NI PXI-2520 Specifications

80-Channel SPST Relay Module

This document lists specifications for the NI PXI-2520 general-purpose relay module. All specifications are subject to change without notice. Visit `ni.com/manuals` for the most current specifications.

Caution The protection provided by the NI PXI-2520 can be impaired if it is used in a manner not described in this document.

Topology ..... 80-channel SPST, non-latching

Refer to the *NI Switches Help* for detailed topology information.

About These Specifications

Specifications characterize the warranted performance of the instrument under the stated operating conditions.

Typical Specifications are specifications met by the majority of the instrument under the stated operating conditions and are tested at 23 °C ambient temperature. Typical specifications are not warranted.

All voltages are specified in DC, AC_{pk}, or a combination unless otherwise specified.

Caution Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document for important safety and electromagnetic compatibility information. To obtain a copy of this document online, visit `ni.com/manuals`, and search for the document title.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Input Characteristics

Maximum switching voltage

- Channel-to-channel ..... 150 V
- Channel-to-ground ..... 150 V, 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 *Read Me First: Safety and Electromagnetic Compatibility* document for more information on measurement categories.

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

Caution The switching power is limited by the maximum switching current, the maximum voltage, and must not exceed 60 W, 62.5 VA.

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

Maximum current
(switching or carry, per channel) ..... 2 A

Simultaneous channels at maximum
current (≤43 °C) 30

Minimum switching conditions ..... 20 mV/1 mA

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 `relayflyback`.

DC path resistance

- Initial ..... <0.5 Ω
- End-of-life ..... ≥1.0 Ω

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 (typical at 23 °C) ..... 12 µV

Bandwidth (-3 dB, typical at 23 °C)
50 Ω termination ..... ≤35 MHz

Crosstalk (typical at 23 °C, 50 Ω termination)

- Channel-to-channel
  - 10 kHz ..... ≤-80 dB
  - 100 kHz ..... ≤-60 dB

Isolation (typical at 23 °C, 50 Ω termination)

- Open channel
  - 10 kHz ..... ≥80 dB
  - 100 kHz ..... ≥60 dB

Module Load Derating at >43 °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

30 channels carry 1.7 A while

10 channels carry 1.5 A

$$(30 \times 1.7^2) + (10 \times 1.5^2) = 109.2\ A^2 \times \text{channels}$$

The module in Example 1 can be used at ambient temperatures between 0 °C and 47 °C.

Example 2

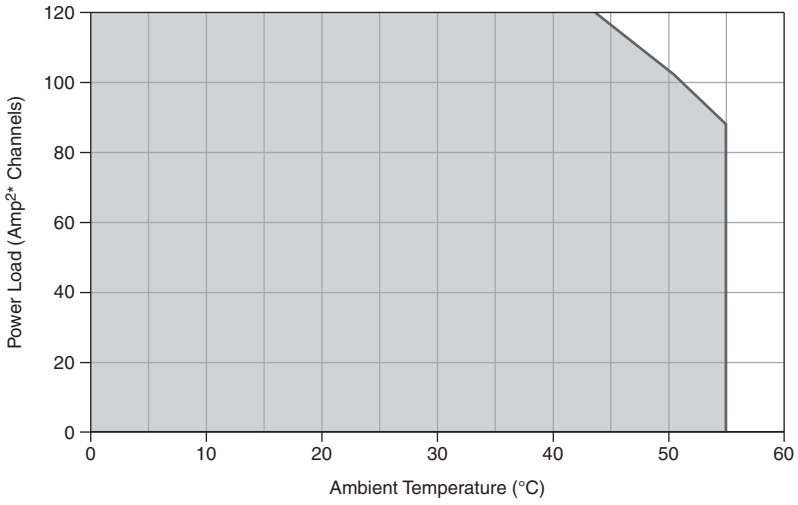
25 channels carry 1.55 A while

5 channels carry 2.0 A

$$(25 \times 1.55^2) + (5 \times 2.0^2) = 80.06\ A^2 \times \text{channels}$$

The module in Example 2 can be used at ambient temperatures between 0 °C and 55 °C.

Figure 1. Module Load Derating



Dynamic Characteristics

Relay operate time

Typical ..... 1 ms

Maximum..... 3.4 ms

Simultaneous drive limit..... 40 relays

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

Expected relay life

- Mechanical ..... 1×10^8 cycles
- Electrical (resistive)
  - 30 V, 1 A ..... 5×10^5 cycles
  - 30 V, 2 A ..... 1×10^5 cycles

Note The relays used in the NI PXI-2520 are field replaceable. Refer to the *NI Switches Help* for information about replacing a failed relay.

Trigger Characteristics

Input trigger

- Sources ..... PXI trigger lines 0-7
- Minimum pulse width ..... 150 ns

Note The NI PXI-2520 can recognize trigger pulse widths less than 150 ns if you disable digital filtering. For information about disabling digital filtering, refer to the *NI Switches Help.*

Output trigger

- Destinations ..... PXI trigger lines 0-7
- Pulse width ..... Programmable (1 µs to 62 µs)

Physical Characteristics

Relay type	Electromechanical, non-latching
Relay contact material	Palladium-ruthenium, gold covered
I/O connector	160 DIN 41612, 160 positions, male
PXI power requirement	6 W at 5 V, 2.5 W at 3.3 V
Dimensions (L × W × H)	3U, one slot, PXI/cPCI module 21.6 × 2.0 × 13.0 cm (8.5 × 0.8 × 5.1 in.)
Weight	174 g (6.1 oz)

Environment

Operating temperature ..... 0 °C to 55 °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.

Shock and Vibration

Operational Shock ..... 30 g peak, half-sine, 11 ms pulse
(Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)

Random Vibration

Operating ..... 5 to 500 Hz, 0.3 g_{rms}

Nonoperating ..... 5 to 500 Hz, 2.4 g_{rms}
(Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Diagrams

Figure 2 shows the NI PXI-2520 hardware diagram.

Figure 2. NI PXI-2520 Hardware Diagram

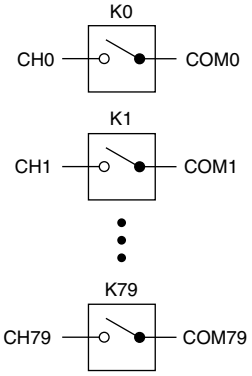
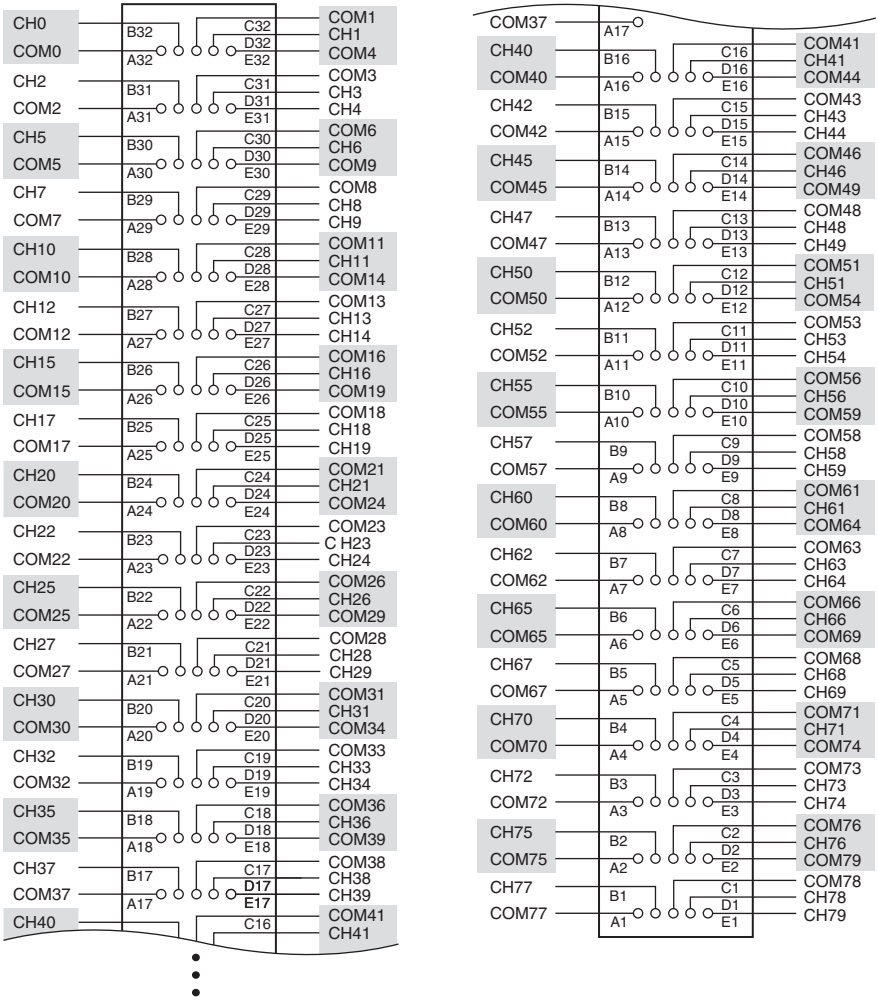


Figure 3 shows the NI PXI-2520 connector pinout.

Figure 3. NI PXI-2520 Connector Pinout



Accessories

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

Table 1. NI Accessories for the NI PXI-2520

Accessory	Part Number
DIN160 to 50 Pin DSUB switch cable, 1 m	782417-03
DIN160 to DIN160 switch cable, 1 m	782417-02
DIN160 to bare wire switch cable, 1 m	782417-01
Relay replacement kit	782460-10

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 61326-1 (IEC 61326-1): 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 In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, and additional information, refer to the *Online Product Certification* section.

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

To obtain product certifications and the Declaration of Conformity (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

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* 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 the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit `ni.com/environment/weee`.

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