

Main Page : DAQ Multifunction I/O Accessory Guide

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Overview

Use this guide to better understand specifications, differences, and answer common questions about using your NI DAQ terminal block or connector block accessories as signal breakouts. This guide will discuss through NI naming terminology, wiring considerations, signal mapping and pinouts, choosing the right accessory to meet your needs—from low cost to high performance noise reducing, shielded, and more.

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Using the DAQ Cable and Accessory Guides

This guide is intended to cover accessories designed for use with NI DAQ devices, and their use cases. It does not cover use with other NI product families such as [Digital Instruments \(formerly HSDIO\)](#), C Series, or Reconfigurable I/O (formerly known as R Series), although some may use similar or the same accessories. It also does not cover legacy or End of Life (EOL) NI DAQ accessories.

If you seek information about a specific connector block or terminal block, NI recommends that you first review this page and its more general information to better understand the product offerings, and then jump to the page for your specific model.

- To find more detailed information about your DAQ accessory connectors, wire gauge, pinout and mappings, dimensional drawings, DIP switches, device modes, mounting, and dimensions, visit [the linked accessory guides in NI DAQ Accessories Connectivity and Features](#).
- To find more information about NI DAQ cables and general information that applies to all DAQ cables, visit [DAQ Multifunction I/O Cable Guide Main Page](#).
- To learn more about compatibility between your NI DAQ accessory or cable and your NI DAQ device or module, visit [Main Page : DAQ Multifunction I/O Cable and Accessory Compatibility](#).
- To create your own cable or test fixture, or to repair an existing NI DAQ cable or accessory, visit [NI DAQ Device Custom Cables, Replacement Connectors, and Screws](#).

Understanding NI Accessory Terminology

NI accessories come in a variety of shapes, orientations, features, and functionality. This section briefly explains what some of that terminology means. If you want to learn more about a specific accessory, visit [the DAQ Accessory Guide Page for your accessory, or its product page](#).

Anatomy of a Model Name

Use this section to better understand your NI accessory's model name and numbering.

Model Prefixes

- **Shielded Connector Block (SCB)** - These accessories feature screw terminal connectivity inside of a shielded enclosure providing rugged, very low-noise signal termination. Example: [SCB-68A](#)
- **Connector Block (CB)** - CB unshielded screw connector blocks are low-cost accessories. These connector blocks feature standoff feet for use on a desktop or mounted in a custom breakout panel. Example: [CB-68LP](#)
- **Terminal Block (TB)** - TB accessories connect directly to the front of your PXI or PXIe DAQ module without the need for a cable. These space-saving accessories feature shielded screw terminal or SMB connectivity providing rugged, very low-noise signal termination. Example: [TB-2705](#)
- **Terminal Block (TBX)** - TBX unshielded screw terminal blocks are low-cost accessories that include hardware for mounting on a standard DIN rail. Example: [TBX-68](#)
- **BNC** - NI BNC accessories feature some connectors with [BNC connectivity](#), typically for analog differential or single-ended connections. They also feature screw terminal connections for digital and counter connections. Example: [BNC-2120](#)
- **Connector Accessory (CA)** - This user configurable signal conditioning enclosure is designed for maximum user-defined I/O connectivity and flexibility. Example: CA-1000

Connector Pin Counts

Most SCB, CB, and TBX accessories typically follow the model prefix with a dash and a number indicating the number of pins on its connectors. Common DAQ connectors are -37, -68, and -100 for 37-pin, 68-pin and 100-pin connectors, respectively. Note that some connectors with the same pin count may come in different forms, such as the 68-pin VHDCI or SCSI.

Suffix

Following the connector pin count, some accessories also include a suffix indicating additional information or functionality. Some of the more common used are:

- **LP** - This accessory features a vertical-mounted connector. Example: [CB-68LP](#)
- **LPR** - This accessory features a right-angle-mounted connector. Example: [CB-68LPR](#)
- **FV** - This accessory features a vertical-mounted connector and mounts perpendicular or vertical to the DIN rail. Example [CB-37FV](#)
- **FH** - This accessory features a vertical-mounted connector and mounts in line or horizontal with the DIN rail. Example: [CB-37FH](#)
- **F-HVD** - This accessory features a higher category voltage rating, and the ability to DIN-rail mount. Example: [CB-37F-HVD](#)

General Accessories Glossary

Connector Block versus Terminal Block

These terms are used interchangeably in the context of NI DAQ accessories. These accessories act as a breakout box from the pins on your NI DAQ device, featuring screw terminals or BNC connectivity when wiring signals to your system.

Shielded vs Unshielded

- **Shielded** - NI shielded accessories feature rugged, very low-noise signal termination. Note that NI DAQ products typically must be operated with shielded cables and accessories to ensure compliance with Electromagnetic Compatibility (EMC) requirements. Example: [SCB-68A](#)
- **Unshielded** - NI unshielded accessories offer low-cost alternatives. They do not provide EMC shielding and thus, are more susceptible to noise interference. If unshielded cables or accessories are used, the EMC specifications for the device or module are no longer guaranteed. Example: [CB-68LP](#)

Connectivity

- **Screw Terminal** - A screw terminal is a type of electrical connector where a wire is held by the tightening of a screw. NI recommends one wire per screw terminal, and thus differential signals will require two screw terminals. Example: [SCB-68A](#)
- **Bayonet Neill–Concelman (BNC)** - Simply known in industry by its acronym, BNC is a quick connect/disconnect for coaxial cables to assist in noise reduction. In this configuration, a signal is carried down the spline (or pin) of the BNC cable, and the COM(AI-), GND or SENSE is carried down the shielding of the BNC cable. Example: [BNC-2120](#)
- **SubMiniature Version B (SMB)** - Similar to the coaxial cable functionality to BNC, but feature a smaller size and latching mechanism. Example: [TB-2708](#)
- **Deutsches Institut für Normung (DIN) Rail Mount** - Simply known by its acronym, a DIN rail is an industry-standard metal rail used to mount equipment, typically inside of equipment racks. NI accessories featuring DIN rail mounts include or make available for purchase the hardware required for a simple mounting procedure. Example: [TBX-68](#)
- **High Voltage Terminal Block** - Industry standard electrical measurement categories or classifications (CAT I, CAT II, and so on) define the total continuous energy that can be safely used at a single point in a circuit by both the working voltage and an impulse or transient overvoltage. Most NI DAQ accessories only support lower level voltages, defined in their specifications. However, some accessories, such as the CB-37F-HVD support higher measurement categories, such as CAT II (150V). Example: [CB-37F-HVD](#)

Common Cable Connector Types Found on NI Accessories

For more information on replacement connectors for your NI DAQ accessory, use the information found throughout this guide, as well as [NI DAQ Device Custom Cables, Replacement Connectors, and Screws](#).

- **D-Sub (37-pin)** - Industry standard 37-pin D-Sub (DSUB) connector. [Click here for an example.](#)
- **SCSI 0.050 D-Type (68-pin and 100-pin)** - Industry standard SCSI connector standard featuring 0.050 in pin spacing. Commonly found on many NI DAQ accessories, these accessories are compatible with older DAQ devices and modules with SCSI connectors as well as newer DAQ devices and modules with VHDCI connectors. Reference compatibility information found in this series of pages for which cable to use with your device or module. [Click here for a 68-pin example.](#)
- **VHDCI .8mm (68-pin)** - An improvement on the SCSI connector allowing a smaller footprint with 0.8 mm pin spacing, and fewer bent pins during connection. This connector is primarily used on PXI mounted terminal blocks to connect to modules with VHDCI connectors. [Click here for an example.](#)

Signal to Pin Mapping When Wiring Up an Accessory

When wiring your sensor or other signals into your NI accessory it is important to understand which screw terminal or BNC connectors map back to which terminals or pin numbers on your NI DAQ device. For accessories not covered in the extended information pages from this guide, this guidance generally applies to mapping any NI device's lines to the accessory.

If your device has extended information [available in this guide](#), there may also be additional information on its DAQ Accessory Guide page.

First, it is important to understand that each device may use its own pinout or pin mapping scheme. Some families of devices with the same pin count will use the same numbering and signal combinations, but others may not. There are several resources you can use to find this scheme.

- **Quick Reference Pinout Labels** - If [available](#), this is the easiest and quickest way to find your signal mapping. NI recommends that you print out and attach the quick reference label to your accessory.
- **User Manuals and User Guides** - You can find your model's pinout in its user manual or user guide. Search [NI Manuals](#) to find your model's user manual or user guide.
- **NI-DAQmx Help** - The *NI-DAQmx Device Terminals Help* section contains the pinouts for every hardware model supported by that version of the driver. The *NI-DAQmx Help* installs locally with your driver, and is also available online.
- **Measurement & Automation Explorer (MAX)** - NI MAX is used to configure your NI DAQ hardware, and also references out to many different types of reference information, including device pinouts.
 - Right-click your device name under **Devices and Interfaces**, and select **Device Pinouts** to directly navigate to the *NI-DAQmx Device Terminals Help* topic for your device.
 - Right-click the device name under **Devices and Interfaces**, and select **Help»Online Device Documentation**. A browser window opens to ni.com/manuals with the results of a search for relevant model documentation.
- All accessories, with the exception of PXI front mounted blocks, connect to a device or module through a cable. Unless you are creating a custom breakout box or test fixture, it's typically unnecessary to understand the pin mapping at each cable and device connector. Instead, you can take the above information in regards to the signal mapping, and use that to wire to the labeled numerical screw or BNC terminals once you have connected your cable. If you'd still like to review connector pinout or mapping for NI DAQ cables, [check out the NI DAQ Cables Guide](#).

SCB-68A to PCIe/PXI-6361 Pinout Mapping Example

Warning: Always refer to the product documentation for your specific device. Your device may use a completely different pin mapping than what is used in this example.

Navigate to the PCIe/PXI-6361 entry in the *NI-DAQmx Device Terminals Help* [using one of the methods described above](#) to find the following pinout diagram.

In this example, we want to connect our differential signal, AI 0. Since our differential signal requires two wires for signal and COM, we will use the differential signal names designated in parentheses. In this case, pin 68 of the PCIe/PXIe-6361, denoted by AI 0 (AI 0+), will be our signal connection; the COM will connect to AI 8 (AI 0-) at pin 34.

AI 0 (AI 0+)	68	34	AI 8 (AI 0-)
AI GND	67	33	AI 1 (AI 1+)
AI 9 (AI 1-)	66	32	AI GND
AI 2 (AI 2+)	65	31	AI 10 (AI 2-)
AI GND	64	30	AI 3 (AI 3+)
AI 11 (AI 3-)	63	29	AI GND
AI SENSE	62	28	AI 4 (AI 4+)
AI 12 (AI 4-)	61	27	AI GND
AI 5 (AI 5+)	60	26	AI 13 (AI 5-)
AI GND	59	25	AI 6 (AI 6+)
AI 14 (AI 6-)	58	24	AI GND
AI 7 (AI 7+)	57	23	AI 15 (AI 7-)
AI GND	56	22	AO 0
AO GND	55	21	AO 1
AO GND	54	20	APFI 0
D GND	53	19	P0.4
P0.0	52	18	D GND

Figure 1: PCIe/PXIe-6361 Pinout with Pin 68 (AI 0+) and Pin 34 (AI 0-) Highlighted

On the SCB-68A we find terminal 68, to which we can wire our AI 0+ signal wire to, and secure through the screw terminal. Similarly, we find terminal 34 to which we can wire our AI 0- signal.

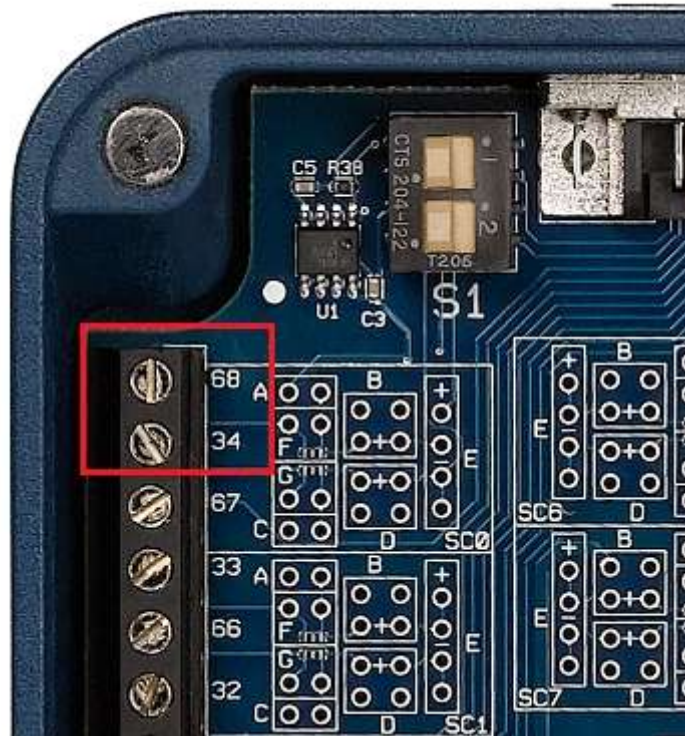


Figure 2: SCB-68A with Terminals 68 and 34 Highlighted

NI DAQ Accessories Connectivity and Features

The following table lists the most popular NI DAQ accessories, and provides links to their Accessory Guide Page, if available. General compatibility with NI DAQ devices, modules, and cables are listed on each Accessory Guide page, but a more extensive list can be found in the [Multifunction DAQ I/O Compatibility guide](#). For more information about an accessory not covered in this guide, [review the accessory's manual](#).

Use this table to quickly identify NI DAQ accessory connectivity, mounting, and features.

Connectivity	Shielding	Product Page	Accessory Guide	Mounting	Additional Features
Screw Terminal	Shielded for high performance noise reduction	SCB-68A¹	SCB-68A	DIN Rail ²	See guide
		SCB-68	SCB-68	-	See guide
		SCB-100A	SCB-100A	DIN Rail ²	See guide
		SCB-100	SCB-100	-	See guide
		TB-2705	-	PXI Module	PXI Mounted
		TB-2706	-	PXI/PXIe Module	PXI Mounted
		TB-2621	-	PXI/PXIe Module	PXI Mounted, High Voltage

Screw Terminal	Unshielded for low cost applications	CB-68LP	-	Custom Panel	-
		CB-68LPR	-	Custom Panel	-
		TBX-68	-	DIN Rail	-
		CB-37F-LP	-	Front mount on module	-
		CB-37FV	-	DIN Rail	-
		CB-37FH	-	DIN Rail	-
		CB-37F-HVD	-	DIN Rail	High voltage
BNC	Shielded for high performance noise reduction	BNC-2110	-	DIN Rail ²	Differential AI
		BNC-2111	-	DIN Rail ²	Single-Ended AI
		BNC-2115	-	DIN Rail ²	AI Extended I/O
		BNC-2120	-	DIN Rail ²	-
		BNC-2090A¹	-	Rack	-
		BNC-2090	-	Rack	-

SMB	Shielded for high performance noise reduction	TB-2708	-	PXI Module	-
		TB-2709	-	PXI Module	-
Custom Connectivity	Shielded signal conditioning enclosure designed for maximum user-defined I/O connectivity and flexibility	CA-1000	-	Rack ²	User configurable signal conditioning

¹SCB-68A and BNC-2090A are newer designs recommended for all new applications over the SCB-68 and BNC-2090.

²DIN rail or rack mount kit sold separately.

Additional Resources

NI DAQ Cable and Accessory Resources

- [Learn about specifications, model differences and other common questions for DAQ cables.](#)
- [Learn about the compatibility of NI DAQ devices and modules with NI DAQ cables and accessories.](#)
- [Find the parts needed to make a custom cable, breakout fixture, or replace connectors and screws on NI DAQ hardware.](#)
- [Browse and search NI manuals, guides, specifications, datasheets, getting started guides, and more.](#)
- [Browse dimensional drawings for NI DAQ cables.](#)
- [Browse dimensional drawings for NI DAQ accessories.](#)

Other NI Cable and Accessory Resources

- [Learn about NI Digital Instrument connector and terminal block accessories, including common questions and needs.](#)
- [Find the parts needed to make a custom cable, breakout fixture, or replace connectors and screws with NI Digital Instrument hardware.](#)
- [Learn about cable and accessory compatibility for C Series \(cDAQ or cRIO\) Modules.](#)

