IOPROJECT SOFTWARE SUITE

Features

- Can be used with SNAP PAC controllers as well as SNAP-LCE controllers and SNAP Ultimate I/O controller/brains.
- Includes ioControl, ioDisplay, and ioManager. Pro version also includes OptoOPCServer.
- Pro version supports *mistic* I/O unit control, legacy programming, communication using multiple protocols, and redundant Ethernet links or a segmented control network.

ioProject Software Suite

DESCRIPTION

NOTE: Three ioProject™ products (IOPROJECTBAS, IOPROJECTPRO and IOCONTROLPRO) are obsolete and no longer available. The remaining ioProject software are legacy products and are not recommended for new development. For new development, use **PAC Project** software. For more information, see Opto 22 form #1688, *SNAP PAC System Migration Technical Note*.

Opto 22's ioProject software suite provides control and HMI development tools to develop your control, monitoring, or data acquisition system. ioProject is easy to use and suitable for projects from equipment management to industrial control.

The ioProject software suite is available in two forms: ioProject Basic™ and ioProject Professional™.

ioProject Basic [Obsolete] provides software for most control system projects not requiring legacy upgrades or complex Ethernet connections. ioProject Basic is designed to be used with a SNAP PAC programmable automation controller, a SNAP-LCE controller, or a SNAP Ultimate I/O controller/brain.

ioProject Professional [Obsolete] adds additional features to:

- Control Ethernet-based SNAP I/O™ and serial-based *mistic* I/O units at the same time (requires SNAP PAC S-series controller)
- Use legacy programming from OptoControl and OptoDisplay
- Communicate using multiple protocols
- Configure redundant Ethernet links or a segmented control network

Both versions of ioProject include three applications:

- **ioControl**™, for developing control software applications to run on an Opto 22 Ethernet-based controller **[IOCONTROLPRO is obsolete]**
- **ioDisplay**™, for developing human-machine interface applications (HMIs) for technicians and operators
- **ioManager**™, for configuring and inspecting Opto 22 Ethernet-based controllers and I/O units

In addition, ioProject Professional includes **OptoOPCServer™** for OLE for Process Control (OPC) communication with OPC 2.0 clients.

All of these applications run on Microsoft® Windows® XP Workstations or Windows 2000® Workstations.

Part Numbers

Part	Description
IOPROJECTPRO **[Obsolete]**	**[Obsolete]** ioProject Professional complete software suite and documentation (in PDF format) available for download.
IOPROJECTBAS **[Obsolete]**	**[Obsolete]** ioProject Basic software suite and documentation (in PDF format) available for download.
IOCONTROLPRO **[Obsolete]**	**[Obsolete]** ioControl Professional software and documentation (in PDF format) available for download.
IOCONTROLBAS	ioControl Basic software and documentation (in PDF format) available for download.
IODISPLAYPRO	ioDisplay Professional software and documentation (in PDF format) available for download.
IODISPLAYBAS	ioDisplay Basic software and documentation (in PDF format) available for download.
OPTOOPCSERVER	OptoOPCServer software and documentation (in PDF format) available for download.
IOMANAGER	ioManager software and documentation (in PDF format) available for download.

ioControl

ioControl is a graphical, flowchart-based programming tool for industrial automation, remote monitoring, and data acquisition applications. Using ioControl, you create, download, and run control programs on a supported industrial standalone or on-the-rack controller. Flowchart-based programming lets you write control strategies visually.

ioControl Basic includes both flowchart and OptoScript programming, subroutines, a graphical debugger, and approximately 400 commands.

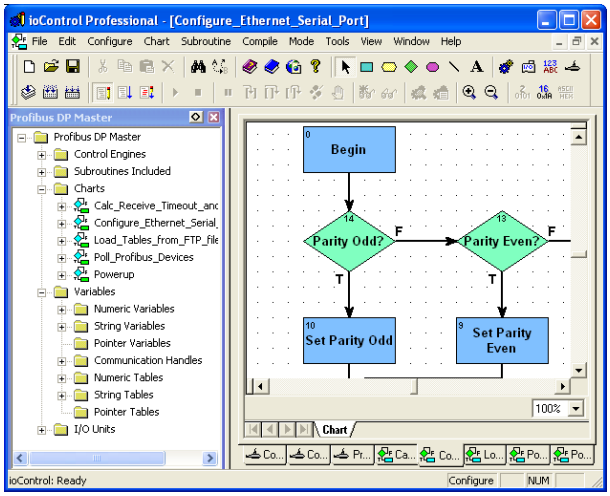
ioControl Professional [Obsolete] has about 500 commands. ioControl Pro adds the following features:

- The ability to create redundant Ethernet links or a segmented control network
- Additional features in Ethernet-based I/O units, such as ramping and pulse generation
- Additional data types in subroutines
- A migration path for Opto 22 FactoryFloor® customers, including support for serial-based *mistic* I/O units (requires SNAP PAC S-series controller) and a conversion utility to move older OptoControl™ strategies to ioControl

For a comparison of features available in ioControl Professional and ioControl Basic, see "Comparison of ioProject Professional and ioProject Basic [Obsolete]" on page 6.

Some of the key features that make ioControl easy to use include:

- A **Strategy Tree** that provides a graphical view of your control system configuration, including I/O points and variables
- **OptoScript,** a powerful scripting language within ioControl, with syntax based on C and other common procedural languages
- **Subroutines** for faster, more powerful programming. Subroutines are especially useful for reiterated tasks.
- An animated **debugger** for stepping through a control program and its subroutines in real time.



ioControl Strategy

ioControl provides the tools you need to create control strategies to automate industrial processes. ioControl automatically downloads your strategy to the memory of an appropriate Opto 22 controller or controller/brain, which uses its own processor's control engine to run the strategy as a standalone application. You can easily modify the program when necessary using ioControl; however, you can turn off your PC or use it for other applications while the control engine runs the program.

A strategy is usually composed of a series of process flowcharts or *charts*, each of which controls one aspect of the automated process. Each chart is made up of blocks connected by arrows, which show how the process flows. Each block in a chart contains one or more instructions, such as *Convert Number to String* or *Start Counter* or *Chart Running?* The shape of the block indicates its function. For example, a rectangle is an action, while a diamond is a condition.

Using a time-slicing technique called multitasking, the Opto 22 SNAP PAC S-series I/O control engine can run up to 32 charts simultaneously.

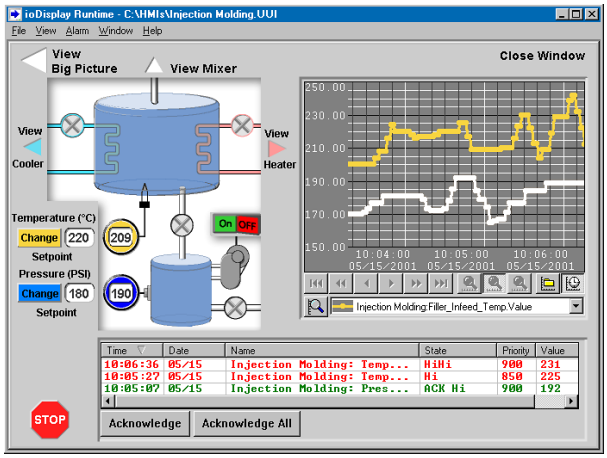
This allows many more charts to be included in the strategy.

ioDisplay

ioDisplay Basic is a user-friendly HMI package for building operator interface applications to communicate with SNAP PAC and SNAP-LCE controllers and SNAP Ultimate I/O controller/brains. ioDisplay offers rich features, including alarming, trending, security, and a built-in library of 3,000 industrial automation graphics. ioDisplay uses a fast, multithreaded scanning engine.

ioDisplay Professional adds the capability to import projects created in OptoDisplay, a part of the FactoryFloor software suite, and to use redundant Ethernet links or a segmented control network on SNAP PAC controllers. ioDisplay Professional can also connect to Ethernet-based FactoryFloor controllers running OptoControl strategies.

The power of ioDisplay lies in its close integration with Opto 22's controllers running ioControl or OptoControl programs. ioDisplay monitors these systems to give operators, technicians, and engineers the information they need at a glance, while transferring operator instructions to the control hardware. ioDisplay also displays data trends and x-y plots, logs historic data, and handles alarms.



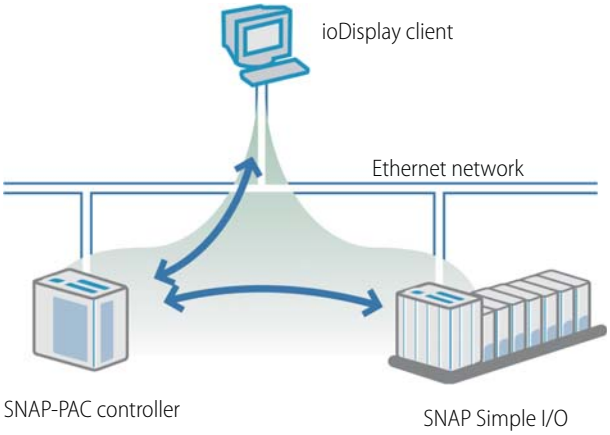
Key Features in ioDisplay

- Close integration with SNAP controllers
- Data trending and logging
- Alarming
- Library of 3,000 industrial automation graphics
- Fast, multithreaded I/O scanner
- Operator authentication and data encryption
- Affordable per-seat licensing

Integration

SNAP PAC, SNAP Ultimate I/O, and SNAP-LCE industrial controllers are programmed using ioControl.

When you build a control program, or *strategy,* using ioControl, a plain-English, tagname database is shared with ioDisplay, thus eliminating duplicate databases and tagname-related errors.



Ease of Use

In ioDisplay you construct your operator interface, referred to as a *project,* by designing graphical objects and then linking them to tags in the corresponding ioControl strategy. On-screen windows can combine pictures, symbols, bitmap graphics, and graphics with 3D effects. You can create graphics using built-in drawing tools, import them from other applications, or select them from the Symbol Factory, ioDisplay's extensive built-in library of industrial automation graphics. Displays can also include controller-driven animations and operator-driven commands.

Security

ioDisplay lets you control access to an operator interface based on users and groups defined in a Microsoft Windows network. Permissions can be defined for individual on-screen controls, and access to the interface itself can be password protected. Detailed usage information can be saved to an encrypted operator action log file. These security features can help applications meet U.S. FDA 21 CFR Part 11 regulations for digital data recording, storage, and handling.

SuperTrends

With ioDisplay's SuperTrend feature, you can plot trends using real-time data, historical data, or both, switching between current data and previously logged data with the click of a button.

With 16 available pens, you can plot 16 variables or I/O points per trend window. Point markers show you when data is actually sampled. For historical data, you can just click on a point to see the exact date, time, and value when the data was scanned.

Alarming

You can view and acknowledge alarms in ioDisplay, as well as see an alarm history for each alarm point. You can determine which alarm points to set up, define alarm thresholds, and choose colors for alarm states. Sound files can be added, and comments or messages can be displayed in alarm graphics while ioDisplay is running.

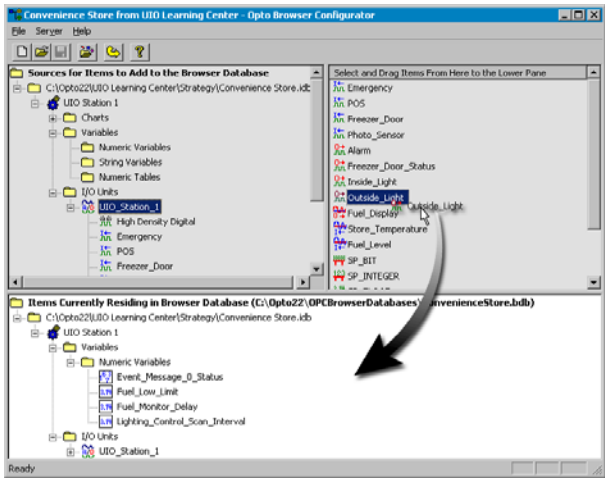
An automatic response to an alarm can be set up to provide immediate action, such as automatically closing a valve when a specific alarm goes off. You can also set priorities for alarms, so that an operator can choose to receive only higher priority alarms during startup, for example.

In addition, you can send the historical log of all alarm to a printer and also to a user-configurable ASCII text file that can be easily imported for analysis into Microsoft Excel, Access, or other applications.

OptoOPCServer

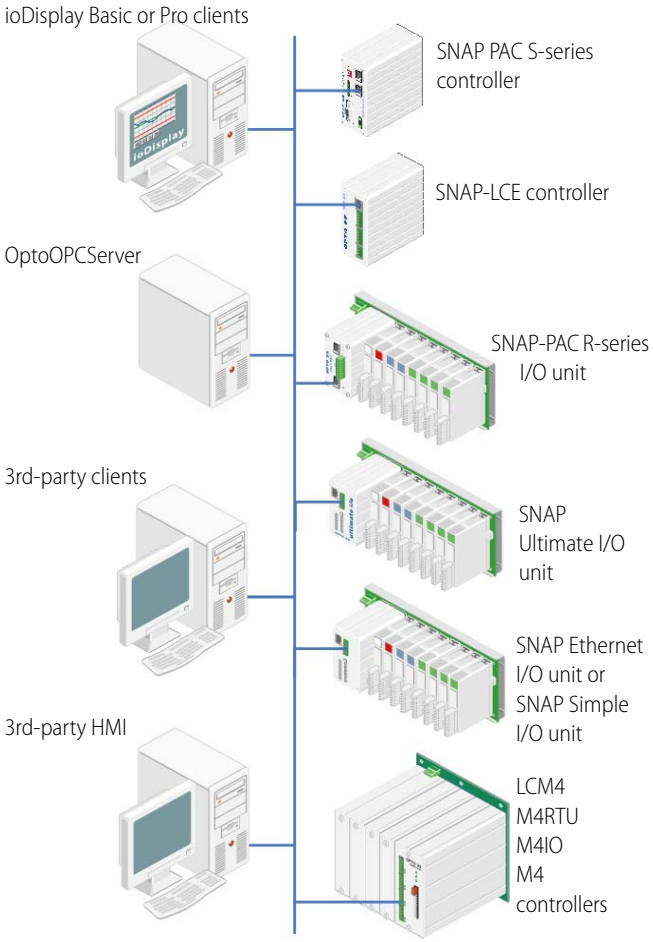
OptoOPCServer is a fast and efficient OPC 2.0-compliant server that handles communications between multiple OPC clients and Opto 22 devices. It lets OPC client software interface with the following Opto 22 hardware:

- SNAP PAC controllers, SNAP Ultimate brains, and SNAP-LCE controllers running ioControl strategies
- Standalone SNAP Ethernet-based I/O units
- Ethernet-based Opto 22 FactoryFloor® controllers running OptoControl™ strategies



Because OptoOPCServer uses a report-by-exception method of communicating with clients, network traffic on industrial automation and manufacturing networks is kept to a minimum. OptoOPCServer can communicate with ioProject systems, standalone Ethernet-based I/O units, and Ethernet-based FactoryFloor systems. This ability helps you consolidate data from all these systems into the OPC client software of your choice.

Client software can include ioDisplay (either Basic or Pro), Microsoft® products, third-party HMI and data acquisition packages, and custom software applications you create with tools such as Visual C++®.



Where multiple PCs are running the same or different copies of ioDisplay, OptoOPCServer works closely with ioDisplay to provide fast data scanning. In fact, OptoOPCServer is strongly recommended for use in this type of application, as it is the critical component for scaling up an ioDisplay monitoring system for optimum performance.

OptoOPCServer includes these software components:

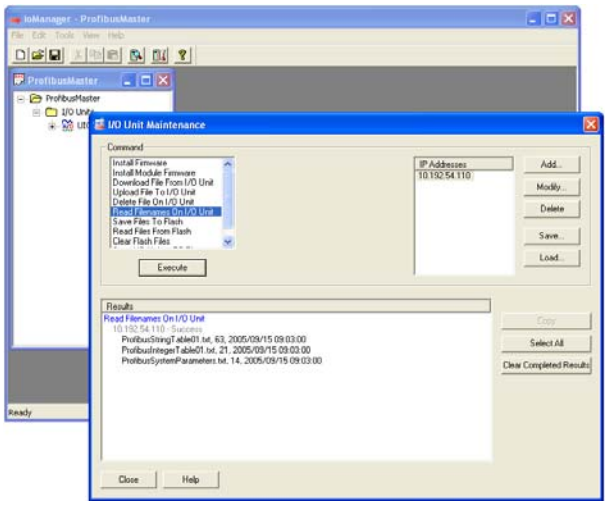
- Opto Browser Configurator, which provides an easy drag-and-drop method of building OPC databases from the data in Opto 22 Ethernet-based systems.
- OptoOPCServer, which runs on a workstation or dedicated network server.
- OptoOPCServer debug monitor, for viewing the activity between OPC clients, OptoOPCServer, and Opto 22 devices

ioManager

ioManager enables you to:

- Assign IP addresses
- Configure I/O points and I/O unit features
- Upgrade firmware on I/O units
- Inspect, read from, or write to I/O units

For multiple I/O units that use the same configuration, you can configure all I/O units simultaneously.



COMPUTER REQUIREMENTS

To use ioProject applications with your PC, you must have the following minimum computer configuration:

- A computer with a standard or mainstream processor and (at least) the minimum memory required for your version of Microsoft Windows. (Low-end CPUs are not recommended.) Additional memory may be required for some configurations.
- One of the following operating systems:
  - Microsoft® Windows® 10 Professional (32-bit or 64-bit)
  - (OptoOPCServer and OptoDataLink only) Windows Server® 2012 R2 and Windows Server 2008 R2

  NOTE: PAC Project cannot be installed on Windows XP or older Windows operating systems. Embedded operating systems are not tested or supported.
- Ethernet capability
- VGA or higher resolution monitor. Minimum size: 800x600 with small fonts
- Mouse or other pointing device
- (Optional) Installed Windows printer
- At least 89 MB of available hard drive space for ioProject Basic, or 108 MB for ioProject Pro

HOW TO OBTAIN IOPROJECT [OBSOLETE]

NOTE: IOPROJECTBAS and IOPROJECTPRO are obsolete and no longer available. **PAC Project** is recommended instead of ioProject for new development.

ioProject software suite. You can obtain the ioProject software suite as follows:

- Get **ioProject Basic**, **[Obsolete]** download it for free from the Opto 22 website at www.opto22.com.
- Purchase **ioProject Professional [Obsolete],** buy and download the software from the Opto 22 website at www.opto22.com.

ioControl Pro, ioDisplay Pro, and OptoOPCServer. Purchase ioControl Pro, ioDisplay Pro, or OptoOPCServer either separately or as part of the complete ioProject Professional software suite.

The purchase price for ioControl Pro or ioDisplay Pro is for one seat.

COMPARISON OF IOPROJECT PROFESSIONAL AND IOPROJECT BASIC [OBSOLETE]

NOTE: IOPROJECTBAS and IOPROJECTPRO are obsolete and no longer available.

The following table compares the features of ioProject Professional and ioProject Basic. Also see Opto 22 form #1485, the *SNAP Controller Comparison Chart*, for more details on controllers.

Feature	ioProject Professional	ioProject Basic
Included software	• ioControl Professional • ioDisplay Professional • OptoOPCServer • ioManager • utilities	• ioControl Basic • ioDisplay Basic • ioManager • utilities
Network	• *To host:* Ethernet/TCP or PPP over serial • *To I/O:* S-series—Ethernet/UDP and serial; R-series—Ethernet/UDP only • Serial or Ethernet/TCP to third-party devices • Support for Ethernet link redundancy or segmented control network	• *To host:* Ethernet/TCP or PPP over serial • *To I/O:* Ethernet only • Serial or Ethernet/TCP to third-party devices
I/O unit compatibility	• SNAP-PAC-R1 I/O units (R1 also has built-in controller) • SNAP Ultimate I/O units • SNAP Ethernet I/O units • SNAP Simple I/O units • E1 and E2 I/O units • Serial *mistic* I/O units (S-series controllers only): B3000, SNAP-BRS, B100, B200, G4D16R, G4D32RS, G4A8R	• Built-in I/O unit (in SNAP-PAC-R1 and SNAP Ultimate I/O) • SNAP Ethernet I/O units • SNAP Simple I/O units • E1 and E2 I/O units
Control software		
Name	ioControl Professional	ioControl Basic
Controllers used	• SNAP PAC S-series • SNAP PAC R-series	• SNAP PAC R-series • SNAP PAC S-series • SNAP-LCE • SNAP Ultimate controller/brains
Main features	• Flowchart programming • OptoScript programming • Subroutines (debuggable) • Graphical debugger • Additional features on SNAP Ethernet brains (ramping, etc.) • Conversion utility for OptoControl strategies (version 4.0 and newer) • Support for serial *mistic* I/O units • Ethernet link redundancy	• Flowchart programming • OptoScript programming • Subroutines (debuggable) • Graphical debugger
Maximum charts running at once	• 32 on SNAP PAC S-series (plus host task) • 16 on SNAP PAC R-series (plus host task)	• 32 on SNAP PAC S-series (plus host task) • 16 on SNAP PAC R-series or SNAP-LCE (plus host task) • 8 on SNAP Ultimate brain (plus host task)
Proportional-integral derivative (PID) loops	• 4 PID algorithms for Ethernet (32 PIDs per SNAP Ultimate I/O unit; 16 PIDs per SNAP Ethernet I/O unit) • 1 PID algorithm for serial (8 PIDs per *mistic* I/O unit) • Graphical tuner for Ethernet and mistic PIDs	• 4 PID algorithms available (32 PIDs per SNAP Ultimate I/O unit; 16 PIDs per SNAP Ethernet I/O unit) • Graphical tuner

Feature	ioProject Professional	ioProject Basic
Ethernet link redundancy	• Primary and secondary IP addresses for controllers and I/O units • ioControl commands can be used to control redundancy algorithm	--
Additional toolkits	• Allen-Bradley DF-1 Integration Kit • OptoMMP Communication Toolkit	• Allen-Bradley DF-1 Integration Kit • OptoMMP Communication Toolkit
HMI software		
Name	ioDisplay Professional	ioDisplay Basic
Main features	• Alarming • Trending • Security • 3000-graphic library • Conversion utility for OptoDisplay projects • Ethernet link redundancy	• Alarming • Trending • Security • 3000-graphic library
Controllers supported	• ioProject controllers • FactoryFloor controllers on Ethernet network	ioProject controllers
Ethernet link redundancy	• Primary and secondary controller • Primary and secondary scanner	--
OPC server		
Name	OptoOPCServer	Not included; purchase separately
OPC version	OPC 2.0-compliant	--
Ethernet link redundancy	ioDisplay primary and secondary controllers	--

More about Opto 22

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.

OPTO 22 • www.opto22.com
43044 Business Park Dr. Temecula, CA 92590-3614

SALES • sales@opto22.com
800-321-6786 • 1-951-695-3000

SUPPORT • support@opto22.com
800-835-6786 • 1-951-695-3080

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