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Find the *National Instruments PXIe-4481* at our website: *Click HERE*

GETTING STARTED GUIDE

PXIe-4480/4481

6-Channel, 24-bit, 1.25 MS/s DSA Analog Input

This document explains how to install, configure, and set up the PXIe-4480 and PXIe-4481 Dynamic Signal Acquisition (DSA) analog input modules. Driver support for these modules was first available in NI-DAQmx 16.1. For a list of devices supported by a specific release, refer to the *NI-DAQmx Readme*, available on the version-specific download page or installation media.

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Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in locations with a controlled electromagnetic environment. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

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Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Caution To ensure the specified EMC performance, the length of all mini-XLR cables must be no longer than 3 m (10 ft).

Caution Electromagnetic interference can adversely affect the measurement accuracy of this product when used with BNC cables. The construction of a BNC coaxial cable is inherently unbalanced in that the outer conductor (LO) is used as a shield for the inner conductor (HI). However, for functional reasons, there is no input configuration of the PXIe-4480/4481 that directly connects the LO terminal to the chassis ground. Without a direct connection to chassis ground, the outer conductor does not act as a shield for unwanted noise and may act as an antenna for coupling noise into the module inputs. For single-ended measurements, the noise immunity for the system can be improved by directly connecting the outer conductor to the chassis or earth ground at the load end of the cable. For differential measurements, where such a connection is inherently not possible, the BNC cable can alternatively be wrapped in a separate grounded shield. In addition, you might need to use snap-on ferrite beads or other remedial measures to improve electromagnetic compatibility.

Unpacking the Kit

The PXIe-4480/4481 module ships in an antistatic package to prevent electrostatic discharge from damaging module components.

Caution To prevent electrostatic discharge from damaging the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis.

1. Touch the antistatic package to a metal part of the grounded object before removing the module from package.
2. Remove the module from the package and inspect the module for loose components or any other sign of damage.

Caution Never touch the exposed pins of connectors.

Store the device in the antistatic package when the device is not in use. Notify NI if the module appears damaged in any way; do not install a damaged device.

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Preparing the Environment

Ensure that the environment in which you are using the PXIe-4480/4481 meets the following specifications.

Operating ambient temperature ..... 0 °C to 55 °C
(IEC 60068-2-1, IEC 60068-2-2)

Operating relative humidity ..... 10% to 90%, noncondensing
(IEC 60068-2-56)

Altitude ..... 2,000 m (800 mbar)
(at 25 °C ambient temperature)

Pollution Degree 2

Indoor use only.

Caution Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Note Refer to the *PXIe-4480/4481 Specifications* at ni.com/manuals for complete specifications.

Verifying the Kit Contents

The following items are necessary to set up and use the PXIe-4480/4481:

- PXIe-4480/4481 analog input module
- NI-DAQmx installation media
- *PXIe-4480/4481 Getting Started Guide*

Note You can download any needed documents from ni.com/manuals.

Other Equipment

Several additional items that are not included in the module kit are necessary to install or operate the PXIe-4480/4481.

Required Items

- PXI Express chassis and chassis documentation. For more information about compatible chassis options, refer to ni.com.
- PXI Express embedded controller or MXI-Express (card or built-in) that meets the system requirements specified in this guide and controller documentation.
- One of the following shielded InfiniBand 12x cables:
  - SHB12X-6BNC
  - SHB12X-6MXLRM
  - SHB12X-6RJ50

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Note Cables may be shipped with a protective covering on the InfiniBand connector. Any protective covering or obstruction should be removed before attempting to secure connection to the PXIe-4480/4481.

Optional Items

- NI LabVIEW

Note For the list of LabVIEW versions supported by a specific version of NI-DAQmx, refer to the *NI-DAQmx Readme*, available on the version-specific download page at `ni.com/downloads` or on the installation media.

Installing the Software

Software support for the PXIe-4480/4481 is provided by NI-DAQmx. For detailed NI software version support, refer to the *NI-DAQmx Readme*.

You must be an Administrator to install NI software on your computer.

1. (Optional) If you are developing an NI-DAQmx application, install an ADE, such as LabVIEW or LabWindows™/CVI™.
2. Install the latest service packs for your operating system.
3. Insert a compatible version of NI-DAQmx. To download the NI-DAQmx driver, visit `ni.com/info` and enter the Info Code `daqmx`.
4. Follow the instructions in the installation prompts.

Note Windows users may see access and security messages during installation. Accept the prompts to complete the installation. For troubleshooting information, refer to the *Worldwide Support and Services* section.

5. When installation completes, select **Restart** in the dialog box that asks if you want to restart, shut down, or restart later.

Installing the Hardware

You must install the software before using the hardware.

Caution To prevent damage to the device caused by ESD or contamination, handle the device using the edges or the metal bracket.

Before you install the hardware, refer to the guidelines in the *Maintain Forced-Air Cooling Note to Users* to maintain forced air cooling in the PXI Express system. This document is available at `ni.com/manuals`.

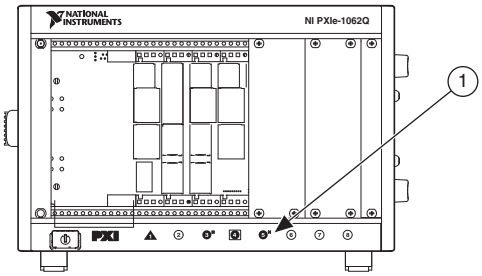
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1. Ensure the AC power source is connected to the chassis before installing the module. The AC power cord grounds the chassis and protects it from electrical damage while you install the module.
2. Make sure the chassis is powered off.

Caution To protect yourself, the chassis, and the module from electrical hazards, leave the chassis powered off until you finish installing the module.

3. Inspect the slot pins on the chassis backplane for any bends or damage prior to installation. Do not install a module if the backplane is damaged.
4. Remove the protective plastic covers from all the captive screws on the module front panel.
5. Identify a supported slot in the chassis. The PXIe-4480/4481 module can be placed only in the supported slot types identified in Table 1. Figure 1 shows the slot type symbols of the various slot types. Refer to your chassis documentation for more details

Figure 1. PXI/PXIe Chassis Slot Type Symbol Location



1 Slot Type Symbols Locations

Table 1. PXIe-4480/4481 Supported Slot Types

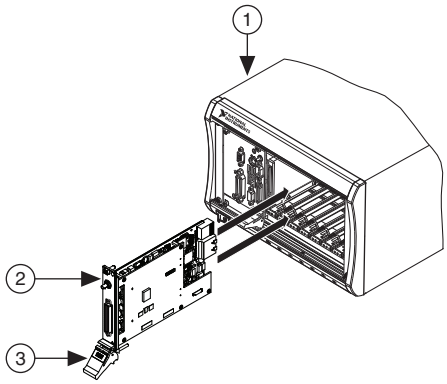
PXI Chassis Slot Type Symbol	Supported Slot Type Description
●	PXI Express Peripheral
●^{H}	PXI/PXI Express Hybrid Peripheral
◉	PXI Express System Timing or Peripheral

6. Touch any metal part on the chassis to discharge any static electricity.
7. Ensure that the injector/ejector handle is in the unlatched (downward) position.
8. Place the module edges into the module guides at the top and bottom of the chassis. Slide the module into the slot until it is fully inserted.

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Caution When installing the module, make sure both edges are positioned inside the guides and that the module components do not come into contact with adjacent modules.

Figure 2. Sliding the PXIe-4480/4481 into the Chassis



1 Chassis
2 Hardware Module
3 Injector/Ejector Handle in Down (Unlatched) Position

9. Latch the module in place by pulling up on the ejector handle.
10. Secure the module front panel to the chassis using the front-panel mounting screws.

Note Tightening the top and bottom mounting screws increases mechanical stability and also electrically connects the front panel to the chassis, which can improve the signal quality and electromagnetic performance.

11. Cover all empty slots using filler panels or slot blockers to maximize cooling air flow.
12. Power on the chassis.

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Configuring the Hardware in MAX

Use NI Measurement & Automation Explorer (MAX) to configure your National Instruments hardware. MAX informs other programs about which modules reside in the system and how they are configured. MAX is automatically installed with NI-DAQmx.

1. Launch MAX.
2. In the Configuration pane, expand **Devices and Interfaces** to see a list of installed modules. Installed modules appear under the name of their associated chassis.



Note If you are using the PXIe-4480/4481 with the LabVIEW Real-Time Module, expand **Remote Systems**. Find your target IP address or name, expand it, and then expand **Devices and Interfaces**.

3. Expand your **Chassis** tree item. MAX lists all modules installed in the chassis. Your default module names may vary.



Note If you do not see your hardware listed, press <F5> to refresh the list of installed modules. If the module is still not listed, power off the system, ensure the module is correctly installed, and restart.

4. Record the device identifier MAX assigns to the hardware. Use this identifier when programming the PXIe-4480/4481.
5. Right-click the device and select **Self-Test** to perform a basic verification of hardware resources.
6. (Optional) Right-click the device and select **Configure** to add accessory information and configure the device.
7. Right-click the device and select **Test Panels** to test device functionality.

   Click **Start** to test the device functions, and then **Stop** and **Close** to exit the test panel. If the test panel displays an error message, refer to `ni.com/support`.

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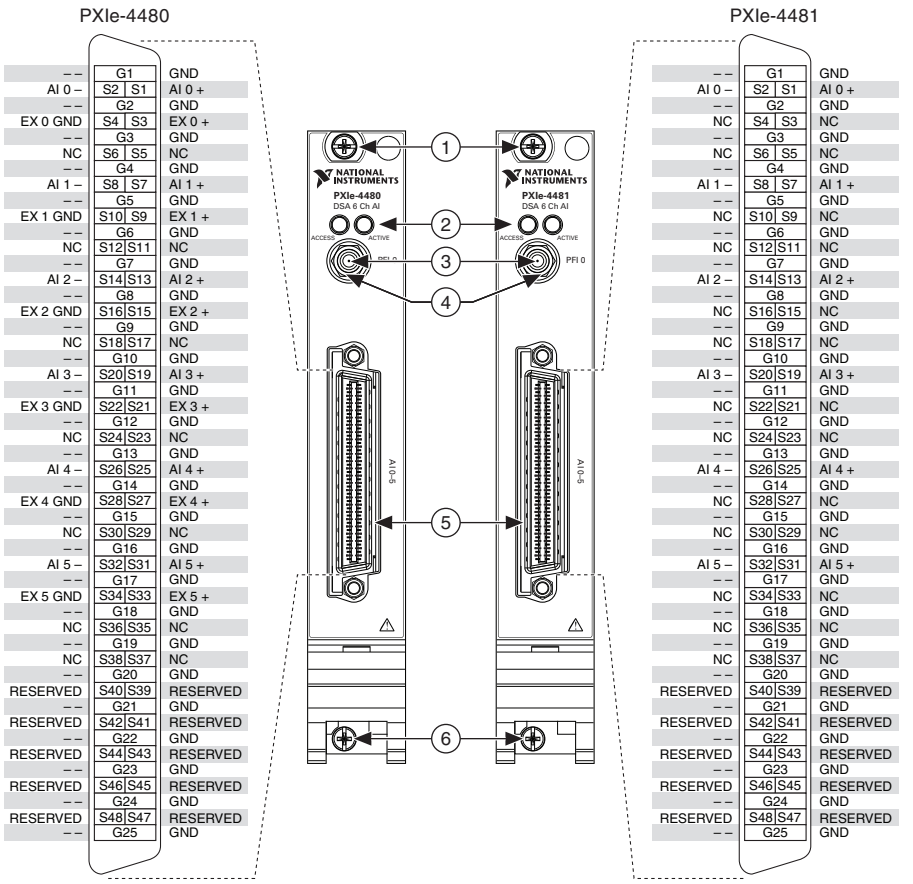
Connecting Signals

The PXIe-4480/4481 front panel has one 73-pin 12x InfiniBand connector. Connect analog input signals using a shielded InfiniBand 12x cable, as described in the *Other Equipment* section. Secure the cable to the module front panel using the cable connector jackscrews.

Note Tightening the top and bottom jackscrews on the InfiniBand connector increases mechanical stability and improves signal quality and electromagnetic performance.

Figure 3 shows the front panel connections of the PXIe-4480 and PXIe-4481 modules.

Figure 3. PXIe-4480/4481 Front Panel



1	Top Module Mounting Screw	2	LEDs	4	Chassis Ground	6	Bottom Module Mounting Screw
		3	PFI	5	AI 0-5		

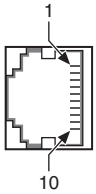
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Note Refer to the *PXIe-4480/4481 Specifications* for information about the operating input range and overvoltage protection.

Connecting RJ50 Cables

The SHB12X-6RJ50 shielded InfiniBand 12x cable provides six RJ50 (10-pin) inputs. Refer to Table 2 for signal names and descriptions, and the correlation to the pin numbers of the RJ50 modular plug.

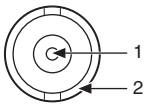
Table 2. RJ50 Connector Pin Assignments

RJ50 Modular Plug Pin Number Diagram	Pin	Signal Name	Signal Description
	1	NC	No connect
	2	AI+	Positive analog input signal (0 to 5)
	3	AI-	Negative analog input signal (0 to 5)
	4	NC	—
	5	NC	—
	6	EX+	Positive excitation (0 to 5)
	7	EX GND	Excitation ground (0 to 5)
	8	NC	—
	9	GND	Ground
	10	NC	—
	Shell	GND	Ground

Connecting BNC Cables

The SHB12X-6BNC shielded InfiniBand 12x cable provides six BNC inputs. Refer to Table for signal names and descriptions, and the correlation to the pin numbers of the BNC plug.

Table 3. BNC Connector Pin Assignments

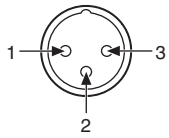
BNC Connector Pin Diagram	Pin	Signal Name	Signal Description
	1	AI+	Positive analog input signal (0 to 5)
	2	AI-	Negative analog input signal (0 to 5)

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Connecting mXLR Cables

The SHB12X-6MXLRM shielded InfiniBand 12x cable provides six mXLR inputs. Refer to Table for signal names and descriptions, and the correlation to the pin numbers of the mXLR plug.

Table 4. mXLR Connector Pin Assignments

mXLR (Male) Connector Pin Diagram	Pin	Signal Name	Signal Description
	1	GND	Chassis ground
	2	AI+	Positive analog input signal (0 to 5)
	3	AI-	Negative analog input signal (0 to 5)
	Shell	GND	Chassis ground

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)



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