

EtherNet/IP Network Devices



Important User Information

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

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

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

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

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

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



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

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



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



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

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Send Email

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This manual describes how to use EtherNet/IP communication modules in Logix 5000™ control systems.

Make sure that you are familiar with the following:

- Use of a controller in a Logix 5000 control system, including these following controllers:
 - CompactLogix™ 5380 controllers
 - Compact GuardLogix® 5380 controllers
 - CompactLogix 5480 controller
 - ControlLogix® 5580 controllers
 - GuardLogix® 5580 controllers
- Use of an EtherNet/IP network
- Use of various software applications from Rockwell Automation

Additional Resources

These documents contain more information concerning related products from Rockwell Automation.

Table 1 - Additional Resources

| Resource | Description |
|--|---|
| EtherNet/IP Media Planning and Installation Manual | Describes how to use the required media components and how to plan for, install, verify, troubleshoot, and certify your EtherNet/IP network. This manual is available from the Open DeviceNet Vendor Association (ODVA) at: http://www.odva.org . |
| Ethernet Design Considerations Reference Manual, publication ENET-RM002 | Describes basic Ethernet concepts: |
| EtherNet/IP Socket Interface Application Technique, publication ENET-AT002 | Describes the socket interface that you can use to program MSG instructions to communicate between a Logix 5000™ controller and Ethernet devices. In this case, the interface is used because the Ethernet devices that do not support the EtherNet/IP application protocol. Such devices include barcode scanners, RFID readers, or other standard Ethernet devices. |
| EtherNet/IP Embedded Switch Technology Application Guide, publication ENET-AP005 | Describes how to install, configure, and maintain linear and Device Level Ring (DLR) networks by using Rockwell Automation® EtherNet/IP devices that are equipped with embedded switch technology. |
| EtherNet/IP Parallel Redundancy Protocol Application Technique, publication ENET-AT006 | Describes how you can configure a Parallel Redundancy Protocol (PRP) network with the 1756-EN2TP EtherNet/IP communication module and a Stratix® 5400 or 5410 switch. |
| Integrated Architecture and CIP Sync Configuration Application Technique, publication IA-AT003 | Provides information on CIP Sync and the IEEE 1588-2008 Precision Time Protocol. |
| Integrated Motion on the EtherNet/IP Network Reference Manual, publication MOTION-RM003 | Reference descriptions of the AXIS_CIP_DRIVE attributes and the Studio 5000 Logix Designer® application Control Modes and Methods |
| Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 | Describes how to use electronic keying in Logix 5000 control system applications. |

Table 1 - Additional Resources

| Resource | Description |
|--|--|
| Network Technology webpage, http://www.rockwellautomation.com/rockwellautomation/products-technologies/network-technology/overview.page? | Provides information on reference architectures and white papers on networking. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation® industrial system. |
| Product Certifications website, http://www.rockwellautomation.com/rockwellautomation/certification/overview.page | Provides declarations of conformity, certificates, and other certification details. |

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

EtherNet/IP Features in Allen-Bradley Network Devices

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EtherNet/IP networks offer a comprehensive suite of messages and services for many automation applications. This open network standard uses standard Ethernet communication products to support real-time I/O messaging, information exchange, and general messaging. Other features to all EtherNet/IP network devices include the following:

- Support for messaging, produced/consumed tags, and distributed I/O
- DNS addressing
- Internet Group Management Protocol (IGMP) snooping (enabled by default) and querier (disabled by default)
- Port configuration and diagnostics
- Email server

EtherNet/IP networks also support CIP Safety applications. Such support makes the simultaneous transmission of safety and standard control data and diagnostics information over a common network possible.

EtherNet/IP Device-Specific Features

EtherNet/IP network devices can provide the following functionality. See the user manual for your device for details.

- Support for the following communication rates:
 - 10 Mbps
 - 100 Mbps
 - 1 Gbps

IMPORTANT

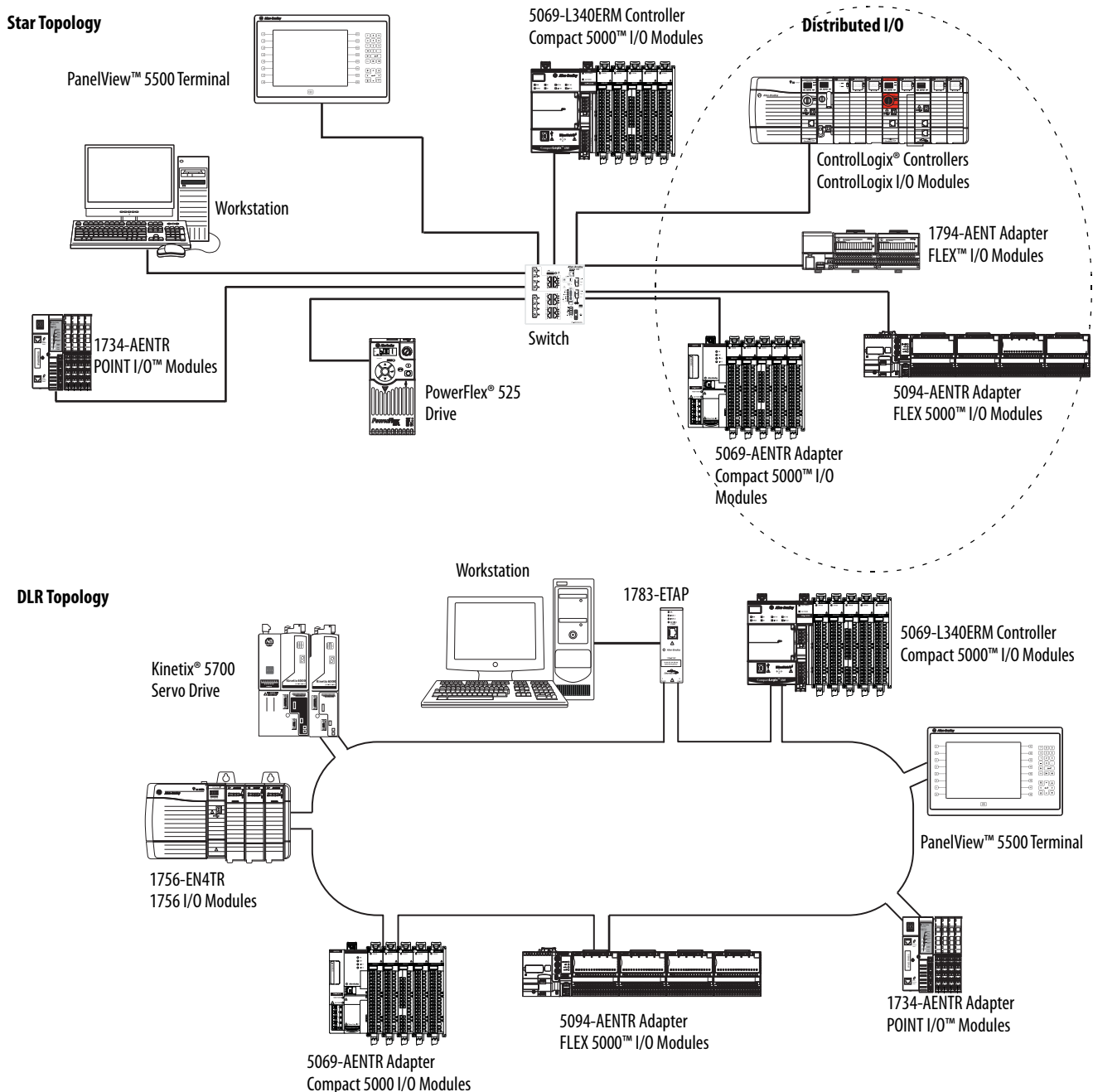
- When a device uses the 1 Gbps network communication rate, it supports only full-duplex mode.
- When a device uses the 10 Mbps or 100 Mbps network communication rate, it supports full-duplex and half-duplex mode.

- Linear network
- Device Level Ring protocol
- Option to operate as a Ring supervisor on a DLR network
- Parallel Redundancy Protocol
- Duplicate IP address detection
- Socket interface
- Email client

Figure 1 shows how Rockwell Automation® EtherNet/IP network devices fit into a control system. In this example, the following can occur over the EtherNet/IP network:

- Controllers produce and consume tags
- Controllers initiate MSG instructions that send and receive data
- Control of I/O modules
- Use of Integrated Motion over an EtherNet/IP network
- Workstations configure devices, and upload or download projects to the controllers

Figure 1 - EtherNet/IP Network Devices in a Control System



Duplicate IP Address Detection

Duplicate IP address detection verifies that an IP address does not match any other device IP address on the network when you perform either of these tasks:

- Connect the device to a EtherNet/IP network.
- Change the IP address on the device.

If the IP address matches that of another device on the network, the EtherNet/IP port on the device transitions to conflict mode. In conflict mode, these conditions exist:

- OK status indicator blinks red.
- Network (NET) status indicator is solid red.
- If the device has a text display, the following message scrolls across the 4-character display:

<IP_address_of_this_device> Duplicate IP -
<MAC_address_of_duplicate_node_detected>

For example: 10.88.60.196 Duplicate IP - 00:00:BC:02:34:B4

Duplicate IP Address Resolution

This table describes how to resolve duplicate IP addresses.

| Duplicate IP Address Detection Conditions | Resolution Process |
|---|---|
| <ul style="list-style-type: none"> • Both devices support duplicate IP address detection • Second device is added to the network after the first device is operating on the network | <ol style="list-style-type: none"> 1. The device that began operation first uses the IP address and continues to operate without interruption. 2. The device that begins operation second detects the duplication and enters Conflict mode. |
| <ul style="list-style-type: none"> • Both devices support duplicate IP address detection • Both devices were powered up at approximately the same time | <p>Both EtherNet/IP devices enter Conflict mode.</p> <p>To resolve this conflict, follow these steps:</p> <ol style="list-style-type: none"> a. Assign a new IP address to one of the devices. b. Cycle power to the other device or disconnect and reconnect all Ethernet cables from the other device. |
| <p>One device supports duplicate IP address detection and a second device does not</p> | <ol style="list-style-type: none"> 1. Regardless of which device obtained the IP address first, the device that does not support IP address detection uses the IP address and continues to operate without interruption. 2. The device that supports duplicate IP address detection detects the duplication and enters Conflict mode. |

DNS Addressing

To qualify the device address further, use DNS addressing to specify a host name for a device. When you specify a host name for the device, you also specify a domain name and DNS servers. DNS addressing makes it possible to create similar network structures and IP address sequences under different domains.

DNS addressing is necessary only if you refer to the device by host name, such as in path descriptions in MSG instructions.

To use DNS addressing, follow these steps.

1. Assign a host name to the device.

A network administrator can assign a host name. Valid host names must be IEC-1131-3 compliant.

2. Configure the device IP address:

In the DNS server, the host name must match the IP address of the device.

IMPORTANT Make sure the DNS enable bit is set.

- If you use Logix Designer application, version 28 or later, to configure your device, the enable bit is set and DNS addressing is successful.
 - If you use RSLinx® Classic software, version 2.41.00 or later, to configure your device, the enable bit is cleared and DNS addressing fails.
-

3. In the Logix Designer application, add the device to the I/O.

IMPORTANT If a child device resides in the same domain as its parent device, type the host name. If the domain name of the child device differs from its parent device, type the host name and the domain name (host.domain)

IMPORTANT You can also use DNS addressing in a device profile in the I/O configuration tree or in a message path. If the domain name of the destination device differs from the source device, use a fully qualified DNS name (hostname.domainname). For example, to send a message from AEN2TR1.location1.companyA to AEN2TR1.location2.company, the host names match, but the domains differ. Without the entry of a fully qualified DNS name, the device adds the default domain name to the specified host name.

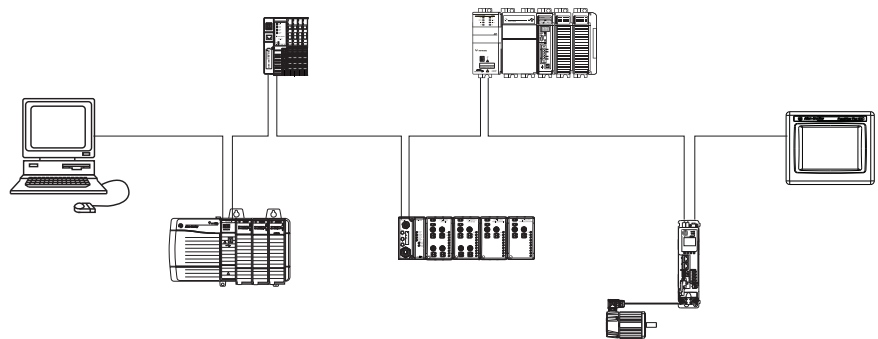
Socket Interface

Some EtherNet/IP devices support the use of a CIP Generic MSG instruction to request socket services. For more information, see EtherNet/IP Socket Interface Application Technique, [ENET-AT002](#).

Linear Network

A linear network is a collection of devices that are daisy-chained together. The EtherNet/IP embedded switch technology lets you implement this topology at the device level. No additional switches are required.

Figure 2 - Example Linear Network



The following are advantages of a linear network.

- Simple installation
- Reduced wiring and installation costs
- No special software configuration required
- Improved CIP Sync application performance on linear networks

The primary disadvantage of a linear network is that any break of the cable disconnects all devices downstream from the break from the rest of the network.

Device Level Ring

Device Level Ring (DLR) is an EtherNet/IP protocol that is defined by the Open DeviceNet® Vendors' Association (ODVA). DLR provides a means to detect, manage, and recover from single faults in a ring-based network.

A DLR network includes the following types of ring nodes.

| Node | Description |
|-------------------------------|---|
| Ring supervisor | <p>A ring supervisor provides these functions:</p> <ul style="list-style-type: none"> • Manages traffic on the DLR network • Collects diagnostic information for the network <p>A DLR network requires at least one node to be configured as ring supervisor.</p> <p>IMPORTANT: By default, the supervisor function is disabled on supervisor-capable devices, so they are ready to participate on a linear or star network or as a ring node on a DLR network.</p> <p>In a DLR network, you must configure at least one of the supervisor-capable devices as the ring supervisor before physically connecting the ring. If you do not, the DLR network does not work.</p> |
| Ring participants | <p>Ring participants provide these functions:</p> <ul style="list-style-type: none"> • Process data that is transmitted over the network. • Pass on the data to the next node on the network. • Report fault locations to the active ring supervisor. <p>When a fault occurs on the DLR network, ring participants reconfigure themselves and relearn the network topology.</p> |
| Redundant gateways (optional) | <p>Redundant gateways are multiple switches that are connected to one DLR network and also connected together through the rest of the network.</p> <p>Redundant gateways provide DLR network resiliency to the rest of the network.</p> |

Depending on their firmware capabilities, both devices and switches can operate as supervisors or ring nodes on a DLR network. Only switches can operate as redundant gateways.

For more information about DLR, see the EtherNet/IP Device Level Ring Application Technique, publication [ENET-AT007](#).

Parallel Redundancy Protocol

Parallel Redundancy Protocol (PRP) is defined in international standard IEC 62439-3 and provides high-availability in Ethernet networks. PRP technology creates seamless redundancy by sending duplicate frames to two independent network infrastructures, which are known as LAN A and LAN B.

A PRP network includes the following components.

| Component | Description |
|-------------------------------------|--|
| LAN A and LAN B | Redundant, active Ethernet networks that operate in parallel. |
| Double attached node (DAN) | An end device with PRP technology that connects to both LAN A and LAN B. |
| Single attached node (SAN) | An end device without PRP technology that connects to either LAN A or LAN B. A SAN does not have PRP redundancy. |
| Redundancy box (RedBox) | A switch with PRP technology that connects devices without PRP technology to both LAN A and LAN B. |
| Virtual double attached node (VDAN) | An end device without PRP technology that connects to both LAN A and LAN B through a RedBox. A VDAN has PRP redundancy and appears to other nodes in the network as a DAN. |
| Infrastructure switch | A switch that connects to either LAN A or LAN B and is not configured as a RedBox. |

For more information about PRP topologies and configuration guidelines, see the EtherNet/IP Parallel Redundancy Protocol Application Technique, publication [ENET-AT006](#).

EtherNet/IP Network Specifications

Table 2 - EtherNet/IP Network Specifications

| Cat. No. | Connections | | CIP Unconnected Messages (backplane + Ethernet) | Ethernet Node Count, Max | Packet Rate Capacity (packets/second) ⁽⁵⁾ | | SNMP Support (password required) |
|---|-------------|--------------------------------|---|--------------------------|---|--|----------------------------------|
| | TCP | CIP | | | I/O | HMI and MSG | |
| 1734-AENT, 1734-AENTR | 32 | 20 | 32 | — | 5000 | 900 | No |
| 1738-AENT, 1738-AENTR | 32 | 20 | 32 | — | 5000 | 900 | No |
| 1756-ENBT | 64 | 128 ⁽³⁾ | 64 + 64 | — | 5000 | 900 | Yes |
| 1756-EN2F, 1756-EN2T, 1756-EN2TXT, 1756-EN2TR, 1756-EN2TRXT | 128 | 256 ⁽³⁾ | 128 + 128 | — | IMPORTANT: Packet rates for ControlLogix EtherNet/IP communication modules depend on series and firmware revision. | 2000 | Yes |
| 1756-EN2TSC | 128 | 256 ⁽³⁾ | 128 + 128 | — | | 930 with encryption 1800 without encryption | Yes |
| 1756-EN3TR | 128 | 256 ⁽³⁾ | 128 + 128 | — | | 2000 | Yes |
| 1756-EN4TR, 1756-EN4TRXT | 512 | 1000 I/O 528 ⁽⁴⁾ | 256+256 | — | <ul style="list-style-type: none"> 50,000 without CIP Security 25,000 with integrity 15,000 with integrity and confidentiality | <ul style="list-style-type: none"> 3,700 without CIP Security 2,700 with integrity 1,700 with integrity and confidentiality | Yes |
| 1756-EWEB | 64 | 128 ⁽³⁾ | 128 + 128 | — | — | 900 | Yes |
| 1756-L81E | 512 | — | — | 100 | — | — | — |
| 1756-L82E | 512 | — | — | 175 | — | — | — |

Table 2 - EtherNet/IP Network Specifications (continued) (continued)

| Cat. No. | Connections | | CIP Unconnected Messages (backplane + Ethernet) | Ethernet Node Count, Max | Packet Rate Capacity (packets/second) ⁽⁵⁾ | | SNMP Support (password required) |
|--|--|--------------------------|---|--------------------------|--|--------------------------------------|----------------------------------|
| | TCP | CIP | | | I/O | HMI and MSG | |
| 1756-L83E | 512 | — | — | 250 | — | — | — |
| 1756-L84E | 512 | — | — | 250 | — | — | — |
| 1756-L85E | 512 | — | — | 300 | — | — | — |
| 1768-ENBT | 32 ⁽¹⁾ 64 ⁽²⁾ | 64 ⁽³⁾ 128 | 32 + 32 | — | 5000 | 960 | Yes |
| 1769-L3xE | 64 | 32 ⁽³⁾ | 32 + 32 | — | 4000 | 760 | Yes |
| 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B | 120 | 256 | 256 | 4 | 6000 @ 500 bytes/packet | 400 messages/s @ 20% comm. timeslice | Yes |
| 1769-L24ER-QB1B, 1769-L24ER-QBFC1B | 120 | 256 | 256 | 8 | 6000 @ 500 bytes/packet | | Yes |
| 1769-L27ERM-QBFC1B | 120 | 256 | 256 | 16 | 6000 @ 500 bytes/packet | | Yes |
| 1769-L30ER, 1769-L30ERM, 1769-L30ER-NSE | 120 | 256 | 256 | 16 | 6000 @ 500 bytes/packet | | Yes |
| 1769-L33ER, 1769-L33ERM | 120 | 256 | 256 | 32 | 6000 @ 500 bytes/packet | | Yes |
| 1769-L36ERM | 120 | 256 | 256 | 48 | 6000 @ 500 bytes/packet | | Yes |
| 1783-ETAP, 1783-ETAP1F, 1783-ETAP2F | 64 | — | — | — | — | 900 | No |
| 1794-AENT | 64 | 64 | — | — | 9500 | — | Yes |
| 5069-AENRT | 32 | 16 (messaging) | 16 | — | 100000 | 500 | Yes |
| 5069-AEN2TR | | 256 (messaging) | 32 | — | 100000 | 2000 | Yes |
| 5094-AENRT, 5094-AENRTXT, 5094-AEN2TR, 5094-AEN2TRXT | 32 | 16 (messaging) | 16 | — | 100000 | 500 | Yes |
| 5069-L306ER, 5069-L306ERM | 512 | — | 256 | 16 | 128000 | 2000 | Yes |
| 5069-L310ER, 5069-L310ER-NSE, 5069-L310ERM | 512 | — | 256 | 24 | 128000 | 2000 | Yes |
| 5069-L320ER, 5069-L320ERM | 512 | — | 256 | 40 | 128000 | 2000 | Yes |
| 5069-L330ER, 5069-L330ERM | 512 | — | 256 | 60 | 128000 | 2000 | Yes |
| 5069-L340ER, 5069-L340ERM | 512 | — | 256 | 90 | 128000 | 2000 | Yes |
| 5069-L350ERM | 512 | — | 256 | 120 | 128000 | 2000 | Yes |
| 5069-L380ERM | 512 | — | 256 | 150 | 128000 | 2000 | Yes |
| 5069-L3100ERM | 512 | — | 256 | 180 | 128000 | 2000 | Yes |
| 9300-ENA | — | — | — | — | — | — | — |

(1) The 1768-ENBT communication module supports 32 TCP connections with firmware revision 1.

(2) The 1768-ENBT communication module supports 64 TCP connections with firmware revision 2 or later.

(3) CIP connections can be used for all explicit or all implicit applications. For example, a 1756-ENBT module has a total of 128 CIP connections that can be used for any combination of connections.

- (4) There are 1000 CIP I/O connections and 528 CIP messaging connections.
- (5) Total packet rate capacity = I/O Produced Tag, max + HMI/MSG, max. Packet rates vary depending on packet size. For more detailed specifications, see the EDS file for a specific catalog number.

Reserve 10% of the bandwidth (packets/second) of the network device for Explicit Messaging.

Time Synchronization

In certain situations, the I/O modules can synchronize with the adapter before the adapter synchronizes with the system Grandmaster clock. This synchronization occurrence leads to a time difference between the I/O and the Grandmaster clock until the adapter synchronizes with the Grandmaster clock.

In your logic, verify that the adapter is synchronized with the Grandmaster clock (CIPSyncValid) before you initiate time stamp requests or scheduled outputs from your I/O modules. A system with intermediate devices, such as network bridges and switches, can require that you insert a delay until the time stabilizes in the system.

For information on how to verify that the adapter is synchronized to a Grandmaster clock, see CIP Sync Diagnostics in the Integrated Architecture and CIP Sync Configuration Application Technique, publication [IA-AT003](#). This publication also includes information on Time Sync Object Attributes.

Configure a Workstation to Operate on an EtherNet/IP Network

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Before you can connect to the device via an Ethernet cable, you must install an EtherNet/IP driver on your workstation.

A communication driver is required to complete these tasks:

- Upload and download Logix Designer application projects to Logix 5000™ controllers over an EtherNet/IP network
- Collect controller data for electronic operator interfaces, for example, PanelView™ Plus terminals, and visualization software, for example, FactoryTalk® View software
- Update device firmware
- Set or change the IP address.
- Configure the device

Remember the following when you use the RSLinx® Classic software communication drivers:

- EtherNet/IP driver:
 - Supports runtime communications
 - Requires that the workstation is properly connected to the EtherNet/IP network
 - Supports communications over longer distances when compared to the USB driver
- Ethernet devices driver:
 - Requires that you configure the IP addresses to which the software browses and, therefore, the devices with which the device communicates
- USB driver:
 - Convenient method to connect to an unconfigured device and configure the Ethernet port
 - Convenient method to connect to a device when the Ethernet port configuration is unknown
 - Convenient method to update the device firmware
 - Not intended for runtime connections; it is a temporary-use only connection with a limited cabling distance

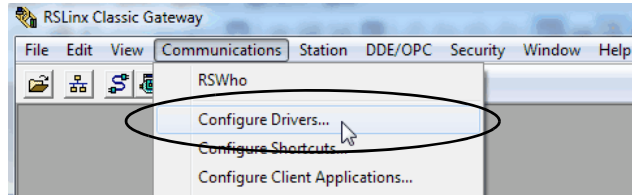
Configure the Ethernet Communication Driver in RSLinx Classic Software

Before you add an Ethernet driver, confirm that these conditions exist:

- The workstation is properly connected to the EtherNet/IP network.
- The workstation IP address and other network parameters are configured correctly.

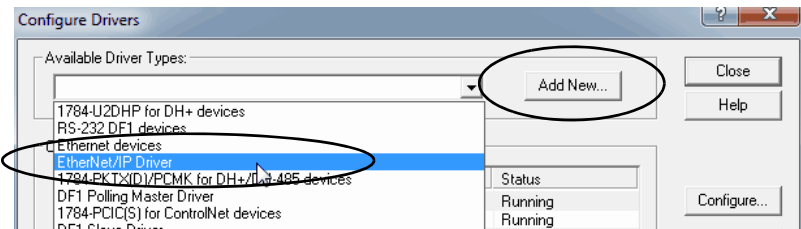
To configure the EtherNet/IP driver, follow these steps.

1. From the Communications menu, choose Configure Drivers.



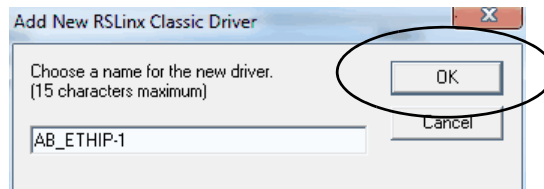
The Configure Drivers dialog box appears.

2. From the Available Driver Types pull-down menu, choose EtherNet/IP Driver.
3. Click Add New.



The Add New RSLinx® Driver dialog box appears.

4. Type a name for the new driver and click OK.

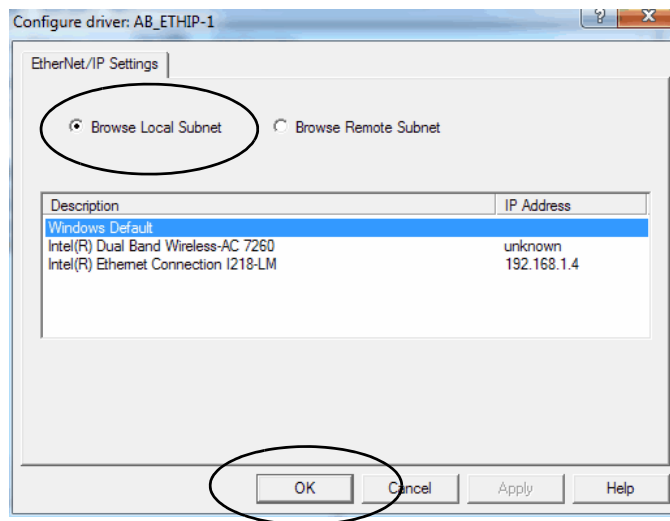


The Configure driver dialog box appears.

5. Click Browse Local Subnet.

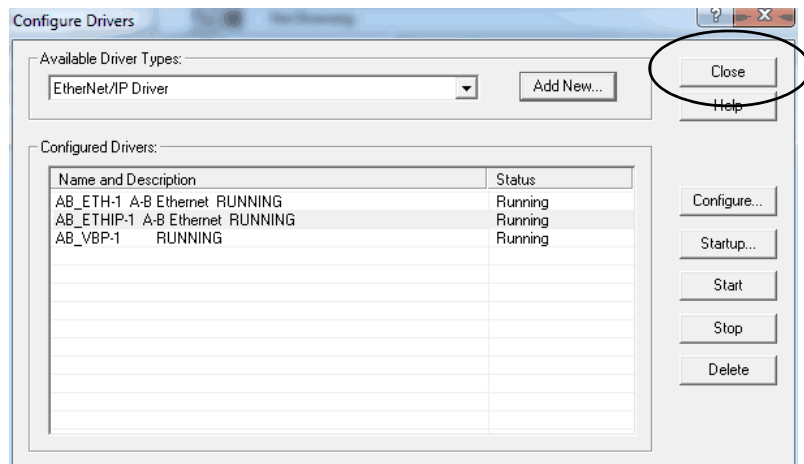
TIP To view devices on another subnet or VLAN from the workstation running RSLinx Classic software, click Browse Remote Subnet.

6. Select the desired driver, and click OK.



The new driver is available on the Configure Drivers dialog box.

7. Click Close.



Configure the USB Communication Driver in RSLinx Classic Software

In RSLinx Classic software, version 3.80.00 or later, a USB driver automatically appears in the software when you connect the USB cable from your workstation to the controller.

The USB driver can take a moment to appear in RSLinx Classic software.

IMPORTANT EtherNet/IP drivers remain visible in RSLinx Classic software after they are configured regardless of whether they are in use or not.

A USB driver appears in RSLinx Classic software only when a USB cable is connected between the workstation and the controller.

Once the cable is disconnected, the driver disappears from RSLinx Classic software.



ATTENTION: The USB port is intended for temporary, local programming purposes only and is not intended for permanent connection. The USB cable is not to exceed 3.0 m (9.84 ft) and must not contain hubs.



WARNING: Do not use the USB port in hazardous locations.

IMPORTANT Do not simultaneously load firmware for multiple devices through a USB port. If you do, one or more of the firmware loads can fail in the middle of the loading process.

If you use the RSLinx Classic software, version 3.80.00 or later, and a USB driver does not appear automatically, complete the following steps.

1. Connect one end of the USB cable to your workstation, and the other end to the USB port on the device.

The RSLinx Found New Hardware Wizard dialog box appears.

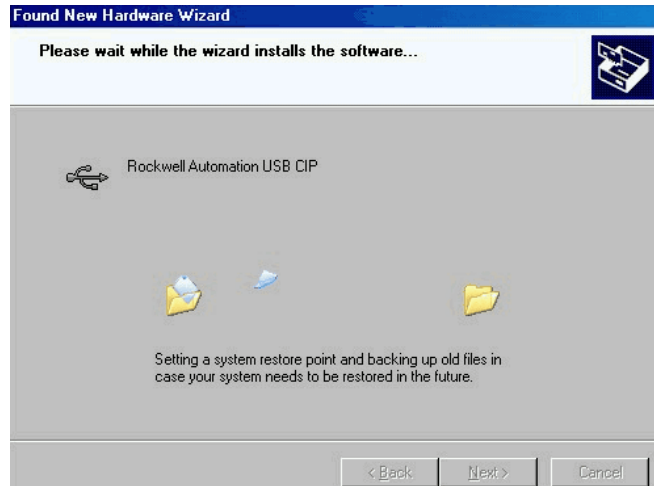
2. Click Install the software automatically (recommended).

3. Click Next.



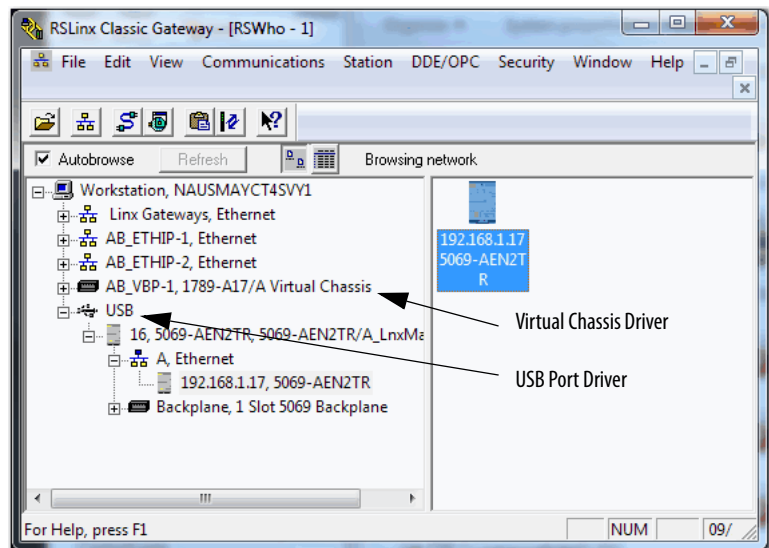
These dialog boxes appear consecutively.

4. Click Finish.



5. In RSLinx Classic software, from the Communications menu, click RSWho.

The RSLinx Workstation organizer appears, and your device appears under two different drivers, a virtual chassis and the USB port.



Notes:

Set an IP Address

| Topic | Page |
|--|------|
| Set the IP Address with the BOOTP/DHCP Utility | 25 |
| Set the IP Address with RSLinx Classic Software | 30 |
| Set the IP Address with Studio 5000 Logix Designer Application | 34 |
| Reset the IP Address to Factory Default Value | 35 |

Set the IP Address with the BOOTP/DHCP Utility

The BOOTP/DHCP tool is a standalone server that you can use to set an IP address. The BOOTP/DHCP tool sets an IP address and other Transport Control Protocol (TCP) parameters.

You can use the BOOTP/DHCP tool to set the IP address when the device powers up in the out-of-box state. That is, the rotary switches are not set to a valid IP address, and the device is DHCP enabled.

Access the BOOTP/DHCP tool from one of these locations:

- Programs > Rockwell Software > BOOTP-DHCP Tool > BOOTP-DHCP Tool
- Tools directory on the Studio 5000® environment installation CD

IMPORTANT Before you start the BOOTP/DHCP tool, remember the following:

- Make sure that you have the hardware (MAC) address of the device.

The hardware address is on a sticker on the side of the device and has a format similar to the following:

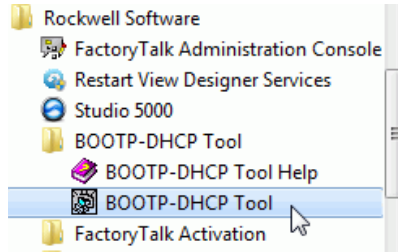
00-00-BC-14-55-35

- Make sure that the workstation that you use to set the IP address has only one connection to the EtherNet/IP network on which the device resides.

The BOOTP/DHCP tool can fail to work if your workstation has multiple connections to the EtherNet/IP network.

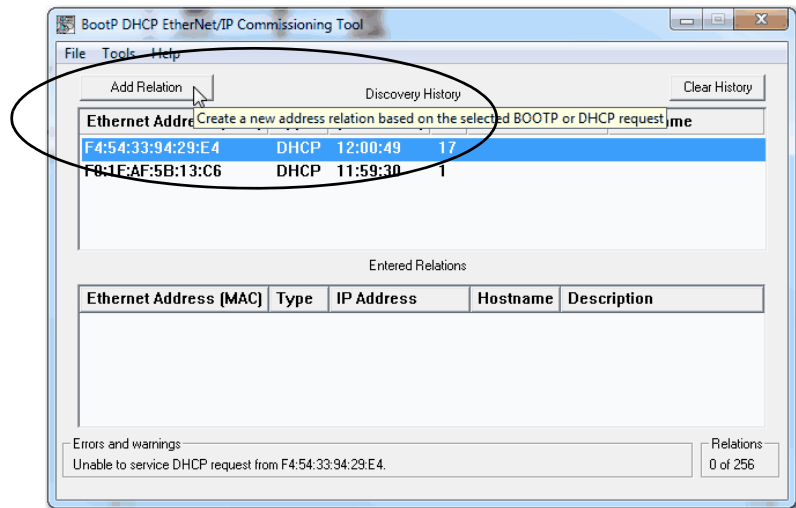
To set the IP address with BOOTP/DHCP tool, complete the following steps.

1. Confirm that the device is connected to the network.
2. Start the BOOTP-DHCP tool.



The MAC ID of the device appears in the Request History window.

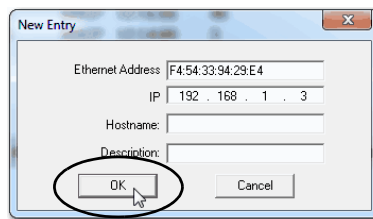
3. Select the appropriate device and click Add to Relation List.



The New Entry dialog box appears.

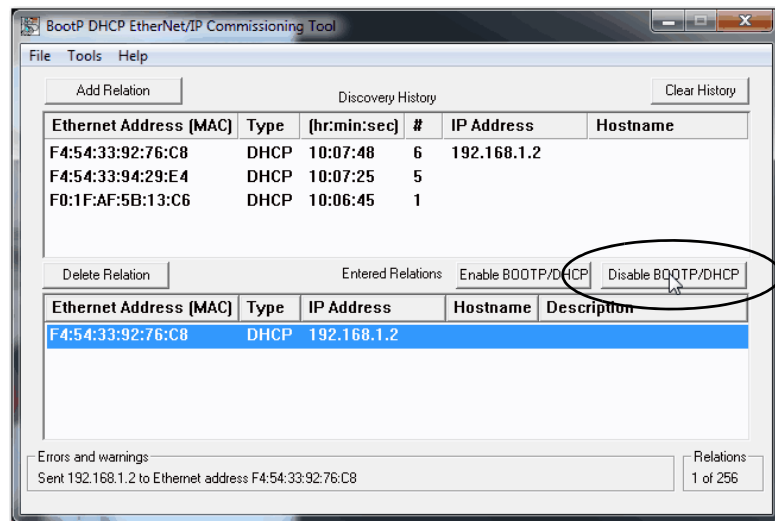
4. Type an IP address, Hostname, and Description for the device.

Hostname and Description are optional.



5. Click OK.
6. To assign this configuration on the device, wait for the device to appear in the Relation List panel and select it.

7. Click Disable BOOTP/DHCP.



The device now uses the assigned configuration and does not issue BOOTP or DHCP requests after power is cycled on the controller.

IMPORTANT Remember the following:

- If you do not click Disable BOOTP/DHCP, on future power cycles, the current IP configuration is cleared and the controller sends DHCP requests again.
- If you click Disable BOOTP/DHCP and it does not disable BOOTP/DHCP, you can use RSLinx® Classic software to disable BOOTP/DHCP.

For more information on how to use RSLinx Classic software to disable BOOTP/DHCP, see page [28](#).

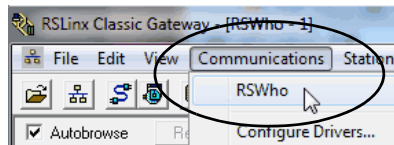
Disable BOOTP/DHCP with RSLinx Classic Software

To disable BOOTP/DHCP in RSLinx Classic software, complete the following steps.

1. Start RSLinx Classic software.

After several seconds, an RSWho dialog box appears.

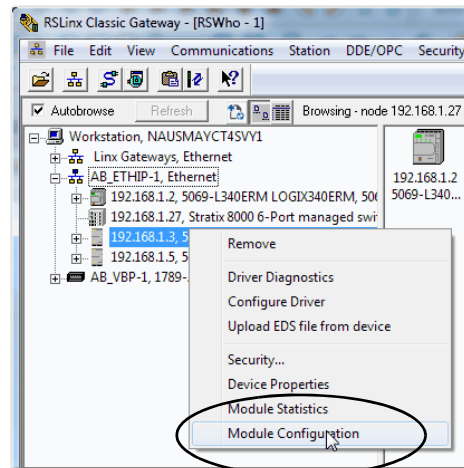
2. If no RSWho dialog box appears, from the Communications pull-down menu, choose RSWho.



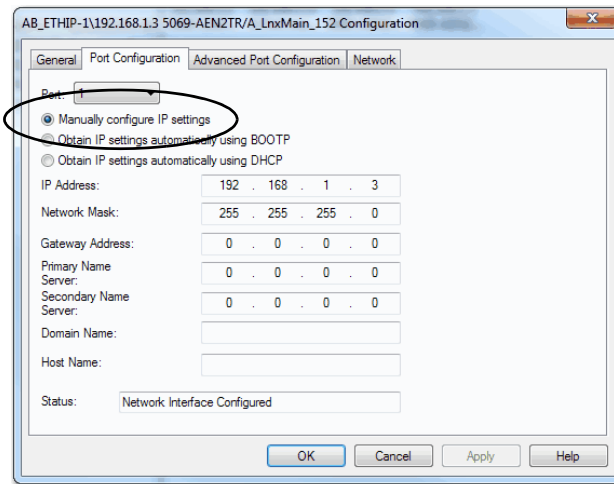
3. Navigate to the device.

You can access the device via the USB or an EtherNet/IP driver.

4. Right-click on the device and choose Module Configuration.



5. Click the Port Configuration tab.
6. Click Manually configure IP settings.



7. Click OK.

DHCP Considerations

If the device is DHCP-enabled in the out-of-box condition, you can use a DHCP server to set the IP address.

The DHCP server automatically assigns IP addresses to client stations logging on to a TCP/IP network. DHCP is based on BOOTP and maintains some backward compatibility.



ATTENTION: You can use a DHCP server that is always configured to assign the same IP address to specific devices when they appear on the EtherNet/IP network and request an IP address.

If your system does not use a DHCP server that assigns the same IP address for specific devices, we **strongly recommend** that you assign the device a fixed IP address. Do not set the IP address dynamically. That is, do not use the Obtain IP settings automatically by using DHCP.

When a device uses Obtain IP settings automatically by using DHCP, the IP address for that device is cleared with each power cycle. If the same IP address is not automatically assigned to the device when it requests a new IP address, the device can be assigned another IP address than what was used before cycling power.

The use of a new IP address can result in such issues as a Duplicate IP address condition or configuration faults because the IP address differs from what is stored in a Logix Designer application project.

Failure to observe this precaution can result in unintended machine motion or loss of process control.

Set the IP Address with RSLinx Classic Software

To use RSLinx Classic software to set the IP address for the **first time**, after it powers up in the out-of-box state, you must connect to the device via the USB port.

If the device does not have a USB port, you cannot use RSLinx Classic software to set the IP address for the first time the device powers up in the out-of-box state.

IMPORTANT You can use RSLinx Classic software to configure the device, including to change the IP address after it has been set.

To change the IP address by using the RSLinx Classic software, the rotary switches on the device must be set to positions that are valid for DHCP address configuration (000...254).

You must access the device by browsing to it via an EtherNet/IP driver.

For more information on how to configure a device with RSLinx Classic software, see [page 32](#).



WARNING: Do not use the USB port in hazardous locations.



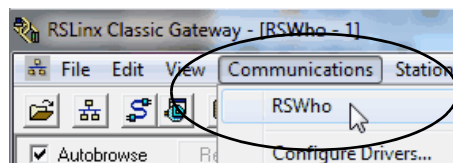
ATTENTION: The USB port is intended for temporary local programming purposes only and not intended for permanent connection. The USB cable is not to exceed 3.0 m (9.84 ft) and must not contain hubs.

Complete these steps to set the IP address with RSLinx Classic software when the device is in the out-of-box state.

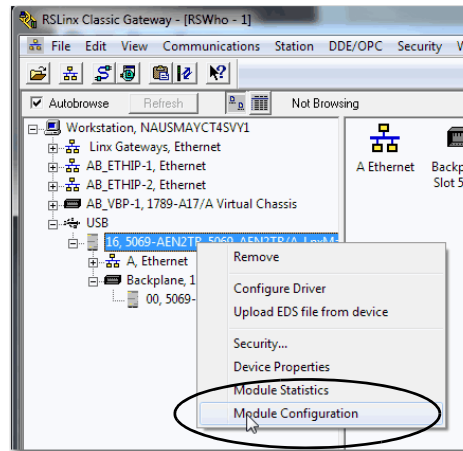
1. Confirm that your computer is connected to the device via a USB cable.
2. Start the RSLinx Classic software.

After several seconds, an RSWho dialog box appears.

3. If the RSWho dialog box does not appear, from the Communications pull-down menu, choose RSWho.

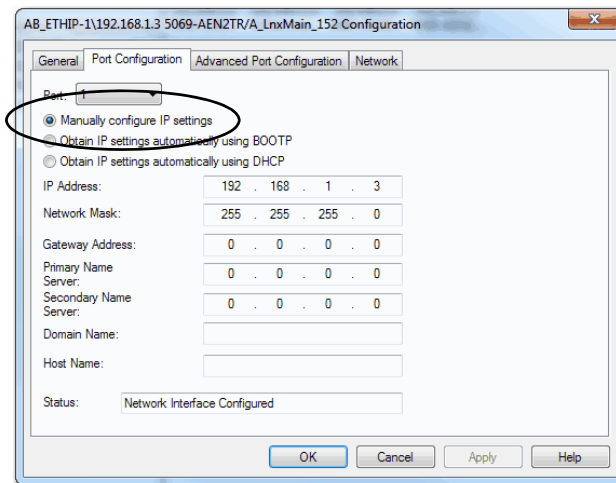


4. Right-click the device and choose Module Configuration.



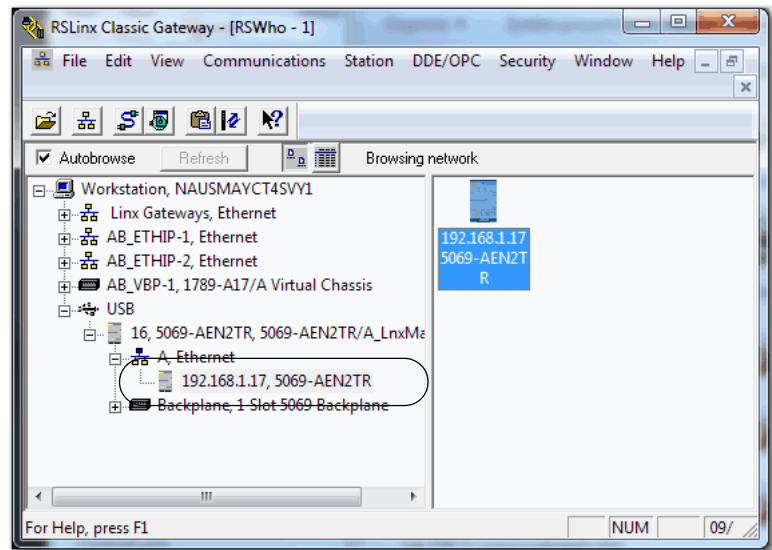
The Module Configuration dialog box appears.

5. Click the Port Configuration tab.
6. Click Manually configure IP settings and set the port configuration parameters.



7. Click OK.
8. Open the USB branch on the menu tree.

The device shows the IP address.



Configure Port Settings with RSLinx Classic Software

You can use RSLinx Classic software to configure a subset of the parameters available on the device.

Complete the following steps.

1. Right-click the device and then click Module Configuration.
2. Click the Advanced Port Configuration tab.

IMPORTANT Consider the following when you configure the port settings:

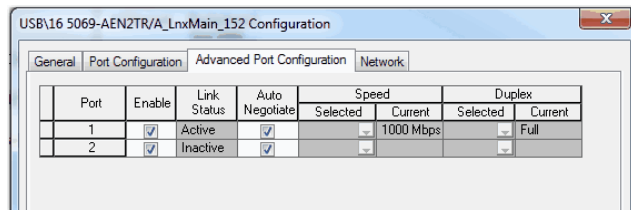
- When the device uses the 1 Gbps network communication rate, it supports only full-duplex mode.
- When the device uses the 10 Mbps or 100 Mbps network communication rate, it supports full-duplex and half-duplex mode.
- The speed and duplex settings for the devices on the same Ethernet network must be the same to avoid transmission errors.
- Fixed speed and full-duplex settings offer better reliability than autonegotiate settings and are recommended for some applications.
- If the device is connected to an unmanaged switch, leave Auto-negotiate checked or the device fails.
- If you force the port speed and duplex with a managed switch, the corresponding port of the managed switch must be forced to the same settings or the device fails.
- If you connect a manually configured device to an autonegotiate device (duplex mismatch), a high rate of transmission errors can occur.
- To disable a port, clear the Enable checkbox.

You cannot disable both ports on a 5069-AENTR or FLEX 5000 EtherNet/IP adapter simultaneously in RSLinx Classic software. We recommend that before you disable a port, you confirm that the port is not in use.

- If you disable a port in RSLinx Classic software and the port is being used for network communication, the communication is interrupted.

In this case, if the other Ethernet port is enabled, we recommend that you moved the Ethernet cable from the disabled port and connect it to the enabled port.

After you re-enable the port that was unintentionally disabled, you can change the cable connection back to the first port



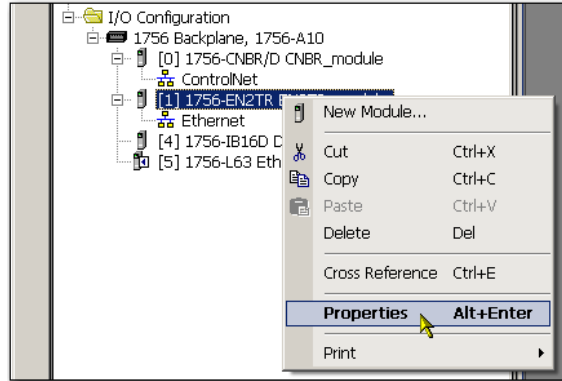
| Task | Action |
|--|--|
| Let the device automatically set the port speed and duplex settings. | Leave the Auto-negotiate enabled. |
| Manually configure the port speed and duplex settings. | Follow these steps. <ol style="list-style-type: none"> 1. Clear the Auto-negotiate port speed and duplex checkbox. 2. From the Current Port Speed pull-down menu, choose a port speed. 3. From the Current Duplex pull-down menu, choose full-duplex. |

3. On the Module Configuration dialog box, click OK.

Set the IP Address with Studio 5000 Logix Designer Application

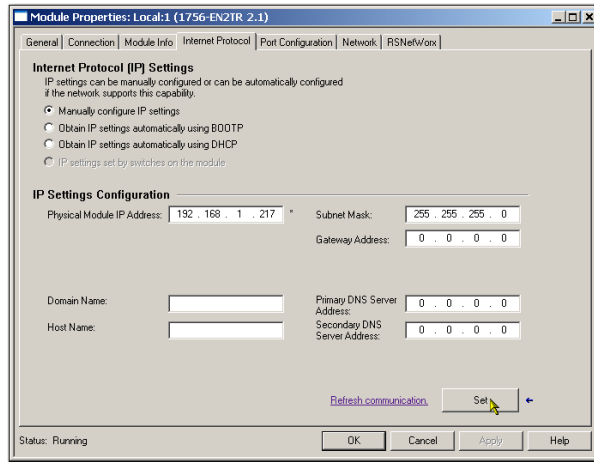
To use the Logix Designer application to set the IP address of the device, follow these steps.

1. In the Controller Organizer, right-click the device and choose Properties.



The Module Properties dialog box appears.

2. Click the Port Configuration tab.



3. In the IP address field, type the IP address.
4. In the other fields, type the other network parameters, if needed.

IMPORTANT The fields that appear vary from one device to another.

5. Click Set.
6. Click OK.

Reset the IP Address to Factory Default Value

You can reset the IP address of the device to its factory default value with the following methods:

- If the device has rotary switches, set the switches to 888 and cycle power.
- If the device does not have rotary switches, use an MSG instruction to reset the IP address.

Notes:

Configure the Device

| Topic | Page |
|--|------|
| Add the Device to the Controller Organizer | 37 |
| Configure EtherNet/IP Communication | 38 |
| Produced and Consumed Data | 39 |
| Message Instructions | 39 |

After installing a device and setting the IP address, add the device to the Controller Organizer in a programming software project. This addition establishes I/O control.

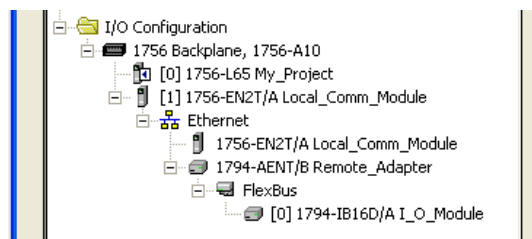
You must download that project to the host controller before operation can begin. When the controller begins operation, it establishes a connection with the device. The configuration of the device determines its behavior.

Add the Device to the Controller Organizer

To build the I/O configuration for a typical I/O network, follow these steps.

1. Add the device.
2. Add the remote device for distributed I/O.
3. Add the I/O modules.

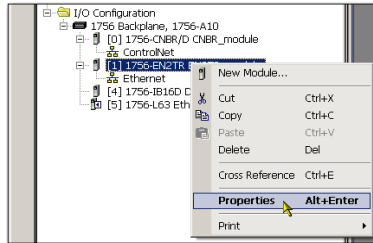
This graphic shows the I/O configuration of the consumer controller after distributed I/O modules are added.



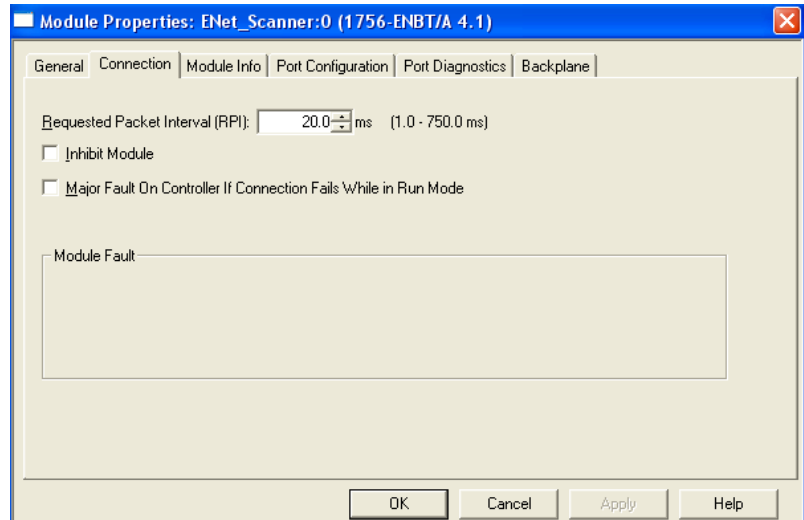
Configure EtherNet/IP Communication

To configure the device, follow these steps.

1. Make sure that the device is installed, started, and connected to the controller.
2. In the Controller Organizer, right-click the device and choose Properties.



The Module Properties dialog box appears.



3. Make configuration selections on the individual tabs.
4. Click OK.

Produced and Consumed Data

Logix controllers can produce (broadcast) and consume (receive) system-shared tags that are sent and received via the device. Produced and consumed tags each require connections.

| Tag Type | Required Connections |
|----------|--|
| Produced | <p>The local controller (producing) must have one connection for the produced tag and the first consumer and one more connection for each additional consumer (heartbeat). The produced tag requires two connections.</p> <p>As you increase the number of controllers that can consume a produced tag, you also reduce the number of connections the controller has available for other operations. Example operations include communication and I/O.</p> |
| Consumed | <p>Each consumed tag requires one connection for the controller that is consuming the tag.</p> <p>IMPORTANT: When you configure a consumed tag, you must add a remote device to the programming software project for the producing controller to configure the consuming controller. The default Comm Format when adding a remote device to the project is rack-optimized.</p> <p>Change the Comm Format to None when adding the remote device.</p> |

All EtherNet/IP devices support as many as 32 produced multicast connections. Each tag that passes through an EtherNet/IP device uses one connection. Due to this feature, the number of available connections limits the total number of tags that can be produced or consumed. If the device uses all of its connections for I/O and other devices, no connections remain for produced and consumed tags.

IMPORTANT Depending on whether it is producing or consuming a tag, a Logix 5000™ controller uses its connections differently.

For more information, see Logix 5000 Controllers Produced and Consumed Tags Programming Manual, publication [1756-PM011](#).

Message Instructions

Messages transfer data to other devices, such as other controllers or operator interfaces. Each message uses one connection, regardless of how many devices are in the message path. To conserve connections, you can configure one message to read from or write to multiple devices.

For more information on programming MSG instruction, see the Logix 5000™ Controller General Instructions Reference Manual, publication [1756-RM003](#).

Notes:

Send Email

This chapter describes how to send an email through an EtherNet/IP communication module.

| Topic | Page |
|---|------|
| EtherNet/IP Communication Module as an Email Client | 41 |
| Send Email Via a Controller-initiated Message Instruction | 43 |
| Possible Email Status Codes | 58 |

For email, the EtherNet/IP communication module can be remote or local to the controller.

EtherNet/IP Communication Module as an Email Client

The EtherNet/IP communication module is an email client that uses a mail relay server to send email.

IMPORTANT The EtherNet/IP communication module can send an email to only one recipient at a time. The module cannot mail to a distribution list.

Table 3 - Ethernet Email

| Desired Action | Required Tasks |
|---|--|
| Send an email to specific personnel when a controller application generates an alarm or reaches a certain condition | Program the controller to send an MSG instruction to the EtherNet/IP communication module The MSG instruction then instructs the EtherNet/IP communication module to send the email text (contained within the MSG instruction) to the mail relay server. |
| Send controller or application status information regularly to a project manager | Multiple controllers can use the same EtherNet/IP communication module to initiate email. |

The EtherNet/IP communication module sends only the content of an MSG instruction as an email to a mail relay server. Delivery of the email depends on the mail relay server. The EtherNet/IP communication module does not receive email.

Figure 3 - Sample System

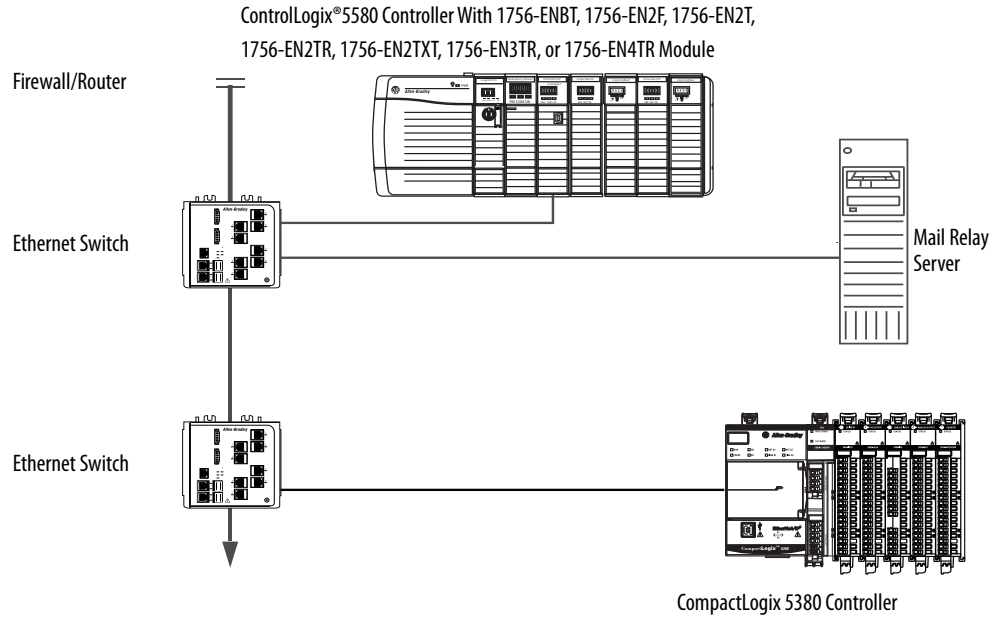
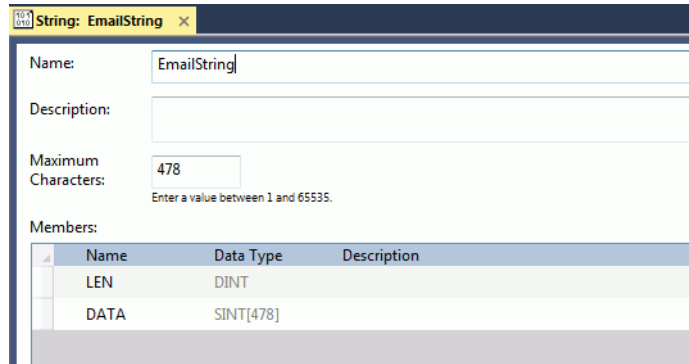


Table 4 - Sample System Capabilities

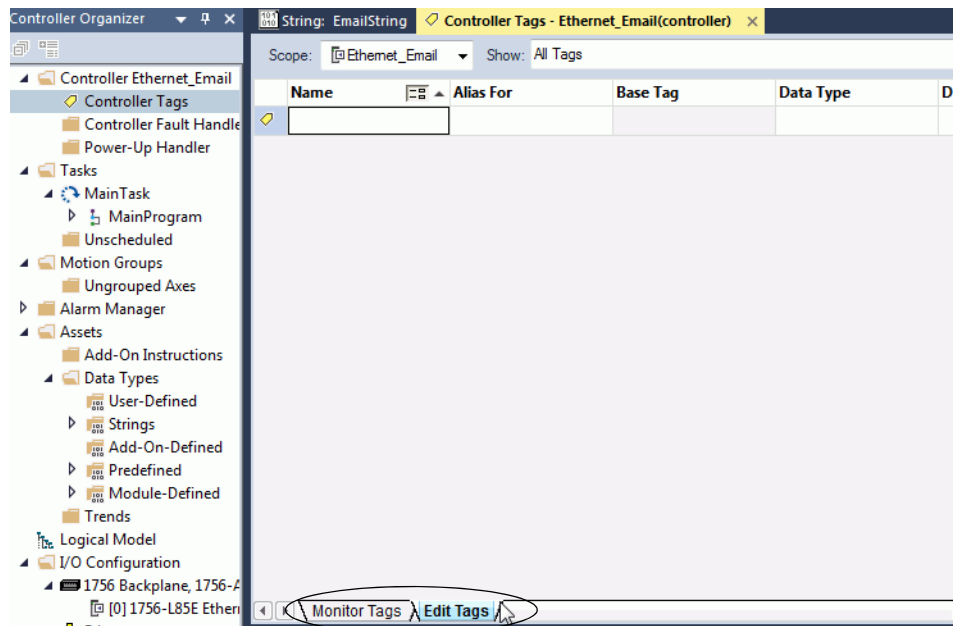
| Device | Capability |
|------------------------------|--|
| ControlLogix controller | Send an MSG instruction to the 1756-ENBT module to initiate sending an email to the mail relay server. |
| CompactLogix controller | Use the path of the MSG instruction to identify the 1756-ENBT module as the target of the MSG instruction. |
| ControlLogix 5580 Controller | Send an email to the mail relay server from the email interface on the Send an Email link. This interface requires that you enter all email information. |
| Mail relay server | Send email to specified recipients. The mail relay server determines the delivery of any email that is sent through an EtherNet/IP communication module, whether via an MSG instruction or from its built-in interface. |

2. Create the String Type “EmailString”.

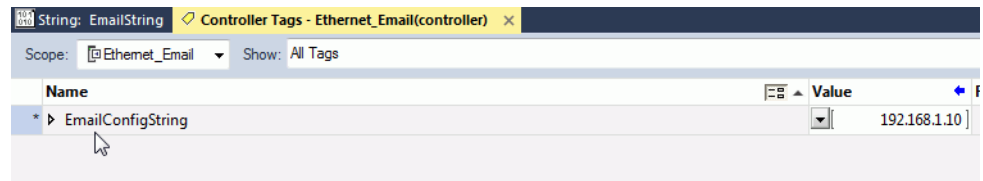
IMPORTANT An email message must not exceed 474 characters in length. An additional 4-byte string-length value is added to the tag. As a result, the maximum source length is 478 characters.



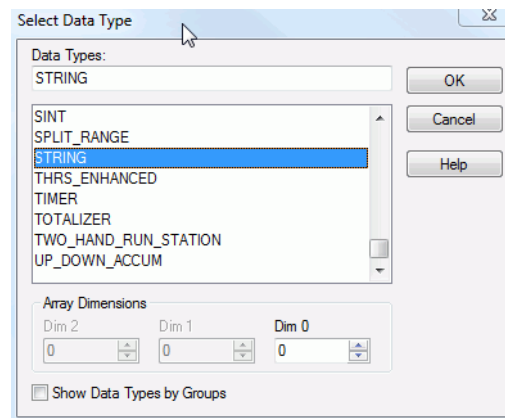
3. Create the tag names by toggling between the Monitor Tags and Edit Tags tabs shown in the following image.



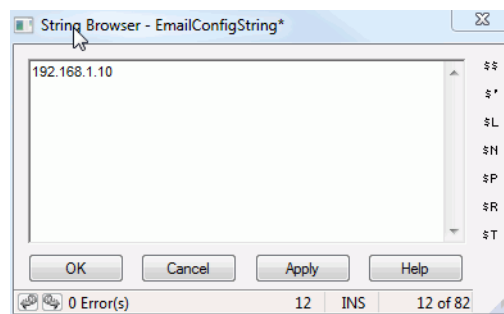
4. Enter a controller tag for the Email Configuration String.



5. Edit the newly created tag, and select the data type.



6. Type the IP address or host name of the mail server.
7. Click OK.

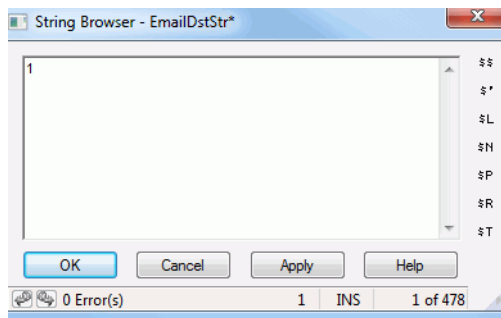


8. Create one controller-scoped tag, such as EWEB_EMAIL, of this new data type to contain the email text.
9. Create a second controller-scoped tag, such as EmailDstStr, of this new data type to contain the transmission status.

Both of these tags are of type EmailString.

| Name | Alias For | Base Tag | Data Type | Description | External Access | Constant | Style |
|---------------------|-----------|----------|-------------|-------------|-----------------|--------------------------|-------|
| ▶ EmailConfigString | | | STRING | | Read/Write | <input type="checkbox"/> | |
| ▶ EmailDstStr | | | EmailString | | Read/Write | <input type="checkbox"/> | |
| ▶ EWEB_EMAIL | | | EmailString | | Read/Write | <input type="checkbox"/> | |

10. Set the Email Distribution String Tag to “1”.



11. Click ... in the Value column of the Controller Tags dialog box

| Name | Value | Force Mask | Style | Data Type |
|---------------------|------------------------|------------|-------|-------------|
| ▶ EmailConfigString | '192.168.1.10' | | {...} | STRING |
| ▶ EmailDstStr | '1' | | {...} | EmailString |
| ▶ EWEB_EMAIL | ... 'To: person@xyz... | | {...} | EmailString |

12. Type your email.

Use the string browser to type the text of the email. To include To:, From:, and Subject: fields in the email, use <CR><LF> symbols to separate each of these fields. The To: and From fields are required; the Subject: field is optional. For example:

To: Email address of recipient <CR><LF>
From: Email address of sender <CR><LF>
Subject: subject of message <CR><LF>
body of email message

The text of the email does not have to be static. You can program a controller project to collect specific data to be sent in an email.

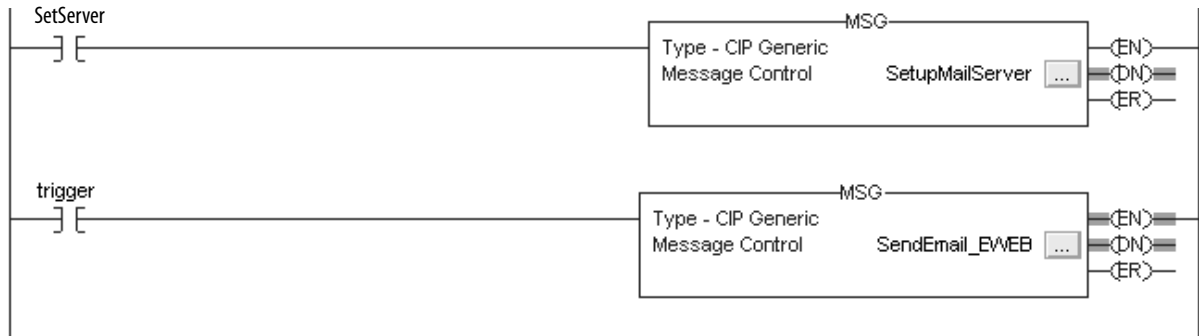
13. Click OK



For more information on how to use ladder logic to manipulate string data, see the Logix 5000™ Controllers Common Procedures Programming Manual, publication [1756-PM001](#).

Enter the Ladder Logic

Ladder logic requires two MSG instructions. One MSG instruction configures the mail server and must be executed only once. The second MSG instruction triggers the email. Execute this email MSG instruction as often as needed.

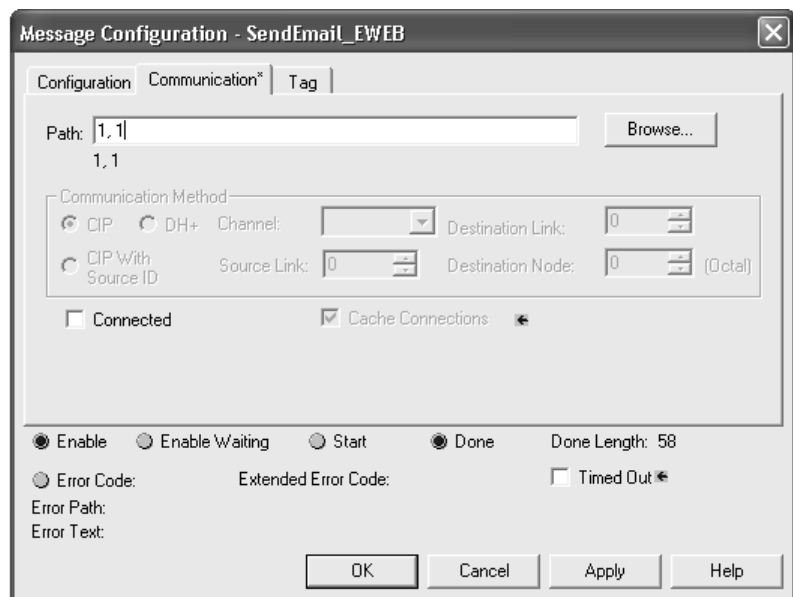


The first rung configures the mail server. The second rung sends the email text.

Configure the MSG Instruction That Identifies the Mail Relay Server

To configure the MSG instruction that identifies the mail relay server, follow these steps.

1. In the MSG instruction, click the Communication tab.



2. In the Path field, type the path for the MSG instruction. The path starts with the controller initiating the MSG instruction.

Type the number of the port from which the message exits and the address of the next module in the path.

For example, if the EtherNet/IP communication module is in the same chassis as the controller and is in slot 2, the path is: 1, 2.

For more information on how to configure the path of an MSG instruction, see the Logix 5000 Controllers General Instructions Reference Manual, publication [1756-RM003](#).

3. Click the Configuration tab.
4. Configure the MSG parameters for sending an email.
 - From the Service Type pull-down menu, choose Attribute Single
 - In the Instance field, type 1.
 - In the Class field, type 32f.
 - In the Attribute field, type 5.
 - From the Source Element pull-down menu, choose the tag that contains your email text.
 - In the Source Length field, type the number of characters in the email plus four.

In this example, you would enter 13 for the number of characters plus 4 for a total of 17.

The Source Length is the number of characters in the STRING tag that identifies the mail relay server plus 4 characters. In this example, the tag contains 13 characters.

The screenshot shows the 'Message Configuration - SetupMailServer' dialog box. The 'Configuration' tab is selected. The 'Message Type' is set to 'CIP Generic'. The 'Service Type' is 'Set Attribute Single'. The 'Source Element' is 'EmailConfigstring'. The 'Source Length' is '17 (Bytes)'. The 'Service Code' is '10 (Hex)', 'Class' is '32f (Hex)', 'Instance' is '1', and 'Attribute' is '5 (Hex)'. There are also fields for 'Destination', 'New Tag...', 'Enable', 'Enable Waiting', 'Start', 'Done', 'Done Length: 0', 'Error Code', 'Extended Error Code', 'Timed Out', 'Error Path', and 'Error Text'. Buttons for 'OK', 'Cancel', 'Apply', and 'Help' are at the bottom.

After the MSG instruction that configures the mail relay server executes successfully, the controller stores the mail relay server information in nonvolatile memory. The controller retains this information, even through power cycles, until another MSG instruction changes the information.

Configure the MSG Instruction That Contains the Email Text

To configure the MSG instruction that contains the email text, perform this procedure.

1. Click the Configuration tab.

The Source Length is the number of characters in the email tag plus 4 characters.

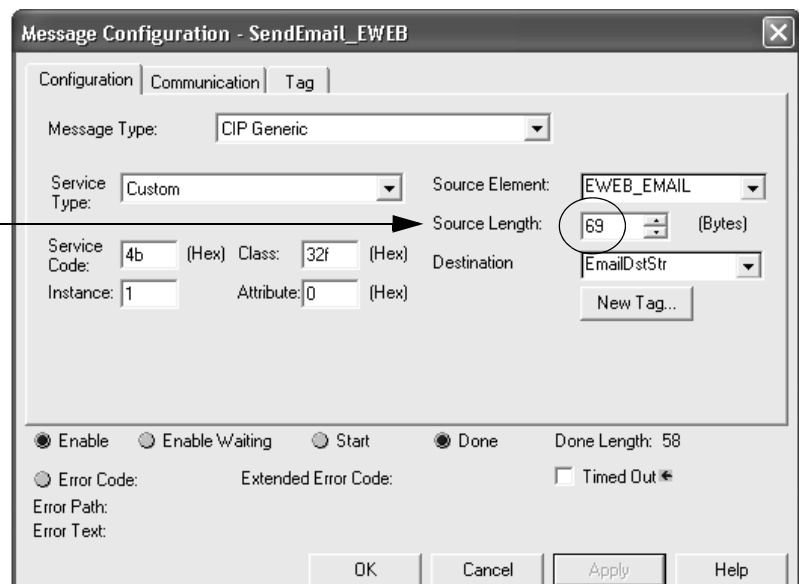
In this example, the email text contains 65 characters.

2. Configure the MSG parameters for sending an email.
 - From the Service Type pull-down menu, choose Custom.
 - In the Service Code field, type 4b.
 - In the Instance field, type 1.
 - In the Class field, type 32f.
 - In the Attribute field, type 0.
 - From the Source Element pull-down menu, choose the tag that contains your email text.
 - In the Source Length field, type the number of characters in the email plus four.

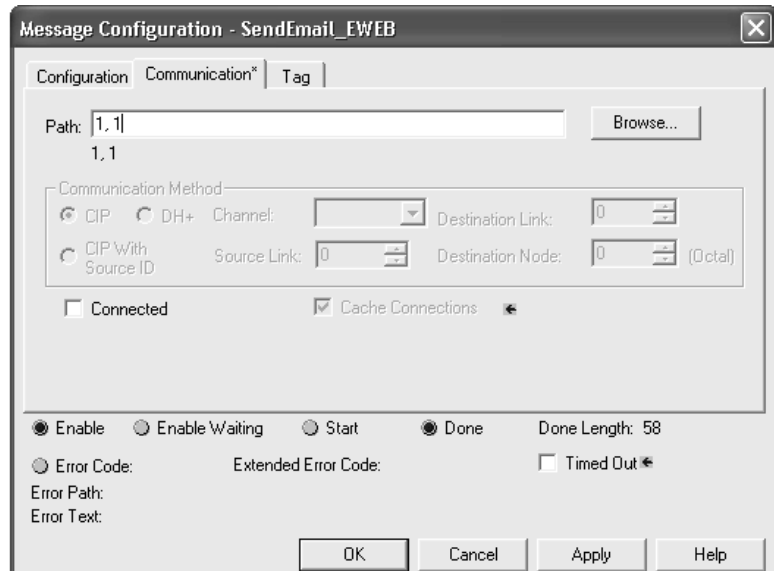
In this example, you would enter 65 for the number of characters plus 4 for a total of 69.

- From the Destination pull-down menu, choose a tag to contain the status of your email transmission.

The Source Length is the number of characters in the STRING tag that identifies the mail relay server plus 4 characters. In this example, the tag contains 65 characters.



- Click the Communication tab.



- In the Path field, type the path from the controller to the EtherNet/IP communication module.

The path starts with the controller initiating the MSG instruction. The second number in the path represents the port from which the message exits and the address of the next module in the path.

For example, if the EtherNet/IP communication module is in the same chassis as the controller and is in slot 2, the path is: 1, 2.

- If all devices in the path are configured in the I/O Configuration tree of the initiating controller, click Browse to select the target module.

The software automatically completes the path.

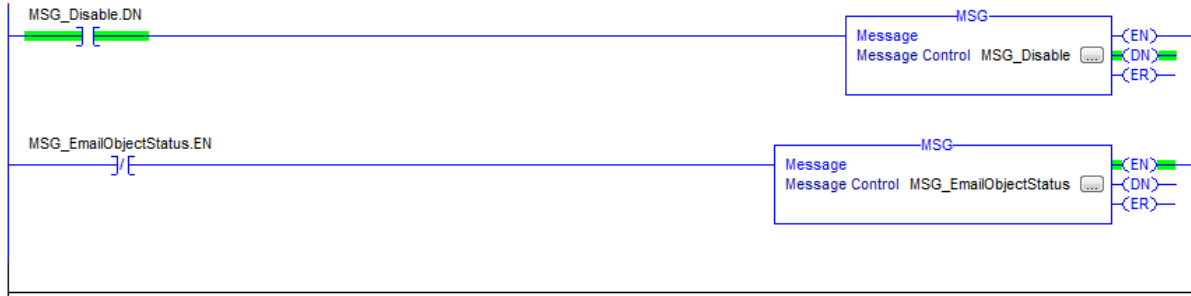
- Click OK.

For more information on how to configure the path of an MSG instruction, see the Logix 5000 Controllers General Instructions Reference Manual, publication [1756-RM003](#).

- Configure the MSG parameters for disabling the Email Object.
 - From the Service Type pull-down menu, choose Set Attribute Single
 - In the Instance field, type 0.
 - In the Class field, type 32f.
 - In the Attribute field, type 8.
 - From the Source Element pull-down menu, choose the tag that contains your email text.
 - This example uses DisableEmailObject.
 - In the Source Length field, type 1.

Configure the Email Object

Ladder logic requires two MSG instructions. One MSG instruction disables the mail server and must be executed only once. The second MSG instruction enables the email. Execute this email MSG instruction as often as needed.



Disable the Email Object

IMPORTANT If you disable the Email Object, it is permanently disabled and a factory reset is required to enable it again.

You can disable the Email Object by setting the class attribute 0x08 to 0. After that operation, all object-specific services and all instance attributes are unavailable for writing and reading. Furthermore, the Object Enable attribute is read-only. The Email Object is permanently disabled and a factory reset is required to enable it again. By default, the Email Object is enabled. [Table 5](#) lists the MSG block parameters to disable an Email Object.

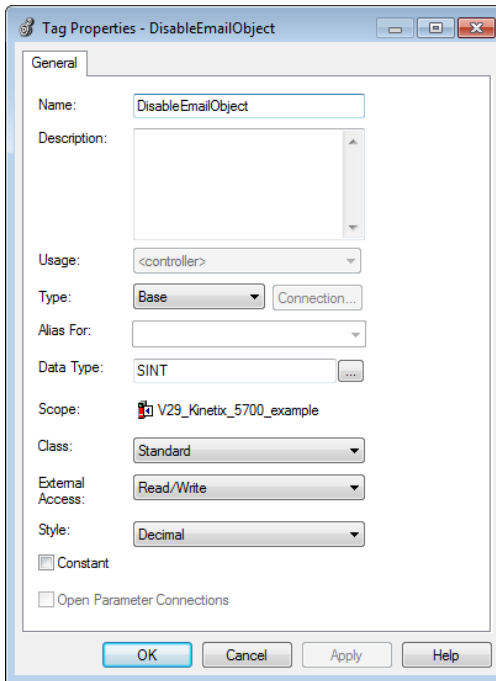
Table 5 - Email Object Parameters

| | |
|-----------|-------|
| Service | 0x10 |
| Class | 0x32F |
| Instance | 0x00 |
| Attribute | 0x08 |
| Data | 0x00 |

To disable the Email Object, perform this procedure.

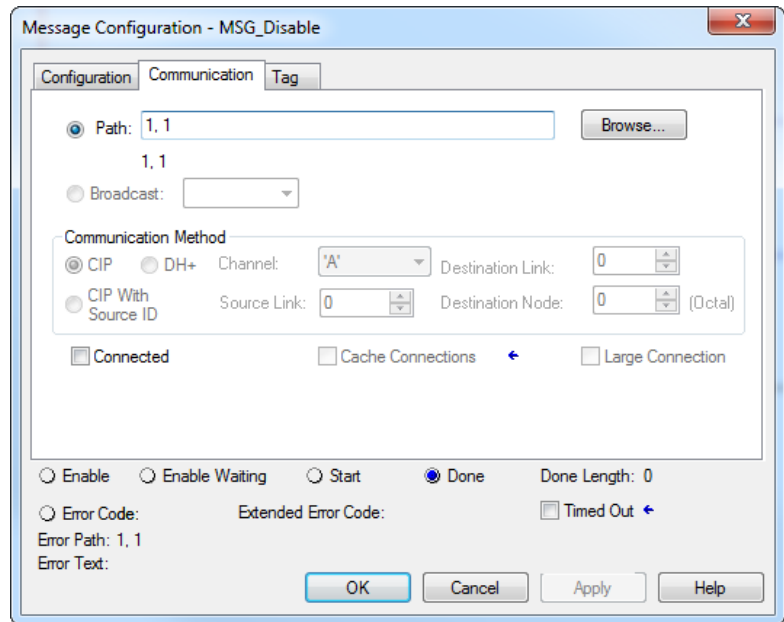
IMPORTANT 1756 EtherNet/IP communication modules with firmware 10.010 or higher support this feature.

1. Create a tag, DisableEmailObject.
2. Select SINT for the data type.



3. Create a message object.
This example names the message object MSG_Disable.
4. In the Data Type category of the Edit Tags window, change the data type to MESSAGE.

- In the MSG_Disable tag, click the Communication tab.



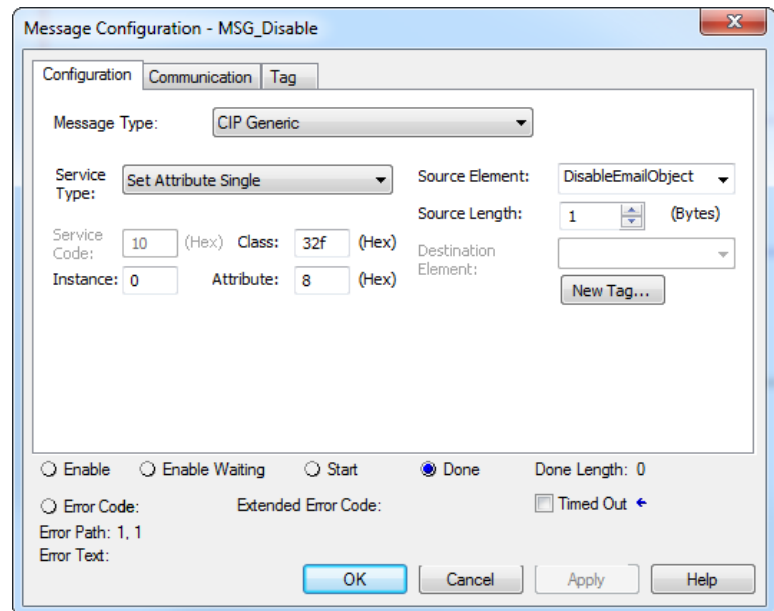
- In the Path field, type the path for the MSG instruction. The path starts with the controller initiating the MSG instruction.

Type the number of the port from which the message exits and the address of the next module in the path.

For example, if the EtherNet/IP communication module is in the same chassis as the controller and is in slot 2, the path is: 1, 2. The path in this example is 1, 1. For this use case, the path is always 1, <1756-EN2T module slot number>.

For more information on how to configure the path of an MSG instruction, see the Logix 5000 Controllers General Instructions Reference Manual, publication [1756-RM003](#).

- Click the Configuration tab.



- Configure the MSG parameters for sending an email.
 - From the Service Type pull-down menu, choose Set Attribute Single
 - In the Instance field, type 0.
 - In the Class field, type 32f.
 - In the Attribute field, type 8.
 - Create a tag that is type SINT and set the tag value to 0. This example uses DisableEmailObject.
 - In the Source Length field, type 1.
- Click Apply.
- In the ladder logic, toggle message to execute.

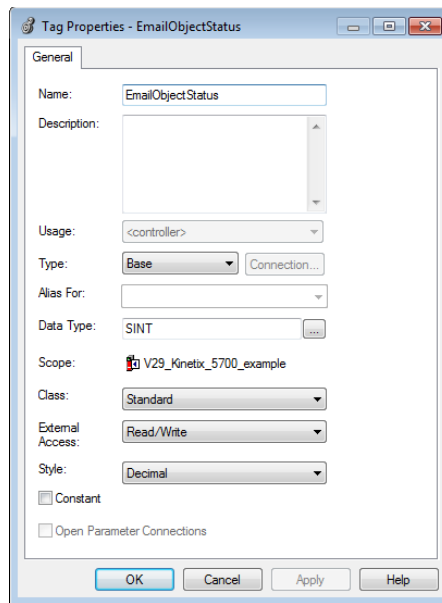
The value is returned in the second message. Since there is no destination element, you do not get a response. However, you receive the DN bit set.

Get Email Object Status

To determine if the email object is disabled, perform this procedure.

- Create a tag, EmailObjectStatus.

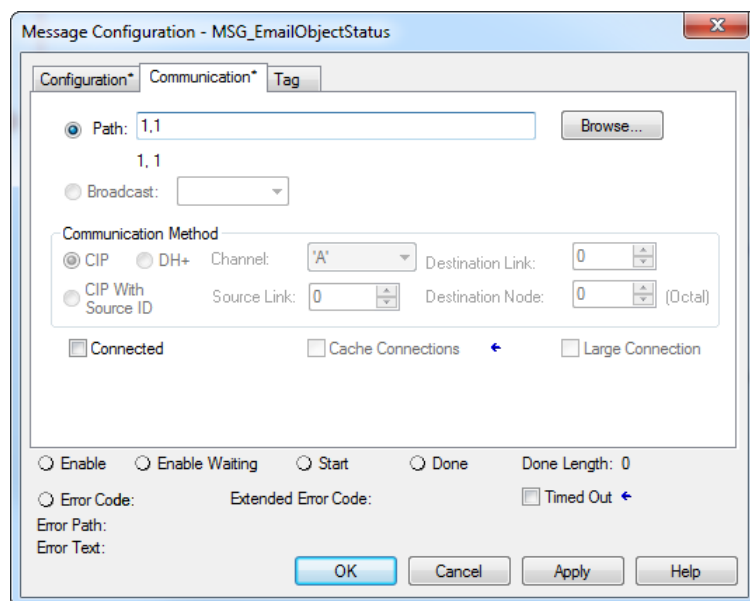
2. Select SINT for the data type.



3. Create a message object.

This example names the message object MSG_EmailObjectStatus.

4. In the Data Type category of the Edit Tags window, change the data type to MESSAGE.
5. In the MSG_EmailObjectStatus instruction, click the Communication tab.



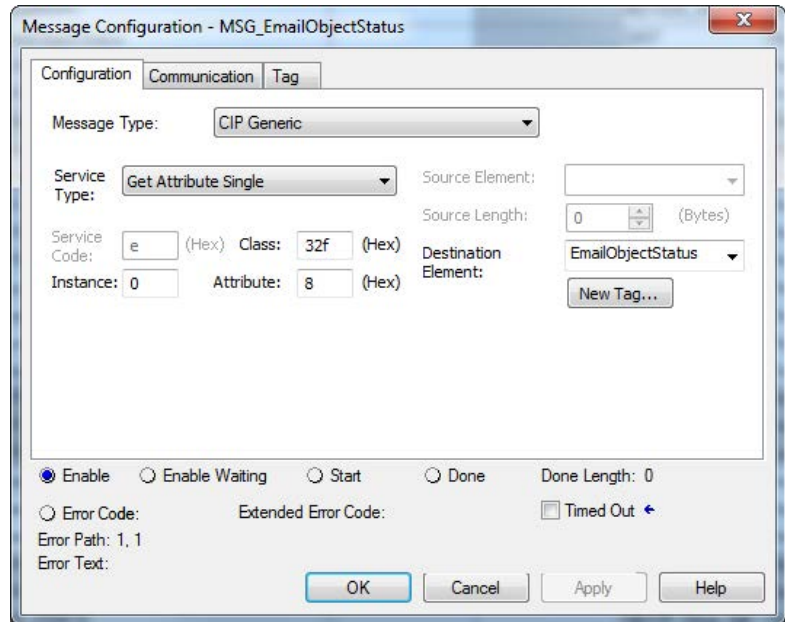
6. In the Path field, type the path for the MSG instruction. The path starts with the controller initiating the MSG instruction.

Type the number of the port from which the message exits and the address of the next module in the path.

For example, if the EtherNet/IP communication module is in the same chassis as the controller and is in slot 2, the path is: 1, 2. The path in this example is 1, 1.

For more information on how to configure the path of an MSG instruction, see the Logix 5000 Controllers General Instructions Reference Manual, publication [1756-RM003](#).

- Click the Configuration tab.



- Configure the MSG parameters for sending an email.
 - From the Service Type pull-down menu, choose Get Attribute Single.
 - In the Instance field, type 0.
 - In the Class field, type 32f.
 - In the Attribute field, type 8.
 - From the Destination Element pull-down menu, choose the tag that contains your email text. This example uses EmailObjectStatus.
- Click Apply.
- In the ladder logic, toggle message to execute.

If the MSG_EmailObjectStatus.DN bit is set and the value of the EnableObjectStatus is 0, then the Email Object is disabled. If the value of the EnableObjectStatus is 1, then the Email Object is enabled.

Possible Email Status Codes

Examine the destination element of the email MSG to see whether the email was successfully delivered to the mail relay server. A successful delivery indicates that the mail relay server placed the email message in a queue for delivery. This notification does not mean that the intended recipient received the email message. [Table 6](#) lists the possible codes that a destination element could contain.

Table 6 - Email Status Code Descriptions

| Error Code (Hex) | Extended-error Code (Hex) | Description |
|------------------|---------------------------|---|
| 0x00 | None | Delivery successful to the mail relay server. |
| 0x02 | None | Resource unavailable. The email object was unable to obtain memory resources to initiate the SMTP session. |
| 0x08 | None | Unsupported Service Request. Make sure that the Service Code is 0x4B and the Class is 0x32F. |
| 0x11 | None | Reply data too large. The Destination string must reserve space for the SMTP server reply message. The maximum reply can be 470 bytes. |
| 0x13 | None | Configuration data size too short. The Source Length is less than the Source Element string size plus the 4-byte length. The Source Length must equal the Source Element string size + 4. |
| 0x15 | None | Configuration data size too large. The Source Length is greater than the Source Element string size plus the 4-byte length. The Source Length must equal the Source Element string size + 4. |
| 0x19 | None | Data write failure. An error has occurred when attempting to write the SMTP server address (attribute 4) to nonvolatile memory. |
| 0xFF | 0x0100 | Error that an email server returns; check the Destination string for reason. The email message was not queued for delivery. |
| | 0x0101 | SMTP mail server not configured. Attribute 5 was not set with an SMTP server address. |
| | 0x0102 | 'To:' address not specified. Attribute 1 was not set with a 'To:' address AND there is not a 'To:' field header in the email body. |
| | 0x0103 | 'From:' address not specified. Attribute 2 was not set with a 'From:' address AND there is not a 'From:' field header in the email body. |
| 0xFF | 0x0104 | Unable to connect to SMTP mail server set in Attribute 5. If the mail server address is a host name, make sure that the device supports DNS, and that a Name Server is configured. If the host name is not fully qualified, for example, 'mail host' and not 'mailhost.xx.yy.com' then the domain must be configured as 'xx.yy.com'. Try 'ping <mail server address>' to make sure that the mail server is reachable from your network. Also try 'telnet <mail server address> 25', which attempts to initiate an SMTP session with the mail server via telnet over port 25. (If you connect then type 'QUIT'). |
| | 0x0105 | Communication error with SMTP mail server. An error occurred after the initial connection with the SMTP mail server. See the ASCII text following the error code for more details as to the type of error. |
| | 0x0106 | SMTP mail server host name DNS query did not complete. A previous send service request with a host name as the SMTP mail server address did not yet complete. A timeout for a DNS lookup with an invalid host name can take up to 3 minutes. Long timeouts can also occur if a domain name or name server is not configured correctly. |

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Rockwell Automation Support

Use the following resources to access support information.

| | | |
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| Technical Support Center | Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates. | https://rockwellautomation.custhelp.com/ |
| Local Technical Support Phone Numbers | Locate the phone number for your country. | http://www.rockwellautomation.com/global/support/get-support-now.page |
| Direct Dial Codes | Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer. | http://www.rockwellautomation.com/global/support/direct-dial.page |
| Literature Library | Installation Instructions, Manuals, Brochures, and Technical Data. | http://www.rockwellautomation.com/global/literature-library/overview.page |
| Product Compatibility and Download Center (PCDC) | Get help determining how products interact, check features and capabilities, and find associated firmware. | http://www.rockwellautomation.com/global/support/pcdc.page |

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