User Manual

PlantPAx
Distributed Control System

PlantPAx Distributed Control System

Application Configuration

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

	**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
	**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.
	**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Chapter 4

Configure Alarms

Chapter 5

Configure Historian

Chapter 6

Configure I/O Modules

Chapter 7

Assign I/O and Diagnostics

Chapter 8

Configure Asset Management Tools

Chapter 9

Add Basic System Diagnostics

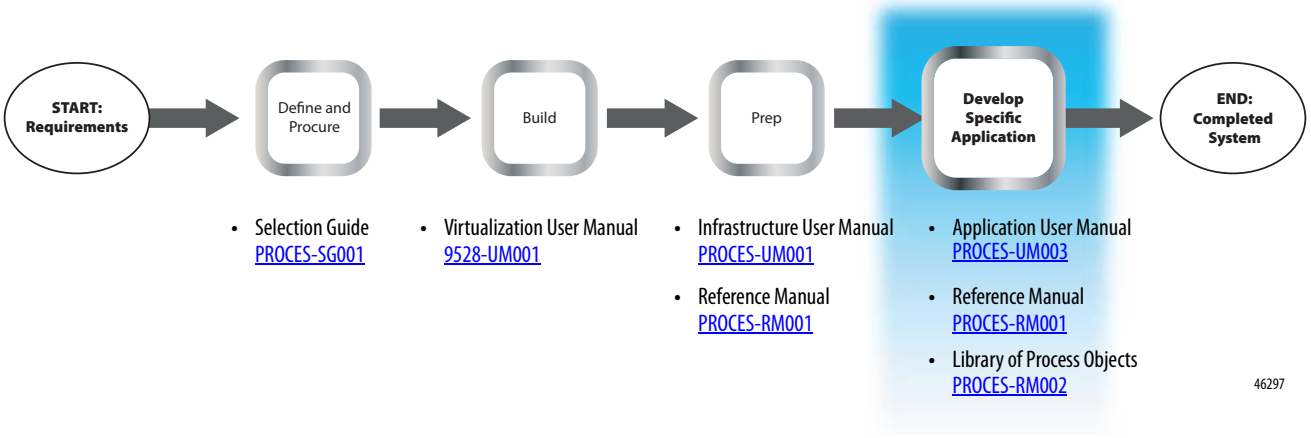
Index

Notes:

The PlantPAx® system provides a modern approach to distributed control using common technology (integrated architecture) shared with all other automation disciplines within the plant. This approach creates a seamless information flow across the plant to create optimization opportunities and enables a connected enterprise.

Our scalable platform provides you with the flexibility to implement a system appropriate for your application. Figure 1 shows the documents (this manual in the highlighted section) that are available to help design and implement your system requirements.

Figure 1 - PlantPAx System Implementation and Documentation Strategy



- **Define and Procure** – Helps you understand the elements of the PlantPAx system to make sure that you buy the proper components.
- **Build–** Provides direction on how to implement the PlantPAx system architecture to help develop your application.
- **Prep–** Provides guidance on how to get started and learn the best practices to develop your application.
- **Develop Specific Application** – Describes the actions and libraries necessary to construct your application that resides on the PlantPAx system.

Purpose of the User Manual

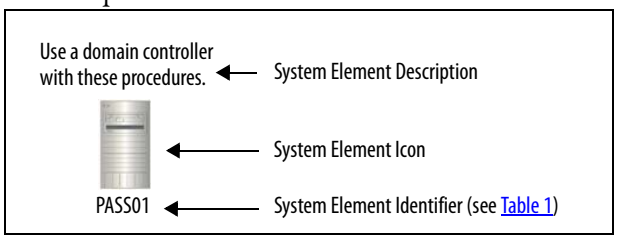
This document describes the steps necessary to start development of your PlantPAx DCS. We suggest that you perform the tasks in the order that is outlined in each chapter. However, each task has standalone screen facsimiles and step-by-step procedures to let you skip to other chapters if necessary.

Each chapter has a flowchart that summaries the topics, similar to a mini Table of Contents.

See page 8 for manual conventions.

Manual Conventions

For instructional purposes, this manual uses visual tools to complement the procedures. Icons that represent system elements are shown at the start of a section to help identify the system element that is being configured. The abbreviation for the element is listed with the icon for identification as shown in the example.



See Table 1 for descriptions and abbreviations of the system element icons.

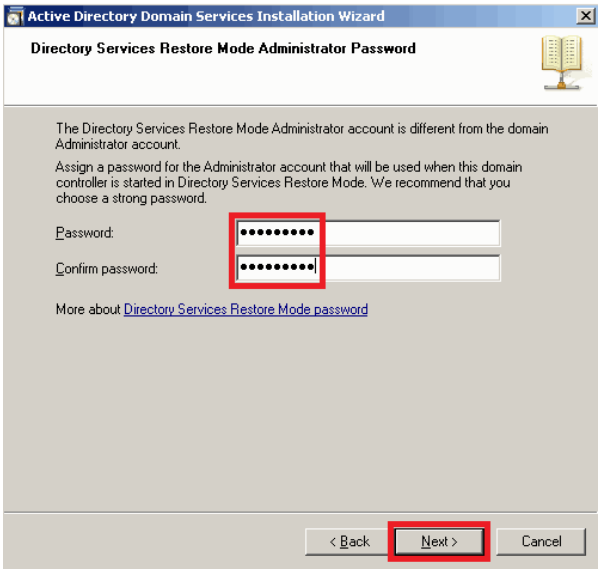
Table 1 - Visual Naming Conventions

Icon	Description	Abbreviation Element Names	Topic Page
	Logix controllers	• LGXC01 - Controller • LGXC02 - Controller	20,23, 26, 39, 43, 47, 50, 79, 119, 123, 150, 155, 158, 211, 211
	PlantPAx workstations	• OWS01(1) - Operator workstation • EWS01(1) - Engineering workstation	45, 65, 183, 211, 212
	PlantPAx Application servers	• ASIS01 - AppServ-Info SQL server • ASIH01 - AppServ-Info Historian server • ASIV01 - AppServ-Info VantagePoint server • ASAM01 - AppServ-Asset Management server • ASBM01 - AppServ-Batch server • ASEWS01 - AppServ-Engineering Workstation server • ASOWS01 - AppServ-Operator Workstation server	55, 59, 95, 183, 198, 199202, 205
	PASS (Process Automation System Server)	• PASS01 - FactoryTalk® Directory • PASS02A- Primary HMI server • PASS02B - Secondary HMI server	59, 209, 216

(1) EWS and OWS are used throughout the manual but the same procedures apply for AppServ-EWS and AppServ-OWS.

Action Identifier

Dialog boxes have red boxes to identify areas that require some type of user action, such as to type text or click 'Next'.

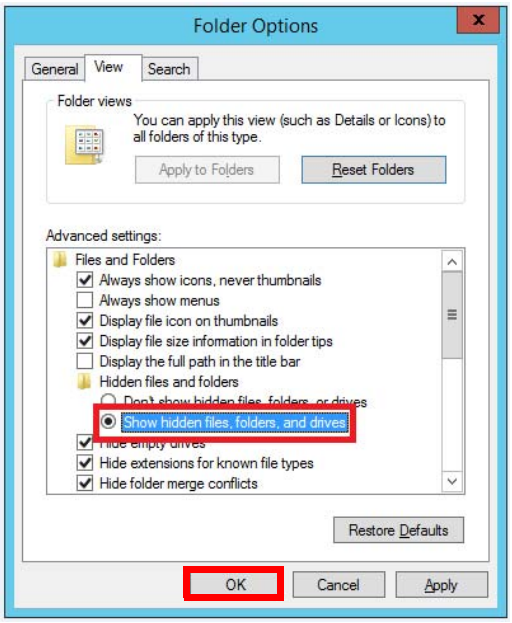


Configure Programs Menu

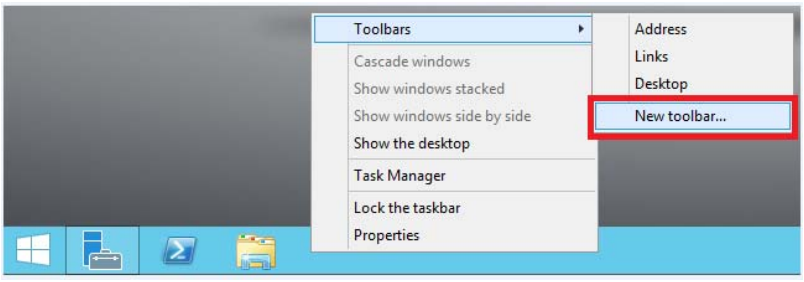
We strongly suggest that you perform the following procedure in the system computers to group folders under 'Programs' on the taskbar. When complete, you access Windows and software folders by clicking the Programs symbol.

1. Click the Windows symbol.
2. Click Control Panel and choose Folder Options.

   The Folder Options dialog box appears.

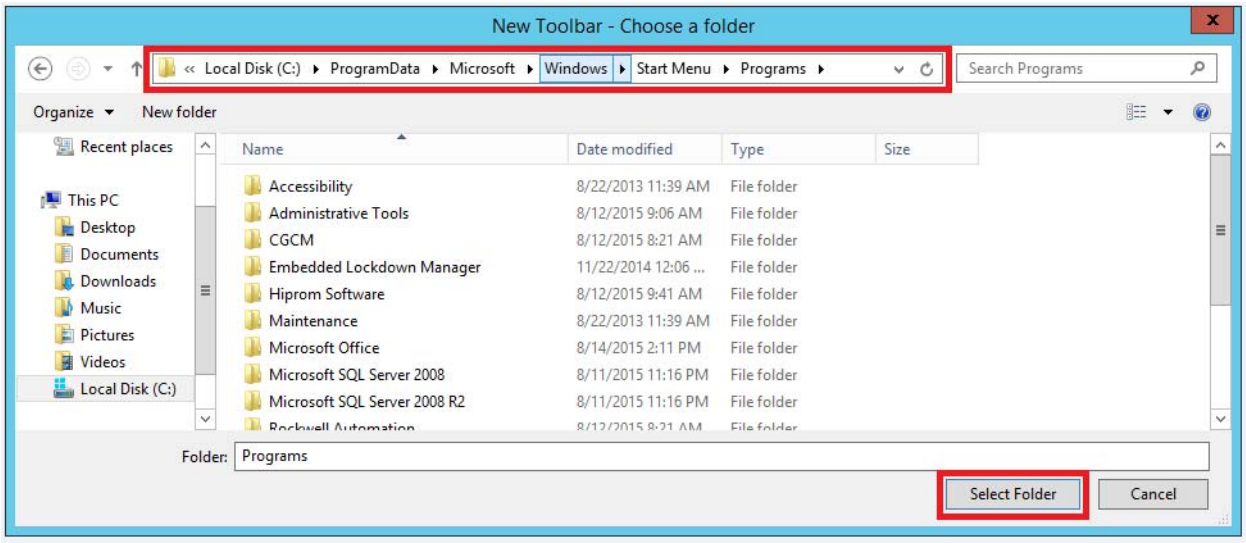


3. On the View Tab, select 'Show hidden files, folders, and drives' and click OK.
4. Right-click in the taskbar, click Toolbars, and choose New Toolbar.



5. On the New Toolbar window, designate a path for your Programs folder.

   For example:
   C:\ProgramData\Microsoft\Windows\StartMenu\Programs.



6. Click Select Folder.

Additional Resources

These documents contain additional information that concern related products from Rockwell Automation.

Resource	Description
PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001	Describes procedures for how to configure system components that comprise a PlantPAx modern DCS.
PlantPAx Distributed Control System Selection Guide, publication PROCES-SG001	Provides basic definitions of system elements and sizing guidelines for procuring a PlantPAx system.
PlantPAx Distributed Control System Reference Manual, publication PROCES-RM001	Provides characterized recommendations for implementing your PlantPAx system.
Rockwell Automation Library of Process Objects Reference Manual, publication PROCES-RM002	Provides an overview of the code objects, display elements, and faceplates that comprise the Rockwell Automation Library of Process Objects.
Rockwell Automation Library of Logix Diagnostic Objects Reference Manual, publication PROCES-RM003	Provides information on Add-On Instructions that monitor Logix controllers to diagnose issues that include memory usage, communication, and control.
ControlLogix® HART Analog I/O Modules User Manual, publication 1756-UM533	Describes how to install, configure, and troubleshoot ControlLogix HART analog I/O modules.
ControlLogix Digital I/O Modules User Manual, publication 1756-UM058	Describes how to install, configure, and troubleshoot your ControlLogix digital I/O modules.
ControlLogix Low-speed Counter Module User Manual, publication 1756-UM536	Describes how to install, configure, and use the counter module for counting incoming pulses.
Logix5000™ Produced and Consumed Tags Programming Manual, publication 1756-PM011	Details how to produce and consume system-shared tags by using a Logix5000 controller.
PowerFlex® 750-series AC Drives Programming Manual, publication 750-PM001	Describes how to install, start-up, and troubleshoot adjustable frequency AC drives.
PowerFlex 520-series Adjustable Frequency AC Drive User Manual, publication 520-UM001	Describes how to install, start-up, and troubleshoot the adjustable frequency AC drive.
SMC™-50 solid-state Smart Motor Controller User Manual, publication 150-UM011	Describes how to install, operate, and troubleshoot the reduced voltage soft starter.
Bulletin 193/592 E300™ Electronic Overload Relay User Manual, publication 193-UM015	Describes the operation of overload protection.
Redundant I/O System User Manual, publication 1715-UM001	Explains how to install and set up the 1715 Redundant I/O system.
EtherNet/IP and ControlNet to FOUNDATION Fieldbus Linking Device User Manual, publication 1788-UM057	Describes the installation and operation of the 1788-EN2FFR and 1788-CN2FFR linking devices.
EtherNet/IP and ControlNet to PROFIBUS PA Linking Device User Manual, publication 1788-UM058	Describes the installation and operation of the 1788-EN2PAR and 1788-CN2PAR linking devices.
Stratix™ Managed Switches User Manual, publication 1783-UM007	Describes the embedded software features and tools for configuring and managing Stratix managed switches.
Product Compatibility and Download Center at http://www.rocZkwellautomation.com/rockwellautomation/support/pcdc.page	Website helps you find product-related downloads including firmware, release notes, associated software, drivers, tools, and utilities.
Rockwell Automation Sample Code website at http://samplecode.rockwellautomation.com	Accesses a Rockwell Automation web page to search for sample code.

You can view or download publications at http:/www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Configure Controllers and Process Strategies

Overview

A traditional distributed control system (DCS) is built from purpose-built, proprietary hardware, and software that are optimized for process control. However, a traditional DCS is difficult to integrate with other necessary automation and business systems in the plant.

The PlantPAx® system leverages a more modern approach by using scalable, multi-disciplined control technology to provide a common automation platform for seamless integration within a plant. This modern DCS approach provides improved workforce productivity, reduced total cost of ownership, and enables new opportunities for optimization to improve yields and reduce costs.

The performance and functionality of the PlantPAx system is dependent upon following the sizing guidelines and application rules to create a system that is optimized for process control. System performance rules and guidelines are developed through a process called characterization. Characterization is the activity of measuring system performance against key operational criteria called critical system attributes (CSA). CSAs provide specific recommendations regarding application sizing and system performance.

Follow the instructions in this manual to build your control system with the highest level of functionality as prescribed by the PlantPAx System Reference Manual and characterization. For example, the procedures in this chapter describe the Studio 5000 Architect™ application that helps reduce the engineering time to assemble your integrated architecture and process application. A canvas area within the Architect application lets you configure system elements by using FactoryTalk® View software and the Studio 5000 Logix Designer® application.

This chapter also explains how to add process strategies to controllers. The strategies, which are labeled 'PS_' (process strategies) in a PlantPAx application, are pre-connected objects for control of process devices. The objects are incorporated from the Rockwell Automation® Library of Process Objects.

Considerations

Consider the following suggestions before starting this chapter:

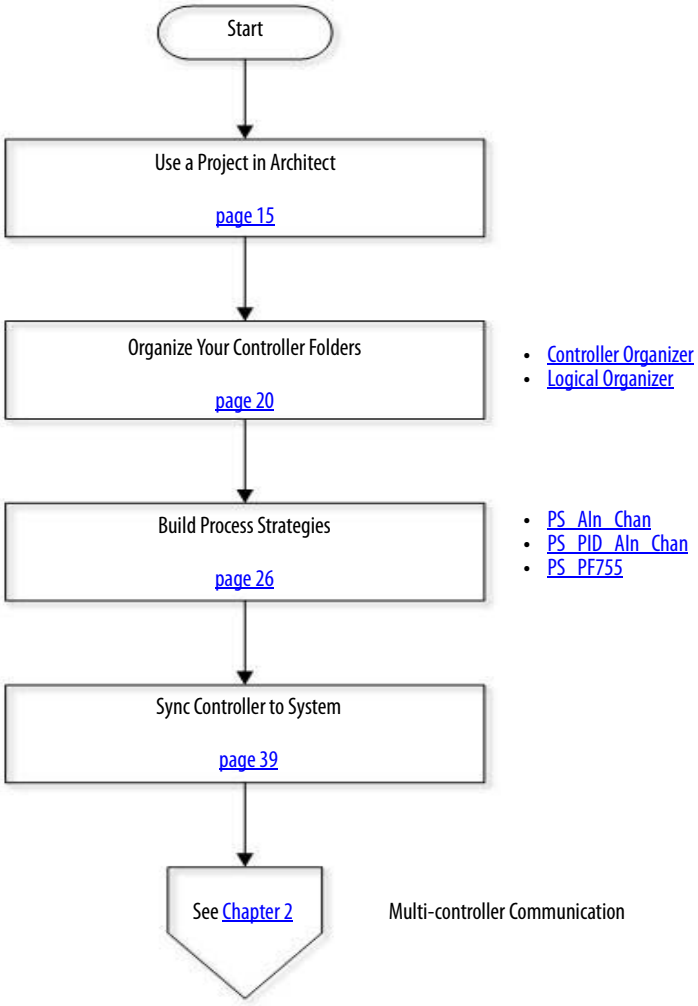
- The Architect application must be installed on an Engineering workstation.
- Check for the latest version of the Process Library in the Product Compatibility and Download Center (PCDC) before initiating an Architect project.

  TIP You can access the PCDC from the Architect application. See page 16 for details.

- We recommend that you perform all I/O configuration inside the Logix Designer application.

Figure 2 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 2 - Studio 5000 Architect Workflow



Use a Project in Architect

Use an Engineering Workstation with these procedures.

EWS

This section describes how to use the software tools within the Architect application to add and modify elements to an existing project. FactoryTalk View software and the Studio 5000 Logix Designer application are available in the Architect application.

IMPORTANT Procedures in this chapter assume that you have completed the following:

- Selected a template
- Created a controller name
- Synchronized the project

For procedures on the bulleted items, see Chapter 6 in the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

For a description of the Architect palette, complete these steps.

1. To open the Studio 5000 Architect application, click the Programs symbol and choose Rockwell Software>Studio 5000.

   The Studio 5000® Common Launcher appears.

2. Open a PlantPAx project.

   To create a project, see the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

Wait a few minutes while the ACD files and project data load.

The Architect canvas appears with a wire diagram of the application hardware for your project.

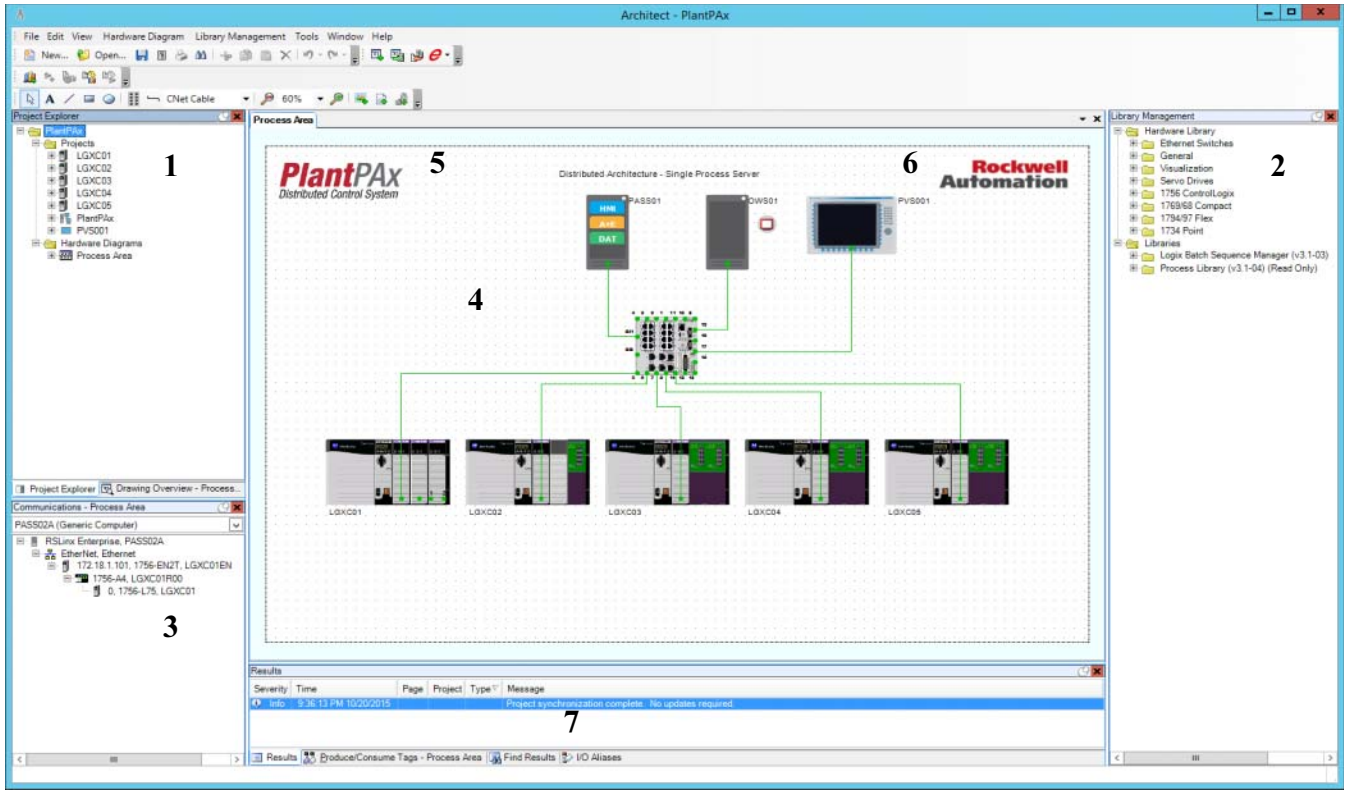


Table 2 - Studio 5000 Architect Palette Example

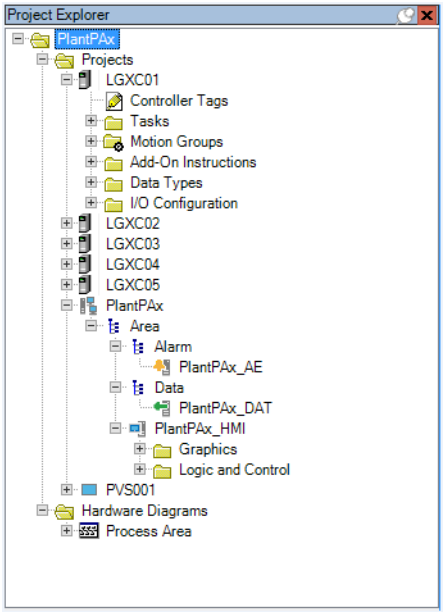
Name	Graphic Example	Description
1 - Project Explorer		In the upper, left corner, the Project Explorer lists the Logix Designer and FactoryTalk View projects that comprise the Studio 5000 Architect Application. **IMPORTANT:** When you are in the Project Explorer, you are using the Architect application. You must open a project in the Explorer to access the Studio 5000 Logix Designer application. To avoid confusion, the words 'Architect' and 'Logix Designer' are in the respective ribbon headers. The system template that you select contains a number of controller and FactoryTalk View projects. Typically, there are more projects (than shown in the graphic example) that are contained in the Project Explorer as your system develops over time. There is one FactoryTalk View software project titled 'PlantPAx'. The three projects that are contained in the template are View ME, View SE Distributed, and View SE Station Local. The Hardware Diagrams folder contains the components on the canvas that represent your PlantPAx system. See number 4 for more information on the canvas.

Table 2 - Studio 5000 Architect Palette Example

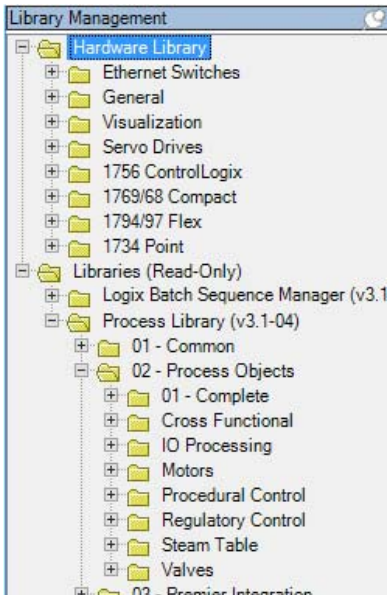
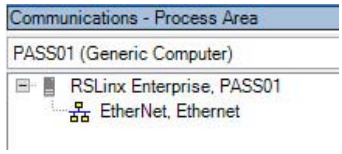
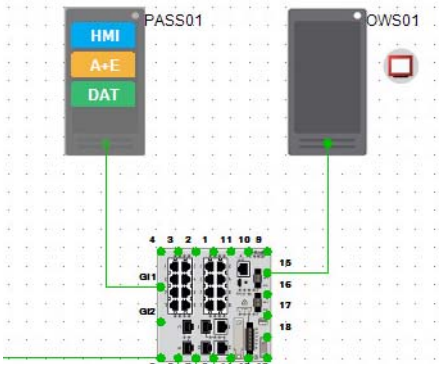
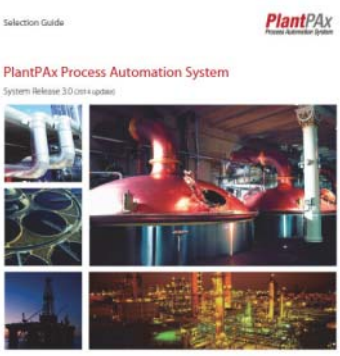
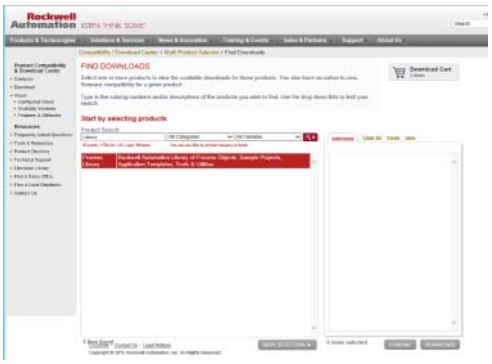
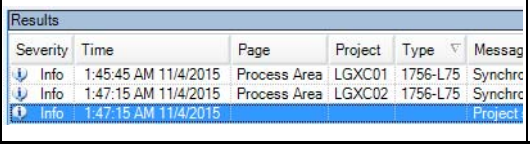
Name	Graphic Example	Description
2 - Library Management		In the upper, right corner, you can view hardware (switches, controllers, associated I/O modules, and so forth) in the project. There are two libraries that are listed as 'Read Only' to denote they cannot be modified or managed within Architect. User-defined libraries are supported in Architect. You must download the Rockwell Automation Library of Process Objects from the Product Compatibility and Download Center (PCDC). See 6 - PCDC.
3 - Communication		In the lower, left corner, the Communications pod shows the communication path from the PASS01 computer to the five controllers. These paths are pre-defined shortcuts by using the Single Process Server template.
4 - Canvas		In the middle section, the canvas shows a graphical representation of the system elements that comprise the application. You can drag-and-drop elements to modify a project. The canvas also provides access to the PlantPAx System Selection Guide and the Product Compatibility and Download Center (PCDC). See 5 - Selection Guide and 6 - PCDC table descriptions.
5 - Selection Guide		In the upper, left corner of the canvas, click the PlantPAx logo. Adobe Reader opens with the license terms. Click Accept to access the Selection Guide for system procurement guidelines.

Table 2 - Studio 5000 Architect Palette Example

Name	Graphic Example	Description
6 - PCDC		In the upper, right corner of the canvas, click the Rockwell Automation logo. The Library filter appears to let you download the Process Library from the Product Compatibility and Download (PCDC) website. The PCDC web site provides access to the latest software and hardware updates. For procedures on how to use the PCDC, see Chapter 4 in the PlantPAx System Infrastructure Configuration User Manual, publication PROCES-UM001. See Download Process Strategies for how to access the .exe file from the Process Library download.
7 - Messages		At the bottom of the canvas, the Messages area provides alerts, if any, for the project.

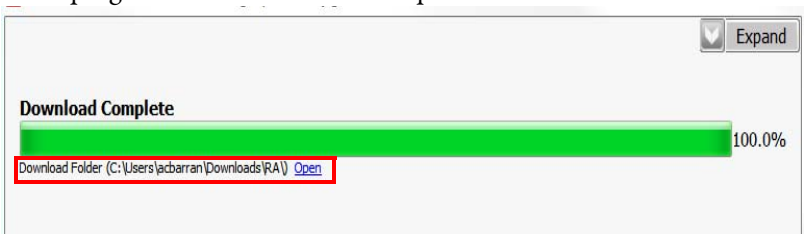
Download Process Strategies

To use Process Strategies in your project, you must download the Process Library Version 3.5 or later from the PCDC web site. The Process Strategies.exe file is in the Files folder of the Process Library download.

Complete these steps.

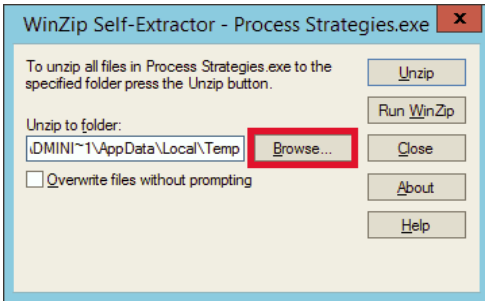
1. See 6 - PCDC in Table 2 to access the web page.
   The Process Library appears in a list.
2. Click Process Library to select a version from the Selections tab.
3. Click Downloads to select the desired version.
4. Click the Show Downloads  icon.
5. In the Downloads list, click RA Library of Process Objects.
6. Click the Download Cart and then click Download Now.
   You need a user name and password to download files.
7. Read the software license agreement and click Accept.
8. Click Managed Download.
9. Click Run.
   The Download Manager opens.

A progress bar shows the installer path to the download folder.

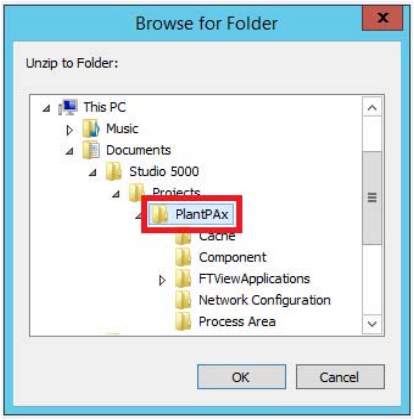


10. Click Open underneath the progress bar (next to the download folder path).
11. Extract the Process Library zip files to the working directory.
12. Double-click the Files folder.
13. Double-click the Process Strategies folder.
14. Double-click the Process Strategies.exe file.

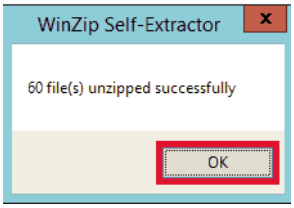
    A WinZip dialog box appears to unzip the Process Strategies.exe file.



15. Click Browse (ellipsis '...') to find the Process Strategies folder with the process strategies for this project within the Architect application.



16. Click OK to choose the folder and then click Unzip.



17. Click OK.

Organize Your Controller Folders

IMPORTANT Before setting up system folders, we recommend that you review the controller guidelines in the PlantPAx Reference Manual, publication PROCES-RM001.

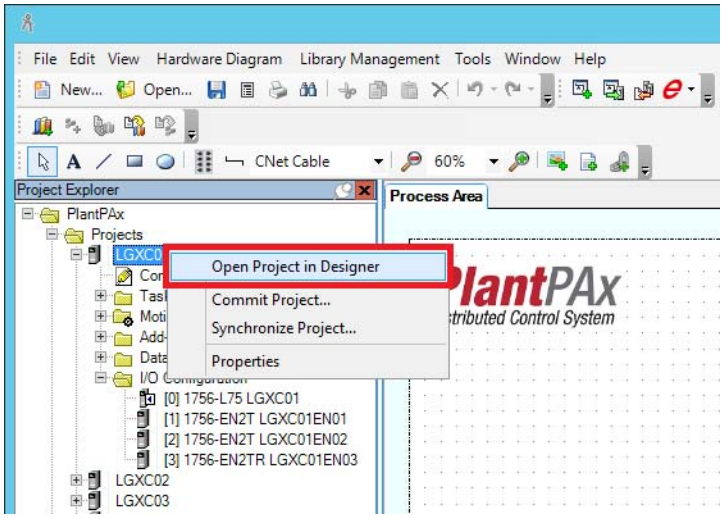
This section shows how to configure your controller folders by using the following tabs in the Logix Designer application:

- **Controller Organizer** — Lists the execution tasks and I/O configuration
- **Logical Organizer** — Sorts in terms of procedures, objects, functions, equipment, or some other natural term or concept for a 'logical' model of your application.

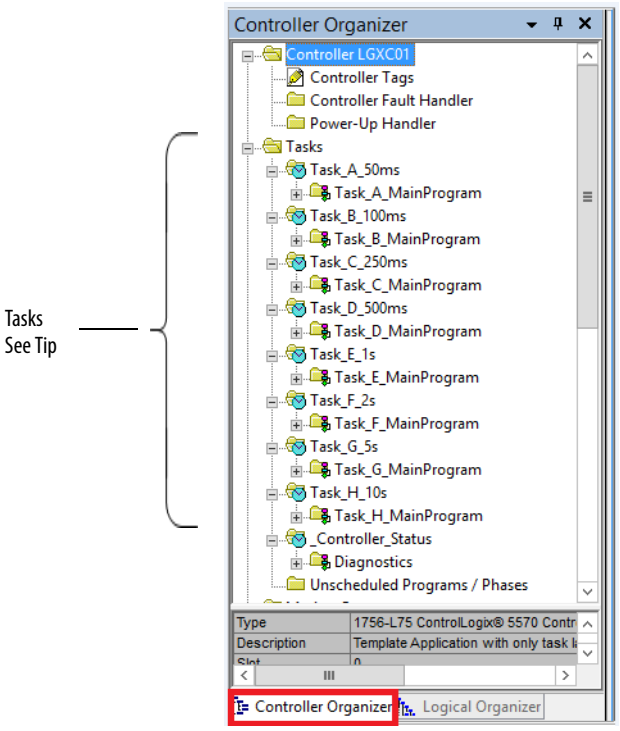
Controller Organizer

Complete these steps.

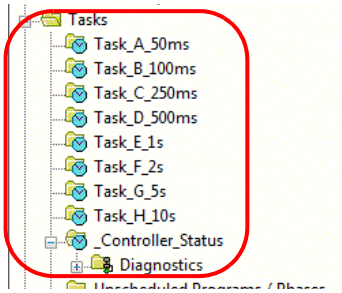
1. In Studio 5000 Architect, right-click a controller and choose Open Project in Designer.



The execution tasks appear in the Controller Organizer tab. Periodic tasks are executed at specific rates that are based on application requirements



TIP

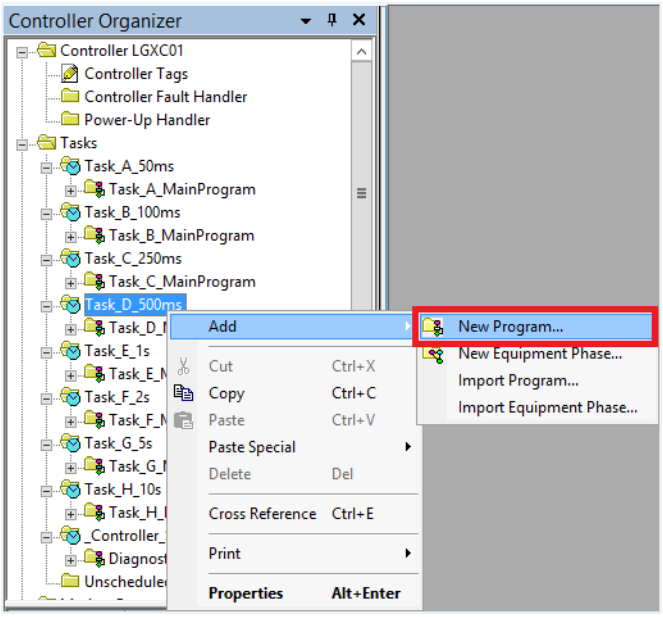


The controller template contains nine predefined periodic tasks, eight of these named Tasks A…H. There is a separate periodic task that is named Controller Status, which is used to collect system diagnostics. For example, the L_CPU Add-On Instruction monitors resources.

Each task is set to execute at a defined time interval from 50 ms…10 s, with faster tasks getting higher priority.

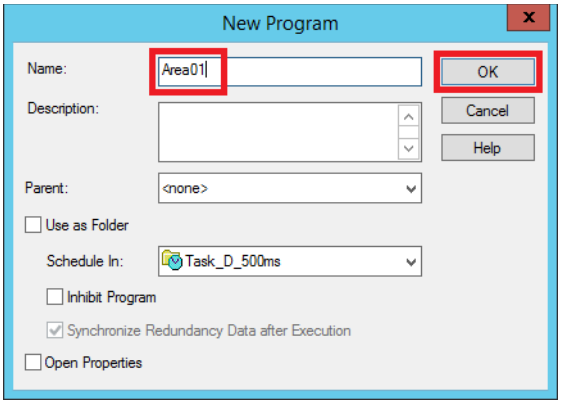
See the Task Configuration guidelines in the PlantPAx Reference Manual, publication PROCES-RM001.

2. To create a program, right-click a task and choose Add>New Program.



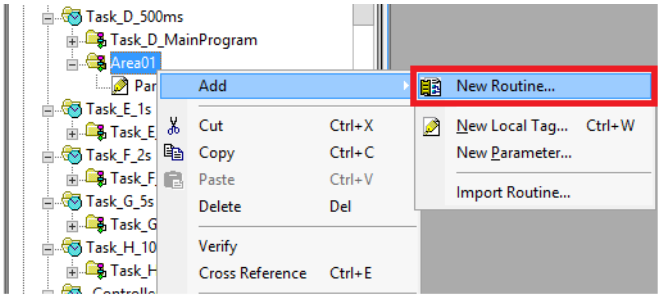
The New Program dialog box appears.

3. Type a program name (Area01 is the example) and click OK.



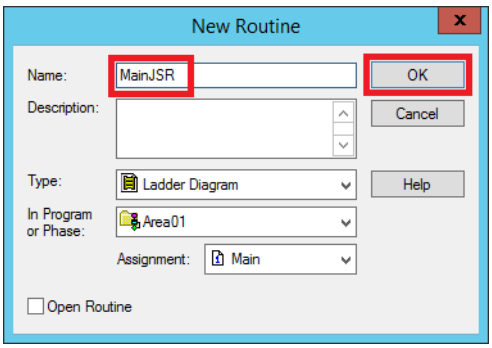
4. To create a routine within a program, right-click the name of the program that you created.

5. Click Add and choose New Routine.



A Jump to Subroutine (JSR) is going to be added to the program to execute a command. JSRs are explained later in this section.

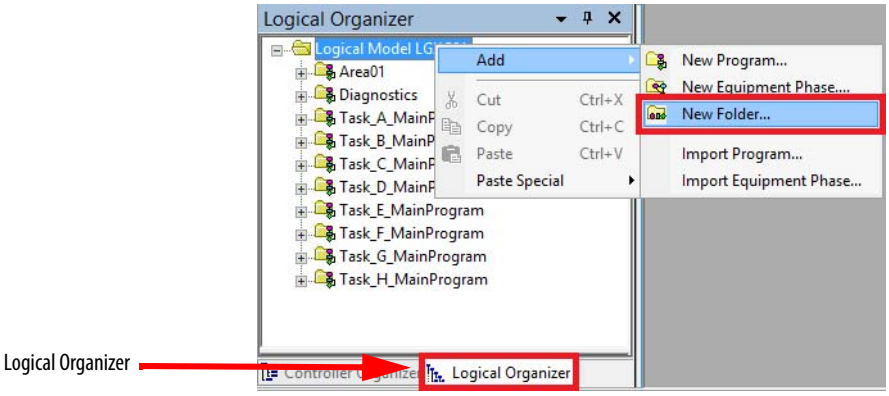
6. Type 'MainJSR' for the routine name and click OK.



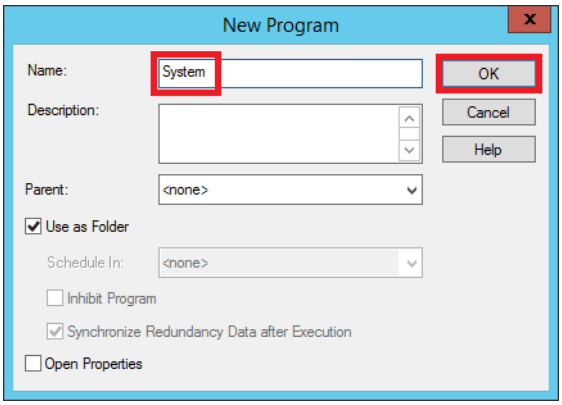
Logical Organizer

Complete these steps in the Logical Organizer to create an organizational model of our system.

1. From the controller that is being configured, click the Logical Organizer tab.
2. Right-click the controller and choose Add>New Folder.

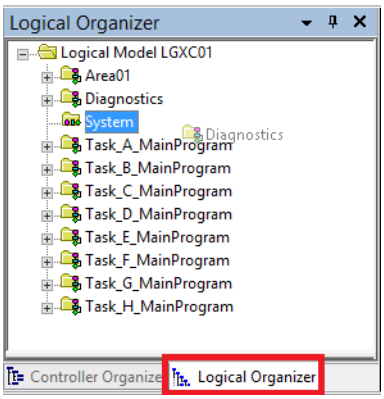


The New Program dialog box appears.



3. Type 'System' for the folder name and click OK.

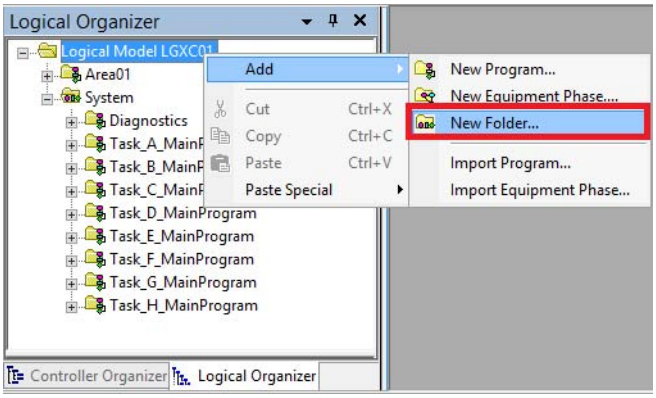
The folder appears in the Logical Model list for the controller.



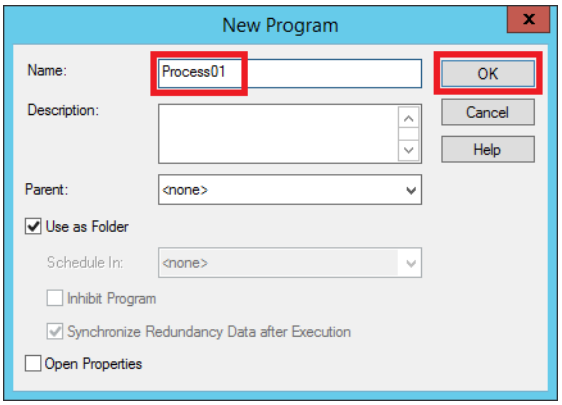
4. Drag-and-drop the Diagnostics folder and all Task programs into the 'System' folder.

TIP A Diagnostics task is included in all controller templates to provide for troubleshooting, reporting, and alarming of controller status and resources.

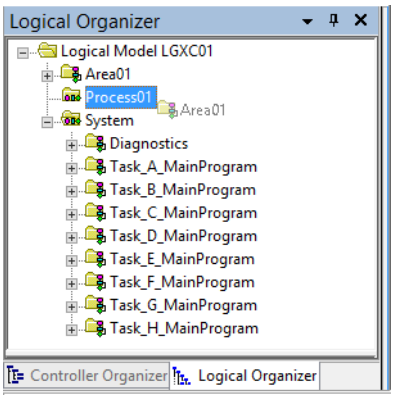
5. Right-click the controller and choose Add>New Folder.



6. Type a folder name and click OK.



7. Drag-and-drop the folder (Area01) into the program (Process01) folder.



The controller folders are ready to Build Process Strategies on page 26.

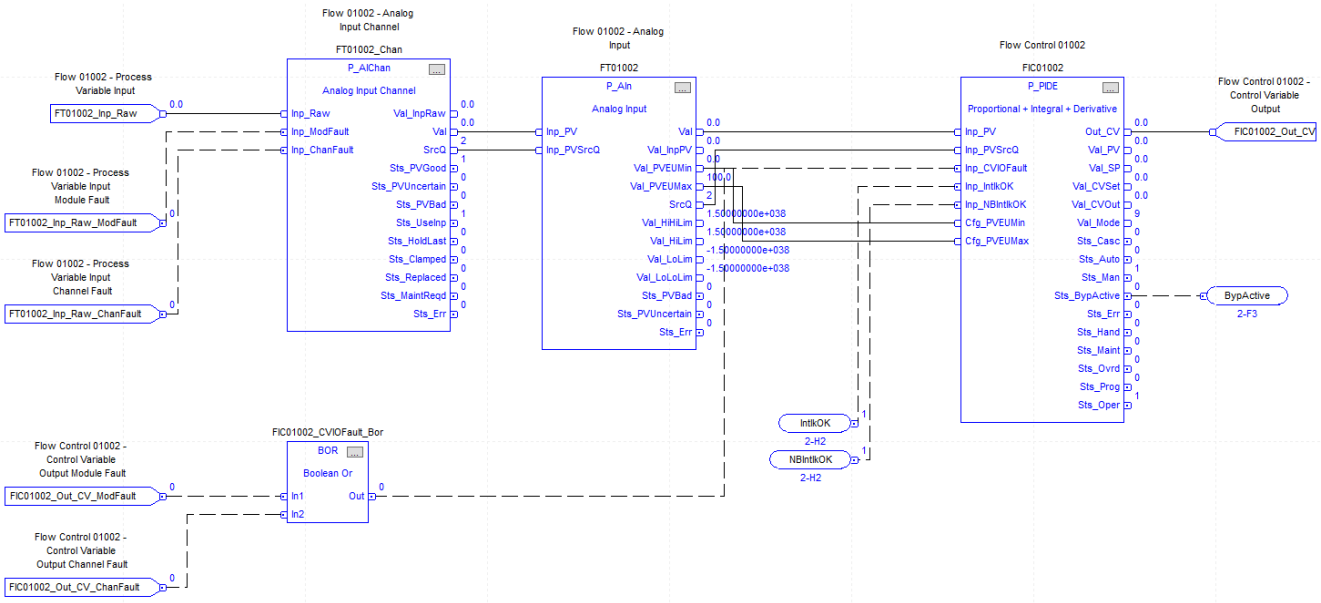
Build Process Strategies

This section describes how to add process strategies to controllers. The strategies, which are labeled 'PS_', contain pre-connected Process Library objects for control of process devices. Strategies are imported as Function Block routines or Ladder Logic rung imports to help reduce implementation time of your application.

IMPORTANT To complete the procedures in the section, you must have unzipped the process strategies folder within the Process Library download. See page 18.

The procedures are written as if they are being performed online. However, if you are offline, the procedures can also be used because they are similar.

Figure 3 - Process Strategy Example Using the P_PIDE Object



The following procedures do not encompass all available process strategies. The examples that are shown are a cross-section of the Rockwell Automation Library of Process Objects that comprise the process strategies.

Program parameters are used for I/O connection. The Add-On Instruction tags are controller-scoped tags.

PS_AIn_Chan

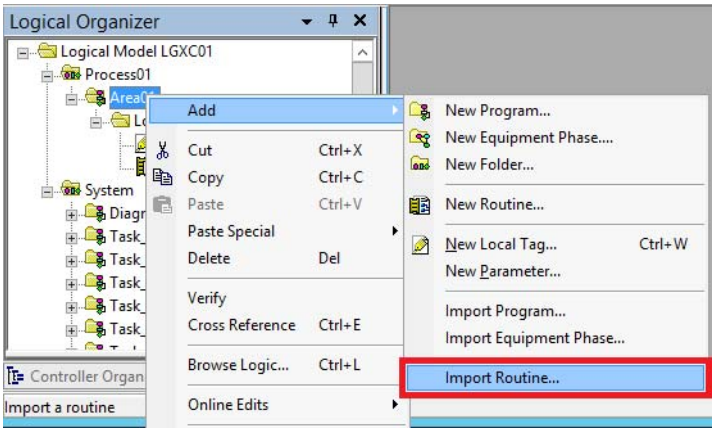
The PS_AIn_Chan strategy lets you monitor a basic analog object with channel capability.

1. From the Studio Architect application, right-click a controller that is being configured and select Open Project in Designer.

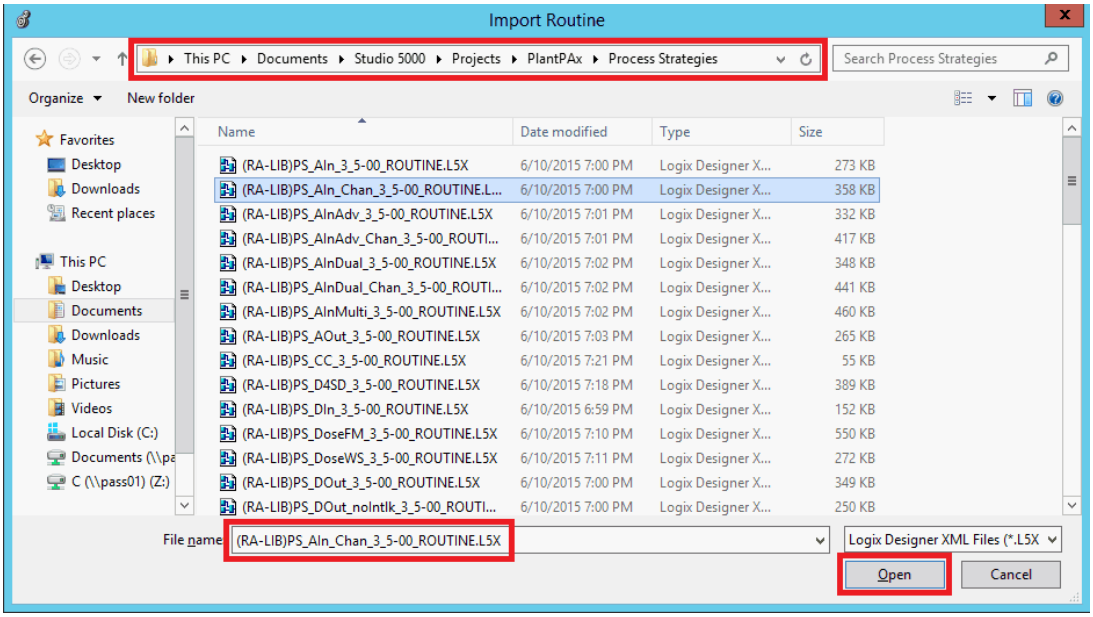
   The Logix Designer application opens within the Architect tool.

2. Click the Logical Organizer tab.

3. Right-click the program (Area01 is the example) and choose Add>Import Routine.



The Import Routine dialog box appears.



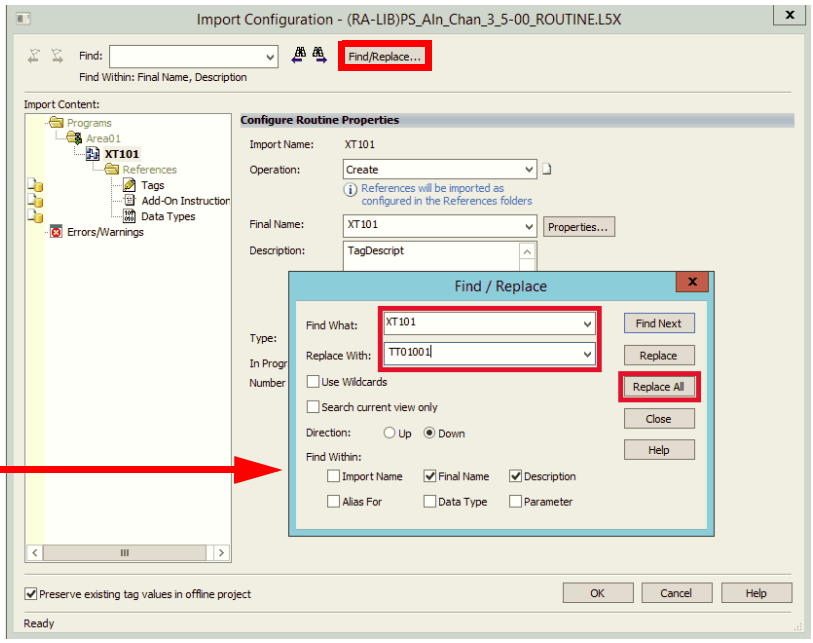
4. Browse the path to the Process Strategies folder and select the (RA-LIB)PS_AIn_Chan_3_5-00_ROUTINE.L5X.

TIP See page 19 for the path to the folder that you used to unzip the process strategies folder.

5. Click Open.

The Import Configuration dialog box appears.

Verify that the Final Name and Description boxes are checked.



6. Click the Find/Replace button to find all tag references of 'XT101' and replace with a user-designated tag name.

   Our example is 'TT01001'.

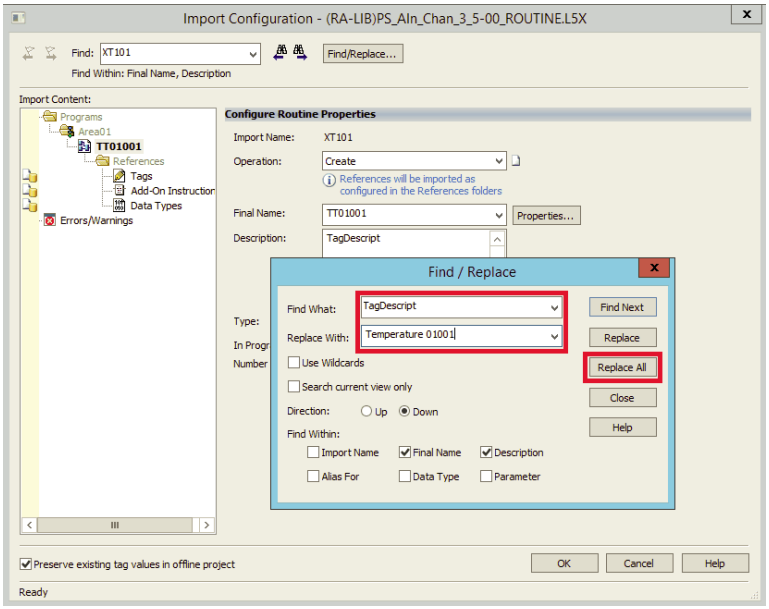
IMPORTANT	In the Find Within section at the bottom of the dialog box, the Final Name box defaults with a check mark only. The first time that you use this dialog box, you must check the Description box. Thereafter, the Description box defaults with a check mark.

7. Click Replace All.

TIP	Click Close to exit Find/Replace **only** if you are done using the utility.

8. Repeat step 6 and step 7 to find all tag references to 'TagDescript' and replace with a description.

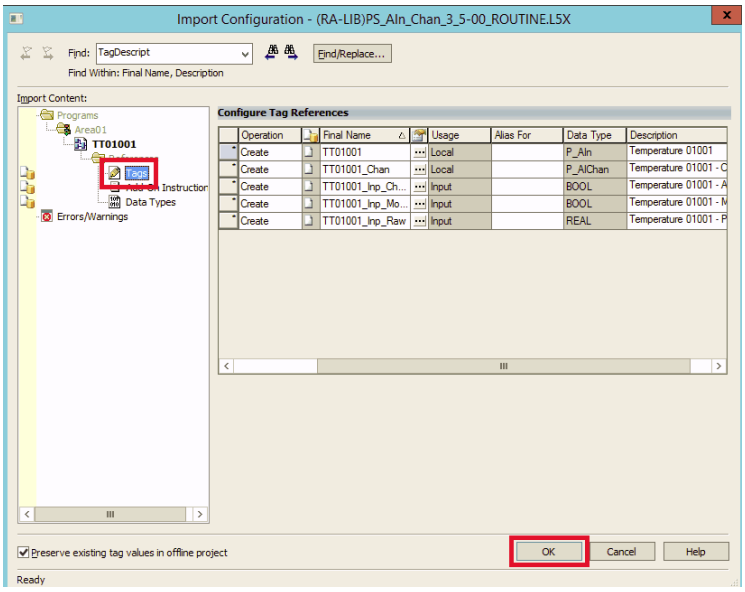
   Our example is 'Temperature 01001'.



9. Click Close to exit Find/Replace.

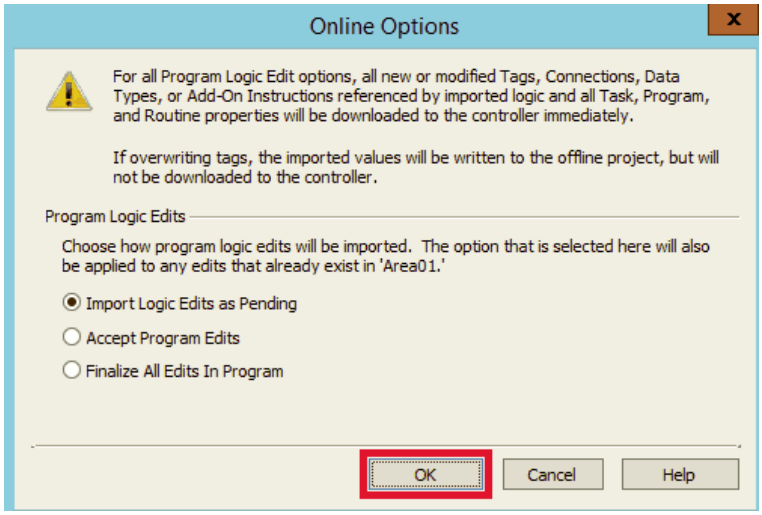
10. Click Tags to view all parameters that comprise the PS_AIn_Chan strategy.

    TIP If there are errors, a red 'X' with a message appears to define the issue.



11. Click OK.

IMPORTANT You must be online to view the dialog box for the next procedure.



12. Select Import Logic Edits as Pending and click OK.

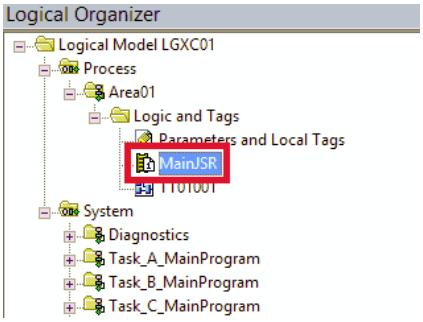
    If offline, the imported values are written to the project.

Add JSR Instructions

Our program includes a Jump to Subroutine (JSR) instruction that we added on page 23. The instruction directs the controller to 'jump to' and execute a separate subroutine file within the ladder program and return to the instruction following the JSR instruction.

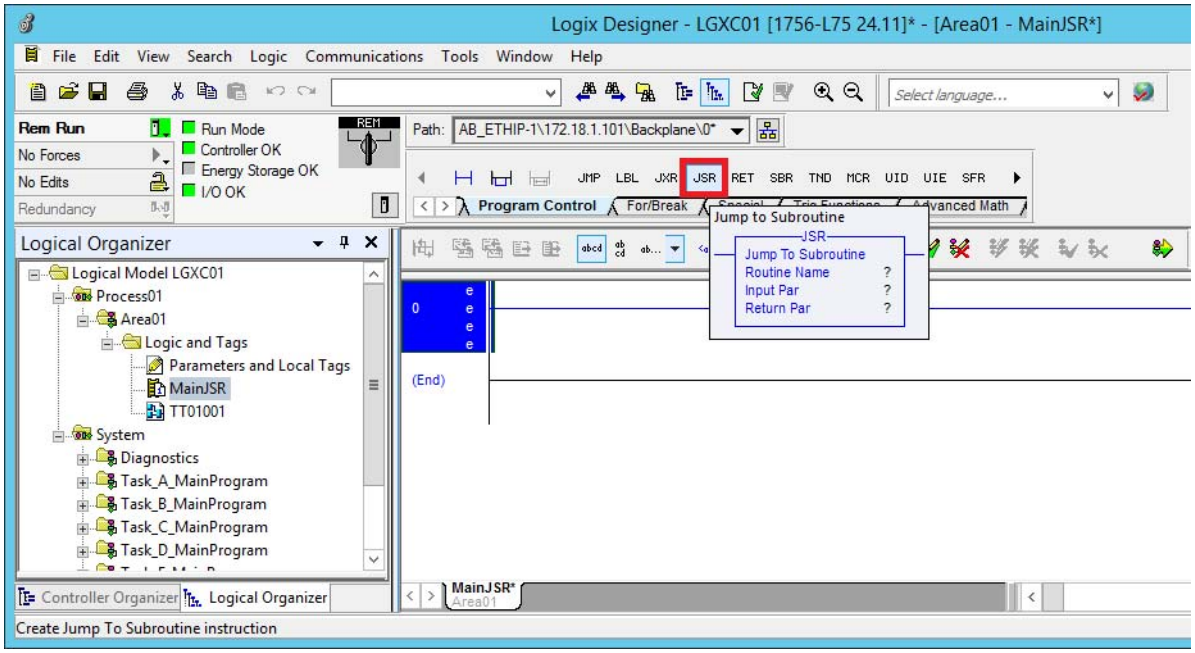
We use JSR instructions to schedule the routines that are added for execution. A JSR instruction must be created for each routine.

1. From the Logical Organizer in the Logix Designer application, double-click MainJSR.

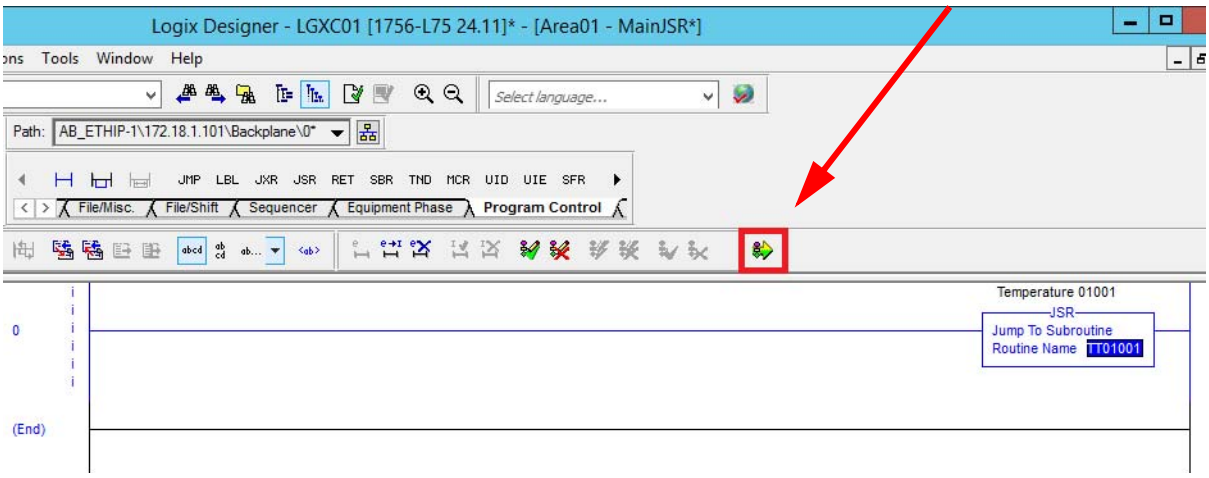


A JSR instruction can be added in the following ways:

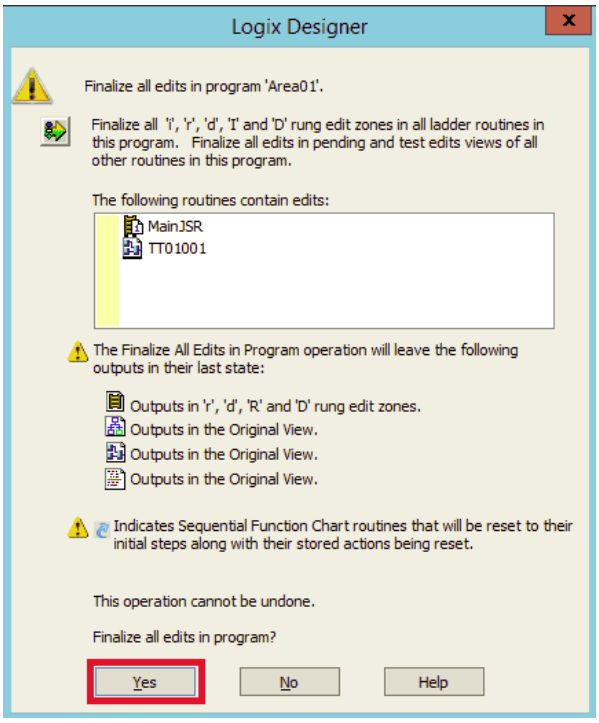
- From the Program Control tab, click JSR (as shown in the example). (Click the left (<) and right (>) arrows to find the Program Control tab.)
- Click the rung and type 'JSR'. Double-click the routine name and select the created Process Strategy. (See the next example on page 31.)



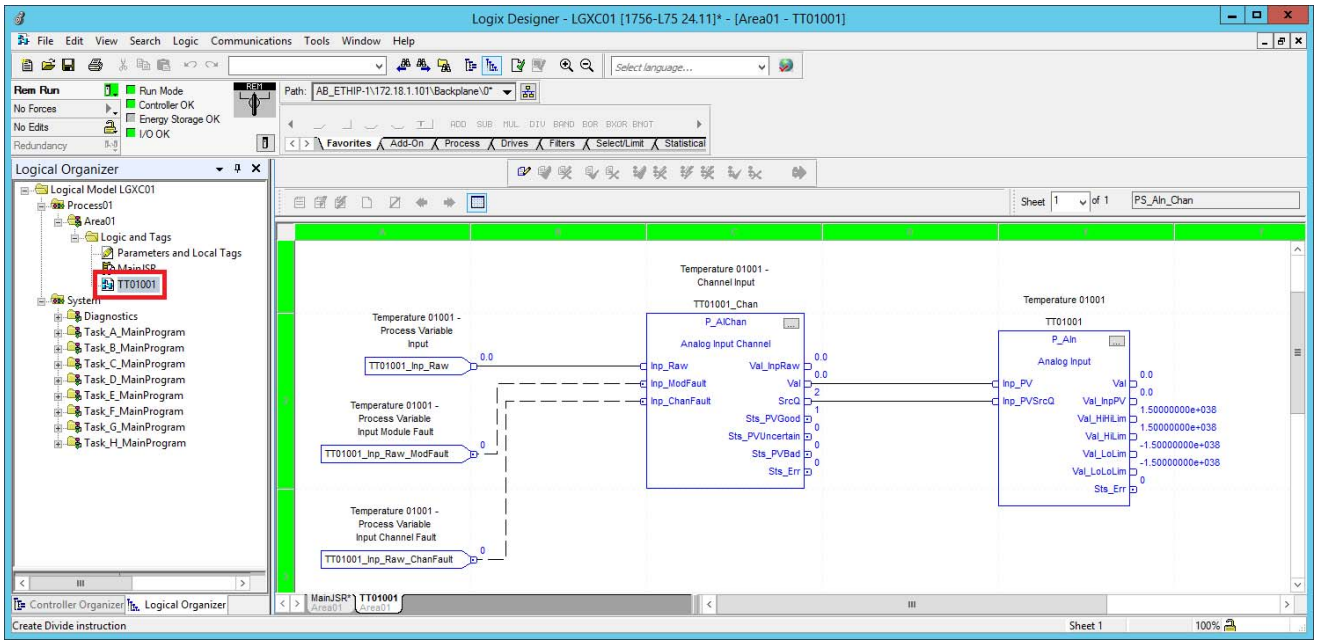
2. If online, click the Finalize All Edits in Program icon.



3. Click Yes.



The control strategy (PS_AInChan in our example) appears in the Logix Designer application.



4. Save the Logix Designer project.

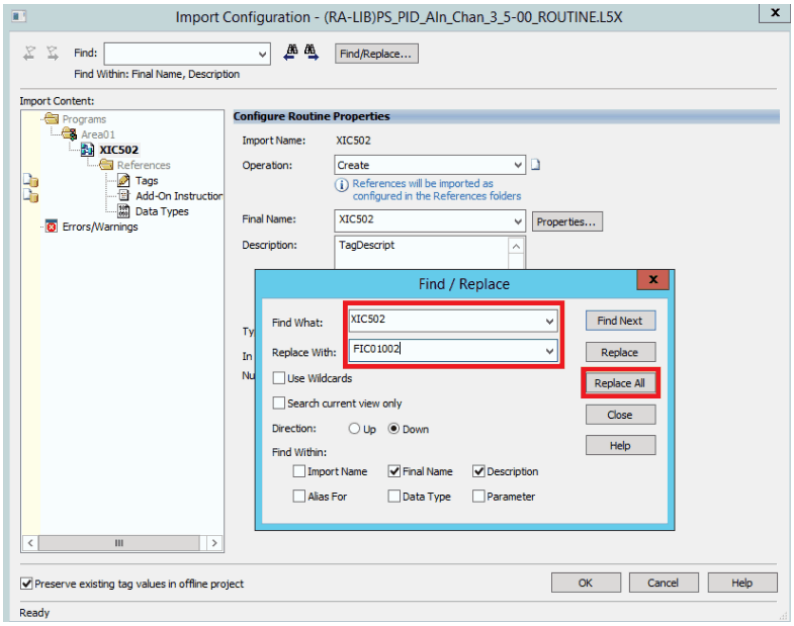
PS_PID_AIn_Chan

The PS_PID_AIn_Chan strategy provides loop control with an analog object that has channel capability.

TIP The procedures and screen facsimiles to create this instruction are similar to PS_AIn_Chan. For your convenience, we include the screen facsimiles that require specific information for this instruction.

1. Repeat steps 1 through 3 on page 26 and page 27.
2. On the Import Routine dialog box, browse the path to the Process Strategies folder and select (RA-LIB)PS_PID_AIn_Chan_3_5-00.ROUTINE.L5X.
3. Click Open.

   The Import Configuration dialog box appears.



4. Click the Find/Replace button to find all tag references to 'XIC502' and replace with a user-designated tag name.

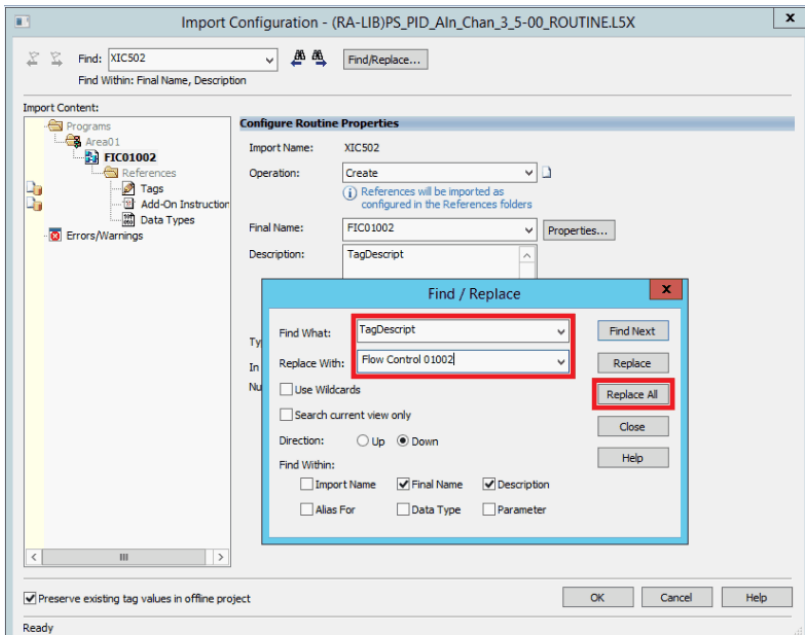
   Our example is 'FIC01002'.

5. Click Replace All.

TIP Click Close to exit Find/Replace only if you are done using the utility.

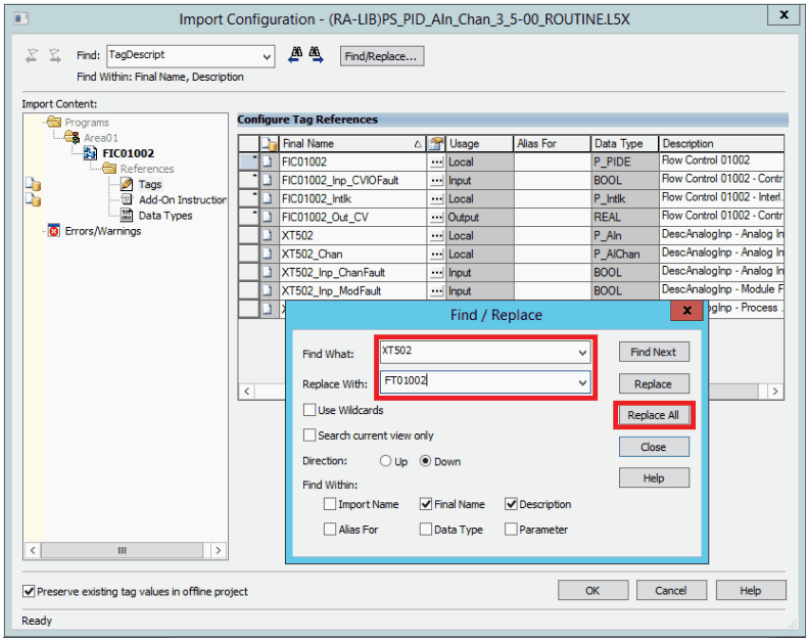
6. Repeat step 4 and step 5 to find all tag references to 'TagDescript' and replace with a description.

   Our example is 'Flow Control 01002'.



7. Click Find Next for all tag references to 'XT502' and replace with a user-designated tag name.

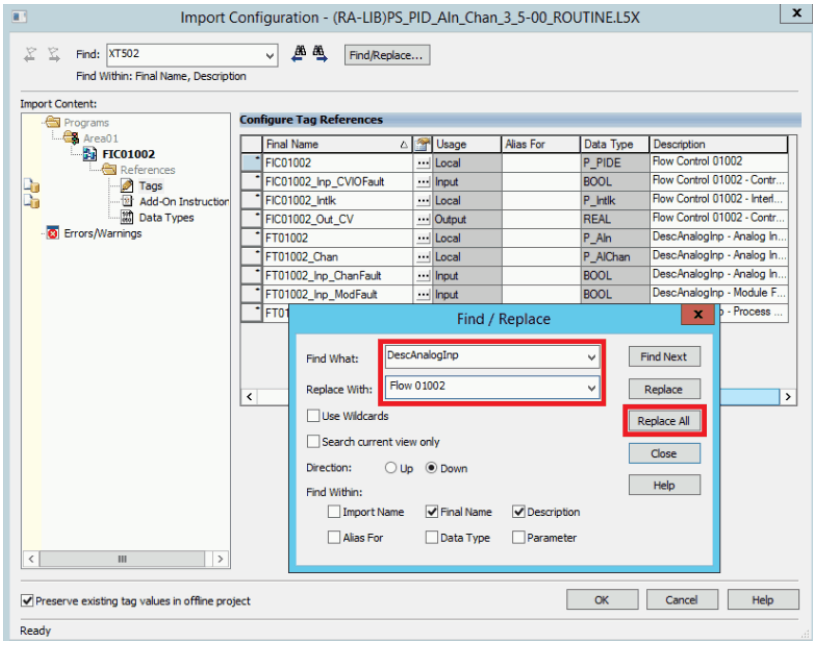
   Our example is 'FT01002'.



8. Click Replace All.

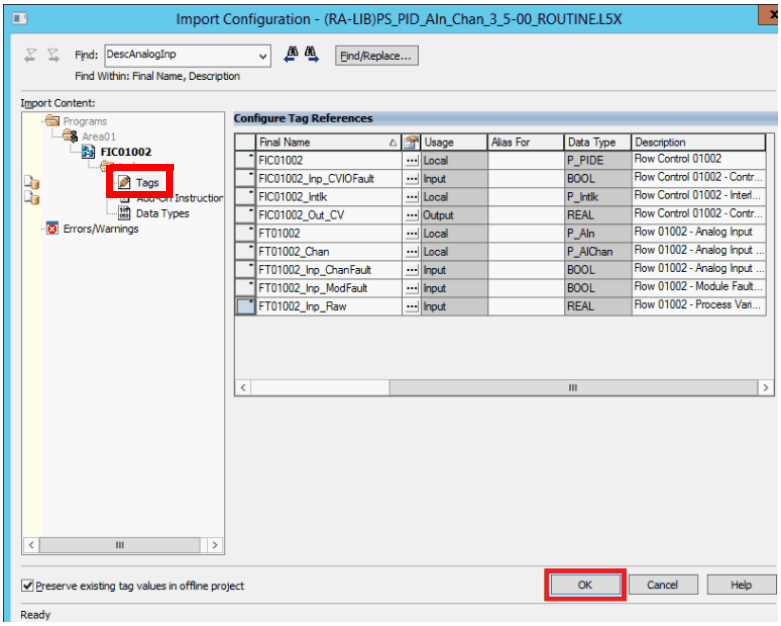
9. Repeat step 4 and step 5 to find all tag references to 'TagDescript' and replace with a description.

   Our example is 'Flow 01002'.



10. Click Close to exit Find/Replace.

11. Click Tags to view all parameters that comprise the P_PID_AIn_Chan code object.

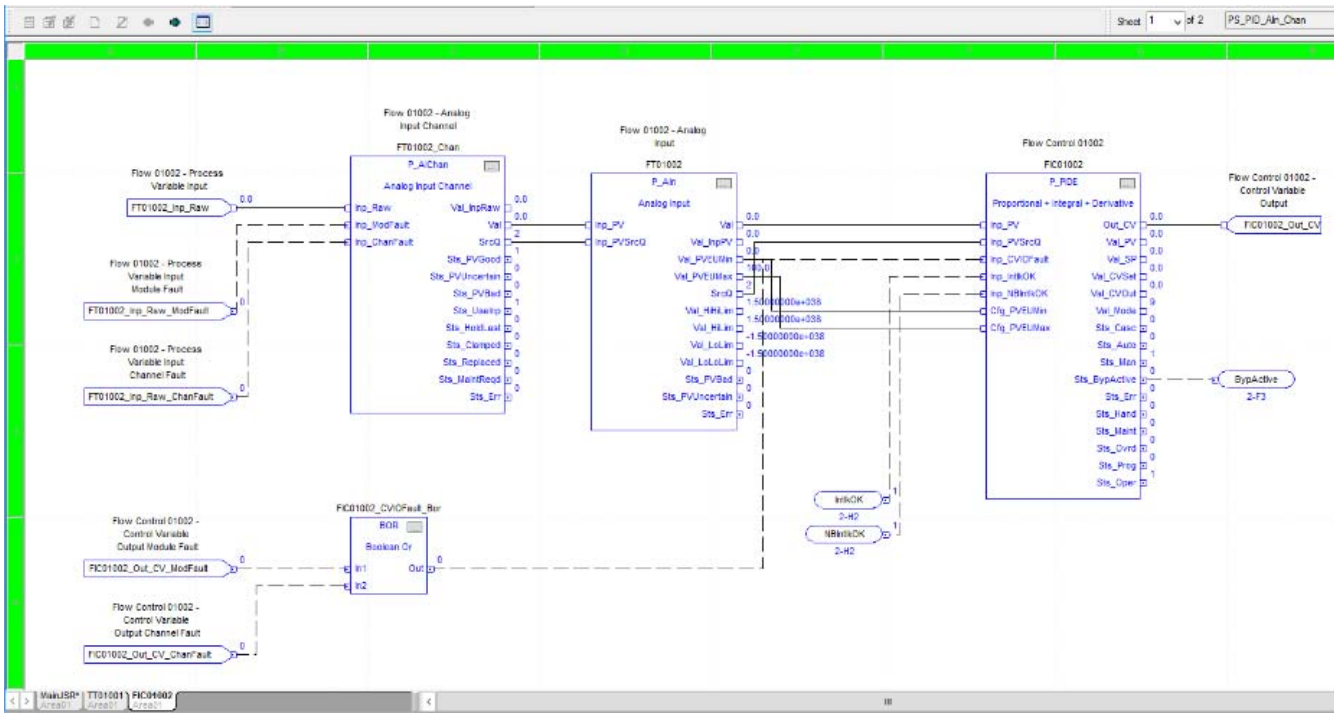


12. Click OK.

13. If online, select Import Logic Edits as Pending and click OK.

    If offline, the imported values are written to the project.

14. Complete the MainJSR routine procedures as documented on page 30.



15. Save the Logix Designer project.

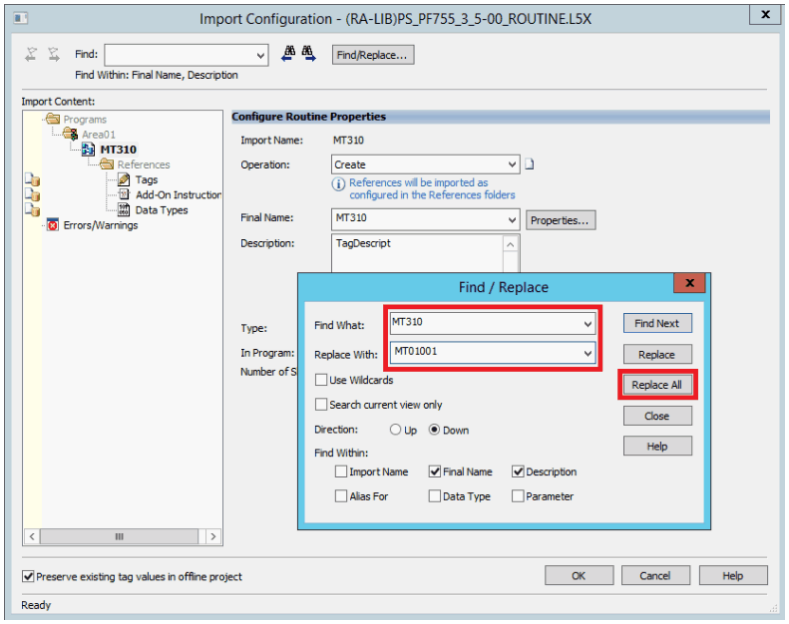
PS_PF755

The PS_PF755 strategy provides a PowerFlex® drive interface.

TIP The procedures and screen facsimiles to create this instruction are similar to PS_AIn_Chan. For your convenience, we include the screen facsimiles that require specific information for this instruction.

1. Repeat steps 1 through 3 on page 26 and page 27.
2. On the Import Routine dialog box, browse the path to the Process Strategies folder and select (RA-LIB)PS_PF755_3_5-00.ROUTINE.L5X.
3. Click Open.

The Import Configuration dialog box appears.



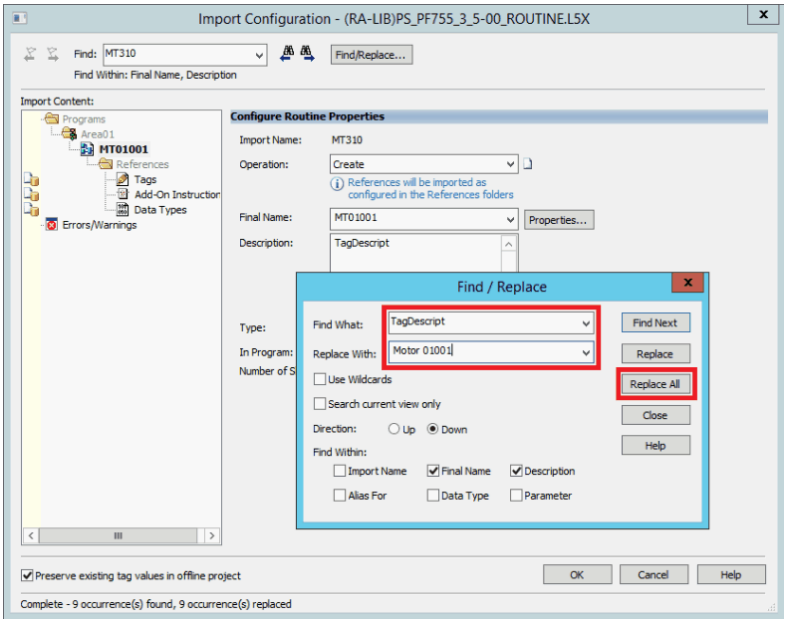
4. Click the Find/Replace button to find all tag references to ‘MT310’ and replace with a user-designated tag name.

   Our example is ‘MT01001’.

5. Click Replace All and then OK.

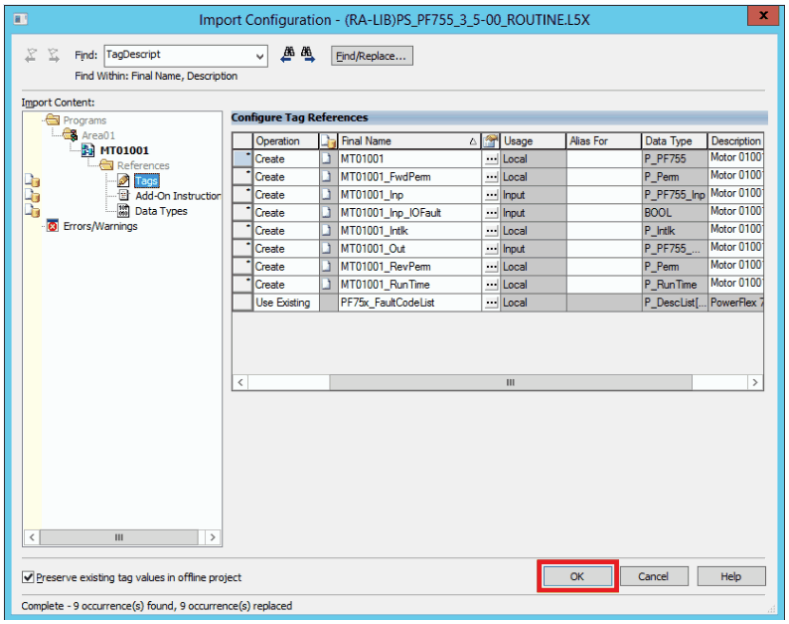
6. Repeat step 4 and step 5 to find all tag references to ‘TagDescript’ and replace with a description.

   Our example is ‘Motor 01001’.



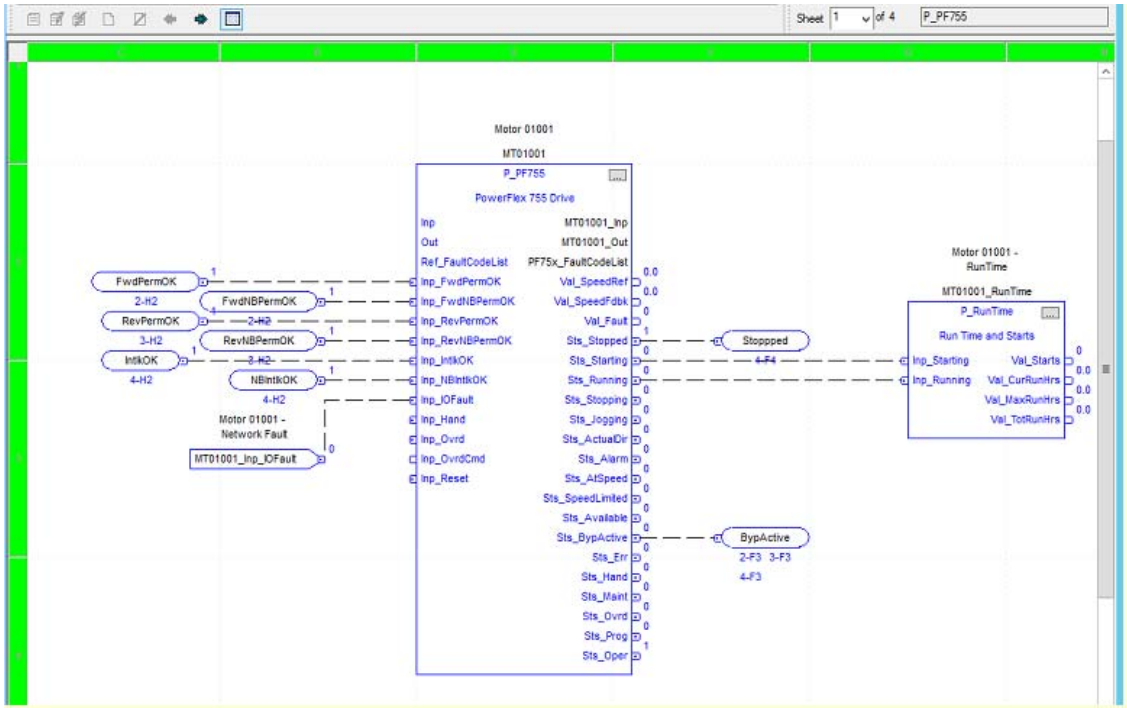
7. Click Tags to view all parameters that comprise the PS_PF755 strategy.

TIP If there are errors, a red ‘X’ with a message appears to define the issue.



8. Click OK.
9. If online, select Import Logic Edits as Pending and click OK.

   If offline, the imported values are written to the project.
10. Complete the MainJSR routine procedures as documented on page 30.

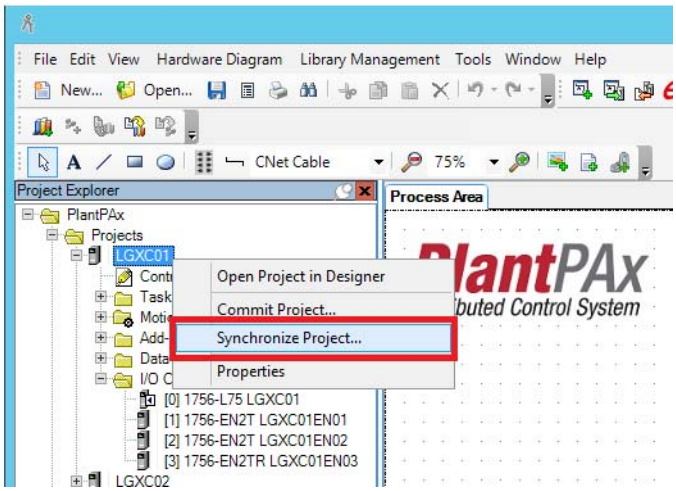


11. Save the Logix Designer project.

Sync Controller to System

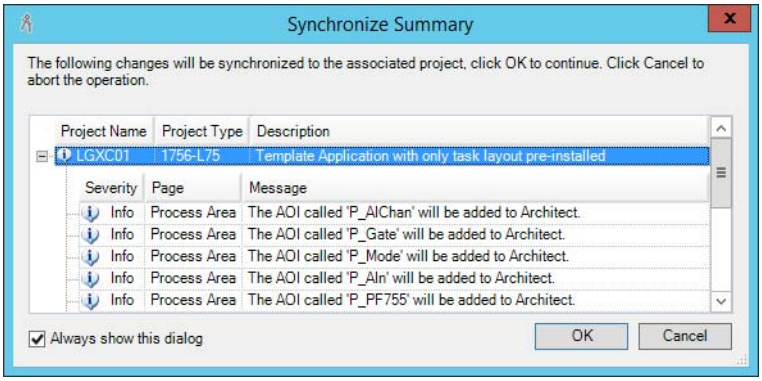
Complete these steps to synchronize the controller changes with the system template inside the Studio Architect software.

1. From the Studio 5000 Architect application, right-click a controller that is being configured and choose Synchronize Project.



   The Synchronize Summary window appears.

   The example shows the project that is expanded with the list of changes.



2. Click OK.

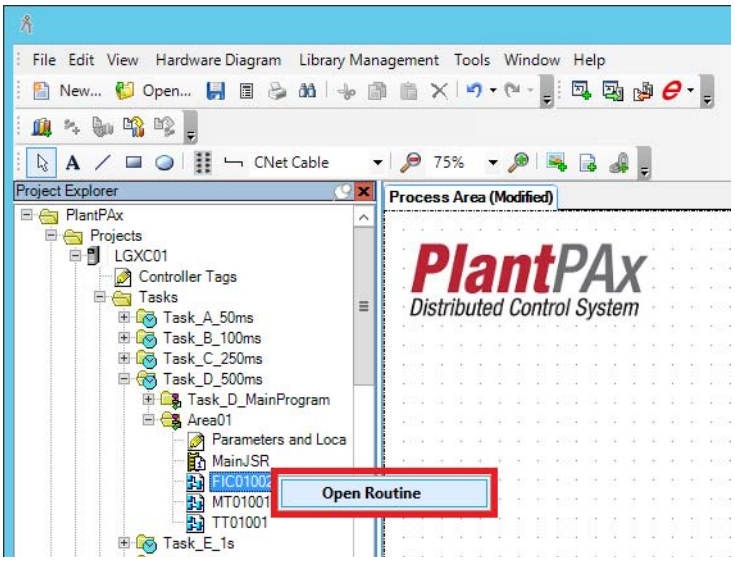
   The Ethernet Configuration dialog box appears.

3. Leave the devices and their port configuration as is, and click OK.

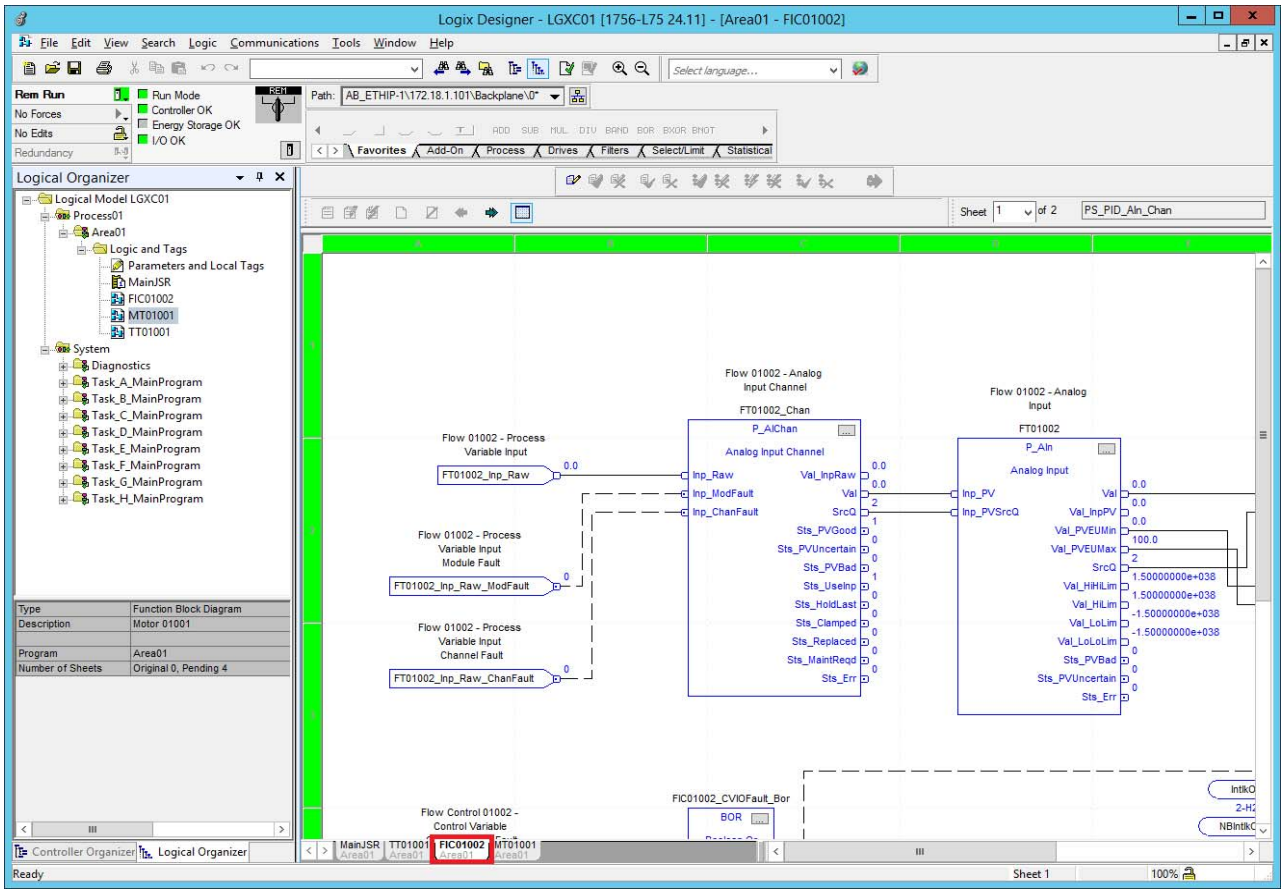
   A wait message appears while the project is being synchronized.

To verify that the changes are synchronized with the system, complete these steps.

1. From the Studio 5000 Architect application, right-click a controller strategy and chose Open Routine.

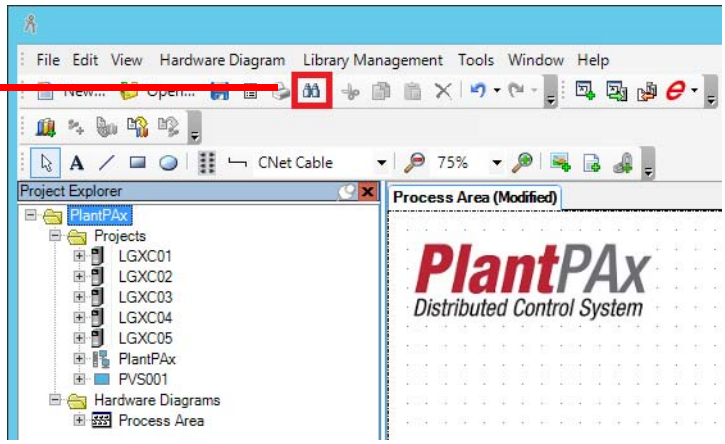


In the Logix Designer application, the program logic appears for the selected process strategy.

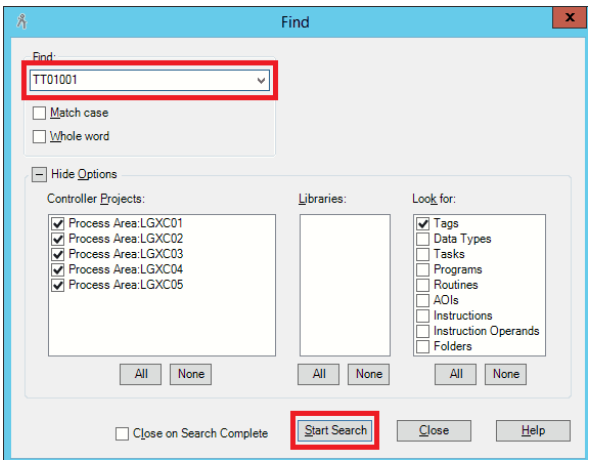


2. From the Studio 5000 Architect toolbar, click the binoculars to find information.

This feature provides search capability for the entire system.

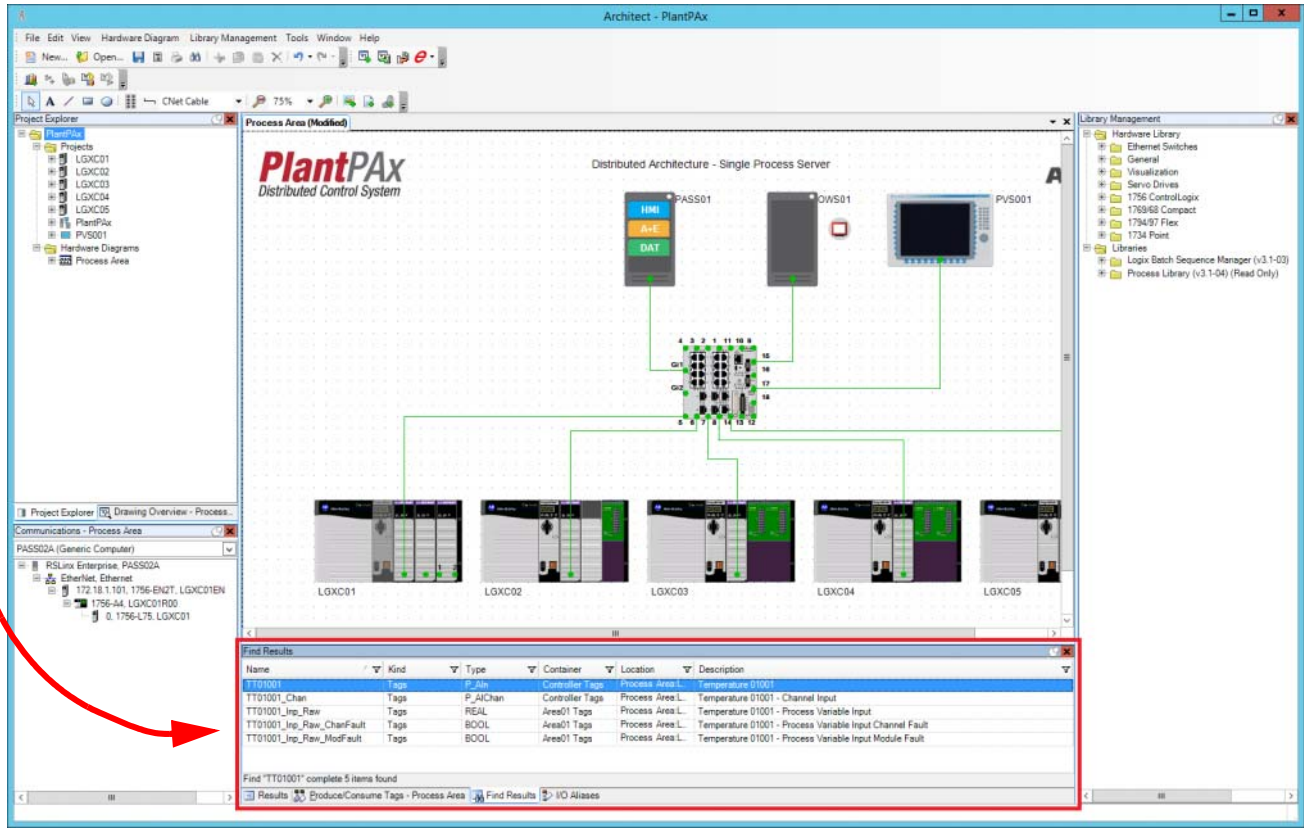


3. From the Find text box, type the tag name.



4. Click Start Search.

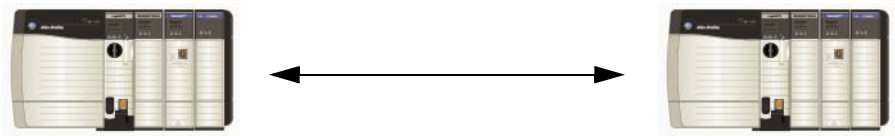
The tags for the selected routine display underneath the system model on the Studio Architect software.



Configure Controller-to-Controller Communication

This chapter describes how to establish a communication pipeline between controllers by creating produce/consume tags with a user-defined data type (UDT).

A Logix5000™ controller lets you produce and consume system-shared tags. A producer controller sends data to the system. The consumer controller is configured to consume the produced tag. The data type of the consumed tag **must** match the data type of the produced tag.



LGXC01

Produced Tag LGXC01
Consumed Tag LGXC02

LGXC02

Consumed Tag LGXC01
Produced Tag LGXC02

For controllers to share produced or consumed tags, the controllers must be attached to the same network, such as a ControlNet or EtherNet/IP network.

The consumed tags require connections. As you increase the number of controllers that can consume a produced tag, you also reduce the number of connections the controller has available for other operations, like communication and I/O.

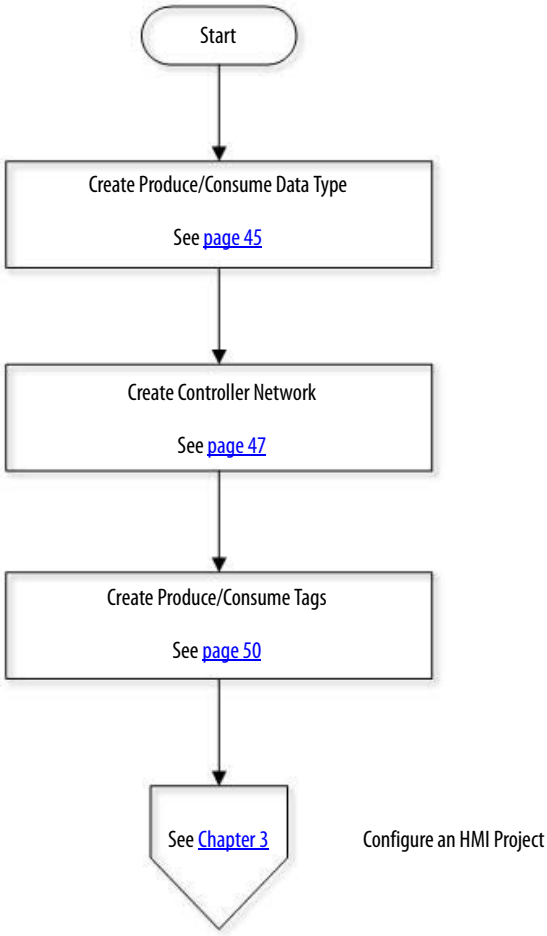
Considerations

Consider the following suggestions before starting this chapter:

- Producer/Consumer uses Class 1 communication (I/O) to enhance data integrity and response time.
- The Producer/Consumer configuration is available only in offline mode. During the initial system configuration, we recommend that you create the communication between all system controllers.
- If a controller is not consuming the produced tag, we recommend that you inhibit the controller connection to save bandwidth.

Figure 4 shows the topics that are described in this section. Click or see the page number for quick access to a section.

Figure 4 - Controller-to-Controller Workflow



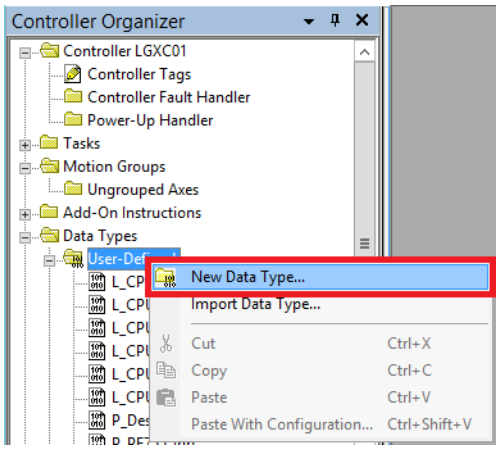
Create Produce/Consume Data Type

Use an Engineering Workstation with these procedures.

EWS

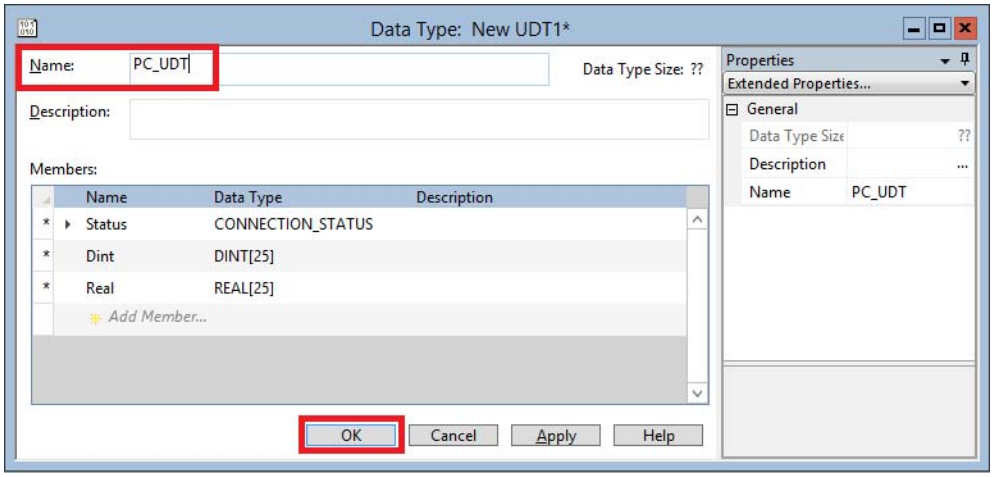
Complete these steps to create user-defined data type (UDT). Remember, the data type of the consumed tag **must** match the data type of the produced tag.

1. In the Controller Organizer of the Logix Designer application, click '+' to expand the Data Types folder for the producer controller.



2. Right-click User-Defined and choose New Data Type.

   The New UDT dialog box appears.

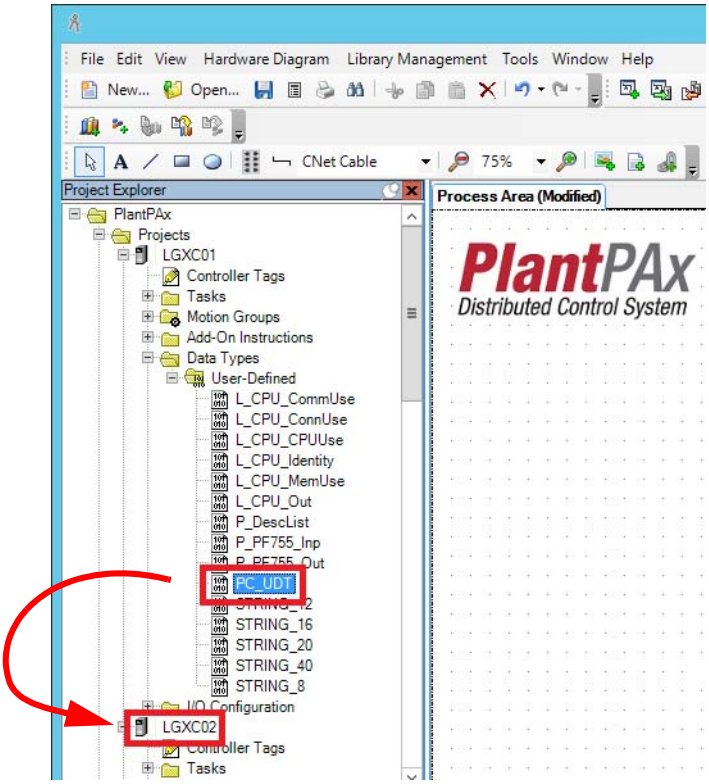


3. To add members to your new data type, do the following:
   a. Type a name.
      Our example is PC_UDT.
   b. Click Add Member and type a name and data type.
   c. Repeat step b for each new member of the UDT.
   d. Click OK.

IMPORTANT The Consumer controller must use the Connection Status for the source quality of the information. If there is a loss of communication, the Connection Status reports the fault.

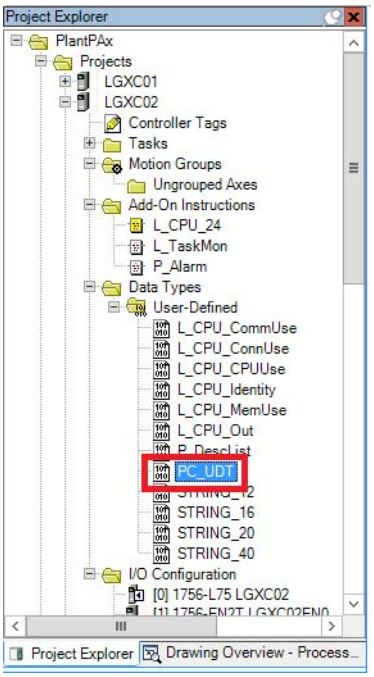
4. Save your work.
5. Synchronize your work in the Architect project.

In the Architect project, the UDT that you created appears in the User-Defined list for the controller.



6. Drag-and-drop the new UDT into the other controller.

   The UDT is now in the User-Defined list for the other controller.



Create Controller Network

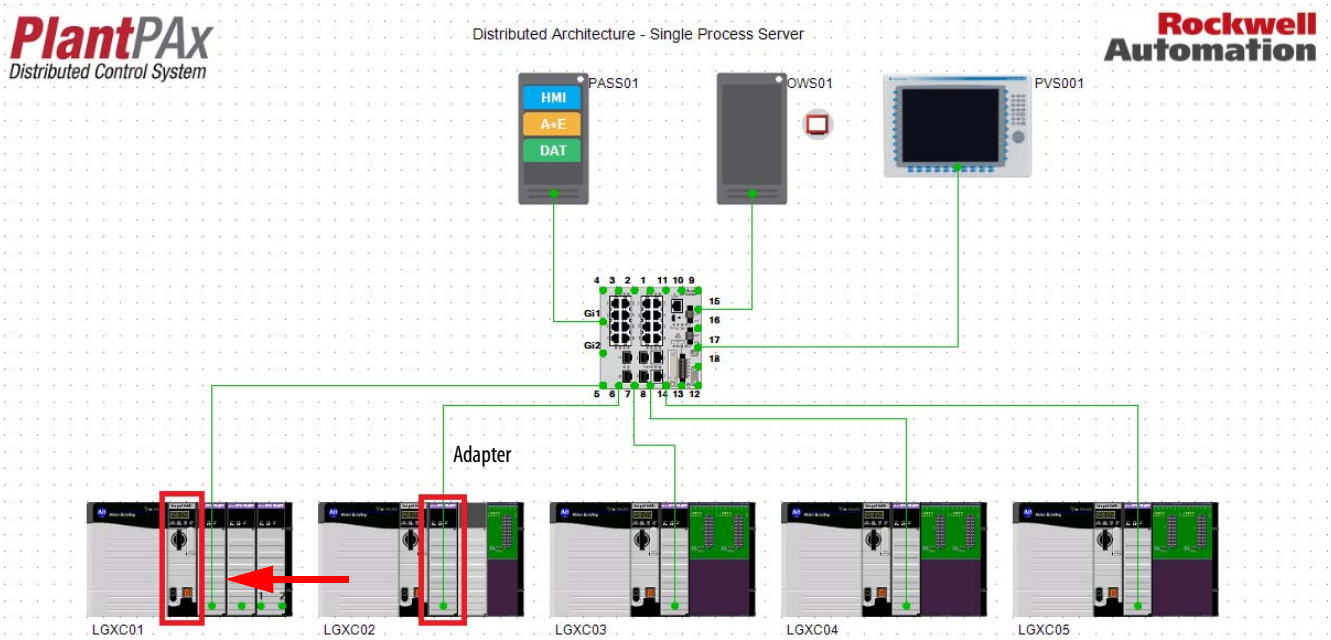
This section describes how to add controllers and place the Producer controller definition into the Consumer controller. This action creates a network communication path.

IMPORTANT To modify controller properties and add local communication adapters, see the PlantPAx® System Infrastructure Configuration User Manual, publication PROCES-UM001.

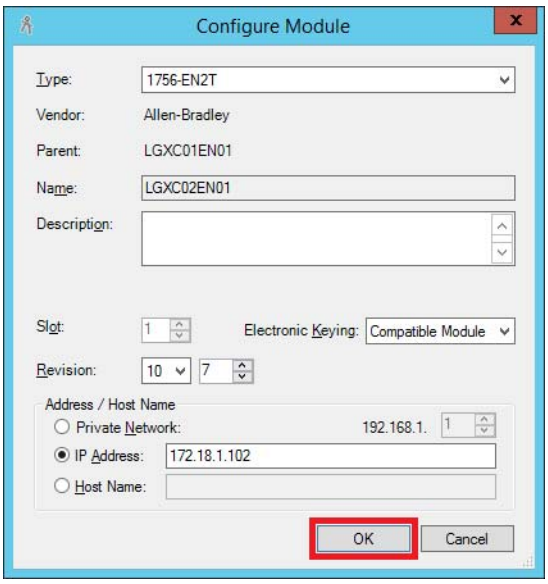
Complete these steps.

1. On the Architect canvas, click and drag the **adapter** of the Producer controller and drop into the Consumer controller.

   For our example, LGXC02 is the Producer controller and LGXC01 is the Consumer.

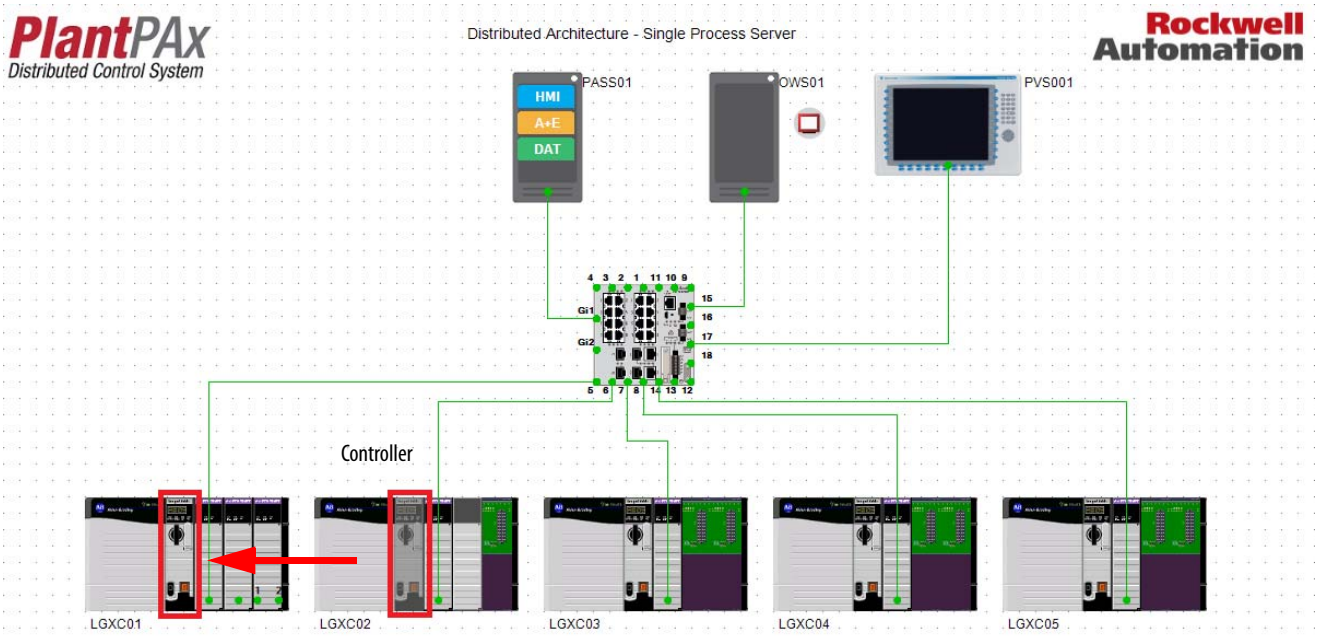


2. Use the defaults and click OK.

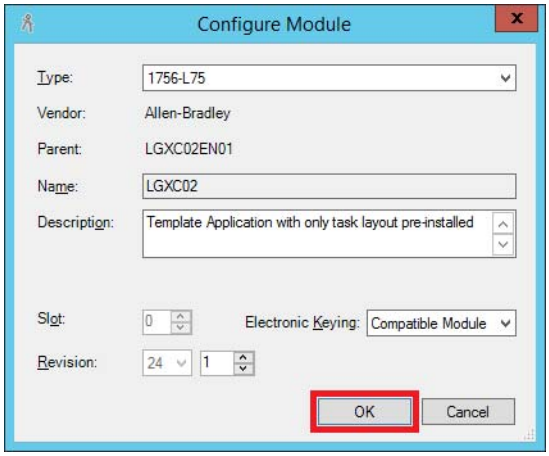


If necessary, you can change the IP address and then click OK.

3. On the Architect canvas, click and drag the **controller** for the Producer controller and drop into the Consumer controller.

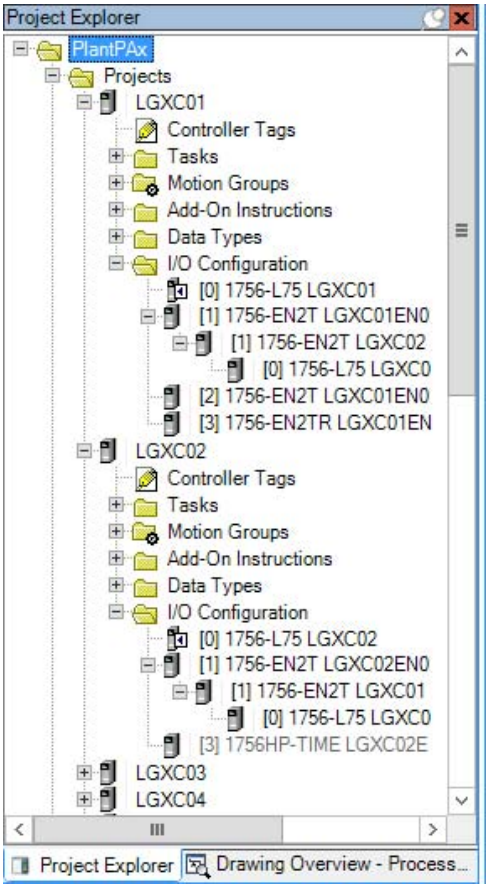


4. Use the defaults and click OK.



5. Repeat step 1 through step 4 but with LGXC01 as the Producer controller and LGXC02 as the Consumer.

   The respective controllers are now linked and can communicate.



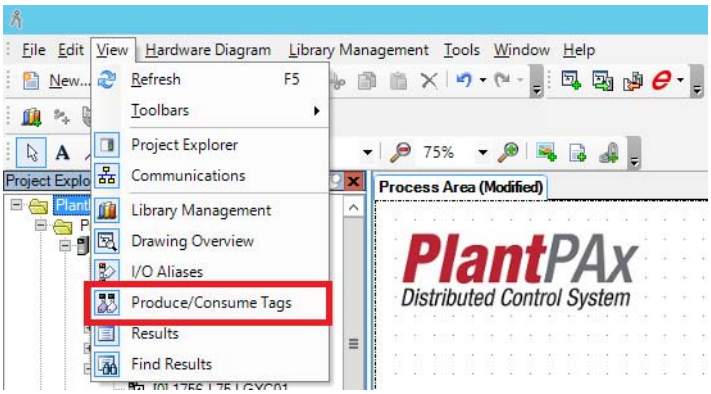
6. Save your work.

Create Produce/Consume Tags

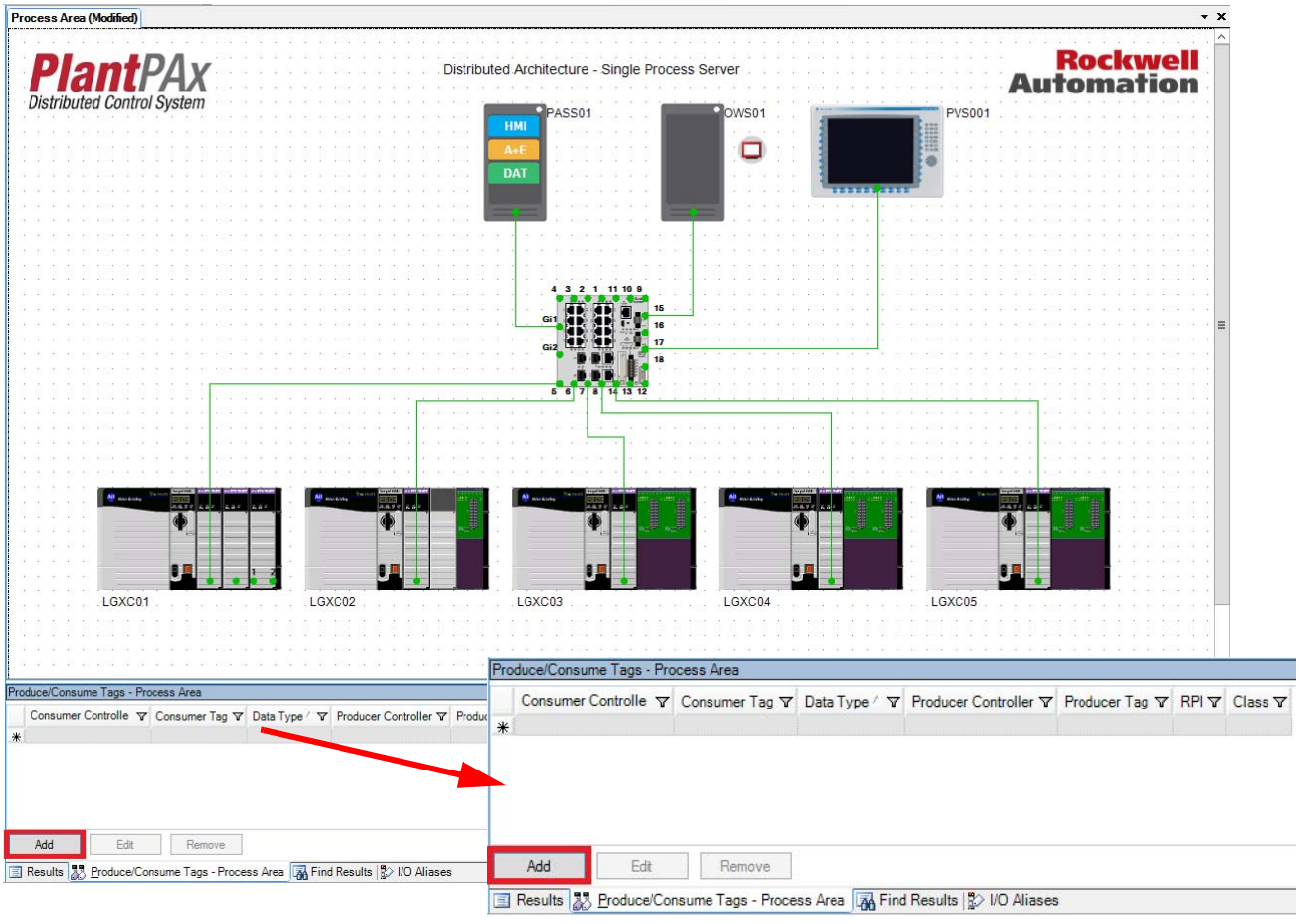
Complete these steps to attach produce/consume tags to a UDT for an application controller.

1. In the Architect menu bar, click View and choose Produce/Consume Tags.

IMPORTANT	Step 1 applies if you do **not** have Produce/Consume tabs on the bottom of the Architect application. Otherwise, click an existing Produce/Consume tab.

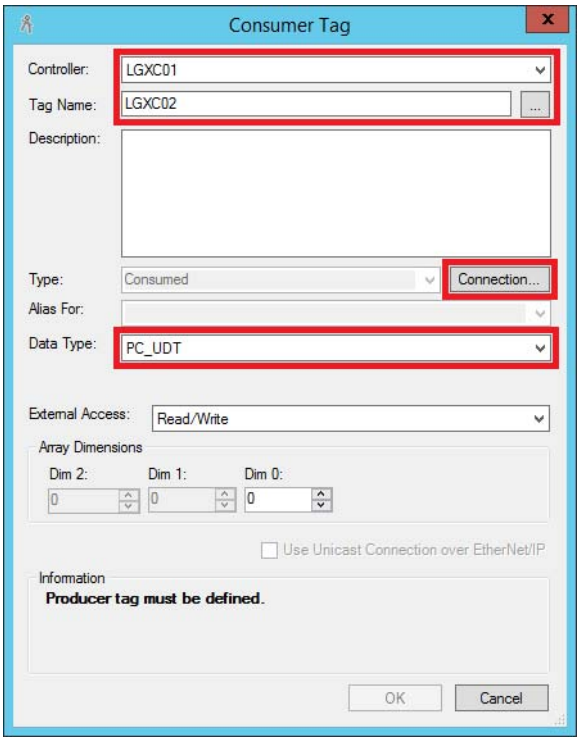


2. In the Produce/Consume Tags window, click Add.



The Consumer Tag dialog box appears.

3. Select 'LGXC01' in the Controller text box.

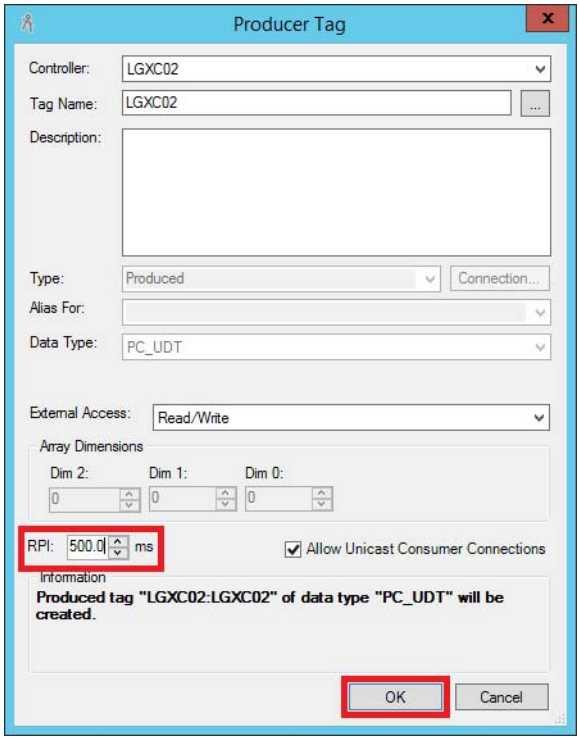


4. Type 'LGXC02' as the tag name.
5. Select PC_UDT from the Data Type pull-down menu.

   The message 'Producer tag must be defined' appears.
6. Click Connection.

The Producer Tag dialog box appears.

Make sure that the Producer controller is listed.

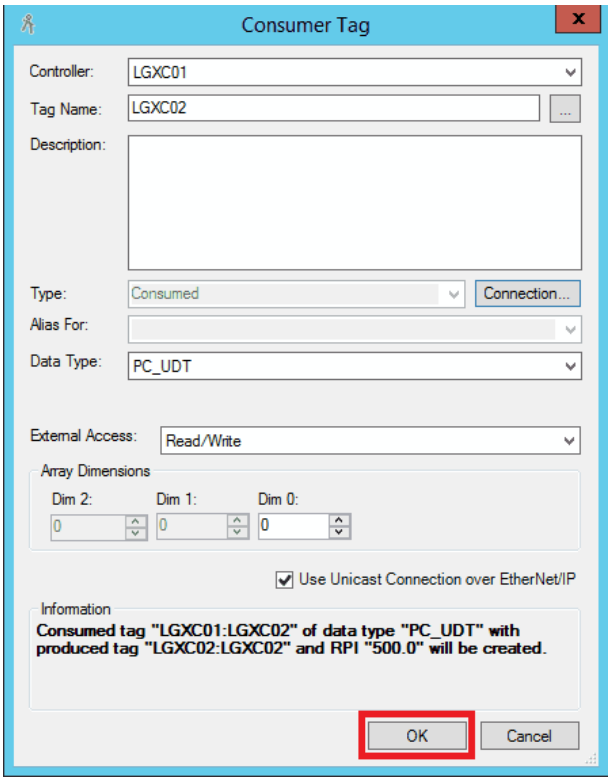


7. Set an RPI value and click OK.

   Use the highest permissible RPI for your application. Follow the standard rule, which is, the RPI must be two times faster than the execution.

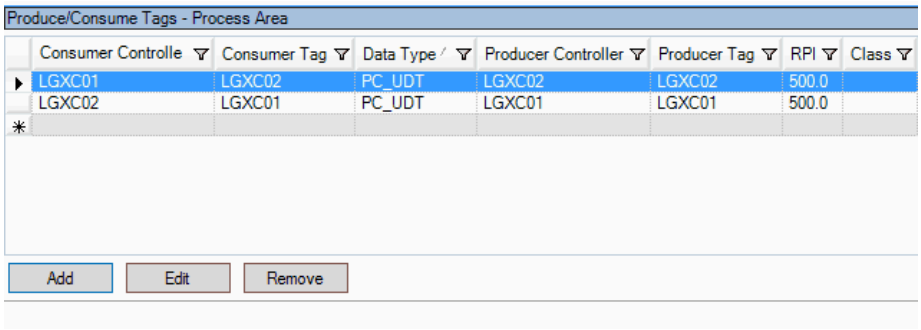
The Consumer Tag dialog box reappears.

Observe in the Information box that you are creating a consumed tag with the same UDT as a produced tag with your selected RPI.



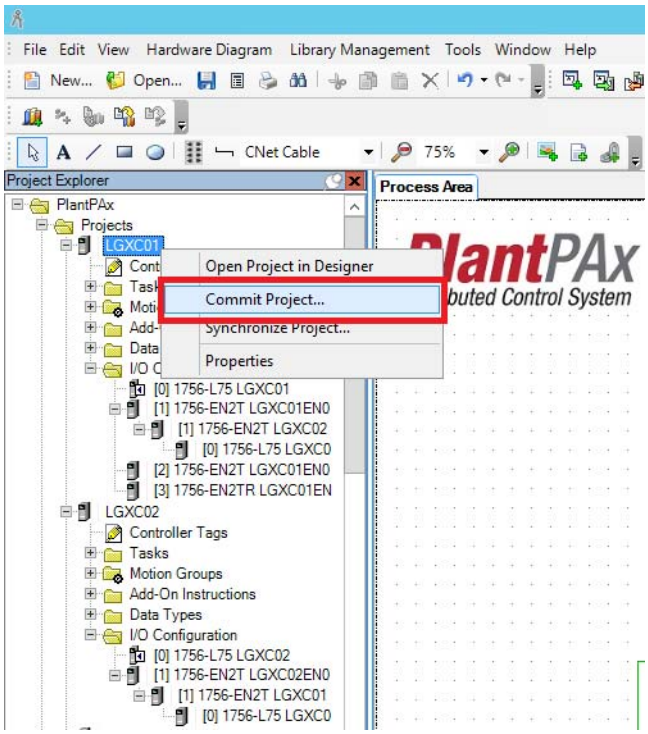
8. Click OK.
9. Repeat step 1 through step 7 with 'LGXC02' as the Producer controller and 'LGXC01' as the Consumer.

   The created tags appear in the Produce/Consume Tags window.

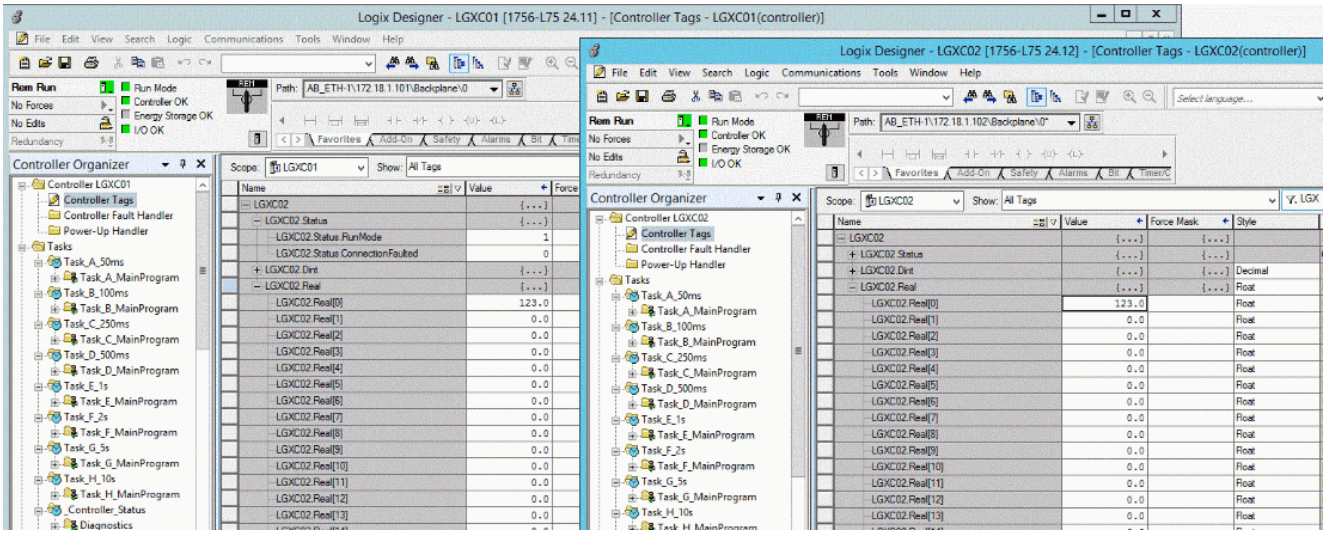


IMPORTANT Make sure that the Logix Designer application is closed before you Commit a project.

10. Right-click in each controller and choose Commit Project.



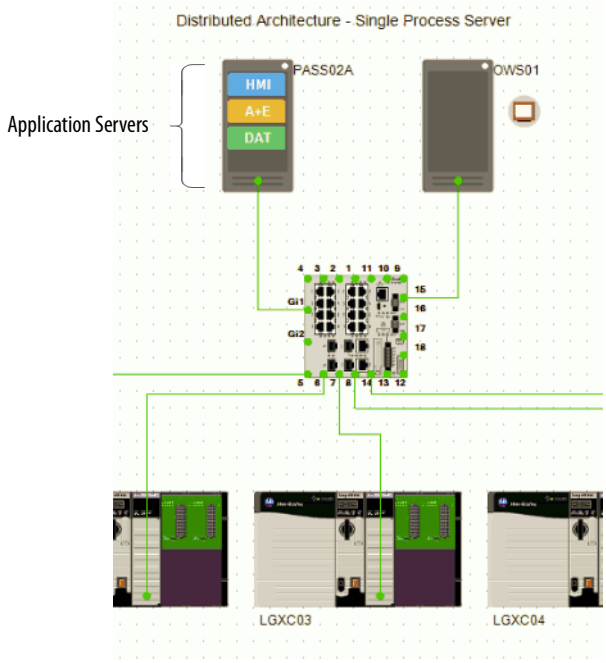
When online, the Monitor Tags tab lists the controller tags.



Configure an HMI Project

This chapter describes how to create and configure your logical servers (data, human-machine interface (HMI), and alarms). All of these software components are assigned to a PASS server.

Use one of the templates that are described on page 57 to configure the servers within an Architect project.



See page 70 for examples of navigation features for your HMI project.

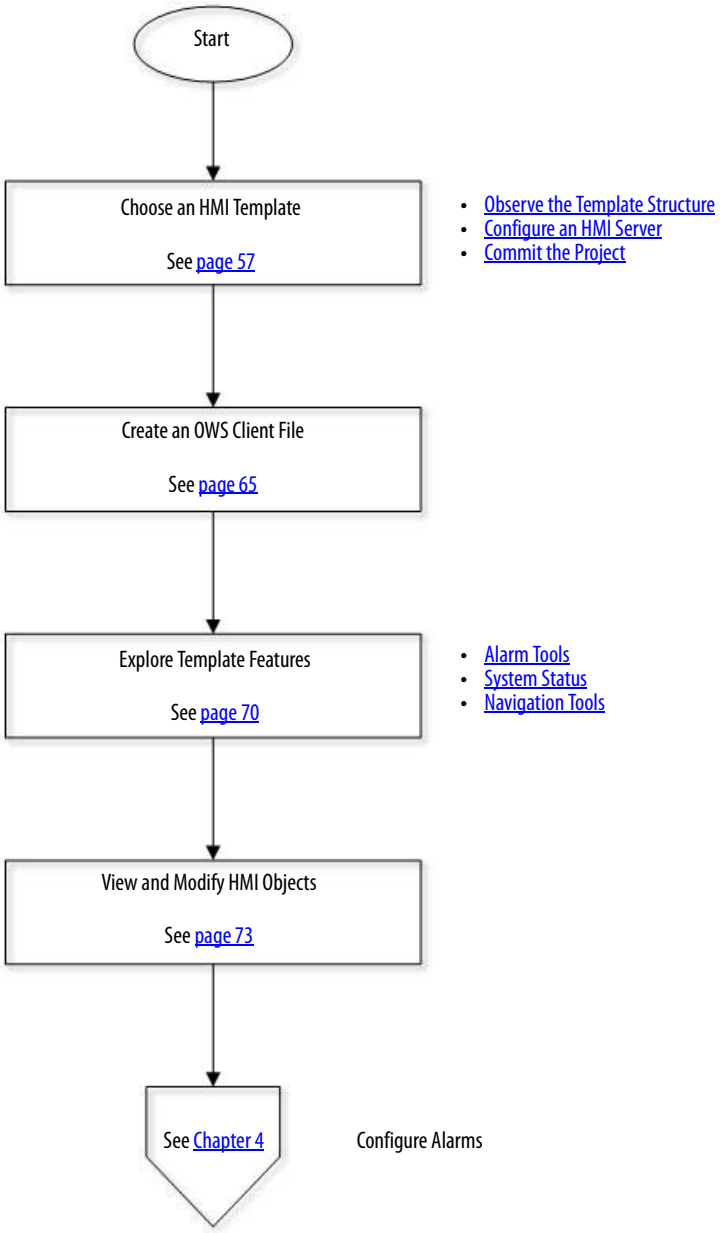
Considerations

Before you complete tasks in this chapter, we suggest that you do the following:

- Determine the number of HMI, data, and alarm and event servers to be used where they are hosted
- Make sure that PASS servers are installed and available
- Identify the target screen resolution on your OWS to choose the appropriate HMI template
- All system server configurations are described in the PlantPAx® Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

Figure 5 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 5 - Server Workflow



Choose an HMI Template

Use the PlantPAx templates to create your HMI project to follow the PlantPAx system recommendations. There are several HMI templates available from the Product Compatibility and Download Center (PCDC).

Click http://www.rockwellautomation.com/rockwellautomation/support/downloads.page to access the PCDC.

For most systems, you load the templates on the PASS server by using the EWS, and your system data is viewed on the OWS.

Table 3 - HMI Template Names and Display Resolutions

Name	Supported Resolution
FTVSE_8_1_P1FHD_3_5_01.apa	1920 x 1080, Full HD
FTVSE_7_P1WXGA_3_5_01.apa	1366 x 768, WXGA
FTVSE_7_P1FHD_3_0_00.apa	1920 x 1080, Full HD
FTVSE_7_P1SXGA_3_0_00.apa	1280 x 1024, SXGA

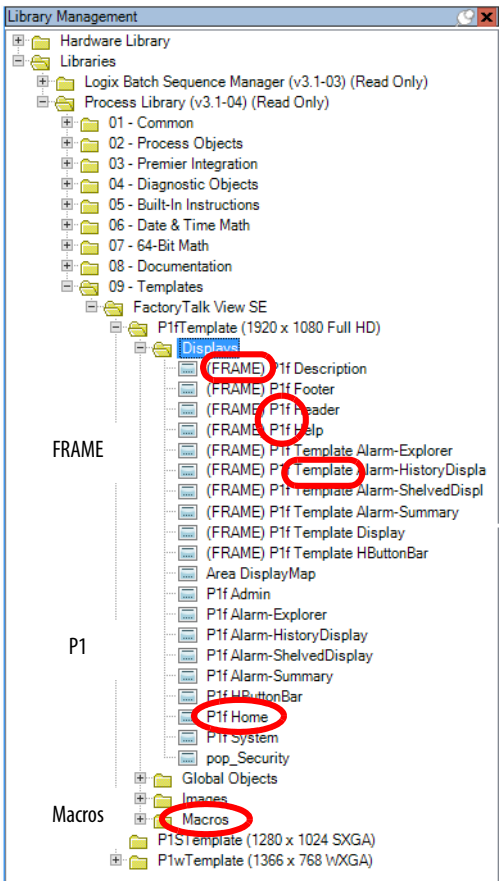
The templates include the following attributes:

- Basic display layout
- Navigation
- FactoryTalk® View Alarm and Event displays

See page 58 for a description of the template structure.

Observe the Template Structure

The example tree diagram shows the HMI template structure. Display and start-up macros are created as part of the template (shown at the bottom of the example).



The displays that are included in the template have the following naming structure:

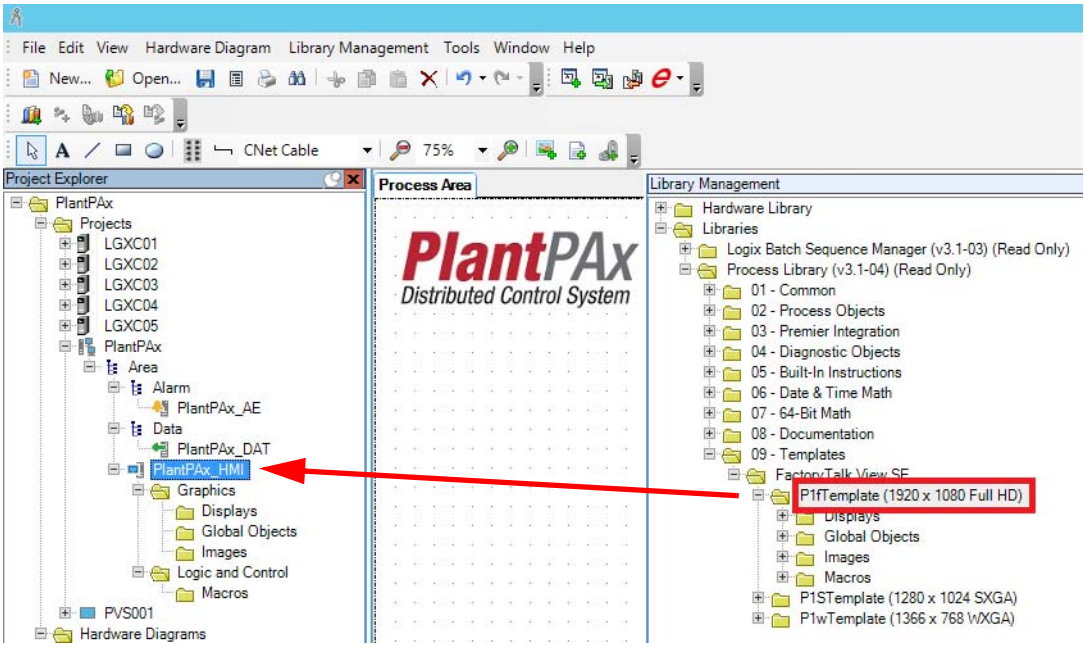
- (**FRAME**) is a prefix that is used on items that are intended only to be used as is with minimum customization.
- **P1f** is a unique template identifier. This prefix identifies the template that is being applied and the files that are part of the template.
- **Template** is used to identify a template that can be copied multiple times to create application-specific content. If the word 'Template' is omitted, the file is not a template display.
- The rest of the name is a brief description of the display file. We suggest that these names be similar across templates. For example, P1 Home is the initial display.

Macros configure the initial display structure during runtime. The start-up macros open the framework files in the orientation intended. For example, the header display at the top and the footer display at the bottom.

Configure an HMI Server

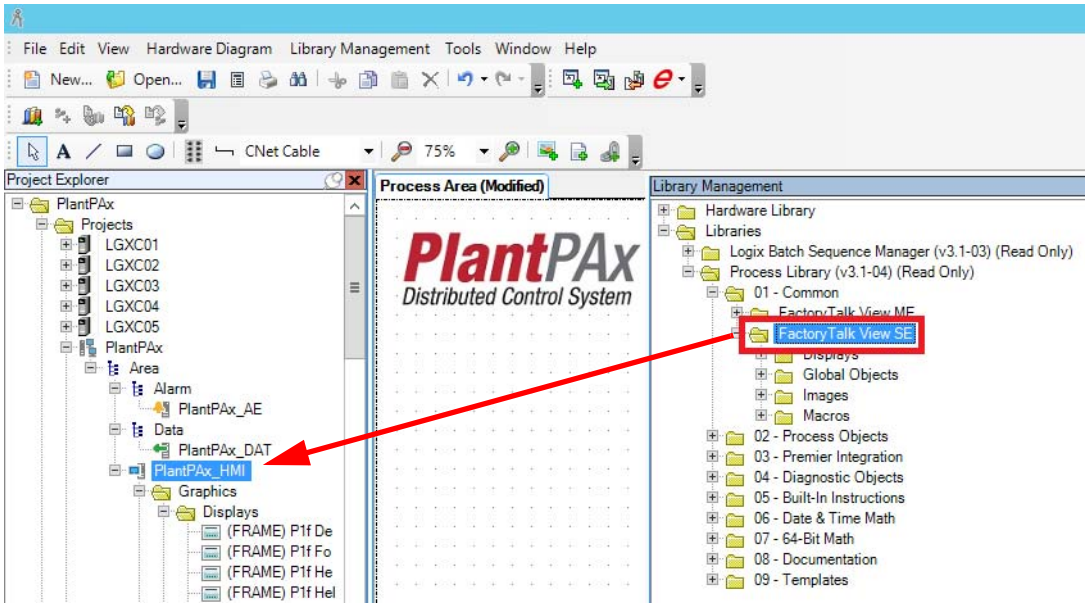
Complete these steps to build your HMI objects and displays through drag-and-drop procedures in an Architect project.

1. To add the basic frame for the template, drag the Libraries> Process Library>Templates>FactoryTalk View SE>P1fTemplate from the Library Management pane and drop it into the PlantPAx HMI folder.



IMPORTANT If you are not using the Rockwell Automation® Library of Process Objects, skip the next steps.

2. In the Library Management pane, expand Libaries>Process Library>Common folders.
3. Expand the FactoryTalk View SE folder and drag-and-drop into the PlantPAx HMI folder in the Project Explorer pane.

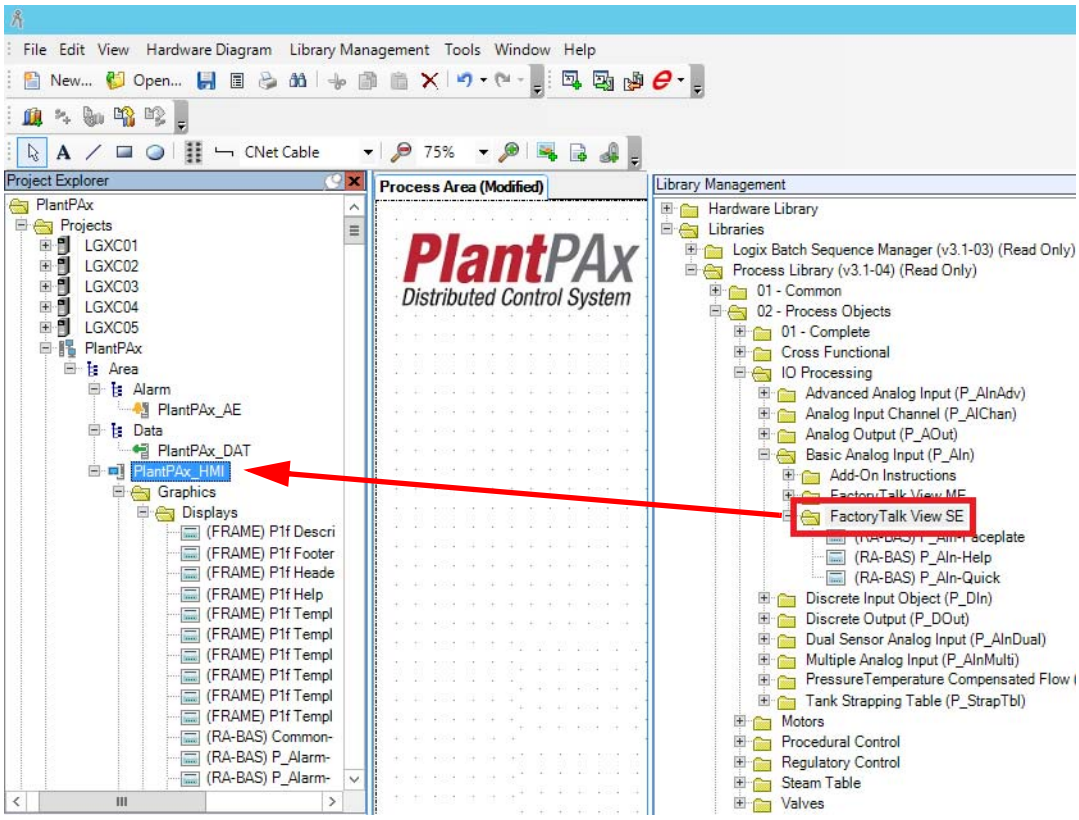


The FactoryTalk View SE folder contains the following common displays and objects for the Rockwell Automation Library of Process Objects:

- Common-AnalogEdit
- P_Alarm
- P_Gate
- P_Mode

IMPORTANT The drag-and-drop option provides you with all global objects (.ggfx), images (.png), and macros (.mcr) for your project. The Common-AnalogEdit, P_Alarm, P_Gate, and P_Mode displays (.gfx) are also added to your project.

4. In the Process Object folder, select the Object folder used in the application and drag-and-drop into the PlantPAx HMI folder.



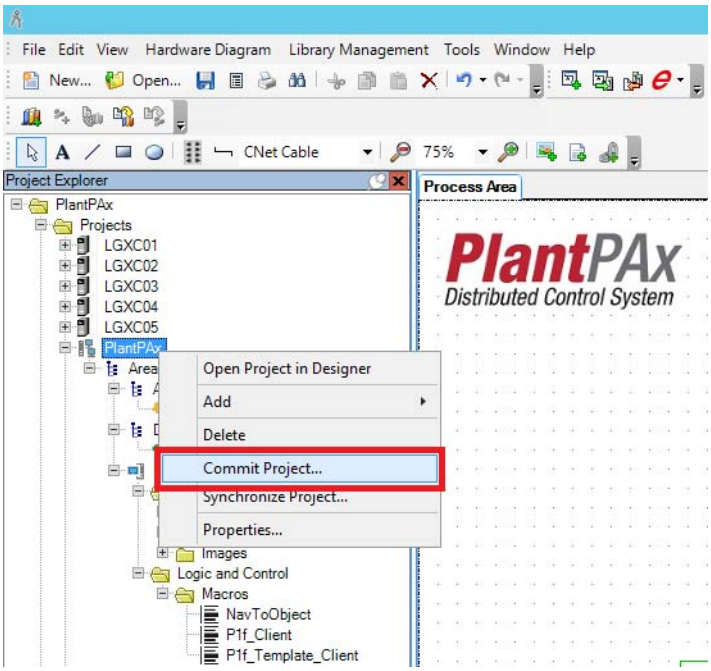
5. Repeat step 4 for each object that you need for your process strategies.
6. Save your work.

Commit the Project

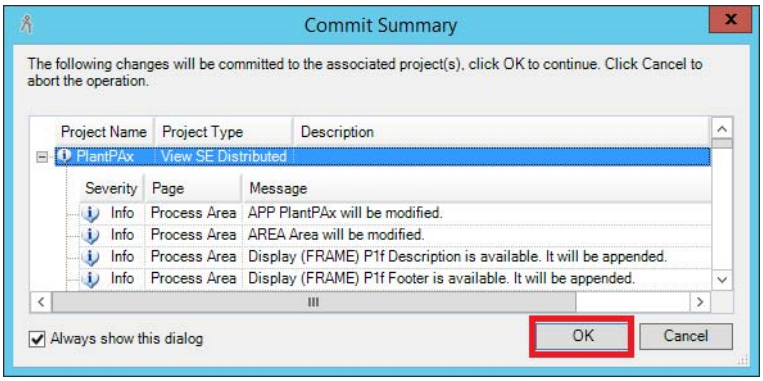
This section describes how to commit a project. The Commit option sends the data from an Architect project to the FactoryTalk View project for the respective servers: HMI, data, and alarm.

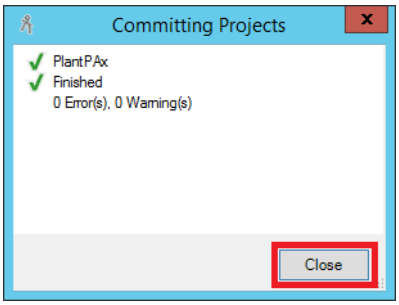
Complete the following steps:

1. In the Project Explorer pane, right-click the application (PlantPAx in the example) and choose Commit Project.

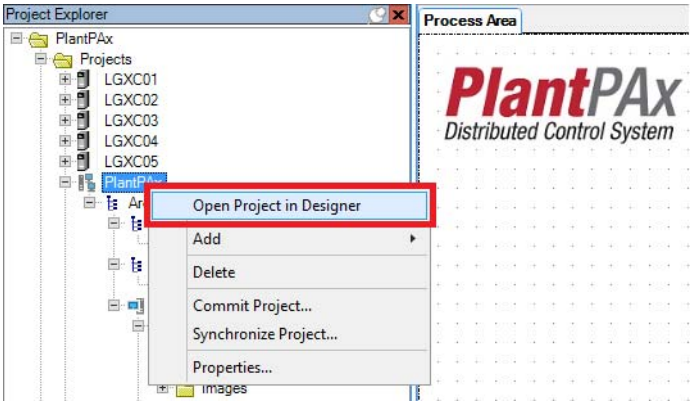


2. Click OK and Close on each of the respective Commit dialog boxes to complete the configuration of the servers.



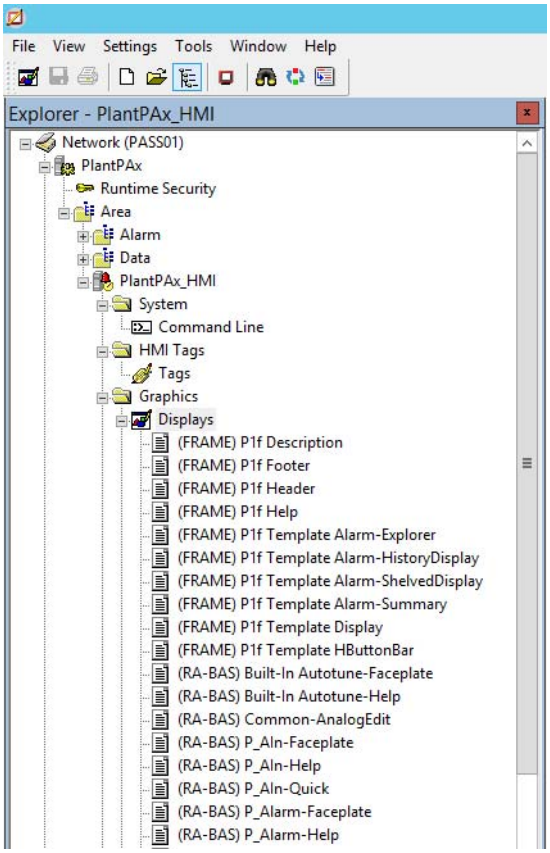


3. To confirm the commit action, in the Project Explorer pane, right-click the application (PlantPAx in the example) and choose Open Project in Designer.



The FactoryTalk View Studio window appears.

4. In the Explorer pane, open the PlantPAx>Area>PlantPAxHMI>Graphics>Displays folder.



This folder typically contains the FRAME, P1f, and RA-BAS display files.

Proceed to page 65 to create a FactoryTalk View SE client file.

Create an OWS Client File

In this section, you create a FactoryTalk View SE client file. Client files are used to launch a FactoryTalk View software client from the Operator Workstation (OWS). Once created, this client file can be copied to each OWS.

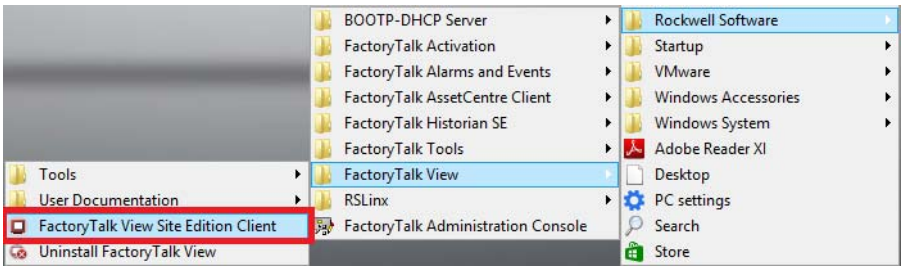
Use an Engineering Workstation or Operator Workstation with these procedures

EWS or OWS

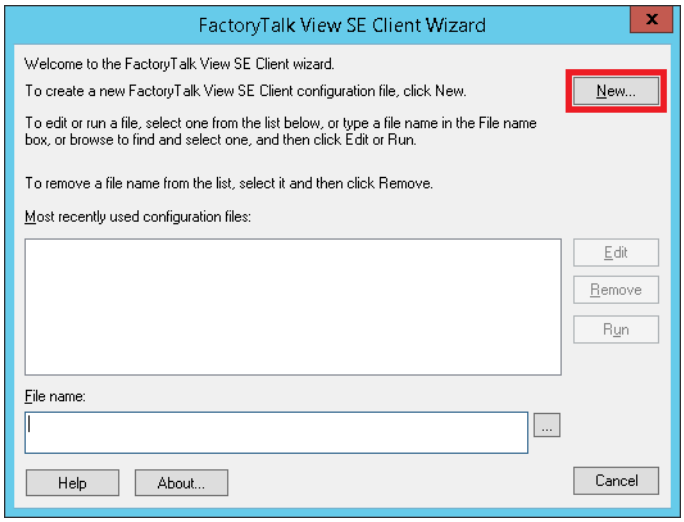
IMPORTANT Our procedure shows how to create the client file on an OWS. This procedure can also be used on an EWS.

Complete the following steps.

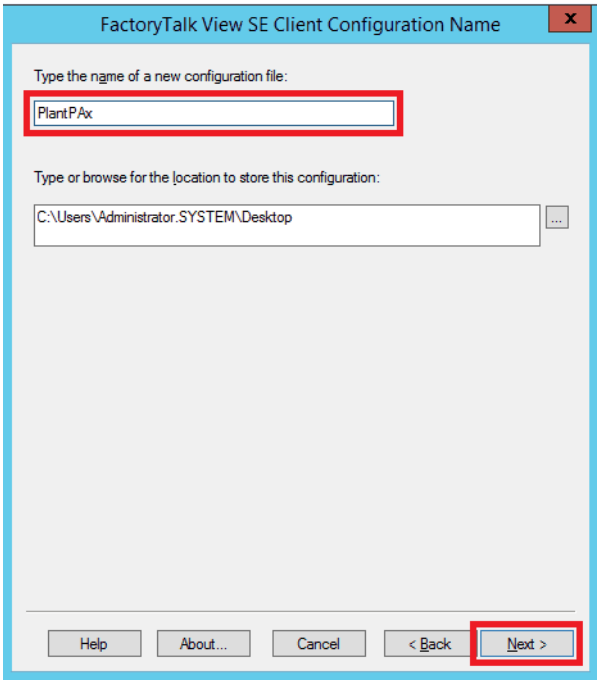
1. Click the Programs symbol and choose Rockwell Software®>FactoryTalk View>FactoryTalk View Site Edition client.



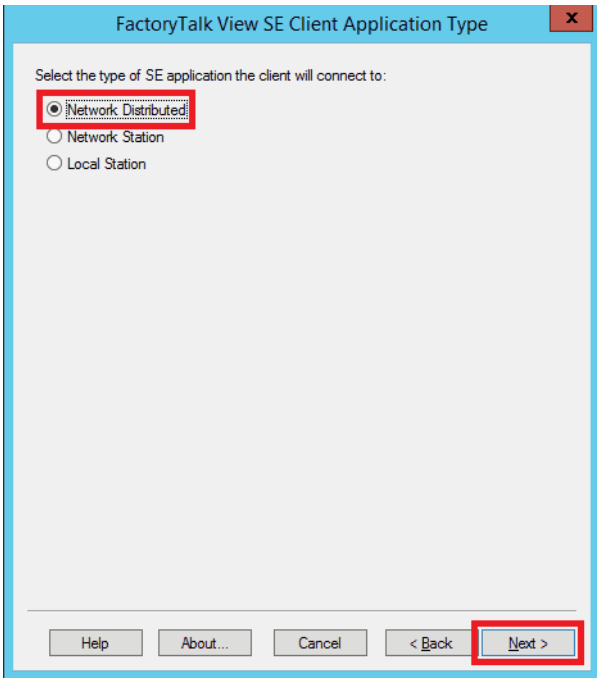
2. To create a client file, click New.



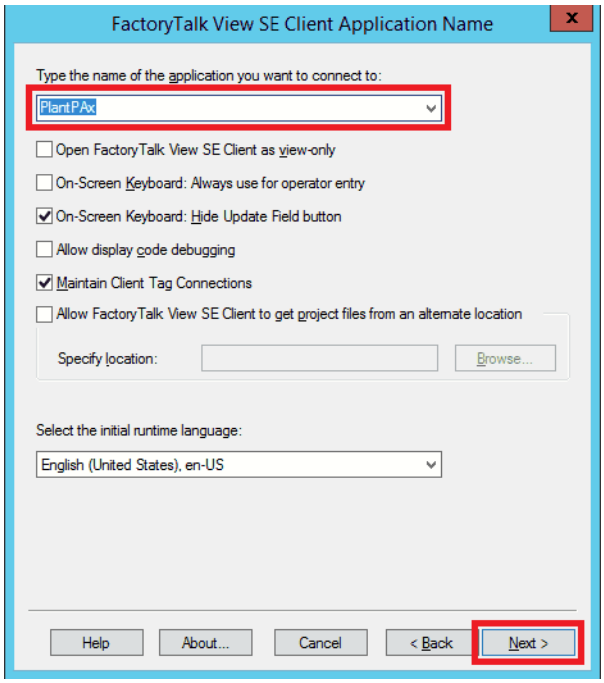
3. Type the name of the new client file and click Next.



4. Click Network Distributed or Network Station and click Next.

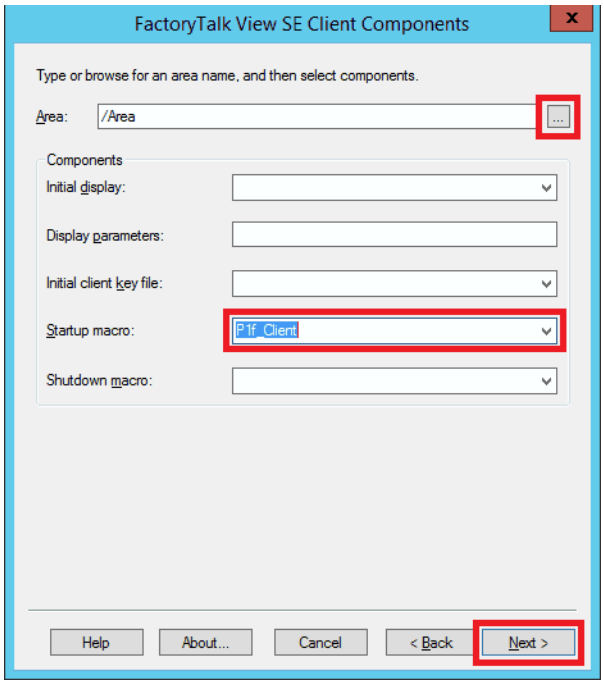


5. From the pull-down menu, choose the name of the application.



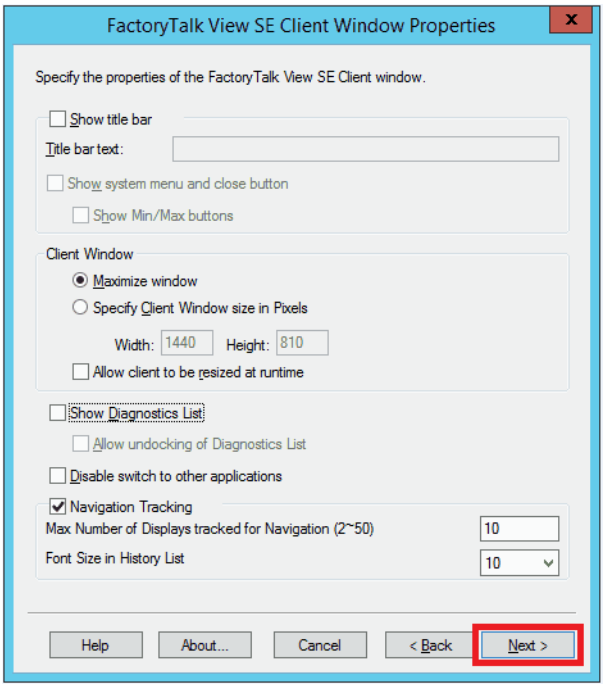
6. Accept the rest of the defaults and click Next.
7. Use Browse (...) to navigate to and choose an Area (Area in the example).
8. From the Startup macro pull-down menu, choose a startup macro (P1f_client in the example).

   The startup macro launches the initial displays and docks the navigation and alarm tool bars.
9. Click Next.



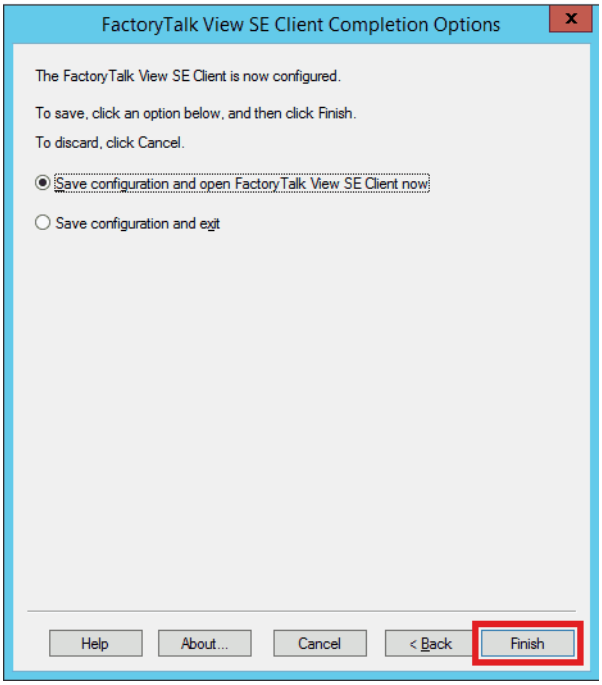
10. Check Maximize window and click Next.

    Make sure your selections in the checkboxes match the dialog box as shown.

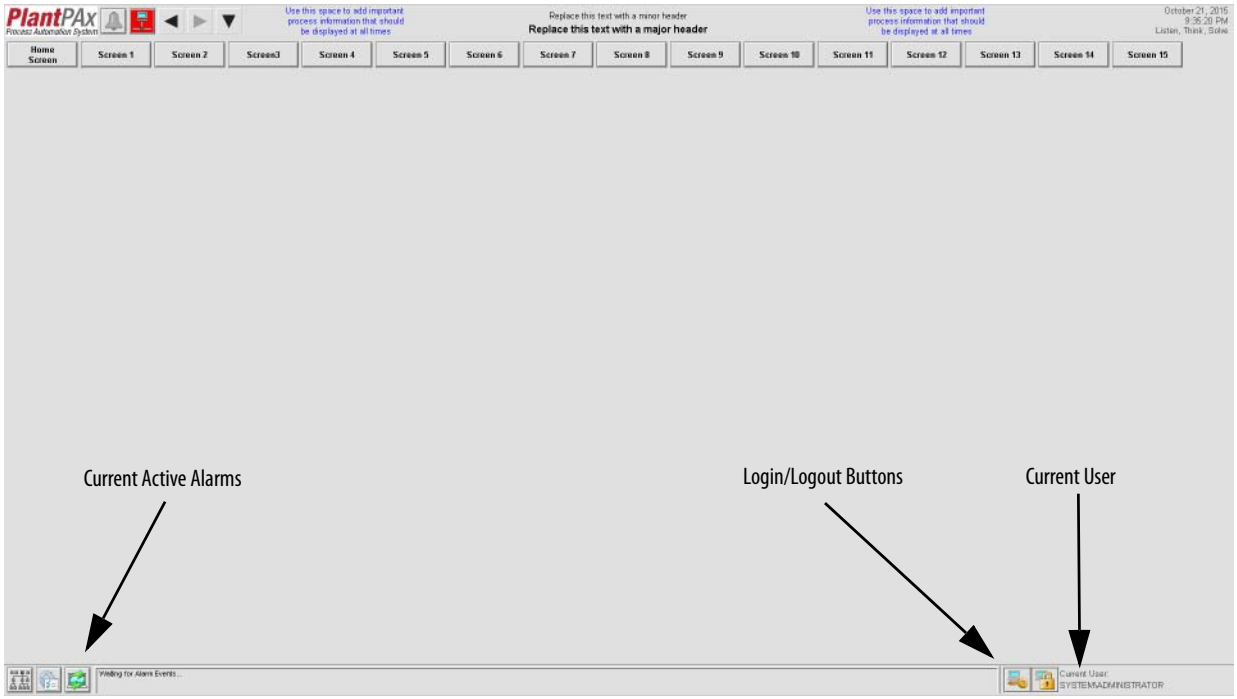


11. From the FactoryTalk View SE Client Auto Logout dialog box, click Next.

12. Accept the default setting and click Finish.



When the client file opens, your application window appears with the layout of the selected template.



Proceed to page 70 to learn about navigation features of your project.

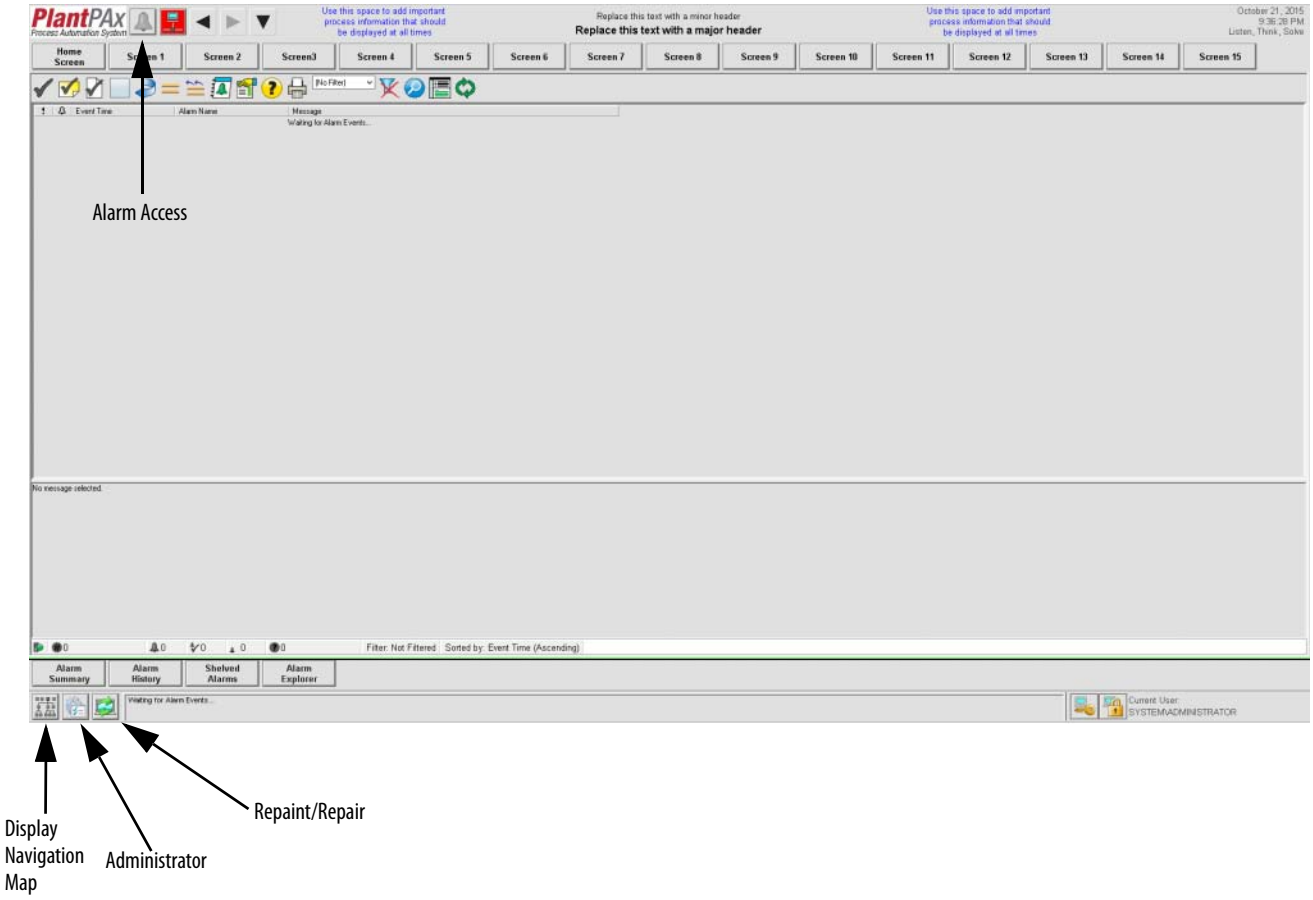
Explore Template Features

This section shows display navigation for your HMI project. We suggest you familiarize yourself with these features to enhance productivity with your templates.

IMPORTANT	Actual layout varies depending on the HMI template selection and the revision being applied.

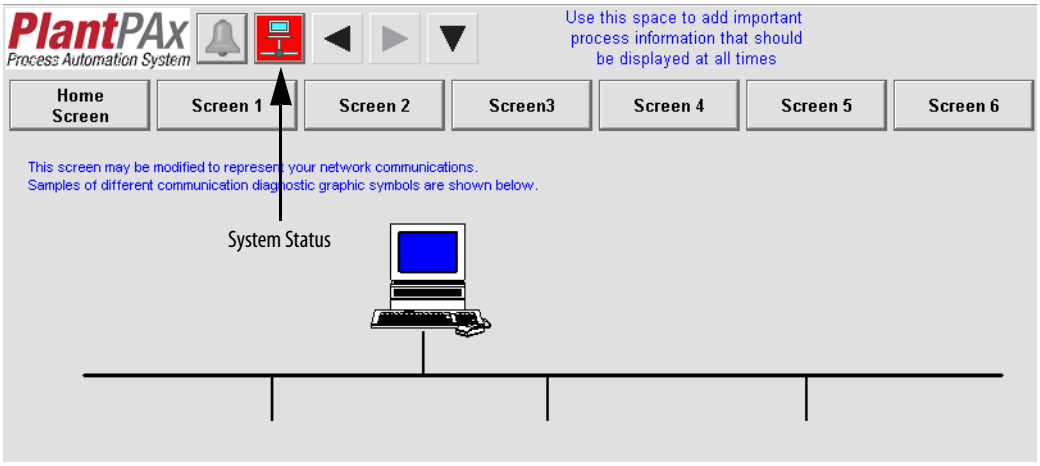
Alarm Tools

Click the bell icon to access active alarms. Tabs appear near the bottom-left of the window to access an alarm summary, alarm history, shelved alarms, and an alarm explorer.



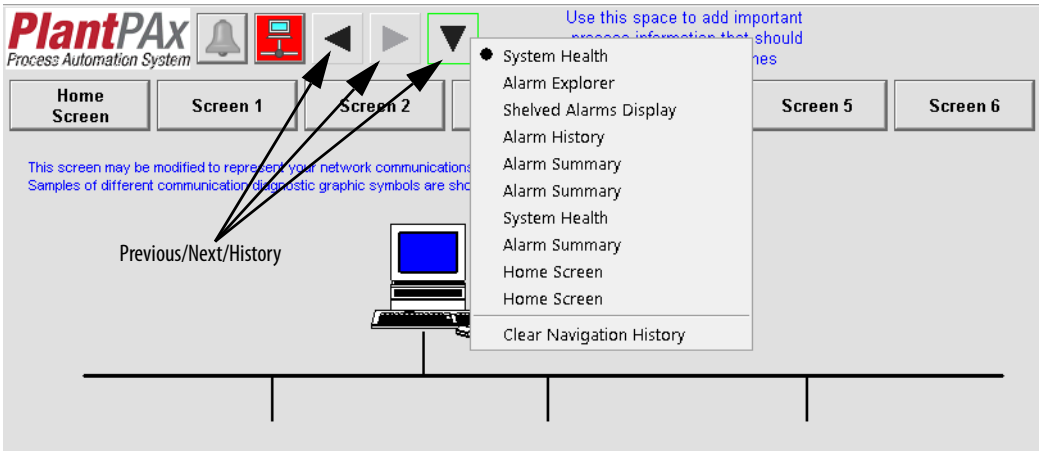
System Status

Click the System Status icon to view system diagnostic.

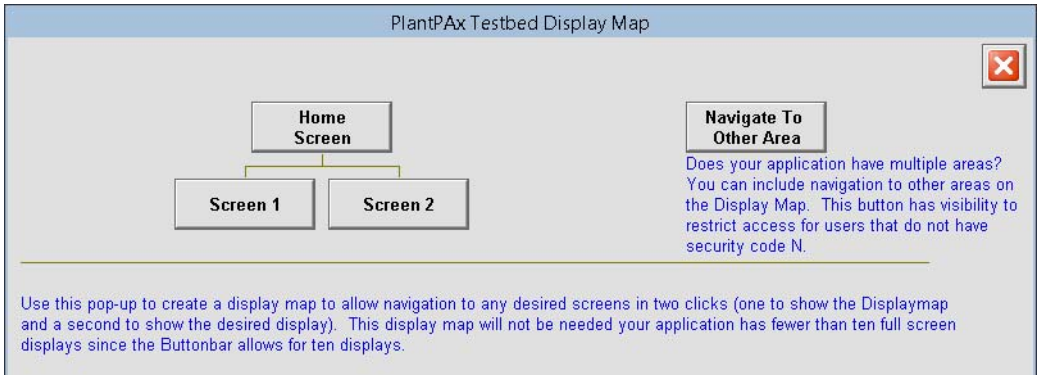


Navigation Tools

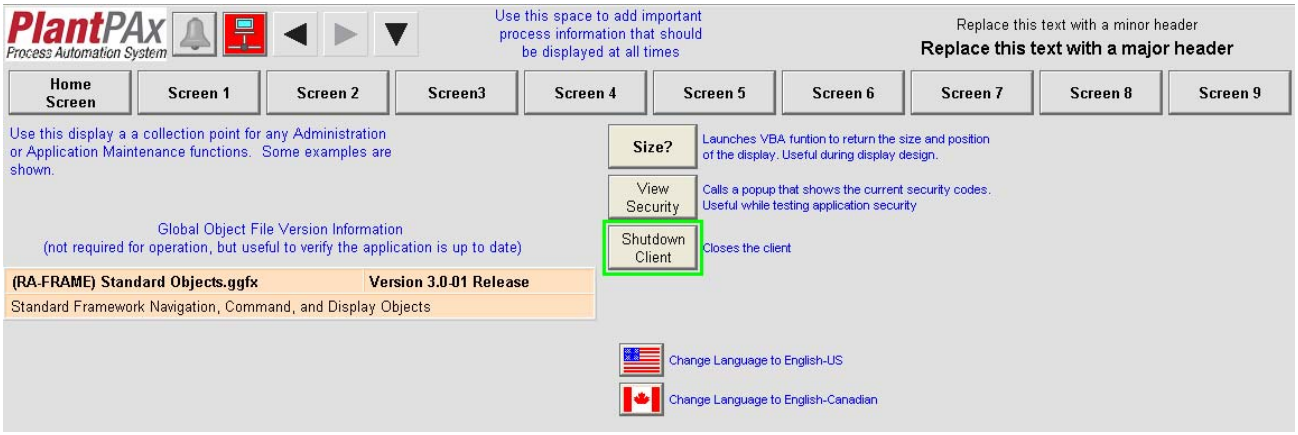
There are three quick screen navigation buttons: Previous, Next, and History.



The Display Navigation Map icon  (at the bottom of the application window) lets you move around your application faster. This feature is typically used for applications that have more than 10 displays. Use the button bar (page 69) for fewer than 10 displays.

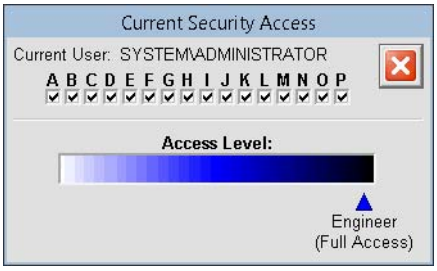


The Administrator icon  accesses information about the system, including display element sizes, version numbers, and security codes.



The View Security button 

accesses the Current Security Access display that shows the security level of the current user. The security settings for a user cannot be changed from this view-only display.



The Repaint/Repair icon  can be used to make edits to an application. After a change is made, click the icon to refresh the application with the changes. This option can also be used to repaint the application if displays are not shown properly.

Proceed to View and Modify HMI Objects.

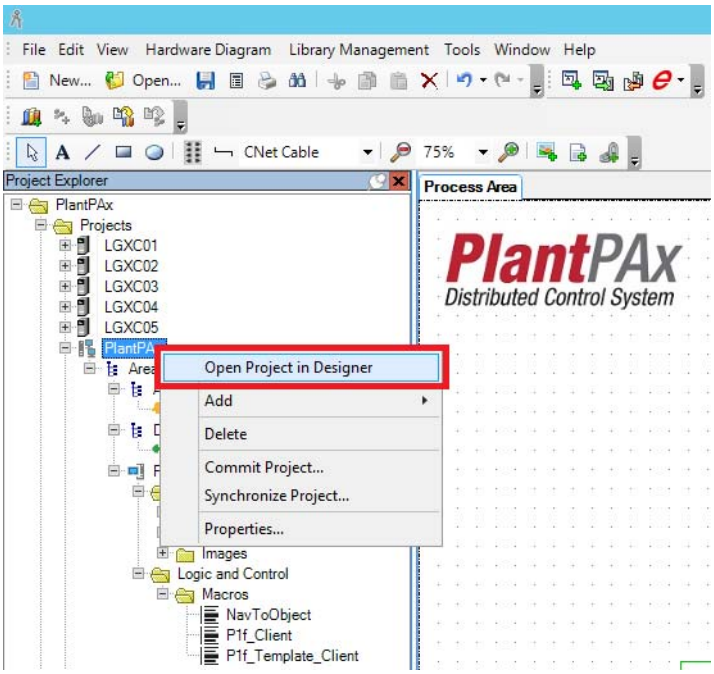
View and Modify HMI Objects

Complete the following steps to modify HMI objects within an Architect product by using FactoryTalk View Studio software.

Use an Engineering Workstation with these procedures

EWS01

1. In the Project Explorer of a Studio Architect project, right-click an application (PlantPAx in the example) and choose Open Project in Designer.

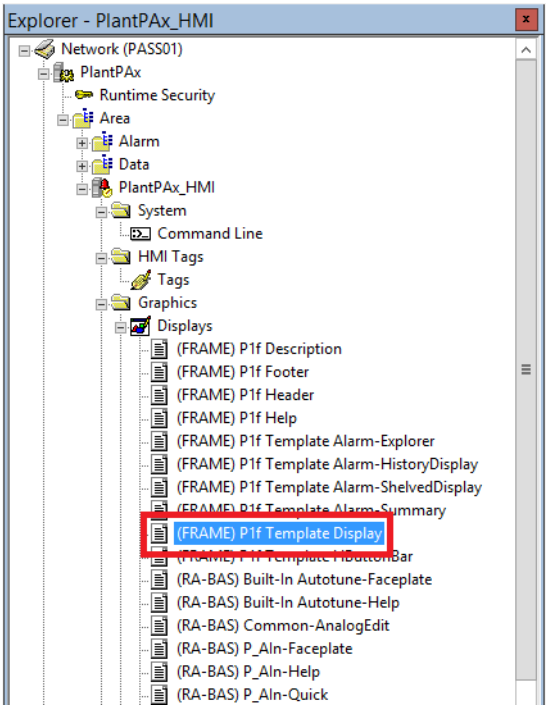


   Wait a short time while the FactoryTalk View Studio software opens.

   Notice that the project structure and content in FactoryTalk View Studio appears as it does in an Architect project.

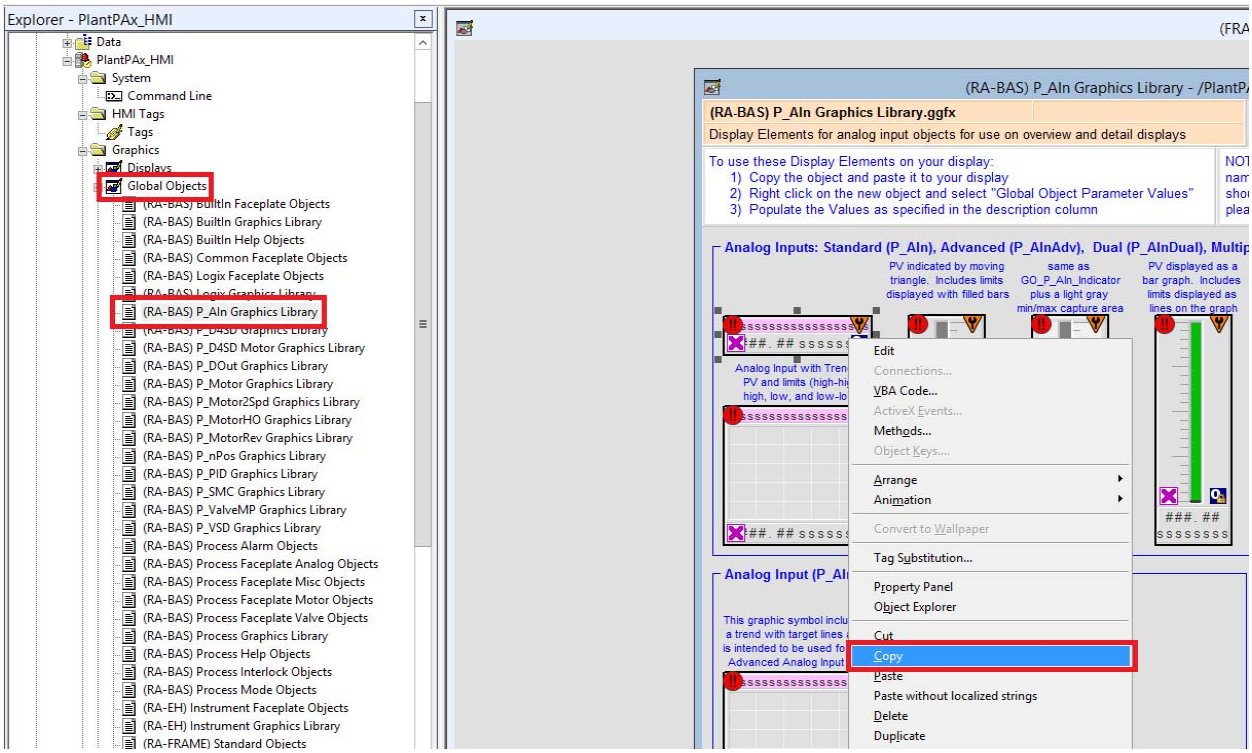
2. Click to expand the Areas, HMI servers, and Displays under the Graphics folder.

3. Double-click (FRAME) P1f Template Display and choose Duplicate.

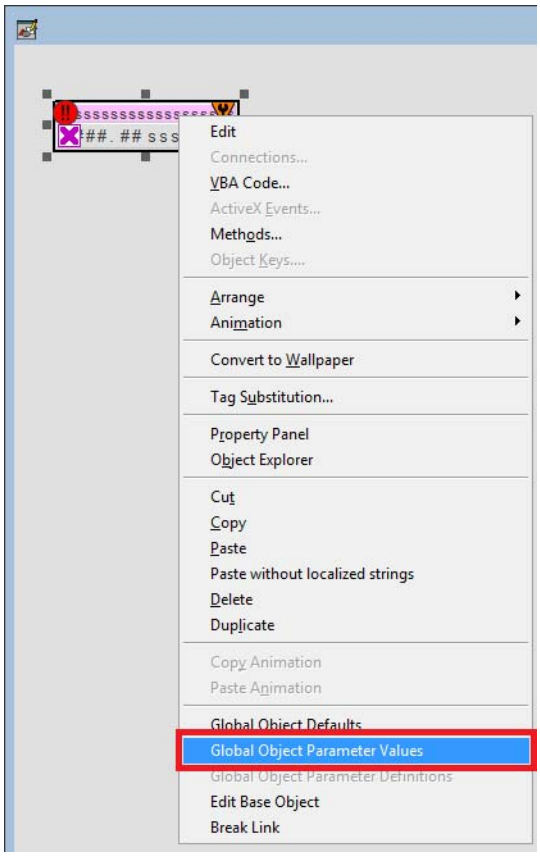


A window appears with the selected template.

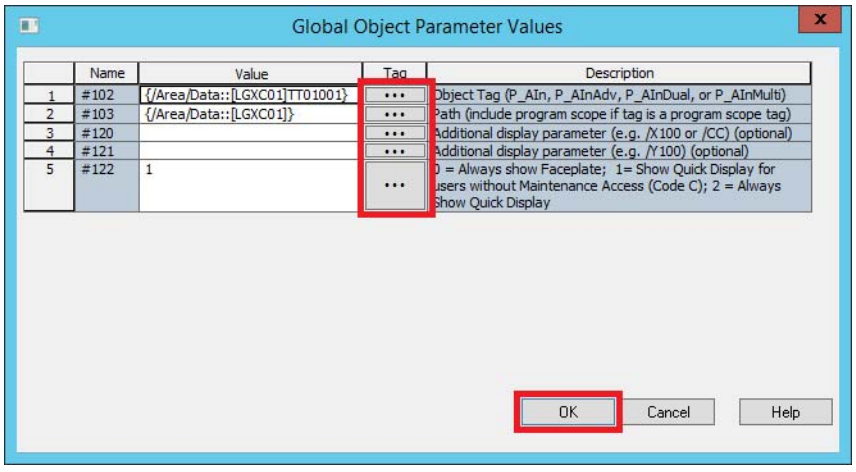
4. Rename the display (for example, Display screen 1) and click OK.
5. Open the renamed display.
6. Expand Global Objects and double-click (RA-BAS) P_AIn Graphics Library to open a collection of display elements for analog input objects.



7. Right-click an object and choose Copy.
8. Paste the object onto the renamed display.
9. Right-click the object and choose Global Object Parameter Values.



The Global Object Parameter Values dialog box appears.



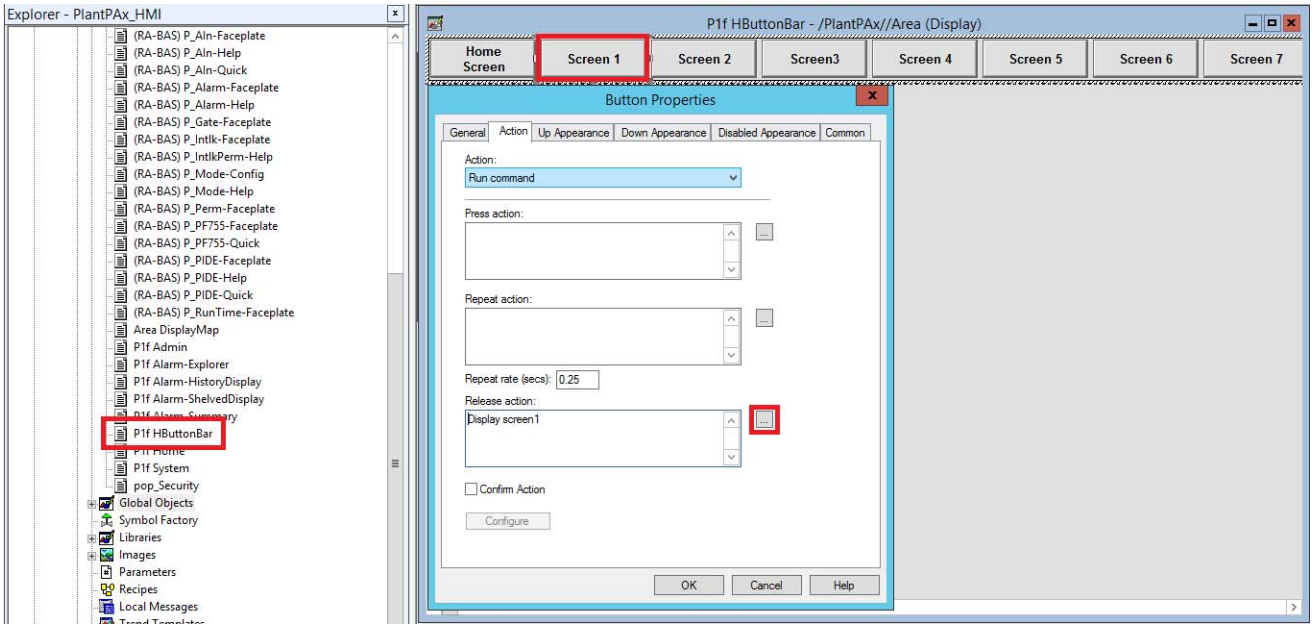
10. Click Browse (ellipsis '...') to select tags and click OK.

    For details on how to configure global object parameter values, see Chapter 4 in the Rockwell Automation Library of Process Objects Reference Manual, publication PROCES-RM002.

11. In the left pane of the Project Explorer under Global Objects, click P1f HButtonbar

    The button bar appears.

12. Double-click twice the Screen 1 button to open the Button Properties dialog box.



The renamed display (Display screen 1 in the example) is now associated with the Screen 1 button.

To change the name of the Screen 1 button, use the tools in the Up Appearance tab of the Button Properties dialog box.

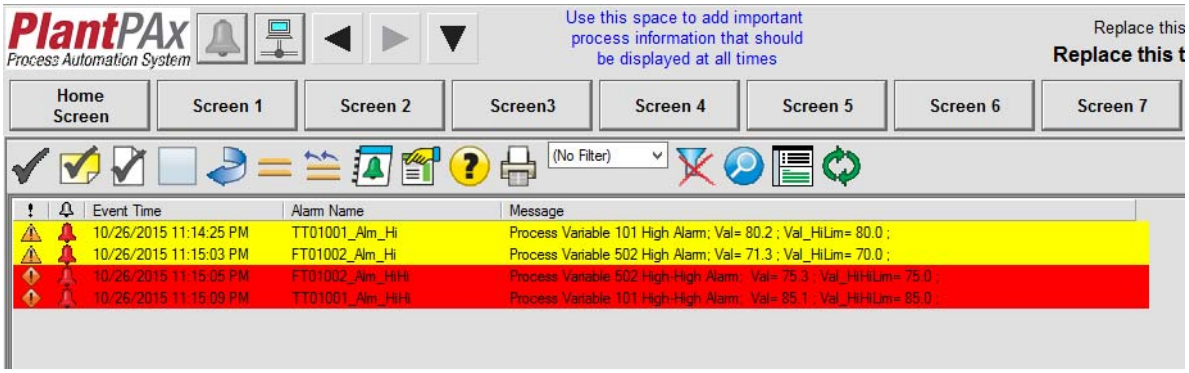
Configure Alarms

This chapter describes how to configure your process alarms on the PlantPAx® system.

Alarms are a critical function of a distributed control system. Effective alarm systems direct the operator's attention to improve the productivity, safety, and environment of a process plant. Ineffective alarm systems have often been cited as contributors to major environmental and safety incidents. This has led to the development of industry standards that govern alarm management engineering practices and alarm system performance metrics.

This chapter does not cover the engineering practices required to fully apply alarm management standards. However, this chapter does cover the procedure required to implement alarms on the PlantPAx system to make sure of system performance and alignment with the functionality expectations of the industry standards.

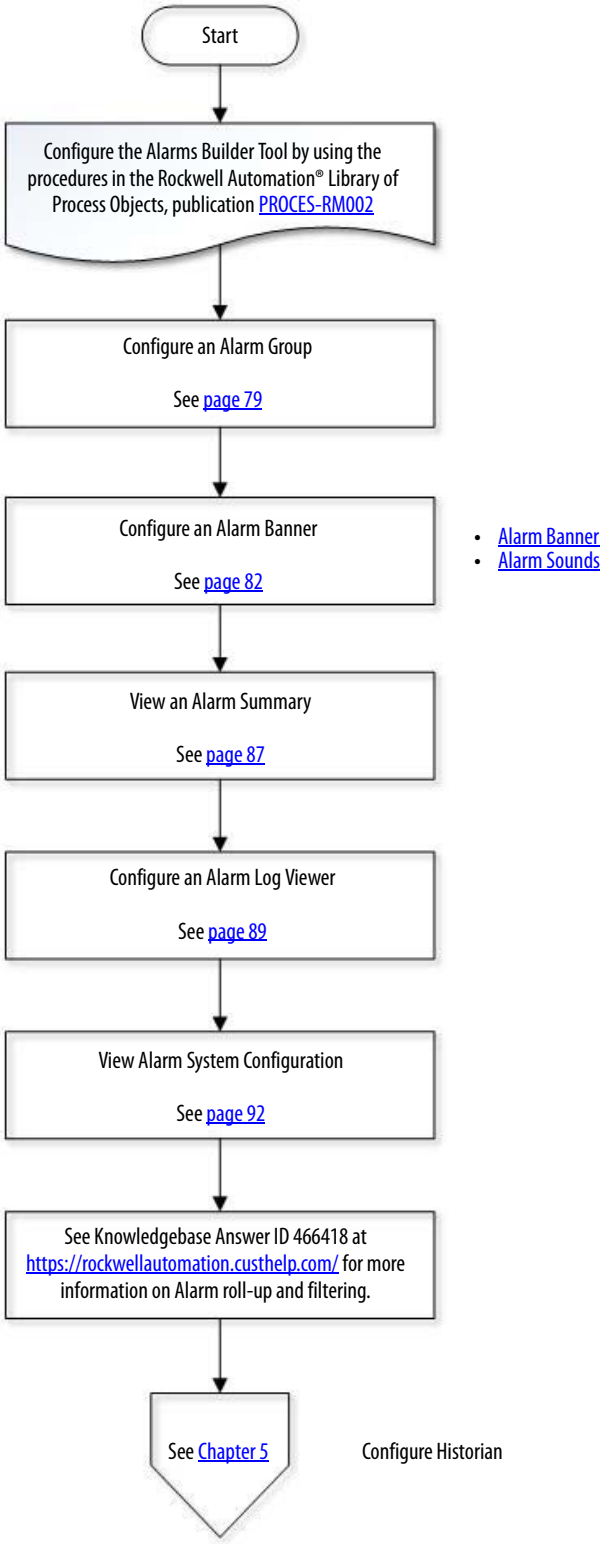
When a controller detects an alarm condition, the server publishes the information to a subscribing OWS via FactoryTalk Alarm and Event Services. This chapter includes how to configure visualization components, including an alarm summary, alarm log viewer, and alarm banner.



IMPORTANT Install the Alarms Builder Tool to simplify alarm tag creation. Each alarm object that comprises the Library of Process Objects must be enabled to be created by Alarms Builder.

Figure 6 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 6 - Alarm Workflow



Considerations

Consider the following suggestions before starting this chapter:

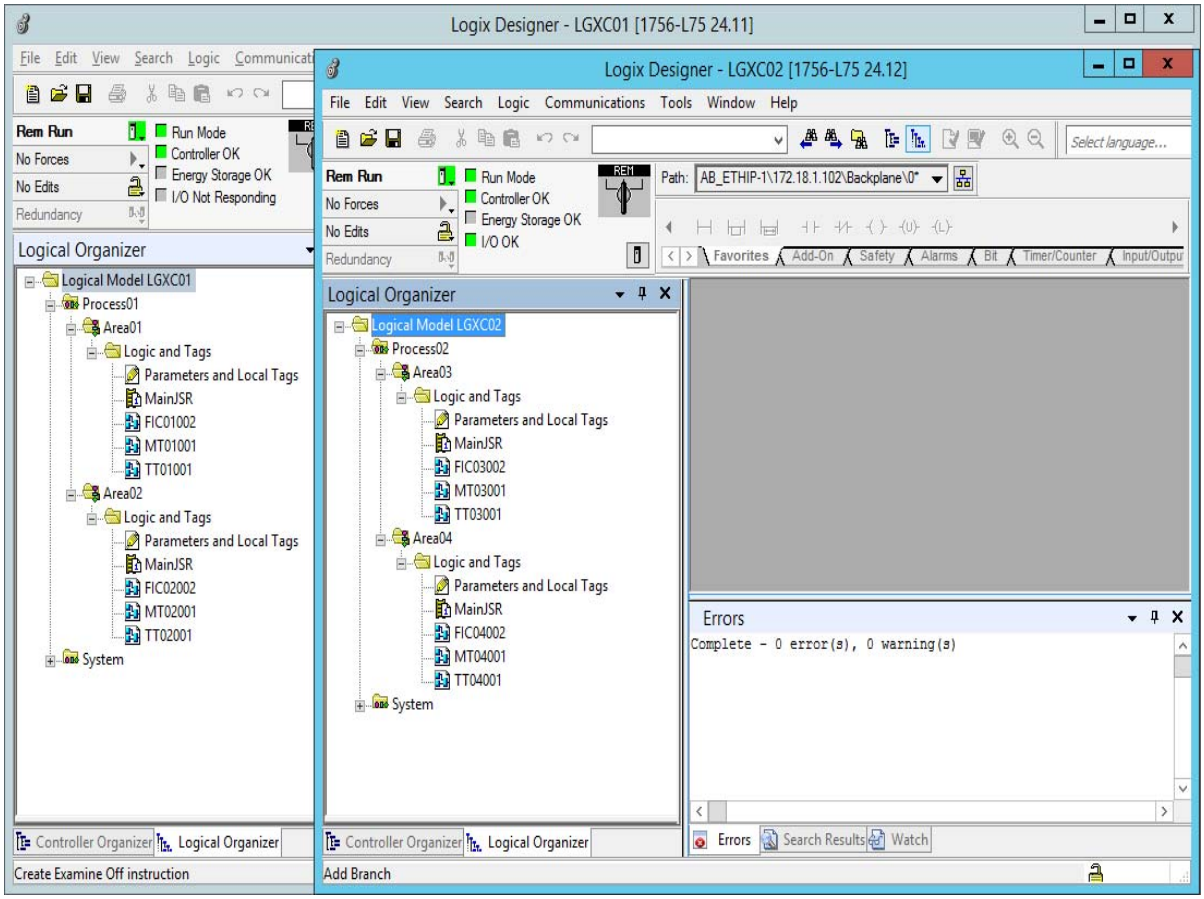
- Tag-based alarms are recommended to generate alarms in the PlantPAx system. Device-based alarms can be used, but we recommend that you limit their use to enhance system performance.
- Perform any alarm configurations in Chapter 8 of the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.
- Review the HMI template information in Chapter 3.

Configure an Alarm Group

This section describes how to configure a group of alarms for a specific area. Complete these steps for each group of alarms for each area.

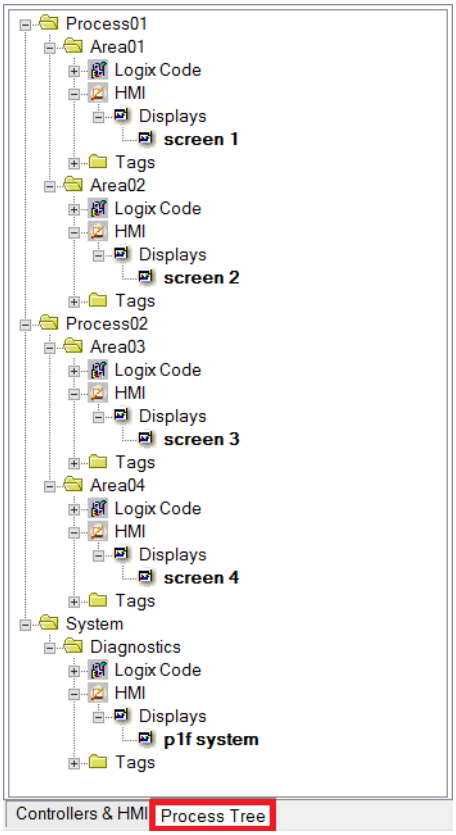
The following example shows two controllers and each has two areas.

- Controller LGXC01 (in the Process01 folder) contains Area01 and Area02.
- Controller LGXC02 (in the Process02 folder) contains Area03 and Area04.

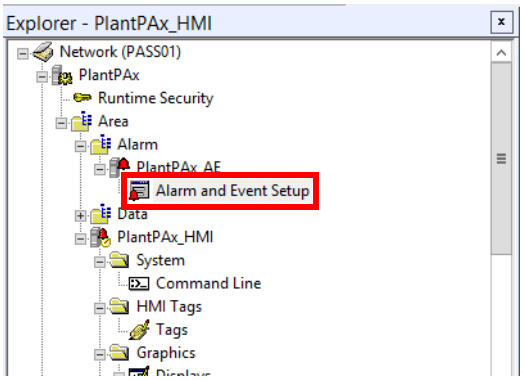


1. Use Alarms Builder to import your alarms as documented in Appendix B of the Rockwell Automation Library of Process Objects Reference Manual, publication PROCES-RM002.

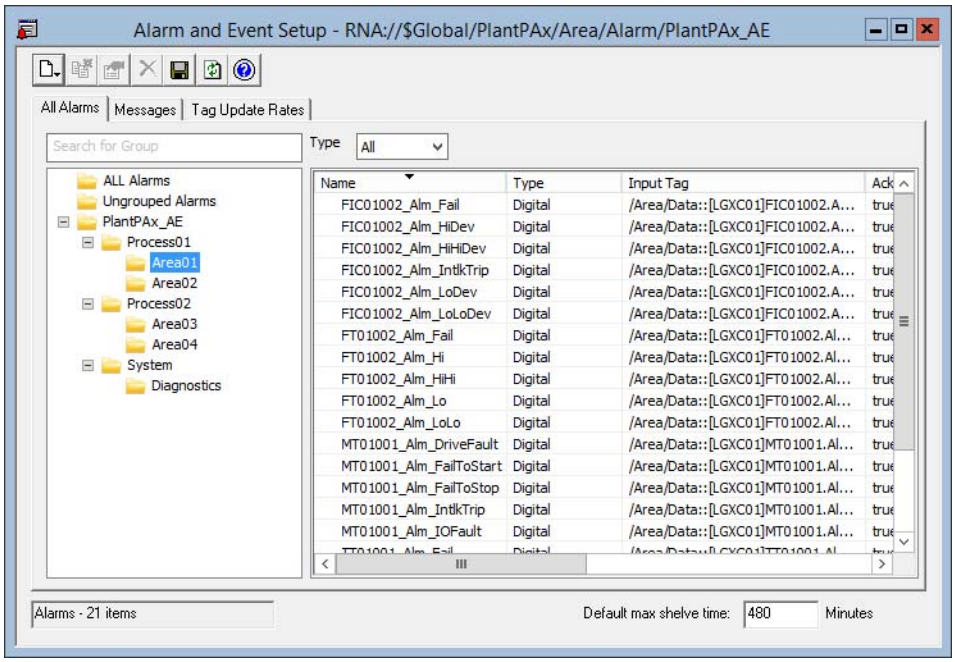
IMPORTANT	When using Alarms Builder, it is expected that the Process Tree is created. To create the group organization, you must create the display association. We recommend that you create an entire system organization by attaching multiple controllers, different programs, routines, and so forth. These items can be part of one group to be the foundation of the alarm grouping.



2. In the FactoryTalk View Studio software, open PlantPAx>Area>Alarm>PlantPAx_AE>Alarm and Event Setup.



The Alarm and Event Setup window appears.



By following the Alarms Builder procedure, it is expected that the Alarm and Events Grouping is similar to the Process Tree organization.

3. To add more groups, right-click on your project (PlantPAx in the example) and choose Add Group.

   Or, if you like, you can drag-and-drop groups and alarms.

4. Click the Save icon.

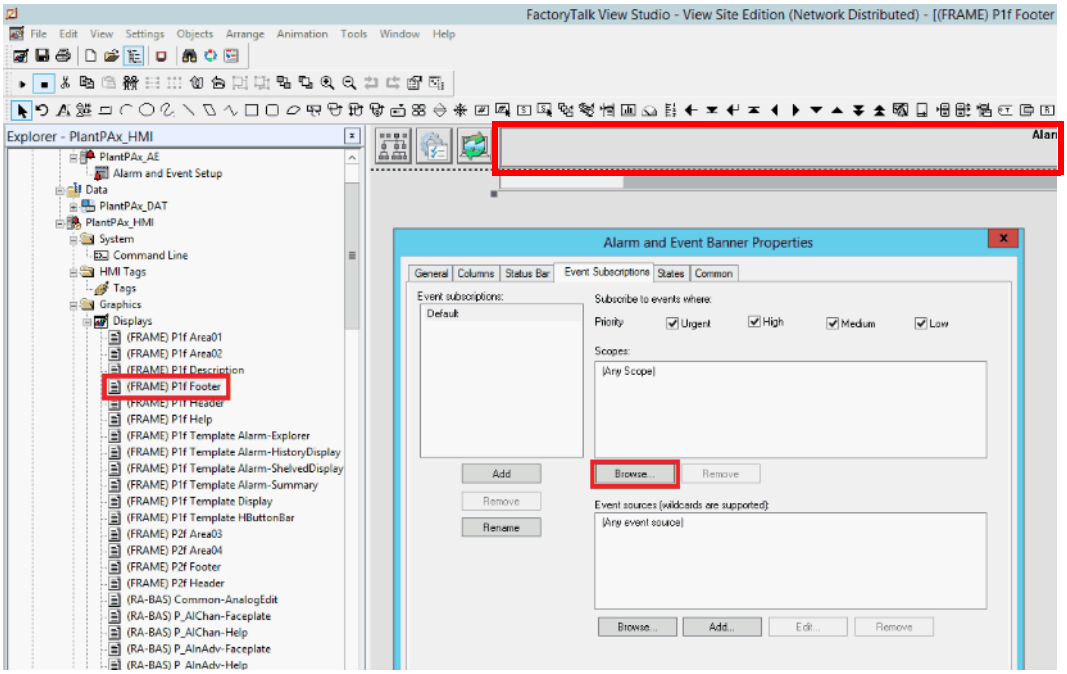
Configure an Alarm and Event Banner

This section how to configure the visual and audible components of an alarm state.

Alarm Banner

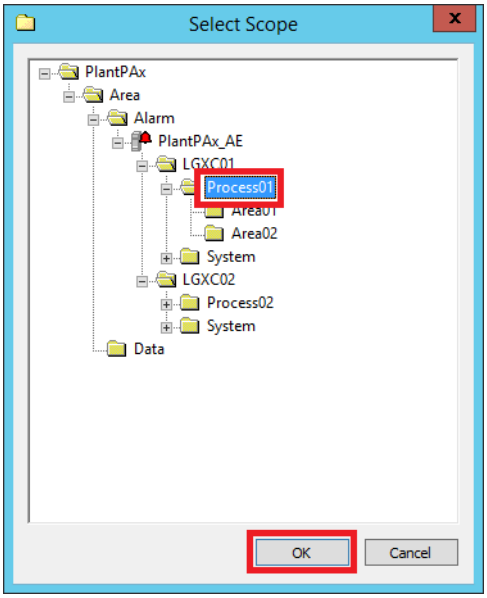
Complete the following steps to configure an alarm banner that provides a visual representation of the alarm status.

1. In FactoryTalk View Studio, open PlantPAx>Area>PlantPAx_HMI> Graphics>Displays>(FRAME)P1f Footer.
2. Double-click in the icon bar to access the Alarm and Event Banner Properties dialog box.
3. In the Event Subscriptions tab, click Browse (ellipsis ...).

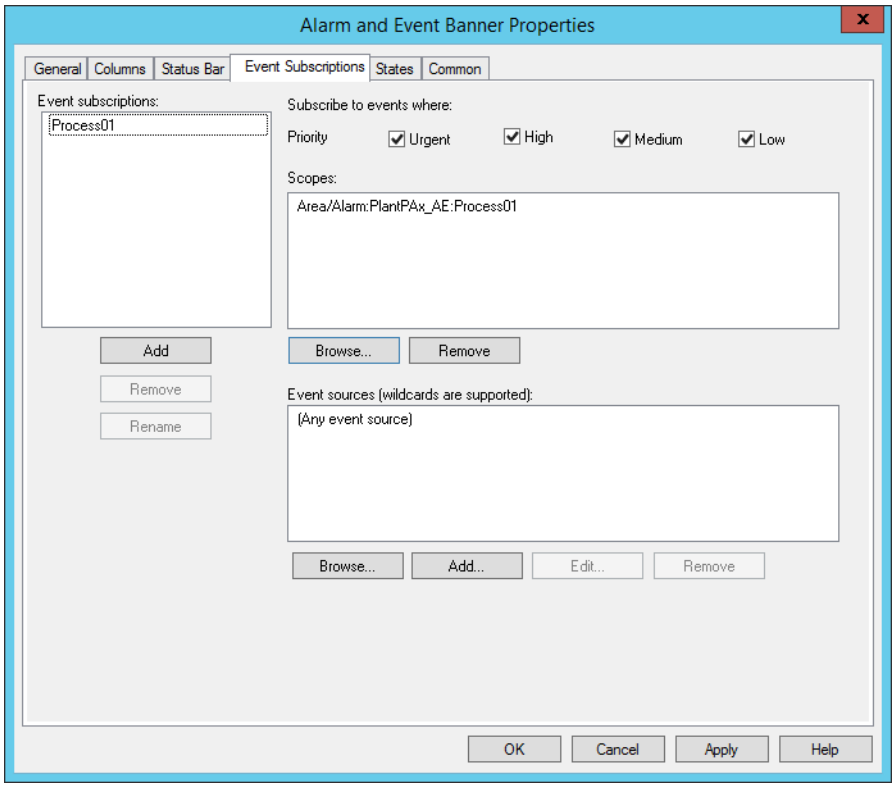


The Select Scope window appears.

4. Click Process01 and click OK.



5. Click OK to use the scope defaults on the Alarm and Event Banner Properties dialog box.

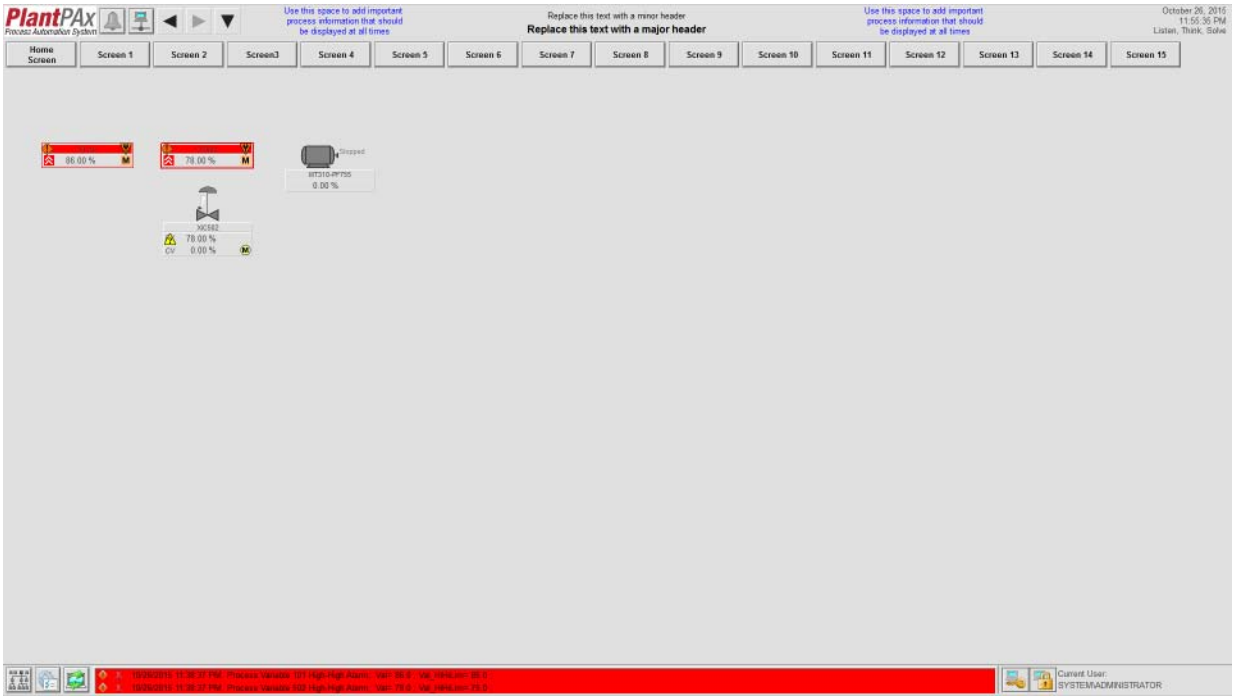


If you are using multiple Process areas, such as Process01 and Process02, you must create different scope sources.

For example: Area/Alarm:PlantPAx_AE:Process01.

Area/Alarm:PlantPAx_AE:Process02.

The alarm banner appears in the footer of the Application window.

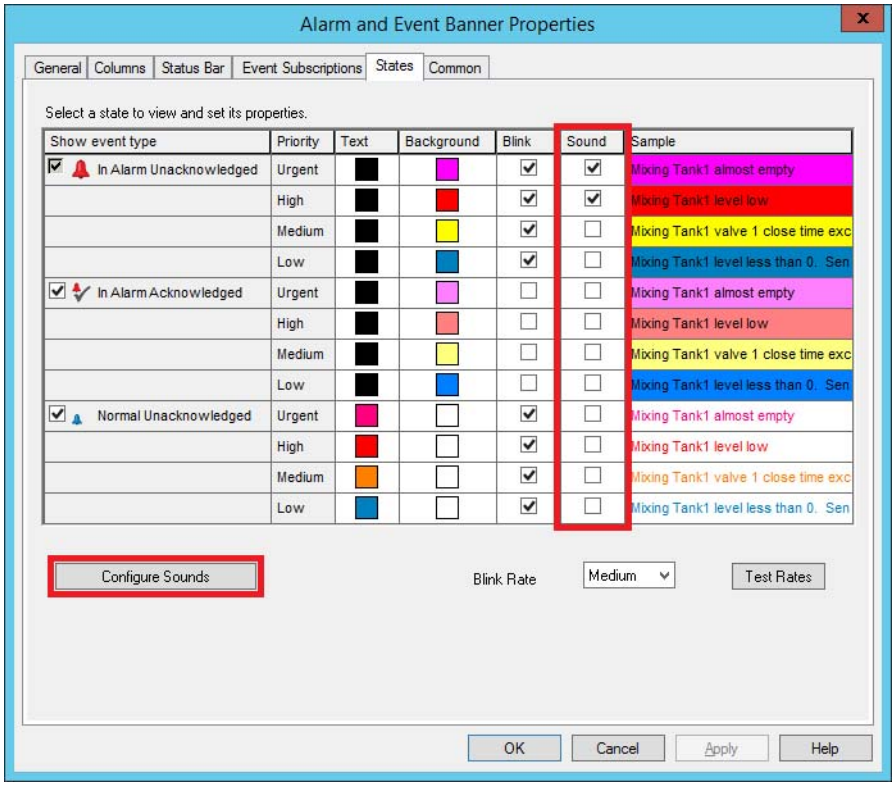


Alarm Sounds

Complete the following steps to configure sounds that provide an audible alert for an alarm.

1. Repeat step 1 and step 2 on page 82.
2. Click the States tab.

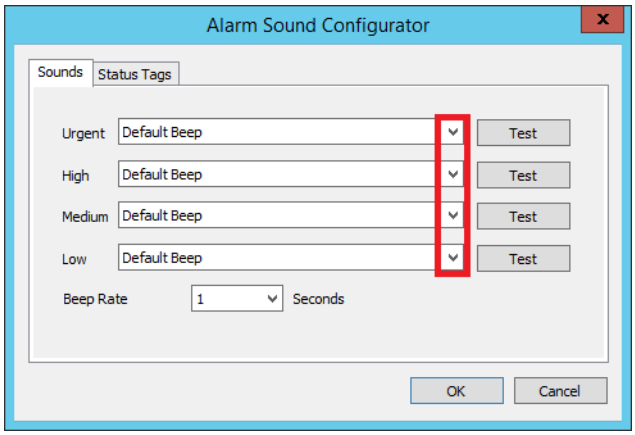
3. Check the desired sound actions in the Sound column and click Configure Sounds.



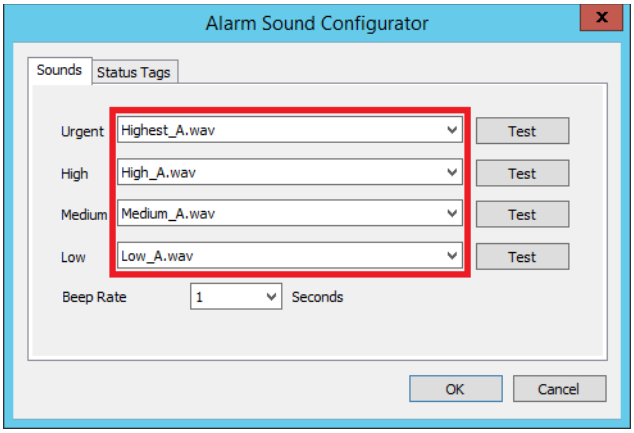
The Alarm Sound Configurator dialog box appears.

IMPORTANT We recommend that you change the default beep to different sounds according to the alarm priority. The default beep is the sound that your local computer generates.

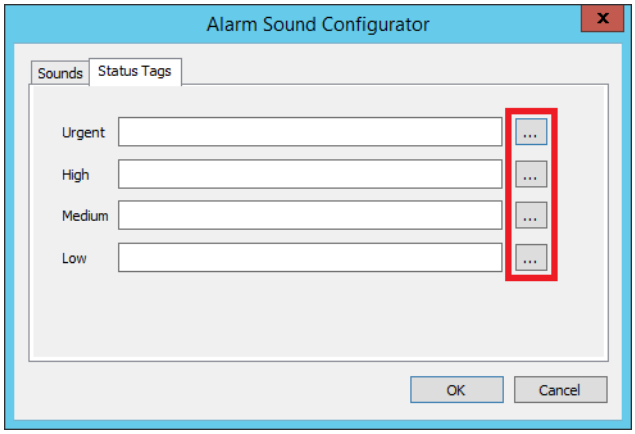
4. For each alarm priority, select a sound file from the pull-down list.
5. When you are finished selecting sound files, click OK.



Your configured Alarm Sound Configurator dialog box looks similar to the following figure.



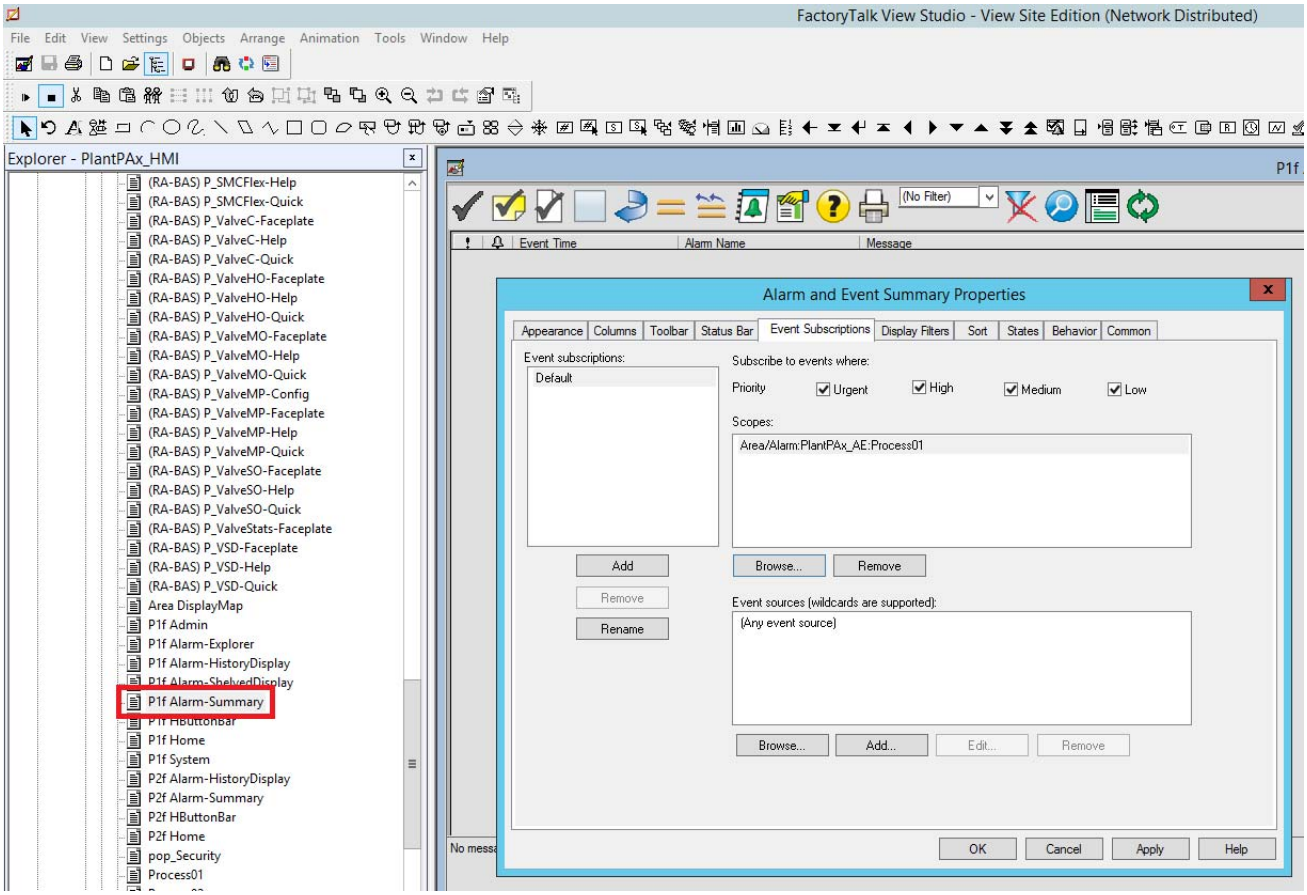
If necessary, it is possible to send sound information to the controller to create a control for a physical horn that can be configured in the Status Tags tab.



View an Alarm Summary

Complete these steps to view alarms in Summary mode.

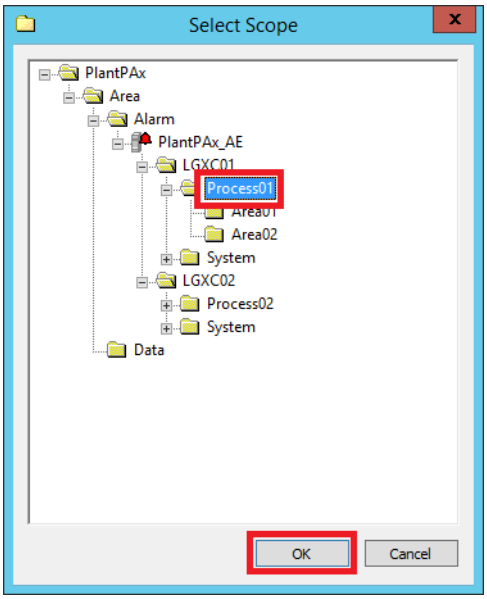
1. In the FactoryTalk View Studio software tree, open PlantPAx>Area>PlantPAx_HMI>Graphics>Displays>P1f Alarm Summary.
2. Double-click in the summary object.



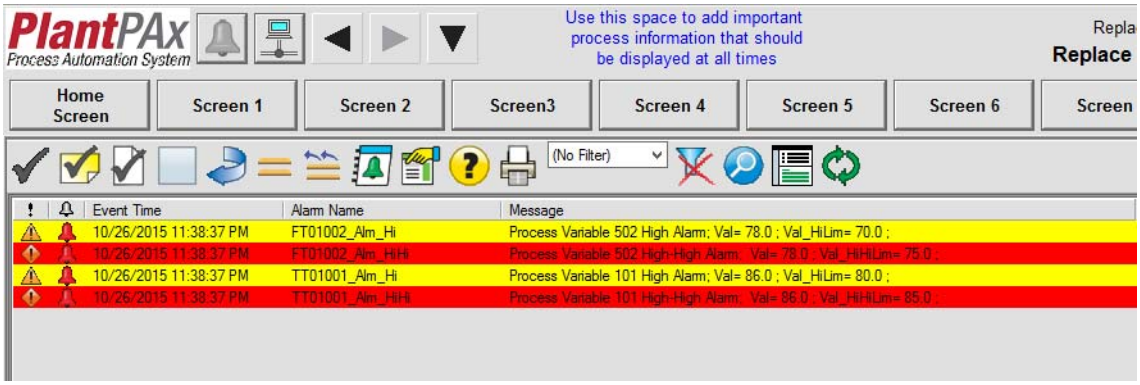
The Alarm and Event Summary Properties dialog box appears.

3. In the Event Subscription tab, click Browse (ellipsis "...") under the Scope text box.

The Select Scope dialog box appears.



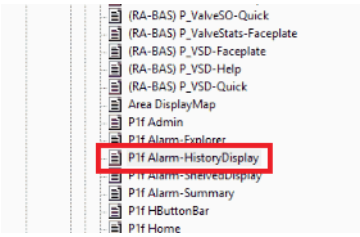
The Alarm Summary dialog box appears.



Configure an Alarm Log Viewer

You can view and print alarm history databases from the Alarm and Event log. Complete these steps.

1. In the FactoryTalk View Studio software tree, open PlantPAx>Area>PlantPAx_HMI>Graphics>Displays>P1f Alarm-History.



   The Alarm and Event Log Viewer Properties dialog box appears.

2. Double-click in the P1f Alarm-History object.

   The Alarm and Event Log Viewer Properties dialog box appears.

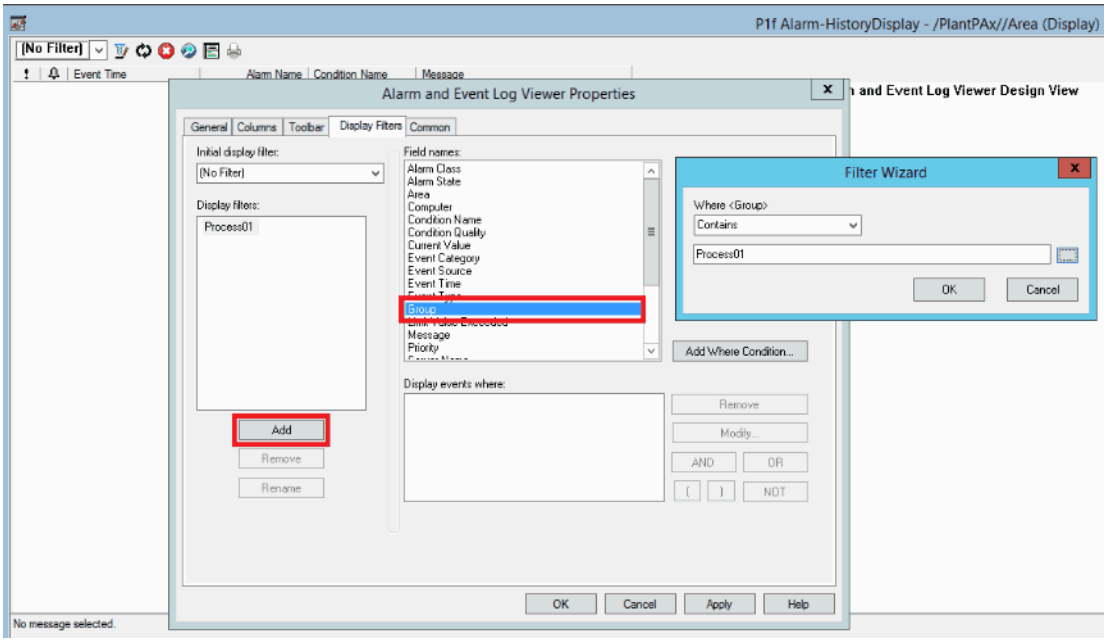
3. On the Display Filters tab, click Add and type the name of the filter (Process01 in the example).

4. Select a group and click Add Where Condition.

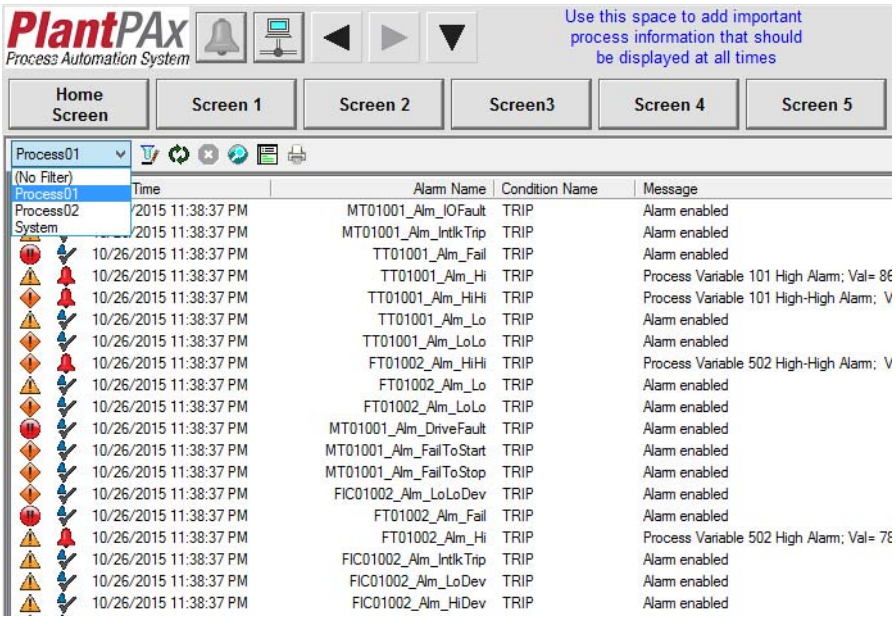
   The Filter Wizard dialog box appears.

5. Select a 'Where <Group>' from the pull-down list (Contains in the example).

6. Click ... and select a group name (Process01 in the example).



7. On the Application window, click the Program pull-down arrow.

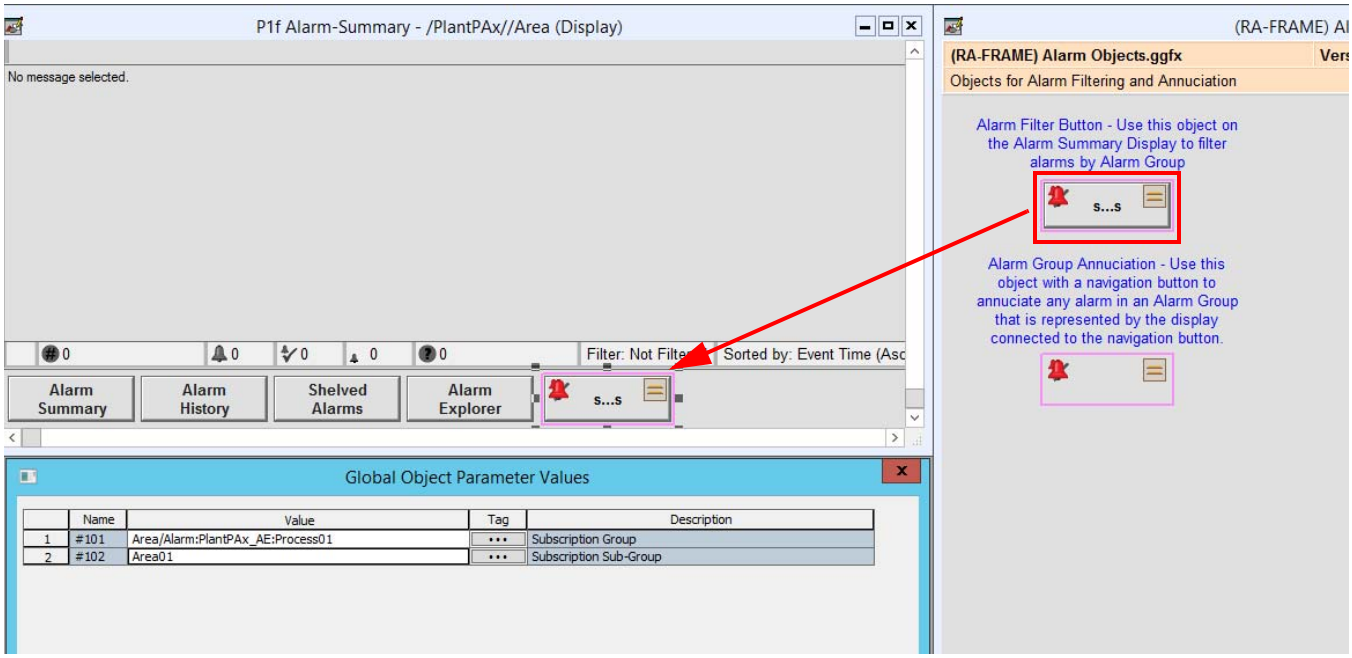


8. Select a program (Process01 in the example) to view the alarm log.

   You can also configure global objects to filter and announce alarms by alarm group. The objects are in the Rockwell Automation Library of Process objects.

9. To filter by alarm group, complete these steps.

   a. From the Alarm Objects in the Library global objects folder, drag-and-drop the Alarm Filter Button onto the Alarm Summary screen.



   b. Right-click the global object and choose Global Object Parameter Values.

The Global Object Parameter Values dialog box appears.

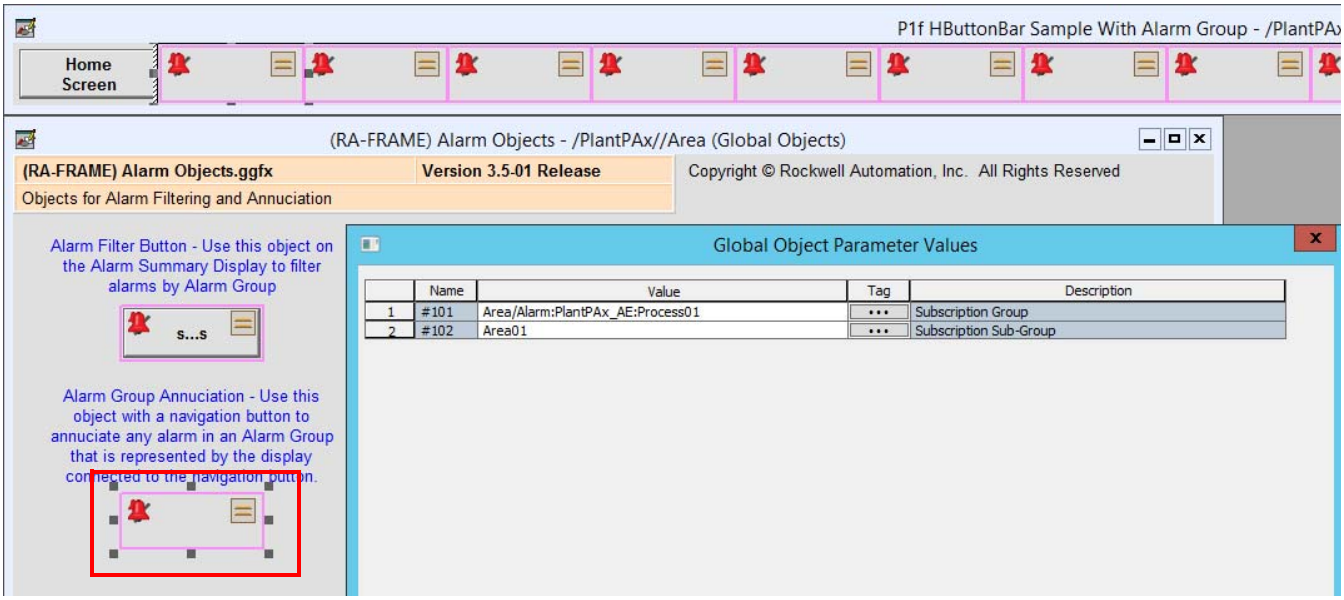
c. For the #101 parameter, type a subscription group.

d. For the #102 parameter, type a subscription sub-group.

e. Click OK.

10. To configure a global object to annuciate an alarm on top of a navigation button, complete these steps.

a. From the Alarm Objects in the Library global objects folder, right-click the alarm button.



b. Choose Global Object Parameter Values.

The Global Object Parameter Values dialog box appears.

c. For the #101 parameter, type a subscription group.

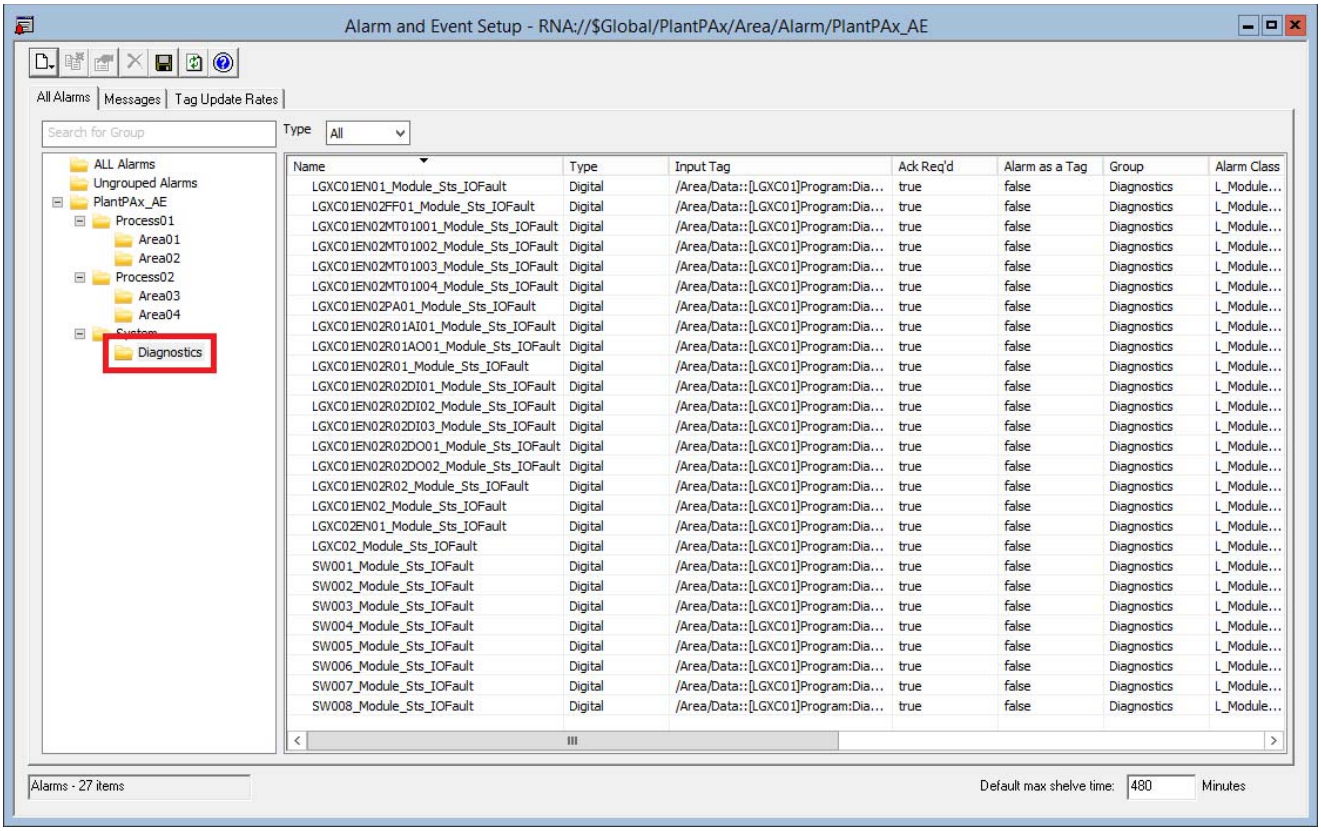
d. For the #102 parameter, type a subscription sub-group.

e. Click OK.

View Alarm System Configuration

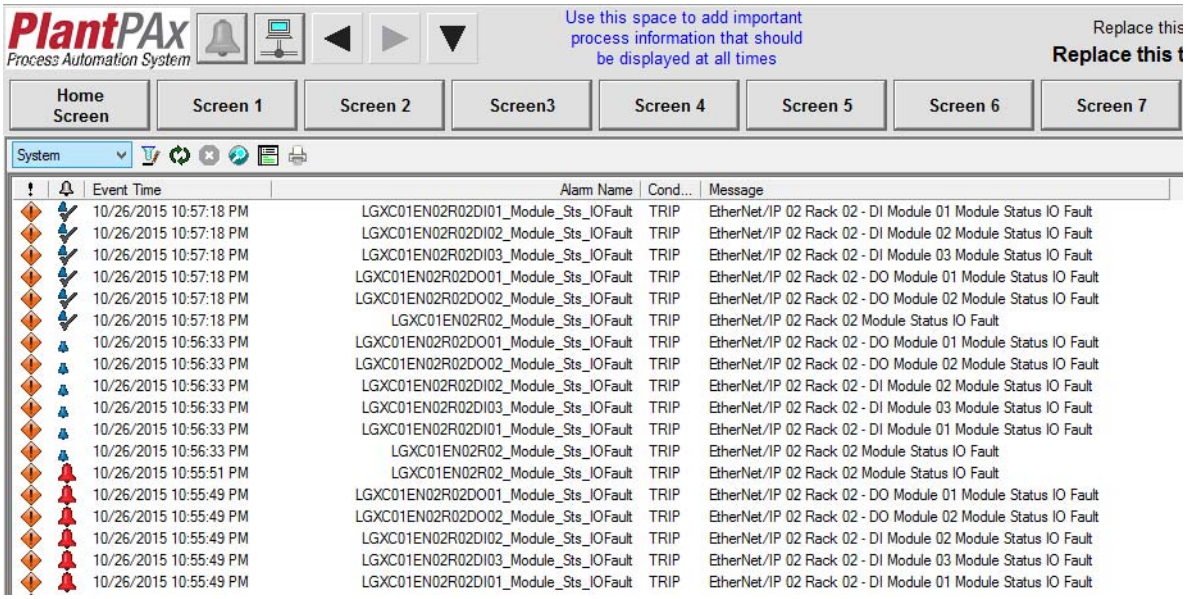
The System folder includes the L_CPU instruction and the L_ModuleSts alarming. Complete these steps to view the alarm system.

1. In the Application tree, open the Area program and choose Alarm>PlantPAx_AE,
2. Double-click Alarm and Event Setup.



3. Click Diagnostics to view information that has been automatically generated by Alarms Builder.

   If you are using L_StsModule, the Alarms Builder, by default, creates and populates a system alarm summary.



!		Event Time	Alarm Name	Cond...	Message
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02DI01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 01 Module Status IO Fault
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02DI02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 02 Module Status IO Fault
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02DI03_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 03 Module Status IO Fault
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02DO01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 01 Module Status IO Fault
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02DO02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 02 Module Status IO Fault
◆	✓	10/26/2015 10:57:18 PM	LGXC01EN02R02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02DO01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 01 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02DO02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 02 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02DI02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 02 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02DI03_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 03 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02DI01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 01 Module Status IO Fault
◆		10/26/2015 10:56:33 PM	LGXC01EN02R02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 Module Status IO Fault
◆	🔔	10/26/2015 10:55:51 PM	LGXC01EN02R02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 Module Status IO Fault
◆	🔔	10/26/2015 10:55:49 PM	LGXC01EN02R02DO01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 01 Module Status IO Fault
◆	🔔	10/26/2015 10:55:49 PM	LGXC01EN02R02DO02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DO Module 02 Module Status IO Fault
◆	🔔	10/26/2015 10:55:49 PM	LGXC01EN02R02DI02_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 02 Module Status IO Fault
◆	🔔	10/26/2015 10:55:49 PM	LGXC01EN02R02DI03_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 03 Module Status IO Fault
◆	🔔	10/26/2015 10:55:49 PM	LGXC01EN02R02DI01_Module_Sts_IOFault	TRIP	EtherNet/IP 02 Rack 02 - DI Module 01 Module Status IO Fault

Notes:

Configure Historian

FactoryTalk® Historian software creates historical points (tags) in the system. The points provide the foundation to produce analytical data.

Analytical data includes process variables, trends, and reporting.

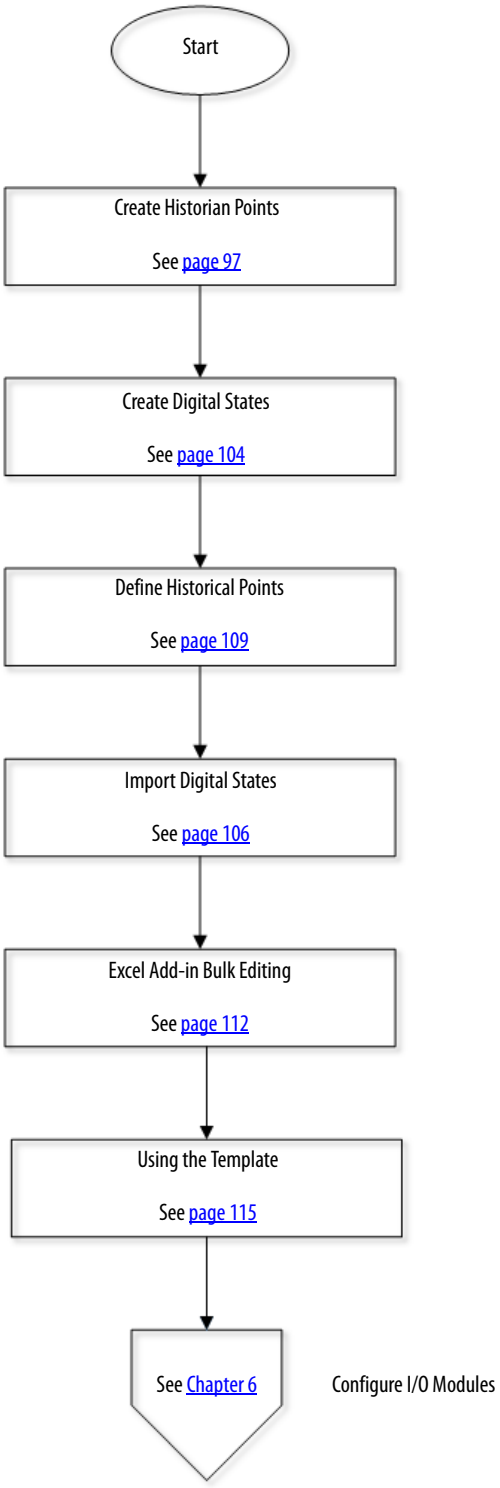
Considerations:

Consider the following suggestions before starting this chapter:

- Perform any necessary configurations that are contained in the PlantPAx® Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.
- The procedures in this chapter use the 'System Management Tool' within FactoryTalk Historian software. The tool is available only for Historian management computers, such as server, node interface, and EWS.
- Microsoft Excel software is required to enable the bulk editing capability.

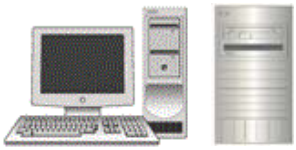
Figure 7 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 7 - FactoryTalk Historian SE Workflow



Create Historian Points

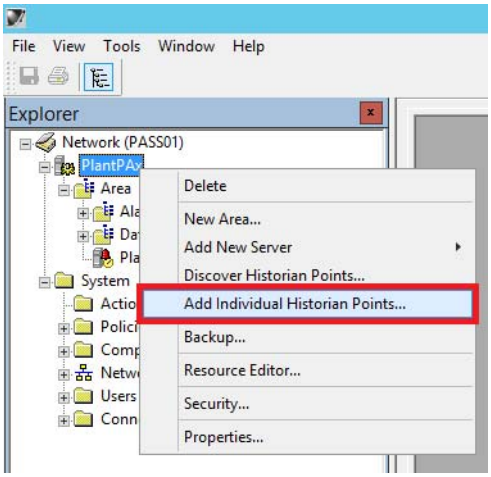
Use an Engineering Workstation or a Historian server with these procedures.



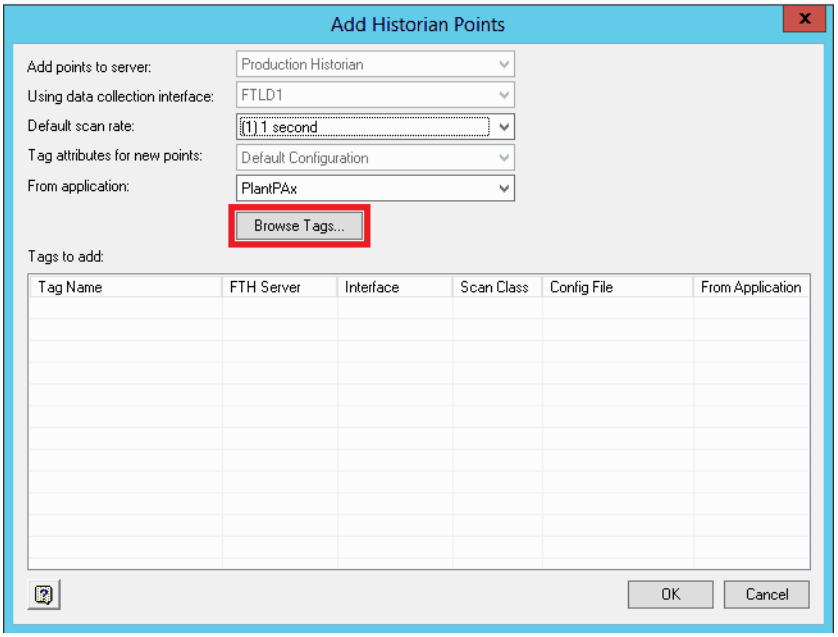
EWS01 or ASIH01A

Complete these steps to create historian points by using the FactoryTalk Administration Console.

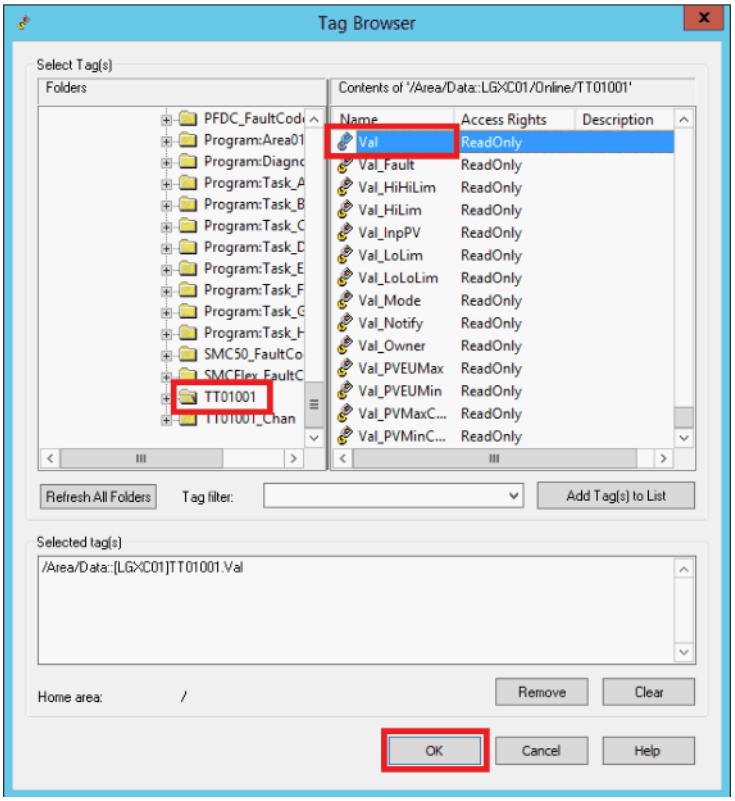
1. Click Rockwell Automation® software and choose FactoryTalk Administration Console.
2. Select the network for the type of FactoryTalk directory.
3. In the Explorer pane, right-click an application (PlantPAx is our example) and choose Add Individual Historian Points.



4. On the Add Historian Points dialog box, click Browse Tags.



5. In the Tag Browser window, select an object tag (TT01001 in the example) in the Folders pane on the left side of the window.

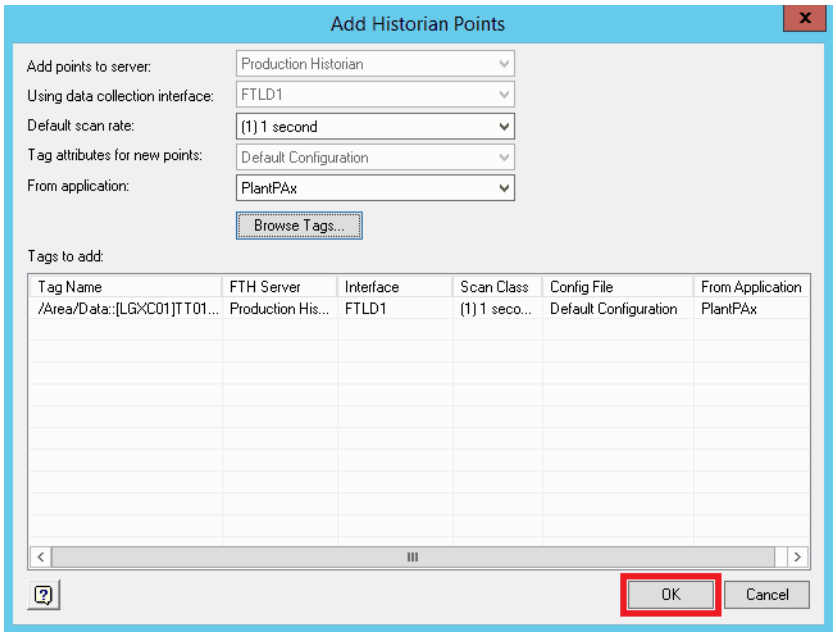


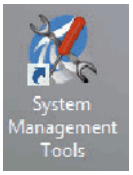
6. In the pane on the right side of the Tag Browser window, double-click the tag to configure as a Historian Point.

   Val (Process Variable Value) is the example.

7. Click Add Tags to List and click OK.

   The Add Historian Points dialog box reappears with a list of selected tags.

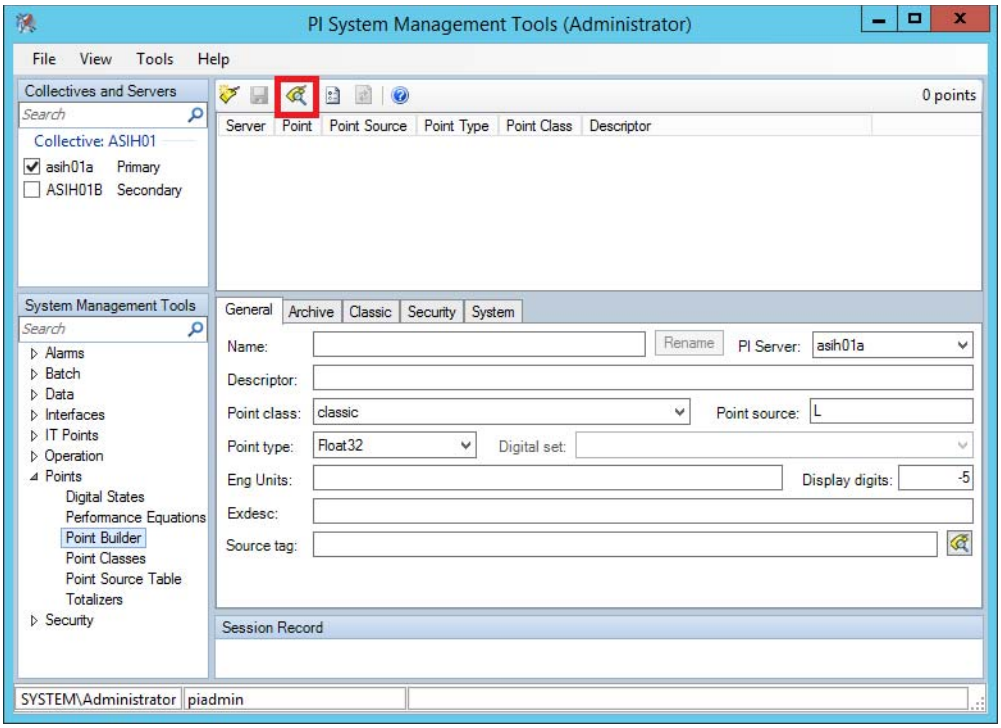




8. Click OK.

   FactoryTalk Historian uses System Management Tools (SMT™) to create and maintain historical points. You must have the proper historian server connection.

9. Choose Rockwell Software®>FactoryTalk Historian SE> System Management Tools.
10. In the Servers and Collectives pane, select the Historian server.
11. In the System Management Tools pane, select Point Builder.

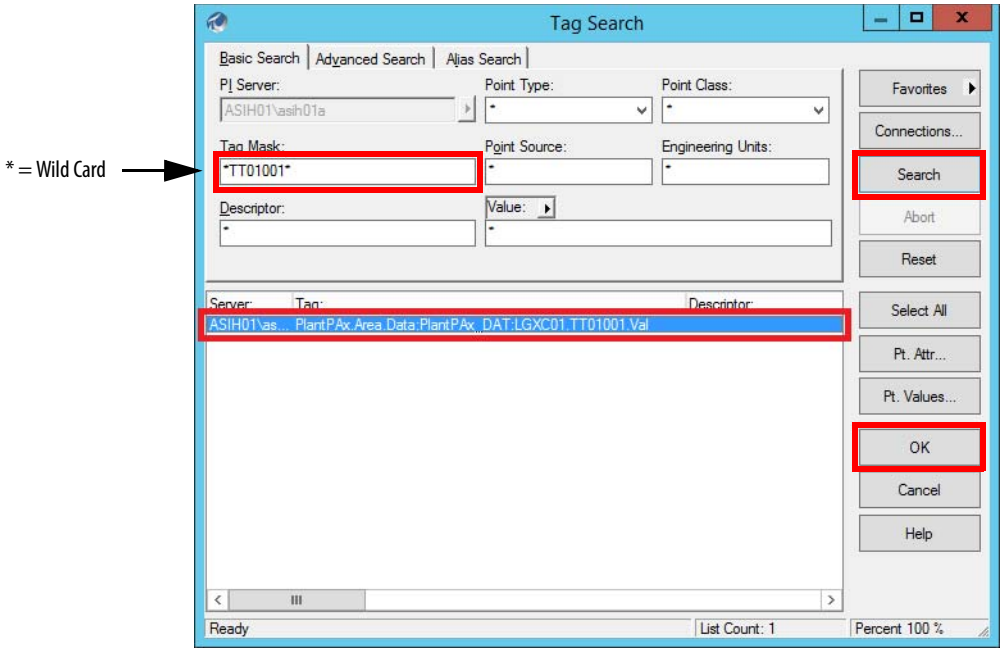


12. Click the Search button.

13. In the Tag Search window, type the Tag Mask and click Search.

    The tag appears on the Tag Search window.

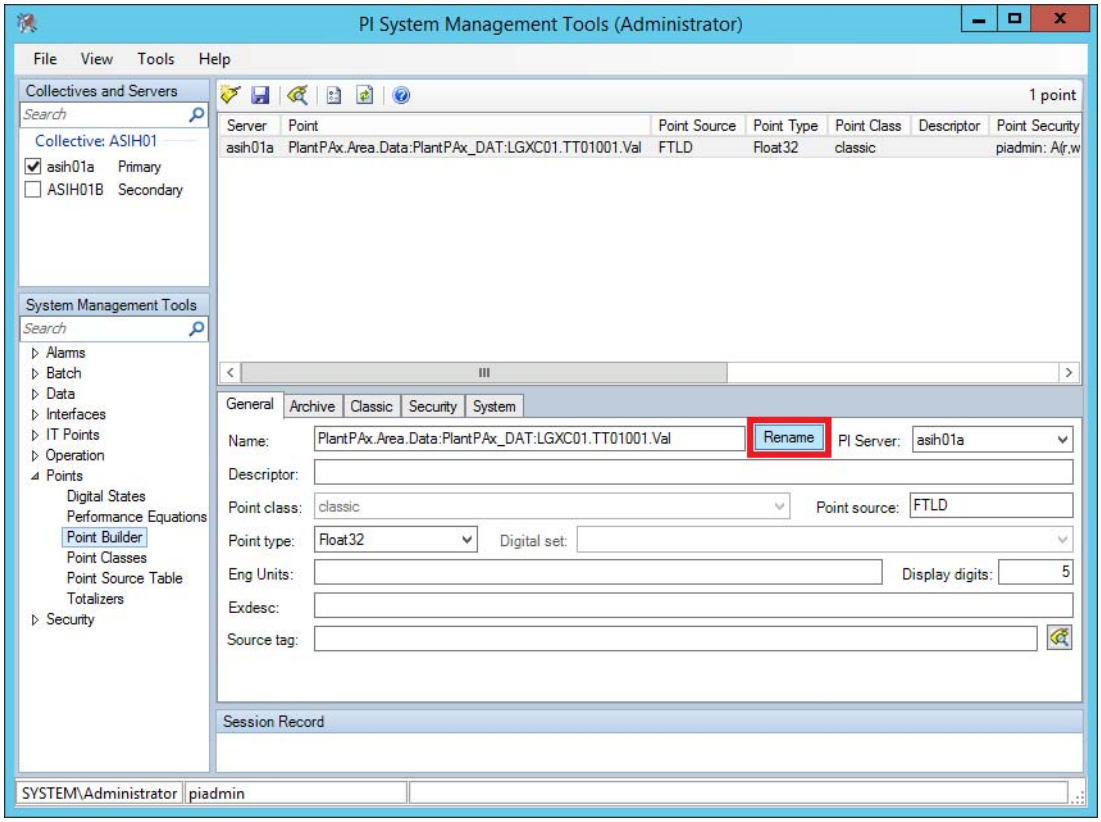
14. Select the tag and click OK.



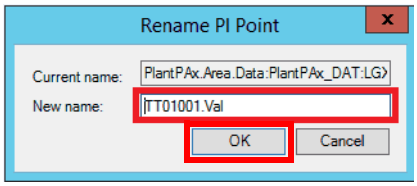
The point name and entire path appears on the Point Builder window.

To change the name of the point, continue with the next step; otherwise, go to step 17.

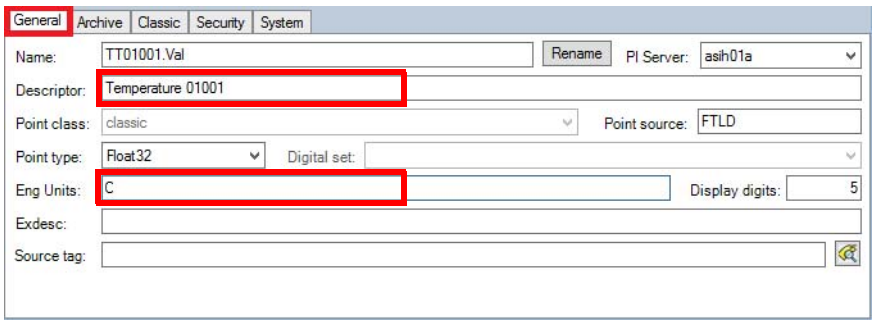
15. Select the tag and click Rename.



16. In the Rename PI Point window, type a new name and click OK.

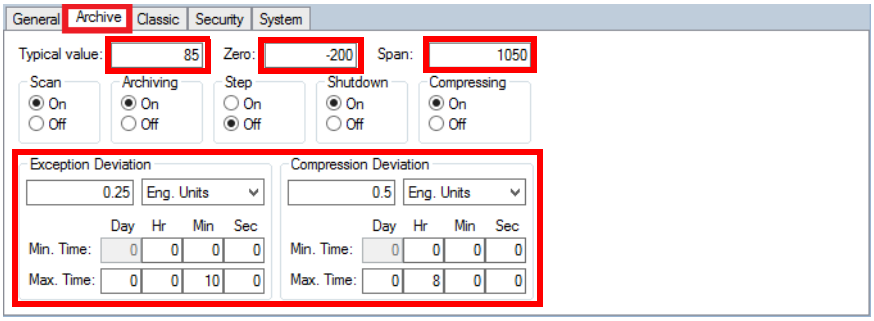


17. In the General tab of the Point Builder dialog box, type a tag description and engineering units.



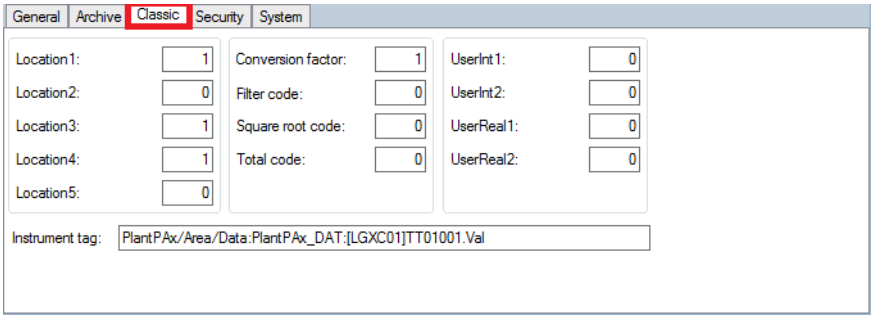
18. Click the Archive tab to configure the range (Zero and Span), typical value, and all exception and compression data for the historical point.

IMPORTANT	Usually, Minimum Range Value = Zero, Span = Maximum Range Value minus Minimum Range Value. The Typical Value is between the Minimum Range Value and the Maximum Range Value.

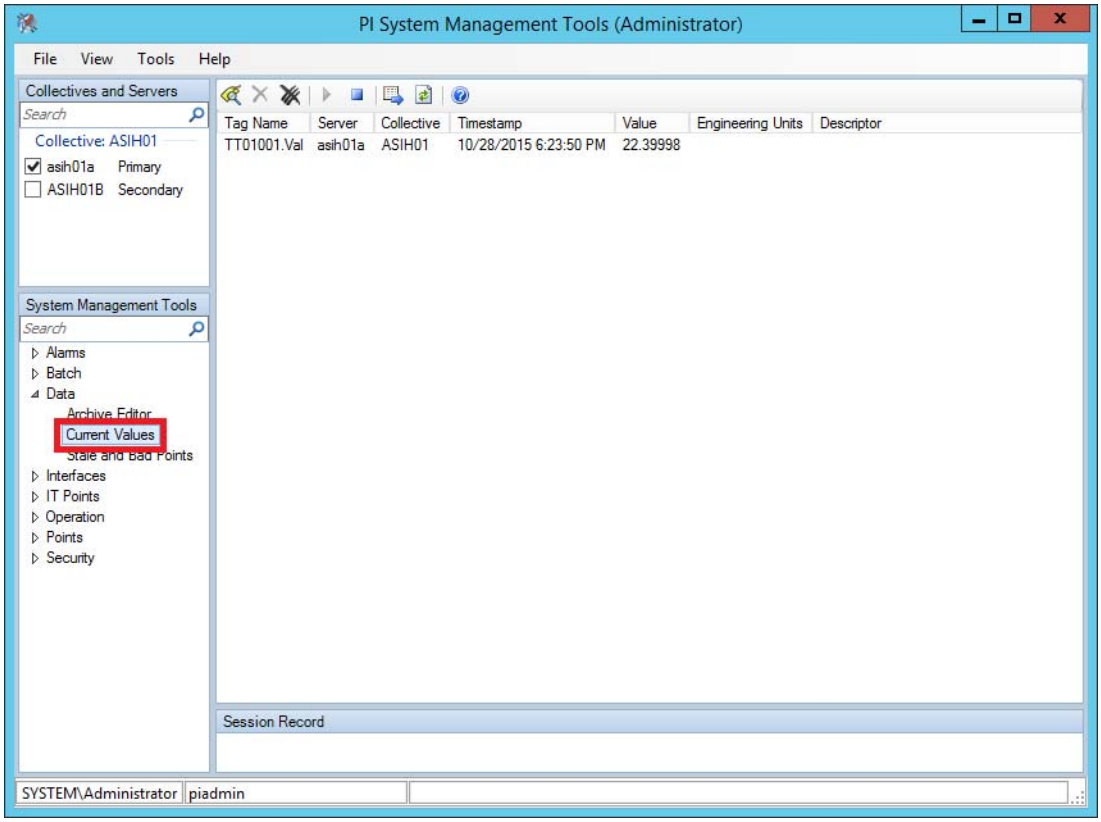


19. Click the Classic tab to view the historical tag path (instrument tag) that includes the Data server name.

    Our example has the RSLinx® Enterprise name, PlantPAx_DAT. The historical point link is broken if any change is made to the RSLinx Enterprise application name.



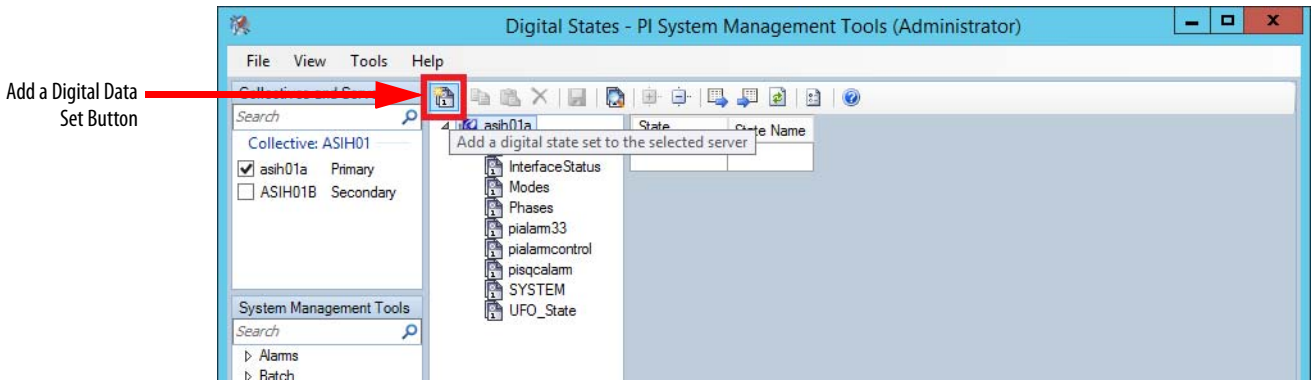
20. To monitor the last historical data, select Current Values and click the Search tool.



Create Digital States

Historian points can be defined as analog or digital. Digital points can be used to enumerate the process states, thus creating a relationship between the value and the text state name.

1. Using SMT™ with the proper historian server connection, select Digital States and click Add a Digital Data Set.



As an example of how to create your own Digital Data Set, review Table 4.

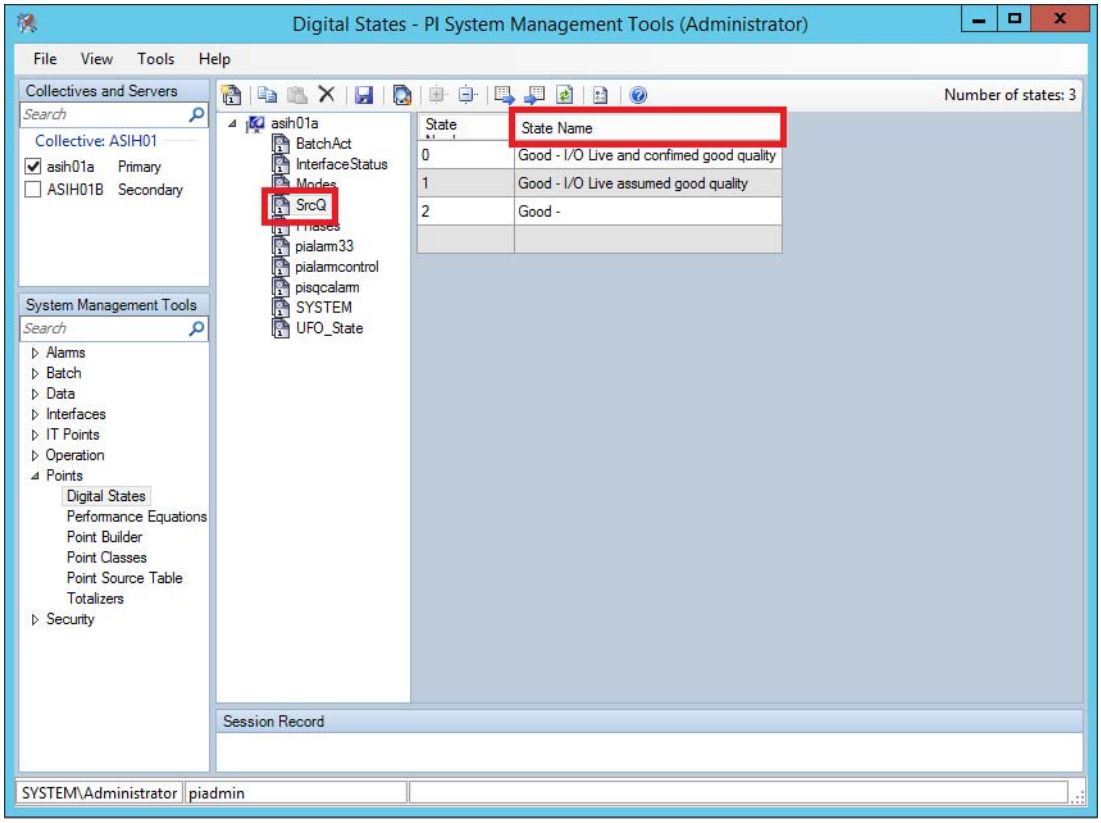
Table 4 - Source Quality Data Examples

Parameter	Data Type	Description
SrcQ	SINT	Final PV source and quality. GOOD 0 = I/O live and confirmed good quality 1 = I/O live and assumed good quality 2 = No feedback configured, assumed good quality TEST 8 = Device simulated 9 = Device loopback simulation 10 = Manually entered value UNCERTAIN 16 = Live input, off-specification 17 = Value substituted at device/bus 18 = Value substituted by maintenance (Has and not Use) 19 = Shed, using last good value 20 = Shed, using replacement value BAD 32 = Signal failure (out-of-range, NaN, invalid combination) 33 = I/O channel fault 34 = I/O module fault 35 = Bad I/O configuration (for example, scaling parameters)

2. Type a Digital Set name (SrcQ in the example).
3. Type a state name as shown in the Description column of Table 4.

   New rows are automatically added as information is entered.

   Unused values can be Undefined states.



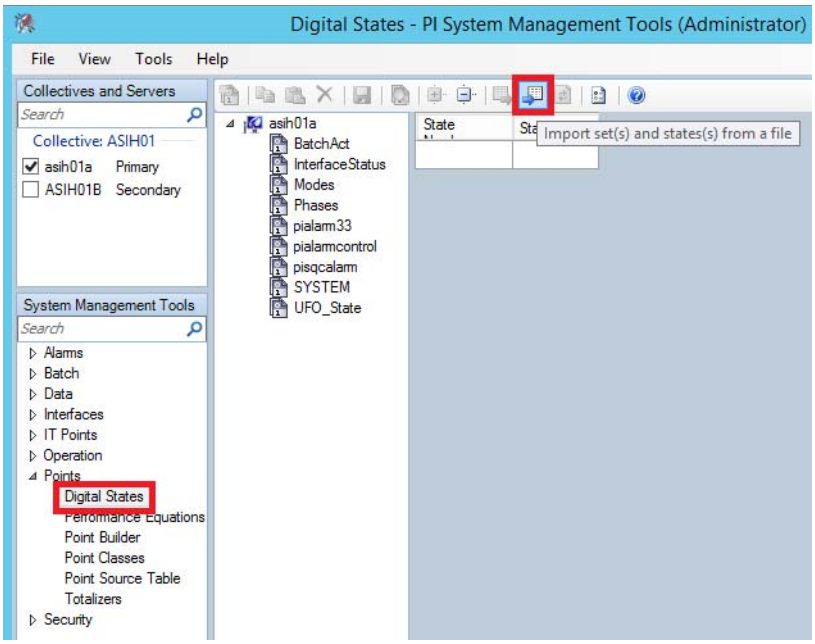
Import Digital Sets and States

Instead of manually entering Digital Sets and States, use Process Objects to import them.

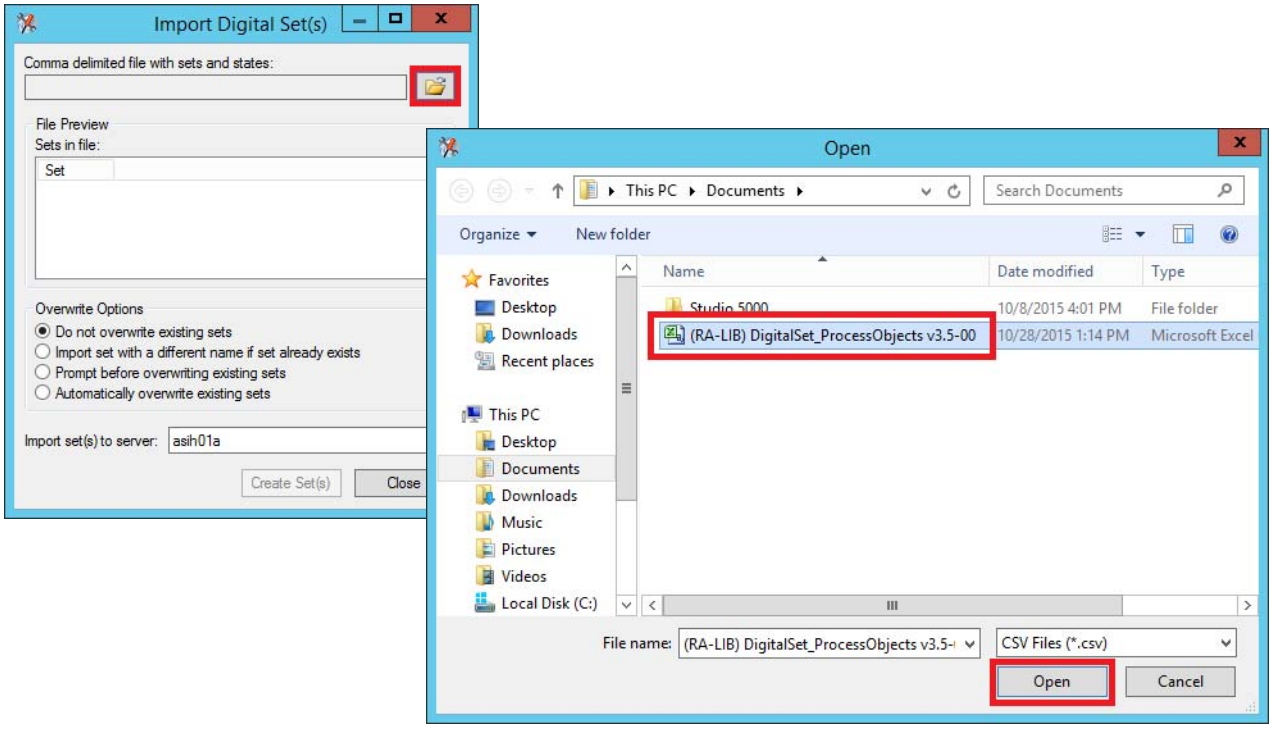
The Digital Sets and States are available from the Historian folder in the Process Library. The Historian information is in a sub-folder (Tools & Utilities) of the Files folder in the Process Library download.

Complete these steps.

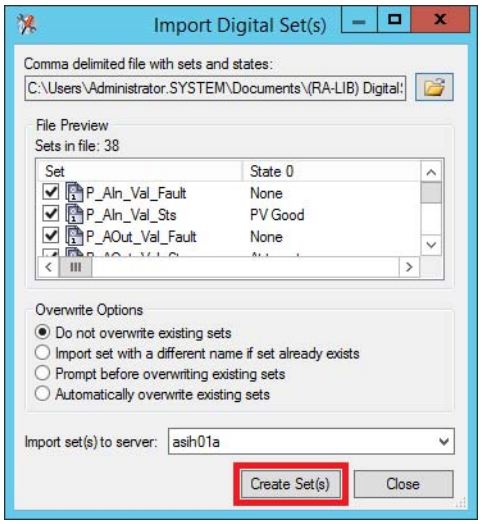
1. Open the Historian folder.
2. Click Digital States and click the Import button.



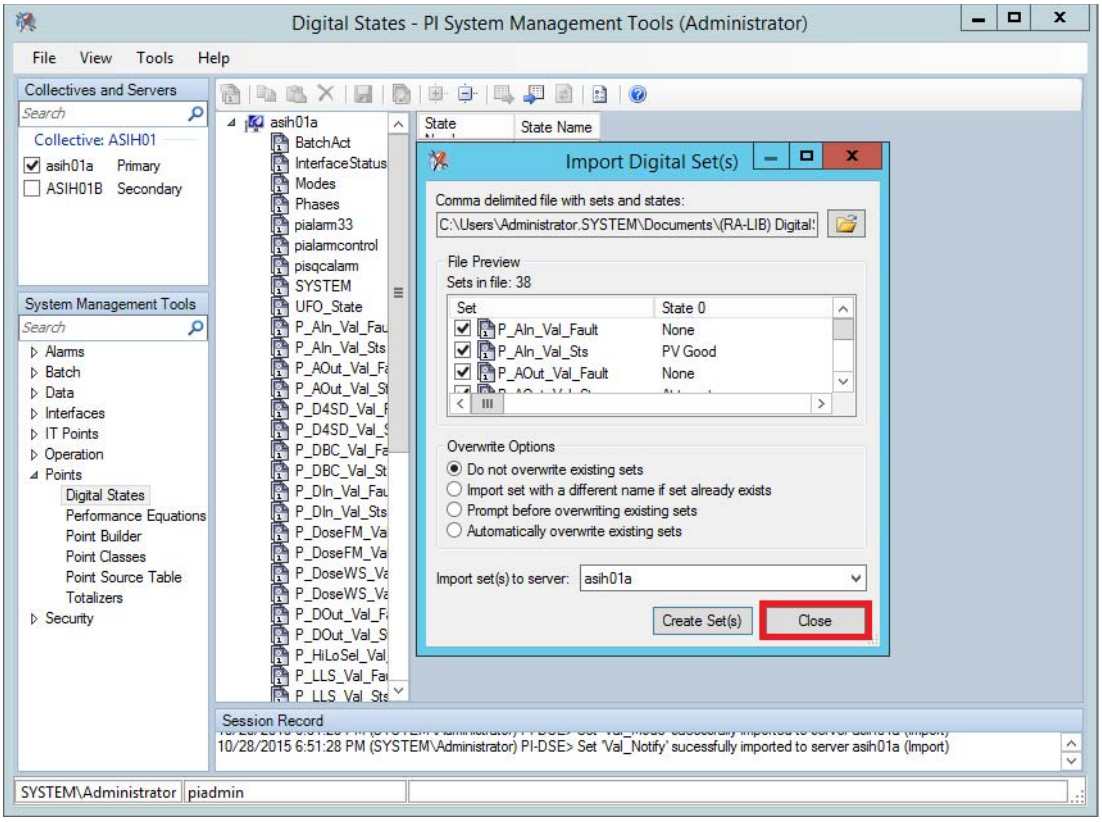
3. From the Import Digital Set(s) dialog box, click the folder icon.
4. Select a .CSV file from the dialog box.



5. Click Open.
6. Click Create Set(s).



A minimum number of the recommended Digital Sets is created. This procedure does not create the basic Digital Set file for all Process Objects digital states.



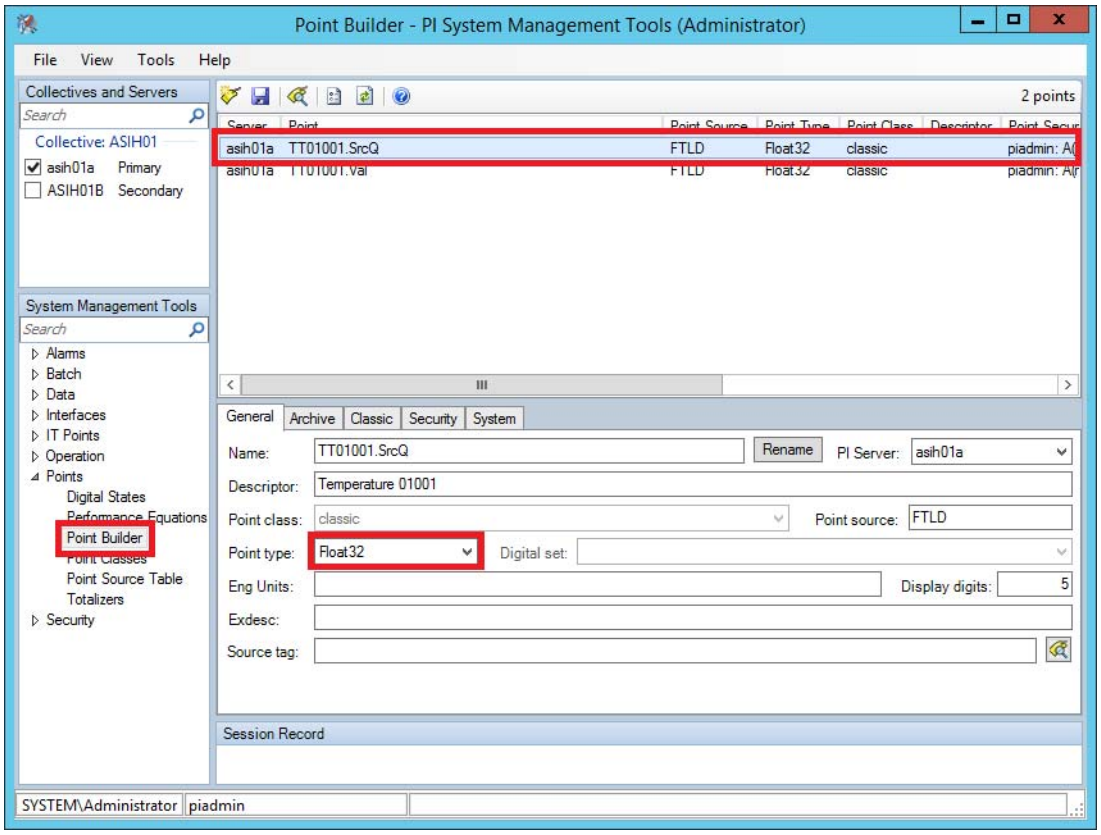
7. Click Close.

Define Digital Historical Points

The digital set is available only to a digital points type. The FactoryTalk Administration Console automatically creates a Float32 (Real) point type for each new point.

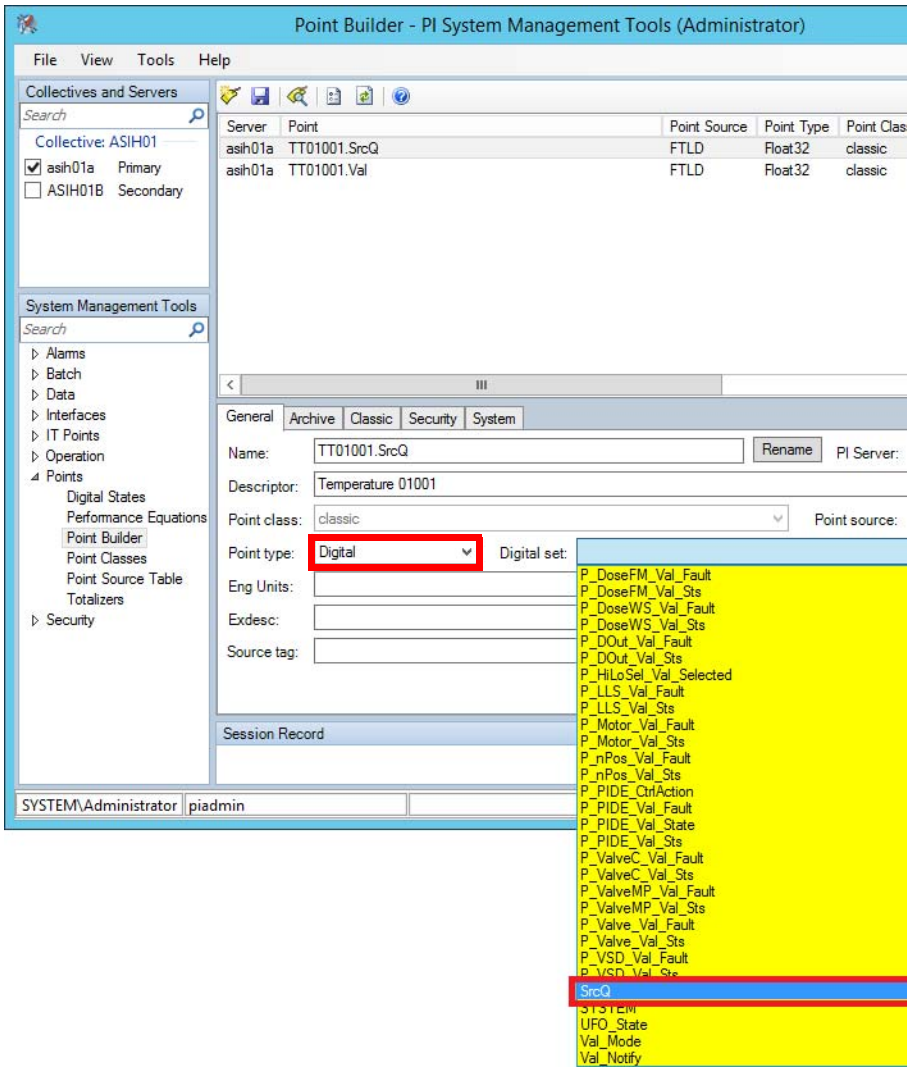
IMPORTANT Before continuing with this section, it is necessary to include the Digital Historical point such as SrcQ (see step 1 on page 97 through step 11 on page 99).

This section shows how to change the point type.



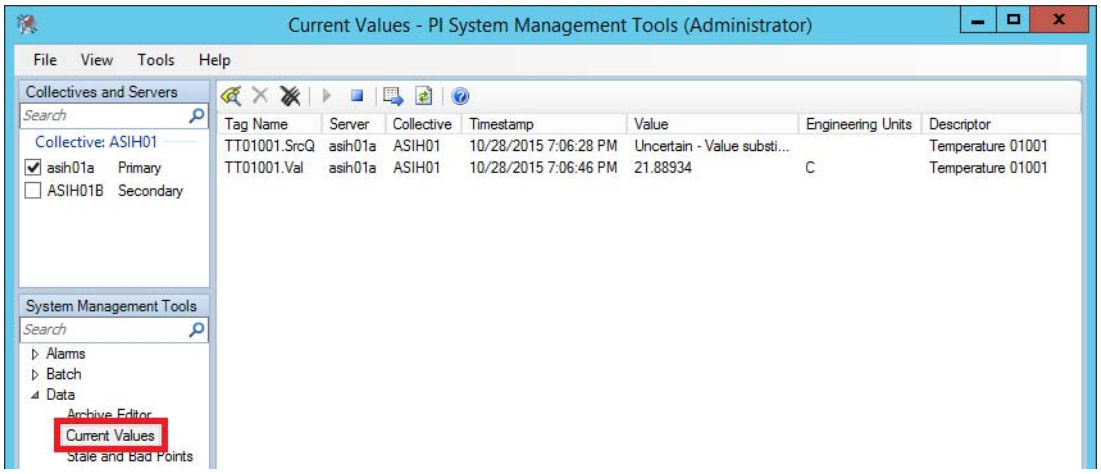
1. To be able to change the digital set, select Digital from the Point type pull-down.

2. Click the Digital set pull-down menu and select a Digital Set (SrcQ in the example).



3. Click the Save icon to store the Historian point.

4. Click Current Values to view the Digital set value corresponding to the point value.



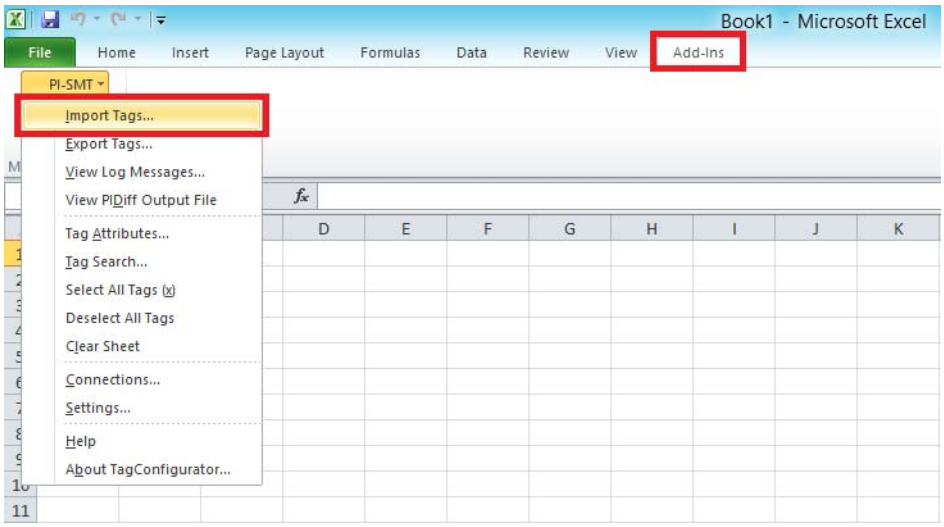
Excel Add-in Bulk Editing

The Microsoft Excel Add-in provides an option for bulk tag editing.

Complete the following steps.

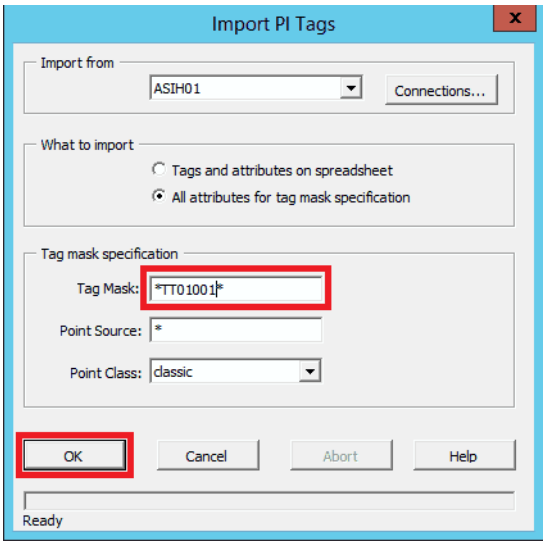
IMPORTANT Before starting this section, Microsoft Excel must be configured as an add-in. See the Excel add-in subsection in Chapter 9 of the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

1. Open the Microsoft Excel software.
2. Click the Add-ins tab and choose Import Tags from the PI-SMT pull-down menu.



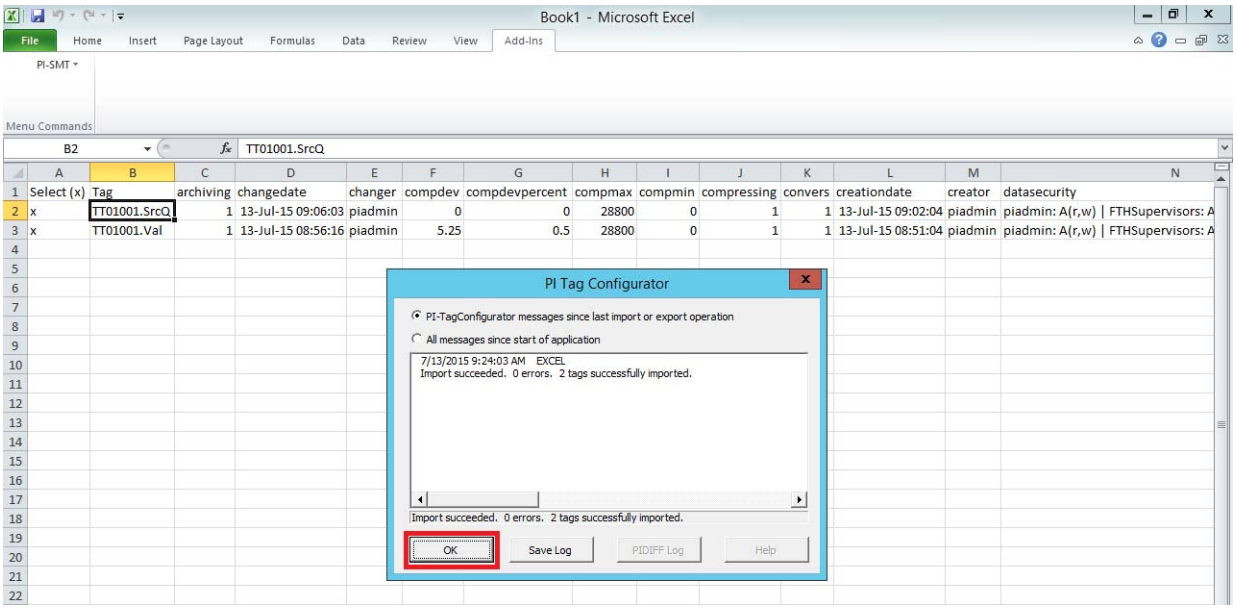
The Import PI Tags dialog box appears.

3. Type a Tag Mask between the asterisks ('TT01001' in the example) and click OK.

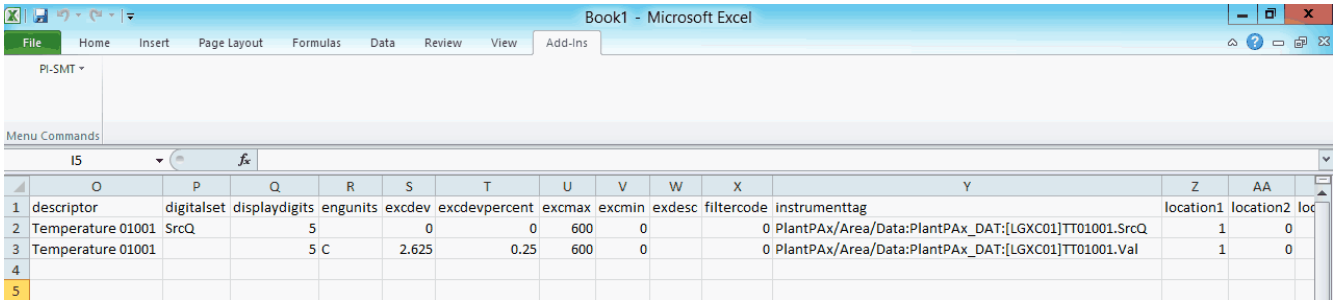


The Historian points populate the Excel spreadsheet and the PI Tag Configurator dialog box appears.

All necessary fields to edit or to create points are available by using the PI tag configurator. This process saves time in comparison to the SMT application software.

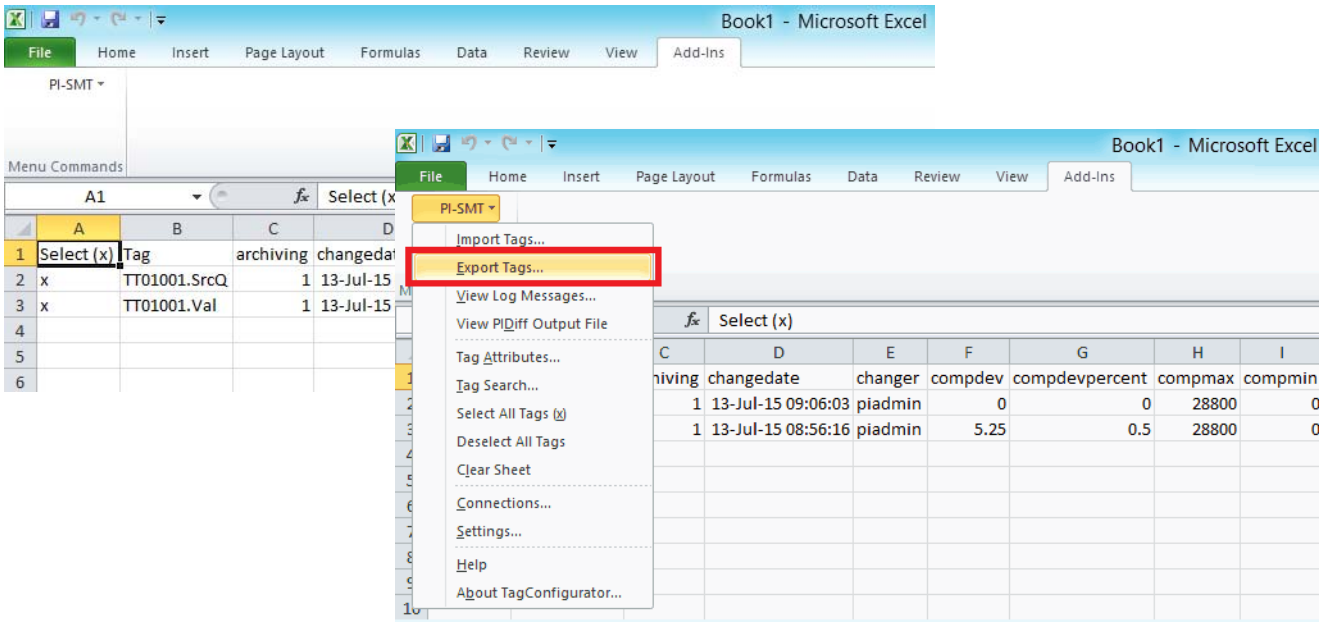


4. Click OK.



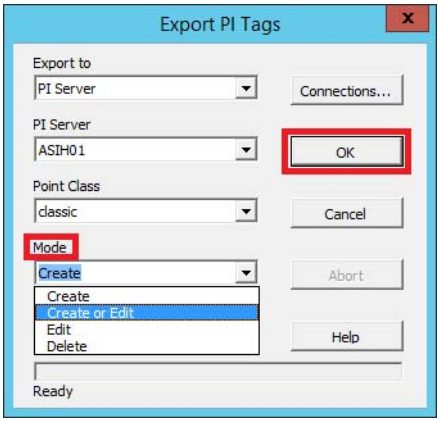
	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
1	descriptor	digitalset	displaydigits	engunits	excdev	excdevpercent	excmax	excmin	exdesc	filtercode	instrumenttag	location1	location2
2	Temperature 01001	SrcQ	5		0	0	600	0		0	PlantPAx/Area/Data:PlantPAx_DAT:[LGXC01]TT01001.SrcQ	1	0
3	Temperature 01001		5	C	2.625	0.25	600	0		0	PlantPAx/Area/Data:PlantPAx_DAT:[LGXC01]TT01001.Val	1	0
4													
5													

5. To export tags, select the point in the Select (x) column and then choose Export Tags from the PI-SMT pull-down menu.



The Export PI Tags dialog box appears.

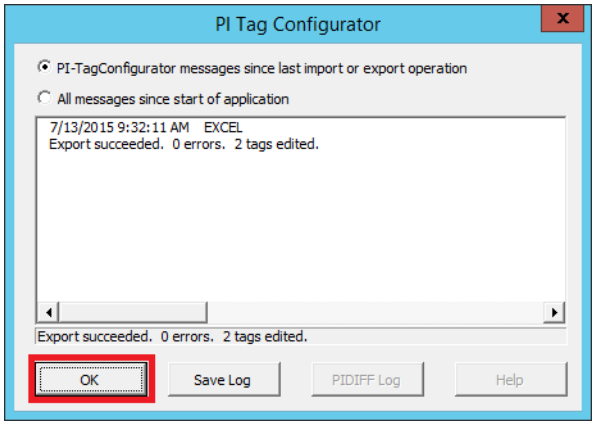
6. From the Mode pull-down menu, select a desired action (Create or Edit in the example).



7. Click OK.

The PI Tag Configurator appears.

8. Click OK.

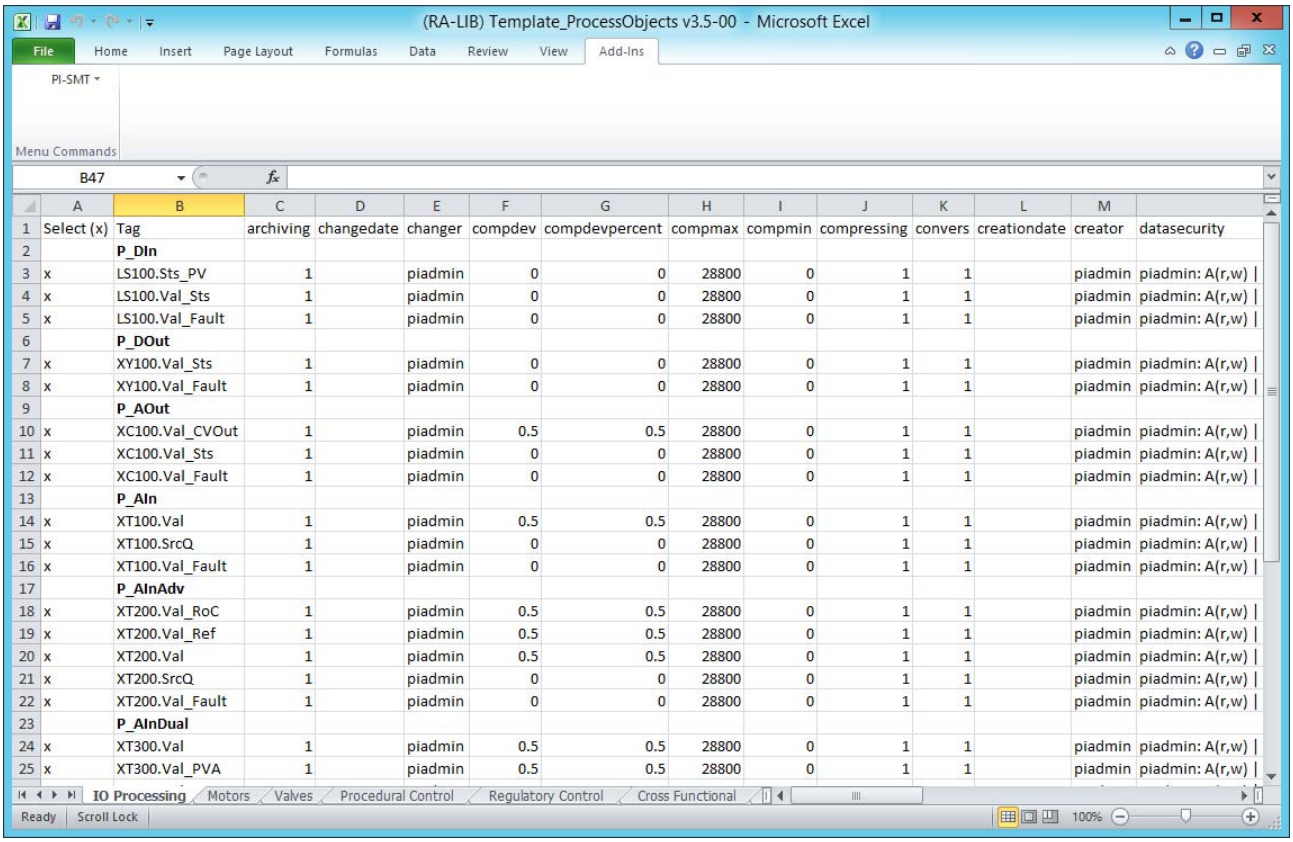


Using the Template

Rockwell Automation provides a Historian template inside the Process Library that shows suggested points that can be used as digital Historian points. To access the Library folder that contains the template, see page 106.

You can select the object points ('x' in the Select(x) column next to the desired point) and edit them according to your needs.

The Export Tags functionality is available to create, edit, or delete Historian points.



	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Select (x)	Tag	archiving	changedate	changer	compdev	compdevpercent	compmax	compmin	compressing	convers	creationdate	creator	datasecurity
2		**P_DIn**												
3	x	LS100.Sts_PV	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
4	x	LS100.Val_Sts	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
5	x	LS100.Val_Fault	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
6		**P_DOut**												
7	x	XY100.Val_Sts	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
8	x	XY100.Val_Fault	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
9		**P_AOut**												
10	x	XC100.Val_CVOut	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
11	x	XC100.Val_Sts	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
12	x	XC100.Val_Fault	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
13		**P_AIn**												
14	x	XT100.Val	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
15	x	XT100.SrcQ	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
16	x	XT100.Val_Fault	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
17		**P_AInAdv**												
18	x	XT200.Val_RoC	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
19	x	XT200.Val_Ref	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
20	x	XT200.Val	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
21	x	XT200.SrcQ	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
22	x	XT200.Val_Fault	1		piadmin	0	0	28800	0	1	1		piadmin	piadmin: A(r,w) |
23		**P_AInDual**												
24	x	XT300.Val	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |
25	x	XT300.Val_PVA	1		piadmin	0.5	0.5	28800	0	1	1		piadmin	piadmin: A(r,w) |

Notes:

Configure I/O Modules

The PlantPAx® system features flexible, intelligent I/O instrumentation to maximize production and reduce downtime. This chapter describes basic techniques for configuring plantwide communication via I/O modules.

The ControlLogix® system is chassis-based and provides the option to configure a control system that uses sequential, process, motion, drive control, deterministic, and I/O capabilities. Ethernet remote I/O modules transmit end device feedback to controllers. The data includes diagnostics, temperature measurement, and counter-inputs for process control.

Procedures in this chapter describe how to configure the devices that are shown in Figure 8.

Figure 8 - Examples of PlantPAx Distributed I/O Modules

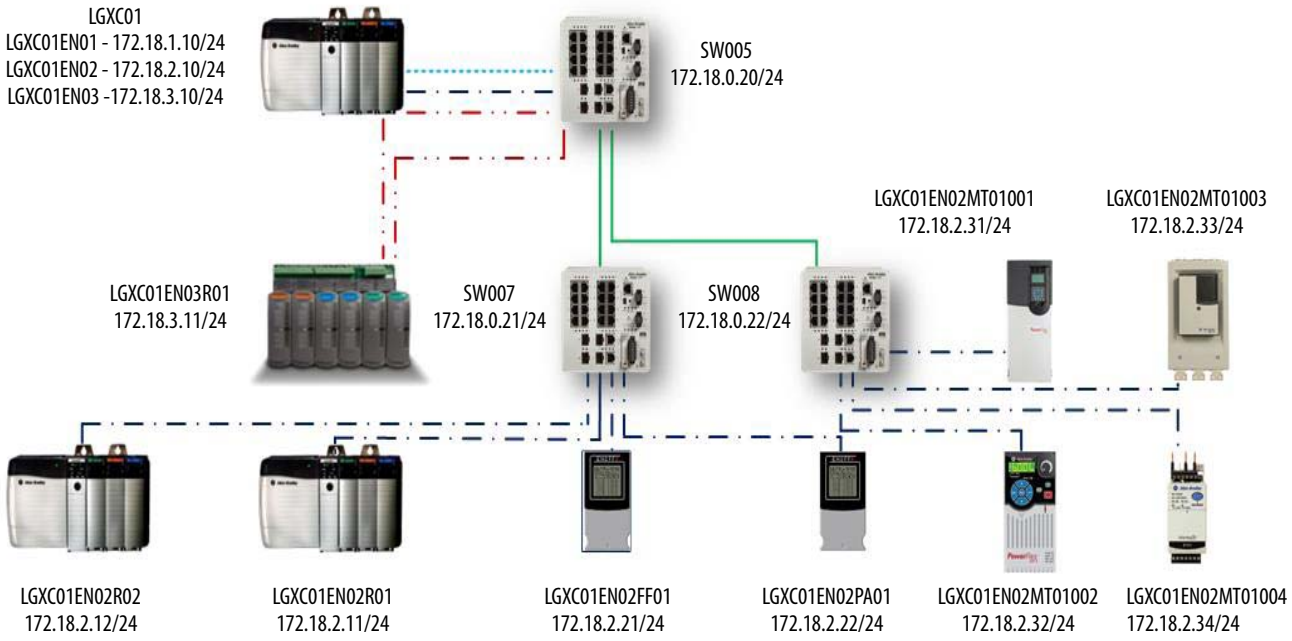
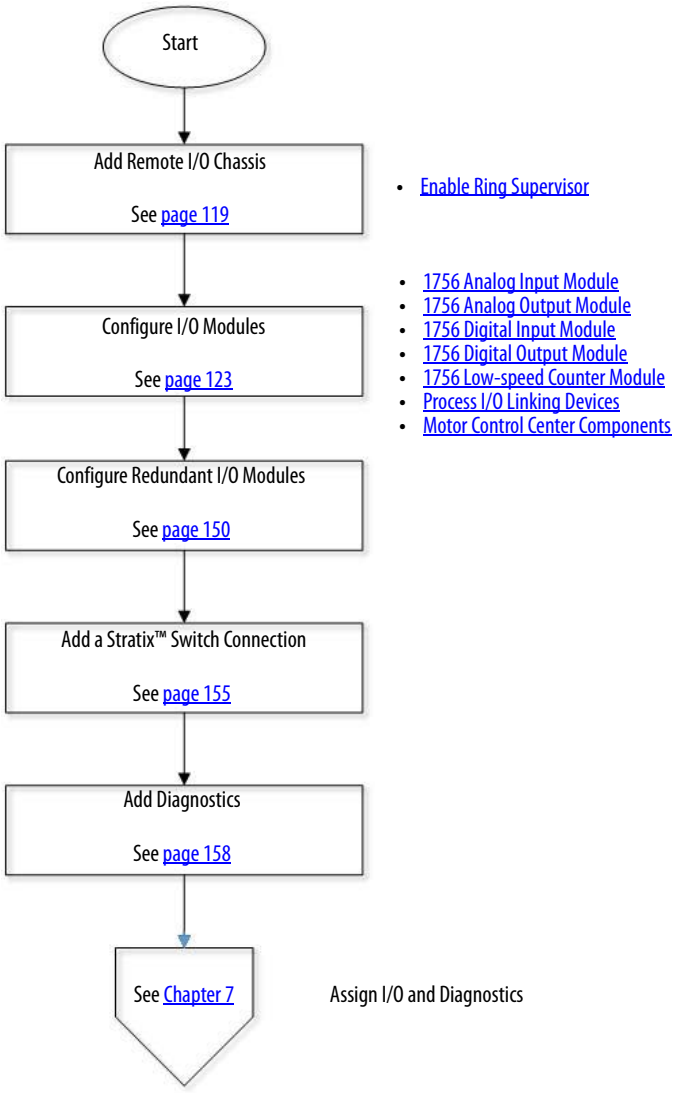


Figure 9 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 9 - I/O Infrastructure Workflow



Add Remote I/O Chassis

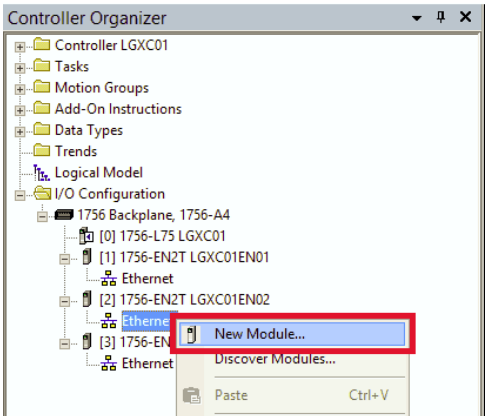
This section describes how to add a remote I/O chassis and configure a ring supervisor, if applicable. Make sure that the chassis size matches the installed rack size.

Use an Engineering Workstation with these procedures.

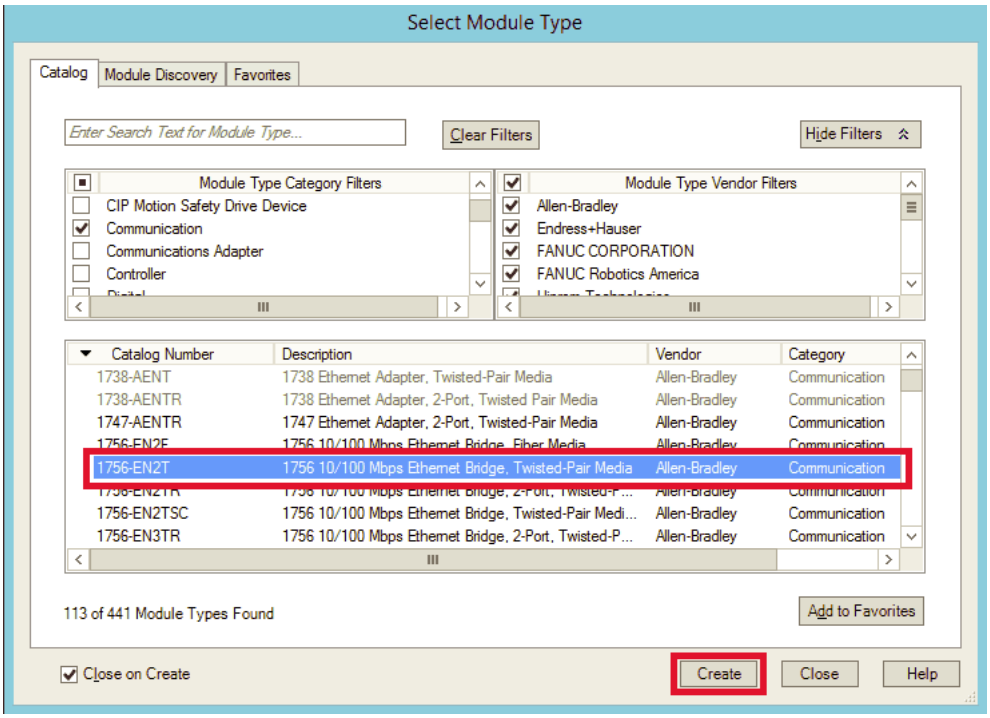
EWS

Complete these steps in Logix Designer.

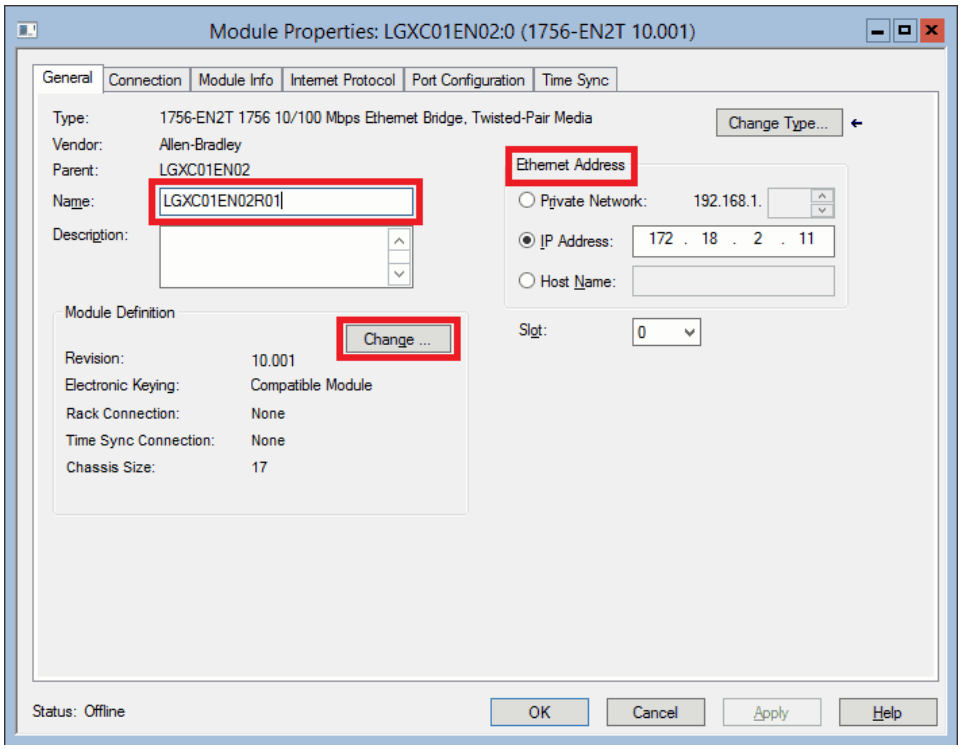
1. In the I/O Configuration tree, right-click the remote I/O network under the adapter and choose New Module.



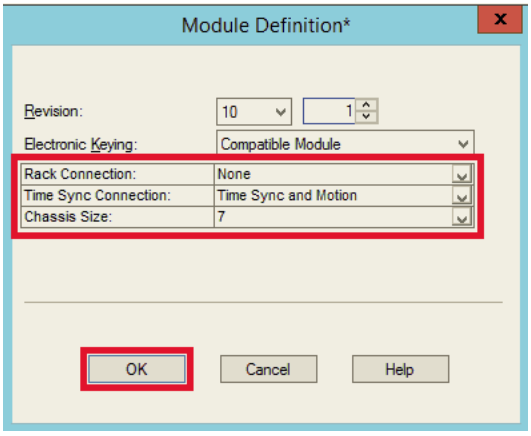
2. In the Catalog tab of the Select Module Type dialog box, select a network adapter and click Create.



3. On the New Module dialog box, type a module name and set an IP address.



4. Click Change.
5. On the Module Definition dialog box, do the following.



   a. See step 6 for the Rack Connection.
   b. In the Time Synch Connection pull-down, select Time Synch and Motion.
   c. In the Chassis Size pull-down, select a value for the number of chassis slots for the first remote chassis.
   d. Click OK.

6. If you use a rack connection as 'Rack Optimization', make sure to configure the proper Requested Packet Interval (RPI) under the Connection tab.

   If you are not using a rack option, you have to set an RPI for each device.

   IMPORTANT The option 'Use Unicast Connection over EtherNet/IP' defaults. For a redundant controller, you must disable this option.

7. Click Yes to change the module definition, and then OK.
8. To add additional network adapters, repeat step 1 through step 7.

   See Configure I/O Modules on page 123 for how to add analog and digital I/O modules.

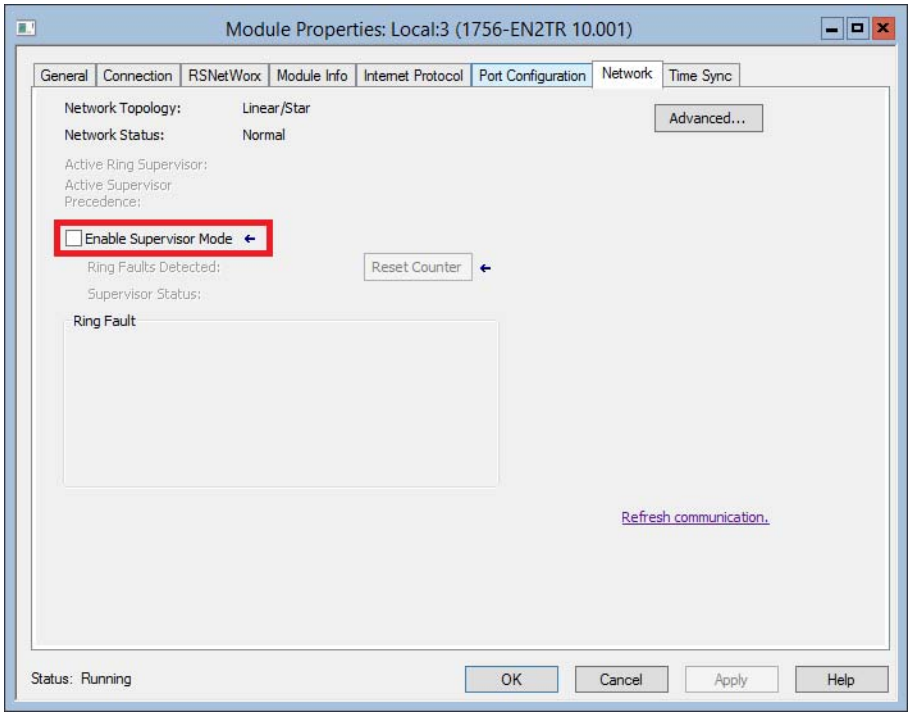
Enable Ring Supervisor

If you are using a DLR ring with your application, you must enable the Supervisor mode.

IMPORTANT You must be online to perform the following procedure.

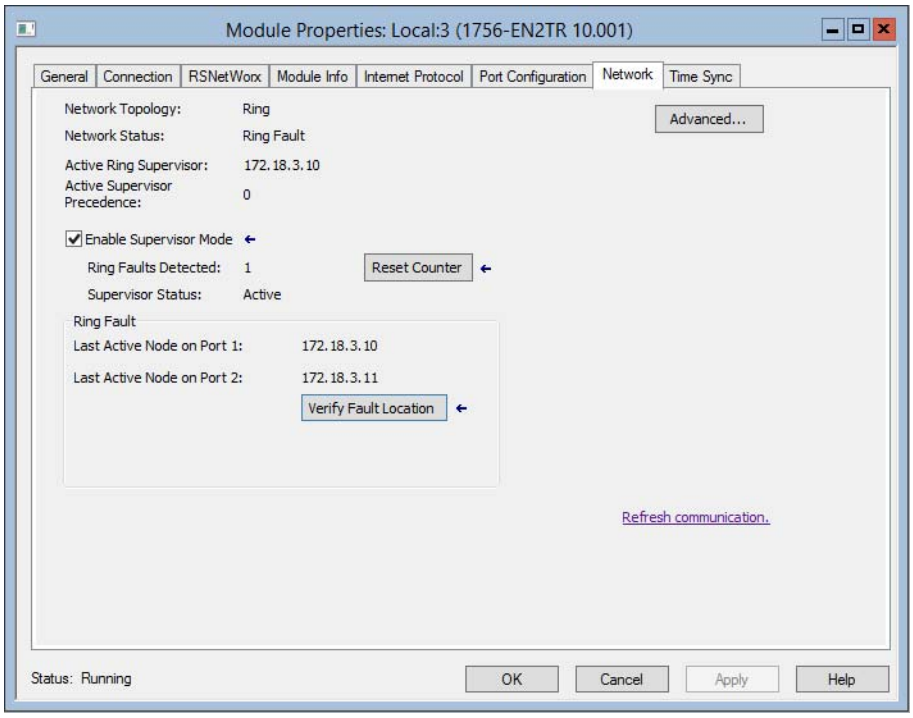
Complete these steps.

1. From the Module Properties dialog box of an I/O communication module, such as a 1756-EN2TR, click the Network tab.



2. Click the Enable Supervisor Mode box.

The Module Properties dialog box reappears with additional Supervisor Mode actions.



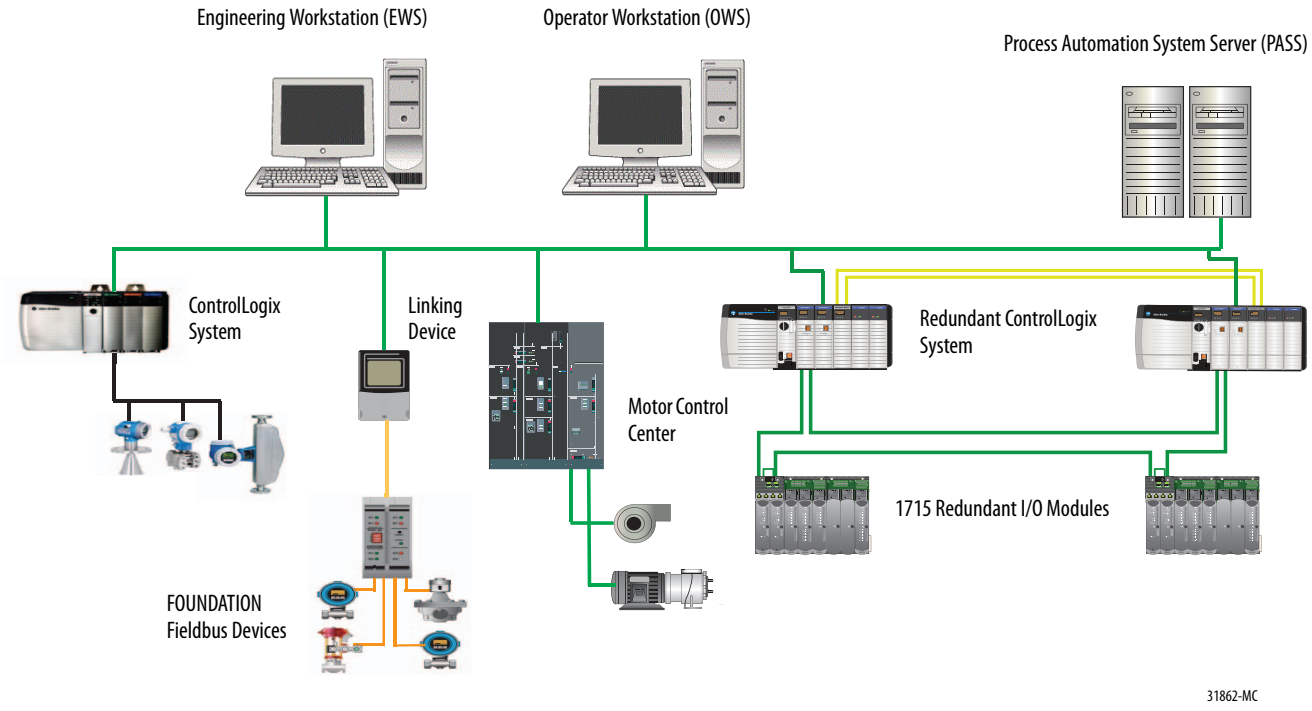
3. Click OK.

Configure I/O Modules

A wide range of I/O modules can be used with smart devices and motors for process control in the PlantPAx system. This section describes how to configure analog and digital I/O modules.

Procedures in this section use preferred PlantPAx I/O network modules with example settings for ControlLogix, HART, Process device, and motor control modules.

Logix5000™ controllers can be configured with local and remote I/O modules in multiple networks.



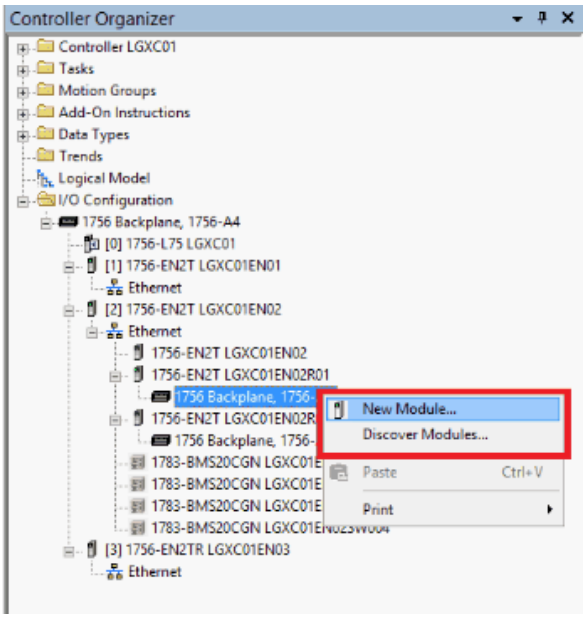
ControlLogix analog I/O modules are interface modules that convert analog signals to digital values for inputs. Conversely, the modules convert digital values to analog signals for outputs. Controllers use these signals for control purposes.

1756 Analog Input Module

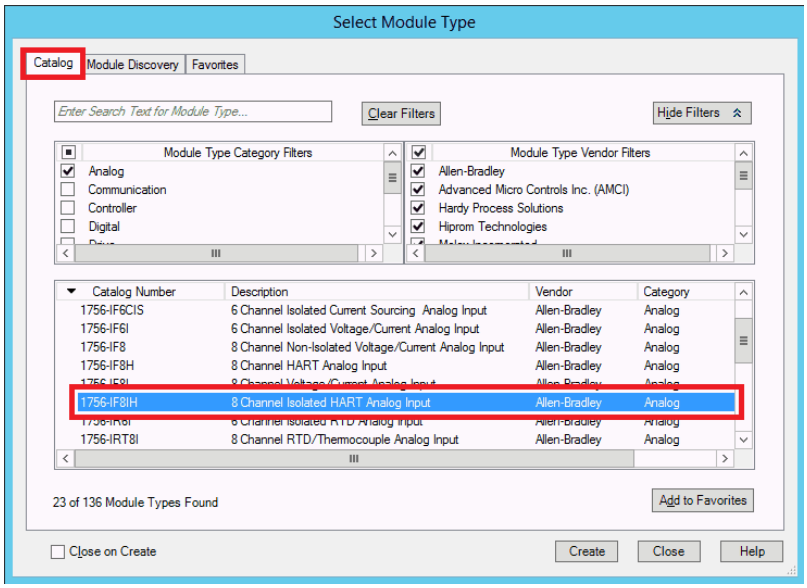
After you create a Logix Designer application and add a communication module to the project (see page 119), complete the following steps to create a module in the project.

This procedure shows how to add an 8-channel isolated HART analog input model to a 1756 ControlLogix controller.

1. In the Controller Organizer of a Logix Designer application, right-click the remote I/O backplane and choose New Module.



The Select Module Type dialog box appears.



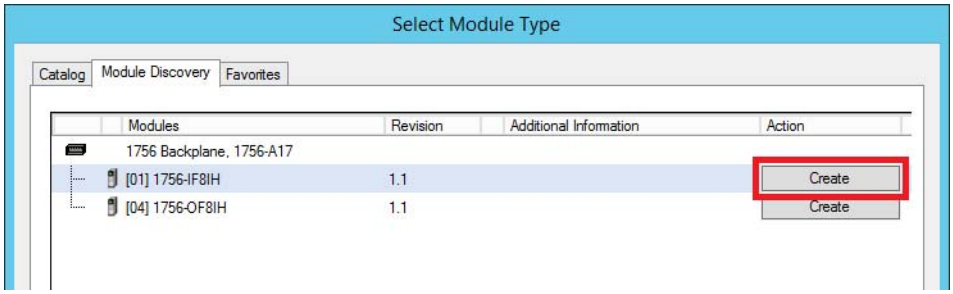
2. With the Category tab selected, click the box for each module type (in the top left filters box).

The Analog box is checked in our example so analog modules are our selection choices in the middle of the dialog box.

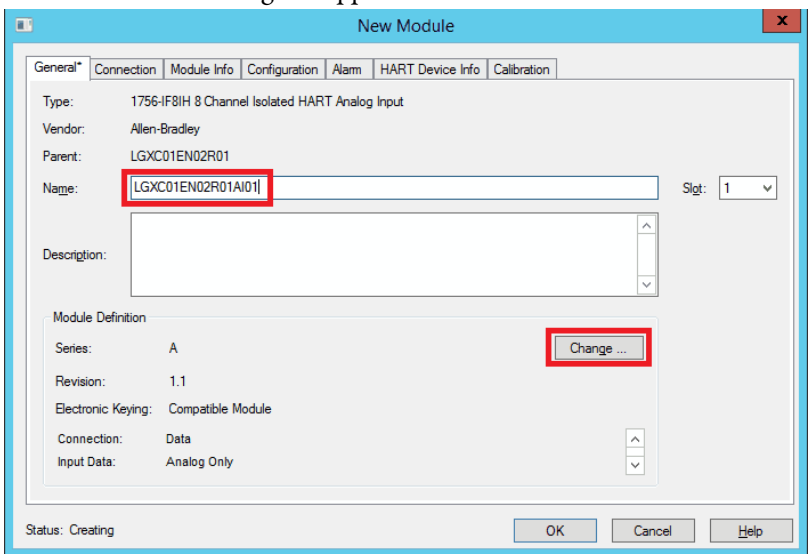
You can also sort by vendor in the top right filter box.

A Logix Designer application also gives you an option to select available modules when you are **online** in the system. The Module Discovery tab lists modules that the Logix Designer application automatically detects on the backplane.

3. If online, select a module and click Create.



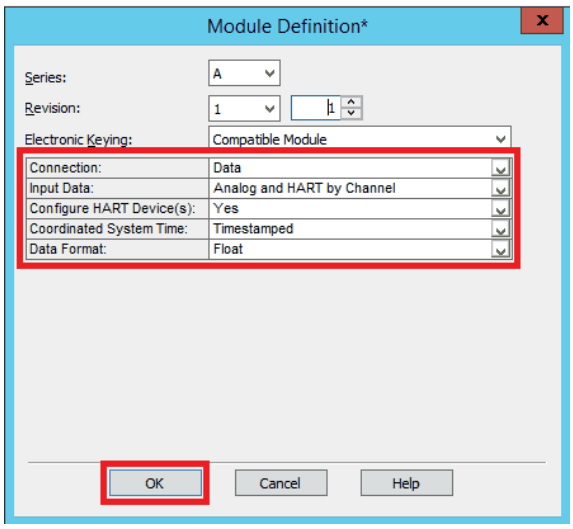
The New Module dialog box appears.



4. On the General tab, do these steps:
   a. Type a name for the module.
   b. Type a description for the module.
   c. Select the slot number for the module.

5. In the Module Definition box, click Change.

   The Module Definition dialog appears.



6. Complete the following actions.

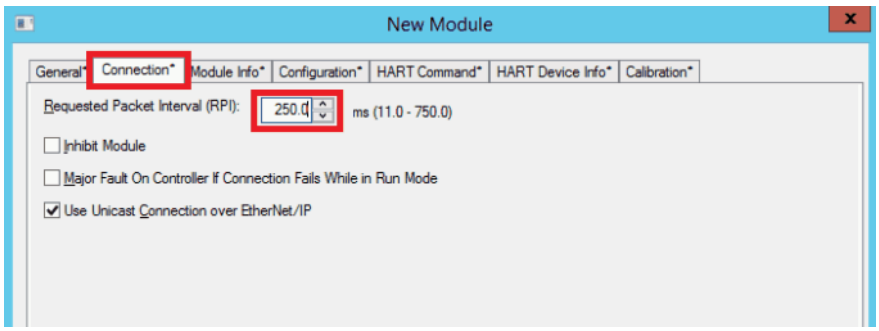
Parameter	Action	Values
Connection	From the pull-down menu, select a connection type.	• Data - has more tabs on the Module Properties dialog box than Listen-only because of configuration settings for alarms, calibration. • Listen-only - has no configuration data, does not send output data.
Input Data	From the pull-down menu, select a data input mode.	• Analog Only • Analog and HART PV • Analog and HART by Channel For details, see the ControlLogix HART Analog I/O Modules User Manual, publication 1756-UM533.
Configure HART Device	Select whether to enable the Configure HART Device feature. This feature is available only for the 1756-IF8IH and 1756-OF8IH modules when data format is Analog and HART by Channel. If you select Yes, a HART Command tab is added to the configuration dialog, in which you specify configuration values to be sent to the HART device.	Values that can be added in the HART Command tab are PV Damping (seconds), PV Units, PV Upper Range, PV Lower Range, PV Transfer Function.
Coordinated System Time	Not configurable.	Timestamped.
Data Format	Not configurable.	Float.

7. Click OK.

   A warning message asks you to confirm changes to the module definition.

8. Click Yes.

9. Click the Connection tab.



10. In the RPI box, type a value to specify a time interval when the data is sent to the controller.

IMPORTANT	An RPI that is set too fast can affect controller performance. We suggest that you specify an RPI that is two times faster than task execution or based on inherent properties of the signal being measured. For example, a 250 ms task requires a 125 ms time, but temperature measurements can be set slower as they are unlikely to change that quickly.

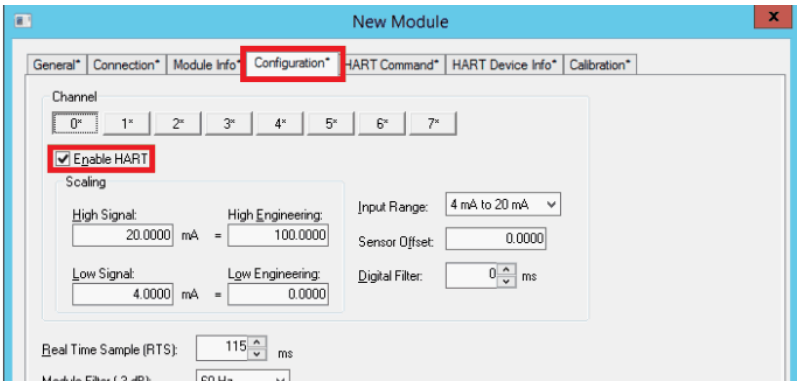
11. Leave the default checkbox 'Use Unicast Connection over EtherNet/IP' and click OK.

IMPORTANT	The Unicast checkbox **must** be disabled (no check mark) for a redundant controller.

Enable HART Channel Data

Complete these steps to configure each channel for HART data.

1. Click the Configuration tab.



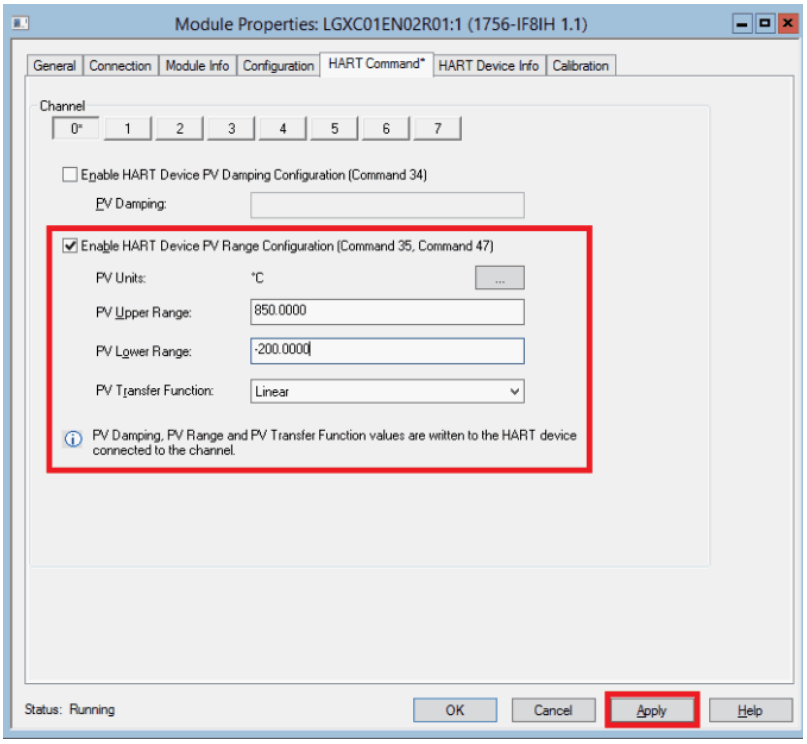
2. Check Enable HART for each applicable channel.

   We recommend that you Enable HART for any channel that has a connected HART device. The information is displayed on the HART Device Info tab and accessed by FactoryTalk® AssetCentre software.

You can check Enable HART on channels that have HART field devices attached.

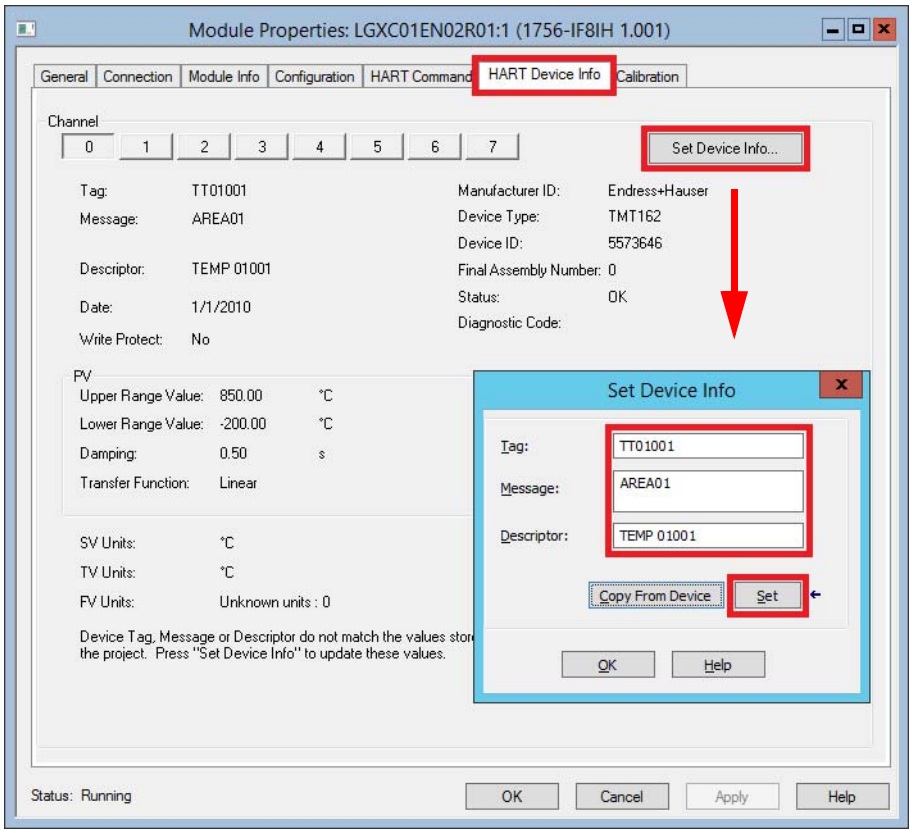
3. If online, click the HART Command tab to specify HART device parameters for each channel. These values are sent to the HART device.
4. Click 'Enable HART Device PV Range Configuration (Command 35, Command 47)'.

IMPORTANT	If you enable the HART device for a PV range, the functionality provides a continuous update of the variables. The data is exposed as tags in the I/O module. If you do not want a continuous update of the variables, remove the check in the 'Enable HART Device PV Range Configuration' box.



5. Set a range for the highest and lowest values for the PV in the specified engineering units.
6. Click Apply.

7. Click the HART Device Info tab.
8. Click Set Device Info.



The Set Device Info button is enabled when the controller is **online**.

9. Type a tag name, message, and descriptor for the HART device on the selected channel and click Set.

   This information is sent to and stored in the HART device.

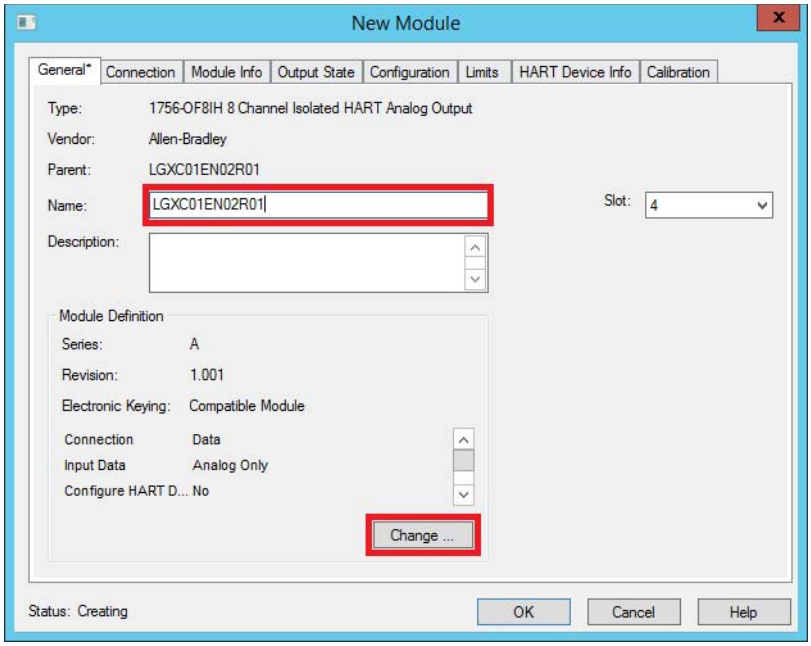
10. Click OK.

1756 Analog Output Module

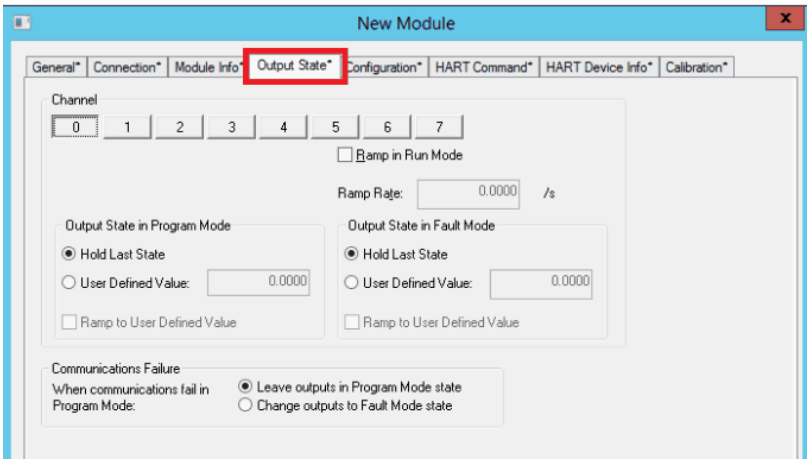
This section describes how to enable output parameters for a 1756-OF8IH analog module.

1. To name the module, select the chassis slot, and define the RPI, repeat step 1 through step 11 on pages 124...127.

   The example shows a naming convention for the 1756-OF8IH analog module.



2. Click the Output State tab.



   The dialog box is divided into four sections:

   - Ramp Rate
   - Output State in Program Mode
   - Output State in Fault Mode
   - Communications Failure

3. With an individual channel button selected, use the information in Table 5 to configure the parameters.

Table 5 - Output Parameter Configuration

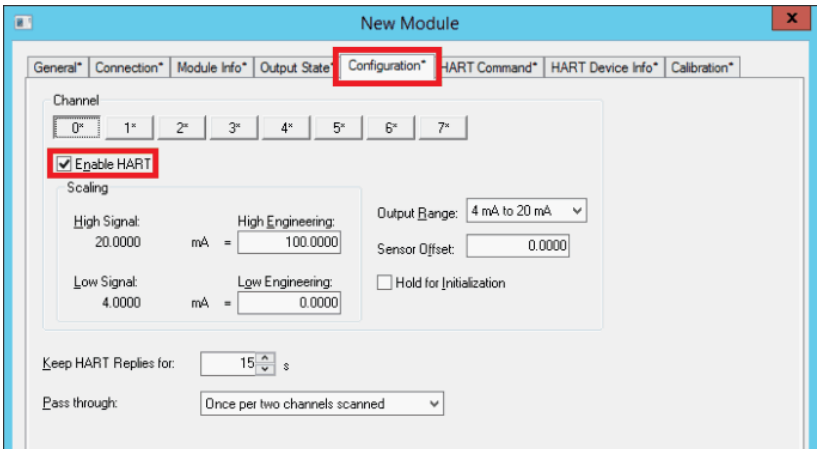
Select	Transitions
Ramp in Run Mode (Parameters available in Hard Run mode)	
Ramp Rate	Check the box and type a value to limit the speed at which an analog output signal can change. This option prevents fast transitions in output from damaging equipment that the output controls.
Output State in Program Mode (Parameters not available in Hard Run mode)	
Hold Last State	Click to leave the current output at its last value.
User Defined Value	Click and type a specific value to use when the owner controller is switched into Program mode. Value range is from -9,999,999…99,999,999, default is 0.
Ramp to User Defined Value	If Hold Last State – This field is disabled. User Defined Value – Check if you want the output to ramp to the user-defined value at the specified ramp rate. If unchecked, output signal steps to the User Defined Value immediately when you enter Program mode.
Output State in Fault Mode (Parameters not available in Hard Run mode) Module enters Program mode state if the Connection from Logix is inhibited. If communication subsequently fails, all channels of the module remain in Program mode.	
Hold Last State	Click to leave the output signal at its last value.
User Defined Value	Click and type a specific value to use if a fault occurs. Value range is -9,999,999…99,999,999, default is 0.
Ramp to User Defined Value	If Hold Last State – This field is disabled. If User Defined Value – You can check this option if you want the output to ramp to the user-defined value at the specified ramp rate. If unchecked, the output signal steps to the user-defined value immediately when you enter Fault mode.
Communications Failure If communication fails while in Run mode, the output signal goes to its Fault mode state. If communication fails while in Program mode, the output signal behaves as follows.	
Leave outputs in Program Mode state	Click to leave output signal at the configured Program mode value
Change outputs to Fault Mode state	Change output signal at configured Fault mode value if a communication fails (connection from controller breaks).

4. Click OK.

Enable HART Channel Data

Complete these steps to set up each channel for HART data.

1. Click the Configuration tab.

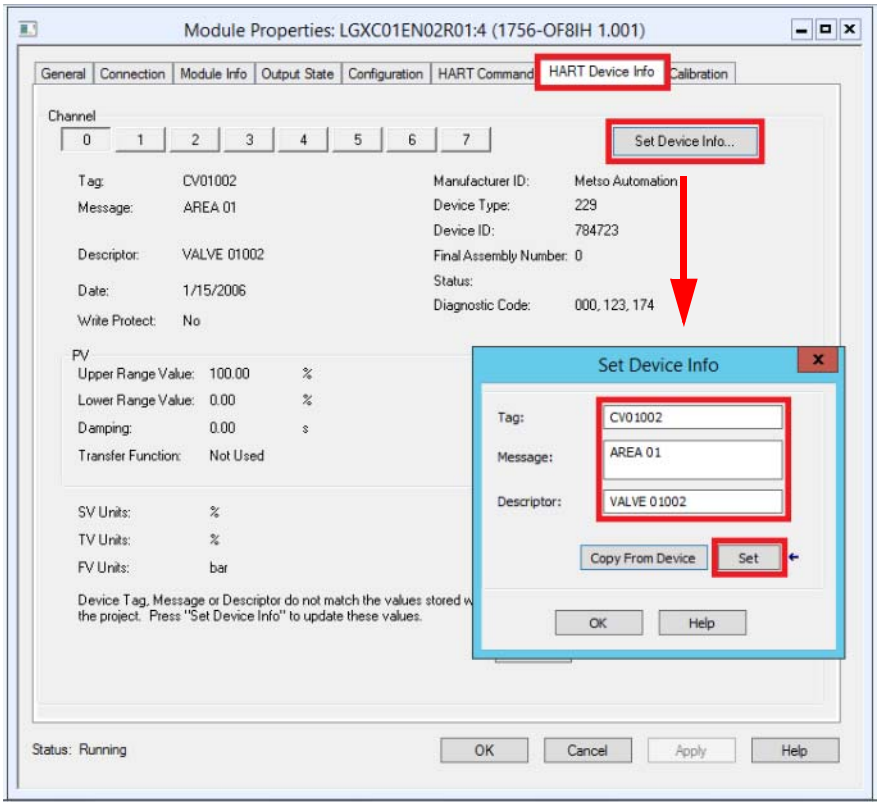


2. Check Enable HART for each applicable channel.

   We recommend that you Enable HART for any channel that has a connected HART device. The information is displayed on the HART Device Info tab and accessed by FactoryTalk AssetCentre software.

3. Click the HART Device Info tab.

4. Click Set Device Info.



The Set Device Info button is enabled when the controller is **online**.

5. Type a tag name, message, and descriptor for the HART device on the selected channel and click Set.

   This information is sent to and stored in the HART device.

6. Click Set.

ControlLogix Digital I/O modules are input/output modules that produce information when needed by using the produce/consume model. Digital modules also provide additional system functions, such as system Time Stamp of data and diagnostic detection.

1756 Digital Input Module

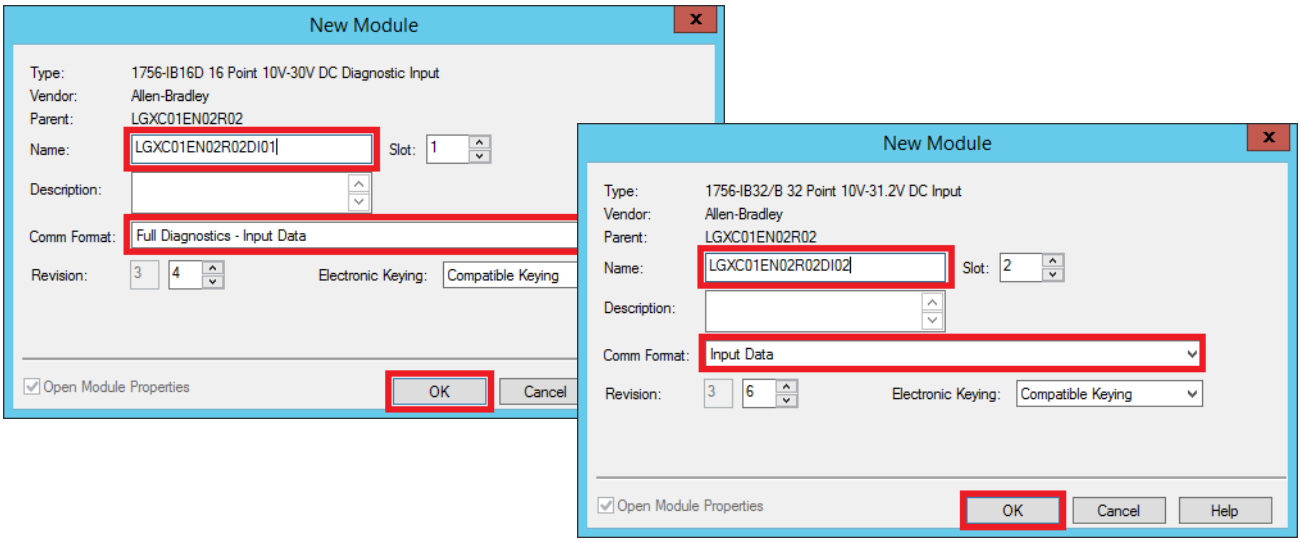
This section focuses on how to configure individual points of the module for On/Off detection and actuation.

Complete these steps.

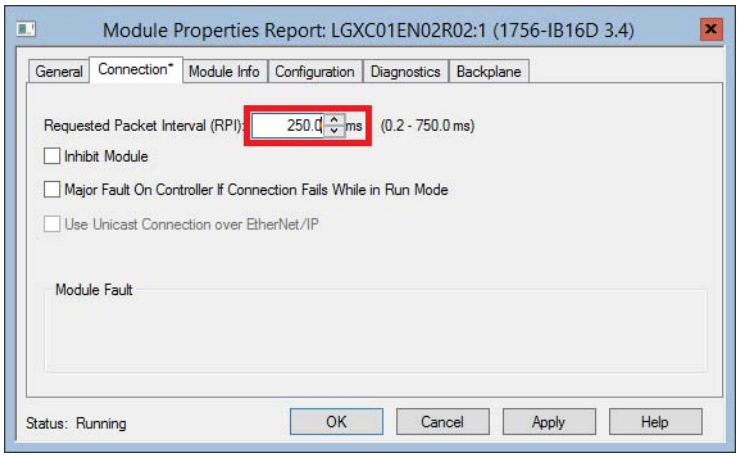
1. To name the module, select the chassis slot, and define the RPI, repeat step 1 through step 11 on pages 124...127.

   On the respective Select Module Type dialog box, choose a 1756-IB16D diagnostic module or a 1756-IB32/B module.

   The diagnostic ('D') module has a Comm Format for Full Diagnostics Output Data while the output module has only Output Data. The graphics are examples only.



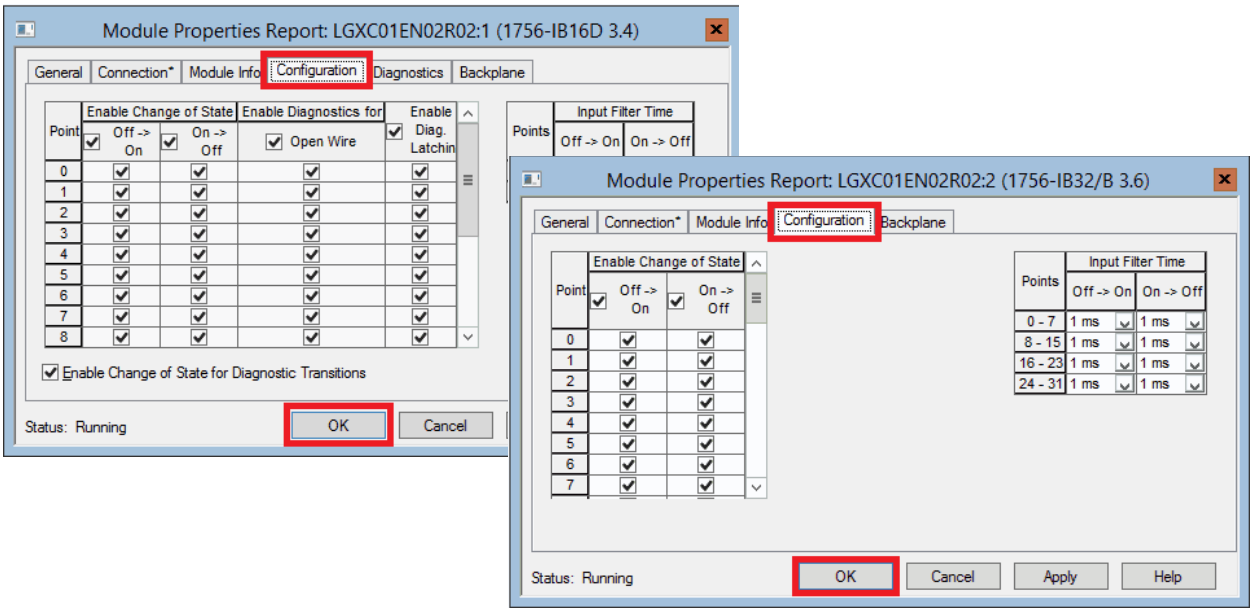
2. On the Connection tab, select an RPI and click OK.



3. Click the Configuration tab.

IMPORTANT Skip the next two steps if you are not using the Change of State functionality.

4. Do one of the following in the Enable Change of State columns:
   - To enable COS for a point, check the corresponding Off to On or On to Off box.
   - To disable COS for a point, clear the corresponding Off to On or On to Off box.



5. Click OK.

6. On the right side of the Configuration tab, choose the input filter times from the Off–On and On–Off pull-down menus.

   These filters improve noise immunity within a signal. A larger filter value affects the length of delay times for signals from these modules.

7. Click OK.

   For more information, see the ControlLogix Digital I/O Modules User Manual, publication 1756-UM058.

1756 Digital Output Module

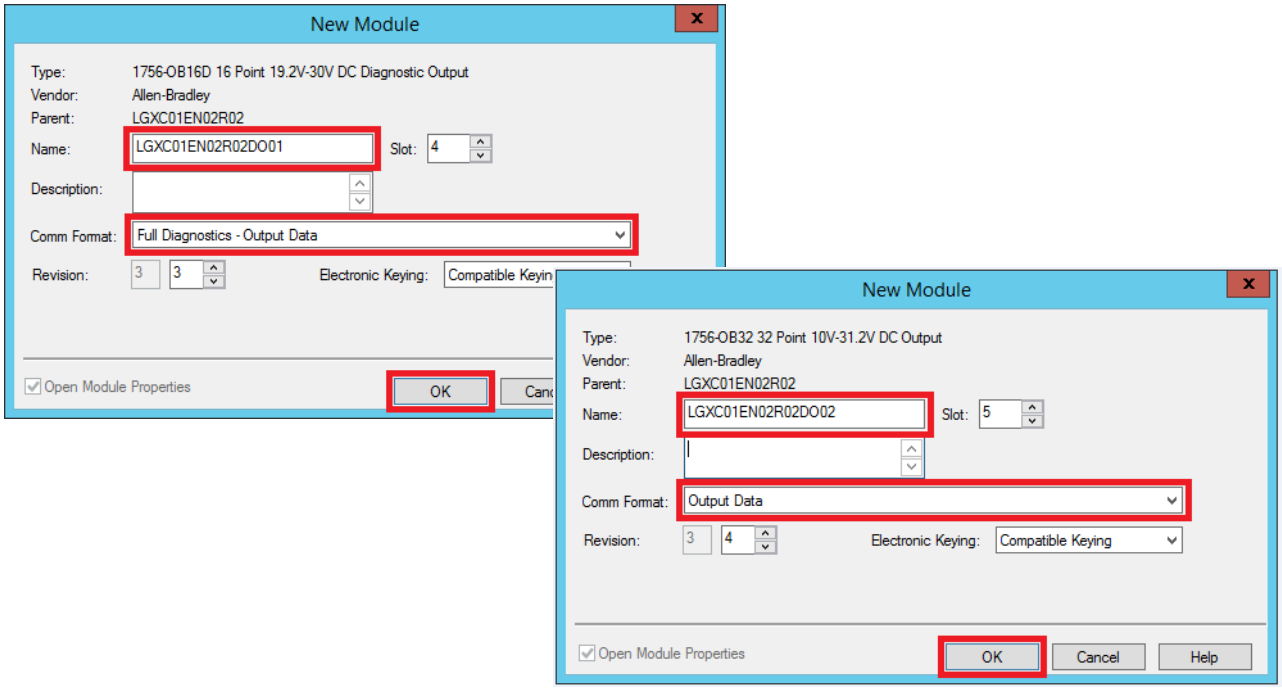
This section describes how to configure output states if the module goes into Program mode or Fault mode.

Complete these steps.

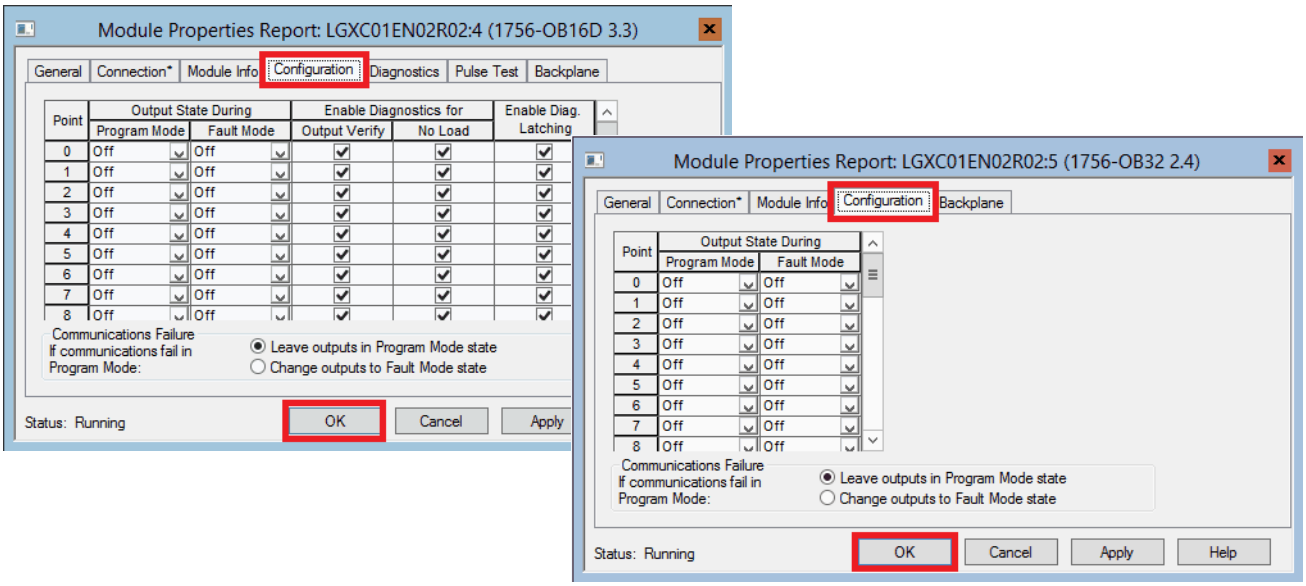
1. To name the module, select the chassis slot, and define the RPI, repeat step 1 through step 11 on pages 124...127.

   On the respective Select Module Type dialog box, choose a 1756-OB16D diagnostic module or a 1756-OB32 module.

   The diagnostic ('D') module has a Comm Format for Full Diagnostics Output Data while the output module has only Output Data. The graphics are examples only.



2. After you define the RPI and click OK, click the Configuration tab.



3. From the Program Mode pull-down menu, choose the module output state during Program mode:
   - On
   - Off
   - Hold (Retain current output state)
4. From the Fault Mode pull-down menu, choose the module output state during Fault mode:
   - On
   - Off
   - Hold (Retain current output state)
5. Click OK.

   For more information, see the ControlLogix Digital I/O Modules User Manual, publication 1756-UM058.

The low-speed counter module is used in Process applications to save controller bandwidth. The module can be used as a pulse totalizer for flowmeters or a speed sensor in conveyors.

1756 Low-speed Counter Module

This section describes Configuration tabs so the counters can count pulses from devices such as proximity switches and photoelectric sensors. The counts are presented as an accumulated count or frequency.

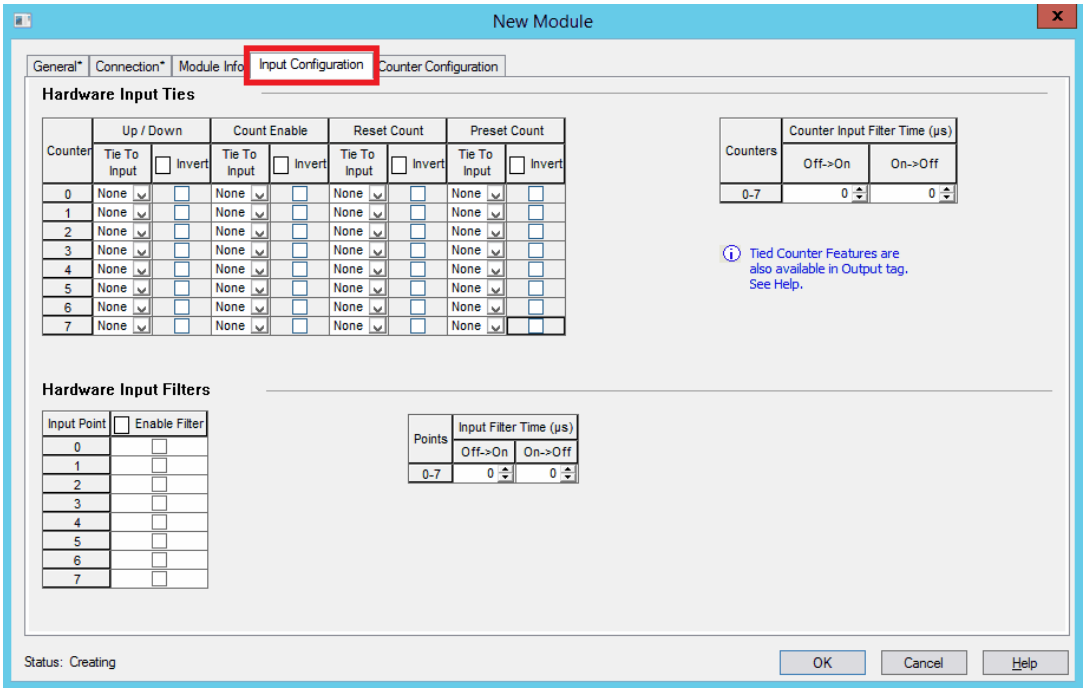
Complete these steps.

1. To name the module, select the chassis slot, and define the RPI, repeat step 1 through step 11 on pages 124...127.

   On the respective Select Module Type dialog box, choose a 1756-LSC8XIB8I module.

2. After you define the RPI and click OK, click the Input Configuration tab.

   This tab lets you associate hardware inputs of the module to the counters.

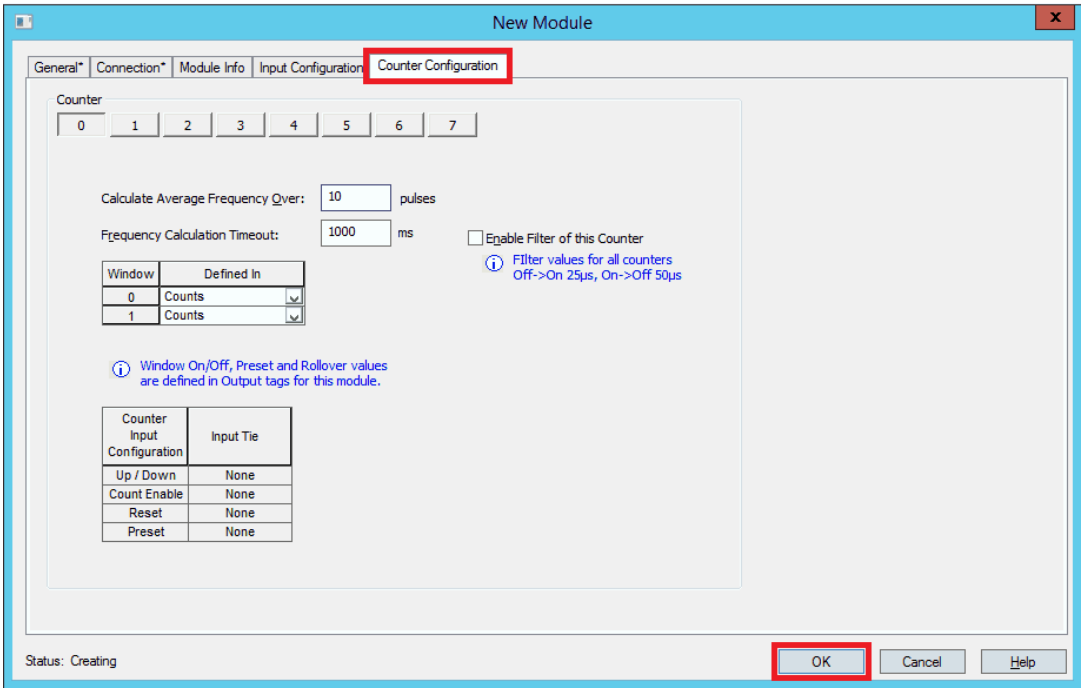


3. Select a counter to tie the counter control function to a standard hardware input.

   The state of the external input device controls the designated counter

4. Check Invert to change the input count direction, if applicable.
5. Use the pull-down menus to choose the desired input filter times.
6. Click OK.

7. Click the Counter Configuration tab.



8. Click a counter to configure frequency per pulses.
9. Click OK.

   For more information, see the ControlLogix Low-speed Counter Module User Manual, publication 1756-UM536.

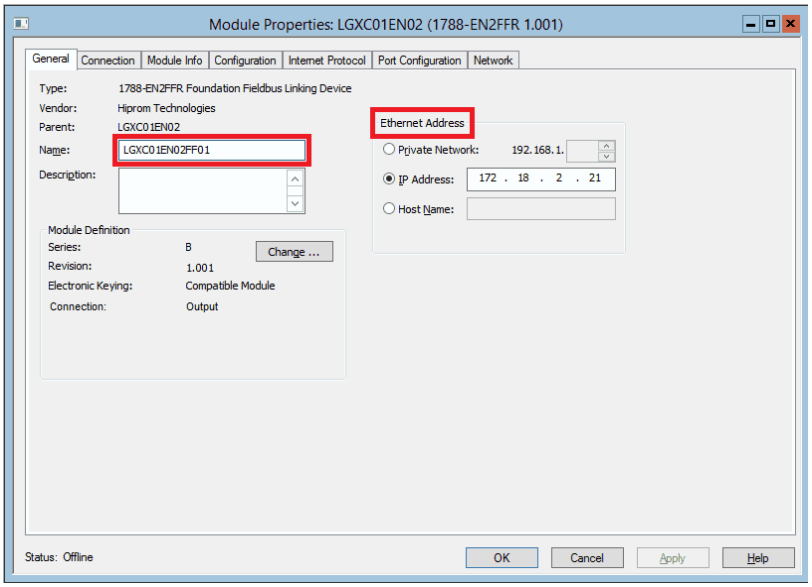
These modules are referred to as linking devices because they provide a gateway between Ethernet and ControlNet networks to FOUNDATION Fieldbus and PROFIBUS PA networks.

Process I/O Linking Devices

This section shows how to configure Fieldbus Foundation and PROFIBUS PA linking devices to communicate field device information via CIP networks to a Logix controller.

Complete these steps.

1. Right-click the network of the remote I/O, and choose New Module.
2. On the respective Select Module Type dialog box, choose a 1788-EN2FFR (fieldbus) or 1788-EN2PAR (PROFIBUS) module.
3. Name the device and type an IP address.

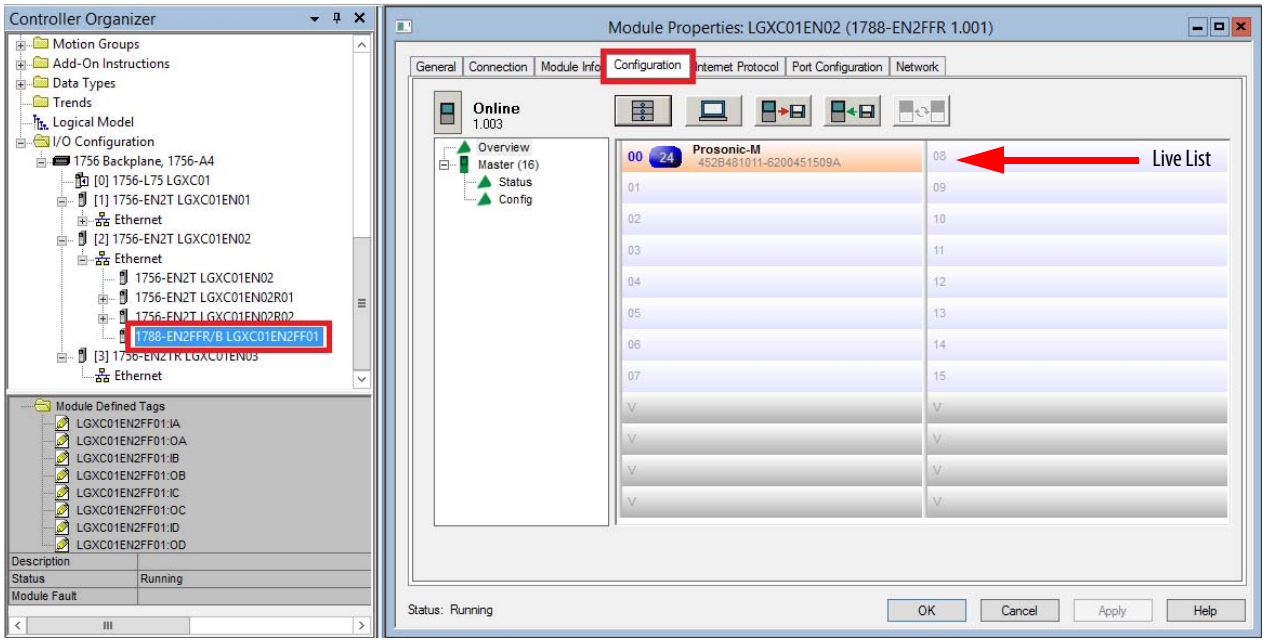


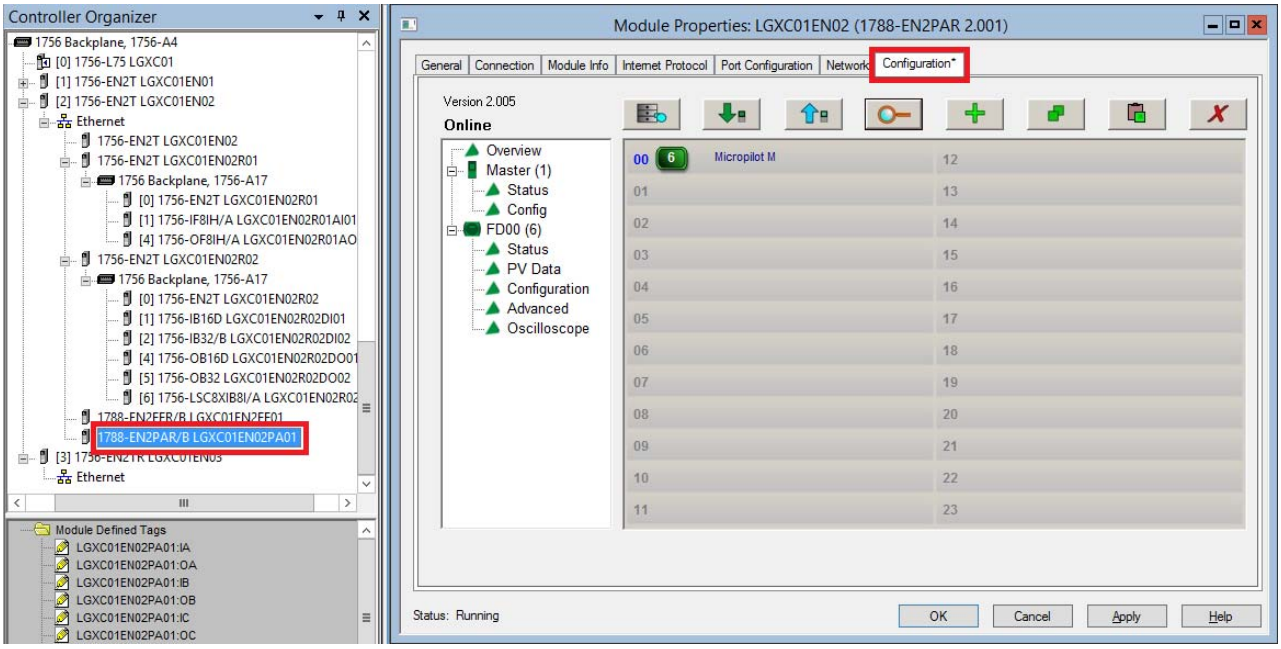
4. Click OK.
5. On the Connection tab, set the RPI value and click OK.

   For more RPI information, see the Important on page 127.
6. In the Controller Organizer, double-click the linking device.

   The Module Properties dialog box appears.

7. Click the Configuration tab.





Once the linking device is connected to the controller, you can see the linking device in the Configuration tab.

- Master green in the configuration tree = linking device is online
- Master gray in the configuration tree = linking device is offline

For more information, see the following documents:

- EtherNet/IP and ControlNet to FOUNDATION Fieldbus Linking Devices User Manual, publication 1788-UM057
- EtherNet/IP and ControlNet to PROFIBUS PA Linking Devices User Manual, publication 1788-UM058

Low-voltage motor control centers (MCC) house starters, soft-starters, and drives as an alternative to wiring each device individually. Simplified programming creates a single network for complete machine control.

Motor Control Center Components

This section describes how to configure MCC components, including PowerFlex® drive, SMC™, and overload relay examples.

IMPORTANT This section shows how to configure the PowerFlex 755 drive. You can use basically the same procedures for configuring other PowerFlex drives.

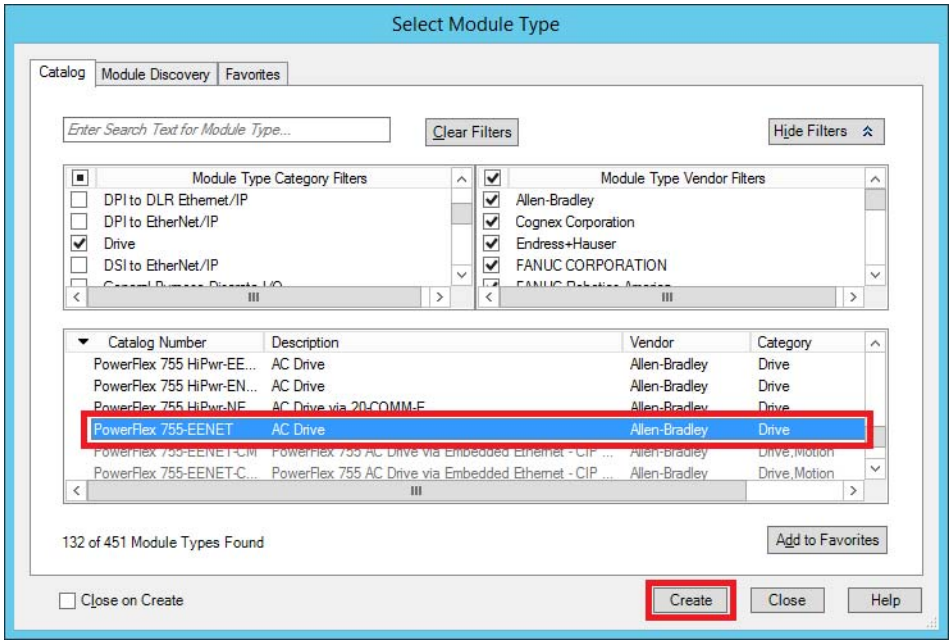
The Datalinks **must** be configured before using the respective PowerFlex procedures. For Datalink information, see the following Rockwell Automation® Library of Process Objects Add-On Instructions:

- PowerFlex 755 (P_PF755), publication SYSLIB-RM040
- PowerFlex 753 (P_PF753), publication SYSLIB-RM044

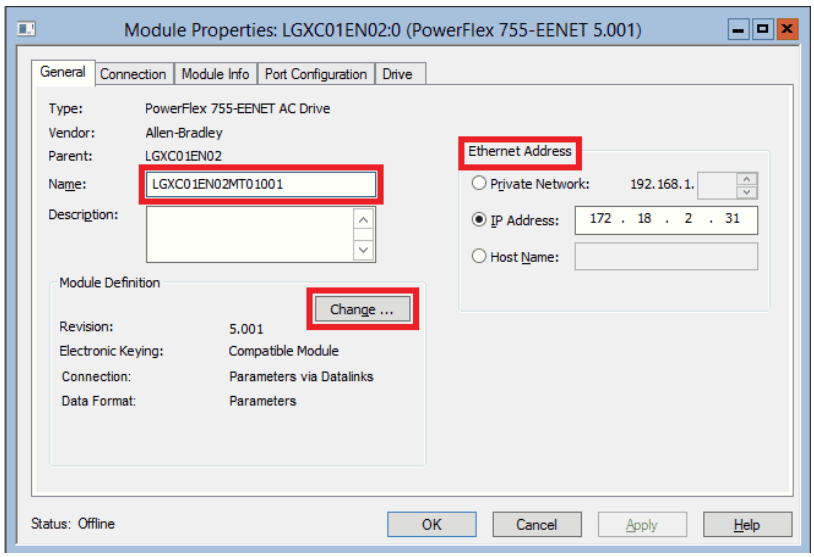
PowerFlex 755 Example

Complete these steps.

1. In the I/O Configuration tree, right-click the remote I/O network and choose New Module.
2. From the Select Module Type dialog box, select a PowerFlex 755 module and click Create.

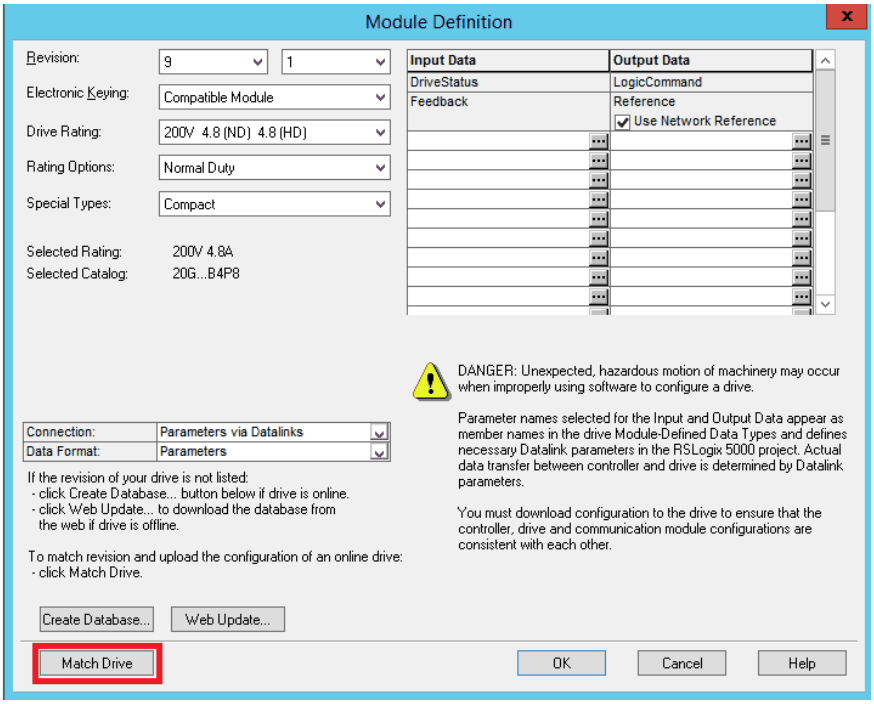


3. Type a name and IP address for the drive.

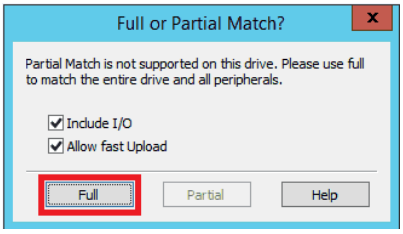


4. In the Module Definition section, click Change.

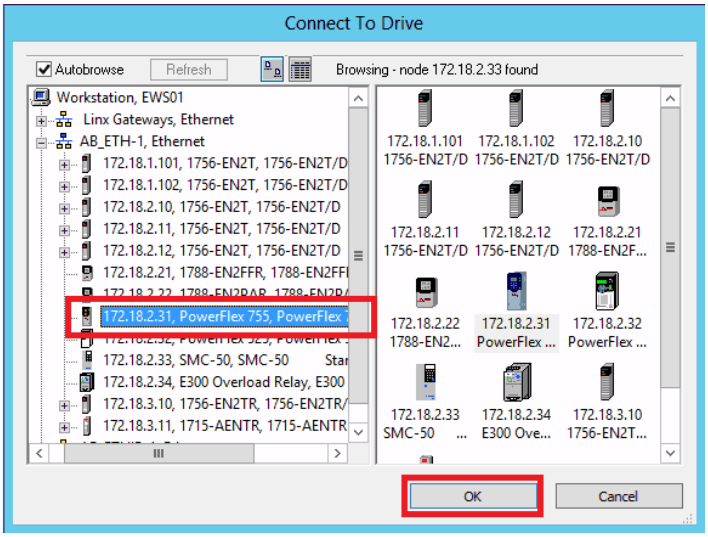
   The Module Definition dialog box appears.



5. Click Match Drive.



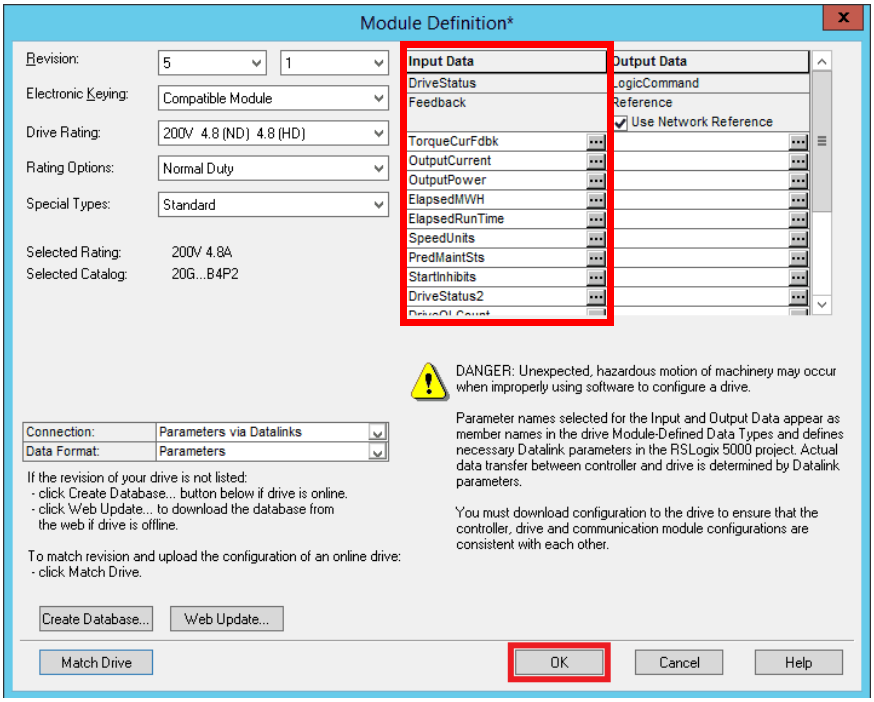
6. Click Full on the message window.



7. Select the drive and click OK.

8. Click OK to the message that the online action is successful.

   The Module Definition dialog box reappears with the input datalinks for the matching drive.



9. Click OK.

10. Click Yes to accept the module changes.

11. Click the Connection tab and set an RPI value.

12. Click OK.

    For more information, see the PowerFlex 750-Series AC Drives Programming Manual, publication 750-PM001.

PowerFlex 525 Example

Complete these steps.

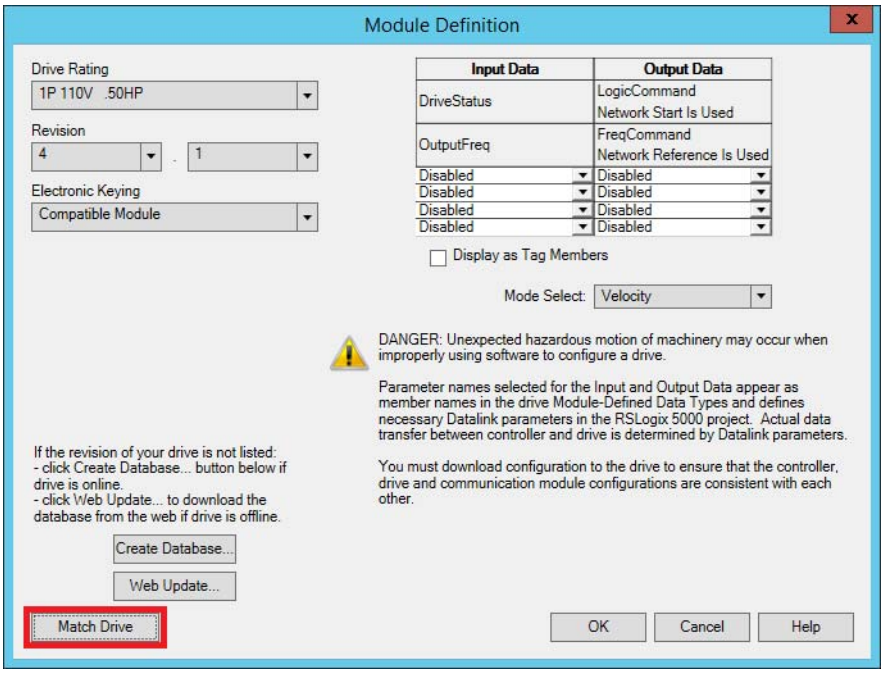
IMPORTANT This section shows how to configure the PowerFlex 525 drive. You can use basically the same procedures for configuring other PowerFlex drives.

The Datalinks **must** be configured before using the respective PowerFlex procedures. For Datalink information, see the following Rockwell Automation Library of Process Objects Add-On Instruction:

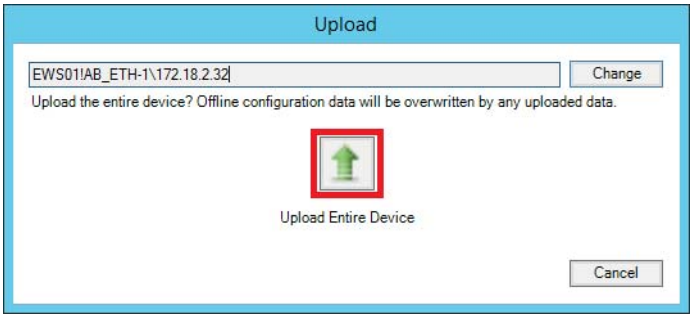
- PowerFlex 523/525 (P_PF52x), publication SYSLIB-RM048

1. In the I/O Configuration tree, right-click the remote I/O network and choose New Module.
2. From the Select Module Type dialog box, select a PowerFlex 525 module and click Create.
3. Type a name and IP address for the drive.
4. In the Module Definition section, click Change.

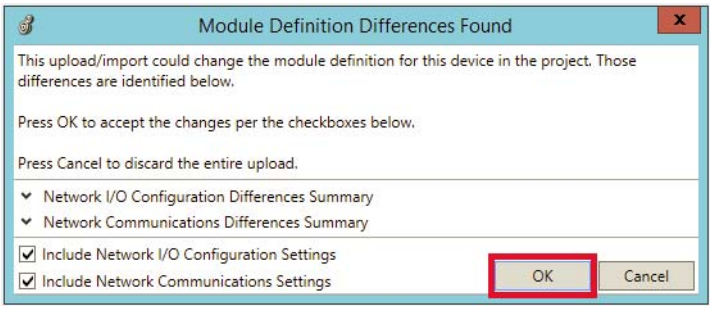
   The Module Definition dialog box appears.



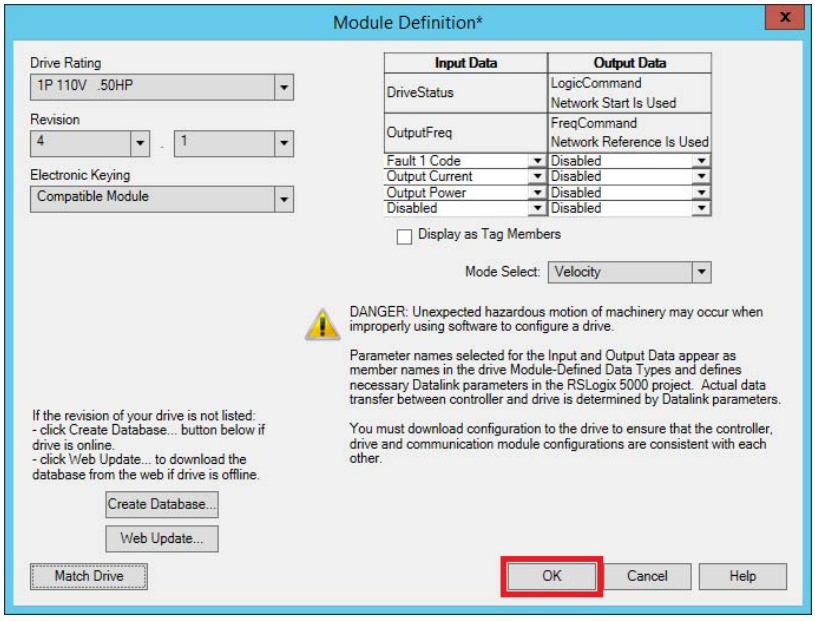
5. Click Match Drive.



6. Click Upload Entire Device.
7. Click OK after a review of possible changes to the module definition on a pop-up window.



8. Click OK on the Module Definition dialog box.



9. Click Yes to accept the module changes.
10. Click the Connection tab and set an RPI value.
11. Click OK.

For more information, see the PowerFlex 520-Series Adjustable Frequency AC Drive Programming Manual, publication 520-UM001.

Smart Motor Controller (SMC™-50) Example

Complete these steps to use a module that is designed to maximize the efficiency of motor starts and stops.

IMPORTANT This section shows how to configure the SMC-50 smart starter. You can use basically the same procedures for configuring other motor starters.

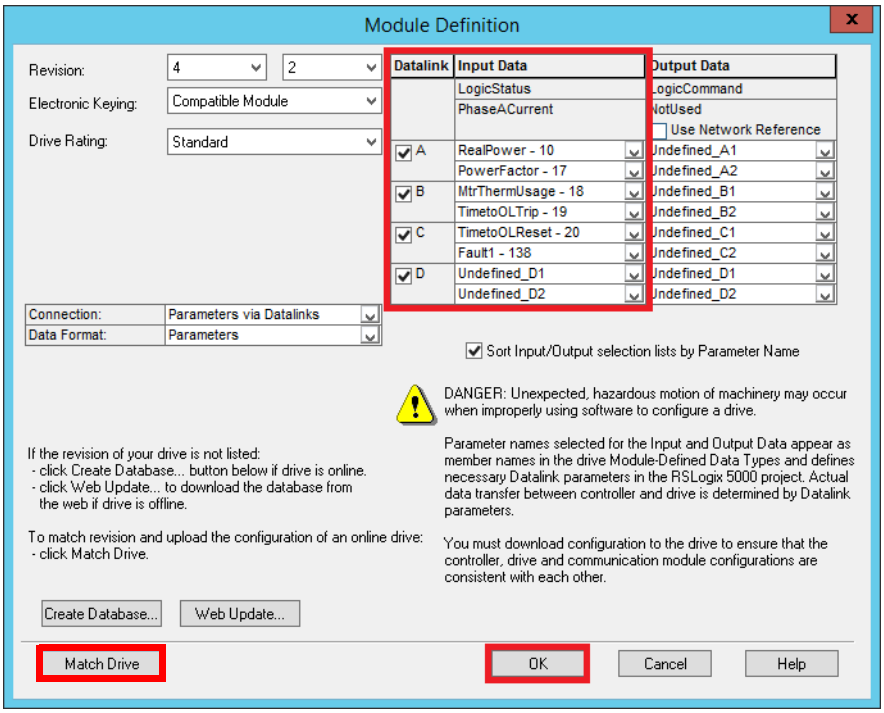
The Datalinks **must** be configured before using the respective SMC procedures. For Datalink information, see the following Rockwell Automation Library of Process Objects Add-On Instructions:

- SMC-50 (P_SMC50), publication SYSLIB-RM052
- SMC Flex (P_SMCFlex), publication SYSLIB-RM053

1. In the I/O Configuration tree, right-click the remote I/O network and choose New Module.
2. From the Select Module Type dialog box, select an SMC-50 module and click Create.
3. Type a name and IP address for the drive.
4. In the Module Definition section, click Change.

   The Module Definition dialog box appears.
5. Click Match Drive.

   The Module Definition dialog box reappears with the input datalinks for the matching drive.



6. Click OK.
7. Click Yes to accept the module changes.

8. Click the Connection tab and set an RPI value.
9. Click OK.

   For more information, see the SMC-50 Solid-State Smart Motor Controller User Manual, publication 150-UM011.

E300™ Electronic Overload Relay Example

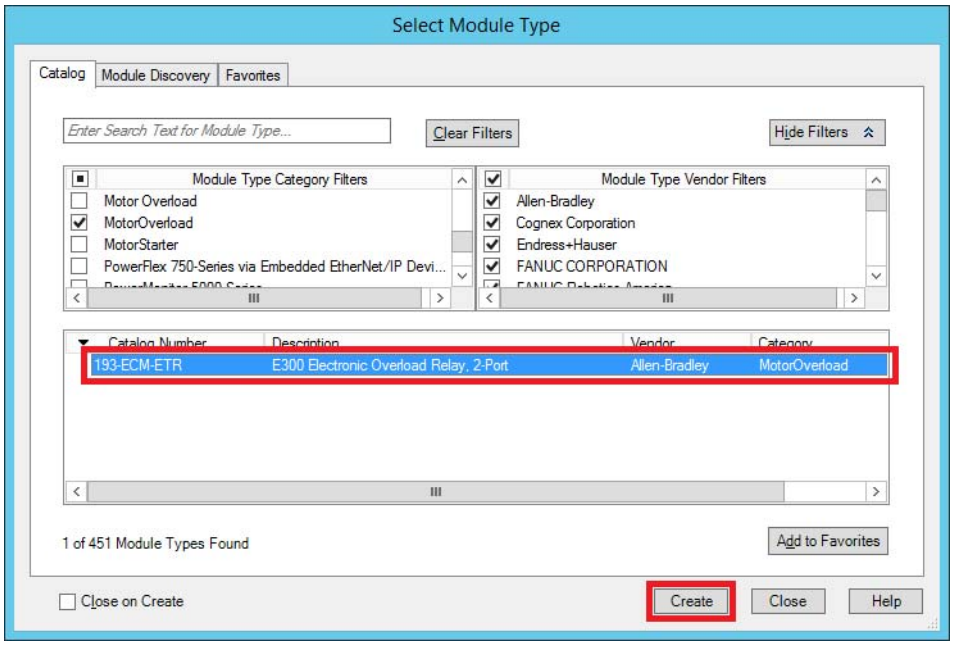
Complete these steps to add an overload relay that features a modular design and diagnostic information for motor control applications.

IMPORTANT This section shows how to configure the E300 overload relay. You can use basically the same procedures for configuring other protection relays.

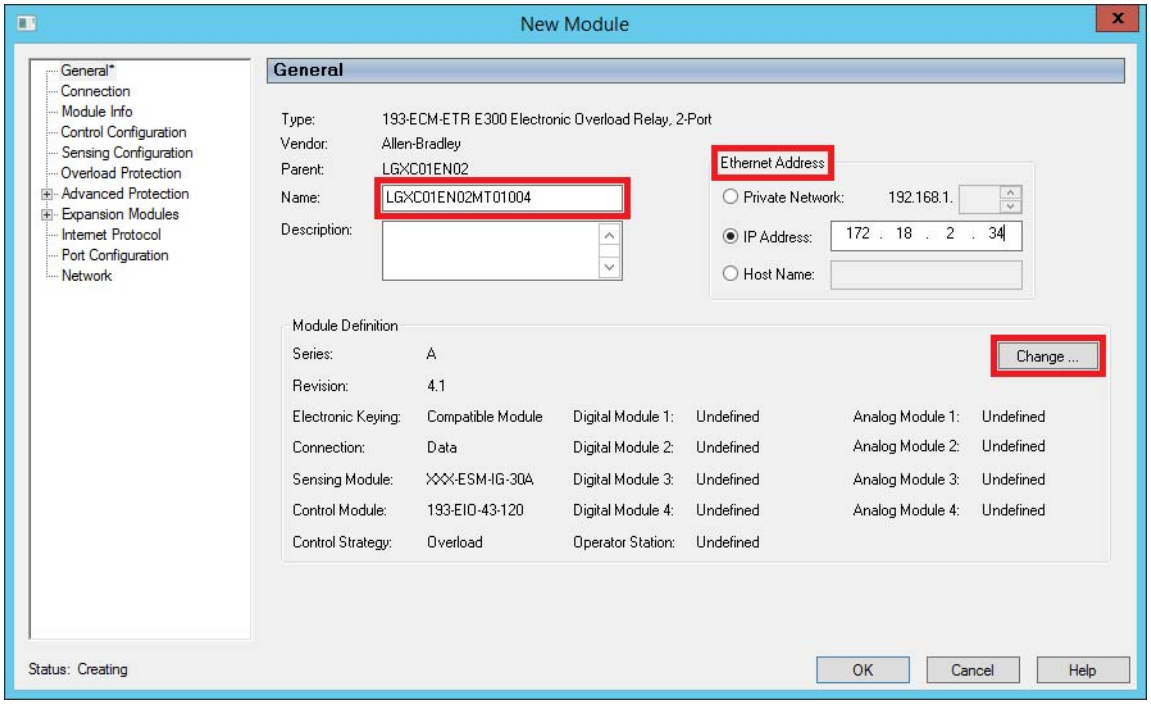
The Datalinks **must** be configured before using the respective SMC procedures. For Datalink information, see the following Rockwell Automation Library of Process Objects Add-On Instructions:

- E300 (P_E300Ovld), publication SYSLIB-RM051
- E1 Plus (P_E1PlusE), publication SYSLIB-RM049
- E3/E3 Plus (P_E3Ovld), publication SYSLIB-RM050

1. In the I/O Configuration tree, right-click the remote I/O network and choose New Module.
2. From the Select Module Type dialog box, select an E300 relay module and click Create.

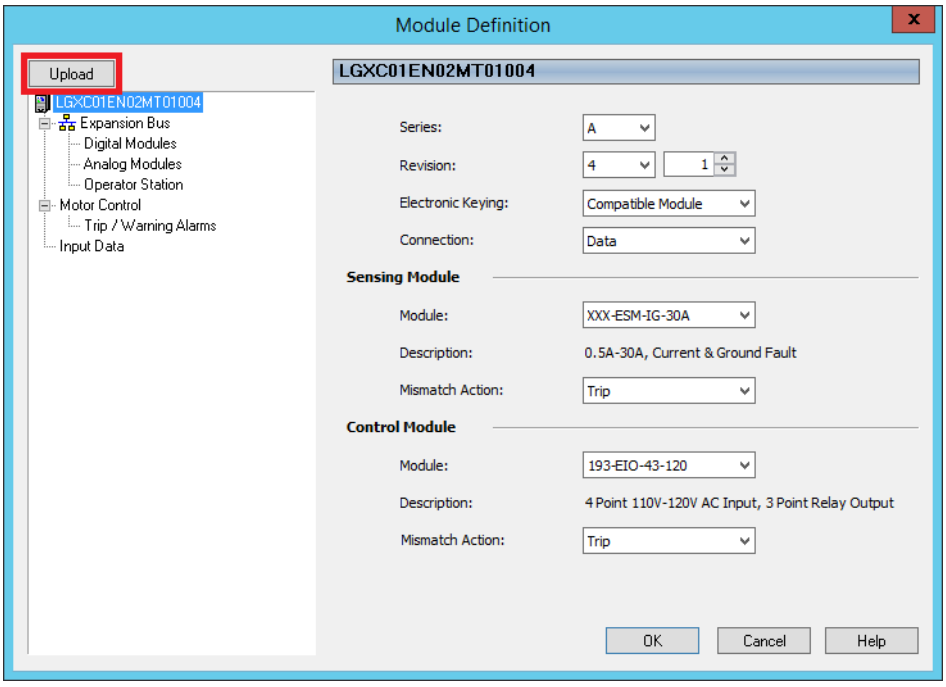


3. Type a name and IP address for the drive.



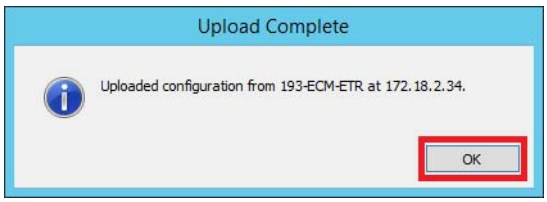
4. In the Module Definition section, click Change.

   The Module Definition dialog box appears.

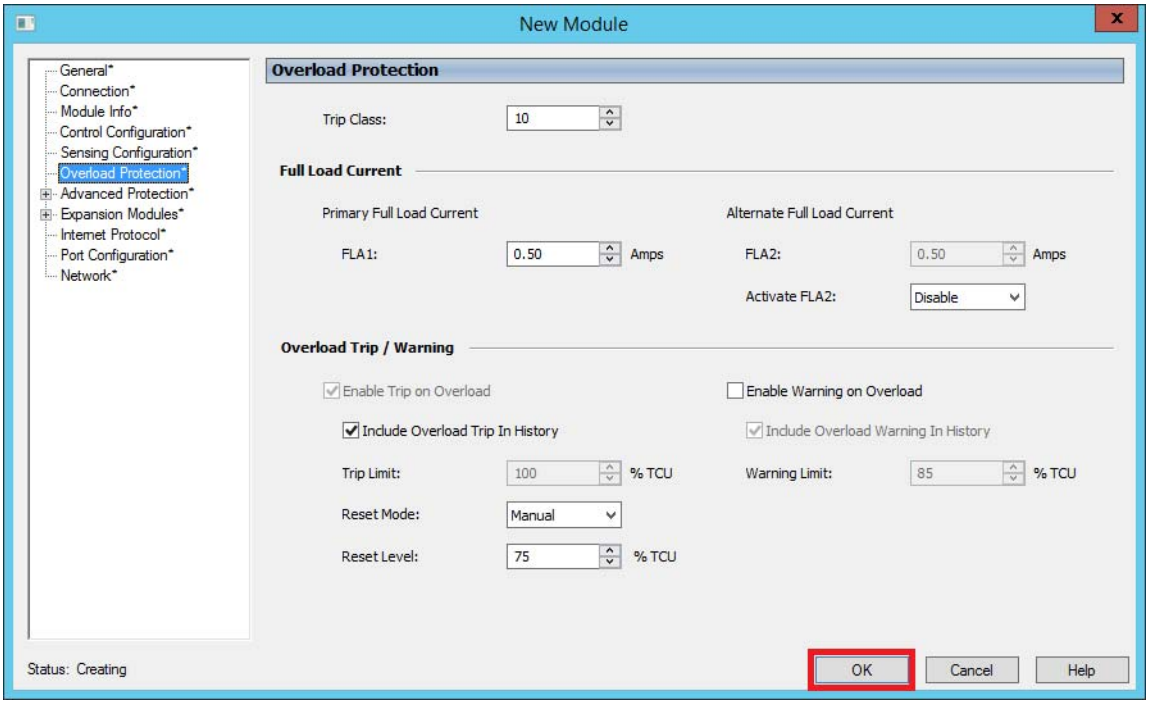


5. Click Upload

6. Click OK on the pop-up window when the Upload completes.



7. Click OK again on the Module Definition dialog box.
8. Click OK on the New Module dialog box.



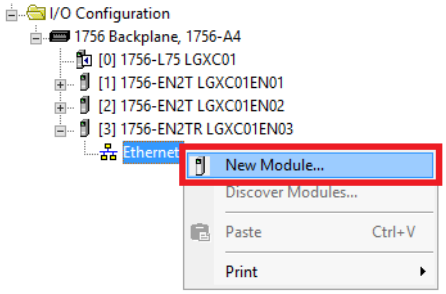
For more information, see the Bulletin 193/592 E300 Overload Relay User Manual, publication 193-UM015.

Configure Redundant I/O Modules

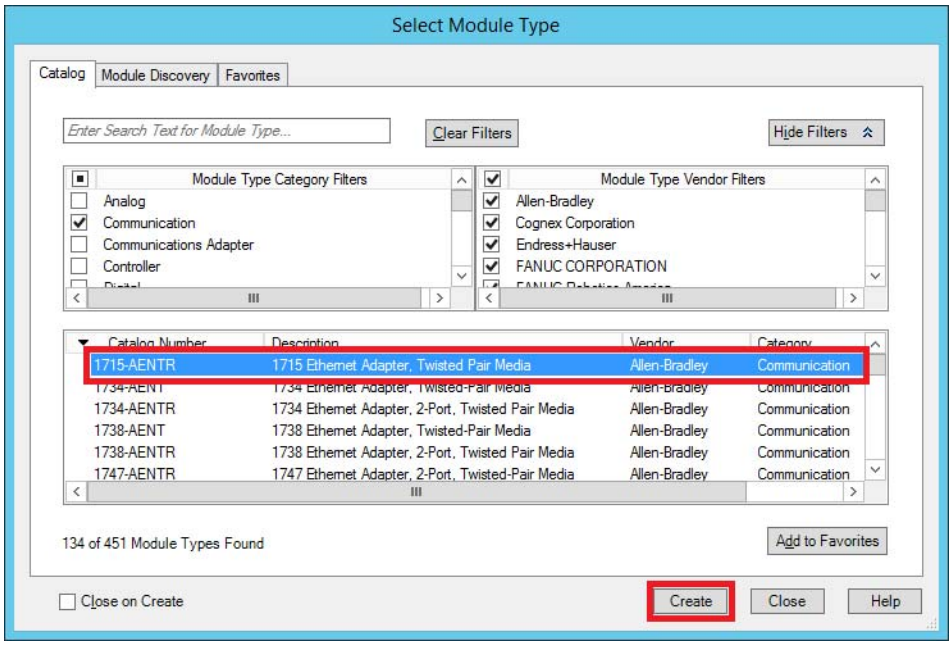
The 1715 redundant I/O platform offers flexibility, with no special wiring, and no user programming code or Add-On Instructions. The redundant I/O system requires less engineering because no additional hardware is required.

This section shows how to configure a 1715 redundant I/O system with a remote I/O chassis on an EtherNet/IP network. Using a ControlLogix controller, this redundant system provides fault tolerance with a redundant adapter pair and multiple I/O modules for enhanced diagnostics.

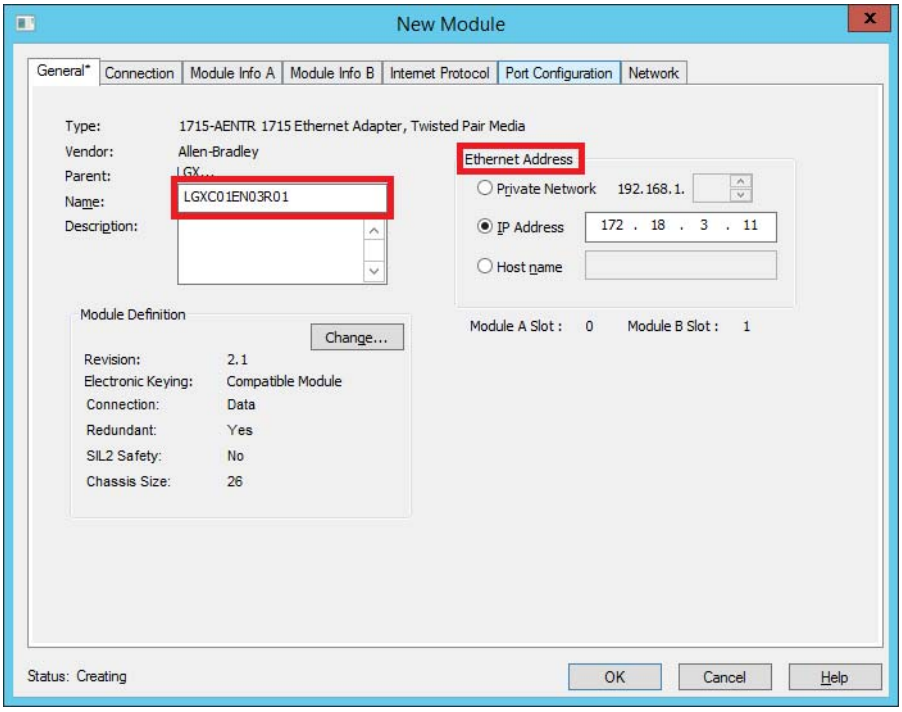
1. To set up a network adapter, right-click an Ethernet bridge in the I/O Configuration tree and choose New Module.



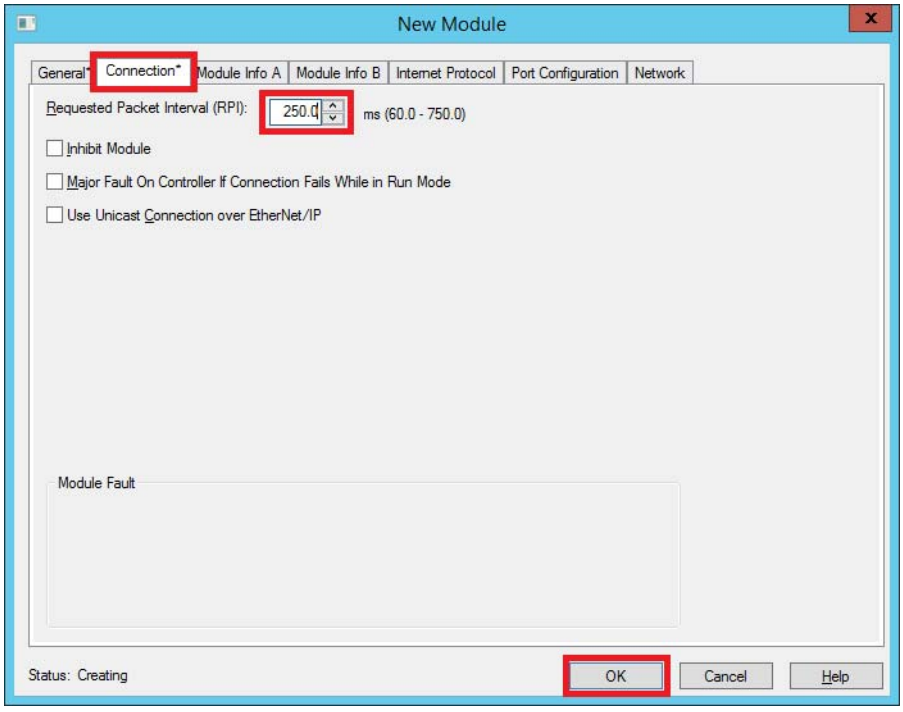
2. On the Catalog tab, use the filter to select a 1715 Ethernet adapter and click Create.



3. On the New Module dialog box, type a name for the adapter and set an IP address.

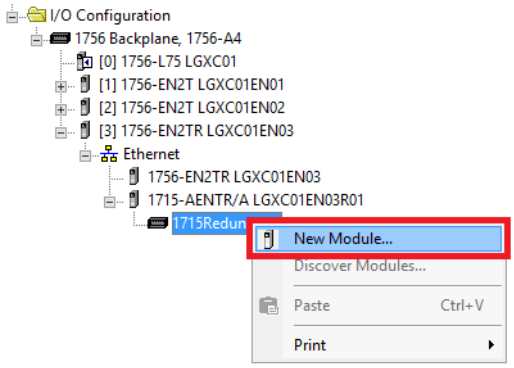


4. Click the Connection tab and select an RPI value.

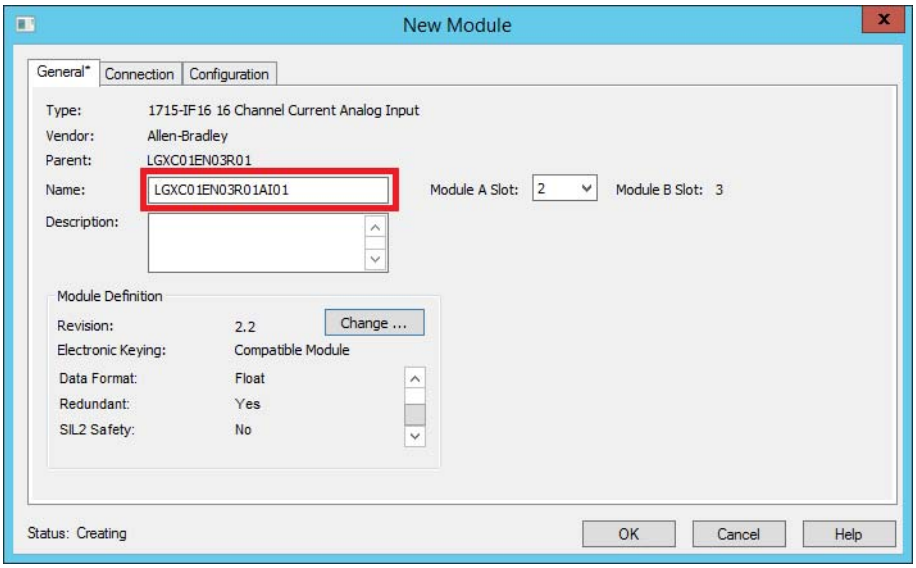


5. Click OK.

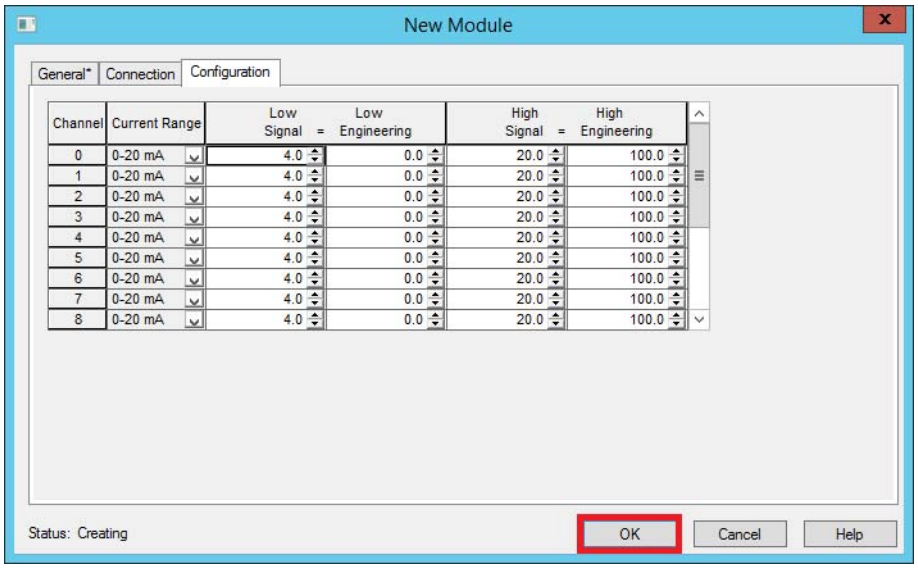
6. Right-click the 1715 network adapter and choose New Module.



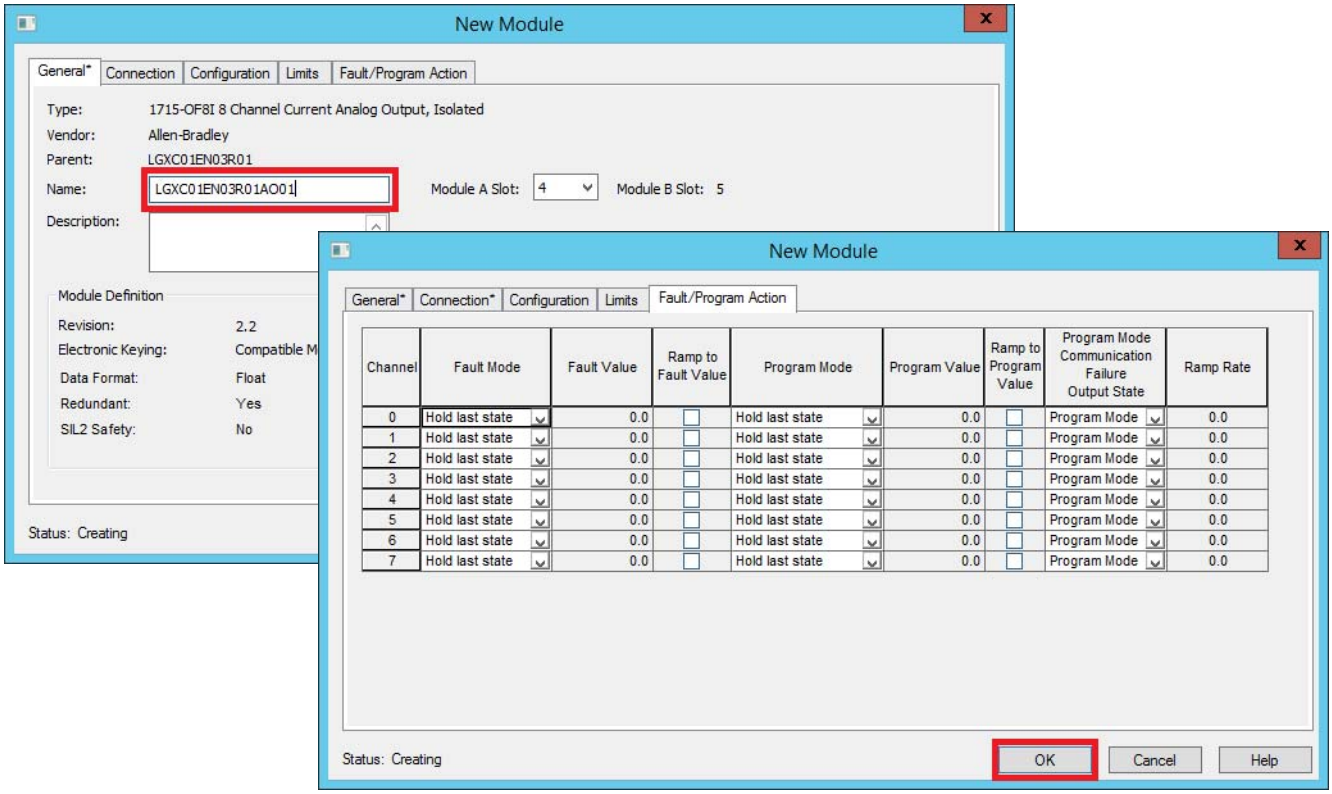
7. Select a 1715-IF16 analog input module, name it, and pick a slot number.



8. Click the Configuration tab to check the channel signals, and click OK.

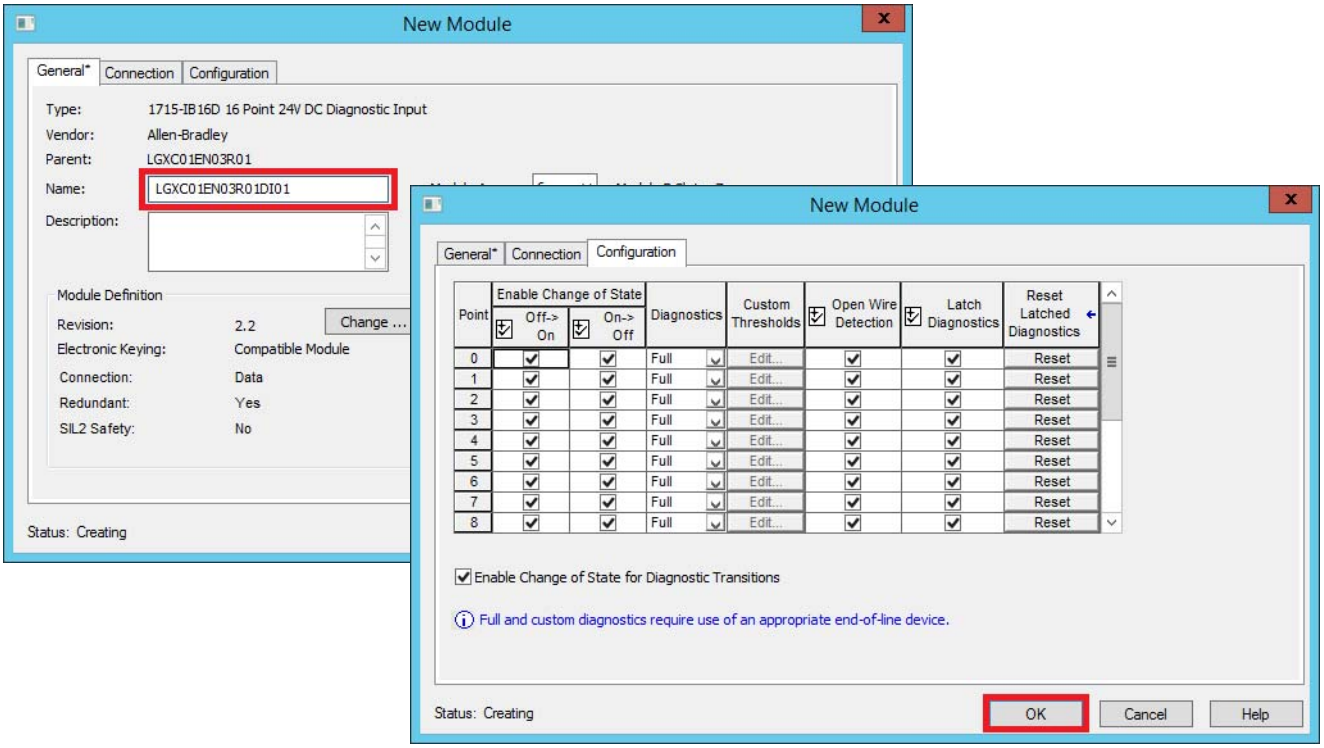


9. Repeat step 6 through step 8 to create a 1715-OF8I analog output module.

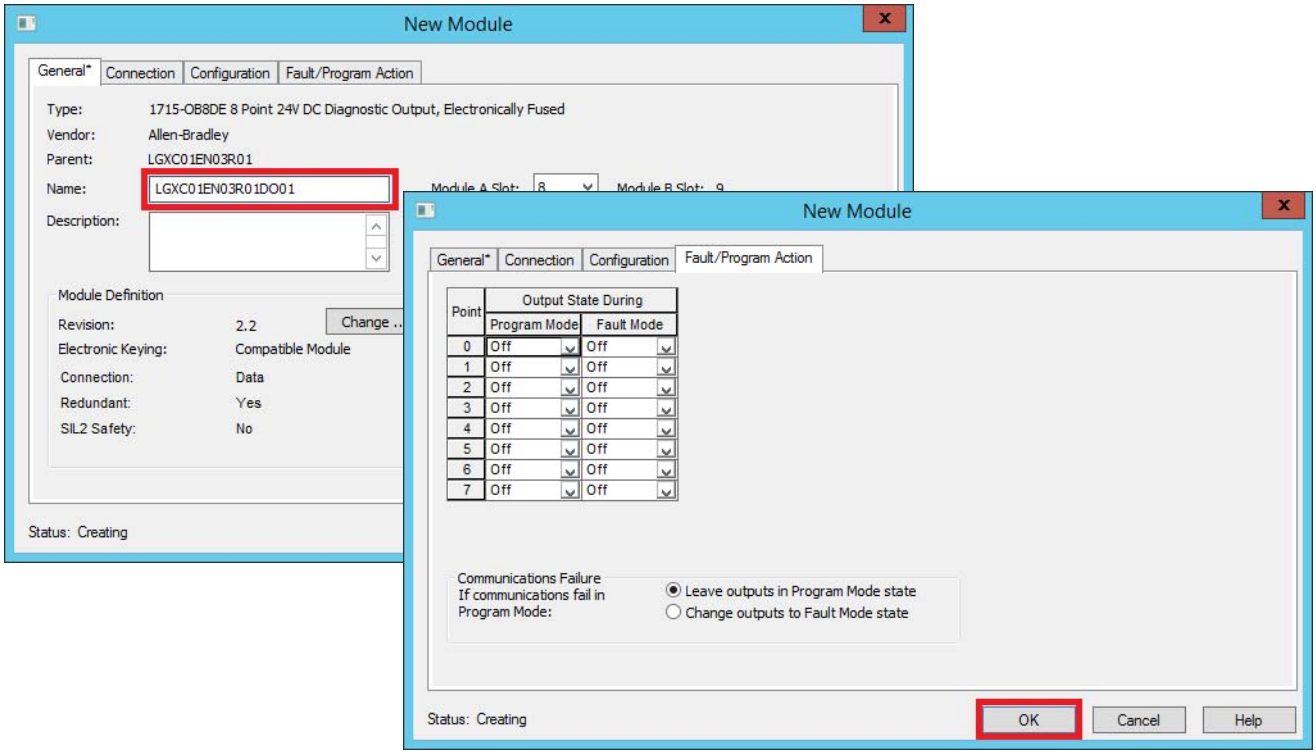


10. Click OK.

11. Repeat step 6 through step 8 to create a digital diagnostic input (1715-IB16D) module.

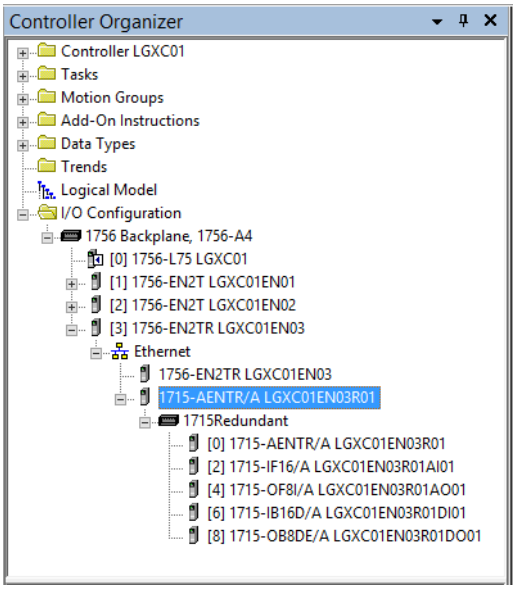


12. Click OK.
13. Repeat step 6 through step 8 to create a digital diagnostic output (1715-OB16DE) module.



14. Click OK.

All 1715 I/O modules are added to the remote I/O chassis.



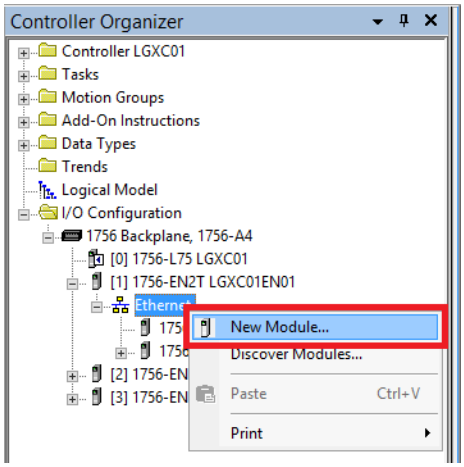
For more information, see the Redundant I/O System User Manual, publication 1715-UM001.

Add a Stratix Switch (CIP) Connection

IMPORTANT A CIP VLAN must be enabled for the switch to perform the following steps. To enable CIP, see Chapter 1 in the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

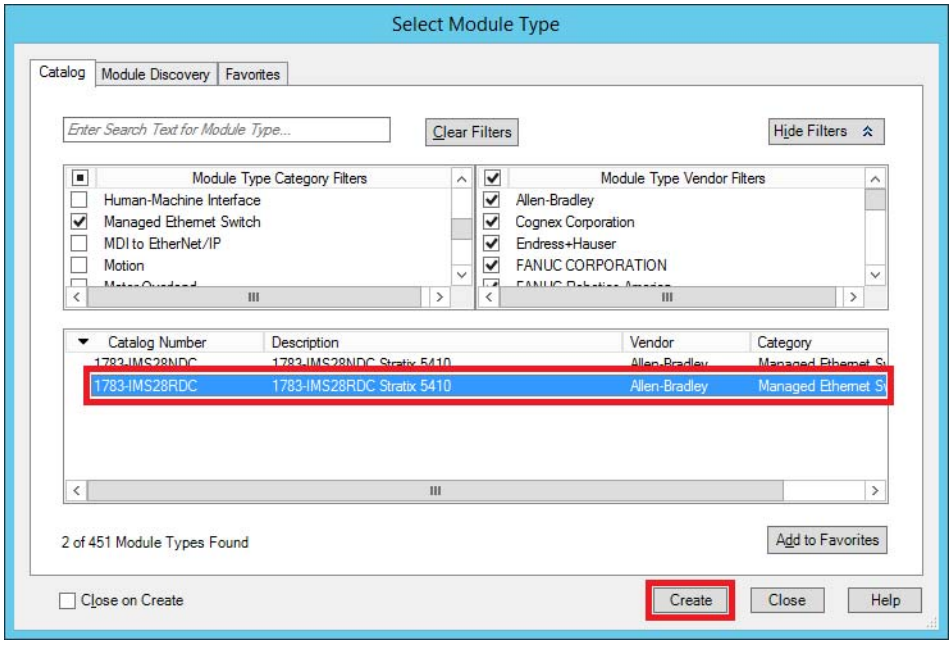
Complete these steps to configure a managed switch to leverage ports for sending messages only to the device that needs or requests the communication.

1. Right-click on an Ethernet adapter and choose New Module.



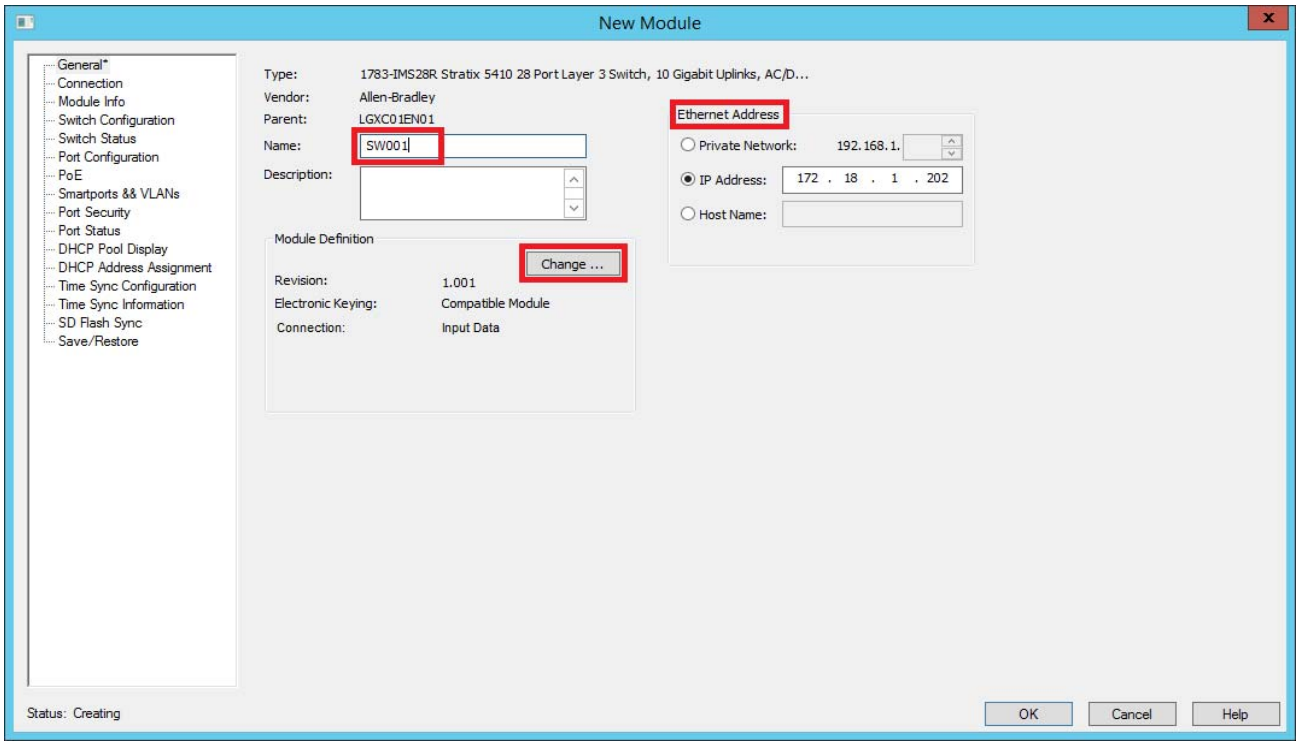
The Select Module Type dialog box appears.

2. Select a Stratix managed port adapter and click Create.

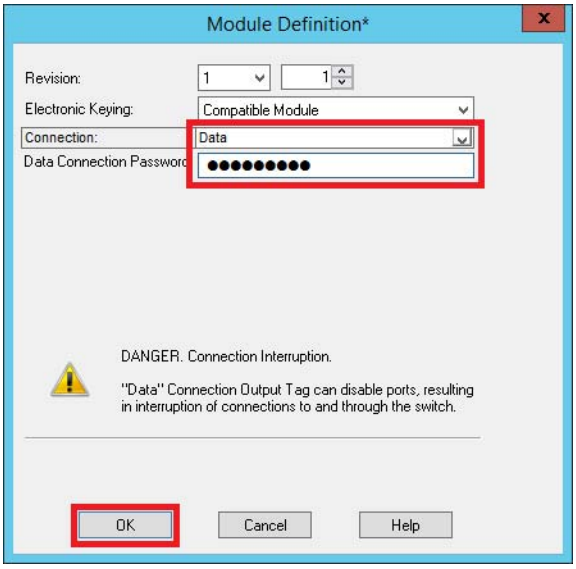


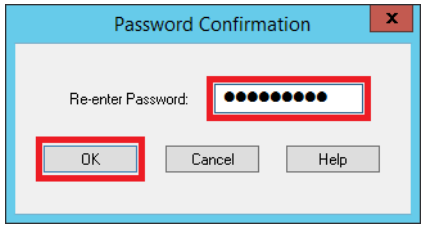
IMPORTANT The Stratix 5410 is accessed via the Managed Ethernet Switch category filter. Other switches are accessed by using the Communication category type.

3. On the New Module dialog box, type a module name and assign an IP address.



4. Click Change, and then type a password and click OK on the Module Definition dialog box.

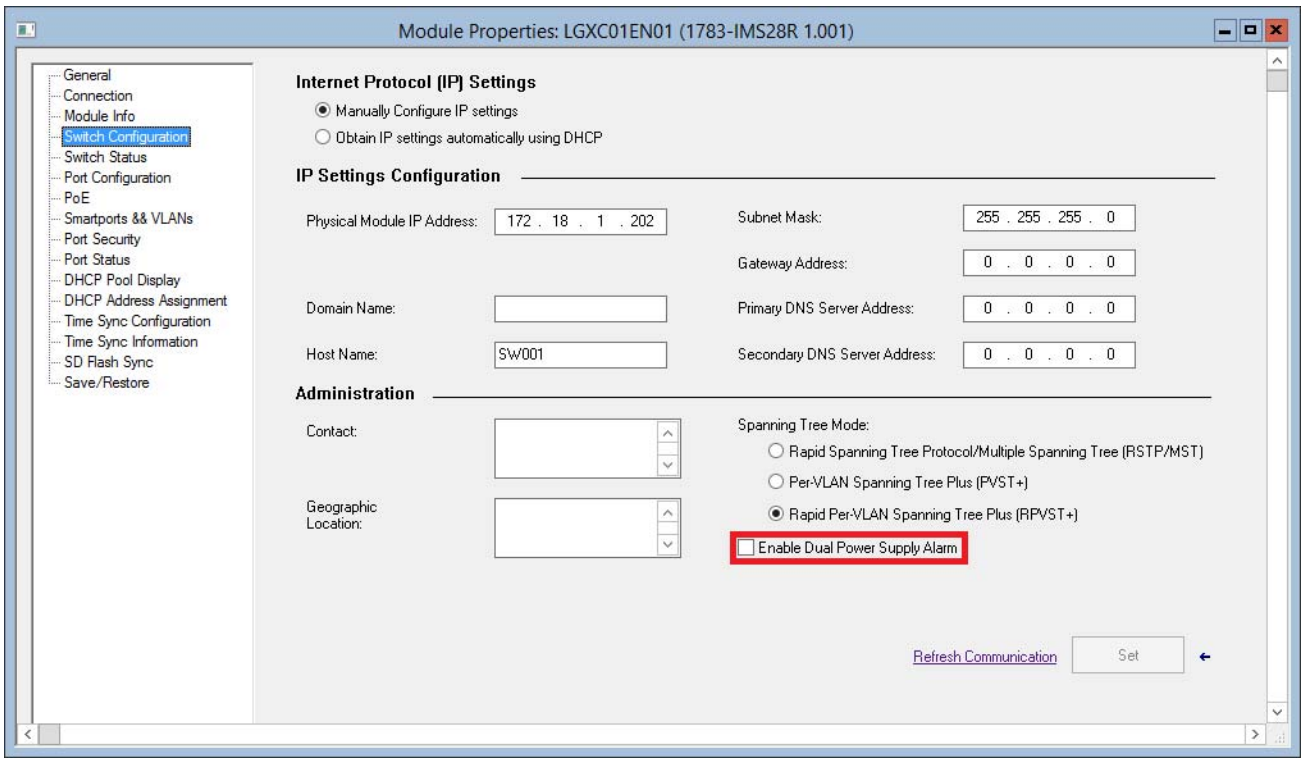




5. Confirm the password and click OK.

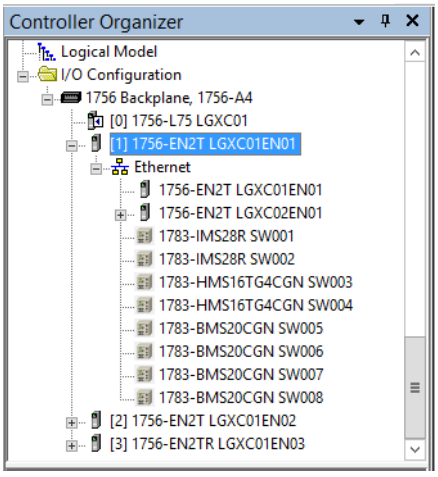
   The New Module dialog box reappears.

6. To enable a redundant power supply, if applicable, click 'Enable Dual Power Supply Alarm' on the switch configuration for the module properties.



Repeat step 1 through step 6 to configure all of your system switches.

A list of switches appears in the Controller Organizer.



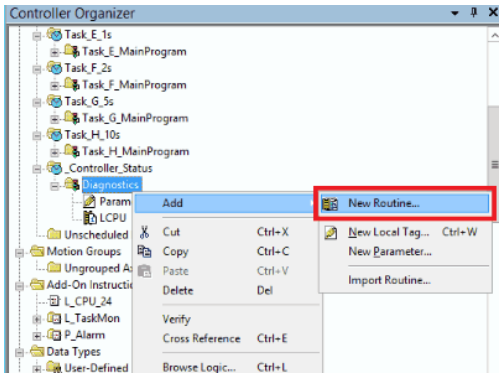
For more information, see the Stratix Managed Switches User Manual, publication 1783-UM007.

Add Diagnostics

This section describes how to add diagnostics to an I/O module. Complete these steps.

IMPORTANT Controller Status is among nine predefined periodic tasks in the controller template. A diagnostics folder is within the Controller Status periodic task.

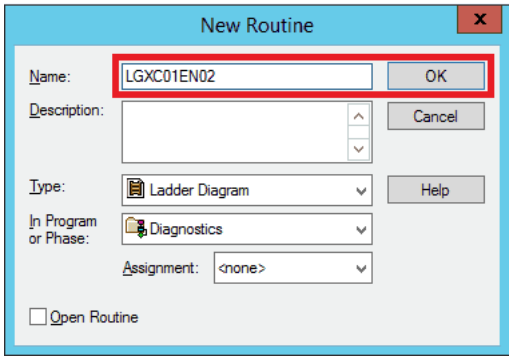
1. In the Controller Organizer, open the Controller Status folder.
2. Right-click Diagnostics and choose Add>New Routine.



The New Routine dialog box appears.

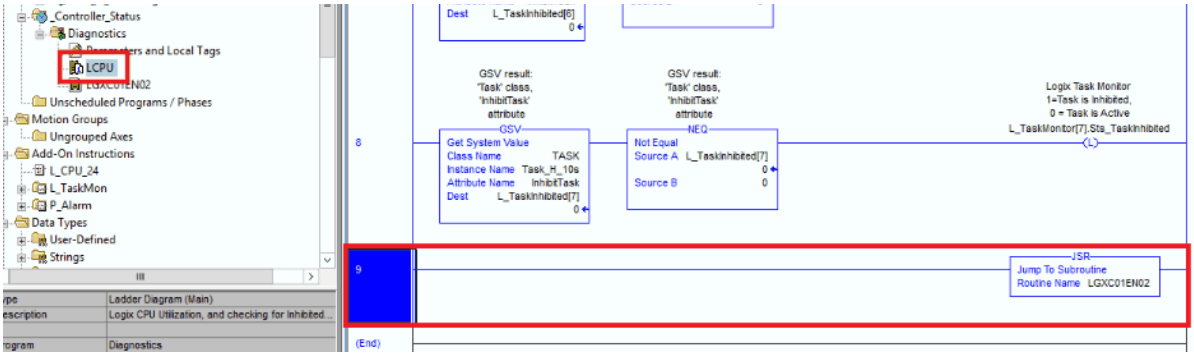
TIP For a remote rack, include one routine per rack. Each rung is to contain one Module_Sts.

For an MCC, include one routine for each MCC device.

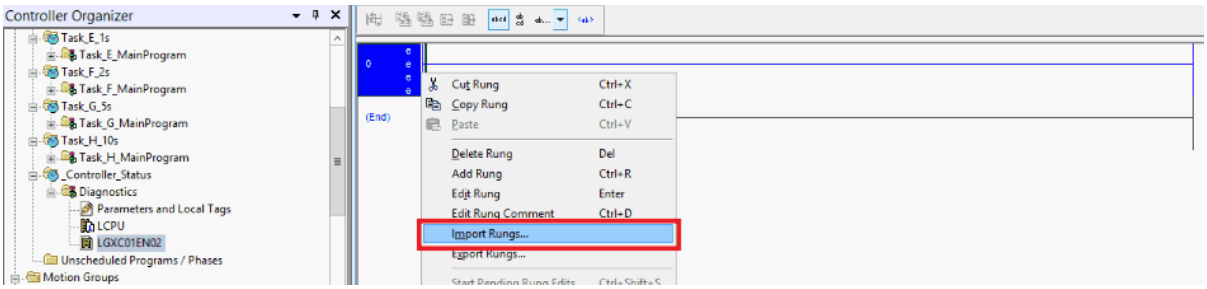


3. Type a routine name and click OK.

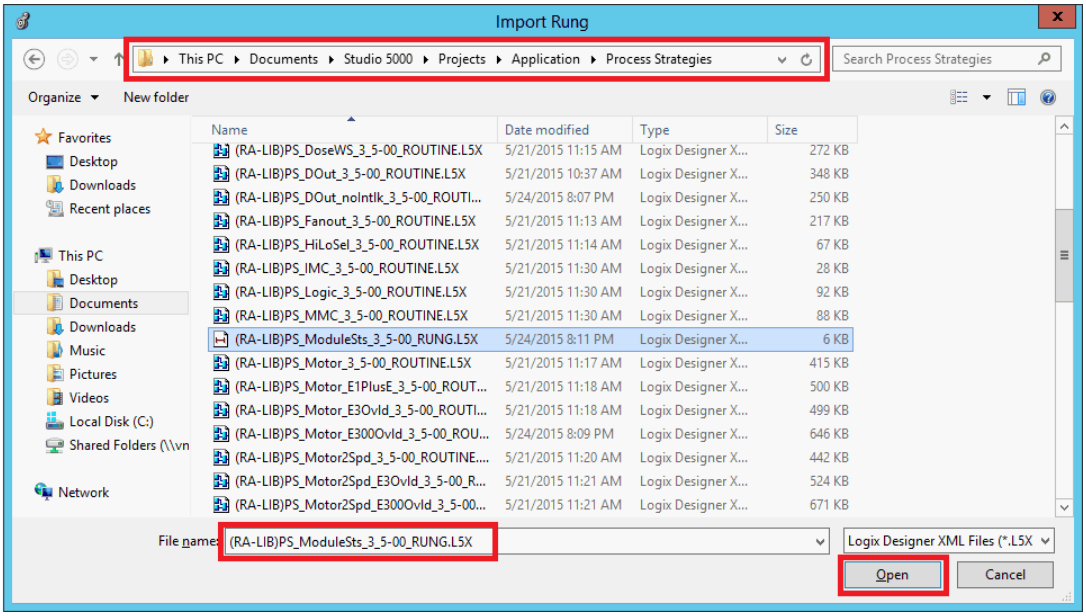
4. In the Diagnostics folder, double-click the LCPU routine to access a ladder project.



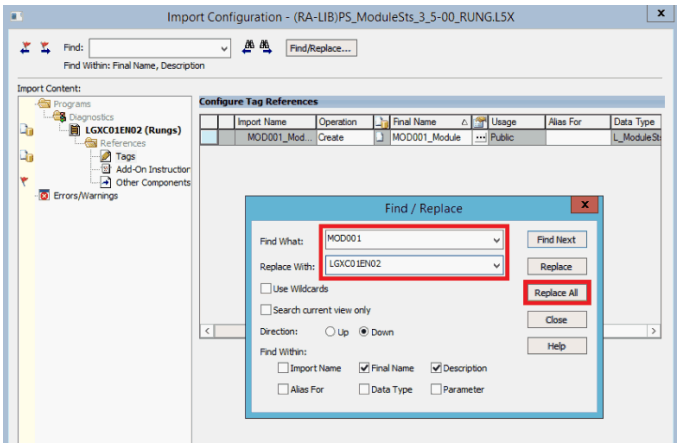
5. Click a rung and type JSR, and then select the subroutine to access a jump to a subroutine box.
6. Click the routine name box inside the JSR command, and type the routine name that you created.
7. Double-click the routine that you created to access a ladder rung.



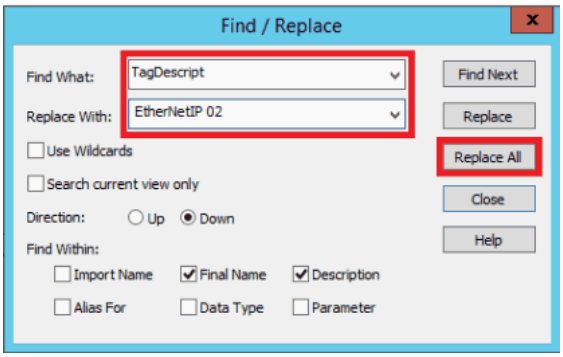
8. Right-click the rung and choose Import Rungs.
9. Browse to the Process Strategies folder and select the Module Status process strategy.



10. Click Open.
11. On the Import Configuration dialog box, click the Find/Replace button to replace the default module tag with your device.

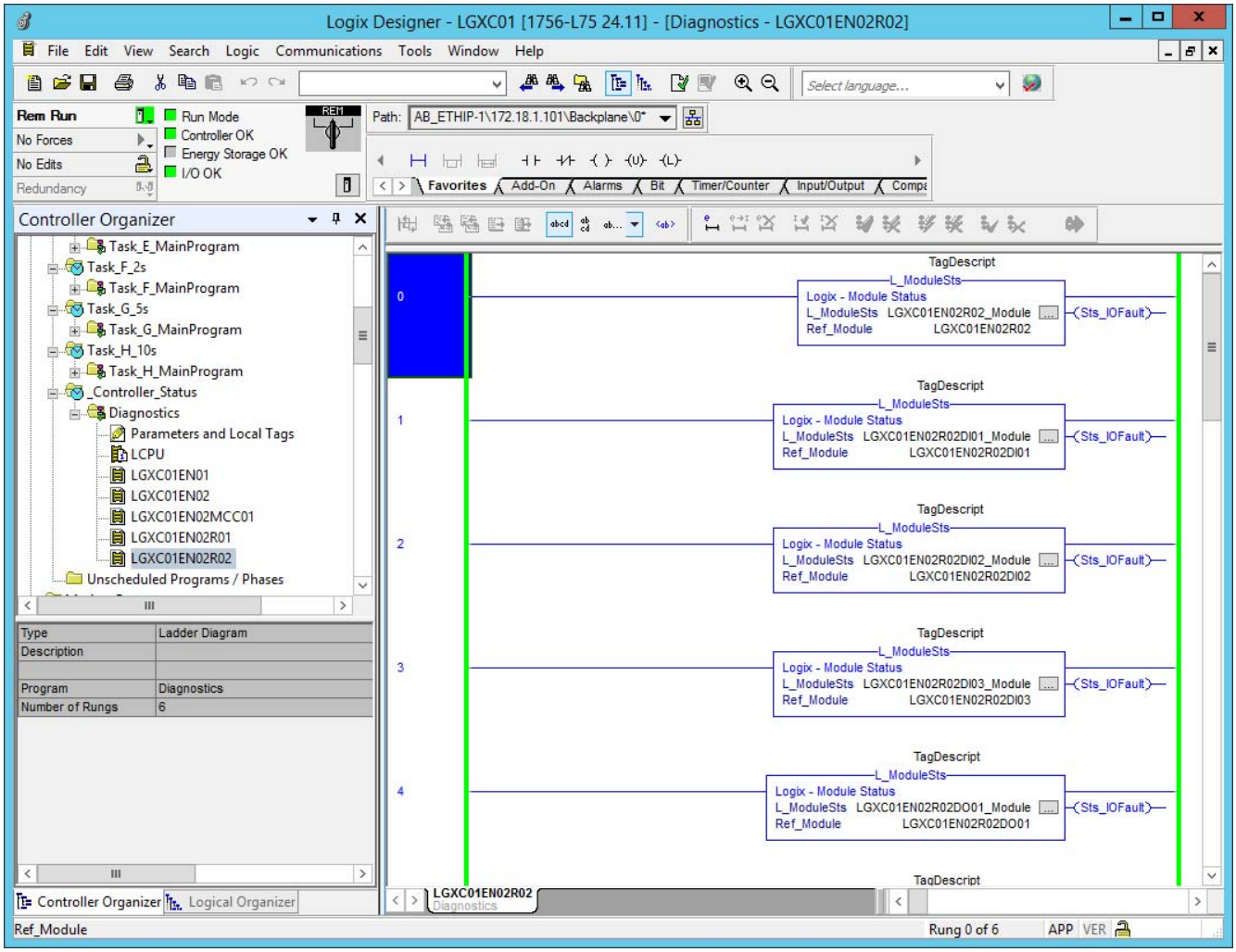


12. Click Replace All.
13. Repeat step 11 and step 12 to replace 'TagDescript' with your own description (EtherNetIP 02 is the example).



14. Click OK.

15. Repeat step 7 through step 14 for all modules in the I/O configuration.



16. Save your work.

Notes:

Assign I/O and Diagnostics

After you have defined your I/O modules and built the process strategies, you must connect the I/O definition to a physical device. This chapter describes how to assign the I/O tags.

When we assign I/O, we are creating a relationship between process strategies and the device. The I/O module is connected to the tags of the process strategy.

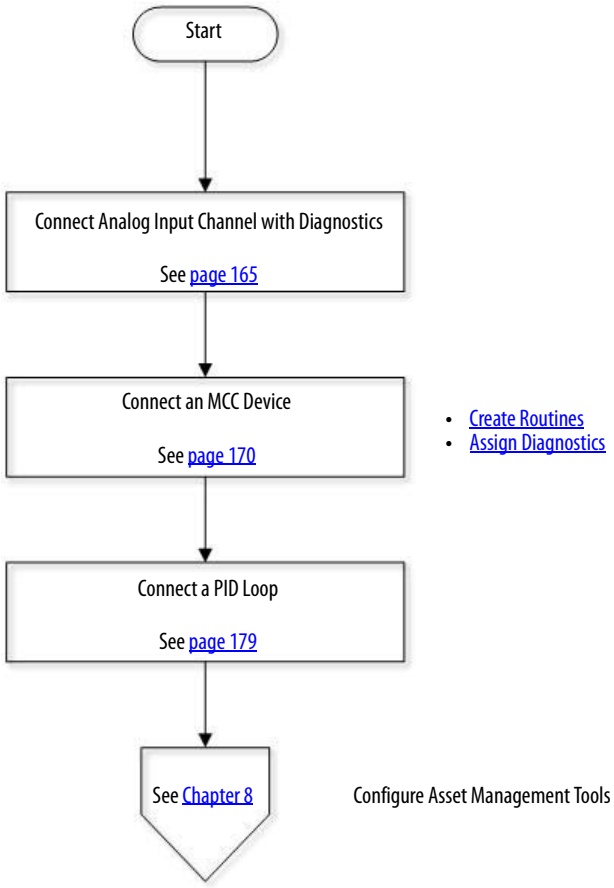
This chapter illustrates the following three program examples:

- An analog input channel with diagnostics
- An MCC device that uses a COP instruction to transfer raw data
- Analog input tags assigned to connectors within a PID loop

Typically, you can use the basic analog input procedures in the first example to assign I/O tags to devices. The other two examples have additional requirements, such as the creation of programs and routines for drives because of differing data types.

Figure 10 contains the topics that are described in this chapter. Click or see the page number for quick access to a section.

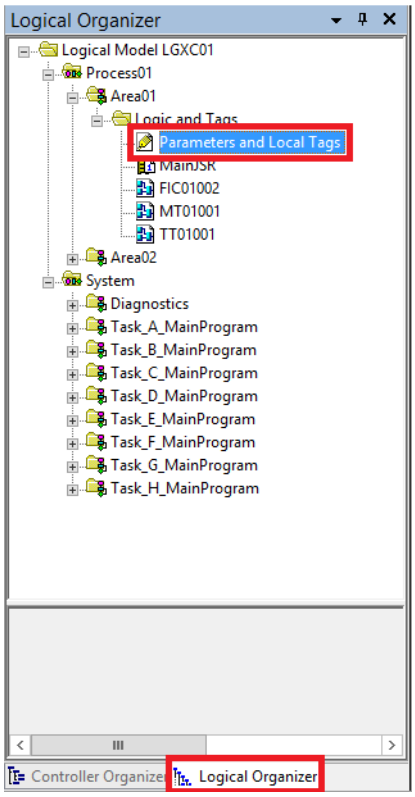
Figure 10 - Assign I/O Workflow



Connect Analog Input Channel with Diagnostics

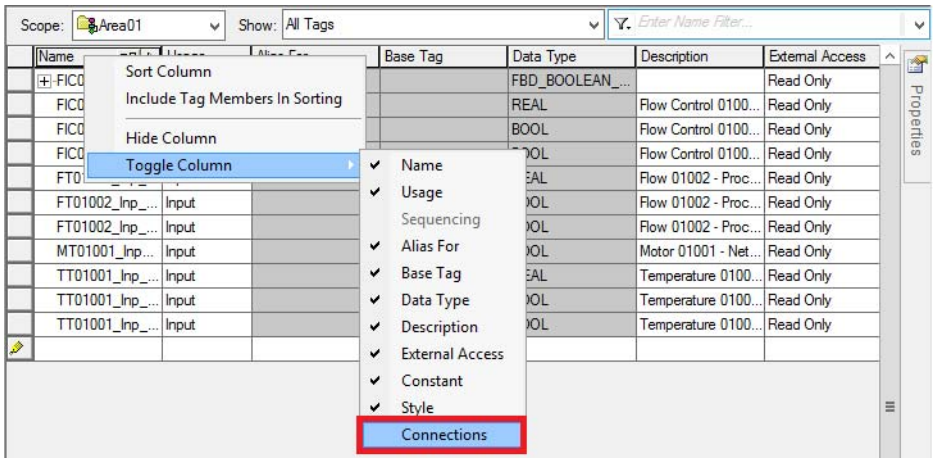
This section shows how to connect I/O to the analog input channel process strategy (PS_AIn_Chan). Complete these steps.

1. In a Logix Designer application, open an existing program.
2. Double-click Parameters and Local Tags under the Area01>Logic and Tags folders.



IMPORTANT The first time that you perform this procedure, the Connections column is not visible. Complete step 3 to show the Connections column.

3. Right-click a column header and select Toggle Column>Connections.

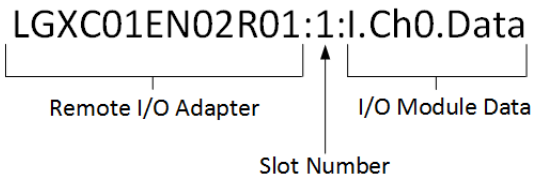


The process strategy tags that appear in the Edit Tags tab show connections.

See Build Process Strategies on page 26.

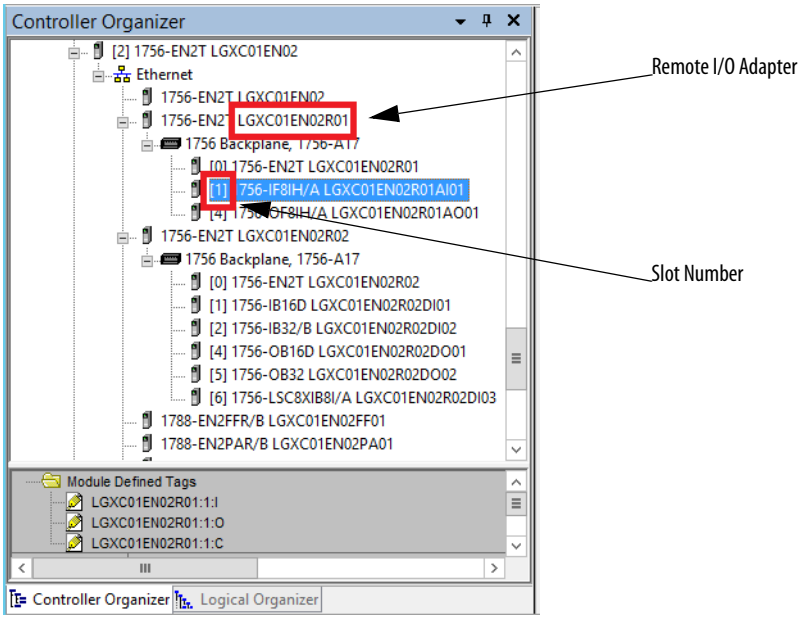
4. In the Connections column, click the pull-down to display a list of I/O tags for the Inp_Raw Process Strategy.

IMPORTANT The tag names can be broken down into the remote module, slot number, and I/O module.

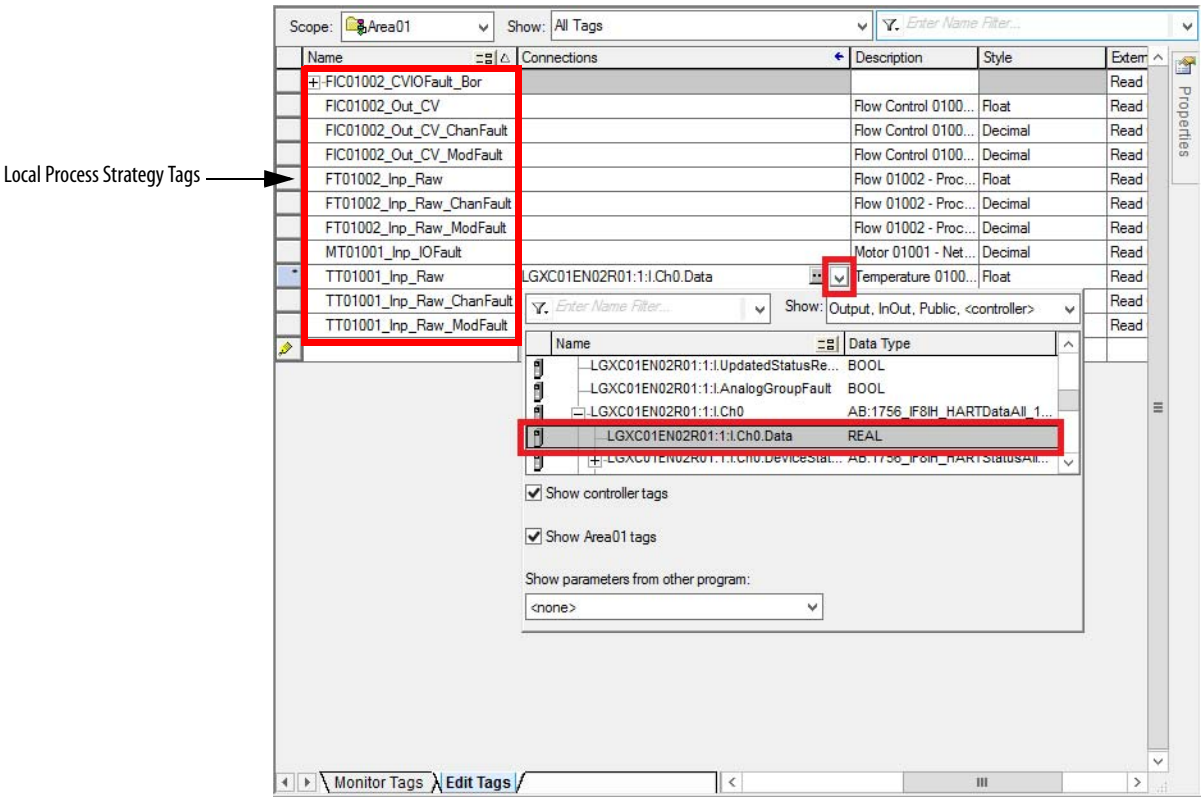


The first letter in the I/O Module Data represents the type of I/O the tag is:

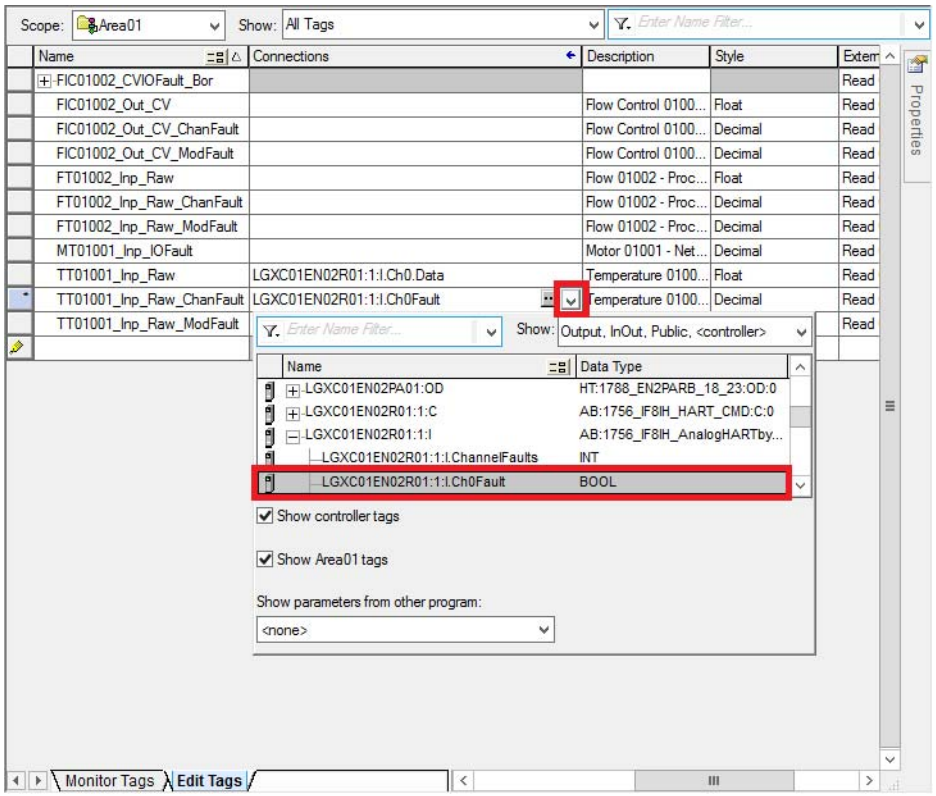
- I = Input
- O = Output
- C = Configuration



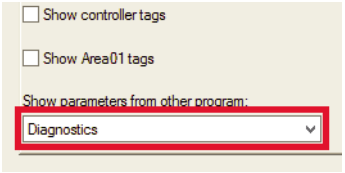
5. Click a data tag (LGXC01EN02R01:1:I.Ch0.Data) in the example) to place the tag in the Connections text box.



6. To place the tag in the Connections text box, click an I/O tag.
7. Repeat step 4 through step 6 to assign a Fault tag to the Inp_Raw_ChanFault Process Strategy.

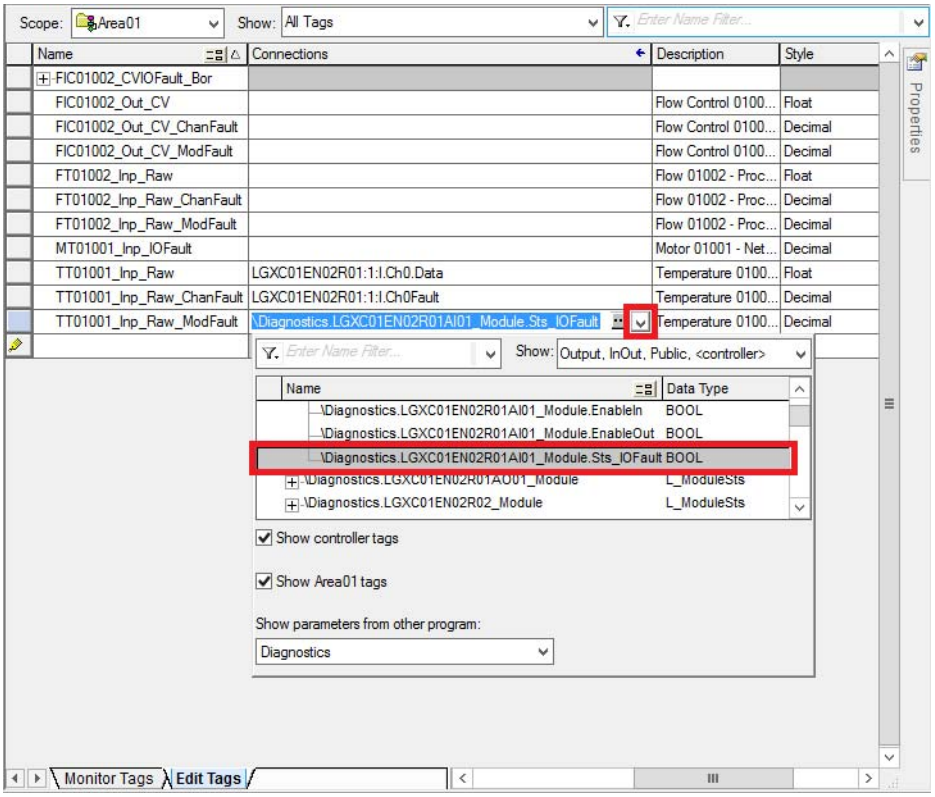


8. For the Module input fault (Inp_Raw_ModFault) Process Strategy, select Diagnostics from the Show parameters from other program pull-down.

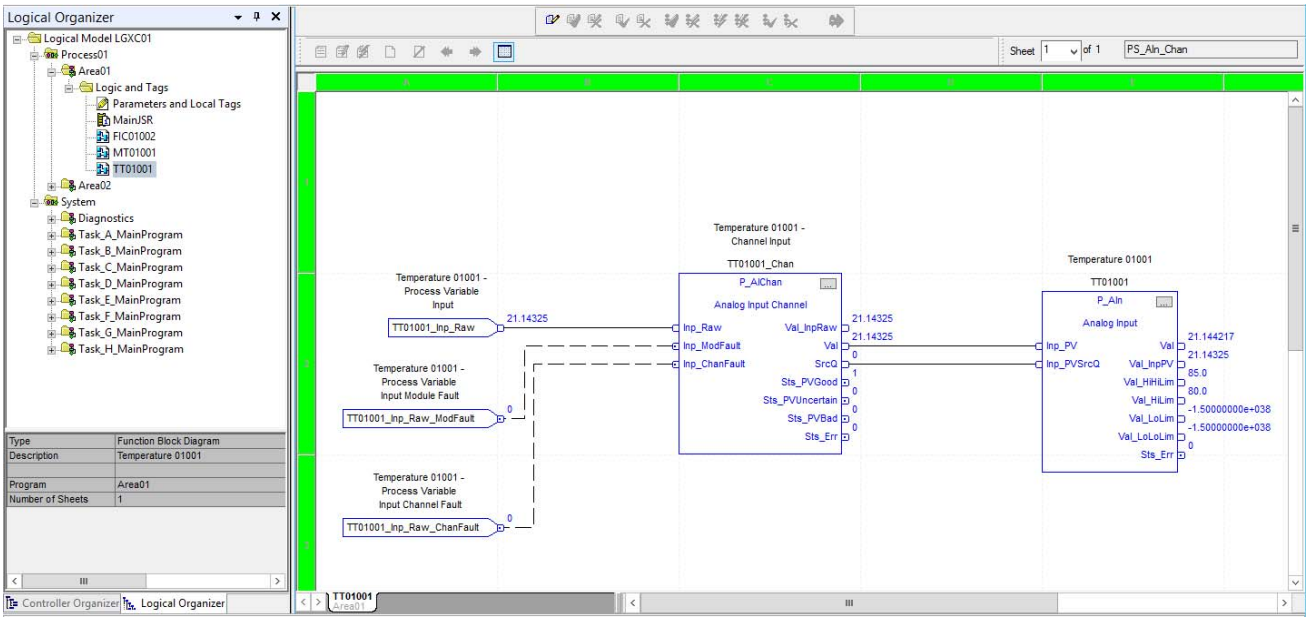


9. Click the Connections pull-down and double-click an I/O diagnostics tag.

   See Chapter 9 for creating I/O diagnostic codes.



10. To view the connections, open the routine.

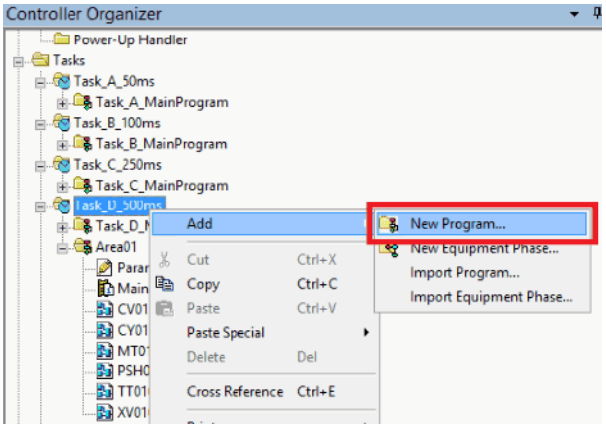


Connect an MCC Device

Drives typically have different data types. You can create a program with specified input and output routines to send raw data to a compatible data type.

Complete the following steps.

1. In a Logix Designer application, open an existing program.
2. In the Controller Organizer, right-click a task and choose Add>New Program.

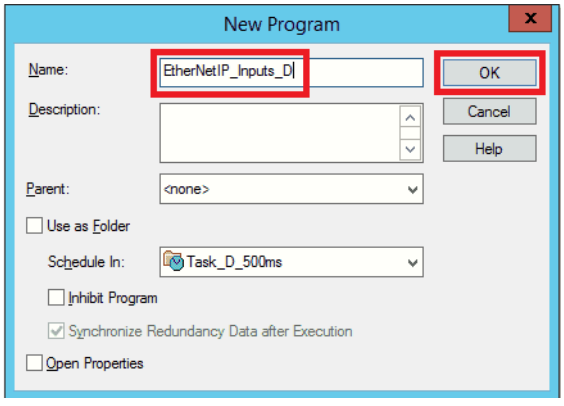


   The New Program dialog box appears.

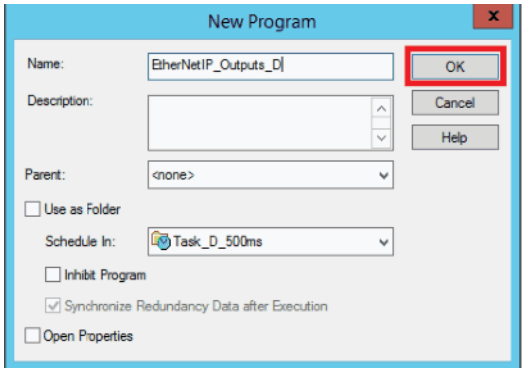
3. Type a program input name.

   Our example (EtherNetIP_Inputs_D) has an _D because we created our program from the Task_D_500ms folder. When you create programs from different tasks add an _x, with 'x' denoting the letter of the selected Task folder. For example, EtherNetIP_Inputs_C.

4. Click OK.



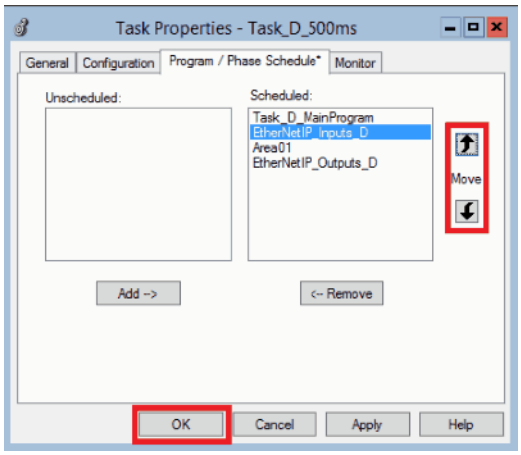
5. Repeat step 2 on page 170 through step 4 on page 170 and type a program output name.



6. To organize programs within a task, right-click the Task in the Controller Organizer and choose Properties.

   The Task Properties dialog box appears.

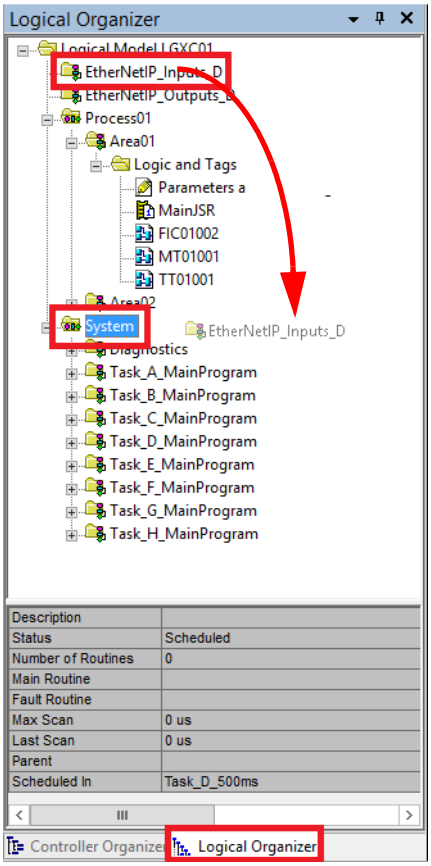
7. Click the Program/Phase Schedule tab.



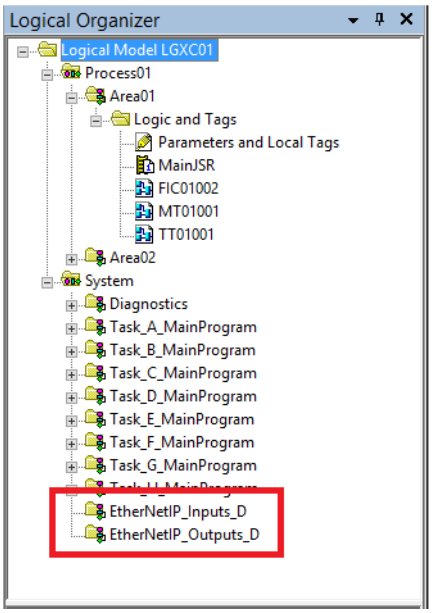
8. Click a program that you want to move and click the Up or Down arrows to move the program. Position the programs in the following execution order (top to bottom): Input ⟶ Process Strategies ⟶ Output

9. Click OK.

10. Click the Logical Organizer tab and drag-and-drop the Inputs and Outputs programs into the System folder.



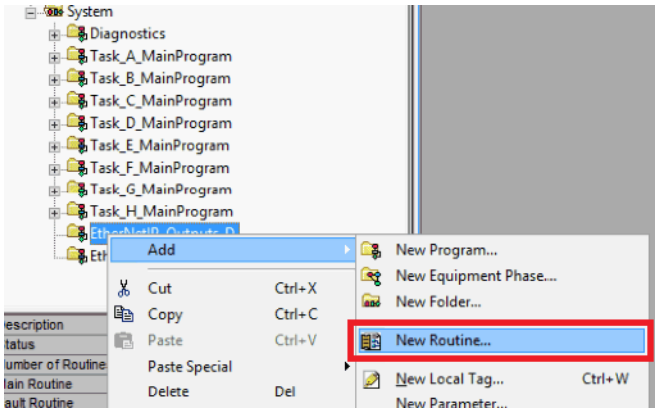
11. Save your work.



Create Routines

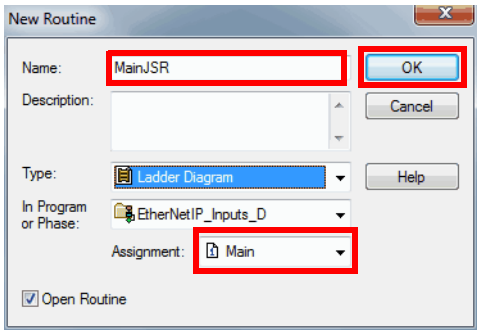
Complete the steps to create routines for the programs.

1. On the Logical Organizer, right-click a Program and choose Add>New Routine.



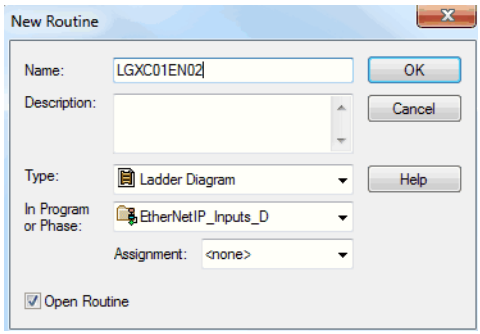
   The New Routine dialog box appears.

2. Type 'MainJSR' for a jump to subroutine, make sure that the assignment is 'Main', and click OK.



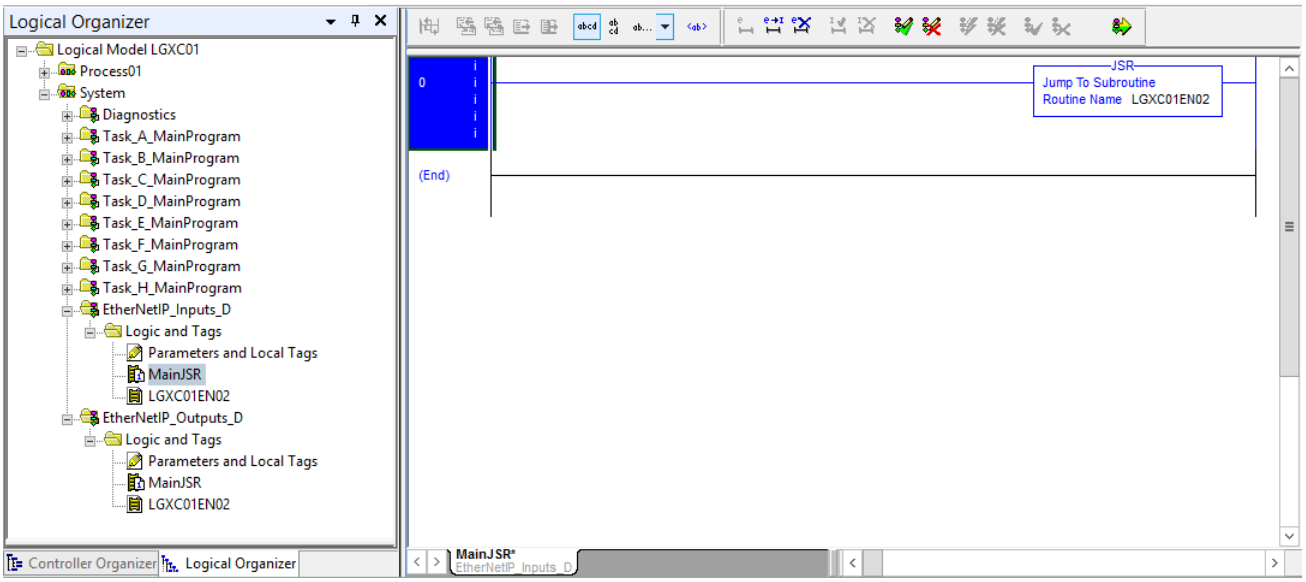
3. Repeat step 1 and step 2 for an EtherNetIP Inputs routine name.

   We suggest that you create one network name for a routine. This routine can contain all network adapters owned by this communication adapter.



4. Repeat step 1 and step 2 for an EtherNetIP Outputs routine name.

5. In the Logical Organizer, double-click MainJSR.



6. Double-click a rung, type JSR, and press Enter.

   An instruction that is named 'JSR' is shown in the rung.

7. In the instruction, select the Routine Name that you created in step 2 (MainJSR in the example) from the pull-down list.

8. Repeat step 6 and step 7 for EtherNetIP_Outputs.

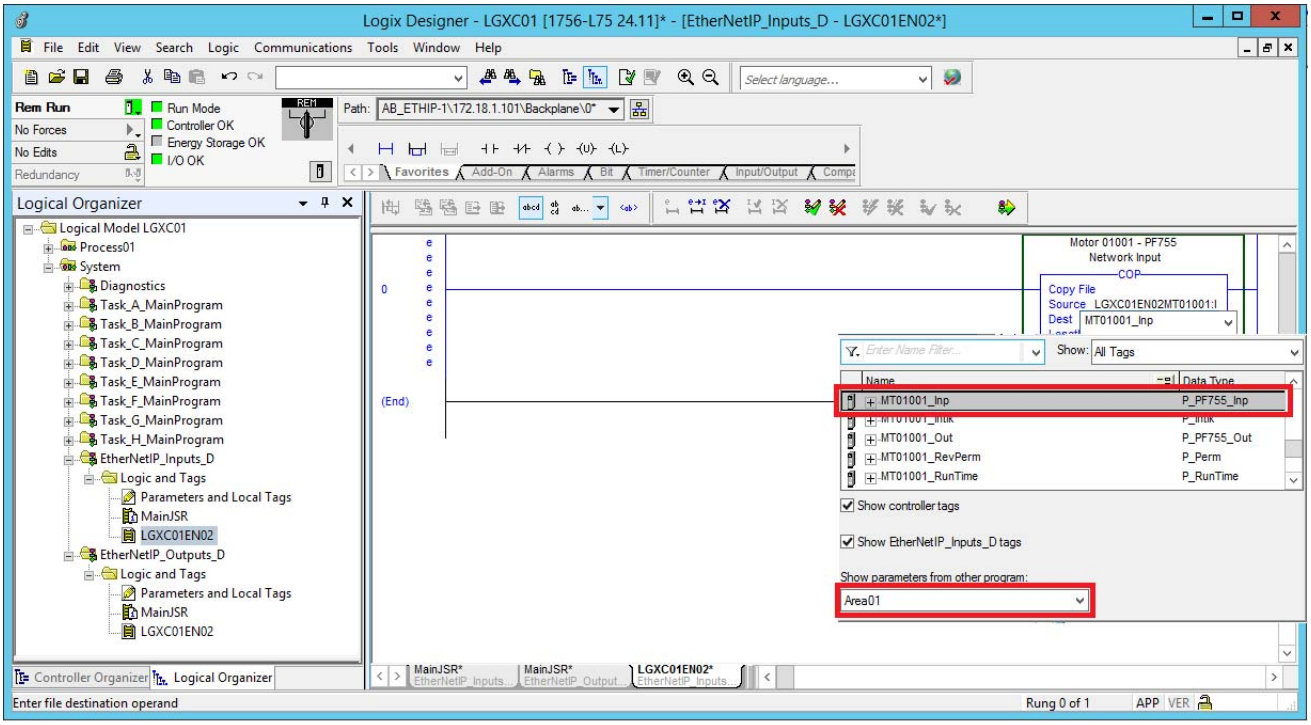
9. Under EtherNetIP_Inputs, open the LGXC01EN02 routine, type COP, and press Enter.

   A Copy instruction transfers raw data only and ignores data types. The instruction lets you use a compatible data type to connect the tags.

10. In the instruction, click the Source pull-down arrow to select a drive input from the list.

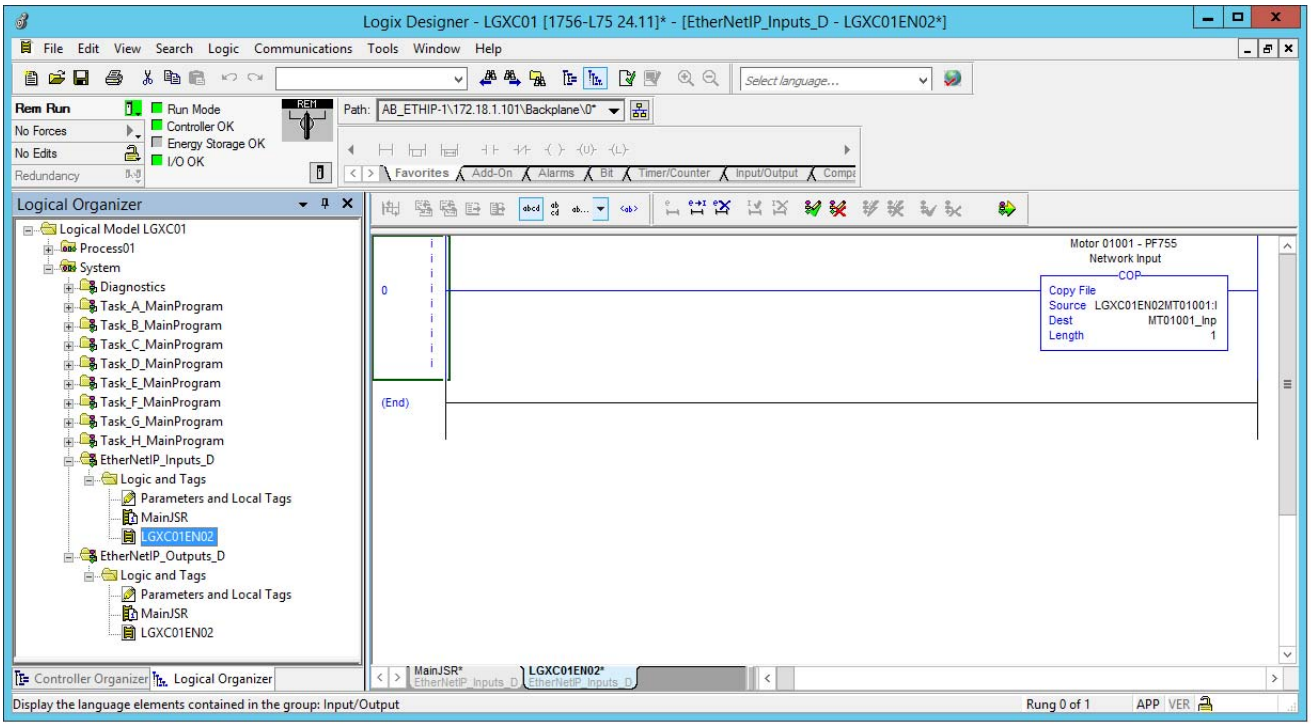
11. In the instruction, click the Destination pull-down arrow and select a destination data type.

For MCC components, select the drive input that is created when importing process strategies for drives.



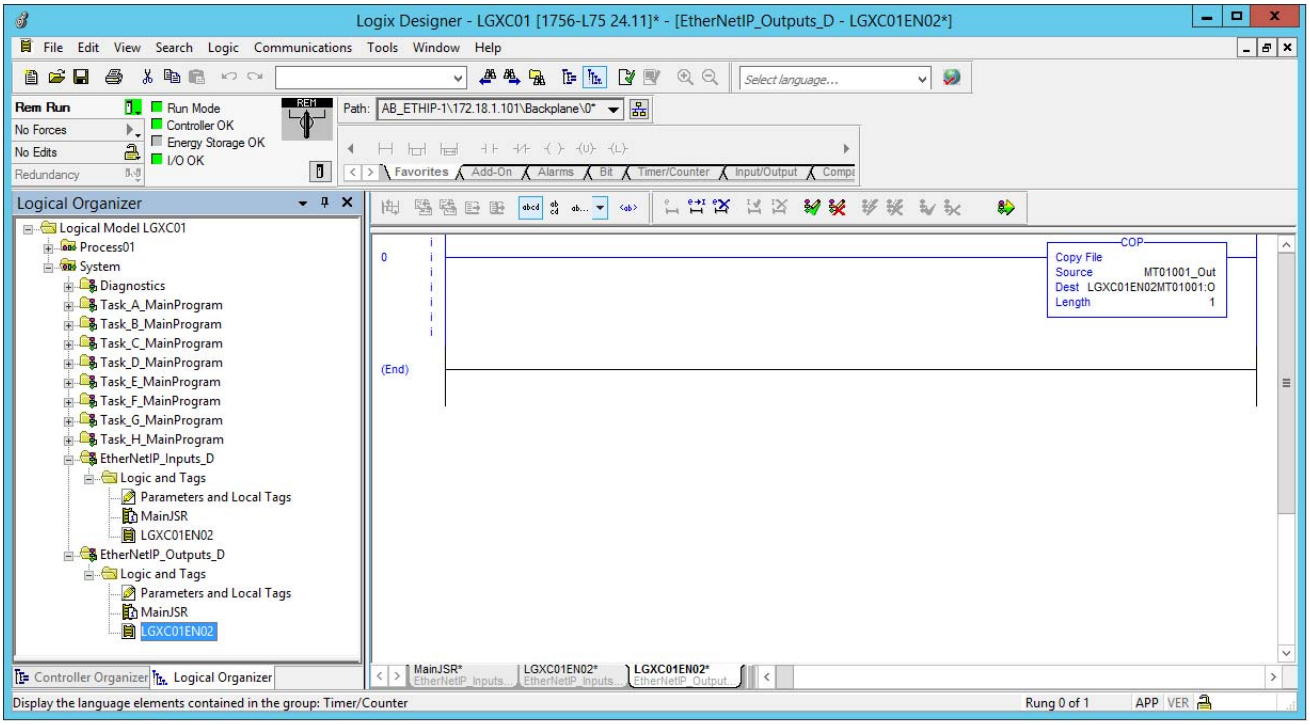
The destination data type appears in the COP instruction.

12. In the instruction, type a Length of '1'.



13. Repeat step 9 through step 11 to tie the EtherNetIP_Outputs tag to the I/O.

IMPORTANT	Observe that the Source and Destination are opposite for the COP output instruction.



14. If online, click the Finalize All Edits in Program  icon.

IMPORTANT	You must finalize EtherNetIP_Inputs, EtherNetIP_Outputs, and Process Strategies.

The Finalize all edits in program window appears.

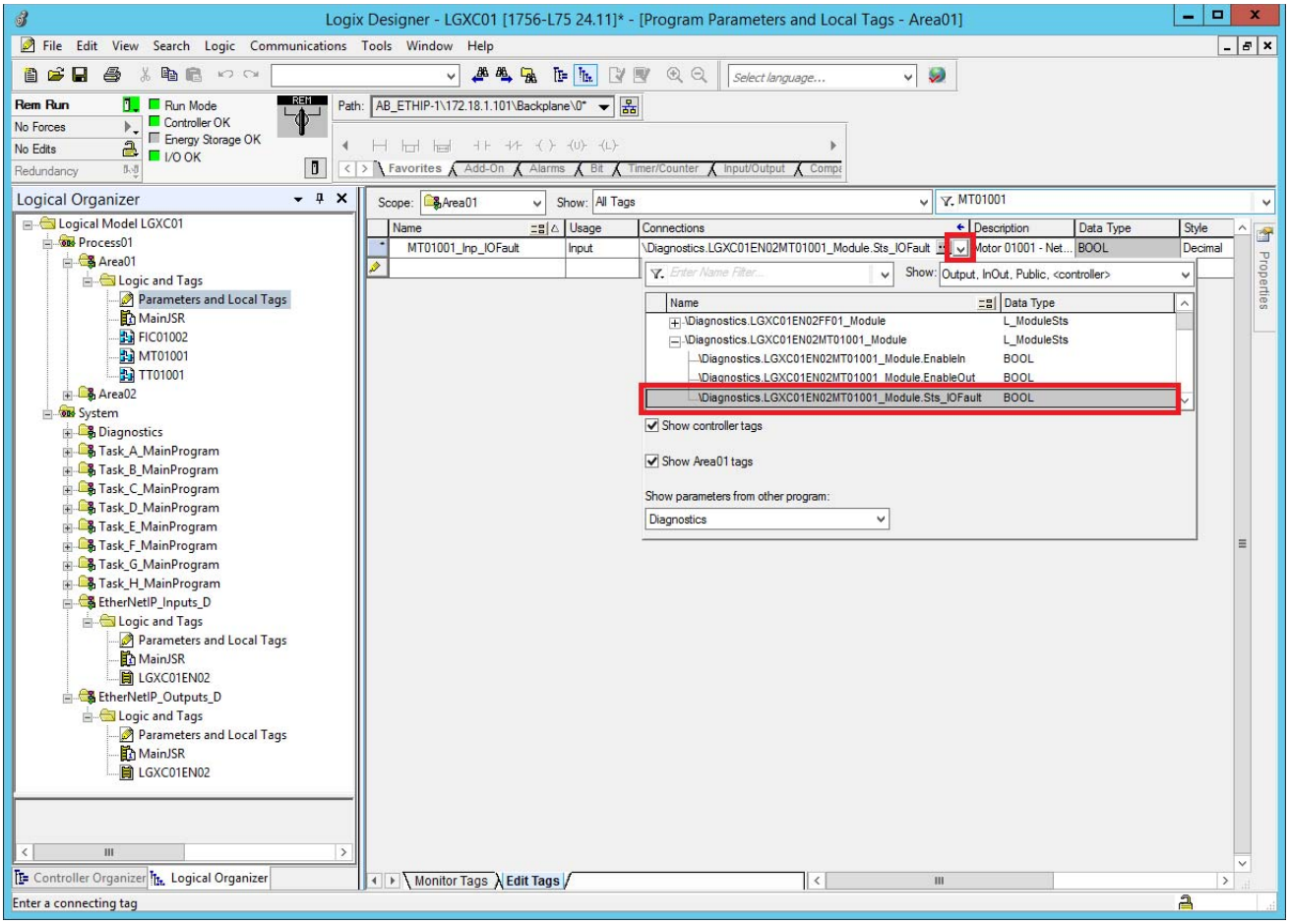
15. Click OK to finalize edits in all programs.
16. Save the program.
17. To add more drives, repeat step 1 through step 16.

Assign Diagnostics

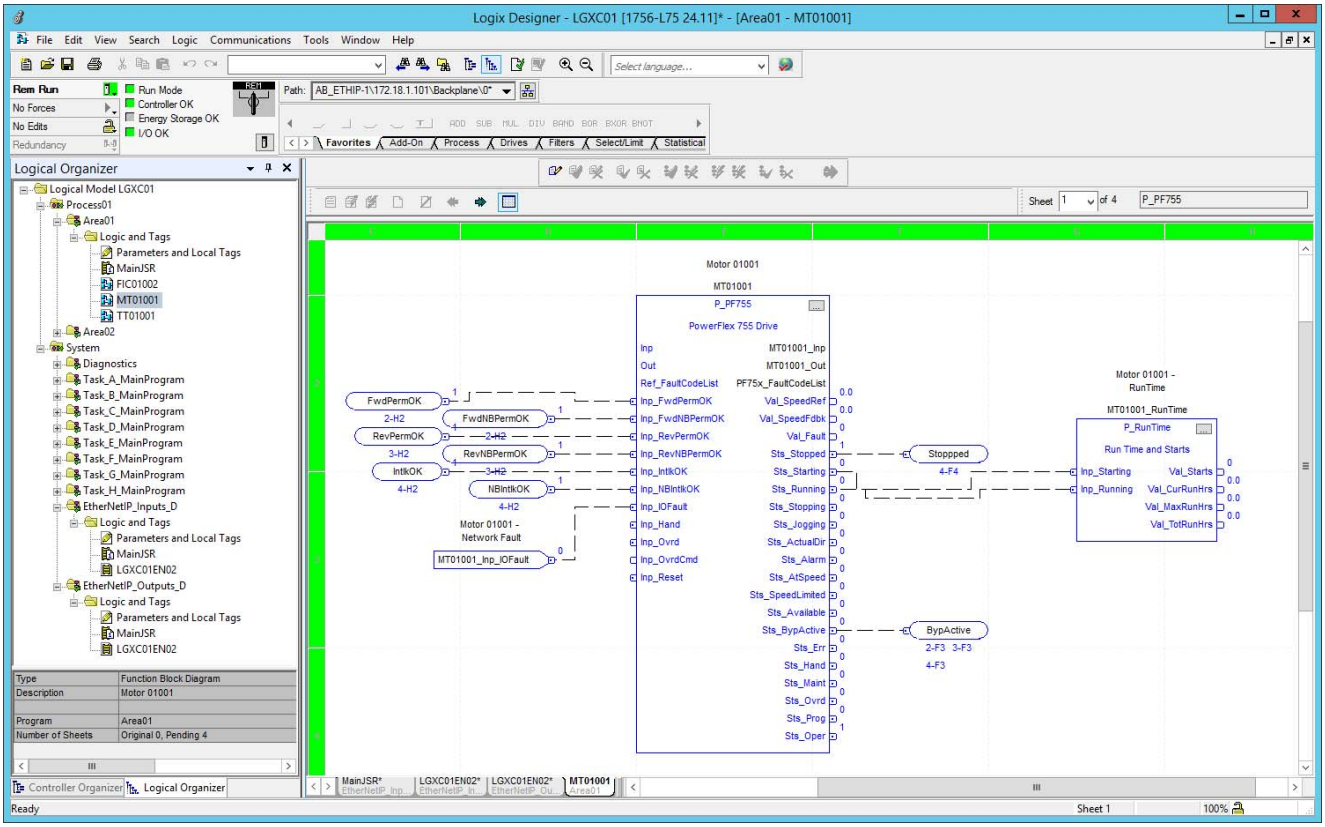
Complete these steps to connect the process strategy tags to the I/O Module (PowerFlex® 755 in our example).

1. In the Logical Organizer, open a program from the Process01 folder and double-click Parameters and Local Tags.

   The Edit Tags tab opens with the program tags.



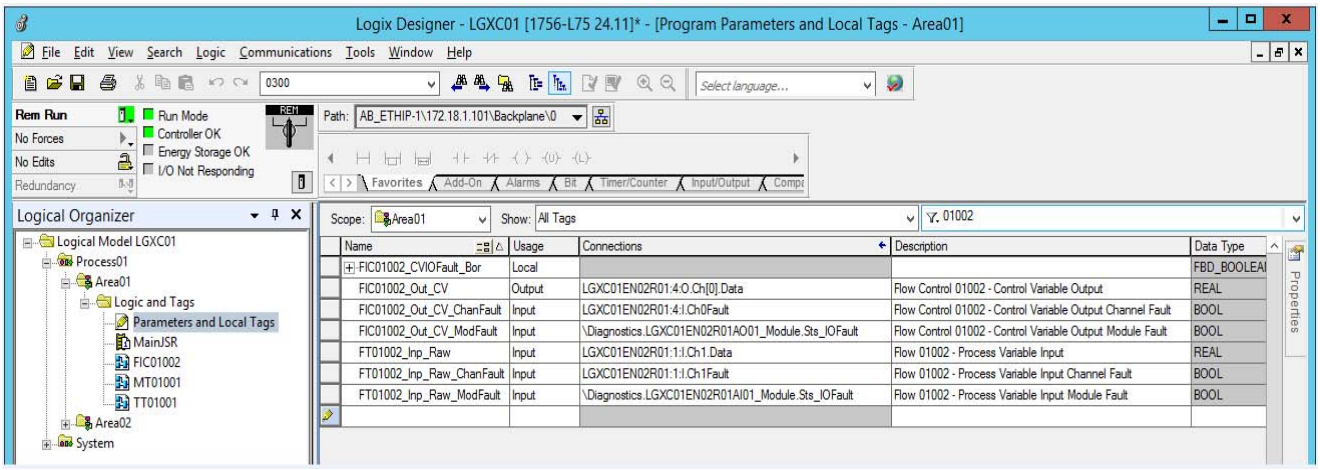
2. To view the connections, click one of the tags in the Logical Organizer.



Connect a PID Loop

Complete the following steps to assign I/O to a PID loop.

1. In the Logical Organizer, open the Process folder and double-click Area01>Logic and Tags>Parameters and Local Tags.
2. Assign the I/O and the diagnostics by using the program connections.



3. Click a data tag to place the tag in the connections text box.
4. Save your work.

Notes:

Configure Asset Management Tools

This chapter describes how to use application tools available with the FactoryTalk® AssetCentre software.

For example, a Device Type Manager (DTM) contains Field Device Tool (FDT) compliant interfaces to enable configuration and communication between devices and the system. The interface helps create device parameters for diagnostics, maintenance, and calibration purposes.

Disaster recovery is another benefit of AssetCentre software. Back up master files of controller applications help to safeguard against a loss of data.

An Audit Log monitors FactoryTalk-related software products and logs user interactions. For details, see Chapter 10 in the PlantPAx® System Infrastructure Configuration User Manual, publication PROCES-UM001.

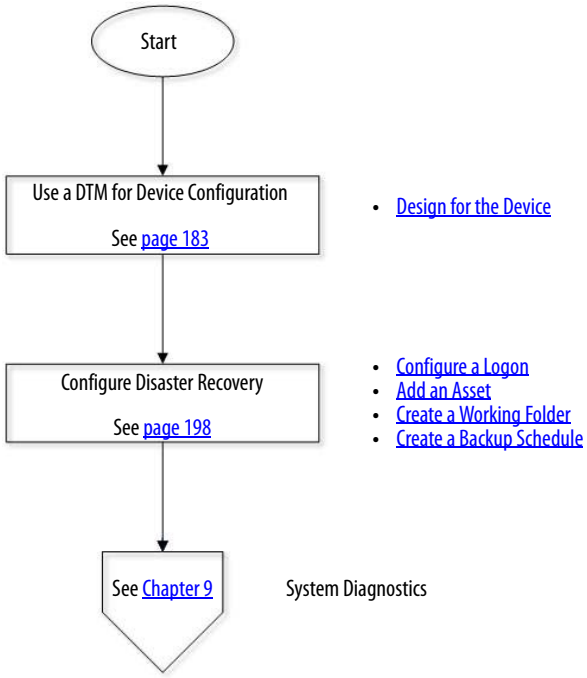
Considerations

Consider the following suggestions before starting this chapter:

- We strongly recommend additional licensing for disaster recovery that automatically backs up supported devices.
- If your are using HART, Fieldbus Foundation, and/or PROFIBUS PA process devices, we recommend the DTM procedures that start on page 183. DTMs contain device-specific data to enhance configuration and communication with the system.
- Instrument calibration is an option with AssetCentre software.

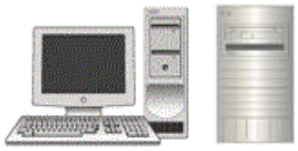
Figure 11 shows the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 11 - AppServ-Asset Workflow



Use a DTM to configure a Process Device

Use an Engineering Workstation (preferred) or AppServ-Asset server with these procedures.



EWS01 or ASAM01

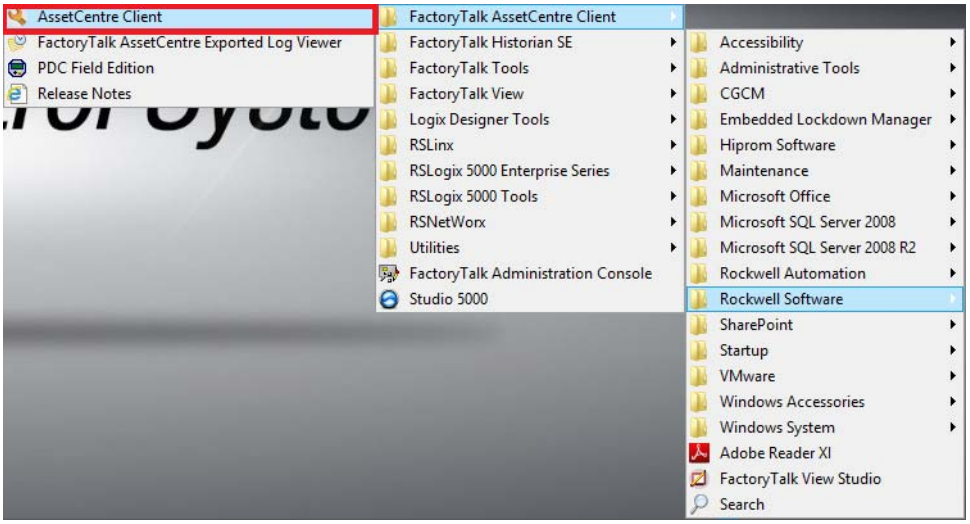
This section describes basic Device Type Manager (DTM) configuration. Use the DTM with FactoryTalk® AssetCentre to connect Process Devices. You can perform this process in the AppServ-Asset server, but typically the EWS is used to store software.

IMPORTANT For procedures on how to configure the AppServ-Asset server, see the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001.

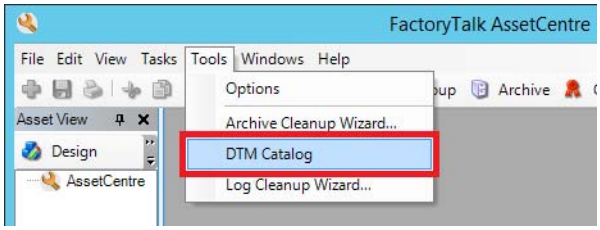
Complete these steps.

1. Click the Programs » symbol and choose Rockwell Software®>FactoryTalk AssetCentre Client>AssetCentre Client.

   The AssetCentre Client window appears.



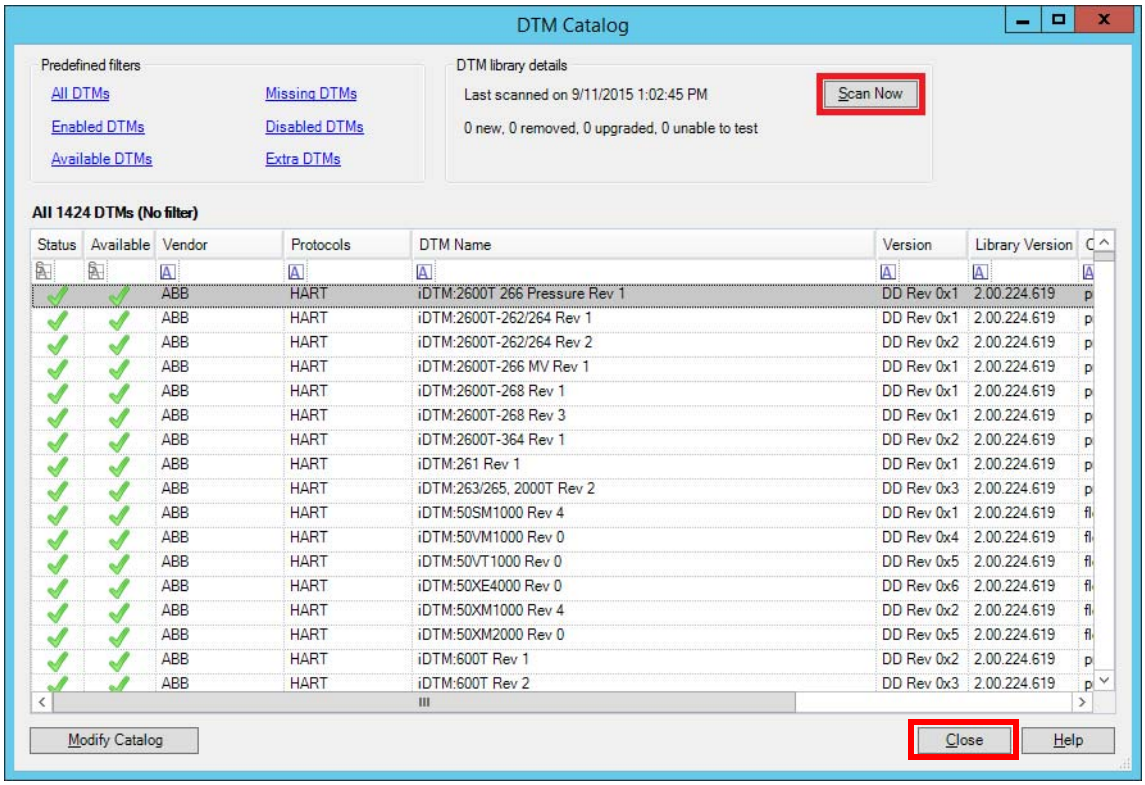
2. Choose Tools>DTM Catalog.



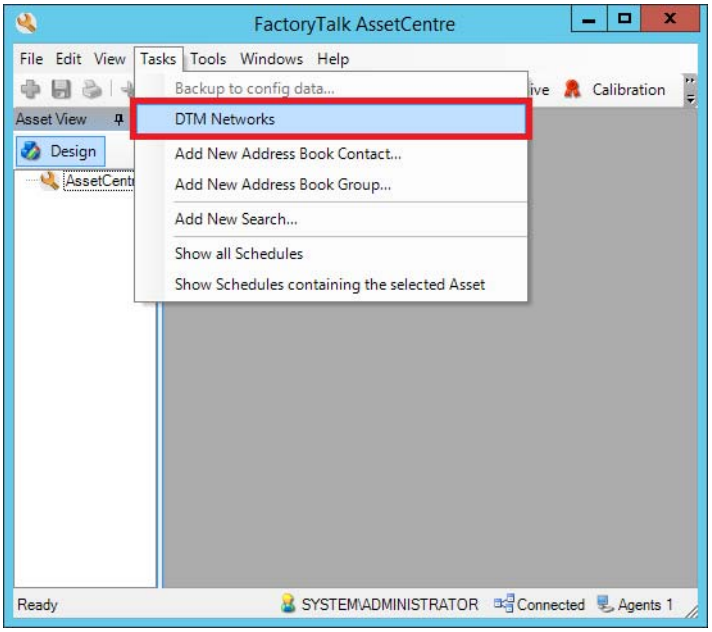
   The DTM Catalog window appears.

3. Click Scan Now to update the catalog.

IMPORTANT	Every newly installed DTM requires a scan. If you do not have a new DTM installed, skip this step.

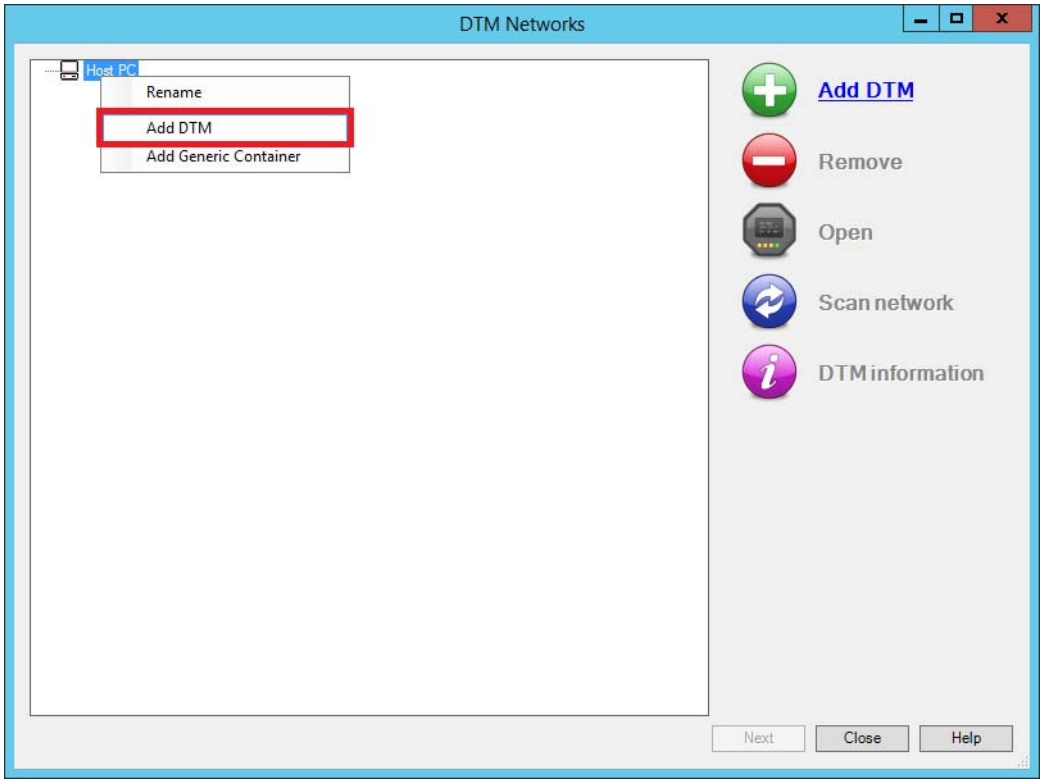


4. Click Close when the scan is complete.
5. In the AssetCentre, click the Tasks tab and choose DTM Networks.



The DTM Networks window appears.

6. Right-click Host PC>Add DTM.

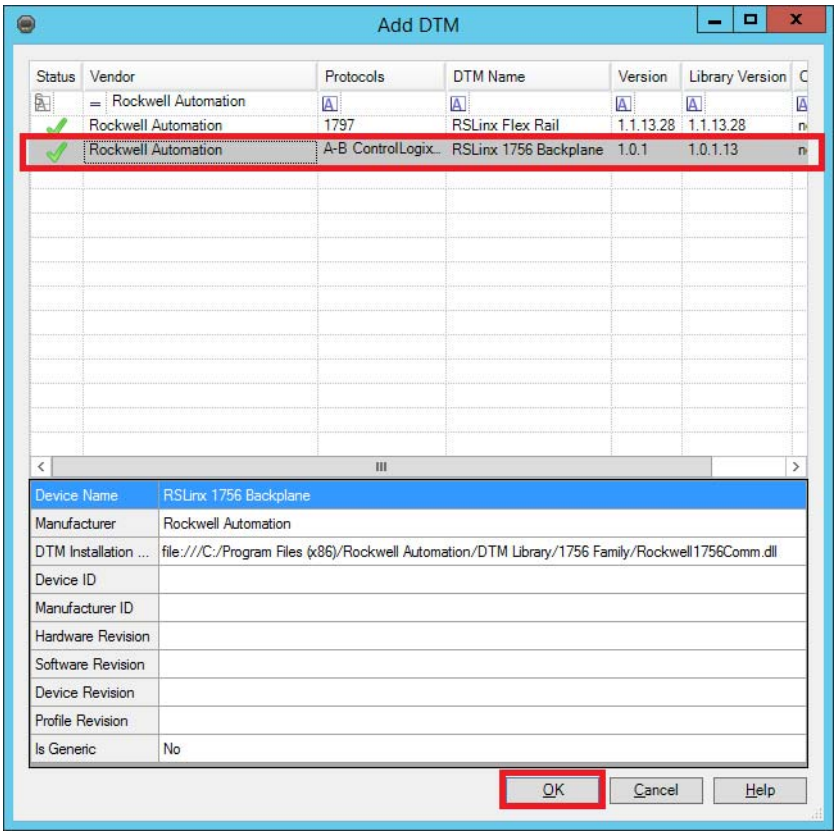


The Add DTM window appears.

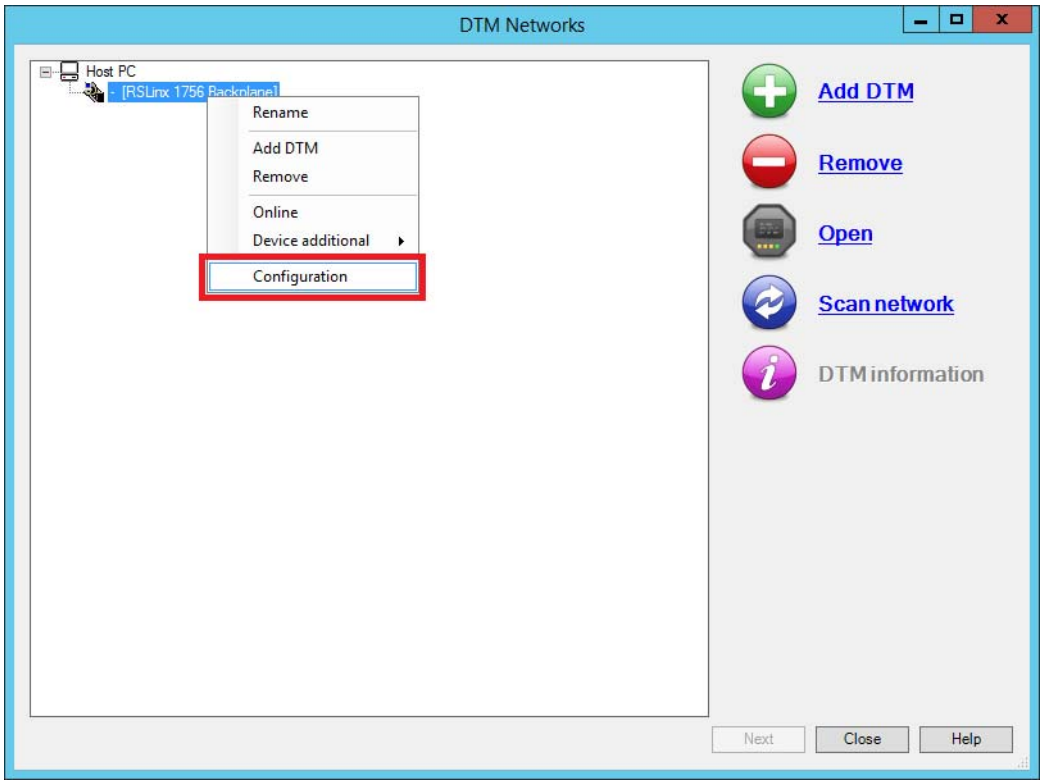
IMPORTANT The HART module must be configured in the I/O configuration tree. For details to enable HART channel data, see Chapter 6.

The same procedure must be performed on PROFIBUS PA and Fieldbus Foundation modules.

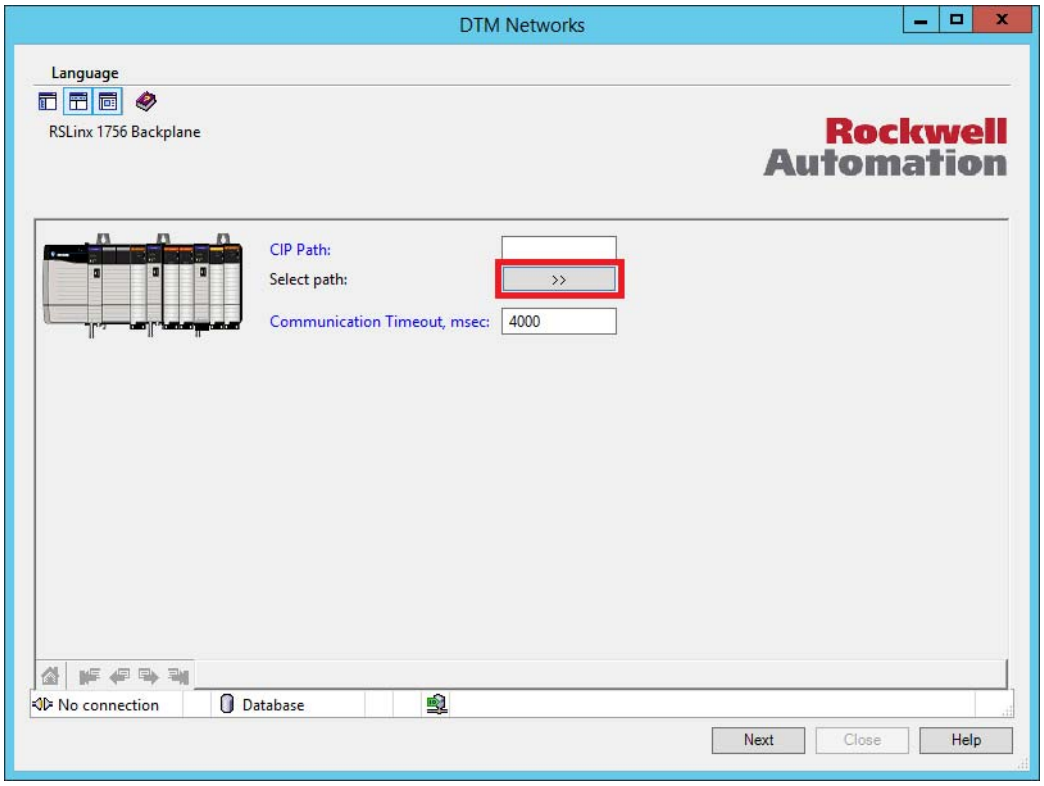
7. Select DTM 'RSLinx® 1756 Backplane (ControlLogix®)' and click OK



8. In the DTM Networks window, right-click '(RSLinx 1756 Backplane)' and choose Configuration.

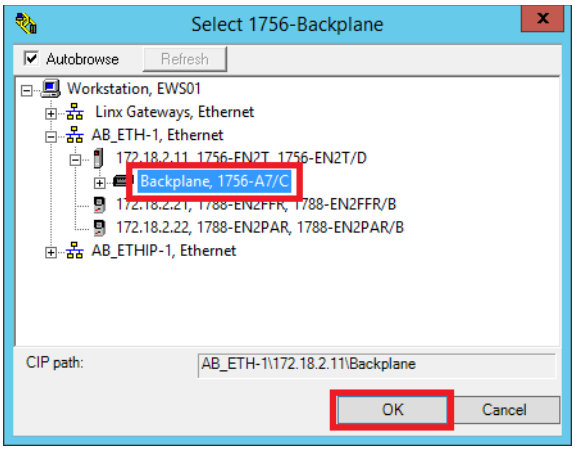


9. Select the path to the backplane.

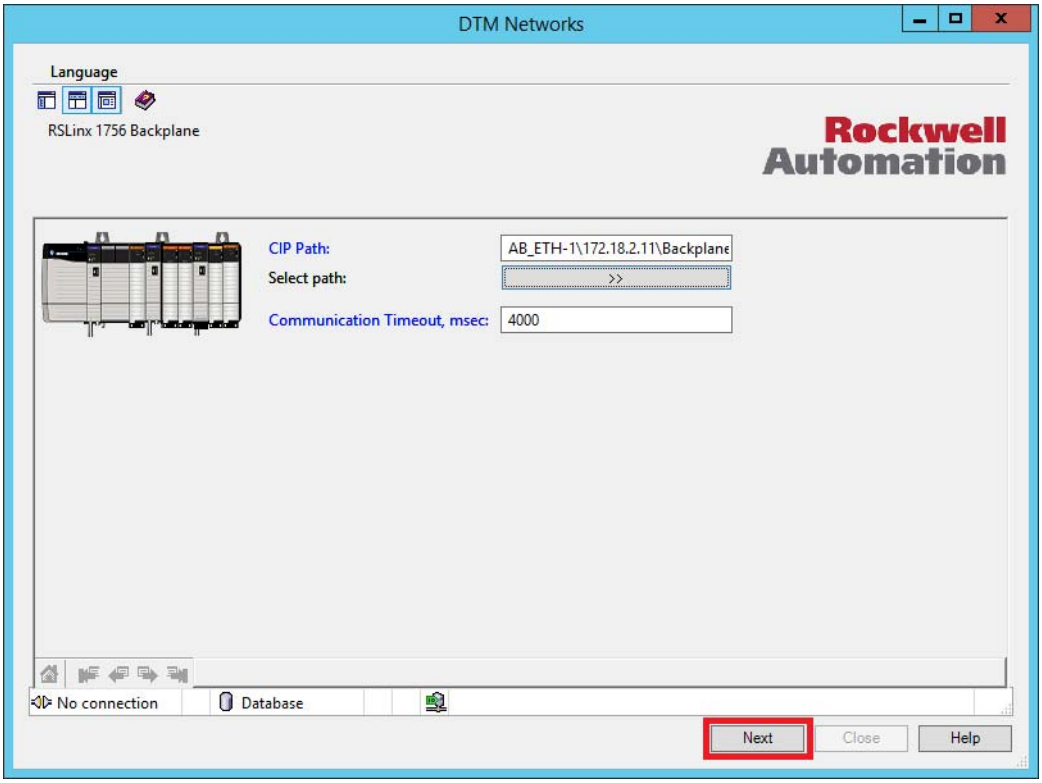


The Select 1756-Backplane dialog box opens.

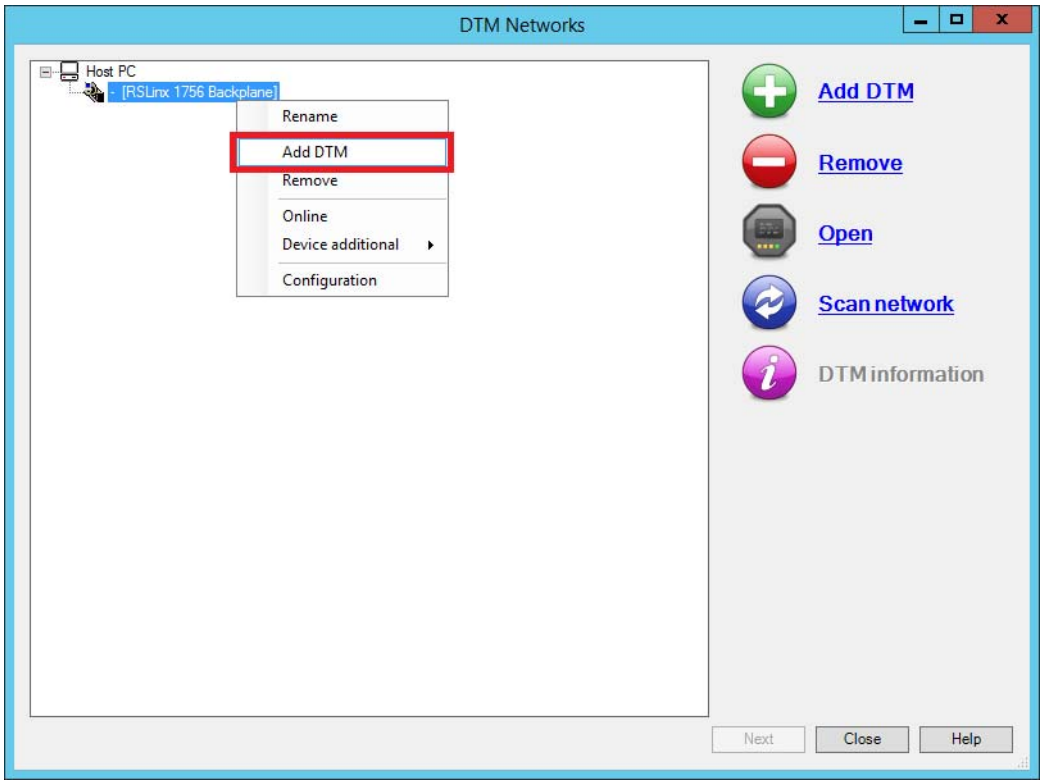
10. Select 'backplane, 1756-A7/C' and click OK.



11. In the DTM Networks window, click Next.

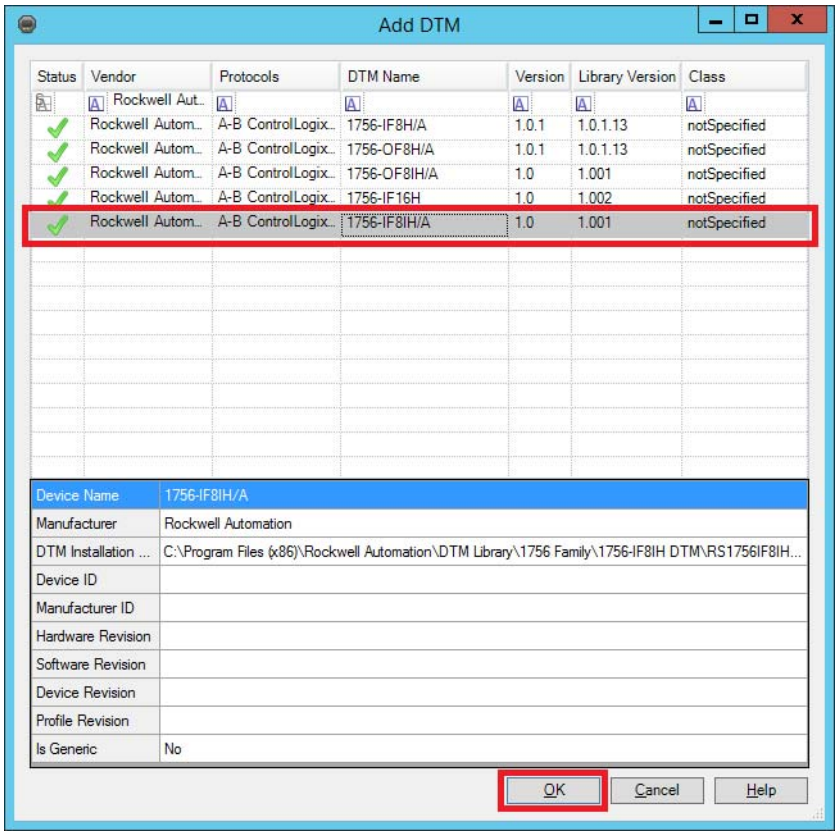


12. In the DTM Networks window, right-click '(RSLinx 1756 Backplane)' and choose Add DTM.

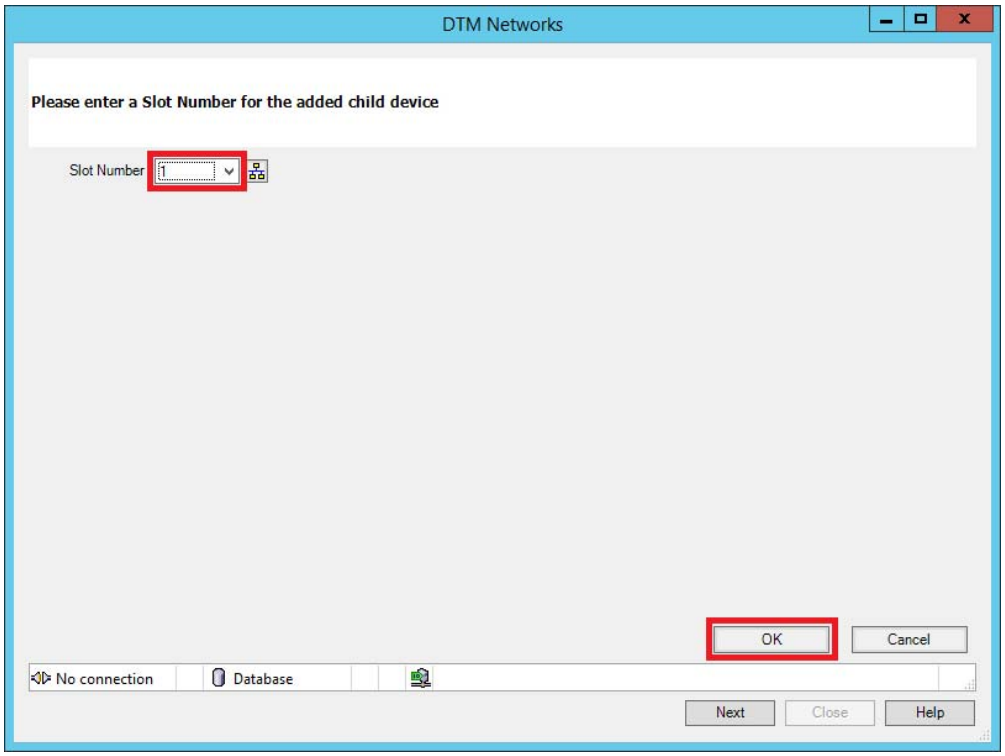


The Add DTM window appears.

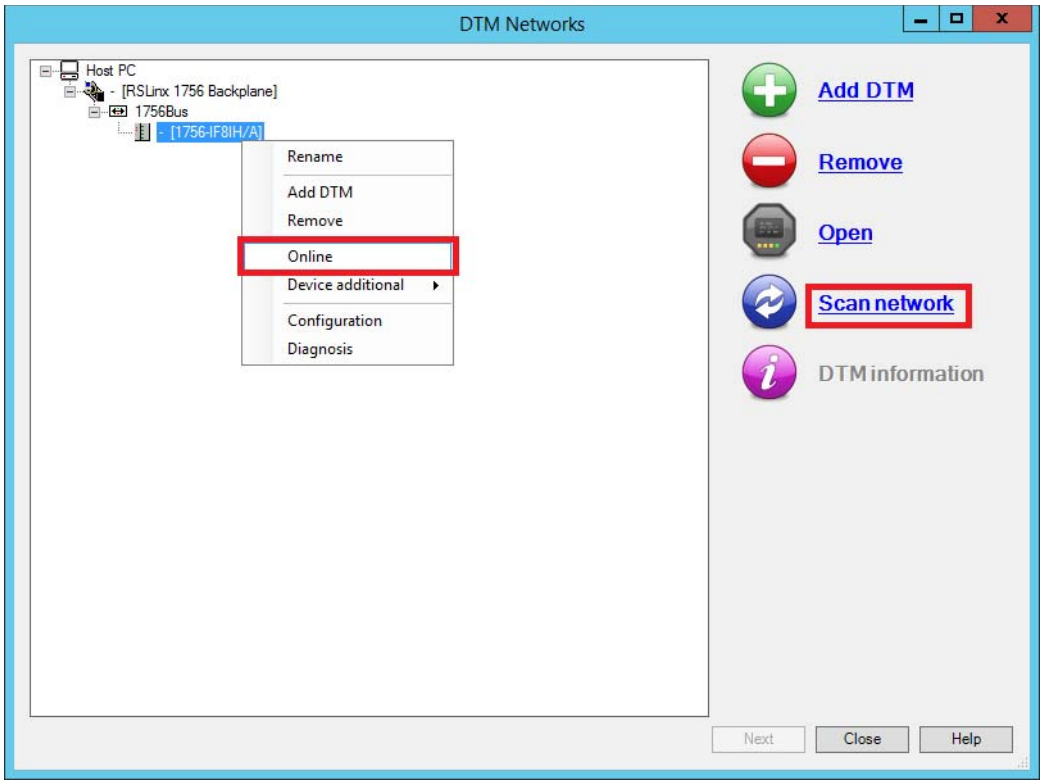
13. Select DTM '1756-IF8IH/A' and click OK.



14. Select the module slot number and click OK.



15. In the DTM Networks window, right-click ' - (RSLinx 1756 Backplane)'>1756Bus> - (1756 IF8H/A1)' and choose Online.\
16. Click Scan Network.

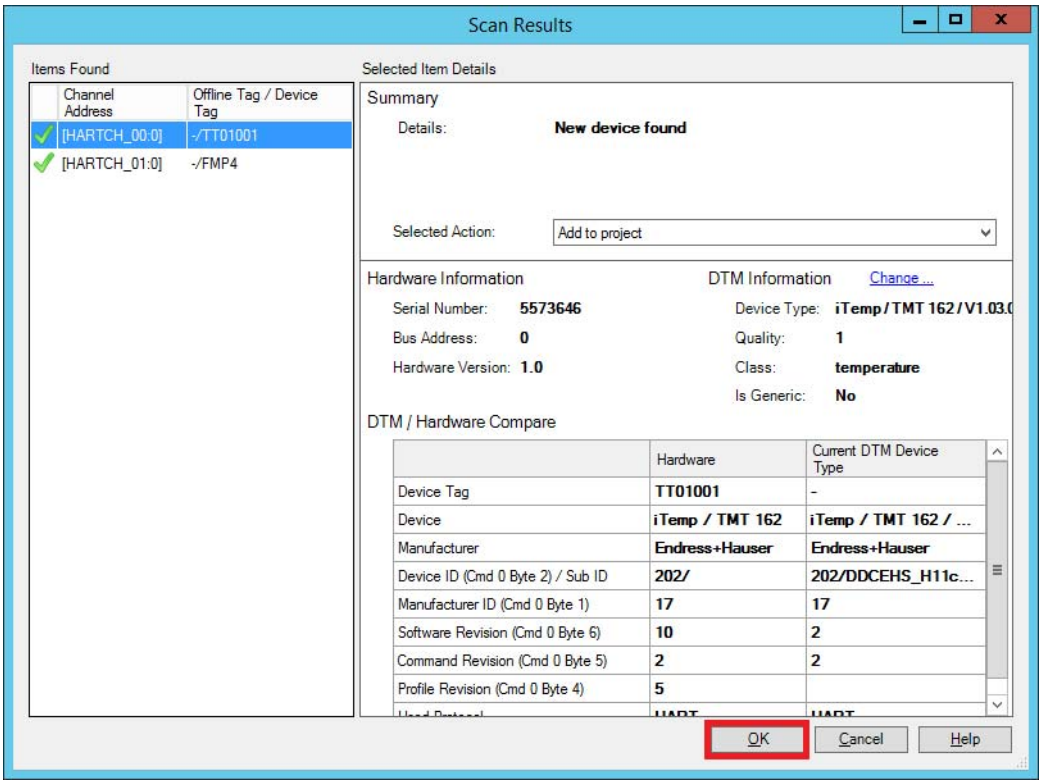


The Select Communications Channel window appears.

17. Select the channels to perform the Scan Network on and click OK.

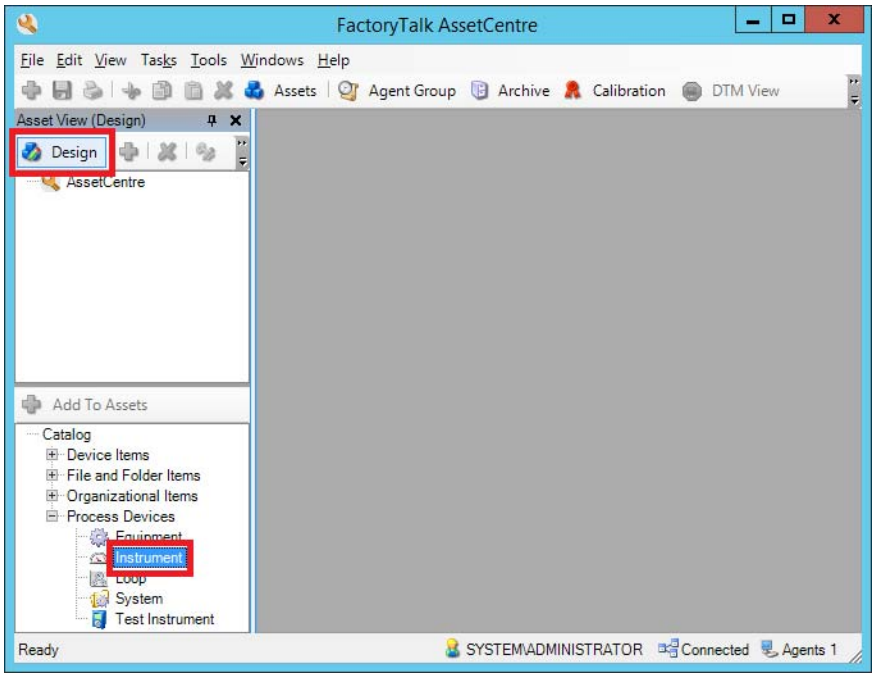
Design for the Device

Any items found (Temperature Transmitter TT01001 in the example) are listed in the Items Found area of the Scan Results window.

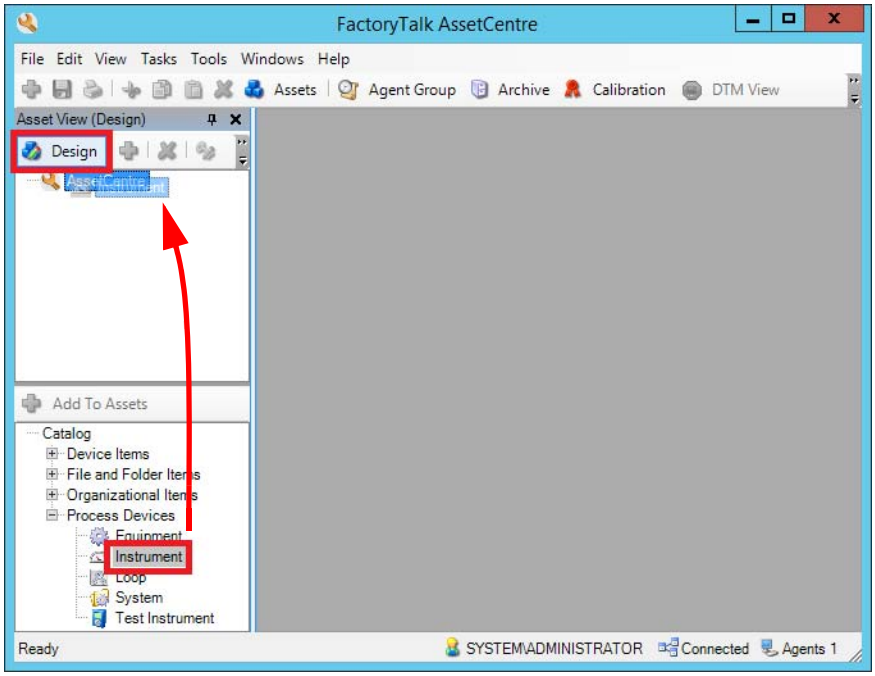


1. Click OK.
2. In the DTM Networks window, click Close.

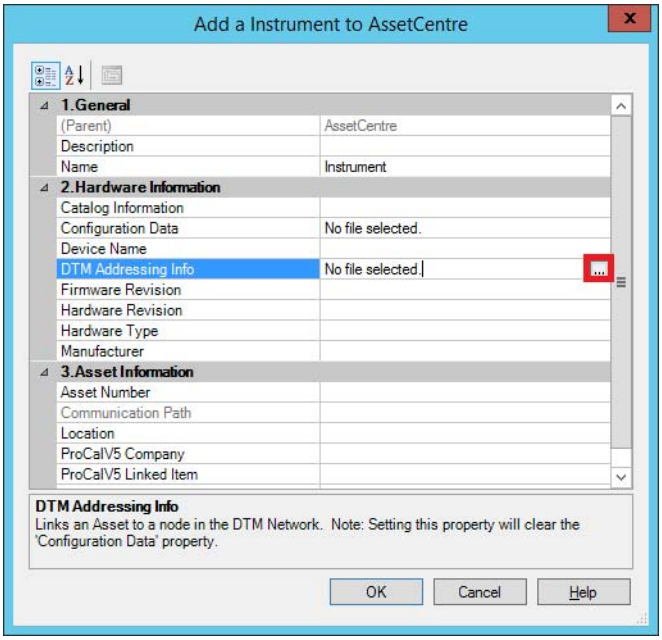
3. In the FactoryTalk AssetCentre window, select Design mode.



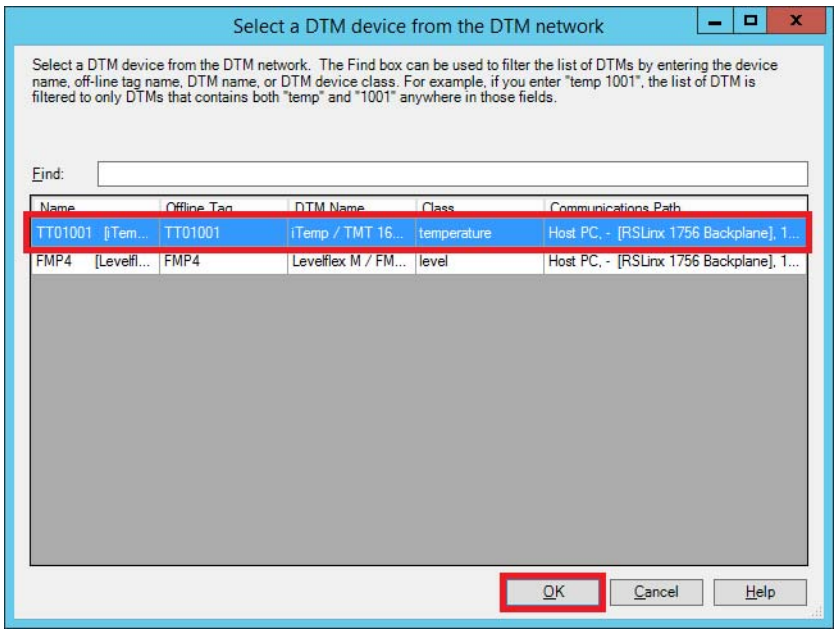
4. Drag-and-drop the Instrument asset into the AssetCentre tree.



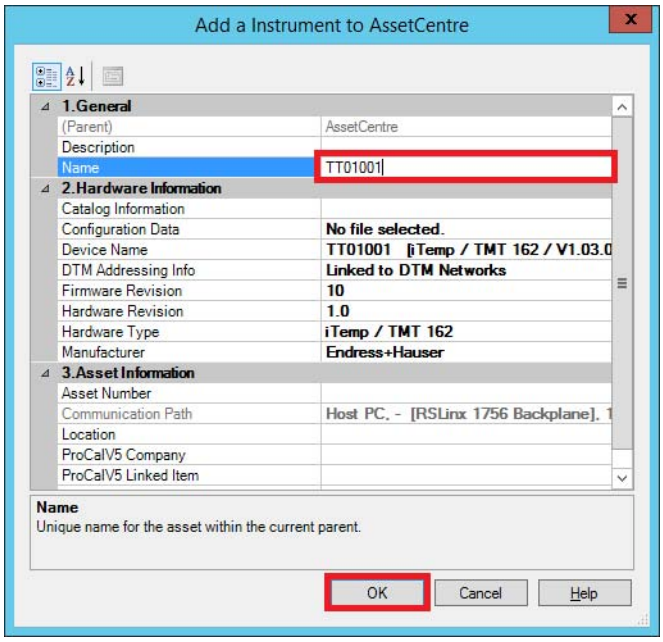
5. Click DTM Addressing Info and then click Browse (ellipsis, ...) to open the Select a DTM device from the DTM network window.



6. Select a Process Device (TT01001 in the example) and click OK.

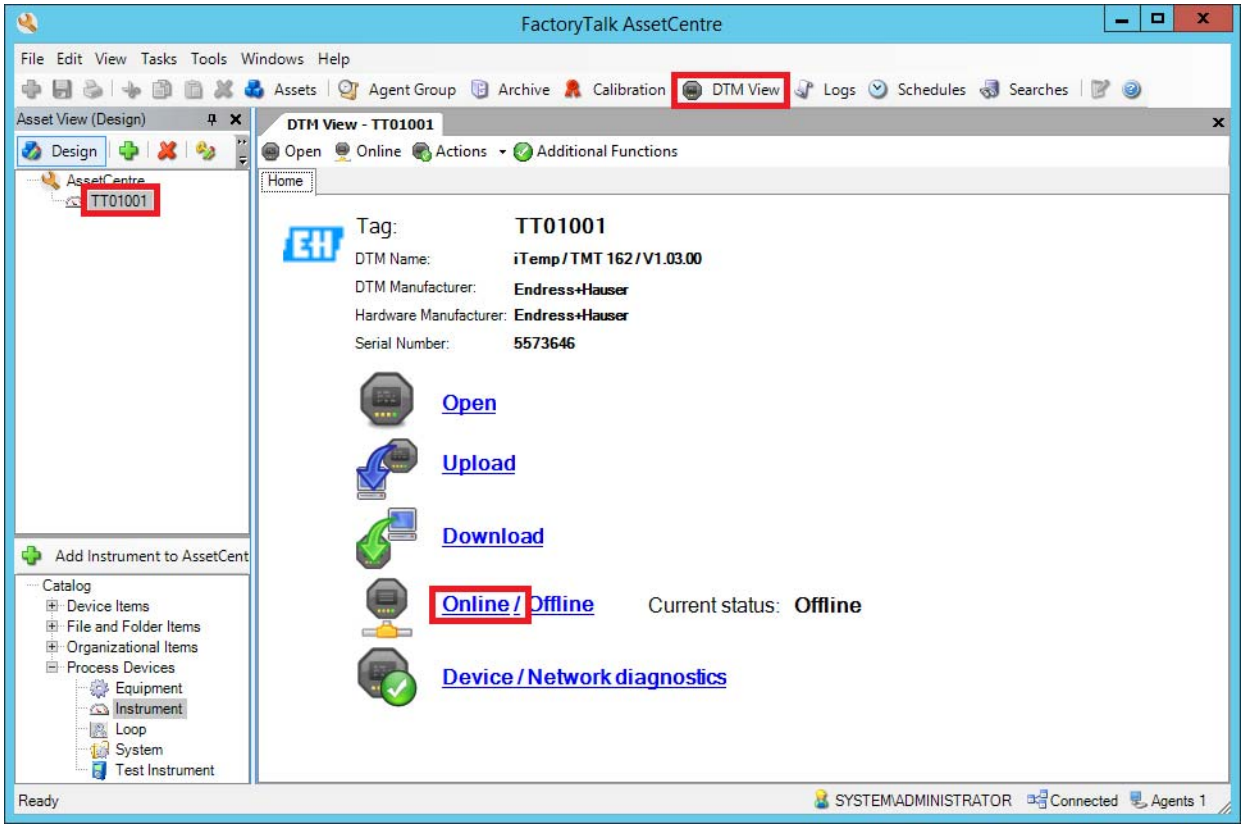


7. Type the device name or tag and click OK.

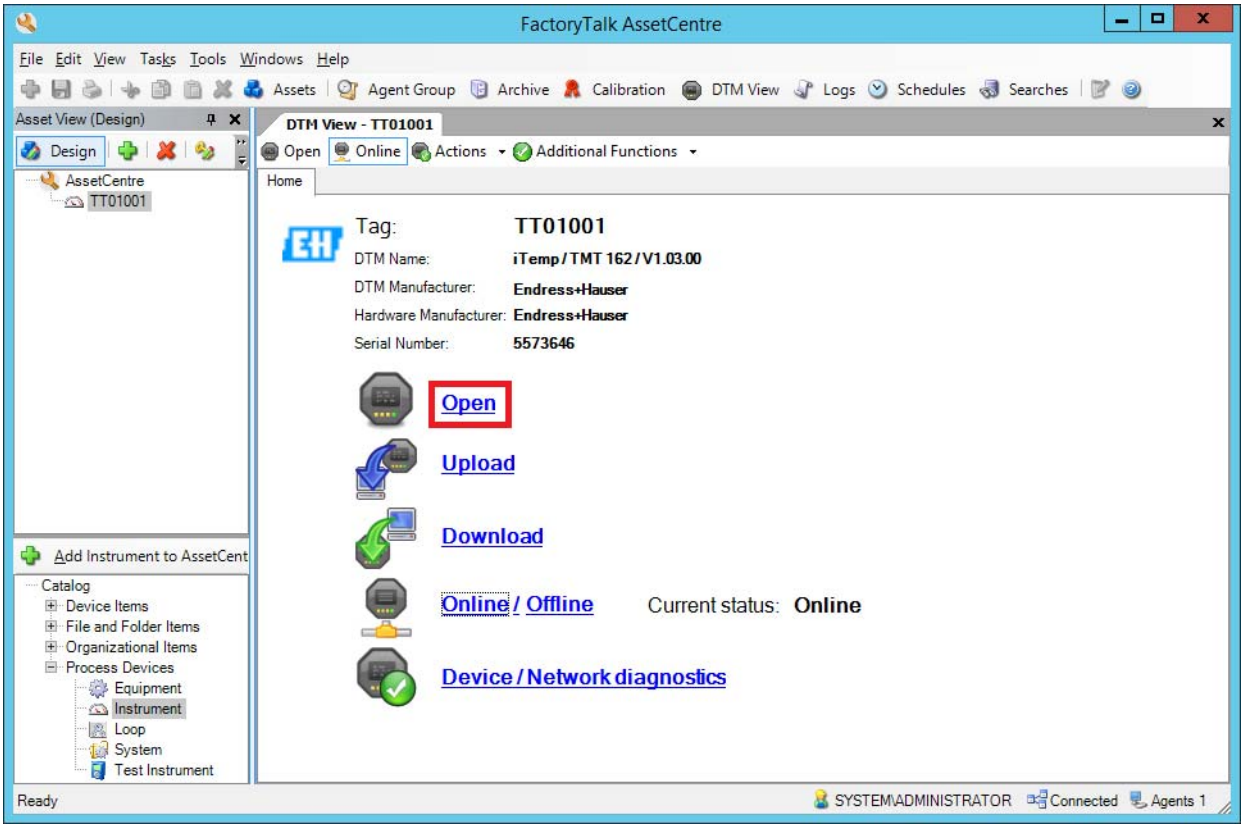


8. Select DTM View, click the device (TT01001 in the example), and click Online.

IMPORTANT The Upload, Download, and Diagnostics functionality is also available.



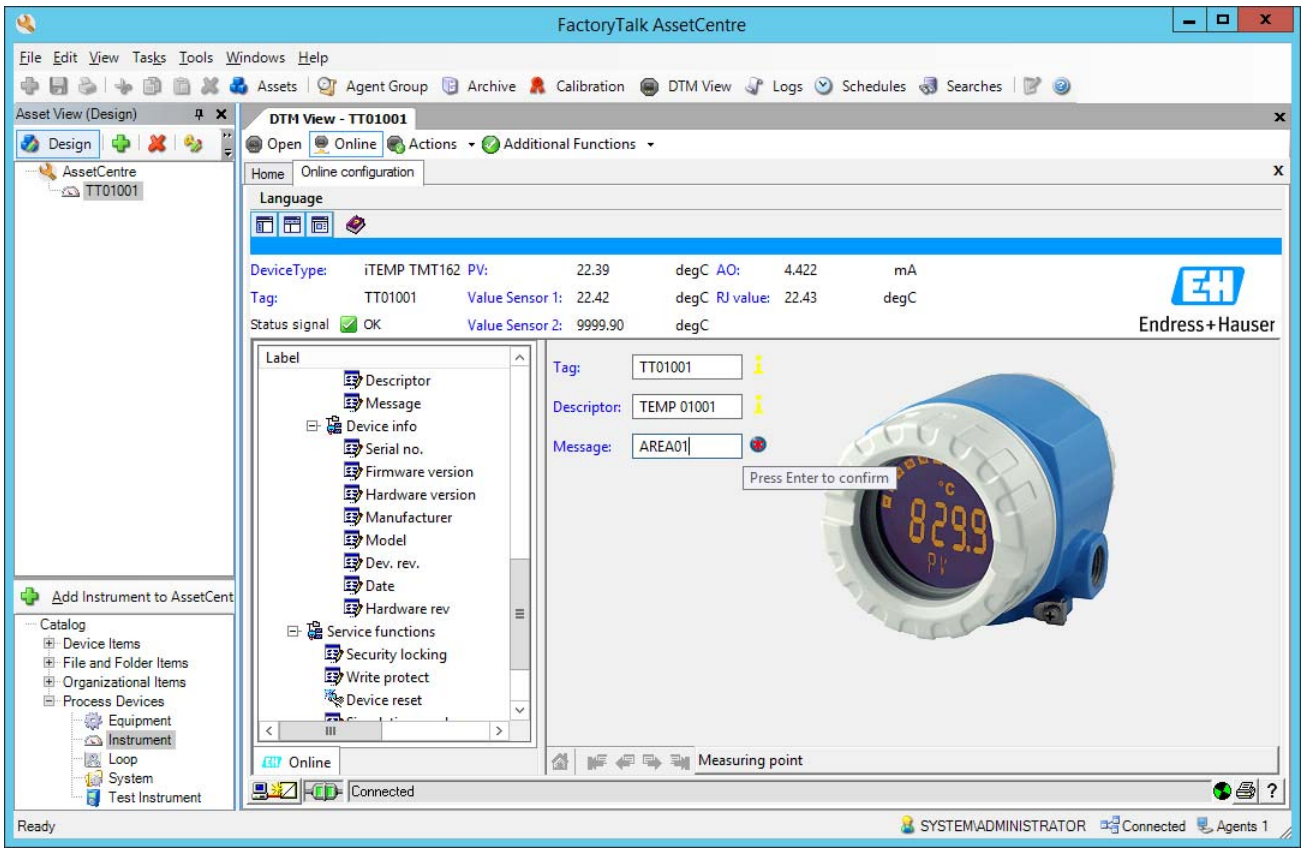
9. Click Open to configure the device.



The Online configuration tab opens.

10. Make any configuration changes you like.

    When you are finished with changes, you can exit the FactoryTalk AssetCentre window. You also can return to the Home tab to make more changes.



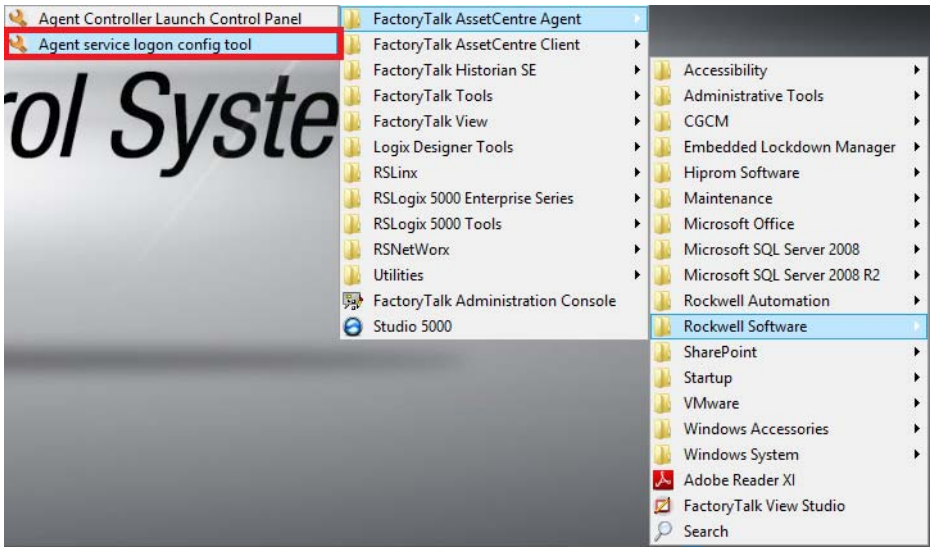
Configure Disaster Recovery

Disaster Recovery software creates back-up files. This procedure schedules a comparison between master files, and processor program and data files.

Configure a Logon

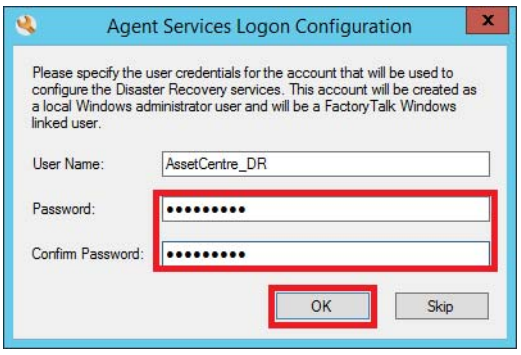
Complete these steps to configure the user name and password to enable the Agent service.

1. Click the Programs symbol and choose Rockwell Software>FactoryTalk AssetCentre Agent>Agent service logon config tool.



   The Agent Services Logon Configuration dialog box appears.

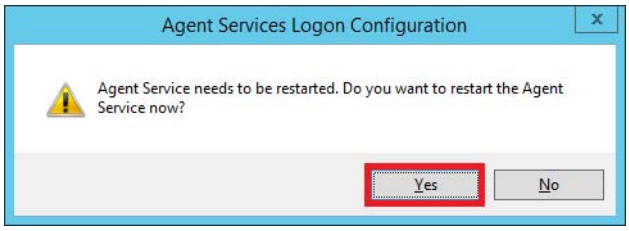
2. Type a user name (AssetCentre_DR in the example), password, and click OK.



After creating the logon, you must confirm that you need to restart the Agent Service.

IMPORTANT This logon cannot be used until the service is restarted.

3. Click Yes.



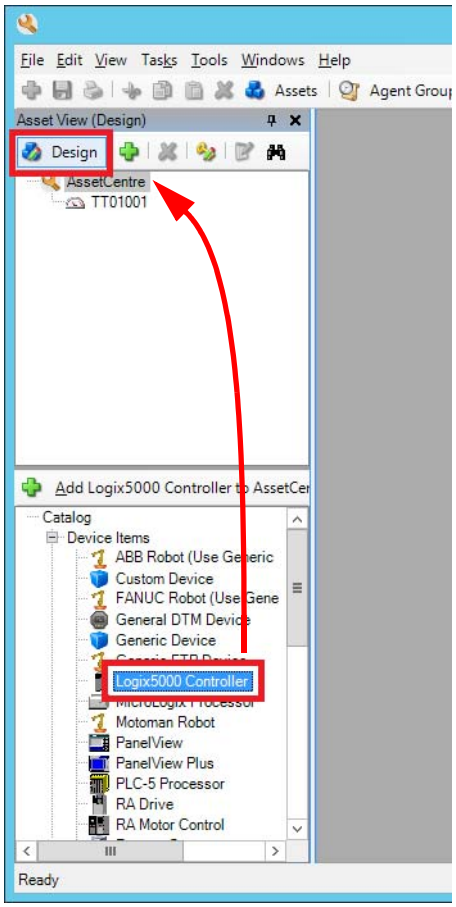
4. Perform step 1 and step 2 to reopen the Agent Service Logon Configuration dialog box.
5. In the next dialog box that appears, confirm that the information is correct and click Close.

   The Agent Service Logon Configuration dialog box closes.

Add an Asset

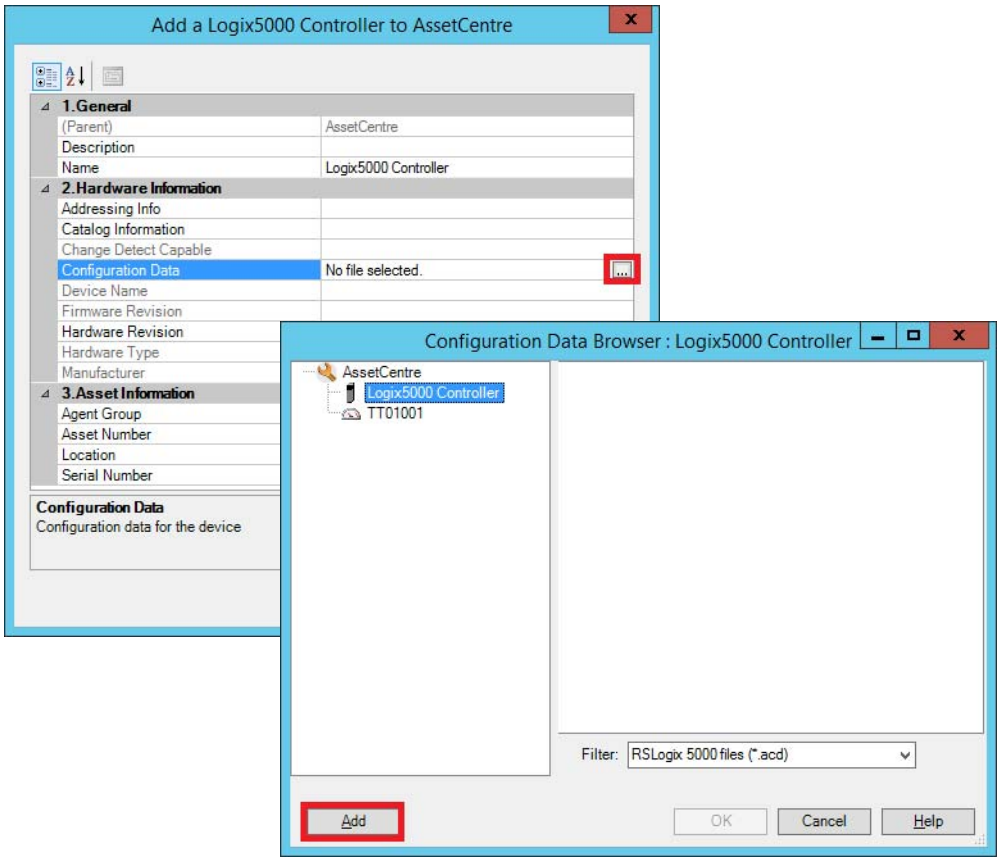
To add a Logix5000™ controller as a new asset, complete the following steps:

1. In the FactoryTalk AssetCentre, click Design.
2. Drag-and-drop the Logix5000™ Controller into AssetCentre.



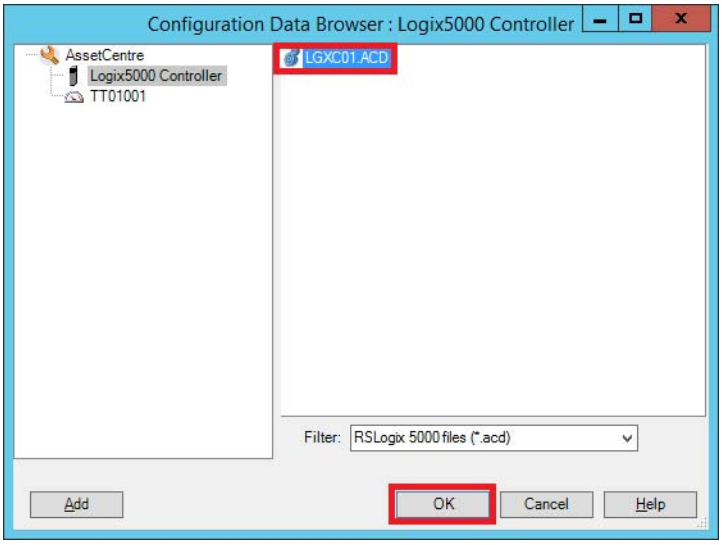
The Add a Logix5000 Controller to AssetCentre dialog box appears.

3. Choose Configuration Data and use Browse (Ellipsis, ...) to find and click Add.

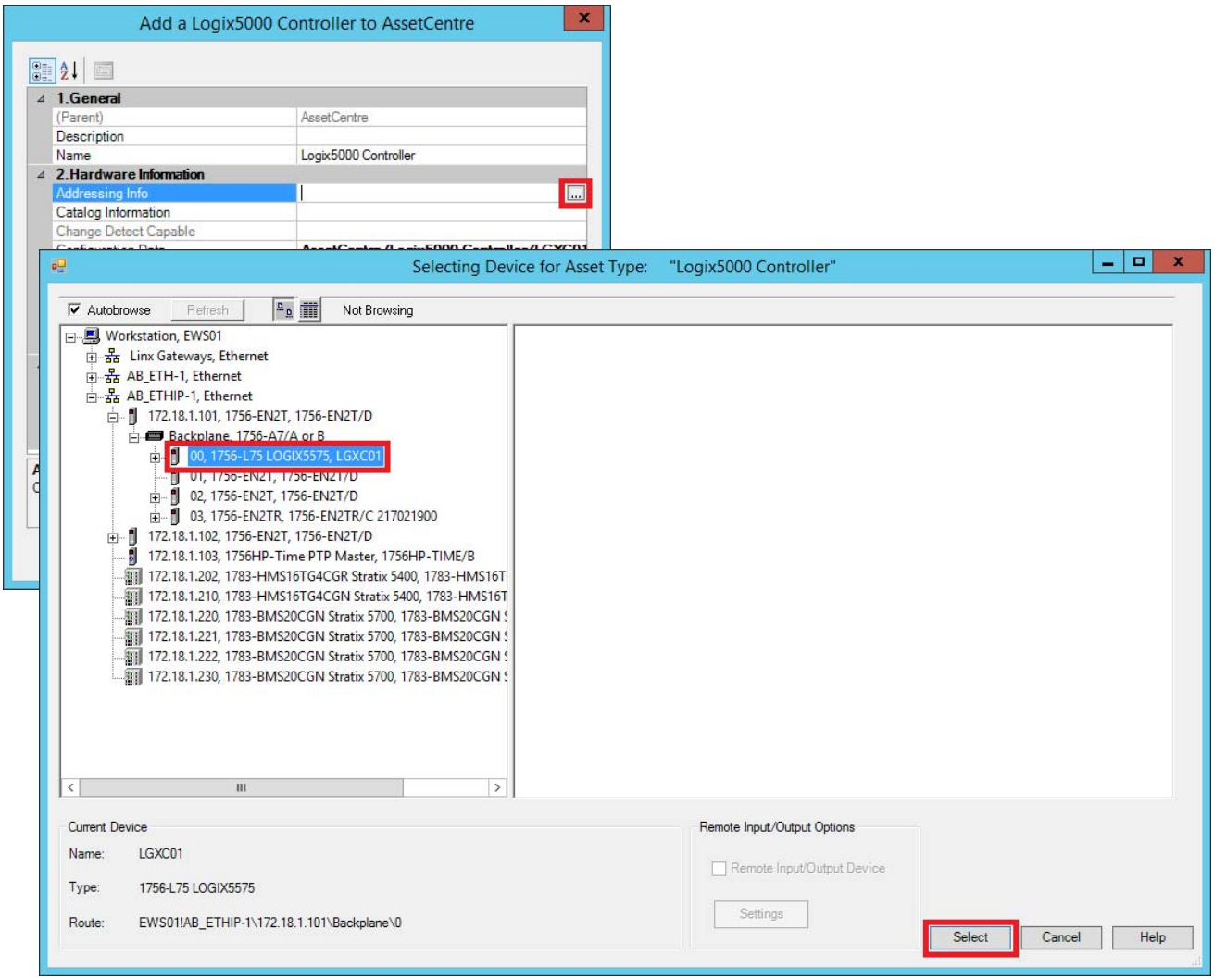


An .ACD file appears in the right side of the window.

4. Select the .ACD file and click OK.



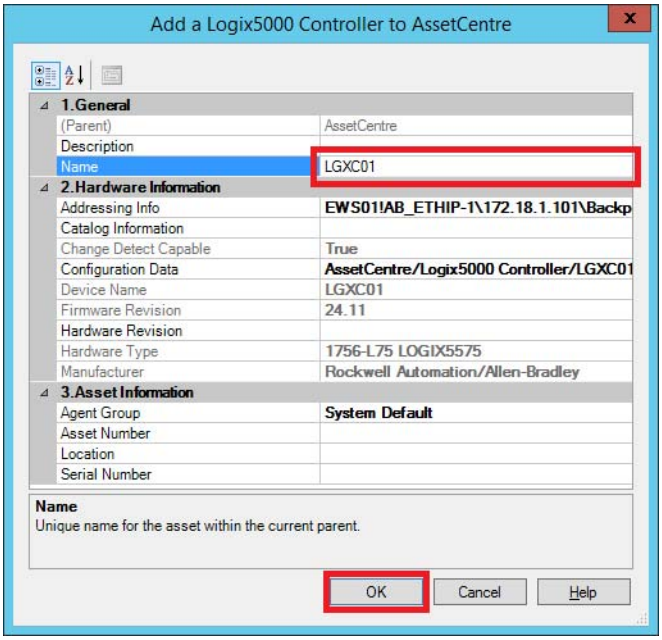
5. In the Add a Logix5000 Controller to AssetCentre dialog box, choose Addressing Info.
6. Click Browse (ellipsis '...').



The Selecting Device For Asset Type window appears.

7. Select the path to the controller and click Select.

8. In the Add a Logix5000 Controller to AssetCentre dialog box, type the controller name (PAC01 in the example) and click OK.

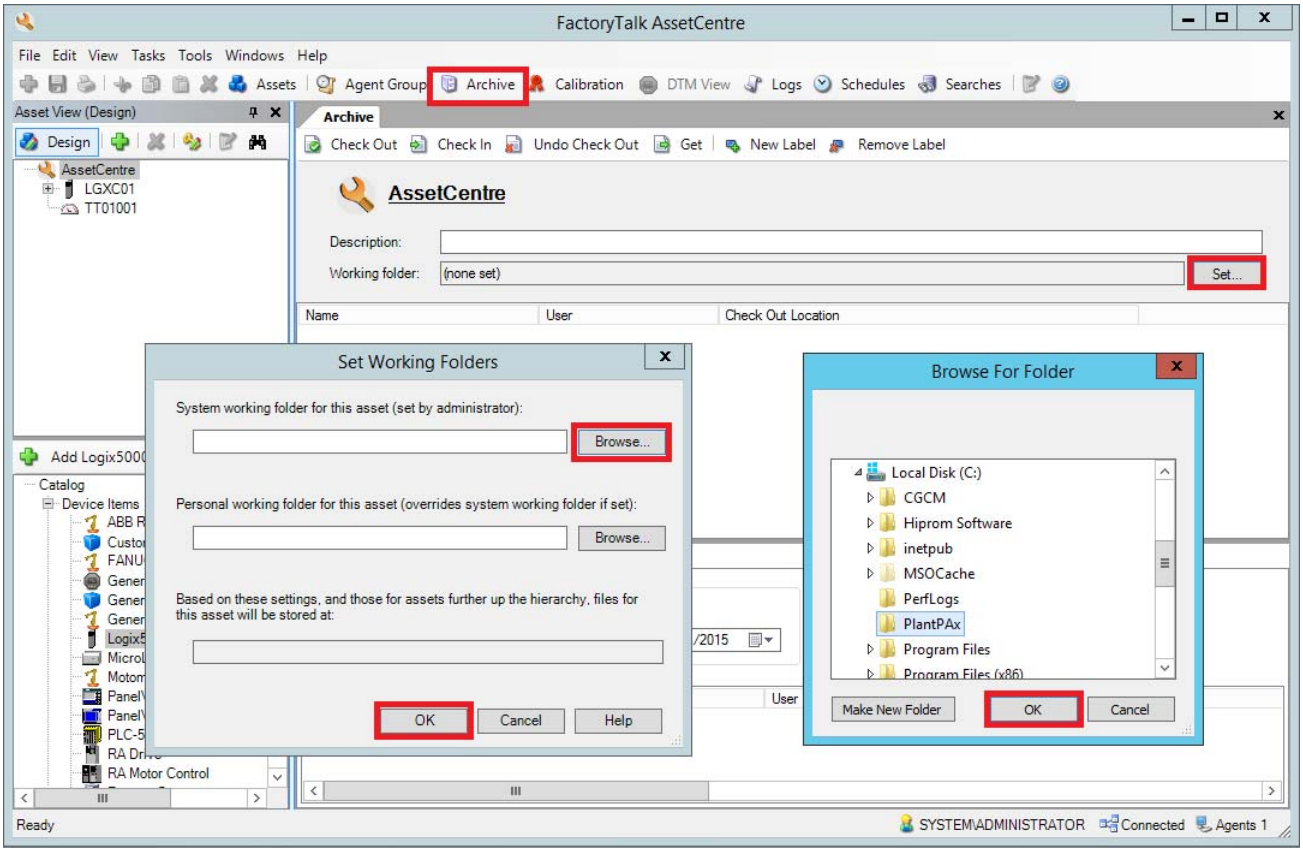


Create a Working Folder

Complete these steps to set the workbook (working folder) in any level of structure.

1. In the FactoryTalk AssetCentre window, select Archive.

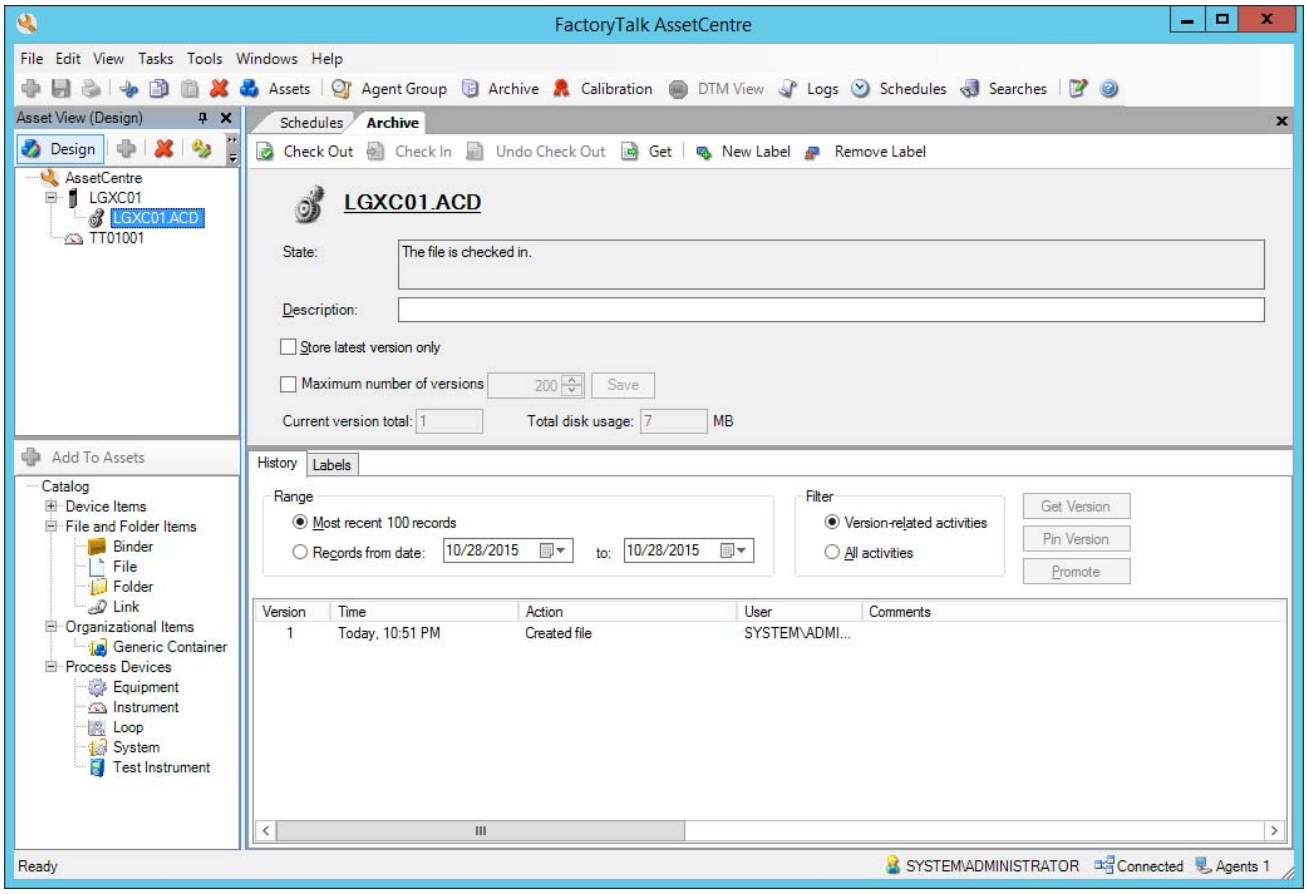
2. In the Archive tab, click Set for the Working folder.



The Set Working Folders dialog box appears.

3. If the System working folder is incorrect, click Browse (ellipsis '...').
4. In the Browse For Folder dialog box, navigate to the desired folder, select it, and click OK.
5. In the Set Working Folders dialog box, click OK.

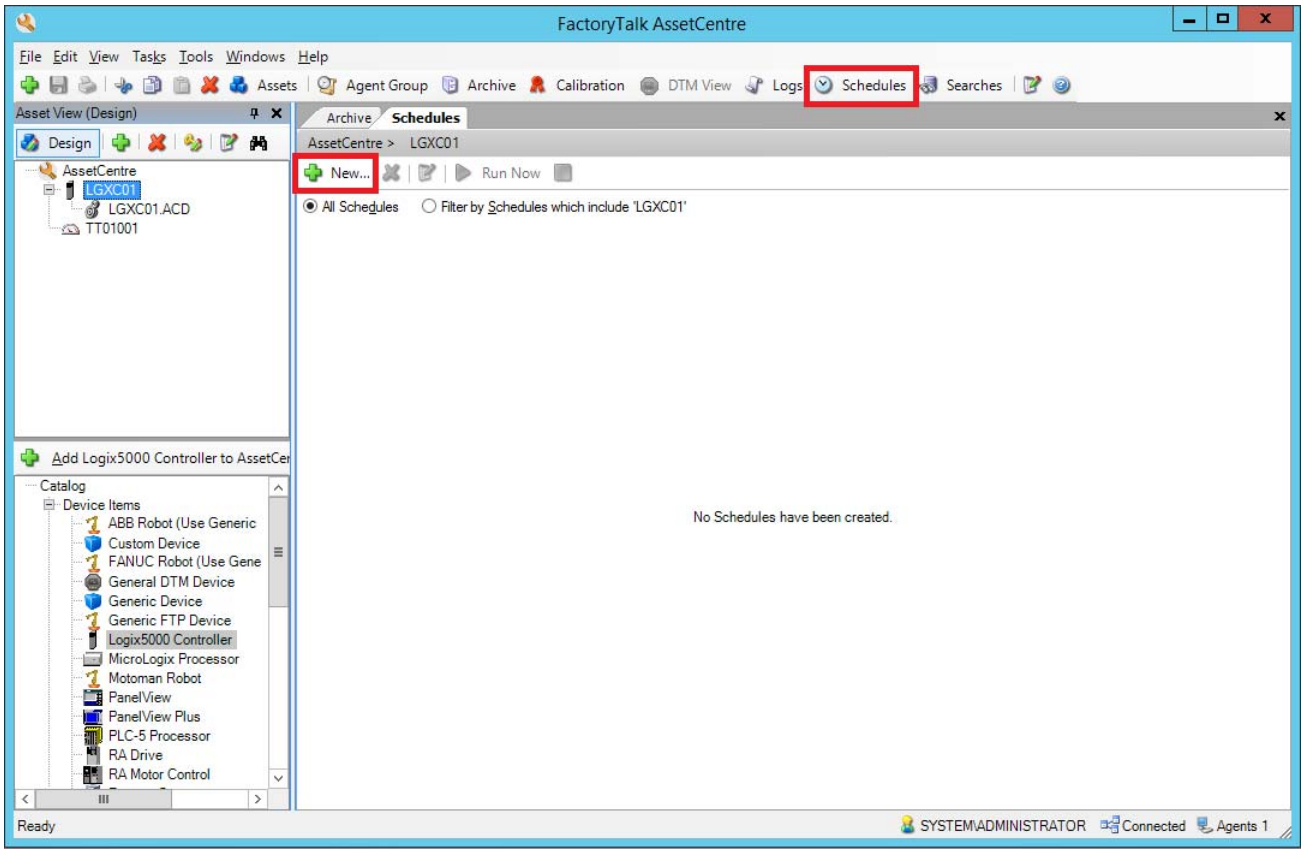
6. In the FactoryTalk AssetCentre software, make sure the Check In, Check Out, and Revision Control procedures are available in the system.



Create a Backup Schedule

Complete these steps to configure a backup schedule.

1. In the FactoryTalk AssetCentre Client, click the controller.
2. Select Schedules.



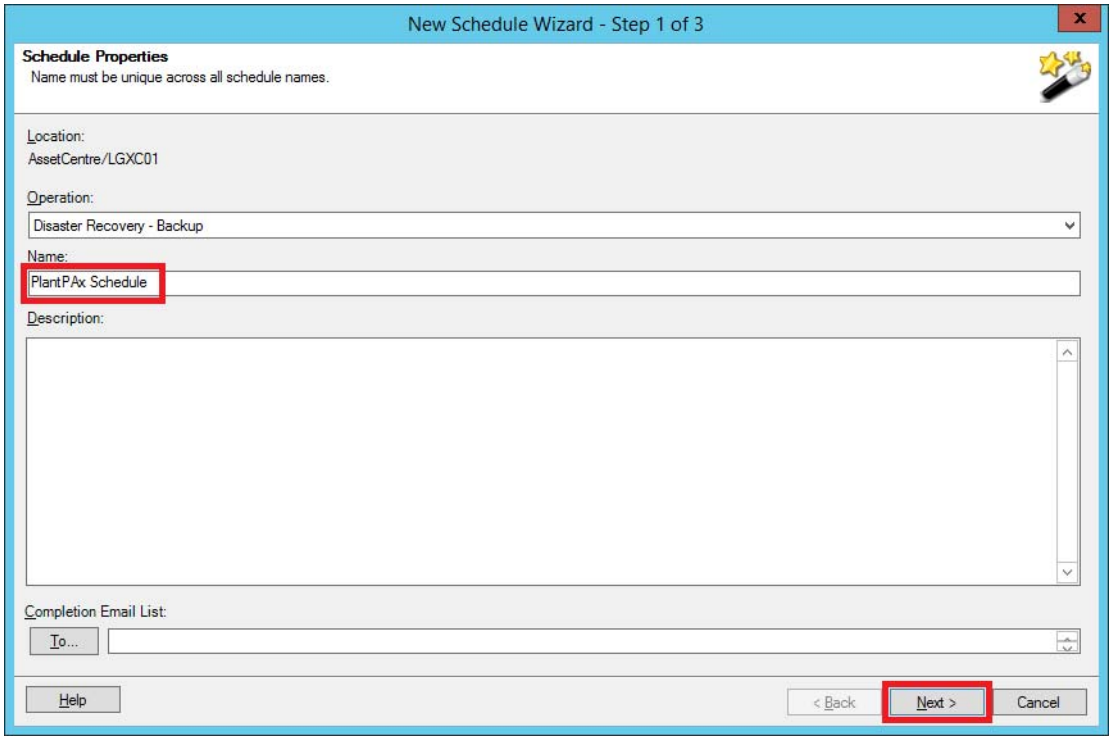
The Schedules tab appears.

3. In the Schedules tab, Click New.

   The 'New Schedule Wizard - Step 1 of 3' dialog box appears.

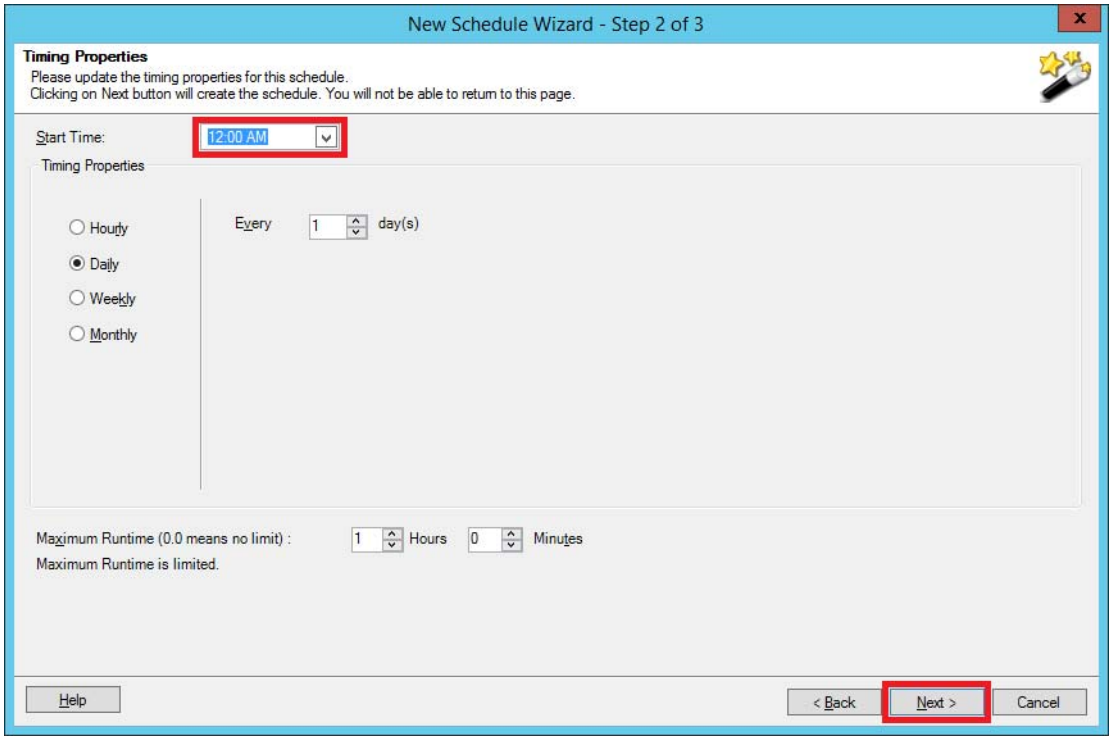
4. Make sure that the Operation is correct.

5. Type the name for the schedule and click Next.



The 'New Schedule Wizard - Step 2 of 3' dialog box appears.

6. From the pull-down menu, select the Start Time.



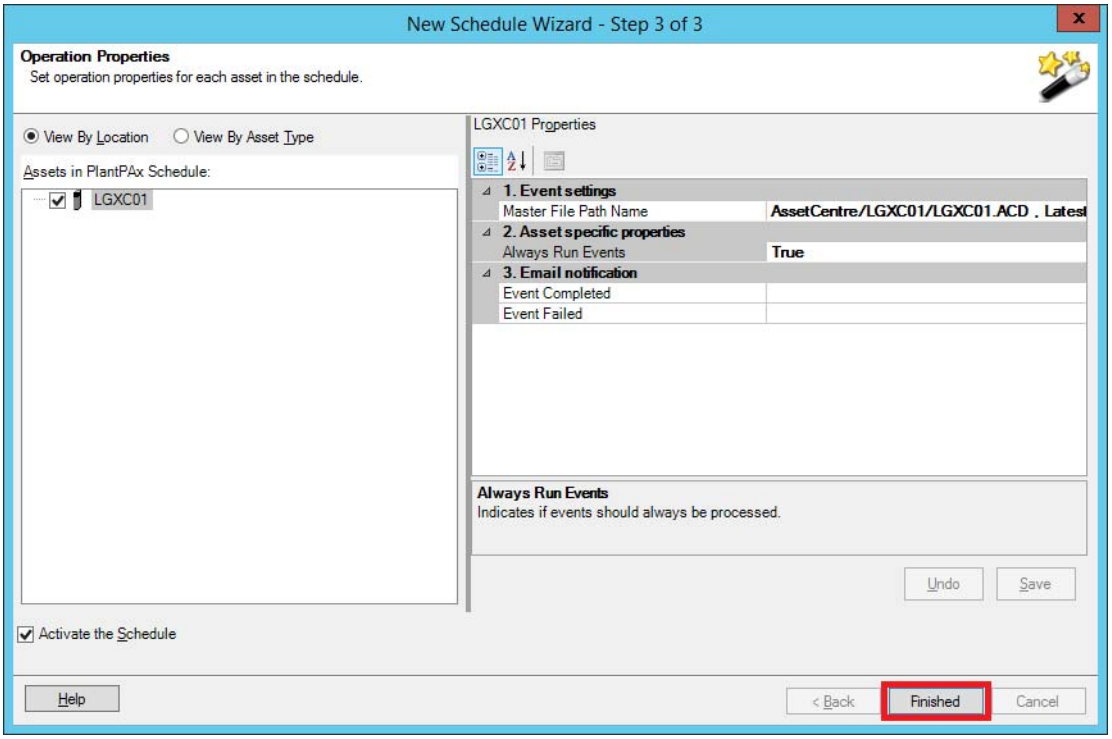
7. Set the Timing Properties.

8. Set the Maximum Runtime.

IMPORTANT A maximum runtime of 0.0 means that there is no maximum limit.

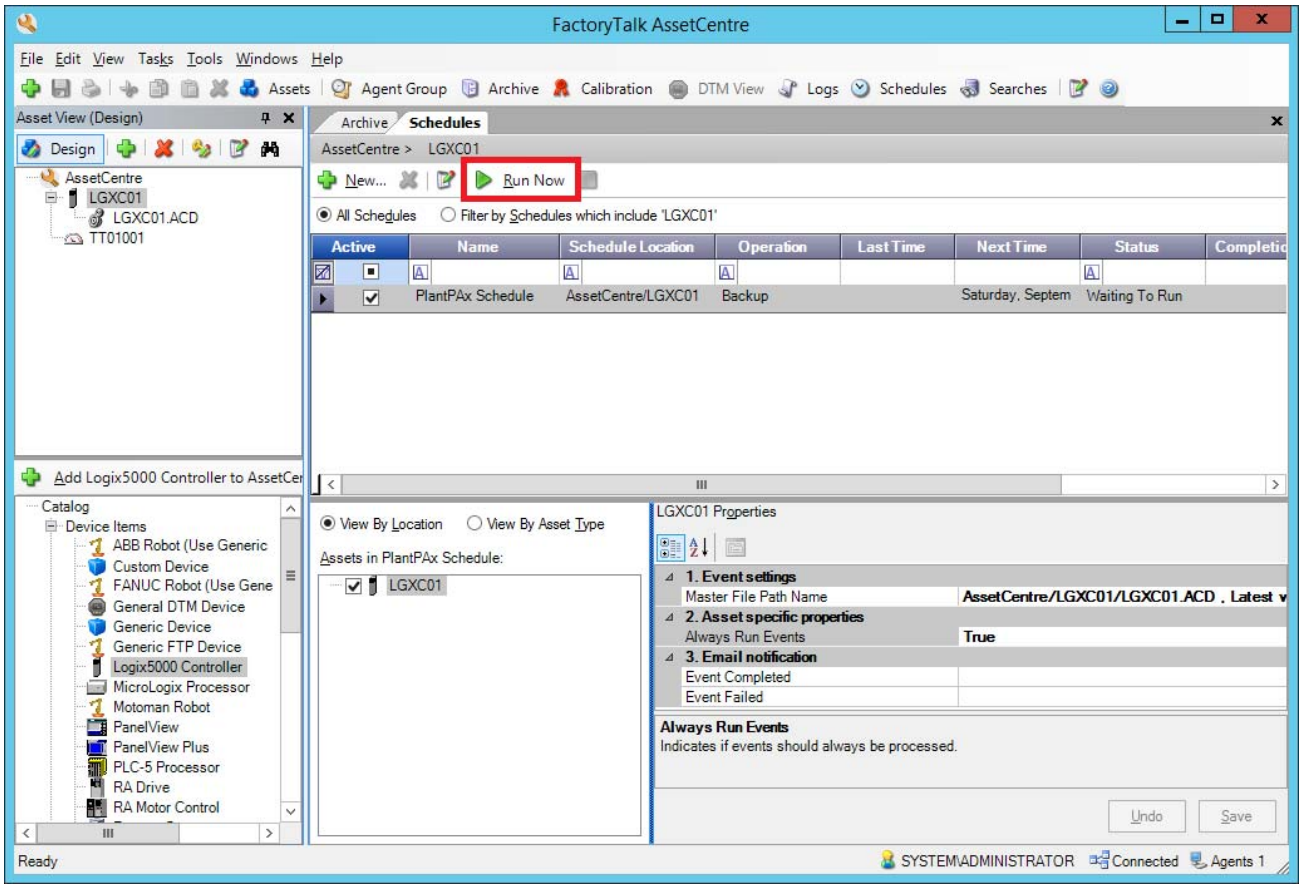
9. Click Next.

   The 'New Schedule Wizard - Step 3 of 3' dialog box appears.



10. Select the Email notification option and click Finished.

11. In the FactoryTalk AssetCentre - Schedules tab, click Run Now to test the functionality of the new schedule outside of the scheduling period.



The backup of the controller runs. After a few minutes, the backup is complete.

Add Basic System Diagnostics

This chapter describes how to add controller and PASS server diagnostics to your system health screen that is provided in the HMI template. HMI templates are provided with the Rockwell Automation Library of Process Objects. As you develop your project, you can add additional diagnostics for your system.

We recommend that you familiarize yourself with the HMI template. See Chapter 3 for examples and descriptions of the template.

Figure 12 shows diagnostic displays that are explained in this chapter.

Figure 12 - HMI Server Status Example

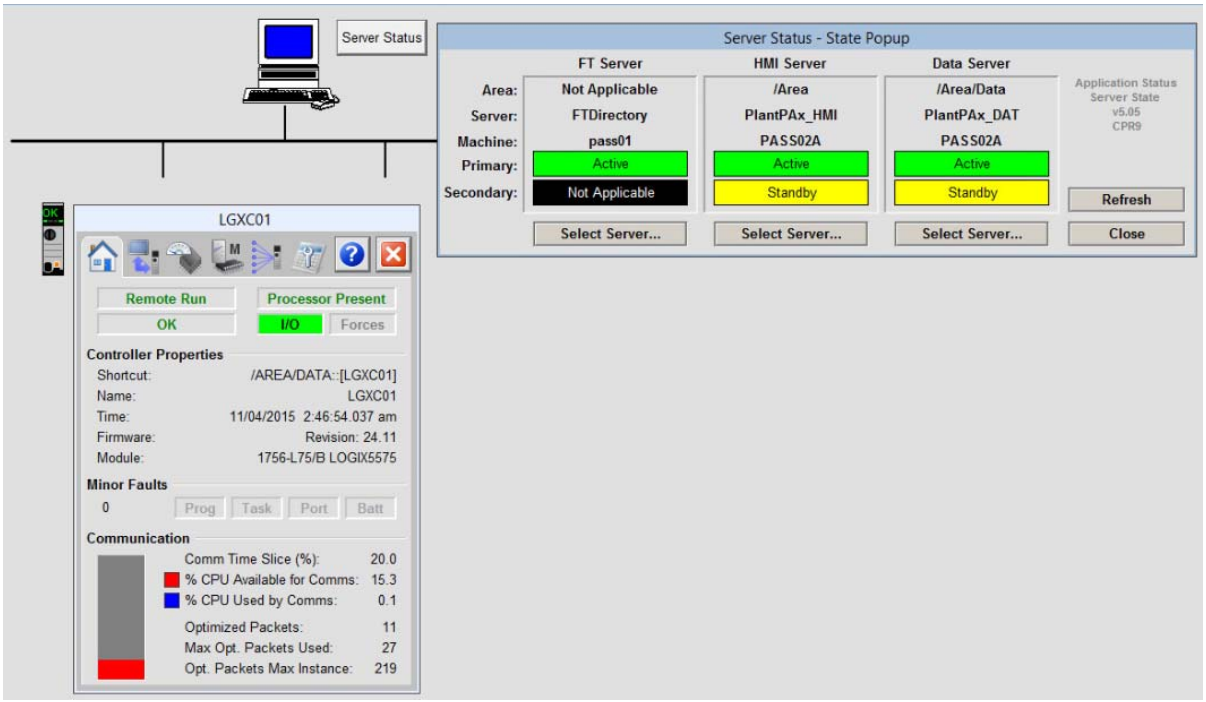
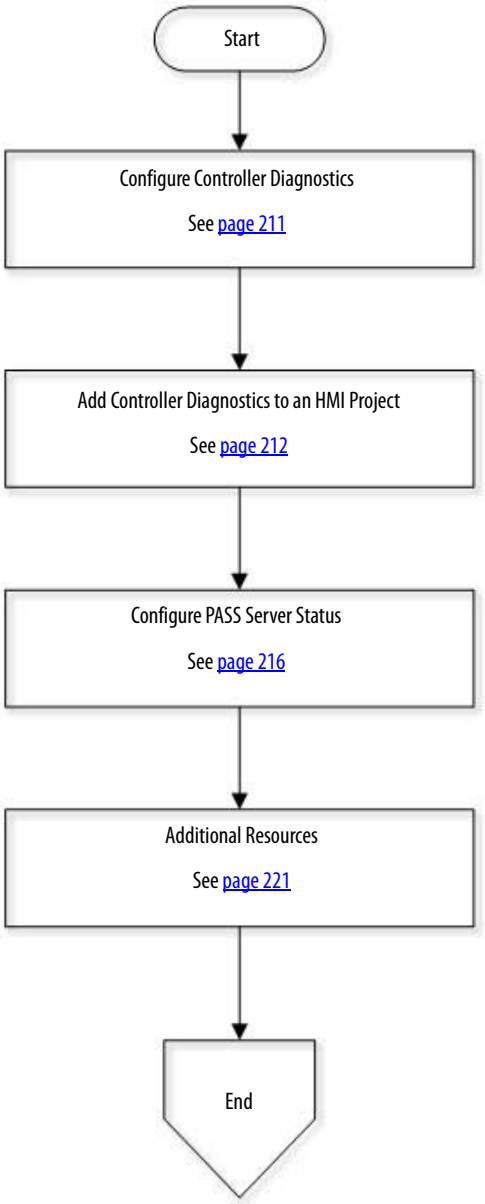


Figure 13 shows the topics that are described in this chapter. Click or see the page number for quick access to a section.

Figure 13 - Basic Diagnostic Workflow



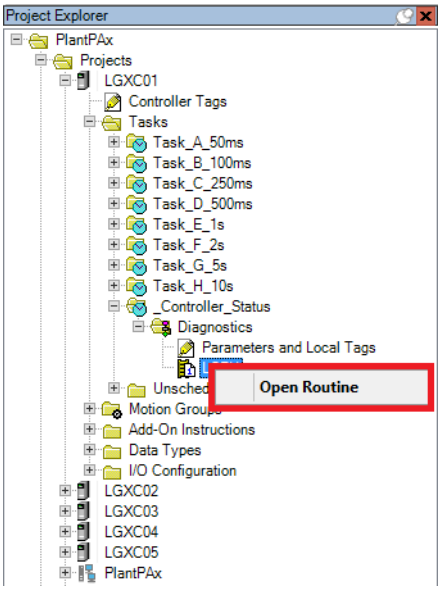
Configure Controller Diagnostics

Use an Engineering Workstation with all procedures.

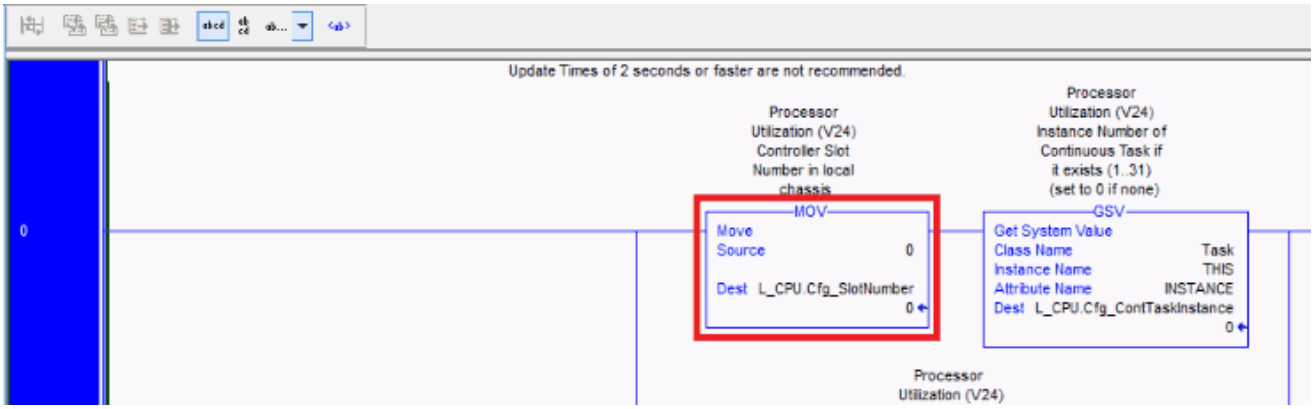
EWS

The Logix Controller CPU Utilization (L_CPU) Add-On Instruction faceplate monitors a Logix controller and provides controller information on the system status page of the HMI template. This status information includes controller CPU utilization, communication usage, memory usage, task scan times, and controller loading.

1. In the Studio 5000 Architect™ application, expand a controller project and open diagnostics under Controller Status.
2. Right-click LCPU and choose Open Routine.



The Logix Designer application opens with the LCPU routine.

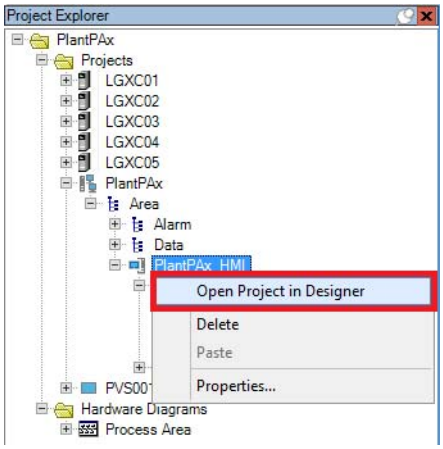


3. In the MOV instruction, type the controller slot number into the Source text box.
4. Save your project.

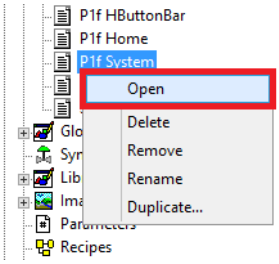
Add Controller Diagnostics to an HMI Project

Follow these steps to add controller diagnostics to your HMI project.

1. From the Architect application, right-click an application and choose Open in Designer.

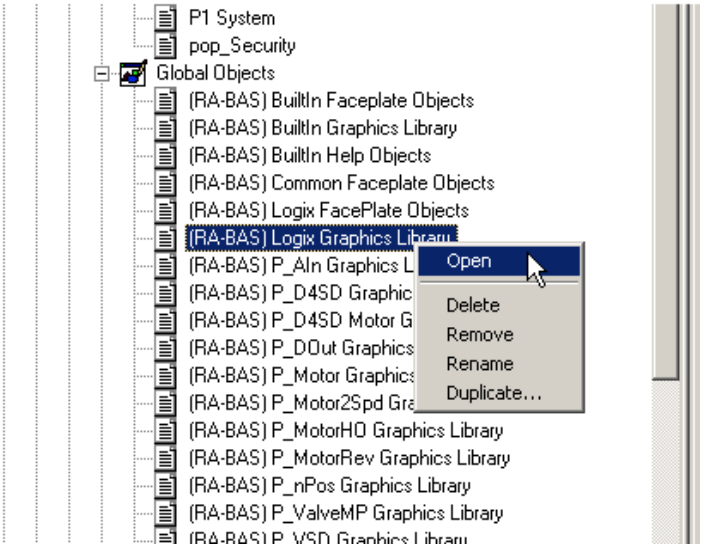


2. From your FactoryTalk® View project, expand your HMI application and displays.
3. Right-click a system diagnostic display (for example, P1f System) from the template and choose Open.

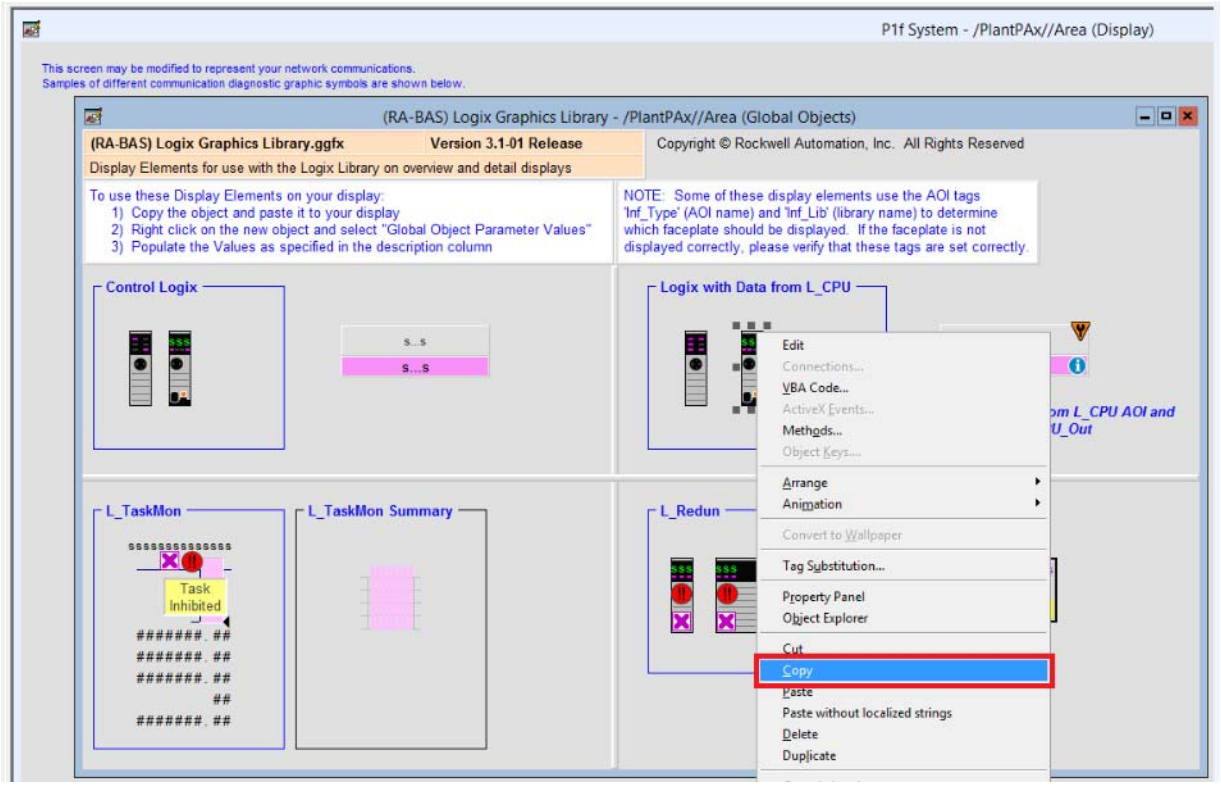


See page 58 for descriptions of the components in an HMI project.

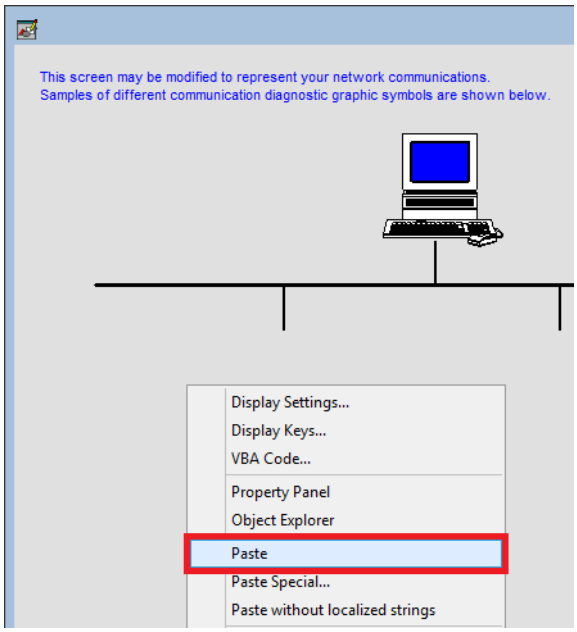
4. From the Global Objects folder, right-click (RA-BAS) Logix Graphics Library and choose Open.



5. Right-click the controller graphic in the L_CPU box and choose Copy.

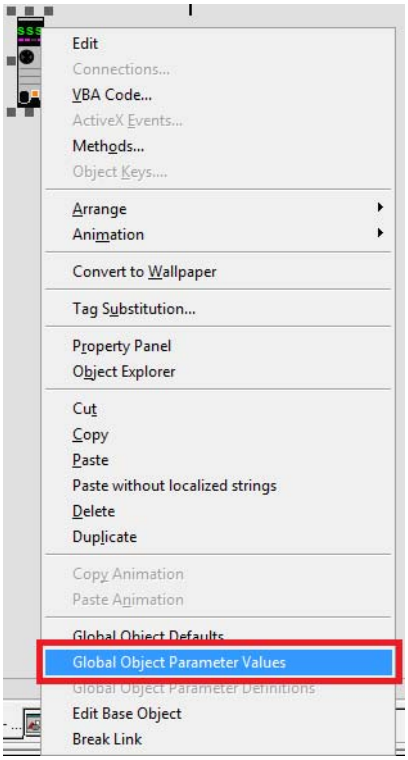


6. On the P1f System display, right-click anywhere in the window and choose Paste.



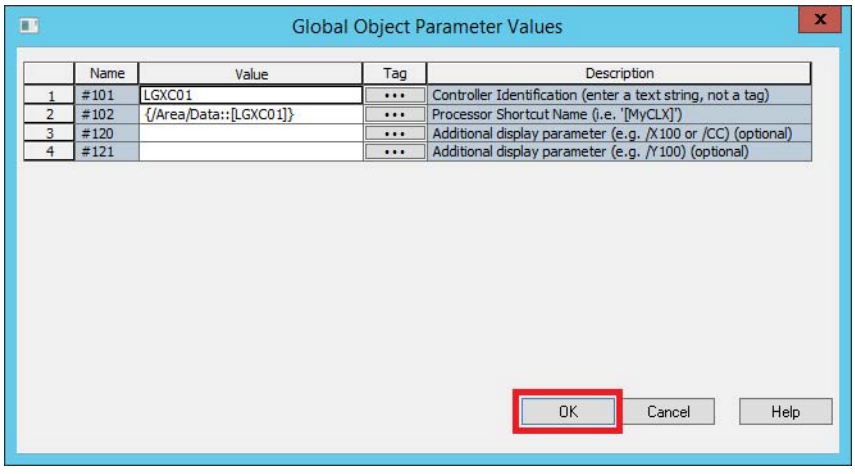
7. Right-click the L_CPU graphics on the P1 System display and choose Global Object Parameter Values.

TIP To open the L_CPU faceplate, you must open the Display folder under the FactoryTalk View SE folder.



8. Type the controller shortcut string in #101.

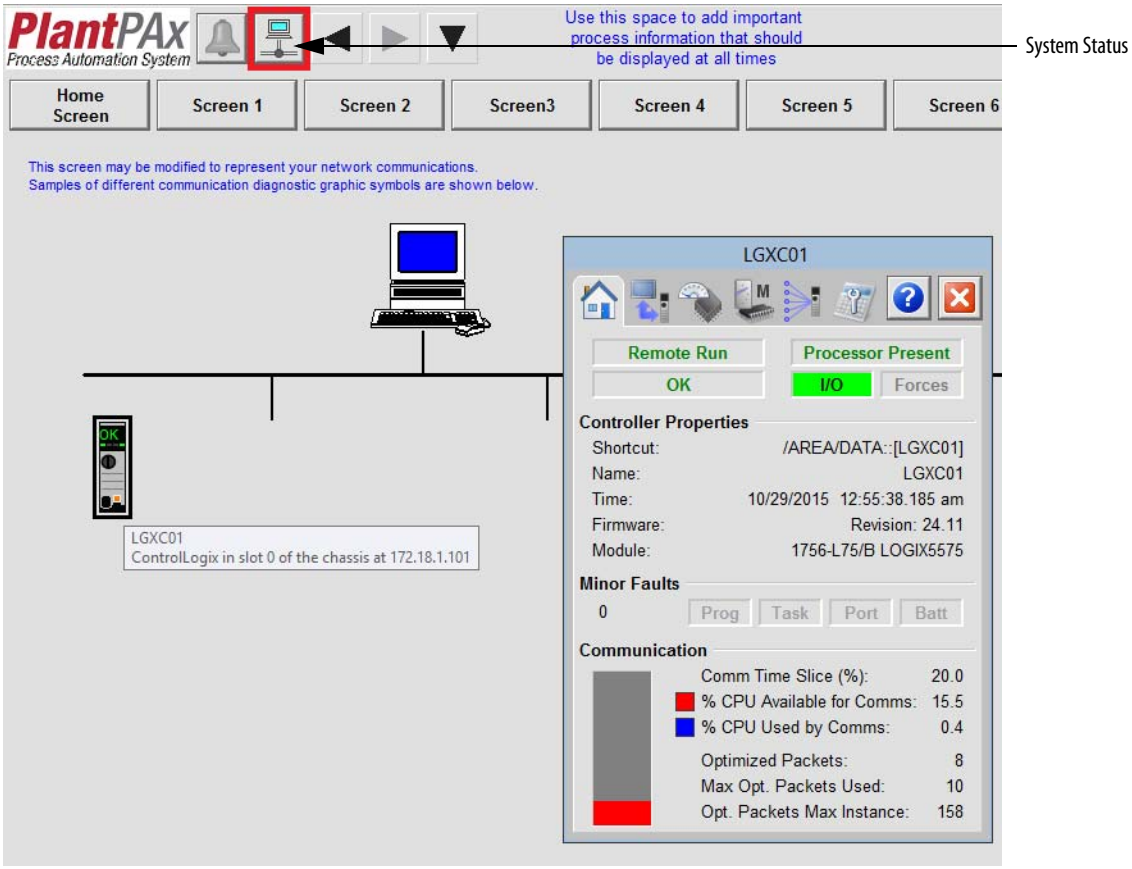
9. Select the shortcut in #102, and click OK.



10. Save the display.

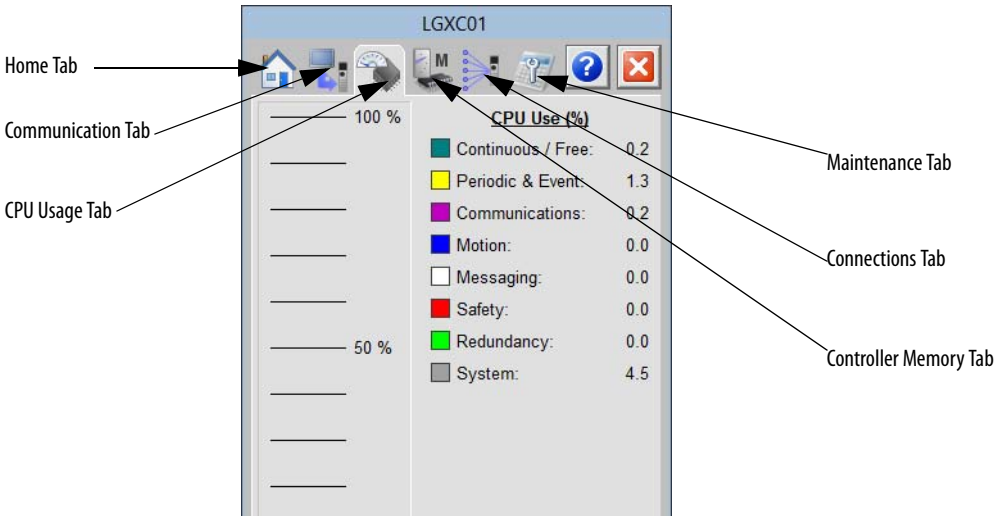
11. Open the HMI template that you created in Chapter 3.

12. On the HMI display, click the System Status icon.



On the HMI template, the controller graphic has some animation that shows the position of the key switch and controller status indicators.

13. Click the controller to access the controller status faceplate.



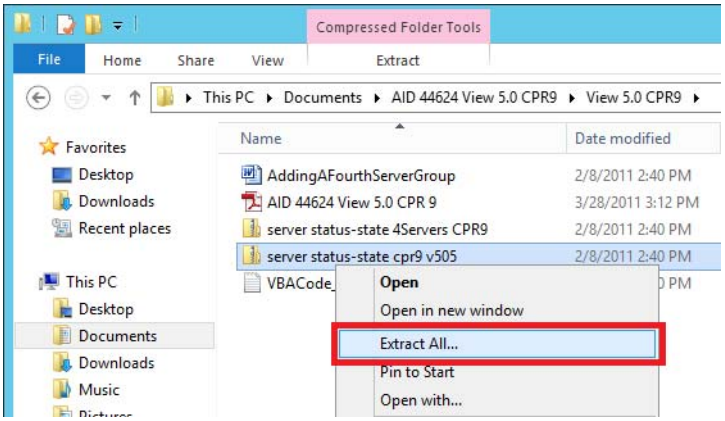
Tabs on the faceplate also provide information on the CPU usage and the status of controller memory and connections.

For complete details, see the PlantPAx® Library of Logix Diagnostic Objects, publication PROCES-RM003.

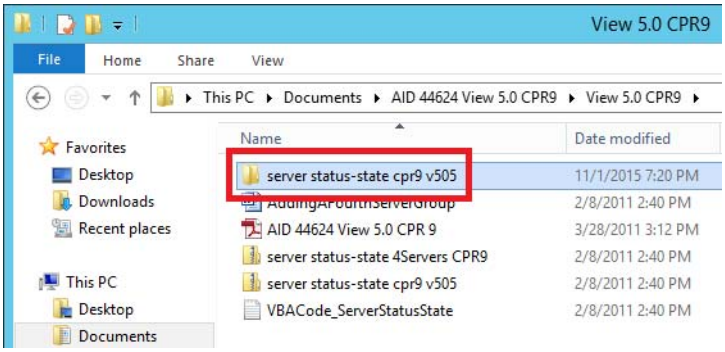
Configure PASS Server Status

In this section, we describe how to add diagnostics for your PASS servers. These diagnostics provide information on the software components that run on the PASS, including an HMI server, data server, and an alarm and event server.

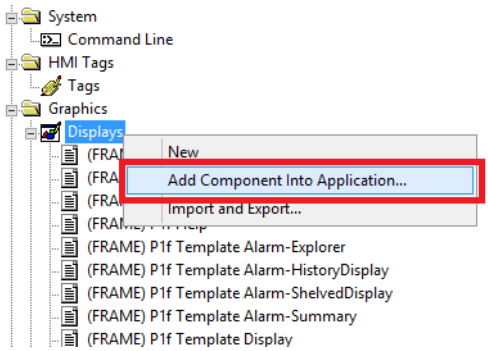
1. Open Knowledgebase Answer ID 44624 at http://rockwellautomation.custhelp.com and download the zip attachment.
2. Right-click the .zip file and choose Extract All.
3. Open the View 5.0 CPR9 folder.
4. Right-click the file and choose Open.
5. Right-click server status-state cpr9 v505 and choose Extract All.



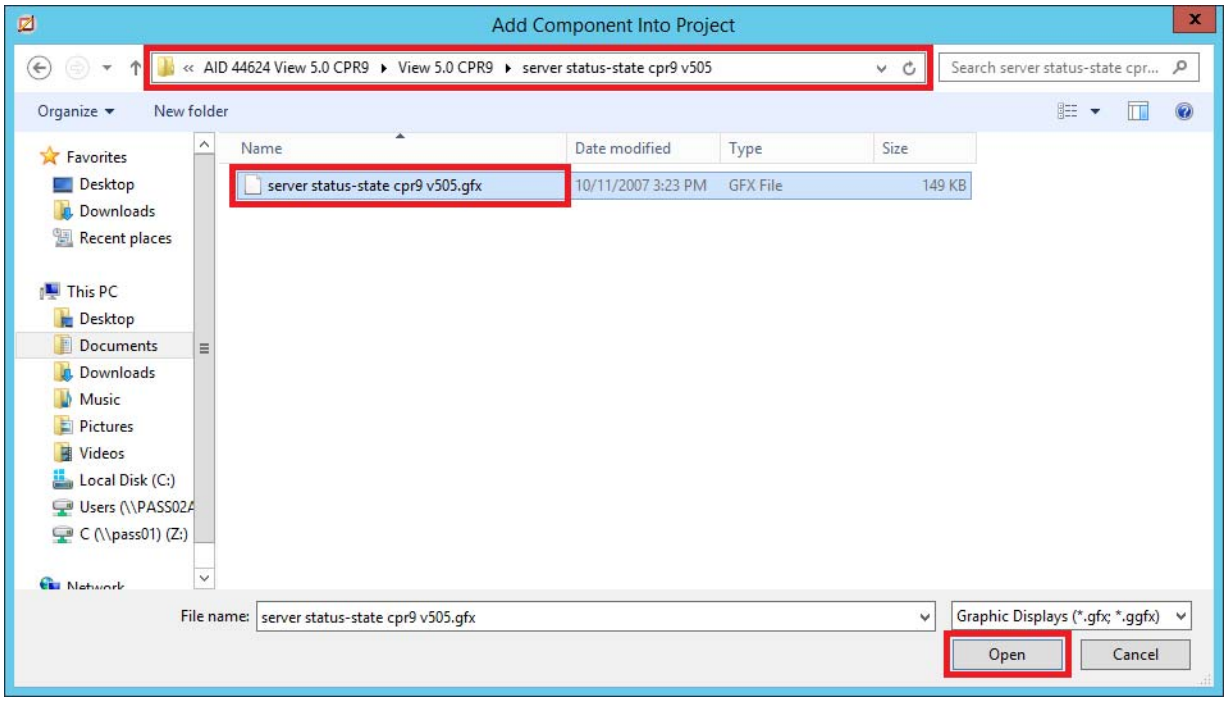
The example shows the unzipped files.



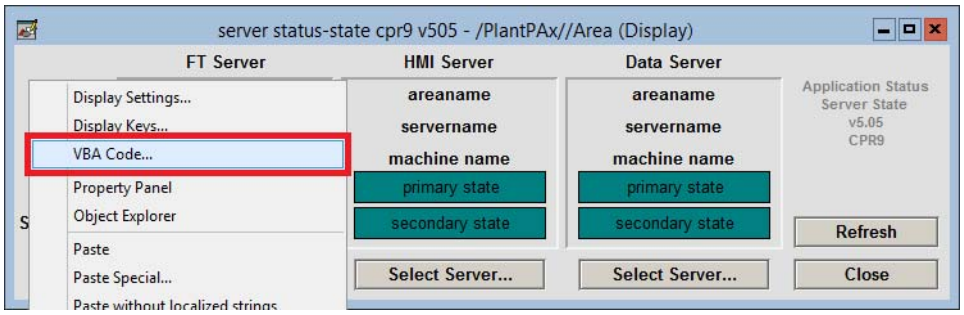
6. In the FactoryTalk View HMI application, right-click Displays and choose Add Component Into Application.



7. Open the server status-state cpr9 V505.gfx file from the files that were unzipped in step 5.



8. Right-click the imported display and choose VBA Code.



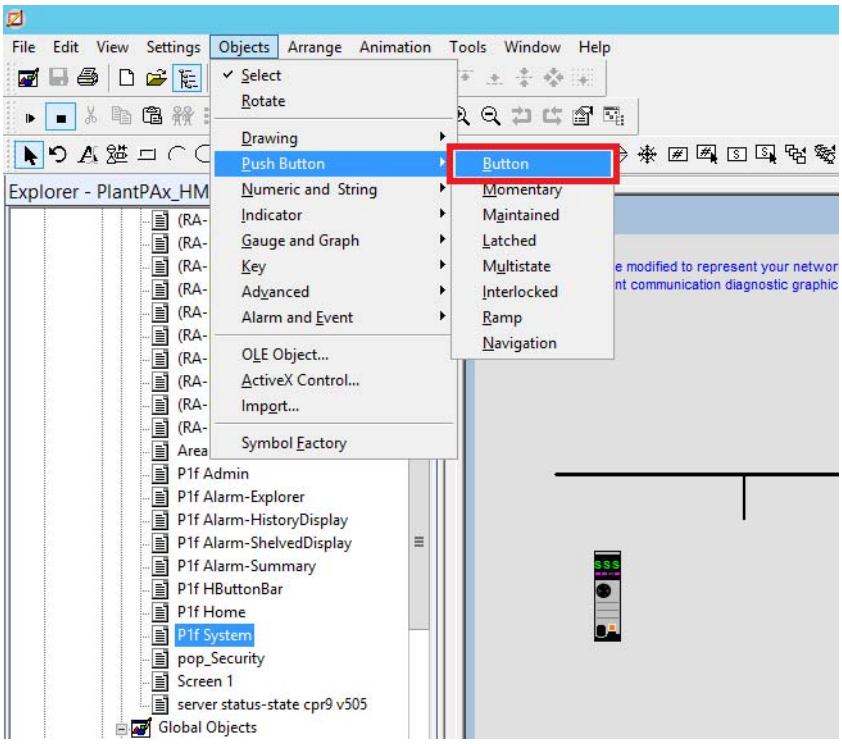
9. Find the text circled in the example and type the name of your HMI server and data server.

```
Private WithEvents appStatus As Application                'app events used to update real time status

Private Const ROOT As String = "/"
Private Const HMISERVERNAME As String = "PlantPAx_HMI"        'default HMI server name - change to actual name
Private Const HMIAREANAME As String = "/Area"              'default area for HMI server - change to actual name

Private Const DATASERVERNAME As String = "PlantPAx_DAT" 'default OPC Data server name - change to actual name
Private Const DATAAREANAME As String = "/Area/Data"          'default area for data server - change to actual name

Private Const NUMBEROFHMISERVERS = 2                       'modify to suit actual number of HMI servers in app
Private Const NUMBEROFDATASERVERS = 2                      'modify to suit actual number of DATA servers in app
```

10. Save the changes to the VBA code and close the server status display.
11. Open a system display.

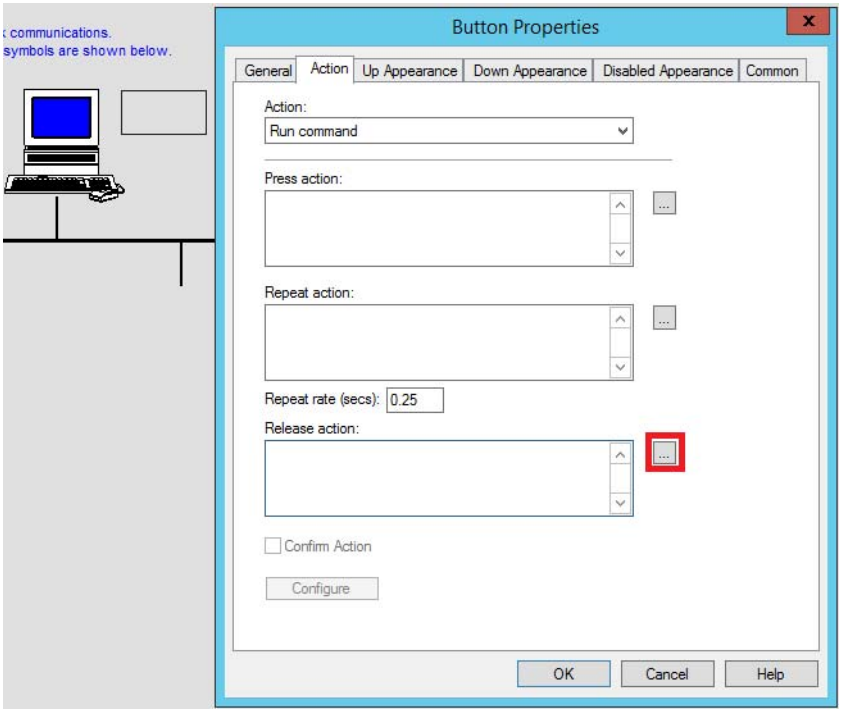
    For example, P1*x*.

12. From the Objects menu, choose Push Button>Button.

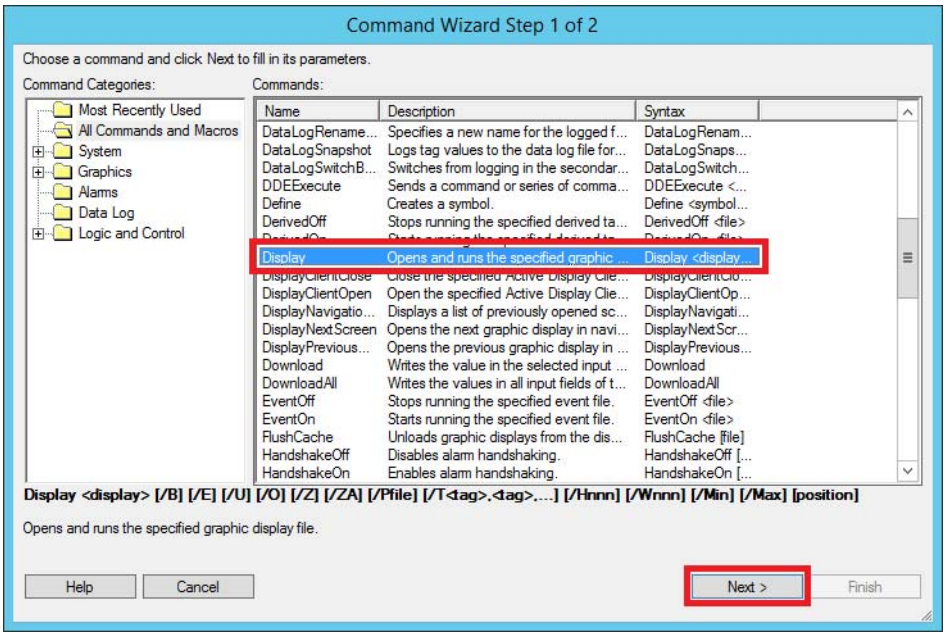


13. Click the display and drag the mouse to draw a button.

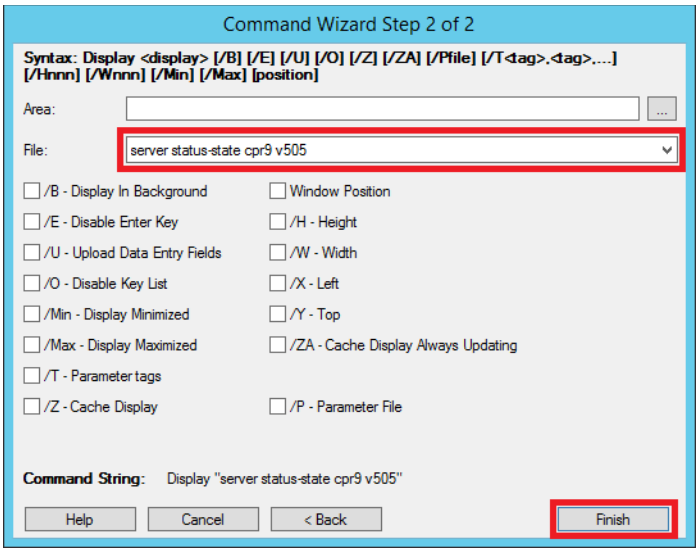
14. From the Action tab, click Browse (ellipse '...') next to Release action.



15. From the All Commands and Macros list, select Display and click Next.

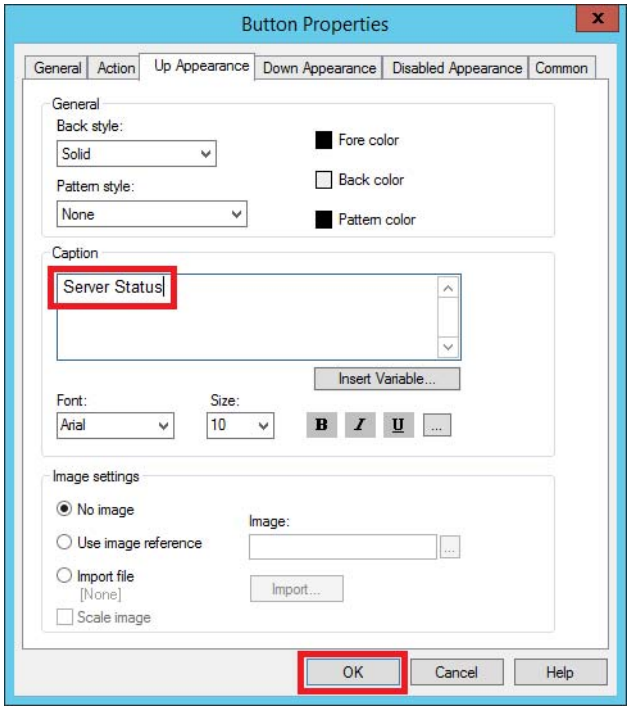


16. From the File pull-down menu, choose the server status display.

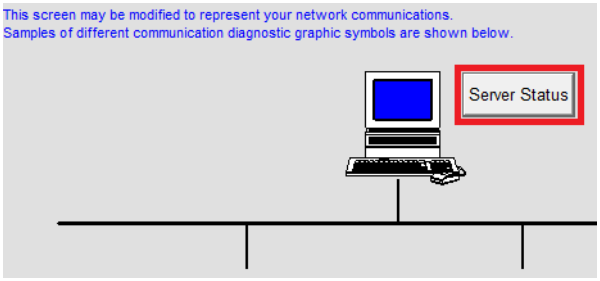


17. Click Finish.

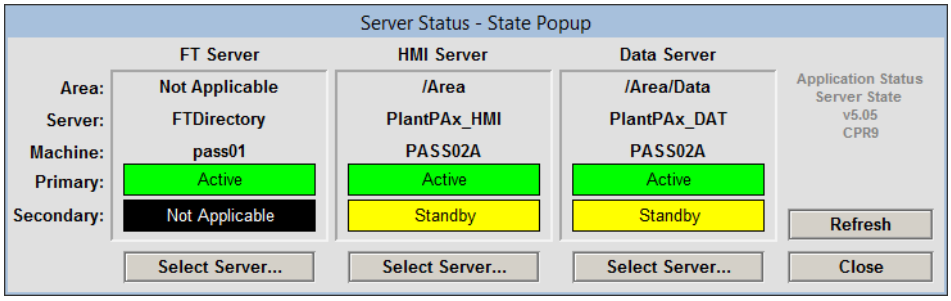
18. On the Button Properties dialog box, click the Up Appearance tab.
19. In the Caption text box, type Server Status.



20. Click OK.
21. Save the changes to the P1 System display.
22. Run the client file and access the System Status page.
23. Click Server Status.



The Server Status display appears.



The example shows a networked station application with the FactoryTalk server, HMI server, and data server on one workstation. None of the servers is redundant in this application example.

TIP We recommend that diagnostic alarms for network adapters and I/O modules be added to the Alarm server. The alarms are displayed on the alarm banner and are included in the alarm log and history.

Add These Additional Resources

The following resources are available to assist with developing your application.

Topic	Description	Where To Find Information
DLR diagnostics	The Device Level Ring (DLR) faceplate shows network status and where a break is in the EtherNet/IP network.	The DLR diagnostics faceplate application can be downloaded from the Rockwell Automation® Sample Code website at http://samplecode.rockwellautomation.com
L_ChangeDet, L_Redun, L_TaskMon library objects	The PlantPAx Library of Logix Diagnostic Objects monitor Logix controllers on the network, checking for changes that impact operation for primary and secondary controller status.	PlantPAx Library of Logix Diagnostic Objects, publication PROCES-RM003

Notes:

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Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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