
16-Channel I/O Expansion Module

Model SDM-IO16

The SDM-IO16 provides 16 digital I/O ports that function similarly to the control ports of the majority of Campbell Scientific dataloggers. When configured as an input, each port can monitor logic state, count pulses, measure signal frequency, and determine duty cycle. An option in the pulse counting mode enables switch debounce filtering allowing the SDM-IO16 to accurately count switch closures. The SDM-IO16 can also be



programmed to send an interrupt signal to the datalogger when one or more input signals change state. When configured as an output, each port can be set to 0 or 5 V by the datalogger. A 'boost' circuit allows an output that is set HI to source a current of up to 100 mA for controlling external devices such as low voltage valves or relays.

SDM Operation

The SDM-IO16 is a synchronously addressed datalogger peripheral. Three ports on the datalogger are used to address the SDM-IO16. Advanced error checking techniques ensure correct data transmission to and from the SDM-IO16. Up to sixteen SDM-IO16 modules can be addressed allowing up to 256 ports to be controlled by the datalogger.

Power Considerations

The datalogger's rechargeable power supply can power the SDM-IO16 for most pulse counting or status input applications. However, when driving loads, the SDM-IO16 power requirements may be large compared to most Campbell Scientific products. For these applications, an external power supply is recommended.

Mounting

Mounting brackets are provided for attaching the SDM-IO16 to the backplate of an ENC12/14 or larger enclosure.

Specifications

Compatible dataloggers:	CR800, CR850, CR1000, CR3000, and CR5000 dataloggers support all of the functions; our CR7 supports the output mode only. Retired dataloggers that support all of the functions include the CR10X (OS 1.17 or later) and CR23X (OS 1.14 or later).
Software requirements:	Support for all the functions requires CRBasic's SDMIO16 instruction or Edlog's Instruction 188. Instruction 188 is available in Edlog templates that post date March 2002 (LoggerNet version 2.1 contains this template). A PC208W patch is available at www.campbellsci.com/downloads for users with PC208W 3.0 or later. Edlog templates that predate March 2002 can support only the output mode using Instruction 104. Instruction SDMC16AC supports only the output mode in CRBasic.
SDM and I/O port:	0/5 V logic level ports for connecting to the datalogger's control/SDM ports
Operating range:	-25° to +50°C
EMC status:	Complies with EN 61326:1997

Specifications (continued)

Power

Operating voltage:	12 Vdc (nominal 9 to 18 V)
Current drain @ 12 Vdc:	600 μ A typical standby (all ports high, no load, excludes pulse counting) 3 mA maximum (active with all 16 ports counting pulses at 2 kHz and no output load) Current consumption is roughly proportional to input signal frequency and number of ports used. Current drawn from any output must be added to the quiescent level to obtain the total current drain.

Output

Voltage (no load):	ON/HI—nominal 5 V, minimum 4.5 V OFF/LO—nominal 0 V, maximum 0.1 V
Sink current:	Output will sink 8.6 mA from a 5 V source
Source current:	Output will source 42 mA @ 3 V; 133 mA short-circuited to ground
Maximum current (total all outputs):	Limited by 12 V supply

Input

Voltage:	High—4.0 V minimum threshold Low—1.0 V maximum threshold
Protection:	Input clamped at -0.6 V and ± 5.6 V relative to ground via a 33 ohm resistor to withstand a continuous current flow of 200 mA
Impedance:	Biased to +5 V relative to ground by a 100 kohm resistor

Pulse Counting

Maximum frequency:	2.0 kHz on all channels simultaneously with switch debounce-mode turned off with a 50/50 duty cycle. 150 Hz on all channels with default switch debounce mode enabled and a 50/50 duty cycle.
Minimum frequency:	0 Hz is reported if there are less than two high-to-low signal transitions in the measurement interval.
Minimum pulse width:	244 μ s
Default switch debounce timing:	Input and ground must remain closed for 3.17 ms then remain open for 3.17 ms to be counted as a closure
Internal clock accuracy (-25° to 50°C):	$\pm 0.01\%$, worst case
Maximum measurement interval:	15.9375 s

Physical

Dimensions:	9" x 4" x 1" (23.0 x 10.0 x 2.4 cm)
Weight:	12 oz (350 g)
Maximum cable length:	20 ft (6 m)

