

SCXI™-1305 AC/DC COUPLING BNC TERMINAL BLOCK

This guide describes how to install and use your SCXI-1305 AC/DC coupling BNC terminal block.

Introduction

The SCXI-1305 terminal block is a shielded card with BNC and SMB connectors that you can connect to the SCXI-1140, SCXI-1141, SCXI-1120, SCXI-1121, or SCXI-1126 input connectors. You can configure each SCXI-1305 channel to AC- or DC-couple a signal to an SCXI module. Each channel can ground-reference a floating signal with a bias resistor.

The terminal block has eight BNC and one SMB connector for easy connection. The eight BNCs are for signal connections to the eight module inputs. The SMB provides access to module digital signals, HOLDTRIG for the SCXI-1140, and OUTCLK and EXTCLK for the SCXI-1141. These signals are not active on the SCXI-1120, SCXI-1121, and SCXI-1126.



Caution *The SCXI-1305 limits the maximum common-mode voltage of the SCXI-1120, SCXI-1121, and SCXI-1126 to 42 V peak or DC. Exceeding this level may injure you. National Instruments is not liable for damage or injuries resulting from improper connection.*

What You Need to Get Started

- SCXI-1305 terminal block
- SCXI-1305 AC/DC Coupling BNC Terminal Block Installation Guide*
- SCXI chassis
- SCXI-1140, SCXI-1141, SCXI-1120, SCXI-1121, or SCXI-1126 module

SCXI™ is a trademark of National Instruments Corporation. Product and company names mentioned herein are trademarks or trade names of their respective companies.

- Phillips-head number 1 and number 2 screwdrivers
- 1/8 in. flathead screwdriver
- Long-nose pliers
- Wire cutter
- Wire insulation stripper
- SMB cable
- BNC cable

Configuring Floating or Ground-Referenced Signals

Before you install and use your terminal block, you need to determine what type of signal sources are in your SCXI system. Signal sources are either floating or ground-referenced.

A *floating source* is not connected in any way to the building ground system and has an isolated ground-reference point that you cannot assume to be at the same potential as any other ground. Examples of floating sources include transformers, insulated thermocouples, optical isolators, isolation amplifiers, and battery-powered devices.

A *ground-referenced* source is connected to the building ground and shares a common ground with the DAQ board, assuming that your computer is connected to the building power supply. Examples of ground-referenced signals are the nonisolated outputs of any devices that plug into the building power supply, such as signal generators and power supplies. Isolated outputs do not constitute ground-referenced sources; you should treat them as floating sources.

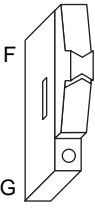

You should reference an input signal to ground at only one point. Therefore, do not reference the input of a differential amplifier module to ground if the signal source is already ground-referenced. If you are measuring a floating source, on the other hand, reference the input to ground.

To ground-reference a floating signal for each channel, use the switch settings shown in Table 1. Each channel has one switch with two positions as follows:

- Use the F position with floating signal sources. Setting one of these switches to the F position connects a 100 k Ω resistor between the negative input for the channel and analog ground. This resistor supplies the necessary reference to ground for the channel. Do not use this position with the SCXI-1120, SCXI-1121, or SCXI-1126.

- Use the G position with ground-referenced sources. Setting the switch to the G position disconnects the resistor from the signal path. Always use this position on the SCXI-1120, SCXI-1121, and SCXI-1126.

Table 1. Floating and Ground-Referenced Signal Configuration

Switch Position	Description
	References floating signals to ground.
	Disconnects ground-reference resistor; use for signals that are already ground-referenced (factory setting). This is the SCXI-1120, SCXI-1121, and SCXI-1126 position.

Refer to Figure 2 for the floating and ground-referenced signal configuration switch locations.

Configuring Your Channels for AC or DC Coupling

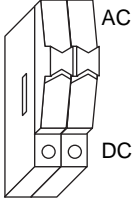
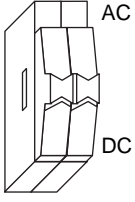
You can configure each channel for either AC or DC coupling using the switch settings shown in Table 2. Change any switch settings before you connect signals to the terminal block. Each channel requires you to set two switches in the same position for the coupling circuitry to operate properly. Configure the channels as follows:

- For AC coupling, set both switches to the AC position. The AC position places single-pole highpass filters in the paths of both the positive and negative inputs for the channel. Each filter consists of a 1 μ F DC blocking capacitor and a 1 M Ω resistor to analog ground¹, giving a –3 dB cutoff frequency of 0.16 Hz. The capacitors can block up to 50 VDC.
- For DC coupling, set both switches to the DC position. DC coupling removes the filters from the signal paths and connects the BNCs

¹ For the SCXI-1120, SCXI-1121, and SCXI-1126, there is an effective 2 M Ω resistor instead of two 1 M Ω resistors. This 2 M Ω resistor is referenced to the negative input of the SCXI-1120, SCXI-1121, and SCXI-1126 instead of ground to maintain the SCXI-1120, SCXI-1121, and SCXI-1126 isolation.

directly to the module inputs. Always use this position on the SCXI-1121 excitation channels.

Table 2. AC/DC Coupling Configuration

Switch Position	Description
	<p>Use for AC coupling of the input signal.</p>
	<p>Use for DC coupling of the input signal (factory setting). Use this position for the SCXI-1121 excitation channels.</p>

Refer to Figure 2 for the AC/DC coupling configuration switch locations.

Configuring Your Clock

Due to space limitations, a jumper, W1, inside the terminal block is used to select which clock goes to the SMB connector. See Figure 2 for location of W1. Refer to your *SCXI-1140 User Manual* or *SCXI-1141 User Manual* for the use of these clocks.

Connecting Signals

To connect the signal to the terminal block, perform the following steps, referring to Figures 1 and 2 as necessary:

1. Unscrew the top cover screws and remove the cover.
2. Configure each of the AC/DC coupling and ground-referencing switches, depending on the signal you are measuring. The top set of switches (S1, S2, and S3) corresponds to input channel 0, the next set down (S4, S5, and S6) corresponds to input channel 1, and so on. The bottom set of switches (S22, S23, and S24) corresponds to input channel 7. Refer to Figure 2 for the switch locations.

3. If using your SCXI-1305 with an SCXI-1140 or SCXI-1141, configure the SMB connector function (jumper W1). See Figure 2 for locations.
4. Reinstall the top cover and tighten the top cover screws.
5. Connect your signal wires to the BNC and SMB connectors. Signal names printed in black are for the SCXI-1120, SCXI-1126, SCXI-1140, and SCXI-1141. Signal names printed in blue are for the SCXI-1121. When connecting your signals to the SCXI-1305, follow the labeling on the SCXI-1305 for the appropriate module, as indicated in Figure 2.
6. Connect the terminal block to the module front connector as explained in the [Installing the Terminal Block](#) section later in this guide.

Figure 1 shows the SCXI-1305 terminal block parts locator diagram.

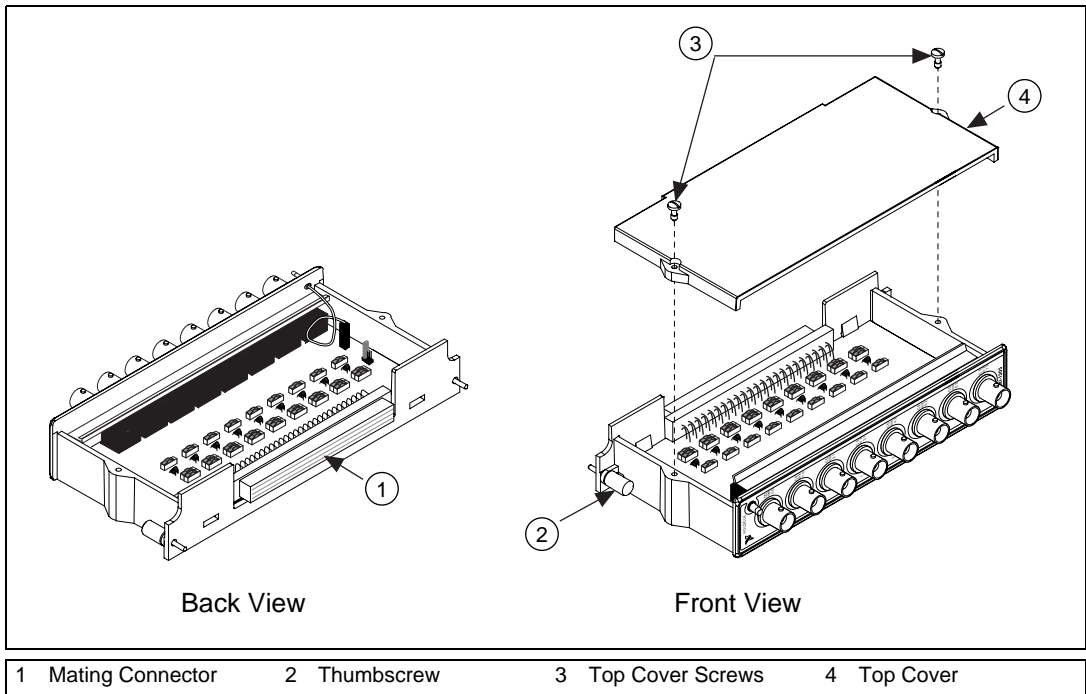


Figure 1. SCXI-1305 Parts Locator Diagram

Figure 2 shows the SCXI-1305 signal connections.

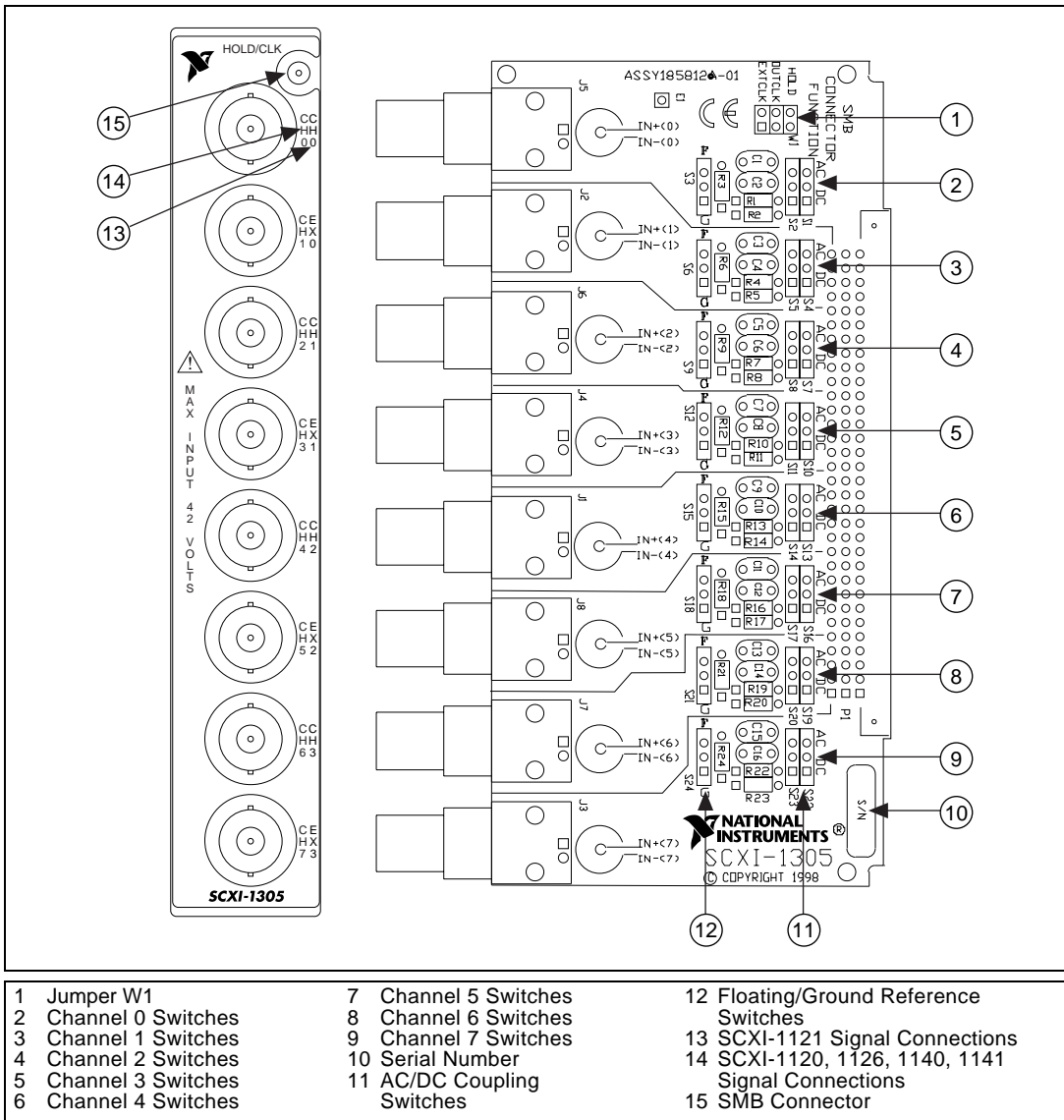


Figure 2. SCXI-1305 Signal Connections



Note

Signal names printed in black (the first name in the pair) are for the SCXI-1120, SCXI-1126, SCXI-1140, and SCXI-1141. Signal names printed in blue (the second name in the pair) are for the SCXI-1121.

Installing the Terminal Block

To connect the terminal block to the SCXI module front connector, perform the following steps:

1. Connect the module front connector to its mating connector on the terminal block.
2. Tighten the top and bottom thumbscrews on the back of the terminal block to hold it securely in place.

Cleaning the Terminal Block

Clean the terminal block by brushing off light dust with a soft, nonmetallic brush. Remove other contaminants with deionized water and a stiff nonmetallic brush. The unit must be completely dry and free from contaminants before returning to service.

Circuit Diagram

You do not need to read this section to operate the SCXI-1305. The circuit diagram in Figure 3 is optional information that you can use if you want more details about the SCXI-1305 circuitry. Figure 3 shows the circuitry for one of the eight analog channels.

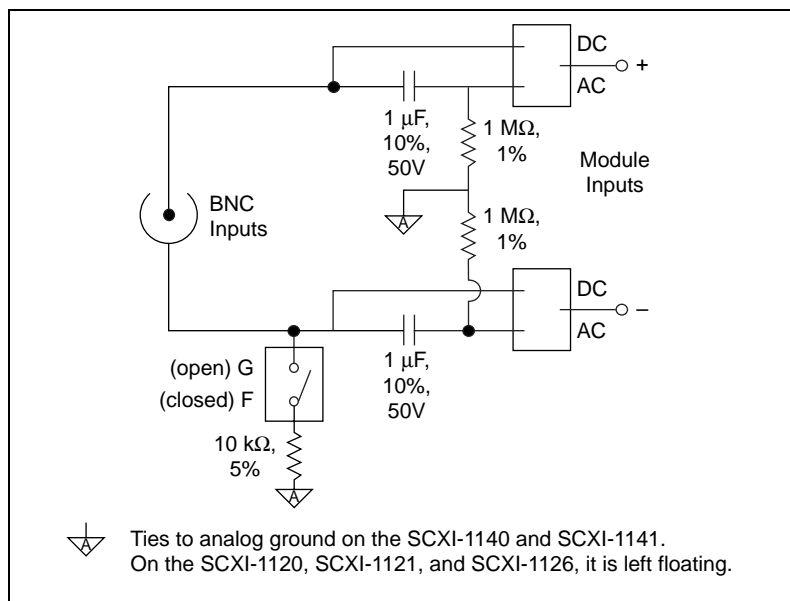


Figure 3. SCXI-1305 Circuit Diagram



322313A-01

Feb99