

Specifications for the NI SCXI™-1166

32-Channel SPDT Relay Module

This document lists specifications for the NI SCXI-1166 general purpose relay module. All specifications are subject to change without notice. Visit ni.com/manuals for the most current specifications.

Configuration 32-channel SPDT, non-latching

Input Characteristics

Maximum switching voltage

Channel-to-channel 150 VDC, 125 VAC, CAT I

Channel-to-ground 150 VDC, 125 VAC, CAT I



Caution This module is rated for Measurement Category I and intended to carry signal voltages no greater than 150 V. This module can withstand up to 800 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 (e.g., wall outlets) of 115 or 230 VAC. Refer to the *NI Switches Getting Started Guide* for more information on measurement categories.

When hazardous voltages ($>42.4 V_{pk}/60$ VDC) are present on any relay terminal, safety low-voltage ($<42.4 V_{pk}/60$ VDC) can not be connected to any other relay terminal.

Maximum switching current 2 ADC, 2 AAC
(per channel)

Simultaneous channels at maximum
switching current (≤ 25 °C) 32

Maximum carry current 5 ADC, 5 AAC
(per channel)

Simultaneous channels at maximum
carry current (≤ 25 °C) 8

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April 2003
323478A-01

Module Load Derating at >25 °C

Load derating is dependent on the ambient temperature and the sum of the current squared of each channel simultaneously carrying a signal. The result must fall within in the shaded region of Figure 1. The following examples represent this calculation.

Example 1:

5 channels carry 3 A while

15 channels carry 1 A

$$(5 \times 3^2) + (15 \times 1^2) = 60 \text{ A}$$

Example 1 can be used at ambient temperatures between 0 °C and 50 °C.

Example 2:

3 channels carry 5 A while

25 channels carry 2 A

$$(3 \times 5^2) + (25 \times 2^2) = 175 \text{ A}$$

Example 2 can be used at ambient temperatures between 0 °C and 30 °C.

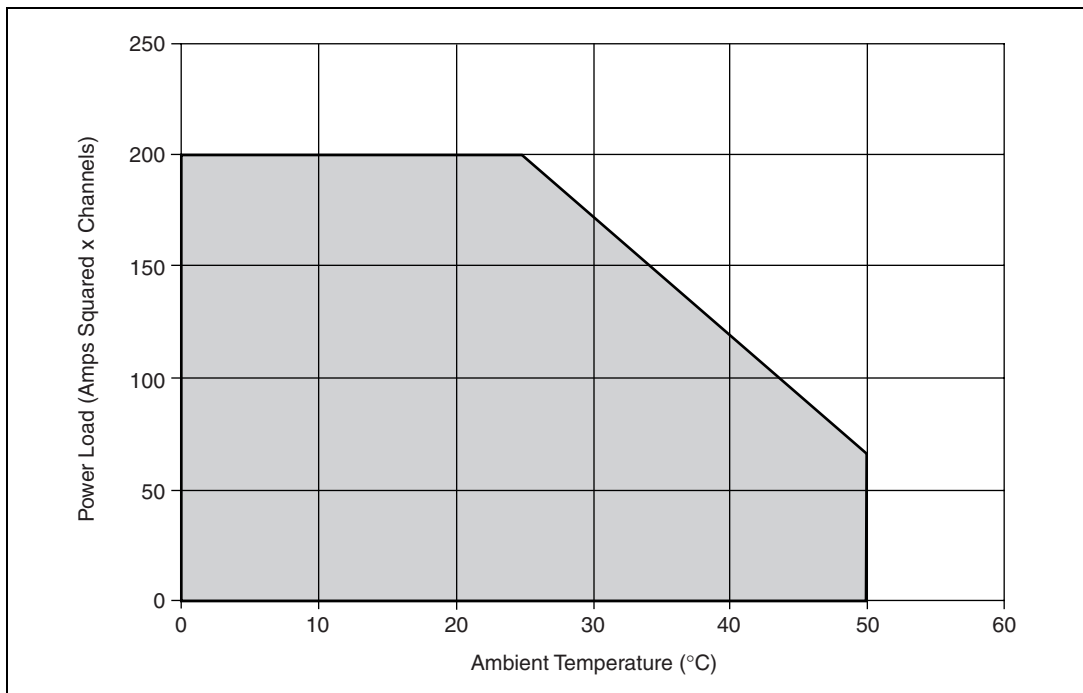


Figure 1. Module Load Derating

Maximum switching power 60 W, 62.5 VA (DC to 60 Hz)
(per channel)

DC path resistance

Initial $<0.1 \Omega$

End of life $\geq 1.0 \Omega$

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

Thermal EMF $<9 \mu\text{V}$ (typical at 23°C)

Minimum switching capacity $10 \mu\text{A}$ at 10 mV DC

Bandwidth (-3 dB) $\geq 70 \text{ MHz}$

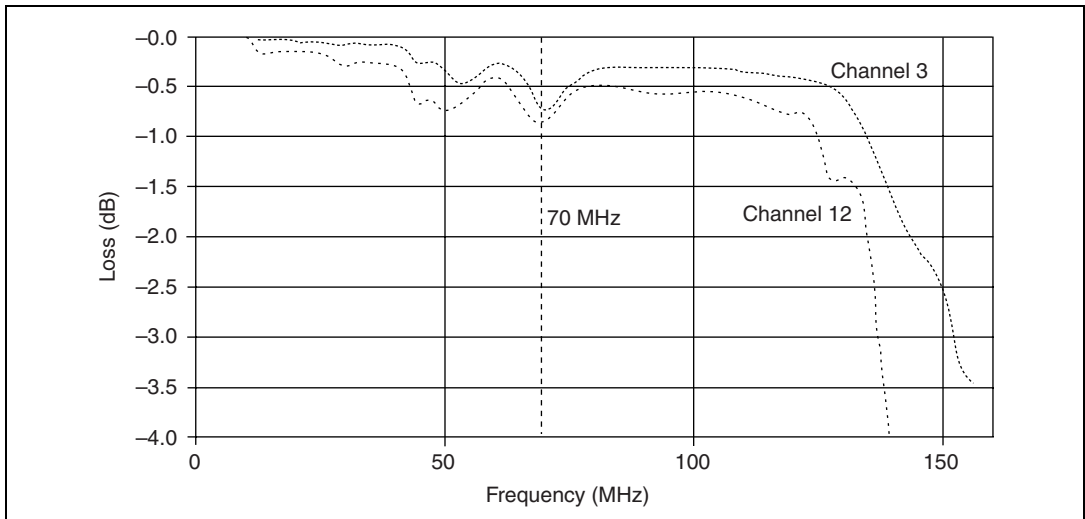


Figure 2. Insertion Loss Measured in a 50Ω System
(Worst Case, Based on 30 Engineering DUTs)

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 cycle speed115 cycles/s

Relay operate time

Typical	2 ms
Maximum	4.4 ms

Expected relay life

Mechanical100,000,000 cycles

Electrical

30 VDC, 1 ADC resistive.....	500,000 cycles
30 VDC, 2 ADC resistive.....	100,000 cycles
125 VAC, 0.2 AAC resistive....	300,000 cycles
125 VAC, 0.5 AAC resistive....	100,000 cycles

Trigger Characteristics

Input trigger

Sources SCXI trigger lines 0–7,
Front panel,
Rear connector

Minimum pulse width 150 ns

Front panel/terminal block input voltage

Minimum –0.5 V

VL maximum +0.7 V

VH minimum +2.0 V

Nominal +3.3 V

Maximum +5.5 V

Output trigger

Destinations SCXI trigger lines 0–7,
Front panel,
Rear connector

Pulse width Programmable (1 μ s to 62 μ s)

Front panel nominal voltage 3.3 V TTL, 8 mA

Physical Characteristics

Relay type Electromechanical, non-latching

Relay contact material Gold clad silver alloy

I/O connectors Two 62-pin DSUBs

SCXI power requirement 6.5 W

Dimensions (W \times H \times D) 3.0 cm \times 17.3 cm \times 19.6 cm
(1.2 in. \times 6.7 in. \times 7.6 in.)

Weight 720 g
(1 lb 10 oz)

Environment

Operating temperature0 °C to 50 °C
Storage temperature–20 °C to 70 °C
Relative humidity5% to 85% noncondensing
Pollution Degree2
Approved at altitudes up to 2,000 m

Accessories

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

Table 1. Accessories Available for the NI SCXI-1166

Accessory	Part Number
NI SCXI-1366 terminal block	777687-66
Backshell and connector kit	778720-01



Note The connector is keyed and has pins removed for safety isolation.

Glossary

channel a single SPDT (form C) relay. Each channel has three terminals—common (COM), normally closed (NC), normally open (NO).

cycle actuate a SPDT relay twice, leaving it in its original state

operate actuate a SPDT relay once, leaving it in the opposite state

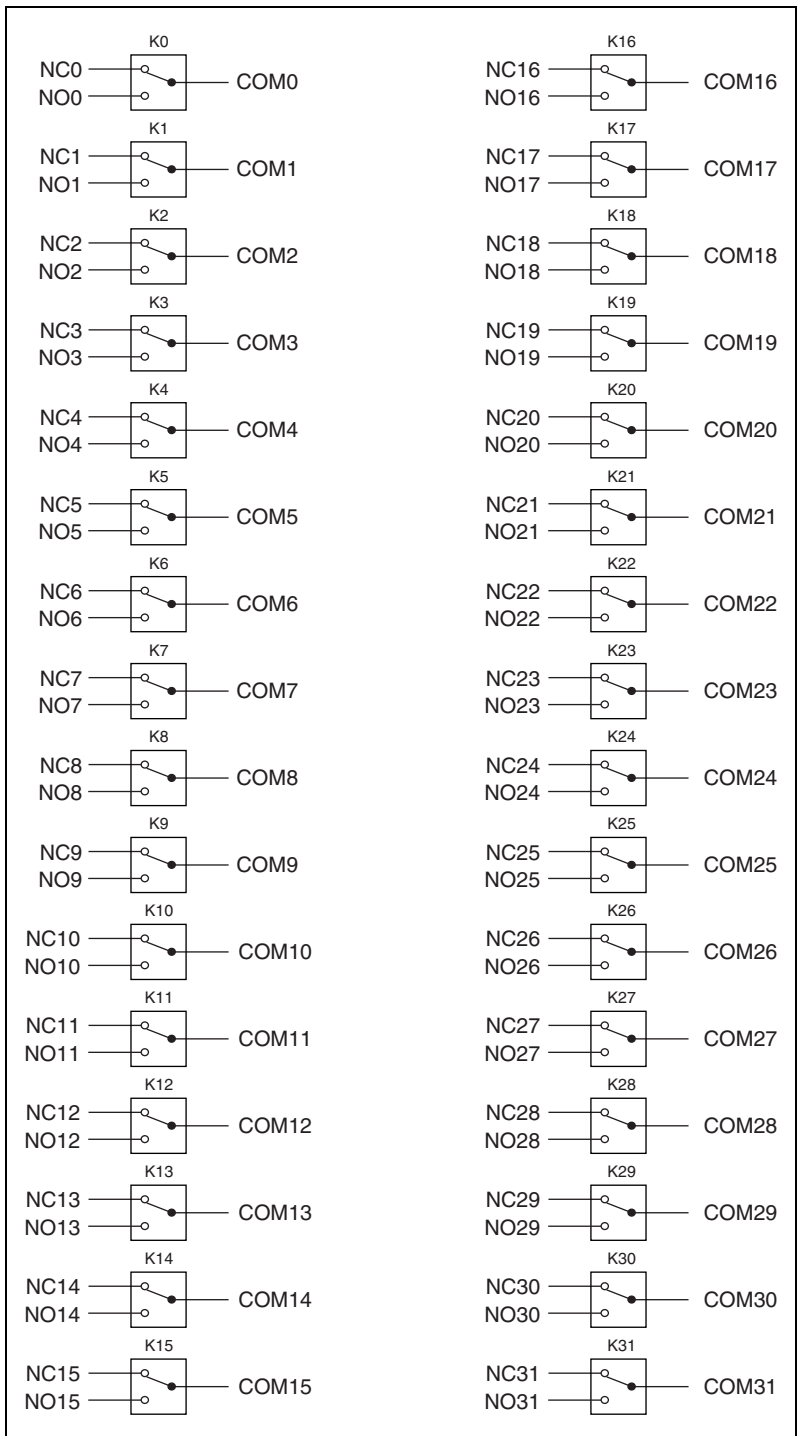


Figure 3. NI SCXI-1166 Power On State

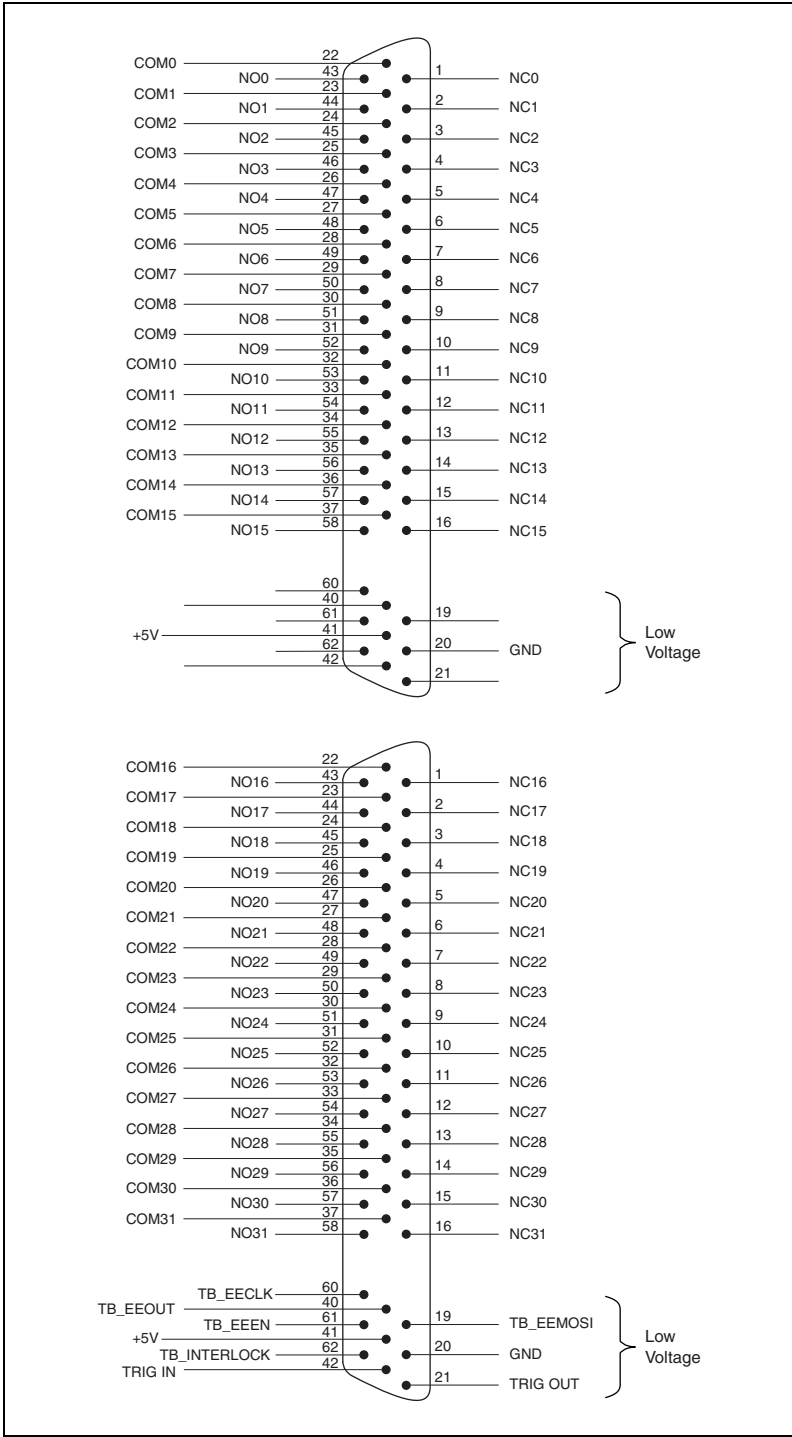


Figure 4. NI SCXI-1166 Front Connectors

Compliance and Certifications

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



Note For UL and other safety certifications, refer to the product label or to ni.com.

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1
EMC/EMI.....	CE, C-Tick and FCC Part 15 (Class A) Compliant



Note For EMC compliance, you *must* operate this device with shielded cabling.

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



Note Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, click **Declarations of Conformity Information** at ni.com/hardref.nsf/.