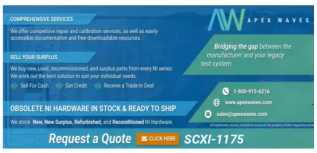
NATIONAL INSTRUMENTS NI SCXI-1175 196 ×1 Relay Multiplexer



NATIONAL INSTRUMENTS NI SCXI-1175 196 ×1 Relay Multiplexer User Manual

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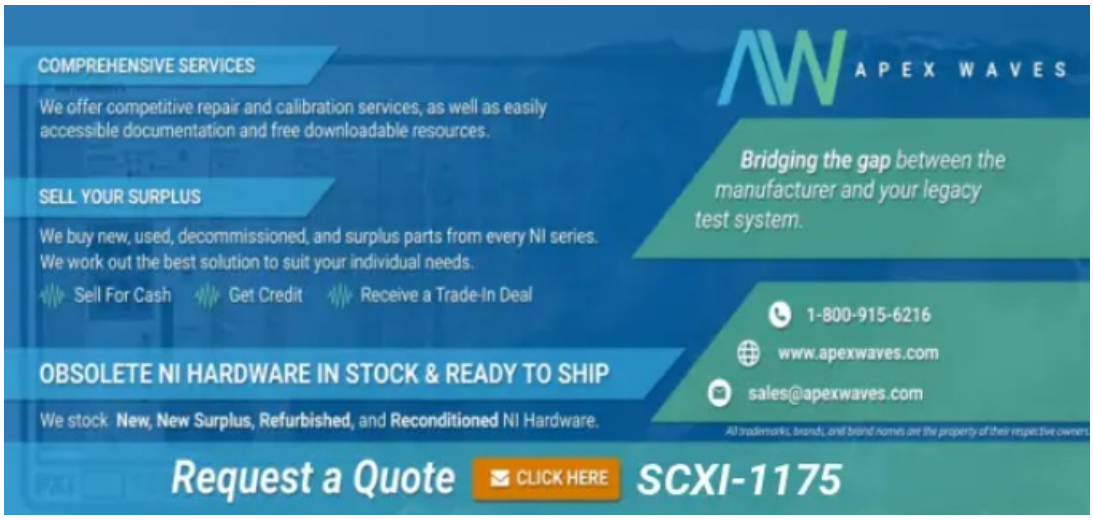

Specifications

- Maximum switching power (per channel): 30 W, 37.5 VA (DC to 60 Hz)
- Maximum total current: 1 A (switching or carry)
- Maximum switching voltage:
  - Channel-to-channel: 100 V
  - Channel-to-ground: 100 V, CAT I
- Open channel isolation (50Ω termination):
  - 10 kHz: 85 dB
  - 100 kHz: 65 dB
  - 1 MHz: 48 dB
- Dynamic Characteristics:
  - Relay operate time:
    - Typical: 1 ms
    - Maximum: 3.4 ms
  - Maximum scan rate: 120 channels/s

Product Usage Instructions

Safety Precautions
Ensure all power sources are disconnected before installation or maintenance. Follow proper safety guidelines when working with high voltages.

Installation
Refer to the product manual for detailed installation instructions. Make sure to securely connect the module to the backplane following the specified guidelines.

Signal Routing
When routing signals through the SCXI High-Voltage Analog Backplane (HVAB), ensure the total current does not exceed 0.5 A.

Relay Replacement
If a relay fails, refer to the product manual for guidance on replacing the relay. Ensure the replacement relay meets the required specifications.

FAQ

- **Q: Can this module be connected to signals within Categories II, III, or IV?**

A: No, this module is rated for Measurement Category I and should not be used for signals exceeding 100 V. Refer to safety guidelines for more information.

- **Q: What should I do if hazardous voltages are present on relay terminals?**
  A: Safety low-voltage (42.4 Vpk/60 VDC) should not be connected to any other relay terminal when hazardous voltages are present.
- **Q: How do I handle high voltage transients from inductive loads?**
  A: To handle high voltage transients, consider using transient suppression methods. Visit **ni.com/info** and enter the Info Code 'induct' for more information.

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™

NI SCXI -1175 Specifications
196 × 1 Relay Multiplexer

This document lists specifications for the NI SCXI-1175 196 × 1 multiplexer relay module. All specifications are subject to change without notice. Visit **ni.com/manuals** for the most current specifications.

- Topologies …….. 1-wire 196 × 1 multiplexer
- 2-wire 95 × 1 multiplexer
- 2-wire 98 × 1 multiplexer

Refer to the NI Switches Help for detailed topology and pinout information.

Input Characteristics

Caution All input characteristics are DC, ACrms, or a combination unless otherwise specified.

Maximum switching voltage

- **Channel-to-channel** …….. 100 V
- **Channel-to-ground……** 100 V, CAT I

Caution This module is rated for Measurement Category I and is intended to carry signal voltages no greater than 100 V. This module can withstand up to 500 V impulse voltage. Do not use this module for connection to signals or for measurements within Categories II, III, or IV. Do not connect to MAINs supply circuits (for example, wall outlets) of 115 or 230 VAC. Refer to the Read Me First: Safety and Electromagnetic Compatibility document for more information about measurement categories.
Caution When hazardous voltages (>42.4 Vpk/60 VDC) are present on any relay terminal, safety low-voltage (≤42.4 Vpk/60 VDC) cannot be connected to any other relay terminal.
Caution Modules that can connect to a common high-voltage analog backplane derate to their lowest common voltage rating. Refer to the NI Switches Getting Started Guide for more information.
Caution The switching power is limited by the maximum switching current, the maximum voltage, and must not exceed 30 W, 37.5 VA.

Maximum switching power

- (per channel)…….30 W, 37.5 VA
- (DC to 60 Hz)
- DC isolation resistance……..>1 GΩ, typical at 25 °C
- (between channel and COM terminals)
- Maximum total current……..1 A
- (switching or carry)
- Minimum switching capacity …….10 mV/10 µA

Note When routing signals through the SCXI High-Voltage Analog Backplane (HVAB), the maximum total current is 0.5 A.
Note Switching inductive loads (for example, motors and solenoids) can produce high voltage transients in excess of the module's rated voltage. Without additional protection, these transients can interfere with module operation and impact relay life. For more information about transient suppression, visit **ni.com/info** and enter the Info Code induct.

DC path resistance
Initial

- Through front panel…….<0.5 Ω
- Through HVAB…….<0.8 Ω
- End-of-life…….. ≥1 Ω

DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rapidly rises above 1 Ω. Load ratings apply to relays used within the specification before the end of relay life.

Differential thermal EMF

- Typical1 …….3 µV
- Maximum…….<12 µV
- Bandwidth (–3 dB, 50 Ω termination)
- 1-wire ……>20 Mhz
- 2-wire ……>8 Mhz

Channel-to-channel isolation (50 Ω termination)

- Each relay in the NI SCXI-1175 is shared by two channels.
- Refer to Table 4 for a list of channel pairings.

1-wire channels in different relays

- 10 kHz ……>90 dB
- 100 kHz ……..>70 dB
- 1 MHz…….>50 dB

1-wire channels in the same relay

- 10 kHz ……>75 dB
- 100 kHz ……..>55 dB
- 1 MHz…….>35 dB

2-wire channels

- 10 kHz ……>95 dB
- 100 kHz ……..>75 dB
- 1 MHz…….>55 dB

Open channel isolation (50 Ω termination)

- 10 kHz……..≥85 dB
- 100 kHz…….≥65 dB
- 1 MHz ……..≥48 dB

Dynamic Characteristics

Relay operate time

- Typical …….1 ms
- Maximum…….3.4 ms

Note Certain applications may require additional time for proper settling. For information about including additional settling time, refer to the NI Switches Help.

- Maximum scan rate……. 120 channels/s
- Expected relay life
- Mechanical …… 5 × 107 cycles
- Electrical
- 10 VDC,
- 100 mADC resistive…… 1 × 106 cycles
- 10 VDC, 1 ADC resistive …… 5 × 105 cycles
- 30 VDC, 1 ADC resistive …… 1 × 106 cycles

- 60 VDC, 1 ADC resistive …… 1 × 105 cycles

Note The relays used in the NI SCXI-1175 are field replaceable. Refer to the NI Switches Help for information about replacing a failed relay.

Trigger Characteristics
Input trigger

- Sources …… SCXI trigger lines 0–7,
- Rear connector
- Minimum pulse width …….. 150 ns
- Output trigger
- Destinations …….. SCXI trigger lines 0–7,
- Rear connector
- Pulse width …… Programmable
- (1 µs to 62 µs)

Physical Characteristics

- Relay type …… Electromechanical,
- latching
- Relay contact material …….. Silver, gold covered
- I/O connector ……. 200 POS LFH Matrix 50,
- receptacle

SCXI power requirement

- +5 VDC …….. 50 mA
- +18.5 VDC to +25 VDC …… 170 mA
- –18.5 VDC to –25 VDC……. 170 mA
- Dimensions (L × W × H) ……. 19.8 × 3.0 × 17.3 cm
- (7.8 × 1.2 × 6.7 in.)
- Weight…… 755 g (1 lb 11 oz)

1 To ensure the typical thermal EMF, power down all relays and avoid pulsing high currents near the channels you are measuring. For more information about powering down latching relays, refer to the Power Down Latching Relays After Debounce property in NI-SWITCH or the Power Down Latching Relays After Settling property in NI-DAQmx.

Environment

- Operating temperature …….. 0 °C to 50 °C
- Storage temperature …… –20 °C to 70 °C
- Relative humidity…….5% to 85%,
- noncondensing
- Pollution Degree …….. 2

- Maximum altitude..... 2,000 m
- Indoor use only.

Accessories
Visit **ni.com** for more information about the following accessories.

Table 1. NI Accessories for the NI SCXI-1175

Accessory	Part Number
LFH200 connector to bare wire switch cable, 2 m	779038-01
LFH200 to 50-pin D-SUB switch cable (CH-CH twisted), 1m	779038-03
NI TBX-50, 50-pin DSUB screw terminal block	779305-01
Relay replacement kit for G6KU-2F-Y relays	780386-01

Note When using either the
SH200LFH-4xDB50F-S or
SH200LFH-BARE WIRE cable with the
NI SCXI-1175 in the 2-wire 98 × 1 topology, CH95, CH96, and CH97 will have lower RF performance than the other 95 channels because they are not in twisted pairs in the cable. To avoid using these channels, NI-SWITCH has support for a 2-wire 95 × 1 topology that does not include CH95, CH96, and CH97.

Caution You must install mating connectors according to local safety codes and standards and according to the specifications provided by the connector manufacturer. You are responsible for verifying safety compliance of third-party connectors and their usage according to the relevant standard(s), including UL and CSA in North America and IEC and VDE in Europe.

Table 2. Third Party Accessories for the NI SCXI-1175

Accessory	Manufacturer	Part Number
Terminal sticks (four required per module)	Molex	71715-4002
Plug connector subassembly	Molex	71719-3000
Backshell only	Jevons	JDC200B-832
Mass interconnect cable assembly, 20 in.	Virginia Panel	540105010105
Mass interconnect cable assembly, 36 in.	Virginia Panel	540105010205
Mating ITA module* (one required per module)	Virginia Panel	510108131
Mating ITA PC* (198 required per module)	Virginia Panel	720101101
* Additional cover or enclosure required. See the previous safety caution.		

Table 3. Third-Party Accessories for the SH200LFH-4xDB50F-S Cable

Accessory	Manufacturer	Part Number
VARIOFACE	Phoenix	FLK-D50
module, with	Contact	SUB/S
screw connection		
and 50 position		
D-Subminiature		
pin strip		
VARIOFACE	Phoenix	FLKM-D50
module, with	Contact	SUB/S
screw connection		
and 50 position		
D-Subminiature		
pin strip		
VARIOFACE	Phoenix	FLKMS-D50
module, with	Contact	SUB/S
screw connection		
and 50 position		
D-Subminiature		
pin strip		
VARIOFACE	Phoenix	FLKM-D50
module, with screw	Contact	SUB/S/LA
connection and		
50 position		
D-Subminiature		
pin strip, with LED		
indicators		

Table 4. NI SCXI-1175 Channel Pairs

Channel Pair	Channel Pair	Channel Pair
CH0, CH95	CH33, CH128	CH66, CH161
CH1, CH96	CH34, CH129	CH67, CH162
CH2, CH97	CH35, CH130	CH68, CH163
CH3, CH98	CH36, CH131	CH69, CH164

CH4, CH99	CH37, CH132	CH70, CH165
CH5, CH100	CH38, CH133	CH71, CH166
CH6, CH101	CH39, CH134	CH72, CH167
CH7, CH102	CH40, CH135	CH73, CH168
CH8, CH103	CH41, CH136	CH74, CH169
CH9, CH104	CH42, CH137	CH75, CH170
CH10, CH105	CH43, CH138	CH76, CH171
CH11, CH106	CH44, CH139	CH77, CH172
CH12, CH107	CH45, CH140	CH78, CH173
CH13, CH108	CH46, CH141	CH79, CH174
CH14, CH109	CH47, CH142	CH80, CH175
CH15, CH110	CH48, CH143	CH81, CH176
CH16, CH111	CH49, CH144	CH82, CH177
CH17, CH112	CH50, CH145	CH83, CH178
CH18, CH113	CH51, CH146	CH84, CH179
CH19, CH114	CH52, CH147	CH85, CH180
CH20, CH115	CH53, CH148	CH86, CH181
CH21, CH116	CH54, CH149	CH87, CH182
CH22, CH117	CH55, CH150	CH88, CH183
CH23, CH118	CH56, CH151	CH89, CH184
CH24, CH119	CH57, CH152	CH90, CH185
CH25, CH120	CH58, CH153	CH91, CH186
CH26, CH121	CH59, CH154	CH92, CH187
CH27, CH122	CH60, CH155	CH93, CH188
CH28, CH123	CH61, CH156	CH94, CH189
CH29, CH124	CH62, CH157	CH190, CH193
CH30, CH125	CH63, CH158	CH191, CH194
CH31, CH126	CH64, CH159	CH192, CH195
CH32, CH127	CH65, CH160	—

Figure 1 shows the NI SCXI-1175 power-on state.

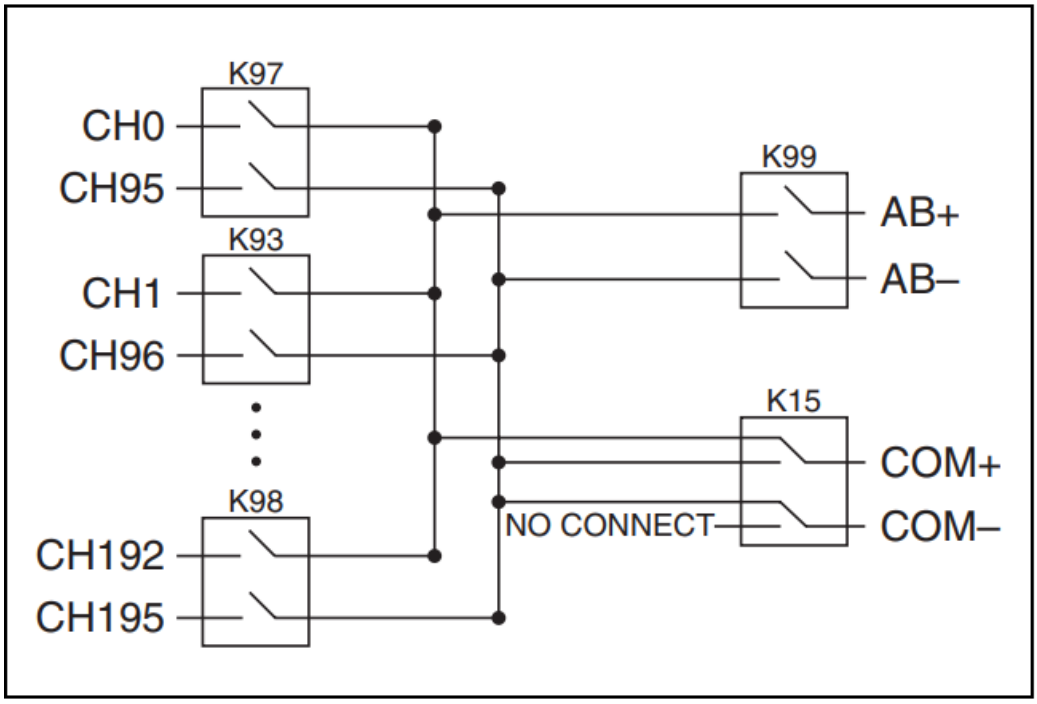

Figure 1. NI SCXI-1175 Power-On State

Figure 1. NI SCXI-1175 Power-On State

Compliance and Certifications

Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the Online Product Certification section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the Online Product Certification section.

Note For EMC compliance, operate this device with shielded cables.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also to NI customers.

For additional environmental information, refer to the NI and the Environment Web page at **ni.com/environment**. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

National Instruments (RoHS) National Instruments RoHS **ni.com/environment/rohs_china** (For information about China RoHS compliance, go to **ni.com/environment/rohs_china**.)

Documents / Resources

	NATIONAL INSTRUMENTS NI SCXI-1175 196 ×1 Relay Multiplexer [pdf] User Manual NI SCXI-1175 196 1 Relay Multiplexer, NI SCXI-1175, 196 1 Relay Multiplexer, Relay Multiplexer, Multiplexer

References

- Test and Measurement Systems, a part of Emerson - NI
- Product Certifications - NI
- Engineering a Healthy Planet - NI
- Product Take-Back Program and Recycling - NI
- Using Info Codes - NI
- Product Documentation - NI
- User Manual