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PXI™

PXI-1025 MegaPAC™ User Manual

NATIONAL INSTRUMENTS™

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FCC/Canada Radio Frequency Interference Compliance*

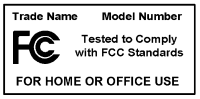
Determining FCC Class

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.

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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 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-1025 MegaPAC chassis requires a connection from the premise wire safety ground to the PXI-1025 MegaPAC 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-1025 MegaPAC. 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**—Only service this equipment 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.

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About This Manual

The *PXI-1025 MegaPAC User Manual* describes the features of the PXI-1025 MegaPAC chassis and contains information about configuration, installing the modules, and operating the PXI-1025 MegaPAC.

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*

1

Getting Started

This chapter describes the key features of the PXI-1025 MegaPAC 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-1025 MegaPAC kit contains the following items:

- ❑ PXI-1025 MegaPAC chassis
- ❑ Filler panels
- ❑ *PXI-1025 MegaPAC 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 supply cords used with the PXI-1025 MegaPAC 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-1025 MegaPAC in other countries must be approved by the authority having jurisdiction in that country.

Optional Equipment

Rack-Mount Kit

An optional rack-mount kit is available from National Instruments. This kit allows you to install the PXI-1025 MegaPAC chassis into a standard 19 in. (48 cm) wide instrument cabinet with a cabinet depth of 24 in.

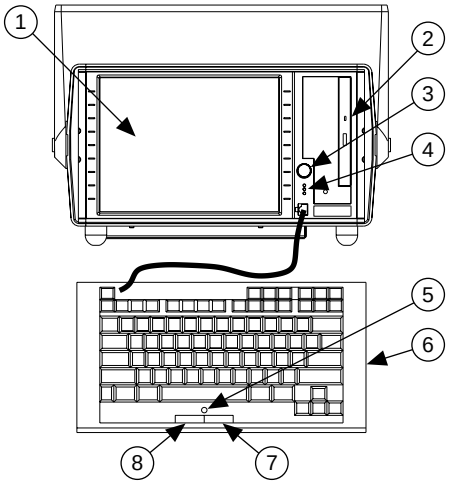
Key Features

The PXI-1025 MegaPAC is a self-contained portable computer platform that combines a high-performance 8-slot PXI backplane with a high-output power supply and a structural design that has been optimized for maximum usability in a wide range of applications. The PXI-1025 MegaPAC fully complies with the PXI Specification, Revision 1.0, offering advanced timing and synchronization features.

The key features of the PXI-1025 MegaPAC include:

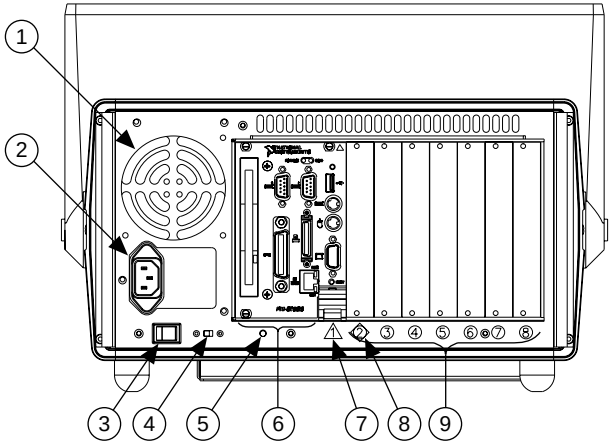
- PXI and CompactPCI (PICMG 2.0 R 2.1) module compatibility
- Compact, 8-slot chassis for portable applications
- 275 W of usable power
- Universal AC input: auto-voltage and auto-frequency ranging
- Carrying handle/tilt stand
- Rear floor-standing feet double as a cable wrap
- Built-in CD ROM drive
- 10.4 in. 800 × 600 SVGA LCD color display
- Fold-down/removable keyboard with built-in pointing device and mouse buttons
- Temperature sensing module controls fan speed to maintain proper cooling

Figures 1-1 and 1-2 show some of the key features and components of the PXI-1025 MegaPAC chassis. Figure 1-1 shows the front view of the PXI-1025 MegaPAC, and Figure 1-2 shows the rear view.



1	Video Display	4	Status LED Indicators	7	Right Mouse Button
2	CD-ROM	5	Pointing Device	8	Left Mouse Button
3	Display Brightness Control	6	Fold-Down Keyboard		

Figure 1-1. Front View of the PXI-1025 MegaPAC Chassis



1	Power Supply Air Outlet	4	Fan Speed Selector	7	System Controller Slot
2	Universal AC Input	5	Chassis Ground Screw	8	Star Trigger/Peripheral Slot
3	Power Switch	6	Controller Expansion Slots	9	Peripheral Slots

Figure 1-2. Rear View of the PXI-1025 MegaPAC Chassis

PXI-1025 Backplane Overview

Interoperability with CompactPCI

The PXI-1025 MegaPAC 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 on only 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-1025 MegaPAC.

System Controller Slot

The System Controller slot is 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 Slot 2. This slot has a dedicated trigger line between each peripheral slot (see Figure 1-3). 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 1-3.

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.

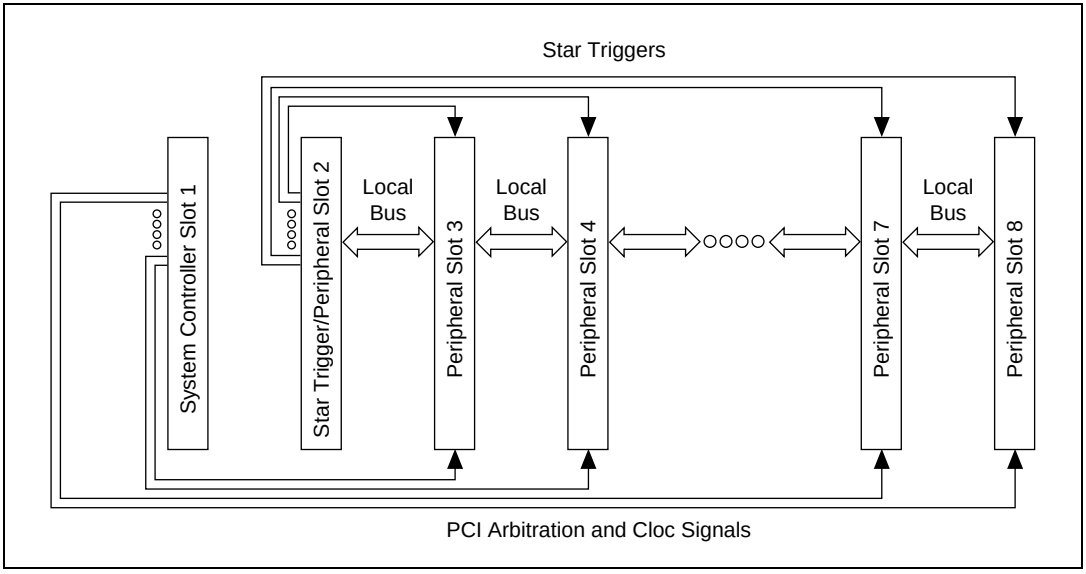


Figure 1-3. PXI Local Bus and Star Trigger Routing

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-1025 MegaPAC 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.

2

Installation, Configuration, and Operation

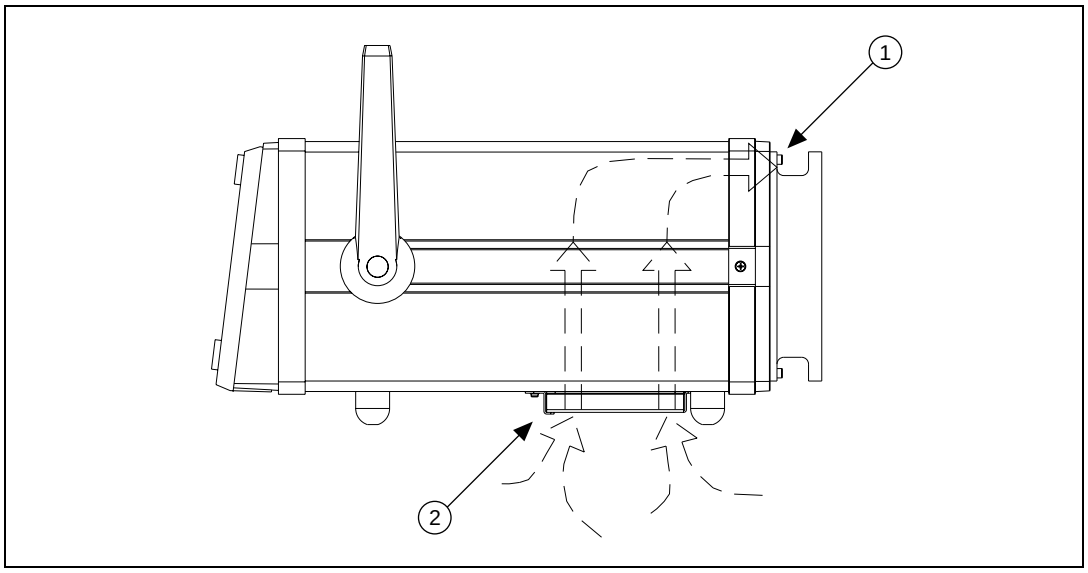
This chapter describes how to prepare and operate your PXI-1025 MegaPAC chassis.

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-1025 MegaPAC is designed to operate on a bench or in an instrument rack. Determine how you want to use your PXI-1025 MegaPAC and follow the appropriate installation instructions.

To facilitate power supply and module cooling, air enters through filters and fan inlets located in the lower rear of the chassis and exits through the upper section on the rear panel, as shown in Figure 2-1. Place your PXI-1025 MegaPAC on a bench top or in an instrument rack so that the fans (air inlets) and the air outlet apertures along the rear 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.

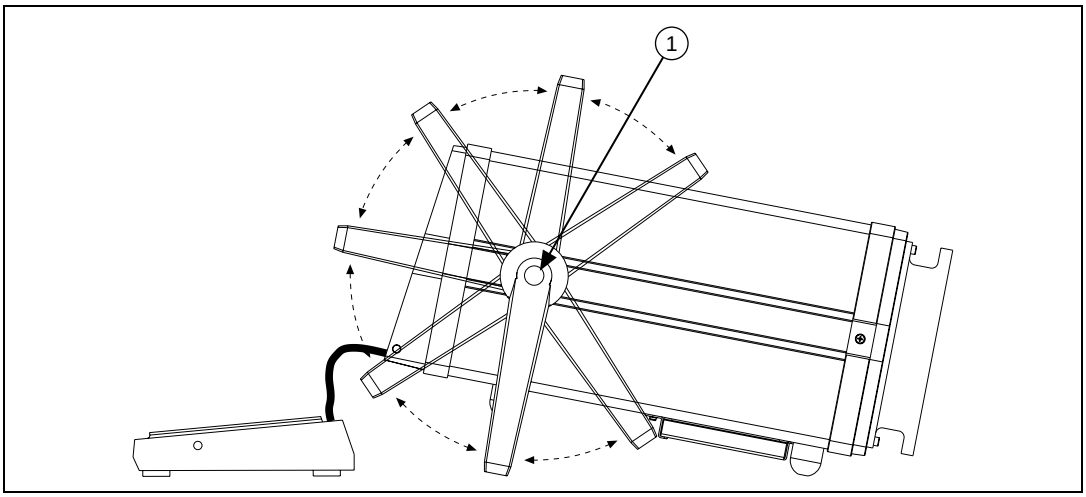


1 Module Cooling Air Outlets	2 Module Cooling Air Intake

Figure 2-1. PXI-1025 MegaPAC Chassis Airflow Side View

Using Handle/Tilt Stand for Bench-Top Application

Press the handle release buttons on each side of the chassis to release the handle. You can then rotate the handle shown in Figure 2-2 to a variety of positions. When the handle is at the desired position, release the buttons. Make sure it locks into position.



1 Handle Release Button

Figure 2-2. Using the Handle for Bench-Top Applications

Fold-Down Keyboard

The removable fold-down keyboard is shown in Figure 1-1, *Front View of the PXI-1025 MegaPAC Chassis*. The fold-down keyboard incorporates a pointing device and left and right mouse buttons.

To close the keyboard, grasp the coiled keyboard cable and pull it away from the LCD screen as you begin closing the keyboard. Keep pulling the cable higher while continuing to close the keyboard. Then release the cable just as the keyboard snaps into place.

To remove the keyboard, unplug the coiled cable from the chassis, press the button on both sides of the keyboard, and remove it.

Rack Mounting

Rack-mount applications require an optional rack-mount kit available from National Instruments. Refer to the instructions supplied with the rack-mount kit to install your PXI-1025 MegaPAC in an instrument rack.

Status LED Indicators

There are three status LED indicators on the PXI-1025 MegaPAC, as shown in Figure 1-1, *Front View of the PXI-1025 MegaPAC Chassis*. The green LED indicates the main system power is on. The yellow LED indicates hard drive activity. The red LED indicates an internal over-temperature condition exists.

Setting Fan Speed

The fan speed selector switch is on the rear panel of the PXI-1025 MegaPAC. Refer to Figure 1-2, *Rear View of the PXI-1025 MegaPAC 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-1025 MegaPAC 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 PXI-1025 MegaPAC 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

Attach input power through the rear AC inlet using the appropriate line cord supplied. Refer to Figure 1-2, *Rear View of the PXI-1025 MegaPAC Chassis*, for a diagram of the IEC 320 inlet.

Push the power switch to the On position (if not already on). Observe that all fans become operational.

If the chassis fails to power up, refer to the following table for possible causes for the power failure and ways to correct them.

Table 2-1. Power Supply Troubleshooting

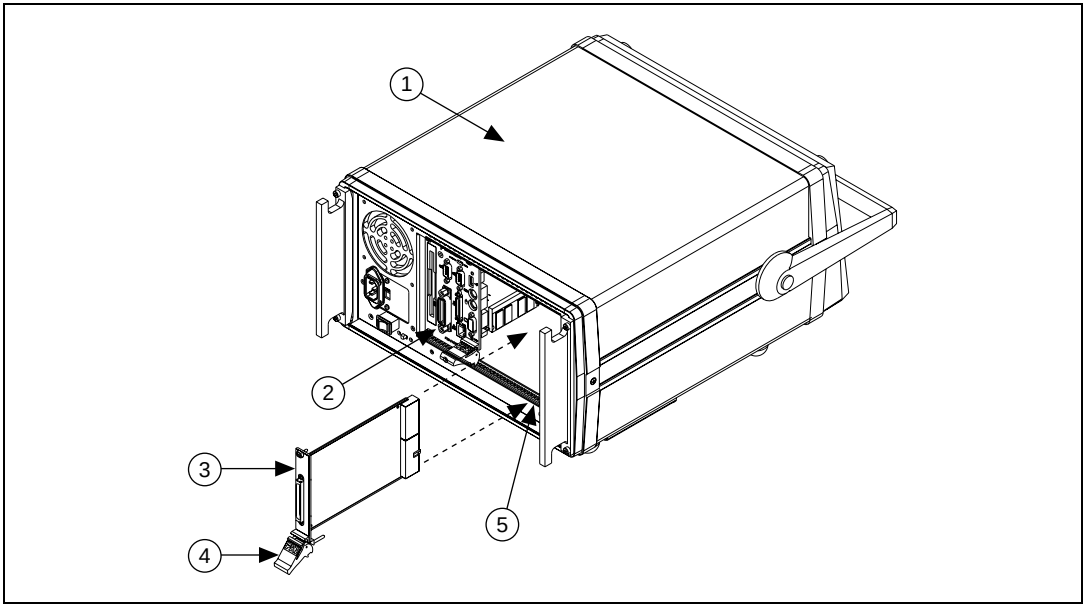
Possible Cause	What to Do
Faulty module installed in chassis.	Remove all modules from the chassis and check power again.
PXI-1025 MegaPAC chassis is not connected to power source.	Make sure that the PXI-1025 MegaPAC is connected to a live electrical outlet. Try operating another piece of equipment from this outlet.
Power switch is not switched on.	Set the power switch to the On (1) position.
Power supply has failed.	Contact National Instruments.

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 2-3. Slide the module into the chassis (making sure that the injector/ejector handle is pushed down as shown in Figure 2-4.

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.



1	PXI-1025 MegaPAC Chassis	3	PXI Board	5	Injector/Ejector Rail
2	PXI-8156B System Controller	4	Injector/Ejector Handle		

Figure 2-3. Installing PXI or CompactPCI Modules

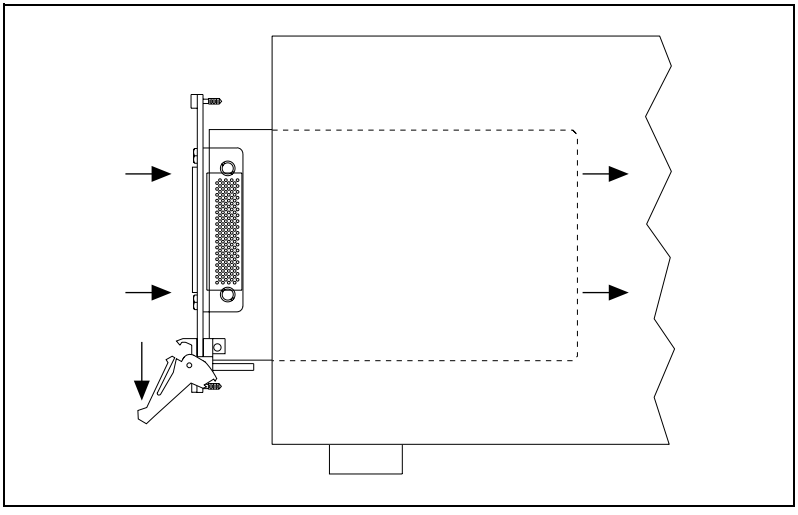


Figure 2-4. Injector/Ejector Handle Position during Module Insertion

3

Maintenance

This chapter describes basic maintenance procedures you can perform on the PXI-1025 MegaPAC 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.

To clean the LCD display, wipe with lens paper or optical cloth.

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

Do *not* let any liquid or harsh chemicals come in contact with LCD display, as it may cause discoloration or spots.

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 Filter

You can easily remove the fan filter from the bottom of the chassis by removing the two screws and filter bracket and sliding the filter out.

Clean the filter by washing it in a mild soap solution. Rinse the filter with water and allow it to dry before reinstalling.

A

Specifications

This appendix contains specifications for the PXI-1025 MegaPAC chassis.

Electrical

AC Input Specifications

Input voltage range..... 90–265 VAC

Input frequency range ..... 50 to 60 Hz

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.

Efficiency..... 70%

DC Output Specifications

Maximum usable power..... 275 W

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

DC Current Capacity (I_{MP})

Voltage	I_{MP} (Steady-State Current)	Regulation
+3.3 V	10 A	1%
+12 V	9 A	5%
+5 V	32 A (3.3 V power)	5%
–12 V	.8 A	5%

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 fans with AUTO/HIGH speed selector

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

Module cooling

- Intake .....Bottom rear of chassis
- Exhaust .....Along rear of chassis

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_{RMS}
- Non-operational[1] .....10 to 500 Hz, 2.4 g_{RMS}

[1] 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.

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.

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

- Height ..... 8.41 in. (21.36 cm)
- Width ..... 16.25 in. (41.27 cm)
- Depth ..... 18.25 in. (46.35 cm)

Weight ..... 28.1 lb. (12.74 kg)

Maximum module weight ..... 4 lb. (1.8 kg)

Figure A-1 shows the PXI-1025 MegaPAC dimensions.

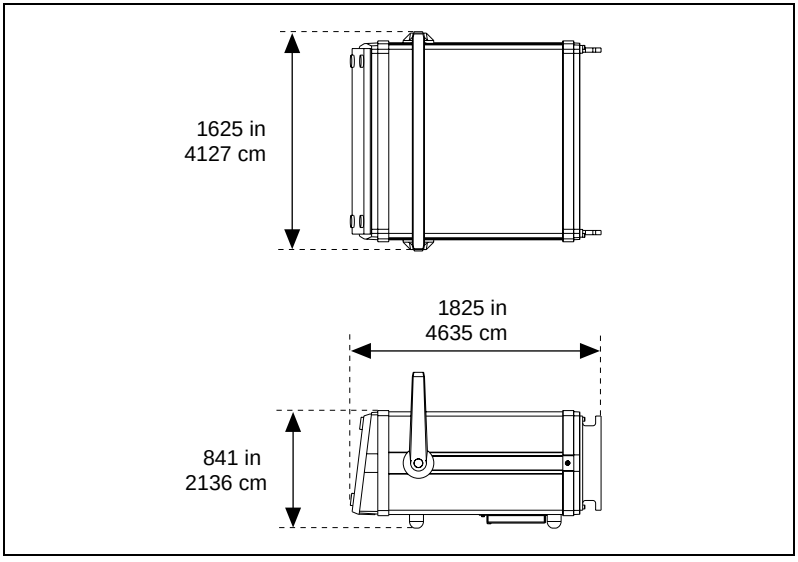


Figure A-1. PXI-1025 MegaPAC Dimensions

B

Pinouts

This appendix describes the P1 and P2 connector pinouts for the PXI-1025 MegaPAC 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	5 V	REQ64#	ENUM#	3.3 V	5 V	GND
24	GND	AD[1]	5 V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3 V	AD[4]	AD[3]	5 V	AD[2]	GND
22	GND	AD[7]	GND	3.3 V	AD[6]	AD[5]	GND
21	GND	3.3 V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3 V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3 V	PAR	C/BE[1]#	GND
17	GND	3.3 V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3 V	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	3.3 V	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	3.3 V	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#	5 V	INTD#	GND
2	GND	TCK	5 V	TMS	TDO	TDI	GND
1	GND	5 V	–12 V	TRST#	+12 V	5 V	GND

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

Pin	Z	A	B	C	D	E	F
22	GND	**PXI_RSVA22**	**PXI_RSVB22**	**PXI_RSVC22**	**PXI_RSVD22**	**PXI_RSVE22**	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	**PXI_TRIG3**	**PXI_TRIG4**	**PXI_TRIG5**	GND	**PXI_TRIG6**	GND
17	GND	**PXI_TRIG2**	GND	PRST#	REQ6#	GNT6#	GND
16	GND	**PXI_TRIG1**	**PXI_TRIG0**	DEG#	GND	**PXI_TRIG7**	GND
15	GND	**PXI_BRSVA15**	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)	**PXI_BRSVB4**	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	5 V	REQ64#	ENUM#	3.3 V	5 V	GND
24	GND	AD[1]	5 V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3 V	AD[4]	AD[3]	5 V	AD[2]	GND
22	GND	AD[7]	GND	3.3 V	AD[6]	AD[5]	GND
21	GND	3.3 V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3 V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3 V	PAR	C/BE[1]#	GND
17	GND	3.3 V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3 V	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	3.3 V	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	3.3 V	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#	5 V	INTD#	GND
2	GND	TCK	5 V	TMS	TDO	TDI	GND
1	GND	5 V	–12 V	TRST#	+12 V	5 V	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	5 V	REQ64#	ENUM#	3.3 V	5 V	GND
24	GND	AD[1]	5 V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3 V	AD[4]	AD[3]	5 V	AD[2]	GND
22	GND	AD[7]	GND	3.3 V	AD[6]	AD[5]	GND
21	GND	3.3 V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3 V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3 V	PAR	C/BE[1]#	GND
17	GND	3.3 V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3 V	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	3.3 V	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	3.3 V	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#	5 V	INTD#	GND
2	GND	TCK	5 V	TMS	TDO	TDI	GND
1	GND	5 V	–12 V	TRST#	+12 V	5 V	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

C

Technical Support Resources

Web Support

National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of `www.ni.com`

NI Developer Zone

The NI Developer Zone at `zone.ni.com` is the essential resource for building measurement and automation systems. At the NI Developer Zone, you can easily access the latest example programs, system configurators, tutorials, technical news, as well as a community of developers ready to share their own techniques.

Customer Education

National Instruments provides a number of alternatives to satisfy your training needs, from self-paced tutorials, videos, and interactive CDs to instructor-led hands-on courses at locations around the world. Visit the Customer Education section of `www.ni.com` for online course schedules, syllabi, training centers, and class registration.

System Integration

If you have time constraints, limited in-house technical resources, or other dilemmas, you may prefer to employ consulting or system integration services. You can rely on the expertise available through our worldwide network of Alliance Program members. To find out more about our Alliance system integration solutions, visit the System Integration section of `www.ni.com`

Worldwide Support

National Instruments has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of `www.ni.com`. Branch office web sites provide up-to-date contact information, support phone numbers, e-mail addresses, and current events.

If you have searched the technical support resources on our Web site and still cannot find the answers you need, contact your local office or National Instruments corporate. Phone numbers for our worldwide offices are listed at the front of this manual.

Glossary

Prefix	Meaning	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 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^2
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_{PP}	Peak to peak voltage

W

W	Watts

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