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GETTING STARTED GUIDE
NI Switches

For NI PXI and NI SCXI™ Switch Modules

This document explains how to install, configure, and test a National Instruments PXI or SCXI switch module. This document contains information about the NI-DAQ driver software relative to NI switch modules. For more detailed information about NI-DAQ, refer to the *NI-DAQ Readme* at **Start»All Programs»National Instruments»NI-DAQ**.

For detailed information about the features and programming options specific to the switch module, refer to the *NI Switches Help* at **Start» All Programs»National Instruments»NI-SWITCH»Documentation**.

Refer to the specifications document included with the switch module for additional safety and EMC information. Current specifications are available at `ni.com/manuals`. Visit `ni.com/idnet` for the latest version of NI-SWITCH driver software.

Contents

Conventions 2
Safety and Compliance 3
1. Verifying the System Requirements 3
2. Unpacking 4
3. Verifying the Kit Contents 4
    Other Required Items 4
4. Installing the Software 5
    Choosing and Installing Your Application Software 5
    Installing NI-SWITCH 5
5. Installing the Hardware 6
    Installing a PXI Switch Module 7
    Installing an SCXI Switch Module 8
6. Configuring and Testing in MAX 23
    Configuring and Testing a PXI Switch Module 23
    Configuring and Testing an SCXI Switch Module 25
7. Connecting Signals 29

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NATIONAL INSTRUMENTS™

8. Programming the Switch Module 31
NI-SWITCH Soft Front Panel (SFP) 31
NI-SWITCH Driver 31
NI-DAQmx Driver 31
Where to Go for Support 32

Conventions

The following conventions are used in this guide:

<>	Angle brackets that contain numbers separated by an ellipsis represent a range of values associated with a bit or signal name—for example, AO <3..0>.
»	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.
	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. When this symbol is marked on the product, refer to the *Read Me First: Safety and Radio-Frequency Interference* document that shipped with your device for precautions to take.
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.
italic	Italic text denotes variables, emphasis, or a cross-reference. Italic text 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.

PCI	Peripheral Component Interconnect (PCI) is a high-performance expansion bus architecture originally developed by Intel to replace ISA and EISA.
Platform	Text in this font denotes a specific platform and indicates that the text following it applies only to that platform.
PXI	PCI eXtensions for Instrumentation (PXI) is a rugged, open system for modular instrumentation based on CompactPCI, with special mechanical, electrical, and software features.
SCXI	Signal Conditioning eXtensions for Instrumentation—The National Instruments product line for conditioning low-level signals within an external chassis near sensors so that only high-level signals are sent to DAQ devices in the noisy PC environment. SCXI is an open standard available for all vendors.

Safety and Compliance

Refer to the *Read Me First: Safety and Radio-Frequency Interference* document for important safety and compliance information. For additional safety information, refer to the specifications document included with the switch module.

1. Verifying the System Requirements

Your system must meet certain requirements to use NI switch modules with NI-SWITCH. For more information on minimum system, recommended system, and supported application development environments (ADEs), refer to the *NI-SWITCH Readme File*, which is available on the NI-SWITCH CD.

Note After you install NI-SWITCH, you can access the *NI-SWITCH Readme File* at **Start»All Programs»National Instruments»NI-SWITCH»Documentation**.

2. Unpacking

The NI switch module ships in an antistatic package to prevent electrostatic discharge (ESD). ESD can damage several components on the device.



Caution *Never* touch the exposed pins of connectors.

To avoid ESD damage in handling the device, take the following precautions:

- Ground yourself with a grounding strap or by touching a grounded object.
- Touch the antistatic package to a metal part of your computer chassis before removing the device from the package.

Remove the device from the package and inspect it for loose components or any other signs of damage. Notify NI if the device appears damaged in any way. Do *not* install a damaged device in your computer or chassis.

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

3. Verifying the Kit Contents

Verify that the kit contains the following items:

- ❑ NI-SWITCH case, which contains the following items:
  - NI-SWITCH driver software CD, which includes the *NI Switches Help* and the *NI-SWITCH Readme File*
  - *NI Switches Getting Started Guide*
  - *NI-SWITCH Instrument Driver Quick Reference Guide*
- ❑ NI switch module
- ❑ Other documents
  - Specifications document for the NI switch module
  - *Read Me First: Safety and Radio-Frequency Interference*

Other Required Items

In addition to the items contained in the kit, you need the following items:

NI PXI Required Items

- ❑ NI PXI chassis or NI PXI/SCXI combination chassis
- ❑ 1/8 in. flathead screwdriver

NI SCXI Required Items

- ❑ NI SCXI chassis or NI PXI/SCXI combination chassis
- ❑ Switch controller

If cabling directly to a switch controller, you also need the following:

- ❑ Cable adapter
- ❑ Cable

4. Installing the Software

This section describes the software installation process for the NI switch module.

Choosing and Installing Your Application Software

NI switch modules are packaged with two drivers—NI-SWITCH and NI-DAQmx. Each driver has its own API with an extensive library of VIs and functions you can call from your ADE to program your NI switch module.

NI-DAQmx is supported in NI application software LabVIEW, LabWindows™/CVI™, or Measurement Studio versions 7.*x* or later, LabVIEW Signal Express 2.*x* or later, and the LabVIEW Real-Time Module 7.1 or later. NI-SWITCH supports LabVIEW and LabWindows/CVI 7.0 or later.

Install an ADE, such as LabVIEW or LabWindows/CVI, if you are developing an application for the switch module. Always install or upgrade your application software *before* installing the driver.

Installing NI-SWITCH

NI-SWITCH features a set of operations and attributes you can use to programmatically configure and control the NI switch module. Install or upgrade NI-SWITCH *before* installing new hardware so Windows can detect your device. To install NI-SWITCH, complete the following steps:



Caution NI-DAQ 7.*x* or later cannot exist on the same system with versions of NI-DAQ prior to version 7.0.

1. Insert the NI-SWITCH CD. The NI-SWITCH installer should open automatically. If not, select **Start»Run**, and enter `x:\setup.exe`, where *x* is the letter of the CD drive.
2. Follow the instructions in the installation prompts. For troubleshooting instructions, refer to the Hardware Installation/Configuration Troubleshooter at `ni.com/support/install`.

Windows Vista Users may see access and security messages during installation. Accept the prompts to complete the installation.

3. When the NI-SWITCH installer completes, a dialog box appears asking if you want to exit, shut down, or restart. Click one of the following options:
   - **Restart Later** to install more NI software or documentation.
     - If you are using a MXI link from a PC to control an NI PXI chassis, exit and install the MXI software at `ni.com/downloads` before using the switch module.
   - **Shut Down** or **Restart** if you are ready to install your device.
   - **Restart** if you are using a system running the LabVIEW Real-Time Module. Download NI-DAQ to the target using Measurement & Automation Explorer (MAX). Refer to the *Measurement & Automation Explorer Help* by selecting **Help»Help Topics» Remote Systems** in MAX.



Note If you install NI application software after installing NI-SWITCH, you must run the NI-SWITCH installer again to install the correct application software support.

5. Installing the Hardware

To install your NI switch module, follow the instructions in the section that describes your hardware platform.

Install the NI-SWITCH driver software *before* installing the hardware to ensure proper installation and auto-detection of the switch module.

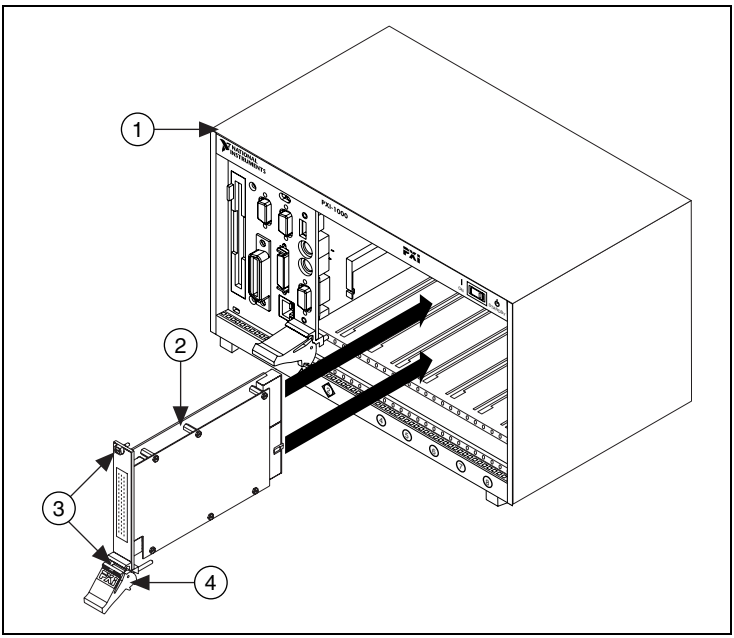


Caution Power off the chassis *before* installing a switch module. Switch modules are not hot-swappable. Adding or removing a switch module while the chassis is powered on can result in blown chassis fuses or damage to the chassis and the switch module.

Follow proper ESD precautions to ensure you are grounded before installing the hardware. Refer to the specifications document for your switch module for important safety and compliance information.

Installing a PXI Switch Module

Refer to Figure 1 and complete the following steps to install an NI PXI switch module.



1	NI PXI or NI PXI/SCXI Combination Chassis	3	Screws
2	NI PXI Switch Module	4	Injector/Ejector Handle

Figure 1. Installing an NI PXI Switch Module

1. Power off and unplug the NI PXI chassis.
2. If the NI PXI chassis has multiple fan speed settings, ensure that the fans are set to high.
3. Position the NI PXI chassis so that inlet and outlet vents are not obstructed. Refer to the chassis documentation for more information.
4. Remove the filler panel of an unused PXI slot.
5. Touch any metal part of the chassis to discharge static electricity.
6. Ensure that the ejector handle of the device is in the unlatched (down) position and swings freely.

7. Holding the device by the injector/ejector handle, slide it into the empty slot, ensuring that the base card (the card on the left when looking at the front of the device) engages with the card guides in the chassis, as shown in Figure 1.
8. Insert the device completely into the chassis
9. When you begin to feel resistance, pull up on the injector/ejector handle to latch the device.
10. Tighten the screws at the top and bottom of the device front panel.
11. Cover all empty PXI slots using blank PXI filler panels.
12. Plug in and power on the NI PXI chassis.
13. Proceed to the *Configuring and Testing a PXI Switch Module* section of this document.

Installing an SCXI Switch Module

NI SCXI switch modules require a dedicated switch controller, often cabled to the switch module using an adapter kit. For example, NI DMMs and NI 4021 switch controllers require an NI SCXI-1359/1358/1357 adapter kit to connect to an NI SCXI switch module.

Alternatively, some switch controllers like the NI USB-1359/1358/1357 can connect an NI SCXI switch module directly to a computer. Refer to the *NI Switches Help* for more information about NI SCXI switch controllers and adapter kits.

Before installing an NI SCXI switch module, install the NI SCXI switch controller.

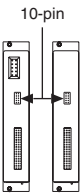
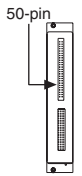
Installing an SCXI Switch Controller

Refer to Table 1 to verify that the switch controller supports your switch module and identify the adapter kit(s) required to cable the controller or the computer to your switch module.

Note A switch controller installed in the rightmost PXI slot of a NI PXI-1010/1011/1050/1052 chassis, does not require any additional cables or adapters to connect to the switch module.

Install and configure the switch controller as described in its documentation. For information about installing an NI E Series, NI M Series, or NI 4021 device, refer to the *DAQ Getting Started Guide*. For information about installing an NI 4060/407*x* device, refer to the *NI Digital Multimeters Getting Started Guide*. For information about installing an NI USB switch controller, refer to *Procedure 5*.

Table 1. NI SCXI Controllers and Supported NI SCXI Switches

Rear Connector	NI Switch Module	NI SCXI Switch Controllers				
		NI 4021	NI 4060	NI 407*x*	NI USB	NI E or M Series
	SCXI-1127	SCXI-1357 kit or SCXI-1358 kit or 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	USB-1357 kit or USB-1358 kit or USB-1359 kit	Indirect control[2]
	SCXI-1128					
	SCXI-1129					
	SCXI-1130		Not supported[1]			
	All other modules					
	SCXI-1160[3]	SCXI-1362 kit	SCXI-1362 kit	SCXI-1362 kit	Indirect control[4]	SH6868-EP and SCXI-1349
	SCXI-1161[3]					
	SCXI-1163R					
	SCXI-1190					

[1] The NI 4060 can only control the NI SCXI-1127/1128/1129/1160/1161/1163R/1190 switch modules configured using Traditional NI-DAQ (Legacy). For software support information, refer to Table 3.

[2] An NI E Series or NI M Series device can control these switches when cabled to a 50-pin rear connector NI SCXI switch module in the same chassis. The cabled NI SCXI module can be an NI SCXI signal conditioning module or another NI SCXI switch module. Alternatively, you can install an NI E Series or an NI SCXI compatible NI M Series device in the rightmost PXI slot of an NI PXI-1010, NI PXI-1011, or NI PXI-1052 chassis.

[3] To use this module with the listed controllers, set jumpers W2, W3, and W4 on the NI switch module to MIO. Refer to the *NI SCXI-1160/1161 Jumpers Note to Users* or the *NI Switches Help* for more information.

[4] An NI USB device can control these switches when cabled to a 10-pin rear connector NI SCXI switch module in the same chassis. NI USB switch controllers cannot be used with an NI PXI-1011 or an NI PXI-1052 chassis.

Determining the SCXI Switch Module Installation Procedure

After you install and configure the switch controller, refer to Table 2 to determine the appropriate installation procedure for your switch module.

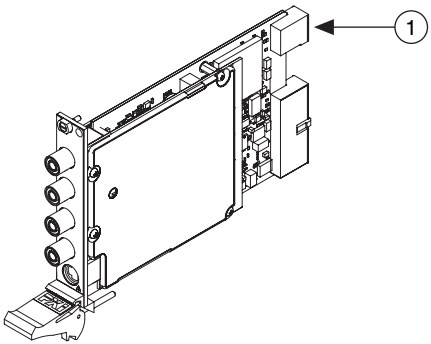
Table 2. Determining the NI SCXI Switch Installation Procedure

NI Switch Module Location	NI Controller Type	Installation Procedure
Any unused SCXI slot	Any existing type	1
SCXI-1000 SCXI-1001	PCI or PXI	2
PXI-1010 PXI-1050	• PXI not in rightmost PXI slot • PXI Express[1] in any slot	2
PXI-1011 PXI-1052	• PXI not in rightmost PXI slot • PXI Express[1] in any slot	3
PXI-1010 PXI-1011 PXI-1050 PXI-1052	PXI[2] in rightmost PXI slot	4
PXI-1010 PXI-1050 SCXI-1000 SCXI-1001	USB	5

[1] PXI Express compatible device.
[2] PXI device, not PXI Express compatible.

PXI Express Compatible Devices

PXI Express devices are distinguished by an enriched hard metric (eHM) rear connector. Refer to Figure 2 to determine if your device is PXI Express compatible.



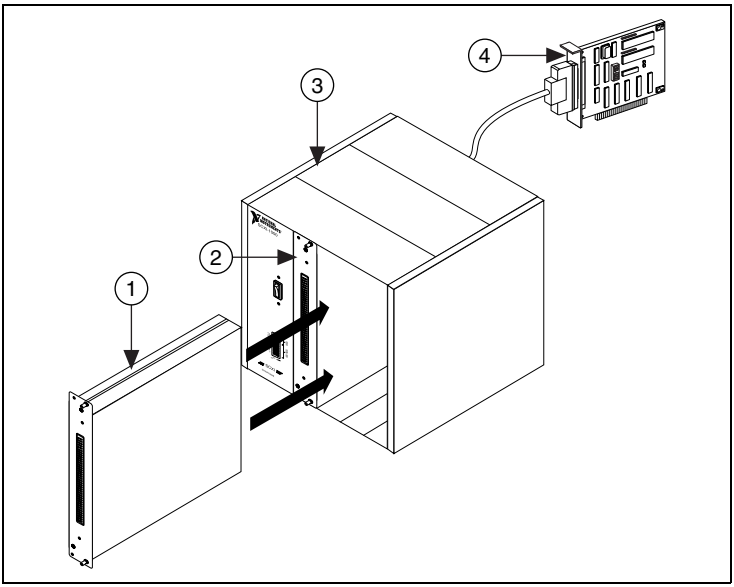
1 eHM Rear Connector

Figure 2. PXI Express Device

Procedure 1

Use this procedure to install an NI SCXI switch module in an existing system. Refer to Table 1 to verify that the existing switch controller supports the switch module.

Refer to Figure 3 and complete the following steps to install an NI SCXI switch module in an existing system.



1	New NI SCXI Switch Module	3	NI SCXI Chassis
2	Existing NI SCXI Module	4	Existing Controller

Figure 3. Installing an NI SCXI Switch Module in an Existing System

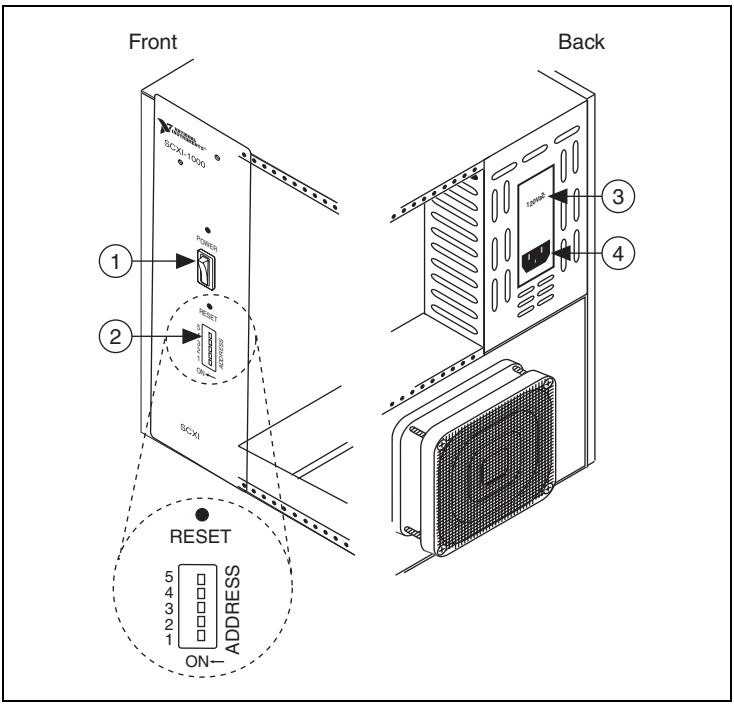
1. Power off and unplug the NI SCXI chassis.
2. Remove the filler panel from an unused SCXI slot.
3. Touch any metal part of the chassis to discharge static electricity.
4. Insert the switch module into the SCXI slot.
5. Screw the switch front panel to the chassis front panel mounting rail.
6. Proceed to step 6 in the *Configuring and Testing an SCXI Switch Module* section of this document to add the switch module to the existing NI SCXI chassis in MAX.

Procedure 2

Use this procedure to install an NI SCXI switch module in any of the following configurations:

- NI SCXI-1000/1001 chassis with an NI PCI or NI PXI switch controller
- NI PXI-1010/1050 chassis with a switch controller *not* in the rightmost PXI slot of the chassis
- NI PXI-1010/1050 chassis with an NI PXI Express switch controller in any slot of the chassis

Refer to Figure 4 and complete the following steps to install an NI SCXI switch module.



1	Chassis Power Switch	3	Chassis Power Settings
2	Chassis Address Switches	4	Power Cord Connector

Figure 4. Chassis Preparation

1. Power off and unplug the chassis.
2. Set the chassis address switches to the OFF position as illustrated in Figure 4.

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

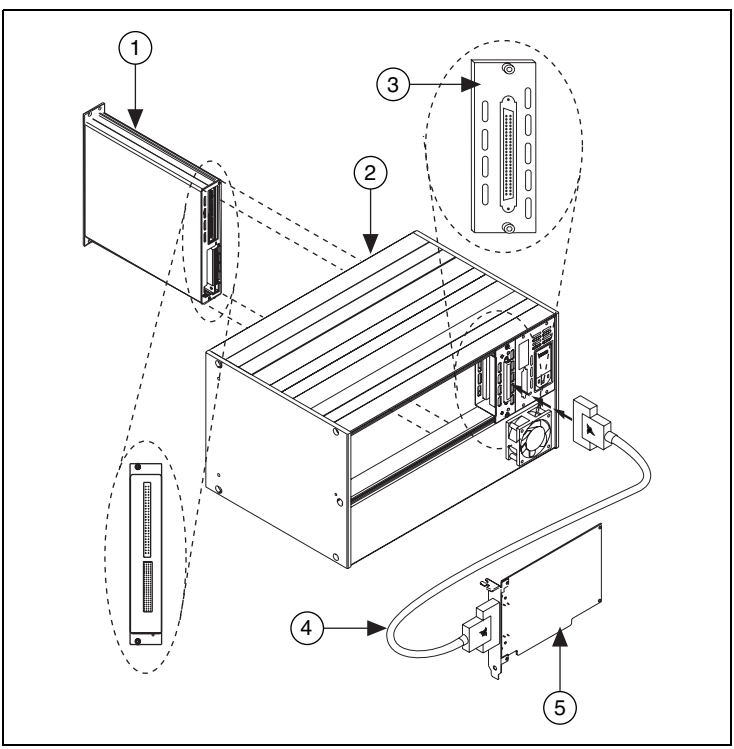
3. Confirm the correct power settings of the chassis (100, 120, 220, or 240 VAC) as shown in Figure 4.
4. Remove the filler panel from an unused SCXI slot.

5. Touch any metal part of the chassis to discharge static electricity.
6. Insert the switch module into the SCXI slot.
7. Screw the switch front panel to the chassis front panel mounting rail.
8. Complete the appropriate set of steps below to cable the NI SCXI switch module to the switch controller.

NI E Series or M Series Device

An NI E Series or M Series device can directly cable only to an NI SCXI switch module with a 50-pin rear connector.

Refer to Figure 5 and complete the following steps to cable an NI E Series or M Series device to an NI SCXI switch module.



1	NI SCXI Switch Module	3	NI SCXI-1349 Cable Adapter
2	NI SCXI-1000/1001 or NI PXI-1010 Chassis	4	NI E Series or M Series Device
		5	NI SH6868 Cable

Figure 5. Cabling to an NI E Series or M Series Device to an NI SCXI Switch Module

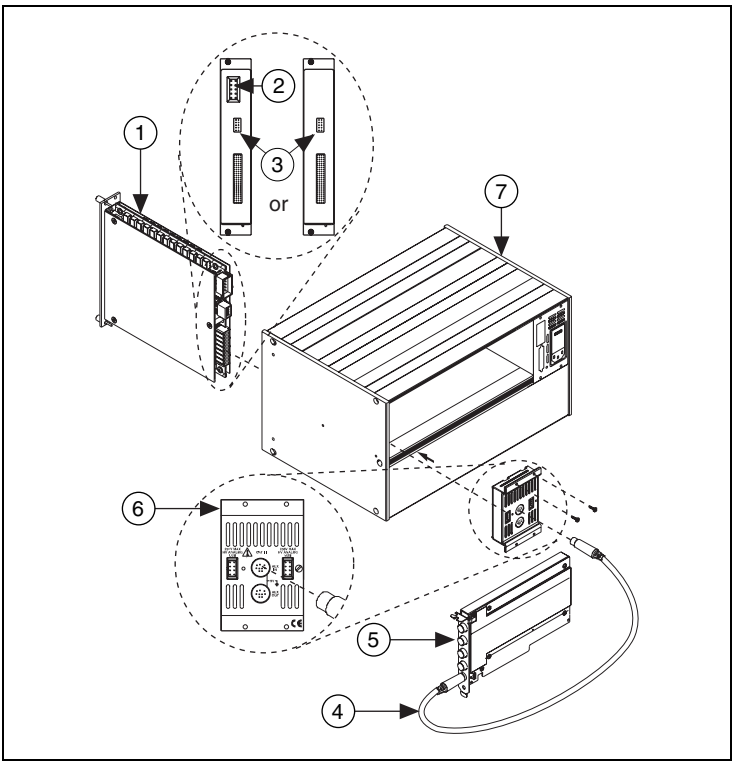
1. Attach the NI SCXI-1349 cable adapter to the rear of the NI SCXI switch module.
2. Screw the cable adapter to the chassis mounting rail.
3. Connect one end of the NI SH6868 cable to the NI SCXI-1349 cable adapter and the other end to the NI E Series or M Series device.
4. Power on the chassis.
5. Proceed to the *Configuring and Testing an SCXI Switch Module* section of this document.

NI 4021/4060/407*x*

To cable an NI 4021/4060/407*x* to an NI SCXI switch module, first determine the cabling scheme of the NI SCXI switch module. To determine the cabling scheme of the switch module, refer to Table 1.

NI SCXI Switch Module with a 10-Pin Rear Connector

Refer to Figure 6 and complete the following steps to cable an NI 4021/4060/407*x* to an NI SCXI switch module with a 10-pin rear connector.



1	NI SCXI Switch Module	5	NI Switch Controller
2	HVAB Connector	6	NI SCXI-1359 Cable Adapter
3	10-Pin Rear Connector	7	NI SCXI-1000/1001 or NI PXI-1010 Chassis
4	SH9MD-AUX Cable		

Figure 6. Cabling an NI 4021/4060/407*x* to a 10-Pin Rear Connector Switch Module

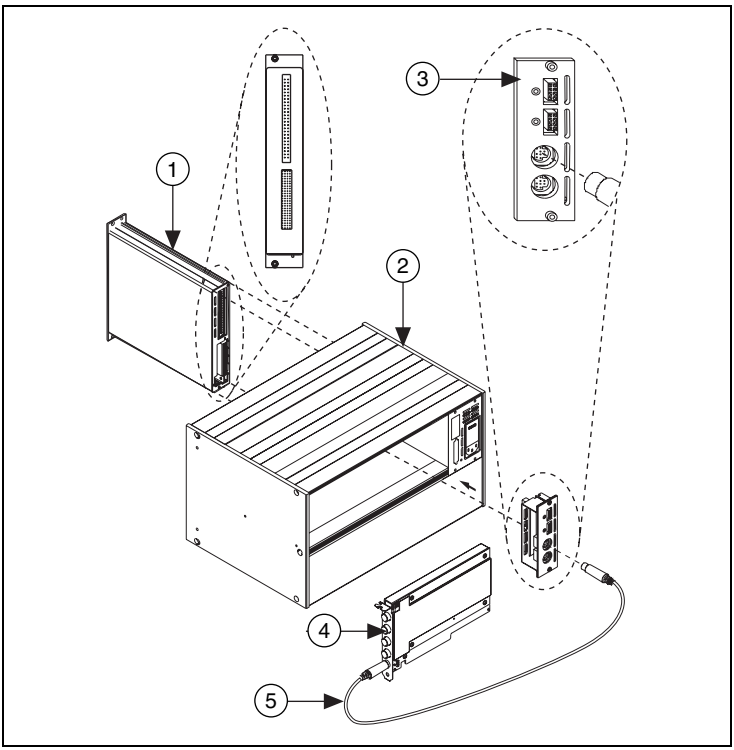
1. Attach the NI SCXI-1359, included with your kit, to the rear of the NI SCXI switch module. Ensure that the 10-pin rear connector of the switch module connects to the lower-right 10-pin rear connector on the NI SCXI-1359.

Note Refer to the *NI Switches Help*, for more information about the connectors on the NI SCXI-1359.

2. Screw the backplane adapter to the chassis mounting rail.
3. Connect one end of the SH9MD-AUX cable to the AUX IN of the NI SCXI-1359 and the other to the NI 4021/4060/407*x*.
4. Power on the chassis.
5. Proceed to the *Installing an SCXI Switch Module* section of this document.

NI SCXI Switch Module with a 50-Pin Rear Connector

Refer to Figure 7 and complete the following steps to cable an NI 4021/4060/407*x* to an NI SCXI switch module with a 50-pin rear connector.



1	NI SCXI Switch Module	4	NI Switch Controller
2	NI SCXI-1000/1001 or NI PXI-1010 Chassis	5	SH9MD-AUX Cable
3	NI SCXI-1362 Cable Adapter		

Figure 7. Cabling an NI 4021/4060/407*x* to a 50-Pin Rear Connector Switch Module

1. Attach the NI SCXI-1362 cable adapter to the rear of the NI SCXI switch module.
2. Screw the cable adapter to the chassis mounting rail.
3. Connect one end of the SH9MD-AUX cable to the NI SCXI-1362 cable adapter and the other end to the NI 4021/4060/407*x*.

4. Power on the chassis.
5. Proceed to the *Configuring and Testing an SCXI Switch Module* section of this document.

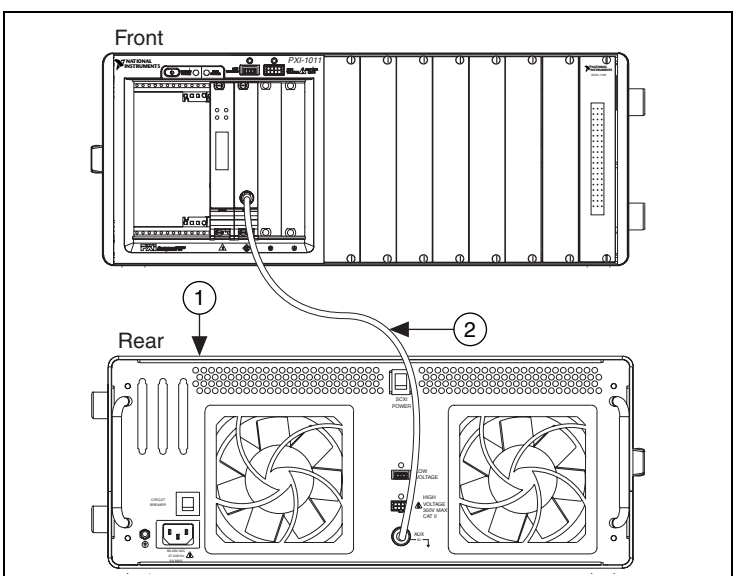
Procedure 3

Use this procedure to install an NI SCXI switch module in any of the following configurations:

- NI PXI-1011/1052 chassis with a switch controller *not* in the rightmost PXI slot of the chassis
- NI PXI-1011/1052 chassis with an NI PXI Express switch controller in any slot of the chassis

In these configurations, you can control NI SCXI switches using an SH9MD-AUX cable. Refer to Table 1 to verify that the controller supports the NI SCXI switch module you are installing.

Refer to Figure 8 and complete the following steps to install an NI SCXI switch module.



1	NI PXI-1011/1052 Chassis	2	SH9MD-AUX Cable

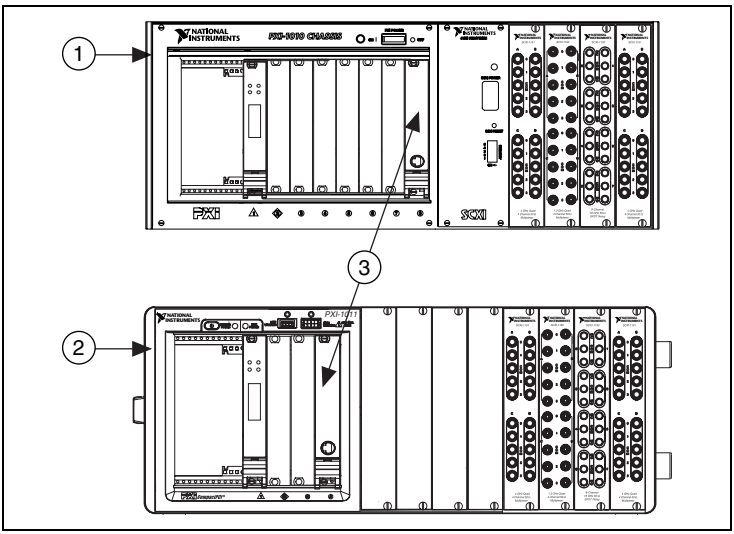
Figure 8. Cabling the Controller to the Back of an NI PXI-1011/1052 Chassis

1. Power off and unplug the NI PXI chassis.
2. Confirm the correct power settings of the chassis (100, 120, 220, or 240 VAC) as shown in Figure 4.
3. Remove the filler panel from an unused SCXI slot.
4. Touch any metal part of the chassis to discharge static electricity.
5. Insert the switch module into the SCXI slot.
6. Screw the device front panel to the chassis front panel mounting rail.
7. Connect one end of the SH9MD-AUX to the controller and the other end to the rear of the NI PXI chassis.
8. Power on the chassis.
9. Proceed to the *Installing an SCXI Switch Module* section of this document.

Procedure 4

Use this procedure to install an NI SCXI switch module in an NI PXI-1010/1011/1050/1052 chassis with a PXI switch controller in the rightmost PXI slot of the chassis. In this configuration, no cables are required to connect the switch module to the controller. Refer to Table 1 to verify that the controller supports the NI SCXI switch module you are installing.

Refer to Figure 9 and complete the following steps to install an NI SCXI switch module.



1	NI PXI-1010 Chassis	2	NI PXI-1011/1052 Chassis	3	Controller

Figure 9. NI Switch Controller in the Rightmost PXI Slot

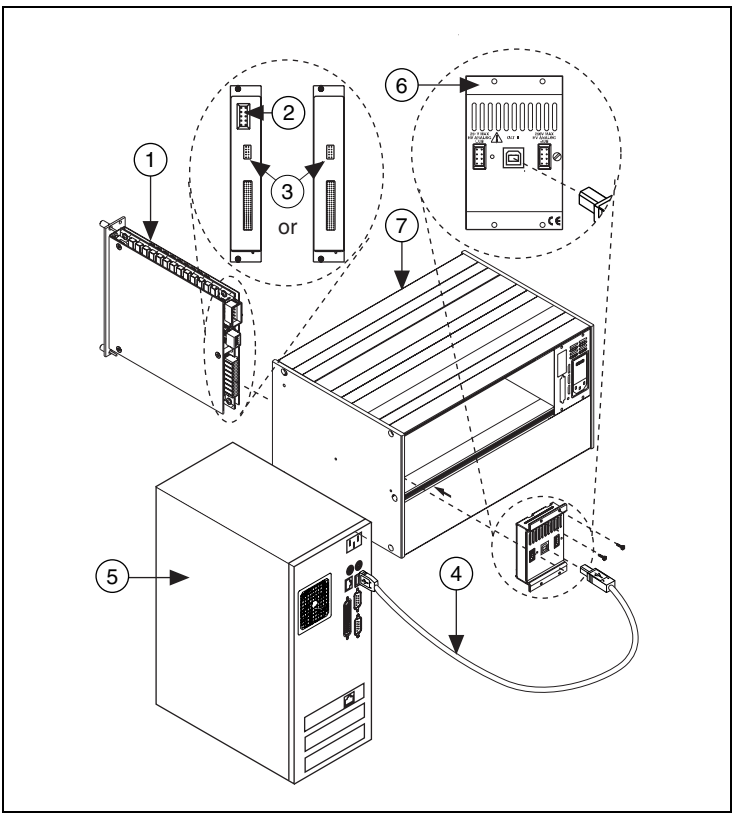
1. Power off and unplug the chassis.
2. (NI PXI-1010 only) Set the chassis address switches to the OFF position as shown in Figure 4.
3. Confirm the correct power settings of the chassis (100, 120, 220, or 240 VAC) as shown in Figure 4.
4. Remove the filler panel from an unused SCXI slot.
5. Touch any metal part of the chassis to discharge static electricity.
6. Insert the switch module into the SCXI slot.
7. Screw the switch front panel to the chassis front panel mounting rail.
8. Power on the chassis.
9. Proceed to the *Configuring and Testing an SCXI Switch Module* section of this document.

Procedure 5

Use this procedure to connect an NI USB switch controller/adapter directly to an NI SCXI switch module with a 10-pin rear connector. To determine the cabling scheme of the switch module, refer to Table 1.

Note Refer to the *NI 1357/1358/1359 SCXI Controller/Adapter Kit Installation Guide* for more information about USB switch control.

Refer to Figure 10 and complete the following steps to install an NI SCXI switch module and cable it to an NI USB switch controller.



1	NI SCXI Switch Module	5	NI Switch Controller
2	HVAB Connector	6	NI 1359 Cable Adapter
3	10-Pin Rear Connector	7	NI SCXI-1000/1001 or NI PXI-1010 Chassis
4	USB Cable		

Figure 10. Cabling an NI USB Switch Controller to a 10-Pin Rear Connector Switch Module

1. Power off and unplug the NI SCXI chassis.
2. Remove the filler panel in an unused SCXI slot.
3. Touch any metal part of the chassis to discharge static electricity.

4. Insert the switch module into the SCXI slot.
5. Screw the switch front panel to the chassis front panel mounting rail.
6. Attach the NI 1359, included with the kit, to the rear of the NI SCXI switch module. Ensure that the 10-pin rear connector of the switch module connects to the lower-right 10-pin rear connector of the NI 1359.

Note Refer to the *NI Switches Help*, for more information about the connectors on the NI 1359.

7. Screw the backplane adapter to the chassis mounting rail.
8. Power on the chassis. You must power on the chassis *before* you connect the NI USB-1359 to the computer to auto-detect the NI USB-1359 and auto-create the chassis in MAX.

Note If you are using an NI PXI-1010, the chassis appears in MAX as an NI SCXI-1000 chassis.

9. Connect one end of the USB cable to the NI USB-1359 and the other end to a USB hub or a USB port on a computer.
10. Proceed to the *Configuring and Testing an SCXI Switch Module* section of this document.

6. Configuring and Testing in MAX

To configure and test your NI switch module, follow the instructions in the section that describes your hardware platform.

Configuring and Testing a PXI Switch Module

Configure all NI PXI switch modules under **NI-DAQmx Devices** in MAX.

1. If necessary, power on the chassis.
2. Double-click the **Measurement & Automation** icon on the desktop to open MAX.
3. Expand **Devices and Interfaces**, then expand **NI-DAQmx Devices**. If you are using a remote real-time (RT) target, expand **Remote Systems**, find and expand the target, and then expand **Devices and Interfaces** and **NI-DAQmx Devices**.
4. Check that the NI PXI switch module appears under **NI-DAQmx Devices**. If the device does not appear, press <F5> to refresh the view in MAX. Refer to `ni.com/support/install` for troubleshooting information if the device is still not recognized.
5. Under **NI-DAQmx Devices**, right-click the switch module name, and select **Properties**.

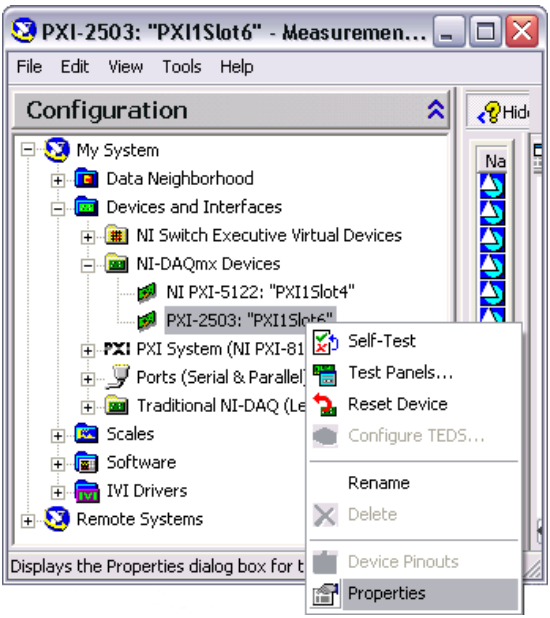


Figure 11. Configuring NI Switch Modules Under NI-DAQmx Devices

6. The **Terminal Block/Topology** tab is selected by default. Select the terminal block connected to the switch module from the **Terminal Block/Accessory** listbox.
7. Set a default topology from the **Topology** listbox.
8. Select the **Channels** tab.
9. If necessary, designate source channels for the topology selected in the **Terminal Block/Topology** tab. You can set different source channels for each topology.
10. If necessary, designate reserved channels for routing. You can reserve different channels for routing in each topology.
11. Click **OK** to accept the changes.
12. Right-click the switch you want to test, and select **Self-Test**. After the self-test, a message indicates successful verification or if an error occurred. If an error occurs, refer to `ni.com/support/install` for troubleshooting information.

Configuring and Testing an SCXI Switch Module

Configure NI SCXI switch modules in MAX under the API you are using to control the module—NI-DAQmx and/or Traditional NI-DAQ (Legacy).

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

Table 3. Switch Module Configuration in MAX by Controller

NI Controller	NI SCXI-1127/1128/1129/1160/1161/1163R/1190/1191/1192 Switches	All Other NI SCXI Switches
NI 4021 NI 407*x* E Series M Series	NI-DAQmx/ Traditional NI-DAQ (Legacy)	NI-DAQmx
NI 4060	Traditional NI-DAQ (Legacy)	—
NI USB	NI-DAQmx	

NI-DAQmx Devices

1. If necessary, power on the chassis.
2. Choose one of the following options to configure your device in MAX:
   - For devices cabled to an NI SCXI-1357/1358/1359 kit, proceed to step 5.
   - For devices cabled to an NI USB-357/1358/1359 kit, where the NI USB-1359 is auto-detected and the chassis is auto-created in MAX as shown in Figure 12, complete the following steps.
     a. Expand the **NI-DAQmx Devices** tab.
     b. Right-click the chassis, and choose **Properties**. The SCXI Chassis Configuration dialog box opens. The **Modules** tab is selected by default.
     c. Proceed to step 6b.
   - For all other devices, proceed to step 3.

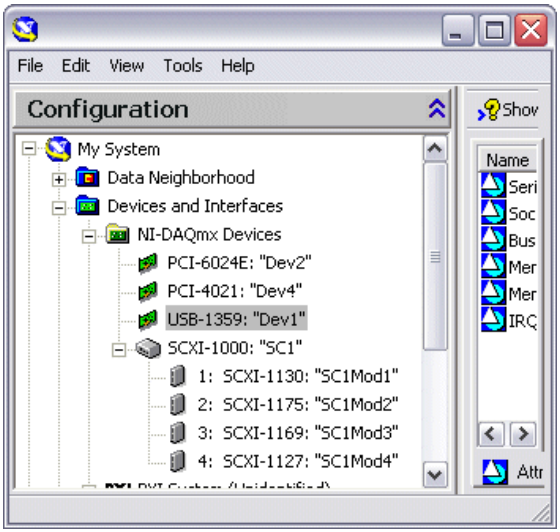


Figure 12. Auto-Detection of the NI USB-1359 and Auto-Creation of the Chassis in MAX

3. Right-click **NI-DAQmx Devices** in the configuration tree in MAX, and select **Create New NI-DAQmx Device**. If you are using a remote RT target, browse for your module under **Remote Systems»Devices and Interfaces»NI-DAQmx Devices**.

4. Select **NI-DAQmx SCXI Chassis**, and choose the chassis.
   The Create New SCXI Chassis dialog box opens as shown in Figure 13.

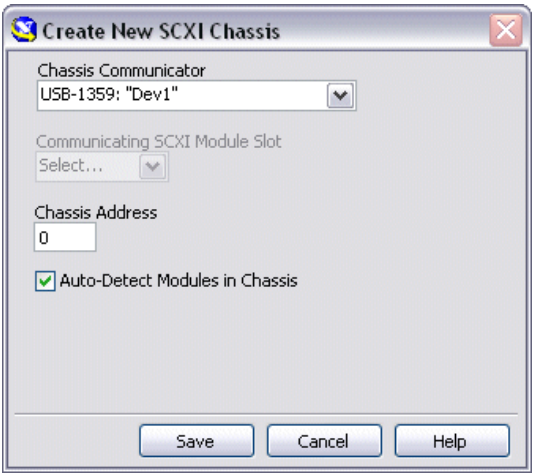


Figure 13. Creating a New NI SCXI Chassis

5. Create a new NI SCXI chassis.

Note If you are using an NI PXI-1010 chassis and the switch controller is *not* in the rightmost PXI slot, or you are using a NI PXI Express switch controller in the rightmost PXI slot, create your chassis as an NI SCXI-1000 in MAX.

   a. Select the controller (**NI USB-1359** or **NI 4021/4060/407x**) cabled to the communicating NI SCXI switch module from the **Chassis Communicator** listbox. If MAX detects only one communicating device, this device is selected as the chassis communicator by default and the listbox is dimmed.
   b. (NI SCXI kits only) Select the module slot connected to the chassis communicator from the **Communicating SCXI Module Slot** listbox.
   c. Enter the chassis address setting in the **Chassis Address** field. Ensure that the setting you enter matches the address setting on the NI SCXI chassis as shown in Figure 4.
   d. Enable the **Auto-Detect Modules in Chassis** option to auto-detect installed NI SCXI switch modules. If you do not auto-detect switch

modules, MAX disables the **Communicating SCXI Module Slot** listbox.

e. Click **Save**.

After you create a new chassis, the SCXI Chassis Configuration dialog box opens as shown in Figure 14. The **Modules** tab is selected by default.

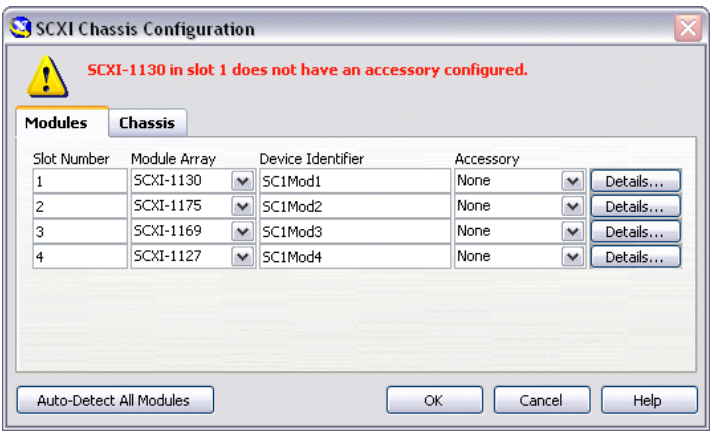


Figure 14. Configuring the NI SCXI Chassis

6. Configure the NI SCXI switch module.
   a. If you did not enable switch module auto-detection in step 5d, select an NI SCXI switch module from the **Module Array** listbox. Assign the switch module the slot number that matches the physical slot location of the switch module in the chassis.
   b. MAX assigns a default name to the NI SCXI switch module in the **Device Identifier** textbox. The **Device Identifier** is the **resource name** string in the NI-SWITCH API and **switch device** string in the NI-DAQmx API. To edit the default name, click the **Device Identifier** textbox and enter a unique alphanumeric ID for the switch module.
   c. If you are using a connected accessory, such as a terminal block, select it from the **Accessory** listbox.
7. Click **Details** to configure the switch module options. The Details dialog box for the switch module configuration dialog box opens. The **Terminal Block/Topology** tab is selected by default.
8. Configure the **Details** dialog box for an NI SCXI switch module.
   a. Select the terminal block connected to the switch module from the **Terminal Block/Topology** listbox.

b. Set a default topology from the **Topology** listbox.

Note During scanning, the NI SCXI-1127/1128 can connect to the high-voltage analog bus (HVAB). To configure the switch module to automatically connect to the HVAB during scanning, enable the optional checkbox in the switch module configuration dialog box.

c. Select the **Channels** tab.

d. Designate source channels for the topology selected in the **Terminal Block/Topology** tab. You can set different source channels for each topology.

e. Designate reserved channels for routing. You can reserve different channels for routing in each topology.

f. Click **OK** to accept the changes.

9. To configure additional NI SCXI switch modules, repeat steps 7 and 8.
10. If necessary, select the **Chassis** tab to modify chassis settings.
11. Click **OK** to accept and save the settings for the chassis.

Note You can save the chassis configuration only *after* you enter the switch module information. A message at the top of the SCXI Chassis Configuration dialog box displays the configuration status. If a warning appears in the message box, you can save the configuration. If an error appears in the message box, you cannot save the configuration.

12. To test the configuration, right-click the chassis name listed under **Devices and Interfaces**, and select **Test**. After the test, a message indicates successful verification of the configuration or if an error occurred. If an error occurs, refer to `ni.com/support/install` for troubleshooting information.

Traditional NI-DAQ (Legacy) Devices

Refer to the *NI Switches Help* for instructions about configuring and testing switch modules under Traditional NI-DAQ (Legacy).

7. Connecting Signals

Caution Exceeding specified switch signal ratings can create a shock or fire hazard and damage the devices connected to the switch module. Always refer to the specifications document included with your switch module for safety and EMC information *before* connecting signals. Specifications are available at `ni.com/manuals`.

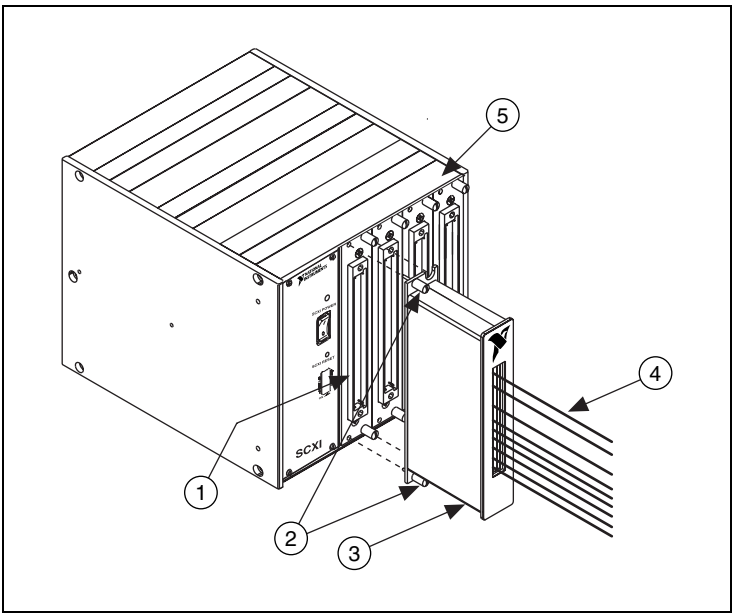
Complete the following steps to connect signals to the switch module.

1. Attach wire sensors to the switch module or the terminal block. Refer to the terminal block installation guide or the *NI Switches Help* for signal connection information.

Caution Modules that share a common HVAB derate to their lowest common voltage rating, even if signals are not connected to the backplane. For derating examples and more information about the HVAB backplane, refer to the High Voltage Analog Bus (HVAB) topic in the *NI Switches Help*.

2. Connect the switch 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 15 illustrates the installation of a terminal block for signal connection.



1 Switch Module	4 Signal Wires
2 Thumbscrews	5 Chassis
3 Terminal Block	

Figure 15. Installing a Terminal Block

8. Programming the Switch Module

You can operate the switch module in one of the following ways:

- Interactively using the NI-SWITCH Soft Front Panel
- Programmatically using NI-SWITCH or NI-DAQmx

NI-SWITCH Soft Front Panel (SFP)

The NI-SWITCH SFP is an interactive tool you can use to test the basic functionality of the switch, become familiar with its operation, and troubleshoot your applications. The NI-SWITCH SFP supports all NI switch modules.

You can launch the NI-SWITCH SFP from **Start»All Programs»National Instruments»NI-SWITCH»NI-SWITCH Soft Front Panel**.

Refer to the *NI Switches Help* for more information about the NI-SWITCH SFP.

NI-SWITCH Driver

The NI-SWITCH API includes a set of operations and attributes that use all the functionality of the switch module, including configuration, control, and other module-specific functions. The NI-SWITCH API supports all NI switch modules.

Refer to the *NI Switches Help* for more information about programming with NI-SWITCH. *NI Switches Help* contains measurement tasks, concepts, a detailed VI/function reference for NI-SWITCH, and information specific to your switch module.

For the location of example programs that you can integrate into your applications, refer to the *NI-SWITCH Readme File* at **Start» All Programs»National Instruments»NI-SWITCH»Documentation**.

NI-DAQmx Driver

You can operate switch modules with the NI-DAQmx API. NI-DAQmx is particularly useful for multimodule scanning operations. The NI-DAQmx API supports all NI switch modules.

Refer to the *NI-DAQmx Help* for more information about programming with the NI-DAQmx API. Refer to the *NI Switches Help* for information specific to your switch module.

For the location of example programs that you can integrate into your applications, refer to the *DAQ Getting Started Guide* at **Start» All Programs»National Instruments»NI-DAQ** after you have installed NI-DAQ.

Where to Go for Support

The National Instruments Web site 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.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

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Lebanon 961 (0) 1 33 28 28, Malaysia 1800 887710,
Mexico 01 800 010 0793, Netherlands 31 (0) 348 433 466,
New Zealand 0800 553 322, Norway 47 (0) 66 90 76 60,
Poland 48 22 3390150, Portugal 351 210 311 210, Russia 7 495 783 6851,
Singapore 1800 226 5886, Slovenia 386 3 425 42 00,
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