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PROMENTUM™

CHASSIS MANAGEMENT MODULE

HARDWARE TECHNICAL PRODUCT SPECIFICATION

MPCMM0001

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007-03233-0000 • May 2008

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Release History

Date	Revision	Description
October 2003	001	Initial public release of this document.
January 2004	002	Product Release
August 2004	003	Changes to CMM Redundancy section, updated figures 8, 9, 10.
September 2005	004	Replaced the second paragraph of section 7.2, CMM Redundancy with more information
May 2006	005	Added section 14.4, Product Code Summary and section 15.1, Material Declaration Data Sheet
August 2006	006	Removed the “hazardous substances” statement and the Material Declaration Data Sheet (MDDS) from Chapter 15; the MDDS is available on request.
December 2007	007	Updated figures 1, 8, 9, 10, 19, 28, 30, 31
May 2008	0000	Document and part number converted to RadiSys format

Where to get more product information

Please visit the RadiSys Web site at www.radisys.com for product information and other resources. Downloads (manuals, release notes, software, etc.) are available via the Technical Support Library product links at www.radisys.com/support or the product pages at www.radisys.com/products.

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1.0 Document Organization

This document describes the operation and use of the Promentum™ MPCMM0001 Chassis Management Module. The following topics are covered in this document.

Chapter 2.0, “Introduction” introduces the key features of the MPCMM0001. This chapter includes a product definition and a list of product features.

Chapter 3.0, “Getting Started” provides installation and setup information for the MPCMM0001. This chapter should be read before using the management module.

Chapter 4.0, “Module Components” describes the major components of the CMM and how the components are interconnected.

Chapter 5.0, “Mechanical Information” provides information on the critical dimensions of the CMM.

Chapter 6.0, “Backplane Considerations” identifies the IPMB routing requirements, power distribution options, and Ethernet routing information for shelf designers to build the MPCMM0001 into their shelves.

Chapter 7.0, “Rear Connections” details the pinouts for the two connectors that interface with a backplane or coplanar mating board.

Chapter 9.0, “Chassis Data Modules (CDMs)” provides information on how the CMM accesses the shelf FRU repository.

Chapter 8.0, “Front Panel” details the cable connections and LEDs on the CMM’s front panel

Chapter 10.0, “Grounding Considerations” provides information on grounding jumpers and ESD discharge features.

Chapter 11.0, “Thermals” provides information on the cooling requirements for the CMM.

Chapter 12.0, “Management Module Specifications” contains the electrical, environmental, and mechanical specifications for the MPCMM0001.

Chapter 13.0, “Certifications” lists the various applicable product certifications of MPCMM0001.

Chapter 15.0, “Safety Warnings” lists important safety warnings in various languages.

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1.1 Acronyms and Terms

The following special acronyms and terms are used in this specification:

Table 1. Acronyms and Terms

Acronym / Term	Meaning
ATCA*	AdvancedTCA*
Board	Front Board as defined in PICMG 3.0 specification
CDM	Chassis Data Module
CFM	Cubic Feet per Minute
Chassis	Physical structure containing boards, backplane, PEMs, etc,; same as shelf
CMM	Chassis Management Module
COM	Common connection (used with relay contacts; see Section 8.3, "Telco Alarm Connector" on page 45)
Component Side 1	Primary side of PCB, used for synergy with PICMG 3.0 terminology
Component Side 2	Secondary side of PCB
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
ETSI	European Telecommunications Standards Institute
Frame	Structure in which Chassis is mounted; could be enclosed or open; same as Rack
FRU	Field Replaceable Unit
I^2C	Inter-integrated Circuit bus
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
LED	Light Emitting Diode
LFM	Linear Feet per Minute
NC	No Connect (exception: see Section 8.3; refers to Normally Closed relay contacts)
NEBS	Network Equipment Building Standards
NO	Normally Open (for relay contacts, see Section 8.3)
PCB	Printed Circuit Board
PEM	Power Entry Modules
PICMG	PCI Industrial Computers Manufacturers Group, sponsor of AdvancedTCA specification
Rack	Structure in which Chassis is mounted; could be enclosed or open; same as Frame
RTM	Rear Transition Module
SCap	Super Capacitor
SEL	System Event Log
Shelf	See Chassis
ShMC	Shelf Management Controller
SSI	Server System Infrastructure

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2.0 Introduction

This chapter provides an overview of the RadiSys Promentum™ MPCMM0001 Chassis Management Module. It includes a product definition and summaries of the module's hardware features. The CMM's firmware features are detailed in the *Promentum™* MPCMM0001 Chassis Management Module *Software Technical Product Specification*.

2.1 Architecture Specification

The MPCMM0001 is designed to be compatible with AdvancedTCA* products, which are based on the PICMG* 3.0 specification. A short form of the PICMG 3.0 specification and other AdvancedTCA information can be found on PICMG's AdvancedTCA web site at:

http://www.advancedtca.org/

2.2 User Documentation

MPCMM0001 is part of the Promentum™ family of products. The latest Promentum™ product information and manuals are available at:

http://www.radisys.com

Documents that are not available on Internet websites may be obtained from your RadiSys Business Link (RBL) account, or contact your RadiSys Field Sales Engineer (FSE) or Field Application Engineer (FAE) to obtain access.

Refer to the following documentation for more information about the components that may be in your system.

- Promentum™ MPCMM0001 Chassis Management Module Software Technical Product Specification
- Promentum™ MPCHC0001 14U Shelf Technical Product Specification
- Backplane for Promentum™ MPCHC0001 14U Shelf Technical Product Specification
- Promentum™ MPCBL0001 High-Performance Single Board Computer Technical Product Specification

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2.3 Product Definition

The Promentum™ MPCMM0001 Chassis Management Module is one of several telecom building blocks from RadiSys, providing OEM equipment designers with carrier-grade, standards-based, high-availability solutions built on the PICMG* 3.x series of specifications. This management module is designed to be used in RadiSys's AdvancedTCA shelves and certain third-party shelves.

Key carrier-grade features of the MPCMM0001 include the following:

- Full Shelf Management Controller and Shelf Manager capability as defined in the PICMG 3.0 specification
- Support for up to 16 board slots in an AdvancedTCA* chassis
- Hybrid dual IPMB star topology support for improved reliability, security, and throughput
- Compact 4U x 280 mm x 4HP size to simplify integration into shelves
- Comprehensive management interfaces including CLI, SNMP, RPC, and RMCP
- Dual 10/100 Mbps Ethernet controllers with support for individually routing connections via software to the front panel, optional rear transition modules, or PICMG 3.0 backplane
- Dual serial ports (one out front, one out the RTM) for local console support
- Isolated telecom alarm connections front or rear to connect to standard telecom alarm systems
- Direct –48 VDC inputs with on-board power regulation for maximum uptime
- Low power design, using less than 30 W
- High-temperature design to survive 70 °C incoming (pre-heated) air to CMM for NEBS-style temperature excursions with the proper airflow
- Dedicated communication paths between dual CMMs for active-standby operation
- Support for chassis data modules (FRU modules), fan trays, PEMs, and external temperature sensors
- Integrated backing plate to help meet the full range of standard NEBS and ETSI tests including earthquake, fire, immunity, and safety

Intel® 80321 processor with Intel XScale® technology, 128 MByte RAM, and 64 MByte flash memory to provide headroom for future expansion and space for custom user applications on board.

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3.0 Getting Started

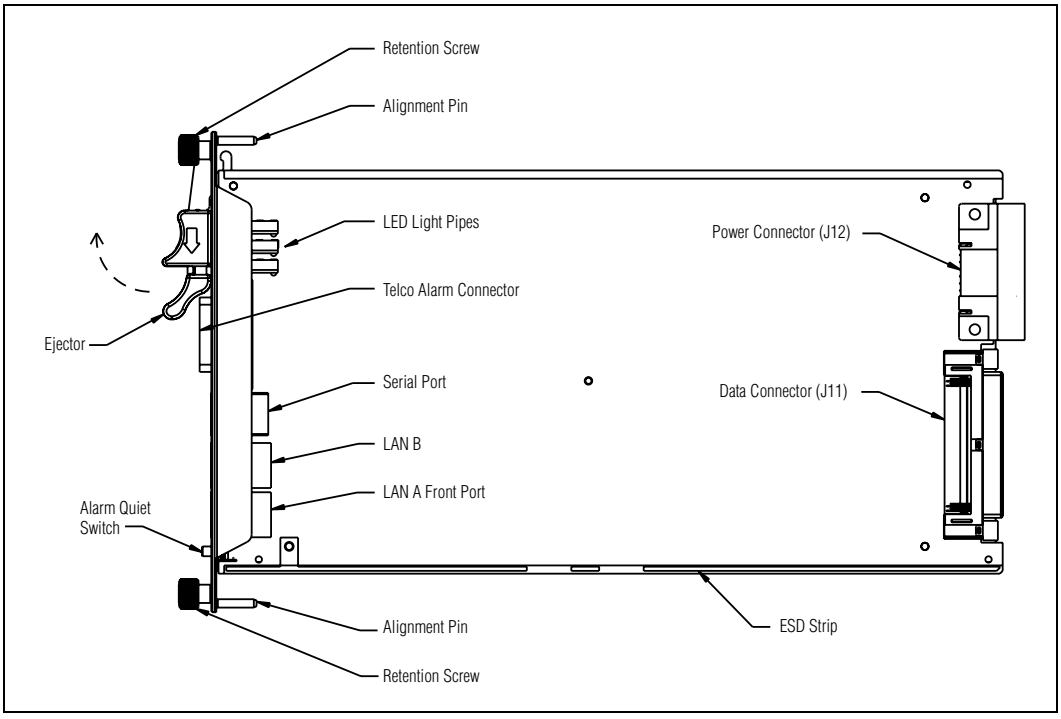
3.1 Installing the Chassis Management Module

This section documents the procedures for installing the management module in a chassis (also called a shelf). Before installing the module, however, read and follow the precautions below:

Caution: As noted in the PICMG* 3.0 specification, AdvancedTCA* products (including MPCMM0001) are designed to be installed and serviced by trained service personnel only, not equipment operators. The primary reason for this is due to the voltages over 60 VDC that can be present with AdvancedTCA systems.

Caution: Many components in the system contain sensitive electronic components. Service personnel should follow proper grounding procedures when installing or servicing this equipment.

Figure 1. Top View of CMM

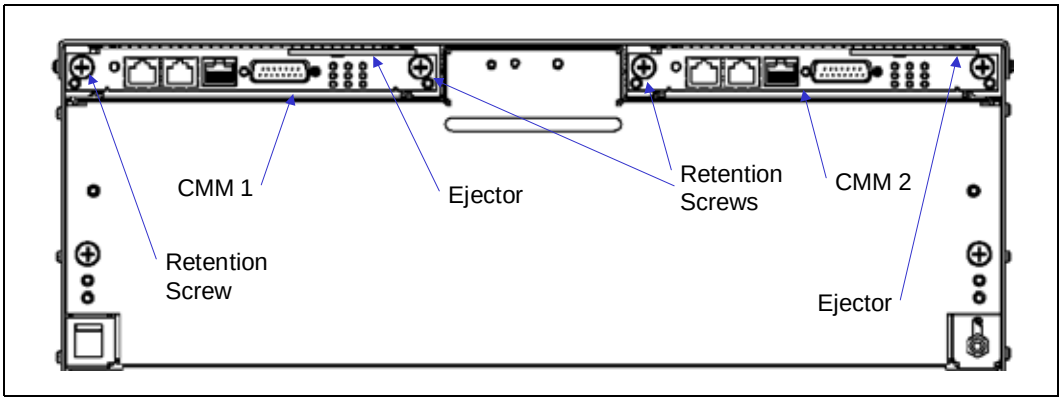


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3.1.1 One-Page Quick Start Guide

1. Open the packing material, find the packing list, and ensure that all the necessary components are present for the MPCMM0001 chassis management module.
2. Take the MPCMM0001 module to the chassis in which it will be installed.
3. Following standard ESD protection procedures, remove the CMM from its anti-static bag.
4. Insert the management module into the card guides for the dedicated CMM slot. Follow the shelf manufacturer's directions for the proper orientation of the CMM. For example, in the RadiSys Promentum™ MPCHC0001 14U Shelf, the CMMs are inserted upside down in slots at the top of the shelf; other vendors may have different orientations for the CMM, so be sure to review the shelf vendor's instructions.

Figure 2. CMMs in an MPCHC0001 Shelf (Front View)



5. As the CMM is being pushed into the slot, keep the ejector handle open until it engages with the card guide. Ensure the alignment pins on the faceplate engage the receptacles on the card cage. When the ejector handle engages, rotate the ejector handle toward the faceplate until the card is fully seated.
6. Use a screwdriver or pair of pliers to tighten the retention screws on both ends of the faceplate.
7. If the chassis power is on, the CMM will turn on automatically.
8. Connect appropriate cables to the front or rear serial port, LAN ports, and telco alarm connector if so desired.
9. The MPCMM0001 is ready to use.

To remove the CMM:

1. Pull the ejector away from the faceplate and wait for the solid blue LED on the faceplate.
2. Loosen the retention screw with a screwdriver.
3. Pull the ejector further in order to pull the CMM out of the chassis.

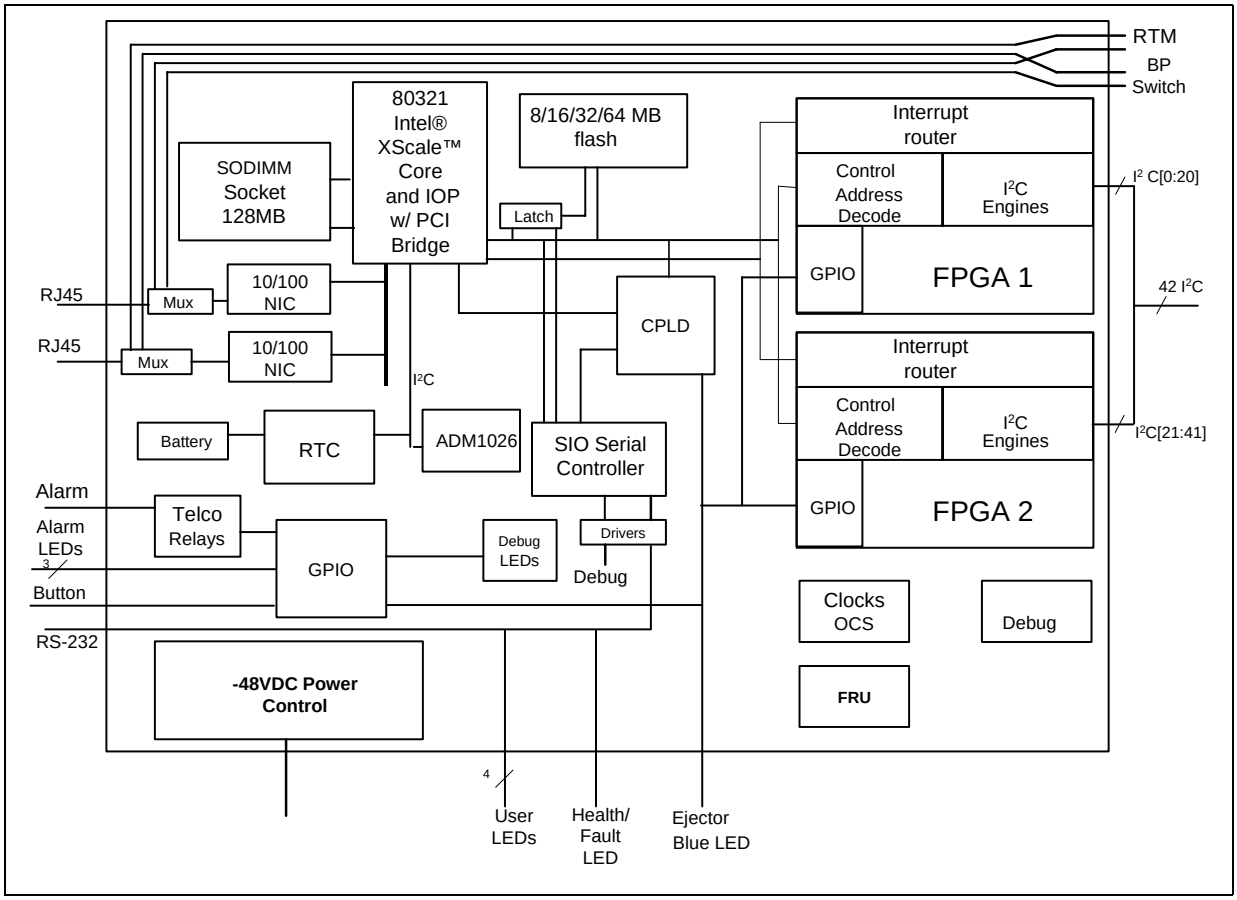
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4.0 Module Components

4.1 MPCMM0001 Block Diagram

The block diagram for the Promentum™ MPCMM0001 Chassis Management Module is shown in Figure 3.

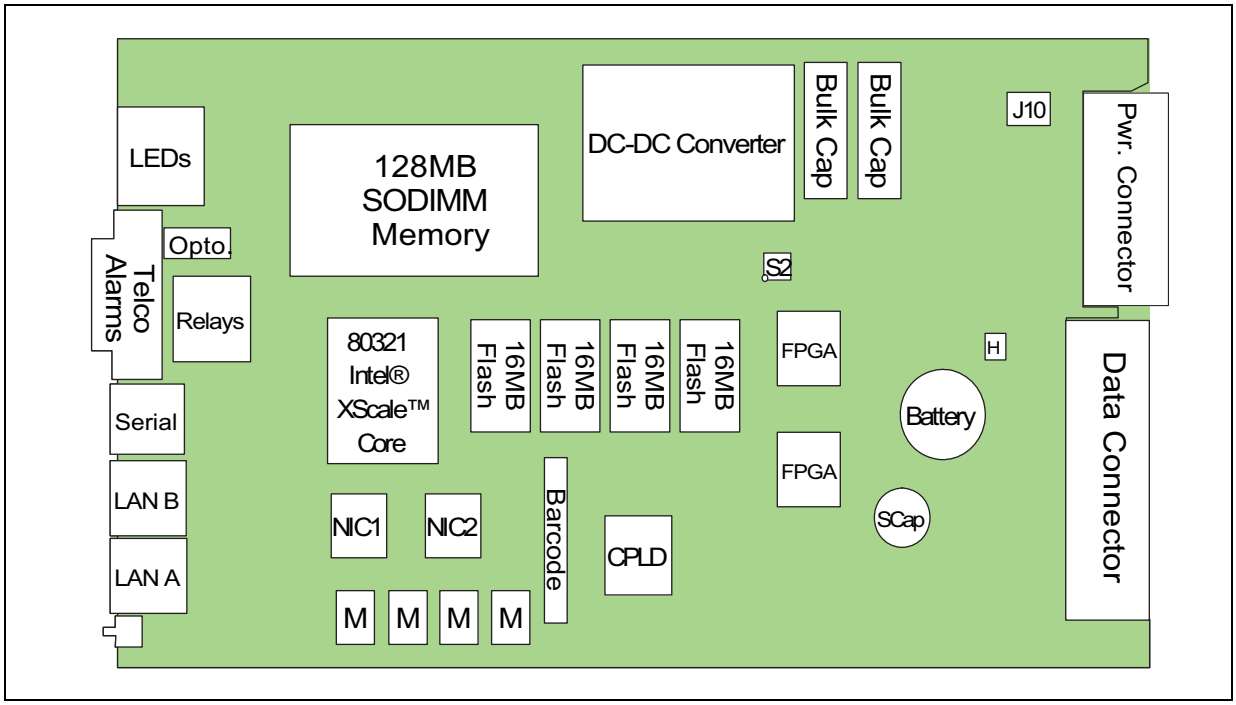
Figure 3. CMM Block Diagram



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The major components of the CMM are arranged as shown in Figure 4.

Figure 4. CMM Layout (Top View)



The PCB is composed of 10 layers of FR406 (or equivalent material). The outer layers (1 and 10) are 0.5 ounce copper (plated to 1.6 ounces), and all other layers are 1 ounce copper.

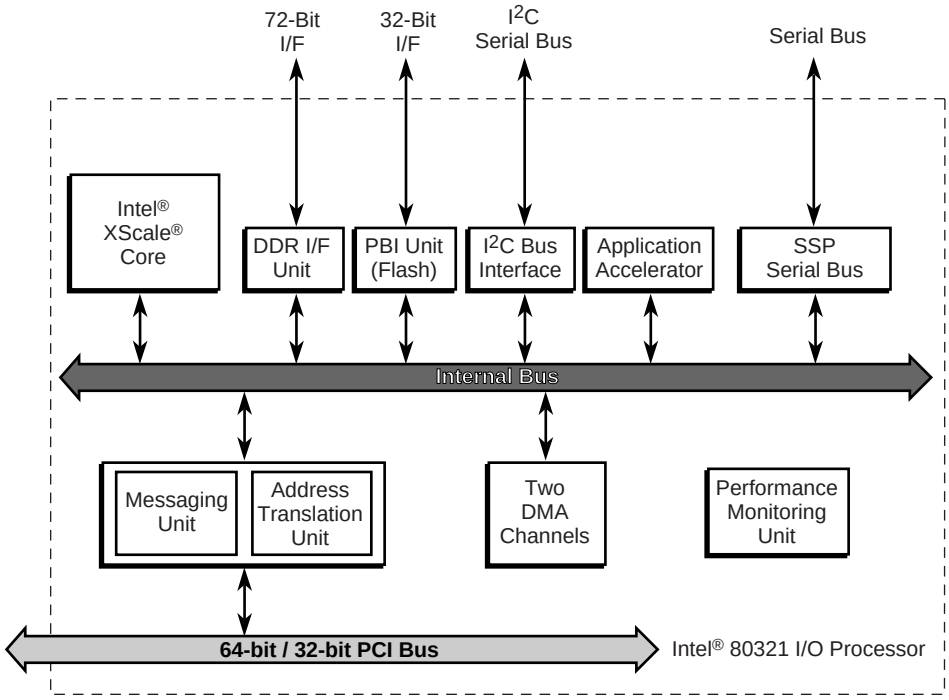
Note: S2 above is a four-pole DIP switch block. The first switch in the DIP, S2-1 (1:8), is used for password reset and the other three switches, S2-2, S2-3, and S2-4 are currently not used. The default position for S2-1 is the 'off' position (open). See the *RadiSys Promentum™ MPCMM0001 Software Technical Product Specification* for procedures on resetting the CMM password.

4.2 Intel® 80321 Processor

The CPU in the MPCMM0001 is an Intel® 80321 Processor/PCI Application Bridge with Intel XScale® technology. The internal block diagram is shown in Figure 5.

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Figure 5. Intel® 80321 Processor Internal Block Diagram



Notes:
Intel® XScale® Microarchitecture is ARM* Architecture compliant.
* Other brands and names are the property of their respective owners.

B3063-01

This processor runs at 600 MHz and has an integrated chipset for lower power usage; the typical power consumption of the CPU is 4 W. Other features include the following:

Table 2. Processor Features (Sheet 1 of 2)

Integrated Intel XScale® Core	—ARM* V5T Instruction Set
	—ARM V5E DSP Extensions
	—400 MHz and 600 MHz
	—Write Buffer, Write-back Cache
PCI Bus Interface	—PCI Local Bus Specification, Rev. 2.2 compliant
	—PCI-X Addendum to the PCI Local Bus Specification, Rev. 1.0a
	—64-bit/66 MHz Operation in PCI Mode
	—64-bit/133 MHz Operation in PCI-X Mode
	—Support 32-bit PCI Initiators and Targets
	—Four Split Read Requests as Initiator
	—Eight Split Read Requests as Target
	—64-bit Addressing Support

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Table 2. Processor Features (Sheet 2 of 2)

Memory Controller	—PC200 Double Data Rate (DDR) SDRAM
	—Up to 1 Gbyte of 64-bit DDR SDRAM (128MByte on MPCMM0001)
	—Up to 512 Mbyte of 32-bit DDR SDRAM
	—Single-bit Error Correction, Multi-bit Support (ECC)
	—1024-byte Posted Memory Write Queue
	—40- and 72-bit wide Memory Interface
Address Translation Unit	—2 KByte or 4 Kbyte Outbound Read Queue
	—4 Kbyte Outbound Write Queue
	—4 Kbyte Inbound Read and Write Queue
	—Connects Internal Bus to PCI/PCI-X Bus
DMA Controller	—Two Independent Channels Connected to Internal Bus
	—Up to 1064 Mbyte/s Burst Support in PCI-X Mode
	—Up to 1600 Mbyte/s Burst Support for Internal Bus
	—2 1-KB Queues in Ch-0 and Ch-1
	—232 Addressing Range on Internal Bus Interface
	—264 Addressing Range on PCI Interface
Application Accelerator Unit	—Performs XOR on Read Data
	—Compute Parity Across Local Memory Blocks
	—1 Kbyte/512-byte Store Queue
I^2C Bus Interface Units	—Two Separate I^2C Units (one used on MPCMM0001)
	—Serial Bus
	—Master/Slave Capabilities
	—System Management Functions
SSP Serial Port	—Full-duplex Synchronous Serial Interface
	—Supports 7.2 KHz to 1.84 MHz Bit Rates
Peripheral Performance Monitoring Unit	—One Dedicated Global Time Stamp Counter
	—Fourteen Programmable Event Counters
	—Three Control/Status Registers
Timers	—Two Dual-programmable 32-bit Timers
	—Watchdog Timer
544-Ball, Plastic Ball Grid Array (PBGA)	
Eight General Purpose I/O Pins	

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4.3 Memory

The MPCMM0001 has SODIMM (Small Outline Dual Inline Memory Module) socket on board. The SODIMM is populated with a 128 Mbyte unbuffered memory module.

The CMM also has four separate 16 Mbyte flash modules. These are Intel E28F128 flash memory modules. Each memory module has multiple lockable regions within the flash.

4.4 Ethernet

The CMM has two Intel® 82559 10/100 Mbyte/s Ethernet controllers with integrated media access controllers and physical interfaces. The output from each of these chips is passed to a dedicated multiplexing device (mux): an SN74CBT16124. Each mux can be individually controlled to send the Ethernet signals to one of three destinations: the front panel, an optional RTM connection, or a separate backplane connection. Separate magnetics (six total) provide magnetic coupling for the 10BASE-T or 100BASE-TX signaling commonly associated with 10/100 Mbyte/s Ethernet. In Figure 4, “CMM Layout (Top View)” on page 12, the four magnetics for the RTM and backplane connections are at the bottom of the board; the two magnetics for the front panel are integrated into the front panel RJ-45 connectors.

4.5 Serial Port UARTs

The UART (Universal Asynchronous Receiver/Transmitter) controller on the MPCMM0001 board is a TI TL16C752B dual UART chip. The first serial port is connected to an RJ-45 connector on the front panel; the second serial port is passed to the rear of the card for an optional RTM connection. Full modem hardware signals are passed through to the RTM.

The UART driver provides 15 KV of ESD protection (8 KV contact, 15 KV air discharge).

4.6 FPGA

The MPCMM0001 chassis management module has two redundant field-programmable gate arrays (FPGAs) on board. These two Xilinx Spartan* II XC2S200 FPGAs have identical internal design, but different addresses. A brief summary of the FPGA functions is shown in Table 3.

Table 3. FPGA Features

Signal	Description
IPMB compatible buses	IPMI 1.5-compliant buses, pulled up to 3.3 V and operating at 100 KHz
	20 IPMB ports per FPGA (40 total): 32 IPMBs for dual star routing to up to 16 AdvancedTCA* slots, 2 shared buses for PEMs and fan trays, 2 buses for communication between CMMs, and 4 spare IPMBs for future expansion
	1 I^2C port per FPGA (2 total) for communication to CDMs
Bus	50nS basic memory bus with data, address, chip select, output enable, and write enable
Interrupt Router	The FPGA is responsible for identifying and routing interrupt requests from multiple sources on the CMM, including the following: internal IPMB engine, other FPGA, both UARTs, the ADM1026 controller, the CPLD, and both LAN controllers

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4.7 Redundancy and Hot Swap CPLD

A Xilinx XC95144XL CPLD is used on MPCMM0001 to control the redundancy fail over logic, hot swap logic, FPGA control, and address decode for simple devices on the CMM. This CPLD also contains the PCI arbitration circuitry for the 80321 processor and the Ethernet controllers.

4.8 Watchdog Timer

A Maxim MAX6374KA-T watchdog timer is used to protect against CPU lockups. The CMM firmware strobes the watchdog periodically; if the CPU fails to strobe the watchdog within a given time interval, the watchdog sends a signal to the CPLD that forces the CPU to reset. This allows the processor to automatically recover to a known good state in the case of lockup.

Note: If the watchdog timer fires, the IPMB signals are not affected by the CPU timer reset. The other CMM automatically takes over and manages the chassis.

4.9 Real-Time Clock

The CMM time-stamps certain events as they occur within the system (particularly System Event Logs, or SELs). A Dallas Semiconductor* DS1307 real-time clock provides this capability.

To prevent against losing the time for the clock, the CMM provides independent power to the DS1307 with an on-board battery (size CR2032). The battery provides approximately five years of run time for the clock in case of a power failure or if the CMM is removed from a chassis.

Batteries have limited shelf lives. After many years in storage, a battery may not be able to hold a charge. To supplement the battery, a super capacitor (SCap) is also provided on the CMM; this provides a mechanism to get up to 40 minutes of backup power for the clock in case of a power failure. Though the SCap will not hold a charge for even a full day, the ability to power the clock circuit during a power failure even after years in storage is a reliability feature of the CMM.

The battery and SCap are both diode-OR'd to ensure that either one can supply the power for the clock without being affected by the other backup power source.

4.10 ADM1026 Controller

An Analog Devices ADM1026 controller monitors the on-board voltages and manages the thermal sensors. The processor communicates with the ADM1026 through an I^2C bus.

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4.11 Hot-Swap Controller

The MPCMM0001 module uses an LTC4250AL* hot-swap controller to ramp voltages and watch for over-current conditions. If the CMM draws more than 2.5 A for more than 500µS, the hot swap controller terminates.

The hot-swap controller waits for the enable signals (short pins tied to each return) to connect before ramping up the circuitry on the CMM. Similarly, if a CMM is pulled out of the system, the hot-swap controller immediately cuts power to the board.

4.12 Ride-Through Support

Many carriers require equipment to survive a 5 ms period without any power in order to survive power glitches due to short circuit, power switchovers, etc. Section 4.1.4.3 of the PICMG 3.0 specification requires boards to survive this 5 ms drop-out and recommends that other shelf elements also have capability to ride through these transients.

The MPCMM0001 module meets this requirement. The CMM will survive the 0 Volt transient described in Table 4-4 of the PICMG 3.0 specification. Large bulk capacitors next to the DC-DC power converters provide this hold-up capacity.

4.13 IPMB Isolation Logic

In a carrier-grade system, it is important to prevent cascaded failures, where a failure in one element affects other system elements and causes them to fail or lose significant functionality. A shared bus is more sensitive to a single item impacting other elements than a simple point-to-point system. This is one reason the MPCMM0001 chassis management module implements the hybrid dual IPMB star topology outlined in section Section 6.1, “IPMB Routing” on page 25.

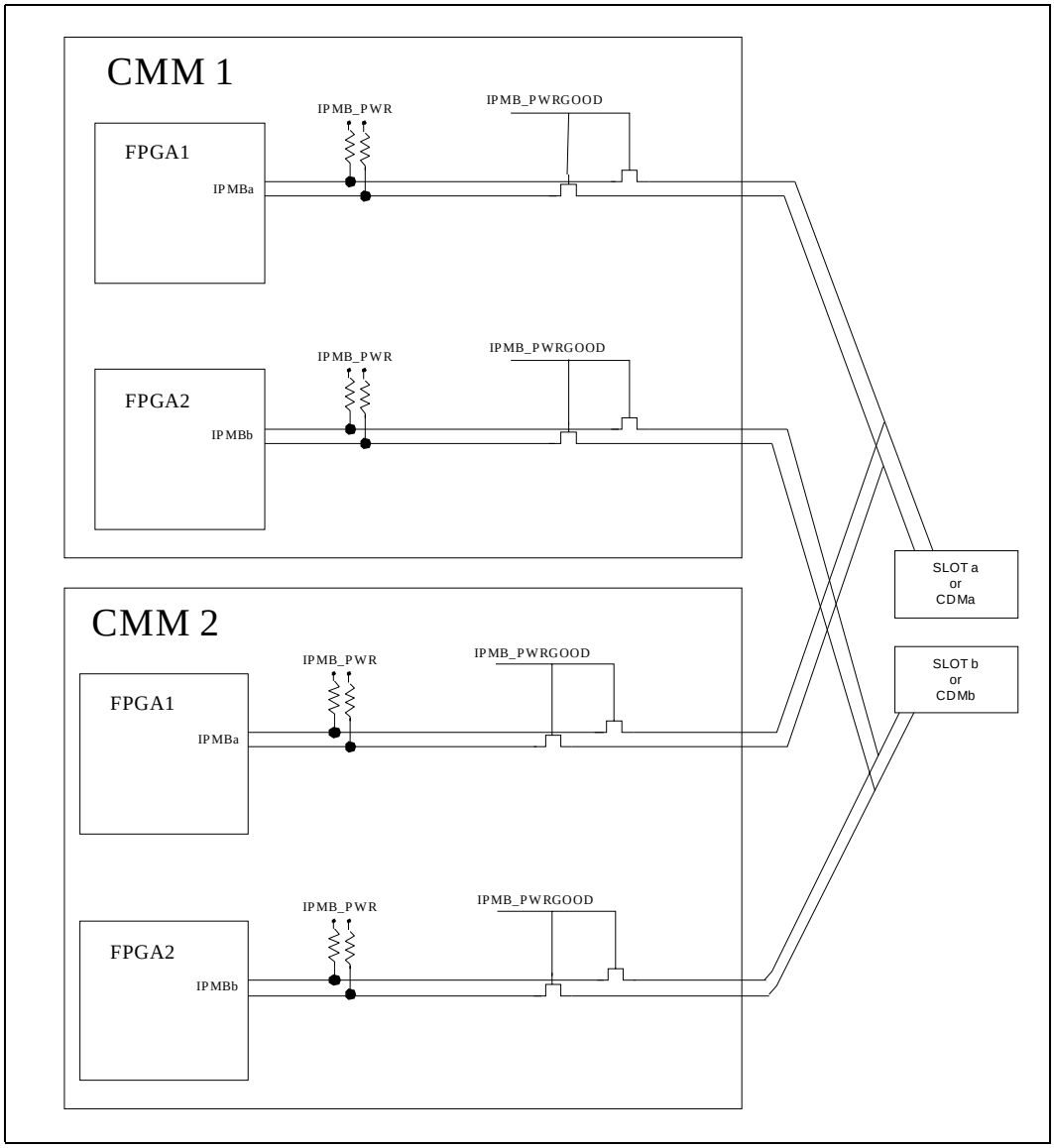
Some IPMB channels are dedicated links between the CMMs and an individual blade; this type of link is called a star. Some IPMB channels are shared among several devices, and this type of link is called a bus. The star and bus elements have different isolation logic in the CMM.

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4.13.1 Dual Star IPMB Isolation

The dual star IPMBs on MPCMM0001 use MOSFET-controlled isolators to disconnect all the radial IPMB signals automatically if power fails on a CMM. The isolation circuit is pictured in Figure 6. The hardware ensures that the CMM is isolated from the dual star IPMBs if power fails.

Figure 6. IPMB Dual Star Isolation



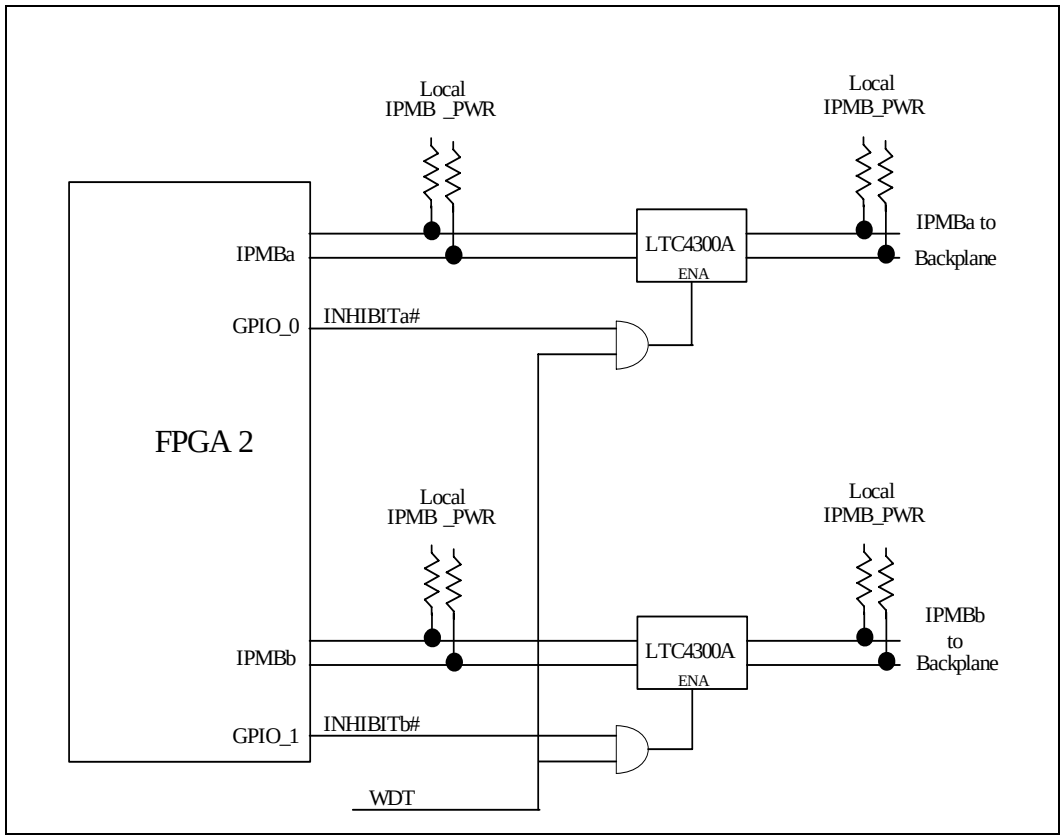
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4.13.2 Dual Bus IPMB Isolation Requirements

The isolation requirements for a dual bus IPMB are more stringent. In addition to the power failure isolation needed by radial IPMBs, bus IPMBs must be able to selectively enable and disable the isolation on each bus. Furthermore, each element on the bus must protect against errors that can cause the bus to hang. Finally, there are electrical drive and rise time requirements that are more difficult to meet on a shared bus.

An LTC4300 on each bus provides the necessary individually selectable isolation mechanisms, in addition to rise time acceleration. A watchdog timer is also used to ensure the bus is isolated if the CPU locks up and resets so that glitches are not propagated to other controllers on the bus.

Figure 7. Dual Bus IPMB Isolation



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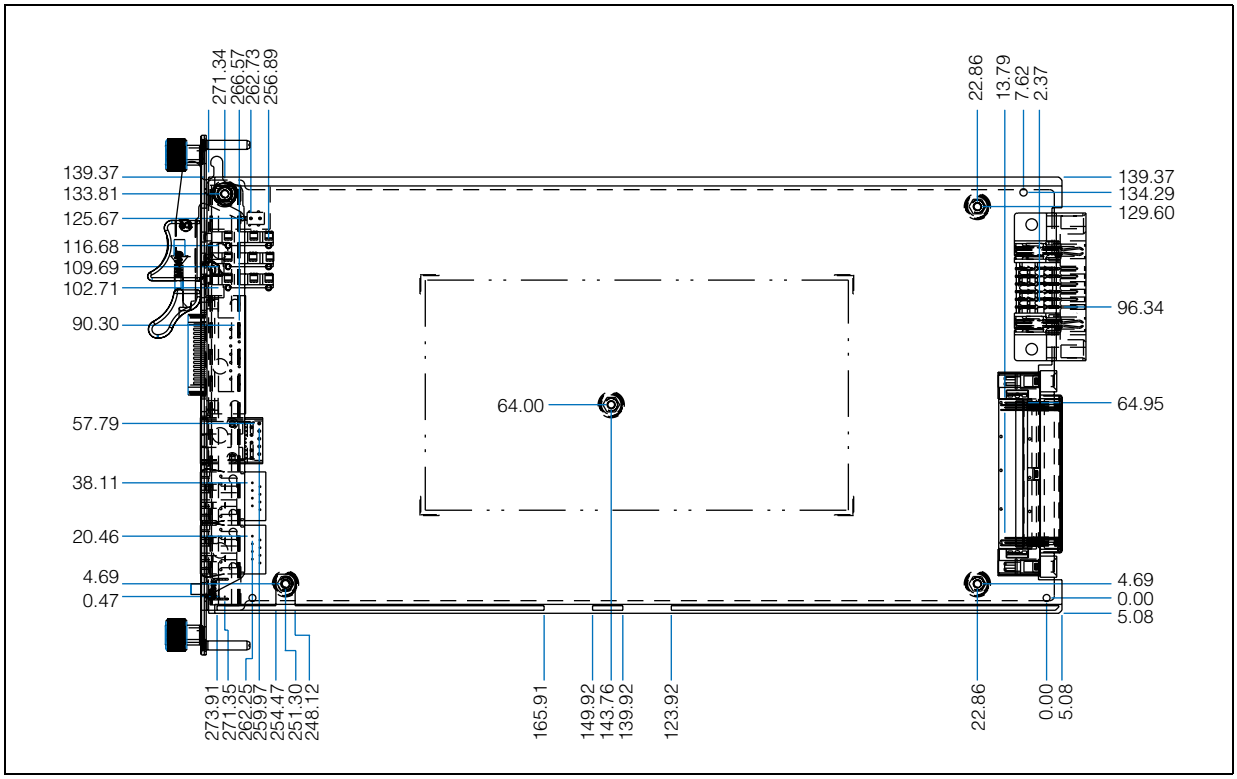
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5.0 Mechanical Information

5.1 Module Dimensions

Dimensions for the CMM are shown in Figure 8. The origin is in the lower right corner and dimensions are in millimeters.

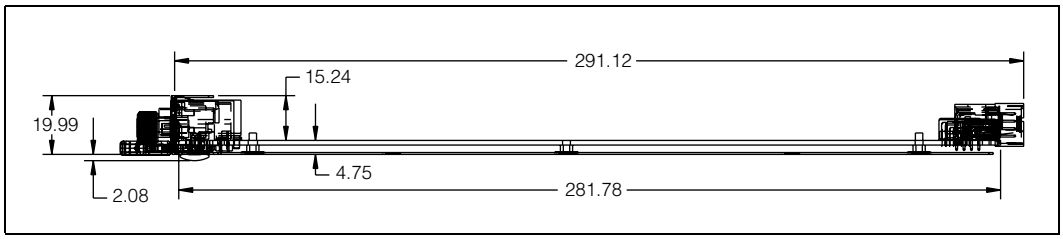
Figure 8. CMM Component Side 1 Dimensions



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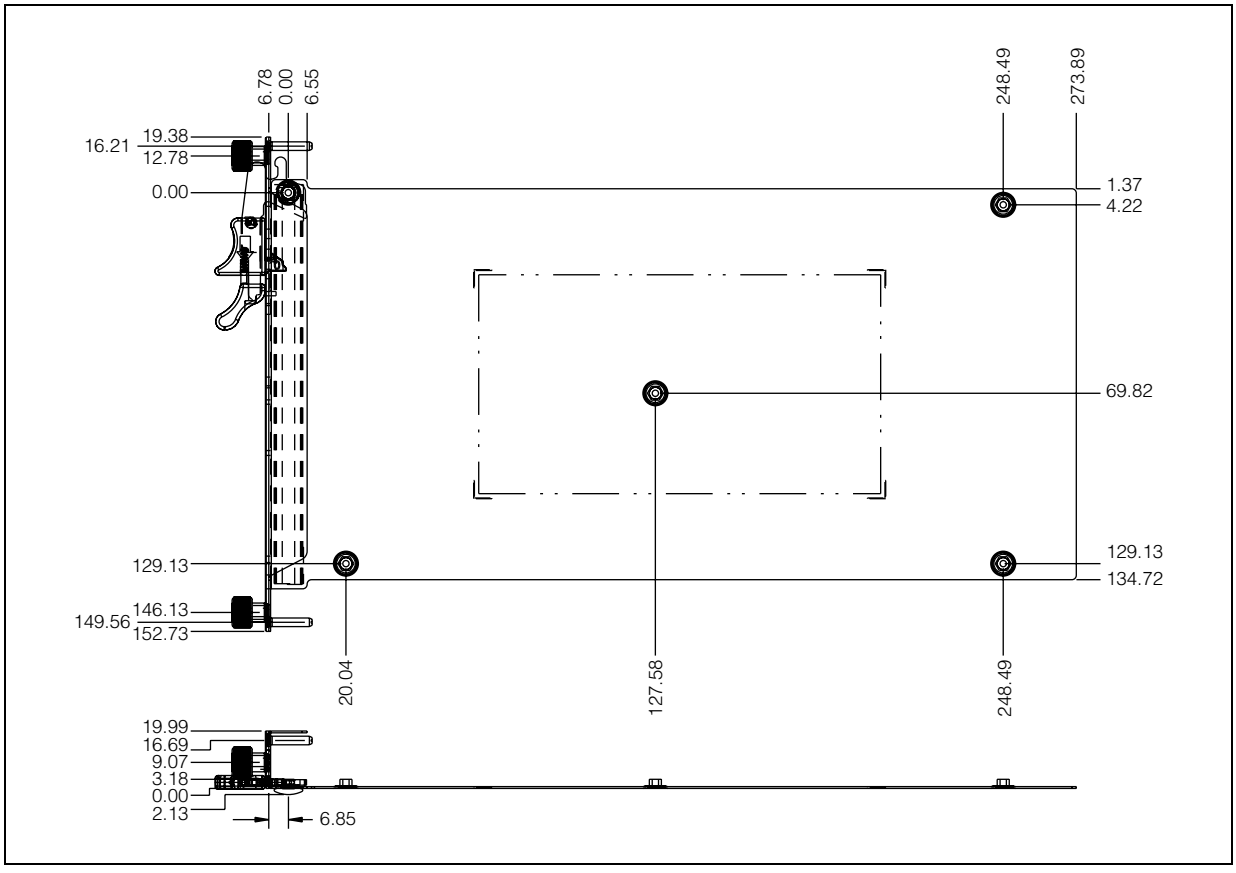
Dimensions for the CMM backing plate are shown below. The origin for these dimensions is based on the mounting hole in the upper left corner.

Figure 9. CMM Backing Plate Dimensions



The gasket is on the secondary side of the backing plate and extends over the pitch line, just as PICMG 3.0 boards extend their gasket over the pitch line. The outer face of the backing plate is 0.15 mm (0.0059 inches) inside the nearest pitch line. Since the gasket has a nominal compressed size of 1.53 mm (0.0602 inches) and a four-sigma range of 0.99 mm (0.0390 inches) to 2.07 mm (0.0815 inches), the gasket must seal on a surface that is between 0.84 mm (0.0331 inches) and 1.92 mm (0.0756 inches) from the left side pitch line.

Figure 10. CMM Side View Dimensions



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5.2 Front Panel Hardware

Table 11, “Telco Alarm Pinout” on page 46 shows two retention screws and two alignment posts on the MPCMM0001 faceplate. Like the hardware used with PICMG* 3.0 boards, these items are M3 hardware. However, since the 20.32 mm (0.8 inches) pitch of the CMM does not allow sufficient room to put the retention screws and alignment posts side by side, the alignment posts are offset slightly.

There is only one ejector on the CMM, but it matches the subrack interface geometry defined in section 2.2.7 of the PICMG 3.0 specification. Note, however, that the ejector handle is 2 mm (0.0787 inches) thick, not the 2.5 mm (0.0984 inches) thickness that many PICMG 3.0 boards use.

A switch on Component Side 2 of the PCB detects the opening and closing of the ejector handle.

5.3 Rear Connector Placement

5.3.1 MPCMM0001 Rear Connectors

The CMM uses two connectors to mate with either backplane or coplanar connectors. The power connector is an SSI-style connector, typically the FCI* 51939-041 (or equivalent) connector. As shown in Table 9, “Ethernet Port Pinouts” on page 45, the A1 pin on the connector is located at coordinates (2.37, 96.34). The data connector on CMM is a Molex* 54145-2405 (or equivalent). Pin 1 on the data connector is located at coordinates (13.7, 64.65).

In this arrangement, the row of pins closest to the edge on the power connector is 3.23 mm (0.1272 inches) closer to the faceplate than the first row of the data connector.

5.3.2 Coplanar Mating Connectors

In a coplanar mating arrangement, a Molex 53941-2405 (or equivalent) connector with Molex 58249-0000 guide pin is mated to the data connector on the CMM, while an FCI 51416-003 (or equivalent) connector mates with the CMM’s power connector. The forward row of pins on the data connector is 7.32 mm (0.2882 inches) forward of the front row of pins on the power connector. When fully mated, the connectors have a 0.5 mm (0.0197 inches) nominal gap between them. This means the closest rows on each power connector are 20.19 mm (0.7949 inches) away from each other and the closest rows on each data connector are 16.10 mm (0.6339 inches) from each other.

5.3.3 Vertical Mating Connectors

When a CMM board mates directly into a backplane, vertical mating connectors are used. The data connector that mates to the CMM is a Molex 53944-2405 (or equivalent) with Molex 58257-0000 guide pin, while the power connector is an FCI 51940-030 (or equivalent). Since they are mounted on a backplane, the rear of these two connectors must be in the same plane.

However, vertical mating connectors must compensate for any lateral differences in the style of connectors. When the boards are mounted in the standard vertical orientation, the left most holes for the data connector are 1.775 mm (0.0699 inches) further to the left than those of the power connector.

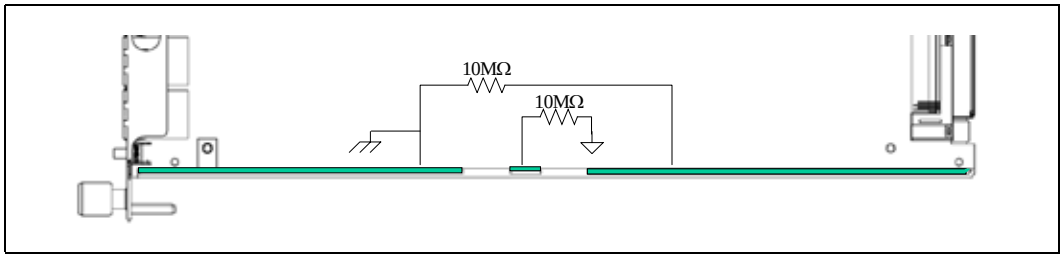
Example: If mounted horizontally with Component Side 1 up, the bottom row of holes for the data connector is 1.775 mm (0.0699 inches) lower than the power connector.

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5.4 ESD Discharge Strip

The ESD strip along the bottom of the CMM follows the guidelines in section 2.2.5 of the PICMG* 3.0 specification. The electrical definition of the ESD discharge strip is shown below.

Figure 11. CMM ESD Strip Electrical Definition



Dimensions of the ESD strips are shown in Table 9, “Ethernet Port Pinouts” on page 45.

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6.0 Backplane Considerations

6.1 IPMB Routing

The Promentum™ MPCMM0001 Chassis Management Module is designed to support a hybrid dual IPMB star topology.

The CMMs can support up to 16 slots, the maximum number of boards in a PICMG* 3.0 chassis. Each board in the subrack has two dedicated IPMBs going to it. Each IPMB is arranged in a 'Y' pattern: the connection from the board is split to two legs, one going to each CMM. Each CMM is present on both buses to each board. In addition, there are two shared IPMB buses routed between the CMMs for private, dedicated IPMB traffic between the two CMMs. While the CMMs theoretically can talk between themselves over any of 30+ IPMBs, the private IPMB traffic between CMMs is normally over these two inter-CMM links.

Note: A shared dual IPMB bus is used for chassis elements such as PEMs and one or more fan trays. This shared dual bus allows the CMM to support varying numbers of PEMs, fan trays, and other intelligent chassis elements.

In compliance with the PICMG 3.0 specification, the shared bus IPMB signals have an isolating buffer device (LTC4300) to ensure proper bus isolation in a shared bus environment. The radial (star) IPMB connections to each node are not required to have this same isolation circuitry since each node is effectively isolated already by the star topology.

6.2 CMM Power

6.2.1 DC Power Input

Each CMM receives dual -48 VDC power feeds on its power connector. Since the maximum power draw is 28 W, the maximum power draw from each CMM is less than 1 A. The typical power draw for each CMM is 17 W. Most of the power is derived from the 3.3 V converter.

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Figure 12. Power System Block Diagram

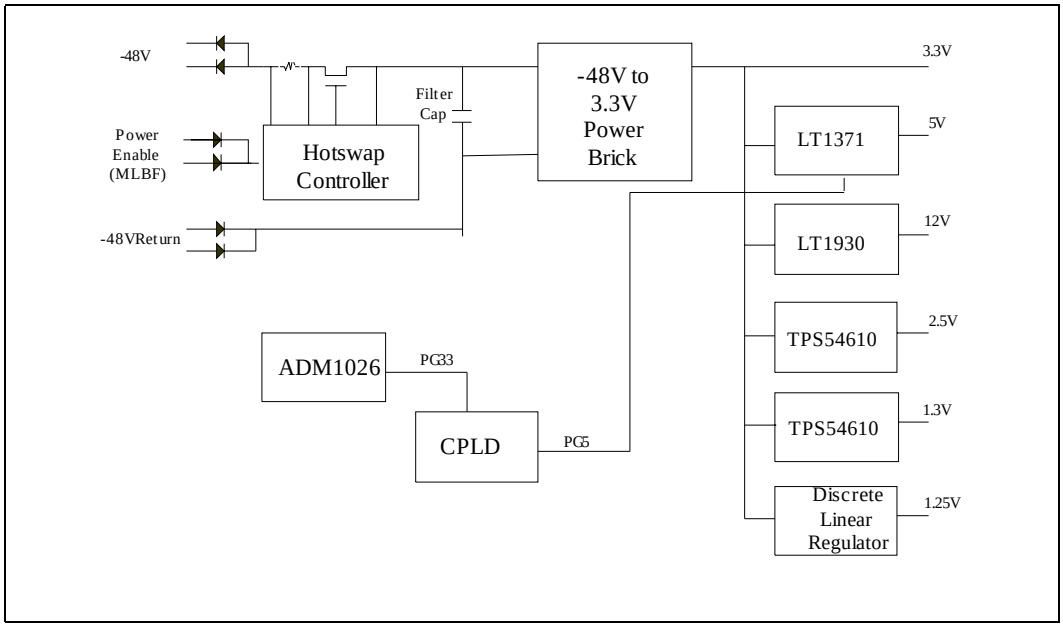


Table 4. Voltage Usage

Voltage	Max current	Where Used	Monitored By
12 V	0.3 A	Op Amp and IPMB isolation circuit	ADM1026
5 V	1 A	Misc components that cannot use 3.3 V	ADM1026
3.3 V	4 A	Most logic	ADM1026
2.5 V	5 A	Memory interface	ADM1026
1.3 V	3 A	IOP321 core	ADM1026
1.25 V	1 A	DDR Termination	ADM1026

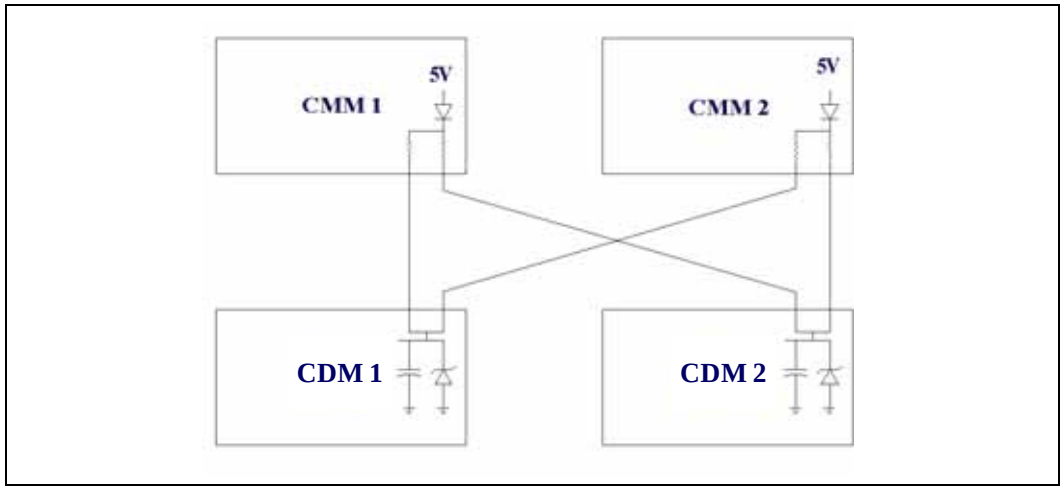
The CMM supports an input voltage range of –34 VDC to –72 VDC, though the 5 ms ride-through capability (see Section 4.12, “Ride-Through Support” on page 17) assumes a prior minimum voltage of –43 VDC.

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6.2.2 CDM Power

The CMM provides a few powered outputs that chassis designers can use as they see fit. The Chassis Data Modules (sometimes called Shelf FRUs) are described in more detail in Section 9.0, "Chassis Data Modules (CDMs)" on page 53. Each CMM provides a diode-OR'd 5 V output at 50 mA maximum current to the CDMs. Shelf designers can use this 5 V output to power simple EEPROMs in a CDM. The CMMs can both drive a tricolor LED on the CDM as well.

Figure 13. CDM Power Input



6.2.3 Filter Tray

The CMM also provides direct support for a filter tray. The CMM provides signals to handle a filter presence switch, two thermistors, and a tricolor LED.

The filter presence switch is typically a mechanical switch that connects the AF_PRES# signal to ground when an air filter is installed in the shelf. The switch is debounced in software.

The two thermistor inputs provide redundant temperature readings to the CMM. The thermistors should be a NTC (negative thermocouple) device like the US Sensor (http://www.ussensor.com/) USX2257 thermocouple. For maximum accuracy, a dedicated logic ground reference signal AFTREF is provided to isolate localized perturbations to logic ground. Shelf designers should use the AFTREF signal exclusively for these thermocouples and should route the two temperature signals and the reference signal in close proximity.

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6.2.4 Power Switch

The CMM has support for an optional soft power switch. This dual-pole input signal can be used to signal the CMM to gracefully shut down the elements within the shelf. Both poles of this switch are debounced in software. If only one contact on the switch closes, the CMM flags this as an error and generates a system event log entry.

These direct drive capabilities of the CMM are summarized in the table below. All the outputs are protected via OR-ing diodes, as shown in Figure 13.

Table 5. Shelf Elements Directly Driven by CMM Hardware

Shelf Element	Component	Notes
CDM	EEPROM + others	50 mA @ 5 V max; typically uses series resistance to drop voltage to 3.3.V.
	LED	Tricolor LEDs driven by CMM
Filter Tray	2 Thermistors	NTC sensors, such as US Sensor USX2257
	LED	Red plus green LEDs driven by CMM
Power switch	Dual pole switch	Soft power switch to CMMs
LAN ports	2 LEDs each (4 total)	Speed on one LED, Link and Activity on the other

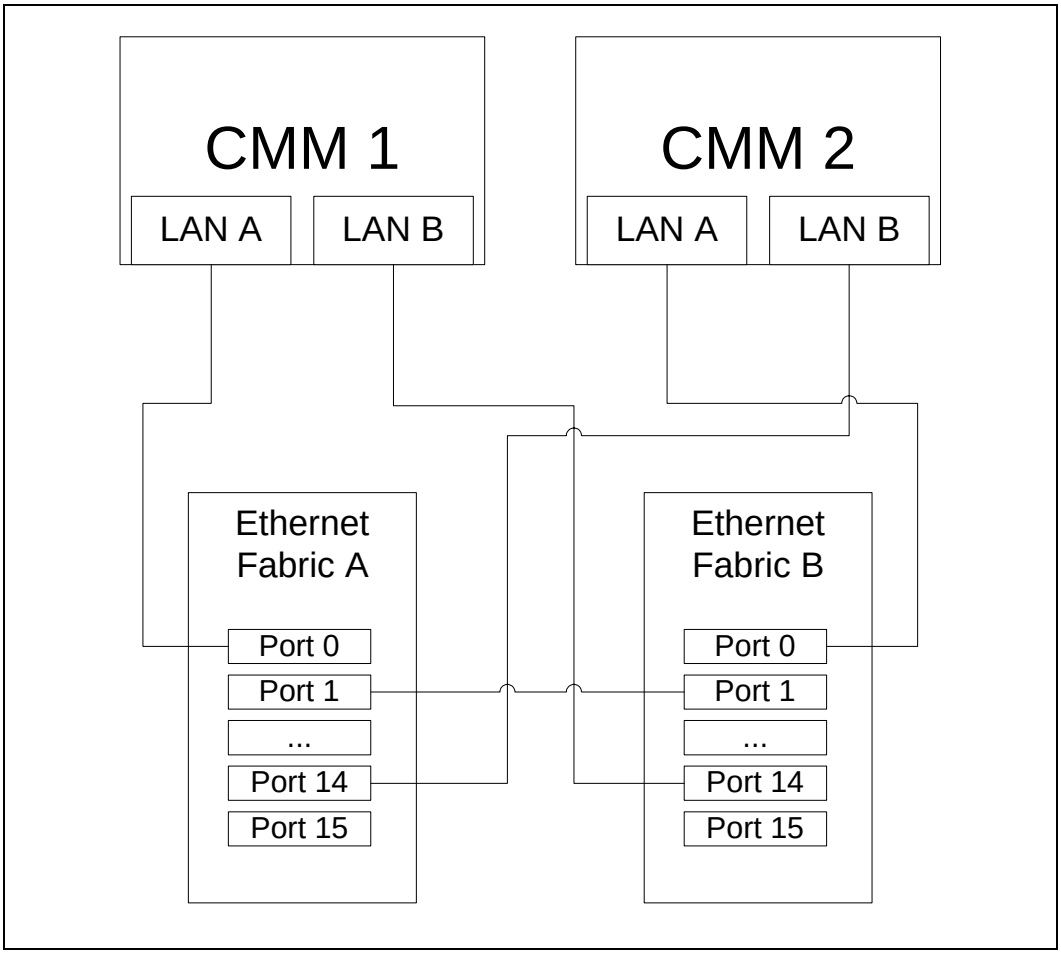
6.2.5 Ethernet Routing

Each CMM provides two Ethernet channels that can be routed to the base interface of PICMG* 3.0 hub slots. The PICMG 3.0 specification only allocates space for one ShMC slot, but the backplane can typically be set up to “poach” an unusable slot in order to provide a connectivity option.

A 14-slot chassis typically uses 14 base Interface channels (13 for other slots plus one for the ShMC). However, the specification defines 16 total channels for the base interface. The second port from each CMM can be routed to an unused upper channel of the opposite hub or fabric board.

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Figure 14. Ethernet Port Poaching



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7.0 Rear Connections

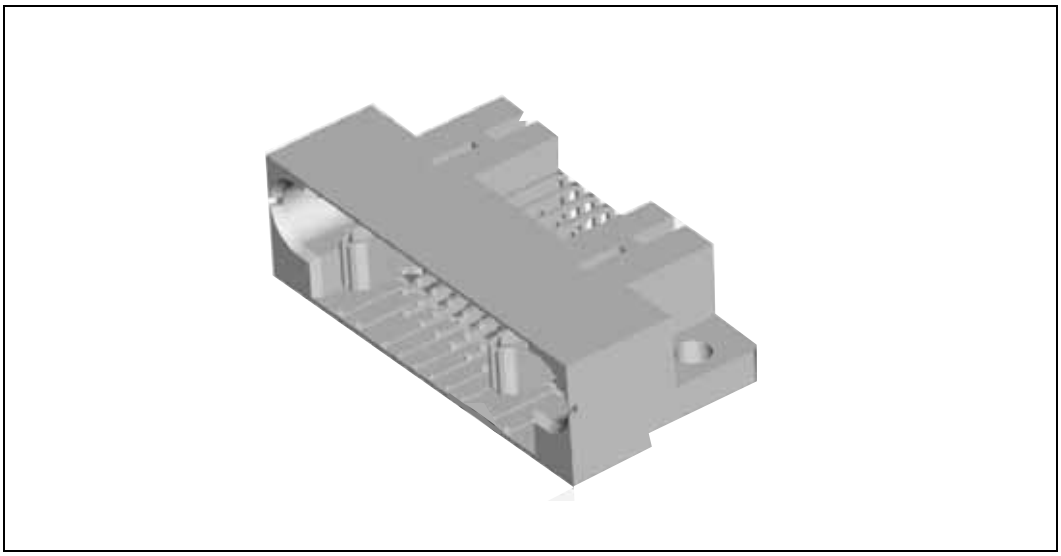
7.1 CMM Connector Pinouts

Each CMM has a power connector and a data connector.

7.1.1 CMM Power Connector

The CMM power connectors are standard SSI power receptacles. These are available from a variety of manufacturers, such as FCI*, Tyco*, Molex*, and Foxconn*. The FCI 51939-041 is one such compatible connector.

Figure 15. CMM Power Connector (J12)



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The pinout of each CMM power connector is shown in the following table.

Table 6. CMM Power Connector Pinout

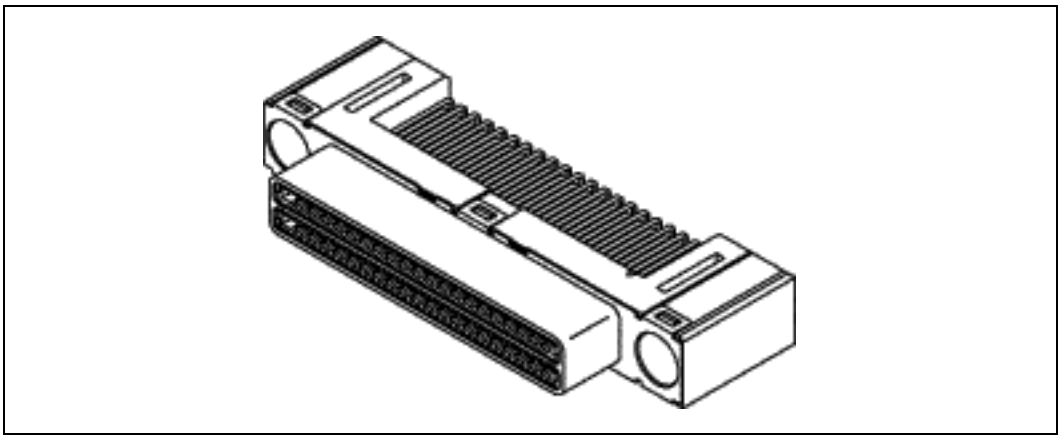
Pin	Designation	Purpose	Notes
P1	SHELF_GND	Shelf Ground, mostly for safety	First mate, blade
P2	LOGIC_GND	Logic Ground for signal returns	Second mate, blade
A1	-48 V_B	B power feed	
B1	RESVD	Reserved for future use	
C1	-48 V_B_ENABLE	Enable signal for B feed	Last mate
D1	-48 V_B_RTN	Return path for B feed	
A2	PWRALRM_NO	Power alarm relay, normally open	No NC contact for power
B2	PWRALARM_COM	Power alarm relay, common path	
C2	RESVD	Reserved for future use	
D2	MinorReset+	Minor alarm reset, positive polarity	
A3	MinorAlarm_COM	Minor alarm relay, common path	
B3	MinorAlarm_NO	Minor alarm relay, normally open	
C3	MinorAlarm_NC	Minor alarm relay, normally closed	
D3	MinorReset-	Minor alarm reset, negative polarity	
A4	MajorAlarm_COM	Major alarm relay, common path	
B4	MajorAlarm_NO	Major alarm relay, normally open	
C4	MajorAlarm_NC	Major alarm relay, normally closed	
D4	MajorReset+	Major alarm reset, positive polarity	
A5	CriticalAlarm_COM	Critical alarm relay, common path	
B5	CiticalAlarm_NO	Critical alarm relay, normally open	
C5	CiticalAlarm_NC	Critical alarm relay, normally closed	
D5	MajorReset-	Major alarm reset, negative polarity	
A6	-48 V_A	A power feed	
B6	RESVD	Reserved for future use	
C6	-48 V_A_ENABLE	Enable signal for A feed	Last mate
D6	-48 V_A_RTN	Return path for A feed	

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7.1.2 CMM Data Connector

The CMM data connector is a Molex 54145-2405 connector.

Figure 16. CMM Data Connector (J11)



The pinout for each CMM data connector is shown in the following table.

Table 7. CMM Data Connector Pinout (Sheet 1 of 7)

Pin	Designation	Purpose	Notes
1,2	LOGIC_GND	Diff pair signal integrity	
3	BP_CMC_TX1-	Backplane CMM GbE TX, negative	Ethernet CMM connections (Ethernet A), designed to connect to Base Interface at ShMC port; pinout is defined for Gigabit Ethernet for future-proofing even though MPCMM0001 only provides Fast Ethernet connectivity
4	BP_CMC_TX1+	Backplane CMM GbE TX, positive	
5,6	LOGIC_GND	Diff pair signal integrity	
7	BP_CMC_RX1-	Backplane CMM GbE RX, negative	
8	BP_CMC_RX1+	Backplane CMM GbE RX, positive	
9,10	LOGIC_GND	Diff pair signal integrity	
11	BP_CMC_TX0-	Backplane CMM FE TX, negative	
12	BP_CMC_TX0+	Backplane CMM FE TX, positive	
13,14	LOGIC_GND	Diff pair signal integrity	
15	BP_CMC_RX0-	Backplane CMM FE RX, negative	
16	BP_CMC_RX0+	Backplane CMM FE RX, positive	
17,18	LOGIC_GND	Diff pair signal integrity	

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Table 7. CMM Data Connector Pinout (Sheet 2 of 7)

Pin	Designation	Purpose	Notes
19	BP_CMX_TX1-	2nd Bplane CMM GbE TX, negative	These are the second ShMC Ethernet ports (Ethernet B); since the ATCA* spec does not call out a second ShMC port per ShMC, these are routed to port 15 of the alternate hub slot's Base Interface (see section Section 6.2.5, "Ethernet Routing" on page 28 for more information)
20	BP_CMX_TX1+	2nd Bplane CMM GbE TX, positive	
21,22	LOGIC_GND	Diff pair signal integrity	
23	BP_CMX_RX1-	2nd Bplane CMM GbE RX, negative	
24	BP_CMX_RX1+	2nd Bplane CMM GbE RX, positive	
25,26	LOGIC_GND	Diff pair signal integrity	
27	BP_CMX_TX0-	2nd Bplane CMM FE TX, negative	
28	BP_CMX_TX0+	2nd Bplane CMM FE TX, positive	
29,30	LOGIC_GND	Diff pair signal integrity	
31	BP_CMX_RX0-	2nd Bplane CMM FE RX, negative	
32	BP_CMX_RX0+	2nd Bplane CMM FE RX, positive	
33,34	LOGIC_GND	Diff pair signal integrity	
35	RP_ENET1_TX1-	RTM for 1st GbE, TX, negative	Rather than going to the backplane itself, the CMM can direct the Ethernet port to go to an RTM; these connections are for the first Ethernet port (Ethernet A)
36	RP_ENET1_TX1+	RTM for 1st GbE, TX, positive	
37,38	LOGIC_GND	Diff pair signal integrity	
39	RP_ENET1_RX1-	RTM for 1st GbE, RX, negative	
40	RP_ENET1_RX1+	RTM for 1st GbE, RX, positive	
41,42	LOGIC_GND	Diff pair signal integrity	
43	RP_ENET1_TX0-	RTM for 1st FE, TX, negative	
44	RP_ENET1_TX0+	RTM for 1st FE, TX, positive	
45,46	LOGIC_GND	Diff pair signal integrity	
47	RP_ENET1_RX0-	RTM for 1st FE, RX, negative	
48	RP_ENET1_RX0+	RTM for 1st FE, RX, positive	
49,50	LOGIC_GND	Diff pair signal integrity	
51	RP_ENET2_TX1-	RTM for 2nd GbE, TX, negative	This is the second Ethernet RTM connection (Ethernet B); note that one differential pair is missing--it can be found at pins 119 and 120
52	RP_ENET2_TX1+	RTM for 2nd GbE, TX, positive	
53,54	LOGIC_GND	Diff pair signal integrity	
55	RP_ENET2_RX1-	RTM for 2nd GbE, RX, negative	
56	RP_ENET2_RX1+	RTM for 2nd GbE, RX, positive	
57,58	LOGIC_GND	Diff pair signal integrity	
59	RP_ENET2_TX0-	RTM for 2nd FE, TX, negative	
60	RP_ENET2_TX0+	RTM for 2nd FE, TX, positive	
61,62	LOGIC_GND	Diff pair signal integrity	

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Table 7. CMM Data Connector Pinout (Sheet 3 of 7)

Pin	Designation	Purpose	Notes
63	I_SDA[16]_A		Each IPMB signal is sent over two wires: a data line (SDA) and a clock line (SCL). The numbers in brackets indicate the slot number. The suffixes indicate which IPMB bus this is, an A designation for PICMG* 3.0's IPMB_A and a B for IPMB_B buses. Note that the CMM pinout is defined to support up to 16 slots.
64	I_SCL[16]_A		
65	I_SDA[16]_B		
66	I_SCL[16]_B		
67	I_SDA[13]_B		
68	I_SCL[13]_B		
69	I_SDA[13]_A		
70	I_SCL[13]_A		
71,72	LOGIC_GND	Signal integrity/ground return	
73	I_SDA[11]_A		
74	I_SCL[11]_A		
75	I_SDA[11]_B		
76	I_SCL[11]_B		
77	I_SDA[8]_B		
78	I_SCL[8]_B		
79	I_SDA[8]_A		
80	I_SCL[8]_A		
81,82	LOGIC_GND	Signal integrity/ground return	
83	I_SDA[6]_A		
84	I_SCL[6]_A		
85	I_SDA[6]_B		
86	I_SCL[6]_B		
87	I_SDA[3]_B		
88	I_SCL[3]_B		
89	I_SDA[3]_A		
90	I_SCL[3]_A		
91,92	LOGIC_GND	Signal integrity/ground return	
93	I_SDA[1]_A		
94	I_SCL[1]_A		
95	I_SDA[2]_B		
96	I_SCL[2]_B		
97	I_SDA[1]_B		
98	I_SCL[1]_B		
99	I_SDA[15]_A		
100	I_SCL[15]_A		
101	I_SDA[15]_B		
102	I_SCL[15]_B		
103	I_CF_SCL_A	Clock I^2C to Chassis Data Module 1	See section Section 9.0, "Chassis Data Modules (CDMs)" on page 53,
104	I_CF_SDA_A	Data I^2C to Chassis Data Module 1	
105,106	LOGIC_GND	Signal integrity/ground return	

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Table 7. CMM Data Connector Pinout (Sheet 4 of 7)

Pin	Designation	Purpose	Notes
107	RP_ENET1_SPD#	Rear panel Ethernet A speed LED (LED -)	These LED outputs go to the RTM Ethernet connections
108	RP_ENET1_ACT#	Rear panel Ethernet A activity LED (LED +)	
109	RP_ENET1_LNK#	Rear panel Ethernet A link LED (LED -)	
110-116	RSVD	Reserved for future use	
117,118	LOGIC_GND	Diff pair signal integrity	
119	RP_ENET2_RX0-	RTM for 2nd FE, RX, negative	See pin 52 for the rest of this group
120	RP_ENET2_RX0+	RTM for 2nd FE, RX, positive	
121,122	LOGIC_GND	Diff pair signal integrity	

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Table 7. CMM Data Connector Pinout (Sheet 5 of 7)

Pin	Designation	Purpose	Notes
123	I_SDA[2]_A		See IPMB notes above.
124	I_SCL[2]_A		
125	I_SDA[7]_B		
126	I_SCL[7]_B		
127	I_SDA[7]_A		
128	I_SCL[7]_A		
129	I_SDA[12]_B		
130	I_SCL[12]_B		
131,132	LOGIC_GND	Signal integrity/ground return	
133	I_SDA[12]_A		
134	I_SCL[12]_A		
135	I_SDA[14]_B		
136	I_SCL[14]_B		
137	I_SDA[14]_A		
138	I_SCL[14]_A		
139	I_SDA[10]_A		
140	I_SCL[10]_A		
141,142	LOGIC_GND	Signal integrity/ground return	
143	I_SDA[10]_B		
144	I_SCL[10]_B		
145	I_SDA[9]_B		
146	I_SCL[9]_B		
147	I_SDA[9]_A		
148	I_SCL[9]_A		
149	I_SDA[5]_A		
150	I_SCL[5]_A		
151,152	LOGIC_GND	Signal integrity/ground return	
153	I_SDA[5]_B		
154	I_SCL[5]_B		
155	I_SDA[4]_B		
156	I_SCL[4]_B		
157	I_SDA[4]_A		
158	I_SCL[4]_A		
159	I_SH_SDA_A	Shared bus IPMB A, data line	These IPMBs go to the fan tray and PEMs
160	I_SH_SCL_A	Shared bus IPMB A, clock	
161	I_SH_SDA_B	Shared bus IPMB B, data line	
162	I_SH_SCL_B	Shared bus IPMB B, clock	
163	I_CF_SCL_B	Clock I^2C to Chassis Data Module 2	
164	I_CF_SDA_B	Data I^2C to Chassis Data Module 2	
165,166	LOGIC_GND	Signal integrity/ground return	

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Table 7. CMM Data Connector Pinout (Sheet 6 of 7)

Pin	Designation	Purpose	Notes
167	SCD	Carrier detect	Second serial port RTM; note that modem signals SCD and SRI are not present in the 8-pin RJ-45 connector.
168	SRTS	Ready to send	
169	SCTS	Clear to send	
170	SDSR	Data set ready	
171	SRX	Receive	
172	STX	Transmit	
173	SDTR	Data terminal ready	
174	SRI	Ring indicator	
175,176	LOGIC_GND	Signal integrity/ground return	
177	RSVD	Reserved	
178	I_RP_SDA_A	Rear panel data line (Bus A)	Reserved for future implementation
179	I_RP_SCL_A	Rear panel clock line (Bus A)	
180	CDMVCC_2	5V output to power CDM 2	Already diode OR'd, but CDM must convert down to 3.3 V; 50 mA max
181,182	LOGIC_GND	Signal integrity/ground return	
183,184	RSVD	Reserved	
185	GA7	General Address 7 (Parity bit)	Odd parity bit
186	GA6	General Address 6	CMM 1 should get address 8 and CMM 2 should get address 9; the CMM provides a 10K pullup resistor on all address signals
187	GA5	General Address 5	
188	GA4	General Address 4	
189	GA3	General Address 3	
190	GA2	General Address 2	
191	GA1	General Address 1	
192	GA0	General Address 0	
193 (**1)	PRESI#	Presence in signal, active low	Cross-connected between CMMs
194 (**1)	PRES#	Presence signal, active low	
195,196	LOGIC_GND	Signal integrity/ground return	
197 (**2)	HLYI#	Healthy in signal, active low	Cross-connected between CMMs
198 (**2)	HLY#	Healthy signal, active low	
199 (**3)	NGOI	Negotiation input from other CMM	Cross-connected between CMMs
200 (**3)	NGO	Negotiation output to other CMM	
201	BP_AF_PRES#	Sense if air filter is present	Wired in parallel between the two CMMs; refer to section Section 6.2.3, "Filter Tray" on page 27 for signal information
202	BP_AFLED2	Air filter LED output (green)	
203	BP_AFLED1	Air filter LED output (red)	
204	BP_AFTREF	Air filter reference signal	
205	BP_AFT2	Air filter temperature sensor 1	
206	BP_AFT1	Air filter temperature sensor 2	
207	I_RED_SCL_B	Inter-CMM IPMB links	These are dedicated IPMB links between the two CMMs (wired in parallel)
208	I_RED_SDA_B		
209	I_RED_SCL_A	Inter-CMM IPMB links	
210	I_RED_SDA_A		

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Table 7. CMM Data Connector Pinout (Sheet 7 of 7)

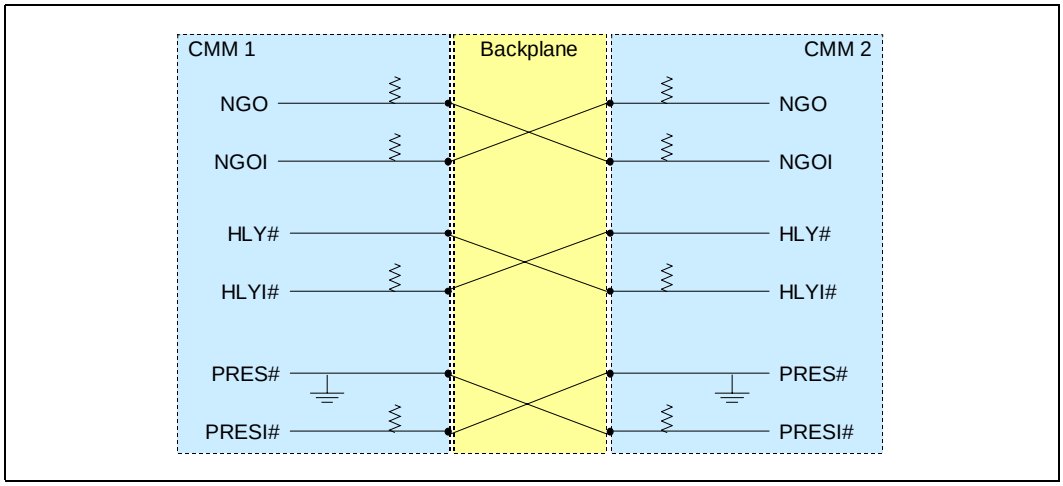
Pin	Designation	Purpose	Notes
211,212	LOGIC_GND	Signal integrity/ground return	
213	USB0+	USB positive polarity	Reserved for future implementation
214	USB0-	USB negative polarity	
215	USBVCC	USB voltage	
216	RP_ENET2_SPD#	LED signal for Ethernet B speed (LED -)	LED driver signals for RTM Ethernet ports
217	RP_ENET2_ACT#	LED signal for Ethernet B activity (LED +)	
218	RP_ENET2_LNK#	LED signal for Ethernet B link status (LED -)	
219	CDM2_STATUS1	CDM 2 green LED	Chassis FRU Module LED, each is tricolor (red/yellow/green)
220	CDM2_STATUS0	CDM 2 red LED	
221	CDM1_STATUS1	CDM 1 green LED	
222	CDM1_STATUS0	CDM 1 red LED	
223	PWRSW2	Power switch 2	Connections to soft power switch; see Section 6.2.4, “Power Switch” on page 28
224	PWRSW1	Power switch1	
225,226	LOGIC_GND	Signal integrity/ground return	
227-230	RSVD	Reserved for future use	
231	AUX_SDA_B	Auxiliary IPMB data line (B bus)	Reserved for future implementation
232	AUX_SCL_B	Auxiliary IPMB clock line (B bus)	
233	AUX_SDA_A	Auxiliary IPMB data line (A bus)	
234	AUX_SCL_A	Auxiliary IPMB clock line (A bus)	
235,236	LOGIC_GND	Signal integrity/ground return	
237	RSVD	Reserved for future use	
238	I_RP_SDA_B	Rear panel IPMB data line (B bus)	Reserved for future implementation.
239	I_RP_SCL_B	Rear panel IPMB clock line (B bus)	
240	FRUVCC_A	Output power to run chassis CDM 1	See #180

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All the IPMB and I^2C ports are wired in parallel between the two CMMs.

The signals whose pin numbers are suffixed with double asterisks are cross-connected as shown in Figure 17. For example, NGO from one CMM is connected to NGOI on the other CMM.

Figure 17. Cross-Connected CMM Signals



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7.2 CMM Redundancy

When a shelf is powered up, the CMM determines which of the two CMMs is initially active. Once the CMM firmware is loaded, it runs an algorithm to determine which CMM is healthier. (See the MPCMM0001 Chassis Management Module Software Technical Product Specification for more information.)

During shelf initialization, the active CMM is the first one that meets all of the following criteria:

- NGOI is not asserted low (which would indicate that the other CMM is already active).
- BD_SEL# bit is set low, indicating that the CMM is properly inserted.
- OSL bit is set high, indicating that the operating system is loading.

The CMMs deassert the HLY# signal under any one of the following conditions:

- CMM board is removed
- Power goes unstable
- Watchdog timer fires
- CMM board is reset
- OSL (operating system loaded) bit is deasserted by the CMM firmware
  The OSL bit is deasserted under the following two conditions.
  - — One of the threads of the CMM command handler generates the SIGILL or SIGSEGV signals
  - — One of the threads of the CMM command handler generates the SIGINT or SIGTERM signals and the ejector latch is not open
- Software sets the fail bit
  The SFAIL bit, /dev/systemFail, is set by the kernel when the reboot command is executed or during a kernel panic.

If the active CMM deasserts the HLY# signal, the standby CMM becomes the active CMM as soon as it sees the HLY# signal rise. Similarly, if one CMM is removed, its PRES# signal on the backplane will no longer be held low and the other CMM will see a high PRESI# signal. Hardware on the CMM quickly negotiates for the CMM to become the active CMM.

In an active-standby mode, a communications path between the two CMMs over both IPMB and Ethernet is needed for full synchronization.

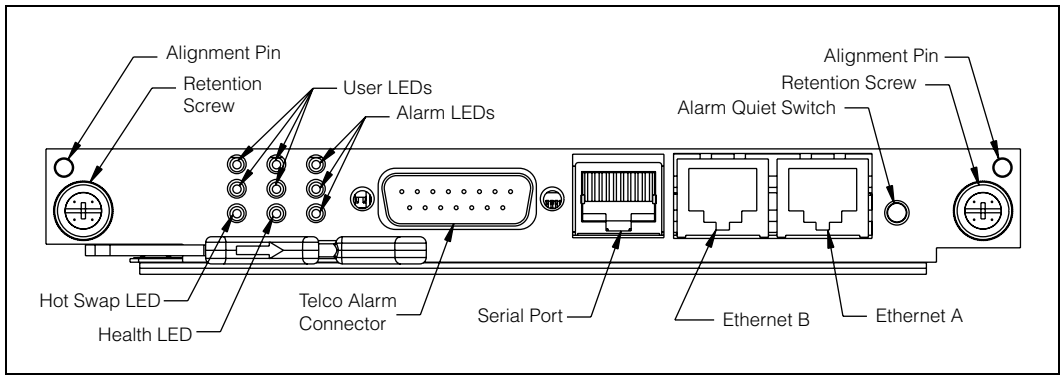
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8.0 Front Panel

The front panel of the MPCMM0001 chassis management module has several connectors, as shown in the figure below:

Figure 18. CMM Front Panel

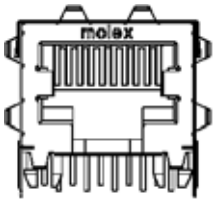


Each part of the front panel is described in more detail in the following sections.

8.1 Serial Port Pinouts

Each CMM has two serial ports; one goes to the front and one goes to the rear for an RTM connection. An RJ-45 connector is used for the front cabling connection, in line with common industry practice. Care should be taken to plug serial port cables into the serial port jack (without LEDs) and not the Ethernet jacks (with LEDs).

Figure 19. Serial Port RJ-45 Connector (Front View)



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Figure 20. Serial Port RJ-45 Cabling

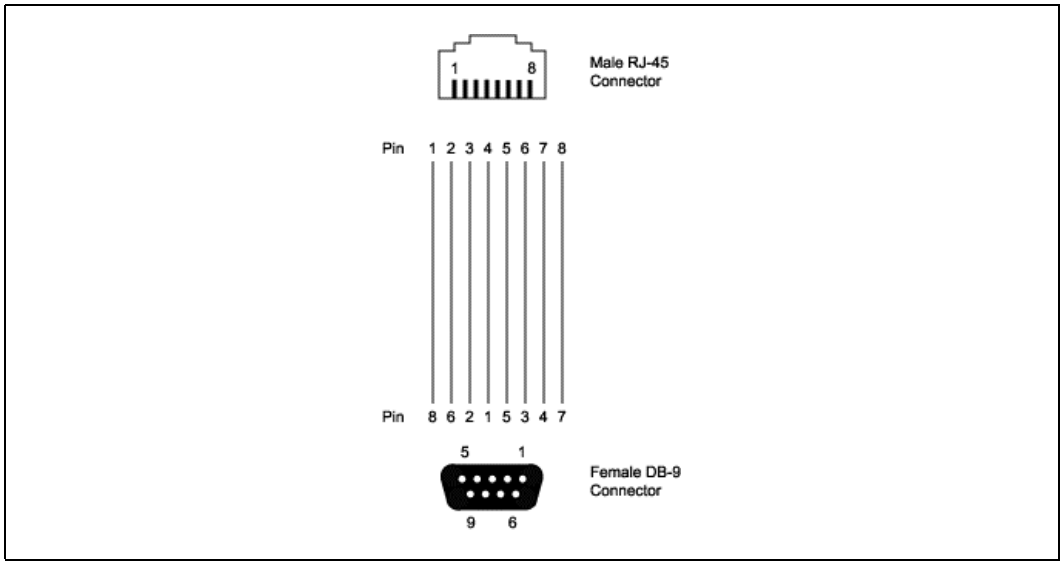


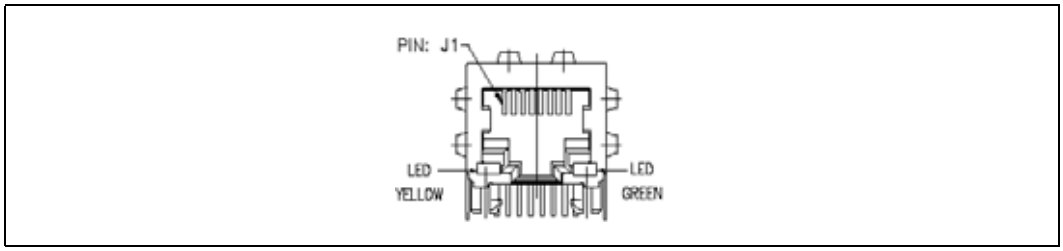
Table 8. RTM Serial Port Pinout

Pin Number	Signal	Meaning
1	RTS	Ready To Send
2	DTR	Data Terminal Ready
3	TXD	Transmit Data
4	GND	Ground
5	GND	Ground
6	RXD	Receive Data
7	DSR	Data Set Ready
8	CTS	Clear To Send

8.2 Ethernet Port Pinouts

The CMM faceplate has two Fast Ethernet ports. The two Ethernet channels can be switched via software to the backplane connections or the RTM connections, but the default state is for the Ethernet ports to come out the front of the CMM. The connections are RJ-45 connectors with integrated LEDs, such as the Stewart* SI-40134 connector.

Figure 21. Ethernet Port RJ-45 Connector (Front View)



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Table 9. Ethernet Port Pinouts

Pins	Signal Names	Comments
1	RP_CMMx_TXA+	Ethernet transmit, positive polarity
2	RP_CMMx_TXA-	Ethernet transmit, negative polarity
3	RP_CMMx_RXA+	Ethernet receive, positive polarity
4	RSVD	Reserved, no connection
5	RSVD	Reserved, no connection
6	RP_CMMx_RXA-	Ethernet receive, negative polarity
7	RSVD	Reserved, no connection
8	RSVD	Reserved, no connection

There are two LEDs for each Ethernet port.

Table 10. Ethernet Port LED States

LED (Color)	Status	Description
Yellow LED	Off	10 Mbps Connection
	On	100 Mbps Connection
Green LED	Off	No Link
	Blinking	Transmission Activity
	Solid On	Link established, but no activity

8.3 Telco Alarm Connector

Many telecom facilities have existing alarm infrastructure. When an error condition occurs, the alarm system activates an audible alarm, flashes lights to help technicians locate the source of the alarm, and possibly interacts with a computer system that is monitoring the facility. Error conditions are typically classified as minor, major, or critical errors, and an LED identifies the current alarm state.

The telco alarm system consists of a distinct dry contact relay that corresponds to each alarm state. These are open or closed depending on the state and are entirely under software control (except power) with the default being the no alarm state. The normally open [NO], normally closed [NC], and common [COM] relay contacts are provided to the DB-15 connector, in line with existing industry practice. There are also reset inputs to clear the minor and major alarm state.

Note: There is no reset for the critical state.

There is an additional set of contacts (common [COM] plus normally open [NO]) that is used to indicate a power system failure. There is no normally closed [NC] contact for this relay nor is there a reset for clearing it.

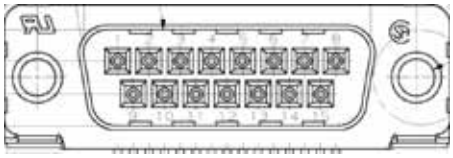
The telco alarm contacts on the MPCMM0001 comply with the alarm connector requirements outlined in Section 2.7.7 of the PICMG* 3.0 specification.

Caution: The RTM connections for the telco alarm connections are wired parallel to the connections on the CMM faceplate. Do not connect cables to both the DB-15 connector on the CMM and the corresponding RTM alarm connector at the same time.

Any standard DB-15 connector within the defined tolerance specification like AMP/Tyco female connector, MPN:1658612-3 is acceptable.

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Figure 22. DB-15 Telco* Alarm Connector



The pinout for the DB-15 is shown below.

Table 11. Telco Alarm Pinout

Pin	Description	Pin	Description
1	MinorReset +	9	MinorAlarm - NC
2	MinorReset -	10	MinorAlarm - COM
3	MajorReset +	11	MajorAlarm - NO
4	MajorReset -	12	MajorAlarm - NC
5	CriticalAlarm - NO	13	MajorAlarm - COM
6	CriticalAlarm - NC	14	PwrAlarm - NO
7	CriticalAlarm - COM	15	PwrAlarm - COM
8	MinorAlarm - NO		

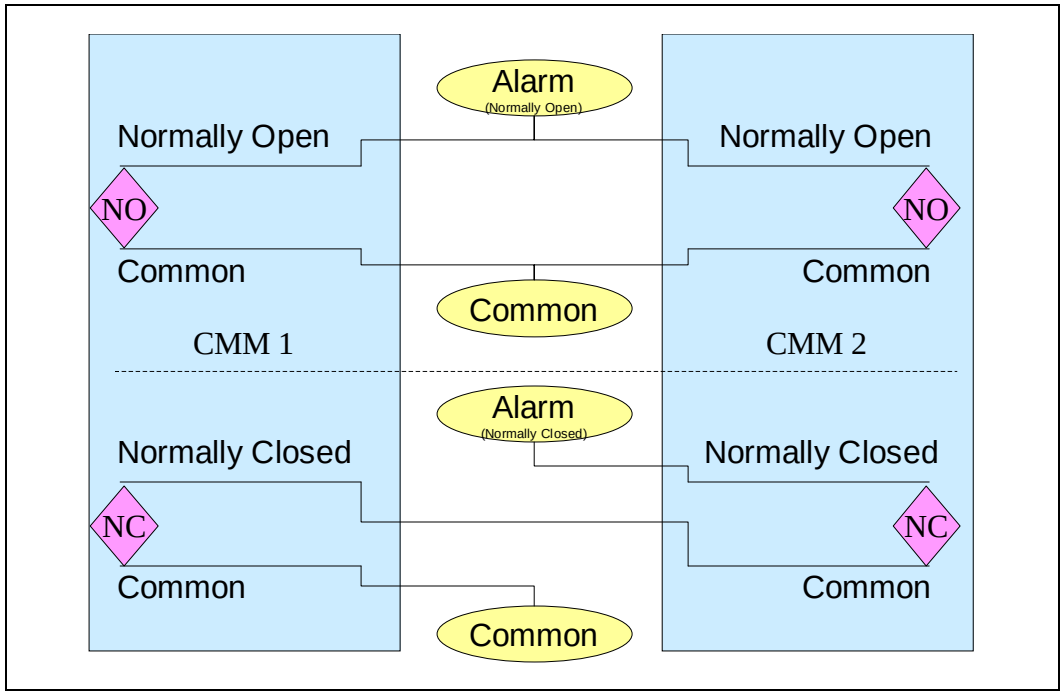
The signals on the alarm connector can be up to –72 VDC. The relay handles currents up to 1 A.

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8.3.1 Cascading the Telco Alarm Connectors

The two telco alarm connectors can be wired independently to separate alarm controls for maximum redundancy. Alternatively, the two connectors may be ganged together to connect to a single alarm panel. Alarms that activate off the normally open [NO] contacts should be wired together differently than the cable for normally closed [NC] contacts.

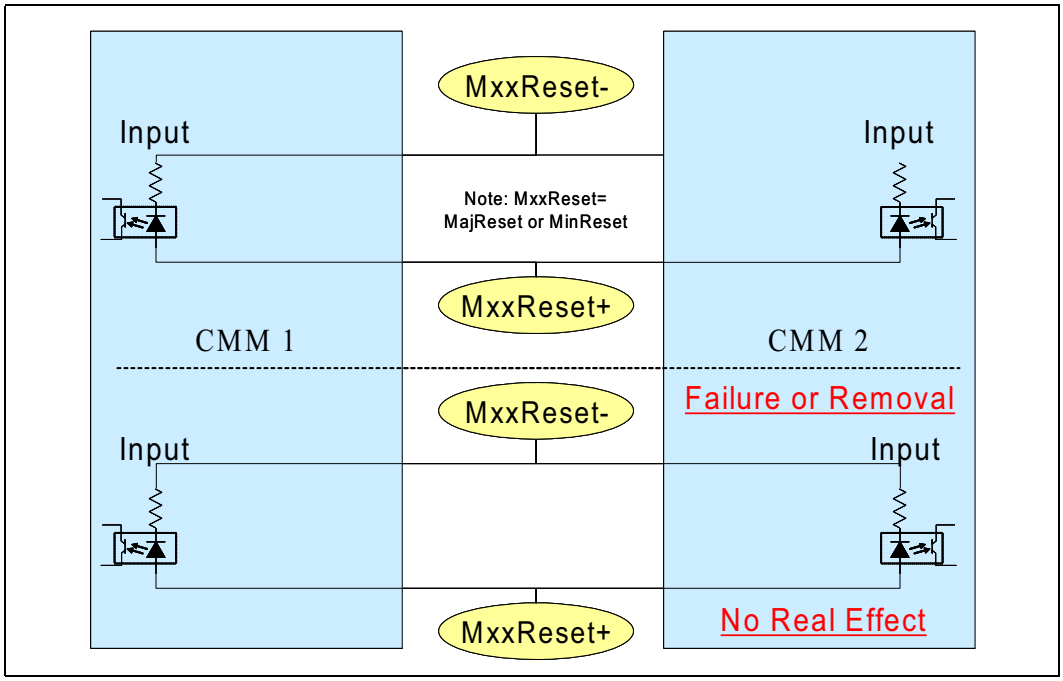
Figure 23. Telco Alarm Contact Wiring for Dual Connectors



The interconnection diagram above shows how the two signals are wired under normal circumstances. In a failure scenario such as a disconnected cable, however, only the normally closed contact reports an error. This is identical to the behavior in a failure scenario with a single telco alarm connector:

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Figure 24. Failure Scenario with Dual Telco Alarm Connectors

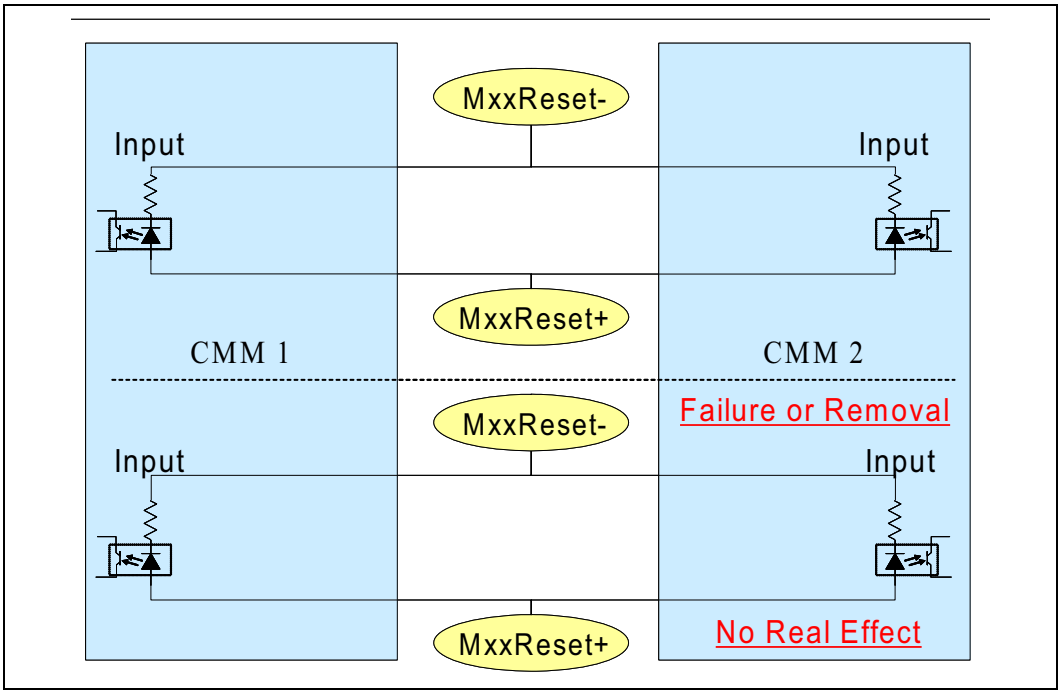


Telco alarm inputs from multiple connectors are wired parallel to each other. The absence or failure of one connection will not affect the ability to recognize an input from the other connection.

Note: The CMM input signals use optocouplers on the reset signals to provide full electrical isolation from the input signals.

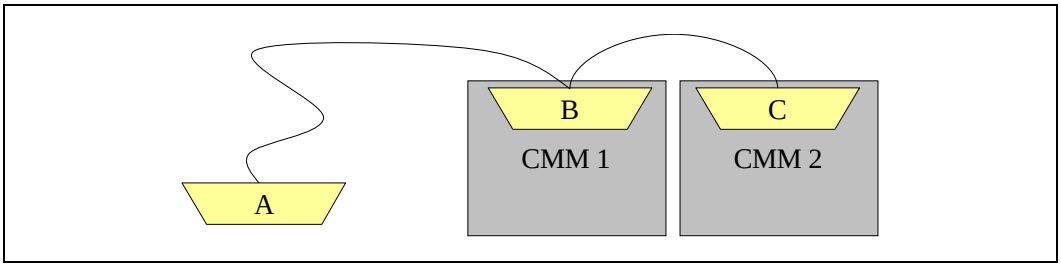
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Figure 25. Parallel Inputs to Telco Alarm Connectors



A cable to connect the two telco alarms together is shown in Figure 26. Connector A goes to the facility's alarm panel, while connectors B and C go to the RTM connectors for CMM 1 and CMM 2.

Figure 26. Cascaded Telco Alarm Cables



Pinouts for the cables to match the diagram in Figure 26 are shown in Table 12. Since the CMMs that drive the telco alarm signals are normally kept synchronized, either of the cables described in this table should work. However, choosing a cable that matches the type of alarm in use, whether normally open or normally closed, also helps protect against errors with the CMMs themselves.

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Table 12. Ganged Telco Alarm Cable Pinouts with Cabling

For Normally Open Alarms				For Normally Closed Alarms			
A Pin	Description	B Pin	C Pin	A Pin	Description	B Pin	C Pin
1	MinorReset +	1	1	1	MinorReset +	1	1
2	MinorReset -	2	2	2	MinorReset -	2	2
3	MajorReset +	3	3	3	MajorReset +	3	3
4	MajorReset -	4	4	4	MajorReset -	4	4
5	CriticalAlarm - NO	5	5	5	CriticalAlarm - NO	5	5
6	CriticalAlarm - NC	6	6	6	CriticalAlarm - NC	6	-
-	-	-	-	-	CriticalAlarm - X	7	6
7	CriticalAlarm - COM	7	7	7	CriticalAlarm - COM	-	7
8	MinorAlarm - NO	8	8	8	MinorAlarm - NO	8	8
9	MinorAlarm - NC	9	9	9	MinorAlarm - NC	9	-
-	-	-	-	-	MinorAlarm - X	10	9
10	MinorAlarm - COM	10	10	10	MinorAlarm - COM	-	10
11	MajorAlarm - NO	11	11	11	MajorAlarm - NO	11	11
12	MajorAlarm - NC	12	12	12	MajorAlarm - NC	12	-
-	-	-	-	-	MajorAlarm - X	13	12
13	MajorgAlarm - COM	13	13	13	MajorAlarm - COM	-	13
14	PwrAlarm - NO	14	14	14	PwrAlarm - NO	14	14
15	PwrAlarm - COM	15	15	15	PwrAlarm - COM	15	15

8.4 Alarm Quiet Switch

The Alarm Quiet Switch is located on the CMM faceplate. When the user presses the alarm quiet switch, the CMM shuts off the alarm relays for a fixed period of time. While the alarm quiet is in effect, the front panel alarm LEDs flash. If the quiet interval is exceeded without resolving the alarms, the alarms will be re-initiated.

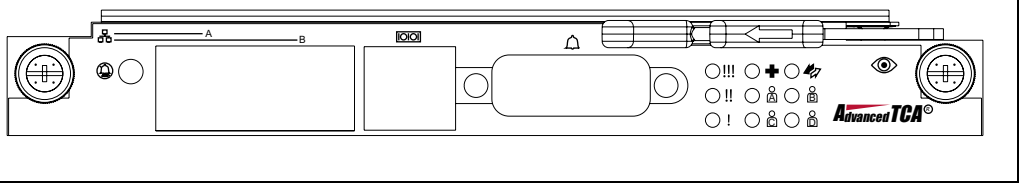
If the Alarm Quiet Switch is held in for more than five seconds, the processor on the CMM are reset. This is equivalent to ejecting and re-inserting the CMM in the shelf.

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8.5 LEDs

Figure 27, “CMM Front Panel (with Labels)” on page 51 shows the LEDs on the front panel of the MPCMM0001 module.

Figure 27. CMM Front Panel (with Labels)



8.5.1 Alarm LEDs

There are three alarm LEDs, corresponding to the minor (!), major (!!) and critical (!!!) alarm states. The LEDs are amber when on. Each LED has the following meaning:

Table 13. CDM Health LED States

LED (Symbol)	Status	Description
Minor Alarm (!)	Off	No Minor Alarm active
	On	Minor Alarm active
	Flashing	Minor Alarm active, but silenced
Major Alarm (!!)	Off	No Major Alarm active
	On	Major Alarm active
	Flashing	Major Alarm active, but silenced
Critical Alarm (!!!)	Off	No Critical Alarm active
	On	Critical Alarm active
	Flashing	Critical Alarm active, but silenced

8.5.2 Health LED

Each CMM maintains a single health LED (✚) to provide the status of the CMM.

Table 14. CMM Health LED States

Color	Description
Off	No power to CMM
Solid Green	Normal operation, power okay
Blinking Green	CMM in standby mode
Solid Red/Amber	Attention status (error condition) - CMM configures error color

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8.5.3 Hot Swap LED

Each CMM maintains a single blue hot swap LED (⎆) to provide the status of the CMM itself.

Table 15. CMM Hot Swap LED States

Color	Description
Off	In use
Long Blink	Searching for CMM (900ms on, 100ms off)
Solid Blue	Ready to remove
Short Blink	Preparing for extraction (100ms on, 900ms off)

Service personnel should be trained to wait for the solid blue LED before removing the CMM from the system.

8.5.4 User-Definable LEDs

Each CMM provides four LEDs (A, B, C, D) that can be controlled via the operator or via software automatically interacting with the CMM. Each LED can be off, green, yellow, or red.

During the boot process, the user LEDs sequentially blink off to indicate boot progress. The user LEDs will be off by the time the CMM software is fully loaded. Once the CMM is up, the administrator can control the LED through standard interfaces or via programmatic control. Methods to control these LEDs are described in the *Promentum*™ MPCMM0001 Chassis Management Module *Software Technical Product Specification.*

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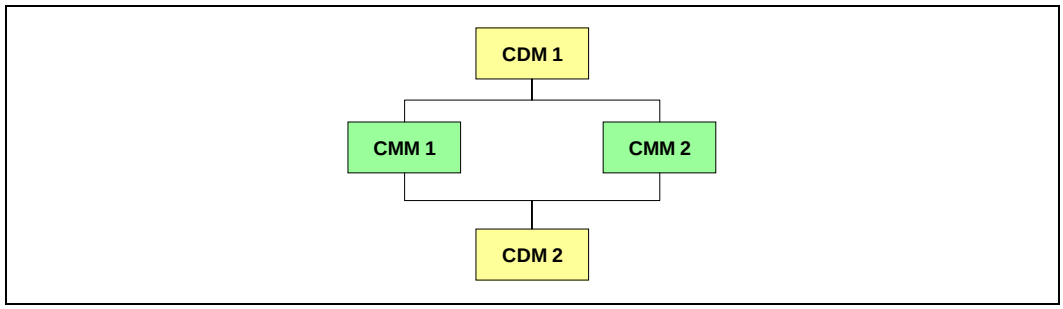
9.0 Chassis Data Modules (CDMs)

9.1 CDM Overview

The CDM, sometimes called a Shelf FRU, is a repository of chassis-specific information (such as serial number of the chassis and backplane), capabilities of the system (number of slots, maximum power per slot, whether dual star or mesh, etc.), and a few administrator-definable configuration options. The latter category allows the administrator to define more conservative limits than the maximum shelf ratings; for example, an administrator could set the maximum power draw per feed to 30 A even if the shelf itself were capable of handling 50 A per feed. CMMs use this information to provide functions such as electronic keying (E-keying), controlling the power state of the system, etc.

The CDMs sit on their own dedicated I^2C links from each CMM, as shown below:

Figure 28. Chassis Data Module I^2C Routing



9.2 CDM LED

The CMM drives a single tri-color LED to indicate the status of the module.

Table 16. CDM Health LED States

Color	Description
Off	No power to shelf
Solid Green	Normal operation
Solid Red/Amber	Attention status (error condition) - CMM configures error color

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9.3 CDM Management

The CMM expects the CDM to act like a simple 24C64 I^2C EEPROM device that the CMM can read from and write to. CDM 1 is at I^2C address 0xA2 and CDM2 is at I^2C address 0xA4. The CDMs are expected to store some limited configuration information, such as the power-on state for each slot. The CDM contains the list of what slots are connected together, how the Update Channels are routed, how many slots are in the system, and what is the maximum power to each slot or group of slots. The CDM provides the information required of a Shelf FRU as defined in the PICMG* 3.0 specification.

Only the CMMs can directly access the CDMs (via the dedicated I^2C buses).

9.4 CDM Power

The CDM is provided a dedicated power signal, which is a diode-OR'd 5 V output from each of the CMMs. Refer to Section 9.4, "CDM Power" on page 54 for more information. As long as one CMM has power, the CDM should operate. The CDM should use a series resistor to lower the 5 V power input to 3.3 V for the I^2C EEPROM in the CDM.

9.5 CDM Redundancy

The CMMs cache the information that is stored in the CDMs, so the CDMs are only needed when the CMMs are first inserted or when the chassis is first turned on. The CMMs can manage two CDMs to ensure that if CDM 1 is corrupted or non-functional, CDM 2 can provide the necessary information.

If a corrupted CDM is found, the CMM will log the error, raise an error condition to upper-level software, and set an error condition on the CDM's LED signals. The CMM provides a command to update a replacement CDM with the cached information. From this point forward, all changes are written to both CDMs.

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10.0 Grounding Considerations

10.1 ESD Discharge Protection

The MPCMM0001 has ESD discharge strips on its lower edge. Refer to Section 5.4, “ESD Discharge Strip” on page 24 for more information.

10.2 Shelf Ground and Logic Ground

Section 4.2.3 of the PICMG 3.0 specification recommends each FRU have a jumper to tie logic ground and shelf ground together. On the MPCMM0001, this jumper is accessible on Component Side 1 of the CMM near the bulk capacitors. Jumper J10 is normally jumpered between pins 1 and 2, which means no connection; move the jumper to connect pins 2 and 3 on J10 to connect these two grounds together. Refer to Figure 4, “CMM Layout (Top View)” on page 12 for the location of J10.

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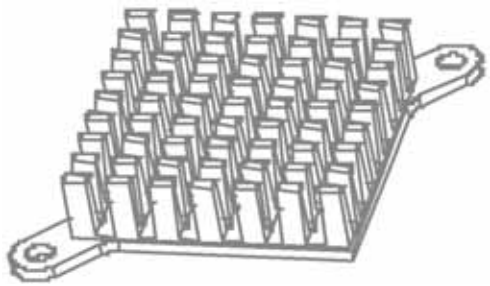
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11.0 Thermals

11.1 Processor Heat Sink

The MPCMM0001 chassis management module has a heat sink on the 80321 processor to aid CMM cooling. This heat sink is a modified pin grid array as shown in Figure 29.

Figure 29. CMM Heat Sink



This heat sink provides similar cooling results with either a vertical or horizontal airflow.

11.2 Module Orientation

The MPCMM0001 module is designed to be installed in one of the four orientations:

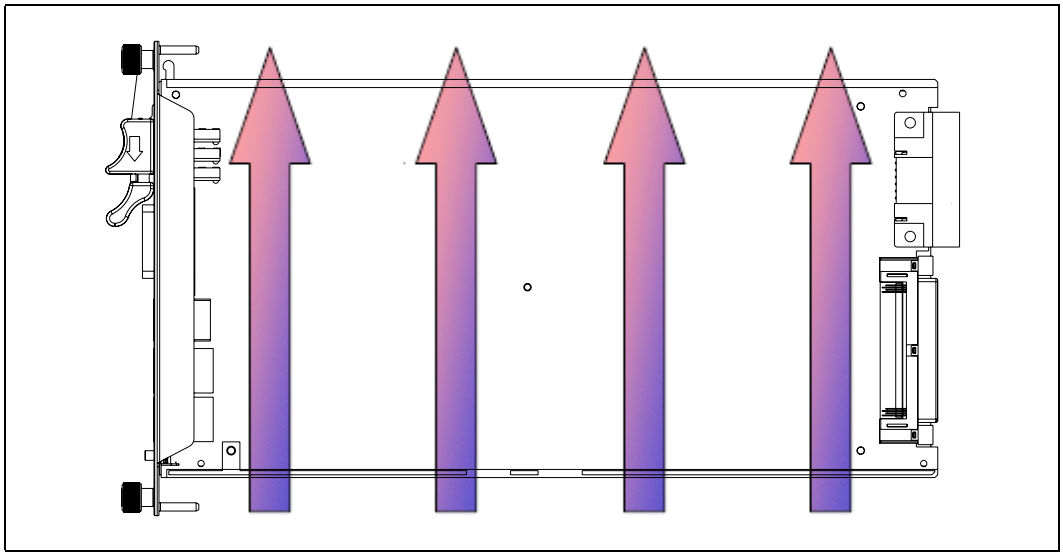
- Horizontal, with component side 1 up
- Horizontal, with component side 1 down
- Vertical, with component side 1 to the right
- Vertical, with component side 1 to the left

11.3 Module Airflow Path

Regardless of the orientation, the airflow to the MPCMM0001 module must follow one of two general patterns: front-to-back or side-to-side. Side-to-side airflow should be evenly distributed throughout the board, as shown in Figure 30, “Side-to-Side Airflow” on page 58 and Figure 31, “Front-to-Back Airflow” on page 58.

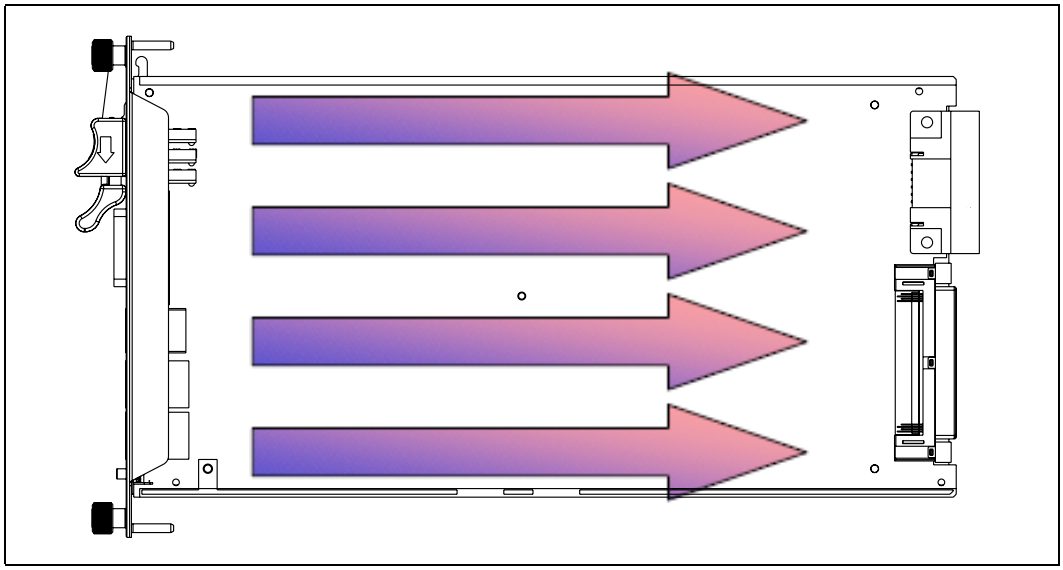
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Figure 30. Side-to-Side Airflow



The MPCMM0001 module supports a front-to-back airflow path as well. This is most useful when the CMM is installed perpendicular to the main subrack, such as horizontally above or below a vertical subrack. Since there is no airflow through the front panel or through most backplanes, chassis designers must ensure that they direct sufficient airflow across the major components on the PCB, including the 80321 processor. While the front or rear 40 mm (1.5748 inches) on each CMM does not need high airflow, chassis designers should ensure that the area between these regions is guaranteed a proper airflow as defined in Section 11.4, “Airflow Requirements” on page 59.

Figure 31. Front-to-Back Airflow



It may be necessary to enclose the area around a CMM when cooled front-to-back to ensure that air is properly channeled across the board and evenly distributed.

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11.4 Airflow Requirements

General airflow requirements for the CMM are shown in Table 17.

Table 17. Typical Airflow and Cooling Requirements

Category	CMMs
Required LFM	180 LFM (54.864 m/min)
Required CFM	5 CFM (0.1416 m^3/min) per CMM
Typical Heat Dissipation	21 W per CMM
Maximum Heat Dissipation	28 W per CMM
Approximate Airflow Resistance	0.2 in.-H_2O (~46 Pa)

11.5 Board Resistance Curve

As described in Chapter 5 of the PICMG* 3.0 specification, all board vendors are required to provide a flow pressure curve for their board along with the airflow requirements for specific wattages. This enables system integrators to compare the slot resistance curves of their shelves with the resistance and airflow requirements of their blades to approximate whether a given shelf can cool a particular blade.

The MPCMM0001 is not subject to this requirement because the board is not an ATCA standard form factor. Flow pressure curves will vary widely depending upon location of the MPCMM0001 in a chassis and the type/amount of airflow across the MPCMM0001 at that location.

As a guideline, the MPCMM0001 requires the airflow in Table 18.

Table 18. Airflow Guidelines

Minimum Air Flow	MPCMM0001 Air Temp Rise
3.3 cfm (0.0934 m^3/min)	15°C (59°F)
4.9 cfm (0.1388 m^3/min)	10°C (50°F)

11.6 Thermal Sensors

Proper thermal design is critical to the successful deployment of the MPCMM0001 chassis management module. In the event sufficient airflow is not provided, the CMM has three levels of thermal protection:

- A thermal sensor near the main processor (wired to ADM1026) and internal sensors in ADM1026 are monitored by software. Software then shuts down the CMM if necessary.
- A dedicated thermal circuit tells the power brick to shut off power to the rest of the board if it detects an even higher temperature on the board.
- Finally, the power converter shuts itself off if it gets too hot.

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12.0 Management Module Specifications

12.1 Feature Summary

Key carrier-grade features of the MPCMM0001 include the following:

- Full Shelf Management Controller and Shelf Manager capability as defined in the PICMG 3.0 specification and support for up to 16 board slots in an AdvancedTCA* chassis
- Hybrid dual IPMB star topology support for improved reliability, security, and throughput
- Compact 4U x 280 mm x 4HP size to simplify integration into shelves
- Comprehensive management interfaces including CLI, SNMP, RPC, and RMCP
- Dual 10/100 Mbps Ethernet controllers front, rear or on the backplane
- Dual serial ports (one out front, one out the RTM) for local console support
- Isolated telecom alarm connections front or rear to connect to standard telecom alarms
- Direct –48 VDC inputs with on-board power regulation for maximum uptime
- Low power design, using less than 30 W
- High-temperature design to allow incoming air as hot as 70 °C (158 °F) with the proper airflow
- Dedicated communication paths between dual CMMs for active-standby operation
- Support for CDMs (FRU modules), fan trays, PEMs, and external temperature sensors
- Integrated backing plate to help meet the full range of standard NEBS tests, including earthquake, fire, immunity, and safety
- Intel® 80321 processor with Intel XScale® technology, 128 MByte RAM, and 64 MByte flash memory to provide headroom for future expansion and space for custom user applications on board
- Comprehensive software management capabilities (detailed in *Promentum*™ MPCMM0001 Chassis Management Module *Software Technical Product Specification*)

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12.2 Dimensions and Weight

Table 19. Dimensions and Weight

Attribute	Value
Height	177 mm (6.9685 inches) faceplate
	144.5 mm (5.6890 inches) PCB
Width	20.32 mm (0.8 inches) (4HP) faceplate
Depth	280 mm (11.0236 inches) PCB
Shipping Weight	0.9 kg (1.2 lbs)

See Section 5.1, “Module Dimensions” on page 21 for more information.

12.3 Environmental Characteristics

Table 20. Environmental Characteristics

Parameter	Conditions	Detailed Specification
Temperature (Ambient)	Operating Ambient to CMM	Normal Operation: +5°C to +55°C (41°F to +131°F) Transient Operation: –5°C to +70°C (23°F to +158°F)
	Storage	-40°C to +70°C (-40°F to +158°F)
Altitude	Operating	4000 Meters (13123 ft)
Humidity	Operating	5-85% (90% short term) non-condensing
	Storage	10-95% non-condensing
Vibration	Operating - Sine	0.5 G acceleration over 5-500 Hz sine wave (P-P), 0.5 oct/min sine sweep
	Operating - Random	5 Hz to 20 Hz @ 0.01 g2/Hz 20 Hz to 500 Hz @ 0.02 g2/Hz
	Storage & Transport	0.5 G acceleration over 5-50 Hz sine wave (P-P), 0.1 oct/min 3 G acceleration over 50-500 Hz sine wave (P-P), 0.25 oct/min sine sweep
Shock	Operating	5 G, trapezoidal 11-ms duration (system-level)
	Storage & Transport	50 G, trapezoidal 11-ms duration (unpackaged board) 18in. drop test @ 167 in/sec acceleration (packaged board) 20 G, trapezoidal 11-ms duration (packaged. system)
Power	Operating Voltage Range	-39.5 VDC to –72 VDC
	Power Dissipation	17 W typical, 28 W maximum

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12.4 Product Reliability Estimate

The calculation results in Table 21 were generated using the references and assumptions listed in Section 12.4.1. This report and it's associated calculations supersede all other released Mean Time Between Failure (MTBF) and Failure in Time (FIT) calculations of earlier report dates. The reported failure rates do not represent catastrophic failure. Catastrophic failure rates will vary based on application environment and features critical to the intended function.

Table 21. Reliability Estimate Data

Failure Rate (FITs):	6,528	Failures in 10^9 hours
MTBF:	153,200	Hours

12.4.1 Assumptions and Notes

12.4.1.1 Environmental Assumptions

1. Failure rates are based on a 40^{o}C (104^{o}F) ambient temperature.
2. Applied component stress levels are 50 percent (voltage, current, and/or power).
3. Ground, fixed, controlled environment with an environmental adjustment factor equal to 1.0.

12.4.1.2 General Assumptions

1. Component failure rates are constant.
2. Board-to-system interconnects included within estimates.
3. Non-electrical components (screws, mechanical latches, labels, covers, …) not included within estimations.
4. Printed Circuit Board considered to have a 0 FIT rate.

12.4.1.3 General Notes

1. Method I, Case I = Based on "Parts Count". Equipment failure is estimated by totaling device failures rates and quantities used.
2. Quality Level II = Devices purchased to specifications, qualified devices, vendor lot-to-lot controls for AQLs and DPMs.
3. Where available, direct component supplier predictions or actual FIT rates have been utilized.

12.5 Agency Certifications

See Section 13.0, “Certifications” on page 65, for more information.

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13.0 Certifications

The Promentum™ MPCMM0001 Chassis Management Module has the following approvals:

- UL/cUL 60950
- EN/IEC 60950
- EN55022 Class A
- EN55024
- FCC CFR47 Part 15 Class A
- VCCI
- AS/NZS3548
- BSMI

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14.0 Agency Information

14.1 North America (FCC Class A)

FCC Verification Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the use will be required to correct the interference at his own expense.

14.2 Canada – Industry Canada (ICES-003 Class A) (English and French-translated below)

CANADA – INDUSTRY CANADA

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques”, NMB-003 édictée par le Ministre Canadian des Communications.

(English translation of the notice above) This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of the Canadian Department of Communications.

14.3 Safety Instructions (English and French-translated below)

14.3.1 English

CAUTION: This equipment is designed to permit the connection of the earthed conductor of the d.c. supply circuit to the earthing conductor at the equipment. See installation instructions. If this connection is made, all of the following conditions must be met:

-This equipment shall be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.

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-This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.

-The DC supply source shall be located within the same premises as this equipment.

-Switching or disconnecting devices shall to be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

14.3.2 French

Cet appareil est conçu pour permettre le raccordement du conducteur relié à la terre du circuit d'alimentation c.c. au conducteur de terre de l'appareil. Cet appareil est conçu pour permettre le raccordement du conducteur relié à la terre du circuit d'alimentation c.c. au conducteur de terre de l'appareil. Pour ce raccordement, toutes les conditions suivantes doivent être respectées:

- Ce matériel doit être raccordé directement au conducteur de la prise de terre du circuit d'alimentation c.c. ou à une tresse de mise à la masse reliée à une barre omnibus de terre laquelle est raccordée à l'électrode de terre du circuit d'alimentation c.c.

- Les appareils dont les conducteurs de terre respectifs sont raccordés au conducteur de terre du même circuit d'alimentation c.c. doivent être installés à proximité les uns des autres (p.ex., dans des armoires adjacentes) et à proximité de la prise de terre du circuit d'alimentation c.c. Le circuit d'alimentation c.c. ne doit comporter aucune autre prise de terre. matériel. - Il ne doit y avoir

– La source d'alimentation du circuit c.c. doit être située dans la même pièce que le aucun dispositif de commutation ou de sectionnement entre le point de raccordement au conducteur de la source d'alimentation c.c. et le point de raccordement à la prise de terre.

14.4 Taiwan Class A Warning Statement

警告使用者 ：
這是甲類的資訊產品， 在居住的環境中使用時，
可能會造成射頻干擾， 在這種情況下，使用者會
被要求採取某些適當的對策。

14.5 Japan VCCI Class A

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

14.6 Korean Class A

기종별	사용자 안내문
A급 기기 (업무용 정보통신기기)	이기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 구입 하였을 때에는 가정용으로 교환하시기 바랍니다.

14.7 Australia, New Zealand



15.0 Safety Warnings

Caution: Review the following precautions to avoid personal injury and prevent damage to this product or products to which it is connected. To avoid potential hazards, use the product only as specified.

Read all safety information provided in the component product user manuals and understand the precautions associated with safety symbols, written warnings, and cautions before accessing parts or locations within the unit. Save this document for future reference.

AC AND/OR DC POWER SAFETY WARNING: The AC and/or DC Power cord is the unit's main AC and/or DC disconnecting device, and must be easily accessible at all times. Auxiliary AC and/or DC On/Off switches and/or circuit breaker switches are for power control functions only (NOT THE MAIN DISCONNECT).

IMPORTANT: See installation instructions before connecting to the supply.

For AC systems, use only a power cord with a grounded plug and always make connections to a grounded main. Each power cord must be connected to a dedicated branch circuit.

For DC systems, this unit relies on the building's installation for short circuit (over-current) protection. Ensure that a Listed and Certified fuse or circuit breaker no larger than 72VDC, 15A is used on all current carrying conductors. For permanently connected equipment, a readily accessible disconnect shall be incorporated in the building installation wiring. For permanent connections, use copper wire of the gauge specified in the system's user manual.

The enclosure provides a separate Earth ground connection stud. Make the Earth ground connection prior to applying power or peripheral connections and never disconnect the Earth ground while power or peripheral connections exist.

To reduce the risk of electric shock from a telephone or Ethernet* system, connect the unit's main power before making these connections. Disconnect these connections before removing main power from the unit.

RACK MOUNT ENCLOSURE SAFETY: This unit may be intended for stationary rack mounting. Mount in a rack designed to meet the physical strength requirements of NEBS GR-63-CORE and NEBS GR 487. Disconnect all power sources and external connections prior to installing or removing the unit from a rack.

System weight may be minimized prior to mounting by removing all hot-swappable equipment. Mount your system in a way that ensures even loading of the rack. Uneven weight distribution can result in a hazardous condition. Secure all mounting bolts when rack mounting the enclosure.

Warning: Verify power cord and outlet compatibility: Use the appropriate power cords for your power outlet configurations. Visit the following website for additional information: http://kropla.com/electric2.htm.

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Warning: Avoid electric overload, heat, shock, or fire hazard: Only connect the system to a to a properly rated supply circuit as specified in the product user manual. Do not make connections to terminals outside the range specified for that terminal. See the product user manual for correct connections.

Warning: Avoid electric shock: Do not operate in wet, damp, or condensing conditions. To avoid electric shock or fire hazard, do not operate this product with enclosure covers or panels removed.

Warning: Avoid electric shock: For units with multiple power sources, disconnect all external power connections before servicing.

Warning: Power supplies must be replaced by qualified service personnel only.

Caution: System environmental requirements: Components such as Processor Boards, Ethernet Switches, etc., are designed to operate with external airflow. Components can be destroyed if they are operated without external airflow. External airflow is normally provided by chassis fans when components are installed in compatible chassis. Never restrict the airflow through the unit's fan or vents. Filler panels or air management boards must be installed in unused chassis slots. Environmental specifications for specific products may differ. Refer to product user manuals for airflow requirements and other environmental specifications.

Warning: Device heatsinks may be hot during normal operation: To avoid burns, do not allow anything to touch heatsinks.

Warning: Avoid injury, fire hazard, or explosion: Do not operate this product in an explosive atmosphere.

Caution: Lithium batteries. There is a danger of explosion if a battery is incorrectly replaced or handled. Do not disassemble or recharge the battery. Do not dispose of the battery in fire. When the battery is replaced, the same type (CR2032) or an equivalent type recommended by the manufacturer must be used. Used batteries must be disposed of according to the manufacturer's instructions.

Warning: Avoid injury: This product may contain one or more laser devices that are visually accessible depending on the plug-in modules installed. Products equipped with a laser device must comply with International Electrotechnical Commission (IEC) 60825.

15.1 Mesures de sécurité



Veuillez suivre les mesures de sécurité suivantes pour éviter tout accident corporel et ne pas endommager ce produit ou tout autre produit lui étant connecté. Pour éviter tout danger, veillez à utiliser le produit conformément aux spécifications mentionnées.

Lisez toutes les informations de sécurité fournies dans les manuels de l'utilisateur des produits composants et veillez à bien comprendre les mesures associées aux symboles de sécurité, aux avertissements écrits et aux mises en garde avant d'accéder à certains éléments ou emplacements de l'unité. Conservez ce document comme outil de référence.

AVERTISSEMENT CONCERNANT LA SÉCURITÉ DE L'ALIMENTATION C.A. ET/OU C.C. : le câble d'alimentation C.A. et/ou C.C. constitue le dispositif de déconnexion principal de l'alimentation électrique de l'unité et doit être facilement accessible à tous moments. Les commutateurs de marche/arrêt C.A. et/ou C.C. et/ou les commutateurs disjoncteurs auxiliaires permettent uniquement de contrôler l'alimentation (ET NON LA DÉCONNEXION PRINCIPALE).

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IMPORTANT : reportez-vous aux instructions d'installation avant de connecter le bloc d'alimentation.

Pour les systèmes C.A., utilisez uniquement un câble d'alimentation avec une prise de terre et établissez toujours les connexions à une prise secteur mise à la terre. Chaque câble d'alimentation doit être connecté à un circuit terminal dédié.

Pour les systèmes C.C., la protection de cette unité repose sur les coupe-circuits (surintensité) du bâtiment. Assurez-vous d'utiliser un fusible ou un disjoncteur répertorié et certifié ne dépassant pas 72 VCC et 15 A pour tous les conducteurs de courant. Pour les équipements connectés en permanence, un sectionneur facilement accessible doit être incorporé au câblage du bâtiment. Pour les connexions permanentes, utilisez des câbles en cuivre d'un calibre conforme à celui spécifié dans le manuel de l'utilisateur du système.

Le boîtier fournit un connecteur de mise à la terre séparé. Établissez la connexion à la terre avant de mettre le système sous tension ou de connecter des périphériques. Veillez à ne jamais déconnecter la mise à la terre tant que le système est sous tension ou si des périphériques sont connectés.

Pour réduire le risque d'un choc électrique en provenance d'un téléphone ou d'un système Ethernet*, connectez l'alimentation principale de l'unité avant d'établir ces connexions. De même, déconnectez-les avant de couper l'alimentation principale de l'unité.

SÉCURITÉ DU BOÎTIER POUR UN MONTAGE EN BAIE : cette unité peut être destinée à un montage en baie stationnaire. Le montage en baie doit satisfaire aux exigences sur la résistance physique des normes NEBS GR-63-CORE et NEBS GR 487. Déconnectez toutes les sources d'alimentation et les connexions externes avant d'installer ou de supprimer l'unité d'une baie.

Minimisez la masse du système avant le montage en retirant l'équipement permutable à chaud. Assurez-vous que le système est réparti de manière uniforme sur la baie. Une distribution inégale de la masse du système peut présenter des risques. Fixez tous les boulons lors de l'installation du boîtier dans une baie.

Avertissement : vérifiez que le câble d'alimentation et la prise sont compatibles. Utilisez les câbles d'alimentation correspondant à la configuration de vos prises de courant. Pour de plus amples informations, visitez le site Web suivant : http://kropla.com/electric2.htm.

Avertissement : évitez toute forme de surcharge, chaleur, choc électrique ou incendie. Connectez uniquement le système à un circuit d'alimentation dûment répertorié conformément aux spécifications du manuel de l'utilisateur du produit. N'établissez pas de connexions à des terminaux en dehors des limites spécifiées pour ce terminal. Reportez-vous au manuel de l'utilisateur du produit pour les connections adéquates.

Avertissement : évitez les chocs électriques. N'utilisez pas ce produit dans des endroits humides, mouillés ou provoquant de la condensation. Pour éviter tout risque de choc électrique ou d'incendie, n'utilisez pas ce produit si les couvercles ou les panneaux du boîtier ne sont pas en place.

Avertissement : évitez les chocs électriques. Pour les unités comportant plusieurs sources d'alimentation, déconnectez toutes les sources d'alimentation externes avant de procéder aux réparations.

Avertissement : les blocs d'alimentation doivent être remplacés exclusivement par des techniciens d'entretien qualifiés.

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Attention : exigences environnementales du système : les composants tels que les cartes de processeurs, les commutateurs Ethernet, etc., sont conçus pour fonctionner avec un flux d'air externe. Les composants peuvent être détruits s'ils fonctionnent dans d'autres conditions. Le flux d'air externe est généralement produit par les ventilateurs des châssis lorsque les composants sont installés dans des châssis compatibles. Veillez à ne jamais obstruer le flux d'air alimentant le ventilateur ou les conduits de l'unité. Des boucliers ou des panneaux de gestion de l'air doivent être installés dans les connecteurs inutilisés du châssis. Les spécifications environnementales peuvent varier d'un produit à un autre. Veuillez-vous reporter au manuel de l'utilisateur pour déterminer les exigences en matière de flux d'air et d'autres spécifications environnementales.

Avertissement : les dissipateurs de chaleur de l'appareil peuvent être chauds lors d'un fonctionnement normal. Pour éviter tout risque de brûlure, veillez à ce que rien n'entre en contact avec les dissipateurs de chaleur.

Avertissement : évitez les blessures, les incendies ou les explosions. N'utilisez pas ce produit dans une atmosphère présentant des risques d'explosion.

Attention : les batteries au lithium. Celles-ci peuvent exploser si elles sont incorrectement remplacées ou manipulées. Veillez à ne pas désassembler ni à recharger la batterie. Veillez à ne pas jeter la batterie au feu. Lors du remplacement de la batterie, utilisez le même type de batterie (CR2032) ou un type équivalent recommandé par le fabricant. Les batteries usagées doivent être mises au rebut conformément aux instructions du fabricant.

Avertissement : évitez les blessures. Ce produit peut contenir un ou plusieurs périphériques laser visuellement accessibles en fonction des modules plug-in installés. Les produits équipés d'un périphérique laser doivent être conformes à la norme IEC (International Electrotechnical Commission) 60825.

15.2 Sicherheitshinweise



Lesen Sie bitte die folgenden Sicherheitshinweise, um Verletzungen und Beschädigungen dieses Produkts oder der angeschlossenen Produkte zu verhindern. Verwenden Sie das Produkt nur gemäß den Anweisungen, um mögliche Gefahren zu vermeiden.

Lesen Sie alle Sicherheitsinformationen in den Benutzerhandbüchern der zu dem Produkt gehörenden Komponenten und machen Sie sich mit den Hinweisen zu den Sicherheitssymbolen, schriftlichen Warnungen und Vorsichtsmaßnahmen vertraut, ehe Sie Teile oder Stellen des Geräts anfassen. Bewahren Sie dieses Dokument gut auf, um später darin nachlesen zu können.

SICHERHEITSWARNUNG FÜR WECHSELSTROM UND/ODER GLEICHSTROM: Die Stromversorgung des Gerätes wird über das Wechselstrom- und/oder Gleichstromkabel unterbrochen und muss daher jederzeit leicht zugänglich sein. Zusätzliche Ein-/Aus-Schalter für Wechselstrom und/oder Gleichstrom und/oder Leistungsschalter dienen lediglich der Steuerung der Stromversorgung (NICHT ABER DER UNTERBRECHUNG DER STROMVERSORGUNG).

WICHTIG: Lesen Sie vor dem Anschließen der Stromversorgung die Installationsanweisungen!

Wechselstromsysteme: Verwenden Sie nur ein Stromkabel mit geerdetem Stecker und verbinden Sie dieses immer nur mit einer geerdeten Steckdose. Jedes Stromkabel muss an einen eigenen Stromkreis angeschlossen werden.

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Gleichstromsysteme: Dieses Gerät basiert auf dem im Gebäude installierten Schutz vor Kurzschlüssen (Netzüberlastung). Stellen Sie sicher, dass für alle stromführenden Leiter eine zertifizierte Sicherung oder ein Leistungsschalter mit nicht mehr als 72V Gleichstrom, 15A verwendet wird. Für Geräte, die ständig angeschlossen sind, sollte in der Gebäudeverkabelung ein leicht zugänglicher Trennschalter installiert werden. Für eine permanente Verbindung verwenden Sie Kupferdraht der im Benutzerhandbuch des Systems angegebenen Stärke.

Das Gehäuse verfügt über einen eigenen Erdungs-Verbindungsbolzen. Stellen Sie die Erdungsverbindung her, ehe Sie das Stromkabel oder Peripheriegeräte anschließen, und trennen Sie die Erdungsverbindung niemals, so lange Strom- und Peripherieverbindungen angeschlossen sind.

Um die Gefahr eines durch ein Telefon oder Ethernet*-System bedingten elektrischen Schlags zu verringern, schließen Sie das Stromkabel des Geräts an, ehe Sie diese Verbindungen einrichten. Trennen Sie diese Verbindungen, ehe Sie die Hauptstromversorgung des Geräts unterbrechen.

SICHERHEITSHINWEISE BEI GESTELLMONTAGE: Dieses Gerät kann stationär in einem Gestell angebracht werden. Das Gestell muss den Anforderungen an eine physische Stärke laut NEBS GR-63-CORE und NEBS GR 487 entsprechen. Trennen Sie vor der Installation oder dem Abbau des Geräts in einem Gestell alle Strom- und externen Verbindungen.

Das Gewicht des Systems kann vor dem Einbau verringert werden, indem man alle während des Betriebs austauschbaren Elemente entfernt. Achten Sie darauf, das System so aufzustellen, dass das Gestell gleichmäßig belastet wird. Eine ungleiche Verteilung des Gewichts kann gefährlich werden. Befestigen Sie alle Sicherungsbolzen, wenn Sie das Gehäuse in einem Gestell montieren.

Warnung: Überprüfen Sie, ob Stromkabel und Steckdose kompatibel sind: Verwenden Sie die Ihrer Stromkonfiguration entsprechenden Stromkabel. Weitere Informationen finden Sie auf folgender Website: http://kropla.com/electric2.htm.

Warnung: Vermeiden Sie elektrische Überlastung, Hitze, elektrischen Schlag oder Feuergefahr: Schließen Sie das System nur an einen den Spezifikationen des Produkt-Benutzerhandbuchs entsprechenden Stromkreis an. Stellen Sie keine Verbindung zu Terminals her, die nicht den jeweiligen Spezifikationen entsprechen. Für die korrekten Verbindungen siehe das Benutzerhandbuch des Produkts.

Warnung: Vermeiden Sie einen elektrischen Schlag: Unterlassen Sie den Betrieb in nassen, feuchten oder kondensierenden Betriebsumgebungen. Um die Gefahr eines elektrischen Schlags oder eines Feuers zu vermeiden, betreiben Sie dieses Produkt nicht ohne Gehäuse oder Abdeckungen.

Warnung: Vermeiden Sie einen elektrischen Schlag: Trennen Sie bei Geräten mit mehreren Stromquellen vor der Wartung alle externen Stromverbindungen.

Warnung: Netzteile dürfen nur von qualifizierten Servicemitarbeitern ausgewechselt werden.

Vorsicht: Anforderungen an die Systemumgebung: Komponenten wie Prozessor-Boards, Ethernet-Schalter usw. sind auf den Betrieb mit externer Luftzufuhr ausgelegt. Diese Komponenten können bei Betrieb ohne externe Luftzufuhr beschädigt werden. Wenn die Komponenten in einem kompatiblen Gehäuse installiert sind, wird Luft von außen normalerweise durch Gehäuselüfter zugeführt. Blockieren Sie niemals die Luftzufuhr der Gerätelüfter oder -ventilatoren. In ungenutzten Gehäusesteckplätzen müssen Füllelemente oder Luftsteuerungseinheiten eingesetzt werden. Die Betriebsbedingungen können zwischen den verschiedenen Produkten variieren. Für die Anforderungen an die Belüftung und andere Betriebsbedingungen siehe die Benutzerhandbücher der jeweiligen Produkte.

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Warnung: Die Kühlkörper des Geräts können sich während des normalen Betriebs erhitzen: Um Verbrennungen zu vermeiden, sollte jeder Kontakt mit den Kühlkörpern vermieden werden.

Warnung: Vermeiden Sie Verletzungen, Feuergefahr oder Explosionen: Unterlassen Sie den Betrieb dieses Produkts in einer explosionsgefährdeten Betriebsumgebung.

Vorsicht: Lithiumbatterien. Bei unsachgemäßem Austausch oder Umgang mit Batterien besteht Explosionsgefahr. Zerlegen Sie die Batterie nicht und laden Sie diese nicht wieder auf. Entsorgen Sie die Batterie nicht durch Verbrennen. Beim Auswechseln der Batterie muss dasselbe oder ein der Händlerempfehlung gleichwertiges Modell verwendet werden (CR2032). Gebrauchte Batterien müssen entsprechend den Anweisungen des Herstellers entsorgt werden.

Warnung: Vermeiden Sie Verletzungen: Dieses Produkt kann ein oder mehrere Lasergeräte enthalten, die abhängig von den installierten Plug-In-Modulen optisch zugänglich sind. Mit einem Lasergerät ausgestattete Produkte müssen der International Electrotechnical Commission (IEC) 60825 entsprechen.

15.3 Norme di Sicurezza



Leggere le norme seguenti per prevenire lesioni personali ed evitare di danneggiare questo prodotto o altri a cui è collegato. Per evitare qualsiasi pericolo potenziale, usare il prodotto unicamente come indicato.

Leggere tutte le informazioni sulla sicurezza fornite nella guida per l'utente relativa al componente e comprendere le norme associate ai simboli di pericolo, agli avvisi scritti e alle precauzioni da adottare prima di accedere a componenti o aree dell'unità. Custodire il presente documento per usi futuri.

AVVISO DI SICUREZZA RELATIVO ALL'ALIMENTAZIONE IN C.A. E/O C.C. Il cavo di alimentazione in c.a. e/o c.c. rappresenta il dispositivo principale per interrompere l'alimentazione in c.a. e/o c.c. dell'unità e deve sempre essere facilmente accessibile. Gli interruttori di accensione/spegnimento ausiliari per l'alimentazione in c.a. e/o c.c. hanno l'unico scopo di controllare l'alimentazione (NON INTERROMPONO L'ALIMENTAZIONE PRINCIPALE).

IMPORTANTE: prima di collegare l'unità alla fonte di alimentazione, leggere le istruzioni di installazione.

Per i sistemi CA, usare solo un cavo di alimentazione con una spina provvista di una messa a terra e collegarsi sempre a prese provviste di una messa a terra. Ogni cavo di alimentazione deve essere collegato ad un circuito derivato dedicato.

Per i sistemi CC, la presente unità può usufruire dell'eventuale installazione integrata nell'edificio per la protezione contro i cortocircuiti (sovratensione). Assicurarsi della presenza di un fusibile o di un circuito derivato non superiore a 72 V c.c., 15 A, certificato e conforme alla normativa in vigore, in tutti i conduttori portanti. Per gli apparecchi collegati in modo permanente, è necessario inserire nel circuito dell'edificio un interruttore ad accesso immediato. Per i collegamenti permanenti, usare il filo di rame del diametro specificato nella guida per l'utente relativa al sistema.

Il materiale fornito comprende un perno per il collegamento della messa a terra. Assicurare il collegamento della messa a terra prima di alimentare l'unità o prima di collegarla alle periferiche e non scollegare mai la messa a terra quando l'unità è alimentata o collegata a periferiche.

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Per ridurre il rischio di scariche elettriche da parte della linea telefonica o dalla rete Ethernet*, collegare l'unità all'alimentazione principale prima di effettuare tale collegamento. Rimuovere i collegamenti prima di togliere l'alimentazione principale all'unità.

NORME DI SICUREZZA PER LE UNITÀ MONTATE IN UN RACK. Questa unità può essere alloggiata in modo permanente in un rack. Il montaggio in rack deve essere conforme ai requisiti di resistenza fisica delle norme NEBS GR-63-CORE e NEBS GR 487.Prima di installare o rimuovere l'unità da un rack, rimuovere tutte le fonti di alimentazione e i collegamenti esterni.

Prima di effettuare il montaggio, è possibile ridurre il peso complessivo del sistema togliendo tutte le apparecchiature sostituibili a caldo. Montare il sistema in modo da garantire una distribuzione uniforme del peso nel rack. Una distribuzione irregolare del peso può essere pericolosa. Avvitare fino in fondo tutti i bulloni durante l'installazione dell'unità in un rack.

Avvertenza: verificare il cavo di alimentazione e la compatibilità con la presa di corrente. Usare i cavi di alimentazione compatibili con il tipo di presa di corrente. Per ulteriori informazioni, visitare il sito Web all'indirizzo seguente: http://kropla.com/electric2.htm.

Avvertenza: evitare sovraccarichi elettrici, calore diretto, scosse e possibili cause di incendio. Collegare il sistema solo ad una rete elettrica la cui tensione nominale corrisponda al valore indicato nella guida per l'utente. Non collegarlo a fonti di alimentazione con valori di tensione esterne a quanto specificato per il sistema. Per ulteriori informazioni sul corretto collegamento, consultare la guida per l'utente del prodotto.

Avvertenza: evitare le scosse elettriche. Non usare l'apparecchio in ambienti umidi o in presenza di condensa. Per evitare scosse elettriche o possibili cause di incendio, non adoperare il prodotto senza le custodie o i pannelli appositi.

Avvertenza: evitare le scosse elettriche. Prima di intervenire su unità con più fonti di alimentazione, rimuovere tutti i collegamenti all'alimentazione esterna.

Avvertenza: far sostituire i componenti di alimentazione solo da personale tecnico qualificato.

Attenzione: rispettare i requisiti ambientali del sistema. I componenti come le schede di processore, i commutatori Ethernet, ecc., sono progettati per funzionare in presenza di un flusso di aria proveniente dall'esterno, in assenza del quale rischiano di danneggiarsi irrimediabilmente. In genere, il flusso di aria esterno viene generato da appositi ventilatori installati contemporaneamente ai componenti nello chassis compatibile. Non ostacolare mai il flusso di aria convogliato dal ventilatore e dai condotti dell'unità. I pannelli di copertura o le schede per il controllo dell'aria devono essere installati negli alloggiamenti vuoti dello chassis. I requisiti ambientali possono variare a seconda del prodotto. Per ulteriori informazioni sui requisiti del flusso di aria e sugli altri requisiti ambientali, consultare la guida per l'utente del prodotto.

Avvertenza: i dissipatori di calore possono scaldarsi durante il funzionamento normale. Per evitare bruciature o danni, evitare il contatto del dissipatore di calore con qualsiasi altro elemento.

Avvertenza: evitare lesioni, possibili cause di incendio o di esplosione. Non usare il prodotto in un'atmosfera in cui sussiste il rischio di esplosione.

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Attenzione: le batterie al litio. La sostituzione o l'uso non corretto della batteria comporta un rischio di esplosione. Non smontare né ricaricare la batteria. Non gettare la batteria nel fuoco. Per la sostituzione, usare il tipo di batteria identico (CR2032) o equivalente consigliato dal costruttore. Le batterie usate devono essere smaltite rispettando le istruzioni del costruttore.

Avvertenza: evitare le lesioni. Questo prodotto può contenere uno o più dispositivi laser accessibili alla vista, a seconda dei moduli installati. I prodotti provvisti di un dispositivo laser devono essere conformi alla norma 60825 della Commissione elettrotecnica internazionale (IEC).

15.4 Instrucciones de Seguridad



Examine las instrucciones sobre condiciones de seguridad que siguen para evitar cualquier tipo de daños personales, así como para evitar perjudicar el producto o productos a los que esté conectado. Para evitar riesgos potenciales, utilice el producto únicamente en la forma especificada.

Lea toda la información relativa a seguridad que se incluye en los manuales de usuario de los distintos componentes y procure familiarizarse con los distintos símbolos de seguridad, advertencias escritas y normas de precaución antes de manipular las distintas piezas o secciones de la unidad. Guarde este documento para consultarlo en el futuro.

AVISO DE SEGURIDAD SOBRE LA ALIMENTACIÓN DE CA O CC El cable de alimentación de CA o CC constituye el dispositivo principal de desconexión de la alimentación de CA o CC, y debe permanecer accesible en todo momento. Los interruptores auxiliares de encendido y apagado de CA o CC y los disyuntores sólo tienen una función de control de la alimentacion (Y NO LA DE DESCONEXIÓN PRINCIPAL).

IMPORTANTE: Consulte las instrucciones de instalación antes de conectar la unidad a la alimentación.

En el caso de sistemas de CA, utilice sólo cables de alimentación con enchufe con toma de tierra, y realice siempre conexiones a una toma con toma de tierra. Cada uno de los cables de alimentación deberá estar conectado a una derivación dedicada.

En el caso de sistemas de CC, la unidad dependerá de la instalación existente en el edificio para la protección frente a cortocircuitos (sobreintensidades). Asegúrese de que todos los conductores que transporten corriente empleen un fusible o disyuntor homologado y certificado con una capacidad que no supere los 72V de CC ni 15A. En el caso de los equipos que vayan a permanecer conectados de manera constante, en la instalación eléctrica del edificio deberá estar incluida una desconexión de fácil acceso. Para conexiones permanentes, emplee cable de cobre del calibre especificado en el manual de usuario del sistema.

El chasis incluye aparte una clavija de conexión a tierra. Realice la conexión a tierra antes de suministrar corriente o realizar cualquier tipo de conexión de periféricos; no desconecte nunca la toma de tierra mientras la corriente esté presente o existan conexiones con periféricos.

Para reducir los riesgos de descargas eléctricas a través de un teléfono o un sistema de Ethernet*, conecte la alimentación principal de la unidad antes de realizar este tipo de conexiones. Desconecte estas conexiones antes de desconectar la alimentación principal de la unidad.

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PROCEDIMIENTOS DE SEGURIDAD PARA EL CHASIS DE MONTAJE EN BASTIDOR: Esta unidad puede estar preparada para su montaje en un bastidor estático. Un montaje de este tipo deberá realizarse en un bastidor que cumpla con los requisitos de robustez de las normas NEBS GR-63-CORE y NEBS GR 487. Desconecte cualquier tipo de alimentación y conexiones externas antes de instalar la unidad en un bastidor o desmontarla.

Puede desmontar todos los equipos de intercambio en caliente para reducir el peso del sistema antes del montaje en bastidor. Asegúrese de montar el sistema de forma que el peso quede distribuido uniformemente en el bastidor. Una distribución irregular del peso podría generar riesgos. Asegúrese de fijar todos los tornillos de montaje en el bastidor.

Advertencia: Compatibilidad del cable y la toma: Utilice los cables adecuados para la configuración de tomas de corriente con que cuente. Si necesita más información, visite el sitio web siguiente: http://kropla.com/electric2.htm.

Advertencia: Evite sobrecargas eléctricas, calor y riesgos de descarga eléctrica o incendio: Conecte el sistema sólo a un circuito de alimentación que tenga el régimen apropiado, según lo especificado en el manual de usuario del producto. No realice conexiones con terminales cuya capacidad no se ajuste al régimen especificado para ellos. Consulte el manual de usuario del producto para que las conexiones que realice sean las correctas.

Advertencia: Evite descargas eléctricas: No haga funcionar el sistema en condiciones de humedad, mojado o si se produce condensación de la humedad. Para evitar descargas eléctricas o posibles incendios, no permita que el aparato funcione con sus tapas o paneles del chasis desmontados.

Advertencia: Evite descargas eléctricas: En el caso de unidades que cuenten con varias fuentes de alimentación, desconecte las conexiones con alimentación externa antes de proceder a realizar labores de mantenimiento.

Advertencia: La sustitución de fuentes de alimentación sólo debe ser realizada por personal de mantemiento cualificado.

Precaución: Requisitos de entorno para el sistema: Los componentes del tipo de placas de procesador, conmutadores de Ethernet, etc., están concebidos para funcionar en condiciones que permitan el paso de aire. Los componentes pueden averiarse si funcionan sin que circule el aire en su entorno. La circulación del aire suele estar facilitada por los ventiladores incorporados en el armazón cuando los componentes están instalados en armazones compatibles. Nunca interrumpa el paso del aire por los ventiladores or los respiraderos. Los paneles de relleno y las placas para el control de la circulación del aire deben instalarse en ranuras del chasis que no estén destinadas a ningún otro uso. Las características técnicas relativas al entorno pueden variar entre productos. Consulte los manuales de usuario del producto si necesita conocer sus necesidades en términos de circulación de aire u otras características técnicas.

Advertencia: En condiciones de funcionamiento normales, los disipadores de calor pueden recalentarse. Evite que ningún elemento entre en contacto con los disipadores para evitar quemaduras.

Advertencia: Riesgos de daños, incendio o explosión: No permita que el aparato funcione en una atmósfera que presente riesgos de explosión.

Precaución: Las baterías de litio. Si las baterías no se manipulan o cambian correctamente, exite riesgo de explosión. No desmonte ni recargue la batería. Nunca tire las baterías al fuego. Al cambiar la batería, es preciso utilizar el mismo tipo (CR2032) o un tipo equivalente que haya sido recomendado por el fabricante. Las baterías utilizadas deben desecharse según las instrucciones del fabricante.

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Advertencia: Daños personales: Este producto puede contener uno o varios dispositivos láser, que estarán a la vista dependiendo de los módulos enchufables que se hayan instalado. Los productos provistos de un dispositivo láser deben ajustarse a la norma 60825 de la International Electrotechnical Commission (IEC).

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