

SPECIFICATIONS

NI PXI-2535

544-Crosspoint FET Matrix

This document lists specifications for the NI PXI-2535 544-crosspoint, FET matrix (NI 2535). All specifications are subject to change without notice. Visit ni.com/manuals for the most current specifications.

Topology

1-wire 4 × 136 matrix



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 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.

Related Information

[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 The protection provided by the NI 2535 can be impaired if it is used in a manner not described in this document.

Input Characteristics

| | |
|--|--|
| Maximum switching voltage (channel-to-ground) | ±12 VDC, 8 VAC |
| Maximum switching power (per channel, resistive) | 1.2 W |
| Maximum switching current | 100 mA |
| DC isolation resistance (between open terminals) | >1 GΩ, typical at 23 °C >334 MΩ, typical at 55 °C |
| Current leakage between column and ground (closed path) | 10 nA, typical (12 VDC applied at 25 °C) |
| Offset voltage | 10 μV, typical |
| Overvoltage protection | |
| Powered on | ±36 VDC |
| Powered off | ±40 VDC |
| Total path resistance, row-to-column | |
| Typical | 9 Ω |
| Maximum | 14 Ω |

RF Performance Characteristics

Test setups for RF characteristics used two 1-meter cables and two NI TBX-68 connector blocks.

| | |
|---|------------------|
| Single crosspoint bandwidth (50 Ω system, one row to one column) | >1 MHz, typical |
| Crosstalk (50 Ω system) | |
| 10 kHz | <-53 dB, typical |
| 100 kHz | <-33 dB, typical |
| 1 MHz | <-30 dB, typical |

Dynamic Characteristics

FET operate time¹

| | |
|---------|------------------|
| Typical | 12 μs |
| Maximum | 16 μs |



Note Certain applications may require additional time for proper settling.

| | |
|--------------------------|--|
| Maximum scan rate | 50,000 crosspoints/s |
| Simultaneous drive limit | 544 switches |
| Expected relay life | Unlimited, when operated within specified limits |

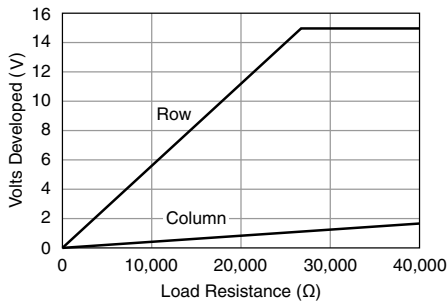


Caution During chassis power up, the row and column connections may produce a charge injection. Refer to the following figures for information about how this might affect loads that are connected to the front panel I/O connectors and referenced to earth ground.

Chassis power-up charge injection

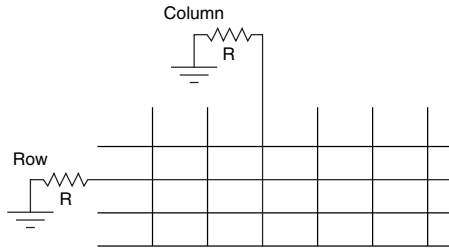
| | |
|--------|---|
| Row | 9.7 μC ($<500 \mu\text{A}$ for a 20 ms time interval, typical) |
| Column | 0.7 μC ($<40 \mu\text{A}$ for a 20 ms time interval, typical) |

Figure 1. Impact of Charge Injection at Power Up: Typical Voltage Developed vs. Resistive Load (Using Test Setup in Figure 2)



¹ Operate time is the time from trigger received by hardware to switch output activation.

Figure 2. Test Setup for Row and Column Connections



Related Information

[Refer to the NI Switches Help for information about including additional settling time.](#)

Trigger Characteristics

Input trigger

| | |
|---------------------|--------------------------|
| Sources | PXI trigger lines 0 to 7 |
| Minimum pulse width | 70 ns |

Output trigger

| | |
|--------------|--|
| Destinations | PXI trigger lines 0 to 7 |
| Pulse width | Programmable (1 μ s to 62 μ s) |

Physical Characteristics

| | |
|--------------------------------------|--|
| Relay type | FET switch |
| I/O connector | Four 68-pin receptacle VHDCI |
| Power requirement | 1.7 W at 3.3 V, typical, 1.3 W at 12 V, typical |
| Dimensions (L \times W \times H) | 3U, one slot, PXI/cPCI module, 21.6 \times 2.0 \times 13.0 cm (8.5 \times 0.8 \times 5.1 in.) |
| Weight | 159 g (5.6 oz) |

Environment

| | |
|-----------------------|-------------------------------------|
| Operating temperature | 0 $^{\circ}$ C to 55 $^{\circ}$ C |
| Storage temperature | -40 $^{\circ}$ C to 70 $^{\circ}$ 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 Hz to 500 Hz, 0.3 g _{rms} |
| Nonoperating | 5 Hz 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 3. NI 2535 Hardware Diagram

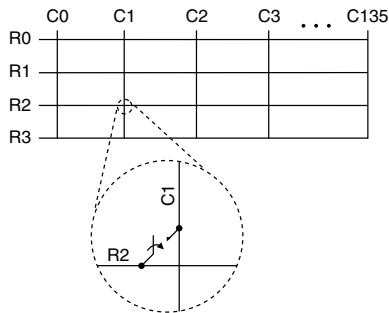
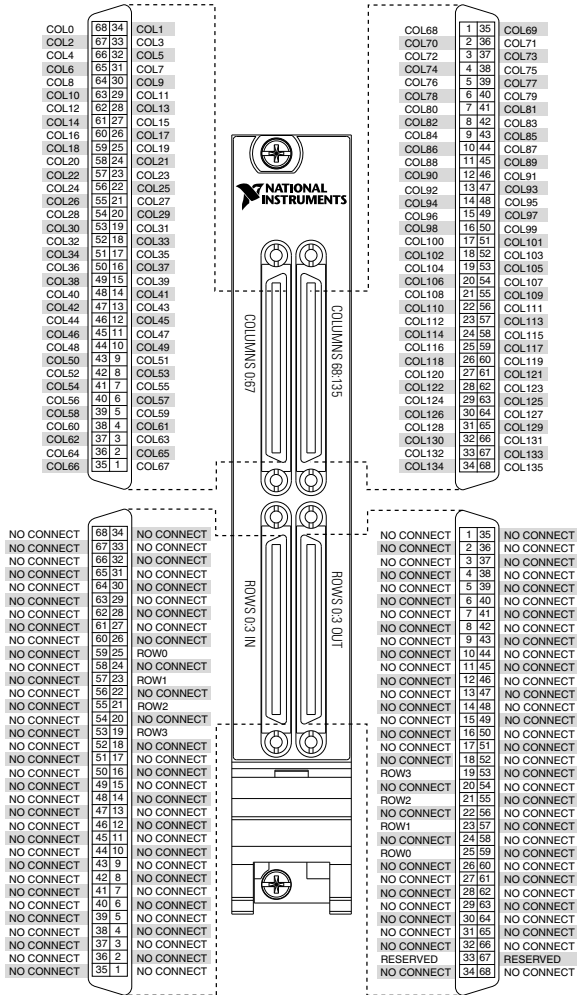


Figure 4. NI 2535 Connector Pinout



Related Information

For topology-specific connection information, refer to your device in the NI Switches Help.

Accessories

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



Caution NI products typically must be operated with shielded cables and accessories to ensure compliance with Electromagnetic Compatibility (EMC)

requirements. To determine if shielded cables or accessories are required for this product, refer to the EMC specifications in the *Electromagnetic Compatibility* section of this document. If shielded cables or accessories are required for EMC compliance, do not use unshielded cables or accessories unless they are installed in a shielded enclosure with properly designed and shielded input/output ports, and are connected to the NI product using a shielded cable. If unshielded cables or accessories are not properly installed and shielded, the EMC specifications for the product are no longer guaranteed.

Table 1. NI Accessories for the NI 2535

| Accessory | Part Number |
|--|-----------------------|
| CB-68LP/R unshielded, 68-pin I/O connector block | 777145-01, 777145-02 |
| NI TBX-68 unshielded, I/O connector block with DIN-rail mounting | 777141-01 |
| SH68-68, 68 pin VHDCI to 68 pin SCSI, twisted pair cable with basic shielding for use with connector blocks (1 m, 2 m) | 191945-01, 191945-02 |
| SHC68-C68-S, 68 pin VHDCI to 68 pin VHDCI, shielded cable (0.5 m, 2 m) | 186380-0R5, 186380-02 |

Compliance and Certifications

Safety

This product is designed to meet the requirements of the following electrical equipment safety standards 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 sensitive electrical equipment for measurement, control, and laboratory use:

- EN 61326-2-1 (IEC 61326-2-1): 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

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the 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 NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）



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