BNC-2110 DESKTOP AND DIN RAIL-MOUNTABLE BNC ADAPTER

This installation guide describes how to install and configure your BNC-2110 accessory.

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 digital screw terminal with 30 pins. The BNC-2110 has a 68-pin I/O connector that connects to the PCI-60*XXE* and PCI-61*XXE* 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 will need the following:

❑ BNC-2110 BNC Adapter

❑ *BNC-2110 Desktop and DIN Rail-Mountable BNC Adapter Installation Guide*

❑ PCI-60*XXE* or PCI-61*XXE* device and the appropriate cable

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

Configuring Your BNC-2110

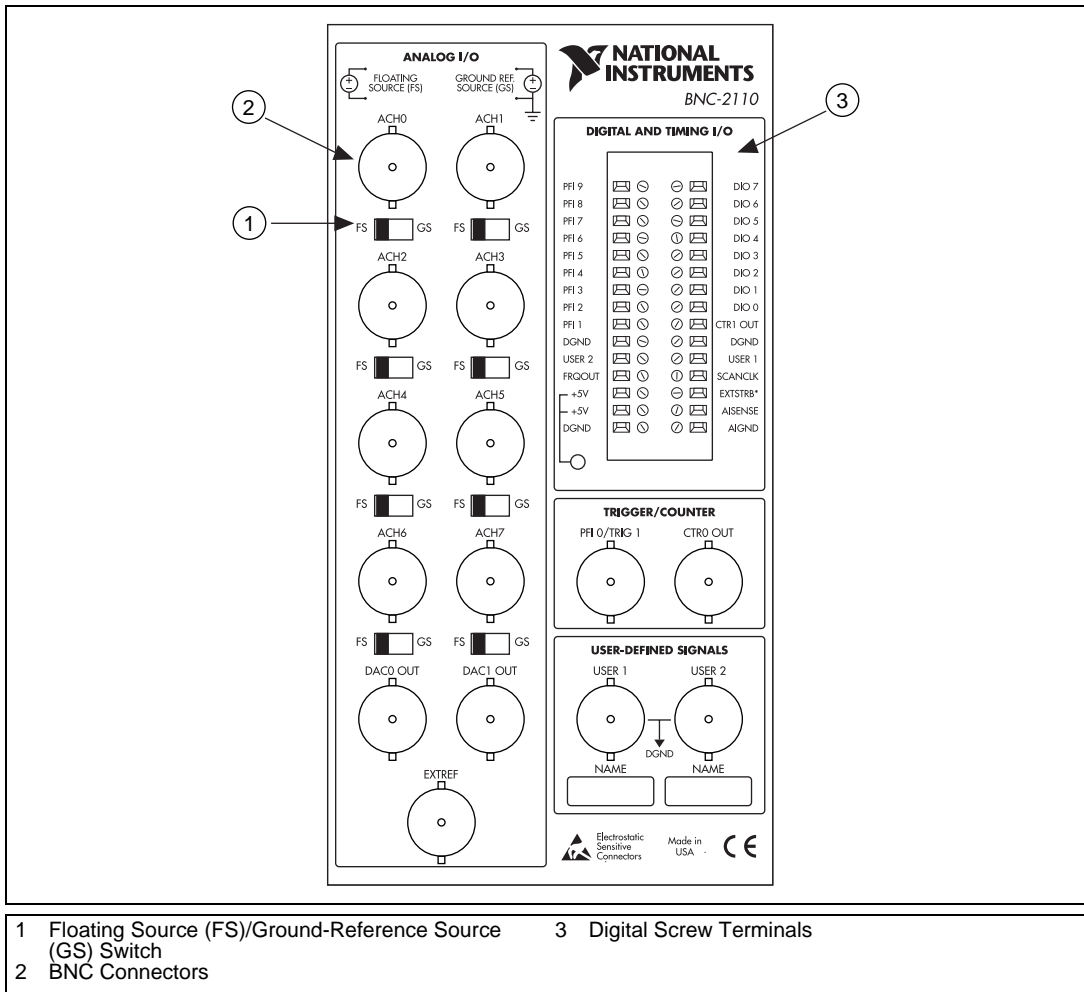This section describes how to configure your BNC-2110 accessory. Figure 1 shows the front panel of the BNC-2110.

1	Floating Source (FS)/Ground-Reference Source (GS) Switch	3	Digital Screw Terminals
2	BNC Connectors		

Figure 1. BNC-2110 Front Panel

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..7>	Differential Analog Channels 0 through 7
DAC0OUT	Digital to Analog Converter 0 Output—This pin supplies the voltage output of analog output channel 0.
DAC1OUT	Digital to Analog Converter 1 Output—This pin supplies the voltage output of analog output channel 1.
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.
CTR0OUT	Counter 0 Output—This is the output from the General-Purpose Counter 0 Output.
USER1	User-Defined 1—Connected to USER1 digital screw terminal block. This connector allows you to modify a signal depending on your application.
USER2	User-Defined 2—Connected to USER2 digital screw terminal block. This connector allows you to modify a signal depending on your application.

Connecting Analog Inputs

You can use the BNC-2110 to measure floating and ground-referenced analog input signals. To measure floating signal sources, move switches ACH0 through ACH7, located below the BNC connectors, to the floating source switch position (labeled FS). In the floating source switch position, the amplifier negative terminal is connected to ground via a 100 MΩ resistor. Table 2 shows the BNC-2110 switch configuration options.

Table 2. Configuration Summary

BNC-2110 Switch Configuration	Signal Source Types	
	Floating Source	**Ground-Referenced Source**
Floating Source (FS)	**Recommended**	**Not Recommended**
Ground-Referenced Source (GS)	**Improper Configuration**	**Recommended**

To measure ground-referenced signals, move the switches to either the floating or ground-referenced source position. However, for 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 connects to the analog output channels on the PCI-60*XXE* and PCI-61*XXE* devices with the DAC0OUT and DAC1OUT BNC connectors.

Connecting Digital I/O Signals

Use both the screw terminal 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 screw terminal 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.

Two user-defined BNC connectors, USER1 and USER2, are connected to the screw terminal blocks on the BNC-2110 front panel. These screw 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 PCI-60*XXE* and PCI-61*XXE* 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

Screw Terminal	Signal Description[1]
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 screw 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 for up to 1 A of +5 V supply. The fuse is self-resetting.
DIO<7..0>	Digital Input/Output Lines 7 through 0—These pins 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.

Table 3. BNC-2110 Digital Screw Terminal Signal Descriptions (Continued)

Screw Terminal	Signal Description[1]
SCANCLK	Scan Clock—This pin pulses once for each A/D conversion when enabled. The low-to-high edge indicates when the input signal can be removed from the input or switched to another signal.
EXSTRB*	External Strobe—This output can be toggled under software control to latch signals or trigger events on external devices.
AISENSE	Analog Input Sense—This pin serves as the reference node for channels ACH<0..15> in NRSE configurations.
AIGND	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.

Table 4 shows the BNC-2110 connectors that you connect to your DAQ device.

Table 4. BNC-2110 Connectors and Device Map

BNC-2110 Connectors	PCI-60*XXE*	PCI-6110E	PCI-6111E
ACH<0..7>	ACH<0..7>	ACH<0..3>	ACH<0..1>
DAC0OUT	DAC0OUT	DAC0OUT	DAC0OUT
DAC1OUT	DAC1OUT	DAC1OUT	DAC1OUT
EXTREF	EXTREF	N/A	N/A
PFI0/TRIG1	PFI0/TRIG1	PFI0/TRIG1	PFI0/TRIG1
CTR0OUT	CTR0OUT	CTR0OUT	CTR0OUT
USER1	USER1	USER1	USER1
USER2	USER2	USER2	USER2

Cabling

The BNC-2110 has one 68-position connector on the rear panel to connect to your DAQ device. Refer to Table 5 to make this connection.

Table 5. BNC-2110 Cabling Options

DAQ Device	Required Cable
100-pin MIO connector	SH1006868
68-pin MIO connector	SH6868, SH6868EP[1], or R6868
50-pin MIO connector	SH6850 or R6850

[1] SH6868EP is necessary for use with 61*XX* DAQ devices.

⚠ **Caution** *Do not connect the BNC-2110 to any device other than the National Instruments PCI-60XXE or PCI-61XXE 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 earlier 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.
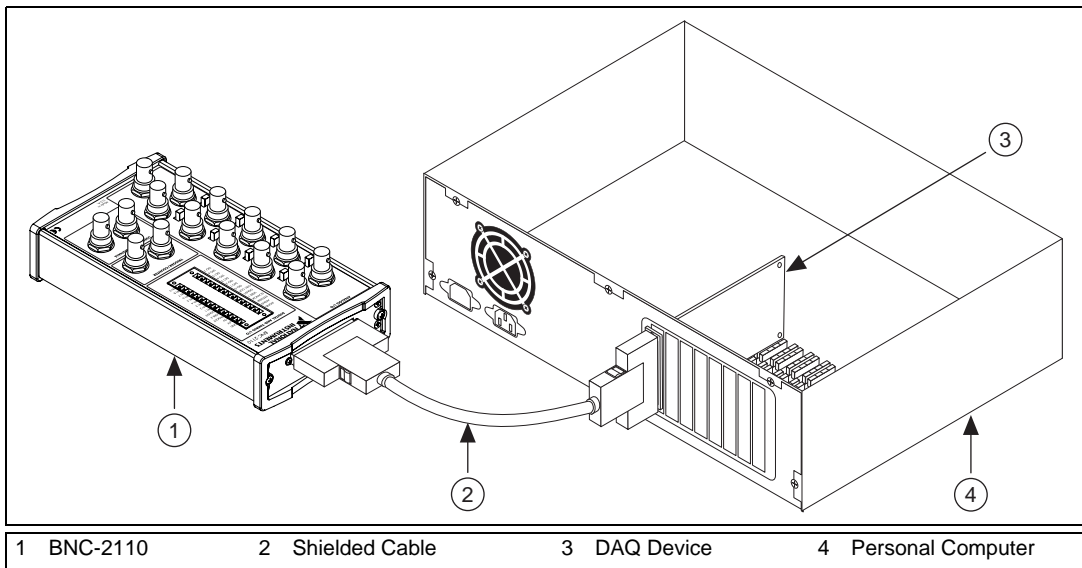
| 1 | BNC-2110 | 2 | Shielded Cable | 3 | DAQ Device | 4 | Personal Computer |

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.

Field connection ....15 BNC connectors (8 analog input connectors, 2 analog output connectors, 1 counter, 1 trigger, 2 user-defined, and 1 external reference)

Screw terminal.......................................30-pin

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

BNC connectors 15

Screw terminal plugs 30

Environment

Operating temperature............................ 0° to 70° C

Storage temperature .... −55° to 125° C

Relative humidity................................... 5% to 90% noncondensing