

High-Frequency Multiplexer/Matrix Modules

NI PXI-2593, NI SCXI-1193

- 500 MHz bandwidth
- 50 Ω characteristic impedance
- 10 W RF carry power
- 150 V CAT I Switching
- Fully software configurable
- Unterminated Multiplexer Configurations
 - NI SCXI-1193: 32x1, Dual 16x1, Quad 8x1, Nine 3x1
 - NI PXI-2593: 16x1, Dual 8x1, Quad 3x1
- Terminated Multiplexer Configurations
 - NI SCXI-1193: 16x1, Dual 8x1, Quad 4x1
 - NI PXI-2593: 8x1, Dual 4x1
- Sparse Matrix Configurations
 - NI SCXI-1193: 36-terminal
 - NI PXI-2593: 18-terminal

Operating Systems

- Windows 2000/NT/XP/Me/9x

Recommended Software

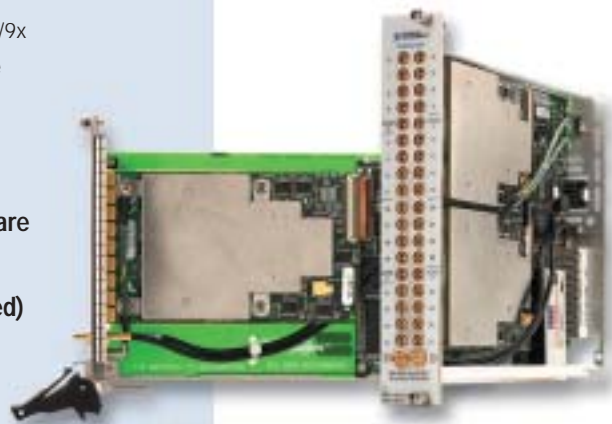
- LabVIEW™
- LabWindows™/CVI™
- Measurement Studio™ for Visual C++
- NI Switch Executive

Other Compatible Software

- Visual Basic
- C/C++

Driver Software (included)

- NI-SWITCH



Overview and Applications

The National Instruments PXI-2593 and SCXI-1193 are high-density 50 Ω RF relay modules. They can be programmatically configured as unterminated multiplexers, externally terminated multiplexers, or dimensionally flexible sparse matrices. Each configuration handles signal frequencies from DC to beyond 500 MHz. These single-slot switch modules use high-density push-on MCX connectors for discrete yet manageable cabling. The NI PXI-2593 and NI SCXI-1193 modules are designed to integrate with high-frequency instruments such as the NI PXI-5404 frequency generator and the NI PXI-5112 high-speed digitizer.

modules use a flexible architecture in which the user defines the row and column dimensions. There is no restriction on row-to-row or column-to-column connections. For example, a user can configure the 18 terminals on the PXI-2593 as a 2x16, 4x14, or 9x9 sparse matrix, or any size in between. It is even possible to connect multiple crosspoints simultaneously. Figure 1 demonstrates the configuration capabilities of the PXI-2593 as a dimensionally flexible sparse matrix.

INFO CODES

For more information or to order products online, visit ni.com/info and enter:

pxi2593
scxi1193

BUY ONLINE!

Multiplexer Configurations

The PXI-2593 and SCXI-1193 are 16 and 32-channel unterminated multiplexers, respectively. Using external 50 Ω MCX terminators (P/N: 761930-01) on half of the channels, these modules can be used as terminated multiplexers. The following table shows available multiplexer configurations for each module.

Multiplexer Topology	NI SCXI-1193		NI PXI-2593	
	Unterminated	Terminated	Unterminated	Terminated
32x1	1 Bank	–	–	–
16x1	2 Banks	1 Bank	1 Bank	–
8x1	4 Banks	2 Banks	2 Banks	1 Bank
4x1	–	4 Banks	–	2 Banks
3x1	9 Banks	–	4 Banks	–

Dimensionally Flexible Sparse-Matrix Configurations

The PXI-2593 and SCXI-1193 can be configured as flexible sparse matrices with which signals can be routed between any pair of channels or commons while maintaining >500 MHz bandwidth and minimizing reflections. Unlike a traditional sparse matrix made from two multiplexers with their COM terminals connected, these

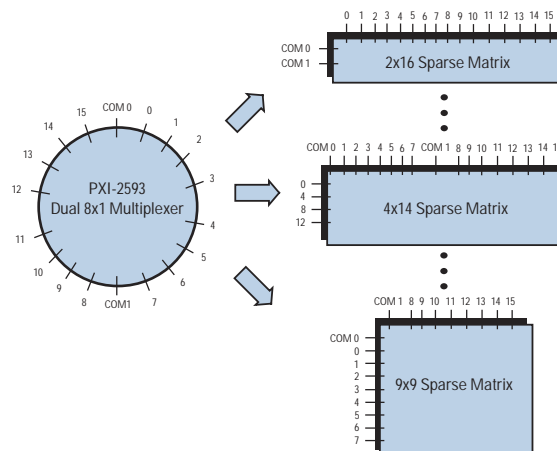


Figure 1. PXI-2593 Sparse Matrix Configurations

High-Frequency Multiplexer/Matrix Modules

System Integration

The NI PXI-2593 and NI SCXI-1193 have a flexible scan list architecture that can reduce overall data acquisition and test time. A scan list delivers the fastest scan possible by providing a hardware-timed solution. You can configure the module to process the scan list once or to continuously loop through the scan list. Commands in the scan list can open or close relays, wait for an External Trigger, and generate a Scanner Advanced trigger.

The External Trigger, sourced by an instrument, such as an NI PXI-5411 arbitrary waveform generator, causes the switch module to advance to the next entry in the scan list. The Scanner Advanced trigger indicates when the module has closed all specified relays and the relays have settled. The Scanner Advanced trigger is typically connected to a measurement device, such as the NI PXI-4070 FlexDMM, which is configured to take a reading upon receiving the trigger.

Ordering Information

NI PXI-2593	778793-01
NI SCXI-1193	776572-93

Recommended Accessories

50 Ω MCX Terminator	778831-01
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Software

All National Instruments PXI and SCXI switch modules are shipped with NI-SWITCH, an IVI-compliant driver offering complete functionality for all switch modules. For additional assistance in configuring, programming, and managing higher-channel-count switching systems, NI Switch Executive software offers an easy-to-use intelligent switch management and visual routing environment.

Specifications

All specifications are subject to change without notice.
Visit ni.com/manuals for the most current/complete specifications.

RF Performance Characteristics

Characteristic impedance (Z_0)	50 Ω nominal
Insertion loss	
8x1	
DC to 200 MHz	<0.9 dB
200 to 500 MHz	<1.6 dB
16x1	
DC to 200 MHz	<1.2 dB
200 to 500 MHz	<1.9 dB
32x1 (SCXI-1193 only)	
DC to 200 MHz	<1.4 dB
200 to 500 MHz	<2.4 dB
Typical bandwidth (3 dB)	
8x1	>900 MHz
16x1	>750 MHz
32x1 (SCXI-1193 only)	>600 MHz
VSWR	
8x1	
DC to 200 MHz	<1.4
200 to 500 MHz	<1.8
16x1	
DC to 200 MHz	<1.4
00 to 500 MHz	<1.8
32x1 (SCXI-1193 only)	
DC to 200 MHz	<1.4
200 to 500 MHz	<1.8
Maximum RF carry power	10 W up to 500 MHz (per channel)

Input Characteristics

Maximum switching voltage	150 V, CAT I
Maximum switching current	0.5 A (per channel)
Maximum carry current	1 A (per channel)
Simultaneous channels at maximum current	
PXI-2593	up to 2
SCXI-1193	up to 4
DC path resistance	
Initial	<1.0 Ω
End of life	≥2.0 Ω

Dynamic Characteristics

Maximum scan rate	100 operations/s
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Expected relay life:

Mechanical	50,000,000 operations
Electrical	300,000 operations
(30 V, 0.3 ADC resistive)	

Physical Characteristics

Relay type	Electromechanical, latching
Relay contact material	Silver palladium and gold
I/O connectors	
PXI-2593	18 MCX jacks
SCXI-1193	36 MCX jacks
Trigger connectors	2 SMB jacks
Dimensions	
PXI-2593	13 by 21.7 cm (5. by 8.6 in.)
SCXI-1193	3.0 by 17.3 by 19.6 cm (1.2 by 6.7 by 7.6 in.)
Weight	
PXI-2593	330 g (12 oz)
SCXI-1193	960 g (2 lb 2 oz)

Environment

Operating temperature	0 to 50 °C
Storage temperature	-20 to 70 °C
Relative humidity	5 to 85% noncondensing
Pollution degree	2
Approved at altitudes up to	2,000 m

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 3111-1, UL 61010B-1
- CAN/CSA C22.2 No. 1010.1

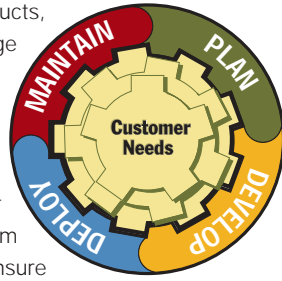
CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE Marking, as follows:

Low-Voltage Directive (safety)	73/23/EEC
Electromagnetic Compatibility Directive (EMC)	89/336/EEC

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