

Welcome to PAC Project 9.0

Welcome to version 9.0 of Opto 22's PAC Project™ software suite for industrial automation, remote monitoring, and data acquisition applications.

PAC Project comes in two forms: PAC Project Basic and PAC Project Professional.

PAC Project Basic

PAC Project Basic is included in your purchase of a SNAP PAC controller and can also be freely downloaded from our website, www.opto22.com. PAC Project Basic is all you need for most monitoring and control needs. It includes the following software applications:

- **PAC Control™** for developing control programs (*strategies*) to automate processes, monitor equipment, and acquire data from processes and equipment
- **PAC Display™** for creating HMIs (human-machine interfaces) for technicians and operators to use
- **PAC Manager™** for configuring hardware and troubleshooting
- **EtherNet/IP Configurator** for setting up EtherNet/IP messaging between an Allen-Bradley® Logix™ controller and Opto 22's SNAP PAC I/O

PAC Project Professional

PAC Project Professional is designed for more complex projects, especially those requiring OLE for Process Control (OPC), database connectivity, multiple PAC Display seats, multiple protocols, multiple networks, or legacy hardware support.

PAC Project Professional can be purchased as a suite or as individual applications to suit your needs. The suite includes the following software applications:

- **PAC Control Professional** for developing control programs
- **PAC Display Professional** for creating HMIs
- **PAC Manager** for configuration
- **OptoOPCServer™**, an OPC 2.0-compliant server for serving SNAP PAC System I/O and variable data to OPC clients, including PAC Display. OptoOPCServer is strongly recommended for multiple seats of PAC Display.

- **OptoDataLink™** for exchanging SNAP PAC System data with databases (including Microsoft SQL Server, Microsoft Access, and MySQL), text files, and email systems
- **EtherNet/IP Configurator** for setting up EtherNet/IP messaging between an Allen-Bradley® Logix™ controller and Opto 22's SNAP PAC I/O

More Information on PAC Project Basic and Pro

Free product support is included with both PAC Project Basic and Professional. Free training and free pre-sales engineering help are also available. For product support, see [“For Help” on page 12](#). For training, see our website under Support > Training or email training@opto22.com. For pre-sales engineering, call 1-800-321-6786 or 1-951-695-3000.

All PAC Project software runs on Microsoft® Windows® XP, Vista, and Windows 7 workstations. See [“Installation Requirements” on page 10](#).

PAC Project works with all SNAP PAC controllers, SNAP PAC brains, SNAP PAC racks, and SNAP I/O modules.

For more information about PAC Project Basic and Professional, see the following documents. The easiest way to find a document on our website, www.opto22.com, is to search on its form number.

- *PAC Project Software Suite Data Sheet*, Opto 22 form 1699
- *PAC Project Basic and Professional Comparison Chart*, form 1681

Note on Firmware

If you are not using controller redundancy, use brain and controller **firmware version 8.5c** with PAC Project 9.0. It supports all other features in 9.0.

If you are using controller redundancy, you will need firmware version 9.0 for your redundant S-series PACs. Firmware 9.0 is available from our website. For more details on firmware, see [page 11](#).

Notes for Customers with Older Systems (ioProject and FactoryFloor)

PAC Project is very similar to older Opto 22 software, but there are important things to know **before you install** and use it. If you're moving to the SNAP PAC System from legacy systems, be sure to read these documents first:

- *PAC Project 8.0 Release Notes*, form 1680. See the section, “Notes for ioProject and FactoryFloor Customers.”

- *SNAP PAC System Migration Technical Note*, form 1688
- (FactoryFloor customers only) *FactoryFloor to PAC Project Migration Technical Note*, form 1692

New Features and Enhancements

In addition to items listed below for PAC Display and PAC Control, PAC Project Professional 9.0 now supports the controller-level redundancy technology made available with the release of the SNAP PAC Redundancy Option Kit, SNAP-PAC-ROK.

The kit provides a SNAP-PAC-SRA arbiter and a SNAP-RPSW redundant power switch, the special Opto 22 hardware components you will need along with PAC Project Pro 9.0 to develop a redundant controller system.

Controller redundancy is distinct from network link redundancy, which has been supported for some time. *Network link redundancy* provides a backup network connection in case the network should fail; it provides a second communication route for the controller. *Controller redundancy*, in contrast, provides a backup controller that takes over running the strategy in the unlikely event that the first controller fails.

For additional information on controller redundancy, system requirements, and how to obtain a SNAP PAC Redundancy Option Kit, see form 1901, the *SNAP PAC Redundancy Option Data Sheet*.

PAC Control

Topping the list of new things for PAC Control Basic are many commands, subroutine types, and other features now included in PAC Control Basic that previously were only available in PAC Control Pro.

For PAC Control Pro, the most important new features are those that support controller redundancy. This includes the new PAC Redundancy Manager, an intuitive and easy-to-use utility for configuring and monitoring a redundant system.

Here's the complete list of new features and enhancements:

- The following new features allow you to create strategies that use redundant controllers:
 - The new PAC Redundancy Manager in PAC Control manages, monitors, and commissions components in redundant controller system.
 - A Sync Block Tool allows you to insert sync blocks in a chart in order to synchronize controllers in a redundant system.

- In a redundant system, persistent variables are now also redundant. Variable persistence is an option of regular global variables.
- Support has been added for Windows themes.
- The toolbars in Configuration, Debug, and Online modes are now less cluttered and easier to use. In particular, the mode buttons are more prominent on the left side.
- A quick-find tool at the bottom of the strategy tree finds items in the strategy tree.
- New strategies now have Full Debug mode set as the default, not Minimal Debug.
- For new strategies, the strategy tree window is now docked and the Powerup chart is maximized.
- A number of new keyboard and mouse shortcuts for navigating in flowcharts, including improved panning and zooming tools.
- OptoScript has an improved toolbar and editing helps, including Hotkeys for common functions, a new “Include parameter helps” option in the Select Instruction dialog box, and allowing the Esc key to cancel if there are no changes.
- Find and Replace is available in pop-up menus for items in the strategy tree to allow searching in the current chart or subroutine for that item. Find and Replace also now works within tag names to easily modify multiple tag names in one operation.
- The following digital features options, subroutine types, and commands are now also available in PAC Control Basic. Previously they were only available in PAC Control Pro.

Digital Features Options
On-Pulse
Off-Pulse
Frequency
Period
On-Time Totalizer
Off-Time Totalizer
TPO

Subroutine Types
Digital Points
Digital Features
Analog Points
I/O Units
Pointer Table

Analog Input Feature Commands
Get & Clear Analog Totalizer Value
Get Analog Totalizer Value
Set Analog Totalizer Rate

Analog Output Feature Command
Ramp Analog Output

Digital Input Features Commands	
Get & Restart Off-Pulse Measurement	Get On-Pulse Measurement Complete Status
Get & Restart Off-Time Totalizer	Get On-Time Totalizer
Get & Restart On-Pulse Measurement	Get Period
Get & Restart On-Time Totalizer	Get Period Measurement Complete Status
Get & Restart Period	IVAL Set Off-Pulse
Get Frequency	IVAL Set Off-Totalizer
Get Off-Pulse Measurement	IVAL Set On-Pulse
Get Off-Pulse Measurement Complete Status	IVAL Set On-Totalizer
Get Off-Time Totalizer	IVAL Set Frequency
Get On-Pulse Measurement	IVAL Set Period

Digital Output Features Commands	
Generate N Pulses	Set TPO Percent
Start Continuous Square Wave	Set TPO Period
Start Off-Pulse	IVAL Set TPO Percentv
Start On-Pulse	IVAL Set TPO Period

- A new command, Start Alternate Host Task, starts an alternate host task in PAC Control to divide up the host workload. With an alternate host task, human-machine interface (HMI) communication can be directed to the alternate host port, leaving the default host free for use with the debugger.
- The Help > Error Lookup... command allows you to look up descriptions for error codes.
- (Legacy) There are three new analog simulation commands for use with *mistic* I/O units:
 - IVAL Set Analog Filtered Value allows the filtered analog input value to be read when analog input filtering is implemented with *mistic* brains.
 - IVAL Set Analog Minimum Value writes to the internal value (IVAL) of the maximum value register of an analog input.
 - IVAL Set Analog Maximum Value writes to the internal value (IVAL) of the minimum value register of an analog input.
- The Add Module dialog box has an option to automatically create points within a new module.
- The Inspect Table dialog has been improved, including:
 - Added a More Info link button to display configuration info
 - Allowing each dialog to have its own display mode (e.g. decimal, hex, or binary)

- For integers, the value is displayed automatically in the same format (decimal or hex) in which it was configured.
- Replaced the dialog's main table control.
- When the full value cannot be displayed, the standard method of displaying an ellipsis is used at the end (i.e. "...")
- If a value is too large to edit in-place, a helper dialog is used to let the user edit the value.
- A Local (loopback) option on the Add/Edit I/O Unit dialog box automatically inserts a loopback address (127.0.0.1).
- The Inspect Digital Point dialog has been improved, including:
 - A plot control to plot the point's value. (PAC Control Pro only)
 - A More Info link button to display configuration info
 - A link the parent I/O unit
 - The enable state of the parent I/O unit is displayed
 - Clear buttons for latches and features
 - The resizing mechanism is improved
- The Inspect Analog Point dialog has been improved, including:
 - A plot control to plot the point's value. (PAC Control Pro only)
 - A More Info link button to display configuration info
 - A link to the parent I/O unit
 - The enable state of the parent I/O unit is displayed
 - The resizing mechanism is improved
- A progress dialog shows configuration progress when running a strategy, including an option to cancel.
- Handling of hexadecimal integers is improved. Numbers can now be entered in hex, binary, or decimal, and PAC Control will remember the format used for that dialog. Also, the display mode (decimal, hex, or binary) can be controlled for each inspect dialog box.
- A checksum of a runfile is now used to determine if a download is required rather than the previous timestamp method. This provides better and more consistent results.
- The Add Velocity (Type C) algorithm for configuring a PID is now supported.

PAC Display Configurator

Many new features and enhancements have been added to PAC Display Configurator, including two ways to display a webpage in Runtime, the ability to configure many more windows than in the previous version, and a number of new alarm features.

- New toolbox controls allow you create the following objects:
 - (Pro Only) URL display window, similar to a graphic window except that it displays a webpage.
 - Windows button
 - Windows combo box
 - (Pro Only) PID button for launching a PID Viewer in Runtime for the configured PID
 - (Pro Only) URL display area within a normal display window. Unlike a URL display window, this allows you to create other graphic objects within the same display window.
- Up to 5,000 windows can be configured for a project. The previous limit was 1,296 windows.
- Alarm points can now be:
 - Configured with a new “Warning” alarm state
 - Displayed in an alert window in Runtime
 - Configured to send an email when alarmed
 - Duplicated
 - Exported to, and imported from, a comma-delimited file
 - Configured so that Persistence and ReAlarm after Acknowledge times are applied to all alarm point levels at once
- Multiple sub-attributes of the same type of Operator Driven Dynamic Attribute may be applied to graphics.
- Objects may be rotated in Configurator and Runtime.
- Individual integer, float, and string tags may be used in recipe downloads and uploads.
- The Import Window command now allows changing control engine ids to match the current project.
- SuperTrend and Historic Log files can be configured to rollover based on a trigger.

- An option in Configurator allows the user currently logged in to Runtime who is a member of the Global Operator Driven permissions not to have to log in when modifying an operator driven attribute.
- Users allowed to log in to PAC Display may be added and modified in Runtime.
- Table controls can be configured to use relative offsets so that all table data will begin at the top row of the table control
- A combo box in the Find and Replace dialog box allows you to select item names as well as enter them manually.
- Security Attributes can be copied and pasted.
- SuperTrend graphics can be moved and scaled from the SuperTrend setup dialog.
- Logging can be forced when using deadband logging.
- SuperTrend pens can be configured to not allow the pen to be disabled in Runtime.
- XY Plots can now be configured to sub-integer resolution.
- Sounds can be configured to play simultaneously.
- The Does Not Trigger condition is triggered when the specified tag does not equal a specified value.
- The following new Control Engine Tags are now available:
 - Strategy Running? returns TRUE or FALSE
 - Charts Running indicates the number of charts currently running in the control engine
- The Convert SuperTrend Files tool converts Supertrend files between text and binary formats.

PAC Display Runtime

The following new features and enhancements have been added to PAC Display Runtime.

- Clicking on a configured PID button launches a PID Viewer for the configured PID.
- Adding or Modifying the list of users allowed to log in can be added to or modified.
- When modifying an alarm point, Persistence and Re-Alarm after Acknowledge time for an alarm point can be changed.
- Alarm Points can be disabled individually.
- The Convert SuperTrend Files tool converts Supertrend files between text and binary formats.

PAC Manager

PAC Manager adds the following new features and enhancements for 9.0:

- Support for SNAP-SCM-SSI module
- Ability to save to the flash memory of a microSD card, or clear a card's flash memory
- Ability to turn off EIP protocol
- Awareness of redundant systems

Bug Fixes

Several bug fixes have been made in the 9.0 version of PAC Project. For a complete list, see the PAC Project Readme file or the Readme file for individual products (PAC Control, PAC Display, and so on).

In addition, see the Readme file for your control engine or brain firmware, available on our website at www.opto22.com. To find firmware, click Support > Downloads > Firmware.

Here are some other useful sources of bug information on our website:

- **OptoKB Article Search**—Click the Support tab on our website and then click OptoKnowledgeBase to find articles by Article No, Title, Text, or Product.
- **OptoSubscriptions**—Use your my.opto22 account to subscribe to updates on the Knowledgebase, products, downloads, and documents.

Installation

CAUTION: If you are upgrading to version 9.0 from a version of ioProject older than 7.0, do NOT uninstall ioProject before running the PAC Project version 9.0 installation. If you uninstall first, you will lose all configured control engines. The PAC Project version 9.0 installer automatically saves ioProject control engines before uninstalling old versions of the software.

Installation Requirements

Here's what you need to install and run PAC Project 9.0 software:

- A computer with at least the minimum processor and memory required for your version of Microsoft Windows, and Ethernet capability. Additional memory may be required for some configurations.
- 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 7 Professional (32-bit or 64-bit), Windows Vista[®] Business (32-bit), or Windows XP Professional (32-bit, with Service Pack 2 or higher)

NOTE: Microsoft Windows server and embedded Windows operating systems are not supported.

- Available hard disk space as shown in the following table:

Application	PAC Project Professional	PAC Project Basic
PAC Control	68.9 MB	67.9 MB
PAC Display	72.6 MB	69.3 MB
OptoOPCServer	16.5 MB	(not included)
OptoDataLink	9.0 MB	(not included)
PAC Manager	26.8 MB	26.8 MB
PAC Utilities	9.4 MB	9.4 MB
EtherNet/IP Configurator	13.0	13.0
Total	216.2 MB*	186.4 MB*

* Installing both Pro and Basic requires a total of 240.7 MB of hard disk space.

Important Note for Windows XP Users

Due to a Microsoft bug involving how Themes are handled in Windows XP (either with Service Pack 2 or with no Service Pack), a resource leak may eventually cause PAC Project applications to crash.

To resolve this problem, install Windows XP Service Pack 3. Or, you can set the Windows XP Desktop Theme to Windows Classic. See Opto 22 [KB49838](#) for details. [KB49838](#) is a OptoKnowledgeBase article on our website. Either click on the link here or search in the OptoKnowledgeBase on the article number, KB49838, including the KB without any spaces.

Important Notes on Firmware

For Controller Redundancy, use 9.0 firmware or newer. Opto 22 hardware is currently being shipped with 8.5c firmware, which supports all of the new PAC Project 9.0 features *except controller redundancy*. If you will be using controller redundancy, you must use 9.0 firmware or newer. To find new firmware, go to www.opto22.com. Click the Support tab, click Downloads, filter by Firmware, and enter the part number for your controller or brain in the search field. Look for "9.0" in the firmware filename, and choose the firmware file for your hardware.

For systems without Controller Redundancy, use 8.5c firmware or newer.

Opto 22 hardware is shipped with the most recent firmware, but you should check the website for additional updates that may be available.

For details on the features each firmware version includes, see the firmware README file for your device. To find the Readme, go to www.opto22.com and search on the PAC's or brain's part number. When you get to the product page, look under the Documents tab for the Readme. The Readme can also be found under Related Documents on the firmware download page.

NOTE: If you are using a SNAP-LCE or Ultimate controller, do not upgrade to PAC Project 9.0. Instead, use either PAC Project 8.0 or ioProject. In order to use these controllers with PAC Project 8.0, use controller firmware version 7.2 and Ethernet brain firmware version 7.0 or newer. If you want to use PAC Project software version 8.1 or newer, you must use SNAP-PAC controllers instead.

For additional compatibility information, see form 1693, the Legacy and Current Product Comparison and Compatibility Charts. To obtain this form, go to the Opto 22 website, www.opto22.com, and search on the form number, 1693.

For Help

If you have any difficulty using software, documents, or firmware, contact Opto 22 Product Support by email or phone:

Phone: 800-TEK-OPTO (835-6786)
951-695-3080
(Hours are Monday through
Friday,
7 a.m. to 5 p.m. Pacific Time)

Fax: 951-695-3017

Email: support@opto22.com

Opto 22 website: www.opto22.com

*NOTE: Email messages
and phone calls to
Opto 22 Product Support
are grouped together
and answered in the
order received.*

In addition, the OptoKnowledgeBase (OptoKB) provides the latest information on support issues and workarounds. Visit www.opto22.com and click on the Support tab for more information.

Check the Opto 22 Website for Product Updates

Opto 22 software, firmware, and documentation are continually updated and improved. Check the Support > Downloads section of the Opto 22 website at www.opto22.com regularly to see if new releases or patches are available for your system.

Sign Up for my.Opto 22.com

Also, we recommend signing up at my.opto22.com to receive news about Opto 22 products. My.opto 22.com lets you subscribe to receive notification of software and firmware upgrades and new or revised documentation such as data sheets, OptoKB articles, and white papers. My.opto22.com also provides a quick and easy way to subscribe to OptoNews, Opto 22's email newsletter, delivered every two weeks.