

# SwitchBlock

## PXI Carrier Module for SwitchBlock and Matrix Modules for SwitchBlock

[PXI-2800](#), [SWB-2810](#), [SWB-2811](#), [SWB-2812](#), [SWB-2813](#), [SWB-2814](#), [SWB-2815](#), [SWB-2816](#), [SWB-2817](#), [SWB-2833](#), and [SWB-2834](#)



- **Software:** Includes interactive soft front panel, API support for LabVIEW and text-based languages, shipping examples, and detailed help files
- Electromechanical and Reed relay options
- Relay health monitoring through the NI Switch Health Center
- Up to 2,000 crosspoints in a single carrier
- Up to 8,000 crosspoints in a single 18-slot PXI chassis
- 1- and 2-wire options
- Up to 150 V or 2 A

## Built for Automated Test and Measurement

SwitchBlock is a flexible and intelligent solution for creating large matrix switches that minimizes wiring and simplifies connectivity. The PXI Carrier Module for SwitchBlock occupies four PXI slots, holds up to six Matrix Modules for SwitchBlock, and includes an integrated analog bus for combining individual matrices into a single, large matrix. By connecting multiple SwitchBlock relay cards through the carrier's integrated analog bus, you can easily create large matrices with more than 2,000 crosspoints in four PXI slots and more than 8,000 crosspoints in a single PXI chassis.

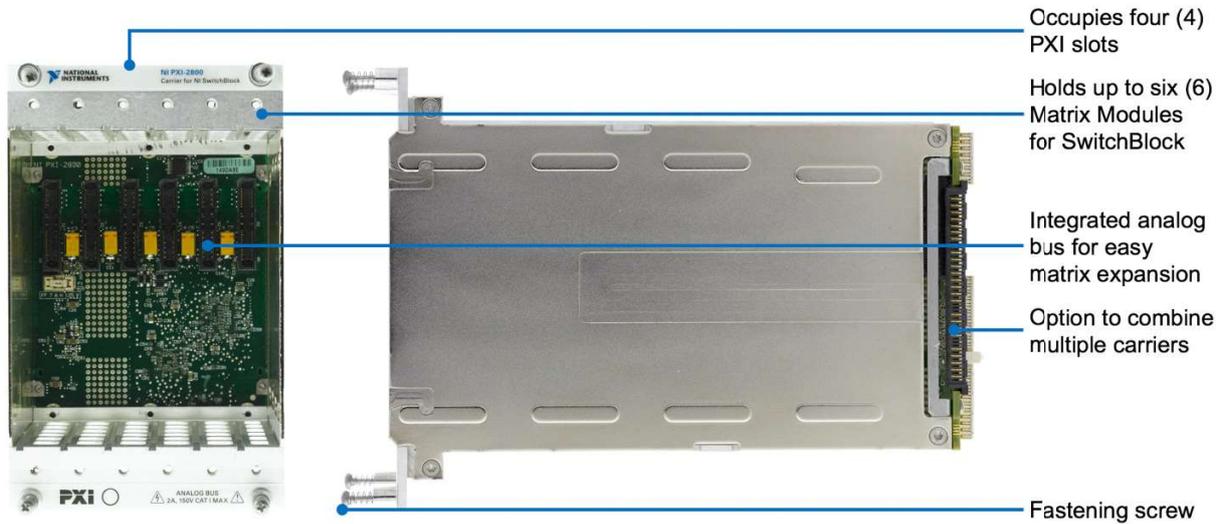
Additionally, NI SwitchBlock systems offer advanced features, such as relay health monitoring and onboard relay count tracking, providing you with an intelligent way to monitor the health of your switching system. These advanced features offer a smarter way to tackle difficult applications in industries ranging from consumer electronics to aerospace and defense.

*Table 7. NI offers a variety of Matrix Modules for SwitchBlock, varying in topology, density, relay type, and voltage/current rating, allowing you to pick the model that best fits your needs. Each PXI Carrier Module for SwitchBlock can hold up to six Matrix Modules for SwitchBlock.*

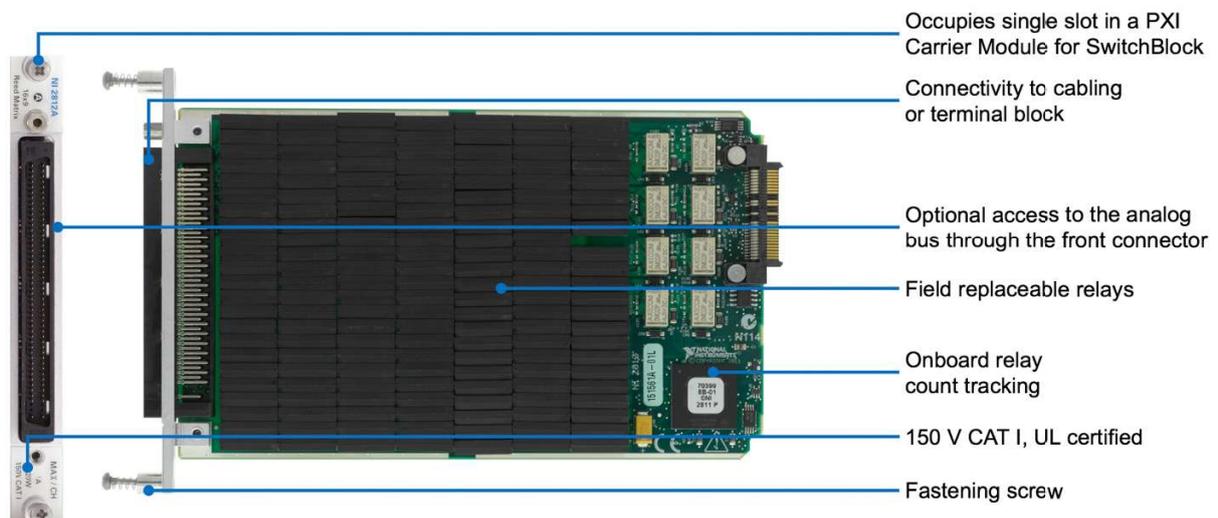
	Maximum Voltage	Maximum Current	Maximum Bandwidth	Relay Type	Number of Slots (Within a SwitchBlock Carrier Module)	Configuration(s)
SWB-2810	150 V	1 A	10 MHz	Reed	1	4 x 43, 1-wire matrix
SWB-2811	150 V	1 A	15 MHz	Reed	1	8 x 21, 1-wire matrix
SWB-2812	150 V	1 A	10 MHz	Reed	1	16 x 9, 1-wire matrix
SWB-2813	150 V	1 A	8 MHz	Reed	1	4 x 21, 2-wire matrix
SWB-2814	150 V	1 A	10 MHz	Reed	1	8 x 9, 2-wire matrix
SWB-2815	100 V	300 mA	6 MHz	Reed	1	4 x 86, 1-wire matrix
SWB-2816	100 V	300 mA	8 MHz	Reed	1	8 x 46, 1-wire matrix
SWB-2817	100 V	300 mA	5 MHz	Reed	1	16 x 22, 1-wire matrix
SWB-2833	100 V	2 A	10 MHz	EMR	2	4 x 71, 2-wire matrix
SWB-2834	100 V	2 A	10 MHz	EMR	2	8 x 34, 2-wire matrix

Note: Matrix Modules for SwitchBlock cannot be used in a PXI chassis without a PXI Carrier Module for SwitchBlock, which serves as a sub-chassis within a PXI system. Each PXI Carrier Module for SwitchBlock can hold up to six Matrix Modules for SwitchBlock.

## Detailed View of PXI-2800 Carrier Module for SwitchBlock



## Detailed View of SWB-2812 Matrix Module for SwitchBlock



## Key Features

### Relay Health Monitoring

To simplify relay maintenance and increase reliability in high-channel-count systems, NI Matrix Switch Modules for SwitchBlock offer advanced relay health monitoring features, such as onboard relay count tracking, which is available on all NI switch modules, and functional relay self-tests, available through the NI Switch Health Center<sup>2</sup>.

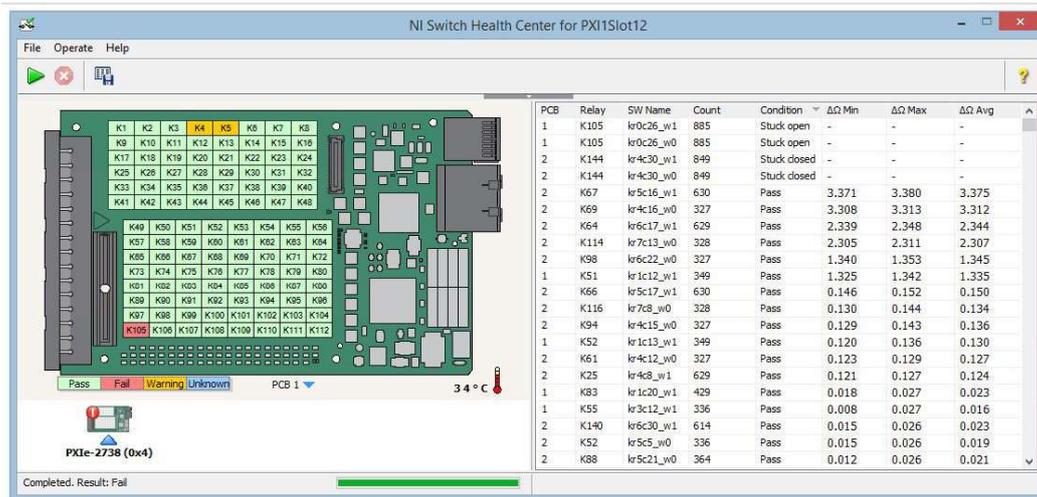


Figure 6. The NI Switch Health center provides advanced relay health monitoring options, including functional and resistive self-tests, onboard relay count tracking, and report generation.

<sup>2</sup>The NI Switch Health Center is available all Matrix Modules for SwitchBlock, but the resistive relay self-test feature is only available on some PXI Matrix Switch Modules. To find out which devices support the resistive relay self-test feature, reference KnowledgeBase article: [Which NI Switch Modules Support Resistive Self Test and Temperature Monitoring?](#)

The NI Switch Health Center is a free application that installs with the NI-SWITCH driver that can be used to monitor individual relay health, guide relay replacement, and generate user reports. The NI Switch Health Center verifies the condition of each relay by sending a signal through a combination of routes and alerting users if a relay has failed stuck open or closed.

For more information on the Switch Health Center, relays, or switch topologies, see the [NI Switch Health Center white paper](#).

### Designed for Matrix Expansion

The customizable hardware design of the NI SwitchBlock makes it easy to create large switch matrices in PXI while minimizing wiring, simplifying connectivity, and providing a high degree of flexibility for your switching needs. A SwitchBlock system comprises a PXI Carrier Module for SwitchBlock (PXI-2800) that occupies four PXI slots and can hold up to six 1-slot or 3 2-slot Matrix Modules for SwitchBlock. The PXI Carrier Module for SwitchBlock features a hybrid-compatible connector, on the back of the second PXI slot, which allows you to place it in a PXI chassis or in a hybrid-compatible slot of a PXI Express chassis.

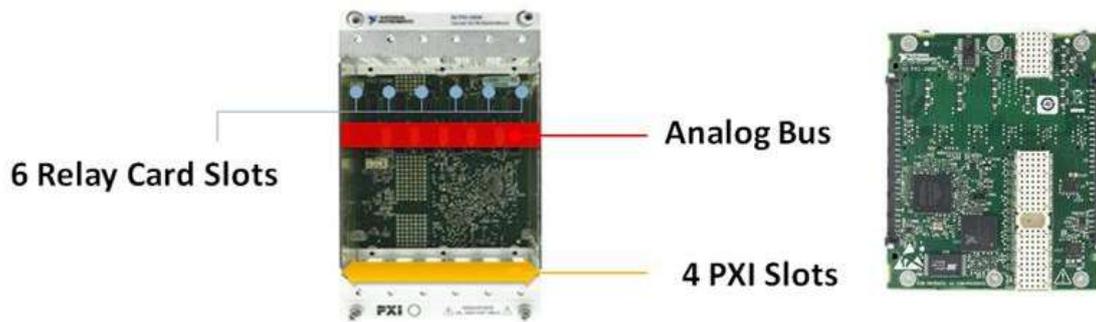


Figure 7. The PXI Carrier Module for SwitchBlock (PXI-2800) occupies four PXI slots, can hold up to six 1-slot Matrix Modules for SwitchBlock, and has an integrated analog bus designed to combine those matrix modules into a single large matrix, without additional external wiring.

The PXI Carrier Module for SwitchBlock (PXI-2800) has an integrated analog bus, allowing for easy matrix expansion without the need for additional external cabling. Each Matrix Module for SwitchBlock has analog bus relays that connect its rows to the analog bus of the carrier, effectively combining any matrices that are connected to the analog bus.

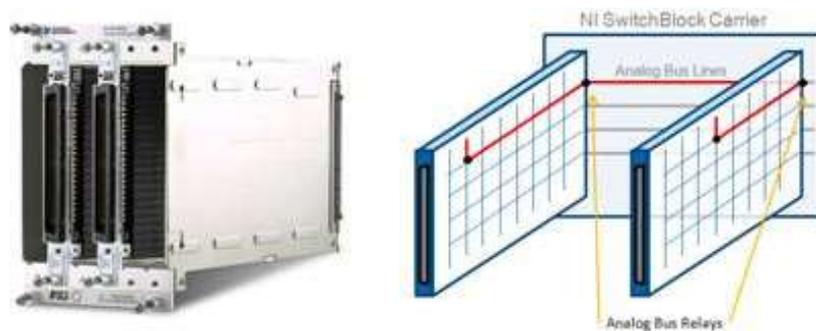


Figure 8. SwitchBlock is designed for easy matrix expansion, allowing up to 2,000 crosspoints in a single PXI Carrier Module for SwitchBlock (PXI-2800). Simply close the analog bus relays to connect that Matrix Module for SwitchBlock with any other devices connected to the analog bus.

Each Matrix Module for SwitchBlock is available in Type A and Type B configurations. The connector on the Type A card provides user access to the columns of the relay card as well as indirect row access, through the analog bus of the carrier. To preserve system bandwidth, Type B cards do not connect the analog bus to the front connector and only provide access to the columns through the front connector. Type A cards allow access to the rows of the matrix indirectly through the analog bus, via the analog bus connector pins. To optimize bandwidth, only one Type A card can connect to the analog bus at a single time, so most large SwitchBlock matrix systems have a single Type A card and the rest are Type B cards of the same model number.

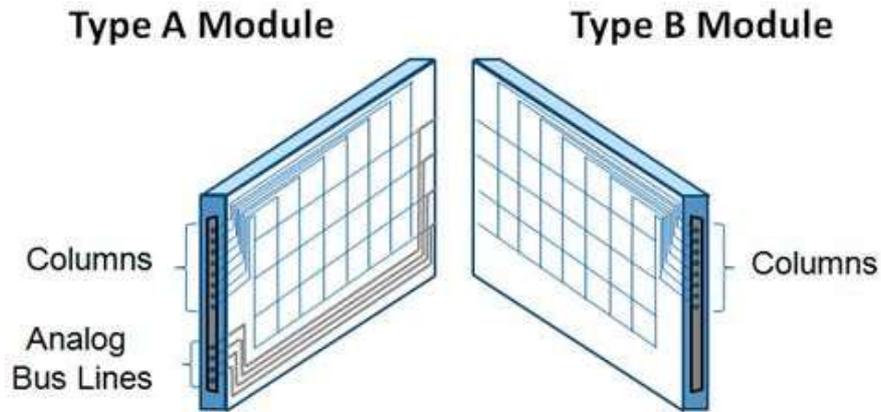


Figure 9. Type A modules provide column access and row access through the front connector, allowing for row-to-column connections and column-to-column connections. Conversely, Type B modules only provide column access and are restricted to column-to-column signal routes, unless joined to a Type A card through the analog bus.

A single PXI Carrier Module for SwitchBlock can create a 2,000-crosspoint matrix in four PXI slots. For larger matrices up to 8,000 crosspoints in an 18-slot PXI chassis, you can combine multiple PXI Carrier Modules for SwitchBlock by inserting a SwitchBlock Expansion Bridge (NI-2806) between two or more PXI Carrier Modules for SwitchBlock.

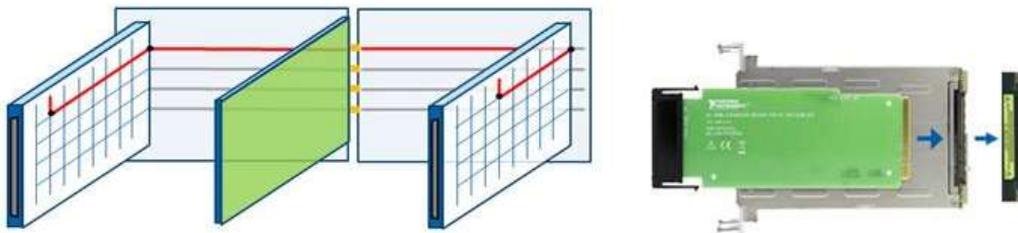
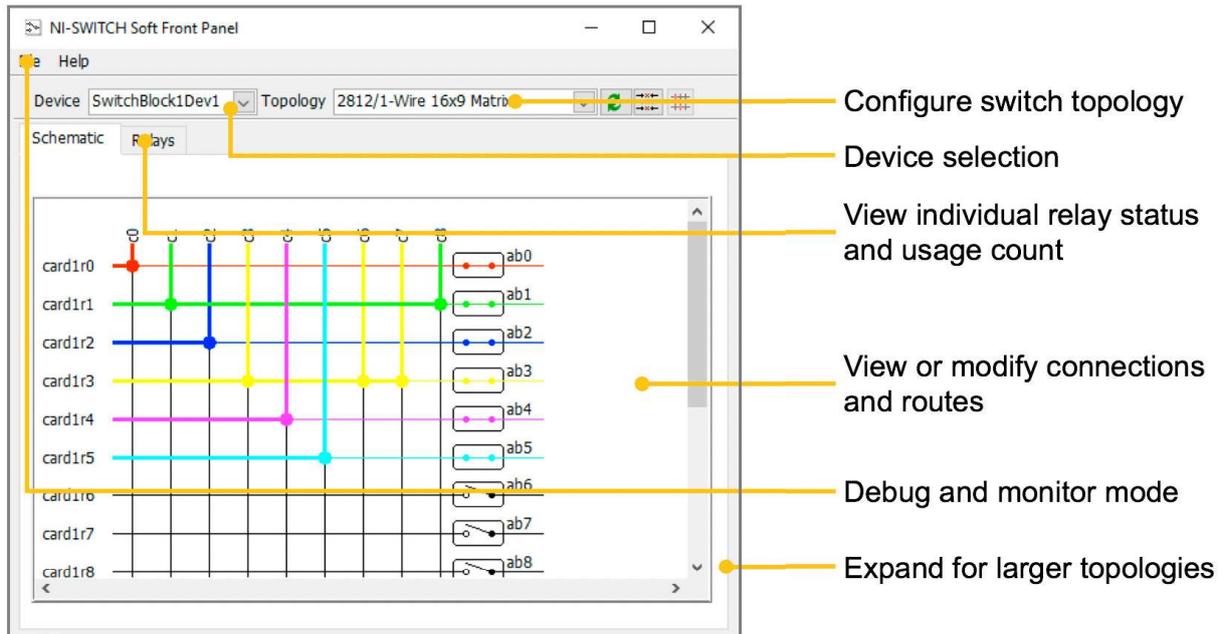


Figure 10. To create larger matrices, you can connect the analog buses of multiple PXI Carrier Modules for SwitchBlock by inserting a SwitchBlock Expansion Bridge (NI-2806) between the two or more PXI Carrier Modules for SwitchBlock. However, you must remove the analog bus cover before inserting the SwitchBlock Expansion Bridge.

For more information on SwitchBlock, see the [NI SwitchBlock Hardware Architecture white paper](#).

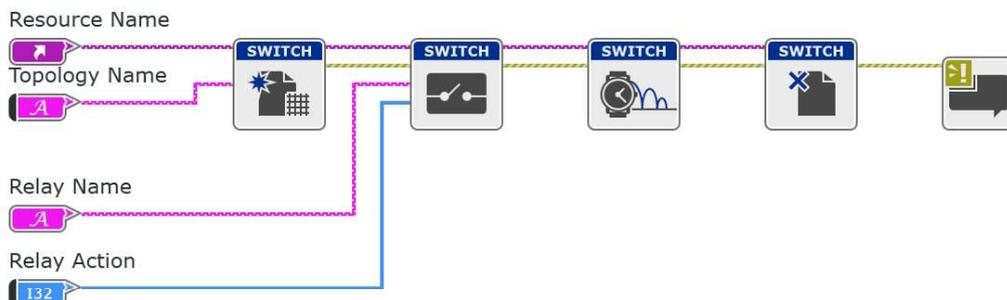
## NI-SWITCH Soft Front Panel

The NI-SWITCH driver software includes an interactive soft front panel for full out-of-the-box functionality. This interactive soft front panel allows you to configure the switch topology and change switch connections with a simple click. In addition, you can use the **Debug Driver Session** mode to monitor and debug the switch during automated measurement. For example, you can monitor which signal paths are active, which individual relays are open/closed, and how many times each relay has been used.



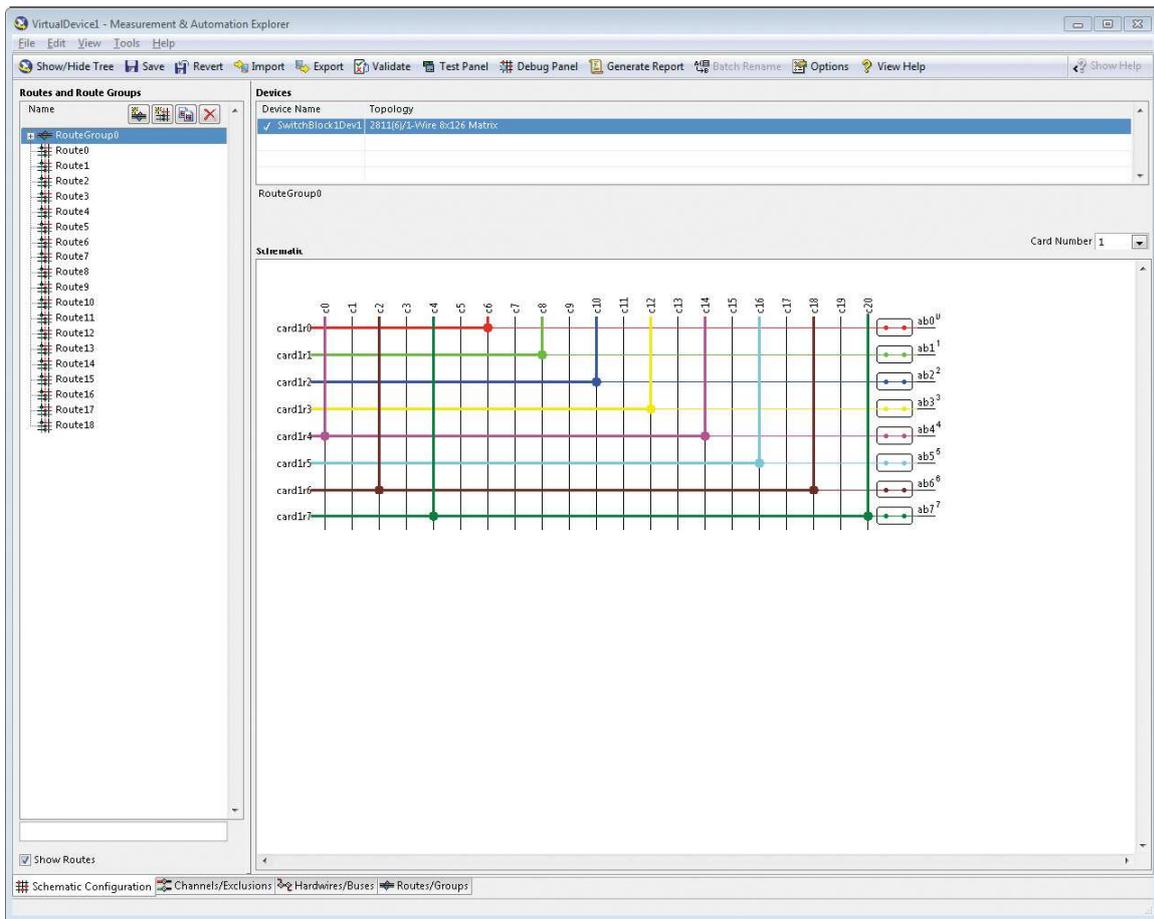
## NI-SWITCH Application Programming Interface (API)

In addition to the soft front panel, the NI-SWITCH driver includes a best-in-class API that works with a variety of development options such as LabVIEW, C, C#, and others. The driver also provides access to help files, documentation, and dozens of ready-to-run shipping examples you can use as a starting point for your application.



## Switch Executive Application Software

While the NI-SWITCH driver provides all the low-level functionality required to program switch actions, [Switch Executive](#) is application software for intelligent switch management and routing that accelerates development and simplifies maintenance of complex switch systems. The point-and-click graphical configuration and automatic routing capabilities make it easy to design your switch system. Using intuitive channel aliases and route names keeps your system documented for future modifications. Save time and increase test code reuse by integrating your system with TestStand, LabVIEW, LabWindows™ /CVI, and Measurement Studio.



- Graphically configure routes and route groups
- Develop reusable switching code and integrate it into NI TestStand or NI LabVIEW
- Automatically route signals between switch endpoints
- Scale switch configuration using Microsoft Excel
- Maintain switch configuration using route validation, reporting and debugging features