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PXI Express™

PXIe-1084 User Manual

March 2018
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About This Manual

The *PXIe-1084 Series User Manual* describes the features of the PXIe-1084 chassis and contains information about configuring the chassis, installing the modules, and operating the chassis.

Related Documentation

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

- IEEE 1101.1-1991, *IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 Connectors*
- IEEE 1101.10, *IEEE Standard for Additional Mechanical Specifications for Microcomputers Using IEEE 1101.1 Equipment Practice*
- *PICMG EXP.0 R1.0 CompactPCI Express Specification*, PCI Industrial Computers Manufacturers Group
- *PCI Express Base Specification*, Revision 1.1, PCI Special Interest Group
- *PXI-5 PXI Express Hardware Specification*, Revision 2.0, PXI Systems Alliance

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1 Getting Started

This chapter describes the key features of the PXIe-1084 chassis and lists the kit contents and 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 during shipment, file a claim with the carrier. Retain the packing material for possible inspection and/or reshipment.

What You Need to Get Started

The PXIe-1084 chassis kit contains the following items:

- ☐ PXIe-1084 chassis
- ☐ Filler panels
- ☐ *PXIe-1084 Safety, Environmental, and Regulatory Information*
- ☐ Software media with *PXI Platform Services 17.5* or newer
- ☐ Chassis number labels

Note You will also need an AC power cable, sold separately. Refer to Table 1-1 for more information about AC power cables.

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Table 1-1. AC Power Cables

Power Cable	Plug Types
Standard 120 V (USA)	ANSI C73.11/NEMA 5-15-P
Switzerland 220 V	SEV 6534-2
Australia 240 V	AS C112
Universal Euro 230 V	CEE (7), II, IV, VII
United Kingdom 230 V	BS 1363
Japan 100 V	JIS 8303

If you are missing any of the items listed in Table 1-1, or if you have the incorrect AC power cable, contact National Instruments.

Key Features

The PXIe-1084 chassis combines a high-performance 18-slot PXI Express backplane with a power supply and a structural design that has been optimized for maximum usability in a wide range of applications. The PXIe-1084 chassis fully complies with the *PXI-5 PXI Express Hardware Specification*.

The key features of the PXIe-1084 chassis include the following:

High Performance for Instrumentation Requirements

- Up to 500 MB/s (single direction) per PXI Express slot dedicated bandwidth (x1 Gen-2 PCI Express).
- 58 W per slot cooling meets increased PXI Express cooling requirements. Refer to the *PXIe-1084 Specifications* for more details.
- Low-jitter internal 10 MHz reference clock for PXI/PXI Express slots with ± 25 ppm stability
- Low-jitter internal 100 MHz reference clock for PXI Express slots with ± 25 ppm stability
- Quiet operation for 0 to 30 °C at 34.4 dBA
- Variable speed fan controller optimizes cooling and acoustic emissions
- Complies with PXI and CompactPCI Specifications

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High Reliability

- 0 to 50 °C temperature range
- Power supply, temperature, and fan monitoring
- Field replaceable fans

Optional Features

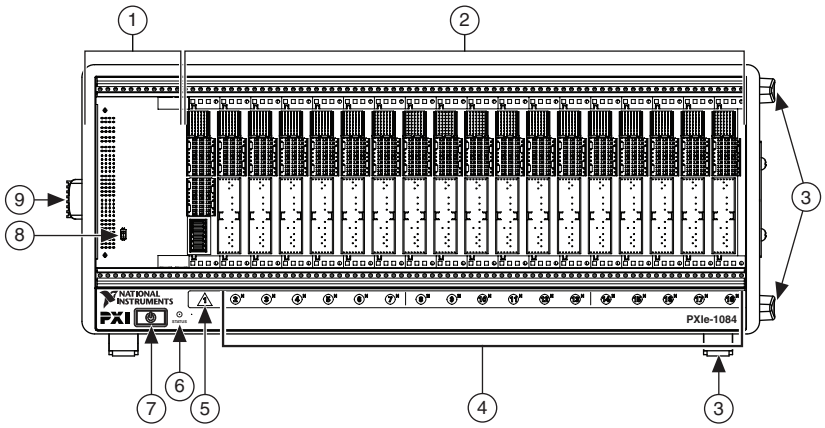
- Front and rear rack-mount kits
- EMC filler panels
- Slot blockers for improved cooling performance
- Factory installation services
- Replacement fan kit

Chassis Description

Figures 1-1 and 1-2 show the key features of the PXIe-1084 chassis front and back panels. Figure 1-1 shows the front view of the chassis. Figure 1-2 shows the rear view of the chassis.

Refer to Figure 2-2, *PXIe-1084 Chassis Vents*, for chassis vent locations.

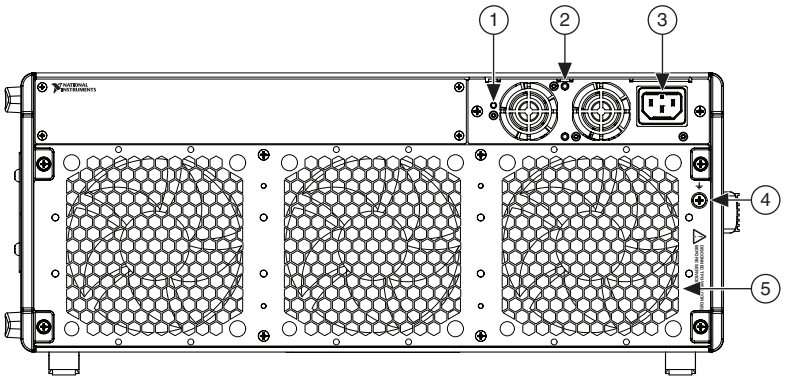
Figure 1-1. Front View of the PXIe-1084 Chassis



1	System Controller Expansion Slot	6	Status LED
2	Backplane Connectors	7	Power Inhibit Switch
3	Removable Feet	8	DIP Switch
4	PXI Express Hybrid Peripheral Slots (17x)	9	Chassis Carry Handle
5	PXI Express System Controller Slot		

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Figure 1-2. Rear View of the PXIe-1084 Chassis



1	Rear Panel Power Supply LED	4	Earth Ground Terminal
2	Power Supply	5	Fan Module
3	Universal AC Input		

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Optional Equipment

Contact National Instruments to order the following options for the PXIe-1084 chassis.

EMC Filler Panels

EMC filler panel kits are available from National Instruments.

Slot Blockers

PXI Slot Blocker kits are available from National Instruments for improved thermal performance when all slots are not used.

Replacement Fan Kit

A fan kit is available from National Instruments, includes both side and PXI module fan assemblies.

Rack Mount Kits

Rack mounting kits are available from National Instruments that can accommodate a variety of rack depths.

PXIe-1084 Backplane Overview

This section provides an overview of the backplane features for the PXIe-1084 chassis.

Interoperability with CompactPCI

The design of the PXIe-1084 chassis provides you the flexibility to use the following devices in a single PXI Express chassis:

- PXI Express compatible products
- CompactPCI Express compatible 2-Link system controller products
- CompactPCI Express compatible Type-2 peripheral products
- PXI peripheral products modified to fit in a hybrid slot
- Standard CompactPCI peripheral products modified to fit in a hybrid slot

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System Controller Slot

The system controller slot is Slot 1 of the chassis and is a 2-Link configuration system slot as defined by the CompactPCI Express and PXI Express specifications. It has three system controller expansion slots for system controller modules that are wider than one slot. These slots allow the system controller to expand to the left to prevent the system controller from using peripheral slots.

The backplane connects the system slot to two PCI Express switches using two Gen-2 x4 PCI Express links. These switches distribute PCI Express connections to the peripheral slots and to three PCI Express-to-PCI bridges to provide a PCI bus to the hybrid peripheral slots.

System slot link 1 is a Gen-2 x4 PCI Express link to PCI Express switch 1, providing a nominal bandwidth of 2 GB/s (single direction) between the system controller and PCI Express switch 1. PXI Express peripheral slots 2 to 10 are connected to PCI Express switch 1 with Gen-2 x1 PCI Express links and are downstream of system slot link 1. The PCI Express-to-PCI bridge 1 is connected to PCI Express switch 1 and provides a 32-bit, 33 MHz PCI bus for hybrid peripheral slots 2 to 7.

System slot link 2 is a Gen-2 x4 PCI Express link to PCI Express switch 2, providing a nominal bandwidth of 2 GB/s (single direction) between the system controller slot and PCI Express switch 2. PXI Express peripheral slots 11 to 18 are connected to PCI Express switch 2 with Gen-2 x1 PCI Express links and are downstream of system slot link 2. The PCI Express-to-PCI bridge 2 is connected to PCI Express switch 2 and provides a 32-bit, 33 MHz PCI bus for hybrid peripheral slots 8 to 13. The PCI Express-to-PCI bridge 3 is also connected to PCI Express switch 2 and provides a 32-bit, 33 MHz PCI bus for hybrid peripheral slots 14 to 18.

The system controller slot also has connectivity to some PXI features such as: PXI_CLK10, PXI Trigger Bus, and PXI Local Bus.

By default, the system controller will control the power supply with the PS_ON# signals. A logic low on this line will turn the power supply on.

Note The chassis Inhibit Mode must be set to **Default** mode for the system controller to control the power supply. Refer to the *Inhibit Mode* section of Chapter 2, *Installation and Configuration*, for details about configuring Inhibit Mode.

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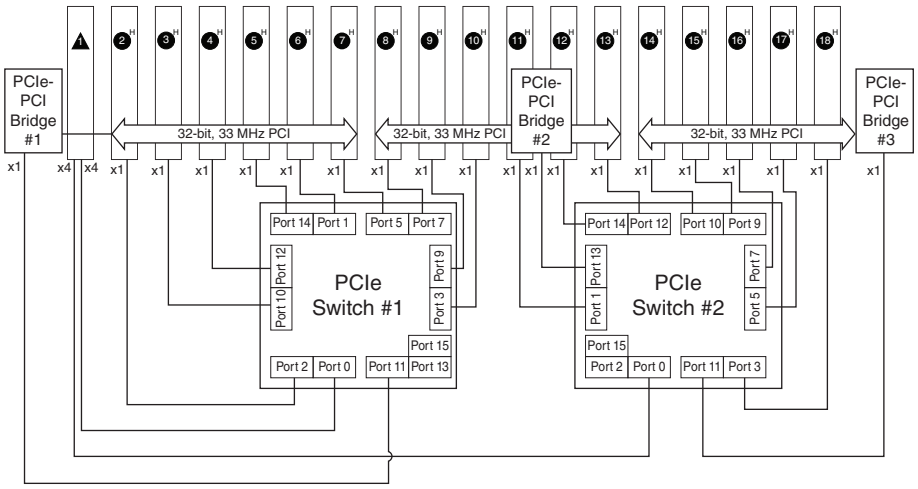
Hybrid Peripheral Slots

The chassis provides seventeen (17) hybrid peripheral slots as defined by the *PXI-5 PXI Express Hardware Specification*: slots 2 through 18. A hybrid peripheral slot can accept the following peripheral modules:

- A PXI Express peripheral with x8, x4, or x1 PCI Express link through a switch to the system slot. Each PXI Express peripheral slot can link up to a Gen-2 x1 PCI Express, providing a maximum nominal single-direction bandwidth of 500 MB/s.
- A CompactPCI Express Type-2 Peripheral with x8, x4, or x1 PCI Express link through a switch to the system slot.
- A hybrid-compatible PXI Peripheral module that has been modified by replacing the J2 connector with an XJ4 connector installed in the upper eight rows of J2. Refer to the *PXI Express Specification* for details. The PXI Peripheral communicates through the backplane's 32-bit PCI bus.
- A CompactPCI 32-bit peripheral on the backplane's 32-bit PCI bus.

The hybrid peripheral slots provide full PXI Express functionality and 32-bit PXI functionality except for PXI Local Bus. The hybrid peripheral slot only connects to PXI Local Bus 6 left and right.

Figure 1-3. PXIe-1084 PCI Express Backplane Diagram



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PXI Local Bus

The PXI backplane local bus is a daisy-chained bus that connects each peripheral slot with adjacent peripheral slots to the left and right.

The backplane routes PXI Local Bus between all slots. Local bus signals may range from high-speed TTL signals to analog signals as high as 42 V.

Initialization software uses the configuration information specific to each adjacent peripheral module to evaluate local bus compatibility.

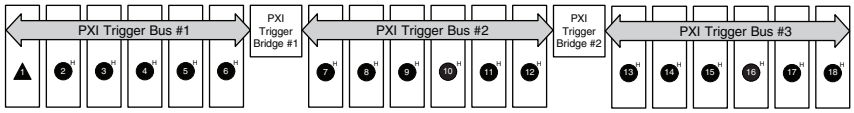
PXI Trigger Bus

All slots on the same PXI bus segment share eight PXI trigger lines. You can use these trigger lines in a variety of ways. For example, you can use triggers to synchronize the operation of several different PXI peripheral modules. Modules can pass triggers to one another, allowing precisely timed responses to asynchronous external events the system is monitoring or controlling.

The PXI trigger lines from adjacent PXI trigger bus segments can be routed in either direction across the PXI trigger bridges through buffers. This allows you to send trigger signals to, and receive trigger signals from, every slot in the chassis. Static trigger routing (user-specified line and directional assignments) can be configured through Measurement & Automation Explorer (MAX). Dynamic routing of triggers (automatic line assignments) is supported through certain National Instruments drivers like NI-DAQmx.

Note Although any trigger line may be routed in either direction, it cannot be routed in more than one direction at a time.

Figure 1-4. PXI Trigger Bus Connectivity Diagram



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System Reference Clock

The PXIe-1084 chassis supplies PXI_CLK10, PXIe_CLK100, and PXIe_SYNC100 independently driven to each peripheral slot.

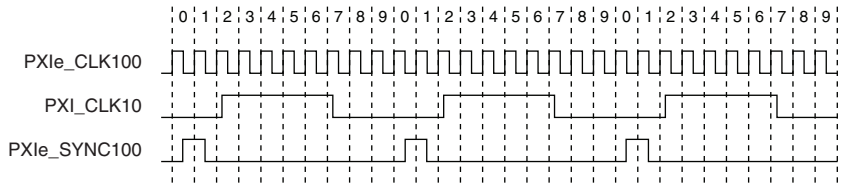
An independent buffer (having a source impedance matched to the backplane and a skew of less than 250 ps between slots) drives PXI_CLK10 to each slot. You can use this common reference clock signal to synchronize multiple modules in a measurement or control system.

An independent buffer drives PXIe_CLK100 to each peripheral slot. These clocks are matched in skew to less than 100 ps. The differential pair must be terminated on the peripheral with LVPECL termination for the buffer to drive PXIe_CLK100 so that when there is no peripheral or a peripheral that does not connect to PXIe_CLK100, there is no clock being driven on the pair to that slot.

An independent buffer drives PXIe_SYNC100 to each peripheral slot. The differential pair must be terminated on the peripheral with LVPECL termination for the buffer to drive PXIe_SYNC100 so that when there is no peripheral or a peripheral that does not connect to PXIe_SYNC100, there is no SYNC100 signal being driven on the pair to that slot.

PXI_CLK10, PXIe_CLK100 and PXIe_SYNC100 have the default timing relationship described in Figure 1-5.

Figure 1-5. System Reference Clock Default Behavior



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2 Installation and Configuration

This chapter describes how to prepare and operate the PXIe-1084 chassis.

Before connecting the chassis to a power source, read this chapter and the *Read Me First: Safety and Electromagnetic Compatibility* document included with your kit.

Safety Information

Cautions Before undertaking any troubleshooting, maintenance, or exploratory procedure, carefully read the following caution notices.

Protection equipment may be impaired if equipment is not used in the manner specified.

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

- **Chassis Grounding**—The chassis requires a connection from the premise wire safety ground to the chassis ground. The earth safety ground must be connected during use of this equipment to minimize shock hazards. Refer to the *Connecting the Safety Ground* section for instructions on connecting safety ground.
- **Live Circuits**—Operating personnel and service personnel *must* not remove protective covers when operating or servicing the chassis. 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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Chassis Cooling Considerations

The PXIe-1084 Series chassis is designed to operate on a bench or in an instrument rack. You must adhere to the cooling clearances as outlined in the following section.

Providing Adequate Clearance

The module and power supply exhaust vents for the PXIe-1084 are on the top of the chassis. The module intake vents are on the rear of the chassis. The vent locations are shown in Figure 2-2, *PXIe-1084 Chassis Vents*.

Adequate clearance between the chassis and surrounding equipment, heat generating devices, and air flow blockages must be maintained to ensure proper cooling. Minimum cooling clearances are shown in Figure 2-1, *PXIe-1084 Chassis Minimum Cooling Clearances*. For rack mount applications adequate forced air ventilation is required. For benchtop applications additional cooling clearances may be required for optimal air flow and reduced hot air recirculation to the air inlet fans.

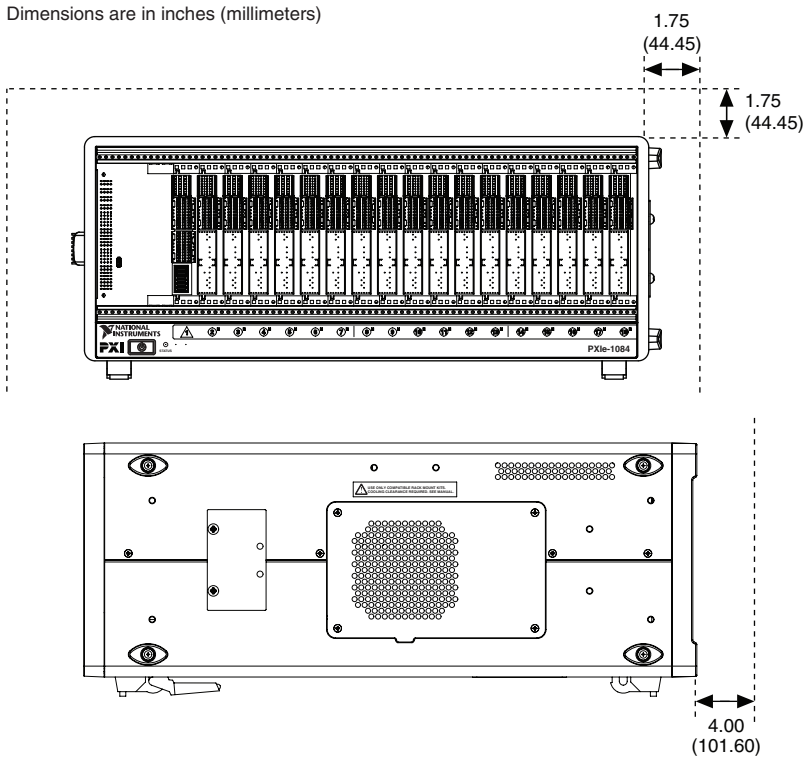
Caution Failure to provide these clearances may result in undesired thermal-related issues with the chassis or modules.

To aid in thermal health monitoring for either rack or benchtop use you can monitor the chassis intake temperatures in Measurement & Automation Explorer (MAX) to ensure the temperatures do not exceed the ratings in the *Operating Environment* section of the *PXIe-1084 Specifications*.

Additionally, many PXI modules provide temperature values you can monitor to ensure critical temperatures are not exceeded. Increasing chassis clearances, ventilation, reducing external ambient temperatures, and removing nearby heat sources are all options for improving overall chassis thermal performance.

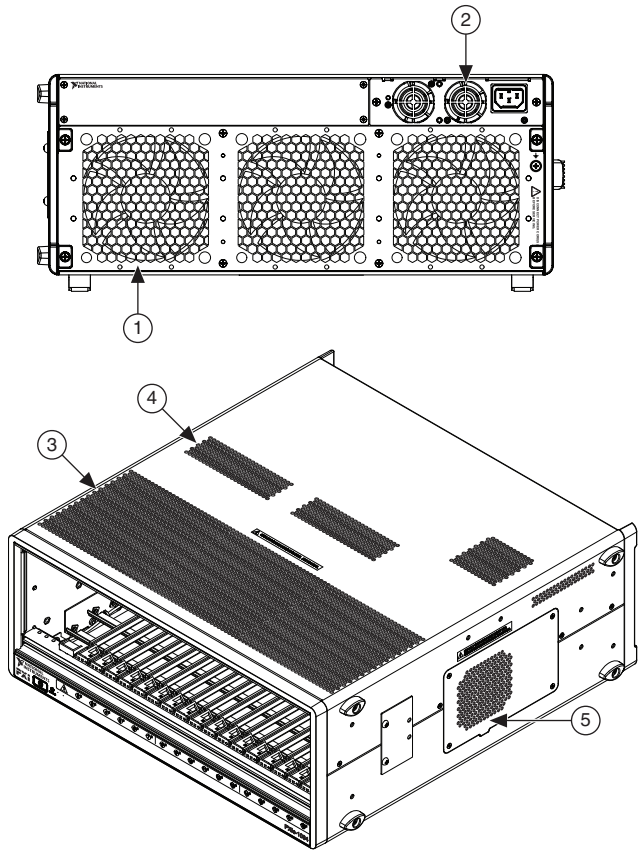
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Figure 2-1. PXIe-1084 Chassis Minimum Cooling Clearances



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Figure 2-2. PXIe-1084 Chassis Vents



1	PXI Module Air Intake (3x)	4	Power Supply Air Exhaust Vent
2	Power Supply Intake	5	Side Air Intake Vent (Right)/Side Air Exhaust Vent (Left)
3	PXI Module Air Exhaust Vent		

Chassis Ambient Temperature Definition

The chassis fan control system uses ambient intake air temperatures for controlling fan speeds when in **Auto** mode. These temperatures may be higher than ambient room temperature depending on surrounding equipment and/or blockages. Ensure ambient intake temperatures do not exceed the ratings in the *Operating Environment* section of the *PXIe-1084 Specifications*. The module and side ambient intake temperatures can be monitored in National Instruments Measurement and Automation Explorer (MAX).

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Setting Fan Speed

The PXIe-1084 chassis supports multiple fan operating modes. Refer to the *Fan Mode* section for more information.

Installing Filler Panels

To maintain proper module cooling performance, install filler panels (provided with the chassis) in unused or empty slots. Secure with the captive mounting screws provided.

Installing Slot Blockers

The cooling performance of the chassis can be improved by installing optional slot blockers. Refer to the National Instruments website at `ni.com/info` and enter the Info Code `slotblocker` for more information about slot blockers.

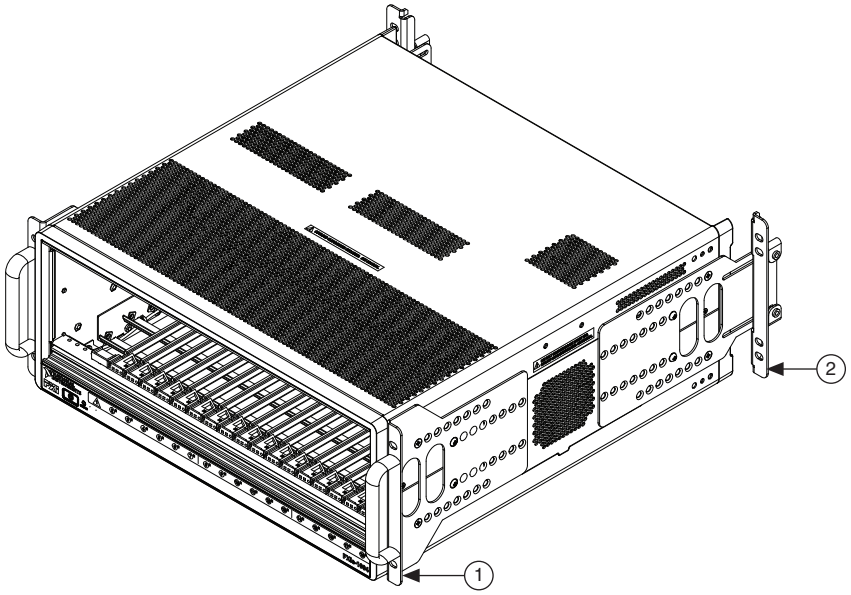
Rack Mounting

Rack mount applications require optional rack mount kits available from National Instruments. Refer to the instructions supplied with the rack mount kits to install your PXIe-1084 chassis in an instrument rack.

Note You may want to remove the feet or carrying handle from the PXIe-1084 chassis when rack mounting.

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Figure 2-3. PXIe-1084 Rack Mount Kit Components



1	Front Rack Mount	2	Rear Rack Mount

Connecting the Safety Ground

Caution The PXIe-1084 chassis are designed with a three-position IEC 60320 C14 inlet for the U.S. that connects the ground line to the chassis ground. For proper grounding, a suitable cordset must be used to connect this inlet to an appropriate earth safety ground.

If your power outlet does not have an appropriate ground connection, you must connect the premise safety ground to the chassis grounding screw located on the rear panel. Refer to Figure 1-2, *Rear View of the PXIe-1084 Chassis*, to locate 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 (#8-32 SEMS) using a 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.

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Connecting to a Power Source

Cautions Do *not* install modules prior to performing the following power-on test.

To completely remove power, you *must* disconnect all power cords.

Attach input power through the rear AC inlet using the appropriate AC power cable supplied. Refer to Figure 1-2, *Rear View of the PXIe-1084 Chassis*, to locate the AC inlet.

The Power Inhibit switch allows you to power on the chassis or place it in standby mode. With an empty chassis in Default Mode, press down the Power Inhibit button and hold it down for four seconds. Observe that all fans become operational and the front panel LED is a steady green. Pressing and holding the Power Inhibit button again for four seconds will return the chassis to standby.

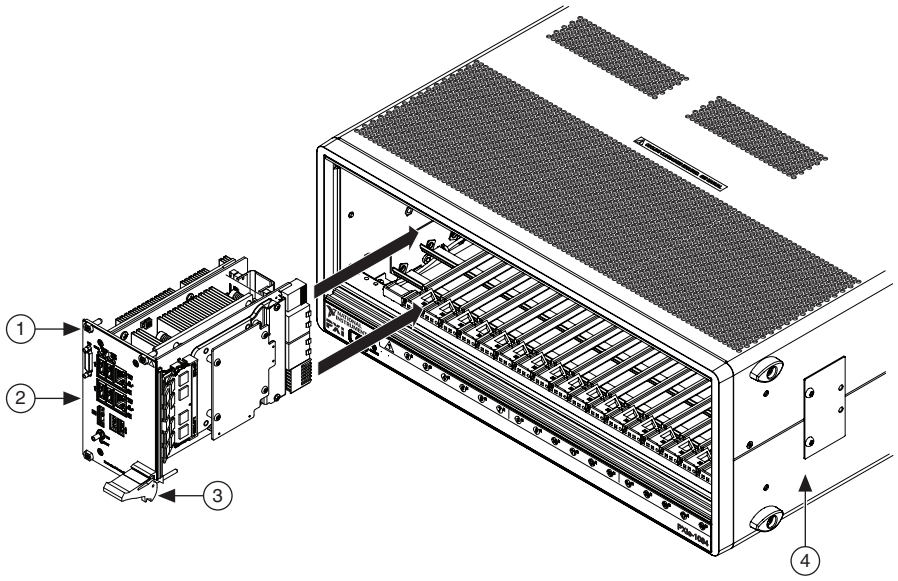
Installing a PXI Express System Controller

This section contains general installation instructions for installing a PXI Express system controller in a PXIe-1084 chassis. Refer to your PXI Express system controller user manual for specific instructions and warnings. To install a system controller, complete the following steps:

1. Connect the AC power source to the PXI Express chassis before installing the system controller. The AC power cord grounds the chassis and protects it from electrical damage while you install the system controller.
2. Install the system controller into the system controller slot (slot 1, indicated by the red card guides) by first placing the system controller PCB into the front of the card guides (top and bottom). Slide the system controller to the rear of the chassis, making sure that the injector/ejector handle is pushed down as shown in Figure 2-4.

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Figure 2-4. Installing a PXI Express System Controller



1	System Controller Front Panel Mounting Screws (4x)	3	Injector/Ejector Handle
2	PXI Express System Controller	4	PXIe Chassis

3. When you begin to feel resistance, pull up on the injector/ejector handle to seat the system controller fully into the chassis frame. Secure the system controller front panel to the chassis using the system controller front-panel mounting screws.
4. Connect the keyboard, mouse, and monitor to the appropriate connectors. Connect devices to ports as required by your system configuration.
5. Power on the chassis. Verify that the system controller boots. If the system controller does not boot, refer to your system controller user manual.

You can place CompactPCI, CompactPCI Express, PXI, or PXI Express modules in other slots depending on the slot type.

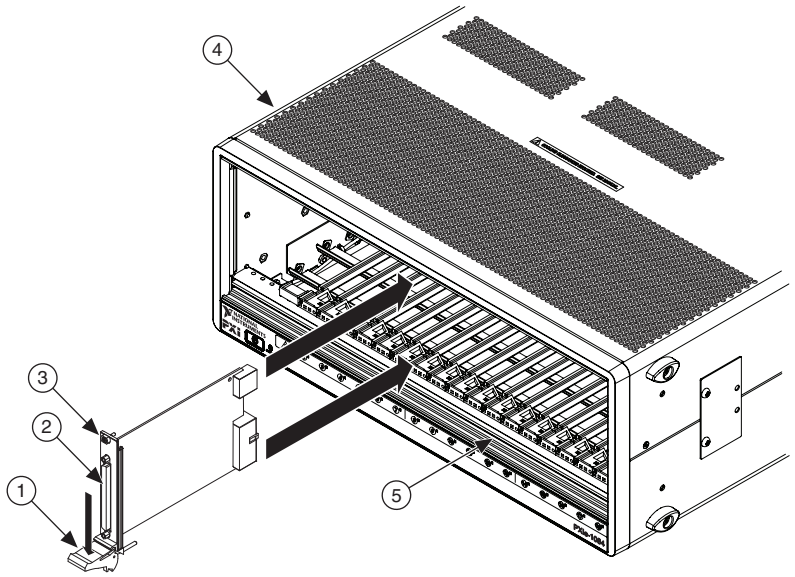
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Installing Peripheral Modules

This section contains general installation instructions for installing a peripheral module in a PXIe-1084 chassis. Refer to your peripheral module user manual for specific instructions and warnings. To install a module, complete the following steps:

1. Connect the AC power source to the PXI Express chassis before installing the module. The AC power cord grounds the chassis and protects it from electrical damage while you install the module.
2. Ensure that the chassis is powered off.
3. Install a module into a chassis slot by first placing the module card PCB into the front of the card guides (top and bottom), as shown in Figure 2-5. Slide the module to the rear of the chassis, making sure that the injector/ejector handle is pushed down as shown in Figure 2-5.
4. When you begin to feel resistance, push up on the injector/ejector handle to fully seat the module into the chassis frame. Secure the module front panel to the chassis using the module front-panel mounting screws.

Figure 2-5. Installing PXI, PXI Express, or CompactPCI Peripheral Modules



1 Injector/Ejector Handle
2 PXI Peripheral Module
3 Peripheral Module Front Panel Mounting Screws (2x)
4 PXIe Chassis
5 Injector/Ejector Rail

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LED Indicators

The following tables describe the front and rear panel LED states. Refer to Figure 1-1, *Front View of the PXIe-1084 Chassis* and Figure 1-2, *Rear View of the PXIe-1084 Chassis* for LED locations. Figure 2-6 shows the Status LED.

Figure 2-6. Status LED



1 Status LED

Table 2-1. Front Panel Status LED States

LED	State	Description
Status LED	Off	Chassis is powered off.
	Steady green	Chassis is powered on, and operating normally.
	Steady red	Indicates temperature is out of range, or an internal chassis fault has occurred.

Table 2-2. Rear Panel Power Supply LED States

LED	State	Description
Power Supply LED	Off	Power supply is unplugged or in standby.
	Steady green	Main power is active and power supply is operating normally.
	Blinking red	Power supply is operating outside of specification.
	Steady red	Power supply has failed.

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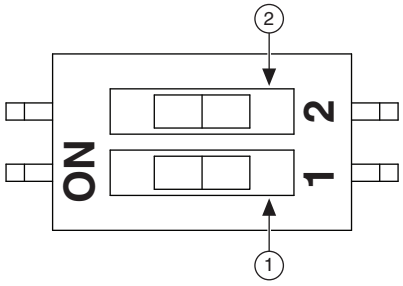
DIP Switches

The backplane has a DIP switch that may be used to control chassis behavior. Refer to Figure 1-1, *Front View of the PXIe-1084 Chassis* for the backplane DIP switch location.

DIP switch #1 (first from the bottom) controls the chassis fan mode. When this switch is in the off (right) position, **Auto** mode is selected. When this switch is in the on (left) position, **High** mode is selected.

DIP switch #2 (second from the bottom) controls the chassis Inhibit Mode. When this switch is in the off (right) position, **Default** mode is selected. When this switch is in the on (left) position, **Manual** mode is selected.

Figure 2-7. Backplane DIP Switches



1 Switch #1 (Fan) 2 Switch #2 (PWR)

Table 2-3. DIP Switch States

Location	Switch	State	Description
1	FAN	Off (Right)	Set chassis fan mode to Auto. Refer to the *Fan Mode* section for information.
		On (Left)	Set chassis fan mode to High.
2	PWR	Off (Right)	Set chassis inhibit mode to **Default**. Refer to the *Inhibit Mode* section for information.
		On (Left)	Set chassis inhibit mode to **Manual**.

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Inhibit Mode

The PXIe-1084 chassis supports operation in two inhibit modes. **Default** mode is used when normal power inhibit button functionality is desired. In **Default** mode, when a system controller is installed in Slot 1 of the chassis, the user can press the power inhibit button to power on the chassis.

Note In **Default** mode, you can also power on the chassis without a system controller installed in slot 1. To power on the chassis from standby, press and hold the power inhibit button for 4 seconds. To power off the chassis, again press and hold the power inhibit button for 4 seconds.

Manual mode is used when you would like to manually control the inhibit state of the chassis. In **Manual** mode, driving the Remote Inhibit signal high or floating it will cause the chassis to be powered on. Driving the Remote Inhibit signal low or shorting it to ground will cause main power to be inhibited.

Note The Timing and Synchronization upgrade is required for access to the Remote Inhibit signal. Without this upgrade, a chassis in **Manual** mode will always be powered on when AC power is connected.

Inhibit Mode Selection

The chassis Inhibit Mode on the PXIe-1084 chassis is selected using a DIP switch on the backplane. Refer to the *DIP Switches* section for more information about the DIP switch. Refer to Figure 1-1, *Front View of the PXIe-1084 Chassis* for the location of this switch.

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Fan Mode

The PXIe-1084 chassis operates in two main fan modes.

In **Auto** mode, the speed of the chassis fans is determined by chassis intake air temperature. Select **Auto** mode for improved acoustic performance.

In **High** mode, the speed of the chassis fans is fixed at high speed regardless of chassis intake air temperature. Select **High** mode for maximum cooling performance.

Cooling Profiles

Both fan modes are available within the 38 W and 58 W cooling profiles.

- **38 W cooling profile**—Supports NI modules up to 38 W max power dissipation
- **58 W cooling profile**—Supports NI modules up to 58 W max power dissipation

Fan Mode Selection

The chassis fan mode can be selected using Measurement & Automation Explorer (MAX). Refer to the *Fan Configuration in MAX* section for more information.

Alternatively, the fan mode on the PXIe-1084 chassis is selected using a DIP switch on the backplane. Refer to the *DIP Switches* section for more information about the DIP switch. Refer to Figure 1-1, *Front View of the PXIe-1084 Chassis* for the location of this switch.

Note The DIP switch must be in the Auto position for software configuration in MAX to work. If the DIP switch is in the High position, the chassis Fan Mode will be High regardless of the software setting.

PXI Express System Configuration with MAX

The PXI Platform Services software included with your chassis automatically identifies your PXI Express system components to generate a `pxiesys.ini` file. You can configure your entire PXI system and identify PXI-1 chassis through Measurement & Automation Explorer (MAX), included with your system controller. PXI Platform Services creates the `pxiesys.ini` and `pxisys.ini` file, which define your PXI system parameters.

Note The configuration steps for single or multiple-chassis systems are the same.

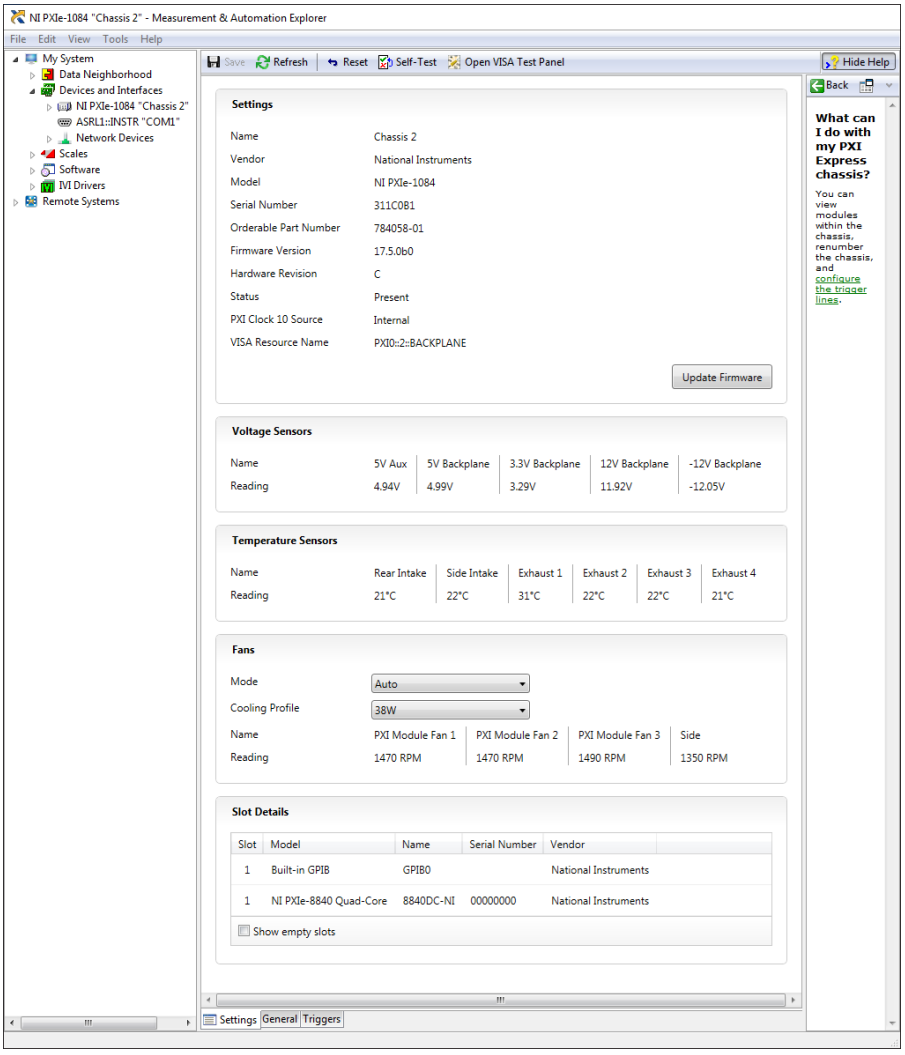
MAX provides the following chassis information:

- Asset information, such as serial number or part number
- Chassis number
- Voltages, temperatures, and fan speeds
- Fan and cooling settings

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- Number and type of power supplies
- Slot details
- Chassis self-test
- Firmware Update

Figure 2-8. Chassis Settings in MAX



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Trigger Configuration in MAX

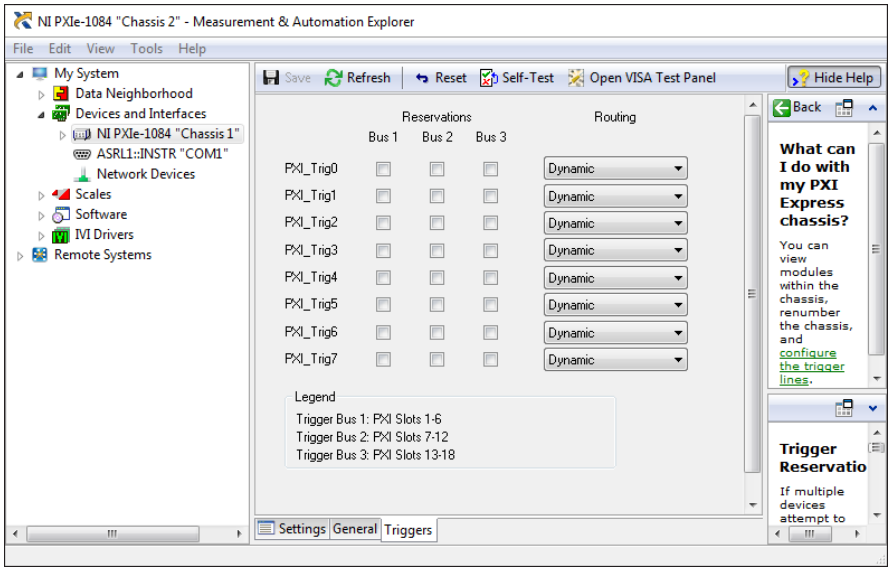
PXI Platform Services provides an interface to route and reserve triggers so dynamic routing, through drivers such as DAQmx, avoids double-driving and potentially damaging trigger lines. For more information about routing and reserving PXI triggers, refer to KnowledgeBase 3TJDOND8 at `ni.com/support`.

Each chassis has one or more trigger buses, each with eight lines numbered 0 through 7 that can be reserved and routed statically or dynamically. Static reservation *pre-allocates* a trigger line to prevent its configuration by a user program. Dynamic reservation/routing/deallocation is *on the fly* within a user program based upon National Instruments APIs such as NI-DAQmx.
NI recommends dynamic reservations and routing are used whenever possible. If static reservations are required, static reservation of trigger lines can be implemented by the user in MAX through the **Triggers** tab. Reserved trigger lines will not be used by PXI modules dynamically configured by programs such as NI-DAQmx. This prevents the instruments from double-driving the trigger lines, possibly damaging devices in the chassis. In the default configuration, trigger lines on each bus are independent. For example, if trigger line 3 is asserted on trigger bus 0, by default it will not be automatically asserted on any other trigger bus.

Complete the following steps to reserve these trigger lines in MAX.

1. In the Configuration tree, click on the PXI chassis branch you want to configure.
2. Then, in the right-hand pane, toward the bottom, click on the **Triggers** tab.
3. Select which trigger lines you would like to statically reserve.
4. Click the **Save** button.

Figure 2-9. Trigger Configuration in MAX



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PXI Trigger Bus Routing

Some National Instruments chassis, including the PXIe-1084, have the capability to route triggers from one bus to others within the same chassis using the **Trigger Routing** tab in MAX, as shown in Figure 2-9.

Note Selecting any non-disabled routing automatically reserves the line in all trigger buses being routed to. If you are using NI-DAQmx, it will reserve and route trigger lines for you, so you won't have to route trigger lines manually.

Complete the following steps to configure trigger routings in MAX.

1. In the **Configuration** tree, select the chassis in which you want to route trigger lines.
2. In the right-hand pane, select the **Trigger Routing** tab near the bottom.
3. For each trigger line, select **Away from Bus 1**, **Away from Bus 2,** or **Away from Bus 3** to route triggers on that line in the described direction, or select **Dynamic** for the default behavior with no manual routing.
4. Click the **Save** button.

Fan Configuration in MAX

You can configure fan behavior using software settings in MAX.

The PXIe-1084 supports both Auto and High fan modes for both the 38 W and 58 W cooling profiles. Refer to the *Fan Mode* section for more information on these modes.

The user may also select a **Manual** fan mode. In this mode, the user may manually set the fan speeds to achieve the desired performance.

Note You may not set the fan speeds or power settings lower than the minimum level required to maintain required cooling levels.

Complete the following steps to change the fan settings in MAX.

1. In the Configuration tree, click on the PXI chassis you want to configure.
2. In the right-hand pane, click on the **Settings** tab.
3. In the **Fans** group, select the desired Mode and Cooling Profile using the drop-down menus.
4. Click the **Save** button. Shortly after clicking the **Save** button, you should see the fan speeds change.

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Using System Configuration and Initialization Files

The PXI Express specification allows many combinations of PXI Express chassis and system modules. To assist system integrators, the manufacturers of PXI Express chassis and system modules must document the capabilities of their products. The minimum documentation requirements are contained in `.ini` files, which consist of ASCII text. System integrators, configuration utilities, and device drivers can use these `.ini` files.

The capability documentation for the PXIe-1084 chassis is contained in the `chassis.ini` file on the software media that comes with the chassis. The information in this file is combined with information about the system controller to create a single system initialization file called `pxisys.ini` (PXI System Initialization). The system controller manufacturer either provides a `pxisys.ini` file for the particular chassis model that contains the system controller or provides a utility that can read an arbitrary `chassis.ini` file and generate the corresponding `pxisys.ini` file. System controllers from NI provide the `pxisys.ini` file for the PXIe-1084 chassis, so you should not need to use the `chassis.ini` file. Refer to the documentation provided with the system controller or to `ni.com/support` for more information on `pxisys.ini` and `chassis.ini` files.

Device drivers and other utility software read the `pxisys.ini` file to obtain system information. The device drivers should have no need to directly read the `chassis.ini` file. For detailed information regarding initialization files, refer to the PXI Express specification at `www.pxisa.org`.

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3 Maintenance

This chapter describes basic maintenance procedures you can perform on the PXIe-1084 chassis.

Caution Disconnect all power cables prior to servicing a PXIe-1084 chassis.

Service Interval

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 *Read Me First: Safety and Electromagnetic Compatibility* document included with your kit 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. Refer to your module user documentation for information on cleaning the individual CompactPCI or PXI Express modules.

Caution *Always* disconnect the AC power cables before cleaning or servicing the chassis.

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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.

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.

Cautions Avoid getting moisture inside the chassis during exterior cleaning, especially through the top vents. 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 harsh chemical cleaning agents; they may damage the chassis. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Connecting Safety Ground

Refer to the *Connecting the Safety Ground* section of Chapter 2, *Installation and Configuration*.

Connecting to Power Source

Refer to the *Connecting to a Power Source* section of Chapter 2, *Installation and Configuration*.

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Installing Replacement Fan Assemblies

This section describes how to remove and install fan assemblies in the PXIe-1084 chassis.

Caution Disconnect all power cables and wait at least 30 seconds prior to replacing fan assemblies.

Replacing the PXI Module Fan Assembly

Before attempting to replace the rear module fan assembly, verify that there is adequate clearance behind the chassis. Disconnect the power cable from the power supply on the back of the chassis. Wait at least 30 seconds for the supply's internal power to dissipate.

Follow these steps to remove the fan assembly:

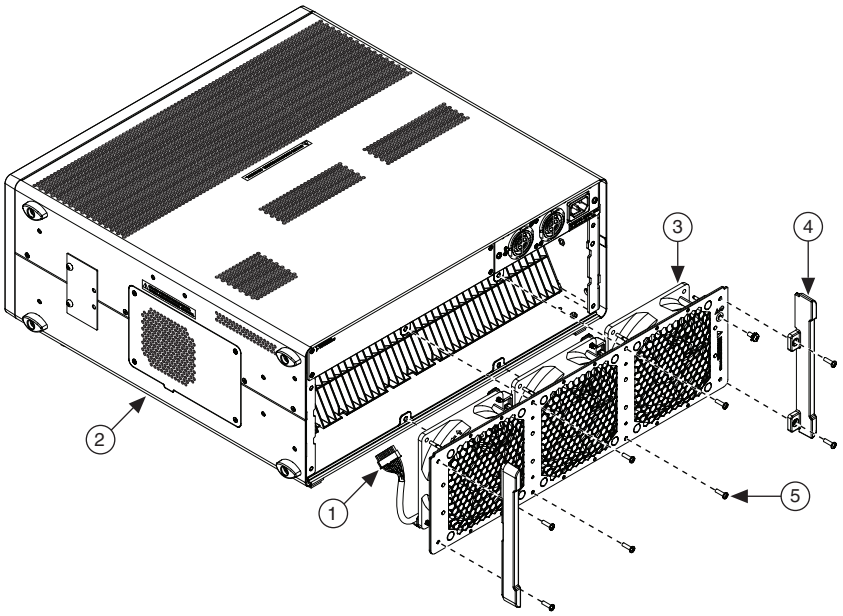
1. Using a Phillips screwdriver, remove the eight #6-32 mounting screws and #8-32 ground screw that attach the fan panel to the chassis.
2. Remove rear chassis feet.
3. With internal fan harness still connected, carefully pull and rotate fan assembly from rear cavity of chassis. Use caution when removing the fan assembly to avoid damaging the fan wire harness.
4. Disconnect fan harness from the internal chassis receptacle as shown in Figure 3-2.

Follow these steps to install a new fan assembly:

1. Angle the fan assembly to install the fan harness plug into the internal chassis receptacle. Use care to avoid damaging the fan harness or receptacle.
2. Connect the internal fan harness and install fan assembly into rear cavity of chassis as shown in Figure 3-2, *Internal Fan Harness*. Use caution when installing the fan panel assembly to avoid pinching or damaging the wire harness.
3. Replace chassis feet.
4. Using a Phillips screwdriver, tighten the eight #6-32 mounting screws and #8-32 ground screw into the rear of the chassis. To meet Shock and Vibration specifications listed in the *PXIe-1084 Specifications*, tighten screws to 11.5 in · lb (1.3 N · m) of torque.

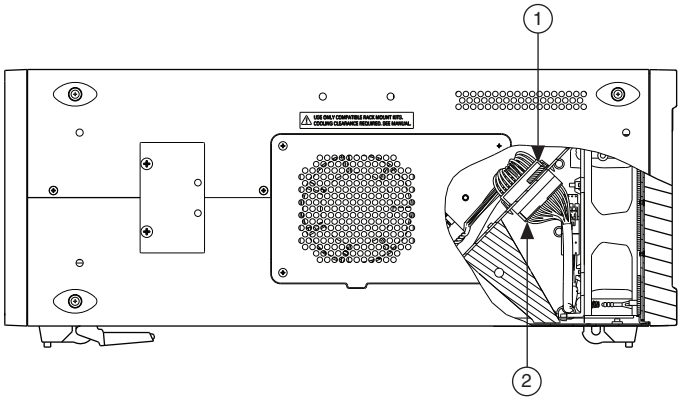
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Figure 3-1. Replacing Rear Fan Module



1	Fan Harness Plug	4	Rear Chassis Feet (2x)
2	PXIe-1084 Chassis	5	Mounting Screws (8x)
3	PXI Module Fan Assembly		

Figure 3-2. Internal Fan Harness



1	Fan Receptacle	2	Fan Harness Plug

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Replacing the Side Fan Assembly

Before attempting to replace the side fan assembly, verify that there is adequate clearance to the side of the chassis. Disconnect the power cable from the power supply on the back of the chassis. Wait at least 30 seconds for the power supply's internal power to dissipate.

Complete the following steps to remove the side fan assembly:

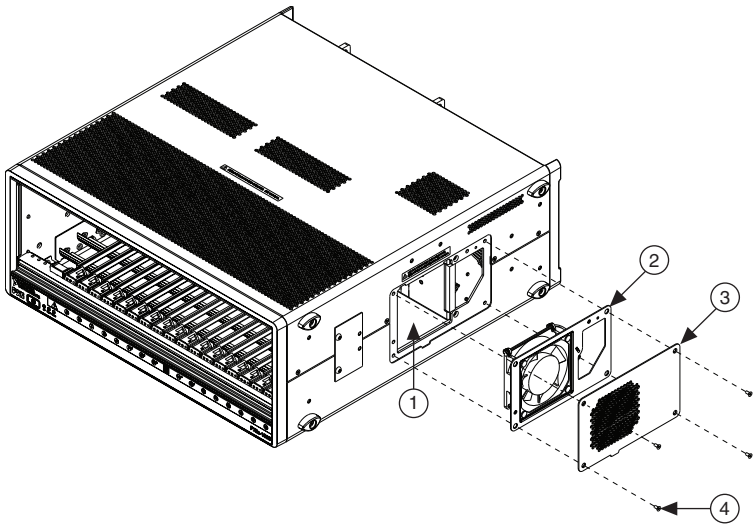
1. Using a Phillips screwdriver, remove the four mounting screws that attach the side fan cover.
2. Remove side fan cover from chassis.
3. Using a Phillips screwdriver, remove the two mounting screws that hold the side fan assembly onto the chassis.
4. Locate side fan assembly harness in internal chassis cavity and disconnect the fan from the chassis receptacle. Use caution when removing the fan assembly to avoid damaging the internal wire harness.
5. Pull side fan assembly straight from chassis and remove.

Complete the following steps to install a new side fan assembly.

1. Plug side fan assembly plug into internal chassis fan receptacle.
2. Set side fan assembly into chassis side fan cavity. Use caution when placing wire harness into chassis to avoid damaging the internal or fan wire harness.
3. Using a Phillips screwdriver, hand tighten two side assembly mounting screws. Use the side fan cutout to pull clear extra cable from chassis side panels to prevent pinching.
4. Place all extra cable into chassis side fan cavity.
5. Using a Phillips screwdriver, tighten the four side fan cover mounting screws to the chassis. To meet Shock and Vibration specifications listed in the *PXIe-1084 Specifications*, tighten screws to 6.7 in · lb (0.8 N · m) of torque.

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Figure 3-3. Replacing Side Fan Assembly



1	Chassis Side Fan Cavity	3	Side Fan Cover
2	Side Fan Assembly	4	Side Fan Cover Mounting Screws (4x)

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A

Pinouts

This appendix describes the connector pinouts for the PXIe-1084 chassis backplane.

Table A-1 shows the XP1 Connector Pinout for the System Controller slot.

Table A-2 shows the XP2 Connector Pinout for the System Controller slot.

Table A-3 shows the XP3 Connector Pinout for the System Controller slot.

Table A-4 shows the XP4 Connector Pinout for the System Controller slot.

Table A-5 shows the P1 Connector Pinout for the Hybrid peripheral slots.

Table A-6 shows the XP3 Connector Pinout for the Hybrid peripheral slots.

Table A-7 shows the XP4 Connector Pinout for the Hybrid peripheral slots.

For more detailed information, refer to the *PXI-5 PXI Express Hardware Specification*, Revision 2.0. Contact the PXI Systems Alliance for a copy of the specification.

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System Controller Slot Pinouts

Table A-1. XP1 Connector Pinout for the System Controller Slot

Pins	Signals
A	GND
B	12V
C	12V
D	GND
E	5V
F	3.3V
G	GND

Table A-2. XP2 Connector Pinout for the System Controller Slot

Pin	A	B	ab	C	D	cd	E	F	ef
1	2PETp1	2PETn1	GND	2PERp1	2PERn1	GND	2PETp2	2PETn2	GND
2	2PETp3	2PETn3	GND	2PERp3	2PERn3	GND	2PERp2	2PERn2	GND
3	2PETp4	2PETn4	GND	2PERp4	2PERn4	GND	2PETp5	2PETn5	GND
4	2PETp6	2PETn6	GND	2PERp6	2PERn6	GND	2PERp5	2PERn5	GND
5	2PETp7	2PETn7	GND	2PERp7	2PERn7	GND	2PETp8	2PETn8	GND
6	2PETp9	2PETn9	GND	2PERp9	2PERn9	GND	2PERp8	2PERn8	GND
7	2PETp10	2PETn10	GND	2PERp10	2PERn10	GND	2PETp11	2PETn11	GND
8	2PETp12	2PETn12	GND	2PERp12	2PERn12	GND	2PERp11	2PERn11	GND
9	2PETp13	2PETn13	GND	2PERp13	2PERn13	GND	2PETp14	2PETn14	GND
10	2PETp15	2PETn15	GND	2PERp15	2PERn15	GND	2PERp14	2PERn14	GND

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Table A-3. XP3 Connector Pinout for the System Controller Slot

Pin	A	B	ab	C	D	cd	E	F	ef
1	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND
2	RSV	RSV	GND	PWR_OK	PS_ON#	GND	LINKCAP	PWRBTN#	GND
3	SMBDAT	SMBCLK	GND	RSVD	RSVD	GND	RSVD	RSVD	GND
4	RSV	PERST#	GND	2RefClk+	2RefClk-	GND	1RefClk+	1RefClk-	GND
5	1PETp0	1PETn0	GND	1PERp0	1PERn0	GND	1PETp1	1PETn1	GND
6	1PETp2	1PETn2	GND	1PERp2	1PERn2	GND	1PERp1	1PERn1	GND
7	1PETp3	1PETn3	GND	1PERp3	1PERn3	GND	1PETp4	1PETn4	GND
8	1PETp5	1PETn5	GND	1PERp5	1PERn5	GND	1PERp4	1PERn4	GND
9	1PETp6	1PETn6	GND	1PERp6	1PERn6	GND	1PETp7	1PETn7	GND
10	2PETp0	2PETn0	GND	2PERp0	2PERn0	GND	1PERp7	1PERn7	GND

Table A-4. XP4 Connector Pinout for the System Controller Slot

Pin	Z	A	B	C	D	E	F
1	GND	GA4	GA3	GA2	GA1	GA0	GND
2	GND	5Vaux	GND	SYSEN#	WAKE#	ALERT#	GND
3	GND	RSV	RSV	RSV	RSV	RSV	GND
4	GND	RSV	RSV	RSV	RSV	RSV	GND
5	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND
6	GND	PXI_TRIG2	GND	RSV	PXI_STAR	PXI_TRIG10	GND
7	GND	PXI_TRIG1	PXI_TRIG0	RSV	GND	PXI_TRIG7	GND
8	GND	RSV	GND	RSV	RSV	PXI_LBR6	GND

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Hybrid Slot Pinouts

Table A-5. P1 Connector Pinout for the Hybrid 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 to 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

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Table A-6. XP3 Connector Pinout for the Hybrid Slot

Pin	A	B	ab	C	D	cd	E	F	ef
1	PXIe_CLK100+	PXIe_CLK100-	GND	PXIe_SYNC100+	PXIe_SYNC100-	GND	PXIe_DSTARC+	PXIe_DSTARC-	GND
2	PRSNT#	PWREN#	GND	PXIe_DSTARB+	PXIe_DSTARB-	GND	PXIe_DSTARA+	PXIe_DSTARA-	GND
3	SMBDAT	SMBCLK	GND	RSV	RSV	GND	RSV	RSV	GND
4	MPWRGD*	PERST#	GND	RSV	RSV	GND	1RefClk+	1RefClk-	GND
5	1PETp0	1PETn0	GND	1PERp0	1PERn0	GND	1PETp1	1PETn1	GND
6	1PETp2	1PETn2	GND	1PERp2	1PERn2	GND	1PERp1	1PERn1	GND
7	1PETp3	1PETn3	GND	1PERp3	1PERn3	GND	1PETp4	1PETn4	GND
8	1PETp5	1PETn5	GND	1PERp5	1PERn5	GND	1PERp4	1PERn4	GND
9	1PETp6	1PETn6	GND	1PERp6	1PERn6	GND	1PETp7	1PETn7	GND
10	RSV	RSV	GND	RSV	RSV	GND	1PERp7	1PERn7	GND

Table A-7. XP4 Connector Pinout for the Hybrid Slot

Pin	Z	A	B	C	D	E	F
1	GND	GA4	GA3	GA2	GA1	GA0	GND
2	GND	5Vaux	GND	SYSEN#	WAKE#	ALERT#	GND
3	GND	12V	12V	GND	GND	GND	GND
4	GND	GND	GND	3.3V	3.3V	3.3V	GND
5	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND
6	GND	PXI_TRIG2	GND	ATNLED	PXI_STAR	PXI_CLK10	GND
7	GND	PXI_TRIG1	PXI_TRIG0	ATNSW#	GND	PXI_TRIG7	GND
8	GND	RSV	GND	RSV	PXI_LBL6	PXI_LBR6	GND

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B

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Glossary

Symbol	Prefix	Value
p	pico	10^{-12}
n	nano	10^{-9}
µ	micro	10^{-6}
m	milli	10^{-3}
k	kilo	10^{3}
M	mega	10^{6}
G	giga	10^{9}
T	tera	10^{12}

Symbols

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

A

A	Amperes.
AC	Alternating current.
ANSI	American National Standards Institute.
Auto	Automatic fan speed control.
AWG	American Wire Gauge.

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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	Code of Federal Regulations.
cm	Centimeters.
CompactPCI	An adaptation of the Peripheral Component Interconnect (PCI) Specification 2.1 or later for industrial and/or embedded applications requiring a more robust mechanical form factor than desktop PCI. It uses industry standard mechanical components and high-performance connector technologies to provide an optimized system intended for rugged applications. It is electrically compatible with the PCI Specification, which enables low-cost PCI components to be utilized in a mechanical form factor suited for rugged environments.
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.
DoC	Declaration of Conformity.

E

efficiency	Ratio of output power to input power, expressed as a percentage.
EIA	Electronic Industries Association.

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EMC	Electromagnetic Compatibility.
EMI	Electromagnetic Interference.

F

FCC	Federal Communications Commission.
filler panel	A blank module front panel used to fill empty slots in the chassis.

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

hr	Hours.
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.
inhibit	To turn off.

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J

jitter	A measure of the small, rapid variations in clock transition times from their nominal regular intervals. Units: seconds RMS.

K

kg	Kilograms.
km	Kilometers.

L

lb	Pounds.
LED	Light emitting diode.
line regulation	The maximum steady-state percentage that a DC voltage output will change as a result of a specified change in input AC voltage (step change from 90 to 132 VAC or 180 to 264 VAC).
load regulation	The maximum steady-state percentage that a DC voltage output will change as a result of a step change from no-load to full-load output current.

M

m	Meters.
MHz	Megahertz. One million Hertz; one Hertz equals one cycle per second.
mi	Miles.
ms	Milliseconds.
MTBF	Mean time between failure.
MTTR	Mean time to repair.

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N

NEMA	National Electrical Manufacturers Association.
NI	National Instruments.

P

power supply shuttle	A removable module that contains the chassis power supply.
PXI	PCI eXtensions for Instrumentation.
PXI_CLK10	10 MHz PXI system reference clock.

R

RH	Relative humidity.
RMS	Root mean square.

S

s	Seconds.
skew	Deviation in signal transmission times.
slot blocker	An assembly installed into an empty slot to improve the airflow in adjacent slots.
SMA	SubMiniature version A connector; a commonly used coaxial connector.
standby	The backplane is unpowered (off), but the chassis is still connected to AC power mains.
System controller	A module configured for installation in Slot 1of a PXI chassis. This device is unique in the PXI system in that it performs the 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.

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system reference clock	A 10 MHz clock, also called PXI_CLK10, that is distributed to all peripheral slots in the chassis, as well as a BNC connector on the rear of chassis labeled *10 MHz REF OUT*. The system reference clock can be used for synchronization of multiple modules in a measurement or control system. The 10 MHz REF IN and OUT BNC connectors on the rear of the chassis can be used to synchronize multiple chassis to one reference clock. The PXI backplane specification defines implementation guidelines for PXI_CLK10.

T

TTL	Transistor-transistor logic.

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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