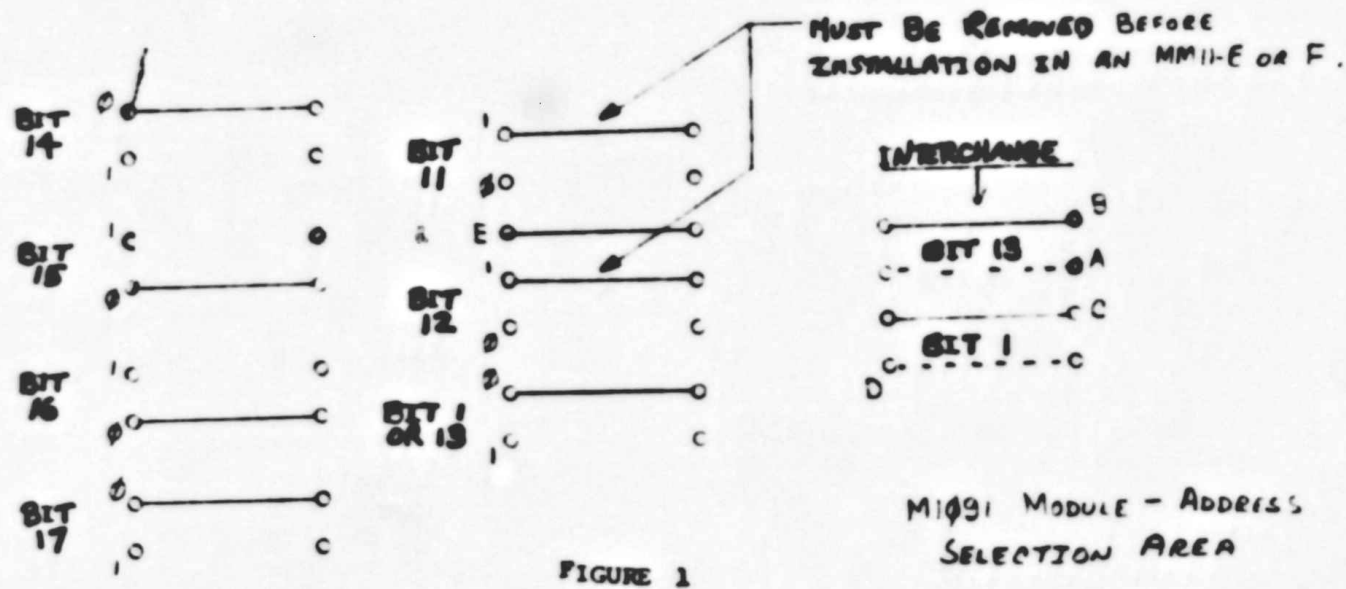
|                         |  |  |  |                  |  |
|-------------------------|--|--|--|------------------|--|
| Title                   |  | MM11-E and F MEMORY ADDRESS SELECTION AND INTERLEAVING |  | Tech Tip MM11-TT |  |
| All                     |  | Author Chuck Dewey                                     |  | Number 87        |  |
| Processor Applicability |  | Rev g  |  | Cross Reference  |  |
|                         |  | Approval Chuck Dewey                                   |  | Date 9/28/72     |  |

Interleaving

Interleaving for MM11-E memories is described in Tech Tip MM11 number 4. It can only be accomplished by system unit wire changes to the back plane. Refer to the ECO's, listed in the Tech Tip, for proper implementation.

MM11-F interleaving is accomplished by manipulation of jumper wires on the M1091 module. These changes are shown in Table 1. It is a normal procedure for the production line to interleave all 8K segments of MM11-F memory on the initial system prior to shipment.

Interleaving of a MM11-E with an MM11-F is not recommended primarily due to the confusion it creates when troubleshooting a system of this nature. It also creates customer misunderstanding since the average memory cycle time specification, in this situation, would not be either the MM11-E or F but somewhere in between.



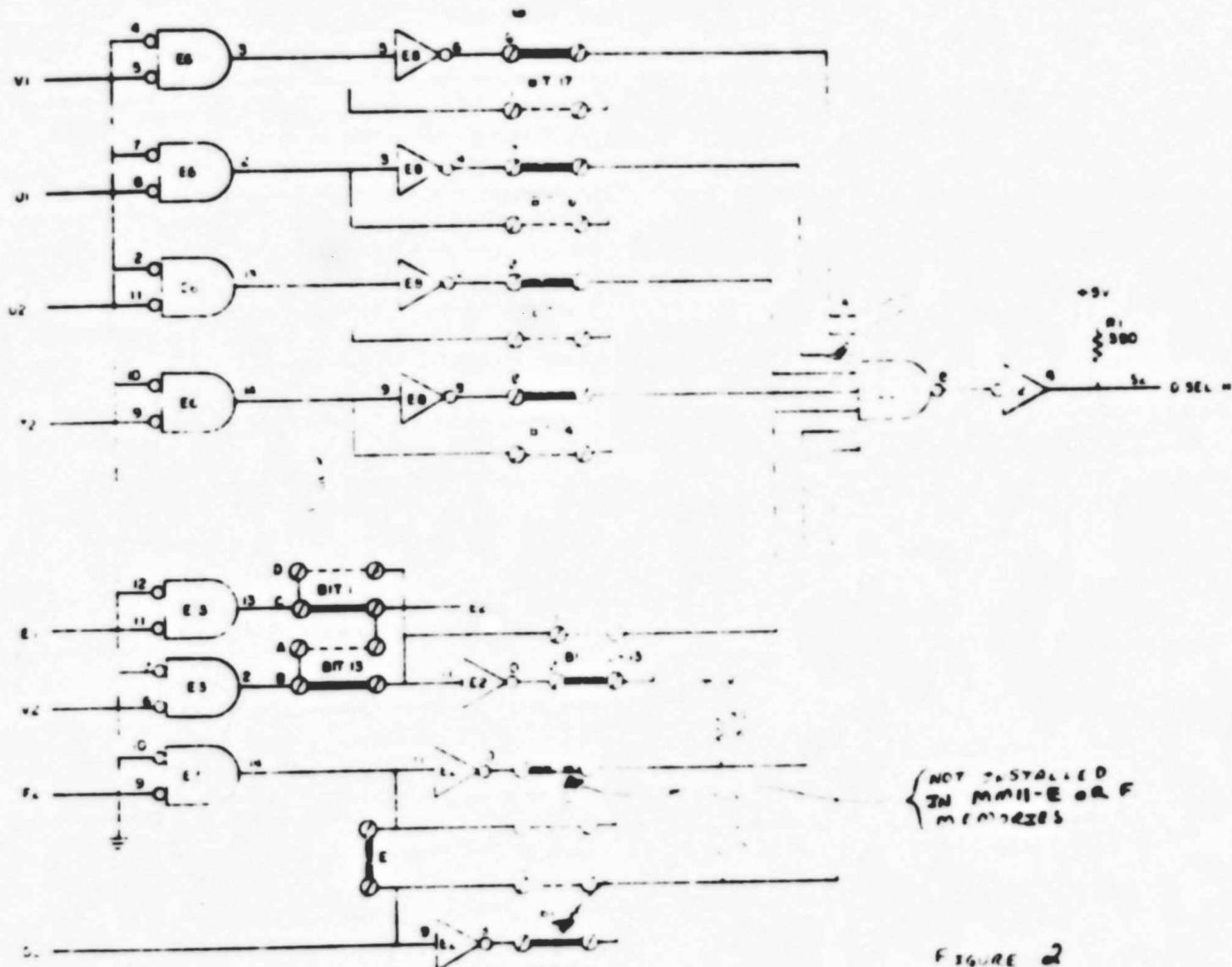


FIGURE 2

THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

|   |  |              |  |                  |  |
|---|--|--------------|--|------------------|--|
| Title MM11-E and F MEMORY ADDRESS SELECTION & INTERLEAVING (CONT'D) |  |              |  | Tech Tip MM11-TT |  |
| All Processor Applicability   |  |              |  | Number 87        |  |
| Author Chuck Dewey  |  | Rev #        |  | Cross Reference  |  |
| Approval Chuck Dewey  |  | Date 9/28/72 |  |                  |  |

TABLE 1

| Bank  | K WORDS | ADDRESSES |        | NON-INTERLEAVED MM11-F AND ALL MM11-E MEMORIES |    |    |    |    |    |    |    | INTERLEAVED MM11-F MEMORY * |   |   |   |
|---|---------|-----------|--------|--|----|----|----|----|----|----|----|-----------------------------|---|---|---|
|   |         | FROM      | TO     | 17   | 16 | 15 | 14 | 13 | 01 | 13 | 01 |                             |   |   |   |
|   |         |           |        | 10   | 10 | 10 | 10 | A  | B  | C  | D  | A                           | B | C | D |
| 1   | 0-4     | 000000    | 017776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 2   | 4-8     | 020000    | 037776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 3   | 8-12    | 040000    | 057776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 4   | 12-16   | 060000    | 077776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 5   | 16-20   | 100000    | 117776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 6   | 20-24   | 120000    | 137776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 7   | 24-28   | 140000    | 157776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| FROM THIS POINT ON A DEVICE SUCH AS MX11, KS11, OR KT11 IS REQUIRED |         |           |        |  |    |    |    |    |    |    |    |                             |   |   |   |
| 8   | 28-32   | 160000    | 177776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 9   | 32-36   | 200000    | 217776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 10  | 36-40   | 220000    | 237776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 11  | 40-44   | 240000    | 257776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 12  | 44-48   | 260000    | 277776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 13  | 48-52   | 300000    | 317776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 14  | 52-56   | 320000    | 337776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 15  | 56-60   | 340000    | 357776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 16  | 60-64   | 360000    | 377776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 17  | 64-68   | 400000    | 417776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 18  | 68-72   | 420000    | 437776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 19  | 72-76   | 440000    | 457776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 20  | 76-80   | 460000    | 477776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 21  | 80-84   | 500000    | 517776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 22  | 84-88   | 520000    | 537776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| DE11 REQUIRED FROM THIS POINT IF M11 IS IN USE                      |         |           |        |  |    |    |    |    |    |    |    |                             |   |   |   |
| 23  | 88-92   | 540000    | 557776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 24  | 92-96   | 560000    | 577776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 25  | 96-100  | 600000    | 617776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 26  | 100-104 | 620000    | 637776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 27  | 104-108 | 640000    | 657776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 28  | 108-112 | 660000    | 677776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 29  | 112-116 | 700000    | 717776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 30  | 116-120 | 720000    | 737776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |
| 31  | 120-124 | 740000    | 757776 | X  | X  | X  | X  | X  | X  | X  | X  | X                           | X | X | X |

BUS ADDRESSING BEYOND THIS POINT RESERVED FOR DEVICES

X DENOTES JUMPER INSERTION ON THE BOARD AT THE IDENTIFIED POINT

\* INTERLEAVING CAN ONLY BE ACCOMPLISHED WITH 8K SEGMENTS OF MEMORY. THE XXXXX0 AND XXXXX4 ADDRESSES ARE TO BE ASSIGNED TO ODD BANK MEMORIES

|   |                                       |  |                                 |                                 |                      |
|---|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| digital   | <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"/> | MM11                 |
| Title DATA ERRORS CAUSED BY DCLO OR INIT ON MM11-K, L, M, S |                                       |  |                                 | Tech Tip Number                 | MM11 #8              |
| All   | Processor Applicability               |  | Author A. Verostic/D. Dickhut   | Rev g                           | Cross Reference      |
|   |                                       |  | Approval Art Zins               | Date 9/27/72                    |                      |

A problem exists with the 4K-8K PDP-11 memory (MM11-S, ME11, MM11-L) that appears to be hardware data errors, but disappears if every word in memory is accessed. The problem can appear whenever Initialize or DCLO occurs during a memory cycle. This turns off the X-Y current drivers at the wrong time, leaving some cores in a partially switched state. These half-selected cores contribute large amounts of noise when accessing other words, causing intermittent failures.

DCLO occurring during a memory cycle can be eliminated if the power fail trap is used properly. The power fail trap sequence should turn off any peripheral that might access memory (**individually**, not by using INIT) and halt the processor before DCLO occurs.

The chances of INIT occurring during a memory cycle will be reduced if software avoids using the RESET instruction, particularly inside tight loops. The condition of half selected cores can be cured by accessing every word in memory to assure all cores are fully switched. Once this is completed, data may be read and written normally.

|       |                         |   |                   |                               |                 |
|-------|-------------------------|---|-------------------|-------------------------------|-----------------|
| Title |                         | MM11-K, L, M, and S Field Problem Summary |                   | Tech Tip MM 11<br>Number TT-9 |                 |
| All   | Processor Applicability |   | Author D. Dickhut | Rev 0                         | Cross Reference |
|       |                         |   | Approval C. Dewey | Date 11/20/72                 |                 |

This Tech Tip is a summary of field problems and their solutions for the MM11-K, L, M, and S memories which are found in ME11L which uses only MM11-L, 11/05 and 11/10 which use MM11-K (4K) 11/05 only and MM11-L (8K), 11/40 which uses only MM11-L (8K), and 11/45 which uses only MM11-S (8K).

1. Random Memory Locations are Altered During Power Fail

The contents may be altered while running Power Fail Diagnostic or by simply turning the machine on and off. ECO G231-5 solves this problem.

2. Memories do not have to be swapped as a system (all 3 modules)

Each system that is shipped has a serial number stamped on side 2 of each module. This number is the same on all 3 modules and is strictly for in-house test purposes only. The memories can be and should be maintained on a module swap basis instead of a system basis (stack not paired anyway). The system serial number can be used in a case where much swapping has taken place and now the modules are to be put back in their original configuration. By matching the serial number, each system can be reunited and a lot of adjustment time can be saved.

3. What adjustments to make when a module is swapped.

When anyone of the 3 modules that make up the memory system is swapped, the strobe adjustment must be made to ensure system reliability (When the G110 module is swapped, it has the strobe pot but the setting cannot be taken for granted) The procedure to use for strobe adjustment is as follows:

1. If strobe adjustment is too far off, EXAM and DEP may not work. To get strobe in the ballpark, sync on pin CU2 of the G110 model (signal READ H) and Test Point 5 of E05 pin 9 for strobe. Press EXAM rapidly and adjust strobe using pot on G110 for a 250 ns delay from rising edge of READ H to rising edge of strobe. This should allow diagnostics to be read in.
2. Load Worst Case Noise Diagnostic (W.C.N. should be used not a Branch SELF)
3. Load Address 200 and START or Load Address 202 to select the desired bank.
4. Sync on pin CU2 of G110 (signal READ H) while scoping Test Point 5 or E05 pin 9 for strobe and margin strobe by turning pot CW until the diagnostic fails and then CCW until it fails. A complete pass of the diagnostic should be made (within reasonable limits for large core systems) at each high and low end point to ensure that is the true end point. Notice the time from the leading edge of READ H to strobe in each case. The total strobe window should be 40 ns or greater and set strobe in the middle of the high and low points. If the window isn't at least 40 ns, then the entire system should be changed because margin problems can only be dealt with back at Module Repair Depot.

This procedure is graphically illustrated and explained in the ME11L, MM11-S, 11/05, and 11/40 manuals.

|         |                                       |  |                                 |                                 |                      |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
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|         | 12 Bit <input type="checkbox"/>       | 16 Bit <input checked="" type="checkbox"/> | 18 Bit <input type="checkbox"/> | 36 Bit <input type="checkbox"/> | MM 11                |

|   |                         |  |                   |               |
|---|-------------------------|--|-------------------|---------------|
| Title MM11-K, L, M, and S Field Problem Summary (Continued) |                         |  | Tech Tip Number   | MM 11<br>TT-9 |
| All   | Processor Applicability |  | Author D. Dickhut | Rev #         |
|   |                         |  | Approval C. Dewey | Date 11/29/72 |
| Cross Reference   |                         |  |                   |               |

4. DEC memory stack threshold problem

Some DEC or RCA memory stacks (DEC stack identified by label on side 2; some may have RCA stickers) have a threshold problem and will not exhibit the normal threshold margins. In order to use these previously rejected stacks in production, the sense circuitry on the G110 was modified. In the field, if a memory stack is swapped and it is a DEC stack, the G110 module should be checked to see if ECC #6 is installed. If it isn't and this is a non-Field effect ECC, a G110 module with that ECC should be obtained from the Maynard Module Repair Depot. The new DEC stack may or may not have this problem and probably will operate properly even if it does. However, with large systems or several NPM (DMA) devices, intermittent failures may occur over a long period of time.

|   |  |  |  |                   |  |               |  |
|---|--|--|--|-------------------|--|---------------|--|
| Title ECO DOCUMENTATION FOR THE MM11K, MM11L and MM11S MEMORIES |  |  |  | Tech Tip Number   |  | MM11<br>TT-10 |  |
| All Processor Applicability                                     |  |  |  | Author G. Cable   |  | Rev #         |  |
|   |  |  |  | Approval C. Dewey |  | Date 12/12/72 |  |
|   |  |  |  | Cross Reference   |  |               |  |

The following Tech Tip will attempt to clarify the confusion regarding the ECO status for the MM11S, MM11K and MM11L memories.

#### G110 Modules

In the near future there will be two separate types of G110 Modules in the field. The first type of G110 Module is an Etch Revision C Module which already exists in the field. The second type of module will be an Etch Revision E.

It will not be possible to ECO the Etch Revision C Module so that it will be electrically equal to the Etch Revision E Module. For this reason it has become necessary to create two separate sets of engineering drawings to cover the two different modules.

The engineering drawings for the Etch Revision C Module will have a circuit schematic revision of E with one numeric digit following. Each ECO released will increment the numeric digit by one (i.e. E1, E2, E3, and etc.).

The engineering drawings for the Etch Revision E Module will have a circuit schematic revision of an alpha character starting at F and continuing sequentially (i.e. F, H, J, L, and etc.).

Below is a chart that shows the revisions for the two G110 Modules.

| G110 Etch Revision C |             | G110 Etch Revision E |             |
|----------------------|-------------|----------------------|-------------|
| ECO No.              | CS Revision | ECO No.              | CS Revision |
| G110-0001            | A           | G110-0006            | F           |
| G110-0002            | B           | G110-0011            | H           |
| G110-0003            | N/A         |                      |             |
| G110-0003A           | N/A         |                      |             |
| G110-0004            | D           |                      |             |
| G110-0005            | E           |                      |             |
| G110-0007            | E-1         |                      |             |
| G110-0008            | E-2         |                      |             |
| G110-0009            | E-3*        |                      |             |
| G110-0010            | E-4*        |                      |             |
| G110-0012            | E-5         |                      |             |

\*Note: There have been a number of Etch Rev C modules shipped that were marked CS Rev H and J these should have been marked CS Rev E3 and E4 respectively.

|                |                                       |  |                                 |                                 |                      |
|----------------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| <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"/> | MM11                 |

|   |                         |                   |               |                            |  |
|---|-------------------------|-------------------|---------------|----------------------------|--|
| Title ECO DOCUMENTATION FOR THE MM11K, MM11L and MM11S Memories (Continued) |                         |                   |               | Tech Tip Number MM11-TT-10 |  |
| All   | Processor Applicability | Author G. Cable   | Rev g         | Cross Reference            |  |
| x   |                         | Approval C. Dewey | Date 12/12/72 |                            |  |

**G231 Module**

There will also be two separate types of G231 Modules in the field in the near future. For this reason it has become necessary to create two sets of engineering drawings.

The first type of G231 Module will be an Etch Revision of C. All future ECO's for this module will use a circuit schematic revision of E with a numeric digit following. Each ECO released will increment the numeric digit by one (i.e. E4, E5, E6 and etc.).

The second type of G231 Module will be an Etch Revision of E. All future ECO's for this module will use a circuit schematic revision with only an alpha character as a designator starting at CS Revision F and incrementing thru the alphabet (i.e. F, H, J, K, and etc.).

Below is a chart that shows the revisions for the two G231 Modules.

| G231 Etch Revision C |             |                   | G231 Etch Revision E |             |
|----------------------|-------------|-------------------|----------------------|-------------|
| ECO No.              | CS Revision | Stamped on Module | ECO No.              | CS Revision |
| G231-0001            | C           | C                 | G231-0004            | F           |
| G231-0002            | N/A         | N/A               |                      |             |
| G231-0003            | C-1         | E                 |                      |             |
| G231-0005            | 1           | E-1               |                      |             |
| G231-0006            | 2           | E-2               |                      |             |
| G231-0007            | 3           | 3                 |                      |             |
| G231-0008            | 3A          | 3A                |                      |             |
| G231-0009            | E4          | E4                |                      |             |

Refer to PDP 11/05 Systems Tech Tip #14 for a detailed listing and description of memory ECO's.

m3

|                              |  |                         |  |                 |  |
|------------------------------|--|-------------------------|--|-----------------|--|
| Title                        |  |                         |  | Tech Tip        |  |
| New MM11 Option Designations |  |                         |  | Number          |  |
|                              |  |                         |  | MM11-TT-11      |  |
| All                          |  | Processor Applicability |  | Author          |  |
|                              |  |                         |  | D. Dickhut      |  |
|                              |  |                         |  | Rev             |  |
|                              |  |                         |  | g               |  |
|                              |  | Approval                |  | Date            |  |
|                              |  | C. Dewey                |  | 1/19/73         |  |
|                              |  |                         |  | Cross Reference |  |

This tech tip is to define the new variations of memories that are in existence and how they differ from the present MM11-L and S memories. The MM11-L and S are defined again for reference.

MM11-L (8K X 16, 900 ns)

It consists of a G110, G231 and H214 and is used on 11/05, 11/10, ME11-L and 11/40.

MM11-S (8K X 16, 900 ns)

This consists of a G110, G231, H214, and a system unit. It is used on 11/35, 11/40 to 11/45.

MM11-LP (8K X 18, memory parity)

This consists of a G109, G231 and H215 and is designed for memory parity. It plugs into a MF11-LP.

MF11-LP (Parity Option)

This is a memory parity option that consists of a nine slot backplane, one MM11-LP and one M7259 double height double width memory parity controller. The backplane can accommodate three MM11-LP's. This option is used on 11/35, 11/40 and 11/45.

MF11-L

This is a memory option that consists of a nine slot backplane and one MM11-L. It can accommodate three MM11-L and is used on 11/35, 11/40 and 11/45.

MB11-S (8K X 16)

This is a special 8K X 16 memory with a 850 ns cycle time and consists of a G110-YA, G231, and H214-YA. This memory is used only on 11/45 and exists in very limited quantities.

G109-YA (for reference only)

Module used only on PDP15 memories.

It is important to remember that the modules mentioned in the above definitions are not interchangeable with a similar looking type in another category. For example a G109 is not interchangeable with a G110 nor is a G110 interchangeable with a G110-YA. When a memory module is replaced or swapped, it should only be replaced with the exact same module type, even though another type may appear to work.

|         |                                       |  |                                 |                                 |                      |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| digital | <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"/> | MM 11                |

|  |                         |  |                   |                            |                 |
|--|-------------------------|--|-------------------|----------------------------|-----------------|
| Title MM11- E and F in BALL-B/D/F Mounting Boxes |                         |  |                   | Tech Tip Number MM11-TT-12 |                 |
| All  | Processor Applicability |  | Author B. Dimbat  | Rev 0                      | Cross Reference |
|  |                         |  | Approval C. Dewey | Date 3/14/73               |                 |

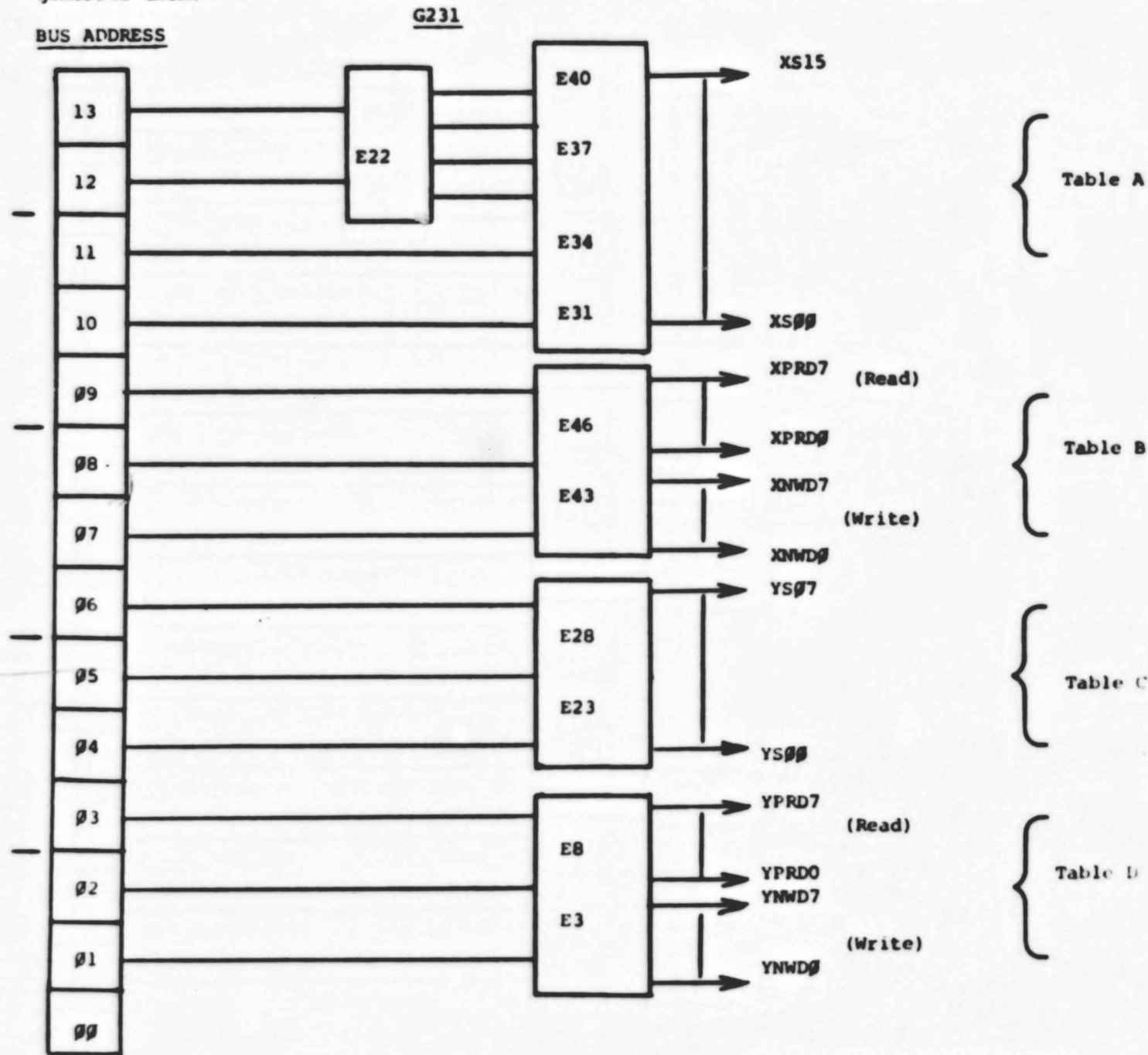
MM11E and MM11F memories cannot be installed in the 11/40 box. They cannot be installed in BALL-B/D/F boxes. They can be used on the 11/40 system but only if they are installed in an 11/20 type box (BALL-ES), which has its own power supply.

MM11E/F's, installed in an 11/40 box, will lose data during the power down sequence.

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|  |                         |  |                    |                          |                 |
|--|-------------------------|--|--------------------|--------------------------|-----------------|
| Title MM11 L, S, K Memory Address Decode |                         |  |                    | Tech Tip Number MM-TT-13 |                 |
| All                                      | Processor Applicability |  | Author John Alston | Rev g                    | Cross Reference |
|  |                         |  | Approval B. Dimbat | Date 6/1/73              |                 |

The diagram and tables supplied here are to aid F/S men when they are troubleshooting MM11L, S & K memories by relating the drive signals on the G231 with the addresses that generate them.



|                |                                       |  |                                 |                                 |                      |
|----------------|---------------------------------------|--|---------------------------------|---------------------------------|----------------------|
| <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"/> | MM11                 |

|  |                         |  |                    |                            |                 |
|--|-------------------------|--|--------------------|----------------------------|-----------------|
| Title MM11 L, S, K Memory Address Decode |                         |  |                    | Tech Tip Number MM11-TT-13 |                 |
| All                                      | Processor Applicability |  | Author J. Alston   | Rev g                      | Cross Reference |
|  |                         |  | Approval B. Dimbat | Date 6/1/73                |                 |

|       | A11=1, A10=1 | A11=1, A10=0 | A11=0, A10=1 | A10=0, A11=0 |
|-------|--------------|--------------|--------------|--------------|
| A13=1 | XS15         | XS14         | XS13         | XS12         |
| A12=1 | E40          |              |              |              |
| A13=1 | XS11         | XS10         | XS09         | XS08         |
| A12=0 | E37          |              |              |              |
| A13=0 | XS07         | XS06         | XS05         | XS04         |
| A12=1 | E34          |              |              |              |
| A13=0 | XS03         | XS02         | XS01         | XS00         |
| A12=0 | E31          |              |              |              |

TABLE A

|               | A08=1, A07=1 | A08=1, A07=0 | A08=0, A07=1 | A08=0, A07=0 |
|---------------|--------------|--------------|--------------|--------------|
| Read<br>Cyc.  | A09=1        | XPRD7        | XPRD6        | XPRD5        |
|               |              | E46          |              |              |
| Write<br>Cyc. | A09=0        | XPRD3        | XPRD2        | XPRD1        |
|               |              | E43          |              |              |
| Read<br>Cyc.  | A09=1        | XNWD7        | XNWD6        | XNWD5        |
|               |              | E46          |              |              |
| Write<br>Cyc. | A09=0        | XNWD3        | XNWD2        | XNWD1        |
|               |              | E43          |              |              |

TABLE B

|   |                         |  |                          |             |
|---|-------------------------|--|--------------------------|-------------|
| Title MM11, L, S, K Memory Address Decode |                         |  | Tech Tip Number MM-TT-13 |             |
| All                                       | Processor Applicability |  | Author J. Alston         | Rev g       |
|   |                         |  | Approval B. Dimbat       | Date 6/1/73 |
| Cross Reference                           |                         |  |                          |             |

TABLE C

|       | A05=1, A04=1    | A05=1, A04=0 | A05=0, A04=1 | A05=0, A04=0 |
|-------|-----------------|--------------|--------------|--------------|
| A06=1 | YS07            | YS06         | YS05         | YS04         |
|       | _____ E28 _____ |              |              |              |
| A06=0 | YS03            | YS02         | YS01         | YS00         |
|       | _____ E23 _____ |              |              |              |

TABLE D

|               |       | A02=1, A01=1   | A02=1, A01=0 | A02=0, A01=1 | A02=0, A01=0 |
|---------------|-------|----------------|--------------|--------------|--------------|
| read          | A03=1 | YPRD7          | YPRD6        | YPRD5        | YPRD4        |
|               |       | _____ E8 _____ |              |              |              |
|               | A03=0 | YPRD3          | YPRD2        | YPRD1        | YPRD0        |
|               |       | _____ E3 _____ |              |              |              |
| write<br>Cyc. | A03=1 | YNWD7          | YNWD6        | YNWD5        | YNWD4        |
|               |       | _____ E8 _____ |              |              |              |
|               | A03=0 | YNWD3          | YNWD2        | YNWD1        | YNWD0        |
|               |       | _____ E3 _____ |              |              |              |

|         |                                       |  |                                 |                                 |                       |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|-----------------------|
| digital | <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"/> | M11<br>MEMORY OPTIONS |

|                                 |  |                          |             |                           |  |
|---------------------------------|--|--------------------------|-------------|---------------------------|--|
| Title M11-D/DP Memory Backplane |  |                          |             | Tech Tip Number M11-TT-14 |  |
| All Processor Applicability     |  | Author William Aupperlee | Rev g       | Cross Reference           |  |
|                                 |  | Approval William Dimbar  | Date 8-5-76 |                           |  |

The M11-D/DP Core Memory Manual states that the G652 (mother board for the M11-D/DP) is inserted into a "Unibus Backplane". To eliminate any confusion, the "Unibus Backplane" is the modified backplanes DD11-C, D and P used on 11/04, 11/34 systems. Other Unibus Backplanes, such as 11/05, 11/35 and DD-11B expansion backplanes are not compatible with these new memory boards.

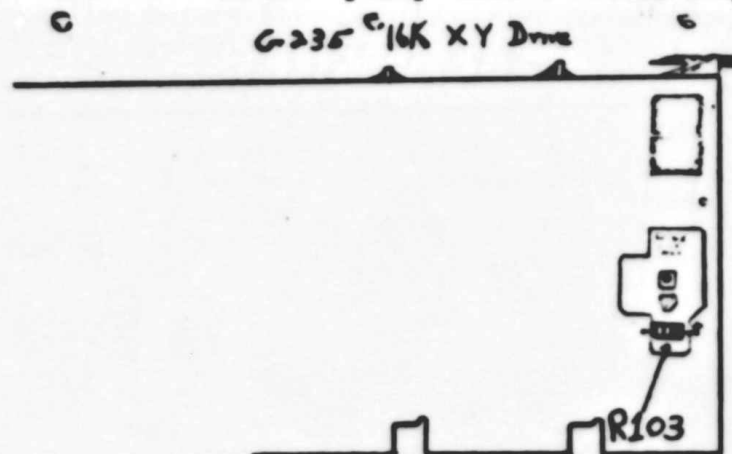
|  |  |                     |              |                           |  |
|--|--|---------------------|--------------|---------------------------|--|
| Title M11-U/UP MEMORIES FAILING HIGH CURRENT MARGINS |  |                     |              | Tech Tip Number M11-TT-15 |  |
| All Processor Applicability                          |  | Author Jim Holderby | Rev g        | Cross Reference           |  |
|  |  | Approval Lee Mickle | Date 9-13-76 |                           |  |

Many reports have been received from the field concerning memories failing high current margins and module set incompatibility (i.e. unable to swap modules). Investigation has shown that the inhibit margins are not properly centered, which could cause marginal operation of the memory under conditions of high drive currents. An ECO (G235-0009) was generated to correct this problem.

Therefore, if a memory exhibits these symptoms, do a visual inspection of the G235 for the ECO. A quick check for the ECO is:

1. Place G235 component side up and fingers toward you.
2. Look at right hand side of module in large etch area (see drawing).
3. If resistor R103 (75Ω 1W) which is across bottom of large etch is not in, ECO has not been installed.

This ECO should be installed before attempting massive module swap or option swap.



|                              |  |  |                          |  |                                  |  |
|------------------------------|--|--|--------------------------|--|----------------------------------|--|
| Title MM11-U/UP INSTALLATION |  |  |                          |  | Tech Tip<br>Number MM11<br>TT-16 |  |
| Processor Applicability      |  |  | Author Jim Holderby      |  | Rev g                            |  |
| All<br>X                     |  |  | Approval Lee Mickle (jm) |  | Date 12-14-76                    |  |
|                              |  |  |                          |  | Cross Reference                  |  |

There is a problem if more than 64K of MM11-U memory is installed in the new type expansion box (RALLF) with power distribution harness 7009566. When the second H754 power supply is installed, the jumpers must be removed from the power harness. The jumpers connect P2 pin 3 to P5 pin 3 and P2 pin 14 to P5 pin 14. If these jumpers are not removed, the two(2) H754 power supplies are connected in parallel and it is possible to damage one or both regulators. The reason the jumpers are there is to allow us to install the memory backplane anywhere in the cabinet.

This information is not in the installation procedure; however, it can be found in the PDP 11/45 and 11/50 System Maintenance Manual (DEC-11-H45SM-D-D) Figure 8-5, power distribution schematic.

|                                   |  |  |                            |  |                               |  |
|-----------------------------------|--|--|----------------------------|--|-------------------------------|--|
| Title MM11-E TROUBLE SHOOTING AID |  |  |                            |  | Tech Tip<br>Number MM11-TT-17 |  |
| Author MICHAEL BABCOCK            |  |  | F.S. Office PITTSBURGH, PA |  | Date 7 JUNE 77                |  |
| Processor Applicability           |  |  | Mgr./Sup.                  |  | Date                          |  |
| All<br>11                         |  |  | Approval: JIM HOLDERBY     |  | Date 16 JUN 77                |  |
|                                   |  |  |                            |  | Revision 0                    |  |
|                                   |  |  |                            |  | Cross Reference               |  |

THE FOLLOWING IS INTENDED AS A TROUBLE SHOOTING AID FOR THE MM11-E MEMORY

| MEMORY SELECT |    | ADDRESS                       |                    |    |                               |                    |   |                               |                    |   |                               |                    |   |   |                   |
|---------------|----|-------------------------------|--------------------|----|-------------------------------|--------------------|---|-------------------------------|--------------------|---|-------------------------------|--------------------|---|---|-------------------|
|               |    | X SWITCH<br>READ AND<br>WRITE |                    |    | X DRIVER<br>READ AND<br>WRITE |                    |   | Y SWITCH<br>READ AND<br>WRITE |                    |   | Y DRIVER<br>READ AND<br>WRITE |                    |   |   |                   |
| 15            | 14 | 13                            | 12                 | 11 | 10                            | 9                  | 8 | 7                             | 6                  | 5 | 4                             | 3                  | 2 | 1 | 0                 |
|               |    |                               | $\phi_{(n)} = X50$ |    |                               | $\phi_{(n)} = XD0$ |   |                               | $\phi_{(n)} = Y50$ |   |                               | $\phi_{(n)} = YD0$ |   |   | BYTE<br>SELECTION |
|               |    |                               | $1_{(n)} = X51$    |    |                               | $1_{(n)} = XD1$    |   |                               | $1_{(n)} = Y51$    |   |                               | $1_{(n)} = YD1$    |   |   |                   |
|               |    |                               | $2_{(n)} = X52$    |    |                               | $2_{(n)} = XD2$    |   |                               | $2_{(n)} = Y52$    |   |                               | $2_{(n)} = YD2$    |   |   |                   |
|               |    |                               | $3_{(n)} = X53$    |    |                               | $3_{(n)} = XD3$    |   |                               | $3_{(n)} = Y53$    |   |                               | $3_{(n)} = YD3$    |   |   |                   |
|               |    |                               | $4_{(n)} = X54$    |    |                               | $4_{(n)} = XD4$    |   |                               | $4_{(n)} = Y54$    |   |                               | $4_{(n)} = YD4$    |   |   |                   |
|               |    |                               | $5_{(n)} = X55$    |    |                               | $5_{(n)} = XD5$    |   |                               | $5_{(n)} = Y55$    |   |                               | $5_{(n)} = YD5$    |   |   |                   |
|               |    |                               | $6_{(n)} = X56$    |    |                               | $6_{(n)} = XD6$    |   |                               | $6_{(n)} = Y56$    |   |                               | $6_{(n)} = YD6$    |   |   |                   |
|               |    |                               | $7_{(n)} = X57$    |    |                               | $7_{(n)} = XD7$    |   |                               | $7_{(n)} = Y57$    |   |                               | $7_{(n)} = YD7$    |   |   |                   |

X AND Y DRIVER SIGNALS ARE POSITIVE FOR READ; NEGATIVE FOR WRITE  
(i.e. YPD $\phi$  FOR READ; YND $\phi$  FOR WRITE)

X AND Y SWITCH SIGNALS ARE NEGATIVE FOR READ; POSITIVE FOR WRITE  
(i.e. XNS $\phi$  FOR READ; XPS $\phi$  FOR WRITE)

YD $\phi$  - YD3 ON G226 SLOT C03  
YD4 - YD7 ON G226 SLOT F03  
YS $\phi$  - YS3 ON G226 SLOT C03  
YS4 - YS7 ON G226 SLOT F03

XD $\phi$  - XD3 ON G226 SLOT C02  
XD4 - XD7 ON G226 SLOT F02  
XS $\phi$  - XS3 ON G226 SLOT C02  
XS4 - XS7 ON G226 SLOT F02

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|         |                                       |  |                                 |                                 |                              |
|---------|---------------------------------------|--|---------------------------------|---------------------------------|------------------------------|
| digital | <b>FIELD SERVICE TECHNICAL MANUAL</b> |  |                                 |                                 | Option or Designator<br>MM11 |
|         | 12 Bit <input type="checkbox"/>       | 16 Bit <input checked="" type="checkbox"/> | 18 Bit <input type="checkbox"/> | 36 Bit <input type="checkbox"/> | MEMORY OPTION                |

|  |                            |                            |              |
|--|----------------------------|----------------------------|--------------|
| Title MM11-E TROUBLE SHOOTING AID (CONT) |                            | Tech Tip Number MM11-TT-17 |              |
| Author MICHAEL BABCOCK                   | F.S. Office PITTSBURGH, Pa | Date 6/17/77               | Revision 0   |
| Processor Applicability                  |                            | Mgr./Sup.                  | Date         |
| All 11                                   |                            | Approval: JIM HOLDERBY     | Date 6/17/77 |
|  |                            | Cross Reference            |              |

LOSS OF A BYTE - TROUBLE WITH BIT 0  
LOSS OF 1 (OCTAL) IN EVERY 20 (OCTAL) LOCATIONS - BAD Y DRIVER  
LOSS OF 20 (OCTAL) LOCATIONS IN EVERY 200 (OCTAL) LOCATIONS - BAD Y SWITCH  
LOSS OF 200 (OCTAL) LOCATIONS IN EVERY 2,000 (OCTAL) LOCATIONS - BAD X DRIVER  
LOSS OF 2000 (OCTAL) LOCATIONS IN EVERY 20000 (4K) (OCTAL) LOCATIONS - BAD X SWITCH

ANY DATA BIT DROPAGE OR PICKUP IS PROBABLY CAUSED BY THE G102'S

|                 |               |
|-----------------|---------------|
| DATA BITS 0-3   | G102 SLOT D03 |
| DATA BITS 4-7   | G102 SLOT D02 |
| DATA BITS 8-11  | G102 SLOT E03 |
| DATA BITS 12-15 | G102 SLOT E02 |

ADDRESS BIT 0 - BYTE SELECT DURING DATOB

| ADDRESS BITS 1-3 |   |   | READ DRIVER | WRITE DRIVER |                  |
|------------------|---|---|-------------|--------------|------------------|
| 3                | 2 | 1 |             |              |                  |
| 0                | 0 | 0 | YPD0        | YND0         |                  |
| 0                | 0 | 1 | YPD1        | YND1         | SWITCH/DECODER A |
| 0                | 1 | 0 | YPD2        | YND2         | G226 SLOT C03    |
| 0                | 1 | 1 | YPD3        | YND3         |                  |
| 1                | 0 | 0 | YPD4        | YND4         |                  |
| 1                | 0 | 1 | YPD5        | YND5         | SWITCH/DECODER B |
| 1                | 1 | 0 | YPD6        | YND6         | G226 SLOT F03    |
| 1                | 1 | 1 | YPD7        | YND7         |                  |

| ADDRESS BITS 4-6 |   |   |      |      |                  |
|------------------|---|---|------|------|------------------|
| 6                | 5 | 4 |      |      |                  |
| 0                | 0 | 0 | YNS0 | YPS0 |                  |
| 0                | 0 | 1 | YNS1 | YPS1 | SWITCH/DECODER C |
| 0                | 1 | 0 | YNS2 | YPS2 | G226 SLOT C03    |
| 0                | 1 | 1 | YNS3 | YPS3 |                  |
| 1                | 0 | 0 | YNS4 | YPS4 |                  |
| 1                | 0 | 1 | YNS5 | YPS5 | SWITCH/DECODER D |
| 1                | 1 | 0 | YNS6 | YPS6 | G226 SLOT F03    |
| 1                | 1 | 1 | YNS7 | YPS7 |                  |

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|         |                 |                            |
|---------|-----------------|----------------------------|
| Page 19 | Page Revision 0 | Publication Date JUNE 1977 |
|---------|-----------------|----------------------------|

PRINTED IN U.S.A.

|  |  |                        |  |                            |                 |
|--|--|------------------------|--|----------------------------|-----------------|
| Title MM11-E TROUBLE SHOOTING AID (CONT) |  |                        |  | Tech Tip Number MM11-TT-17 |                 |
| Author MICHAEL BABCOCK                   |  | F.S. Office PITTS., PA |  | Date 6/17/77               | Revision 0      |
| Processor Applicability                  |  | Mgr /Sup.              |  | Date                       |                 |
| All 11                                   |  | Approval: JIM HOLDERBY |  | Date 6/17/77               | Cross Reference |

**ADDRESS BITS 7-9**

| 9 | 8 | 7 |      |      |                                   |
|---|---|---|------|------|-----------------------------------|
| 0 | 0 | 0 | XPD0 | XND0 |                                   |
| 0 | 0 | 1 | XPD1 | XND1 | SWITCH/DECODER A<br>G226 SLOT C02 |
| 0 | 1 | 0 | XPD2 | XND2 |                                   |
| 0 | 1 | 1 | XPD3 | XND3 |                                   |
| 1 | 0 | 0 | XPD4 | XND4 |                                   |
| 1 | 0 | 1 | XPD5 | XND5 | SWITCH/DECODER B<br>G226 SLOT F02 |
| 1 | 1 | 0 | XPD6 | XND6 |                                   |
| 1 | 1 | 1 | XPD7 | XND7 |                                   |

**ADDRESS BITS 10-12**

| 12 | 11 | 10 |      |      |                                   |
|----|----|----|------|------|-----------------------------------|
| 0  | 0  | 0  | XNS0 | XPS0 |                                   |
| 0  | 0  | 1  | XNS1 | XPS1 | SWITCH/DECODER C<br>G226 SLOT C02 |
| 0  | 1  | 0  | XNS2 | XPS2 |                                   |
| 0  | 1  | 1  | XNS3 | XPS3 |                                   |
| 1  | 0  | 0  | XNS4 | XPS4 |                                   |
| 1  | 0  | 1  | XNS5 | XPS5 | SWITCH/DECODER D<br>G226 SLOT F02 |
| 1  | 1  | 0  | XNS6 | XPS6 |                                   |
| 1  | 1  | 1  | XNS7 | XPS7 |                                   |

|   |  |                      |  |                            |                            |
|---|--|----------------------|--|----------------------------|----------------------------|
| Title M7850 S SYN DLY ADJUSTMENT (MM11-CP, MM11-DP) |  |                      |  | Tech Tip Number MM11-TT-18 |                            |
| Author JIM HOLDERBY                                 |  | F.S. Office MAYNARD  |  | Date 9-23-77               | Revision 0                 |
| Processor Applicability                             |  | Mgr /Sup. LEE MICKLE |  | Date 9-23-77               |                            |
| All   |  | Approval: LEE MICKLE |  | Date 9-23-77               | Cross Reference M7850-TT-1 |

THIS TECH TIP APPLIES TO MM11-CP AND MM11-DD. CROSS REFERENCE M7850.

MM11-E

MM11-E/F PARTS BREAKDOWN

|          |                                |
|----------|--------------------------------|
| 7006405  | - Logic Frame                  |
| 7006468  | - MM11-E Wired assembly        |
| 70007263 | - MM11-F Wired assembly        |
|          |                                |
| G102     | - Sense Inhibit Card           |
| G103     | - Memory Levels & Gates        |
| G225     | - X-Y Current Generator        |
| G226     | - X-Y Current Generator        |
|          |                                |
| H207     | - 4K 16 Bit Core Memory Stack  |
|          |                                |
| M109     | - Device Select                |
| M729     | - MM11-E Control Logic         |
| M1091    | - Device Select                |
| M7290    | - Control Logic & Timing       |
|          |                                |
| MM11-E   | - 4K Single Memory Unit        |
| MM11-EX  | - 4K Interleaved               |
| MM11-F   | - 4K Single Memory Unit        |
| MM11-FP  | - Single Parity Memory Unit    |
| MM11-FX  | - Interleaved Memory (jumpers) |

DOOL

CS

THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

**Engineering Change Order Log**

**DEC-O-LOG**

ECO SYNOPSIS pages are updated and published continuously in conjunction with the issuance of ENGINEERING CHANGE ORDERS for all DEC products and are available upon subscription from:

DIGITAL EQUIPMENT CORPORATION  
FIELD SERVICE INFORMATION CENTER  
MAYNARD, MASSACHUSETTS 01704

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MAYNARD, MASSACHUSETTS

ECO SYNOPSIS FOR LOGIC OR OPTION

PDP-11 MEMORY **MMII-E**

| PRODUCT LINE | PUBLICATION DATE OF THIS SYNOPSIS PAGE | PAGE REVISION |
|--------------|--|---------------|
| PDP-11       | JULY 1976                              | 0             |

| ECO NO.      | LOGIC OR OPTION SERIAL NO'S AFFECTED | FIELD CODE | SYNOPSIS   |
|--------------|--------------------------------------|------------|--|
| MM11-E 00001 | >MM11-E                              | M          | JAN 76 - CHANGES STACK HINGE TOLERANCE AND ADDS A FLATNESS SPECIFICATION.  |
| MM11-E 00002 | MM11-E 110-120                       | D          | JAN 76 - MAKES CORRECTIONS TO THE WIRE LIST.   |
| MM11-E 00003 | MM11-E 110-120                       | D          | JAN 76 - ADDS CURRENT LOOPS FOR X AND Y CURRENT MEASUREMENTS AND SCOPING. UPDATES THE LIST OF MANUALLY INSTALLED WIRING.   |
| MM11-E 00004 | >MM11-E                              | D          | JAN 76 - UPDATES THE MM11-E PRINT SET.   |
| MM11-E 00005 | N.A.                                 | D          | JAN 76 - CORRECTS A DRAWING WHICH WAS DRAWN IN REVERSE. ADDS CLARIFICATION NOTES.  |
| MM11-E 00006 | MM11-E 110-239                       | D          | FEB 76 - ADDS TWO WIRES WHICH WERE PREVIOUSLY OMITTED FROM THE WIRE LIST.  |
| MM11-E 00007 | >MM11-E                              | M          | FEB 76 - CHANGES THE SPECIFICATION FOR THE MEMORY HINGE. SPECIFIES THE USE OF SELF EXTINGUISHING PLASTIC FOR MM11-E FABRICATION.   |
| M729 00001   | ALL M729                             | D          | MAR 76 - REVISES SEVERAL DESIGN CONSIDERATIONS; CHANGES THE ETCH LAYOUT AND SEVERAL COMPONENTS. MODULE STATUS - UNRELEASED.<br>M729 CIRCUIT SCHEMATIC REVISION A ETCHED BOARD REVISION B |
| G226 00003   | >G226                                | D          | MAR 76 - ADDS DIODES TO CLAMP OUTPUT VOLTAGE SPIKES WHICH COULD EXCEED THE TRANSISTOR BREAKDOWN RATING. MODULE STATUS - UNRELEASED.<br>G226 CIRCUIT SCHEMATIC REVISION C                 |

**LEGEND**

FIELD CODE  
F - Field action may be required  
D - Design E/O  
P - Print or Wire List change  
M - Mechanical E/O

SYMBOL  
> - ECO applicable to future production

ECO CHARGES  
Charges are coded within the numbers (15A 115Y 115Z)  
S1 - Charge for Setup and material prints only  
S2 - Charge for no setup parts only  
S3 - Charge for an air letter only - installation by DEC  
NOTE - Charges are additive (S1+S2+S3) on one charge for ECO installation by DEC

**MASTER DRAWING LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| A   | MM11-E-00002 |     |            |
| B   | MM11-E-00003 |     |            |
| C   | MM11-E-00004 |     |            |
| D   | MM11-E-00005 |     |            |
| E   | MM11-E-00006 |     |            |
| F   | PDP11-00004  |     |            |

**WIRE LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| A   | MM11-E-00002 |     |            |
| B   | MM11-E-00006 |     |            |

| ECO NO.      | LOGIC OR OPTION SERIAL NO'S AFFECTED | FIELD CODE | SYNOPSIS   |
|--------------|--------------------------------------|------------|--|
| G102 00002   | >PDP-11                              | F          | MAR 76 - REPLACES THE 8001 IC WITH A 74M011 TO INCREASE SPEED. THIS MODULE CANNOT BE REWORKED IN THE FIELD. (ERROR CORRECTED BY ECO G102-00003)<br>G102 CIRCUIT SCHEMATIC REVISION B ETCHED BOARD REVISION D |
| G103 00002   | ALL PDP-11                           | F          | MAR 76 - REPLACES SN7410N IC WITH SN7410N TO INCREASE SYSTEM SPEED. THE MODULE CANNOT BE REWORKED IN THE FIELD.<br>G103 CIRCUIT SCHEMATIC REVISION B   |
| G102 00003   | >PDP-11                              | F          | APR 76 - CORRECTS AN ERROR IN ECO G102-00002; CHANGES 100 OHM RESISTORS TO 75 OHMS.<br>G102 CIRCUIT SCHEMATIC REVISION B ETCHED BOARD REVISION D   |
| MM11-E 00008 | >MM11-E                              | P          | APR 76 - CORRECTS DIMENSIONS ON THE ETCHED BOARD DRAWING TO MEET STANDARDS.  |
| MM11-E 00009 | N.A.                                 | P          | APR 76 - CHANGES WIRING AND TUBING REFERENCES ON THE PARTS LIST.   |
| G103 00004   | ALL PDP-11                           | F          | APR 76 - CHANGES R17 FROM A 100 OHM THERMISTOR TO A 500 OHM THERMISTOR.<br>G103 CIRCUIT SCHEMATIC REVISION C   |
| G616 00001   | N.A.                                 | D          | APR 76 - DELETES THE MODULE HANDLE FROM THE G616 PARTS LIST AND ADDS IT TO THE MEMORY STACK PARTS LIST.<br>G616 CIRCUIT SCHEMATIC REVISION B   |
| G616 00002   | >G616                                | D          | MAY 76 - INTERCHANGES THE POSITIONS OF THERMISTOR R11 AND RESISTOR R1.<br>G616 CIRCUIT SCHEMATIC REVISION C  |
| MM11-E 00010 | N.A.                                 | P          | MAY 76 - ADDS A MODULE CLIP HOLDER PART NUMBER AND ITS DESCRIPTION TO THE PARTS LIST.  |
| MM11-E 00011 | >MM11-E                              | P          | MAY 76 - ADDS MM11-E ALIGNMENT PROCEDURE TO THE PRINT SET.   |
| MM11-E 00012 | >MM11-E                              | D          | MAY 76 - CHANGES A HOLE SIZE AND ADDS TWO OTHERS FOR THE G616.   |

**LEGEND**

FIELD CODE  
F - Field action may be required  
D - Design E/O  
P - Print or Wire List change  
M - Mechanical E/O

SYMBOL  
> - ECO applicable to future production

ECO CHARGES  
Charges are coded within the numbers (15A 115Y 115Z)  
S1 - Charge for Setup and material prints only  
S2 - Charge for no setup parts only  
S3 - Charge for an air letter only - installation by DEC  
NOTE - Charges are additive (S1+S2+S3) on one charge for ECO installation by DEC

**MASTER DRAWING LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| M   | MM11-E-00009 |     |            |
| J   | MM11-E-00010 |     |            |
| K   | MM11-E-00011 |     |            |

**WIRE LIST REVISIONS**

| REV | ECO NUMBER | REV | ECO NUMBER |
|-----|------------|-----|------------|
|     |            |     |            |

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**DEC O LOG**

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MAYNARD, MASSACHUSETTS

ECO SYNOPSIS FOR LOGIC OR OPTION

PDP-11 MEMORY **MM11-E**

| PRODUCT LINE | PUBLICATION DATE OF THIS SYNOPSIS PAGE | PAGE REVISION |
|--------------|--|---------------|
| PDP-11       | APRIL 1971                             | A             |

| ECO NO.      | LOGIC OR OPTION SERIAL NO.'S AFFECTED | FIELD CODE | SYNOPSIS   |
|--------------|---------------------------------------|------------|--|
|              |                                       |            | REFERENCE ECO G102-R0034   |
| G103 L0005   | ALL MM11-E                            | F          | JUN 70 - CHANGES CIRCUITRY TO PROVIDE 16-PIN INSTEAD OF 14-PIN FOR THE SENSE AMPLIFIERS. ADDS A HEAT SINK TO J4 TO PROVIDE APPROPRIATE HEAT DISSIPATION. BOTH OF THESE CHANGES ARE ORDERED FOR IMMEDIATE REWORK IN THE FIELD AND ARE TO BE PHASED IN BY THE MM11-E. CHANGES CIRCUITRY TO SPEED UP TURN-OFF TIME FOR THE STACK DISCHARGE CIRCUITS. THIS CHANGE IS TO BE PHASED IN BY BOTH THE MM11-E AND MM11-F. THE MODULE CAN BE REWORKED IN THE FIELD. |
| G005 R0003   | ALL MM11-E                            | F          | JUL 70 - REDUCES THE VALUE OF RESISTOR R22 TO 2.2K TO SPEED UP STABILIZATION OF THE KEY LOCK-IN REFERENCE VOLTAGES. SOLVES THE PROBLEM OF LOSS OF MEMORY DATA DURING POWER UP OR POWER DOWN.   |
| MM11-E 00013 | MM11-E                                | M          | JUL 70 - SPECIFIES A REWORKING OF THE MODULE HOUSERS.  |
| MM11-E 00014 | MM11-E 122-9033                       | P          | AUG 70 - DELETES CONFLICTING REFERENCES TO THE LOGS OF THE G102 FROM THE MM11-E-24 LOGIC PRINT.  |
| MM11-E 00015 | MM11-E 101-9033                       | F          | SEP 70 - CONVERTS THE SIGNAL HIS TWO LOG OUT FROM THE POWER HIS TO THE UNIBUS. THESE CHANGES ENDURE PROPER OPERATION OF THE POWER FAIL OPTION IN MULTIPLE HUR SYSTEMS. THIS ECO MUST BE INSTALLED IN CONJUNCTION WITH ECOS MM11-A0011, MM11-A0027, AND 5409473-0000 AND IS APPLICABLE TO ALL MULTIPLE HUR SYSTEMS.   |
| MM11-E 00016 | ALL MM11-E SHIPPED JULY-DEC-1970      | F          | AUG 70 - PROVIDES A COPY OF THE DATA WIRE TABLE AND INSTRUCTIONS FOR CORRECTING IMPROPERLY WIRED UNITS WHICH WERE SHIPPED BETWEEN JULY AND DECEMBER OF 1970. SYMPTOMS OF THIS MEMORY WIRING PROBLEM INCLUDE DATA ERRORS, LOW MEMORY RANGES, AND NON-INTERCHANGEABILITY OF G102 MODULES.  |

**LEGEND**

FIELD CODE  
 F = Field action may be required  
 D = Design ECO  
 M = Material or wire list change  
 P = Packaging ECO  
 S = Sparepart ECO

SYMBOL  
 > = ECO applicable to future production

ECO CHANGES  
 Changes are coded within the brackets: (101-101) (101-101)  
 01 = Change for future and updated prints only  
 02 = Change for hardware parts only  
 03 = Change for on-site installation by DEC  
 NOTE: Changes are addressed 01-02-03 = 101-101 on-site change for ECO installation by DEC

**MASTER DRAWING LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| 1   | MM11-E-00013 |     |            |
| 2   | MM11-E-00014 |     |            |
| 3   | MM11-E-00015 |     |            |
| 4   | MM11-E-00016 |     |            |

**WIRE LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| 1   | MM11-E-00015 |     |            |

JUN 7 1976

| ECO NO.      | LOGIC OR OPTION SERIAL NO.'S AFFECTED | FIELD CODE | SYNOPSIS   |
|--------------|---------------------------------------|------------|--|
| MM11-E 00017 | MM11-E AS REQUIRED                    | F          | JAN 71 - CORRECTS THE TEST PROCEDURE TO SPECIFY CHANGING THE SENSE SKIPPING FROM 210 NSFC TO 220 NSFC TO IMPROVE MEMORY PERFORMANCE. ECO MM11-E-00020 SUPERSEDES THIS 220 NSFC SENSE SKIPPING REWORKING IT TO 210 NSFC. SOMETIMES CIRCUITRY WAS TOO HIGH FOR OPTIMUM PERFORMANCE WHEN ADJUSTING THE REFERENCE VOLTAGES. CHANGED THE WIRE LIST. UPDATED THE BLOCK SCHEMATIC TO REFLECT CHANGES MADE TO THE W29 CIRCUIT SCHEMATIC. UPDATED TYPING AND FLOW CHARTING. |
| MM11-E 00018 | MM11-E                                | F          | JAN 71 - CHANGES SLOTTING OF THE 288 PIN BLOCK ENDS TO ELIMINATE THEM BREAKING OFF WHEN 288 PIN SIZE CARDS ARE INSERTED AND REMOVED.   |
| MM11-E 00019 | MM11-E                                | F          | MAR 71 - UPDATES DOCUMENTATION TO INCLUDE THE REPAIR MODULE. UPDATES PRINTS TO INCLUDE INSTRUCTIONS FOR TROUBLESHOOTING REPAIRS.   |
| MM11-E 00020 | MM11-E WITH ECO MM11-E-00017          | F          | MAR 71 - THIS ECO REVISIONS THE SENSE SKIPPING SPECIFICATION OF ECO MM11-E-00017. CORRECTS THE TEST PROCEDURE TO SPECIFY SKIPPING THE SENSE AT 210 NSFC. SKIPPING IT AT 220 NSFC AS SUGGESTED IN ECO MM11-E-00017 IS TOO LATE FOR OPTIMUM PERFORMANCE.   |

**MM11-E-00021 CODE: P ML: V**  
 MAY 71 - PROBLEM: Packaging instructions for the PDP-11 memory stack are not included in the print set.  
 CORRECTION: Add packaging instructions to MM11-E drawing index list.  
 In plant effectivity: Documentation change only.

**MM11-E-00022 CODE: DF ML: W**  
 MAR 71 - PROBLEM: Under some conditions when other options are placed along side an MM11-E, they fail to operate correctly.  
 CORRECTION: Install a module protection plate.  
 In plant effectivity: Retrofit all MM11-E's as required.  
 Field effectivity: All MM11-E's as required. Time To Install And Test: 10 Hour.  
 Kit Contents: Kit Contents.  
 ECO Prints And Parts: Kit Contents.

**MM11-E-023 CODE: P ML: Y**  
 APR 71 - CORRECTION: Update test procedure.  
 In plant effectivity: Documentation change only.

**MM11-E-00024 CODE: F ML: AA WL: E**  
 MAY 71 - PROBLEM: 1. Strobe signals and TMR have too much noise on them.  
 CORRECTION 1: Install twisted pair wiring for these signals.  
 PROBLEM 2: READ H signal has too many loads on it.  
 CORRECTION 2: Develop another READ H signal to share the load.

In plant effectivity: Rework immediately.  
 Field effectivity: Retrofit all MM11-E.  
 Kit revision E is created. Time To Install And Test: 10 Hour.  
 Kit Contents: ECO Prints Only.

**LEGEND**

FIELD CODE  
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 D = Design ECO  
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 P = Packaging ECO  
 S = Sparepart ECO

SYMBOL  
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**MASTER DRAWING LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| 1   | MM11-E-00017 |     |            |
| 2   | MM11-E-00018 |     |            |
| 3   | MM11-E-00019 |     |            |
| 4   | MM11-E-00020 |     |            |

**WIRE LIST REVISIONS**

| REV | ECO NUMBER   | REV | ECO NUMBER |
|-----|--------------|-----|------------|
| 1   | MM11-E-00017 |     |            |

JUN 7 1976

55

FCCO'S

FS

ENS

E.O. #7571

**EQUIPMENT CORPORATION**  
**ENGINEERING**  
**CHANGE ORDER**

REQ'D. BY ENGR. OR SPEED RELEASE:  8/10/70

TYPE OF CHANGE:  
 ELECTRICAL   
 MECHANICAL   
 MODULES

CHANGE NO: **M11B-00015**

DOCUMENTATION PROJECT NUMBER:  
 A57 P001 L02 TYPE OR DISCRETE NO. **1 1 0 7 4 2 8**

MANUFACTURING PROJECT NUMBER:  
 A57 P001 L02 TYPE OR DISCRETE NO.

UNIT NAME MEMORY MODEL NO. M11B

PREPARED OPTIONS AFFECTED

| MODEL NO. | VARIATION |
|-----------|-----------|
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |

CHANGE TESTED BY \_\_\_\_\_

ESTIMATED TIME TO INSTALL **4 MINUTES**

PARTS ADDED OR DELETED (SEE REFER TO SEPARATE SHEET) YES NO

SHOP MODEL AFFECTED

SYSTEMS PROGRAMS AFFECTED

DIAGNOSTIC PROGRAMS AFFECTED

TECHNICAL PUBLICATIONS AFFECTED

**BREAK-IN POINT**  
(DATE/GENERAL NO.)

**FIELD RETROFIT ON MULTIPLE BOX SYS. ONLY. PHASE-IN PRODUCTION-- ALL MULTIPLE BOX SYS. FOR THE MONTH OF AUG.. ALL MACHINES AS OF AUGUST 24, 1970. SER. #100-258**

**PROBLEM:**

- TO ALLOW PROPER POWER FAIL OF MULTIPLE BOX SYSTEMS.
1. SIGNAL BUS AC LO L MUST BE CONNECTED FROM THE POWER BUS TO THE UNIBUS.
  2. SIGNAL BUS DC LO L MUST BE CONNECTED FROM THE POWER BUS TO THE UNIBUS.
  3. THIS ECO REQUIRES BOTH OF THE FOLLOWING:  
ECO #5408475-00006; ECO #M930-00001.

ALL REFERENCED CHANGES MUST BE MADE SIMULTANEOUSLY IN A GIVEN SYSTEM.

**CORRECTION:**

1. INSTALL WIRES.
2. CORRECT PRINTS.
3. NOTE: IF INSTALLATION OF THIS UNIT CREATES A MULTIPLE BOX SYSTEM, THIS ECO AND ECO NUMBER 5408475-00006; ECO NUMBER M930-00001 MUST BE INSTALLED. ONE SET OF CONNECTIONS BETWEEN THE POWER BUS AND UNIBUS ARE REQUIRED FOR EACH BALL WITHIN A SYSTEM.

**DRAWINGS AFFECTED**

| NUMBER       | OLD REV. | NEW REV. |
|--------------|----------|----------|
| A-M-M11-B    |          | M P      |
| E-M-M11-B-07 |          | B C      |
| D-Y-M11-B-09 |          | B A      |
|              |          |          |
|              |          |          |
|              |          |          |
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|              |          |          |

**FIELD SERVICE CODES**

**F**

ORIGINATOR Richard V. Manion DATE 8-3-70

PRODUCTION ENG. D. Call DATE 8-3-70

DESIGN ENG. Peter Durant DATE 8-3-70

OTHER R. J. Farrier AGK DATE 8-3-70

**PRODUCT LINES AFFECTED**

PDP-11

FORM 02A 111  
 5/75/FORM 0

65

ADD/DELETE SHEET

MAKE ALL DELETIONS FIRST

PAGE \_\_\_\_\_ OF \_\_\_\_\_

| COLOR | SIGNAL NAME | FROM PIN | TO PIN | COMPONENTS | ADD | DEL |
|-------|-------------|----------|--------|------------|-----|-----|
|       | BUS ACLOL   | B04F1    | A03R2  |            | X   |     |
|       | BUS DCLOL   | B04F2    | A03S2  |            | X   |     |
|       |             |          |        |            |     |     |
|       |             |          |        |            |     |     |
|       |             |          |        |            |     |     |
|       |             |          |        |            |     |     |
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|       |             |          |        |            |     |     |
|       |             |          |        |            |     |     |
|       |             |          |        |            |     |     |

ECO NUMBER MM11E-00015

MADE BY Jane Stott

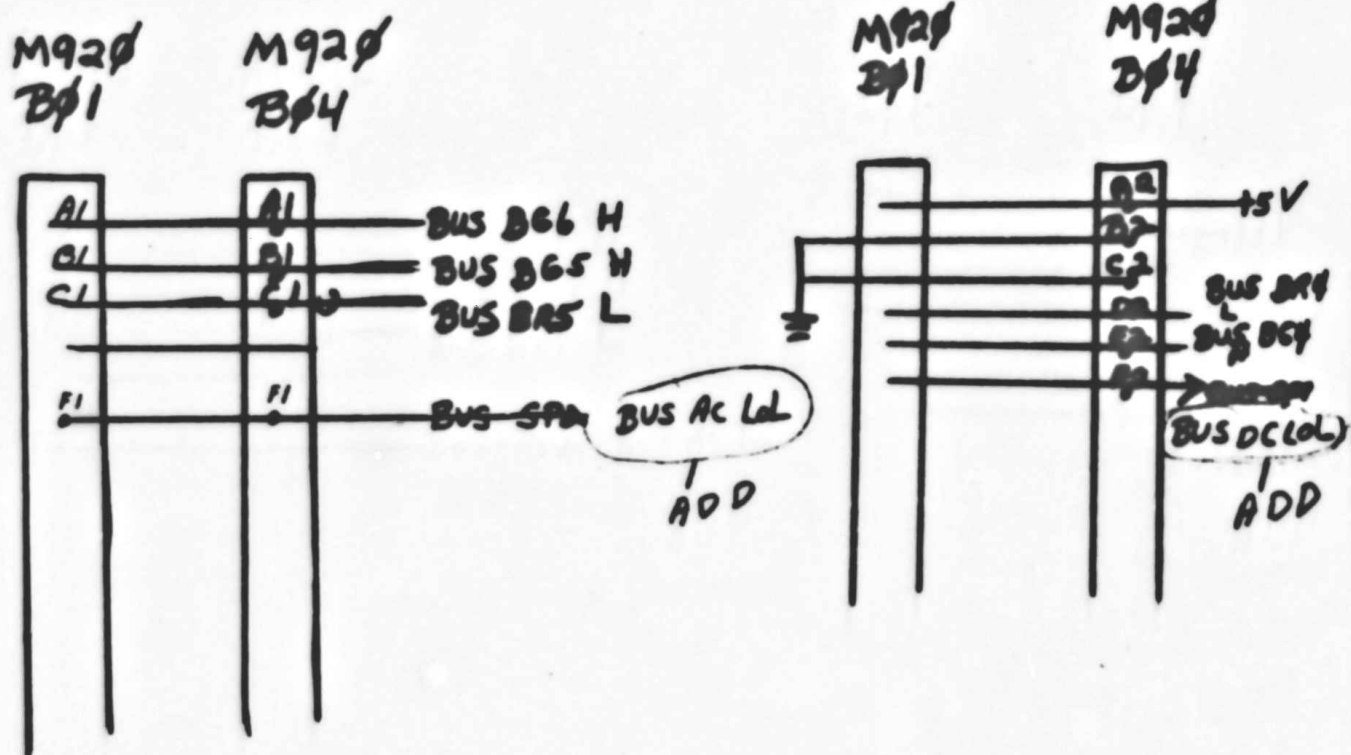
| DRAWING NUMBER AFFECTED |      |           |              |
|-------------------------|------|-----------|--------------|
| CODE                    | SIZE | NUMBER    | NEW REV LTR. |
| 11L                     | K    | MM11-E-07 | C            |
|                         |      |           |              |
|                         |      |           |              |
|                         |      |           |              |

DD-01 (11) DTIC FORM 8

175

DWG LOC.  
B-6

B-4



ECO # MM11E-00015

D-IC-MM11-E-09

NEW  
REV.  
A

| DWG NO         | REV LET | NO OF SHEETS | TITLE          |
|----------------|---------|--------------|----------------|
| D-IC-MM11-E-09 | A       | 1            | I/O CONNECTORS |
| K-WL-M11-E-07  | BC      | <del>1</del> | WIRE LIST      |
|                |         |              |                |

ECO # MM11E-00015

A-ML-MM11E

NEW  
REV.  
P

**EQUIPMENT CORPORATION**  
**ENGINEERING CHANGE ORDER**

|                      |                                     |     |     |
|----------------------|-------------------------------------|-----|-----|
| REC'D. BY INFO. SER. | MO.                                 | DAY | YR. |
|                      | 8                                   | 6   | 70  |
| SPEC. RELEASE        | Y 27 77                             |     |     |
| TYPE OF CHANGE       |                                     |     |     |
| ELECTRICAL           | <input checked="" type="checkbox"/> |     |     |
| MECHANICAL           | <input type="checkbox"/>            |     |     |
| MODULES              | <input type="checkbox"/>            |     |     |

|                              |           |                      |  |
|------------------------------|-----------|----------------------|--|
| CHANGE NO. MH11E-00016       |           |                      |  |
| DOCUMENTATION PROJECT NUMBER |           |                      |  |
| ACT                          | ISS. LINE | TYPE OR DISCRETE NO. |  |
|                              | 110       | 7428                 |  |
| MANUFACTURING PROJECT NUMBER |           |                      |  |
| ACT                          | ISS. LINE | TYPE OR DISCRETE NO. |  |
|                              |           |                      |  |

UNIT NAME PDP-11 MEMORY MODEL NO. MH11E

| MODEL NO. | VARIATION |
|-----------|-----------|
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |
|           |           |

CHANGE TESTED IN SERIAL NO. \_\_\_\_\_ BY \_\_\_\_\_

ESTIMATED TIME TO INSTALL \_\_\_\_\_

|   |                          |                                     |
|---|--------------------------|-------------------------------------|
| PARTS ADDED OR DELETED (IF YES REFER TO SEPARATE SHEET) | YES                      | NO                                  |
| SHOP MODEL AFFECTED                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| SYSTEMS PROGRAMS AFFECTED                               | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| DIAGNOSTIC PROGRAMS AFFECTED                            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| TECHNICAL PUBLICATIONS AFFECTED                         | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

BREAK-IN POINT  
(DATE/SERIAL NOS)  
SER. #100 THRU 953 AND  
ALL FUTURE.  
ALL IN PROCESS.

PROBLEM:

- TIMING + FLOW DIAGRAM WRONG.
- NOT ENOUGH INFORMATION GIVEN ON THE DRAWING TO INSURE THE REQUIRED RESULTS WHEN HAND WIRE. WRAPPING. TWISTED PAIRS WILL PICK BACK PLANE NOISE UNLESS DONE CORRECTLY.

CORRECTION:

- CORRECT TIMING + FLOW DIAGRAM
- ADDITIONAL INFORMATION PUT ON THE PRINT.

DRAWINGS AFFECTED

| NUMBER           | OLD  | NEW  |
|------------------|------|------|
|                  | REV. | REV. |
| A-MH-MH11-E      | M    | N    |
| D-TD-MH11-E-08   | A    | B    |
| D-AD-7006468-0-0 | B    | C    |
| A-PL-7006468-0-0 | B    | C    |
|                  |      |      |
|                  |      |      |
|                  |      |      |
|                  |      |      |
|                  |      |      |
|                  |      |      |
|                  |      |      |
|                  |      |      |

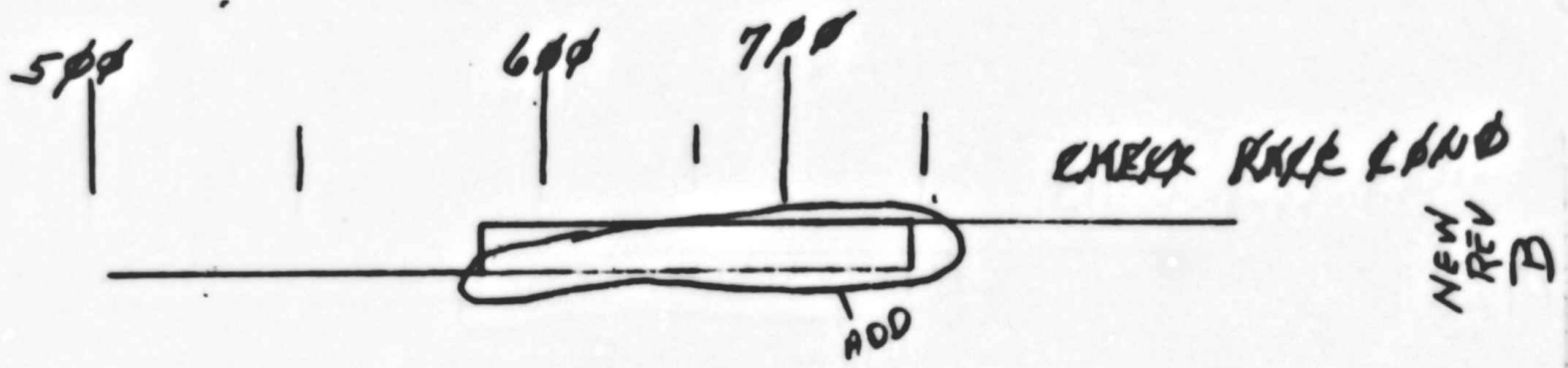
FIELD SERVICE CODED

D

ORIGINATOR Richard V. Manion x-2814 DATE 8-2-70  
 PRODUCTION ENG. D. Call DATE 8-3-70  
 DESIGN ENG. Peter Durant DATE 8-3-70  
 OTHER R. J. FARRIER AGK DATE 8-4-70

PRODUCT LINES AFFECTED  
PDP-11

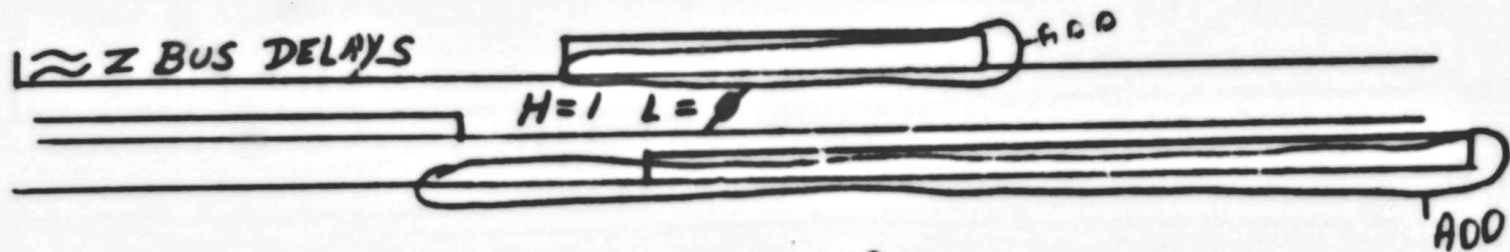
DWG LOC.  
D-4



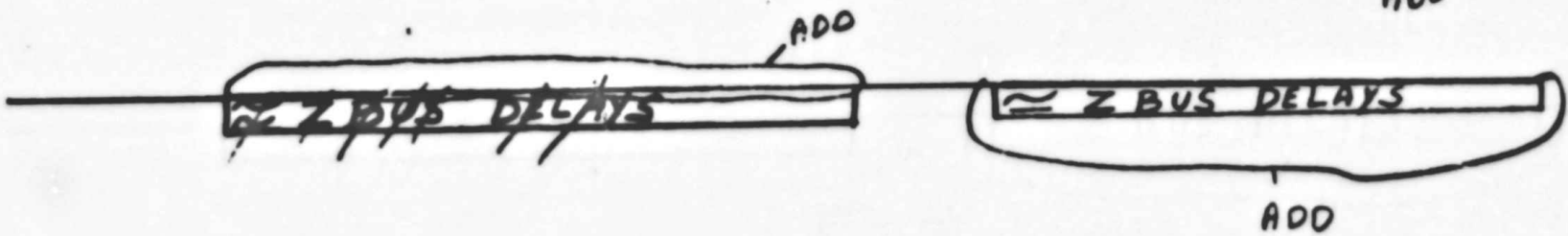
C-4+3



B-5



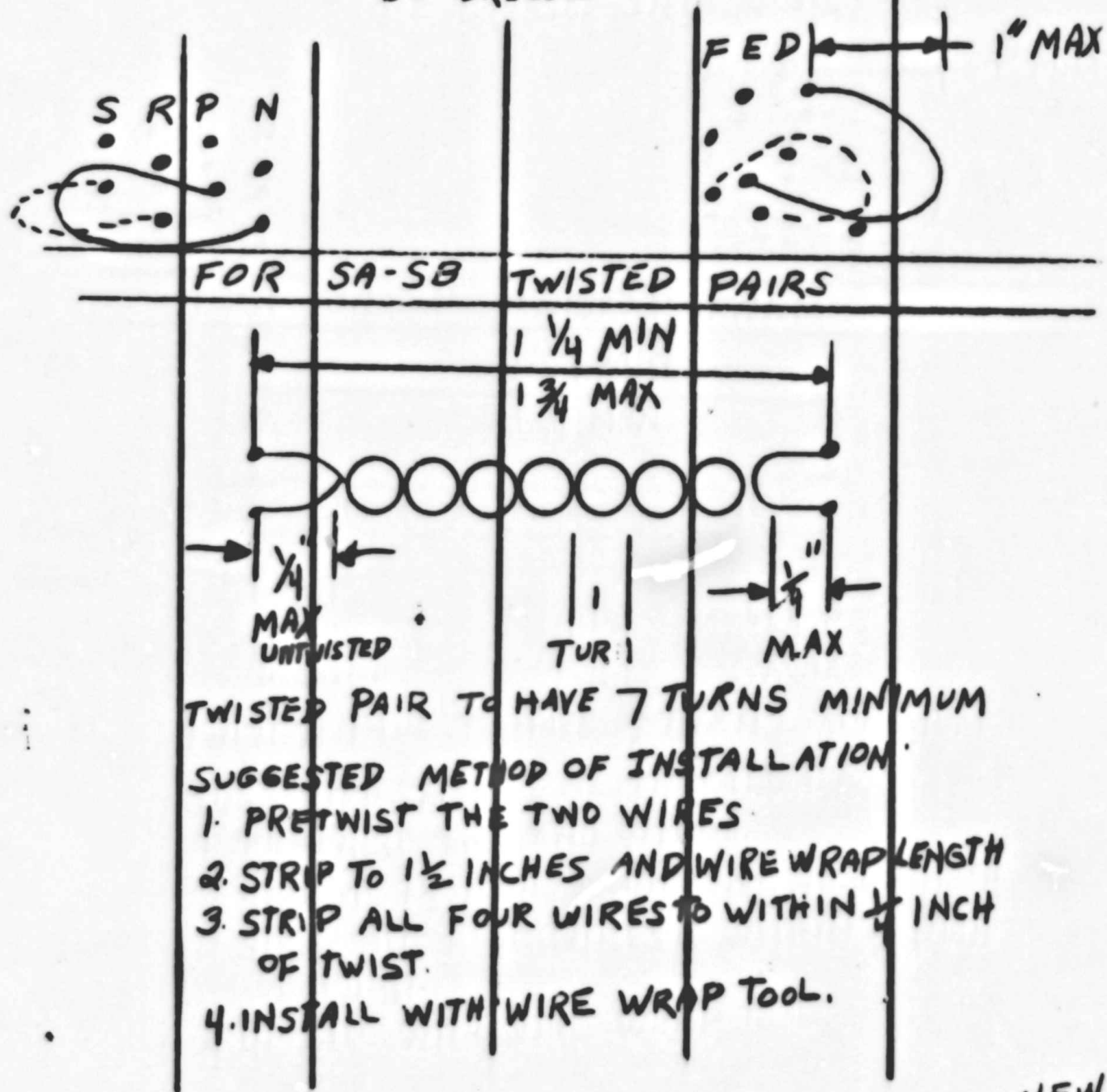
B5+6



D-TD-MM11E-08

ELO # MM11E-00016

LENGTH SHOULD BE A MAXIMUM OF  
 $2\frac{1}{4}$  INCHES. CHECK DRAWINGS FOR  
 LENGTH AND FOR HOW LOOPS SHOULD  
 BE DRESSED INTO LOGIC.



ECO# MM11E-00016 D-AD-7006468-0-0

NEW  
 REV  
 C.

ms

| DWG NO.          | REV<br>LET |
|------------------|------------|
| D-AD-7006468-0-0 | BC         |
| A-PL-7006468-0-0 | BC         |
| D-TD-MM11-E-08   | AB         |

ECO# MM11E-00016

A-ML-MM11-E

NEW  
REV.  
N

AB

|  |   |  |
|--|---|--|
| <b>ENGINEERING CHANGE ORDER</b>  |   | ECO NO.<br>MM11E-00017<br>Sheet 1 of 4   |
| <b>ORIGINATOR</b><br>RICHARD MANTON  | <b>RECEIVED CHG. DATE</b><br>12/22/70           | <b>ISSUED ECO DATE</b><br>1-22-71  |
| <b>DATE</b><br>12/15/70  | <b>EXT.</b><br>2005                             | <b>FINAL RELEASE DATE</b>  |
| <b>DISCRETE PROJECT NUMBER</b><br>11 07602   |   |  |
| <b>EQUIPMENT AFFECTED</b>  |   |  |
| <b>TYPE CHANGE</b>   | <b>UNIT TO BE CHANGED</b>                       | <b>CHECKLIST</b>   |
| ELECTRICAL <input checked="" type="checkbox"/>   | MM11-E  | SHOP MODEL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO             |
| MECHANICAL <input type="checkbox"/>  | <b>PRODUCT LINES</b>                            | SYSTEMS PROGRAMS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO       |
| MODULE <input type="checkbox"/>  |   | DIAGNOSTICS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO            |
| SUBASSEMBLY <input type="checkbox"/>   | PDP11   | TECHNICAL PUB. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO         |
| MFG/FIELD PROCEDURE <input type="checkbox"/>   |   | TEST PROGRAMS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO          |
| <b>TEST INFORMATION</b>  |   | TESTER <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO                 |
| SERIAL #   |   | MFG.FIELD PROCEDURE <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO    |
| BY   |   | PACKAGING INSTRUCTIONS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO |
|  |   | TOOLING <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO                |
| <b>BREAK IN POINT</b>  |   | <b>SIGNIFICANCE</b>  |
| <b>SYSTEM</b>  | <b>MODULE/OPTION</b>                            | <b>FIELD</b>   |
|  | MM11-E  |  |
|  |   | <b>REWORK</b>  |
|  |   | 05   |
|  | <b>RETROFIT</b>                                 | <b>CODE</b>  |
|  | DISTRIBUTED FOR FIELD SERVICE INFORMATIO.N ONLY |  |
| <b>REQ. TO MEET SPECIFICATION</b> <input type="checkbox"/><br><b>PROD. IMPROVEMENT</b> <input checked="" type="checkbox"/><br><b>CUSTOMER/FIELD REQ.</b> <input type="checkbox"/><br><b>FACILITATE MFG.</b> <input type="checkbox"/><br><b>DRAWING CORRECTION</b> <input type="checkbox"/><br><b>VENDOR</b> <input type="checkbox"/>   |   |  |
| <b>PROBLEM</b>   |   |  |
| 1. WANTED TO IMPROVE MEMORY PERFORMANCE. STROBE 210 NS WAS TO EARLY FOR OPTIMUM PERFORMANCE . SOME TIMES CURRENT WAS TOO HIGH FOR OPTIMUM PERFORMANCE WHEN ADJUSTING THE REFERENCE VOLTAGE.<br>2. WIRE LIST WAS NOT CHANGED ACCORDING TO ECO # MM11E-00015.<br>3 BLOCK SCHEMATIC DOES NOT REFLECT CHANGES OF M729 CIRCUITSCHEMATIC<br>4.TIMING AND FLOW DIAGRAM NEEDS TO BE UPDATED.<br>5. WRITING IN MARGIN |   |  |
| <b>CORRECTION</b>  |   |  |
| 1. CHANGED TEST PROCEDURE TO IMPROVE MEMORY PERFORMANCE.<br>2. CORRECT WIRE LIST ACCORDING TO SUBMITTED ADD/DELETE SHEET.<br>3. UPDATE BLOCK SCHEMATIC PER ATTACHED MARKED UP PRINT.<br>4. UPDATE TIMING AND FLOW DIAGRAM AS INDICATED .<br>5. REMOVE WRITING FROM MARGIN.   |   |  |
| <b>APPROVAL</b>  |   |  |
| DESIGN ENGINEER <u>P. DURANT</u>   | ENG. MGR. _____                                 | FIELD SERVICE (ADVISORY) <u>J. BUZYNSKI</u>  |
| PRODUCTION ENGINEER <u>D. CALL</u>   | CHIEF ENGINEER _____                            |  |

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**ENGINEERING CHANGE ORDER  
DOCUMENT & MATERIAL  
CHANGE**

ECO NO.

MM11E-00017

Sheet 2 of 4

| ITEM | DOCUMENT/OR PART NUMBER | OLD REV | NEW REV | (PART NAME) DESCRIPTION OF CHANGE  | DISP CODE |
|------|-------------------------|---------|---------|--|-----------|
| 1    | A-ML-MM11-E             | P       | R       | (MASTER LIST)<br>UPDATE REVISION LEVEL ON THE FOLLOWING DRAWINGS:<br>D-BS-MM11-E-05 FROM A TO B<br>K-WL-MM11-E-07 FROM C TO D<br>D-TD-MM11-E-08 FROM B TO C<br>A-SP-MM11-E-11 FROM O TO A  | 06        |
| 2    | D-BS-MM11-E-05          | A       | B       | (BLOCK SCHEMATIC)<br>SEE MARKED PRINT THIS ECO.  | 06        |
| 3    | K-WL-MM11-E-07          | C       | D       | (WIRE LIST)<br>SEE ADD/DELETE SHEET THIS ECO.  | 06        |
| 4    | D-TD-MM11-E-08          | B       | C       | (TIMING DIAGRAM)<br>DELETE CHECK RACE COND. IN MARGIN.<br>INCREASE TIME AND FLOW IN DISZ BEFORE 650NS. INCREASE TIME AND FLOW IN CINZ BEFORE 350 NS.   | 06        |
| 5    | A-SP-MM11-E-11          | -       | A       | (ENGINEERING SPECIFICATION)<br>DELETE FROM PARA. 11.0 210 NS .<br>ADD 220NS. ADD TO PARA. 13.4- IF THE MARGIN IS GREATER THAN 1.0V SET VXY AT 0.5 BELOW THE FAILING HIGH END POINT. (EXAMPLE IF MARGINS ARE 0.4 TO 1.8V, SET AT 1.3V= 1.8-0.5) | 06        |

**DISPOSITION CODES**

|   |    |                           |    |
|---|----|---------------------------|----|
| Use up Present Stock                        | 01 | Retrofit to Break-in      | 05 |
| Use Present Stock until New Stock Available | 02 | Documentation Change Only | 06 |
| Rework all Material                         | 03 | New Item Purchase         | 07 |
| Rework until New Stock Available            | 04 | New Item in Stock         | 08 |
|   |    | New Item on Order         | 09 |
|   |    | Retain                    | 00 |

DRA 112A

SEE REVERSE SIDE FOR INSTRUCTIONS

66

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**ENGINEERING CHANGE ORDER  
ADD/DELETE SHEET**

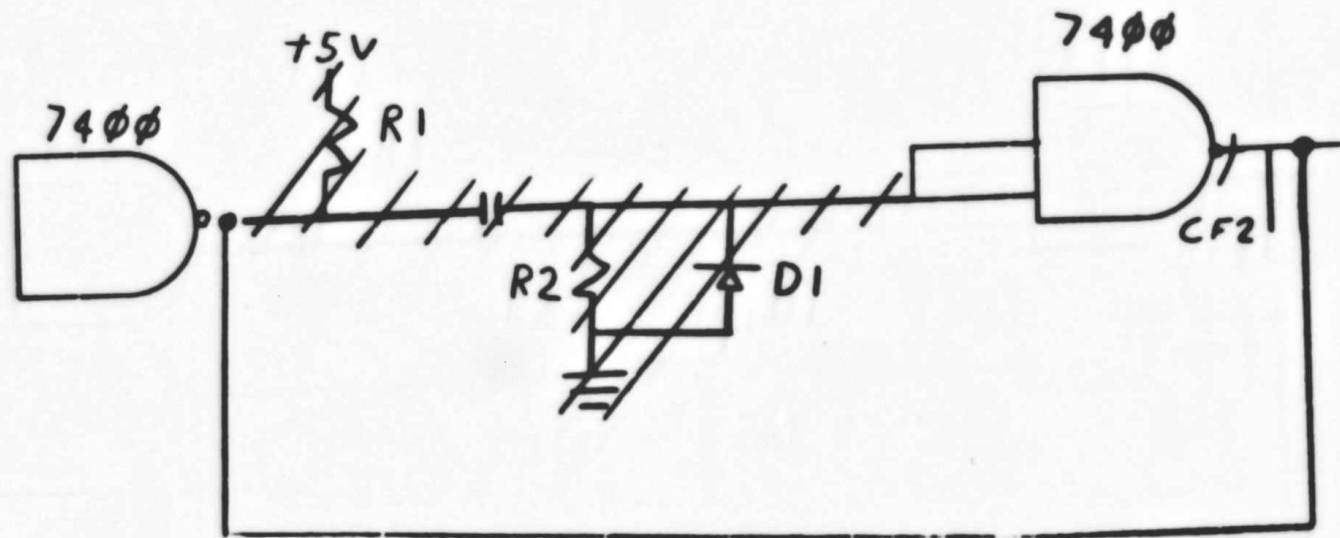
ECO NO.  
MM11E-00017  
Sheet 3 of 4

WIRE LIST NO. MM11-E-07

TITLE

MAKE ALL DELETIONS FIRST WHEN INSTALLING

| SIGNAL NAME | FROM PIN | TO PIN | COMPONENTS | ADD | DEL |
|-------------|----------|--------|------------|-----|-----|
| BUS AC LD L | B04F1    | A03R2  |            | X   |     |
| BUS DC LD L | B04F2    | A03S2  |            | Y   |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |



ECO# MM11E-00017

D-BS-MM11-E-05

NEW  
REVB



# ENGINEERING CHANGE

ECO NO.  
MM11E-00020  
Sheet 1 of 3

W.O. 362E CS ORDER DM

|                              |                               |                            |                               |                                     |
|------------------------------|-------------------------------|----------------------------|-------------------------------|-------------------------------------|
| ORIGINATOR<br>RICHARD MANION | RECEIVED CHG. DATE<br>3/24/71 | ISSUED ECO DATE<br>3-26-71 | FINAL RELEASE DATE<br>4-13-71 | DISCRETE PROJECT NUMBER<br>11 07602 |
| DATE<br>3/9/71               | EXT.<br>2005                  |                            |                               |                                     |

## EQUIPMENT AFFECTED

| TYPE CHANGE                                    | UNIT TO BE CHANGED | CHECKLIST              | YES                                 | NO                                  |
|--|--------------------|------------------------|-------------------------------------|-------------------------------------|
| ELECTRICAL <input checked="" type="checkbox"/> | MM11E              | SHOP MODEL             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| MECHANICAL <input type="checkbox"/>            | PRODUCT LINES      | SYSTEMS PROGRAMS       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| MODULE <input type="checkbox"/>                |                    | DIAGNOSTICS            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| SUBASSEMBLY <input type="checkbox"/>           | PDP11              | TECHNICAL PUB.         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| MFG/FIELD PROCEDURE <input type="checkbox"/>   |                    | TEST PROGRAMS          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| TEST INFORMATION                               |                    | TESTER                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| SERIAL #                                       |                    | MFG/FIELD PROCEDURE    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| BY   |                    | PACKAGING INSTRUCTIONS | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|  |                    | TOOLING                | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

| BREAK IN POINT |               |  |        | SIGNIFICANCE |  |
|----------------|---------------|--|--------|--------------|--|
| SYSTEM         | MODULE/OPTION | FIELD  | REWORK | CODE         |  |
| FIELD SERVICE  | MM11E         | DISTRIBUTED FOR FIELD SERVICE INFORMATION ONLY |        | 06           | REQ. TO MEET SPECIFICATION <input type="checkbox"/>    |
|                |               |  |        |              | PROD. IMPROVEMENT <input checked="" type="checkbox"/>  |
|                |               |  |        |              | CUSTOMER/FIELD REQ. <input type="checkbox"/>           |
|                |               |  |        |              | FACILITATE MFG. <input type="checkbox"/>               |
|                |               |  |        |              | DRAWING CORRECTION <input checked="" type="checkbox"/> |
|                |               |  |        |              | VENDOR <input type="checkbox"/>                        |

**PROBLEM**

- 1) WANTED TO IMPROVE MEMORY PERFORMANCE. STROBE AT 220 NS AS SUGGESTED IN ECO MM11E-00017 WAS TOO LATE FOR OPTIMUM PERFORMANCE
- 2) PAR 12.0 MM11E TEST PROCEDURE INCORRECT. V THRESHOLD SET TO -5.3V IS TOO LOW.

**CORRECTION**

- 1) CHANGE STROBE SETTING AS STATED IN PARAGRAPH 11.0 FROM 220 NS TO 210 NS
- 2) CHANGE TEST PROCEDURE . SET V THRESHOLD AT -5.2V

NOTE: REF. ECO MM11E-00017 PROBLEM 1. IF THE CORRECTION FOR PROBLEM (1) IN ECO MM11E-00017 WAS NOT PERFORMED IT WILL NOT BE NECESSARY TO IMPLEMENT CORRECTION (1) OF THIS ECO.

**APPROVAL**

DESIGN ENGINEER P. DURANT 3/2/71      ENG. MGR. \_\_\_\_\_

PRODUCTION ENGINEER DON CALL 3/3/71      FIELD SERVICE (ADVISORY) J. BUZYNSKI

CHIEF ENGINEER \_\_\_\_\_

DRA 111A

SEE REVERSE SIDE FOR INSTRUCTIONS

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**ENGINEERING CHANGE ORDER  
DOCUMENT & MATERIAL**

ECO NO.  
MM11E-00020  
Sheet 2 of 3

| ITEM | DOCUMENT/OR<br>PART NUMBER | OLD<br>REV | NEW<br>REV | (PART NAME)<br>DESCRIPTION OF CHANGE   | DISP<br>CODE |
|------|----------------------------|------------|------------|--|--------------|
| 1    | A-ML-MM11-E                | T          | U          | (MASTER LIST)<br>UPDATE REVISION LEVEL OF ITEM 3<br>THIS ECO   | 06           |
| 2    | A-ML-MM11-EX               | -          | A          | (MASTER LIST)<br>SAME CHANGE AS ITEM 1 THIS ECO  | 06           |
| 3    | A-SP-MM11E-11              | A          | B          | (TEST PROCEDURE)<br>SHEET 4 OF 5:<br>DELETE 220 NS IN PARAGRAPH 11.0<br>ADD 210 NS<br>DELETE -5.3V IN PARAGRAPH 12.0<br>ADD -5.2V<br>UPDATE REVISION LEVEL ON ALL SHEETS | 06           |

**DISPOSITION CODES**

|  |    |                           |    |
|--|----|---------------------------|----|
| Use up Present Stock                           | 01 | Retrofit to Break-in      | 05 |
| Use Present Stock until New<br>Stock Available | 02 | Documentation Change Only | 06 |
| Rework all Material                            | 03 | New Item Purchase         | 07 |
| Rework until New Stock<br>Available            | 04 | New Item in Stock         | 08 |
|  |    | New Item on Order         | 09 |
|  |    | Retain                    | 00 |

DRA 112A

SEE REVERSE SIDE FOR INSTRUCTIONS

FIELD SERVICE NOTES:

ECO MM1E-00020  
Page 3 of 3

**C** LEVEL OF URGENCY code

The ECO number will be posted to the EDP file with this LOU code replacing the lead # - "A" = Mandatory, High Priority  
"B" = Mandatory "C" = Applicable if symptoms are present  
"D" = Low Priority "D" = Product Improvement, Optional

**Yes** This ECO is NO CHARGE TO CUSTOMER - All DEC installation labor and materials are to be reported under a "W" charge code.

**No** This ECO is STANDARD APPLICABILITY - It is to be installed at no charge for warranty and maintenance contract customers in accordance with the technical effectivity, otherwise at customer expense.  
Charges - Documentation \$ N/C, Parts \$ NONE,  
DEC on-site labor \$ N/C. (minimum per call billing applies)  
(\* parts prices not available at the time of Speco release)

**F** FIELD DISTRIBUTION CODE

"F" = Immediate Speco distribution to all field offices  
"DF" = No general Speco distribution, only to offices where equipment is located (less than 25 units in the field)

**No** UNCONDITIONAL ECO - General distribution kits will include Field Installation Orders, Specos, Prints, and Parts.

**Yes** CONDITIONAL ECO - General distribution will include Field Installation Orders only. Prints and parts must be ordered from FSIC as required.

**No** Parts availability delay expected \_\_\_\_\_.

**Yes** The REQUIREMENT TO MEET SPECIFICATION is applicable retroactively to equipment in the field.

NOTE:



ENGINEERING  
CHANGE ORDER 8523

ORIGINATOR Richard Manion 5-2  
TEL EXT 2005 DATE 3/13/72  
DISC PROJ NO. 11 07602  
COST CENTER NO. 392 A.F.

ECO NO. MM11E-00022  
SHEET 1 OF 3  
DATE RECEIVED 3-16-72  
FIRST ISSUE 3-21-72  
FINAL ISSUE

**PROBLEM**  
Under some conditions when other options are placed along side an MM11/E they fail to operate correctly.

UNIT TO BE CHANGED

MM11/E  
Memory

DISP CODE 36

OPTIONS AFFECTED

MM11/E

**CORRECTION**

Install a module protection plate.

**BREAK-IN/EFFECTIVITY**

\*Install module protection plate only when problems occur.

PRODUCT LINES  
AFFECTED

PDP11/20

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE  | DOCUMENTATION AFFECTED   | FIELD SERVICE AFFECTED   | TYPE OF CHANGE   |
|----------|-------------------|---------|---------|-----------|--|--|--|--|
| 1.       | C-DI-MM11-E-01    | D       | E       | 06        | (Drawing Index Memory)<br>Change per this ECO.                   | <input type="checkbox"/> MODEL<br><input type="checkbox"/> DIAGNOSTICS<br><input type="checkbox"/> TECH MANUAL<br><input type="checkbox"/> TESTER<br><input type="checkbox"/> TEST PROG<br><input type="checkbox"/> TOOLING<br><input type="checkbox"/> PKG INST<br><input type="checkbox"/> ENG SPEC<br><input type="checkbox"/> PURCH SPEC | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO<br><input type="checkbox"/> Customer Change<br><input checked="" type="checkbox"/> Product Line Change | <input type="checkbox"/> ELECTRICAL<br><input checked="" type="checkbox"/> MECHANICAL<br><input type="checkbox"/> MODULE<br>ORDER PR MODEL<br><input type="checkbox"/> YES<br><input checked="" type="checkbox"/> NO |
| 2.       | 7408490           | -       | -       | 07        | (Module Protection Plate)<br>Add quantity of 1 to drawing index. |  |  |  |
| 3.       | A-ML-MM11-E       | V       | W       | 06        | Update per item 1.   |  |  |  |

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

Typewritten Name Signature  
DESIGN ENGR Pete Durant *P. Durant*  
ENG MGR (OPT) \_\_\_\_\_  
FIELD SERVICE (OPT) \_\_\_\_\_  
CHIEF ENGR (MODULES ONLY) *R. Durant*



# FIELD CHANGE ORDER

7524

FCO MM11E - D 0022  
PAGE 2 OF 2

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

### FIELD EFFECTIVITY

**MM11-E Memory Assembly**

FIELD RETROFIT IS ANTICIPATED IN 5 % 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 8 PARTS 8 DEC ON-SITE LABOR 8

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.

### FIELD OFFICE FCO DISTRIBUTION CODE

F IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES  
 DE IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT AND TO OFFICES WHERE SUBJECT EQUIPMENT IS LOCATED

### FCO KIT DISTRIBUTION

FSIC WILL INITIATE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE.  
 ~~FCO DISTRIBUTION CODES WILL BE DISBURSED~~ KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED.

### CONTENTS OF AN FSIC INITIATED KIT

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

### CONTENTS OF A FIELD ORDERED KIT

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

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

|   |   |   |   |
|---|---|---|---|
| D | H | K | W |
|---|---|---|---|

PRINT CHANGES ARE MINIMAL AND ARE TO BE MADE MANUALLY IN RED AND GREEN. FCO REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST

### INSTALLATION AND TEST PROCEDURES

- Carefully install module protection plate per FCO instructions. This requires insertion of the plate under existing wire runs which are easily broken.
- Run maindecs or other programs whose failure indicated the need for this FCO to be implemented. They should now function correctly.

### 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

### DISCRETE PROJECT NUMBER (FOR FIELD SERVICE REPORTING)

AVAILABILITY DELAY None NO PARTS

ESTIMATED DOWN TIME FOR INSTALLATION AND TESTING 1.0 HOURS

### SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

LAST PREVIOUS FCO'S C020, C016, 015

### RELATED OR PREREQUISITE FCO'S

- MAINDEC CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

### VERIFICATION MAINDECS

### PARTS REQUIRED

Q1 74-08490 Module Protection Plate

### NOTES

### FIELD SERVICE APPROVAL

Charles Dewey

*CDK*

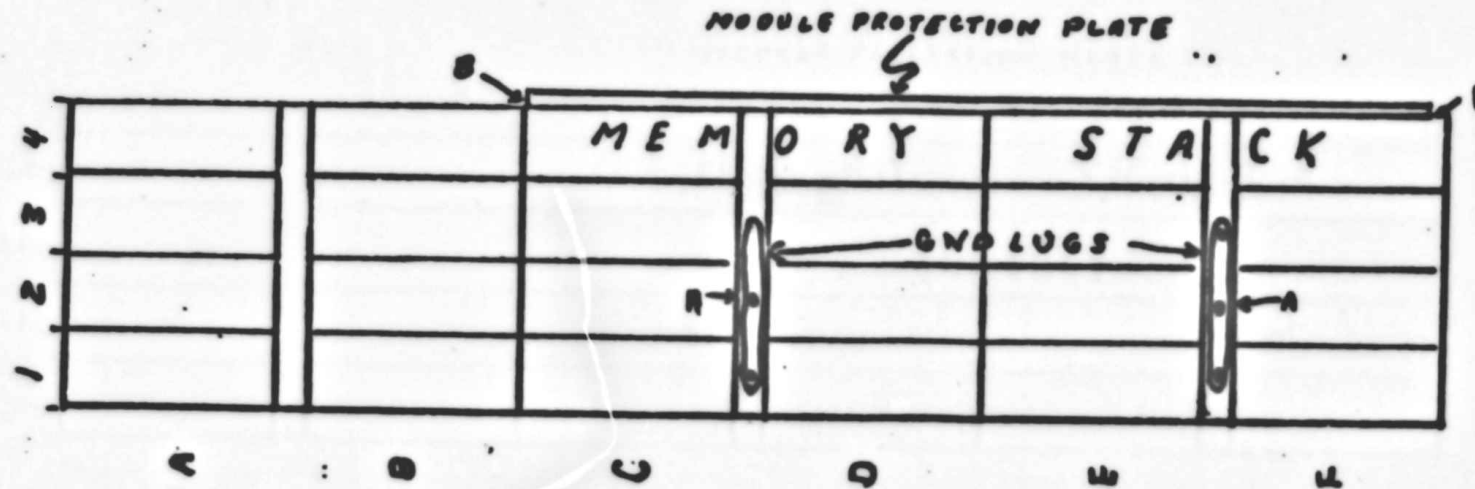
3/20 3/24 (0) 3/24 75


THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

ECO MM11E-00022  
MM11F REWORK SHEET

SHEET 2 OF 2

1. LOOSEN 2 SCREWS AT POINTS A, CARE SHOULD BE USED AT ALL TIME SO, THAT NO WIRES WILL BE DAMAGED.
2. SLIDE THE FINGERS OF THE MODULE PROTECTION PLATE UNDER THE GND LUGS. THE PROTECTION PLATE SHOULD BE RIGHT AGAINST THE WIRED ASSY. FRAME, POINTS B.
3. TIGHTEN SCREWS.



|  |                    |                     |     |
|--|--------------------|---------------------|-----|
| <br>ENGINEERING<br>CHANGE ORDER | TITLE              | DWG NO.             | REV |
|  | JRN ALYCE FUERTADO |                     |     |
| CHK'D <i>C. J. T.</i>  | DWG LOC.           | GRAPHIC DESCRIPTION |     |

digital

ENGINEERING ~~BASE~~  
CHANGE ORDER

ORIGINATOR R. Manion 1-3  
TEL EXT 2005 DATE 5-6-72  
DESC PROJ NO. D-96-6122  
COST CENTER NO. 392

A.F.

ECO NO. MM11-E-0024  
SHEET 1 OF 6  
DATE RECEIVED 5-9-72  
FIRST ISSUE 5-10-72  
FINAL ISSUE 6-26-72

**PROBLEM**  
1. STROBE Signals and TINH have too much noise on them.  
2. Read H signal has too many loads on it.

UNIT TO BE CHANGED  
MM11-E

DISP CODE 03

OPTIONS AFFECTED

MM11-E

**CORRECTION**

1. Install twisted pairs for these signals.
2. Develop another Read H signal to share the load.

**BREAK-IN/EFFECTIVITY** All MM11-E's shipped after May 12 will have this ECO.  
Rework M729 Module when necessary, all MM11-E's with this  
ECO, MUST have M729's with ECO # 9.

PRODUCT LINES  
AFFECTED

PDP-11/45  
PDP-11/20  
PDP-11/45

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE                                    | DOCUMENTATION AFFECTED               | FIELD SERVICE AFFECTED  | TYPE OF CHANGE                                 |
|----------|-------------------|---------|---------|-----------|--|--------------------------------------|---|--|
| 1        | K-WL-MM11-E-07    | D       | E       | 06        | Wire List Update   | <input type="checkbox"/> MODEL       | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO | <input checked="" type="checkbox"/> ELECTRICAL |
| 2        | D-AD-7006468-0-0  | D       | E       | 06        | Wire Ass'y MM11-E<br>See final release print.            | <input type="checkbox"/> DIAGNOSTICS | <input type="checkbox"/> Customer Charge                            | <input type="checkbox"/> MECHANICAL            |
| 3        | D-BS-MM11-E-03    | A       | B       | 06        | Core Memory stack (2 sheets)<br>See final release print. | <input type="checkbox"/> TECH MANUAL | <input checked="" type="checkbox"/> Product Line Change             | <input type="checkbox"/> MODULE                |
| 4        | A-PL-MM11-E       | Z       | AA      | 06        | UPDATE PRINT PER THIS<br>ECO.                            | <input type="checkbox"/> TESTER      |   | ORDER PR MODEL                                 |
| 5        | E-DI-MM11-E-01    | E       | F       | 06        | UPDATE PRINT PER THIS<br>ECO                             | <input type="checkbox"/> TEST PROG   |   | <input type="checkbox"/> YES                   |
| 6        | A-PL-7006468-0-0  | D       | E       | 06        | UPDATE REV PER THIS E.C.O.                               | <input type="checkbox"/> TOOLING     |   | <input type="checkbox"/> NO                    |
|          |                   |         |         |           |  | <input type="checkbox"/> PKG INST    |   |  |
|          |                   |         |         |           |  | <input type="checkbox"/> ENG 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 Pete Durant *[Handwritten Signature]*  
 ENG MGR (OPT) \_\_\_\_\_  
 FIELD SERVICE (OPT) \_\_\_\_\_  
 CHIEF ENGR (MODULES ONLY) \_\_\_\_\_



ENGINEERING CHANGE ORDER  
ADD/DELETE SHEET

ECO NO.  
MM11E-00024  
Sheet \_\_\_ of \_\_\_

WIRE LIST NO. K-WL-MM11-E-07

TITLE  
MM11E

MAKE ALL DELETIONS FIRST WHEN INSTALLING

| SIGNAL NAME | FROM PIN | TO PIN | COMPONENTS | ADD | DEL |
|-------------|----------|--------|------------|-----|-----|
| READ H      | C02V2    | D01A1  | REMARKS    |     | X   |
| READ 01 H   | C01F2    | C02C1  |            | X   |     |
| STROBE 00 H | C01F1    | D02S1  |            |     | X   |
| STROBE 01 H | C01A1    | E02S1  |            |     | X   |
| TINH 0 H    | D02E1    | E01S1  |            |     | X   |
| TINH 1 H    | E01H2    | F01F1  |            |     | X   |
| STROBE 00 H | C01F1    | D02S1  | WHT        |     | X   |
| GND         | C01C2    | D02T1  | BLK        | TWP | X   |
| STROBE 01 H | C01A1    | E02S1  | WHT        |     | X   |
| GND         | C01C2    | E03T1  | BLK        | TWP | X   |
| T 0 INH     | E01S1    | D02E1  | WHT        |     | X   |
| GND         | E01C2    | D01C2  | BLK        | TWP | X   |
| T 1 INH     | E01H2    | F01E1  | WHT        |     | X   |
| GND         | E01C2    | F01C2  | BLK        | TWP | X   |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |

digital

# FIELD CHANGE ORDER

4:5  
FCO MM11E - B 0024  
PAGE     OF    

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

FIELD EFFECTIVITY  
Retrofit all MM11-E'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.

DISCRETE PROJECT NUMBER  
(FOR FIELD SERVICE REPORTING)

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

ESTIMATED DOWN TIME 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 AND TO OFFICES WHERE SUBJECT EQUIPMENT IS LOCATED

FCO KIT DISTRIBUTION

- FSIC WILL INITIATE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE
- ~~FSIC WILL INITIATE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE~~  
KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED.

LAST PREVIOUS FCO'S D022, C020, C017  
RELATED OR PREREQUISITE FCO'S  
M729-00003

- MAINDEC CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

CONTENTS OF AN FSIC INITIATED KIT

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

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

CONTENTS OF A FIELD ORDERED KIT

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

|   |   |   |   |
|---|---|---|---|
| D | H | K | W |
|   |   |   |   |

- PRINT CHANGES ARE MINIMAL AND ARE TO BE MADE MANUALLY IN RED AND GREEN. FCO REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST.

VERIFICATION MAINDECS

INSTALLATION AND TEST PROCEDURES

PARTS REQUIRED

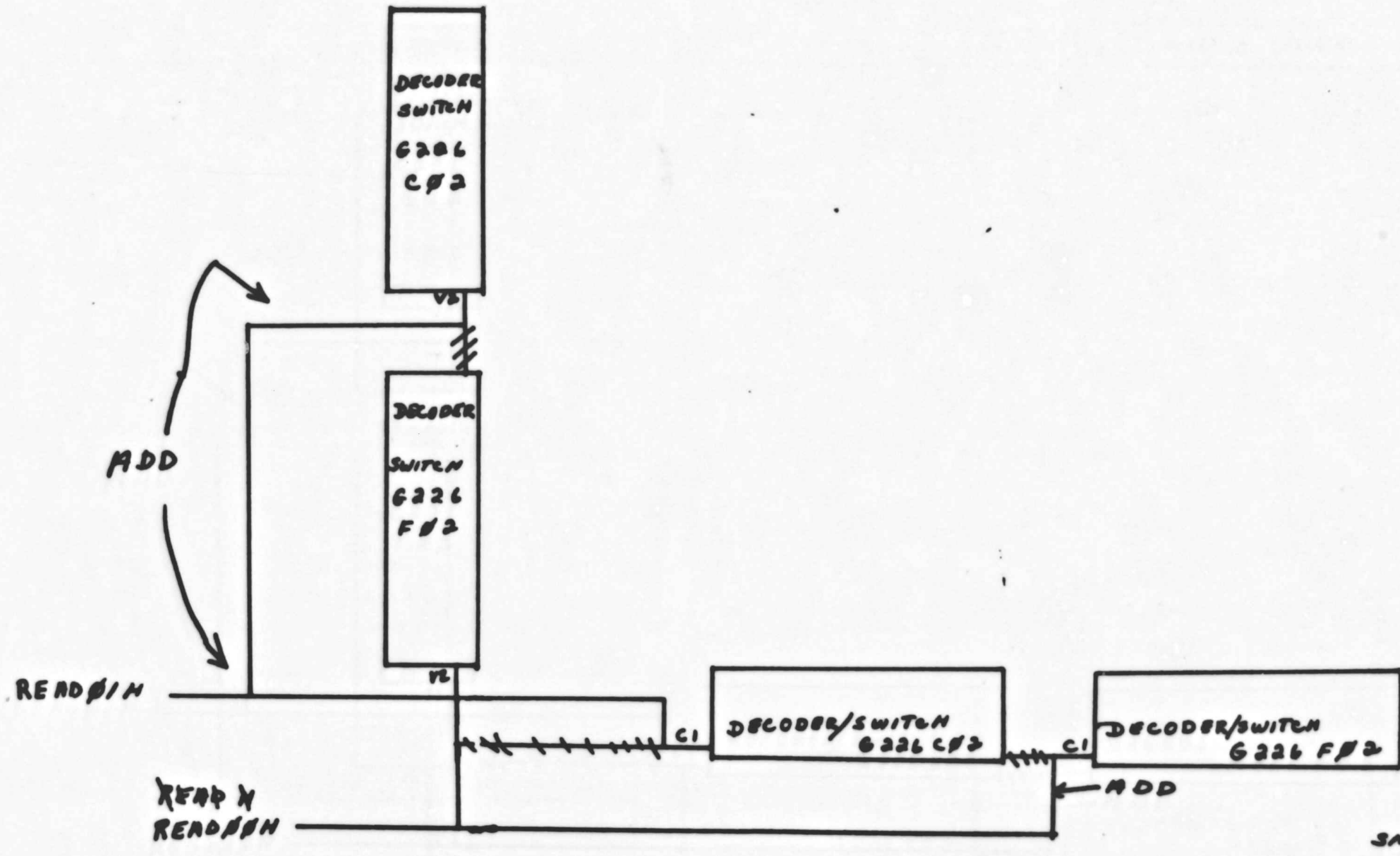
NOTES  
Necessary to improve reliability on existing units.

FIELD SERVICE APPROVAL  
Art King

5/11 5/17 (1534) 5/17 800

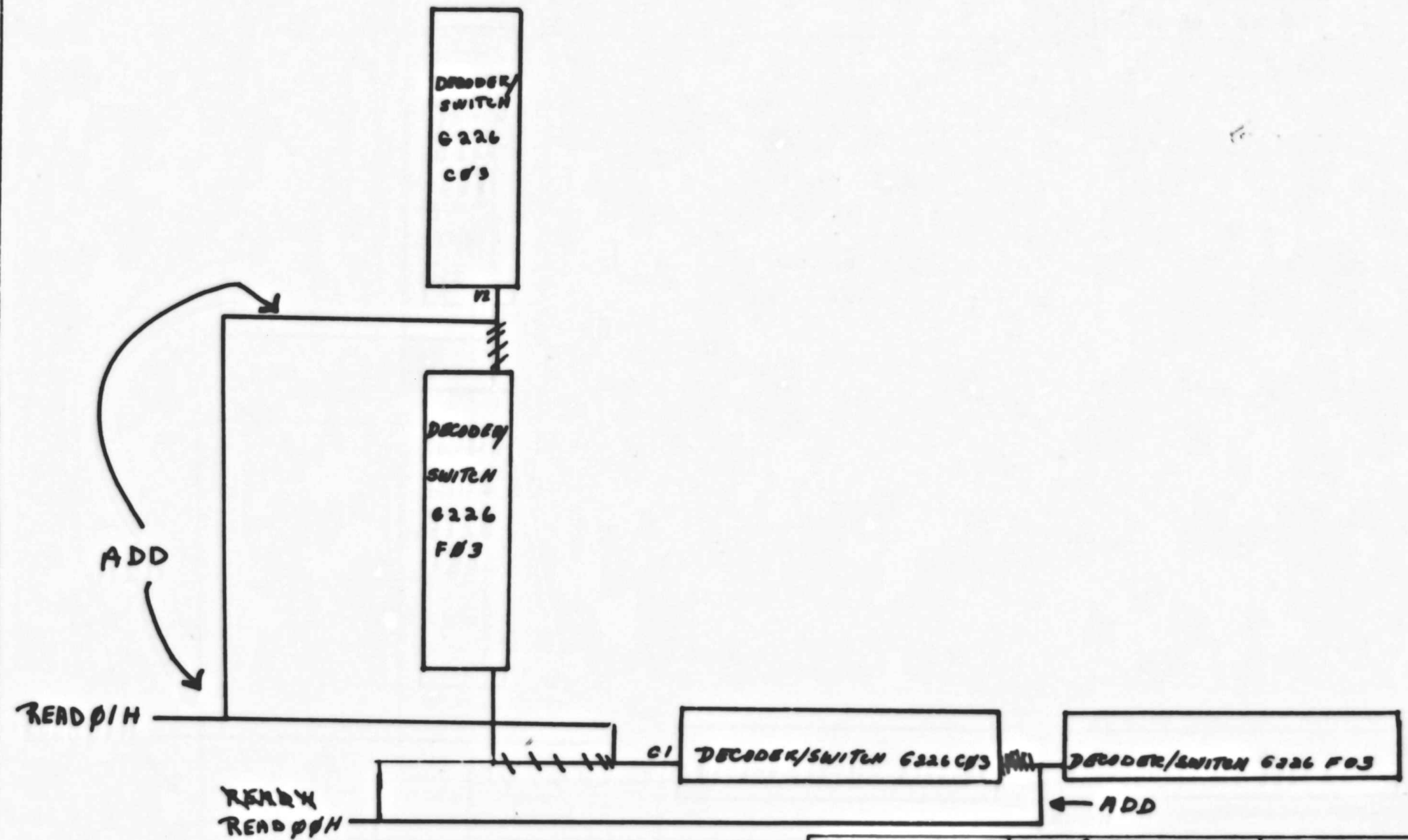
THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

A)



SHEET 192

|                          |       |                              |          |               |                     |   |
|--------------------------|-------|------------------------------|----------|---------------|---------------------|---|
| digital                  | TITLE | CONF. MEMORY STACK (X DRIVE) | DWG NO.  | D-03-MM11E-03 | REV                 | B |
|                          | URN   | <i>Ally G. Smith</i>         | CWG LOC. |               | GRAPHIC DESCRIPTION |   |
| ENGINEERING CHANGE ORDER | CHK'D | <i>Cathy</i>                 |          |               |                     |   |




SHEET 2 of 2

|         |                             |                         |                   |       |
|---------|-----------------------------|-------------------------|-------------------|-------|
| digital | CORE MEMORY STACK (Y DRIVE) |                         | NO. D-BS-MM116-03 | REV B |
|         | ENGINEERING CHANGE ORDER    | BY <i>John F. Smith</i> |                   |       |

**WIRE TABLE**

| SIGNAL NAME    | FROM PIN       | TO PIN         | COLOR      | REMARKS | SIGNAL NAME    | FROM PIN       | TO PIN         | COLOR      | REMARKS |
|----------------|----------------|----------------|------------|---------|----------------|----------------|----------------|------------|---------|
| STROBEN<br>GND | C61A1<br>C61C2 | E63E1<br>E63T1 | WHT<br>BLK | TWP     | TO INH<br>GND  | E01S1<br>E01C2 | D63E1<br>D01C2 | WHT<br>BLK | TWP     |
|                |                |                |            |         | T1 INH<br>GND  | E61N2<br>E01C2 | F01E1<br>F01C2 | WHT<br>BLK | TWP     |
|                |                |                |            |         | STROBEN<br>GND | G01E1<br>G01C2 | D03S1<br>D03T1 | WHT<br>BLK | TWP     |
|                |                |                |            |         |                |                |                |            |         |

ADD

|  |   |   |
|--|---|---|
| <br>ENGINEERING<br>CHANGE ORDER | TITLE<br><b>WIRED ASS'Y<br/>                 MM11-E</b> | DWG NO. <b>D-AD-700147-1-0</b> REV <b>E</b> |
|  | LDRN<br><b>Colin [Signature]</b>                        | ENG. LOC.                                   |

FCR

**MM11-E  
PDP-11 MEMORY  
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>G102-B0002 MAR 70</b><br/><b>G102-B0003</b><br/><b>QUICK SYNOPSIS</b><br/>8881 IC's replaced by higher speed 74H011 IC's.<br/><b>QUICK CHECK</b><br/>74H011 IC's in place of 8881 IC's.<br/><b>NEW REVISION</b><br/>Exchange with CS B or later.</p> | <p>■ <b>G103-C0005 JUN 70</b><br/><b>QUICK SYNOPSIS</b><br/>Provides increase to -8.5VDC for sense amplifiers.<br/><b>QUICK CHECK</b><br/>Heat sink ADD'ed to Q4; C1 and C2 changed from 1000mmfd to 820mmfd.<br/><b>NEW REVISION</b><br/>Rework etch D, E to CS D.</p>      |
| <p>■ <b>G103-C0002 MAR 70</b><br/><b>QUICK SYNOPSIS</b><br/>Increases system speed.<br/><b>QUICK CHECK</b><br/>7410 IC replaced by 74H10 IC.<br/><b>NEW REVISION</b><br/>Rework etch B, C to CS B.</p>   | <p>■ <b>G225-C0003 JUL 70</b><br/><b>QUICK SYNOPSIS</b><br/>Speeds stabilization of X and Y current generator reference voltage.<br/><b>QUICK CHECK</b><br/>R22 changed from 4.7K ohms to 2.2K ohms.<br/><b>NEW REVISION</b><br/>Rework etch B to CS B.</p>                  |
| <p>■ <b>G103-C0004 APR 70</b><br/><b>QUICK SYNOPSIS</b><br/>Provides new higher value trimpot.<br/><b>QUICK CHECK</b><br/>R17 changed from 100 ohm to 500 ohm trimpot.<br/><b>NEW REVISION</b><br/>Rework etch B, C to CS C.</p>                             | <p>■ <b>MM11E-C0018 AUG 70</b><br/><b>QUICK SYNOPSIS</b><br/>Provides wire table and wiring instructions to ensure correct memory margins and G102 interchangeability.</p>   |
| <p>■ <b>G102-B0004 JUN 70</b><br/><b>QUICK SYNOPSIS</b><br/>Decreases turn-off time of the 2007 transistors.<br/><b>QUICK CHECK</b><br/>C2, C7, C12, C17 changed from 1000mmfd to 820mmfd.<br/><b>NEW REVISION</b><br/>Rework etch D to CS D.</p>            | <p>■ <b>MM11E-A0015 SEP 70</b><br/><b>QUICK SYNOPSIS</b><br/>Connects AC LO L and DC LO L signal from the Power Bus to the Unibus to ensure proper Power Fail.<br/><b>QUICK CHECK</b><br/>BUS AC LO L tied to pin F1.<br/><b>NEW REVISION</b><br/>Rework to Wire List B.</p> |

**MM11-E  
PDP-11 MEMORY  
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**

- **M930-C0001 AUG 70**  
**QUICK SYNOPSIS**  
Power Fail requires BUS SP1 and BUS SP2 for AC LO and DC LO. (In-plant, new etch B at CS A.)  
**QUICK CHECK**  
R57 and R69 are 390 ohms.  
**NEW REVISION**  
Rework etch B to CS A.
- **5408475-C0008 OCT 70**  
**QUICK SYNOPSIS**  
AC LO and DC LO returns high after assertion in multiple box systems.  
**QUICK CHECK**  
D003 clamping diodes from AC LO (anode) and from DC LO to +5V line.  
**NEW REVISION**  
Rework etch A, B, C to CS D.
- **MM11E-C0017 JAN 71**  
**MM11E-C0020**  
**QUICK SYNOPSIS**  
Improves memory performance.  
**QUICK CHECK**  
Wire ADD B04F2 to A03S2.
- **M729-C0002 JAN 71**  
**QUICK SYNOPSIS**  
Reduces memory cycle time on systems with 8K interleaved memory. (In-plant, new etch C.)  
**QUICK CHECK**  
Wire ADD E9 pin 2 to feed-thru near E5 pin 1.  
**NEW REVISION**  
Rework etch B to CS B.
- **M1091-C0001 MAR 71**  
**QUICK SYNOPSIS**  
Provides 1 unit load on BUS in systems with 16K or more memory.  
**QUICK CHECK**  
M1091 replaced M109 module.  
**NEW REVISION**  
Rework etch B to CS A.
- **G102-B0008 APR 71**  
**QUICK SYNOPSIS**  
Eliminates MM11-F's noise susceptibility.  
**QUICK CHECK**  
C3, C8, C13, C18 changed from 33mmfd to 120mmfd.  
**NEW REVISION**  
Rework etch D to CS D.
- **G225-C0007 MAY 71**  
**QUICK SYNOPSIS**  
Prevent heat sinks from shorting to etch.  
**QUICK CHECK**  
Insulating washers under heat sinks.
- **M7290-C0002 OCT 71**  
**QUICK SYNOPSIS**  
Prevents Unibus hang with SSYN asserted from memory. (In-plant, new etch E.)  
**QUICK CHECK**  
Wire ADD E8 pin 5 to E7 pin 9.  
**NEW REVISION**  
Rework etch C to CS D.
- **MM11E-D0022 MAR 77**  
**QUICK SYNOPSIS**  
Module protection plate prevents MM11-E noise interaction with adjacent modules.  
**QUICK CHECK**  
Presence of protection plate.
- **MM11E-B0024 MAY 72**  
**QUICK SYNOPSIS**  
Reduces noise on TINH and strobe signals.  
**QUICK CHECK**  
Wire ADD C01F1 to D02S1/C01C2 to D02T1.  
**NEW REVISION**  
Rework to Wire List E.

**MM11-E  
PDP-11 MEMORY  
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**

■ **M729-C0003 MAY 72**  
**M729-D0004**  
**QUICK SYNOPSIS**  
Unibus hangs with Ssyn asserted from  
memory.  
**QUICK CHECK**  
Wire ADD E5 pin 8 to E3 pin 1.  
**NEW REVISION**  
Rework etch B. C to CS C.

■ **M7290-C0003 MAY 72**  
**QUICK SYNOPSIS**  
Reduced inductance of the TINH H etch cor-  
rects noise condition. (In-plant, new etch F.)  
**QUICK CHECK**  
Wire ADD E11 pin 8 to feed-thru going to  
AR1.  
**NEW REVISION**  
Rework etch C. D to CS E.

FCR Page 3. Revision ""

H)

**ECO  
QUICK CHECK**

MM11-E/F FIELD CODED ECO's

|        |                              |
|--------|------------------------------|
| G102   | B2, B3, C4, B6               |
| G103   | C2, C4, C5, C7               |
| G225   | C3, C7                       |
| G226   | C4                           |
| M729   | B2, C3 & A & B               |
| M1091  | C1                           |
| M7290  | C2, C3                       |
| MM11-E | C15, C16, C17, C20, D22, B24 |
| MM11-F | D1, C3                       |

MM11-E/F ECO PARTS

| <u>NAME</u> | <u>ECO#</u> | <u>QTY</u> | <u>PART NUMBER</u> | <u>COMMENTS &amp; DESCRIPTION</u> |
|-------------|-------------|------------|--------------------|-----------------------------------|
| G102        | #2          | 1          | 19-09849           | I.C.                              |
|             | #3          | 8          | 13-03064           | Resistor                          |
|             | #4          | 4          | 10-00027           | Capacitor                         |
|             |             | 4          | 13-09995-0         | Resistor                          |
|             |             | 1          | 16-09996-0         | Indicator                         |
|             | #6          | 4          | 10-00018           | Capacitor                         |
| G103        | #2          | 3          | 19-09057           | I.C.                              |
|             | #4          | 1          | 13-05631           | Resistor                          |
|             | #5          | 2          | 13-02602           | Resistor                          |
|             |             | 2          | 13-09994-0         | Resistor                          |
|             |             | 1          | 13-00295           | Resistor                          |
|             |             | 2          | 10-00027           | Capacitor                         |
|             |             | 1          | 11-09991           | Diode                             |
|             |             | 1          | 11-09990           | Diode                             |
|             |             | 1          | 16-09996-0         | Conductor                         |
|             |             | 1          | 12-10001-0         | Heat sink                         |
|             | #7          | 1          | 10-10274           | Capacitor                         |
| G225        | #3          | 1          | 13-00417           | Resistor                          |
|             | #7          | 4          | 90-08493           | Washers                           |
|             |             | A/R        | 90-08268           | Thermal compound                  |
| G226        | #4          | 1          | 10-10274           | Capacitor                         |
| M792        | #3          | 1          | 19-05547           | I.C.                              |
| M1091       | #1          | 1          | M1091 etch "B"     | if applicable module              |
| MM11-F      | #1          | 1          | 74-08490           | Memory shield                     |
| MM11-E      | #2          | 1          | 74-08490           | Memory shield                     |

MM11-E/F PARTS BREAKDOWN

|          |                                |
|----------|--------------------------------|
| 7006405  | - Logic Frame                  |
| 7006468  | - MM11-E Wired assembly        |
| 70007263 | - MM11-F Wired assembly        |
| G102     | - Sense Inhibit Card           |
| G103     | - Memory Levels & Gates        |
| G225     | - X-Y Current Generator        |
| G226     | - X-Y Current Generator        |
| H207     | - 4K 16 Bit Core Memory Stack  |
| M109     | - Device Select                |
| M729     | - MM11-E Control Logic         |
| M1091    | - Device Select                |
| M7290    | - Control Logic & Timing       |
| MM11-E   | - 4K Single Memory Unit        |
| MM11-EX  | - 4K Interleaved               |
| MM11-F   | - 4K Single Memory Unit        |
| MM11-FP  | - Single Parity Memory Unit    |
| MM11-FX  | - Interleaved Memory (jumpers) |

REVISION DATE APRIL 1976

| MM11-E MEMORY |              | ETCH | OPTION  | OPTION SERIAL# | PDP  | SYSTEM SERIAL # | LOCATION | CAB            | BOX               | SYS. UNIT        | SLOT                | IPB            | PAGE 1 OF 2 |
|---------------|--------------|------|---------|----------------|--|-----------------|----------|----------------|-------------------|------------------|---------------------|----------------|-------------|
| ECO           | RELEASE DATE | CS   | ETCH WL | ECO HRS. TIME  | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 | QTY      | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME     |
| 00002         | 01/70        |      | A       |                | Jumper D01-B1 to E01-E1  |                 |          | NIL            |                   |                  |                     |                |             |
| 00003         | 01/70        |      |         |                | Black wire of twisted pair from C02-C2 to E03-C2   |                 |          | NIL            |                   |                  |                     |                |             |
| 00006         | 02/70        |      | B       |                | Jumper A01-S2 to A04-S2  |                 |          | NIL            |                   |                  |                     |                |             |
| C 00015       | 09/70        |      | C       |                | <u>NOTE:</u> 1) Rework multiple box systems only<br>2) Must have ECO 5408475-00006 and M930-00001<br>Jumper A03-S2 to B04-F2 |                 |          | NIL            |                   |                  |                     |                |             |
| C 00016       | 12/70        |      |         | 1.5            | Blue jumper from E01-C1 to E01-E2 looping through logic  |                 |          | NIL            |                   |                  |                     |                |             |
| C 00017       | 01/71        |      | D       |                | Jumper B04-F1 to A03-R2  |                 |          | NIL            |                   |                  |                     |                |             |
| C 00020       | 03/71        |      |         |                | <u>NOTE:</u> F/S information regarding strobe and threshold level settings   |                 |          | NIL            |                   |                  |                     |                |             |
| D 00022       | 04/71        |      |         | 1.0            | A module protection plate along MM11-E memory bank   |                 | 1        | 74-08490       |                   |                  |                     |                |             |
| B 00024       | 06/72        |      | E       | 1.0            | <u>NOTE:</u> Must have ECO M729 #3<br>Black wire of twisted pair from E01-C2 to F01-C2.                                      |                 |          | NIL            |                   |                  |                     |                |             |

EVEN

ODD

m7

| MM11-E |              | MEMORY |            | ETCH                | OPTION                                    | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION          | CAB                  | BOX                    | SYS. UNIT                 | SLOT              | IPB        | PAGE<br>2 OF 2 |
|--------|--------------|--------|------------|---------------------|---|-----------------|-----|-----------------|-------------------|----------------------|------------------------|---------------------------|-------------------|------------|----------------|
| ECO    | RELEASE DATE | CS     | ETCH<br>WL | ECO<br>HRS.<br>TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO |                 |     | QTY             | PARTS<br>REQUIRED | MAINDECS<br>REQUIRED | PRINT<br>SET<br>UPDATE | ACTUAL<br>INSTALL<br>TIME | DATE<br>INSTALLED | CE<br>NAME |                |
| 00025  | 05/76        |        |            |                     | NOTE: Documentation change                |                 |     |                 | NIL               |                      |                        |                           |                   |            |                |

| MM11-F 4K 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 WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO                             | QTY.            | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME  |      |     |             |
| D 00001                 | 3/72         |    |         | 1.0           | A module protection plate along each MM11-F bank.                     | 1               | 74-08490       |                   |                   |                     |                |          |      |     |             |
| 00002                   | 5/72         |    |         |               | <u>NOTE:</u> Print update of test procedure                           |                 | Nil            |                   |                   |                     |                |          |      |     |             |
| C 00003                 | 8/72         |    | A       | 1.0           | <u>NOTE:</u> Must have ECO M7290-C0003<br>Red jumper C01-C2 to E01-T1 |                 | Nil            |                   |                   |                     |                |          |      |     |             |

EVEN

REVISION DATE JULY/77

| G102 SENSE INHIBIT CARD |              |    |         | ETCH          | OPTION  | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION                                  | CAB               | BOX               | SYS UNIT            | SLOT           | IPB     | PAGE<br>1 OF 1 |
|-------------------------|--------------|----|---------|---------------|---|-----------------|-----|-----------------|---|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                     | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   |                 |     | QTY             | PARTS REQUIRED                            | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |                |
| 00001                   | 3/70         |    | C       |               | <u>NOTE:</u> Documentation change   |                 |     |                 | Nil                                       |                   |                   |                     |                |         |                |
| B 00002                 | 3/70         | B  | D       | 0.5           | E5 is a DEC I.C. <u>74H01-1</u><br>E5 is the 1st I.C. from AS1  |                 |     | 1               | 19-09849                                  |                   |                   |                     |                |         |                |
| B 00003                 | 4/70         | B  | D       |               | <u>NOTE:</u> Supplement to ECO # 2<br>R4 is a <u>75</u> ohm 1/8W resistor<br>R4 is the 1st resistor from AA1                                  |                 |     | 8               | 13-03064                                  |                   |                   |                     |                |         |                |
| C 00004                 | 6/70         | C  | D       | .5            | R2 is a <u>56</u> ohm 1/4W 5% resistor<br>R2 is the 1st resistor above E2<br>E2 is a DEC transformer  |                 |     | 4<br>4<br>1     | 10-00027<br>13-09995-0<br>16-09996-0      |                   |                   |                     |                |         |                |
| 00005                   | 6/71         |    | D       |               | <u>NOTE:</u> See ECO # B6   |                 |     |                 | Nil                                       |                   |                   |                     |                |         |                |
| B 00006                 | 4/71         | D  | D       | .25           | C3 is a <u>120</u> MMF 5% capacitor<br>C3 is the closest capacitor from AA1   |                 |     | 4               | 10-00018                                  |                   |                   |                     |                |         |                |
| 00007                   | 06/77        | E  | D       |               | <u>NOTE:</u> 1) PHASE IN DEC 7438 TO REPLACE<br>74H01-1 AT E5<br>2) CHANGES FCO #2<br>E5 IS A <u>DEC 7438</u><br>E5 IS THE LAST I.C. FROM AS1 |                 |     | 1<br>OR<br>1    | 19-0949-00<br>19-11219-01<br>(SEE ECO #7) |                   |                   |                     |                |         |                |

| 3103 MEMORY LEVELS & GATES |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL #                      | LOCATION  | CAB               | BOX               | SYS UNIT            | SLOT           | IPB     | PAGE<br>1 OF 1 |
|----------------------------|--------------|----|---------|---------------|--|-----------------|-----|--------------------------------------|---|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                        | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY                                  | PARTS REQUIRED  | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |                |
| 00001                      | 1/70         | A  | A       |               | <u>NOTE:</u> Print update  |                 |     |                                      | N/A   |                   |                   |                     |                |         |                |
| C 00002                    | 3/70         | B  | A       | .5            | E2 is a I.C. DEC 74H10<br>E2 is the 1st i.c. from AH1  |                 |     | 3                                    | 19-09057  |                   |                   |                     |                |         |                |
| 00003                      | 3/70         |    | A       |               | <u>NOTE:</u> Print update  |                 |     |                                      | N11   |                   |                   |                     |                |         |                |
| C 00004                    | 4/70         | C  | A       | .25           | R17 is a 500 ohm trim pot<br>R17 is located in bottom left corner  |                 |     | 1                                    | 13-05631  |                   |                   |                     |                |         |                |
| C 00005                    | 6/70         | D  | A       | 1.0           | R1, R2 are 56 ohm, 1/4W, 5% resistors<br>R1 & R2 are the two resistors just right of R4<br>R4 is the 10W resistor nearest the top right corner |                 |     | 2<br>2<br>1<br>2<br>1<br>1<br>1<br>1 | 13-02602<br>13-09994-0<br>13-00295<br>10-00027<br>11-09991<br>11-09990<br>16-09996-0<br>12-100001-0 |                   |                   |                     |                |         |                |
| 00006                      | 2/71         | E  | A       |               | <u>NOTE:</u> Print change  |                 |     |                                      | N11   |                   |                   |                     |                |         |                |
| C 00007                    | 1/72         | F  | A       | .25           | C11 is a .22 mfd 50V capacitor<br>C11 is the only capacitor left of the two transistors at AC1   |                 |     | 1                                    | 10-10274  |                   |                   |                     |                |         |                |

| G225 X - Y CURRENT GENERATOR |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION                                   | CAB               | BOX               | SYS UNIT            | SLOT           | IPB     | PAGE<br>1 OF 1 |
|------------------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|--|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                          | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY             | PARTS REQUIRED                             | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |                |
| C 00003                      | 7/70         | B  | B       | 1.0           | R22 is a <u>2.2K</u> $\frac{1}{2}$ W 5% resistor<br>R22 is the 3rd resistor from bottom left corner                        |                 |     | 1               | 13-00417                                   |                   |                   |                     |                |         |                |
| 00004                        | 7/70         | C  | C       |               | R5 is a <u>680</u> ohm $\frac{1}{2}$ W 5% resistor<br>R5 is the 1st resistor from AA1                                      |                 |     | 4               | 12-02313                                   |                   |                   |                     |                |         |                |
|                              |              |    |         |               |  |                 |     | 4               | 13-00347                                   |                   |                   |                     |                |         |                |
|                              |              |    |         |               |  |                 |     | 4               | 13-00394                                   |                   |                   |                     |                |         |                |
| 00005                        | 8/70         | C  |         |               | <u>NOTE:</u> Print change  |                 |     |                 | Nil  |                   |                   |                     |                |         |                |
| 00006                        | 9/70         | D  | D       |               | <u>NOTE:</u> New etch rev  |                 |     |                 | Nil  |                   |                   |                     |                |         |                |
| C 00007                      | 5/71         | E  | D       | 1.0           | <u>NOTE:</u> Rework only "D" etch boards<br>Insulating washers on all four heat sinks<br>are tight and can not be rotated. |                 |     | 4               | 90-08493<br>90-08268<br>(thermal compound) |                   |                   |                     |                |         |                |

| G226 X - Y DECODER SWITCH  |              |    |         | 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<br>CAUTION - NOT COMPLETE ECO   |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE MAY |             |
| 00001                      | 11/69        | A  | C       |               | C22 is a .1ufd 50V capacitor<br>C22 is below the two 1/4W resistors on board which are separated by a capacitor   |                 |     |                 | N/A            |                   |                   |                     |                |        |             |
| 00002                      | 3/70         | B  | C       |               | NOTE: Documentation   |                 |     |                 | Nil            |                   |                   |                     |                |        |             |
| 00003                      | 3/70         | C  | C       |               | Resistor closest to the bottom left corner is a 120 ohm 1/4W 5% resistor  |                 |     |                 | N/A            |                   |                   |                     |                |        |             |
| <b>C</b> 00004<br>6A<br>6B | 11/71        | D  | D       | 0.5           | C22 is a .22 ufd 50V capacitor<br>C22 is below the two 1/4W resistors on board which are separated by a capacitor |                 |     | 1               | 10-10274       |                   |                   |                     |                |        |             |

| M109 |              | DEVICE SELECT |         | 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<br>CAUTION - NOT COMPLETE ECO |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| NONE |              |               |         |               | NOTE: NO ECO's                            |                 |     |                 |                |                   |                  |                     |                |         |             |

| M729 M11-E Control Logic |                |    |         | 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<br>CAUTION - NOT COMPLETE ECO  |                |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED       | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| 00001                    | 03/70          | A  | B       |               | NOTE: 1) New etch rev<br>2) Rework Etch "A" Revs<br>E5 is aDEC I.C. 74 H 74  |                |     |                 | N/A            |                         |                  |                     |                |         |             |
| B 00002                  | 01/71          | B  | C       | 1.0           | NOTE: 1) Must be installed in interleaved memories and optional for non-interleaved memory<br>2) Rework etch "B" rev only<br>(ECO #3 has better rework instructions)<br>No capacitor between the 270 OHM and 390 OHM resistors located near the upper left hand corner |                |     |                 | NIL            |                         |                  |                     |                |         |             |
| C 00003<br>6A<br>6B      | 06/72<br>01/73 | C  | C       | 1.5           | NOTE: ECO# 3 contains ECO #2 & #3 rework instructions for all etch revs<br>Measure an open CKT from E04-09 to E09-01<br>E09 is the 4th I.C. from AK1   |                |     | 1               | 19-05547       | DZQGQ<br>DZQCA<br>DZQKB |                  |                     |                |         |             |

| M1091 DEVICE SELECT |              |    |         |               | ETCH  | OPTION | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION                             | CAB               | BOX               | SYS UNIT            | SLOT           | IPB     | PAGE<br>1 OF 1 |
|---------------------|--------------|----|---------|---------------|---|--------|-----------------|-----|-----------------|--------------------------------------|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                 | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   |        |                 |     | QTY.            | PARTS REQUIRED                       | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |                |
| C 00001             | 3/71         | *  | A       | N/A           | NOTE: MM11-E systems<br>M1091 module if 16K of memory or more   |        |                 |     | 1               | M1091 etch<br>"B" (if<br>applicable) |                   |                   |                     |                |         |                |
| 00002               | 3/71         | A  | B       |               | NOTE: MM11-E, MM11-F and MMR11-E<br>memory systems phase in M1091<br>modules.<br>Check for M1091 module |        |                 |     | 1               | M1091<br>Etch "B"                    |                   |                   |                     |                |         |                |

| M7290 CONTROL AND LOGIC |              |    |                  | ETCH          | OPTION  | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION       | CAB                 | BOX               | SYS. UNIT           | SLOT           | IPB     | PAGE<br>1 OF 1 |
|-------------------------|--------------|----|------------------|---------------|---|-----------------|-----|-----------------|----------------|---------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                     | RELEASE DATE | CS | ETCH WL          | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED   | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CB NAME |                |
| 00001                   | 2/71         | C  | D                |               | Jumper E06-06 to E31-10 feed through E6 is the 3rd I.C. from AL1<br>E31 is the last I.C. on board |                 |     |                 | Nil            |                     |                   |                     |                |         |                |
| C 00002                 | 9/71         | D  | E<br>D<br>C      | 2.0           | NOTE: Rework "C" & "D" etch boards<br>Jumper E03-03 to T07-10 feed through                        |                 |     |                 | Nil            |                     |                   |                     |                |         |                |
| C 00003                 | 8/72         | E  | F<br>E<br>D<br>C | 4.0           | NOTE: 1) Must have ECO MM11-F-C0003<br>2) Rework all previous etch boards<br>Jumper E02-08 to AC1 |                 |     |                 | Nil            | DZMMA thru<br>DZMMI |                   |                     |                |         |                |
| 00004                   | /77          | F  | F<br>E<br>D<br>C |               | NOTE: DEC 74H01-1 DIRECT SUBSTITUTION<br>TO DEC 7438<br>E IS A DEC 7438<br>E IS                   |                 |     |                 | NIL            |                     |                   |                     |                |         |                |

MM11-F

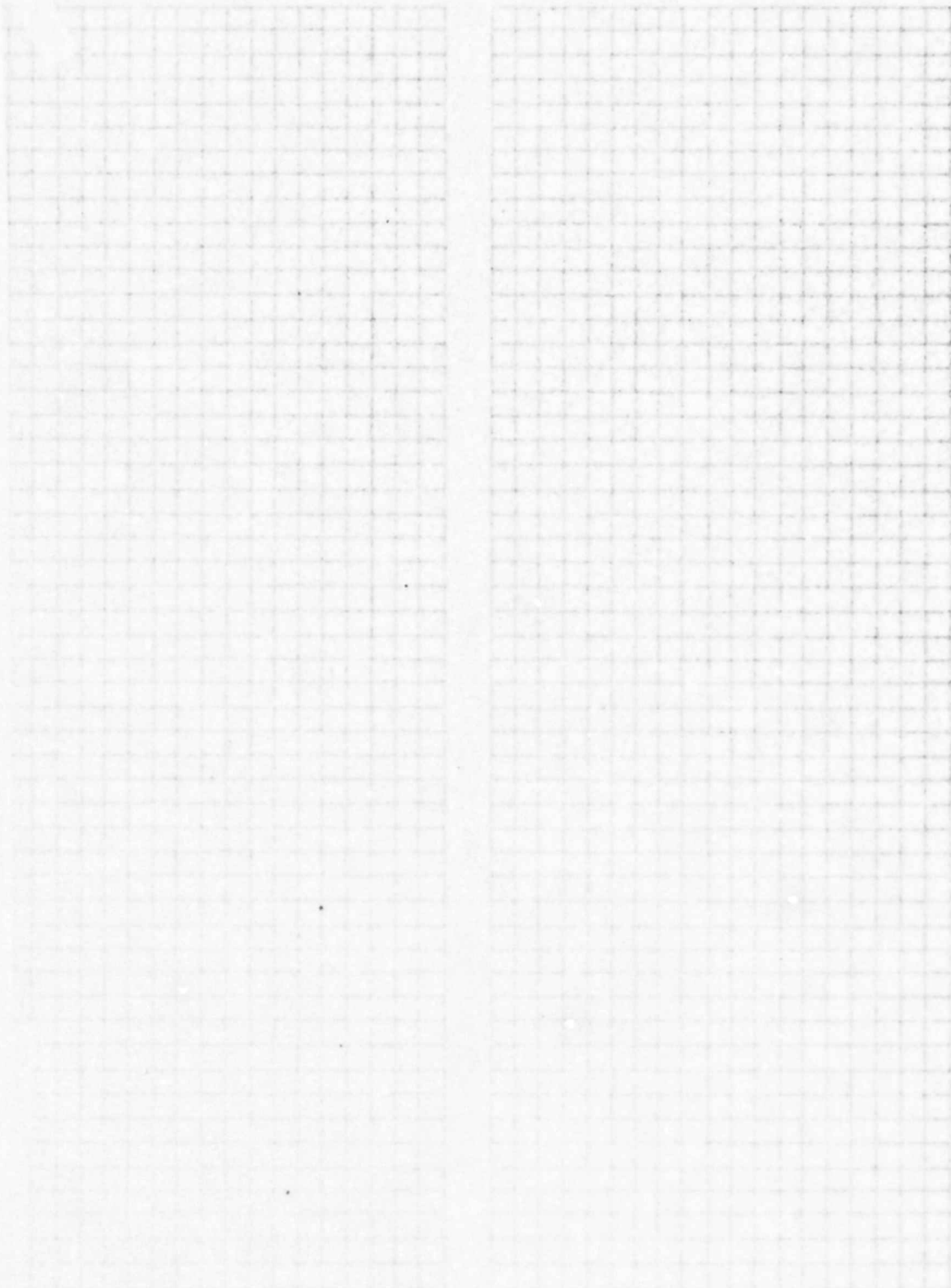
DOOL

2358 R624  
**PROCESSOR TYPE PDP-11**

**MM11F-00001 CODE: DF ML: A**  
MAR 72 PROBLEM Under some conditions, when other options are placed along side an MM11F, they fail to operate correctly  
CORRECTION Install a module protection plate  
In plant effectivity All MM11F as required  
Field effectivity All MM11F as required  
Time To Install And Test 10 Hours  
Kit Contents PCO/Prints And Parts

**MM11F-00002 CODE: P ML: B**  
APR 72 PROBLEM 1 MM11F Test Procedure needs updating  
CORRECTION 1 Update Test Procedure  
PROBLEM 2 MM11FX print sets are the same as MM11F  
CORRECTION 2 Obsolete old MM11FX Master Drawing list Use New Master Drawing list format on MM11F to include MM11FX  
In plant effectivity as documentation change only

**MM11F-00003 CODE: F ML: D WL: A**  
MAY 72 PROBLEM 1 Strobe signals and TSNH have too much noise on them  
CORRECTION 1 Install twisted pairs on strobe signals generate another TSNH signal and install twisted pairs on these signals  
PROBLEM 2 READ H signal has too many loads on it  
CORRECTION 2 Develop another READ H signal to share the load  
CORRECTION 3 Solves memory problems caused by DMA transfers that memory diagnostics don't show up Also solves not sensitive G100, G102 problems  
In plant effectivity Rework immediately  
Field effectivity Retrofit all MM11F  
Time To Install And Test 10 Hour  
Kit Contents PCO/Prints



FCCO'S



ENGINEERING  
CHANGE ORDER 8524

ORIGINATOR Richard Manion 5-2  
TEL EXT 2005 DATE 3/13/72  
DISC PROJ NO. 11 07602  
COST CENTER NO. 392

J.S.

ECO NO. MM11F-0001  
SHEET 1 OF 5  
DATE RECEIVED 3-16-72  
FIRST ISSUE 3-20-72  
FINAL ISSUE

**PROBLEM**  
Under some conditions when other options are placed along side an MM11/F they fail to operate correctly.

UNIT TO BE CHANGED

MM11/F  
Memory

DISP CODE \*

OPTIONS AFFECTED

MM11/F

**CORRECTION**  
Install a module protection plate.

**BREAK-IN/EFFECTIVITY**  
\*Install module protection plate only when problems occur.

PRODUCT LINES AFFECTED

PDP11/20

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE  | DOCUMENTATION AFFECTED   | FIELD SERVICE AFFECTED   | TYPE OF CHANGE   |
|----------|-------------------|---------|---------|-----------|--|--|--|--|
| 1.       | A-PL-MM11-F-0     | 0       | A       | 06        | (Memory Assembly MM11/F)<br>Change per this ECO.                 | <input type="checkbox"/> MODEL<br><input type="checkbox"/> DIAGNOSTICS<br><input type="checkbox"/> TECH MANUAL<br><input type="checkbox"/> TESTER<br><input type="checkbox"/> TEST PROG<br><input type="checkbox"/> TOOLING<br><input type="checkbox"/> PKG INST<br><input type="checkbox"/> ENG SPEC<br><input type="checkbox"/> PURCH SPEC | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO<br><input type="checkbox"/> Customer Charge<br><input checked="" type="checkbox"/> Product Line Charge | <input type="checkbox"/> ELECTRICAL<br><input checked="" type="checkbox"/> MECHANICAL<br><input type="checkbox"/> MODULE<br>ORDER PR MODEL<br><input type="checkbox"/> YES<br><input checked="" type="checkbox"/> NO |
| 2.       | 7408490           | -       | -       | 07        | (Module Protection Plate)<br>Add quantity of 1 to drawing index. |  |  |  |
| 3.       | A-ML-MM11-F       | 0       | A       | 06        | Update per item 1.   |  |  |  |

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

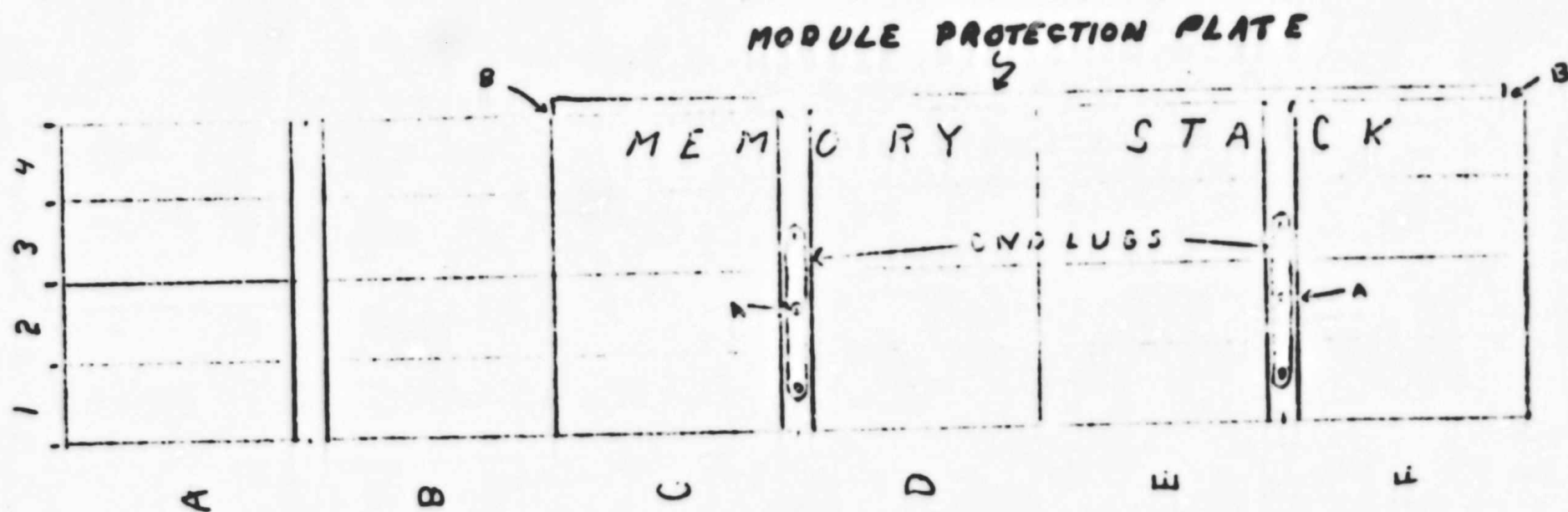
APPROVAL SIGNATURES

DESIGN ENGR Pete Durant *Pete Durant*  
ENG MGR (OPT) \_\_\_\_\_  
FIELD SERVICE (OPT) \_\_\_\_\_  
CHIEF ENGR (MODULES ONLY) *Pete Durant*

ECO MMIF  
MMIF REWORK SHEET

SHEET 2 OF 3

1. LOOSEN 2 SCREWS AT POINTS A, CARE SHOULD BE USED AT ALL TIME SO THAT NO WIRES WILL BE DAMAGED.
2. SLIDE THE FINGERS OF THE MODULE PROTECTION PLATE UNDER THE END LUGS. THE PROTECTION PLATE SHOULD BE RIGHT AGAINST THE WIRED ASSY. FRAME, POINTS B.
3. TIGHTEN SCREWS.





# FIELD CHANGE ORDER

FCO MM11F - D 0001PAGE 1 OF 3

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

**FIELD EFFECTIVITY**

MM11-F Memory Assembly

FIELD RETROFIT IS ANTICIPATED IN 5 % 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.

**FIELD OFFICE FCO DISTRIBUTION CODE** F IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES DF IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT AND TO OFFICES WHERE SUBJECT EQUIPMENT IS LOCATED**FCO KIT DISTRIBUTION** FSIC WILL INITIATE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE. ~~FIELD INSTALLATION ORDERS FROM FSIC WILL BE DISBURSED~~ KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED.**CONTENTS OF AN FSIC INITIATED KIT**

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

**CONTENTS OF A FIELD ORDERED KIT**

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

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

|   |   |   |   |  |  |
|---|---|---|---|--|--|
| D | H | A | W |  |  |
|---|---|---|---|--|--|

 PRINT CHANGES ARE MINIMAL AND ARE TO BE MADE MANUALLY IN RED AND GREEN. FCO REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST.**INSTALLATION AND TEST PROCEDURES**

- Carefully install module protection plate per FCO instructions. This requires insertion of the plate under existing wire runs which can be easily broken.
- Run maindecs or other programs whose failure indicated the need for this FCO to be implemented. They should now function correctly.

**NOTES**FIELD SERVICE APPROVAL  
Charles Dewey**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

**DISCRETE PROJECT NUMBER (FOR FIELD SERVICE REPORTING)**

| AVAILABILITY DELAY | NO PARTS |
|--------------------|----------|
| PARTS None         |          |

ESTIMATED DOWN TIME FOR INSTALLATION AND TESTING 1.0 HOURS

SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

LAST PREVIOUS FCO'S None

RELATED OR PREREQUISITE FCO'S

- MAINDEC CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

VERIFICATION MAINDECS

**PARTS REQUIRED**

Q\* 74-08490 Module Protection Plate

THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

*CDK*  
3/20 3/24 (?) 3/24 75

**digital****ENGINEERING  
CHANGE ORDER**ORIGINATOR Richard Manion  
TEL EXT 2005 DATE 5/10/72  
DISC PROJ NO. 96 06122  
COST CENTER NO. 392ECO NO. MM11F-00003  
SHEET 1 OF \_\_\_\_\_  
DATE RECEIVED 5-12-72  
FIRST ISSUE 5-15-72  
FINAL ISSUE 7-4-72**PROBLEM**

1. Strobe signals and TINH have too much noise on them.
2. Read H signal has too many loads on it.
3. Solves memory problems caused by DMA transfers that memory diagnostics don't show up, also, solves slot sensitive G103, G102 problems.

**UNIT TO BE CHANGED**

MM11/F

DISP CODE 03

**OPTIONS AFFECTED**

MM11/F

**CORRECTION**

1. Install twisted pairs on strobe signals, generate another TINH signal and install twisted pairs on these signals.
2. Develop another Read H signal to share the load.

**BREAK-IN/EFFECTIVITY**

All MM11/F's shipped after May 31 will have this ECO.  
Rework M7290 module when necessary, all MM11/F's with this ECO have to have M7290's with ECO #3.

**PRODUCT LINES  
AFFECTED**PDP11/15  
PDP11/20  
PDP11/45

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE                                    | DOCUMENTATION AFFECTED               |
|----------|-------------------|---------|---------|-----------|--|--------------------------------------|
| 1        | K-WL-MM11-F-07    | -       | A       | 06        | Update wire list.  | <input type="checkbox"/> MODEL       |
| 2        | A-PL-MM11-F-0     | A       | B       | 06        | Update Rev. per this ECO.                                | <input type="checkbox"/> DIAGNOSTICS |
| 3        | A-ML-MM11-F       | C       | D       | 06        | Update.  | <input type="checkbox"/> TECH MANUAL |
| 4        | D-AD-7007263-0-0  | -       | A       | 06        | Wire Ass'y MM11/F.<br>See final release print.           | <input type="checkbox"/> TESTER      |
| 5        | D-BS-MM11-F-03    | -       | A       | 06        | Core memory stack (2 sheets)<br>See final release print. | <input type="checkbox"/> TEST PROG   |
| 6        | A-PL-7007263-0-0  | -       | A       | 06        | Update revision level.                                   | <input type="checkbox"/> TOOLING     |

**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**

Typewritten / Hand Signature  
 DESIGN ENGR Pete Durant  
 ENG MGR (OPT) \_\_\_\_\_  
 FIELD SERVICE (OPT) \_\_\_\_\_  
 CHIEF ENGR (MODULES ONLY) \_\_\_\_\_

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ENGINEERING CHANGE ORDER  
ADD/DELETE SHEET

ECO NO.  
MM11F-00003  
Sheet \_\_\_ of \_\_\_

WIRE LIST NO. K-WL-MM11-F-07

TITLE MM11/F WIRE LIST NEW REV. A

MAKE ALL DELETIONS FIRST WHEN INSTALLING

| SIGNAL NAME | FROM PIN | TO PIN | COMPONENTS | ADD | DEL |
|-------------|----------|--------|------------|-----|-----|
| TINH H      | C01C1    | D02E1  |            |     | X   |
| TINH H      | D03E1    | E03E1  |            |     | X   |
| TINH H      | E01E1    | F01E1  |            |     | X   |
| STROBE 00 H | C01R1    | D02S1  |            |     | X   |
| STROBE 01 H | C01A1    | E01S1  |            |     | X   |
| TSS H       | F01V2    | F01P1  |            |     | X   |
| TINH L      | C01K1    | F01S1  |            | X   |     |
| TINH L      | F01S1    | F01U2  |            | X   |     |
| TINH L      | F01U2    | F01V2  |            | X   |     |
| TINH 00 H   | C01C1    | D02E1  | WHT        | TWP | X   |
| GND         | C01C2    | D02C2  | RED        |     | X   |
| TINH 01 H   | F01T2    | F01F1  | WHT        | TWP | X   |
| GND         | F01T1    | F01C2  | RED        |     | X   |
| TINH 01 H   | F01T2    | E02E1  | WHT        | TWP | X   |
| GND         | F01T1    | E02C2  | RED        |     | X   |
| STROBE 00 H | C01R1    | D02S1  | WHT        | TWP | X   |
| GND         | C01T1    | D02T1  | RED        |     | X   |
| STROBE 01 H | C01A1    | E01S1  | WHT        | TWP | X   |
| GND         | C01C2    | E01T1  | RED        |     | X   |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |
|             |          |        |            |     |     |

digital

# FIELD CHANGE ORDER

466

FCO MM11F-C0003  
PAGE     OF    

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

- 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 EFFECTIVITY  
Retrofit all MM11-F's

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.

DISCRETE PROJECT NUMBER  
(FOR FIELD SERVICE REPORTING)

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

ESTIMATED DOWN TIME 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 AND TC OFFICES WHERE SUBJECT EQUIPMENT IS LOCATED

LAST PREVIOUS FCO'S D01

- FCO KIT DISTRIBUTION
- FSIC WILL INITIATE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE
- ~~FCO KITS AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED.~~

RELATED OR PREREQUISITE FCO'S  
M7290-00003

- MAINDEC CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

CONTENTS OF AN FSIC INITIATED KIT

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

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

CONTENTS OF A FIELD ORDERED KIT

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

D H K W

- PRINT CHANGES ARE MINIMAL AND ARE TO BE MADE MANUALLY IN RED AND GREEN FCO REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST

VERIFICATION MAINDECS

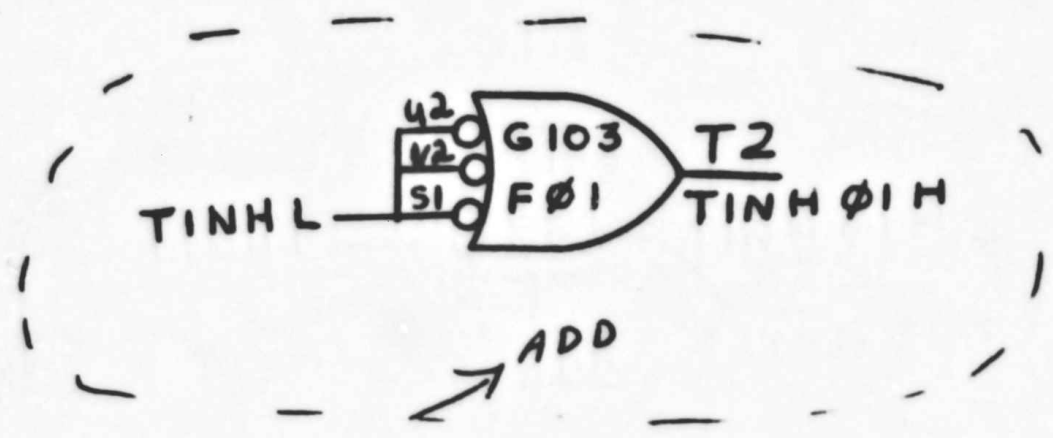
INSTALLATION AND TEST PROCEDURES

PARTS REQUIRED

NOTES  
Necessary to improve reliability on existing units.

FIELD SERVICE APPROVAL  
Art Zins  
24K  
5/16 5/17 (171) 5/18 400

THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.



|                             |                                   |                |                     |
|-----------------------------|-----------------------------------|----------------|---------------------|
| digital                     | CORE<br>MEMORY STACK<br>(X DRIVE) | D-05-MM11-F-03 | REV A               |
|                             | DESIGNED BY: <i>Alyce Mustafa</i> | B-7            | GRAPHIC DESCRIPTION |
| ENGINEERING<br>CHANGE ORDER | DATE:                             | SCALE:         | sheet 2             |

X9

# WIRE TABLE

| SIGNAL NAME   | FROM PIN       | TO PIN         | COLOR      | REMARKS   | NAME SIGNAL           | FROM PIN                | TO PIN                 | COLOR             | REMARKS         |
|---------------|----------------|----------------|------------|---|-----------------------|-------------------------|------------------------|-------------------|-----------------|
| -15           | A03L1          | F04B2          | BLUE       | ↓<br>WIRES MUST PHYSICALLY RUN TO THE RIGHT OF THE BLACK AND PINS |                       |                         |                        |                   |                 |
| TINH Ø ØH GND | CP1C1<br>CP1C2 | D02E1<br>D02C2 | WHT<br>BLK | TWP   |                       |                         |                        |                   |                 |
| TINH Ø IH GND | F01T2<br>F01T1 | F01F1<br>F01E2 | WHT<br>BLK | TWP   | SAIB<br>SAIB<br>INHIB | D04V1<br>D04V2<br>D04V2 | E04D<br>E04J2<br>E04J1 | WHT<br>BLK<br>YEL | 3 TWISTED WIRES |
|               |                |                |            |   | STROBE B GND          | CP1A1<br>CP1T1          | D02S1<br>D02T1         | WHT<br>BLK        | TWP             |
|               |                |                |            |   | STROBE B1 GND         | CP1A1<br>CP1C2          | E01S1<br>E01T1         | WHT<br>BLK        | TWP             |
|               |                |                |            |   |                       |                         |                        |                   |                 |

→ ADD

→ ADD

**digital**

ENGINEER NO  
CHANGE ORDER

WIRED ASSY  
M M 11-15

BY: *W. J. JAMES*

REV: 1

DWG NO. DAD-707263-0-0

REV A

FIG. LOC.

GRAPHIC  
DESCRIPTION

FCR

MM11-F  
4K 16 BIT 22 MIL MEMORY  
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

- 1 G102-B0002 MAR 70  
G102-B0003  
QUICK SYNOPSIS  
8881 IC's replaced by higher speed 74H011 IC's.  
QUICK CHECK  
74H011 IC's in place of 8881 IC's.  
NEW REVISION  
Exchange with CS B or later.
- 2 G103-C0002 MAR 70  
QUICK SYNOPSIS  
Increases system speed.  
QUICK CHECK  
7410 IC replaced by 74H10.  
NEW REVISION  
Rework etch B, C to CS B.
- 3 G103-C0004 APR 70  
QUICK SYNOPSIS  
Provides new higher value trimpot.  
QUICK CHECK  
R17 changed from 100 ohm to 500 ohm trimpot.  
NEW REVISION  
Rework etch B, C to CS C.
- 4 G102-B0004 JUN 70  
QUICK SYNOPSIS  
Decreases Turn-off time of the 2007 transistors.  
QUICK CHECK  
C2, C7, C12, C17, changed from 1000mmfd to 820mmfd  
NEW REVISION  
Rework etch D to CS D.
- 5 G103-C0005 JUN 70  
QUICK SYNOPSIS  
Provides increase to -6.84VDC for Sense amplifiers  
QUICK CHECK  
Heat sink ADD'ed to Q4; C1 and C2 changed from 1000mmfd to 820mmfd.  
NEW REVISION  
Rework etch D, E to CS D.
- 6 G225-C0003 JUL 70  
QUICK SYNOPSIS  
Speeds stabilization of X and Y current generator reference voltage  
QUICK CHECK  
R22 changed from 4.7K ohm to 2.2K ohms.  
NEW REVISION  
Rework etch B to CS B.
- 7 M930-C0001 AUG 70  
QUICK SYNOPSIS  
Power Fail requires BUS SP1 and BUS SP2 for AC LO and DC LO (In-plant, new etch B at CS A)  
QUICK CHECK  
R57 and R69 are 390 ohms  
NEW REVISION  
Exchange with etch B.
- 8 5408475-C0006 OCT 70  
QUICK SYNOPSIS  
AC LO and DC LO return high after assertion in multiple box systems  
QUICK CHECK  
D003 clamping diode from AC LO (anode) and from DC LO to +5V line  
NEW REVISION  
Rework etch A, B, C to CS D.
- 9 M729-C0002 JAN 71  
QUICK SYNOPSIS  
Reduces memory cycle time on systems with 8K interleaved memory (In-plant, new etch C)  
QUICK CHECK  
Wire ADD E9 pin 2 to feed-thru near E5 pin 1  
NEW REVISION  
Rework etch B to CS B.

**MM11-F  
4K 16 BIT 22 MIL MEMORY  
FCO Cross Reference**

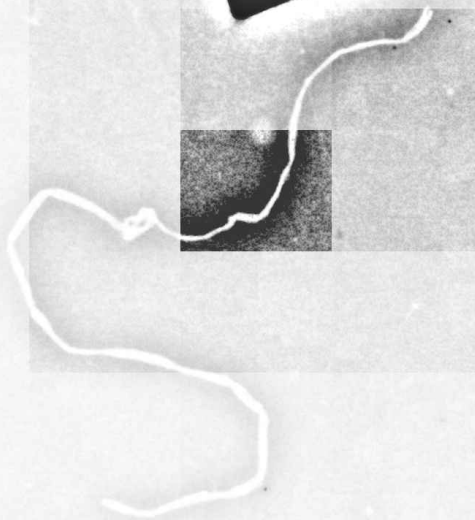
**A Chronological Listing of Field Retrofit FCO's Which Must Be  
Considered in the Field Installation and Maintenance of This Option/Module/Power Supply**

**• Indicates FCO Conjunction Must Be Considered With Prior FCO**

- |   |   |
|---|---|
| <p><b>9</b> <b>M1091-C0001 MAR 71</b><br/><b>QUICK SYNOPSIS</b><br/>Provides 1 unit load on BUS in systems with 16K or more memory.<br/><b>QUICK CHECK</b><br/>M1091 replaces M109 module.<br/><b>NEW REVISION</b><br/>Rework etch B to CS A.</p>                 | <p><b>10</b> <b>MM11F-C0003 MAY 72</b><br/><b>QUICK SYNOPSIS</b><br/>Reduces noise on TINH and strobe signals.<br/><b>QUICK CHECK</b><br/>C01C1 to D02E1/C01C2 to D02C2.<br/><b>NEW REVISION</b><br/>Rework to Wire List A.</p>   |
| <p><b>10</b> <b>G102-B0006 APR 71</b><br/><b>QUICK SYNOPSIS</b><br/>Eliminates MM11-F's noise susceptibility.<br/><b>QUICK CHECK</b><br/>C3, C8, C13, C18 changed from 33mmfd to 120mmfd.<br/><b>NEW REVISION</b><br/>Rework etch D to CS D.</p>                  | <p><b>11</b> <b>M729-C0003 MAY 72</b><br/><b>M729-D0004</b><br/><b>QUICK SYNOPSIS</b><br/>Unibus hangs with Ssyn asserted from memory.<br/><b>QUICK CHECK</b><br/>Wire ADD E5 pin 6 to E3 pin 1.<br/><b>NEW REVISION</b><br/>Rework etch B, C to CS C.</p>                                |
| <p><b>11</b> <b>G225-C0007 MAY 71</b><br/><b>QUICK SYNOPSIS</b><br/>Prevent heat sink from shorting to etch.<br/><b>QUICK CHECK</b><br/>Insulating washers under heat sinks.</p>  | <p><b>11</b> <b>M7290-C0003 MAY 72</b><br/><b>QUICK SYNOPSIS</b><br/>Reduced inductance of TINH H etch corrects noise condition. (In-plant, new etch F)<br/><b>QUICK CHECK</b><br/>Wire ADD E11 pin 8 to feed-thru going to AR1<br/><b>NEW REVISION</b><br/>Rework etch C, D to CS E.</p> |
| <p><b>12</b> <b>M7290-C0002 OCT 71</b><br/><b>QUICK SYNOPSIS</b><br/>Prevents Unibus hang with Ssyn asserted from memory. (In-plant, new etch E)<br/><b>QUICK CHECK</b><br/>Wire ADD E8 pin 5 to E7 pin 9.<br/><b>NEW REVISION</b><br/>Rework etch C to CS D.</p> |   |
| <p><b>13</b> <b>MM11F-D0001 MAR 72</b><br/><b>QUICK SYNOPSIS</b><br/>Module protection plate prevents MM11-F noise interaction with adjacent modules.<br/><b>QUICK CHECK</b><br/>Presence of protection plate</p>   |   |

MM11-L

**FCR**



**MM11-L**  
**8K 16 BIT 18 MIL MEMORY**  
**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 <b>G110-B0004 MAY 72</b><br/><b>QUICK SYNOPSIS</b><br/>Corrects Delay line 3 termination on etch C G110's<br/><b>QUICK CHECK</b><br/>R115 changed from 3 K ohms<br/><b>NEW REVISION</b><br/>Rework etch C to CS D<br/><b>COMPATIBILITY</b><br/>R115 changed from 3K ohms to 1K ohms</p> | <p>1 <b>MM11-S-C0003 OCT 72</b><br/><b>QUICK SYNOPSIS</b><br/>Module protection plate prevents MM11-S noise interaction with adjacent modules<br/><b>QUICK CHECK</b><br/>Presence of module protection plate</p>  |
| <p>2 <b>G110-B0005 MAY 72</b><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>1 <b>G110-C0010 NOV 72</b><br/><b>QUICK SYNOPSIS</b><br/>Data errors occur during the first DAT1 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>3 <b>G231-B0001 MAY 72</b><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>1 <b>G110-D0012 DEC 72</b><br/><b>QUICK SYNOPSIS</b><br/>Provides print clarification affecting etch C G110's<br/><b>NEW REVISION</b><br/>CS E5</p>  |
| <p>1 <b>G231-D0003 AUG 72</b><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>1 <b>G110-D0013 DEC 72</b><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> |
| <p>5 <b>G231-A0005 AUG 72</b><br/><b>QUICK SYNOPSIS</b><br/>Improves DC LO and AC LO circuit 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>1 <b>G231-D0009 DEC 72</b><br/><b>QUICK SYNOPSIS</b><br/>G231 prints redrawn to DEC standards<br/><b>NEW REVISION</b><br/>CS E4</p>  |

**MM11-L  
8K 16 BIT MIL MEMORY  
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

- 11 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
- 12 G110-C0015 MAR 73**  
**QUICK SYNOPSIS**  
Allows longer memory cycle time on systems with high speed NPR devices  
**QUICK CHECK**  
DL3 changed from 100nsec to 125nsec delay  
**NEW REVISION**  
Rework etch C to CS E7
- 13 G110-CD016**  
**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
- 14 G109-C0006 MAR 73**  
**QUICK SYNOPSIS**  
Lengthens memory cycle time  
**QUICK CHECK**  
DL3 replaced with 125nsec delay  
**NEW REVISION**  
Rework etch C to CS E4
- 15 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 E
- 16 G110-B0018 APR 73**  
**QUICK SYNOPSIS**  
Eliminates noise on STROBE O H etch  
**QUICK CHECK**  
Twisted pair E32 pin 6 feed-thru to E58 pin 4 feed-thru/E33 pin 7 to ground side of C4  
**NEW REVISION**  
Rework etch C to CS E9
- 17 G109-C0010 JUL 73**  
**QUICK SYNOPSIS**  
Eliminates noise-induced condition where memory randomly picks up and drops bits  
**QUICK CHECK**  
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
- 18 G110-C0019 NOV 73**  
**QUICK SYNOPSIS**  
Widening R/W Reset L prevents memory skipping a restore cycle  
**QUICK CHECK**  
E26 pin 8 goes to tap 10 of Delay line  
**NEW REVISION**  
Rework etch C to CS E10
- 19 G109-C0011 NOV 73**  
**QUICK SYNOPSIS**  
Lengthens R/W flip-flop reset input pulse to prevent skipped memory cycles on a read  
**QUICK CHECK**  
E26 pin 8 goes to top 10 of the Delay line  
**NEW REVISION**  
Rework etch C to CS E8

ECO  
QUICK CHECK

NOV./74

MM11-L PARTS BREAKDOWN

- G110 - Control and Data Loops
- G231 - Memory Driver
- H214 - 8K 16 Bit Memory Stack
- MM11-L - One 8K 16 Bit Bank of Memory

JAN./75

MM11-L FIELD CODED ECO'S

G110

B4, B5, C9, C10 & A, D12, D13 & A, C15 & A, C16,  
B18, C19

G231

B1, D3, A5, D9

March/75

MM11-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<br>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                       |

H11

| G110 CONTROL & DATA LOOPS |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION | CAB                  | BOX               | SYS. UNIT         | SLOT                | IPB            | PAGE    |    |
|---------------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|----------|----------------------|-------------------|-------------------|---------------------|----------------|---------|----|
|                           |              |    |         |               |  |                 |     |                 |          |                      |                   |                   |                     |                | 1       | CF |
| ECO                       | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>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<br>R118 is left of E28 and right of DL3<br>or possibly under DL3<br>E28 is the 6th I.C. from BE1<br>DL3 is the small delay line right of DL1<br>DL1 is the biggest delay line   |                 |     |                 |          | N11                  |                   |                   |                     |                |         |    |
| 00002                     | 03/72        | B  | C       |               | DL3 is a 100n sec. delay line with<br>part number D-10100 and/or 1609559<br>DL3 is a small delay line just right of<br>DL1-08<br>DL1 is the biggest delay line on board<br>DL3 CHANGED TO 125 N SEC. (P/N-322-1)<br>AND/OR 1611327 BY ECO #15 +15A |                 |     |                 |          | N11                  |                   |                   |                     |                |         |    |
| 00003                     | 08/72        | C  | D       |               | R113 is a 120 ohm 1/2W 5% resistor<br>R113 is located at AS1 below DL2<br>DL2 is between E1 and E2   |                 |     |                 |          | N11                  |                   |                   |                     |                |         |    |
| B 00004                   | 08/72        | D  | C       | 1.0           | NOTE: This ECO affects only "C" etch<br>modules<br>R115 is a 1K 1/2W 5% resistor<br>R115 is the 3rd resistor right of DL1-12<br>DL1 is the biggest delay line  |                 |     |                 | 1        | 13-00365             |                   |                   |                     |                |         |    |
| B 00005                   | 08/72        | E  | C       | 3.0           | NOTE: This ECO affects only "C" etch<br>modules<br>C152 is a 6.8 ufd. capacitor with the<br>cathode connected to the + etch on board.<br>C152 is the capacitor right of DL1 -02<br>DL1 is the biggest delay line                                   |                 |     |                 | 1<br>4   | 10-05306<br>90-08213 |                   |                   |                     |                |         |    |

| G110 CONTROL & DATA LOOPS |              | ETCH | OPTION  | OPTION SERIAL # | PDP  | SYSTEM SERIAL # | LOCATION | CAB  | BOX               | SYS. UNIT         | SLOT                | IPB            | PAGE 2 OF 4 |
|---------------------------|--------------|------|---------|-----------------|--|-----------------|----------|--|-------------------|-------------------|---------------------|----------------|-------------|
| ECO                       | RELEASE DATE | CS   | ETCH WL | ECO HRS. TIME   | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 | QTY.     | PARTS REQUIRED                                   | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CS NAME     |
| 00006                     | 11/72        | F    | E       |                 | R123 is a 390 ohm 1/4W 5% resistor<br>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<br>C47 is directly below E40<br>E40 is the 1st I.C. from CT1<br>DO NOT COUNT PULSE TRANSFORMER AS I.C. |                 |          | N/A  |                   |                   |                     |                |             |
| C 00009                   | 12/72        | E3   | C       | .5              | Four #18 gauge black ground jumpers on<br>SIDE ONE INSTEAD OF ON SIDE # TWO  |                 |          | 17-00024<br>(#18 black & white<br>teflon coated) |                   |                   |                     |                |             |
| C 00010 & 10A             | 11/72        | E4   | C       | 1.0             | Jumper E15-10 to E28-13<br>E15 is the 4th I.C. from AV1<br>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"<br>etch modules.  |                 |          | N11  |                   |                   |                     |                |             |

| G110 CONTROL & DATA LOOPS |              | ETCH | OPTION  | OPTION SERIAL # | PDP   | SYSTEM SERIAL # | LOCATION | CAB            | BOX                     | SYS. UNIT         | SLOT                | IPB            | PAGE<br>3 OF 4 |
|---------------------------|--------------|------|---------|-----------------|---|-----------------|----------|----------------|-------------------------|-------------------|---------------------|----------------|----------------|
| ECO                       | RELEASE DATE | CS   | ETCH WL | ECO HRS. TIME   | QUICK CHECK<br>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<br>Jumper pin 4 to 13 on spare I.C. slot above E40<br>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<br>Jumper E15-10 to E28-13<br>E15 is the 4th I.C. from AV1<br>E28 is the 6th I.C. from BE1                        |                 |          | N/A            |                         |                   |                     |                |                |
| 00014A                    | 03/73        | K    | F       |                 | NOTE: This ECO affects E & F etch revs modules<br>DL3 is 125 n sec. delay line with P/N 1-322-1 and or 1611327<br>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<br>DL3 is 125 n sec. delay line with P/N L-00-01 and/or 1611327<br>DL3 is small delay line right of the big delay line    |                 | 1        | 16-11327       | DZMMG<br>DZQKB<br>DZQGA |                   |                     |                |                |
| C 00016                   | 06/73        | E8   | C       | 2.0             | NOTE: Rework only "C" etch rev modules<br>Jumper E04-04 to E07-07   |                 |          | N11            | DZMMG<br>DZQKB<br>DZQGA |                   |                     |                |                |
| 00017                     | 12/73        | L    | F       |                 | NOTE: This ECO affect only "E" & "F" etch rev modules<br>Jumper E04-04 to E07-07  |                 |          | N11            |                         |                   |                     |                |                |

EVEN

K11

| 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<br>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<br>White wire of twisted pair from E32-06 feed through to E58-14<br>E32 is the 4th I.C from BS1<br>E58 is the 1st I.C from FC1                      | 1               | 10-01610       |                   |                  |                     |                |         |             |
| C 00019             | 12/73        | E10                  | C                | 1.0             | NOTE: Rework "C" etch rev<br>Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter)<br>E26 is the 4th I.C from BE1<br>DL1 is the biggest delay line  |                 | NIL            | DZQMB             |                  |                     |                |         |             |
| 00020<br>6A         | 01/74        | M                    | H                |                 | NOTE: Affects "F" etch rev<br>Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter)<br>E26 is the 4th I.C from BE1<br>DL1 is the biggest delay line |                 | N/A            |                   |                  |                     |                |         |             |
| 00021               | 07/74        | N<br>N<br>E11<br>E11 | H<br>F<br>E<br>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<br>1 OF 3 |
|--------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|----------------|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY.            | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CS 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<br>D116 is a D672 diode instead of being a resistor<br>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<br>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 MEl1 systems.<br>11/45 memories do <u>not</u> need this ECO<br>Jumper from R101 to Q7<br>R101 is the 3rd resistor from bottom left corner<br>Q7 is the biggest transistor from EL1 |                 |     |                 | Nil            |                   |                   |                     |                |         |                |
| 00006              | 8/72         | E2 | C       |               | R170 is a 100 ohm 1/4W 5% resistor<br>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            |                   |                   |                     |                |         |                |

m11

| 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<br>CAUTION - NOT COMPLETE ECO  |     |                 | QTY.     | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME     |
| 00008              | 9/72         | E1A<br>E2A<br>E3A | C<br>C<br>C |               | C52 is a 470 pfd 100V 5% capacitor<br>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<br>R176 is a 4.7K 1/4W 5% resistor<br>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<br>Q12 is closest transistor to bottom left corner.   |     |                 |          | N/A            |                   |                   |                     |                |             |
| 00015              | 6/74         | M                 | E<br>ALL    |               | NOTE: This ECO affects all etch rev modules.<br>J1 & J2 have insulated jumper wire<br>J1 & J2 are between E31 and E34<br>E31 is the last I.C. from CD slot |     |                 |          | N/A            |                   |                   |                     |                |             |
| 00016              | /74          | N<br>E6           | E<br>C      |               | NOTE: I.C. 380 and 7380 are unsuitable<br>E9, E15, E16, E17 are I.C. DEC 8640's<br>E9 is the last I.C. from AV1<br>E15 is the 1st I.C. from BF1            |     |                 |          | N/A            |                   |                   |                     |                |             |

AIR

| G231 MEMORY DRIVER |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION       | CAB               | BOX               | SYS. UNIT           | SLOT           | IPB     | PAGE<br>3 OF 3 |
|--------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|----------------|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>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<br>Q6 is the <u>last</u> transistor from EJ1          |                 |     |                 | N/A            |                   |                   |                     |                |         |                |
| 00018              | 04/75        | R  | E       |               | <u>NOTE:</u> Phase in jumper wire<br>For current loops using teflon insulated wire |                 |     |                 | N/A            |                   |                   |                     |                |         |                |

| H214 - 8K x 16 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 NO | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NO. |             |
| 00001                           | 6/72         | B  |         |               | <u>NOTE:</u> Print change   |                 |     |                 | Nil            |                   |                   |                     |                |        |             |
| 00002                           | 1/73         | C  |         |               | <u>NOTE:</u> Reference chart for H214, H215, H216 and G645 etch & CS revs             |                 |     |                 | Nil            |                   |                   |                     |                |        |             |
| 00003                           | 6/73         | D  |         |               | <u>NOTE:</u> Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03 |                 |     |                 | N/A            |                   |                   |                     |                |        |             |
| 00004                           | 10/73        | E  |         |               | <u>NOTE:</u> Print correction   |                 |     |                 | Nil            |                   |                   |                     |                |        |             |
| 00005                           | 11/73        | F  |         |               | <u>NOTE:</u> Print correction   |                 |     |                 | Nil            |                   |                   |                     |                |        |             |
| 00006                           | 07/74        | H  |         |               | <u>NOTE:</u> Documentation update   |                 |     |                 | NIL            |                   |                   |                     |                |        |             |
| 00007<br>SA                     | 12/74        | J  |         |               | <u>NOTE:</u> DOCUMENTATION FOR AMPER STACK  |                 |     |                 | NIL            |                   |                   |                     |                |        |             |

REVISION DATE

|                                 |  |      |        |                 |     |                 |          |     |     |          |      |     |             |
|---------------------------------|--|------|--------|-----------------|-----|-----------------|----------|-----|-----|----------|------|-----|-------------|
| H214 - 8K x 16 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<br>CAUTION - NOT COMPLETE ECO   | QTY. | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |
|-------|--------------|----|---------|---------------|---|------|----------------|-------------------|-------------------|---------------------|----------------|---------|
| 00001 | 6/72         | B  |         |               | <u>NOTE:</u> Print change   |      | Nil            |                   |                   |                     |                |         |
| 00002 | 1/73         | C  |         |               | <u>NOTE:</u> Reference chart for H214, H215, H216 and G645 etch & CS revs             |      | Nil            |                   |                   |                     |                |         |
| 00003 | 6/73         | D  |         |               | <u>NOTE:</u> Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03 |      | N/A            |                   |                   |                     |                |         |
| 00004 | 10/73        | E  |         |               | <u>NOTE:</u> Print correction   |      | Nil            |                   |                   |                     |                |         |
| 00005 | 11/73        | F  |         |               | <u>NOTE:</u> Print correction   |      | Nil            |                   |                   |                     |                |         |
| 00006 | /74          | H  |         |               | <u>NOTE:</u> Documentation update   |      |                |                   |                   |                     |                |         |

EVEN

212

MMF11-LP

FCR

**MM11-LP**  
**8K 16 BIT PARITY (18 BIT) MEMORY MODULE SET**  
**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> <b>G231-B0001 MAY 72</b><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>1</b> <b>G109-C0007 MAR 73</b><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 E</p>  |
| <p><b>2</b> <b>G231-D0003 AUG 72</b><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>2</b> <b>C109-C0010 JUL 73</b><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>3</b> <b>G231-A0005 AUG 72</b><br/><b>QUICK SYNOPSIS</b><br/>Improves AC LO and DC LO circuit 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>3</b> <b>G109-C0011 NOV 73</b><br/><b>QUICK SYNOPSIS</b><br/>Lengthens R/W flip-flop reset input pulse to prevent skipped memory cycles on a read<br/><b>QUICK CHECK</b><br/>E26 pin 8 goes to top of 10 of the Delay line<br/><b>NEW REVISION</b><br/>Rework etch C to CS E8</p>   |
| <p><b>4</b> <b>G231-D0009 DEC 72</b><br/><b>QUICK SYNOPSIS</b><br/>G231 prints redrawn to DEC standards<br/><b>NEW REVISION</b><br/>CS E4</p>  | <p><b>4</b> <b>G109-C0004 DEC 74</b><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>5</b> <b>G109-C0006 MAR 73</b><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>  |   |

**ECO  
QUICK CHECK**

D13

NOV./74

MM11-LP PARTS BREAKDOWN

|         |                             |
|---------|-----------------------------|
| G109    | - Control & Data Loops      |
| G231    | - Memory Driver             |
| H215    | - 8K 16 Bit Memory Stack    |
| MM11-LP | - One 8K Parity Memory Bank |

MAR/76

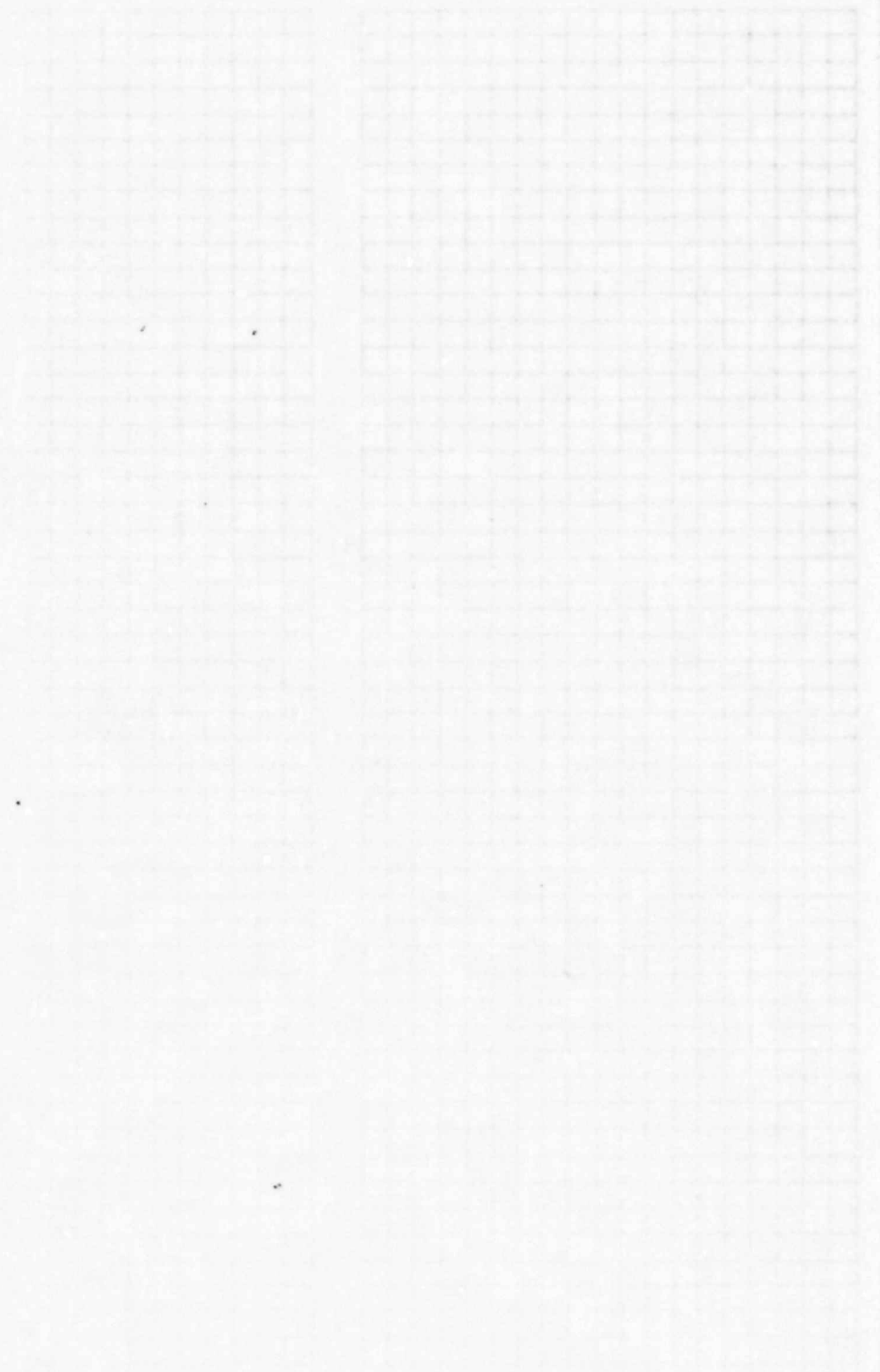
MM11-LP FIELD CODED ECO'S

G109

- C4, C6, C7, C10, C11

G231

- B1, D3, A5, D9



F13

JAN./75

MM11-LP ECO PARTS

| <u>NAME</u> | <u>ECO #</u> | <u>QTY</u> | <u>PART NUMBER</u> | <u>COMMENTS &amp; DESCRIPTION</u> |
|-------------|--------------|------------|--------------------|-----------------------------------|
| G109        | # 3, 3A      | 8          | 10-00064           | Capacitor                         |
|             |              | 4          | 10-01610           | Capacitor                         |
|             |              | 1          | 13-00309           | Capacitor                         |
|             |              | 5          | 13-05324           | Resistor                          |
|             |              | 1          | 16-11327           | Delay                             |
| G109        | # 6          | 1          | 10-01610           | Capacitor                         |
| G109        | # 10         | 1          | 10-01610           | Capacitor                         |
|             |              | A/R        | 91-07720-09        | White Wire                        |
| G231        | # 1          | 2          | 90-06892           | Standoffs                         |
| G231        | # 3          | 16         | 11-05275           | Diode                             |
| G231        | # 15         | A/R        | 90-09185           | Jumper Wire                       |
| M7259       | # 4          | 1          | 13-01874           | Resistor                          |
|             |              | 1          | 13-09143-11        | Resistor                          |

| 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<br>CAUTION - NOT COMPLETE ECO   |                 | QTY              | PARTS REQUIRED                                | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAM      |
| 00001                     | 12/72        | F    | E       |                 | NOTE: New etch Rev  |                 |                  | NIL   |                   |                  |                     |                |             |
| 00002<br>&A               | 12/72        | E1   | C       |                 | Standoffs are screwed on  |                 |                  | N/A   |                   |                  |                     |                |             |
| 00003<br>&A               | 01/73        | E2   | C       |                 | C47 is a .01uf , 100V 20% disc capacitor<br>C47 is directly below E40<br>E40 is the 1st I.C. from CT1<br>NOTE: DO NOT COUNT PULSE TRANSFORMER   |                 | 8<br>4<br>1<br>5 | 10-000064<br>10-01610<br>13-00309<br>13-05324 |                   |                  |                     |                |             |
| C 00004                   | 01/73        | E3   | C       | 2.0             | NOTE: Rework G109-YA only for parity memory<br>Jumper from E15-10 to E28-13<br>E15 is the 4th I.C. from AV1<br>E28 is the 6th I.C. from BE1   |                 |                  | NIL   | DZMFA             |                  |                     |                |             |
| 00005                     | 05/73        | K    | F       |                 | NOTE: Affects etch "E" and "F" revs<br>DL3 is 125 n sec. delay line with part number L-00-01 and/or 16-11327<br>DL3 is the small delay line left of E28<br>E28 is the 6th I.C. from BE1 |                 |                  | NIL   |                   |                  |                     |                |             |
| C 00006                   | 05/73        | E4   | C       | 1.0             | NOTE: Affects etch "C" revs<br>DL3 is a 125 n sec. delay line part number L-00-01 and/or 16-11327<br>DL3 is a small delay line left of E28<br>E28 is the 6th I.C. from BE1              |                 | 1                | 16-11327                                      | DZMFG<br>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<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY             | PARTS REQUIRED          | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NA |             |
| C 00007                   | 05/73        | E5 | C       | 1.0           | NOTE: Affects etch "C" rev G109 & G109-YA modules<br>Jumper E04-04 to E07-07   |                 |     |                 | NIL                     | DZQKB             |                  |                     |                |       |             |
| 00008<br>&A               | 06/75        | E6 | C       |               | NOTE: 1) Affects etch "C" revs.<br>2) Generate separate G109-YA documentation<br>3) Change component substitution list<br>R96 is a 82 ohm 1/2W 5% resistor<br>R96 is right of E44<br>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.<br>Jumper E04-04 to E07-07  |                 |     | 1               | 10-01610                |                   |                  |                     |                |       |             |
| C 00010                   | 12/73        | E7 | C       | 1.0           | NOTE: Affects etch "C" rev<br>White jumper from E32-06 to E58-14<br>E32 is the 4th I.C. from BS1<br>E58 is the 1st I.C. from FC1   |                 |     | 1<br>A/R        | 10-01610<br>91-07720-09 |                   |                  |                     |                |       |             |
| C 00011                   | 12/73        | E8 | C       | 1.0           | NOTE: Rework etch "C" rev<br>Jumper or etch run from E26-08 to tap 10 of DL1<br>E26 is the 4th I.C. from BE1<br>DL1 is the biggest delay line  |                 |     |                 | NIL                     | DZQMB             |                  |                     |                |       |             |
| 00012<br>&A               | 06/74        | M  | H       |               | NOTE: Affects etch "F" rev<br>Jumper E26-08 to DL1-10<br>E26 is the 3rd I.C. from BE1<br>DL1 is the biggest delay line   |                 |     |                 | N/A                     |                   |                  |                     |                |       |             |

REVISION DATE MAY/76

| 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<br>CAUTION - NOT COMPLETE ECO                                 |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAM |             |
| 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            |                   |                  |                     |                |        |             |

J13

| G231 MEMORY DRIVER |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION       | CAB               | BOX               | SYS UNIT            | SLOT           | IPB    | PAGE<br>1 OF 3 |
|--------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|----------------|-------------------|-------------------|---------------------|----------------|--------|----------------|
| ECO                | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAM |                |
| 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<br>D116 is a D672 diode instead of being a resistor<br>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<br>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 M11 systems.<br>11/45 memories do <u>not</u> need this ECO<br>Jumper from R101 to Q7<br>R101 is the 3rd resistor from bottom left corner<br>Q7 is the biggest transistor from E1 |                 |     |                 | Nil            |                   |                   |                     |                |        |                |
| 00006              | 8/72         | E2 | C       |               | R170 is a 100 ohm 1/4W 5% resistor<br>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<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY.            | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| 00008              | 9/72         | E1A<br>E2A<br>E3A | C<br>C<br>C |               | C52 is a 470 pfd 100V 5% capacitor<br>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<br>R176 is a 4.7K 1/4W 5% resistor<br>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<br>Q12 is closest transistor to bottom left corner.   |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00015              | 6/74         | M                 | E<br>ALL    |               | NOTE: This ECO affects all etch rev modules.<br>J1 & J2 have insulated jumper wire<br>J1 & J2 are between E31 and E34<br>E31 is the last I.C. from CD slot |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00016              | /74          | N<br>E6           | E<br>C      |               | NOTE: I.C. 380 and 7380 are unsuitable<br>E9, E15, E16, E17 are I.C. DEC 8640's<br>E9 is the last I.C. from AV1<br>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<br>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<br>Q6 is the <u>last</u> transistor from EJ1          |                 |     |                 |          | N/A            |                   |                   |                     |                |         |    |   |
| 00018              | 04/75        | R  | E       |               | <u>NOTE:</u> Phase in jumper wire<br>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<br>CAUTION - NOT COMPLETE ECO  | QTY | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | BY |
|-------------|--------------|----|---------|---------------|--|-----|----------------|-------------------|-------------------|---------------------|----------------|----|
| 00001       | 7/73         | A  |         |               | <u>NOTE:</u> Print change                  |     | NIL            |                   |                   |                     |                |    |
| 00002<br>6A | 12/74        |    |         |               | <u>NOTE:</u> DOCUMENTATION FOR AMPEX STACK |     | NIL            |                   |                   |                     |                |    |

A14

MM11-S

NOV/74

MM11-S PARTS BREAKDOWN

|            |                                 |
|------------|---------------------------------|
| 7008816    | -Backplane Assembly             |
| 7008855-2B | -11/45 MM11 Power Cable (old)   |
| 7008909    | -11/40 MM11 Power Cable (old)   |
| 7009562    | -G772 System Unit Harness (new) |
| G110       | -Control & Data Loops           |
| G231       | -Memory Drivers                 |
| H214       | -8K Bank of Core Memory         |
| BC11-A     | -Unibus Cable                   |
| M920       | -Unibus Jumper                  |
| MM11-S     | -Single Backplane Unit          |

DOL

214

2356 R624

PROCESSOR TYPE PDP-11/45

MM11S-00001 CODE: D WL: A  
APR 72 PROBLEM Missing wires on MM11S back plane for signal  
SPG.H  
CORRECTION Add three wires to Wire List  
In plant effectively 03 rework immediately

MM11S-00002 CODE: P  
SEP 72 CORRECTION Make corrections to Drawing Directory BDD  
MM11S  
In plant effectively 06 documentation change only

MM11S-00003 CODE: F  
OCT 72 PROBLEM Under some conditions when other options are  
placed beside an MM11S they fail to operate correctly  
CORRECTION Install a #74-0000 module protection plate

NOTE This FCC is required when other options such as KW11P etc are  
physically mounted next to an MM11S memory. Noise generated by the  
MM11S may interact with adjacent modules.  
In plant effectively 02 phase in  
Field effectively Retrofit all MM11S memories as required  
100 revision B is created - Time To Install And Test 5 Hour  
Kit contents FCC Prints And Parts

MM11S-00004 CODE: P DD: C  
NOV 72 CORRECTION Add Manufacturing Test Procedures for MM11  
K L M and S and drawing ASPMM11S Modules and Systems to  
Drawing Directory  
In plant effectively 06 documentation change only

THIS DOCUMENT WAS NOT PRODUCED  
FOR MICROFICHE; THEREFORE, ONLY  
PARTS OF IT ARE READABLE.

FCCO'S



ORIGINATOR R. Manion 1-3  
 TEL EXT 2005 DATE 10/16/72  
 DISC PROJ NO. 896A 06314  
 COST CENTER NO. 392  
 W.O. 1732

ECO NO. MM11-00003  
 SHEET 1 OF 2  
 DATE RECEIVED 10-17-72  
 FIRST ISSUE 10-19-72  
 FINAL ISSUE 11-14-72

**PROBLEM**  
 Under some conditions when other options are placed along side an MM11/S they fail to operate correctly.

UNIT TO BE CHANGED  
**MM11/S  
 MEMORY**  
 DISP CODE \*02  
 OPTIONS AFFECTED

**CORRECTION**  
 Install a module protection plate.

**MM11/S  
 MM11/SP**

**BREAK-IN/EFFECTIVITY** \*Install on all units in production.  
 Install in field if required.

PRODUCT LINES AFFECTED  
**PDP11/45**

| ITEM NO. | DOCUMENT/PART NO. | OLD REV | NEW REV | DISP CODE | DESCRIPTION OF CHANGE  | DOCUMENTATION AFFECTED   | FIELD SERVICE AFFECTED   | TYPE OF CHANGE   |
|----------|-------------------|---------|---------|-----------|--|--|--|--|
| 1.       | B-DD-MM11-S       | A       | B       | 06        | (Drawing Directory) Change per this ECO.<br><br>(Module Protection Plate) Add B-MB-7+08+90-0-0 to drawing directory. | <input type="checkbox"/> MODEL<br><input type="checkbox"/> DIAGNOSTICS<br><input type="checkbox"/> TECH MANUAL<br><input type="checkbox"/> TESTER<br><input type="checkbox"/> TEST PROG<br><input type="checkbox"/> TOOLING<br><input type="checkbox"/> PKG INST<br><input type="checkbox"/> ENG SPEC<br><input type="checkbox"/> PURCH SPEC | <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO<br><input type="checkbox"/> Customer Charge<br><input checked="" type="checkbox"/> Product Line Charge | <input type="checkbox"/> ELECTRICAL<br><input checked="" type="checkbox"/> MECHANICAL<br><input type="checkbox"/> MODULE<br>ORDER PR MODEL<br><input type="checkbox"/> YES<br><input checked="" type="checkbox"/> NO |

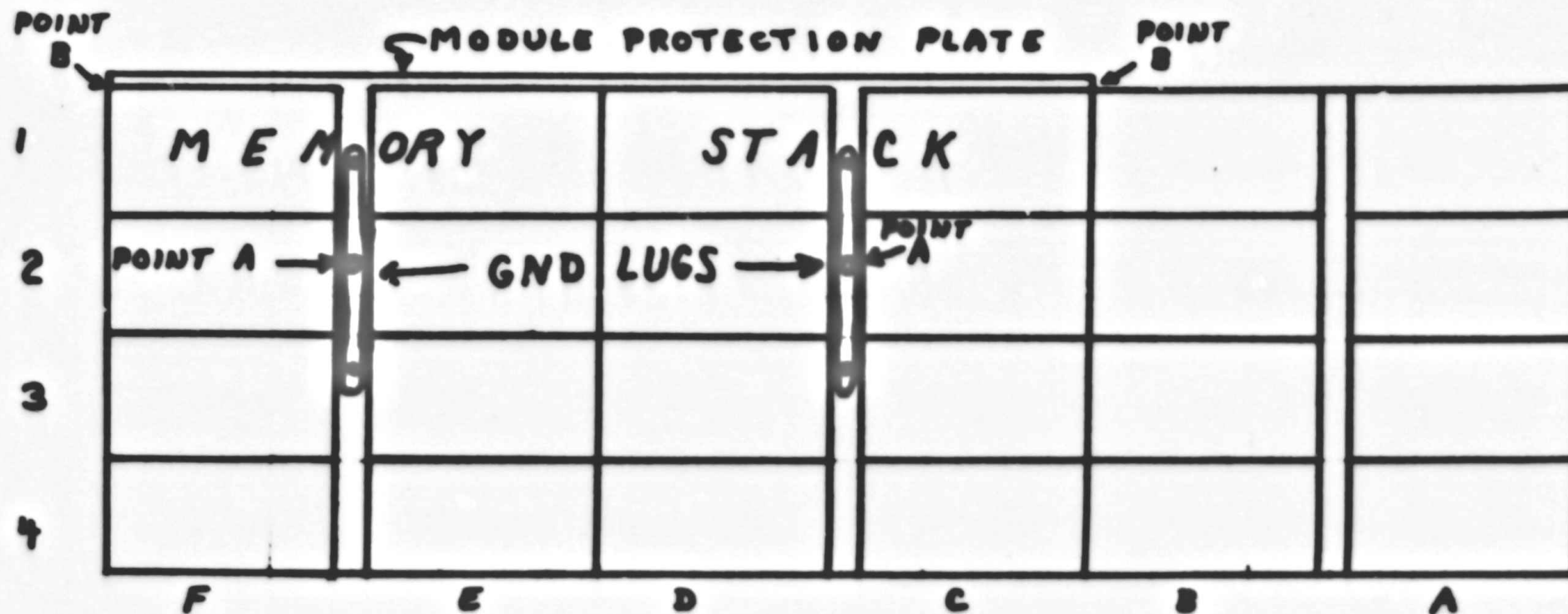
- DISPOSITION CODES**
- 00 - RETURN TO STOCK
  - 01 - (DELETED)
  - 02 - USE PRESENT STOCK UNTIL NEW STOCK AVAILABLE (PHASE IN)
  - 03 - REWORK IMMEDIATELY (RETROFIT)
  - 04 - (DELETED)
  - 05 - (DELETED)
  - 06 - DOCUMENT CORRECTION
  - 07 - NEW ITEM (THIS ASSEMBLY)
  - 08 - NEW ITEM (THIS COMPANY)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

**APPROVAL SIGNATURES**

DESIGN ENGR Pete Durant *1-3 Typewritten* *Hand Signature*  
 ENG MGR (OPT) \_\_\_\_\_  
 FIELD SERVICE (OPT) \_\_\_\_\_  
 CHIEF ENGR (MODULES ONLY) \_\_\_\_\_

## MM115 REWORK SHEET

1. LOOSEN 2 SCREWS AT POINTS A. CARE SHOULD BE USED AT ALL TIME SO THAT NO WIRES ARE DAMAGED.
2. SLIDE THE FINGERS OF THE MODULE PROTECTION PLATE UNDER THE GND LUGS. THE PROTECTION PLATE SHOULD BE RIGHT AGAINST THE WIRED ASSY. FRAME, POINT B.
3. TIGHTEN SCREWS.



MM115-00003  
Sheet 2 of 2

digital

# FIELD CHANGE ORDER

FCO MM1S - C 0003  
PAGE 1 OF 1

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

**FIELD ACTIVITY**  
Retrofit all MM1-S memories as required

- \* 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 \_\_\_\_\_ % 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.

DEFERRED PROJECT NUMBER (FOR FIELD SERVICE REPORTING) W67

AVAILABILITY DELAY None NO PARTS

ESTIMATED 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
- R IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

LAST PREVIOUS FCO'S None

RELATED OR PREREQUISITE FCO'S

### FCO KIT INSTRUCTION

KITS, AS DEFINED BELOW, MAY BE ORDERED AS REQUIRED

- MAINDEC CHANGE
- MAINTENANCE MANUAL CHANGE
- OPERATIONAL PROGRAMS AFFECTED

#### CONTENTS OF AN FSIC INITIATED KIT

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

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

#### CONTENTS OF A FIELD ORDERED KIT

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

|   |   |   |   |
|---|---|---|---|
| D | H | K | W |
|   |   |   |   |

VERIFICATION MAINDECS

11-DZQMB

### INSTALLATION AND TEST PROCEDURES

PARTS REQUIRED  
Q1 74-08490 Module protection plate

**NOTES** This FCO is required when other options such as KW1-P, etc. are physically mounted next to an MM1-S memory. Noise generated by the MM1-S may interact with adjacent modules.

FIELD SERVICE APPROVAL

Art Zins

ack

10/30 450

THIS DOCUMENT WAS NOT PRODUCED FOR MICROFICHE; THEREFORE, ONLY PARTS OF IT ARE READABLE.

FCR

514

**MM11-S**  
**8K, 16 BIT 18 MIL MEMORY**  
**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

- **G231-B0001 MAY 71**  
**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.
- **G110-B0004 MAY 72**  
**QUICK SYNOPSIS**  
Corrects delay line 3 termination on C etch G110's.  
**QUICK CHECK**  
R115 changed from 3K to 1K ohm.  
**NEW REVISION**  
Rework etch C to CS D.
- **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.
- **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.
- **G231-A0005 AUG 72**  
**QUICK SYNOPSIS**  
Improves AC LO and DC LO circuit operation.  
**QUICK CHECK**  
Wire ADD from R89 to R93.  
**NEW REVISION**  
Rework etch C to CS E1.
- **G110-D0012 DEC 72**  
**QUICK SYNOPSIS**  
Provides print clarification affecting etch C G110's.  
**NEW REVISION**  
CS E5
- **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.
- **G110-C0015 MAR 73**  
**QUICK SYNOPSIS**  
Allows longer memory cycle time on systems with high speed NPR devices.  
**QUICK CHECK**  
DL3 changed from 100nsec to 125nsec delay.  
**NEW REVISION**  
Rework etch C to CS E7.
- **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 8.  
**NEW REVISION**  
Rework etch C to CS E8.

**MM11-S**  
**BK. 16 BIT 18 MIL MEMORY**  
**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

■ **G110-B0018 APR 73**

**QUICK SYNOPSIS**

Eliminates noise on STROBE O H etch.

**QUICK CHECK**

E32 pin 8 feed-thru to E58 pin 4 feed-  
thru/E33 pin 7 to ground side of C44.

**NEW REVISION**

Rework etch C to CS E9.

■ **G110-C0019 NOV 73**

**QUICK SYNOPSIS**

Lengthening R/W RESET L prevents memory  
skipping a Restore cycle.

**QUICK CHECK**

E28 pin 8 goes to Tap 10 of Delay line.

**NEW REVISION**

Rework etch C to CS E10.

■ **MM11S-C0003 OCT 73**

**QUICK SYNOPSIS**

Module protection plate eliminates MM11-S  
noise interaction with adjacent modules.

**QUICK CHECK**

Presence of protection plate.

ECO  
QUICK CHECK

m14

NOV/74

MM11-S PARTS BREAKDOWN

|            |                                 |
|------------|---------------------------------|
| 7008816    | -Backplane Assembly             |
| 7008855-2B | -11/45 MM11 Power Cable (old)   |
| 7008909    | -11/40 MM11 Power Cable (old)   |
| 7009562    | -G772 System Unit Harness (new) |
| G110       | -Control & Data Loops           |
| G231       | -Memory Drivers                 |
| H214       | -8K Bank of Core Memory         |
| BC11-A     | -Unibus Cable                   |
| M920       | -Unibus Jumper                  |
| MM11-S     | -Single Backplane Unit          |

JAN/75

MM11-S 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/white gd.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                       |
| MM11-S      | # 3          | 1          | 74-08490           | Shield                            |

JAN./75

MM11-S FIELD CODED ECO'S

|        |  |
|--------|--|
| G110   | B4, B5, C9, C10 & A, D12, D13 & A, C15 & A, C16,<br>B18, C19 |
| G231   | B1, D3, A5, D9   |
| MM11-S | C3   |

C15

| MM11-S 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 WL | ECO HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY             | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| 00001                   | 4/72         |    | A       |               | Jumper A01-U1 to A02-U1  |                 |     |                 | Nil            |                   |                   |                     |                |         |             |
| 00002                   | 9/72         |    |         |               | <u>NOTE:</u> Print change  |                 |     |                 | Nil            |                   |                   |                     |                |         |             |
| C 00003                 | 10/72        |    |         | .5            | A module protection plate beside MM11-S memory bank.   |                 |     | 1               | 74-08490       |                   |                   |                     |                |         |             |
| 00004                   | 11/72        |    |         |               | <u>NOTE:</u> Adds test procedures for MM11-K, L, M, S and SP modules and systems   |                 |     |                 | Nil            |                   |                   |                     |                |         |             |
| 00005                   | 10/73        |    |         |               | Jumper C02-A2 to F01-A2  |                 |     |                 | Nil            |                   |                   |                     |                |         |             |
| 00006                   | 2/74         |    |         |               | <u>NOTE:</u> New harness (7009562) introduced for 15 pin power distribution. 11/40 and 11/45 with serial numbers greater than 6000 and 2000 respectively have a G772 system unit harness |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00007                   | 05/75        |    |         |               | <u>NOTE:</u> Document update   |                 |     |                 | NIL            |                   |                   |                     |                |         |             |
| 00008                   | 05/76        |    |         |               | <u>NOTE:</u> Documentation update  |                 |     |                 | 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<br>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<br>R118 is left of E28 and right of DL3<br>or possibly under DL3<br>E28 is the 6th I.C. from BE1<br>DL3 is the small delay line right of DL1<br>DL1 is the biggest delay line  |                 |          | N11                  |                   |                   |                     |                |         |
| 00002                     | 03/72        | B    | C       |                 | DL3 is a 100n sec. delay line with<br>part number D-10100 and/or 1609559<br>DL3 is a small delay line just right of<br>DL1-08<br>DL1 is the biggest delay line on board<br>DL3 CHANGED TO 125 N SEC. (P/N-322-1)<br><u>AND/OR 1611327 BY ECO #12 +15A</u> |                 |          | N11                  |                   |                   |                     |                |         |
| 00003                     | 08/72        | C    | D       |                 | R113 is a 120 ohm 1/2W 5% resistor<br>R113 is located at AS1 below DL2<br>DL2 is between E1 and E2  |                 |          | N11                  |                   |                   |                     |                |         |
| B 00004                   | 08/72        | D    | C       | 1.0             | NOTE: This ECO affects only "C" etch<br>modules<br>R115 is a 1K 1/2W 5% resistor<br>R115 is the 3rd resistor right of DL1-12<br>DL1 is the biggest delay line   |                 | 1        | 13-00365             |                   |                   |                     |                |         |
| B 00005                   | 08/72        | E    | C       | 3.0             | NOTE: This ECO affects only "C" etch<br>modules<br>C152 is a 6.8 ufd. capacitor with the<br>cathode connected to the + etch on board.<br>C152 is the capacitor right of DL1 -02<br>DL1 is the biggest delay line  |                 | 1<br>4   | 10-05306<br>90-08213 | DZMMG<br>DZMMI    |                   |                     |                |         |

| G110 CONTROL & DATA LOOPS |              |    |         | ETCH          | OPTION   | OPTION SERIAL # | PDP | SYSTEM SERIAL # | LOCATION   | CAB               | BOX               | SYS. UNIT           | SLOT           | IPB     | PAGE<br>2 OF 4 |
|---------------------------|--------------|----|---------|---------------|--|-----------------|-----|-----------------|--|-------------------|-------------------|---------------------|----------------|---------|----------------|
| ECO                       | RELEASE DATE | CS | ETCH WL | ECO HRS. TIME | QUICK CHECK<br>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 1/2W 5% resistor<br>R123 is the closest resistor to BS1  |                 |     |                 | N11  |                   |                   |                     |                |         |                |
| 00007                     | 09/72        | E1 | C       |               | 4 - Standoffs <u>screwed on</u>  |                 |     |                 | N11  |                   |                   |                     |                |         |                |
| 00008                     | 10/72        | E2 | C       |               | C47 is a .01 uf 100V 20% disc capacitor<br>C47 is directly below E40<br>E40 is the 1st I.C. from CT1<br>DO NOT COUNT PULSE TRANSFORMER AS I.C. |                 |     |                 | N/A  |                   |                   |                     |                |         |                |
| C 00009                   | 12/72        | E3 | C       | .5            | Four #18 gauge black ground jumpers on<br>SIDE ONE INSTEAD OF ON SIDE # TWO  |                 |     |                 | 17-00024<br>(#18 black<br>& white<br>teflon<br>coated) |                   |                   |                     |                |         |                |
| C 00010 &<br>10A          | 11/72        | E4 | C       | 1.0           | Jumper E15-10 to E28-13<br>E15 is the 4th I.C. from AV1<br>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"<br>etch modules.  |                 |     |                 | N11  |                   |                   |                     |                |         |                |

EVEN

OLD

FIS

| 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<br>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<br>Jumper pin 4 to 13 on spare I.C. slot above E40<br>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<br>Jumper E15-10 to E28-13<br>E15 is the 4th I.C. from AV1<br>E28 is the 6th I.C. from BE1                        |                 |          | N/A            |                         |                   |                     |                |         |
| 00014A                    | 03/73        | K    | F       |                 | NOTE: This ECO affects E & F etch revs modules<br>DL3 is 125 n sec. delay line with P/N 1-322-1 and or 1611327<br>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<br>DL3 is 125 n sec. delay line with P/N L-00-01 and/or 1611327<br>DL3 is small delay line right of the big delay line    |                 | 1        | 16-11327       | DZMMG<br>DZQKB<br>DZQGA |                   |                     |                |         |
| C 00016                   | 06/73        | E8   | C       | 2.0             | NOTE: Rework only "C" etch rev modules<br>Jumper E04-04 to E07-07   |                 |          | N11            | DZMMG<br>DZQKB<br>DZQGA |                   |                     |                |         |
| 00017                     | 12/73        | L    | F       |                 | NOTE: This ECO affect only "E" & "F" etch rev modules<br>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<br>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<br>White wire of twisted pair from E32-06 feed through to E58-14<br>E32 is the 4th I.C from BS1<br>E58 is the 1st I.C from FC1                       | 1              | 10-01610       |                   |                  |                     |                |           |      |     |             |
| C 00019             | 12/73        | E10                  | C                | 1.0           | NOTE: Rework "C" etch rev<br>Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter)<br>E26 is the 4th I.C from BE1<br>DL1 is the biggest delay line   |                | NIL            | DZQMB             |                  |                     |                |           |      |     |             |
| 00020<br>&A         | 01/74        | M                    | H                |               | NOTE: Affects "F" etch rev<br>Visual check of jumper or etch run from E26-08 to DL1 tap 10 ( Do Not Use Meter)<br>E26 is the 4th I.C from BE1<br>DL1 is the biggest delay line |                | N/A            |                   |                  |                     |                |           |      |     |             |
| 00021               | 07/74        | N<br>N<br>E11<br>E11 | H<br>F<br>E<br>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            |                   |                  |                     |                |           |      |     |             |

H15

| 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<br>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<br>D116 is a D672 diode instead of being a resistor<br>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<br>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.<br>11/45 memories do <u>not</u> need this ECO<br>Jumper from R101 to Q7<br>R101 is the 3rd resistor from bottom left corner<br>Q7 is the biggest transistor from E1 |                 |          | Nil            |                   |                   |                     |                |         |
| 00006              | 8/72         | E2   | C       |                 | R170 is a 100 ohm 1/4W 5% resistor<br>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            |                   |                   |                     |                |         |

| 3231 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<br>CAUTION - NOT COMPLETE ECO  |                 |     | QTY.            | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| 00008              | 9/72         | E1A<br>E2A<br>E3A | C<br>C<br>C |               | C52 is a 470 pfd 100V 5% capacitor<br>C52 is at the far left of DRI and the only component between two transistors   |                 |     |                 | Nil            |                   |                   |                     |                |         |             |
| 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<br>R176 is a 4.7K 1/4W 5% resistor<br>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<br>Q12 is closest transistor to bottom left corner.   |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00015              | 6/74         | M                 | E<br>ALL    |               | NOTE: This ECO affects all etch rev modules.<br>J1 & J2 have insulated jumper wire<br>J1 & J2 are between E31 and E34<br>E31 is the last I.C. from CD slot |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00016              | /74          | N<br>E6           | E<br>C      |               | NOTE: I.C. 380 and 7380 are unsuitable<br>E9, E15, E16, E17 are I.C. DEC 8640's<br>E9 is the last I.C. from AV1<br>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<br>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<br>Q6 is the <u>last</u> transistor from EJ1          |                 |     |                 | N/A            |                   |                   |                     |                |         |             |
| 00018              | 04/75        | R  | E       |               | <u>NOTE:</u> Phase in jumper wire<br>For current loops using teflon insulated wire |                 |     |                 | N/A            |                   |                   |                     |                |         |             |

REVISION DATE MAR/77

|                                 |  |      |        |                 |     |                 |          |     |     |          |      |     |             |
|---------------------------------|--|------|--------|-----------------|-----|-----------------|----------|-----|-----|----------|------|-----|-------------|
| H214 - 8K x 16 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<br>CAUTION - NOT COMPLETE ECO   | QTY | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE |
|-------------|--------------|----|---------|---------------|---|-----|----------------|-------------------|-------------------|---------------------|----------------|----|
| 00001       | 6/72         | B  |         |               | <u>NOTE:</u> Print change   |     | Nil            |                   |                   |                     |                |    |
| 00002       | 1/73         | C  |         |               | <u>NOTE:</u> Reference chart for H214, H215, H216 and G645 etch & CS revs             |     | Nil            |                   |                   |                     |                |    |
| 00003       | 6/73         | D  |         |               | <u>NOTE:</u> Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03 |     | N/A            |                   |                   |                     |                |    |
| 00004       | 10/73        | E  |         |               | <u>NOTE:</u> Print correction   |     | Nil            |                   |                   |                     |                |    |
| 00005       | 11/73        | F  |         |               | <u>NOTE:</u> Print correction   |     | Nil            |                   |                   |                     |                |    |
| 00006       | 07/74        | H  |         |               | <u>NOTE:</u> Documentation update   |     | NIL            |                   |                   |                     |                |    |
| 00007<br>5A | 12/74        | J  |         |               | <u>NOTE:</u> DOCUMENTATION FOR AMPLEX STACK   |     | NIL            |                   |                   |                     |                |    |

EVEN

UK

MM11-U/UP

FCR

**MM11-U  
16K CORE MEMORY/PARITY  
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**

- G235-80009 SEP 78**  
**QUICK SYNOPSIS**  
Marginal memory under conditions of high  
drive current  
**QUICK CHECK**  
750 ohm resistor at + symbol near large etch  
**NEW REVISION**  
Rework etch D to CS N

FCR Page 1, Revision ""

C16

**ECO  
QUICK CHECK**

D16

APRIL/77

NOTE: 1) MM11-U/UP are combined together for convenience

MM11-U/UP PARTS BREAKDOWN

|           |                                      |
|-----------|--------------------------------------|
| G114      | - 16K sense memory                   |
| G235      | - 16K X-Y driver                     |
| H217-C    | - parity memory stack (16K X 18 bit) |
| H217-D    | - memory stack (16K X 16 bit)        |
| M8239     | - 16K timing module                  |
| MM11-U/UP | - 16K Core Memory/Parity             |

MM11-U/UP FIELD CODED ECO's

|      |      |
|------|------|
| G114 | - 15 |
| G235 | - 59 |

MM11-U/UP ECO PARTS

| <u>NAME</u> | <u>ECO#</u> | <u>QTY</u> | <u>PART NUMBER</u> | <u>COMMENTS &amp; DESCRIPTION</u> |
|-------------|-------------|------------|--------------------|-----------------------------------|
| G235        | #9          | 1          | 13-05281-00        | RESISTOR                          |

| G114 16K SENSE INHIBIT |              | 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<br>CAUTION - NOT COMPLETE ECO   |                 | QTY      | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CB NAME     |
| 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 OHM</u> , 1/2W, 5% resistor<br>R108 to the right of T103<br>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<br>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 HRS. TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                |     | QTY             | PARTS REQUIRED                   | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME |             |
| 00001 | 07/73        | D              | D       |               | R35 is a 3.16K, 1/8W, 1% resistor<br>R35 is located below W4<br>W4 is left of E2-01<br>E2 is the 2nd I.C. from AT1                                   |                |     | 1<br>1          | 13-00229<br>13-03045             |                   |                  |                     |                |         |             |
| 00002 | 09/73        | E              | D       |               | R92 is NOT a 330ohm, 1/2W, 5% resistor<br>R92 is the 4th component above R101<br>R101 is 220 ohm, 2W resistor left at AT1                            |                |     | 1<br>2<br>1     | 11-03441<br>13-00271<br>13-02379 |                   |                  |                     |                |         |             |
| 00003 | 11/73        | F              | D       |               | R29 is a 120K, 1/2W 5% resistor<br>R29 is the 1st resistor above Q14<br>Q14 is the transistor above E4<br>E4 is the 2nd I.C. from BL1                |                |     |                 | N/A                              |                   |                  |                     |                |         |             |
| 00004 | 01/74        | H              | D       |               | D2, D3, D4 are deleted<br>No diodes between E2 and R18<br>R18 is a 100ohm resistor, above E2   |                |     | 1<br>1          | 15-05321<br>19-10466             |                   |                  |                     |                |         |             |
| 00005 | 04/74        | J              | D       |               | C47 is a .022 ufd capacitor<br>C47 is the 1st capacitor below T2<br>T2 is a transformer at the far left of AN1                                       |                |     | 2<br>1          | 10-11683<br>13-04855             |                   |                  |                     |                |         |             |
| 00006 | 08/74        | K              | D       |               | Delete C44<br>Only one 47ufd, 20V, 10% capacitor still present (not two) between Q12 and Q13<br>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 |
|---------------------|--------------|------|---------|----------------|---|-----------------|----------|----------------------|-------------------|------------------|---------------------|----------------|-------------|
| ECO                 | RELEASE DATE | CS   | ETCH WL | ECO HRS. TIME  | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   |                 | QTY      | PARTS REQUIRED       | MAINDECS REQUIRED | PRINT SET UPDATE | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME     |
| 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<br>R23 is an 1K 1/2W resistor<br>R23 is the only resistor left of AA1 |                 | 1<br>1   | 13-00364<br>13-02388 |                   |                  |                     |                |             |
| I 00009<br>8A       | 06/76        | N    | D       |                | R103 is a 75 ohm 1W 5% resistor<br>R103 is immediately right of Q12<br>Q12 is the 2nd transistor from AC1         |                 |          |                      |                   |                  |                     |                |             |

| H217 16K STACK |              | ETCH | OPTION  | OPTION SERIAL # | PDP  | SYSTEM SERIAL # | LOCATION | CAB            | BOX               | SYS. UNIT         | SLOT                | IPB            | PAGE<br>1 OF 1 |
|----------------|--------------|------|---------|-----------------|--|-----------------|----------|----------------|-------------------|-------------------|---------------------|----------------|----------------|
| ECO            | RELEASE DATE | CS   | ETCH WL | ECO HRS. TIME   | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO  |                 | QTY      | PARTS REQUIRED | MAINDECS REQUIRED | PRINT SET UPDATED | ACTUAL INSTALL TIME | DATE INSTALLED | CE NAME        |
| 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)<br>Diodes D29, D30 are deleted<br>D29, D30 were Diodes left of CE1<br>but right of the resistor network |                 |          | NIL            |                   |                   |                     |                |                |
| 00004          | 03/76        | C    | E       |                 | NOTE: Manufacturing change.  |                 |          | NIL            |                   |                   |                     |                |                |

| 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<br>WI. | ECO<br>HRS.<br>TIME | QUICK CHECK<br>CAUTION - NOT COMPLETE ECO   | QTY             | PARTS<br>REQUIRED | MAINDECS<br>REQUIRED | PRINT<br>SET<br>UPDATE | ACTUAL<br>INSTALL<br>TIME | DATE<br>INSTALLED | CE<br>NAME |             |
| 00001             | 10/73        | B    | B           |                     | NOTE: This is a mandatory ECO<br>Measure continuity from E21-03 to E25-13<br>E21 is the 2nd I.C. from CL1<br>E25 is below E21                       |                 | NIL               |                      |                        |                           |                   |            |             |
| 00002             | 11/73        | C    | B           |                     | NOTE: This is a mandatory ECO<br>Measure continuity from E03-05 to DL3-05<br>DL3 is the only delay line left of ARI                                 |                 | NIL               |                      |                        |                           |                   |            |             |
| 00003<br>&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<br>B      |                     | NOTE: Introduces M8293-YB for XM15<br>M8293-YB can be distinguished by checking for<br>jumper from E38-12 to E38-13<br>E38 is the 4th I.C. from DT1 |                 | NIL               |                      |                        |                           |                   |            |             |