PXIe-8861

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Contents

This document includes instructions for installing and configuring your PXIe-8861 PXI Express controller module.

Getting Started

This section includes instructions for unpacking and installing your PXIe-8861 controller. It also describes the controller's front panel connectors.

> **Caution** Using the PXIe-8861 controller in a manner not described in this guide can impair the protection the controller provides.

Unpacking

The PXIe-8861 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 chassis before removing the device from the package.

   > **Caution** Never touch the exposed pins of connectors.

2. Remove the device from the package and inspect the device for loose components or any other sign of damage.
3. Notify National Instruments if the device appears damaged in any way. Do **not** install a damaged device into your chassis.

Installing the PXIe-8861 into a PXI Express Chassis

To install the PXIe-8861 into a PXI Express chassis, complete the following steps.

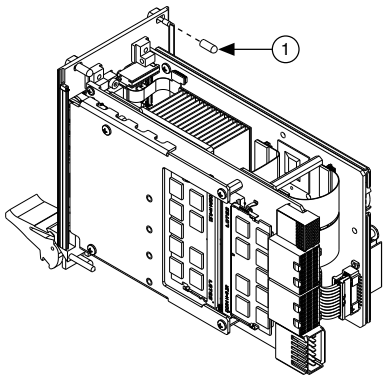
1. Plug in your chassis before installing the PXIe-8861. The power cord grounds the chassis and protects it from electrical damage while you install the module.

> **Caution** In some National Instruments chassis, you must ensure that the power LED is off. For more information about chassis power behavior, refer to the user manual for the specific chassis.

> **Caution** To protect both yourself and the chassis from electrical hazards, leave the chassis off until you finish installing the PXIe-8861.

2. Remove any panels blocking access to the system controller slot (Slot 1) in the chassis.
3. Touch the metal part of the chassis case to discharge any static electricity that might be on your clothes or body.
4. Remove the protective plastic covers from the four bracket-retaining screws as shown in the following figure.

   Figure 1. Removing Protective Plastic Covers

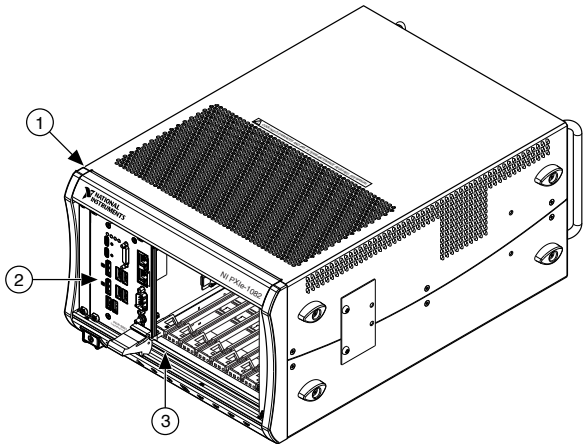
   1. Protective Screw Cap (4x)

5. Make sure the injector/ejector handle is in its downward position. Align the PXIe-8861 with the card guides on the top and bottom of the system controller slot.

> **Caution** Do **not** raise the injector/ejector handle as you insert the PXIe-8861. The module will not insert properly unless the handle is in its downward position so that it does not interfere with the injector rail on the chassis.

6. Hold the handle as you slowly slide the module into the chassis until the handle catches on the injector/ejector rail.
7. Raise the injector/ejector handle until the module firmly seats into the backplane receptacle connectors. The front panel of the PXIe-8861 should be even with the front panel of the chassis.
8. Tighten the four bracket-retaining screws on the top and bottom of the front panel to secure the PXIe-8861 to the chassis.
9. Check the installation.
10. Connect the keyboard and mouse to the appropriate connectors.
11. Connect the DisplayPort monitor video cable or adapter to the DisplayPort connector.
12. Connect devices to ports as required by your system configuration.
13. Power on the display.
14. Power on the chassis.
15. Verify that the controller boots. If it does not boot, refer to the **Troubleshooting** section.
    The following figure shows a PXIe-8861 controller installed in the system controller slot of an NI PXIe-1082 chassis.

Figure 2. PXIe-8861 Installed in a PXI Express Chassis



1. PXI Express Chassis
2. PXI Express Controller
3. Injector/Ejector Rail

Data Storage

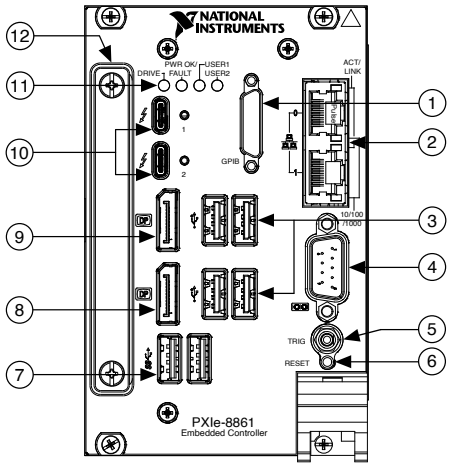
The PXIe-8861 has the following data storage features:

- M.2 NVMe internal solid state drive (500 GB or larger), or
- U.2 NVMe removable solid state drive (500 GB or larger)
- USB storage support—USB CD/DVD-ROM, mass storage device, or floppy drive

PXIe-8861 Front Panel

The following figure shows the PXIe-8861 front panel layout.

Figure 3. PXIe-8861 Front Panel Layout



1. GPIB
2. Ethernet
3. USB 2.0
4. RS-232 Serial
5. Trigger
6. Reset Button
7. USB 3.0
8. DisplayPort 1.1
9. DisplayPort 1.2
10. Thunderbolt
11. LEDs
12. Removable Hard Drive Shuttle (Removable Hard Drive Variant Only)

Front Panel Connectors

The following table lists various peripherals and their corresponding PXIe-8861 external connectors, bus interfaces, and functions.

Peripheral	External Connector	Description
Video (DisplayPort 1.1 and 1.2)	DisplayPort	ATI Radeon E6465 Embedded GPU

Peripheral	External Connector	Description
Thunderbolt 3	USB Type C (2 ports)	Thunderbolt 3 compliant, supports USB, PCI Express, and DisplayPort
Serial	COM1 (9-pin DSUB)	16550 RS-232 serial port
Ethernet Port 0	LAN (RJ45)	10/100/1000 Ethernet connection Intel I219 Wake on LAN
Ethernet Port 1	LAN (RJ45)	10/100/1000 Ethernet connection Intel I210
USB 2.0	USB 4-pin Series A stacked receptacle (4 ports)	Hi-Speed USB 2.0
USB 3.0	USB 9-pin Series A stacked receptacle (2 ports)	SuperSpeed USB, backwards compatible with USB 2.0
PXI trigger	Trigger (SMB)	Routing PXI triggers to or from the backplane trigger bus
GPIB	GPIB (25-pin Micro D)	General-Purpose Interface Bus, IEEE 488.2

Front Panel Features

The PXIe-8861 has two front panel LEDs that show PC status:

- DRIVE LED— Indicates when an access to the internal drive is occurring.
- PWR OK/FAULT LED—Indicates the controller status. The LED indicates one of the following states:
  - Green ON steady—PXI and onboard power is on and within regulation limits.
  - Green BLINKING—The controller has entered the soft off state and is safe to power down.

> **Note** This status is applicable only when the chassis is set to Manual.

  - Green FADING—The controller has entered the standby (S3) state.

- OFF—The controller is powered off.
- Red BLINKING—The controller detected a power rail fault when trying to boot.
- Red SOLID—The controller detected a thermal fault and has shut down to protect the system.

- USER LEDs — Two bi-color green/yellow LEDs (USER1 and USER2) that you can define to meet the needs of your LabVIEW application.

Removing the PXIe-8861 from a PXI Express Chassis

To remove the PXIe-8861 from a PXI Express chassis, complete the following steps.

1. Power off the chassis.
2. Remove any cables that may be attached to the controller front panel.
3. Unscrew the four bracket-retaining screws in the front panel.
4. Press the injector/ejector handle down.
5. Slide the unit out of the chassis.

Note If the PXI Express chassis Inhibit Mode Selector Switch is not in the Default position, any attempt to shut down the PXIe-8861 through the push button reset or using Windows will result in the controller Power OK LED blinking. The user must use the Remote Inhibit pin on the Remote Inhibit and Voltage Monitoring Connector to turn off the chassis. Refer to the PXI Express chassis user manual for details on the functionality of the Remote Inhibit and Voltage Monitoring controls.

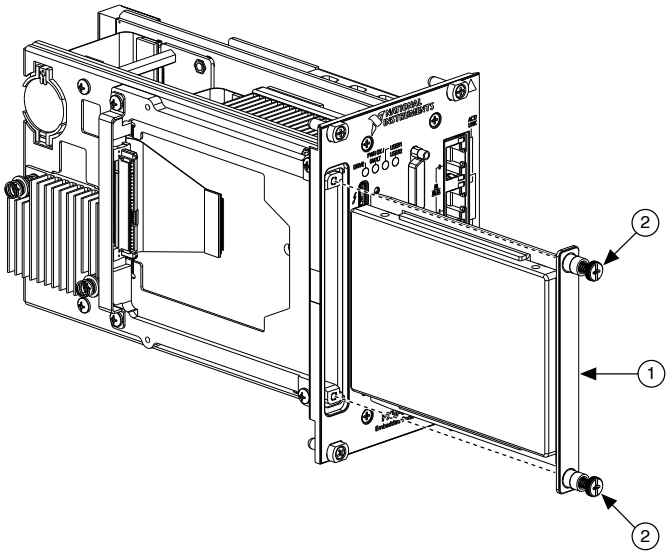
Installing the Removable Hard Drive (Removable Hard Drive Variant Only)

To install the removable hard drive, complete the following steps:

1. Hold the removable hard drive so that the top side is facing left, as shown in the following figure.

2. Insert the removable hard drive so that it is completely seated in its connector. The insertion resistance will increase for the final connector mate.
3. If the removable hard drive does not easily insert, do not force the drive. Check the alignment and try again.
4. Tighten the thumb screws. If the thumb screws do not thread, the removable hard drive may not be fully inserted. Try removing and completely inserting the removable hard drive.

Figure 4. Installing the Removable Hard Drive in a PXIe-8861 Controller



1. Removable Hard Drive
2. Thumb Screws (2x)

Removing the Removable Hard Drive (Removable Hard Drive Variant Only)

To remove the removable hard drive, complete the following steps:

1. Power off the chassis.
2. Loosen the thumb screws.
3. Unseat the removable hard drive from the connector and remove it from the slot.

Store the hard drive in the original antistatic packaging when not in use to avoid damage.

Common Configuration Questions

This section answers common configuration questions you may have when using a PXIe-8861 embedded controller.

What do the LEDs on the front panel mean?

Refer to the LED status descriptions in the **Front Panel Features** section.

How do I check the configuration of the memory, storage drive, time/date, and so on?

You can view these parameters in the BIOS setup utility. Complete the following steps to enter the BIOS setup:

1. Reboot the PXIe-8861.
2. Press <Delete> during the system boot up.

Can I use the internal storage drive and an external storage drive at the same time?

Yes.

What devices can I boot from?

The PXIe-8861 can boot from the following devices:

- The internal drive.
- An external SCSI hard drive or SCSI CD/DVD-ROM if a SCSI adapter, such as the PXI-8214, is used.
- A network PXE server on the same subnet.
- An external USB mass storage device such as a USB hard drive, USB CD/DVD-ROM, or USB flash drive.
- Most PCI or PCI Express-based devices that provide an Option ROM.

Note There are limitations when booting from a USB device. You can install Windows 7 and later from a USB CD/DVD-ROM, but not earlier versions of Windows. The PXIe-8861 BIOS configures the USB devices so that they work in a DOS environment.

How do I configure the controller to boot from these devices?

You can configure the controller to permanently or temporarily change the boot order.

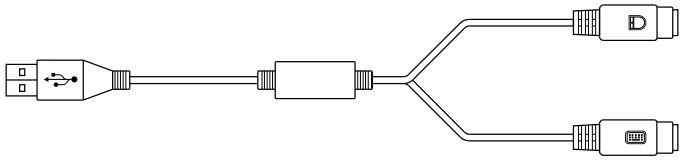
There are two methods.

- Enter Setup and select the Boot menu. You will see a list of all bootable devices, ordered by device type. You can set the boot order using <+> and <->. Set the order by device type and set the order for the devices listed within the device type.
- To boot from a different device without changing the boot order in the BIOS, press <F10> continuously while booting. After the BIOS completes the POST and just before the controller boots the OS, the Boot menu is displayed. You can select the device type you want to boot from.

How do I plug both a PS/2 mouse and PS/2 keyboard into the controller?

The PXIe-8861 has no PS/2 connector, and you need to use a USB Y-splitter cable as shown below, or a similar device, to connect both a PS/2 mouse and PS/2 keyboard. National Instruments part number 778713-02 is such a cable and is available through the online catalog at ni.com/products.

Figure 5. Y-Splitter Cable



How do I connect a VGA monitor to the PXIe-8861?

You can use a DisplayPort-to-VGA adapter (part number 782271-01) available from National Instruments to connect a VGA monitor to a DisplayPort connector.

How do I install or reinstall the video driver?

Refer to What Peripheral Drivers Should I Use with My PXI or VXI Controller? at ni.com/support.

How do I install or reinstall the Ethernet driver?

Refer to What Peripheral Drivers Should I Use with My PXI or VXI Controller? at ni.com/support.

How do I install software from a CD?

The compact size of the PXIe-8861 does not allow for an integrated USB CD/DVD-ROM drive. You have the following options:

- USB CD/DVD-ROM—You can install from a USB CD/DVD-ROM using a bootable installation CD.
- SCSI CD-ROM—Other types of CD-ROM drives are available. Check with the vendor to make sure Windows 10 supports the drive.
- Mapped network drive—You can use the Ethernet to connect to another computer. If you share the USB CD/DVD-ROM drive on the other computer, you can map the shared USB CD/DVD-ROM drive to a drive letter on the PXIe-8861.

A USB CD/DVD-ROM drive is available from National Instruments, part number 778492-01.

How do I upgrade system memory?

You can change the amount of installed RAM on the PXIe-8861 by augmenting or replacing the preinstalled SO-DIMM. Complete the following steps to replace the RAM.

1. Remove the PXIe-8861 from the PXI chassis.
2. Locate the SO-DIMM module on the side of the controller, as shown in the following figure.
3. Install the new SO-DIMM module into the slot.

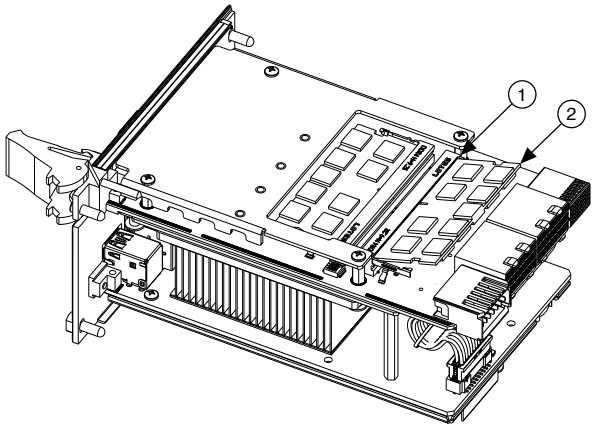
PXIe-8861 System Memory Information

National Instruments offers the following types of SO-DIMMs for use with the PXIe-8861 controller.

- 8 GB, 2133 MHz DDR4 PC4-17000 compatible (NI part number 786777-01)
- 16 GB, DDR4-2133 MHz PC4-17000 compatible (NI part number 786776-01)

Note National Instruments has tested and verified that the DDR4 SO-DIMMs listed above work with the PXIe-8861 controller. We recommend you purchase your SO-DIMM modules from National Instruments. Other off-the-shelf modules are not guaranteed to work properly.

Figure 6. Installing a SO-DIMM in a PXIe-8861 Controller



1. DDR4 SO-DIMM Socket
2. DDR4 SO-DIMM Module

How do I flash a new BIOS?

For more information, refer to Determining and Upgrading PXI and VXI Embedded Controller BIOS Versions.

Where do I get the latest software drivers?

The latest National Instruments software is available from ni.com/downloads. For peripheral drivers, refer to What Peripheral Drivers Should I Use with My PXI or VXI Controller? at ni.com/support.

Troubleshooting

This section answers common troubleshooting questions you may have when using the PXIe-8861 embedded controller.

What if the controller does not boot?

Several problems can cause a controller not to boot. Here are some things to look for and possible solutions.

Things to Notice:

- Which LEDs come on? The PWROK/FAULT LED should stay lit green. The Drive LED should blink during boot as the disk is accessed.
- What appears on the display? Does it hang at some particular point (BIOS, Operating System, and so on)? If nothing appears on the screen, try a different monitor. Does your monitor work with a different PC? If it hangs, note the last screen output that you saw for reference when consulting National Instruments technical support.
- What has changed about the system? Did you recently move the system? Was there electrical storm activity? Did you recently add a new module, memory chip, or piece of software?
- Refer to your chassis documentation for additional troubleshooting steps.

Things to Try:

- Make sure the chassis is plugged in to a working power source.
- Check any fuses or circuit breakers in the chassis or other power supply (possibly a UPS).
- Make sure the controller module is firmly seated in the chassis.
- Remove all other modules from the chassis.
- Remove any nonessential cables or devices.
- Try the controller in a different chassis.
- Try a similar controller in the same chassis.
- Clear the CMOS.
- Recover the internal drive on the controller.

- Make sure the RAM is properly seated.

What if I can't see the video?

If you can see the BIOS screen at boot time but do not see video from the OS, the video card output may be set past the monitor limits. To resolve the problem, start Windows in Safe Mode by booting the controller from your recovery media and verifying that Windows troubleshooting options are available. If you do not see your BIOS screen on boot up, check all cables, adapters, and monitor connections and power.

My system boots fine as long as a particular module is not in my chassis. How do I boot the chassis with the module installed?

The most common cause of this problem is a damaged module. Try the module in a different chassis or with a different controller. Also, remove any external cables or terminal blocks connected to the system. If the module does not work in these cases, it is likely damaged. Contact the module manufacturer for further troubleshooting.

What if some modules installed in a remote Thunderbolt chassis show up in Windows Device Manager with yellow exclamation points?

Thunderbolt does not allow peripherals to take advantage of legacy IO Space. Some devices (such as serial or Ethernet modules) may rely on IO Space, creating resource allocation issues in the system. These modules should not prevent boot or operation of other devices, but will not function using IO Space.

For more information, go to ni.com/support.

What if some devices, when installed in a system with many remote chassis, show up in Windows Device Manager with yellow exclamation points?

PCI Express systems are allocated 256 unique bus segments. The Thunderbolt 3 ports on the PXIe-8861 consume 50 segments each (two ports total), leaving the

residual segments for remote chassis connections. Disabling the Thunderbolt 3 ports from your PXIe-8861 BIOS allows those 100 bus segments to be allocated to remote chassis.

For more information, go to ni.com/support.

My chassis or controller does not appear in MAX. How do I use MAX to identify and configure my PXI system?

If you are using MAX to configure your PXI system, you must install the PXI Platform Services software on your controller to identify NI PXI and PXI Express chassis and modules in MAX. You can install PXI Platform Services from the software CD included with your controller or from ni.com/downloads.

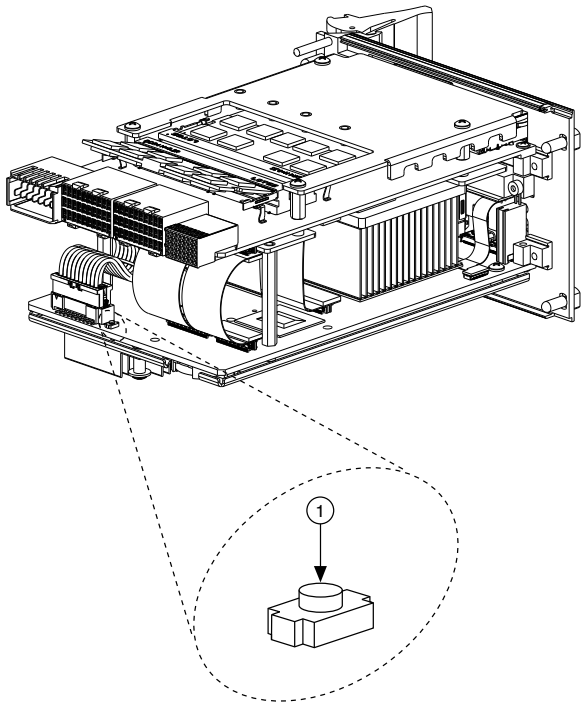
PXI Platform Services version 18.0 or later supports the PXIe-8861.

My CMOS is corrupted. How do I set it back to default?

There are two methods that you can use to reset the CMOS.

1. First Method
    1. Enter the BIOS setup program.
    2. Press <F9> to load BIOS defaults.
    3. Answer Y (Yes) to the verification prompt.
    4. Select Save and Exit Setup.
2. Second Method
    1. Power off the chassis.
    2. Remove the controller from the chassis.
    3. Press the Clear CMOS button (SW1) for 2 to 3 seconds as shown in the following figure.
    4. Reinstall the controller in the chassis.

Figure 7. Clearing the CMOS Contents



1. Push-Button Switch SW1

Worldwide Support and Services

The NI website is your complete resource for technical support. At ni.com/support, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit ni.com/services for information about the services NI offers.

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