

# NI SCXI™-1193 Specifications

## 500 MHz Quad 8x1 50 Ω Multiplexer

This document lists specifications for the NI SCXI-1193 multiplexer module. All specifications are subject to change without notice. Visit [ni.com/manuals](http://ni.com/manuals) for the most current specifications.

Configurations.....	Quad 8x1 multiplexers
	Dual 16x1 multiplexers
	Single 32x1 multiplexer
	Quad 4x1 terminated multiplexers
	Dual 8x1 terminated multiplexers
	Single 16x1 terminated multiplexer

## RF Performance Characteristics

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Characteristic impedance ( $Z_0$ )..... 50 Ω 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

#### 32x1

DC to 200 MHz ..... <1.4 dB

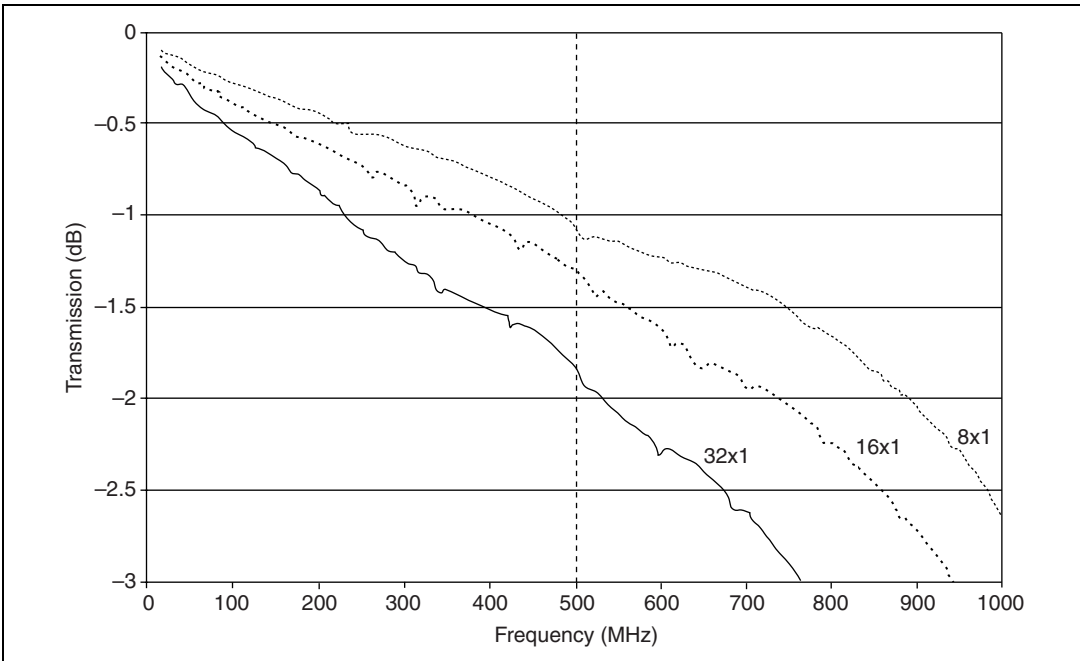
200 MHz to 500 MHz..... <2.4 dB

### Typical bandwidth (3 dB)

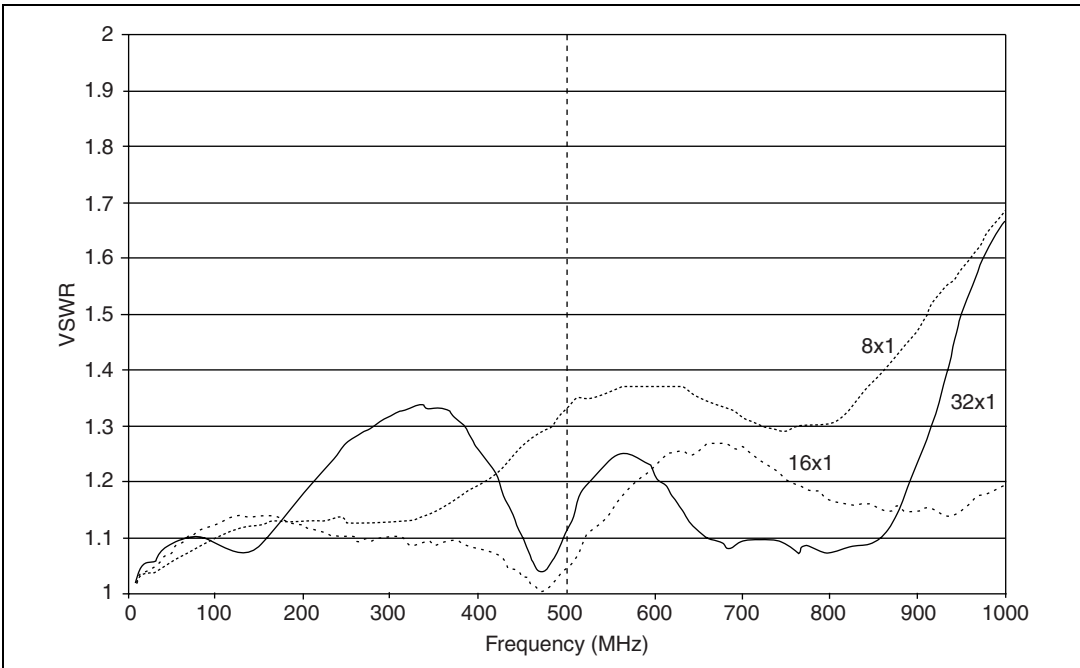
8x1 ..... >900 MHz

16x1 ..... >750 MHz

32x1 ..... >600 MHz



**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

32x1

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)

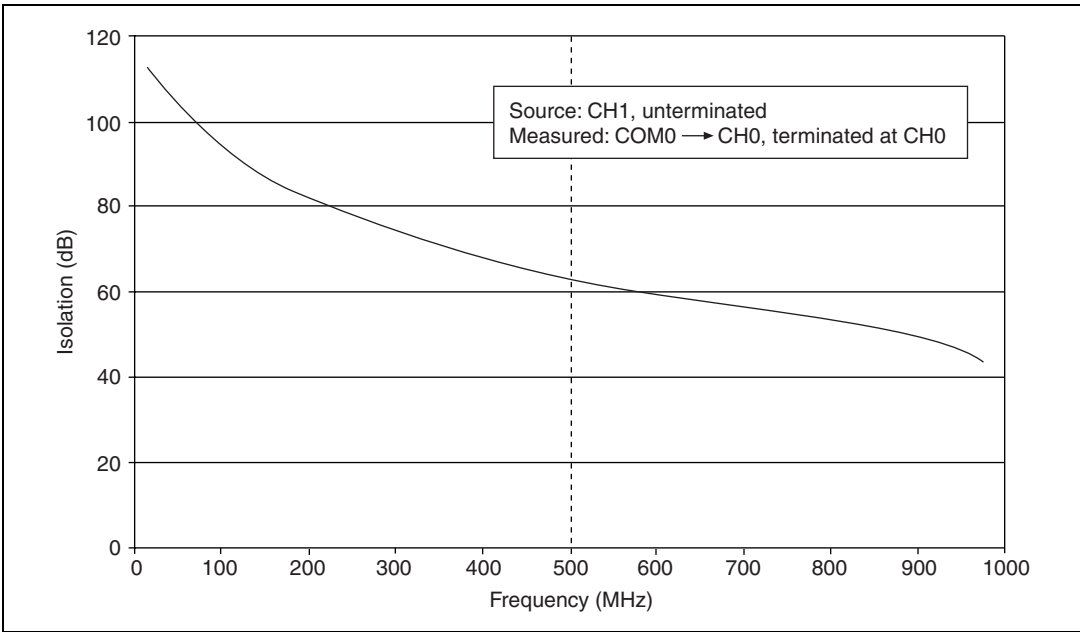
COM	CH0-CH7	CH8-CH15	CH16-CH23	CH24-CH31
0	1.90 to 2.00	2.55 to 2.65	3.75 to 3.85	3.55 to 3.65
1	—	1.90 to 2.00	—	—
2	—	—	1.90 to 2.00	2.55 to 2.65
3	—	—	—	1.90 to 2.00

Typical rise time (10% to 90%)

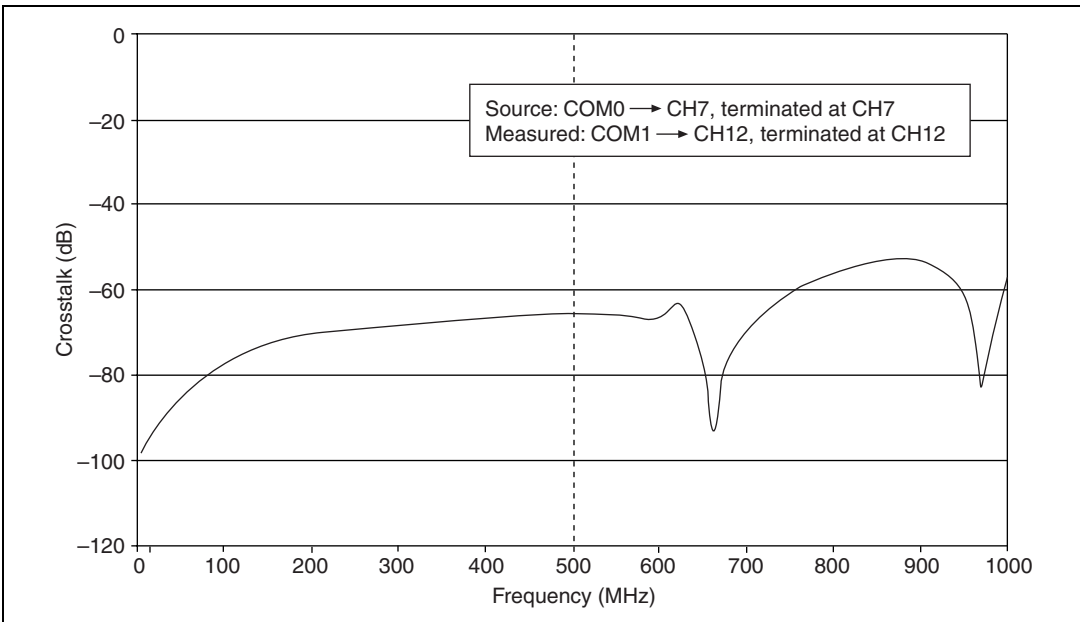
8x1 ..... 385 ps

16x1 ..... 460 ps

32x1 ..... 550 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 (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 ( $\leq 42.4 V_{pk}/60 VDC$ ) 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 4

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.

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  $1.0 \Omega$ .

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

## Module Load Derating

Insertion loss results in power dissipation and heat buildup within the module. Use the graphs in Figure 5 to determine the maximum power dissipated in each active channel.

Total RF power dissipation limit .....7 W  
(valid over the entire ambient operating temperature range)

### Example 1: Single 32x1 Multiplexer

1 channel carrying a 10 W signal at 500 MHz

From Figure 5C, the dissipated RF power for the signal is 4.2 W.

### Example 2: Quad 8x1 Multiplexer

2 channels carrying 5 W signals at 100 MHz, and

2 channels carrying 10 W signals at 150 MHz

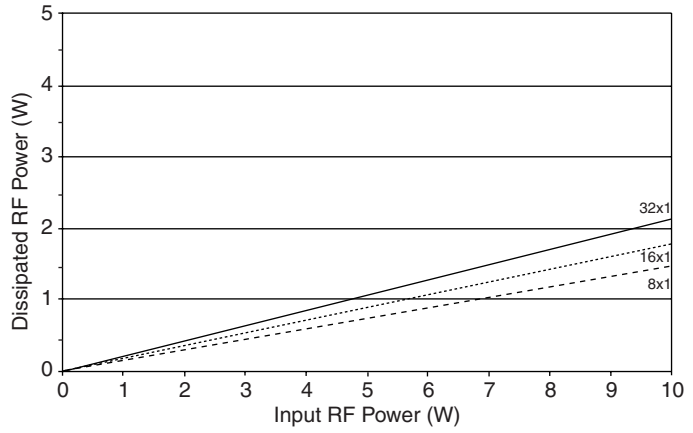
From Figure 5A, the dissipated RF power for each 5 W, 100 MHz signal is 0.75 W.

From Figure 5B, the dissipated RF power for each 10 W, 150 MHz signal is 1.9 W.

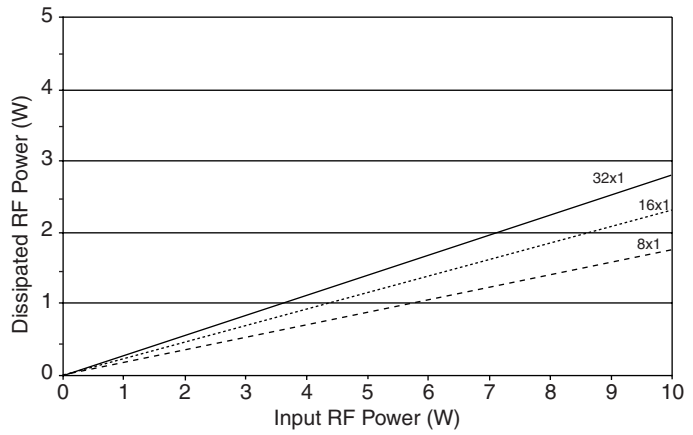
The total RF power dissipation for all four channels is:

$$2 \times (0.75 \text{ W}) + 2 \times (1.9 \text{ W}) = 5.3 \text{ W}$$

A.  $f \leq 100$  MHz



B.  $100 \text{ MHz} < f \leq 200 \text{ MHz}$



C.  $200 \text{ MHz} < f \leq 500 \text{ MHz}$

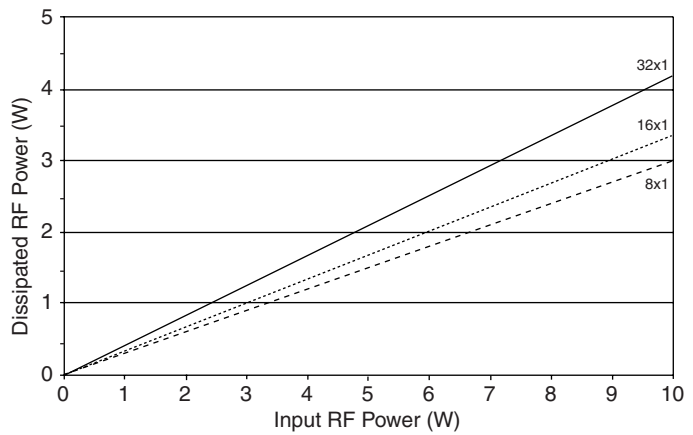


Figure 5. Maximum RF Power Dissipation per Channel

# 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 .....	SCXI trigger lines 0–7, Front panel, Rear connector
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 .....	SCXI trigger lines 0–7, Front panel, Rear connector
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.....	36 MCX jacks
Trigger connectors .....	2 SMB jacks

### SCXI DC power requirement

+5 VDC.....	50 mA
+18.5 VDC to +25 VDC.....	170 mA
-18.5 VDC to -25 VDC .....	170 mA

Dimensions (W × H × D)..... 3.0 × 17.3 × 19.8 cm  
(1.2 × 6.8 × 7.8 in.)

Weight..... 960 g  
(2 lb 2 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](http://ni.com) for more information about the following accessories.

**Table 2.** RG-316 Cabling Available for the NI SCXI-1193

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 (1 GHz maximum)	—	778831-01

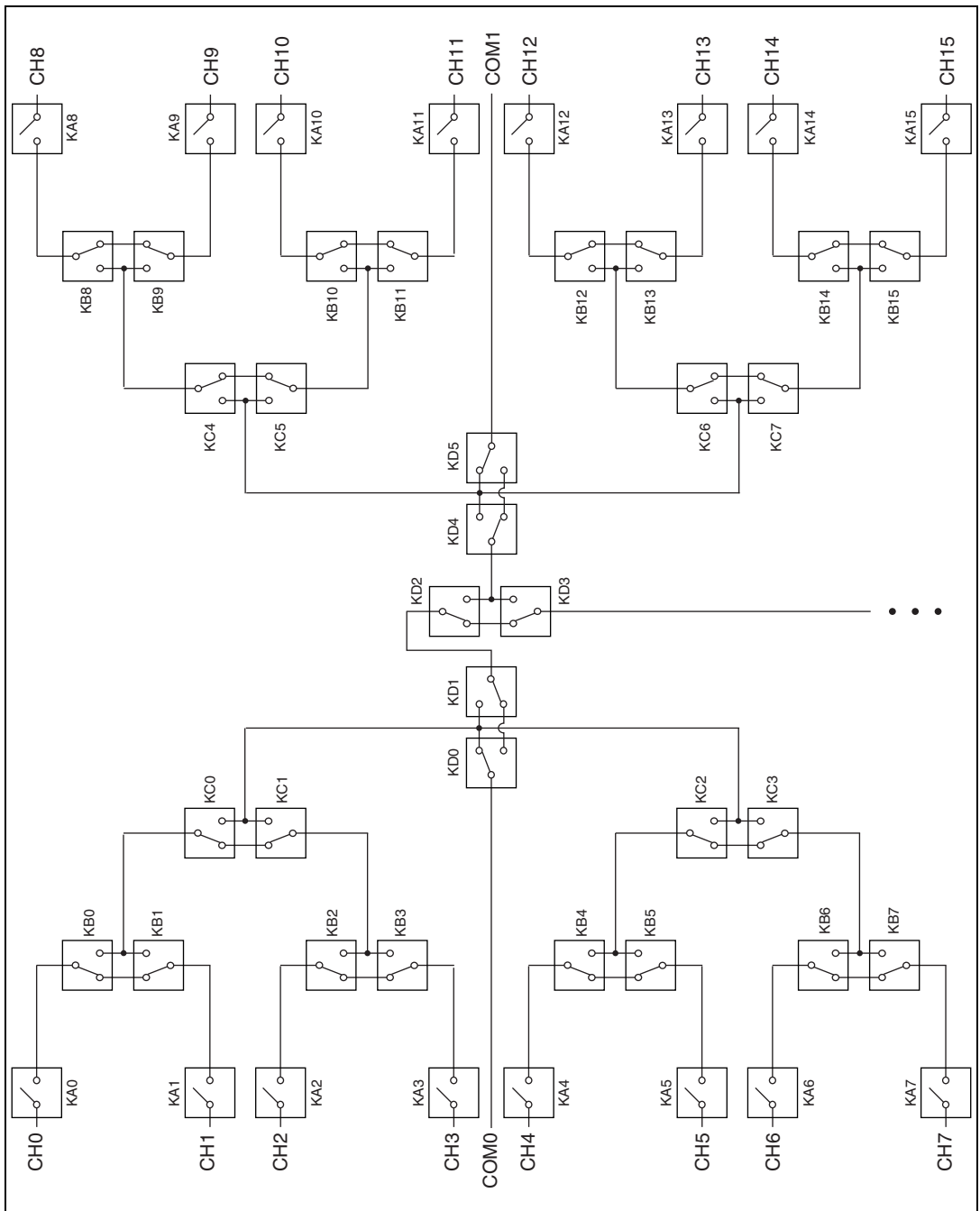


Figure 6. NI SCXI-1193 Power-On State

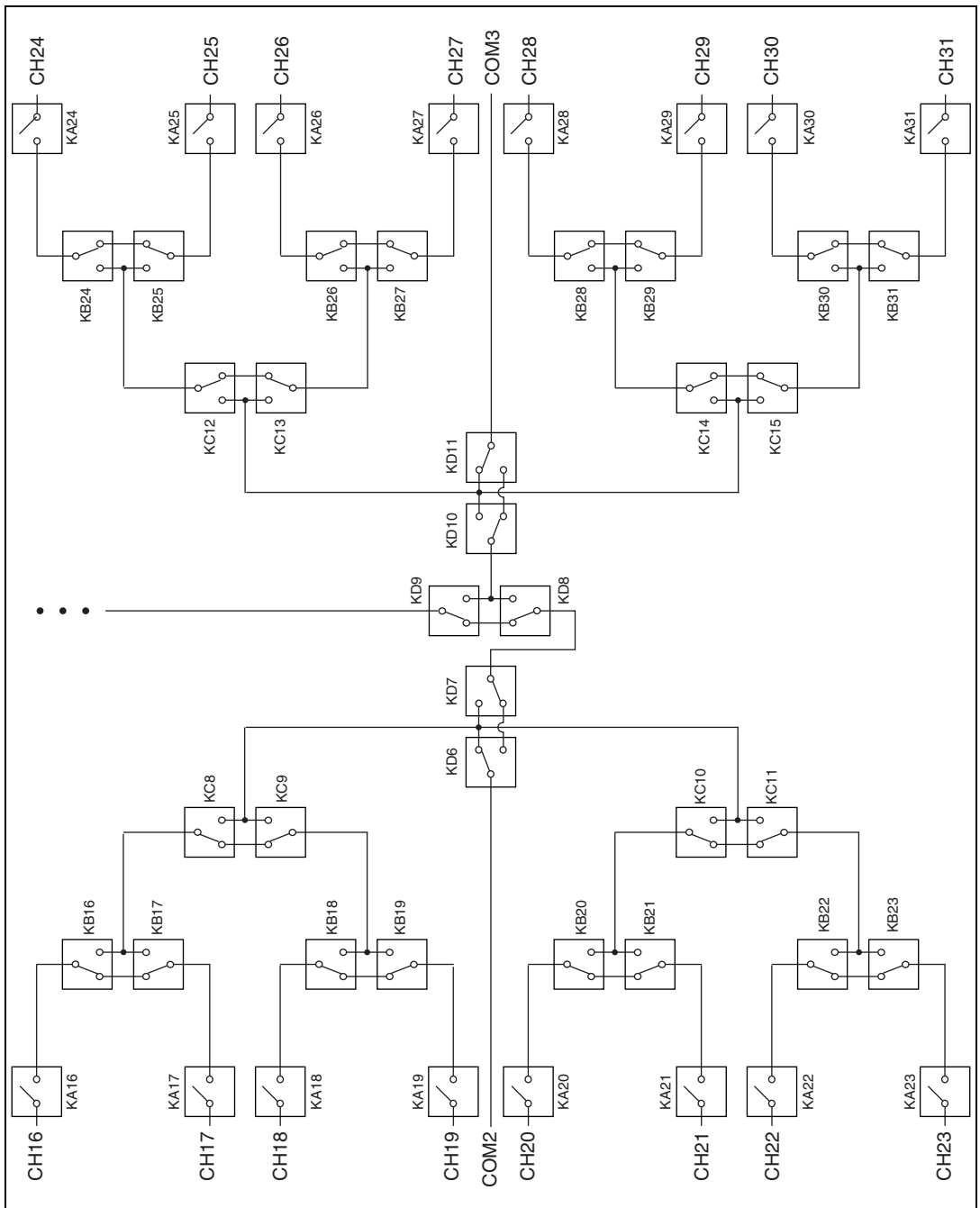


Figure 6. NI SCXI-1193 Power-On State (continued)

# 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 FCC Part 15A above 1 GHz
Immunity .....	EN 61326:1997 + A2:2001, Table 1
EMC/EMI .....	CE, 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](http://ni.com/hardref.nsf), search by model number or product line, and click the appropriate link in the Certification column.