

BNC-2115 DESKTOP AND DIN RAIL-MOUNTABLE BNC ADAPTER

This installation guide describes how to install and configure your BNC-2115 accessory.

Introduction

The BNC-2115 is a desktop and DIN rail-mountable BNC adapter you can connect directly to data acquisition (DAQ) devices. The BNC-2115 includes 24 BNC connectors and a two-position screw terminal. The BNC-2115 has a 68-pin I/O connector that connects to the extended analog input of 64-channel multifunction I/O (MIO) devices and the extended digital I/O (DIO) of MIO devices. The BNC-2115 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-2115 accessory, you will need the following:

- BNC-2115 BNC adapter
- BNC-2115 Desktop and DIN Rail-Mountable BNC Adapter Installation Guide*
- 64-channel MIO device and SH1006868 cable

Detailed specifications for the BNC-2115 are in the *Specifications* section later in this guide.

Configuring Your BNC-2115

This section describes how to configure your BNC-2115 accessory.

Figure 1 shows the front panel of the BNC-2115.

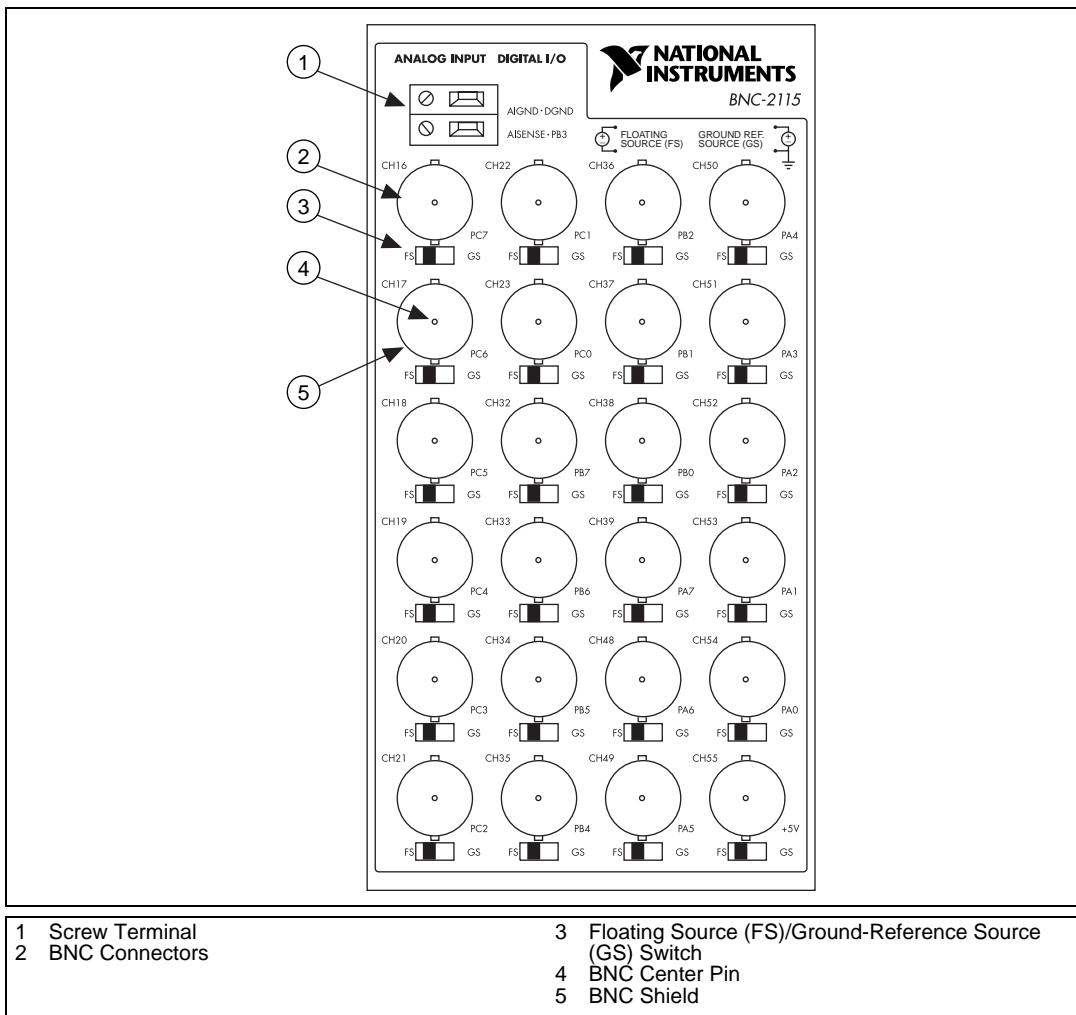


Figure 1. BNC-2115 Front Panel

Tables 1 and 2 describe the connectors available on the front panel of your BNC-2115.

Table 1. BNC-2115 BNC Connector Signal Descriptions

Front Panel BNC Connectors	Signal Description
CH<16..23>	Differential Analog Channels 16 through 23
CH<32..39>	Differential Analog Channels 32 through 39
CH<48..55>	Differential Analog Channels 48 through 55

Table 2. BNC-2115 Two-Position Terminal Block Signal Descriptions

Two-Position Terminal Block Connector	Signal Description
AIGND	Analog Input Ground—The analog input voltages are referenced to this node
AISENSE	Analog Input Sense—This pin serves as the reference node for channels CH<16..63>in NRSE configurations

Connecting Analog Signals

National Instruments recommends that you use the BNC-2115 in differential mode. If you need more analog inputs in your application than are available using differential mode, you can configure your DAQ device in single-ended mode and double the number of analog input channels. See *Operating Your BNC-2115 in Single-Ended Mode*, later in this document, for details.

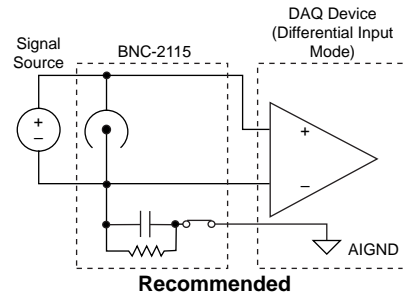
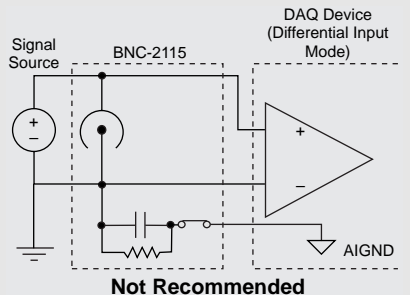
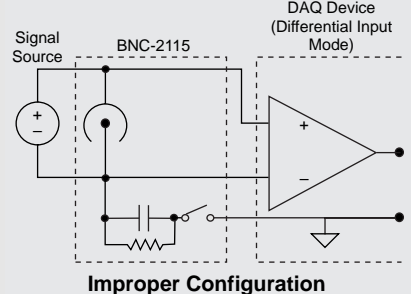
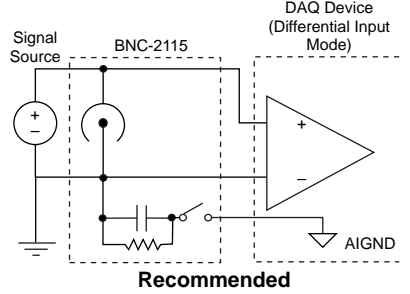
You can use the BNC-2115 to measure floating and ground-referenced analog input signals in differential mode. To measure floating signal sources, move the switch located below the applicable analog input BNC to the floating source switch position (labeled FS). In the floating source switch position, the amplifier negative terminal is connected to ground via a 5 k Ω resistor in parallel with a 0.1 μ F capacitor. Table 3 shows the BNC-2115 switch configuration options.



Note

Measuring floating signal sources, such as isolated battery-powered equipment, with the GS setting will result in incorrect measurements.

Table 3. Configuration Summary

BNC-2115 Switch Configuration	Signal Source Types	
	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 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 Digital I/O Signals

Use the BNC connectors and the two-position screw terminal to connect your digital signals to your DAQ device. The DIO signal can be accessed on the center pin of the applicable BNC connector, while digital ground can be accessed on the outer shield of the BNC connector. Tables 4 and 5 describe the connectors available on the front panel of your BNC-2115 for digital signals.

Table 4. BNC-2115 BNC Connections for Extended DIO Accessory

Front Panel BNC Connectors	Signal Description
PC<0..7>	Bidirectional DIO channels PC<0..7>
PB<0..7>	Bidirectional DIO channels PB<0..7>
PA<0..7>	Bidirectional DIO channels PA<0..7>

Table 5. BNC-2115 Two-Position Terminal Block Connections for Extended DIO Accessory

Two-Position Terminal Block Connector	Signal Description
DGND	Digital Ground—This pin supplies the reference for the digital signals at the I/O connector as well as the +5 VDC supply.
PB3	Port B bit 3—Bidirectional DIO line for Port B.

Table 6 shows the BNC-2115 connectors that you connect to your DAQ device.

Table 6. BNC-2115 Connectors and Device Map

BNC-2115 Signals	DAQ Device Signals			
	PCI-60XXE	PCI-6025	AT-MIO-64E-3	AT-MIO-16DE-10
<CH16..55>	<CH16..55>	—	<CH16..55>	—
DIO Port A	—	DIO Port A	—	DIO Port A
DIO Port B	—	DIO Port B	—	DIO Port B
DIO Port C	—	DIO Port C	—	DIO Port C

Cabling

The BNC-2115 has one 68-pin connector on the rear panel to connect to your DAQ device. Use the SH1006868 cable to connect to one of the following DAQ devices:

- PCI-6031E
- PCI-6033E
- PCI-6071E
- PCI-6025
- AT-MIO-64E-3
- AT-MIO-16DE-10



Caution *Do not connect the BNC-2115 to any device other than the National Instruments devices listed above. Doing so can damage the BNC-2115, the DAQ device, or host computer. National Instruments is not liable for damages resulting from these connections.*

Installing Your BNC-2115

Refer to Figure 2 as you perform the following steps to connect your BNC-2115 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-2115 on a workbench near the host computer or use the available DIN rail-mount kit.*

1. Make sure that switches CH<16..55> are set correctly for your application.
2. Connect the BNC-2115 to your DAQ device with the extended I/O end of the SH1006868 cable.
3. Connect the field signals to the BNC connectors and/or digital screw terminal plugs. Refer to the *Configuring Your BNC-2115* section earlier in this guide for more information.

When you have finished using your BNC-2115, turn off any powered external signals connected to your BNC-2115 before you turn off your computer.

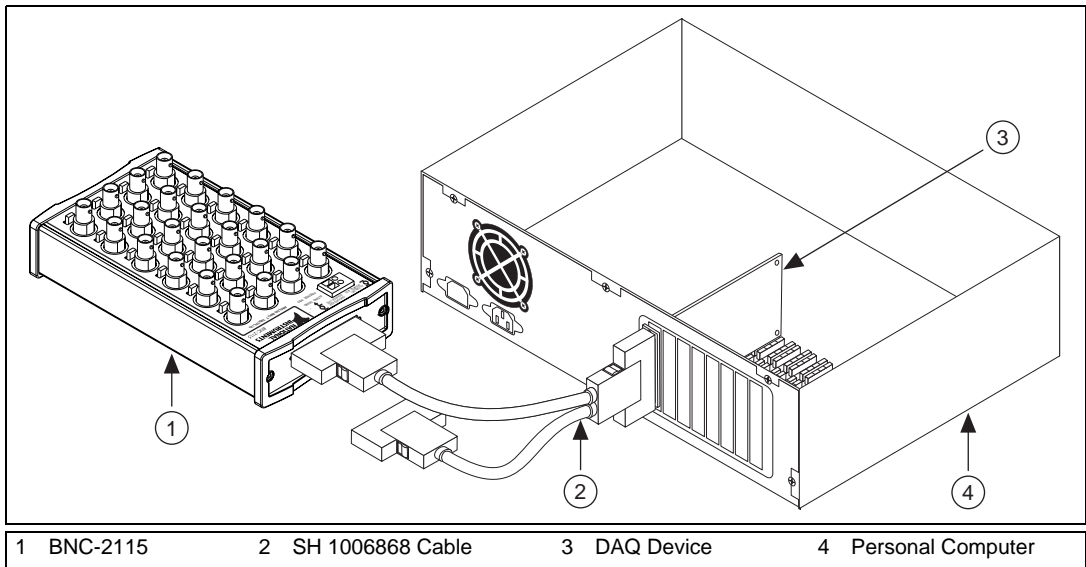


Figure 2. Connecting the BNC-2115 to Your DAQ Device



Warning *The BNC-2115 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-2115, 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.*

Operating Your BNC-2115 in Single-Ended Mode

You can increase the number of analog input channels available by configuring the DAQ device analog input to operate in either referenced single-ended (RSE) mode, or nonreferenced single-ended (NRSE) mode. In either of these modes, each BNC coaxial cable carries two single-ended channels, instead of one differential channel.

To configure the DAQ device analog input, open Measurement & Automation Explorer, select **Devices and Interfaces**, then right-click on the icon for your device. select **Properties** from the menu, then click the **AI** tab and change the analog input (AI) mode to RSE or NRSE. Table 7 shows the connections that you will need to make.

Table 7. Analog BNC Pairs

BNC Center Pin	BNC Outer Shield	Signal Reference	Ground Reference
CH16	CH24	AISENSE	AIGND
CH17	CH25	AISENSE	AIGND
CH18	CH26	AISENSE	AIGND
CH19	CH27	AISENSE	AIGND
CH20	CH28	AISENSE	AIGND
CH21	CH29	AISENSE	AIGND
CH22	CH30	AISENSE	AIGND
CH23	CH31	AISENSE	AIGND
CH32	CH40	AISENSE	AIGND
CH33	CH41	AISENSE	AIGND
CH34	CH42	AISENSE	AIGND
CH35	CH43	AISENSE	AIGND
CH36	CH44	AISENSE	AIGND
CH37	CH45	AISENSE	AIGND
CH38	CH46	AISENSE	AIGND
CH39	CH47	AISENSE	AIGND
CH48	CH56	AISENSE	AIGND
CH49	CH57	AISENSE	AIGND
CH50	CH58	AISENSE	AIGND
CH51	CH59	AISENSE	AIGND
CH52	CH60	AISENSE	AIGND
CH53	CH61	AISENSE	AIGND
CH54	CH62	AISENSE	AIGND
CH55	CH63	AISENSE	AIGND

Specifications

This section lists the specifications of the BNC-2115. These specifications are typical at 25° C unless otherwise specified.

Field connection..... 24 BNC connectors

Screw terminal 2-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 24

Screw terminal plugs 2

Environment

Operating temperature..... 0 to 70 °C

Storage temperature -55 to 125 °C

Relative humidity 5% to 90% noncondensing