SWB-2816 Specifications

2025-03-13

Contents

SWB-2815A/B Specifications

These specifications describe the SWB-2815A/B matrix relay card.

Topology	1-wire 4 × 86 matrix

About These Specifications

Specifications characterize the warranted performance of the instrument under the stated operating conditions. Data in this document are ***Specifications*** unless otherwise noted.

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.

Clean devices and terminal blocks by brushing off light dust with a soft, nonmetallic brush. Remove other contaminants with a soft, lint-free, dampened cloth. Do not use detergent or chemical solvents. The unit must be completely dry and free from contaminants before returning to service.

Cautions

Caution This module is rated for Measurement Category I and intended to carry signal voltages no greater than 70 V_{rms}/100 V_{pk}/100 VDC. This module can withstand up to 500 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 VAC or 230 VAC. Refer to the ***Read Me First: Safety and Electromagnetic***

Compatibility document for more information on measurement categories.

Caution In systems that include cards with different maximum voltages, the lowest safety voltage rating as specified on the front of the card applies for the entire system. The system can include all cards in the carrier, and all cards in other carriers that are connected with the NI 2806 expansion bridge.

Caution When hazardous voltages (>42.4 Vpk/60 V DC) are present on any channel, safety low-voltage (≤42.4 Vpk/60 V DC) cannot be connected to any other channel.

Caution Always disconnect or turn off power sources before powering on a chassis.

Input Characteristics

Maximum switching voltage	
Row/column-to-ground	100 V, CAT I
Row-to-column	100 VDC/70 VAC
Maximum switching current	0.25 A (per channel)
Maximum carry current	0.3 A (per channel)
Maximum switching power	
Per channel	3 W

Per crosspoint	3 W
DC path resistance	
Initial	<1 Ω
End-of-life	≥2 Ω
Open channel	>1 × 10^9 Ω

Note DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rises rapidly above the specified value. Load ratings apply to relays used within the specification before the end of relay life.

Thermal EMF, typical	<50 µV
Bandwidth, typical (-3 dB, 50 Ω termination, column-row-column)	≥8 MHz
Crosstalk, typical (50 Ω termination) channel-to-channel	
10 kHz	<-60 dB
100 kHz	<-50 dB
1 MHz	<-30 dB
Isolation, typical (50 Ω termination) open channel	

10 kHz	>65 dB
100 kHz	>50 dB
1 MHz	>30 dB
Analog bus line connections	AB <0...7> (8 Lines)

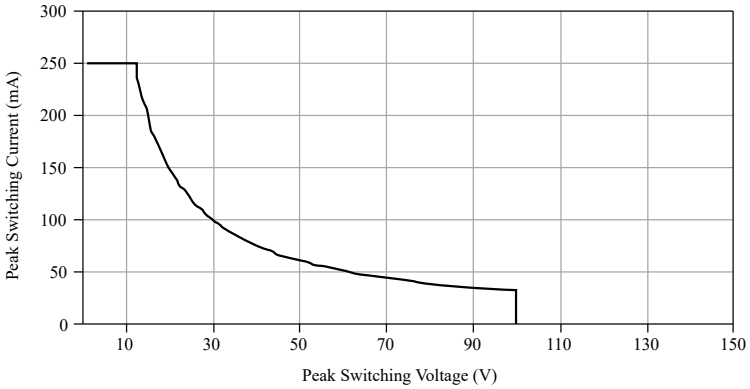
Related reference:

- Peak Switching Voltage Versus Current

Peak Switching Voltage Versus Current

The following figure shows the peak switching voltage in relation to the peak switching current.

Figure 1. Peak Switching Voltage Versus Current



Dynamic Characteristics

Simultaneous drive limit[1]	61 relays

Relay operate/release time (simultaneous relays), typical[2]	
Up to 8 relays	<1 ms
Up to 50 relays	<2 ms
Expected relay life, mechanical (no load)	2.5×10^8 cycles
Expected relay life, electrical (resistive, <10 pF load)	
5 V, 10 mA	1×10^9 cycles
10 V, 100 mA	4×10^6 cycles
100 V, 10 mA	5×10^5 cycles

Note Optional 100 Ω series protection resistance, available for the interface cable, increases the expected relay life at higher voltages by protecting the reed relays from the effects of cable and load capacitance. For more information about increasing the life of your relay, visit ni.com/info and enter the Info Code `relaylifetime`.

Note Reed relays are highly susceptible to damage caused by switching capacitive and inductive loads. Capacitive loads can cause high inrush currents, and inductive loads can cause high flyback voltages. The addition of appropriate 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`.

Power

Power consumption per relay	63 mW
Power consumption limit[3]	3.9 W
Power dissipation limit	
Card	3.9 W
Carrier	3.9 W

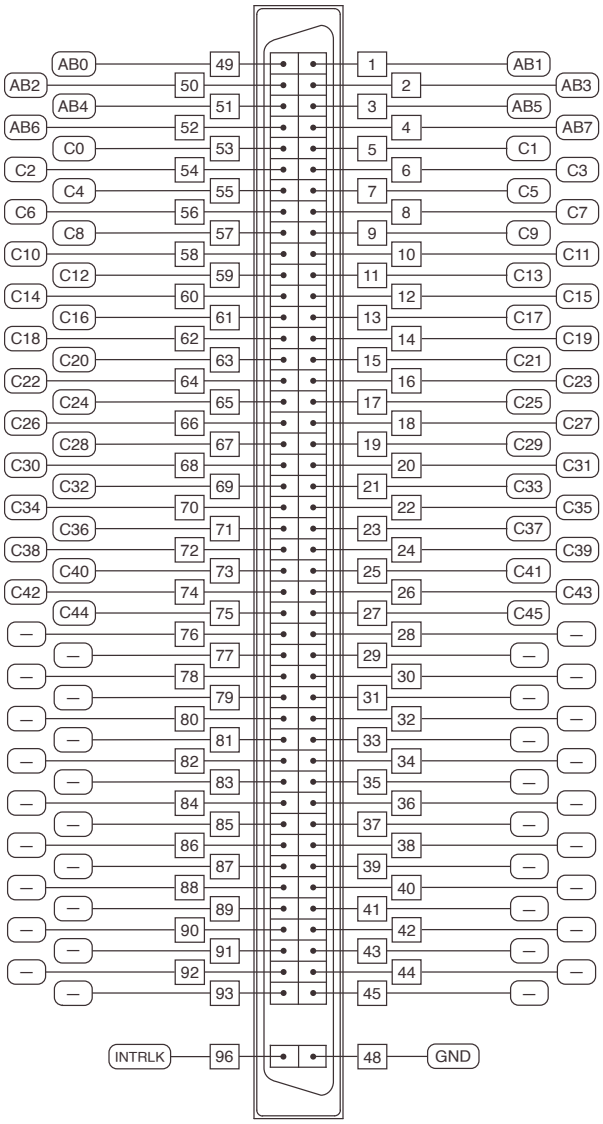
Physical Characteristics

Relay type	Reed, non-latching
Relay contact material	Ruthenium
I/O connectors	96 position, plastic SCSI
Power requirement, carrier	10 W at 5 V 2 W at 3.3 V
Dimensions (L × W × H)	11.2 cm × 1.2 cm × 17.1 cm (4.4 in. × 0.5 in. × 6.7 in.)

Weight	320 g (11.3 oz)

Connector Pinout

Figure 1. SWB-2816A/B Connector Pinout



Environment

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)

Pollution Degree	2

Indoor use only.

Operating Environment

Ambient temperature range	0 °C to 55 °C
Relative humidity range	10% to 90%, noncondensing

Storage Environment

Ambient temperature range	-20 °C to 71 °C
Relative humidity range	5% to 95%, noncondensing

Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms}

Compliance and Certifications

Safety Compliance Standards

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 C22.2 No. 61010-1

Note For safety certifications, refer to the product label or the Product Certifications and Declarations 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
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: 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, certifications, and additional information, refer to the Product Certifications and Declarations section.

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

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 ***Engineering a Healthy Planet*** 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.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—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）

- **中国RoHS**— NI符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于NI中国RoHS合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

Accessories

Refer to ni.com for more information about the following accessories.

Table 1. NI Accessories for the SWB-2816A/B

Accessory	Part number
SH96F-96M-NI SwitchBlock Cable	150275-01
SH96F-96M-RES-NI SwitchBlock Cable with 100 Ω resistance	150579-01
NI TBX-2809 Screw Terminal Accessory (unshielded)	781420-09