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PXIe-4466/4467/4468 Getting Started Guide

Contents

Getting Started Guide

This document explains how to install, configure, and set up the PXIe-446**x** Sound and Vibration Module.

> ✏️ **Note** In this document, the PXIe-4466, PXIe-4467, and PXIe-4468 are referred to inclusively as the PXIe-446**x**.

Driver support for the modules was first available in the following NI-DAQmx versions:

- PXIe-4466—NI-DAQmx 20.7
- PXIe-4467—NI-DAQmx 21.3
- PXIe-4468—NI-DAQmx 22.8

For the list of devices supported by a specific release, refer to the **NI-DAQmx Readme**, available on the version-specific download page.

> ✏️ **Note** Before you begin, install and configure your chassis and controller.

Unpacking the Kit

The PXIe-446**x** ships in an antistatic package to prevent electrostatic discharge from damaging device components. To prevent such damage when handling the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis, and complete the following steps.

1. Touch the antistatic package to a metal part of the computer chassis.
2. Remove the module from the package and inspect it for loose components or other signs of damage.

> ⚠️ **Notice** Never touch the exposed pins of connectors.

> **Note** Do not install a module if it appears damaged in any way.

3. Unpack any other items and documentation from the kit.

Store the module in the antistatic package when the module is not in use.

Verify the Kit Contents

The following items are necessary to set up and use the PXIe-446**x**.

- PXIe-446**x** analog input/output module
- Module **Safety, Environmental, and Regulatory Information** document

Other Equipment

The following additional items, not included in the module kit, are necessary to operate the PXIe-446**x**.

- PXI Express chassis with

  - controller, or
  - MXI-Express (card or built-in)

- (optional) 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.

Preparing the Environment

Refer to the module **Safety, Environmental, and Regulatory Information** document shipped with your device for the environmental specifications required for the PXIe-446**x**.

> 🖉 **Note** This model is intended for use in indoor applications only.

Installing the Software

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

1. Install an ADE, such as LabVIEW or LabWindows™/CVI™.

2. Download the NI-DAQmx driver software installer from ni.com/downloads. NI Package Manager downloads with the driver software to handle the installation. Refer to the NI Package Manager Manual for more information about installing, removing, and upgrading NI software using NI Package Manager.
   Driver support for the modules was first available in the following NI-DAQmx versions:

   - PXIe-4466—NI-DAQmx 20.7

   - PXIe-4467—NI-DAQmx 21.3

   - PXIe-4468—NI-DAQmx 22.8

3. 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.

4. When the installer completes, select **Restart** in the dialog box that prompts you to restart, shut down, or restart later.

   > 🖉 **Note** Ensure that you have installed the latest version of NI Package Manager. To access the download page for NI Package Manager, go to ni.com/info and enter info code NIPMDownload.

Installing the PXIe-446x

> ⊘ **Notice** To prevent damage to the PXIe-446**x** caused by ESD or contamination, handle the module using the edges or the metal bracket.

> ✎ **Note** To maintain forced air cooling in the PXIe system, refer to the **Maintain Forced-Air Cooling** document.

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. Power off the chassis.
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 black plastic covers from all the captive screws on the module front panel.
5. Identify a supported slot in the chassis. The following figure shows the symbols that indicate the slot types.

   **Figure 1.** Chassis Compatibility Symbols
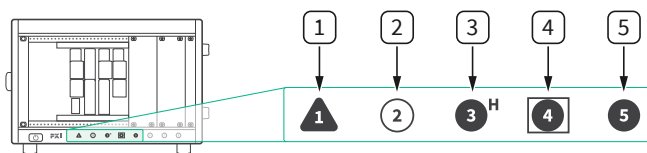
   1. PXI Express System Controller Slot
   2. PXI Peripheral Slot
   3. PXI Express Hybrid Peripheral Slot
   4. PXI Express System Timing Slot
   5. PXI Express Peripheral Slot

PXIe-446**x** modules can be placed in PXI peripheral slots or PXI Express Hybrid peripheral slots.

6. Touch any metal part of the chassis to discharge static electricity.

7. Ensure that the ejector handle is in the downward (unlatched) 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.

Figure 2. Module Installation
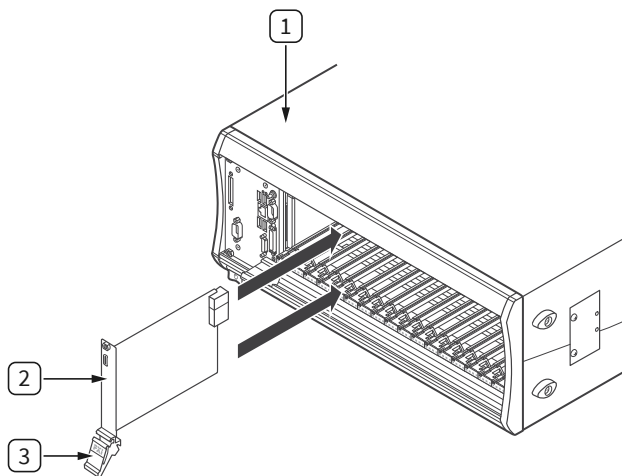
1. Chassis
2. Hardware Module
3. Ejector Handle in Downward (Unlatched) Position

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 either filler panels (standard or EMC) or slot blockers with filler panels, depending on your application.

> ✏️ **Note** For more information about installing slot blockers and filler panels, go to ni.com/r/pxiblocker.

12. Power on the chassis.

Configuring the PXIe-446*x* in MAX

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

1. Launch MAX.

2. In the configuration tree, expand **Devices and Interfaces** to see the list of installed NI hardware.
   Installed modules appear under the name of their associated chassis.

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

   > ✏️ **Note** If you do not see your module 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 identifier MAX assigns to the hardware. Use this identifier when programming the PXIe-446*x*.

5. Self-test the hardware by selecting the item in the configuration tree and clicking **Self-Test** in the MAX toolbar.
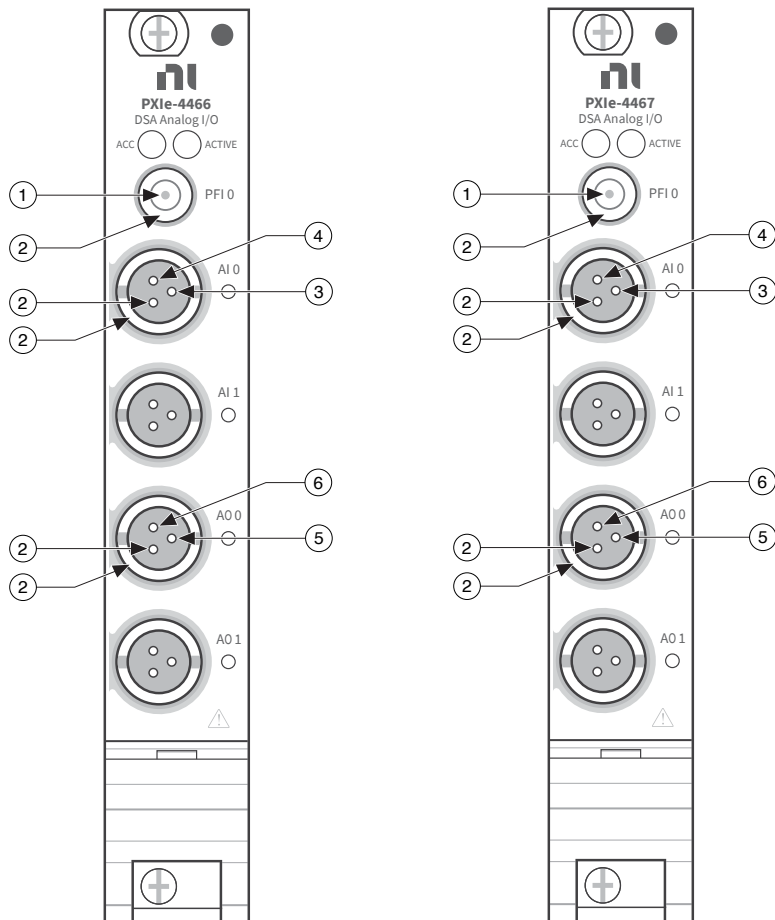   The MAX self-test performs a basic verification of hardware resources.

PXIe-446*x* Pinout and LEDs

The following figures show the front panel connections of the PXIe-446*x*.
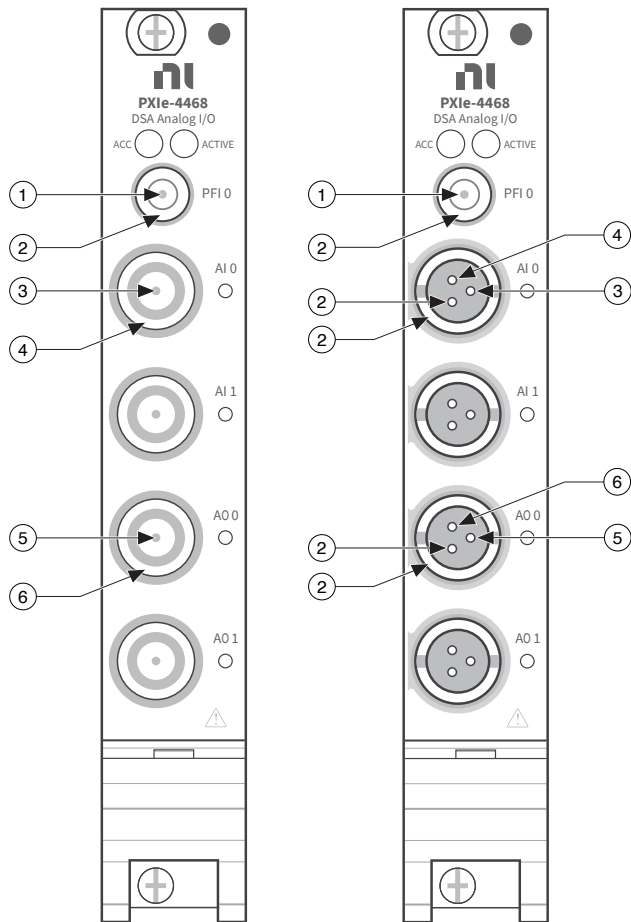
> **Note** Refer to the module specifications for information about the operating input and output ranges and overvoltage protection.

Figure 3. PXIe-4466/4467 Front Panel

1. PFI
2. Chassis Ground
3. AI+
4. AI-
5. AO+
6. AO-

Figure 4. PXIe-4468 Front Panel

1. PFI
2. Chassis Ground
3. AI+
4. AI-
5. AO+
6. AO-

Table 1. Signal Descriptions

Signal Name	Signal Description
AI+	Positive analog input signal
AI-	Negative analog input signal

Signal Name	Signal Description
AO+	Positive analog output signal
AO-	Negative analog output signal
GND	Chassis ground

Table 2. LEDs

| LED	Description
ACC	Access—Indicates the basic hardware status of the analog output module. OFF—The module is not yet functional, or has detected a problem with a PXI power rail. AMBER—The module is being accessed. The Access LED flashes amber for 75 ms when the module is accessed. GREEN—The module is ready to be programmed.
ACTIVE	OFF—Module is not acquiring or preparing to acquire data. AMBER—Module is waiting for a trigger event to start an acquisition. GREEN—An acquisition has been triggered, and the module is currently acquiring data. AMBER/GREEN (alternating)—The module is changing reference clock timebase. RED (solid)—An error has been detected by hardware. Use NI-DAQmx software to determine the cause and/or clear the error by resetting the module.

LED	Description
<AI 0..1>	AMBER/GREEN (alternating)—The reference clock source is changing to onboard or PXIeClk100. AMBER (solid)—The channel is waiting for a trigger to start acquiring. GREEN (solid)—The channel is actively acquiring a signal. RED (solid)—An error has been detected on the channel or board. Possible errors include the following: - The board is overheated - The power supply is not at the proper voltage - A clocking error occurred (PLL fell out of lock or PXIe_CLK100 was not present when using the external timebase) - An external overvoltage or overcurrent was detected[1] - An overload was detected - A streaming underflow was detected on the channel - Internal hardware failed (either due to software or hardware failure)
<AO 0..1>	AMBER/GREEN (alternating)—The reference clock source is changing to onboard or PXIeClk100. AMBER (solid)—The channel is waiting for a trigger to start generating. GREEN (solid)—The channel is actively generating a signal.

| LED	Description
	RED (solid)—An error has been detected on the channel or board. Possible errors include the following: ■ The board is overheated ■ The power supply is not at the proper voltage ■ A clocking error occurred (PLL fell out of lock or PXIeClk100 was not present when using the external timebase) ■ An external overvoltage or overcurrent was detected[1] ■ An overload was detected ■ A streaming underflow was detected on the channel ■ Internal hardware failed (either due to software or hardware failure)

Analog Input Connections

The following figure shows the PXIe-446**x** input connection with the terminal configuration in differential mode. Refer to the NI-DAQmx Help for more information about terminal configuration.

**Figure 5.** PXIe-446**x** Input Connection in Differential Mode
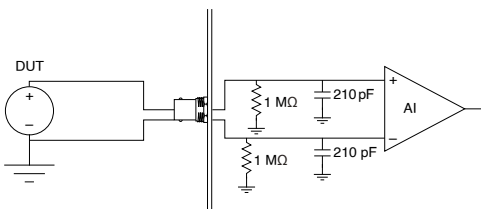
The following figure shows an PXIe-446**x** input connection with the terminal configuration in pseudodifferential mode.

Figure 6. PXIe-446**x** Input Connection in Pseudodifferential Mode
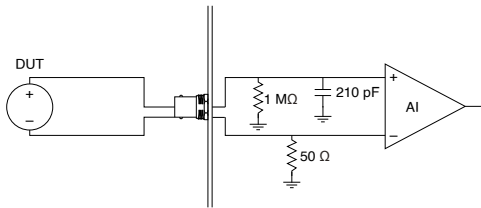
The following figure shows the PXIe-446**x** analog input circuitry block diagram. Depending on the connector type, connect the signals as shown in the inset.

Figure 7. PXIe-446**x** Analog Input Block Diagram
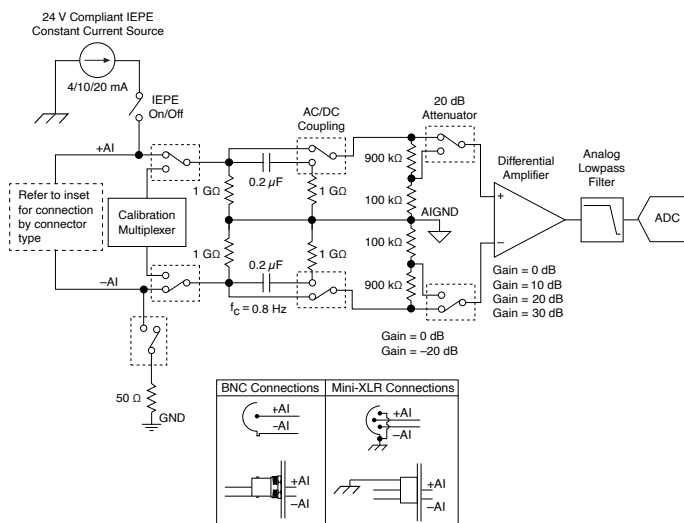
Analog Output Connections

The following figure shows the PXIe-446**x** analog output circuitry block diagram. Depending on the connector type, connect the signals as shown in the inset.
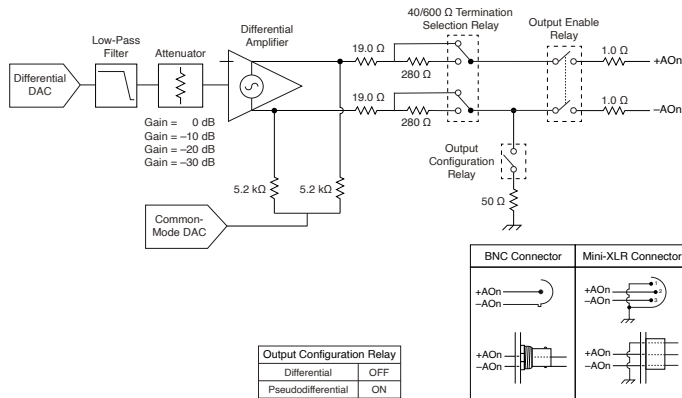
Figure 8. PXIe-446**x** Analog Output Block Diagram

The PXIe-446**x** output stage is a differential amplifier. The output stage can be configured to pseudodifferential mode in software, where the -AO terminal is internally connected to chassis ground through a 50 Ω resistor. This connection introduces a gain difference in the output stage of -22.0 mdB, for which the software corrects automatically. Refer to the **NI-DAQmx Help** for more information about terminal configuration.

The PXIe-446**x** output stage can also be configured to pseudodifferential mode by making an external connection between +AOn or -AOn to chassis ground. This connection introduces a gain change in the output stage of -22.0 mdB, for which the software does not correct.

For most applications, configuring the PXIe-446**x** output stage in differential mode will yield the best performance. For improved common-mode noise rejection, it is highly recommended to make a connection between the chassis ground of the PXIe-446**x** and the input device ground. This connection is critical when the input device is isolated; if this connection is not available, it may be better to configure the PXIe-446**x** output stage in pseudodifferential mode.

The following figures show the recommended output connections for both connector types.

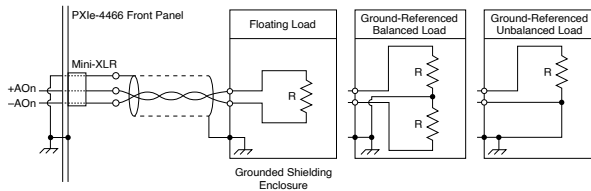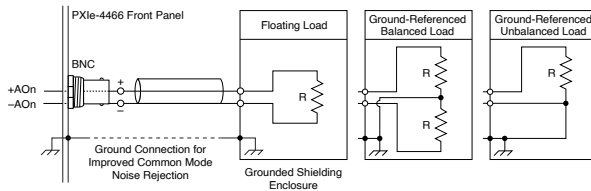**Figure 9.** PXIe-446**x** Recommended Output Connection

Figure 10. PXIe-446**x** BNC Recommended Output Connection

Troubleshooting

If an issue persists after you complete a troubleshooting procedure, search our KnowledgeBase for additional information our technical support engineers create as they answer common user questions and resolve unexpected issues.

What Should I Do if the PXIe-446**x** Does Not Appear in MAX?

1. In the MAX configuration tree, expand **Devices and Interfaces**.

2. Expand the **Chassis** tree to see the list of installed hardware, and press <F5> to refresh the list.

3. If the module is still not listed, power off the system, ensure that all hardware is correctly installed, and restart the system.

4. Navigate to the Device Manager.

Operating System	Description
Windows 10	Right-click the Start button, and select **Device Manager**.

5. Verify the PXIe-446**x** appears in the Device Manager.

    1. Under an NI entry, confirm that a PXIe-446**x** entry appears.

> **Note** If you are using a PC with a device for PXI remote control system, under **System Devices**, also confirm that no error conditions appear for the **PCI-to-PCI Bridge**.

2. If error conditions appear, reinstall the NI-DAQmx driver.

Why Is the ACCESS LED Off When the Chassis Is On?

The LEDs may not light until the module has been configured in MAX. Before proceeding, verify that the PXIe-446**x** appears in MAX.

If the ACCESS LED fails to light after you power on the chassis, a problem may exist with the chassis power rails, a hardware module, or the LED.

> **Notice** Apply external signals only while the PXIe-446**x** is powered on. Applying external signals while the module is powered off may cause damage.

1. Disconnect any signals from the module front panels.
2. Power off the chassis.
3. Remove the module from the chassis and inspect it for damage. Do not reinstall a damaged module.
4. Install the module in a different chassis slot from which you removed it.
5. Power on the chassis.

> **Note** If you are using a PC with a device for PXI remote control system, power on the chassis before powering on the computer.

6. Verify that the module appears in MAX.
7. Reset the module in MAX and perform a self-test.

What Should I Do if the PXIe-446x Fails the Self-Test?

1. Restart the system.
2. Launch MAX, and perform the self-test again.
3. Power off the chassis.
4. Reinstall the failed module in a different slot.
5. Power on the chassis.
6. Perform the self-test again.

[1] An external overvoltage, overcurrent, or overload error can be read through NI-DAQmx property nodes.