

2.4 HPMM and IOP Card Files

Introduction

There are nine (9) card file models. Three models are not CE Compliant and six models are CE Compliant. The following table lists the nine card file models. All models are also available with conformal coating (a model number with a prefix of MC, rather than MU).

Table 1 Card File Models

| Card File Description | CE Compliant | Non-CE Compliant |
|--------------------------|--------------|------------------|
| Left 7-Slot HPMM or IOP | N/A | MU-HPFH01 |
| Right 7-Slot HPMM or IOP | N/A | MU-HPFH11 |
| 15-Slot HPMM or IOP | N/A | MU-HPFX02 |
| Left 7-Slot HPMM | MU-HPFH03 | N/A |
| Right 7-Slot HPMM | MU-HPFH13 | N/A |
| 15-Slot HPMM | MU-HPFX03 | N/A |
| Left 7-Slot IOP | MU-HPFI03 | N/A |
| Right 7-Slot IOP | MU-HPFI13 | N/A |
| 15-Slot IOP | MU-HPFI23 | N/A |

HPMM and IOP card file differences

An HPMM card file and IOP card file differ only in the application. Electrically, their backpanels are the same.

Non-CE Compliant card file models

The non-CE Compliant card file models can be designated as an HPMM card file or an IOP card file by either installing an HPMM card set in the two left-most card slots or installing IOP cards.

CE Compliant card file models

Unlike the non-CE Compliant card file models, the CE Compliant card file models are designated either an HPMM card file or an IOP card file because even though there is no electrical difference in the backpanel, they differ mechanically. The addition of a ground plate and filtered IOP connectors in the two left-most slots prohibits the installation of an HPMM card set.

The card file is designated an IOP card file when the ground plate and filtered connectors are present.

The card file is designated an HPMM card file when the ground plate and filtered connectors are absent.

Conversion kit

A CE Compliant HPMM card file can be converted to an IOP card file with a model MU-ZPFI03 upgrade kit. The kit adds 2 filtered IOP adapter connectors to the two left-most card slots and a ground plate extension.

2.5 HPMM Card Files

Introduction

A High-Performance Process Manager (HPMM) card file is a 7-Slot or 15-Slot card file that is populated with an HPMM card set. The HPMM card set consists of following assemblies.

- High-Performance Comm/Control card
- High-Performance I/O Link card

2 Equipment Description

2.5 HPMM Card Files

- HPM UCN Interface module

The HPMM assemblies occupy the two left-most slot positions in the card file. The HPM UCN Interface module mounts in the connector beneath the High-Performance Comm/Control card in the first slot.

HPMM card file configurations

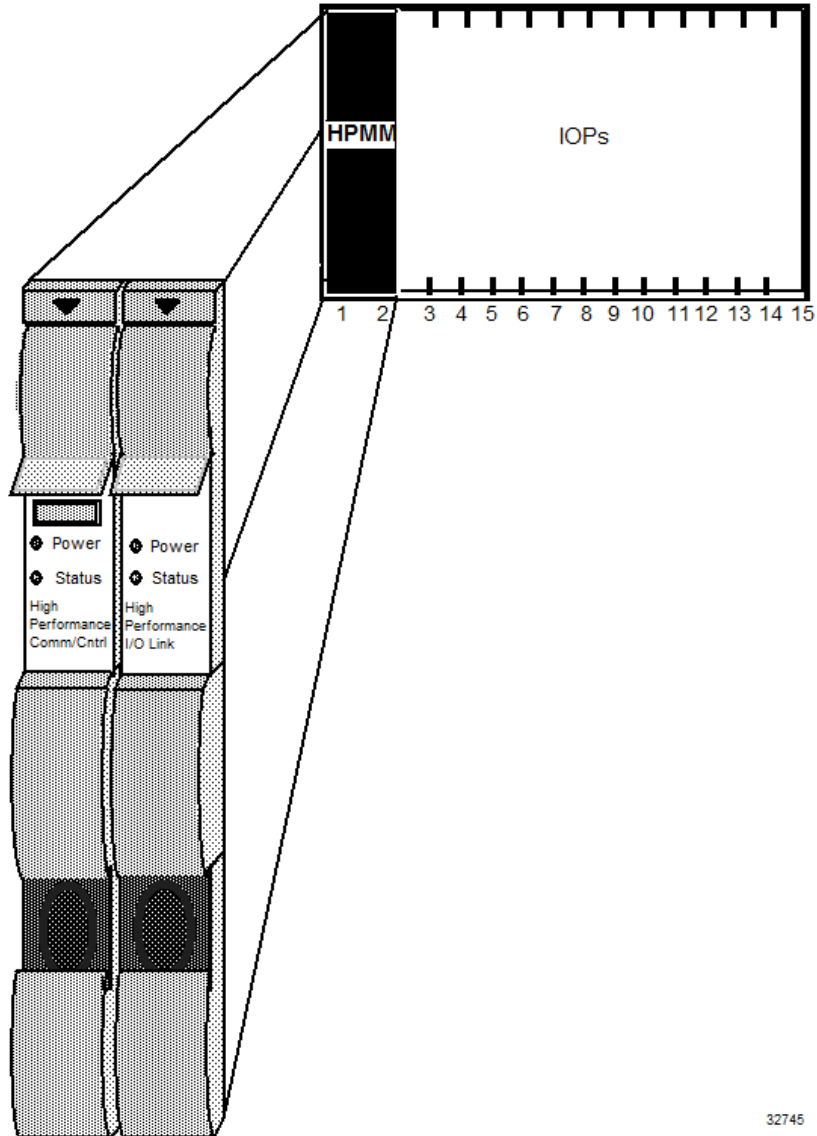
There are 3 HPMM card file configurations. They are as follows:

- Left 7-Slot HPMM card file
- Right 7-Slot HPMM card file
- 15-Slot HPMM card file

15-Slot HPMM card file

The following figure is an illustration of a 15-Slot HPMM card file.

Figure 2 15-Slot HPMM Card File



32745

HPMM functionality

The High-Performance Process Manager Module (HPMM) provides:

- Communications with the Local Control Network (LCN) Network Interface Module (NIM) through the Universal Control Network (UCN)
- A Communications processor (Motorola 68LC040)
- Communications through the I/O Link Interface with Input/Output Processors (IOPs) and I/O Link Extenders
- A Control processor (Motorola 68040)
- Separate and shared memory for the Communications and Control processors
- An I/O Link processor (Motorola 80C32) with SRAM
- HPMM redundancy control

HPMM card/module types

The HPMM is composed of two card types and a UCN interface module that mounts in the 50-pin connector below the High-Performance Communications/Control card in the first left-most card file slot. The cards and the module are described in the following table.

Table 2 HPMM Card/Module Types

| Card/Module Type | Function |
|------------------------------------|--|
| High-Performance Comm/Control Card | Consists of a Communications (Comm) processor, Control processor (Control), separate and shared RAM for the processors, interface to the HPMM Global bus on the backpanel, TBC interface to the HPM UCN Interface module, redundancy interface to another HPMM, and front panel LEDs and a four character alphanumeric diagnostic display. |
| High-Performance I/O Link Card | Consists of an I/O Link processor, SRAM through which the processor communicates with the Communications/Control card, an I/O Link driver/receiver interface, and a +24 Vdc to +5 Vdc power converter that provides +5 Vdc for both HPMM cards and the HPM UCN Interface module. |
| HPM UCN Interface Module | Consists of 5 Mbps IEEE 802.4 compatible MAP carrier band modulator/demodulator circuitry that provides the interface with the Universal Control Network (UCN). Logically provides redundant UCN cable selection (transmit on both, receive on the selected cable) through redundant UCN cable driver/receivers. |



ESD HAZARD

It is important that you wear a properly connected Electrostatic Discharge (ESD) wriststrap while touching or handling HPM components.

Card/module illustrations

These cards and interface module are shown in more details in the following figures.

- Figure 3 HPM UCN Interface Module (Front Panel)
- Figure 4 High-Performance Comm/Control Card (Front Panel)
- Figure 5 High-Performance I/O Link Card (Front Panel)

Refer to these figures for the discussion of HPMM indicators, diagnostic switch, and power margin jumper that follows.

Power indicators

When power is applied to the HPMM, the **Power** indicator on each HPMM card and the HPM UCN Interface module lights. The **Power** indicator is illuminated whenever 24 Vdc from the cabinet Power System is present.

Status indicators

The **Status** indicator on the High-Performance Communications/Control card illuminates momentarily after applying power. Internal test routines are executed upon applying power, and the **Status** indicator remains on if the tests are successfully completed. The steady illumination of the **Status** indicator signifies that no test failures were detected.

The High-Performance I/O Link **Status** indicator is not lit when the HPMM is in the Alive state. It will light (not blinking) after the HPMM is loaded with the operating personality software, and enters the OK state.

The UCN cables in use indicators are visible at the front of the HPM UCN Interface module (**Rx-A** and **Rx-B**) as well as under the front cover of the High-Performance Comm/Control card (**UCN A** and **UCN B**).

The Transmit (**Tx**) indicator at the front of the HPM UCN Interface module is an indication of UCN cable transmit activity.

Refer to the “FTA Redundancy Indicators” subsection in the “Fault Isolation” section. for additional information on the status indicators.

Diagnostic display

The 4-digit Diagnostic display at the front of the High-Performance Communications/Control card (below the upper extraction lever) provides additional status information as well as error code information if a failure occurs. After power is applied and the internal test routines have completed successfully, it will display a code that indicates the HPMM is in the Alive state, such as **Axxx**.

Diagnostic display analysis example

A diagnostic code of **AL09** is analyzed as follows:

First character = **A** = The HPMM is in the Alive state.

Possible first characters are:

A = Alive

B = Backup

I = Idle

F = Fail

L = Load

T = Test

Second character = **L** = The card file is a left 7-Slot file.

Possible characters are:

L = Left 7-slot HPMM card file

R = Right 7-slot HPMM card file

1 = First 15-slot HPMM card file

2 = Second 15-slot HPMM card file

Third and Fourth characters = **09** = The pinned UCN node number

Refer to subsection “Redundant Analog Output IOP Failure Diagnosis” in “Fault Isolation” for additional Diagnostic display codes and more detailed information.

Detailed Diagnostic display switch

A pushbutton switch (**Display**) under the front cover of the High-Performance Comm/Control card controls additional detailed diagnostic information displays. The additional diagnostic codes are presented in a fixed sequence.

This detailed diagnostic information becomes extremely useful when troubleshooting.

The switch effects only the behavior of the display and will not effect the operational capability of the High-Performance Comm/Control card.

Refer to the “Fault Isolation” section for troubleshooting information, failure code charts including suggested corrective actions, and additional information on detailed diagnostic displays and the sequences of presentation.

Debug connector

The High-Performance Comm/Control card has a debug connector (**Debug**) under the front cover. The connector is used by Honeywell engineering with specialized equipment and design level knowledge. The factory also uses the connector.

Conformally coated ORU parts list

The following table is a parts list of conformally coated HPM ORU assemblies.

Table 89 Conformally Coated HPM ORU Parts List

| Name | Description | Part Number |
|--------------------------------|--|--|
| POWER SYSTEM COMPONENTS | | |
| Power Supply Module | Standard 20 A Power Supply Module (Replaced by 51198651-100) | 51109456-200 (obsolete) |
| Power Supply Module | AC Only 8 A Power Supply Module | 51190465-150 |
| Power Supply Module | AC Only 16 A Power Supply Module | 51190465-250 |
| 48 V Battery Backup | 48 V Battery Pack assembly | 51303948-100 |
| Power System Backpanel Assy | PM/APM Power System backpanel | 51401166-150 |
| Power System Backpanel Assy | HPM Power System backpanel | 51404172-150 |
| AC/DC Distribution Assembly | AC Only power control and distribution board 115 Vac dual PSMs | 51401135-150 |
| AC/DC Distribution Assembly | AC Only power control and distribution board 115 Vac single PSM | 51401135-250 |
| AC/DC Distribution Assembly | AC Only power control and distribution board 230 Vac dual PSMs | 51401135-350 |
| AC/DC Distribution Assembly | AC Only power control and distribution board 230 Vac single PSM | 51401135-450 |
| CMOS Battery Backup Assembly | PM/APM Charger/monitor for CMOS memory | 51303968-150 |
| CMOS Battery Backup Assembly | HPM PS charger/monitor for CMOS memory | 51309206-150 |
| HPMM CARDS/MODULE | | |
| High-Performance Comm/Control | Communications/Control card | 51401635-150 (obsolete) 51403988-150 |
| High-Performance I/O Link | I/O Link Interface card | 51309276-150 |
| HPM UCN Interface | UCN Interface module | 51402573-100 (obsolete) 51402573-250 (obsolete) 51402573-450 |
| IOP CARDS | | |
| HLAI IOP (MC-PAIH02) | High Level Analog Input card | 51304489-150 |
| HLAI IOP (MC-PAIH03) | High Level Analog Input card | 51304754-150 |
| LLAI IOP (MC-PAIL02) | Low Level Analog Input card | 51304481-150 |
| LLMux IOP (MC-PLAM02) | Low Level Multiplexer card | 51304362-150 |