PXI-2567

User Manual

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Welcome to the PXI-2567 User Manual

The PXI-2567 User Manual provides detailed descriptions of product functionality and step-by-step processes for use.

Looking for something else?

For information not found in the User Manual for your product, such as specifications and API reference, browse Related Information.

Related information:

- PXI-2567 Specifications
- PXI-2567 Dimensional Drawings
- PXI-2567 Product Certifications
- PXI-2567 Letter of Volatility
- NI-SWITCH Help
- NI-SWITCH Release Notes
- Download NI-SWITCH
- NI-SWITCH Soft Front Panel
- Download Switch Executive
- NI Switches Cable and Accessory Compatibility
- License Setup and Activation
- Discussion Forums
- NI Learning Center

PXI-2567 Overview

The PXI-2567 is a 64-channel external relay driver that works with internal or external power sources. Use the PXI-2567 for applications that need custom switching topologies or switching as close to the device under test (DUT) as possible.

Key Features

The PXI-2567 has the following features and capabilities.

- Sources up to 50 V and 600 mA of drive capacity per channel when connected to an external power supply.
- Drives small DC motors or other inductive relay coils.
- Provides overcurrent, overvoltage, and flyback protection to ensure long-life operation.
- Provides a commercial-off-the-shelf (COTS) option for controlling individual relays, regardless of relay types or configuration, while using the standard IVI-compliant NI-SWITCH driver software.
- Offers hardware triggering and scanning to improve throughput.

Related information:

- Scanning
- NI-SWITCH Scan VIs

Driver Support

NI recommends that you use the newest version of the driver for your module.

Table 1. Earliest Driver Version Support

Module	Driver Name	Earliest Version Support
PXI-2567	NI-SWITCH	2.5.0

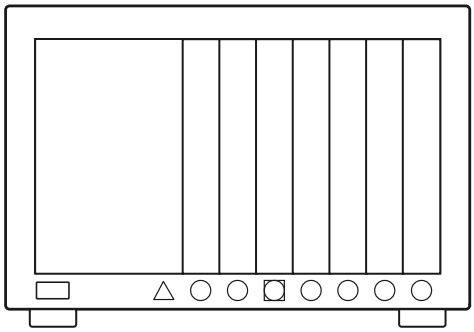
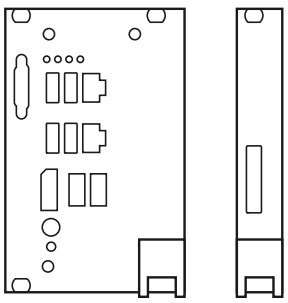
Components of a PXI-2567 System

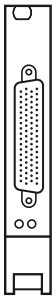
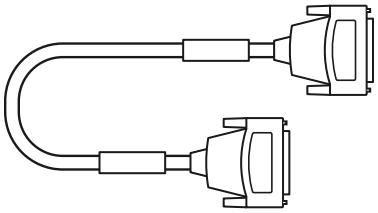
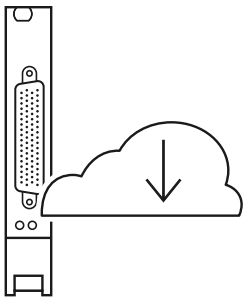
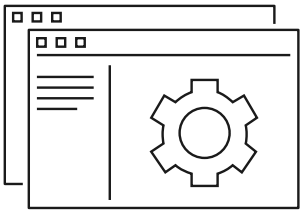
The PXI-2567 is designed for use in a system that includes other hardware components, drivers, and software.

Notice A system and the surrounding environment must meet the requirements defined in the ***PXI-2567 Specifications***.

The following list defines the minimum required hardware and software for a system that includes a PXI-2567.

Table 2. System Components

Component	Description and Recommendations
PXI Chassis 	A PXI chassis houses the PXI-2567 and supplies power, communication, and timing for PXI-2567 functions.
PXI Controller or PXI Remote Control Module 	You can install a PXI controller or a PXI remote control (MXI) module depending on your system requirements. These components, installed in the same PXI chassis as the PXI-2567, interface with the PXI-2567 using NI device drivers.

Component	Description and Recommendations
PXI-2567 	Your relay driver module.
Cables and Accessories 	Cables and accessories allow connectivity to/from your instrument for measurements. Refer to ***Cables and Accessories*** for recommended cables and accessories and guidance.
NI-SWITCH Driver 	Instrument driver software that provides functions to interact with the PXI-2567.
NI Applications 	NI-SWITCH offers driver support for the following ADEs (application development environments): • LabVIEW • LabWindows/CVI • C/C++ • Python • .NET

Cables and Accessories

NI recommends using the following cables and accessories with your module.

Table 3. Cables and Accessories

Accessory Description	Notes	Part Number
Replacement Connector and Backshell for PXI-2567	Shipped with PXI-2567	787413-01
PXI slot blockers	Set of 5	199198-01
PXI EMC filler panel	N/A	778700-01

Note Visit ***NI Switches Cable and Accessory Compatibility*** for more information about supported cables and accessories for your instrument.

Additional Cabling and Accessory Guidance

NI recommends the following:

- The female 78-pin DSUB connector (p/n 761958-01) has metal posts to which you can solder bare wire. When connecting wires to the PXI-2567, use the PXI-2567 pinout to identify the correct pins and solder the appropriate connections.
- Use the backshell enclosure to cover the connector.
- You can install PXI slot blockers and PXI EMC filler panels in empty slots to improve chassis cooling and control EMC emissions from the chassis. For more information about installing slot blockers and filler panels, go to ni.com/r/pxiblocker.

Related reference:

- PXI-2567 Pinout

Related information:

- NI Switches Cable and Accessory Compatibility

Programming Options

You can control the PXI-2567 interactively using the NI-SWITCH Soft Front Panel (SFP), or you can use the NI-SWITCH instrument driver to program the PXI-2567 in the supported ADE of your choice.

- NI-SWITCH SFP – provides a graphical interface for controlling and viewing the state of the PXI-2567. You can access the NI-SWITCH SFP in any of the following ways:
  - From the Windows **Start** menu, select **National Instruments** » **NI-SWITCH Soft Front Panel**
  - From Measurement & Automation Explorer (MAX), select the PXI-2567 and then click **Test Panels...**.
  - From Hardware Configuration Utility, select the PXI-2567 and then click **Soft Front Panel**.
- NI-SWITCH Instrument Driver – features a set of operations and attributes that exercise all the functionality of the PXI-2567, including configuration, control, and other device-specific functions.
  - LabVIEW—Available on the LabVIEW Functions palette at **Measurement I/O** » **NI-SWITCH**. Examples are available from the **Start** menu in the **National Instruments** folder.
  - LabWindows/CVI—Available at **Program Files** » **IVI Foundation** » **IVI** » **Drivers** » **NI-SWITCH**. LabWindows/CVI examples are available from the **Start** menu in the **National Instruments** folder.
  - C/C++—Available at **Program Files** » **IVI Foundation** » **IVI**.
  - Python—You can install Python support for NI-SWITCH by running `pip install niswitch`.

For information about how to use NI-SWITCH in ADEs, refer to the ***Creating an application with NI-SWITCH*** topic in ***NI-SWITCH***.

Related information:

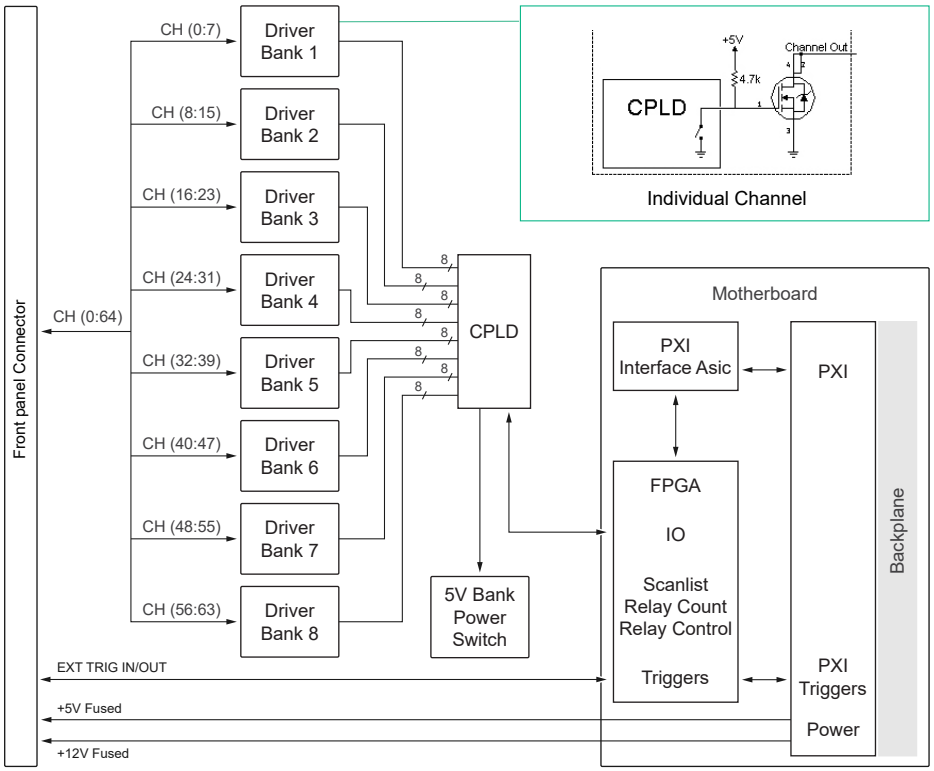
- Creating an application with NI-SWITCH

PXI-2567 Theory of Operation

PXI-2567 Block Diagram

The following diagram illustrates the design of the PXI-2567. Refer to the component sections to understand the design of each component.

Figure 1. PXI-2567 Block Diagram



PXI-2567 Motherboard Configuration

The motherboard effectively treats each relay driver as a non-latching relay, so there are eight banks of eight relay driver banks each. The motherboard sends commands over the FPGA (***field programmable gate array***)-to-CPLD (***complex programmable logic device***) serial link one bank at a time, so there is a small skew between the operation of each relay driver bank.

The motherboard provides the interface to the PXI bus, trigger, and power lines on the chassis backplane. The motherboard also records relay counts, so you can track usage life on relays that are wired to the PXI-2567.

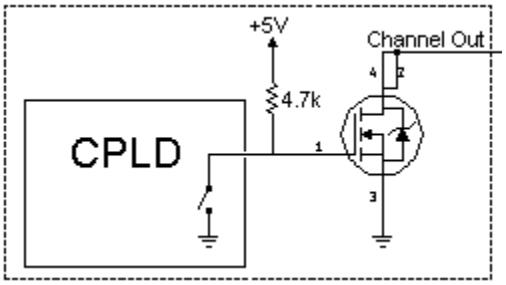
The PXI-2567 can drive all 64 relay drivers simultaneously if enough external power is available and does not exceed the module's 600 mA per-channel and 25 A total sink current limit.

Relay Driver Control

The daughterboard's CPLD serves as a shift register and address decoder. When data shifts in during a relay command, the CPLD holds the data in the shift register until the address is decoded. The CPLD then copies the data to the corresponding output bank for relay control. The CPLD has a dedicated output pin for each of the 64 relay drivers, which is known as the ***direct drive*** relay control method.

The following figure shows a high-level design of a single relay driver channel.

Figure 2. PXI-2567 Individual Relay Driver Channel



As shown in the above figure, to control a relay, you can connect one end of a relay coil to the Channel Out connection, and connect the other end of the coil to a power supply.

When a channel is not in use, the CPLD grounds the output for that channel. This shorts the gate of the FET (***field-effect transistor***) driver to the source, which turns off the FET and allows the drain to float. The coil of the relay pulls the drain up to the supply voltage, so there is no voltage drop across the coil and the relay is undriven.

When the CPLD drives a channel, it opens (tristates) the output for that channel. The FET gate and the CPLD open-drain output are both high impedance, so the pull-up

resistor on the gate pulls the drain up to 5 V. This drives the FET into saturation and therefore holds the drain voltage to be just above the source voltage. Due to the voltage drop produced across the relay coil, the relay actuates.

Additional User I/O & Pinout

Besides the relay driver channels and the return lines, the PXI-2567 provides triggers and power supplies at the front panel.

You can use the power supplies to control a limited number of relays. The PXI-2567 has a 5 V and a 12 V source available to drive relays. The 5 V source, available on pin 58, can provide up to 1.25 A of current. The 12 V source, available on pin 19, can provide 0.50 A of current.

Channel Protection Circuitry

Each relay driver channel offers overtemperature, overcurrent, and overvoltage protection. These features are built into the FET drivers.

The built-in temperature sensor in each chip provides overtemperature protection. When the junction temperature exceeds 150 °C, the drain is automatically tristated. The chip automatically closes the drain when the temperature drops to 135 °C, as long as the gate of the FET driver remains high (enabled).

The overcurrent protection is based on the overtemperature protection. When the current exceeds the FET limit (over about 2 A continuously at 55 °C), the chip takes itself out of saturation. This increases the drain-source voltage, producing heat which increases the temperature above the 150 °C limit. The channel automatically opens, and the current path is broken.

The overvoltage protection has two parts. When the chip is on, the active logic in the driver bank IC monitors the gate voltage. When the gate voltage exceeds the specification, the circuitry automatically shunts current to reduce the voltage. This acts as flyback protection during typical relay driver use.

The chip also has a built-in Zener diode on the output. When the chip is not powered, this diode acts as flyback and provides overvoltage protection.

The driver bank chips are extremely durable, able to withstand high pulse currents and voltage shocks up to 16 kV on the drain. The overvoltage protection, which shunts current to reduce the voltage, can only shunt less than 100 mA continuously without fusing the drain to the source.

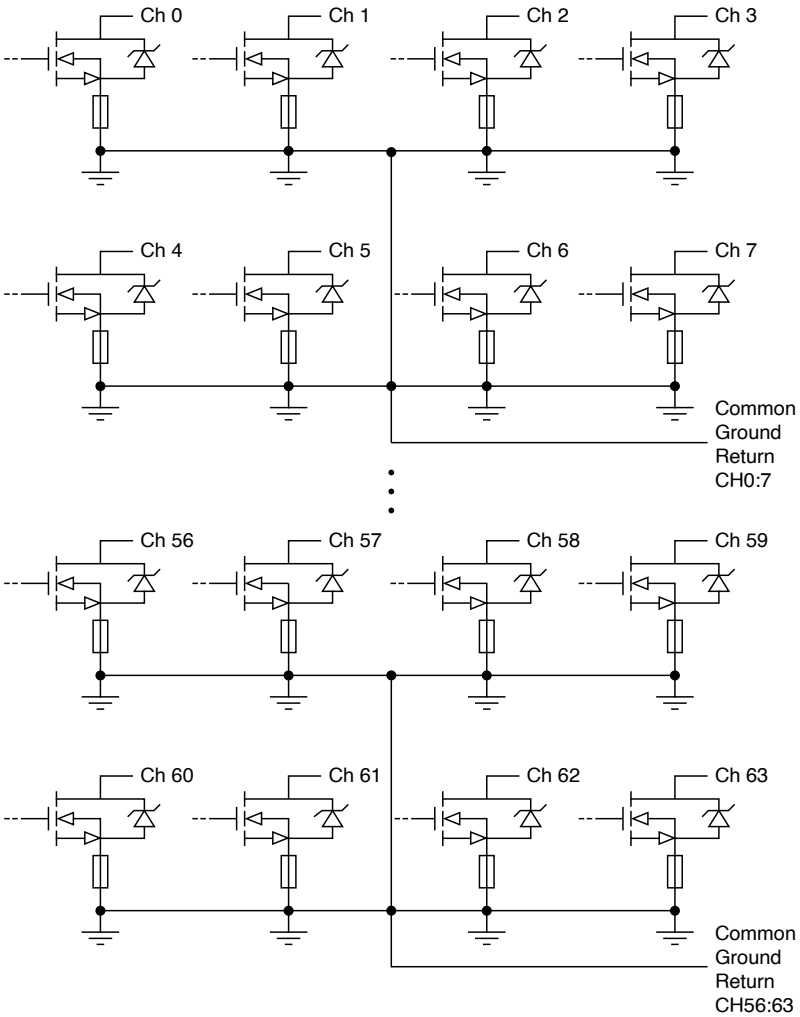
Related concepts:

- FET Switches

PXI-2567 Channel Diagram

The following figure shows the channel diagram of the PXI-2567.

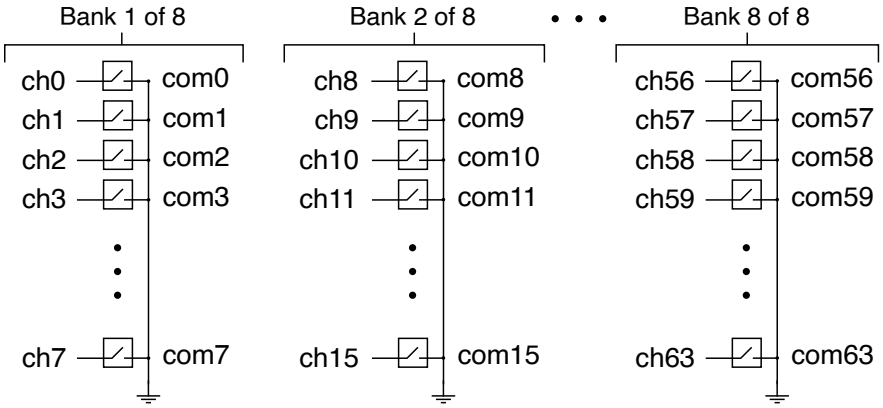
Figure 3. PXI-2567 Channel Diagram



PXI-2567 Topology

The following figure describes the topology of PXI-2567.

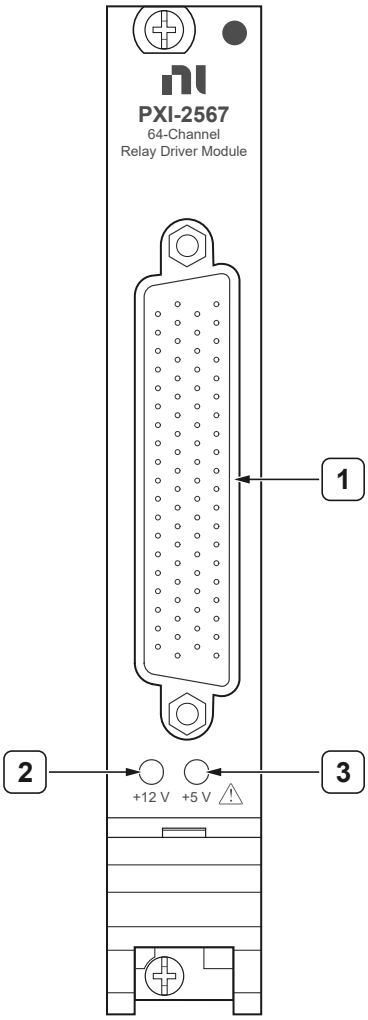
Figure 4. PXI-2567 Independent Topology



Note Using two channels per relay, the PXI-2567 can also control 32 two-coil latching relays.

PXI-2567 Front Panel

Figure 5. PXI-2567 Front Panel

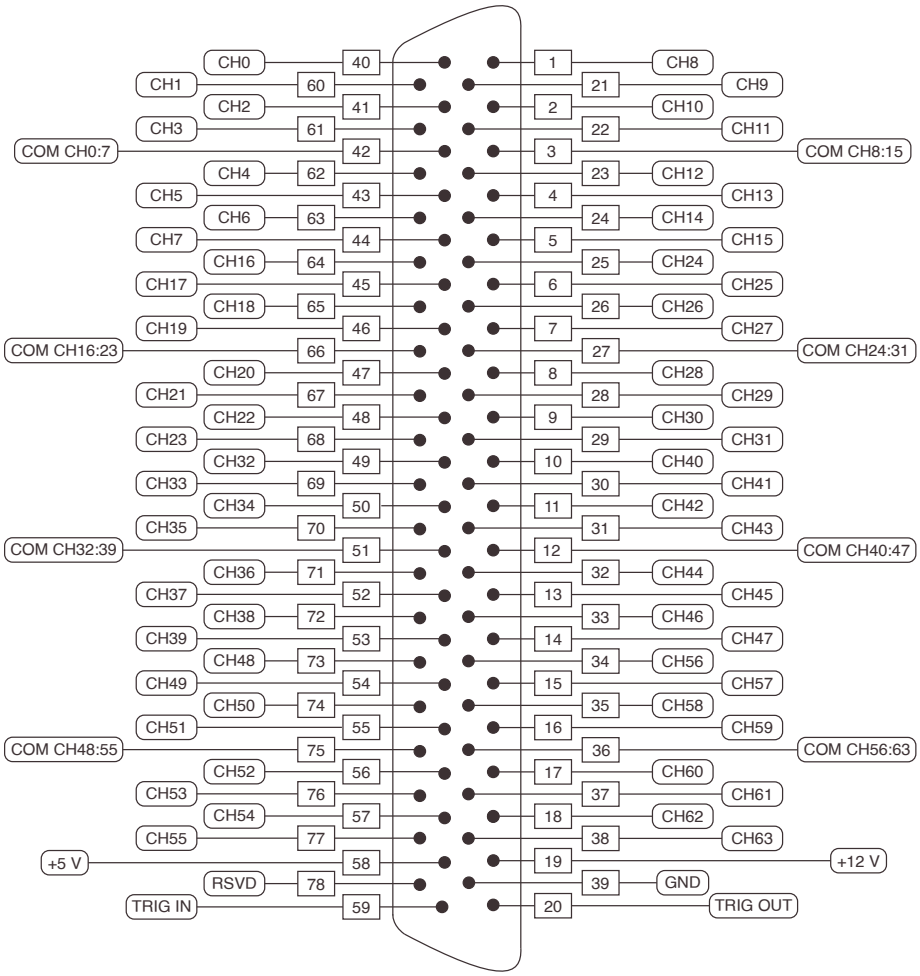


1. Connectors
2. +12 V LED
3. +5 V LED

PXI-2567 Pinout

The following figure shows the terminals on the PXI-2567 connector.

Figure 6. PXI-2567 Pinout



Caution Do not connect to the RSVD pins.

Table 4. Signal Descriptions

Signal	Description
CH***x***	Signal connection
COM CH***x:x***	Common ground return for the corresponding channels

Signal	Description
GND	Ground connection
RSVD	Reserved, do not connect
TRIG IN	Trigger input connection
TRIG OUT	Trigger output connection
+5 V	5 V power output connection
+12 V	12 V power output connection

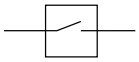
Fundamentals

The following concepts are applicable to the PXI-2567:

Relay Form

Relays are classified by their number of poles and number of throws. The ***pole*** of a relay is the terminal common to every path. Each position where the pole can connect is called a ***throw***. A relay can be made of n poles and m throws. For example, a single-pole single-throw (SPST) relay has one pole and one throw, as illustrated in the following figure.

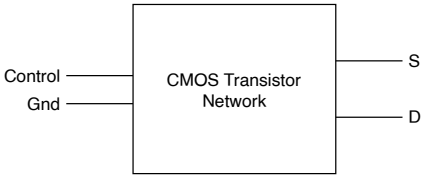
Figure 7. Single-Pole Single-Throw (SPST) Relay



FET Switches

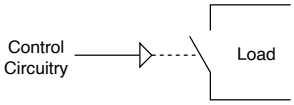
Field-effect transistor (FET) switches are made of several CMOS transistors. A voltage is applied to the control circuitry, which connects the source (S) and drain (D) of a transistor network (load circuit) as shown in the following figure.

Figure 8. FET Switch



There is no additional isolation between the control circuitry and the signal path, as shown in the following figure. This lack of isolation restricts operation to low voltage, but it allows very fast switching speeds.

Figure 9. FET Switch Isolation



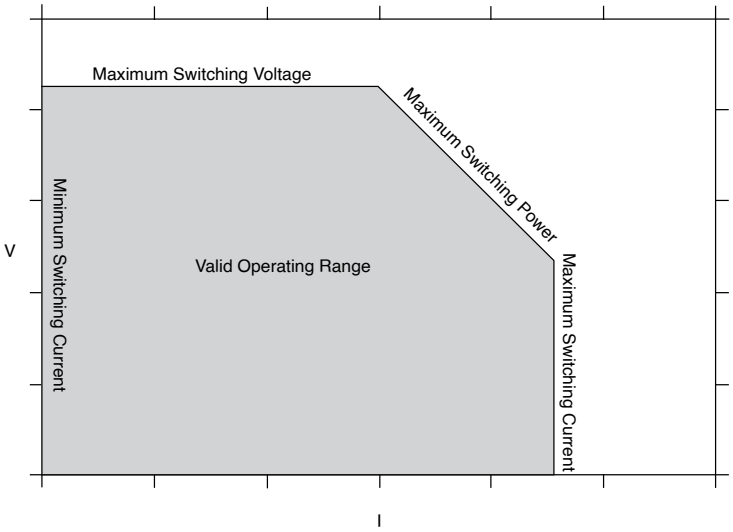
PXI-2567 Switching Capacity

Signal levels through a switch must account for the following specifications:

- Switching voltage
- Switching current
- Switching power

The following figure shows the valid operating range defined by these limits.

Figure 10. Valid Operating Range



Switching Voltage

Switching voltage refers to the maximum signal voltage that the switch module can safely maintain.

Switching voltage is defined from channel-to-ground and from channel-to-channel. Channel-to-ground is the voltage potential between the signal line and the grounded chassis. Channel-to-channel is the voltage potential between any pair of signal lines within the switch module. This voltage includes voltages across open relay contacts, as

well as voltages between adjacent connection terminals.

Note CE compliance marking for measurement and control devices requires compliance to the IEC 61010-1 standard. Switch modules intended for high voltage signals (>60 V DC / 30 V RMS) are rated for Installation Categories as defined in this standard. Installation Categories describe the acceptable transient overvoltages and fault protection necessary for safe operation.

Switching Current

Switching current is the maximum rated current that can flow through the switch as it makes or breaks a contact.

Switching active currents results in arcing that can damage the contacts of electromechanical relays. A minimum current specification indicates the smallest current that can reliably flow through the switch.

Switching Power

Switching power is the limit on the combined open-contact voltage and closed-contact current of a signal in the switch.

Switching Power = ***Switching Voltage*** × ***Switching Current***

Switching high-power signals causes high-energy arcing at the electromechanical contacts during actuation, reducing the useful life of the switch.

NI-SWITCH Examples

NI-SWITCH includes several example applications that demonstrate the functionality of your device and can serve as interactive tools, programming models, and building blocks for your own applications.

NI Example Finder

The NI Example Finder is a utility that organizes examples into categories and allows you to browse and search installed examples. For example, search for "`SWITCH`" to locate all NI-SWITCH examples. You can see descriptions and compatible hardware models for each example or see all the examples compatible with one particular hardware model.

To locate examples using the NI Example Finder within LabVIEW or LabWindows/CVI, select **Help**»**Find Examples** and navigate to **Hardware Input and Output**»**Modular Instruments**»**NI-SWITCH**.

Example Locations

ADE		Example Locations
LabVIEW or LabWindows/CVI		Within LabVIEW or LabWindows CVI, select **Help**»**Find Examples** and navigate to **Hardware Input and Output**»**Modular Instruments**.
C/C++		• Windows — `Users\Public\Documents\National Instruments\NIDocDir\NI-SWITCH\examples` • Linux — `usr/share/niswitch-devel/examples`
.NET	4.0	`C:\Users\Public\Documents\National Instruments\NI-SWITCH\Examples\DotNET 4.0`
	4.5	`C:\Users\Public\Documents\National Instruments\NI-SWITCH\Examples\DotNET 4.5`
Python		Refer to ***Python NI-SWITCH Examples***.

Related information:

- Python NI-SWITCH Examples

PXI-2567 Installation and Configuration

Complete the following steps to install the PXI-2567 into a chassis and prepare it for use.

1. Unpacking the Kit
2. Preparing the Environment
3. Installing the Software
4. Installing a PXI-2567 into the Chassis
5. Verifying the Installation
   Before using the PXI-2567, verify that it is installed correctly through Hardware Configuration Utility or MAX.

Unpacking the Kit

Notice To prevent electrostatic discharge (ESD) 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 computer chassis.
2. Remove the device from the package and inspect the device for loose components or any other sign of damage.

   Notice Never touch the exposed pins of connectors.

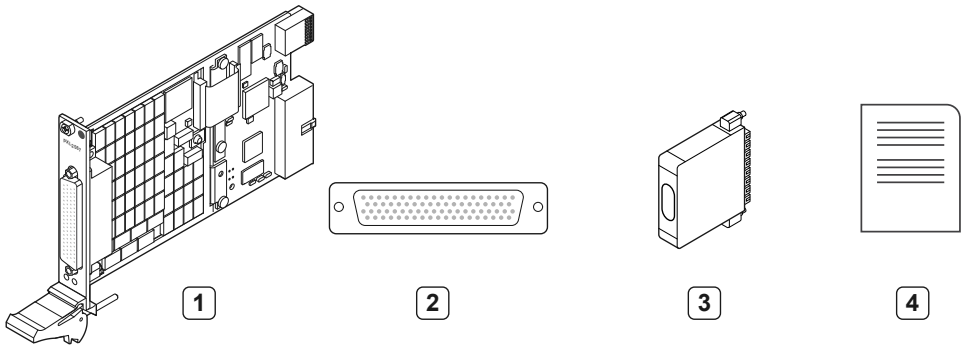
   Note Do not install a device if it appears damaged in any way.
3. Unpack any other items and documentation from the kit.

Note Store the device in the antistatic package when the device is not in use.

Kit Contents

Refer to the following figure to identify the contents of the PXI-2567 kit.

Figure 11. PXI-2567 Kit Contents



1. PXI-2567 Module
2. Connector
3. Backshell
4. Documentation

Preparing the Environment

Ensure that the environment in which you are using the PXI-2567 meets the following specifications.

PXI Modules

Operating Environment	
Ambient temperature range	0 °C to 55 °C
Relative humidity range	10% to 90%, noncondensing

Maximum altitude	2,000 m (at 25 °C ambient temperature)
Pollution degree	2

Indoor use 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-SWITCH 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.
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.

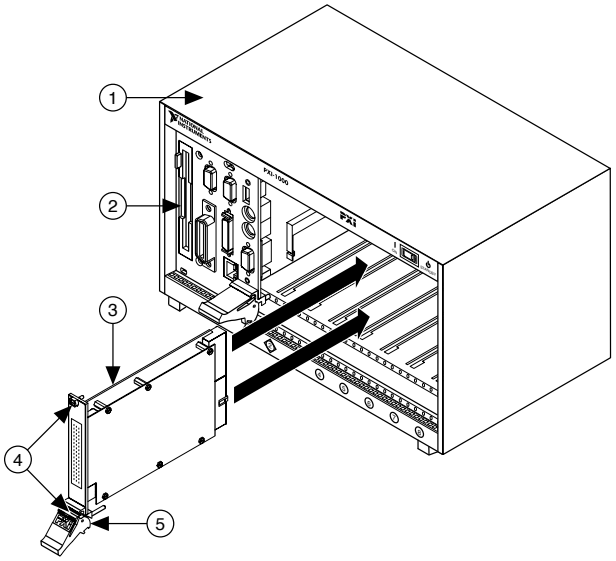
Tip You can use Switch Executive to simplify the configuration, management, and maintenance of the PXI-2567 system. Visit ni.com/r/switchexecutive to purchase the latest version of Switch Executive. If you need physical media, contact orders@ni.com.

Installing a PXI-2567 into the Chassis

You must install the software before installing the hardware.

Before you install the PXI-2567, refer to the guidelines in ***Maintain Forced-Air Cooling Note to Users*** to ensure that the PXI-2567 can cool itself effectively.

Figure 12. Installing a PXI-2567



1. NI PXI/PXI Express or NI PXI/SCXI Combination Chassis
2. Controller
3. PXI-2567
4. Screws
5. Ejector Handle

Complete the following steps to install your PXI-2567 into the chassis.

1. Ensure the AC power source is connected to the chassis before installing the PXI-2567.
   The AC power cord grounds the chassis and protects it from electrical damage while you install the PXI-2567.
2. Power off the chassis.
3. If the NI PXI/PXI Express chassis has multiple fan speed settings, ensure that the fans are set to high.
4. Position the chassis so that inlet and outlet vents are not obstructed.
   For more information about optimal chassis positioning, refer to chassis documentation.
5. Remove the black vinyl caps from all the captive screws on the front panel of the PXI-2567.
6. Identify a supported slot in the NI PXI/PXI Express chassis.
   Refer to the following table to determine what slots support PXI-2567 if you are using a NI PXI Express chassis. Refer to the chassis documentation for details.

Table 5. Slot Identification Symbols in an NI PXI/PXI Express Chassis

②	NI PXI Peripheral Slot
❸	NI PXI Express Peripheral Slot
❹ᴴ	NI PXI Express Hybrid Peripheral Slot
❺	NI PXI Express System Timing Slot

Tip If you plan to use the optional PXIe-6674T Timing and Synchronization Module, reserve the PXI Express system timing slots for its placement in the chassis.

7. Remove the filler panel of an unused PXI/PXI Express slot.
8. Touch any metal part of the chassis to discharge static electricity.
9. Ensure that the ejector handle of the PXI-2567 is in the unlatched (down) position and swings freely.
10. Holding the PXI-2567 by the ejector handle, slide it into the empty slot, ensuring that the card engages with the card guides in the chassis.
11. When you begin to feel resistance, pull up on the ejector handle to latch the PXI-2567.
12. Secure the PXI-2567 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.

13. 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.

14. Power on the chassis.

Related information:

- Maintain Forced-Air Cooling Note to Users

Verifying the Installation

Before using the PXI-2567, verify that it is installed correctly through Hardware Configuration Utility or MAX.

Verifying the Installation in Hardware Configuration Utility

NI recommends using Hardware Configuration Utility to perform and validate initial hardware configuration.

1. Open Hardware Configuration Utility.
   The PXI-2567 should appear in the system pane automatically.
2. Record the name Hardware Configuration Utility assigns to the PXI-2567 or, if desired, provide a custom name to the PXI-2567.
   Use this name when programming the PXI-2567.
3. Validate that your instrument is installed correctly: select the PXI-2567 module in the system pane, expand the **Troubleshooting** area of the configuration pane, and click **Self-test**.
   Hardware Configuration Utility reports when the hardware setup is validated.

Related information:

- Hardware Configuration Utility

Verifying the Installation in MAX

You can 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-SWITCH.

Note MAX is not available on Linux.

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 name MAX assigns to the hardware. Use this identifier when programming the PXI-2567.
5. Self-test the hardware by selecting the item in the configuration tree and clicking **Self-Test** in the MAX toolbar.
   MAX self-test performs a basic verification of hardware resources.

What Should I Do if the PXI-2567 Doesn't Appear in Hardware Configuration Utility or MAX?

1. Check if the connection between the hardware and software needs to be refreshed.

Software	Description
Hardware Configuration Utility	Click the refresh button ( ).
MAX	a. In the MAX configuration tree, expand **Devices and Interfaces**. b. Expand the **Chassis** tree to see the list of installed hardware and press **F5** to refresh the list.

2. If the PXI-2567 is still not listed, power off the system, ensure that all hardware is correctly installed, and restart the system.
3. Navigate to the Device Manager by right-clicking the **Start** button and selecting **Device Manager**.
4. Depending on your controller type, verify Device Manager settings.

Controller Type	Description
PXI controller	a. Verify that a **National Instruments** entry appears in the system device list b. If error conditions appear in the list, right-click the module you are using in the **Device Manager** and select **Update Driver**.
MXI controller	Right-click **PCI-to-PCI Bridge** and select **Properties** from the shortcut menu to verify that the bridge is enabled and that no error conditions appear.

   If error conditions persist, reinstall NI-SWITCH.
5. Restart your computer.

What Should I Do if the PXI-2567 Fails the Self-Test?

1. Reset the PXI-2567 through Hardware Configuration Utility or MAX and then perform the self-test again.
2. Restart the system, and then 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.

> **Note** If the module fails the self-test again, contact NI or visit ni.com/support for further troubleshooting information.

Driving Relays with PXI-2567

Before driving relays with the PXI-2567, make sure you connect the matching cable and connector to the PXI-2567 as specified in ***PXI-2567 Pinout*** and ***PXI-2567 Topology***.

Table 6. PXI-2567 Matching Accessories

Module	PXI-2567
Topology	Independent
Connector Type	D-Sub 78-pin
Front Mounted Terminal Block	N/A
Cable	N/A
Remote Terminal Block	N/A
Custom Connectivity	N/A

Related reference:

- PXI-2567 Pinout
- PXI-2567 Topology

Driving Single Coil Non-latching Relays

You can use the niSwitch Connect Channels VI or the `niSwitch_Connect` function to drive relays with the PXI-2567. The following example shows how to connect a relay to channel 7 on the PXI-2567:

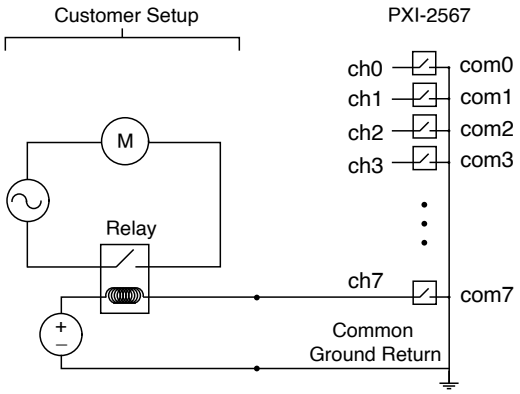
1. Connect the positive terminal of your voltage source to the positive side of the relay coil.
2. Connect the negative side of the relay coil to pin 44 of the front connector.

Note Polarized relays do not work if installed incorrectly.

3. Connect the negative terminal of your voltage source to the common ground return of channel 7 (pin 42).
4. Call `niSwitch_Connect(vi, "ch7", "com7")` to close the channel 7 relay. This completes the circuit and drives your relay to channel 7.

   The following figure illustrates how to actuate a relay connected to channel 7.

Figure 13. Driving Single Coil Non-latching Relay



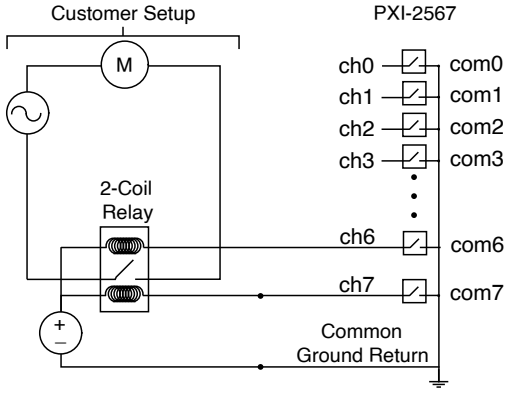
You can also open and close relays by calling the niSwitch Relay Control VI or the `niSwitch_RelayControl` function. For the relay name, enter K0 for channel 0, K1 for channel 1, and so on.

Note When scanning the module, a typical scan list entry could be `ch2->com2;`. This entry drives the relay connected to channel 2.

Driving Two-Coil Latching Relays

The following figure shows an example of using the PXI-2567 to drive a two-coil latching relay.

Figure 14. Driving a Two-Coil Latching Relay



To close the relay in this example, call `niSwitch_Connect(vi, "ch7", "com7")`. To open the relay, call `niSwitch_Disconnect(vi, "ch7", "com7")` and then `niSwitch_Connect(vi, "ch6", "com6")`.

Alternatively, you can actuate the relay by calling the niSwitch Relay Control VI or the `niSwitch_RelayControl` function. To close the relay in this example, call `niSwitch_RelayControl(vi, K7, NISWITCH_VAL_CLOSE_RELAY)` to power on the lower coil in the diagram. Then call `niSwitch_RelayControl(vi, K7, NISWITCH_VAL_OPEN_RELAY)` to power off the lower coil, and call `niSwitch_RelayControl(vi, K6, NISWITCH_VAL_CLOSE_RELAY)` to power on the other coil and open the relay.

Maintaining the PXI-2567

Understand how to maintain the PXI-2567.

Replacing the PXI-2567 Internal Drive Power Fuse

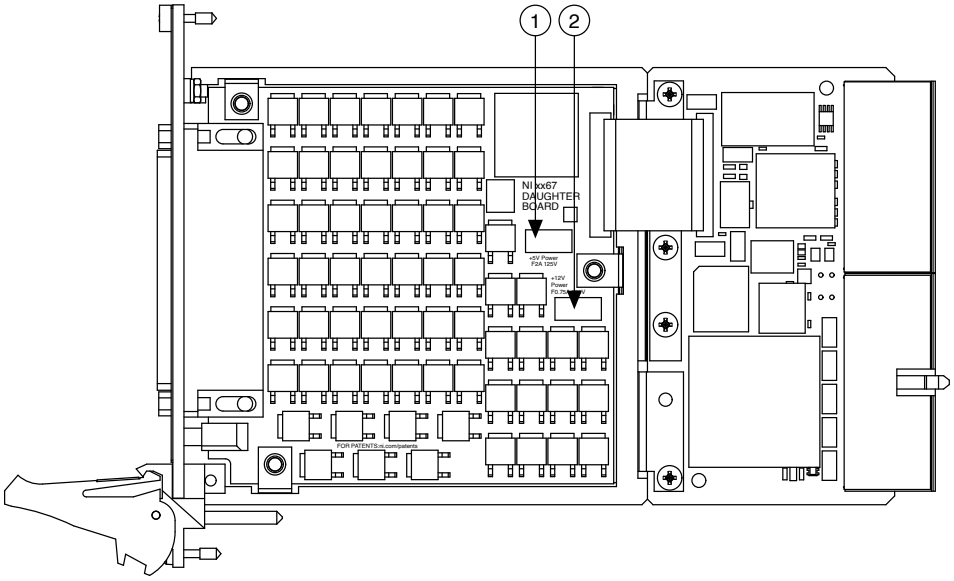
The front panel LEDs show the status of the +5 V and +12 V fuses. If an LED is on, the corresponding fuse is intact. This section explains how to replace the fuse in the PXI-2567.

Table 7. Replacement Fuses for PXI-2567

Accessory	+5 V Internal Drive Power Fuse	+12 V Internal Drive Power Fuse
Fuse Rating	F 2 A, 125 V	F 0.75 A, 125 V
Manufacturer and Part Number	Littelfuse, NANO2, 0453.002	Littelfuse, NANO2, 0453.750

1. Ground yourself with a grounding strap or with a ground to your PXI chassis. Proper grounding prevents damage to your PXI-2567 from electrostatic discharge.
2. Power off the PXI chassis and remove the PXI-2567 with the blown fuse.
3. Remove the blown fuse with pliers and replace it. Refer to the following figure for the fuse locations.

Figure 15. PXI-2567 Internal Drive Power Fuse Locations



1. +5 V Fuse
2. +12 V Fuse

Improving Relay Life for PXI-2567

You can improve relay life by monitoring relay usage, preventing high currents, and limiting flyback voltages.

Monitoring Relay Usage

- Use the `niSwitch Get Relay Count` VI or the `niSwitch_GetRelayCount` function to track relay usage. You can then analyze the relay counts on your PXI-2567 to better manage the use of each relay.
- Edit test sequences to reduce the number of switching cycles.

Preventing High Currents from Damaging Relays

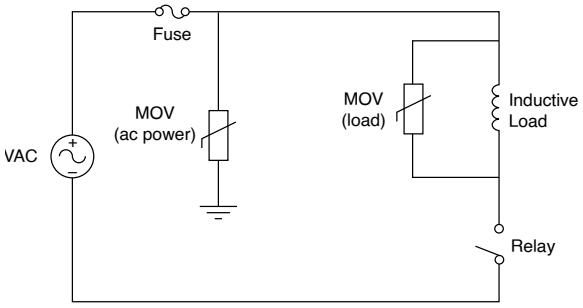
High inrush current can damage relays when switching with capacitive loads. This is because the inrush current needed to charge the capacitive load may be substantially higher than the steady-state current through the system. To mitigate damage from high currents, consider the following approaches:

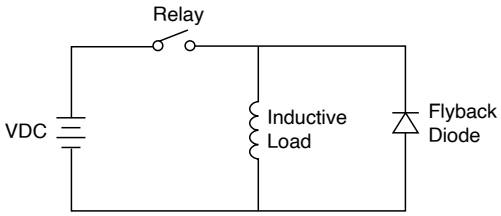
- Use series resistance when switching with capacitive loads to prevent high inrush

currents from damaging relays. Examples of capacitive loads include: DMMs, long cabling, and DUTs.
- Turn off power supplies or other voltage sources connected to the relay before switching to ensure that voltage levels are the same on both sides of the relay.

Limiting Flyback Voltages

Flyback voltages are large counter electromotive forces that occur when relays that are connected to inductive loads open. This counter electromotive force generates large voltage spikes across your relay contact because of the reactive energy stored in the load. The flyback voltages can severely damage the relay contacts and greatly shorten the relay life. To limit flyback voltages at your inductive load, consider either of the following options:

- Install a metal oxide varistor (MOV) for AC loads as shown in the following figure.
  Figure 16. Metal Oxide Varistor (MOV)
  

- Install a flyback diode for AC loads as shown in the following figure.
  Figure 17. Flyback Diode
  

Cleaning the PXI-2567 System

NI recommends the following to clean and maintain your instrument's system:

- Clean the fan filters on the chassis regularly to prevent fan blockage and to ensure efficient air circulation. Cleaning frequency depends on the amount of use and the

operating environment. For specific information about cleaning procedures and other recommended maintenance, refer to the chassis user documentation.

- 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.