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CompactPCI® CPX1200 Series System

Installation and Reference Guide

CPX1200SA/IH2
June 2005 Edition

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Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

The safety precautions listed below represent warnings of certain dangers of which Motorola is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

Do Not Operate in an Explosive Atmosphere.

Do not operate the equipment in any explosive atmosphere such as in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment could result in an explosion and cause injury or damage.

Keep Away From Live Circuits Inside the Equipment.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Service personnel should not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, such personnel should always disconnect power and discharge circuits before touching components.

Use Caution When Exposing or Handling a CRT.

Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, do not handle the CRT and avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified service personnel using approved safety mask and gloves.

Do Not Substitute Parts or Modify Equipment.

Do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Motorola representative for service and repair to ensure that all safety features are maintained.

Observe Warnings in Manual.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.



Warning

To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

Flammability

All Motorola PWBs (printed wiring boards) are manufactured with a flammability rating of 94V-0 by UL-recognized manufacturers.

EMI Caution



Caution

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used with adequate EMI protection.

CD-ROM



Warning

If a label with the words CLASS 1 LASER PRODUCT is affixed to the back of your system, the unit is equipped with a CD-ROM drive. These devices contain a laser diode that produces invisible laser radiation harmful to the eyes.

Performing adjustments or procedures other than those specified in this manual may result in hazardous radiation exposure. **Do not look into the optical lens at any time.**

CE Notice (European Community)



Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Motorola products with the CE marking comply with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

> EN55022 “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment”; this product tested to Equipment Class A
>
> EN 300 386 V.1.2.1 “Electromagnetic compatibility and radio spectrum matters (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements”

This product also fulfills EN60950 (product safety) which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

AC configurations of this system also meet the requirements of the following European standards:

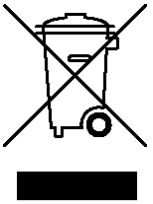
> EN61000-3-2 “Limits of Harmonic Current Emissions (equipment input current ≤ 16 A per phase)”
>
> EN61000-3-3 “Limits of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A”

In accordance with European Community directives, a “Declaration of Conformity” has been made and is available on request. Please contact your sales representative.

This product is not a workstation per the European Ergonomic Standard.

Kein Bildschirmarbeitsplatz nach dem Europäischen Ergonomie Standard.

WEEE Compliance



To satisfy the requirements for marking electrical and electronic equipment in accordance with article 11 (2) of Directive 2002/96/EC, Waste from Electrical and Electronic Equipment (WEEE), Motorola includes a crossed-out bin symbol on all standard and noncustom chassis product. This marking fulfills the requirement set out by WEEE that a producer of an electrical or electronic appliance that bears their trade name and is put on the European Union market after 13 August 2005, places a clearly identifiable mark on the equipment and that this mark signifies that equipment is to be reprocessed or recycled using authorized recyclers and processes. This minimizes the disposal of unsorted municipal waste, achieves a high level of separate collection of WEEE, and ensures the environmentally sound disposal of electrical and electronic equipment placed on the market after 13 August 2005.

To dispose of equipment marked with the WEEE symbol, Motorola has contracted with certified companies that can reprocess this equipment per European Union requirements. Please visit the Motorola web site, motorola.com, or contact your Motorola representative to find out who to contact and how to dispose of the equipment.

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Motorola, Inc.
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About This Manual

This *CompactPCI® CPX1200 Series System Installation and Reference Guide* gives you general information and installation procedures for the CPX1200 Series chassis, and associated field replaceable components. Refer to this table for CPX1200 Series models covered in this manual.

Model Numbers	**Description**
CPX1204	Four slot CompactPCI card cage with drive bay module that installs into the top of the card cage, alarm panel options
CPX1204T	Four slot CompactPCI card cage with drive bay module that installs into the top of the card cage and H.110 backplane
CPX1205	Five slot CompactPCI card cage intended for CPUs with on-board disk drive resources
CPX1205T	Five slot CompactPCI card cage with H.110 backplane intended for CPUs with on-board disk drive resources

Refer to the publications listed in Appendix F, *Related Documentation* for other documents that may give you helpful information.

Summary of Changes

This table summarizes revisions to this manual.

Date:	Change:
June 2005	Updated to include WEEE Compliance statement. Updated to current publications standards and new URLs.
February 2003	Appendix B, *CPX1200 Series System Starter Kits and Replacement Parts* updated Support for the MCP820 and CPV5370 boards added Removed board, drive, and memory components that have been EOLd DC power supply and cabling information added H.110 pinout information for the J4 connector has been included
February 2001	Added NEBS testing statement to *Front-Mount Installation* on page 3-2 Revised Figure 3-1 on page 3-5, chassis mounting bracket locations with accompanying description. Revised Chapter 6, *CPX1200 Alarm Board*. Revised Table 6-5 on page 6-11. Revised *Removing and Installing Drive Modules and Associated Drives (CPX1204 only)* on page 7-7 Revised Appendix A, *Platform Specifications* for the 200W power supply and chassis dimensions. Revised Appendix B, *CPX1200 Series System Starter Kits and Replacement Parts*. Added Field Replacement Unit (FRU) and replacement parts kit marketing numbers. Revised Chapter 9, *Connector Pin Assignments*. Added *PCI Mezzanine Cards and Expansion Carriers* on page 8-2.

Overview of Contents

This table gives you a short description of the content of this manual.

This Chapter or Appendix:	Gives you:
Chapter 1, *Introduction*	Detailed CPX1200 Series system product description, information about front and rear panel features
Chapter 2, *Site Preparation*	Describes chassis placement, electrical recommendations, cables, cooling, and safety considerations for lithium batteries
Chapter 3, *CPX1200 Series System Installation*	Describes installation, grounding, connecting system cables, power up and power down, emergency power off, the alarm board
Chapter 4, *System Operations*	Provides procedures for monitoring the operating mode of the power, fans, and temperatures in the CPX1200 Series system
Chapter 5, *Single Board Computer Setup*	Provides instructions on configuring the CPU boards for operation in non-HA mode
Chapter 6, *CPX1200 Alarm Board*	Describes installation and use of the optional alarm board used in the CPX1200 Series platform
Chapter 7, *Subassembly Removal and Replacement*	Procedures for removal and installation of field replaceable units
Chapter 8, *System Hardware Components*	Reference for CPU boards, CPU board memory options, PCI mezzanine cards and carriers, the SCSI controller transition board and system CPU mounted drives
Chapter 9, *Connector Pin Assignments*	Pinouts for the alarm module, rear fan, drive module bus, IDE, SCSI, floppy, and power supply
Appendix A, *Platform Specifications*	System specifications and information about Network Equipment Building System (NEBS) and European Telecom Standards Institute (ETSI) compliance
Appendix B, *CPX1200 Series System Starter Kits and Replacement Parts*	Starter kits, field replacement units and replacement parts for the CPX1200 Series systems
Appendix C, *Systeminstallationsanleitung*	German translation of installation information

This Chapter or Appendix:	Gives you:
Appendix D, *Commands*	A listing of serial interface commands and responses for the CPX1200
Appendix E, *Software Configuration*	Configuring the software used in the CPX1200 Series systems
Appendix F, *Related Documentation*	Related Motorola Computer Group documents, related specifications, manufacturer's documents, and URLs.

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Introduction 1

CPX1200 Series System Product Description

The CPX1200 Series system chassis are low profile, rack mounted, high reliability CompactPCI platforms that allow hot swap replacement of payload boards and fans without loss of system function. You can use the CPX1200 family of real-time platforms in telecommunications Central Office applications when there is limited rack space. These platforms can be configured with:

- CPU boards compatible with either PowerPC or Intel architecture
- H.110 hot swap-compliant CompactPCI backplanes
- CompactPCI 2.1 H.100 and non-H.110 peripheral boards
- CompactFlash for real-time and network-boot applications

Features of the CPX1200 Series system include:

- Four-slot CompactPCI card cage with drive bay module that installs into the top of the card cage, with optional H.110 backplane and alarm panel (CPX1204/CPX1204T)
- Five-slot CompactPCI card cage with optional H.110 backplane intended for CPUs with on-board disk drive resources (CPX1205/CPX1205T)
- Support for hot swap payload boards per PICMG CompactPCI Specification 2.1
- CompactPCI PMC carrier options
- 200W power supplies with over 300,000 hour MTBF 3.3 VIO or 5 VIO, or optional 3.3 VIO Heavy
- Auto ranging AC and DC input versions
- Hot swap fans with filter option

- Front access service and installation of CompactPCI boards, drives, fans, and power supplies
- Rear connection of power and I/O
- Alarm board option for detection and remote reporting of power, temperature, and fan fail conditions
- Low profile rack mount chassis (3U - 5.25 inches of vertical rack space)

Front and Rear Panel Features on the CPX1204 Chassis

Front panel features on the CPX1204 chassis (Figure 1-1) include:

- Hot swap alarm/exhaust fan module (alarm module is optional)
- Two-slot CompactPCI drive module (optional)
- Up to a three-slot wide CPU module (when no CompactPCI drive module)
- Hot swap AC Power Supply/Fan module with filter element (DC module optional)
- Alarm LED Indicators (optional)
- ESD bond point

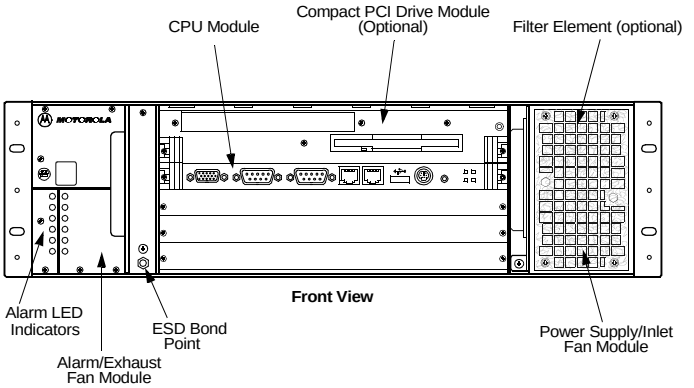


Figure 1-1. CPX1204 Front Panel Features (With Alarm Panel)

Rear panel features on the CPX1204 chassis (Figure 1-2) include:

- ESD bond point
- Dual earth ground attachment points
- AC power rocker switch (DC breaker optional)
- CPU Rear Transition Module
- AC Power Distribution Panel (DC optional)
- Exhaust fan module
- AC input receptacle (DC input optional)

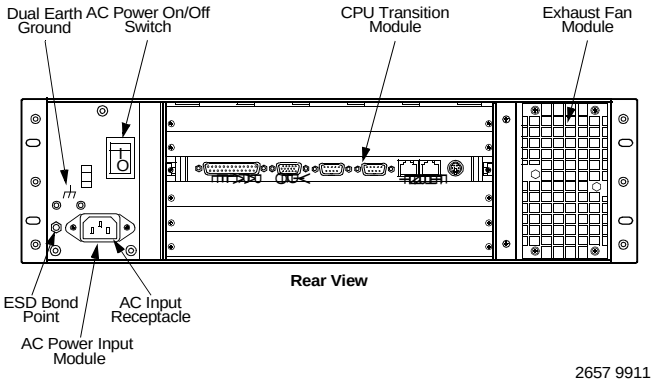


Figure 1-2. CPX1204 Rear Panel Features (AC Version)

Front and Rear Panel Features on the CPX1205 Chassis

Front panel features on the CPX1205 chassis (Figure 1-3) include:

- Hot swap alarm module (optional)
- Hot swap exhaust fan module
- CPU module
- Hot swap PMC carrier
- Hot swap AC power supply/fan module with filter element (DC module optional)
- ESD bond point

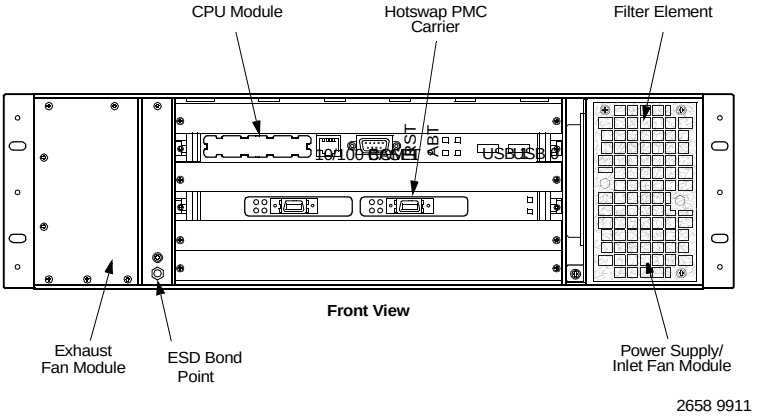


Figure 1-3. CPX1205 Front Panel Features (No Alarm Panel)

Rear panel features on the CPX1205 chassis (Figure 1-4) include:

- ESD bond point
- Dual earth ground attachment points
- AC rocker switch (DC breaker optional)
- AC power distribution panel (DC optional)
- Exhaust fan module

- CPU Rear Transition Module
- AC input plug (DC breaker optional)

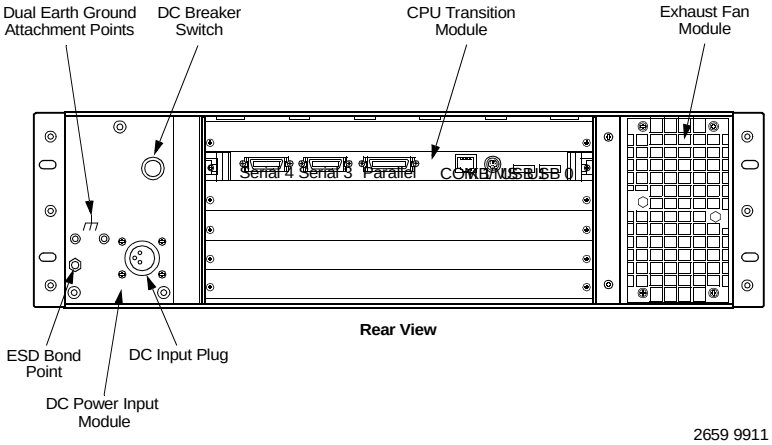


Figure 1-4. CPX1205 Rear Panel Features (DC Version)

Site Preparation 2

This chapter discusses the proper placement recommendations, environmental conditions, and installation options for the CPX1200 Series system chassis.

Safety and Regulatory Compliance

The base system chassis complies with the safety and regulatory standards applicable to component-level equipment. It is possible to use this product with other components that produce a system not in compliance with system guidelines. Since Motorola cannot anticipate what equipment may be used with this enclosure or how it may be used, the responsibility for designing a system that conforms overall to CSA (C/USA)/VDE safety requirements and EMI/RFI emission limits rests entirely with the system integrator and installer.

Guidelines for System Location

Before you begin to set up and cable your new system, consider these guidelines:

- ❑ Locate the system in a stable area, free of excess movement and jarring.
- ❑ Install the system safely. Ensure that cables and cords are out of the way.
- ❑ Ensure that the set-up is comfortable for users.
- ❑ Allow room for proper air flow for cooling.
- ❑ Locate the computer where it can be easily serviced (front and rear).
- ❑ Provide an area free of excess heat, dust, smoke, and electrostatic discharge (ESD).

2

Weight Distribution Within a Rack



To avoid personal injury or damage to the equipment, plan your installation so that (within the limitations of equipment and cabling):

- The weight of the equipment is evenly distributed in the rack
- The heaviest units are mounted nearer the bottom of the rack

Uneven mechanical loading of the rack may cause toppling.

Power Requirements

Power for the rack system must come from a totally dedicated circuit breaker. Do not plug any other electrical device into an outlet connected to the circuit breaker serving the rack equipment.

Data loss can occur if the circuit is overloaded and the circuit breaker trips.

Guidelines for Branch Circuits

All branch circuits for the system must come from the same circuit breaker panel. Failure to do this can cause power to flow in the data cables interconnecting various devices of the system.



You must attach H.110 power inputs to approved Telephone Network Voltage (TNV) branch circuits only. TNV branch circuits must comply with all requirements called for in these safety standards: IEC 950/EN60 950, UL #1950, and CSA #950. Attaching the inputs to non-TNV approved power sources causes the system to fail compliance with safety regulations and may cause damage to the system backplane and system components.

Do not overload branch circuits. Check the manual and/or rating plate of all devices and verify that the sum of the ampere ratings does not exceed two-thirds of the branch rating.

Laser printers and some other devices cause periodic short duration heavy loads that do not appear in their ampere ratings. Connect these devices on a separate branch circuit from the system chassis.

Using power strips with separate circuit breakers does not add additional protection and may cause unwanted power interruption. Ensure that all power strips use at least #16 AWG (the best choice is #14 AWG or larger) with ground.



Caution

Do not use surge/transient suppressors without careful and expert power system analysis. Most surge/transient suppressors can cause system damage from transients if used in the typical manner.

All branch circuits must have a third wire type ground for the branch circuit that only goes to the circuit breaker panel. Conduit ground is unacceptable for any portion of the system.

Blinking lights or fluctuating intensity from lighting at the computer site indicate poor power. This may be a cause of system hangups. Check the electrical installation to ensure proper system operation.

Note Failure to observe proper grounding practices may cause a variety of noise, electrostatic discharge, and radio frequency interference problems.

Power Circuit Protection

Protect the power circuit with an electrical line filter that prevents voltage spikes from reaching the system.

Circuit Breakers and Receptacles

Make sure circuit breakers furnishing power to the system are the correct size to protect the system. Make sure all receptacles are wired for three-wire power distribution (line, neutral, and ground).

All power receptacles servicing any equipment that is directly cable-connected to the system must have a single, common grounding point. The ground wire must be at true ground potential with a resistance (measured at the power panel bus) of five ohms or less between the bus bar and earth. The ground wire is the third wire type (not conduit ground).

Power Cords

Motorola systems have detachable power cords that you can plug in at both the wall socket and the equipment. Place the chassis within six feet of the electric receptacle.

Note Do not use extension cords.

Cables

Your CPX1200 Series system chassis, console, and some other peripherals use shielded cables. You can successfully use shielded cables for communication over extended distances. Reliable communication over cables longer than 50 feet depends on the absence of electrical noise, correct ground potentials at termination points, and other variables.

Cable Planning

When planning the installation of cables:

- Do not run signal cables parallel to AC power cables if they are within four inches of each other.
- Do not install signal cables close to electric motors, power line regulators, relays, or power supplies.
- Avoid laying signal cables close to air conditioners, copy machines, water coolers, and other similar equipment that generates power line noise.

- Do not run signal cables near equipment that generates radio frequency interference (for example, radio transmitters).
- Do not expose cables to moisture or heat. If you install signal cables outdoors, use a conduit or raceway to protect them from lightning and weather.
- Use shielded cable to ensure radio frequency compatibility.
- Use the shortest possible cable between the single-board computer and peripherals.
- To ensure maximum protection for equipment and operators, check the protective grounds at each power outlet to make sure they are adequate.
- Protect external interconnecting cables from physical damage without endangering users. Install the cables under a raised floor if possible. Avoid tight pulls against sharp corners.



Caution To avoid the possibility of damage to equipment or components during cabling, unplug all other devices in the system before you begin with the installation of any additional units.

Environmental Considerations

When installing the system in a particular environment, keep the environmental specifications of the system components in mind, you can refer to Appendix A, *Platform Specifications*. For example, floppy and hard disk drives typically do not operate reliably above 50º C (122º F) ambient temperature. In an enclosed environment, you need to consider the internal temperature rise over the worst case external ambient temperature.

2

Cooling the Enclosure

It is essential to properly cool all of the equipment used in a rack mounted system. The components of the system require an input air temperature below 55º C (131º F). Four fans provides forced-air cooling for the system's power supply, CPU and I/O controller card cage, transition module card cage, and drive bay. To ensure adequate cooling:

- ❏ Allow at least three inches of space at the front and back of the system
- ❏ Make sure all panels are in place
- ❏ Make sure air block panel is in the slot above slot 5 of the CPX1205 system chassis for single slot processor applications
- ❏ Fill or cover all module slots
- ❏ Make sure airflow in an open frame rack is front to rear
- ❏ Make sure airflow in an enclosed cabinet is front to rear, bottom to top

Replacing Lithium Batteries

Note Do not recharge, open, puncture or crush, incinerate, expose to high temperatures or dispose of in your general trash collection.

To replace the lithium battery, observe the following guidelines and follow the steps below.

Notes When replacing the battery, power must be applied to the board to prevent data loss.



Warning To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

Warning

Lithium batteries incorporate flammable materials such as lithium and organic solvents. If lithium batteries are short-circuited or exposed to high temperature or pressure, they may burst open and ignite, possibly resulting in injury and/or fire. When dealing with lithium batteries, carefully follow the precautions listed below in order to prevent accidents.

- ❏ Do not short-circuit
- ❏ Do not disassemble, deform, or apply excessive pressure
- ❏ Do not heat or incinerate
- ❏ Do not apply solder directly
- ❏ Do not use different models, or new and old batteries together
- ❏ Do not charge
- ❏ Always check proper polarity

Caution

Danger of explosion if battery is replaced incorrectly.

Replace battery only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to local regulations and manufacturer's instructions.

Caution

Avoid touching areas of integrated circuitry; static discharge can damage circuits.

Attach an ESD strap to your wrist. Attach the other end of the ESD strap to an electrical ground. (Note that the system chassis may not be grounded if it is unplugged.) The ESD strap must be secured to your wrist and to ground throughout the procedure.

1. To remove the battery from the module, carefully pull the battery from the socket.
2. Before installing a new battery, ensure that the battery pins are clean.
3. Note the battery polarity and press the new battery into the socket.

Notes When the battery is in the socket, no soldering is required.

4. Recycle or dispose of the old battery according to local regulations and manufacturer's instructions.

CPX1200 Series System Installation

3

Overview

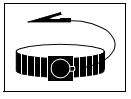
This chapter gives you information about installing the CPX1200 Series system. The following topics are discussed in this chapter.

- ESD and safety procedures
- Installing the CPX1200 Series chassis in a frame relay rack/cabinet
- Connecting system cables
- Powering up the AC and DC systems
- Installation troubleshooting

Safety and Regulatory Compliance

The base system chassis complies with the safety and regulatory standards applicable to component-level equipment. It is possible to use this product with other components that produce a system not in compliance with system guidelines. Since Motorola cannot anticipate what equipment may be used with this enclosure or how it may be used, the responsibility for designing a system that conforms overall to CSA (C/USA)/VDE safety requirements and EMI/RFI emission limits rests entirely with the system integrator and installer.

Use ESD



Wrist Strap

Motorola strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

Tools You Need

You need the following tools to remove and install components of a CPX1200 Series system:

- Phillips head screwdriver #2, four inch shaft
- Phillips head screwdriver #2, right angle
- Slotted head screwdriver
- Torque wrench

The CPX1200 Series system chassis can be mounted in either a 19” or 23” frame relay rack/cabinet, which are common in Central Office locations.

Be sure to mount the chassis with metal screws or bolts that give a good electrical connection between the screws or bolts and the mounting surface.



Caution

Attach an ESD strap to your wrist. Attach the other end of the ESD strap to an electrical ground. (Note that the system chassis may not be grounded if it is unplugged.) The ESD strap must be secured to your wrist and to ground throughout the procedure.

Front-Mount Installation

This section gives you information about front mounting the chassis in a 19-inch or 23-inch frame relay rack/cabinet. Your chassis mounts in a rack/cabinet that meets the EIA Standard (EIA-310-D). It may not fit in a nonstandard 19” rack. Ensure that the rack has a minimum opening of 17.6 inches.

The chassis ships with the mounting bracket in the front mount position. To accommodate a mid-mount configuration, refer to *Mid-Mount Installation* on page 3-3. Please note that the front-mount configuration does not meet the vibration, shock, or earthquake NEBS/ETSI specifications stated in Appendix A, *Platform Specifications*.



Caution

Do not mount a single chassis at the top of the rack. A top-heavy rack can tip, causing damage to equipment and injury to personnel.



Warning

Two people should perform the following steps to avoid personal injury or damage to the equipment.

1. Slide the chassis into the front of the rack.
2. Attach the chassis to the rack using four screws recommended by the rack/cabinet manufacturer. Be sure to mount the chassis with metal screws or bolts that give a good electrical connection between the screws or bolts and the mounting surface.

Note Failure to observe proper grounding practices may cause a variety of noise, electrostatic discharge, and RFI (Radiation Frequency Interference) problems.

3. Tighten all screws using a torque setting recommended by the rack/cabinet manufacturer.

Mid-Mount Installation

This section gives you information about mid-mounting the CPX1200 Series chassis in a 19, 23, or 24-inch frame relay rack/cabinet. Optional mounting brackets hold the chassis in the mid-mount position. Mid-mounting provides a balanced weight distribution for the chassis and aids in system reliability when the chassis is subject to earthquake, shock, or vibration.

To order the mid-mount bracket kit for the CPX1200 series chassis, refer to the following table for ordering information.

Mounting Bracket Kits (Mid-Mount Only)

If you are mid-mounting the CPX1200 Series chassis, a separate mounting bracket kit is required for either a 19, 23, or 24-inch wide rack/cabinet. The kit includes four (4) mounting brackets and eight (8) screws and can be ordered from your local Motorola sales office or distributor. The part number is CPX1200MTBRKT-K.



Caution

Two people should perform the following steps to avoid personal injury or damage to the equipment.

1. Attach one mounting bracket to the front mounting holes on each side of the chassis. Refer to Figure 3-1.
   - For 19-inch racks, fasten the long side of the brackets to the chassis.
   - For 23 and 24-inch racks, fasten the short side of the brackets to the chassis.
2. Slide the chassis into the front of the rack.
3. Attach the front mounting brackets to the rack using four screws. Do not tighten these screws until the back brackets are installed.
4. Attach two mounting brackets to the rear mounting holes of the chassis.
   - For 19-inch racks, fasten the long side of the brackets to the chassis.
   - For 23 and 24-inch racks, fasten the short side of the brackets to the chassis.
5. Tighten all screws using a torque setting specified by the rack/cabinet manufacturer.

6. Attach the rear mounting brackets to the rack with four screws and a torque setting specified by the manufacturer.

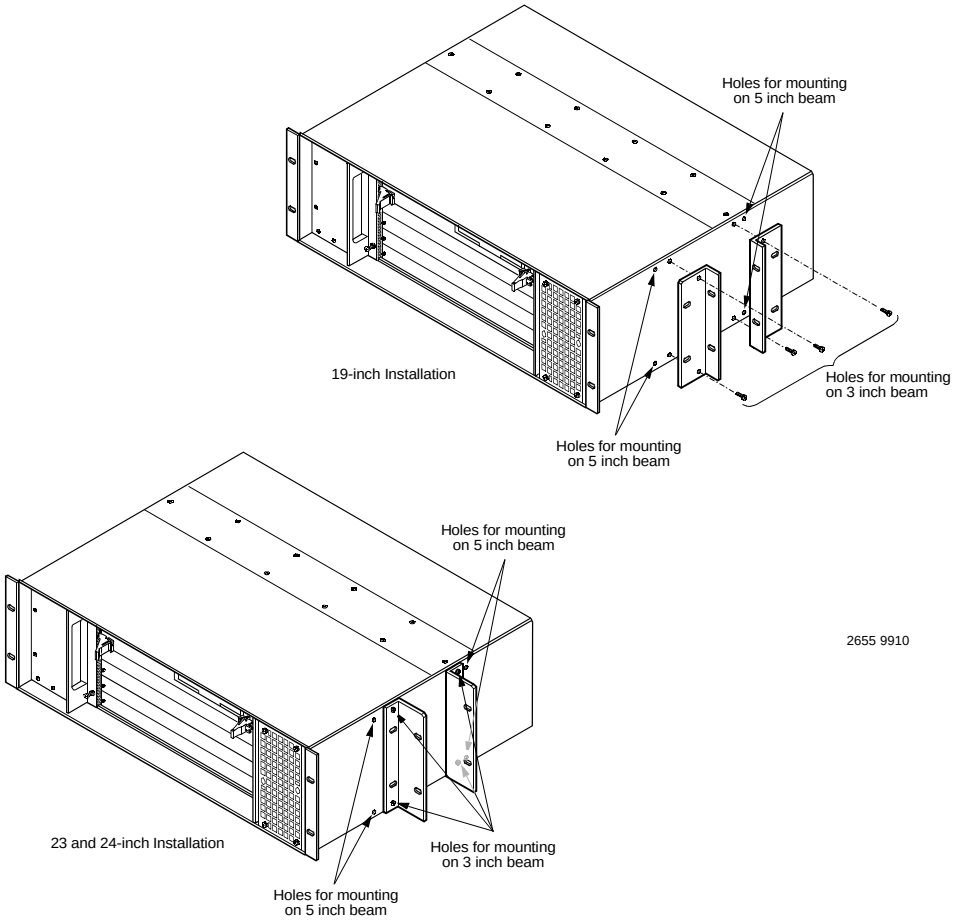


Figure 3-1. Mounting Bracket Locations for the Frame Relay Rack/Cabinet

You can mount CPX1200 Series systems in Electronic Industries Association (EIA) equipment racks, cabinets, and panels. Refer to Appendix F, *Related Documentation* for information about EIA Standard,

EIA-310. You can also mount CPX1200 Series systems in nonstandard/proprietary racks and cabinets. You cannot use slides and rails to mount the system in any racks, cabinets, or panels.

Connecting System Cables

Often, to avoid damage during shipping, all external system cables are removed before packing. Refer to these instructions to connect cables to the system.

To cable a breaker DC system, read all of the following cautions and warnings, properly ground the equipment, and follow the procedures in this section.



Warning

Couper l'alimentation avant l'entretien et le depannage.

Disconnect power supply before servicing.

Service personnel: If using more than one DC power circuit, disconnect all power sources before installing or servicing any components internal to the MXP enclosure.

The DC power inputs must only be attached to approved Telephone Network Voltage (TNV) or SELV (Safe Extra Low Voltage) branch circuits. Branch circuits must comply with all requirements called for in these safety standards: IEC 60950, EN 60950, CAN/CSA-C22.2 No. 60950-00. Attaching inputs to non-TNV/SELV approved power sources will cause the system to fail compliance with safety regulations.

The power input cable's green/yellow wire **must be connected** to a reliable earth ground connection to comply with Class 1 Equipment requirements.

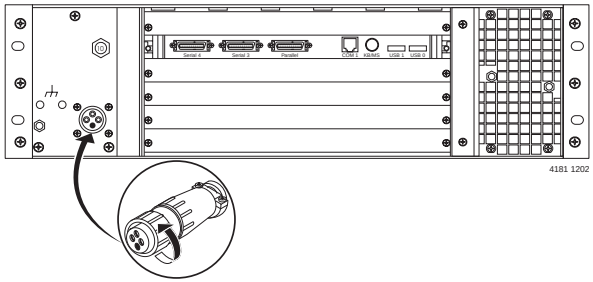
Connecting the System to AC Power

1. Make sure power to the system is OFF:
2. For AC power, set the ON/OFF power switch on the AC power distribution panel to OFF (O).
3. Connect the system to the AC source:

   For AC systems, plug the socket end of the chassis power cord (packed with your system) into the AC inlet on the AC power distribution panel. Plug the other end into a grounded, surge-protected power source.
4. Plug all power cords into a grounded, surge-protected power source.

Connecting the System to DC Power

1. Make sure the ON/OFF power breaker on the back of the chassis is set to OFF (**O**). Do this by pulling the DC breaker button out to turn power OFF.
2. The DC input power cable inserts into the single power connector on the power distribution panel.
3. Plug the DC cable firmly into the connectors on the power distribution panel on the rear of the system. Tighten the cable by turning the coupling ring counter-clockwise.
4. Plug all power cords into a grounded, surge-protected power source.



Recommended Cabling for DC Systems

For DC systems use the following parts to construct your own connecting cable with connector:

- Connector housing (AMP part number 206060-1)
- Pins (AMP part number 66601-2)
- Cable clamp (AMP 206062-3)
- Minimum 18 AWG wire

Refer to the following table for DC connector pinouts.

Table 3-1. DC Connector Pinouts

Pin Number	Description
1	-48V
2	-48V RTN
3	Chassis Ground
4	No Connection

Using the green/yellow wire, make the chassis earth ground connection.

Table 3-2. Earth Ground Wire Guide

Wire	Signal
Green/yellow	PE GND (Primary Earth Ground)
Black	-48Vdc
Blue	-48Vdc RETURN

For power-on, power-off, and emergency power -off procedures, refer to Chapter 4, *System Operations*.

Connecting the System to Peripherals

Use the information in this section to help you connect your system to a printer, monitor, keyboard, and mouse.

Connecting to a Parallel Printer or Serial Terminal

1. If using the CPX1200 Series system with a parallel printer, connect the parallel cable to the 25-pin port on the rear transition module.
2. If connecting a serial terminal (for example; DecTerm, VT100), connect the serial cable to the COM 1 port on the CPU module COM 1 is configured as DTE.

The default setting for a terminal are:

- 19200 baud (default for Intel-based boards)
  9600 baud (default for MPC-based boards))
- 1 stop bit
- No parity
- No flow control

Connecting to a Monitor, Keyboard, and Mouse

If using the CPX1200 Series system with a monitor, keyboard, and mouse:

1. Connect one end of the monitor (video) cable to the port on the monitor (not necessary if your monitor comes with the cable attached) and the other end to the video connector on the CPU module.
2. Connect the single end of the keyboard and mouse adapter cable into the keyboard/mouse port (identified by a keyboard and mouse icon) on the front of the CPU module.
3. Connect the keyboard and mouse cables with their respectively labeled ports on the split end of the keyboard and mouse adapter cable.

System Operations 4

Overview

This chapter provides the basic operating procedures for the CPX1200 Series system chassis. For software-specific information or information regarding the operation of third-party and add-on components, please refer to the product's vendor documentation. This chapter covers the following major topics:

- *Recommended Power-On Procedures*
- *Recommended Power-Off Procedure*
- *Emergency Power-Off Procedure*
- *System Monitoring*
- *Chassis Cooling*
- *Cooling Monitoring*

Recommended Power-On Procedures

Powering Up the AC and DC Systems



Caution

Cover all open module slots and put all panels in place before turning on power. Slot covers must remain in place during system operation. This is necessary to avoid electrical shock, other possible hazards, and to properly cool the chassis.

1. Verify that all system modules and associated data and control cables are properly configured and installed.
2. Verify that the system configuration's current loads do not exceed the power supply limit of 200W total load.

The maximum current load on the system depends on the configuration of the system. Refer to the following tables for the single power supply output. Verify that the system is connected to the AC or DC input power.

3. Verify that the system is connected to the AC or DC input power.
4. Turn on AC or DC power:
   - For **AC power** - Flip the rocker switch on the rear of the power distribution panel to ON (I).
   - For **DC power** - Push the breaker switch in.

Table 4-1. DC Output - 3.3V 200W Power Supplies (AC/DC, DC/DC)

Output Voltage	Regulation	Minimum Load	Maximum Load
+3.3V	+/-2.0%	0.5A	15.0A
+5.0V	+/-2.0%	3.0A	30.0A
+12.0V	+/-3.5%	0.3A	6.0A
-12.0V	+/-3.5%	0.3A	2.0A 3.0A peak

Table 4-2. DC Output - +5.0V 200W Power Supplies (AC/DC, DC/DC)

Output Voltage	Regulation	Minimum Load	Maximum Load
+3.3V	+/-2.0%	0.5A	30.0A
+5.0V	+/-2.0%	3.0A	15.0A
+12.0V	+/-3.5%	0.3A	6.0A
-12.0V	+/-3.5%	0.3A	3.0A

Table 4-3. DC Output - +3.3V Heavy 200W Power Supplies (AC/DC, DC/DC)

Output Voltage	Regulation	Minimum Load	Maximum Load
+3.3V	+/-2.0%	0.5A	30.0A
+5.0V	+/-2.0%	3.0A	15.0A
+12.0V	+/-3.5%	0.3A	6.0A
-12.0V	+/-3.5%	0.3A	3.0A

Note The voltage on the rating label adjacent to the power receptacle must agree with the type of line or cord and the applied voltage.

After powering up your system, go to Chapter 5, *Single Board Computer Setup* to enter the setup utilities and configure the High Availability (HA) mode.

Recommended Power-Off Procedure

Powering Down the AC and DC Systems

To shutdown your CPX1200 Series system:

1. Shut down all software operations and the operating system.
2. For AC systems, move the rocker switch on the power distribution panel to OFF (O).
3. For DC systems, pull the circuit breaker button out. You can see a white band on the DC circuit breaker button when the system is shut off.

Emergency Power-Off Procedure

Caution

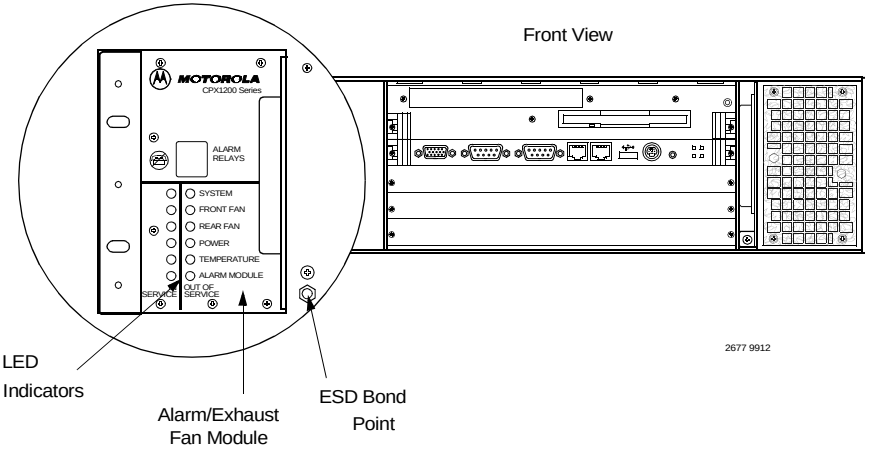
Following this procedure results in a loss of data and may cause damage to system components in a running system. Use this procedure only when you cannot follow normal shutdown procedures.

In case of an emergency, move the rocker switch on the power distribution panel to O (OFF) for AC power or pull the breaker switch to shutdown DC power.

This removes input power from the power supply and results in an abnormal shutdown of the system.

System Monitoring

There is an optional system alarm board specifically designed to work with the CPX1200 Series chassis using either Intel-based or PowerPC architecture-based host processor boards. The alarm board communicates via an RS-232 (8 bits, no parity, one stop, 9600 baud for PowerPC-based boards, or 19200 for Intel-based boards) serial link (configured as DTE) to the CPU, routed to system slot J5, user I/O on the CompactPCI backplane.



The alarm board monitors and displays status of these values in the CPX1200 chassis.

- System
- Front fan
- Rear fan
- Power
- Temperature
- Alarm module

This board reports the system status via the front panel LEDs, relays, system reset signal, and a momentary power supply inhibit signal.

For more information on the CPX1200 Alarm Board, refer to Chapter 6, *CPX1200 Alarm Board*.

Controls and Indicators

This section describes the various locations and functions of the controls and indicators of the CPX1200 Series enclosure. The controls and indicators for the various CompactPCI modules available for the system are not covered in this section—refer to the documentation that came with your modules for this information.

Chassis Cooling

Four DC powered fans configured for N+1 redundancy provide forced-air cooling for the system's power supply, CPU and I/O controller card cage, transition module card cage, and drive bay. The fans run at either high speed (default) or temperature controlled. The high setting (power-up default) runs until the software changes it. The temperature controlled setting operates with variable fan speeds which varies with temperature, as follows:

Temperature Speed	**RPM**
<25° C Low	2500
24° to 45° C	Linear increase between 2500 to 3500
>45°C High	3500

Fans should be put in temperature controlled mode to reduce the noise level of the system. This is done using AAPI calls supplied by the operating system software.

Refer to *Removing and Installing the Power Supply and Inlet Fan Module* on page 7-18 for information about replacing a fan/power supply module. Fans must be replaced as a unit.

Air filters are an optional item. Air filters will last for approximately 90 days, depending on the conditions of the Central Office Environment. Check your air filters occasionally to make sure they are not obstructed or damaged, or if they need to be cleaned or replaced. It is recommended that you replace any damaged or obstructed filters. You can order replacement air filter media (Marketing Part Number CPX1200FLTR-K) from your Motorola Sales Representative.

Cooling Monitoring

Input air temperature is monitored by cooling sensors located on the power supply/fan sled in back of the fan. Two temperature trip points are hard-wired into the sensors.

- When the input temperature rises, either through a failed fan or through an increase in the ambient temperature (measured at inlet), and reaches the first trip point, the sensor detects the rise in temperature and sends a warning signal to the system.
- At this point, Motorola-supported devices and most other devices in the system are approaching their upper temperature limits, but are not in immediate danger of damage. Recovery can be accomplished by either replacing the failed unit or decreasing the ambient temperature.
- If the temperature continues to rise, and second trip-point is reached, the sensor sends a warning that the system should be shut down.
- At this point, shut down the system. Replace failed units and inspect the system components for heat damage. Before restarting the system, take measures to prevent a recurrence of the over temperature condition.

Single Board Computer Setup

5

This chapter provides the steps need to setup and verify your single board computer for use in the CPX1200 Series platform. For software-specific information or information regarding the operation of third party and add-on components, please refer to the product's vendor documentation.

Verify the CPV5350 or CPV5370 Single Board Computer Mode

After powering up the system, you must perform these steps to make sure the Intel processor-based Single Board Computer (SBC) is not in the High Availability (HA) mode.

Starting the Setup Utility

The PhoenixBIOS setup utility starts when you turn on or reboot your system. It checks and configures the system through power-on self-test (POST). During POST, the following message appears at the bottom of the screen:

```
Press <F2> to enter SETUP
```

Note For the CPX1200 Series systems, which does not have a hot swap controller, you should set the claim domain option to NO. If the claim domain is set to YES it assumes that there is a hot swap controller present.

To enter the PhoenixBIOS setup utility and configure the HA mode:

1. Press <F2> during start-up
2. Right arrow to “Advanced” in the Menu Bar
3. Down arrow to “PCI Configuration”
4. Press <enter> to select
5. Down arrow to “HA Config”
6. Press <enter> to select
7. Up arrow to “Disabled”
8. Press <enter> to select
9. Press <Esc> twice to exit
10. Press <enter> at “Exit Saving Changes”
11. Press <enter> at “Yes”, to confirm.

The system reboots.

Refer to the *CPV5350 or CPV5370 CompactPCI BIOS and Programmer’s Reference Guide* listed under Appendix F, *Related Documentation* for more information.

Setting Up the MCP820 and MCP750HA Single Board Computer

PPCBug is used for setting environmental variables. At the PPCBug> prompt, type **env** to change the environment setting. Most environment settings should use the default values and should need no other modification.

To view the default settings, at the PPCdiag> prompt, type: **env;d,** and press **enter.** Scroll down to view the settings, pressing **yes** when prompted. The self tests will run and return you to the PPCBug prompt.

To view the configuration settings, at the PPCdiag> or PPCBug> prompt, type: **cnfg** and press **enter**. Use the return key to scroll through the ENV RAM contents. A sample configuration is shown below.

```
PPC1-Diag>"cnfg <cr>
Board (PWB) Serial Number    = 3127844?
Board Identifier             = MCP750 HA?
Artwork (PWA) Identifier     = 01-W3378F01C?
MPU Clock Speed              = 233?
BUS Clock Speed              = 067?
Ethernet Address             = 08003E26D03D?
primary SCSI Identifier      = 07?
System Serial Number         = BT100?
System Identifier            = CPX120_SK2x?
License Identifier           = 3127844?

Update Non-Volatile RAM (Y/N)? y <cr>
PPC1-Diag>
```

Refer to the MCP820 or MCP750HA CompactPCI Single Board Computer Programmer's Reference Guide listed under Appendix F, *Related Documentation* for more information.

CPX1200 Alarm Board 6

Overview

The CPX1200 Series alarm board is optional on the both the CPX1204 and CPX1205 platform and is a part of the hot swappable Alarm/Exhaust Fan Module. It continuously monitors the status of:

- Power supply voltages (+5V, -5V, +12V, and -12V for +/- 5% tolerance)
- Four fan speeds by sensing the fan tach signals
- The on-board temperature sensor

The alarm board indicates status with front panel LEDs and relay contacts.

If any of the values deviates from a predetermined threshold (setpoint), a red alarm (Out-of-Service) LED illuminates. If the monitored value returns to normal (within threshold), the red (Out-of-Service) alarm LED goes off and the green (In-Service) LED illuminates. For threshold values, see Table 6-5 on page 6-11.

Alarm Board Outputs

You can view alarm board outputs as:

- Front panel LEDs
- Relays
- A system reset signal
- A momentary power supply inhibit signal

Six green In-Service LEDs and six red Out-of-Service LEDs indicate out of tolerance failure conditions:

- System
- Front Fan
- Rear Fan
- Power
- Temperature
- Alarm Module

The four relays provide contact closures via an RJ45 jack for Critical, Major, Minor, and Rack alarms.

The alarm board communicates via an RS-232 (8 bits, no parity, one stop, 9600 baud for PowerPC-based boards, or 19200 for Intel-based boards) serial link (configured as DTE) to the CPU, routed to system slot J5, user I/O on the CompactPCI backplane. There is no flow control. A command set gives you get/set data operations including:

- Heartbeat protocol
- Alarm messages
- Control commands
- Status requests
- Firmware upgrade capability
- System reset
- Momentary power supply inhibit command

Refer to Appendix D, *Commands* for commands to communicate with the serial interface. The alarm board acts as a server to requests on the serial link, responding only when polled. The alarm board firmware does not send asynchronous messages on the serial link (except in debug mode).

The alarm board monitors and reports out of tolerance failure conditions associated with the sensors under its control. It controls the state of the Front Fan, Rear Fan, Power, Temperature, and Alarm Module LEDs under all operating conditions according to a setpoint threshold. Refer to Table 6-5. Alarm board controller firmware or commands sent over the serial link can control the relays and the system LEDs. In autonomous mode the alarm board controls all relays and LEDs.

Major Modes of Operation

This section explains the major modes of operation for the alarm board:

- Normal
- Debug
- Autonomous
- Heartbeat

Normal Mode

Remove the J6A jumper to enable the normal mode. Refer to *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16. Refer to Figure 6-2 on page 6-16 to locate jumper J6A. We ship your alarm board with the normal mode enabled (that is, with the J6A jumper removed.) Normal mode enabled means that:

- All debug messages and special debug features are disabled
- The LEDs and relays display the status of the alarms
- The LEDs do not blink or change state unless an alarm condition occurs or clears

If the speaker is enabled, any alarm condition causes a beep every 1.6 seconds. You can use the alarm cutoff switch, if installed, to stop the alarm beep. This, however, does not clear the alarm condition.

Debug Mode

Refer to Table 6-1 for the states of debug jumper J6A.

Table 6-1. States of Debug Jumper J6A

If jumper is:	then board is operating in this mode:
Removed	Normal
Installed	Debug

Refer to *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16. Refer to Figure 6-2 to locate jumper J6A. Debug mode behaves the same as the Normal Mode and also offers these behaviors:

- LEDs and relays blink about every six seconds to indicate the board is live
- Sticky indication if any alarm occurs since power up using the System LED
- Current status dumps every six seconds to a serial port in formatted ASCII text to permit diagnostic access by a dumb terminal
- Provides serial command SM00000 to enable debug mode by a terminal instead of using jumper J6A

  This command displays all alarm board status data once; including relays, LEDs, latches, devices, and alarms.

Autonomous Mode

By default, the alarm board operates in autonomous mode. Autonomous mode means the alarm board does not illuminate the system LEDs.

Heartbeat Mode

In heartbeat mode, the alarm board illuminates the system LEDs to indicate either In-Service or Out-of-Service conditions. The system LED stays In-Service as long as there is regular polling from the Alarm API

interface (AAPI) software, before a timeout occurs. When the heartbeat count timeout occurs, the Out-of-Service LED illuminates and the In-Service goes out.

Power Supply Inhibit

Refer to the following table for the states of jumper J6B.

Table 6-2. States of Power Supply Jumper J6B

If jumper is:	then power supply inhibit is:
Removed (default)	Enabled
Installed	Disabled

Refer to Figure 6-2 to locate the J6B jumper. We ship your alarm board with the Power Supply Inhibit feature enabled (that is, with the J6B jumper removed.)

Alarm Application Programming Interface Overview

The Alarm Application Programming Interface (AAPI) is the software interface to the alarm board. The AAPI is a library of functions and data structure definitions. All communication with the alarm board and application program takes place through the AAPI.

See your local Motorola Sales Office for information about the availability of current AAPI driver software and target operating systems.

Optional Alarm Board Software

Optional alarm board software is available to communicate with the alarm board from the host CPU using the COM2 serial port. Refer to *COM2 Port with an Installed Alarm Module* on page 6-15.

Examples of the supported features of the alarm software are:

- Commands to gather alarms and status
- Heartbeating

- System LED control
- Relay control
- Set-point modification

Contact your local Motorola sales office for more information about the optional alarm board software.

Alarm Exerciser Application Program Overview

The Alarm Exerciser (AEXC) is an Alarm Control Application (ACA) which tests and demonstrates the AAPI. The AEXC gives you a sample application/source code to complete the example. AEXC uses the AAPI driver software to communicate with the alarm board over a serial port.

Contact your local Motorola sales office for more information about current ACA software and target operating systems (OS).

Power-Up Lamp Test

The power-up lamp test lets you visually verify that all LEDs operate. After the power-up lamp test completes, the alarm board immediately goes into the normal monitoring mode (that is, all LEDs go to green.) The System LED color depends on a configuration setting in nonvolatile memory for heartbeat or nonheartbeat mode.

Note The operator must visually monitor this test to determine that all LEDs function.

When the alarm board powers up, all:

- Green (In-Service) LEDs turn on for 1/4 second, and then turn off
- Red (Out-of-Service) LEDs turn on for 1/2 second, and then turn off
- LEDs return to the green state

As the board updates alarm conditions, any existing alarm condition displays a red (Out-of-Service) LED.

Alarm Status

The alarm board indicates current alarm status in these ways:

- Through the LED indicators on the front panel of the alarm/exhaust fan module
- Via four relays through an RJ45 jack located on the alarm/exhaust fan module front panel
- Through an RS-232 connection on the backplane to the host CPU, using alarm software

LED Indicators

The red Out-of-Service LEDs indicate a malfunctioning subsystem. The green In-Service LEDs indicate a properly functioning subsystem. There are two LEDs for each of these subsystems. Refer to Figure 6-1.

- SYSTEM (host heartbeat)
- FRONT FAN (front fan speeds)
- REAR FAN (rear fan speeds)
- POWER (power supply voltages)
- TEMPERATURE (on-board temperature)
- ALARM MODULE (alarm subsystem)

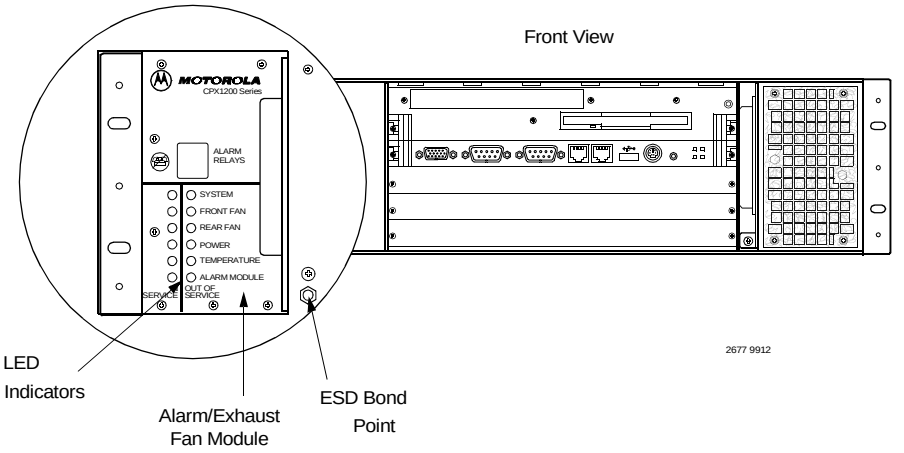


Figure 6-1. Alarm Board LED Indicators

Note Both LEDs of a particular subsystem never illuminate at the same time.

Refer to Table 6-3 for information about alarm board subsystem purpose and states.

Table 6-3. Alarm Board Subsystem LED Purpose and States

This subsystem LED on the Alarm Board front panel:	Indicates:	State		
		In Service: - Red LED Off - Green LED On means:	**Out of Service: - Red LED On - Green LED Off means:**	**Not enabled: - Red LED Off - Green LED Off means:**
System [1]	Status of the host CPU heartbeat	Heartbeat present	Heartbeat not present [2]	Heartbeat mode not enabled
Front Fan	Front fan alarm status	Front fans are OK. (RPM are within the setpoints)	Front fan failure condition exists (front fans RPM are outside the setpoints)	Not possible
Rear Fan	Rear fan alarm status	Rear fans are OK. (RPM are within the setpoints)	Rear fan failure condition exists (rear fans RPM are outside the setpoints)	Not possible
Power	Alarm status of the power supply voltages	Power supply is OK (all four power supply voltages are within the setpoints)	A power supply failure condition exists (at least one of the four power supply voltages is outside the setpoints)	Not possible
Temperature	Alarm status of the temperature sensor located in the exhaust air flow of the chassis	Temperature is OK (temperature sensor reading is within the setpoints)	An over temperature condition exists (temperature sensor reading is outside the setpoints) [3]	Not possible

Table 6-3. Alarm Board Subsystem LED Purpose and States

This subsystem LED on the Alarm Board front panel:	Indicates:	State		
		In Service: - Red LED Off - Green LED On means:	**Out of Service: - Red LED On - Green LED Off means:**	**Not enabled: - Red LED Off - Green LED Off means:**
Alarm Module	If the alarm subsystem is operating	Alarm board is operating normally	Alarm board is malfunctioning	Not possible
1System LEDs do not illuminate in autonomous mode. 2You can change the System LED indication with alarm software on the host. [3]Freezing temperatures do not set this alarm (only over temperature.)				

Responding to Red (Out of Service) Indications

Table 6-4 gives you possible red (Out-of-Service) LED indications and suggests responses to these conditions. Refer to Table 6-5 for information about setpoint thresholds.

Note Threshold values may change with current firmware.

Table 6-4. Red LED Indications and Suggested Recovery Actions

This Red (Out of Service) LED on the Alarm Board front panel:	Means:	You should:
System	There is a loss of heartbeat or other system software problem	Check host alarm software for heartbeat. and Check host alarm software for communication over serial COM2.
Front Fan	A front fan tach signal is below set speed threshold	Check the front fan assembly. Refer to Figure 7-4 on page 7-17.

Table 6-4. Red LED Indications and Suggested Recovery Actions

This Red (Out of Service) LED on the Alarm Board front panel:	Means:	You should:
Rear Fan	A rear fan tach signal is below set speed threshold	Check the rear fan assembly. Refer to *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16.
Power	Power supply voltages are outside of set thresholds	Check power supply/inlet fan module. Refer to Figure 7-4 on page 7-17.
Temperature	Temperature is above set temperature thresholds	Check filters and/or reduce ambient air temperature. Refer to *Replacing the Inlet Fan Module Filter Element* on page 7-21.
Alarm Board	The alarm board or power supply is malfunctioning	Remove and replace alarm/exhaust fan module. Refer to *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16. or Remove and replace power supply/inlet fan module. Refer to Figure 7-4 on page 7-17.

Alarm Board Setpoint Thresholds

Table 6-5 gives you the default (firmware hardcoded) setpoints for the alarm thresholds. An alarm condition exists if any values go beyond the predetermined threshold. If the monitored value returns to normal (within threshold) the alarm indication clears. The system always uses the default setpoint thresholds unless the host alarm software changes them.

Table 6-5. Alarm Board Default Setpoint Thresholds

Monitored Condition	High Setpoint	Low Setpoint	Alarm Condition
5V	5.30	4.75	Power
3V	3.50	3.10	Power
5VSM	5.00	4.15	Power
12V	12.72	11.28	Power

Table 6-5. Alarm Board Default Setpoint Thresholds

Monitored Condition	High Setpoint	Low Setpoint	Alarm Condition
-12V	13.20	10.80	Power
Fans Front	none [1]	4000 RPM	Front fans
Fans Rear	none [1]	4000 RPM	Rear fans
Temperature	55 C	none [1]	Temperature
[1] none = setpoint not used for this condition			

Relay Indicators

The four relays indicate conditions requiring attention via an RJ-45 jack on the alarm board front panel. You can collect the relay signals using a collection device which may signal by lights or bells, or you can display signals on remote consoles using a modem. Closed contact states indicate the alarm condition. Open contact states indicate an OK condition.

Note You can also control the relay signals using host alarm software commands. Get information about these commands from your local Motorola (ECC) sales office.



Caution Do not plug a phone or any network connection into the alarm relays, RJ-45 connector on the alarm board front panel. Connecting any other equipment could damage the CPX1200 Series system or your equipment.

Relay Power-Up States

Refer to Table 6-6 for information about the state of the relays (Critical, Major, Minor, and Rack) before, during, and after power-up. The Power On State means the alarm board is in its normal operating mode, monitoring alarm conditions. In Power-On State, all relays are open unless an alarm condition exists.

Table 6-6. Power-Up States for the Alarm Board Relays

States	Critical (pins 1/ 2)	Major (pins 3/ 4)	Minor (pins 5/ 6)	Rack (pins 7/ 8)
Power-Off State	Open	Open	Open	Closed
Power Initializing State [1]	Closed	Closed	Open	Closed
Power-On State [2]	Open	Open	Open	Open

[1] during firmware initialization

[2] no alarm conditions detected by Alarm Board firmware

Relay Logic

All four relays (Critical, Major, Minor, and Rack) use the open contact state to indicate an OK condition and the closed state to indicate the alarm condition. You can also use host software commands for control of these relay states, to indicate any condition desired. Refer to Table 6-7 for information about relay logic states.

Table 6-7. Relay Logic States

If this relay:	is:	it indicates:
Critical	Closed	A critical system problem. System is: - initializing - out of service
	Open	An OK condition
Major	Closed	A major system problem, such as: - alarms out - over temperature condition exists - two fans out - power out
	Open	An OK condition
Minor	Closed	A minor system problem, such as: - single fan failure
	Open	An OK condition
Rack	Closed	An alarm condition exists in any or all of these rack subsystems: - system - front Fan - rear Fan - power - temperature - alarm Module
	Open	An OK condition

Alarm Board Battery and Jumpers

You cannot replace the alarm board and battery in the field. Refer to *Replacing Lithium Batteries* on page 2-6. If you need to replace the battery you must remove the entire hot swap Alarm/Exhaust Fan Module. Refer to *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16.

Features supported by the battery are only used with software, therefore you do not need to replace the battery if you do not use the alarm software. If you use the alarm software you can check battery condition by referring to your alarm software documentation.

COM2 Port with an Installed Alarm Module

If you have an alarm module installed in your system you can use the COM2 port for alarm module or other peripheral communication by setting the jumpers on the J8 jumper block on the alarm board. Refer to the next table for J8 jumper settings.

Table 6-8. Jumper J8 Settings for the CPX1200 Series System Alarm Board

If jumpers:	are:	then:
1 - 2 3 - 4 5 - 6	In	Alarm board connects to the host card COM2 port through J5. COM2 is not available for other use.
7 - 8 9 - 10	Out	Alarm board is not connected to COM2 port. COM2 is available for other use.

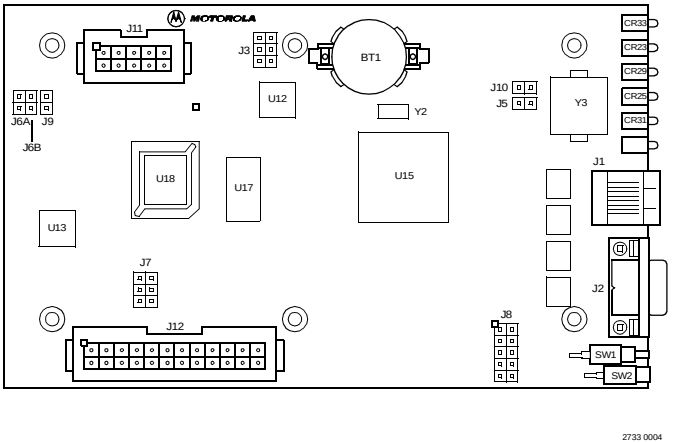


Figure 6-2. Jumper Blocks on the CPX1200 Series System Alarm Board

Subassembly Removal and Replacement

7

Introduction

This chapter gives you removal and installation procedures for Field Replaceable Units (FRUs) in a CPX1200 Series System.

- *Removing and Installing a CPU Module* on page 7-2
- *Board Removal and Replacement* on page 7-3
- *Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module* on page 7-16
- *Removing and Installing the Power Supply and Inlet Fan Module* on page 7-18
- *Removing and Installing the Power Distribution Panel* on page 7-22
- *Removing and Installing the Bezel* on page 7-24

Tools You Need

You need a #2 Phillips head screwdriver and a torque wrench to complete many of the removal and replacement procedures in this chapter.

Removing and Installing a CPU Module

This section tells you how to remove and replace CPU modules.

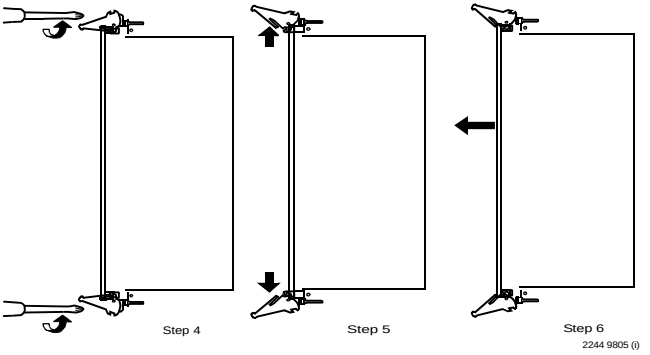
Removing a CPU Module

Caution

Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surfaces and anti-static bags for component storage.

To remove a CPU module from your chassis:

1. Set the power switch on the rear of the chassis to OFF (O).
2. Remove power from the system by disconnecting the power cord(s) from the source.
3. Disconnect any cables attached to the front of the module.
4. Completely loosen the module's captive screws.



5. Press the ejector levers outward at the same time to eject the module.
6. Pull the module from the chassis.

Installing a CPU Module



Do not install CPU modules into slot 5 in systems which have the drive module option (CPX1204 systems). Inserting a CPU into this slot may damage your CPU module.

To install a CPU module, follow the procedures as described in *Installing a Module* on page 7-5.

Board Removal and Replacement

You can remove hot-swap modules without shutting down the operating system or removing the system's power.

Note Make sure that your board manufacturer identifies your module as hot swap ready.

Refer to the documents listed for the system and the sources in Appendix F, *Related Documentation* for more information about hot swap and the PCI Industrial Computer Manufacturer's Group (PICMG) Hot Swap Specification.



Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surface, and antistatic containers when handling and storing components.

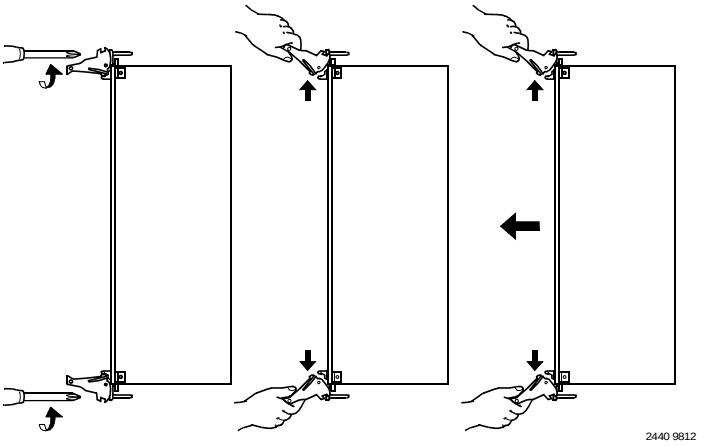


Prevent possible damage to module components by verifying the proper slot usage for your configuration.

Card Guide Description:
CPU Slot = Red
Bridge or Switch Slot = Tan
I/O Slot = Black.

Removing a Hot-Swap Module

This procedure does not refer to rear transition modules. Refer to the following figure and perform these steps:



1. Loosen the module's captive screws.
2. Press the ejector levers outward. This partially unseats the module from the backplane connectors. DO NOT pull the module from the slot at this point.

Note Depending on your system configuration, you may need to manually shutdown software on your module prior to removal to prevent data corruption.

Make sure the blue LED on the front of your hot-swap module illuminates before you begin to withdraw the module from the chassis. Once it illuminates, you may continue to remove the module.

3. Pull the module from the chassis.

Installing a Module

Caution

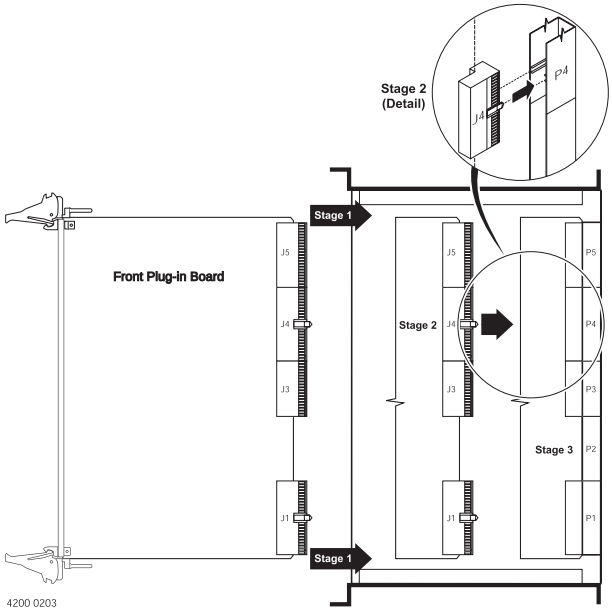
Do not insert a 3.3V VIO card into a 5V VIO backplane, or vice-versa. Check the P1 connector for the appropriate signaling key:

3V VIO = Yellow key
5V VIO = Blue key

A universal card (no key in J1 connector) may be used with either backplane.

MCG and our suppliers take significant steps to ensure there are no bent pins on the backplane or connector damage to the boards prior to leaving our factory. Bent pins caused by improper installation or by boards with damaged connectors could void the MCG warranty for the backplane or boards.

To reduce the risk of pin damage, refer to the following figure and perform these steps when installing modules:



1. Press the ejector levers outward.



Insert the board by holding the ejector levers—do not insert the board by pushing on the faceplate of the board.

2. Apply equal and steady pressure using your thumbs (Stage 1) to carefully slide the module into the card cage guide rails. Continue gently pushing until pre-alignment guide pegs engage in backplane connector receptacles (Stage 2) and ejector handle makes contact with the chassis rails. DO NOT FORCE THE BOARD INTO THE BACKPLANE SLOT.

3. Use the ejector levers to seat the board in the slot by closing the levers towards one another until they are in the horizontal, locked position (Stage 3). If handles do not completely latch, remove module from chassis and visually inspect the slot to ensure there are no bent pins.

   If a system contains one or more crushed pins, it must not be powered on.

   Contact your local sales representative to schedule delivery of a replacement chassis assembly.

4. If the board is completely latched, secure it by tightening the captive screws at the top and bottom of the panel.

Removing and Installing Drive Modules and Associated Drives (CPX1204 only)

This section describes how to remove and install the CompactPCI Drive Module (CPX1204 only). It also describes how to remove and install the drive kits listed in the following table.

Table 7-1. CPX1200 Series System Drive Kits

For information about this drive kit:	With kit number:	See page:
CD-ROM/Floppy/Slim Line EIDE	CPX1204KIT01-K	7-9
Floppy/SCSI/EIDE	CPX1204KIT06-K	7-12
Floppy/Slim EIDE Hard Drive	CPX1204KIT07-K	7-14

Removing and Installing the CompactPCI Drive Module

Remove and install the CompactPCI drive module using the same precautions and techniques used to remove and install a CPU module. Refer to *Removing and Installing a CPU Module* on page 7-2.

Removing and Installing Drive Kits

The CPX1204 chassis accepts a plug-in drive module that installs into the top two slots of the chassis card cage. The drive module can carry these drive devices.

- CD-ROM
- Floppy
- EIDE
- SCSI
- Slim line

This section describes the process for hot swapping drives into and out of the drive module. To perform this procedure you must configure your system with the appropriate software support for hot swap and you must install the drive in a hot swap drive module. You don't need to shut down the operating system or remove power from the system enclosure to hot swap a drive mounted in a hot swap drive module.

You can order the drive(s) you need and the associated drive mounting kit(s). Refer to Table 7-1 for a summary of the available drive mounting kits.

To remove/install any of the drive kits, follow these steps:

1. Remove the drive module from the chassis.

   Refer to *Removing and Installing a CPU Module* on page 7-2.

2. Observe ESD precautions.

   Refer to *Safety and Regulatory Compliance* on page 3-1.

3. If necessary, remove the existing front panel from the drive module by removing the two screws at the top and bottom of the front panel.

4. Remove any other screws holding the existing front panel to the drive module.

5. Secure the new front panel using two screws.

6. Torque screws to 3 in/lbs.

7. Where necessary, install wire connector from the front panel to the drive module.

Each kit also contains various screws for attaching the drive brackets to the drives and to the drive module.

Removing and Installing Drive Kit, CPX1204KIT01-K

The CPX1204KIT01-K kit contains these main parts:

- 1 - Front panel for CD-ROM, Floppy, Slim Line EIDE
- 1 - Cable assembly
- 1 - Slim Line EIDE hard drive/floppy Bracket
- 1 - CD-ROM drive bracket

Mounting the CD-ROM Drive.

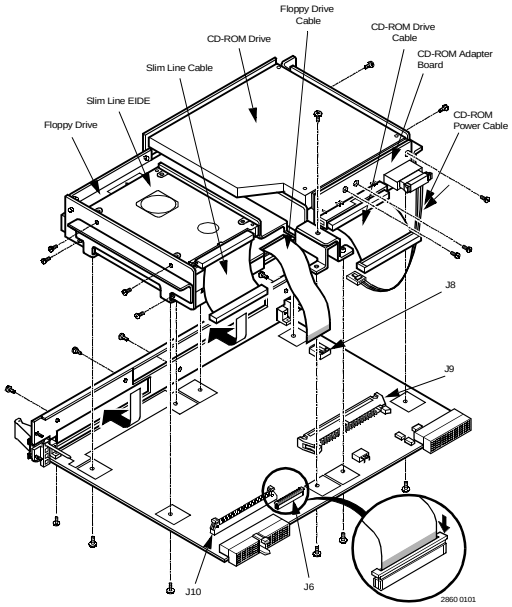


Figure 7-1. Removing and Installing Drive Kit CPX1204KIT01-K

1. To mount the CD-ROM drive, position the drive bracket and secure it to the top half of the drive module using four screws. Torque screws to 3 in/lbs. Refer to Figure 7-1.
2. Secure the bracket to the front panel using two screws. Torque screws to 5 in/lbs.

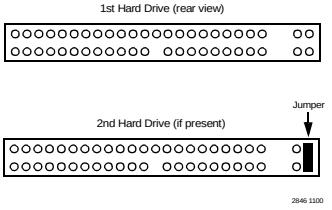
3. Connect the CD-ROM cable to connector J9 on the drive module board.

Note A CD-ROM drive is typically mounted and configured as a slave.

4. Connect the power cable to connector J8 on the drive module board
5. Slide the CD-ROM drive through the drive module front panel.
6. Attach the CD-ROM adapter board to the CD-ROM drive with three screws.
7. Connect the CD-ROM drive cable and power cable to the CD-ROM adapter.
8. Secure the CD-ROM drive to the bracket using four screws (two on each side) and torque screws to 1.5 in/lbs.

Mounting and Configuring the Floppy and Slim Line Hard Drives

1. Configure the hard drive(s):



2. Insert the floppy drive into the drive bracket.
3. Secure the floppy drive to the bracket using four screws. Torque screws to 1.5 in/lbs.
4. Insert the hard drive into the drive bracket.
5. Secure the hard drive to the bracket using four screws. Torque screws to 5 in/lbs
6. Insert drive assembly into drive carrier.

7. Secure the front bracket to the drive module with three screws. Torque screws to 5 in/lbs.
8. Secure the drive bracket to the drive module with four screws. Torque screws to 3 in/lbs.
9. Connect the hard drive cable to the drive module hard drive J10 connector.



Caution

Make sure the silver side of the floppy drive cable faces the connector lining.

10. Connect the floppy connector to the J6 connector on the drive module.
    a. Lift up the connector housing and insert the cable.
    b. Press down the housing clip to secure.
    c. Fold cables down to keep out of the way of installation into the chassis.
11. Reinstall the drive module assembly into the top two chassis slots.
12. Torque captive screws to 3 in/lbs.

Removing and Installing Disk Kit CPX1204KIT06-K

The CPX1204KIT06-K kit contains these main parts:

- 1 - Front panel for floppy, SCSI/EIDE
- 1 - Floppy bracket
- 1 - Drive bracket (outer)
- 1 - Drive bracket (inner)

Mounting the Floppy Drive.

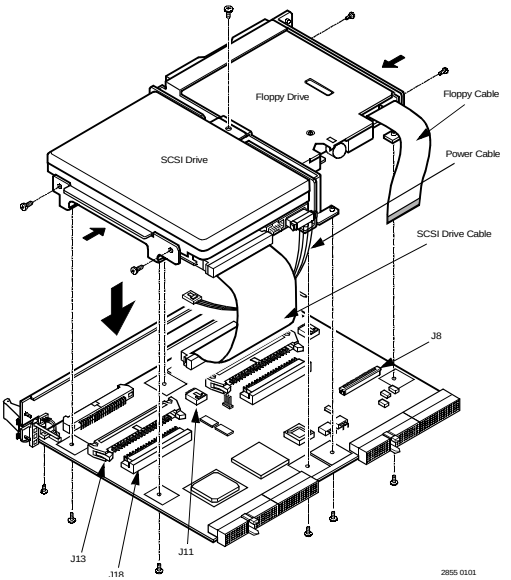


Figure 7-2. Removing and Installing the Disk Kit CPX1204KIT06-K

1. Connect the floppy drive cable to connector J8. Refer to Figure 7-2.
2. Position the floppy drive bracket on the drive module.
3. Secure the bracket to the drive module using four screws, torque them to 3 in/lbs.
4. Insert floppy drive into bracket.

5. Align screw holes and secure with two screws on one side.
6. Torque screws to 3 in/lbs.
7. Align screws holes and secure with two more screws on the other side. Torque screws to 3 in/lbs.
8. Lift up drive connector and connect cable to floppy drive.

Mounting the SCSI/EIDE Drive

1. Connect the SCSI hard drive cable to connector J18.

   If mounting an EIDE drive, connect the EIDE hard drive cable to J13.

Note Typically a hard drive is mounted and configured as a master drive.

2. Connect the hard drive power cable to connector J11.
3. Configure the hard drive.
4. Secure one drive bracket to the hard drive using two screws.
5. Torque screws to 7 in/lbs.
6. Secure the other drive bracket to the hard drive using two screws.
7. Torque screws to 7 in/lbs.
8. Secure the hard drive to the drive module using four screws.
9. Torque screws to 3 in/lbs.
10. Secure the hard drive to the front panel using one screw.
11. Torque screw to 3 in/lbs.
12. Secure the drive assemblies using one center screw. Torque screw to 5 in/lbs.

Removing and Installing Drive Kit, CPX1204KIT07-K

The CPX1204KIT07-K kit contains these main parts:

- 1 - Front panel for floppy, Slim EIDE
- 1 - Cable assembly
- 1 - Floppy/Hard drive bracket

Mounting the Hard and Floppy Drives

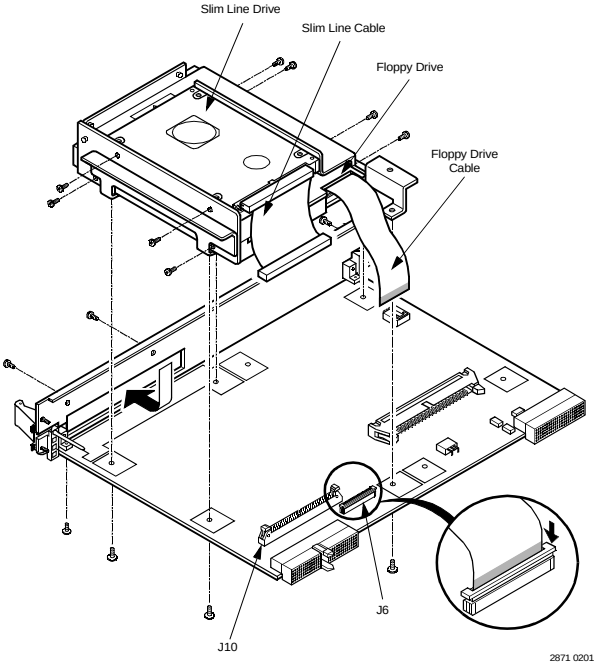
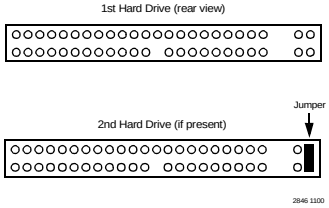


Figure 7-3. Removing and Installing Drive Kit, Part Number CPX1204KIT07-K

1. Configure the hard drive.



2. Insert the floppy drive into the hard drive bracket. Refer to Figure 7-3.
3. Secure the floppy drive to the bracket using four screws. Torque screws to 1.5 in/lbs.
4. Secure the hard drive to the bracket using four screws. Torque screws to 5 in/lbs.
5. Secure the drive assembly to the drive module using four screws. Torque screws to 3 in/lbs.
6. Secure the drive assembly to the front plate using two screws. Torque screws to 5 in/lbs.
7. Connect the hard drive cable to the hard drive and to connector J10 on the drive module.
8. Lift up the floppy drive connector housing on the floppy drive and insert the floppy drive cable.
9. Press down the housing clip to secure.

Caution

Make sure the silver side of the cable faces the connector lining.

10. Connect the floppy cable to the J6 connector on the drive module.

    Lift up connector and insert cable.

    Press down housing clip to secure.

11. Fold cables down to keep out of the way of installation into the chassis.

Removing and Installing the SCSI Controller Transition Module

The SCSI controller transition module mounts behind the CPU and provides all of its rear I/O connections.

Removing or installing a transition module is the same as removing CPU or I/O modules. Refer to *Board Removal and Replacement* on page 7-3.

Removing and Installing the Hot Swap Alarm/ Exhaust Fan Module

The hot swap Alarm/Exhaust Fan Module contains the alarm board and the rear (exhaust) fans. The alarm board receives control and status information from the power supply and the front fans through the backplane. It connects directly to the rear fans for control and status information.

The Alarm/Exhaust Fan Module is a hot swap module which means you can replace it without discontinuing system service.

Refer to Table B-2 on page B-1 for replacement part ordering information.

Use this procedure to remove the Alarm/Exhaust Fan Module from the chassis.

1. Loosen the single captive Phillips-head screw, located above the front ESD bonding point receptacle. Refer to Figure 7-4 on page 7-17.

2. Gently withdraw the module out the front of the chassis and away from the backplane using the module handle. Refer to Figure 7-4.

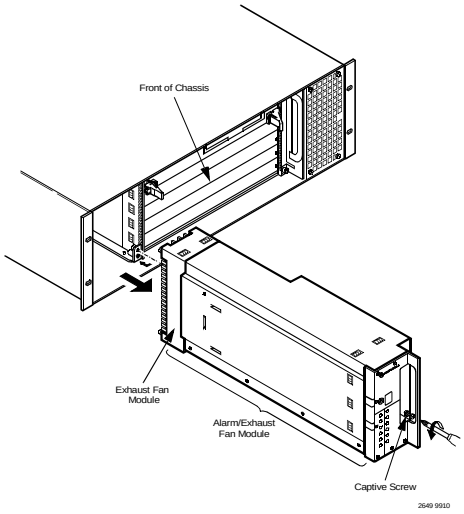


Figure 7-4. Removing the Alarm/Exhaust Fan Module from the Chassis

3. To replace the Alarm/Exhaust Fan Module, loosen the four captive screws holding the Exhaust Fan Module to the rear of the Alarm/Exhaust Module and separate the Exhaust Fan Module from the Alarm Exhaust Module. Refer to Figure 7-5.

Note When reinserting the Exhaust Fan Module make sure the flange on the right side of the module (when viewed from the rear) lines up with the body of the Alarm/Exhaust Module.

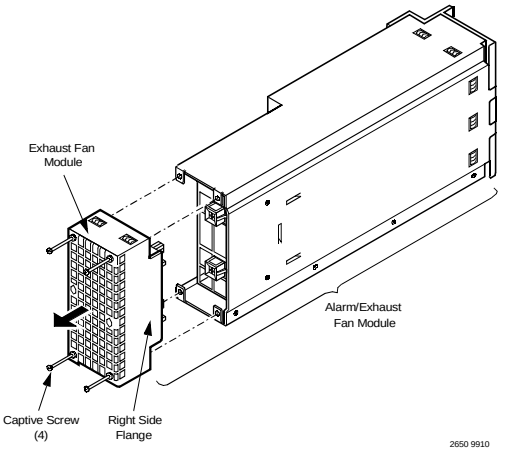


Figure 7-5. Separating the Alarm/Exhaust Fan and Exhaust Fan Modules

Removing and Installing the Power Supply and Inlet Fan Module

This section tells you how to remove and reinstall the power supply and hot swap Inlet Fan Module (IFM) in a CPX1200 Series system.

Refer to Table B-2 on page B-1, *Field Replaceable Unit and Replacement Parts Kits* for replacement part ordering information.

Removing and Installing the Power Supply

Observe these precautions before removing and installing power supplies.

Note The power supply for the CPX1200 Series system is not a hot swappable module. Please read the following steps carefully before removal or installation of a power supply.



Only properly trained service personnel should remove or install power supplies. Do not touch base parts inside the enclosure because of the possible presence of hazardous energy levels.

Removal of the power supply provides access to high voltages. Set the main power switch to OFF (O). Disconnect all power cords from their sources before working on the chassis. Allow one minute for the capacitors in the power supply to discharge.

1. For AC power, set the main power switch to **OFF** (O).
2. For DC power, pull the DC power push button out (white ring around push button is visible when in the **OFF** position).
3. Disconnect the power cord(s) from the source to make sure that you remove power from the system.



Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surfaces, and anti-static bags for component storage.

4. Remove the single captive screw securing the Power Supply/Inlet Fan Module to the chassis. Refer to Figure 7-6.

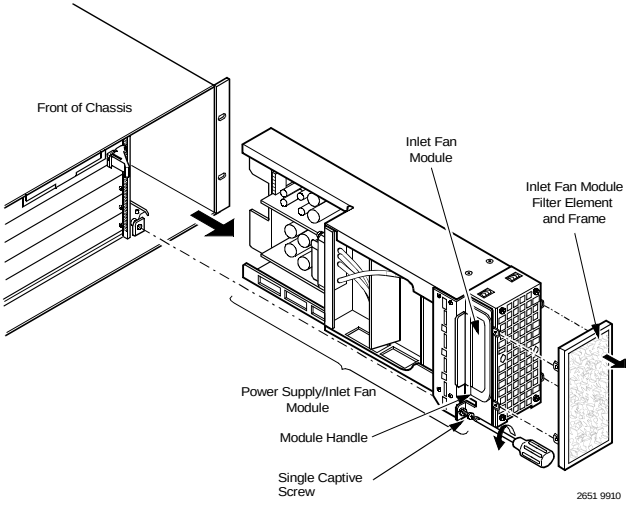


Figure 7-6. Removing the Power Supply/Inlet Fan Module from the Chassis

5. Gently withdraw the module out the front of the chassis and away from the backplane using the module handle.

Note There may be some initial resistance as the connector disengages from the backplane.

Removing the Hot Swap Inlet Fan Module

You can remove the Inlet Fan Module (IFM) from the front of the power supply without removing the power supply from the chassis.

1. Unscrew four captive screws securing the IFM to the power supply module. Refer to Figure 7-7.

2. Pull the IFM away from the power supply module.

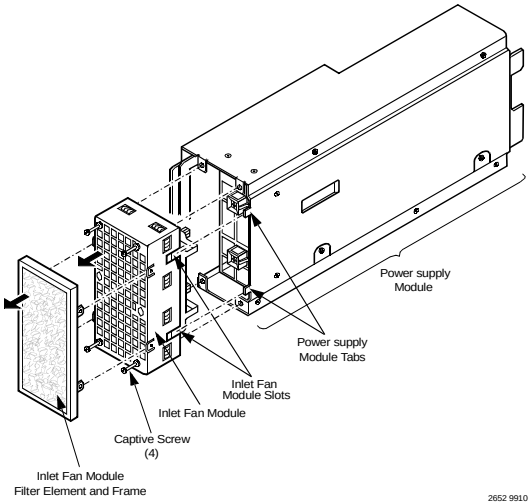


Figure 7-7. Removing the Inlet Fan Module

Note When reinstalling the IFM, make sure to align the tabs on the side of the power supply with the slots on the side of the IFM.

Replacing the Inlet Fan Module Filter Element

Air filters are an optional item. Air filters will last for approximately 90 days, depending on the conditions of the Central Office Environment. Replacement time is based on the number and size of airborne particulates; and the amount of airflow passed through the filter. For information on purchasing replacement air filters, see *Cooling Monitoring* on page 4-7

Check your air filters occasionally to make sure they are not obstructed or damaged, or if they need to be cleaned or replaced. It is recommended that you replace any damaged or obstructed filters. You can order replacement air filter media (Marketing Part Number CPX1200FLTR-K) from your Motorola Sales Representative. This part number does not include the air filter frame, only the air filter.

To remove and replace the filter, lift the filter element frame away from the IFM. The filter element fits loosely in the frame.

Removing and Installing the Power Distribution Panel

This section tells you how to remove and replace the AC or DC Power Distribution Panel. Refer to Figure 7-8 and Figure 7-9.

Refer to Table B-2 on page B-1, *Field Replaceable Unit and Replacement Parts Kits* for replacement part ordering information.

Warning

Only properly trained service personnel should remove or install power input modules. Do not touch base parts inside the enclosure because of the possible presence of hazardous energy levels.

Removal of the power distribution panel provides access to high voltages. Set the main power switch to **OFF** (O). Disconnect all power cords from their sources before working on the chassis.

Caution

Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surfaces and antistatic bags for component storage.

1. For AC systems, set the main power switch to **OFF** (O).
2. For DC, pull the DC push button out until the white ring is visible.
3. Disconnect the power cord(s) from the source to make sure that you remove power from the system.
4. Unscrew the three screws securing the power distribution panel to the chassis.
5. Gently withdraw the power distribution panel out, away from its backplane connector and at a slight angle to the right.

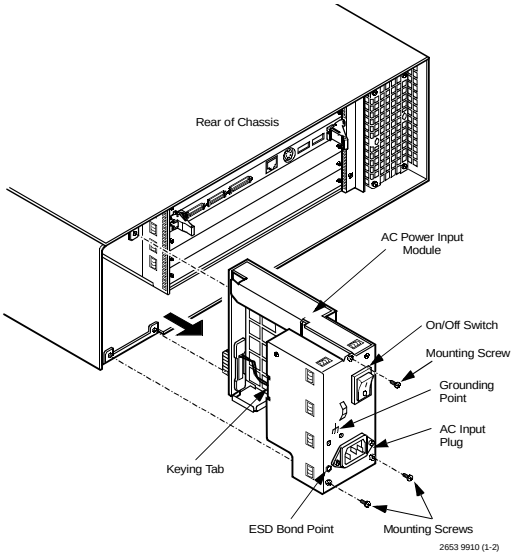


Figure 7-8. Removing and Installing the AC Power Distribution Panel

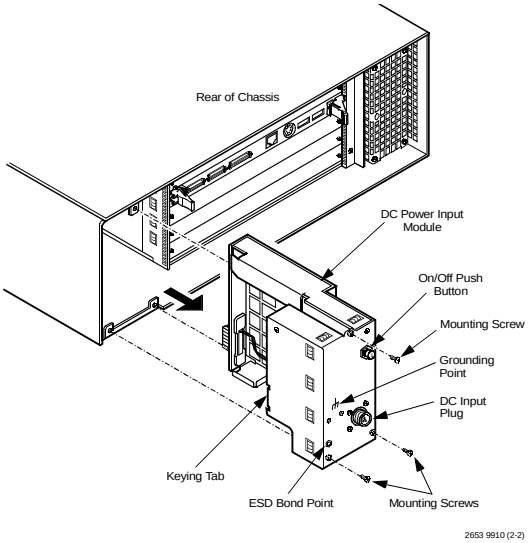


Figure 7-9. Removing and Installing the DC Power Distribution Panel

Note

When reinstalling the unit, note that the AC and DC versions are keyed differently to prevent accidental insertion of the wrong power supply into your system.

Removing and Installing the Bezel

The front bezel helps protect the wiring connections you make to the front of your system and gives a finished appearance to your system. Refer to Table B-2 on page B-1, *Field Replaceable Unit and Replacement Parts Kits* for replacement part ordering information.

To remove the bezel:

1. Face the front of the chassis and grasp the bezel by the openings on each end. Refer to the following figure.

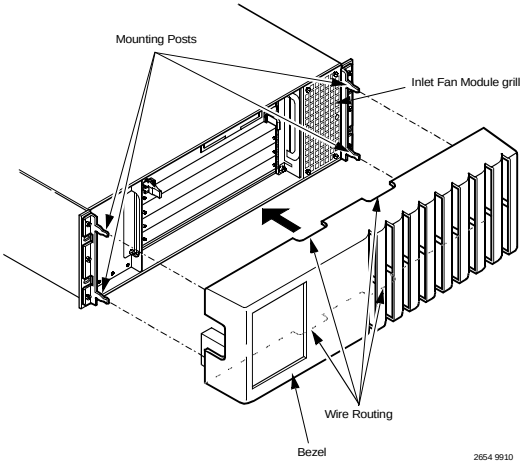


Figure 7-10. Removing and Installing the Bezel

2. Pull the bezel toward you until the four clips release.

Note Set the bezel on a flat surface away from extreme heat and sunlight.

To install the bezel:

1. Face the front of the chassis and align the four bezel mounting clips with the posts on the bezel mounting brackets.
2. Make sure that any wiring off the front of the chassis routes through the wiring openings on the top, bottom, and end of the bezel.

Note Do not route wires in front of the Inlet Fan Module grill.

3. Press the bezel onto the four mounting posts.

System Hardware Components 8

You can configure the CPX1200 Series platforms with the following components, peripherals, and add-in cards.

CPU Boards

You can use these Motorola CompactPCI system CPU boards in CPX1204 and CPX1205 platforms:

- CPV5370 700 MHz Pentium III
- CPV5350 500 MHz Pentium II
- MCP820 500 MHz PowerPlus III
- MCP750 466 MHz PowerPC Architecture Processor

CPU Board Memory Options

You can use these CPU board memory options in CPX1204 and CPX1205 systems. SDRAM uses DIMMs on Intel CPU boards and memory mezzanines on both Intel and PowerPC architecture CPU boards.

- 64MB SDRAM DIMM
- 128MB SDRAM DIMM
- 256MB SDRAM DIMM

CompactFlash cards in the sizes listed below are used on both Intel and PowerPC architecture CPUs or Rear Transition Modules, depending on your configuration.

- 128MB CompactFlash
- 156MB CompactFlash
- 512MB CompactFlash

Memory mezzanines are available for use with either the MCP750 or CPV5300 family of CPU boards. Memory sizes range from 128MB up to 512MB. For information on the memory mezzanines that can be used in CPX1204 and CPX1205 systems, refer to Appendix B, *CPX1200 Series System Starter Kits and Replacement Parts*.

System Alarm Board

The CPX1200 Series systems also support the use of a system alarm board. For information on the installation and use of this optional board, refer to Chapter 6, *CPX1200 Alarm Board*.

PCI Mezzanine Cards and Expansion Carriers

You can install PMC modules on some system CPUs or on an optional PMC Expansion Carrier to give the system more I/O.

There are a variety of PCI Mezzanine Cards (PMC) that are used with the CPX1200 Series systems. Depending on your configuration you may select from several SCSI and Ethernet PMCs options. A dual PMC carrier card, the CPV8540, is a hot swap, nonintelligent carrier that is used with optional I/O board selections

To install a PMC module on an optional PMC Expansion Carrier refer to Figure 8-1 on page 8-3 and follow these steps.

1. Remove the PMC carrier (CPU or Expansion Carrier) from the system.
2. Lay the PMC carrier flat, with the connectors facing you, on a static-free surface.
3. Remove the PMC slot filler panel from the carrier’s front panel.
4. Slide the PMC module’s face into the PMC slot opening in the carrier.
5. Align the PMC module over the carrier:

a. Align the connectors on the underside of the PMC module with the corresponding connectors on the carrier

b. Align the keying hole on the PMC module with the keying pin on the carrier.

6. Gently press the PMC module onto the carrier.

7. Fasten the PMC module with the screws provided. Some PMC modules take a screw at each corner of the module. Others require only two screws at the forward corners.

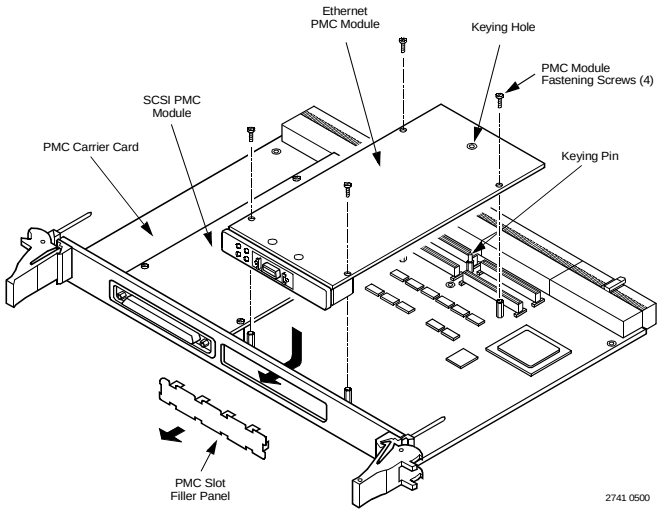


Figure 8-1. PCI Mezzanine Card (PMC) Installation

Rear Transition Modules

Rear transition modules are available for the CPX1200 Series system platform to provide additional I/O capability. Depending on your system's configuration, the appropriate rear transition module will be shipped according to the CPU being used.

System CPU Mounted Drives

The CPX1205 system supports a CPU-mounted drive option for the CPV5370 CPU board. CPU mounted drives are not available for the CPX1204.

Drive Carrier Boards

You can add drive carrier boards to the CPX1204/CPX1204T system that accommodate a plug-in drive carrier module that installs into slots 5 and 6. Addition of the board lets you daisy chain seven external devices such as hard disks and printers.

Connector Pin Assignments 9

This chapter provides the pin assignments for the CPX1200 Series platforms. Backplane slot connectors, rear fan connectors, and power supply connectors are the same for both the CPX1204 and CPX1205 systems. Pin assignments for drive module connectors used in the CPX1204 system are included, along with any special H.110 compliant connectors used in the CPX1205 system.

- *CPX1200 Backplane Connectors* on page 9-1
- *CPX1204 4-Slot System with Drive Module* on page 9-2
- *CPX1205 5-Slot System (with H.110 Bus)* on page 9-12
- *Alarm Module and Rear Fan Alarm Module Connectors* on page 9-17
- *CPX1204 Drive Module Connectors* on page 9-18
- *CPX1200 Power Supply* on page 9-23
- *Power Input and H.110 Special Voltages* on page 9-24

CPX1200 Backplane Connectors

The following tables provide the pin assignments for the CPX1200 Series Systems, including the 5-Slot H.110 and standard system.
The H.110 system has a different set of pin assignments on the P4 and P5 connectors.

- Slot 5 is used for the CPU on the CPX1205 platform.
- Slot 4 is used for the CPU on the CPX1204 platform.

Signal naming conventions for the CPX1200 Series backplane are as follows:

- Signals with a leading underscore (_) are prefixed with a bus name as noted. For instance, _FRAME# on CompactPCI bus is CPCI_FRAME#.
- Signals with trailing # are low-true. Signals of the same name but without the # are complementary and separate signals.
- Signals with [n] are unique signals in like connectors. The [n] is replaced by the instance (slot number). For example BD_SEL[n]# is BD_SEL1# in slot 1, and BD_SEL5# in slot 5.

CPX1204 4-Slot System with Drive Module

P5 - Slots 1-3 (I/O Connectors)

In the front I/O slots (system slots 1-4) connectors P5, P4, and P3 are reserved for user I/O. Connectors P2 and P1 carry the CompactPCI bus.

Table 9-1. P5 Connector, Slots 1-3 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
22-1	I/O	I/O	I/O	I/O	I/O
All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.					

P4 - Slots 1-3 (I/O Connectors)

Table 9-2. P4 Connector, I/O Slots 1-3 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
25-15	I/O	I/O	I/O	I/O	I/O
14 -12	**KEY AREA**				
11-1	I/O	I/O	I/O	I/O	I/O
All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.					

P3 - Slots 1-3 (I/O Connectors)

Table 9-3. P3 Connector, I/O Slots 1-3 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
19-1	I/O	I/O	I/O	I/O	I/O

All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.

P2 - Slots 1-3 (I/O Connectors)

Table 9-4. P2 Connector, I/O Slots 1-3 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
22	GA4	GA3	GA2	GA1	GA0
21		GND	RSV [2]	RSV	RSV
20		GND	RSV	GND	RSV
19	GND	GND	RSV	RSV	RSV
18	_BRSVP2A18	_BRSVP2B18	_BRSVP2C18	GND	_BRSVP2E18
17	_BRSVP2A17	GND			
16	_BRSVP2A16	_BRSVP2B16			_BRSVP2E16
15	_BRSVP2A15	GND			
14	_AD[35][1]	_AD[34]	_AD[33]	GND	_AD[32]
13	_AD[38]	GND	VIO	_AD[37]	_AD[36]
12	_AD[42]	_AD[41]	_AD[40]	GND	_AD[39]
11	_AD[45]	GND	VIO	_AD[44]	_AD[43]
10	_AD[49]	_AD[48]	_AD[47]	GND	_AD[46]
9	_AD[52]	GND	VIO	_AD[51]	_AD[50]
8	_AD[56]	_AD[55]	_AD[54]	GND	_AD[53]
7	_AD[59]	GND	VIO	_AD[58]	_AD[57]
6	_AD[63]	_AD[62]	_AD[61]	GND	_AD[60]
5	_C/BE[5]#	GND	VIO	_C/BE[4]#	_PAR64

1. All bussed signals are CompactPCI
2. Signals RSV are not connected
3. Signals _BRSVxxx are bussed but not used
4. Open spaces are NC

Table 9-4. P2 Connector, I/O Slots 1-3 (CPCI Bus) (Continued)

POS	Row A	Row B	Row C	Row D	Row E
4	VIO	_BRSVP2B4	_C/BE[7]#	GND	_C/BE[6]
3		GND			
2					
1		GND			

1. All bussed signals are CompactPCI
2. Signals RSV are not connected
3. Signals _BRSVxxx are bussed but not used
4. Open spaces are NC

P1 - Slots 1-3 (I/O Connectors)

Table 9-5. P1 Connector, I/O Slots 1-3 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
25	5V	_REQ64#	A_ENUM#	3.3V	5V
24	_AD[1]	5V	VIO	_AD[0]	_ACK64#
23	3.3V	_AD[4]	_AD[3]	5V	_AD[2]
22	_AD[7]	GND	3.3V	_AD[6]	_AD[5]
21	3.3V	_AD[9]	_AD[8]	_M66EN	_C/BE[0]#
20	_AD[12]	GND	VIO	_AD[11]	_AD[10]
19	3.3V	_AD[15]	_AD[14]	GND	_AD[13]
18	_SERR#	GND	3.3V	_PAR	_C/BE[1]
17	3.3V	_SDONE	_SBO#	GND	_PERR#
16	_DEVSEL#	GND	VIO	_STOP#	_LOCK#
15	3.3V	_FRAME#	_IRDY#	_BD_SEL[n]#	_TRDY#
14-12	**KEY AREA**				
11	_AD[18}	_AD[17]	_AD[16]	GND	_C/BE[2]#
10	_AD[21]	GND	3.3V	_AD[20]	_AD[19]
9	_C/BE[3]	_IDSEL	_AD[23]	GND	_AD[22]
8	_AD[26]	GND	VIO	_AD[25]	_AD[24]
7	_AD[30]	_AD[29]	_AD[28]	GND	_AD[27]
6	REQ[N]#	GND	3.3V	_CLK[N]	_AD[31]
5	_BRSVP1A5	_BRSVP1B5	_RST[N]#	GND	_GNT[N]#
4	_BRSVP1A4	HLTY[N]#	VIO	_INTP	_INTS
3	_INTA#	_INTB#	_INTC#	5V	_INTD#
2	TCK	5V	TMS	TDO	TDI
1	5V	-12V	TRST#	+12V	5V

Notes:
1. All bussed signals are CompactPCI.
2. Signals RSV are not connected. Signals CPCI_ BRSVxxx are bussed but no used. Open spaces are NC.
3. See CompactPCI Specification for JTAG signals.
4. All BD_SEL# are ground. HLTY# is open bypassed with 0.01 uF at each slot.

P5 - Slot 4 (CPU) Connector

Slot 4 is wired as a system slot in the CPX1204 system. The SYS_EN#

signal is grounded for future use with universal CPUs. The P5, P4, and P3 connectors have long tails and rear shrouds; P5 has embedded connections in the backplane. P2 and P1 are standard tail. The signals are used internally and are not connected in the RTM.

Table 9-6. P5 Connector IDE-Floppy, Slot 4 (CPU)

Pin	Row A	Row B	Row C	Row D	Row E
22	PBRESET	I/O	I/O	I/O	I/O
21-13	I/O	I/O	I/O	I/O	I/O
12	COM1_RTS	COM1_CTS	COM1_RI	I/O	COM1_DRT
11	COM1_DCD	I/O	COM1_RxD	COM1_DSR	COM1_TxD
10	FL_TR0	FL_WPROT_L	FL_RDATA_L	FL_HDSEL_L	FL_DSKCG_L
9	FL_MTR1_L	FL_DIR_L	FL_STEP_L	FL_WDATA_L	FL_WGATE_L
8	RSV1	FL_INDEX_L	FL_MTR0	FL_DS1_L	FL_DS0_L
7	IDE_CS1FX_L	IDE_CS3FX_L	IDE_DA1	IDE_DSAP_L	RSV2
6	IDE_IOCS16_L	GND	IDE_PDIAG_L	IDE_DA0	IDE_DA2
5	IDE_DMARQ	IDE_IORDY	IDE_DIOW_L	IDE_DMACK_L	IDE_DIOR_L
4	IDE_D14	IDE_D0	GND	IDE_D15	IDE_INTRQ
3	IDE_D3	IDE_D12	IDE_D2	IDE_D13	IDE_D1
2	IDE_D9	IDE_D5	IDE_D10	IDE_D4	IDE_D11
1	I/O	IDE_RST_L	IDE_D7	IDE_D8	IDE_D6

IDE, FL, and COM1 are used in the CPX1205 chassis.
Note: RSV1 and RSV2 are bussed for legacy support of disk size selection.

P4 - Slot 4 (CPU) Connector

Table 9-7. P4 Connector, Slot 4 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
25-15	I/O	I/O	I/O	I/O	I/O
14 -12	**KEY AREA**				
11-1	I/O	I/O	I/O	I/O	I/O

All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.

P3 - Slot 4 (CPU) Connector

Table 9-8. P3 Connector, Slot 4 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
19-1	I/O	I/O	I/O	I/O	I/O

All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.

P2 - Slot 4 (CPU) Connector

Table 9-9. P2 Connector, Slot 4 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
22	GA4	GA3	GA2	GA1	GA0
21	CLK6	GND	RSV[2]	RSV	RSV
20	CLK5	GND	RSV	GND	RSV
19	GND	GND	RSV	RSV	RSV
18	_BRSVP2A18	_BRSVP2B18	_BRSVP2C18	GND	_BRSVP2E18
17	_BRSVP2A17	GND	(_PRST#)[4]	REQ6#	GNT#6
16	_BRSVP2A16	_BRSVP2B16	(_DEG#)	GND	_BRSVP2E16
15	_BRSVP2A15	GND	(_FAL#)	REQ5#	GNT5#
14	_AD[35][1]	_AD[34]	_AD[33]	GND	_AD[32]
13	_AD[38]	GND	VIO	_AD[37]	_AD[36]

1. All bussed signals are CompactPCI
2. Signals RSV are not connected
3. Signals _BRSVxxx are bussed but not used
4. Open spaces are NC

Table 9-9. P2 Connector, Slot 4 (CPCI Bus) (Continued)

POS	Row A	Row B	Row C	Row D	Row E
12	_AD[42]	_AD[41]	_AD[40]	GND	_AD[39]
11	_AD[45]	GND	VIO	_AD[44]	_AD[43]
10	_AD[49]	_AD[48]	_AD[47]	GND	AD[46]_
9	_AD[52]	GND	VIO	_AD[51]	_AD[50]
8	_AD[56]	_AD[55]	_AD[54]	GND	_AD[53]
7	_AD[59]	GND	VIO	_AD[58]	_AD[57]
6	_AD[63]	_AD[62]	_AD[61]	GND	_AD[60]
5	_C/BE[5]#	GND	VIO	_C/BE[4]#	_PAR64
4	VIO	_BRSVP2B4	_C/BE[7]#	GND	_C/BE[6]
3	CLK4	GND	GNT3#	REQ4#	GNT4#
2	CLK2	CLK3	_SYSEN#	GNT2#	REQ3#
1	CLK1	GND	REQ1#	GNT1#	REQ2#

1. All bussed signals are CompactPCI
2. Signals RSV are not connected
3. Signals _BRSVxxx are bussed but not used
4. Open spaces are NC

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P1 - Slot 4 (CPU) Connector

Table 9-10. P1 Connector, Slot 4 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
25	5V	_REQ64#	A_ENUM#	3.3V	5V
24	_AD[1]	5V	VIO	_AD[0]	A_CK64#
23	3.3V	_AD[4]	_AD[3]	5V	AD[2]_
22	_AD[7]	GND	3.3V	_AD[6]	_AD[5]
21	3.3V	_AD[9]	_AD[8]	_M66EN	_C/BE[0]#
20	_AD[12]	GND	VIO	_AD[11]	_AD[10]
19	3.3V	_AD[15]	_AD[14]	GND	_AD[13]
18	_SERR#	GND	3.3V	_PAR	_C/BE[1]

Notes:
1. All bussed signals are CompactPCI
2. Signals RSV are not connected. Signals _BRSVxxx are bussed but not used. Open spaces are NC.
3. See CompactPCI specification for JTAG signals.
4. CLK/REQ/GNT signals connect between slots 4 and 5.
5. BD_SEL# is grounded. HLTY# is open and bypassed with 0.01 uF at each slot.

Table 9-10. P1 Connector, Slot 4 (CPCI Bus) (Continued)

POS	Row A	Row B	Row C	Row D	Row E
17	3.3V	_SDONE	_SBO#	GND	_PERR#
16	_DEVSEL#	GND	VIO	_STOP#	_LOCK#
15	3.3V	_FRAME#	_IRDY#	_BD_SEL[n]#	_TRDY#
14-12	**KEY AREA**				
11	_AD[18}	_AD[17]	_AD[16]	GND	_C/BE[2]#
10	AD[21]_	GND	3.3V	_AD[20]	_AD[19]
9	_C/BE[3]	_IDSEL	_AD[23]	GND	_AD[22]
8	_AD[26]	GND	VIO	_AD[25]	_AD[24]
7	_AD[30]	_AD[29]	_AD[28]	GND	_AD[27]
6	REQ[N]#	GND	3.3V	_CLK [4]	AD[31]_
5	_BRSVP1A5	_BRSVP1B5	RST[N]#	GND	GNT[N]#
4	_BRSVP1A4	HLTY[N]# [5]	VIO	_INTP	_INTS
3	_INTA#	_INTB#	_INTC#	5V	_INTD#
2	TCK [2]	5V	TMS	TDO	TDI
1	5V	-12V	TRST#	+12V	5V

Notes:

1. All bussed signals are CompactPCI
2. Signals RSV are not connected. Signals _BRSVxxx are bussed but not used. Open spaces are NC.
3. See CompactPCI specification for JTAG signals.
4. CLK/REQ/GNT signals connect between slots 4 and 5.
5. BD_SEL# is grounded. HLTY# is open and bypassed with 0.01 uF at each slot.

Drive Module Slot 5(

Table 9-11. Drive Module Slot 5

Pin	Row A	Row B	Row C	Row D	Row E
22-11	NC	NC	NC	NC	NC
10	FL_TR0	FL-WPROT_L	RL_RDATA_L	RL_HDSEL_L	FL_DSKICG_L
9	FL_MTR1_L	FL_DIR_L	FL_STEP_L	FL_WDATA_L	FL_WGATE_L
8	RSV1	FL_INDEX_L	FL_MTR0	FL_DS1_L	FL_DS0_L
7	IDE_CS1FX_L	IDE_CS3FX_L	IDE_DA1	IDE_DSAP_L	RSV2
6	IDE_IOCS16_L	GND	IDE_PDIAG_L	IDE_DA0	IDE_DA2
5	IDE_DMARQ	IDE_IORDY	IDE_DIOW_L	IDE_DMACK_L	IDE_DIOR_L
4	IDE_D14	IDE_D0	GND	IDE_D15	IDE_INTRQ
3	IDE_D3	IDE_D12	IDE_D2	IDE_D13	IDE_D1
2	IDE_D9	IDE_D5	IDE_D10	IDE_D4	IDE_D11
1	NC	IDE_RST_L	IDE_D7	IDE_D8	IDE_D6

P2 - Drive Module Slot 5 (CompactPCI)

Table 9-12. P2 Connector, Slot 5 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
22	GA4	GA3	GA2	GA1	GA0
21		GND	RSV[2]	RSV	RSV
20		GND	RSV	GND	RSV
19	GND	GND	RSV	RSV	RSV
18	BRSVP2A18	BRSVP2B18	BRSVP2C18	GND	BRSVP2E18
17	BRSVP2A17	GND			
16	BRSVP2A16	BRSVP2B16			BRSVP2E16
15	BRSVP2A15	GND			
14	AD[35][1]	AD[34]	AD[33]	GND	AD[32]
13	AD[38]	GND	VIO	AD[37]	AD[36]
12	AD[42]	AD[41]	AD[40]	GND	AD[39]

1. Bussed Signals beginning with an underscore (_) are CompactPCI
2. Signals RSV are not connected. Signals beginning with _BRSV are bussed, but not used.
Open spaces are not connected.
3. See specification for JTAG signals.
4. All BD_SEL# are ground, HLTY# is open, bypassed w/0.01uF at each slot.

Table 9-12. P2 Connector, Slot 5 (CPCI Bus) (Continued)

POS	Row A	Row B	Row C	Row D	Row E
11	AD[45]	GND	VIO	AD[44]	AD[43]
10	AD[49]	AD[48]	AD[47]	GND	AD[46]
9	AD[52]	GND	VIO	AD[51]	AD[50]
8	AD[56]	AD[55]	AD[54]	GND	AD[53]
7	AD[59]	GND	VIO	AD[58]	AD[57]
6	AD[63]	AD[62]	AD[61]	GND	AD[60]
5	C/BE[5]#	GND	VIO	C/BE[4]#	PAR64
4	VIO	BRSVP2B4	C/BE[7]#	GND	C/BE[6]
3		GND			
2					
1		GND			

1. Bussed Signals beginning with an underscore (_) are CompactPCI
2. Signals RSV are not connected. Signals beginning with _BRSV are bussed, but not used.
Open spaces are not connected.
3. See specification for JTAG signals.
4. All BD_SEL# are ground, HLTY# is open, bypassed w/0.01uF at each slot.

P1 - Drive Module Slot 5 (CompactPCI)

Table 9-13. P1 Connector, Slot 5 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
25	5V	_REQ64#	A_ENUM#	3.3V	5V
24	AD[1]	5V	VIO	AD[0]	ACK64#
23	3.3V	AD[4]	AD[3]	5V	AD[2]
22	AD[7]	GND	3.3V	AD[6]	AD[5]
21	3.3V	AD[9]	AD[8]	_M66EN	C/BE[0]#
20	AD[12]	GND	VIO	AD[11]	AD[10]
19	3.3V	AD[15]	AD[14]	GND	AD[13]
18	_SERR#	GND	3.3V	PAR	C/BE[1]
17	3.3V	_SDONE	_SBO#	GND	PERR#
16	_DEVSEL#	GND	VIO	_STOP#	_LOCK#
15	3.3V	_FRAME#	IRDY#	BD_SEL[n]# [4]	TRDY#
14-12	**KEY AREA**				
11	AD[18}	AD[17]	AD[16]	GND	C/BE[2]#

Table 9-13. P1 Connector, Slot 5 (CPCI Bus) (Continued)

POS	Row A	Row B	Row C	Row D	Row E
10	AD[21]	GND	3.3V	AD[20]	AD[19]
9	C/BE[3]	IDSEL	AD[23]	GND	AD[22]
8	AD[26]	GND	VIO	AD[25]	AD[24]
7	AD[30]	AD[29]	AD[28]	GND	AD[27]
6	REQ[N]#	GND	3.3V	CLK[N]	AD[31]
5	_BRSVP1A5	_BRSVP1B5	RST[N]#	GND	GNT[N]#
4	_BRSVP1A4	HLTY[N]# [4]	VIO	INTP	INTS
3	INTA#	INTB#	INTC#	5V	INTD#
2	TCK [3]	5V	TMS	TDO	TDI
1	5V	-12V	TRST#	+12V	5V

CPX1205 5-Slot System (with H.110 Bus)

P5 - Slot 5 (CPU) Connector - CPX1205

Slot 5 is a system host slot in the CPX1205 system. The SYS_EN# signals are grounded for future compatibility with universal CPUs. This connector routes the user I/O signals from front to rear, with exceptions as listed below.

Table 9-14. P5 Connector, Slot 5 (CPU)

POS	Row A	Row B	Row C	Row D	Row E
22-21	I/O	I/O	I/O	I/O	I/O
20	I/O	SMBDATA	SMBCLK	I/O	SMBALERT
19-12	I/O	I/O	I/O	I/O	I/O
11	I/O	I/O	RX2-	I/O	TX2-
10-1	I/O	I/O	I/O	I/O	I/O

P4 - Slots 1-4 (User I/O) Connector - Standard Backplane

Table 9-15. P4 Connector, I/O Slots 1-4 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
25-15	I/O	I/O	I/O	I/O	I/O
14-12	**KEY AREA**				
11-1	I/O	I/O	I/O	I/O	I/O

All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.

P4 - Connector for CPX1205 - H.110 Backplane

The H.110 bus passes through connector P4 across the I/O slots. It does not connect to the CPU slot. It is a special front-side only connector.

Table 9-16. P4 Connector, H.110

POS	Row A	Row B	Row C	Row D	Row E
25	SGA4	SGA3	SGA2	SGA1	SGA0
24	GA4	GA3	GA2	GA1	GA0
23	+12V	CT_RST[n]#	CT_EN[n]#	-12V	CT_MC
22	PSF0#	RSVD	RSVD	RSVD	RSVD
21	-SELVbat	PSF1#	RSVD	RSVD	SELVbat RTN
20	NP	NP	NP	NP	NP
19	NP	NP	NP	NP	NP
18	VRG	NP	NP	NP	VRG RTN
17	NP	NP	NP	NP	NP
16	NP	NP	NP	NP	NP
15	-Vbat	NP	NP	NP	Vbat RTN
14-12	**Key Area**				
11	CT_D29	CT_D30	CT_D31	V(I/O)	CT_FRAME_A#
10	CT_D27	+3.3V	CT_D28	+5V	CT_FRAME_B#

NP=Not Populated. P4 implements the full H.110 Bus connections, which requires P4 to use depopulated connectors.
CT_RST1# through CT_RST6# are routed radially to the bridge slots.
CT_EN1# is connected to BD_SEL1# on the backplane, and so forth.
[n]=n is the slot number.
Refer to the H.110 specifications for line terminations.

Table 9-16. P4 Connector, H.110

POS	Row A	Row B	Row C	Row D	Row E
9	CT_D24	CT_D25	CT_D26	GND	FR_COMP#
8	CT_D21	CT_D22	CT_D23	+5V	CT_C8_A
7	CT_D19	+5V	CT_D23	GND	CT_C8_A
6	CT_D16	CT_D17	CT_D18	GND	CT_NETREF_1
5	CT_D13	CT_D14	CT_D15	+3.3V	CT_NETREF_2
4	CT_D11	+5V	CT_D12	+3.3V	SCLK
3	CT_D8	CT_D9	CT_D10	GND	SCLK-D
2	CT_D4	CT_D5	CT_D6	CT_D7	GND
1	CT_D0	+3.3V	CT_D1	CT_D2	CT_D3

NP=Not Populated. P4 implements the full H.110 Bus connections, which requires P4 to use depopulated connectors.
CT_RST1# through CT_RST6# are routed radially to the bridge slots.
CT_EN1# is connected to BD_SEL1# on the backplane, and so forth.
[n]=n is the slot number.
Refer to the H.110 specifications for line terminations.

P3 - Slots 1-4 (User I/O) Connector

Table 9-17. P3 Connector, I/O Slots 1-4 (User I/O)

POS	Row A	Row B	Row C	Row D	Row E
19-1	I/O	I/O	I/O	I/O	I/O

All I/O pins pass through the backplane to the transition module; they do not make any connection to the backplane.

P2 - Slots 1-4 (CompactPCI Bus) Connector

Table 9-18. P2 Connector, I/O Slots 1-4 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
22	GND (GA4)	GND (GA3)	NC (GA2)	GND (GA1)	NC (GA0)
21	NC (RSV1)	GND (RSV1)	NC (RSV1)	NC (RSV1)	NC (RSV1)
20	NC (RSV1)	GND (RSV1)	NC (RSV1)	GND	NC (RSV1)
19	GND (RSV1)	GND (RSV1)	SMBDATA (RSV1)	SMBCLK (RSV1)	SMBALERT (RSV1)
18	BRSV17	BRSV16	BRSV15	GND	BRSV14
17	BRSV6	GND	PRST# (RSV1)	NC (RSV1)	NC (RSV1)
16	BRSV9	BRSV8	NC (RSV1)	GND	BRSV7
15	BRSV12	GND	NC (RSV1)	NC (RSV1)	NC (RSV1)
14	AD[35]	AD[34]	AD[33]	GND	AD[32]
13	AD[38]	GND	VIO	AD[37]	AD[36]
12	AD[42]	AD[41]	AD[40]	GND	AD[39]
11	AD[45]	GND	VIO	AD[44]	AD[43]
10	AD[49]	AD[48]	AD[47]	GND	AD[46]
9	AD[52]	GND	VIO	AD[51]	AD[50]
8	AD[56]	AD[55]	AD[54]	GND	AD[53]
7	AD[59]	GND	VIO	AD[58]	AD[57]
6	AD[63]	AD[62]	AD[61]	GND	AD[60]
5	C/BE[5]#	GND (64EN#)	VIO	C/BE[4]#	PAR64
4	VIO	BRSV13	C/BE[7]#	GND	C/BE[6]
3	NC (RSV1)	GND	GNT3# (RSV1)	NC (RSV1)	NC (RSV1)
2	CLK2 (RSV1)	CLK3 (RSV1)	GND (SYSEN#)	GNT2# (RSV1)	REQ3# (RSV1)
1	CLK1 (RSV1)	GND	REQ1# (RSV1)	GNT1# (RSV1)	REQ2# (RSV1)

NOTES:
Signals NC are not connected.
Parentheses indicates signal names in the format, backplane connection.
SMB* signals have resistor population options to connect them.

P1 - Slots 1-4 (CompactPCI) Connector

Table 9-19. P1 Connector, I/O Slots 1-4 (CPCI Bus)

POS	Row A	Row B	Row C	Row D	Row E
25	5V	REQ64#	ENUM#	3.3V	5V
24	AD[1]	5V	VIO[1]	AD[0]	ACK64#
23	3.3V	AD[4]	AD[3]	5V[1]	AD[2]
22	AD[7]	GND (64EN#)	3.3V[1]	AD[6]	AD[5]
21	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#
20	AD[12]	GND	VIO	AD[11]	AD[10]
19	3.3V	AD[15]	AD[14]	GND[1]	AD[13]
18	SERR#	GND	3.3V	PAR	C/BE[1]
17	3.3V	IPMB_SCL	IPMB_SDA	GND[1]	PERR#
16	DEVSEL#	GND (PCIXCAP)	VIO	STOP#	LOCK#2
15	3.3V	FRAME#	IRDY#	GND (BD_SEL)#	TRDY#
14-12	**KEY AREA**				
11	AD[18}	AD[17]	AD[16]	GND[1]	C/BE[2]#
10	AD[21]	GND	3.3V	AD[20]	AD[19]
9	C/BE[3]	NC (IDSEL)	AD[23]	GND[1]	AD[22]
8	AD[26]	GND	VIO	AD[25]	AD[24]
7	AD[30]	AD[29]	AD[28]	GND[1]	AD[27]
6	REQ0#	GND (PCI_PRSNT)	3.3V[1]	CLK0	AD[31]
5	BRSV3	BRSV1	RST#	GND[1]	GNT0#
4	IPMB_PWR	HLTY#	VIO[1]	INTP	INTS
3	INTA	INTB#	INTC#	5V[1]	INTD#
2	TCK	5V	TMS	TDI	TDO
1	5V	-12V	TRST#	+12V	5V

1. Early power pins.

NOTES:

Signals NC are not connected.

Parentheses indicates signal names in the format, backplane connection.

HEALTHY# is connected to a 0.01 uF capacitor.

REQ64# and ACK64# have resistor population options to connect normally to other slots or to pull up to VIO.

Alarm Module and Rear Fan Alarm Module Connectors

The Alarm Module backplane connector is a Molex Mini-Fit Jr. with a 24 pin dual row.

Table 9-20. Pinouts for the Alarm Board Backplane Connector

Signal Description	Pin	Pin	Signal Description
+5V	1	13	GND
+5V	2	14	GND
PBRESET	3	15	PS inhibit
Inlet Fan Module Present	4	16	power good
Fan 1 Tach	5	17	GND (signal)
Reserved	6	18	SMB CLK
Fan 2 Tach	7	19	SMB DATA
CPU COM2 RxD	8	20	SMB ALERT
CPU COM2 TxD	9	21	GND
+3.3V	10	22	-12V
+12V	11	23	GND
+12V	12	24	GND

The rear fan connector is a Molex Mini-Fit Jr. with an 10 pin dual row.

Table 9-21. Alarm Board Rear Fan Connector (J11)

Signal	Pin	Pin	Signal
Fan -12V RTN	1	6	-12V
-12V	2	7	Fan 4 Tach
Fan 3 Tach	3	8	No connection
Rear Fan Module Present	4	9	No connection
-12V RTN	5	10	No connection
		7	Fan 4 Tach

CPX1204 Drive Module Connectors

Table 9-22. Pinouts for the Drive Module Backplane Connector (P5)

Pin	Row A	Row B	Row C	Row D	Row E
22	+12V	+12V	+12V	+12V	+12V
11 - 21	NC	NC	NC	NC	NC
10	FL_TR0_L	FL_WPROT_L	FL_RDATA_L	FL_HDSEL_L	FL_DSKCG_L
9	FL_MTR1_L	FL_DIR_L	FL_STEP_L	FL_WDATA_L	FL_WGATE_L
8	NC	FL_INDEX_L	FL_MTR0	FL_DS1_L	FL_DS0_L
7	IDE_CS1FX_L	IDE_CS3FX_L	IDE_DA1	IDE_DSAP_L	NC
6	IDE_IOCS16_L	GND	IDE_PDIAG_L	IDE_DA0	IDE_DA2
5	IDE_DMARQ	IDE_IORDY	IDE_DIOW_L	IDE_DMACK_L	IDE_DIOR_L
4	IDE_D14	IDE_D0	GND	IDE_D15	IDE_INTRQ
3	IDE_D3	IDE_D12	IDE_D2	IDE_D13	IDE_D1
2	IDE_D9	IDE_D5	IDE_D10	IDE_D4	IDE_D11
1	NC	IDE_RST_L	IDE_D7	IDE_D8	IDE_D6

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Table 9-23. Pinouts and Signal Descriptions for 40 Pin IDE Connector

Signal Description	Pin	Pin	Signal Description
IDE_RST#	1	2	GND
IDE_D7	3	4	IDE_D8
IDE_D6	5	6	IDE_D9
IDE_D5	7	8	IDE_D10
IDE_D4	9	10	IDE_D11
IDE_D3	11	12	IDE_D12
IDE_D2	13	14	IDE_D13
IDE_D1	15	16	IDE_D14
IDE_D0	17	18	IDE_D15
GND	19	20	Key (Pin Missing)
IDE_DMARQ	21	22	GND
IDE_DIOW#	23	24	GND

Table 9-23. Pinouts and Signal Descriptions for 40 Pin IDE Connector

Signal Description	Pin	Pin	Signal Description
IDE_DIOR#	25	26	GND
IDE_IORDY	27	28	Not connected
IDE_DMACK#	29	30	GND
IDE_INTRQ	31	32	IDE_IOCS16#
IDE_DA1	33	34	IDE_PDIAG#
IDE_DA0	35	36	IDE_DA2
IDE_CS1FX#	37	38	IDE_CS3FX#
IDE_DASP#	39	40	GND

Table 9-24. Pinouts and Signal Descriptions for 44 Pin IDE Connector

Signal Description	Pin	Pin	Signal Description
IDE_RST#	1	2	GND
IDE_D7	3	4	IDE_D8
IDE_D6	5	6	IDE_D9
IDE_D5	7	8	IDE_D10
IDE_D4	9	10	IDE_D11
IDE_D3	11	12	IDE_D12
IDE_D2	13	14	IDE_D13
IDE_D1	15	16	IDE_D14
IDE_D0	17	18	IDE_D15
GND	19	20	Key (Pin Missing)
IDE_DMARQ	21	22	GND
IDE_DIOW#	23	24	GND
IDE_DIOR#	25	26	GND
IDE_IORDY	27	28	Not connected
IDE_DMACK#	29	30	GND
IDE_INTRQ	31	32	IDE_IOCS16#
IDE_DA1	33	34	IDE_PDIAG#

Table 9-24. Pinouts and Signal Descriptions for 44 Pin IDE Connector

Signal Description	Pin	Pin	Signal Description
IDE_DA0	35	36	IDE_DA2
IDE_CS1FX# (CS0#)	37	38	IDE_CS3FX# (CS01#)
IDE_DASP#	39	40	GND
+5V	41	42	+5V
GND	43	55	NC

Table 9-25. Pinouts and Signal Descriptions for 68 Pin SCSI Connector

Pin	Signal Description	Pin	Signal Des	Pin	Signal
1	GND	28	GND	55	ATN*
2	GND	29	GND	56	GND
3	GND	30	GND	57	BSY*
4	GND	31	GND	58	ACK*
5	GND	32	GND	59	RST*
6	GND	33	GND	60	MSG*
7	GND	34	GND	61	SEL*
8	GND	35	DB12*	62	C/D
9	GND	36	DB13*	63	REQ*
10	GND	37	DB14*	64	I/O*
11	GND	38	DB15*	65	DB8*
12	GND	39	DBP1*	66	DB9*
13	GND	40	DB0*	67	DB10*
14	GND	41	DB1*	68	DB11*
15	GND	42	DB2*		
16	GND	43	DB3*		
17	TERMPWR	44	DB4*		
18	TERMPWR	45	DB5*		
19	TERMPWR	46	DB6*		

Table 9-25. Pinouts and Signal Descriptions for 68 Pin SCSI Connector

Pin	Signal Description	Pin	Signal Des	Pin	Signal
20	GND	47	DB7*		
21	GND	48	DBP0*		
22	GND	49	GND		
23	GND	50	GND		
24	GND	51	TERMPWR		
25	GND	52	TERMPWR		
26	GND	53	RESERVED		
27	GND	54	GND		

Table 9-26. Pinouts and Signal Descriptions for 50 Pin SCSI Connector

Signal Description	Pin	Pin	Signal Description
GND	1	26	TERMPWR
DB0*	2	27	Not connected
GND	3	28	GND
DB1*	4	29	GND
GND	5	30	GND
DB2*	6	31	GND
GND	7	32	ATN*
DB3*	8	33	GND
GND	9	34	GND
DB4*	10	35	GND
GND	11	36	BSY*
DB5*	12	37	Not connected
GND	13	38	ACK*
DB6*	14	39	Not connected
GND	15	40	RST*
DB7*	16	41	GND

Table 9-26. Pinouts and Signal Descriptions for 50 Pin SCSI Connector

Signal Description	Pin	Pin	Signal Description
GND	17	42	MSG*
DBP0*	18	43	GND
GND	19	44	SEL*
GND	20	45	GND
GND	21	46	C/D*
GND	22	47	GND
Not connected	23	48	REQ*
GND	24	49	GND
Not connected	25	50	I/O*

Table 9-27. Pinouts and Signal Descriptions for Floppy Connectors

Signal Description	Pin	Pin	Signal Description
GND	1	2	Not connected
GND	3	4	Not connected
Key (Pin Missing)	5	6	Not connected
GND	7	8	F_INDEX#
GND	9	10	F_MTR0#
GND	11	12	F_DS1#
GND	13	14	F_DS0#
GND	15	16	F_MTR1#
GND	17	18	F_DIR#
GND	19	20	F_STEP#
GND	21	22	F_WDATA#
GND	23	24	F_WGATE#
GND	25	26	F_TR0#

Table 9-27. Pinouts and Signal Descriptions for Floppy Connectors

Signal Description	Pin	Pin	Signal Description
GND	27	28	F_WPROT#
GND	29	30	F_RDATA#
GND	31	32	F_HDSEL#
GND	33	34	F_DSKCHG#

Table 9-28. Pinouts and Signal Descriptions for EIDE Drives Power Connectors

Pin	Signal Description
1	+5V
2	GND
3	GND
4	+12V

CPX1200 Power Supply

The power supply connector provides power input to the power supply and power output from the power supply. It has staged pins for hot swap.

Table 9-29. Pinouts and Signal Descriptions for the CPX1204/1205 Power Supply

Signal Description	Pin	Pin	Signal Description
line/-48v RTN	1 [1]	2 [1]	Neutral/-48V
Chassis GND	3 [1]		
Not connected	4	5	-12V RTN
-12V	6	7	+5V/+3.3V Sense RTN
+3.3V Sense	8	9	PS Inhibit
Power Good	10	11	Fan 2 Tach
GND (signal)	12	13	Fan 1 Tach
Inlet Fan Mod Present	14	15	+5V Sense

Table 9-29. Pinouts and Signal Descriptions for the CPX1204/1205 Power Supply (Continued)

Signal Description	Pin	Pin	Signal Description
+12V	16	17	+12V RTN
Not connected	18	19	Not connected
		20 [2]	5V/3.3V RTN
+3.3V	21 [2]	22 [2]	+5V

Power Input and H.110 Special Voltages

The power input/H.110 connector is a 14-pin dual row Molex mini-fit BMI. It provides power input to the power supply via the backplane and H.110 voltages to the backplane.

Table 9-30. H.110 Voltages

Signal	Pin	Pin	Signal
Line / -48V RTN	1	8	Neutral / -48V
	2	9	
-SELVbat	3	10	SELVbat RTN
	4	11	
VRG	5	12	VRG RTN
	6	13	
-Vbat	7	14	Vbat RTN

Platform Specifications

A

Specifications for the CPX1200 Series Platform

A CompactPCI CPX1200 Series platform requires minimum maintenance and care to keep it operating properly. Place the unit within the appropriate temperature, humidity, and altitude ranges. For the best system performance, keep environmental parameters as close as possible to the middle of these environmental ranges. Environmental conditions should not change abruptly. Refer to Table A-1 on page A-2 for CPX1200 Series chassis specifications. Figure A-1 on page A-8 gives you a CPX1200 Series chassis dimension drawing.

The CPX1200 Series platforms are intended to meet the requirements of the Bellcore standards and the European Telecom Standard. Compliance statements and criteria can be found in *Network Equipment Building System (NEBS) Requirements* and *European Telecom Standards Institute (ETSI) Requirements* in this appendix.

Table A-1. Physical, Electrical, and Environmental Specifications CPX1200 Series System

Specifications	Description
Chassis Dimensions	19 inches wide flange to flange (482.6 mm) 17.524 inches wide side to side (445.1 mm) 5.219 inches high (132.6 mm) 17.13 inches deep (435.1 mm) not including power connectors and switches
Chassis Weight	34 lbs. (15.4 kg) fully loaded 27 lbs. (12.2 kg) without cards or peripherals
Backplane	- hot swap - PICMG 2.0 Rel 2.1 compliant - supports 32 or 64 bit PCI architectures - CPX1204 backplane: 3 - 6U x 4HP (.8 inch) adapter card slots 1 - 6U x 4HP (.8 inch) system CPU slot 1 - 6U x 8HP (1.6 inch) Drive Module or 3 - 6U x 4HP (.8 inch) adapter card slots 1 - 6U x 8HP or 12HP (1.6 or 2.4 inch) system CPU slot - CPX1205 backplane: 4 - 6U x 4HP (.8 inch) adapter card slots 1 - 6U x 4HP or 8HP (.8 or 1.6 inch) system CPU slot - ENUM signal (J1:C25) bussed per the PCI Industrial Computer Manufacturer's Group (PICMG) Hot Swap Specification[1] - individual clock lines to all adapter card slots per the PICMG Hot Swap Specification[1] - J1/J2 pin staging per the PICMG Hot Swap Specification[1]

[1] Refer to Internet URL http://www.picmg.org for information about the *PCI Industrial Computer Manufacturer's Group (PICMG) Hot Swap Specification.*

Table A-1. Physical, Electrical, and Environmental Specifications CPX1200 Series System (Continued)

Specifications	Description
Power Supply	Output: 200W MTBF>340,000 hours at 25ºC and full load 30A maximum combined: +5V (0.5A to 30A) +3.3V (0.5A to 15A) +3.3V Heavy (0.5A to 30A)
Power Distribution Panel	AC Input Version 85 to 264VAC input, 47 to 63Hz 2.0A maximum input current at 115VAC 1.0A maximum input current at 230VAC double pole rocker on/off switch (AC version) IEC standard 6A AC input receptacle DC Input Version -40VDC to -72VDC input 6.0 A maximum input current at -40VDC single pole on/off switch circuit breaker dual (redundant) input power terminal, diode protected
Input Voltage	85- 264Vac (AC version), 47- 63Hz -40Vdc to -72Vdc (-48Vdc version)

Network Equipment Building System (NEBS) Requirements

The CPX1200 Series systems comply with the Telcordia standards, Network Equipment Building System (NEBS) Requirements: Physical Protection, GR-63 and Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunication Equipment, GR-1089. We test the product to the requirements for NEBS Level 3 criteria.

Table A-2. NEBS Specifications

Criteria	Specification	Reference
Temperature	Normal: 5° C to 40° C Short-term: -5° C to 55° C	GR-63, R4-7
Relative Humidity	Normal: 5% to 85% Short-term: 5% to 90%	GR-63, R4-7
Office Vibration	0.1 G @ 5-100 Hz with 0.1 octave/min 1.5 G @ 100-500 Hz with 0.25 octave/min	GR-63, R4-56 GR-63, R4-57
Transportation Vibration	5-50 Hz with 0.1 octave/min 50-500 Hz with 0.25 octave/min	GR-63, R4-58
Earthquake	Zone 4	GR-63, R4-44 to O-55
Drop	Packaged: 600 mm drop height Unpackaged: 75 mm drop height	GR-63, R4-41 GR-63, R4-43
Load	N/A	N/A
Altitude	-60 to 1800 m ASL without temp. derating 1800 to 4000 m ASL with temp. derating	GR-63, R4-8 GR-63, R4-9 GR-63, O4-9
Acoustic Noise	60 dBA @ 600 mm	GR-63, O4-62
Heat Dissipation	Documentation 300/w/m^2/m max per shelf 38° C max. aisle-facing surface temp @ 26° C ambient	GR-63, R4-11 GR-63, R4-12 GR-63, O4-13
Fire Resistance and Materials	All material UL94V-1 or better. See GR-63, Section 4.2	GR-63, R4-14 to O4-40
Illumination	See GR-63, Section 4.7	GR-63, R4-63 to O4-69

Table A-2. NEBS Specifications (Continued)

Criteria	Specification	Reference
Airborne Contaminant	Sulfate: 30 µg/m^3 Nitrite: 12 µg/m^3 Volatile organics: 12 µg/m^3 Sulfur Dioxide: 12 ppb Hydrogen Sulfide: 40 ppb Ammonia: 50 ppb NO: 50 ppb NO_2: 250 ppb HNO_3: 50 ppb Ozone: 250 ppb HCL+Cl_2: 6 ppb	GR-63: R4-59, O4-60
Regulatory Conformance	Product Safety	UL1950, CSA 950, IEC 950, VDE 0805 and EN 6-950
	EMC	FCC Class A CISPR 22 Class B EN55022 Class B
	CE Mark	Per CE Directive for Class A computing equipment
	ESD	IEC 801-2

European Telecom Standards Institute (ETSI) Requirements

The CPX1200 Series systems comply with the requirements of the European Telecom Standard (ETSI), including, *Equipment Engineering (EE): Environmental Conditions and Environmental Tests for Telecommunications Equipment, ETS 300 019-1-3*. We test the product to the requirements for Class 3.2 equipment.

- Storage, ETS 300 019-1-1, for Class 1.2 equipment
- Transportation, ETS 300 019-1-2, for Class 3.2 equipment

Table A-3. ETSI Specification Compliance

Criteria	ETSI	
	Specification	Reference
Temperature	Storage: -25° to 55° C (-13° to 131° F) Transport: -40° to 70° C (-40° to 158° F) Operating: -5° to 45° C (23° to 113° F)	IEC68-2-1 IEC68-2-2 IEC68-2-14
Relative Humidity	Storage: 10% to 100% RH (non-condensing and condensing) Transport: 95% @ -40° C to 45° C (-40° to 113° F) Operating: 5% to 95% RH (non-condensing and condensing)	IEC68-2-56 IEC68-2-30
Vibration	Storage: 1.5 mm @ 2-9 Hz, 0.5 G @ 9-200 Hz Transport: sinusoidal: 3.5 mm @ 2-9 Hz, 1 G @ 9-200 Hz, 1.5 Gs @ 200-500 Hz Transport: random: 3 m^2/s^3 @ 10-200 Hz, 1 m^2/s^3 @ 200-2000 Hz Operating: 1.5 mm @ 2-9 Hz, 0.5 G @ 9-200 Hz	IEC68-2-6 IEC68-2-36
Shock	Storage: Type I: 4 Gs @ 22 ms Transport: Type I: 30 Gs @ 11 ms Operating: 4 Gs @ 22 ms	IEC68-2-27 IEC68-2-29
Drop	Transport: 1.2 m free fall	IEC 68-2-32
Load	Storage: 5 kPa Transport: 10 kPa	N/A

Table A-3. ETSI Specification Compliance (Continued)

Criteria	ETSI	
	Specification	Reference
Altitude	-471 to 3708 m ASL	N/A
Acoustic Noise	5.5 bels @ -5° to 30° C (23° to 86° F) (with plastic cover) 5.5 to 7.2 bels @ 30° to 45° C (86° to 113° F) (with plastic cover) 7.2 bels @ 1 m, above 45° C	ETS 300 753 ISO 7779
Fire Resistance and Materials	All material UL 94V-0 or better	UL 94V-0 UL94HF-1 BS2782 Part 1 (ISO 181)
Airborne Contaminant	SO2: 0.3/1.0 mg/m^3 H_2S: 0.1/0.5 mg/m^3 Salt mist: sea and road salt CL_2: 0.1/0.3 mg/m^3 HCl: 0.1/0.5 mg/m^3 NO_X: 0.5/5.0 mg/m^3 NH_3: 1.0/3.0 mg/m^3 HF: 0.01/0.03 mg/m^3 O_3: 0.05/0.1 mg/m^3 Dust sedimentation: 20 mg/m^2h Dust suspension: 5 mg/m^3	N/A

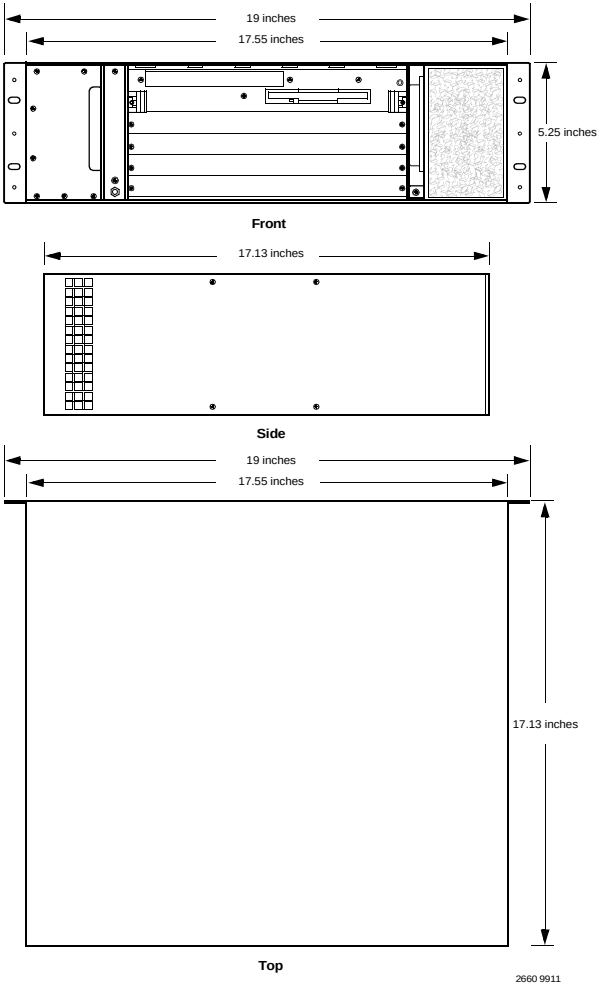


Figure A-1. Dimensions for the CPX1204/CPX1205 Chassis

CPX1200 Series System Starter Kits and Replacement Parts

B

Overview

This appendix gives you information about the Starter Kits that are available for the CPX1200 Series system. There are Starter Kits for both the PowerPC architecture and Intel architecture systems. Also, refer to Table B-2 for Field Replaceable Units (FRUs) and replacement part kits.

Table B-1. CPX1204T Starter Kits

For information about starter kit part number:	Description:	Go to Page:
CPX1204SK13	Pentium III® Network Bootable Starter Kit	B-4
CPX1204SK22	PowerPC® Network Bootable Starter Kit	B-4

Contact your local Motorola sales office or distributor to order FRUs or replacement parts using these marketing part numbers:

Table B-2. Field Replaceable Unit and Replacement Parts Kits

This FRU or Replacement Parts Kit (Marketing Part Number):	Includes:
CPX1200ALRMFNA-F/K	Alarm/exhaust fan module (with alarm)
CPX1200FAN-K	Fan module (without alarm)
CPX1200FANR-K	Rear fan
CPX1200FANF-K	Inlet fan module
CPX1200DC2PSFN-K	Power supply/inlet fan module (200W, DC)
CPX1200DC2DIST-K	Power Distribution Panel (200W, DC)
CPX1200FLTR-K	Inlet Fan Module (4 filter elements)
CPX1200AC2PSFN-K	Power supply/inlet fan module (200W, AC)
CPX1200AC2DIST-K	Power Distribution Panel (200W, AC)
CPX1200BZL-K	Bezel (two mounting brackets)
CPX1200BZLA-K	Bezel (alarm light pipes, two mounting brackets)

Table B-2. Field Replaceable Unit and Replacement Parts Kits (Continued)

This FRU or Replacement Parts Kit (Marketing Part Number):	Includes:
CPX1200MTBRKT-K	Chassis mid-mount position brackets
CPXFP-K	1 blank filler panel
CPX1204CAR-CK	CPX1204 EIDE drive carrier kit
CPX1204FLPY-K	1.44Mb, 3.5 inch floppy drive
CPX1204ECDROM-K	EIDE CD-ROM
CPX1204ES20GHD-K	20GB EIDE 2.5 inch Slim Line hard drive
CPX1204SCARA-K	Drive Carrier SCSI/EIDE/Floppy
CPXSCSI36G-K	36GB SCSI Drive Kit
DSKEIDE40G-K	40GB EIDE Drive Kit
DSEIDE80G-K	80GB EIDE Drive Kit
CPV5370-700-K	CPX5370-700 MHz CPU
CPX5350-500-K	CPX5350-500MHz CPU, 16MB EIDE Flash
CPX750HA-233-K	MCP750HA, 233MHz CPU
MCP750HA-466-K	MCP750HA, 466MHz CPU
CPX750HATM-K	MCP750HA, CPU Transition Module
CPV5350BTM80-EXT-K	CPV5350 CPU Transition Module
CPV5350BTM80-EXT-F	CPV5350 CPU Transition Module
CPTM-04-F	CPV5370 CPU Transition Module

Table B-3. MCP820 Memory Options

Memory Mezzanine	Memory Size	Compatible with	Location
MCP820-500-CK		RAM500-XXX	
RAM500-005	128MB	MCP820/MCP765/MVME5100	Top
RAM500-015	128MB	MCP820/MCP765/MVME5100	Bottom
RAM500-006	256MB	MCP820/MCP765/MVME5100	Top
RAM500-016	256MB	MCP820/MCP765/MVME5100	Bottom
RAM500-010	512MB	MCP820/MCP765/MVME5100	Top
RAM500-020	512MB	MCP820/MCP765/MVME5100	Bottom

For more information about replacement parts, contact your Motorola Sales Office or distributor.

Table B-4. CPV5370 Memory Options

Memory Mezzanine	Memory Size	Compatible with	Installation
CPMEZZ-256B	256MB	CPV5370	Bottom
CPMEZZ-256B-F	256MB	CPV5370	Factory install (bottom)
CPMEZZ-256T	256MB	CPV5370	Top
CPMEZZ-256T-F	256MB	CPV5370	Factory install (top)

Starter Kits

The starter kits are functional hardware platforms with the PPCBug firmware installed on each PowerPC architecture compatible CPU board and Phoenix BIOS on the Intel architecture CPU boards. The debugger and diagnostics perform board self-tests, including loop backs, register tests, and memory address/data tests.

The components of the starter kits are pr-installed so that you can install and power-up the system with a minimum amount of cabling and configuration.

CPX1204 System Starter Kits

The CPX1204 System Starter Kits include the either the CPX1204 or CPX1204T system assembly. This assembly is an 4-slot CompactPCI chassis with a hot swap backplane and 200W power supply.

These systems lets you use media-based booting via floppy, CD-ROM, or hard drive. You can connect to the CPU from the front or rear. The systems are NEBS compliant and include an alarm panel.

CPX1204SK13 Pentium III Disk Bootable Starter Kit

This system gives you a H.110 enabled, disk-bootable, NEBS compliant computing node with front-accessible serial ports and dual 10/100 Ethernet.

The CPX1204SK13 Starter Kit includes:

- CPX1204T CompactPCI Chassis
- 700 MHz Pentium III CPU with 128MB RAM
- 20GB EIDE hard disk
- CD-ROM drive
- Floppy drive
- AC power supply and front fan module
- AC power distribution panel
- Three available payload slots
- front and rear filler panels in unused slots
- Rear transition module for CPU

CPX1204SK22 PowerPC Disk Bootable Starter Kit

This system gives you a disk bootable, NEBS compliant computing node with front-accessible PMC, serial, and 10/100 Ethernet.

The CPX1204SK22 Starter Kit includes:

- CPX1204 CompactPCI Chassis
- 466 MHz MCP750 CPU with 128MB DRAM
- 20GB hard drive
- CD-ROM drive
- Floppy drive
- AC power supply and front fan module

- AC power distribution panel
- Three available payload slots
- Front and rear filler panels in unused slots
- Rear transition module for CPU

AC Power Cords

AC powered units ship with a separate AC power cord.

Table B-5. AC Power Cords

Description	Part Number
Australia and New Zealand	CORDANZ
Denmark	CORDDN
France	CORDFR
Germany	CORDFRG
Italy	CORDIT
Switzerland/Norway	CORDSW
United Kingdom (UK)	CORDUK
North America and Japan	CORDUS

Empfangen und Auspacken

Dem Gerät sollte eine Teileliste beiliegen, die alle im Lieferumfang des Systems enthaltenen Teile auflistet. Vergleichen Sie diese Teileliste mit den erhaltenen Teilen. Sollte die Teileliste mit den erhaltenen Teilen nicht übereinstimmen, benachrichtigen Sie unverzüglich den Lieferungsagenten und Motorola. Alle mit dem System bestellten Optionen sind werkseitig installiert und nicht separat auf der Teileliste aufgelistet. Bewahren Sie die Versandkartons auf, um sie ggf. wiederverwenden zu können.

Hinweis Falls die Versandkartons bei Empfang beschädigt sind, sollten Sie den Lieferungsagenten bitten, bei dem Auspacken und der Inspektion des Geräts anwesend zu sein.

1. Stellen Sie sicher, daß sich der Verpackungskarton in aufrechter Position befindet.
2. Schneiden Sie das Verpackungsklebeband vorsichtig mit einem Schneidemesser auf, und öffnen Sie dann den Karton.
3. Entfernen Sie die Kartonverpackung, das Schaumstoff-verpackungsmaterial und die schützende Plastikverpackung.
4. Heben Sie das Chassis vorsichtig aus dem Karton, und plazieren Sie es an dem gewünschten Aufstellungsort.

Richtlinien zum Aufstellen des Systems

Bei der Wahl des Systemstandorts empfiehlt es sich, folgende Punkte in Betracht zu ziehen:

1. Stabilität. Stellen Sie das System in einem Bereich auf, der vor übermäßigen Bewegungen und Erschütterungen geschützt ist.
2. Sicherheit. Installieren Sie das System im Hinblick auf Sicherheit. Sorgen Sie dafür, daß Kabel und Drähte den Zugang nicht behindern.
3. Zugang. Stellen Sie das System so auf, daß es problemlos gewartet werden kann. Bei Wartungsarbeiten ist Zugang zur Vorder- und Rückseite des Systems erforderlich.
4. Betriebsumgebung. Stellen Sie das System in einem Bereich auf, an dem es Hitze, Staub, Rauch und elektrostatischer Entladung (ESE) nicht ausgesetzt ist.
5. Kühlung. Lassen Sie Platz für eine ausreichende Luftzirkulation zur Kühlung. Stellen Sie sicher, daß vor und hinter dem System mindestens 10 cm Freiraum gelassen wird. (Zusätzliche Richtlinien zur Kühlung des Gerätes finden Sie im nächsten Abschnitt.)

Kühlen des Gehäuses

Es ist äußerst wichtig, daß alle Geräte eines Systems sachgemäß gekühlt werden. Die Eingangslufttemperatur der Systemkomponenten muß im allgemeinen unter 50º C (122º F) liegen. Interne, durch Gleichstrom betriebene Ventilatoren kühlen die Laufwerke und Module des Systems ab. Die Übergangsmodule an der Rückseite des Chassis werden durch natürliche Konvektion gekühlt. Um eine ausreichende Kühlung zu gewährleisten, sollten Sie:

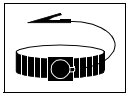
- Vor und hinter dem System mindestens 10 cm Freiraum lassen.
- Sicherstellen, daß die Verkleidungen aufgesetzt, alle vorderen und rückwärtigen Schlitze gefüllt und alle Öffnung abgedeckt sind.

- Alle nicht verwendeten Modulschlitze abdecken.

Bei der Installation des Systems in einer bestimmten Betriebsumgebung sollten die technischen Daten zur Betriebsumgebung der Systemkomponenten beachtet werden. Zum Beispiel: Bei Umgebungstemperaturen über 50º C (122º F) wird der Betrieb von Disketten- und Festplattenlaufwerken nicht mehr zuverlässig. Im Falle eines Gerätes, das in einem Gehäuse installiert ist, sollten Sie beachten, daß die interne Umgebungstemperatur unter Umständen über die maximal mögliche, externe Umgebungstemperatur ansteigen kann.

ESE und Sicherheit

ESE-Antistatikband verwenden



Motorola empfiehlt, bei allen Installations- oder Aufrüstarbeiten am System ein Antistatikband und eine ableitende Schaumstoffunterlage zu verwenden. Elektronische Komponenten, wie z.B. Plattenlaufwerke, Platinen und Speichermodule, können gegen ESE äußerst empfindlich sein. Nach dem Entfernen des Bauteils aus dem System oder aus der Schutzhülle wird das Bauteil flach auf eine geerdete und statikfreie Oberfläche gelegt, und im Falle einer Platine mit der Komponentenseite nach oben. Das Bauteil nicht auf der Oberfläche hin und her bewegen.

Ist kein ESE-Arbeitsplatz verfügbar, so können ESE-Gefahren durch das Tragen eines Antistatikbands (in Elektronik-Fachgeschäften erhältlich) vermieden werden. Dabei ist ein Ende des Bandes um das Handgelenk zu legen. Das Erdungsende (normalerweise ein Stück Kupferfolie oder eine Krokodilklemme) an einer elektrischen Masseverbindung anschließen. Hierbei kann es sich um ein Stück Metall handeln, das direkt zur Erde führt (z.B. ein unbeschichtetes Metallrohr) oder ein Metallteil eines geerdeten, elektrischen Gerätes. Ein elektrisches Gerät ist geerdet, wenn es einen dreistiftigen Schukostecker besitzt, der in eine Schuko-Steckdose gesteckt wird. Das System selbst kann nicht als Masseverbindung verwendet werden, weil es bei allen Arbeiten vom Netz getrennt wird.



Warnung

Vor dem Ausführen dieser Verfahren ist die Stromzufuhr des Systems auszuschalten und das System vom Stromnetz zu trennen. Wenn der Strom vor dem Öffnen des Systems nicht ausgeschaltet wird, besteht die

Gefahr von Körperverletzungen und Beschädigungen des Gerätes. Im Gerät sind gefährliche Spannungen, Strom und Hochenergie vorhanden. An den Anschlußpunkten der Betriebsschalter können gefährliche Spannungen anliegen, auch wenn sich der Schalter in der ausgeschalteten Position befindet. Das System darf nicht bei abgenommener Gehäuseabdeckung betrieben werden. Vor dem Einschalten des Systems ist die Gehäuseabdeckung stets anzubringen.

Sicherheits- und Betriebsnormen

Diese Systeme entsprechen den Sicherheits- und Betriebsnormen, die für einzelne Geräteteile gelten. Es ist jedoch möglich, dieses Produkt mit anderen Einzelteilen zusammen zu verwenden, die ein System ergeben, welches nicht den Systemrichtlinien entspricht. Da Motorola nicht voraussehen kann, welche Geräte mit diesem Gehäuse verwendet werden oder wie dieses Gehäuse verwendet wird, sind der Systemintegrator und der Installateur völlig dafür verantwortlich, daß das gesamte fertiggestellte System den Sicherheitsanforderungen von CSA/VDE sowie den EMI/HFI-Emissionsgrenzen entspricht.

Vorsichtshinweise zur Lithium-Batterie

Dieses System enthält Lithium-Batterien.



Vorsicht

Bei einem inkorrekten Auswechseln der Lithium-Batterien besteht Explosionsgefahr. Wechseln Sie die Batterien nur mit dem gleichen oder einem gleichwertigen Batterietyp, der von dem Gerätehersteller empfohlen ist, aus. Entsorgen Sie gebrauchte Batterien gemäß den Herstelleranweisungen.



Vorsicht

Bitte nehmen Sie vor Ort keine Wartung bzw. Austausch der Lithium-Batterien selber vor. Um die Batterien sachgemäß warten oder auswechseln zu lassen, setzen Sie sich mit Ihrem Motorola-Servicevertreter in Verbindung.

Stromkreisbelastung

Das System muß von einem völlig dedizierten Stromunterbrecher mit Netzstrom versorgt werden. Schließen Sie kein anderes elektrisches Gerät an eine Steckdose an, die mit dem Stromunterbrecher verbunden ist, der das Rack-Gerät mit Strom versorgt. Wenn der Stromkreis überlastet wird und der Stromunterbrecher den Stromkreis unterbricht, besteht die Gefahr von Datenverlust.

Installation in ein 19-Zoll-Rack

Um das Gerät in ein Rack einzubauen, gehen Sie folgendermaßen vor:



Vorsicht

Befestigen Sie das Chassis nicht oben am Rack. Ein kopflastiges Rack kann Umkippen und Geräte beschädigen sowie Personal verletzen.

Um Verletzungen von Personen oder Beschädigungen der Geräte zu vermeiden sollten folgende Schritte von zwei Personen ausgeführt werden,

1. Schieben Sie das Chassis vorne in das Rack.
2. Befestigen Sie das Chassis mit Schrauben. (Um Genaueres über die hierzu empfohlenen Schraubenarten zu erfahren, wenden Sie sich bitte an den Hersteller des Racks.)

Anschließen des Systems

Um das System zu verkabeln, gehen Sie folgendermaßen vor:

1. Stellen Sie sicher, daß der Netzschalter (EIN/AUS) am Chassis auf AUS (O) gestellt ist. (Ist Ihr System mit einem Spannungswahlschalter versehen, so stellen Sie den Schalter auf die Ihrem Standort gemäße Betriebsspannung.)

2. Stecken Sie das Sockelende des im Lieferumfang des Systems enthaltenen Chassisnetzkabels in die Netzsteckbuchse an der Rückseite des Chassis.
3. Stecken Sie das Sockelende des Bildschirmnetzkabels in die Anschlußbuchse an der Rückseite des Datensichtgerätes.
4. Stecken Sie ein Ende des Videokabels in die Anschlußbuchse des Datensichtgeräts (Video). (Dieser Schritt erübrigt sich, wenn das Videokabel permanent am Datensichtgerät befestigt ist.)
5. Stecken Sie das andere Ende des Videokabels in die sachgemäße Videoanschlußbuchse an der Rückseite des Systems.
6. Stecken Sie die Kabel für Tastatur und Maus in die entsprechenden Anschlußbuchsen an der Rückseite des Systems.
7. Stecken Sie alle Netzkabel in eine geerdete, gegen Spannungsspitzen geschützte Schuko-Steckdose.



Warnung

Vor Wartungsarbeiten am Chassis ist das Netzkabel vom Stromnetz zu trennen, um die Gefahr eines elektrischen Schlages oder andere mögliche Gefahren zu reduzieren.

Einschalten des Netzstroms

Nachdem Sie die Verkabelung des Systems vollzogen haben, können Sie den Netzstrom einschalten.



Warnung

Decken Sie alle offenen Modulschlitze ab, und setzen Sie alle Verkleidungen auf, bevor Sie den Netzstrom einschalten. Diese Maßnahmen sind notwendig, um das Chassis ordnungsgemäß zu kühlen und um die Gefahr eines elektrischen Schlages und andere mögliche Gefahren zu vermeiden. Für die Dauer des Systembetriebs müssen die Schlitzabdeckungen und die Verkleidungen angebracht sein.

Um den Netzstrom einzuschalten, stellen Sie den Netzschalter (EIN/AUS) am Chassis auf EIN (1). Die normale Startroutine des Systems erfolgt, und das System ist dann einsatzbereit.

Serial Interface Commands and Responses

Table D-1 summarizes the serial interface commands and responses. These commands are used to communicate with the optional alarm board for the CPX1200 Series systems.

Table D-1. Serial Interface Commands and Responses

Command Symbol	Command Value	Arguments	Command Size (bytes)	Response Size (bytes)	Purpose
CMD_GHB	0x49	None	7	11	Get Heartbeat - Gets all configuration information. This command is used as the heartbeat
CMD_GAS	0x48	None	7	75	GetAllStatus - Collects all status data in one command including alarms, relays, LEDs, latches configuration settings, temperature, power, and fans
CMD_SSR	0x53	None	7	7	SetReset - do a soft reset of the Alarm Board
CMD_SIA	0x4B	None	7	7	SetInitAck - Acknowledge the receipt of the initial heartbeat reply (due to reset or hot swap of the Alarm Board), and therefore cause the heartbeat type bit to be set “hb_type = NORMAL”

Table D-1. Serial Interface Commands and Responses (Continued)

Command Symbol	Command Value	Arguments	Command Size (bytes)	Response Size (bytes)	Purpose
CMD_SAA	0x4C	None	7	7	SetAlarmsAck - acknowledge the receipt of the status data, and therefore cause the alarm update bits to be reset
CMD_SHB	0x4A	HB/Auto	7	7	SetHeartbeatMode - set the HB mode to AUTO or HB
CMD_SHC	0x56	Count	7	7	SetHeartbeatCount - set the number of heartbeats to miss before a system alarm
CMD_SSL	0x50	Mode, Value	7	7	SetSystemLeds - set the state of the 2 system LEDs
CMD_SRE	0x4F	Relay byte	7	7	SoftRelay - Provides relay control input to AB that is logically OR'd with AB alarm states
CMD_SDS	0x4D	2 Setpoint Arguments	7	7	SetSetpoints - sets the setpoints for the alarm board
CMD_SLT	0x51	Mode	7	7	SetLampTest - do a lamp test
CMB_SBT	0x52	None	7	7	SetBist - do a built-in self test
CMD_SDF	0x4E	None	7	7	SetDefaults - resets setpoints to defaults immediately

Table D-1. Serial Interface Commands and Responses (Continued)

Command Symbol	Command Value	Arguments	Command Size (bytes)	Response Size (bytes)	Purpose
CMD_SNV	0x57	None	7	7	SetNvram - Clears the NV ram data on the next power up cycle
CMD_SLR	0x58	None	7	7	SetLatchReset - asserts the latch driven external PRST lead which goes to the backplane
CMD_SPS	0x54	None	7	7	SetPowerReset - cause the AB to toggle the PS inhibit lead, which cycles the power supply

Command and Response Details

This section gives you the exact structure for each command and response for the system, and how to use it. Syntax descriptions use capital letters for constants and small letters for arguments (variables). Refer to Table D-2.

Table D-2. Command and Response Structure

Command Name	CMD_GHB
Description	GetHeartbeat - gets the heartbeat data from the alarm board. In heartbeat mode, “no hb count” increments each time the firmware does an internal polling cycle and does not see a command (any command resets the “no_hb_count”). If the “no hb count” exceeds the “hb count” (set by CMD_SHC command), than a system alarm indication is triggered, Once a heartbeat arrives, the system alarm is cleared, and the “no hb count” returns to 0. The default “hb count” is 25 polling cycles. In AUTO mode, the CMD_GHB command returns the status the same as in HB mode.
Command Syntax	<‘S’><‘M’><CMD_GHB><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used

Table D-2. Command and Response Structure (Continued)

Response Syntax	<'S'><'M'><CMD_GAS><DEV_AB> <hb_status_byte><FW_VER_MSB> <FW_VER_LSB><HW_VER_MSB><HW_VER_LSB><no_hb_count>
Response Notes	hb_status-byte bit 0 hb mode - 0 = auto, 1 = hb (changed using CMD_SHB) bit 1 hb mode - 0 = initial, 1= norm (changed to norm using CMD_SIA) bit 2 hb type - 0 = same, 1 = changed (cleared using CMD_SAA) bit 3 hb type - 0 = OK, 1 = Alarm (cleared by removing alarm condition) bit 4, 5, 6 and 7 not used FW_VER_MSB - most significant byte of 2 byte firmware version number FW_VER_LSB - least significant byte of 2 byte firmware version number HW_VER_MSB - most significant byte of 2 byte hardware version number HW_VER_LSB - least significant byte of 2 byte hardware version number no_hb_count - number of heartbeats that have been "missed" by firmware. No_hb_count is reset by any command.
Command Name	**CMD_GAS**
Description	GetAllStatus - gets all the status data from the Alarm Board. Includes heartbeat, relay, led, inputs/outputs, and device data
Command Syntax Example: request a device/status stream from alarm board	<'S'><'M'><CMD_GAS><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used

Table D-2. Command and Response Structure (Continued)

Response Syntax	<'S'><'M'><CMD_GAS><DEV_AB> <hb_status_byte><FW_VER_MSB> <FW_VER_LSB><HW_VER_MSB><HW_VER_LSB><no_hb_count> <redleds><grnleds><relays><inputs> <3v_sh><3v_sl><3v_hi><3v_low><3v_cur><3v_status> <5v_sh><5v_sl><5v_hi><5v_low><5v_cur><5v_status> <12v_sh><12v_sl><12v_hi><12v_low><12v_cur><12v_status> <n12v_sh><n12v_sl><n12v_hi><n12v_low><n12v_cur><n12v_status> <5vaux_sh><5vaux_sl>5vaux_hi><5vaux_low><5vaux_cur><5vaux_status> <f1_sh><f1_sl><f1_hi><f1_low><f1_cur><f1_status> <f2_sh><f2_sl><f2_hi><f2_low><f2_cur><f2_status> <f3_sh><f3_sl><f3_hi><f3_low><f3_cur><f3_status> <f4_sh><3v_sl><3v_hi><3v_low><3v_cur><3v_status> <t1_sh><t1_sl><t1_hi><t1_low><t1_cur><t1_status> <ACK>

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Table D-2. Command and Response Structure (Continued)

Response Notes	hb_status_byte bit 0 hb mode, 0 = auto, 1 = hb (changed using CMD_SHB) bit 1 hb type, 0 = initial, 1 = norm (changed to norm using CMD_SIA) bit 2 hb history, 0 = same, 1 = changed (cleared using CMD_SAA) bit 3 hb status, 0 = OK, 1 = Alarm (cleared by removing alarm condition) bit 4-7 not used FW_VER_MSB most significant byte of 2 byte firmware version number FW_VER_LSB least significant byte of 2 byte firmware version number HW_VER_MSB most significant byte of 2 byte hardware version number HW_VER_LSB least significant byte of 2 byte hardware version number no_hb_count, number of heartbeats that have been “missed” by firmware. No_hb_count is reset by any command. <redleds> - red leds output latch (U5) value with bits for each red led bit 0 temperature - 1=on, 0=off bit 1 fans front - 1=on, 0=off bit 2 fans rear - 1=on, 0=off bit 3 power - 1=on, 0=off bit 4 system <grnleds> - green leds output latch (U28) value with bits for each green led bit 0 temperature - 1=on, 0=off bit 1 fans front - 1=on, 0=off bit 2 fans rear - 1=on, 0=off bit 3 power - 1=on, 0=off bit 4 system - 1=on, 0=off

Table D-2. Command and Response Structure (Continued)

Response Notes (Continued)	<relays> - relay/output latch (U9) value with bits defined: bit 0 minor relay - 1=closed, 0=open - note: reversed logic bit 1 major relay - 1=open, 0=closed bit 2 critical relay - 1=open, 0=closed bit 3 rack relay - 1=open, 0=closed bit 4 alarm red - 1=on, 0=off bit 5 alarm green - 1=on, 0=off bit 6 ps_inhibit - 1=on, 0=off bit 7 rst_out - 1=on, 0=off <inputs> - input latch (U14) value with bits defined: bit 0 alarm cutoff switch - 1=closed, 0=open bit 1 ac fail - 1=OK, 0=alarm bit 2 battery low warning - 1=alarm, 0=OK bit 3 hot swap power ok - 1=OK, 0=alarm bit 4 front fan present - 1=present, 0=alarm bit 5 rear fan present - 1=present, 0=alarm bit 6 J6A jumper strap - 1=debug serial, 0=normal bit 7 J6B jumper strap - 1=debug old board, 0=normal Voltage devices each return 6 bytes of data. There are 5voltage devices: 3V, 5V, 12V, 12VN, 5VAUX Below is the meaning of the 3V data bytes: <3V_sh> - high setpoint in tenths of volts <3V_sl> - low setpoint in tenths of volts <3V_hi> - highest value in tenths of volts <3V_low> - lowest value in tenths of volts <3V_cur> - current value in tenths of volts <3V_status> bit 0 alarm status - 1=alarm, 0=OK bit 1 history - 1=changed, 0=same

Table D-2. Command and Response Structure (Continued)

Response Notes (Continued)	Fan devices each return 6 bytes of data. There are 4 fan devices: F1, F2, F3, F4 Below is the meaning of the F1 data bytes: <f1_sh> - not used <f1_sl> - low setpoint for fan 1, RPM in hundreds of RPM (45 = 4500 RPM) <f1_hi> - highest recorded fan speed, in hundreds of RPM <f1_low> - lowest recorded fan speed, in hundreds of RPM <f1_cur> - current recorded fan speed, in hundreds of RPM <f1_status> bit 0 alarm status - 1=alarm, 0=OK bit 1 history - 1=changed, 0=same Temperature devices each return 6 bytes of data. There is 1 temp device: T1 Below is the meaning of the T1 data bytes: <t1_sh> - high setpoint in degrees C, 55 = 55 degrees C <t1_sl> - not used <t1_hi> - highest recorded temperature in degrees C <t1_low> - lowest recorded temperature in degrees C <t1_cur> - current temperature in degrees C <t1_status> bit 0 alarm status - 1=alarm, 0=OK bit 1 history - 1=changed, 0=same
Command Name	**CMD_SSR**
Description	SetSoftReset - Does a reset of the alarm board. Reinitializes the entire board by causing the watchdog timer to expire. This is an internal reset of the alarm board and does not go external to the CPU reset.
Command Syntax Example: force a soft reset of the alarm board	<‘S’><‘M’><CMD_SSR><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used

Table D-2. Command and Response Structure (Continued)

Response Syntax	<‘S’><‘M’><CMD_SSR><DEV_AB><hb_status><0><ACK>			
Response Notes	hb-status_byte is the same meaning as described in CMD_GHB. Last byte is ACK if ok, or NAK if there is a problem			
Command Name	**CMD_SDS**			
Description	SetDeviceSetpoints - sets all setpoints specified on the command line. Must set all setpoints. Use GAS to see the setpoint changes take effect. Scale input data to fit in 8-bit variable, therefore we use tenths of volts and hundreds of RPM			
Command Syntax Example: set the 3.3V setpoints to 3.6 (high) and 3.0 (low)	<‘S’><‘M’><CMD_SDS><dev_byte><arg1><arg2><EOT>			
Command Notes	Voltages in tenths of volts, 35 = 3.5V Fan RPMs in hundreds, 56 = 5600 RPM Temperature in degrees C, 27 = 27C			
		dev_byte	**arg1**	**arg2**
	3V SP [1]	DEV_3V	3V_sh	3V_sl
	5V SP	DEV_5V	5V_sh	5V_sl
	12V SP	DEV_12V	12V_sh	12V_sl
	N12V SP	DEV_N12V	n12V_sh	n12V_sl
	Fan 1 SP	DEV_F12	fan1_sl	fan2_sl
	Fan 2 SP			
	Fan 3 SP	DEV_F34	fan3_sl	fan4_sl
	Fan 4 SP			
	Temp SP	DEV_TEMP	temp_sh	not used

Table D-2. Command and Response Structure (Continued)

Response Syntax	<‘S’><‘M’><CMD_SDS><dev_byte><arg1><arg2><ACK>
Response Notes	Response is the same as command except last character is ACK if ok, or NAK if there is a problem
[1] setpoint	
Command Name	**CMD_SIA**
Description	SetInitAcknowledge - Acknowledge the receipt of the initial heartbeat reply (due to reset or hot swap of the Alarm Board), and therefore cause the heartbeat type bit to be set “hb_type=NORMAL.” This lets an application determine if the status of the alarm board was read since a power cycle or reset event. The application may want to download custom setpoints, activate heartbeat mode, or set other parameters if the alarm board was reset.
Description	SetInitAcknowledge - Acknowledge the receipt of the initial heartbeat reply (due to reset or hot swap of the Alarm Board), and therefore cause the heartbeat type bit to be set “hb_type=NORMAL.” This lets an application determine if the status of the alarm board was read since a power cycle or reset event. The application may want to download custom setpoints, activate heartbeat mode, or set other parameters if the alarm board was reset.
Command Syntax Example: disable scanning of Fan 1	<‘S’><‘M’><CMD_SIA><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used
Response Syntax	<‘S’><‘M’><CMD_SIA><DEV_AB><hb_status_byte><0><0><ACK>
Response Notes	hb_status_byte is the same meaning as described in CMD_GHB. Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SAA**
Description	SetAlarmsAcknowledge - acknowledge the receipt of the status data, and therefore cause the alarm history bits to be reset. This lets an application determine which alarms have occurred since the last time the status was read.

Table D-2. Command and Response Structure (Continued)

Command Syntax Example: enable scanning of SEN 1	<‘S’><‘M’><CMD_SAA><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used
Response Syntax	<‘S’><‘M’><CMD_SAA><DEV_AB><hb_status><0><0><ACK>
Response Notes	hb_status_byte is the same meaning as described in CMD_GHB. Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SHB**
Description	SetHeartbeatMode - set the heartbeat mode to “hb” or “auto”. With heartbeat mode “hb”, the Alarm Board expects to see regular heartbeat polls (GHB) on the serial port. With heartbeat mode “auto”, the Alarm Board does not expect to see heartbeat polls. The heartbeat affects the operation of the “system” LEDs. In “hb” mode, when the heartbeat goes away for longer than “hb count” polls as determined by the Alarm Board, the system LED is set to “OUT”.
Command Syntax Example: set major relay output during 12V alarm condition	<‘S’><‘M’><CMD_SHB><dev_byte><relay_mode><0><EOT>
Command Notes	Byte 5 is the hb mode. 0=auto, 1=hb Byte 6 not used
Response Syntax	<‘S’><‘M’><CMD_SHB><DEV_AB><hb_mode><0><ACK>
Response Notes	Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_MRL**
Description	Manual Control Relay Output
Command Syntax Example: allow manual control of relay outputs	<‘S’><‘M’><CMD_MRL><DEV_AB><0><0><EOT>

Table D-2. Command and Response Structure (Continued)

Byte	0	1	2	3	4	5	6
Byte Description	'S'	'M'	CMD_MRL	DEV_AB	0	0	EOT
Hex Value	53hh	4Dh	5Bh	48h	00h	00h	04h
Command Notes	Bytes 4 and 5 not used						
Response Syntax	<'S'><'M'><CMD_MRL><DEV_AB><0><0><ACK>						
Response Notes	Last byte is ACK if ok, or NAK if there is a problem						
Command Name	**CMD_SHC**						
Description	SetHeartbeatCount - set the heartbeat count. The default "hb count" is 25 polling cycles. In HB mode, "no hb count" increments each time the firmware does an internal polling cycle and does not see a heartbeat command. If the "no hb count" exceeds the "hb count" (set by shc command), a system alarm indication triggers. When a hearbeat arrives, the system alarm clears, and the "no hb count" returns to 0. In AUTO mode, the GHB command returns the status the same as in HB mode. Time interval for each count is about 1.7 seconds. This means the maximum timeout period is over seven minutes.						
Command Syntax Example: allow automatic control of relay outputs	<'S'><'M'><CMD_SHC><DEV_AB><hb_count><0><0><EOT>						
Command Notes	Byte 5 is the hb_count. 0 to 255 Byte 6 not used						
Response Syntax	<'S'><'M'><CMD_SHC><DEV_AB><hb_count><0><0><ACK>						
Response Notes	Last byte is ACK if ok, or NAK if there is a problem						
Command Name	**CMD_SSL**						
Description	SetSystemLED - set the state of the system LED: "In" or "Out". Uses two arguments. Mode enables the feature. Value sets the actual value of the LEDs. Then mode = on, this command totally overrides any other control of the system LED.						
Command Syntax	<'S'><'M'><CMD_SSL><DEV_AB><mode><value><EOT>						

Table D-2. Command and Response Structure (Continued)

Command Notes	mode off=0, on=1 value out=0, in=1
Response Syntax	<‘S’><‘M’><CMD_SSL><DEV_AB><mode><value><ACK>
Response Notes	Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SRE**
Description	SetRelays - send relay inputs to the Alarm Board. These inputs are OR’d with the Alarm Board relay inputs.
Command Syntax	<‘S’><‘M’><CMD_SRE><DEV_AB><relays><0><EOT>
Command Notes	<relays> - byte containing bit field to control each of the 4 relays bit 0 minor, 0=open, 1=closed bit 1 major, 0=open, 1=closed bit 2 critical, 0=open, 1=closed bit 3 rack, 0=open, 1=closed bit 4 through 7 not used
Response Syntax	<‘S’><‘M’><CMD_SRE><DEV_AB><relays><0><ACK>
Response Notes	Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SLT**
Description	SetLampTest - Do a lamp test. All LEDs on three seconds, off one second, repeat two more times, then stay all on. To return the system to normal operating mode, the “off” command must be sent. The lamp test command is used for factory diagnostics.
Command Syntax	<‘S’><‘M’><CMD_SLT><DEV_AB><mode><0><EOT>
Command Notes	mode 0=off, 1=on
Response Syntax	<‘S’><‘M’><CMD_SLT><DEV_AB><mode><0><ACK>
Response Notes	Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SBT**
Description	SetBistTest - execute the bist test routine
Command Syntax	<‘S’><‘M’><CMD_SBT><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used

Table D-2. Command and Response Structure (Continued)

Response Syntax	<‘S’><‘M’><CMD_SBT><DEV_AB><hb_status><bist_result><ACK>
Response Notes	<hb_status> - same as in CMD_GHB <bist_result> 0=failed, 1=OK Last byte is ACK if ok, or NAK if there is a problem
Command Name	**CMD_SPS**
Description	SetPowerSupplyReset - Toggle the power supply inhibit lead which causes the power supply to cycle chassis power immediately. **Caution** This command resets the whole system. It is difficult to view the result since the system resets after sending the command.
Command Syntax	<‘S’><‘M’><CMD_SPS><DEV_AB><1><2><EOT>
Command Notes	Application software must send this command three times in a row to trigger this event. This protects against accidental triggering by noise/hacking on the serial port. Bytes 5 and 6 are keys and must be 1 and 2, respectively.
Response Syntax	<‘S’><‘M’><CMD_SPS><DEV_AB><hb_status><0><ACK>
Response Notes	<hb_status> - same as in CMD_GHB Last byte is ACK if ok, or NAK if there is a problem.
Command Name	**CMD_SDF**
Description	SetDefaults - reset the default setpoints immediately
Command Syntax	<‘S’><‘M’><CMD_SDF><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used
Response Syntax	<‘S’><‘M’><CMD_SDF><DEV_AB><hb_status><0><ACK>

Table D-2. Command and Response Structure (Continued)

Response Notes	<hb_status> - same as in CMD_GHB Last byte is ACK if ok, or NAK if there is a problem.
Command Name	**CMD_SNV**
Description	SetNvramClear - Clears the non-volatile RAM data on the next power up or reset of the Alarm Board.
Command Syntax	<‘S’><‘M’><CMD_SNV><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used
Response Syntax	<‘S’><‘M’><CMD_SNV><DEV_AB><hb_status><0><ACK>
Response Notes	hb_status> - same as in CMD_GHB Last byte is ACK if ok, or NAK if there is a problem.
Command Name	**CMD_SLR**
Description	SetLatchReset - asserts the external latch reset signal which goes to the backplane as PRST. May cause the CPU to reset, or other CompactPCI devices depending on how those devices interpret the PRST signal.
Command Syntax	<‘S’><‘M’><CMD_SLR><DEV_AB><0><0><EOT>
Command Notes	Bytes 5 and 6 not used
Response Syntax	<‘S’><‘M’><CMD_SLR><DEV_AB><hb_status><0><ACK>
Response Notes	same as in CMD_GHB Last byte is ACK if ok, or NAK if there is a problem.

Device Bytes

Refer to Table D-3 for the device (DEV) byte values. All commands use DEV_AB except for the **CMD_SDS** command, which uses any one of the seven other values.

Table D-3. Device Byte Values

This DEV byte label:	Has this value:
DEV_AB	**0x4B**
DEV_3V	**0x44**
DEV_5V	**0x45**
DEV_12V	**0x46**
DEV_N12V	**0x47**
DEV_F12	**0x41**
DEV_F34	**0x42**
DEV_TEMP	**0x43**

Valid Commands

A valid command contains seven bytes including:

- The S and M header in bytes 0 and 1
- A valid CMD byte
- An end-of-message (EOT) trailer as the seventh byte

Invalid Commands

If the alarm board receives an invalid command, it responds with the same command and a NAK (not acknowledged) byte instead of ACK (acknowledged). An invalid command is a command packet that contains the S and M prefix in bytes 0 and 1, but has an undefined command (CMD) byte or no end-of-message (EOT) byte, as the last byte.

The alarm board can send two types of NAK response. If a command makes no sense (nonsense command) it sends a four byte NAK reply.

<‘S’><‘M’><chars_rcvd><NAK>

8. If the alarm board detects the S, M syntax, but some other problem exists, for example;

   a. no EOT; or

   b. the alarm board does not recognize the CMD byte

      The alarm board sends a seven byte NAK reply. The seven byte reply echoes back the receive buffer.

<s><m><cmd_byte><dev_byte><arg1_byte><arg2_byte> <NAK>

Debug Commands

Use the commands shown in Table D-4 for debugging. They use the same S and M syntax as regular commands, but contain no arguments and do not require the end-of-message (EOT) byte. Responses from the debug commands are in plain ASCII text for use with a dumb terminal.

Note You must send seven characters for each command.

Table D-4. Debug Commands

Debug Command Name	Command	Description
GetAllStatus	SM00000	Displays all alarm board status data once. Includes relays, LEDs, latches, devices, and alarms
FAT mode toggle	SM11111	Toggles FAT test mode on/off
Debug Mode toggle	SM22222	Toggles Debug mode on/off, displays all status data about every 6 seconds, and exercises all LEDs and Relays
Latch Reset [1]	SM33333	Resets the Alarm Board using the latch
SW watchdog reset [1]	SM44444	Resets the Alarm Board using the watchdog timeout
External I2C [1]	SM55555	Makes the external I2C leads go active for a few seconds and then return to the inactive state

Table D-4. Debug Commands (Continued)

Debug Command Name	Command	Description
Assert power supply inhibit [1]	SM66666	Triggers the power supply inhibit lead for hardware debug
Alarm Board alert active [1]	SM77777	Makes the Alarm Board alert leads go active for a few seconds, then return to the inactive state
Clear non-volatile RAM [1]	SM88888	Clears the non-volatile test variables to aid in verification of the non-volatile RAM hardware features
[1] Used for hardware debug only		

Command Examples

Table D-5, Table D-6, Table D-7, and Table D-8 give you four examples of command data sent from the Alarm Control Application (ACA) to the alarm board.

- Get Heartbeat

Table D-5. Serial Command Syntax for the GetHeartbeat Command

Byte	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Definition	S	M	Command	Device	Data 1	Data 2	EOT
Command Data	<0x53>	<0x4D>	<0x49>	<0x4B>	<0x00>	<0x00>	<0x04>

- GetAllStatus

Table D-6. Serial Command Syntax for the GetAllStatus Command

Byte	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Definition	S	M	Command	Device	Data 1	Data 2	EOT
Command Data	<0x53>	<0x4D>	<0x48>	<0x4B>	<0x00>	<0x00>	<0x04>

- SetSetpoints (5V set to 5.5 and 4.5)

Table D-7. Serial Command Syntax for the SetSetpoints Command

Byte	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Definition	S	M	Command	Device	Data 1	Data 2	EOT
Command Data	<0x53>	<0x4D>	<0x4D>	<0x45>	<0x37>	<0x2D>	<0x04>

- SetSystemLed (mode = on, value = in-service)

Table D-8. Serial Command Syntax for the SetSystemLed Command

Byte	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Definition	S	M	Command	Device	Data 1	Data 2	EOT
Command Data	<0x53>	<0x4D>	<0x48>	<0x4B>	<0x01>	<0x01>	<0x04>

Support Notes for Software Configuration

The CPX1200 Series systems support different combinations of CPU types, peripheral devices, and operating systems. This appendix covers the VxWorks 5.4/Tornado 2.0 operating system. However, interactions with other real-time operating systems are possible. Table E-1 shows the supported peripherals for different combinations of Real Time Operating Systems (RTOS) and CPU hardware.

In this context, the word *supported* means enabled access to a storage device for file I/O, booting, and installation, if applicable. This also implies there are no special changes to the operating system beyond the normal procedures required by the operating system vendor to install a storage device.

Table E-1. Peripheral Device Support Matrix/CPX1200 Series

CPU + Operating System	On-Board Flash	Compact Flash Card	IDE Drive Module Support		
			IDE Hard Drive	CD-ROM Drive	Floppy Drive
MCP750 PPCBug [1]	Yes	Yes	Yes	Yes	Yes
MCP820 PPCBug[1]	Yes	Yes	Yes	Yes	Yes
CPV5350 + VxWorks 5.4/Tornado 2.0	Yes	NBSP [2,7,8]	NBSP [3,5,7]	No [4,5]	Yes
CPV5370 + VxWorks 5.4/Tornado 2.0	No	Yes	Yes	Yes	Yes

Yes = This device is supported by this OS/CPU combination.

NBSP = No Board Support Package available. Board Support Package (BSP) modifications are required to access this peripheral device)

No = This device is not supported by this OS/CPU combination.

Notes

1. MCP750 uses PPCBug.

2. By default, only a single primary IDE controller device is supported in the Tornado 2.0 Pentium Board Support Package (BSP). For the CPV5350 or CPV5370, make changes to the default Tornado 2.0 Pentium BSP to enable support for the slave device on the primary IDE controller (CompactFlash card = primary slave device = 0,1).

   In the file **C:\tornado\target\config\pcPentium\syslib.c**

   change **IDE_LOCAL, 1** to **IDE_LOCAL,2** in the **controller 0** portion of the ataResources structure:

   ```
   },
   IDE_LOCAL, 2, ATA0_INT_VEC, ATA0_CONFIG,
   ATA_SEM_TIMEOUT, ATA_WDG_TIMEOUT, 0, 0
   }, /* ctrl 0 */
   ```

   After making this change and rebuilding the VxWorks image, the primary slave device should appear. Make sure to insert a CompactFlash card into:

   - ❑J21 of the CPV5350 CPU
   - ❑J23 of the CPV5370 CPU

   before turning on the system power. Reboot using the VxWorks image created with the above changes.

   From the shell, type: **usrAtaConfig 0,1, /ata1/**
   (mounts the Compact Flash card as **/ata1/**)

   Then, type: **devs** (shows a list of devices)

   And see in the list of devices: **drv name**

   3/atal/

3. By default, the Tornado 2.0 Pentium BSP supports only the primary IDE controller device. For the CPV5350, support for the secondary IDE controller devices must be enabled by making two changes to the default Tornado 2.0 Pentium BSP. These devices are typically the hard disk drive (1, 0) and the CD-ROM drive (1, 1). The hard

disk drive is supported by the BSP change below. The CD-ROM drive is not supported by Tornado 2.0.

a. In the file **C:\tornado\target\config\pcPentium\syslib.c**, change **ATA_PCMCIA, 1** to **IDE_LOCAL, 1** in the **controller 1** portion of the ataResources:

```
},

IDE_LOCAL, 1, ATA1_INT_VEC, ATA1_INT_LVL,
ATA1_CONFIG, ATA_SEM_TIMOUT, ATA_WDG_TIMEOUT, 0,
0

} /* ctrl 1 */
```

b. In the file **C:\tornado\target\config\pcPentium\pc.h**,

change from: #define **ATA1_INT_LVL** 0x09

change to: #define **ATA1_INT_LVL** 0x0f

After making these changes and rebuilding the VxWorks image, the secondary IDE device should appear. Reboot using the VxWorks image created with the above changes.

4. VxWorks 5.4/Tornado 2.0 for the CPV5350 does not support the CD-ROM.

5. If you enable two IDE devices by inserting **IDE_LOCAL, 2**, but only one is physically present in the system, it may not boot correctly. Be sure to have two IDE hard drives connected to use **IDE_LOCAL, 2**.

6. If BSP support is not available for the CPV5350 or CPV5370, any changes made using [VxWorks Boot] are lost after a cold reset. The Tornado 2.0 VxWorks bootloader does not save the boot parameters into NVRAM without changes to the BSP. Instead, you should modify the boot string in the **config.h** to support your configuration (that is; use a hard coded boot configuration).

7. Use a workaround method to boot from the CompactFlash or the IDE Hard Drive since the VxWorks **mkbootAta()** command fails. Instead, use the DOS based utilities supplied by Wind River (**vxsys.com** and **vxcopy.exe**) to install the boot strap loader and

copy the **bootrom.sys** to the device. See *Building a Boot Disk/Diskette from MS-DOS* instructions in the Intel x86 appendix of the *VxWorks 5.4 Programmer's Guide*.

8. To make the on-board flash bootable, be sure to use the **mkbootAta 0,0, /fd0/bootrom.dat/** command **before** using the **usrAtaConfig 0,0, /ata0/** command. Otherwise, **mkbootAta** will fail. Also, be sure that all files delete from the flash before trying **mkbootAta**.

Related Documentation F

Embedded Communications Computing Documents

You can get more information about CompactPCI by looking at the publications in Table F-1. You can get electronic copies of Embedded Communications Computing publications by visiting ECC's World Wide Web literature site, http://www.motorola.com/computer/literature.

Table F-1. Motorola Documents

Document Title:	Motorola Publication Number:
CPV5350 CompactPCI Single Board Computer and Transition Module Installation Guide	CPV5350A/IHx
CPV5350 CompactPCI BIOS and Programmer's Reference Guide	CPV5350A/PGx
CPV5370 CompactPCI Single Board Computer and Transition Module Installation Guide	CPV5370A/IHx
MCP750 CompactPCI Single Board Computer Installation and Use	MCP750A/IHx
MCP750 CompactPCI Single Board Computer Programmer's Reference Guide	MCP750A/PGx
MCP820 CompactPCI Single Board Computer Installation and Use	MCP750A/IHx
MCP820 CompactPCI Single Board Computer Programmer's Reference Guide	MCP820A/PGx
CPV8540B User manual	CPV8540B/UMx
CompactPCI CPV5350 Windows NT 4.0 Operating System Installation Guide	CPV5350WNTA/RNx

Manufacturers' Documents

For more information, refer to these manufacturer user manuals. The information in these manuals can change without notice.

Table F-2. Manufacturer User Manuals

Document Title	Microsoft Publication Number
Basics and Installation Microsoft Windows NT Workstation (Microsoft publication number 000-43880), http://www.microsoft.com	000-43880
Basics and Installation Microsoft Windows NT Server, http://www.microsoft.com	000-43881

F

Related Specifications

Table F-3. Related Specifications

Document Title	Reference Number
PCI Industrial Manufacturers Group (PICMG) http://www.picmg.com/	
Compact PCI Specification	CPCI Rev. 2.1, Dated 9/2/97
PCI-to-PCI Bridge Specification PCI-ISA Specification	Rev. 1.02 Rev. 2.0
CompactPCI Hot Swap Specification PCI Industrial Computers Manufacturers Group (PICMG)	PICMG 2.1 R1.0
PCI Special Interest Group (PCI SIG) http://www.pcisig.com/	
Peripheral Component Interconnect (PCI) Local Bus Specification, Revision 2.0, 2.1, 2.2 PCI Special Interest Group;	PCI Local Bus Specification
Telcordia Technologies http;//www.telcordia.com/	

Table F-3. Related Specifications

Document Title	Reference Number
Network Equipment Building System (NEBS) Requirements: Physical Protection	GR-63
Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunication Equipment	GR-1089
Electronic Industries Alliance http://www.eia.org/	
Electronic Industries Association (EIA) Standard (Cabinets, Racks, Panels, and Associated Equipment)	EIA-310

URLs

These URLs (uniform resource locators) may give you helpful sources for more information about this product, related services, and development tools. Please note that we verify these URLs but they can change without notice.

- VxWorks® from Wind River Systems, http://www.wrs.com
- OSE™ from Enea OSE Systems, http://www.enea.com
- QNX® Neutrino® from QNX Software Systems Ltd., http://www.qnx.com
- Windows NT®, http://www.microsoft.com
- GoAhead Software Inc., http://www.goahead.com

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