

BNC-2110 DESKTOP AND DIN RAIL-MOUNTABLE BNC ADAPTER

This installation guide describes how to install and configure your BNC-2110 accessory with an E Series or waveform generation DAQ device. Waveform generation DAQ devices refer to 671X and 672X devices.

Introduction

The BNC-2110 is a desktop and DIN rail-mountable BNC adapter you can connect directly to data acquisition (DAQ) devices. The BNC-2110 includes 15 BNC connectors and a terminal block with 30 pins. The BNC-2110 has a 68-pin I/O connector that connects to the E Series and waveform generation DAQ devices. The BNC-2110 is ideal for simplifying connections between your measurement apparatus and your DAQ device in laboratory, test, and production environments.

What You Need to Get Started

To set up and use your BNC-2110 accessory, you need the following:

- BNC-2110 BNC Adapter
- BNC-2110 Desktop and DIN Rail-Mountable BNC Adapter Installation Guide*
- E Series or waveform generation DAQ device and the appropriate cable
- Small straight-blade screwdriver (supplied)

Detailed specifications for the BNC-2110 are in the *Specifications* section found later in this guide.

Configuring Your BNC-2110

This section describes how to configure your BNC-2110 accessory. Figure 1 shows the front panel of the BNC-2110.

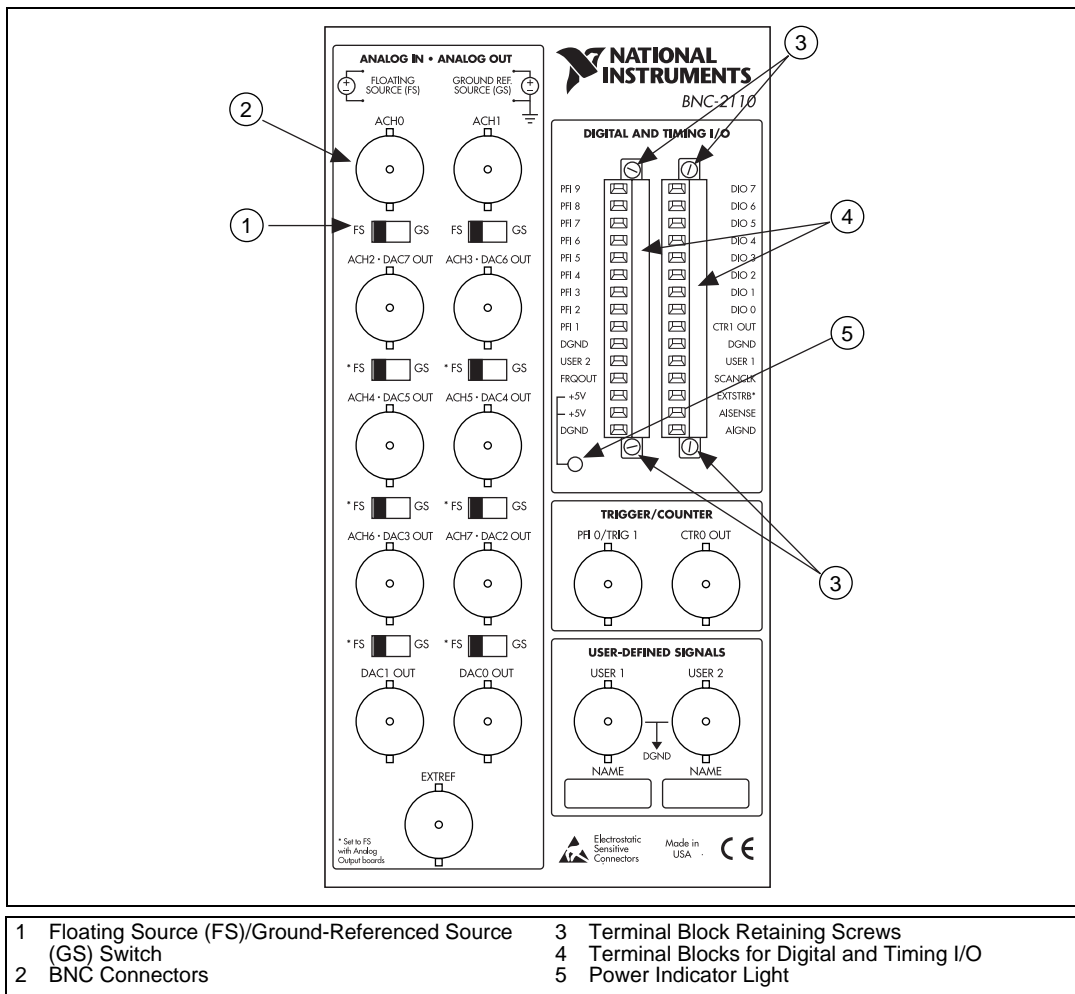


Figure 1. BNC-2110 Front Panel

The BNC-2110 is compatible with all E Series devices as well as with the waveform generation DAQ devices. Some of the connectors on this accessory may have a different function depending on the device to which it is connected.

Table 1 describes the BNC connectors available on the front panel of your BNC-2110.

Table 1. BNC-2110 Connector Signal Descriptions

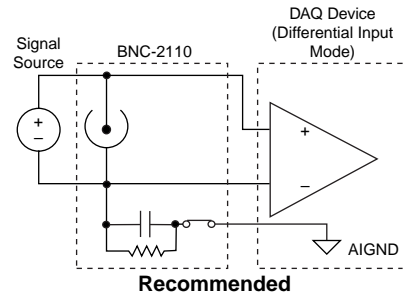
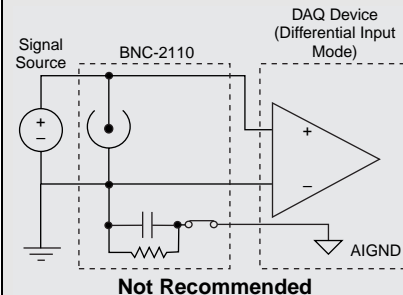
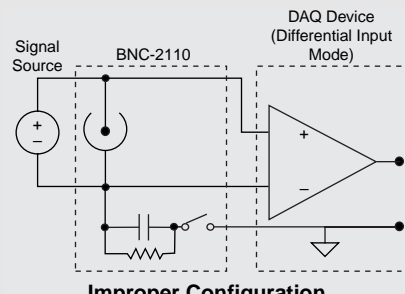
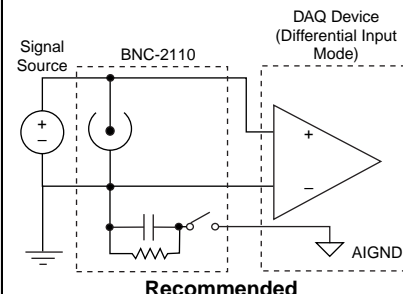
Front Panel BNC Connectors	Signal Description
ACH<0..1>	Differential Analog Channels 0 through 1 ¹
ACH<2..7>/DAC<7..2>OUT	Differential Analog channels 2 through 7 ² or Digital to Analog Converter Outputs 7 through 2 ³ .
DAC<1..0>OUT	Digital to Analog Converter output 1 and 0.
EXTREF	External Reference—This is the external reference input for analog output circuitry.
PFI0/TRIG1	Programmable Function Input 0/Trigger 1—As an input, this is either one of the PFIs or the source for the hardware analog trigger. As an output this is the AI start trigger.
CTROOUT	Counter 0 Output—This is the output from the General-Purpose Counter 0.
USER<1..2>	User-Defined 1—Connected to USER1 and USER2 digital terminal blocks. This connector allows you to use a BNC connector for a digital or timing I/O signal of your choice.
¹ E Series devices only, reserved in waveform generation DAQ devices ² when connected to an E Series device ³ when connected to waveform generation DAQ devices	

Connecting Analog Inputs (E Series Devices Only)

The BNC-2110 provides BNC connectors for up to eight differential analog input channels. These connectors are labeled ACH<0..7>. The number of connectors used for this purpose depends on the device connected.

You can use the BNC-2110 to measure floating and ground-referenced analog input signals. To measure floating signal sources, move the switch located below the BNC connector for the AI channel you are using, to the floating source switch position (labeled FS). In the floating source switch position, the amplifier negative terminal connects to ground through a 5 kΩ resistor in parallel with a 0.1 μF capacitor. Table 2 shows the BNC-2110 switch configuration options.

Table 2. Configuration Summary

BNC-2110 Switch Configuration	Signal Source Types for E Series Devices	
	Floating Source	Ground-Referenced Source
Floating Source (FS)	 <p style="text-align: center;">Recommended</p>	 <p style="text-align: center;">Not Recommended</p>
Ground-Referenced Source (GS)	 <p style="text-align: center;">Improper Configuration</p>	 <p style="text-align: center;">Recommended</p>

To measure ground-referenced signals, move the switch to either the floating or ground-referenced source position. However, for the best performance, use the ground-referenced source position (labeled GS) to avoid ground loops. Refer to your DAQ device user manual for more information on measuring floating and ground-referenced signals.

Connecting Analog Outputs

The BNC-2110 provides BNC connectors for up to eight analog output channels. These connectors are labeled DAC<0..7>OUT. The number of these connectors used for this purpose depends on the device connected to the adapter. When using connectors DAC <7..2>OUT, make sure the switch is in the FS position.

Connecting Digital/Timing I/O

Use both the terminal block plugs and the BNC connectors to connect your digital signals to your DAQ device. Refer to Table 4 to make these connections. When connecting signals to the terminal block plugs, you can use up to 24 AWG wire with the insulation stripped to 0.28 in. Refer to Tables 1 and 3 for the signal names of all the labeled connectors.

The terminal blocks on the BNC-2110 are spring terminals for easy access. You can change these blocks to screw terminals by ordering the screw terminal kit.

Two user-defined BNC connectors, USER1 and USER2, are connected to the terminal blocks on the BNC-2110 front panel. These terminals and their associated BNC connectors give you the flexibility to choose up to two additional digital/timing signals. For example, if an application requires access to SCANCLK and CTR1OUT signals, you can wire the screw terminals labeled SCANCLK and CTR1OUT to the screw terminals labeled USER1 and USER2, respectively. This configures BNC connector USER1 as SCANCLK and USER2 as CTR1OUT.

All of the digital and timing signals from the E Series and waveform generation DAQ devices are available on the front panel of the BNC-2110. Refer to your DAQ device user manual for information on using these signals.

Table 3 describes the digital screw terminals available on the front panel of your BNC-2110.

Table 3. BNC-2110 Digital Screw Terminal Signal Descriptions

Signal	Description¹
PFI<9..1>	Programmable Function Input Lines 9 through 1
DGND	Digital Ground—This pin supplies the reference for the digital signals at the I/O connector as well as the +5 VDC supply.
USER2	User-Defined 2—Connected to USER2 BNC. This terminal is used to provide a user-definable BNC terminal.
FRQOUT	Frequency Output—This output is from the frequency generator output.
+5 V	+5 V Power—These pins are fused on the DAQ device and are self-resetting. The current available depends on the product to which it is connected.
DIO<7..0>	Digital Input/Output Lines 7 through 0—DIO 6 and 7 can control the up/down signal of General-Purpose Counters 0 and 1, respectively.
CTR1OUT	Counter 1 Output—This is the output from the General-Purpose Counter 1 Output.
USER1	User-Defined 1—Connected to USER1 BNC. This screw terminal is used to provide a user-definable BNC signal.
SCANCLK	Scan Clock—This pin pulses once for each A/D conversion when enabled.
EXSTRB*	External Strobe—This is the signal used to control external devices under control of NI-DAQ.
AISENSE ²	Analog Input Sense—This pin serves as the reference node for channels ACH<0..15> in NRSE configurations.
AIGND ²	Analog Input Ground—The analog input voltages are referenced to this node.
¹ Refer to your DAQ device user manual for more information on using these signals. ² E Series devices only	

Cabling

The BNC-2110 has one 68-position connector on the rear panel to connect to your DAQ device. Refer to Table 4 to make this connection.

Table 4. BNC-2110 Cabling Options

DAQ Device	Required Cable
100-pin MIO connector	SH1006868
68-pin SCSI connector	SH6868, SH6868EP ¹ , or R6868
50-pin MIO connector	SH6850 or R6850
¹ SH6868EP is necessary for use with 61XX DAQ devices.	



Caution Do not connect the BNC-2110 to any device other than the National Instruments E Series or waveform generation DAQ devices. Doing so can damage the BNC-2110, the DAQ device, or host computer. National Instruments is *not* liable for damages resulting from these connections.

Installing Your BNC-2110

Refer to Figure 2 as you perform the following steps to connect your BNC-2110 to your DAQ device. Consult your computer user manual or technical reference manual for specific instructions and warnings.



Note You can either place the BNC-2110 on a workbench near the host computer or use the available DIN rail-mount kit.

1. Make sure that switches ACH 0 through ACH 7 are set correctly for your application.
2. Connect the BNC-2110 to your DAQ device. Refer to Table 5 to make sure that you have the proper cable for the DAQ device that you are using.
3. Connect the field signals to the BNC connectors and/or digital screw terminal plugs. Refer to the *Configuring Your BNC-2110* section in this guide for more information.

When you have finished using your BNC-2110, turn off any powered external signals connected to your BNC-2110 before you turn off your computer.

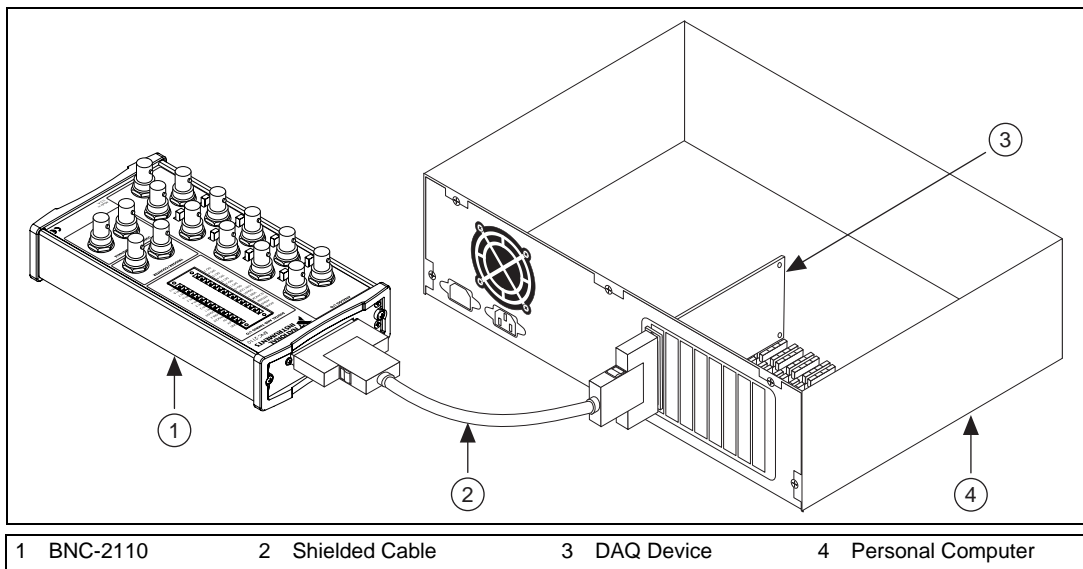


Figure 2. Connecting the BNC-2110 to Your DAQ Device



Warning The BNC-2110 is not designed for input voltages greater than 42 V, even if a user-installed voltage divider reduces the voltage to within the input range of the DAQ device. Input voltages greater than 42 V can damage the BNC-2110, any device connected to it, and the host computer. Overvoltage can also cause an electric shock hazard for the operator. National Instruments is *not* liable for damage or injury resulting from such misuse.

Specifications

This section lists the specifications of the BNC-2110. These specifications are typical at 25 °C unless otherwise specified.

Physical

Dimensions..... 19.05 by 10.48 by 3.51 cm
(7.5 by 4.125 by 1.38 in.)

I/O connector..... One 68-position male connector

Environment

Operating temperature..... 0 to 70 °C

Storage temperature –55 to 125 °C

Relative humidity 5 to 90% noncondensing



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