

Overview of Synchronous Devices for Measurement (SDMs)



SDM Overview

Synchronous Devices for Measurement (SDMs) are addressable peripherals that expand the datalogger's measurement and control capabilities. This functionally diverse group of peripherals operate somewhat independently of the datalogger, yet expand its measurement and control capabilities.

The datalogger typically requests, processes, and stores data from the SDM. In control applications, the datalogger can then send a controlling SDM updated control signals to react to changing conditions in the application. Multiple SDMs, in any combination, can be connected to one Campbell Scientific datalogger.

The SDM port is specific to our dataloggers and acts as a high-speed data exchange mechanism. On the CR3000 and CR5000 dataloggers, the ports are labeled SDM-C1, SDM-C2, and SDM-C3. On the other dataloggers, the ports are labeled C1, C2, and C3.

Brief descriptions of our SDM models as well as some peripherals that are used with our SDMs are provided. More in depth descriptions and specifications are available from our product brochure for the individual SDM models. A chart on page 6 shows the dataloggers in which individual SDM models are compatible.

SDM-AO4A Four-Channel Continuous Analog Output Module



The SDM-AO4A includes four independent, continuous, analog outputs for proportional control or driving strip charts. Measured or processed values in the datalogger are scaled to millivolts and transferred to the SDM-AO4A as digital values. It then performs a digital-to-analog conversion and outputs an analog voltage signal. The SDM-AO4A has two voltage ranges (± 5 Vdc and 0 to 10 Vdc) and two operation modes (synchronous and sequential).

SDM-CAN Datalogger to CANbus Interface

The SDM-CAN interface allows a Campbell Scientific datalogger to sample data directly from a CANbus communications network. CANbus data can be stored (and synchronized) with other data values measured directly by the datalogger, allowing testing and verification of CANbus-based data alongside measurements made independently via the datalogger's input channels. The SDM-CAN also supports transmission of data onto a CANbus network. The CANbus protocol is used in a number of networking applications, including vehicle data acquisition systems (VDAS).



SDM-CD16AC 16-Channel AC/DC Relay Controller

The SDM-CD16AC has 16 switchable ac/dc relays for control of ac or dc devices. Each port is logically controlled by the datalogger; toggle switches provide manual override capability. An LED indicates when each port is active. Ports can be controlled individually or in groups. A 12 Vdc external power supply is recommended. The SDM-CD16AC is UL approved.

UL/CUL contact ratings:

- DC devices: 5 A @ 30 Vdc, 0.3 A @ 110 Vdc
- AC devices: 5 A @ 125 Vac (1/10 hp),
5 A @ 277 Vac (1/6 hp).



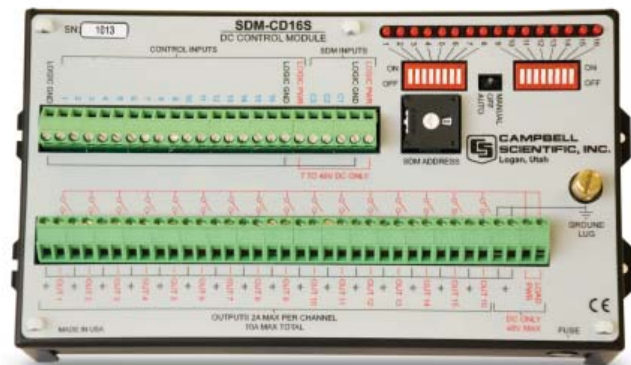
SDM-CD16D 16-Channel Digital Control Port Expansion Module



The SDM-CD16D increases the number of digital outputs that can be controlled (i.e., set to 0 or 5 Vdc) by a Campbell datalogger. The SDM-CD16D is commonly used to drive normal logic level inputs. It can also source some current; when an output is set HI, a 'boost' circuit allows the SDM-CD16D to source a current of up to 100 mA, which allows it to directly control low voltage valves, relays, etc.

SDM-CD16S 16-Channel Solid State DC Relay Controller Module

The SDM-CD16S is a 16-channel, solid-state relay driver that can control devices that have a relatively high-powered load such as solenoids, solenoid valves, dc motors, stepper motors, lights, horns, heaters, and fans. With a voltage range of up to 48 Vdc and a maximum current output per channel of 2 A, the SDM-CD16S can drive up to 100 W of power on each channel. Separate inputs for power-to-outputs (48 Vdc maximum) and power-to-SDM-CD16S logic (7 to 48 Vdc) allow the option of powering the logic from the datalogger's 12 V while switching a higher voltage.



SDM-CD8S 8-Channel Solid-State DC Controller

The SDM-CD8S controls DC devices that have a moderate current load, such as solenoids, solenoid valves, DC motors, stepper motors, lights, horns, heaters, and fans. The SDM-CD8S is targeted for applications requiring only a few control ports, where a larger, high-powered relay module such as the SDM-CD16S is not necessary. The voltage range for this device is 8 to 26 Vdc. It can deliver up to 1 A per channel with a maximum of 6 A total for all channels.



SDM-CVO4 Four-Channel Current and Voltage Output Module



The SDM-CVO4 outputs either a voltage signal (0 to 10 V) or a current signal (0 to 20 mA). Typical applications include driving remote current loop display units, retransmitting measured values to systems that have current or voltage inputs, sending control signals to valve controllers, and providing excitation voltages or currents to sensors that cannot be excited directly by a datalogger.

SDM-INT8 Eight-Channel Interval Timer

Each SDM-INT8 input channel is programmed to detect voltage transitions, then output any combination of period, pulse width, frequency, counts, and time intervals. Additional output options include average over the scan interval, average over a specified interval, or output all events. Events are measured with 1 μ s resolution, making comparison of inter channel events accurate to $\pm 1 \mu$ s.



SDM-IO16 16-Channel Input/Output Expansion Module

The SDM-IO16 expands the digital input and/or output capability of Campbell Scientific dataloggers. It offers similar functionality to the control ports of our dataloggers. When configured as an input, each port can monitor logic state, count pulses and switch closures, measure signal frequency, and determine duty cycle. When configured as an output, the SDM-IO16 can drive normal logic level inputs and directly control low-voltage valves and relays.



SDM-SIO1 Serial Input/Output Module



The SDM-SIO1 expands the number of serial devices that can communicate with a CR800, CR850, CR1000, or CR3000 datalogger. The SDM-SIO1 module connects to a remote serial device using industry standard hardware that can be set to true RS-232, RS-485 or RS-422 mode. It accepts up to 2047 bytes of serial data and stores the data in a buffer. The buffer allows remote equipment to transmit large amounts of data without hindering other processes in the datalogger.

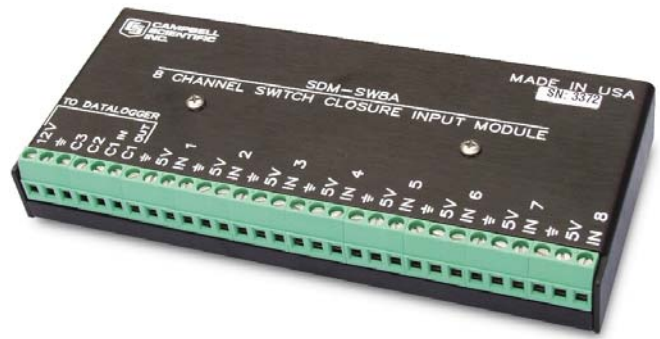
SDM-SIO4 Four-Channel Serial Input/Output Interface

The SDM-SIO4 adds capacity and flexibility to a datalogger. It has four serial ports that communicate with intelligent serial sensors, display boards, printers, satellite links, and other serial devices. Once programmed, the SDM-SIO4 communicates with connected devices in parallel with the datalogger's own program sequence, thus making the complete datalogging system faster and more efficient.



SDM-SW8A Eight-Channel Switch Closure Input Module

The SDM-SW8A Switch Closure Module measures up to eight channels of switch closures or voltage pulse inputs. Each channel of this pulse count module can be individually configured for single-pole double-throw (SPDT), single-pole single throw (SPST), or voltage pulse measurements. Output options include signal state, duty cycle, or counts. The SDM-SW8A is well suited for use in energy management studies.



Datalogger Compatibility Table (see Note 1)

Device	CR800/CR850	CR1000	CR3000	CR5000	CR9000X
SDM-AO4A	X	X	X	X	
SDM-CAN	X	X	X	X	X
SDM-CD16AC	X	X	X	X	see note 2
SDM-CD16D	X	X	X	X	see note 2
SDM-CD16S	X	X	X	X	see note 2
SDM-CD8S	X	X	X	X	see note 2
SDM-CVO4	X	X	X	X	see note 2
SDM-INT8	X	X	X	X	X
SDM-IO16	X	X	X	X	
SDM-SIO1	X	X	X		
SDM-SIO4	X	X	X	X	X
SDM-SW8A	X	X	X	X	

Notes:

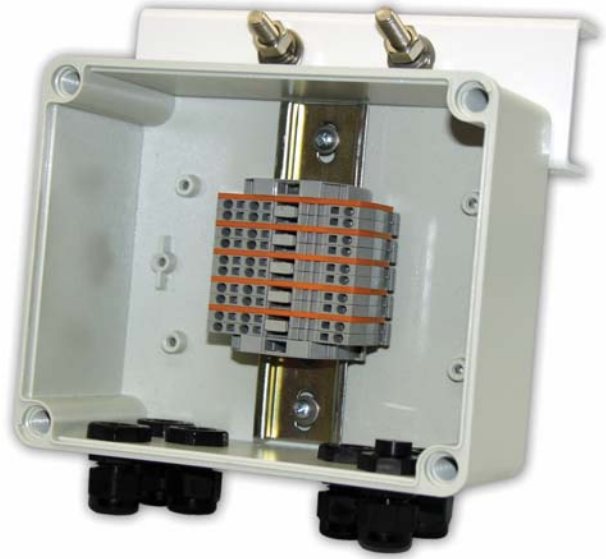
1. SDMs are not compatible with the CR200X-series dataloggers. Contact Campbell Scientific for information about compatibility with retired dataloggers.
2. Although compatible, these devices do not support the CR9000X's fastest communications rate and therefore are not practical for most CR9000X applications.
3. Specifications and additional information are provided in product literature for individual SDM models.

Accessories

HUB-SDM5 5-Channel Hub for SDM Peripherals

The HUB-SDM5 can make it more convenient to connect multiple SDMs to a single datalogger. It consists of DIN-rail mounted busbars housed in a small environmental enclosure. Connection terminals for up to five external SDM devices are included. The HUB-SDM5's enclosure is fitted with six compression fittings on its lower surface. Each compression fitting accommodates entry/exit of one cable. The enclosure also has an external bracket for attaching the enclosure to a pole or mast.

Spring-loaded guillotine terminals mounted on a DIN-rail provide connection points for individual wires. The terminals are grouped in five sets of six terminals each allowing connection of five groups of five incoming wires and one common outgoing wire. A small screwdriver is included to open the guillotines for wire entry.



HUB-SDM8 8-Channel Hub for SDM Peripherals & Power Connectors



The HUB-SDM8 is intended for customers who want to connect multiple SDMs to the same datalogger, as well as run multiple power connections using a 16 AWG wire. The HUB-SDM8 is comprised of an environmental enclosure with eight compression fittings (two larger) and eight terminal strips. Up to five external SDMs can be connected to the HUB-SDM8's terminals.

Spring-loaded guillotine terminals mounted on a DIN-rail provide connection points for individual wires. A small screwdriver is included to open the guillotines for wire entry.

CABLE5CBL-L 5-Conductor 24-AWG Cable with Drain Wire

The CABLE5CBL-L is recommended for connecting the SDM to the datalogger. A 1-ft cable length should be sufficient when both the datalogger and SDM are housed within an ENC12/14 enclosure; a 2-ft length may be required if the datalogger and the SDM are housed at opposite ends of an ENC16/18 enclosure.

Cable lengths should be kept as short as possible. Long cable lengths can adversely affect the measurement. The SDMSpeed CRBasic instruction should be used if the cable length is longer than 20 ft.

