

## 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

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

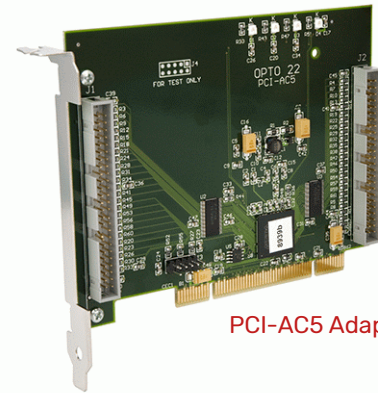
Both PCI-AC5 and PCIe-AC5 adapter cards have two 50-wire ribbon cable interfaces; each card can control up to 48 I/O points (24 per rack). They offer expanded operation and support for modern computers with PCI and PCIe slots. These cards are about 100 times faster than the AC5 when accessing I/O using 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](#).



PCI-AC5 Adapter Card

### 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 [Obsolete]	[Obsolete] PCI adapter card for direct I/O
PCIe-AC5 [Obsolete]	[Obsolete] PCI express adapter card for direct I/O
AC5 [Obsolete]	[Obsolete] ISA bus adapter card with 6-ft. cable to I/O rack with edge connector
G4AC5 [Obsolete]	[Obsolete] 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 [Obsolete]	PCI-AC5 [Obsolete]	AC5 and G4AC5 [Obsolete]
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 <sup>1</sup> : 5 VDC @ 250 mA and 3.3 VDC @ 250 mA  Rev B card <sup>1</sup> : 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. <sup>2</sup>		
SDK compatibility	<ul style="list-style-type: none"><li>64- and 32-bit versions of Microsoft Windows 10 Professional, 8.1 Professional, and 7 Professional<sup>3</sup></li><li>Supports C# and VB.NET</li></ul>	<ul style="list-style-type: none"><li>64- and 32-bit versions of Microsoft Windows 10 Professional, 8.1 Professional, and 7 Professional<sup>3</sup></li><li>Supports C# and VB.NET</li></ul>	See Note. <sup>4</sup>
Jumpers	Jumperless configuration	Jumperless configuration	Used to configure base address
LEDs	Four	Four	One
Operating temperature	0 to 60 °C	0 to 70 °C	0 to 70 °C
Storage temperature	-30 to 85 °C	-30 to 85 °C	-30 to 85 °C
Agency certifications	Compliant with DFARS	Compliant with DFARS	Compliant with DFARS
Warranty	30 months	30 months	30 months

<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> 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>.

<sup>4</sup> 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](#).

These products are obsolete.



These products are obsolete.

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

\* 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.

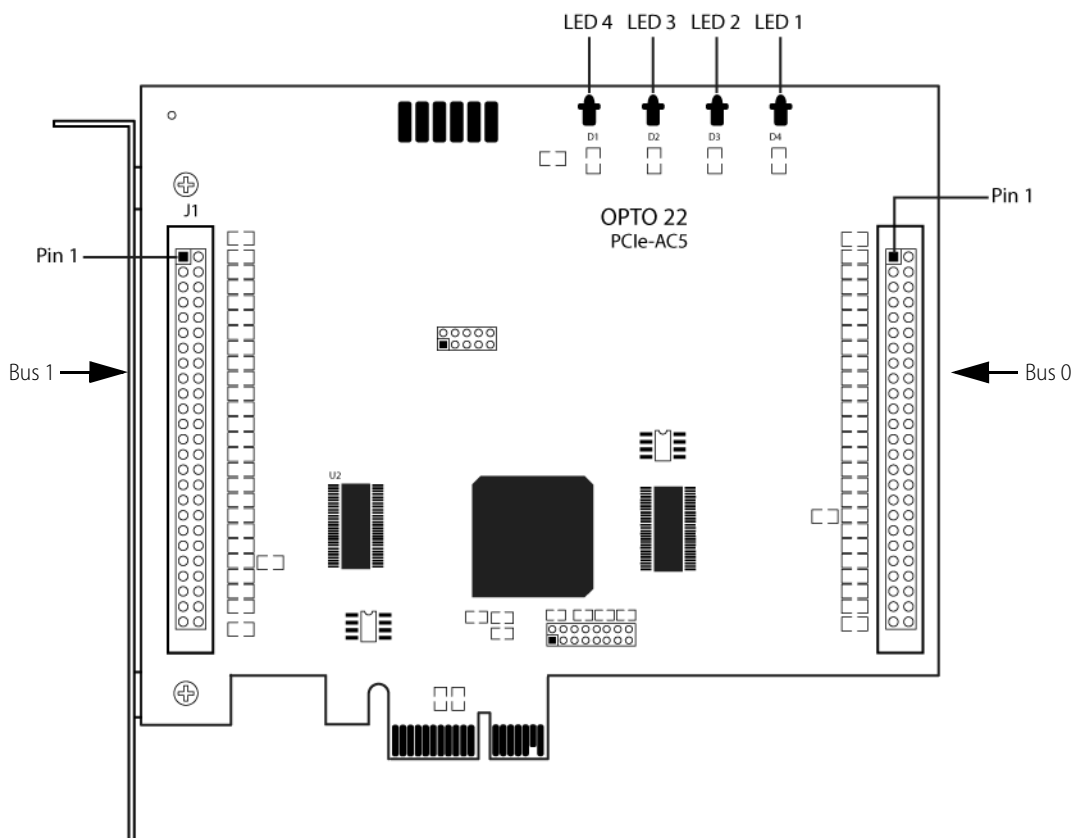
\*\* Modification required to use these racks: Remove the JP1 and JP2 jumpers. **WARNING:** Failure to remove the jumpers may cause damage to the computer.



## DRAWINGS

### PCIe-AC5 [Obsolete]

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

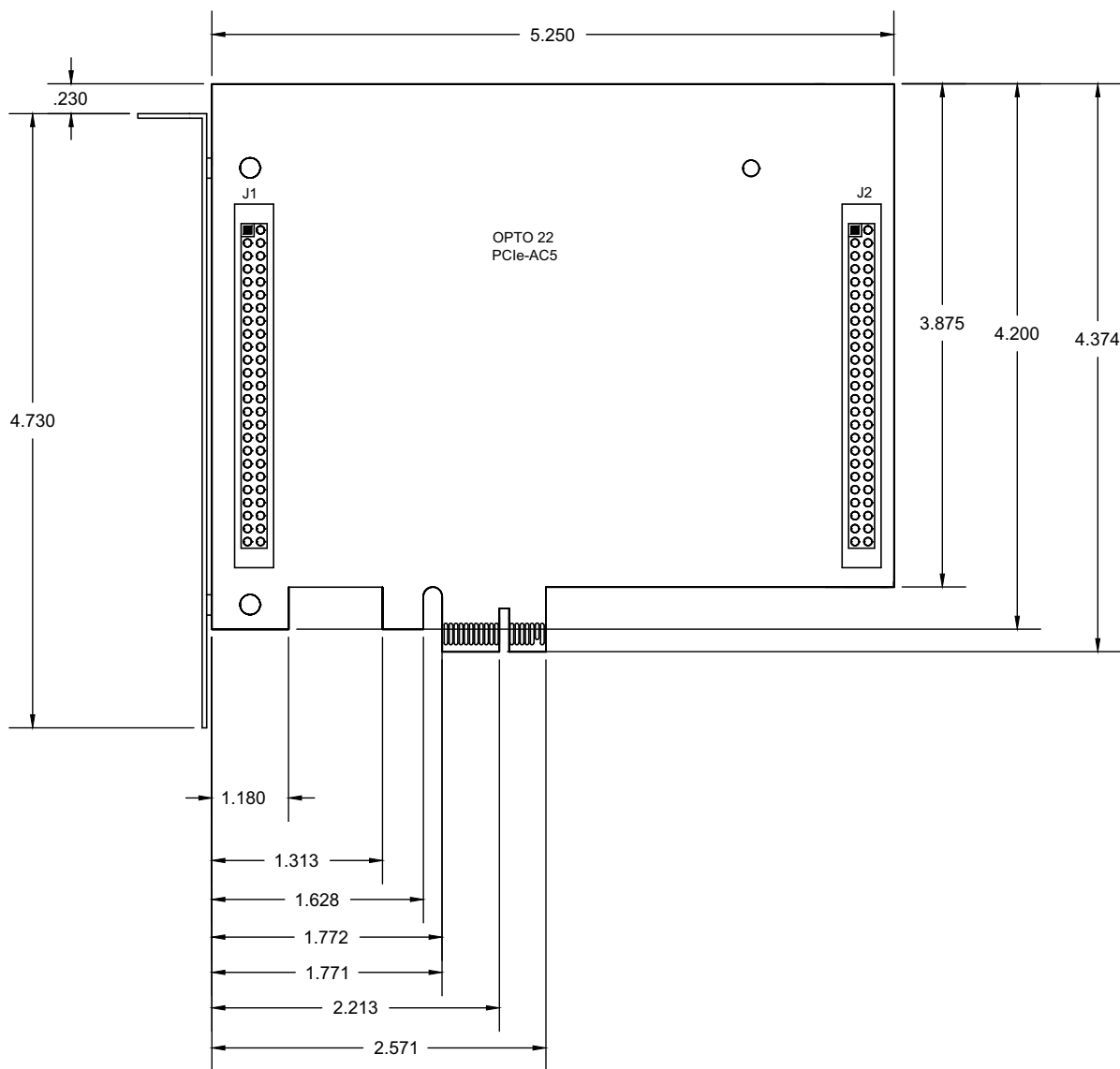


These products are obsolete.

These products are obsolete.

## DRAWINGS

### PCIe-AC5 Dimensions [Obsolete]



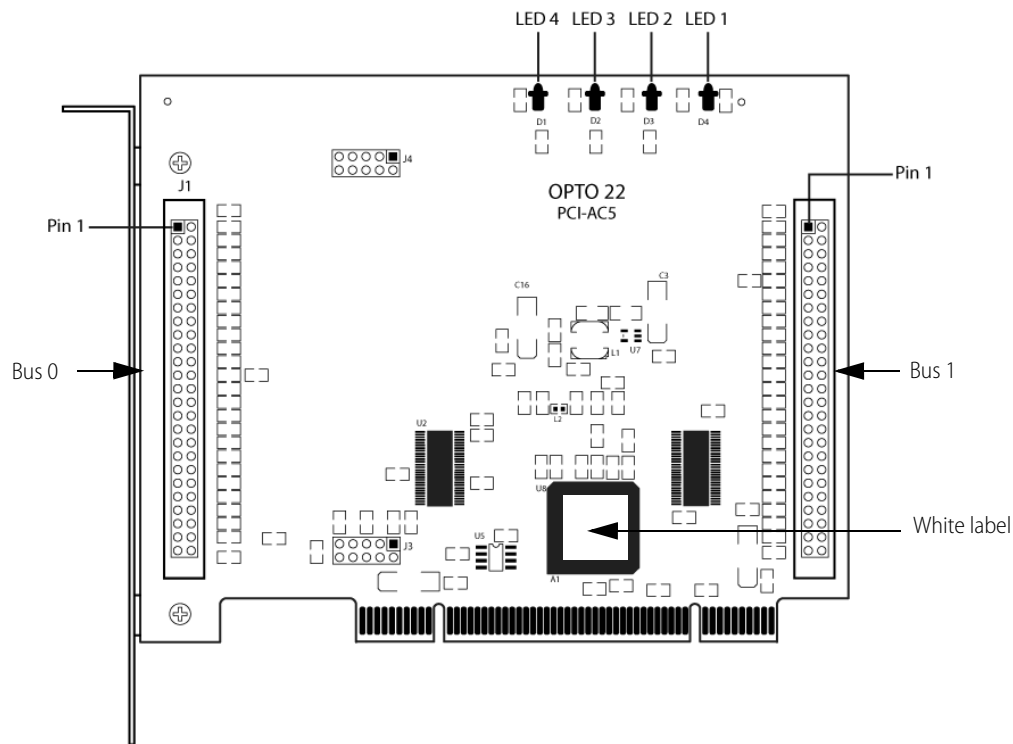
## DRAWINGS

### PCI-AC5—Newer Card [Obsolete]

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

These products are obsolete.

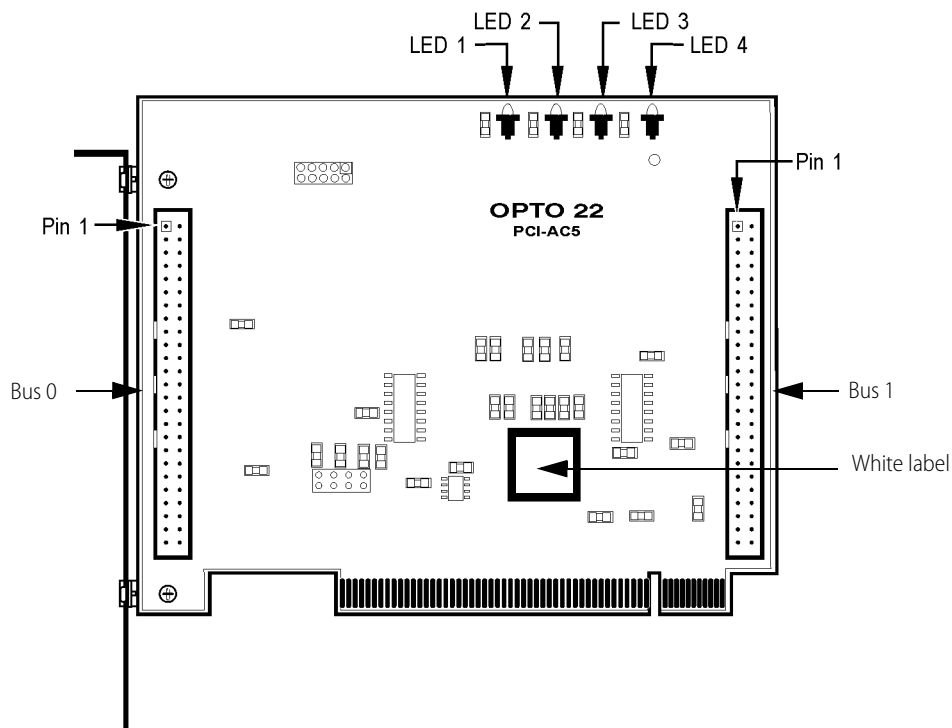
These products are obsolete.

## DRAWINGS (CONTINUED)

### PCI-AC5—Older Card [Obsolete]

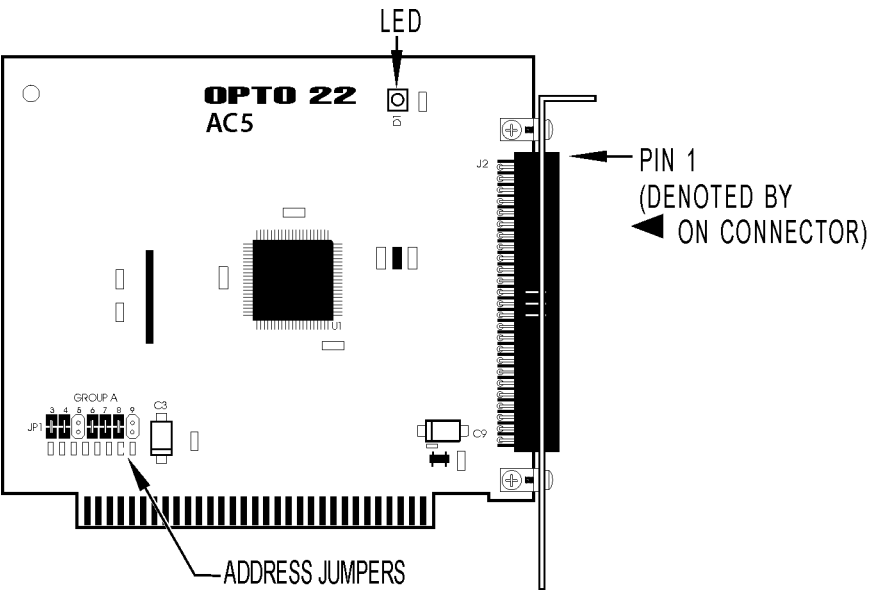
Manufactured before November 2008. Designation on white label: 8939

Power requirements: 5.0 VDC @ 600 mA



DRAWINGS (CONTINUED)

AC5 and G4AC5 [Obsolete]



These products are obsolete.

## 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 even write an IEC 61131-3 compliant control program to run on *groov RIO*, using CODESYS. 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](http://www.opto22.com).

