General-Purpose Relays

NI SCXI-1161

- 8 independent SPDT electromechanical relays
- Nonlatching relays
- Switching capacity
  - 8 A at 125 V_{rms}
  - 6 A at 250 V_{rms}
  - 5 A at 30 VDC
- 3 operations/s
- Fully software programmable

NI SCXI-1160

- 16 independent SPDT electromechanical relays
- Latching relays
- Switching capacity
  - 2 A at 250 V_{rms}
  - 2 A at 30 VDC
- 50 operations/s
- Fully software programmable

Operating Systems
- Windows 2000/NT/XP

Recommended Software
- LabVIEW
- LabVIEW Real-Time Module
- LabWindows/CVI
- Measurement Studio
- NI Switch Executive

Other Compatible Software
- Visual Basic
- C/C++

Driver Software (included)
- NI-SWITCH

Certifications
- UL

Overview

The National Instruments SCXI-1160 and SCXI-1161 are general-purpose relay switching modules. The SCXI-1160 has 16 independent SPDT (Form C) latching relays with very low on-resistance and low thermal offset. With power capabilities of up to 2 A at 250 V_{rms} or 30 VDC, these relays are suitable for switching, routing, and controlling medium-level signals. The SCXI-1161 has eight independent SPDT nonlatching relays. Because the SCXI-1161 relays can switch up to 8 A at 125 V_{rms}, 6 A at 250 V_{rms}, or 5 A at 30 VDC, they are suitable for higher power applications. Each channel on both modules has a normally closed (NC), normally open (NO), and common (COM) terminal. You can use two or more SCXI-1160s and SCXI-1161s in one or more chassis to switch and control thousands of signals.

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-1160 and SCXI-1161, including software, certifications and compliance, relay control, etc., please see page 20. For detailed specifications, please see page 506.

Ordering Information

NI SCXI-1160 776572-60
NI SCXI-1161 776572-61
Includes switch module and NI-SWITCH driver software.

Accessories
SCXI-1324 terminal block 777687-24
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 options.

BUY ONLINE!
Visit ni.com/products and enter scxi1160 and/or scxi1161.

Switch Specifications

Specifications (continued)

Physical

Dimensions ..... 17.2 by 20.3 by 3.0 cm (6.8 by 8.0 by 1.2 in.)

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 90% noncondensing

[1]Transfer rate depends largely on the computer and software. These tests were made using an AT-MIO-16E-2 installed in a 450 MHz Pentium III computer running LabVIEW and Windows NT.

PXI-2566, SCXI-1166

Input Characteristics

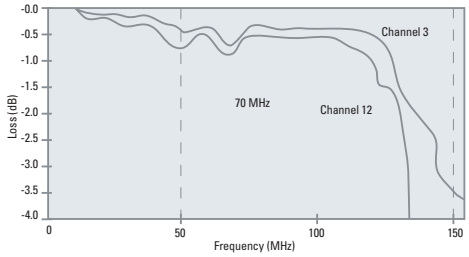
Maximum switching voltage
- Channel-to-channel ..... 150 VDC, 125 VAC, CAT I
- Channel-to-ground ..... 150 VDC, 125 VAC, CAT I

Simultaneous channels at maximum switching current (≤25 °C)
- PXI-2566 16
- SCXI-1166 32

Maximum carry current ..... 5 ADC, 5 AAC (per channel)
Simultaneous channels at maximum carry current (≤25 °C)
- PXI-2566 9
- SCXI-1166 8

Maximum switching power ..... 60 W, 62.5 VA (DC to 60 Hz) (per channel)
DC path resistance
- Initial ..... <1.0 Ω
- End of life ..... ≥1.0 Ω

Thermal EMF ..... <9 µV (typical at 23 °C)
Minimum switching capacity ..... 10 µA at 10 mVDC
Bandwidth (-3 dB) ..... ≥70 MHz



Crosstalk (Typical at 23 °C)

Channel-to-channel
- 10 kHz ..... ≤-75 dB
- 100 kHz ..... ≤-65 dB
- 1 MHz ..... ≤-45 dB
- 10 MHz ..... ≤-25 dB

Isolation (Typical at 23 °C)

Open channel
- 100 kHz ..... ≥65 dB
- 1 MHz ..... ≥45 dB
- 10 MHz ..... ≥25 dB

Dynamic Characteristics

Maximum speed ..... 115 operations/s
Relay operate time
- Typical ..... 2 ms
- Maximum ..... 4.4 ms

Expected relay life
- Mechanical ..... 10^8 operations
- Electrical
  - 30 VDC, 1 A resistive ..... $5x10^5$ operations
  - 30 VDC, 2 A resistive ..... 10^5 operations
  - 125 VAC, 0.2 A resistive ..... $3x10^5$ operations
  - 125 VAC, 0.5 A resistive ..... 10^5 operations

Physical Characteristics

Relay type ..... Electromechanical, nonlatching
Relay contact material ..... Gold clad silver alloy
I/O connectors ..... Two 62-pin D-Sub
Dimensions
- PXI-2566 ..... 10 by 16 cm (3.9 by 6.3 in.)
- SCXI-1166 ..... 3.0 by 17.3 by 19.6 cm (1.2 by 6.7 by 7.6 in.)

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 electricalequipment 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

SCXI-1160, SCXI-1161

Input Characteristics

Number of relays
- SCXI-1160 16
- SCXI-1161 8

Relay type
- SCXI-1160 ..... SPDT (Form C), latching
- SCXI-1161 ..... SPDT (Form C), nonlatching

Maximum input voltage
- Channel-to-channel ..... 250 VDC, 250 V_{rms}
- Channel-to-ground ..... 250 VDC, 250 V_{rms}

Maximum switching voltage
- SCXI-1160 ..... 250 VDC, 250 V_{rms}
- SCXI-1161 ..... 250 VDC, 250 V_{rms}

Maximum switching capacity
- SCXI-1160 ..... 2 A at 250 V_{rms}, 0.6 A at 48 VDC, 2 A at 30 VDC
- SCXI-1161 ..... 8 A at 125 V_{rms}, 6 A at 250 V_{rms}, 5 A at 30 VDC

Minimum current load
- SCXI-1160 ..... 100 µA
- SCXI-1161 ..... 100 mA

Channel on resistance
- SCXI-1160 (includes terminal block) ..... 75 mΩ (initially)
- SCXI-1161 ..... 175 mΩ (initially)

Contact material
- SCXI-1160 ..... Gold-clad silver alloy
- SCXI-1161 ..... Silver alloy

Thermal offset
- SCXI-1160 ..... 3 µV

Dynamic Characteristics

Relay operate time
- SCXI-1160 ..... 10 ms
- SCXI-1161 ..... 15 ms

Relay release time
- SCXI-1160 ..... 10 ms
- SCXI-1161 ..... 15 ms

Maximum switching rate
- SCXI-1160 ..... 50 operations/s
- SCXI-1161 ..... 3 operations/s

Specifications (continued)

Expected life for SCXI-1160/1161
- Mechanical ..... 10^8 operations at 2 A, 30 VDC
- Electrical ..... 10^5 operations at 2 A, 250 V_{rms}

Physical
Dimensions ..... 3.0 by 17.2 by 20.3 cm (1.2 by 6.8 by 8.0 in.)

Enviroment
Operating temperature ..... 0 to 50 °C
Operating temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 90% noncondensing

PXI-2565

Input Characteristics
Number of relays ..... 16 SPST
Common-mode voltage
- Channel-to-channel ..... 250 V_{rms}, 250 VDC
- Channel-to-ground ..... 250 V_{rms}, 250 VDC

Maximum switching voltage
- AC ..... 250 V_{rms}
- DC ..... 125 VDC

Maximum switching capacity per channel
- 30 VDC (resistive load) ..... 5 A
- 250 VAC (resistive load) ..... 7 A

Maximum switching power per channel ..... 1750 VA, 150 W
Maximum combined channel current ..... 80 A
Channel on resistance ..... 30 mΩ
Contact material ..... Gold-flash over silver alloy

Dynamic Characteristics
Relay operate time (20 °C) ..... 5 ms typical, 10 ms maximum
Relay release time (20 °C) ..... 4 ms typical, 10 ms maximum
Maximum switching rate ..... 5 operations/s per channel

Expected life
- Mechanical (3 operations/s) ..... $5x10^7$ operations
- Electrical at maximum switching capacity ..... 10^5 operations (exceeding maximum switching capacity decreases electrical life)

PXI bus interface ..... Slave

PXI Trigger Bus
Trigger lines 8
Star trigger 1

Power Requirement
+5 VDC ..... 350 mA (all relays open) 1.4 A (all relays closed)

Physical
Dimensions ..... 10x16 cm (3.9 x 6.3 in.) 2 slots wide
I/O connector ..... 16x2 minicombicon header
I/O mating connector ..... Two 16x1 minicombicon connectors

Environment
Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 85% noncondensing

Shock and Vibration
Functional shock ..... MIL-T-28800E Class3 (30 g half-sine shock pulse) also meets IEC 60068-2-27
Random vibration ..... MIL-T-28800E, MIL-STD-810E Category 1
- Operational ..... 5 to 500 Hz, 0.3 g_{rms}
- Nonoperational ..... 5 to 500 Hz, 2.4 g_{rms}