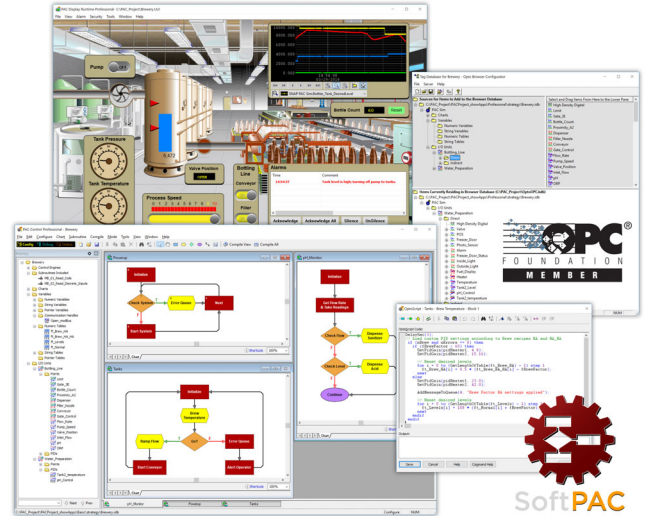


PAC PROJECT SOFTWARE SUITE

Features

- Control programming, HMI development, OPC communication, and database connectivity in one integrated package
- Single tag database is shared by all components
- Fully integrated with the *groov* EPIC® processor, *groov* RIO modules, and *groov* I/O; and SNAP PAC controllers, brains, and I/O
- I/O points and variables have user-defined names; commands are in plain English
- Easy-to-use graphical interfaces for development and debugging



PAC Project Software Suite

DESCRIPTION

The **PAC Project Software Suite™** from **Opto 22** provides the software you need for industrial automation, remote monitoring, and data acquisition applications in any field. A key component of Opto 22's industrial internet of things (IIoT) systems, PAC Project software is fully integrated with the *groov* EPIC® (**E**dge **P**rogrammable **I**ndustrial **C**ontroller) processor, *groov*® I/O modules, *groov* RIO modules, and Opto 22 SNAP PAC controllers, brains, and I/O.

PAC Project software is simple to use and its commands are in plain English. A single tagname database is shared by all software components, so the I/O points and data elements you define during control programming are automatically available when you're building an HMI, configuring data to send to OPC clients and databases, or using our REST API (representational state transfer application programming interface).

And since you give I/O points and other data elements meaningful names that suit the way you are using them, troubleshooting and maintenance are easier.

The PAC Project Software Suite comes in two forms: PAC Project Basic™ and PAC Project Professional™. See [page 8](#) for a comparison chart..

PAC Project Basic™ is free and includes everything you need to develop most industrial automation applications: control programming, HMI creation, and I/O configuration software.

PAC Project Professional™ adds OPC communication, database connectivity, and support for Ethernet link redundancy, controller redundancy, and legacy hardware.

Both PAC Project Basic and PAC Project Professional include:

- **PAC Control™** for developing control applications
- **PAC Display™** for developing human-machine interface applications (HMIs) for technicians and operators

- **PAC Manager™** for configuring and inspecting Opto 22 SNAP PAC controllers, brains, and I/O

In addition, PAC Project Professional adds:

- **OptoOPCServer™** for OLE for Process Control (OPC) communication with OPC 2.0 clients
- **OptoDataLink™** for sharing acquired data with ODBC-compliant databases
- **SoftPAC™** for software-based programmable automation control

You can also purchase individual components of PAC Project Professional, and then download them from the Opto 22 website for immediate use.

Part Numbers

Part	Description
PACPROJECTPRO	PAC Project Professional Software Suite
PACPROJECTBAS	PAC Project Basic Software Suite
PACCONTROLPRO	PAC Control Professional control software
PACCONTROLBAS	PAC Control Basic control software
PACDISPLAYPRO	PAC Display Professional HMI software
PACDISPLAYBAS	PAC Display Basic HMI software
OPTOOPCSERVER	OptoOPCServer OPC 2.0-compliant software
OPTODATALINK	OptoDataLink data exchange software for ODBC
PACMANAGER	PAC Manager, configuration software for SNAP PAC controllers, brains, and I/O
SOFTPAC	Software-based programmable automation controller for PC-based control (includes PAC Project Basic software)

ADVANTAGES OF OPTO 22 SYSTEMS

The integrated software and hardware of both the *groov* EPIC system and the SNAP PAC System make it easier to understand, select, and apply an automation, monitoring, IIoT, or data acquisition system for your needs. System components work together, and the systems can easily be extended as your business grows.

The *groov* EPIC System

The *groov* EPIC system combines real-time control, local and remote HMI, and industrial/IT data exchange in a compact, industrial package. Most I/O modules carry Opto 22's Limited Lifetime warranty.

Designed and developed to work at the network's edge, *groov* EPIC is a complete control and communications system, including:

- **I/O.** Connect to field devices and translate their electrical signals into the ones and zeros that computer systems understand.
- **Control.** Automate equipment and systems at the network's edge. Use PAC Control's flowchart-based control development software for programming. You can also program EPIC using any IEC 61131-3 compliant language with CODESYS, or use the *groov* EPIC processor's embedded open-source Linux® operating system to run your own custom-built programs.¹
- **Connectivity and data handling.** Acquire, move, and share data from industrial systems, legacy equipment, business and IT systems, and the cloud
- **Visualization.** Securely monitor, control, and use data as you need it—locally, on premises, or from anywhere using an authorized mobile device, computer, or any device with a web browser.

The system consists of the **groov EPIC PR1** processor, software, *groov* I/O modules, chassis, and power supply.



The PR1 is an embedded Linux, real-time controller with gateway functions, and is the world's first edge programmable industrial controller (EPIC). It's the central command to your *groov* EPIC system, which handles multiple control, automation, and data acquisition tasks involving digital

and analog control, serial string handling, PID, and enterprise connectivity. The controller provides USB and HDMI ports so you can extend its capabilities, as well as dual independent Gigabit Ethernet network interfaces. The PR1's modern design offers a condensed and sturdy unit that features an integrated high-resolution color touchscreen.

In addition to **PAC Project Basic**, the *groov* EPIC system comes with:

- **groov Manage** for browser-based management of your *groov* EPIC system and *groov* RIO modules
- **groov View** for building and viewing custom operator interfaces for local, mobile, and browser-based devices
- **CODESYS** Development Environment for an alternate way to program control (use either PAC Project or CODESYS)
- **Node-RED** for creating simple logic flows using pre-built nodes
- **Ignition Edge®** from Inductive Automation® for connecting to Allen-Bradley®, Siemens®, and Modbus®/TCP devices via OPC UA, and for efficient IIoT communications using MQTT with strings or Sparkplug payload

groov I/O modules are wired directly to field devices (sensors and actuators) so you can monitor and control devices and use their data wherever you need it, in your local computer network or in cloud services. Wiring is simplified with a top-mounted connector, which provides spring-clamp terminals for power, common, and field wiring. The connector can be removed with the field wiring intact for easier field replacement or wiring in advance.

Remote I/O with *groov* EPIC

A *groov* EPIC processor can also monitor, control, and acquire data from the following remote I/O units:

- Other *groov* EPICs
- **groov RIO**—compact power-over-Ethernet (PoE) industrial remote I/O units with built-in multi-signal, multifunction I/O and a communications processor, configured from browser-based software
- SNAP PAC R-series controllers and EB I/O units

The SNAP PAC System

The SNAP PAC system consists of Opto 22 SNAP PAC controllers and brains, SNAP I/O modules, and PAC Project software.

SNAP PAC controllers. SNAP PAC programmable automation controllers run PAC Control strategies.

- SNAP PAC *R-series* controllers mount on the rack with the input/output (I/O) modules and include I/O processing and communications as well as control.
- Standalone SNAP PAC *S-series* controllers offer more power for complex distributed systems, support for legacy hardware, and redundant controller capability.

1. Optional licensing provides access to the Linux operating system through secure shell (SSH), toolchains and interpreters for Java, C/C++, Python, JavaScript/Node.js, and more.

- Software-based *SoftPAC* is available for PC-based control.

R-series and S-series PACs also offer a built-in REST API for secure access to I/O point and variable data on the PAC.

SNAP PAC brains. These I/O and communication processors provide distributed intelligence under the control of a SNAP PAC controller. For Ethernet-based networks, choose a SNAP PAC R-series controller or EB-series brain; for serial networks, choose an SB-series brain with an S-series controller. Both brains handle digital and analog I/O modules, and EB-series brains also support SNAP serial communication modules.

SNAP I/O modules. Opto 22 SNAP analog, digital, and serial input and output modules provide a wide range of signal types for any application. Each SNAP I/O module contains from 1 to 32 I/O points.

Remote I/O with SNAP PAC

A SNAP PAC controller can also monitor, control, and acquire data from *groov* EPIC processors, *groov* I/O, and *groov* RIO modules.

More information

For more information about either *groov* EPIC or SNAP PAC Systems, visit www.opto22.com.

PAC CONTROL

PAC Control is an intuitive, flowchart-based programming and debugging tool for industrial automation, remote monitoring, and data acquisition applications. Using PAC Control, you create, download, and run control programs on both *groov* EPIC processors and SNAP PAC controllers.

PAC Control Basic includes all the features you need for most applications, including:

- A **Strategy Tree** that provides a graphical view of your control system configuration, including I/O points and variables
- A **comprehensive, plain-English command set**, including commands for analog process and digital sequential control, logic and math, conditional branching, string handling, serial device control, PID loop control, data tables, and more complex functions
- **Flowchart-based programming**, which lets you write control strategies visually and offers a more intuitive alternative to ladder logic programming
- **OptoScript™** programming, an optional advanced scripting language similar to Pascal or C, and ideal for experienced control engineers who prefer a procedural approach to program development
- **Subroutines** for more efficient programming of repeated tasks and processes that are used in multiple control strategies.

- A graphical **debugger** for stepping through a control program and its subroutines in real time

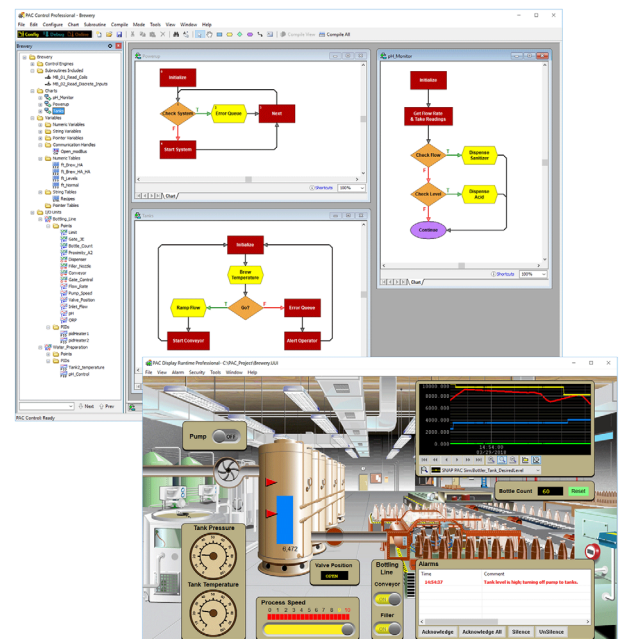
PAC Control Professional includes everything in PAC Control Basic and adds the following features:

- Support for **controller redundancy** (when using SNAP PAC S-series controllers and the SNAP PAC Redundancy Option Kit, part number [SNAP-PAC-ROK](#))
- Support for **Ethernet link redundancy** to controllers and R-series I/O units
- Support for **Legacy hardware**, including serial *mistic®* I/O units with a SNAP PAC S-series controller
- A **conversion utility** to help you move older OptoControl™ strategies to PAC Control
- Additional “**Pro version only**” PAC Control commands

For a comparison of features available in PAC Control Professional and PAC Control Basic, see “[PAC Project Basic and Professional Comparison](#)” on page 8.

PAC Control Strategy

Using PAC Control on a PC, you create and debug a control program (called a *strategy*) to automate processes. You then download your strategy to the memory of your *groov* EPIC processor or SNAP PAC controller, which runs the strategy independently of the PC. You can turn off your PC or use it for other applications while the strategy runs.



PAC Control and PAC Display

A strategy is composed of one or more 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 the process flow. Each block in a chart contains one or more *commands* (such as *Convert Number to String*) or *conditions* (such as *Chart Running?*) The shape of the block indicates its function. For example, a rectangle is an action, a diamond is a condition, and a hexagon contains lines of OptoScript code.

A strategy can contain an almost unlimited number of charts. The *groov* EPIC processor and SoftPAC software-based controller can run up to 64 charts simultaneously; the SNAP PAC S-series controller can run up to 32 charts simultaneously; and the SNAP PAC R-series can run up to 16 charts at once.

PAC Terminal SSD

Although not a component of PAC Project, PAC Terminal SSD™ (Secure Strategy Download) is an optional application that allows you to safely distribute a protected strategy to a controller in the field. PAC Terminal SSD can also ensure that new firmware is from Opto 22 and has not been modified by anyone.

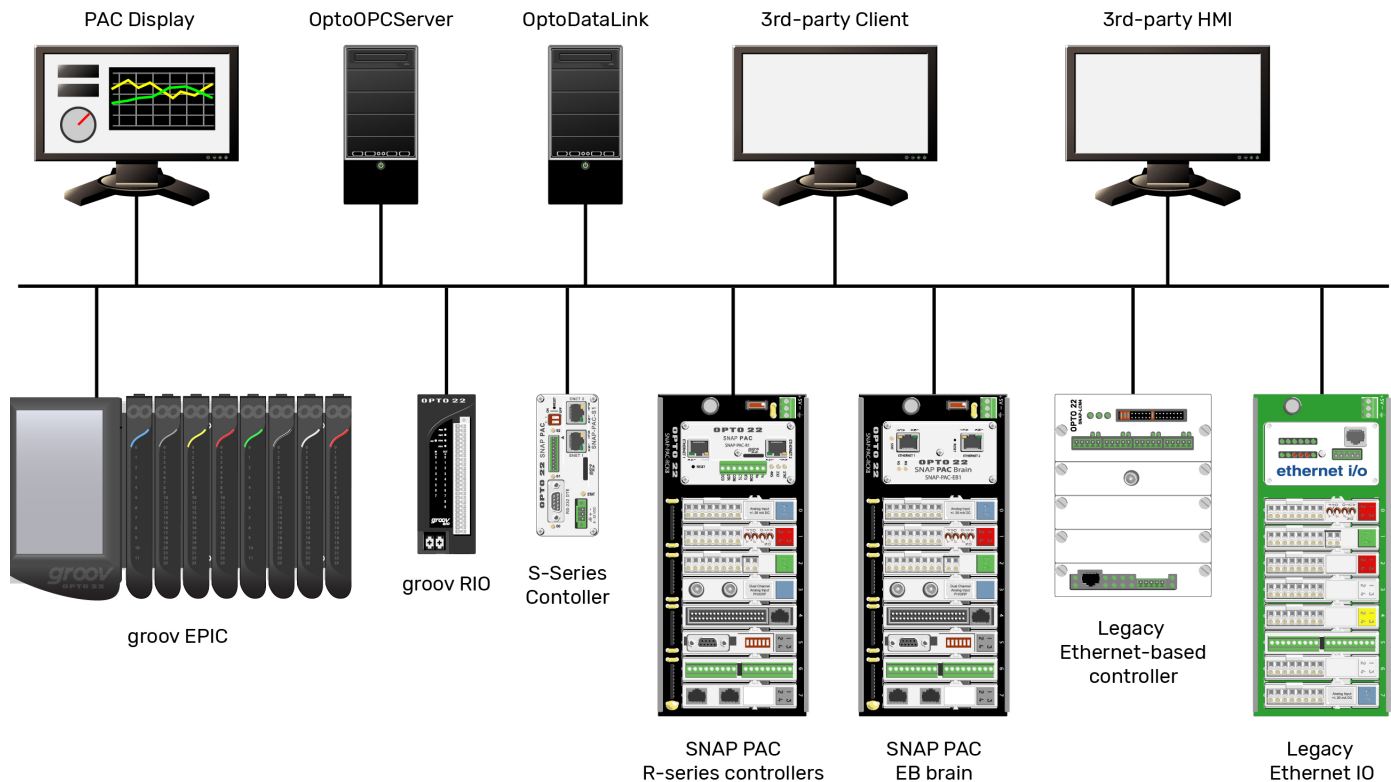
PAC Terminal SSD is available from the Opto 22 website at www.opto22.com. There, you'll find instructions to register PAC Terminal SSD in order to obtain a password and the software.

PAC DISPLAY

PAC Display Basic is a user-friendly HMI package for building operator interface applications to communicate with *groov* EPIC processors, SNAP PAC controllers, and Ethernet-based I/O units, including *groov* RIO and SNAP PAC. PAC Display offers rich features, including alarming, trending, security, and a built-in library of 3,000 industrial automation graphics. PAC Display uses an efficient, multithreaded scanning engine.

PAC Display Professional adds the capability to use redundant scanners, redundant networks, and (when used with the SNAP PAC Redundancy Option Kit) redundant controllers. With PAC Display Professional, you can also log SuperTrends, Historical Logs, and Runtime Operator Logging data files to an ODBC database. PAC Display Professional also supports Opto 22 legacy hardware.

The power of PAC Display lies in its close integration with Opto 22 controllers and I/O units. PAC Display monitors these systems to give operators, technicians, and engineers the information they need at a glance, while transferring operator instructions to the control hardware. PAC Display also displays data trends and x-y plots, logs historical data, and handles alarms.



Security

PAC Display lets you control access to an operator interface based on users and groups. Permissions can be defined for individual on-screen controls, and access to the interface itself can be password protected. Login and 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.

Single-Tag Database

When you build a strategy using PAC Control, the database of I/O and variables you create in PAC Control is automatically shared with PAC Display. This single tagname database eliminates the need to create duplicate databases and eliminates tagname-related errors.

SuperTrends

With PAC Display'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.

Alarming

You can view and acknowledge alarms in PAC Display, 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 PAC Display 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 occurs. You can also set priorities for alarms, so that, for example, an operator can choose to receive only higher priority alarms during startup.

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

PAC MANAGER

PAC Manager is a configuration and maintenance tool for SNAP PAC controllers and SNAP I/O units. (The *groov* EPIC processor and *groov* RIO modules use their own *groov* Manage tool.)

With PAC Manager you can:

- Assign IP addresses to SNAP PAC controllers
- Configure security
- Upgrade firmware

- Configure I/O points, I/O unit features, and SNAP serial modules
- Inspect, read from, and write to devices for testing

PAC Manager includes tools for configuring multiple Ethernet devices at once. For example, if you have I/O units that use the same configuration or that all need firmware updated, you can change all of them simultaneously.

OPTOOPCSERVER

OptoOPCServer is part of PAC Project Professional and can also be purchased separately. A fast and efficient OPC 2.0-compliant server, OptoOPCServer handles communications between multiple OPC clients and Opto 22 devices. It lets OPC client software interface with the following Opto 22 hardware:

- *groov* EPIC processors and SNAP PAC controllers running PAC Control strategies
- Independent SNAP PAC EB brains and *groov* RIO modules
- Independent legacy Ethernet-based I/O units
- SNAP PAC controllers running legacy ioControl™ and Ethernet-based OptoControl strategies

OptoOPCServer can manage communication with Opto 22 devices not only for OPC clients, but also for OptoDataLink and for multiple seats of PAC Display. OptoOPCServer communicates with clients by using a report-by-exception method that reduces network traffic on industrial automation and manufacturing networks. When multiple clients need to access Opto 22 systems, OptoOPCServer smoothly and efficiently manages message flow.

Where multiple PCs are running the same or different PAC Display projects, OptoOPCServer works closely with PAC Display to provide efficient data scanning. In fact, OptoOPCServer is the critical component for scaling up a PAC Display monitoring system for optimum performance.

Since OptoOPCServer can communicate with the *groov* EPIC system, *groov* RIO, SNAP PAC controllers and brains, and legacy Ethernet-based Opto 22 systems, you can consolidate data from all these systems into the OPC client software of your choice.

Client software can include PAC Display (either Basic or Pro), OptoDataLink, OPC 2.0-compliant products, third-party HMI, and data acquisition packages.

OptoOPCServer includes three software components:

- Opto Browser Configurator, which provides an easy drag-and-drop method of building OPC databases from the tag databases already created in your control strategies
- OptoOPCServer, which runs on Microsoft Windows®-based PCs
- OptoOPCServer debug monitor, for viewing the activity between OPC clients, OptoOPCServer, and Opto 22 devices

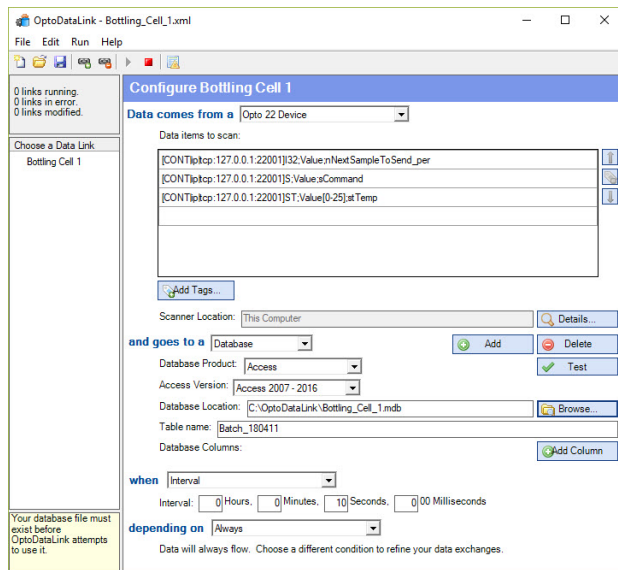
OPTODATALINK

Providing data exchange with popular databases such as Microsoft SQL Server®, Microsoft Access, and MySQL®, OptoDataLink connects your Opto 22 devices with the tools used for making business decisions to bring real-time, accurate data to decision makers.

OptoDataLink is included in PAC Project Professional and is also available for purchase separately.

OptoDataLink transparently provides multiple connections for exchanging data. Thanks to PAC Project's single tagname database, the data elements you created when programming your PAC Control strategy—such as I/O points and variables—are automatically available for use in OptoDataLink.

Simply choose data elements from the list, and use OptoDataLink's flexible configuration tool to create data connections, or *links*, between the data source and data destination. The data destination can be any ODBC-compliant database (including applications such as Microsoft Excel®), an ASCII text file, or an Opto 22 controller or brain.



OptoDataLink

SOFTPAC

SoftPAC™ is a software-based programmable automation controller (PAC) designed for PC-based control. SoftPAC gives you the choice of running your control program on a computer in a Microsoft Windows environment rather than on a processor or controller.

SoftPAC is ideal for machine builders or OEMs who may already have a PC in their product. SoftPAC can provide significant savings in hardware costs for some applications.

SoftPAC is especially useful for applications requiring:

- Extended file storage
- Frequent access to files
- Math-intensive processes

For example, industrial engineers working with gas density calculations, solar tracking, and encryption can greatly reduce calculation time.

Using SoftPAC, you can take advantage of a PC's ability to quickly read and write to files as well as its greater space for data storage. A large refrigerated warehouse, for example, may need to log gigabytes of temperature, power, compressor, and door status data. SoftPAC handles large amounts of data with ease, because file operations are limited only by the size of the PC's hard drives and the available network volumes.

Another advantage is that when SoftPAC runs as a service, an operator doesn't have to log in; SoftPAC will start automatically when the PC boots up.

SoftPAC is part of PAC Project Professional and can also be purchased separately.

COMPUTER REQUIREMENTS

To use PAC Project 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
- If your PAC Display Pro project accesses an M4-series controller (such as a SNAP-LCM4 or M4RTU) via an Ethernet connection, controller firmware version R4.1a or newer is required. In addition, in order to access strings or string tables, controller firmware R4.1d or newer is required.

- At least 356 MB of available hard drive space for PAC Project Basic, or 643 MB for PAC Project Professional. For PAC Display, OptoDataLink, or OptoOPCServer projects with more than 10,000 tags, at least 1,000 MB (1 GB) is recommended.

HOW TO OBTAIN PAC PROJECT

PAC Project Software Suite:

- Download PAC Project Basic for free from the Opto 22 website at www.opto22.com.
- Purchase **PAC Project Professional** from your local distributor and download it from our website to get started right away.

PAC Control Pro, PAC Display Pro, OptoOPCServer, OptoDataLink, and SoftPAC:

These software components are included in PAC Project Professional, but can also be purchased separately.

- Purchase price is per seat for:
 - PAC Project Professional
 - PAC Control Professional
 - PAC Display Professional
 - OptoOPCServer
 - OptoDataLink
- OptoOPCServer is strongly recommended for multiple seats of PAC Display.

All products include complete documentation in PDF format. Documentation is also available on our website. Search for the product, then when the product page opens, click the Documents tab.

PAC PROJECT BASIC AND PROFESSIONAL COMPARISON

The following table compares the features in version R10.3 of PAC Project Basic™ and PAC Project Professional™.

Feature		Basic	Pro
Included software	PAC Control™ Basic	●	●
	PAC Control Professional		●
	PAC Display™ Basic	●	●
	PAC Display Professional		●
	PAC Manager™	●	●
	OptoOPCServer™		●
	OptoDataLink™		●
	SoftPAC™		●
Control software: PAC Control			
Compatible controllers	groov EPIC processor	●	●
	SNAP PAC controllers (S-series and R-series)	●	●
	SoftPAC software-based controller	●	●
Compatible I/O	Built-in I/O unit (in groov EPIC processors and SNAP PAC R-series controllers)	●	●
	groov RIO modules (with groov EPIC and SNAP PAC controllers) ¹	●	●
	SNAP PAC brains	●	●
	G4EB2 brains (with groov EPIC and SNAP PAC controllers)	●	●
	Ethernet I/O units—E1, E2, EIO, UIO (with groov EPIC and SNAP PAC controllers)	●	●
	Serial <i>mistic</i> ™ brains/bricks: B3000-B, B3000, SNAP-BRS, B100, B200, G4D16R, G4D32RS, G4A8R (with SNAP PAC S-series controllers only)		●
Network	<i>Controller to PC:</i> groov EPIC and SNAP PAC—Ethernet	●	●
	<i>Controller to I/O:</i>		
	• groov EPIC—Ethernet only	●	●
	• SNAP PAC S-series:		
	– Ethernet to R-series controllers and EB brains	●	●
	– Serial to SB brains	●	●
	– Serial to <i>mistic</i> brains		●
	• SNAP PAC R-series—Ethernet only	●	●
	<i>Controller to third-party devices:</i> Ethernet or serial ³	●	●
	Support for Ethernet link redundancy or segmented control network		●
Support for controller redundancy (SNAP PAC S-series only)		●	

Feature		Basic	Pro
Main features	Flowchart programming	●	●
	OptoScript programming	●	●
	Subroutines (debuggable)	●	●
	Graphical debugger	●	●
	Conversion utility for OptoControl 4.1 strategies		●
	Support for serial <i>mistic</i> I/O units ²		●
	Ethernet link redundancy (with S-series controllers and R-series I/O units)		●
	Controller redundancy ⁴		●
Maximum charts running at once	On <i>groov</i> EPIC (plus host task)	64	64
	On SoftPAC (plus host task)	64	64
	On SNAP PAC S-series (plus host task)	32	32
	On SNAP PAC R-series (plus host task)	16	16
Proportional-integral-derivative (PID) loops	PID algorithms for Ethernet I/O units	4	4
	PID algorithm for <i>mistic</i> serial units ²	–	1
	Loops per SNAP PAC brain	96	96
	Loops per <i>groov</i> RIO module	4	4
	Loops per <i>mistic</i> brain/brick ²	–	8
	Graphical tuner for Ethernet PID loops	●	●
	Graphical tuner for <i>mistic</i> ² PID loops		●
Ethernet link redundancy	Primary and secondary IP addresses on <i>groov</i> EPIC processors and SNAP PAC controllers		●
	PAC Control commands can be used to control redundancy algorithm		●
Controller redundancy ⁴	PAC Redundancy Manager utility		●
	Checkpoint blocks		●
Additional toolkits ⁵	Modbus Integration Kit (serial and TCP)	●	●
	Controller Area Network (CAN) Integration Kit ⁶	●	●
	Other Integration Kits (BACnet, TL1, DNP3, IEC60870-5, Allen-Bradley DF1) ⁶	●	●
HMI software: PAC Display			
Main features	Alarming	●	●
	Trending	●	●
	Logging	●	●
	Operator authentication and login	●	●
	3000-graphic library	●	●
	Additional graphics tools for PID and embedding web pages		●
	Data logging to MySQL, Microsoft® SQL Server, and other ODBC databases		●
	Conversion utility for OptoDisplay projects		●
	Primary and secondary IP addresses for control engine		●
	Primary and secondary scanner		●

Feature		Basic	Pro
Controllers supported	<i>groov</i> EPIC processors ⁷	●	●
	SNAP PAC controllers	●	●
	ioControl controllers	●	●
	OptoControl controllers with Ethernet interface		●
OPC server: OptoOPCServer			
OPC version	OPC DA 2.0-compliant		●
Database connectivity: OptoDataLink			
Databases supported	Microsoft SQL Server, Microsoft Access, MySQL, and ODBC-compatible databases		●
PC-based control: SoftPAC			
Compatible I/O	<i>groov</i> RIO modules	●	●
	<i>groov</i> I/O (EPIC processor)	●	●
	SNAP PAC (R-series and EB-series)	●	●
	Ethernet I/O units (E1, E2, UIO, EIO)	●	●
	G4EB2 brains	●	●

1 Requires SNAP PAC controller firmware 10.3a or higher or *groov* EPIC firmware 2.0.0 or higher.

2 Requires SNAP PAC S-series controller(s).

3 On a *groov* EPIC, serial connections from the processor require a USB-to-serial adapter.

4 Also see the [SNAP-PAC-ROK Redundancy Option Kit](#).

5 For more information, see the [Communication Tools & Protocols for Opto 22 Products Technical Note](#) (form 1820).

6 Not recommended for use with *groov* EPIC processors running PAC Control.

7 PAC Display projects can include *groov* EPIC systems and *groov* RIO modules. PAC Display cannot run on an EPIC processor; it runs on a Microsoft Windows PC.

PRODUCTS

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

groov EPIC® System

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

groov EPIC I/O

groov I/O connects locally to sensors and equipment with up to 24 channels on each I/O module. 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 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.

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 or on a monitor connected via the HDMI or USB ports.

groov EPIC Software

Software included in the *groov EPIC* processor:

- PAC Control engine to run PAC Control and PAC Display
- CODESYS Runtime engine to run IEC61131-3 compliant programs built with CODESYS Development System
- Optional access to the Linux operating system through a secure shell (SSH) to download and run custom applications
- *groov View* for building your own device-independent HMI, viewable on the touchscreen, PCs, and mobile devices
- Node-RED for creating simple logic flows from pre-built nodes
- Ignition Edge® from Inductive Automation®, with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications with Sparkplug for efficient IIoT data transfer

groov RIO®

groov RIO revolutionizes remote I/O by offering a single, compact, PoE-powered industrial package with web-based configuration, commissioning, and flow logic software built in, plus support for multiple OT and IT protocols.

Standing alone, it meets the needs of small, variable I/O count applications, especially those that require data logging or data communications, commonly found in IIoT applications. *groov RIO* can also be used with a Modbus/TCP master or as remote I/O for a *groov EPIC* system.

Older products

From solid state relays (our first products) to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and still doing the job at thousands of installations worldwide. You can count on us to give you 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, 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, including [free online training](#) at OptoU, how-to [videos](#), [user's guides](#), the Opto 22 KnowledgeBase, troubleshooting tips, and [OptoForums](#). In addition, instructor-led, hands-on [Premium Factory Training](#) is available 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 **+1-951-695-3000**, or visit our website at www.opto22.com.