
NATIONAL
INSTRUMENTS

Switch Soft Front Panel Help

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The *Switch Soft Front Panel Help* provides step-by-step information about how to use the Switch Soft Front Panel (SFP) to test the basic functionality of your switch module and troubleshoot your applications.

For more information about this help file, refer to the following topics:

To comment on National Instruments documentation, refer to the National Instruments Web site.

Related Documentation

The following documentation contains information that you may find helpful as you use this help file:

- *NI Switches Help*

Using Help

Conventions

This help file uses the following formatting and typographical conventions:

»	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.
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.
green	Underlined text in this color denotes a link to a help topic, help file, or Web address.
italic	Italic text denotes variables, emphasis, cross references, or an introduction to a key concept. 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.

Navigating Help (Windows Only)

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window or use the following toolbar buttons located above the tabs:

- **Hide**—Hides the navigation pane from view.
- **Locate**—Locates the currently displayed topic in the **Contents** tab, allowing you to view related topics.
- **Back**—Displays the previously viewed topic.
- **Forward**—Displays the topic you viewed before clicking the **Back** button.
- **Options**—Displays a list of commands and viewing options for the help file.

Searching Help (Windows Only)

Use the **Search** tab to the left of this window to locate content in this help file. If you want to search for words in a certain order, such as "related documentation," add quotation marks around the search words as shown in the example. Searching for terms on the **Search** tab allows you to quickly locate specific information and information in topics that are not included on the **Contents** tab.

Wildcards

You also can search using asterisk (*) or question mark (?) wildcards. Use the asterisk wildcard to return topics that contain a certain string. For example, a search for "prog*" lists topics that contain the words "program," "programmatically," "progress," and so on.

Use the question mark wildcard as a substitute for a single character in a search term. For example, "?ext" lists topics that contain the words "next," "text," and so on.

Note Wildcard searching will not work on Simplified Chinese, Traditional Chinese, Japanese, and Korean systems.

Nested Expressions

Use nested expressions to combine searches to further refine a search. You can use Boolean expressions and wildcards in a nested expression. For example, "example AND (program OR VI)" lists topics that contain "example program" or "example VI." You cannot nest expressions more than five levels.

Boolean Expressions

Click the ▸ button to add Boolean expressions to a search. The following Boolean operators are available:

- **AND** (default)—Returns topics that contain both search terms. You do not need to specify this operator unless you are using nested expressions.
- **OR**—Returns topics that contain either the first or second term.
- **NOT**—Returns topics that contain the first term without the second term.
- **NEAR**—Returns topics that contain both terms within eight words of each other.

Search Options

Use the following checkboxes on the **Search** tab to customize a search:

- **Search previous results**—Narrows the results from a search that returned too many topics. You must remove the checkmark from this checkbox to search all topics.
- **Match similar words**—Broadens a search to return topics that contain words similar to the search terms. For example, a search for "program" lists topics that include the words "programs," "programming," and so on.
- **Search titles only**—Searches only in the titles of topics.

Printing Help File Topics (Windows Only)

Complete the following steps to print an entire book from the **Contents** tab:

1. Right-click the book.
2. Select **Print** from the shortcut menu to display the **Print Topics** dialog box.
3. Select the **Print the selected heading and all subtopics** option.

   Note Select **Print the selected topic** if you want to print the single topic you have selected in the **Contents** tab.
4. Click the **OK** button.

Printing PDF Documents

This help file may contain links to PDF documents. To print PDF documents, click the print button located on the Adobe Acrobat Viewer toolbar.

Switch Soft Front Panel

Use the Switch Soft Front Panel (SFP) as a tool to test the basic functionality of your switch device and troubleshoot your applications. Because the Switch SFP enables you to monitor connections on a switch module as you make them, the Switch SFP is also a powerful debugging tool.

Accessing the Switch Soft Front Panel

You can access the Switch SFP from within Measurement & Automation Explorer (MAX) or from the **Start** menu. To launch the Switch SFP from the **Tools** menu in MAX or from the **Start** menu, NI-SWITCH 2.4 or later must be installed.

Note The Switch SFP does *not* support switch devices used with the LabVIEW Real-Time Module.

From MAX

- Right-click on the switch device, and select **Test Panels**.

or

- Select **Tools»Soft Front Panels»NI-SWITCH Soft Front Panel**.

From the Start Menu

Select **Start»All Programs»National Instruments»NI-SWITCH»NI-SWITCH Soft Front Panel**.

The Switch Soft Front Panel Toolbar

Controls

Active Device—Lists all of the switch devices that are installed on your system. This list also includes simulated switch devices created in MAX.

Topology—Lists all of the topologies associated with the switch device.

Icons

 Select the **Refresh** icon to refresh the views of the **Schematic** and **Relay** tabs of the Switch Device window.

 Select the **Disconnect All** icon to disconnect all existing connections on the switch device.

Switch Device Window

The Switch Device window displays information about the active switch device and is divided into the following access tabs:

- Schematic tab
- Relays tab

The Schematic Tab

The **Schematic** tab contains a graphical representation, or schematic, of the topology of the switch device.

Use the **Schematic** tab to control the switch device. Simply click the connections on the **Schematic** tab to make connections on the switch device. The Switch SFP translates these clicks into the appropriate channel connections and makes driver calls to execute the connections. Additionally, use the **Schematic** tab to verify the connection state of the switch device.

Note When a scan list is downloaded and the active switch device is being scanned, the **Schematic** tab is *not* operational and does *not* reflect the state of the switch hardware.

Depending on the topology you select in the Topology listbox on the Switch SFP toolbar, one of four topologies is displayed in the **Schematic** tab:

- Matrix
- Multiplexer
- Single-Pole Double-Throw
- Single-Pole Single-Throw

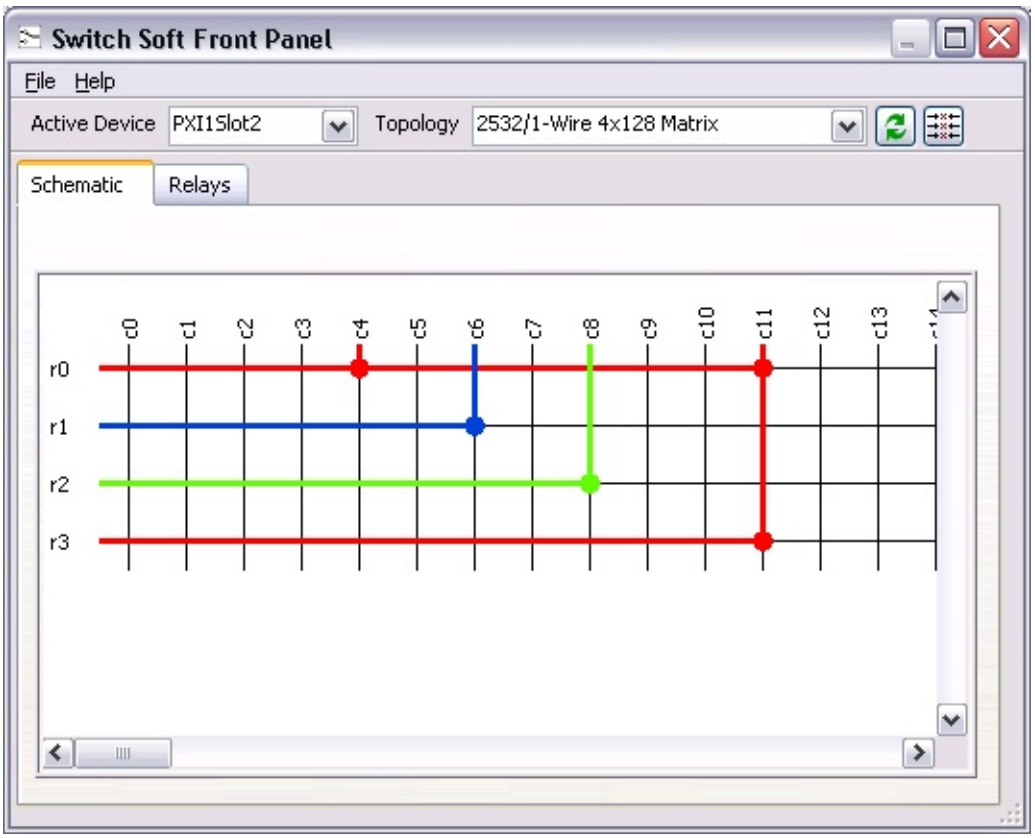
The Matrix Topology

A matrix is a flexible topology that can connect multiple inputs to multiple outputs organized as columns and rows. You can connect any column to any number of rows and any row to any number of columns. Refer to the *NI Switches Help* for more information about matrix topologies.

On a matrix schematic, row-column cross-points represent potential connections on the switch device. For visibility, the Switch SFP displays each connection and its associated connection route on the matrix schematic in a different color. For a channel with multiple connections, the Switch SFP displays all of the connections and their associated connection routes in the same color. Refer to row 0 (r0) of the schematic below for an example of a matrix channel with multiple connections.

Note You can resize the Switch Device window to see more channels.

Refer to the schematic below for an example of the NI PXI-2532 in the 1-Wire 4×128 matrix topology.



Make a Matrix Connection

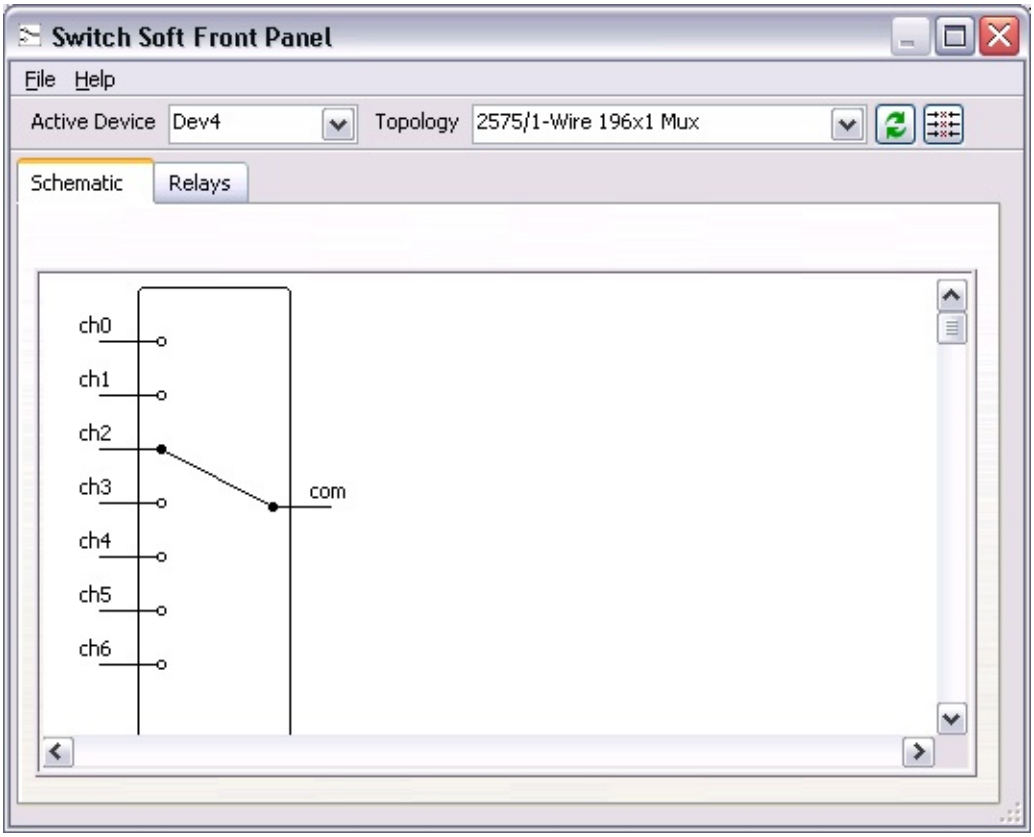
Click a row-column cross-point to make a connection on the matrix. To break a connection, simply click the connection again. The Switch SFP makes the appropriate connect/disconnect calls to the driver.

The Multiplexer Topology

A multiplexer, or a mux, is a topology in which you can connect one input to multiple outputs or one output to multiple inputs. Use this topology to connect a sequence of channels to a common line. Refer to the *NI Switches Help* for more information about multiplexer topologies.

Note You can resize the Switch Device window to see more channels.

Refer to the schematic below for an example of the NI PXI-2575 in the 1-Wire 196×1 mux topology.



Make a Multiplexer Connection

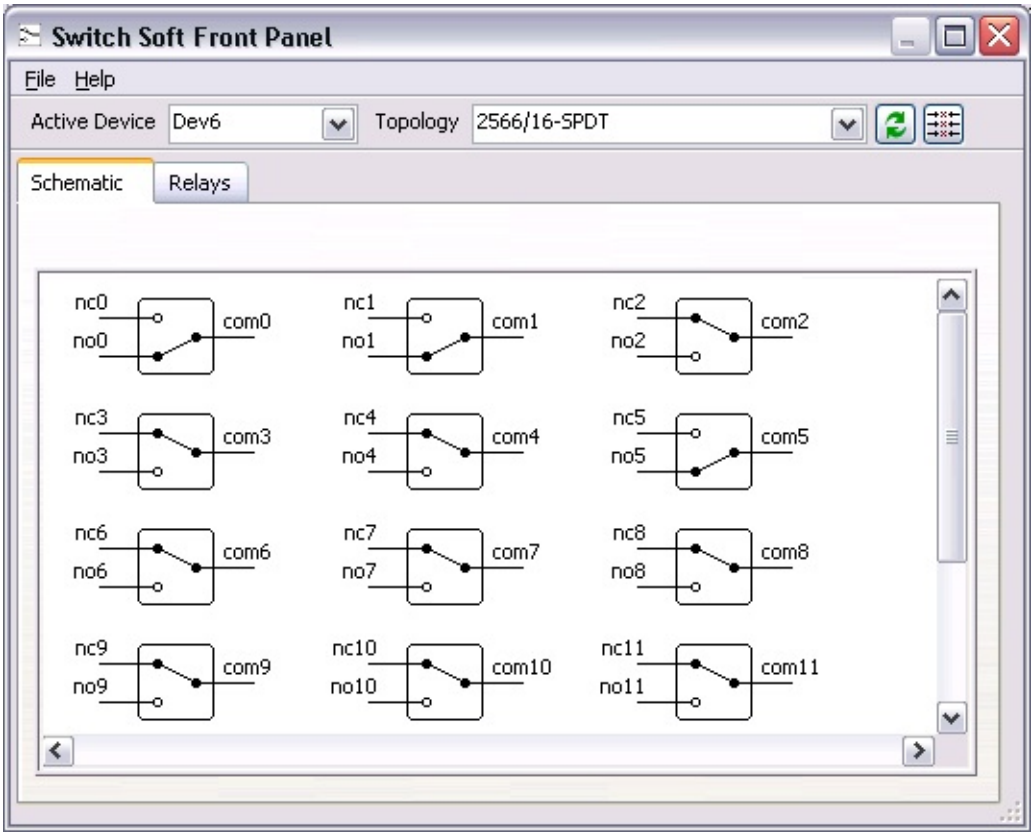
Click the end of the pole associated with the channel (left) you want to connect to the com channel (right). The Switch SFP makes the appropriate connect/disconnect calls to the driver.

The Single-Pole Double-Throw Topology

The single-pole double-throw (SPDT) topology is composed of one-pole, two-throw relays. Based on the default position of the pole, one throw is considered normally open (NO) while the other is normally closed (NC). Refer to the *NI Switches Help* for more information about SPDT topologies.

Note You can resize the Switch Device window to see more SPDT relays.

Refer to the schematic below for an example of the NI PXI-2566 in the 16-SPDT topology.



Make an SPDT Connection

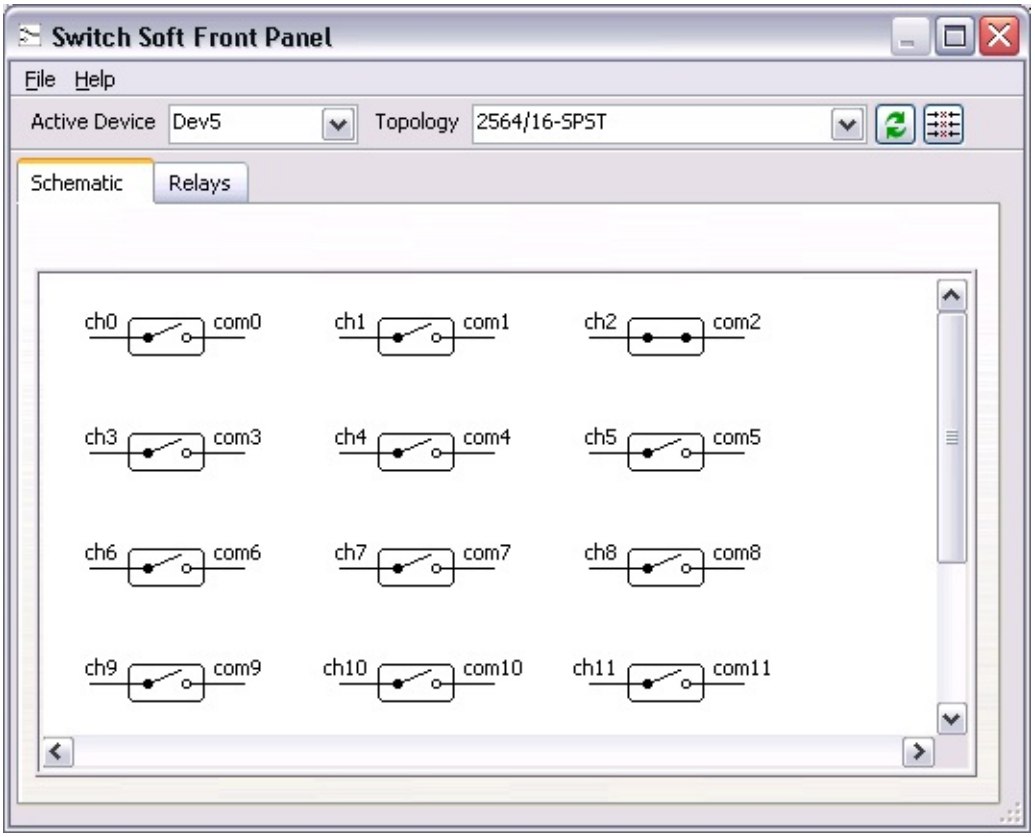
Click on an individual relay to make an SPDT connection. To connect no5 to com5, for example, simply click on the relay. The pole connects no5 to com5, and the Switch SFP makes the appropriate connect/disconnect calls to the driver.

The Single-Pole Single-Throw Topology

The single-pole single-throw (SPST) topology is composed of one-pole, one-throw relays. Refer to the *NI Switches Help* for more information about SPST relay forms.

Note You can resize the Switch Device window to see more SPST relays.

Refer to the schematic below for an example of the NI PXI-2564 in the 16-SPST topology.



Make an SPST Connection

Click on an individual relay to make an SPST connection. The Switch SFP translates this click into the appropriate channel connection and makes the connect call to the driver. To connect ch2 to com2, for example, click on the relay. The pole connects ch2 to com2. To break a connection, simply click the connection. The Switch SFP makes the appropriate connect/disconnect calls to the driver.

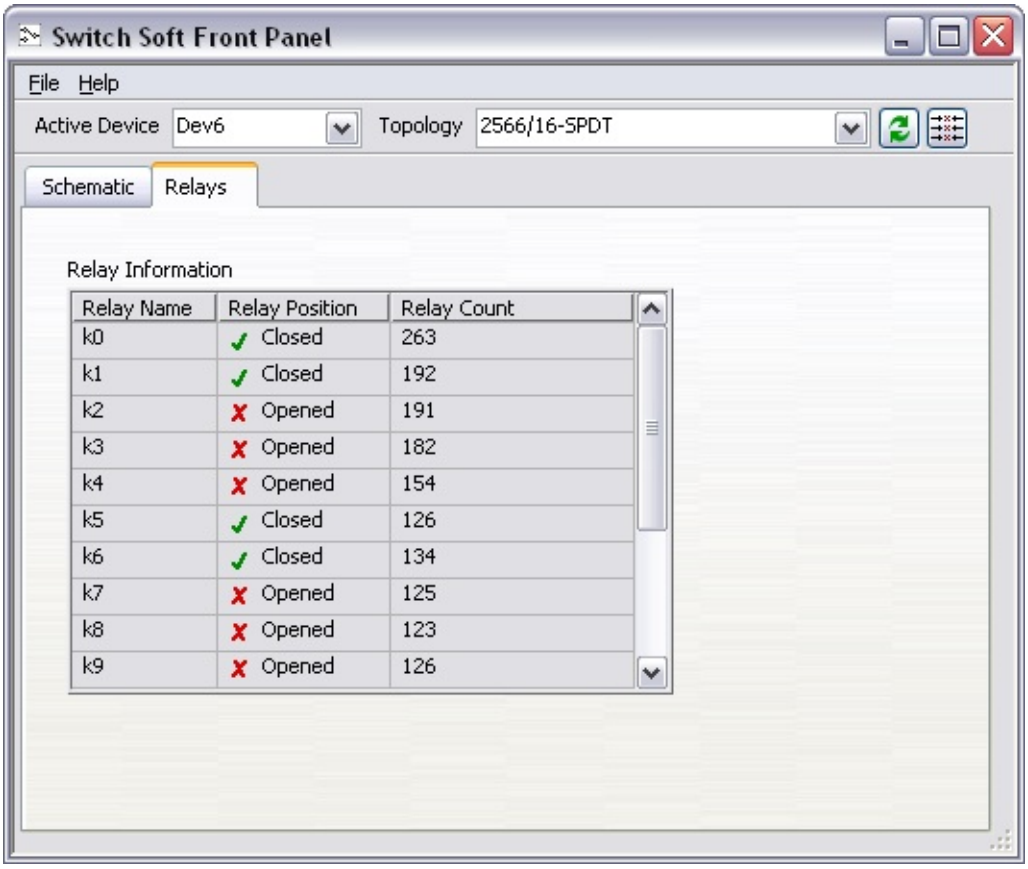
The Relays Tab

The **Relays** tab displays the name, position, and count of each relay on the switch device. Use the relay count information to determine if the relays on the switch device are approaching their life-time expectancy and if scheduled maintenance is needed. If your switch device does not support relay counts, the **Relays** tab displays only the names and the positions of the relays.

Note When using the NI USB-1359 to control a switch, the Switch SFP optimizes updates to the relay states by updating only the relays that are visible. Relay states that have not been updated are displayed in blue. Upon update, the relay states are changed from blue to black.

Visit ni.com and search by the switch module name to order replacement relays for your switch module. For relay replacement instructions, refer to the Relay Replacement section for your switch module in the *NI Switches Help*.

The figure below illustrates the relay positions and counts for the NI PXI-2566.


Switch Soft Front Panel
File Help
Active Device Dev6
Topology 2566/16-SPDT
Schematic
Relays
Relay Information
Relay Name
Relay Position
Relay Count
k0 Closed 263
k1 Closed 192
k2 Opened 191
k3 Opened 182
k4 Opened 154
k5 Closed 126
k6 Closed 134
k7 Opened 125
k8 Opened 123
k9 Opened 126

Creating a New Window

Create a new window to monitor multiple switch devices simultaneously. You can create a new window for the same device or different devices without causing changes in the hardware. To open multiple instances of the Switch SFP, select **File»New Window**.

Customizing the Switch Soft Front Panel

You can customize settings and operations in the Switch SFP.

Customizing the Refresh Settings

Select **File»Options**, and click **Automatic Refresh** to disable the automatic refresh settings for the **Schematic** and **Relay** tabs. To enable the refresh settings, click **Automatic Refresh** again. Type in a delay time, in milliseconds, to customize the delay interval, or the amount of time that must elapse before the **Schematic** and **Relays** tabs are refreshed with the latest information for the switch device.

Customizing Relay Operations

Select **File»Options**, and click **Enable changing relay positions** to customize relay operations. With the **Enable changing relay positions** control enabled, you can change the relay positions of the switch device from within the **Relays** tab.

Relay Maintenance

Expand this topic for information about relay maintenance, including instructions for replacing and resetting a relay.

Determining Relay End-of-Life

Relay use affects, and relay **arcing** can accelerate, the end-of-life of a relay. For more detailed information about relay life and arcing, refer to the *NI Switches Help*. To determine the expected life of your relay, refer to the specifications document for your switch module.

To determine if you need to replace a relay, monitor the relay count of your switch module in the **Relays Tab** of the Switch Device window. If you have switched a relay beyond its expected life or it has sustained excessive arcing, refer to Replacing a Relay.

Replacing a Relay

Refer to the Relay Replacement topic for your switch module in the *NI Switches Help* for instructions on how to replace a relay. After you replace the relay, refer to Resetting a Relay Count.

Resetting a Relay Count

Caution Because the Switch SFP disables relay count synchronization during the relay count reset process, counts may be lost for any relay operation performed up to ten minutes prior to resetting a relay count.

Complete the following steps to reset a relay count.

1. Select **File»Relay Maintenance**. The Relay Maintenance dialog box appears.
2. Select the relay to reset from the **Relay Name** drop-down list.
3. (Optional) Record the **Existing Relay Count** for your records.
4. Verify the relay you selected for reset, and click **OK** to reset the relay count to zero. The Switch SFP saves the new relay count to the hardware and resets the active device.

Restoring a Relay Count

In case of unintentional relay reset, complete the following steps to restore a previous relay count.

1. Repeat steps 1 and 2 of Resetting a Relay.
2. Verify the relay you selected for reset, and enable **Edit Count**.
3. Type the previous count in **New Relay Count** and click **OK**. The Switch SFP saves the relay count to the hardware and resets the active device.

Remotely Accessing the Switch Soft Front Panel Using a Browser

You can view and control the Switch SFP and debug switch applications remotely using a Web browser. To access the Switch SFP from a client machine, first configure the Web host feature on the server machine.

Configuring the Server

Complete the following steps to configure the Web host feature on the server machine.

1. Run the Switch SFP on the server.
2. Select **File»Options** to display the Options dialog box.
3. Select the **Web Host** tab.
4. Click the **Enable Web host** checkbox.
5. Replace the value of **Listen on port number** with the TCP port value you want to use.

Note If you use a TCP port value other than 80, you must specify the TCP port value on the URL that refers to the server when accessing the Switch SFP from a client machine. For example, if your TCP port value is 8000, specify the TCP port value on the URL as http://ipaddress:8000/SwitchSoftFrontPanel.htm.

After you configure the server, the client can view and control the Switch SFP. If you want to disable control of the Switch SFP and leave only viewing capability from the client, right-click anywhere on the Switch SFP window of the server outside of the access tabs (i.e., the **Schematic** or **Relay** tab), and select **Regain Control** from the shortcut menu. Control of the Switch SFP then returns to the server, and the server is locked. When the server is locked, the client can view the Switch SFP but cannot control it.

To unlock the server, right-click anywhere on the Switch SFP window outside of the access tabs, and select **Unlock Control** from the shortcut menu. The server is unlocked, and control returns to the client.

Remotely Accessing the Switch SFP

Complete the following steps to view and control the Switch SFP remotely using a browser on a client machine.

1. Launch the default browser on the client.
2. In the URL of the browser, enter the IP address or computer name of the server followed by SwitchSoftFrontPanel.htm, for example, http://ipaddress/SwitchSoftFrontPanel.htm.

Note If the LabVIEW Run-Time Engine is not installed on the client, entering the URL prompts you for installation. You can install the LabVIEW Run-Time Engine from the LabVIEW CD or visit the National Instruments Web site to download the latest version. Refer to the *LabVIEW Help* for more information about the LabVIEW Run-Time Engine.

To close your connection to the Switch SFP running on the server, click the close glyph on the browser window.

Additional Considerations

- Only the server window titled *Switch Soft Front Panel - Web Host* can be remotely controlled. You cannot remotely control new windows created on the server.
- The **File»New Window** menu item does *not* launch a new window on the client. Launch separate instances of the Switch SFP on separate TCP ports to view multiple windows.
- Online help is only available on the server machine.

Hot Keys and Keyboard Shortcuts

The table below lists the hot keys and keyboard shortcuts you can use with Switch SFP:

<F5>	Refreshes the **Schematic** and **Relays** tabs of the Switch Device window
<F1>	Displays online help
<Ctrl+N>	Creates a new window
<Ctrl+Q>	Exits Switch SFP

Debugging with the Switch Soft Front Panel

When you launch the Switch SFP for a particular switch device, the current connections on the switch device are displayed in the **Schematic** tab of the Switch Device window.

By default, the Switch SFP automatically updates all changes in the connection state of the switch device. If an application changes the state of the connections on the switch device, and you have enabled the Automatic Refresh option in the Switch SFP, this change is reflected in the **Schematic** tab. For example, if you have an application running in LabVIEW, the Switch SFP displays the connections made by the LabVIEW application.

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- Support—Online technical support resources at ni.com/support include the following:
  - **Self-Help Resources**—For answers and solutions, visit the award-winning National Instruments Web site for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on.
  - **Free Technical Support**—All registered users receive free Basic Service, which includes access to hundreds of Applications Engineers worldwide in the NI Developer Exchange at ni.com/exchange. National Instruments Applications Engineers make sure every question receives an answer.

    For information about other technical support options in your area, visit ni.com/services or contact your local office at ni.com/contact.
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- System Integration—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit ni.com/alliance.

If you searched ni.com and could not find the answers you need, contact your local office or NI corporate headquarters. You also can visit the Worldwide Offices section of ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Branch Offices

Office	Telephone Number
Australia	1800 300 800
Austria	43 0 662 45 79 90 0
Belgium	32 0 2 757 00 20
Brazil	55 11 3262 3599
Canada	800 433 3488
China	86 21 6555 7838
Czech Republic	420 224 235 774
Denmark	45 45 76 26 00
Finland	385 0 9 725 725 11
France	33 0 1 48 14 24 24
Germany	49 0 89 741 31 30
India	91 80 41190000
Israel	972 0 3 6393737
Italy	39 02 413091
Japan	81 3 5472 2970
Korea	82 02 3451 3400
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	7 095 783 68 51
Singapore	1800 226 5886
Slovenia	386 3 425 4200

South Africa	27 0 11 805 8197
Spain	34 91 640 0085
Sweden	46 0 8 587 895 00
Switzerland	41 56 200 51 51
Taiwan	886 02 2377 2222
Thailand	662 278 6777
United Kingdom	44 0 1635 523545
United States (Corporate)	512 683 0100