



POINT I/O EtherNet/IP Adapter

Catalog Number 1734-AENT, Series C



Allen-Bradley

by ROCKWELL AUTOMATION

User Manual

Original Instructions

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.

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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.

These 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).

The following icon may appear in the text of this document.



Identifies information that is useful and can help to make a process easier to do or easier to understand.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

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Notes:

Read this preface to familiarize yourself with the rest of the manual. It provides information concerning:

- who should use this manual
- the purpose of this manual
- related documentation
- conventions used in this manual

Who Should Use this Manual

Use this manual if you are responsible for designing, installing, programming, or troubleshooting control systems that use series C POINT I/O™ EtherNet/IP™ adapters.

Purpose of this Manual

This manual is a reference guide for the 1734-AENT/C POINT I/O EtherNet/IP Adapter, a communications adapter for POINT I/O modules. It describes the procedures you use to install, wire, configure, troubleshoot, and use your adapter.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Summary of Changes

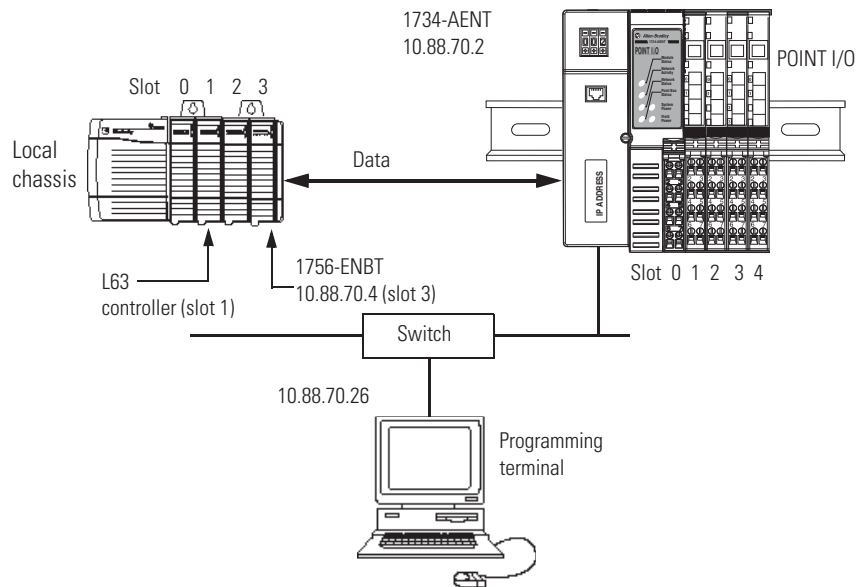
This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated front cover	Front Cover
Updated back cover	Back Cover
Added inclusive language acknowledgment	Important User Info
Added section on Implicit Protected Mode	38...41
Added section on Enable or Disable the Web Server	41, 97...98
Added section on Log in to the Web Server	98...100

About the Example Applications

This manual presents two example applications that demonstrate the procedures for configuring and communicating with POINT I/O modules using the 1734-AENT/C adapter. We intend the example applications as building blocks to help you get your own system up and running. We recommend that you set up and run the example applications and use them as guides.

Here is the type of system you are setting up.



System Components

We used the following components for the example applications. You need the same or similar components to set up your own control system using POINT I/O modules on an EtherNet/IP network.

Quantity	Product Name	Catalog Number
Hardware		
1	POINT I/O EtherNet/IP adapter	1734-AENT
1	POINT I/O 24V DC sink output module	1734-OV4E/C
1	POINT I/O relay output module	1734-OW2/C
1	DIN rail	199-DR1 or equivalent
1	ControlLogix® chassis	1756-A4 (or 1756-A7, 1756-A13, 1756-A17)
1	ControlLogix power supply	1756-PA72 (or 1756-PB72)
1	L63 controller	1756-L63
1	ControlLogix EtherNet/IP bridge	1756-ENBT
1	Personal computer that supports RSLogix 5000® software ⁽¹⁾	Any appropriate model running Windows® NT 4.0, Service Pack 6A or higher
1	Ethernet switch	Refer to manufacturer's specifications
1	24V DC power supply	1734-EP24DC
	Associated media and connectors as needed	
Software		
RSLinx® communications software, version 2.31.00 or later		
RSLogix 5000 programming software, version 17 or later		

⁽¹⁾ From version 21 onwards, RSLogix 5000 is known as Studio 5000 Logix Designer®.

Related Documentation

The following documents contain additional information concerning Rockwell Automation® products. To obtain a copy, contact your local Rockwell Automation office or distributor.

Resource	Description
POINT I/O Modules Selection Guide, publication 1734-SG001	A description and overview of the 1734 series I/O modules and compatible control platforms.
Ethernet Reference Manual, publication ENET-RM002	Using EtherNet/IP for Industrial Control.
EtherNet/IP Network Configuration User Manual, publication ENET-UM001	A manual describing how to use EtherNet/IP modules with Logix 5000® controllers and communicate with various devices on the Ethernet network.
ControlLogix Chassis Installation Instructions, publication 1756-IN621	Describes how to install and troubleshoot standard and ControlLogix-XT™ versions of the 1756 chassis and power supplies, including redundant power supplies.
ControlLogix EtherNet/IP Bridge Module Installation Instructions, publication 1756-IN019	ControlLogix EtherNet/IP bridge installation instructions.
ControlLogix System User Manual, publication 1756-UM001	Detailed information on how to install, configure, and troubleshoot the ControlLogix Sequence of Events module in your ControlLogix application.
RSLinx Classic Getting Results Guide, publication LINX-GR001	Information on how to install and navigate the RSLinx Classic software. It explains how to access and navigate the help, and how to effectively use the RSLinx Classic software.
POINT I/O EtherNet/IP Adapter Installation Instructions, publication 1734-IN042	Installation instructions for installing the 1734 POINT I/O EtherNet/IP Adapter.
Industrial Automation Glossary, publication AG-QR071	A glossary of industrial automation terms and abbreviations.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-IN041	Detailed information on proper wiring and grounding techniques.

Common Techniques Used in this Manual

The following conventions are used throughout this manual:

- Bulleted lists such as this one provide information, not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.
- *Italic* type is used for emphasis.

Rockwell Software® products contain extensive tutorials and help screens. We recommend that you use these tutorials and help screens to learn about the products.

For more information about Rockwell Software products, visit the Rockwell Software website at rok.auto/software.

Overview of the POINT I/O EtherNet/IP Adapter

Overview

This chapter provides an overview of the POINT I/O Series C EtherNet/IP adapter, its primary features, and how to use it. You need to understand the concepts discussed in this chapter to configure your adapter and use it in an EtherNet/IP control system.

Adapter Features

The POINT I/O adapters provide connectivity to EtherNet/IP networks for POINT I/O modules. The POINT I/O adapter is for the I/O backplane that provides connectivity through an RJ45 connector.

Some of the module's features are as follows:

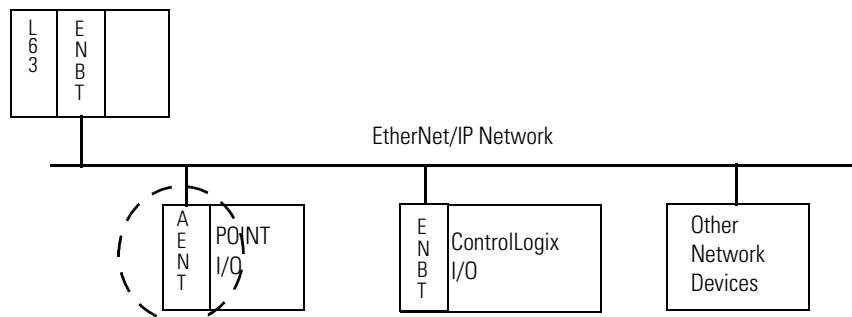
- EtherNet/IP messages encapsulated within standard TCP/UDP/IP protocol
- Common application layer with ControlNet® and DeviceNet® networks
- Interfacing via Category 5 rated twisted-pair cable
- Half/full duplex 10 Mbit or 100 Mbit operation
- DIN rail mounting
- Communication to and from other POINT I/O modules on the same DIN rail
- Communication supported by RSLinx software
- IP address assigned via standard DHCP tools
- I/O configuration via RSLogix 5000 software
- No network scheduling required
- No routing tables required
- Support of connections from multiple controllers simultaneously

You must use RSLogix 5000 to configure these features. For more details on configuration, see [Configuration Requirements](#) in [Chapter 3](#).

What the Adapter Does

The I/O adapters perform the following primary tasks:

- Control of real-time I/O data (also known as implicit messaging) - the adapter serves as a bridge between I/O modules and the network



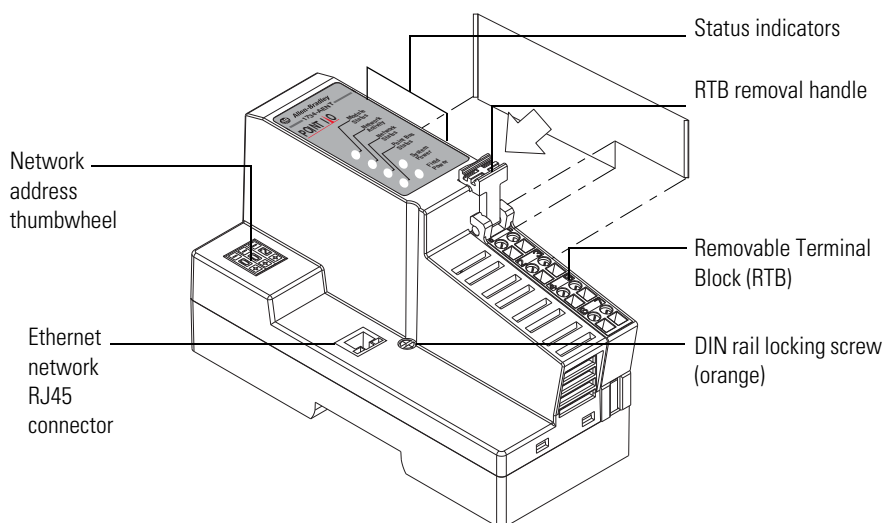
- Support of messaging data for configuration and programming information (also known as explicit messaging)
- Support of Output hold in all output modules during Program mode and Fault mode. Note that the option is not available for Program Download mode.

Physical Features of Your Adapter

The 1734 Adapters have the following components:

- Removable Terminal Block (RTB)
- Network address Thumbwheel
- Connector (one RJ45 EtherNet/IP connector)
- Status indicators (Module Status; Network Status; POINTBus™ Status; Network Activity; System Power; Field Power)

Physical Features of the 1734-AENT Series C Adapters



Hardware/Software Compatibility

The I/O adapters and the applications described in this manual are compatible with the following firmware revisions and software releases.

Contact Rockwell Automation if you need software or firmware updates to use this equipment

Product	Firmware Revision/ Software Release ⁽¹⁾
1734-AENT Series C adapter	6.011 or later
1756-ENBT module	4.006 or later
1768-ENBT module	2.003 or later
Logix controller	17 or later
RSLogix 5000 software	17 or later
RSLinx software	2.56 or later

(1) Installation of the Add-on Profile (AOP) for the adapter is required.

The Enhanced Rack-Optimization option is only supported in the following.

Product	Firmware Revision/ Software Release ⁽¹⁾
1734-AENT Series C adapter	6.011 or later
Logix controller	20 or later
RSLogix 5000 software	20 or later
RSLinx software	2.56 or later

(1) Installation of the Add-on Profiles (AOP) for the adapter and I/O module are required.

Important Adapter Considerations

Before you begin using your adapter, note the following important considerations.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Thumbwheel Settings

You can set the thumbwheels on the adapter to perform different functions. Refer to the following table to see the valid thumbwheel settings and the corresponding function.

Setting	Function
001...254	Sets the network address. Refer to Set the Network Address on page 33 for more information.
801...864	Sets the chassis size. Refer to Set the Chassis Size by Using the Thumbwheels on page 15 for more information.
888	Restores default factory settings.

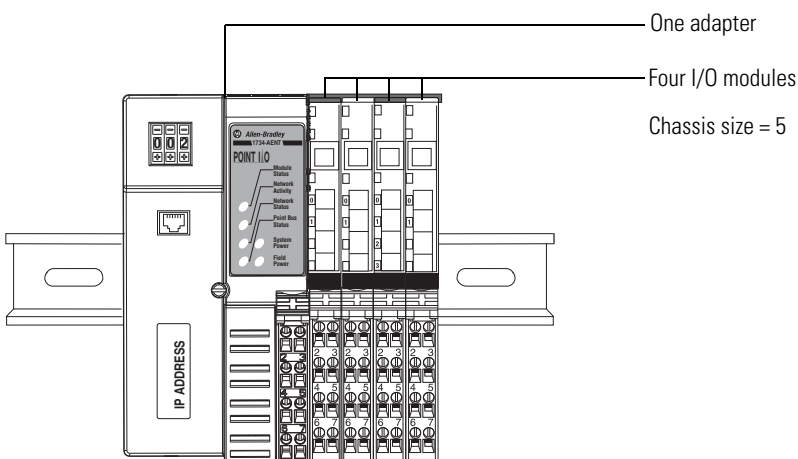
If the thumbwheels are set to an invalid number, the adapter checks to see if DHCP is enabled. If DHCP is enabled, the adapter requests an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters.

Set the Chassis Size

The I/O adapters for EtherNet/IP require configuration of their chassis size before you can make any I/O connections. The factory default setting for the chassis size is one slot, which represents the adapter by itself.

You must set the chassis size to a number equaling one slot for the adapter plus one slot for each I/O module present in the backplane of the adapter.

For example, if your system consists of one adapter and four I/O modules, set the chassis size to 5.



The adapter stores this chassis size setting in nonvolatile memory.

Each time the adapter is powered up, the adapter compares the number of I/O modules present on its backplane to the chassis size value from nonvolatile memory. The adapter does not allow any I/O connection until the number of I/O modules present equals the chassis size value minus one for the adapter itself.

You can set the chassis size by using the following:

Tool	Description
RSLogix 5000 software Add-on Profile (AOP)	Refer to Add the POINT I/O Adapter to the I/O Configuration on page 50 and Verify the Module Chassis Size on page 61 for more information.
RSLinx Classic software, version 2.56 or later	Log into rock.auto/knowledgebase and search the Rockwell Automation technical support center for information on changing or configuring the chassis size of POINT I/O adapters.
Web dialog	Refer to for Use the Identity Page on page 111 more information.
Thumbwheels (Firmware revision 5.015 or later)	Refer to Set the Chassis Size by Using the Thumbwheels on page 15 for more information.

Set the Chassis Size by Using the Thumbwheels

For firmware revision 5.015 or later, you can set the chassis size without a computer by using the thumbwheels on the adapter.

1. Make sure that the adapter is not powered.
2. Set the thumbwheels to 8xx where xx is the chassis size value from 01...64.

For example, set the thumbwheels to 802 to set the chassis size to 2, 803 to set the chassis size to 3, and so on, up to 864 to set the chassis size to 64.

TIP Press a pen tip into the center and perpendicular to the + or the - button to change the number. You only need a small amount of force to press the button (approximately 2N).

3. Power up the adapter.
4. Observe the status indicators.

The following table describes the status indicators of the adapter when the adapter is powered up while the thumbwheels are set a value from 801...864:

Indicator	Status
Module Status	Flashing red
Network Activity	Off
Network Status	Off
POINTBus Status	The POINTBus status indicator flashes red initially and then either changes to solid green or continues to flash red depending on the connection result. • Solid green – if the configured chassis size and number of physical nodes present match • Flashing red – if the configured chassis size and number of physical nodes present do not match

Note: Communication on all Ethernet ports are disabled while the thumbwheels are set to 8xx.

5. If the POINTBus status indicator changes to solid green, skip to Step 9.
6. If the POINTBus status indicator continues to flash red, determine the cause of the error.

The cause of error may be one of the following:

Error	Action
Chassis size mismatch	Make sure that the chassis size value matches the total number of the adapter plus the I/O modules. For example, if you have 1 adapter and 10 I/O modules, then the chassis size is 11. Therefore, the thumbwheels must be set to 811.
Module fault	Refer to the installation instructions publication for the affected module for information on how to interpret its status indicators.

7. Remove power from the adapter and then address the error accordingly.
8. Once you have addressed the error, repeat Steps 1...5.
9. Once you have set the chassis size by using the thumbwheels, remove power from the adapter and then set the thumbwheels according to the IP address setting that you need.

For more information, see [Set the Network Address for POINT I/O Adapters on page 33](#).

Adapter Replacement

Note that during a connection request from the controller, the chassis size setting is not communicated to the adapter. You must always set this chassis size using a separate operation. This includes situations when you are replacing an adapter. The adapter does not allow any I/O connections until it is configured with the appropriate chassis size and the proper number of POINT I/O modules are present.

Empty Slots and RIUP Situations

The POINT I/O system cannot detect an empty terminal base. For this reason, there are numerous situations in which you can potentially configure a system that is unusable or one that exercises unintended control.

In an attempt to address these situations, you must observe the following rules for I/O system construction and the removal and reinsertion of modules.

- A correct I/O system does not have any empty terminal bases.
- After you cycle power, the adapter will not allow any I/O connections until the number of modules comprising the chassis plus one for the adapter equals the stored chassis size.

- It cannot assume any safe operation until there is a match between the number of modules indicating their presence in the chassis and what the adapter has saved in nonvolatile memory because it cannot detect empty terminal bases.
- Actual module identification (such as, electronic keying) is done when connection establishment requests are received from the controller or controllers.
- A POINT I/O module removed under power does not disrupt operation of the other I/O modules. On the other hand, ArmorPOINT® I/O modules are not intended to be removed under power.
 - When you remove a module, the adapter detects what changed.
 - Whenever you remove a module with an active connection from the POINT I/O system, the adapter indicates this by flashing the POINTBus status indicator red and reports a minor recoverable fault.
- If more than one contiguous module is removed under power, connections to all modules in the contiguous missing module set are disallowed until all modules are replaced. Because the adapter cannot detect an empty base, it does not know the physical positioning of the modules until all the missing modules are replaced.
- If a module separating two sets of contiguous missing modules is removed, the two sets merge into a single set. All the modules must be replaced before connections are permitted to any module in the set.
- If modules of different types are removed and returned to the wrong locations, attempts to connect to these modules fail during verification of the electronic ID (providing that keying has not been disabled).
- If modules of the same type are removed and returned to the wrong locations, they accept connections from the controller or controllers and reconfigure with the correct data once they pass their electronic keying check.
- These removal and return situations exist whether the system is under power or not. If the system is under power, the situation arises immediately. If the system is not under power, the situation arises in the next power cycle.

Power Up a System for the First Time

When you power the I/O for the first time, the adapter must assign slot addresses to every module in the backplane. All I/O modules ship configured at the same address.

When you first apply power, we expect that all but one module on the backplane exhibits a solid red module status indicator.

One by one the adapter resets these modules and addresses them appropriately. The amount of time that this operation takes is proportional to the size of your I/O system.

Use of the Common Industrial Protocol (CIP)

The adapter uses the Common Industrial Protocol (CIP™). CIP is the application layer protocol specified for EtherNet/IP, the Ethernet Industrial Protocol, as well as for ControlNet and DeviceNet networks. It is a message-based protocol that implements a relative path to send a message from the producing device in a system to the consuming devices.

The producing device contains the path information that steers the message along the proper route to reach its consumers. Since the producing device holds this information, other devices along the path simply pass this information; they do not store it.

This has the following significant benefits:

- You do not need to configure routing tables in the bridging modules, which greatly simplifies maintenance and module replacement.
- You maintain full control over the route taken by each message, which enables you to select alternative paths for the same end device.

Understand the Producer/Consumer Model

The CIP producer and consumer networking model replaces the old source and destination (master and slave) model. The producer and consumer model reduces network traffic and increases speed of transmission. In traditional I/O systems, controllers poll input modules to obtain their input status. In the CIP system, input modules are not polled by a controller. Instead, they produce (multicast or unicast) their data either upon a change of state (COS) or periodically.

Multicast is the default mode for version 17 Logix and earlier controllers and unicast is the default for version 18 with multicast as a selectable option.

The frequency of update depends upon the options chosen during configuration and where on the network the input module resides. The input module, therefore, is a producer of input data, and the controller is a consumer of the data.

The controller also produces data for other controllers to consume. The produced and consumed data is accessible by multiple controllers and other devices over the EtherNet/IP network. This data exchange conforms to the producer and consumer model.

Specify the Requested Packet Interval (RPI)

The Requested Packet Interval or RPI is the update rate specified for a particular piece of data on the network. The RPI can be specified for the adapter and include all of the I/O modules in the I/O system (using a rack-optimization or enhanced rack-optimization connection) or specified for a particular module (using direct connection).

When you add a module or an adapter to the I/O configuration of a controller, you must enter the RPI as a parameter. This value specifies how often to produce the data for that device. For example, if you specify an RPI of 50 ms, it means that

every 50 ms the device should send its data to the controller and the controller should send the consumed (output) data to the device.

Use RPIs only for devices that exchange data. For example, a ControlLogix EtherNet/IP bridge in the same chassis as the controller does not require an RPI, because it is not a data-producing member of the system. Its use is only as a bridge to remote racks.

Support for Rack-optimization, Enhanced Rack-optimization, and Direct Connections

The I/O adapter supports direct, rack-optimization, and enhanced rack-optimization connections. A direct connection is a real-time data transfer link between the controller and the module occupying the slot that the configuration data references.

Direct I/O connections occur at a cyclic rate specified by the RPI during configuration. A rack-optimization connection is a grouping of data from one or more digital I/O modules into a single block of data sent over a single connection at the same data rate.

Analog, safety, and specialty modules cannot participate in the rack-optimization connection; these modules require an enhanced rack-optimization or direct I/O connection.

Enhanced rack-optimization connections reduce the total number of connections needed to transfer data when using many digital and analog, or specialty modules in a system.

Rack-optimization connections reduce the total number of connections needed to transfer data when using many digital I/O modules in a system. The following example illustrates the benefit of rack-optimization connections.

Assume you set up a system that contains eight digital I/O modules interfaced to an adapter. If you use direct connections to transfer data to each of these I/O modules, you need eight connections to transfer all of the data, one to each of the eight I/O modules. If you use a rack-optimization connection to transfer the data, you only need a single connection – the connection to the I/O adapter.

IMPORTANT

Although rack-optimization and enhanced rack-optimization connections offer an efficient way to use resources, there are a few limitations on their use:

- You can use only rack-optimization or enhanced rack-optimization connections to send data to and from digital I/O modules.
 - Safety modules, IO-Link modules, and third-party I/O modules can not participate in enhanced rack-optimization connections.
 - Enhanced rack-optimization does not support a listen only connection. Do not use enhanced rack-optimization if your application requires a connection for monitoring.
 - All data is sent at the same time as the RPI rate of the I/O adapters. If the update rate required for a digital module is different from the RPI of the rack-optimization or enhanced rack-optimization connection, a direct connection to that I/O module is required.
-

See the EtherNet/IP Device Level Ring Application Technique, publication [ENET-AT007](#), for more information on connections.

Mixing Rack-optimization, Enhanced Rack-optimization, and Direct Connections

You can mix communication formats for different I/O modules communicating through the same adapter. I/O modules set up to use rack optimization or enhanced rack-optimization communicate at the rate of the RPI configured for the adapter. I/O modules configured for direct communication communicate at their own individual RPIs and ignore the rack-optimization RPI.

Before You Begin

To effectively use your adapter, note the following considerations.

Determine Compatibility

If using the adapter with a 1756-ENBT module or 1768-ENBT module, use the following required firmware revisions for these bridges:

- 1756-ENBT firmware revision 4.006 or later
- 1768-ENBT firmware revision 2.003 or later

Understand Messaging

Class 3 (Explicit Message) requests through the 1734-AENT adapter to a specific POINT I/O module may not always receive a response from the I/O modules. In the case where the I/O module does not reply to the request, the adapter responds with an error code indicating a timeout.

Configure Autobaud

The adapter cannot reconfigure an I/O module that you previously configured to operate at a fixed communication rate. When you reuse a POINT I/O module from another POINT I/O system, configure the module to autobaud before using it with the adapter.

Notes:

Install Your POINT I/O EtherNet/IP Adapter

Overview

This chapter describes how to physically install the POINT I/O Series C EtherNet/IP adapter; and how to connect the adapter to your EtherNet/IP network. The only tools you require are a flat or Phillips screwdriver and a drill.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Mount the POINT I/O Adapter on a DIN Rail

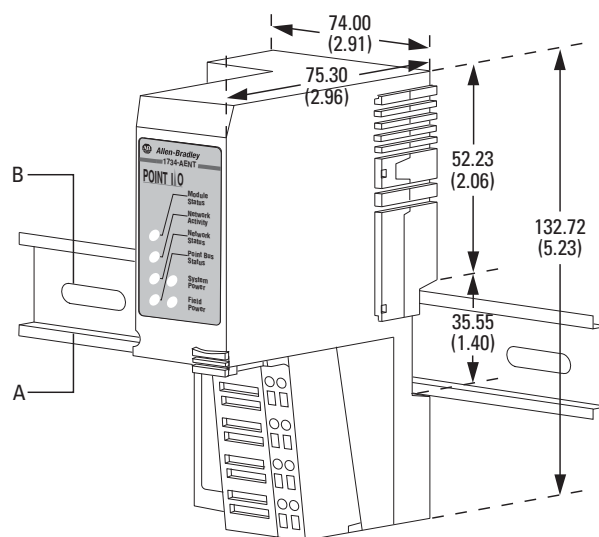
1. Make sure the DIN rail locking screw (orange) is in horizontal position.
2. Position the adapter vertically above an IEC standard (35 x 7.5 x 1 mm) top-hat DIN rail at a slight angle (DIN rail: Allen-Bradley® part number **199-DR1; 46277-3**).
3. Press down firmly to install the adapter on the DIN rail, noting that the locking mechanism locks the adapter to the DIN rail.



ATTENTION: Allow 25.4 mm (1.0 in.) of space between adjacent equipment for adequate ventilation.

4. Set the network address thumbwheel switches to the desired value. See [Set the Network Address](#) in chapter 3 for details on setting the IP address.

- Slide the safety end cap up to remove it, exposing the backplane and power interconnections.



A = DIN rail

B = Secure DIN rail approximately every 200 mm (7.8 in.)



WARNING: If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electric arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding.



ATTENTION: Do not remove or replace an adapter while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

Install POINT I/O Modules

The following instructions explain how to install your POINT I/O Modules onto the DIN rail.

- Position the mounting base vertically above the DIN rail.
- Verify the adapter DIN rail locking screw (orange) is in the horizontal position.
- Slide the I/O module mounting base down, allowing the interlocking side pieces to engage the adjacent mounting base/adapter.
- Press down firmly to install the I/O module mounting base on the DIN rail. A locking mechanism locks the mounting base to the DIN rail.

5. Rotate the keyswitch on the I/O module mounting base clockwise until the appropriate number for the module you are installing (listed on the module label) aligns with the correct notch in the base.
6. Position the I/O module vertically above its mounting base.
7. Slide the module down until it engages the latching mechanism. You hear a clicking sound when the I/O module is properly engaged. The locking mechanism locks the module to its mounting base.

Remove POINT I/O Modules

To remove a module from its mounting base:

1. Put a screwdriver into the slot of the orange latching mechanism in the mounting base of the I/O module to be removed.
2. Push the screwdriver toward the I/O module to disengage the latch. The module lifts off the mounting base.
3. Pull the module off the mounting base.

Replace An Adapter

Use these procedures to install a replacement POINT I/O adapter to an existing system.

1. Disconnect the Ethernet connectors from the adapter.
2. Pull up on the Removable Terminal Block (RTB) handle to remove the terminal block.
3. Remove the adjacent module from its mounting base.
4. Use a small bladed screwdriver to rotate the DIN rail locking screw (orange) to a vertical position. This releases the locking mechanism.
5. Lift the adapter straight up to remove.
6. Slide the safety end cap up to remove it, which exposes the backplane and power connections.



ATTENTION: Do not discard the end cap. Use this end cap to cover the exposed interconnections on the last mounting base on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.



WARNING: When you insert or remove the module while backplane power is on, an electric arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

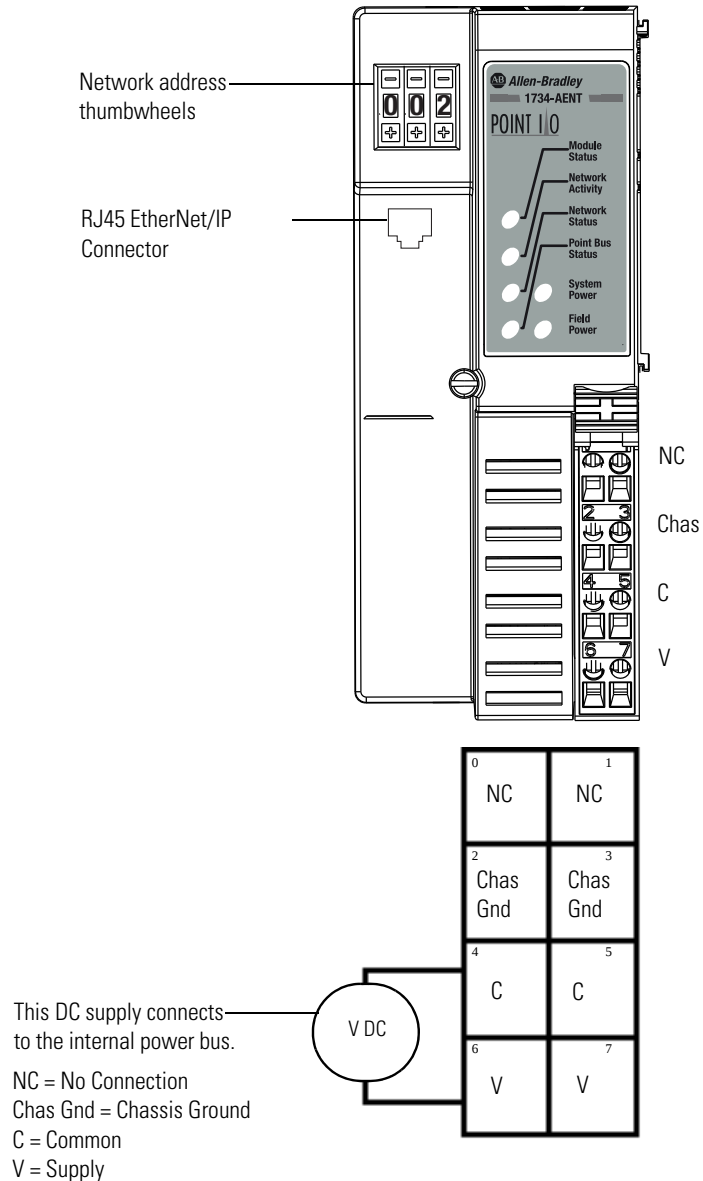
-
7. Position the replacement adapter vertically above the DIN rail, verifying the DIN rail locking screw (orange) is in the horizontal position.
 8. Slide the adapter down, allowing the interlocking side pieces to engage the adjacent module.
 9. Press firmly to seat the adapter on the DIN rail, noting that the adapter locking mechanism will snap into place.
 10. Set the network address on the network address thumbwheel.
 11. Insert the end of the Removable Terminal Block opposite the handle into the Removable Terminal Block base unit, noting that this end has a curved section that engages with the base unit.
 12. Rotate the Removable Terminal Block into the wiring base until it locks into place.
 13. Replace the adjacent module in its mounting base.
 14. Reconnect the Ethernet cables to the adapter.
 15. Set the IP address for this module (see [Set the Network Address](#) in chapter 3).
 16. Configure the adapter chassis size.

Wire the Adapter

The POINT I/O adapter uses RJ45 EtherNet/IP connectors for its EtherNet/IP connection. Connect the cord set you selected for your module to the appropriate port.

Wire a POINT I/O Adapter

Refer to the following illustration to wire the adapter.



43264



ATTENTION: Do not connect 120/240V AC power to this supply. This DC supply is connected to the internal power bus.



ATTENTION: Do not wire more than two conductors on any single terminal.



WARNING: When you connect or disconnect the Removable Terminal Block (RTB) with field side power applied, an electric arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding.



WARNING: When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.



ATTENTION: This product is grounded through the DIN rail to chassis ground. Use zinc-plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.



WARNING: To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following:

Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

Configure the Adapter with RSLogix 5000 or Studio 5000 Logix Designer Application

Introduction

This chapter guides you through the steps required to configure your modules using the RSLogix 5000 or Studio 5000 Logix Designer application. Note that the modules presented in this chapter can be configured using RSLogix 5000 software, version 17, or later.

Before using your adapter in an EtherNet/IP network, you need to configure it with an IP address, subnet mask, and optional Gateway address. This chapter describes these configuration requirements and the procedures for providing them. Here are ways you can do this:

- Use the Rockwell Automation BOOTP/DHCP utility, version 2.3 or later, that ships with RSLogix 5000 or RSLinx software.
 - You can also use this utility to reconfigure a device with an IP address you must change.
- Use a third-party DHCP server.
- Use the Network Address thumbwheel switches.
- Have your network administrator configure the adapter via the network DHCP server.

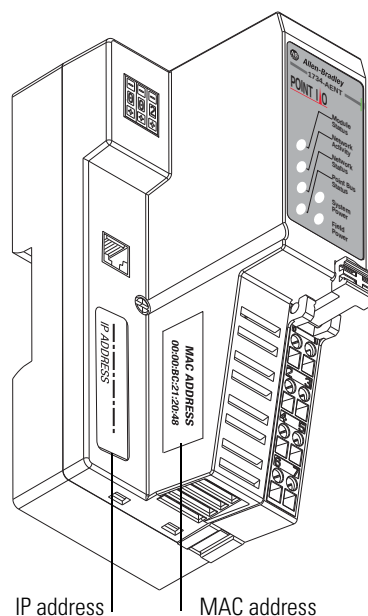
Configuration Requirements

Before you can use your adapter, you must configure its IP address, its subnet mask, and, optionally, a gateway address. You can use the Rockwell Automation BOOTP/DHCP utility, version 2.3 or later, to perform the configuration. You can also use a DHCP server or the network address switches to configure these parameters.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

If you need to reset the adapter to factory defaults, see [Work with the Configuration Pages](#) in Appendix A.



IMPORTANT

If you set the thumbwheels on the adapter to the value 888 and then power cycle the module, the following will occur.

- The DHCP Enabled function is enabled (set to True).
- The Ethernet link is negotiated automatically (the Auto Negotiate function is set to True).
- The web server is enabled (the Disabled Web Server function is disabled).
- The password for this page resets to the factory default (the word password is the factory default password).

Note the value of the switches before you enter the 888 value, because you return the adapter to those values once this process is complete.

IMPORTANT

If using the BOOTP/DHCP utility, you need to know the Ethernet hardware address of your adapter. Rockwell Automation assigns each 1734-AENT adapter a unique 48-bit hardware address at the factory. The address is printed on a label on the side of your 1734-AENT adapter as shown in the figure. It consists of six hexadecimal digits separated by colons. This address is fixed by the hardware and cannot be changed.

If you change or replace the 1734-AENT adapter, you must enter the new Ethernet hardware address of the adapter when you configure the new adapter.

IP Address

The IP address identifies each node on the IP network (or system of connected networks). Each TCP/IP node on a network (including the adapter) must have a unique IP address.

The IP address is 32 bits long and has a Network ID part and Host ID part. Networks are classified A, B, C, or other. The class of the network determines how an IP address is formatted.

	0	7	8	31
Class A	0	Network ID		Host ID
	0	15	16	31
Class B	10	Network ID		Host ID
	0	23	24	31
Class C	110	Network ID		Host ID

You can distinguish the class of the IP address from the first integer in its dotted-decimal IP address as follows:

Range of first Integer	Class	Range of first Integer	Class
0 1...127	A	192...223	C
128...191	B	224... 255	other

Each node on the same physical network must have an IP address of the same class and must have the same network ID. Each node on the same network must have a different Host ID thus giving it a unique IP address.

IP addresses are written as four decimal integers (0...255) separated by periods where each integer gives the value of one byte of the IP address.

EXAMPLE

For example, the 32-bit IP Address:

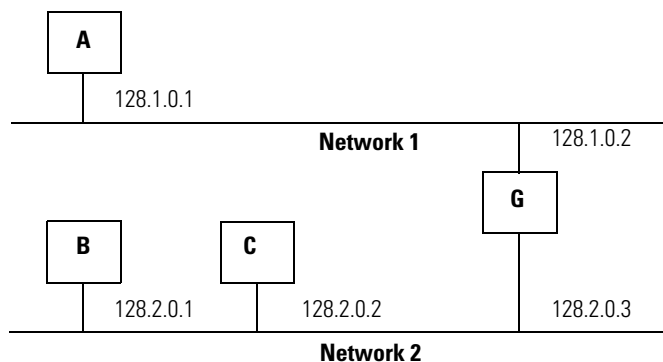
10000000 00000001 00000000 00000001 is written as
128.1.0.1

Gateway Address

This section applies to multi-network systems. If you have a single network system, refer to the next section.

The Gateway Address is the default address of a network. It provides a single domain name and point of entry to the site. Gateways connect individual physical networks into a system of networks.

When a node needs to communicate with a node on another network, a gateway transfers the data between the two networks. The figure shows gateway G connecting Network 1 with Network 2.



When host B with IP address 128.2.0.1 communicates with host C, it knows from C's IP address that C is on the same network. In an Ethernet environment, B can then resolve C's IP address into a hardware address (MAC address) and communicate with C directly.

When host B communicates with host A, it knows from A's IP address that A is on another network (the network IDs are different). In order to send data to A, B must use the IP address of the gateway connecting the two networks. In this example, the gateway's IP address on Network 2 is 128.2.0.3.

The gateway has two IP addresses (128.1.0.2 and 128.2.0.3). The first must be used by hosts on Network 1 and the second must be used by hosts on Network 2. To be usable, a gateway of a host must be addressed using a network ID matching its own.

Subnet Mask

The subnet mask is used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the Host ID address field into a field for subnets.

EXAMPLE

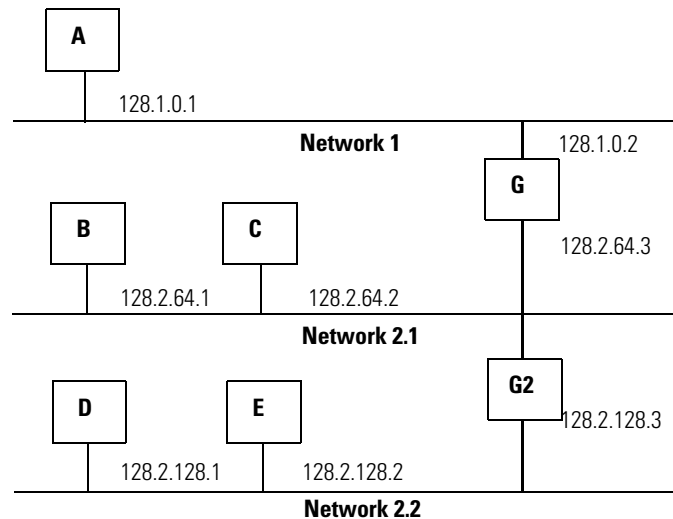
Take Network 2 (a Class B network) in the previous example and add another physical network. Selecting the following Subnet Mask would add two additional network ID bits, allowing for four physical networks:

11111111 11111111 **11**000000 00000000 = 255.255.192.0

These two bits of the Host ID are used to extend the network ID.

Two bits of the Class B host ID are used to extend the network ID. Each unique combination of bits in the part of the Host ID where subnet mask bits are 1 specifies a different physical network.

The new configuration is:



A second network with Hosts D and E was added. Gateway G2 connects Network 2.1 with Network 2.2.

Hosts D and E use Gateway G2 to communicate with hosts not on Network 2.2.

Hosts B and C use Gateway G to communicate with hosts not on Network 2.1.

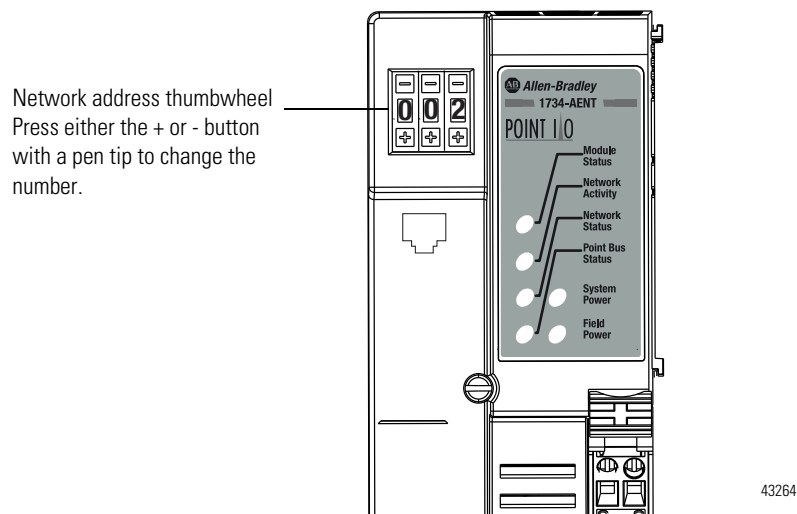
When B is communicating with D, G (the configured Gateway for B) routes the data from B to D through G2.

Set the Network Address

The adapters ship DHCP-enabled and with the pen-push Network address thumbwheels set to **999**. You can set the network Internet Protocol (IP) address as follows.

Set the Network Address for POINT I/O Adapters

- Use the pen-push thumbwheels on the adapter. Press either the + or - button with a pen tip to change the number and assign the IP address.
- Use a Dynamic Host Configuration Protocol (DHCP) server, such as Rockwell Automation BOOTP/DHCP.
- Retrieve the IP address from nonvolatile memory.



The adapter reads the thumbwheels first to determine if the thumbwheels are set to a valid number. You set the node address by using the 3-position pen-push thumbwheel using a pen tip.

Note: Press a pen tip into the center and perpendicular to the + or the - button to change the number. You only need a small amount of force to press the button (approximately 2N).

Valid settings range from **001...254**. When you use the thumbwheel to assign an address and set it to **001**, the adapter gateway address is set to **0.0.0.0** and the subnet mask is set to **255.255.255.0**. When you use the thumbwheel to assign an IP address between **002...254**, the adapter gateway address is set to **192.168.1.1**.

The adapter does not have a host name assigned, or use any Domain Name System when using the thumbwheel settings.

If the thumbwheels are set to an invalid number (for example, 000 or a value greater than 254 excluding 888), the adapter checks to see if DHCP is enabled. If DHCP is enabled, the adapter requests an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters.

If DHCP is not enabled, the adapter uses the IP address, along with other TCP configurable parameters, stored in nonvolatile memory.



WARNING: When you change thumbwheels settings while power is on, an electric arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding.

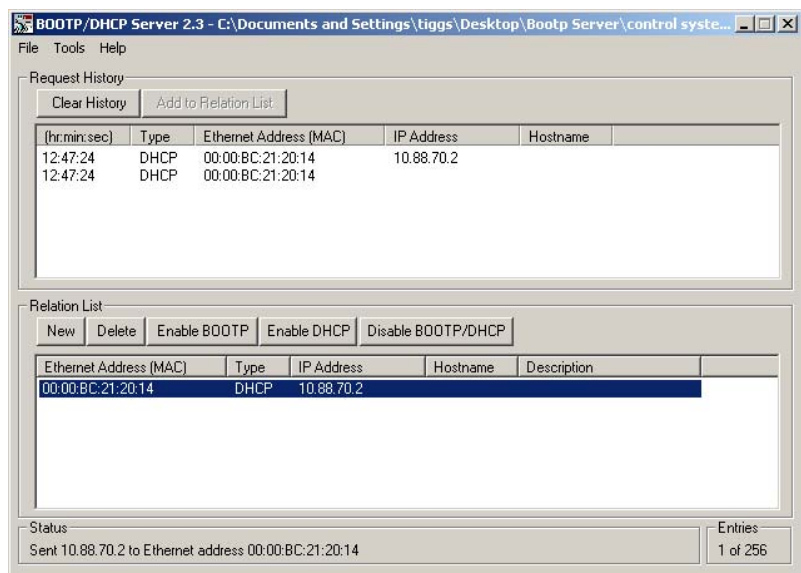
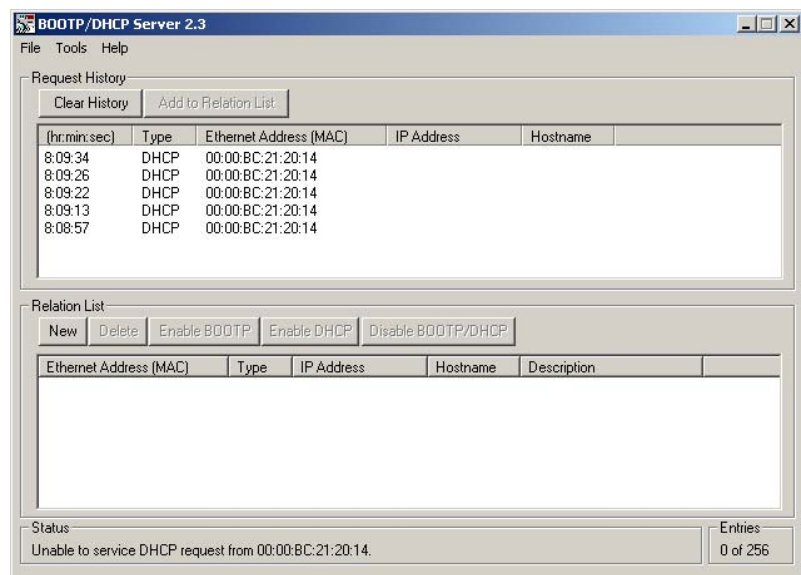
Use the BOOTP/DHCP Utility

The 1734-AENT/C adapter should be configured using only DHCP. The Rockwell Automation BOOTP/DHCP utility is a standalone program that incorporates the functionality of standard BOOTP software with a user-friendly graphical interface the **Utils** directory on the RSLogix 5000 software installation CD. The adapter must have DHCP enabled (factory default and the network address switches set to an invalid value) to use the utility.

To configure your adapter using the BOOTP utility, perform the following steps:

1. Run the BOOTP software.

In the BOOTP Request History panel you see the hardware addresses of devices issuing BOOTP requests.



2. Double-click the hardware address of the device you want to configure.

The New Entry dialog appears with the device's media access control address (MAC).

The 'New Entry' dialog box contains the following fields:

- Ethernet Address (MAC): 00:00:BC:21:20:14
- IP Address: 10 . 88 . 70 . 2
- Hostname: (empty)
- Description: (empty)
- Buttons: OK, Cancel

3. Enter the IP address you want to assign to the device and click OK. The device is added to the Relation List, displaying the MAC address and corresponding IP address, host name, and Description (if applicable).

The 'BOOTP/DHCP Server 2.3' application window shows the following data:

Request History

(hr:min:sec)	Type	Ethernet Address (MAC)	IP Address	Hostname
12:47:24	DHCP	00:00:BC:21:20:14	10.88.70.2	
12:47:24	DHCP	00:00:BC:21:20:14		

Relation List

Ethernet Address (MAC)	Type	IP Address	Hostname	Description
00:00:BC:21:20:14	DHCP	10.88.70.2		

Status
Sent 10.88.70.2 to Ethernet address 00:00:BC:21:20:14

Entries
1 of 256

When the address displays in the IP address column in the Request History section, the IP address assignment has been made.

4. To make this configuration static in the device, highlight the device in the Relation List panel, and click the Disable BOOTP/DHCP button.

When power is cycled to the device, it uses the configuration saved in nonvolatile memory and will not issue a DHCP request.

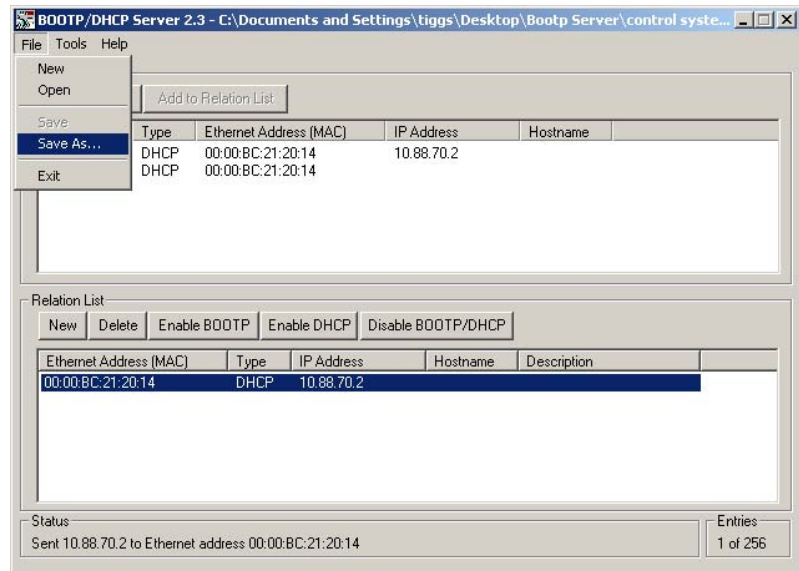
5. To enable DHCP for a device with DHCP disabled, highlight the device in the Relation List, and click the Enable DHCP button.

You must have an entry for the device in the Relation List panel to re-enable DHCP.

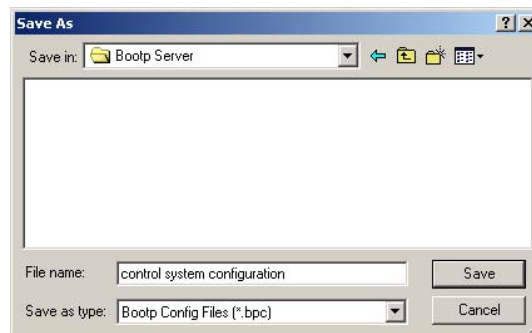
Save the Relation List

You can save the Relation List for later use. To save the Relation List, perform the following steps:

1. Select Save As... from the File menu.



The Save As dialog appears.



2. Select the folder where you want to save the Relation List.
3. Enter a File name for the Relation List, for example, control system configuration, and click Save.

You can leave the Save as type at the default setting: BOOTP Config Files (*.bpc).

You now have the option to open the file containing the Relation List at a later session.

Use DHCP Software to Configure Your Adapter

DHCP (Dynamic Host Configuration Protocol) software automatically assigns IP addresses to client stations logging on to a TCP/IP network.

DHCP is based on BOOTP and maintains some backward compatibility. The main difference is that BOOTP was designed for manual configuration, while DHCP allows for dynamic allocation of network addresses and configurations to newly attached devices.

Be cautious about using DHCP software to configure your adapter. A DHCP server typically assigns a finite lease time to the offered IP address.

When 50% of the leased time has expired, the adapter attempts to renew its IP address with the DHCP server.

The possibility exists that the adapter will be assigned a different IP address, which would cause the adapter to cease communicating with the ControlLogix controller.

See [Configure the Adapter with Fixed IP Address](#) in Chapter 4 to configure the adapter with a fixed IP address.



ATTENTION: To avoid unintended control or loss of control, the I/O adapter must be assigned a fixed IP address. A dynamically provided IP address should be used only at initial configuration. If a DHCP server is used, it must be configured to assign the same IP address to your adapter. Failure to observe this precaution may result in unintended machine motion or loss of process control.

Implicit Protected Mode

Implicit Protected Mode is a state where the device is operational, but has implemented defenses against disruptive changes that would take the product out of service for the process. For more complete information on how Protected Mode works, see EtherNet/IP Network Devices User Manual, publication [ENET-UM006](#).

Implicit Protected Mode is a security enhancement that is automatically triggered as soon as one of the following occur:

- The adapter bridges I/O connections.
- The adapter is a target of I/O connections.

This security enhancement occurs on the I/O module level and helps prevent unauthorized configuration changes that can affect system behavior and cause unintended and unforeseen changes.

Enter and Exit Implicit Protected Mode

The adapter enters Implicit Protected Mode as soon as I/O connections are established through or to the adapter (status connection). The adapter exits Implicit Protected Mode as soon as all I/O connections through or to the adapter (status connection) are stopped.

Restrictions Imposed By Implicit Protected Mode

Implicit Protected Mode helps prevent access to services that are not required after the device is configured and in normal operation. Protected Mode disables features that can make the device vulnerable to disruptive actions. By doing so, Protected Mode helps to reduce the attack surface.

When it is in Protected Mode, the adapter helps prevent execution of the following tasks:

- Changing Ethernet configuration settings, such as port speed.
- Changing IP settings, such as IP address, mask, and DHCP mode.
- Updating the adapter firmware revision.
- Disabling or re-enabling external product ports.
- Performing remote adapter resets.

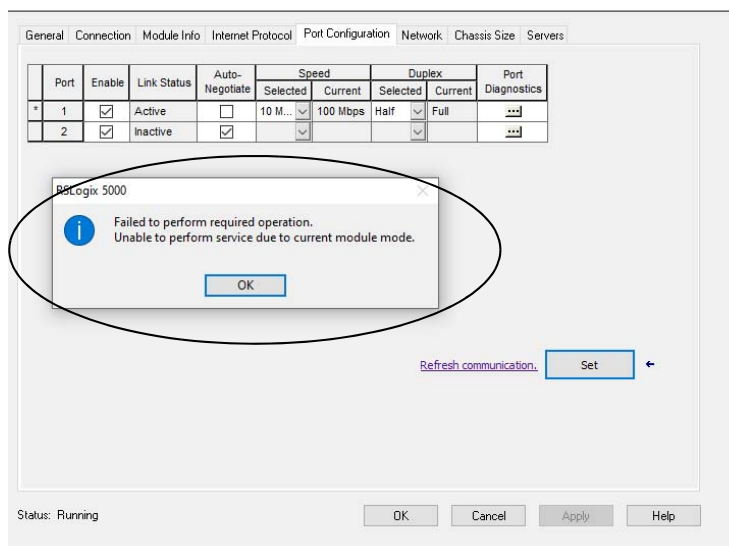
Perform Tasks When Restricted

If the adapter is in Implicit Protected Mode and you attempt to perform any of the restricted tasks, you are alerted that such a task cannot be performed because the adapter is in Implicit Protected Mode.

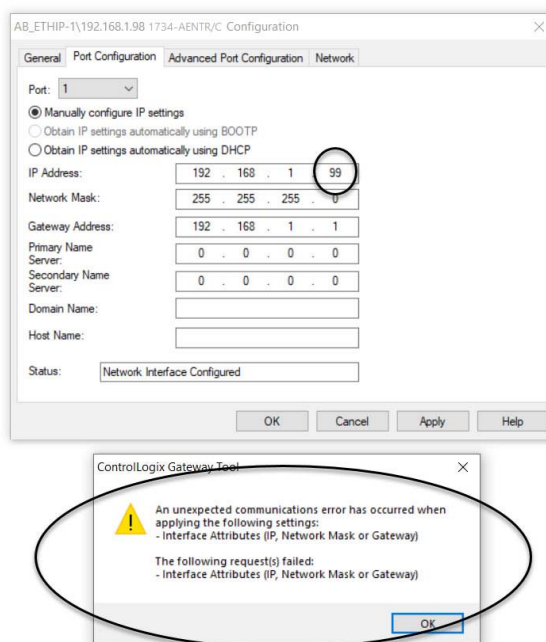
The following are example alerts that result from an attempt to set IP values on the adapter when the adapter is in Implicit Protected Mode:

IMPORTANT Protected Mode is not configurable.

- Studio 5000 Logix Designer application



- RSLinx software



If the adapter is not in Implicit Protected Mode, the adapter does not reject attempts to perform the tasks that are described previously.

For example, after the adapter is initially powered up, but no I/O connections are established yet, the adapter is not in Implicit Protected Mode. Additionally, if the adapter is not in Implicit Protected Mode then you can attempt to update the adapter firmware revision and the adapter does not reject the attempt.

TIP

If the adapter enters Implicit Protected Mode each time the adapter powers up, check application controllers to determine if there are active I/O connections that are opened via the adapter.

Enable or Disable Web Server

You can enable or disable the web server as an added security feature from firmware revision 2.011 or later.

The web server is enabled by default from firmware revision 2.011 or later.

Disabling the web server in conjunction with using the Implicit Protected Mode decreases the possibility of a security breach.

For more information on how to enable or disable the web server, see [Enable or Disable the Web Server on page 97](#).

Notes:

Configure the Adapter for Direct Connection in RSLogix 5000 or Studio 5000 Logix Designer Application

Overview

This chapter guides you through the steps required to configure your modules using the RSLogix 5000 or Studio 5000 Logix Designer application.

In this example, a ControlLogix controller communicates with I/O modules via the adapter using a direct connection.

The adapter makes a direct connection to each of the modules referenced by the data. The modules presented in this chapter use RSLogix 5000 software, version 17, or later.



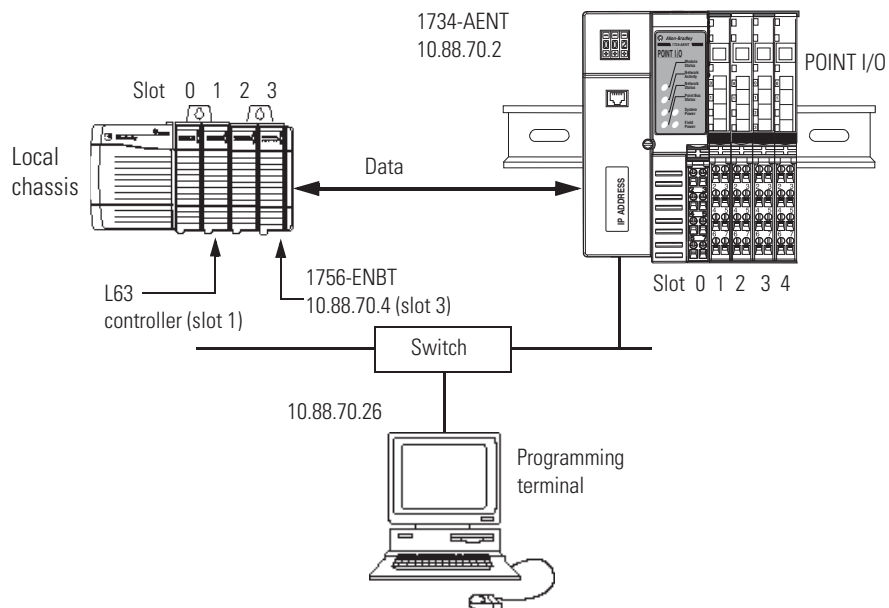
ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Set Up the Hardware

The following section describes how to set up the I/O Hardware.

In this example, a ControlLogix chassis contains the L63 controller in slot 1 and a 1756-ENBT bridge in slot 3. The 1734-AENT adapter is mounted on a DIN rail in slot 0, with a 1734-OW2/C relay output module in slot 1, a 1734-OV4E/C sink output module in slot 2, and a power supply (not shown).

To work along with this example, set up your system as shown in the figure.



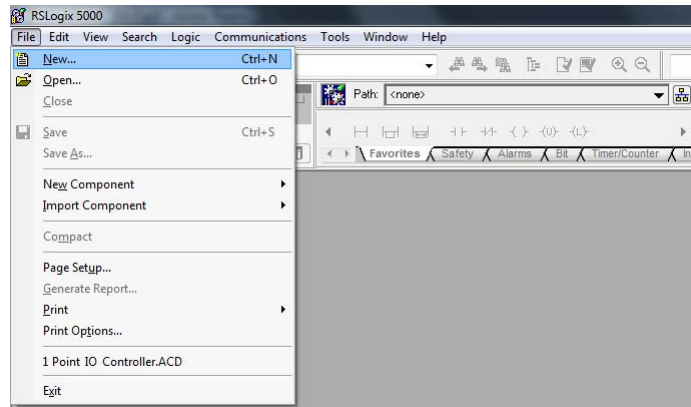
31393

- In the example application, we assume that the L63 controller and 1756-ENBT module (firmware revision 4.006, or later) are in the slots shown in the figure.
- Verify the IP addresses for your programming terminal, 1756-ENBT module, and adapter.
- Verify the position (slot) of the I/O modules on the DIN rail.
- Verify that you connected all wiring and cabling properly.
- Be sure you configured your communication driver (for example, AB_ETH-1 or AB-ETHIP-1) in RSLinx software, as described in Appendix [B](#) in this manual.

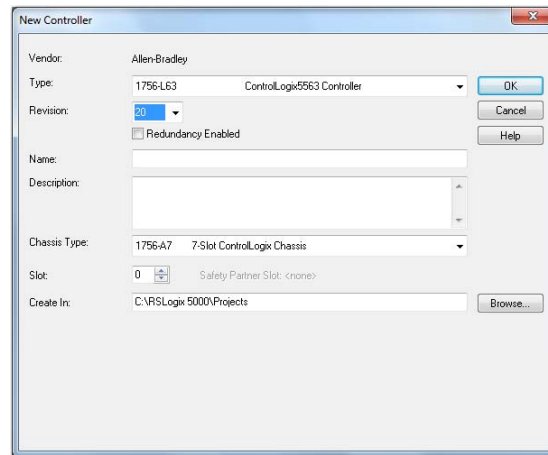
Create the Example Application

Perform the following steps to create the example application:

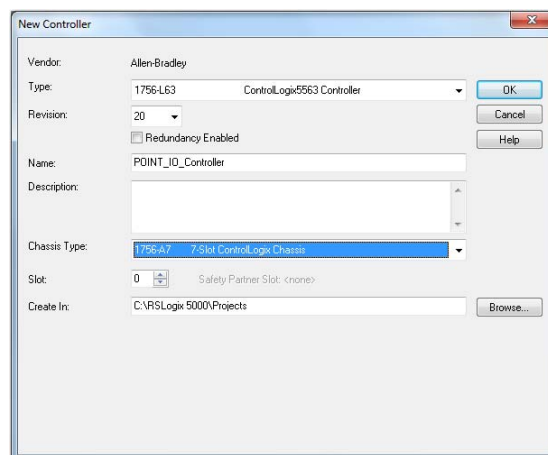
1. Start RSLogix 5000 Enterprise Series software to open the RSLogix 5000 main dialog.
2. From the File menu, select New.



3. The New Controller dialog opens.



4. Enter an appropriate Name for the Controller, for example, POINT_IO_Controller.



5. Select the correct Revision, Chassis Type, and Slot number of the L63 controller, and the folder where you want to save the RSLogix 5000 file (Create In). The Description is optional.

Note: RSLogix 5000 software version 18, and later, lets you enable redundancy. To use redundancy in your system, check the Redundancy Enabled checkbox in the Redundancy tab when using the said Revision or later.

6. Click OK.

Configure the I/O Modules

You now add the POINT I/O modules to the controller's I/O configuration performing these procedures:

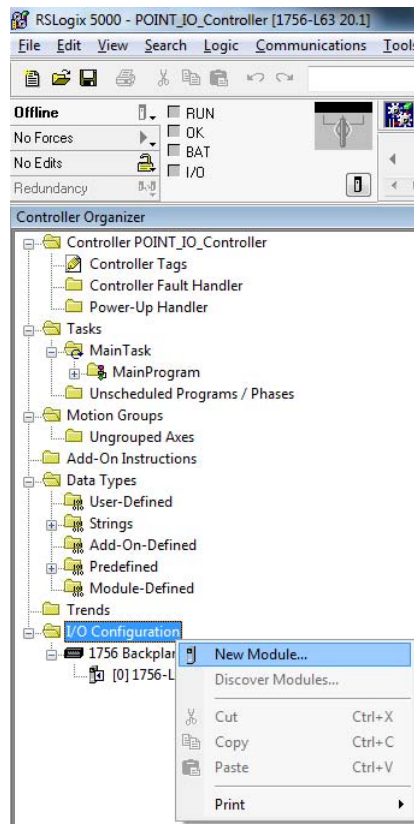
- Add the local 1756-ENBT bridge to the I/O configuration.
- Add the 1734-AENT/C adapter as a child of the 1756-ENBT module on the Ethernet network.
- Add the POINT I/O modules as children of the AENT/B adapter.

IMPORTANT

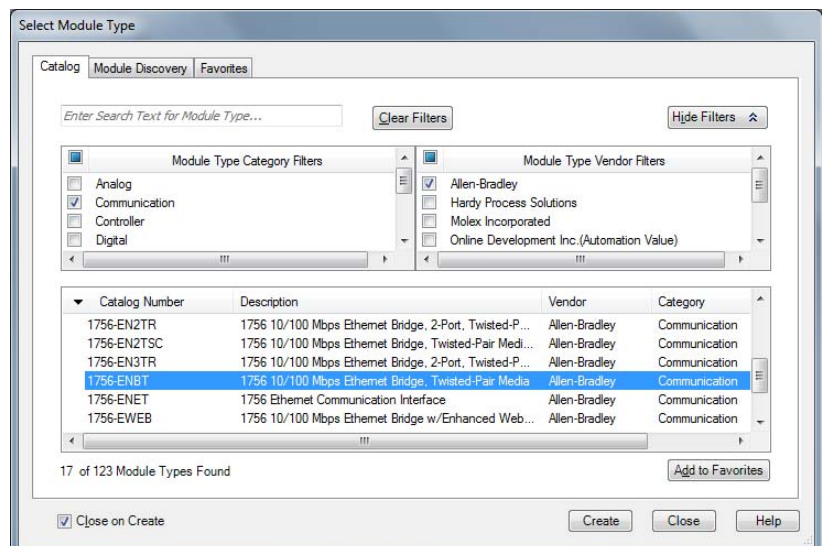
Click the Help button on the configuration dialogs shown in this section if you need assistance in selecting and setting the parameters.

Add the Local EtherNet/IP Bridge to the I/O Configuration

1. Right-click the I/O Configuration folder in the project dialog, and select New Module.



The Select Module Type dialog opens.

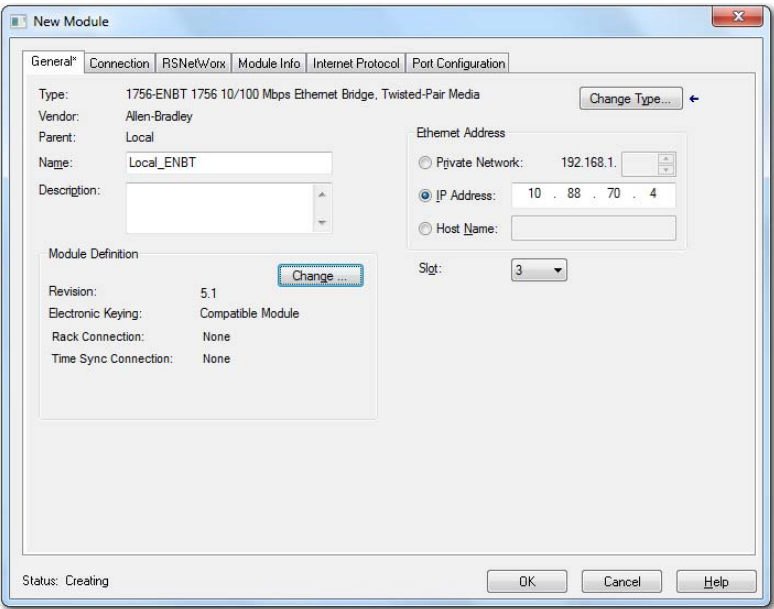


- 2. Select the appropriate Module Type filter Category (for the example we selected Communication), and Module Type Vendor (for the example we selected Allen-Bradley).

TIP In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

Note: to select only one category you will need to unselect those already selected.

- 3. From the list of adapters displayed, select the 1756-ENBT EtherNet/IP Bridge and click Create.
- 4. The New Module dialog opens.



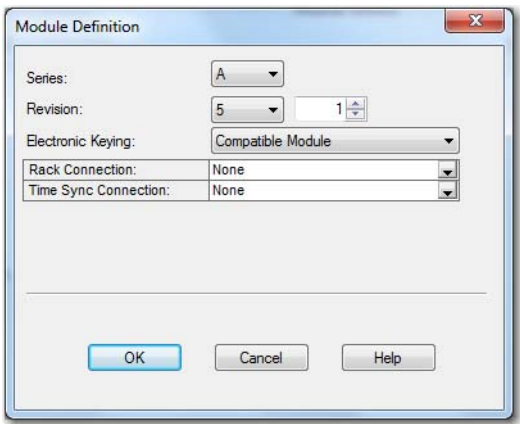
- 5. Enter values for Name, IP address, and Slot, noting that we used the following values:

Name	Local_ENBT
IP address	10.88.70.4
Slot	3

Note the module definition properties on the bottom left of the New Module dialog. You have the option to change these properties by clicking the Change button. Some of the properties cannot be modified while pending edits exists.

To change the default module properties,

- 6. Click Change...
The Module Definition dialog opens.

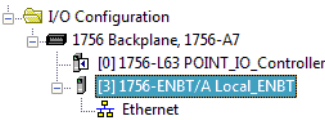


- 7. Enter or select values for Revision, Electronic Keying, Rack Connection, and Time Sync Connection, noting that we used the following values:

Series	A
Revision	5.1
Electronic Keying	Compatible Module
Rack Connection	None
Time Sync Connection	None

- 8. Click OK to accept the configuration.

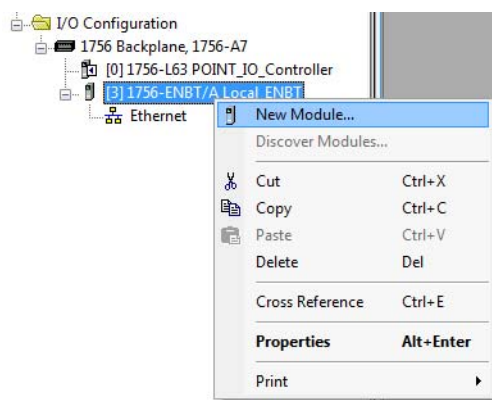
The module appears indented under the I/O Configuration folder.



Add the POINT I/O Adapter to the I/O Configuration

Next, you must add the POINT I/O adapter as a child of the local 1756-ENBT module.

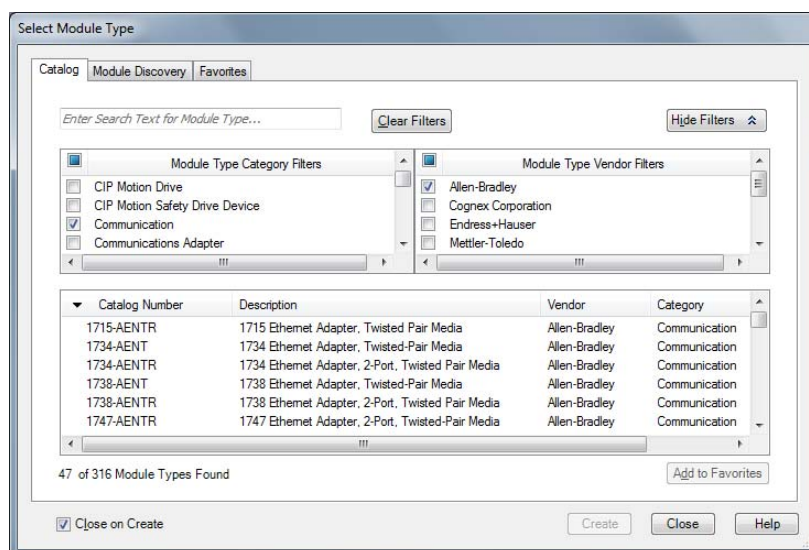
1. In the Project dialog, right-click the local 1756-ENBT module under the I/O Configuration folder, and select New Module from the dialog.



The Select Module Type dialog opens.

2. Select the appropriate Module Type filter Category (for the example we selected Communication), and Module Type Vendor (for the example we selected Allen-Bradley).

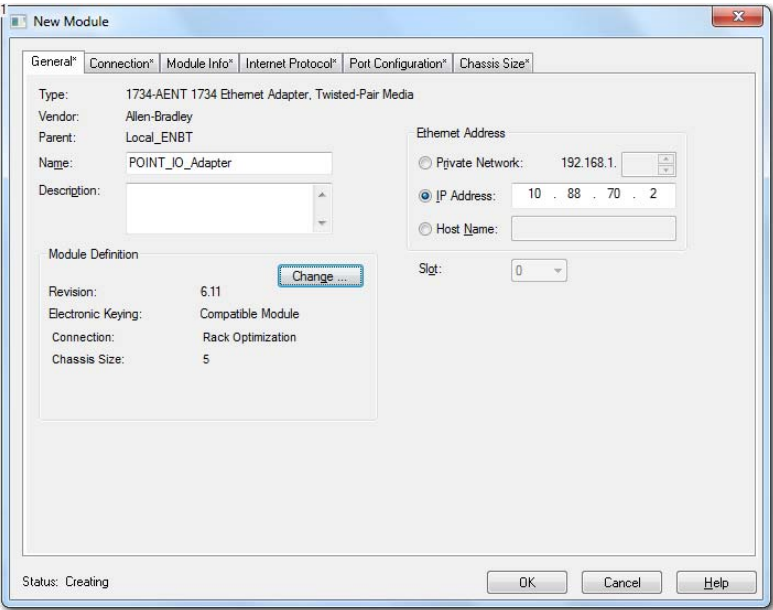
Note: to select only one category you will need to unselect those already selected.



TIP

In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

3. Select your adapter from the list and click Create.
The New Module dialog opens.

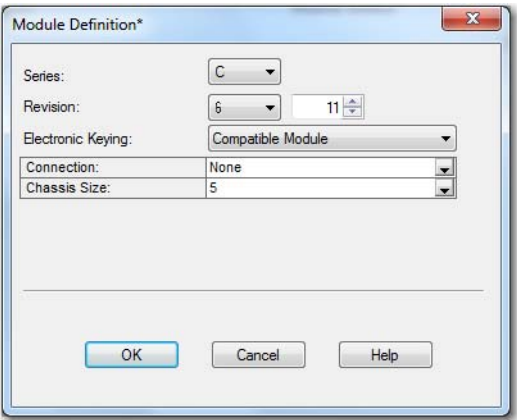


4. Select the General Tab and enter the module details, noting that we used the following values.

Name	POINT IO Adapter
IP address	10.88.70.2

IMPORTANT Note that the slot field is disabled because the slot is automatically 0 for the 1734-AENT adapter.

5. Click Change...
The Module Definition dialog opens.



6. Choose values for Series, Revision, Electronic Keying, Connection, and Chassis Size, noting that we used the following values:

Series	C
Connection	None
Chassis Size	5
Electronic Keying	Compatible Module
Revision	6.11

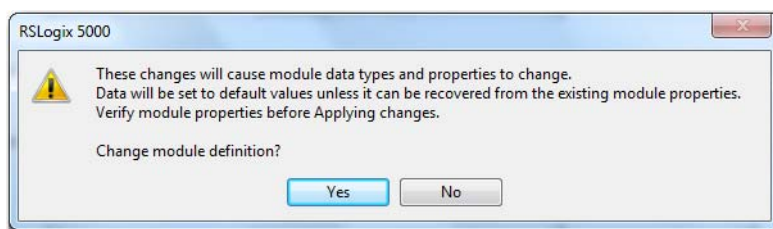
IMPORTANT The chassis size value equals 1 for the adapter plus the number of I/O modules installed (physically present on the I/O backplane).

Connection choices are the following:

- None – the adapter only makes a direct connection to each of the modules referenced by the data. RPI is disabled in this case.
 - Rack optimization – digital I/O data is collected into a rack image. This rack image excludes analog or specialty I/O modules.
 - Enhanced rack optimization – digital, analog, and specialty I/O data is collected into a rack image.
 - Listen only - rack optimization – read or verify input data only, but does not control the modules. When you have multiple controllers, one controller is used to control and the other controllers are used to monitor. When the owning controller of rack-optimization connection closes the connection, the Listen-Only data will also stop.
7. Choose None as Connection, because we are only making direct connections, then click OK.

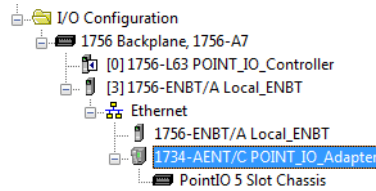
Note: There is no need to have a rack-optimization connection if all I/O connections to the POINT I/O modules are directly connected.

A dialog box opens.



8. Click Yes.

- In the New Module screen, click OK to accept the new configuration. The 1734-AENT/C adapter appears indented under the local 1756-ENBT bridge in the I/O Configuration folder.



Note: The requested packet interval (RPI) is disabled because you have chosen None as the Connection.

Add the POINT I/O Modules to the I/O Configuration

You now add POINT I/O modules to the I/O Configuration List under the adapter.

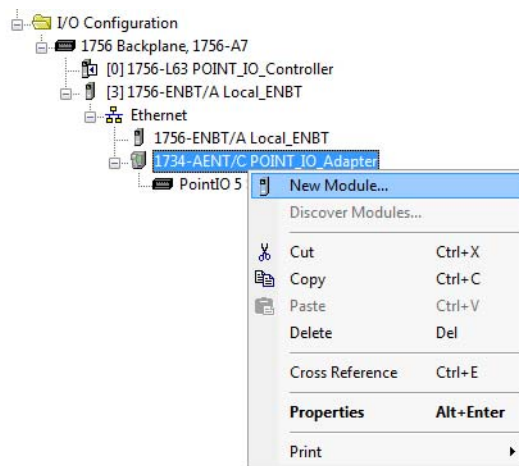
In this example, you add a 1734-OW2 relay output module and a 1734-OV4E sink output module with standard configurations. Use these steps as a guide when configuring different I/O modules for your system.

TIP

This example application uses I/O module default configurations. For more information, refer to the POINT I/O Modules Selection Guide, publication [1734-SG001](#).

Add the Digital Relay Output Module

- Highlight the 1734-AENT/C adapter under the I/O Configuration folder, right-click, and select New Module.

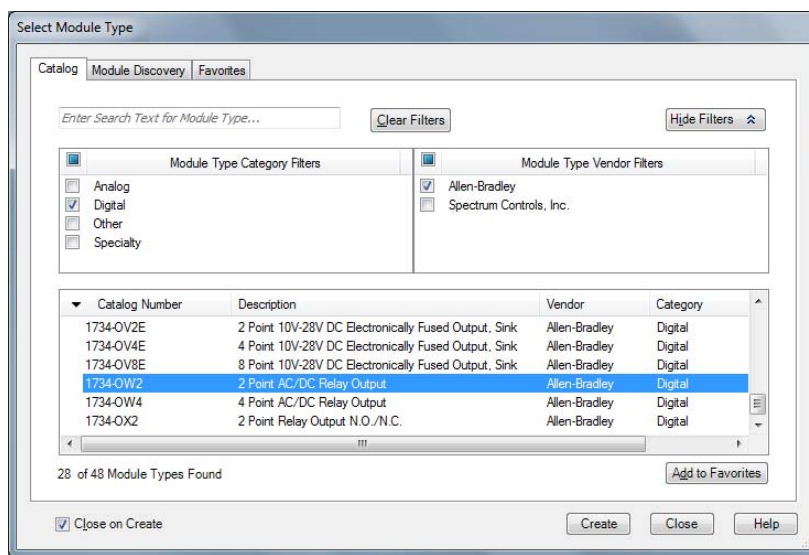


The Select Module Type dialog opens.

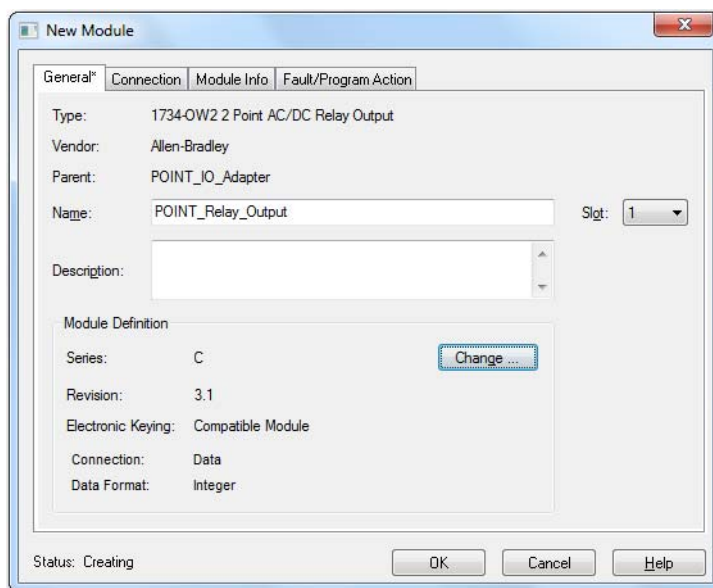
2. Select the appropriate filter for Module Type Category (for the example we selected Digital) and Module Type Vendor (for the example we selected Allen-Bradley).

Note: to select only one category you will need to unselect those already selected.

3. From the modules listed select the 1734-OW2 digital relay output module and click Create.



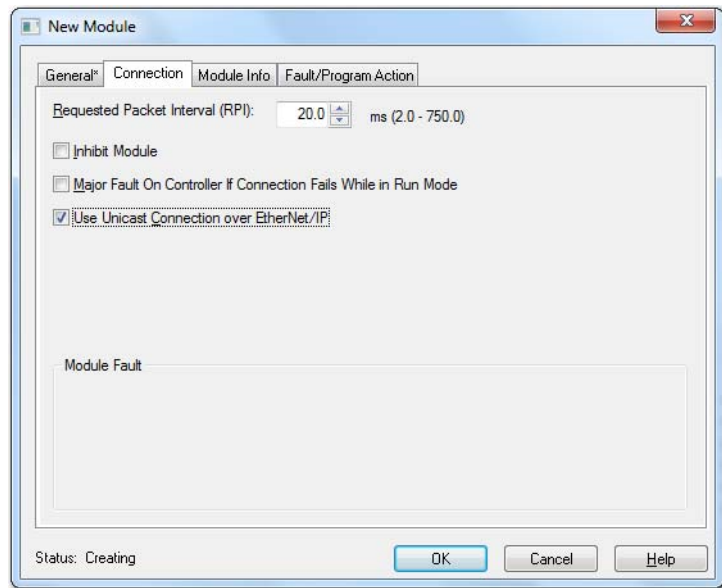
The New Module dialog opens.



4. Enter values for Name and Slot, noting that we used the following values.

Name	POINT_Relay_Output
Slot	1

5. Choose the Connection tab to set the RPI value.
RPI is selectable since it is a direct connection.



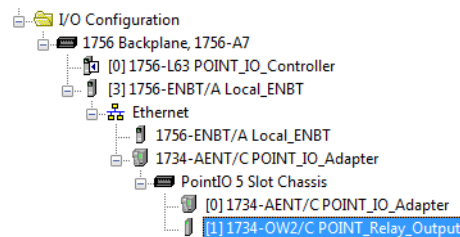
Note that the RPI is selectable on the screen and has a default value. Because we are making a direct connection to each I/O module, we must specify an RPI to determine how often the data is exchanged with the 1734-AENT adapter for each module.

6. Enter 50 for requested packet interval (RPI) to set how often you exchange data with the I/O adapters.

IMPORTANT

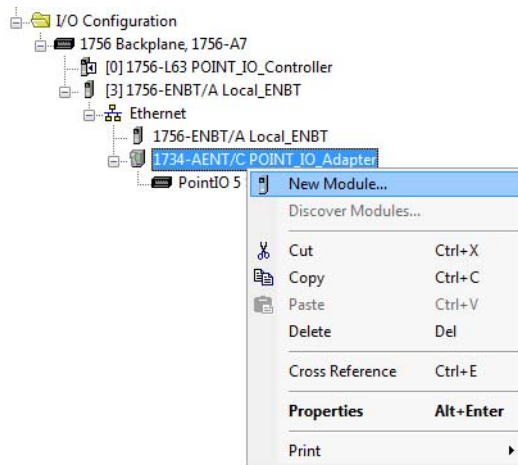
To avoid overloading the I/O adapters, we recommend that RPI be no less than 10 ms for rack-optimization and enhanced rack-optimization connections, and 50 ms for direct connections.

7. Click OK to save the configuration.
The relay output module appears under Ethernet.



Add the Digital Output Module

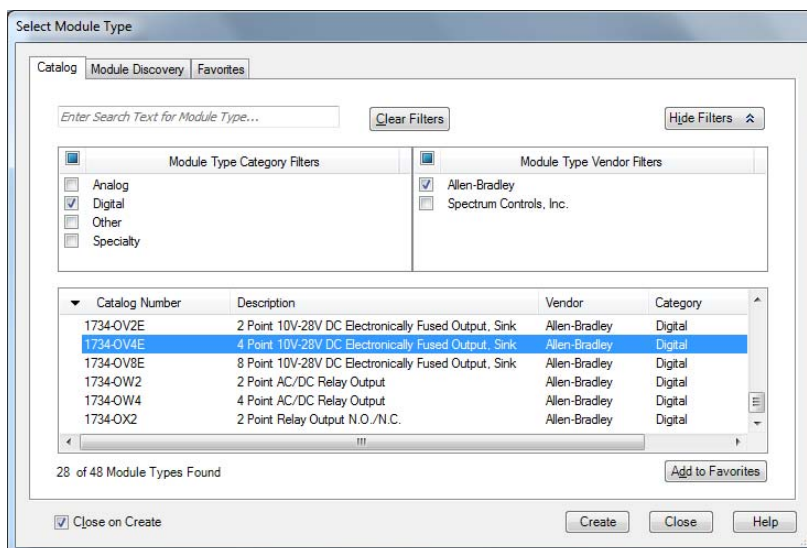
1. Highlight the 1734-AENT/C adapter under the I/O Configuration folder, right-click, and select New Module.



The Select Module Type dialog opens.

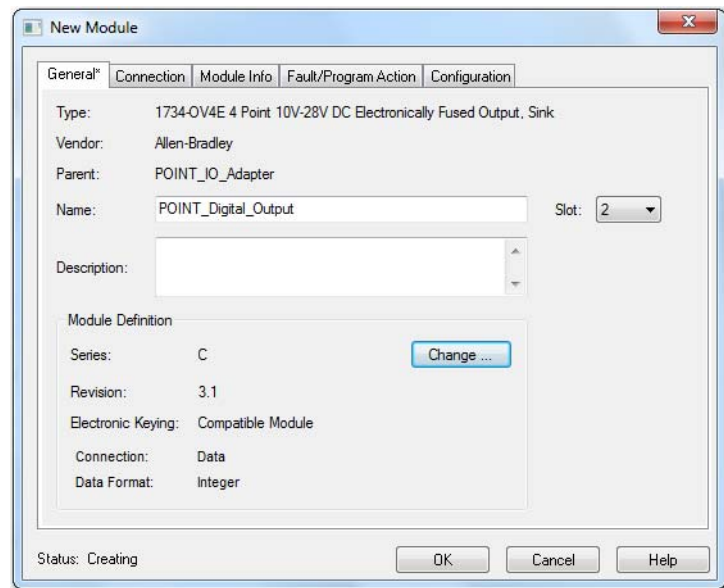
2. Select the appropriate Module Type Category Filter (for the example we selected Digital) and Module Type Vendor (for the example, we selected Allen-Bradley).

Note: to select only one category you will need to unselect those already selected.



3. From the modules listed select the 1734-OV4E sink output module and click Create.

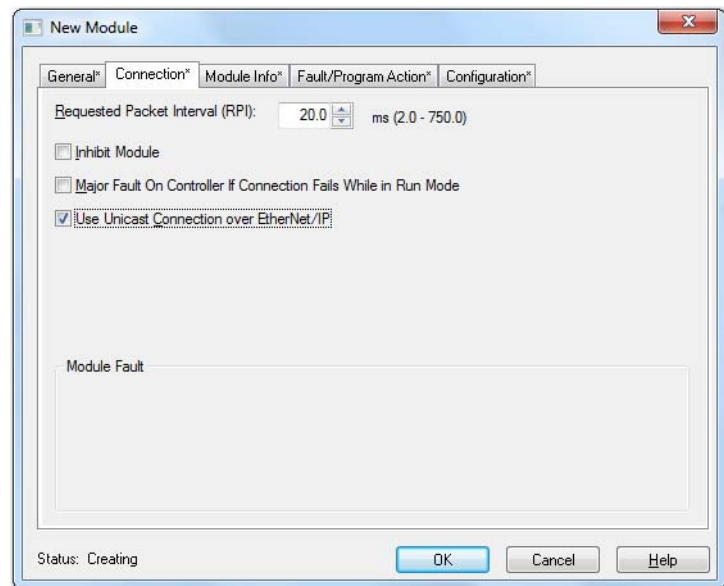
The New Module dialog opens.



4. Enter values for Name and Slot, noting that we used the following values.

Name	POINT_Digital_Output
Slot	2

5. Choose the Connection tab to set the RPI value.
The RPI is selectable since it is a direct connection.

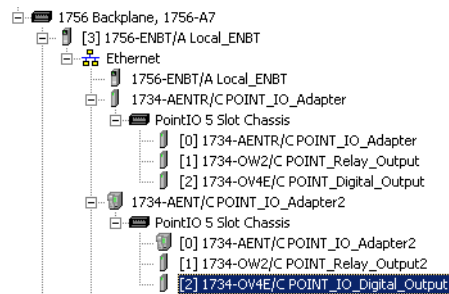


Note that the RPI is selectable and has a default value. Because we are making a direct connection to each I/O module, we must specify an RPI to determine how often the data is exchanged with the adapter for each module.

6. Enter 10 ms as the RPI for the 1734-OV4E module.

IMPORTANT	To avoid overloading the I/O adapters, we recommend that RPI be no less than 10 ms for rack-optimization and enhanced rack-optimization connections, and 50 ms for direct connections.
------------------	--

7. Click OK to save the configuration.
The module appears in the I/O configuration folder indented under Ethernet.

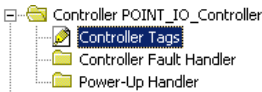


Edit the Controller Tags

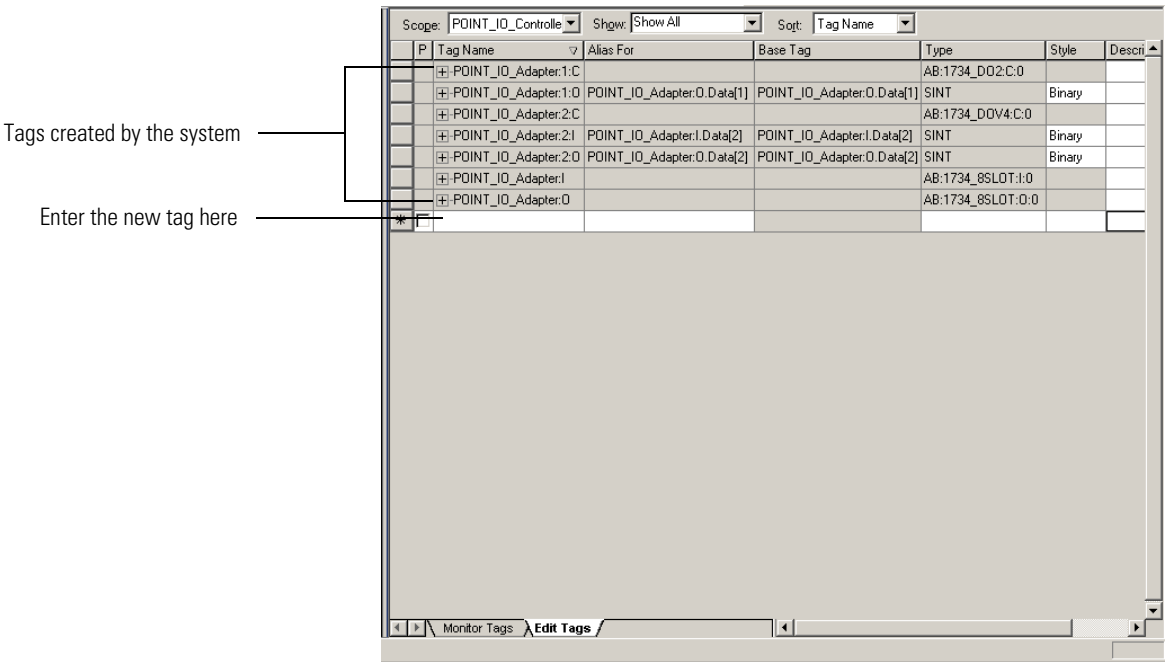
When you add modules to the I/O configuration the system creates *tags* for those modules to use in the application program.

For the example application you need to add one more controller tag.

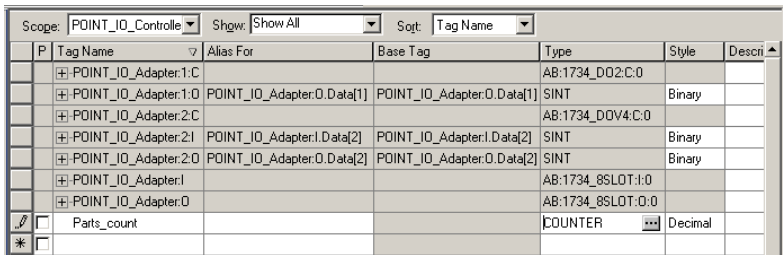
1. Double-click the Controller Tags folder in the project dialog.



The Controller Tags dialog opens. You see the tags created for the 1734-AENT adapter and its digital I/O modules.



2. Click the Edit Tags tab at the bottom of the Controller Tags dialog.



3. Create the following tag:

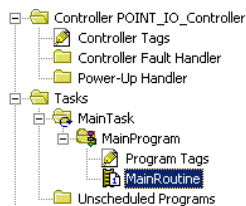
Tag	Type
Parts_Count	Counter

4. Close the Controller Tags dialog.

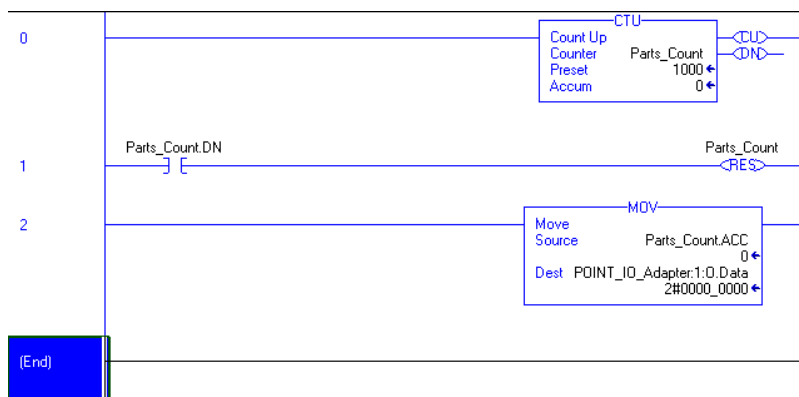
Create the Ladder Program

Create the example ladder program to test the I/O.

1. Under the Main Program folder, double-click Main Routine.



2. Enter the following ladder program using the tags previously created.

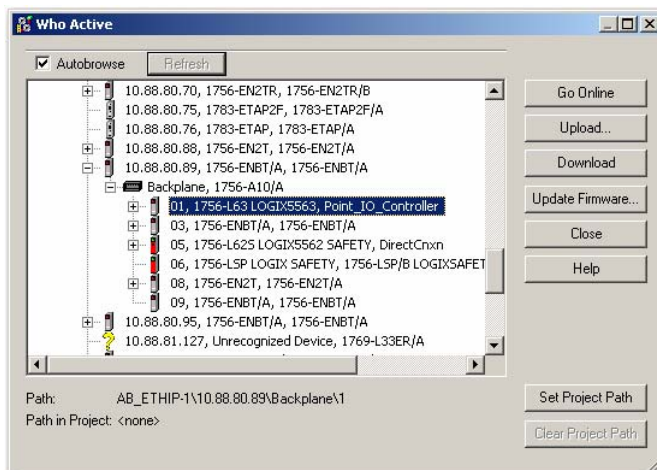


3. Save the program.

Download the Program to the Controller

Follow this procedure to download the program you just saved to the ControlLogix controller.

1. From the main menu, choose Communications>Who-Active. The Who Active dialog opens.

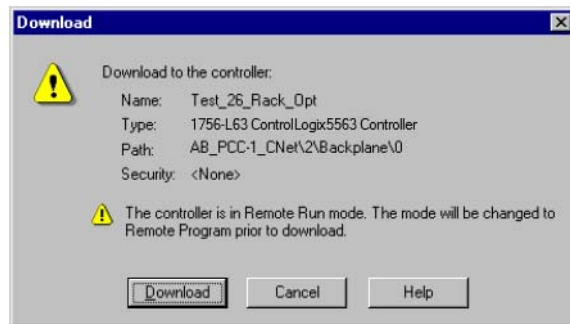


2. Navigate to select the slot where the controller is in the chassis.
3. Choose Set Project Path.

4. Choose Download.

The Download dialog opens with a reminder of the following.

- The controller is in Remote Run mode.
- The mode changes to Remote Program before download.

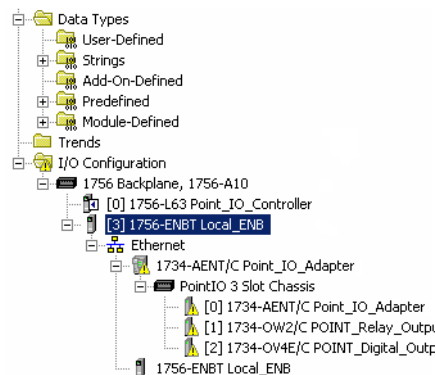


5. From the Download dialog, choose Download.

The RSLogix 5000 software dialog opens.



6. Notice that the 1756-ENBT Bridge is now online.
If yellow triangles are present, see the following section.



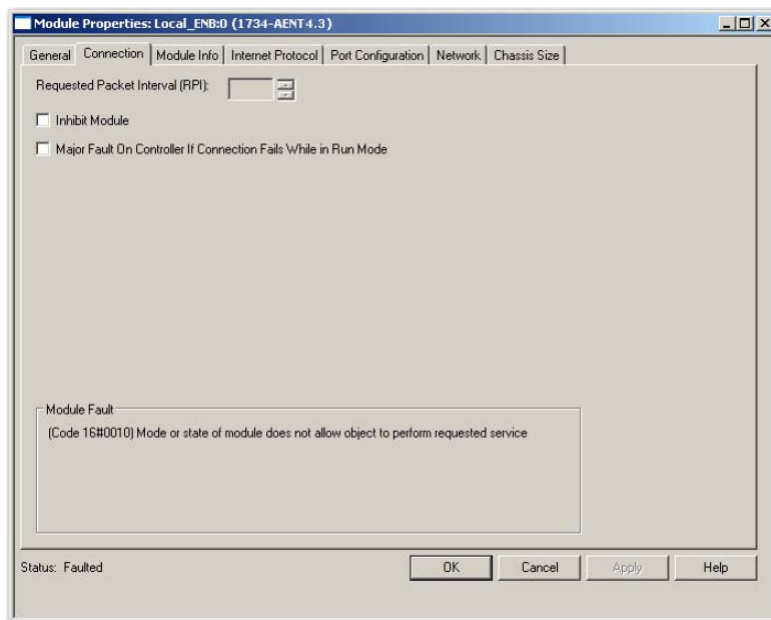
Verify the Module Chassis Size

You have now built the I/O tree in the RSLogix 5000 software, and the RSLogix 5000 software used the chassis size from the 1734-AENT General tab.

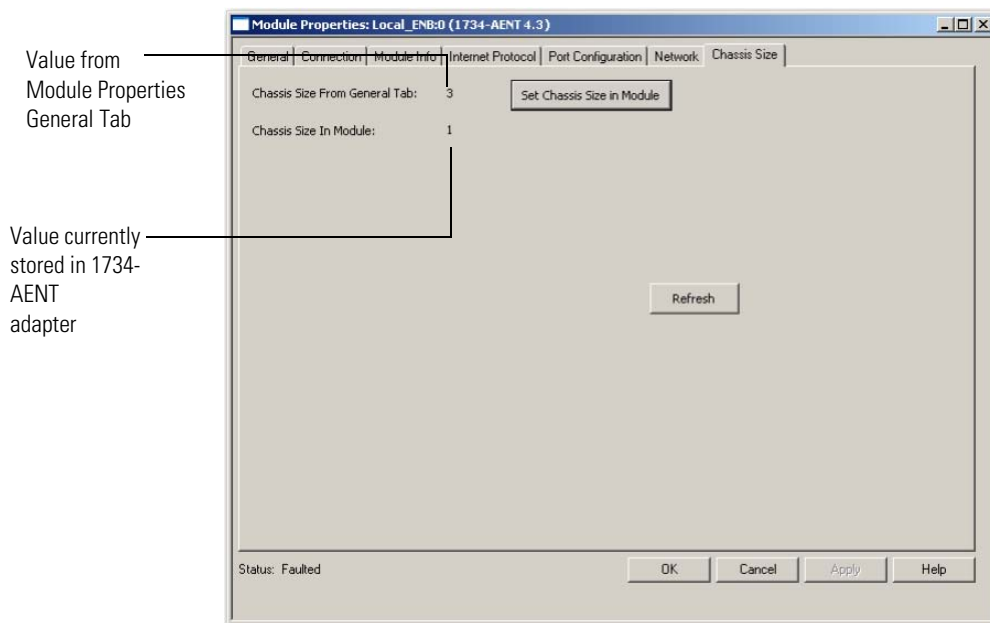
Now you need to download this new chassis size value into the 1734-AENT adapter hardware. This procedure synchronizes the chassis size value from the RSLogix 5000 software into the 1734-AENT adapter hardware.

1. Verify that the RSLogix 5000 software is online.

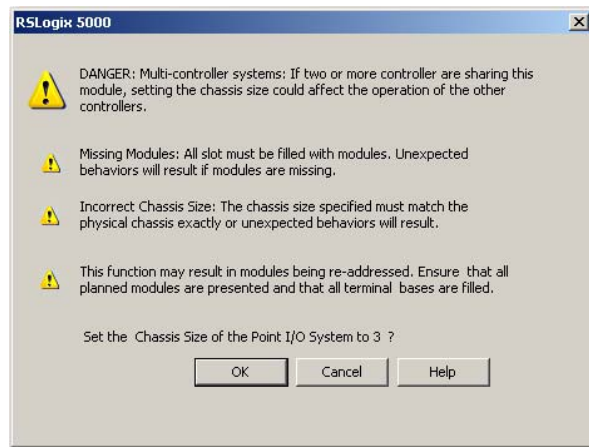
2. In the Project dialog, right-click the 1734-AENT adapter under I/O Configuration.
3. Select Properties.
4. Click the Connection tab.
The Module Fault error code displays.



5. Click the Chassis Size tab.
6. Click Set Chassis Size in Module.



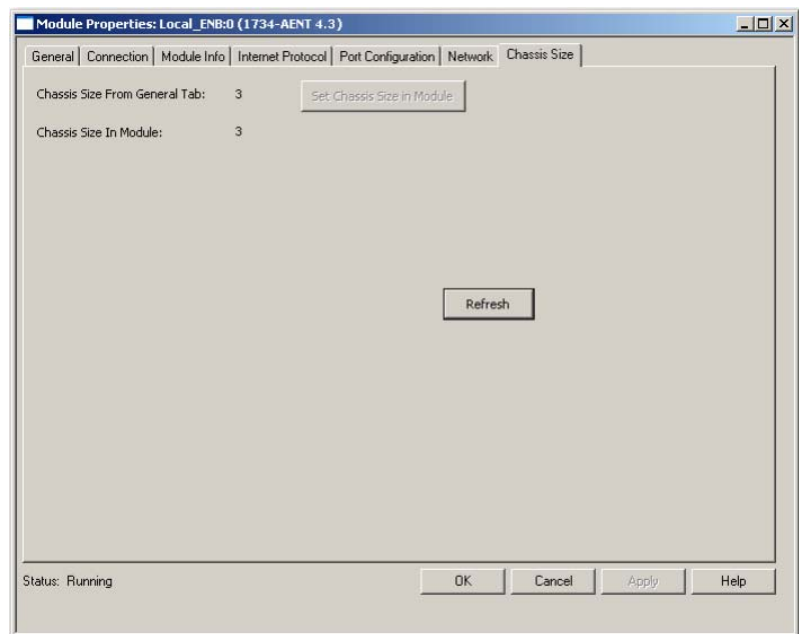
7. Read and acknowledge the warning dialog.



8. Click OK to continue.

Notice the chassis size stored in the module has been changed to 3.

At this point, your POINTBus status indicator should be solid green. All the yellow triangles in your I/O configuration should be gone.

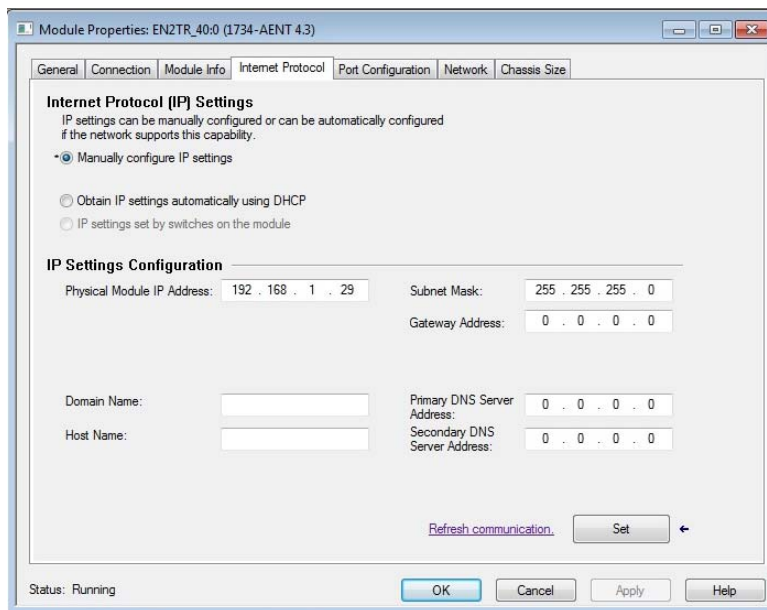


9. Click OK.

Configure the Adapter with Fixed IP Address

To configure the adapter with a fixed IP address to help prevent the adapter from ceasing to communicate with the ControlLogix controller:

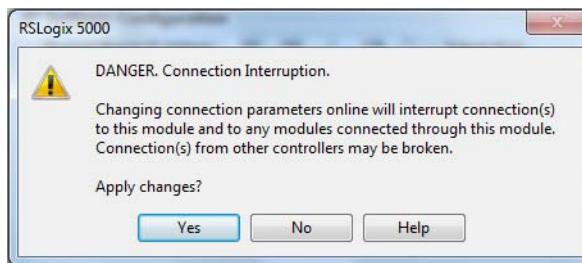
1. All controllers with I/O connections to the AENT and/or the modules in its backplane need to be in program mode.
2. In the Module Properties dialog, click the Internet Protocol tab.



3. If it is not selected, select Manually configure IP settings.
4. Enter values for Physical Module IP address, and Subnet Mask, noting we used the following values:

Physical Module IP address	192.168.1.29
Subnet Mask	255.255.255.0

5. Click Set.
6. Read and acknowledge the warning.



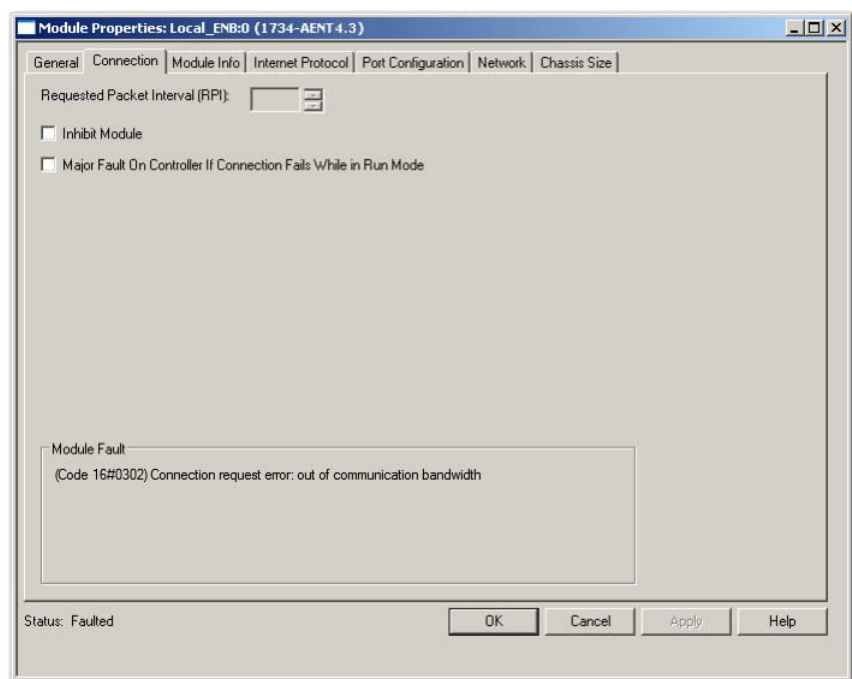
7. Click Yes.
8. Click the Refresh communication button to verify the changes.

Recover From an Overloaded Adapter

Each I/O connection established with the I/O adapter consumes a portion of microprocessor bandwidth. The amount of bandwidth used by a connection depends on several variables, such as the requested packet interval (RPI), number of I/O modules involved in the connection, and rate of change of the I/O.

The AENT adapter continuously monitors this bandwidth and rejects requests for new I/O connections when there is insufficient bandwidth available to support the new connection.

The condition where the I/O adapters cannot support the connection due to a limit of the bandwidth of the microprocessor is shown on the Connection tab of the Module Properties dialog.



If you encounter this condition, the only action you can take is to alter the existing connections to reduce the amount of microprocessor bandwidth consumed. The most likely fixes for this condition include the following:

- Increase the RPI.
- Decrease the number of connections.
- Remove modules from the rack-optimization I/O connection.
- Remove the rack-optimization connection if there are no modules participating in it.

Notes:

Configure the Adapter for Direct Connection, Rack Optimization, and Enhanced Rack Optimization

Overview

This chapter guides you through the steps required to configure your AENT adapter with direct, rack-optimization, and enhanced rack-optimization I/O connections using RSLogix 5000 or Studio 5000 Logix Designer application.

You can mix I/O connection formats for different I/O modules communicating through the same adapter. I/O modules set up to use rack optimization or enhanced rack optimization communicate at the rate of the RPI configured for the adapter.

I/O modules controlled by a direct I/O connection communicate at their own set RPI. The RPI of the rack-optimization or enhanced rack-optimization I/O connection has no bearing on the direct I/O connections. The modules presented in this chapter have a configuration using RSLogix 5000 software, version 17 or later.



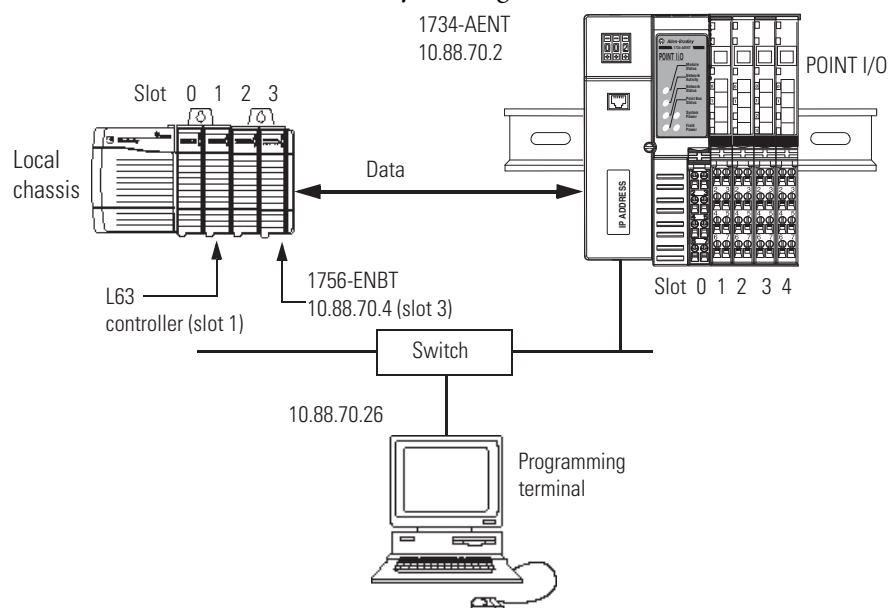
ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Set Up the Hardware

The following section describe how to set up the I/O Hardware.

Set Up the POINT I/O Hardware

In this example, a ControlLogix chassis contains the L63 controller in slot 1 and a 1756-ENBT bridge in slot 3. In this example, we mounted the 1734-AENT adapter on a DIN rail in slot 0, with a 1734-OW2/C relay output module in slot 1, a 1734-OV4E/C sink output module in slot 3, and two other POINT I/O modules which are not controlled by this Logix controller in slots 2 and 4.



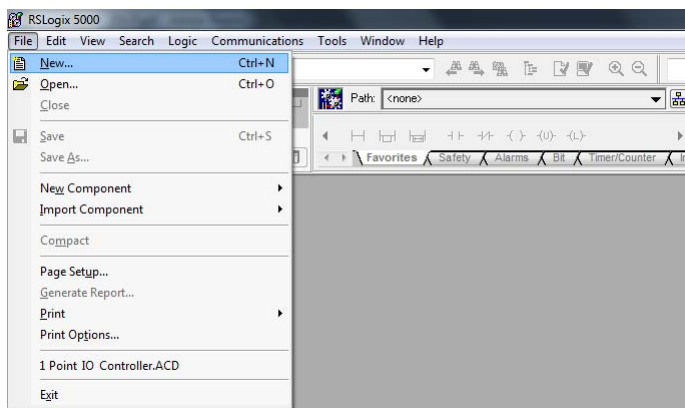
To work along with this example, set up your system as shown in the figure.

- Note that in the example application, the Logix controller, and 1756-ENBT module (firmware revision 4.006 or later) we assume are in the slots shown in the figure.
- Verify the IP addresses for your programming terminal, 1756-ENBT module, and I/O adapter.
- Verify the position (slot) of the I/O modules on the DIN rail.
- Verify that you properly connected all wiring and cabling.
- Make sure you configured your communication driver (such as AB_ETH-1 or AB-ETHIP-1) in the RSLinx software. See [Configure the RSLinx Ethernet Communication Driver](#) in Appendix B.

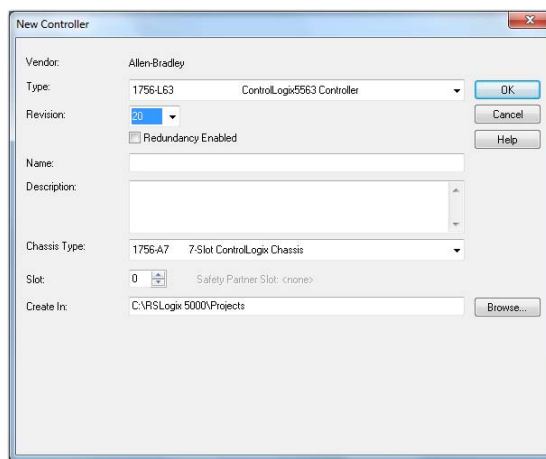
Create the Example Application

Perform the following steps to create the example application:

1. Start the RSLogix 5000 Enterprise Series software. The RSLogix 5000 software main dialog opens.
2. From the File menu, select New.



3. The New Controller dialog opens.



4. Enter an appropriate Name for the Controller, for example, POINT_IO_Controller.
5. Select the following:
 - Revision
 - Chassis Type
 - Slot number
 - Description (optional)

Note: RSLogix 5000 software, revision 18 and later includes enable redundancy. To use redundancy in your system, select the Redundancy Enabled checkbox. This example does not use redundancy.

6. Complete the Create In entry by selecting the folder where you want to save the file.
7. Click OK.

Configure the I/O Modules

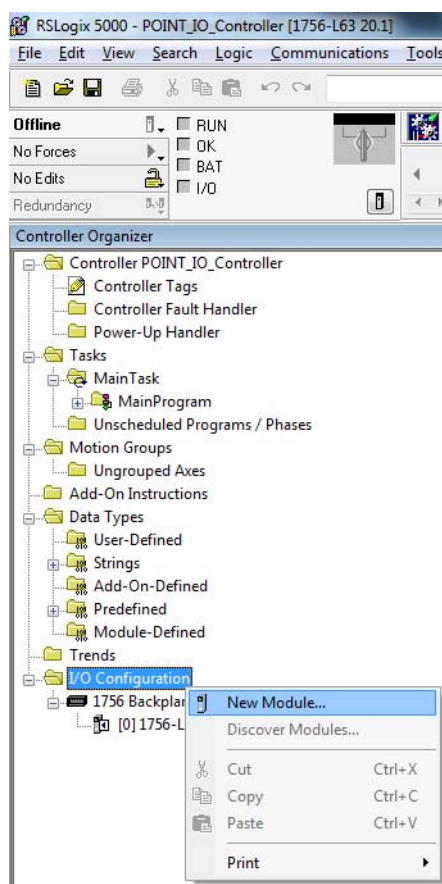
You now add the I/O modules to the controller I/O configuration. To do this, first add the local 1756-ENBT bridge to the I/O configuration. Next, add the I/O adapter as a child of the 1756-ENBT module, and then add the I/O modules as children of the adapter.

IMPORTANT

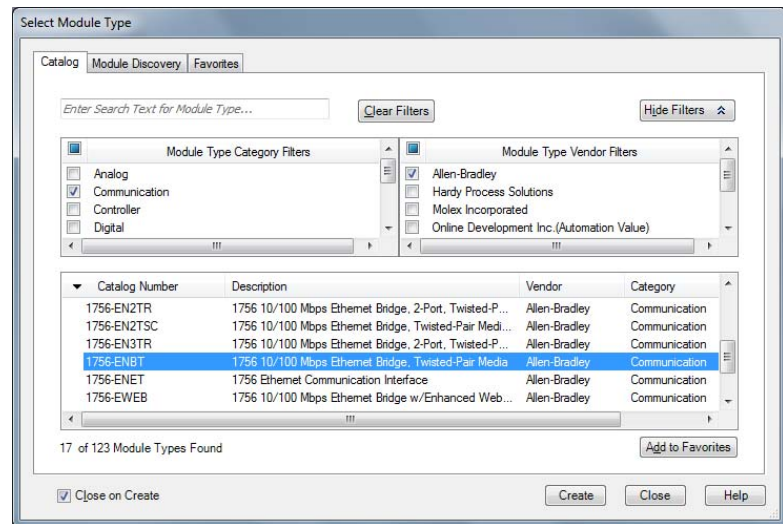
Click the Help button on the configuration dialog shown in this section if you need assistance in selecting and setting the parameters.

Add the Local EtherNet/IP Bridge to the I/O Configuration

1. Right-click the I/O Configuration folder in the project dialog and select New Module.



The Select Module Type dialog opens.



2. Select the appropriate Module Type filter Category (for the example we selected Communication), and Module Type Vendor (for the example we selected Allen-Bradley).

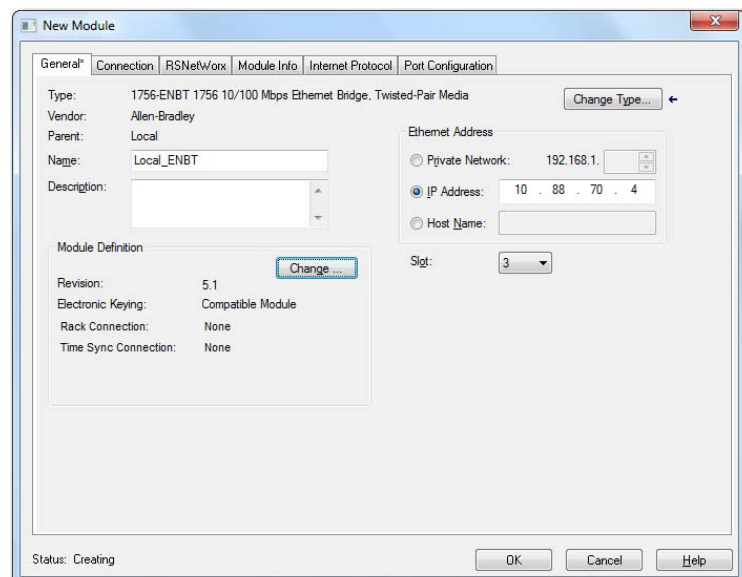
TIP

In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

Note: to select only one category you will need to unselect those already selected.

3. From the list of adapters displayed, select the 1756-ENBT EtherNet/IP Bridge and click Create.

The New Module dialog opens.



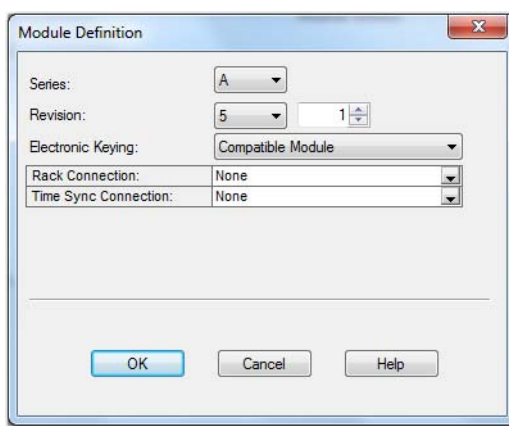
4. Enter values for Name, IP address, and Slot, noting that we used the following values:

Name	Local_ENBT
IP address	10.88.70.4
Slot	3

Note the module definition properties on the bottom left of the New Module dialog. You have the option to change these properties by clicking the Change button. Some of the properties cannot be modified while pending edits exists.

To change the default module properties,

5. Click Change...
The Module Definition dialog opens.

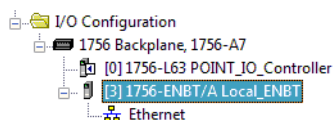


6. Enter or select values for Series, Revision, Electronic Keying, Rack Connection, and Time Sync Connection, noting that we used the following values:

Series	A
Revision	5.1
Electronic Keying	Compatible Module
Rack Connection	None
Time Sync Connection	None

7. Click OK to accept the configuration.

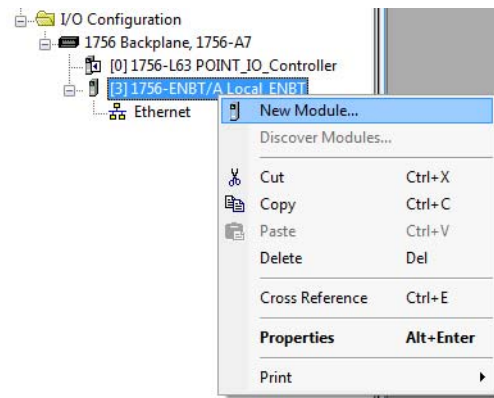
The module appears indented under the I/O Configuration folder.



Add the POINT I/O Adapter to the I/O Configuration

Next, you must add the POINT I/O adapter as a child of the local 1756-ENBT module.

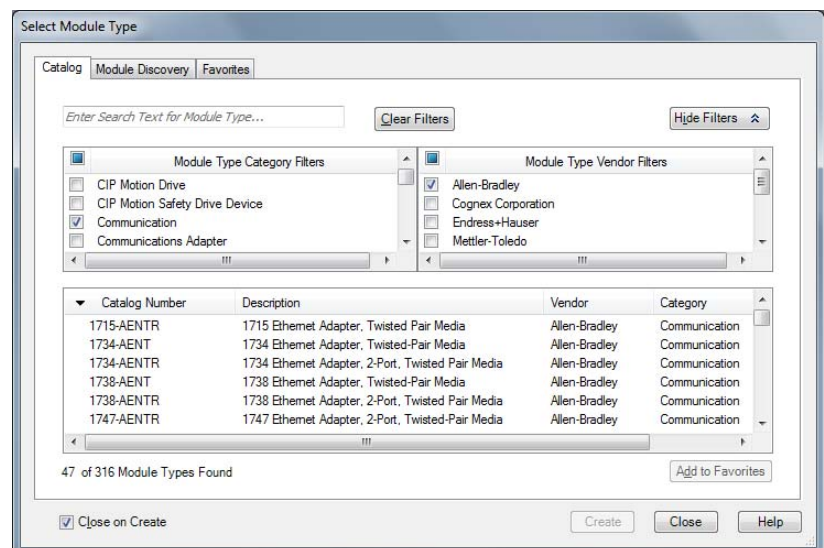
1. In the Project dialog, right-click the local 1756-ENBT module under the I/O Configuration folder, and select New Module from the dialog.



The Select Module Type dialog opens.

2. Select the appropriate Module Type filter Category (for the example we selected Communication), and Module Type Vendor (for the example we selected Allen-Bradley).

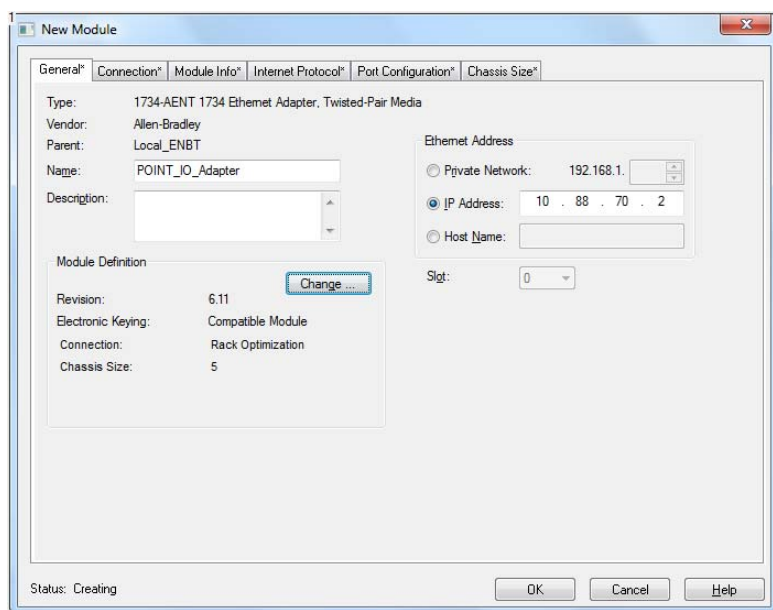
Note: to select only one category you will need to unselect those already selected.



TIP

In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

3. Select your adapter (in this example, we use the 1734-AENT/C) from the list and click Create.
The New Module dialog opens.

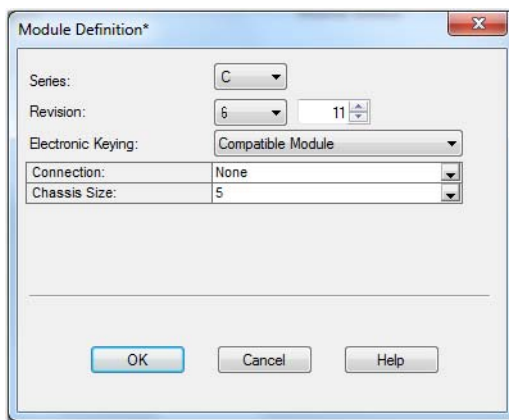


4. Select the General Tab and enter the module details, noting that we used the following values.

Name	POINT_IO_Adapter
IP address	10.88.70.2

IMPORTANT Note that the slot field is disabled because the slot is automatically 0 for the 1734-AENT adapter.

5. Click Change...
The Module Definition dialog opens.



6. Enter or select values for Series, Revision, Electronic Keying, Connection, and Chassis Size, noting that we used the following values:

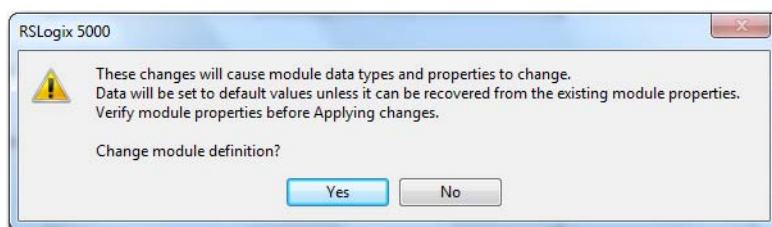
Series	C
Connection	Rack Optimization
Chassis Size	5
Electronic Keying	Compatible Module
Revision	6.11

IMPORTANT The chassis size value equals 1 for the adapter plus the number of I/O modules installed (physically present on the I/O backplane).

Connection choices include:

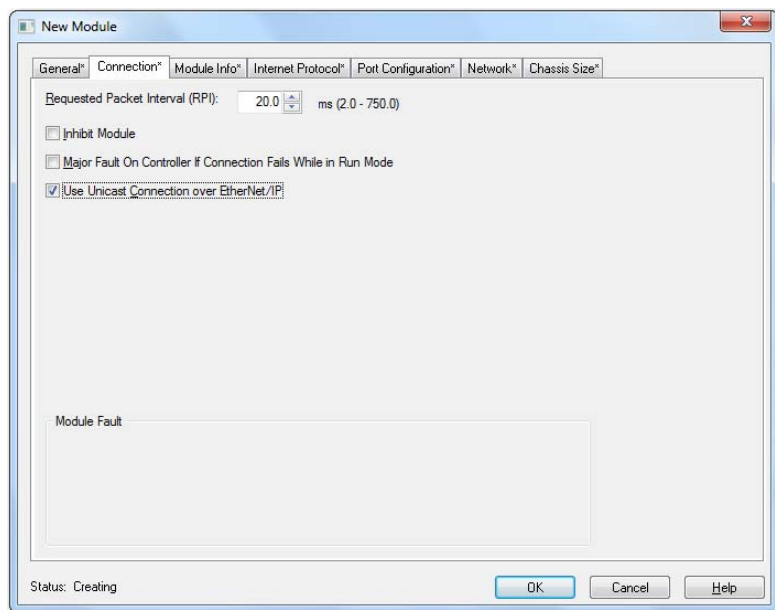
- None – the adapter makes a direct connection to each of the modules referenced by the data. RPI is disabled in this case.
 - Rack optimization– digital I/O data is collected into a rack image. This excludes analog or specialty I/O modules.
 - Enhanced rack optimization – digital, analog, and specialty I/O data is collected into a rack image.
 - Listen only - rack optimization– read or verify data only, but does not control the modules. When you have multiple controllers - one controller is used to control and the other controllers are used to monitor.
7. Because we are making a mixed connection (both a direct connection and rack-optimization connection), choose Rack Optimization as the Connection for the 1734-AENT/C adapter and click OK.

A dialog box opens.



8. Click Yes.

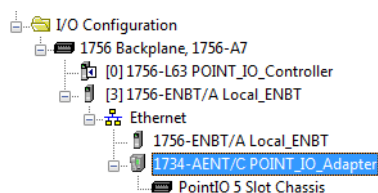
9. In the New Module screen, select the Connection Tab.



10. Verify that the Requested Packet Interval (RPI) used for the rack-optimization connection to the I/O modules is appropriate for your system (20.0 ms for this example). If not, change it to the correct value.

IMPORTANT To avoid overloading the adapter, it is recommended that the RPI be no less than 10.0 ms for rack-optimization and enhanced rack-optimization connections, and 50.0 ms for direct connections.

11. Click OK to accept the configuration.
The 1734-AENT/C adapter appears indented under the local 1756-ENBT bridge in the I/O Configuration folder.

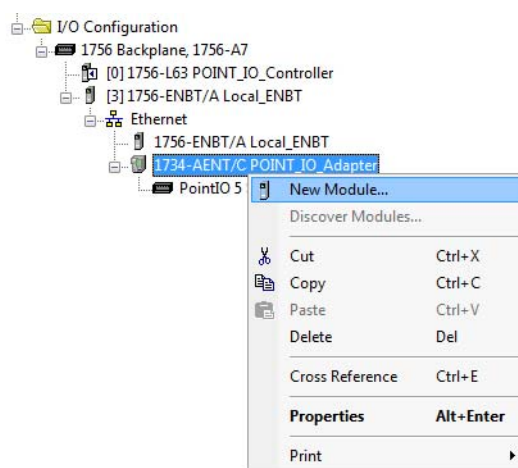


Add the POINT I/O Modules and Configure for Rack-optimization Connection

You must now add the POINT I/O modules to the I/O Configuration List under the adapter. In this example, the digital input and output modules are configured for rack optimization.

Add the Digital Relay Output Module

1. Right-click the POINT I/O Chassis in the I/O Configuration folder and select New Module.

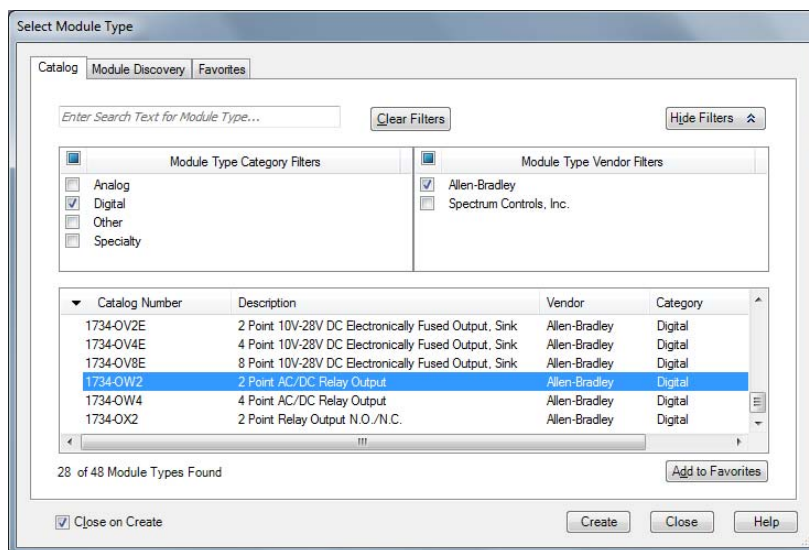


The Select Module Type dialog displays.

2. Select the appropriate filter for Module Type Category (for the example we selected Digital) and Module Type Vendor (for the example we selected Allen-Bradley).

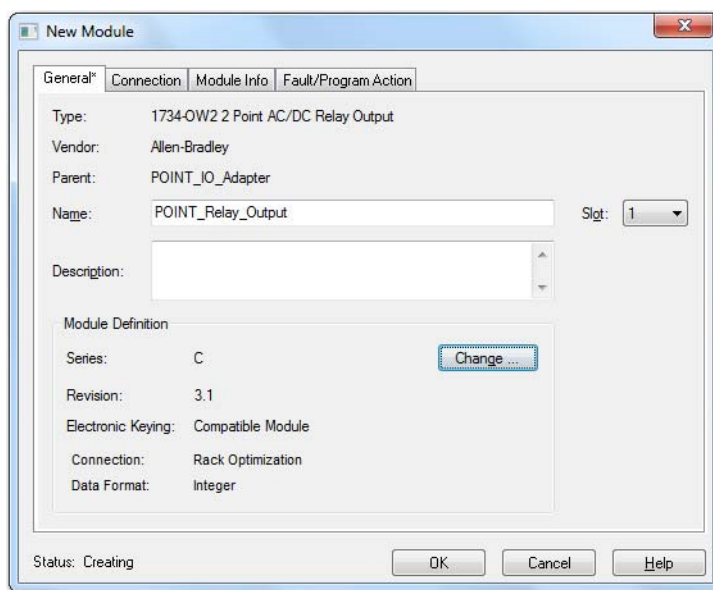
Note: to select only one category you will need to unselect those already selected.

- From the modules listed select the 1734-OW2 digital relay output module and click Create.



TIP In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

The New Module dialog opens.

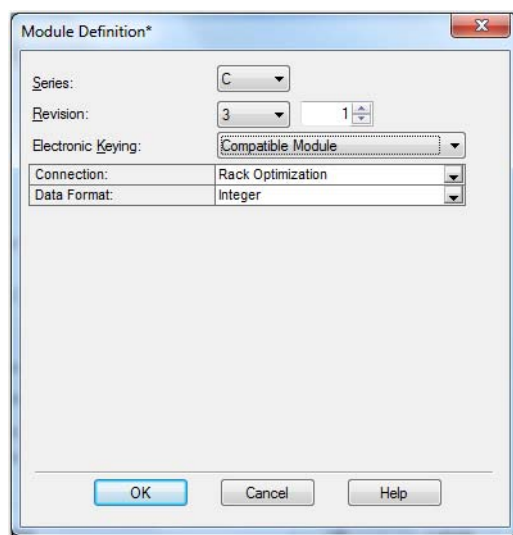


- Enter values for Name and Slot, noting that we used the following values.

Name	POINT_Relay_Output
Slot	1

Note the module definition properties on the bottom left of the New Module dialog. You have the option to change these properties by clicking the Change... button. Some of the properties cannot be modified while pending edits exist.

5. Select Change...
The Module Definition dialog displays.

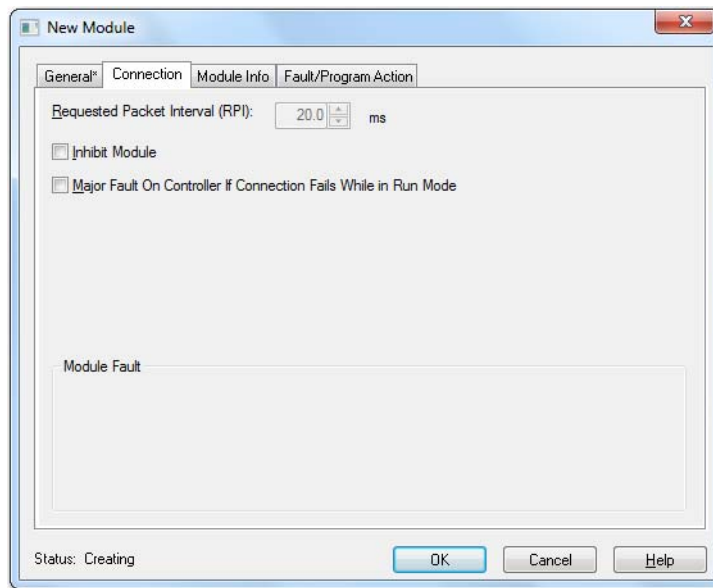


6. Change the Connection from Data to Rack Optimization and click OK.
Note that the requested packet interval (RPI) is the same as was chosen by the adapter. You use this value for the rack-optimization connection to the I/O modules.

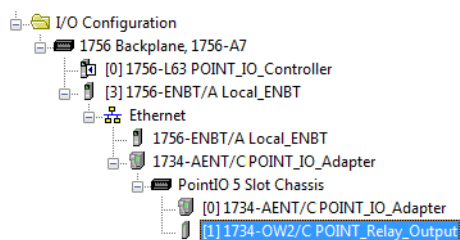
IMPORTANT

To avoid overloading the I/O adapter, we recommend that the RPI be no less than 10 ms for rack-optimization and enhanced rack-optimization connections, and 50 ms for direct connections.

7. In the New Module screen, select the Connection tab and verify that the Requested Packet Interval (RPI) used for the rack-optimization connection to the I/O modules is appropriate for your system (20.0 ms for this example). If not, change it to the correct value.



8. Click OK to accept the configuration.
The digital output module appears indented under the local 1734-AENT/C adapter in the I/O Configuration folder.

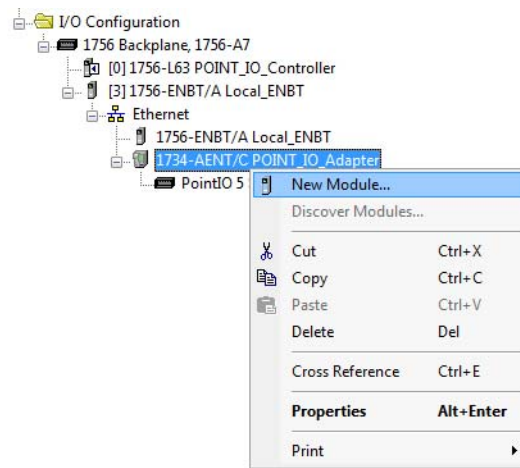


Add the POINT I/O Modules and Configure for Enhanced Rack-optimization Connection

You must now add the POINT I/O modules to the I/O Configuration List under the adapter. In this example, the digital input and output modules are configured for enhanced rack optimization.

Add the Digital Relay Output Module

1. Right-click the POINT I/O Chassis in the I/O Configuration folder and select New Module.

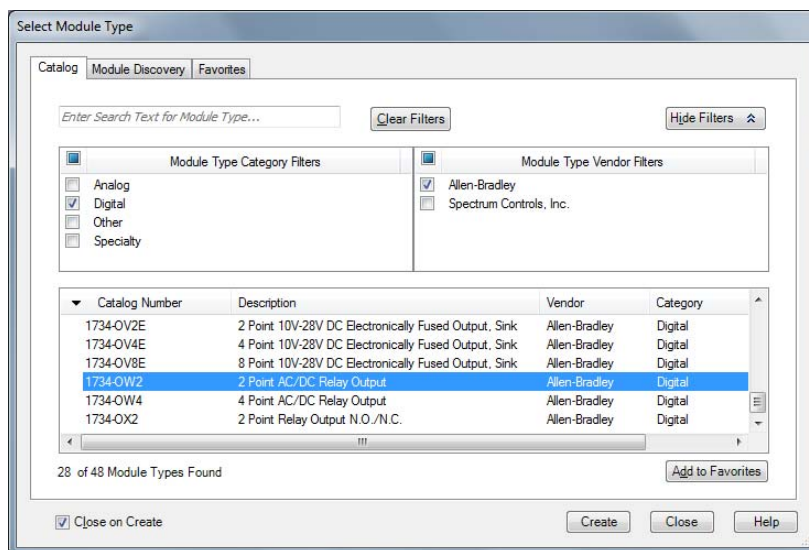


The Select Module Type dialog displays.

2. Select the appropriate filter for Module Type Category (for the example we selected Digital) and Module Type Vendor (for the example we selected Allen-Bradley).

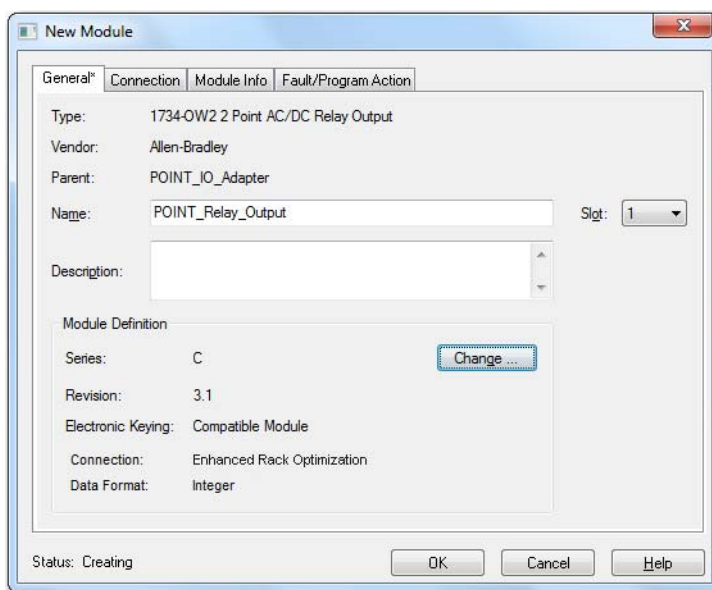
Note: to select only one category you will need to unselect those already selected.

- From the modules listed select the 1734-OW2 digital relay output module and click Create.



TIP In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

The New Module dialog opens.



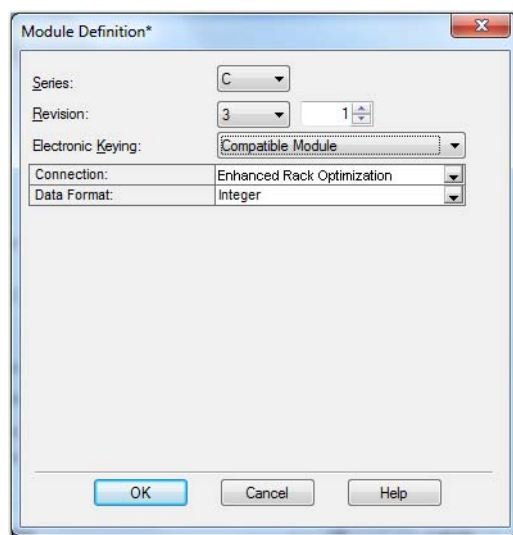
- Enter values for Name and Slot, noting that we used the following values.

Name	POINT_Relay_Output
Slot	1

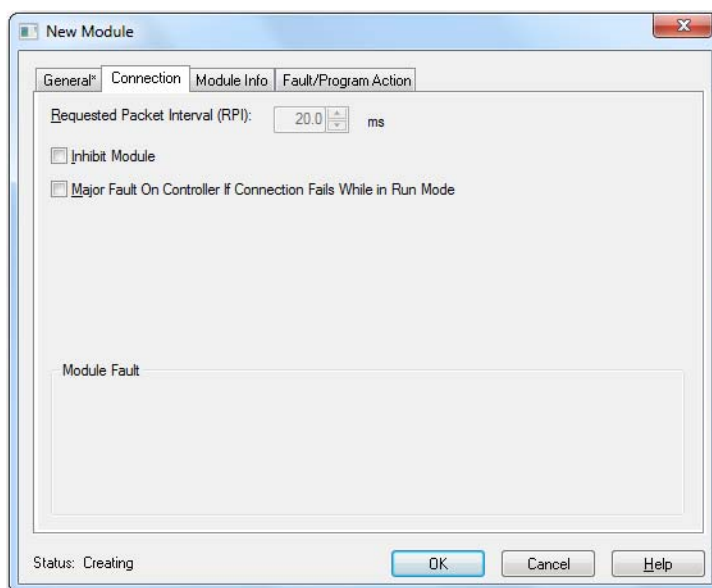
Note the module definition properties on the bottom left of the New Module dialog. You have the option to change these properties by clicking the Change... button. Some of the properties cannot be modified while pending edits exist.

5. Select Change...

The Module Definition dialog displays.



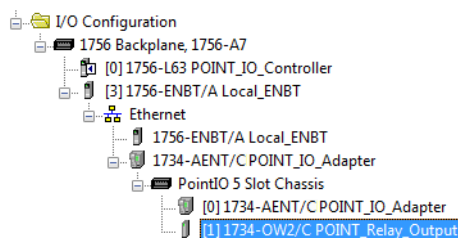
6. Note that the requested packet interval (RPI) is the same as was chosen by the adapter. You use this value for the enhanced rack-optimization connection to the I/O modules.



IMPORTANT

To avoid overloading the I/O adapter, we recommend that the RPI be no less than 10 ms for rack-optimization and enhanced rack-optimization connections, and 50 ms for direct connections.

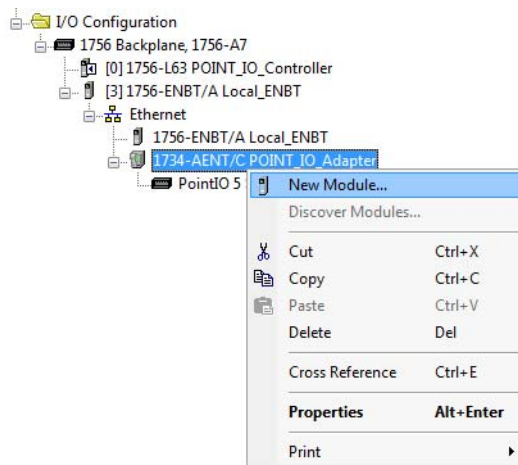
7. Click OK to accept the configuration.
The digital input module appears indented under the local 1734-AENT/C adapter in the I/O Configuration folder.



Add the POINT I/O Module and Configure For Direct Connection

Add The Digital Sink Output Module

1. Right-click the POINT I/O Chassis in the I/O Configuration folder and select New Module.



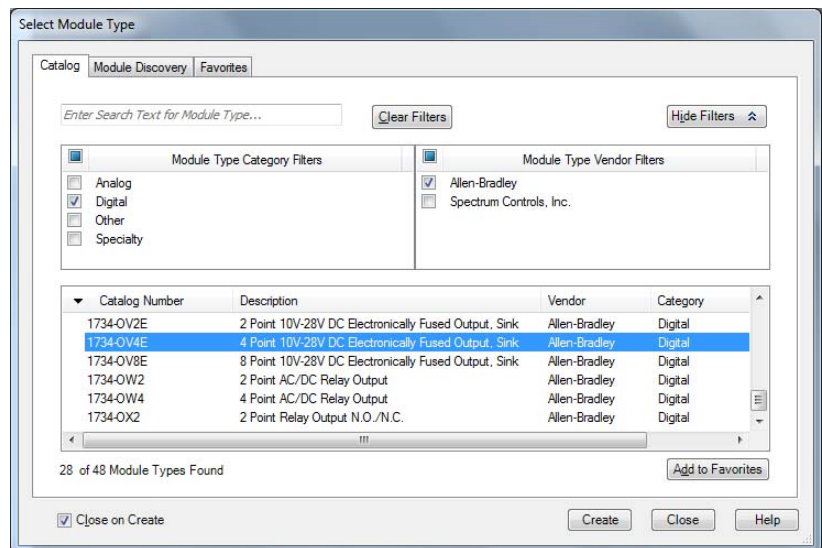
The Select Module Type dialog opens.

2. Select the appropriate filter for Module Type Category (for the example we selected Digital) and Module Type Vendor (for the example we selected Allen-Bradley).
Note: to select only one category you will need to unselect those already selected.

IMPORTANT

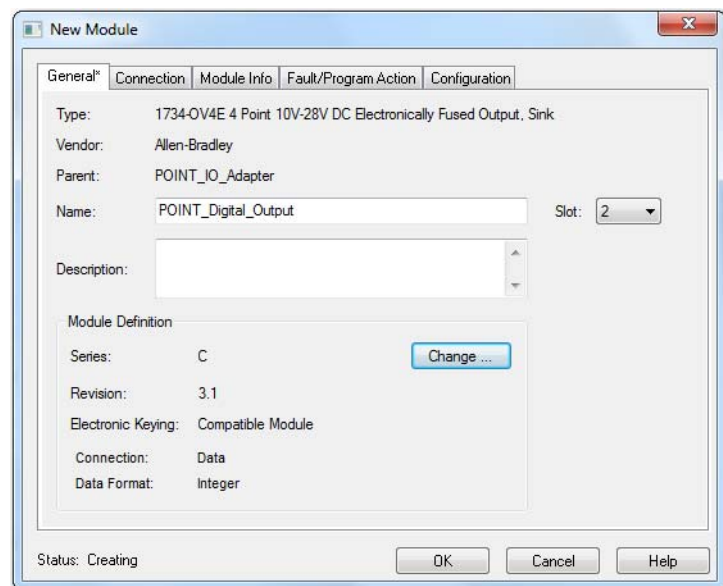
If you exceed the adapter chassis size trying to add more modules than you configured, the New Module selection appears dim and is disabled. Increase the adapter chassis size to add more I/O modules.

3. From the modules listed select the 1734-OV4E/C Digital Sink Output module and click Create.



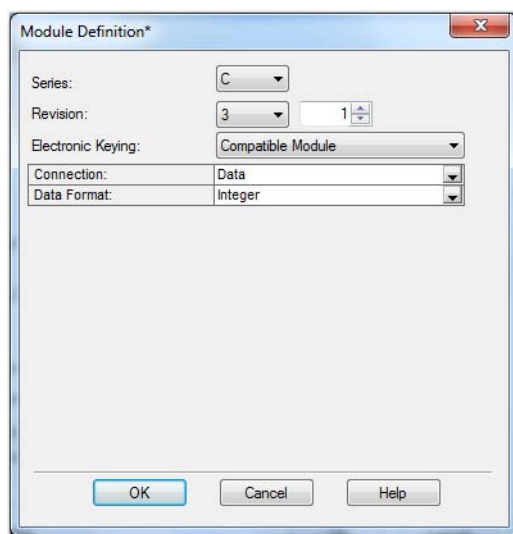
TIP In the Select Module Type dialog, you have options to search for a specific module, add modules to a Favorites list, filter by Category and/or Vendor, Hide and Show Filters, use Module Discovery, sort by vendor, or access your Favorites list.

The New Module dialog opens.

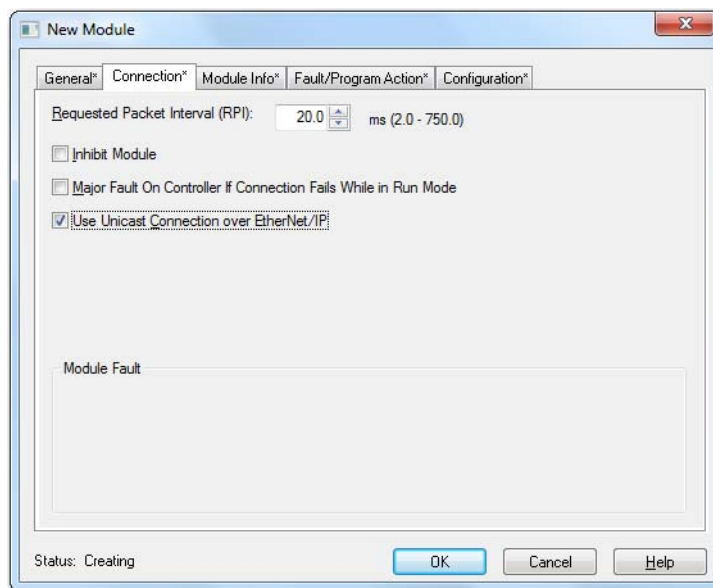


4. From the New Module dialog, complete the following:
 - Enter a value for Name.
 - Enter a value for Slot.

5. Select Change...
The Module Definition dialog displays.



6. For Connection, select Data and click OK.
This configures the controller to make a Direct I/O Connection to the module.
7. From the New Module dialog, select the Connection tab to set the RPI value. RPI is selectable since it is a direct connection.



Note that the RPI is selectable and has a default value. Because we are making a direct connection to each I/O module, we must specify an RPI to determine how often the data is exchanged with the adapter for each module.

IMPORTANT

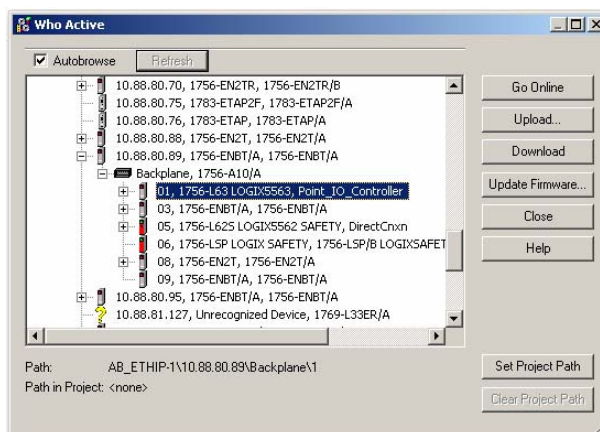
To avoid overloading the I/O adapter, we recommend that the RPI be no less than 10 ms for rack-optimization and enhanced rack-optimization connections, and 50 ms for direct connections.

8. From the New Module dialog, enter 50 for the Requested Packet Interval (RPI).
9. Keep the following unchecked.
 - a. Inhibit Module
 - b. Major Fault on Controller If Connection fails While in Run Mode
10. Click OK.
11. Choose File → Save and enter the name and location of the file.

Download the Program to the Controller

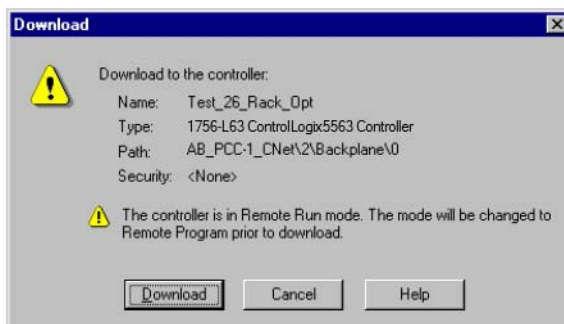
Follow this procedure to download the program we just saved to the ControlLogix controller.

1. From the main menu, choose Communications>Who Active.
2. From the Who Active dialog, navigate to select the slot where the controller is in the chassis.



3. Click Set Project Path.

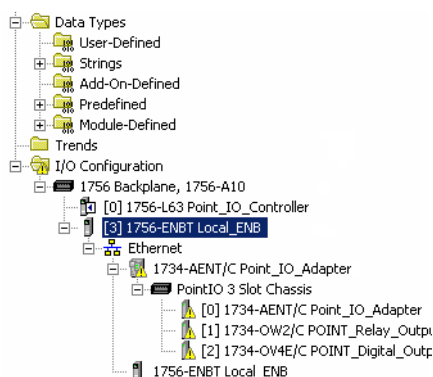
4. Click Download.
The Download dialog opens.



5. From the Download dialog, click Download.
The Downloading dialog displays the download progress.



Notice that the 1756-ENBT Bridge is now online.



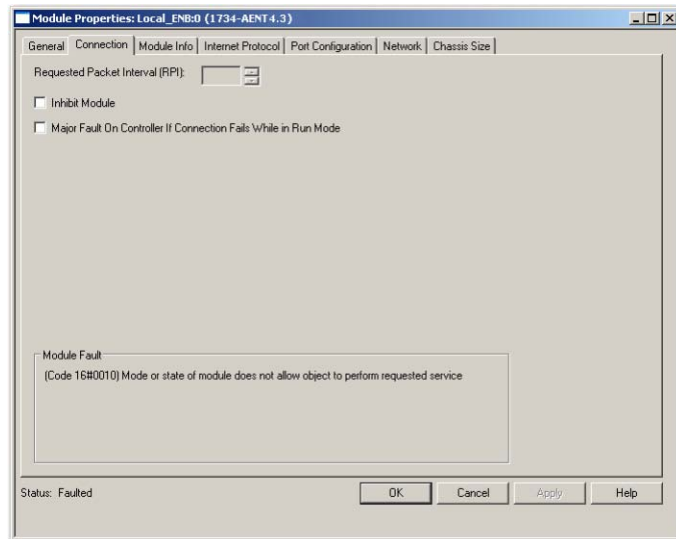
If yellow triangles are present, see the following section.

Verify the Module Chassis Size

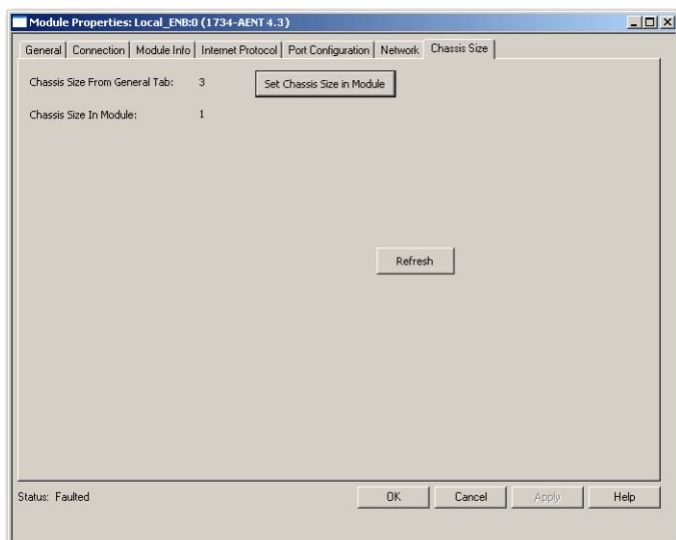
You have now built the I/O tree and the RSLogix 5000 software uses the chassis size from the General tab of the adapter for the rack-optimization I/O connection. Now you need to configure this new chassis size value into the adapter nonvolatile memory. This procedure synchronizes the chassis size value from the RSLogix 5000 software into the adapter hardware. You must be online to perform this procedure.

1. Verify that the RSLogix 5000 software is online.
2. Right-click the name of the adapter under I/O Configuration in the Project dialog.
3. Select Properties.

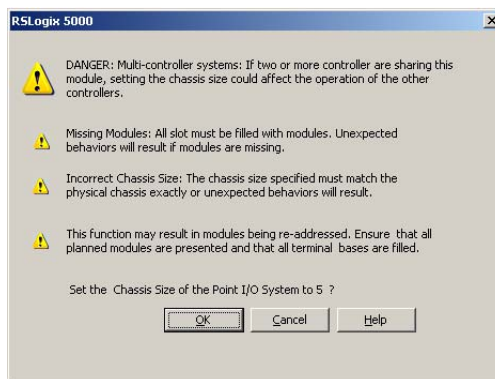
4. Click the Connection tab.
The Module Fault error code displays at the bottom of the Connection tab.



5. Click the Chassis Size tab.
6. Click Set Chassis Size in Module.

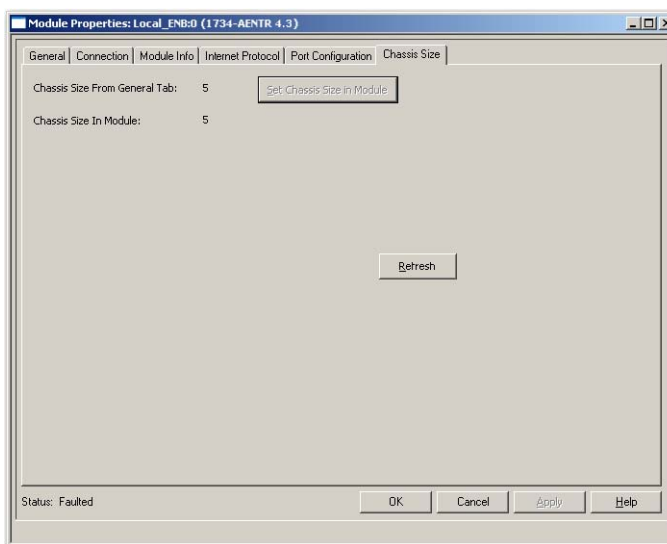


7. Read and acknowledge the warning dialog.



8. Click OK to continue.

9. Notice the chassis size in the module is modified to 5.



10. Click OK.

At this point, your POINTBus status indicator should be solid green. All the yellow triangles in your I/O configuration should be gone.

11. Click OK to close the dialog.

12. Click File → Save to save the project.

Access Module Data

Use the following information to use the I/O adapter data in the ladder logic program:

- POINT_IO_Adapter — the name you gave to your Ethernet adapter
- # — slot number of POINT I/O module
- C — configuration, I = input, O = output

Name	Value	Force Mask	Style	Data Type
IO_Adapter:1:C	{...}	{...}		AB:1734_D02:C:0
IO_Adapter:1:O	2#0000_0000		Binary	SINT
IO_Adapter:2:C	{...}	{...}		AB:1734_D0V4:C:0
IO_Adapter:2:I	{...}	{...}		AB:1734_D0B8:I:0
IO_Adapter:2:O	{...}	{...}		AB:1734_D08:O:0
IO_Adapter:I	{...}	{...}		AB:1734_5SLOT:I:0
IO_Adapter:I.SlotStatusBi...	2#1111_1111_1111_1111_1111_1111_1111_1101		Binary	DINT
IO_Adapter:I.SlotStatusBi...	2#1111_1111_1111_1111_1111_1111_1111_1111		Binary	DINT
IO_Adapter:I.Data	{...}	{...}	Binary	SINT[5]
IO_Adapter:O	{...}	{...}		AB:1734_5SLOT:O:0

Use the controller tags in your ladder program to read input data or write output data.

- For ControlLogix controller information, refer to ControlLogix System User Manual, publication [1756-UM001](#).
- Slot Status Bits: The Slot Status bits display the connection status for each of the POINT I/O modules that use a rack-optimization connection.
 - Bit 0 is reserved for the adapter and always reports a value of 1.
 - Each of the other bits (1 to 63) correspond to a POINT I/O module that you install in the POINT I/O backplane.
 - In this example, we configured the 1734-AENT adapter for both rack-optimization and direct connections. The slot status bits indicate that we installed the module in slot 2 with it operating correctly:

0 = module participating with no errors, and

1 = module not participating or connection error (typically, module removed/missing).

Notes:

Troubleshoot the Adapter

This chapter describes the different status indicators available in the 1734 POINT I/O EtherNet/IP adapter and how to interpret these indicators to help troubleshoot the module.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

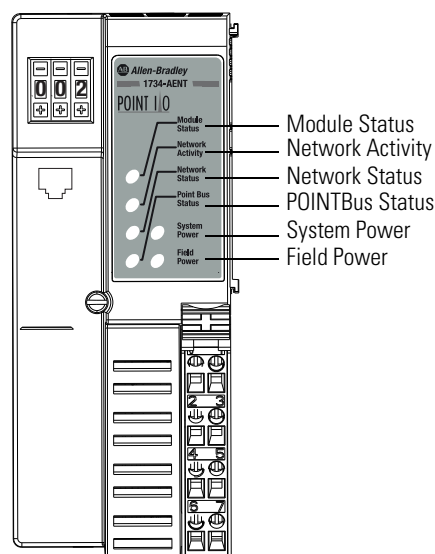
Interpret the Status Indicators

The 1734 POINT I/O EtherNet/IP adapters have the following status indicators:

- Module Status
- Network Activity
- Network Status
- POINTBus Status
- System Power
- Field Power

Status Indicators for POINT I/O Adapters

The following describes the status indicators on the 1734-AENT.



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Status Indicators for 1734-AENT Adapter

Indicator	Status	Description
Module Status	Off	No power applied to device
	Flashing green	Device needs commissioning due to missing, incomplete, or incorrect configuration.
	Solid green	Device is operating normally.
	Flashing Red	Recoverable fault. Complete firmware update, verify address switches.
	Solid red	Unrecoverable fault has occurred: - Self-test failure present (checksum failure, or RAMtest failure at cycle power). - Firmware fatal error.
Network Activity	Off	No link established.
	Flashing green/Off	Transmit or receive activity present.
	Steady green	Link established.
Network Status	Off	Device not initialized. The module does not have an IP address.
	Flashing green	No CIP connections present. Device has an IP address, but no CIP connections are established.
	Green	CIP connections present. Device online and has an IP address, and CIP connections are established.
	Flashing red	One or more CIP connections in timed-out state. Check for I/O module failure and controller operation. Note: This does not apply to POINT Guard I/O™ connection timeout.
	Solid red	Duplicate IP address detected. Verify IP address setting and correct, as needed.
	Flashing red/green	The module is performing a self-test (only occurs during cycle power test).
POINTBus Status	Off	Device not powered – check module status indicator.
	Flashing red/green	Status indicator cycle power test present.
	Flashing red	Recoverable fault occurred: - At cycle power the number of expected modules does not equal the number of modules present - A module is missing - Node fault (I/O connection timeout) occurred.
	Solid red	Unrecoverable fault occurred – the adapter is bus off.
	Flashing green	Firmware (NVS) update in progress.
	Solid green	Adapter online with connections established (normal operation, Run mode).
System Power	Off	Not active; field power is off or DC-DC converter problem present.
	Solid green	System power is on; DC-DC converter is active (5V).
Field Power	Off	Not active; field power is off.
	Solid green	Power is on; 24V DC is present.

Notes:

Adapter Web Dialogs

Overview

The Web dialog of the I/O adapter offers extensive internal and network diagnostics. To view the Web dialogs, enter the IP address of the I/O adapters into your browser.

Enable or Disable the Web Server

With firmware revision 2.011 or later, the web server feature is enabled by default. Use the network address switches to enable or disable the web server for your application.

Disabling the web server in conjunction with using the Implicit Protected Mode decreases the possibility of a security breach.

Value	Description
000	Enables the web server. Cycle power to the module for the setting to take effect. When you apply power, the module status indicator flashes red to indicate that the web server is enabled.
901	Disables the web server. Cycle power to the module for the setting to take effect. When you apply power, the module status indicator flashes red to indicate that the web server is disabled.

IMPORTANT To reduce the likelihood of exploitation and associated security risk, we recommend that you keep the web server disabled.
If you need to enable the web server, consider secondary mitigation such as disabling the web server after using it.

The following section describes how to enable or disable the web server.

Enable Web Server

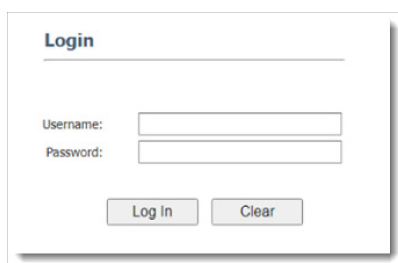
1. Set Rotary switch to 000 and cycle power to the module.
The module status indicator blinks red to indicate that the web server status has changed.
2. Set the switches to the desired IP address and cycle power to the module.
3. In your web browser, enter the IP address of the module.
The web server home page displays.

Disable Web Server

1. Set the switches to 901 and cycle power to the module.
The module status indicator flashes red to indicate that the web server status has changed.
2. Set the switches to the desired IP address and cycle power to the module.
3. In your web browser, enter the IP address of the adapter.
The web server home page does not display.

Log in to the Web Server

When you enter the IP address of the module into your web browser, the Login page appears as shown in the following example. You must authenticate with your credentials before you can access the web server.



The screenshot shows a web browser window with a title bar. The page has a header with the word "Login" in blue. Below the header, there are two input fields: "Username:" and "Password:". Below the input fields, there are two buttons: "Log In" and "Clear".

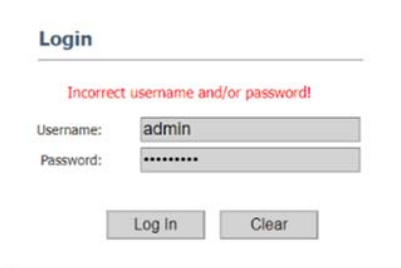
Mandatory First-time Password Change

You must change the default password after you log in to the web server for a module that is in the out-of-box state, or when the module has been reset to factory default.

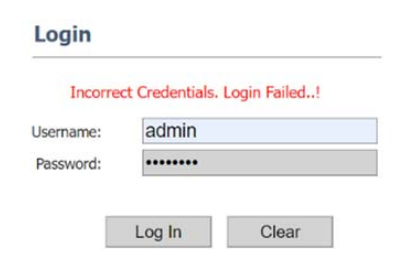
After you log in with the default username and password, the Change Password page appears as shown in the following examples.

First and second unsuccessful login attempts

Third unsuccessful login attempt



The screenshot shows a web browser window with a title bar. The page has a header with the word "Login" in blue. Below the header, there is a red error message: "Incorrect username and/or password!". Below the error message, there are two input fields: "Username:" and "Password:". The "Username:" field contains the text "admin". The "Password:" field contains a series of asterisks. Below the input fields, there are two buttons: "Log In" and "Clear".

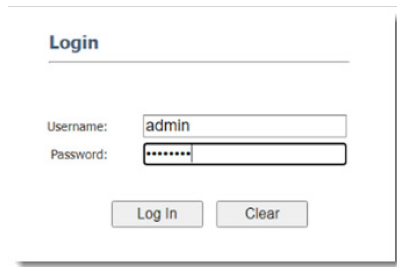


The screenshot shows a web browser window with a title bar. The page has a header with the word "Login" in blue. Below the header, there is a red error message: "Incorrect Credentials. Login Failed..!". Below the error message, there are two input fields: "Username:" and "Password:". The "Username:" field contains the text "admin". The "Password:" field contains a series of asterisks. Below the input fields, there are two buttons: "Log In" and "Clear".

Maximum limit of unsuccessful login attempts

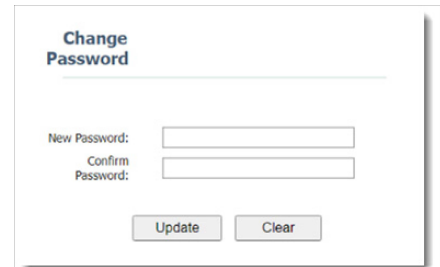
You are allowed up to three unsuccessful attempts to log in to the web server. An “Incorrect username and/or password” error message displays for the first and second unsuccessful attempts. On the third unsuccessful attempt, an “Incorrect Credentials. Login Failed..!” error message displays and you are locked out of the web server for one minute.

Default login example



The 'Login' dialog box contains two input fields: 'Username:' with the text 'admin' and 'Password:' with masked characters. Below the fields are two buttons: 'Log In' and 'Clear'.

Change password example

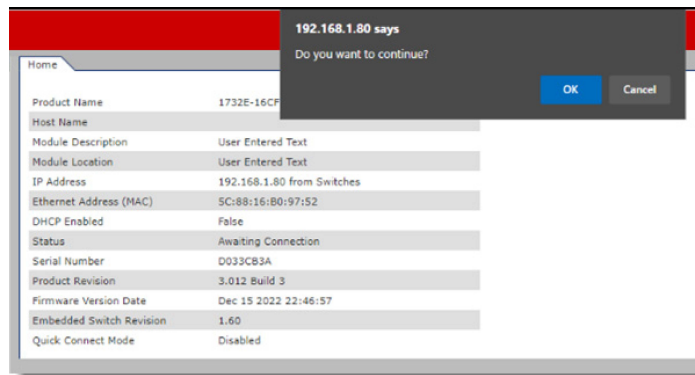


The 'Change Password' dialog box contains two input fields: 'New Password:' and 'Confirm Password:'. Below the fields are two buttons: 'Update' and 'Clear'.

Session Timeout (Inactivity Timeout)

The web server monitors webpage usage and locks you out of the current session if no input or movement is detected for 10 minutes. The webpage goes inactive until you reauthenticate to resume your session. You can also choose to return to the Login page.

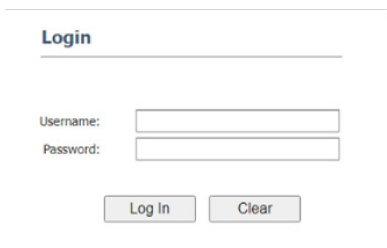
Inactivity notification



The inactivity notification dialog box is overlaid on a 'Home' page. The notification box has a red header and asks '192.168.1.80 says Do you want to continue?' with 'OK' and 'Cancel' buttons. The background page shows a table of system information.

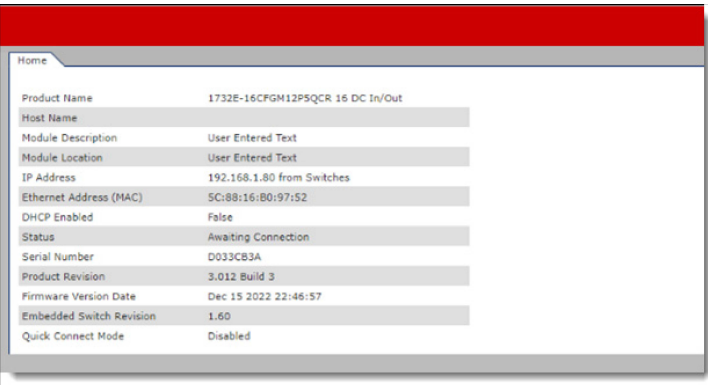
Product Name	1732E-16CP
Host Name	
Module Description	User Entered Text
Module Location	User Entered Text
IP Address	192.168.1.80 from Switches
Ethernet Address (MAC)	5C:88:16:80:97:52
DHCP Enabled	False
Status	Awaiting Connection
Serial Number	D033CB3A
Product Revision	3.012 Build 3
Firmware Version Date	Dec 15 2022 22:46:57
Embedded Switch Revision	1.60
Quick Connect Mode	Disabled

Click cancel to return to Login page



The 'Login' dialog box is shown again, identical to the first example, with 'Username:' and 'Password:' fields and 'Log In' and 'Clear' buttons.

Click OK to reauthenticate and resume session



Work with the Home Page

Use the adapter diagnostics home page to access other adapter diagnostics webpages and see the following information.

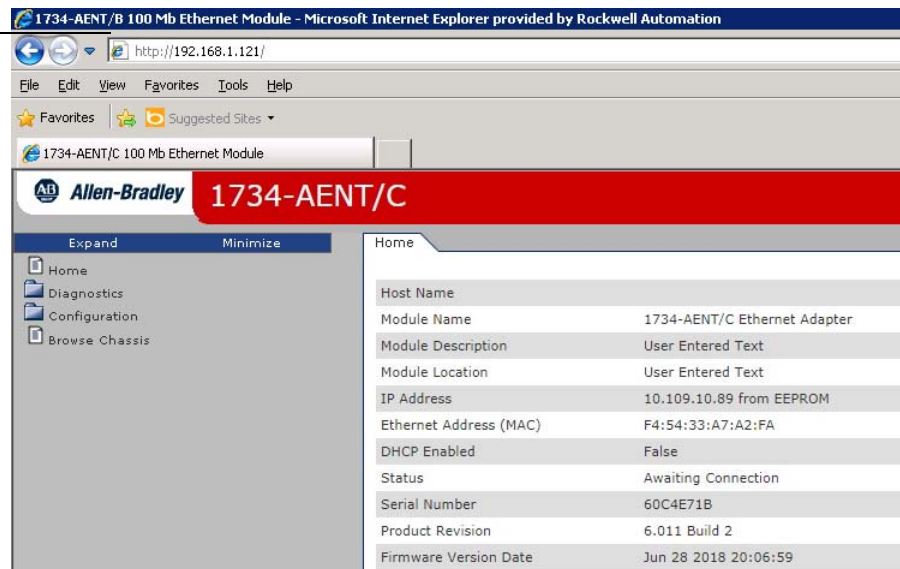
- Host Name
- Module Name
- Module Description
- Module Location
- IP address
- MAC address
- DHCP Enabled
- Status
- Serial Number
- Product Revision
- Firmware revision Date

To display and work with the adapter diagnostics home page, follow these procedures.

IMPORTANT	Make sure that your PC Internet LAN setting and your TCP/IP settings are configured to access the subnet on which your adapter communicates.
------------------	--

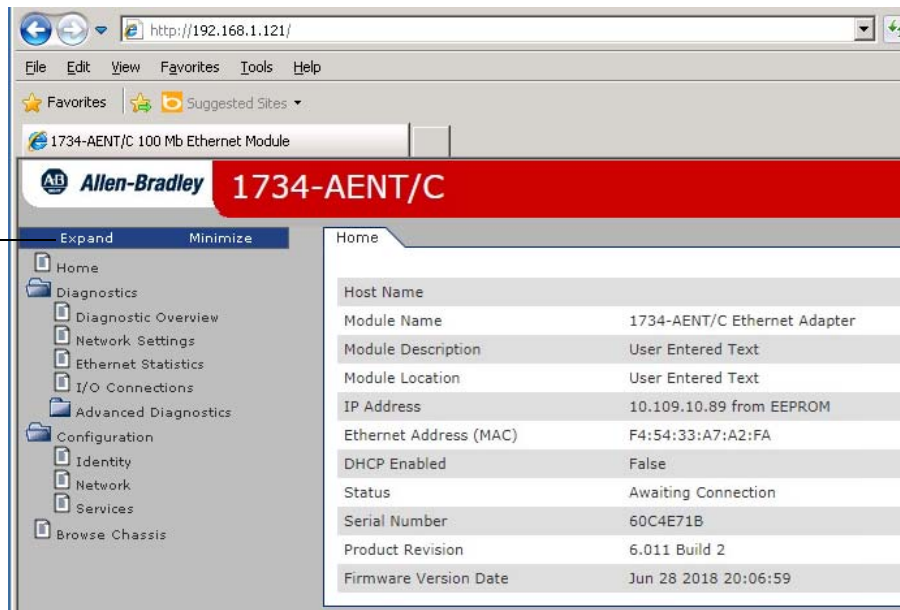
1. From your web browser, enter the adapter IP address to see the home page.

Enter the adapter IP address
to see the home page.



2. From the home page, click Expand to show options, or minimize to see Diagnostics, Configuration, and Browse Chassis options without the expansion.

Click Expand to show
options.



3. From the home page, complete one of these, as desired.
 - Click one of the following to access <https://ab.rockwellautomation.com>.
 - Allen-Bradley logo at the top of the page
 - Visit <https://ab.rockwellautomation.com> for additional information statement under Resources
 - Click Rockwell Automation at the top right to go to <https://www.rockwellautomation.com>.
 - Click the following to see additional diagnostics webpages.

- Diagnostics - Diagnostic overview, Network Settings, Ethernet Statistics, I/O Connections, Advanced Diagnostics
- Configuration - Identity, Network, Services
- Browse Chassis

Work with the Diagnostics Pages

To work with the Diagnostics options, follow these procedures.

1. From the home page, click Diagnostics or Expand to see the following diagnostics options from the panel at the left.
 - Diagnostic overview
 - Network settings
 - Ethernet statistics
 - I/O connections
 - Advanced Diagnostics
2. In the Refresh Rate field, you can type a refresh rate, noting that the default rate is 15 seconds.
3. From the panel at the left or tabs at the top of the page, click one of the diagnostics options to see the corresponding page.

Click tabs to see the corresponding page.

Click from this panel to see the corresponding page.

Type a refresh rate.

The screenshot shows the Allen-Bradley 1734-AENT/C web interface. The left sidebar contains a tree view with the following structure:

- Home
- Diagnostics
 - Diagnostic Overview
 - Network Settings
 - Ethernet Statistics
 - I/O Connections
 - Advanced Diagnostics
- Configuration
 - Identity
 - Network
 - Services
- Browse Chassis

The top header features tabs for Diagnostic Overview, Network Settings, Ethernet Statistics, and I/O Connections. The main content area displays the following information:

- Ethernet Link**

Media Speed (10/100Mb)	100Mbps
Half or Full Duplex	Full Duplex
Autonegotiate Status	Autonegotiation completed
- System Resource Utilization**

CPU Utilization	22.6% (22.7%[pk])
Module Uptime	6 days, 05h:47m:36s
- CIP Connection Statistics**

Current CIP Msg Connections	0
CIP Msg Connection Limit	32
Max Msg Connections Observed	0
Current CIP I/O Connections	1
CIP I/O Connection Limit	31
Max I/O Connections Observed	1

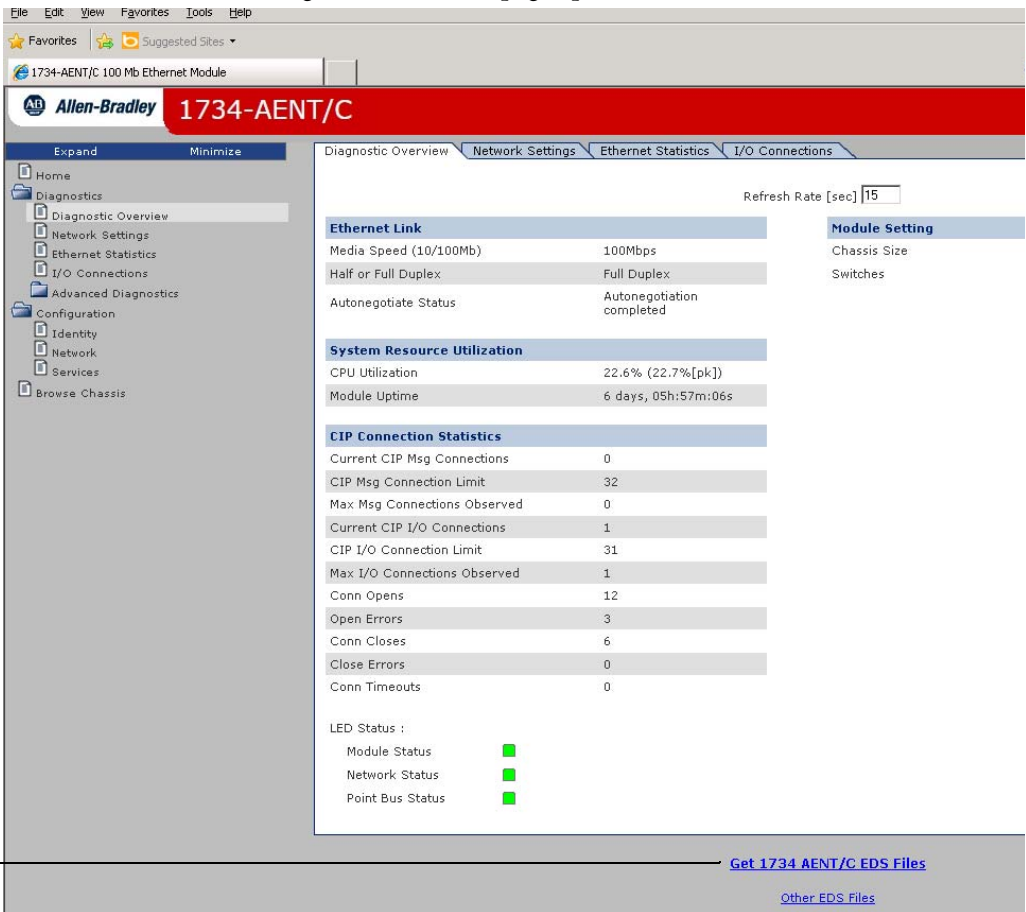
On the right side of the main content area, there is a 'Refresh Rate [sec]' field set to 15, and a 'Module Setting' button.

Use the Diagnostic Overview Page

To use the Diagnostic Overview page for general diagnostics information, follow this procedure.

1. Click Diagnostic Overview from the tab at the top of the page or panel on the left.

The Diagnostic Overview page opens.



The screenshot shows the Allen-Bradley 1734-AENT/C Diagnostic Overview page. The left sidebar contains a tree view with the following items: Home, Diagnostics (expanded), Diagnostic Overview (selected), Network Settings, Ethernet Statistics, I/O Connections, Advanced Diagnostics, Configuration, Identity, Network, Services, and Browse Chassis. The main content area displays the following information:

- Ethernet Link**

Media Speed (10/100Mb)	100Mbps
Half or Full Duplex	Full Duplex
Autonegotiate Status	Autonegotiation completed
- System Resource Utilization**

CPU Utilization	22.6% (22.7%[pk])
Module Uptime	6 days, 05h:57m:06s
- CIP Connection Statistics**

Current CIP Msg Connections	0
CIP Msg Connection Limit	32
Max Msg Connections Observed	0
Current CIP I/O Connections	1
CIP I/O Connection Limit	31
Max I/O Connections Observed	1
Conn Opens	12
Open Errors	3
Conn Closes	6
Close Errors	0
Conn Timeouts	0
- LED Status :**
 - Module Status: ■
 - Network Status: ■
 - Point Bus Status: ■

At the bottom of the page, there is a link to [Get 1734 AENT/C EDS Files](#) and a link to [Other EDS Files](#).

Download EDS files for
your adapter

2. From the Diagnostic Overview page, view the following:

- Ring Status
 - Network Topology
 - Network Status
 - Ring Supervisor
- System Resource Utilization
 - CPU Utilization
 - Module Uptime
- CIP Connection Statistics
 - Current CIP MSG Connections
 - CIP MSG Connection Limit
 - Max msg Connections Observed

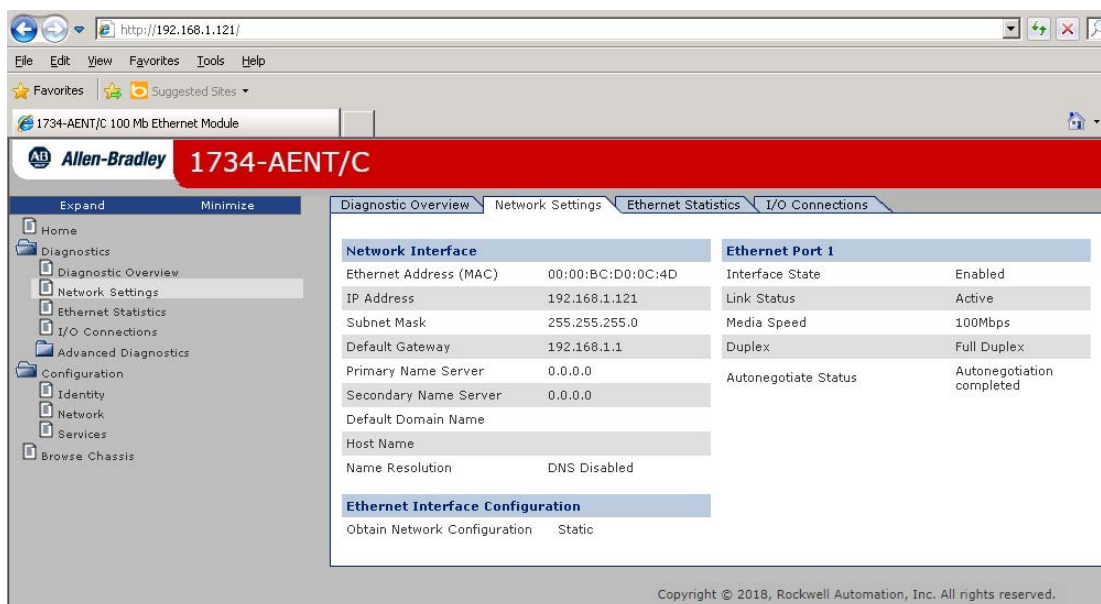
- Current CIP I/O Connections
- CIP I/O Connection Limit
- Max I/O Connections Observed
- Conn Opens
- Open Errors
- Conn Closes
- Close Errors
- Conn Timeout
- Status
- Module Settings
 - Chassis Size
 - Switches

Use the Network Settings Page

To use the Network Settings page for network-related information, follow this procedure.

1. Click Network Settings from the tab at the top of the page or panel on the left.

This opens the Network Settings page.



2. From the Network Settings page, view the following:
 - Network Interface
 - MAC address (MAC)
 - IP address

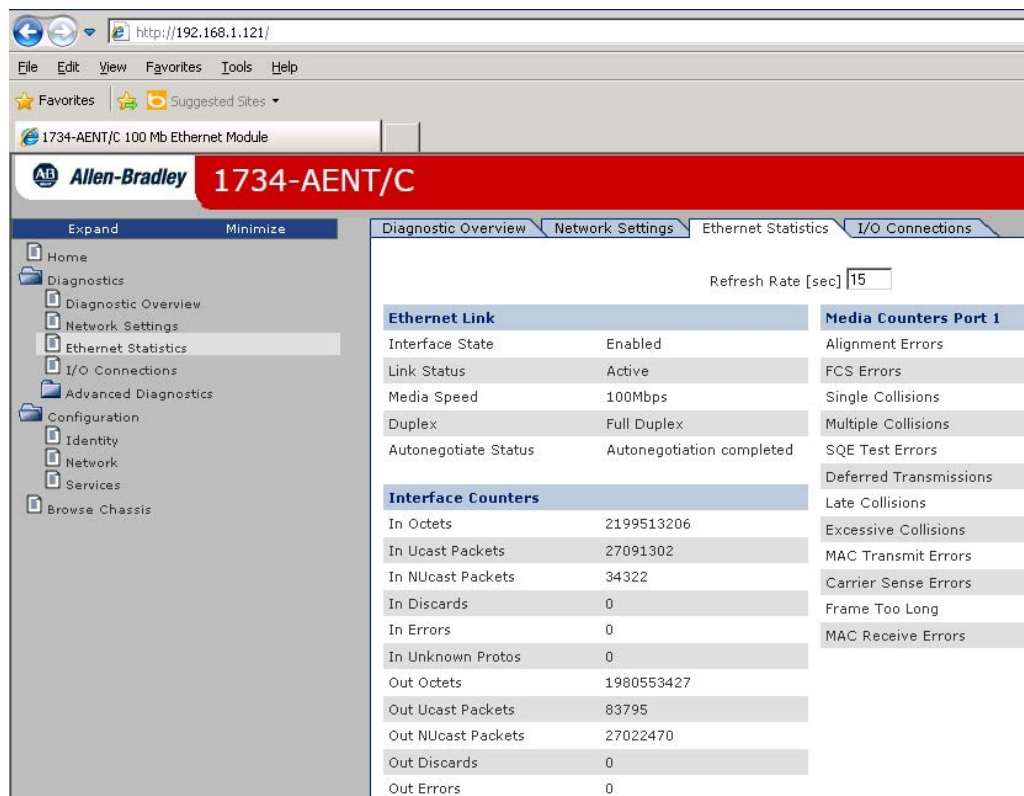
- Subnet Mask
 - Default Gateway
 - Primary Name Server
 - Secondary Name Server
 - Default Domain Name
 - Host Name
 - Name Resolution
- Ethernet Interface Configuration
 - How the Network Configuration was obtained - Static or Dynamic
- Ethernet Port 1
 - Interface State
 - Link Status
 - Media Speed
 - Duplex
 - Autonegotiate Status
- Ethernet Port 2
 - Interface State
 - Link Status
 - Media Speed
 - Duplex
 - Autonegotiate Status

Use the Ethernet Statistics Page

To use the Ethernet Statistics page for information about the Ethernet link and interface and media counters, use this procedure.

1. Click the Ethernet Statistics tab at the top of the page or on the left panel.

The Ethernet Statistics page opens.



2. From the Ethernet Statistics page, view the following:

- Ethernet Link
 - Media Speed, Half, or full-duplex, Autonegotiate Status
- Interface Counters
 - In Octets, In Ucast Packets, In NUCast Packets, In Discards, In Errors, In Unknown Protos, Out Octets, Out Ucast Packets, Out NUCast Packets, Out Discards, Out Errors
- Media Counters
 - Alignment Errors
 - FCS Errors
 - Single Collisions
 - Multiple Collisions
 - SQE Test Errors
 - Deferred Transmissions
 - Late Collisions
 - Excessive Collisions
 - MAC Transmit Errors
 - Carrier Sense Errors
 - Frame Too Long
 - MAC Receive Errors

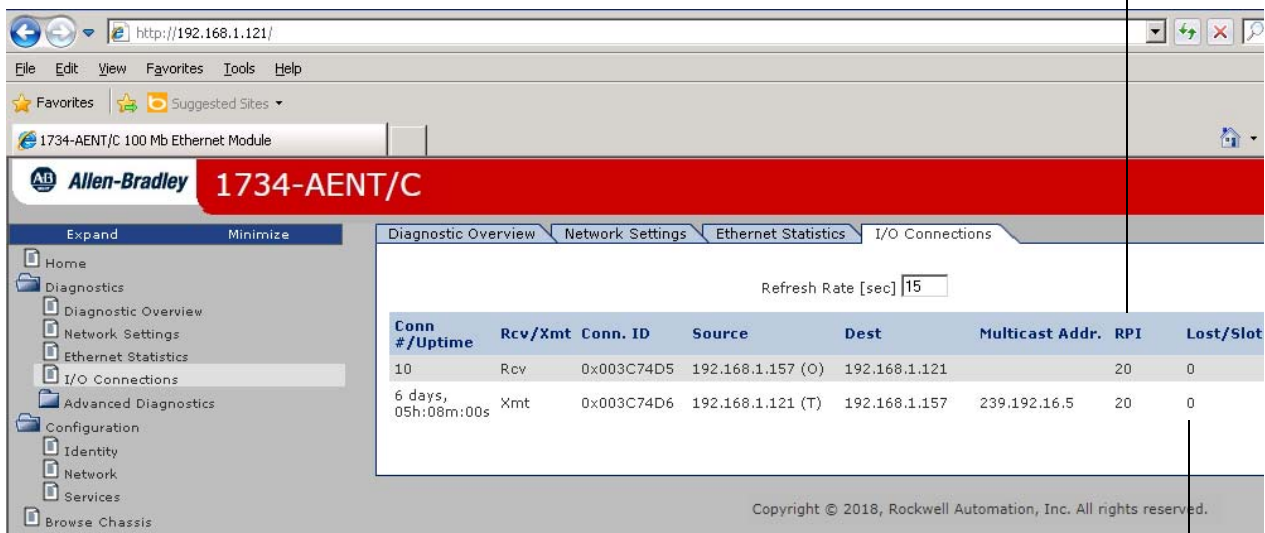
Use the I/O Connections Page

To use the I/O Connections page for CIP I/O (Class 1) connection information, follow this procedure.

1. Click I/O Connections from the tab at the top of the page or panel on the left.

The I/O Connections page opens.

The top value in this column representing Lost shows the number of packets from the missing source.



The value for Slot shows the slot number of the I/O module this connection is controlling.

2. From the I/O Connections page, view the following:
 - Connection Number
 - Uptime
 - Receive and Transmit (Rcv/Xmt)
 - Connection ID
 - Source IP address with an indication of the following:
 - (O) for originator
 - (T) for target
 - Destination IP address
 - Multicast Address
 - Requested Packet Interval (RPI)
 - Lost/Slot that shows the number of lost packets and the slot number for the connection, with a slot value of 0 indicating that this is a rack-optimization connection
 - Size of data in bytes

Use the Advanced Diagnostics Page

To use the Advanced Diagnostics page to review message services, use this procedure.

1. Click Advanced Diagnostics from the tab at the top of the page or panel on the left. The Advanced Diagnostics page opens.
2. From the Advanced Diagnostics page, select Backplane Statistics to see values similar to that shown.

The screenshot shows the Allen-Bradley 1734-AENT/C web interface. The left sidebar contains a navigation tree with the following items: Home, Diagnostics (expanded), Diagnostic Overview, Network Settings, Ethernet Statistics, I/O Connections, Advanced Diagnostics (selected), Backplane Statistics, Module Statistics, Configuration, Identity, Network, Services, and Browse Chassis. The main content area is titled 'Backplane Statistics' and 'Module Statistics'. The 'Backplane Statistics' section includes a 'Refresh Rate [sec]' dropdown set to 15. Below this are three tables: 'BP Bus Load Counters', 'BP Counters', and 'BP Driver Interrupt'. The 'Module Statistics' section includes a table titled 'Module Timeout Counters' with 21 slots, each showing 'Slot No', 'Timeout Counters', and 'Slot No'.

BP Bus Load Counters	
BP Bus Load	0.54%
BP Bus Peak Load	1.29%
BP Packet Rate [pkt/s]	120

BP Counters	
Receive Interrupt	28029435
Receive Message Counter	28029435
Receive IO Message	28027360
Receive EM Message	2073
Receive Queue Full Discard	0
Transmit Interrupt	28105728
Transmit Message	28105728
Transmit Length Error	0
Transmit Queue Full Discard	0
BP Interrupt Errors	2
BP Overrun Error	0
BP Driver Interrupt	56135162
BP Signal Interrupt	56135162
BP Driver Reset	0
BP Driver ISR Discard	0
BP Rx Bytes	198633768
BP Tx Bytes	172389007
BP Transmit Not Ready	101633
Unused	0
Unused	0
Unused	4

Module Timeout Counters					
Slot No	Timeout Counters	Slot No	Timeout Counters	Slot No	Timeout Counters
1	0	22	0	43	0
2	0	23	0	44	0
3	0	24	0	45	0
4	0	25	0	46	0
5	0	26	0	47	0
6	0	27	0	48	0
7	0	28	0	49	0
8	0	29	0	50	0
9	0	30	0	51	0
10	0	31	0	52	0
11	0	32	0	53	0
12	0	33	0	54	0
13	0	34	0	55	0
14	0	35	0	56	0
15	0	36	0	57	0
16	0	37	0	58	0
17	0	38	0	59	0
18	0	39	0	60	0
19	0	40	0	61	0
20	0	41	0	62	0
21	0	42	0	63	0

3. From the Advanced Diagnostics page, select Module Statistics to see values similar to that shown.

The screenshot shows the Allen-Bradley 1734-AENT/C web interface. The left sidebar contains a navigation tree with the following items: Home, Diagnostics (expanded), Diagnostic Overview, Network Settings, Ethernet Statistics, I/O Connections, Advanced Diagnostics (selected), Backplane Statistics, Module Statistics, Configuration, Identity, Network, Services, and Browse Chassis. The main content area is titled '1734-AENT/C' and has two tabs: 'Backplane Statistics' and 'Module Statistics' (selected). The 'Module Statistics' tab shows a 'Refresh Rate [sec]' of 15 and a 'Slot Number' of 1. Below this, there are three sections: 'Module information', 'Connection information', and 'Scanlist information'. Each section contains a table of data.

Module information		Diagnostics Counter	
Module Location Status	True	Module Total Time Out Counter	0
Module Status	True	Module Time Out Counter	0
Module Slot Number	1	Module Uplink Time Out Counter	0
Connection information		IO Connection Request Counter	3
EM Connection State	Established	IO Connection Response Counter	3
Consume Connection State	Established	IO Connection Response Error Counter	0
Produce Connection State	Established	EM Request Counter	959
Fwd Open Receive Status	Received	EM Response Counter	685
Scanlist information		EM Response Error Counter	274
Scan List Config Valid	Valid	Consume Connection Packet Counter	1083517
Scan List Scan Type	COS		
Scan List Out Epr [ms]	500		
Scan List In Epr [ms]	40		

Work with the Configuration Pages

To work with the Configuration pages, follow these procedures.

IMPORTANT

The values on these pages are in nonvolatile memory. Changes to these parameters do not take effect until you reset or cycle power through the I/O adapters.

IMPORTANT

If you set the value of the I/O adapters switch to 888 and then power cycle the module, the following occurs:

- The DHCP Enabled function is enabled (set to True).
- The Ethernet link is negotiated automatically. The Auto Negotiate function is set to True.
- The web server is enabled. The Disabled web server function is disabled.
- The Ethernet ports are disabled. Both ports are re-enabled once the switches are returned to their previous value and power is cycled.
- The password for this page resets to the factory default, which is "password".

Note the value of the switches before you enter the 888 value because you must return the adapter to those values once this process is complete.

1. From the home page, click Configuration or Expand to see the Configuration options, if needed.
2. From the Configuration page, click one of the following:
 - Identity
 - Network
 - Services

A login dialog opens as shown. The dialog may vary in appearance depending on your operating system and browser.



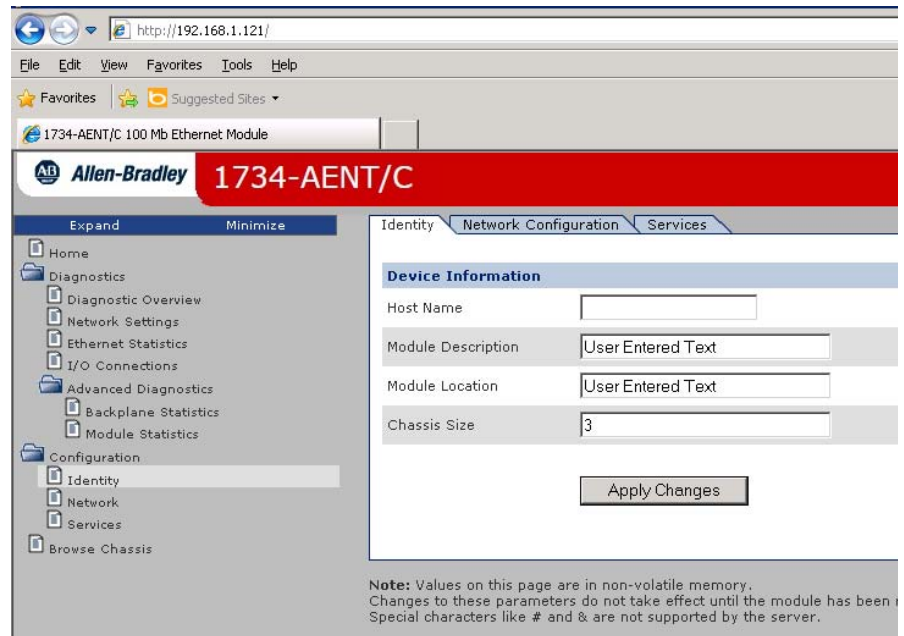
3. From the user name and password dialog, enter values, noting the following:
 - The values for user name and password are case-sensitive.
 - The default user name is admin.
 - The default password is “password”.
4. Click OK to log in. After you log in, you can go to any of the Configuration pages without having to log in again.
5. Refer to the section of this manual that corresponds to the section you clicked:
 - Identity
 - Network Configuration
 - Services

Use the Identity Page

To use the Identity page to make entries for the host name, module description, module location, and chassis size, use this procedure.

1. Click Identity from the tab at the top of the page or panel on the left.

The Identity page opens.

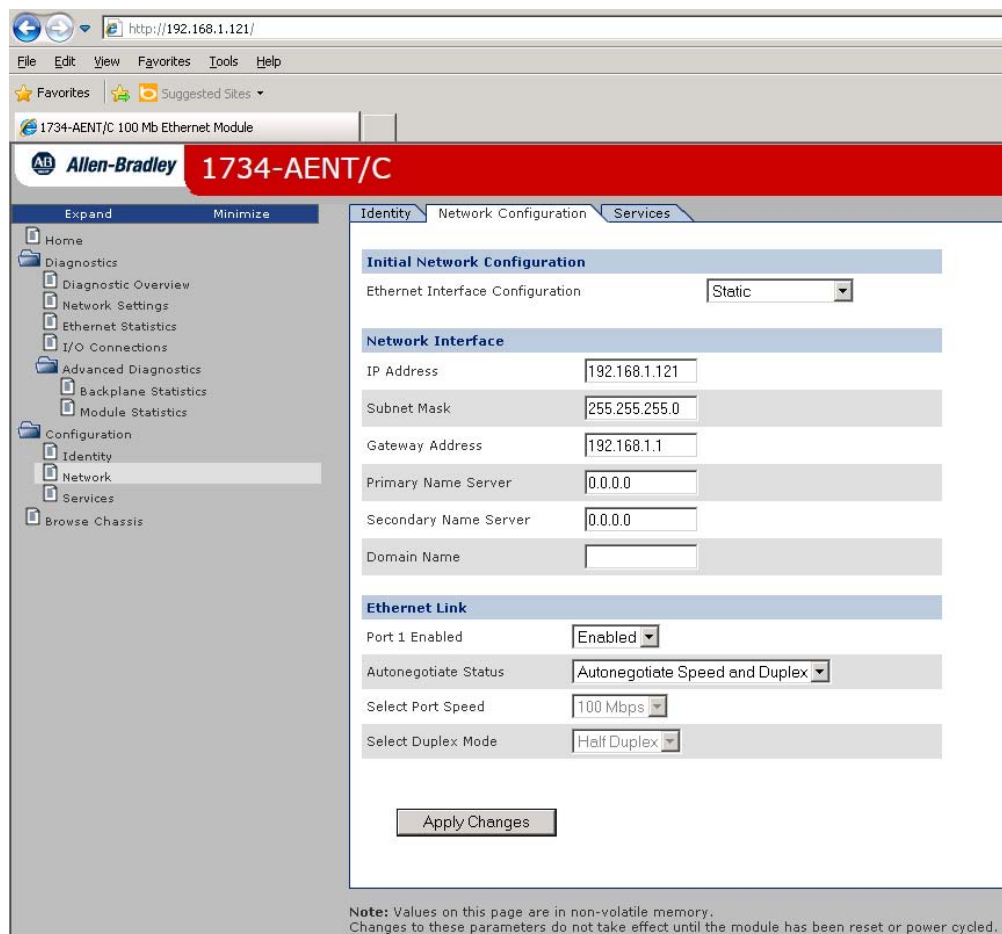


2. From the Identity page, complete entries for the following, noting that the description and location help you identify where modules are in the facility:
 - Host Name – the name a Domain Name Server uses to resolve this adapter's IP address
 - Module Description
 - Module Location
 - Chassis Size - the value that shows the number of I/O modules plus the adapter. This value must match the number of I/O modules plus 1 for the adapter before any I/O connections are allowed.
3. Click Apply Changes to save the modified values.

Use the Network Configuration Page

To use the Network Configuration page to make entries for enabling or disabling DHCP and setting TCP/IP parameters and Ethernet link operation, follow this procedure.

1. Click Network from the tab at the top of the page or panel on the left. The Network Configuration page opens.



2. From the Network Configuration page, complete these entries, noting that values for Network Interface are disabled when DHCP is Dynamic DHCP and port speed and duplex mode are disabled when Autonegotiate Speed and Duplex is selected.
 - For Initial Network Configuration:
 - Ethernet Interface Configuration
 - Static
 - Dynamic DHCP
 - For Network Interface, select from these choices:
 - IP address
 - Subnet Mask
 - Gateway Address

- Primary Name Server
 - Secondary Name Server
 - Domain Name
 - For Ethernet Link, select from these choices:
 - Autonegotiate Status
 - Autonegotiate Speed and Duplex
 - Force Speed and Duplex
 - Select Port Speed - 10 megabits, 100 megabits
 - Select Duplex Mode - half-duplex, full-duplex
3. From the Network Configuration page, click Apply Changes to save the modified values.

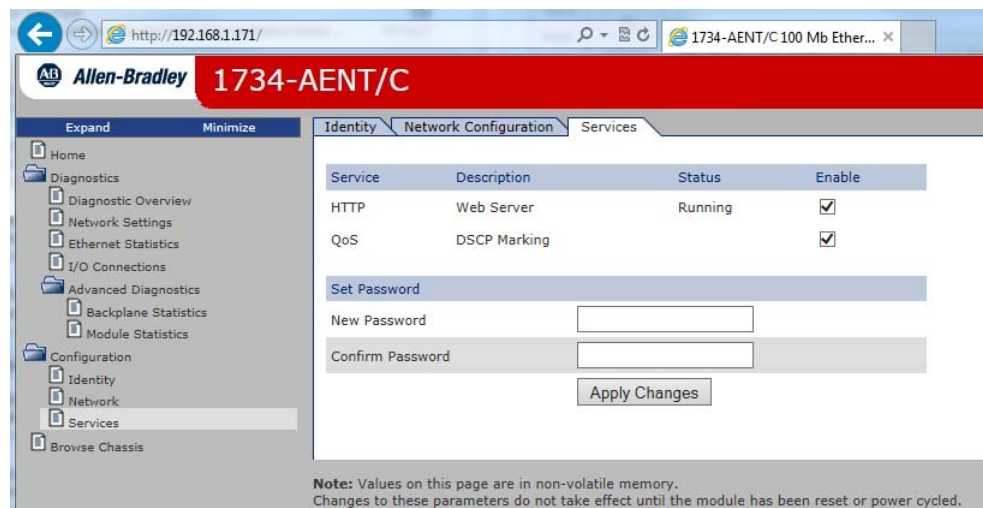
IMPORTANT

If there is a mismatch in duplex between the adapter and the connected equipment you may experience 'intermittent connectivity.' For complete details and information on how to resolve this, refer to Troubleshoot EtherNet/IP Networks Application Technique, publication [ENET-A003](#).

Use the Services Page

To use the Services page to change the password for the Configuration webpage or disable the web server, complete these procedures.

1. Click Services from the tab at the top of the page or panel on the left. The Services page opens.



2. From the Services page, make these entries.
 - Click in the Enable box to change whether the web server runs after the module is reset.

- Click in the Enable box to change whether QoS is enabled or disabled after the module is reset.
 - Change the password by typing the new value for New Password and Confirm Password, noting the following:
 - The entry is case-sensitive.
 - The default value is the word password.
3. Click Apply Changes.

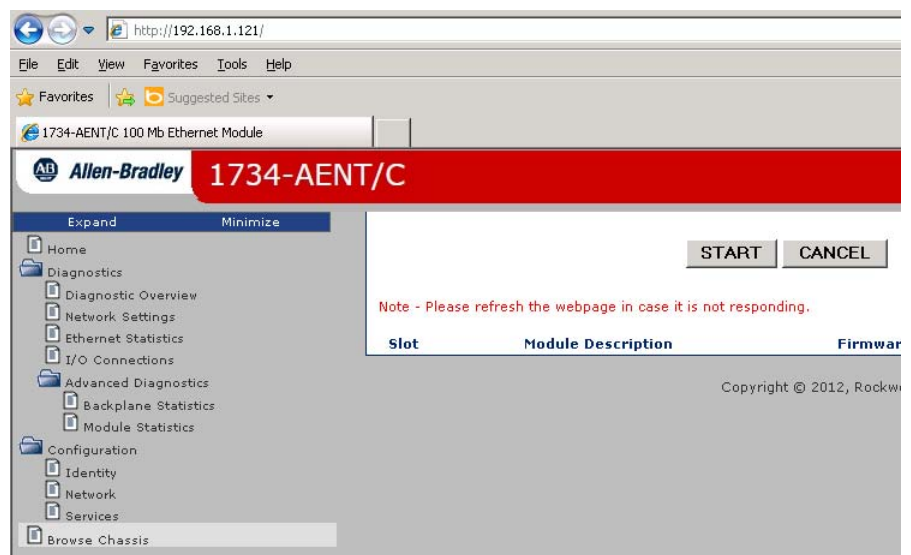
Work with the Browse Chassis Page

Use the Browse Chassis page for the following:

- See what modules are present on the system.
- Run a query from slot 1 to slot 63.
- Display the modules found based on the query.
- Provide an easy way to see which modules the adapter recognizes on your system.

To work with the Browse Chassis page, follow these procedures.

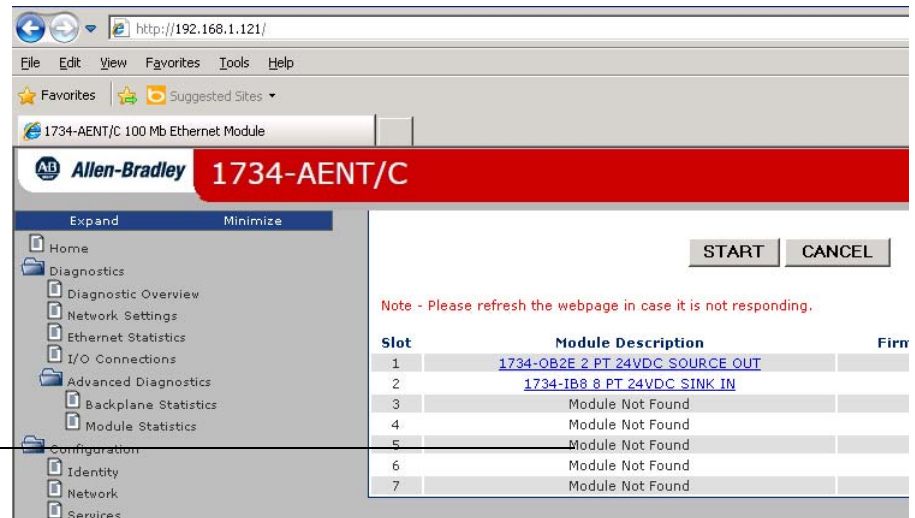
1. From the home page, click Browse Chassis.
The following page displays.



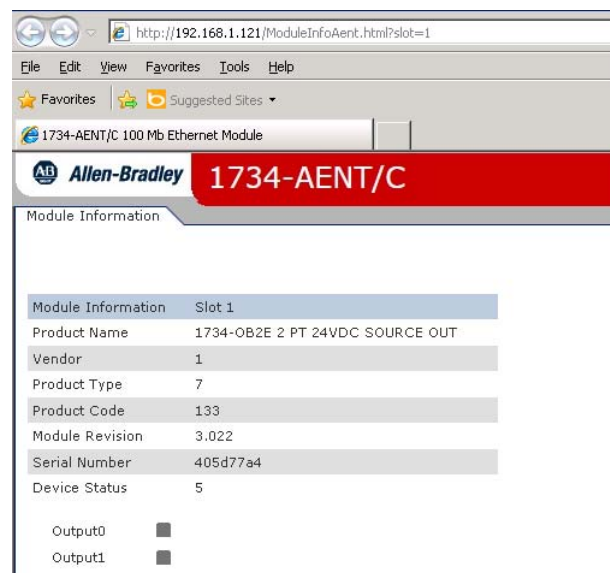
2. Click START to run a query. A Browser Chassis page opens.
Note that module hyperlinks are inactive before the query completes or is canceled.

After completing a query, here is how a typical Browse Chassis page looks.

If there is no response to the query, the Module not found message appears.



- To view information about a particular module, click the corresponding Module Description hyperlink. In the following example, the first Module has been selected:



The 1734 Module Information page opens showing this information about the module:

- Product Name
- Vendor
- Product Type
- Product Code
- Module Revision
- Serial Number
- Status

Notes:

Configure the RSLinx Ethernet Communication Driver

Overview

To communicate with your adapter over your network, you must configure the RSLinx Ethernet Communication Driver (AB_ETH) or the EtherNet/IP driver (AB-ETHIP). You can configure the AB_ETH driver with the IP addresses of all the Ethernet devices on your system. You need one of these drivers to download the example application programs in this manual.

See the table for a list of the contents of this appendix.



ATTENTION: Check the Product Compatibility and Download Center (PCDC) to verify the compatibility between your POINT I/O module and the POINT I/O adapter.

Install the RSLinx Software

Use this procedure to install the RSLinx software on your computer.

1. Insert the CD in the CD-ROM drive.

Note that the CD-ROM supports Autorun. Once inserted into the CD-ROM drive, if you have Autorun configured, the installation automatically starts at the first setup screen.

If Autorun is not configured for your CD-ROM drive, go to step 2.

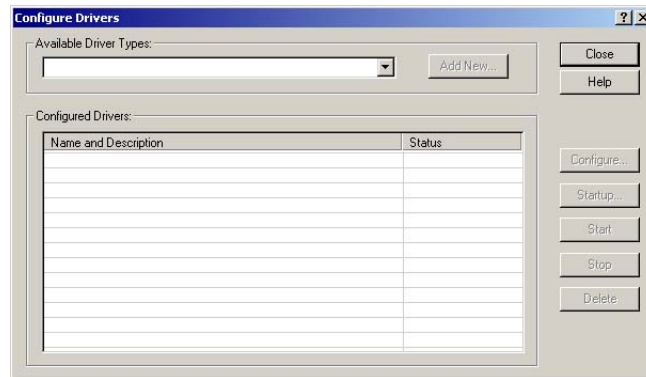
2. From the Start menu, choose Run. The Run dialog opens.
3. Type D:/setup (if it doesn't appear automatically), where D: is your CD-ROM drive letter.
4. Click OK.

The progress bar, followed by the welcome screen opens.

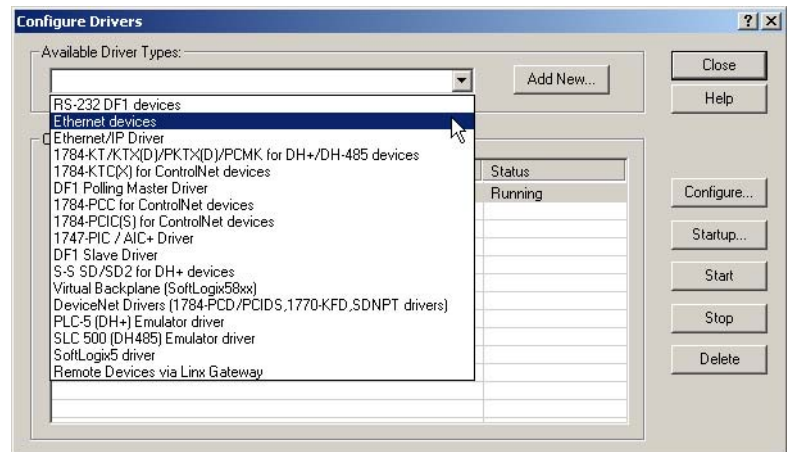
Configure the AB_ETH Driver

To configure the AB-ETH Ethernet communication driver, perform the following steps:

1. Start the RSLinx software.
2. From the Communications menu, select Configure Drivers.



3. Select Ethernet Devices from the list and click Add/New...

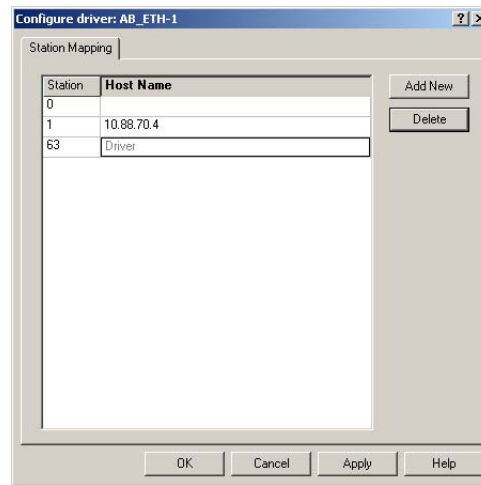


4. Select the default driver name (for example, AB_ETH-1) or type in a name and click OK.



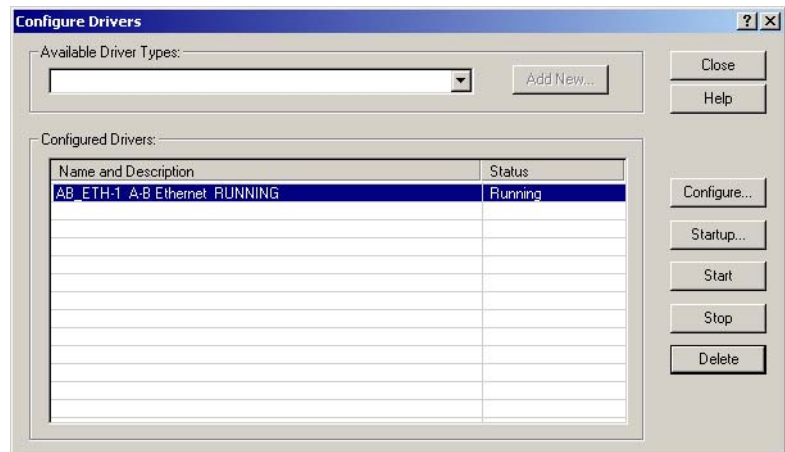
The Configure driver dialog opens.

- Click Add New and enter the IP address or Host Name of your Ethernet device (for example, 10.88.70.4, Pump1).



- Repeat step 6 for each additional Ethernet device you need to access.
- After entering the IP addresses, click Apply.
- Click OK to close the Configure driver dialog.

The new driver appears in the list of configured drivers. Your list displays the drivers you configured on your workstation.

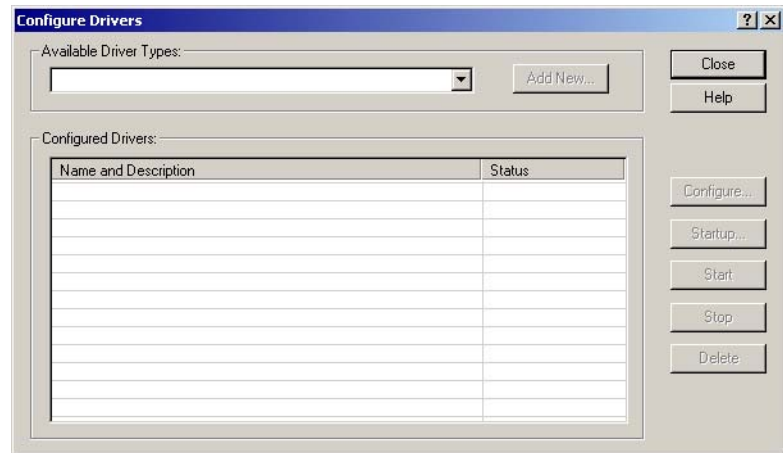


- Close the RSLinx software.

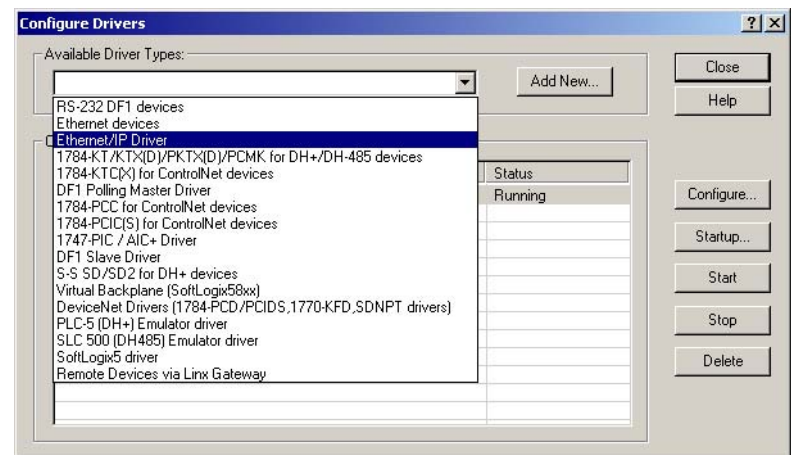
Configure the AB_ETHIP Driver

To configure the AB-ETHIP Ethernet communication driver, perform the following steps.

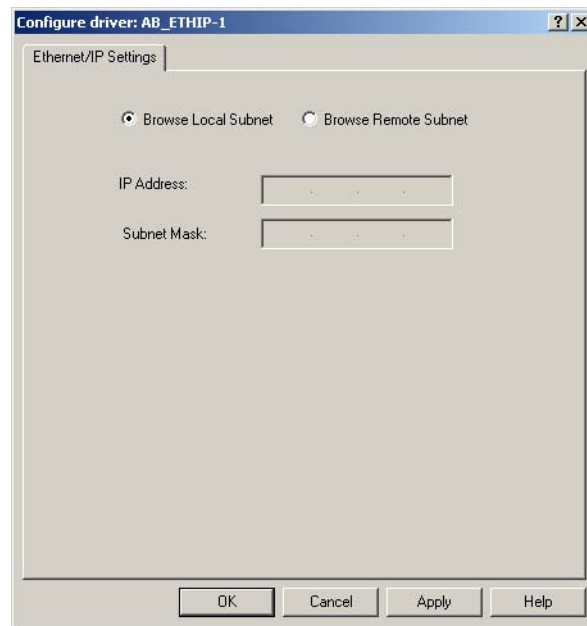
1. Start the RSLinx software.
2. From the Communications menu, select Configure Drivers.



3. Select EtherNet/IP Devices from the list and click Add/New...



The Configure Driver dialog box opens.

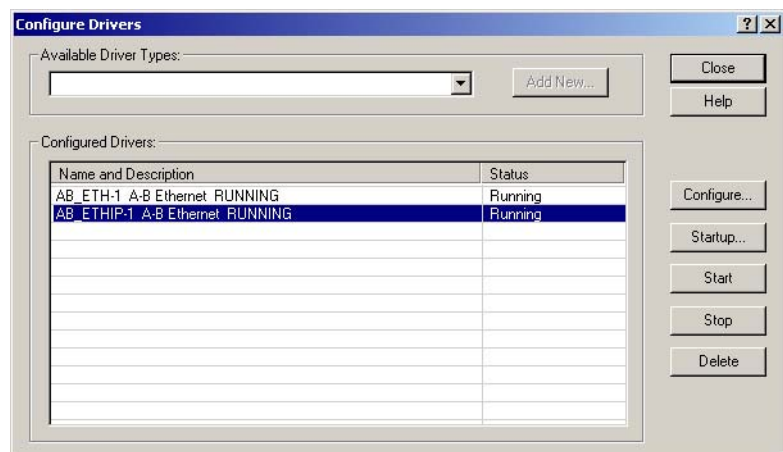


Make sure the Browse Local Subnet button is selected.

The RSLinx software browses your local subnet and automatically reads the IP address.

4. Click OK.

The AB-ETHIP driver is now configured and appears in the configured drivers window.



5. Close the RSLinx software.

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