

# SCXI-1304 AC/DC COUPLING TERMINAL BLOCK

This guide describes how to install and use the SCXI-1304 AC/DC coupling terminal block with the SCXI-1140 and SCXI-1141 modules.

## Introduction

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The SCXI-1304 AC/DC coupling terminal block is a shielded board with screw terminals that you can connect to the SCXI-1140 or SCXI-1141 input connector. You can configure each SCXI-1304 channel to provide AC or DC coupling of a signal to the SCXI module, and each channel can ground reference a floating signal with a bias resistor.

The terminal block has 22 screw terminals for easy connection. Eight pairs of screw terminals are for signal connections to the eight module inputs, and one pair of terminals connects to the module analog ground. The remaining four screw terminals provide access to the digital ground and digital signals of the module; these signals are HOLDTRIG for the SCXI-1140 and OUTCLK and EXTCLK for the SCXI-1141.

## What You Need to Get Started

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To set up and use your SCXI-1304 terminal block, you need the following items:

- SCXI-1304 AC/DC coupling terminal block
- SCXI-1304 AC/DC Coupling Terminal Block Installation Guide*
- SCXI chassis
- SCXI-1140 or SCXI-1141 module
- No. 1 and No. 2 Phillips-head screwdrivers
- 1/8 in. flathead screwdriver

- Long-nose pliers
- Wire cutter
- Wire insulation stripper

## Floating and Ground-Referenced Signal Configuration

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Signal sources are either floating sources or ground-referenced sources.

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

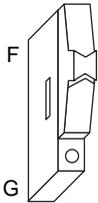
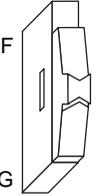
A *ground-referenced source* is connected to the building ground and thus shares a common ground with the DAQ board, assuming that your computer is connected to the building power supply as well. Examples of ground-referenced signals are the nonisolated outputs of any devices that plug into the building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

In general, 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.

You can ground reference a floating signal for each channel by using the switch settings shown in Table 1. Each channel has one switch with two positions as follows:

- Use position F with floating signal sources. Setting one of these switches to position F connects a 100 k $\Omega$  resistor between the negative input screw terminal for the channel and analog ground. This resistor provides the necessary reference to ground for the channel.
- Use position G with ground-referenced sources. Setting the switch to position G disconnects the resistor from the signal path.

**Table 1.** Floating and Ground-Referenced Signal Configuration

Switch Position	Description
	Use this setting to provide a reference to ground for floating signals.
	Use this setting for signals that are already ground referenced (factory setting).

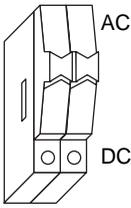
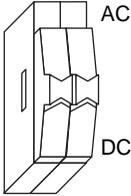
Refer to the parts locator diagram in Figure 1 for the floating and ground-referenced signal configuration switch locations.

## AC/DC Coupling Configuration

You can configure each channel for either AC or DC coupling using the switch settings shown in Table 2. Each channel requires two switches that must be in the same position for the coupling circuitry to operate properly. Configure the channels as follows:

- Set both switches to the AC position to AC couple the input signal. Position AC places single-pole highpass filters in the paths of both the positive and negative inputs for the channel. Each filter consists of a 1  $\mu$ F DC blocking capacitor and a 1 M $\Omega$  resistor to analog ground, giving a -3 dB cutoff frequency of 0.16 Hz. The capacitors are capable of blocking up to 50 VDC.
- Set both switches to the DC position to DC couple the input signal. DC coupling removes the filters from the signal paths and connects the screw terminals directly to the module inputs.

**Table 2.** AC/DC Coupling Configuration

Switch Position	Description
 <p>The diagram shows a switch mechanism with two positions. The top position is labeled 'AC' and the bottom position is labeled 'DC'. The switch is currently in the top 'AC' position.</p>	Use this setting to AC couple the input signal.
 <p>The diagram shows a switch mechanism with two positions. The top position is labeled 'AC' and the bottom position is labeled 'DC'. The switch is currently in the bottom 'DC' position.</p>	Use this setting to DC couple the input signal (factory setting).

Refer to the parts locator diagram in Figure 1 for the AC/DC coupling configuration switch locations.

## Signal Connection

When connecting your signals to the SCXI-1304, follow the labeling on the SCXI-1304 for the appropriate module, as indicated in Figure 2.

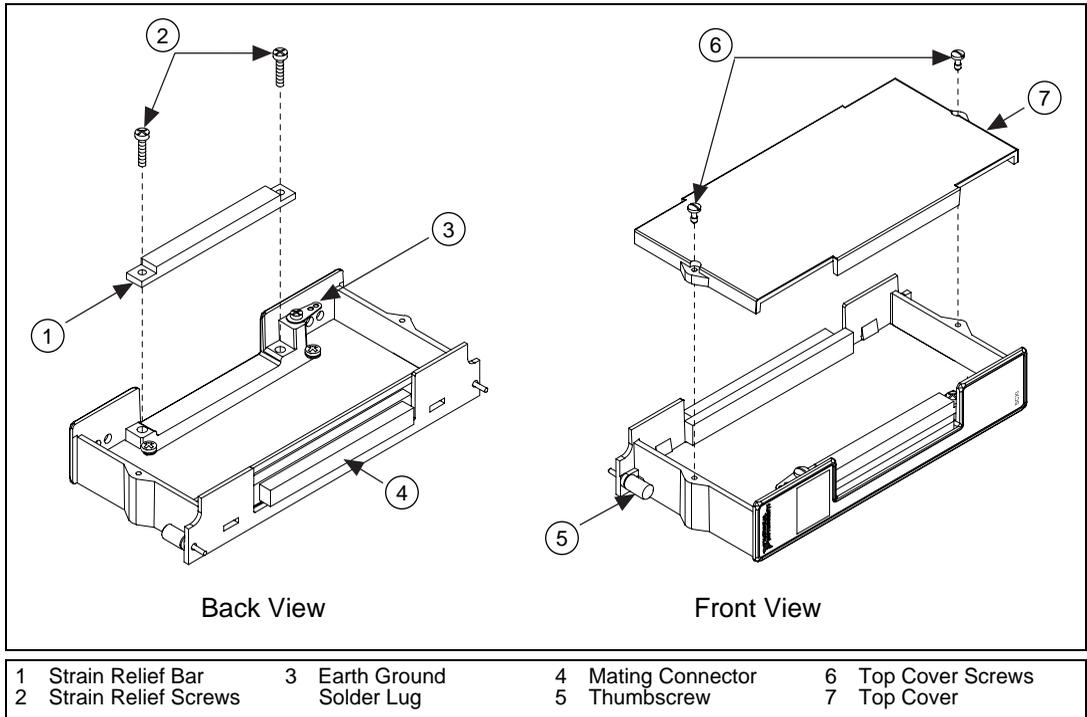
To connect the signal to the terminal block, perform the following steps, referring to Figures 1 and 2 as necessary:

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 the parts locator diagram Figure 2 for the switch locations.
3. Loosen the strain-relief screws and remove the strain-relief bar.
4. Run the signal wires through the strain-relief opening. You can add insulation or padding if necessary.
5. Prepare your signal wire by stripping the insulation no more than 7 mm.
6. Connect the wires to the screw terminals by inserting the stripped end of the wire fully into the terminal. No bare wire should extend past the

screw terminal. Exposed wire increases the risk of shorting and causing a failure.

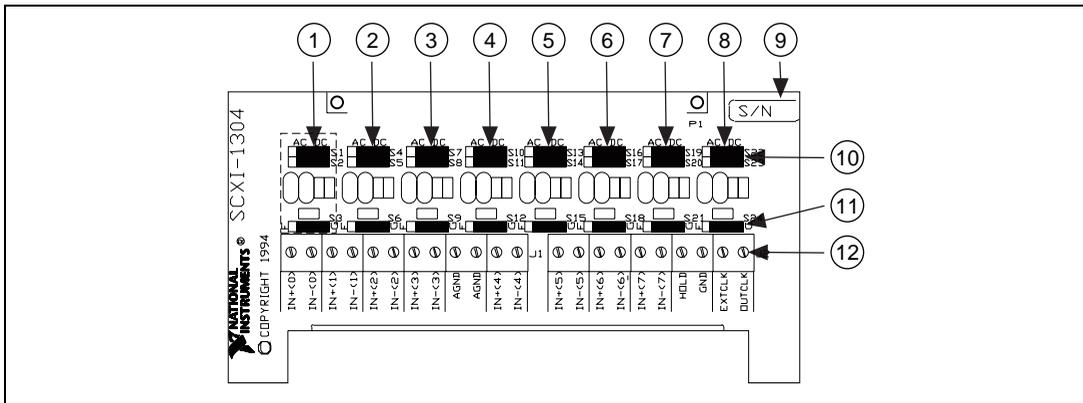
7. Tighten the screw terminal to a torque of 5–7 in.-lb.
8. Connect your shield or earth ground to the earth ground solder lug.
9. Reinstall the strain-relief bar and tighten the strain-relief screws.
10. Reinstall the top cover and tighten the top cover screws.
11. Connect the terminal block to the module front connector as explained in the *Installation* section later in this guide.

Figure 1 shows the SCXI-1304 terminal block parts locator diagram.



**Figure 1.** SCXI-1304 Parts Locator Diagram

Figure 2 shows the SCXI-1304 signal connections.



1 Channel 0 Switches	5 Channel 4 Switches	9 Serial Number
2 Channel 1 Switches	6 Channel 5 Switches	10 AC/DC Coupling Switches
3 Channel 2 Switches	7 Channel 6 Switches	11 Floating/Ground Reference Switches
4 Channel 3 Switches	8 Channel 7 Switches	12 Screw Terminals

Figure 2. SCXI-1304 Signal Connections

## Installation

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

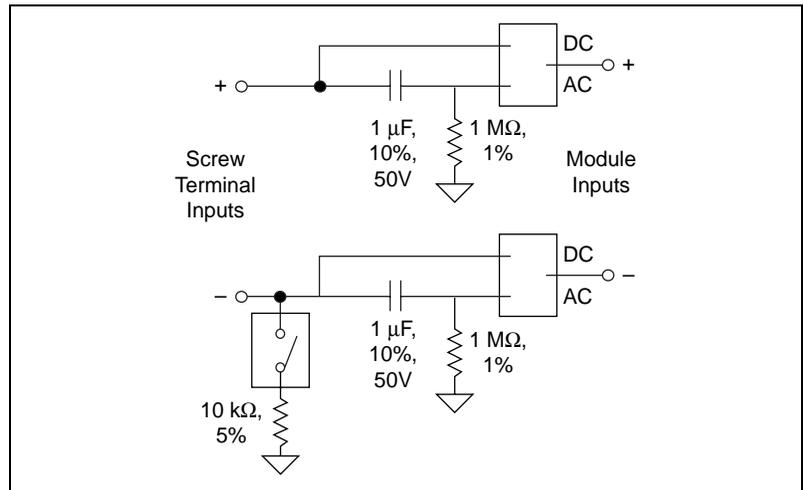
1. Connect the module front connector to its mating connector on the terminal block.
2. Tighten the top and bottom thumbscrews on the back of the terminal block to hold it securely in place.

## 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-1304. The circuit diagram in Figure 3 is optional information that you can use if you want more details about the SCXI-1304 circuitry. Figure 3 shows the circuitry for one of the eight analog channels.



**Figure 3.** SCXI-1304 Circuit Diagram



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