PM-D11/SPC-1
MOUNTING PANEL
MANUAL

Plessey
Peripheral
Systems

PM-D11/SPC-1
MOUNTING PANEL
MANUAL

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Section 1
General Information

1.1 INTRODUCTION

This manual presents the descripton, installation, maintenance and troubleshooting procedures and drawings for the PM-D11/SPC-1 memory mounting assembly manufactured by Plessey Microsystems, Irvine, California 92714.

The material in this manual is arranged into four sections as follows:

- Section 1 - GENERAL INFORMATION

  This section contains the scope and arrangement of the manual, and a brief electrical and physical description of the PM-D11/SPC-1.

- Section 2 - INSTALLATION

  This section contains requirements and procedures for installing the mounting assembly.

- Section 3 - MAINTENANCE AND TROUBLESHOOTING

  Recommended general maintenance procedures are described as well as general troubleshooting procedures.

- Drawing Package - A separate Maintenance Drawing Package MD 701190 contains the parts list and schematics pertaining to the PM-D11/SPC-1.

1.2 PHYSICAL DESCRIPTION

The PM-D11/SPC-1 is a prewired backplane designed to accept memories or small peripheral controllers (SPC) for use in the Digital Equipment Corporation (DEC) PDP-11 series computers.*

The PM-D11/SPC-1 is a nine slot backplane that accepts +5V, -5V, +15V, -15V, and +20V power supply inputs including battery backup power for semiconductor memories. It can support the following Plessey memory systems:

* DEC and PDP are registered trademarks of Digital Equipment Corporation.

- PM-1132/100 - 32K x 16 core memory (+5V and -15V)
- PM-1132/102 - 32K x 18 parity core memory
- PM-S1132 - 32K x 18 MOS dynamic memory (+5V and +15V)
- PM-1116B - 16K x 16 core memory (+5V and -15V0
- PM-1116A/101 - 16K x 16 core memory (+5V, -5V, and +20V)
- PM-1116A/100 - 16K x 18 parity core memory (+5V, -5V, and +20V)
- PM-1105B - 8K x 16 core memory (+5V and -15V)
- PM-1105BP - 8K x 18 parity core memory (+5V and -15V)
- PM-7850 - Parity controller

Power is supplied to the backplane via a power cable which is supplied with the unit.

Power connections to the backplane are made via fast-on tabs for +5V, -5V, +15V, +20V, -15V, 0V and via a 10 pin connector for the -15V, +15V, and +5V battery backup supplies plus ACLO, DCLO, LTC, and ground.

Three power cables are available to accomodate different PDP-11 computers. The three cables, corresponding PM-D11/SPC-1 part numbers and their applications are shown in Table 1-1. It is important to specify the complete system model number when ordering backplanes.

PLESSEY BACKPLANE KIT NUMBER	POWER CABLE PART NUMBER *	APPLICATON
701190-100	701121-100	PDP11/05 - NC/ND PDP11/10 - NC/ND PDP11/35 - JA/JB
701190-200	701123-100	PDP11/40 with serial numbers up to 5999. PDP11/45 and 11/50 with serial numbers up to 1999. H960 - D/E with serial numbers up to 6999. PM-1150/4 PM-1150/2A
701190-300	701196-100*	PDP 11/04 PDP11/05 - SC/SD PDP 11/34 PDP 11/35 - FL/FM PDP 11/35 - SC/SD PDP 11/40 with serial numbers 6000 and up. PDP 11/45 and 11/50 with serial numbers 2000 and up. PM-1150/5 H960 - D/E with serial numbers 7000 and up.

TABLE 1-1: POWER CABLE APPLICATIONS

* Cable Number 701122-100 is used for battery back-up units.

Section 2
Installation

This section contains information for installation of the backplane.

2.1 UNPACKING AND INSPECTION

Visually inspect the shipping container for damage. If the shipping container is damaged it should be saved. If the unit proves to be damaged in shipment and an insurance claim is filed, the carrier may wish to examine the shipping container.

Open the shipping container, remove the assembly, and inspect for physical damage.

2.2 INSTALLATION

2.2.1 Preparation

Before beginning to install the PM-D11/SPC-1 insure that all necessary parts and equipment are available. The following parts should have been supplied with the mounting panel kit:

- The PM-D11/SPC-1 mounting panel
- Plessey bus grant cards (the number of cards required depends upon the application)
- Power cable

Other parts that may be required are a DEC M9202 or Plessey PM-9202 Unibus connector or Unibus cable, and DEC M9302 or Plessey PM-9302 Unibus terminator.* The only tool required is a medium screwdriver, however, a penny or dime may be used.

* Unibus is a registered trademark of Digital Equipment Corporation.

2.2.2 Installation of the Mounting Panel

The installation of the mounting panel varies slightly depending on the exact processor type. Use the following general procedures and refer to Figure 2-1.

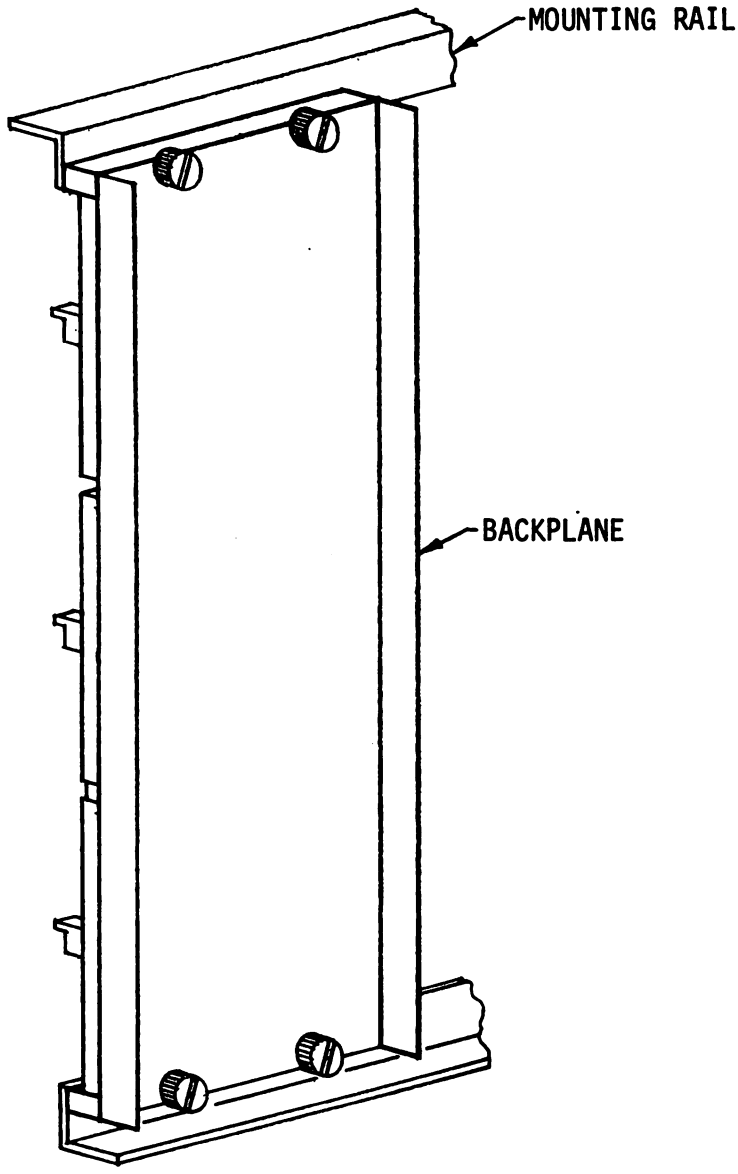

FIGURE 2-1: BACKPLANE INSTALLATION

- Slide mounting box out from rack and remove bottom and top covers if necessary.
- Set the PM-D11/SPC-1 against the mounting rail adjacent to the last system unit in the box.
- Align the four mounting screws with the holes in the mounting rails and screw them down securely.
- Insure that the "A" connector of the PM-D11/SPC-1 is oriented in the same direction as the existing system units.

2.2.3 Power Cable

Power to the assembly is provided by a power cable which connects to fast-on terminals on the back of the mounting panel. Connection is as follows:

GROUND		BLACK WIRE
+ 5V		RED WIRE
+15V		GREY WIRE
+20V		ORANGE WIRE
- 5V		BROWN WIRE
-15V		BLUE WIRE
ACLO		RIBBON CABLE WITH TEN PIN CONNECTOR
DCLO		
LTC		
+ 5V	BATTERY	
+15V	BATTERY	
-15V	BATTERY	

Once the cable is connected to the backplane, the cable should be routed between connector rows and plugged into the power socket on the mounting box.

CAUTION

Careful routing of the cable is necessary to avoid damage to the backplane and/or system. Cables must be routed between connector rows, not across the top.

2.2.4 Unibus Connection

The Unibus enters through slots A1 and B1. Continuation of the bus is made through slots A9 and B9. These connections may be made using a PM9202 Unibus connector or Unibus cables. If the PM-D11/SPC-1 is last on the bus, the DEC M9302 or Plessey PM-9302 Unibus terminator should be installed in slots A9 and B9.

2.3 MODULE UTILIZATION

This section explains the installation of mounting cards in the PM-D11/SPC-1. All cards should be installed with the component side toward the #1 connector row.

2.3.1 Memories

Any of the following memories may be mounted in rows 2 through 8 of the PM-D11/SPC-1 backplane:

- PM-1105B
- PM-1105BP
- PM-1116A/100
- PM-1116A/101
- PM-1116B
- PM-1132/100
- PM-1132/102
- PM-S1132

CAUTION

Certain restrictions must be observed when installing memories; they are:

- Be sure that the MSYNA jumper option is removed on PM-1116B and PM-1105BP memories. Failure to remove the jumper will damage the memory. Memories are normally shipped with this jumper removed.

- PM-1116A and PM-1132 may not be installed in connector row 8.

- Do not attempt to install DEC multi-card memories into this backplane.

2.3.2 Small Peripheral Controllers (SPC)

Connector C through F of slots 1 through 9 are wired to accept DEC small peripheral controllers. Table 2-1 contains a partial list of small peripheral controllers which may be installed in the PM-D11/SPC-1.

DEC MODEL	DESCRIPTION
BM792-Y	Bootstrap loader
CM11-F	Card Reader Interface
CR11	Card Reader Interface
PL11-A	Terminal Control
DL11	Asynchronous Line Interface
PR11-C	General Interface
KG11-A	Communications Arithmetic Unit
KW11-P	Programmable Clock
LC11-A	LA 3Ø Control
LP11-F	Printer Interface (8Ø COL)
LP11-J	Printer Interface (132 COL)
LS11	Line Printer Interface
LV11	Electrostatic Printer
M792	Diode ROM
MRR11-DB	Bootstrap
PC11	Paper Tape Reader/Punch
PR11	Paper Tape Reader
TA11	Cassette Interface

TABLE 2-1: SMALL PERIPHERAL CONTROLLERS

2.3.3 Bus Grant Cards

Any connector row which does not have a card installed (i.e., memory or SPC) must have a bus grant card, Plessey part PM-G727 or DEC G727 in the "D" slot. This card is necessary to continue the bus grants to other devices in the Unibus. The card is installed in the "D" slot with the contact fingers facing toward row 9.

2.3.4 Parity Controller

For parity operation a PM-7850 parity controller may be installed in any A and B connector, rows 2 through 8.

2.3.5 Direct Memory Access (DMA) SPC's

In order to use DMA SPC's in the D11/SPC-1 backplane, the backplane wiring must be modified. It should be noted that if the wiring is modified, the slots modified must always have DMA SPC's installed in them in order to continue the non-processor grant (NPG) line.

The modification(s) to the backplane are as follows:

1. Determine which slot or slots will be used for DMA SPC's.

2. Remove the wire on connector C between A1 and B1 of all slots to be used with DMA SPC's. (NOTE: These wires are the last wires that were wire wrapped on these pines).

Section 3

Maintenance and Troubleshooting

This section provides maintenance and troubleshooting information for effective fault isolation and repair. The drawings in the appendix are provided as an additional aid.

3.1 PERIODIC MAINTENANCE

The PM-D11/SPC-1 requires no periodic maintenance, however, when cards are removed after being installed for extended periods of time it is recommended that the contacts of the connectors be cleaned. Contact cleaning procedure is described below.

The card connector contacts should be cleaned with alcohol or LPS Instant Contact Cleaner. Saturate the contact area thoroughly. While the contacts are still wet scrub with a soft natural bristle brush.

CAUTION

Do not use Freon to clean contents of the connectors in this assembly.

3.2 MAINTENANCE EQUIPMENT

Table 3-1 lists equipment which is useful for diagnosing and repairing the backplane assembly.

EQUIPMENT	MANUFACTURER	PART NO.
Oscilloscope	Tektronix	453 or equivalent
VOM	Simpson	260 or equivalent
Diagonal Cutters		
Needle Nose Pliers		
Wire Wrap Gun	Gardner Denver	
Wire Wrap Sleeve	Gardner Denver	
Wire Wrap Bit	Gardner Denver	28-30 guage or equivalent
Screw Driver Medium Slot		
Wire Wrap Unwrap Tool	Gardner Denver	28-30 guage or equivalent

TABLE 3-1: MAINTENANCE EQUIPMENT

3.3 FAULT ISOLATION AND REPAIR

The PM-D11/SPC-1 is basically a wired connector panel and as such has no components to fail. Failures in the unit will generally fall into one of the following categories:

- Open wires.
- Shorted wires or pins.
- Foreign material in the backplane.
- Improperly installed cards.

To isolate a fault the following procedure is recommended:

- Insure that the panel is securely fastened to the mounting rails.
- Insure that all cards are properly seated.
- Visually inspect the back side of the assembly for bent or shorted pins, frayed or broken wires, or foreign material such as loose screws or pieces of wire.
- If the above procedures do not yield a satisfactory result, the suspected signal paths may be checked for proper connection with an ohmmeter or scope. Use the pin assignment chart in the Drawing Package.