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NI PXI-2530 Specifications

128-Channel Reed Relay Multiplexer/Matrix

このドキュメントには、日本語ページも含まれています。

This document lists specifications for the National Instruments PXI-2530 128-channel multiplexer/matrix module.
All specifications are subject to change without notice. Visit `ni.com/manuals` for the most current specifications.

Topologies ..... 1-wire 128 × 1 multiplexer,
1-wire dual 64 × 1 multiplexer,
1-wire quad 32 × 1 multiplexer,
1-wire octal 16 × 1 multiplexer,
2-wire 64 × 1 multiplexer,
2-wire dual 32 × 1 multiplexer,
2-wire quad 16 × 1 multiplexer,
4-wire 32 × 1 multiplexer,
4-wire dual 16 × 1 multiplexer,
1-wire 4 × 32 matrix,
1-wire 8 × 16 matrix,
2-wire 4 × 16 matrix,
independent

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

Note The NI PXI-2530 has eight interconnected banks of 1-wire 16 × 1 multiplexers. These multiplexers can be used in any combination with the independent topology.

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

Caution Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document at `ni.com/manuals` for important safety and compliance 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. Typical specifications are not warranted.

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

Input Characteristics

Maximum switching voltage

Channel-to-channel .....60 VDC, 30 VAC_{rms}, CAT I

Channel-to-ground .....60 VDC, 30 VAC_{rms}, CAT I

Maximum current .....0.4 A
(per terminal or internal path)

Maximum switching power .....10 W
(per channel, resistive)

Typical DC path resistance
(channel-to-common)

Initial .....<2 Ω

End-of-life..... ≥3 Ω

Path resistance is a combination of relay contact resistance and trace resistance. Contact resistance typically remains low for the life of a relay. At the end of relay life, the contact resistance may rapidly rise above 3 Ω.

Typical thermal EMF .....<50 µV
(1-wire configuration, channel-to-common)

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RF Performance Characteristics

Typical bandwidth
(50 Ω system, 1-wire configuration referenced to 1WREF)

16 × 1 .....>15 MHz

128 × 1 .....>3 MHz

Typical channel-to-channel isolation
(50 Ω system, 1-wire configuration referenced to 1WREF)

200 kHz.....>60 dB

1 MHz .....>40 dB

Dynamic Characteristics

Simultaneous drive limit .....64 relays

Relay operate/release time.....555 µS

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

Typical relay life (no load)

Mechanical.....1×10^9 cycles

Electrical (resistive, <10 pF load)

10 V, 100 mA .....1×10^8 cycles

25 V, 400 mA .....5×10^6 cycles

60 V, 160 mA .....1×10^6 cycles

To estimate reed relay lifetime, refer to the *Reed Relay Life* section of this document.

Note Reed relays are highly susceptible to damage caused by switching capacitive and inductive loads. Capacitive loads can cause high inrush currents while inductive loads can cause high flyback voltages. The addition of appropriate resistive protection can greatly improve contact lifetime. For more information about adding protection circuitry to a capacitive load, visit `ni.com/info` and enter the Info Code `relaylifetime`. For information about inductive loads, enter the Info Code `relayflyback`.

Note The relays used in the NI PXI-2530 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, Front panel

Minimum pulse width.....150 ns

Front panel input voltage

Minimum ..... –0.5 V

V_{IL} maximum..... +0.7 V

V_{IH} minimum ..... +2.0 V

Nominal ..... +3.3 V

Maximum..... +5.5 V

Note The NI PXI-2530 can recognize trigger pulse widths that are less than 150 ns by disabling digital filtering. For information about disabling digital filtering, refer to the *NI Switches Help*.

Output trigger

Destinations ..... PXI trigger lines 0–7, Front panel

Pulse width ..... Programmable (1 µs to 62 µs)

Front panel nominal voltage..... +3.3 V TTL, 8 mA

Physical Characteristics

Relay types..... Reed

Note NI advises against installing reed relay modules directly adjacent to an embedded controller with a magnetic hard drive because of the sensitivity of reed relays and the possibility of interference.

Front panel connector ..... 176-pin docking station plug

PXI power requirement..... 1.2 W at 3.3 V
4.2 W at 5 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..... 400 g (14 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.

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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.)

Refer to the following figure for the hardware diagram of the NI PXI-2530.

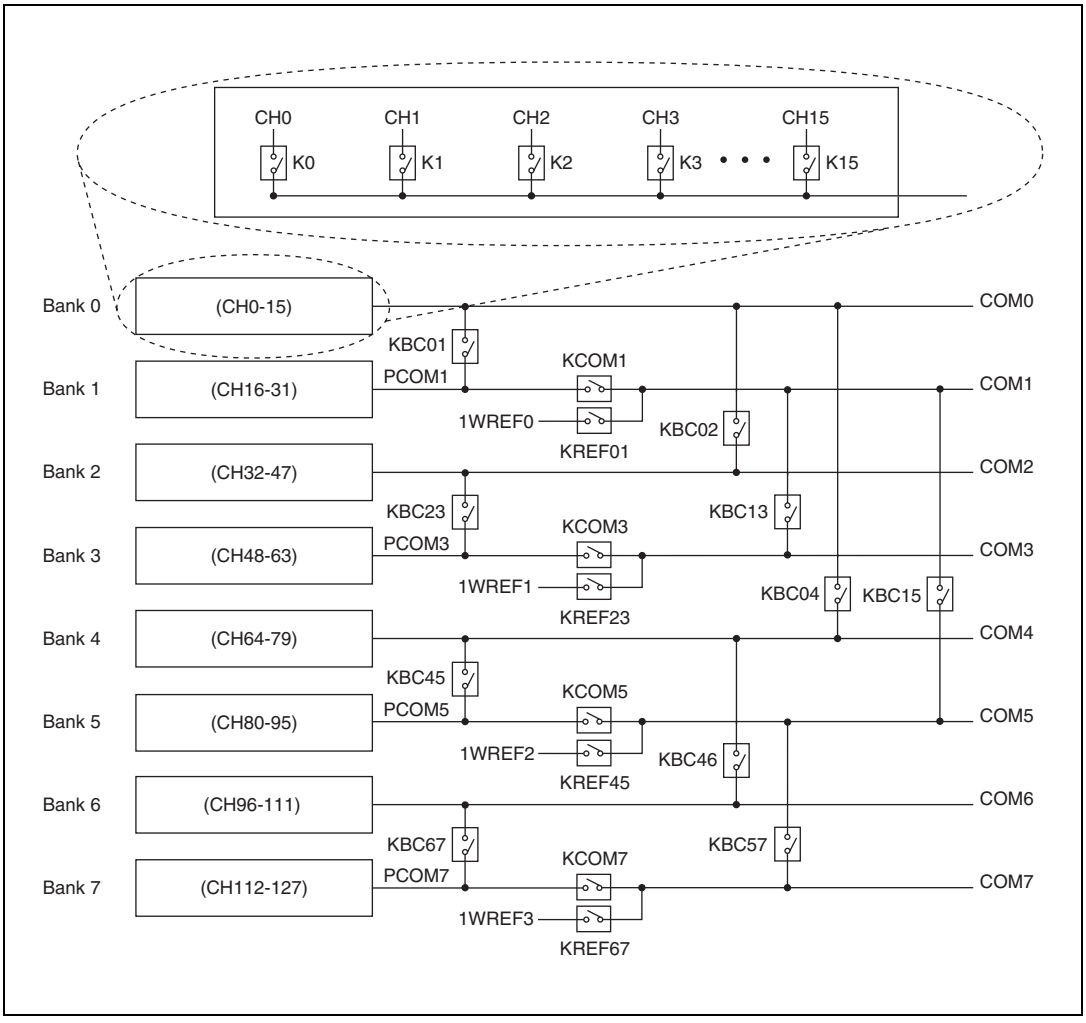


Figure 1. NI PXI-2530 Hardware Diagram (All Relays Open)

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The following figure shows the NI PXI-2530 connector pinout.

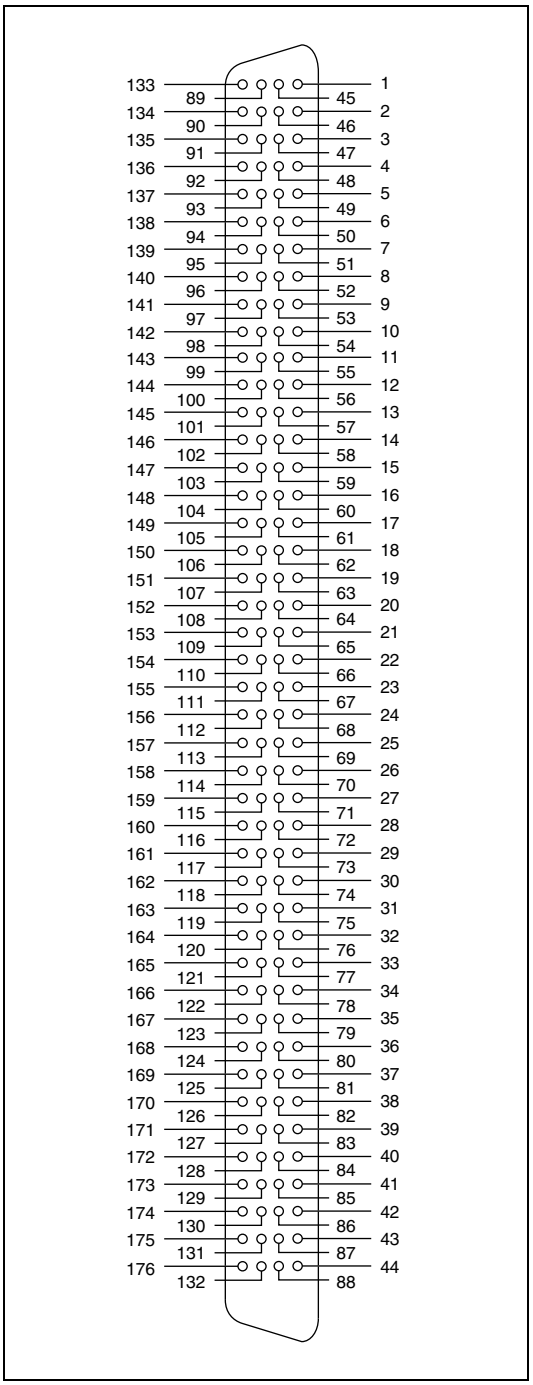


Figure 2. NI PXI-2530 Connector Pinout

Note For topology-specific connection information, refer to your device in the *NI Switches Help* and the installation instructions for any associated cables or terminal blocks.

Accessories

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

Table 1. Accessories Available for the NI PXI-2530

Accessory	Part Number
NI TB-2630 terminal block (multiplexer)	778733-01
NI TB-2631 terminal block (4 × 32, 1-wire matrix, 4 × 16, 2-wire matrix)	778734-01
NI TB-2632 terminal block (8 × 16, 1-wire matrix)	778735-01
176-pin cable for the NI PXI-2530	780889-01

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 PXI-2530

Accessory	Manufacturer	Manufacturer Part Number
Mating front panel connector, right-angle*	Molex	52755-1769
* PCB mount, additional cover or enclosure required. See previous safety caution.		

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Reed Relay Life

Figure 3 shows the reed relay lifetime nomograph. The purpose of this graph is to estimate reed relay lifetime.

Note This nomograph is not meant to be an exact or guaranteed specification and should only be used as a guideline to estimate lifetime. Actual reed relay lifetimes may vary depending on application.

Complete the following steps to use this nomograph:

1. Determine the peak voltage experienced across the relay while switching and mark this value on the *Volts* line.
2. Determine the sum of the DUT, cable, and instrumentation capacitances and mark this value on the *Load Capacitance* line.
3. Draw a straight line between both values.

The intersection points of this line and the *No Protection* and *50 Ω Protection* axes are the corresponding estimated relay lifetimes in cycles. For more information on adding protection resistance, visit `ni.com/info` and enter the Info Code `relaylifetime`.

Refer to the following example and Figure 3 for an example application.

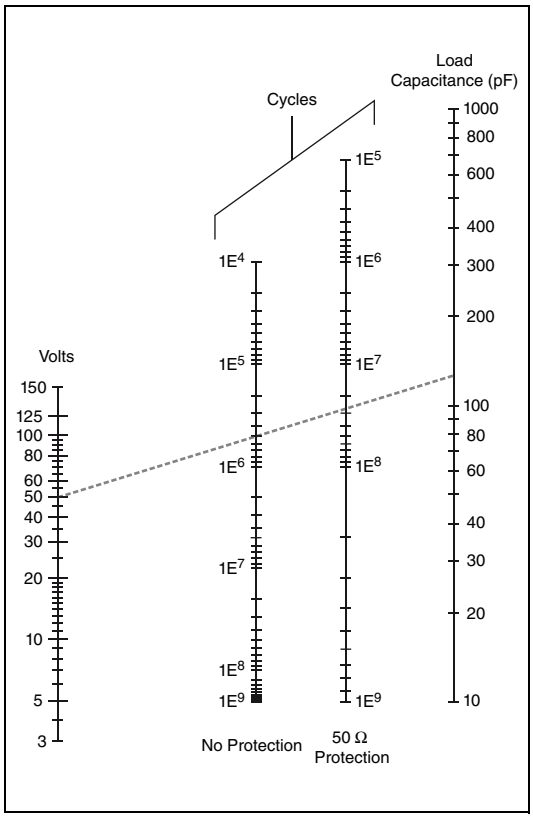


Figure 3. Reed Relay Lifetime Nomograph

Example

The reed relay module is connected to a DMM via 1 meter of cable. The DMM and cable capacitances are 100 pF and 30 pF respectively. The maximum voltage switched across the relay is 50 volts. Determine the estimated number of relay cycles with and without protection resistance.

Solution

The total load capacitance is the sum of the cable and DMM capacitance, which is 130 pF. Draw a line between the 50V point on the *Volts* axis and 130 pF on the *Load Capacitance* axis.

The line drawn intersects the Cycles axes at approximately 500,000 on the *No Protection* axis and about 25,000,000 on the *50 Ω Protection* axis (refer to Figure 3). This series resistance should be placed as close as possible to the relay for maximum effect.

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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 For EMC declarations and certifications, 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 *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 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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