Multifunction DAQ Cable and Accessory Selection Guides

NI Cable Design Advantages
The SH68-68-EP cable is the most commonly used E Series and S Series cable. The cable is designed to work specifically with the NI Multifunction DAQ devices to preserve signal integrity through these technologies:

- Separate digital and analog sections
- Twisted pairs for critical digital I/O
- Individually-shielded twisted pairs for all analog inputs
- Individually-shielded analog outputs
- Large (30 AWG) conductor for +5V Lines
- PVC jacket
- Double ground shield

Figure 1. SH68-68-EP Cable

A variety of cabling and accessory options are available for your needs. Use the following tables to choose the most appropriate cables and accessories. To determine which Multifunction DAQ device best fits your needs, please see page 192.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Shielding</th>
<th>Connect to ...</th>
<th>Cable</th>
<th>Adapter</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SCXI high-performance signal conditioning</td>
<td>SCXI-1349</td>
<td>–</td>
<td>SCXI Chassis and Modules, p. 246</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screw terminals 1</td>
<td>SH68-68-EP</td>
<td>–</td>
<td>SCB-68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-pin connector</td>
<td>SHB580</td>
<td>–</td>
<td>CB50, custom or 3rd party</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Configurable connectivity box</td>
<td>SHB8-68-EP</td>
<td>–</td>
<td>CA-1000</td>
</tr>
<tr>
<td></td>
<td>Unshielded</td>
<td>Screw terminals 1</td>
<td>RB888</td>
<td>–</td>
<td>TBX-68, CB-68LP, CB-68LPFR, DAQ Signal Accessory</td>
</tr>
<tr>
<td>PXI only</td>
<td>Shielded</td>
<td>Front-mounted screw terminals</td>
<td>N/A</td>
<td>–</td>
<td>TB-2705</td>
</tr>
<tr>
<td></td>
<td>Unshielded</td>
<td>Screw terminals 1</td>
<td>SHC88-68-EP</td>
<td>–</td>
<td>SCB-68, CA-1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-pin connector</td>
<td>SHC88-68-EP</td>
<td>–</td>
<td>CB50, custom or 3rd party</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unshielded</td>
<td>SC88-68</td>
<td>–</td>
<td>CB50, custom or 3rd party</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-pin connector</td>
<td>RC88-68</td>
<td>–</td>
<td>CB50, custom or 3rd party</td>
</tr>
</tbody>
</table>

Table 1. Cable Connection Specifications for 16-Channel E Series Devices (except NI 6025E)
Multifunction DAQ and Signal Conditioning

E Series Devices (NI 6031E, NI 6033E, NI 6071E, NI 6025E)

<table>
<thead>
<tr>
<th>Platform</th>
<th>Shielding</th>
<th>Connect to ...</th>
<th>Cable</th>
<th>Cable Leg</th>
<th>Adapter</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI, PXI</td>
<td>Shielded</td>
<td>Screw Terminals</td>
<td>SH100100</td>
<td>MIO:</td>
<td>—</td>
<td>SCB-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screw Terminals</td>
<td>SH1006888</td>
<td>MIO:</td>
<td>—</td>
<td>SCB-68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screw Terminals1</td>
<td>SH1056888</td>
<td>MIO:</td>
<td>—</td>
<td>TBU-68, CB-68LP, CB-68LP, DAQ Signal Accessory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BNC Terminal Block</td>
<td>SH1006888</td>
<td>MIO:</td>
<td>—</td>
<td>BNC-2110, BNC-2120, BNC-2690</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-pin Connectors</td>
<td>SH1006888</td>
<td>MIO:</td>
<td>68M-50F MIO</td>
<td>custom or 3rd party</td>
</tr>
<tr>
<td></td>
<td>Unshielded</td>
<td>50-pin Connector</td>
<td>R1005050</td>
<td>MIO:</td>
<td>—</td>
<td>68M-50F Extended</td>
</tr>
</tbody>
</table>

Table 1. Cable Connection Specifications for 64-Channel E Series Devices and the NI 6025E

ISA - Visit ni.com/info and enter in "legacy" for more information on ISA Products.

*Shielded cable with unshielded accessories
Multifunction DAQ Accessories

SCXI High-Performance Modular Signal Conditioning (see Figure 1)
SCXI is a high-performance modular signal conditioning platform that you use as a front end to your E Series DAQ device. With the SCXI multiplexing architecture, you can expand your analog inputs to 3,072 channels. Additionally, SCXI offers a variety of modules for connecting to thermocouples, RTDs, strain gauge transducers, LVDT position sensors, ICP-compatible accelerometers/microphones, thermistors, millivolt inputs, voltage inputs up to 1000 V, current inputs (0-20mA), frequency inputs or dynamic signals.

See page 246 for details on SCXI Signal Conditioning.

SCC Portable Modular Signal Conditioning for Low-Channel-Count Applications (see Figure 2)
The SCC Series portable modular signal conditioning system consists of SCC modules that plug into a low-profile SC-2345 shielded carrier. SCC modules give you single or dual-channel signal conditioning for up to 16 analog input channels and eight digital I/O lines of your E Series or basic multifunction DAQ device. The SCC Series offers signal conditioning for a variety of inputs, including thermocouples, RTDs, strain gauges, ICP-compatible accelerometers, accelerators, analog inputs requiring isolation, high voltage (up to 100 V), current (0-20mA), and optically isolated digital I/O. Lowpass filtering and breadboard modules are also available.

See page 320 for details on SCC Signal Conditioning.

Connector Blocks
BNC-2100 Series Connector Blocks (see Figure 3)
The BNC-2100 Series are shielded connector blocks with signal-labeled BNC connectors for easy connectivity of your analog input, analog output, digital I/O and counter/timer signals to your multifunction DAQ device, including analog input devices. The BNC-2110 and BNC-2120 work with all E Series devices. The BNC-2120 also provides a function generator, quadrature encoder, temperature reference, thermocouple connector, and LED so that you can test the functionality of your hardware. The BNC-2115 has 24 BNC inputs for connecting to the extended I/O channels of our 100-pin E Series DAQ devices.

BNC-2110................................................................................................777643-01
Dimensions – 20.3 by 11.2 by 5.5 cm (8.0 by 4.4 by 2.2 in.)
BNC-2115................................................................................................777807-01
Dimensions – 20.3 by 11.2 by 5.5 cm (8.0 by 4.4 by 2.2 in.)
BNC-2120................................................................................................777960-01
Dimensions – 26.7 by 11.2 by 6.0 cm (10.5 by 4.4 by 2.4 in.)

SC-2075 Breadboard Connector Block (see Figure 4)
The SC-2075 provides breadboard area for prototyping and BNC and spring terminal connectivity for 68-pin E Series DAQ devices. The built-in ±15 V or adjustable 0 to 5 V power supply and LEDs for digital lines make the SC-2075 a cost-effective device, ideal for academic laboratories.

SC-2075 ..................................................................................................778147-90
Dimensions – 26.72 by 20.70 by 4.37 cm (10.52 by 8.15 by 1.72 in.)
Multifunction DAQ Accessories

**BNC-2090 Shielded BNC Adapter Chassis** (see Figure 5)
The BNC-2090 is a shielded, rack-mountable adapter with signal-labeled BNC connectors, spring terminal blocks, and component locations for passive signal conditioning. Consists of 22 BNC connectors and 28 spring terminals to simplify connection to your analog, digital, trigger and counter/timer signals. The BNC-2090 has silk-screened component locations that you use to develop simple signal conditioning circuits. For added flexibility, you can connect any E Series DAQ device to the BNC-2090 from the front or rear through dual 68-pin connectors.

BNC-2090 .............................................................................................777270-01

Dimensions – 48.3 by 4.4 by 18.8 cm (19.0 by 1.7 by 7.4 in.)

**CA-1000 Configurable Signal Conditioning Enclosure** (see Figure 6)
The CA-1000 is a configurable enclosure that gives you maximum user-defined connectivity and flexibility through customized panelettes. Each enclosure can accommodate up to nine panelettes.

Dimensions – 30.7 by 25.4 by 4.3 cm (21.1 by 10 by 1.7 in.)

See page 352 for more information about the CA-1000.

**TB-2705 Terminal Block for 68-pin PXI E Series Devices** (see Figure 7)
The TB-2705 is a screw terminal block for PXI that works with your PXI E Series DAQ module. It latches to the front of your PXI module with locking screws and provides strain relief and easy access to your analog, digital, trigger and counter/timer signals through screw terminals.

TB-2705 ................................................................................................778241-01

Dimensions – 8.43 by 10.41 by 2.03 cm (3.32 by 4.1 by 0.8 in.)

**SCB-68 and SCB-100 Shielded I/O Connector Blocks** (see Figure 8)
The SCB-68 and SCB-100 are shielded I/O connector blocks for rugged, very low-noise signal termination for connecting to 68-pin or 100-pin E Series DAQ devices, respectively. Silk-screened component locations for easy addition of simple signal-conditioning circuitry for your analog input channels. They also include general-purpose breadboard areas (two on the SCB-68; three on the SCB-100) as well as an IC temperature sensor for cold-junction compensation in temperature measurements.

SCB-68 ..................................................................................................776844-01

Dimensions – 19.5 by 15.2 by 4.5 cm (7.7 by 6.0 by 1.8 in.)

SCB-100 ................................................................................................776990-01

Dimensions – 19.5 by 15.2 by 4.5 cm (7.7 by 6.0 by 1.8 in.)

**TBX-68 I/O Connector Block with DIN-Rail Mounting** (see Figure 9)
The TBX-68 is a termination accessory with 68 screw terminals for easy connection of field I/O signals to 68-pin DAQ devices. It includes one 68-pin male connector for direct connection to 68-pin cables. The TBX-68 is mounted in a protective plastic base with hardware for mounting on a standard DIN rail.

TBX-68 ..................................................................................................777141-01

Dimensions – 12.50 by 10.74 cm (4.92 by 4.23 in.)
Multifunction DAQ Accessories

CB-68LP and CB-68LPR I/O Connector Blocks (see Figure 10)
The CB-68LP and CB-68LPR are low-cost termination accessories with 68 screw terminals for easy connection of field I/O signals to 68-pin E Series DAQ devices. They include one 68-pin male connector for direct connection to 68-pin cables. The connector blocks include standoffs for use on a desktop or for mounting in a custom panel. The CB-68LP has a vertical-mounted 68-pin connector. The CB-68LPR has a right-angle mounted connector, and it is used with the CA-1000 (see page 352).
CB-68LP ................................................................................................777145-01
Dimensions – 14.35 by 10.74 cm (5.65 by 4.23 in.)
CB-68LPR ............................................................................................777145-02
Dimensions – 7.62 by 16.19 cm (3.00 by 6.36 in.)

DAQ Signal Accessory (see Figure 11)
The DAQ Signal Accessory demonstrates and tests the use of analog, digital, and counter/timer functions of DAQ devices. You can connect the DAQ Signal Accessory directly to your DAQ device. It features a built-in function generator, quadrature encoder, solid-state relay, IC temperature sensor, noise generator, microphone jack, thermocouple jack, four LEDs, and a digital trigger button. The DAQ Signal Accessory works with all E Series DAQ devices.
DAQ Signal Accessory ............................................................................777382-01
Dimensions – 12.7 by 12.7 cm (5.0 by 5.0 in.)

RTSI Bus Cables (see Figure 12)
Use RTSI bus cables to connect timing and synchronization signals among Measurement, Vision, Motion, and CAN boards for PCI, and FireWire DAQPad devices. For systems using long and short boards, order the extended RTSI cable.
2 boards ..................................................................................................776249-02
3 boards .................................................................................................776249-03
4 boards .................................................................................................776249-04
5 boards ..................................................................................................776249-05
Extended, 5 boards ................................................................................777562-05
3 FireWire DAQPads ..............................................................................186464-01

Shielded I/O Cables
SH68-68-EP Shielded Cable (see Figure 13)
The SH68-68-EP is a shielded 68-conductor cable terminated with two 68-pin female 0.050 series D-type connectors. It features individually shielded analog twisted pairs for reduced crosstalk with high-speed devices. This cable connects to all 68-pin E Series devices (except DAQCards). If you need a right-angle connector, the SH68-68R1-EP shielded cable is electrically equivalent.
1 m..........................................................................................................184749-01
2 m..........................................................................................................184749-02
Please call for other length options.

SH68-68R1-EP Shielded Cable (see Figure 14)
The SH68-68R1-EP is a shielded 68-conductor cable. One end terminates with a 68-pin female 0.050 series D-type connector and the other end terminates with a right-angle 68-pin female 0.050 series D-type connector.
1 m..........................................................................................................187051-01

Figure 10. CB-68LP and CB-68LPR I/O Connector Blocks
Figure 11. DAQ Signal Accessory
Figure 12. RTSI Bus Cable
Figure 13. SH68-68-EP Shielded Cable
Figure 14. SH68-68R1-EP Shielded Cable
Multifunction DAQ Accessories

SH100100 Shielded Cable (see Figure 15)
The SH100100 is a shielded 100-conductor cable terminated with 100-pin male 0.050 series D-type connectors. This cable connects the 100-pin E Series devices to 100-pin accessories.

1 m ................................................................. 182853-01
2 m ................................................................. 182853-02

68M-50F S Series Cable Adapters (see Figure 16)
The 68M-50F cable adapter connects a 68-pin NI cable to a standard 0.1 by 0.1 in. 50-pin connector on third-party or custom accessories. The 68M-50F MIO should be used with the SH68-68-EP, SHC68-68-EP, SHC68U-68-EP, or the MIO leg of the SH1006868. The 68M-50F Extended I/O cable adapter should be used for the extended I/O leg of the SH1006868.

68M-50F MIO ....................................................... 184670-01
68M-50F Extended I/O ........................................ 184670-02

SH1006868 Shielded Cable (see Figure 17)
The SH1006868 is a shielded cable that connects to 100-pin E Series devices and terminates with two female 68-pin 0.050 series D-type connectors. See Table 2 on page 256 for accessories compatible with each 68-pin connector.

1 m ................................................................. 182849-01
2 m ................................................................. 182849-02

SHC68-68-EP and SHC68U-68-EP Shielded Cables for DAQCards (see Figure 18)
These cables connect DAQCards to standard 68-pin accessories. Latching screws secure the shielded connector to the PCMCIA DAQCard. The SHC68-68-EP is a shielded 68-conductor cable terminated with a VHDCI 68-pin male connector at one end and a 68-pin female 0.050 series D-type connector at the other. The SHC68U-68-EP is identical to the SHC68-68-EP except it uses an inverted VHDCI 68-pin male connector. Use the SHC68-68-EP cable with a DAQCard inserted in the lower PCMCIA slot in your laptop or when using only one DAQCard. Use the SH68U-68-EP for a DAQCard located in the upper PCMCIA slot in your laptop. When using two E Series DAQCard PCMCIA devices in adjacent slots, use one SHC68-68-EP and one SHC68U-68-EP.

SHC68-68-EP
0.5 m .............................................................. 186838-0R5
1 m ................................................................. 186838-01

SHC68U-68-EP
0.5 m .............................................................. 187406-0R5
1 m ................................................................. 187406-01

SH6850 Shielded Cable (see Figure 19)
The SH6850 connects a standard 68-pin E Series or S Series product to a 3rd party or custom standard 50-pin accessory. The cable provides a screw-latching 68-pin female connector on one side and a standard 50-pin female connector on the other side.

1 m ................................................................. 776784-01
2 m ................................................................. 776784-02
Multifunction DAQ Accessories

Ribbon I/O Cables

**R6868 Ribbon Cable for E Series Devices** *(see Figure 20)*
The R6868 is a 68-conductor flat ribbon cable terminated with two 68-pin connectors. Use this cable to connect a 68-pin E Series device to 68-pin accessories.

<table>
<thead>
<tr>
<th>Length</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m</td>
<td>182482-01</td>
</tr>
</tbody>
</table>

**RC68-68 Ribbon Cable for DAQCards** *(see Figure 21)*
The RC68-68 ribbon cable connects DAQCards directly to 68-pin accessories. Two RC68-68 cables can be used together in adjacent PCMCIA slots.

<table>
<thead>
<tr>
<th>Length</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25 m</td>
<td>187262-0R25</td>
</tr>
<tr>
<td>1 m</td>
<td>187252-01</td>
</tr>
</tbody>
</table>

**R1005050 Ribbon Cable** *(see Figure 22)*
This cable connects 100-pin E Series devices, including the NI 6071E, NI 6033E, NI 6031E, and NI 6025E to standard 50-pin 3rd party or custom connectors.

<table>
<thead>
<tr>
<th>Length</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m</td>
<td>182762-01</td>
</tr>
<tr>
<td>2 m</td>
<td>182762-02</td>
</tr>
</tbody>
</table>

**R6850 Ribbon Cable Kit** *(see Figure 23)*
This cable kit combines a 68F-50M cable adapter and a standard 50-pin cable with female connectors on both ends. The cable kit is designed to adapt an E Series, S Series, or PCI-6013/6014 product to a third-party or custom 50-pin accessory.

<table>
<thead>
<tr>
<th>Length</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m</td>
<td>776842-01</td>
</tr>
</tbody>
</table>

Custom Connectivity Components

**68-Pin Custom Cable Connector/Backshell Kit** *(see Figure 24)*
The 68-pin female mating connector and backshell kit is used to make custom cables. Solder-cup contacts are available for soldering cable wires to the connector.

<table>
<thead>
<tr>
<th></th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>68-pin connector/backshell kit</td>
<td>776832-01</td>
</tr>
</tbody>
</table>
Multifunction DAQ Accessories

**PCB Mounting Connectors for Custom Accessories (see Figure 25)**

PCB mounting connectors are used to build custom accessories that connect to 68-conductor or 100-conductor shielded and ribbon cables. Two connectors are available, one for right-angle and one for vertical mounting onto a PCB.

- 68-pin, male, right-angle mounting ..............................................................777600-01
- 68-pin, male, vertical mounting ........................................................................777601-01
- 100-pin, female, right-angle mounting .........................................................777778-01
- 100-pin, female, vertical mounting ...............................................................777779-01

**PCMCIA Strain-Relief Accessory (see Figure 26)**

The PCMCIA Strain-Relief accessory attaches to the bottom of your notebook computer and provides adjustable strain relief for one or two PCMCIA cables attached to the installed PCMCIA card(s).

PCMCIA Strain-Relief Accessory ......................................................................777550-01

---

**Use Interactive Online Catalog Configurator for Quick Product Selection**

You can now easily configure NI multifunction data acquisition (DAQ) measurement systems using a new, interactive feature of our online catalog. The interactive online catalog offers a better, easier way to select and purchase measurement solutions from National Instruments. Based on user input, the interactive online catalog suggests products and then lists the appropriate cables and accessories for those products. This new automated tool helps eliminate ordering mistakes and product-compatibility errors.

To take advantage of the online catalog for multifunction DAQ devices, visit [ni.com/catalog](http://ni.com/catalog)

From the Products and Services menu, select Data Acquisition, then select Multifunction I/O. The online catalog prompts you with a series of questions regarding preferences for operating system, computer bus, number of channels, and maximum sampling rate. The online catalog then recommends several appropriate DAQ devices. You can then review specifications for each device and select your preferred product. Next, the catalog suggests the preferred accessory and cable solution designed to work with the selected DAQ device. You have the option of choosing the preferred configuration or choosing from a separate list of accessories and cables that also work with the selected DAQ device. You can purchase the selected items online.