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CPC7301

Intelligent Shelf Manager
Hardware Manual

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Document Revision History

Date	Explanation of changes
09/15/03	Initial Production Release
04/27/04	Corrected “Ethernet Controllers” topic title
12/08/04	Updated Management Cable Pinout drawing
07/18/05	Corrected reference to RJ-45 connector J7.
11/21/06	Added RoHS and WEEE Compliance topic. Updated serial cable part number. Updated Battery Backup Characteristics topic.
02/02/07	Updated the SW2-3 (Bootvariable Reset) description
07/29/08	Updated battery documentation. Updated document format.
02/27/09	Removed reference to CMOS memory.
08/12/09	Updated conditions under which the alarm cutoff feature automatically cancels itself in “S1 (Alarm Cutoff and Board Reset)” on page 30. Updated “Telco Alarm Cable” on page 42 with Molex part number and Web link.
10/14/09	Corrected Ethernet LED definitions in “Front Panel Features” on page 19 and Figure 2-1, “Front Panel,” on page 20. Upgraded Figure 5-4, “Management Cable Pinout,” on page 41and Figure 5-5, “Telco Alarm Cable Pinout,” on page 42
10/14/10	Updated format, rebranded. Corrected Table 5-2, “J1 ISM Backplane Connector Pinout,” on page 35.
06/12/12	Removed the internal file reference from “UL/cUL 60950 Safety for Information Technology Equipment” (see “Safety” on page 53).
06/21/12	Updated the RoHS and WEEE directives to state that this products is compliant with *Directive 2011/65/EU*. It may also fall under the *Directive 2002/96/EC* (see “Compliance with RoHS and WEEE Directives” on page 57).

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Symbol Conventions in This Manual

The following symbols appear in this document:

Caution:
There is risk of equipment damage. Follow the instructions.

Warning:
Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions.

Caution:
Electronic components on printed circuit boards are extremely sensitive to static electricity. Ordinary amounts of static electricity generated by your clothing or work environment can damage the electronic equipment. It is recommended that anti-static ground straps and anti-static mats are used when installing the board in a system to help prevent damage due to electrostatic discharge.

Additional safety information is available throughout this guide and in “Product Safety Information” on page 55.

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Chapter 1

About This Guide

This manual describes the operation and use of the CPC7301 Intelligent Shelf Manager (referred to as CPC7301or ISM in this guide). The following outline describes the focus of each chapter.

Chapter 2, “Introduction” provides an overview of the CPC7301 and includes information such as blade features, front panel features, and a description of the environment in which the ISM is intended to operate.

Chapter 3, “Getting Started” provides setup information and includes information such as unpacking the blade, system requirements, and installation procedures.

Chapter 4, “Configuration” describes setting the user-configurable switch options on board the CPC7301.

Chapter 5, “Connectivity” detailed information about the connectors included on the CPC7301. It includes connector descriptions, pinout tables, and a connector location illustration. It also presents information for building or buying compatible alarm and management cables.

Chapter 6, “Installing Memory” gives the procedures for removing and replacing the onboard SODIMM memory.

Chapter 7, “Reset” describes the reset types with their respective sources on the CPC7301.

Chapter 8, “Specifications” contains mechanical, electrical, and environmental specifications as well as reliability data.

Chapter 9, “Data Sheet Reference” provides information on data sheets, standards and specifications for the technology designed into the CPC7301.

Chapter 10, “Agency Approvals” presents agency approvals and certification information.

This product is compatible with the complete suite of PT software.

The CPC7301 should be used in conjunction with the ISM software package described in the *CPC7301 Intelligent Shelf Manager System Manager Interface Software Manual*.

The most current documentation to support the additional components that you purchased from PT is available at www.pt.com under the product you are inquiring about.

For additional documentation references see Chapter 9, “Data Sheet Reference.”

Text Conventions

Conventions in This Guide describes the text conventions that are used in this guide.

Conventions in This Guide

Convention	Used For
`Monospace font`	Monospace font represents sample code.
Bold font	Bold font represents: • paths • file names • UNIX commands • user input.
Italic font	Italic font represents: • notes that supply useful advice • supplemental information • referenced documents.

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2. **TELEPHONE** – Contact us via telephone at the number listed below, and request Technical Support. Our offices are open Monday to Friday, 8:00 a.m. to 8:00 p.m. (Eastern Time).

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Phone	+1 (585) 256-0248 (Monday to Friday, 8 a.m. to 8 p.m. Eastern Time)	+1 (585) 256-0248 (Monday to Friday, 8 a.m. to 8 p.m. Eastern Time)

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To submit a return merchandise authorization (RMA) request, complete the online RMA form available at http://pt.com/assets/lib/files/rma-request-form.doc and follow the instructions on the form. You will be notified with an RMA number once your return request is approved. Shipping information for returning the unit to PT will be provided once the RMA is issued.

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PT warrants that its products sold hereunder will at the time of shipment be free from defects in material and workmanship and will conform to PT's applicable specifications or, if appropriate, to Buyer's specifications accepted by PT in writing. If products sold hereunder are not as warranted, PT shall, at its option, refund the purchase price, repair, or replace the product provided proof of purchase and written notice of nonconformance are received by PT within 12 months of shipment, or in the case of software and integrated circuits within ninety (90) days of shipment and provided said nonconforming products are returned F.O.B. to PT's facility no later than thirty days after the warranty period expires. Products returned under warranty claims must be accompanied by an approved Return Material Authorization number issued by PT and a statement of the reason for the return. Please contact PT, or its agent, with the product serial number to obtain an RMA number. If PT determines that the products are not defective, Buyer shall pay PT all costs of handling and transportation. This warranty shall not apply to any products PT determines to have been subject to testing for other than specified electrical characteristics or to operating and/or environmental conditions in excess of the maximum values established in applicable specifications, or have been subject to mishandling, misuse, static discharge, neglect, improper testing, repair, alteration, parts removal, damage, assembly or processing that alters the physical or electrical properties. This warranty excludes all cost of shipping, customs clearance and related charges outside the United States. Products containing batteries are warranted as above excluding batteries.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS, IMPLIED OR STATUTORY INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS. IN NO EVENT SHALL PT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES DUE TO BREACH OF THIS WARRANTY OR ANY OTHER OBLIGATION UNDER THIS ORDER OR CONTRACT.

Chapter 2

Introduction

This chapter provides an overview of the CPC7301 Intelligent Shelf Manager (ISM). It includes a product definition and summaries of the board's hardware and software features. This chapter is useful for comparing the features of the CPC7301 to the needs of a specific application.

Note: *PT has adopted the term "shelf" for alignment with the typical practice in telecommunications applications. Traditionally (for instance, in the CompactPCI specifications), the term "chassis" has been used with essentially the same meaning.*

The following key topics are presented in this chapter:

- "Product Definition," on page 17
- "CPC7301 Features," on page 18
- "Front Panel Features," on page 19
- "System Environment," on page 20

Product Definition

The CPC7301 is a 3U, single-slot, Intelligent Shelf Manager (ISM) for all PT platforms. It includes a comprehensive management architecture that delivers high availability protection with reliable, redundant, IPMI (Intelligent Platform Management Interface) standards-based management to all the major components in the shelf. It provides centralized management and alarming for up to 21 CompactPCI boards, eight system power supplies and four fan trays. The ISM may be paired with a redundant standby ISM for use in high availability applications.

The ISM provides comprehensive user and software interfaces via SNMP (Simple Network Management Protocol), CLI (Command Line Interface), RMCP (Remote Management Control Protocol) and a graphical interface.

The ISM is a special-purpose, single board computer with its own CPU, memory, operating system, and peripherals. The CPC7301 monitors and configures IPMI-based components in the shelf. When thresholds (such as temperature and voltage) are crossed or a failure occurs, the ISM captures these events, stores them in an event log, sends SNMP traps, and drives the Telco alarm relays and alarm LEDs. The ISM can query FRU information (such as serial number, model number, manufacture date, etc.), detect presence of components (such as fan tray, CPU board, etc.), and perform health monitoring of each component. In addition, the ISM controls the power-up sequencing of each slot via the BD_SEL# signal.

CPC7301 Features

- High density 3U X 1-slot form-factor
- Compatible with PICMG 2.1, 2.16, and 2.9-compliant components
- Enhanced reliability and protection via star topology
- Monitors via the Intelligent Platform Management Interface (IPMI) protocol
- Provides isolated IPMI signals for each slot for maximum security and reliability
- Out-of band management with dedicated Ethernet interface
- Dedicated serial port
- Hot swap support for field-replaceable components
- Ethernet Fabric Interconnect
- Full isolation of the standby ISM
- The architecture can be used as the foundation for PMC compute engines
- µDB15 Telco Alarm Interface at the front panel
- Dry contact relays for critical, major, minor and power fail alarms
- Alarm cutoff pushbutton at the front panel
- Critical, major, and minor alarm LEDs at the front panel
- ISM status and hot swap LEDs at the front panel
- Support for multiple management standards including SNMP, IPMI, RMCP, Telnet and SSH
- Secure, fail-safe, remote firmware updates via the network
- Designed for software extensibility and abstraction
- Monitors backplane voltages and status for up to eight power supplies
- Monitors system temperature sensors
- Monitors system fan tray presence
- Monitors tachometers for up to 16 system fans

Front Panel Features

The following features are found at the CPC7301's front panel. See Figure 2-1, “Front Panel,” on page 20 for locations.

- Minor, major, and critical alarm LEDs

  These LEDs indicate the presence of various event-triggered alarms. The LEDs function as follows:

  Off = no alarm triggered

  Amber = alarm triggered

  Blinking = alarm cutoff (ACO) is activated

- Alarm Cutoff (ACO) pushbutton

  This pushbutton toggles the ACO state. When ACO is activated, the active alarm LEDs blink and all of the alarm relays are deactivated. This button does not clear alarms.

  The CPC7301 can be reset by pressing and holding the ACO button for more than 5 seconds. See the topic“Hard Reset Sources” on page 45 for more information.

- Telco Alarm Interface (µDB15 connector)

  This interface relays alarm signals to off-board equipment. See the topic “Cables” on page 41 for cabling information.

- Serial Port (RJ-45 connector)

  This serial port may be used to access the ISM's Command Line Interface (CLI). See “Command Line Interface” on page 23. See the topic “Cables” on page 41 for cabling information.

- Ethernet Port (RJ-45 with LEDs)

  This port provides an out-of-band 10/100 Ethernet connection. The port's integrated LEDs function as follows:

  Yellow: Off = No Activity

  Blinking = Active

  Green: Off = No Link

  On = Link

- Hot Swap LED

  This LED indicates when it is safe to remove the ISM from a live (powered-on) shelf. The LED functions as follows:

  Off = the ISM is not ready to be removed from a live shelf.

  Blue = the ISM is ready to be removed from a live shelf.

  Refer to the topic “Removing the ISM” on page 27 for complete information about removing the ISM from a shelf.

- ISM Status LED

  This LED indicates ISM status as follows:

  Green = power is on and the board is acting as the master (active) ISM.

  Blinking green = power is on and the board is acting as the backup (standby) ISM.

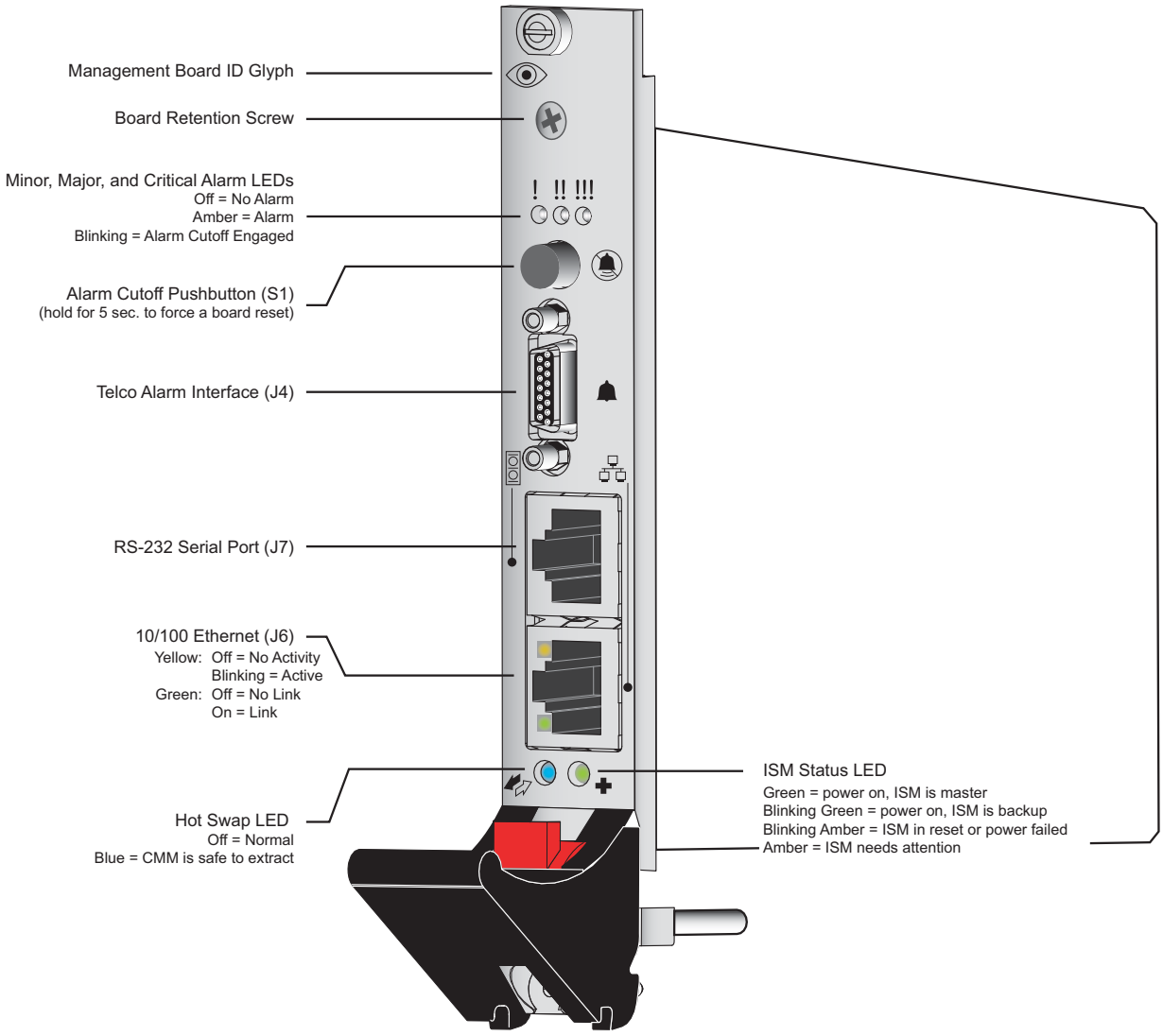
  Blinking Amber = the ISM is in reset or software has failed.

  Amber = the ISM needs attention (a critical problem exists).

- Ejector with hot swap switch

  The ejector functions as a handle and a lever for installing or removing the ISM. The ejector incorporates a switch that tells the ISM when the board is about to be removed from a system. Refer to the topic “Removing the ISM” on page 27 for complete information about removing the ISM from a shelf.

Figure 2-1: Front Panel



System Environment

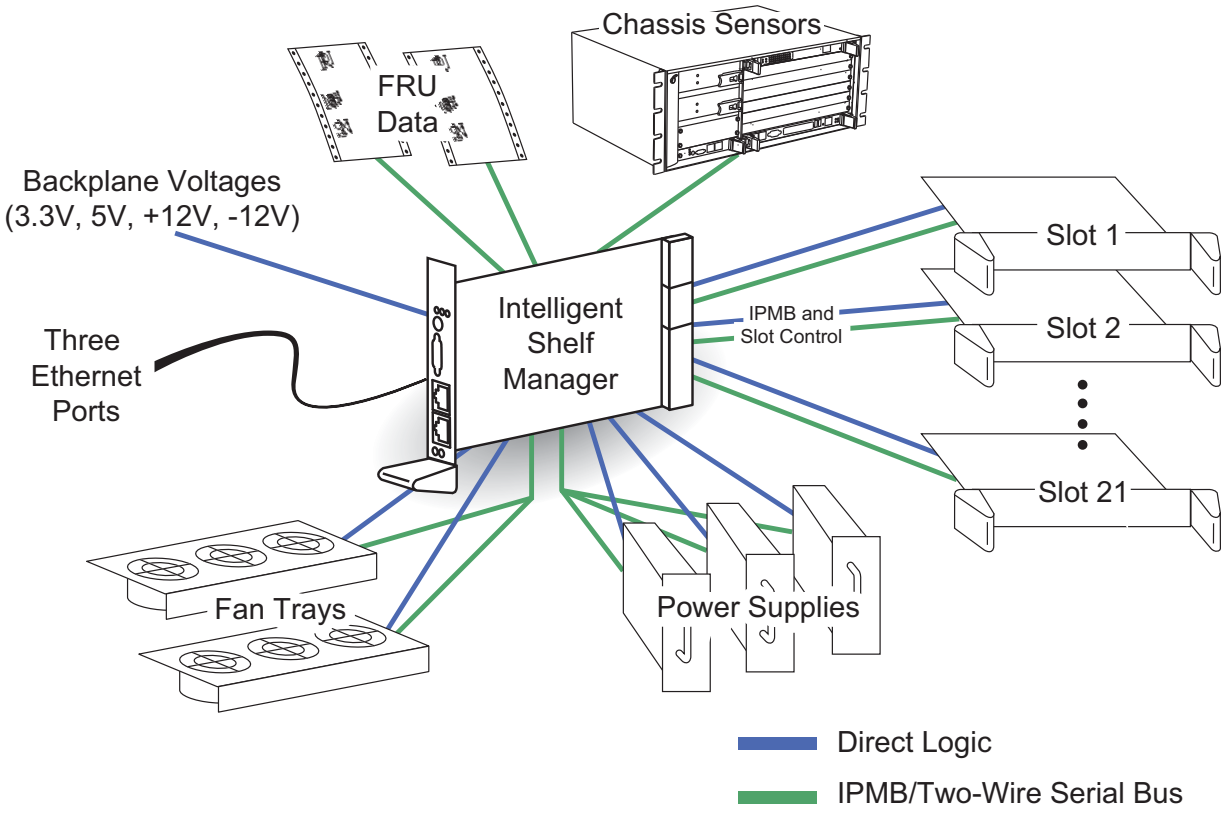
The CPC7301 is intended to operate as a shelf management building block in a PT system. The CPC7301 uses a unique backplane interface pinout and requires a dedicated slot within the shelf. Refer to the topic “Connectors” on page 33 for descriptions and pinouts of the ISM's J1, J2, and J3 backplane connectors.

Star Topology

As shown in the “Intelligent Shelf Management Architecture” illustration, Intelligent Platform Management Buses (IPMBs) are the primary management connection between components in the system environment. When installed in a PT platform, the CPC7301 provides an IPMI connection to each individual node or fabric slot and to power supplies and fan trays in the shelf - much like an Ethernet switch in a star topology. The ISM acts as the primary Baseboard Management Controller (BMC) for the entire shelf, blocking any traffic between two points of

the star. This increases reliability: if any IPMI-based component or subsystem fails and causes its bus to be inoperable, the ISM isolates it from the rest of the IPMI framework. It also allows multiple single board computers with BMCs to coexist in the same shelf but not compete as the primary management controller, including management or control of other IPMI-based components in the shelf.

Figure 2-2: Intelligent Shelf Management Architecture



Processor

The CPC7301 uses the Intel IOP321 I/O processor. Based on Intel's XScale™ micro-architecture, this single chip solution combines high performance processing with low power consumption.

The 32-bit, high-performance, 600MHz Intel IOP321 processor features 32 KB data and instruction caches, a memory controller and a PCI interface for the ISM's Ethernet controllers. The topic “Intel IOP321 Processor Chipset” on page 51 contains a link to the data sheet for the chipset.

Memory

The CPC7301 includes 128MB of SDRAM on a Small Outline Dual Inline Memory Module (SODIMM). Refer to Chapter 6, “Installing Memory” for information about removing and installing the SODIMM.

On-board storage for data and code is provided by flash memory. The ISM includes on-board NOR flash that stores boot code and the primary file system.

Ethernet Controllers

The CPC7301 uses three Intel 82559 Fast Ethernet Controllers. The ISM provides an RJ-45 connector on the front panel to connect to out-of-band 10/100 LAN0. This connector is labeled with the Ethernet icon (refer to Figure 2-1, “Front Panel,” on page 20). Care should be taken not to confuse the RJ-45 Ethernet port with the RJ-45 serial port that is next to it (note that the Ethernet port has integrated speed and activity LEDs). LAN0 can also be directed to a connector on an optional Rear Transition Module. See “SW2-1 (Ethernet (LAN0) Front/ Software Selectable)” on page 30.

A second 10/100 Ethernet channel, LAN1, is available only over the backplane for use by the system's CompactPCI Ethernet switch board. LAN1 is disabled by default for security reasons. To enable LAN1, use the following commands:

```
ifconfig eth1 up
```

```
ifconfig eth1 IpAddress
```

The third 10/100 Ethernet channel, LAN2, is available over the backplane for a dedicated ISM-to-ISM connection (requires the RTM4820 RTM or support on the backplane).

Refer to “Connectors” on page 33 for backplane connector pinouts.

Serial I/O

The CPC7301 provides an RS-232 compatible RJ-45 serial port connector on the front panel that can be used to access the Command Line Interface. Serial port signals are also available for rear panel access. See Figure 2-1, “Front Panel,” on page 20 for the connector location.

Note: *Port 0 signals are available to the front and rear panel simultaneously. Utilizing the Port 0 signal at the front and rear at the same time will cause a signaling conflict.*

Real-Time Clock

A Dallas Semiconductor DS1337 Serial Real-Time Clock allows the CPC7301 to keep track of time for accurate event logging. The DS1337 features a clock/calendar that counts seconds, minutes, hours, day, date, month, and years with leap-year compensation valid up to 2100, and battery backup.

To set the real-time clock, enter the correct date and time in the following format:

```
setdate 'Fri Dec 14 10:48:58 PST 2003'
```

A coin-cell lithium battery located on the CPC7301 powers the real-time clock. For more information about the battery, see “Battery Backup Characteristics” on page 49.

Watchdog Timer

The CPC7301 uses a watchdog timer to supervise processor activity. If software fails to strobe the watchdog within the programmed period, the watchdog resets the CPU.

Operating System

The CPC7301 runs embedded Monterey Linux®.

System Manager Interface

The CPC7301 allows system management to be conducted by software or by human operators. The following set of system manager interface options provide different mechanisms of access to similar kinds of information and control for a shelf. These interfaces are described in detail in the *CPC7301 Intelligent Shelf Manager System Manager Interface software manual*.

Command Line Interface

This interface is oriented towards human users rather than programmatic ones. It provides a comprehensive set of textual commands that can be issued to the shelf manager via either a physical serial connection or Telnet. Using this mechanism, the system manager can access information about the current state of the shelf, including current FRU population, sensor values, threshold settings, recent events and overall shelf health.

Graphical Interface

This interface, also oriented towards human users, enables essentially the same functionality as the Command Line Interface, with access to the Shelf Manager via a java applet that is typically served from the built-in web browser on the ISM.

Simple Network Management Protocol Interface

Simple Network Management Protocol (SNMP) is supported with a custom Management Information Base (MIB) providing Get and Set access to a wide range of information and controls regarding the shelf.

Remote Management Control Protocol Interface

This relatively low level interface provides essentially complete access to the IPMI aspects of a shelf, including the ability for the System Manager to issue IPMI commands to IPM Controllers in the shelf, using the Shelf Manager as a proxy.

Chapter 3

Getting Started

This chapter describes the steps necessary to install and set up the CPC7301 Intelligent Shelf Manager (ISM). It includes instructions on unpacking, installing, and removing the ISM.

The following key topics are presented in this chapter:

- "Unpacking," on page 25
- "System Requirements," on page 25
- "User Configurable Hardware," on page 26
- "Connectors," on page 26
- "Installing the ISM," on page 27
- "Removing the ISM," on page 27

Unpacking

Check the shipping carton for damage. If the shipping carton and contents are damaged, notify the carrier and PT for an insurance settlement. Retain the shipping carton and packing material for inspection by the carrier. Obtain authorization before returning any product to PT. Refer to "Customer Support and Services" on page 14 for assistance information.

Caution:
This board must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a wrist strap grounded through one of the system's ESD Ground jacks when servicing system components.

System Requirements

The following topics briefly describe the basic system requirements and configurable features of the CPC7301. Links are provided to other topics containing more detailed information.

Connectivity

The CPC7301 is intended to be installed as the Intelligent Shelf Manager in a system's dedicated Intelligent Shelf Manager slot. Where two Intelligent Shelf Manager slots are available in a system, two ISMs may be installed (they will automatically negotiate for active and standby roles).

The CPC7301 is designed to operate in a backplane providing CompactPCI-style 2mm Hard Metric connectors to the board's J1, J2, and J3 backplane interfaces. The backplane's ISM interfaces are specific to the ISM and do not support other 3U CompactPCI boards. See the topic "Connectors" on page 33 for connector descriptions and pinouts.

Electrical and Environmental

The CPC7301 requires +5VDC +5%/-11%, @ 1.8A typical. ISM power comes from the backplane's 5V power (IPMB_PWR); other voltages are derived as needed.

The CPC7301's processor can operate between +5° and approximately +55° C ambient, with a minimum of 200 LFM (1 meter per second) of external airflow. It is the users' responsibility to ensure that the CPC7301 is installed in a shelf capable of supplying adequate airflow. The maximum power dissipation of the ISM is 15W (10W typical). External airflow **must** be provided at all times.

Caution:
*The processor "core" temperature must **never** exceed 100°C under any condition of ambient temperature or usage. This may result in permanent damage to the processor.*

The CPC7301 may contain materials that require regulation upon disposal. Please dispose of this product in accordance with local rules and regulations. For disposal or recycling information, please contact your local authorities or the Electronic Industries Alliance at http://www.eiae.org/.

See Chapter 8, "Specifications," for more information about the CPC7301's electrical and environmental specifications.

Redundancy

The CPC7301 supports redundant operation in high availability applications. In systems where two ISMs are present, one acts as the active ISM and the other as standby. Both ISMs monitor one another and either can trigger an automatic failover if necessary.

User Configurable Hardware

The CPC7301 provides several configuration options that cannot be provided through software. Refer to Chapter 4, "Configuration," for more information about configuration options.

Connectors

The CPC7301 includes several connectors to interface to application-specific devices. The ISM's backplane connectors interface with the system's backplane when the board is inserted into a shelf. Front panel connectors are available to allow access to the ISM's Command Line Interface (CLI) and alarm signals. Always use shielded cables when connecting devices to the front panel connectors. Refer to Chapter 5, "Connectivity," for complete connector descriptions and pinouts and for cable recommendations.

Installing the ISM

The following instructions cover the mechanical aspects of installing the CPC7301 ISM in a compatible system.

For a better understanding of what happens when an ISM is absent from a system, see the next topic, “Removing the ISM” on page 27.

Warning:
When the system is plugged in, high voltages are present on the backplane. Do not reach into the enclosure.

Static electricity can damage electronic components. Wear a wrist strap grounded through one of the system's ESD ground jacks when servicing system components.

1. Take the necessary precautions to protect the CPC7301 from static discharge.
2. System power does not need to be off to install an ISM board.
3. Locate the system's dedicated ISM slot and remove the filler-panel or existing ISM (see “Removing the ISM” on page 27 for removal instructions).
4. Prepare the new/replacement ISM by opening its ejector handle (refer to Figure 3-1, “Ejector Handle Operation,” on page 28).
5. Carefully align the edges of the board with the card guides in the ISM slot. It may be helpful to look into the enclosure to verify correct alignment of the rails in the guides.
6. Taking care to keep the board aligned in the guides, slide the board in until the injector/ejector mechanism engages the retention bar.
7. Simultaneously push in the board and rotate the ejector handle to its closed position (rotate inward) to seat the backplane connectors.
8. If system power is on, the ISM boots and its Status LED lights green (active ISM) or blinks green (standby ISM).
9. Screw in the board retention screw to anchor the board in the shelf. This screw is located at the opposite end of the front panel from the ejector handle. Refer to Figure 2-1, “Front Panel,” on page 20 for the screw's location.
10. Use the ISM's Command Line Interface (CLI) to configure the ISM.

Removing the ISM

In ISM-based systems, the ISM controls power to every slot in the system via BD_SEL#. If a system's only ISM is removed, all the boards in the system lose power. When hot swapping an ISM, it performs a controlled shutdown of itself but not of the other boards in the system. Therefore, ensure that the entire system is in a “safe” state before removing an active ISM. The ISM's hot swap LED will not light while other boards in the system are powered on.

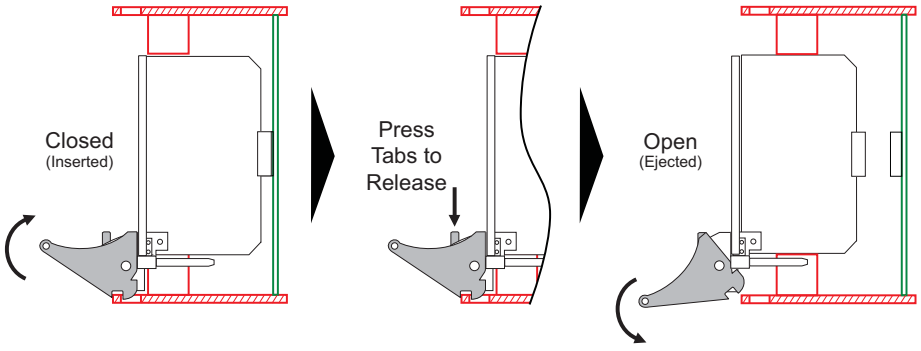
If a redundant ISM is available, the ISM being removed automatically fails over to the standby ISM (if a failover hasn't already occurred). In this case, the ISM's removal does not cause a loss of system power or an interruption in service (you must still wait for the blue hot swap LED to light before removing the ISM).

If the ISM loses power or is removed suddenly, there is a possibility that the ISM's flash memory could become corrupted. If this happens, refer to the “ISM Recovery and Updating” topic in the *CPC7301 Intelligent Shelf Manager System Manager Interface Software Manual* to restore the board to operation.

The following instructions cover the mechanical aspects of removing the ISM from a system.

1. Take the necessary precautions to protect the CPC7301 from static discharge.
2. System power does not need to be off to remove an ISM board. However, other boards in the system should be shut down unless a standby ISM is operating in the system.
3. Unscrew the board retention screw that fastens the board to the enclosure. This screw is located at the opposite end of the front panel from the ejector handle. Refer to Figure 2-1, “Front Panel,” on page 20 for the screw's location.
4. If system power is off or the ISM's blue LED is on, proceed to step 6. If not, the ISM must be in a “safe” state before it can be removed. Signal the ISM that it is about to be removed by partially unlatching its ejector. Do not fully open the ejector as this levers the board out of the enclosure and breaks its backplane connection before the board can shut down properly.
5. Wait for the blue hot swap LED to light. This shouldn't take more than a few seconds. Refer to the “Front Panel” illustration for the LED's location.
6. Open the ejector handle fully, rotating it outward until the board disengages from the backplane (refer to Figure 3-1, “Ejector Handle Operation”).
7. Slide the board evenly out of the enclosure.
8. Install a replacement ISM or cover the empty slot with a filler panel to maintain the system's shielding and cooling performance.

Figure 3-1: Ejector Handle Operation



Chapter 4

Configuration

The CPC7301 features several user configurable options. Some options are controlled by software. Options that cannot be software controlled are configured with switches.

The following key topics are presented in this chapter:

- “Switch Options and Locations,” on page 29
- “Switch Descriptions,” on page 30

Switch Options and Locations

The CPC7301 contains a push-button switch on the front panel and one bank of DIP switches on the component side of the board. The switches are listed and briefly described in the “Switch Cross-Reference” table below.

Factory default switch settings are shown in Figure 4-1, “Default Switch Configuration,” on page 31.

Note: *Where switches are referenced in this chapter in the format SWn-s, “SWn” refers to the switch number and “-s” refers to the switch segment. For example, SW1-2 means “switch number 1, segment 2."*

Table 4-1: Switch Cross-Reference Table

Switch	Function	Page
S1	Alarm Cutoff and Board Reset Pushbutton	30
SW2-1	Ethernet (LAN0) Front/Software Selectable	30
SW2-2	Flash Boot Sector Write Protect	31
SW2-3	Reset Password	31
SW2-4	Reserved	31

Switch Descriptions

The following topics provide a detailed description of each switch.

S1 (Alarm Cutoff and Board Reset)

S1 is a pushbutton at the front panel of the CPC7301. S1 toggles the ISM's alarm cutoff (ACO) state. Press and hold the button for less than 5 seconds to assert an ACO. When ACO is activated, the active alarm LEDs blink and the alarm relays are de-activated. This button does not clear alarms.

The alarm cutoff feature automatically cancels itself if it is engaged for a period of time specified in the ALARM_CUTOFF_TIMEOUT variable found in the shelfman.conf file on the ISM. The default value is 300 seconds (5 minutes). See the topic “Setting Up the Shelf Manager Configuration File” in Chapter 3 of the *CPC7301 Intelligent Shelf Manager Software Manual* for more details.

Press and hold the button for more than 5 seconds to reset the ISM. Reset remains asserted for as long as the button is pressed. Reset is discussed in more detail in see Chapter 7, "Reset". See Figure 2-1, “Front Panel,” on page 20 for the switch location.

SW2-1 (Ethernet (LAN0) Front/Software Selectable)

This switch allows LAN0 signals to be active at either front panel connector J6 or the rear panel I/O connector J1. Open SW2-1 to allow software to direct LAN0 signals to the front panel or rear panel connector: the ISM comes out of reset with LAN0 routed to the front panel, but software can be configured to automatically route LAN0 to the rear panel. Close SW2-1 to force LAN0 signals to the front panel connector. Factory default is open. See Figure 4-1, “Default Switch Configuration,” on page 31 for the switch location. See Figure 2-1, “Front Panel,” on page 20 and Figure 5-1, “Connector Locations,” on page 34 for the connector locations.

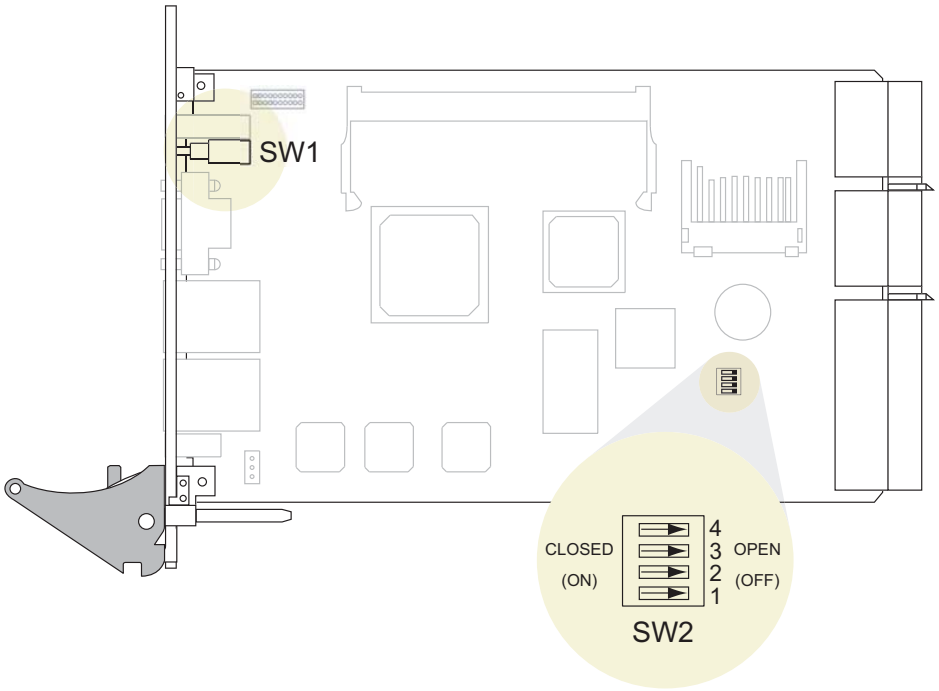
SW2-1		Function
Open	Default	Software controls LAN0 Routing – Hardware default: front
Closed		Force front LAN0 signals active

SW2-2 (Flash Boot Sector Write Protect)

Open this switch to write-protect the boot sector of on-board flash memory. The remaining flash area may be write-protected under software control. When SW2-2 is closed, software can control whether all of flash is write protected. See the *CPC7301 Intelligent Shelf Manager System Manager Interface Software Manual* for more information. Factory default is SW2-2 open. See Figure 4-1, “Default Switch Configuration,” on page 31 for the switch location.

SW2-2		Function
Open	Default	Boot sector read only
Closed		Boot sector read/write

Figure 4-1: Default Switch Configuration



SW2-3 (Bootvariable Reset)

Close this switch to reset the ISM's bootvariables. This provides the same results as using the u-boot command envdeflt -f. For more information about resting the bootvariables, refer to the “Re-Initializing the Boot Variables” topic in the *CPC7301 Intelligent Shelf Manager System Manager Interface Software Manual*. In general, the following steps should be followed to reset the bootvariables. See Figure 4-1, “Default Switch Configuration,” for the switch location.

1. Remove the CPC7301 from the system (see the topic “Removing the ISM” on page 27 for instructions).
2. Close SW2-3.
3. Open SW2-3.
4. Insert and power-up the CPC7301 (see the topic “Installing the ISM” on page 27 for instructions).
5. Verify login.

Note: *Do not leave SW2-3 closed. Doing so can result in extra drain on the battery.*

SW1-1		Function
Open	Default	Does not reset the ISM's bootvariables at reboot.
Closed		Resets the ISM's bootvariables at reboot.

SW2-4 (Reserved)

Reserved. This switch should be left open.

Chapter 5

Connectivity

This chapter provides detailed information about the connectors included on the CPC7301. It includes connector descriptions, pinout tables, and a connector location illustration. It also presents information for building or buying compatible alarm and management cables.

The following key topics are presented in this chapter:

- "Connectors," on page 33
- "Cables," on page 41

Connectors

As shown in Figure 5-1, "Connector Locations," on page 34, the CPC7301 includes several connectors to interface to application-specific devices. A brief description of each connector is given in Table 5-1, "Connector Assignments," below. A detailed description and pinout for each connector is given in the following topics.

Table 5-1: Connector Assignments

Connector	Function	Page
J1	Backplane Connector (110-pin, 2 mm x 2 mm, female)	35
J2	Backplane Connector (55-pin, 2 mm x 2 mm, female)	36
J3	Backplane Connector (55-pin, 2 mm x 2 mm, female)	37
J4	Telco Alarm Connector (µDB-15, 15-pin)	38
J5	Hot Swap Ejector Switch Connector	40
J6	Ethernet (LAN0) Connector (RJ-45, 8-pin)	39
J7	Serial Port (RJ-45, 8-pin)	39
J8	Connector reserved for test.	40
J9	SODIMM Socket (200-pin)	40

Figure 5-1: Connector Locations

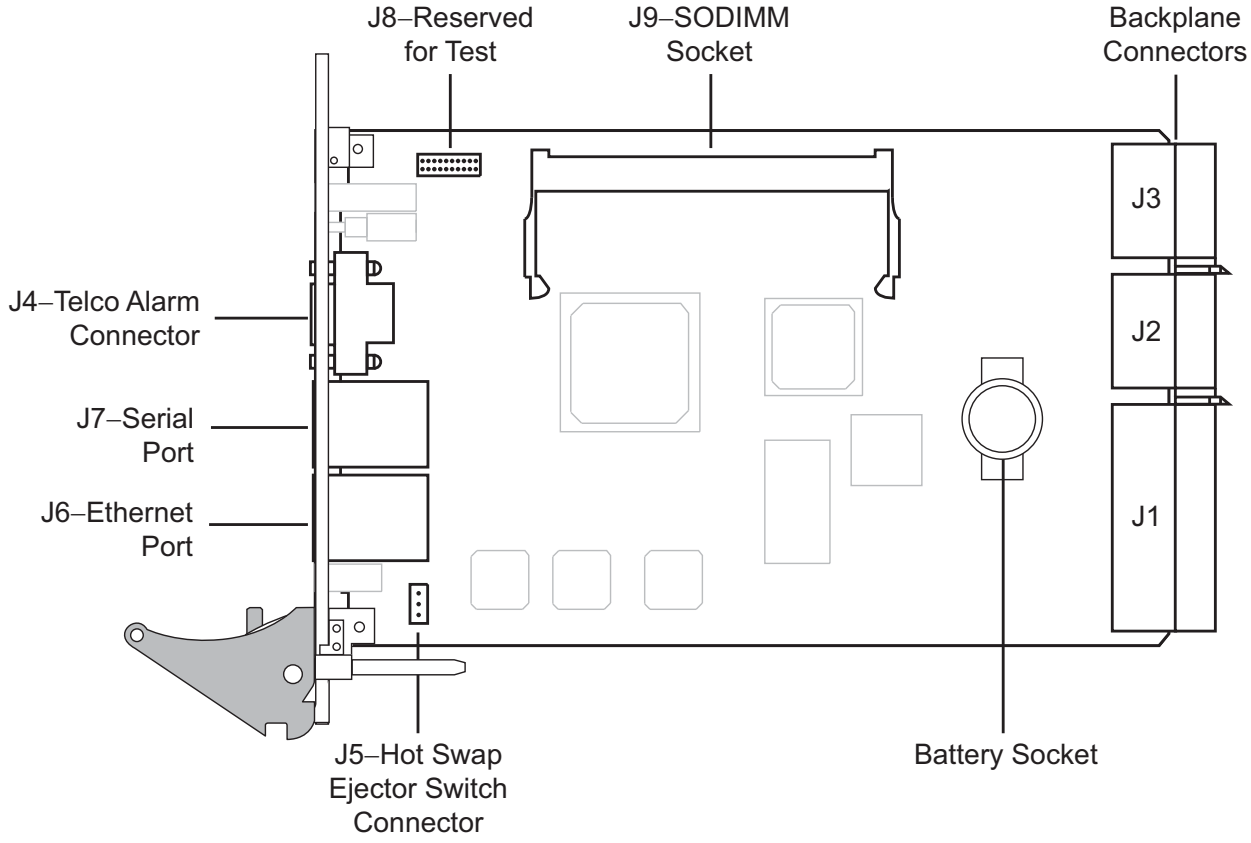
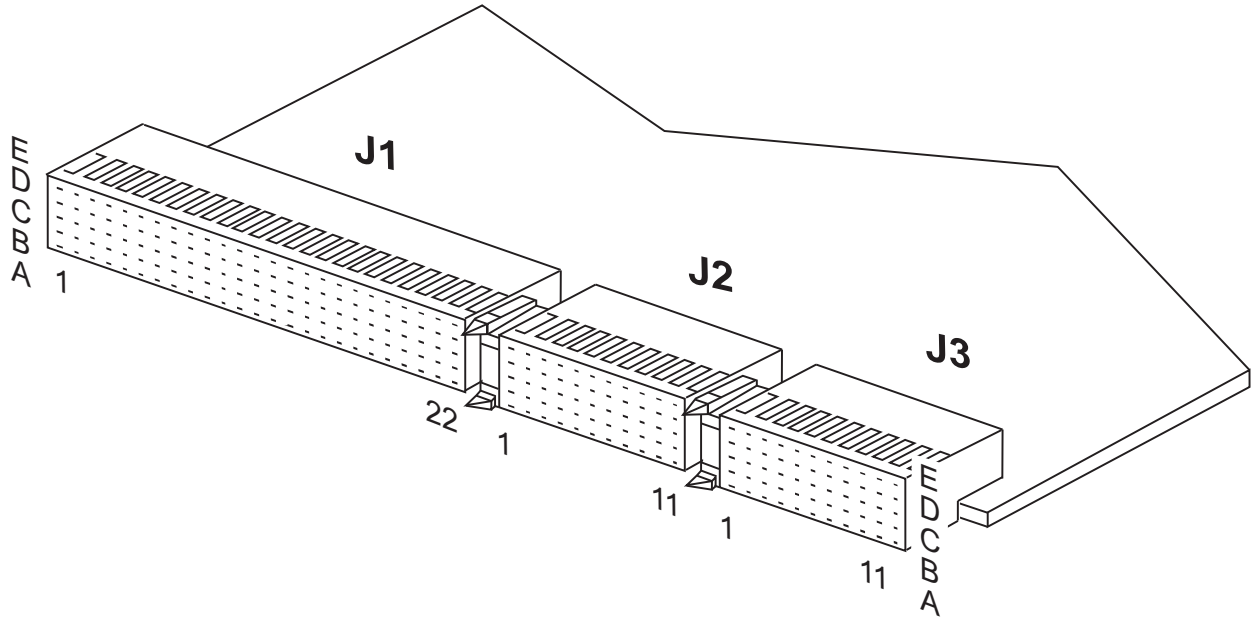


Figure 5-2: Backplane Connectors - Pin Locations



Backplane Connectors

J1 ISM Backplane Connector

J1 is a 110-contact 2 mm x 2 mm female CompactPCI form-factor connector (AMP 352152-1). See Table 5-2 for pin definitions and Figure 5-2, “Backplane Connectors - Pin Locations,” on page 34 for relative pin placement.

Table 5-2: J1 ISM Backplane Connector Pinout

Pin#	A	B	C	D	E	F
22	PDEG0#	PDEG2#	GND	PDEG4#	PDEG6#	GROUND SHIELD
21	PDEG1#	PDEG3#	IPMB_PWR	PDEG5#	PDEG7#	
20	PFAIL0#	PFAIL2#	GND	PFAIL4#	PFAIL6#	
19	PFAIL1#	PFAIL3#	IPMB_PWR	PFAIL5#	PFAIL7#	
18	PINH0#	PINH2#	GND	PINH4#	PINH6#	
17	PINH1#	PINH3#	IPMB_PWR	PINH5#	PINH7#	
16	PS_SCL0	PS_SDA0	GND	PRES_I#	GA0	
15	PS_SCL1	PS_SDA1	RP_PWR	FANP0#	FANP2#	
14	FT_SCL	FT_SDA	GND	FANP1#	FANP3#	
13	CS_SCL	CS_SDA	RP_PWR	FANPWM0	FANPWM2	
12	CF_SCL0	CF_SDA0	GND	FANPWM1	FANPWM3	
11	CF_SCL1	CF_SDA1	RP_PWR	FANTK0	FANTK8	
10	RP_SCL	RP_SDA	GND	FANTK1	FANTK9	
9	RES	RES	RTM_PRS#	FANTK2	FANTK10	
8	STx	SRx	SRI	FANTK3	FANTK11	
7	SCTS	SRTS	SCD	FANTK4	FANTK12	
6	SDSR	SDTR	RES	FANTK5	FANTK13	
5	RPMAC#	RPMIC#	RES	FANTK6	FANTK14	
4	RPCR	RPMAR	RPMIR	FANTK7	FANTK15	
3	BP_5V	BP_N12V	BP_12V	BP_3.3V	V(I/O)	
2	SwTx+	SwTx-	GND	RpTx+	RpTx-	
1	SwRx+	SwRx-	GND	RpRx+	RpRx-	

Notes:

 # Designates a low true signal.

All signals interface to medium length pins on the backplane.

J2 ISM Backplane Connector

J2 is a 55-contact 2 mm x 2 mm female CompactPCI form-factor connector (AMP 352115-1). See Table 5-3 for pin definitions and Figure 5-2, “Backplane Connectors - Pin Locations,” on page 34 for relative pin placement.

Table 5-3: J2 ISM Backplane Connector Pinout

Pin#	A	B	C	D	E	F
11	N_SCL1	N_SDA1	N_SCL10	N_SDA10	N_SCL18	GROUND
10	N_SCL2	N_SDA2	N_SCL11	N_SDA11	N_SDA18	
9	N_SCL3	N_SDA3	N_SCL12	N_SDA12	N_SCL19	
8	N_SCL4	N_SDA4	N_SCL13	N_SDA13	N_SDA19	
7	N_SCL5	N_SDA5	N_SCL14	N_SDA14	N_SCL20	
6	N_SCL6	N_SDA6	N_SCL15	N_SDA15	N_SDA20	
5	N_SCL7	N_SDA7	N_SCL16	N_SDA16	N_SCL21	SHIELD
4	N_SCL8	N_SDA8	N_SCL17	N_SDA17	N_SDA21	
3	N_SCL9	N_SDA9	GND	NEG_O	HLY0#	
2	R_SCL	IPMB_PWR	RES	IPMB_PWR	HLYI#	
1	GND	R_SDA	SEATED#	NEG_I	GND	

Notes:

 # Designates a low true signal.

Pins A1, C3, D2, and E1 interface to long length pins on the backplane

Pin C1 interfaces to a short length pin on the backplane.

J3 ISM Backplane Connector

J3 is a 55-contact 2 mm x 2 mm female CompactPCI form-factor connector (AMP 352115-1). See Table 5-4 for pin definitions and Figure 5-2, “Backplane Connectors - Pin Locations,” on page 34 for relative pin placement.

Table 5-4: J3 ISM Backplane Connector Pinout

Pin#	A	B	C	D	E	F
11	N_HLY1#	N_BDS1#	N_HLY10#	N_BDS10#	N_HLY18#	GROUND SHIELD
10	N_HLY2#	N_BDS2#	N_HLY11#	N_BDS11#	N_BDS18#	
9	N_HLY3#	N_BDS3#	N_HLY12#	N_BDS12#	N_HLY19#	
8	N_HLY4#	N_BDS4#	N_HLY13#	N_BDS13#	N_BDS19#	
7	N_HLY5#	N_BDS5#	N_HLY14#	N_BDS14#	N_HLY20#	
6	N_HLY6#	N_BDS6#	N_HLY15#	N_BDS15#	N_BDS20#	
5	N_HLY7#	N_BDS7#	N_HLY16#	N_BDS16#	N_HLY21#	
4	N_HLY8#	N_BDS8#	N_HLY17#	N_BDS17#	N_BDS21#	
3	N_HLY9#	N_BDS9#	IPMB_PWR	RES	RES	
2	ISM_Tx+	GND	ISM_Rx+	GND	RES	
1	IPMB_PWR	ISM_Tx-	PRES_O#	ISM_Rx-	IPMB_PWR	

Notes:

 # Designates a low true signal.

Pins A1, C3, D2, and E1 interface to long length pins on the backplane

Pin C1 interfaces to a short length pin on the backplane.

Front Panel Connectors

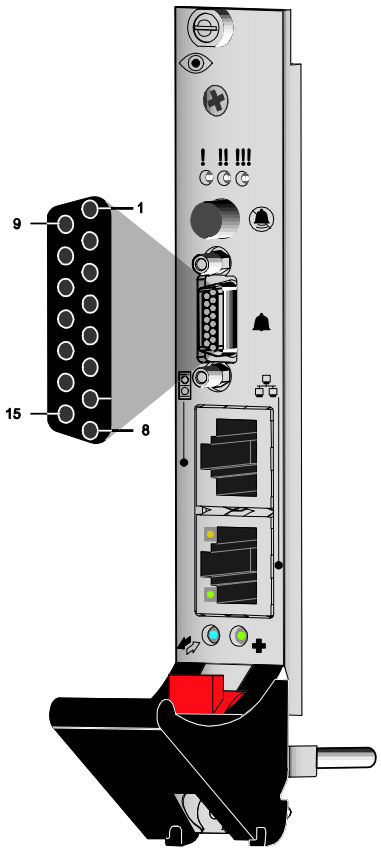
J4 Telco Alarm Connector

J4 is a female µDB-15 connector providing a front-panel Telco alarm interface. Contact PT for information about obtaining a compatible µDB-15 to DB-15 cable. See Table 5-5 below for pin definitions.

Table 5-5: J4 Telco Alarm Connector Pinout

Pin#	Function	Description
1	MNRRES+	Minor Reset +
2	MNRRES-	Minor Reset -
3	MJRRES+	Major Reset +
4	MJRRES-	Major Reset -
5	CRTALRM_NO	Critical Alarm NO
6	CRTALRM_NC	Critical Alarm NC
7	CRTALRM_COM	Critical Alarm COM
8	MNRALRM_NO	Minor Alarm NO
9	MNALRM_NC	Minor Alarm NC
10	MNALRM_COM	Minor Alarm COM
11	MJRALRM_NO	Major Alarm NO
12	MJRALRM_NC	Major Alarm NC
13	MJRALRM_COM	Major Alarm COM
14	PWRALM_NO	Power Alarm NO
15	PWRALM_COM	Power Alarm COM

Figure 5-3: Telco Alarm Connector Pinout



Notes:

COM = Common

NO = Normally Open

NC = Normally Closed

Although the Power Alarm is connected to the normally closed side of the relay, the relay is open when the backplane IPMB_PWR is within normal operation range. The relay closes when IPMB_PWR has failed.

J6 Ethernet (LAN0) Port

J6 is an RJ-45 Ethernet port on the front panel providing 10 Mbit (10BASE-T) and 100 Mbit (100BASE-TX) protocols. J6 connects to the ISM's LAN0 channel. LAN0 is also available at the backplane. See the topic “SW2-1 (Ethernet (LAN0) Front/Software Selectable)” on page 30 for more information. See Figure 2-1, “Front Panel,” on page 20 for the connector location.

Two LEDs are located in the RJ-45 Ethernet connector:

- Amber indicates activity
- Green indicates presence of a link

See Table 5-6 below for pin definitions.

Table 5-6: J6 Ethernet LAN0 Port Pinout

Pin#	Function
1	TXD+
2	TXD-
3	RXD+
4, 5	Unused pair; terminated on CPC7301
6	RXD-
7, 8	Unused pair; terminated on CPC7301

J7 Serial Port

J7 is an RJ-45 connector providing a front-panel RS-232 serial port interface. Serial port signals are also directed out connector J1 to the backplane. See the topic “Cables” on page 41 to make an RJ-45 to DB-9 cable or contact PT for information about obtaining a compatible cable. See Figure 2-1, “Front Panel,” on page 20 and Figure 5-2, “Backplane Connectors - Pin Locations,” on page 34 for the connector locations. See Table 5-7 below for pin definitions.

Table 5-7: J7 Serial Port Pinout

Pin#	Function	Description
1	RTS	Serial Request To Send
2	DTR	Serial Data Terminal Ready
3	TXD	Serial Transmit
4	GND	Ground
5	GND	Ground
6	RXD	Serial Receive
7	DSR	Serial Data Set Ready
8	CTS	Serial Clear To Send
-	SRI	Serial Ring Indicator (not used)
-	CD	Serial Carrier Detect (not used)

Internal Connectors

J5 Hot Swap Ejector Switch Connector

J5 is a 3-pin vertical 1.25 mm (.049 in) surface-mount connector linking the hot swap switch to the board's lower ejector mechanism. This switch is tied to logic on the CPC7301 to sense a board extraction or insertion. See Table 5-8 for pin definitions. See Figure 5-1, “Connector Locations,” on page 34 for the connector's placement on the CPC7301.

Table 5-8: J5 Hot Swap Ejector Switch Connector Pinout

Pin#	Function
1	Common
2	Latched
3	Unlatched

J8 (Reserved)

This connector is reserved for PT test applications.

J9 SODIMM Socket

J9 is a 200-pin DDR SODIMM socket accepting a PC1600 DDR SDRAM memory module. See Figure 5-1, “Connector Locations,” on page 34 for the connector's placement on the CPC7301.

Cables

Serial Cable

The front panel RJ-45 connector J7 described on page 39 may be used to access the ISM's Command Line Interface. Some shelf managers require a DB-9 connector for this purpose. A male RJ-45 to female DB-9 management cable requires the following parts:

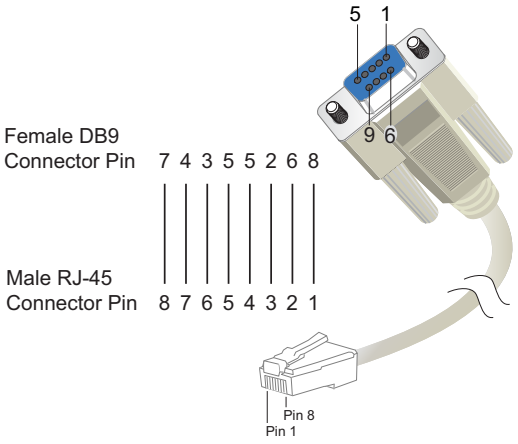
- Male RJ-45 connector
- High quality cable, such as Category 5
- Female DB-9 connector

Table 5-9 and Figure 5-4 show the required connections. This cable is available from PT as material number PT-ACC7340-12077.

Table 5-9: Management Cable Pinout

RJ-45		DB9	
Pin	Signal	Pin	Signal
1	RTS	8	CTS
2	DSR	6	DTR
3	RxD	2	TxD
4	GND	5	GND
5	GND	5	GND
6	TxD	3	RxD
7	DTR	4	DSR
8	CTS	7	RTS

Figure 5-4: Management Cable Pinout



Telco Alarm Cable

The front panel µDB-15 connector (see “J4 Telco Alarm Connector” on page 38) may be used to access the ISM's front-panel Telco alarm interface. Some shelf managers require a DB-15 connector for this purpose. A male µDB-15 to female DB-15 management cable requires the following parts:

- Male µDB-15 connector (available as Molex part # 0834229014. See http://www.molex.com/molex/products/datasheet.jsp?part=active/0834229014_IO_CONNECTORS.xml&channel=Products&Lang=en-US)
- High quality cable, such as Category 5
- Female DB-15 connector

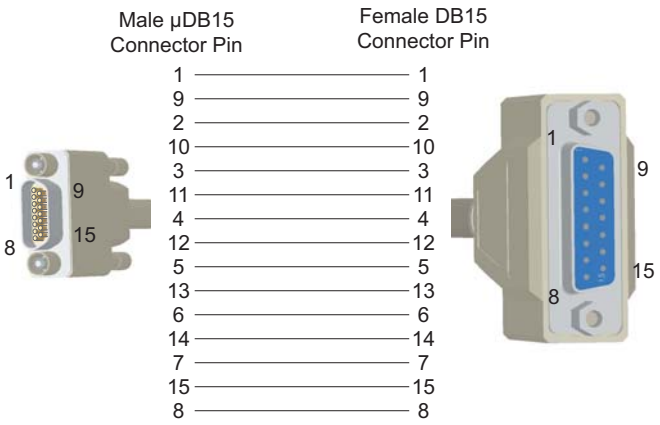
Table 5-10 and Figure 5-5 show the required connections

Caution:
Some connectors may show pin layouts that differ from those shown below. Connect only as shown below.

Table 5-10: Telco Alarm Cable Pinout

Male µDB-15		Female DB15	
Pin	**Signal**	**Pin**	**Signal**
1	MNRRES+	1	MNRRES+
2	MNRRES-	2	MNRRES-
3	MJRRES+	3	MJRRES+
4	MJRRES-	4	MJRRES-
5	CRTALRM_NO	5	CRTALRM_NO
6	CRTALRM_NC	6	CRTALRM_NC
7	CRTALRM_COM	7	CRTALRM_COM
8	MNRALRM_NO	8	MNRALRM_NO
9	MNALRM_NC	9	MNALRM_NC
10	MNALRM_COM	10	MNALRM_COM
11	MJRALRM_NO	11	MJRALRM_NO
12	MJRALRM_NC	12	MJRALRM_NC
13	MJRALRM_COM	13	MJRALRM_COM
14	PWRALM_NO	14	PWRALM_NO
15	PWRALM_COM	15	PWRALM_COM

Figure 5-5: Telco Alarm Cable Pinout



The CPC7301 carries its memory on a Small Outline Dual Inline Memory Module (SODIMM). SODIMMs are available in various capacities. If it should become necessary to replace a memory module on your CPC7301, follow the removal and installation procedures in this chapter.

Warning:
Static electricity can damage electronic components. Wear a wrist strap grounded through one of the system's ESD ground jacks when servicing system components.

Handle the SODIMM by the card edges only. Place the removed SODIMM on an antistatic mat and store in an antistatic container.

Removing the SODIMM

The following instructions cover the mechanical aspects of removing the SODIMM from a CPC7301. To remove the CPC7301 from a shelf, refer to the topic “Removing the ISM” on page 27.

1. Take the necessary precautions to protect the CPC7301 and the SODIMM from static discharge.
2. Locate the SODIMM socket (J9). Refer to Figure 5-1, “Connector Locations,” on page 34 for the socket's location.
3. Press outward on the clips at either end of the SODIMM socket (press both clips at the same time) until the module ejects from the slot and tilts upward.
4. Pull the SODIMM away from the socket.

Installing the SODIMM

The following instructions cover the mechanical aspects of installing the SODIMM in a CPC7301.

1. Take the necessary precautions to protect the CPC7301 and the SODIMM from static discharge.
2. Hold the SODIMM at an angle and push it into the SODIMM socket (J9). Figure 5-1, “Connector Locations,” on page 34 for the socket's location.
3. Align the notches on the ends of the module with the matching bumps on the latches and gently push the module down until it clicks in place.
4. To install the CPC7301 in a shelf, refer to the topic “Installing the ISM” on page 27.

This chapter discusses the reset types and reset sources on the CPC7301.

Reset Types and Sources

The CPC7301's reset types are listed below. The sources for each reset type are detailed in the following topics.

- **Hard Reset:** All devices are held in reset (except the FPGA and slot control).
- **Backend Power Down:** The backend logic is powered off. The board is powered on and is held in reset.

Hard Reset Sources

Alarm Cutoff Pushbutton

The Alarm Cutoff (ACO) pushbutton (S1) on the CPC7301's front panel can be used to initiate a hard reset. Press and hold the ACO pushbutton for more than five seconds to reset the board. The board's blue hot swap LED lights when the board is in reset. See Figure 2-1, “Front Panel,” on page 20 for switch and LED locations.

Caution:
Since this causes a hard reset of the board, we recommend that this option be used with caution. During normal operation we recommend that a “reboot” command be used to shut down the software gracefully.

Watchdog Timer

The watchdog timer generates a hard reset if it is not strobed within a given time-out period.

Backend Power-Down Sources

Board Extraction

When a board is extracted from an enclosure (specifically, when the short “board select” pin is disengaged), the hot swap controller unconditionally removes backend power from the board and holds the board in reset.

Low Voltage

If the IPMB_PWR supply voltage drops below the acceptable operating limit, the board is held in reset.

Overcurrent Fault

If a power fault condition (overcurrent) is detected, the hot swap controller removes backend power and turns the status LED indicator amber. The board is held in reset.

Chapter 8

Specifications

This chapter describes the electrical, environmental, and mechanical specifications of the CPC7301.

The following key topics are presented in this chapter:

- “Electrical and Environmental,” on page 47
- “Reliability,” on page 50
- “Mechanical,” on page 50

Electrical and Environmental

Absolute Maximum Ratings

The values below are stress ratings only. Do not operate the CPC7301 at these maximums. See the “DC Operating Characteristics” topic below for operating conditions.

Supply Voltage, IPMB_PWR:	5.5V
Storage Temperature:	-40° to +70° Celsius
Operating Temperature:	+5° to +55° Celsius
Non-Condensing Relative Humidity:	<90% at 40° Celsius

DC Operating Characteristics

Supply Voltage, IPMB_PWR:	4.45V minimum to 5.25V maximum
Supply Current, Icc:	1.8A average (with 600 MHz processor and 128 MB SDRAM. Peak (short duration) power supply current may be significantly higher (up to 50%) and varies depending upon the application.

Telco Alarm Signal Specifications

Alarm Relays

The CPC7301's alarm relay circuits are capable of carrying 60VDC, or 1.0A, with a maximum rating of 30VA.

Opto Inputs

The CPC7301 accepts timed pulse inputs for clearing minor and major alarm states (there is no reset for the Critical state). Reset is accomplished by asserting a voltage differential from 3.3V to 48V for between 200 and 300 ms. The acceptable voltage range is from 0 to 48VDC continuous (handles up to 60VDC at a 50% duty cycle). The current drawn by a reset input does not exceed 12mA.



Caution:
Do not apply more than 60V (maximum) to any pin or combination of pins on the ISM's J7 Telco alarm connector.

Battery Backup Characteristics

The battery backup circuit on the CPC7301 contains a CR1225 lithium battery that is used only when power is not applied to the board. The battery operates from -30°C to 70°C under normal operating conditions. The battery shelf discharge rate when operated at room temperature (23°C) is < 1% per year.

Battery Replacement

Under normal operating conditions it is not anticipated that the battery will require replacement during the life of the product. Each customer must evaluate their operating conditions to determine if a battery maintenance program is required as part of a regular maintenance cycle for their board.

There are two options in the event the battery must be replaced:

- Return the board to PT to have the battery replaced.
- Contact PT to obtain a list of vendors of batteries approved for the product.

Note: *If you decide to replace the battery in the field, you are responsible for any damage that may occur to the board during battery replacement.*

Battery Voltage:	3V
Battery Capacity:	48mAh
Real-Time Clock Data Retention:	3 years @ 23°C (not powered); 3 years @ 45°C with system power applied 24 hours per day
Electrochemical Construction:	Long life lithium with solid-state polycarbon monofluoride cathode.
Battery Socket Location:	See Figure 5-1, “Connector Locations,” on page 34.



Caution:
The CPC7301 contains a lithium battery. There is a danger of explosion if the 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 or an equivalent type recommended by the manufacturer must be used. Used batteries must be disposed of according to the manufacturer's instructions.

Operating Temperature

The CPC7301's processor can operate between +5° and approximately +55°C ambient, with a minimum of 200LFM (1 meter per second) of external airflow. External airflow must be provided to the CPC7301 at all times.

Reliability

MTBF: 140,558 hours (based upon environment ground fixed controlled, operating temp of 30°C @ 50% stress of voltage and current). Technical Reference: Bellcore TR-TSY332 Issue 6

MTTR: 3 minutes (based on hot-swap board replacement), plus system startup

Mechanical

Board Dimensions and Weight

In a compatible enclosure, the CPC7301 occupies a single 3U ISM slot.

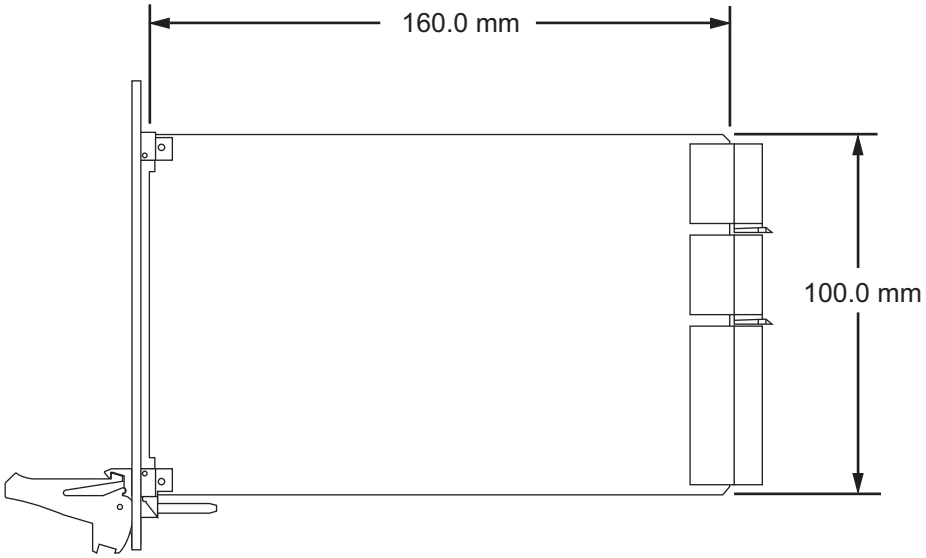
Mechanical dimensions are shown in Figure 8-1 and are outlined below.

PCB Dimensions: 100 mm x 160 mm x 1.6 mm

Board Dimensions: 3U x 4HP (one slot)

Weight: 7.7 ounces w/ 128 MB SODIMM

Figure 8-1: PCB Dimensions



Chapter 9

Data Sheet Reference

This chapter provides links to data sheets, standards, and specifications for the technology designed into the ISM.

CompactPCI

Current CompactPCI Specifications can be purchased from PICMG (PCI Industrial Computer Manufacturers Group) for a nominal fee. Short form specifications in Adobe Acrobat format (PDF) are also available on PICMG's Web site at:

http://www.picmg.org

IPMI

The Intelligent Platform Management Initiative is described and current specifications can be found at:

http://developer.intel.com/design/servers/ipmi

Intel IOP321 Processor Chipset

For more information about the Intel IOP321 Processor Chipset, see the following Web site:

http://www.intel.com/design/iio/iop321.htm

User Documentation

The latest product information and manuals are available on the PT CPC7301 product Web page at:

http://www.pt.com/products/prod_cpc7301.html

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

- CPC7301 Intelligent Shelf Manager System Manager Interface software manual
- RTM4820 Intelligent Shelf Manager Rear Transition Module hardware manual

Chapter 10

Agency Approvals

The CPC7301 is designed to meet UL, CE, and FCC requirements. The CPC7301 is also designed for NEBS and ETSI compliance.

The following key topics are presented in this chapter:

- "CE Certification," on page 53
- "Safety," on page 53
- "Emissions Test Regulations," on page 53
- "Regulatory Information," on page 54
- "Product Safety Information," on page 55
- "Compliance with RoHS and WEEE Directives," on page 57

CE Certification

The CPC7301 meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low-Voltage Directive 73/23/EEC for Product Safety.

Safety

UL/cUL 60950	Safety for Information Technology Equipment
EN/IEC 60950	Safety for Information Technology Equipment
CB Report Scheme	CB certificate and Report

Emissions Test Regulations

FCC Part 15, Subpart B, Class B

EN 55022

CISPR 22

Bellcore GR-1089

EN 50081-1 Emissions

GR-1089-CORE	Sections 2 and 3
EN 55022	Class B Radiated
EN 55022	Power Line Conducted Emissions
EN 61000-3-2	Power Line Harmonic Emissions
EN 61000-3-3	Power Line Fluctuation and Flicker

EN 55024 Immunity

GR-1089-CORESections 2 and 3

EN 61000 4-2Electro-Static Discharge (ESD)

EN 61000 4-3Radiated Susceptibility

EN 61000 4-4Electrical Fast Transient Burst

EN 61000 4-5Power Line Surge

EN 61000 4-6Frequency Magnetic Fields

EN 61000 4-11Voltage Dips, Variations, and Short Interruptions

Regulatory Information

FCC (USA)

This product has been tested and found to comply with the limits for a Class B 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 product generates, uses, and can radiate radio frequency energy and, 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 user will be required to correct the interference at his own expense.

Note: *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.
2. This device must accept any interference received, including interference that may cause undesired operation.



Caution:
If you make any modification to the equipment not expressly approved by PT, you could void your authority to operate the equipment.

Industry Canada (Canada)

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

This digital apparatus does not exceed the Class B 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.

Product Safety Information

Safety Precautions

Review the following precautions to avoid injury and prevent damage to this product, or any 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.



Warning:
Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions.



Warning:
To Avoid Electric Overload: *To avoid electrical hazards (heat shock and/or fire hazard), do not make connections to terminals outside the range specified for that terminal. See the product user manual for correct connections.*



Warning:
To Avoid the Risk of Electric Shock: *When supplying power to the system, always make connections to a grounded main. Always use a power cable with a grounded plug (third grounding pin). Do not operate in wet, damp, or condensing conditions.*



Caution:
System Airflow Requirements: *Platform components such as Single Board Computers, 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. Filler panels must be installed over unused chassis slots so that airflow requirements are met. Please refer to the product data sheet for airflow requirements if you are installing components in custom chassis.*



Warning:
Microprocessor Heatsinks May Become Hot During Normal Operation: *To avoid burns, do not allow anything to touch processor heatsinks.*



Warning:
Do Not Operate Without Covers: *To avoid electric shock or fire hazard, do not operate this product with any removed enclosure covers or panels.*



Warning:
To Avoid the Risk of Electric Shock: *Do not operate in wet, damp, or condensing conditions.*

Warning:
Do Not Operate in an Explosive Atmosphere: *To avoid injury, fire hazard, or explosion, do not operate this product in an explosive atmosphere.*

Warning:
If Your System Has Multiple Power Supply Sources: *Disconnect all external power connections before servicing.*

Warning:
Power Supplies Must Be Replaced by Qualified Service Personnel Only.

Caution:
Lithium Batteries Are Not Field-Replaceable Units: *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.*

AC and/or DC Power Safety Warning

The AC and/or DC power cord is your 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).

For your safety, use only a power cord with a grounded plug. The enclosure is also provided with a separate earth ground connection/stud. The earth ground connection should be installed prior to the application of power or peripheral connections and should never be disconnected while power or peripheral connections exist.

To reduce the possibility of electric shock from a telephone or Ethernet system, plug your enclosure into the power source before making these connects. Disconnect these connections before unplugging your enclosure from the power source.

Warning:
Verify Power Cord and Outlet Compatibility*. Check to ensure you are using the appropriate power cords for your power outlet configurations. Visit the following Web site for additional information: http://kropla.com/electric2.htm.*

Rack Mount Enclosure Safety

Your enclosure 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. Your system may have multiple power sources. Disconnect all power sources and external connections/cables prior to installing or removing your system from a rack frame.

Prior to mounting, PT recommends you remove all hot-swappable equipment for optimum weight reduction. Be sure to mount your system in a way that ensures even loading of the rack. Uneven mechanical loading can result in a hazardous condition. Secure all mounting bolts when installing the enclosure to the frame/rack.



Warning:
Avoid Electric Overload. *To avoid electric shock or fire hazard, only connect your system to an input voltage source as specified in the product user manual.*

Compliance with RoHS and WEEE Directives

In February 2003, the European Union issued *Directive 2002/95/EC* regarding the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS) and *Directive 2002/96/EC* on Waste Electrical and Electronic Equipment (WEEE).

In 2011, the RoHS legislation was updated by *Directive 2011/65/EU*, referred to as RoHS2 or RoHS recast.

This product is compliant with *Directive 2011/65/EU*. It may also fall under the *Directive 2002/96/EC*.

PT's complete position statements on the RoHS and WEEE Directives can be viewed on the Web at the following Web site:

http://pt.com/assets/lib/files/pdfs/rohs/policies/rohs-european.pdf

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