PXI™

PXI-1006 User Manual

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Worldwide Technical Support and Product Information

ni.com

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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 labeled 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.

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.

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About This Manual

The *PXI-1006 User Manual* describes the features of the PXI-1006 chassis and contains information about configuring the chassis, installing the modules, and operating and using the PXI-1006.

Conventions Used in This Manual

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.

bold Bold text denotes items that you must select or click on in the software, such as menu items and dialog box options. Bold text also denotes parameter names.

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:

- *Compact PCI Specification PICMG 2.0 R3.0*
- *PXI Specification Revision 2.0*
- 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*

For Your Safety

Caution Before undertaking any troubleshooting, maintenance, or exploratory procedure, carefully read the warning and caution notices.

This equipment contains voltage hazardous to human life and safety, and can inflict personal injury.

- **Chassis Grounding**—The PXI-1006 requires a connection from the premise wire safety ground to the PXI-1006 chassis ground. The earth safety ground must be connected during use of this equipment to minimize shock hazards. See the *Connecting Safety Ground* section below.
- **Live Circuits**—Operating personnel and service personnel must not remove protective covers when operating or servicing the PXI-1006.
- **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.
- **Modification**—Do *not* modify any part of the chassis from its original condition. Unsuitable modifications may result in safety hazards.

Connecting Safety Ground

Warning The PXI-1006 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. To connect the safety ground, complete the following steps:

1. Connect a 16 AWG (1.3 mm) wire to the chassis grounding screw on the rear of the chassis 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.

1

Installing and Verifying Operation

This chapter describes how to unpack the PXI-1006, install a controller, and verify that the chassis is operating correctly.

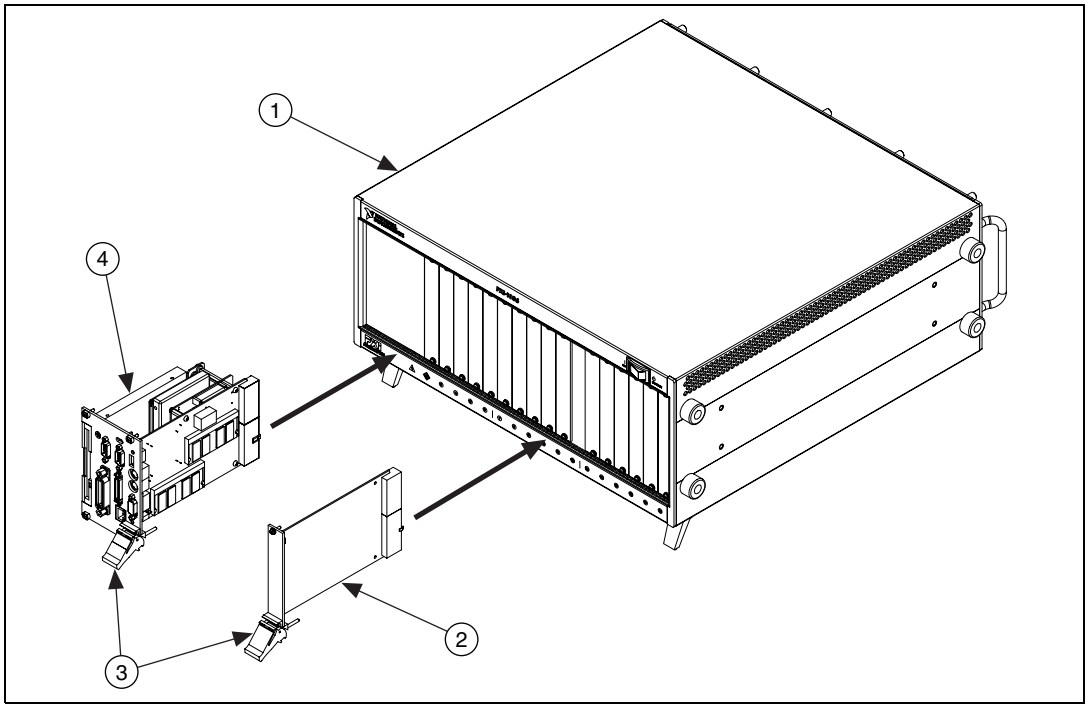
Unpacking the PXI-1006 and Installing a Controller

This installation example assumes you are using an embedded PXI controller.

1. Unpack your PXI-1006 chassis.
2. Make sure the power switch is in the **Standby** (Off) position.
3. Plug in the AC power cord.

   Power cords are available from National Instruments, or use a power cord that meets 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-1006 in other countries must be approved by the authority having jurisdiction in that country.

4. Install your controller in Slot 1 of your PXI-1006. Install peripheral cards, if any, in slots 2 through 18.



1	PXI-1006 Chassis	3	Ejector Handle in Down Position
2	Peripheral Card	4	PXI Controller

Figure 1-1. Installing Controller and PXI Modules

5. Set the fan speed selector switch (located on the rear of the chassis) to either HI for maximum cooling or AUTO to employ the temperature sensing module that controls the fan speed.
6. Power on the chassis. Verify that all fans become operational.
7. Verify that your controller boots the operating system.

Note If the chassis does not power on, see Chapter 3, *Troubleshooting*.

2

PXI-1006 Features

This chapter describes the key features of the PXI-1006 chassis and lists optional equipment you can order from National Instruments.

Key Features

The PXI-1006 combines a high-performance 18-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 chassis' modular design ensures the highest level of maintainability resulting in a very low mean time to repair (MTTR). The PXI-1006 fully complies with the PXI Specification, Revision 2.0, offering advanced timing and synchronization features.

The key features of the PXI-1006 include:

- PXI and CompactPCI (PICMG 2.0 R 3.0) module compatibility
- 3U-sized, 18-slot chassis
- 600 W of usable power
- Universal AC input: auto-voltage and auto-frequency ranging
- Over-current protection via push-reset circuit breaker (no loose fuses to replace)
- Removable modular power supply
- Remote power status and inhibit via a rear panel connector
- On/Off (Standby) switch located on the front panel for easy access
- Selectable fan speed for maximum cooling or quiet operation
- Carrying handle for portability
- Tilt feet for bench-top applications
- Rack mount compatibility

PXI-1006 Backplane Overview

Interoperability with CompactPCI

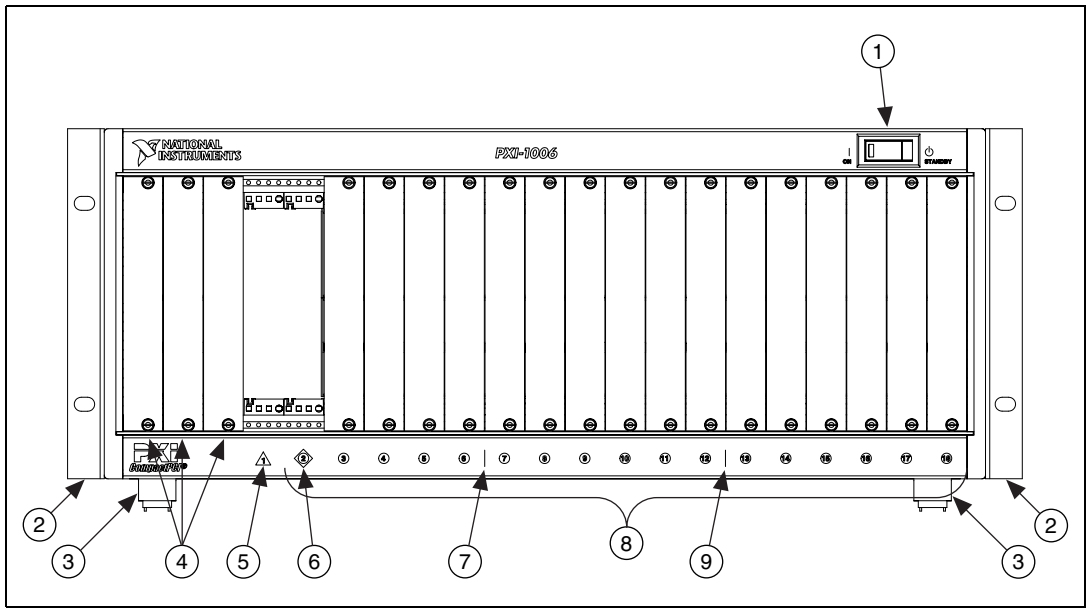
The PXI-1006 backplane is interoperable with PXI-compatible products and standard CompactPCI products. This is an important feature, as many PXI-compatible systems may require components that do not implement PXI-specific features. For example, you may want to use a standard CompactPCI network interface 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-1006.

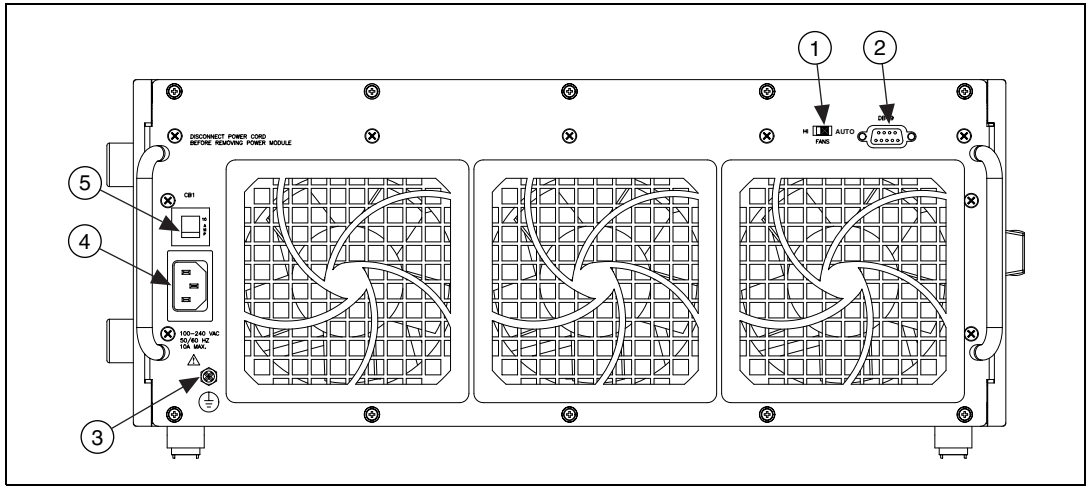
The PXI-1006 has three PCI bus segments linked via two 64-bit PCI-to-PCI bridges. The PCI bus segment divisions are represented on the front of the chassis by vertical bars. See Figure 2-1 for the PCI segment divider locations.

Figures 2-1 and 2-2 show some of the key features and components of the PXI-1006 chassis. Figure 2-1 shows the front view of the PXI-1006. Figure 2-2 shows the rear view.



1	Remote On/Off (Standby) Switch	4	Three Controller Expansion Slots	7	Segment Break 1
2	Optional Mounting Brackets	5	System Controller Slot	8	17 Peripheral Slots
3	Removable Feet	6	Star Trigger/Peripheral Slot	9	Segment Break 2

Figure 2-1. Front View of the PXI-1006 Chassis



1	Fan Speed Selector	3	Chassis Ground Screw	5	Circuit Breaker
2	Remote Power Status and Inhibit Connector	4	Universal AC Input		

Figure 2-2. Rear View of the PXI-1006 Chassis

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 itself and slots 3-15. Slots 16-18 do not use the Star Trigger functionality because there are 13 Star Trigger lines, as specified in the PXI specification (see Figure 2-3). This slot is intended for modules with ST functionality that can provide individual triggers to the peripherals installed in slots 3-15. However, if you do not require advanced trigger functionality, you can install any standard peripheral module into this slot.

Peripheral Slots

There are 17 peripheral slots including the Star Trigger controller 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 2-3.

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 PXI bandwidth.

The PXI-1006 has local bus connections between all slots except slots 1 and 2, in accordance with the PXI specification. See Figure 2-3 for details.

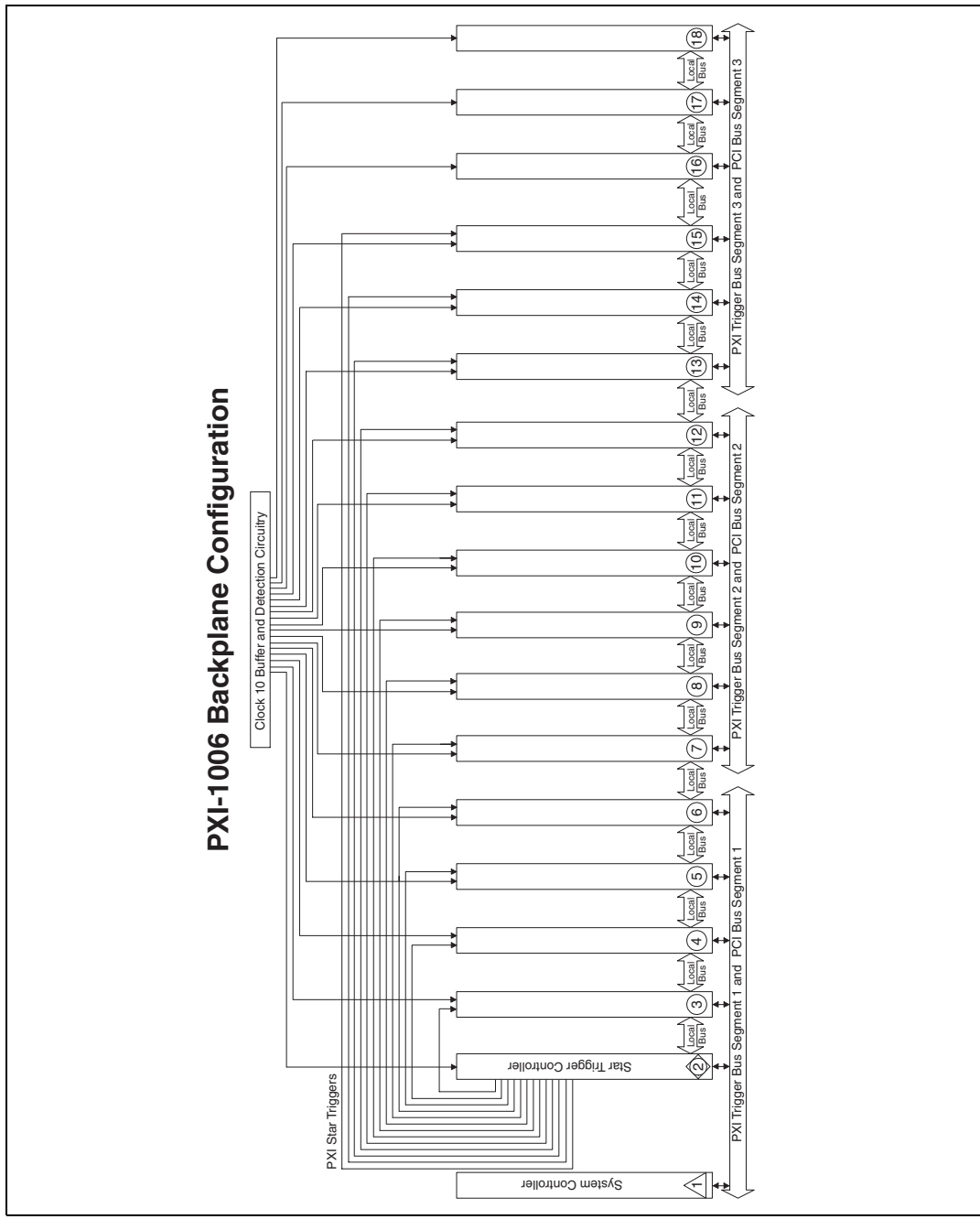


Figure 2-3. PXI Local Bus and Star Trigger Routing

Trigger Bus

The PXI-1006 has three PXI segments. Vertical bars represent the segment divisions on the front of the chassis. (See Figure 2-1 for the segment divider locations.) The PXI trigger bus is divided into three separate trigger buses at these locations. 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-1006 supplies the PXI 10 MHz system clock signal (PXI_CLK10) independently to every 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-1, *P1 (J1) Connector Pinout for the System Controller Slot*.) Sourcing an external clock on this pin automatically disables the backplane's 10 MHz source.

Rack Mounting

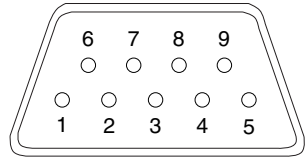
Rack-mount applications require the optional rack-mount kit available from National Instruments. Refer to the instructions supplied with the rack-mount kit to install your PXI-1006 in a standard 19 in. instrument rack.

Remote Power Monitoring and Inhibiting Interface

The PXI-1006 chassis supports remote power monitoring and inhibiting via a 9-pin D-sub connector located on the rear panel. Table 2-1 shows the pinout of the DB-9 connector.

Table 2-1. DB-9 Connector Pinout

DB-9 Pin	Signal
1	Logic Ground
2	+5 V
3	Reserved
4	+3.3 V
5	Inhibit*
6	+12 V
7	Reserved
8	–12 V
9	Logic Ground



Using the Inhibiting Feature

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). 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. Note that the power (standby) switch, located on the front of the chassis, uses this inhibiting feature. For remote reset, connect a momentary switch between pin 5 and pin 1 (or pin 9).

Using the Power Monitoring Feature

You can use a digital voltmeter to ensure all voltage levels in your PXI-1006 are within the allowable limits.

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.

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) on the rear panel. Refer to Table 2-1 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 chassis 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 3, *Troubleshooting*.

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-1006 chassis initialization file, `chassis.ini`, is included on the diskette for your PXI-1006.

Cleaning

Cleaning procedures consist of exterior and interior cleaning of the chassis and cleaning the fan filters. 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.

Mise en garde Veillez à éteindre le châssis et déconnecter le cordon d'alimentation avant de nettoyer ou d'intervenir sur le châssis.

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 front- or rear-panel 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 chassis cooling filters from the rear of the chassis by removing the plastic housing attached to each fan.

Clean the fan 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 them on the chassis.

3

Troubleshooting

This chapter describes basic troubleshooting procedures you can perform on the PXI-1006 chassis.

Troubleshooting the PXI-1006

Refer to Table 3-1 to troubleshoot the PXI-1006 chassis. The table lists possible causes for power failure and recommends ways to correct the problem.

Table 3-1. Troubleshooting

Possible Cause	What to Do
PXI-1006 chassis is not connected to power source.	Make sure that the PXI-1006 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.
Remote inhibiting input on the rear panel of the chassis is active.	Deactivate your system's remote inhibiting control.
Circuit breaker is tripped.	Reset the circuit breaker. Refer to the *Resetting the AC Mains Circuit Breaker* section in this chapter.
Power supply has failed.	Contact National Instruments.

Resetting the AC Mains Circuit Breaker

If your PXI-1006 is connected to an AC source and encounters an over-current condition, the circuit breaker located on the rear panel will trip to prevent damage to the chassis. Complete the following steps to reset 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 steps:

1. Turn the front panel power switch to the Standby position.
2. Disconnect the chassis from the AC mains power source.
3. Remove all modules from the chassis.
4. Complete the test procedure described in the *Using the Power Monitoring Feature* section in Chapter 2, *PXI-1006 Features*.
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-1006 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.

A

Specifications

This appendix contains specifications for the PXI-1006 chassis.

Electrical

AC Input

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 ..... 10 A

Line regulation ..... ± 0.1% over operating line range

Efficiency ..... 70-80% typical

Power disconnect ..... The (standby) power switch causes the power module to supply DC power to the CompactPCI/PXI backplane. The rear-panel D-sub connector facilitates remote inhibiting operation. The (standby) switch must be in the On position prior to use of remote inhibit. The power cord provides main power disconnect.

DC Output

Maximum usable power .....600 W

DC current capacity (I_{MP})

Voltage	I_{MP} (Steady-State Current)
+3.3 V	60 A
+5 V	60 A
+12 V	9 A
–12 V	1.8 A

Load regulation

Voltage	Regulation
+3.3 V	0.4% or 20 mV max
+12 V	0.4% or 20 mV max
+5 V	0.4% or 20 mV max
–12 V	0.4% or 20 mV max

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

Over-current protection.....105–140% of rated output current; automatic recovery

Over-voltage protection .....3.3 V, 5 V clamp at 122–134% of output voltage
+12 V and –12 V clamp at 110–120% of output voltage

Power supply/fan unit MTTR .....Replacement in under 5 minutes

Cooling

Module cooling system.....Forced air circulation (positive pressurization) via three 140 cfm fans with HI/AUTO speed selector

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

Module/power supply cooling intake..... Three rear fans

Module cooling exhaust ..... Along both sides and top of chassis

Power supply cooling system..... Forced air circulation via integrated fan

Power supply cooling exhaust..... Along upper left side

Power supply/fan unit ..... Replacement in under 5 minutes

Electromagnetic Compatibility

EMC/EMI..... CE, C-Tick and FCC Part 15 (Class A) compliant

Electrical emissions..... EN 55011 Class A @ 10 m. FCC Part 15A above 1 GHz

Electrical immunity..... Evaluated to EN 61326:1998, Table 1

Note This device should be operated only with shielded cabling for full EMC and EMI compliance. See the Declaration of Conformity for this product for any additional regulatory compliance information.

Safety

Designed in accordance with IEC 61010-1, EN 61010-1, UL 3111-1, and CAN/CSA C22.2 No. 1010.1 for electrical measuring and test equipment
Installation Category II
Pollution Degree 2

Environmental

Operating temperature..... 0 to 50 °C

Storage temperature ..... –20 to 70 °C

Operating relative humidity ..... Maximum 80% for temperatures up to 31 °C, decreasing linearly to 50% at 40 °C

Functional shock (operating) .....MIL-T-28800E CLASS 3, Half-Sine Shock Pulse, 11 ms duration, 30 g peak

Operating location .....Indoor use only

Random vibration

Operational[1] .....5 to 500 Hz, 0.31 g_{RMS}

Non-operational[1] .....10 to 500 Hz, 2.46 g_{RMS}

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.

Altitude .....2 km (1.24 mi) max

Backplane

Size .....3U-sized; one system slot (with three system expansion slots) and 17 peripheral slots. Compliant with IEEE 1101.10 mechanical packaging. PXI Specification Revision 2.0 compliant. Accepts both PXI and CompactPCI (PICMG 2.0 R3.0) 3U modules.

Backplane bare-board material .....UL 94 V-0 recognized

Backplane connectors .....Conform to IEC 917 and IEC 1076-4-101, and are UL 94 V-0 rated

[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.

Mechanical

Weight ..... 13.2 kg (29.2 lb.)

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

Materials..... Sheet Aluminum (5052-H32 and 3003-H14) and Cold Rolled Steel

Finish

- Unpainted aluminum..... Conductive clear conversion coating
- Cold rolled steel ..... Clear chromate zinc plating
- Paint ..... Polyurethane enamel

Figure A-1 shows the PXI-1006 dimensions. The holes shown are for the installation of the optional rack-mount kit. You can install this kit on the front or rear of the chassis, depending on which end of the chassis you want to face toward the front of the instrument cabinet. Note that the front and rear chassis mounting holes (size M4) are symmetrical.

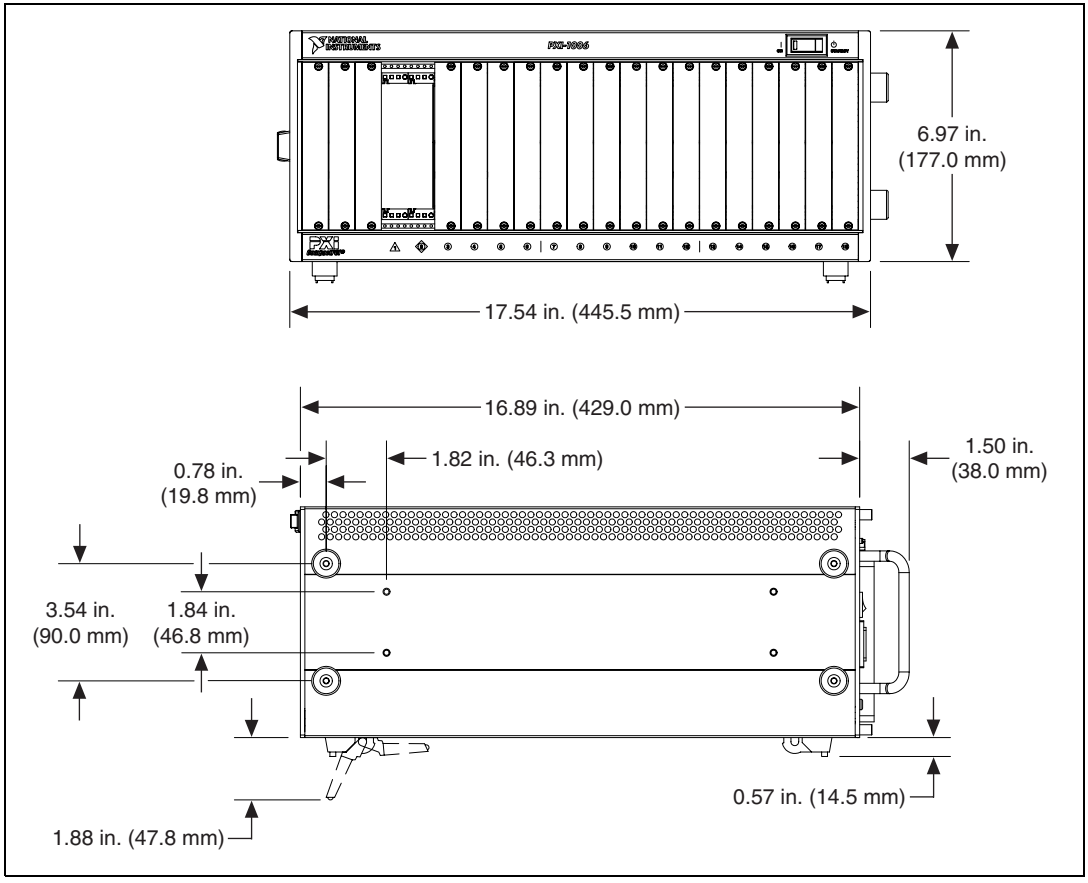


Figure A-1. PXI-1006 Dimensions

B

Pinouts

This appendix describes the P1 and P2 connector pinouts for the PXI-1006 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	IPMB_SCL	IPMB_SDA	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]#	GND	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	REQ0#	GND	3.3V	CLK0	AD[31]	GND
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GNT0#	GND
4	GND	IPMB_PWR	HEALTHY#	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	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CLK6	GND	RSV	RSV	RSV	GND
20	GND	CLK5	GND	RSV	GND	RSV	GND
19	GND	GND	GND	SMB_SDA	SMB_SCL	SMB_ALERT#	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	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	IPMB_SCL	IPMB_SDA	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	BD_SEL#	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	IPMB_PWR	HEALTHY#	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	GA4	GA3	GA2	GA1	GA0	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	RSV	**PXI_CLK10_IN**	**PXI_CLK10**	GND
16	GND	**PXI_TRIG1**	**PXI_TRIG0**	RSV	GND	**PXI_TRIG7**	GND
15	GND	**PXI_BRSVA15**	GND	RSV	**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**	UNC	**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	IPMB_SCL	IPMB_SDA	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	BD_SEL#	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	IPMB_PWR	HEALTHY#	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	GA4	GA3	GA2	GA1	GA0	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	RSV	**PXI_STAR**	**PXI_CLK10**	GND
16	GND	**PXI_TRIG1**	**PXI_TRIG0**	RSV	GND	**PXI_TRIG7**	GND
15	GND	**PXI_BRSVA15**	GND	RSV	**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**	UNC	**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 `ni.com`

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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 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 0 of a VXIbus mainframe. This device is unique in the VXIbus system in that it performs the VMEbus 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 VXIbus backplane, or both.

U

UL	Underwriter's Laboratories

V

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

W

W	Watts

Index

M

N

P

R

S

T

V

W