

## COMPREHENSIVE SERVICES

We offer competitive repair and calibration services, as well as easily accessible documentation and free downloadable resources.

## SELL YOUR SURPLUS

We buy new, used, decommissioned, and surplus parts from every NI series. We work out the best solution to suit your individual needs.

 Sell For Cash    Get Credit    Receive a Trade-In Deal

## OBSOLETE NI HARDWARE IN STOCK & READY TO SHIP

We stock **New**, **New Surplus**, **Refurbished**, and **Reconditioned** NI Hardware.



*Bridging the gap between the manufacturer and your legacy test system.*

 1-800-915-6216

 [www.apexwaves.com](http://www.apexwaves.com)

 [sales@apexwaves.com](mailto:sales@apexwaves.com)

*All trademarks, brands, and brand names are the property of their respective owners.*

**Request a Quote**

 **CLICK HERE**

**PXI-1020**

# PXI™

---

## PXI-1020 User Manual

## **Worldwide Technical Support and Product Information**

[www.ni.com](http://www.ni.com)

### **National Instruments Corporate Headquarters**

11500 North Mopac Expressway Austin, Texas 78759-3504 USA Tel: 512 794 0100

### **Worldwide Offices**

Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20, Brazil 011 284 5011,  
Canada (Calgary) 403 274 9391, Canada (Ontario) 905 785 0085, Canada (Québec) 514 694 8521,  
China 0755 3904939, Denmark 45 76 26 00, Finland 09 725 725 11, France 01 48 14 24 24,  
Germany 089 741 31 30, Greece 30 1 42 96 427, Hong Kong 2645 3186, India 91805275406,  
Israel 03 6120092, Italy 02 413091, Japan 03 5472 2970, Korea 02 596 7456, Mexico (D.F.) 5 280 7625,  
Mexico (Monterrey) 8 357 7695, Netherlands 0348 433466, Norway 32 27 73 00, Poland 48 22 528 94 06,  
Portugal 351 1 726 9011, Singapore 2265886, Spain 91 640 0085, Sweden 08 587 895 00,  
Switzerland 056 200 51 51, Taiwan 02 2377 1200, United Kingdom 01635 523545

For further support information, see the *Technical Support Resources* appendix. To comment on the documentation, send e-mail to [techpubs@ni.com](mailto:techpubs@ni.com)

© Copyright 1999 National Instruments Corporation. All rights reserved.

# Important Information

---

## Warranty

The PXI-1020 is warranted against defects in materials and workmanship for a period of one year from the date of shipment, as evidenced by receipts or other documentation. National Instruments will, at its option, repair or replace equipment that proves to be defective during the warranty period. This warranty includes parts and labor.

The media on which you receive National Instruments software are warranted not to fail to execute programming instructions, due to defects in materials and workmanship, for a period of 90 days from date of shipment, as evidenced by receipts or other documentation. National Instruments will, at its option, repair or replace software media that do not execute programming instructions if National Instruments receives notice of such defects during the warranty period. National Instruments does not warrant that the operation of the software shall be uninterrupted or error free.

A Return Material Authorization (RMA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. National Instruments will pay the shipping costs of returning to the owner parts which are covered by warranty.

National Instruments believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, National Instruments reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult National Instruments if errors are suspected. In no event shall National Instruments be liable for any damages arising out of or related to this document or the information contained in it.

EXCEPT AS SPECIFIED HEREIN, NATIONAL INSTRUMENTS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S RIGHT TO RECOVER DAMAGES CAUSED BY FAULT OR NEGLIGENCE ON THE PART OF NATIONAL INSTRUMENTS SHALL BE LIMITED TO THE AMOUNT THEREFORE PAID BY THE CUSTOMER. NATIONAL INSTRUMENTS WILL NOT BE LIABLE FOR DAMAGES RESULTING FROM LOSS OF DATA, PROFITS, USE OF PRODUCTS, OR INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY THEREOF. This limitation of the liability of National Instruments will apply regardless of the form of action, whether in contract or tort, including negligence. Any action against National Instruments must be brought within one year after the cause of action accrues. National Instruments shall not be liable for any delay in performance due to causes beyond its reasonable control. The warranty provided herein does not cover damages, defects, malfunctions, or service failures caused by owner's failure to follow the National Instruments installation, operation, or maintenance instructions; owner's modification of the product; owner's abuse, misuse, or negligent acts; and power failure or surges, fire, flood, accident, actions of third parties, or other events outside reasonable control.

## Copyright

Under the copyright laws, this publication may not be reproduced or transmitted in any form, electronic or mechanical, including photocopying, recording, storing in an information retrieval system, or translating, in whole or in part, without the prior written consent of National Instruments Corporation.

## Trademarks

National Instruments™, ni.com™, and PXI™ are trademarks of National Instruments Corporation.

Product and company names mentioned herein are trademarks or trade names of their respective companies.

## WARNING REGARDING USE OF NATIONAL INSTRUMENTS PRODUCTS

(1) NATIONAL INSTRUMENTS PRODUCTS ARE NOT DESIGNED WITH COMPONENTS AND TESTING FOR A LEVEL OF RELIABILITY SUITABLE FOR USE IN OR IN CONNECTION WITH SURGICAL IMPLANTS OR AS CRITICAL COMPONENTS IN ANY LIFE SUPPORT SYSTEMS WHOSE FAILURE TO PERFORM CAN REASONABLY BE EXPECTED TO CAUSE SIGNIFICANT INJURY TO A HUMAN.

(2) IN ANY APPLICATION, INCLUDING THE ABOVE, RELIABILITY OF OPERATION OF THE SOFTWARE PRODUCTS CAN BE IMPAIRED BY ADVERSE FACTORS, INCLUDING BUT NOT LIMITED TO FLUCTUATIONS IN ELECTRICAL POWER SUPPLY, COMPUTER HARDWARE MALFUNCTIONS, COMPUTER OPERATING SYSTEM SOFTWARE FITNESS, FITNESS OF COMPILERS AND DEVELOPMENT SOFTWARE USED TO DEVELOP AN APPLICATION, INSTALLATION ERRORS, SOFTWARE AND HARDWARE COMPATIBILITY PROBLEMS, MALFUNCTIONS OR FAILURES OF ELECTRONIC MONITORING OR CONTROL DEVICES, TRANSIENT FAILURES OF ELECTRONIC SYSTEMS (HARDWARE AND/OR SOFTWARE), UNANTICIPATED USES OR MISUSES, OR ERRORS ON THE PART OF THE USER OR APPLICATIONS DESIGNER (ADVERSE FACTORS SUCH AS THESE ARE HEREAFTER COLLECTIVELY TERMED "SYSTEM FAILURES"). ANY APPLICATION WHERE A SYSTEM FAILURE WOULD CREATE A RISK OF HARM TO PROPERTY OR PERSONS (INCLUDING THE RISK OF BODILY INJURY AND DEATH) SHOULD NOT BE RELIANT SOLELY UPON ONE FORM OF ELECTRONIC SYSTEM DUE TO THE RISK OF SYSTEM FAILURE. TO AVOID DAMAGE, INJURY, OR DEATH, THE USER OR APPLICATION DESIGNER MUST TAKE REASONABLY PRUDENT STEPS TO PROTECT AGAINST SYSTEM FAILURES, INCLUDING BUT NOT LIMITED TO BACK-UP OR SHUT DOWN MECHANISMS. BECAUSE EACH END-USER SYSTEM IS CUSTOMIZED AND DIFFERS FROM NATIONAL INSTRUMENTS' TESTING PLATFORMS AND BECAUSE A USER OR APPLICATION DESIGNER MAY USE NATIONAL INSTRUMENTS PRODUCTS IN COMBINATION WITH OTHER PRODUCTS IN A MANNER NOT EVALUATED OR CONTEMPLATED BY NATIONAL INSTRUMENTS, THE USER OR APPLICATION DESIGNER IS ULTIMATELY RESPONSIBLE FOR VERIFYING AND VALIDATING THE SUITABILITY OF NATIONAL INSTRUMENTS PRODUCTS WHENEVER NATIONAL INSTRUMENTS PRODUCTS ARE INCORPORATED IN A SYSTEM OR APPLICATION, INCLUDING, WITHOUT LIMITATION, THE APPROPRIATE DESIGN, PROCESS AND SAFETY LEVEL OF SUCH SYSTEM OR APPLICATION.

# Compliance

---

## FCC/Canada Radio Frequency Interference Compliance\*

### Determining FCC Class

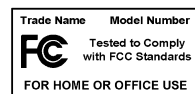
The Federal Communications Commission (FCC) has rules to protect wireless communications from interference. The FCC places digital electronics into two classes. These classes are known as Class A (for use in industrial-commercial locations only) or Class B (for use in residential or commercial locations). Depending on where it is operated, this product could be subject to restrictions in the FCC rules. (In Canada, the Department of Communications (DOC), of Industry Canada, regulates wireless interference in much the same way.)

Digital electronics emit weak signals during normal operation that can affect radio, television, or other wireless products. By examining the product you purchased, you can determine the FCC Class and therefore which of the two FCC/DOC Warnings apply in the following sections. (Some products may not be labelled at all for FCC, if so the reader should then assume these are Class A devices.)

FCC Class A products only display a simple warning statement of one paragraph in length regarding interference and undesired operation. Most of our products are FCC Class A. The FCC rules have restrictions regarding the locations where FCC Class A products can be operated.

FCC Class B products display either a FCC ID code, starting with the letters **EXN**, or the FCC Class B compliance mark that appears as shown here on the right.

The curious reader can consult the FCC web site <http://www.fcc.gov> for more information.



### FCC/DOC Warnings

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual and the CE Mark Declaration of Conformity\*\*, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC).

Changes or modifications not expressly approved by National Instruments could void the user's authority to operate the equipment under the FCC Rules.

### Class A

#### Federal Communications Commission

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

#### Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### Class B

#### Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful

interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **Canadian Department of Communications**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## **European Union - Compliance to EEC Directives**

Readers in the EU/EEC/EEA must refer to the Manufacturer's Declaration of Conformity (DoC) for information\*\* pertaining to the CE Mark compliance scheme. The Manufacturer includes a DoC for most every hardware product except for those bought for OEMs, if also available from an original manufacturer that also markets in the EU, or where compliance is not required as for electrically benign apparatus or cables.

- \* Certain exemptions may apply in the USA, see FCC Rules §15.103 **Exempted devices**, and §15.105(c). Also available in sections of CFR 47.
- \*\* The CE Mark Declaration of Conformity will contain important supplementary information and instructions for the user or installer.

# For Your Safety

---



**Caution** Before undertaking any troubleshooting, maintenance, or exploratory procedure, read carefully the following WARNING and CAUTION notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

- **Chassis Grounding**—The PXI-1020 chassis requires a connection from the premise wire safety ground to the PXI-1020 chassis ground. The earth safety ground must be connected during use of this equipment to minimize shock hazards. Refer to the *Connecting Safety Ground* section of Chapter 2, *Installation, Configuration, and Operation*, for instructions on connecting safety ground.
- **Live Circuits**—Operating personnel and service personnel must *not* remove protective covers when operating the PXI-1020. Adjustments and service to internal components must be undertaken by qualified service technicians. During service of this product, the mains connector to the premise wiring must be disconnected. Dangerous voltages may be present under certain conditions; use extreme caution.
- **Explosive Atmosphere**—Do *not* operate the chassis in conditions where flammable gases are present. Under such conditions this equipment is unsafe and may ignite the gases or gas fumes.
- **Part Replacement**—Service this equipment only with parts that are exact replacements, both electrically and mechanically. Contact National Instruments for replacement part information. Installation of parts with those that are not direct replacements may cause harm to personnel operating the chassis. Furthermore, damage or fire may occur if replacement parts are unsuitable.
- **Modification**—Do *not* modify any part of the chassis from its original condition. Unsuitable modifications may result in safety hazards.

# Contents

---

## About This Manual

Conventions .....	xi
Related Documentation.....	xi

## Chapter 1 Getting Started

Unpacking .....	1-1
What You Need to Get Started .....	1-1
Optional Equipment .....	1-2
Battery Pack and Cable for DC-Capable PXI-1020 .....	1-2
Rack-Mount Kit.....	1-2
Key Features .....	1-2
PXI-1020 Backplane Overview .....	1-5
Interoperability with CompactPCI .....	1-5
System Controller Slot .....	1-5
Star Trigger Slot .....	1-5
Peripheral Slots.....	1-5
Local Bus .....	1-6
Trigger Bus .....	1-7
System Reference Clock.....	1-7

## Chapter 2 Installation, Configuration, and Operation

Site Considerations .....	2-1
Rack Mounting .....	2-2
Setting Fan Speed .....	2-2
Connecting Safety Ground.....	2-2
Connecting to Power Source.....	2-3
DC Input Connector (DC-Capable Chassis Only).....	2-3
Installing the Battery Pack (DC-Capable Power Supply Only).....	2-4
Charging the Battery Pack (DC-Capable Power Supply Only).....	2-7
Power Supply Status Indication (DC-Capable Power Supply Only).....	2-8
Input Voltage Priority (DC-Capable Power Supply Only).....	2-8
Testing Power Up .....	2-8
Remote Power Monitoring and Inhibiting Interface .....	2-9
Installing PXI Modules .....	2-10
Installing Filler Panels .....	2-12
Using the Chassis Initialization File .....	2-12



## Chapter 3 Maintenance

Service Interval.....	3-1
Preparation.....	3-1
Cleaning.....	3-1
Interior Cleaning .....	3-2
Exterior Cleaning .....	3-2
Cleaning the Fan Filters.....	3-2

## Chapter 4 Troubleshooting

Resetting the AC Mains Circuit Breaker.....	4-2
Replacing the Fuse for Optional Battery Pack (DC-Capable Chassis Only) .....	4-3

## Appendix A Specifications

## Appendix B Pinouts

## Appendix C Technical Support Resources

## Glossary

## Index

## Figures

Figure 1-1.	Front View of the PXI-1020 Chassis .....	1-3
Figure 1-2.	Rear View of the AC-Only PXI-1020 Chassis .....	1-4
Figure 1-3.	Rear View of the DC-Capable PXI-1020 Chassis .....	1-4
Figure 1-4.	PXI Local Bus and Star Trigger Routing.....	1-6
Figure 2-1.	PXI-1020 Chassis Airflow Side View .....	2-2
Figure 2-2.	DC Connector on Rear of DC-Capable PXI-1020 Chassis .....	2-4
Figure 2-3.	Fan Connector .....	2-5
Figure 2-4.	Rear of Chassis with Rear Panel and Power Supply Removed .....	2-6
Figure 2-5.	Positioning, Securing, and Connecting the Battery Pack .....	2-7

Figure 2-6.	Installing PXI or CompactPCI Modules .....	2-11
Figure 2-7.	Injector/Ejector Handle Position During Module Insertion .....	2-11
Figure 4-1.	Fan Connector .....	4-3
Figure 4-2.	Rear of Chassis with Rear Panel and Power Supply Removed.....	4-4
Figure 4-3.	Optional Battery Pack .....	4-4
Figure A-1.	PXI-1020 Front Dimensions .....	A-6
Figure A-2.	PXI-1020 Top Dimensions.....	A-6
Figure A-3.	PXI-1020 Side Dimensions .....	A-7

## Tables

Table 2-1.	Power Supply Status Indication, DC Only .....	2-8
Table 2-2.	Power Supply Voltages at Power Monitoring Connector (DB-9).....	2-9
Table 2-3.	DB-9 Connector Pinout .....	2-9
Table 4-1.	Troubleshooting.....	4-1
Table B-1.	P1 (J1) Connector Pinout for the System Controller Slot .....	B-2
Table B-2.	P2 (J2) Connector Pinout for the System Controller Slot .....	B-3
Table B-3.	P1 (J1) Connector Pinout for the Star Trigger Slot .....	B-4
Table B-4.	P2 (J2) Connector Pinout for the Star Trigger Slot .....	B-5
Table B-5.	P1 (J1) Connector Pinout for the Peripheral Slot .....	B-6
Table B-6.	P2 (J2) Connector Pinout for the Peripheral Slot .....	B-7

# About This Manual

---

The *PXI-1020 User Manual* describes the features of the PXI-1020 chassis and contains information about configuration, installing the modules, and operating the PXI-1020.

## Conventions

---



The following conventions appear in this manual:

This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.



This icon denotes a warning, which advises you of precautions to take to avoid being electrically shocked.

*italic*

Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace

Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

## Related Documentation

---

The following documents contain information that you may find helpful as you read this manual:

- *CompactPCI Specification PICMG 2.0 R2.1*
- *PXI Specification Revision 1.0*
- IEEE 1101.1-1991, *IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 Connectors*
- IEEE 1101.10 and P1101.11, *IEEE Standard for Additional Mechanical Specifications for Microcomputers Using IEEE 1101.1 Equipment Practice*

---

# Getting Started

This chapter describes the key features of the PXI-1020 chassis, lists the contents of your kit, and lists optional equipment you can order from National Instruments.

## Unpacking

---

Carefully inspect the shipping container and the chassis for damage. Check for visible damage to the metal work. Check to make sure all handles, hardware, and switches are undamaged. Inspect the inner chassis for any possible damage, debris, or detached components. If damage appears to have been caused in shipment, file a claim with the carrier. Retain the packing material for possible inspection and/or reshipment.

## What You Need to Get Started

---

The PXI-1020 kit contains the following items:

- PXI-1020 chassis
- Filler panels
- PXI-1020 User Manual*
- Floppy disk with Chassis Initialization file, `chassis.ini`

Other required equipment includes:

- AC power cord (contact National Instruments to order your power cord)



**Note** AC mains power supply cords used with the PXI-1020 must meet the requirements of ANSI/UL817 for use in the United States, CSA C22.2 21 and 49 for use in Canada, and IEC 227 or 245 for use in the European Union. AC mains power supply cords used with the PXI-1020 in other countries must be approved by the authority having jurisdiction in that country.

## Optional Equipment

---

Contact National Instruments to order the following options for your PXI-1020 chassis.

### Battery Pack and Cable for DC-Capable PXI-1020

A DC input capable power supply is optionally installed in your PXI-1020 chassis at the factory. The DC-capable supply can be powered with AC input or 10 to 32 VDC input and has 150 W of output.

If you have purchased a PXI-1020 with the DC-capable power supply, you can install an optional 1.7 Ah NiCd battery pack. The chassis can draw power from this battery pack and operate when no AC or DC input are present or if the DC input drops below 10 V. The battery can power the PXI-1020 for up to 12 minutes under full load.

A DC input cable is available for the PXI-1020 with the DC-capable power supply. This cable contains an inline fuse and has unterminated ends allowing the user to install connectors for their specific DC source.

### Rack-Mount Kit

An optional rack-mount kit is available from National Instruments. This kit allows you to install the PXI-1020 chassis into a standard 19 in. (48 cm) wide instrument cabinet.

## Key Features

---

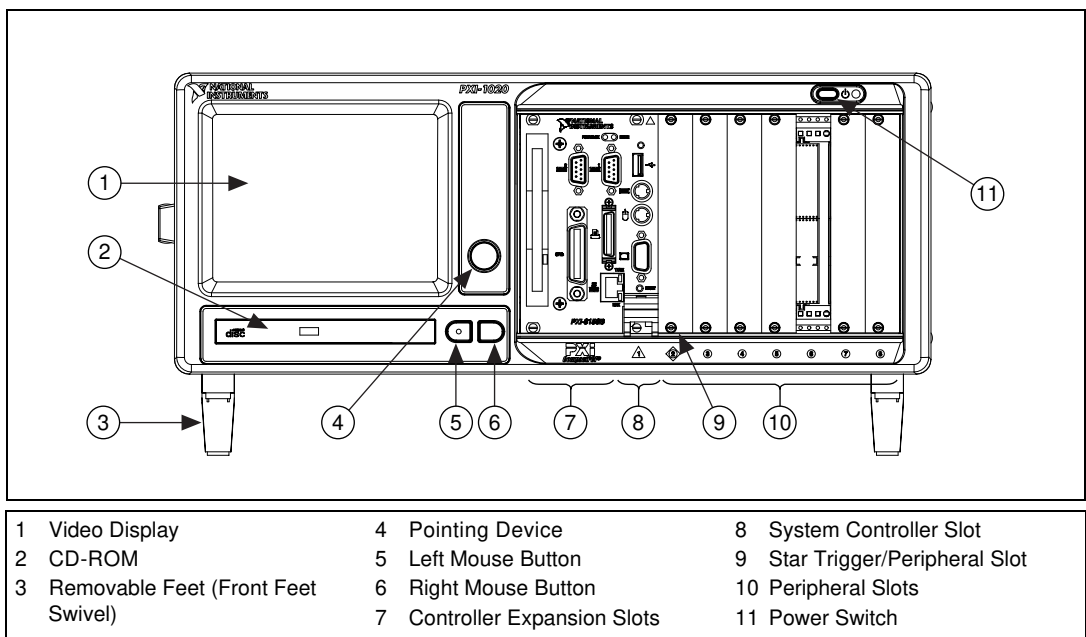
The PXI -1020 is a flexible instrument platform that features an integrated LCD display, pointing device, and CD-ROM drive that are used through built-in interconnections on a PXI controller (PXI-8150B Series or later) as well as eight PXI slots. An external mouse and Super VGA display can also be connected on the controller front panel. Also, any standard keyboard can be used with the PXI-1020 system. The PXI backplane in the PXI-1020 fully implements all timing and triggering extensions defined in the PXI specification for high-performance instrumentation applications.

The key features of the PXI-1020 include:

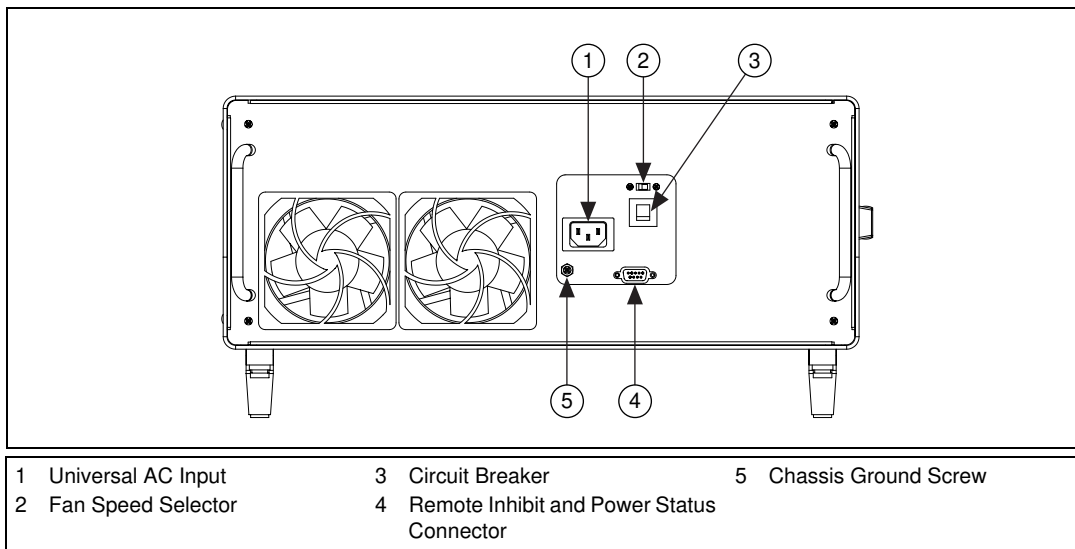
- PXI and CompactPCI (PICMG 2.0 R 2.1) module compatibility
- Compact, 8-slot chassis for portable applications
- 300 W of usable power; 150 W for DC-capable supply

- Universal AC input: auto-voltage and auto-frequency ranging
- Carrying handle
- Tilt feet
- Rear handles double as a cable wrap
- Built-in CD ROM drive
- 6.4 in. 640 × 480 VGA LCD color display
- Pointing device and mouse buttons
- Temperature sensing module controls fan speed to maintain proper cooling

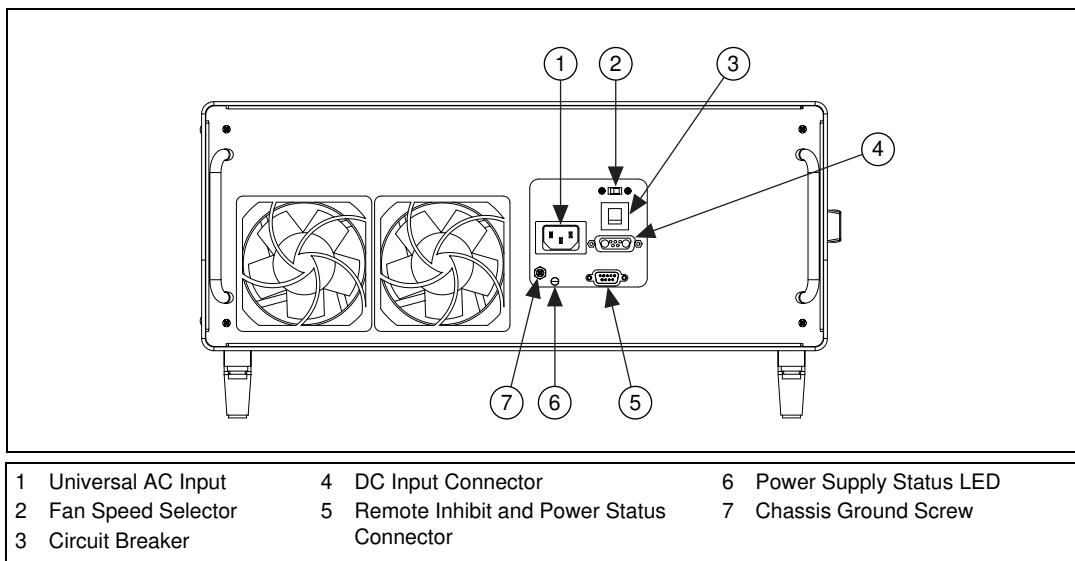
Figures 1-1, 1-2, and 1-3 show some of the key features and components of the PXI-1020 chassis. Figure 1-1 shows the front view of the PXI-1020. Figure 1-2 shows the rear view of the AC-only chassis, and Figure 1-3 shows the rear view of the DC-capable chassis.



**Figure 1-1.** Front View of the PXI-1020 Chassis



**Figure 1-2.** Rear View of the AC-Only PXI-1020 Chassis



**Figure 1-3.** Rear View of the DC-Capable PXI-1020 Chassis

# PXI-1020 Backplane Overview

---

## Interoperability with CompactPCI

The PXI-1020 backplane is interoperable with PXI-compatible products and standard CompactPCI products. This is an important feature, as many PXI-compatible systems may not require components that do not implement PXI-specific features. For example, you may want to use a standard CompactPCI network interface card in a PXI chassis.

The signals on the P1 connector of the backplane meet the requirements of the CompactPCI specification for both the peripheral and system modules.

The PXI-specific signals are located on P2 and are found only on the signals that are reserved or not used in the CompactPCI 64-bit specification. Therefore, all modules that meet the requirements of the CompactPCI 64-bit specification will function in the PXI-1020.

## System Controller Slot

The System Controller slot is located in Slot 1 of the chassis as defined by the PXI specification. It has three controller expansion slots, which are used for system controller modules that are wider than one slot. As defined in the PXI specification, these slots allow the controller to expand to the left to prevent the controller from using up peripheral slots.

## Star Trigger Slot

The Star Trigger (ST) slot is located at Slot 2. This slot has a dedicated trigger line between each peripheral slot (see Figure 1-4). This slot is intended for modules with ST functionality that can provide individual triggers to all other peripherals. Additionally, you can use the ST slot as a high-precision 10 MHz clock source. However, if you do not require advanced trigger functionality, you can install any standard peripheral module into this slot.

## Peripheral Slots

There are seven peripheral slots including the ST slot.

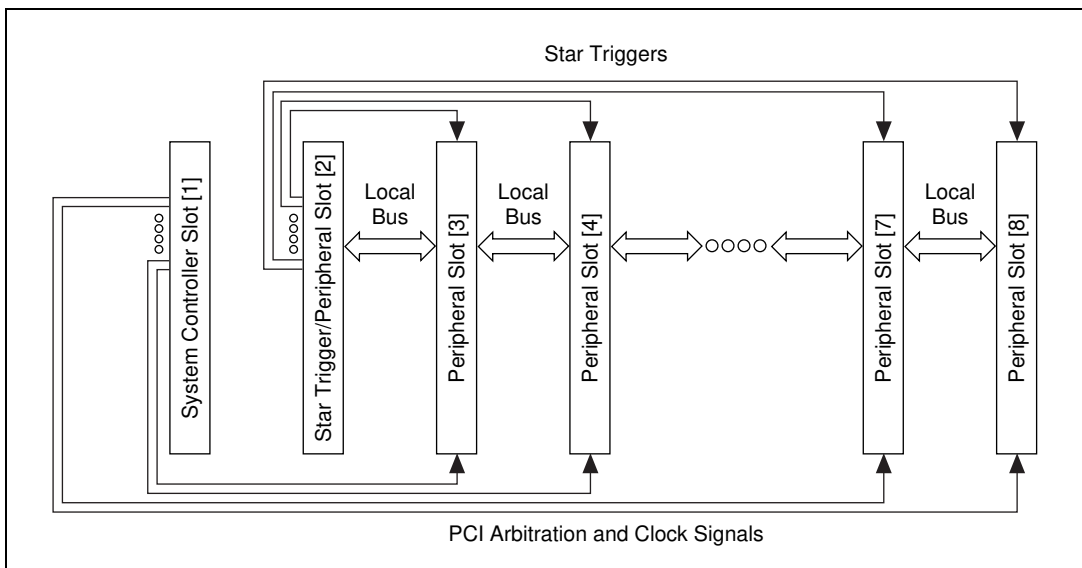


## Local Bus

The PXI backplane's local bus is a daisy-chained bus that connects each peripheral slot with its adjacent peripheral slots to the left and right, as shown in Figure 1-4.

For example, a given peripheral slot's right local bus connects to the adjacent slot's left local bus, and so on. Each local bus is 13 lines wide and can pass analog signals between cards or provide a high-speed side-band communication path that does not affect the PCI bandwidth.

Local bus signals may range from high-speed TTL signals to analog signals as high as 42 V. Initialization software keys adjacent boards to prohibit the use of incompatible boards. This software uses the configuration information specific to each peripheral board to evaluate compatibility. This method is a flexible way to define local bus functionality that is not limited by hardware keying.



**Figure 1-4.** PXI Local Bus and Star Trigger Routing

## Trigger Bus

The eight PXI trigger lines are bused to each slot. You can use the trigger lines in a variety of ways. For example, you can use triggers to synchronize the operation of several different PXI peripheral modules. In other applications, one module can control carefully timed sequences of operations performed on other modules in the system. Modules can pass triggers to one another, allowing precisely timed responses to asynchronous external events the system is monitoring or controlling.

## System Reference Clock

The PXI-1020 supplies the PXI 10 MHz system clock signal (PXI\_CLK10) independently to each peripheral slot. An independent buffer (having a source impedance matched to the backplane and a skew of less than 1 ns between slots) drives the clock signal to each peripheral slot. You can use this common reference clock signal to synchronize multiple modules in a measurement or control system. You can drive PXI\_CLK10 from an external source through the PXI\_CLK10\_IN pin on the P2 connector of the Star Trigger Slot. (See Table B-4, *P2 (J2) Connector Pinout for the Star Trigger Slot*, in Appendix B, *Pinouts*.) Sourcing an external clock on this pin automatically disables the backplane's 10 MHz source.

---

# Installation, Configuration, and Operation

This chapter describes how to prepare and operate your PXI-1020 chassis.

Before connecting the chassis to a power source, read this chapter and the *For Your Safety* section located at the beginning of this manual.

## Site Considerations

---

The PXI-1020 is designed to operate on a bench or in an instrument rack. Determine how you want to use your PXI-1020 and follow the appropriate installation instructions.

To facilitate power supply and module cooling, air enters through filters and fan inlets located in the rear of the chassis and exits through the upper section on the left and right sides of the chassis, as shown in Figure 2-1. Place your PXI-1020 on a bench top or in an instrument rack so that the fans (air inlets) and the air outlet apertures along the left and right sides of the chassis have adequate ventilation. Keep other equipment a minimum of 3.0 in. (76.2 mm) away from the air inlets and outlets.

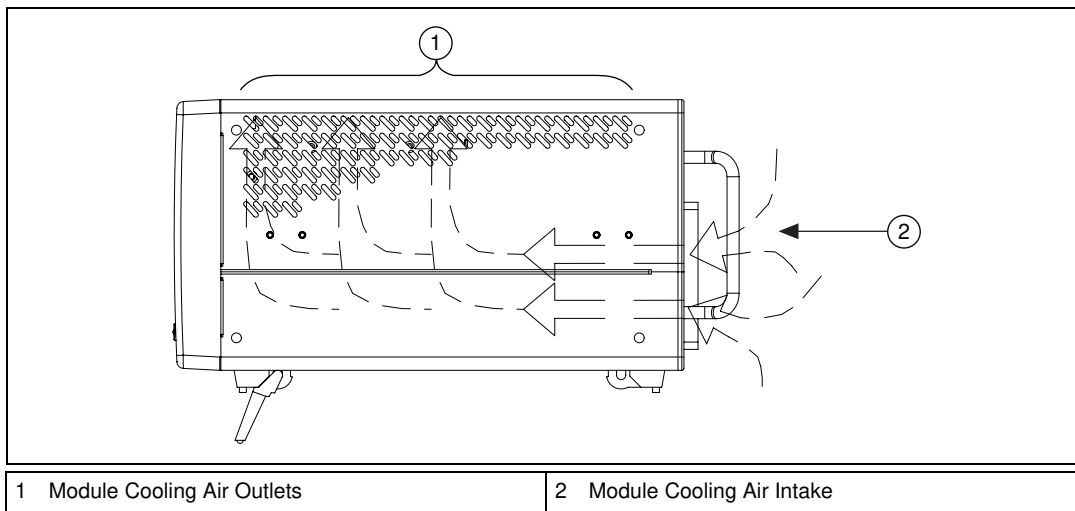


Figure 2-1. PXI-1020 Chassis Airflow Side View

## Rack Mounting

Rack-mount applications require the optional rack-mount kit available from National Instruments. Refer to the instructions supplied with the rack-mount kit to install your PXI-1020 in an instrument rack.

## Setting Fan Speed

The fan speed selector switch is on the rear panel of the PXI-1020. Refer to Figure 1-2, *Rear View of the AC-Only PXI-1020 Chassis*, or Figure 1-3, *Rear View of the DC-Capable PXI-1020 Chassis*, for the location of the fan speed selector switch. Select HIGH for maximum cooling or AUTO to employ the temperature sensing module that controls the fan speed.

## Connecting Safety Ground



**Warning** The PXI-1020 chassis is designed with a three-position NEMA 15-5 style plug that connects the ground line to the chassis ground. To minimize shock hazard, make sure your electrical power outlet has an appropriate earth safety ground that is connected whenever you power up the chassis.

If your power outlet does not have an appropriate ground connection, you must connect the premise wire safety ground to the chassis grounding screw located on the rear panel. Refer to Figure 1-2, *Rear View of the AC-Only PXI-1020 Chassis*, or Figure 1-3, *Rear View of the DC-Capable PXI-1020 Chassis*, for the location of the chassis grounding screw. To connect the safety ground, complete the following steps:

1. Connect a 16 AWG (1.3 mm) wire to the chassis grounding screw using a toothed grounding lug. The wire must have green insulation with a yellow stripe or must be noninsulated (bare).
2. Attach the opposite end of the wire to permanent earth ground using toothed washers or a toothed lug.

## Connecting to Power Source

---



**Caution** Do *not* install modules prior to performing the first power-on test.

If your PXI-1020 has an AC-only input power supply, attach input power through the rear AC inlet using the appropriate line cord supplied. Refer to Figure 1-2, *Rear View of the AC-Only PXI-1020 Chassis*, for a diagram of the IEC 320 inlet.

If your PXI-1020 has a DC-capable power supply, you can attach an AC line cord or a DC cord if a DC power source is available.

The power switch allows you to turn on the chassis or place it in standby mode. Push the power switch to the On position (if not already on). Observe that all fans become operational.

## DC Input Connector (DC-Capable Chassis Only)

---

Figure 2-2 shows the DC input connector (P1) on the rear panel of the DC-capable PXI-1020.

If you want to build a custom DC cable, be sure to note the positive (+) and negative (–) terminals shown in Figure 2-2. Use the following components or their equivalents to mate to the P1 port:

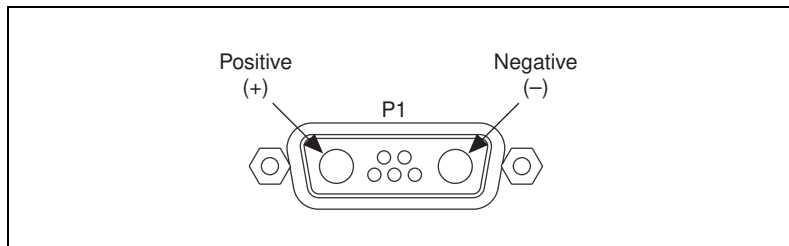
- Positronic connector, part number CBD7W2F20000
- Norcomp hood, part number 972-015-010-011
- Two Positronic contacts, part number FS4008D

Install a 20 A inline fuse on the positive (+) wire of the custom cable.



**Note** You can purchase an optional DC cable from National Instruments that incorporates an inline fuse and the mating connector for the P1 port.

Figure 2-2 details the P1 connector on the chassis, *not* the cable.



**Figure 2-2.** DC Connector on Rear of DC-Capable PXI-1020 Chassis

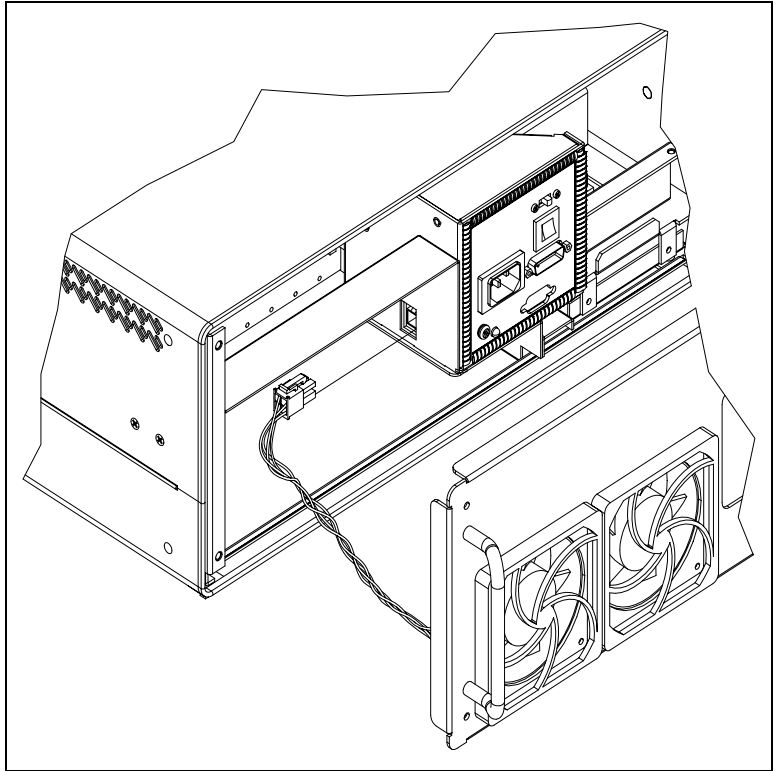
## Installing the Battery Pack (DC-Capable Power Supply Only)

---

If you purchased a DC-capable PXI-1020 and an optional 1.7 Ah NiCd battery pack, install it according to the following steps. (Refer to Figures 2-3, 2-4, and 2-5.)

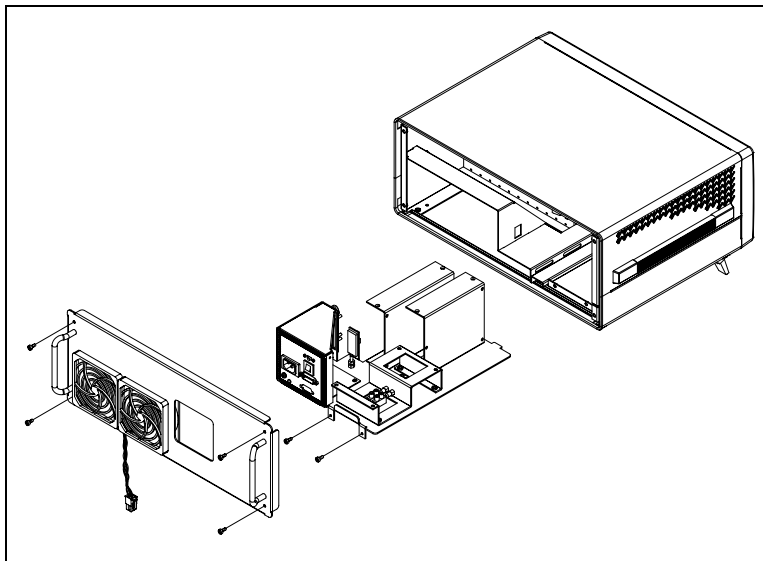
1. Make sure the power switch is in the Off/Standby position.
2. Disconnect AC power cord (and DC power cable, if attached).
3. Remove the four screws on the rear of the chassis.
4. Pull the rear panel away from the chassis.

5. Disconnect the fan connector.



**Figure 2-3.** Fan Connector

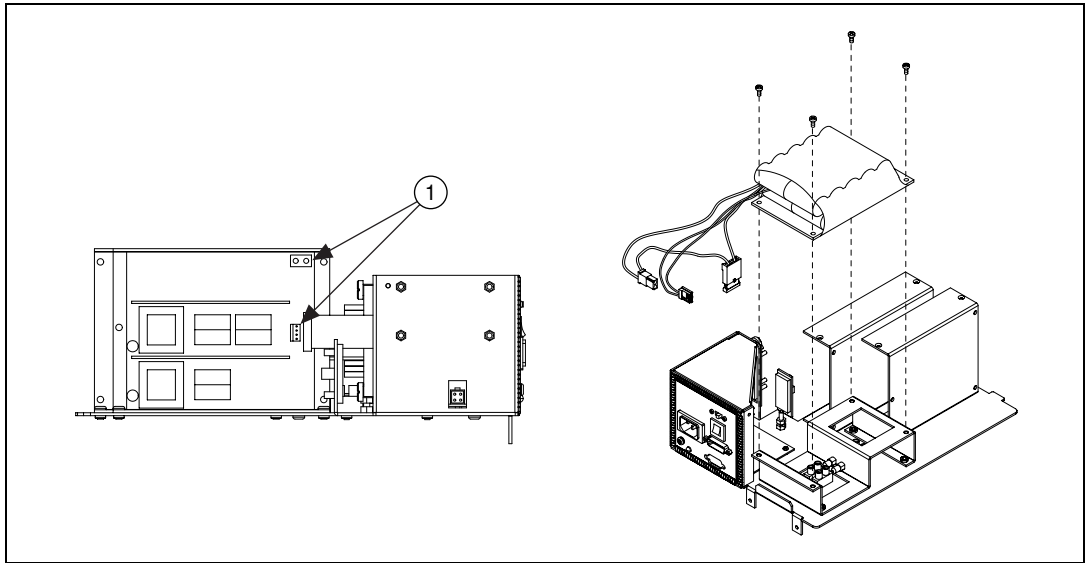
6. Remove the power supply by removing the two screws and sliding out the power supply tray.



**Figure 2-4.** Rear of Chassis with Rear Panel and Power Supply Removed



7. Secure the battery pack inside the chassis using the four screws supplied with the battery pack.



1 Battery Pack Connector Mates

**Figure 2-5.** Positioning, Securing, and Connecting the Battery Pack

8. Connect the two plugs from the battery pack to the mating connectors on the power supply, as shown in Figure 2-5.
9. Reinstall the power supply tray and replace the two screws.
10. Reconnect the fan connector and rear panel.
11. Replace the four screws.
12. Reconnect the AC power cord (and DC power cable, if previously attached).

## Charging the Battery Pack (DC-Capable Power Supply Only)

The optional battery pack is charged when either the AC power or the external DC power is connected, regardless of the power switch position. The power supply has circuitry to prevent the battery pack from overcharging.

## Power Supply Status Indication (DC-Capable Power Supply Only)

---

If your PXI-1020 has a DC-capable power supply, refer to the following table for power supply indications provided by the Power Supply Status LED. Refer to Figure 1-3, *Rear View of the DC-Capable PXI-1020 Chassis*, for the location of the Power Supply Status LED.

**Table 2-1.** Power Supply Status Indication, DC Only

Power Source	Power Switch Mode	Status LED
AC or External DC Input	Standby	Green
AC or External DC Input	On	Bright Green
Optional Battery Pack	On	Yellow
Optional Battery Pack (Discharged)	On	Red

## Input Voltage Priority (DC-Capable Power Supply Only)

---

If more than one power source is connected at the same time, the priority of the power sources is as follows.

1. AC Input
2. DC Input
3. Internal Battery Pack

## Testing Power Up

---



**Caution** When connecting digital voltmeter probes to the rear D-sub connector, be careful not to short the probe leads together. Doing so could damage the power supply.

You can use a digital voltmeter to ensure all voltage levels in your PXI-1020 are within the allowable limits. Referring to Table 2-2, connect one lead of the voltmeter to a supply pin on the remote power monitoring connector (9-pin D-sub) located on the rear panel. Refer to Table 2-3 for a pinout diagram of the remote power monitoring connector. Connect the reference lead of the voltmeter to one of the ground pins. Compare each voltage reading to the values listed in Table 2-2.



**Note** Use the rear-panel D-sub connector to check voltages only. Do *not* use the connector to supply power to external devices.

**Table 2-2.** Power Supply Voltages at Power Monitoring Connector (DB-9)

Pin	Supply	Acceptable Voltage Range
2	+5 V	4.75 to 5.25 V
4	+3.3 V	3.135 to 3.465 V
6	+12 V	11.4 to 12.6 V
8	-12 V	-12.6 to -11.4 V
1, 9	Logic Ground	N/A

If the voltages fall within the specified ranges, the mainframe complies with the CompactPCI voltage limit specifications. Notice that the rear-panel D-sub connector is to be used to check voltages only. Do *not* use these voltages to supply power to external devices.



**Note** If the fans or power unit fail to function properly, refer to Chapter 4, [Troubleshooting](#).

## Remote Power Monitoring and Inhibiting Interface

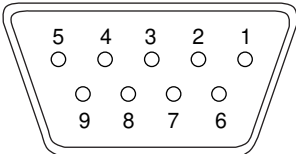
The PXI-1020 mainframe supports remote power monitoring and inhibiting via a 9-pin D-sub connector located on the rear panel. Table 2-3 shows the pinout of the DB-9 connector.

**Table 2-3.** DB-9 Connector Pinout

DB-9 Pin	Signal
1	Logic Ground
2	+5 V
3	Inhibit Return (DC-capable supply only)
4	+3.3 V
5	Inhibit*
6	+12 V

**Table 2-3.** DB-9 Connector Pinout (Continued)

DB-9 Pin	Signal
7	Reserved
8	-12 V
9	Logic Ground

You can use the Inhibit signal (active low) to turn off the power supply outputs. To use this feature, connect the Inhibit pin (pin 5) to a Logic Ground pin (pin 1 or 9) on the AC-only input power supply or Inhibit Return (pin 3) for the DC-capable power supply. Make sure the front (standby) switch is in the ON position. As long as the connection is made, the power supply inhibits its DC outputs. DC output resumes when Inhibit is no longer connected. For remote reset, connect a momentary switch between pin 5 and pin 1 (or pin 9) on the AC-only input power supply or between pin 5 and pin 3 for the DC-capable power supply.

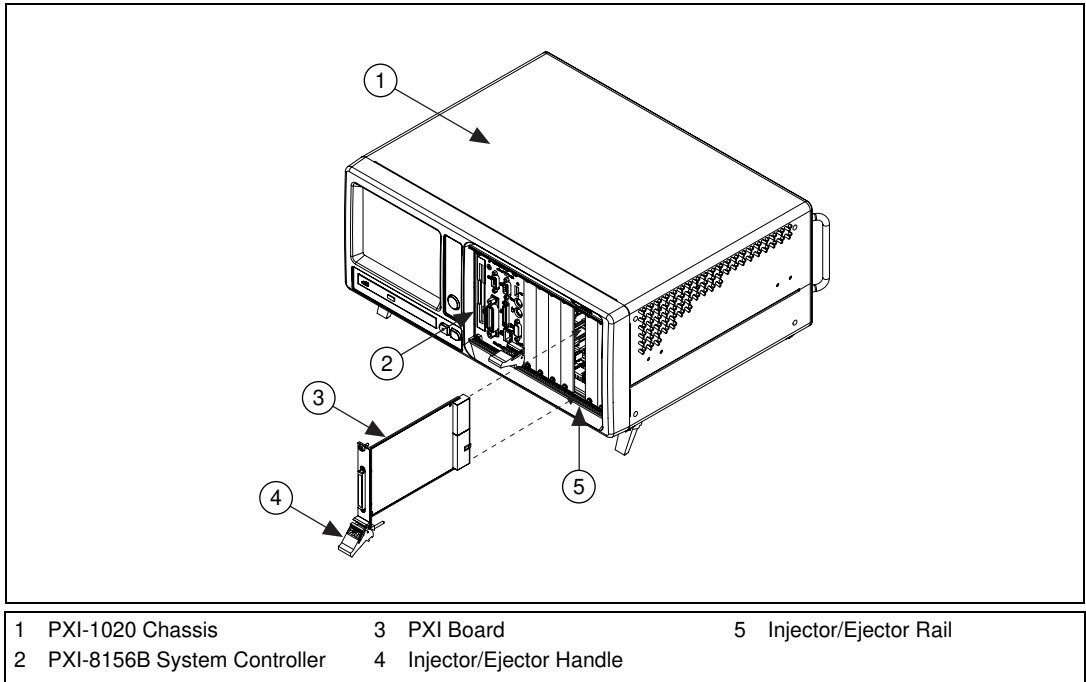
## Installing PXI Modules



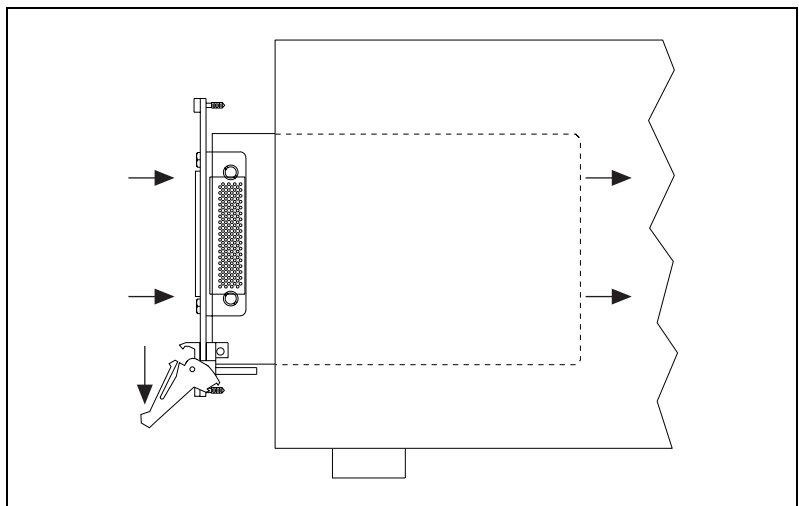
**Caution** Turn off the chassis power before installing CompactPCI or PXI modules.

Install a module into a chassis slot by first placing the module's card edges into the front module guides (top and bottom), as shown in Figure 2-6. Slide the module to the rear of the chassis, making sure that the injector/ejector handle is pushed down as shown in Figure 2-7.

When you begin to feel resistance, push up on the injector/ejector handle to inject the card into the frame. Secure the module's front panel to the chassis using the module's front-panel mounting screws.



**Figure 2-6.** Installing PXI or CompactPCI Modules



**Figure 2-7.** Injector/Ejector Handle Position During Module Insertion

## Installing Filler Panels

---

To optimize module cooling performance, install filler panels into unused or empty slots. Secure with the captive mounting screws.

## Using the Chassis Initialization File

---

To assist system integrators, the PXI specification requires manufacturers of PXI chassis and system modules to document the capabilities of their products. The minimum documentation requirements are contained in `.ini` files, which consist of ASCII text. The system integrator can read the `.ini` file, and configuration utilities and device drivers can also use this file. The PXI-1020 chassis initialization file, `chassis.ini`, is included on the diskette for your PXI-1020.

---

# Maintenance

This chapter describes basic maintenance procedures you can perform on the PXI-1020 chassis.

## Service Interval

---

Clean the chassis fan filter at a maximum interval of six months. Depending on the amount of use and ambient dust levels in the operating environment, the filter may require more frequent cleaning.

Clean dust from the chassis exterior (and interior) as needed, based on the operating environment. Periodic cleaning increases reliability.

## Preparation

---

The information in this section is designed for use by qualified service personnel. Read the *For Your Safety* section at the beginning of this manual before attempting any procedures in this chapter.



**Caution** Many components within the chassis are susceptible to static discharge damage. Service the chassis only in a static-free environment. Observe standard handling precautions for static-sensitive devices while servicing the chassis. Always wear a grounded wrist strap, or equivalent, while servicing the chassis.

## Cleaning

---

Cleaning procedures consist of exterior and interior cleaning of the chassis and cleaning the fan filter. Refer to your module user documentation for information on cleaning the individual CompactPCI or PXI modules.



**Caution** Always power-off the chassis and disconnect the power cord before cleaning or servicing the chassis.

## Interior Cleaning

Use a dry, low-velocity stream of air to clean the interior of the chassis. Use a soft-bristle brush for cleaning around components. If you must use a liquid for minor interior cleaning, use a 75% isopropyl alcohol solution and rinse with deionized water.

## Exterior Cleaning

Clean the exterior surfaces of the chassis with a dry lint-free cloth or a soft-bristle brush. If any dirt remains, wipe with a cloth moistened in a mild soap solution. Remove any soap residue by wiping with a cloth moistened with clear water. Do *not* use abrasive compounds on any part of the chassis.



**Caution** Avoid getting moisture inside the chassis during exterior cleaning. Use just enough moisture to dampen the cloth.

Do *not* wash the connectors or switches. Cover these components while cleaning the chassis.

Do *not* use chemical cleaning agents; they may damage the chassis. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

## Cleaning the Fan Filters

---

You can easily remove the fan filters from the rear of the chassis by removing the plastic housing attached to each fan. You can then remove the filters.

Clean the filters by washing them in a mild soap solution and then vacuuming or blowing air through them. Rinse the filters with water and allow them to dry before reinstalling.



# Troubleshooting

This chapter describes basic troubleshooting procedures for the PXI-1020 chassis.

Refer to Table 4-1 to troubleshoot the PXI-1020 chassis. The table lists possible causes for power failure and recommends ways to correct the problem.

**Table 4-1.** Troubleshooting

Possible Cause	What to Do
PXI-1020 chassis is not connected to power source.	Make sure that the PXI-1020 is connected to a live electrical outlet. Try operating another piece of equipment from this outlet.
Power switch is not switched on.	Set the power switch to the On position. The green LED should be lit.
Remote inhibiting input on the rear panel of the mainframe is active.	Deactivate your system's remote inhibiting control.
Circuit breaker is tripped.	Reset the circuit breaker. Refer to the <a href="#">Resetting the AC Mains Circuit Breaker</a> section of this chapter.
If DC-capable PXI-1020 is powered by an external DC source, inline fuse on DC-power cord may be blown.	Check fuse and replace, if necessary, with same type.
If DC-capable PXI-1020 is powered by optional battery pack, inline fuse to the battery pack may be blown.	Check fuse and replace. See the section <a href="#">Replacing the Fuse for Optional Battery Pack (DC-Capable Chassis Only)</a> in this chapter.
If DC-capable PXI-1020 is powered by an optional battery pack only, battery pack may be discharged.	Connect PXI-1020 to AC or DC power source to charge battery. (Note: The battery is charged whether the power switch is in the On or Standby position.)
Power supply has failed.	Contact National Instruments.

## Resetting the AC Mains Circuit Breaker

---

If your PXI-1020 is connected to an AC source and encounters an over-current condition, the circuit breaker on the rear panel will trip to prevent damage to the mainframe. Complete the following steps to reset the circuit breaker:

1. Make sure the power switch is in the Off/Standby position.
2. Disconnect the AC line cord.
3. Depress the circuit breaker to reset it.
4. Reconnect the AC line cord.
5. Turn the power switch to the On position.

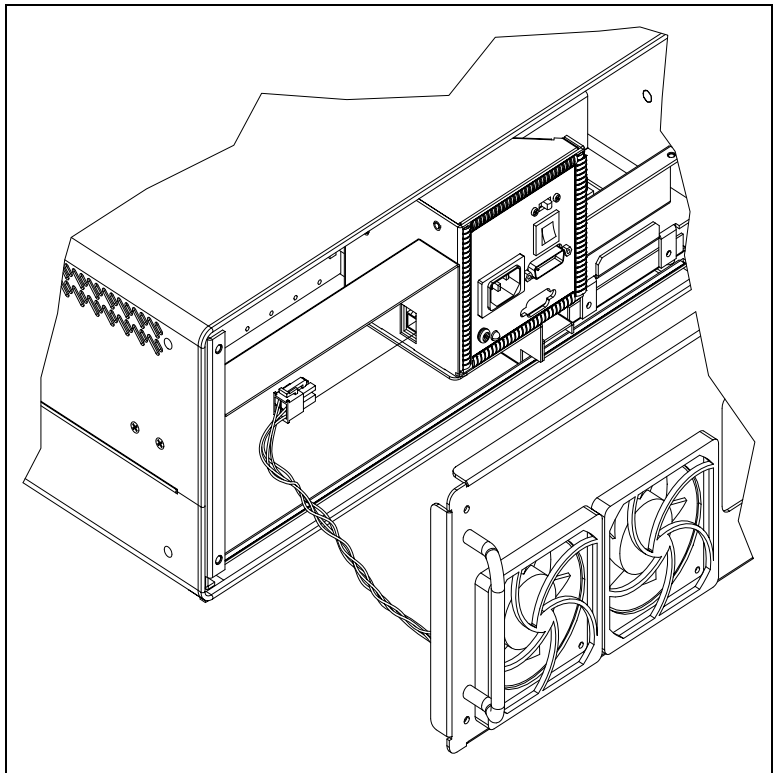
If the circuit breaker trips again, complete the following steps:

1. Turn the power switch to the Off/Standby position.
2. Disconnect the mainframe from the AC mains power source.
3. Remove all modules from the mainframe.
4. Complete the test procedure described in the [Connecting to Power Source](#) section in Chapter 2, *Installation, Configuration, and Operation*.
5. If any voltages are outside the acceptable limits, contact National Instruments.
6. If all voltages are within the acceptable limits, verify that your PXI-1020 can meet the power requirements of your CompactPCI or PXI modules. Overloading the chassis can cause the breaker to trip. Refer to Appendix A, *Specifications*.
7. The over-current condition that caused the circuit breaker to trip may be due to a faulty CompactPCI or PXI module. Refer to the documentation supplied with the modules for troubleshooting your modules.

## Replacing the Fuse for Optional Battery Pack (DC-Capable Chassis Only)

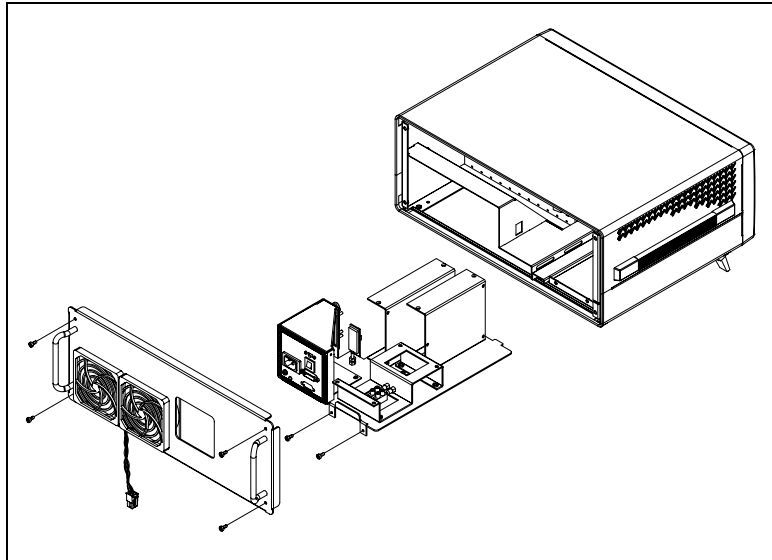
The optional battery pack for the DC-capable PXI-1020 has a 10 A inline automotive-type fuse. Complete the following steps to replace the fuse shown in Figure 4-3.

1. Make sure the power switch is in the Off/Standby position.
2. Disconnect AC power cord (and DC power cable, if attached).
3. Remove the four screws on the rear of the chassis.
4. Pull the rear panel away from the chassis.
5. Disconnect the fan connector.



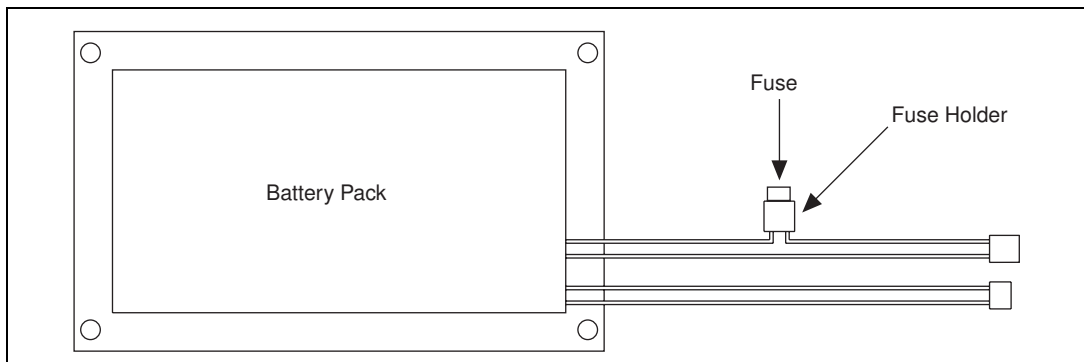
**Figure 4-1.** Fan Connector

6. Remove the power supply by removing the two screws and sliding out the power supply tray.



**Figure 4-2.** Rear of Chassis with Rear Panel and Power Supply Removed

7. Replace the battery pack fuse.



**Figure 4-3.** Optional Battery Pack

8. Reinstall the power supply tray and replace the two screws.
9. Reconnect the fan connector and rear panel.
10. Replace the four screws.
11. Reconnect the AC power cord (and DC power cable, if previously attached).

---

## Specifications

This appendix contains specifications for the PXI-1020 chassis.

### Electrical

#### AC Input Specifications for AC-Only Power Supply

Input voltage range..... 90–264 VAC

Input frequency range ..... 47 to 63 Hz

Over-current protection ..... 10 A circuit breaker

Power disconnect ..... The power switch causes the power module to supply DC power to the CompactPCI/PXI backplane. The power cord provides main power disconnect.

Maximum steady state operating  
operating current ..... 8 A

Line regulation .....  $\pm 0.2\%$  over operating line range

Efficiency ..... 70% typical

#### DC Output Specifications for AC-Only Power Supply

Maximum usable power ..... 300 W

Maximum ripple and noise ..... 1% ripple, 1% noise,  
20 MHz bandwidth

DC Current Capacity ( $I_{MP}$ )

Voltage	$I_{MP}$ (Steady-State Current)	Regulation
+3.3 V	35 A	< 1.5%
+5 V	25 A	< 1%
+12 V	4 A	< 5%
-12 V	1 A	< 5%

Power supply MTTR .....Replacement in under 5 minutes

### AC Input Specifications for DC-Capable Power Supply

Input voltage range .....85–265 VAC

Input frequency range .....45 to 65 Hz

Over-current protection.....5 A circuit breaker

Operating current (RMS steady state) ....3.0 A

Line regulation.....±0.2% over operating line range

Efficiency.....85% typical

Power disconnect .....The power switch causes the power module to supply DC power to the CompactPCI/PXI backplane. The power cord provides main power disconnect.

### DC Input Specifications for DC-Capable Power Supply

Input voltage range .....10–32 V

DC to DC isolation .....500 Vrms

Over-current protection.....Inline fuse must be installed into DC input cable

Efficiency.....82% typical

Power disconnect ..... The power switch causes the power module to supply DC power to the CompactPCI/PXI backplane. The power cord provides main power disconnect.

## DC Output Specifications for DC-Capable Power Supply

Maximum usable power ..... 150 W

Ripple and noise ..... 1% ripple, 1% noise,  
20 MHz bandwidth

### DC Current Capacity ( $I_{MP}$ )

Voltage	$I_{MP}$ (Steady-State Current)	Regulation
+3.3 V	10 A	< 2%
+5 V	20 A (3.3 V power)	< 2%
+12 V	4 A	< 2%
-12 V	0.4 A	< 5%

Power supply MTTR ..... Replacement in under 5 minutes

## Cooling

Per slot cooling capacity ..... Slot cooling capacity in worst-case slot is 20 W with fan speed set to HIGH

Module cooling system ..... Forced air circulation (positive pressurization) via two 60 cfm fans with AUTO/HIGH speed selector

Slot airflow direction ..... P1 to P2, bottom of module to top of module

### Module cooling

Intake ..... Rear of chassis

Exhaust ..... Upper left and right sides

## Safety

UL 3111-1, IEC 1010-1, CSA 22.2 No. 1010.1  
Installation Category II  
Pollution Degree 2  
Safety Class 1

## Environmental

Operating temperature .....0 to 50 °C  
Storage temperature .....-20 to 70 °C  
Operating relative humidity .....10 to 90%, noncondensing  
Functional shock (operating) .....MIL-T-28800E CLASS 3,  
30 g half-sine shock pulse  
(also meets IEC 60068-2-27)  
Operating location .....Indoor use  
Random vibration  
Operational .....5 to 500 Hz, 0.3 g<sub>RMS</sub>  
Non-operational<sup>1</sup> .....10 to 500 Hz, 2.4 g<sub>RMS</sub>  
EMC emissions .....FCC Class A compliant and  
EN 55011 Group 1 Class A  
compliant  
EMC immunity .....Refer to DOC supplied with  
chassis for compliance to  
relevant directives.

---

<sup>1</sup> Random vibration profiles were developed in accordance with MIL-T-28800E CLASS 3 and MIL-STD-810E Method 514 Test levels exceed those recommended in MIL-STD-810E for Category 1 (Basic Transportation), Figures 514.4-1 through 514.4-3.



## Backplane

Size .....	3U-sized; one system slot (with three system expansion slots) and seven peripheral slots. Compliant with IEEE 1101.10 mechanical packaging. PXI Specification Revision 1.0 compliant. Accepts both PXI and CompactPCI (PICMG 2.0 R2.1) 3U modules.
Backplane bare-board material .....	UL 94 V-0 recognized (File No. E 116551)
Backplane connectors .....	Conform to IEC 917 and IEC 1076-4-101, and are UL 94 V-0 rated

## Mechanical

Overall dimensions standard chassis.....	17.71 by 44.51 by 36.95 cm (6.97 by 17.52 by 14.55 in.)
Weight .....	9.75 kg (21.5 lb.)
Maximum module weight .....	1.82 kg (4 lb.)

Figures A-1, A-2, and A-3 show the PXI-1020 dimensions.

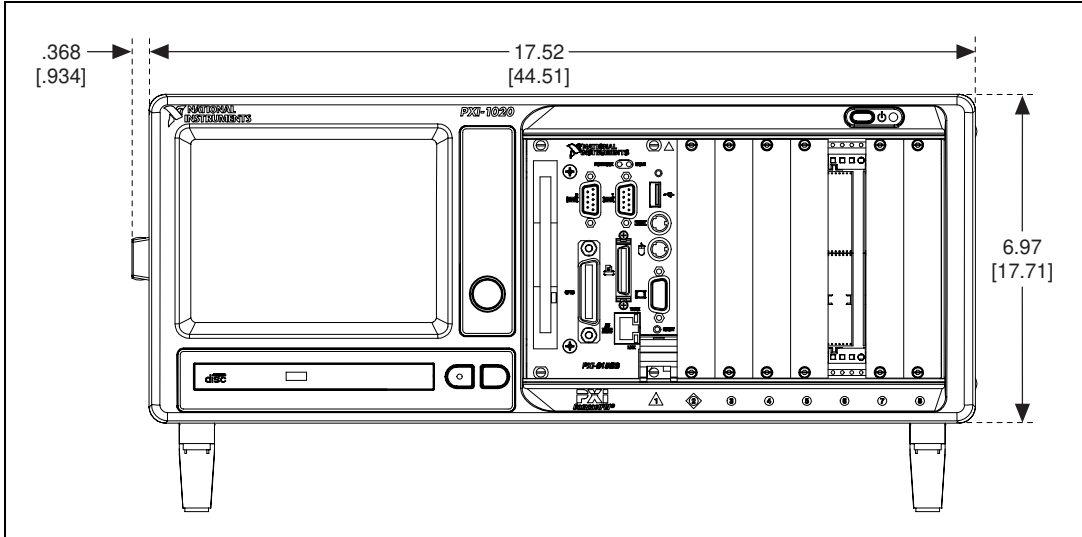


Figure A-1. PXI-1020 Front Dimensions

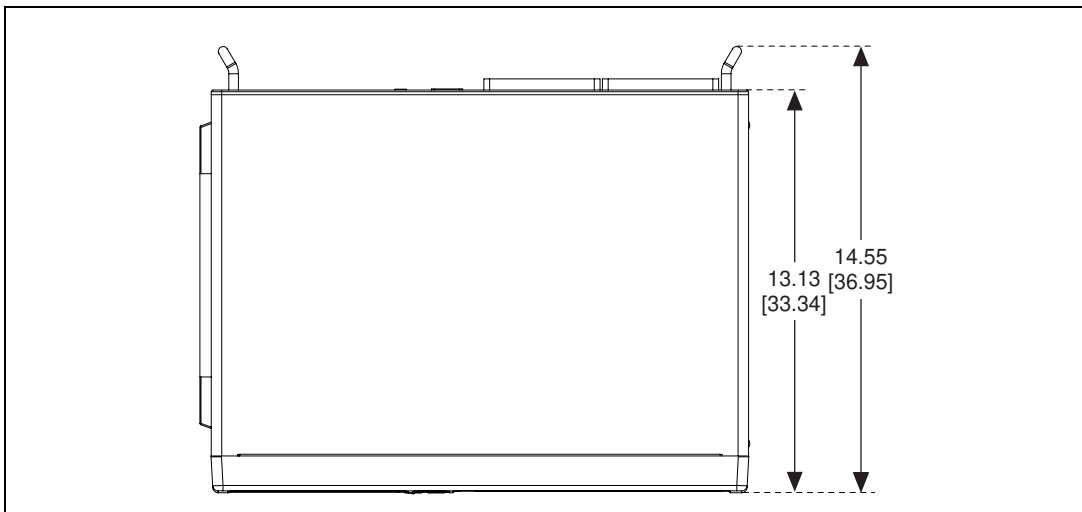


Figure A-2. PXI-1020 Top Dimensions

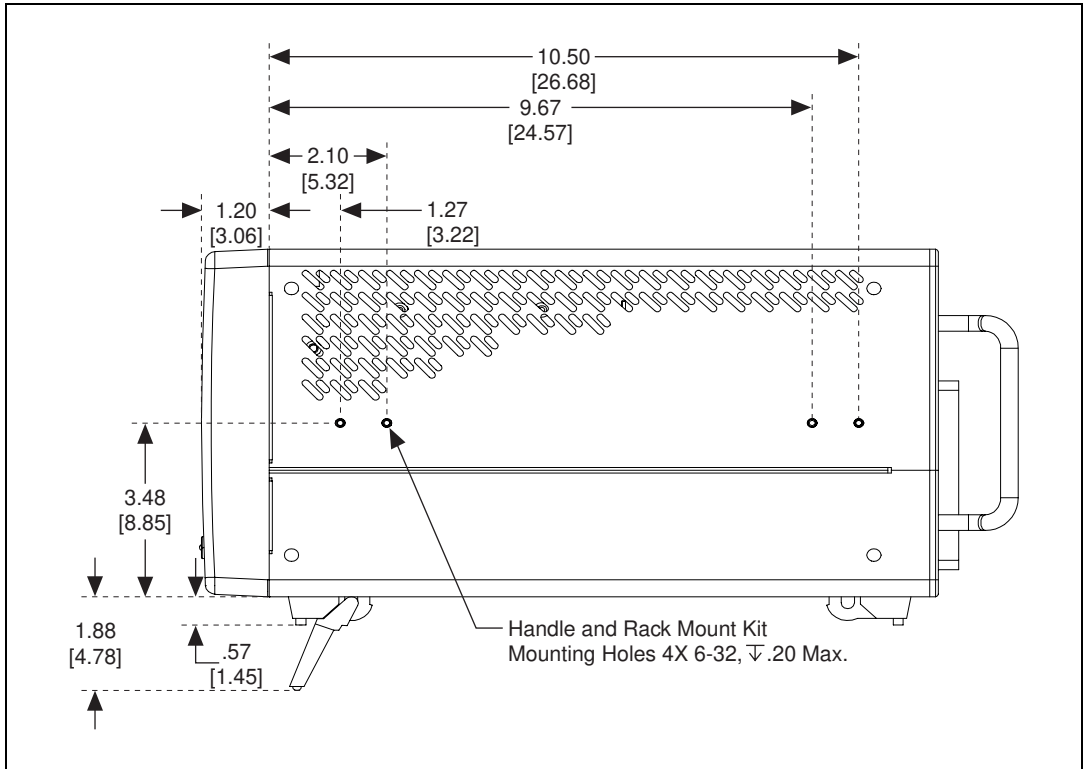


Figure A-3. PXI-1020 Side Dimensions

---

## Pinouts

This appendix describes the P1 and P2 connector pinouts for the PXI-1020 backplane.

Table B-1 shows the P1 (J1) connector pinout for the System Controller slot.

Table B-2 shows the P2 (J2) connector pinout for the System Controller slot.

Table B-3 shows the P1 (J1) connector pinout for the Star Trigger slot.

Table B-4 shows the P2 (J2) connector pinout for the Star Trigger slot.

Table B-5 shows the P1 (J1) connector pinout for the peripheral slots.

Table B-6 shows the P2 (J2) connector pinout for the peripheral slots.



**Note** PXI signals are shown in **bold**.

**Table B-1.** P1 (J1) Connector Pinout for the System Controller Slot

Pin	Z	A	B	C	D	E	F
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND
24	GND	AD[1]	5V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND
17	GND	3.3V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND
12-14	Key Area						
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ#	GND	3.3V	CLK	AD[31]	GND
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GNT#	GND
4	GND	BRSVP1A4	GND	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

**Table B-2.** P2 (J2) Connector Pinout for the System Controller Slot

Pin	Z	A	B	C	D	E	F
22	GND	<b>PXI_RSVA22</b>	<b>PXI_RSVB22</b>	<b>PXI_RSVC22</b>	<b>PXI_RSVD22</b>	<b>PXI_RSVE22</b>	GND
21	GND	RSV	GND	RSV	RSV	RSV	GND
20	GND	RSV	RSV	RSV	GND	RSV	GND
19	GND	RSV	GND	RSV	RSV	RSV	GND
18	GND	<b>PXI_TRIG3</b>	<b>PXI_TRIG4</b>	<b>PXI_TRIG5</b>	GND	<b>PXI_TRIG6</b>	GND
17	GND	<b>PXI_TRIG2</b>	GND	PRST#	REQ6#	GNT6#	GND
16	GND	<b>PXI_TRIG1</b>	<b>PXI_TRIG0</b>	DEG#	GND	<b>PXI_TRIG7</b>	GND
15	GND	<b>PXI_BRSVA15</b>	GND	FAL#	REQ5#	GNT5#	GND
14	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
13	GND	AD[38]	GND	V(I/O)	AD[37]	AD[36]	GND
12	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
11	GND	AD[45]	GND	V(I/O)	AD[44]	AD[43]	GND
10	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
9	GND	AD[52]	GND	V(I/O)	AD[51]	AD[50]	GND
8	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
7	GND	AD[59]	GND	V(I/O)	AD[58]	AD[57]	GND
6	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
5	GND	C/BE[5]#	GND	V(I/O)	C/BE[4]#	PAR64	GND
4	GND	V(I/O)	<b>PXI_BRSVB4</b>	C/BE[7]#	GND	C/BE[6]#	GND
3	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND
2	GND	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	GND
1	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND

**Table B-3.** P1 (J1) Connector Pinout for the Star Trigger Slot

Pin	Z	A	B	C	D	E	F
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND
24	GND	AD[1]	5V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND
17	GND	3.3V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND
12–14	Key Area						
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ#	GND	3.3V	CLK	AD[31]	GND
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GNT#	GND
4	GND	BRSVP1A4	GND	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

**Table B-4.** P2 (J2) Connector Pinout for the Star Trigger Slot

Pin	Z	A	B	C	D	E	F
22	GND	PXI_RSVA22	PXI_RSVB22	PXI_RSVC22	PXI_RSVD22	PXI_RSVE22	GND
21	GND	PXI_LBR0	GND	PXI_LBR1	PXI_LBR2	PXI_LBR3	GND
20	GND	PXI_LBR4	PXI_LBR5	PXI_STAR0	GND	PXI_STAR1	GND
19	GND	PXI_STAR2	GND	PXI_STAR3	PXI_STAR4	PXI_STAR5	GND
18	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND
17	GND	PXI_TRIG2	GND	PRST#	PXI_CLK10_IN	PXI_CLK10	GND
16	GND	PXI_TRIG1	PXI_TRIG0	DEG#	GND	PXI_TRIG7	GND
15	GND	PXI_BRSVA15	GND	FAL#	PXI_STAR6	PXI_LBR6	GND
14	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
13	GND	AD[38]	GND	V(I/O)	AD[37]	AD[36]	GND
12	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
11	GND	AD[45]	GND	V(I/O)	AD[44]	AD[43]	GND
10	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
9	GND	AD[52]	GND	V(I/O)	AD[51]	AD[50]	GND
8	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
7	GND	AD[59]	GND	V(I/O)	AD[58]	AD[57]	GND
6	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
5	GND	C/BE[5]#	GND	V(I/O)	C/BE[4]#	PAR64	GND
4	GND	V(I/O)	PXI_BRSVB4	C/BE[7]#	GND	C/BE[6]#	GND
3	GND	PXI_LBR7	GND	PXI_LBR8	PXI_LBR9	PXI_LBR10	GND
2	GND	PXI_LBR11	PXI_LBR12	SYSEN#	PXI_STAR7	PXI_STAR8	GND
1	GND	PXI_STAR9	GND	PXI_STAR10	PXI_STAR11	PXI_STAR12	GND



**Table B-5.** P1 (J1) Connector Pinout for the Peripheral Slot

Pin	Z	A	B	C	D	E	F
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND
24	GND	AD[1]	5V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND
17	GND	3.3V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND
12–14	Key Area						
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ#	GND	3.3V	CLK	AD[31]	GND
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GNT#	GND
4	GND	BRSVP1A4	GND	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

**Table B-6.** P2 (J2) Connector Pinout for the Peripheral Slot

Pin	Z	A	B	C	D	E	F
22	GND	PXI_RSVA22	PXI_RSVB22	PXI_RSVC22	PXI_RSVD22	PXI_RSVE22	GND
21	GND	PXI_LBR0	GND	PXI_LBR1	PXI_LBR2	PXI_LBR3	GND
20	GND	PXI_LBR4	PXI_LBR5	PXI_LBL0	GND	PXI_LBL1	GND
19	GND	PXI_LBL2	GND	PXI_LBL3	PXI_LBL4	PXI_LBL5	GND
18	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND
17	GND	PXI_TRIG2	GND	PRST#	PXI_STAR	PXI_CLK10	GND
16	GND	PXI_TRIG1	PXI_TRIG0	DEG#	GND	PXI_TRIG7	GND
15	GND	PXI_BRSVA15	GND	FAL#	PXI_LBL6	PXI_LBR6	GND
14	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
13	GND	AD[38]	GND	V(I/O)	AD[37]	AD[36]	GND
12	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
11	GND	AD[45]	GND	V(I/O)	AD[44]	AD[43]	GND
10	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
9	GND	AD[52]	GND	V(I/O)	AD[51]	AD[50]	GND
8	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
7	GND	AD[59]	GND	V(I/O)	AD[58]	AD[57]	GND
6	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
5	GND	C/BE[5]#	GND	V(I/O)	C/BE[4]#	PAR64	GND
4	GND	V(I/O)	PXI_BRSVB4	C/BE[7]#	GND	C/BE[6]#	GND
3	GND	PXI_LBR7	GND	PXI_LBR8	PXI_LBR9	PXI_LBR10	GND
2	GND	PXI_LBR11	PXI_LBR12	SYSEN#	PXI_LBL7	PXI_LBL8	GND
1	GND	PXI_LBL9	GND	PXI_LBL10	PXI_LBL11	PXI_LBL12	GND



---

# Technical Support Resources

This appendix describes the comprehensive resources available to you in the Technical Support section of the National Instruments Web site and provides technical support telephone numbers for you to use if you have trouble connecting to our Web site or if you do not have internet access.

## NI Web Support

---

To provide you with immediate answers and solutions 24 hours a day, 365 days a year, National Instruments maintains extensive online technical support resources. They are available to you at no cost, are updated daily, and can be found in the Technical Support section of our Web site at [www.ni.com/support](http://www.ni.com/support)

### Online Problem-Solving and Diagnostic Resources

- **KnowledgeBase**—A searchable database containing thousands of frequently asked questions (FAQs) and their corresponding answers or solutions, including special sections devoted to our newest products. The database is updated daily in response to new customer experiences and feedback.
- **Troubleshooting Wizards**—Step-by-step guides lead you through common problems and answer questions about our entire product line. Wizards include screen shots that illustrate the steps being described and provide detailed information ranging from simple getting started instructions to advanced topics.
- **Product Manuals**—A comprehensive, searchable library of the latest editions of National Instruments hardware and software product manuals.
- **Hardware Reference Database**—A searchable database containing brief hardware descriptions, mechanical drawings, and helpful images of jumper settings and connector pinouts.
- **Application Notes**—A library with more than 100 short papers addressing specific topics such as creating and calling DLLs, developing your own instrument driver software, and porting applications between platforms and operating systems.

## Software-Related Resources

- **Instrument Driver Network**—A library with hundreds of instrument drivers for control of standalone instruments via GPIB, VXI, or serial interfaces. You also can submit a request for a particular instrument driver if it does not already appear in the library.
- **Example Programs Database**—A database with numerous, non-shipping example programs for National Instruments programming environments. You can use them to complement the example programs that are already included with National Instruments products.
- **Software Library**—A library with updates and patches to application software, links to the latest versions of driver software for National Instruments hardware products, and utility routines.

## Worldwide Support

---

National Instruments has offices located around the globe. Many branch offices maintain a Web site to provide information on local services. You can access these Web sites from [www.ni.com/worldwide](http://www.ni.com/worldwide)

If you have trouble connecting to our Web site, please contact your local National Instruments office or the source from which you purchased your National Instruments product(s) to obtain support.

For telephone support in the United States, dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20,  
Brazil 011 284 5011, Canada (Calgary) 403 274 9391,  
Canada (Ontario) 905 785 0085, Canada (Québec) 514 694 8521,  
China 0755 3904939, Denmark 45 76 26 00, Finland 09 725 725 11,  
France 01 48 14 24 24, Germany 089 741 31 30, Greece 30 1 42 96 427,  
Hong Kong 2645 3186, India 91805275406, Israel 03 6120092,  
Italy 02 413091, Japan 03 5472 2970, Korea 02 596 7456,  
Mexico (D.F.) 5 280 7625, Mexico (Monterrey) 8 357 7695,  
Netherlands 0348 433466, Norway 32 27 73 00, Poland 48 22 528 94 06,  
Portugal 351 1 726 9011, Singapore 2265886, Spain 91 640 0085,  
Sweden 08 587 895 00, Switzerland 056 200 51 51,  
Taiwan 02 2377 1200, United Kingdom 01635 523545

# Glossary

---

Prefix	Meaning	Value
n-	nano-	$10^{-9}$
$\mu$ -	micro-	$10^{-6}$
m-	milli-	$10^{-3}$
c-	centi-	$10^{-2}$
k-	kilo-	$10^3$
M-	mega-	$10^6$

## Symbols

°	Degrees
≥	Equal or greater than
≤	Equal or less than
%	Percent

## A

A	Amperes
AC	Alternating current
Ah	Ampere hours
ANSI	American National Standards Institute
AWG	American Wire Gauge

## **B**

backplane                      An assembly, typically a printed circuit board, with connectors and signal paths that bus the connector pins

## **C**

C                                  Celsius

cfm                                Cubic feet per minute

CFR                                Cooperative Fuel Research

CSA                                Canadian Standards Association

## **D**

daisy-chain                      A method of propagating signals along a bus, in which the devices are prioritized on the basis of their position on the bus

DC                                 Direct current

## **E**

ECL                                Emitter-coupled logic

EIA                                Electronic Industries Association

EMC                                Electromagnetic Compatibility

## **F**

FCC                                Federal Communications Commission

## **G**

g                                    1) grams 2) A measure of acceleration equal to 9.8 m/s<sup>2</sup>

GPIB                                General Purpose Interface Bus (IEEE 488)

$g_{RMS}$  A measure of random vibration. The root mean square of acceleration levels in a random vibration test profile.

## H

Hz Hertz; cycles per second

## I

IEC International Electrotechnical Commission; an organization that sets international electrical and electronics standards

IEEE Institute of Electrical and Electronics Engineers

$I_{MP}$  Mainframe peak current

in. Inches

## L

lb Pounds

## M

m Meters

MTBF Mean time between failure

MTTR Mean time to repair

## N

NEMA National Electrical Manufacturers Association

## P

PXI PCI eXtensions for Instrumentation

## R

RH	Relative humidity
RMS	Root mean square. A method used to measure electrical output in volts and watts

## S

s	Seconds
ST	Star Trigger
Star Trigger slot	This slot is located at slot 2 and has a dedicated trigger line between each peripheral slot. Use this slot for a module with ST functionality that can provide individual triggers to all other peripherals.
System controller	A module configured for installation in Slot 1 of a PXI chassis. This device is unique in the PXI system in that it performs the PCI system controller functions, including clock sourcing and arbitration for data transfers across the backplane. Installing such a device into any other slot can damage the device, the PXI backplane, or both.

## U

UL	Underwriter's Laboratories
----	----------------------------

## V

V	Volts
VAC	Volts alternating current
V <sub>PP</sub>	Peak to peak voltage

## W

W	Watts
---	-------



# Index

---

## A

- AC input specifications, A-1, A-2
- AC mains power supply cords
  - requirements, 1-1
- AC-only power supply specifications, A-1

## B

- backplane, 1-5
  - interoperability with CompactPCI, 1-5
  - local bus, 1-6
  - overview, 1-5
  - peripheral slots, 1-5
  - specifications, A-5
  - Star Trigger (ST) slot, 1-5
  - system reference clock, 1-7
  - trigger bus, 1-7
- battery pack
  - charging, 2-7
  - DC connector (DC chassis only), 2-3
  - DC connector (figure), 2-4
  - description, 1-2
  - installation, 2-4
  - positioning, securing, and connecting (figure), 2-7
  - power supply module (figure), 2-3

## C

- chassis grounding (safety caution), *vi*
- chassis initialization file, 2-12
- chassis with rear panel and power supply removed (figure), 2-6, 4-4

## CompactPCI

- installing modules (figure), 2-11
- interoperability with PXI-1020 backplane, 1-5
- configuration. *See* installation, configuration, and operation.
- connector pinouts. *See* pinouts.
- cooling
  - air cooling of PXI-1020, 2-1
  - air intake (figure), 2-2
  - filler panel installation, 2-12
  - setting fan speed, 2-2
  - specifications, A-3

## D

- DB-9 connector
  - pinout (table), 2-9
  - power supply voltages (table), 2-9
- DC connector (DC chassis only), 2-3
- DC connector (figure), 2-4
- DC input specifications, A-2
- DC output specifications, A-1, A-3
- DC-capable power supply specifications, A-2
- dimensions (figures), A-6
- documentation
  - conventions used in manual, *xi*
  - related documentation, *xi*

## E

- environmental specifications, A-4
- explosive atmosphere (safety caution), *vi*

## F

- fan
  - setting speed, 2-2
- fan connector (figure), 2-5, 4-3
- fan filter
  - cleaning, 3-2
- filler panel installation, 2-12

## G

- getting started
  - what you need, 1-1
- ground, connecting, 2-2

## I

- IEC 320 inlet, 1-4, 2-3
- installation, configuration, and operation, 2-1
  - battery pack
    - charging, 2-7
    - installation, 2-4
  - chassis initialization file, 2-12
  - chassis with rear panel and power supply removed (figure), 2-6
  - connecting safety ground, 2-2
  - DC power supply status indication (table), 2-8
  - fan connector (figure), 2-5
  - filler panel installation, 2-12
  - input voltage priority (DC only), 2-8
  - module installation, 2-10
    - CompactPCI or PXI modules (figure), 2-11
    - injector/ejector handle position (figure), 2-11
  - power supply
    - connecting to, 2-3
  - rack mounting, 2-2
  - remote power monitoring and inhibiting interface, 2-9

- setting fan speed, 2-2
- site considerations, 2-1
- unpacking the PXI-1020, 1-1
- interoperability with CompactPCI, 1-5

## K

- key features, 1-2
- kit contents, 1-1

## L

- live circuits (safety caution), *vi*
- local bus
  - routing (figure), 1-6

## M

- maintenance of PXI-1020, 2-1, 3-1
  - cleaning
    - exterior cleaning, 3-2
    - fan filter, 3-1, 3-2
    - interior cleaning, 3-2
  - preparation, 3-1
  - service interval, 3-1
  - static discharge damage (caution), 3-1
  - troubleshooting
    - causes, what to do (table), 4-1
    - replacing fuse for optional battery pack (DC only), 4-3
    - resetting the AC mains circuit breaker, 4-2
- mechanical specifications, A-5
- modification (safety caution), *vi*

## N

- National Instruments Web support, C-1

**O**

online problem-solving and diagnostic resources, C-1  
 optional equipment, 1-2

**P**

P1 (J1) connector  
   peripheral slot (table), B-6  
   Star Trigger slot (table), B-4  
   system controller slot (table), B-2  
 P2 (J2) connector  
   peripheral slot (table), B-7  
   Star Trigger slot (table), B-5  
   system controller slot (table), B-3  
 part replacement (safety caution), *vi*  
 peripheral slots  
   overview, 1-5  
   P1 (J1) connector pinouts (table), B-6  
   P2 (J2) connector pinouts (table), B-7  
 pinouts, B-1  
   DB-9 connector (table), 2-9  
   P1 (J1) connector  
     peripheral slot (table), B-6  
     Star Trigger slot (table), B-4  
     system controller slot (table), B-2  
   P2 (J2) connector  
     peripheral slot (table), B-7  
     Star Trigger slot (table), B-5  
     system controller slot (table), B-3  
 power monitoring connector. *See* DB-9 connector.  
 power problems, troubleshooting, 4-1  
 power supply  
   AC mains power supply cord requirements, 1-1  
   connecting to, 2-3  
   DC connector (DC chassis only), 2-3  
   DC connector (figure), 2-4  
   DC power supply status indication (table), 2-8

  input voltage priority (DC only), 2-8  
   power supply module (figure), 2-3  
   remote power monitoring and inhibiting interface, 2-9  
   removal from chassis (figure), 2-6  
   specifications, A-1  
   testing power up, 2-8  
   voltages at power monitoring connector (DB-9) (table), 2-9  
 power supply status indication (DC-capable power supply only), 2-8  
 PXI\_CLK10, 1-7  
 PXI\_CLK10\_IN pin, 1-7  
 PXI-1020  
   battery pack  
     charging, 2-7  
     DC connector (DC chassis only), 2-3  
     DC connector (figure), 2-4  
     description, 1-2  
     installation, 2-4  
     positioning, securing, and connecting (figure), 2-7  
     replacing fuse (DC only), 4-3  
   battery pack (figure), 4-4  
   chassis with rear panel and power supply removed, 4-4  
   cooling air intake (figure), 2-2  
   cooling specifications, A-3  
   dimensions (figures), A-6  
   electrical specifications, A-1  
   environmental specifications, A-4  
   fan connector (figure), 2-5, 4-3  
   fan speed, setting, 2-2  
   front view (figure), 1-3  
   installation  
     *See* installation, configuration, and operation.  
   key features, 1-2  
   maintenance  
     *See* maintenance of PXI-1020.  
   mechanical specifications, A-5

- optional equipment, 1-2
- pinouts, B-1
- power supply module (figure), 2-3
- power supply specifications, A-1
- rack mounting, 2-2
- rack-mount kit, 1-2
- rear view of AC-only (figure), 1-4
- rear view of DC-capable (figure), 1-4
- safety ground, connecting, 2-2
- safety specifications, A-4
- testing power up, 2-8

PXI-1020 backplane, 1-5

- interoperability with CompactPCI, 1-5
- local bus, 1-6
- overview, 1-5
- peripheral slots, 1-5
- specifications, A-5
- Star Trigger (ST) slot, 1-5
- system reference clock, 1-7
- trigger bus, 1-7

## R

- rack mounting, 2-2
- rack-mount kit, 1-2
- remote power monitoring and inhibiting interface, 2-9

## S

- safety ground, connecting, 2-2
- safety specifications, A-4
- safety, warning and caution notices, vi
- service interval, 3-1
- setting fan speed, 2-2
- software-related resources, C-2
- specifications, A-1
  - backplane, A-5
  - cooling, A-3
  - dimensions (figures), A-6

- electrical, A-1
- environmental, A-4
- mechanical, A-5
- power supply, A-1
- safety, A-4

Star Trigger (ST) slot

- description, 1-5
- P1 (J1) connector pinouts (table), B-4
- P2 (J2) connector pinouts (table), B-5

status LED, 2-8

system controller slot

- description, 1-5
- P1 (J1) connector pinouts (table), B-2
- P2 (J2) connector pinouts (table), B-3

system reference clock, 1-7

## T

- technical support resources, C-1
- telephone support, C-2
- testing power up, 2-8
- trigger bus, 1-7
- troubleshooting
  - causes, what to do (table), 4-1
  - replacing fuse for optional battery pack (DC only), 4-3
  - resetting the AC mains circuit breaker, 4-2

## U

- unpacking the PXI-1020, 1-1

## V

- voltages at power monitoring connector (DB-9) (table), 2-9

## **W**

- Web support from National Instruments
  - online problem-solving and diagnostic resources, C-1
  - software-related resources, C-2
- worldwide technical support, C-2