Bus Extenders

PRO 3212 Series

PCIe-to-PCI Bus Extender Set with Cable, Chassis, and Power Supply

USER'S MANUAL

VER. 3.0C • AUG 2008

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PRO 3212 Series		
Revision #	**Description**	**Date of Issue**
1.0	Initial Release	July 2006
2.0	Revision	October 19th 2007
3.0C	Revision	August 6th 2008

Using this Manual

Audience and Scope

The PRO 3212 Series User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and using PCI Express®-to-PCI extension systems. This document is specifically intended to describe connecting the CyberResearch PRO 3212 Series Extension Systems to a host computer or I/O devices for extended functionality.

Manual Organization

This manual is organized as follows:

Preface: Presents important copyright notifications, disclaimers, trademarks, and associated information on the proper understanding and usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the PRO 3212 Series PCI Express®-to-PCI Extension System overview, its features, applications, and package contents.

Chapter 2, Getting Started: Presents information on properly installing PRO 3212 Series equipment and cabling a PCI Express® to PCI extension system.

Chapter 3, Hardware Information: Presents layout information, technical drawings, jumper settings and configuration.

Chapter 4, Troubleshooting: Provides basic information on quickly addressing configuration/setup/installation problems that may occur.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Warranty Information: Presents important warranty information for users/manufacturers rights and responsibilities regarding products and services.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE:	Additional information, aids, and tips that help users perform tasks.

CAUTION:	Information to prevent *minor* physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING:	Information to prevent *serious* physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1   Introduction

This chapter introduces the PRO 3212 Series PCI Express®-to-PCI Extension System, presents a general overview and basic applications, its package contents, specifications, and features.

1.1   Overview

Harnessing the bandwidth potential of PCI Express®, the PRO 3212-P04A and the PRO 3212-P13A smart extension systems enable computers with a PCI Express® slot to remotely manage and control up to 13 PCI devices, using the high-speed PCI Express® interface. These extension systems operate in 32-bit/33 MHz configuration and come with complete end-to-end hardware and software transparency for the host system. Hardware devices installed in the extension system behave and work as if they are directly installed on the host system, requiring no additional drivers or software installation.

The host system may be separated from the extension system at up to seven meters using high-quality shielded twisted copper cables. The robust and reliable PCI Express®-to-PCI extension systems are suited for portable test and measurement applications with high-density I/O requirement and are ideal in hazardous industrial control and automation environments.

1.1.1   Controlling PCI with PCI Express®

Based on PCI Express® technology, PRO 3212-P04A and PRO 3212-13A provide bus expansion capability through the high-speed differential signal interface. The PRO 3212-P04A and PRO 3212-13A use a signal equalizer and a PCI Express®-to-PCI bridge to architecture a PCI Express® to PCI extension system. With our PRO 3212-P04A and PRO 3212-P13A, user can use an available PCI Express® slot to control an external PCI chassis. Because the PCI Express® Bridge is a transparent bridge, there is

no need to install any additional software when using PCI devices in the external chassis.

The PRO 3212-P13A and PRO 3212-P04A implement a PCI Express®-based control of PCI modules. The technology consists of the Host Card installed in the host computer, a shielded cable, and the extension system. The Host Card comes in a PCI Express® x1 footprint and communicates with the extension system's low-profile Extender Card via a twisted and shielded cable. The Extender Card converts the PCI Express® interface into a PCI bridge or additional PCI slots in the extension system.

The link between host PC and the external chassis is a PCI Express® X1 link that represents a dual-simplex communications channel consisting of two, low-voltage differentially driven signal pairs. The signaling rate can reach up to 2.5 Gbps in each direction. Using the shielded and twisted cable, the maximum extension distance can be up to 7 M without decreasing the signal rate.

1.2 Package Contents

PRO 3212-P04A

▶ Host Card (packaged separately)

▶ PRO P04A wall-mount chassis, pre-installed with:

 ▷ Extender card

 ▷ 5-slot backplane (4 available slots)

 ▷ 200 W AC power supply

▶ 3 m extension cable

▶ AC power cord

▶ Wall-mount kit for chassis

▶ User's manual

PRO 3212-P13A

▶ Host Card (packaged separately)

▶ PRO P13A wall-mount chassis, pre-installed with:

 ▷ Extender Card

 ▷ 14-slot backplane (13 available slots)

 ▷ 400 W AC power supply

▶ 3 m extension cable

▶ AC power cord

▶ Wall-mount kit for chassis

▶ Remote power-on cable

▶ User's manual

NOTE:	If any of the items on the contents list are missing or damaged, contact CyberResearch, Inc.

1.3   Specifications

Host Card

▶ Compliant with PCI Express® Base Specifications (Rev. 1.0a)

▶ PCI Express® x1 link with 2.5 Gb/s data throughput

▶ Maximum extended distance of up to seven meters

▶ Low-profile footprint, 68.90 mm (H) x 86.65 mm (W)

▶ Power requirement: 3.3 V, 210 mA (max)

Extender Card (on extension system)

▶ Compliant with PCI-to-PCI Bridge Architecture Specifications (Rev. 1.2)

▶ Supports 5 V and 3.3 V PCI bus

▶ 32-bit/33 MHz full data throughput

▶ Maximum extended distance of seven meters

▶ Low-profile footprint, 64.41 mm (H) x 119.91 mm (W)

▶ Power requirement: +3.3 V, 720 mA

Operating and Storage Environments

▶ Operating temperature: 0°C to 50°C

▶ Storage temperature: -20°C to 80°C

▶ Relative humidity: 10% to 90%, non-condensing

1.4   Features

▶ PCI Express® control of PCI cards

▶ High-speed PCI Express® X1 interface

▶ Compatible with 5 V and 3.3 V PCI bus

▶ Supports 32-bit/33 MHz PCI interface

▶ Provides four extended half-size PCI slots with built-in 200 W power supply in a shoebox size chassis (PRO 3212-P04A)

▶ Provides 13 extended full-size PCI slots with built-in 400 W power supply in 19" rack-mount chassis (PRO 3212-P13A)

▶ Extension lengths of 1 M, 3 M and 7 M

▶ Complete hardware and software transparency

▶ Compliant with PCI Express® Base Specification, Revision 1.0a

▶ Compliant with PCI-to-PCI Bridge Architecture Specification, Revision 1.2

▶ Compliant with PCI Local Bus Specification, Revision 3.0

1.5   Applications

These extension systems are suitable for:

▶ Electronics manufacturing testing

▶ High-density I/O systems

▶ Industrial automation and control

▶ Military and aerospace

▶ Testing systems for remote and/or harsh environments

▶ Video capture

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2   Getting Started

This chapter describes the installation environment, installation procedures, cabling the equipment, and instructions on powering-on/off the PRO 3212 Series PCI Express® to PCI Extension Systems.

✓ **NOTE:**	Diagrams and images of equipment mentioned are used for reference only. Actual system appearance may vary.

2.1   Installation Environment

Whenever unpacking and preparing to install any equipment described in this manual, please refer to the ***Important Safety Instructions*** chapter of this manual.

Only install equipment in well lit areas on flat, sturdy surfaces with access to basic tools such as flat and cross head screwdrivers.

The PRO 3212-P04A and PRO 3212-P13A contain several electro-static sensitive components that can be easily damaged by static electricity. For this reason, the card and chassis should be handled on a grounded anti-static mat and the operator should wear an anti-static wristband during the unpacking and installation procedure.

Please also inspect the components for apparent damage. Improper shipping and handling may cause damage to the components. Be sure there is no shipping and handling damage on the components before continuing.

⚠ **CAUTION:**	Do not apply power to any equipment if it has been damaged.

2.2   Installing the Host Card on a Host Computer

1. Power-off your host computer.

2. Unscrew the housing of your host computer using a (cross-head or flat-head) screwdriver. Open the housing.

3. Locate your PCI Express® extension card (host card) and remove it from its packaging. (Please wear anti-static gloves and use an anti-static surface when handling the card).

4. Install the host card in an available PCI Express® slot in your host computer. Be sure to firmly attach the host card's bracket to the backplane of the host PC.

5. Close the chassis and re-install its housing screws.

Figure 2-1: Host Card to Host PC Installation Diagram
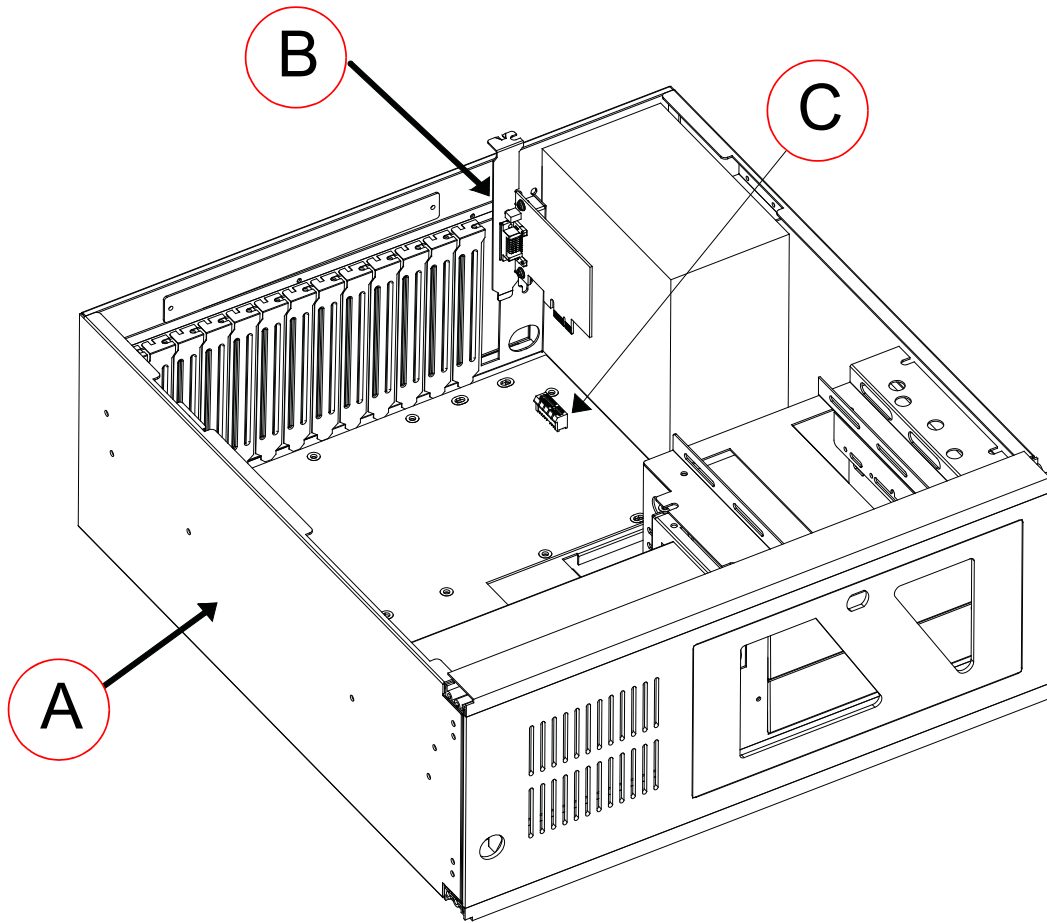
Item	Description
A	Industrial PC or Desktop PC with X1 PCI Express® Slot
B	Host Card PCI Express®-to-PCI extension)
C	PCI Express® Slot

Table 2-1: Host Card to Host PC Chassis Installation Items

2.3   Installing PCI Peripheral Cards to an Extension Chassis

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⚠️
CAUTION:

The following instructions are for illustration purposes when attempting to install additional PCI devices to your extension chassis. Both PRO P04A/PRO P13A extension chassis are pre-installed with one extension card.

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1. Locate your extension chassis (PRO P04A or PRO P13A) and plug-in the AC power cord but **DO NOT** power-on the equipment.

2. Unscrew the four housing screws of the extension chassis using a (cross-head or flat-head) screwdriver. Open the top cover of the chassis. You should see a row of PCI slots (four slots PRO P04A or 13 slots PRO P13A) along the backplane.

3. Locate your PCI device and remove it from its packaging. (Please wear anti-static gloves and use an anti-static surface when handling the card).

4. Install your PCI device in an available PCI slot and be sure to firmly attach it's bracket to the backplane of the extension chassis.

5. Close the extension chassis and re-install its housing screws.

Figure 2-2: PCI to Extension Chassis Installation Diagram
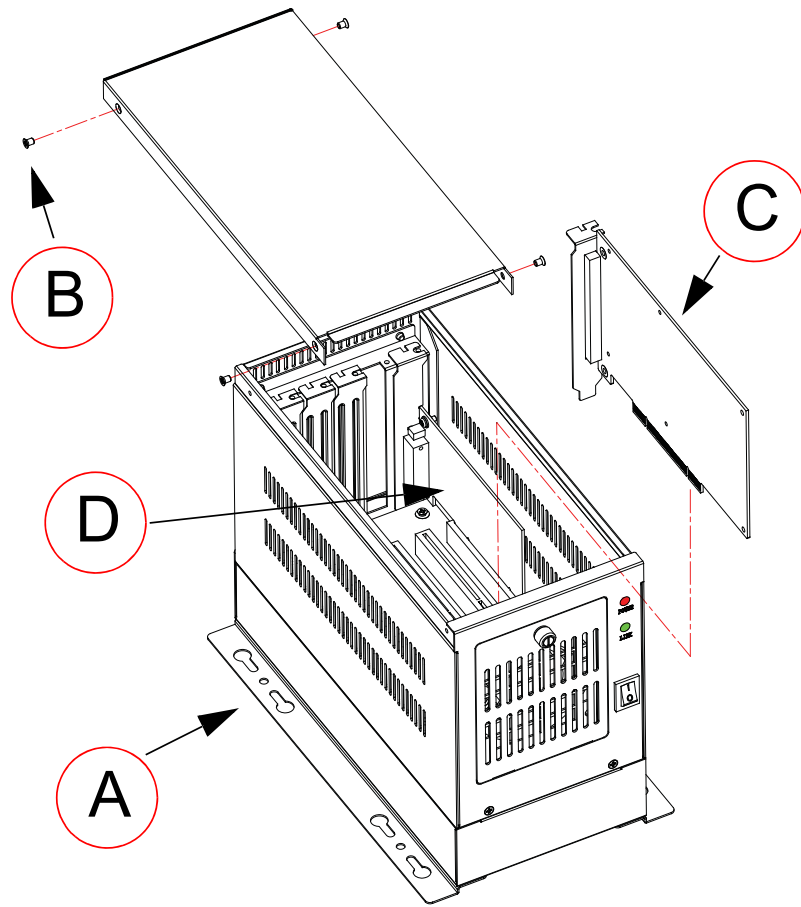
Item	Description
A	Extension chassis (PRO P04A)
B	Extension chassis housing screws
C	Additional PCI card/device
D	Pre-installed Extender Card

Table 2-2: PCI device to Host PC Chassis Installation Items

2.4   Cabling Host Computer to Extension Chassis

Now that you have successfully installed the host card into the Host computer (or installed an additional PCI device in the extension chassis), you may connect the Host Computer and Extension Chassis with an extension cable.

⚠️
CAUTION:
Do not remove the extension cable after the system is powered on. It may cause system errors or data loss. If the cable is unplugged improperly, reconnect it and reboot the host PC and extension chassis.

---

1. Locate your extension cable 3/10/23M lengths availabe.

2. Connect the extension cable to the PCI Express® serial link connector (host card) of your host PC.

3. Firmly attach the extension cable by tightening its retention screws.

Figure 2-3: Cabling Extension Cable to Host PC
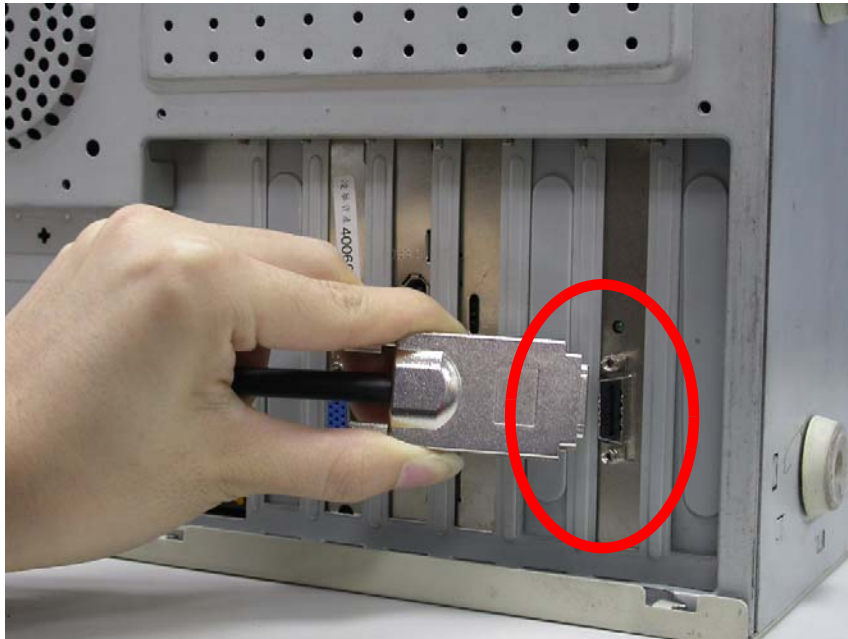
4. Connect the other end of the extension cable to the Extender Card serial link connector of the extension chassis (PRO P04A or PRO P13A).

Figure 2-4: Cabling 3 M Extension Cable to Extension Chassis

Figure 2-5: Host Computer connected to a PCI Extension System

2.5   Power-ON/OFF Sequence

To power-on the PCI express® extension system, follow these steps:

1. Check that the extension cable is properly connected to the host PC and extension chassis.

2. Power-on the extension chassis first.

3. Power-on the host PC.

⚠ CAUTION: **DO NOT** remove the cable after the system and extension chassis are powered on. Disconnecting the cable while the system is running may cause unpredictable system errors and/or system crash.

As the PCI Express®-to-PCI extension system is a standard PCIe-to-PCI bridge interface, the BIOS will identify each device behind the PCI bridge and assign resource to each one during start up. Thus users have to power-on the remote chassis first in order to get appropriate resources from the BIOS.

To power-off the PCI Express® extension system, follow these steps:

1. Power-off the host PC.

2. Power-off the extension chassis.

⚠ CAUTION: **DO NOT** power-off the extension chassis until the host PC is powered off. If the extension chassis is powered off while the host PC is on, the host PC may hang or crash.

2.6   Remote Power-ON/OFF Functionality

Optional functionality of the PCI express® extension system includes remote power-on/off via the 13-Slot Backplane.

Once the 13-Slot Backplane is connected, configured, and enabled, users may remotely power-on/off the extension chassis via a host PC.

The following table lists the connectors that enable remote power-on/off functionality.

Part Number	Connector/ Jumper	Function
Extender Card	JP1	A signal is sent from JP1 on Extender Card and enables the PRO P13A to power-on when the Host PC is powered on.
13-Slot Bkpln.	JP2	ATX power connector for 13-Slot Backplane

Table 2-3: Remote Power-ON/OFF Configuration

NOTE:

Please refer to sections 3.3, 3.4, 3.5, 3.6 and 3.7 for detailed layout, connectors and jumpers.

To enable remote power-on/off functionality, follow these steps:

1. Unscrew the four housing screws of the extension chassis (PRO P13A) using a (cross-head or flat-head) screwdriver. Open the top cover of the chassis.

2. Disconnect the power-on button of the PRO P13A chassis panel.

3. Locate the JP2 connector on the 13-Slot Backplane as well as the JP1 of the Extender Card.
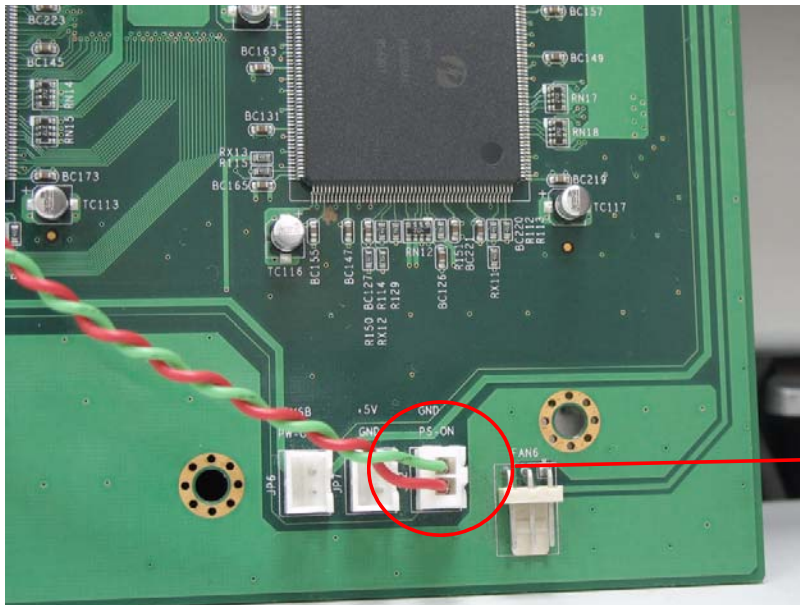
13-Slot Backplane JP2 Connector
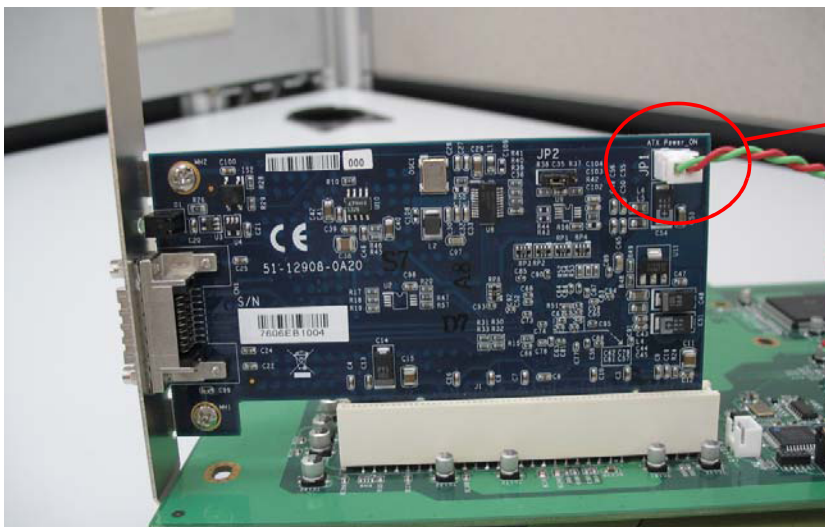
Extender Card JP1 Connector

4. Using a controller cable, connect the JP1 of the Extender Card and JP2 of the 13-Slot Backplane.

Figure 2-6: 13-Slot Backplane Remote Power-On/Off Diagram
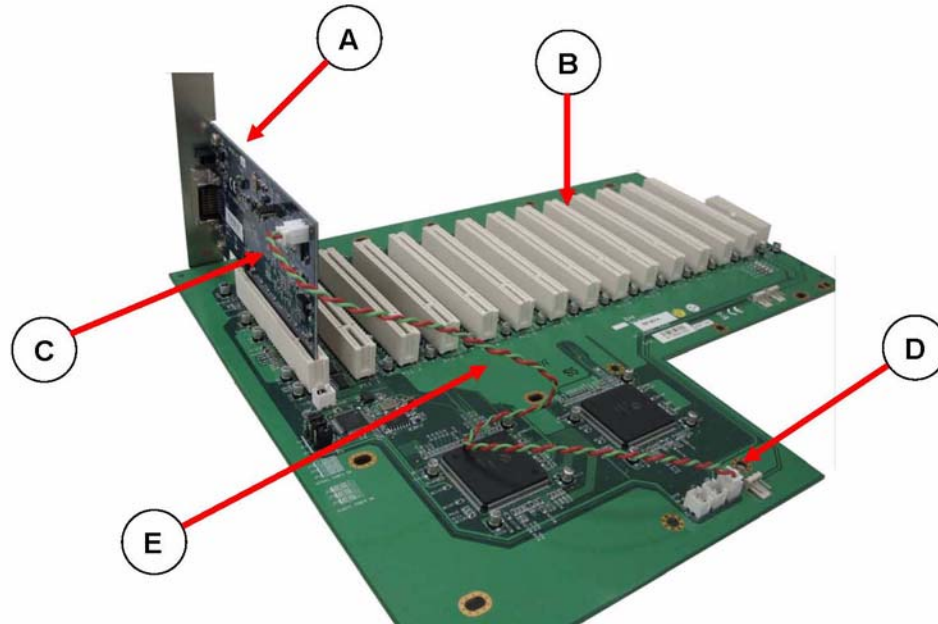
Item	Description
A	Extender Card
B	13-Slot Backplane
C	JP1 on Extender Card. JP2 is used for controlling remote chassis power.
D	JP2 on the 13-Slot Backplane is used to control the ATX power of PRO P13A.
E	Remote power-on/off control cable.

Table 2-4: Remote Power-On/Off Diagram Description

2.7 LED Status

The LEDs on the front panel of the host card and Extender Card give power status information. The LEDs light up only when the following conditions are met:

▶ The extension cable between the host card (Host PC) and Extender Card (Extension Chassis) is properly connected.

▶ The extension chassis is powered on.

▶ The host PC is entering its Power-On Self Test (POST).

3   Hardware Information

3.1   Functional Block Diagram

Figure 3-1: PCI Express Extension System Functional Block Diagram
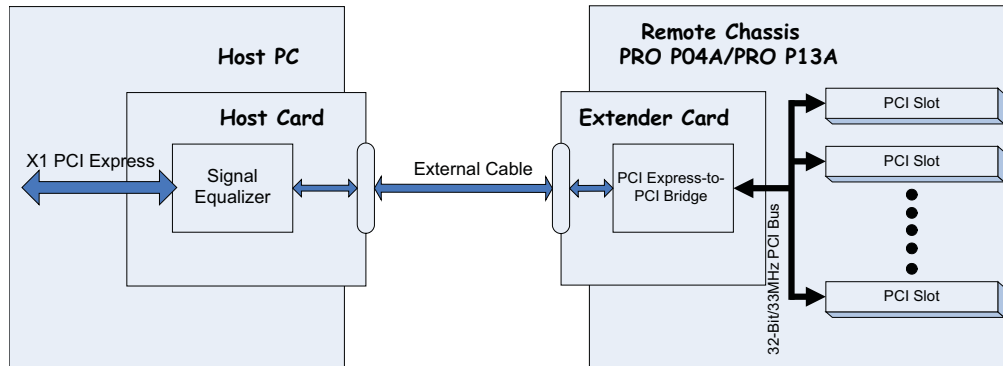
3.2 Host Card Layout, Connectors and Jumpers

Figure 3-2: Host Card Mechanical Layout
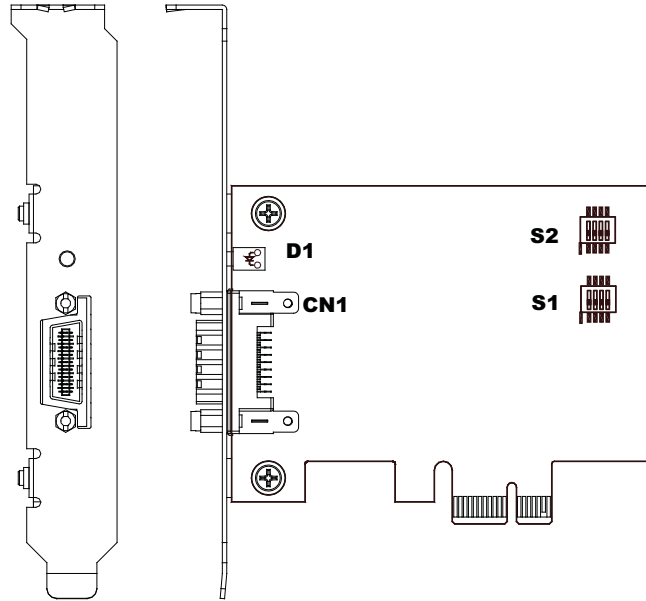
Connector/Jumper/LED	Description
S1	Adjusts Signal Equalizer
S2	Adjusts Signal Equalizer
CN1	PCI Express® Serial Link Connector
D1	Serial Link Status LED

Table 3-1: Host Card Connectors, Jumpers and LED

3.2.1 Host Card S1/S2 Signal Equalizer Adjustments

The Host Card provides equalization, amplification and de-emphasis circuits to optimize signal integrity performance. With this design, the Host Card allows signal transmission over long distances and reduces signal distortion.

NOTE:	The following adjustment should be applied to both S1 and S2 simultaneously. The S1 transmits signals and S2 is receives signals.
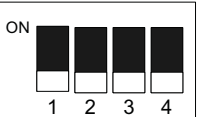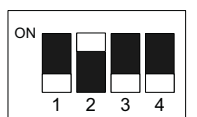
Configuration	Description
ON — 1 2 3 4	Strongest equalizer levels (default)
ON — 1 2 3 4	Moderate equalizer level
ON — 1 2 3 4	Weakest equalizer level
ON — 1 2 3 4	No equalizer

Table 3-2: Host Card Pin 1 and Pin 2 Equalizer Selection
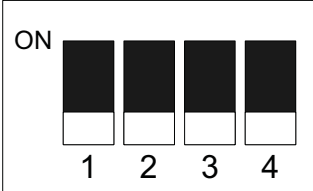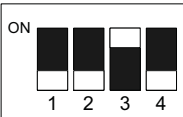
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Configuration	Description
ON ■ ■ ■ ■ 1 2 3 4	High level output signal swing (Default)
ON ■ ■ □ ■ 1 2 3 4	Normal level output signal swing

Table 3-3: Host Card Pin 3 Output Swing Control
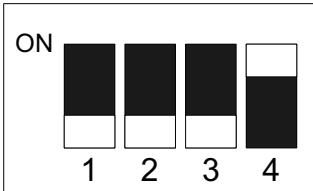
Configuration	Description
ON ■ ■ ■ ■ 1 2 3 4	High level output signal swing (Default)
ON ■ ■ ■ □ 1 2 3 4	Normal level output signal swing

Table 3-4: Host Card Pin 4 Output De-Emphasis Control

3.3   Extender Card Layout, Connectors and Jumpers

Figure 3-3: Extender Card Mechanical Layout
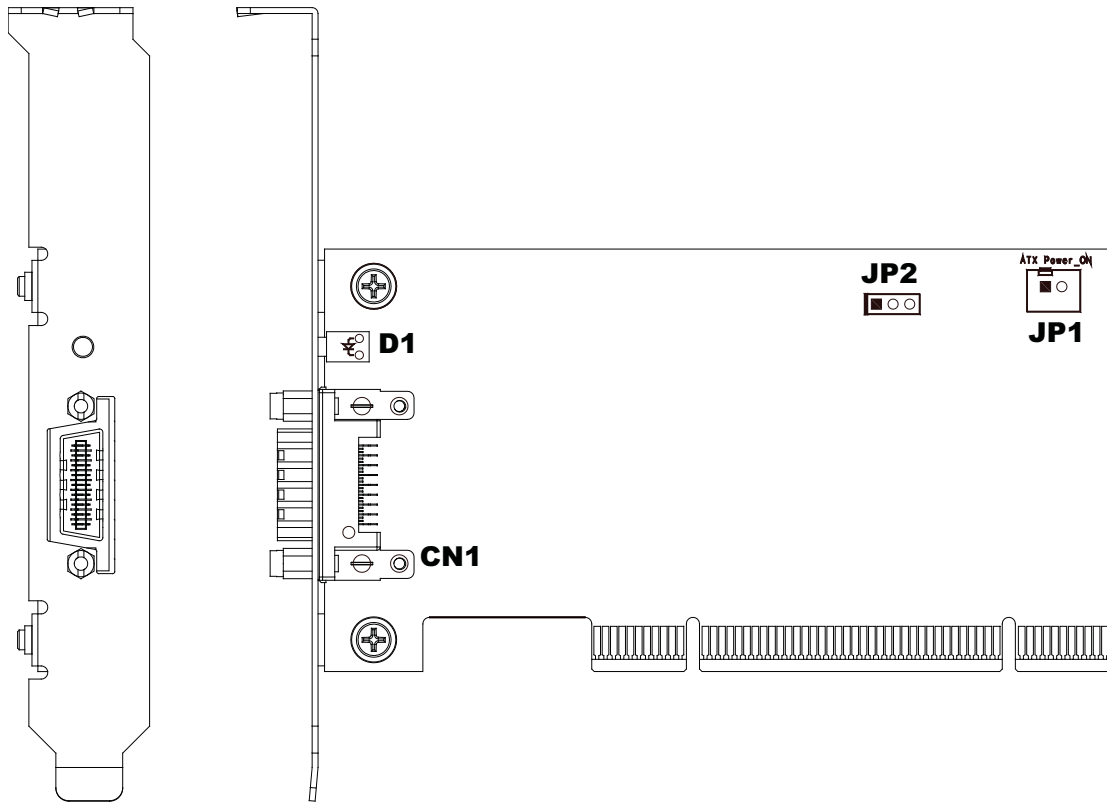
Connector/Jumper/LED	Description
JP1	ATX power enabling connector. This connector is used for remote power-on control.
JP2	Spread spectrum clock control
CN1	PCI Express® serial link connector
D1	Serial Link Status LED

Table 3-5: Extender Card Connectors, Jumpers and LED

	Pin #	Assignment
1 2 JP1	1	PWR-ON. This pin is used for remote power-on/off functionality. Connect this to JP2 on the 13-Slot Backplane to enable it.
	2	N/C

Table 3-6: Extender Card JP1 Remote Power-ON/Off Connector
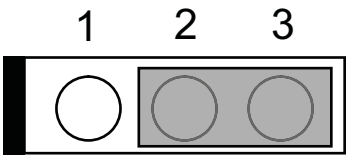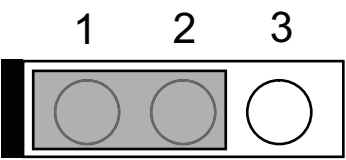
Setting	Description
1 2 3	Enables spread spectrum control. When enabling spread spectrum control, the PCI clock will be modulated with a low frequency carrier, the peak EMI can be greatly reduced in the system.
1 2 3	Disables spread spectrum control.

Table 3-7: Extender Card JP2 Spread Spectrum Clock Control

3.4 PRO P04A 4-Slot Extension Chassis

PRO P04A is a robust industrial chassis for accommodating the 4-Slot Backplane. The PRO P04A is a small, compact chassis (122mm X 195mm X 260mm) with a built-in 200W universal AC power supply. The PRO P04A is provided with a wall-mount kit so you can place it in many different environments.

NOTE: Only half-size PCI cards are suitable for the PRO P04A.

3.4.1   PRO P04A Chassis Mechanical Drawing

Figure 3-4: PRO P04A Chassis Front and Back View
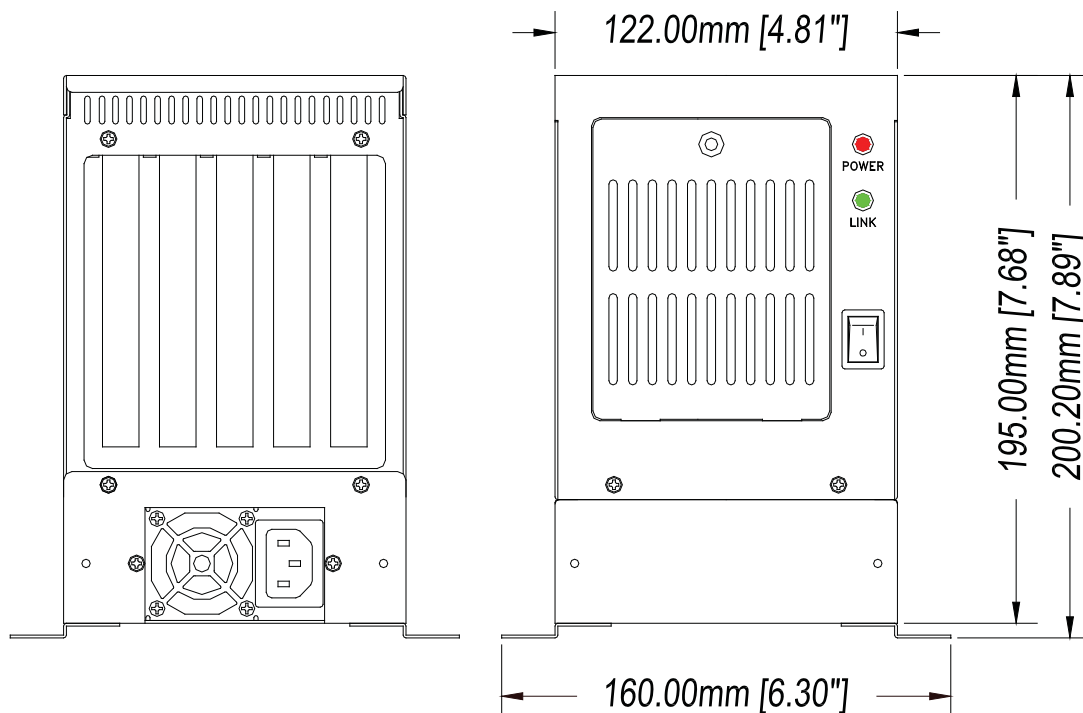
Figure 3-5: PRO P04A Chassis Top View
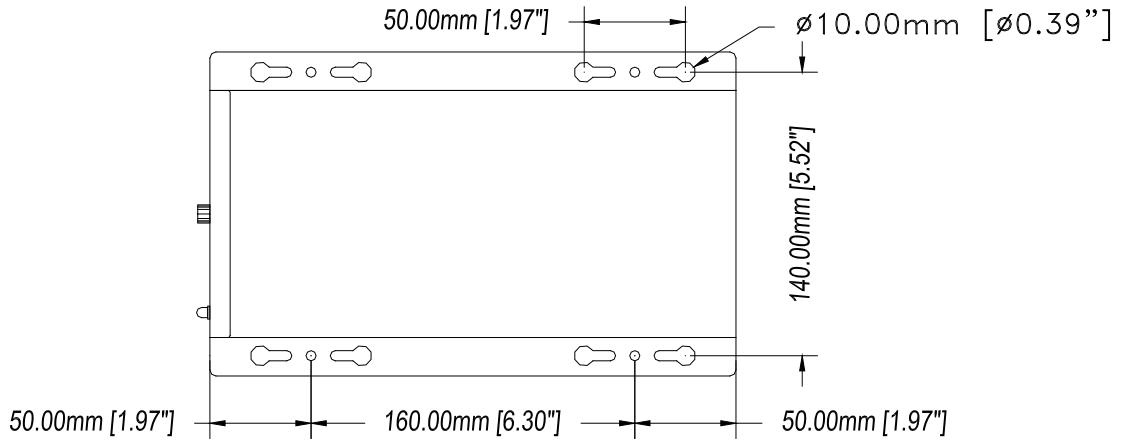
Figure 3-6: PRO P04A Side View
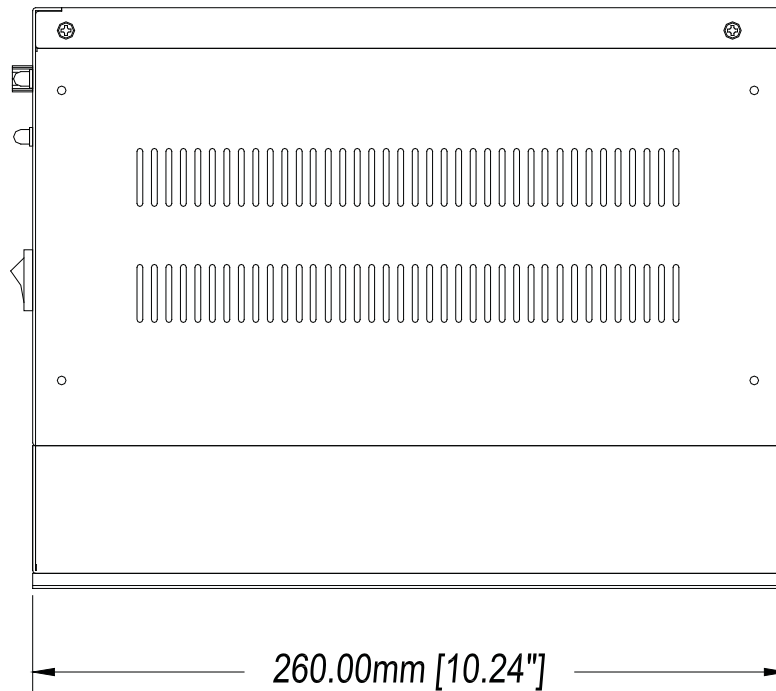
3.5   PRO P13A 13-Slot Extension Chassis

PRO P13A is a robust industrial chassis for accommodating the 13-Slot Backplane. The PRO P13A is a 177 mm X 481.1 mm X 438.5 mm chassis with a built-in 200W universal AC power supply.

3.5.1   PRO P13A Chassis Mechanical Drawing

Figure 3-7: PRO P13A Front View
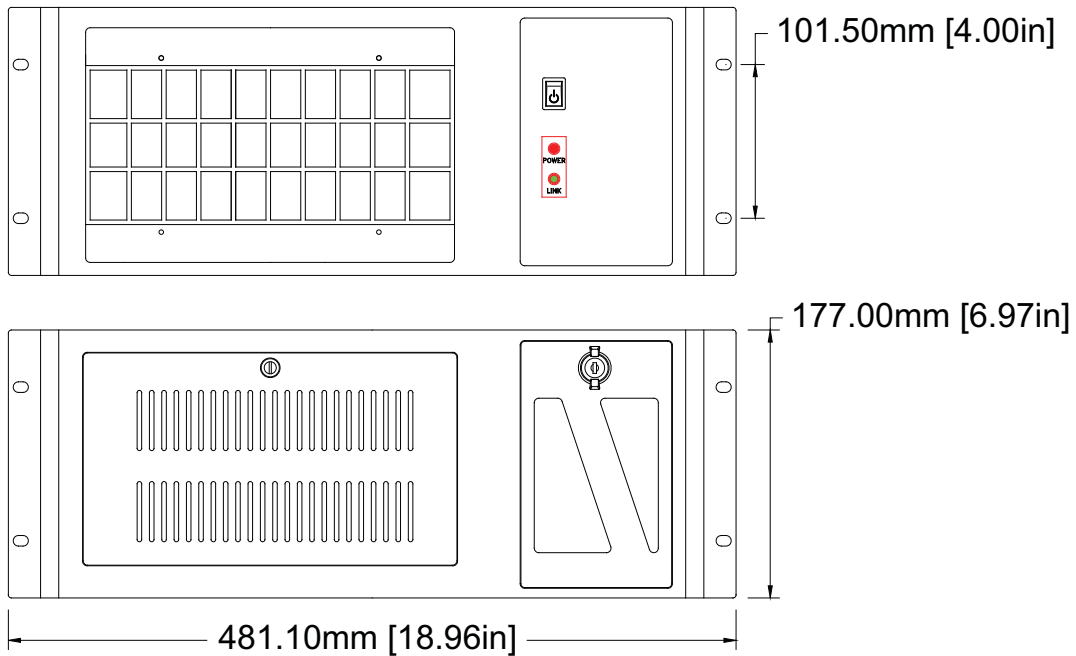
Figure 3-8: PRO P13A Back View

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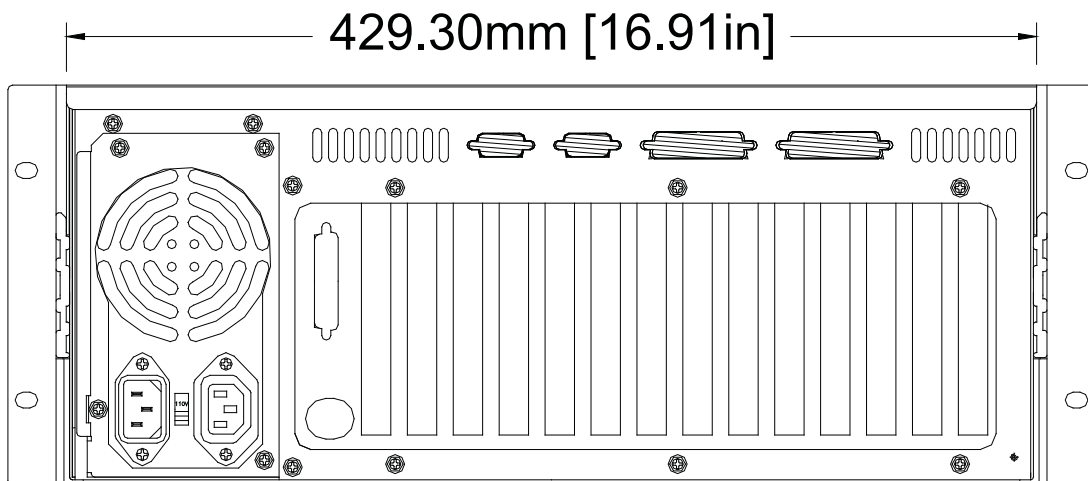
Figure 3-9: PRO P13A Top View
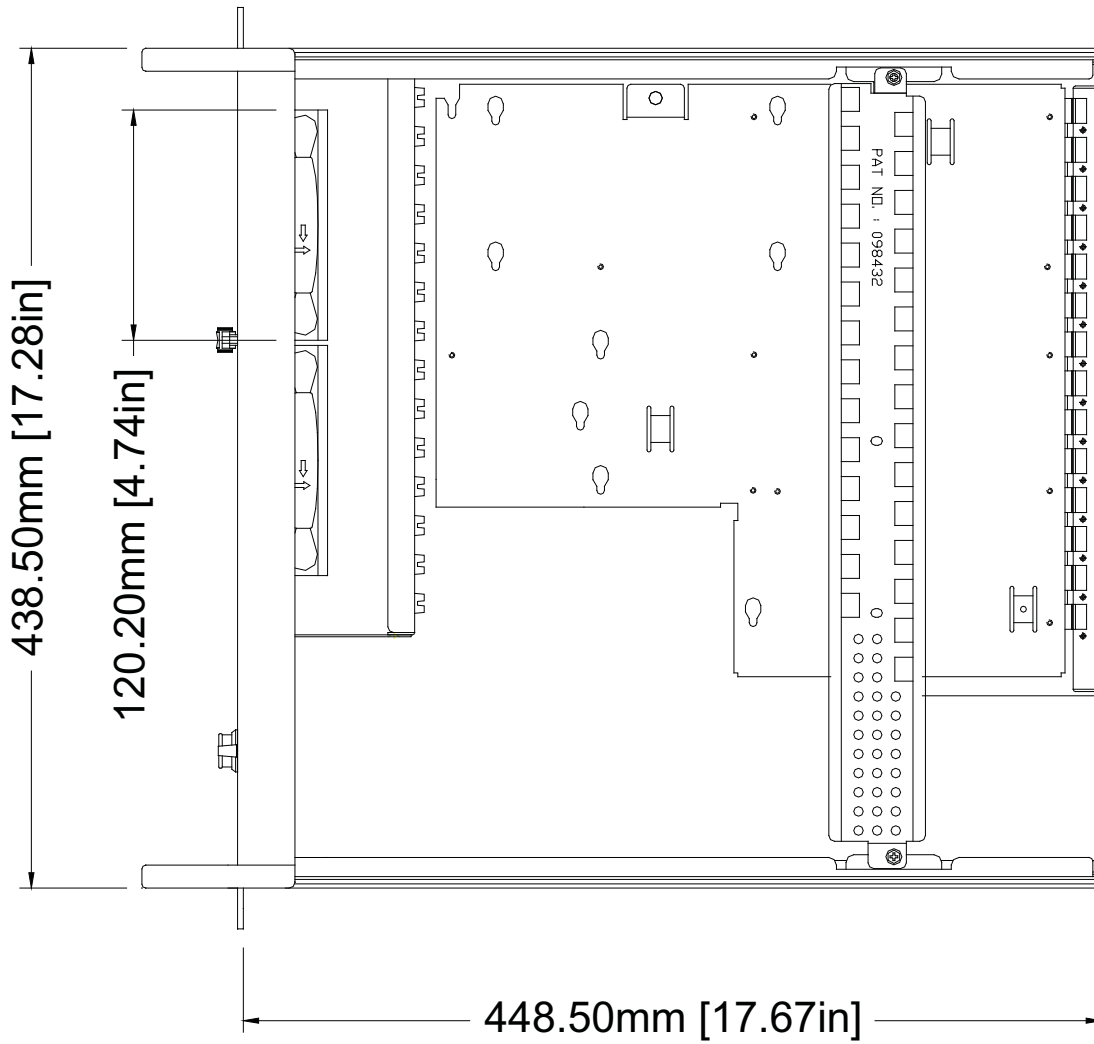
Figure 3-10: PRO P13A Side View
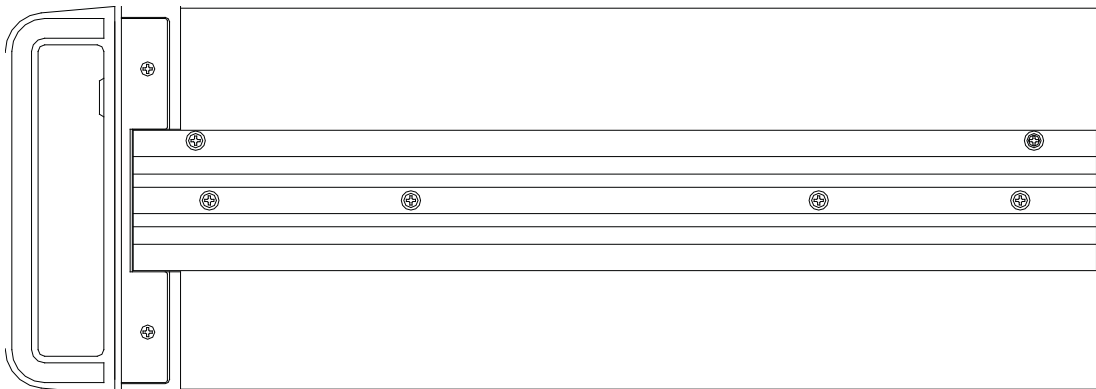
3.6 4-Slot Backplane Layout, Connectors and Jumpers

The 4-Slot Backplane provides 1 system slot and 4 available PCI peripheral slots. These PCI slots are for 32-bit and 33MHz PCI devices.

| ⚠ CAUTION: | The system slot is occupied by a pre-installed Extender Card, please **DO NOT** install a CPU controller in this slot. |

Figure 3-11: 4-Slot Backplane Layout

Top View   **Soldered Side**
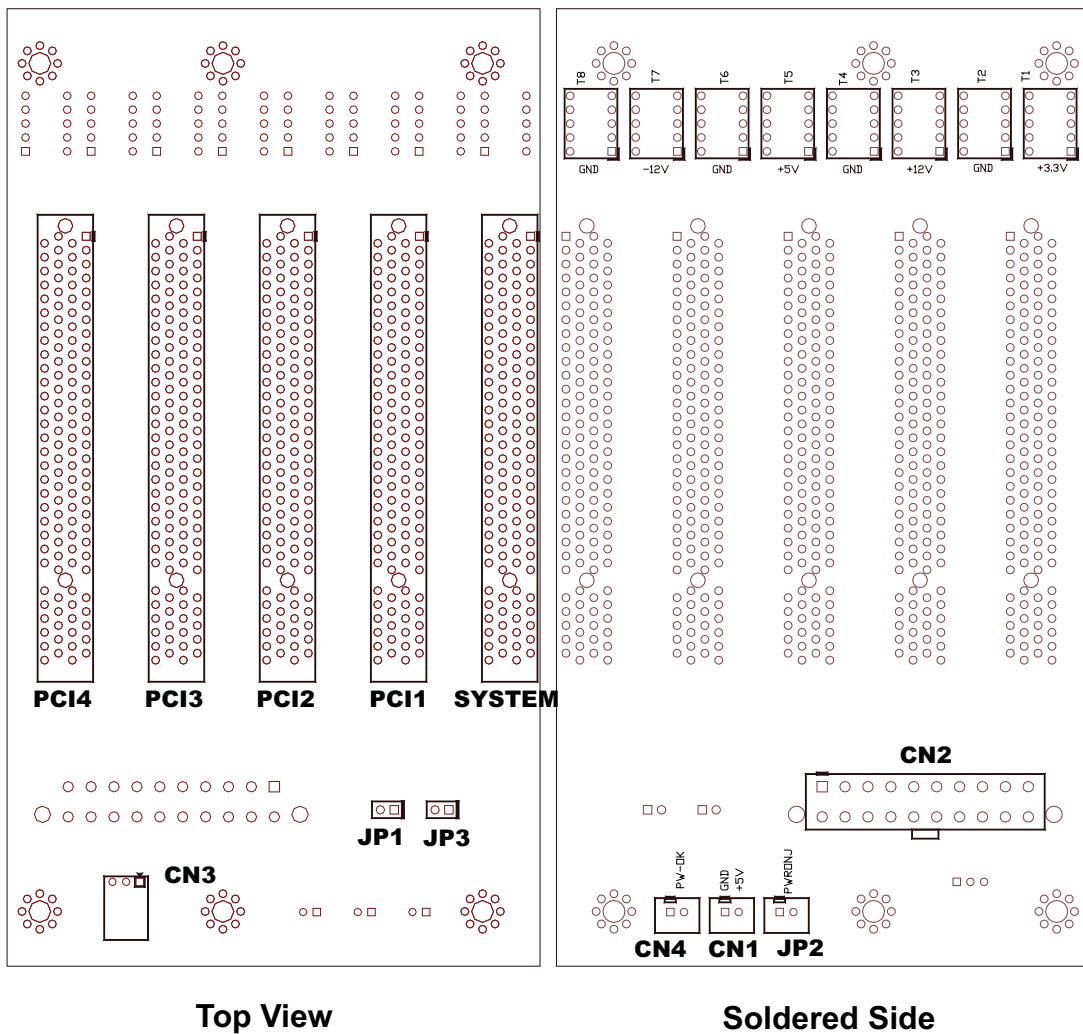
Connector/Jumper/LED	Description
CN1	LED connector
CN2	ATX power connector
CN3	Fan connector
CN4	ATX power OK status connector
JP1	LED connector
JP2	ATX power enabler
JP3	Fan connector
System	System slot for extension card. This slot is modified for bus extension purposes and does not support general signal board controllers.
PCI1 to PCI4	Peripheral PCI Slot

Table 3-8: 4-Slot Backplane Connectors, Jumpers and LED

! **DO NOT** plug CPU cards in the system slot.

CAUTION:

	Pin #	Assignment
	1	Ground
1 ☐ ▮ GND 2 ○ +5V **CN1**	2	+5 V Output

Table 3-9: 4-Slot Backplane CN1 LED Connector

	Pin #	Assignment	Pin #	Assignment
	1	+3.3 V	11	+3.3 V
	2	+3.3 V	12	-12 V
	3	Ground	13	Ground
	4	+5 V	14	PS-ON
	5	Ground	15	Ground
CN2	6	+5 V	16	Ground
	7	Ground	17	Ground
	8	PW-OK	18	-5 V
	9	5 VSB	19	+5 V
	10	+12 V	20	+5 V

Table 3-10: 4-Slot Backplane CN2 ATX Power Connector

	Pin #	Assignment
	1	N/C
CN3	2	+12 V
	3	Ground

Table 3-11: 4-Slot Backplane CN3 Fan Connector

	Pin #	Assignment
	1	Ground
CN4	2	PW-OK. ATX Power Status

Table 3-12: 4-Slot Backplane CN4 ATX Power OK Status Connector
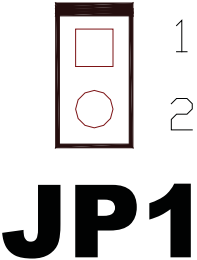
	Pin #	Assignment
JP1	1	Ground
	2	LED Power, +5 V

Table 3-13: 4-Slot Backplane JP1 LED Connector
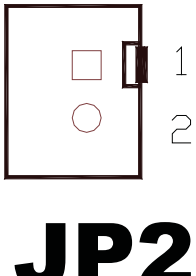
	Pin #	Assignment
JP2	1	Ground
	2	PWR-ON, ATX Power Enable

Table 3-14: 4-Slot Backplane JP2 ATX Power Enable Connector
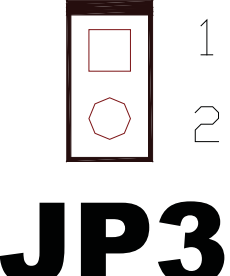
	Pin #	Assignment
JP3	1	Ground
	2	+12 V

Table 3-15: 4-Slot Backplane JP3 Fan Connector

## 3.7 13-Slot Backplane Layout, Connectors and Jumpers

The 13-Slot Backplane provides 1 system slot and 13 available PCI peripheral slots. The system is occupied by a pre-installed Extender Card PCI extension card. The remaining PCI slots are availble for 5 V or universal PCI peripheral cards.

Figure 3-12: 13-Slot Backplane Layout

CyberResearch, Inc.   **33**
25 Business Park Drive   P: (203) 643-5000; F: (203) 643-5001
Branford, CT USA   www.cyberresearch.com
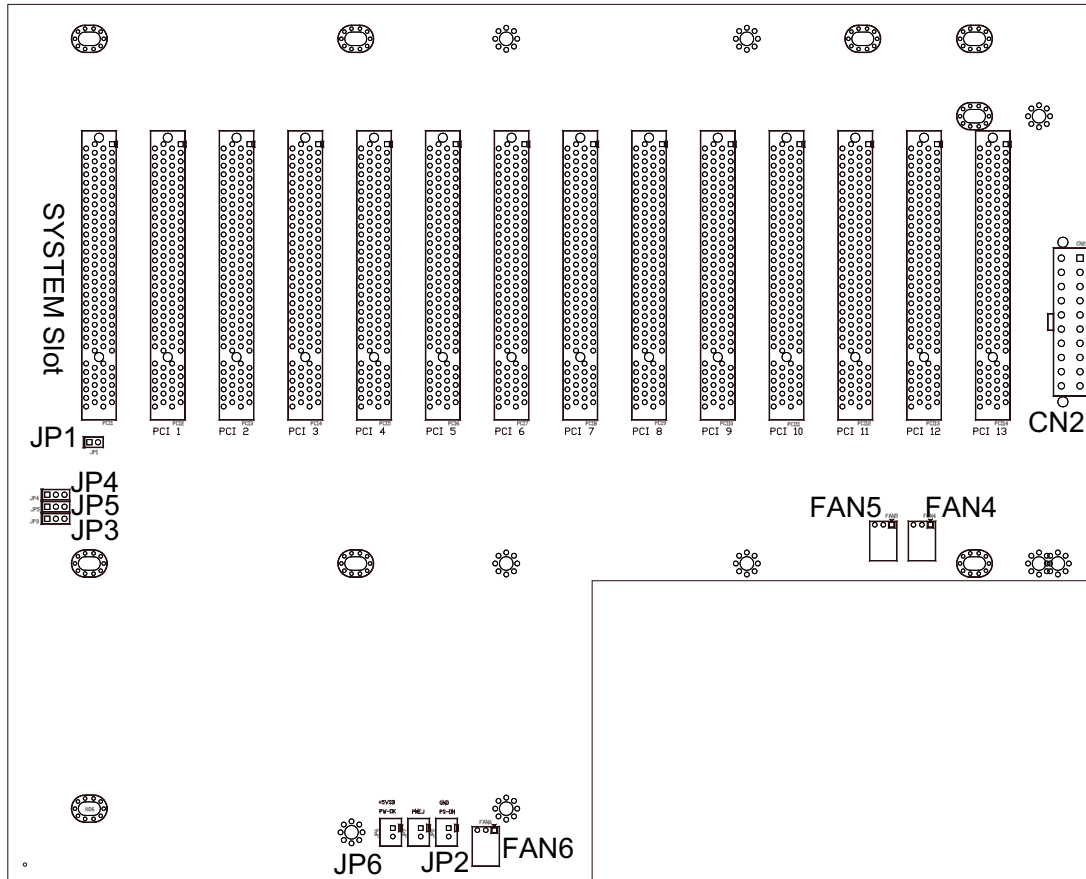
Connector/Jumper	Description
JP2	ATX power enabling connector
JP6	ATX power OK status connector
JP7	LED connector
FAN4	Fan connector for +12 V fan
FAN5	Fan connector for +12 V fan
FAN6	Fan connector for +12 V fan
CN2	ATX power connector

Table 3-16: 13-Slot Backplane Connectors and Jumpers
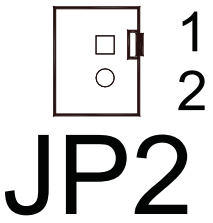
	Pin #	Assignment
JP2	1	PWR-ON
	2	If JP3 2-3 connected, this pin is Ground (Default). For PRO 3212-P13A extension system, user should not change the setting of JP3.

Table 3-17: 13-Slot Backplane JP2 ATX Power Enable Connector
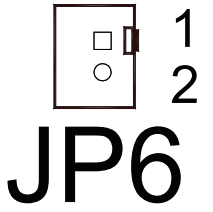
	Pin #	Assignment
JP6	1	PWR-OK
	2	5 V$_{sb}$, +5 V standby power

Table 3-18: 13-Slot Backplane JP2 ATX Power Enable Connector
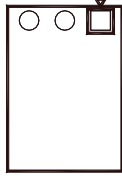
	Pin #	Assignment
3 2 1	1	N/C
	2	+12 V
	3	Ground

Table 3-19: 13-Slot Backplane FAN4, FAN5, and FAN6 +12 V Connector
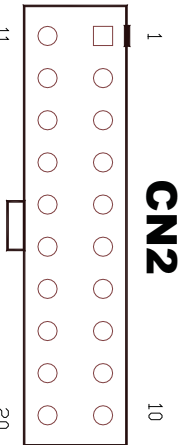
	Pin #	Assignment	Pin #	Assignment
CN2	1	+3.3 V	11	+3.3 V
	2	+3.3 V	12	-12 V
	3	Ground	13	Ground
	4	+5 V	14	PS-ON
	5	Ground	15	Ground
	6	+5 V	16	Ground
	7	Ground	17	Ground
	8	PW-OK	18	-5 V
	9	5 VSB	19	+5 V
	10	+12 V	20	+5 V

Table 3-20: 13-Slot Backplane CN2 ATX Power Connector

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Branford, CT USA   www.cyberresearch.com

3.8   Extension Cable Options

The PCI Express®-to-PCI extension system (PRO 3212-P13A and PRO 3212-P04A) is available with three different cables in lengths. These cables are designed to transfer high speed signals and have high immunity from electromagnetic interference.

Figure 3-13: Standard 3 M extension cable (PRO CBL02-03)

Part Number	Description
PRO CBL02-03	3 M, PCI Express®-to-PCI extension cable
PRO CBL02-10	10 M, PCI Express®-to-PCI extension cable
PRO CBL02-23	23 M, PCI Express®-to-PCI extension cable

Table 3-21: Optional Extension Cables

4   Troubleshooting (FAQ)

This chapter describes frequently asked questions that may guide the user to solve minors problem they may encounter.

This Troubleshooting (FAQ) applies to:

▶ PCI Express®-to-PCI Extension System: including PRO 3212-13A and PRO 3212-P04A.

In the following description, the products will be renamed as "PCI Express® Bus Extension Products".

Question: What is the maximum extension length of PCI Express® Bus Extension Products?

Answer: The maximum extension length is 23m. CyberResearch offers different cables in length for customer's applications, 3 M, 10 M and 23 M.

Question: When using our PCI Express® Bus Extension Products, is there any additional driver or software required to install?

Answer: CyberResearch PCI Express® Bus Extension Products are designed to be standard PCI Express®-to-PCI bridges. It is not necessary to install additional drivers or software for support.

Question: How many extension chassis can I connect to a host PC by using CyberResearch PCI Express® Bus Extension products?

Answer: Due to the point-to-point architecture of PCI Express®, only one PCI Express® Bus Extension Product can

be supported by one chassis. However, users can select multiple extension chassis for different purposes. For example, a 4-slot extension chassis provides small and compact form factor while an 18-slot extension chassis provides more PCI slots. Theoretically, PCI specification allows up to 255 PCI bus segments. But the PCI Express® Bus Extension Products do not limit the bus segment number. The maximum PCI bus segments may limited by your BIOS or operating system.

Question: Is there any compatibility problems with the Cyber-Research PCI Express®-to-PCI extension kit?

Answer: All our PCI Express® Bus Extension Products are designed as standard PCI Express®-to-PCI Bridge. During PC boot up, your PC BIOS will search devices and assign resources such as, I/O, memory space and IRQ number, to each device according to its algorithm. Although PCI specification allows up to 255 bus segments in a PC system, the BIOS may not assign the correct and/or proper resource to each device in some complex PCI systems.

Because the PCI Express® specification was released in 2002, most hardware and circuit board designers as of yet do not offer multiple PCI-to-PCI bridges. Most BIOS work for simple applications but may not work for multiple PCI bus segments and a variety of resource requests. We suggest customers choose PC equipment with Intel 945, 965 or later chipsets to adjust for these issues.

Question: When I encounter compatibility problems, what should I do?

Answer: Because most compatibility problems come from PCI resource assignments, customers should consult their PC vendors or BIOS vendors for help. Updating to the most current BIOS version may also resolve PCI resources problems.

The following list are some indications that may help customers to deal with compatibility issues:

1. Disable the onboard device functions of your host PC to release IO resources.

2. Remove PCI devices plugged/installed in your host PC.

3. Connect an extension chassis which is single bus segment to the host PC. Plug a PCI device to an extension chassis one by one and boot each in sequence to check if your host PC can accommodate the PCI device or not.

4. You may try to plug the PCI Express® extension host card to a different PCI Express® slot.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

▶ Read these safety instructions carefully.

▶ Keep this user's manual for future reference.

▶ Read the specifications section of this manual for detailed information on the operating environment of this equipment.

▶ When installing/mounting or uninstalling/removing equipment:

▷ Turn off power and unplug any power cords/cables.

▶ To avoid electrical shock and/or damage to equipment:

▷ Keep equipment away from water or liquid sources;

▷ Keep equipment away from high heat or high humidity;

▷ Keep equipment properly ventilated (do not block or cover ventilation openings);

▷ Make sure to use recommended voltage and power source settings;

▷ Always install and operate equipment near an easily accessible electrical socket-outlet;

▷ Secure the power cord (do not place any object on/over the power cord);

▷ Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,

▷ If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

▶ Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

▶ A Lithium-type battery may be provided for uninterrupted, backup or emergency power.

⚠
CAUTION: Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions.

▶ Equipment must be serviced by authorized technicians when:

   ▷ The power cord or plug is damaged;

   ▷ Liquid has penetrated the equipment;

   ▷ It has been exposed to high humidity/moisture;

   ▷ It is not functioning or does not function according to the user's manual;

   ▷ It has been dropped and/or damaged; and/or,

   ▷ It has an obvious sign of breakage.

Product Service

Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

1)   Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
2)   Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
3)   Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
4)   Isolate problem areas that are not working as you expected.
5)   Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
6)   Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

1)   Check the PC-bus power and any power supply signals.
2)   Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL– . It CANNOT exceed the full scale range of the board.
3)   Check the other boards in your PC or modules on the network for address and interrupt conflicts.
4)   Refer to the example programs as a baseline for comparing code.

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Warranty Notice

CyberResearch, Inc. warrants that this equipment as furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase by the original buyer and that upon written notice of any such defect, CyberResearch, Inc. will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way which may, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding or inconsistent with its specifications or if the serial number has been removed.

CyberResearch, Inc. does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage prepaid. Package it securely and insure it. You will be charged for parts and labor if the warranty period has expired.

Returns and RMAs

If a CyberResearch product has been diagnosed as being non-functional, is visibly damaged, or must be returned for any other reason, please call for an assigned RMA number. The RMA number is a key piece of information that lets us track and process returned merchandise with the fastest possible turnaround time.

PLEASE CALL FOR AN RMA NUMBER!

Packages returned without an RMA number will be refused!

In most cases, a returned package will be refused at the receiving dock if its contents are not known. The RMA number allows us to reference the history of returned products and determine if they are meeting your application's requirements. When you call customer service for your RMA number, you will be asked to provide information about the product you are returning, your address, and a contact person at your organization.

Please make sure that the RMA number is prominently displayed on the outside of the box.

• Thank You •

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