SC-1608 Series

USB and Ethernet DAQ Devices with Isolated Analog and Digital Signal Conditioning

SC-1608-2AO-ENET

SC-1608X-2AO-USB

SC-1608X-USB

SC-1608-USB

User's Guide

MEASUREMENT COMPUTING™

Trademark and Copyright Information

Notice

Measurement Computing Corporation does not authorize any Measurement Computing Corporation product for use in life support systems and/or devices without prior written consent from Measurement Computing Corporation. Life support devices/systems are devices or systems that, a) are intended for surgical implantation into the body, or b) support or sustain life and whose failure to perform can be reasonably expected to result in injury. Measurement Computing Corporation products are not designed with the components required, and are not subject to the testing required to ensure a level of reliability suitable for the treatment and diagnosis of people.

Table of Contents

About this User's Guide

What you will learn from this user's guide

This user's guide describes the Measurement Computing SC-1608 Series family of USB and Ethernet DAQ devices with isolated analog and digital signal conditioning, and lists specifications.

Conventions in this user's guide

For more information

Text presented in a box signifies additional information related to the subject matter.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

bold text **Bold** text is used for the names of objects on a screen, such as buttons, text boxes, and check boxes.

italic text *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase.

Where to find more information

Additional information about SCC-8-8-2 hardware is available on our website at www.mccdaq.com. You can also contact Measurement Computing with specific questions.

- Knowledgebase: kb.mccdaq.com
- Tech support form: www.mccdaq.com/support/support_form.aspx
- Email: techsupport@mccdaq.com
- Phone: 508-946-5100 and follow the instructions for reaching Tech Support

For international customers, contact your local distributor. Refer to the International Distributors section on our website at www.mccdaq.com/International.

Default configuration

Each SC-1608 Series product has switches and jumpers on the baseboard that should be configured before use. Refer to Figure 1 and the table below list the location and default setting of each configurable item. Refer to the Functional Details chapter on page 14 for more information about each item.
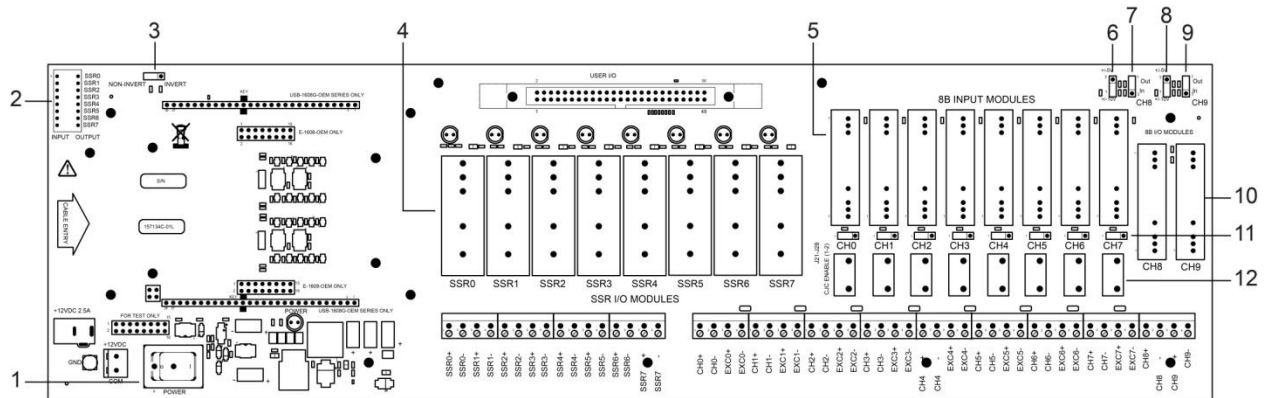
Figure 1. Configurable component locations

Callout	Designation	Description	Default Configuration
1	SW1 (POWER)	Power switch	Off
2	SW2	8-position DIP switch for SSR module direction	All OUTPUT
3	W1	Non-invert/Invert logic control jumper	INVERT
4	SSR0 to SSR7	Mounting locations for SSR digital I/O modules	Unpopulated
5	CH0 to CH7	Mounting locations for 8B input modules	Unpopulated
6	J30	AOUT0 voltage divider for module location CH8 (U9)	±10 V
7	J29	AOUT0 readback or convert location CH8 (U9) to input	OUT (no function)
8	J32	AOUT1 voltage divider for module location CH9 (U10)	±10 V
9	J31	AOUT1 readback or convert location CH9 (U10) to input	OUT (no function)
10	CH8 to CH9	Mounting locations for 8B I/O modules (analog voltage input or voltage/current output)	Unpopulated
11	J21 to J28	CJC Enable jumpers	All Disabled
12	R1 to R8	Resistor locations	Unpopulated

Introducing the SC-1608 Series

The SC-1608 Series is a family of products that integrate DAQ functionality, isolated analog signal conditioning, and isolated digital I/O signal conditioning on one board. The SC-1608 Series includes the following products:

SC-1608 Series Product	Components
SC-1608-2AO-ENET	SCC-8-8-2 baseboard and power supply, E-1608-OEM, cable, accessory kit
SC-1608X-2AO-USB	SCC-8-8-2 baseboard and power supply, USB-1608GX-2AO-OEM, cable, accessory kit
SC-1608X-USB	SCC-8-8-2 baseboard and power supply, USB-1608GX-OEM, cable, accessory kit
SC-1608-USB	SCC-8-8-2 baseboard and power supply, USB-1608G-OEM, cable, accessory kit

You can install industry-standard 8B analog signal conditioning modules and solid state relay (SSR) digital I/O modules onto the baseboard. The SC-1608 Series can be installed in a rack mount enclosure or used on a bench.

SCC-8-8-2 baseboard

The SCC-8-8-2 baseboard provides the following features:

- Connectors for mating with a USB-1608G-OEM Series board or E-1608-OEM board.
- Mounting locations for eight 8B analog input modules and two 8B analog input or output modules.

  8B modules provide 500 V channel-to-channel isolated signal conditioning for voltage, thermocouples, RTD, strain gauge, current and frequency type signals.

- Mounting locations for eight SSR digital I/O modules.
  - o SSR digital I/O modules are isolated relay control modules that sense AC/DC voltages from a field source and respond with a digital output signal, or to switch and control AC/DC loads using a digital signal. You set the module type for input or output, and the logic polarity to invert or non-invert.
- 50-pin User I/O header connector.
  - o The 50-pin User I/O header connector is where all non-conditioned input and output signals are available for user connections.
- Screw terminals to access all conditioned analog and digital signals.

The SCC-8-8-2 baseboard is powered with a supplied 12 volt, 30 watt external power supply. An alternate power header is available to connect a user-supplied 12 VDC power supply.

Integrated DAQ Functionality

The USB-1608G-OEM Series board or E-1608-OEM mates directly onto the SCC-8-8-2 baseboard.

Unless a feature is applicable only to a specific SC-1608 Series product, this document refers to the USB-1608G-OEM Series and E-1608-OEM board as *OEM DAQ board*.

USB-1608G-OEM Series

The USB-1608G-OEM Series includes the USB-1608GX-2AO-OEM, USB-1608GX-OEM, and USB-1608G-OEM. These boards provide the following features:

- Eight differential (DIFF) or 16 single-ended (SE) analog input channels (SE mode is required for use with 8B analog I/O modules)
- Sample rates up to 500 kS/s aggregate
- Two analog output channels (USB-1608GX-2AO-OEM)
- Eight individually-configurable digital I/O channels
- Two counter channels (32-bit) that count TTL pulses
- One timer output channel (32-bit)
- Header connectors for mating with the SCC-8-8-2 baseboard

OEM Hardware manuals

Refer to the hardware manual for each USB-1608G-OEM Series board for more information about the DAQ features.

- USB-1608GX-2AO-OEM: www.mccdaq.com/PDFs/manuals/USB-1608GX-2AO-OEM.pdf
- USB-1608GX-OEM: www.mccdaq.com/PDFs/manuals/USB-1608GX-OEM.pdf
- USB-1608G-OEM: www.mccdaq.com/PDFs/manuals/USB-1608G-OEM.pdf

E-1608G-OEM

The E-1608-OEM provides the following features:

- Four differential (DIFF) or eight single-ended (SE) analog input channels (SE mode is required for use with 8B analog I/O modules)
- Sample rates up to 250 kS/s aggregate
- Two analog output channels (16-bit)
- Eight individually-configurable digital I/O channels
- One counter channel (32-bit) that counts TTL pulses
- Header connectors for mating with the SCC-8-8-2 baseboard

Hardware manual

Refer to the E-1608-OEM hardware manual at www.mccdaq.com/PDFs/manuals/E-1608-OEM.pdf for more information about its DAQ features

Functional block diagrams

SC-1608X-2AO-USB

Figure 2 shows the functionality provided by a SC-1608X-2AO-USB with analog I/O 8B modules and digital I/O SSR modules installed. The SC-1608X-USB and SC-1608-USB provide the same functionality without the analog output capability.
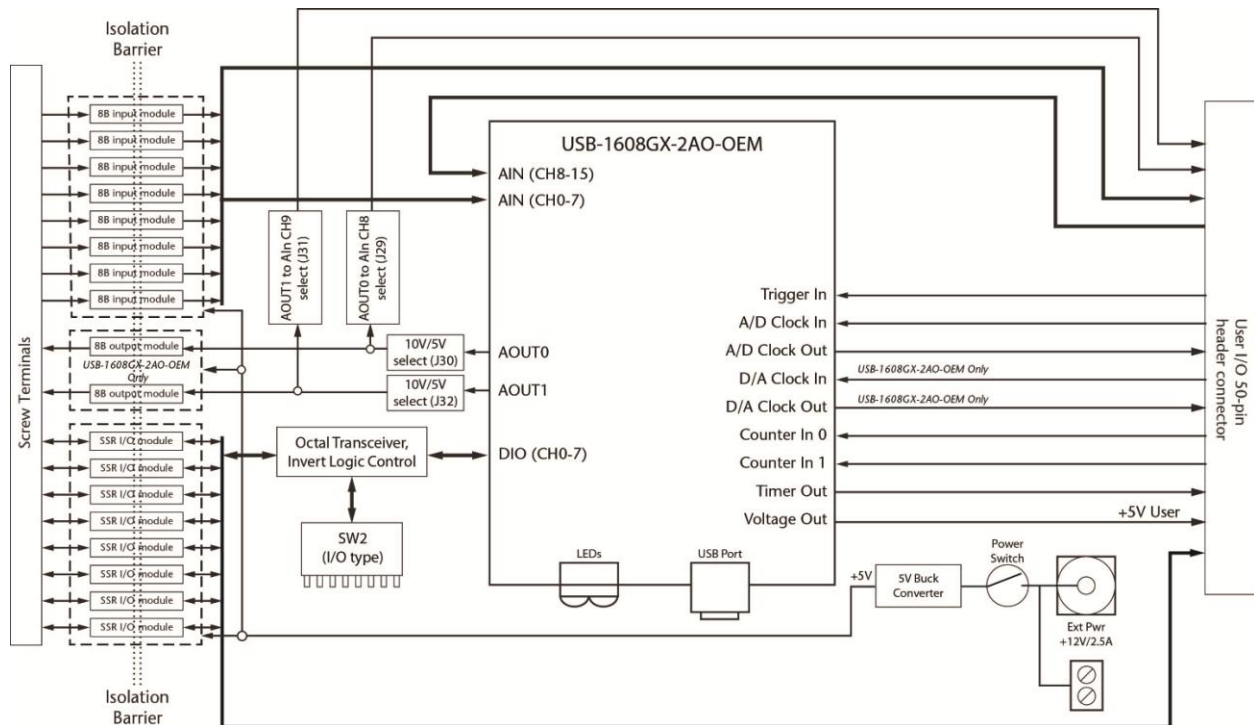
Figure 2. SC-1608X-2AO-USB functionality

The USB-1608G-OEM Series devices receive power from the +5 V USB supply from your computer.

SC-1608-2AO-ENET

Figure 3 shows the functionality provided by a SC-1608-2AO-ENET with analog I/O 8B modules and digital I/O SSR modules installed.
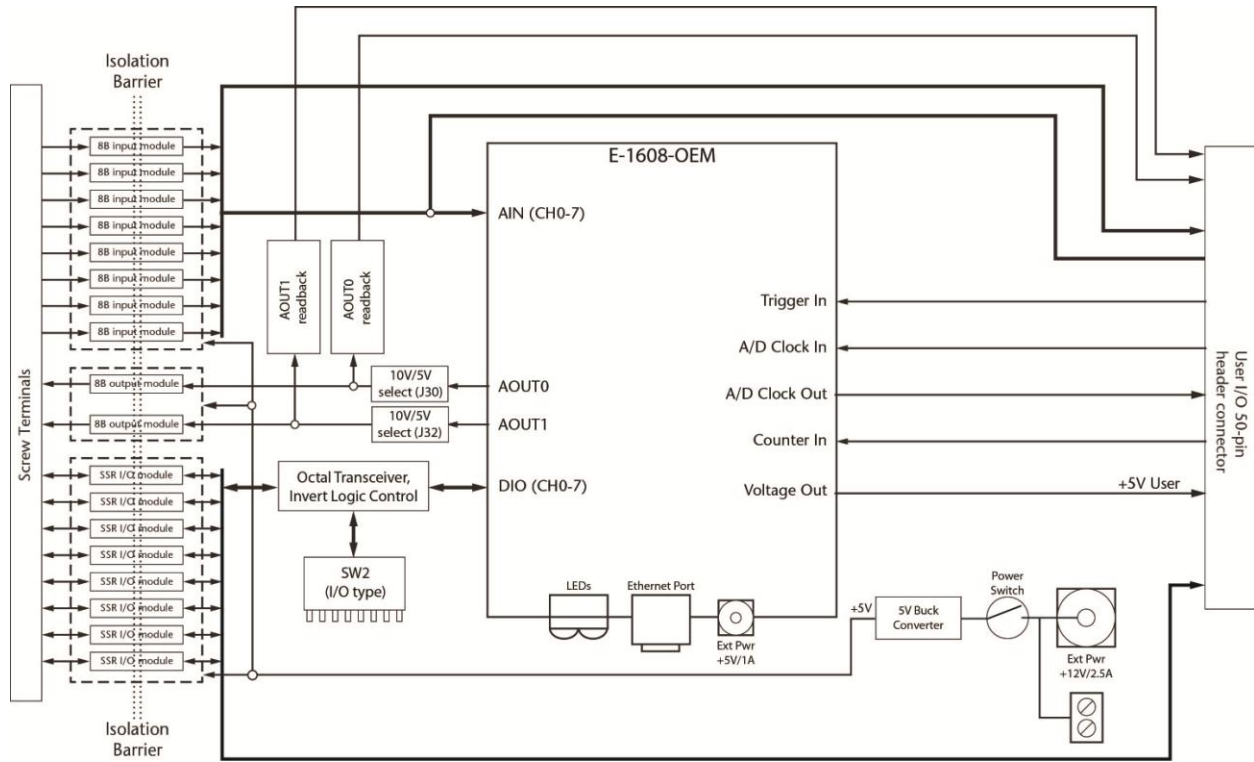
Figure 3. SC-1608-2AO-ENET functionality

The E-1608-OEM receives power from the included external supply when the baseboard is powered on. When connected to the baseboard, the E-1608-OEM power header connector (**W1** on the OEM DAQ board) mates with the +5 V power header connector (**J37**) on the baseboard. No additional supply is required.

Compatible modules

When using the SC-1608X-2AO-USB, SC-1608X-USB, SC-1608-USB, the total current available for 8B analog I/O modules and SSR digital I/O modules is 1612 mA, maximum. When using the SC-1608-2AO-ENET, the total current available for 8B analog I/O modules and SSR digital I/O modules is 1292 mA, maximum. Keep these values in mind when installing modules.

SSR digital I/O control modules

SSR digital I/O modules are solid state relay control modules that provide 4000 Vrms optical isolation. Digital input modules sense AC/DC voltages from field devices and convert them to digital TTL signals. Digital output modules use TTL signals to switch and control AC/DC loads.

The baseboard has eight locations for single channel solid state relay modules. The input/output type is configured with onboard switch **SW2**. The polarity is configured with onboard jumper **W1**. The table below lists the input and output modules that you can install.

SSR digital I/O modules compatible with the SC-1608 Series

SSR module type	Description
SSR-IAC-05	AC sense, 90 to 140 VAC/VDC
SSR-IAC-05A	AC sense, 180 to 280 VAC/VDC
SSR-IDC-05	DC sense, 3 to 32 VDC

SSR module type	Description
SSR-IDC-05NP	DC sense, 10 to 32 VDC non-polarized digital inputs
SSR-OAC-05	AC switch, 24 to 140 VAC, 3.5 A @ 120 VAC
SSR-OAC-05A	AC switch, 24 to 280 VAC, 3.5 A @ 240 VAC
SSR-ODC-05	DC switch, 1 to 60 VDC @ 3.5 A
SSR-ODC-05A	DC switch, 4 to 200 VDC @ 3.5 A

8B analog I/O signal conditioning modules

8B analog modules provide 500 V channel-to-channel isolated analog I/O signal conditioning. Mix and match per channel between supported voltage, TC, RTD, strain gage, current, and frequency type signals.

- 8B analog input modules isolate, filter, and amplify an input signal and provide an analog voltage output.
- 8B analog output modules accept an input signal from a non-isolated source, then isolate, filter, and convert the signal to a voltage or current output.

The baseboard has eight locations for 8B analog input modules, and two locations for 8B analog input or analog output modules.

The following table lists the 8B analog I/O module types you can install, and the maximum number of each module that can be installed:

8B analog I/O modules compatible with the SC-1608 Series

8B module type	Measurement type	Max number of supported modules*	
		Ethernet version	**USB version**
8B30/31	Voltage input, 3 Hz bandwidth	8	8 or 10*
8B32	Current input, 0-20 mA, 4-20 mA	8	8 or 10*
8B33	Isolated true RMS input	8	8 or 10*
8B34	Linearized 2- or 3-wire RTD input	8	8
8B35	Linearized 4-wire RTD input	8	8
8B38	Strain gage input, 8 kHz and 3Hz bandwidth	7 with no SSRs installed 6 with SSRs installed	8
8B39-01	Current output, 0-20 mA, 4-20 mA	2	2
8B40/41	Voltage input, 1 kHz bandwidth	8	8 or 10*
8B45	Frequency input	8	8
8B47J/K/T	Linearized thermocouple input	8	8
8B49	Voltage output	2	2
8B50/51	Voltage input, 20 kHz bandwidth	8	8 or 10*

* When using the SC-1608X-USB or SC-1608-USB, you can install two additional 8B voltage input modules into the 8B I/O module locations (for a total of 10). Voltage input modules installed in the I/O location must be 2-wire types that don't require excitation terminals. Refer to 8B analog I/O module control jumpers on page 19 for details. The SC-1608-2AO-ENET or SC-1608X-2AO-USB accept output modules in the two 8B I/O module locations only.

Refer to the MCC Signal Conditioning page on our website for a list of the specific modules supported within each module type.

OEM DAQ Analog Ranges

The analog input range of the OEM DAQ boards can be configured for ±5 V which allows them to interface to most of the 8B output modules. The resolution and accuracy of the OEM DAQ boards is sufficient for use with 8B output modules that have a unipolar 0-5 V output range.

The analog output voltage range of the SC-1608-2AO-ENET and SC-1608X-2AO-USB is ±10 V, allowing the baseboard to interface with many of the 8B modules. For 8B modules with a ±5 V or unipolar 0-5 V range, you can scale the ±10 V outputs to ±5 V, so that combined with the resolution and accuracy of the OEM DAQ boards these modules are also supported.

Installing the SC-1608 Series

SC-1608 Series products ship as the following components:

- OEM DAQ board (USB-1608G-OEM Series or E-1608-OEM)
- SCC-8-8-2 baseboard (pre-assembled with standoffs)
- External 12 VDC power supply (MCC p/n PS-12V30WEPS)
- USB and Ethernet cables; use the cable specific to your DAQ board.
- Accessory kit – contains standoffs for securing the OEM DAQ board to the SCC-8-8-2 baseboard, a protective shield that mounts onto the OEM DAQ board, and printed assembly instructions.

Unpacking

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing a board from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

Contact us immediately if any components are missing or damaged.

Downloading the software

Refer to the product page specific to your OEM DAQ board on the Measurement Computing website for information about the supported software you can download.

Install the software before you connect the hardware to the computer

The driver needed to run the board is installed when you install the software. Therefore, you need to install the software package you plan to use before you connect the OEM DAQ board.

Assembling the hardware

Perform the procedure below before connecting an OEM DAQ board to the baseboard:

1. Set the baseboard power switch (**SW1**) to OFF, and set each of the digital module I/O type DIP switch positions (**SW2**) to match the specific module type that will be installed.

   Both the OEM DAQ board and baseboard should be powered off while they are being assembled together.

2. Attach the hardware standoffs and protective shield to the OEM DAQ board.

   Refer to the printed SC-1608 Series assembly instructions included in the shipment for the steps to perform this procedure.

3. Configure the digital pull-up/down jumper on the OEM DAQ board for pull-down.

   o E-1608-OEM: Set jumper **W3** for pull-down; this setting is labeled **PULL DN** on the board.

   o USB-1608 USB-1608G-OEM Series boards: verify jumper **W1** is set for pull-down (shown below); this is the default setting.
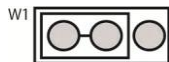
4. Mate the OEM DAQ board you are using with the baseboard; perform the step specific to your OEM DAQ board:

   o USB-1608G-OEM Series: plug the board into socket connectors J5 and J6 (labeled **USB-1608G-OEM Series ONLY** on the baseboard). These connectors are polarized to ensure the proper orientation when mating the boards together. Refer to the "**Cable Entry**" board label for proper orientation.

   o E-1608-OEM: plug the board into socket connectors J3 and J4 (labeled **E-1608-OEM ONLY** on the baseboard). These connectors are not polarized, so take care to properly orient the board. Refer to the **Cable Entry** board label for proper orientation.

> **Verify that the OEM DAQ board is properly connected**
>
> Ensure that the header pins on the OEM DAQ board are properly connected to the OEM header connectors on the baseboard. Orient the OEM DAQ board so the USB/Ethernet cables connect to the OEM DAQ board at the left edge of the baseboard. Refer to the **Cable Entry** board label for proper orientation.

5. Attach the supplied PC interface cable to the OEM DAQ board; perform *one* of the following steps:

    o   Attach the USB cable to a USB-1608G-OEM Series board and the computer or self-powered hub.

    o   Attach the CAT-6 Ethernet cable to the E-1608-OEM board.

Installing 8B analog I/O modules

You can install up to eight 8B analog input modules into the baseboard mounting locations labeled **CH0** to **CH7**, and two analog input or analog output modules into mounting locations labeled **CH8** and **CH9**. When using a product with analog outputs you must install an output module in CH8/CH9. When using a product without analog outputs you can install a voltage input module into CH8/CH9.

> **Power down the baseboard whenever you install or remove 8B analog I/O modules**
>
> Make sure the power switch **SW1** is OFF before you install or remove 8B modules.

Each 8B analog input module (**CH0** to **CH7**) has dedicated positive (+) and negative (–) inputs, along with positive (+) and negative (–) excitation inputs. Each 8B output module has dedicated positive (+) and negative (–) outputs. All signals are brought out to screw terminals for field wiring connections. When using CH8 and CH9 with 8B input modules installed, note that there are no associated ± excitation pins.

Perform the following steps to install 8B analog I/O modules:

1. Turn the baseboard power switch **SW1** OFF.
2. Align the 8B module retaining screw and pins with the holes on the circuit board.
3. Gently press the module into place.
4. Tighten the retaining screw; do not over-tighten.
5. Repeat these steps to install additional 8B analog I/O modules.

> **Configuring for ten 8B analog input modules**
>
> 8B analog I/O mounting locations CH8 and CH9 are configured by default for output. When connected to a board without analog output functionality, such as the USB-1608G-OEM or USB-1608GX-OEM, these locations can be converted to 8B analog input modules via onboard jumpers. Refer to 8B analog I/O module control jumpers on page 19 for more information.

Configuring 8B analog I/O modules

Onboard jumpers let you enable CJC for thermocouple input modules, convert the analog output module locations to input, and scale the OEM DAQ analog output channel voltage to ±5V to match the voltage range output by an installed 8B analog output module. Refer to 8B analog I/O module control jumpers on page 19 for details about how to use the 8B module control jumpers.

Installing SSR digital I/O modules

You can install up to eight digital I/O modules into the mounting locations labeled **SSR0** to **SSR7**. Each location can be set for either input or output with the DIP switch labeled **SW2**.

> **Power down the baseboard whenever you install or remove a digital I/O module**
>
> Make sure the power switch **SW1** is OFF before you install or remove an SSR module.

Mounting screw threads are provided to easily install the SSR modules. SSR modules use a standard color scheme so you can quickly identify what module type is installed. Positive (+) and negative (–) relay contacts are brought out to screw terminals for field wiring connections. Each SSR module has an associated LED that turns on when the module output state is active.

Perform the following steps to install SSR digital I/O modules:

1. Turn the baseboard power switch **SW1** OFF.
2. Align the SSR module retaining screw and pins with the holes on the circuit board.
3. Gently press the module into place.
4. Tighten the retaining screw; do not over-tighten.
5. Repeat these steps to install additional SSR modules.
6. Configure the SW2 DIP switch to match the input/output type for each installed module.

Configuring the OEM DAQ boards with software

Before using a SCC-8-8-2 product, configure the analog input mode on the OEM DAQ board. When using the SC-1608-2AO-ENET, the E-1608-OEM network settings must also be configured.

Perform the following steps to configure the OEM DAQ board for use with the SCC-8-8-2:

- Configure the analog input mode with software for single-ended mode.
- Configure network settings (SC-1608-2AO-ENET only). Refer to the E-1608-OEM manual at www.mccdaq.com/PDFs/manuals/E-1608-OEM.pdf for details about network settings.

Powering up

To prevent digital inputs from floating, do not apply power to the baseboard before connecting to the OEM DAQ board.

The E-1608-OEM receives power from the baseboard when the boards are connected. The USB-1608G-OEM Series board is powered from the USB connector on a computer or self-powered hub. The digital channels on the USB-1608G-OEM Series OEM DAQ board and the SCC-8-8-2 power up in digital input mode, so neither board can drive current into the other when powered on. Therefore, the power up sequence of the two boards is arbitrary; either board can be powered on first.

Perform the following steps to power up an SCC-8-8-2 product:

1. USB-1608G-OEM Series: connect the USB cable into the USB connector on the computer or self-powered hub.

   The E-1608-OEM doesn't require a separate power supply, as the board receives power from the SCC-8-8-2 baseboard when connected.

2. Connect a power supply to the SCC-8-8-2 baseboard; perform *one* of the following steps:
   o Connect the supplied 12 VDC external power supply to connector **J1**.
   o Connect a 12 VDC 2.5 A power supply (not supplied) to the 2-pole terminal block at **J2**.

     A higher-amperage supply may be used. The SC-1608 Series is designed with over current protection that prevents board damage if the current drawn exceeds 2 A.

Connect a 12 VDC supply to either connector J1 or J2

Do not attempt to apply power to both external power connectors simultaneously.

---

3. Turn the baseboard power switch **SW1** On.

Avoiding logic contention

Pay careful attention to the DIO configuration of the baseboard digital pins (set with **SW2**) and the OEM DAQ board in order to avoid a logic contention issue. You configure the OEM DAQ board with software.

Functional Details

This chapter discusses the functional details of the SCC-8-8-2 baseboard. For functional details of the OEM DAQ board, refer to the hardware manual specific to the SC-1608 Series;

- USB-1608GX-2AO-OEM: www.mccdaq.com/PDFs/manuals/USB-1608GX-2AO-OEM.pdf
- USB-1608GX-OEM: www.mccdaq.com/PDFs/manuals/USB-1608GX-OEM.pdf
- USB-1608G-OEM: www.mccdaq.com/PDFs/manuals/USB-1608G-OEM.pdf
- E-1608-OEM: www.mccdaq.com/PDFs/manuals/E-1608-OEM.pdf

SCC-8-8-2 baseboard components

The location of each component on the baseboard is shown in Figure 4.

1	External power connectors J1 and J2	10	8B I/O module control jumpers J29 and J30 (for CH8) J29: AOUT0 readback or convert to input module location J30: AOUT0 voltage divider
2	E-1608-OEM connectors J3, J4, and J37	11	8B I/O module control jumpers J31 and J32 (for CH9) J31: AOUT1 readback or convert to input module location J32: AOUT1 voltage divider
3	8-position DIP switch for SSR module direction	12	8B I/O module mounting locations CH8 and CH9
4	Non-invert/Invert logic control jumper W1	13	CJC Enable jumpers J21 to J28
5	USB-1608G-OEM Series connectors J5to J6	14	R1 - R8 resistor locations
6	SSR I/O module mounting locations SSR0 to SSR7	15	8B module screw terminals
7	SSR I/O module status LEDs (8)	16	SSR I/O module screw terminals
8	User I/O header connector J35	17	Power switch SW1
9	8B input module mounting locations CH0 to CH7		

Figure 4. SCC-8-8-2 baseboard components

External power connectors

External power can be connected to either power connector **J1** (barrel connector) or **J2** (terminal block). Do not attempt to apply power to both power connectors simultaneously.

- Connector **J1** connects to the +12 VDC external power supply included in the SCC-8-8-2 shipment.
- Connector **J2** connects to a user-supplied +12 VDC power supply.

Figure 5 shows a schematic for external power connectors J1 and J2.
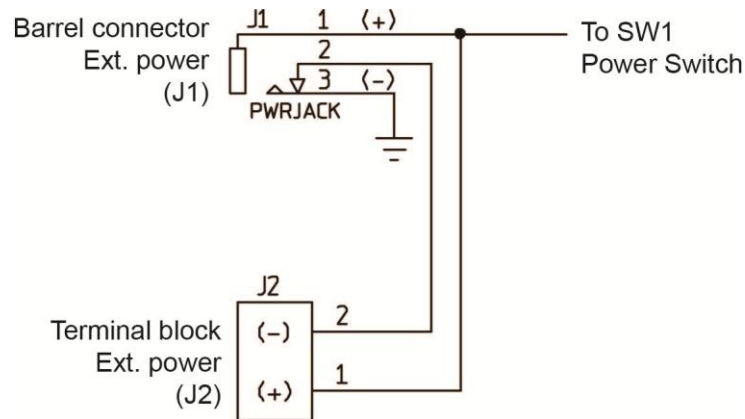
Figure 5. J1 and J2 power schematic

Power switch

SW1 is the main power switch that provides power to the baseboard when it is switched on and when an external supply is connected to either **J1** or **J2**.

E-1608-OEM connectors

Socket connectors **J3** and **J4** connect with the header connectors on an E-1608-OEM board.

The **J37** header connector is used to power the E-1608-OEM. When the E-1608-OEM connects to the baseboard, its power input header (**W1**) mates with the baseboard power header connector (**J37**).

The E-1608-OEM receives power from the SCC-8-8-2 baseboard

Do not connect an external supply to the E-1608-OEM barrel input connector.

Pinout tables for J3, J4, and J37 are listed in the [Specifications](#) chapter.

USB-1608G-OEM Series connectors

Socket connectors **J5** and **J6** connect with the header connectors on a USB-1608G-OEM Series board. The connectors are keyed to ensure proper board orientation. Pinout tables for socket connectors J5 and J6 are listed in the [Specifications](#) chapter.

50-pin User I/O header connector

J35 is a 50-pin header connector where all conditioned and non-conditioned input and output signals are available for user connections.

The eight analog inputs, two analog outputs, and eight digital I/O that interface with the 8B analog I/O modules and digital I/O modules are connected directly to this header connector. Any non-conditioned input or output can be used as a *non-isolated* channel.

Do not connect to a signal being used by an analog or digital module

Be careful not to connect to a signal already in use by a digital I/O or analog I/O module.

The following table lists the pinout for header connector **J35**.

J35 connector pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	CH0	Analog input 0 (single-ended)	2	CH1	Analog input 1 (single-ended)
3	CH2	Analog input 2 (single-ended)	4	CH3	Analog input 3 (single-ended)
5	GND	Ground	6	GND	Ground
7	CH4	Analog input 4 (single-ended)	8	CH5	Analog input 5 (single-ended)
9	CH6	Analog input 6 (single-ended)	10	CH7	Analog input 7 (single-ended)
11	GND	Ground	12	GND	Ground
13	CH8	Analog input 8 (single-ended)	14	CH9	Analog input 9 (single-ended)
15	CH10	Analog input 10 (single-ended)	16	CH11	Analog input 11 (single-ended)
17	GND	Ground	18	GND	Ground
19	CH12	Analog input 12 (single-ended)	20	CH13	Analog input 13 (single-ended)
21	CH14	Analog input 14 (single-ended)	22	CH15	Analog input 15 (single-ended)
23	GND	Ground	24	GND	Ground
25	AOUT0	Analog output 0	26	GND	Ground
27	AOUT1	Analog output 1	28	GND	Ground
29	+VO	+5V user output	30	GND	Ground
31	GND	Ground	32	GND	Ground
33	DIO0	DIO bit 0	34	DIO1	DIO bit 1
35	DIO2	DIO bit 2	36	DIO3	DIO bit 3
37	DIO4	DIO bit 4	38	DIO5	DIO bit 5
39	DIO6	DIO bit 6	40	DIO7	DIO bit 7
41	AICLKI	AI clock input	42	AICLKO	AI clock output
43	AOCLKI	AO clock input	44	AOCLKO	AO clock output
45	TRIG	Trigger Input	46	GND	Ground
47	CTR0	Counter 0 Input	48	CTR1	Counter 1 input
49	TMR	Timer Output	50	GND	Ground

Analog input signals CH8 to CH15 have no function when the E-1608-OEM is connected. Analog output signals AOUT0 and AOUT1 and AOCLKO have no function when a USB-1608G-OEM or USB-1608GX-OEM is connected.

Connector cabling and signal termination

The User I/O connector is compatible with C50FF-x ribbon cable and CIO-MINI50 screw terminal board. Details on these accessories are available on our website.

SSR I/O module input/output type DIP switch

Switch **SW2** is an 8-position DIP switch used to set the module type for each installed SSR module as either input or output. Each DIP switch position is set by default for OUTPUT. Switch **SW2** is shown in Figure 6.
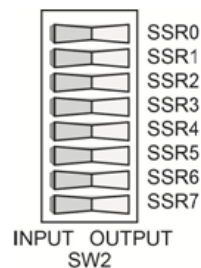

Figure 6. I/O module type DIP switch SW2

Push down on the left side to set the DIP switch position for input; push down on the right side to set the DIP switch position for output.

Set SW2 to INPUT for use with digital input modules. Set to OUTPUT for use with digital output modules. You set the digital direction of the OEM DAQ board digital channels with software. SW2 switches have no effect on the bit direction of the digital I/O channels on the OEM DAQ board.

When a switch position is set for output, the behavior of the associated digital module is affected by the configuration of the invert logic jumper (**W1**) and the digital logic state of the OEM DAQ board. Module behavior for each configuration is summarized in the <u>Digital output logic control</u> section on page 23.

Non-invert/Invert logic control jumper

Jumper **W1** sets the control logic polarity for each digital output module installed in locations **SSR0**-**SSR7** to inverted logic (active high, default) or non-inverted (active low). Figure 7 shows **W1** set for inverted logic.
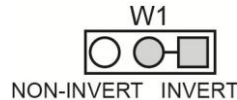

NON-INVERT   INVERT

Figure 7. Switch S2 default configuration

The invert/non-invert setting applies only to output modules, and has no effect on input modules. When a switch position is set for output, the associated output module behavior is determined by the configuration of the invert logic control jumper (**W1**) and the digital logic state set for the OEM DAQ board digital bits. The logic table on page 23 summarizes module behavior for each configuration.

Digital I/O module mounting locations

You can install up to eight digital I/O modules into mounting locations **SSR0** to **SSR7**. Supported modules are listed on page 9. Set the module input/output type for each installed module with onboard switch **SW2**.

Digital I/O module LEDs

Each digital I/O module has an associated LED. For digital output modules, the LED turns on when the module is active (turned on). For digital input modules, the LED turns on when the module detects an input voltage (logic high).

Digital I/O module screw terminals

The SCC-8-8-2 has eight pairs of screw terminals for field wiring connections. Positive (+) and negative (−) relay contacts are brought out to screw terminals **SSRx+** and **SSRx−**.

Use 16 AWG to 30 AWG wire for your signal connections. Properly insulate and dress the wires to avoid any short circuit to adjacent channels or other points on the board.

SSR digital I/O module pinout

Pin	Signal name	Pin description
1	SSR0 +	Digital I/O module 0+
2	SSR0 –	Digital I/O module 0 –
3	SSR1 +	Digital I/O module 1+
4	SSR1 –	Digital I/O module 1 –
5	SSR2 +	Digital I/O module 2+
6	SSR2 –	Digital I/O module 2–
7	SSR3 +	Digital I/O module 3+
8	SSR3 –	Digital I/O module 3–
9	SSR4 +	Digital I/O module 4+
10	SSR4 –	Digital I/O module 4–
11	SSR5 +	Digital I/O module 5+
12	SSR5 –	Digital I/O module 5–
13	SSR6 +	Digital I/O module 6+
14	SSR6 –	Digital I/O module 6–
15	SSR7 +	Digital I/O module 7+
16	SSR7 –	Digital I/O module 7–

8B analog input module mounting locations

You can install up to eight 8B analog input modules into mounting locations **CH0** to **CH7**. When using a product without analog output capability, such as the SC-1608X-USB or SC-1608-USB, you can install a voltage input module into locations CH8 or CH9, and convert the location to input using an onboard jumper. Refer to 8B analog I/O module control jumpers on page 19 for more information about how to use the I/O module jumpers.

CJC Enable jumpers

Use the CJC Enable jumpers **J21** to **J28** to enable cold-junction compensation for each 8B thermocouple input module installed in 8B input module locations **CH0** to **CH7**. Configure the jumper directly below the location where the thermocouple module is installed.

 The following table lists the configuration options for CJC Enable jumpers J21 to J28.

CJC Enable Jumpers J21-J28 configuration

J21-J28 Jumper Position	Function
1-2	CJC enabled
2-3	CJC disabled (default)

Figure 8 shows a typical jumper configured to enable CJC.

Figure 8. CJC jumper configured to enable CJC

If you are not using thermocouple input modules, make sure that jumpers J21 to J28 are disabled (position 2-3).

8B analog I/O module mounting locations

8B I/O module locations **CH8** and **CH9** are wired for output. When using a product without analog output capability, such as the SC-1608X-USB or SC-1608-USB, you can install a voltage input module in these locations. Voltage input modules installed in CH8 and CH9 must be 2-wire types that don't require excitation terminals. When using the SC-1608-2AO-ENET or SC-1608X-2AO-USB, you must install a voltage or current output module.

Each I/O module location has an associated pair of jumpers that let you either convert the location to input, or read back an output voltage at the header connector, depending on the type of module installed. You can also scale the default analog output voltage to match the range of an installed 8B output module. Refer to the 8B analog I/O module control jumpers section on page 19 for details about how to use the jumpers.

R1 to R8 resistor locations

You can install plug-in shunt resistors at locations R1 to R8 to monitor a 4-20 mA current loop, or to measure current using 8B analog voltage input modules.

Complete the following steps to monitor a 4-20 mA current loop or to measure current:

1. Turn the baseboard power switch **SW1** OFF.
2. Plug the shunt resistor into the plug-in location for the applicable voltage input module. DO NOT solder the resistor in place.

Shunt resistors can only be used with 8B voltage input modules

Shunt resistors must be removed when using other types of input modules, including current input modules.

Voltage input modules used to monitor a 4-20 mA loop often use a 250 Ω precision resistor to develop a 1 VDC to 5 VDC voltage drop.

Shunt resistors are user-supplied

If installing a shunt resistor, we recommend using a Dataforth SCM7BXR1 250 Ω current conversion resistor. Contact Dataforth for the specification.

8B analog I/O module control jumpers

Jumpers **J29** and **J31** are associated with the module installed in location CH8 (U9). Jumpers **J30** and **J32** are associated with the module installed in CH9 (U10). Module locations CH8 and CH9 are wired by default for output.

- J29 and J30 can be used to convert an output location to input (this requires a board without AOUT functionality), or to measure the analog output voltage being applied to the output module's input pin.
- J30 and J32 are voltage divider jumpers used to scale the analog output voltage to match the output voltage range of the installed module. These jumpers require that an output module be installed, and have no effect when an input module is installed.

Jumpers J29 and J31

The following table lists the configuration options for the 8B output control jumpers J29 and J31.

Jumper J29 (location CH8) and J31 (location CH9) configuration

J29/31 jumper position	Function
1-2 (default)	No function
2-3 *output* module installed in CH8 (U9) or CH9 (U10)	This configuration lets you measure (read back) the value of the analog output voltage at the header connector. ■ J29: connects OEM DAQ board output channel AOUT0 to the OEM DAQ board input channel CH8 (J35 pin 13), or converts 8B I/O module location CH8 (U9) to an 8B input module location. ■ J31: connects OEM DAQ board output channel AOUT1 to the OEM DAQ board input channel CH9 (J35 pin 14), or converts 8B I/O module location CH9 (U10) to an 8B input module location. **Note**: When using the SC-1608X-2AO-USB, you can read back the AOUTx voltage from the CH8/CH9 pins on the J35 header. When using the SC-1608-2AO-ENET, you can read back the AOUTx voltage from J35 pins 25 and 27 using a voltmeter or other DAQ board.
2-3 *input* module installed in CH8 (U9) or CH9 (U10)	This configuration converts the default output module location to input. ■ J29: converts module location CH8 to an input location. ■ J31: converts module location CH9 to an input location. **Note**: Voltage input modules installed in CH8 or CH9 must be 2-wire types that don't require excitation terminals.

Figure 9 shows jumper 29 and 31 set for its default configuration. This jumper has no function when set to the default 1-2 position.

Figure 9. Jumper 29 and J31 default configuration (no function)

Figure 10 illustrates the connection flow when an *output* module is installed in module location CH8, and jumper J29 is set for position 2-3.
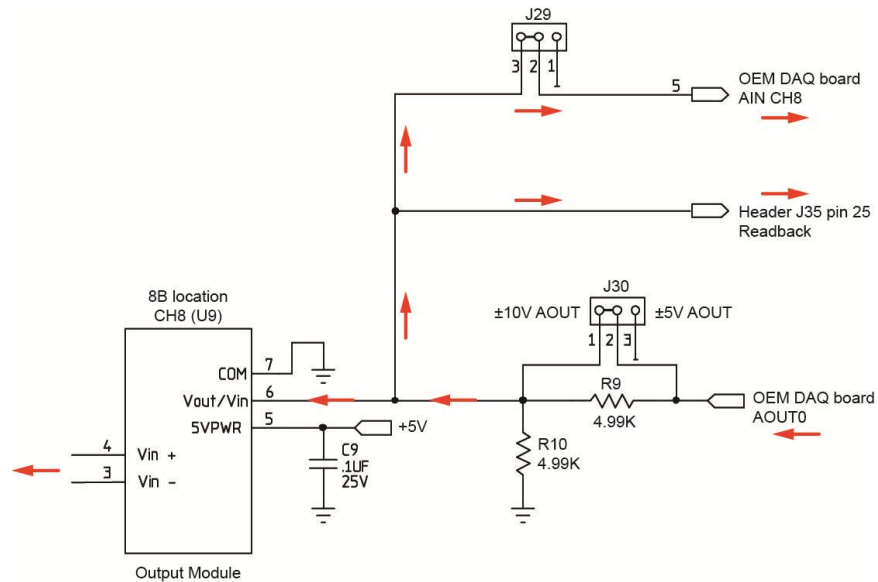
Figure 10. J29 set for position 2-3 with an output module installed in CH8 (U9)

In this scenario, the value of the voltage output from OEM DAQ board channel AOUT0 can be read from OEM DAQ analog input channel CH8 at J35 pin 13 when using the SC-1608X-2AO-USB. When using the SC-1608X-2AO-USB, the OEM DAQ AOUT0 voltage can be read with a meter or other DAQ board at J35 pin 25 (AOUT0) .

When set to position 1-2 (not shown in the diagram), the same voltage readback functionality is available using J35 pin 25 and non-isolated analog input CH8 (pin 13). The signal is non-isolated in this configuration, since the AOUT0 signal is no longer connected to AIN CH8.

Figure 11 illustrates the connection flow when an *input* module is installed in module location CH8, and jumper J29 is set for position 2-3.
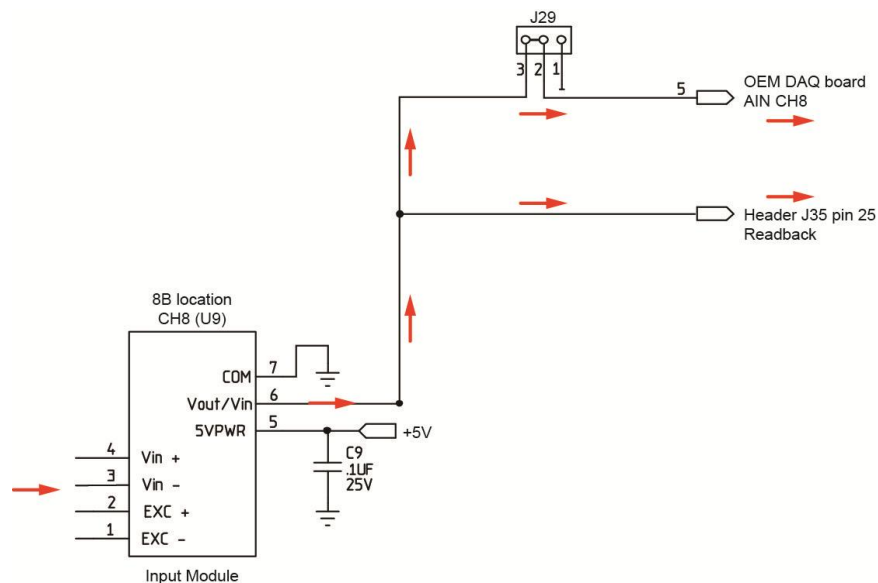
Figure 11. J29 set for position 2-3 with an input module installed in CH8 (U9)

In this scenario, the value of the input module's output voltage can be read from J35 header pin 13 when using the SC-1608X-2AO-USB. The output value can also be read from header pin 25 with a meter or other DAQ board when using the SC-1608-2AO-ENET or SC-1608X-2AO-USB.

When set to position 1-2 (not shown in the diagram), the same voltage readback functionality is available using J35 pin 25 and non-isolated analog input CH8 (pin 13). The signal is non-isolated in this configuration, as AOUT0 is no longer connected to AIN CH8.

Voltage divider jumpers J30 and J32

These jumpers are used to scale the OEM DAQ board AOUTx channel output voltage range to match the voltage input range of an analog output module installed at CH8 (U9) or CH9 (U10).

The following tables list the configuration settings of jumpers J30 and J32.

Jumper J30 (location CH8) and J32 (location CH9) configuration

J30/32 jumper position	Function
1-2 (default)	■ J30: OEM DAQ board channel AOUT0 outputs ±10V output (default) ■ J32: OEM DAQ board channel AOUT1 outputs ±10V output (default)
2-3	■ J30: OEM DAQ board channel AOUT0 ±10V output is scaled to ±5V ■ OEM DAQ board channel AOUT1 ±10V output is scaled to ±5V

Figure 12 shows jumper 30 and 32 set for its default configuration.
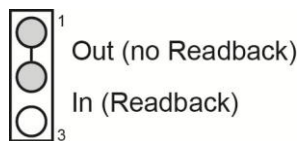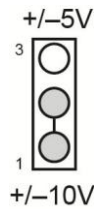

Figure 12. Jumper J30 and J32 default configuration (output ±10V)

Figure 13 illustrates the connection flow when an output module is installed in module location CH8, and jumper J30 is set for position 2-3.
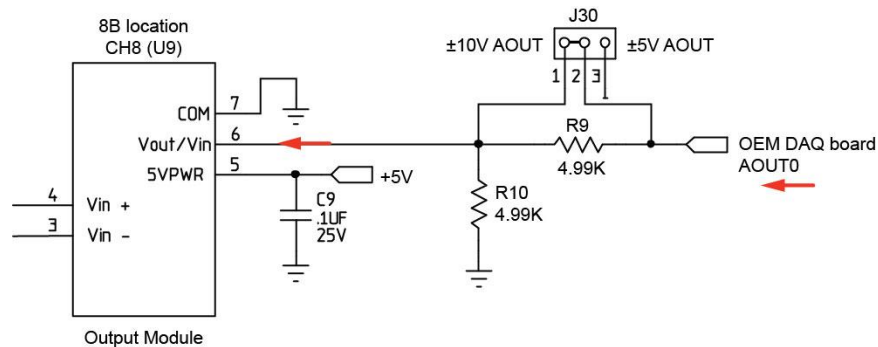

Figure 13. J30/J32 voltage divider schematic

In this scenario, the OEM DAQ board channel AOUT0 is configured to output ±10V.

If an 8B output module is installed that has an output range of ±5V or 0-5 V, configure this jumper for position 2-3 to scale the voltage output by the OEM DAQ board AOUT0 channel to ±5V.

8B analog I/O module screw terminals

Connect 8B analog input module signals to screw terminals labeled **CH0+**/**CH0–** to **CH7+**/**CH7–** and the associated excitation terminals **EXCx+**/**EXCx–**. Connect 8B analog output module signals to **CH8+**/**CH9+** and **CH8–**/**CH9–**. Use 16 AWG to 30 AWG wire when connecting signals.

8B module screw terminals

Signal name	Pin description
CH0+	8B input module CH0+
CH0–	8B input module CH0–
EXC0+	8B input module excitation CH0+
EXC0–	8B input module excitation CH0–
CH1+	8B input module CH1+
CH1–	8B input module CH1–
EXC1+	8B input module excitation CH1+
EXC1–	8B input module excitation CH1–
CH2+	8B input module CH2+
CH2–	8B input module CH2–
EXC2+	8B input module excitation CH2+
EXC2–	8B input module excitation CH2–
CH3+	8B input module CH3+
CH3–	8B input module CH3–
EXC3+	8B input module excitation CH3+
EXC3–	8B input module excitation CH3–
CH4+	8B input module CH4+
CH4–	8B input module CH4–
EXC4+	8B input module excitation CH4+
EXC4–	8B input module excitation CH4–
CH5+	8B input module CH5+
CH5–	8B input module CH5–
EXC5+	8B input module excitation CH5+
EXC5–	8B input module excitation CH5–
CH6+	8B input module CH6+
CH6–	8B input module CH6–
EXC6+	8B input module excitation CH6+
EXC6–	8B input module excitation CH6–
CH7+	8B input module CH7+
CH7–	8B input module CH7–
EXC7+	8B input module excitation CH7+
EXC7–	8B input module excitation CH7–
CH8+	8B I/O module CH8+
CH8–	8B I/O module CH8–
CH9+	8B I/O module CH9+
CH9–	8B I/O module CH9–

Note that excitation terminals are provided only for analog input modules installed in **CH0** to **CH7**, and are not provided for locations **CH8** or **CH9**, even if a voltage input module is installed.

Mechanical drawing
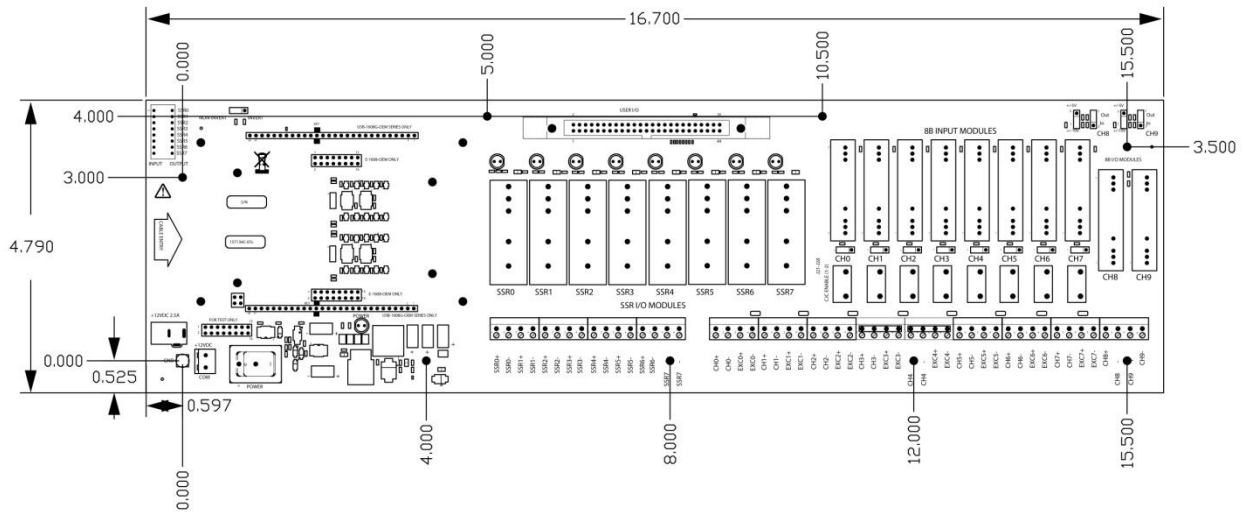
Figure 14. SCC-8-8-2 baseboard mechanical dimensions

Digital output logic control

The behavior of a digital output module is determined by the configuration of SW2, invert logic jumper W1, and the output logic state set on the OEM DAQ board.

The table below defines how a digital output module behave according to the configuration of the digital output logic state, the position of **SW2** switches, and the setting of invert logic control jumper **W1**.

Logic table

Digital Output Logic State	SW2 Position	W1 Position	Digital Output Module
Logic 0	Output	Invert	Off
Logic 1	Output	Invert	On
Logic 0	Output	Non-Invert	On *
Logic 1	Output	Non-Invert	Off
* With this configuration, the SSR modules will turn *On* if the DAQ OEM device loses power. This scenario does not normally occur because the SCC-8-8-2 is configured by default for inverting logic.			

Signal connections

Analog input

Analog input signals CH0 to CH7 are mapped to both the User I/O connector and to 8B analog input locations CH0 to CH7.

Analog input channels CH8 to CH15 on USB-1608G-OEM Series boards are mapped to the User I/O header connector only. These signals are not present on the E-1608-OEM board.

Analog output

E-1608-OEM and SC-1608X-2AO-USB channels AOUT0 and AOUT1 are mapped to 8B module locations CH8 and CH9 and to the header connector.

Locations CH8 and CH9 are wired for output by default.

- Use jumpers J29/32 to convert the CH8/CH9 module location to input.
- Use jumpers J30/32 to scale the analog output voltage from the default ±10 V to ±5 V.

Refer to 8B analog I/O module control jumpers on page 19 for information about the settings for each jumper.

Digital I/O

Digital channels DIO0 to DIO7 are mapped to SSR digital module locations SSR0 to SSR7 and to the header connector.

The eight digital channels are bidirectional and bit-configurable as input or output. Use the **SW2** DIP switch positions to set the input or output type for each bit. The factory setting for each switch position is OUTPUT. Use the invert logic control jumper W1 to set the control logic polarity for output modules. Input modules operate as inverted regardless of the jumper setting.

Trigger, counter, and timer channels

The trigger, counter, and timer signals are available on the 50-pin User I/O header connector.

Mounting options

The SC-1608 Series can be used on a bench or installed in the ENC-19X5X5 rack mount enclosure available from MCC.

Specifications

> **This chapter lists specifications for the SCC-8-8-2 baseboard**
>
> The specifications in this chapter are specific to the SCC-8-8-2 baseboard. Refer to the OEM user's guide or SC-1608 Series data sheet posted on our website for OEM DAQ board specifications.

All specifications are subject to change without notice.

Typical for 25 °C unless otherwise specified.

Specifications in *italic* text are guaranteed by design.

Analog input

Table 1. Analog input CJC specifications

Parameter	Specification
8B analog input module CJC sensor (Note 1)	Vishay-Dale TFPT1206L1002DM CJC control jumper J21-J28: ■ Position 1-2: CJC enabled ■ Position 2-3: CJC disabled (default)

Note 1: Each 8B analog input module location (CH0-CH7) includes a CJC sensor and three-pin header with jumper control (J21-J28).

Analog output

Table 2. Analog output jumper control specifications

Parameter	Specification
8B I/O module analog output jumper control (J29 and J31) (Note 2)	■ J29 position 1-2: No function (default) ■ J29 position 2-3: Connects DAQ AOUT0 to DAQ analog input CH8 (J35 pin 13), or converts 8B I/O location CH8 to an 8B input module location. ■ J31 position 1-2: No function (default) ■ J31 position 2-3: Connects DAQ AOUT1 to DAQ analog input CH9 (J35 pin 14), or converts 8B I/O location CH9 to an 8B input module location.
8B I/O module voltage divider jumper control (J30 and J32) (Note 3)	2×4.99 kΩ resistor, 0.1% tolerance, 25 ppm ■ J30 position 1-2: DAQ AOUT0 outputs ±10 V output range (default) ■ J30 position 2-3: DAQ AOUT0 outputs ±5 V output range ■ J32 position 1-2: DAQ AOUT1 outputs ±10V output range (default) ■ J32 position 2-3: DAQ AOUT1 outputs ±5V output range

Note 2: Three-pin headers J29 and J31 can be configured to read the OEM DAQ board's analog output control voltage at 8B I/O module locations with OEM DAQ board AIN CH8 and CH9 when using the USB-1608GX-2AO-OEM. When using the E-1608-OEM, the AOUTx voltage can be read at the J35 header connector (pins 25 and 27) using a voltmeter or other DAQ board.

When using a DAQ board that does not have analog output capability, such as the USB-1608G-OEM and USB-1608GX-OEM, configuring headers J29 and J31 for position 2-3 converts 8B I/O module locations CH8 and CH9 to an 8B input module location (for a total of 10 8B input locations). Voltage input modules installed in CH8 and CH9 must be 2-wire types that don't require excitation terminals.

Note 3: The voltage divider jumper options let you scale the OEM ±10V AOUTx to a ±5V output. To make this change, place either of the J30 (CH8) and J32 (CH9) jumpers in the 2-3 position.

SSR module I/O control

Table 3. SSR module specifications

Parameter	Specification
Number of I/O control logic	8
SSR default configuration (Note 4)	OUTPUT type (SW2 default)
Configuration	Each module location (SSR0–SSR7) is individually configurable as INPUT or OUTPUT using switch SW2.
Logic inversion control (Note 5)	Configurable for inverting or non-inverting logic with jumper W1; set by default to INVERT.
LED	Each module location (SSR0-SSR7) has a dedicated LED for indicating the module status.

Note 4: Set the SW2 DIP switch to INPUT for use with SSR input modules such as the Grayhill 70IDC5. The OEM DAQ board should be configured for digital input mode.

Set the SW2 DIP switch to OUTPUT for use with SSR output modules such as the Grayhill 70ODC5. The OEM DAQ board should be configured for digital output mode.

Note 5: The inverting logic feature is applied to SSR digital output modules only. The setting of jumper W1 has no effect on SSR digital input modules.

Digital input/output

Table 4. Digital input/output specifications

Parameter	Specification
Digital type	5V TTL
Number of I/O	8
Configuration	Bidirectional: each bit is individually configurable as digital input or digital output using DIP switch SW2 (Note 6).
Connector location	J35
Input high voltage threshold	2.0 V min
Input high voltage limit	5.5 V absolute max
Input low voltage threshold	0.8 V max
Input low voltage limit	–0.5 V absolute min 0 V recommended min
Output high voltage	4.4 V min (IOH = –50 μA) 3.76 V min (IOH = –24 mA)
Output low voltage	0.1 V max (IOL = 50 μA) 0.44 V max (IOL = 24 mA)
Power On default state	Digital output, +5V logic level

Note 6: Take care to avoid creating a digital I/O logic contention state between the DAQ board DIO and the SCC-8-8-2 DIO.

Power

Table 5. Power specifications

Parameter	Condition	Specification
External power input connectors (Note 7)		■ J1: barrel type ■ J2: 2-pole terminal block, (16 AWG to 30 AWG)
External power input voltage range (Note 8)		+10 V to +14 V
External power supply current		25 mA typical (Note 9) 1700 mA max, including all external loading
External power supply (included)	MCC p/n PS-12V30WEPS	+12 V DC, 30 Watt, 5% regulation
+VO output voltage range	User I/O connector J35, pin 29	4.50 V min to 5.25 V max
+VO output current		10 mA max
Power LED		$3V < V_{ext} < 15$ V: LED is ON $V_{ext} > 15$ V: LED OFF (power fault)
Power ON sequence (Note 10)		Arbitrary; either the SCC-8-8-2 or the OEM DAQ board can be powered on first.

Note 7: The SCC-8-8-2 can be powered from either of the external power connectors J1 or J2. Do not attempt to apply power to both external power connectors simultaneously.

Note 8: This specification applies to the actual voltage level present at the input to the external power connector (J1 or J2) of the SCC-8-8-2, as any significant loading of the external power supply will cause a voltage drop across the power supply cable.

Note 9: This is the total quiescent current requirement for the device, and does not include any potential loading of the 8B modules, SSR modules, digital I/O bits, or +VO terminal.

Note 10: To prevent digital inputs from floating, both the SCC-8-8-2 and the OEM board should be powered off while they are being assembled together.

Note 11: When using a USB-1608G-OEM-Series board, the total current available for 8B analog I/O modules and SSR digital I/O modules is 1612 mA, maximum.
When using the E-1608-OEM, the total current available for 8B analog I/O modules and SSR digital I/O modules is 1292 mA, maximum. For example, this current limitation would restrict the number of 8B38 strain gage modules that can be installed on the SC-1608-2AO-ENET to six (when SSR modules are installed), or seven (when no SSR modules are installed). Refer to the SC-1608 Series User's Guide for details.

Environmental

Table 6. Environmental specifications

Parameter	Specification
Operating temperature range	0 °C to 50 °C max
Storage temperature range	–40 °C to 85 °C max
Humidity	0% to 90% non-condensing max

Mechanical

Table 7. Mechanical specifications

Parameter	Condition	Specification
Dimensions (L × W × H)	■ SCC-8-8-2 with 0.38 in. standoffs ■ SCC-8-8-2 with 0.38 in. standoffs, OEM, and protective shield Note 12	101.6 × 426.72 × 42.16 mm (4.0 × 16.8 × 1.66 in)
	■ SCC-8-8-2 with SSR modules installed (SSR modules sold separately)	101.6 × 426.72 × 48.50 mm (4.0 × 16.8 × 1.91 in)

Note 12: The height of the SCC-8-8-2 User I/O connector is the same height as the SCC-8-8-2 assembled with the OEM and protective shield, so these dimensions apply to the SCC-8-8-2 alone as well as assembled with an OEM and shield.

Screw terminal connectors

Table 8. Screw terminal connector specifications

Parameter	Specification
Connector type	Screw terminal
Wire gauge range	16 AWG to 30 AWG

Table 9. Screw terminal pinout

Pin	Signal name	Pin description
1	SSR0 +	SSR I/O module 0+
2	SSR0 –	SSR I/O module 0 –
3	SSR1 +	SSR I/O module 1+
4	SSR1 –	SSR I/O module 1 –
5	SSR2 +	SSR I/O module 2+
6	SSR2 –	SSR I/O module 2–
7	SSR3 +	SSR I/O module 3+
8	SSR3 –	SSR I/O module 3–
9	SSR4 +	SSR I/O module 4+
10	SSR4 –	SSR I/O module 4–
11	SSR5 +	SSR I/O module 5+
12	SSR5 –	SSR I/O module 5–
13	SSR6 +	SSR I/O module 6+
14	SSR6 –	SSR I/O module 6–
15	SSR7 +	SSR I/O module 7+
16	SSR7 –	SSR I/O module 7–
17	CH0+	8B input module CH0+
18	CH0–	8B input module CH0–
19	EXC0+	8B input module excitation CH0+
20	EXC0–	8B input module excitation CH0–
21	CH1+	8B input module CH1+
22	CH1–	8B input module CH1–
23	EXC1+	8B input module excitation CH1+
24	EXC1–	8B input module excitation CH1–
25	CH2+	8B input module CH2+
26	CH2–	8B input module CH2–
27	EXC2+	8B input module excitation CH2+
28	EXC2–	8B input module excitation CH2–
29	CH3+	8B input module CH3+
30	CH3–	8B input module CH3–
31	EXC3+	8B input module excitation CH3+
32	EXC3–	8B input module excitation CH3–
33	CH4+	8B input module CH4+
34	CH4–	8B input module CH4–
35	EXC4+	8B input module excitation CH4+
36	EXC4–	8B input module excitation CH4–
37	CH5+	8B input module CH5+
38	CH5–	8B input module CH5–
39	EXC5+	8B input module excitation CH5+
40	EXC5–	8B input module excitation CH5–
41	CH6+	8B input module CH6+
42	CH6–	8B input module CH6–
43	EXC6+	8B input module excitation CH6+
44	EXC6–	8B input module excitation CH6–
45	CH7+	8B input module CH7+
46	CH7–	8B input module CH7–
47	EXC7+	8B input module excitation CH7+
48	EXC7–	8B input module excitation CH7–
49	CH8+	8B I/O module CH8+
50	CH8–	8B I/O module CH8–
51	CH9+	8B I/O module CH9+
52	CH9–	8B I/O module CH9–

User I/O connector (J35)

Table 10. 50-pin header connector specifications

Parameter	Specification
Connector type	50-pin header
Pin spacing	0.1 inch

Table 11. User I/O connector J35 pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	CH0	Analog input 0 (single-ended)	2	CH1	Analog input 1 (single-ended)
3	CH2	Analog input 2 (single-ended)	4	CH3	Analog input 3 (single-ended)
5	GND	Ground	6	GND	Ground
7	CH4	Analog input 4 (single-ended)	8	CH5	Analog input 5 (single-ended)
9	CH6	Analog input 6 (single-ended)	10	CH7	Analog input 7 (single-ended)
11	GND	Ground	12	GND	Ground
13	CH8	Analog input 8 (single-ended)	14	CH9	Analog input 9 (single-ended)
15	CH10	Analog input 10 (single-ended)	16	CH11	Analog input 11 (single-ended)
17	GND	Ground	18	GND	Ground
19	CH12	Analog input 12 (single-ended)	20	CH13	Analog input 13 (single-ended)
21	CH14	Analog input 14 (single-ended)	22	CH15	Analog input 15 (single-ended)
23	GND	Ground	24	GND	Ground
25	AOUT0	Analog output 0	26	GND	Ground
27	AOUT1	Analog output 1	28	GND	Ground
29	+VO	+5 V output	30	GND	Ground
31	GND	Ground	32	GND	Ground
33	DIO0	DIO bit 0	34	DIO1	DIO bit 1
35	DIO2	DIO bit 2	36	DIO3	DIO bit 3
37	DIO4	DIO bit 4	38	DIO5	DIO bit 5
39	DIO6	DIO bit 6	40	DIO7	DIO bit 7
41	AICKI	AI clock input	42	AICKO	AI clock output
43	AOCKI	AO clock input	44	AOCKO	AO clock output
45	TRIG	Trigger Input	46	GND	Ground
47	CTR0	Counter 0 Input	48	CTR1	Counter 1 input
49	TMR	Timer output	50	GND	Ground

Note 13:   Analog input signals CH8 to CH15 have no function when the SCC-8-8-2 is connected to the E-1608-OEM.

USB-1608G-OEM Series connectors (J5/J6)

Use these connectors to mate with a USB-1608G-OEM Series board.

Table 12. J5/J6 connector pinout

J5				J6		
Pin	Signal name	Pin description		Pin	Signal name	Pin description
1	CH0	Analog input 0 (single-ended)		1	CH15	Analog input 15 (single-ended)
2	CH8	Analog input 8 (single-ended)		2	CH7	Analog input 7 (single-ended)
3	GND	Ground		3	GND	Ground
4	CH1	Analog input 1 (single-ended)		4	CH14	Analog input 14 (single-ended)
5	CH9	Analog input 9 (single-ended)		5	CH6	Analog input 6 (single-ended)
6	GND	Ground		6	GND	Ground
7	CH2	Analog input 2 (single-ended)		7	CH13	Analog input 13 (single-ended)
8	CH10	Analog input 10 (single-ended)		8	CH5	Analog input 5 (single-ended)
9	GND	Ground		9	GND	Ground
10	CH3	Analog input 3 (single-ended)		10	CH12	Analog input 12 (single-ended)
11	CH11	Analog input 11 (single-ended)		11	CH4	Analog input 4 (single-ended)
12	GND	Ground		12	GND	Ground
13	AOUT0	Analog output 0 (Note 14)		13	GND	Ground
14	GND	Ground		14	GND	Ground
15	AOUT1	Analog output 1 (Note 14)		15	+VO	+5 V output
16	GND	Ground		16	GND	Ground
17				17		
18	GND	Ground		18	GND	Ground
19	DIO0	DIO bit 0		19	AICKI	AI clock input
20	DIO1	DIO bit 1		20	AICKO	AI clock output (Note 14)
21	DIO2	DIO bit 2		21	AOCKI	AI clock input
22	DIO3	DIO bit 3		22	AOCKO	AO clock output (Note 14)
23	DIO4	DIO bit 4		23	TRIG	Trigger input
24	DIO5	DIO bit 5		24	GND	Ground
25	DIO6	DIO bit 6		25	CTR1	Counter 1 input
26	DIO7	DIO bit 7		26	CTR0	Counter 0 input
27	GND	Ground		27	TMR	Timer output
28	NC	Do not connect		28	GND	Ground

Note 14:   AOUT0/AOUT1 and AICKO/AOCKO have no function when the SCC-8-8-2 is connected to an OEM DAQ board with no analog output capability, such as the USB-1608GX-OEM or USB-1608G-OEM.

E-1608-OEM connectors (J3/J4)

Use these connectors to mate with an E-1608-OEM board.

Table 13. J3 connector pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	CH0	Analog input 0 (single-ended)	2	CH1	Analog input 1 (single-ended)
3	GND	Ground	4	CH2	Analog input 2 (single-ended)
5	CH3	Analog input 3 (single-ended)	6	GND	Ground
7	CH4	Analog input 4 (single-ended)	8	CH5	Analog input 5 (single-ended)
9	GND	Ground	10	CH6	Analog input 6 (single-ended)
11	CH7	Analog input 7 (single-ended)	12	GND	Ground
13	AOUT0	Analog output 0	14	GND	Ground
15	AOUT1	Analog output 1	16	GND	Ground

Table 14. J4 connector pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	DIO0	DIO bit 0	2	DIO1	DIO bit 1
3	DIO2	DIO bit 2	4	DIO3	DIO bit 3
5	DIO4	DIO bit 4	6	DIO5	DIO bit 5
7	DIO6	DIO bit 6	8	DIO7	DIO bit 7
9	GND	Ground	10	+VO	+5 V output
11	GND	Ground	12	AICKO	AI clock output
13	AICKI	AI clock input	14	CTR0	Counter 0
15	TRIG	Trigger input	16	GND	Ground

Table 15. J37 connector pinout

Pin	Signal name	Pin description	Pin	Signal name	Pin description
1	+5V	5V power output	2	GND	Ground
3	NC	Do not connect	4	NC	Do not connect

Note 15:   J37 is used to power the E-1608-OEM. Do not attempt to use this connector for any other purpose.

CE   Declaration of Conformity
According to ISO/IEC 17050-1:2010

Manufacturer:	Measurement Computing Corporation
Address:	10 Commerce Way
	Suite 1008
	Norton, MA 02766
	USA
Product Category:	Electrical equipment for measurement, control and laboratory use.
Date and Place of Issue:	May 5, 2015, Norton, Massachusetts USA

Measurement Computing Corporation declares under sole responsibility that the products

SC-1608-2AO-ENET, SC-1608X-2AO-USB, SC-1608X-USB, SC-1608-USB

Complies with the essential requirements of the following applicable European Directives:

Electromagnetic Compatibility (EMC) Directive 2004/108/EC
Low Voltage Directive 2006/95/EC
RoHS Directive 2011/65/EU

Conformity is assessed in accordance to the following standards:

EMC:

Emissions:
- EN 61326-1:2013 (IEC 61326-1:2012), Class A
- EN 55011: 2009 + A1:2010 (IEC CISPR 11:2009 + A1:2010), Group 1, Class A

Immunity:
- EN 61326-1:2013 (IEC 61326-1:2012), Controlled EM Environments
- EN 61000-4-2:2008 (IEC 61000-4-2:2008)
- EN 61000-4-3 :2010 (IEC61000-4-3:2010)
- EN 61000-4-4 :2012 (IEC61000-4-4:2012)
- EN 61000-4-5 :2005 (IEC61000-4-5:2005)
- EN 61000-4-6 :2013 (IEC61000-4-6:2013)
- EN 61000-4-11:2004 (IEC61000-4-11:2004)

Safety:
- EN 61010-1 (IEC61010-1)

Environmental Affairs:

Articles manufactured on or after the Date of Issue of this Declaration of Conformity do not contain any of the restricted substances in concentrations/applications not permitted by the RoHS Directive.

Carl Haapaoja, Director of Quality Assurance