GETTING STARTED GUIDE

NI Switches

NI PXI/PXI Express Switches

This document explains how to install, configure, and test NI PXI/PXI Express Switches. The switch ships with the NI-SWITCH instrument driver, which you can use to program the device.

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

Contents

Electromagnetic Compatibility Guidelines

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

NATIONAL INSTRUMENTS

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

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

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

⚠ **Caution** To ensure the specified EMC performance, the length of all I/O cables must be no longer than 30 m (100 ft).

Verifying the System Requirements

To use the NI-SWITCH driver, your system must meet certain requirements. For more information about minimum system requirements, recommended system, and supported application development environments (ADEs), refer to the readme, which is available on the software media or online at *ni.com/updates*.

Unpacking the Kit

⚠ **Caution** 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.

⚠ **Caution** 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.

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

Preparing the Environment

Ensure that the environment in which you are using the NI PXI/PXI Express Switch meets the following specifications:

PXI Express Modules

Operating Environment

Ambient temperature range	0 °C to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)
Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)
Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

PXI Modules

Operating Environment

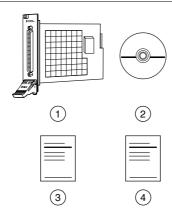|	
Ambient temperature range	0 °C to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)
Maximum altitude	2,000 m (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

Note Refer to the device specifications on *ni.com/manuals*.

Verifying the Kit Contents

The items shown in the following figure are necessary to set up and use your device.

Figure 1. Kit Contents

1. NI PXI/PXI Express Switch
2. NI-SWITCH Driver Software DVD

3. NI PXI/PXI Express Switches Getting Started Guide
4. Safety, Environmental, and Regulatory Information

In addition to the items contained in the kit, you need the following items to install or operate your device.

NI PXI/PXI Express Switch Required Items

- NI PXI chassis, NI PXI Express chassis, or NI PXI/SCXI combination chassis
- 1/8 in. flathead screwdriver or #1 Phillips screwdriver

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. Insert the driver software media into your computer. The installer should open automatically.

   If the installation window does not appear, navigate to the drive, double-click it, and double-click autorun.exe.
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.

Installing the Hardware

You must install the software before installing the hardware.

Before you install the hardware, refer to the guidelines in the *Maintain Forced-Air Cooling Note to Users* at *ni.com/manuals* to ensure that the device can cool itself effectively.

⚠ **Caution** To prevent damage to the device caused by ESD or contamination, handle the device using the edges or the metal bracket.
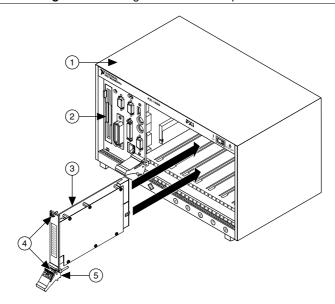
⚠ **Caution** Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Installing an NI PXI/PXI Express Switch

📝 **Note** Some NI switches do not have ejector handles.

Figure 2. Installing an NI PXI/PXI Express Switch

1. NI PXI/PXI Express or NI PXI/SCXI Combination Chassis
2. Controller
3. NI PXI/PXI Express Switch
4. Screws
5. Certain products: Ejector Handle

1. Ensure the AC power source is connected to the chassis before installing the switches.

The AC power cord grounds the chassis and protects it from electrical damage while you install the switches.

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 switch front panel.

6. Identify a supported slot in the NI PXI/PXI Express chassis.

   Refer to the following table to determine what slots support your switch if you are using a NI PXI Express chassis. Refer to the chassis documentation for details.

Table 1. Slot Identification Symbols in an NI PXI/PXI Express Chassis

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

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 injector/ejector handle of the device is in the unlatched (down) position and swings freely.

10. Holding the device by the injector/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 injector/ejector handle to latch the device.

12. Secure the device 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 filler panels or slot blockers to maximize cooling air flow.

14. Power on the chassis.

Configuring the NI PXI/PXI Express Switch in MAX

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

1. Launch MAX.

2. In the configuration tree, expand **Devices and Interfaces** to see the list of installed devices.

   Installed devices appear under the name of their associated chassis.

3. Expand your **Chassis** tree item.

   MAX lists all devices installed in the chassis. Your default device names may vary.

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

4. Record the device identifier MAX assigns to the hardware. Use this identifier when programming the NI PXI/PXI Express Switch.

5. Self-test the device by selecting the device in the configuration tree and clicking **Self-Test** in the MAX toolbar.

   The MAX self-test performs a basic verification of hardware resources.

Connecting Signals to Switch Terminal Blocks

Refer to the documentation for your terminal block to install the terminal block and connect signals to the NI PXI/PXI Express Switch.

Programming the NI PXI/PXI Express Switch

You can acquire data interactively using the NI-SWITCH Soft Front Panel (SFP), or you can control the device programmatically using the NI-SWITCH instrument driver. You can then

use NI-SWITCH to program the device in the application development environment (ADE) of your choice.

Table 2. NI PXI/PXI Express Switch Programming Options

Application Programming Interface (API)	Location	Description
NI-SWITCH SFP	Available from the Start menu or NI Launcher in Windows 8.	Provides a graphical interface for controlling and viewing the state of your NI PXI/PXI Express Switch.
NI-SWITCH Instrument Driver	LabVIEW—Available on the LabVIEW Functions palette at **Measurement I/O»NI-SWITCH**.	Features a set of operations and attributes that exercise all the functionality of the NI PXI/PXI Express Switch, including configuration, control, and other device-specific functions.
	C or LabWindows/CVI— Available at `Program Files \IVI Foundation\IVI \Drivers\niSWITCH`.	
	Installed examples for Visual C/C++ are in the *NI-SWITCH Readme*.	Refer to the *Creating an Application with Microsoft Visual C/C++* topic in the *NI Switches Help* for information about developing an NI-SWITCH application.

NI-SWITCH Examples

Examples demonstrate the functionality of the device and serve as programming models and building blocks for your own applications. The NI Example Finder is a utility available for some ADEs that organizes examples into categories and allows you to easily browse and search installed examples. You can see descriptions and compatible hardware models for each example or see all the examples compatible with one particular hardware model.

Table 3. Locating NI-SWITCH Examples

ADE	How to Locate Examples
LabVIEW or LabWindows/CVI	Locate examples with the NI Example Finder. Within LabVIEW or LabWindows/CVI, select **Help»Find Examples** and navigate to **Hardware Input and Output»Modular Instruments**.
ANSI C or Microsoft Visual C/C++	Locate examples in the `<NIDocDir>\CVI\Samples\niswitch` directory, where `<NIDocDir>` is one of the following directories: • Windows 8/7/Vista—`Users\Public\Public Documents\National Instruments` • Windows XP—`Documents and Settings\All Users\Documents\National Instruments`

Troubleshooting

If an issue persists after you complete a troubleshooting procedure, contact NI technical support or visit *ni.com/support*.

What Should I Do if the NI PXI/PXI Express Switch Doesn't Appear in MAX?

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

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

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

4. Navigate to the Device Manager.

Operating System	Description
Windows 8	Right-click the Start screen, and select **All apps»Control Panel»Hardware and Sound»Device Manager**.
Windows 7	Select **Start»Control Panel»Device Manager**.
Windows Vista	Select **Start»Control Panel»System and Maintenance»Device Manager**.
Windows XP	Select **Start»Control Panel»System»Hardware»Device Manager**.

5. If you are using a PXI or PXI Express controller, verify that a **National Instruments** entry appears in the system device list. Reinstall NI-SWITCH and the device if error conditions appear in the list. If you are using an MXI controller, right-click **PCI-to-PCI Bridge**, and select **Properties** from the shortcut menu to verify that the bridge is enabled.
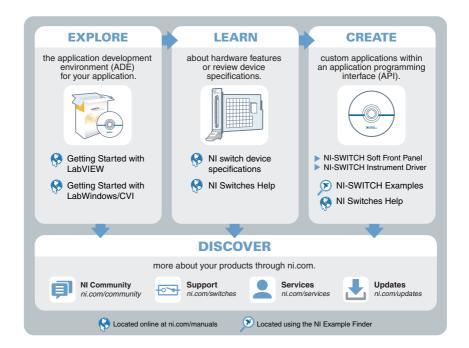
What Should I Do if the NI PXI/PXI Express Switch Fails the Self-Test in MAX?

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

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

Where to Go Next

EXPLORE the application development environment (ADE) for your application.

- Getting Started with LabVIEW
- Getting Started with LabWindows/CVI

LEARN about hardware features or review device specifications.

- NI switch device specifications
- NI Switches Help

CREATE custom applications within an application programming interface (API).

- ▶ NI-SWITCH Soft Front Panel
- ▶ NI-SWITCH Instrument Driver
- NI-SWITCH Examples
- NI Switches Help

DISCOVER more about your products through ni.com.

NI Community ni.com/community
Support ni.com/switches
Services ni.com/services
Updates ni.com/updates

Located online at ni.com/manuals   Located using the NI Example Finder

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 NI Factory Installation Services, repairs, extended warranty, and other services.

Visit *ni.com/register* to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting *ni.com/certification*. If your product supports calibration, you can obtain the calibration certificate for your product at *ni.com/calibration*.

NI corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For telephone support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the *Worldwide Offices* section of *ni.com/niglobal* to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.