OPTO 22

ioProject™ 7.0 Release Notes

Welcome to ioProject Version 7.0

Welcome to version 7.0 of Opto 22's ioProject software suite for industrial automation, remote monitoring, and data acquisition applications. Version 7.0 introduces two forms of the software suite—ioProject Basic and ioProject Professional.

Version 7.0 also supports new controllers and I/O modules, adds significant backwards compatibility for customers currently using Opto 22 FactoryFloor®, and adds support for network segmenting and Ethernet link redundancy.

ioProject Basic and ioProject Professional

ioProject Basic gives you everything you need for most projects. ioProject Basic is included in your purchase of an Opto 22 controller or controller/brain, yet provides the following full-featured control and HMI software:

- ioControl™ Basic for developing control programs, or *strategies*
- ioDisplay™ Basic for developing operator interfaces (human-machine interfaces, or HMIs)
- ioManager™ for configuration

ioProject Basic comes with your purchase of a SNAP PAC or SNAP-LCE controller, or a SNAP Ultimate, SNAP Ethernet, or SNAP Simple brain. It can also be downloaded at no cost from our website, www.opto22.com. Full documentation is provided in Adobe® Acrobat® PDF format.

ioProject Professional does everything ioProject Basic does, plus more. Pro is designed for more complex projects, especially those requiring OLE for Process Control (OPC), multiple ioDisplay seats, multiple protocols, multiple networks, or legacy hardware support. ioProject Professional is designed for use with SNAP PAC controllers and takes advantage of their features, including dual independent Ethernet network interfaces for redundant Ethernet links or segmented networking. ioProject Professional includes the following:

- ioControl Professional for developing control strategies
- ioDisplay Professional for developing operator interfaces (HMIs)
- OptoOPCServer™ for communicating with OPC 2.0 clients
- ioManager for configuration

ioProject Professional can be purchased as a complete suite or as individual applications. It can be downloaded from our website (password required for full installation) and is also shipped to you on a CD with complete documentation in both PDF and printed form.

More Information on ioProject Basic and Pro

Free product support is included with both ioProject Basic and ioProject Professional, and free trainng is available. For product support, see "For Help" on page 5. For training, see our website under Support➞Training or email training@opto22.com.

All ioProject software runs on Microsoft® Windows® XP and Windows 2000® workstations.

For more information on ioProject Basic and Professional, see the *ioProject Software Suite Data Sheet*, Opto 22 form #1473, and the *ioProject and FactoryFloor Comparison Chart*, form #1603, which compares features in ioProject Basic, ioProject Pro, and the legacy FactoryFloor software suite.

New Hardware

ioProject version 7.0 supports new hardware from Opto 22, including new controllers and new analog and Profibus I/O modules.

New SNAP PAC Controllers

SNAP PAC programmable automation controllers are compact industrial controllers in two form factors: standalone (S-series) and rack-mounted (R-series). The first SNAP PAC controller to be introduced is the **SNAP-PAC-S1**.

The SNAP-PAC-S1 has two independent Ethernet network interfaces and three serial ports: one RS-485 for communicating with I/O, and two RS-232 for modem communication using PPP and for connection to serial devices. One RS-232 port has full handshaking capabilities.

The SNAP-PAC-S1 takes full advantage of the extra features in ioProject Professional 7.0, including Ethernet link redundancy, network segmenting, and the ability to run ioControl strategies that use both Ethernet and serial *mistic* I/O units.

New I/O Modules

The following new I/O modules are supported in ioProject 7.0:

- **SNAP-AILC**—an analog input module that works with 2 mV/V and 3 mV/V load cells as a load cell front end. Using a separate 24 VDC power source (purchased separately), the module provides isolated 10 VDC bridge excitation for up to four 350 ohm or 415 ohm load cells.

- **SNAP-AOA-23-iSRC**—an analog output module that provides a nominal output range of 4 mA to 20 mA. The module includes built-in loop sourcing capability. With the connection of a single 24 V power supply, the module sources two 24 V loops. The two channels and their loop sources are isolated from each other.

- **SNAP-AIMA2-i**—an analog current input module that provides an input range of -1 mA to +1 mA and has two channels that are isolated from each other.

- **SNAP-AIARMS-i**—an analog current input module that provides two channels with an input range of 0 to 10 amps RMS AC/DC. An ideal input is the 5-amp secondary of a standard current transformer used to monitor AC line current.

- **SNAP-AIVRMS-i**—an analog voltage input module that provides two channels with an input range of 0 to 250 volts AC or DC. This module may be used to monitor 120/240-volt AC/DC and 12/24/48-volt AC/DC system voltage.

- **SNAP-SCM-PROFI**—a high-speed serial communications module that provides a standard electrical interface between Ethernet-based Opto 22 SNAP I/O systems and PROFIBUS DP® networks. The module has a single isolated port with a built-in DB-9 connector.

Backwards Compatibility

ioProject version 7.0 offers a migration path for customers currently using Opto 22 FactoryFloor software who wish to move to Ethernet networks and more modern hardware. Using ioProject Professional and a SNAP PAC S-series controller, you can convert OptoControl™ strategies to ioControl, convert OptoDisplay™ projects to ioDisplay, and control both Ethernet-based and *mistic*® serial-based I/O units from the same controller.

Conversion requires some preparation. Be sure to read the *FactoryFloor to ioProject Migration Technical Note*, form #1596, for details on backwards compatibility and migration.

Network Segmenting and Ethernet Link Redundancy

ioProject Professional used with SNAP PAC controllers provides the ability to segment the control network from the host network. Both S-series and R-series SNAP PAC controllers have two independent Ethernet network interfaces with separate IP addresses. One interface can be connected to the control network, and the other to the host network.

As an alternative, you can use the two Ethernet interfaces on the SNAP PAC to set up redundant Ethernet links from hosts (PCs running ioControl, ioDisplay, or OptoOPCServer) to the controller. Each PC needs to have two NICs (network interface cards). If the primary link is down for maintenance or because of a problem, the secondary link provides communication. Using SNAP PAC R-series controllers as I/O units, redundant links can go all the way to the I/O level.

For more information on using these features, see the Technical Note on redundancy, form #1597.

Installation

CAUTION: *Do NOT uninstall previous versions of ioProject before running the version 7.0 installation. If you uninstall first, you will lose all configured control engines. The ioProject version 7.0 installer automatically saves control engines before uninstalling old versions of the software.*

Installation Requirements

Here's what you need to install and run ioProject 7.0 software:

- 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 or Windows 2000® (with SP4) workstation operating system

- At least 128 MB RAM (256 MB recommended)

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

Application	ioProject Professional	ioProject Basic
ioControl	30 MB	29 MB
ioDisplay	44 MB	36 MB
OptoOPCServer	10 MB	(not included)
ioManager	13 MB	13 MB
ioUtilities	11 MB	11 MB
Total	108 MB	89 MB

Obtaining Updated Firmware

New firmware is required for all hardware that will be used with ioProject 7.0. To find new firmware, go to www.opto22.com. Click the Support tab, click Downloads at the upper left, click Firmware, and enter the part number for your controller or brain in the search field.

Opto 22 hardware is shipped with the most recent firmware, but you should check the website for additional updates that may be posted. Updated firmware for ioProject 7.0 is also available on our website for the following hardware:

- SNAP-LCE controllers

- SNAP-UP1-ADS, SNAP-UP1-D64, and SNAP-UP1-M64 Ultimate controller/brains

- SNAP-B3000-ENET, SNAP-ENET-D64, and SNAP-ENET-RTC Ethernet brains
- SNAP-ENET-S64 Simple brains

Firmware must match the hardware and the ioControl version. Look for "7.0" in the firmware filename, and choose the firmware file for your control engine. For example, a SNAP-UP1-ADS Ultimate brain would take firmware file UioAD_R7.0x.uio (the x may be another letter).

NOTE: For complete information on changes and updates to firmware, see the README files available for download with the firmware on the Opto 22 website.

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 Web site:	support.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 OptoSupport Blog 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.

Also, we recommend signing up at my.opto22.com to receive news about Opto 22 products.

New Features

ioControl Basic and ioControl Professional

ioControl Basic version 7.0 is very similar to the previous version 6.1. Features are the same, and support for new modules has been added. ioControl Basic works with SNAP PAC and SNAP-LCE controllers and SNAP Ultimate controller/brains.

ioControl Professional version 7.0 works with the new SNAP PAC controllers. ioControl Pro includes several new features not available in Basic:

- Support for network segmenting or Ethernet link redundancy, using the two Ethernet network interfaces on SNAP PAC controllers. For more information, see the *SNAP PAC S-Series Controller Data Sheet*, form #1584.

- Support for serial *mistic* I/O units (requires a SNAP PAC S-series controller, which has an RS-485 serial port for communication with serial-based I/O) as well as Ethernet-based I/O units.

- Ability to convert OptoControl strategies to ioControl (requires some preparation; see "Conversion of OptoControl Strategies to ioControl," below).

- Support for expanded features in some SNAP Ultimate and SNAP Ethernet I/O units, including analog ramping, on-pulse and off-pulse measurement, time-proportional output (TPO), and pulse generation (N pulses, continuous square wave, on-pulse, and off-pulse). Note that these expanded features are available only through commands in an ioControl Pro strategy running on a SNAP PAC controller. They are not currently available through ioManager or the I/O unit's memory map, nor through an ioControl Basic strategy running on a SNAP Ultimate I/O unit. The I/O unit must have version 7.0 or newer firmware.

- Support for additional data types in subroutines. In ioControl Pro, pointer variables can now be used for local items; I/O points, I/O units, and pointer tables can be used for passed-in items.

IMPORTANT: Strategies, subroutines, and exported charts saved in ioControl Professional cannot be subsequently opened with ioControl Basic. In addition, you cannot copy and paste items between the two applications.

Conversion of OptoControl Strategies to ioControl

OptoControl strategies can be opened in ioControl Professional and converted to ioControl. Most things will convert without difficulty, but some will not. When you're considering switching, be aware of hardware support differences and other issues, such as how True/False and error codes are handled. **Before opening an OptoControl strategy in ioControl Professional**, make a backup copy of the strategy and read the *FactoryFloor to ioProject Migration Technical Note*, form #1596, which provides important details about the differences.

Command Changes for ioControl Basic and Professional

Both ioControl Basic and ioControl Professional 7.0 include the following commands for use with the new load cell module, the SNAP-AILC. (These were first introduced in version 6.1c.)

• Set Analog Load Cell Fast Settle Level

• Set Analog Load Cell Filter Weight

Because *mistic* PID commands have been added to support PID loops on *mistic* I/O units, the existing PID command group name has been changed in both Basic and Pro. Commands for PID loops on Ethernet-based I/O units are now called *PID—Ethernet Commands*.

ioControl Basic contains about 400 commands, while ioControl Pro has about 500.

New Commands for ioControl Professional Only

ioControl Professional 7.0 includes many new commands to support new features and *mistic* I/O units. New commands are listed in the tables below. Please note the following:

• Most new commands apply to *mistic* I/O units only. Some new digital commands, however, apply to both *mistic* and Ethernet-based I/O units. For example, SNAP-UP1-ADS and SNAP-B3000-ENET I/O units now support ramping and pulsing commands. See the *ioControl Command Reference* (form #1301) or online Command Help for details on all new commands.

• Event/Reaction Commands are a new group. These commands apply to *mistic* I/O units only.
  – Note that *mistic* interrupts are not supported in ioControl Pro version 7.0 because SNAP PAC controllers currently do not support the interrupt line.
  – Events and reactions on SNAP Ethernet-based I/O units are still configured through ioManager only. See the *ioManager User's Guide* (form #1440) for information.

• Some commands work slightly differently on Ethernet-based I/O units than on *mistic* I/O units. For example, on Ethernet-based units, new square waves take effect as soon as a Start Continuous Square Wave instruction is sent.

• Before using commands, read the section about them in Chapter 10 of the *ioControl User's Guide*, and check the individual command details in the *ioControl Command Reference* or online Help.

New Commands for ioControl Professional	
Event/Reaction Commands Clear All Event Latches Clear Event Latch Disable Scanning for All Events Disable Scanning for Event Disable Scanning of Event/Reaction Group Enable Scanning for All Events Enable Scanning for Event Enable Scanning of Event/Reaction Group Event Occurred? Event Occurring? Event Scanning Disabled? Event Scanning Enabled? Get & Clear Event Latches Get Event Latches Read Event/Reaction Hold Buffer	**PID—Mistic Commands** Clamp Mistic PID Output Clamp Mistic PID Setpoint Disable Mistic PID Output Disable Mistic PID Output Tracking in Manual Mode Disable Mistic PID Setpoint Tracking in Manual Mode Enable Mistic PID Output Enable Mistic PID Output Tracking in Manual Mode Enable Mistic PID Setpoint Tracking in Manual Mode Get Mistic PID Control Word Get Mistic PID D Term Get Mistic PID I Term Get Mistic PID Input Get Mistic PID Mode Get Mistic PID Output Get Mistic PID Output Rate of Change Get Mistic PID P Term Get Mistic PID Scan Rate Get Mistic PID Setpoint Set Mistic PID Control Word Set Mistic PID D Term Set Mistic PID I Term Set Mistic PID Input Set Mistic PID Mode to Auto Set Mistic PID Mode to Manual Set Mistic PID Output Rate of Change Set Mistic PID P Term Set Mistic PID Scan Rate Set Mistic PID Setpoint
Simulation Commands Disable Communication to Event/Reaction Disable Communication to Mistic PID Loop Disable Event/Reaction Group Enable Communication to Event/Reaction Enable Communication to Mistic PID Loop Enable Event/Reaction Group Event/Reaction Communication Enabled? Event/Reaction Group Communication Enabled? IVAL Set Digital Binary IVAL Set Frequency IVAL Set Mistic PID Control Word IVAL Set Mistic PID Process Term IVAL Set Off-Pulse * IVAL Set Off-Totalizer IVAL Set On-Pulse * IVAL Set On-Totalizer IVAL Set Period IVAL Set TPO Percent * IVAL Set TPO Period *	**String Commands** Convert Mistic I/O Hex String to Float Convert Number to Mistic I/O Hex String

* Applies to SNAP-UP1-ADS and SNAP-B3000-ENET I/O units (with 7.0 or newer firmware) as well as to *mistic* I/O units.

New Commands for ioControl Professional	
Analog Point Commands Get & Clear Analog Filtered Value Get & Clear Analog Totalizer Value Get Analog Filtered Value Get Analog Square Root Filtered Value Get Analog Square Root Value Get Analog Totalizer Value Ramp Analog Output * Set Analog Load Cell Fast Settle Level ** Set Analog Load Cell Filter Weight ** Set Analog Totalizer Rate **Communication Commands** Transmit/Receive Mistic I/O Hex String **I/O Unit Commands** Get Target Address State Set All Target Address States Set Digital I/O Unit from MOMO Masks Set Target Address State	**Digital Point Commands** Generate N Pulses * Get & Restart Off-Pulse Measurement * Get & Restart Off-Time Totalizer Get & Restart On-Pulse Measurement * Get & Restart On-Time Totalizer Get & Restart Period Get Frequency Get Off-Pulse Measurement * Get Off-Pulse Measurement Complete Status * Get Off-Time Totalizer Get On-Pulse Measurement * Get On-Pulse Measurement Complete Status * Get On-Time Totalizer Get Period Get Period Measurement Complete Status Set TPO Percent * Set TPO Period * Start Continuous Square Wave * Start Off-Pulse * Start On-Pulse *

* Applies to SNAP-UP1-ADS and SNAP-B3000-ENET I/O units (with 7.0 or newer firmware) as well as to *mistic* I/O units.
**Applies to SNAP Ethernet-based I/O units only.

ioDisplay Basic and ioDisplay Professional

ioDisplay Basic is very similar to the previous ioDisplay version 6.1, with the addition of support for new SNAP PAC controllers.

ioDisplay Professional adds several new features:

- Support for Ethernet link redundancy using the dual Ethernet network interfaces on SNAP PAC controllers. You can designate primary and secondary control engines; if the primary is not available, ioDisplay Pro will switch to the secondary control engine. For maintenance or testing, you can also manually switch control engines.

- Conversion of OptoDisplay projects to ioDisplay projects.

- Connection to Ethernet-based FactoryFloor controllers running OptoControl 4.1d or newer strategies.

- Ability to read and write I/O unit data through the control engine as well as directly from Ethernet-based I/O units. This ability means you can set up segmented networks using a SNAP PAC controller, with one Ethernet interface used for the control network and one to communicate with hosts. (ioDisplay Basic, in contrast, must talk directly to the I/O units.)

- Primary and secondary scanners. As with control engines, if the primary is not available, ioDisplay Pro will switch to the secondary. You can also manually switch scanners.

- Real-time overview of control engine and I/O unit status.

- Access to Scratch Pad bits, integers, floats and strings; pointer variables; PIDs; event/reactions; and limited support for Integer 64 variables.

- The ability to replace controllers, item names, table and bit indices for windows; and alarm points, historic logs, sounds, triggers, and so on, for the entire project.

Multiple ioDisplay Clients

Note that if your application requires more than one or two seats of ioDisplay (either Basic or Pro), Opto 22 strongly recommends that you purchase OptoOPCServer. When OptoOPCServer is present on the network, all ioDisplay clients use its scanner, rather than each one having to scan I/O independently. Without OptoOPCServer, network performance will deteriorate.

Firmware Required for New ioDisplay Features

The following firmware is required to support new ioDisplay (and OptoOPCServer) features:

This feature	Requires controller firmware	Requires I/O unit firmware
ioControl strategy tag access (not I/O data)	R7.0a or newer	--
ioControl I/O unit tag access through the control engine	R7.0a or newer	any firmware
Ethernet I/O unit tag access (directly to I/O unit, not through control engine)	--	any firmware
OptoControl strategy tags (I/O and non-I/O)	R4.1d or newer	--

OptoOPCServer

OptoOPCServer 7.0 is part of ioProject Professional only; it is not included in ioProject Basic. This version adds support for redundant Ethernet links using the SNAP PAC controllers' two Ethernet interfaces. OptoOPCServer offers the ability to designate primary and secondary controllers. If the primary controller is not available, OptoOPCServer will use the secondary controller.

Like ioDisplay, OptoOPCServer can also obtain I/O data through a SNAP PAC controller rather than having to talk directly with the I/O unit. Since OptoOPCServer does not require an Ethernet connection to I/O units, a segmented control network is possible using the SNAP PAC's two network interfaces.

Support has also been added for Ethernet-based FactoryFloor controllers running OptoControl strategies, so that OPC clients can now work with data on these legacy control systems.

Firmware requirements are the same for OptoOPCServer as for ioDisplay. See the table in the previous section for details.

IMPORTANT: *There is a known problem when OptoOPCServer 7.0 is used with ioDisplay Professional. Specifically, when an ioDisplay project is configured to use redundant (primary and secondary) OptoOPCServers, ioDisplay or OptoOPCServer may stop operating or otherwise*

become unavailable. Contact Opto 22 Product Support for current information on this problem; contact information is on page 5.

ioManager

ioManager adds support for the new **SNAP PAC controllers.** Follow instructions in the *ioManager User's Guide* (form #1440) to assign primary and secondary IP addresses to the controller. Assigning the primary IP address is similar to assigning an address for a SNAP-LCE or SNAP Ultimate I/O. The secondary IP address is assigned separately, after the primary, using ioManager's Inspect window.

Enhancements and Bug Fixes

ioProject 7.0 includes enhancements and bug fixes in the areas listed below and others. For a complete list, see the README file for each product (ioControl, ioDisplay, and so on). README files are installed in each application's directory.

In addition, see the README file for your control engine or brain firmware, available on our website at www.opto22.com. Click the Support tab.

OptoSupport Blog—The OptoSupport Blog on our website provides the latest information about bug updates and workarounds. To view or subscribe to this blog, visit www.opto22.com. Click on the word *Blogs* at the bottom of any page.

ioControl and Control Engine Firmware

Faster Control Engine—Control engine firmware for version 7.0 is now faster for existing SNAP LCE and SNAP Ultimate I/O hardware. Firmware was optimized for speed in several ways:

*   The way variables are accessed was improved.

*   I/O communications over Ethernet were changed to non-directed UDP. Because each task has its own UDP socket, tasks don't have to wait in a queue.

*   Tasks not in use (including the host task, when inactive) do not use CPU time. Any processing power that would have been used by the task is freed up for tasks that are working.

Additional Scratch Pad integers and floats. For SNAP PACs, SNAP Ultimate I/O, and SNAP-LCE, the number of Scratch Pad integers and floats has been increased by 7168 to new totals of 10240 integers and 10240 floats.

Bug fixes:

*   When entering debug mode, existing breakpoints in the control engine are correctly displayed.

- When using Find with subroutines, a global variable with the same name as a local variable is not shown unless a matching local variable cannot be found.

- Issues with UDP port 2001 going offline under certain circumstances have been fixed.

- Errors you add to the queue (through Add User Error To Queue) now work correctly with Copy Current Error To String.

- False errors indicating that a point was the wrong type for a particular command have been cleared up.

- A "stack full" error associated with an ioDisplay request for a 64-bit integer tag or 64-bit integer table element has been fixed.

- I/O points configured as disabled in ioControl Configure mode remain disabled when the strategy is run.

- Scratch Pad bits on the SNAP-LCE are written to correctly.

SNAP Ethernet–Based Brain Firmware

PPP connections—PPP links at 19,200 bps or faster on SNAP Ethernet-based I/O units can now be established.

ioDisplay

The following issues have been resolved:

- Digital input and output points are visible and can now be added to a Historic Data Log.

- ioDisplay will not unexpectedly terminate for some Runtime windows containing Windows metafile graphics (.wmf or .emf).

- Some bitmaps were focus-frame and beep enabled inadvertently; this problem has been fixed.

- RAM used for a SuperTrend is now correctly shown in kilobytes (KB) rather than megabytes (MB).

- Negative values in ioDisplay windows are correctly shown. (Previously, some had an extra comma.)

- Lo alarms associated with a tag under Setup By Current Value are triggered correctly.

- Historic logging works correctly. (The problem occurred when a new control engine was used and the log file name was created from a String Name.)

- An erratic good/bad data state associated with a 64-bit integer tag or a 64-bit integer table element has been fixed.

ioManager and Utilities

For SNAP PACs, SNAP Ultimate I/O, and SNAP-LCE, the number of Scratch Pad integers and floats has been increased in ioManager to new totals of 10240 integers and 10240 floats.

For SNAP PAC controllers, new PPP commands were added to ioManager for hardware handshaking and better control.

Device data returned in the ioManager Find Opto 22 MMP Devices dialog box can now be copied to the clipboard.

In OptoVersion, a tab-delimited file is now created that contains version data; this file can be opened in Microsoft Excel® or another application for easy viewing and sorting.