MJ11/MM11

TECHNICAL
INFORMATION
COMPANY CONFIDENTIAL

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FICHE 1 OF 1

AUG 1977
digital
MADE IN USA

MJ11-A

MM11

MM11-E

MM11-F

MM11-L

MM11-S

MM11-U/UP

FCR

TECH TIPS

DOL

FCO's

ECO QUICK CHECK

MM11-LP

MJ11-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

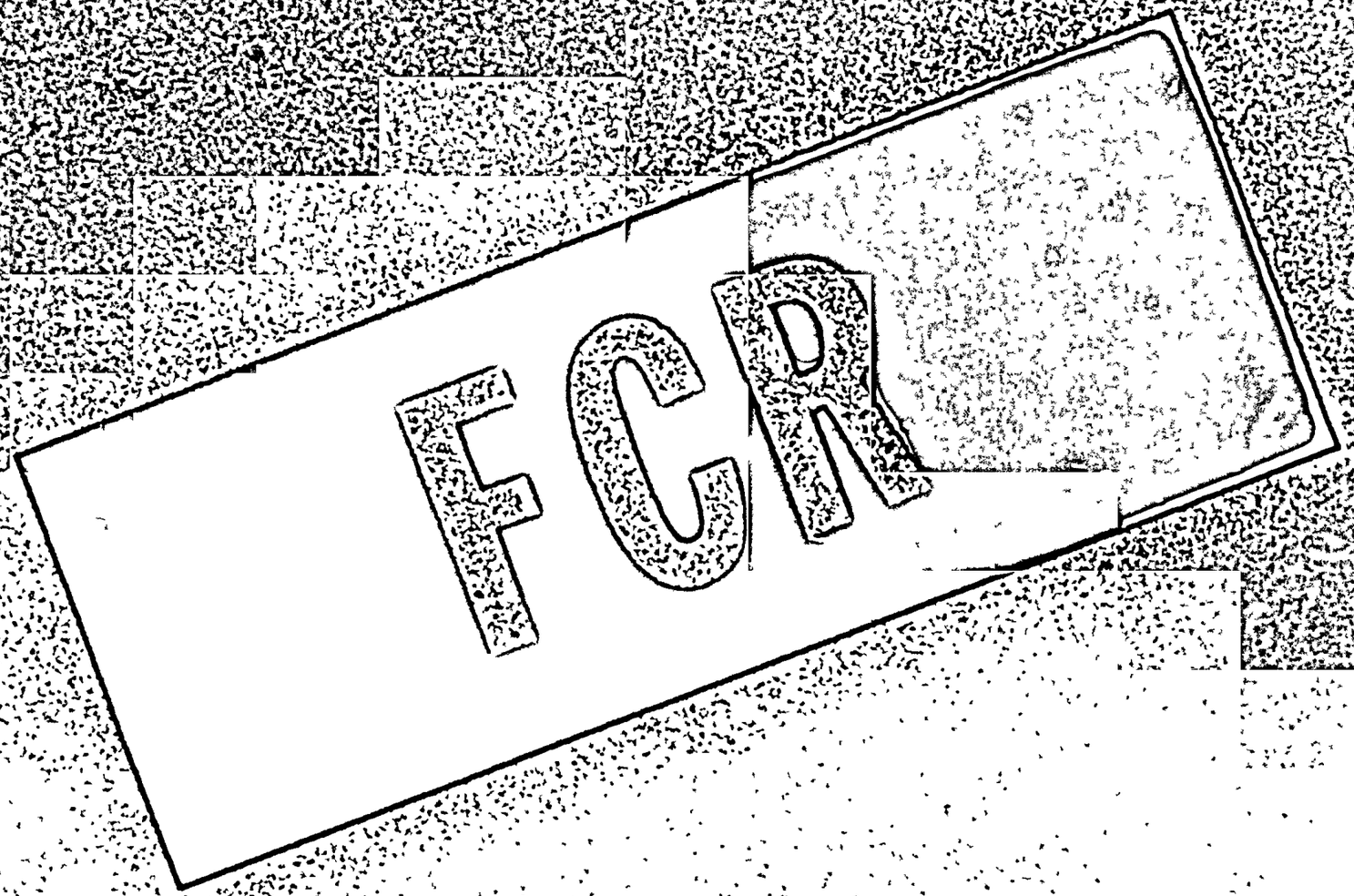
G114
G235

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


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

M8148-S0003 OCT 76
QUICK SYNOPSIS
Eliminates timing drift of READ TIMING DELAY LINE DRIVER.
QUICK CHECK
Wire between CB4 and D2 (cathode)
NEW REVISION
Rework etch A to CS C.

M8148-S0004 JUL 76
QUICK SYNOPSIS
Eliminates intermittent system software failures.
QUICK CHECK
Nylon screws hold H873 to M8148
NEW REVISION
Rework etch A to CS A1.

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

MM11

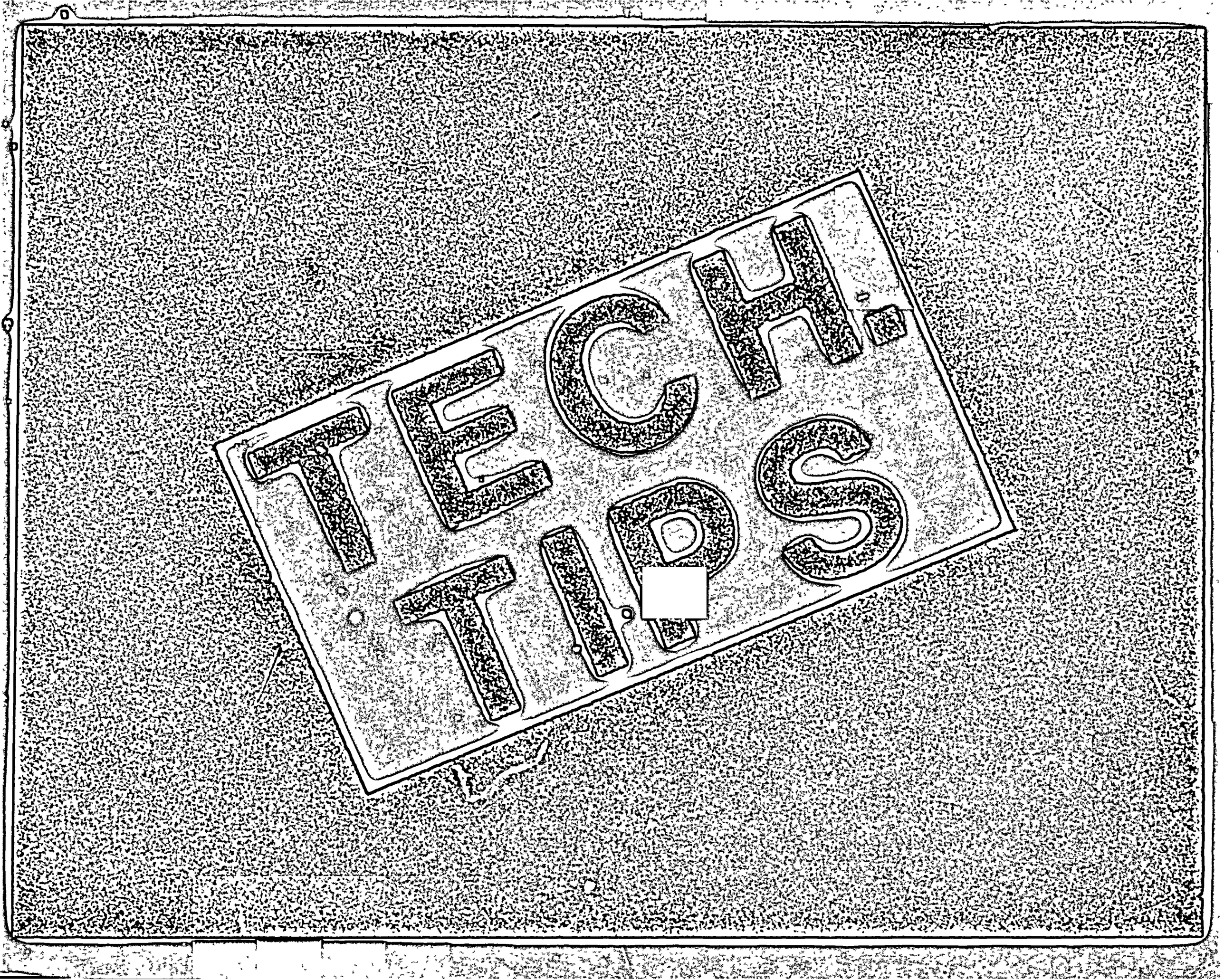
THE FOLLOWING MODULE/ASSEMBLIES ARE CONTAINED IN THIS DEVICE. EACH MAY HAVE ASSOCIATED TECH TIPS, DEC-O-LOG AND FCO's DOCUMENTED IN THE MODULE/ASSEMBLY CATEGORY OF THE MICROFICHE LIBRARY.

70-06468
70-07263
70-09562

G102
G103
G109
G110
G225
G226
G231
G615
G616
G645

H213
H214

M109
M229
M1091
M7290


FEC
TIDS

FIELD SERVICE TECHNICAL MANUAL

Option or Designator: M811

12 Bit ☐ | 16 Bit ☒ | 18 Bit ☐ | 36 Bit ☐

Title: QUALADYNE 1540 SENSE AMPS

Tech Tip Number: 01

Processor Applicability: All

Author: DON KERESKI Rev: A

Approval: CHUCK DEWEY Date: 6/27/72

Cross Reference:

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 M8[illegible] and F[illegible].

Since the Motorola 1540 units are in [illegible]y, Production is only replacing failing units and are not retrofitting all boards in all product lines. Machines in the field that exhibit strange m[illegible]y 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: M207E MEMORY STACK

Tech Tip Number: M811 02

Processor Applicability: All

Author: TOM KARPOWSKI Rev: A

Approval: CHUCK DEWEY Date: 6/27/72

Cross Reference:

The M811-E memory will be using a new stack, RCA's M207E. This stack can only be used in an M811-E. The M207 stack can be used in an M811-E and M811-F.

Title: M811-E & F/G102 MODULES

Tech Tip Number: M811 03

Processor Applicability: All

Author: TOM KARPOWSKI Rev: B

Approval: CHUCK DEWEY Date: 6/1/72

Cross Reference:

ECO G102-00005 has been written to make the G102 module capable of running in the M811-F memory. This ECO makes this module CS revision D. It has to be at least revision D to run in an M811-F. This revision can also be used in M811-E's. Please see that your spares are modified accordingly.

Title: INTERLEAVING THE M811-E MEMORY

Tech Tip Number: M811 04

Processor Applicability: All

Author: JOHN BUSYNSKI Rev: B

Approval: CHUCK DEWEY Date: 6/1/72

Cross Reference:

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 DATI mode is free to complete its cycle after the MSYN L dialog and as soon as the setup times for the bus are satisfied, MSYN L can be deasserted to

Title	INTERLEAVING THE M811-E MEMORY (Continued)	Tech Tip Number	M811 #4
All	Author JOHN [illegible] Rev #	Cross Reference	
	Approved CHUCK [illegible] Date 6/1/72		

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 M811-E the two address bits have to be physically interchanged on the backplane. It is also necessary to modify M729 control logic module to speed up the SSYNL reset circuit. (Refer to ECO's M811-E Numbers 17, 19, and 20; M729 number 2; and ECO M1091 number 1).

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

Title	FIELD INSTALLATION OF M811-E ON PDP-11/45	Tech Tip Number	M811 #5
All	Author ANDY VERosTIC Rev #	Cross Reference	
11/45	Approved ART KINS Date 6/7/72		

HARDWARE
Existing M729 control must have ECO [illegible] installed for operation on 11/45.

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

Title	FIELD INSTALLATION OF M811-F ON PDP-11/45	Tech Tip Number	M811 #6
All	Author ANDY VERosTIC Rev A	Cross Reference	
11/45	Approved ART KINS Date 6/7/72		

HARDWARE
Existing M7290 control must have ECO's [illegible] and [illegible] installed for proper operation on the 11/45.

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

Address Selection

M811-E Memories have had two types of address selection modules. The M1#9 was the original address selector and may still be found in some installations. The M1#9 causes insertion of two UNIBUS unit loads. This was corrected when the M1#91 was introduced (ECO M1091-00001). Selection of addresses when using M1#9 is described in the hardware manual (DEC-11-HR3B-D).

Both the M811-E and M811-F memories now utilize M1#91 address selector modules. Figure 1 shows the circuit schematic of the M1091 address selection logic. Figure 2 shows a layout of that portion of the physical module where the addressing is accomplished by insertion or removal of jumper wires. Table 1 lists the following:

a. Bank Number - These numbers are indicative of the physical system units of M811-E or F memories.

b. K Words - This indicates the word quantity for a specific bank in thousands (K) words.

c. Addresses - The inclusive (octal) word (two byte) addresses within a specific bank of memory are listed here. They assume a non-interleaved configuration.

d. Bits 17, 16, 15, 14, 13 and #1 Non-Interleaved These columns show, by an X, that jumper which should be installed in order to respond to a specific memory bank addressing. The 1, #, A, B, C and D correspond to the identification shown on the module, figure 1, and figure 2.

e. Bits 13, and #1 Interleaved - These two bits accomplish the interleaving for M811-F memories and are to be used in place of their counterparts listed for d, above. When used these cause modification of two 4K Banks so that their addressing has the lower (odd) bank with addresses ending with # or 4 and upper (even) bank ending with 2 or 6.

Title	MM11-E and F MEMORY ADDRESS SELECTION AND INTERLEAVING	Tech Tip Number	MM11-TT #7
All (Processor Applicability)	Author Chuck Davey	Rev 0	Cross Reference
	Approval Chuck Davey	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.

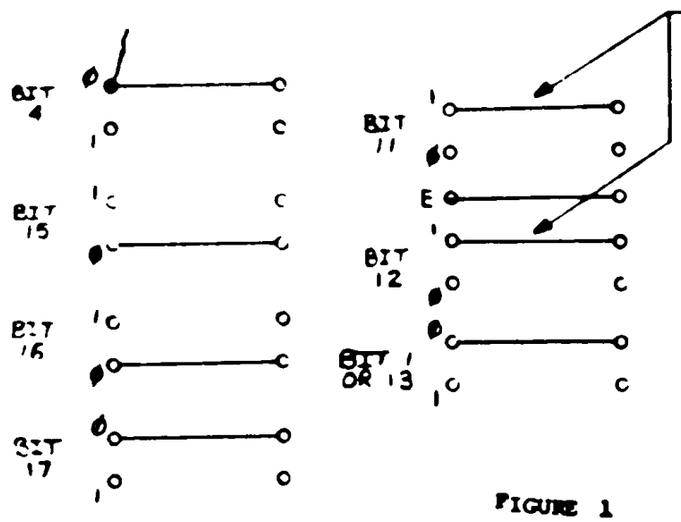
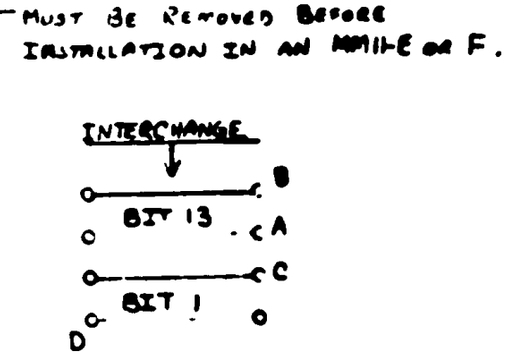


FIGURE 1



M1091 MODULE - ADDRESS SELECTION AREA

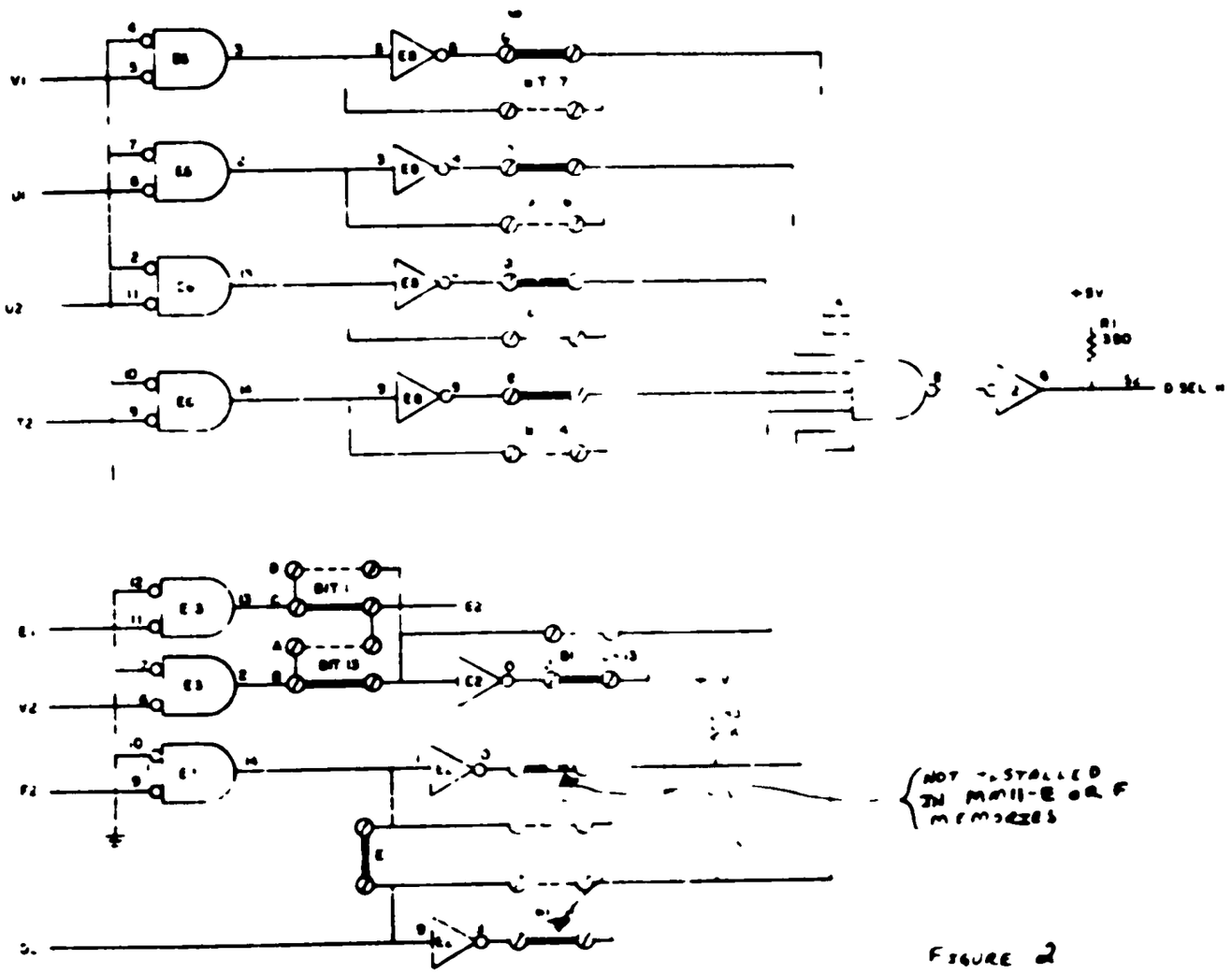


FIGURE 2

Title	MM11-E and F MEMORY ADDRESS SELECTION & INTERLEAVING (CONT'd)	Tech Tip Number	MM11-TT 07
Processor Applicability: All	Author: Chuck Dewey	Rev: 1	Cross Reference
	Approval: Chuck Dewey	Date: 9/28/72	

TABLE 1

BANK	K WORDS	ADDRESSES FROM	ADDRESSES TO	NON-INTERLEAVED MM11-F AND ALL MM11-E MEMORIES: 17	16	15	14	13				01		INTERLEAVED MM11-F MEMORY *: 13				01			
				1	0	1	0	1	0	1	0	1	0	A	B	C	D	A	B	1	0	C	D
1	0 - 4	000000	017776	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
3	8 - 12	040000	057776	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
5	16 - 20	100000	117776	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
7	24 - 28	140000	157776	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
9	32 - 36	200000	217776	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
11	40 - 44	240000	257776	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
13	48 - 52	300000	317776	X		X		X			X		X	X		X		X			X		X
14	52 - 56	320000	337776	X		X		X			X	X		X		X		X		X			
15	56 - 60	340000	357776	X		X		X		X			X	X		X		X			X		
16	60 - 64	360000	377776	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
18	68 - 72	420000	437776		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
20	76 - 80	460000	477776		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
22	84 - 88	520000	537776		X		X	X			X	X		X		X		X		X			X
DB11 REQUIRED FROM THIS POINT IF MX11 IS IN USE																							
23	88 - 92	540000	557776		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
25	96 - 100	600000	617776		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
27	104 - 108	640000	657776		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
29	112 - 116	700000	717776		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
31	120 - 124	740000	757776		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

Title: DATA ERRORS CAUSED BY DCLO OR INIT ON MM11-K, L, M, S

Tech Tip Number: MM11 #8

Processor Applicability: All

Author: A.Verostic/D.Dickhut Rev: 0

Approved: Art Zins Date: 9/27/72

Cross Reference:

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 Number	MM 11 TT-9
Processor Applicability: All	Author D. Dickhut	Rev	0
	Approved C. Dewey	Date 11/20/72	Cross Reference

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 (stock not spared 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.

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 ECO 98 is installed. If it isn't and this is a non-Field effect ECO, a G110 module with that ECO 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 NPR (DMA) devices, intermittent failures may occur over a long period of time.

Title	ECO DOCUMENTATION FOR THE M8113, M8111 and M8115 MEMORIES	Tech Tip Number	M811 TT-10
Processor Applicability: All	Author G. Cable	Rev #	Cross Reference
	Approved C. Dewey	Date 12/12/72	

The following Tech Tip will attempt to clarify the confusion regarding the ECO status for the M8115, M8113 and M8111 memories.

G11@ Modules

In the near future there will be two seperate t pes of G110 Modules in the field. The first type of G11@ 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 seperate 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, K, and etc.).

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

G11@ Etch Revision C

ECO No.	CS Revision
G110-0001	A
G110-0002	B
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

G11@ Etch Revision E

ECO No.	CS Revision
G110-0006	F
G110-0011	H

*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.

G231 Module

There will also be two seperate 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

ECO No.	CS Revision	Stamped on Module
G231-0001	C	C
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

G231 Etch Revision E

ECO No.	CS Revision
G231-0004	F

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

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

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 accomodate 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 accomodate 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.

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐	MM 11

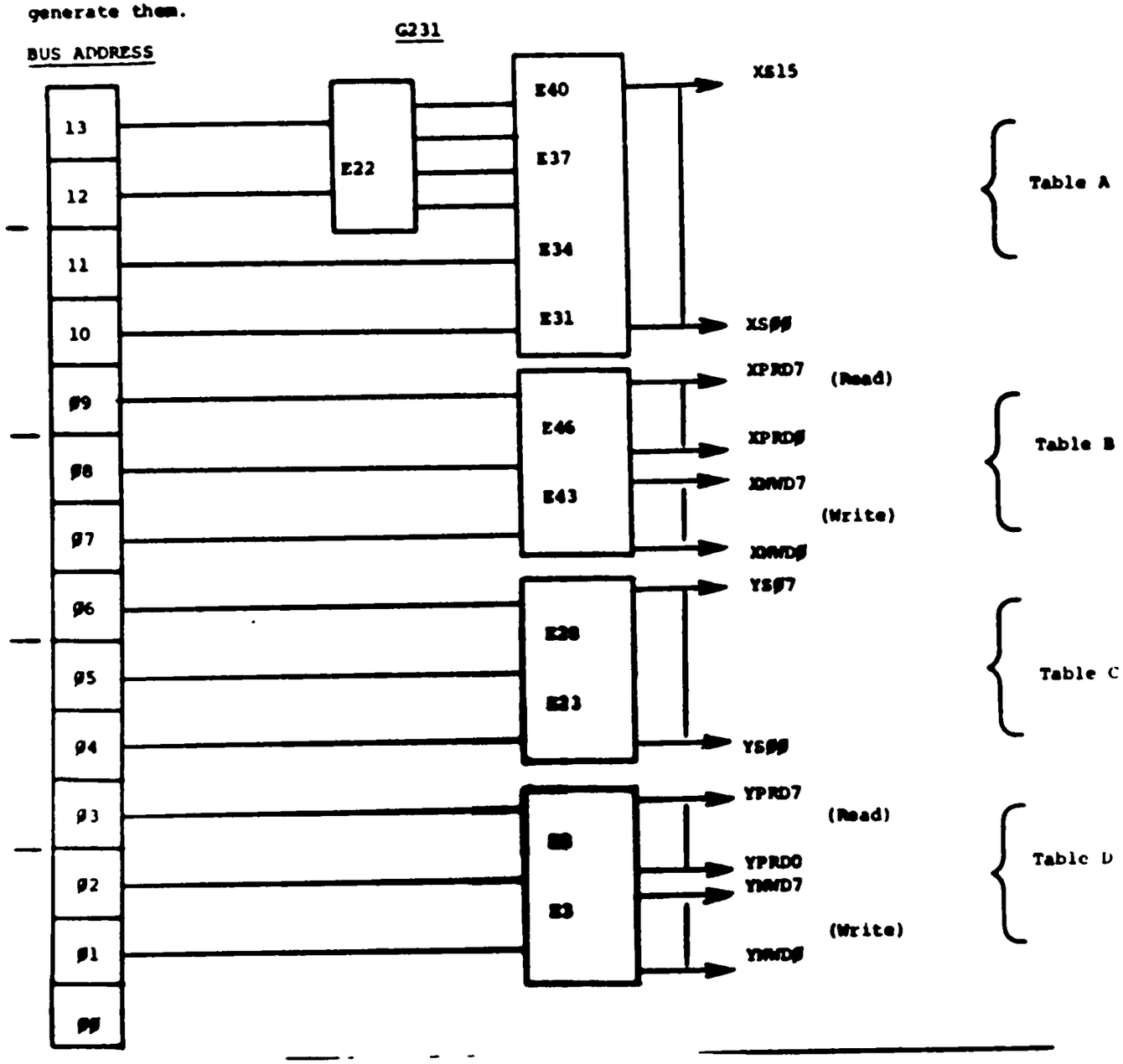
Title MM11- E and F in BA11-B/D/F Mounting Boxes			Tech Tip Number MM11-TT-12
Processor Applicability: All	Author B. Dimbat	Rev 0	Cross Reference
	Approved C. Dewey	Date 3/14/73	

MM11E and MM11F memories ca not be installed in the 11/40 box. They cannot be installed in BA11-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 (BA11-E5), which has its own power supply.

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

Title: MM11 L, S, K Memory Address Decode		Tech Tip Number: MM-TT-13
Processor Applicability: All	Author: John Alston Rev: β Approval: B. Dimbat Date: 6/1/71	Cross Reference

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.



Title	MM11 L, S, K Memory Address Decode		Tech Tip Number	MM11-TT-13
All (Processor Applicability)	Author J. Alston	Rev 0	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 A12=1	XS15	XS14	XS13	XS12
	E40			
A13=1 A12=0	XS11	XS10	XS09	XS08
	E37			
A13=0 A12=1	XS07	XS06	XS05	XS04
	E34			
A13=0 A12=0	XS03	XS02	XS01	XS00
	E31			

TABLE A

		A08=1,A07=1	A08=1,A07=0	A08=0,A07=1	A08=0,A07=0
Read Cyc.	A09=1	XPRD7	XPRD6	XPRD5	XPRD4
		E46			
	A09=0	XPRD3	XPRD2	XPRD1	XPRD0
		E43			
Write Cyc.	A09=1	XNWD7	XNWD6	XNWD5	XNWD4
		E46			
	A09=0	XNWD3	XNWD2	XNWD1	XNWD0
		E43			

TABLE B

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

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 Cyc.	A03=1	YPRD7	YPRD6	YPRD5	YPRD4
		E8			
	A03=0	YPRD3	YPRD2	YPRD1	YPRD0
		E3			
Write Cyc.	A03=1	YNWD7	YNWD6	YNWD5	YNWD4
		E8			
	A03=0	YNWD3	YNWD2	YNWD1	YNWD0
		E3			

Title	Tech Tip Number
M9312-D/DP Memory Backplane	M9312-TT-14

Processor Applicability	Author	Rev	Cross Reference
All	William Doppering	J	
	Approval William Dinbar	Date 8-5-76	

The M9312-D/DP Core Memory Manual states that the G652 (mother board for the M9312-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	Tech Tip Number
M9312-D/DP MEMORIES FAILING HIGH CURRENT MARGINS	M9312-TT-15

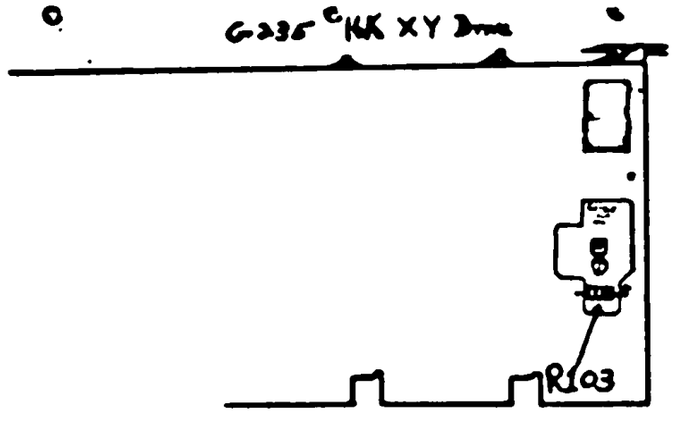
Processor Applicability	Author	Rev	Cross Reference
All	Jim Holderby	J	
	Approval Lee Nicklas	Date 9-13-76	

Many reports have been received from the field concerning memories failing high current margins and module set incompatability (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 (750 Ω) 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	M9312-D/UP INSTALLATION	Tech Tip Number	M9312 TT-16
Processor Applicability: All X	Author: Jim Holderby Rev: B	Approved: Lee Mickle Date: 12-14-76	Cross Reference

There is a problem if more than 64K of MF11-U memory is installed in the new type expansion box (BA11F) 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-H45M-D-D) Figure 8-5, power distribution schematic.

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

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

	ADDRESS												
MEMORY SELECT			X SWITCH READ AND WRITE			X DRIVER READ AND WRITE			Y SWITCH READ AND WRITE			Y DRIVER READ AND WRITE			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
			ϕ_{00} = XS0			ϕ_{00} = XD0			ϕ_{00} = YS0			ϕ_{00} = YD0			BYTE SELECTION
			1_{00} = XS1			1_{00} = XD1			1_{00} = YS1			1_{00} = YD1			
			2_{00} = XS2			2_{00} = XD2			2_{00} = YS2			2_{00} = YD2			
			3_{00} = XS3			3_{00} = XD3			3_{00} = YS3			3_{00} = YD3			
			4_{00} = XS4			4_{00} = XD4			4_{00} = YS4			4_{00} = YD4			
			5_{00} = XS5			5_{00} = XD5			5_{00} = YS5			5_{00} = YD5			
			6_{00} = XS6			6_{00} = XD6			6_{00} = YS6			6_{00} = YD6			
			7_{00} = XS7			7_{00} = XD7			7_{00} = YS7			7_{00} = YD7			

X AND Y DRIVER SIGNALS ARE POSITIVE FOR READ; NEGATIVE FOR WRITE
(i.e. YPDØ FOR READ; YNDØ FOR WRITE)

X AND Y SWITCH SIGNALS ARE NEGATIVE FOR READ; POSITIVE FOR WRITE
(i.e. XNSØ FOR READ; XPSØ FOR WRITE)

YDØ - YD3 ON G226 SLOT C03
YD4 - YD7 ON G226 SLOT F03
YSØ - YS3 ON G226 SLOT C03
YS4 - YS7 ON G226 SLOT F03

XDØ - XD3 ON G226 SLOT C02
XD4 - XD7 ON G226 SLOT F02
XSØ - XS3 ON G226 SLOT C02
XS4 - XS7 ON G226 SLOT F02

DEC 12-17040-1100-0374

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	

PRINTED IN U.S.A.

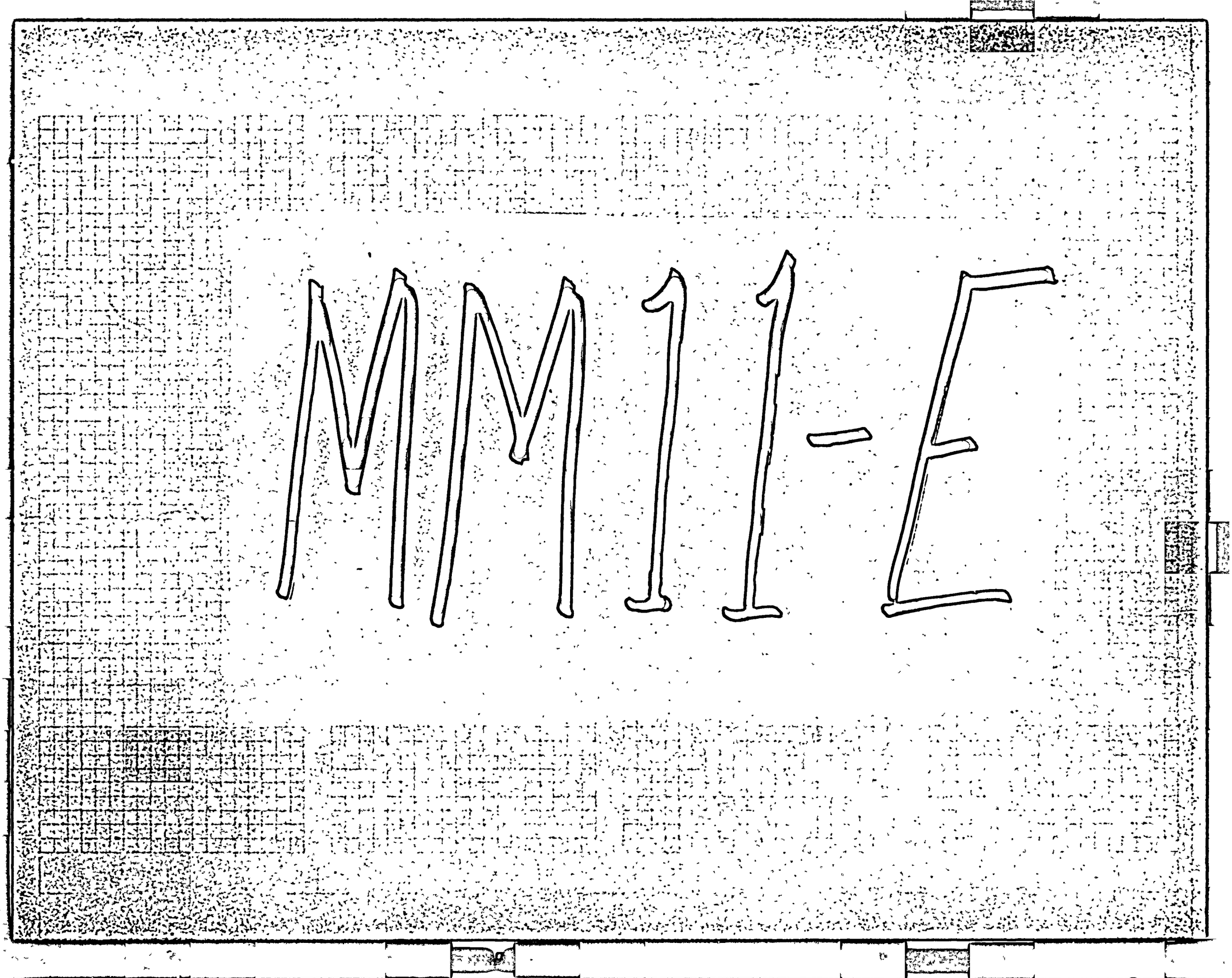
Title	MM11-E TROUBLE SHOOTING AID (CONT)			Tech Tip Number	MM11-TT-17
Author	MICHAEL BABCOCK	F.S. Office	PITTS., PA	Date 6/17/77	Revision 0
Processor Applicability	All 11	Mgr./Sup.		Date	Cross References
		Approval:	JIM HOLDERBY	Date 6/17/77	

ADDRESS BITS 7-9

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

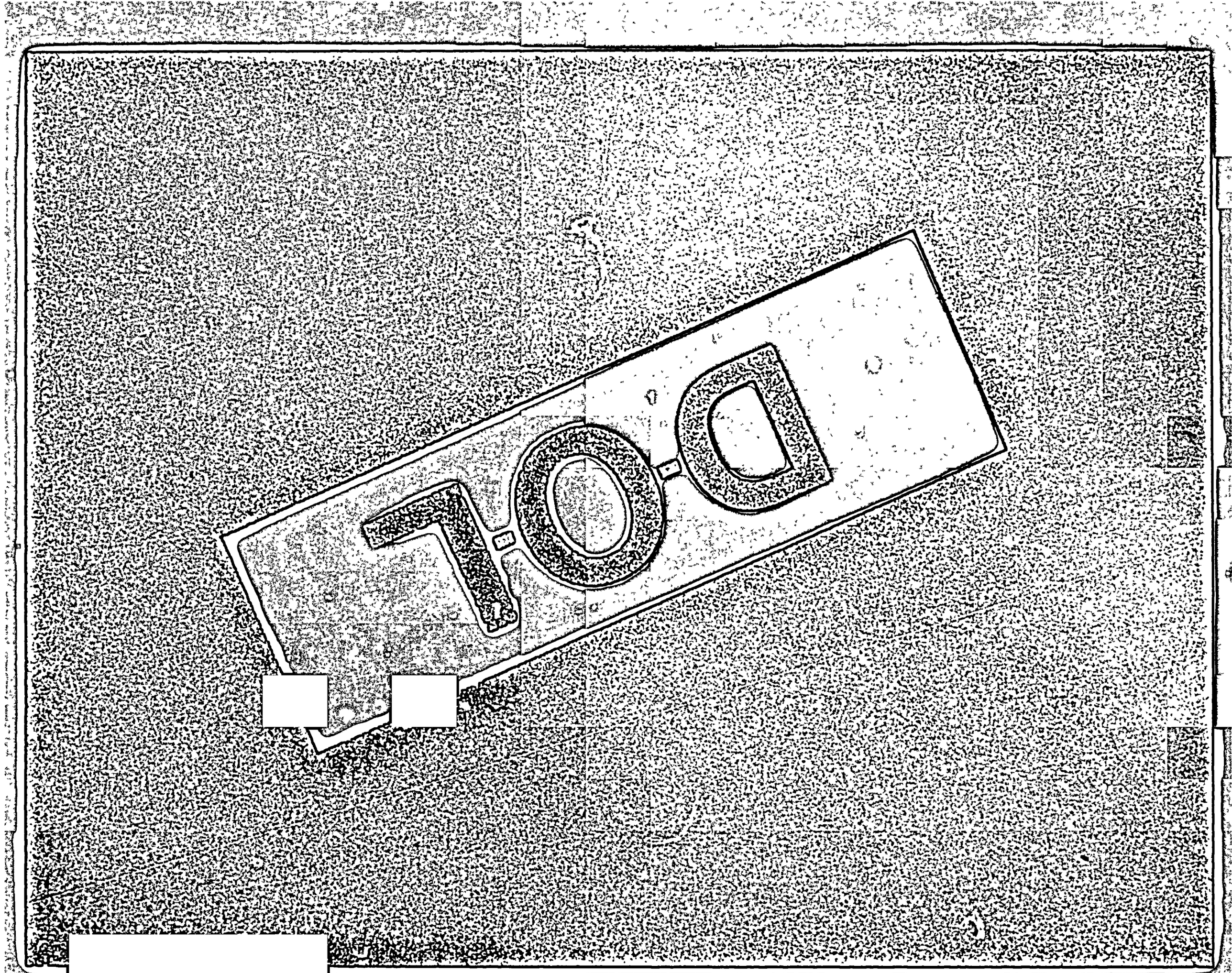
ADDRESS BITS 10-12

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



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)



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ECO SYNOPSES FOR LOGIC OR OPTION

PDP-11 MEMORY **MM11-E**

PRODUCT LINE	PUBLICATION DATE OF THIS SYNOPSES PAGE	PAGE REVISION
PDP-11	JULY 1970	B

ECO NO.	LOGIC OR OPTION SERIAL NO.'S AFFECTED	FIELD CODE	SYNOPSIS
MM11-E 00001	>MM11-E	B	JAN 70 - CHANGES STACK MINDE TOLERANCE AND ADDS A FLATNESS SPECIFICATION.
MM11-E 00002	MM11-E 110-1800>	B	JAN 70 - MAKES CORRECTIONS TO THE WIRE LIST.
MM11-E 00003	MM11-E 110-1800>	B	JAN 70 - ADDS CURRENT LOOPS FOR X AND Y CURRENT MEASUREMENTS AND SCOPING. UPDATES THE LIST OF MANUALLY INSTALLED WIRING.
MM11-E 00004	>MM11-E	B	JAN 70 - UPDATES THE MM11-E PRINT SET.
MM11-E 00005	N.A.	B	JAN 70 - CORRECTS A DRAWING WHICH WAS DRAWN IN REVERSE. ADDS CLARIFICATION NOTES.
MM11-E 00006	MM11-E 110-839>	B	FEB 70 - ADDS TWO WIRES WHICH WERE PREVIOUSLY OMITTED FROM THE WIRE LIST.
MM11-E 00007	>MM11E	A	FEB 70 - CHANGES THE SPECIFICATION FOR THE MEMORY HINGE. SPECIFIES THE USE OF SELF EXTINGUISHING PLASTIC FOR MM11-E FABRICATION.
M789 00001	ALL M789	B	MAR 70 - REVISES SEVERAL DESIGN CONSIDERATIONS; CHANGES THE ETCH LAYOUT AND SEVERAL COMPONENTS. MODULE STATUS - UNRELEASED. M789 CIRCUIT SCHEMATIC REVISION A ETCHED BOARD REVISION B
8886 00003	>8886	B	MAR 70 - ADDS DIODES TO CLAMP OUTPUT VOLTAGE SPIKES WHICH COULD EXCEED THE TRANSISTOR BREAKDOWN RATING. MODULE STATUS - UNRELEASED. 8886 CIRCUIT SCHEMATIC REVISION C
8102 00002	>PDP-11	F	MAR 70 - REPLACES THE 8881 IC WITH A 74H811 TO INCREASE SPEED. THIS MODULE CANNOT BE REWORKED IN THE FIELD. (ERROR CORRECTED BY ECO 8102-00003) 8102 CIRCUIT SCHEMATIC REVISION B ETCHED BOARD REVISION B
8103 00000	ALL PDP-11	F	MAR 70 - REPLACES SN7410N IC WITH SN74H10N TO INCREASE SYSTEM SPEED. THE MODULE CANNOT BE REWORKED IN THE FIELD. 8103 CIRCUIT SCHEMATIC REVISION B
8102 00003	>PDP-11	F	APR 70 - CORRECTS AN ERROR IN ECO 8102-00000; CHANGES 100 OHM RESISTORS TO 75 OHMS. 8102 CIRCUIT SCHEMATIC REVISION B ETCHED BOARD REVISION B
MM11-E 00008	>MM11-E	F	APR 70 - CORRECTS DIMENSIONS ON THE ETCHED BOARD DRAWING TO MEET STANDARDS.
MM11-E 00009	N.A.	F	APR 70 - CHANGES WIRING AND TUBING REFERENCES ON THE PARTS LIST.
8103 00004	ALL PDP-11	F	APR 70 - CHANGES R17 FROM A 100 OHM TRIMPOT TO A 500 OHM TRIMPOT. 8103 CIRCUIT SCHEMATIC REVISION C
8616 00001	N.A.	B	APR 70 - DELETES THE MODULE HANDLE FROM THE 8616 PARTS LIST AND ADDS IT TO THE MEMORY STACK PARTS LIST. 8616 CIRCUIT SCHEMATIC REVISION B
8616 00002	>8616	B	MAY 70 - INTERCHANGES THE POSITIONS OF THERMISTER RT1 AND RESISTOR R1. 8616 CIRCUIT SCHEMATIC REVISION C
MM11-E 00010	N.A.	F	MAY 70 - ADDS A MODULE CLIP HOLDER PART NUMBER AND ITS DESCRIPTION TO THE PARTS LIST.
MM11-E 00011	>MM11-E	F	MAY 70 - ADDS MM11-E ALIGNMENT PROCEDURE TO THE PRINT SET.
MM11-E 00012	>MM11-E	B	MAY 70 - CHANGES A HOLE SIZE AND ADDS TWO SIGNALS FOR THE 8616.

LEGEND

- FIELD CODE
  - F = Field action may be required
  - B = Change ECO
  - F = First or Field Test change
  - N = Maintenance ECO
- SYMBOL
  - > = ECO applicable to future production
- ECO CHANGES
  - Changes are coded within the synopsis. FIELD CODE changes
  - CH = Change for C, T/C and associated wiring
  - CT = Change for T/C wiring only
  - CC = Change for C/C wiring only; maintenance by DEC

MASTER DRAWING LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
A	MM11E-00002		
B	MM11E-00003		
C	MM11E-00004		
D	MM11E-00005		
E	MM11E-00006		
F	PDP11-00004		

WIRE LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
A	MM11E-00002		
B	MM11E-00004		

JUN 7 1970

LEGEND

- FIELD CODE
  - F = Field action may be required
  - B = Change ECO
  - F = First or Field Test change
  - N = Maintenance ECO
- SYMBOL
  - > = ECO applicable to future production
- ECO CHANGES
  - Changes are coded within the synopsis. FIELD CODE changes
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  - CT = Change for T/C wiring only
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MASTER DRAWING LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
H	MM11E-00009		
J	MM11E-00010		
H	MM11E-00011		

WIRE LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER

JUN 7 1970

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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

M934

ECO NO.	LOGIC OR OPTION SERIAL NO.'S AFFECTED	FIELD CODE	SYNOPSIS
			REFERENCE ECO 6102-00034
6103 C0005	ALL M810 >MM11-L	B	JUN 70 - CHANGES CIRCUITRY TO PROVIDE -6.0VDC INSTEAD OF -4VDC FOR THE SENSE AMPLIFIERS. ADDS A HEAT SINK TO J4 TO PROVIDE ADEQUATE HEAT DISSIPATION. BOTH OF THESE CHANGES ARE ORDERED FOR IMMEDIATE RETROFIT IN THE M810 UNIT AND TO BE PHASED IN ON THE MM11-E. CHANGES CIRCUITRY TO SPEED UP TURN-OFF TIME FOR THE STACK DISCHARGE CIRCUITS. THIS CHANGE IS TO BE PHASED IN ON BOTH THE M810 AND MM11-E. THE MODULE CAN BE RECOGNIZED IN THE FIELD.
6225 00003	ALL MM11-E	B	JUL 70 - REDUCES THE VALUE OF RESISTOR R22 TO 2.2K TO SPEED UP STABILIZATION OF THE A/T CURRENT REFERENCE VOLTAGE. SOLVES THE PROBLEM OF LOSS OF MEMORY DATA DURING POWER UP OR POWER DOWN.
MM11-E 00013	>MM11-E	A	JUL 70 - SPECIFIES A RECORDING OF THE MODULE MODULES.
MM11-E 00014	MM11-E 100-953>	A	AUG 70 - DELETES CONFLICTING REFERENCES TO THE IC'S ON THE 8102 FROM THE MM11E-04 LOGIC PRINT.
MM11-E A0015	MM11-L 100-953>	B	SEP 70 - CONNECTS THE SIGNAL BUS "AC LO L" FROM THE POWER BUS TO THE UNIBUS; CONNECTS THE SIGNAL BUS "DC LO L" FROM THE POWER BUS TO THE UNIBUS. THESE CHANGES ENSURE PROPER OPERATION OF THE POWER FAIL OPTION IN MULTIPLE MOS SYSTEMS. THIS ECO MUST BE INSTALLED IN CONJUNCTION WITH ECO'S M930-A0001, M811-A0007, AND 5A00475-A0004 AND IS APPLICABLE TO ALL MULTIPLE MOS SYSTEMS.
MM11-E C0016	ALL MM11-L SHIPPED JULY-DEC.,1970	B	AUG 70 - PROVIDES A COPY OF THE DA-56 WIRE TABLE AND INSTRUCTIONS FOR CORRECTING IMPROPERLY WIRED UNITS WHICH WERE SHIPPED BETWEEN JULY AND DECEMBER OF 1970. SYMPTOMS OF THIS PROBLEM INCLUDE DATA ERRORS, LOW MEMORY MARGINS, AND NON-INTERCHANGEABILITY OF 8102 MODULES.

LOGIC

M-0-0 0000
P = Page number may be required
D = Change DOC
R = Print or Print List change
M = Maintenance DOC

SYMBOL
>= DOC equivalent to future production

DOC CHANGES
Changes are coded within the numbers. First digit = type of change
DA = Change for Device and address prints (000)
DV = Change for necessary parts (000)
DM = Change for on site labor (000) Maintenance to DOC
NOTE: Changes are coded DA-DV-DM. Zeros on any change for DOC maintenance to DOC

MASTER DRAWING LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
L	MM11E-00013		
M	MM11E-00014		
P	MM11E-A0015		
R	MM11E-C0016		

WIRE LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
C	MM11E-A0015		

JUN 7 1970

MM11-F PAGE 1

ECO NO	LOGIC OR OPTION SERIAL NO.'S AFFECTED	FIELD CODE	SYNOPSIS
MM11-L L0017	MM11-L AB REQUIRED	F	JAN 71 - CORRECTS THE TEST PROCEDURE TO SPECIFY CHANGING THE STROBE SETTING FROM 210 NSEC TO 280 NSEC TO IMPROVE MEMORY PERFORMANCE. ECO MM11E-C0020 SUPERSEDES THIS 280 NSEC STROBE SETTING, RETURNING IT TO 210 NSEC. SOMETIMES CURRENT WAS TOO HIGH FOR OPTIMUM PERFORMANCE WHEN ADJUSTING THE REFERENCE VOLTAGE. CHANGES THE BINE LIST. UPDATES THE BLOCK SCHEMATIC TO REFLECT CHANGES MADE TO THE M789 CIRCUIT SCHEMATIC. UPDATES TIMING AND FLOW DIAGRAMS.
MM11-E 03719	>MM11-L	A	JAN 71 - CHANGES SLOTTING OF THE DSD PIN BLOCK BARS TO ELIMINATE ERROR OCCURRING OUT WHEN CPU4 DIAG DIAG CANNOT BE LOCATED AND REMOVED.
MM11-E 00019	M.A.	P	MAR 71 - UPDATES DOCUMENTATION TO INCLUDE THE M1801 MODULE. UPDATES PRINTS TO INCLUDE INSTRUCTIONS FOR INTERLEAVING MEMORIES.
MM11-E L2000	MM11-L with ECO MM11E-C0017	F	MAR 71 - THIS ECO RESCINDS THE STROBE SETTING SPECIFICATION OF ECO MM11E-C0017. CORRECTS THE TEST PROCEDURE TO SPECIFY SETTING THE STROBE AT 210 NSEC. SETTING IT AT 280 NSEC AS SUGGESTED IN ECO MM11E-C0017 IS TOO LATE FOR OPTIMUM PERFORMANCE.

MM11E-0001 CODE P ML V
MAY 71 PROBLEM Packaging instructions for the PDP11 memory mark are not included in the print set
CORRECTION Add packaging instructions to MM11-E drawing index list
In plant effectivity Documentation change only

MM11E D022 CODE DF ML W
MAR 72 PROBLEM Under some conditions when other options are placed along side an MM11E 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-F as required Time To Install And Test 10 Hour Kit Contents
FCO/Prints And Parts

MM11E-023 CODE P ML Y
APR 72 CORRECTION Update test procedure
In-plant effectivity -Documentation change only

MM11E-B004 CODE F ML AA WL E
MAY 72 PROBLEM 1 Strobe signals and TIME 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 Retrofit immediately
Field effectivity Retrofit all MM11-E
(A revision K is created Time To Install And Test 10 Hour Kit Contents FCO/Prints Only

LOGIC

M-0-0 0000
P = Page number may be required
D = Change DOC
R = Print or Print List change
M = Maintenance DOC

SYMBOL
>= DOC equivalent to future production

DOC CHANGES
Changes are coded within the numbers. First digit = type of change
DA = Change for Device and address prints (000)
DV = Change for necessary parts (000)
DM = Change for on site labor (000) Maintenance to DOC
NOTE: Changes are coded DA-DV-DM. Zeros on any change for DOC maintenance to DOC

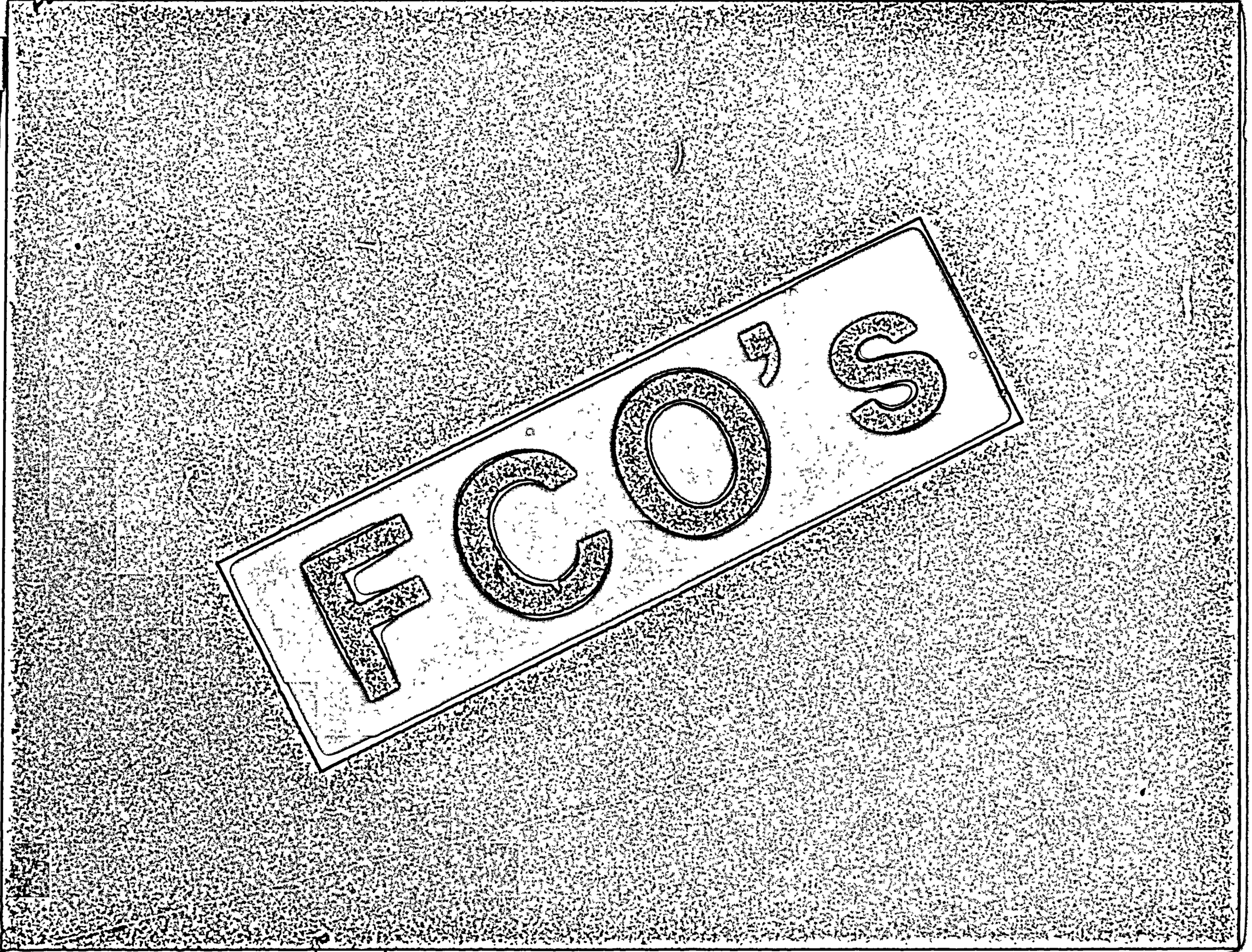
MASTER DRAWING LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
K	MM11E-C0017		
L	MM11E-D3018		
M	MM11E-D0019		
N	MM11E-C0020		

WIRE LIST REVISIONS

REV	ECO NUMBER	REV	ECO NUMBER
U	MM11E-C0017		

MAR 7 1972


FROOT LOOPS

DEC W.O. 87171

EQUIPMENT CORPORATION
ENGINEERING CHANGE ORDER

	ECO	ENGR	TR
ORIG. BY ENGR. ORG.	5	10	70
ECO RELEASE	5	27	70

TYPE OF CHANGE

ELECTRICAL	X
MECHANICAL	
MODIFIED	

CHANGE NO. M118-00015
DOCUMENTATION PROJECT NUMBER

ASY	FAB. NO.	TYPE OR DRAWING NO.
	2 5	0 7 8 2 5

MANUFACTURING PROJECT NUMBER

ASY	FAB. NO.	TYPE OR DRAWING NO.

UNIT NAME MEMORY MODEL NO. M118

PRODUCT STRUCTURE AFFECTED

ASSY. NO.	REVISION

STARTED TEST ON _____ BY _____

ESTIMATED TEST TO REPEAT 4 MINUTES

	YES	NO
DIAG. MODEL AFFECTED		X
SYSTEMS PROGRAMS AFFECTED		X
DIAGNOSTIC PROGRAMS AFFECTED		X
TECHNICAL PUBLICATIONS AFFECTED		X

BREAK-IN POINT (MANUFACTURING ONLY)

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.

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 #5408930-00001.

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 AND ECO NUMBER 5408475-00006; ECO #5408930-00001 MUST BE INSTALLED. ONE SET JUMPERS BETWEEN THE POWER BUS AND UNIBUS ARE REQUIRED FOR EACH BAY WITHIN A SYSTEM.

DRAWINGS AFFECTED

NUMBER	REV
[illegible]	[illegible]

PRODUCT LINES AFFECTED

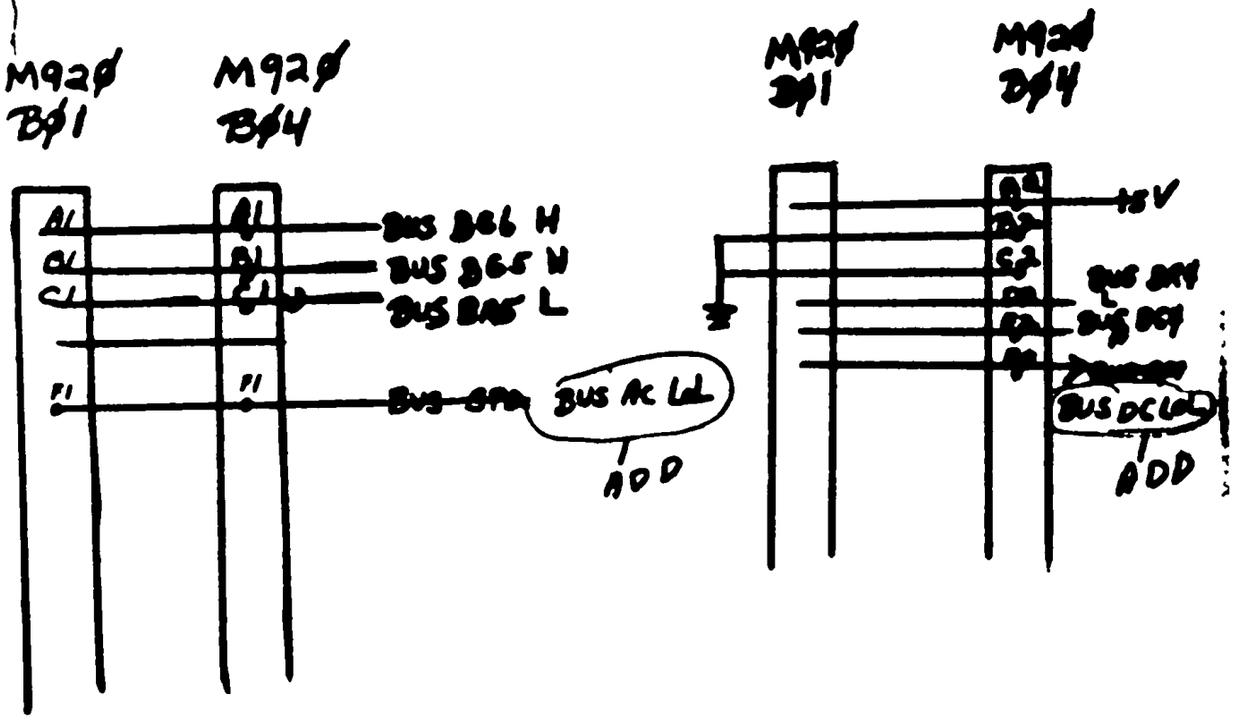
ORIGINATOR	Richard V. Manion DATE 8-3-70
PRODUCTION ENGR.	D. Call DATE 8-3-70
DESIGN ENGR.	Peter Durant DATE 8-3-70
OTHER	R. J. Farrier MSK DATE 8-3-70

JS MG

SHEET 1 OF 4

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	B C	4/4	WIRE LIST

ECO # MM11E-00015 A-ML-MM11E NEW REV. P

ADD/DELETE SHEET

MAKE ALL DELETIONS FIRST

PAGE ____ OF ____

COLOR	SIGNAL NAME	FROM PIN	TO PIN	COMPONENTS	ADD	DEL.
	BUS ACLOL	B04 F1	A03R2		X	
	BUSDCLOL	B04F2	A03S2		X	

ECO NUMBER MM11E-00015

MADE BY Jane [illegible]

DRAWING NUMBER AFFECTED

CODE	SIZE	NUMBER	NEW REV LTR
11L	K	MM11-E-07	C

W.O. 87568

EQUIPMENT CORPORATION
ENGINEERING CHANGE ORDER

TYPE OF CHANGE
ELECTRICAL X
MECHANICAL
MODULES

CHANGE NO. M8118-00016
DOCUMENTATION PROJECT NUMBER
ASY | FORM | LVL | TYPE DOCUMENT NO.
3 3 0 7 6 2 1 1
MANUFACTURING PROJECT NUMBER
ASY | FORM | LVL | TYPE DOCUMENT NO.

UNIT NAME PDP-11 MEMORY MODEL NO. M8118

MODEL NO.	MODIFICATION

	YES	NO
		X
		X
		X
		X
		X

BREAK-IN POINT
SER. #100 THRU 953 AND
ALL FUTURE.
ALL IN PROCESS.

PROBLEM:

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

CORRECTION:

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

DRAWINGS AFFECTED

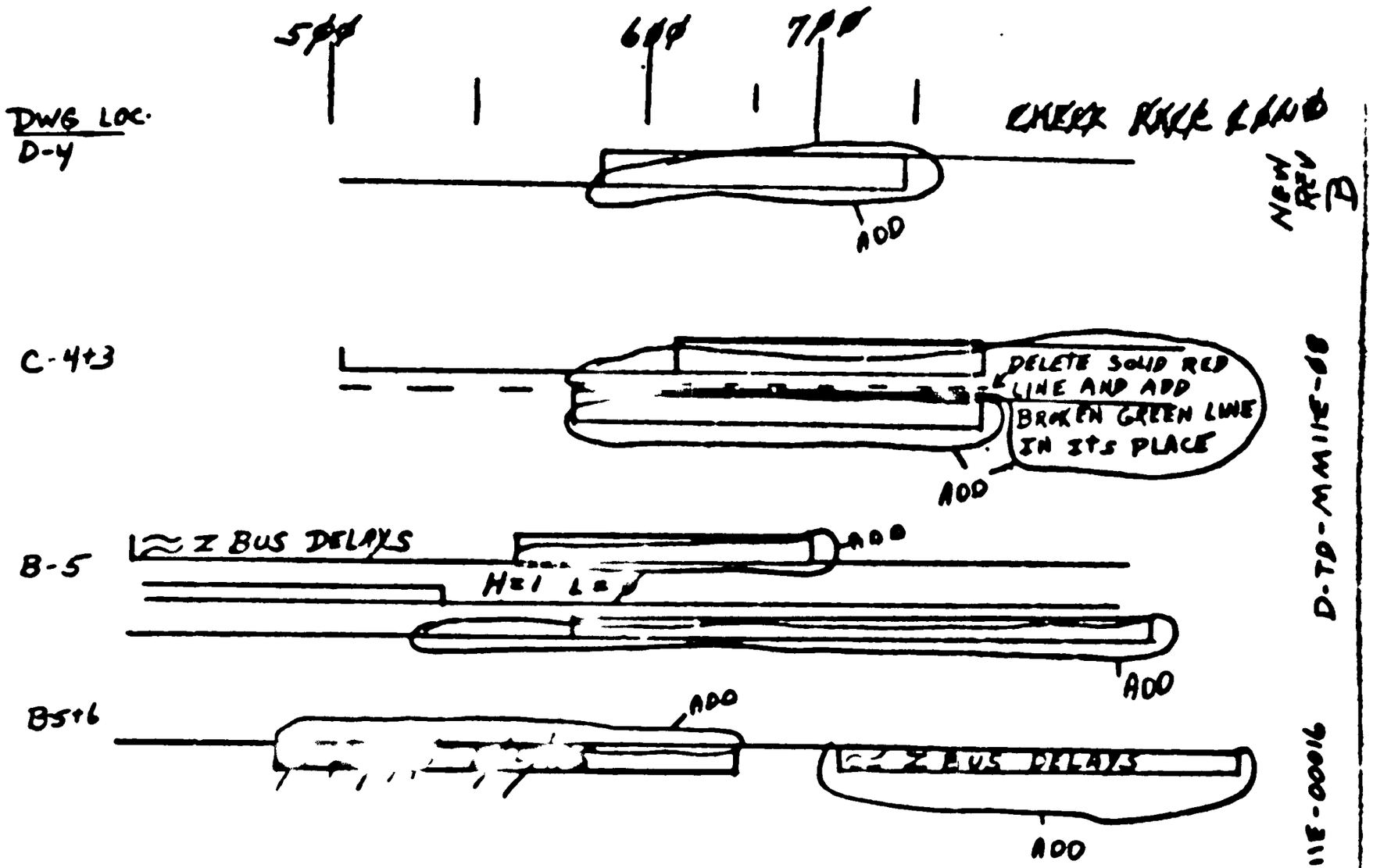
NUMBER	CHG	NEW
A-MC-M8118-0-0	X	
B-SD-M8118-0-0	X	
C-MS-7003448-0-0	X	
D-MC-2004468-0-0	X	

PRODUCT LINES AFFECTED
M8118

ORIGINATOR Richard V. Manion M-2814 DATE 8-2-70
PRODUCTION ENGR. D. Call DATE 8-3-70
DESIGN ENGR. Peter Durant DATE 8-3-70
QUALITY ENGR. R. J. FISHER ACK DATE 8-4-70

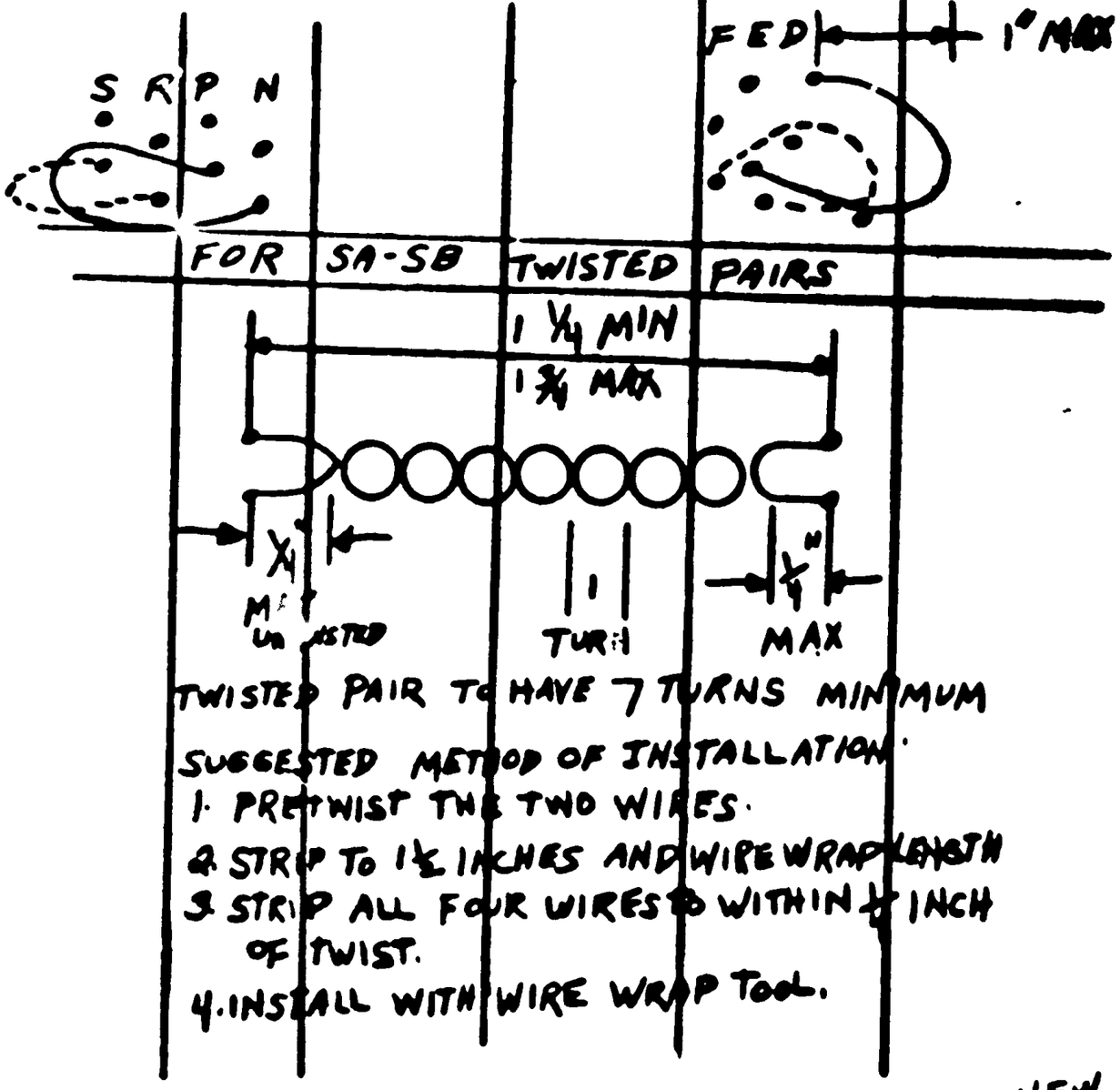
JS

SHEET 1 OF 1



ECO # MM 11E-00016 D-TD-MM11E-00

LENGTH SHOULD BE A MAXIMUM OF 2¼ INCHES. CHECK DRAWINGS FOR LENGTH AND FOR HOW LOOPS SHOULD BE DRESSED INTO LOGIC.



TWISTED PAIR TO HAVE 7 TURNS MINIMUM

SUGGESTED METHOD OF INSTALLATION.

1. PRETWIST THE TWO WIRES.
2. STRIP TO 1½ INCHES AND WIRE WRAP LENGTH
3. STRIP ALL FOUR WIRES TO WITHIN ½ INCH OF TWIST.
4. INSTALL WITH WIRE WRAP TOOL.

ECO= MM11E-00016 D-AD-700648-0-0 NEW REV C

DWG NO.	REV LET
D-AD-7006468-0-0	~~B~~ C
A-PL-7006468-0-0	~~B~~ C
D-TD-MM11-E-~~0~~8	~~A~~ B

ECO# MM11E-00016 A-ML-MM11-E NEW REV. N

ENGINEERING CHANGE ORDER

ECO NO. M11E-00017
Sheet 1 of 4

ORIGINATOR	RECEIVED CHG. DATE	ISSUED ECO DATE	FINAL RELEASE DATE	DISCRETE PROJECT NUMBER
RICHARD MANION DATE 12/15/70 EXT. 2005	12/22/70	1-22-71		11 07602

EQUIPMENT AFFECTED

TYPE CHANGE	UNIT TO BE CHANGED	CHECKLIST	YES	NO
ELECTRICAL ☒ MECHANICAL ☐ MODULE ☐ SUBASSEMBLY ☐ MFG. & PROCEDURE ☐	M11-E	SHOP MODEL	☐	☒
		SYSTEMS PROGRAMS	☐	☒
		DIAGNOSTICS	☐	☒
		TECHNICAL PUB.	☒	☐
		TEST PROGRAMS	☐	☒
		TESTER	☐	☒
		MFG/FIELD PROCEDURE	☐	☒
		PACKAGING INSTRUCTIONS	☐	☒
		TOOLING	☐	☒
TEST INFORMATION SERIAL # BY	PRODUCT LINES PDP11			

BREAK IN POINT

SYSTEM	MODULE/OPTION	FIELD RETROFIT	REWORK	CODE
	M11-E	DISTRIBUTED FOR FIELD SERVICE INFORMATIOJ ONLY		05

SIGNIFICANCE

- REQ. TO MEET SPECIFICATION ☐
- PROD. IMPROVEMENT ☒
- CUSTOMER/FIELD REQ. ☐
- FACILITATE MFG. ☐
- DRAWING CORRECTION ☒
- VENDOR ☐

PROBLEM 1. WAS 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.
2. WIRE LIST WAS NOT CHANGED ACCORDING TO ECO # M11E-00015.
3 BLOCK SCHEMATIC DOES NOT REFLECT CHANGES OF M729 CIRCUIT SCHEMATIC
4.TIMING AND FLOW DIAGRAM NEEDS TO BE UPDATED.
5. WRITING IN MARGIN

CORRECTION
1. CHANGED TEST PROCEDURE TO IMPROVE MEMORY PERFORMANCE.
2. CORRECT WIRE LIST ACCORDING TO SUBMITTED ADD/DELETE SHEET.
3. UPDATE BLOCK SCHEMATIC PER ATTACHED MARKED UP PRINT.
4. UPDATE TIMING AND FLOW DIAGRAM AS INDICATED .
5. REMOVE WRITING FROM MARGIN.

ENGR R DEWART
ENGR D. [illegible]
ENG. MGR
FIELD SERVICE (ADVISORY) J. RUZYOLSKI

SEE REVERSE SIDE FOR

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 LO L	B04F1	A03R2		X	
BUS DC LO L	B04F2	A03S2		X	

DEA. 240

SEE REVERSE SIDE FOR INSTRUCTIONS

ENGINEERING CHANGE ORDER DOCUMENT & MATERIAL CHANGE

ECO NO. M611E-00017

Sheet 2 of 4

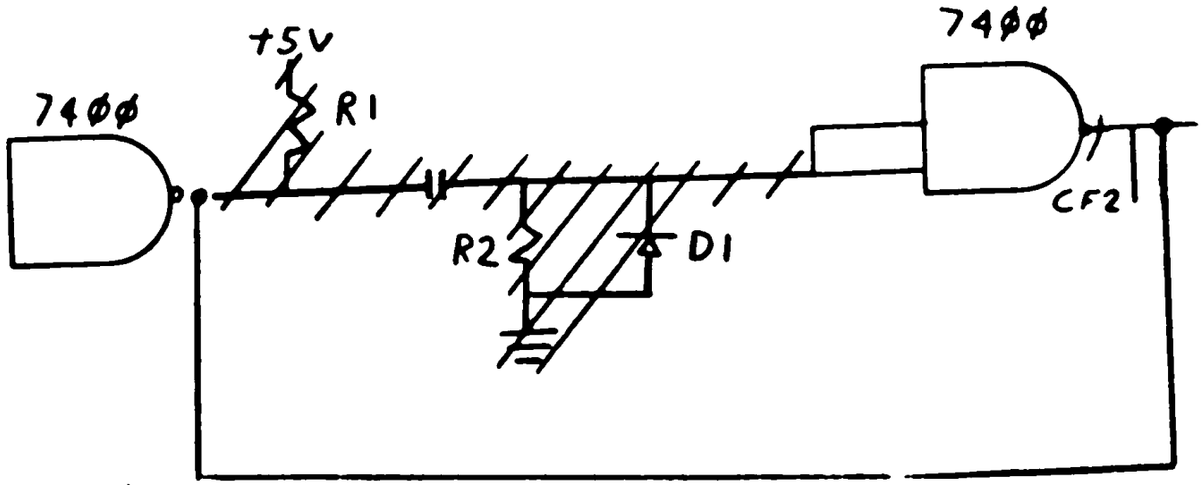
ITEM	DRAWING NUMBER / PART NUMBER	OLD REV	NEW REV	(PART NAME) DESCRIPTION OF CHANGE	DISP CODE
1	A-ML-M611-E	P	R	(MASTER LIST) UPDATE REVISION LEVEL ON THE FOLLOWING DRAWINGS: D-BS-M611-E-05 FROM A TO B K-WL-M611-E-07 FROM C TO D D-TD-M611-E-08 FROM B TO C A-SP-M611-E-11 FROM O TO A	06
2	D-BS-M611-E-05	A	B	(BLOCK SCHEMATIC) SEE MARKED PRINT THIS ECO.	06
3	K-WL-M611-E-07	C	D	(WIRE LIST) SEE ADD/DELETE SHEET THIS ECO.	06
4	D-TD-M611-E-08	B	C	(TIMING DIAGRAM) DELETE CHECK RACE COND. IN MARGIN. INCREASE TIME AND FLOW IN DIS2 BEFORE 650NS. INCREASE TIME AND FLOW IN CIN2 BEFORE 350 NS.	06
5	A-SP-M611-E-11	-	A	(ENGINEERING SPECIFICATION) DELETE FROM PARA. 11.0 210 NS . 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	Rework 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
		Return	00

DRA 112A

SEE REVERSE SIDE FOR INSTRUCTIONS



ECO# MM11E-00017 0-BS-MM11-E-Ø5 NEW REVB

ENGINEERING CHANGE ORDER

W.O.3628 CE DH

ECO NO. MM11B-00020 Sheet 1 of 3

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

EQUIPMENT AFFECTED

TYPE CHANGE		UNIT TO BE CHANGED	CHECKLIST	YES	NO
ELECTRICAL	☒	MM11E	SHOP MODEL	☐	☒
MECHANICAL	☐		SYSTEMS PROGRAMS	☐	☒
MODULE	☐	PRODUCT LINES	DIAGNOSTICS	☐	☒
SUBASSEMBLY	☐	PDP11	TECHNICAL PUB.	☒	☐
MFG/FIELD PROCEDURE	☐		TEST PROGRAMS	☐	☒
TEST INFORMATION			TESTER	☐	☒
SERIAL #			MFG/FIELD PROCEDURE	☒	☐
BY			PACKAGING INSTRUCTIONS	☐	☒
			TOOLING	☐	☒

BREAK IN POINT

SYSTEM	MODULE/OPTION	FIELD RETROFIT	REWORK	CODE
	MM11E	DISTRIBUTED FOR FIELD SERVICE INFORMATION ONLY		06

SIGNIFICANCE

- REQ. TO MEET SPECIFICATION ☐
- PROD. IMPROVEMENT ☒
- CUSTOMER/FIELD REQ. ☐
- FACILITATE MFG. ☐
- DRAWING CORRECTION ☒
- VENDOR ☐

FIELD SERVICE COPY F

1) WANTED TO IMPROVE MEMORY PERFORMANCE. STROBE AT 220 NS AS SUGGESTED IN ECO MM11B-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: F.T. ECO MM11B-00017 PROBLEM 1. IF THE CORRECTION FOR PROBLEM (1) IN ECO MM11B-00017 WAS NOT PERFORMED IT WILL NOT BE NECESSARY TO IMPLEMENT CORRECTION (1) OF THIS ECO.

APPROVAL

DESIGN ENGINEER R. DURANT 3/2/71 ENG. MGR. _____

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

CHIEF ENGINEER _____

DEA 1114

SEE REVERSE SIDE FOR INSTRUCTIONS

	ENGINEERING CHANGE ORDER DOCUMENT/MATERIAL	ECO NO. M111B-00020 Sheet 2 of 3

ITEM	DOCUMENT/DR PART NUMBER	OLD REV	NEW REV	(PART No.) DESCRIPTION OF CHANGE	DISP CODE
1	A-ML-M111-E	T	U	(MASTER LIST) UPDATE REVISION LEVEL OF ITEM 3 THIS ECO	06
2	A-ML-M111-EX	-	A	(MASTER LIST) SAME CHANGE AS ITEM 1 THIS ECO	06
3	A-SP-M111E-11	A	B	(TEST PROCEDURE) SHEET 4 OF 5: DELETE 220 HS IN PARAGRAPH 11.0 ADD 210 HS DELETE -5.3V IN PARAGRAPH 12.0 ADD -5.2V UPDATE REVISION LEVEL ON ALL SHEETS	06

DISPOSITION CODES

Use up Present Stock	01	Retrofit to Stock-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
		Return	00

DRA 112A

SEE REVERSE SIDE FOR INSTRUCTIONS

FIELD SERVICE NOTES:

ECO MM116-00020
Page 1 of 1

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 $ N/C, 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:

[redacted]

ENGINEERING
CHANGE ORDER 823

ORIGINATOR Richard Manion
TEL EXT 2005 DATE 3/13/72
DEC PROJ NO. 11 07602
COST CENTER NO. 392 A.K

ECO NO. MM11E-00028
SHEET 1 OF 3
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/E they fail to operate correctly.

UNIT TO BE CHANGED

MM11/E
Memory

DISP CODE 06

CORRECTION

Install a module protection plate.

OPTIONS AFFECTED

MM11/E

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
1.	C-DI-MM11-E-01	D	E	06	(Drawing Index Memory) Change per this ECO.
2.	7408490	-	-	07	(Module Protection Plate) Add quantity of 1 to drawing index.
3.	A-ML-MM11-E	V	W	06	Update per item 1.

DOCUMENTATION AFFECTED
- ☐ MODEL
- ☐ DIAGNOSTICS
- ☐ TECH MANUAL
- ☐ TESTER
- ☐ TEST PROG
- ☐ TOOLING
- ☐ FIELD INST
- ☐ ENG SPEC
- ☐ PURCH SPEC

FIELD SERVICE APPROVED
- ☒ YES ☐ NO
- ☐ Customer Change
- ☒ Product Line Change

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 – RETURN IMMEDIATELY (RETROFIT)
04 – (DELETED)
05 – (DELETED)
06 – DOCUMENT CORRECTION
07 – NEW ITEM (THIS ASSY ONLY)
08 – NEW ITEM (THIS & LOWER ASSY)
09 – SCRAP IMMEDIATELY

APPROVAL SIGNATURES

Typewritten / Hand Signature

DESIGN ENGR Pete Durant /s/ Durant
ENG MGR (OPT)
FIELD SERVICE (OPT)
CHKP ENGR (MODULES ONLY) /s/ [illegible]

FIELD CHANGE ORDER

FCO MM11E - D 0022

PAGE 1 OF 1

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

* 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 SERVICE

MM11-E Memory Assembly

FIELD SERVICE IS APPROPRIATED IN 5 % OF UNITS DEFINED ABOVE

[X] NO CHARGE TO CUSTOMER - ALL DEC INSTALLATION LABOR AND MATERIAL ARE TO BE SUPPLIED UNDER A "NO CHARGE CODE."

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

ESTIMATED QUANTITY 0 ____ FCO'S 0 ____ DEC-SERVICE LABOR 0 ____

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

FIELD OFFICE FCO DISTRIBUTION CODE

[F] F - IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES
[ ] BF - IMMEDIATE FCO DISTRIBUTION TO GENERAL PRODUCT SUPPORT AND TO OFFICES WHERE SPECIAL EQUIPMENT IS LOCATED.

FCO SET INCLUSION

[ ] THIS WILL INITIATE DISTRIBUTION OF FCO SETS AS DEFINED BELOW IN ACCORDANCE WITH THE DEC CONFIGURATION FILE.
[X] FIELD DISTRIBUTION ORDERS (FDO'S) WILL BE GENERATED WHERE, AS DEFINED BELOW, SETS ARE ORDERED AS REQUIRED.

CONTENTS OF ARE FOR INSTALLATION ONLY				FCO ESTIMATED FOR SITE WILL BE DISTRIBUTED FOR A LIMITED USE IN THE DEC CONFIGURATION FILE IN THE SERVICE STATUS LOCATION
FCO	FCO	REMOVE		
CONTENTS OF ARE FOR				
FCO	FCO			J N E W
	X	A		

[ ] PRINT CHANGES ARE AN INTEGRAL PART OF THIS FCO AND ARE TO BE MADE MANUALLY IN RED AND ORDERS FOR REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST

DATE ASSOCIATED DEC'S 3C010

ESTIMATED SERVICE TIME FOR INSTALLATION AND TESTING 1.0 HOURS

SPECIAL TEST EQUIPMENT, TOOLS, OR SUPPLIES

LAST PREVIOUS FCO'S C020, 0016, 015

RELATED OR PREREQUISITE FCO'S

[ ] HARDWARE CHANGE
[ ] MAINTENANCE MANUAL CHANGE
[ ] OPERATIONAL PROGRAMS AFFECTED

VERIFICATION MARKINGS

INSTALLATION AND TEST PROCEDURES

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

PARTS REQUIRED

Q1 74-08490 Module Protection Plate

NOTES

FIELD SERVICE APPROVAL

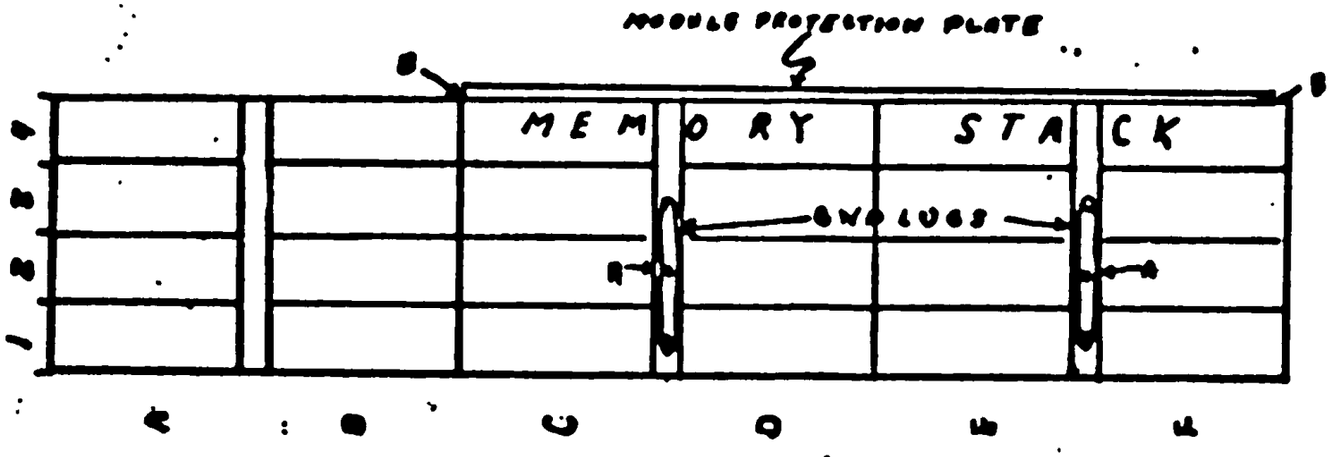
Charles Dewey _____ _____ OK

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

ECO MM11E-00022 SHEET 2 OF 2

MMNF REWORK SHEET

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.



	TITLE ALTOS FW200	DWG NO.	GRAPHIC DESCRIPTION
		DWG LOC	

	CHANGE ORDER R. Manion 1-3 TASK 2105 DATE 5-6-72 DESCRIPTION NO. D-96-6122 COST CENTER NO. 392 A.F.	ECO SHEET 1 DATE RECEIVED 5-9-72 FIRST ISSUE 5-11-72 FINAL ISSUE 6-28-72

PROBLEM

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

UNIT TO BE CHANGED

MM11-E

EMP CODE 03

CORRECTION

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

OPTIONS AFFECTED

MM11-E

BREAK-DOWN/EFFECTIVITY

All MM11-E's shipped after May 12 will have this ECO.
Rework MM11-E's where necessary, all MM11-E's with this ECO, Mod 3 with ECO 9.

PRODUCTS AFFECTED

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

ITEM NO.	DOCUMENT/PART NO.				DESCRIPTION OF CHANGE
1	D-UL-MM11-E-09	D	E	06	Wire List Update
2	D-AD-7006468-0-0	D	E	06	Wire Ass'y MM11-E See final release print.
3	D-BD-MM11-E-03	A	B	06	Core Memory stack (2 sheets) See final release print.
4	A-UL-MM11-E	Z	AA	06	UPDATE PRINT PER THIS ECO.
5	C-BD-MM11-E-04	E	F	06	UPDATE PRINT PER THIS ECO
6	A-PL-7006468-0-0	D	E	06	UPDATE REV PER THIS ECO

DOCUMENTATION AFFECTED

- ☐ MODEL
- ☐ DIAGNOSTICS
- ☐ TECH MANUAL
- ☒ TESTER
- ☐ TEST PROG
- ☐ TOOLING
- ☐ PLO DIST
- ☐ ENG SPEC
- ☐ PURCH SPEC

FIELD SERVICE AFFECTED

- ☒ YES ☐ NO
- ☐ Customer Change
- ☐ Product Line Change

TYPE OF CHANGE

- ☒ ELECTRICAL
- ☐ MECHANICAL
- ☐ MODULE
  - ORDER PR MODEL
    - ☐ YES
    - ☐ NO

DISPOSITION CODES

[illegible]

APPROVAL SIGNATURES

Originator / Board Signature

DESIGN ENGR Pete Barnet

ENG MGR (OPT)

FIELD SERVICE (OPT)

CHIEF ENGR (MODULES ONLY)

[illegible] FOR DISTRIBUTION [illegible] TO FILL OUT FORM FULLY)

ENGINEERING CHANGE ORDER ADD/DELETE SHEET	ECO NO. MM11E-00024 Sheet ___ of ___

W[illegible] NO. K-WL-MM11-E-07

TITLE MM11E

MAKE ALL DELETIONS FIRST WHEN INSTALLING

SIGNAL NAME	FROM PIN	TO PIN	COMPONENTS		ADD	DEL
T[illegible]N	[illegible]Ø2V2	DØ1A1	REMARKS			X
[illegible]LDØ1IN	CØ1F2	CØ2C1			X	
STA[illegible]ØN	CØ1F1	DØ2S1				X
STA[illegible]Ø1N	C71A1	EØ2S1				X
TINHØN	D[illegible]2E1	EØ1S1				X
TINH1N	EØ1H2	F11F1				X
STA[illegible]Ø1N	C11E1	DØ2S1	WHT	TWP	X	
END	C11C2	DØ2T1	BLK		X	
STA[illegible]Ø1N	C11A1	EØ2S1	WHT	TWP	X	
END	C11C2	EØ3T1	BLK		X	
TØINH	EØ1S1	DØ2E1	WHT	TWP	X	
END	E11C2	DØ1C2	BLK		X	
T1INH	E11H2	F11E1	WHT	TWP	X	
END	E11C2	F11C2	BLK		X	

DRA, 340

FIELD CHANGE ORDER

PCO MM11E - B 0024

PAGE ___ OF ___

DATA PROCESSING AND DEC-ECO-LOG WILL POST THIS PCO 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-E's

FIELD RETROFIT IS ANTICIPATED IN 100 % OF UNITS DEFINED ABOVE

[X] NO CHARGE TO CUSTOMER – ALL DEC INSTALLATION LABOR AND MATERIAL ARE TO BE REPORTED UNDER A "W" CHARGE CODE

[ ] STANDARD APPLICABILITY – THIS PCO 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 PCO IS INSTALLED BY DEC THE DEC LABOR CHARGE ASSUMES PCO 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 PCO DISTRIBUTION CODE

[P] F IMMEDIATE PCO DISTRIBUTION TO ALL DEC FIELD OFFICES
DF IMMEDIATE PCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT AND TO OFFICES WHERE SUBJECT EQUIPMENT IS LOCATED.

LAST PREVIOUS PCO'S D022, C020, C017

RELATED OR PREREQUISITE PCO'S M729-00003

PCO KIT DISTRIBUTION

[ ] PSHC WILL INITIATE DISTRIBUTION OF PCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE EDP CONFIGURATION FILE

[X] [redacted] KITS, AS DEFINED BELOW MAY BE ORDERED AS REQUIRED

[ ] MAINDEC CHANGE
[ ] MAINTENANCE MANUAL CHANGE
[ ] OPERATIONAL PROGRAMS AFFECTED

CONTENTS OF AN PSHC INITIATED KIT

P/O	PCO	PRINTS	PARTS	

CONTENTS OF A FIELD ORDERED KIT

P/O	PCO	PRINTS	PARTS	
	X	X		

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

D	H	K	W			

VERIFICATION MAINDECS

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

INSTALLATION AND TEST PROCEDURES

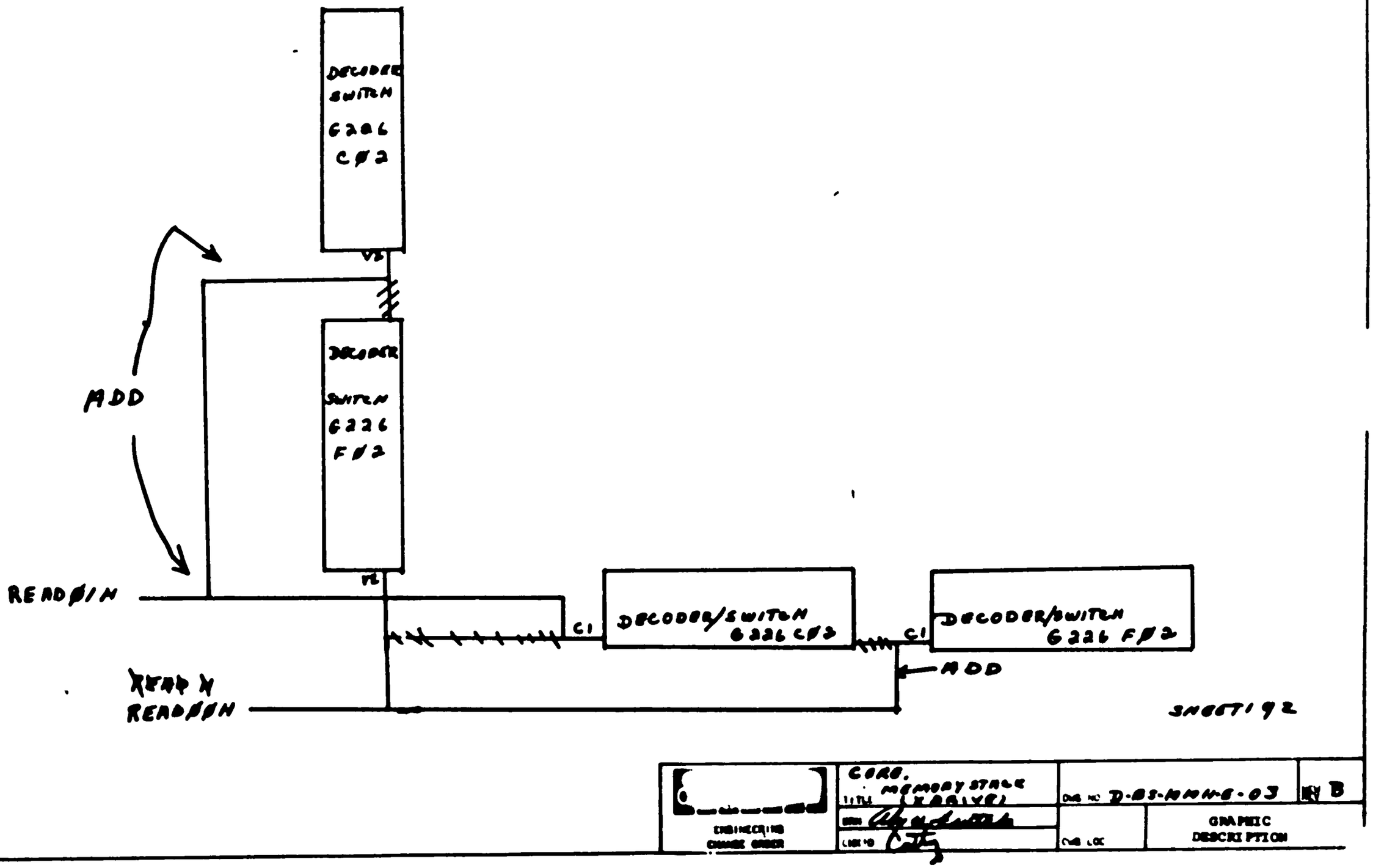
PARTS REQUIRED

REMARKS

Necessary to improve reliability on existing units.

FIELD SERVICE APPROVAL

Art Zins _____ _____ 5/11 5/17 (1534) 5/17 800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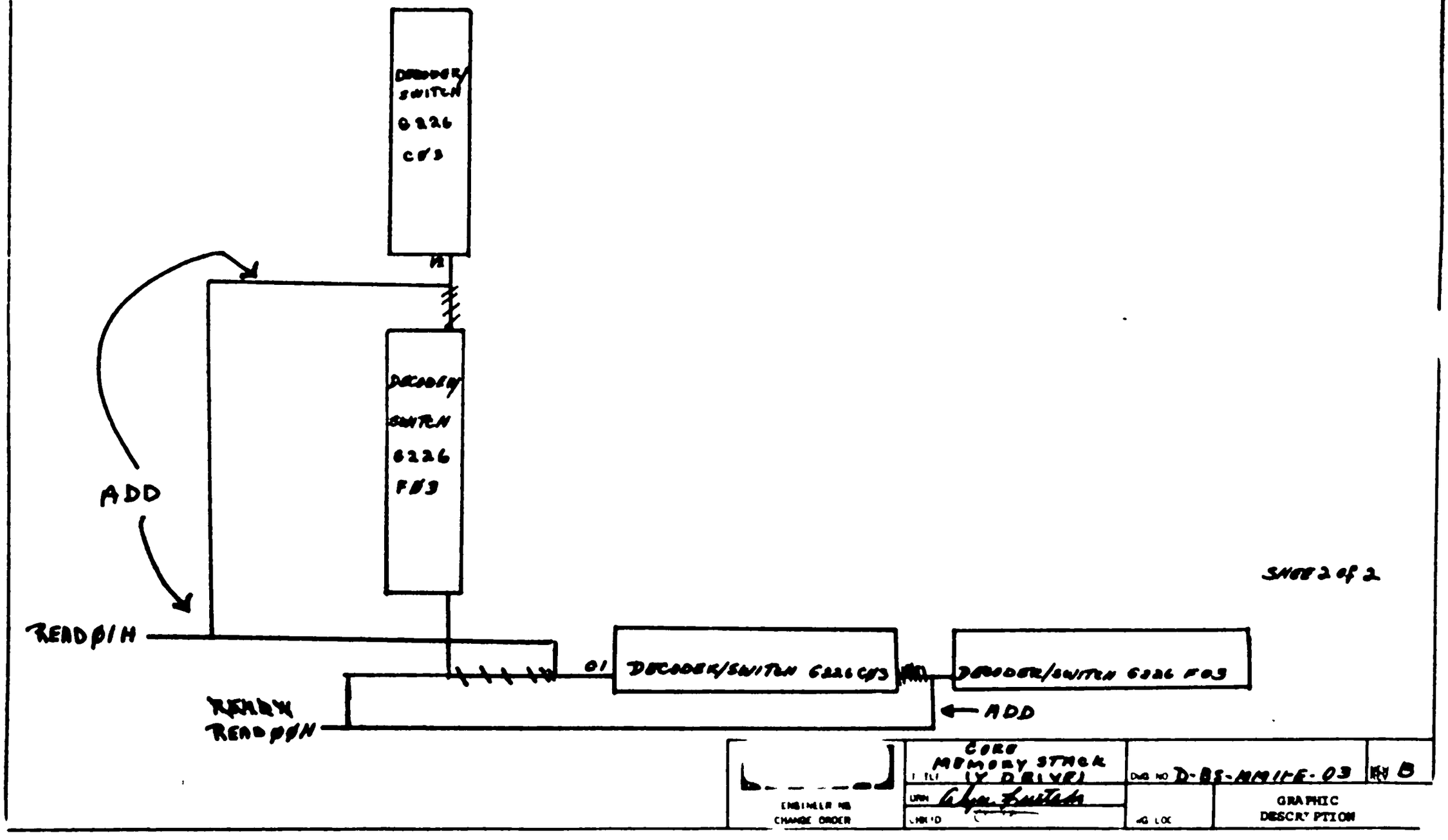
V2
DECODER SWITCH 6226 F#2
V1
ADD
READ IN
C1
DECODER/SWITCH 6226 C#2
C1
DECODER/SWITCH 6226 F#2
ADD
READ N
READ IN
SHEET 192
CORE MEMORY STACK (ARRAYS)
D-BS-NNNE-03
REV B
ENGINEERING CHANGE ORDER
GRAPHIC DESCRIPTION

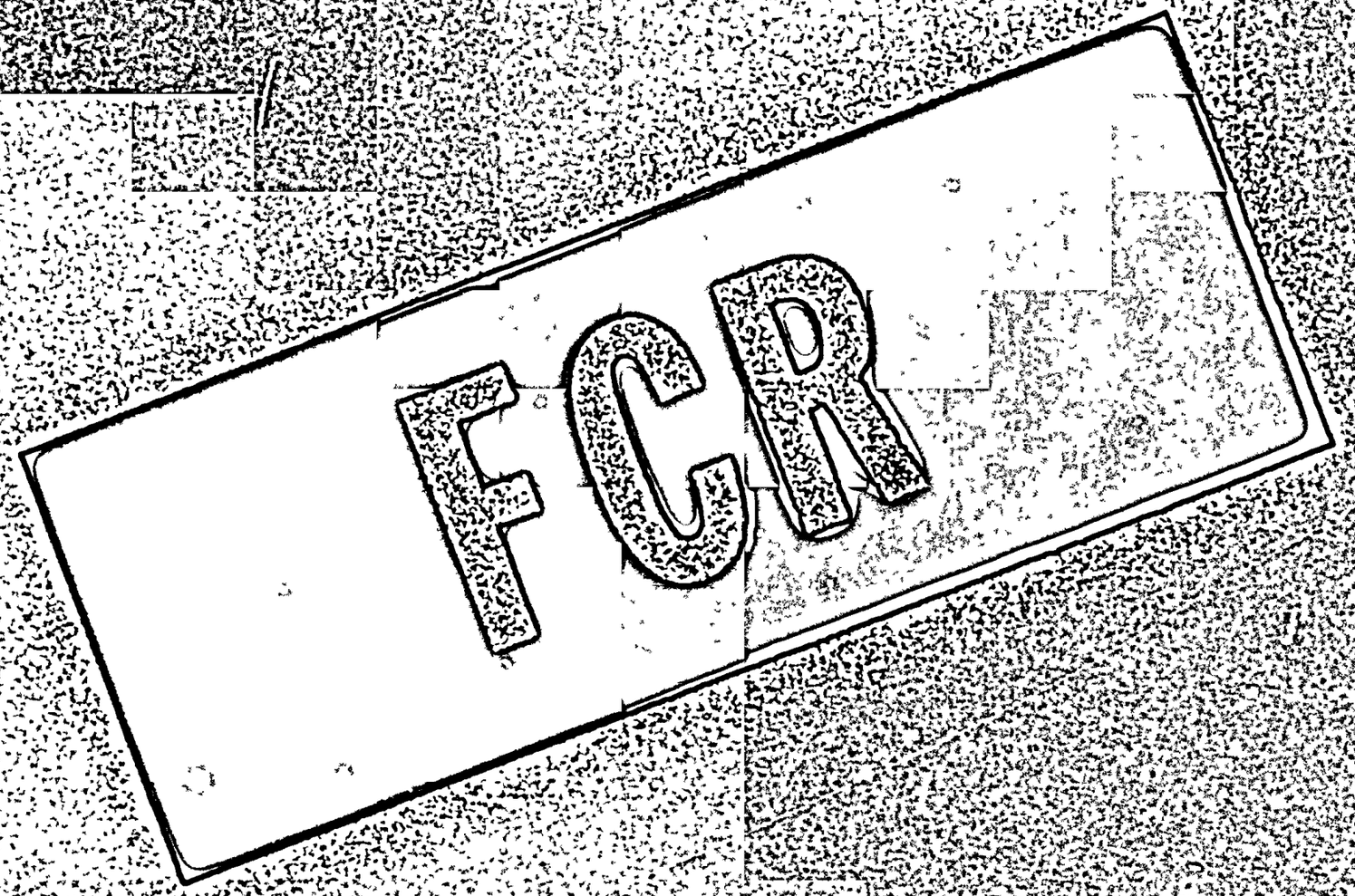

DECODER/SWITCH 6226 CF3
DECODER SWITCH 6226 F03
ADD
READ Ø1H
01
DECODER/SWITCH 6226 CF3
DECODER/SWITCH 6226 F03
READ Ø1N
READ Ø4N
ADD
SHEET 2 of 2
ENGINEER NO
CHANGE ORDER
CORE MEMORY STACK (Y DRIVE)
DRN
CHK'D
DWG NO D-BS-MM1E-03
REV B
SIZE
GRAPHIC DESCRIPTION

WIRE TABLE

END			CLR	WIRE TWP	SIGNAL TO INNER GND	POWER SUPPLY	DIGITAL SIGNALS	UNIT BUS	BACKSHELL TYPE
					TIMING GND	TIMING SIGNALS	POWER SIGNALS	UNIT BUS	TWP
					STROBE/EN GND	CNTL SIGNALS	DIGITAL DATA	UNIT BUS	TWP

ADD

	WIRED ASS'Y TITLE MMJ1-6	DWG NO. 8-80-7005/15-6-0	REV E
	DRN Gilbert Engineering		
	CHK'D	WT. LBS.	FINISH PER SPEC


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

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 8081 IC's.
NEW REVISION
Exchange with CS B or later.

G103-C0002 MAR 70
QUICK SYNOPSIS
Increases system speed.
QUICK CHECK
7410 IC replaced by 74H10 IC.
NEW REVISION
Rework etch B, C to CS B.

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.

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.

G103-C0005 JUN 70
QUICK SYNOPSIS
Provides increase to -6.8VDC 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.

G225-C0003 JUL 70
QUICK SYNOPSIS
Speeds stabilization of X and Y current generator reference voltage.
QUICK CHECK
R22 changed from 4.7K ohms to 2.2K ohms
NEW REVISION
Rework etch B to CS B.

MM11E-C0016 AUG 70
QUICK SYNOPSIS
Provides wire table and wiring instructions to ensure correct memory margins and G102 interchangeability

MM11E-A0015 SEP 70
QUICK SYNOPSIS
Connects AC LO L and DC LO L signal from the Power Bus to the Unibus to ensure proper Power Fail
QUICK CHECK
BUS AC LO L tied to pin F1
NEW REVISION
Rework to Wire List B.

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 R [illegible] are 390 ohms.
  NEW REVISION
  Rework etch B to CS A.

- **5409475-C0006 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 B04P2 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 E6 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-E'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 6 to E3 pin 1.
NEW REVISION
Rework etch B, C to CS C.

M7280-C0003 MAY 72
QUICK SYNOPSIS
Reduced inductance of the TWH H etch corrects 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.

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

NAME	ECO#	QTY	PART NUMBER	COMMENTS & DESCRIPTION
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 76

MM11-E MEMORY	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLE
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		NOTE: 1) Rework multiple box systems only 2) Must have ECO 5408475-00006 and M930-00001 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-E2		NIL				
C 00020	03/71				NOTE: 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	NOTE: Must have ECO M729 #3 Black wire of twisted pair from E01-C2 to F01-C2.		NIL				

REVISION DATE MAY /76

MM11-E	MEMORY	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF

ECO	RELEASE DATE	CS	ETCH / WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED
00025	05/76				NOTE: Documentation change		NIL				

REVISION DATE _____

MM11-F 4K 16 BIT MEMORY	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF

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

REVISION DATE JULY/77

G102 SENSE INHIBIT CARD	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF 1

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION = NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	3/70		C		NOTE: Documentation change		Nil					
B 00002	3/70	B	D	0.5	E5 is a DEC I.C. 74H01-1 E5 is the 1st I.C. from AS1	1	19-09849					
B 00003	4/70	B	D		NOTE: Supplement to ECO # 2 R4 is a 75 ohm 1/8W resistor R4 is the 1st resistor from AA1	8	13-03064					
C 00004	6/70	C	D	.5	R2 is a 56 ohm ¼W 5% resistor R2 is the 1st resistor above E2 E2 is a DEC transformer	4 4 1	10-00027 13-09995-0 16-09996-0					
00005	6/71		D		NOTE: See ECO # B6		Nil					
B 00006	4/71	D	D	.25	C3 is a 120 MMF 5% capacitor C3 is the closest capacitor from AA1	4	10-00018					
00007	06/77	E	D		NOTE: 1) PHASE IN DEC 7438 TO REPLACE 74H0.-1 AT E5 2) CHANGES FCO #2 E5 IS A DEC 7438 E5 IS THE LAST I.C. FROM AS1	1 OR 1	19-0949-00 19-11219-01 (SEE ECO #7)					

REVISION DATE _____

3103 MEMORY LEVELS & GATES	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED
00001	1/70	A	A		NOTE: Print update		N/A				
C 00002	3/70	B	A	.5	E2 is a I.C. DEC 74H10 E2 is the 1st i.c. from AH1	3	19-09057				
00003	3/70		A		NOTE: Print update		Nil				
C 00004	4/70	C	A	.25	R17 is a 500 ohm trim pot R17 is located in bottom left corner	1	13-05631				
C 00005	6/70	D	A	1.0	R1, R2 are 56 ohm, ¼W, 5% resistors R1 & R2 are the two resistors just right of R4 R4 is the 10W resistor nearest the top right corner	2 2 1 2 1 1 1 1	13-02602 13-09994-0 13-00295 10-00027 11-09991 11-09990 16-09996-0 12-100001-0				
00006	2/71	E	A		NOTE: Print change		Nil				
C 00007	1/72	F	A	.25	C11 is a .22 mfd 50V capacitor C11 is the only capacitor left of the two transistors at AC1	1	10-10274				

REVISION DATE

G225 X - Y CURRENT GENERATOR	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED
C 00003	7/70	B	B	1.0	R22 is a 2.2K ¼W 5% resistor R22 is the 3rd resistor from bottom left corner	1	13-00417				
00004	7/70	C	C		R5 is a 680 ohm ¼W 5% resistor R5 is the 1st resistor from AA1	4 4 4	12-02313 13-00347 13-00394				
00005	8/70	C			NOTE: Print change		Nil				
00006	9/70	D	D		NOTE: New etch rev		Nil				
C 00007	5/71	E	D	1.0	NOTE: Rework only "D" etch boards Insulating washers on all four heat sinks are tight and can not be rotated.	4	90-08493 90-08268 (thermal compound)				

REVISION DATE MAR/77

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 CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL (PRT	DATE INSTALLED	CE INIT
00001	11/69	A	C		C22 is a .1ufd 50V capacitor C22 is below the two ¼W 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 ¼W 5% resistor		N/A					
C 00004 &A &B	11/71	D	D	0.5	C22 is a .22 ufd 50V capacitor C22 is below the two ¼W resistors on board which are separated by a capacitor	1	10-10274					

REVISION DATE DEC/75

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 CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED
NONE					NOTE: NO ECO's						

REVISION DATE DEC/75

M729 MM11-E Control Logic	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1
		MM11-E										

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED
00001	03/70	A	B		NOTE: 1) New etch rev 2) Rework Etch "A" Revs 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 2) Rework etch "B" rev only (ECO #3 has better rework instructions) No capacitor between the 270 OHM and 390 OHM resistors located near the upper left hand corner		NIL				
C 00003	06/72	C	C	1.5	NOTE: ECO# 3 contains ECO #2 & #3 rework instructions for all etch revs Measure an open CKT from E04-09 to E09-01 E09 is the 4th I.C. from AK1	1	19-05547	DZQCQ			
&A								DZQCA			
&B	01/73							DZQKB			

REVISION DATE

M1091 DEVICE SELECT	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PA 1 0.

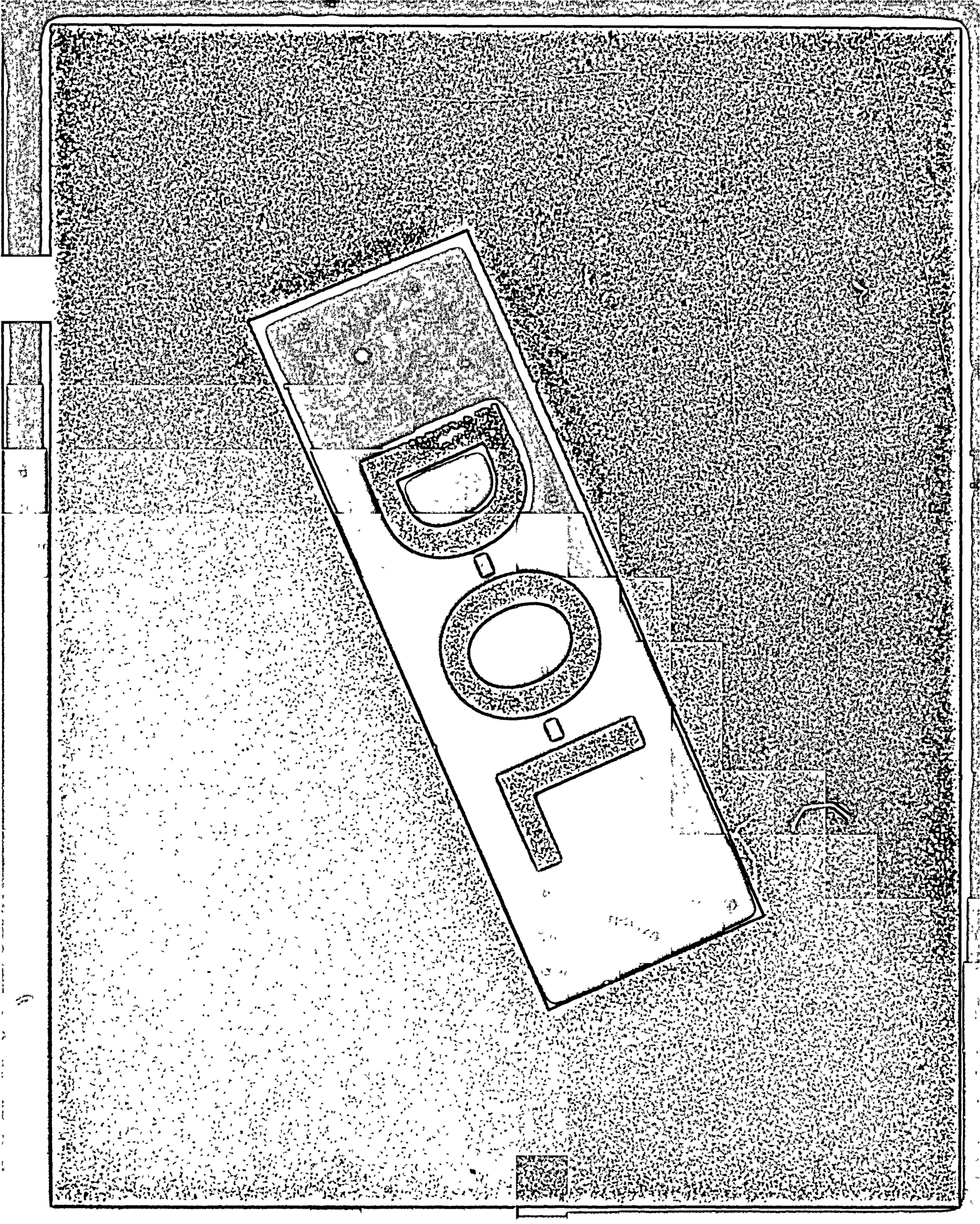
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED
C 00001	3/71	*	A	N/A	NOTE: MM11-E systems M1091 module if 16K of memory or more	1	M1091 etch "B" (if applicable)				
00002	3/71	A	B		NOTE: MM11-E, MM11-F and MMR11-E memory systems phase in M1091 modules. Check for M1091 module	1	M1091 Etch "B"				

REVISION DATE JUNE 1977

L AND LOGIC	ETCH	OPTION	OPTION SERIAL #	FDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	[illegible]	SLOT	IPB	PAGE 1 OF 1

		CS	ETCH WL	ECO HIST.	QUICK CHECK CAUTION = NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
01	2/71	C	D		Jumper E06-06 to E31-10 feed through E6 is the 3rd I.C. from AL1 E31 is the last I.C. on board		Nil					
02	9/71	D	E D C	2.0	[illegible]: Rework "C" & "D" etch boards Jumper E03-03 to T07-10 feed through		Nil					
03	8/72	E	F E D C	4.0	NOTE: 1) Must have ECO M8ll-P-C0003 2) Rework all previous etch boards Jumper E02-08 to AC1		Nil	DZM8A thru DZM8I				
08084	/77	F	F E D C		NOTE: DEC 74H01-1 DIRECT SUBSTITUTION TO DEC 7438 E IS A DEC 7438 E IS		NIL					

MM11-F



digital EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

Engineering Change Order Log

MM11-F

4K 16 Bit
22 Mil Memory

2000 Page

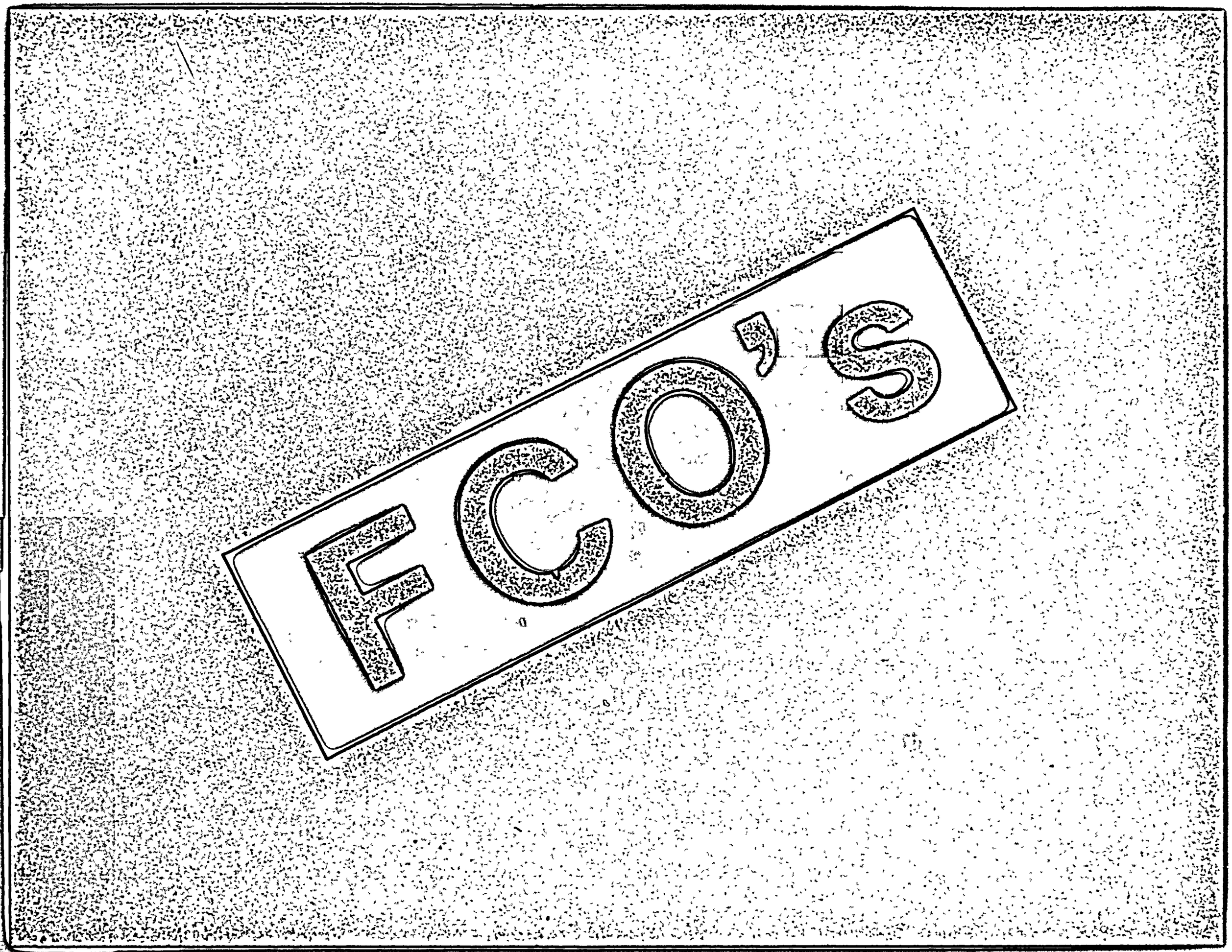
PROCESSOR TYPE PDP-11

MM11F-D0001 CODE: DF ML: A
MAR 70 PROBLEM: Under some conditions, when other options are placed along side an MM11-F they fail to operate correctly
CORRECTION: Install a module protection plate
In-plant effectivity: All MM11-F as required
Field effectivity: All MM11-F as required
(Time To Install And Test (0 Hours)
(Kit Contents: PCO/Prints And Parts)

MM11F-0000E CODE: P ML: B
APR 71 PROBLEM 1: MM11-F Test Procedure needs updating
CORRECTION 1: Update Test Procedure
PROBLEM 2: MM11-FX print sets are the same as MM11-F
CORRECTION 2: Obsolete old MM11-FX Master Drawing list. Use New Master Drawing list format on MM11-F to include MM11-FX
In-plant effectivity: -0- documentation change only

MM11F-C0002 CODE: F ML: D WL: A
MAY 72 PROBLEM 1: Strobe signals and TIMR have too much noise on them
CORRECTION 1: Install twisted pairs on strobe signals, generate another TIMR 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 slot sensitive GMR, GMB problems
In-plant effectivity: Rework immediately
Field effectivity: Retrofit all MM11-F
Time To Install And Test (0 Hour)
Kit Contents: PCO/Prints)

JUN 7 1976


FCO'S

[redacted]

ENGINEERING CHANGE ORDER 8521

ORIGINATOR Richard Manion 5-2
TEL EXT 2005 DATE 3/13/72
DSSC 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 06

CORRECTION

Install a module protection plate.

OPTIONS AFFECTED

MM11/F

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
1.	A-PL-MM11-F-0	0	A	06	(Memory Assembly MM11/F) Change per this ECO.
2.	7408490	-	-	07	(Module Protection Plate) Add quantity of 1 to drawing index.
3.	A-ML-MM11-F	0	A	06	Update per item 1.

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 – (DO NOT USE)

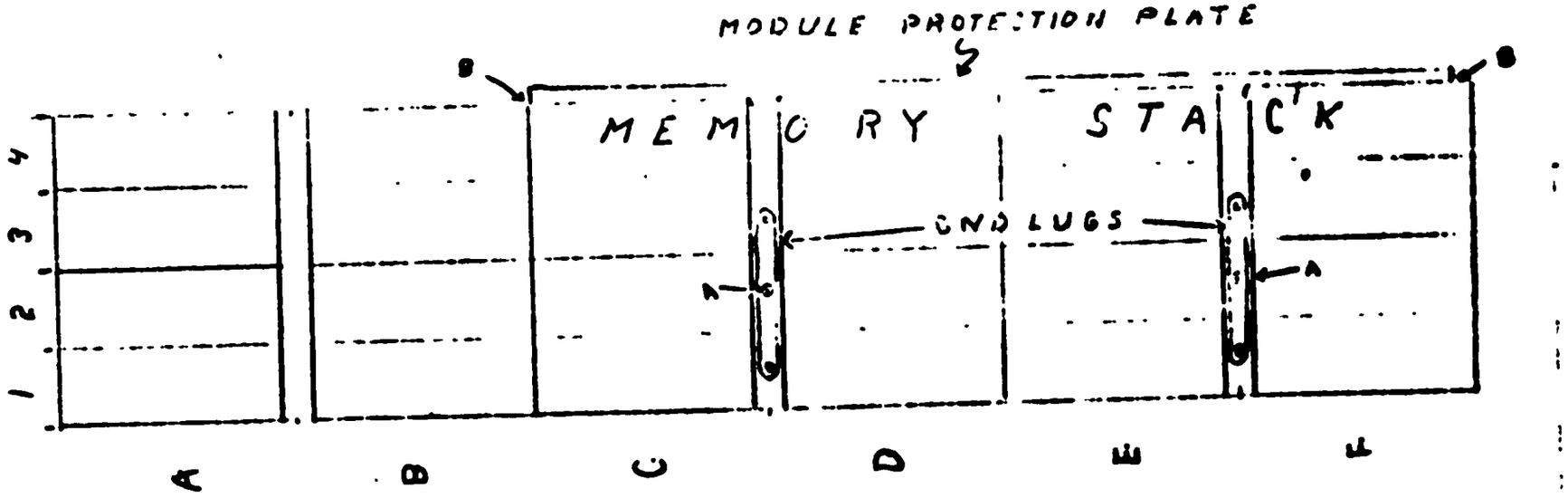
APPROVAL SIGNATURES

Typewritten / Hand Signature

DESIGN ENGR Pete Durant [signature]
ENG MGR (OPT) _____
SERVICE (OPT) _____

MM11F REWORK SHEET

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.



FIELD CHANGE ORDER

FCO MM11F - D 0001

PAGE 1 OF 3

DATA PROCESSING AND DEC-SCOLOG 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

[X] 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

[DF] 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

[X] ~~FIELD INSTALLATION ORDERS (FIOS) WILL BE DISTRIBUTED.~~ KITS AS DEFINED BELOW MAY BE ORDERED AS REQUIRED.

CONTENTS OF AN FSIC INITIATED KIT

FIO	FCO	PRINTS	PARTS	

CONTENTS OF A F E D.C. KIT

FIO	FCO	PRINTS	P	S
	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 NON-MAIL AND ARE TO BE MADE MANUALLY IN RED AND GREEN. FCO REVISED PRINTS WILL BE SUPPLIED ONLY UPON SPECIAL REQUEST.

INSTALLATION AND TEST PROCEDURES

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

NOTES

PARTS REQUIRED

Q1 74-08490 Module Protection Plate

AVAILABILITY DELAY — PARTS None — NO PARTS

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

FIELD SERVICE APPROVAL

Charles Dewey

ASK

3/20 3/24 (J) 3/24 75

CHANGE ORDER [illegible]

ORIGINATOR Richard Manion
TEL EXT 2005 DATE 5/10/72
DEC PROJ NO 96 06122
COST CENTER NO. 392

ECO NO. [illegible]
SHEET 1 OF
DATE RECEIVED 5-12-72
FIRST ISSUE 5-15-72
FINAL ISSUE 5-24-72

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

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.

OPTIONS AFFECTED
MM11/F

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 [illegible] M7290's with ECO #3.

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

ITEM NO.	DOCUMENT/PART NO.	REV	REV	DISP CODE	DESCRIPTION OF CHANGE
1	K-WL-MM11-P-07	-	A	06	Update wire list.
2	A-PL-MM11-P-0	A	B	06	Update Rev. per this ECO.
3	A-ML-MM11-F	C	D	06	Update.
4	D-AD-7007263-0-0	-	A	06	Wire Ass'y MM11/F. See final release print.
5	D-BS-MM11-F-03	-	A	06	Core memory stack (2 sheets) See final release print.
6.	A-PL-7007263-0-0	-	A	06	Update revision level.

DOCUMENTATION AFFECTED
- ☐ MODEL
- ☐ DIAGNOSTICS
- ☐ TECH MANUAL
- ☐ TESTER
- ☐ TEST PROG
- ☐ TOOLING
- ☐ PRO INST
- ☐ ENG SPEC
- ☐ PURCH SPEC

FIELD SERVICE AFFECTED
- ☒ YES ☐ NO
- ☐ Customer Change
- ☒ Product Line Change

TYPE OF CHANGE
- ☒ ELECTRICAL
- ☐ MECHANICAL
- ☐ MODULE
  - ORDER PR MODEL
    - ☐ YES
    - ☒ NO

DISPOSITION CODES

00 – RETURN TO STOCK
01 – [illegible]
02 – [illegible] PUT STOCK UNTIL NEW STOCK AVAILABLE (PHASE IN)
03 – RETURN IMMEDIATELY (RETROFIT)
04 – [illegible]
05 – [illegible]
06 – [illegible]
07 – [illegible]
08 – [illegible]
09

APPROVAL SIGNATURES

Typewritten / Hand Signature

DESIGN ENGR Pete Durant P Durant
ENG MGR (OPT) _____
FIELD SERVICE (OPT) _____
CHIEF ENGR (MODULES ONLY) _____

TO FILL OUT FORM [illegible]

ENGINEERING CHANGE ORDER ADD/DELETE SHEET	ECO NO. MM11F-0003 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	D02G1				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	

SEE REVERSE SIDE FOR INSTRUCTIONS

FIELD CHANGE ORDER

FCO M11F-C 0003

PAGE ___ OF ___

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

FIELD EFFECTIVITY

Retrofit all M11-F'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

DISCRETE PROJECT NUMBER (FOR FIELD SERVICE REPORTING)

[X] NO CHARGE TO CUSTOMER - ALL DSS INSTALLATION LABOR AND MATERIAL ARE TO BE REPORTED UNDER A "NC" CHARGE CODE.

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

DOCUMENTATION $_____ PARTS $_____ DSS ONSITE LABOR $_____

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

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] F WARRANTY FCO DISTRIBUTION TO ALL DSS FIELD OFFICES
NF NONWARRANTY FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT AND TSS OFFICES HAVING SUBDIST TREATMENT AS LEASEES.

LAST PREVIOUS FCO'S D01

RELATED OR PREREQUISITE FCO'S

M7290-00003

FCO DISTRIBUTION

[ ] THIS WILL DEFINE DISTRIBUTION OF FCO KITS AS DEFINED BELOW IN ACCORDANCE WITH THE DSS IDENTIFICATION FILE.

[X] [illegible] NEW KITS DEFINED BELOW MAY BE ORDERED AS REQUIRED.

QUANTITY OF KITS ESTIMATED NOT TO EXCEED			
FOR	FOR	FOR	FOR

QUANTITY OF A FIELD ENGINEER MAY			
FOR	FOR	FOR	FOR
	X	X	

FIRM KITS DEFINED FCO KITS WILL BE DISTRIBUTED FOR ALL UNITS LISTED ON THE DSS IDENTIFICATION FILE WITH THE FOLLOWING SERVICE STATUS CODES:

D E F

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

[ ] MAINTENANCE MANUAL CHANGE

[ ] OPERATIONAL PROGRAMS AFFECTED

VERIFICATION HARDCOPY

INSTALLATION AND TEST PROCEDURE

PARTS REQUIRED

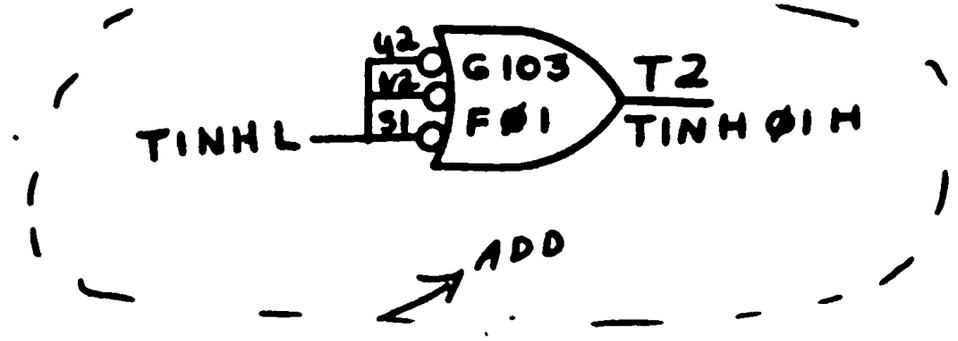
NOTES

Necessary to improve reliability on existing units.

FIELD SERVICE APPROVAL

Art Zins _____ _____

5/16 5/17 (171) 5/18 400

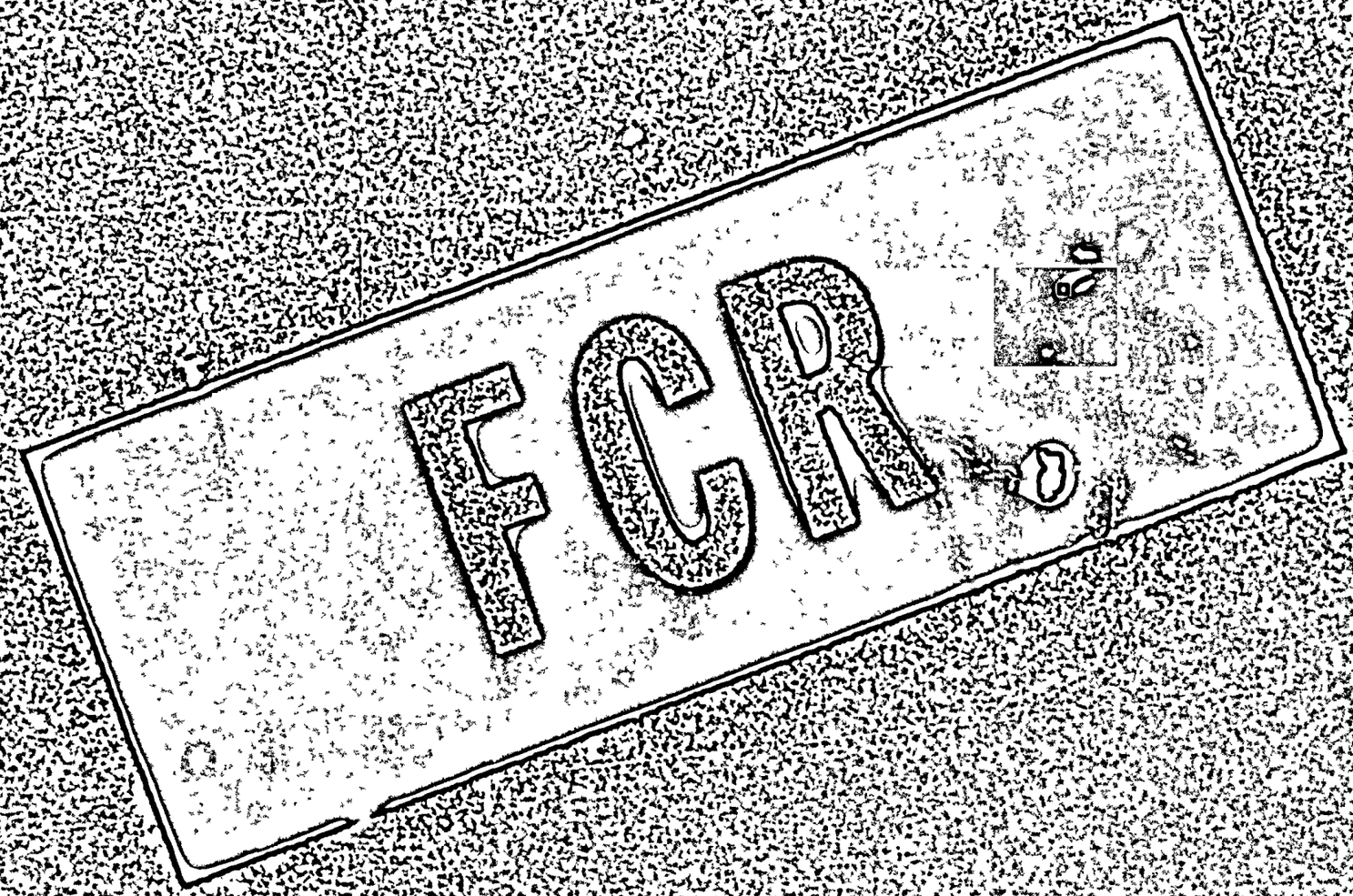


	CORE MEMORY STACK (Y DRIVE)	D-BS-MM11-F-03	REV A
		B-7	GRAPHIC DESCRIPTION

WIRE TABLE

SIGNAL NAME	FROM PIN	TO PIN	COLOR	REMARKS	NAME SIGNAL	FROM PIN	TO PIN	COLOR	REMARKS
-10	A0L1	FAH62	↓ BLUE	WIRES MUST ENTER ALL RUN WITH RIGHT OF THE BLACK ANODIZE					
TINN ØN GND	C0IC1 C0IC2	D02F1 D02C2	WHT BLK	TWP					
TINN ØN GND	F0IT2 F0IT1	F0HF1 F0IC2	WHT BLK	TWP	SAI8 SAI8 INH18	D04Y1 D04Y2 D04Y2	C0H0 H032 E031	WHT BLK YEL	3 TWISTED WIRES
— — → ADD —					STROBE 88 GND	C0IN1 C0IT1	0F201 E0RT1	WHT BLK	TWP
					STROBE81 GND	0D1A1 C0C2	E0I31 E0IT1	WHT BLK	TWP
					— → ADD —				

ENGINEER NO. CHANGE ORDER	WIRED ASSY TITLE NO 11-15	DWG NO. DAD-700263-0-0	REV A
	APPR	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

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

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

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

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

G103-C0006 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

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

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

• 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

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

M1091-C0001 MAR 71
QUICK SYNOPSIS
Provides 1 unit load on BUS in systems with 16K or more memory
QUICK CHECK
M1091 replaces M109 module
NEW REVISION
Rework etch B to CS A

G102-B0006 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 sink from shorting to etch
QUICK CHECK
Insulating washers under heat sinks

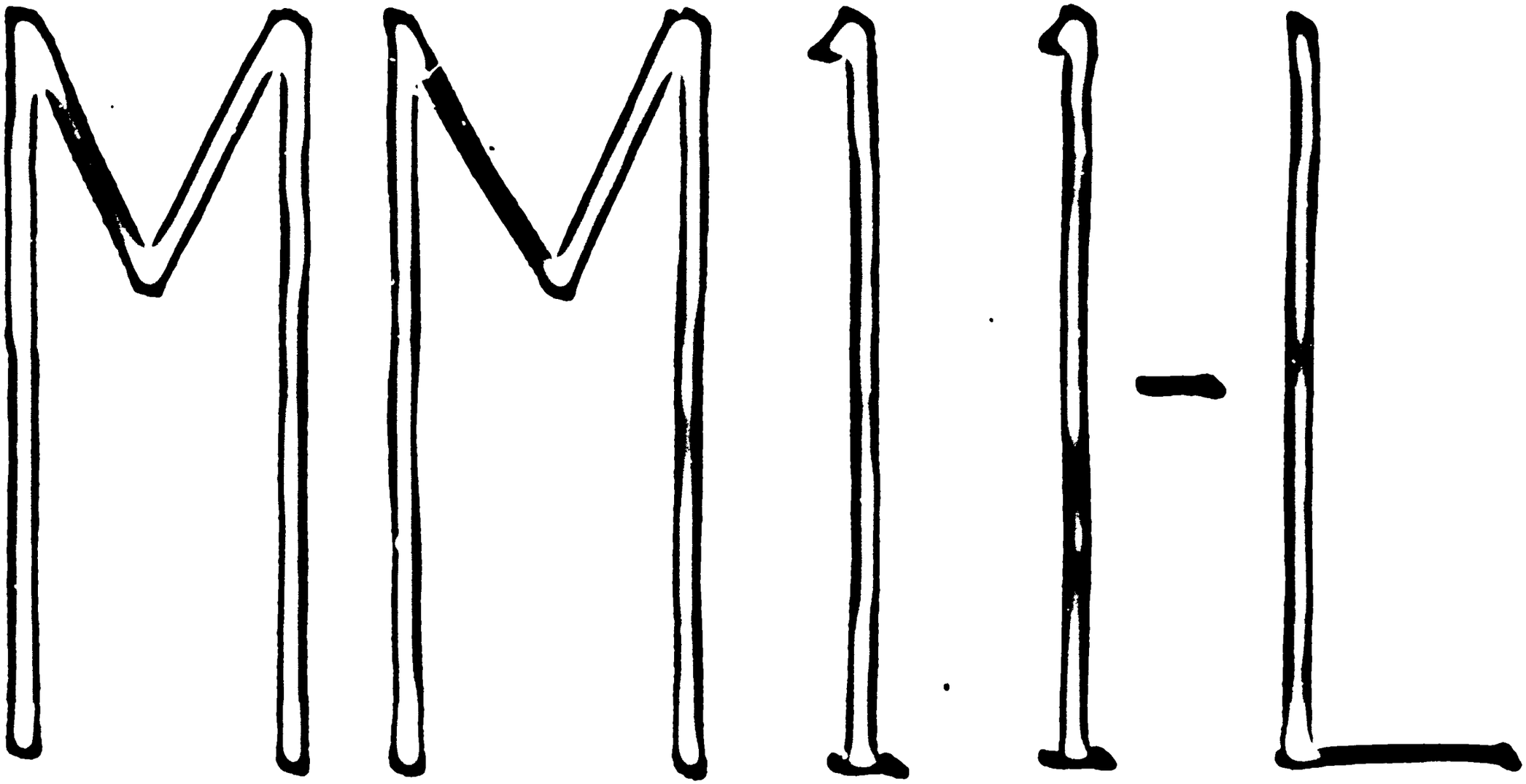
M7290-C0002 OCT 71
QUICK SYNOPSIS
Prevents Unibus hang with SSYN asserted from memory (In-plant, new etch E)
QUICK CHECK
Wire ADD E8 pin 5 to E7 pin 9
NEW REVISION
Rework etch C to CS D

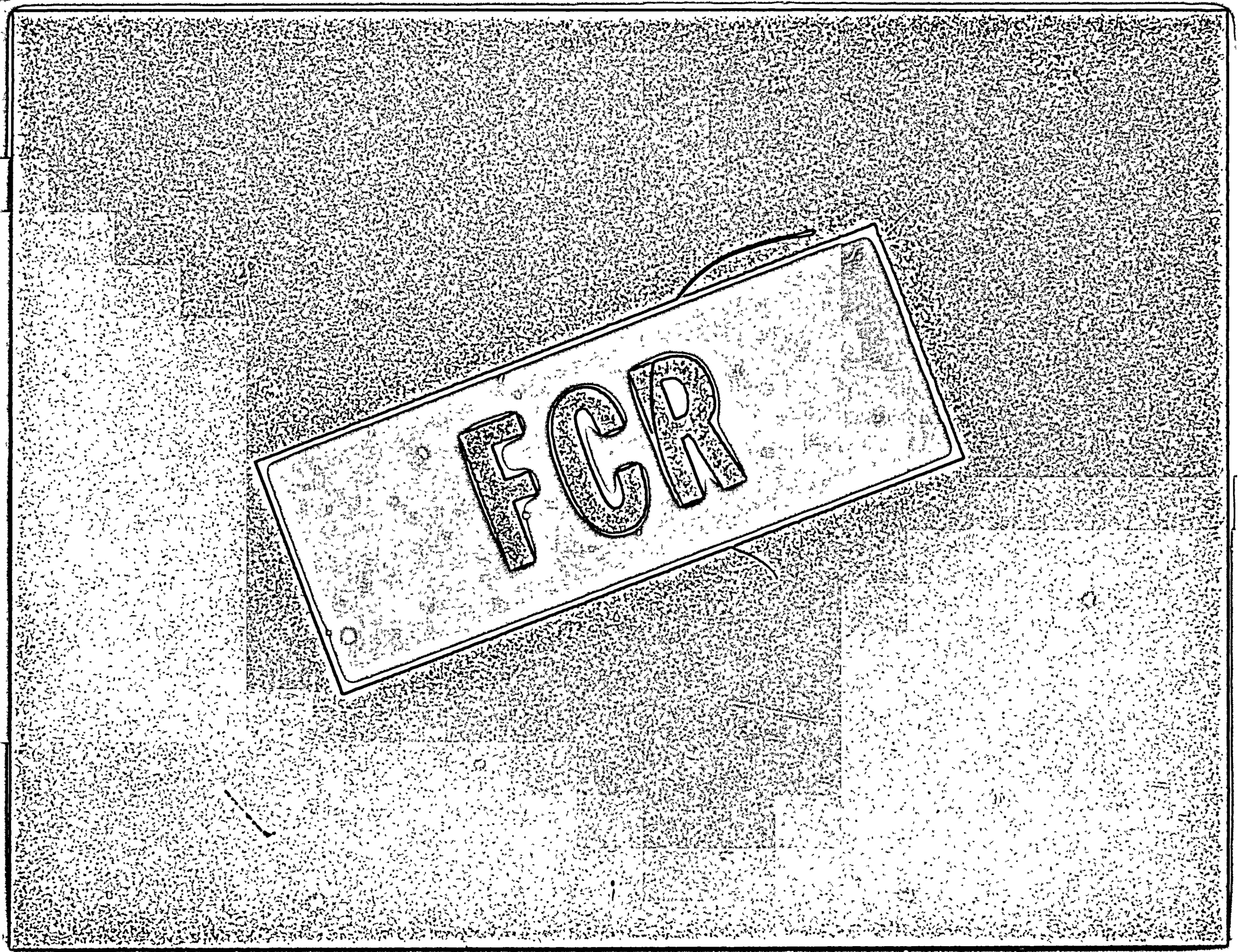
MM11F-D0001 MAR 72
QUICK SYNOPSIS
Module protection plate prevents MM11-F noise interaction with adjacent modules
QUICK CHECK
Presence of protection plate

MM11F-C0003 MAY 72
QUICK SYNOPSIS
Reduces noise on TINH and strobe signals
QUICK CHECK
C01C1 to D02E1/C01C2 to D02C2
NEW REVISION
Rework to Wire List A

M729-C0003 MAY 72
M729-D0004
QUICK SYNOPSIS
Unibus hangs with SSYN asserted from memory
QUICK CHECK
Wire ADD E5 pin 6 to E3 pin 1
NEW REVISION
Rework etch B C to CS C

M7290-C0003 MAY 72
QUICK SYNOPSIS
Reduced inductance of TINH H etch corrects 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

MM11-L
8K 16 BIT 16 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-B0004 MAY 72
QUICK SYNOPSIS
Corrects Delay line 3 termination on etch C G110's
QUICK CHECK
R115 changed from 3 K ohms
NEW REVISION
Rework etch C to CS D
COMPATIBILITY
R115 changed from 3K ohms to 1K ohms

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-B0001 MAY 72
QUICK SYNOPSIS
Prevents components on G231 shorting to module above it
QUICK CHECK
Two phenolic 7/16" standoffs on module
NEW REVISION
Rework etch B to CS C

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 DC LO and AC LO circuit operation
QUICK CHECK
Wire ADD from R89 to R93
NEW REVISION
Rework etch C to CS E1

MM11-S-C0003 OCT 72
QUICK SYNOPSIS
Module protection plate prevents MM11-S noise interaction with adjacent modules
QUICK CHECK
Presence of module protection plate

G110-C0010 NOV 72
QUICK SYNOPSIS
Data errors occur during the first DATI to any memory bank
QUICK CHECK
Wire ADD E28 pin 13 to E15 pin 10
NEW REVISION
Rework etch C, D, E to CS J

G110-D0012 DEC 72
QUICK SYNOPSIS
Provides print clarification effecting 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

G231-D0009 DEC 72
QUICK SYNOPSIS
G231 prints redrawn to DEC standards
NEW REVISION
CS E4

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

G108-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

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-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

G108-C0006 MAR 73
QUICK SYNOPSIS
Lengthens memory cycle time
QUICK CHECK
DL3 replaced with 125nsec delay
NEW REVISION
Rework etch C to CS E4

G108-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

G110-B0018 APR 73
QUICK SYNOPSIS
Eliminates noise on STROBE 0 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

G108-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

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

G108-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 tap 10 of the Delay line
NEW REVISION
Rework etch C to CS E8

ECO QUICK CHECK

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

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

MM11-L ECO PARTS

NAME	ECO #	QTY	PART NUMBER	COMMENTS & DESCRIPTION
G110	#4	1	13-00365	Resistor
	#5	1	10-05306	Capacitor
		4	90-08213	Standoffs
	#9	A/R	17-00024	#10 black/wire ground wire
	#10	1	19-05547	I.C.
	#15	1	16-11327	Delay
	#18	1	10-01610	Capacitor
G231	#1	2	90-06892	Standoffs
	#3	16	11-05275	Diode
	#15	A/R	90-09185	Jumper Wire

REVISION DATE DEC /75

G110 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF 4

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE INITIALS
00001	03/72	A	C		R118 is a 220 ohm resistor R118 is left of E28 and right of DL3 or possibly under DL3 E28 is the 6th I.C. from BE1 DL3 is the small delay line right of DL1 DL1 is the biggest delay line		Nil					
00002	03/72	B	C		DL3 is a 100n sec. delay line with part number D-10100 and/or 1609559 DL3 is a small delay line just right of DL1-08 DL1 is the biggest delay line on board DL3 CHANGED TO 125 N SEC. (P/N-322-1) AND/OR 1611327 BY ECO #15 +15A		Nil					
00003	08/72	C	D		R113 is a 120 ohm ¼W 5% resistor R113 is located at AS1 below DL2 DL2 is between E1 and E2		Nil					
B 00004	08/72	D	C	1.0	NOTE: This ECO affects only "C" etch modules R115 is a 1K ¼W 5% resistor R115 is the 3rd resistor right of DL1-12 DL1 is the biggest delay line	1	13-00365		DZMMO DZMMI			
B 00005	08/72	E	C	3.0	NOTE: This ECO affects only "C" etch modules C152 is a 6.8 ufd. capacitor with the cathode connected to the + etch on board. C152 is the capacitor right of DL1 -02 DL1 is the biggest delay line	1 4	10-05306 90-08213					

REVISION DATE Jan./75

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 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 ¼W 5% resistor R123 is the closest resistor to BS1		Nil					
00007	09/72	E1	C		4 - Standoffs screwed on		Nil					
00008	10/72	E2	C		C47 is a .01 uf 100V 20% disc capacitor C47 is directly below E40 E40 is the 1st I.C. from CT1 DO NOT COUNT PULSE TRANSFORMER AS I.C.		N/A					
C 00009	12/72	E3	C	.5	Four #18 gauge black ground jumpers on SIDE ONE INSTEAD OF ON SIDE # TWO		17-00024 (#18 black & white teflon coated)					
C 00010 & 10A	11/72	E4	C	1.0	Jumper E15-10 to E28-13 E15 is the 4th I.C. from AV1 E28 is the 6th I.C. from BE1	1	19-05547	DZQKB				
00011	12/72				NOTE: This ECO deleted		N/A					
D 00012	12/72	E5	C	N/A	NOTE: Print update affecting only "C" etch modules.		Nil					

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G110 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 4

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

REVISION DATE MAY ./76

CONTROL & DATA LOOP	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE
G110												4 OF 4

ECO	RELEASE DATE	CS	ETCH / WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
B 00018	10/73	E9	C	1.0	NOTE: Rework etch "C" Rev White wire of twisted pair from E32-06 feed through to E58-14 E32 is the 4th I.C from BS1 E58 is the 1st I.C from FC1	1	10-01610					
C 00019	12/73	E10	C	1.0	NOTE: Rework "C" etch rev Visual check of jumper or etch run from E26-08 to DL1 tap 10 (Do Not Use Meter) E26 is the 4th I.C from BE1 DL1 is the biggest delay line		NIL	DZQMB				
00020 6A	01/74	M	H		NOTE: Affects "F" etch rev Visual check of jumper or etch run from E26-08 to DL1 tap 10(Do Not Use Meter) E26 is the 4th I.C from BE1 DL1 is the biggest delay line		N/A					
00021	07/74	M M E11 E11	H F E C		NOTE: Phase in DEC 8640's to replace DEC 380's		N/A					
00022	05/76	P	H		NOTE: DEC 7438 allowable I.C. substitution for 74H01-1 at E5, E18-E22		NIL					

REVISION DATE DEC /75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 1 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
B 00001	6/72	C	C	3.0	Two standoffs to prevent shorting	2	90-06892					
00002	8/72	D	D		Four standoffs on module		Nil					
D 00003	8/72	E	D	4.0	NOTE: Rework only "C" etch modules D116 is a D672 diode instead of being a resistor D116 is the only diode right of E1	16	11-05275	DZMMI				
00004 & 4A	8/72	F	E		E2 is a DEC I.C. 1074H00 E1 is the I.C closest to the top left corner.		Nil					
A 00005	8/72	E1	C	4.0	NOTE: Rework only G231's with etch rev "C" which are in 11/05 and ME11 systems. 11/45 memories do not need this ECO Jumper from R101 to Q7 R101 is the 3rd resistor from bottom left corner Q7 is the biggest transistor from EL1		Nil					
00006	8/72	E2	C		R170 is a 100 ohm ¼W 5% resistor R170 is the 2nd resistor from top edge of board in the 1st row of resistors left of E1		Nil					
00007	9/72	E3	C		NOTE: Print update		Nil					

REVISION DATE Jan./75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS UNIT	SLOT	IPB	PAGE 2 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00008	9/72	E1A E2A E3A	C C C		C52 is a 470 pfd 100V 5% capacitor C52 is at the far left of DR1 and the only component between two transistors		Nil					
D 00009	12/12	E4	C	N/A	NOTE: Field service clarification for etch "C" modules		Nil					
00010	3/73	H	E		E1 is a DEC I.C 4011 quad transistor		N/A					
00011	4/73	E5	C		E1 is a DEC I.C. 4011 quad transistor		N/A					
00012	4/73	J	E		NOTE: Affects etch "E" rev only R176 is a 4.7K ¼W 5% resistor R176 is the 1st resistor below two transistors at the far left of EJ1		N/A					
00013	11/73	K	E		NOTE: I.C. substitution cancelled by ECO # 16		N/A					
00014	2/74	L	E		Q12 as snap-on heat sink Q12 is closest transistor to bottom left corner.		N/A					
00015	6/74	M	E ALL		NOTE: This ECO affects all etch rev modules. J1 & J2 have insulated jumper wire J1 & J2 are between E31 and E34 E31 is the last I.C. from CD slot		N/A					
00016	/74	N E6	E C		NOTE: I.C. 380 and 7380 are unsuitable E9, E15, E16, E17 are I.C. DEC 8640's E9 is the last I.C. from AV1 E15 is the 1st I.C. from BF1		N/A					

REVISION DATE DEC./75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00017	01/75	P	E		Q6 is a DEC 6534C transistor Q6 is the last transistor from EJ1		N/A					
00018	04/75	R	E		NOTE: Phase in jumper wire For current loops useing teflon insulated wire		N/A					

REVISION DATE MAR/77

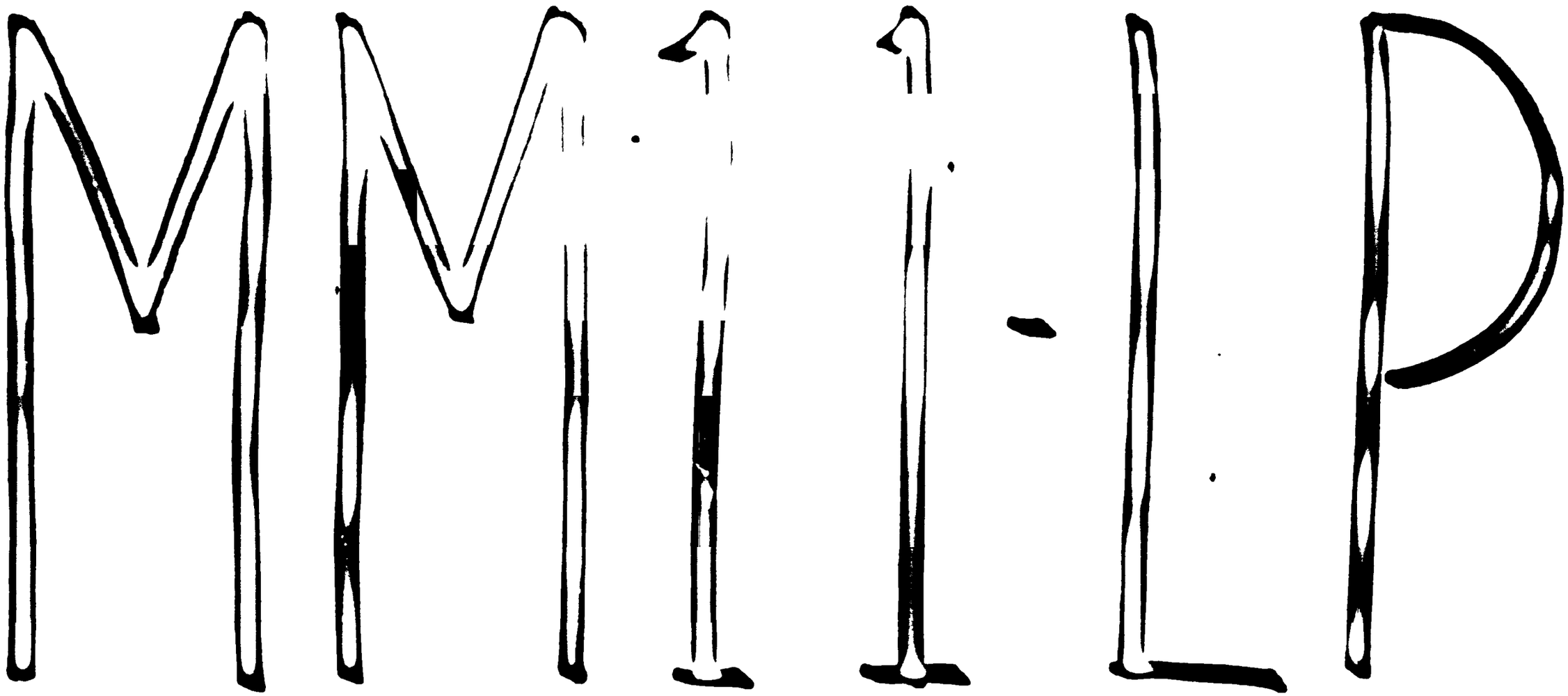
H214 - 8K x 16 BIT MEMORY STACK	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1

ECO	RELEASE DATE	CS	ETCH W2	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE INI
00001	6/72	B			NOTE: Print change		Nil					
00002	1/73	C			NOTE: Reference chart for H214, H215, H216 and G645 etch & CS revs		Nil					
00003	6/73	D			NOTE: Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03		N/A					
00004	10/73	E			NOTE: Print correction		Nil					
00005	11/73	F			NOTE: Print correction		Nil					
00006	07/74	H			NOTE: Documentation update		Nil					
00007 SA	12/74	J			NOTE: DOCUMENTATION FOR AMPEX 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 CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	6/72	B			NOTE: Print change		Nil					
00002	1/73	C			NOTE: Reference chart for H214, H215, H216 and G645 etch & CS revs		Nil					
00003	6/73	D			NOTE: Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03		N/A					
00004	10/73	E			NOTE: Print correction		Nil					
00005	11/73	F			NOTE: Print correction		Nil					
00006	/74	H			NOTE: Documentation update							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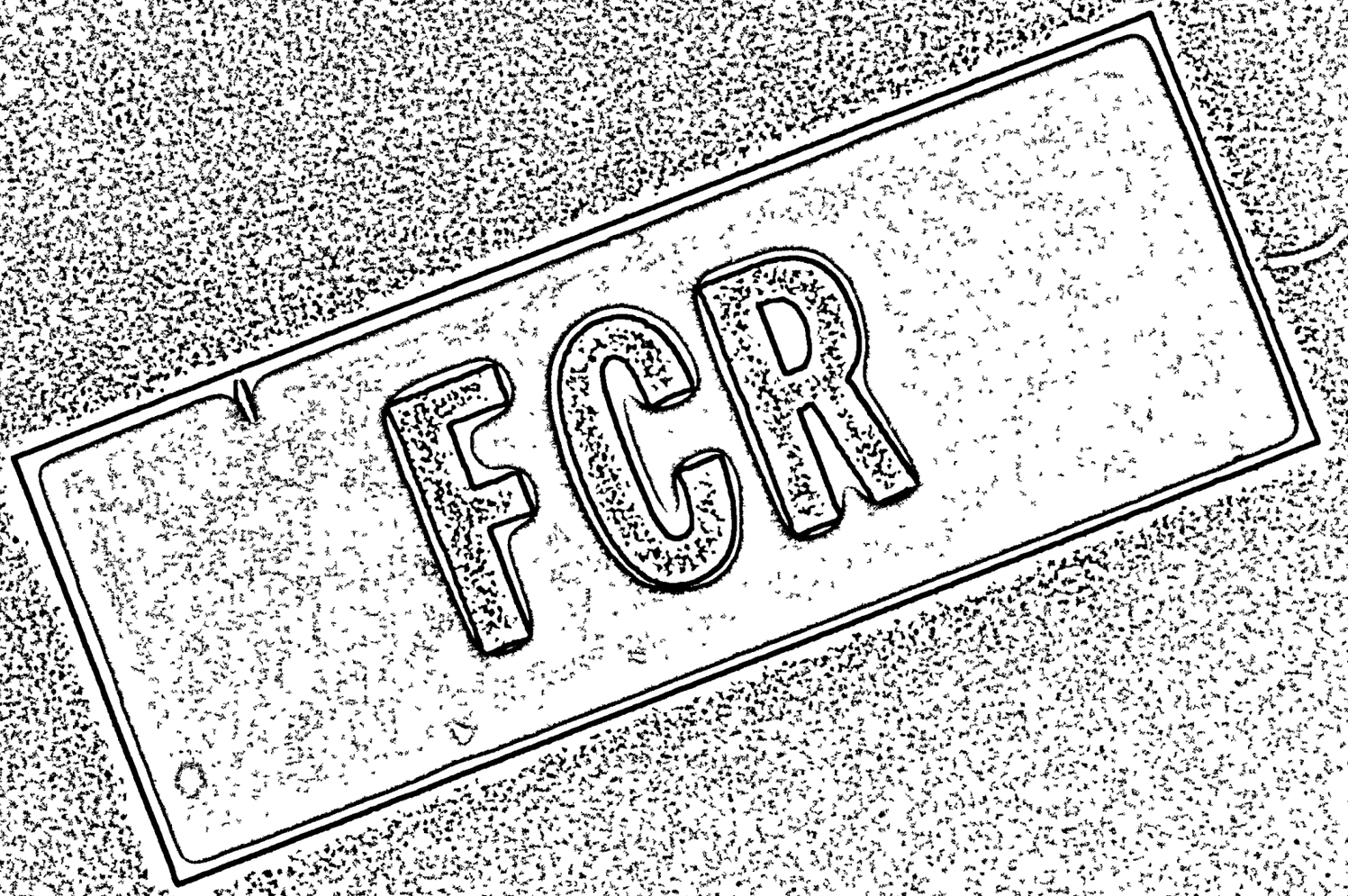
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MM11-LP
8K 16 BIT PARITY (18 BIT) MEMORY MODULE SET
FCO Cross Reference

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

G231-B0001 MAY 72
QUICK SYNOPSIS
Prevents components on G231 shorting to module above it
QUICK CHECK
Two phenolic 7/16" standoffs on module
NEW REVISION
Rework etch B to CS C

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

G231-D0009 DEC 72
QUICK SYNOPSIS
G231 prints redrawn to DEC standards
NEW REVISION
CS E4

G109-C0006 MAR 73
QUICK SYNOPSIS
Lengthens memory cycle time
QUICK CHECK
DL3 replaced with 125 nsec delay
NEW REVISION
Rework etch C to CS E4

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

C109-C0010 JUL 73
QUICK SYNOPSIS
Eliminates noise induced condition where memory randomly picks up and drops bits
QUICK CHECK
Twisted pair E32 pin 6 feed-thru to E58 pin 14 feed thru/E33 pin 7 to ground side of C44
NEW REVISION
Rework etch C to CS E7

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 of 10 of the Delay line
NEW REVISION
Rework etch C to CS E8

G109-C0004 DEC 74
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

ECO QUICK CHECK

MM11-LP PARTS BREAKDOWN

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

MM11-LP FIELD CODED ECO'S

G109 - C4, C6, C7, C10, C11

G231 - B1, D3, A5, D9

MM11-LP ECO PARTS

NAME	ECO #	QTY	PART NUMBER	COMMENTS & DESCRIPTION
G109	# 3, 3A	8	10-00064	Capacitor
		4	10-01610	Capacitor
		1	13-00309	Capacitor
		5	13-05324	Resistor
G109	# 6	1	16-11327	Delay
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

REVISION DATE MAR./76

G109 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 3

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

REVISION DATE MAR./76

G109 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NA
C 00007	05/73	E5	C	1.0	NOTE: Affects etch "C" rev G109 & G109-YA modules Jumper E04-04 to E07-07		NIL	ZQKB				
00008 &A	06/75	E6	C		NOTE: 1) Affects etch "C" revs. 2) Generate separate G109-YA documentation 3) Change component substitution list R96 is a 82 ohm ¼W 5% resistor R96 is right of E44 E44 is the 2nd I.C. left of DA1		NIL					
00009	12/73	L	F		NOTE: Affects etch "E" & "F" rev - G109 and G109-YA. Jumper E04-04 to E07-07	1	10-01610					
C 00010	12/73	E7	C	1.0	NOTE: Affects etch "C" rev White jumper from E32-06 to E58-14 E32 is the 4th I.C. from BS1 E58 is the 1st I.C. from FC1	1 A/R	10-01610 91-07720-09					
C 00011	12/73	E8	C	1.0	NOTE: Rework etch "C" rev Jumper or etch run from E26-08 to tap 10 of DL1 E26 is the 4th I.C. from BE1 DL1 is the biggest delay line		NIL	DZQMB				
00012 &A	06/74	M	H		NOTE: Affects etch "F" rev Jumper E26-08 to DL1-10 E26 is the 3rd I.C. from BE1 DL1 is the biggest delay line		N/A					

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 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					

REVISION DATE DEC /75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE MAN
B 00001	6/72	C	C	3.0	Two standoffs to prevent shorting	2	90-06892					
00002	8/72	D	D		Four standoffs on module		Nil					
D 00003	8/72	E	D	4.0	NOTE: Rework only "C" etch modules D116 is a D672 diode instead of being a resistor D116 is the only diode right of E1	16	11-05275	DZMMI				
00004 & 4A	8/72	F	E		E2 is a DEC I.C. 1074H00 E2 is the I.C closest to the top left corner.		Nil					
A 00005	8/72	E1	C	4.0	NOTE: Rework only G231's with etch rev "C" which are in 11/05 and ME11 systems. 11/45 memories do not need this ECO Jumper from R101 to Q7 R101 is the 3rd resistor from bottom left corner Q7 is the biggest transistor from EL1		Nil					
00006	8/72	E2	C		R170 is a 100 ohm ¼W 5% resistor R170 is the 2nd resistor from top edge of board in the 1st row of resistors left of E1		Nil					
00007	9/72	E3	C		NOTE: Print update		Nil					

REVISION DATE Jan./75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00008	9/72	E1A E2A E3A	C C C		C52 is a 470 pfd 100V 5% capacitor C52 is at the far left of DR1 and the only component between two transistors		Nil					
D 00009	12/12	E4	C	N/A	NOTE: Field service clarification for etch "C" modules		Nil					
00010	3/73	H	E		E1 is a DEC I.C. 4011 quad transistor		N/A					
00011	4/73	E5	C		E1 is a DEC I.C. 4011 quad transistor		N/A					
00012	4/73	J	E		NOTE: Affects etch "E" rev only R176 is a 4.7K ¼W 5% resistor R176 is the 1st resistor below two transistors at the far left of EJ1		N/A					
00013	11/73	K	E		NOTE: I.C. substitution cancelled by ECO # 16		N/A					
00014	2/74	L	E		Q12 as snap-on heat sink Q12 is closest transistor to bottom left corner.		N/A					
00015	6/74	M	E ALL		NOTE: This ECO affects all etch rev modules. J1 & J2 have insulated jumper wire J1 & J2 are between E31 and E34 E31 is the last I.C. from CD slot		N/A					
00016	/74	N E6	E C		NOTE: I.C. 380 and 7380 are unsuitable E9, E15, E16, E17 are I.C. DEC 8640's E9 is the last I.C. from AV1 E15 is the 1st I.C. from BF1		N/A					

REVISION DATE DEC./75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00017	01/75	P	E		Q6 is a DEC 6534C transistor Q6 is the last transistor from EJ1		N/A					
00018	04/75	R	E		NOTE: Phase in jumper wire For current loops useing teflon insulated wire		N/A					

REVISION DATE MAR/77

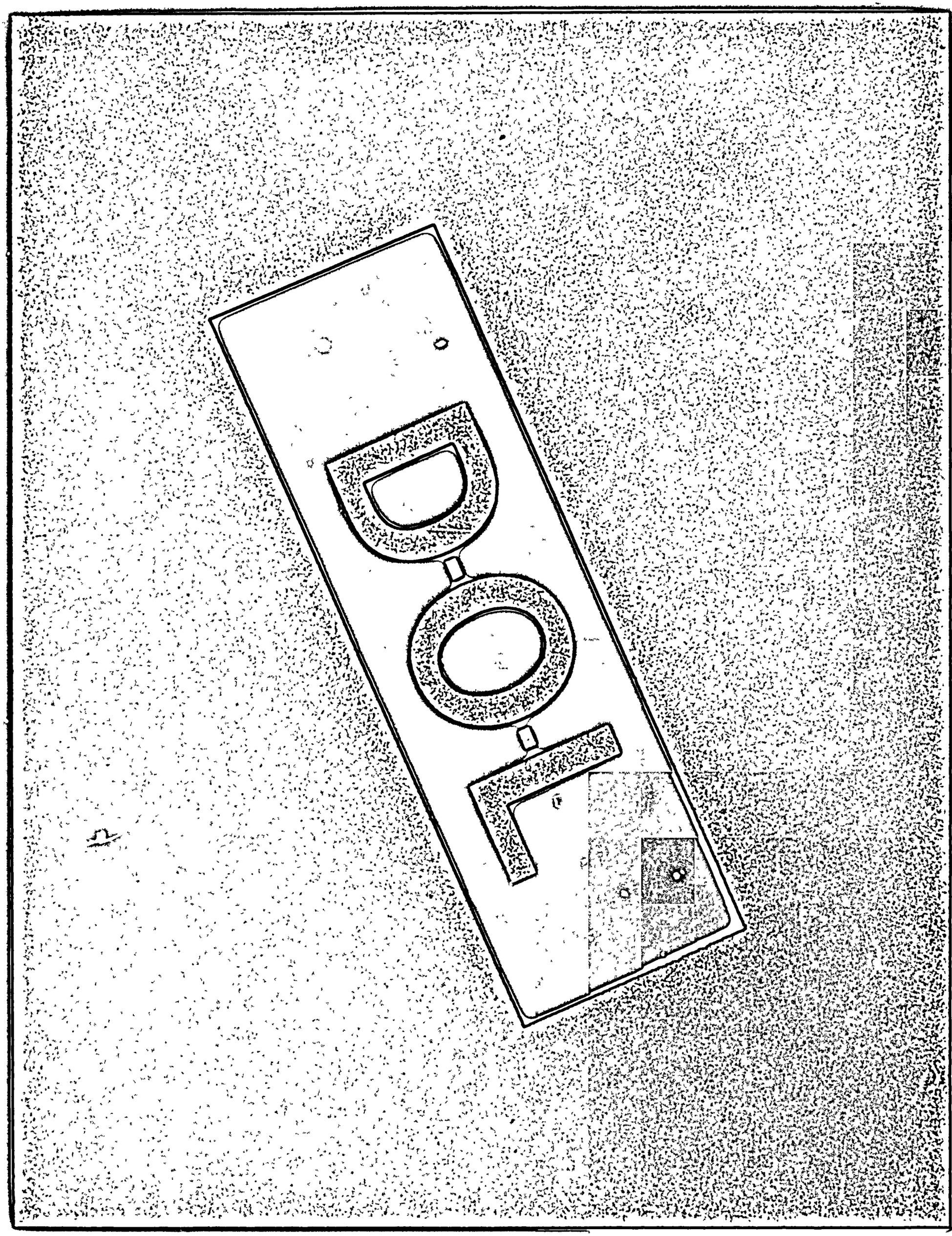
H215 8K x 18 BIT MEMORY STACK	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1

ECO	RELEASE DATE	CS	ECO IL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE INI
00001	7/73	A			NOTE: Print change		NIL					
00002 &A	12/74				NOTE: DOCUMENTATION FOR AMPEX STACK		NIL					

MM11-S

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



EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

Engineering Change Order Log

MM11-S

8K 16 Bit,
890 ns Memory

2398 R624

PROCESSOR TYPE PDP-11/45

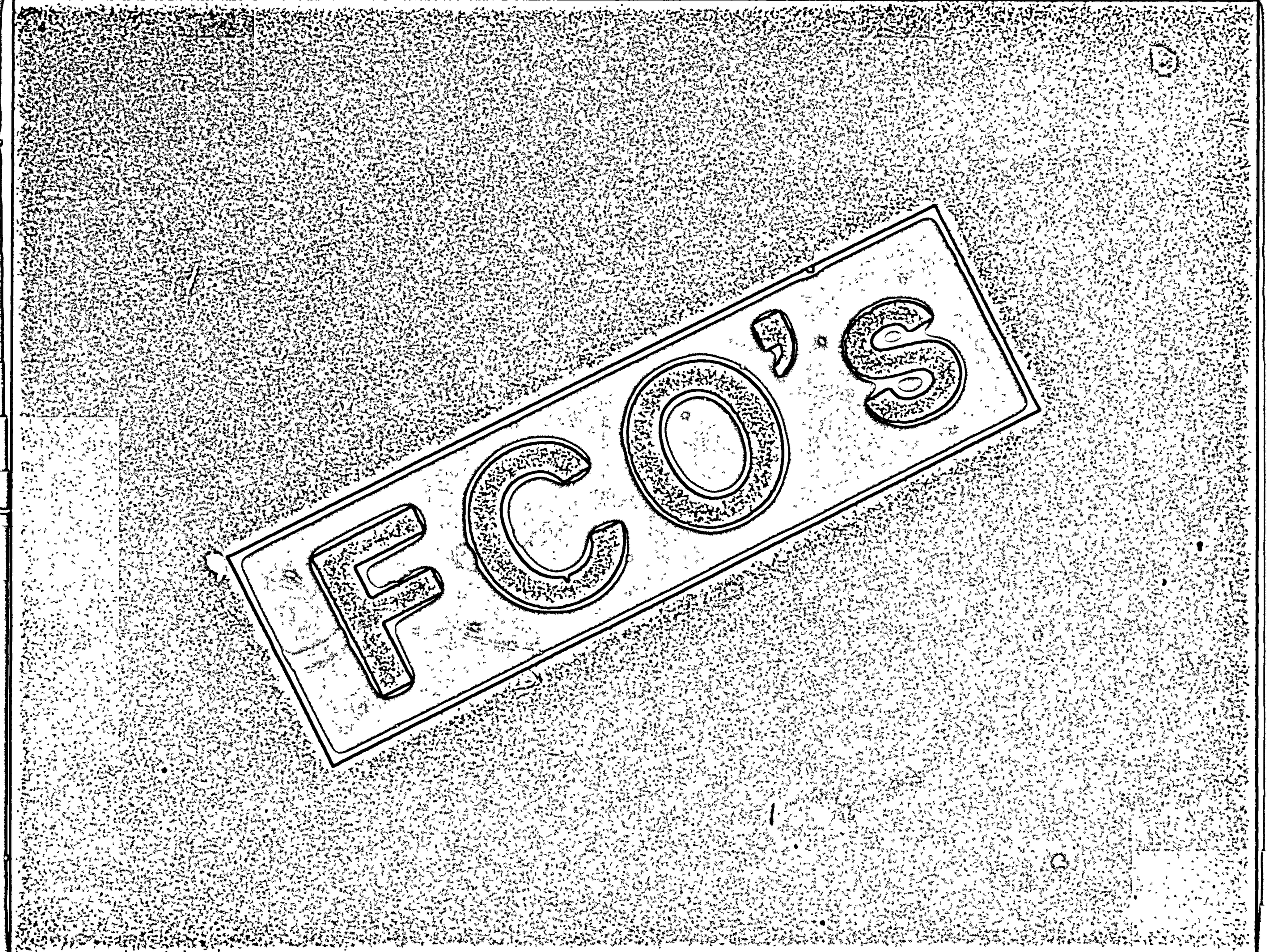
MM11S-00001 CODE D . WL A
APR 72 PROBLEM Missing wires on MM11S back plane for signal SPCLH
CORRECTION Add three wires to Wire List
In plant effectivity -05 rework immediately

MM11S-00002 CODE P
SEP 72 CORRECTION Make corrections to Drawing Directory B DD MM11S
In plant effectivity -05 documentation change only

MM11S-C0003 CODE P
OCT 72 PROBLEM Under some conditions when other options are placed beside an MM11S they fail to operate correctly
CORRECTION Install a 7010080 module protection plate

NOTE This FCO 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 effectivity -05 phase in
Field effectivity Retrofit all MM11S memories as required
DEC revision B is created Time To Install And Test 5 Hour
Kit Contents FCO Prints And Parts

MM11S-00001 CODE P DD C
NOV 72 CORRECTION Add Manufacturing Test Procedure for MM11S -1 -2 -4 and -5 and drawing ASP MM11 L5 Modules and Systems to Drawing Directory
In plant effectivity -05 documentation change only


FOS

C ORDER

ORIGINATOR R. Manion 1-3
TEL EXT 2005 DATE 10/16/72
DEC PROJ NO. EY6A 063 M
COST CENTER NO. 392
W.O. 1732

ECO NO. MMR-00002
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

DEC CODE *02

CORRECTION

Install a module protection plate.

OPTIONS AFFECTED

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.	OL. REV	REV	* CODE	DESCRIPTION OF CHANGE
1.	B-DD-MM11-S	A	B	06	(Drawing Directory) Change per this ECO. (Module Protection Plate) Add B-MB-7408490-0-0 to drawing directory.

DOCUMENTATION AFFECTED

- ☐ MODEL
- ☐ DIAGNOSTICS
- ☐ TECH MANUAL
- ☐ TESTER
- ☐ TEST PROG
- ☐ TOOLING
- ☐ PKG INST
- ☐ ENG SPEC
- ☐ PURCH SPEC

FIELD SERVICE AFFECTED

- ☒ YES ☐ NO
- ☐ Customer Change
- ☒ Product Line Change

TYPE OF CHANGE

- ☐ ELECTRICAL
- ☒ MECHANICAL
- ☐ MODULE
  - ORDER PR MODEL
    - ☐ YES
    - ☒ NO

DISPOSITION CODES

00 – RETURN TO STOCK
01 – (DELETED)
02 – USE PRESENT STOCK UNTIL NEW STOCK AVAILABLE (PHASE IN)
03 – REWORK IMMEDIATELY (RETROFIT)
04 – (DELETED)
05 – (DELETED)
06 – SCRAP
07 – REWORK (AT VENDOR'S FACILITY)
08 – RETURN TO VENDOR (AT VENDOR'S FACILITY)
09 – SCRAP AT VENDOR'S FACILITY

APPROVAL SIGNATURES

Typewritten / Hand Signature

DESIGN ENGR Pete Durant
ENG MGR (OPT) _____
FIELD SERVICE (OPT) _____
CHIEF ENGR (MODULES ONLY) _____

DRA-111C

DEC [illegible] REVERSE FOR INSTRUCTIONS (IN ORDER TO FILL OUT FORM PROPERLY)

FIELD CHANGE ORDER

FCO MM11S - C 0003

PAGE ___ OF ___

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

FIELD EFFECTIVITY

Retrofit all MM11-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

[X] TO 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] F IMMEDIATE FCO DISTRIBUTION TO ALL DEC FIELD OFFICES
DF IMMEDIATE FCO DISTRIBUTION TO REGIONAL PRODUCT SUPPORT

FCO KIT DISTRIBUTION

[X] KITS AS DEFINED BELOW MAY BE ORDERED AS REQUIRED

CONTENTS OF AN FSAC INITIATED KIT

FIO	FCO	PRINTS	PARTS	

CONTENTS OF A FIELD ORDERED KIT

FIO	FCO	PRINTS	PARTS	
	X	X	X	

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

D	H	A	B			

USER SITE PROJECT NUMBER (FOR FIELD SERVICE REPORTING) W67

AVAILABILITY DELAY
PARTS None

NO PARTS

ESTIMATED DOWN TIME FOR INSTALLATION AND TESTING 0.5 HOURS

SPECIAL TEST EQUIPMENT TOOLS, OR SUPPLIES

LAST PREVIOUS FCO'S None

RELATED OR PREREQUISITE FCO'S

[ ] HANDBOOK CHANGE
[ ] MAINTENANCE MANUAL CHANGE
[ ] OPERATIONAL PROGRAMS AFFECTED

VERIFICATION HANDBOOKS

11-DZQMB

INSTALLATION AND TEST PROCEDURES

PARTS REQUIRED

Q1	74-08490	Module protection plate

NOTES This FCO is required when other options such as KW11-P, etc. are physically mounted next to an MM11-S memory. Noise generated by the MM11-S may interact with adjacent modules.

FIELD SERVICE APPROVAL

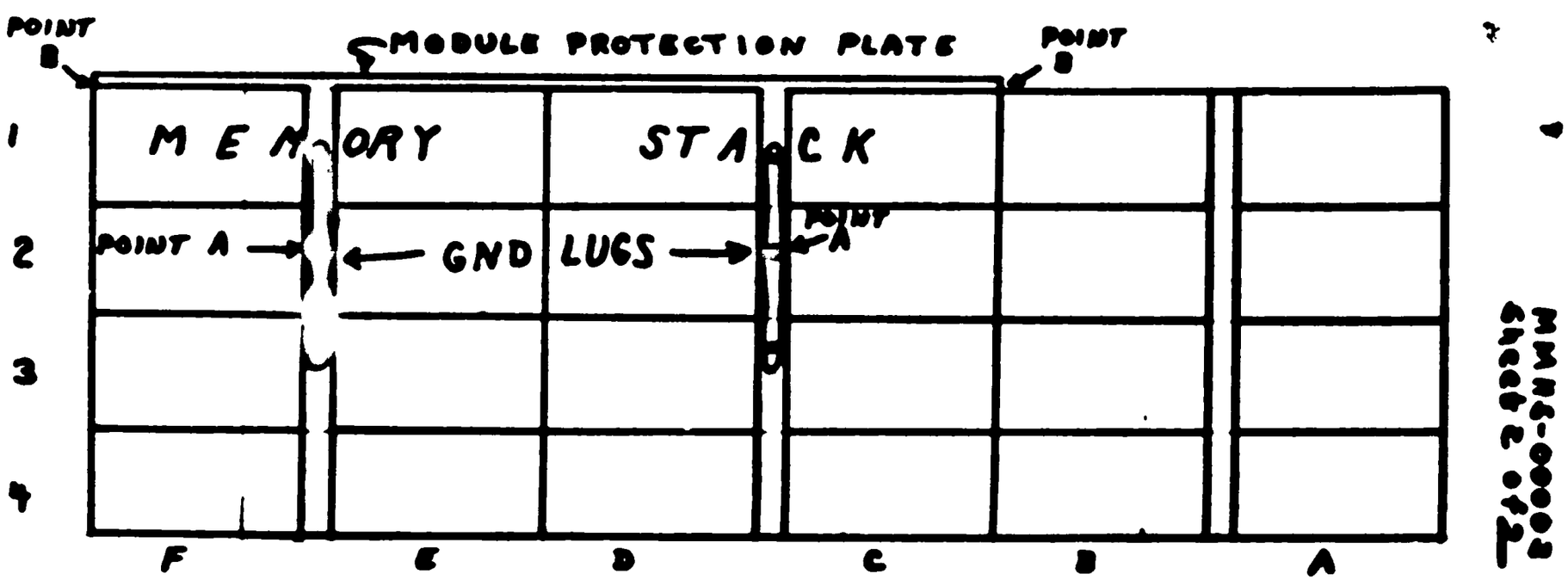
Art Zins _____ _____ 10/30

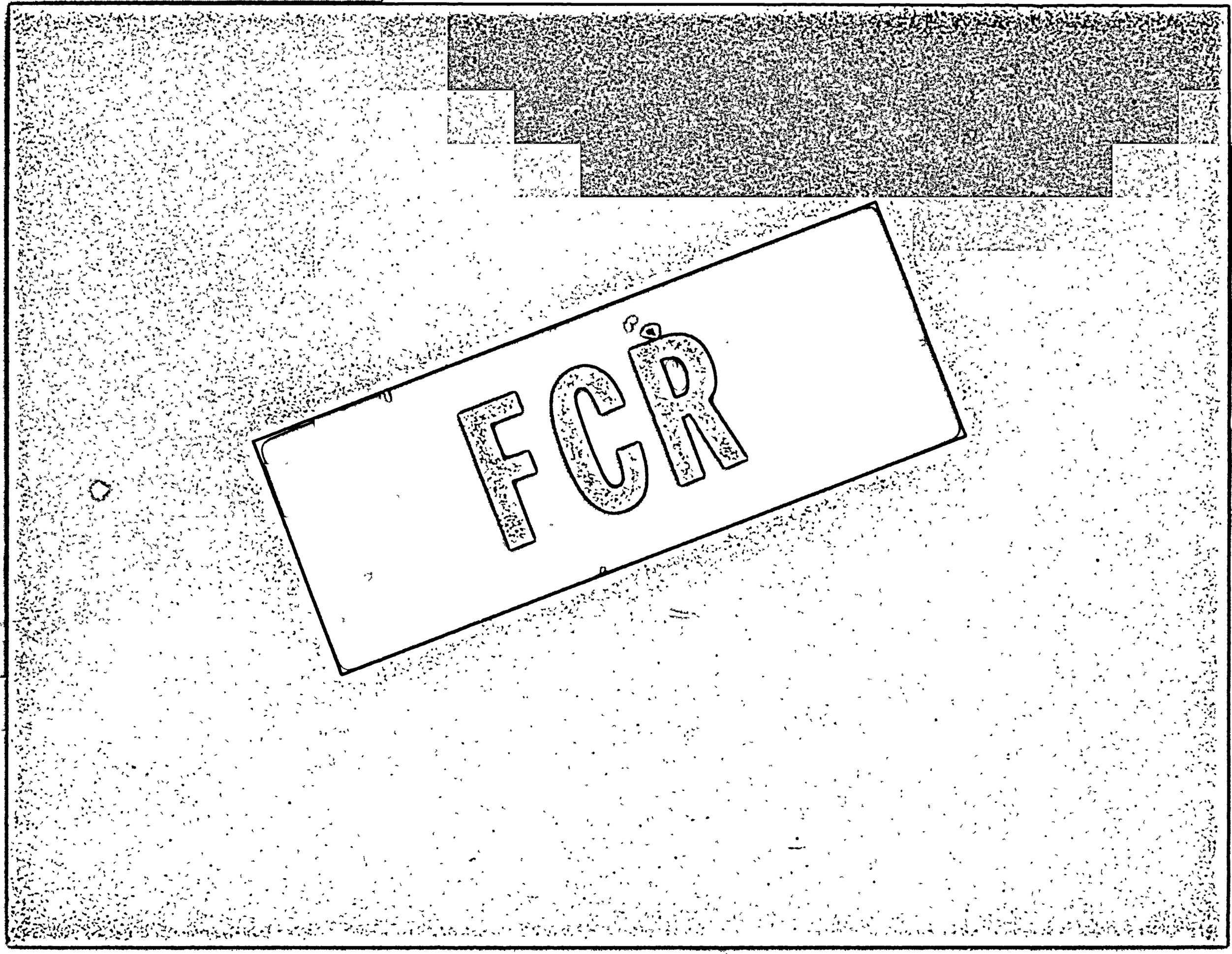
450

DEC 12-(7587)-1009 41071

MM11S 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.




FCR

MM11-S
8K, 18 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-B0006 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-A0006 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 6
NEW REVISION
Rework etch C to CS E8

MM11-S
8K, 16 BIT 18 MIL MEMORY
FCO Cross Reference

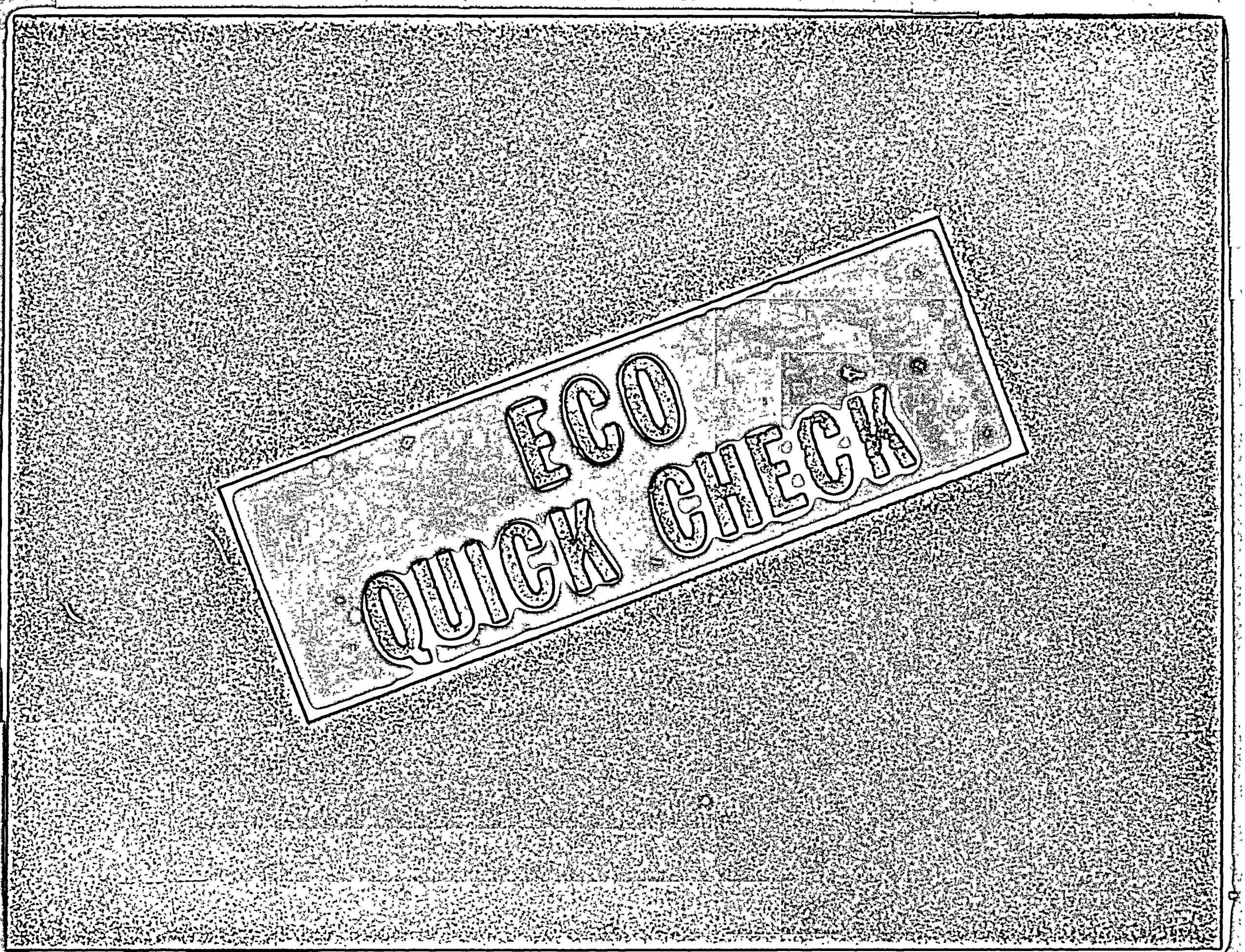
A Chronological Listing of Field Retrofit FCO's Which Must Be Considered in the Field Installation and Maintenance of This Option/Module/Power Supply

• Indicates FCO Conjunction Must Be Considered With Prior FCO

■ **6110-B0018 APR 73**
QUICK SYNOPSIS
Eliminates noise on STROBE 0 H csh.
QUICK CHECK
E32 pin 6 feed-thru to E66 pin 4 feed-thru/E33 pin 7 to ground side of C44.
NEW REVISION
Rework csh C to C8 B8.

■ **6110-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 csh C to C8 E10.

■ **MM11S-C0008 OCT 73**
QUICK SYNOPSIS
Module protection plate eliminates MM11-S noise interaction with adjacent modules.
QUICK CHECK
Presence of protection plate.


ECO
QUICK CHECK

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

MM11-S ECO PARTS

NAME	ECO #	QTY	PART NUMBER	COMMENTS & DESCRIPTION
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

MM11-S FIELD CODED ECO'S

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

REVISION DATE MAR/77

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 W/L	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE INITIALS
00001	4/72		A		Jumper AO1-U1 to AO2-U1		Nil					
00002	9/72				NOTE: Print change		Nil					
C 00003	10/72			.5	A module protection plate beside MM11-S memory bank.	1	74-08490					
00004	11/72				NOTE: Adds test procedures for MM11-K, L, M, S and SP modules and systems		Nil					
00005	10/73				Jumper CO2-A2 to F01-A2		Nil					
00006	2/74				NOTE: 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				NOTE: Document update		NIL					
00008	05/76				NOTE: Documentation update		NIL					

REVISION DATE DEC /75

G110 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 4

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	03/72	A	C		R118 is a 220 ohm resistor R118 is left of E28 and right of DL3 or possibly under DL3 E28 is the 6th I.C. from BE1 DL3 is the small delay line right of DL1 DL1 is the biggest delay line		Nil					
00002	03/72	B	C		DL3 is a 100n sec. delay line with part number D-10100 and/or 1609559 DL3 is a small delay line just right of DL1-08 DL1 is the biggest delay line on board DL3 CHANGED TO 125 N SEC. (P/N-322-1) AND/OR 1611327 BY ECO #15 +15A		Nil					
00003	08/72	C	D		R113 is a 120 ohm ¼W 5% resistor R113 is located at AS1 below DL2 DL2 is between E1 and E2		Nil					
B 00004	08/72	D	C	1.0	NOTE: This ECO affects only "C" etch modules R115 is a 1K ¼W 5% resistor R115 is the 3rd resistor right of DL1-12 DL1 is the biggest delay line	1	13-00365	DZMMG DZMMI				
B 00005	08/72	E	C	3.0	NOTE: This ECO affects only "C" etch modules C152 is a 6.8 ufd. capacitor with the cathode connected to the + etch on board. C152 is the capacitor right of DL1 -02 DL1 is the biggest delay line	1 4	10-05306 90-08213					

REVISION DATE Jan./75

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 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 ¼W 5% resistor R123 is the closest resistor to BS1		Nil					
00007	09/72	E1	C		4 - Standoffs screwed on		Nil					
00008	10/72	E2	C		C47 is a .01 uf 100V 20% disc capacitor C47 is directly below E40 E40 is the 1st I.C. from CT1 DO NOT COUNT PULSE TRANSFORMER AS I.C.		N/A					
C 00009	12/72	E3	C	.5	Four #18 gauge black ground jumpers on SIDE ONE INSTEAD OF ON SIDE # TWO		17-00024 (#18 black & white teflon coated)					
C 00010 & 10A	11/72	E4	C	1.0	Jumper E15-10 to E28-13 E15 is the 4th I.C. from AV1 E28 is the 6th I.C. from BE1	1	19-05547	DZQKB				
00011	12/72				NOTE: This ECO deleted		N/A					
D 00012	12/72	E5	C	N/A	NOTE: Print update affecting only "C" etch modules.		Nil					

REVISION DATE Jan./75

G110 CONTROL & DATA LOOPS	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 4

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

REVISION DATE MAY ./76

CONTROL & DATA LOOP	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE
C110												4 OF 4

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

REVISION DATE DEC /75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 3

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
B 00001	6/72	C	C	3.0	Two standoffs to prevent shorting	2	90-06892					
00002	8/72	D	D		Four standoffs on module		Nil					
D 00003	8/72	E	D	4.0	NOTE: Rework only "C" etch modules D116 is a D672 diode instead of being a resistor D116 is the only diode right of E1	16	11-05275	D2MMI				
00004 & 4A	8/72	F	E		E2 is a DEC I.C. 1074H00 E2 is the I.C closest to the top left corner.		Nil					
A 00005	8/72	E1	C	4.0	NOTE: Rework only G231's with etch rev "C" which are in 11/05 and ME11 systems. 11/45 memories do not need this ECO Jumper from R101 to Q7 R101 is the 3rd resistor from bottom left corner Q7 is the biggest transistor from EL1		Nil					
00006	8/72	E2	C		R170 is a 100 ohm ¼W 5% resistor R170 is the 2nd resistor from top edge of board in the 1st row of resistors left of E1		Nil					
00007	9/72	E3	C		NOTE: Print update		Nil					

REVISION DATE Jan./75

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 CAUTION - NOT COMPLETE ECO	QTY.	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00008	9/72	E1A E2A E3A	C C C		C52 is a 470 pfd 100V 5% capacitor C52 is at the far left of DR1 and the only component between two transistors		Nil					
00009	12/12	E4	C	N/A	NOTE: Field service clarification for etch "C" modules		Nil					
00010	3/73	H	E		E1 is a DEC I.C. 4011 quad transistor		N/A					
00011	4/73	E5	C		E1 is a DEC I.C. 4011 quad transistor		N/A					
00012	4/73	J	E		NOTE: Affects etch "E" rev only R176 is a 4.7K ¼W 5% resistor R176 is the 1st resistor below two transistors at the far left of EJ1		N/A					
00013	11/73	K	E		NOTE: I.C. substitution cancelled by ECO # 16		N/A					
00014	2/74	L	E		Q12 as snap-on heat sink Q12 is closest transistor to bottom left corner.		N/A					
00015	6/74	M	E ALL		NOTE: This ECO affects all etch rev modules. J1 & J2 have insulated jumper wire J1 & J2 are between E31 and E34 E31 is the last I.C. from CD slot		N/A					
00016	/74	N E6	E C		NOTE: I.C. 380 and 7380 are unsuitable E9, E15, E16, E17 are I.C. DEC 8640's E9 is the last I.C. from AV1 E15 is the 1st I.C. from BF1		N/A					

REVISION DATE DEC./75

G231 MEMORY DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 3 OF 3

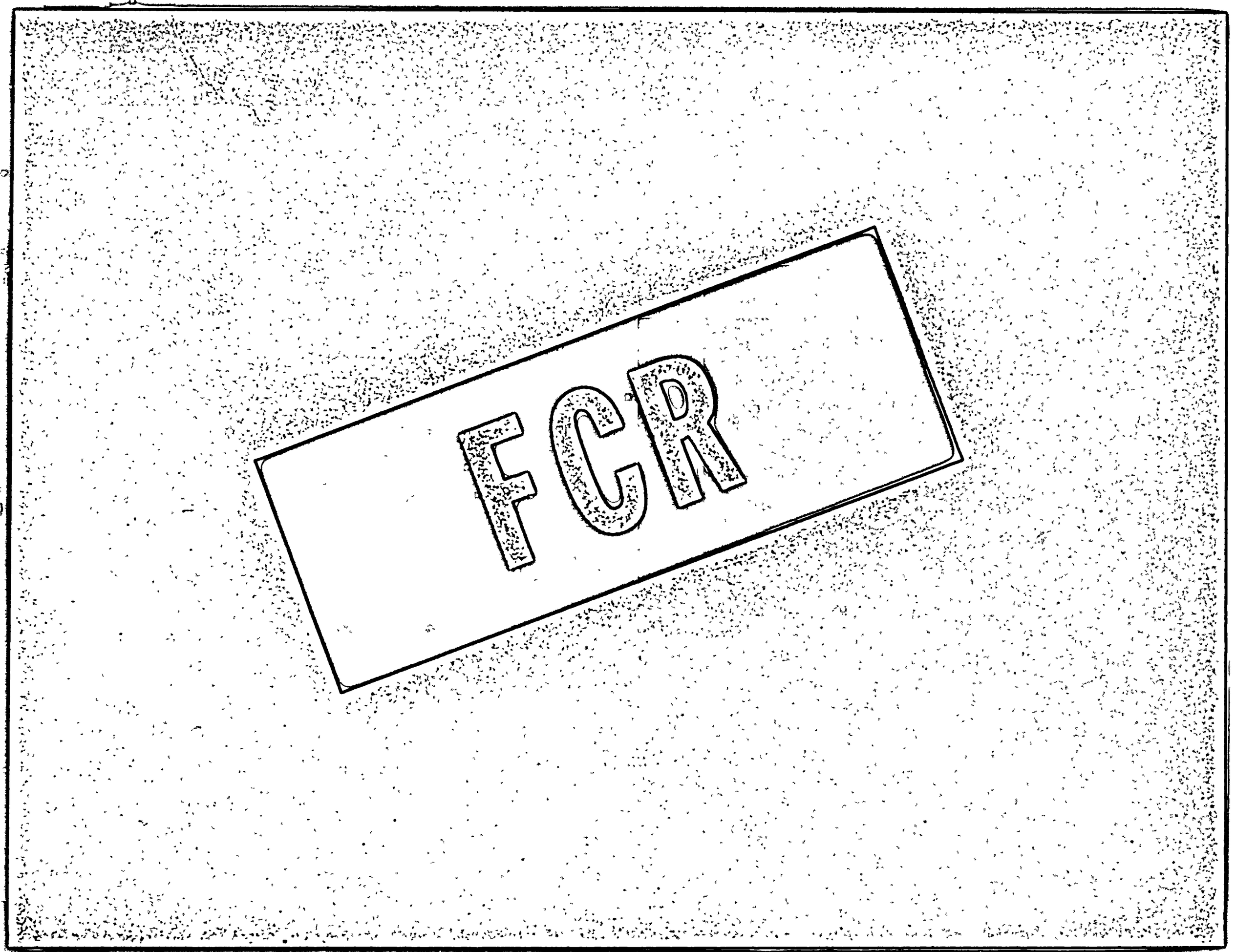
ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00017	01/75	P	E		Q6 is a DEC 6534C transistor Q6 is the last transistor from EJ1		N/A					
00018	04/75	R	E		NOTE: Phase in jumper wire For current loops useing 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 REV	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE INITIALS
00001	6/72	B			NOTE: Print change		Nil					
00002	1/73	C			NOTE: Reference chart for H214, H215, H216 and G645 etch & CS revs		Nil					
00003	6/73	D			NOTE: Allowable I.C. substitution is DEC 2501 to DEC 2501-01, 2501-02, 2501-03		N/A					
00004	10/73	E			NOTE: Print correction		Nil					
00005	11/73	F			NOTE: Print correction		Nil					
00006	07/74	H			NOTE: Documentation update		NIL					
00007 SA	12/74	J			NOTE: DOCUMENTATION FOR AMPEX STACK		NIL					

MM11-0700

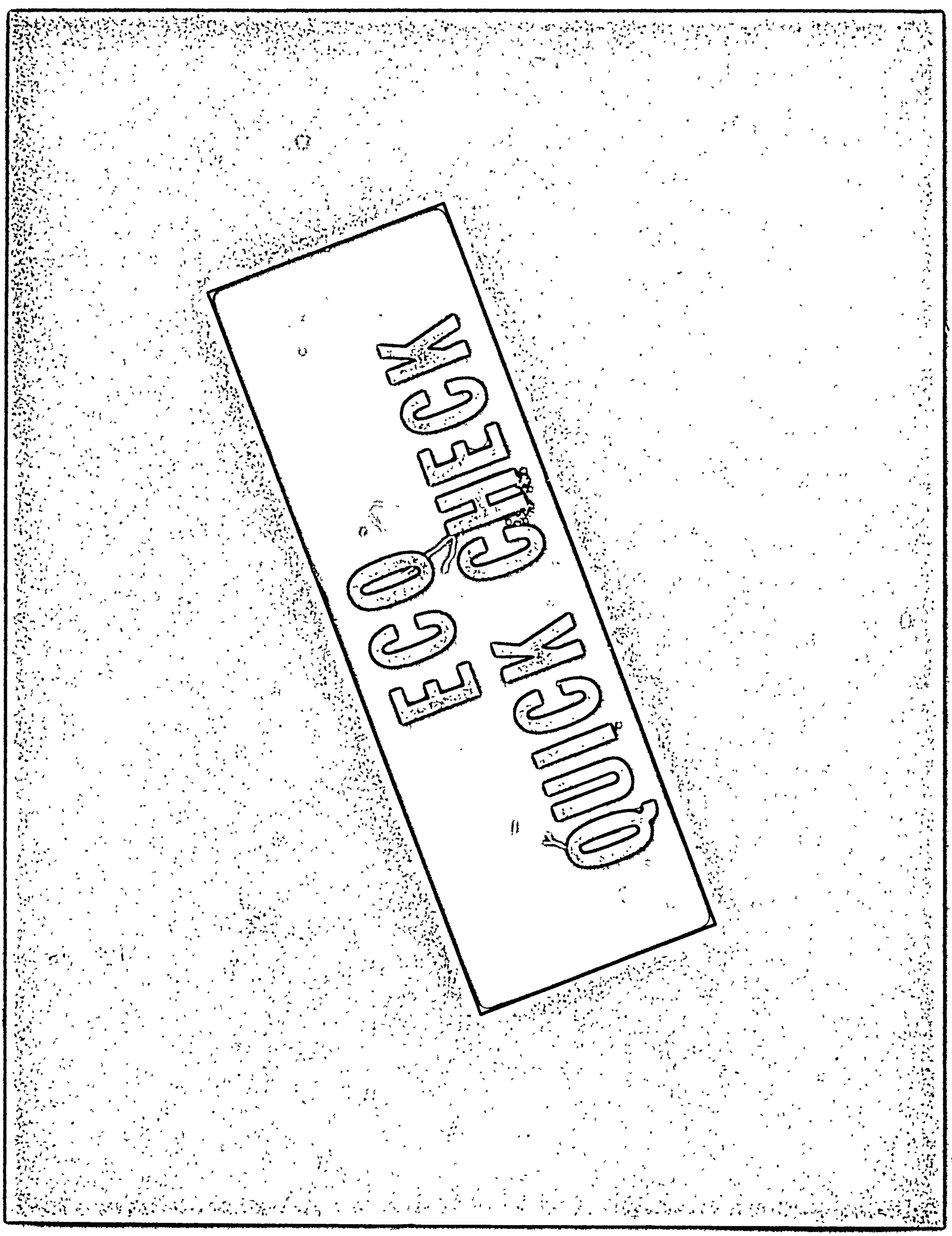

FCR

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

G235-80008 SEP 76
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


LUCKY
LUCKY

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

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	- I5
G235	- S9

MM11-U/UP ECO PARTS

NAME	ECO#	QTY	PART NUMBER	COMMENTS & DESCRIPTION
G235	#9	1	13-05281-00	RESISTOR

REVISION DATE DEC /75

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 CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	10/73	B	B		NOTE: Cancelled By ECO# 1A		NIL					
00001A	10/73	B	B		Gnd Jumper from FT1 and along the bottom of the board	A/R	91-07470-00					
00002	11/73	C	B		R108 is a 56 OHM, 1/2W, 5% resistor R108 to the right of T103 T103 is a transformer along AC1 near handle side.		N/A					
00003	10/74	D	C		NOTE: New Etch Rev.		NIL					
00004	04/75	E	C		NOTE: Part substitution due to shortage		N/A					
I 00005	05/75	F	C	.5	NOTE: Affects only etch "C" rev's Measure open circuit from the top left metal handle to ground		NIL					

REVISION DATE DEC./75

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 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 R35 is located below W4 W4 is left of E2-01 E2 is the 2nd I.C. from AT1	1 1	13-00229 13-03045					
00002	09/73	E	D		R92 is NOT a 330ohm, ¼W, 5% resistor R92 is the 4th component above R101 R101 is 220 ohm, 2W resistor left at AT1	1 2 1	11-03441 13-00271 13-02379					
00003	11/73	F	D		R29 is a 120K, ¼W 5% resistor R29 is the 1st resistor above Q14 Q14 is the transistor above E4 E4 is the 2nd I.C. from BL1		N/A					
00004	01/74	H	D		D2, D3, D4 are deleted No diodes between E2 and R18 R18 is a 100ohm resistor, above E2	1 1	15-05321 19-10466					
00005	04/74	J	D		C47 is a .022 ufd capacitor C47 is the 1st capacitor below T2 T2 is a transformer at the far left of AM1	2 1	10-11683 13-04855					
00006	08/74	K	D		Delete C44 Only one 47ufd, 20V, 10% capacitor still present (not two) between Q12 and Q13 Q12 and Q13 are the 1st and 2nd transistors from AE1		NIL					

REVISION DATE _ MAY /76

G235 16K X-Y DRIVER	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 2 OF 2
		MF11-U/UP MM11-U/UP										

ECO	RELEASE DATE	CS	ETCH / WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	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 R23 is an 1K ½W resistor R23 is the only resistor left of AA1	1 1	13-00364 13-02388					
I 00009 &A	06/76	N	D		R103 is a 75 ohm 1W 5% resistor R103 is immediately right of Q12 Q12 is the 2nd transistor from AC1							

REVISION DATE APRIL/76

H217 16K STACK	ETCH	OPTION	OPTION SERIAL #	PDP	SYSTEM SERIAL #	LOCATION	CAB	BOX	SYS. UNIT	SLOT	IPB	PAGE 1 OF 1

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATED	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	05/74				NOTE: Manufacturing Change		NIL					
00002	07/74				NOTE: Document Change		NIL					
00003	10/74	B	E		NOTE: Rework H217-B and C (18 or 19 Bit) Diodes D29, D30 are deleted D29, D30 were Diodes left of CE1 but right of the resistor network		NIL					
00004	03/76	C	E		NOTE: Manufacturing change.		NIL					

REVISION DATE MAY/76

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

ECO	RELEASE DATE	CS	ETCH WL	ECO HRS. TIME	QUICK CHECK CAUTION - NOT COMPLETE ECO	QTY	PARTS REQUIRED	MAINDECS REQUIRED	PRINT SET UPDATE	ACTUAL INSTALL TIME	DATE INSTALLED	CE NAME
00001	10/73	B	B		NOTE: This is a manadatory ECO Measure continuity from E21-03 to E25-13 E21 is the 2nd I.C. from CL1 E25 is below E21		NIL					
00002	11/73	C	B		NOTE: This is a manadatory ECO Measure continuity from E03-05 to DL3-05 DL3 is the only delay line left of AR1		NIL					
00003 &A	06/74	D	C		NOTE: New etch rev		N/A					
00004	06/75	E	C		NOTE: Phase in DEC 8640 to replace DEC 380		N/A					
00005	06/76	F	C B		NOTE: Introduces M8293-YB for XM15 M8293-YB can be distinguished by checking for jumper from E38-12 to E38-13 E38 is the 4th I.C. from DT1		NIL					