PXIe-8822/42/ 62 User Manual

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Contents

PXIe-8822/42/62 User Manual

> ⚠️ **Caution** Using the PXIe-8822/42/62 controller in a manner not described in this guide can impair the protection the controller provides.

Unpacking

The PXIe-8822/42/62 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 NI if the device appears damaged in any way. Do **not** install a damaged device into your chassis.

Installing the PXIe-8822/42/62 into a PXI Express Chassis

To install the PXIe-8822/42/62 into a PXI Express chassis, complete the following steps.

1. Plug in your chassis before installing the PXIe-8822/42/62. The power cord grounds the chassis and protects it from electrical damage while you install the module.

   > ⚠️ **Caution** In some NI 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-8822/42/62.

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 (PXIe-8862 Shown)
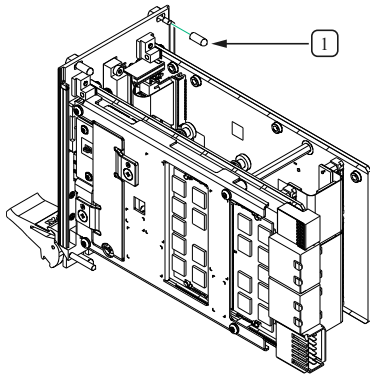
1. Protective Screw Cap (4x)

5. Make sure the injector/ejector handle is in its downward position. Align the PXIe-8822/42/62 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-8822/42/62. 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-8822/42/62 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-8822/42/62 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-8862 controller installed in the system controller slot of an NI PXI Express chassis.

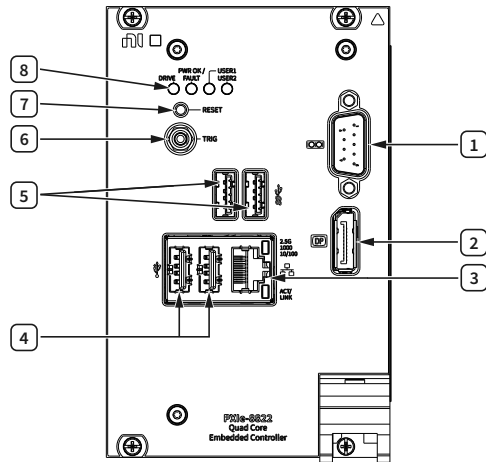Figure 2. PXIe-8862 Installed in a PXI Express Chassis
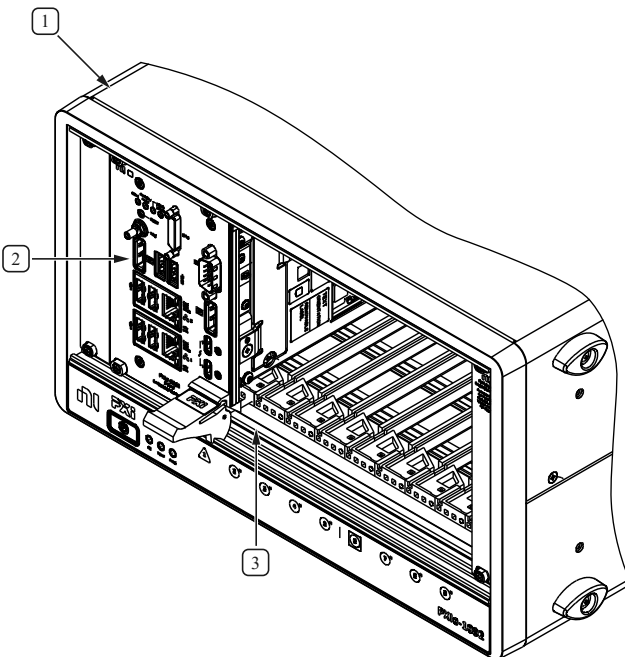
1. PXI Express Chassis

2. PXIe-8862 Controller

3. Injector/Ejector Rail
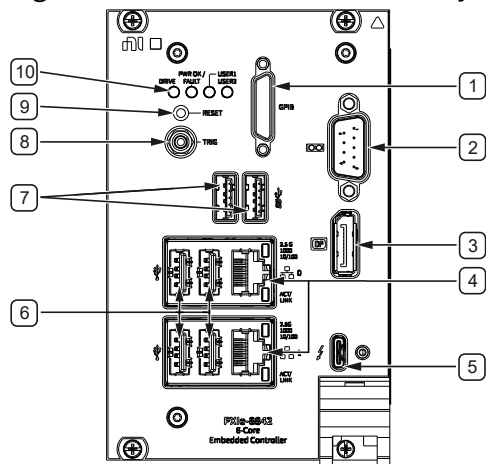
PXIe-8822/42/62 Front Panel

The following figures show the PXIe-8822/42/62 front panel layouts.

Figure 3. PXIe-8822 Front Panel Layout

1. RS-232 Serial
2. DisplayPort 1.4
3. Ethernet
4. USB 2.0
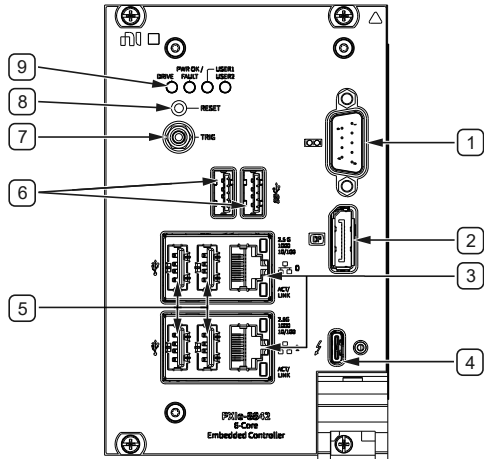5. USB 3.2
6. Trigger
7. Reset Button
8. LEDs

Figure 4. PXIe-8842 Front Panel Layout

1. GPIB
2. RS-232 Serial
3. DisplayPort 1.4
4. Ethernet
5. Thunderbolt 4

6. USB 2.0
7. USB 3.2
8. Trigger
9. Reset Button
10. LEDs

Figure 5. PXIe-8842 Without GPIB Front Panel Layout

1. RS-232 Serial
2. DisplayPort 1.4
3. Ethernet
4. Thunderbolt 4
5. USB 2.0
6. USB 3.2
7. Trigger
8. Reset Button
9. LEDs

Figure 6. PXIe-8862 Front Panel Layout

1. GPIB
2. RS-232 Serial
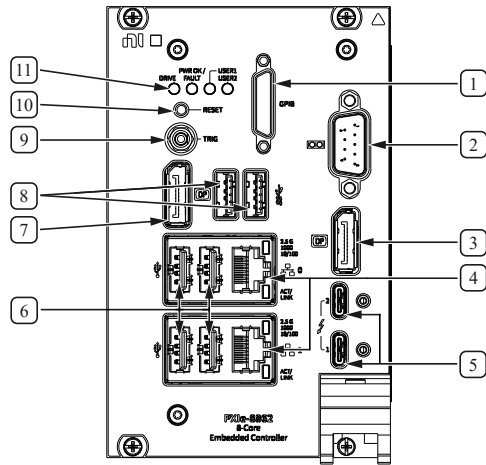3. DisplayPort 1.4
4. Ethernet
5. Thunderbolt 4
6. USB 2.0
7. DisplayPort 1.4
8. USB 3.2
9. Trigger
10. Reset Button
11. LEDs

Figure 7. PXIe-8862 Without GPIB Front Panel Layout
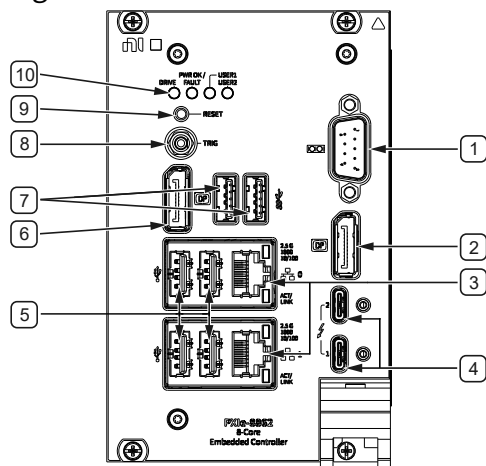
1. RS-232 Serial
2. DisplayPort 1.4

3. Ethernet
4. Thunderbolt 4
5. USB 2.0
6. DisplayPort 1.4
7. USB 3.2
8. Trigger
9. Reset Button
10. LEDs

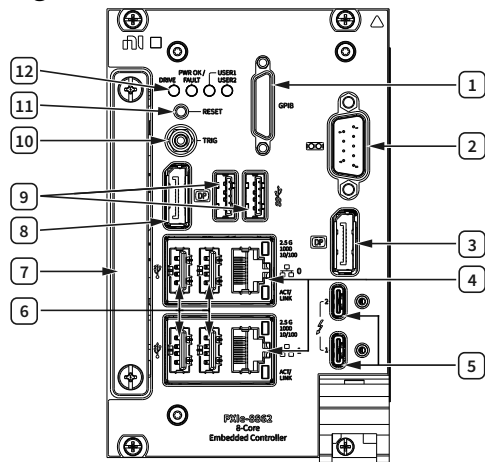Figure 8. PXIe-8862 With Removable Hard Drive Front Panel Layout

1. GPIB
2. RS-232 Serial
3. DisplayPort 1.4
4. Ethernet
5. Thunderbolt 4
6. USB 2.0
7. Removable Hard Drive
8. DisplayPort 1.4
9. USB 3.2
10. Trigger
11. Reset Button
12. LEDs

Figure 9. PXIe-8862 With Removable Hard Drive and Without GPIB Front Panel Layout
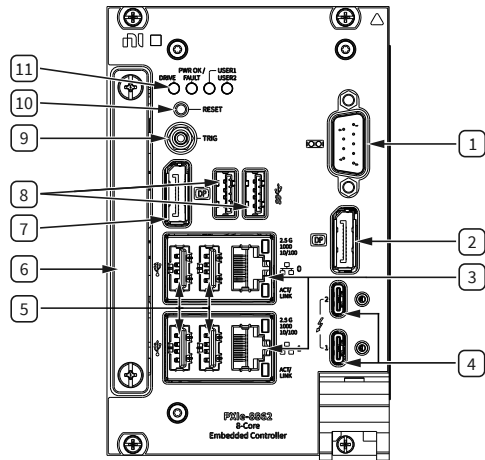
1. RS-232 Serial
2. DisplayPort 1.4
3. Ethernet
4. Thunderbolt 4
5. USB 2.0
6. Removable Hard Drive
7. DisplayPort 1.4
8. USB 3.2
9. Trigger
10. Reset Button
11. LEDs

Front Panel Connectors

The following table lists various peripherals and their corresponding PXIe-8822/42/62 external connectors, bus interfaces, and functions.

Peripheral	External Connector	Description
Video (DisplayPort 1.4)	DisplayPort	Intel HD Graphics
Thunderbolt 4	USB Type C (2 ports)	Thunderbolt 4 compliant, supports USB, PCI Express, and DisplayPort
Serial	COM1 (9-pin DSUB)	RS-232 serial port
Ethernet Port 0	LAN (RJ45)	10M/100M/1000M/2.5G

Peripheral	External Connector	Description
		Ethernet connection Intel I225 Wake on LAN supported
Ethernet Port 1	LAN (RJ45)	10M/100M/1000M/2.5G Ethernet connection Intel I225 Wake on LAN supported
USB 2.0	USB 4-pin Series A stacked receptacle (4 ports)	Hi-Speed USB 2.0
USB 3.2 Gen 1	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-8822/42/62 has two front panel LEDs that show PC status and two user LEDs:

- 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 Inhibit Mode**.

  - Green FADING—The controller has entered the sleep (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.

The following table lists and describes the 10M/100M/1000M/2.5G LAN connector LED states.

Table 1. 10M/100M/1000M/2.5G LAN Connector LED States

LED	Color	LED State	Condition
2.5G 1000 10/100	Green	On	2.5 Gb/s data rate is selected
	Amber	On	1000 Mb/s data rate is selected
	Unlit	Off	10/100 Mb/s data rate is selected
ACT/LINK	Unlit	Off	LAN link is not established
	Green	On (steady state)	LAN link is established
		On (pulsing)	The controller is communicating with another device on the LAN

Removing the PXIe-8822/42/62 from a PXI Express Chassis

To remove the PXIe-8822/42/62 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-8822/42/62 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. For chassis without a Remote Inhibit pin, turn off the chassis AC power.

BIOS Setup Utility

You can change the PXIe-8822/42/62 configuration settings in the BIOS setup program.

Most users do not need to use the BIOS setup program, as the PXIe-8822/42/62 controller ships with default settings that work well for most configurations.

> **Caution** Changing BIOS settings may lead to incorrect controller behavior and possibly an unbootable controller. If this happens, follow the instructions for restoring default settings in the *System CMOS* section. In general, do *not* change a setting unless you are absolutely certain what it does.

Accessing BIOS Setup Utility

1. Power on or restart your PXIe-8822/42/62 controller.
2. When the message `Press <DEL> to enter setup` appears, press the <Delete> key. The setup program loads after a short delay.

The Main menu is displayed when you first enter the BIOS setup program.

Use the following keys to navigate through the BIOS setup program:

- Left Arrow, Right Arrow—Use these keys to move between the different setup menus. If you are in a submenu, these keys have no effect, and you must press <Esc> to leave the submenu first. (To use the arrows on the numeric keypad, you must turn off Num Lock.)

- Up Arrow, Down Arrow—Use these keys to move between the options within a setup menu. (To use the arrows on the numeric keypad, you must turn off Num Lock.)
- <Enter>—Use this key either to enter a submenu or display all available settings for a highlighted configuration option.
- <Esc>—Use this key to return to the parent menu of a submenu. At the top-level menus, this key serves as a shortcut to a `Quit without Saving?` prompt.
- <+> and <–>—Use these keys to cycle between all available settings for a selected configuration option.
- <Tab>—Use this key to select time and date fields.
- <F9>—Use this key to load the optimal default values for BIOS configuration settings. The optimal default values are the same as the shipping configuration default values.

Main Setup Menu

The most commonly accessed and modified BIOS settings are in the Main setup menu. The Main setup menu reports the following configuration information:

- BIOS Version and Build Date
- Embedded Firmware Version
- Processor Type, Base/Max Processor Frequency, and Active Processor Cores
- Microcode Revision
- Total Memory and Frequency
- PXIe Chassis Information—These values indicate the overall chassis link configuration, the link width of each link, and the link speed of each link.

The Main setup menu also includes the following settings:

- System Date—This setting controls the date, which is stored in a battery-backed real-time clock. Most operating systems also include a way to change this setting. Use <+> and <-> in conjunction with <Enter> and <Tab> to change these values.
- System Time—This setting controls the time of day, which is stored in a battery-backed real-time clock. Most operating systems include a way to change this setting. Use <+> and <-> in conjunction with <Enter> and <Tab> to change these values.

Advanced Setup Menu

This menu contains BIOS settings that normally do not require modification. If you have specific problems such as unbootable disks or resource conflicts, you may need to examine these settings.

> ⚠️ **Caution** Changing settings in this menu may result in an unstable or unbootable controller. If this happens, follow the procedures outlined in the **System CMOS** section to restore BIOS settings to their factory defaults.

The Advanced setup menu includes the following settings and submenus:

- System Profile Configuration—Refer to the **System Profile Configuration Submenu** section for more information.
- CPU Configuration—Refer to the **CPU Configuration Submenu** section for more information.
- Video Configuration—Refer to the **Video Configuration** Submenu section for more information.
- Power/Wake Configuration—Refer to the **Power/Wake Configuration Submenu** section for more information.
- PCI Configuration—Refer to the **PCI Configuration Submenu** section for more information.
- USB Configuration—Refer to the **USB Configuration Submenu** section for more information.
- Thunderbolt Configuration—Refer to the **Thunderbolt Configuration Submenu** section for more information.
- TPM Configuration—Refer to the **TPM Configuration Submenu** section for more information.
- UEFI Network Boot Configuration—Use this setting to view and configure the network boot, such as the UEFI HTTP boot and UEFI iSCSI Boot. Refer to the **UEFI Network Boot Configuration Submenu** section for more information.

System Profile Submenu

Use this submenu to apply alternate settings.

- System Profile—This setting selects the profile for performance optimized, OS defined, or customized settings. OS defined means the BIOS depends on the OS installed to optimize settings for performance or Real Time OS.

CPU Configuration Submenu

Use this submenu to apply alternate settings to the CPU.

- Hyper Threading—This setting enables or disables Intel Hyper-Threading technology. The default value is Enabled. Enabling Hyper-Threading increases performance for some applications by adding virtual CPU cores. Hyper-Threading can increase application jitter, so be careful when enabling this setting on a Real Time system. When the BIOS is configured to boot LabVIEW Real-Time, Hyper-Threading is disabled automatically. This setting will be grayed out if system profile is OS defined.
- C-States—This setting enables or disables CPU power management. The default value is Enabled. Enabling C-States allows the processor to put idle CPU cores to sleep, allowing active cores to run at higher than base frequencies when Turbo Boost is enabled. Enabling C-States can increase application jitter, so be careful when enabling this setting on a Real Time system. When the BIOS is configured to boot LabVIEW Real-Time, C-States are disabled automatically.
- Turbo Boost—This setting enables or disables Intel Turbo Boost technology. The default is Enabled. Enabling Turbo Boost allows CPU cores to run at higher than their base frequency for short durations, while other cores are idle. Enabling Turbo Boost can also increase application jitter, so be careful when enabling this setting on a LabVIEW Real-Time system. To achieve maximum possible Turbo Boost frequencies, also enable the C-States setting.
- Adjacent Cache Line Prefetcher—This setting enables or disables the processor mechanism to fetch the adjacent cache line within a 128-byte sector that contains the data needed due to a cache line miss.
- Hardware Prefetcher—This setting enables or disables the processor mechanism to prefetch data into the cache according to a pattern-recognition algorithm.
- VT-D—This setting enables or disables the Intel Virtualization technology for directed I/O.
- Kernel DMA Protection—This setting enables or disables the Kernel DMA protection in Windows through an ACPI table.
- Total Memory Encryption—This setting enables or disables the Total Memory Encryption in the BIOS.

Video Configuration Submenu

Use this submenu to apply alternate settings to the video configuration.

- Primary Display—This setting specifies which video adapter the BIOS should use as the primary adapter if more than one is present. To use an external video adapter as the primary graphics adapter, choose Offboard Video. The default value is Onboard Intel Video.

Power/Wake Configuration Submenu

Use this submenu to apply alternate configurations to the power and wake features of the chipset and controller.

- Restore After Power Loss—This setting specifies the power state that the controller should return to after AC power is lost. Valid values are Stay Off and Turn On. The default is Stay Off. When set to Stay Off, the controller returns to the soft off power state after AC power is restored. When set to Turn On, the controller powers on when AC power is restored.
- Power Button Off Behavior—This setting specifies how the PXI Express power button should behave. Valid options are Enabled and Disabled. The default value is Enabled. When set to Enabled, the OS controls the power button. When set to Disabled, pressing the power button has no effect. The Disabled option should be used only in conjunction with the PXI Express chassis' inhibit mode switch.
- PXIe Backplane WAKE#—This setting enables or disables a PXI Express peripheral module's ability to wake a soft off system. The default value is Disabled.
- SMBus ALERT#—This setting enables or disables a System Management device's ability to wake a soft off system by asserting the ALERT# signal. The default value is Disabled.

PCI Configuration Submenu

Use this submenu to apply alternate settings to PCI devices.

- 64-Bit Memory Mapped IO—This setting enables or disables support for memory-mapped I/O above the 4 GB boundary. It can be useful when using a 64-bit OS and a large number of PCI devices. The default value is Enabled.
- PCIe Max Payload Size—This setting determines the maximum payload size of PCI Express devices. Valid options are Auto and 128 Bytes. The default value is Auto,

which allows the BIOS to choose an optimal value based on which devices are present.

- PCIe Max Read Request Size—This setting determines the maximum size of memory read requests for PCI Express devices. Valid options range from 128 bytes to 4096 bytes. The default value is 4096 bytes, which allows the BIOS to choose an optimal value based on which devices are present.
- PCI System Error Reporting—This setting enables/disables reporting of PCI system errors. The default value is Enabled.

USB Configuration Submenu

Use this submenu to apply alternate configurations to the USB ports.

- **USB Devices**—This item lists the total number of devices detected in the system, categorized by device type.
- **Legacy USB Support**—This setting specifies whether legacy USB support is enabled. Legacy USB support refers to the ability to use a USB keyboard and mouse during system boot or in a legacy operating system such as DOS. The default value is **Enabled**. This option is disabled automatically when booting LabVIEW Real-Time to reduce application jitter.
- **Overcurrent Reporting**—This setting allows the BIOS to notify the operating system of any USB ports which sources too much current. The default value for this setting is **Disabled**.
- **Transfer Timeout**—This setting specifies the timeout value for Control, Bulk, and Interrupt USB transfers. The default value for this setting is 20 seconds.
- **Device Reset Timeout**—This setting specifies the number of seconds the Power-On Self Test waits for a USB mass storage device to start. The default is 20 seconds.
- **Device Power-Up Delay**—This setting specifies the maximum time a device takes before it properly reports itself to the host controller. When set to **Auto**, a root port is granted 100 ms, and for a hub port, the delay value is taken from the hub descriptor. When set to **Manual**, you can set the delay manually. The default value for this setting is **Auto**.
- **Device Power-Up Delay in Seconds**—This setting specifies the number of seconds the Power-On Self Test waits for a USB device or hub to power on. This setting is visible only if **Device Power-Up Delay** is set to **Manual**. The default is 5 seconds.

In addition, the following option is available for each detected device if a USB mass storage device is present:

- **Emulation Type**—This setting specifies how the BIOS presents the USB mass storage device to the system. You can use this option to present a USB mass storage device as a floppy, Zip, hard disk, or CD-ROM drive. The default is **Auto**, which allows the BIOS to treat small USB flash disk drives as floppy drives and larger USB flash disk drives as hard disk drives.

Thunderbolt Configuration Submenu

Use this submenu to enable or disable Thunderbolt support and configure the Thunderbolt security level.

- **Control IOMMU Pre-Boot Behavior**—This option enables or disables IOMMU pre-boot behavior. The default value is **Enabled**. You may want to disable this option when certain PXI Express cards or eGPU do not support IOMMU being present in the system.
- **ITBT Port Configuration**—Use this option to bring up ITBT per port configuration. Use this option to enable or disable Thunderbolt ports and reconfigure Thunderbolt resources per port.

TPM Configuration Submenu

Use this submenu to view the Trusted Platform Module (TPM) hardware type and execute selected TPM commands.

- **Clear TPM**—Use this option to clear the TPM.

> ⚠️ **Caution** Clearing the TPM is a destructive operation that may result in the loss of all data protected by the TPM device.

TPM Physical Presence Confirmation Screen

Some TPM commands may require confirmation of physical presence before they can be executed. In this case, the system will reboot and the BIOS will present a screen asking for confirmation to execute the TPM command. You can confirm or reject the execution of the TPM command.

UEFI Network Book Configuration Submenu

Use this submenu to view and configure the UEFI iSCSI network boot. To access iSCSI Configuration and do the configuration, set the PXE Network Boot submenu under the Boot Setup menu to UEFI, then save and reset.

- iSCSI Configuration—This setting provides the functions to configure iSCSI virtual drives in the UEFI BIOS Setup Utility iSCSI screens.

    > ✎ **Note** iSCSI Configuration is grayed out if you do not set the PXE Network Boot submenu to UEFI.

    There are four child submenus:

    - iSCSI Initiator Name—Use this setting to specify the iSCSI initiator name in iSCSI Qualified Name (iqn) format. For example, iqn.1988-12.com.oracle:0010e02e458f.
    - Add an Attempt—Use this setting to connect to an iSCSI virtual drive. All the available network adapter MAC addresses are shown. Select the network adapter MAC address configured in the iSCSI server.

        > ✎ **Note** To see the network adapter MAC address, you must set the PXE Network Boot submenu to UEFI and then save and reset.)

        After you select the network adapter MAC address, the Port Configuration screen appears. Complete the following steps to set the port configuration.

        1. Set the iSCSI Mode property to Enabled.

        2. Set the Internet Protocol property to IPv4.

        3. Set the Connection Retry Count property to 1.

        4. Set the Enable DHCP property to Enabled or Disabled to specify an addressing method for the iSCSI initiator.

        5. If you set the Enable DHCP property to Disabled, specify the Initiator IP Address, Initiator Subnet Mask, and Gateway. (Use the same subnet.)

6. Specify the Target Name in iSCSI Qualified Name (iqn) format. For example, iqn.1988-12.com.oracle:X6-2-target.

7. Specify the Target IP Address, Target Port, and Boot LUN.

Note When iSCSI is enabled on a network port, PXE is disabled for that port.

8. Set the Authentication Type property to CHAP or None.

9. Select Save Changes.

Note The Attempt 1 submenu is shown below the Add attempt submenu now.

10. Press the <F10> key to save your changes and reset the controller.

○ Delete Attempts—Use this setting to remove an existing attempt. To remove the attempt, select Attempt X and set it to Enabled. Then select Commit Changes and Exit to remove the selected attempt or select Discard Changes and Exit to exit the Delete Attempts submenu.
○ Change Attempt Order—Use this setting to change the order of attempts. Press the <Enter> key to open the attempt order list. Use the arrow keys to select the attempt, then press the <+> or <-> keys to move the attempt up/down in the attempt order list. Select Commit Changes and Exit to confirm the changes or select Discard Changes and Exit to exit the Change Attempt Order submenu.

Boot Setup Menu

Use this menu to configure settings related to the boot process and boot device priority.

- **Boot Settings Configuration**—Use this setting to access the **Boot Settings Configuration** submenu. Refer to the ***Boot Settings Configuration Submenu*** section for more information.
- **Network Boot**—This setting specifies whether the UEFI network stack is enabled. When enabled, the HTTP/HTTPs boot and UEFI PXE boot options appear and allow

you to boot from a PXE server or HTTP/HTTPS on the local subnet. You can configure the HTTP/HTTPS boot from the **UEFI Network Boot Configuration** submenu to boot into desired devices. The default value is **Disabled**.

Boot Settings Configuration Submenu

Use this submenu to apply alternate configurations to boot settings. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration.

- **Setup Prompt Timeout**—This setting specifies the number of seconds the system waits for a BIOS Setup menu keypress (the <Delete> key). The default value is **2**.
- **Bootup NumLock State**—This setting specifies the power-on state of the keyboard NumLock setting. The default value is **On**.

Security Menu

Use this menu to enable BIOS security options.

- **Administrator Password**—This setting specifies a password that must be entered to access the BIOS Setup Utility. If only the Administrator's password is set, this setting limits access to only the BIOS setup program and is asked for only when entering the BIOS setup program. By default, no password is specified.
- **User Password**—This setting specifies a password that must be entered to access the BIOS Setup Utility or boot the system. If only the user's password is set, this is a power on password and must be entered to boot or enter the BIOS setup program. In the BIOS setup program, the user has Administrator rights. By default, no password is specified.
- **Secure Boot**—Use this menu to enable or disable secure boot. If factory keys are not installed, install the factory keys from the **Secure Boot** submenu before turning on secure boot. There are two profiles for secure boot: standard or custom. Standard installs the default keys from the system, while custom allows you to freely install user-defined keys.

Save & Exit Menu

The **Save & Exit** setup menu includes all available options for exiting, saving, and loading the BIOS default configuration. As an alternative to this screen, press <F9> to

load optimal BIOS default settings and <F10> to save changes and exit setup.

The **Save & Exit** setup menu includes the following settings:

- **Save Changes and Reset**—Any changes made to BIOS settings are stored in NVRAM. The setup program then exits and reboots the controller. You also can use the <F10> key to select this option.
- **Discard Changes**—Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The BIOS setup continues to be active.
- **Restore Factory Defaults**—This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting. Notice that any nondefault settings such as boot order, passwords, and so on also are restored to their factory defaults. You also can use the <F9> key to select this option.
- **Save As User Defaults**—This option saves a copy of the current BIOS settings as the User Defaults. This option is useful for preserving custom BIOS setup configurations.
- **Restore User Defaults**—This option restores all BIOS settings to the user defaults. This option is useful for restoring previously preserved custom BIOS setup configurations.
- **Boot Override**—This option lists all possible bootable devices and allows the user to override the **Boot Option Priorities** list for the current boot. If no changes have been made to the BIOS setup options, the system continues booting to the selected device without first rebooting. If BIOS setup options have been changed and saved, a reboot is required and the boot override selection is not valid.

Boot Options

The PXIe-8822/42/62 can boot from the following devices:

- The internal drive.
- A network PXE or iSCSI 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 a UEFI Option ROM.

There are two ways to configure the controller to boot from these devices:

- Enter the BIOS setup by rebooting the controller and pressing <Delete> during the memory tests. Select the **Boot** menu. You will see a list of all bootable devices, ordered by device type. You can set the boot order by altering the **1st Boot Device**, **2nd Boot Device**, and **3rd Boot Device** settings.
- To boot from a different device without permanently changing the boot order, press <F10> during POST. 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.

Hard Drive Recovery

You can recover the PXIe-8822/42/62 system using NI external recovery media (refer to the following part numbers) or Windows Recovery tools.

- 787269-**xx** for Windows 10 IOT Enterprise GAC
- 788832-**xx** for Windows 11 IOT Enterprise GAC
- 789623-**xx** for Windows 10 IOT Enterprise LTSC
- 787269-**xx** for Windows 11 IOT Enterprise LTSC

> **Note** Controllers shipped starting September 2025 use Windows LTSC version and require LTSC recovery media.

> **Note** Recovering the OS erases the contents of your hard disk. Back up any files you want to keep.

Common Configuration Questions

This section answers common configuration questions you may have when using a PXIe-8822/42/62 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-8822/42/62.
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-8822/42/62 can boot from the following devices:

- The internal drive.
- A network PXE or iSCSI 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.

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

There are three methods to configure the controller to change the boot order permanently or temporarily:

- Enter BIOS 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 then 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, enter BIOS Setup and select the Save & Exit menu. In the Boot Override section, select your desired boot entry.
- 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 in the Boot menu.

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

The PXIe-8822/42/62 does not have a PS/2 connector. Use a USB Y-splitter cable, such as NI part number 778713-02, or a similar device to connect both a PS/2 mouse and PS/2 keyboard.

Figure 10. Y-Splitter Cable
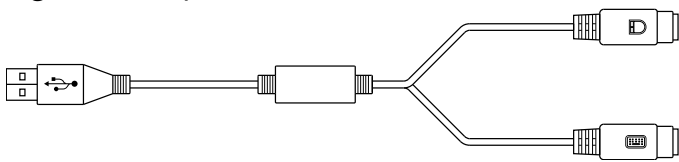
How do I connect a VGA monitor to the PXIe-8822/42/62?

You can use a DisplayPort-to-VGA adapter available from NI to connect a VGA monitor to a DisplayPort connector.

How do I install or reinstall the video driver?

You can download the latest Intel Graphics driver for 11th Gen Intel Core Processor from the Intel website.

How do I install or reinstall the Ethernet driver?

You can download the latest i225-IT driver for Windows 10 and Windows 11 from the Intel website.

How do I install software from a CD?

The compact size of the PXIe-8822/42/62 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.
- **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-8822/42/62.

A USB CD/DVD-ROM drive is available from NI (part number 778492-01).

How do I upgrade system memory?

You can change the amount of installed RAM on the PXIe-8822/42/62 by augmenting or replacing the preinstalled SO-DIMM. Complete the following steps to replace the RAM.

1. Remove the PXIe-8822/42/62 from the PXI chassis.
2. Locate the SO-DIMM sockets on the side of the controller, as shown in the following figures.
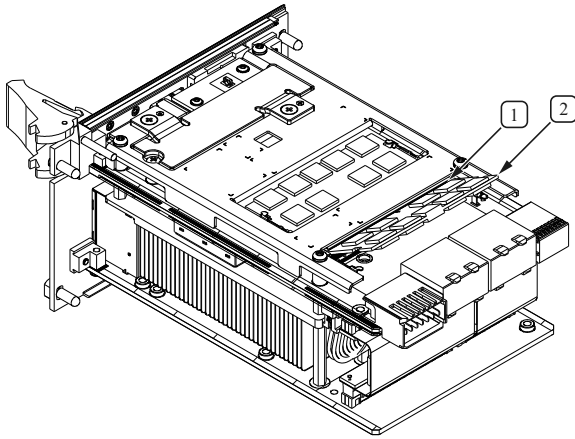3. Install the new SO-DIMM module into the slot.

Figure 11. Installing a SO-DIMM in a PXIe-8822/42 Controller (PXIe-8822 Shown)
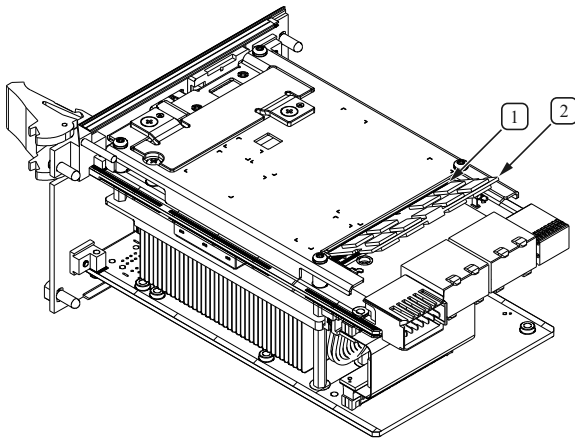
1. DDR4 SO-DIMM Socket
2. DDR4 SO-DIMM Module

Figure 12. Installing a SO-DIMM in a PXIe-8862/PXIe-8862 with Removable Hard Dive Controller

(PXIe-8862 Shown)

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

PXIe-8822/42/62 System Memory Information

NI offers the following types of SO-DIMMs for use with the PXIe-8822/42/62 controller.

- PXIe-8822/42—16 GB, DDR4 3200 MHz non-ECC SODIMM (NI part number 788899-01)
- PXIe-8862—2x 16 GB, DDR4 3200 MHz non-ECC SODIMM (NI part number 788900-01)

Note NI has tested and verified that the DDR4 SO-DIMMs listed above work with the PXIe-8822/42/62 controller. We recommend you purchase your SO-DIMM modules from NI. Other off-the-shelf modules are not guaranteed to work properly.

How do I upgrade or replace the storage drive?

NI offers the following types of SSD for use with the PXIe-8822/42/62 controller.

- PXIe-8822/42/62
  - 512 GB, M.2 80 mm NVMe SSD (NI part number 788897-01)
  - 1 TB, M.2 80 mm NVMe SSD (NI part number 788898-01)
- PXIe-8862 Removable Drive variant – 960 GB U.2 NVMe SSD (NI part number 787247-01)

Replacing the M.2 Hard Drive

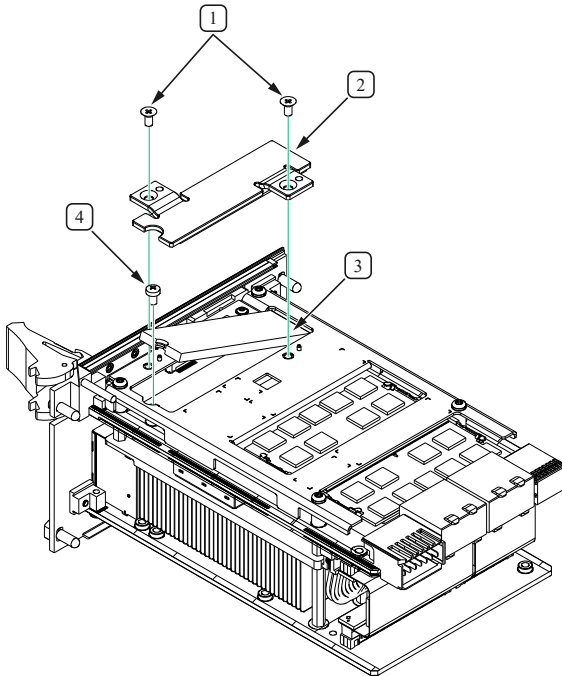Complete the following steps to replace the M.2 hard drive:

1. Power off the chassis.
2. Remove the PXIe-8822/42/62 controller from the chassis.
3. Remove the M.2 heat spreader screws using a #1 Phillips screwdriver, as shown in the following figure.
4. Remove the M.2 heat spreader.
5. Remove the M.2 hard drive screw using a #1 Phillips screwdriver.
6. Unseat and remove the M.2 hard drive from the connector.
7. Insert the new M.2 hard drive and press it into the connector.
8. Replace the M.2 hard drive screw and tighten to 6.7 lb · in.
9. Replace the M.2 heat spreader.
10. Replace the M.2 heat spreader screws and tighten to 6.7 lb · in.

Figure 13. Replacing the PXIe-8822/42 M.2 Hard Drive (PXIe-8822 Shown)
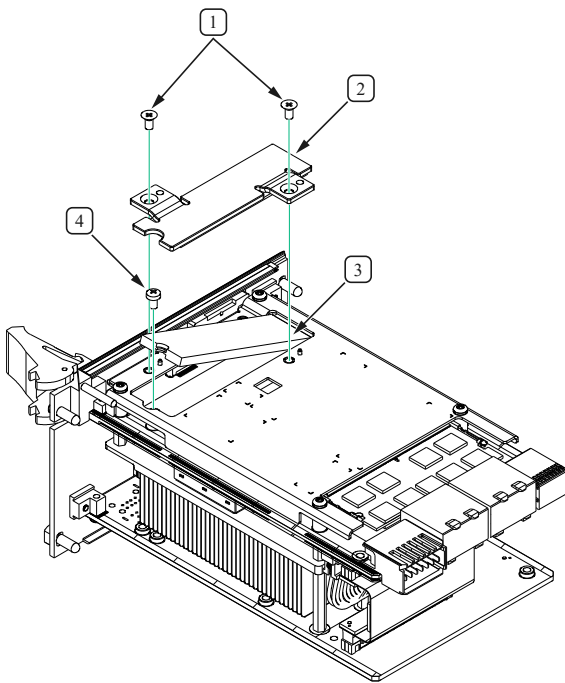
1. M.2 Heat Spreader Phillips Screws
2. M.2 Heat Spreader
3. M.2 Hard Drive
4. M.2 Hard Drive Phillips Screw

Figure 14. Replacing the PXIe-8862 M.2 Hard Drive

1. M.2 Heat Spreader Phillips Screws
2. M.2 Heat Spreader
3. M.2 Hard Drive
4. M.2 Hard Drive Phillips Screw

Replacing the PXIe-8862 Removable Hard Drive (Removable Hard Drive Variant Only)

Complete the following steps to install the removable hard drive:

1. Power off the chassis.
2. Loosen the removable hard drive thumb screws using a #2 Phillips screwdriver.
3. Unseat the removable hard drive from the connector and remove it from the slot.
4. Hold the new removable hard drive so that the top side is facing left, as shown in the following figure.
5. Insert the new removable hard drive until it is completely seated in its connector. The insertion resistance will increase for the final connector mate.

> ✏️ **Note** If the removable hard drive does not insert easily, do not force the drive. Check the alignment and try again.

6. Tighten the thumb screws using a #2 Phillips screwdriver.

> ✎ **Note** 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 15. Installing the Removable Hard Drive in a PXIe-8862 with Removable Drive
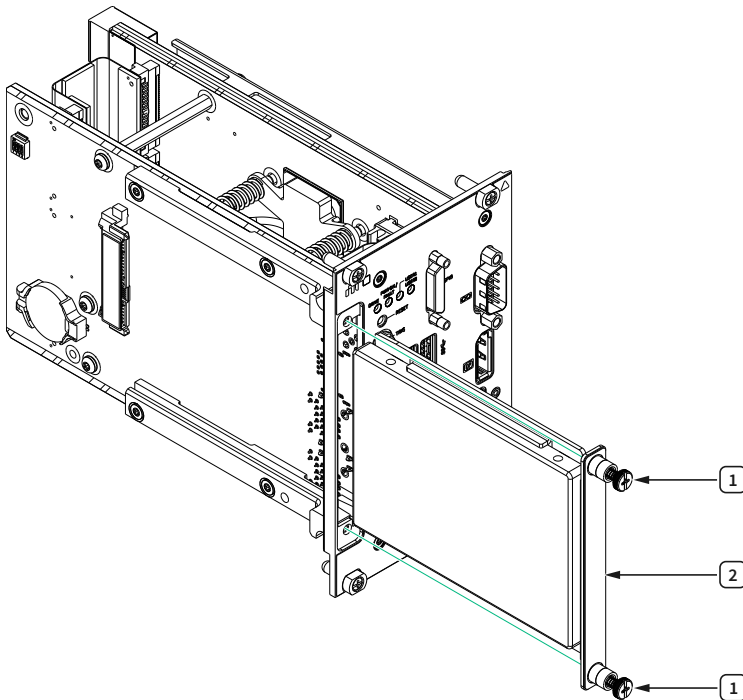
1. Thumb Screws
2. Removable Hard Drive

How do I flash a new BIOS?

For more information, refer to [Determining and Upgrading PXI and VXI Embedded Controller BIOS Versions](#).

Known Issues

A PCI Express Link Connected to a Retimer May Fail to Link Up on Chassis with Gen 1 or Gen 2 PCI Express Switches

Impacted PCI Express links:

- 2-link mode: link 1
- 4-link mode: link 1 and link 2

Workaround:

- Power cycle the system.
- Apply a possible workaround in the PCI Express switch errata to disable capture of TCB training sets to reduce the failure rate to about 2%. However, this requires a PCI Express switch EEPROM update. The EEPROM update is not tested with other shipping controllers.

A PCI Express Link Connected to a Retimer May Go Down After a Secondary Bus Reset or Link Disable on Gen 1 or Gen 2 Switches

Impacted PCI Express links:

- 2-link mode: link 1
- 4-link mode: link 1 and link 2

Workaround:

Assert a secondary bus reset or link disable from the upstream port of the module itself instead of asserting from the CPU root complex.

Streaming Performance is Poor in x4 Mode When There Are Many Memory Read Requests to the CPU

Issue:

The streaming performance may drop by about 50% if the link is operated at x4 or lower link width and there are many memory read requests to the CPU. The issue is due to CPU limitations on bifurcated PCI Express links.

Known impacted chassis:

All chassis that work in x4 or lower link width.

Workaround:

Use x8 links chassis for maximum streaming performance.

Compatibility Issues with eGPUs

Issue:

The controller may fail to boot or cannot enumerate the monitor connected when connected to an eGPU. The issue happens because the PXIe-8822/42/62 supports only UEFI graphics cards that support IOMMU. There is no support for legacy graphics cards.

Workaround:

- Use a UEFI graphics card with IOMMU support.
- To use a UEFI graphics card without IOMMU support, change the IOMMU setting under the **Thunderbolt Configuration** submenu to allow the eGPU to work properly with the PXIe-8822/42/62.

Troubleshooting

This section answers common troubleshooting questions you may have when using the PXIe-8822/42/62 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 and cable/adapter. Does your monitor work with a different PC? If it hangs, note the last screen output that you saw for reference when consulting NI 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.
- Reset 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 4 ports on the PXIe-8862 consume 50 segments each (two ports total), leaving the residual segments for remote chassis connections. Disabling the Thunderbolt 4 ports from your PXIe-8862 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 21.5 or later supports the PXIe-8822/42/62.

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

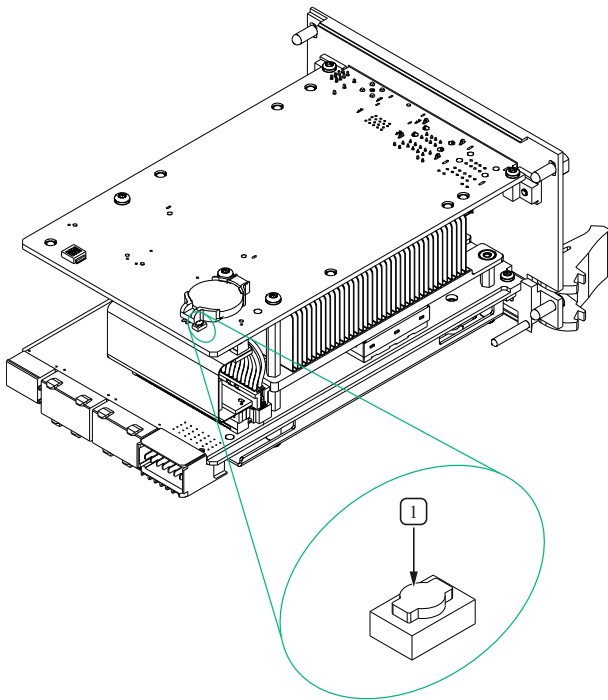There are two methods that you can use to reset the CMOS.

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**.

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 16. Clearing the CMOS Contents (PXIe-8862 Shown)

1. Push-Button Switch SW1