

# Specifications for the NI PXI-2593

## 500 MHz Dual 8x1 50 $\Omega$ Multiplexer

This document lists specifications for the NI PXI-2593 multiplexer module. All specifications are subject to change without notice. Visit [ni.com/manuals](http://ni.com/manuals) for the most current specifications.

Configurations..... Dual 8x1 multiplexers  
Single 16x1 multiplexer

## RF Performance Characteristics

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Characteristic impedance ( $Z_0$ )..... 50  $\Omega$  nominal

### Insertion loss

#### 8x1

DC to 200 MHz ..... <0.9 dB

200 MHz to 500 MHz..... <1.6 dB

#### 16x1

DC to 200 MHz ..... <1.2 dB

200 MHz to 500 MHz..... <1.9 dB

### Typical bandwidth (3 dB)

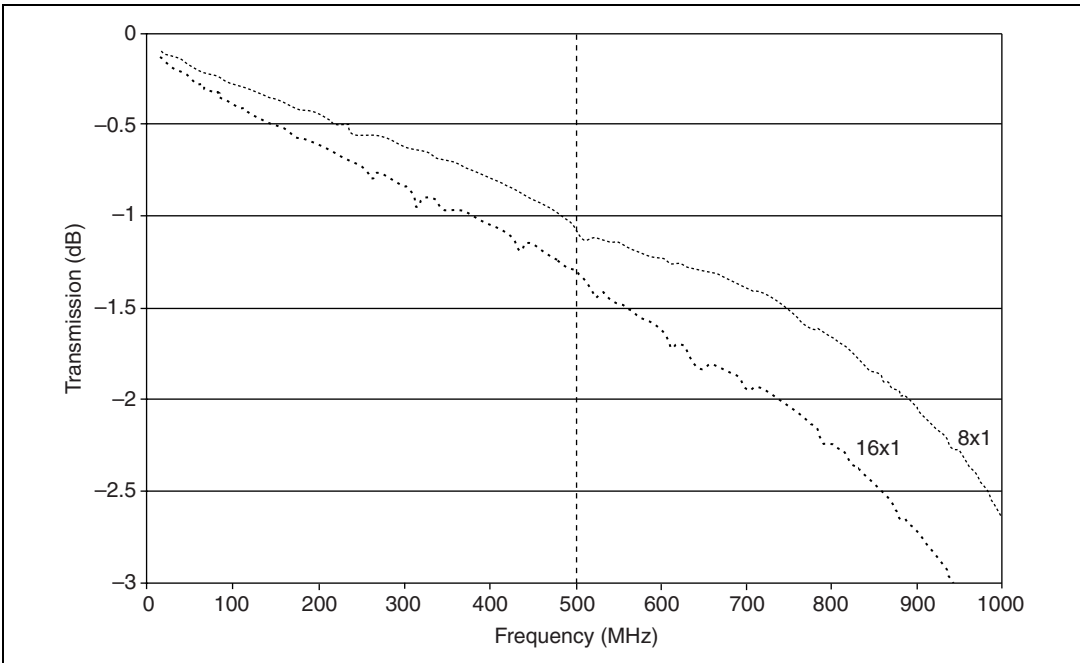
8x1 ..... >900 MHz

16x1 ..... >750 MHz

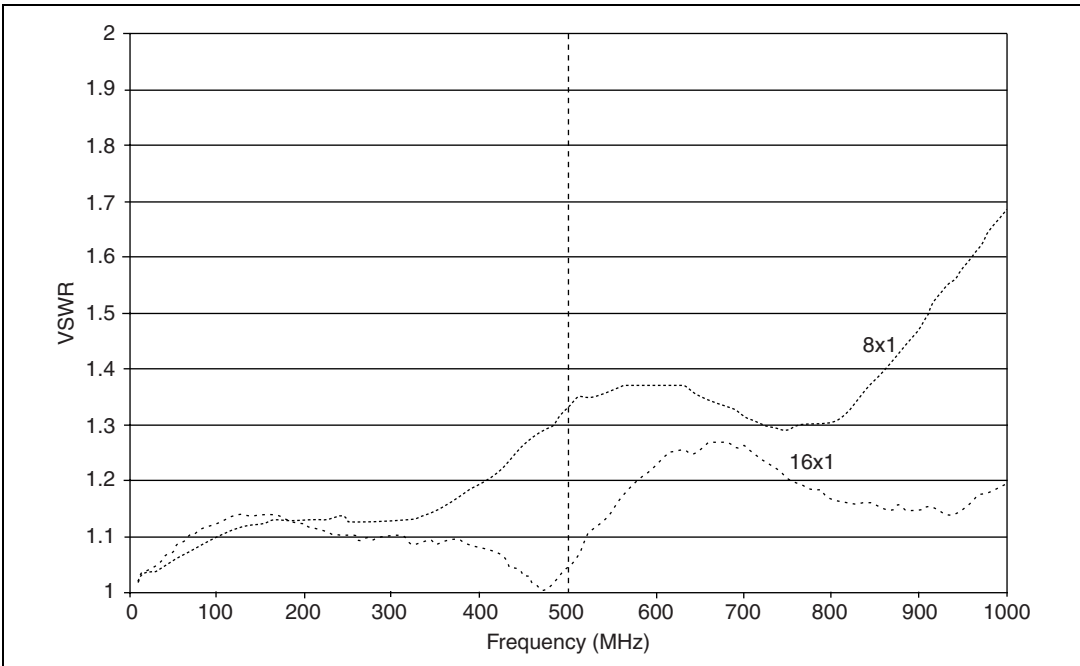
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**Figure 1.** Typical Insertion Loss



**Figure 2.** Typical VSWR

VSWR

8x1

DC to 200 MHz ..... <1.4

200 MHz to 500 MHz..... <1.8

16x1

DC to 200 MHz ..... <1.4

200 MHz to 500 MHz..... <1.8

Channel-to-channel skew within each 8-channel bank is less than 100 ps. Only channels from standard topologies are listed in Table 1.

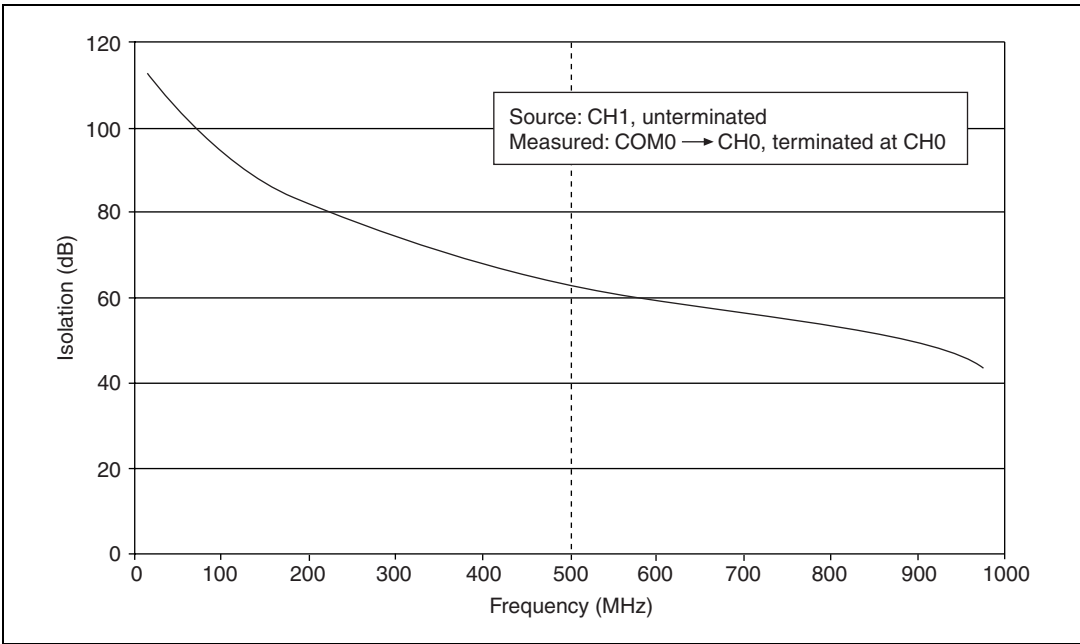
**Table 1.** Propagation Delay (ns)

| COM | CH0-CH7      | CH8-CH15     |
|-----|--------------|--------------|
| 0   | 1.90 to 2.00 | 2.55 to 2.65 |
| 1   | —            | 1.90 to 2.00 |

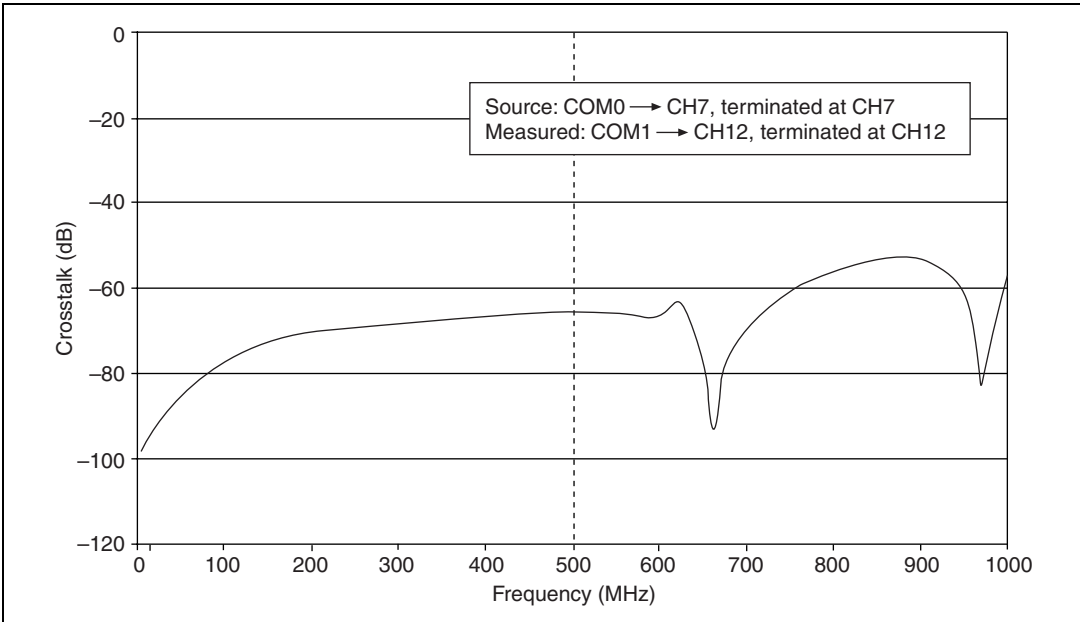
Typical rise time (10% to 90%)

8x1 ..... 385 ps

16x1 ..... 460 ps



**Figure 3.** Typical Channel-to-Channel Isolation



**Figure 4.** Typical Bank-to-Bank Crosstalk

# Input Characteristics

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All input characteristics are DC,  $AC_{rms}$ , or a combination unless otherwise specified.

Maximum switching voltage..... 150 V, CAT I  
(channel-to-channel and channel-to-ground)



**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 ( $\leq 42.4 V_{pk}/60 VDC$ ) cannot be connected to any other relay terminal.

Maximum switching current ..... 0.5 A  
(per channel)

Maximum carry current ..... 1 A  
(per channel)

Simultaneous channels  
at maximum current ..... Up to 2

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



**Note** National Instruments recommends against switching active RF signals. As a relay actuates, the channel is momentarily unterminated. Some RF sources can be damaged by reflections if their outputs are not properly terminated. Consult your RF source documentation for more information.

Maximum RF carry power ..... 10 W up to 500 MHz  
(per channel)

DC path resistance  
Initial .....  $<1.0 \Omega$   
End of life .....  $\geq 2.0 \Omega$

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 rises rapidly above  $1.0 \Omega$ .

## Dynamic Characteristics

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|                             |                   |
|-----------------------------|-------------------|
| Maximum scan rate .....     | 100 channels/s    |
| Expected relay life         |                   |
| Mechanical .....            | 50,000,000 cycles |
| Electrical.....             | 300,000 cycles    |
| (30 V, 0.3 A, DC resistive) |                   |

## Trigger Characteristics

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|                                  |                                       |
|----------------------------------|---------------------------------------|
| Input trigger                    |                                       |
| Sources .....                    | PXI trigger lines 0–7,<br>Front panel |
| Minimum pulse width.....         | 150 ns                                |
| Front panel input voltage        |                                       |
| Minimum .....                    | –0.5 V                                |
| V <sub>L</sub> maximum .....     | +0.7 V                                |
| V <sub>H</sub> minimum .....     | +2.0 V                                |
| Nominal .....                    | +3.3 V                                |
| Maximum .....                    | +5.5 V                                |
| Output trigger                   |                                       |
| Destinations .....               | PXI trigger lines 0–7,<br>Front panel |
| Pulse width .....                | Programmable (1 µs to 62 µs)          |
| Front panel nominal voltage..... | 3.3 V TTL, 8 mA                       |

## Physical Characteristics

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|                              |                             |
|------------------------------|-----------------------------|
| Relay type .....             | Electromechanical, latching |
| Relay contact material ..... | Silver palladium and gold   |
| I/O connectors.....          | 18 MCX jacks                |
| Trigger connectors .....     | 2 SMB jacks                 |
| SCXI power requirement.....  | 6.5 W                       |

Dimensions (W × H × D)..... 2.0 × 10.0 × 16.3 cm  
 (0.8 × 3.9 × 6.4 in.)

Weight..... 330 g  
 (12 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

## Accessories

Visit [ni.com](http://ni.com) for more information about the following accessories.

**Table 2.** RG-316 Cabling Available for the NI PXI-2593

| Connectors                             | Length | Part Number |
|--|--------|-------------|
| MCX-MCX                                | 0.3 m  | 188374-0R3  |
|  | 1.0 m  | 188374-01   |
| MCX-BNC                                | 0.3 m  | 188375-0R3  |
|  | 1.0 m  | 188375-01   |
| MCX-SMB                                | 0.3 m  | 188376-0R3  |
|  | 1.0 m  | 188376-01   |
| MCX-SMA                                | 0.3 m  | 188377-0R3  |
|  | 1.0 m  | 188377-01   |
| 50 Ω MCX terminator<br>(1 GHz maximum) | —      | 761930-01   |

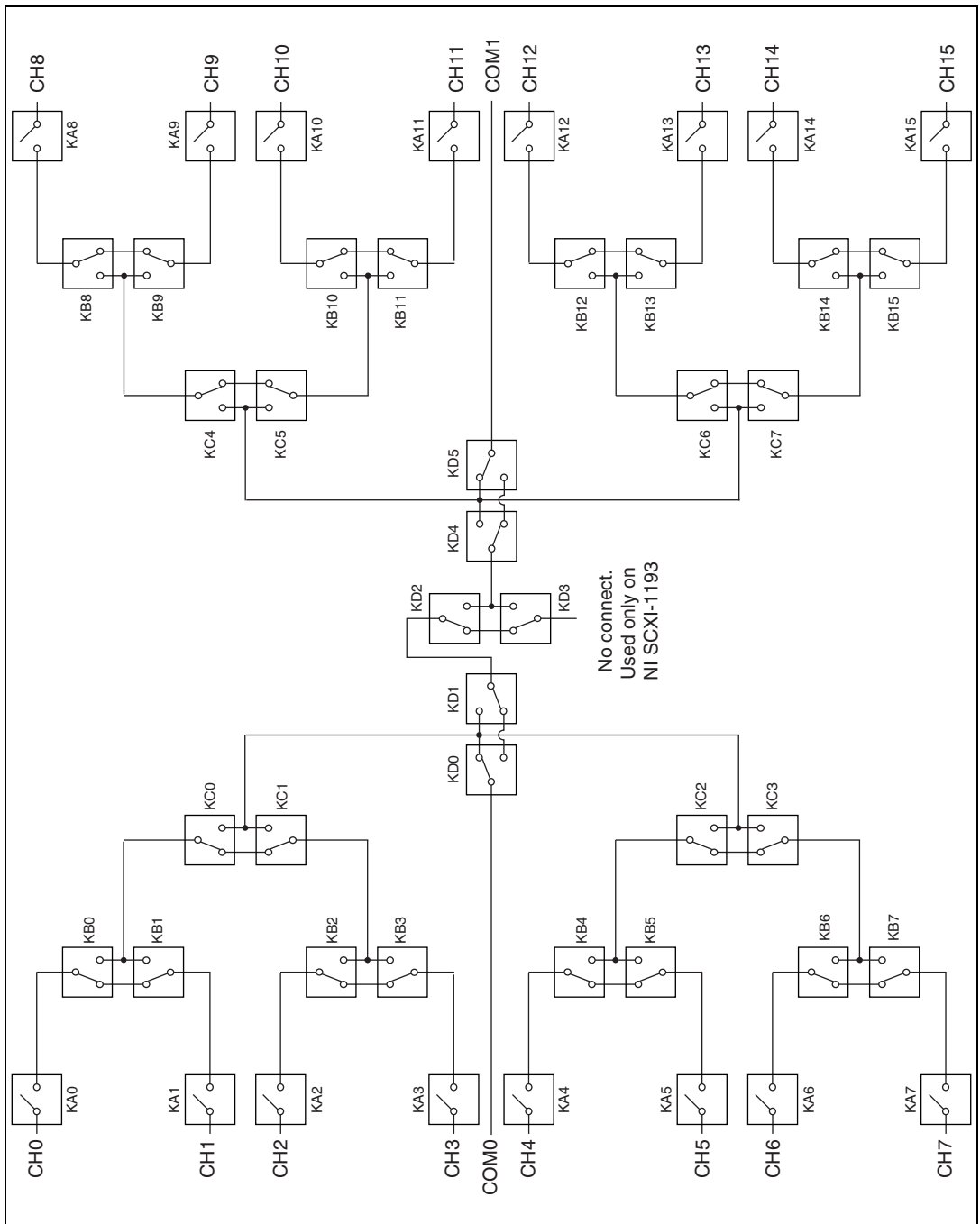


Figure 5. NI PXI-2593 Power-On State



# Compliance and Certifications

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## 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](http://ni.com).

## Electromagnetic Compatibility

|                 |  |
|-----------------|--|
| Emissions ..... | EN 55011 Class A at 10 m<br>FCC Part 15A above 1 GHz |
| Immunity .....  | EN 61326:1997 + A2:2001,<br>Table 1                  |
| EMC/EMI .....   | CE, C-Tick, and FCC Part 15<br>(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<br>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/](http://ni.com/hardref.nsf/).