

# SNAP-SCM-ST2 Pulse Output Module

## Features

- Suited for pulse/direction applications with a frequency range of 0.13–50,000 Hz
- Dual outputs
- Software configurable

## Description

The SNAP-SCM-ST2 pulse output module is a two-channel serial communication module that provides pulse and direction signals for stepper motor drives. Each channel is isolated from the logic side. The module can either output a constant frequency, or it can ramp from one frequency to another.

The SNAP-SCM-ST2 links up to two stepper motors which can be controlled by a SNAP PAC controller running a PAC Control™ strategy. LED indicators are provided to indicate activity on each port.

The module snaps onto an Opto 22 SNAP PAC mounting rack. SNAP PAC racks accommodate up to 4, 8, 12, or 16 I/O modules, with a maximum of 8 serial modules (including SNAP-SCM-ST2) on any one rack. Because the SNAP-SCM-ST2 module is mounted on these standard racks with other SNAP I/O modules, you can use the combination of analog, digital, and serial modules required by your application at the location where they are needed.

SNAP racks have a retention rail locking system. Use two 4–40 by ½-inch standard machine screws to hold each module securely in position on the SNAP rack.

*NOTE: SNAP-SCM-ST2 modules require a SNAP PAC EB-series brain or R-series controller with firmware R9.1a or newer. These modules do not work with SNAP PAC SB-series brains nor with legacy brains or controllers.*



SNAP-SCM-ST2 Module

## Commands Supported

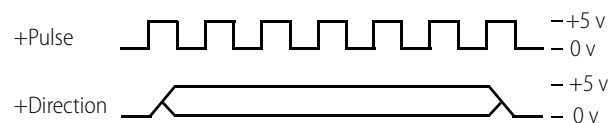
The SNAP-SCM-ST2 module supports the following pulse output commands in PAC Control:

- **SetPulseFrequency** outputs a set frequency until instructed to do otherwise.
- **SetPulseSequence** ramps from one frequency to another.
- **ReadPulseFrequency** returns a string representing a channel's current frequency. *This command requires SNAP-SCM-ST2 module firmware version R1.0d or newer.*

These pulse output commands are entered in PAC Control using the Transmit/Receive String command. For more information, see "Using the SNAP-SCM-ST2 Module Commands" in [form 1191](#), the *SNAP Serial Communication Module User's Guide*.

## How the SNAP-SCM-ST2 Outputs Data

The SNAP-SCM-ST2 outputs a specified frequency based on the command received, as shown here.



The Direction pin can be either +5 VDC or 0 VDC, as determined by the parameters of the command executed. See "Using the SNAP-SCM-ST2 Module Commands" in [form 1191](#), the *SNAP Serial Communication Module User's Guide*.

## Part Numbers

Part	Description
SNAP-SCM-ST2	SNAP 2-Channel Pulse Output Module

# SNAP-SCM-ST2 Pulse Output Module

## Specifications

Frequency Range	0.13–50,000 Hz
Pulse Width Range <sup>1</sup>	3.84 Sec to 10 µSec
Pulse Width Accuracy <sup>2</sup>	0–2 Hz, 2–30 Hz, 30–50,000 Hz (see graphs on the next page)
Output Format	CMOS/TTL Compatible
Logic Supply Voltage	5.0 VDC
Logic Supply Current	200 mA
Compatible I/O Processors	SNAP PAC R-series controllers and EB-series brains with R9.1a or newer firmware
Duty Cycle	Fixed at 50%
Number of Ports per Module	2
Operating Temperature Range	-20–60 °C
Storage Temperature Range	-30–85 °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	CE, RoHS, DFARS
Warranty	30 months from date of manufacture

<sup>1</sup>Pulse Width is equal to one-half the period.

<sup>2</sup>To find the frequency error in Hz:

Frequency Error (+/-) = Desired Frequency - (1 ÷ (Pulse Width Resolution + (1 ÷ Desired Frequency)))

## Pin Assignments

Pin	Port	Use	Description
1	A	Pulse	Frequency output
2		Ground	Isolated from logic side
3		Direction	+5 VDC when asserted 0 VDC when deasserted
4		Ground	Isolated from logic side
5	B	Pulse	Frequency output
6		Ground	Isolated from logic side
7		Direction	+5 VDC when asserted 0 VDC when deasserted
8		Ground	Isolated from logic side

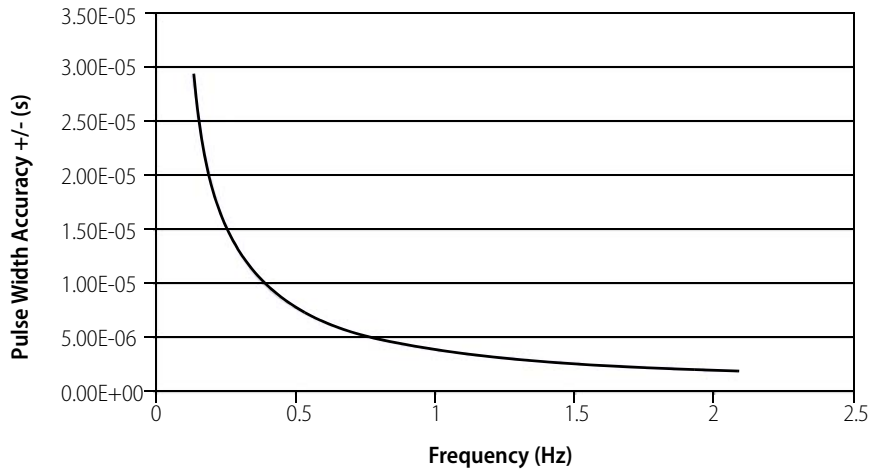
See diagram on [page 4](#) for location of pin 1.

## LED Indicators

LED	Description
1	Blinks when outputting pulses on channel 1
2	Positive/Negative direction indicator on channel 1
3	Blinks when outputting pulses on channel 2
4	Positive/Negative direction indicator on channel 2

# SNAP-SCM-ST2 Pulse Output Module

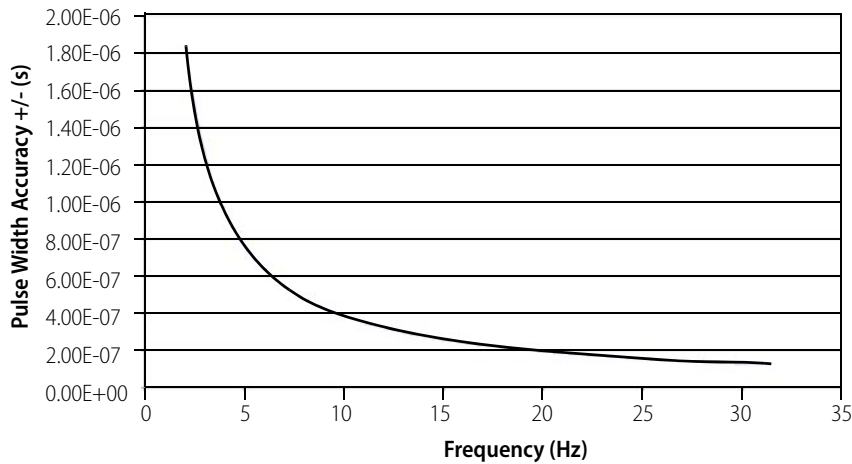
## Pulse Width Accuracy for Frequencies from 0–2 Hz



**Equation:**

$$\text{Accuracy} = \frac{3.871 \times 10^{-6}}{\text{Frequency}^{0.993}}$$

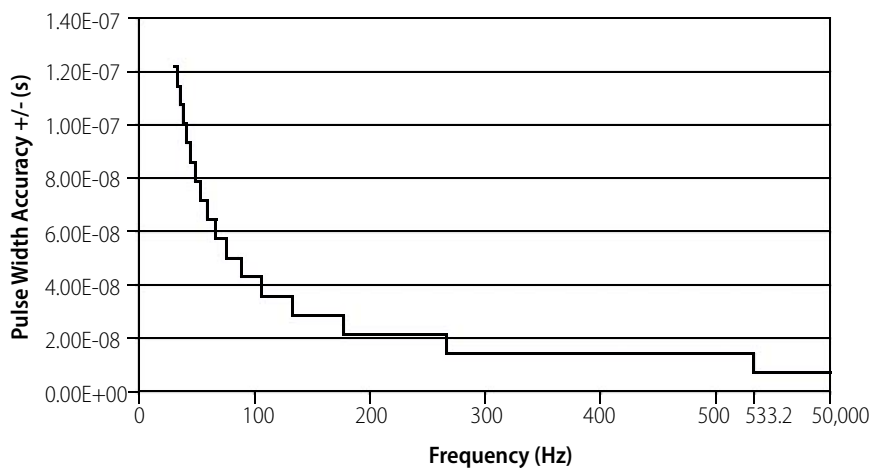
## Pulse Width Accuracy for Frequencies from 2–30 Hz



**Equation:**

$$\text{Accuracy} = \frac{3.795 \times 10^{-6}}{\text{Frequency}^{0.993}}$$

## Pulse Width Accuracy for Frequencies from 30–50,000 Hz



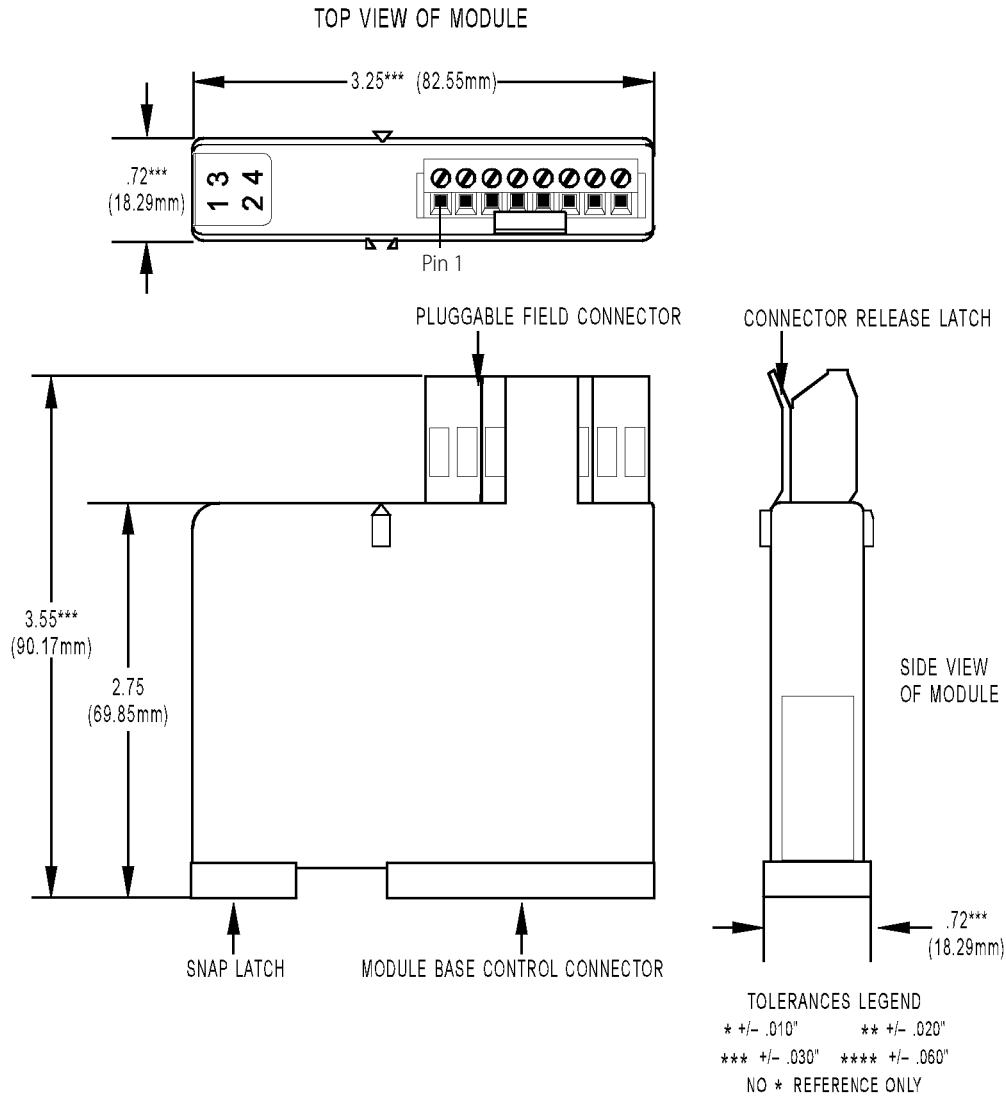
**Transition Points:**

Frequency	Accuracy
533.20	7.15430×10 <sup>-9</sup>
266.60	1.43086×10 <sup>-8</sup>
177.73	2.14629×10 <sup>-8</sup>
133.30	2.86172×10 <sup>-8</sup>
106.64	3.57715×10 <sup>-8</sup>
88.87	4.29258×10 <sup>-8</sup>
76.17	5.00801×10 <sup>-8</sup>
66.65	5.72344×10 <sup>-8</sup>
59.24	6.43887×10 <sup>-8</sup>
53.32	7.15430×10 <sup>-8</sup>
48.47	7.86973×10 <sup>-8</sup>
44.43	8.58516×10 <sup>-8</sup>
41.02	9.30060×10 <sup>-8</sup>
38.09	1.00160×10 <sup>-7</sup>
35.55	1.07315×10 <sup>-7</sup>
33.33	1.14469×10 <sup>-7</sup>
31.36	1.21623×10 <sup>-7</sup>
29.62	1.28777×10 <sup>-7</sup>

# SNAP-SCM-ST2 Pulse Output Module

## Dimensions

### SNAP-SCM-ST2 Pulse Output Module



# More About Opto 22

## Products

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

Industrial automation, process control, building automation, industrial refrigeration, remote monitoring, data acquisition, Industrial Internet of Things (IIoT), and information technology 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.

Additional support is always available on our website: how-to videos, OptoKnowledgeBase, self-training guide, troubleshooting and user's guides, 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).

{RESTful API}



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