

# NI Switches Getting Started Guide

## For PXI and SCXI™ Switch Modules

This document explains how to install, configure, and set up National Instruments PXI and SCXI switch modules. This document covers the NI-DAQ 7.0 software relative to NI switch modules. For a more detailed explanation of NI-DAQ 7.0, refer to the *DAQ Quick Start Guide for NI-DAQ 7.0*.

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# Conventions

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The following conventions are used in this manual:

» The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.

◆ The ◆ symbol indicates that the following text applies only to a specific product, a specific operating system, or a specific software version.



This icon denotes a tip, which alerts you to advisory information.



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

**bold** Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names and information on hardware labels.

*italic* Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

`monospace` Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

*monospace italic* Italic text in this font denotes text that is a placeholder for a word or value that you must supply.

## FCC/Canada Radio Frequency Interference Compliance

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### Determining FCC Class

The Federal Communications Commission (FCC) has rules to protect wireless communications from interference. The FCC places digital electronics into two classes. These classes are known as Class A (for use in industrial-commercial locations only) or Class B (for use in residential or commercial locations). All NI products are FCC Class A products.

Depending on where it is operated, this Class A product could be subject to restrictions in the FCC rules. (In Canada, the Department of Communications (DOC), of Industry Canada, regulates wireless interference in much the same way.) Digital electronics emit weak signals during normal operation that can affect radio, television, or other wireless products.

All Class A products display a simple warning statement of one paragraph in length regarding interference and undesired operation. The FCC rules have restrictions regarding the locations where FCC Class A products can be operated.

Consult the FCC Web site at [www.fcc.gov](http://www.fcc.gov) for more information.

## **FCC/DOC Warnings**

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual and the CE marking Declaration of Conformity<sup>1</sup>, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC).

Changes or modifications not expressly approved by NI could void the user's authority to operate the equipment under the FCC Rules.

## **Class A**

### **Federal Communications Commission**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

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<sup>1</sup> The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

# Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Compliance to EU Directives

Readers in the European Union (EU) must refer to the manufacturer's Declaration of Conformity (DoC) for information pertaining to the CE marking compliance scheme. The manufacturer includes a DoC for most hardware products except for those bought from OEMs. In addition, DoCs are usually not provided if compliance is not required, for example electrically benign apparatus or cables.

To obtain the DoC for this product, click **Declarations of Conformity Information** at [ni.com/hardref.nsf/](http://ni.com/hardref.nsf/). This Web site lists the DoCs by product family. Select the appropriate product family, followed by your product, and a link to the DoC appears in Adobe Acrobat format. Click the Acrobat icon to download or read the DoC.

## Safety Information

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**Caution** National Instruments measurement products may be classified as either Installation Category I or II. Operate products at or below the Installation Category level specified in the switch module specifications.

Installation Category<sup>1</sup>: Measurement circuits are subjected to working voltages<sup>2</sup> and transient stresses (overvoltage) from the circuit to which they are connected during measurement or test. Installation Category establishes standardized impulse withstand voltage levels that commonly occur in electrical distribution systems. The following is a description of Installation (Measurement<sup>3</sup>) Categories:

- Installation Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS<sup>4</sup> voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements

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<sup>1</sup> Installation Categories as defined in electrical safety standard IEC 61010-1.

<sup>2</sup> Working voltage is the highest rms value of an AC or DC voltage that can occur across any particular insulation.

<sup>3</sup> Installation Category is also referred to as Measurement Category.

<sup>4</sup> MAINS is defined as the (hazardous live) electrical supply system to which equipment is designed to be connected for the purpose of powering the equipment. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

- Installation Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (e.g., 115 V for U.S. or 230 V for Europe). Examples of Installation Category II are measurements performed on household appliances, portable tools, and similar products.
- Installation Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired equipment such as equipment in fixed installations, distribution boards, and circuit breakers. Other examples are wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and stationary motors with permanent connections to fixed installations.
- Installation Category IV is for measurements performed at the primary electrical supply installation (<1,000 V). Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.



**Note** Refer to the *Specifications* document included with the switch module to determine the relevant pollution and installation categories.

## Related Documentation

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The following documents contain additional information about your switch module and the APIs used to program them. The documents are available in electronic form at **Program Files»National Instruments»NI-SWITCH»Documentation** or **Program Files»National Instruments»NI-DAQ**.

- *Specifications* document for your switch
- *NI Switches Help* contains technical and programming support for your NI switch module and the NI-SWITCH 2.0 API
- *NI-SWITCH Quick Reference Guide* contains an API overview and function/VI overview
- *DAQ Quick Start Guide for NI-DAQ 7.0* contains additional information about NI-DAQ 7.0, the relationship between Traditional NI-DAQ and NI-DAQmx, and a complete list of supported modules
- *NI-DAQmx Help* contains information about programming your switch with the NI-DAQmx API
- *NI-DAQmx VI Reference Help*

# 1. Unpack the Module and Accessories

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The switch module is shipped in an antistatic package to prevent electrostatic damage (ESD) that can damage several components in the module. To avoid such damage when you handle the module, take the following precautions:



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

- Ground yourself using a grounding strap or by holding a grounded object.
- Touch the antistatic package to a metal part of the chassis before you remove the module from the package.

Remove the module from the package and inspect the module for loose components or any sign of damage. Notify NI if the module appears damaged in any way. Do *not* install a damaged module in the chassis.

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

## 2. Verify the Components

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Make sure you have the following:

- NI-DAQ 7.0 software and documentation package
- The *Specifications* document that ships with your NI switch module
- 1/8 in. flathead screwdriver
- For development, at least one of the following software packages and documentation:
  - LabVIEW
  - LabWindows™/CVI™
  - Microsoft Visual C++
  - Microsoft Visual Basic
- ◆ PXI switch modules require the following:
  - PXI switch module
  - PXI chassis or PXI/SCXI combination chassis

- ◆ SCXI switch modules require the following:
  - Controller (NI 4021/4060/4070 or E Series device)
  - Cable adapter
  - Cable
  - SCXI switch module
  - SCXI chassis or PXI/SCXI combination chassis

## 3. Install the Software

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National Instruments switch modules are packaged with NI-DAQ 7.0. This driver software package contains three drivers as well as an extensive library of functions and VIs you can call from your application software, including LabVIEW or LabWindows/CVI, to fully program your NI switch module. The NI-DAQ 7.0 driver software has an application programming interface (API), which is a library of functions, classes, VIs, attributes, and properties for creating applications for your device.

### Insert the NI-DAQ 7.0 CD



**Caution** NI-DAQ 7.0 cannot exist on the same system with earlier versions of NI-DAQ. When you install NI-DAQ 7.0, Traditional NI-DAQ replaces NI-DAQ 6.9.x and earlier versions, as well as any support files installed by that earlier version. Older versions of NI-DAQ are removed when you install NI-DAQmx. Some NI-DAQ devices supported in 6.9.3 may no longer be supported. Refer to the *DAQ Quick Start Guide for NI-DAQ 7.0* for details.

Insert the NI-DAQ 7.0 CD. The NI-DAQ 7.0 installer should open automatically. If not, select **Start»Run**. Enter `x:\setup.exe`, where `x` is the letter of the CD drive. For troubleshooting and operating system-specific instructions, refer to the Hardware Installation Wizard at [ni.com/support/install](http://ni.com/support/install).



**Tip** Install your driver software *before* installing the switch module to ensure proper installation and to avoid warnings about driver installation asking you to install the driver.



**Note** You must use NI application software (LabVIEW, LabWindows/CVI, or Measurement Studio) version 7.0 or higher to use NI-DAQmx. The NI-SWITCH API supports LabVIEW 6.1 and LabVIEW 7.0 and LabWindows/CVI 5.5 and higher. Install or upgrade your application software before installing the driver software.

## Select an API

NI-DAQ 7.0 includes three drivers, each with its own API.

- Traditional NI-DAQ is an upgrade to NI-DAQ 6.9.3 and earlier. Traditional NI-DAQ has the same VIs and functions and works the same way as NI-DAQ 6.9.3. Traditional NI-DAQ and NI-DAQmx, both part of NI-DAQ 7.0, can coexist on the same computer.
- NI-DAQmx is the latest NI-DAQ driver with new VIs, functions, and development tools for programming switch modules as well as E Series and other SCXI modules.
- NI-SWITCH 2.0 is the latest NI-SWITCH driver with new VIs, functions, and development tools for programming switch modules. NI-SWITCH is a driver layer on top of the NI-DAQmx and Traditional DAQ drivers. NI-SWITCH is an IVI-compliant instrument driver that supports all NI switch modules.

Refer to Table 1 to determine which APIs work with your switch module.

**Table 1.** Switch Module API Support

Module	NI-DAQmx API	Traditional NI-DAQ API	NI-SWITCH 2.0 API
SCXI-1166 and SCXI-1193	✓	—	✓
SCXI-1160, SCXI-1161, and SCXI-1163R	✓	✓	✓
All other SCXI switch modules	✓	—	✓
PXI-2566 and PXI-2593	✓	—	✓
All other PXI switch modules	—	—	✓

## Install Support Files

The NI-DAQ 7.0 installer detects the NI software installed on the system and automatically selects the latest versions of the driver, application software, and language support files from the CD. You also can select one or all of the support file subcomponents for each driver.

Verify that the installer detected and selected the correct support files and the correct version number of the application software and/or language. You can select additional options to install the support files, examples, and documentation. Follow the software prompts.



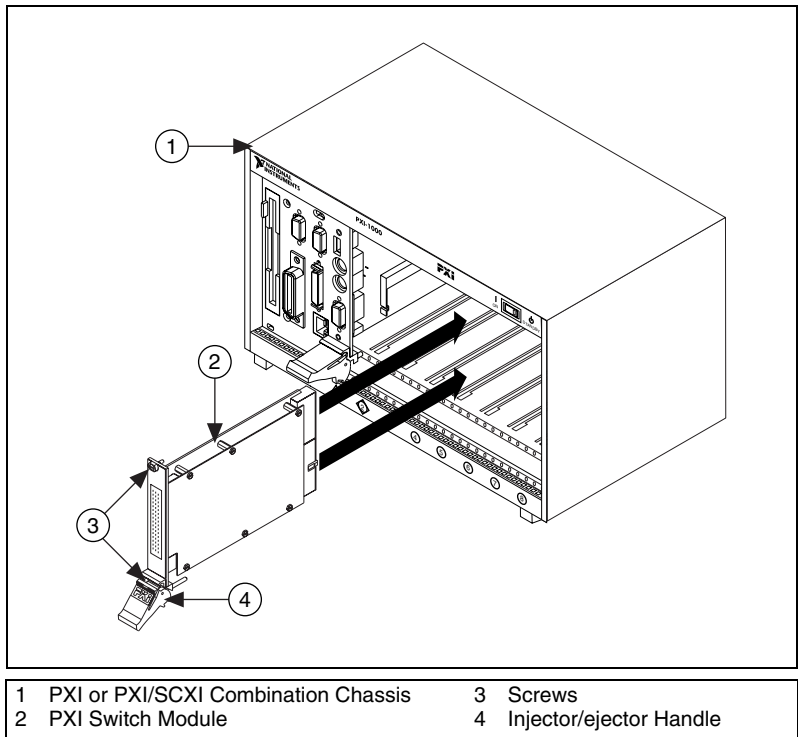
**Note** If you installed your NI application software after installing NI-DAQ 7.0, relaunch the installation program by selecting **Start>Run**. Enter `x:\setup.exe`, where *x* is the letter of the CD drive with the NI-DAQ 7.0 CD.



## 4. Install the PXI Switch Modules

To install a PXI module, complete the following steps:

1. Power off and unplug the PXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Remove the filler panel of an unused PXI slot.
3. Touch any metal part of the chassis to discharge static electricity.
4. Insert the device into the PXI slot. Use the injector/ejector handle to fully insert the device.
5. Screw the device front panel to the chassis front panel mounting rail.

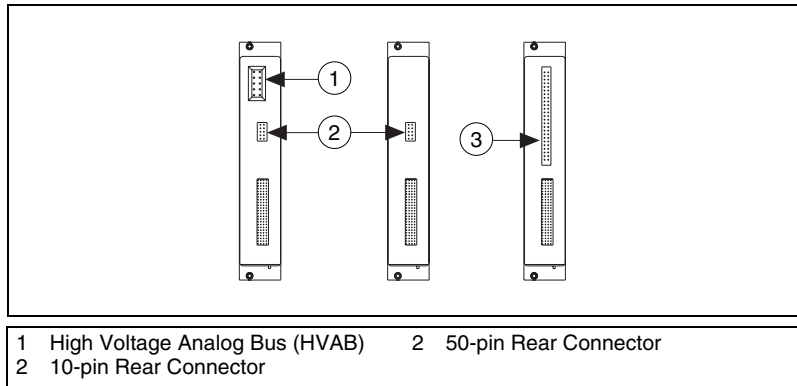


**Figure 1.** Installing a PXI Switch Module

# 5. Install the SCXI Switch Modules

## Rear Connectors

SCXI switches have two types of rear connectors that differentiate their cabling schemes: a 10-pin and a 50-pin. Refer to Table 2 and look at the back of the switch module to determine how many pins are on the rear connector.



**Figure 2.** SCXI Switch Module Rear Connectors

# SCXI Controllers

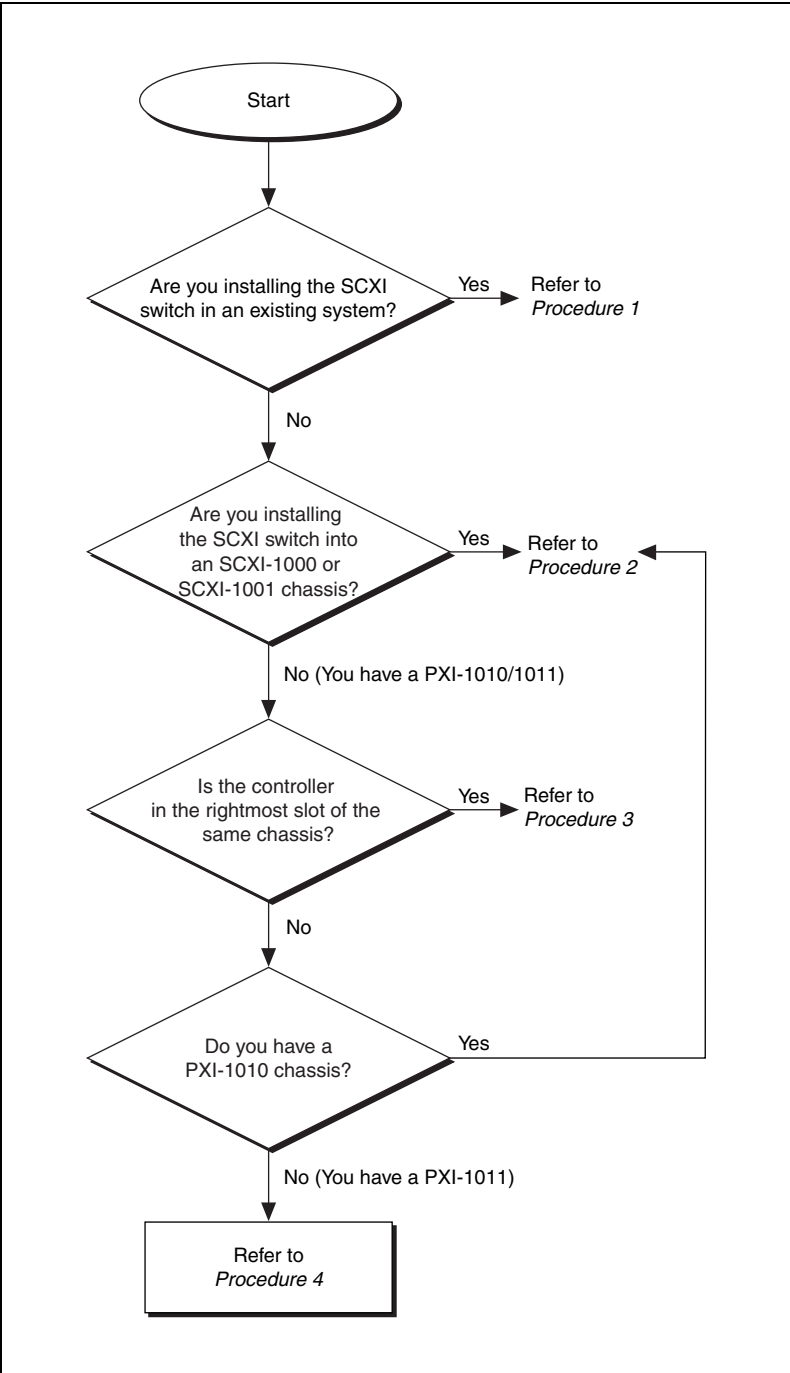
SCXI switch modules require a controller. Before installing an SCXI switch module, refer to Table 2 to ensure that your controller supports your switch. Table 2 also lists the cable adapter kit(s) necessary to cable the controller directly to the switch module.

**Table 2.** SCXI Controllers and Supported SCXI Switches

Rear Connector	Switch Module	SCXI Switch Controllers			
		NI 4021	NI 4060	NI 4070	E Series
10-pin	SCXI-1127	SCXI-1359 kit	SCXI-1357 kit or SCXI-1358 kit or SCXI-1359 kit	SCXI-1357 kit or SCXI-1358 kit or SCXI-1359 kit	Can control but not cable directly to switch module <sup>2</sup>
	SCXI-1128				
	SCXI-1129				
	SCXI-1166	Not supported <sup>1</sup>	Not supported <sup>1</sup>		
	SCXI-1193				
50-pin	SCXI-1160	SCXI-1362 kit	SCXI-1362 kit	SCXI-1362 kit	SH6868-EP and SCXI-1349
	SCXI-1161				
	SCXI-1163R				
	SCXI-1190				
	SCXI-1191				
	SCXI-1192				
<sup>1</sup> The NI 4060 and the NI 4070 cannot control the SCXI-1166 or the SCXI-1193 switch modules. For software support information refer to Table 3.					
<sup>2</sup> An E Series device can control these switches when cabled to another SCXI module in the same chassis. The cabled SCXI module can be an SCXI signal conditioning device or other SCXI switch module. Alternatively, you can install the E Series device in the rightmost PXI slot of a PXI-1010 or PXI-1011 chassis.					

## Installation

After you have installed and configured the controller, refer to the flowchart in Figure 3 for your next steps. Refer to the *DAQ Quick Start Guide for NI-DAQ 7.0* for installing an E Series or NI 4021 device and the *NI Digital Multimeters Getting Started Guide* for installing the NI 4060/4070.

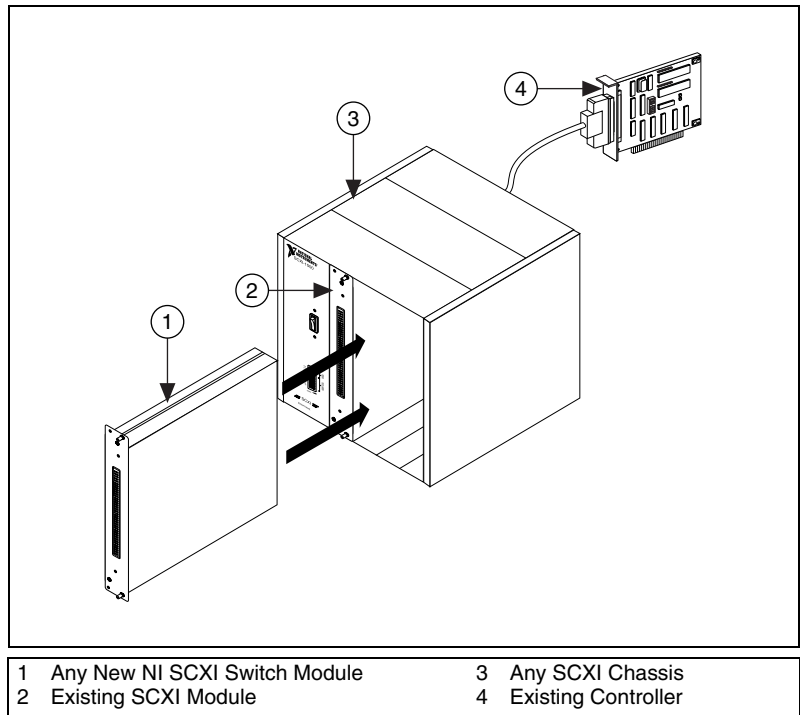


**Figure 3.** SCXI Switch Module Installation Flowchart

## Procedure 1: Installing the SCXI Switch in an Existing System

If your SCXI system already has a controller established and the controller supports your switch, you can simply add additional SCXI switch modules in any available SCXI slots. Refer to Table 2 to determine if your controller supports your SCXI switch module.

1. Power off and unplug the SCXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Remove the filler panel in an unused SCXI slot.
3. Touch any metal part of your chassis to discharge static electricity.
4. Insert the switch module into the SCXI slot.
5. Screw the device front panel to the chassis front panel mounting rail.



**Figure 4.** Installing an SCXI Switch Module in an Existing System

## Procedure 2: Cable the Controller to the SCXI Switch

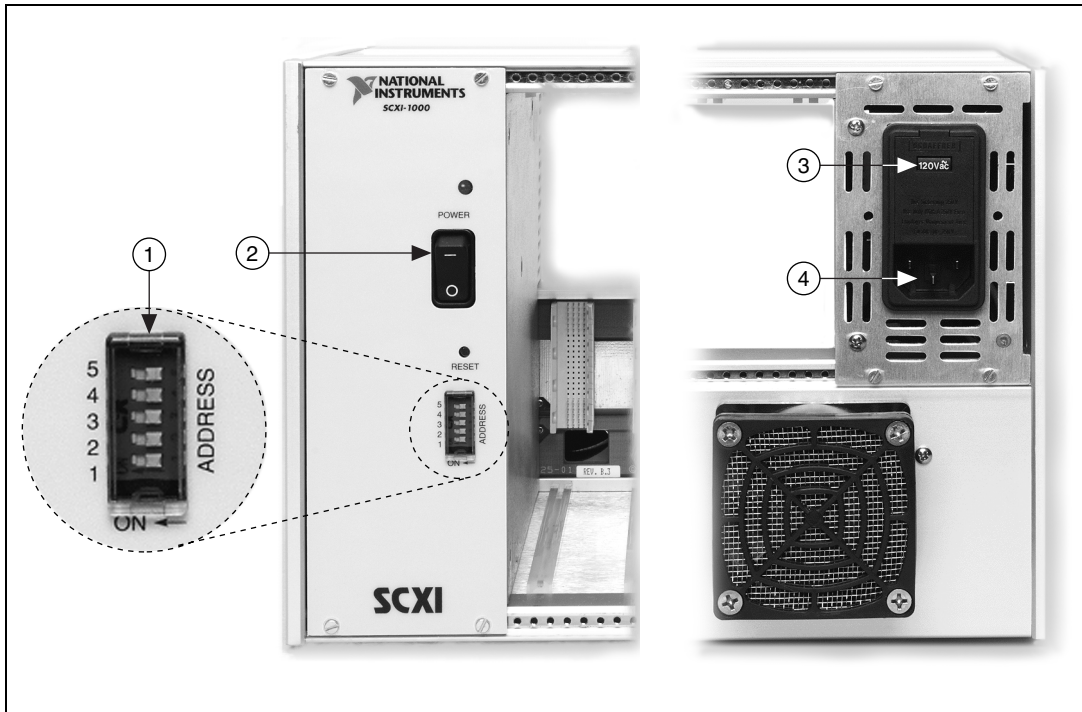
If you are using an SCXI-1000/1001 or PXI-1010 chassis, complete the following steps:

1. Power off and unplug the SCXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Set the chassis address switches to OFF. In Figure 5, all switches are shown in the OFF position.



**Note** Older chassis use jumpers inside the front panel, instead of chassis address switches. Older chassis also differ in fuses and AC power selection. Refer to the chassis documentation for more information.

3. Confirm the correct power settings (100, 120, 220, or 240 VAC).
4. Connect the power cord.



- 1 Chassis Address Switches
- 2 Chassis Power Switch

- 3 Power Settings
- 4 Power Cord Connector

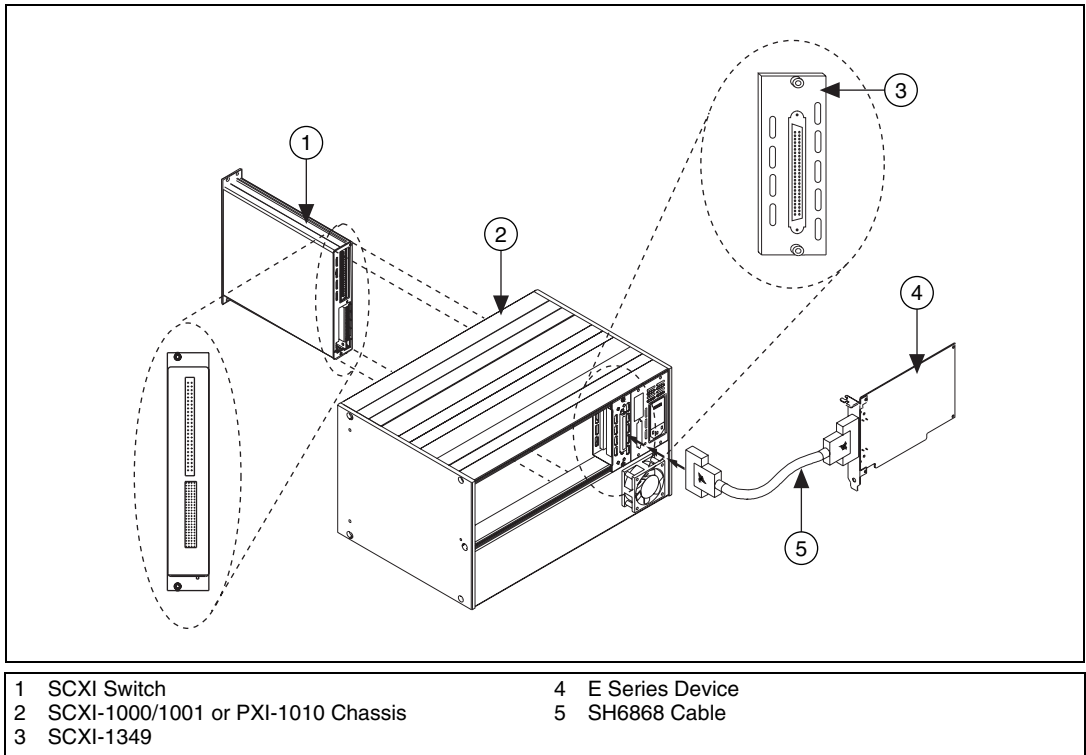
**Figure 5.** Chassis Preparation

After you have prepared your chassis, complete the instructions appropriate to your controller. Refer to Table 2 to determine if your controller supports and connects to your SCXI switch module.

## E Series

E Series devices can directly cable only to switches with 50-pin rear connectors. Refer to Table 2 to determine if your switch module has a 50-pin rear connector.

1. Power off and unplug the SCXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Remove the filler panel in an unused SCXI slot.
3. Touch any metal part of your chassis to discharge static electricity.
4. Insert the device into the SCXI slot.
5. Screw the device front panel to the chassis front panel mounting rail.
6. Attach the SCXI-1349 cable adapter to the rear of the SCXI switch module.
7. Screw the cable adapter to the chassis cable adapter mounting rail.
8. Connect one end of the SH6868 cable to the SCXI-1349 cable adapter and the other to the E Series device.



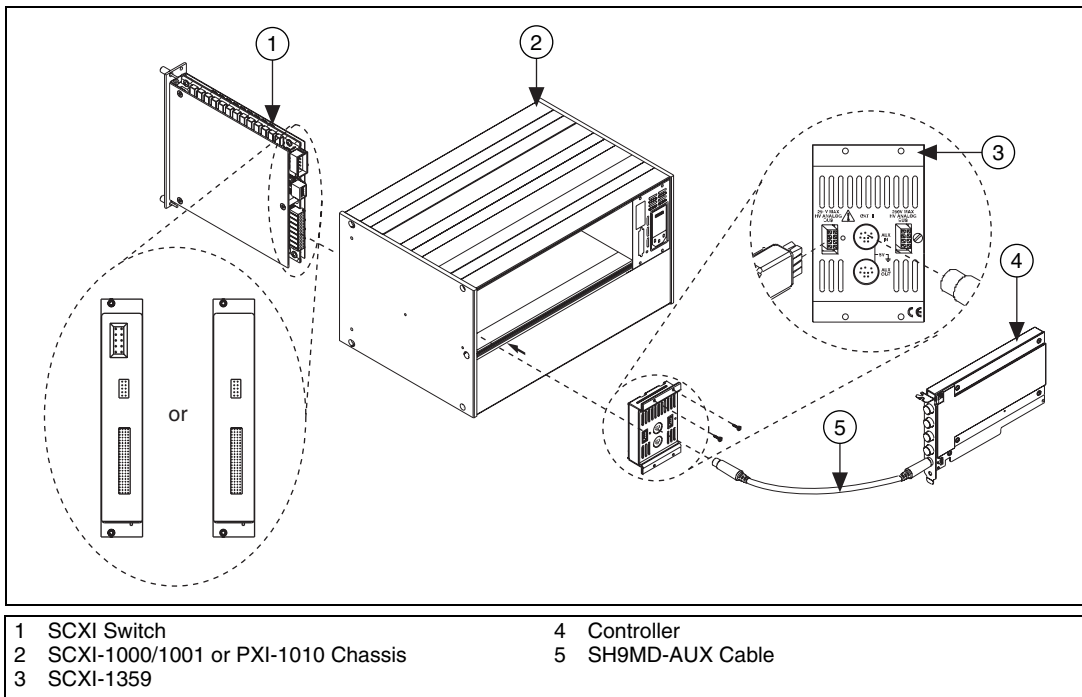
**Figure 6.** Cabling to an E Series Device

## NI 4021/4060/4070

Complete the following steps based on the rear connector of your switch module. Refer to Table 2 to determine how many pins are on the rear connector of the switch module.

### SCXI Switch with 10-Pin Rear Connector

1. Power off and unplug the SCXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Remove the filler panel in an unused SCXI slot.
3. Touch any metal part of your chassis to discharge static electricity.
4. Insert the device into the SCXI slot.
5. Screw the device front panel to the chassis front panel mounting rail.
6. Attach the SCXI-1359 cable adapter, included with SCXI-1357/1358 and 1359 kits, to the rear of the SCXI switch module. Ensure that the 10-pin connector of the switch module, shown in Figure 2, connects to the lower right 10-pin connector of the SCXI-1359 (facing the back).
7. Screw the cable adapter to the chassis cable adapter mounting rail.
8. Connect one end of the SH9MD-AUX cable to the SCXI-1359 cable adapter and the other to the NI 4021/4060/4070.

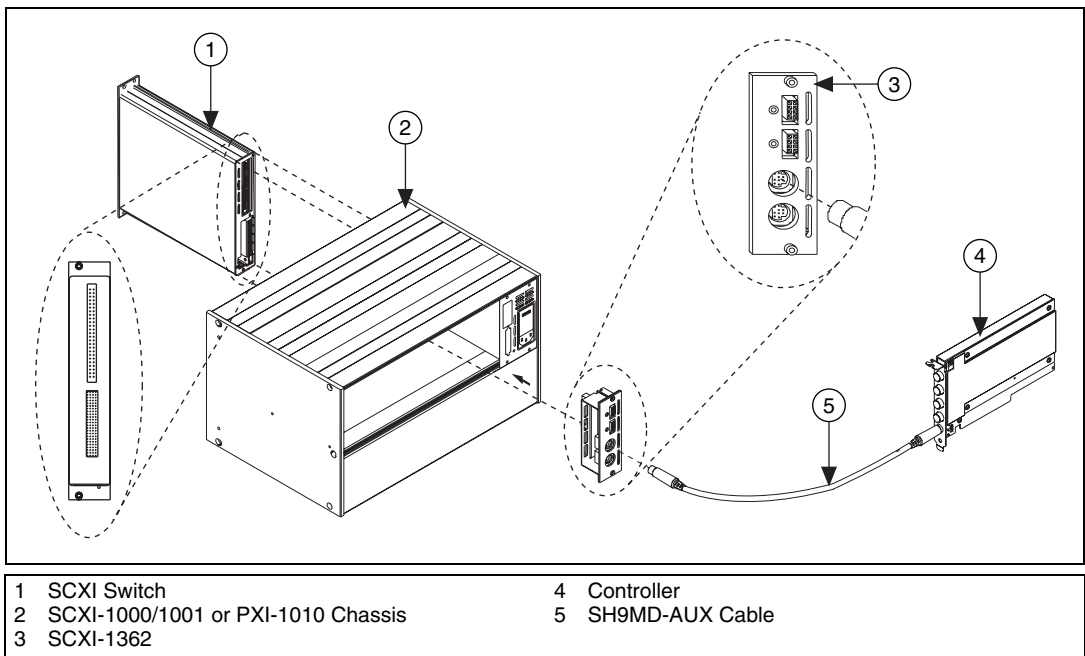


**Figure 7.** Cabling an NI 4021/4060/4070 to a 10-Pin Rear Connector Switch Module



## SCXI Switch with 50-Pin Rear Connector

1. Power off and unplug the SCXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Remove the filler panel in an unused SCXI slot.
3. Touch any metal part of your chassis to discharge static electricity.
4. Insert the device into the SCXI slot.
5. Screw the device front panel to the chassis front panel mounting rail.
6. Attach the SCXI-1362 cable adapter to the rear of the SCXI switch module.
7. Screw the cable adapter to the chassis cable adapter mounting rail.
8. Connect one end of the SH9MD-AUX cable to the SCXI-1362 cable adapter and the other to the NI 4021/4060/4070.

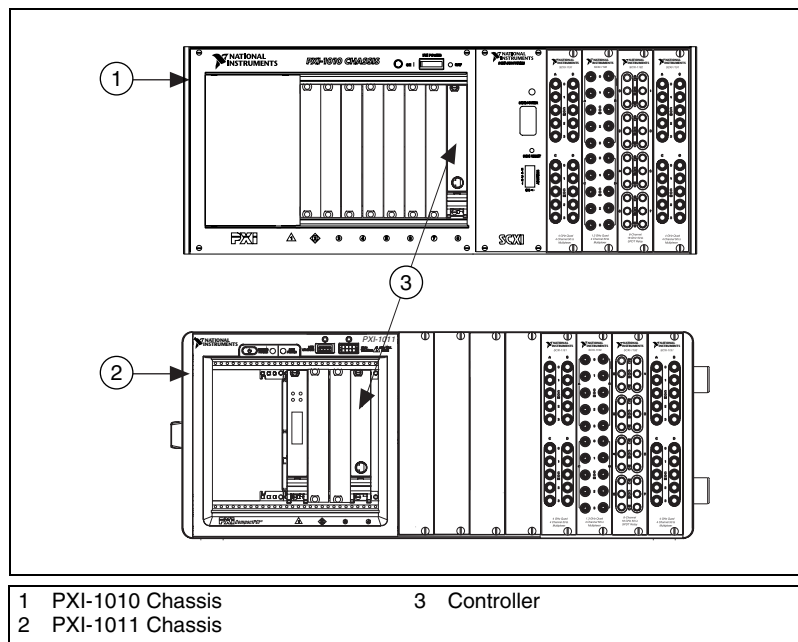


**Figure 8.** Cabling an NI 4021/4060/4070 to a 50-Pin Rear Connector Switch Module

## Procedure 3: Controller in the Rightmost PXI Slot

You can control your SCXI switches without additional cabling by installing your controller in the rightmost PXI slot of a PXI-1010 or PXI-1011 chassis. Refer to Table 2 to determine if your controller supports your SCXI switch module. Complete the following steps:

1. Power off and unplug the PXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. (PXI-1010 only) Set the chassis address switches to OFF. All switches in the OFF position are shown in Figure 5.
3. Confirm the correct power settings of the chassis (100, 120, 220, or 240 VAC).
4. Connect the chassis power cord.
5. Remove the filler panel in an unused SCXI slot.
6. Touch any metal part of your chassis to discharge static electricity.
7. Insert the device into the SCXI slot.
8. Screw the device front panel to the chassis front panel mounting rail.

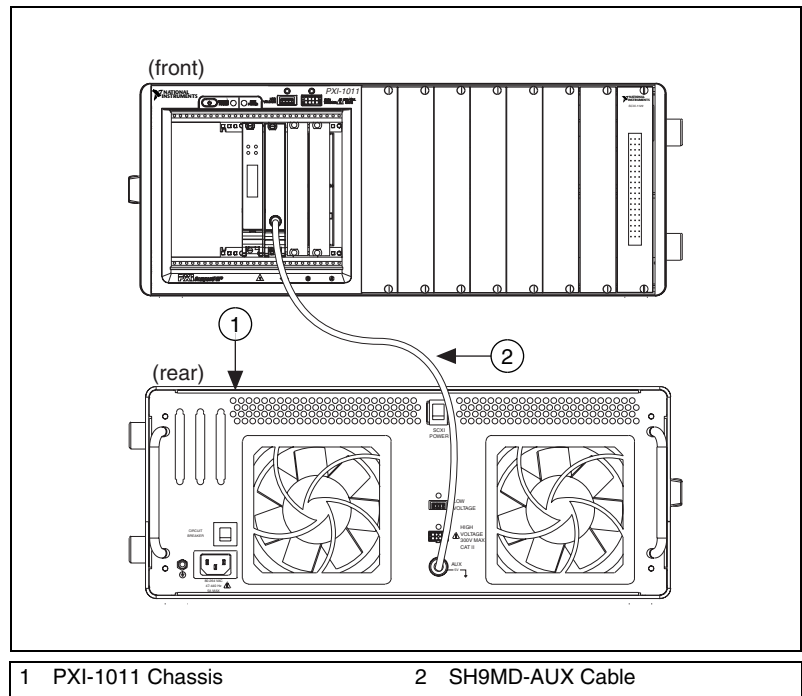


**Figure 9.** Controller in Rightmost PXI Slot

## Procedure 4: Controller Not in Rightmost PXI Slot of PXI-1011

If you do not install the SCXI controller in the rightmost PXI slot of the PXI-1011 chassis, you can control the SCXI switches using the SH9MD-AUX cable. Refer to Table 2 to determine if your controller supports and connects to your SCXI switch module.

1. Power off and unplug the PXI chassis. Follow proper ESD precautions to ensure you are grounded before installing the hardware.
2. Confirm the correct power settings of the chassis (100, 120, 220, or 240 VAC).
3. Connect the chassis power cord.
4. Remove the filler panel in an unused SCXI slot.
5. Touch any metal part of your chassis to discharge static electricity.
6. Insert the device into the SCXI slot.
7. Screw the device front panel to the chassis front panel mounting rail.
8. Connect the SH9MD-AUX cable to the rear of the PXI-1011 chassis.



**Figure 10.** Cabling the Controller to the Back of a PXI-1011 Chassis

## 6. Configure the PXI Switch Modules

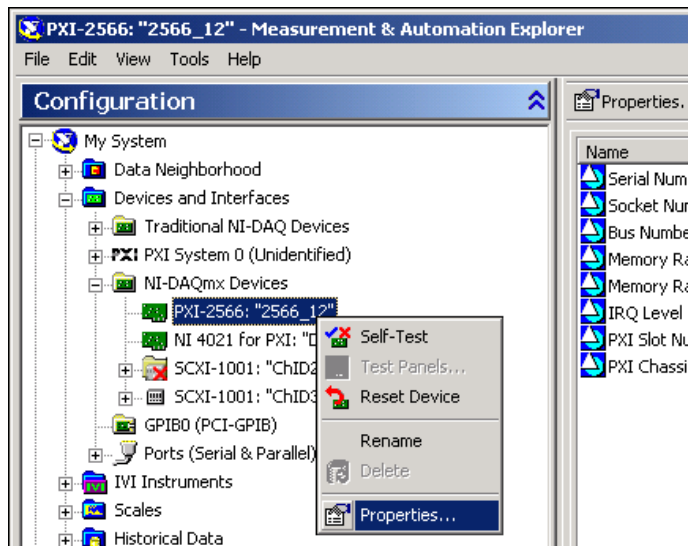
In Measurement & Automation Explorer (MAX), configure each PXI switch module you installed. Configuring the switch modules in MAX establishes the default settings for the switch module. The PXI-2566 and PXI-2593 must be configured under NI-DAQmx Devices while all other PXI switches are configured under PXI System.

1. Double-click the **Measurement & Automation Explorer** icon on the desktop to open MAX.
2. Expand **Devices and Interfaces**.
3. Check that your PXI switch module appears under Devices and Interfaces.

If your device does not automatically appear, press <F5> to refresh the view in MAX. If the device is still not recognized, refer to [ni.com/support/install](http://ni.com/support/install) for troubleshooting information.

### NI-DAQmx

1. Right-click the switch name and select **Properties**. Be sure to click the device name under NI-DAQmx Devices.



**Figure 11.** Configuring Switch Modules Under NI-DAQmx Devices in MAX

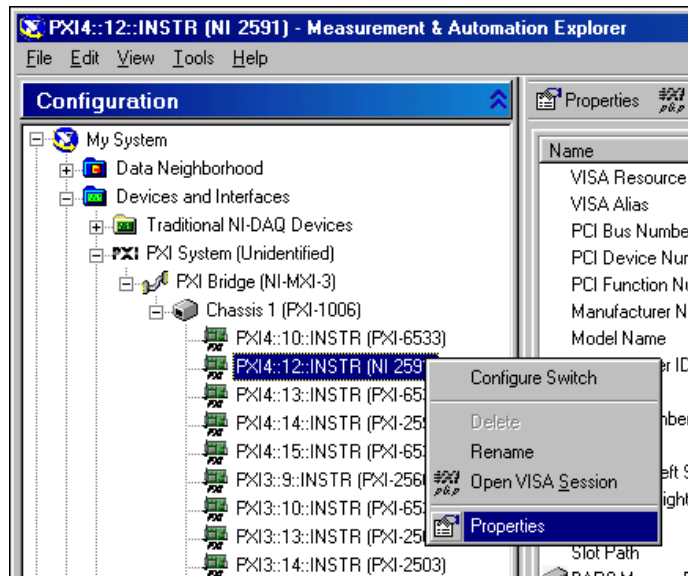
2. Configure the module properties.
  - (Optional) Select the terminal block/accessory from the **Terminal Block/Accessory** list box.
  - Set the default topology of the switch module by selecting a topology from the **Topology** list box.
3. Click **OK** to accept the changes.
4. You can perform a self-test on switches listed under NI-DAQmx Devices. Right-click the switch you want to test.
5. Select **Self-Test** to test the selected device.
6. When the self-test finishes, a message indicates if an error occurred. If an error occurs, refer to [ni.com/support](http://ni.com/support) for troubleshooting information.

## PXI System

1. Right-click the switch name and select **Properties**. Be sure to click the device name under PXI System.



**Note** The PXI-2566 and PXI-2593 must be configured under NI-DAQmx Devices



**Figure 12.** Configuring Switch Modules Under PXI System in MAX

2. Configure the module properties.
  - (Optional) Select the terminal block/accessory from the **Terminal Block/Accessory** list box.
  - Set the default topology of the switch module by selecting a topology from the **Topology** list box.
3. Click **OK** to accept the changes.

## 7. Configure the SCXI Switch Modules

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In MAX, configure each SCXI switch module you installed. SCXI switches can be configured under NI-DAQmx Devices and/or Traditional NI-DAQ Devices. Configuring the switch modules in MAX establishes the default settings for the switch module.

Refer to Table 3 to determine your MAX configuration options according to your controller. For example, the NI 4021 can control a switch module configured under NI-DAQmx Devices or Traditional NI-DAQ Devices. The NI 4060 can only control SCXI switch modules configured under Traditional NI-DAQ Devices.

**Table 3.** Switch Module Configuration in MAX by Controller

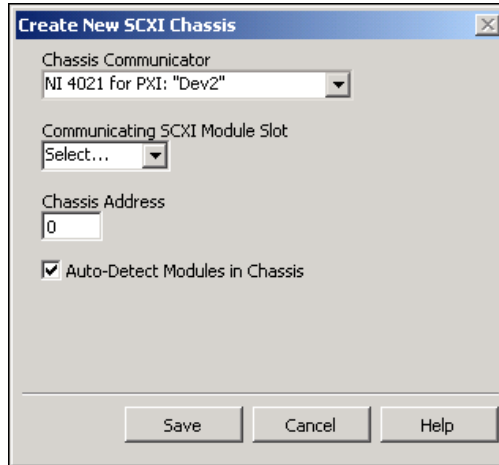
Controller	SCXI-1166/1193 Can Be Configured Under	All Other SCXI Switch Modules Can Be Configured Under
NI 4021	NI-DAQmx Devices	NI-DAQmx Devices/ Traditional DAQ Devices
NI 4060	—	Traditional DAQ Devices
NI 4070	—	Traditional DAQ Devices
E Series	NI-DAQmx Devices	NI-DAQmx Devices/ Traditional DAQ Devices

### NI-DAQmx

If you are using NI-DAQmx, complete the following steps, as shown in the figures, to configure the SCXI chassis and switch module.

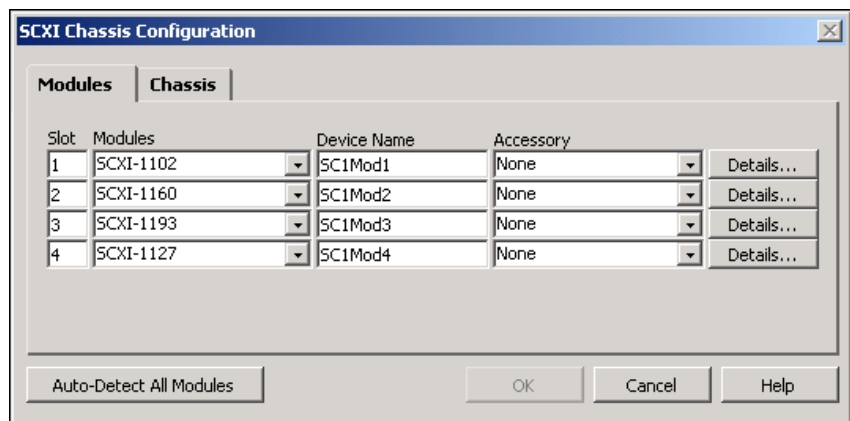
1. Right-click **NI-DAQmx Devices** in the configuration tree and select **Create New NI-DAQmx Device**.
2. Select **NI-DAQmx SCXI Chassis** and choose the chassis.
3. Select the controller cabled to the communicating SCXI module from **Chassis Communicator**. If MAX detects only one DAQ device, the device is chosen by default, and this option is disabled.

4. Select the module slot connected to the chassis communicator from **Communicating SCXI Module Slot**.
5. Enter the chassis address setting in **Chassis Address**. Make sure the setting matches the address setting on the SCXI chassis.
6. Select whether or not to auto-detect SCXI modules. If you do not auto-detect modules, MAX disables the Communicating SCXI Module Slot.
7. Click **Save**.



**Figure 13.** Configuring SCXI Switch Modules Under NI-DAQmx Devices

8. The SCXI Chassis Configuration window opens. The **Modules** tab is selected by default. If you did not auto-detect modules, select an SCXI module from the **Modules** list box. Be sure to locate the module in the correct slot.



**Figure 14.** Configuring SCXI Switch Modules Under NI-DAQmx Devices

9. MAX provides a default name for the Device Name field. To change the name, click in the field and enter a unique alphanumeric ID for the SCXI module.

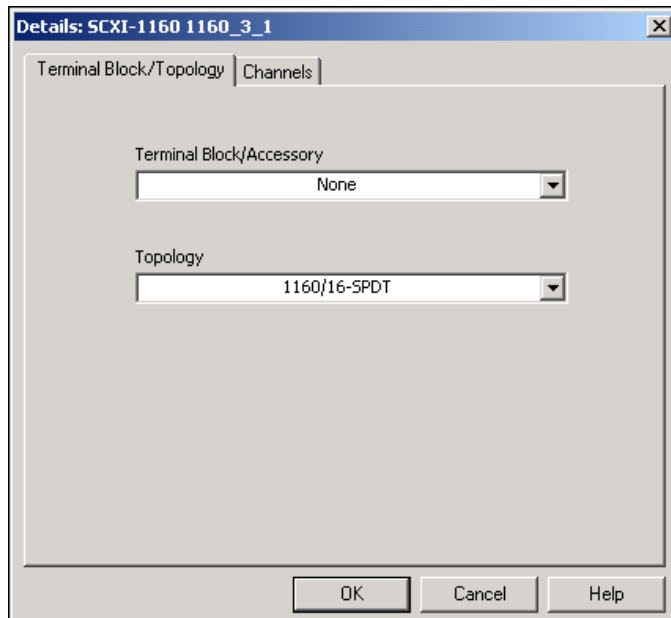


**Note** The text in the Device Name column is the name you reference in the NI-DAQmx API and is the **resource name** for the NI-SWITCH API.

10. If you are using a connected accessory, such as a terminal block, select it from **Accessory**.
11. Click **Details** to configure the switch module options.
12. The switch module configuration window opens. The **Terminal Block/Accessory** tab is selected by default. Select the terminal block connected to the switch module from the **Terminal Block/Accessory** list box.
13. Set a default topology from the **Topology** list box.



**Note** The SCXI-1127/1128 can connect to the high voltage analog bus (HVAB) during scanning. You can configure the switch to automatically connect to the HVAB during scanning by clicking an optional check box (not shown) on the previous window.



**Figure 15.** Configuring SCXI Switch Modules Under NI-DAQmx Devices



14. Click the **Channels** tab.
15. Designate source channels for the topology selected in the **Terminal Block/Topology** tab. You can set different source channels for each topology.
16. Designate reserved for routing channels. You can reserve different channels for routing in each topology.
17. Click **OK**.
18. Repeat steps 11 through 17 to configure additional SCXI switch modules.
19. If you need to change any chassis settings, click the **Chassis** tab.
20. Click **OK** to accept and save the settings for this chassis.



**Note** You cannot save the chassis configuration until you finish entering module information. A message at the top of the SCXI Chassis Configuration window alerts you of the status of the configuration. You cannot save if an error appears in the message box. If a warning appears in the message box, you can save the configuration.

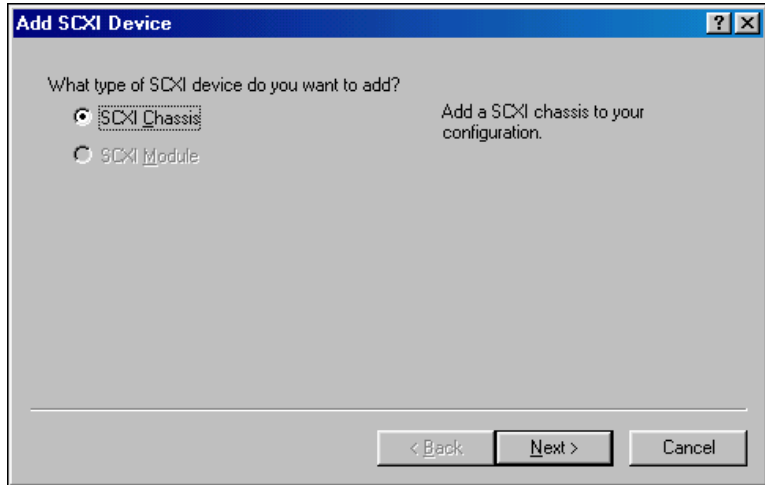
21. Right-click the chassis name in the NI-DAQ API you want to test under Devices and Interfaces.
22. Select **Test**. If the test fails, a message explains the failure.

## Traditional NI-DAQ

If you are using Traditional NI-DAQ, complete the following steps, as shown in the figures, to configure the SCXI chassis and switch module.

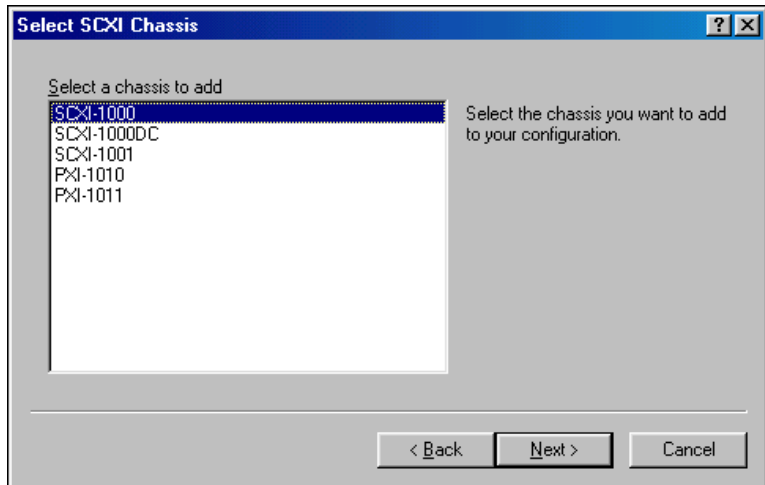
1. Right-click **Traditional NI-DAQ Devices** in the configuration tree and select **Add SCXI Chassis**.

2. Select **SCXI Chassis**. Click **Next**.



**Figure 16.** Adding an SCXI Chassis in MAX

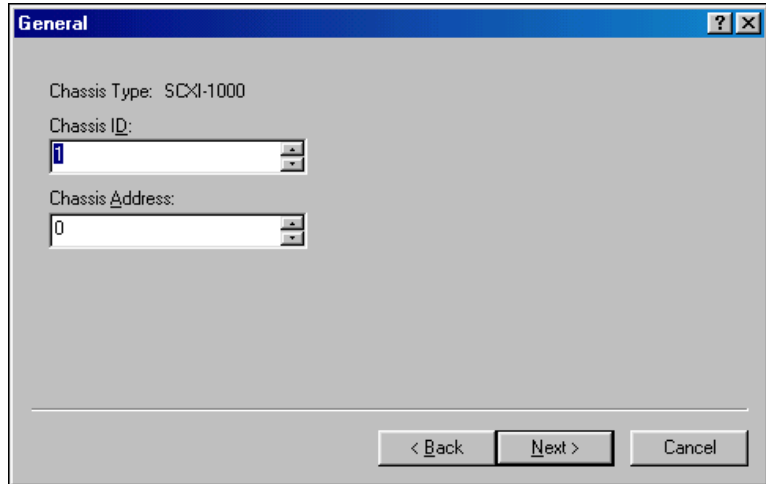
3. Select the type of chassis. Click **Next**.



**Figure 17.** Selecting a Chassis Type in MAX

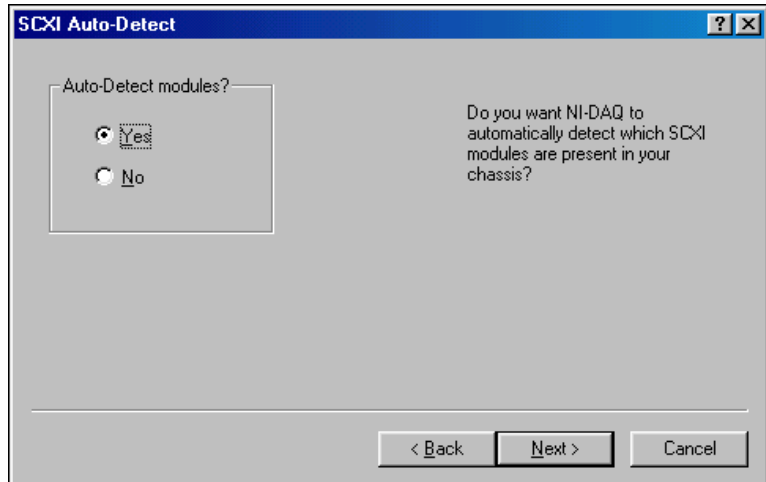
4. Select an ID for the SCXI chassis. The ID can be any integer between 1 and 3,200. Use this ID to identify the chassis in your application.

5. Enter the chassis address setting. Make sure the setting matches the chassis address setting on the SCXI chassis. Refer to the *Procedure 2* section for help locating the chassis address switches. Click **Next**.



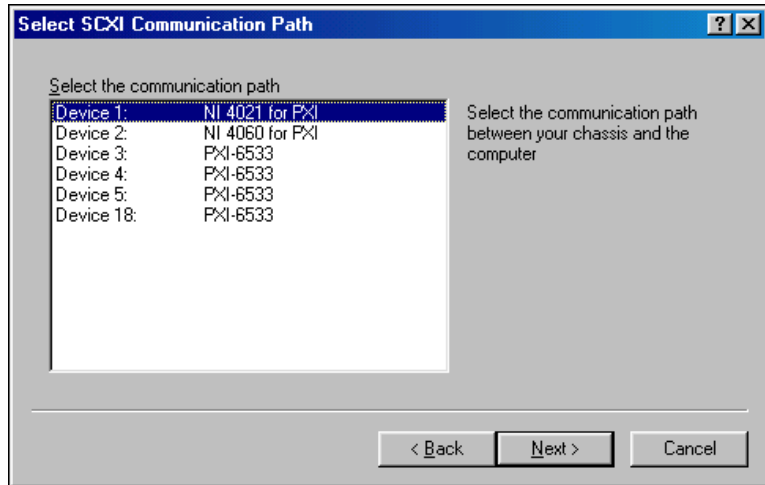
**Figure 18.** Configuring the Chassis ID and Address in MAX

6. Select whether or not to auto-detect SCXI modules. Click **Next**.



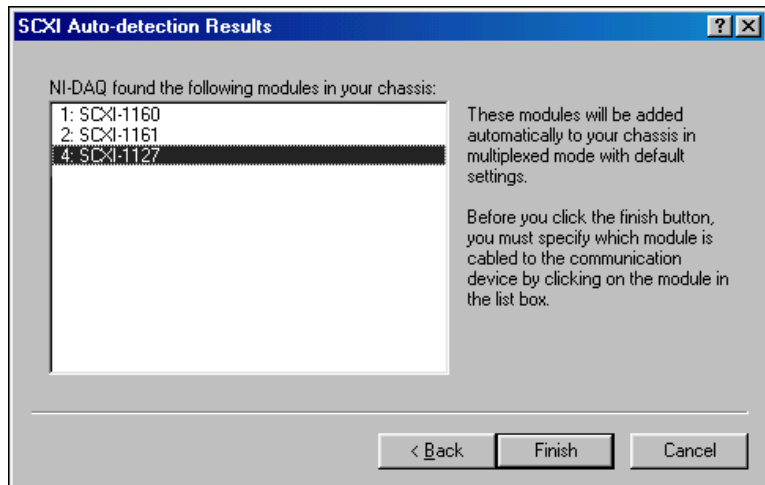
**Figure 19.** Auto-Detecting Modules

7. Select the controller which acts as the communication path between the chassis and the computer. Click **Next**.



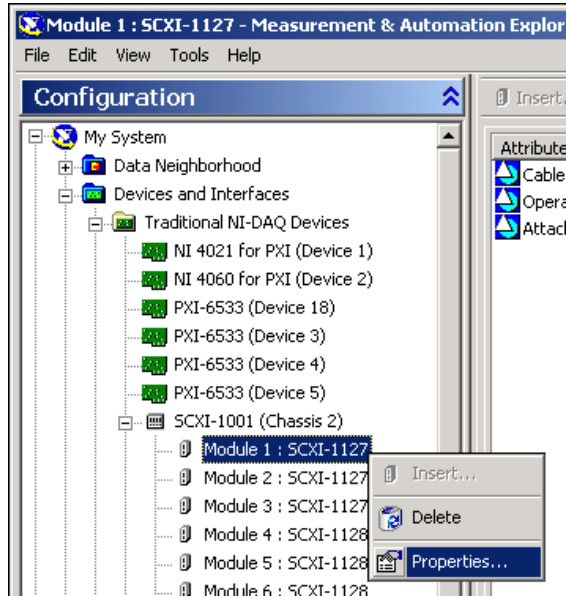
**Figure 20.** Select the Controller

8. Select the switch module that is cabled to the communication device. If the chassis has only one module, NI-DAQ selects the module by default.
9. Click **Finish** to accept the settings.



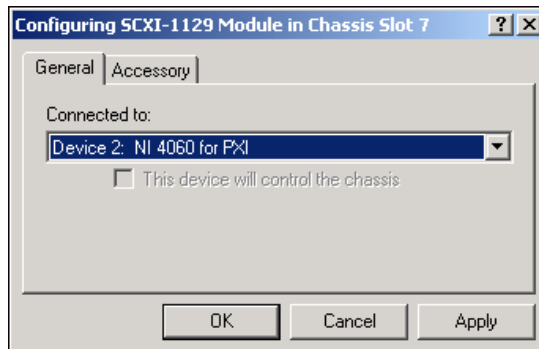
**Figure 21.** Select the Cabled Switch Module

10. Select the chassis from **Devices and Interfaces»Traditional NI-DAQ Devices**.
11. Right-click a module slot and choose **Properties**.



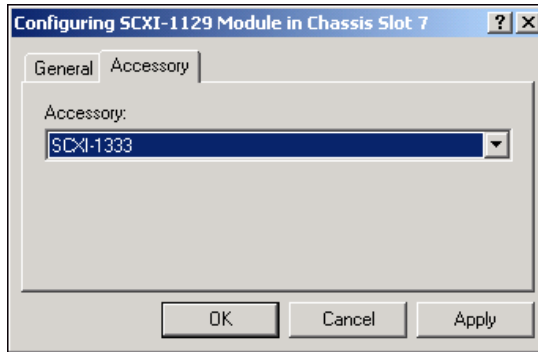
**Figure 22.** Configuring Switch Modules Under Traditional NI-DAQ Devices in MAX

12. The **General** tab is selected by default. Choose which controller connects to the module from the **Connected to** list box. Select the check box if the DAQ device controls the chassis.



**Figure 23.** Configuring Switch Modules Under Traditional NI-DAQ Devices in MAX

13. Click the **Accessory** tab (if available). Select the terminal block connected to the switch module from the **Accessory** list box.



**Figure 24.** Configuring Switch Modules Under Traditional NI-DAQ Devices in MAX

14. Click **OK** to accept the settings.

## 8. Install the Terminal Blocks and Connect Signals

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If your module uses a terminal block, complete the following steps:

1. Wire sensors to your switch module or the terminal block. For signal connection information, refer to the terminal block installation guide or the *NI Switches Help* for more information.

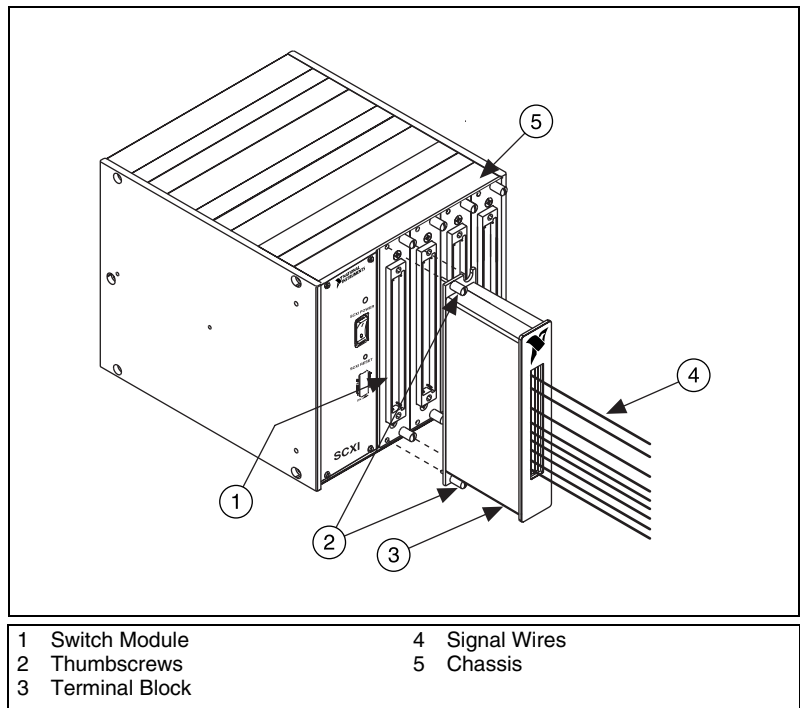


**Caution** Always refer to the *Specifications* document included with your switch *before* connecting signals. Exceeding specified switch signal ratings can create a shock or fire hazard and damage any or all of the devices connected to the switch.



**Caution** Modules that share a common high-voltage analog backplane derate to their lowest common voltage rating, even if they do not connect signals to the backplane. Refer to the [Derating Modules that Share the HVAB](#) section for more information.

2. Connect the module front connector to its mating connector on the terminal block.
3. Tighten the top and bottom thumbscrews on the back of the terminal block rear panel to hold it securely in place.



**Figure 25.** Installing a Terminal Block

## Derating Modules that Share the HVAB

As a safety precaution, modules that share a common high-voltage analog back plane must be derated to their lowest common voltage rating, even if they do not connect signals to the backplane. Refer to Figure 2 to determine if your switch has an HVAB connector. The following examples demonstrate how to derate your modules.

### Example 1

SCXI-1000 chassis

SCXI-1359 2-slot backplane adapter behind slots 3 and 4

SCXI-1127 (250 V, CAT II) in slot 4

SCXI-1129 (150 V, CAT I) in slot 3

Both modules share the high-voltage analog backplane and the SCXI-1127 must not exceed the rating of the SCXI-1129 (150 V, CAT I).

## Example 2

SCXI-1000 chassis  
SCXI-1359 2-slot backplane adapter behind slots 3 and 4  
SCXI-1127 (250 V, CAT II) in slot 4  
SCXI-1129 (150 V, CAT I) in slot 2

The SCXI-1127 does not share the high-voltage analog backplane with the SCXI-1129. Therefore, the SCXI-1127 can operate at the full rating (250 V, CAT II).

## Example 3

SCXI-1000 chassis  
SCXI-1359 2-slot backplane adapter behind slots 3 and 4  
SCXI-1127 (250 V, CAT II) in slot 4  
SCXI-1190 (30 V, CAT I) in slot 3

The SCXI-1190 does not have a high-voltage analog backplane connector. Therefore, the SCXI-1127 can operate at the full rating (250 V, CAT II).

# 9. Program the Switch Modules

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You can operate the switch module in one of three ways: interactively using the NI-SWITCH Soft Front Panel, programming using the NI-SWITCH API, or programming using the NI-DAQmx API.

## NI-SWITCH Soft Front Panel

The NI-SWITCH SFP is an interactive tool that allows you to test the basic functionality of the switch, become familiar with its operation, and use it as a tool for troubleshooting your applications. All NI switches can be operated with the NI-SWITCH SFP.

You can launch the NI-SWITCH SFP from **Program Files»National Instruments»NI-SWITCH»NI-SWITCH Soft Front Panel**.

## NI-SWITCH API

The NI-SWITCH API includes a set of operations and attributes that use all the functionality of the switch, including configuration, control, and other module-specific functions. All NI switches can be programmed with NI-SWITCH.

Information about programming with NI-SWITCH is available in the *NI Switches Help*. This document contains measurement tasks, concepts, a detailed function/VI reference for NI-SWITCH 2.0, and information specific to your switch module.



For example locations, refer to **Programming»Getting Started with NI-SWITCH** in the *NI Switches Help* at **Program Files»National Instruments»Documentation»NI Switches Help**.

## NI-DAQmx API

You can operate some switch modules with the NI-DAQmx API. NI-DAQmx is particularly useful for multimodule scanning operations. Refer to Table 1 to determine if you can program your switch with the NI-DAQmx API.

Information about programming with the NI-DAQmx API is available in the *NI-DAQmx Help*. Information specific to your switch module is available in the *NI Switches Help*.

For example locations, refer to the *DAQ Quick Start Guide for NI-DAQ 7.0*.

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