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Find the *National Instruments SCXI-1127* at our website: *Click HERE*

High-Voltage Multiplexer/Matrix

NI SCXI-1127, NI SCXI-1128

- Configuration determined by terminal block
- 64x1 (1-wire), 32x1 (2-wire), and 16x1 (4-wire) configurations (SCXI-1331)
- 4x8 2-wire matrix (SCXI-1332)
- 512-step scan list for deterministic scanning
- Fully software programmable
- Easy instrument synchronization with hardware triggers

NI SCXI-1127

- Electromechanical relay
- Switch capacity
  - 200 mA at 250 V_{rms}
  - 1 A at 30 VDC
- 100 operations/s

NI SCXI-1128

- Solid-state relay
- Switch capacity
  - 1 mA at 250 VDC/V_{rms}
  - 30 mA at 10 VDC/V_{rms}
- 1200 operations/s

Operating Systems

- Windows 2000/NT/XP

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio
- NI Switch Executive

Other Compatible Software

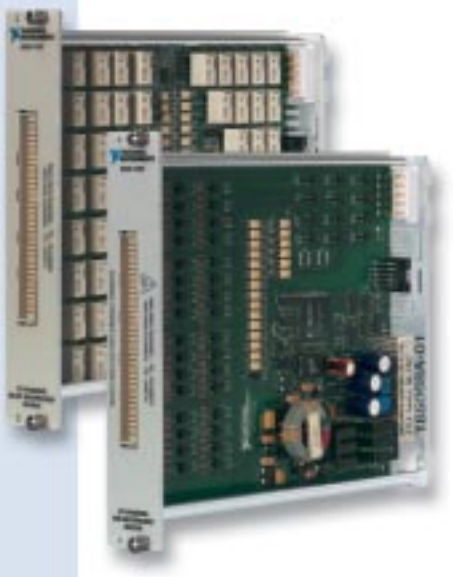
- Visual Basic
- C/C++

Driver Software (included)

- NI-SWITCH

Certifications and Compliance

- UL
- CE



Overview

The National Instruments SCXI-1127 (electromechanical relay) and SCXI-1128 (solid-state relay) modules have multiple switch configurations determined by a front-mounting terminal block as shown in Table 1. With the SCXI-1331 front-mounting terminal block, the modules can be configured into three different multiplexing modes – 1-wire for large-channel-count systems, 2-wire for differential pair systems, and 4-wire for low-resistance measurements such as RTDs. With the SCXI-1332 front-mounting terminal block, the NI SCXI-1127 or NI SCXI-1128 becomes a 4x8 2-wire matrix.

The SCXI-1127 is designed to work well with both low and high-voltage signals. For low-voltage measurements, such as thermocouples, the SCXI-1127 uses relays with low thermal offset to ensure accurate measurements. Providing low contact resistance as well, the SCXI-1127 is ideal for switching low resistance and RTD measurements. Because these same relays can handle up to 250 V_{rms} at 200 mA, the module can measure line voltages worldwide. The SCXI-1128 uses solid-state relays that provide very high scanning speed. Unlike the SCXI-1127, the SCXI-1128 has no moving mechanical parts, so the relays have a long life expectancy.

Expanding the multiplexer or matrix channel count is as easy as adding additional modules. Analog signals can be passed between two or more switch modules via the high-voltage backplane or expansion cables. With these connections, you can instantly expand your channels without complicated wiring.

Modes of Operation

The SCXI-1127 and SCXI-1128 are completely software configurable to operate as a multiplexer/scanner, matrix, or independent switch bank.

Multiplexer/Scanning

Module	Topology	Configuration	Terminal Block
SCXI-1127, SCXI-1128	Multiplexer	64x1 (1-wire) 32x1 (2-wire) 16x1 (4-wire)	SCXI-1331
SCXI-1127, SCXI-1128	Matrix	4x8 (2-wire)	SCXI-1332

Table 1. SCXI-1127 and SCXI-1128 Configurations

You can configure the SCXI-1127 and SCXI-1128 in several different multiplexer/scanner configurations. The 1 and 2-wire modes are designed for measuring/sourcing voltage or 2-wire resistance measurements. In 2-wire mode, you can solder resistors into pads inside the SCXI-1127 and SCXI-1128 to perform current measurements or current-loop monitoring.

For improved measurement accuracy with low-voltage signals, such as those from thermocouples or low-resistance devices, such as RTDs, configure the SCXI-1127 and SCXI-1128 in 4-wire mode for 4-wire resistance measurements. The SCXI-1128 is recommended for low-power applications requiring high scanning speeds, or long switch life. For low-voltage and resistance measurements, the SCXI-1127 is the recommended choice because of its low contact resistance and low thermal emf. You can configure the SCXI-1127 and SCXI-1128 to route excitation (current or voltage) from an external supply through two of the four wires. While the SCXI-1127 and SCXI-1128 do not supply excitation, other devices, such as an NI 5411 arbitrary waveform generator, can supply these signals.

Matrix

Configured as a matrix, the SCXI-1127 and SCXI-1128 become general-purpose signal routers. The 64 lines of the SCXI-1127 and SCXI-1128 form a 2-dimensional array of four rows and eight columns.

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High-Voltage Multiplexer/Matrix

Through software, you can control the matrix to connect any row(s) to any column(s). The SCXI-1332 terminal block automatically configures the SCXI-1127 for 4x8, 2-wire matrix mode. For applications requiring matrices larger than 4x8, use the matrix expansion cable accessories described on page 499. Insert these cables between SCXI-1332 terminal blocks to automatically connect rows or columns together of two or more SCXI-1127 modules. Each cable carries four differential lines. Therefore, to expand a 4x8 matrix to an 8x8 matrix, you need two matrix expansion cables to connect the eight columns. However, if you wanted to expand a 4x8 matrix to a 4x16 matrix, you only need one matrix expansion cable to connect the four rows.

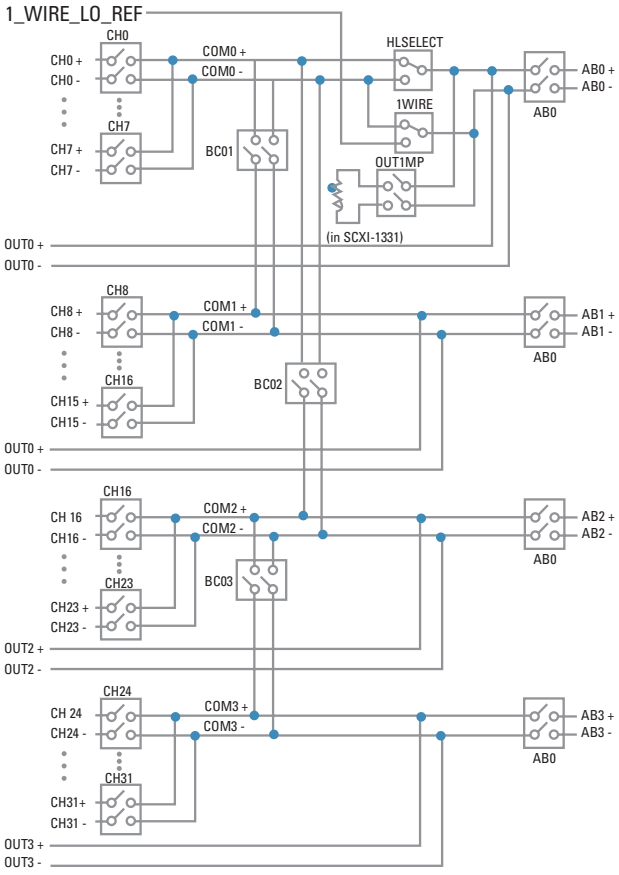


Figure 1. NI SCXI-1127 and NI SCXI-1128 Hardware Diagram.

Extended Features and Specifications

National Instruments switch modules are built with a number of core features that are covered in detail in the Switch Overview section.

For additional information about the SCXI-1127 and SCXI-1128, including software, certifications and compliance, relay control, etc., please see page 20. For detailed specifications, please see page 502.

Ordering Information

NI SCXI-1127 776572-27
NI SCXI-1128 776572-28
Includes switch module and NI-SWITCH driver software.

Accessories

SCXI-1331 multiplexor terminal block 777687-31
SCXI-1332 matrix terminal block 777687-32
Matrix expansion cables
40 cm 185440-0R4
75 cm 185440-0R75
PXI-4021 switch controller 778278-01
PCI-4021 switch controller.....778277-01

For information on extended warranty and value added services, see page 20.
See page 499 for accessory and cable information.

BUY ONLINE!
Visit ni.com/products and enter scxi1127 and/or scxi1128.

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Switch Specifications

Specifications

SCXI-1129

Input Characteristics

Input voltage, node to node ..... 150 V_{rms} or 150 VDC
Maximum switching voltage
  AC ..... 150 V_{rms}
  DC ..... 150 VDC
Maximum current switching capacity
  AC (resistive load) ..... 250 mA
  DC (resistive load) ..... 1 A
Maximum relay switching power ..... 37.5 VA, 30 W
Maximum combined channel current ..... 5 A
Path resistance (HVAB) ..... 1 Ω
Contact material ..... Gold-clad AgPd

Transfer Characteristics

Thermal emf (differential) ..... 9 µV (worst case)

Bandwidth (-3 dB)

1 row – 1 column ..... 10 MHz

Crosstalk[1] (Adjacent Rows and Columns)

Frequency	Crosstalk (dB)
10 KHz	-80
100 KHz	-66
1 MHz	-50

[1]50 Ω termination
Dynamic Characteristics
Maximum operating speed ..... Between 22 and 250 operations/s depending on the number of relays operated
Relay operate time (at 20 ºC)
  Set/release ..... 4 ms max
Expected life
  Mechanical (at 3 operations/s) ..... $5x10^7$ operations

Stability

Recommended warm-up time ..... 5 minutes

Physical

Dimensions ..... 3.0 by 17.2 by 20.3 cm (1.18 by 6.9 by 8.0 in.)
I/O connector ..... 180-pin HDI

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5% to 85% noncondensing
IEC-1010, voltage insulation category I double insulation, EMI, CE

SCXI-1127, SCXI-1128

Input Characteristics

Input voltage
  Channel-to-channel ..... 250 VDC/V_{rms}
  Channel-to-earth ..... 250 VDC/V_{rms}
Maximum switching voltage
  differential or single ended ..... 250 VDC/V_{rms}
Maximum switching capacity – differential mode or single ended
  AC
    SCXI-1127 (resistive load) ..... 200 mA at 250 V_{rms}, 500 mA at 125 V_{rms}
    SCXI-1128 (resistive load) ..... 30 mA at 10 V_{rms}, 1 mA at 250 V_{rms}
  DC
    SCXI-1127 (resistive load) ..... 1 A at 30 VDC
    SCXI-1128 (resistive load) ..... 30 mA at 10 VDC 1 mA at 300 VDC
Maximum switching power per differential channel or single ended
  SCXI-1127 ..... 60 VA, 30 W
  SCXI-1128 ..... 300 mW
Path resistance
  SCXI-1127 ..... <1 Ω
  SCXI-1128 ..... <1.2 kΩ
Contact material (SCXI-1127) ..... Gold-clad silver alloy

Transfer Characteristics

Thermal emf (differential) (SCXI-1127) ..... ≤3 µV
Thermal offset voltage (SCXI-1128) ..... <100 µV

Maximum Bandwidth

SCXI-1127 ..... 11 MHz

Channel-to-Channel Isolation

SCXI-1127 (50 Ω termination)

Frequency	Isolation (dB)
10 KHz	> 70
100 KHz	> 55
1 MHz	> 50
5 MHz	> 40
11 MHZ	> 25

SCXI-1128 (50 Ω termination)

Frequency	Isolation (dB)
100 Hz	> 80
1 KHz	> 70
10 KHz	> 55
100 KHz	> 35
1 MHZ	> 20

Dynamic Characteristics

Maximum operating speed
  SCXI-1127 ..... 100 operations/s
  SCXI-1128 ..... 1200 operations/s
Relay operate time (at 20 °C)
  SCXI-1127 ..... 3 ms typical, 5 ms maximum
  SCXI-1128 ..... 0.25 ms typical, 0.5 ms maximum
Relay release time (at 20 °C)
  SCXI-1127 ..... 1.5 ms typical, 5 ms maximum
  SCXI-1128 ..... 0.08 ms typical, 0.2 ms maximum
Mechanical (at 3 operations/s)
SCXI-1127 ..... $5x10^7$ operations
SCXI-1128 ..... unlimited
SCXI-1127 relay lifetime ..... (operating life varies with switching conditions)
Expected Life

Voltage	Current	Expected Operations
30 VDC	1 A	200,000
250 V_{rms}	200 mA	50,000
250 V_{rms}	250 µA	100,000

Stability

Recommended warm-up time ..... 5 minutes

Physical

Dimensions ..... 3.0 by 17.2 by 20.3 cm
(1.18 by 6.9 by 8.0 in.)
I/O connector ..... 96-pin HDI

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5% to 85% noncondensing
IEC-1010, voltage insulation category I double insulation, EMI, CE

PXI-2501

Input Characteristics

Maximum working voltage ..... ±10 VDC from chassis ground
Overvoltage protection (signals CH<0:23>, COM<0:3>)
  Powered on or off ..... ±25 VDC from ground
Overvoltage protection (signals AB<0:1>)
  Powered on ..... ±25 VDC from ground
  Powered off ..... ±15 VDC from ground
FET switch on-resistance
  At 25 °C ..... 50 Ω typical; 85 Ω maximum
  At 85 °C ..... 100 Ω
Total signal path resistance
  (channel x to analog bus x) ..... 1,650 Ω typical; 1,900 Ω maximum
Total signal path resistance
  (channel x to common x) ..... 1,900 Ω typical; 2,150 Ω maximum

Transfer Characteristics

Channel amplifier (unity gain)
  Offset voltage (differential) ..... 1.2 mV, maximum
Cold-junction sensor channel buffer
  Offset voltage ..... 60 µV, maximum

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