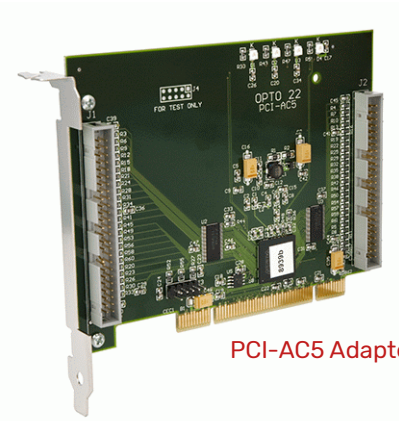
PCI-AC5, PCIE-AC5, AC5, AND G4AC5 ADAPTER CARDS

Features

- Provides direct connection from a PC to a wide variety of I/O mounting racks
- Bidirectional I/O lines allow any combination of input and output modules
- PCIe, PCI, or ISA bus compatible choices
- Includes six-foot interface cable



PCI-AC5 Adapter Card

DESCRIPTION

The PCI-AC5, PCIe-AC5, AC5, and G4AC5 adapter cards provide an interface between personal computers and Opto 22 digital I/O mounting racks, for direct connection to input/output points.

- The **AC5** and **G4AC5** are compatible with ISA bus-based PCs and can control up to 24 I/O points on a single mounting rack.
- The **PCI-AC5** is compatible with computers that feature a 33 MHz Peripheral Component Interconnect (PCI) bus.
- The **PCIe-AC5** is compatible with computers that feature a PCI Express (PCIe) 1.1 single-lane slot.

Both PCI-AC5 and PCIe-AC5 adapter cards have two 50-wire ribbon cable interfaces; each card can control up to 48 I/O points (24 per rack). They offer expanded operation and support for modern computers with PCI and PCIe slots. These cards are about 100 times faster than the AC5 when accessing I/O using the free PC-Based Direct I/O SDK (included with the cards). The PCI and PCIe cards also have jumperless configuration and four LEDs for debugging or indicating application status.

WARNING: *Your system can be damaged if you use an incompatible rack or an improperly configured card. For details, see "Rack Compatibility" on page 3.*

Cables

Six-foot ribbon cables are supplied with each adapter card to connect the card to the I/O rack. The PCI-AC5 and PCIe-AC5 come with two 50-wire ribbon cables with header connectors. If needed, edge-connector cables are available for purchase.

The G4AC5 and AC5 part numbers include identical adapter cards but have different cables. The cable included with the G4AC5 connects the card to racks with header connectors (such as the G4PB24). The cable included with the AC5 connects the card to racks with edge connectors (such as the PB16A). For full rack compatibility information, see page 3.

LEDs

The AC5 and G4AC5 cards include one LED that flashes to indicate activity (reading from or writing to the card). The PCI-AC5 and PCIe-AC5 cards include four LEDs that can be used for debugging or indicating application status.

Developer SDK

The free PC-Based Direct I/O software development kit (SDK) helps developers build custom applications for the PCI-AC5 and PCIe-AC5. (For the AC5 and G4AC5 cards, an older version of the SDK can be downloaded from the Opto 22 website.)

The SDK is included on the PC-Based Direct I/O CD (shipped with the cards) and can also be downloaded from our website. The SDK is compatible with 64- and 32-bit versions of Microsoft® Windows® 10 Professional, Windows 8.1 Professional, and Windows 7 Professional, and supports development in C#® and VB.NET®.

For more information about the SDK, see Opto 22 form 1211, *PCI-AC5, PCIe-AC5, and AC5 User's Guide*.

Part Numbers

Part	Description
PCI-AC5	PCI adapter card for direct I/O
PCIe-AC5	PCI express adapter card for direct I/O
AC5	ISA bus adapter card with 6-ft. cable to I/O rack with edge connector
G4AC5	ISA bus adapter card with 6-ft. cable to I/O rack with header connector
PC-DIRECT-SDK	PC-Based Direct I/O SDK

Requirements

- For PC bus power requirements, see Specifications below.
- For I/O, an external 5 VDC power supply is required at the I/O mounting rack. This power cannot be provided by the adapter card. Opto 22 recommends that you use an Opto 22 SNAP-PS5 or an isolated supply for this purpose.
- A software driver is required to access the adapter card.

SPECIFICATIONS AND SYSTEM REQUIREMENTS

	PCIe-AC5	PCI-AC5	AC5 and G4AC5
Interface	PCIe (1.x)	PCI	ISA
I/O points controlled	48	48	24
Computer compatibility	PCIe 1.1 bus	32-bit, 33 MHz PCI 2.1 bus	ISA bus
Power requirements for card (from the PCI or ISA bus on the PC)	12 VDC @ 50 mA and 3.3 VDC @ 500 mA	Rev C card[1]: 5 VDC @ 250 mA *and* 3.3 VDC @ 250 mA Rev B card[1]: 5.0 VDC @ 600 mA	5 VDC @ 600 mA
Compatible modules	All cards: 5 VDC logic modules, such as the IDC5, ODC5, G4IDC5, G4ODC5, and SNAP-IAC5.[2]		
SDK compatibility	• 64- and 32-bit versions of Microsoft Windows 10 Professional, 8.1 Professional, and 7 Professional[3] • Supports C# and VB.NET	• 64- and 32-bit versions of Microsoft Windows 10 Professional, 8.1 Professional, and 7 Professional[3] • Supports C# and VB.NET	See Note.[4]
Jumpers	Jumperless configuration	Jumperless configuration	Used to configure base address
LEDs	Four	Four	One
Operating temperature Storage temperature	0 to 60 °C -30 to 85 °C	0 to 70 °C -30 to 85 °C	0 to 70 °C -30 to 85 °C
Agency certifications	Compliant with DFARS	Compliant with DFARS	Compliant with DFARS
Warranty	30 months	30 months	30 months

[1] Rev C cards show **9278** on a white label; older Rev B cards show a number beginning with **8939**. Rev C cards require *both* 5.0 and 3.3 volts. These cards are not compatible with computers that supply 5 VDC only.

[2] Choose 5 VDC logic modules that are compatible with the mounting rack used.
WARNING: Do not use 15 VDC or 24 VDC modules (such as the IDC15 and IDC24). Using these modules with 15 or 24 VDC logic power can cause serious damage to the adapter card and to the computer.

[3] For Windows 7 to properly identify the SDK's digital signatures and files, Microsoft Security Advisory 3123479 update (or higher) must be installed. To download the update, see https://support.microsoft.com/en-us/kb/3123479.

[4] The PC-Based Direct I/O SDK no longer supports the AC5 or G4AC5 adapter cards. For these cards, you can continue to use version R5.0b of the PC-Based Direct I/O SDK (PC_Based_Direct _IO_SDK_R5.0b.exe). It can be downloaded from Opto 22's FTP site.

Rack Compatibility

The following table lists Opto 22 racks that are compatible with the adapter cards as well as racks that can be modified to work with the cards.

WARNING: *Do not use the racks listed as NOT COMPATIBLE. Doing so may cause damage to the computer.*

AC5 Compatible (Edge Connectors)	PCI-AC5 PCIe-AC5, and G4AC5 Compatible (Header Connectors)		PCI-AC5 PCIe-AC5, and G4AC5 Compatible Only if Modified		NOT COMPATIBLE DO NOT USE
PB8	G4PB8	SNAP-D6MC	G4PB16J*	PB16J*	
PB16A	G4PB16	SNAP-D6MC-P	G4PB16K*	PB16K*	G4PB8H
PB16C	G4PB24	SNAP-D12M	G4PB16L*	PB16L*	G4PB16H
PB24	PB24HQ	SNAP-D12MC	PB4H*	PB16HQ*	G4PB16HC
PB24Q	SNAP-D6M	SNAP-D12MC-P	PB8H*	SNAP-D8M**	
			PB16H*	SNAP-D8MC**	
			PB16HC*	SNAP-D8MC-P**	

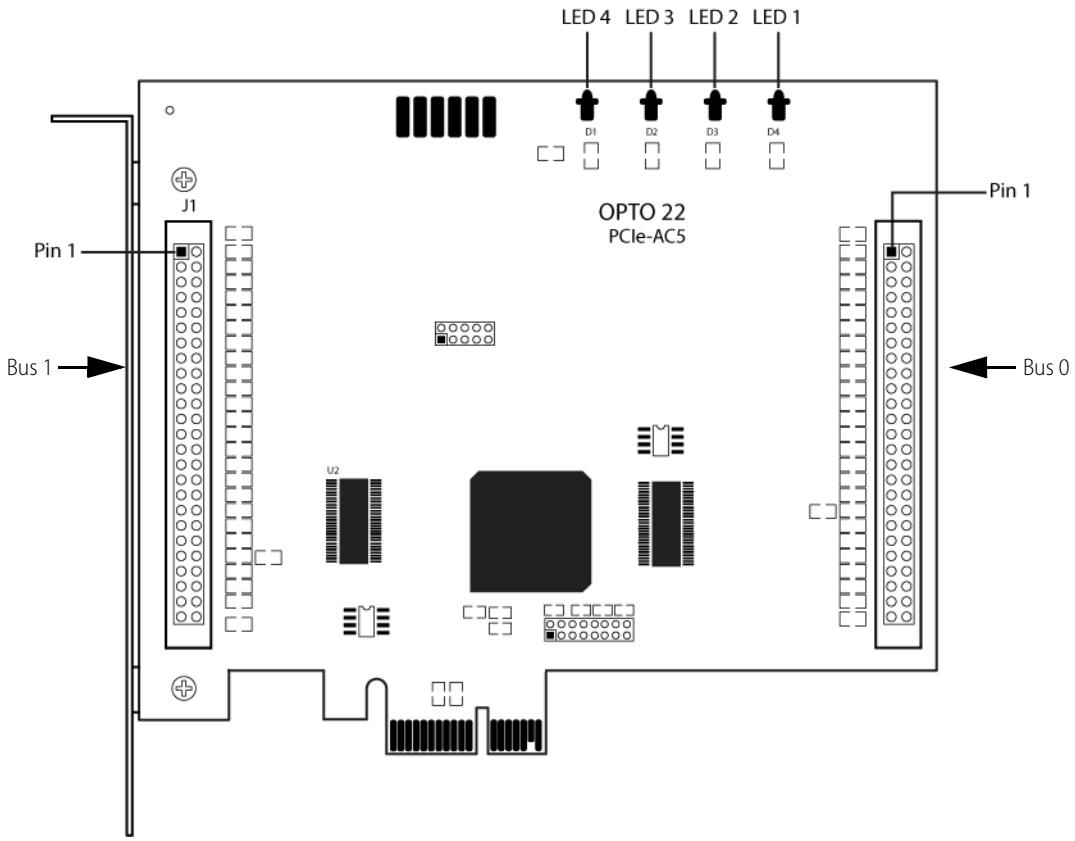
* Modification required to use these racks: Remove the jumpers to pins 1 and 49. (These jumpers are labeled JP1 and JP2 on racks G4PB16J, G4PB16K, and G4PB16L.) The jumpers can be de-soldered or clipped. ***WARNING:*** *If these jumpers are not removed, then the power-on LED will be lit, regardless of the actual power status. This can result in a false power-on indication and may cause damage to the computer.*

** Modification required to use these racks: Remove the JP1 and JP2 jumpers. ***WARNING:*** *Failure to remove the jumpers may cause damage to the computer.*

DRAWINGS

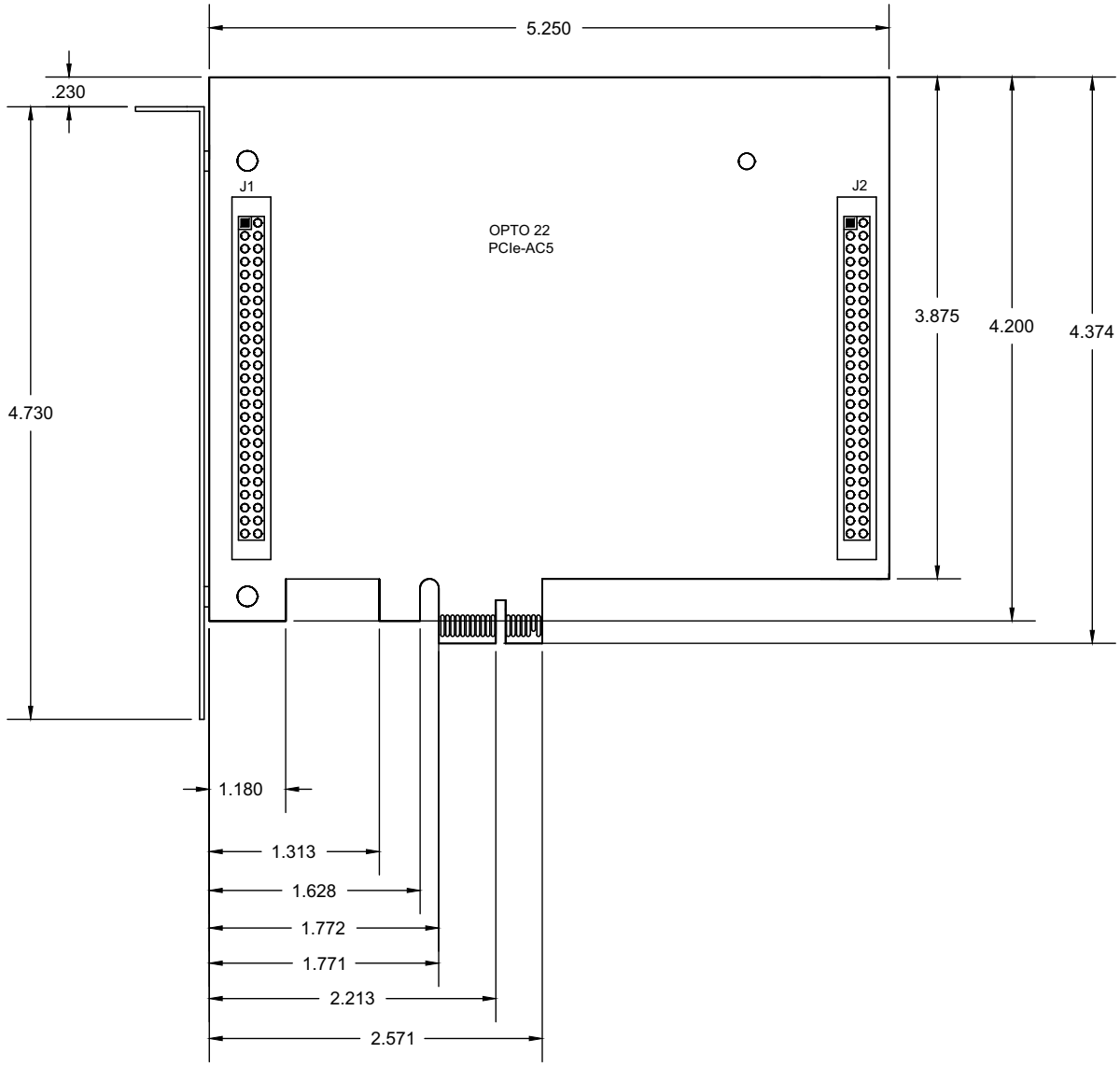
PCIe-AC5

Note that bus numbers are reversed when compared to the PCI-AC5.
See the following page for dimensions.



DRAWINGS

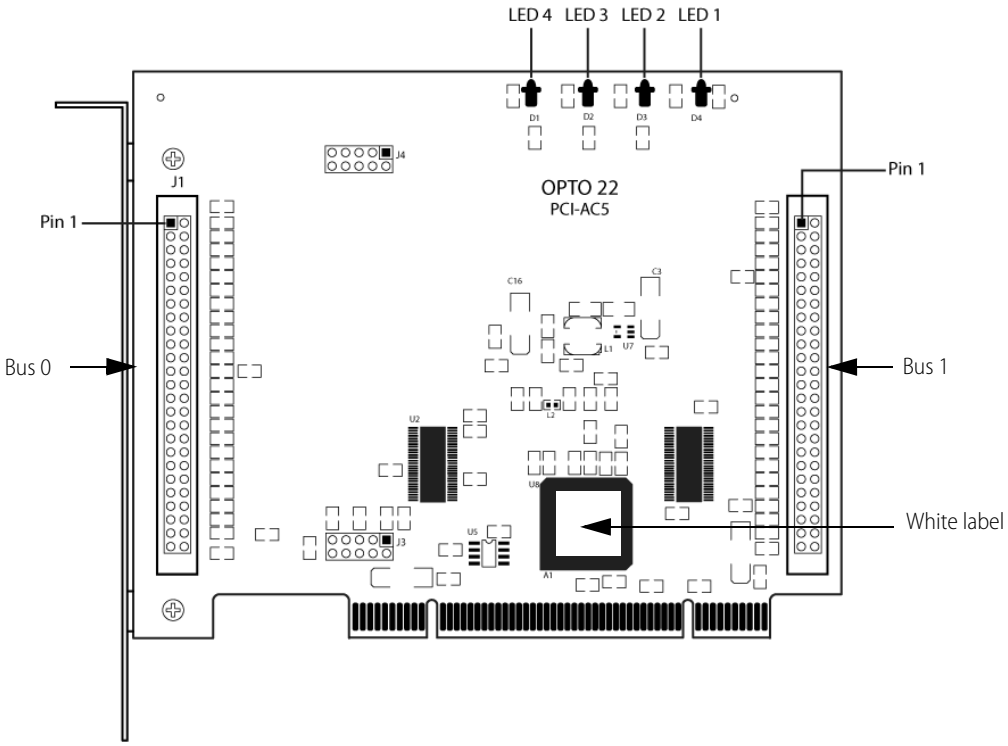
PCIe-AC5 Dimensions



DRAWINGS

PCI-AC5—Newer Card

Manufactured November 2008 and after. Designation on white label: 9278.
Power requirements: 5.0 VDC @ 250 mA *and* 3.3 VDC @ 250 mA
Note reversed numbering of LEDs from previous card.

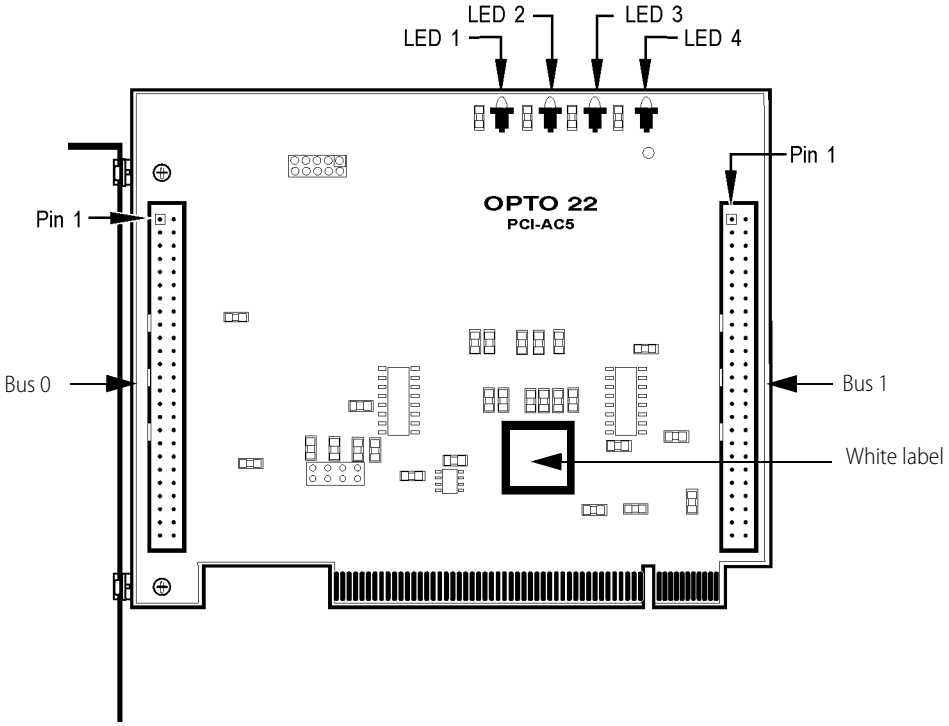


PCI-AC5_2009

DRAWINGS (CONTINUED)

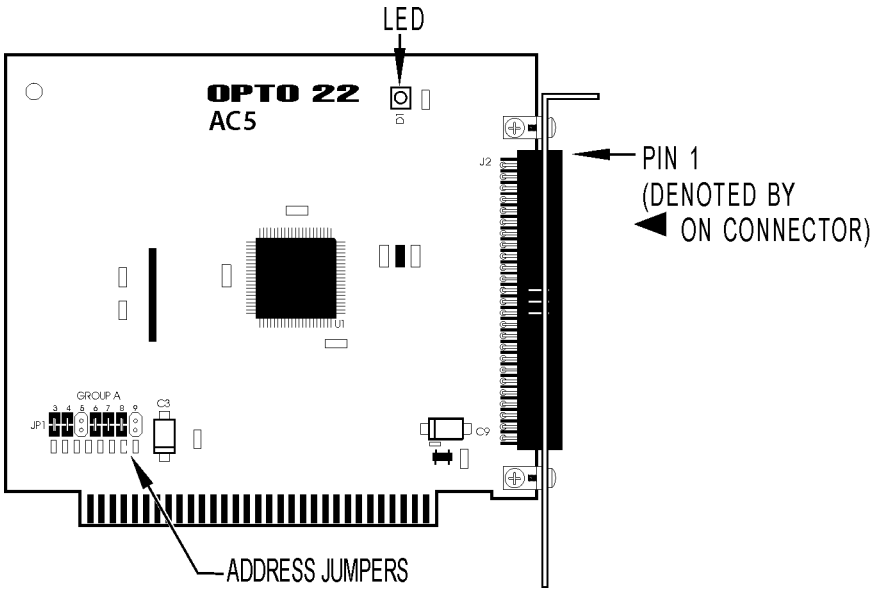
PCI-AC5—Older Card

Manufactured before November 2008. Designation on white label: 8939
Power requirements: 5.0 VDC @ 600 mA



DRAWINGS (CONTINUED)

AC5 and G4AC5



More about Opto 22

OPTO 22

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 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. 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.

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