PXI

PXI™-1000B User Manual

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FCC/DOC Radio Frequency Interference Class A Compliance

This equipment generates and uses radio frequency energy and, if not installed with the instructions in this manual, may cause interference to radio and televis requirements are the same for the Federal Communications Commission (FCC Department of Communications (DOC). This equipment has been tested and fo following two regulatory agencies:

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class to part 15 of the FCC Rules. These limits are designed to provide reasonable pr interference when the equipment is operated in a commercial environment. Thi uses, and can radiate radio frequency energy and, if not installed and used in acc manual, may cause harmful interference to radio communications. Operation o residential area is likely to cause harmful interference in which case the user w interference at his own expense.

Notices to User: ***Changes or modifications not expressly approved by Natio the user's authority to operate the equipment under the F***

This device complies with the FCC rules only if used with of suitable quality and construction. National Instruments this device and provides them for sale to the user. The use interface cables could void the user's authority to operate FCC rules.

If necessary, consult National Instruments or an experienced radio/television te suggestions. The following booklet prepared by the FCC may also be helpful: *Electronic Entertainment Equipment Handbook*. This booklet is available from Printing Office, Washington, DC 20402.

Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interfere Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlem du Canada.

For Your Safety

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

This equipment contains voltage hazardous to human life capable of inflicting personal injury.

- **Mainframe Grounding**—The PXI-1000B mainfran connection from the premise wire safety ground to tl chassis ground. The earth safety ground must be conr of this equipment to minimize shock hazards. Refer t *Safety Ground* section of Chapter 2, Installation, Co and Operation, for instructions on connecting safety
- **Live Circuits**—Operating personnel and service per remove protective covers when operating or servicing Adjustments and service to internal components mus by qualified service technicians. During service of th mains connector to the premise wiring must be disco Dangerous voltages may be present under certain co extreme caution.
- **Explosive Atmosphere**—Do not operate the mainfra where flammable gases are present. Under such conc equipment is unsafe and may ignite the gases or gas
- **Part Replacement**—Only service this equipment w exact replacements, both electrically and mechanical National Instruments for replacement part informatic parts with those that are not direct replacements may personnel operating the mainframe. Furthermore, da occur if replacement parts are unsuitable.
- **Modification**—Do not modify any part of the mainf original condition. Unsuitable modifications may res hazards.

Contents

Chapter 3
Maintenance

Appendix A
Specifications

Appendix B
Pinouts

Appendix C
Customer Communication

Glossary

Index

Figures

Tables

About This Manual

The *PXI-1000B User Manual* describes the features of th mainframe and contains information about configuring th installing the modules, and operating and using the PXI-

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Getting Started*, describes the key feature PXI-1000B mainframe, lists the contents of your kit, equipment you can order from National Instruments.
- Chapter 2, Installation, Configuration, and Operatior to prepare and operate your PXI-1000B mainframe.
- Chapter 3, *Maintenance*, describes basic maintenanc can perform on the PXI-1000B mainframe.
- Appendix A, *Specifications*, contains complete speci PXI-1000B mainframe.
- Appendix B, *Pinouts*, describes the P1 and P2 conne the PXI-1000B backplane.
- Appendix C, *Customer Communication*, contains for request help from National Instruments or to commer and manuals.
- The *Glossary* lists abbreviations, acronyms, metric p mnemonics, symbols, and terms.
- The *Index* contains an alphabetical list of key terms a this manual, including the page where you can find e

Conventions Used in This Manual

The following conventions are used in this manual:

This icon to the left of bold italicized text denotes a note, to important information.

This icon to the left of bold italicized text denotes a cautic you of precautions to take to avoid injury, data loss, or a

	This icon to the left of bold italicized text denotes a wa you of precautions to take to avoid being electrically s
bold italic	Bold italic text denotes a note, caution, or warning.
italic	Italic text denotes emphasis, a cross reference, or an i concept. This font also denotes text from which you su word or value, as in Windows 3.*x*.
`monospace`	Text in this font denotes text or characters that are to t from the keyboard, sections of code, programming ex examples. This font is also used for the proper names c directories, device names, functions, variables, filenar

Related Documentation

The following documents contain information that you you read this manual:

- *Compact PCI Specification PICMG 2.0 R2.1*
- *PXI Specification Revision 1.0*
- IEEE 1101.1-1991, *IEEE Standard for Mechanic Specifications for Microcomputers Using IEC 60.*
- IEEE 1101.10 and P1101.11, *IEEE Standard for . Mechanical Specifications for Microcomputers U Equipment Practice*

Customer Communication

National Instruments wants to receive your comments and manuals. We are interested in the applications you products, and we want to help if you have problems w easy for you to contact us, this manual contains comme forms for you to complete. These forms are in Append *Communication*, at the end of this manual.

Getting Started

This chapter describes the key features of the PXI-1000B the contents of your kit, and lists optional equipment you National Instruments.

Unpacking

Carefully inspect the shipping container and the mainfra Check for visible damage to the metal work. Check to m handles, hardware, and switches are undamaged. Inspect for any possible damage, debris, or detached components appears to have been caused in shipment, file a claim wit Retain the packing material for possible inspection and/o

What You Need to Get Started

The PXI-1000B kit contains the following items:

- ❑ PXI-1000B mainframe
- ❑ Filler panels
- ❑ AC power cable (see Table 1-1 for AC power cables)
- ❑ *PXI-1000B User Manual*
- ❑ Floppy disk with Chassis Initialization file, `chassis`

Table 1-1. AC Power Cables

Power Cable	Reference Stan
Standard 120 V (USA)	ANSI C73.11/NEMA 5-1
Switzerland 220 V	SEV
Australia 240 V	AS C112

Table 1-1. AC Power Cables (Continue

Power Cable	Reference St
Universal Euro 240 V	CEE (7), II, IV, VII IE
North America 240 V	ANSI C73.20/NEMA 5
United Kingdom 240 V	BS 1363/IEC83

If you are missing any of the above items or if you have cord, contact National Instruments.

Optional Equipment

Contact National Instruments to order the following o PXI-1000B mainframe.

Battery Pack and Cable for DC-Capable PXI-1000B

A DC input capable power supply is optionally install PXI-1000B mainframe at the factory. The DC-capable powered with AC input or 10 to 32 VDC input and ha

If you have purchased a PXI-1000B with the DC-capa you can install an optional 1.7 Ah NiCd battery pack. draw power from this battery pack and operate when no present or if the DC input drops below 10 V. The batte PXI-1000B for up to 12 minutes under full load.

A DC input cable is available for the PXI-1000B with power supply. This cable contains an inline fuse and h easy connection to various DC sources.

Rack-Mount Kit

An optional rack-mount kit is available from National can use this kit to install the PXI-1000B mainframe in (482 mm) instrument cabinet.

Key Features

The PXI-1000B combines a high-performance 8-slot PXI high-output power supply and a structural design that has for maximum usability in a wide range of applications. T modular design ensures the highest level of maintainabili very low mean time to repair (MTTR). The PXI-1000B fu the PXI Specification, Revision 1.0, offering advanced ti synchronization features.

The key features of the PXI-1000B include:

- PXI and CompactPCI (PICMG 2.0 R 2.1) module cc
- Compact 3U-sized, 8-slot chassis
- 300 W of usable power; 150 W for DC-capable supp
- Universal AC input: auto-voltage and auto-frequenc
- Over-current protection via push-reset circuit breake to replace)
- Removable modular power supply
- Remote power status and inhibit via a rear panel con
- On/Off (Standby) switch located on the front panel f
- Selectable fan speed for maximum cooling or quiet c
- Carrying handle for portability
- Tilt feet for bench-top applications

PXI-1000B Backplane Overview

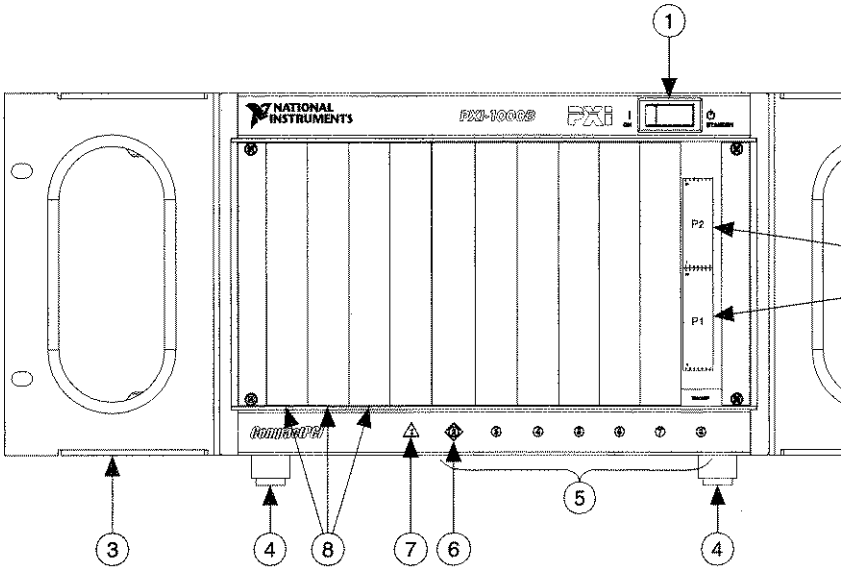
Interoperability with CompactPCI

The PXI-1000B backplane is interoperable with PXI-com and standard CompactPCI products. This is an important PXI-compatible systems may not require components tha implement PXI-specific features. For example, you may standard CompactPCI network interface card in a PXI ch

The signals on the P1 connector of the backplane meet the the CompactPCI specification for both the peripheral and

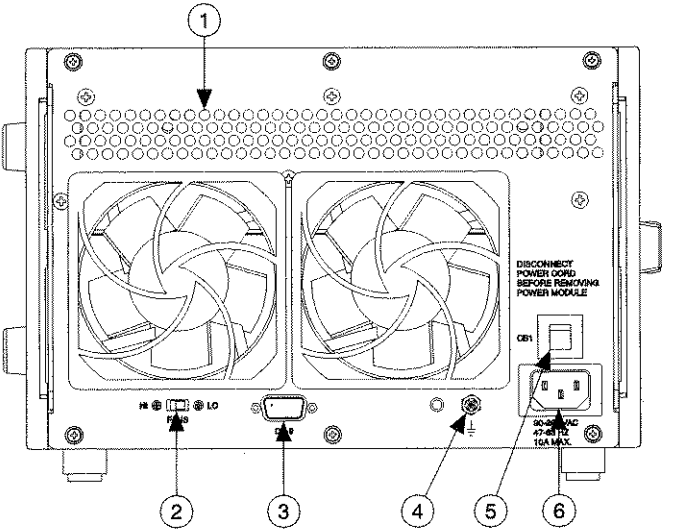
The PXI-specific signals are located on P2 and are onl
signals that are reserved or not used in the CompactPC
specification. Therefore, all modules that meet the req
CompactPCI 64-bit specification will function in the I

Figures 1-1, 1-2, and 1-3 show some of the key featur
of the PXI-1000B mainframe. Figure 1-1 shows the fr
PXI-1000B. Figure 1-2 shows the rear view of the AC
Figure 1-3 shows the rear view of the DC-capable cha



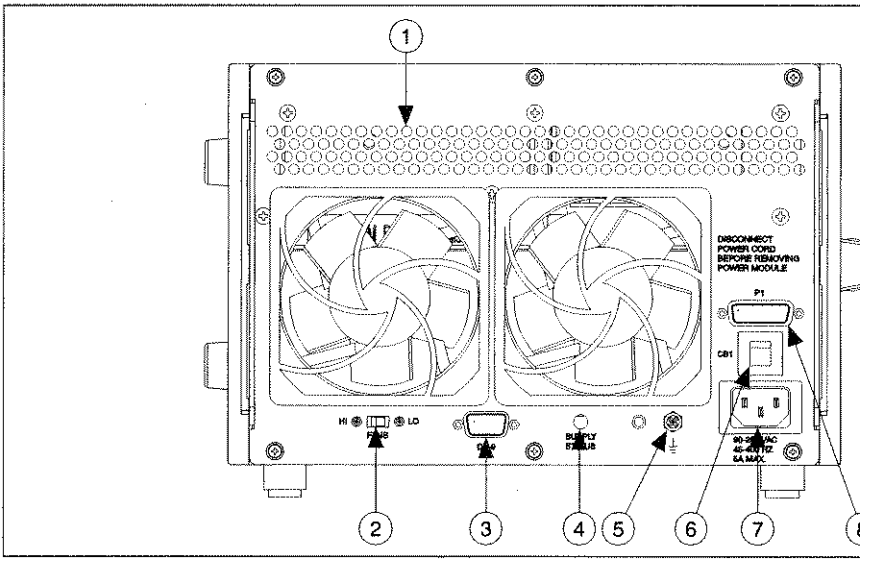
1	Remote On/Off (Standby) Switch	3	Optional Mounting Brackets	6	Star Trigge
2	Backplane Connectors (Located in Slots 1-8)	4	Removable Feet	7	System Cc
		5	Peripheral Slots	8	Controller

Figure 1-1. Front View of the PXI-1000B Ma



1	Module Cooling Air Outlets	3	Remote Power Status and Inhibit Connector	5	C
2	Fan Speed Selector	4	Chassis Ground Screw	6	U

Figure 1-2. Rear View of the AC-Only PXI-1000B M



1	Module Cooling Air Outlets	3	Remote Power Status and Inhibit Connector	5	Chassis Ground Screw	7	
2	Fan Speed Selector	4	Power Supply Status LED	6	Circuit Breaker	8	

Figure 1-3. Rear View of the DC-Capable PXI-100

System Controller Slot

The System Controller slot is located in Slot 1 of the c
the PXI specification. It has three controller expansio
used for system controller modules that are wider than
in the PXI specification, these slots allow the controlle
to prevent the controller from using up peripheral slot

Star Trigger Slot

The Star Trigger (ST) slot is located at Slot 2. This sl
trigger line between each peripheral slot (see Figure 1
intended for modules with ST functionality that can p
triggers to all other peripherals. However, if you do n
trigger functionality, you can install any standard peri
this slot.

Peripheral Slots

There are seven peripheral slots including the Star Trigge

Local Bus

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

For example, a given peripheral slot's right local bus conn adjacent slot's left local bus and so on. Each local bus is 1 can pass analog signals between cards or provide a high-s communication path that does not affect the PXI bandwid

Local Bus signals may range from high-speed TTL signa signals as high as 42 V. Initialization software keys adjac prohibit the use of incompatible boards. This software us configuration information specific to each peripheral boa compatibility. This method is a flexible way to define loc functionality that is not limited by hardware keying.

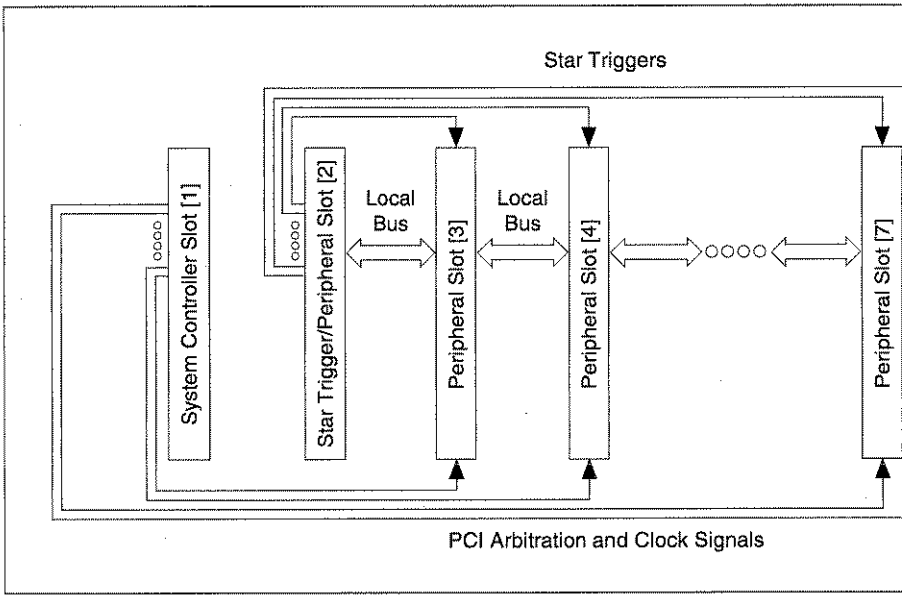


Figure 1-4. PXI Local Bus and Star Trigger Rout

Trigger Bus

The eight PXI trigger lines are bused to each slot. You lines in a variety of ways. For example, you can use tri the operation of several different PXI peripheral modu applications, one module can control carefully timed operations performed on other modules in the system. triggers to one another, allowing precisely timed respo asynchronous external events the system is monitorin

System Reference Clock

The PXI-1000B supplies the PXI 10 MHz system clo (PXI_CLK10) independently to each peripheral slot. buffer (having a source impedance matched to the bac less than 1 ns between slots) drives the clock signal to You can use this common reference clock signal to sy modules in a measurement or control system. You car from an external source through the PXI_CLK10_IN connector of the Star Trigger Slot. (See Table B-1, *Pi Pinout for the System Controller Slot*, in Appendix B, an external clock on this pin automatically disables th 10 MHz source.

Installation, Configuration, and Operation

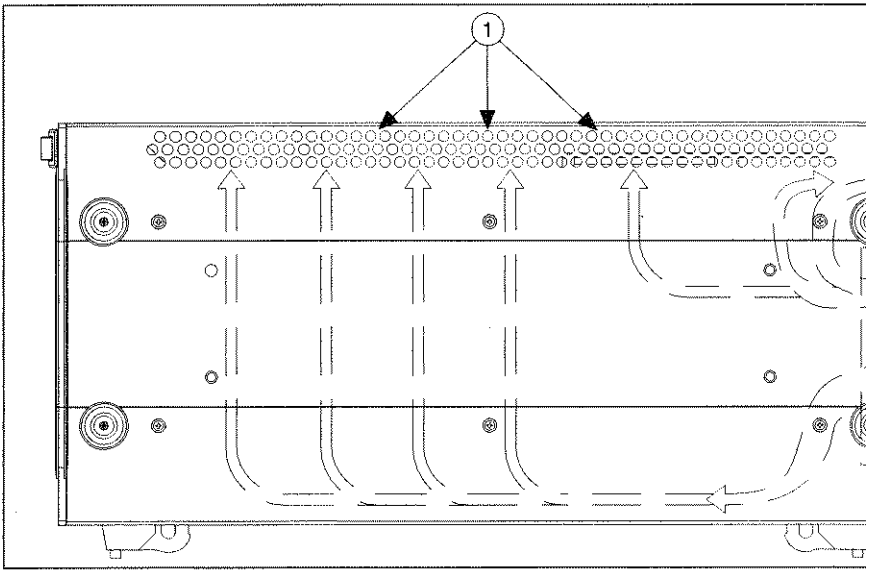
This chapter describes how to prepare and operate your P mainframe.

Before connecting the mainframe to a power source, read the *For Your Safety* section located at the beginning of thi

Site Considerations

The PXI-1000B is designed to operate on a bench or in an Determine how you want to use your PXI-1000B and foll appropriate installation instructions.

Apertures in the rear and along both sides of the mainframe supply and module cooling. Air enters through filters and f in the lower rear of the mainframe and exits through the u on both sides and through the rear, as shown in Figure 2-1 PXI-1000B on a bench top or in an instrument rack so tha (air inlets) and the air outlet apertures along both sides of have adequate ventilation. Keep other equipment a minim (76.2 mm) away from the air inlets and outlets.



1 Module Cooling Air Outlets 2 Module Cooling Air Intake

Figure 2-1. PXI-1000B Mainframe Airflow Si

Install your mainframe so that you can easily access t
simplifies the replacement of the air filters or power s
if necessary.

Rack Mounting

Rack-mount applications require the optional rack-m
from National Instruments. Refer to the instructions s
rack-mount kit to install your PXI-1000B in an instru

Note ***You may wish to remove the feet from your PXI-1000B when To do so, remove the screws holding the feet in place.***

Setting Fan Speed

The fan speed selector switch is located on the rear pan
Refer to Figure 1-2, *Rear View of the AC-Only PXI-1*
Figure 1-3, *Rear View of the DC-Capable PXI-1000B*
diagram of the fan speed selector. Select HI for maxi
effectiveness (recommended) or LO for quiet operati

Connecting Safety Ground

Warning ***The PXI-1000B chassis is designed with a three-position NEMA that connects the ground line to the chassis ground. To minimize make sure your electrical power outlet has an appropriate earth sa is connected whenever you power up the chassis.***

If your power outlet does not have an appropriate ground must connect the premise wire safety ground to the chassi screw located on the rear panel. Refer to Figure 1-2, *Rear AC-Only PXI-1000B Mainframe*, or Figure 1-3, *Rear Vie DC-Capable PXI-1000B Mainframe*, for a diagram of the grounding screw. To connect the safety ground, complete steps:

1. Connect a 16 AWG (1.3 mm) wire to the chassis grou using a toothed grounding lug. The wire must have gı with a yellow stripe or must be non-insulated (bare).
2. Attach the opposite end of the wire to permanent eart toothed washers or a toothed lug.

Connecting to Power Source and Testing Powe

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

If your PXI-1000B has an AC-only input power supply, at through the rear AC inlet using the appropriate line cord s Figure 1-2, *Rear View of the AC-Only PXI-1000B Mainfr* diagram of the IEC 320 inlet.

If your PXI-1000B has a DC-capable power supply, you AC line cord or a DC cord if a DC power source is availa

The power switch allows you to turn on the mainframe or p mode. Push the power switch to the On position (if not alre that all fans become operational.

Caution ***When connecting digital voltmeter probes to the rear D-sub conn not to short the probe leads together. Doing so could damage the***

You can use a digital voltmeter to ensure all voltage level PXI-1000B are within the allowable limits. Referring to T one lead of the voltmeter to a supply pin on the remote p

connector (9-pin D-sub) located on the rear panel. Ref
pinout diagram of the remote power monitoring conne
reference lead of the voltmeter to one of the ground pi
voltage reading to the values listed in Table 2-1.

Note ***Use the rear-panel D-sub connector to check voltages only. D connector to supply power to external devices.***

Table 2-1. Power Supply Voltages at Power Monitoring

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

If the voltages fall within the specified ranges, the mai
with the CompactPCI voltage limit specifications. Not
rear-panel D-sub connector is to be used to check volt
use these voltages to supply power to external devices

Note ***If the fans or power unit fail to function properly, refer to the PXI-1000B section of Chapter 3, Maintenance.***

Remote Power Monitoring and Inhibiting Int

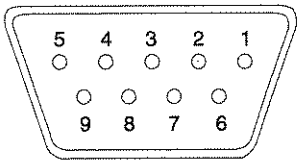
The PXI-1000B mainframe supports remote power m
inhibiting via a 9-pin D-sub connector located on the r
shows the pinout of the DB-9 connector.

Table 2-2. DB-9 Connector Pinout

DB-9 Pin	Signa
1	Logic Ground
2	+5 V
3	Inhibit Return (DC-cap
4	+3.3 V

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

DB-9 Pin	Signal
5	Inhibit*
6	+12 V
7	Reserved
8	–12 V
9	Logic Ground



You can use the Inhibit signal (active low) to turn off the p
outputs. To use this feature, connect the Inhibit pin (pin 5)
Ground pin (pin 1 or 9) on the AC-only input power supp
Return (pin 3) for the DC-capable power supply. Make su
(standby) switch is in the ON position. As long as the con
the power supply inhibits its DC outputs. DC output resun
is no longer connected. Note that the power (standby) switc
front of the chassis, uses this inhibiting feature. For remote
momentary switch between pin 5 and pin 1 (or pin 9) on th
power supply or between pin 5 and pin 3 for the DC-capab

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

If your PXI-1000B has a DC-capable power supply refer
table for power supply indications provided by the Power
LED. Refer to Figure 1-3, *Rear View of the DC-Capable
Mainframe*, for a diagram of the Power Supply Status LE

Table 2-3. Power Supply Status Indication, DC C

Power Source	Power Switch Mode	
AC or External DC Input	Standby	Gr
AC or External DC Input	On	Br

Table 2-3. Power Supply Status Indication, DC Onl

Power Source	Power Switch Mode
Optional Battery Pack	On
Optional Battery Pack (Discharged)	On

Input Voltage Priority (DC-Capable Power Su

If more than one power source is connected at the sam of the power sources is as follows.

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

Installing the Battery Pack (DC-Capable Pow Only)

If you purchased a DC-capable PXI-1000B and an opt battery pack, install it according to the following steps

1. Remove the power supply module by loosening th on the rear of the PXI-1000B and pulling on the r
2. Connect the two cables on the battery pack to the opening in the rear of the power supply module.
3. Insert the battery pack into the opening in the rear module (batteries facing inward) and install the fo
4. Reinstall the power supply module and tighten th

Charging the Battery Pack (DC-Capable Pow Only)

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

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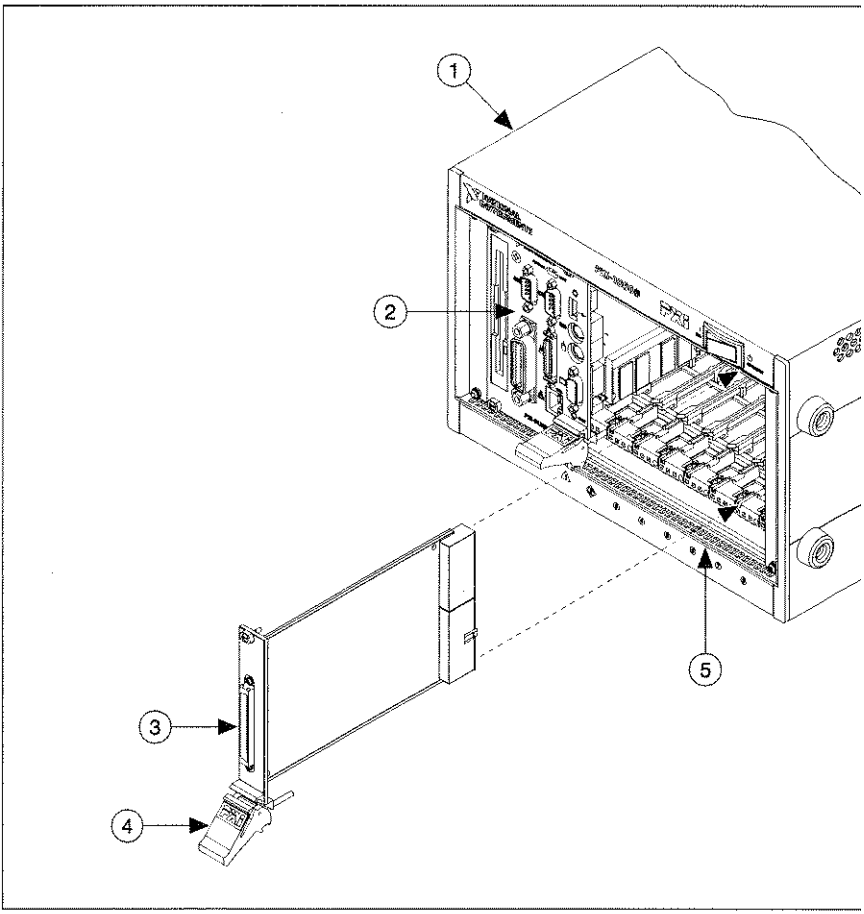
Caution ***Turn off the mainframe power before installing CompactPCI or***

Install a module into a mainframe slot by first placing the
edges into the front module guides (top and bottom), as sl
Figure 2-2. Slide the module to the rear of the mainframe (
the injector/ejector handle is pushed down as shown in Fi

When you begin to feel resistance, push up on the injec
inject the card into the frame. Secure the module's fro
mainframe using the module's front-panel mounting s



1	PXI-1000B Chassis	3	PXI Board	5	Injector/E
2	PXI-8156B System Controller	4	Injector/Ejector Handle		

Figure 2-2. Installing PXI or CompactPCI M

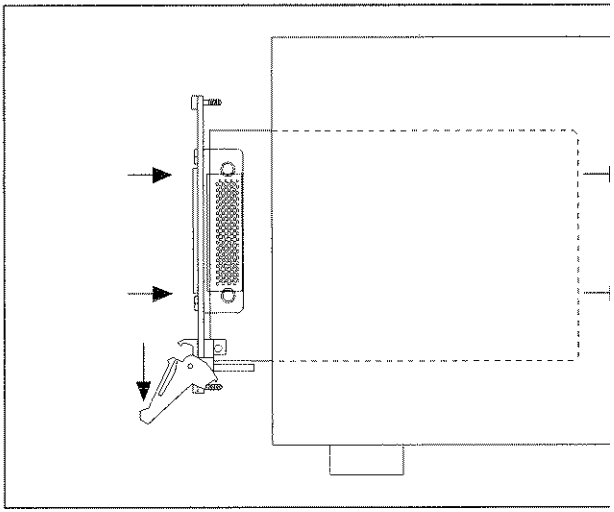


Figure 2-3. Injector/Ejector Handle Position during Mod

Installing Filler Panels

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

Using the Chassis Initialization File

To assist system integrators, the PXI specification requir
of PXI chassis and system modules to document the capa
products. The minimum documentation requirements are
in `.ini` files, which consist of ASCII text. The system ir
read the `.ini` file, and configuration utilities and device
use this file. The PXI-1000B chassis initialization file, c
is included on the diskette for your PXI-1000B.

Maintenance

This chapter describes basic maintenance procedures you
the PXI-1000B mainframe.

Service Interval

Clean the mainframe fan filters at a maximum interval of
Depending upon the amount of use and ambient dust level
environment, the filters may require more frequent cleani

Clean dust from the mainframe exterior (and interior) as r
the operating environment. Periodic cleaning increases re

Preparation

The information in this section is designed for use by qua
personnel. Read the *For Your Safety* section at the beginni
before attempting any procedures in this chapter.

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

Cleaning

Cleaning procedures consist of exterior and interior clean
mainframe and cleaning the fan filters. Refer to your mo
documentation for information on cleaning the individua
or PXI modules.

Caution ***Always power-off the mainframe and disconnect the power cord
or servicing the mainframe.***

Interior Cleaning

Use a dry, low-velocity stream of air to clean the interi
Use a soft-bristle brush for cleaning around componer
liquid for minor interior cleaning, use a 75% isopropyl
rinse with deionized water.

Exterior Cleaning

Clean the exterior surfaces of the mainframe with a dr
soft-bristle brush. If any dirt remains, wipe with a cloth
soap solution. Remove any soap residue by wiping wi
with clear water. Do not use abrasive compounds on a
mainframe.

Cautions ***Avoid getting moisture inside the mainframe during exterior enough moisture to dampen the cloth.***

Do not wash the front- or rear-panel connectors or switches. components while cleaning the mainframe.

Do not use chemical cleaning agents; they may damage the n chemicals that contain benzene, toluene, xylene, acetone, or

Cleaning the Fan Filters

You can easily remove the mainframe cooling filters
mainframe by removing the plastic housing attached t

Clean the fan filters by washing them in a mild soap s
vacuuming or blowing air through them. Rinse the filt
allow them to dry before reinstalling them on the mai

Resetting the AC Mains Circuit Breaker

If your PXI-1000B is connected to an AC source and enc
over-current condition, the circuit breaker located on the re
to prevent damage to the mainframe. Complete the follow
the circuit breaker:

1. Turn the power switch to the 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 s

1. Turn the front panel power switch to the Standby pos
2. Disconnect the mainframe from the AC mains power
3. Remove all modules from the mainframe.
4. Complete the test procedure described in the *Connec*
   Source and Testing Power up section in Chapter 2, *I*
   Configuration, and Operation.
5. If any voltages are outside the acceptable limits, cont
   Instruments.
6. If all voltages are within the acceptable limits, verify
   PXI-1000B can meet the power requirements of your
   PXI modules. Overloading the chassis can cause the
   Refer to Appendix A, *Specifications.*
7. The over-current condition that caused the circuit bre
   may be due to a faulty CompactPCI or PXI module.
   documentation that was supplied with the modules for
   your modules.

Troubleshooting the PXI-1000B

Refer to Table 3-1 to troubleshoot the PXI-1000B ma
lists possible causes for power failure and recommend
problem.

Table 3-1. Troubleshooting

Possible Cause	What to Do
PXI-1000B mainframe is not connected to power source.	Make sure that the PXI-1000B is cor electrical outlet. Try operating anoth equipment from this outlet.
Power switch is not switched on.	Set the power switch to the On positi
Remote inhibiting input on the rear panel of the mainframe is active.	Deactivate your system's remote inhi
Circuit breaker is tripped.	Reset the circuit breaker. Refer to the *Mains Circuit Breaker* section in this
If DC-capable PXI-1000B is powered by an external DC source, inline fuse on DC-power cord may be blown.	Check fuse and replace if necessary.
If DC-capable PXI-1000B is powered by optional battery pack, the inline fuse to the battery pack may be blown.	Remove power supply (see *Installing* Chapter 2 for procedure). Check inli pack and replace if necessary.
If DC-capable PXI-1000B is powered by an optional battery pack only, the battery pack may be discharged.	Connect PXI-1000B to AC or DC po charge battery. Notice: The battery is the power switch is in the On or Stan
Power supply has failed.	Contact National Instruments.

Specifications

This appendix contains complete specifications for the PX mainframe.

Electrical

Table A-1. AC Input Specifications for AC-Only Powe

Characteristic	Descriptio
Input Voltage Range	90–264 VAC
Input Frequency Range	47 to 63 Hz
Over-Current Protection	10 A circuit breaker
Maximum Steady State Operating Current	8 A
Line Regulation	± 0.2% over operating lin
Efficiency	70% typical
Power Disconnect	The (standby) power swit power module to supply I the CompactPCI/PXI bac rear-panel D-sub connect remote inhibiting operatic (standby) switch must be position prior to use of re The power cord provides disconnect.

Table A-2. DC Output Specifications for AC-Only F

Characteristic	Descrip	
Maximum Usable Power	300 W	
DC Current Capacity (I_{MP})	Voltage	I_{MP} (Stead
	+3.3 V	35
	+12 V	4
	+5 V	25
	–12 V	1
Load Regulation	Voltage	Regu
	+3.3 V	< 1.5
	+12 V	< 5
	+5 V	< 1
	–12 V	< 5
Maximum Ripple and Noise	1% ripple, 1% noise 20 MHz bandwidth	
Over-Current Protection	All outputs protected f and overload, automati	
Over-Voltage Protection	3.3 V, 5 V clamp at 20 output voltage +12 V and –12 V clam referenced across + an	
Power Supply/Fan Unit MTTR	Replacement in under	

Table A-3. AC Input Specifications for DC-Capable

Characteristic	Descrip
Input Voltage Range	85–265 VAC
Input Frequency Range	45 to 65 Hz
Over-Current Protection	5 A circuit breaker

© Nationa

Table A-3. AC Input Specifications for DC-Capable Power Su

Characteristic	Descriptio
Operating Current (RMS Steady State)	3.0 A
Line Regulation	± 0.2% over operating lin
Efficiency	85% typical
Power Disconnect	The (standby) power swit power module to supply D CompactPCI/PXI backpla rear-panel D-sub connect remote inhibiting operatic (standby) switch must be position prior to use of re The power cord provides disconnect.

Table A-4. DC Input Specifications for DC-Capable Pov

Characteristic	Descriptio
Input Voltage Range	10–32 V
DC to DC Isolation	500 VAC
Over-Current Protection	Inline fuse must be installe cable
Efficiency	82% typical
Power Disconnect	The front (standby) powe the power module to supp the CompactPCI/PXI bac rear-panel D-sub connect remote inhibiting operatic (standby) switch must be position prior to use of re The power cord provides disconnect.

Table A-5. DC Output Specifications for DC-Capable

Characteristic		Descrip
Maximum Usable Power	160 W	
DC Current Capacity (I_{MP})	Voltage	I_{MP} (Stead
	+3.3 V	10
	+12 V	4
	+5 V	20
	–12 V	0.4
Load Regulation	Voltage	Regu
	+3.3 V	< 2
	+12 V	< 2
	+5 V	< 2
	–12 V	< 5
Maximum Ripple and Noise	1% ripple, 1% noise 20 MHz bandwidth	
Over-Current Protection	All outputs have over-c Restart by ON/STAND	
Over-Voltage Protection	20% to 35% above outp supply shutdown. Resta ON/STANDBY switch	
Power Supply/Fan Unit MTTR	Replacement in under	

Cooling

Table A-6. Cooling Specifications

Characteristic	Descriptio
Per Slot Cooling Capacity	Slot cooling capacity in w is 20 W with fan speed se
Module Cooling System	Forced air circulation (po pressurization) via two 6(HI/LO speed selector
Slot Airflow Direction	P1 to P2, bottom of modu module
Module Cooling Intake	Bottom rear of mainfram
Module Cooling Exhaust	Along both sides of main
Power Supply Cooling System	Forced air circulation via
Power Supply Cooling Intake	Rear of mainframe
Power Supply Cooling Exhaust	Along both sides of main upper rear panel
Module Cooling Fan MTBF	40,000+ hr
Power Supply/Fan Unit	Replacement in under 5 n

Safety

Table A-7. Safety Specifications

Characteristic	Descriptio
Safety Characteristics	UL 3111-1, IEC 1010-1, No. 1010.1 Installation Category II Pollution Degree 2 Safety Class 1

Environmental

Table A-8. Environmental Specificatio

Characteristic	Descri
Operating Temperature	0° to 50° C
Storage Temperature	–20° to 70° C
Operating Relative Humidity	Maximum 80% for te 31° C, decreasing line
Functional Shock (Operating)	MIL-T-28800E CLAS Shock Pulse, 11 ms d
Operating Location	Indoor use
Random Vibration (Operational)*	5 to 500 Hz, 0.31 g_{RMS}
Random Vibration (Non-Operational)*	10 to 500 Hz, 2.46 g_{RM}
EMC Emissions	FCC Class A complia Group 1 Class A Com
EMC Immunity	Refer to DOC supplie compliance to relevan
Altitude	2 km (1.24 mi)

* Random vibration profiles were developed in accordance with M and MIL-STD-810E Method 514 Test levels exceed those recom MIL-STD-810E for Category 1 (Basic Transportation), Figures 5

Backplane

Table A-9. Backplane Specifications

Characteristic	Descriptio
Size	3U-sized; one system slot system expansion slots) a peripheral slots. Compliant with IEEE 110 mechanical packaging. PXI Specification Revisic compliant. Accepts both PXI and Co (PICMG 2.0 R2.1) 3U mc
Backplane Bare-Board Material	UL 94 V-0 recognized (File No. E 116551)
Backplane Connectors	Conform to IEC 917 and I and are UL 94 V-0 rated

Mechanical

Table A-10. Mechanical Specification

Characteristic	Descrip
Overall Dimensions Standard Mainframe	
Height Width Depth	17.78 cm (7.00 in.) 27.02 cm (10.64 in.) 37.85 cm (14.90 in.) **Notes:** 1.80 cm (.71 in.) adde feet are installed. When tilted with front table top, height is inc approximately 5.29 cm and 1.48 cm (.583 in.)
Weight	8.6 kg (19 lb.)
Maximum Module Weight	1.8 kg (4 lb.)
Materials	Sheet Aluminum (505 Cold Rolled Steel
Finish	
Unpainted Aluminum	Conductive Clear Iridi
Cold Rolled Steel	Clear Chromate Zinc I
Paint	Polyurethane Enamel

Figure A-1 shows the PXI-1000B dimensions. The holes sh
installation of the optional rack-mount kit. You can install
front or rear of the chassis, depending on which end of the c
to face toward the front of the instrument cabinet. Note tha
rear chassis mounting holes (size M4) are symmetrical.

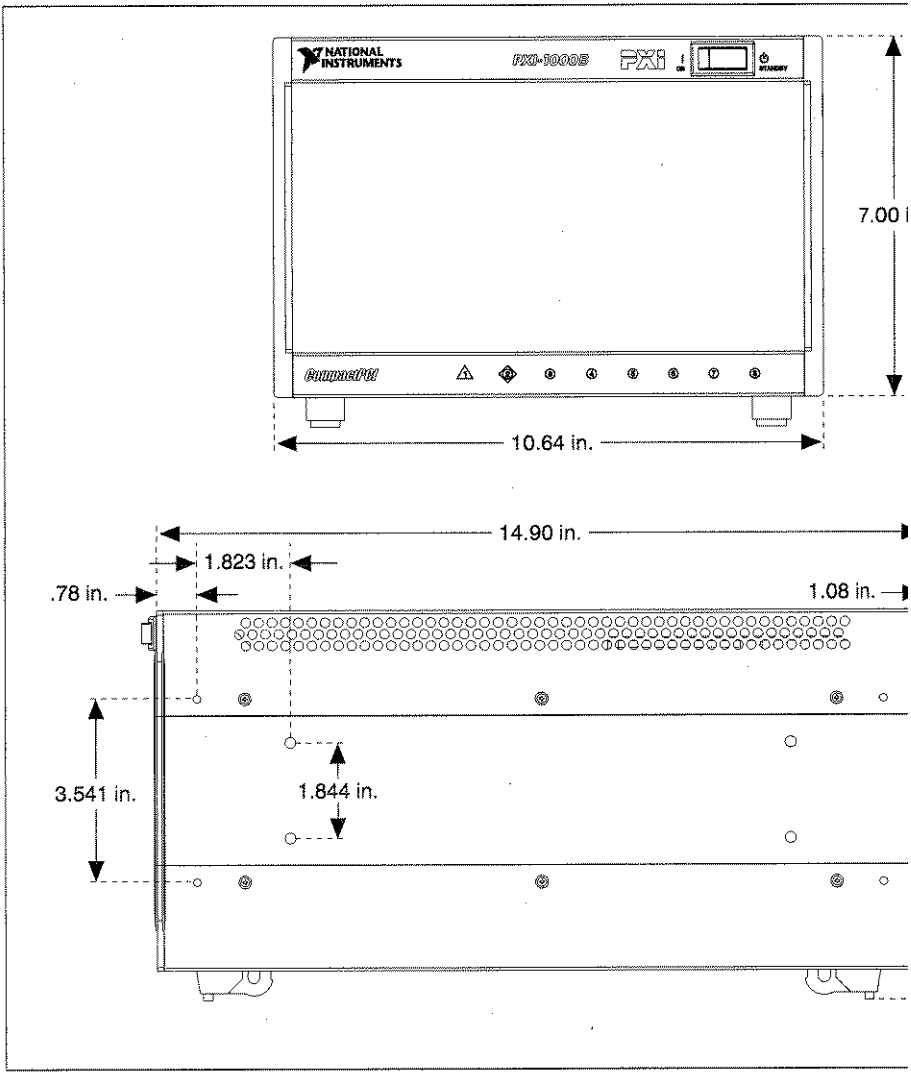


Figure A-1. PXI-1000B Dimensions

Pinouts

for This appendix describes the P1 and P2 connector pinouts PXI-1000B backplane.

em Table B-1 shows the P1 (J1) connector pinout for the Syst slot.

em Table B-2 shows the P2 (J2) connector pinout for the Syst slot.

Tri Table B-3 shows the P1 (J1) connector pinout for the Star

Tri Table B-4 shows the P2 (J2) connector pinout for the Star

ohe Table B-5 shows the P1 (J1) connector pinout for the peri

ohe Table B-6 shows the P2 (J2) connector pinout for the peri

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

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

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

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

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

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

Pin	Z	A	B	C	D	
25	GND	5V	REQ64#	ENUM#	3.3V	5V
24	GND	AD[1]	5V	V(I/O)	AD[0]	AC
23	GND	3.3V	AD[4]	AD[3]	5V	AI
22	GND	AD[7]	GND	3.3V	AD[6]	AI
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/
20	GND	AD[12]	GND	V(I/O)	AD[11]	AI
19	GND	3.3V	AD[15]	AD[14]	GND	AI
18	GND	SERR#	GND	3.3V	PAR	C/
17	GND	3.3V	SDONE	SBO#	GND	PE
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LC
15	GND	3.3V	FRAME#	IRDY#	GND	TR
12–14	Key Area					
11	GND	AD[18]	AD[17]	AD[16]	GND	C/I
10	GND	AD[21]	GND	3.3V	AD[20]	AI
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AI
8	GND	AD[26]	GND	V(I/O)	AD[25]	AI
7	GND	AD[30]	AD[29]	AD[28]	GND	AI
6	GND	REQ#	GND	3.3V	CLK	AI
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GN
4	GND	BRSVP1A4	GND	V(I/O)	INTP	IN
3	GND	INTA#	INTB#	INTC#	5V	IN
2	GND	TCK	5V	TMS	TDO	TI
1	GND	5V	–12V	TRST#	+12V	5V

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

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

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

Pin	Z	A	B	C	D	
25	GND	5V	REQ64#	ENUM#	3.3V	5V
24	GND	AD[1]	5V	V(I/O)	AD[0]	AC
23	GND	3.3V	AD[4]	AD[3]	5V	AI
22	GND	AD[7]	GND	3.3V	AD[6]	AI
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/I
20	GND	AD[12]	GND	V(I/O)	AD[11]	AI
19	GND	3.3V	AD[15]	AD[14]	GND	AI
18	GND	SERR#	GND	3.3V	PAR	C/I
17	GND	3.3V	SDONE	SBO#	GND	PE
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LC
15	GND	3.3V	FRAME#	IRDY#	GND	TR
12–14	Key Area					
11	GND	AD[18]	AD[17]	AD[16]	GND	C/I
10	GND	AD[21]	GND	3.3V	AD[20]	AI
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AI
8	GND	AD[26]	GND	V(I/O)	AD[25]	AI
7	GND	AD[30]	AD[29]	AD[28]	GND	AI
6	GND	REQ#	GND	3.3V	CLK	AI
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GN
4	GND	BRSVP1A4	GND	V(I/O)	INTP	IN
3	GND	INTA#	INTB#	INTC#	5V	IN
2	GND	TCK	5V	TMS	TDO	TD
1	GND	5V	–12V	TRST#	+12V	5V

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

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

Customer Communication

National Instruments offers technical support through elec
telephone systems. The electronic services include our W
site, and a fax-on-demand system. If you have a hardware
problem, please first try the electronic support systems. If
available on these systems does not answer your questions
our technical support centers, which are staffed by applica
for support by telephone and fax. To comment on the doc
supplied with our products, send e-mail to techpubs@na

Web Site

The InstrumentationWeb address is http://www.natin

From this Web site you can connect to our Web sites arou
(http://www.natinst.com/niglobal/) and access t
(http://www.natinst.com/support/).

FTP Site

To access our FTP site, log in to our Internet host, ftp.n
as anonymous and use your e-mail address, such as
yourname@anywhere.com, as your password. The supp
documents are located in the \support directories.

Fax-on-Demand Support

Fax-on-Demand is a 24-hour information retrieval system
library of documents in English on a wide range of techni
You can access Fax-on-Demand from a touch-tone teleph
512 418 1111.

E-Mail Support

You can submit technical support questions to the applicat
team through e-mail at support@natinst.com. Remem
your name, address, and phone number so we can contact
solutions and suggestions.

National Instruments has branch offices all over the v
following list to find the technical support number for
is no National Instruments office in your country, cor
which you purchased your software to obtain support

Country	Telephone
Australia	03 9879 5166
Austria	0662 45 79 90 0
Belgium	02 757 00 20
Brazil	011 284 5011
Canada (Ontario)	905 785 0085
Canada (Québec)	514 694 8521
Denmark	45 76 26 00
Finland	09 725 725 11
France	0 1 48 14 24 24
Germany	089 741 31 30
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 84 84 00
Singapore	2265886
Spain (Madrid)	91 640 0085
Spain (Barcelona)	93 582 0251
Sweden	08 587 895 00
Switzerland	056 200 51 51
Taiwan	02 2377 1200
United Kingdom	01635 523545
United States	512 795 8248

Technical Support Form

Photocopy this form and update it each time you make changes to your software or hai the completed copy of this form as a reference for your current configuration. Comple accurately before contacting National Instruments for technical support helps our app engineers answer your questions more efficiently.

If you are using any National Instruments hardware or software products related to thi include the configuration forms from their user manuals. Include additional pages if n

Name _____

Company _____

Address _____

_____

Fax (___) _____ Phone (___) _____

Computer brand _____ Model _____ Processor _____

Operating system (include version number) _____

Clock speed _____ MHz RAM _____ MB Display adapter _____

Mouse ___ yes ___ no Other adapters installed _____

Hard disk capacity _____ MB Brand _____

Instruments used _____

_____

National Instruments hardware product model _____ Revision _____

Configuration _____

National Instruments software product _____ Version _____

Configuration _____

The problem is: _____

_____

_____

_____

_____

List any error messages: _____

_____

_____

The following steps reproduce the problem: _____

_____

_____

_____

_____

Record the settings and revisions of your hardware and software on the line to the rig
Complete a new copy of this form each time you revise your software or hardware co
use this form as a reference for your current configuration. Completing this form acc
contacting National Instruments for technical support helps our applications engineer
questions more efficiently.

National Instruments Products

___ Complete Part Number _____

___ Serial Number _____

___ Line Voltage _____

___ Fan Speed _____

___ Safety Ground Connected? _____

___ Rack-Mount or Bench Top Configuration? _____

___ Using Remote Power Monitoring _____

___ Filler Panels Installed in Empty Slots? _____

List and describe all devices installed in your mainframe.

Slot	Manufacturer, Description, and Function
1	
2	
3	
4	
5	
6	
7	
8	

Documentation Comment Form

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Edition Date: February 1999

Part Number: 321710C-01

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Glossary

Prefix	Meanings	Value
n-	nano-	10^{-9}
μ-	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 co 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 whicl 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/
GPIB	General Purpose Interface Bus (IEEE 488)

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

H

Hz	Hertz; cycles per second

I

IEC	International Electrotechnical Commission; an organizati 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 electric watts

S

s	Seconds
ST	Star Trigger
Star Trigger slot	This slot is located at slot 2 and has a dedicated trigg peripheral slot. Use this slot for a module with ST fur provide individual triggers to all other peripherals.
System controller	A module configured for installation in Slot 0 of a VXI device is unique in the VXIbus system in that it perfo system controller functions, including clock sourcing data transfers across the backplane. Installing such a c slot can damage the device, the VXIbus backplane, or

U

UL	Underwriter's Laboratories

V

V	Volts
VAC	Volts alternating current
V_{PP}	Peak to peak voltage

W

W	Watts

Index

R

S

T

U

V