

NI SCXI™-1166 Specifications

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, nonlatching

Input Characteristics

Maximum switching voltage

Channel-to-channel 150 VDC, 125 VAC

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 (for example, 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 power 60 W, 62.5 VA (DC to 60 Hz)
(per channel, not to exceed 2 A per channel)

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

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 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.

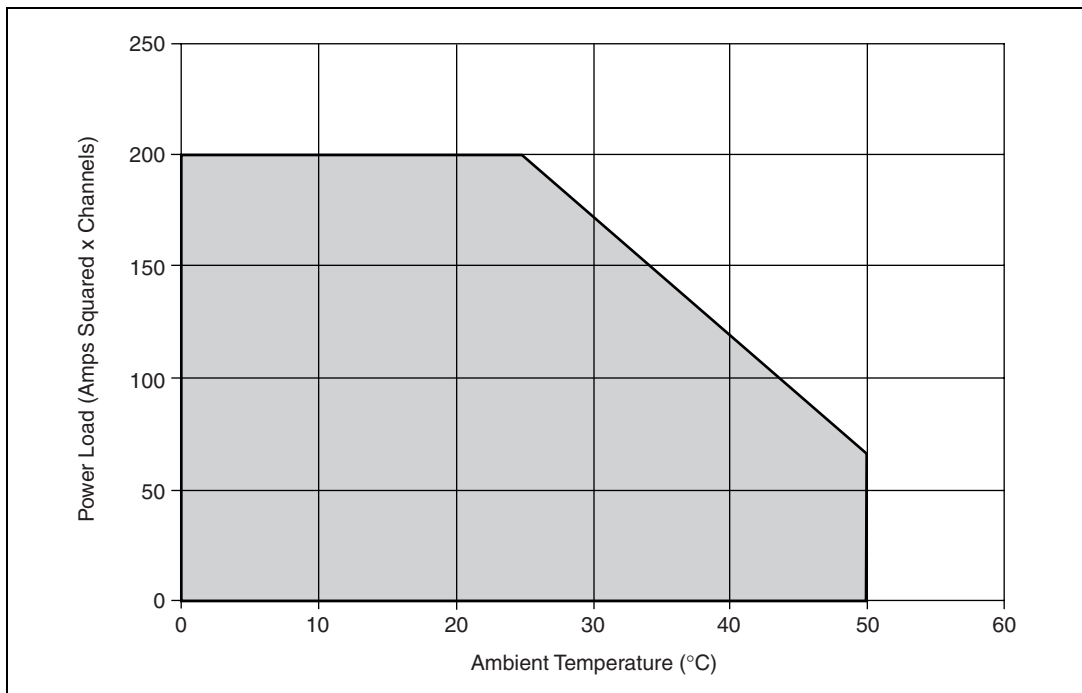


Figure 1. Module Load Derating

DC path resistance

Initial <0.1 Ω

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 1 Ω . Load ratings apply to relays used within the specification before the end of relay life.

Thermal EMF <9 μV (typical at 23 $^{\circ}\text{C}$)

Minimum switching capacity 10 μA at 10 mV DC

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

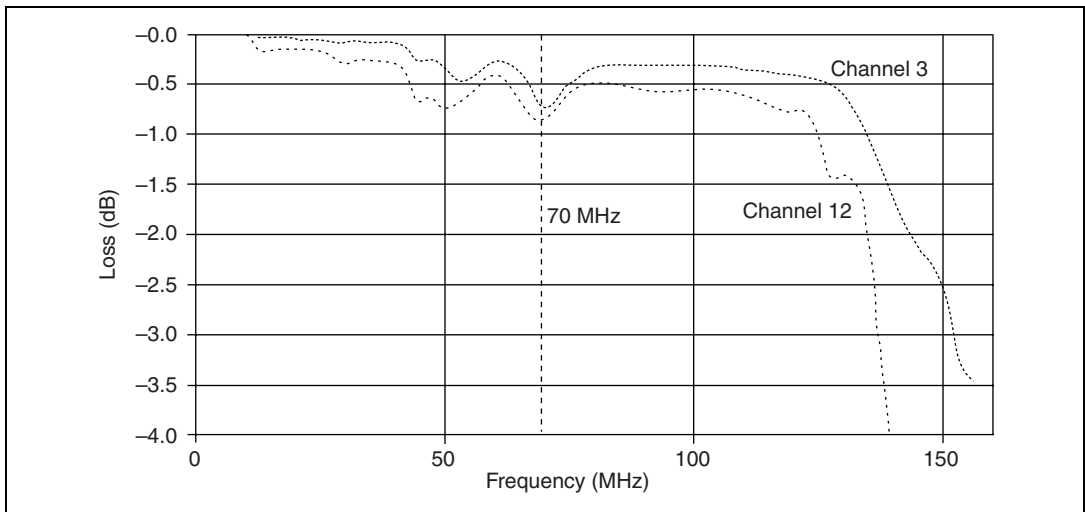


Figure 2. Insertion Loss Measured in a 50 Ω System (Worst Case, Based on 30 Engineering DUTs)

Crosstalk (typical at 23 $^{\circ}\text{C}$)

Channel-to-channel

10 kHz $\leq -75 \text{ dB}$

100 kHz $\leq -65 \text{ dB}$

1 MHz $\leq -45 \text{ dB}$

10 MHz $\leq -25 \text{ dB}$

Isolation (typical at 23 $^{\circ}\text{C}$)

Open channel

100 kHz $\geq 65 \text{ dB}$

1 MHz $\geq 45 \text{ dB}$

10 MHz $\geq 25 \text{ dB}$

Dynamic Characteristics

Maximum cycle speed	115 cycles/s
Relay operate time	
Typical.....	2 ms
Maximum	4.4 ms
Expected relay life	
Mechanical	100,000,000 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, nonlatching
Relay contact material.....	Gold-clad silver alloy
I/O connectors	Two 62-pin D-SUBs
Power requirement, including optional internal drive power	6.3 W at ± 18.5 V 200 mW at 5 V
Dimensions (W \times H \times D).....	3.0 cm \times 17.3 cm \times 19.8 cm (1.2 in. \times 6.8 in. \times 7.8 in.)
Weight.....	720 g (1 lb 10 oz)

Environment

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

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 module and accessory kit connectors are keyed and have pins removed for safety isolation.



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 Accessory for the NI SCXI-1166

Accessory	Manufacturer
62-pin D-SUB connector	Any

Glossary

channel	a single SPDT (form C) relay. Each channel has three terminals—common (COM), normally closed (NC), normally open (NO).
cycle	actuate an SPDT relay twice, leaving it in its original state.
operate	actuate an SPDT relay once, leaving it in the opposite state.

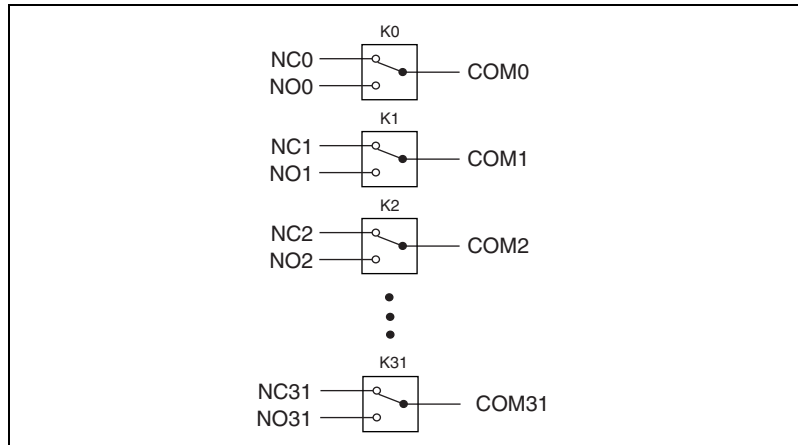


Figure 3. NI SCXI-1166 Power-On State

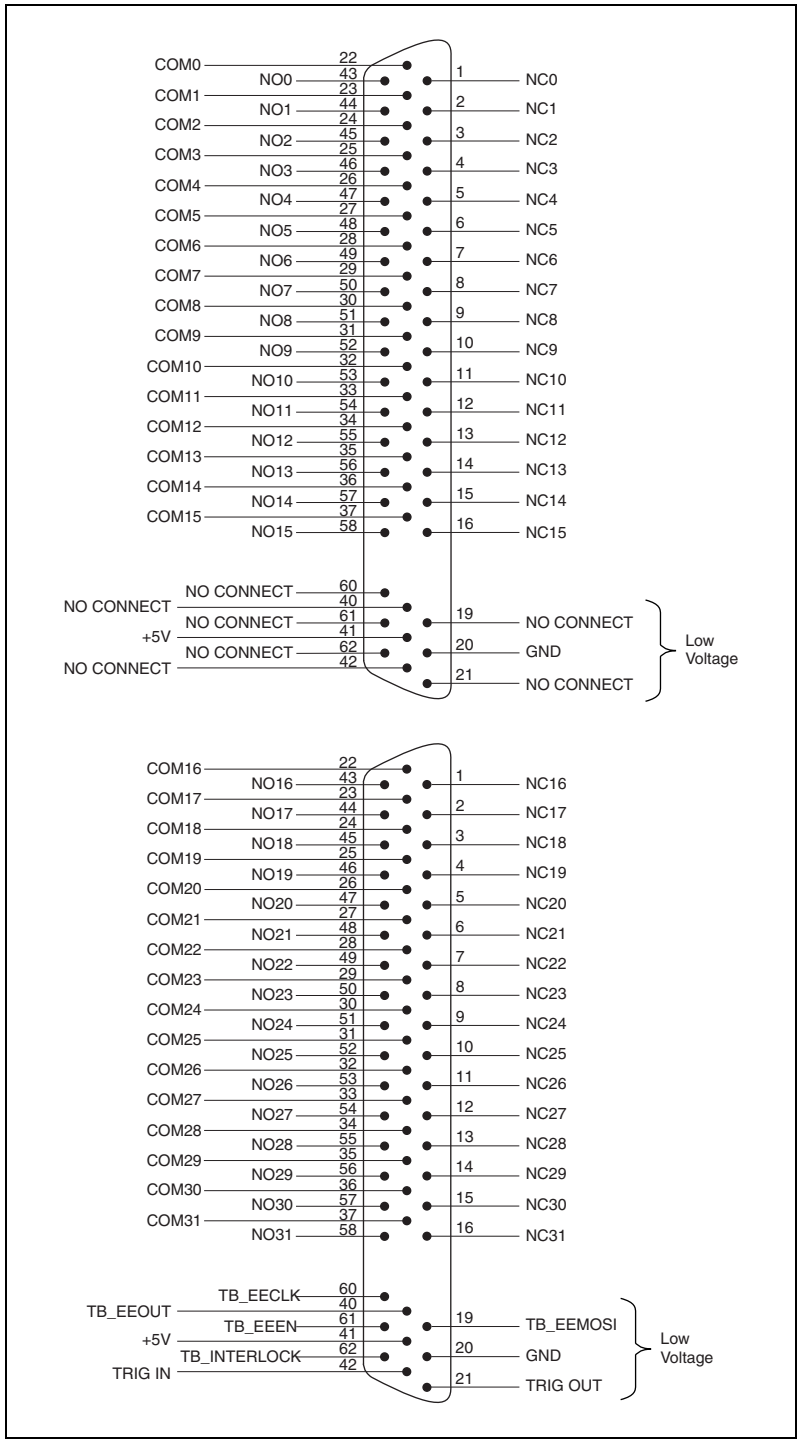


Figure 4. NI SCXI-1166 Front Connectors

Compliance and Certifications

Safety

This product meets the requirements of the following standards for safety and 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 visit ni.com/hardref.nsf, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

EmissionsEN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

ImmunityEN 61326:1997 + A2:2001,
Table 1

EMC/EMICE, 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, visit ni.com/hardref.nsf, search by model number or product line, and click the appropriate link in the Certification column.