OPTO 22

DATA SHEET

Form 640-230117

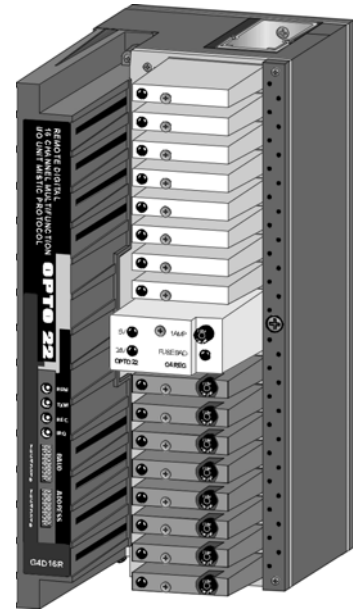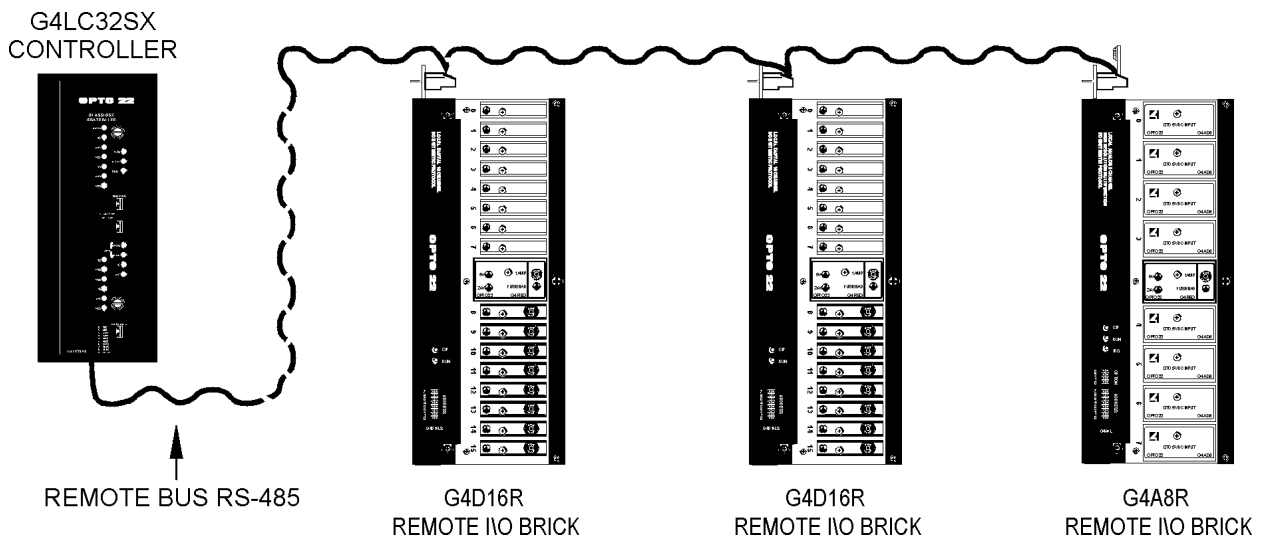| Part Number	Description
G4D16R	Remote Digital 16-Channel Multifunction I/O Unit Mistic Protocol

Description

[This part is obsolete and no longer available.]

The G4D16R is a high-performance digital I/O brick for the Opto 22 family of processors and I/O. It provides intelligent and flexible single-point I/O control for up to 16 digital I/O modules in a rugged, deadfront, compact package. Onboard brick intelligence offers latching, pulse train generation, time delays, counting, event/reactions, and many other control functions. Event/reactions execute high-speed deterministic responses to sophisticated control sequences, alarm monitors, diagnostics, and host interrupts.

Digital bricks use Opto 22's Mistic protocol and high-speed serial communications. You can program digital bricks using Opto 22's intuitive multitasking, flowchart-based languages OptoControl or Cyrano. For custom software development, use a host computer and Opto 22's Misticware software driver with the high-level software language of your choice.

System Architecture

G4LC32SX CONTROLLER

REMOTE BUS RS-485

G4D16R
REMOTE I\O BRICK

G4D16R
REMOTE I\O BRICK

G4A8R
REMOTE I\O BRICK

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Setup And System Commands
IDENTIFY UNIT
POWER UP CLEAR
REPEAT LAST RESPONSE
RESET
RESET ALL PARAMETERS TO DEFAULT
SET COMM LINK WATCHDOG MOMO* AND DELAY
SET RESPONSE DELAY
SET SYSTEM OPTIONS

Digital I/O Configuration Commands
READ MODULE CONFIGURATION
SET CHANNEL CONFIGURATION
SET I/O CONFIGURATION-GROUP
STORE SYSTEM CONFIGURATION

Digital Read/Write, Latch Commands
CLEAR OUTPUT
READ AND OPTIONALLY CLEAR INPUT LATCHES GROUP
READ AND OPTIONALLY CLEAR INPUT LATCH
READ MODULE STATUS
SET OUTPUT MODULE STATE-GROUP
SET OUTPUTS

Digital Counter, Frequency Commands
CLEAR COUNTER
ENABLE/DISABLE COUNTER GROUP
ENABLE/DISABLE COUNTER
READ 16-BIT COUNTER
READ 32-BIT COUNTER GROUP
READ 32-BIT COUNTER
READ AND CLEAR 16-BIT COUNTER
READ AND CLEAR 32-BIT COUNTER GROUP
READ AND CLEAR 32-BIT COUNTER
READ AND CLEAR ENABLE/DISABLE STATUS
READ FREQUENCY MEASUREMENT
READ FREQUENCY MEASUREMENT GROUP

Digital Time Delay, Pulse Output Commands
GENERATE N PULSES
READ OUTPUT TIMER COUNTER
SET TIME PROPORTIONAL OUTPUT PERIOD
SET TIME PROPORTIONAL OUTPUT PERCENTAGE
START CONTINUOUS SQUARE WAVE
START OFF PULSE
START ON PULSE

Digital Pulse/Period Measurement Commands
READ 16-BIT PULSE/PERIOD MEASUREMENT
READ 32-BIT PULSE/PERIOD GROUP
READ 32-BIT PULSE/PERIOD MEASUREMENT
READ AND RESTART 16-BIT PULSE/PERIOD
READ AND RESTART 32-BIT PULSE/PERIOD
READ AND RESTART 32-BIT PULSE/PERIOD GROUP
READ PULSE/PERIOD COMPLETE STATUS

Event Reaction Commands
CLEAR EVENT/REACTION TABLE
CLEAR EVENT ENTRY
CLEAR INTERRUPT
ENABLE/DISABLE EVENT ENTRY GROUP
ENABLE/DISABLE EVENT ENTRY
READ AND OPTIONALLY CLEAR EVENT LATCH
READ AND CLEAR EVENT LATCHES
READ EVENT ENABLE/DISABLE STATUS
READ EVENT LATCHES
READ EVENT/DATA HOLD BUFFER
READ EVENT ENTRY
SET EVENT INTERRUPT STATUS
SET EVENT ON A COMMUNICATIONS WATCHDOG TIME OUT
SET EVENT ON COUNTER GREATER OR EQUAL
SET EVENT ON TIMER GREATER OR EQUAL
SET EVENT ON COUNTER LESS THAN OR EQUAL
SET EVENT ON TIMER LESS THAN OR EQUAL
SET EVENT ON MOMO* MATCH
SET REACTION TO NULL
SET REACTION TO CLEAR COUNTER/TIMER
SET REACTION TO OUTPUT A MODULE STATE
SET REACTION TO ENABLE/DISABLE COUNTER
SET REACTION TO ENABLE/DISABLE AN EVENT
SET REACTION TO ENABLE/DISABLE EVENT GROUPS
SET REACTION TO START OFF-PULSE
SET REACTION TO START ON-PULSE
SET REACTION TO READ AND HOLD COUNTER VALUE
SET REACTION TO READ AND HOLD TIMER VALUE
SET REACTION TO WRITE MOMO**

* MOMO-Must Be On, Must Be Off - Used to set or test state of digital outputs or inputs.

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Specifications [This part is obsolete and no longer available.]

Multifunction Digital Brick Specifications

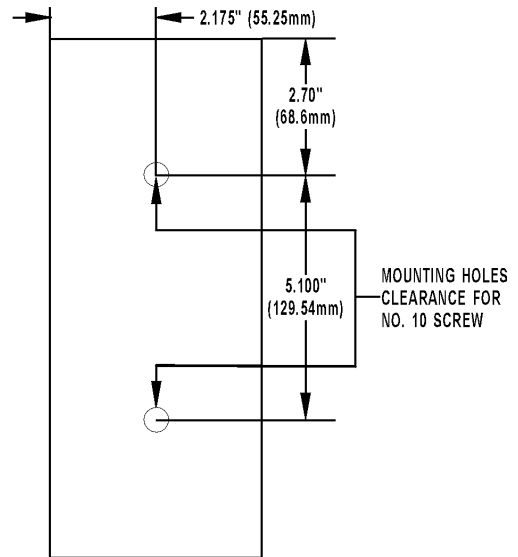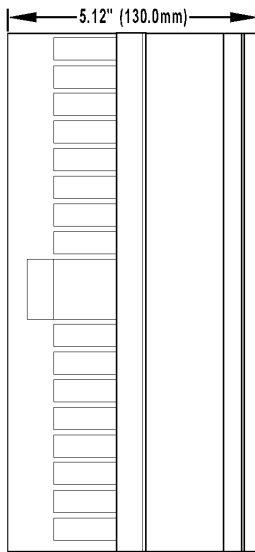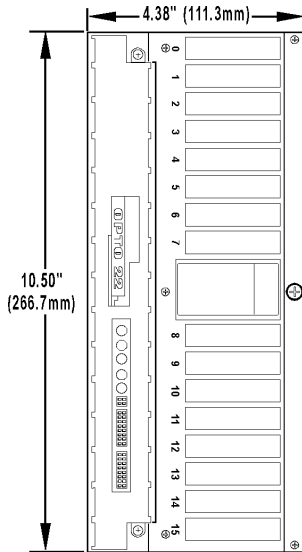|	
CPU CPU clock frequency	16-bit, Intel 80C196 processor 12 MHz processor

Communications
    Bus speed
    Cable type
 	
    Maximum cable length
    Mode
	
	300 - 115.2 KBd
	3 wire, twisted pair + GND,
	Interrupt uses 2nd wire pair
	3,000 ft (more with repeaters)
	Binary or ASCII

Typical I/O times
(includes communication transfer time)
    Read 16 channels
    Write 16 channels
	
	1.76 ms
	2.27 ms

Counters (frequency measure)
    Maximum rate
    Data size
    Minimum pulse width ON
    Minimum pulse width OFF
	
	20 KHz
	32 bits
	10 μs
	10 μs

Latching (minimum pulse width)	10 μs

Output pulse
    Maximum continuous rate
    Minimum pulse width ON
    Minimum pulse width OFF
	
	500 Hz
	1 ms
	1 ms

Time-proportional output (TPO) minimum period	100 ms
Typical Event/Reaction time (£16 Event/Reactions)	4 ms

*System power consumption @ 24 VDC ± 0.1V
    Terminated (last brick on the bus)
    Non-terminated (all other bricks)
	
	250 mA
	250 mA

Temperature
    Operating
    Storage
	
	0°C to 70°C
	- 40°C to 80°C

Humidity	5% to 95% relative humidity
Software	OptoControl, Cyrano 200 and Misticware

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Dimensions

TOLERANCES: .XX +/– .02 (.5) .XXX +/– .010 (.25)

Assembly
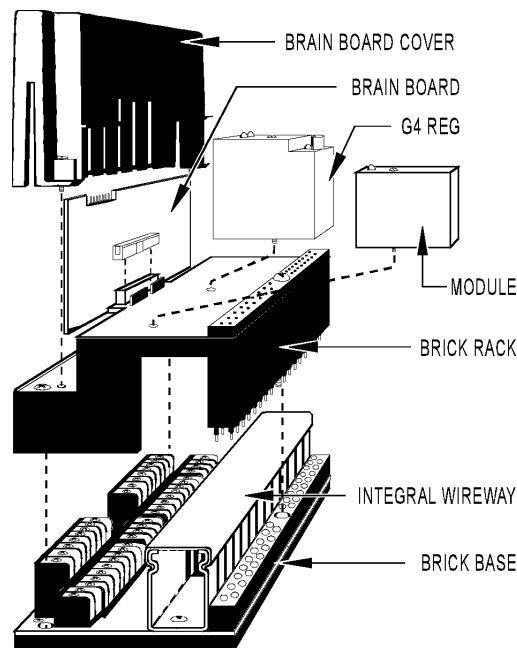
- BRAIN BOARD COVER
- BRAIN BOARD
- G4 REG
- MODULE
- BRICK RACK
- INTEGRAL WIREWAY
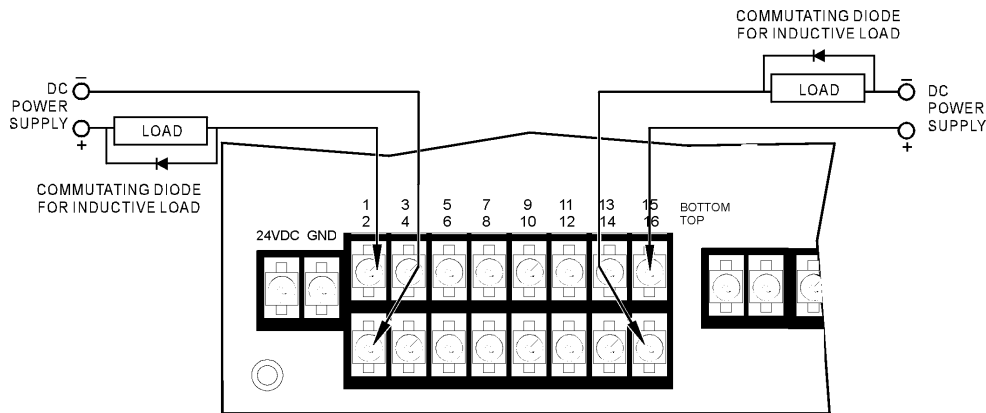- BRICK BASE

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Field Wiring Instructions

Digital DC Outputs

Applies to G4ODC5, G4ODC5A, G4ODC5MA, G4ODC5R, G4ODC5R5, and G4SWOUT modules

SHOWS WIRING CONNECTION IN CURRENT SOURCING MODE, MODULE POSITION 0

SHOWS WIRING CONNECTION IN CURRENT SOURCING MODE, MODULE POSITION 7

Digital DC Inputs

Applies to G4IDC5, G4IDC5B, G4IDC5D, G4IDC5G, G4IDC5K, and G4IDC5MA modules.
Also applies to G4IAC5, G4IAC5A, and G4IAC5MA modules when used with DC field voltages.
NOTE: Since the G4SWIN module simulates field devices for testing, this module does not need to be wired on the field side.
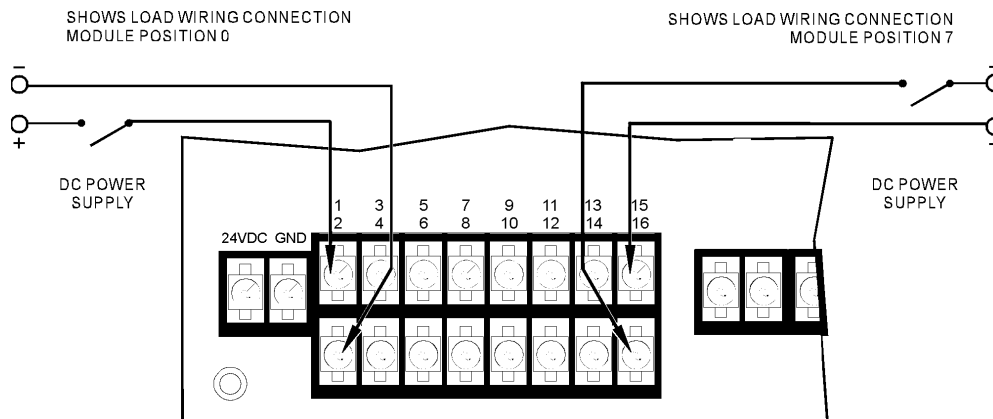
SHOWS LOAD WIRING CONNECTION MODULE POSITION 0

SHOWS LOAD WIRING CONNECTION MODULE POSITION 7

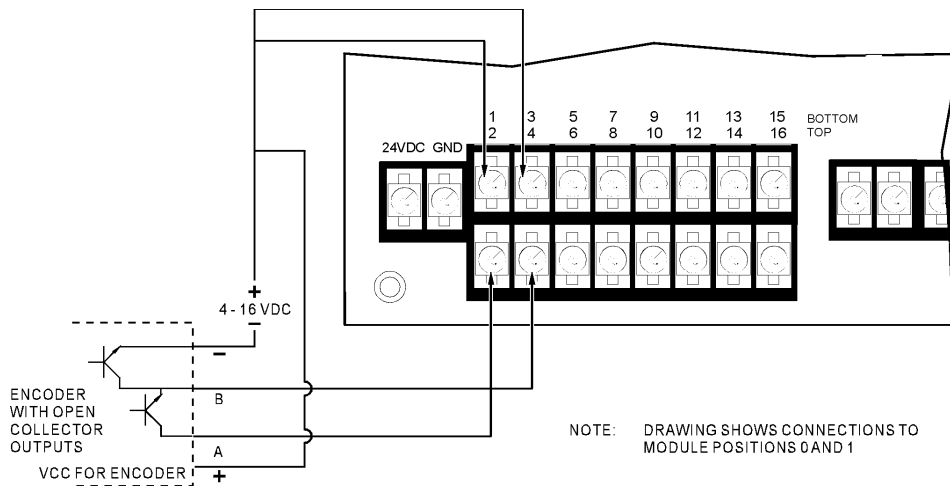Opto 22 • 43044 Business Park Drive • Temecula, CA 92590-3614 • Phone: (951) 695-3000 • (800) 321-OPTO • Fax: (951) 695-3095 • www.opto22.com

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Field Wiring Instructions

Digital Quadrature Inputs

Applies to the G4IDC5Q module

NOTE: DRAWING SHOWS CONNECTIONS TO MODULE POSITIONS 0 AND 1

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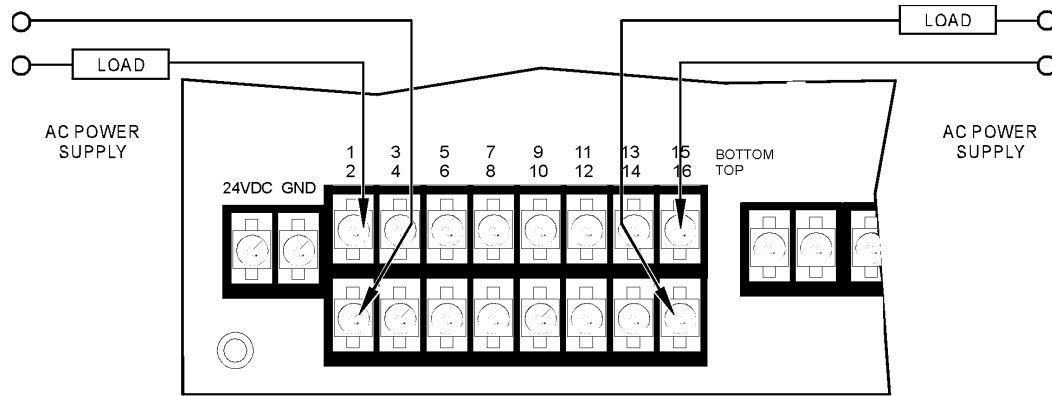
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Digital AC Outputs

Applies to G4OAC5, G4OAC5A, G4OAC5A5, and G4OAC5MA modules.
Also applies to G4ODC5R, G4ODC5R5, and G4SWOUT modules when used with AC field voltages.
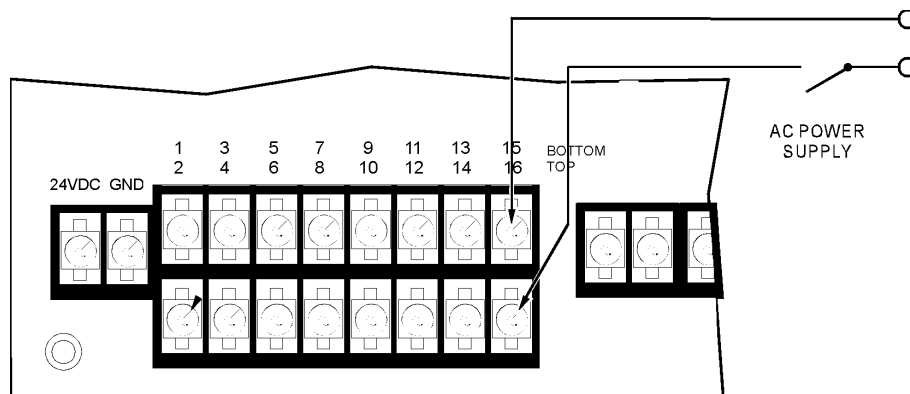

SHOWS LOAD WIRING CONNECTION
MODULE POSITION 0

SHOWS LOAD WIRING CONNECTION
MODULE POSITION 7

Digital AC Inputs

Applies to G4IAC5, G4IAC5A, and G4IAC5MA modules.
Also applies to G4IDC5, G4IDC5B, G4IDC5G, and G4IDC5MA modules when used with AC field voltages.

INPUT DEVICE MAY BE IN SERIES WITH
EITHER LINE. SHOWS WIRING
CONNECTION FOR MODULE POSITION 7.

More about Opto 22

PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products. Industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications worldwide all rely on Opto 22.

groov RIO®

groov RIO edge I/O offers a single, compact, PoE-powered industrial package with web-based configuration and IIoT software built in, support for multiple OT and IT protocols, and security features like a device firewall, data encryption, and user account control.

Standing alone, groov RIO connects to sensors, equipment, and legacy systems, collecting and securely publishing data from field to cloud. Choose a universal I/O model with thousands of possible field I/O configurations, with or without Ignition from Inductive Automation®, or a RIO EMU energy monitoring unit that reports 64 energy data values from 3-phase loads up to 600 VAC, Delta or Wye.

You can also use groov RIO with a Modbus/TCP master or as remote I/O for a groov EPIC system.

groov EPIC® System

Opto 22's groov Edge Programmable Industrial Controller (EPIC) system gives you industrially hardened control with a flexible Linux®-based processor with gateway functions, guaranteed-for-life I/O, and software for your automation and IIoT applications.

groov EPIC Processor

The heart of the system is the groov EPIC processor. It handles a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

In addition, the EPIC provides secure data communications among physical assets, control systems, software applications, and online services, both on premises and in the cloud. No industrial PC needed.

Configuring and troubleshooting I/O and networking is easier with the EPIC's integrated high-resolution color touchscreen. Authorized users can manage the system locally on the touchscreen, on a monitor connected via the HDMI or USB ports, or on a PC or mobile device with a web browser.

groov EPIC I/O

groov I/O connects locally to sensors and equipment. Modules have a spring-clamp terminal strip, integrated wireway, swing-away cover, and LEDs indicating module health and discrete channel status. groov I/O is hot swappable, UL Hazardous Locations approved, and ATEX compliant.

groov EPIC Software

The groov EPIC processor comes ready to run the software you need:

- Programming: Choose flowchart-based PAC Control, CODESYS Development System for IEC61131-3 compliant programs, or secure shell access (SSH) to the Linux OS for custom applications
- Node-RED for creating simple IIoT logic flows from pre-built nodes
- Efficient MQTT data communications with string or Sparkplug data formats
- Multiple OPC UA server options
- HMI: groov View to build your own HMI viewable on touchscreen, PCs, and mobile devices; PAC Display for a Windows HMI; Node-RED dashboard UI
- Ignition or Ignition Edge® from Inductive Automation (requires license purchase) with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications

Older products

From solid state relays, to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and working hard at thousands of installations worldwide. You can count on us for the reliability and service you expect, now and in the future.

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 testing a sample of each batch, we can afford to 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 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, including free online training at OptoU, how-to videos, user's guides, the Opto 22 KnowledgeBase, and OptoForums.

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 **+1-951-695-3000**, or visit our website at www.opto22.com.