

# SNAP-SCM-CAN2B Communication Module

## Features

- ▶ Transmits and receives data packets on a Controller Area Network
- ▶ Can be configured to encode data as ASCII Hex with frame delimiting
- ▶ Standard top-mounted connector for easy wiring
- ▶ Baud rates to 1 Mbps
- ▶ Up to eight SNAP-SCM-CAN2B modules per rack
- ▶ PAC Project integration kit available
- ▶ 30-month warranty
- ▶ UL approved

## Description

The **SNAP-SCM-CAN2B** serial communications module can transmit and receive data on a Controller Area Network (CAN).

When transmit functionality is enabled, all transmit and receive data passed between the module and the SNAP PAC brain or controller over Ethernet is ASCII encoded and frame delimited for robust communications.

The SNAP-SCM-CAN2B module is designed for use with Opto 22's SNAP PAC R-series controllers and SNAP PAC EB-series brains, both the standard wired models and the Wired+Wireless™ models. The brain or controller processes the data from the module and can communicate the data to other parts of an Opto 22 SNAP PAC System™ or to another system (such as a Modbus® system or an OPC client).

*NOTE: The R-series controller or EB-series brain must have firmware version 9.2a or newer. This module does not work with legacy brains or controllers.*

The SNAP-SCM-CAN2B module snaps into Opto 22 SNAP PAC mounting racks, right beside other SNAP I/O modules, to provide the mix of analog, digital, and serial channels you need at any location. It uses the standard SNAP removable top-mounted connector for easy wiring. LEDs indicate CAN bus activity on the port, as well as power and operation status.

SNAP racks have a retention rail locking system. Use two 4-40 by 1/2-inch standard machine screws to hold each module securely in position on the SNAP rack.



SNAP-SCM-CAN2B Module

## Configuration

Configuration of the SNAP-SCM-CAN2B module to transmit and receive data is normally done in PAC Control using sample subroutines from the Opto 22 CAN RX/TX Integration Kit for PAC Project™ (part number **PAC-INT-CAN-RXTX**, a free download from our website).

Using PAC Control, you add the integration kit's sample subroutines into your PAC Control strategy. By modifying the samples as necessary, your Opto 22 SNAP PAC System (equipped with one or more SNAP-SCM-CAN2B modules) can transmit data from a CAN network and receive data with encoding and frame delimiting.

For information on using the integration kit, see form 2151, the *CAN RX/TX Integration Kit for PAC Project Technical Note*.

If you wish, you can also use PAC Manager for configuration. For information on installing and configuring the module in PAC Manager, see form 1191, *Serial Communications Module User's Guide*.

PAC Project Basic (including PAC Control and PAC Manager) comes on a CD with every SNAP PAC brain and controller. Both PAC Project and the integration kit are also available for download from the Product section of our website, [www.opto22.com](http://www.opto22.com).

## Part Numbers

Part	Description
SNAP-SCM-CAN2B	Serial communication module for transmitting and receiving CAN packets
PAC-INT-CAN-RXTX	CAN RX/TX Integration Kit for PAC Project

# SNAP-SCM-CAN2B Communication Module

## Backward Compatibility

The SNAP-SCM-CAN2B was originally issued as a receive-only module but as of May 2015 includes transmit capability as well. Default behavior is still receive only; to also transmit you just need to configure the module in PAC Control or PAC Manager.

**To add transmit capability to a module with older firmware**, update the module's firmware to version R2.0b or higher. The [new SNAP-SCM-CAN2B firmware](#) is available on the Opto 22 website (follow the link or click the Support tab, choose Downloads, and filter by Firmware). For steps to update firmware, see the [PAC Manager User's Guide](#).

## Pins for Each Port

Pins 1-4 are in parallel to pins 5-8. V+ is not used by the module. See diagram on [page 4](#) for location of pin 1.

Pin	Use
1,5	V +
2,6	CAN +
3,7	CAN -
4,8	GND

For complete installation information, see form 1191, the [SNAP Serial Communication Modules User's Guide](#).

## Specifications

Baud rates	10–1000 Kbps*
Logic supply voltage	5.0 VDC
Logic supply current	250 mA DC
Number of ports per module	1
Max. number of modules per rack**	8
Processor compatibility	SNAP PAC R-series controllers and SNAP PAC EB brains, both standard wired and Wired+Wireless models, with firmware 9.2a or newer.
Operating temperature	-20 to 70 °C
Storage temperature	-30 to 85 °C
Torque, hold-down screws	4 in-lb (0.45 N-m)
Torque, connector screws	5.26 in-lb (0.6 N-m)
Agency Approvals	UL, CE, FM, RoHS, DFARS
Warranty	30 months from date of manufacture

\* Module performance is limited by the number of serial modules on the SNAP rack. Each rack backplane provides approximately 2.5 Mbps of bandwidth.

\*\* Maximum number of modules per rack assumes an Opto 22 SNAP power supply and SNAP rack.

## Buffers

The SNAP-SCM-CAN2B has two buffers, transmit and receive, that are 8192 bytes each, regardless of the mode (transmit and receive or receive only). If transmit is enabled (which implies ASCII Hex encoding and frame delimiting) then packet sizes range from 9–29 bytes, which translates to a buffer storing 282 to 910 CAN packets. In receive-only mode packet sizes are from 6–13 bytes and a buffer can store 613 to 1365 CAN packets. If the buffer is full and a new packet is received, the oldest packet will be dropped from the buffer.

Modules now sold with transmit capability built in are backwards compatible with older module firmware version R1.0d. If you are using a new module in a PAC Control strategy designed for the older module, you should not need to change your strategy unless you want to use the transmit capability.

**Integration kits.** There are two integration kits:

- **PAC-INT-CAN-RXTX** is the new integration kit that includes sample subroutines and charts for transmitting and receiving CAN data. Use this integration kit for modules with firmware version R2.0b or higher.
- **PAC-INT-CAN-RX** (formerly PAC-INT-CAN) is the older kit that includes sample charts only for receiving CAN data. Use this kit only for modules with firmware R1.0d and lower.

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## LEDs

LED	Type	Indicates
1	CAN Bus Activity	Communication activity with the CAN module. This LED illuminates while the module is being configured and when CAN data is received.
2	STATUS	2 blinks: SNAP-SCM-CAN2B firmware has started. 5 blinks: firmware error 8 blinks: CAN module error
3	POWER	Power is applied to the module.
4	ERROR	Error on the CAN bus. (For details, see next section.)

**Error LED Operation.** The #4 LED indicates an error on the CAN bus. Error codes include:

Error Codes	Description
0	Error—Active State. The SNAP-SCM-CAN2B has received less than 96 errors.
-1	Error—Active State. The SNAP-SCM-CAN2B has received 96 or more errors but less than 128 errors.
-2	Receiver Overflow. A CAN packet was dropped. This happens when the SNAP-SCM-CAN2B can't keep up with the traffic on the CAN bus. This means the internal buffer on the CAN2B module is full. This can happen if the strategy isn't reading the data fast enough, or too many serial modules are on the rack. To resolve it, you can: <ul style="list-style-type: none"><li>• Configure the Data Masks and Filters to receive fewer CAN packets.</li><li>• Reduce the number of serial modules on the rack.</li><li>• Increase how frequently the strategy reads the module.</li></ul>
-3	Error—Passive State. The SNAP-SCM-CAN2B has received 128 or more errors but less than 255 errors.

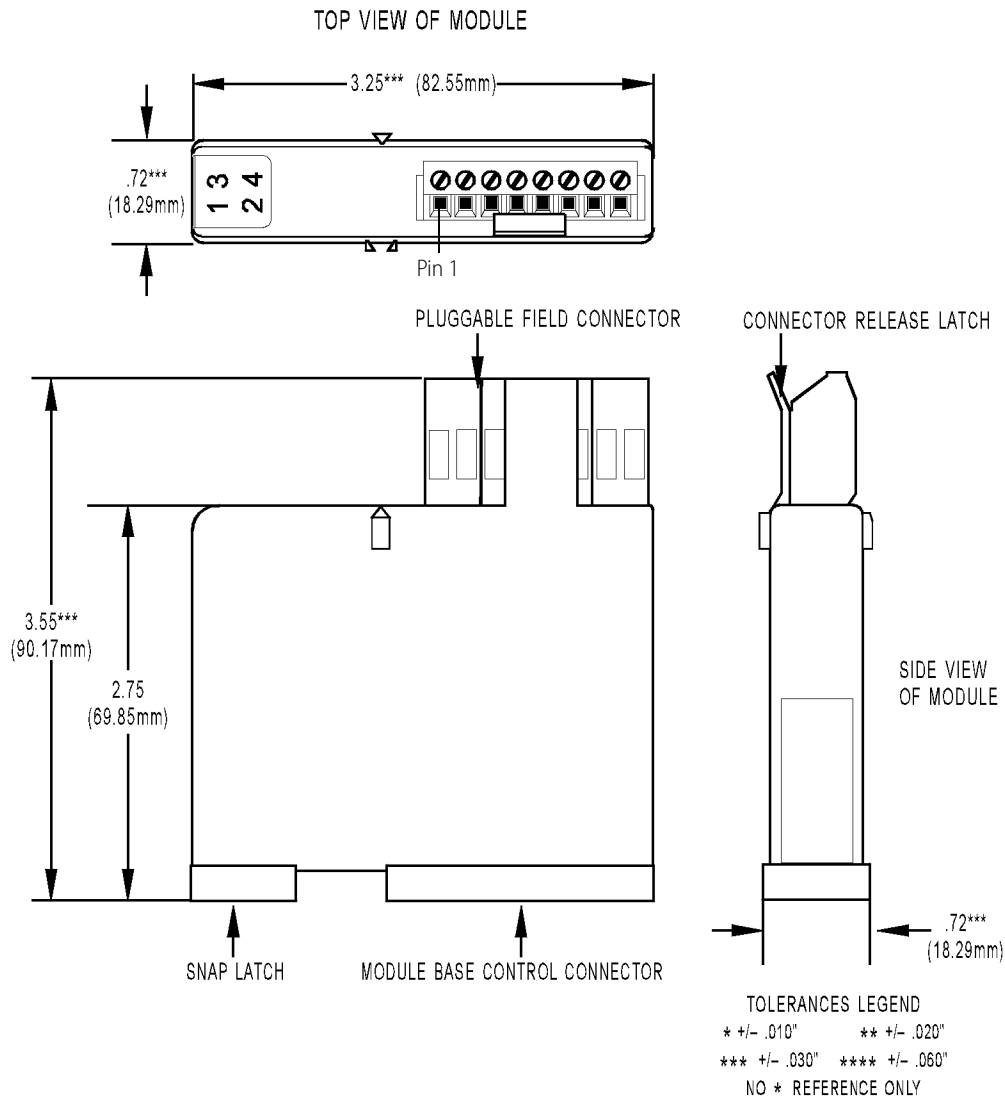
To clear the error, you can use PAC Manager or PAC Control to read the CAN module configuration from the memory map. (For the memory map addresses required to access the error codes, see form 1465, [OptoMMP Protocol Guide](#), Appendix A: SNAP-SCM-CAN2B Serial Module Configuration-Read/Write.)

If your device has **SNAP-SCM-CAN2B Firmware R2.0b or higher**, the Error LED also illuminates when any bits are set in either the CAN bus error flags register or the CAN transport error flags register. For information on error flags, see the [CAN RX/TX Integration Kit for PAC Project Technical Note](#), "CAN Module Status Reply."

In addition to clearing the error by reading from the memory map, with firmware R2.0b, you can also clear the error by issuing an "S" command from the O22Can2BModuleCtrlStat subroutine (in the [CAN Integration Kit for PAC Project](#)). For more information, see form 2151, the [CAN RX/TX Integration Kit for PAC Project Technical Note](#), "PAC Control Sample Subroutines."

# SNAP-SCM-CAN2B Communication Module

## Dimensions



## PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products used worldwide.

Industrial automation, process control, building automation, industrial refrigeration, remote monitoring, data acquisition, and Industrial Internet of Things (IIoT) applications all rely on Opto 22.



### groov

Monitor and control your equipment from anywhere using your smartphone or tablet with groov. Build your own mobile app easily—just drag, drop, and tag. No programming or coding. Visit [groov.com](http://groov.com) for more information and your free trial.

## SNAP PAC System

Developer- and IIoT-ready, the SNAP PAC System connects physical assets to databases and applications using open standards. The SNAP PAC System consists of four integrated components:

- SNAP PAC controllers
- PAC Project™ Software Suite
- SNAP PAC brains
- SNAP I/O™

### SNAP PAC Controllers

SNAP PAC programmable automation controllers handle a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

For IIoT applications and easier integration with company systems, standalone and rack-mounted SNAP PACs include a built-in HTTP/HTTPS server and **RESTful API** (application program interface). The REST API gives you secure, direct access to I/O and variable data using your choice of programming languages. No middleware, protocol converters, drivers, or gateways needed.

Based on open Ethernet and Internet Protocol (IP) standards, SNAP PACs make it easier to build or extend a system without the expense and limitations of proprietary networks and protocols.

### PAC Project Software Suite

Opto 22's PAC Project Software Suite offers full-featured, cost-effective control programming, HMI (human machine interface), OPC server, and database connectivity software.

Control programming includes both easy-to-learn flowcharts and optional scripting. Commands are in plain English; variables and I/O point names are fully descriptive.

PAC Project Basic offers control and HMI tools and is free for download on our website, [www.opto22.com](http://www.opto22.com). PAC Project Professional, available for separate purchase, adds one SoftPAC software-based controller, OptoOPCServer, OptoDataLink, options for controller redundancy or segmented networking, and support for legacy Opto 22 serial *mistic*™ I/O units.

### SNAP PAC Brains

While SNAP PAC controllers provide central control and data distribution, SNAP PAC brains provide distributed intelligence for I/O processing and communications. Brains offer analog, digital, and serial functions, including thermocouple linearization, local PID loop control, watchdog, totalizing, and much more.

### SNAP I/O

I/O provides the local connection to sensors and equipment. Opto 22 SNAP I/O offers 1 to 32 points of reliable I/O per module. Analog, digital, and serial modules are mixed on one mounting rack and controlled by a SNAP PAC brain or rack-mounted PAC.

## QUALITY

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California.

Because we test each product twice before it leaves our factory, rather than only testing a sample of each batch, we can guarantee most solid-state relays and optically isolated I/O modules for life.



## FREE PRODUCT SUPPORT

Opto 22's California-based Product Support Group offers free, comprehensive technical support for Opto 22 products from engineers with decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Support is always available on our website: how-to videos, user's guides, OptoKnowledgeBase, self-training guide, troubleshooting, and OptoForums. In addition, hands-on training is available for free at our Temecula, California headquarters, and you can [register online](#).

## PURCHASING OPTO 22 PRODUCTS

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-6786 (toll-free in the U.S. and Canada) or 951-695-3000, or visit our website at [www.opto22.com](http://www.opto22.com).