

# FactoryFloor to PAC Project Migration

## Introduction

This technical note describes how to migrate a control system that uses Opto 22 FactoryFloor® software applications—specifically OptoControl™ and OptoDisplay™—to Opto 22’s PAC Project™ Professional software. Note that PAC Project Pro (not PAC Project Basic) is required for this migration.

### Other migration documents:

If you’re doing this	See this document	Form #
Migrating from ioProject to PAC Project, or integrating older SNAP systems with the SNAP PAC System	<i>SNAP PAC System Migration Technical Note</i>	1688
Migrating from Cyrano to PAC Project (requires migrating to FactoryFloor as an intermediate step)	<i>Cyrano to OptoControl Migration Technical Note</i>	1169

The following sections are included in this technical note:

- [“Preparing for Migration”](#) on page 5
- [“Converting OptoControl Strategies to PAC Control Pro”](#) on page 6
- [“Converting OptoDisplay Projects to PAC Display Pro”](#) on page 25

## Why Migrate to PAC Project?

PAC Project Professional software and Opto 22 SNAP PAC™ controllers provide a migration path for legacy control systems based on FactoryFloor software and *mistic*™ controllers. Moving to contemporary hardware and software can expand your control system's capabilities while maintaining your investment in I/O units, sensors/actuators, wiring, and other components.

PAC Project Professional software applications are designed for more complex projects, especially those requiring OPC (OLE for Process Control), database connectivity, multiple protocol, multiple network, or legacy hardware support. PAC Project 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.

See the section [“Comparing Opto 22 FactoryFloor and PAC Project Professional”](#) on page 2 for specific features and more information.

## Comparing Opto 22 FactoryFloor and PAC Project Professional

The following table compares the features of PAC Project Professional and FactoryFloor software suites. For additional comparisons, including controller capabilities and hardware compatibility charts, see Opto 22 form #1693, *Legacy and Current Product Comparison and Compatibility Charts*.

Feature	PAC Project Professional 8.x	FactoryFloor 4.1
Included software	<ul style="list-style-type: none"> <li>• PAC Control Professional</li> <li>• PAC Display Professional</li> <li>• OptoOPCServer™</li> <li>• Utilities</li> <li>• OptoDataLink™</li> <li>• PAC Manager™</li> </ul>	<ul style="list-style-type: none"> <li>• OptoControl</li> <li>• OptoDisplay</li> <li>• OptoServer™</li> <li>• OptoUtilities™</li> </ul> <p>NOTE: An earlier version of FactoryFloor contained OptoConnect for database connectivity.</p>
Network	<ul style="list-style-type: none"> <li>• <i>Controller to host</i>: Ethernet or PPP over dial-up modem</li> <li>• <i>Controller to I/O</i>: S-series—Ethernet and serial; R-series—Ethernet only</li> <li>• Ethernet or Serial to third-party devices</li> <li>• Support for Ethernet link redundancy or segmented control network</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Controller to host and I/O</i>: Serial, Ethernet, or ARCNET (depending on controller)</li> <li>• Serial to third-party devices</li> </ul>
I/O unit compatibility	<ul style="list-style-type: none"> <li>• SNAP PAC EB brains</li> <li>• SNAP PAC SB brains (S-series controllers only)</li> <li>• SNAP PAC R-series controllers (R-series have built-in I/O processor)</li> <li>• Serial <i>mistic</i> I/O units (S-series controllers only): B3000, SNAP-BRS, B100, B200, G4D16R, G4D32RS, G4A8R</li> <li>• SNAP Ultimate, SNAP Ethernet, SNAP Simple, E1, and E2 I/O units (not all 8.x features are available)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>mistic</i> protocol I/O units including <i>mistic</i> bricks, B3000, B100, B200, and G4 high-density analog</li> <li>• SNAP Ethernet and SNAP Simple I/O units (M4 bus controllers only; requires Ethernet card)</li> <li>• ARCNET B3000-HA, SNAP-BRS-HA I/O units (G4LC32; or M4 bus or G4LC32SX controllers with ARCNET card)</li> </ul>
<b>Control software</b>		
Name	PAC Control Professional	OptoControl
Controllers used	<ul style="list-style-type: none"> <li>• SNAP PAC S-series</li> <li>• SNAP PAC R-series</li> </ul>	<ul style="list-style-type: none"> <li>• SNAP-LCM4</li> <li>• SNAP-LCSX, SNAP-LCSX-PLUS</li> <li>• G4LC32 series</li> <li>• M4 and M4RTU series</li> </ul>
Main features	<ul style="list-style-type: none"> <li>• Flowchart programming</li> <li>• OptoScript™ programming</li> <li>• Subroutines (debuggable)</li> <li>• Graphical debugger</li> <li>• Conversion utility for OptoControl strategies (from version 4.1)</li> <li>• Support for serial <i>mistic</i> I/O units</li> <li>• Additional features on SNAP Ethernet brains (ramping, etc.)</li> <li>• Ethernet link redundancy</li> </ul>	<ul style="list-style-type: none"> <li>• Flowchart programming</li> <li>• OptoScript programming</li> <li>• Subroutines (no debugging within strategy)</li> <li>• Graphical debugger</li> <li>• Cyrano™ conversion utility</li> <li>• Support for serial <i>mistic</i> I/O units</li> </ul>
Maximum charts running at once	<ul style="list-style-type: none"> <li>• 32 on SNAP PAC S-series (plus host task)</li> <li>• 16 on SNAP PAC R-series (plus host task)</li> </ul>	32 (including host task)

Feature	PAC Project Professional 8.x	FactoryFloor 4.1
Proportional-integral derivative (PID) loops	<ul style="list-style-type: none"> <li>• 4 PID algorithms for Ethernet I/O units (96 PIDs per SNAP PAC R-series controller and SNAP PAC brain; 32 PIDs per SNAP Ultimate I/O unit; 16 PIDs per SNAP Ethernet I/O unit)</li> <li>• 1 PID algorithm for <i>mistic</i> serial (8 PIDs per <i>mistic</i> analog I/O unit)</li> <li>• Graphical tool for manual tuning of Ethernet and <i>mistic</i> PIDs</li> </ul>	<ul style="list-style-type: none"> <li>• 1 PID algorithm</li> <li>• 8 PIDs per analog brain</li> </ul>
Ethernet link redundancy	<ul style="list-style-type: none"> <li>• Primary and secondary IP addresses for SNAP PAC controllers</li> <li>• PAC Control commands can be used to control redundancy algorithm</li> </ul>	--
Additional toolkits	<ul style="list-style-type: none"> <li>• Allen-Bradley DF-1 Integration Kit</li> <li>• Modbus/TCP Integration Kit</li> <li>• Modbus Serial Integration Kit</li> <li>• OptoMMP™ Communication Toolkit</li> </ul>	<ul style="list-style-type: none"> <li>• Allen-Bradley DF-1 Integration Kit</li> <li>• Modbus Serial Integration Kit</li> <li>• OptoControl SDK</li> </ul>
<b>HMI software</b>		
Name	PAC Display Professional	OptoDisplay
Main features	<ul style="list-style-type: none"> <li>• Alarming</li> <li>• Trending</li> <li>• Security</li> <li>• 3000-graphic library</li> <li>• Conversion utility for OptoDisplay projects</li> <li>• OPC server redundancy (OptoOPCServer)</li> <li>• Scanner redundancy via OptoOPCServer</li> </ul>	<ul style="list-style-type: none"> <li>• Alarming</li> <li>• Trending</li> <li>• Security</li> <li>• 3000-graphic library</li> <li>• Conversion utility from <i>mistic</i> MMI projects</li> </ul>
HMI controller data	<ul style="list-style-type: none"> <li>• PAC Project controllers</li> <li>• ioProject controllers</li> <li>• FactoryFloor controllers on Ethernet network</li> </ul>	<ul style="list-style-type: none"> <li>• FactoryFloor controllers</li> <li>• Cyrano controllers</li> </ul>
<b>OPC server</b>		
Name	OptoOPCServer	OptoServer
OPC version	OPC 2.0-compliant	OPC 1.0-compliant
Scanner redundancy	PAC Display primary and secondary OptoOPCServers	--
<b>Database connectivity</b>		
Name	OptoDataLink	[A previous version of FactoryFloor contained OptoConnect.]
Databases supported	Microsoft SQL Server Microsoft Access MySQL	[OptoConnect supported SQL 6 and Access 97]
Other file types	Text files	--

## Opto 22 FactoryFloor and PAC Project Software Applications

The following table matches PAC Project software applications to their comparable FactoryFloor applications.

PAC Project	FactoryFloor
PAC Control	OptoControl
PAC Display	OptoDisplay
PAC Utilities™ PAC MessageViewer™ PAC Terminal™ and PAC Manager™ OptoVersion	OptoUtilities™ OptoSnif™ OptoTerm™ OptoVersion™
OptoOPCServer	OptoServer
OptoDataLink	OptoConnect (pre-4.1 version of FactoryFloor)

## Documentation

See the following guides for additional information on using PAC Control, PAC Display, and related software applications. Make certain you obtain the legacy editions as noted below, because they contain all commands and information for older hardware:

For using	See these guides	Opto 22 form
PAC Control	<i>PAC Control User's Guide, Legacy Edition</i> <i>PAC Control Command Reference, Legacy Edition</i> <i>PAC Control Commands Quick Reference, Legacy Edition</i>	1710 1711 1713
PAC Display	<i>PAC Display User's Guide</i>	1712
OptoOPCServer	<i>OptoOPCServer User's Guide</i>	1439
OptoDataLink	<i>OptoDataLink User's Guide</i>	1705
PAC Manager	<i>PAC Manager User's Guide, Legacy Edition</i>	1714

## For Help

If you are having trouble migrating your control system to PAC Project Professional and cannot find the help you need in this technical note or in the related documentation, contact Opto 22 Product Support.

**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.*

## Preparing for Migration

### Requirements

- **PAC Project Professional software suite**—The FactoryFloor controllers used in the control system must be configured on the PC used for converting to PAC Control and PAC Display, because the controller configuration information is stored in the computer's registry.
- **Opto 22 FactoryFloor R4.1 software suite**—If you have a version of FactoryFloor that is older than R4.1, contact Opto 22 Product Support for assistance.
- **SNAP PAC controller(s)**—If the OptoControl strategy references serial I/O units on more than one serial port, use a SNAP-PAC-S2 controller. The S2 has four serial ports, all software configurable for RS-485. (The SNAP-PAC-S1 will work fine if you need only one RS-485 serial port.)

### 1—Inventory Your Existing Control System

Before starting to convert OptoControl strategies and OptoDisplay projects, we recommend that you list or map the hardware and software components of your control system. Doing this will help to identify unsupported hardware, functions that are not supported in PAC Project, and other potential obstacles to migrating your system.

Make sure to identify all controllers, I/O units, and the type of network (Ethernet, RS-485, ARCNET, etc.) used to connect them. Also list any PCs running OptoDisplay or other FactoryFloor applications.

## 2—Back Up Your Current Strategies and Projects

Before making any changes to your existing OptoControl strategy or OptoDisplay project, back up all files to one or more secure locations.

## 3—Convert Strategies and Projects to FactoryFloor R4.1

PAC Control Professional and PAC Display Professional can import only strategies and projects saved in OptoControl R4.1 and OptoDisplay R4.1, respectively. If necessary, open older strategies and projects using OptoControl R4.1 and OptoDisplay R4.1 and then save the files. If you have an older version of FactoryFloor, contact Opto 22 Product Support for assistance.

### For Cyrano and *mistic* MMI Users

Legacy Cyrano control strategies or *mistic* MMI projects must be saved in FactoryFloor R4.1 before starting the conversion steps described in this technical note. There are functional differences between Cyrano and OptoControl strategies that you must consider when opening a Cyrano strategy in OptoControl. These differences and other information are described in **Cyrano to OptoControl Migration Technical Note (Opto 22 form 1169)**, which can be downloaded from the Opto 22 website ([www.opto22.com](http://www.opto22.com)). Also see the following documents for more information on using Cyrano and *mistic* MMI in OptoControl and OptoDisplay:

Application	See these guides	Opto 22 form
Cyrano	<i>OptoControl User's Guide</i> <i>OptoControl Command Reference</i>	724 725
<i>mistic</i> MMI	<i>OptoDisplay User's Guide</i>	723

## Converting OptoControl Strategies to PAC Control Pro

PAC Control Professional handles the OptoControl-to-PAC Control conversion automatically. However, depending on the complexity and features of the OptoControl strategy, you may need to change or adjust the strategy both before and after conversion.

### 1—Assessing Major Differences in Features

Before converting an OptoControl strategy to PAC Control, determine if any features and functions used in the OptoControl strategy are unavailable or implemented differently in PAC Control. For most features and functions, there are alternative approaches or workarounds to accomplish the same task using PAC Control. On [page 7](#), review the table of OptoControl features not available in PAC Control; also check [“Additional OptoControl and PAC Control Differences” on page 7](#).

## OptoControl Features Not Available in PAC Control

OptoControl Feature Not Available in PAC Control	Alternative, Workaround, or Notes												
Serial host support (except for PPP over a modem)	Use PPP and a modem.												
ARCNET networking	Evaluate your networking environment to see if Ethernet or serial networking is an option.												
External instruction sets (also called "XIDs" and "Forth libraries")	<p>Most functions implemented using external instruction sets have been integrated into PAC Control. If necessary, recreate what the external instruction set does using OptoScript and/or subroutines:</p> <table border="1" data-bbox="808 680 1406 932"> <thead> <tr> <th data-bbox="808 680 1117 716">External Instructions</th> <th data-bbox="1117 680 1406 716">PAC Control Equivalent</th> </tr> </thead> <tbody> <tr> <td data-bbox="808 716 1117 758">Save tables</td> <td data-bbox="1117 716 1406 758">Persistent variables</td> </tr> <tr> <td data-bbox="808 758 1117 800">External pointer commands</td> <td data-bbox="1117 758 1406 800">Typed pointer commands</td> </tr> <tr> <td data-bbox="808 800 1117 842">Modbus toolkit with XID</td> <td data-bbox="1117 800 1406 842">Modbus toolkit</td> </tr> <tr> <td data-bbox="808 842 1117 884">Allen-Bradley toolkit with XID</td> <td data-bbox="1117 842 1406 884">Allen-Bradley toolkit</td> </tr> <tr> <td data-bbox="808 884 1117 932">Case statements, if/then/else, looping logic</td> <td data-bbox="1117 884 1406 932">OptoScript</td> </tr> </tbody> </table>	External Instructions	PAC Control Equivalent	Save tables	Persistent variables	External pointer commands	Typed pointer commands	Modbus toolkit with XID	Modbus toolkit	Allen-Bradley toolkit with XID	Allen-Bradley toolkit	Case statements, if/then/else, looping logic	OptoScript
External Instructions	PAC Control Equivalent												
Save tables	Persistent variables												
External pointer commands	Typed pointer commands												
Modbus toolkit with XID	Modbus toolkit												
Allen-Bradley toolkit with XID	Allen-Bradley toolkit												
Case statements, if/then/else, looping logic	OptoScript												
Binary/checksum or ASCII/checksum support for <i>mistic</i> brains	PAC Control supports only binary/CRC or ASCII/CRC format for <i>mistic</i> brains. Contact Opto 22 Product Support for current information on binary/checksum or ASCII/checksum options in PAC Control.												
HRD analog brick support	Consider using a SNAP I/O unit with SNAP analog modules, which have up to 32 channels per module. A maximum of 16 SNAP analog modules can be placed on one SNAP rack.												
Localbus support	<p>Change the localbus port in OptoControl to a remote (serial) port. Resolve any potential I/O address conflicts if you are already using serial ports. You will need to replace the local I/O unit and points with compatible replacements. It may be possible to simply replace the local brains with "remote" brains.</p> <p>Also evaluate your application and networking environment to see if using Ethernet-based brains is an option.</p>												

## Additional OptoControl and PAC Control Differences

Note the following important differences between OptoControl and PAC Control:

- PIDs on SNAP Ethernet brains have more features and options than *mistic* PID loops.** PIDs have been divided into their own command groups in PAC Control: PID-Ethernet commands and PID-Mistic commands. See Chapter 10 of the *PAC Control User's Guide, Legacy Edition* for more information.

- **PAC Control uses a positive 1 value to represent true and a 0 for false.** This is different from OptoControl, which used -1 for true and 0 for false. This difference also affects true/false returns on some commands. Please note the following:

Command	OptoControl Result	PAC Control Result
Set Variable True	Sets integer variable to <b>-1</b>	Sets integer variable to <b>+1</b>
Set Variable False	Sets integer variable to <b>0</b>	Sets integer variable to <b>0</b>
Variable False?	Evaluates true if value of integer variable is <b>0</b> . <b>False</b> is defined as <b>zero</b> .	
Variable True?	Evaluates true if value of integer variable <b>not 0</b> . <b>True</b> is defined as any <b>non-zero</b> value (any non-false value).	

- **PAC Control string commands that use an Index parameter start at zero; equivalent commands in OptoControl start at 1.** The following commands are affected:

- Find Character in String
- Find Substring in String
- Get Substring
- Get Nth Character
- Set Nth Character

If your strategy uses these commands, in order to get the correct character(s), you must change each occurrence of the command: subtract 1 from the Index value you're using.

- **The Covert Number to String command (NumberToString in OptoScript) behaves differently in OptoControl and PAC Control.** For more information, see OptoKB article #KB80115.
- **Error codes, both returned and queued, are different in OptoControl and PAC Control.** See note 4 in [“Notes for OptoControl and PAC Control Commands” on page 23](#) for more information on differences in return values.
- **The sign used on quadrature counting is different in *mistic* and SNAP Ethernet brains.** See “Digital Point Commands” in Chapter 10 of the *PAC Control User's Guide, Legacy Edition* for more information.
- **Mistic I/O unit firmware may need upgrading** in order for the PAC Control strategy to run properly. Some types of I/O units may require EPROM chip replacements, while others can receive firmware downloads. Contact Opto 22 Product Support if you need EPROMs.
- **Repeated use of the commands Start Chart or Call Chart** may cause a problem in PAC Control due to the execution speed of these commands (100 ms per instance). If your OptoControl strategy uses these commands repeatedly, contact Opto 22 Product Support to discuss alternate strategy logic.

- **Allen-Bradley DF1 Integration Kit** and **Modbus Integration Kits** are available for both OptoControl and PAC Control. However, their implementation differs: in OptoControl, the integration kits use external commands; in PAC Control, they do not. Conversion of strategy logic and subroutines related to these toolkits is *not* automatic; the logic will need to be rewritten.

## 2—Preparing the Strategy

Before converting your OptoControl strategy to PAC Control, do the following:

- **Back up the current, working OptoControl strategy and subroutines to one or more secure locations.**
- **Check for I/O units configured on more than one serial port.** In the strategy tree, under I/O Units, double-click the I/O Units folder to see a list of all I/O units for the strategy, including Port and Address field. If more than one port is used, you must use a SNAP-PAC-S2 rather than a SNAP-PAC-S1 controller. (The S1 has only one RS-485 port; the S2 has four ports configurable for RS-485.)
- **Check for any ARCNET I/O units.** ARCNET I/O units, such as the B3000-HA and the SNAP-BRS-HA, are not supported in PAC Project. You'll need to replace these brains with Ethernet or serial brains. In the OptoControl strategy, create new replacement I/O units. Then move I/O points from the old ARCNET units to the new units.
- **Check for external instructions.** In the strategy tree there's a folder called "Ext. Instruction Files Included." If this folder is not empty, you'll need to figure out what the function of those commands is and then implement it using PAC Control commands.
- **Check subroutines.** OptoControl and PAC Control subroutines support different parameters. Any unsupported parameters passed to a subroutine will need to be handled differently.

### OptoControl Subroutine Data Types Supported in PAC Control Pro

- Numeric variables, literals, and tables
- String variables, literals, and tables
- Communication handles
- I/O points, I/O units, and pointer tables
- Pointer variables as local parameters

### OptoControl Subroutine Data Types Not Supported in PAC Control

- Unsupported I/O units and the I/O points on them, such as G4 or HRD I/O units
- Event/reactions
- Charts
- PID loops

- **If you have *mistic* local-bus I/O**, you need to move the points to a SNAP-B3000 brain. However, not all *mistic* brick points are movable, so first you must change any non-movable *mistic* brick points to movable point types.

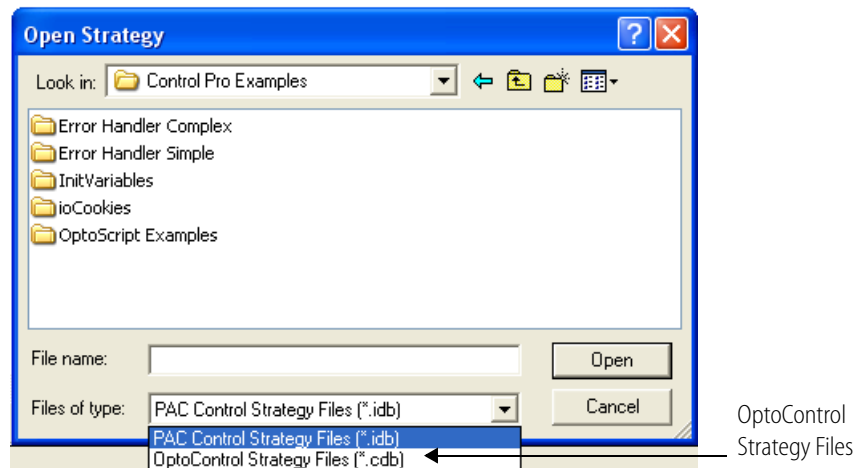
The following table shows which G4 point types can and cannot be moved. Only a point with *no* scaling can be moved, and it must be moved into a SNAP module that offers the same range. These rules also apply to similar B200 points.

Point Type	Movable	Not Movable
G4AD3: 4 - 20 mA		●
G4AD4: ICTD Temp. Probe	●	
G4AD5: Type J Thermocouple	●	
G4AD6: 0 - 5 VDC		●
G4AD6HS: 0 - 5 VDC High-Speed		●
G4AD7: 0 - 10 VDC		●
G4AD7HS: 0 - 10 VDC High-Speed		●
G4AD8: Type K Thermocouple	●	
G4AD9: 0 - 50 mV	●	
G4AD10: 100 Ohm RTD	●	
G4AD11: -5 - +5 VDC	●	
G4AD12: -10 - +10 VDC	●	
G4AD13: 0 - 100 mV		●
G4AD16: 0 - 5 A AC/DC		●
G4AD17: Type R Thermocouple	●	
G4AD18: Type T Thermocouple	●	
G4AD19: Type E Thermocouple	●	
G4AD20: Rate (Frequency)		●
G4AD22: 0 - 1 VDC		●
G4AD23: Type S Thermocouple	●	
G4AD24: Type B Thermocouple	●	
G4AD25: 0 - 100 VAC/VDC		●
G4AD26: Velocity		●
G4DA3: 4 - 20 mA	●	
G4DA4: 0 - 5 VDC		●

Point Type	Movable	Not Movable
G4DA5: 0 - 10 VDC	●	
G4DA6: -5 - +5 VDC		●
G4DA7: -10 - +10 VDC	●	
G4DA8: 0 - 20 mA		●
G4DA9: 5 - 60 VDC TPO		●
G4DA10: 12 - 280 VAC TPO		●

### 3—Converting the Strategy

1. To open PAC Control, from the Windows Start menu select All Programs→Opto 22→PAC Project→PAC Control.
2. In PAC Control, select File→Open Strategy.
3. In the Open Strategy dialog box that appears, select “OptoControl Strategy Files (\*.cdb)” from the “Files of type” drop-down menu.



4. Navigate to the OptoControl strategy file you want to convert, select it, and click Open.
  - If there are no problems converting the strategy, a message box will prompt you to choose a location where the converted strategy will be saved. Continue to [step 5 on page 12](#).
  - If there is a problem that prevents the OptoControl strategy from being converted, the conversion process stops. Read the error message describing the problem, modify the OptoControl strategy as needed, and repeat [step 4](#).

If the conversion process stops while converting the OptoControl strategy, one of the following error messages will appear:

Error message	Description
Cannot open from OptoControl version <versionnumber>.	PAC Control can only open OptoControl files saved in OptoControl R4.1. Contact Opto 22 Product Support if you do not have this version of the software.
I/O unit <unitname> is using ARCNET or a local port. Strategy cannot be converted.	Review the information in “1—Assessing Major Differences in Features” on page 6 and “2—Preparing the Strategy” on page 9 for workarounds or other approaches.

5. Click OK to close the message box, and in the dialog box that opens, select a location to save the converted strategy and then click Open.

The automatic part of the conversion process is now complete.

## 4—Saving Strategies to Flash

**Be sure to save your strategy to the SNAP PAC’s flash memory after downloading.**

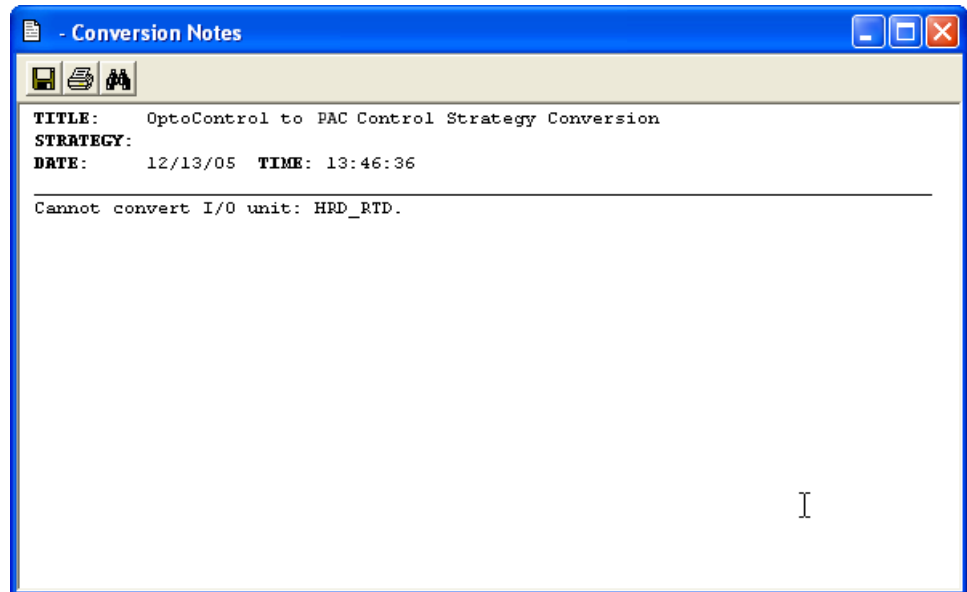
On the SNAP PAC controller, persistent variables and variables initialized on download are automatically saved to battery-backed RAM, but strategies are not. The SNAP PAC S-series controller has about 7.5 MB available in flash memory for strategy storage. See the *PAC Control User’s Guide, Legacy Edition* (form 1710) for instructions.

## 5—Followup

The converted OptoControl strategy will open in PAC Control. Before using the strategy, you must review and correct conversion errors, test-compile any OptoScript blocks, and finally configure the strategy to be saved to the controller’s flash memory upon download.

### Reviewing Conversion Errors

If errors occur that do not stop the conversion process, they are listed in the error log file “Conversion\_Notes.rtf”. The log file is saved in the same directory as the converted strategy and opens in its own PAC Control window.



Check each message listed in the error log against the list in [“Conversion Error Log Messages” on page 14](#) and correct the converted strategy as needed.

### Test Compiling OptoScript Blocks

Because OptoScript blocks in the OptoControl strategy remain unchanged through the conversion process, you'll need to check them for necessary command and error handling changes. If OptoScript commands are different in OptoControl and PAC Control, the OptoScript block will not compile.

Select **Compile** → **Compile All** to check all the OptoScript blocks. Or you can check individual OptoScript blocks by clicking the **Test Compile** button in each OptoScript block; if the block does not compile, the exact lines of code that need to be updated will be listed. Click the error description to jump directly to the line of code that needs modification. See [page 18](#) for a list of OptoControl commands and PAC Control equivalents. Also remember that any PID command used in an OptoControl strategy now has “mistic” in its command name in PAC Control to distinguish it from Ethernet PID commands.

### Saving Strategies to Flash

**IMPORTANT:** *Be sure to configure your strategy to be saved to the SNAP PAC's flash memory upon download.*

On the SNAP PAC controller, persistent variables and variables initialized on download are automatically saved to battery-backed RAM, but strategies are not. The SNAP PAC controller has about 7.5 MB available in flash memory for strategy storage. See the *PAC Control User's Guide, Legacy Edition* (form 1710) for instructions.

## Conversion Error Log Messages

Error Message	Description
<p>Cannot convert instruction &lt;instructionname&gt; in chart &lt;chartname&gt;, block &lt;blocknumber&gt;.</p>	<p>An instruction used in a chart in the OptoControl strategy isn't available in PAC Control. An invalid instruction is turned into a "Comment (OptoControl Conversion Issue)" instruction. This instruction's description string contains the name of the old instruction and the parameters used.</p>
<p>Cannot convert subroutine &lt;subname&gt;, it contains pointer variables.</p>	<p>A subroutine uses pointers as internal variables, which PAC Control doesn't support. All other subroutine variable types used in OptoControl are allowed in PAC Control Pro.</p>
<p>Cannot convert subroutine &lt;subname&gt;, it uses invalid parameter types.</p>	<p>OptoControl allows many subroutine parameter types that PAC Control does not support. These subroutine parameter types will not convert to PAC Control:</p> <ul style="list-style-type: none"> <li>• Analog Event Reaction</li> <li>• B100 Digital Multifunction I/O Unit</li> <li>• B200 Analog Multifunction I/O Unit</li> <li>• B3000 SNAP Analog</li> <li>• B3000 SNAP Digital</li> <li>• B3000 SNAP Mixed I/O</li> <li>• Chart</li> <li>• Digital Event/Reaction</li> <li>• Event/Reaction Group</li> <li>• G4 Analog Multifunction I/O Unit</li> <li>• G4 Digital Local Simple I/O Unit</li> <li>• G4 Digital Multifunction I/O Unit</li> <li>• G4 Digital Remote Simple I/O Unit</li> <li>• HRD Analog Current Output I/O Unit</li> <li>• HRD Analog RTD Input I/O Unit</li> <li>• HRD Analog Thermocouple/mV Input I/O Unit</li> <li>• HRD Analog Voltage Output I/O Unit</li> <li>• HRD Analog Voltage/Current Input I/O Unit</li> <li>• Local Simple Digital Input</li> <li>• Local Simple Digital Output</li> <li>• PID Loop</li> <li>• Pointer Table</li> <li>• SNAP Digital 64</li> <li>• SNAP Remote Simple Digital</li> <li>• SNAP Simple 64</li> <li>• TPO</li> </ul>
<p>Cannot convert instruction &lt;instructionname&gt; in subroutine &lt;subname&gt;, block &lt;blocknumber&gt;.</p>	<p>An instruction used in a subroutine in the OptoControl strategy isn't available in PAC Control. An invalid instruction is turned into a "Comment (OptoControl Conversion Issue)" instruction. This instruction's description string contains the name of the old instruction and the parameters used.</p>

Error Message	Description
<p>Cannot convert I/O unit: &lt;unitname&gt;.</p>	<p>An I/O unit definition used in the OptoControl strategy isn't available in PAC Control. The following I/O units are not supported in PAC Control:</p> <ul style="list-style-type: none"> <li>• G4 Digital Local Simple (G4D16LS)</li> <li>• HRD Analog RTD Input (G4AIRTD)</li> <li>• HRD Analog Thermocouple/mV Input (G4AITM)</li> <li>• HRD Analog Voltage/Current Input (G4AIVA)</li> <li>• HRD Analog Current Output (G4AOA)</li> <li>• HRD Analog Voltage Output (G4AOV)</li> <li>• Motion Servo and Stepper boards (NOTE: The SNAP PAC Motion Control Subsystem can provide stepper motor control.)</li> </ul>
<p>Cannot convert analog point: &lt;pointname&gt;.</p>	<p>An analog I/O point on an HRD (high density) I/O unit will not be available because this I/O unit cannot be converted into PAC Control. The following analog inputs and outputs on an HRD I/O unit cannot be converted:</p> <p><b>Inputs</b></p> <ul style="list-style-type: none"> <li>• Type B Thermocouple (Note that SNAP-AITM2: Type B Thermocouple will convert.)</li> <li>• Type C Thermocouple</li> <li>• Type D Thermocouple</li> <li>• Type E Thermocouple</li> <li>• Type G Thermocouple</li> <li>• Type J Thermocouple</li> <li>• Type K Thermocouple</li> <li>• Type N Thermocouple</li> <li>• Type R Thermocouple</li> <li>• Type S Thermocouple</li> <li>• Type T Thermocouple</li> <li>• 0 - 100 mV (Scalable)</li> <li>• -50 - +50 mV</li> <li>• -150 - +150 mV</li> <li>• 0 - 20 mA</li> <li>• 4 - 20 mA (Scalable)</li> <li>• 4 - 20 mA</li> <li>• 0 - 1.25 VDC</li> <li>• 0 - 5 VDC</li> <li>• 0 - 10 VDC (Scalable)</li> <li>• 0 - 10 VDC</li> <li>• -5 - +5 VDC</li> <li>• -10 - +10 VDC</li> </ul>

Error Message	Description
<p>Cannot convert analog point: &lt;pointname&gt;. (Continued)</p>	<ul style="list-style-type: none"> <li>• 0 - 12500 Ohms (Scalable)</li> <li>• 100 Ohm Pt: Alpha=385 3-wire</li> <li>• 100 Ohm Pt: Alpha=385 2/4-wire</li> <li>• 120 Ohm Ni: Alpha=672 3-wire</li> <li>• 120 Ohm Ni: Alpha=672 2/4-wire</li> <li>• 604 Ohm NiFe: Alpha=518 3-wire</li> <li>• 604 Ohm NiFe: Alpha=518 2/4-wire</li> <li>• 100 Ohm Pt: Alpha=3923 3-wire SAMA</li> <li>• 100 Ohm Pt: Alpha=3923 2/4-wire SAMA</li> <li>• 100 Ohm Pt: Alpha=3928 3-wire ITS90</li> <li>• 100 Ohm Pt: Alpha=3928 2/4-wire ITS90</li> <li>• 100 Ohm Pt: Alpha=391 3-wire OIML</li> <li>• 100 Ohm Pt: Alpha=391 2/4-wire OIML</li> <li>• 100 Ohm Pt: Alpha=3916 3-wire JIS</li> <li>• 100 Ohm Pt: Alpha=3916 2/4-wire JIS</li> <li>• 100 Ohm Pt: Alpha=3916 3-wire JEMIMA</li> <li>• 100 Ohm Pt: Alpha=3916 2/4-wire JEMIMA</li> <li>• 100 Ohm Pt: Alpha=391 3-wire GOST</li> <li>• 100 Ohm Pt: Alpha=391 2/4-wire GOST</li> </ul> <p><b>Outputs</b></p> <ul style="list-style-type: none"> <li>• 0 - 5 VDC</li> <li>• 0 - 10 VDC (Scalable)</li> <li>• 0 - 10 VDC</li> <li>• -5 - +5 VDC</li> <li>• -10 - +10 VDC</li> <li>• 0 - 20 mA</li> <li>• 4 - 20 mA (Scalable)</li> <li>• 4 - 20 mA</li> </ul>
<p>Cannot convert digital point: &lt;pointname&gt;.</p>	<p>A digital I/O point will not be available if the I/O unit for that point was not converted into PAC Control.</p>
<p>Cannot convert PID Loop: &lt;pidname&gt;. I/O Unit was not converted.</p>	<p>A PID loop will not be available if the I/O unit for that PID loop was not converted into PAC Control.</p>
<p>Cannot convert Event/Reaction: &lt;ername&gt;. I/O Unit was not converted.</p>	<p>An event/reaction (E/R) will not be available if the I/O unit for that E/R was not converted into PAC Control.</p>
<p>Strategy has external action definitions which won't be converted.</p>	<p>External actions are not supported in PAC Control.</p>
<p>Strategy has external condition definitions which won't be converted.</p>	<p>External conditions are not supported in PAC Control.</p>
<p>Added new numeric variable: &lt;variablename&gt; for returning subroutine status.</p>	<p>This message will appear for any OptoControl strategy that includes subroutines. In PAC Control, all subroutines return a status parameter that reports the overall success or errors for the subroutine call. Because this parameter does not exist in OptoControl, a new numeric variable "SubroutineReturnStatus" is automatically created.</p>
<p>A subroutine and chart are both named &lt;suband-chartname&gt;. This will cause problems when you run the strategy.</p>	<p>Subroutines and charts in an OptoControl strategy can share the same name (for example, a chart and a subroutine can both be named Valve_Control). In PAC Control, subroutines and charts cannot share the same name. You must change the name of either the chart or the subroutine before running the converted strategy.</p>

Error Message	Description
<p>A string command was found that may need to be adjusted in &lt;chartname&gt; at block &lt;blocknumber&gt;. OptoControl strings use a 1-based index but PAC Control strings use a 0-based index.</p>	<p>OptoControl string commands that use an index start with index 1; equivalent PAC Control commands start with index 0.</p> <p>Five commands are affected by this change:</p> <ul style="list-style-type: none"> <li>• Get Substring [no error code]</li> <li>• Get Nth Character</li> <li>• Set Nth Character</li> <li>• Find Substring in String</li> <li>• Find Character in String</li> </ul> <p>Find each instance of these commands in your strategy. For each one, subtract 1 from the index value you used in OptoControl.</p>

## Handling Interrupt Charts from OptoControl

FactoryFloor Interrupt charts are converted in PAC Control 8.2 and later, and they are fully supported in a properly configured system. However, here are some questions that you may have when converting strategies that use an Interrupt chart:

### ***What if I want to continue using an Interrupt chart from OptoControl (from a PAC Control 8.2 migration or later).***

1. Verify the operation of the Interrupt chart.
2. Make sure that the I/O unit interrupt line is wired properly to the controller.

*NOTE: If the I/O unit interrupt line is miswired or improperly biased or terminated, this could result in the IRQ signal being activated accidentally. The interrupt chart will run as long as the IRQ signal is active or asserted, which can cause the strategy to become very unresponsive.*

### ***What if there is an Interrupt chart that I don't use?***

If the strategy does not implement the interrupt chart, just delete the chart. If you need an Interrupt chart later, you can create it then. If you would like to retain the contents of the Interrupt chart, create a new chart that is not named Interrupt. Cut and paste the functionality of the Interrupt chart into the new chart, and then delete the Interrupt chart.

In OptoControl, an Interrupt chart was created automatically when the strategy was created. In PAC Control, you must manually create an Interrupt chart.

***How do I resurrect an Interrupt chart from OptoControl*** If a strategy is converted from FactoryFloor using PAC Control 8.1 or earlier, the *mistic* interrupt handling commands are converted to comments. These interrupt commands are responsible for detecting which I/O unit has asserted the IRQ and (more importantly) responsible for negating (or clearing) the IRQ signal.

To resurrect an Interrupt chart:

1. Search for all instructions named *Comment (OptoControl Conversion Issue)* in the Interrupt chart.

2. Update these comments with their equivalent functions.
3. Make sure that the I/O unit interrupt line is wired properly to the controller.

*NOTE: If the I/O unit interrupt line is miswired or improperly biased or terminated, this could result in the IRQ signal being activated accidentally. The interrupt chart will run as long as the IRQ signal is active or asserted, which can cause the strategy to become very unresponsive.*

*NOTE: If an I/O unit's configuration is stored in flash, when certain conditions are met, the I/O unit may be capable of asserting an IRQ causing the controller to invoke the Interrupt chart. However, if the mystic interrupt handling commands were converted to comments, when an I/O unit asserts an IRQ, the Interrupt chart will be activated, but it won't be able to handle the IRQ signal. The Interrupt chart will continue to run indefinitely resulting in severe degradation of performance.*

## OptoControl and PAC Control Commands

Most commands convert automatically. However, some OptoControl commands are different or unavailable in PAC Control, and you'll need to change your strategy as noted in the following table. For each OptoControl command, the comparable PAC Control command and any applicable notes are listed. Table footnotes follow on [page 23](#).

OptoControl Command	Comparable PAC Control Command(s)	Notes
Accept Session On TCP Port	Accept Incoming Communication	11
ARCNET Connected?	n/a	5
ARCNET Message Address Equal to?	n/a	5
ARCNET Node Present?	n/a	5
Calculate & Store Strategy CRC	n/a	This command is not needed in PAC Control. PAC Control includes options for backing up strategies and saving them on the PC or controller. In PAC Control, see Strategy Options under the File menu.
Characters Waiting at Serial Port?	Get Number of Characters Waiting	11
Clear PC Byte Swap Mode (ISA Only)	n/a	3
Clear Quadrature Counter	Clear Counter	1—The PAC Control command can access quadrature points.
Clear Receive Buffer	Use "Get Number of Characters Waiting" and "Receive N Characters" to achieve the same result. For TCP communication handles, use "Clear Communication Receive Buffer."	11
Close Ethernet Session	Close Communication	11
Configure I/O Unit	n/a	In PAC Control, I/O units are automatically configured when an I/O unit becomes enabled.

OptoControl Command	Comparable PAC Control Command(s)	Notes
Configure Port	Set Communication Handle Value	11
Configure Port Timeout Delay	Set Communication Handle Value	11—For individual serial I/O units, timeout values can be changed from the 1 sec. default. Timeout values can also be changed for FTP communication handles. TCP timeouts have the following default values: <ul style="list-style-type: none"> <li>• Open: 4 sec.</li> <li>• Selects: 1 sec.</li> <li>• (all other timeouts): 10 sec.</li> </ul>
CTS Off?	n/a	10
CTS On?	n/a	10
Disable Communication To Analog Point	Disable Communication to Point	1
Disable Communication To Digital Point	Disable Communication to Point	1—Does not convert if parameter is a pointer or a simple digital point.
Enable Communication To Analog Point	Enable Communication to Point	1
Enable Communication To Digital Point	Enable Communication to Point	1—Does not convert if parameter is a pointer or a simple digital point.
Ethernet Session Open?	Communication Open?	11
Get & Clear Digital I/O Unit Latches	n/a	8
Get & Clear Digital-64 I/O Unit Latches	n/a	8
Get & Clear Quadrature Counter	Get & Clear Counter	1
Get & Clear Simple-64 I/O Unit Latches	n/a	8
Get Address Of I/O Unit Causing Current Error	Get Name of I/O Unit Causing Error	4
Get Analog Lower Clamp	n/a	1
Get Analog Upper Clamp	n/a	1
Get ARCNET Destination Address On Port	n/a	5
Get ARCNET Host Destination Address	n/a	5
Get ARCNET Peer Destination Address	n/a	5
Get Controller Address	"Get Control Engine Address" and "Convert IP Address String to Integer 32" (if needed)	1
Get Default Host Port	n/a	PAC Control controllers do not have jumpers.
Get Digital I/O Unit As Binary Value	Get I/O Unit As Binary Value	1—Does not convert if original "Put In" parameter was a float variable.
Get Digital I/O Unit Latches	n/a	8
Get Digital-64 I/O Unit As Binary Value	Get I/O Unit As Binary Value	1

OptoControl Command	Comparable PAC Control Command(s)	Notes
Get Mixed I/O Unit As Binary Value	Get I/O Unit As Binary Value	1
Get Simple-64 I/O Unit As Binary Value	Get I/O Unit As Binary Value	1
Get Digital-64 I/O Unit Latches	n/a	8
Get Ethernet Session Name	Get Communication Handle Value	11
Get Number Of Characters Waiting On Ethernet Session	Get Number of Characters Waiting	11
Get Number Of Characters Waiting On Serial Or ARCNET Port	Get Number of Characters Waiting	5, 11
Get Port Of I/O Unit Causing Current Error	Get Name of I/O Unit Causing Error	4
Get Priority	n/a	6
Get Priority Of Host Task	n/a	6
Get Quadrature Counter	Get Counter	1
Get RTU/M4IO Temperature	n/a	7
Get RTU/M4IO Voltage	n/a	7
Get Simple-64 I/O Unit Latches	n/a	8
Host Task Received a Message?	n/a	9
Interrupt On Port0?	n/a	2
Interrupt On Port1?	n/a	2
Interrupt On Port2?	n/a	2
Interrupt On Port3?	n/a	2
Interrupt On Port6?	n/a	2
IVAL Set Analog From Table	IVAL Move Numeric Table to I/O Unit	8
IVAL Set Quadrature Counter	IVAL Set Counter	1
Low RAM Backup Battery?	n/a	7
Move Analog I/O Unit To Table	Move I/O Unit to Numeric Table	1—Does not convert if parameter is a pointer.
Move Digital I/O Unit To Table	Move I/O Unit to Numeric Table	1
Move Digital I/O Unit To Table Element	Get I/O Unit as Binary Value	1—Use OptoScript to move value(s) to a table element using Table[index] syntax. Example: Int32table[0] = GetIoUnitAsBinaryValue(UIO);
Move Mixed I/O Unit To Table	Move I/O Unit to Numeric Table	1
Move Simple-64 I/O Unit To Table	Move I/O Unit to Numeric Table	1
Move Table Element To Digital I/O Unit	Set Digital I/O Unit From MOMO Masks	1

OptoControl Command	Comparable PAC Control Command(s)	Notes
Move Table To Analog I/O Unit	Move Numeric Table to I/O Unit	1—Does not convert if parameter is a pointer.
Move Table To Digital I/O Unit	Move Numeric Table to I/O Unit	1
Move Table To Simple-64 I/O Unit	Move Numeric Table to I/O Unit	1
Open Ethernet Session	Open Outgoing Communication	11
Read Byte From PC Memory (ISA Only)	n/a	3
Read Byte From PC Port (ISA Only)	n/a	3
Read Word From PC Memory (ISA Only)	n/a	3
Read Word From PC Port (ISA Only)	n/a	3
Receive Character Via Serial Port	"Receive Character" or "Receive N Characters"	11
Receive N Characters Via ARCNET	n/a	5
Receive N Characters Via Ethernet	"Receive Character" or "Receive N Characters"	11
Receive N Characters Via Serial Port	"Receive Character" or "Receive N Characters"	11
Receive String Via ARCNET	n/a	5
Receive String Via Ethernet	"Receive String" or "Receive String Table"	11
Receive String Via Serial Port	"Receive String" or "Receive String Table"	11
Receive Table Via ARCNET	n/a	5
Receive Table Via Ethernet	"Receive Numeric Table"	11
Receive Table Via Serial Port	"Receive Numeric Table"	11
Reset Controller	Write Number to I/O Unit Memory Map	This can be done by writing the value 5 to the address 0xF038000 in the controller's memory map. See Opto 22 form 1465 for more information on the memory map.
Set ARCNET Destination Address On Port	n/a	5
Set ARCNET Host Destination Address	n/a	5
Set ARCNET Mode Raw	n/a	5
Set ARCNET Mode Standard	n/a	5
Set ARCNET Peer Destination Address	n/a	5
Set Day Of Week	n/a	The day of the week is automatically calculated based on the date.
Set End-of-message Terminator	Set End-Of-Message Terminator	11

OptoControl Command	Comparable PAC Control Command(s)	Notes
Set I/O Unit Configured Flag	n/a	In PAC Control, I/O units are automatically configured when an I/O unit becomes enabled.
Set Mixed I/O Unit From MOMO Masks	Set Mixed I/O Unit from MOMO Masks	1
Set Number Of Retries To All I/O Units	n/a	Retries are set on an I/O unit when the I/O unit is configured.
Set PC Byte Swap Mode (ISA Only)	n/a	3
Set Priority	n/a	6
Set Priority Of Host Task	n/a	6
Set Simple-64 I/O Unit From MOMO Masks	Set Simple-64 I/O Unit From MOMO Masks	1
Start Continuous Square Wave	Start Continuous Square Wave	1—On Ethernet-based units, new square waves take effect as soon as a Start Continuous Square Wave instruction is sent.
Start Default Host Task	n/a	9
Start Host Task (Ascii)	n/a	9
Start Host Task (Binary)	n/a	9
Start Quadrature Counter	Start Counter	1
Stop Host Task	n/a	9
Stop Quadrature Counter	Stop Counter	1
Suspend Default Host Task	n/a	9
Transmit Character Via Serial Port	Transmit Character	11
Transmit Newline Via Serial Port	Transmit Newline	11
Transmit String Via ARCNET	n/a	5
Transmit String Via Ethernet	Transmit String	11
Transmit String Via Serial Port	Transmit String	11
Transmit Table Via ARCNET	n/a	5
Transmit Table Via Ethernet	Transmit Numeric Table	11
Transmit Table Via Serial Port	Transmit Numeric Table	11
Transmit/receive Mistic I/O Hex String With Checksum	n/a	Checksum is not correctly supported.
Transmit/receive Mistic I/O Hex String With CRC	Transmit/Receive Mistic I/O Hex String	1—See the <i>PAC Control Command Reference, Legacy Edition</i> (form 1711) for additional options for this command.

OptoControl Command	Comparable PAC Control Command(s)	Notes
Transmit/receive Optomux String	Transmit/Receive String	<b>1</b> —The “Transmit/Receive String” command may be used to send a serial Optomux (or other protocol) string using a serial communication handle. B3000 brain users may consider reconfiguring their brain’s jumpers for <i>mistic</i> mode. B1 and B2 brain board users should consider upgrading to an E1 or E2 Ethernet-capable brain board.
Transmit/receive String Via ARCNET	n/a	<b>5</b>
Transmit/receive String Via Ethernet	Transmit/Receive String	<b>11</b>
Transmit/receive String Via Serial Port	Transmit/Receive String	<b>11</b>
Turn Off RTS	n/a	<b>10</b>
Turn Off RTS After Next Character	n/a	<b>10</b>
Turn On RTS	n/a	<b>10</b>
Write Byte To PC Memory (ISA Only)	n/a	<b>3</b>
Write Byte To PC Port (ISA Only)	n/a	<b>3</b>
Write Word To PC Memory (ISA Only)	n/a	<b>3</b>
Write Word To PC Port (ISA Only)	n/a	<b>3</b>

### Notes for OptoControl and PAC Control Commands

1. The OptoControl command is directly converted to a comparable PAC Control command except as noted.
2. *mistic* interrupts are supported in PAC Control Professional version 8.2 and higher. However, this command is not supported.
3. Legacy Opto 22 ISA controllers are not supported in PAC Control. Consider moving your control logic to SNAP PAC standalone and rack-mounted controllers.
4. Error handling commands are different and more extensive in PAC Control.

**IMPORTANT:** *Keep in mind that the status and error codes that are returned by many PAC Control commands and that appear in the message queue often differ from the comparable command in OptoControl. Error handling charts and code may need to be modified accordingly.*

If you are currently checking for errors by error number, Opto 22 recommends that you check instead for 0 (success) versus non-0 (error).

To search for places in your strategy that check for an exact match, try searching for the “Equal?” condition.

- a. In Configure Mode, choose Edit→Find.  
The Find dialog box appears.

- b.** Under Search Scope, select Global.
- c.** Under Search For, select the Instruction and Condition radio button.
- d.** Under Instruction, select Equal?

Check each occurrence for any references to specific error codes that may have changed between OptoControl and PAC Control.

- 5.** ARCNET is not supported by PAC Project software. B3000-HA brains may be replaced by B3000 (serial) brains or one of several SNAP Ethernet brains without having to change the rack, modules, and field wiring. SNAP PAC SB (serial) and EB (Ethernet) brains can also be used as replacements; they use the same modules but require a different rack or a rack adapter.
- 6.** "Priority" commands are not supported in PAC Control. You can make PAC Project charts more efficient by careful use of subroutines and "Delay" commands. For more information on this, see the *PAC Control User's Guide, Legacy Edition* (form 1710).
- 7.** M4RTU and M4IO controllers had special maintenance commands which do not apply to PAC Project controllers.
- 8.** To simultaneously read multiple values from a brain, or other values not directly supported by built-in PAC Control commands, you can construct your own low-level protocol commands to send directly to the I/O unit. This method is more difficult and error-prone than using built-in PAC Control commands for accessing I/O, but may be useful in certain cases such as speed-sensitive applications.

For example, you can construct a *mistic* command to read multiple latches (command 'S'), or to get analog lower/upper clamp values (command 'r'). *mistic* commands constructed manually within a strategy can be sent using the PAC Control command "Transmit/Receive Mystic I/O Hex String." For more information, see the *Mistic Protocol User's Guide* (Opto 22 form 270). For Ethernet-based brains, multiple addresses in the memory map can be read at once using the PAC Control commands in the "I/O Unit – Memory Map" group (for example, "Read Numeric Table from I/O Unit Memory Map"). See the *OptoMMP Protocol Guide* (Opto 22 form 1465) for information about the memory map.

You can also read or set multiple values conveniently in PAC Control by looping through similarly named and sequential variables. This is done by using pointers and the command "Get Pointer From Name." For example, to use a "for loop," create the point names (for example: "Point0", "Point1", "Point2," etc.) and then use the command "Get Pointer From Name" to update a pointer which you can then use to get/set latches for that point in the loop.

- 9.** PAC Control does not support manually manipulating the host task(s). Ethernet is used for host communications, supporting up to 31 sessions on the host port for SNAP PAC S-series controllers. Visit the Opto 22 website ([www.opto22.com](http://www.opto22.com)) or contact Opto 22 Product Support for current information about this feature.

10. RS-232 handshaking using Communication Handles is not supported in PAC Control. Visit the Opto 22 website ([www.opto22.com](http://www.opto22.com)) or contact Opto 22 Product Support for current information about this feature.
11. Rather than referencing ports by number, data can now be transmitted and received using variables called Communication Handles. More generic open, close, transmit, receive, and other commands can be used with a variety of Communication Handle types, including TCP, serial, local files, and FTP. For more information, see Chapter 10, "Communication Commands," in the *PAC Control User's Guide, Legacy Edition* (Opto 22 form 1710).

## Converting OptoDisplay Projects to PAC Display Pro

An OptoDisplay project is converted into PAC Display using a separate conversion utility.

*NOTE: Remember that PAC Display Professional can access a FactoryFloor controller running an OptoControl strategy. Specifically, if a SNAP-LCM4 controller using an M4SENET-100 Ethernet adapter card is running an OptoControl strategy, a PAC Display project running on a PC can connect to that controller. However, throughput will be slower than it was using OptoDisplay to communicate to the OptoControl controller.*

### 1—Preparing the Project

1. **If you have not already done so, back up the current, functioning OptoDisplay project to one or more separate locations.**
2. Confirm that the OptoDisplay project is saved in OptoDisplay R4.1. If you have an older version of OptoDisplay, contact Opto 22 Product Support.
3. Confirm that the FactoryFloor controllers used by the OptoDisplay project are configured on the PC used for converting to PAC Display.

### 2—Converting the Project

1. From the Start menu, select Opto 22→PAC Project→Tools→OptoDisplay Converter.  
You can also select File→Convert OptoDisplay Project in PAC Display Configurator Pro when no project is loaded.
2. From the File menu of the OptoDisplay Converter, select Open.
3. In the dialog box, navigate to the location of the OptoDisplay project to be converted.
4. Select the OptoDisplay project (the .MMI file) and click Open.  
The OptoDisplay project is converted. If any errors occur, a warning will be displayed.
5. In the dialog box, navigate to the folder where you want to save the new PAC Display project and then click OK.

### 3—Followup

After converting the OptoDisplay project to PAC Display, open and save the converted file, and then update the list of controllers which the project references.

1. Open PAC Display Configurator.

*IMPORTANT: Do not try to open the converted project in PAC Display Runtime.*

2. Select File→Open. In the Open File dialog box, navigate to the location where the converted file was saved.
3. Select the file and click OK.
4. If the project's windows do not appear in PAC Display Configurator, go to Windows→Open, select the windows you want to open, and then click OK.
5. Select Configure→Control Engine(s).
6. If the project uses multiple controllers, note the order of the FactoryFloor controllers listed in the Control Engines dialog box.

You will need to replace these controllers with PAC Project controllers in the same order.

7. Select each controller in the list and click Delete.
8. Now click Add and select the PAC Project controller(s) to be used.

Note that you will need to locate the strategy running on the PAC Project controller; this is described in "Chapter 5, Configuring Control Engines and Tags" in the *PAC Display User's Guide, Legacy Edition* (form 1712).

If the project uses multiple controllers, **each controller must be added in the original order** you noted in [step 6](#).

9. Click OK to close the Control Engines dialog box.
10. Select File→Save to save the converted project.
11. Choose Tools→Autocorrect Tags.
12. Choose Tools→Regenerate IO Scanner Tag Names.