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CONNECTION GUIDE AND SPECIFICATIONS

NI SCB-68 HSDIO

68-Pin Shielded Connector Block



The NI SCB-68 HSDIO is a shielded I/O connector block with 72 screw terminals for connecting signals to a 68-pin very-high-density cable interconnect (VHDCI) connector.

Setting up the NI SCB-68 HSDIO

Before you begin, review the following safety information about hazardous voltages and connector blocks.

Cautions Do *not* connect hazardous voltages (>30 V_{rms}/42 V_{pk}/60 VDC). Refer to your device documentation for information about the electrical limits of your device.

Install the cover before use. To avoid electrical shock, do *not* remove NI SCB-68 HSDIO covers unless you are qualified to do so. Before removing the cover, disconnect any live circuit from the connector block. Replace the cover for use.

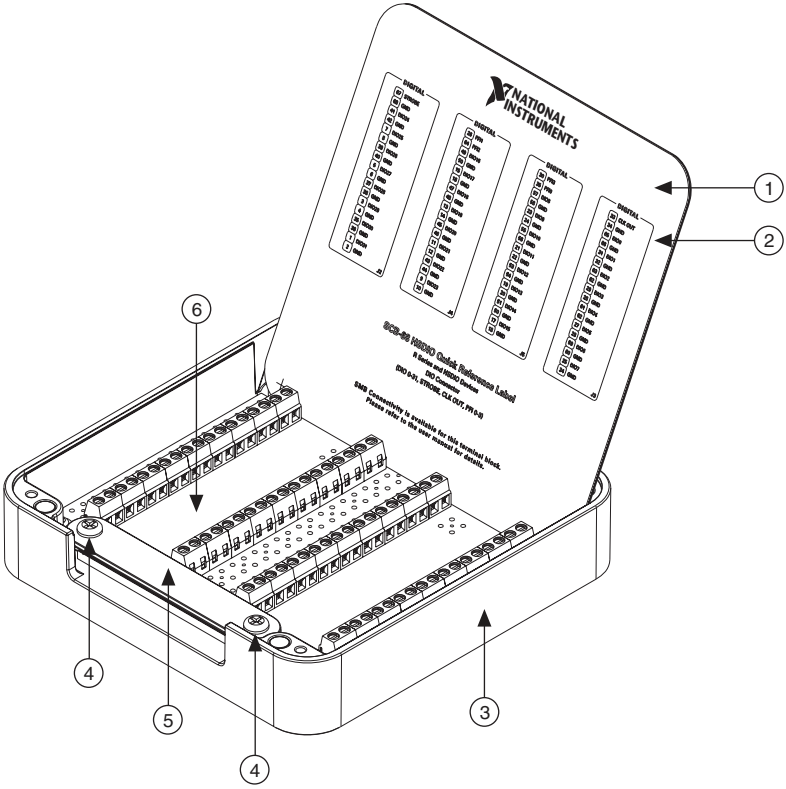
The chassis ground lug on the NI SCB-68 HSDIO is for grounding high-impedance sources, such as a floating source (1 mA maximum). Do *not* use the chassis ground lug as a safety earth ground.

NATIONAL INSTRUMENTS

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

Figure 1 shows the parts of the NI SCB-68 HSDIO.

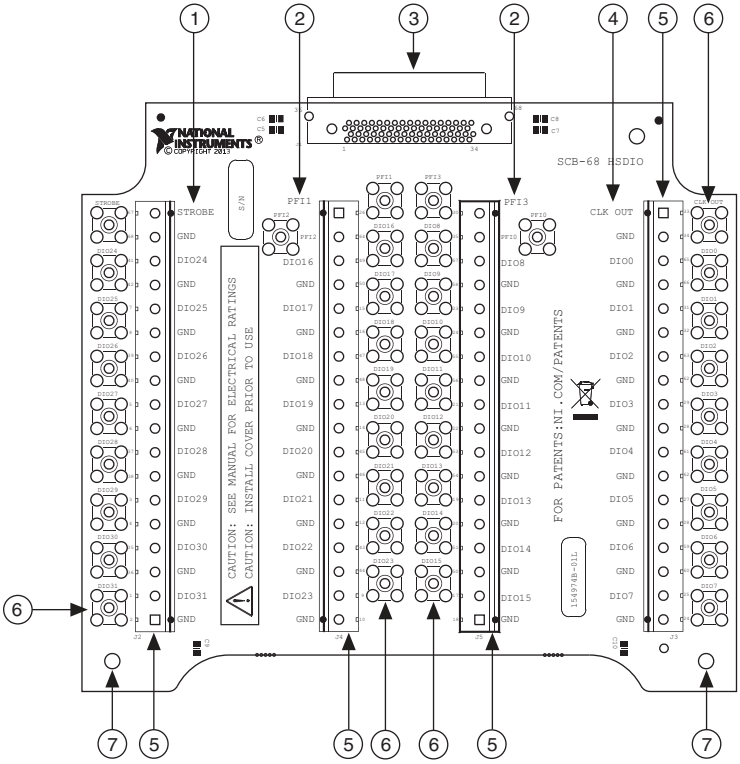
Figure 1. NI SCB-68 HSDIO Parts Locator Diagram



1	Top cover (required)	3	Enclosure base	5	Strain-relief bar
2	Quick reference label	4	Strain-relief screws	6	NI SCB-68 HSDIO board assembly

Figure 2 shows the connections on the NI SCB-68 HSDIO board assembly.

Figure 2. NI SCB-68 HSDIO Circuit Board Diagram



1	Strobe	4	Clock	6	SMB Pads
2	PFI lines	5	Screw terminals	7	Ground lugs
3	68-pin I/O connector				

To get started with the NI SCB-68 HSDIO, complete the following steps while referring to Figures 1 and 2.

Note You can stand up the cover of the NI SCB-68 HSDIO for easy reference, as shown in Figure 1.

1. (Optional) Mount the NI SCB-68 HSDIO on a DIN rail as described in the *Mounting the NI SCB-68 HSDIO on a DIN Rail* section.
2. Remove the cover.
3. Remove the film from both sides of the cover.
4. Adjust the strain-relief bar by removing the strain-relief screws with a #2 Phillips screwdriver.

5. Prepare the shielded, multi-conductor cable by stripping the insulation and shield(s) to expose enough signal wire to connect from just inside the strain-relief bar to the appropriate screw terminal. Ensure that the shield drain wire(s) of the shielded cable is long enough to connect to one of the two ground lugs on the circuit board, which are shown in Figure 2.
6. Connect the wires of the shielded, multi-conductor cable to the screw terminals by stripping 6 mm (0.25 in.) of insulation, inserting the wires into the screw terminals, and securely tightening the screws with a flathead screwdriver to a torque of 0.5-0.6 N · m (4-5 in. · lb).

Note Refer to the *Special Considerations for HSDIO Connections* section for information about appropriate cables and signal termination.

Caution To ensure the specified EMC performance, signal wires routed outside of the enclosure must be contained within a shielded cable and connected to shielded accessories.

7. Reinstall the strain-relief bar (if removed) and tighten the strain-relief screws. If the shielded cable is too large to route through the strain-relief hardware, either use multiple, smaller-diameter cables or remove the top strain-relief bar and add insulation or padding if necessary to constrain the cable.
8. Replace the cover.

Caution You must install the cover before use.

9. Connect the NI SCB-68 HSDIO to the RIO device using the appropriate cable(s) for the device.
10. Launch Measurement & Automation Explorer (MAX). In the left panel, expand **Devices and Interfaces** to confirm that the DAQ device is recognized, and then configure device settings.

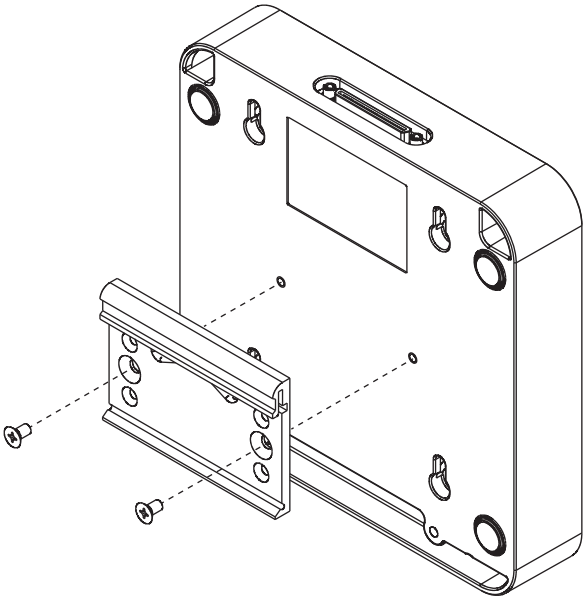
Mounting the NI SCB-68 HSDIO on a DIN Rail

You can use the NI SCB-68 HSDIO on a desktop or mount it on a standard DIN rail.

The NI 9913 DIN rail mounting kit (part number 783198-01) contains one clip for mounting the NI SCB-68 HSDIO on a standard 35 mm DIN rail. Fasten the DIN rail clip to the enclosure using the two flathead #6-32 × 1/4” screws included in the kit with a #2 Phillips screwdriver, as shown in Figure 3.

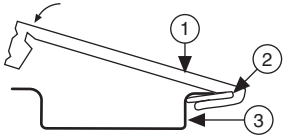
Note Do not use the threaded holes on the NI SCB-68 HSDIO for DIN rail mounting more than five times. Unscrewing and reinstalling the DIN rail clip might compromise the connection between the DIN rail clip and enclosure.

Figure 3. NI SCB-68 HSDIO DIN Rail Clip Installation



Clip the chassis onto the DIN rail with the larger lip of the DIN rail clip positioned up, as shown in Figure 4.

Figure 4. DIN Rail Clip Parts Locator Diagram



1	DIN Rail Clip	2	DIN Rail Spring	3	DIN Rail

Securing the Cover

In most cases, attaching the cover with the integrated magnets is sufficient to secure it. Complete the following steps if you want to permanently secure the cover to the NI SCB-68 HSDIO base.

1. Using a 3.5 mm (9/64 in.) diameter drill bit, drill two holes through the silkscreened crosshairs on the label side of the cover. When drilling, place the cover on a flat surface, such as a drill press, and drill slowly to minimize burrs.
2. Replace the cover on the base, lining up the drill holes with the holes in the enclosure.
3. Screw in two M3 × 6 (4-40 ×5/16) thread-forming Phillips panhead screws, such as Taptite® Trilobular® screws, with a torque of 1.0-1.2 N · m (8-10 in. · lb). You can purchase Taptite screws from many vendors.

Adding SMB Connectors (Optional)

If your application requires better signal integrity for high-speed signals, you can populate one or more of the SubMiniature version B (SMB) pads with connectors. Figure 2 shows the locations of the SMB pads.

Use SMB connectors with 50 Ω impedance to match the trace impedance of the NI SCB-68 HSDIO. Table 1 lists the recommended SMB connectors.

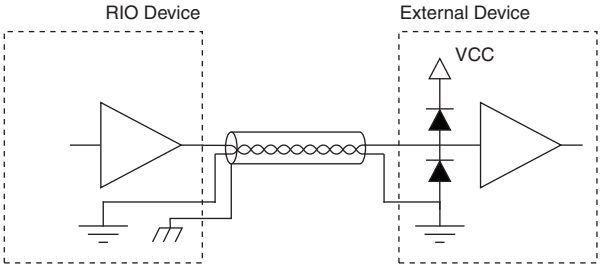
Table 1. Recommended SMB Connectors

Manufacturer	Part Number
Amphenol	903-415J-51P
Applied Engineering Products (AEP)	2009-1511-0050

Special Considerations for HSDIO Connections

National Instruments recommends using 50 Ω cables for all signal connections. If you do not use 50 Ω cables, your application may be affected by signal reflections. You can limit the amplitude of signal reflections by terminating output lines with Schottky diodes, as shown in Figure 5.

Figure 5. terminating Output Lines with Schottky Diodes



One suitable Schottky diode is the 1N5711, available from several manufacturers.

Note Refer to the help file for your RIO device for information about the number and functions of available DIO channels on the device. DIO <20..31> and PFI_0 may not be applicable to your device. DDC CLK OUT/PFI_4 and STROBE/PFI_5 may function differently on different devices.

Note The NI 6533 and NI 6534 are not compatible with the NI SCB-68 HSDIO.

Specifications

The following specifications are typical at 25 °C unless otherwise noted.

Digital I/O

DIO channels ..... 32, single-ended

Propagation delay ..... 1.1 ns typical

Channel-to-channel skew ..... 32 ps typical

Trace impedance ..... 50 Ω typical

Control I/O

Control I/O channels ..... 6, single-ended

Trace impedance ..... 50 Ω typical

Physical Characteristics

Dimensions (including feet) ..... 14.7 × 14.7 × 3.0 cm (5.8 × 5.8 × 1.2 in.)

Weight ..... 650 g (1 lb 7 oz)

I/O connector ..... One 68-pin male VHDCI connector

Screw terminals ..... 72; all I/O signals are available at screw terminals

- Wire gauge ..... 14-30 AWG
- Torque ..... 0.5-0.6 N · m (4.4-5.3 in. · lb)

SMB pads ..... 38, unpopulated

Through hole pads ..... 0.8 to 0.9 mm (in diameter)

Safety Voltages

Connect only voltages that are no greater than 30 V_{rms}/42 V_{pk}/60 VDC.

Environmental

Temperature

- Operating ..... 0 to 70 °C
- Storage ..... -20 to 70 °C

Relative humidity

- Operating ..... 5 to 90% RH, noncondensing
- Storage ..... 5 to 90% RH, noncondensing

Pollution Degree 2

Maximum altitude ..... 2,000 m

Indoor use only.

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 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 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

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.

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