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: ioProject™ is a legacy product and is 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 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 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
- **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	ioProject Professional complete software suite and documentation (in PDF format) on CD, plus printed documentation
IOPROJECTBAS	ioProject Basic software suite and documentation (in PDF format) available for download
IOCONTROLPRO	ioControl Professional software and documentation (in PDF format) on CD, plus printed documentation
IOCONTROLBAS	ioControl Basic software and documentation (in PDF format) available for download
IODISPLAYPRO	ioDisplay Professional software and documentation (in PDF format) on CD, plus printed documentation
IODISPLAYBAS	ioDisplay Basic software and documentation (in PDF format) available for download
OPTOOPCSERVER	OptoOPCServer software and documentation (in PDF format) on CD, plus printed documentation
IOMANAGER	ioManager software and documentation (in PDF format) available for download.

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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.

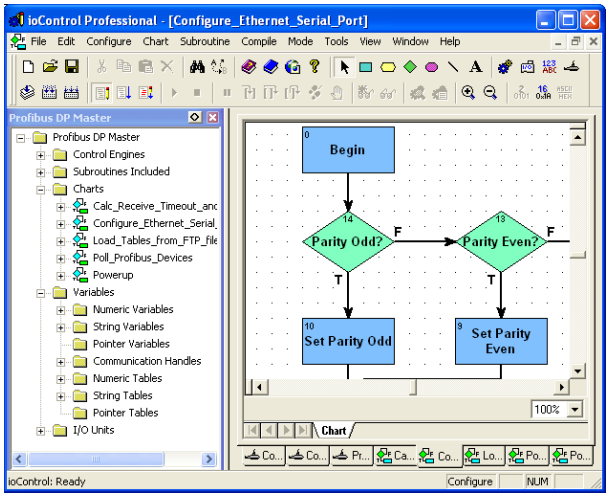
ioControl Professional has about 500 commands. ioControl Pro adds the following features:

- 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" 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.

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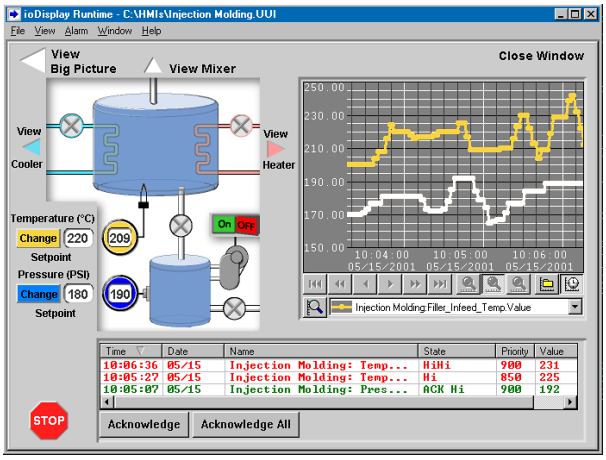
ioProject Software Suite

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.

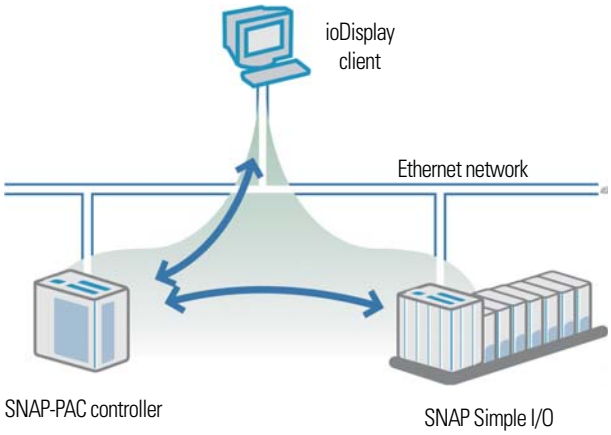


Key Features in ioDisplay

- 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.

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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.

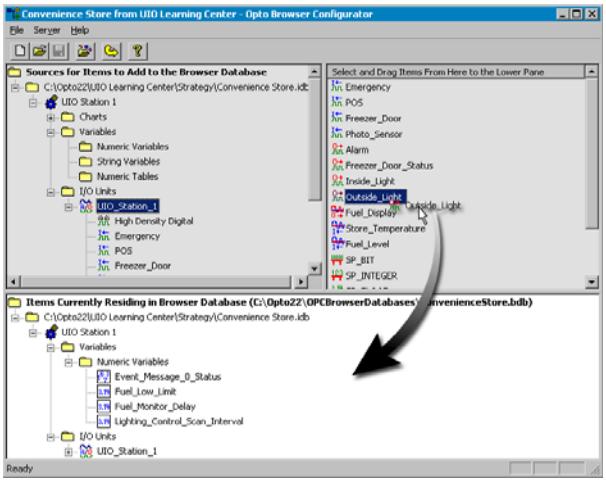
An automatic response to an alarm can be set up to provide immediate action, such as automatically closing a valve when a specific alarm goes off. You can also set priorities for alarms, so that an operator can choose to receive only higher priority alarms during startup, for example.

In addition, you can send the historical log of all alarms 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

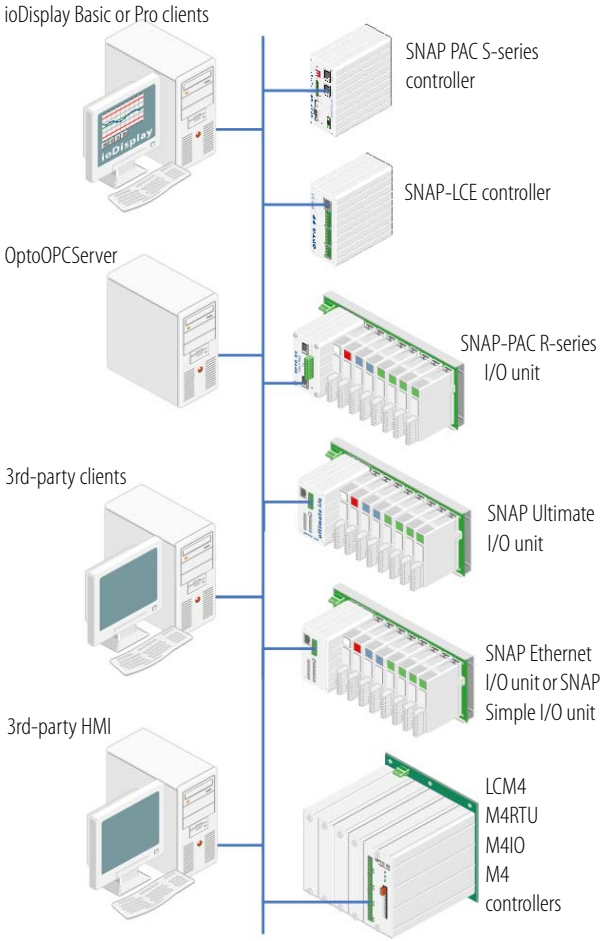
OptoOPCServer is a fast and efficient OPC 2.0-compliant server that handles communications between multiple OPC clients and Opto 22 devices. It lets OPC client software interface with the following Opto 22 hardware:

- 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.

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ioProject Software Suite

OptoOPCServer includes these software components:

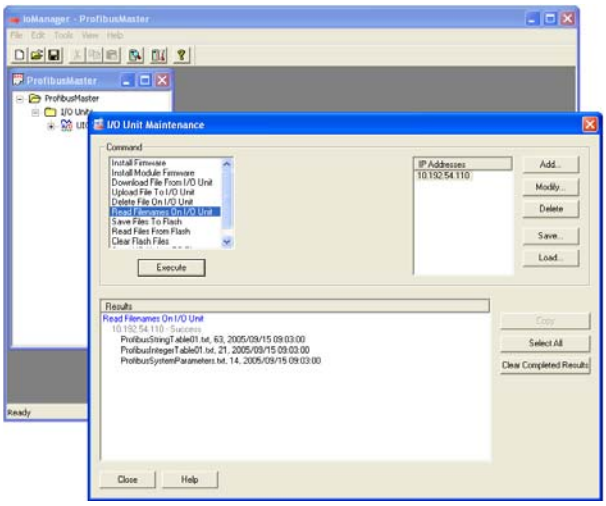
- Opto Browser Configurator, which provides an easy drag-and-drop method of building OPC databases from the data in Opto 22 Ethernet-based systems.
- OptoOPCServer, which runs on a workstation or dedicated network server.
- OptoOPCServer debug monitor, for viewing the activity between OPC clients, OptoOPCServer, 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 at least the minimum processor required for your version of Microsoft Windows (1 GHz Pentium®-class or better recommended) and Ethernet capability
- VGA or higher resolution monitor (Super VGA recommended). Minimum size: 800x600 with small fonts.
- Mouse or other pointing device
- Installed Windows printer (optional)
- Microsoft Windows XP (with Service Pack 2) or Windows 2000® (with Service Pack 4) workstation operating system. Microsoft Windows server and 64-bit versions of Windows workstation operating systems are not supported.
- At least 256 MB RAM (512 MB RAM or more is recommended)
- At least 89 MB of available hard drive space for ioProject Basic, or 108 MB for ioProject Pro

How to Obtain ioProject

***NOTE:* 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** free on the CD that comes with any SNAP PAC or SNAP-LCE controller or SNAP Ultimate controller/brain. Or download it for free from our website, www.opto22.com.
- Purchase **ioProject Professional** on CD, including all software, with both Adobe Acrobat PDF format and printed documentation. Or, to get ioProject Pro immediately, buy and download the software from the Opto 22 website at www.opto22.com; the CD and printed documentation will be shipped to you.

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.

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Comparison of ioProject Professional and ioProject Basic

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

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ioProject Software Suite

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	--

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More About Opto 22

Products

Opto 22 develops and manufactures reliable, flexible, easy-to-use hardware and software products for industrial automation, remote monitoring, and data acquisition applications.

SNAP PAC System

Designed to simplify the typically complex process of understanding, selecting, buying, and applying an automation system, 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

Programmable automation controllers (PACs) are multifunctional, multidomain, modular controllers based on open standards and providing an integrated development environment.

Opto 22 has been manufacturing PACs for many years. The latest models include the standalone SNAP PAC S-series and the rack-mounted SNAP PAC R-series. Both handle a wide range of digital, analog, and serial functions and are equally suited to data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

SNAP PACs are based on open Ethernet and Internet Protocol (IP) standards, so you can 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 provides full-featured and cost-effective control programming, HMI (human machine interface) development and runtime, OPC server, and database connectivity software to power your SNAP PAC System.

These fully integrated software applications share a single tagname database, so the data points you configure in PAC Control™ are immediately available for use in PAC Display™, OptoOPCServer™, and OptoDataLink™. 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 OptoOPCServer, OptoDataLink, options for Ethernet link 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; PID loop control; and optional high-speed digital counting (up to 20 kHz), quadrature counting, TPO, and pulse generation and measurement.

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, depending on the type of module and your needs. Analog, digital, serial, and special-purpose modules are all mixed on the same mounting rack and controlled by the same processor (SNAP PAC brain or rack-mounted controller).

Quality

Founded in 1974 and with over 85 million devices sold, 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 do no statistical testing and each part is tested twice before leaving our factory, we can guarantee most solid-state relays and optically isolated I/O modules for life.

Free Product Support

Opto 22's Product Support Group offers free, comprehensive technical support for Opto 22 products. Our staff of support engineers represents decades of training and experience. Product support is available in English and Spanish, by phone or email, Monday through Friday, 7 a.m. to 5 p.m. PST.

Free Customer Training

Hands-on training classes for the SNAP PAC System are offered at our headquarters in Temecula, California. Each student has his or her own learning station; classes are limited to nine students. Registration for the free training class is on a first-come, first-served basis. See our website, www.opto22.com, for more information or email training@opto22.com.

Purchasing Opto 22 Products

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