



FLEX 5000 EtherNet/IP Adapter

Catalog Numbers 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR,
5094-AEN2TRXT, 5094-AENSFPR, 5094-AENSFPRXT,
5094-AEN2SFPR, 5094-AEN2SFPRXT



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.

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.

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:

About This Publication

This manual describes how to use FLEX 5000® EtherNet/IP™ adapters in Logix 5000® control systems. Use this manual in conjunction with the EtherNet/IP Network Devices User Manual, publication [ENET-UM006](#).

Make sure that you are familiar with the following:

- Use of a controller in a Logix 5000 control system
- Use of an EtherNet/IP network
- Use of various software applications from Rockwell Automation

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

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 table FLEX 5000 EtherNet/IP Adapter Status Indicators	40
Updated table FLEX 5000 EtherNet/IP Adapter Hardware Faults	77
Added History of Changes	81

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Resource	Description
FLEX 5000 Module Specifications Technical Data, publication 5094-TD001	Provides FLEX 5000 modules and EtherNet/IP adapters specifications.
FLEX 5000 EtherNet/IP Adapters with RJ45 Ports Installation Instructions, publication 5094-IN001	Describes how to install a FLEX 5000 EtherNet/IP adapter with RJ45 ports.
FLEX 5000 EtherNet/IP Adapters with SFP Support Installation Instructions, publication 5094-IN002	Describes how to install a FLEX 5000 EtherNet/IP adapter with small form-factor pluggable (SFP) support.
EtherNet/IP Parallel Redundancy Protocol Application Technique, publication ENET-AT006	Provides information on Parallel Redundancy Protocol (PRP) features and how to configure a PRP network.
EtherNet/IP Device Level Ring Application Technique, publication ENET-AT007	Provides information on Device Level Ring (DLR) features and how to configure a DLR network.
EtherNet/IP Media Planning and Installation Manual, publication PUB00148	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: https://www.odva.org .
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications Technical Data, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

FLEX 5000 Module Operation in a Logix 5000 Control System

IMPORTANT

You cannot use FLEX 5000 I/O modules with all Logix 5000 controllers. For example, you can use FLEX 5000 I/O modules with CompactLogix® 5380 and ControlLogix® 5580 controllers but not with CompactLogix 5370 and ControlLogix 5570 controllers.

You can use FLEX 5000 I/O modules with Logix 5000 controllers as remote I/O modules only.

Throughout this publication, the term Logix 5000 controller refers to the controllers with which you can use FLEX 5000 I/O modules in a given capacity. The term does not refer to all Logix 5000 controllers. For the most current information on the Logix 5000 controllers with which you can use FLEX 5000 I/O modules, see the product description at rok.auto/flex5000IO.

The Logix 5000 controllers use FLEX 5000 standard and safety I/O modules to control devices in a control system. The controllers access the modules over an EtherNet/IP network. The FLEX 5000 I/O modules use terminal base (TB) assemblies to connect field-side wiring.

The FLEX 5000 I/O modules use the Producer/Consumer network communication model. This communication is an intelligent data exchange between modules and other system devices in which each module produces data without first being polled.

You use FLEX 5000 I/O modules as remote I/O modules that are accessible via an EtherNet/IP network. The modules are installed to the right of a FLEX 5000 EtherNet/IP adapter.

The Logix 5000 controllers can exchange the data with the modules over an EtherNet/IP network. [Figure 1](#) shows a CompactLogix 5380 standard controller with a FLEX 5000 EtherNet/IP adapter and standard I/O modules. The standard controllers do not support the safety I/O modules.

Figure 1 - FLEX 5000 Standard I/O Modules in a Logix 5000 Control System

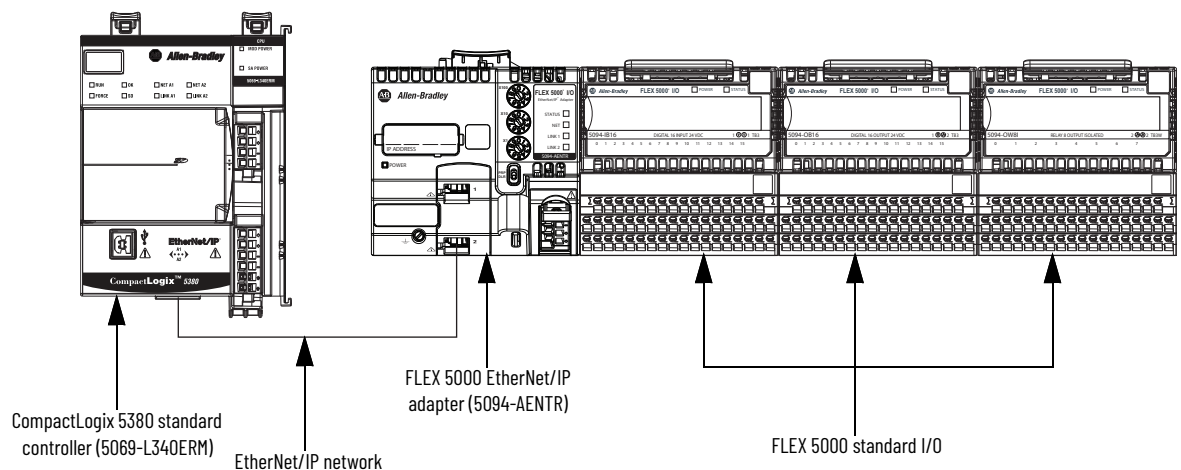
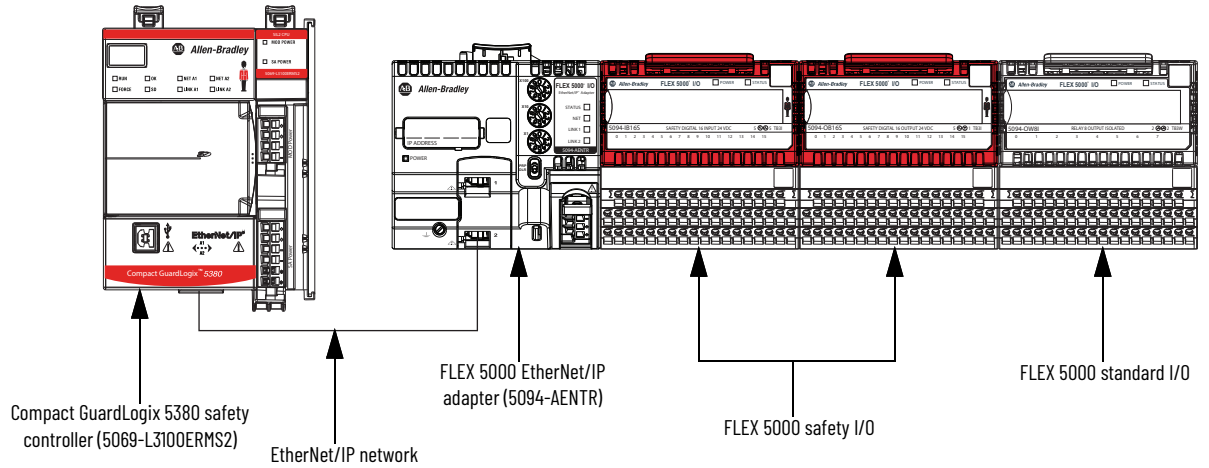


Figure 2 shows a Compact GuardLogix 5380 safety controller with a FLEX 5000 EtherNet/IP adapter, and both standard and safety I/O modules. Safety controllers support both standard and safety I/O modules.

Figure 2 - FLEX 5000 Safety I/O Modules in a Logix 5000 Control System



Controller and Software Compatibility

Controller and programming software compatibility requirements apply when you use FLEX 5000 standard and safety I/O modules. A module type and how it is used affect which requirements apply.

You must also consider Studio 5000 Logix Designer® application version requirements when you design your system. For example, you can use FLEX 5000 safety I/O modules with only version 32 or later of the Studio 5000 Logix Designer application. Similarly, you can use a PlantPAx® system or High Availability with only version 33 or later of the Studio 5000 Logix Designer application.

Controller Compatibility

The compatibility between Logix 5000 controllers and FLEX 5000 I/O modules varies based on module type, whether the module is standard or safety.

While you must pair safety I/O with a safety controller, you can also pair standard I/O with a safety controller. For example, the ControlLogix 5580 controllers are compatible with FLEX 5000 standard I/O modules. The GuardLogix® 5580 controllers are compatible with FLEX 5000 standard and safety I/O modules.

IMPORTANT The Logix Safety Instrumented System (Logix SIS) safety controller requires the use of Studio 5000 Logix Designer application version 37.00.00 or later and FLEX 5000 adapter firmware revision 6.011 or later.

IMPORTANT The ControlLogix 5580 High Availability controllers that use Studio 5000 Logix Designer application version 33.00.00 or later require firmware revision 5.011 or later for the FLEX 5000 EtherNet/IP adapter.

Firmware and Software Compatibility

[Table 1](#) describes the module compatibility requirements when you use FLEX 5000 I/O standard and safety modules with Logix 5000 controllers.

IMPORTANT You must use adapter firmware revision 3.011 or later with safety I/O modules and firmware revision 2.011 or later of standard I/O modules.

Table 1 – Module Compatibility

Modules	Controllers		Studio 5000 Logix Designer Application Version
	System	Catalog Numbers	
Standard Modules 5094-IA16, 5094-IA16XT, 5094-OA16, 5094-OA16XT, 5094-IB16, 5094-IB16XT, 5094-IB32, 5094-IB32XT, 5094-OB8, 5094-OB8XT, 5094-OB16, 5094-OB16XT, 5094-OB32, 5094-OB32XT, 5094-OW8I, 5094-OW8IXT, 5094-IF8, 5094-IF8XT, 5094-IM8, 5094-IM8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT, 5094-IJ2I ⁽¹⁾ , 5094-IJ2IXT ⁽¹⁾ , 5094-HSC, 5094-HSCXT, 5094-SERIAL, 5094-SERIALXT	CompactLogix 5380	5069-L320ER, 5069-L340ERM	31.00.00 or later
		5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L320ERM, 5069-L330ER, 5069-L330ERM, 5069-L340ER	31.00.00 or later
		5069-L350ERM, 5069-L380ERM, 5069-L3100ERM	31.00.00 or later
	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	31.00.00 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	32.00.00 or later
	ControlLogix 5580	1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E	31.00.00 or later
	ControlLogix 5580 High Availability Controller	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	31.00.00 or later
		1756-L85ES	36.00.00 or later
	CompactLogix 5480	5069-L46ERMW, 5069-L450ERMW, 5069-L430ERMW, 5069-L4200ERMW, 5069-L4100ERMW	32.00.00 or later
HART Modules 5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT	CompactLogix 5380	5069-L320ER, 5069-L340ERM	32.02 or later
		5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L320ERM, 5069-L330ER, 5069-L330ERM, 5069-L340ER	32.02 or later
		5069-L350ERM, 5069-L380ERM, 5069-L3100ERM	32.02 or later
	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	32.02 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	32.00.00 or later
	ControlLogix 5580	1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E	32.02 or later
	ControlLogix 5580 High Availability Controller	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	32.02 or later
		1756-L85ES	36.00.00 or later
	Safety Modules 5094-IB16S, 5094-IB16SXT, 5094-OB16S, 5094-OB16SXT, 5094-OW4IS, 5094-OW4ISXT	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2
5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3			32.00.00 or later
GuardLogix 5580		1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	32.00.00 or later
		1756-L85ES	36.00.00 or later

Table 1 - Module Compatibility (Continued)

Modules	Controllers		Studio 5000 Logix Designer Application Version
	System	Catalog Numbers	
Safety Modules (Continued) 5094-IF4IHS, 5094-IF4IHSXT, 5094-OF4IHS, 5094-OF4IHSXT, 5094-IJ2IS, 5094-IJ2ISXT, 5094-IRT8S, 5094-IRT8SXT	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	33.00.00 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L340ERMS3K, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	33.00.00 or later
		1756-L85ES	36.00.00 or later

(1) The modules 5094-IJ2I and 5094-IJ2IXT are compatible with Studio 5000 Logix Designer Application version 34.00.00 or later.

Secure Access to the System

To secure access to the Logix 5000 controllers and EtherNet/IP adapters by authorized users only, consider these options:

- Password helps protect the source and execution of the control program.
- Remove the key from the controller.
- Deploy EtherNet/IP devices in accordance with recommended architectures and concepts. See the Converged Plantwide Ethernet (CPwE) Design and Implementation Guide, publication [ENET-TD001](#).
- Implement physical barriers, such as locked cabinets.

To secure access to the system, consider these options:

- Follow industry best practices to harden your personal computers and servers, including antivirus/antimalware and application whitelisting solutions.
- The recommendations are published at the Rockwell Automation technical support center in Knowledgebase article Rockwell Automation Customer Hardening Guidelines, Document ID [PN767](#). To access technical support center, go to rok.auto/knowledgebase.
- Develop and deploy the backup and disaster recovery policies and procedures. Test backups on a regular schedule.
- Minimize network exposure for all control system devices and systems, and confirm that they are not accessible from the Internet.
- Locate control system networks and devices behind firewalls and isolate them from the business network.
- Subscribe to Knowledgebase article Industrial Security Advisory Index, Answer ID [54102](#) at the Rockwell Automation technical support center so you have access to information about security matters that affect Rockwell Automation products. To access technical support center, go to rok.auto/knowledgebase.

FLEX 5000 Adapter Features

A FLEX 5000 adapter performs the following functions:

- Facilitates high-speed data transfer between some Logix 5000 controllers and remote I/O modules.
- Provides system-side power to the FLEX 5000 I/O modules.
- Connects to multiple EtherNet/IP network topologies.
- Supports the Removal and Insertion Under Power (RIUP) of I/O modules, and live bank changes.
- Supports High Availability controllers
- Supports Logix SIS solution^(a)

(a) The Logix SIS solution requires firmware revision 6.011 or later to support concurrent connections to the safety I/O modules via FLEX 5000 adapters.

- Supports I/O modules, as follows:
 - The 5094-AENTR, 5094-AENTRXT, 5094-AENSFPR, and 5094-AENSFPRXT adapters support up to 8 FLEX 5000 I/O modules.
 - The 5094-AEN2TR, 5094-AEN2TRXT, 5094-AEN2SFPR, and 5094-AEN2SFPRXT adapters support up to 16 FLEX 5000 I/O modules.
 - Also supports FLEX 5000 safety I/O modules from firmware revision 3.011 or later.
- The 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, and 5094-AEN2SFPRXT adapters support fiber or copper SFP modules via two SFP slots.

IMPORTANT When you use the FLEX 5000 adapter in a Logix SIS solution, there is a limit of 6 safety HART modules per adapter.

FLEX 5000 EtherNet/IP Adapter Features

The adapters support these EtherNet/IP features.

FLEX 5000 EtherNet/IP Adapter Features

Features	5094-AENTR 5094-AENTRXT	5094-AEN2TR 5094-AEN2TRXT	5094-AENSFPR 5094-AENSFPRXT	5094-AEN2SFPR 5094-AEN2SFPRXT
10 Mbps, 100 Mbps, 1 Gbps	Yes			
Media	Copper		Copper Fiber ⁽¹⁾	
DLR/Linear/Star network support	Yes			
PRP network support	Firmware revision 4.011 or later			
Ability to operate as a DLR Supervisor	Yes			
Implicit Protection Mode	Yes			
Explicit Protection Mode				
Web server and SNMP enable/disable feature	Firmware revision 2.011 or later			
Rotary switches, PRP/DLR switch monitoring				
Thermal Monitoring	Yes			
Power Monitoring	Configurable			
End-cap monitoring	Yes			
Safety I/O support	Firmware revision 3.011 or later			
ControlLogix 5580 High Availability controller feature support ⁽²⁾	Firmware revision 5.011 or later			
Logix SIS Solution support ⁽²⁾	Firmware revision 6.011 or later			

(1) For media support, see [Supported SFP Modules on page 19](#).

(2) Listen only connection is not supported for FLEX 5000 modules in a high availability system and Logix SIS solution.

Concurrent Communication with FLEX 5000 Safety I/O Modules

Concurrent communication is available with FLEX 5000 safety I/O modules. It occurs between Logix SIS controllers and the I/O modules via an EtherNet/IP network.

You must configure a 1756-EN4TR EtherNet/IP communication module in each Logix SIS chassis to use concurrent communication and not use IP swapping mode.

With concurrent communication, data transmission between 1756-EN4TR EtherNet/IP communication modules and the FLEX 5000 EtherNet/IP adapter is redundant at the logical and physical levels.

IMPORTANT

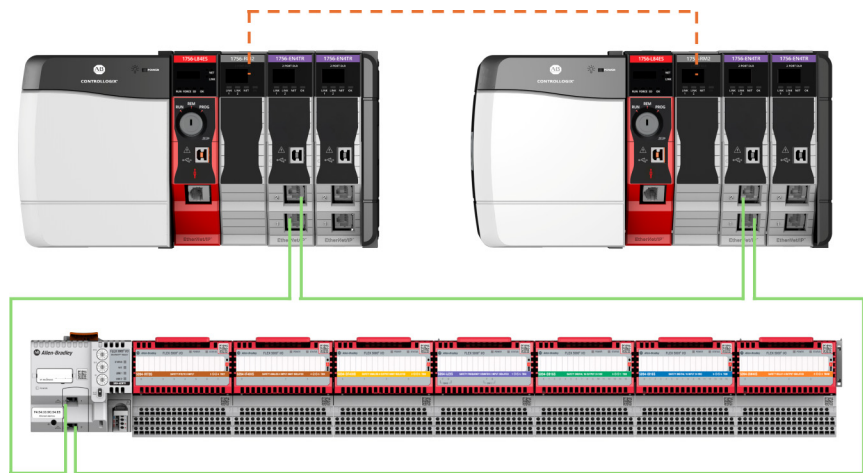
The FLEX 5000 adapters can support both concurrent communication and non-concurrent communication simultaneously, however the FLEX 5000 standard I/O modules **do not support** concurrent communication.

If your FLEX 5000 I/O system includes safety and standard I/O modules, you must configure a second EtherNet/IP communication module such as a 1756-EN2TR or 1756-EN4TR which is not configured for concurrent communications. The second EtherNet/IP communication module will use IP swapping mode to connect to the standard I/O modules.

In this scenario, you must connect to the FLEX 5000 EtherNet/IP adapter twice, once through the 1756-EN4TR EtherNet/IP communication module to connect to safety modules and again through the second EtherNet/IP communication module to add standard I/O modules to the GuardLogix 5580 controller's Logix Designer application project.

You can only use concurrent communication with FLEX 5000 safety I/O modules if you use the following components in your system.

Component		Software Version	Firmware Revision
Software	Studio 5000 Logix Designer application	Version 37.00.00 or later	—
	FactoryTalk® Linx software	Version 6.31.00 or later	—
	ControlFLASH Plus™ software	Version 5.00.00 or later	—
GuardLogix 5580 system required components	GuardLogix 5580 controller	—	Revision 37.011 or later
	1756-EN4TR ControlLogix EtherNet/IP communication modules	—	Revision 7.001 or later
FLEX 5000 safety I/O system components	FLEX 5000 EtherNet/IP adapter	—	Revision 6.011 or later
	FLEX 5000 safety I/O modules	—	Any



Logical Level

Concurrent communication uses a logical CIP™ connection to the I/O module. Logix SIS controllers open the concurrent communication path to the FLEX 5000 EtherNet/IP adapter.

The controllers operate in parallel to synchronize the data. Each controller sends a data packet to the 1756-EN4TR EtherNet/IP adapter in its local chassis. The data packets are identical. The adapters transmit the data on the EtherNet/IP network. As a result, the same output values occur simultaneously. Thus, data is duplicated.

When data arrives at the FLEX 5000 EtherNet/IP adapter, it converts the concurrent communication to standard communication and sends one data packet to the I/O module. The I/O module establishes a signal value that is set on the terminal screws.

A similar pattern is followed for input data that is transmitted from the FLEX 5000 safety I/O module to the Logix SIS controllers. The I/O module sends one data packet to the FLEX 5000 EtherNet/IP adapter, the adapter then sends identical data packets onto the 1756-EN4TR EtherNet/IP adapters in the redundant chassis. Thus, the data is duplicated. Each adapter then sends a single data packet to the GuardLogix 5580 controller in its chassis.

Physical Level

During transmission, the duplicated data passes along physical connections between the 1756-EN4TR EtherNet/IP communication modules and the FLEX 5000 EtherNet/IP adapter. The physical network redundancy is achieved via redundant paths between the 1756-EN4TR EtherNet/IP communication module and the FLEX 5000 EtherNet/IP adapter as follows:

- PRP network - Duplicated data at the physical level for each path
- DLR network - Providing redundant paths

For more information on how concurrent communication occurs, see the ControlLogix EtherNet/IP Network Devices User Manual, publication [1756-UM004](#).

Notes:

FLEX 5000 Adapter Power Requirements

Power I/O Modules and Field-side Devices

The adapters provide system-side power that powers the I/O modules and lets them transfer data and execute logic.

- The system-side power is provided through the Module (MOD) Power connector and is passed to each module as it is added to the system. The system-side power is also known as MOD power.
- The field-side power is provided through the Sensor/Actuator (SA) Power connectors on each modules terminal base and is added to the system. Field-side power is also known as SA power.

System power begins at the EtherNet/IP adapter and passes across the I/O module internal circuitry via power buses. The MOD power bus and SA power bus are isolated from each other.

IMPORTANT We recommend the following power supplies for FLEX 5000 EtherNet/IP adapters:

Recommended Power Supply	FLEX 5000 EtherNet/IP Adapter
1606-XLP72E	5094-AENTR, 5094-AENTRXT, 5094-AENSFPR, and 5094-AENSFPRXT
1606-XLE80E	5094-AEN2TR, 5094-AEN2TRXT, 5094-AEN2SFPR, and 5094-AEN2SFPRXT

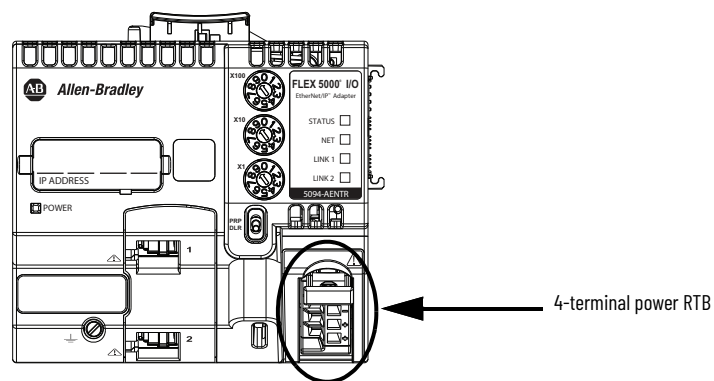
For more information, see Switched Mode Power Supply Specifications Technical Data, publication [1606-TD002](#).

Power Connectors

Connect the external power supplies to removable terminal blocks (RTBs) to provide MOD power and SA power. The adapters use different RTBs to connect power.

FLEX 5000 EtherNet/IP adapters use one 4-terminal power RTB.

Figure 3 - FLEX 5000 EtherNet/IP Adapter Power Connection



For more information on how to connect MOD power, see the FLEX 5000 EtherNet/IP Adapters with RJ45 Ports Installation Instructions, publication [5094-IN001](#) or FLEX 5000 EtherNet/IP Adapters with SFP Support Installation Instructions, publication [5094-IN002](#).

MOD Power Bus

The MOD power is a DC power source that is required to operate the adapter and the I/O modules installed with it. Remember the following:

- The adapter and the I/O modules that are installed with it use only one MOD power bus.
- Every module draws current from the MOD power bus and passes the remaining current to the next module.
- You must limit the MOD power source to 10 A, max, at 18...32V DC.
- We recommend that you use an external power supply that is adequately sized for the total MOD power bus current drawn by the adapter and I/O modules.

For example, if the total MOD power current draw is 5 A, you can use a MOD power supply that is limited to 5 A.

You must consider **current inrush requirements** when you calculate the total MOD power bus current draw in the system.

When the MOD power source is turned On, that is, I/O modules receive system-side power, the following occurs.

1. The adapter draws current from the MOD power bus current and passes the remaining current through to the next module.
2. The next module draws MOD power bus current and passes the remaining current through to the next module.
3. The process continues until MOD power bus current needs are met for all modules.

For more information on the current that the modules draw from the MOD power bus, see the FLEX 5000 Module Specifications Technical Data, publication [5094-TD001](#).

FLEX 5000 Adapters with SFP Support

SFP Module Support

The following adapters support EtherNet/IP network transceiver modules in SFP format:

- 5094-AENSFPR
- 5094-AENSFPRXT
- 5094-AEN2SFPR
- 5094-AEN2SFPRXT

Table 2 - Supported SFP Modules

Catalog Number	Maximum Network Speed	Standard
1783-SFP100FX	100 Mbps	100BASE-FX
1783-SFP100EXC	100 Mbps	100BASE-EX
1783-SFP16SX	1 Gbps	1000BASE-SX
1783-SFP16LX	1 Gbps	1000BASE-LX/LH
1783-SFP100LX	100 Mbps	100BASE-LX
1783-SFP16EXE	1 Gbps	1000BASE-EX
1783-SFP100ZXC	100 Mbps	100BASE-ZX
1783-SFP16ZX	1 Gbps	1000BASE-ZX
1783-SFP16TE	10 Mbps, 100 Mbps, 1 Gbps	1000BASE-T over SGMII

You must purchase SFP modules separately. For SFP module specifications, see Stratix® Ethernet Device Specifications Technical Data, publication [1783-TD002](#).

SFP Module Compatibility

The SFP module media and standard must be compatible in order to maintain transceiver module functionality. Use official Allen-Bradley® modules that can be correctly detected and initialized by the firmware. For more information on identifying correctly initialized modules, see [SFP Module Status on page 19](#).



WARNING: Using a transceiver module that is not recommended may cause data loss, hardware damage, or may interfere with control process.

Install a SFP module

You can insert or remove the SFP modules during run time.

To confirm that your SFP module is properly inserted, the corresponding LINK status indicator is ON if the network cable is connected between transceiver module and an operating network device.

IMPORTANT

- The fiber SFP modules have no auto-negotiation capabilities. You must use identical fiber modules at either end of a fiber cable and settings.
- The copper RJ45 modules have auto-negotiation capabilities.

SFP Module Status

To check the status of an inserted SFP module, do the following:

1. On the Adapter webpage go to Diagnostic → Network Settings.
2. Locate the SFP module type under the Ethernet Port information.

If the module is successfully detected and initialized, the catalog number or type of standard displays.

Ethernet Port 2	
Interface State	Unknown
Link Status	Inactive
Speed	
Duplex	
Autonegotiate Status	
SFP module type	1783-SFP1GZX

If the module is not recognized and not initialized the SFP module type displays as Unknown.

Ethernet Port 2	
Interface State	Unknown
Link Status	Inactive
Speed	
Duplex	
Autonegotiate Status	
SFP module type	Unknown

See [SFP Module Compatibility on page 80](#) for more information on selecting SFP modules to use with your FLEX 5000 adapters.

Connect to the EtherNet/IP Network

You must set the IP address on the adapter for the adapter to operate on an EtherNet/IP network.

The following are adapter conditions in which you set the IP address:

- Set the IP address for the **first time** after it powers up in the out-of-box state.

IMPORTANT The adapter powers up in the out-of-box state the first time you install it. However, the adapter also returns to the out-of-box state if the adapter is configured so that you must set the IP address each time that power is cycled.

- Change the IP address after it has been set.

IMPORTANT Verify that the IP address for the adapter is not a duplicate of any existing devices on the network.

Requirements

To set the IP address, have the following:

- EtherNet/IP drivers installed on the programming workstation
- MAC ID from the device QR code, which is located next to the IP ADDRESS label on the device
- Recommended IP address for the device

Set the IP Address

When the adapter is in the out-of-box state, the following apply regarding IP addresses:

- The adapters ship without an IP address.
- The rotary switches on the FLEX 5000 adapter are set to 999.
- The adapter is DHCP-enabled which means the adapter is configured to obtain an IP address via a DHCP server.
- If there is no DHCP server or the DHCP server is not configured to set the IP address, you must set the IP Address manually.
- The adapter issues requests for an IP address via DHCP until an IP address is set by using one of the tools that are described in this section.
- The adapter is configured so that it must obtain the IP address over DHCP each time that power is cycled.
- You can change the adapter configuration so that it is not required to obtain the IP address over DHCP each time that power is cycled.

The FLEX 5000 adapters support the following methods to set/change the IP address:

- Rotary Switches. See [Set the IP Address with the Rotary Switches on page 22](#).
- FactoryTalk Linx Software. See [Set the IP Address with the FactoryTalk Linx Software on page 22](#).
- BOOTP/DHCP utility^(a)
- RSLinx® Classic software^(a)

(a) For more information on how to use these methods, see EtherNet/IP Network Devices User Manual, publication [ENET-UM006](#).

Set the IP Address with the Rotary Switches

If the network uses 192.168.1.x, use the rotary switches on the adapter to set the last octet of the network IP address. Valid numbers range from 001...254.

IMPORTANT The rotary switches only set the IP address when power is cycled.

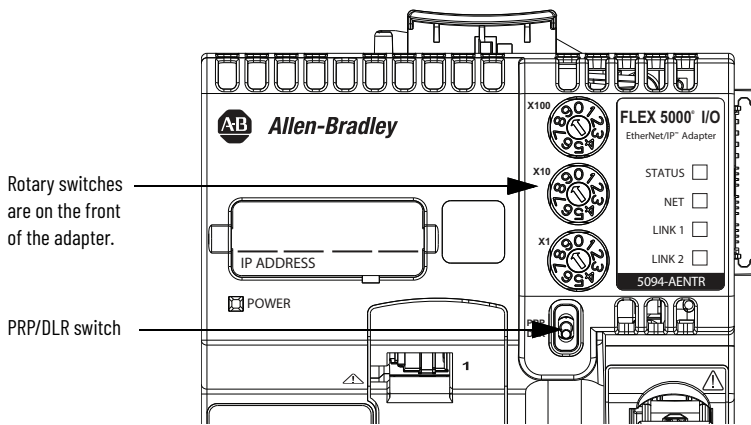


WARNING: When you change switch settings on the adapter while power is On, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

From firmware revision 2.011 onwards, if you change the rotary switches when the device is powered up, a minor recoverable fault occurs on the device in order to alert you of an unexpected configuration change.

IMPORTANT The FLEX 5000 EtherNet/IP adapters do not have a reset button.

Rotary switches - The bottom switch represents the first digit in the octet, the middle switch represents the second digit, and the top switch represents the third digit.

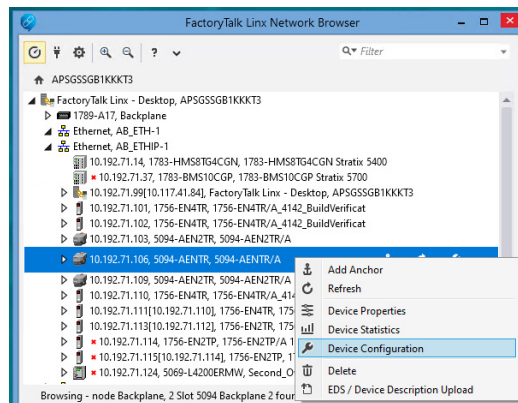


IMPORTANT The PRP feature is available from firmware revision 4.011 onwards. If you are using an earlier firmware revision, the adapter cannot establish connection with I/O modules when the PRP/DLR switch is in the PRP position.

Set the IP Address with the FactoryTalk Linx Software

To use FactoryTalk Linx software to set the IP address, follow these steps:

1. Open the FactoryTalk Linx Network Browser and browse to the EtherNet/IP adapter.
2. Right-click on the EtherNet/IP adapter and select Device Configuration.



3. On the Device Configuration dialog box, complete these steps:
 - a. Select Manually configure IP settings.
 - b. Complete the IP address and other fields as necessary.
 - c. Select Apply.

APSGSSGCB62YH3IAB_ETH-1\10.192.71.6

Internet Protocol Port Configuration Network Configuration LLDP

Port:
1/2

Manually configure IP settings
 Obtain IP settings automatically using BOOTP
 Obtain IP settings automatically using DHCP
 IP set by rotary switch

Physical Device IP Address: 10 . 192 . 71 . 6 Subnet Mask: 255 . 255 . 255 . 0

Gateway Address: 10 . 192 . 71 . 1 Primary DNS Server Address: 0 . 0 . 0 . 0

Secondary DNS Server Address: 0 . 0 . 0 . 0

Domain Name: Host Name:

Refresh Apply

4. When prompted, select Yes to confirm that you want to assign the IP address.

IP Configuration

The IP configuration is about to change. Do you want to continue?

Yes No

Select the Network Redundancy Mode

The FLEX 5000 EtherNet/IP adapter supports two types of network redundancy:

- DLR (Device Level Ring)
- PRP (Parallel Redundancy Protocol)

In these modes, all EtherNet/IP ports of the adapter are used to provide redundant network paths.

IMPORTANT Make sure that both EtherNet/IP ports are enabled and configured correctly (recommended setting: auto-negotiation is ON).

To select one of the network redundancy modes, do the following:

1. Power down the adapter.
2. Use the PRP/DLR switch to select the redundancy mode.
3. Power up the adapter.

Before you select one of the redundancy modes, verify your network settings to determine the redundancy mode used by your network.

IMPORTANT If you switch the adapter to a redundancy mode that is different from your network, the adapter disconnects from the network.

IMPORTANT You cannot switch the network redundancy mode while the adapter is running. A minor recoverable fault occurs to warn about the unintentional change to the network redundancy mode.

Performance Impact of PRP Network Redundancy Mode

When you enable the PRP network redundancy mode, there is an impact on the maximum possible performance of the adapter for I/O connections.

Table 3 - Maximum Packet per Second (pps) Values for I/O Connections

Redundancy Mode	Maximum pps for I/O Connections for all Traffic, to and from Chassis
DLR	100,000
PRP	50,000

To achieve the best possible performance when using the PRP network, make sure that LAN A and LAN B are symmetric. Both networks should have the same topology and utilize the same type of devices. The PRP networks work best when the path for redundant network packets is the same or very similar in both networks.

For more information about PRP and how to configure a PRP network, see EtherNet/IP Parallel Redundancy Protocol Application Technique, publication [ENET-AT006](#).

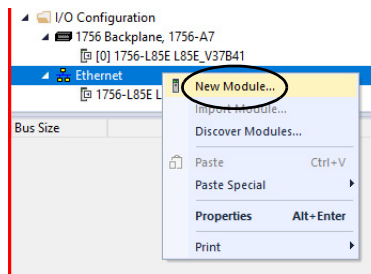
Configure the Adapter

After you install the communication module and set the IP address, you must add the module to a controller project. The project must be online to set the Speed and Duplex configurable parameters on the module.

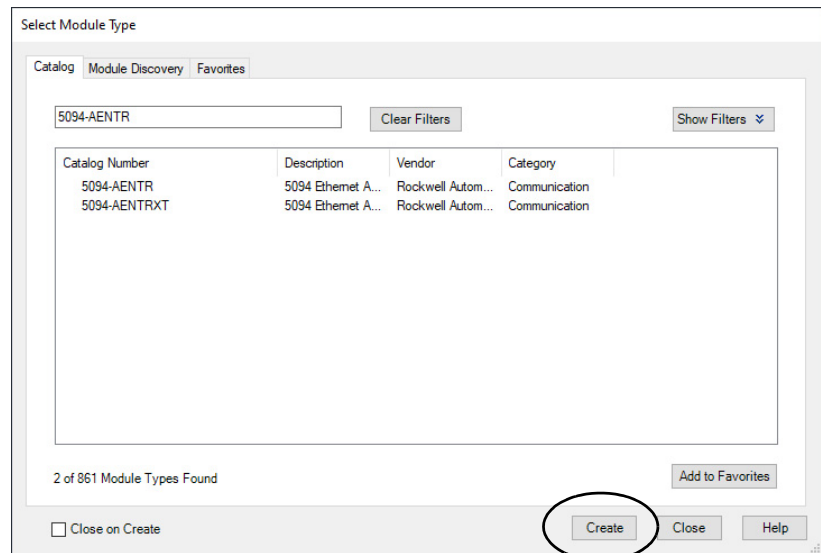
IMPORTANT You must use the Studio 5000 Logix Designer application version 28 or later.

Add the Adapter to a Project

1. Verify that your project is offline.
2. Right-click on your network port, and select New Module.

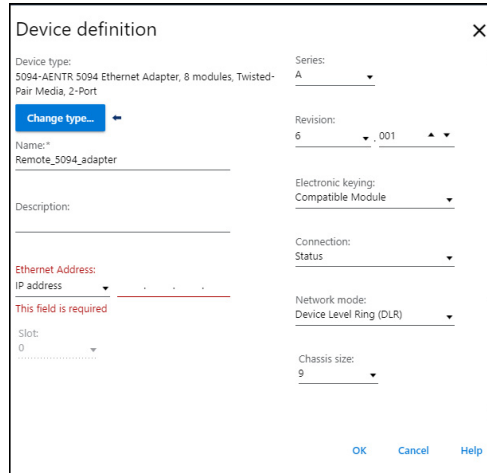


3. On the Select Module Type dialog, complete the following tasks:
 - a. In the search field, type the catalog number for your adapter.
This example uses the 5094-AENTR adapter.
 - b. Select your adapter from the search result.
For some modules, the Select Major Revision dialog can appear. If this dialog appears, choose the major revision of the module and select OK.
 - c. Select Create.



4. From the Device definition dialog, complete the following:
 - a. Enter a name for your adapter.
 - b. Enter the IP address in the Ethernet Address field.
 - c. Set appropriate firmware revision of your adapter. Use the left and right dropdowns under the Revision.

Major revision (left dropdown menu)	This field only displays the major revisions that are applicable to the selected series. This field appears dimmed when online unless the module supports allowing major revision changes to be made while online.
Minor revision (right field)	Sets the minor revision of the module. The valid range is 1..255. This field is enabled while offline, and in the Program, Remote Program, and Remote Run modes. It appears dimmed in Run mode or when the Electronic Keying is set to Disable Keying.



- d. Select the appropriate the Electronic Keying setting.


The Electronic Keying is enabled while offline, and in Program, Remote Program, and Remote Run modes. It appears dimmed in Run mode.

The Electronic Keying reduces the possibility that you use the wrong device in a control system. It compares the device that is defined in your project to the installed device. If keying fails, a fault occurs. These attributes are compared.

Attribute	Description
Vendor	The device manufacturer.
Device Type	The general type of the product, for example, digital I/O module.
Product Code	The specific type of the product. The Product Code maps to a catalog number.
Major Revision	A number that represents the functional capabilities of a device.
Minor Revision	A number that represents behavior changes in the device.

[Table 4](#) shows the available Electronic Keying options.

Table 4 – Electronic Keying Options

Electronic Keying Option	Description
Compatible Module	<p>Lets the installed device accept the key of the device that is defined in the project when the installed device can emulate the defined device. With Compatible Module, you can typically replace a device with another device that has the following characteristics:</p> <ul style="list-style-type: none"> • Same catalog number • Same or higher Major Revision • Minor Revision as follows: <ul style="list-style-type: none"> - If the Major Revision is the same, the Minor Revision must be the same or higher. - If the Major Revision is higher, the Minor Revision can be any number.
Disable Keying	<p>Indicates that the keying attributes are not considered when attempting to communicate with a device. With Disable Keying, communication can occur with a device other than the type specified in the project.</p> <hr/> <div style="display: flex; align-items: center;">  <p>ATTENTION: Be cautious when you use Disable Keying. If used incorrectly, this option can lead to personal injury or death, property damage, or economic loss. We strongly recommend that you do not use Disable Keying. If you use Disable Keying, you must take full responsibility for understanding whether the device being used can fulfill the functional requirements of the application.</p> </div> <hr/>
Exact Match	<p>Indicates that all keying attributes must match to establish communication. If any attribute does not match precisely, communication with the device does not occur.</p>

Carefully consider the implications of each keying option when selecting one.

IMPORTANT When you change Electronic Keying parameters online, it interrupts connections to the device and any devices that are connected through the device. Also, connections from other controllers can be broken.

If an I/O connection to a device is interrupted, the result can be a loss of data.

For more detailed information, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication [LOGIX-AT001](#).

e. Select the connection from the Connection dropdown list.

Connection Options	Description
None	No direct connection from the controller (Originator) to the adapter.
Status	Reports device status.

IMPORTANT We recommend that you select Status as a connection type when using the adapter in a ControlLogix 5580 high availability control system.

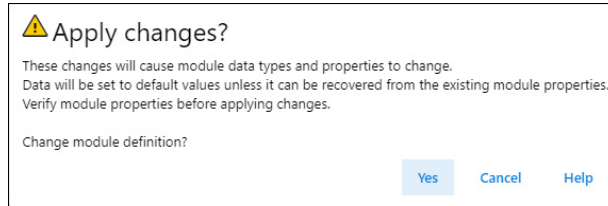
If you select None as a connection type, the controller takes longer time to recognize that there is a communication loss to the controller.

IMPORTANT The Logix SIS solution requires you to select Status as a connection type.

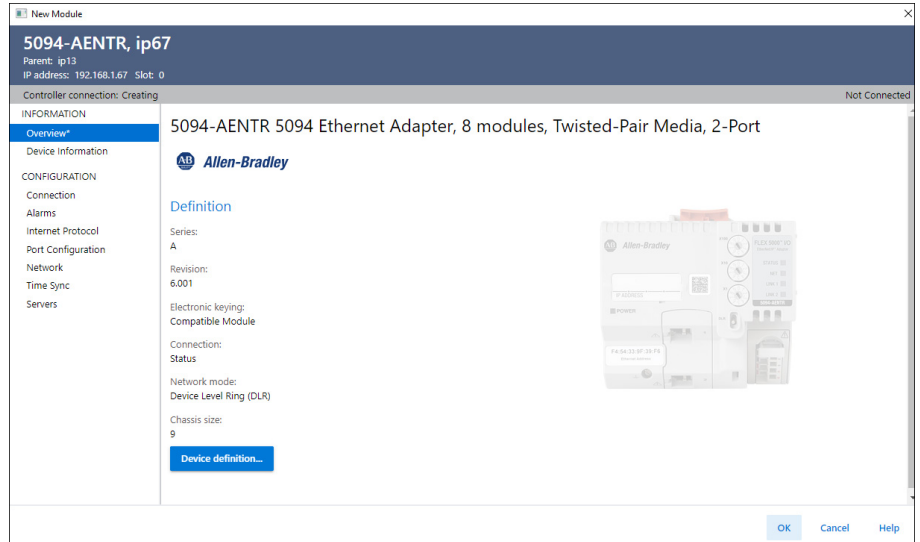
f. Select the network mode from the Network mode dropdown list.

Network Mode Options	Description
Device Level Ring (DLR)	Providing redundant paths.
Parallel Redundancy Protocol (PRP)	Duplicated data at the physical level for each path.

- g. Set the Chassis size to the number of modules including the adapter.
For example, one adapter with eight I/O modules considered as Chassis size 9.
 - h. Select OK.
- If you set the Connection to Status, select Yes on the Apply changes dialog.

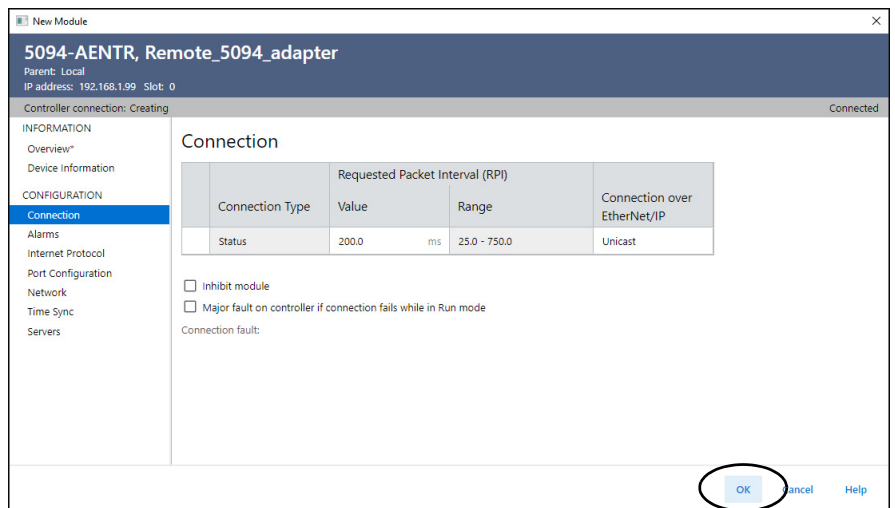


The New Module dialog appears with Overview information.

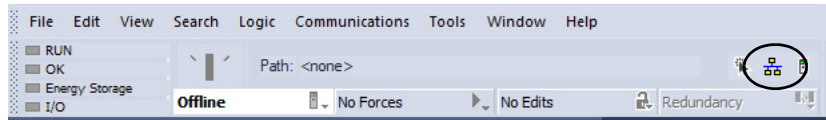


5. On the New Module dialog, select the Connection from the CONFIGURATION category and complete the following tasks:
 - a. Set the Requested Packet Interval (RPI). The acceptable range is 25.0...750.0 ms, with 200.0 ms as the default. This connection is for status data only, with no I/O.
 - b. Set the Connection over EtherNet/IP to Unicast or Multicast from the dropdown list.

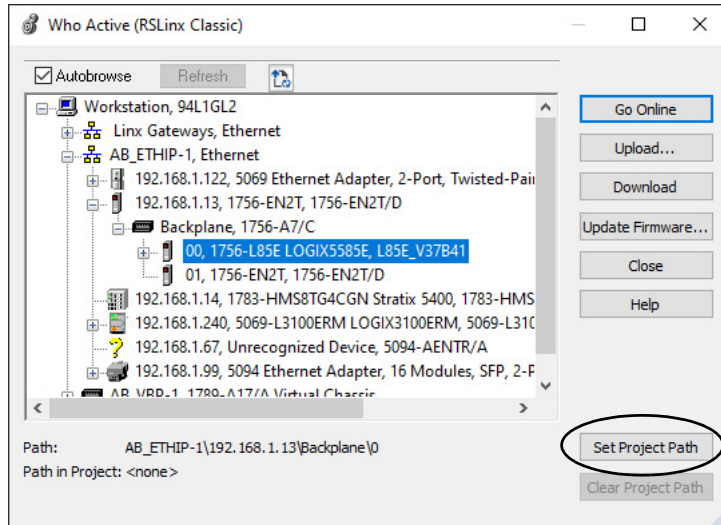
For non-redundant controllers, the default value is Unicast when the target device supports unicast. Otherwise, the default value is Multicast. For redundant controllers, the default value is Multicast when the target device supports multicast. Otherwise, the default value is Unicast. Logix SIS is an exception to this as it uses unicast connections for concurrent communications to safety modules even in high availability systems.



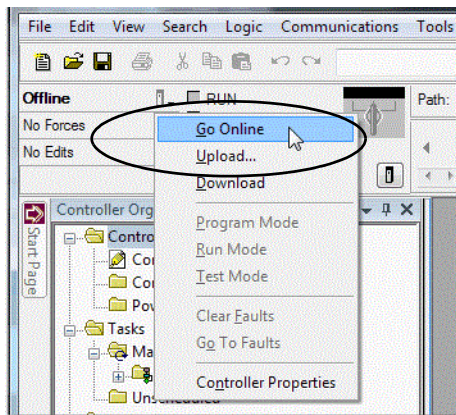
- c. Select OK.
6. Save the project.
7. If the project does not have a communication path to the controller, select Browse to create a path.



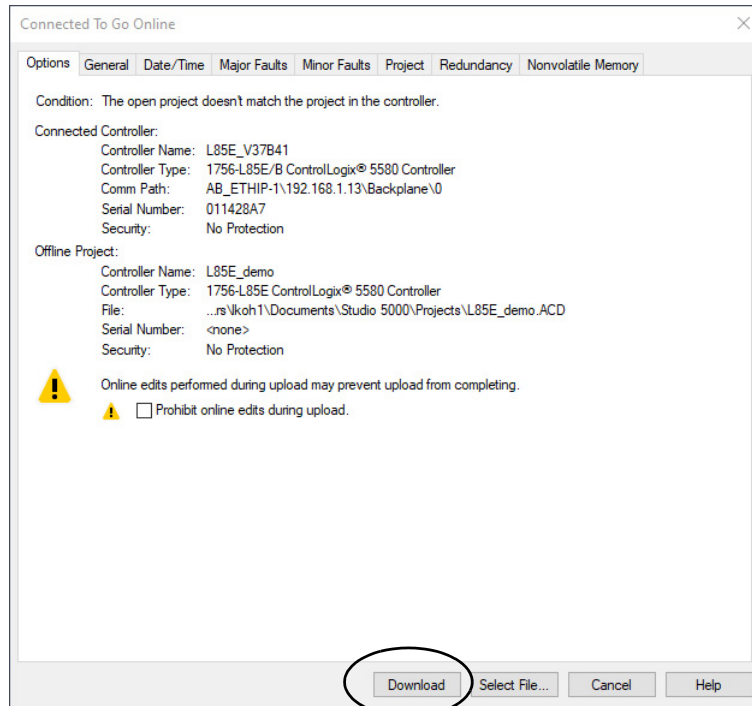
8. On the Who Active dialog, choose the desired path and select Set Project Path and close the dialog.



9. Verify that the controller mode switch is in the PROG mode position.
10. Right-click on the Controller Status icon, and select Go Online.



11. On the Connected To Go Online dialog, select Download.

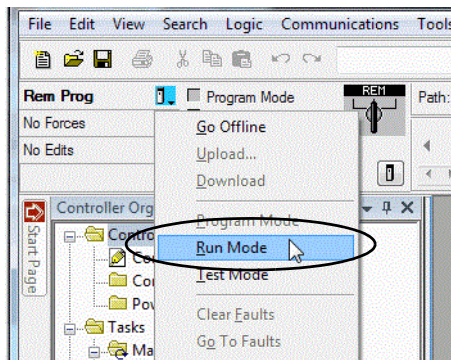


12. Confirm that you want to download the project.

The project downloads to the controller. The Connected To Go Online dialog closes when the download is complete.

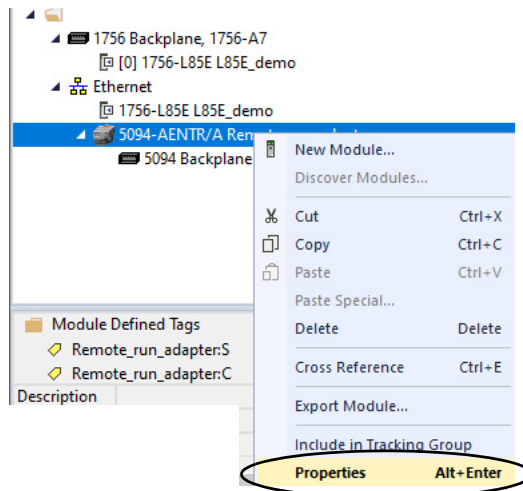
If you did not already configure the Ethernet port speed and duplex settings with RSLinx Classic software, complete these tasks:

1. Put the controller mode switch in the REM position.
2. Change the Studio 5000 Logix Designer application project to Run Mode.

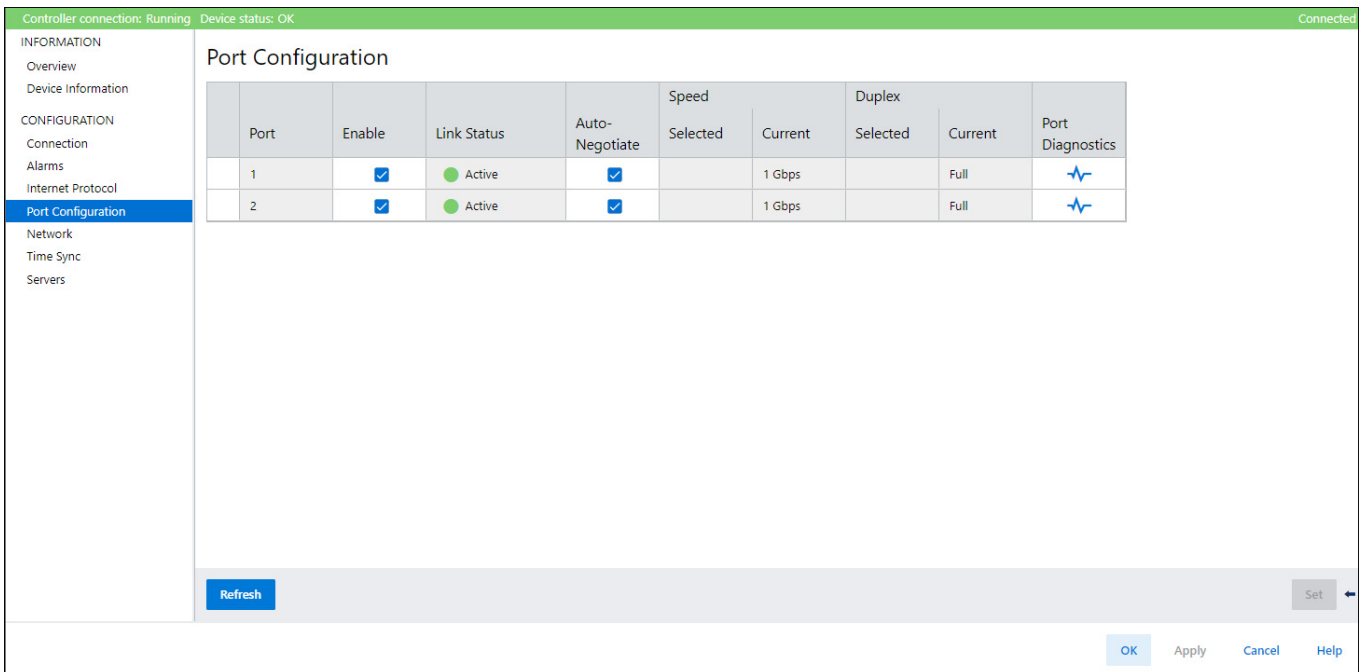


When prompted to change the controller mode to Remote Run, select Yes.

3. Right-click on your adapter, and select Properties.



4. From the Module Properties dialog, select Port Configuration.



Desired Task	Action
Let the module automatically set the port speed and duplex settings.	Leave the Auto-Negotiate checkboxes selected.
Manually configure your port speed and duplex settings.	Follow these steps: 1. Clear the Auto-Negotiate checkbox. 2. Under Speed category Selected column, select the port speed from the dropdown list. 3. Under Duplex category Selected column, select Full from the dropdown list to set the port to full-duplex mode.

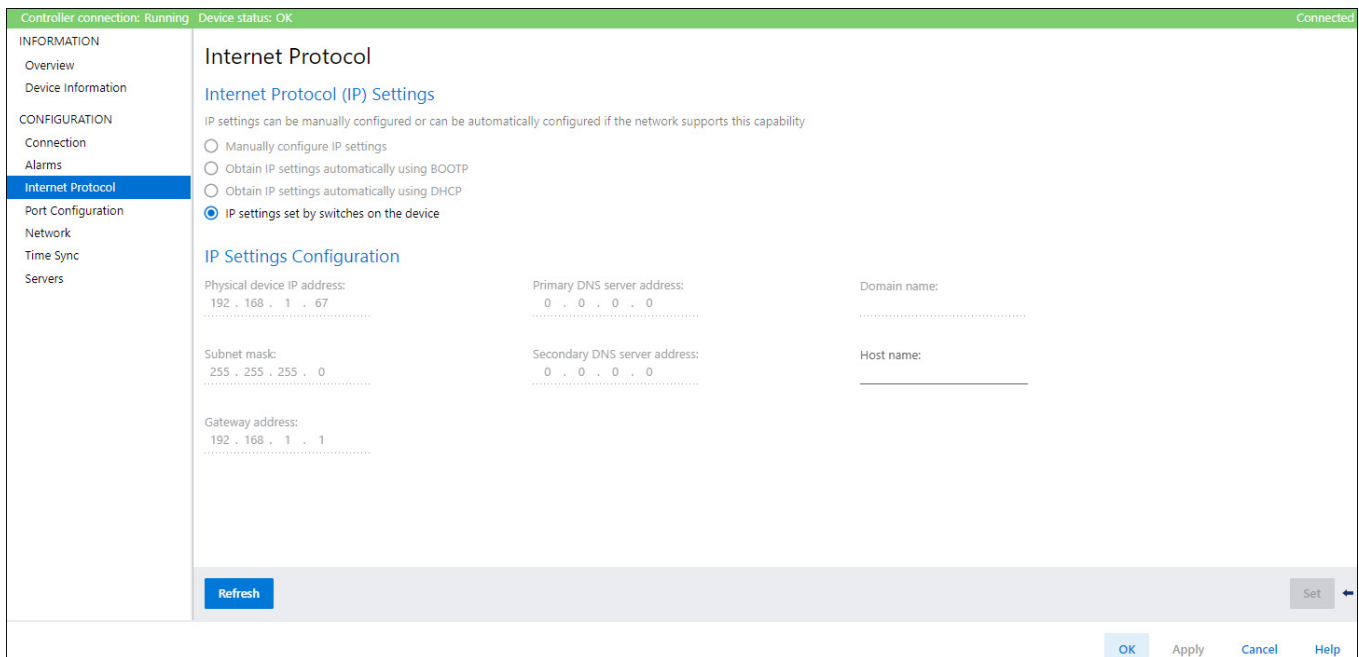
IMPORTANT Consider the following when you configure the port settings:

- The FLEX 5000 I/O EtherNet/IP adapters only support full-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 Auto-Negotiate settings and are recommended for some applications.
- If the module is connected to an unmanaged switch, leave Auto-Negotiate, otherwise the module 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, otherwise the module fails.
- If you connect a manually configured device to an autonegotiate device (duplex mismatch), a high rate of transmission errors can occur.
- Speed and duplex settings for the devices on the fiber SFP must be the same on both ends, otherwise the module fails.

5. From the Module Properties dialog, select Internet Protocol.

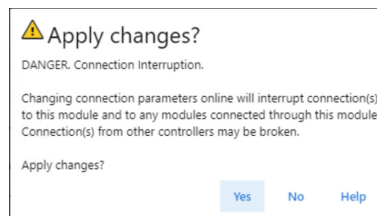
If needed, you can set Internet Protocol properties such as:

- Domain Name
- Host Name
- Gateway Address
- Primary DNS Server Address
- Secondary DNS Server Address



6. On the Module Properties dialog, select OK.

IMPORTANT If you try to change the IP address on this page, the following alert appears:



7. Save the project.

Use your Adapter to Substitute an Other Adapter

For convenience, FLEX 5000 EtherNet/IP adapters can act as substitutes for other FLEX 5000 EtherNet/IP adapters in Studio 5000®.

For example, if your Studio 5000 project requires a 5094-AENTR adapter that can support eight I/O modules, but you have a 5094-AEN2TR adapter that can support 16 I/O modules, you can select the compatible mode in the 5094-AENTR adapter Add-on profile. The compatibility mode allows you to use a 5094-AEN2TR adapter instead of a 5094-AENTR adapter, without making any changes to your Studio 5000 project.

See [Table 5](#) to identify which adapters are compatible as substitutes in your projects.

Table 5 - FLEX 5000 EtherNet/IP Adapter Configuration Compatibility

In Use (✓ means compatible)								
5094-	AENTR	AENSFPR	AEN2TR	AEN2SFPR	AENTRXT	AEN2TRXT	AENSFPRXT	AEN2SFPRXT
AENTR	✓	✓	✓	✓	✓	✓	✓	✓
AENSFPR	✓ ⁽¹⁾	✓	✓ ⁽¹⁾	✓	✓ ⁽¹⁾	✓ ⁽¹⁾	✓	✓
AEN2TR			✓	✓		✓		✓
AEN2SFPR			✓ ⁽¹⁾	✓		✓ ⁽¹⁾		✓
AENTRXT					✓	✓	✓	✓
AEN2TRXT						✓		✓
AENSFPRXT					✓ ⁽¹⁾	✓ ⁽¹⁾	✓	✓
AEN2SFPRXT						✓		✓

(1) The adapter must use copper RJ45 Ethernet network cables.

Protection Mode

The Protection 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. There are two types of Protection Mode that are Implicit and Explicit. These modes differ in how a device is entered in such state and what type of action is prohibited in each of these modes.

An Implicit Protection 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.

An Explicit Protection Mode is a security enhancement, supported with firmware revision 2.011 onwards, that is triggered when a certain rotary switches pattern is selected.

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 Protection Mode

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

Enter and Exit Explicit Protection Mode

The adapter enters Explicit Protection Mode when rotary switches are set to value 900 during boot up.

To enter Explicit Protection Mode, do the following:

1. Note the current position of the rotary switches.
2. Power down the device.
3. Set the rotary switches to 900, then power up the device.

The adapter confirms entering into Explicit Protection Mode with the following status indicator flashing sequence:

- OK indicator is flashing red
- All other indicators are off.

4. Power down the device and restore previous values to the rotary switches.
5. Power up the device to normal work with Explicit Protection Mode enabled.

To exit Explicit Protection Mode, do the following:

1. Note the current position of the rotary switches.
2. Power down the device.
3. Set the rotary switches to 000, then power up the device.

The adapter confirms exiting Explicit Protection Mode with the following status indicator flashing sequence:

- OK indicator is flashing red
- All other indicators are off.

4. Power down the device and restore previous values to the rotary switches.
5. Power up the device to normal work with Explicit Protection Mode disabled.

Restrictions Imposed By Implicit Protection Mode

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

When it is in Protection Mode, the adapter prevents 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
- Enabling or disabling the supervisor mode in DLR mode
- Changing the following Advanced Network Configuration parameters:
 - Supervisor Precedence
 - Beacon Interval
 - Beacon Timeout
 - DLR Protocol VLAN ID
- Changing Internet Protocol parameter Host Name

Restrictions Imposed By Explicit Protection Mode

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

When it is in Protection Mode, the adapter prevents 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
- Disabling or enabling WWW server

- Disabling or enabling SNMP server
- Enabling or disabling the supervisor mode in DLR mode
- Changing the following Advanced Network Configuration parameters:
 - Supervisor Precedence
 - Beacon Interval
 - Beacon Timeout
 - DLR Protocol VLAN ID
- Changing Internet Protocol parameter Host Name

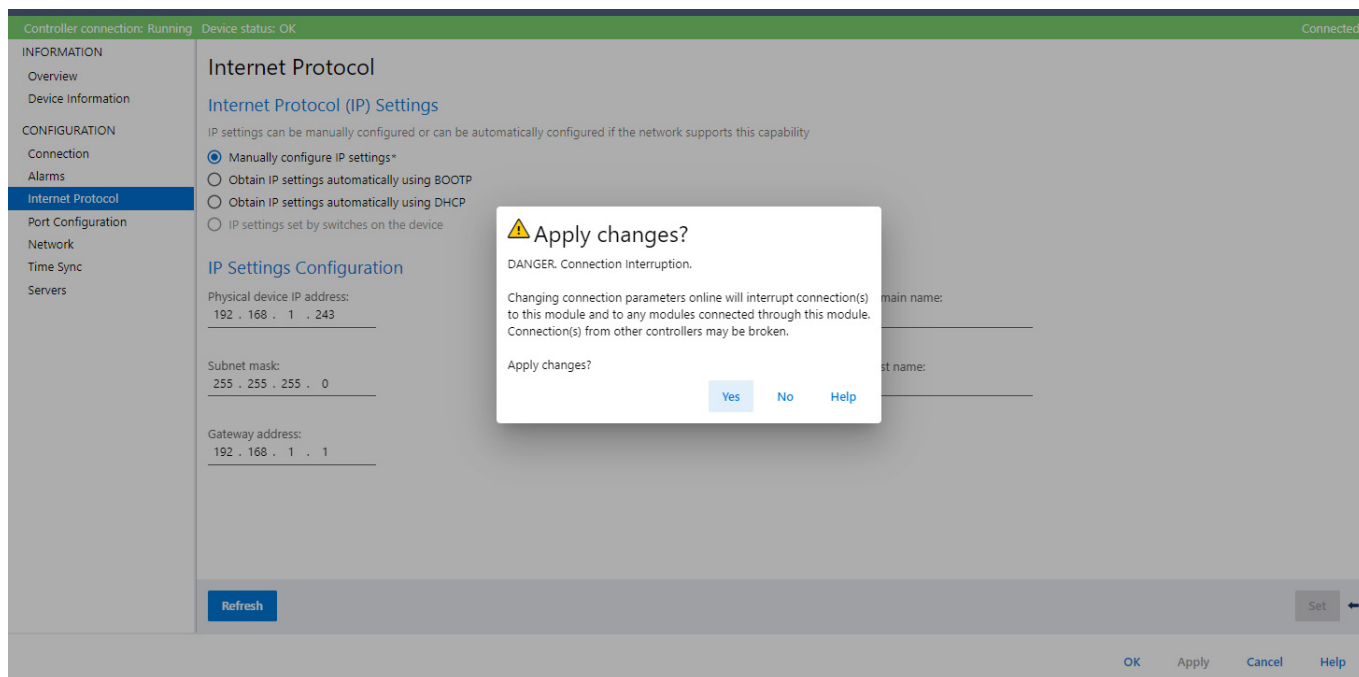
Perform Tasks When Restricted

If the adapter is in Protection 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 Protection Mode.

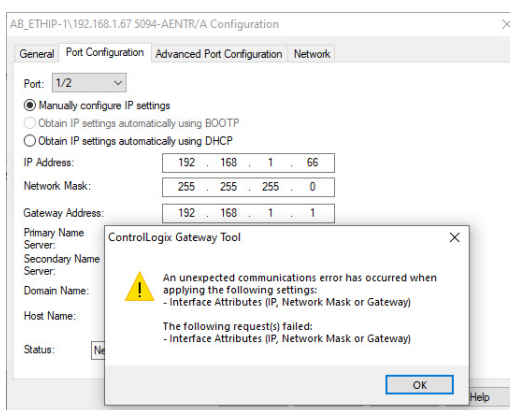
The following are example alerts that result from an attempt to set IP values on the adapter when the adapter is in Protection Mode:

IMPORTANT The Protection Mode is not configurable.

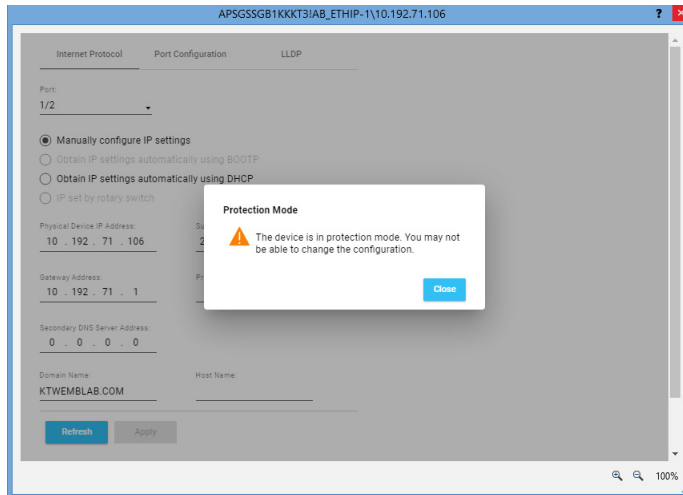
- Alert example in Studio 5000 Logix Designer application



- Alert example in RSLinx Classic software



- Alert example in FactoryTalk Linx Software



If the adapter is not in Protection Mode, the adapter does not reject attempts to perform the tasks that are described above.

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



If the adapter enters Protection 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 HTTP Server and SNMP Server

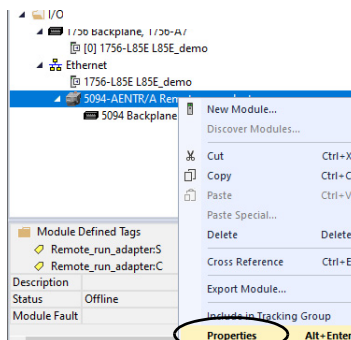
You can enable or disable the HTTP server and SNMP server as an added security feature from firmware revision 2.011 or later. The HTTP server and SNMP server are disabled by default from firmware revision 3.011 or later. Disabling these servers in conjunction with using the Explicit Protection Mode decreases the possibility of a security breach.

Enable the HTTP Server in Studio 5000 Logix Designer Application

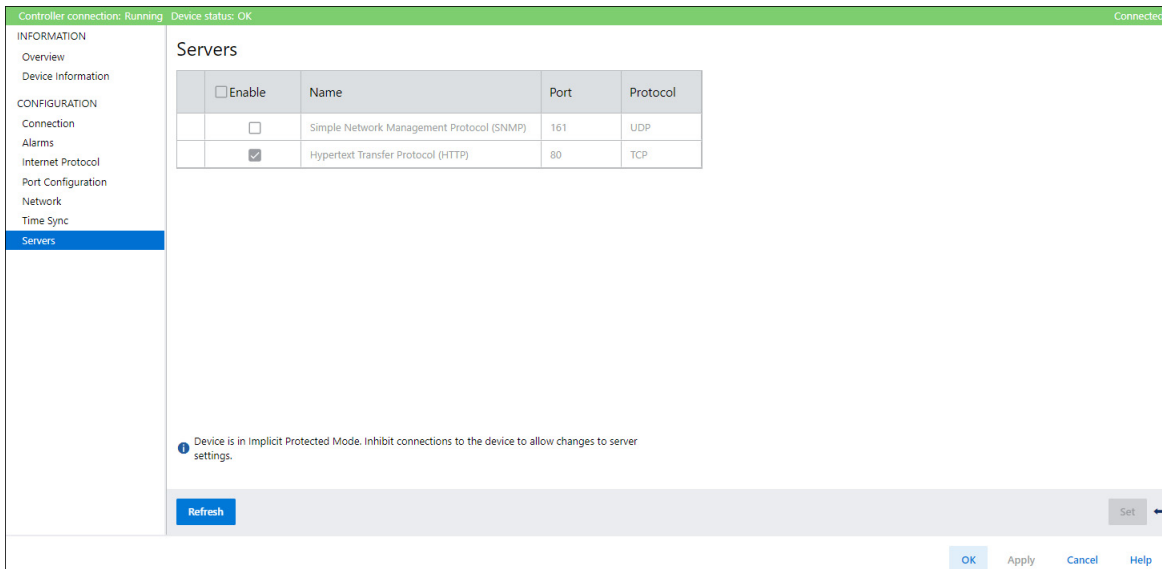
To change the settings in the Add-on Profile Server pages, make sure that the adapter is not in Explicit Protection Mode. To exit Explicit Protection Mode, see [Enter and Exit Explicit Protection Mode on page 33](#).

IMPORTANT From firmware revision 3.011 or later, the HTTP server is disabled by default in out-of-box state and after performing the Factory Reset.

- In Studio 5000 Logix Designer application, select the adapter device from the Controller Organizer pane.
- Right-click on the adapter and select Properties.



- On the Module Properties dialog, select Servers.



4. Enable the Hypertext Transfer Protocol (HTTP).
5. Select Apply to accept the changes. You do not need to cycle power to the adapter.
6. Enter Explicit Protection Mode. See [Enter and Exit Explicit Protection Mode on page 33](#).



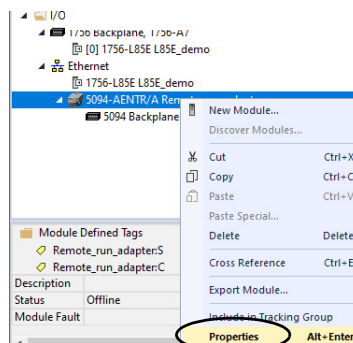
ATTENTION: In order to decrease the possibility of a security breach, use Explicit Protection Mode and do not enable the HTTP server.

Enable the SNMP Server in Studio 5000 Logix Designer Application

To change the settings in the Add-on Profile Server pages, make sure that the adapter is not in Explicit Protection Mode. To exit Explicit Protection Mode, see [Enter and Exit Explicit Protection Mode on page 33](#).

IMPORTANT From firmware revision 3.011 or later, the SNMP server is disabled by default in out-of-box state and after performing the Factory Reset.

1. In Studio 5000 Logix Designer application, select the adapter device from the Controller Organizer pane.
2. Right-click on the adapter and select Properties.



3. On the Module Properties dialog, select Servers.

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Alarms
Internet Protocol
Port Configuration
Network
Time Sync
Servers

Servers

<input type="checkbox"/> Enable	Name	Port	Protocol
<input checked="" type="checkbox"/>	Simple Network Management Protocol (SNMP)	161	UDP
<input type="checkbox"/>	Hypertext Transfer Protocol (HTTP)	80	TCP

Device is in Implicit Protected Mode. Inhibit connections to the device to allow changes to server settings.

Refresh Set

OK Apply Cancel Help

4. Enable the Simple Network Management Protocol (SNMP).
5. Select Apply to accept the changes. You do not need to cycle power to the adapter.
6. Enter Explicit Protect Mode. See [Enter and Exit Explicit Protection Mode on page 33](#).



ATTENTION: In order to decrease the possibility of a security breach, use Explicit Protection Mode and do not enable the SNMP server.



See Knowledgebase article [SNMP Password and MIB Configuration](#), Document ID [QA50173](#) available at Rockwell Automation technical support center for more information. To access technical support center, go to rok.auto/knowledgebase.

FLEX 5000 Adapter Status Indicators

An EtherNet/IP communication modules have multi-character displays and status indicators to assist with performance and diagnostics.

FLEX 5000 EtherNet/IP Adapter Status Indicators

Figure 4 - FLEX 5000 EtherNet/IP Adapter Status Indicators

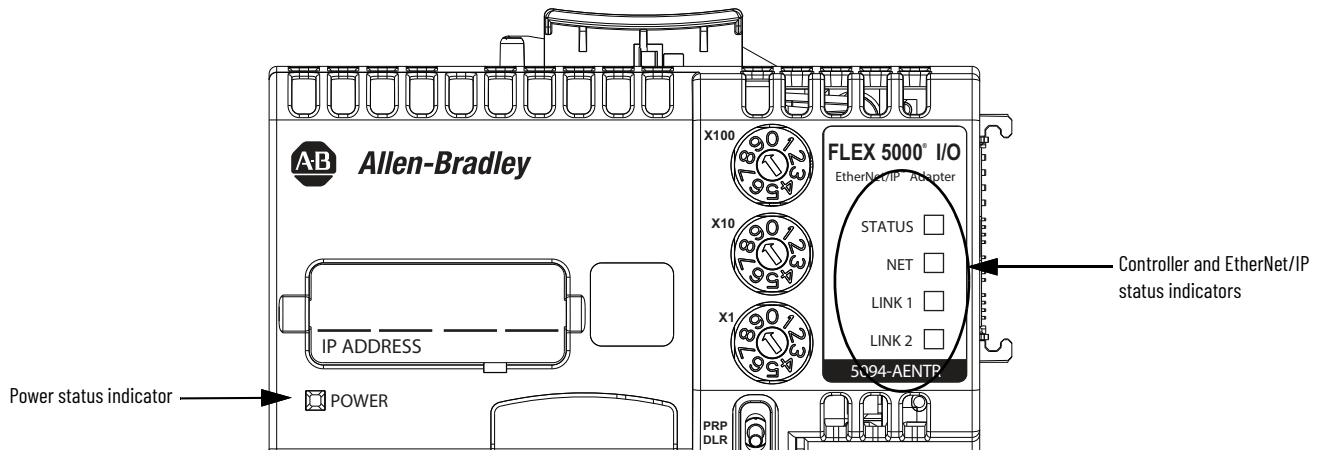


Table 6 describes the FLEX 5000 EtherNet/IP adapter status indicators.

Table 6 - FLEX 5000 EtherNet/IP Adapter Status Indicators

Indicator	State	Description	Recommended Action
STATUS	Off	There is no power applied to the device.	Apply power as necessary.
	Flashing green	There is no IP address assigned to or being used by the device.	Set the IP address on the adapter.
	Steady green	The device is operating in a normal condition.	None
	Flashing red	One of the following: <ul style="list-style-type: none"> The device has a recoverable fault. The fault can be read from the diagnostic webpages. A firmware update is being performed on the device. The adapter has powered up and is in the Factory Default state. 	One of the following: <ul style="list-style-type: none"> Cycle power. Wait for the firmware update to finish. Use adapter as necessary.
	Steady red	The device has an unrecoverable fault.	Cycle power. If the fault persists, replace the device.
NET	Off	<ul style="list-style-type: none"> The device is not configured. The device does not have an IP address. An invalid IP address is configured on the rotary switch. 	Configure the device or assign an IP address. See Chapter 4 for more information on how to set the IP address. See Chapter 5 for more information on how to configure the adapter.
	Flashing green	The device has an IP address, but no active connections are established.	Establish connections as required by the project.
	Steady green	The device has an IP address and at least one established active connection.	None
	Steady red	There is a duplicate IP address condition or invalid configuration.	Troubleshoot the issue and remedy the cause. For example, if a duplicate IP address condition exists, determine which devices on the network use the same IP address and change the IP addresses to unique values.

Table 6 - FLEX 5000 EtherNet/IP Adapter Status Indicators (Continued)

Indicator	State	Description	Recommended Action
LINK 1/LINK 2	Off	No activity. One of these conditions exists: <ul style="list-style-type: none"> The module is not powered. 	One of the following: <ul style="list-style-type: none"> If there is no power to the device, complete one of the following: <ul style="list-style-type: none"> Turn on power. Verify that the module RTB is properly seated in the adapter. IMPORTANT: Before you touch the module RTB, verify that power is not applied to the adapter. Once the module RTB is properly seated, turn on power.
		<ul style="list-style-type: none"> The RJ45 cables are not properly seated in the adapter and connected devices. SFP module is not properly inserted to port slot of adapters with SFP support. 	<ul style="list-style-type: none"> Verify that the cable or SFP modules are properly seated in the adapter and connected devices.
		<ul style="list-style-type: none"> No link exists on the port. 	<ul style="list-style-type: none"> If there is power to the device but no link exists, troubleshoot the issue and remedy the cause.
		<ul style="list-style-type: none"> The port is administratively disabled. 	<ul style="list-style-type: none"> If the port is administratively disabled, confirm that is the desired state. If not, use RSLinx Classic software or the Studio 5000 Logix Designer application to enable the port.
		<ul style="list-style-type: none"> The port is disabled due to rapid ring faults. 	<ul style="list-style-type: none"> If the port is disabled due to rapid ring faults, troubleshoot the cause of the fault and remedy it.
	<ul style="list-style-type: none"> The port configuration is configured in a manner that can result in issues. For example, the port can be configured to Auto-Negotiate and the port at the other end of the cable is configured such that Auto-Negotiate is disable. 	Check configuration for the links at both ends of the cable and verify that they are correct to perform normal operation.	
	Flashing green	Activity exists on the port.	None
	Steady green	An adapter is the supervisor of a DLR network.	None
	Flashing red	The adapter is operating in PRP mode and a LAN A or LAN B warning has occurred.	Check all devices and cable connections in this redundant LAN that indicates an error.

FLEX 5000 Adapter Diagnostics

This chapter describes how to diagnose and troubleshoot issues with the FLEX 5000 adapter.

Diagnostics with the Studio 5000 Logix Designer Application

You can use the Module Properties in the Studio 5000 Logix Designer application to diagnose issues with the adapter.

When your project is online, the following tabs display information about the state and status of the adapter:

- [Device Information](#)
- [Connection](#)
- [Alarms](#)
- [Port Configuration](#)
- [Network](#)
- [Time Sync](#)

Device Information

Device Information tab displays the module identity and status information about the module. See [Table 7](#) for parameter descriptions.

The screenshot displays the 'Device Information' tab in the Studio 5000 Logix Designer application. The interface is divided into several sections:

- Header:** 5094-AENTR, ip67. Parent: ip13. IP address: 192.168.1.67 Slot: 0.
- Status Bar:** Controller connection: Running. Device status: OK. Connected.
- Navigation Menu:** INFORMATION (Overview, Device Information), CONFIGURATION (Connection, Alarms, Internet Protocol, Port Configuration, Network, Time Sync, Servers).
- Device Information Content:**

Identification	Status
Vendor: Rockwell Automation/Allen-Bradley	Major fault: None
Product type: Communications Adapter	Minor fault: None
Product name: 5094-AENTR/A	Internal state: Run mode
Catalog number: 5094-AENTR	Configured: No
Series: A	Owned: No
Revision: 6.011	Device identity: Match
Product code: 5094-AENTR	Protection mode: Implicit
Serial number: D06DF227	
Manufacture date: 2017-08-11	
Warranty number: 46777706	
- Buttons:** Refresh, Reset device.
- Footer:** OK, Apply, Cancel, Help.

Table 7 - Device Information Parameters

Parameter	Description
Identification	<p>Displays the following:</p> <ul style="list-style-type: none"> • Vendor • Product type • Product name • Catalog number • Series • Revision • Serial number • Manufacture date • Warranty number <p>The name that is displayed in the Product name field is read from the module. This name displays the series of the module.</p>
Major/Minor fault	<p>Displays one of the following fault types:</p> <ul style="list-style-type: none"> • None • Unrecoverable • Recoverable
Internal state	<p>Displays the current operational state of the module:</p> <ul style="list-style-type: none"> • Self-test • Flash update • Communication fault • Unconnected • Flash configuration bad • Major Fault (see Major/Minor Fault) • Run mode • Program mode • (16#xxxx) unknown <p>If you selected the wrong module from the module selection tab, this field displays a hexadecimal value. A textual description of this state is only given when the device identity you provide is a match with the actual module.</p>
Configured/Owned	For I/O modules only. Does not apply to adapters, scanners, bridges, or other communication modules.
Device identity	<p>Match</p> <ul style="list-style-type: none"> • Agrees with what is specified on the Device definition dialog. • For the Match condition to exist, the following must agree: <ul style="list-style-type: none"> - Vendor - Module Type (the combination of Product Type and Product Code for a particular vendor) - Major Revision
	<p>Mismatch</p> <ul style="list-style-type: none"> • Does not agree with what is specified on the Device definition dialog. <p>The Device Identity field does not consider the Electronic Keying or Minor Revision selections for the module that were specified on the Device definition dialog.</p>
Protection mode	Implicit/Explicit

Refresh

Select Refresh to refresh the tab with new data from the module.

Reset device

To reset a module to its power-up state, select Reset device.

IMPORTANT You cannot reset the FLEX 5000 adapter when it is in Protection Mode.

Diagnostics for FLEX 5000 EtherNet/IP Adapters

Select Diagnostics to access the diagnostics for a module.



Table 8 - Module Diagnostics Parameters

Parameter	Description
Run mode	Shows the operating state for the module. Run Mode is blank when the module is offline, or when the connection is not established to the module.
Diagnostics thresholds exceeded	Shows whether any diagnostics are active or a threshold has been reached when the event occurred.
Diagnostics sequence count	Shows the count for each time a distinct diagnostic condition was detected, and also each time a distinct diagnostic condition transitioned from detected to not detected.
Self test	Shows whether the product initialization code detected an error.
CPU utilization	Shows the usage of the compute engine.
Chassis status	Shows whether the end cap and the module bases are properly connected.
Connections	Shows the number of CIP connections currently open to and through the adapter.
Packets lost	Shows the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.
Timeouts	Shows the running count of the number of connections that are time out, both originated and targeted, to and through the adapter.
HMI packet rate	Shows the rate at which the HMI sent data. The number of Class 3 packets and unconnected packets sent and received by the device in the previous second.
IO packet rate	Shows the rate at which the I/O sent data. The number of Class 0 and Class 1 packets that were transmitted or received by the adapter in the previous second.
Ethernet errors	Shows the sum over all ports of the following Ethernet Link object values: In Discards, In Errors, In Unknown Protos, Out Discards, Out Errors, 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, and MAC Receive Errors.
Time Synchronization	
Status	Shows whether the module is currently synchronized with a 1588 master.
Grand master clock identity	Shows the identity of the Grand Master clock to which the module is synced.

Table 8 - Module Diagnostics Parameters (Continued)

Parameter	Description
Local clock offset to system time	Shows the offset in nanoseconds from the local clock to the system time. Use this value to detect steps in time. This value updates when a precision time protocol (PTP) update message is received.
Local clock offset timestamp	Shows the timestamp of the local clock offset in YYYY-MM-DD-HH:mm:SS.mmm format. <ul style="list-style-type: none"> • YYYY = Year • MM = Month • DD = Day • HH = Hour (24 hour) • mm = Minutes • SS = Seconds • mmm = Milliseconds
System Power Alarm	
Low system power alarm	Shows whether the input system power voltage has moved below the configured Low System Power Limit. If it is below the configured Low System Power Limit, it remains set until the input system power voltage moves above the configured Low System Power Alarm Limit.
Low system power timestamp	The time when a Low System Power condition most recently transitioned from No to Yes.
High system power alarm	Shows whether the input system power voltage moves above the configured High System Power Limit. If it is above the configured High System Power Limit, it remains set until the input system power voltage moves below the configured High System Power Alarm Limit.
High system power timestamp	The time when a High System Power condition most recently transitioned from No to Yes.
Temperature	
Over temperature	Shows whether the product temperature is higher than its rated operating limits.
Over temperature timestamp	Shows the time when the product most recently became higher temperature than its operating limits.
Critical temperature	Shows whether the product is above critical temperature limit for proper operation and may shutdown without further warning.
Critical temperature timestamp	The time when the module temperature most recently transitioned above the Critical Temperature.
Module Fault	
Internal fault	Shows whether one or more I/O module on the backplane was not correctly recognized and enumerated by the adapter. See FLEX 5000 EtherNet/IP Adapter Hardware Faults on page 77 for more details.
Internal fault timestamp	The time when an Internal Fault condition most recently transitioned from No to Yes.

Connection

The Connection tab displays information about the condition of the connection between the controller and the module. The data on this tab comes directly from the controller.

IMPORTANT The ControlLogix 5580 High Availability controllers using Studio 5000 Logix Designer application version 33.00.00 require firmware revision 5.011 or later for the FLEX 5000 adapter.

5094-AENTR, ip67
Parent: ip13
IP address: 192.168.1.67 Slot: 0

Controller connection: Running Device status: OK Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Alarms

Internet Protocol

Port Configuration

Network

Time Sync

Servers

Connection

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Status	200.0	ms 25.0 - 750.0	Unicast

Inhibit module

Major fault on controller if connection fails while in Run mode

Connection fault:

OK Apply Cancel Help



The default connection for High Availability projects is Multicast. If you change the connection to Unicast, a 'Controller redundancy enabled, unicast connection not supported' message appears when you try to download the project. Logix SIS is an exception to this as it uses unicast connections for concurrent communications to safety modules even in high availability systems.

Connection fault

Connection fault area displays the fault code that is returned from the controller, and text on the Connection fault that occurred. In the Studio 5000 Logix Designer application online help, type the fault code into the Search field to find information on the fault code.

Common Error Categories

Common Errors	Description
Connection Request Error	The controller is attempting to make a connection to the module and has received an error. The connection was not made.
Service Request Error	The controller is attempting to request a service from the module and has received an error. The service was not performed successfully.
Module Configuration Invalid	The configuration in the module is invalid.
Electronic Keying Mismatch	The Electronic Keying is enabled and some part of the keying information differs between the software and the module.

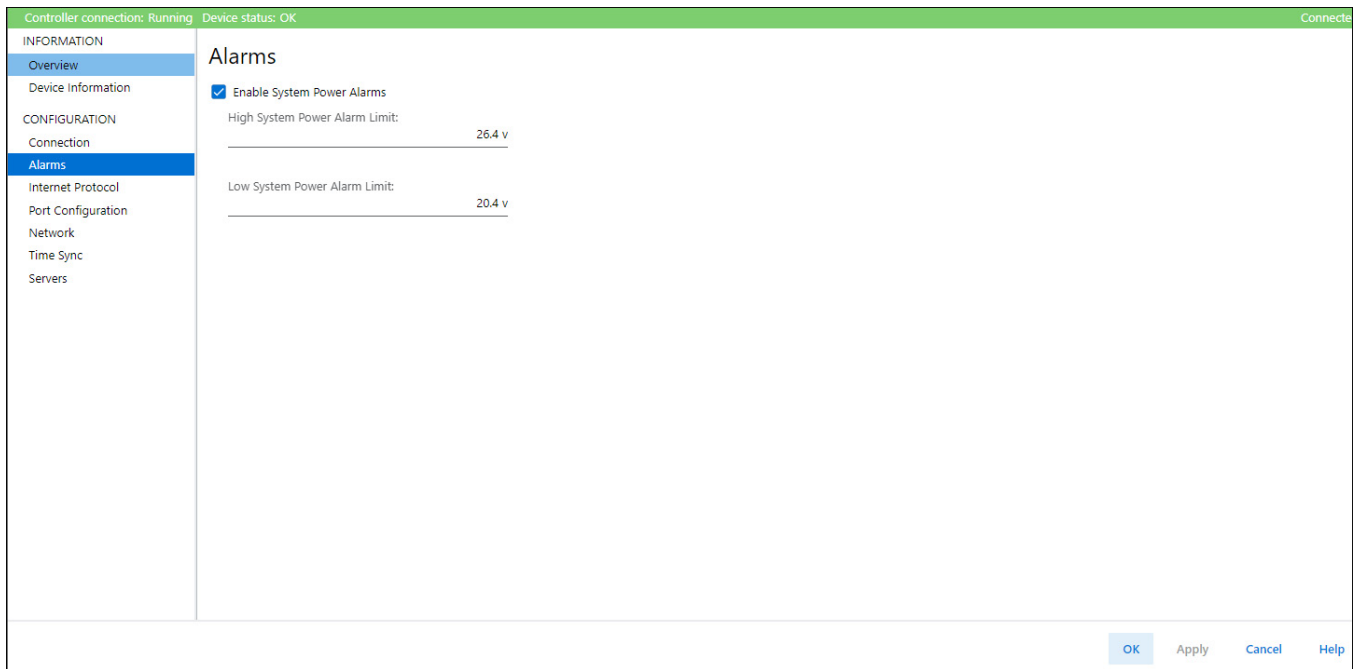
Controller connection

The Controller connection line at the top of the of the Module Properties dialog displays the status that the controller has about the module.

Controller Connection	Meaning
Standby	A transient state that occurs when shutting down
Faulted	The controller is unable to communicate with the module. When the status is Faulted, the Connection tab displays the fault.
Validating	A transient state that occurs before connecting to the module
Connecting	A state that occurs while connections are being established to the module
Running	The module is communicating and everything is working as expected.
Shutting Down	The connections are closing.
Inhibited	The connection to the module is inhibited.
Waiting	The connection to this module is not made due to one of the following: <ul style="list-style-type: none"> • The parent has not yet made a connection to it. • The parent is inhibited. • The parent is faulted.
Offline	You are not online.
Reconfiguring	The configuration information is being downloaded to the module again.
Firmware Updating	The modules firmware is being updated.
Configuring	Indicates that the Logix controller is configuring the module.

Alarms

The Alarms tab allows you to enable or disable the power monitoring feature in the adapter. It also allows you to configure appropriate alarm thresholds.



If you enable power monitoring, the controller is allowed to use certain diagnostic tags. See [FLEX 5000 Adapter Tags on page 67](#) for more information on the LSystemPowerAlarm and HSystemPowerAlarm tags.

IMPORTANT Power monitoring works only when status connections to adapter are opened.

IMPORTANT The first controller to make a connection to the input module is the only controller that can change the configuration. Therefore, it owns the module configuration. The subsequent controllers that connect to the input modules must also have the same configuration to avoid unexpected behavior.

To enable power monitoring, do the following:

1. Select the Enable Systems Power Alarms checkbox.
2. Enter the voltage value in the High System Power Alarm Limit field to set the voltage threshold for the highest acceptable voltage level.
3. Enter the voltage value in the Low System Power Alarm Limit field to set the voltage threshold for the lowest acceptable voltage level.
4. Select Apply or OK.

Port Configuration

The Port Configuration tab displays the status information of the module ports. You can configure speed and duplex mode and disable or enable the ports.

The screenshot shows the 'Port Configuration' tab in a software interface. At the top, it indicates 'Controller connection: Running' and 'Device status: OK'. A sidebar on the left lists various configuration options, with 'Port Configuration' selected. The main area contains a table with the following data:

Port	Enable	Link Status	Auto-Negotiate	Speed		Duplex		Port Diagnostics
				Selected	Current	Selected	Current	
1	<input checked="" type="checkbox"/>	Active	<input checked="" type="checkbox"/>		1 Gbps		Full	
2	<input checked="" type="checkbox"/>	Active	<input checked="" type="checkbox"/>		1 Gbps		Full	

An arrow points to the 'Port Diagnostics' icon in the second row of the table, with the text: 'Select this icon to view the port diagnostics.' At the bottom of the interface, there are buttons for 'Refresh', 'Set', 'OK', 'Apply', 'Cancel', and 'Help'.

Port Diagnostics

From the Port Configuration tab, select the Port Diagnostics to view the information for the port diagnostics. See [Table 9](#) for parameter descriptions.

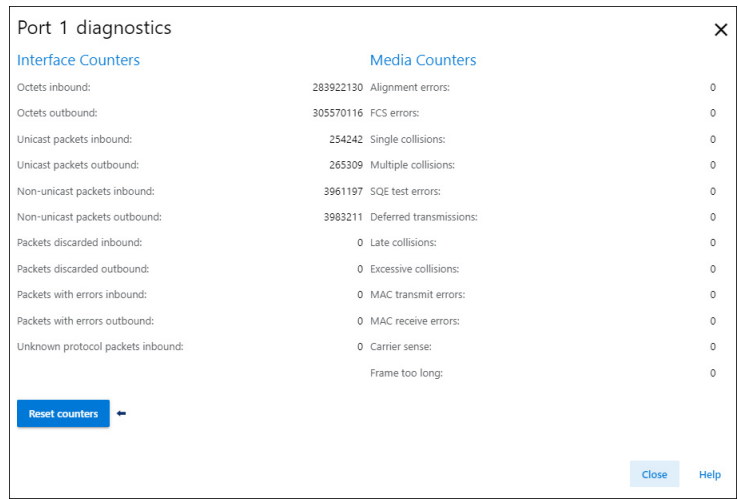


Table 9 - Port Diagnostics Parameters

Parameter	Description
Interface Counters	The Interface Counters parameters have no value when you are offline or online and there is a communication error.
Octets inbound	Displays the number of octets that are received on the interface.
Octets outbound	Displays the number of octets that are transmitted to the interface.
Unicast packets inbound	Displays the number of unicast packets that are received on the interface.
Unicast packets outbound	Displays the number of unicast packets that are transmitted on the interface.
Non-unicast packets inbound	Displays the number of non-unicast packets that are received on the interface.
Non-unicast packets outbound	Displays the number of non-unicast packets that are transmitted on the interface.
Packets discarded inbound	Displays the number of inbound packets that are received on the interface but discarded.
Packets discarded outbound	Displays the number of outbound packets that are transmitted on the interface but discarded.
Packets with errors inbound	Displays the number of inbound packets that contain errors (excludes discarded inbound packets).
Packets with errors outbound	Displays the number of outbound packets that contain errors (excludes discarded outbound packets).
Unknown protocol packets inbound	Displays the number of inbound packets with unknown protocol.
Media Counters	The Media Counters parameters have no value when you are offline or online and there is a communication error.
Alignment errors	Displays the number of frames received that are not an integral number of octets in length.
FCS errors	Displays the number of frames received that do not pass the FCS check.
Single collisions	Displays the number of successfully transmitted frames that experienced exactly one collision.
Multiple collisions	Displays the number of successfully transmitted frames that experienced multiple collisions.
SQE test errors	Displays the number of times an SQE test error message was generated.
Deferred transmissions	Displays the number of frames for which the first transmission attempt is delayed because the medium is busy.
Late collisions	Displays the number of times a collision is detected later than 512 bit-times into the transmission of a packet.
Excessive collisions	Displays the number of frames for which transmission fails due to excessive collisions.
MAC transmit errors	Displays the number of frames for which transmission fails due to an internal MAC sub layer transmit error.
MAC receive errors	Displays the number of frames for which reception on an interface fails due to an internal MAC sub layer receive error.

Table 9 - Port Diagnostics Parameters (Continued)

Parameter	Description
Carrier sense	Displays the number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame.
Frame too long	Displays the number of frames received that exceed the maximum permitted frame size.
Reset counters	Select Reset Counters to reset the values of Interface Counters and Media Counters to zero. The values then update to the current counter values. The Reset Counters appears dimmed in the following conditions: <ul style="list-style-type: none"> • The project is offline. • The project is online and a communication error occurred.

Network

The Network tab displays statistics and diagnostics information related to the selected network redundancy mode. The information shown varies depending on the network redundancy protocol.

For more information about PRP and how to configure a PRP network, see the EtherNet/IP Parallel Redundancy Protocol Application Technique, publication [ENET-AT006](#).

Property Dialog for PRP Mode

This dialog displays the properties for the PRP network redundancy mode.

The screenshot shows a software interface with a sidebar on the left containing a navigation menu. The main area is titled "Network" and displays the following information:

- Controller connection: Running | Device status: OK | Connected
- INFORMATION
 - Overview (selected)
 - Device Information
- CONFIGURATION
 - Connection
 - Alarms
 - Internet Protocol
 - Port Configuration
 - Network** (selected)
 - Time Sync
 - Servers

Network
Network mode: Parallel Redundancy Protocol (PRP)

Diagnostics for this node

	Port A	Port B
Network status	OK	OK
Network fault count	0	0
Transmit count	66	0
Receive count	0	0
Wrong LAN count	0	0
Unique entry count	0	0
Duplicate entry count	0	0
Multiple entry count	0	0

Reset counters ←

Last PRP port A fault timestamp: None
Last PRP port B fault timestamp: None

Diagnostics for other PRP nodes

Address	Node type	Port A	Port B
No rows to show.			

Refresh

OK Apply Cancel Help

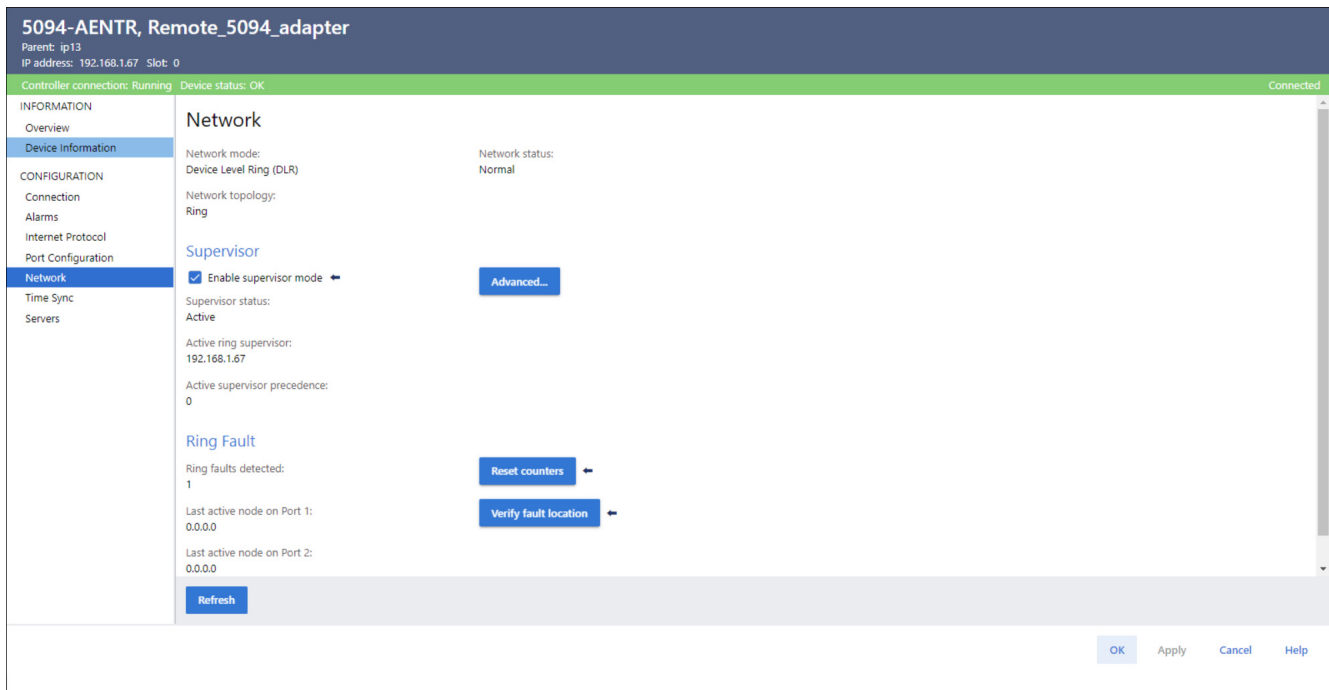
Table 10 - Network Diagnostics Parameters - PRP Mode

Parameter	Description
Network mode	Displays the selected network redundancy protocol.
Network status	PRP LAN A or LAN B status
Network fault count	Increments each time the PRP Network Status changes to Fault.
Transmit count	The number of PRP-tagged frames that are transmitted over each LAN since the last Reset Counters operation or powerup.
Receive count	The number of PRP-tagged frames that are received on each LAN since the last Reset Counters operation or powerup.
Wrong LAN count	The count of PRP packets received on one PRP port that should have been received on the other PRP port.
Unique entry count	The count of PRP packets only received on the current port.
Duplicate entry count	The count of PRP packets received on one PRP port after the same packet was received on the other PRP port.
Multiple entry count	The count of PRP packets received on one port more than once.
Last PRP port A fault timestamp	The time since last PRP fault at network A was detected.
Last PRP port B fault timestamp	The time since last PRP fault at network B was detected.

To reset the statistics counters, select the Reset counters.

Property Dialogs for DLR Mode

This dialog displays the properties for the DLR network redundancy mode using ring network topology.



This dialog displays the properties for the DLR network redundancy mode using linear/star network topology.

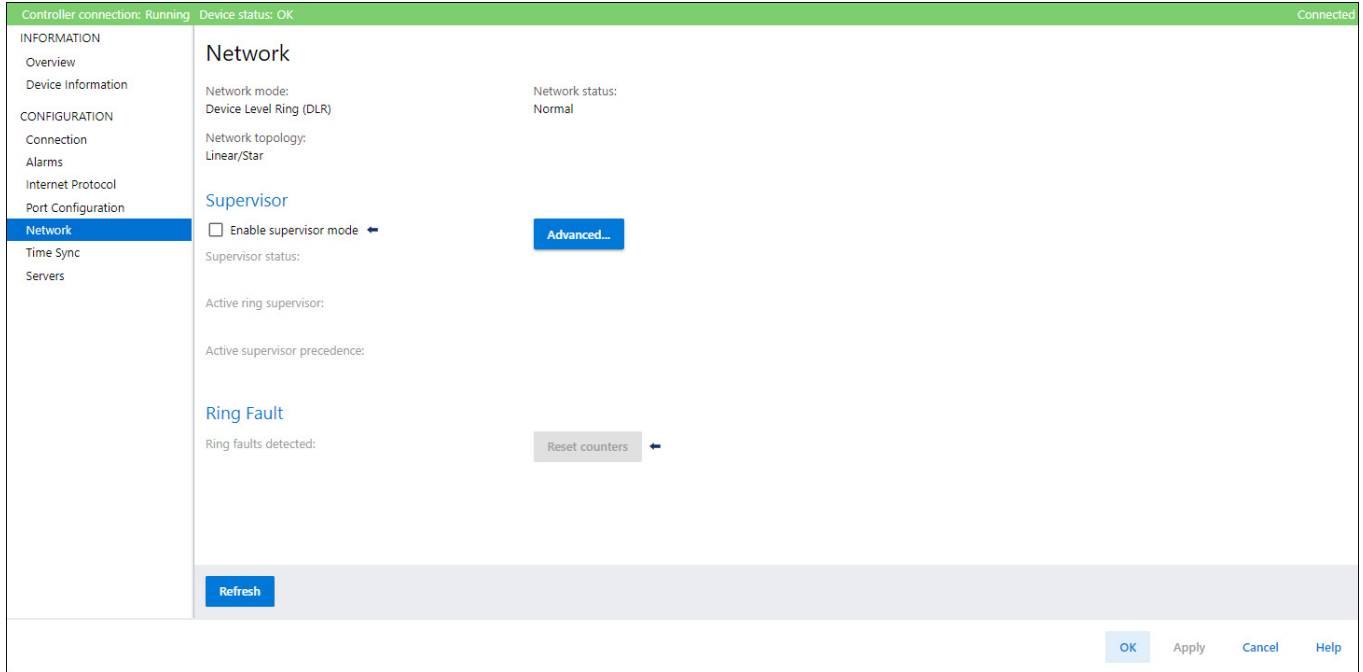


Table 11 - Network Diagnostics Parameters - DLR Mode

Parameter	Description
Network mode	Displays the currently selected network redundancy protocol.
Network topology	Specifies whether the network topology is linear/star or ring.
Network status	Specifies whether the network is operating normally or otherwise.
Active ring supervisor	Specifies IP address of active ring supervisor.
Active supervisor precedence	The precedence value of the module. If the operation of the active supervisor node is interrupted, the backup supervisor with the next highest precedence value becomes the active supervisor node.
Ring faults detected	The value increases each time a ring fail is detected (enabled only when local device is selected as a Ring Supervisor).
Supervisor status	Indicates if ring supervisor is Active (enabled only when local device is selected as a Ring Supervisor).

To reset the Ring faults detected counter, select the Reset counter.

To display the Advanced network configuration dialog, select the Advanced.

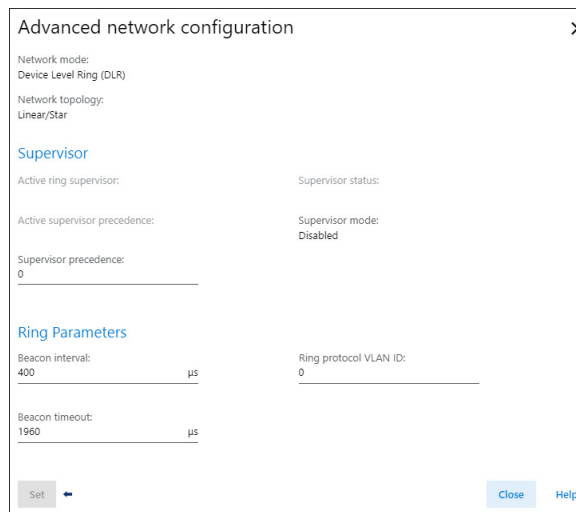


Table 12 - Advanced Network Configuration Parameters

Parameter	Description
Network mode	Displays the currently selected network redundancy protocol.
Network topology	Displays the Ethernet network topology that is Linear/Star or Ring.
Active ring supervisor	Displays the IP address or MAC address of the active ring supervisor.
Active supervisor precedence	Precedence value for current active supervisor device.
Supervisor mode	Enabled/Disabled depends on the option selected at Network DLR dialog.
Supervisor precedence	<p>You can configure a supervisor precedence number for each device configured as a ring supervisor. The highest possible supervisor precedence value is 255. When multiple nodes are enabled as supervisor, the node with the highest precedence value is assigned as the active ring supervisor. The other nodes automatically become back-up supervisors. We recommend the following:</p> <ul style="list-style-type: none"> • Configure at least one back-up supervisor node. • Set your desired Active Ring Supervisor with a relatively high supervisor-precedence value compared to the back-up nodes. • Keep track of the supervisor precedence values of your network. <p>If multiple supervisors are configured with the same precedence value (the factory default value for all supervisor-capable devices is zero), the node with the numerically highest MAC address becomes the active supervisor.</p>
Supervisor status	Displays whether this node is the active ring supervisor (Active), a back-up supervisor (Back-up), a ring node, or part of a linear network.
Beacon interval	The frequency the active ring supervisor uses when transmitting a beacon frame through both of its ring ports.
Beacon timeout	The amount of time that supervisor or ring nodes wait before timing out the reception of beacon frames and taking appropriate action.
Ring protocol VLAN ID	Reserved

IMPORTANT We recommend you use the default values for Beacon Interval, Beacon Timeout, and Ring Protocol VLAN ID parameters.

Time Sync

The Time Sync displays information that is related to CIP Sync™ time synchronization. The information appears only if the project is online and CIP Sync is enabled.

Controller connection: Running
Device status: OK
Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Alarms

Internet Protocol

Port Configuration

Network

Time Sync

Servers

Time Sync

CIP Sync time synchronization:
Enabled

UTC system time:
2/1/1970 9:38:53 am

Grandmaster Clock

Identity:
5C8816FFFE9938FE

Class:
248

Accuracy:
254

Variance:
65535

Source:
Oscillator

Priority 1:
128

Priority 2:
128

[Description...](#)

Local Clock

Identity:
5C8816FFFECD73E

Class:
248

Accuracy:
254

Variance:
65535

Source:
Oscillator

Priority 1:
128

Priority 2:
128

Synchronization status:
Synchronized

Offset to master:
-17 ns

Backplane:
Initializing (Port 1)

Ethernet:
Slave (Port 2)

Table 13 - Time Sync Parameters

Parameter	Description
Grandmaster Clock	
Description	<p>Displays information about the Grandmaster clock. The vendor of the Grandmaster device controls this information. The following information is specified:</p> <ul style="list-style-type: none"> • User Name • User Location • Protocol Address • Physical Address • Clock Type • Manufacturer Name • Model • Serial Number • Hardware Revision • Firmware Revision • Software Version • Profile Identity • Physical Protocol • Network Protocol • Port Number <p>Use the vertical scroll bar to view the data.</p>
Identity	Displays the unique identifier for the Grandmaster clock. The format depends on the network protocol. Ethernet network encodes the MAC ID into the identifier.
Class	Displays a measure of the quality of the Grandmaster clock. The values are defined from 0...255 with zero as the best clock.
Accuracy	Indicates the expected absolute accuracy of the Grandmaster clock relative to the PTP epoch. The accuracy is specified as a graduated scale that starts at 25 nsec and ends at greater than 10 seconds or unknown. The lower the accuracy value, the better the clock.
Variance	Displays the measure of inherent stability properties of the Grandmaster clock. The value is represented in offset scaled log units. The lower the variance, the better the clock.
Source	<p>Displays the time source of the Grandmaster clock. The available values are:</p> <ul style="list-style-type: none"> • PTP • Oscillator
Priority 1/Priority 2	Displays the relative priority of the Grandmaster clock to other clocks in the system. The priority values range from 0...255. The highest priority is zero. The default value for both settings is 128.
Local Clock	
Identity	Displays the unique identifier for the local clock. The format depends on the network protocol. Ethernet network encodes the MAC ID into the identifier.
Class	Displays a measure of quality of the local clock. The values are defined from 0...255, with zero as the best clock.
Accuracy	Indicates the expected absolute accuracy of the local clock relative to the PTP epoch. The accuracy is specified as a graduated scale that starts at 25 nsec and ends at greater than 10 seconds or unknown. The lower the accuracy value, the better the clock.
Variance	Displays the measure of inherent stability properties of the local clock. The value is represented in offset scaled log units. The lower the variance, the better the clock.
Source	<p>Displays the time source of the local clock. The available values are:</p> <ul style="list-style-type: none"> • PTP • Oscillator
Priority 1/Priority 2	Displays the relative priority of the Local clock to other clocks in the system. The priority values range from 0...255. The highest priority is zero. The default value for both settings is 128.
Synchronization status	Displays whether the local clock is synchronized or not synchronized with the Grandmaster reference clock. A clock is synchronized if it has one port in the slave state and is receiving updates from the time master.
Offset to master	Displays the amount of deviation between the local clock and the Grandmaster clock in nanoseconds.
Backplane	Displays the current state of the backplane. The available values are: Initializing, Faulty, Disabled, Listening, PreMaster, Master, Passive, Uncalibration, Slave, or None.
Ethernet	Displays the state of the Ethernet port. The available values are: Initializing, Faulty, Disabled, Listening, PreMaster, Master, Passive, Uncalibration, Slave, or None.

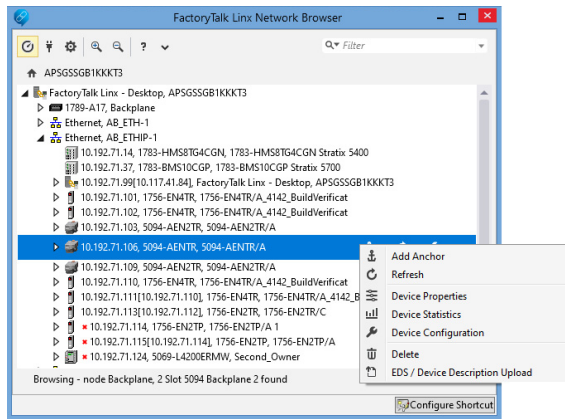
Diagnostics with FactoryTalk Linx Software

You can also view diagnostic information in FactoryTalk Linx software. Diagnostic information is available on the following tabs:

- [General](#)
- [Port](#)
- [Connection Manager](#)

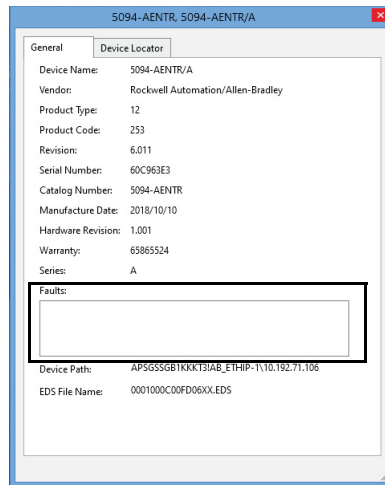
To view these diagnostic tabs, follow the below steps:

1. From the FactoryTalk Linx Network Browser dialog, navigate to the respective Ethernet node.
2. Right-click on the EtherNet/IP module and select the following options:
 - Device Properties – To view the General tab.
 - Device Statistics – To view the Port and Connection Manager tabs



General

The General tab shows the device information and any faults on the adapter.



Port

The Port tab shows the diagnostic information for the port. Select the port number from the Current Port dropdown list to view the respective port diagnostic information. See [Table 14](#) for diagnostic parameter descriptions.

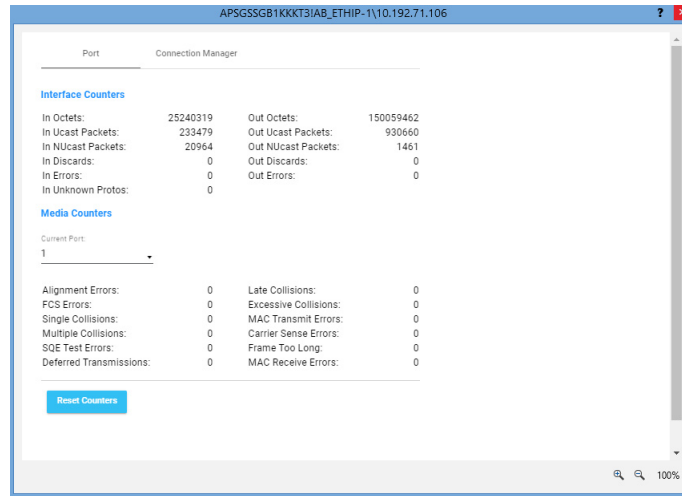


Table 14 - Port Diagnostics Parameters

Parameter	Description
Interface Counters	Provides information relevant to receipt of packets on the interface
In Octets	Octets received on the interface
Out Octets	Octets sent out from the interface
In Ucast Packets	Unicast packets that are received on the interface
Out Ucast Packets	Unicast packet sent out from the interface
In NUcast Packets	Non-unicast packets that are received on the interface
Out NUcast Packets	Non-unicast packets sent out from the interface
In Discards	Inbound packets that were received on the interface but discarded
Out Discards	Outbound packets that were sent out from the interface but were discarded
In Errors	Inbound packets that contain errors (excludes In Discards)
Out Errors	Outbound packets that contain errors
In Unknown Protos	Inbound packets with unknown protocol
Media Counters	Provides information specific to Ethernet media you are using
Alignment Errors	Frames received that are not an integral number of octets in length
FCS Errors	Frames received that do not pass the FCS (Frame Check Sequence) check
Single Collisions	Successfully transmitted frames that experienced exactly one collision
Multiple Collisions	Successfully transmitted frames that experienced multiple collisions
SQE Test Errors	Number of times an SQE test error message was generated
Deferred Transmissions	Frames for which the first transmission attempt is delayed because the medium is busy
Late Collisions	Number of times a collision is detected later than 512 bit-times into the transmission of a packet
Excessive Collisions	Frames for which transmission fails due to excessive collisions
MAC Transmit Errors	Frames for which transmission fails due to an internal MAC sub layer transmit error
Carrier Sense Error	Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame

Table 14 - Port Diagnostics Parameters (Continued)

Parameter	Description
Frame Too Long	Frames received that exceed the maximum permitted frame size
MAC Receive Errors	Frames for which reception on an interface fails due to an internal MAC sub layer receive error
Reset Counters	Select Reset Counters to reset the values of Interface Counters and Media Counters to zero. The values then update to the current counter values. The Reset Counters appears dimmed in the following conditions: <ul style="list-style-type: none"> • The project is offline. • The project is online and a communication error occurred.

Connection Manager

The Connection Manager shows the diagnostic information for the connection requests. See [Table 15](#) for the descriptions of the diagnostic parameters.

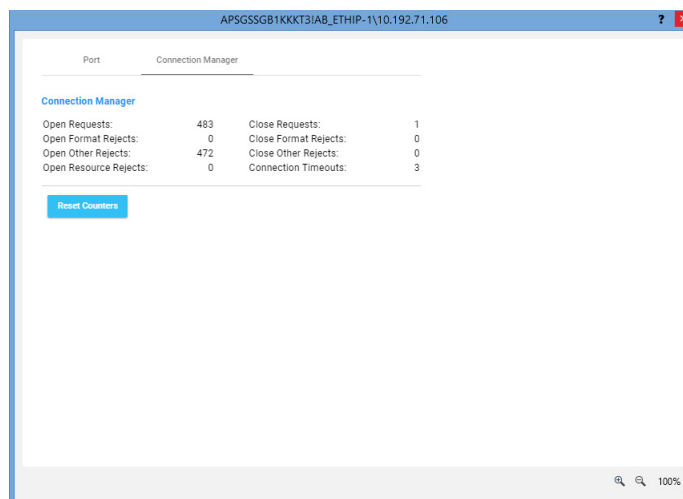


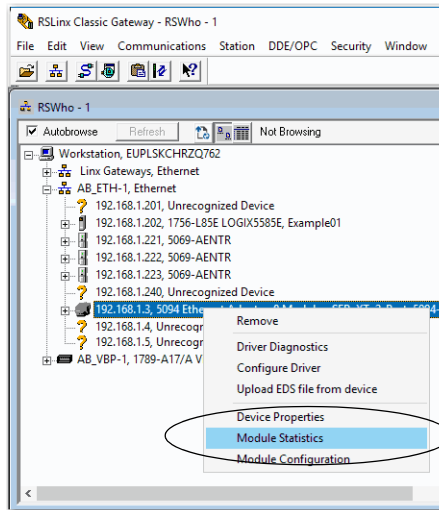
Table 15 - Connection Manager Diagnostics Parameters

Parameter	Description
Connection Manager	
Open Requests/Close Requests	The number of open/close connection requests that this module has received
Open Format Rejects/Close Format Rejects	The number of open/close connection requests that this module has rejected because the request was not formatted correctly or because some parameter value was not within a supported range of values
Open Other Rejects/Close Other Rejects	The number of forwarded open/close connection requests a module rejects
Open Resource Rejects	The number of open connection requests that this module has rejected because the module did not have enough resources (buffers, link bandwidth, or CPU utilization) to honor the request
Connection Timeouts	The number of connections that are not explicitly closed by the connection originator, but closed by this module because they were not being used
Reset Counters	Select Reset Counters to reset the interface and connection counter values to zero. The values then update to the current counter values. Reset Counter appears dimmed in the following conditions: <ul style="list-style-type: none"> • The project is offline. • The project is online and a communication error occurred.

Diagnostics with RSLinx Classic Software

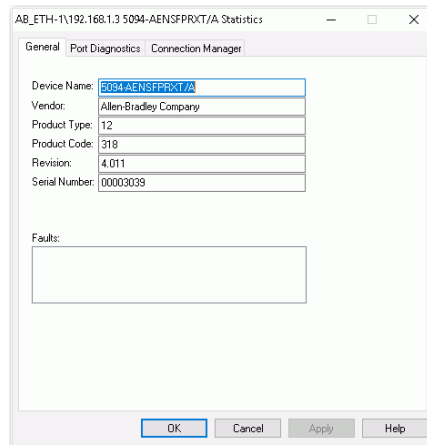
You can also view diagnostic information in RSLinx Classic software. Diagnostic information is available on the following tabs:

- [General](#)
 - [Port Diagnostics](#)
 - [Connection Manager](#)
1. From the Communications menu, select RSWho.
 - The RSWho dialog box appears.
 2. Navigate to the Ethernet network.
 3. Right-click the EtherNet/IP module and select Module Statistics.



General

The General tab shows device information and any faults on the adapter.



Port Diagnostics

The Port Diagnostics tab shows the diagnostic information for the port. Select the port number from the Current Port dropdown list to view the respective port diagnostic information. See [Table 16](#) for parameter descriptions.

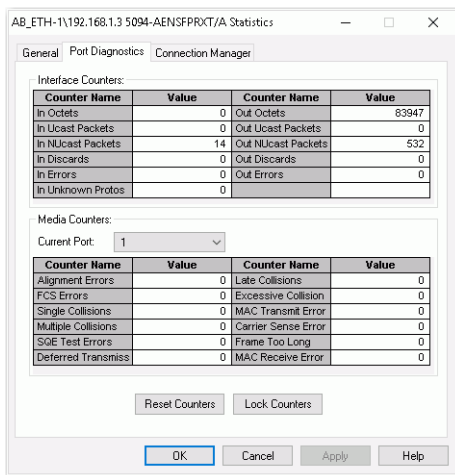


Table 16 - Port Diagnostics Parameters

Parameter	Description
Interface Counters	Provides information relevant to receipt of packets on the interface
In Octets	Octets received on the interface
Out Octets	Octets sent out from the interface
In Ucast Packets	Unicast packets that are received on the interface
Out Ucast Packets	Unicast packet sent out from the interface
In NUcast Packets	Non-unicast packets that are received on the interface
Out NUcast Packets	Non-unicast packets sent out from the interface
In Discards	Inbound packets that were received on the interface but discarded
Out Discards	Outbound packets that were sent out from the interface but were discarded
In Errors	Inbound packets that contain errors (excludes In Discards)
Out Errors	Outbound packets that contain errors
In Unknown Protos	Inbound packets with unknown protocol
Media Counters	Provides information specific to Ethernet media you are using
Alignment Errors	Frames received that are not an integral number of octets in length
FCS Errors	Frames received that do not pass the FCS (Frame Check Sequence) check
Single Collisions	Successfully transmitted frames that experienced exactly one collision
Multiple Collisions	Successfully transmitted frames that experienced multiple collisions
SQE Test Errors	Number of times an SQE test error message is generated
Deferred Transmissions	Frames for which the first transmission attempt is delayed because the medium is busy
Late Collisions	Number of times a collision is detected later than 512 bit-times into the transmission of a packet
Excessive Collisions	Frames for which transmission fails due to excessive collisions
MAC Transmit Errors	Frames for which transmission fails due to an internal MAC sub layer transmit error
Carrier Sense Error	Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
Frame Too Long	Frames received that exceed the maximum permitted frame size
MAC Receive Errors	Frames for which reception on an interface fails due to an internal MAC sub layer receive error
Reset Counters	Select Reset Counters to reset the values of Interface Counters and Media Counters to zero. The values then update to the current counter values. The Reset Counters appears dimmed in the following conditions: <ul style="list-style-type: none"> The project is offline. The project is online and a communication error occurred.

Connection Manager

The Connection Manager shows the diagnostic information for the connection requests. See [Table 17](#) for the descriptions of the diagnostic parameters.

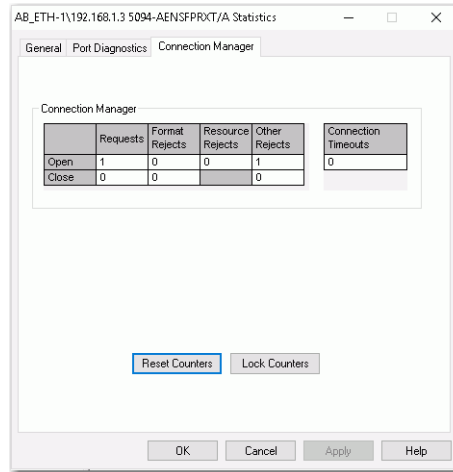


Table 17 - Connection Manager Diagnostic Parameters

Field	Description
Connection Manager	
Requests	The number of open/close connection requests that this module has received
Format Rejects	The number of open/close connection requests that this module has rejected because the request was not formatted correctly or because some parameter value was not within a supported range of values
Resource Rejects	The number of open connection requests that this module has rejected because the module did not have enough resources (buffers, link bandwidth, or CPU utilization) to honor the request
Other Rejects	The number of forwarded open/close connection requests a module rejects
Connection Timeouts	The number of connections that are not explicitly closed by the connection originator, but closed by this module because they were not being used
Reset Counters	Select Reset Counters to reset the interface and connection counter values to zero. The values then update to the current counter values. Reset Counter appears dimmed in the following conditions: <ul style="list-style-type: none"> The project is offline. The project is online and a communication error occurred.
Lock Counters	Select Lock Counters to stop refreshing and updating the interface and connection counter values.

EtherNet/IP Adapter Diagnostic Webpages

The adapters provide diagnostic webpages.

IMPORTANT

Consider the following:

- The diagnostic webpages have many fields that you can use to monitor the EtherNet/IP adapter operating state. This section describes only the most common fields that are used during monitoring. To troubleshoot problems that you diagnose, see the Troubleshoot EtherNet/IP Networks Application Technique, publication [ENET-AT003](#).
- You can enable the diagnostic webpages and SNMP for the FLEX 5000 adapter if it is not in Explicit Protection Mode. However, they are currently disabled by default.

The most commonly used diagnostic webpages for the FLEX 5000 EtherNet/IP adapters are the following:

- [Diagnostic Overview](#)
- [Network Settings](#)
- [Ethernet Statistics](#)
- [Ring Statistics](#)
- [PRP Statistics](#)
- [PRP Nodes](#)

IMPORTANT

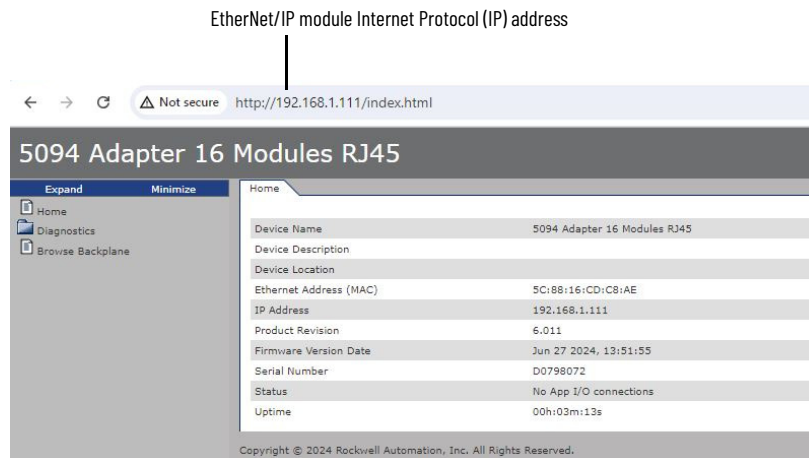
The FLEX 5000 adapter offers other diagnostic webpages. Those webpages are not as commonly used as the other pages described in this section.

Access Web Browser Support

To access the diagnostic webpages, follow these steps.

1. Open your web browser.
2. In the Address field, type the IP address of the adapter and press Enter.

The Home diagnostic webpage appears.



3. Open the Diagnostics folder in the left-most navigation bar, and select the link for each diagnostic webpage you must monitor.

Ethernet Statistics

The Ethernet Statistics diagnostic webpage shows the status of communication activity on the Ethernet network. The most commonly monitored fields are described in [Table 18](#).

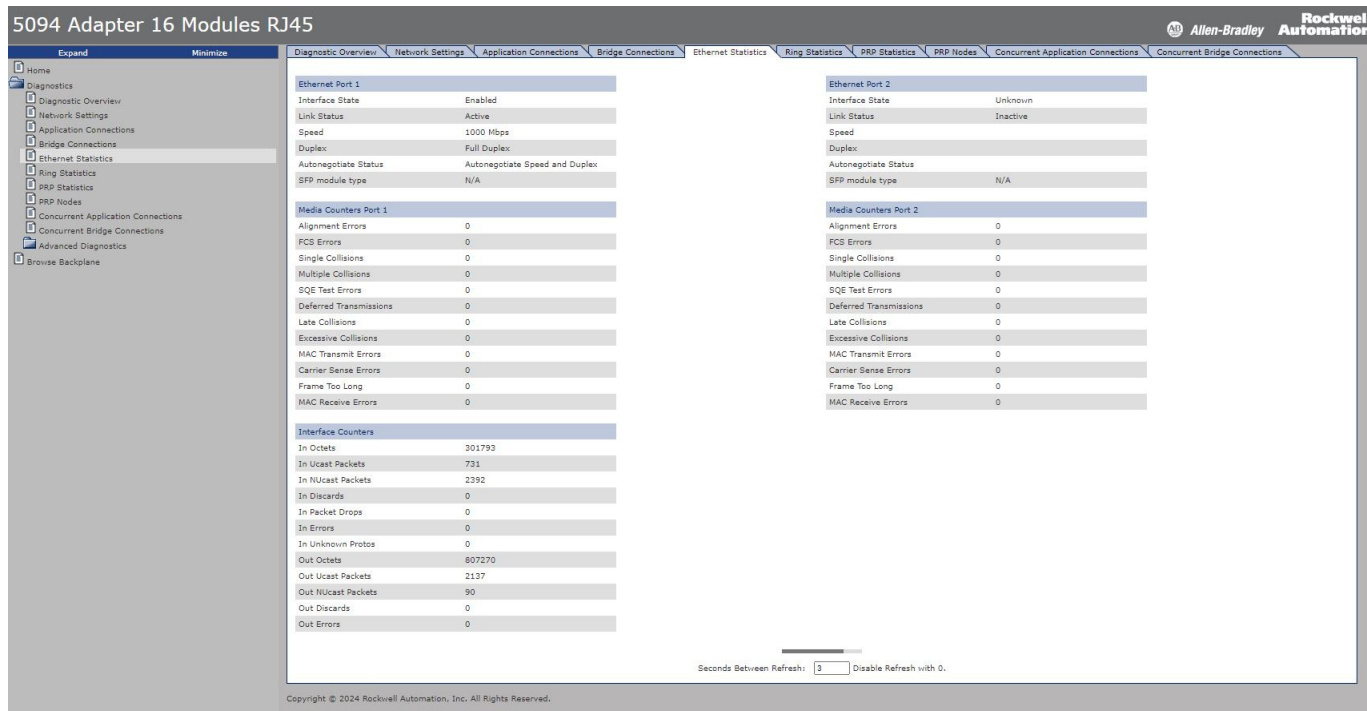


Table 18 - Ethernet Statistic Fields

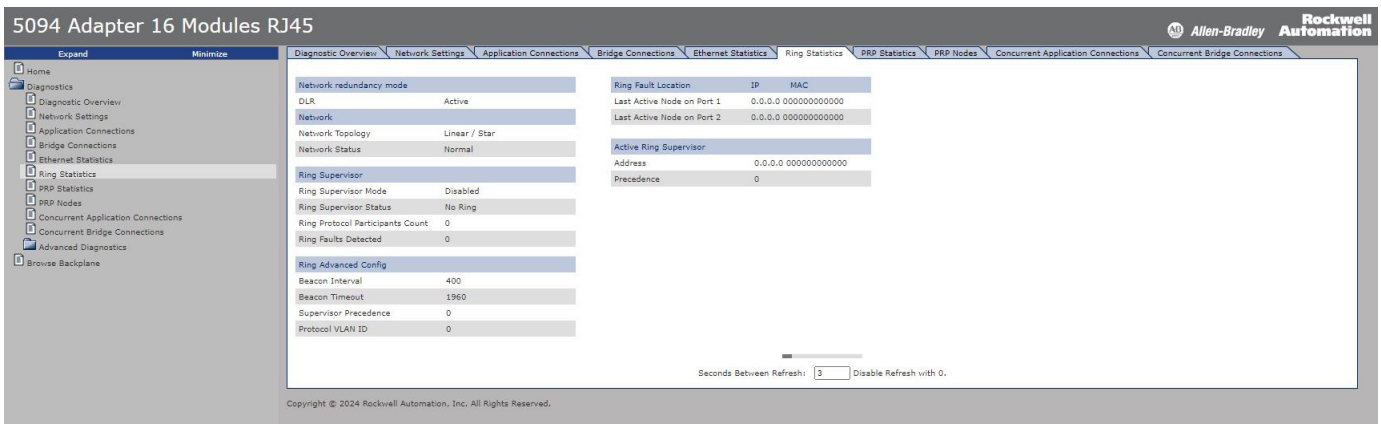
Field	Specifies
Ethernet Port 1 and Ethernet Port 2	
Interface State	Whether the port is turned off or on. Active or inactive indicates whether there is a cable that is connected.
Link Status	Whether the port is blocked for DLR protocol frames
Speed	Whether the Ethernet port is operating at 10 Mbps, 100 Mbps, or 1 Gbps
Duplex	If the Ethernet port is operating at full-duplex mode
Autonegotiate Status	Whether the port speed and Duplex mode were determined via autonegotiation or whether they were manually configured
SFP module type	Whether the SFP module is recognized and initialized. If it is recognized, the SFP module catalog number or type of standard displays.
Media Counters Port 1 and Port 2	
Alignment Errors	A frame containing bits that do not total an integral multiple of eight
FCS Errors	A frame containing eight bits, at least one of which has been corrupted
Single Collisions	The number of outgoing packets that encountered only one collision during transmission
Multiple Collisions	The number of outgoing packets that encountered 2...15 collisions during transmission
SQE Test Errors	A test to detect the collision-present circuit between a transceiver and a network interface card (NIC) IMPORTANT Because most NICs now have an integrated transceiver, the SQE test is unnecessary. Ignore this media counter.
Deferred Transmissions	The number of outgoing packets whose transmission is deferred because the network is busy when the first attempt is made to send them
Late Collisions	The number of times two devices transmit data simultaneously
Excessive Collisions	The number of frames that experience 16 consecutive collisions
MAC Transmit Errors	Frames for which transmission fails due to an internal MAC sublayer transmit error

Table 18 - Ethernet Statistic Fields (Continued)

Field	Specifies
Carrier Sense Errors	Times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
Frame Too Long	The number of incoming packets that exceed the maximum Ethernet packet size
MAC Receive Errors	Frames for which reception on the Ethernet interface failed due to an internal MAC sublayer receive error
Interface Counters	
In Octets	Octets received on the Ethernet interface
In Ucast Packets	Unicast packets received on the Ethernet interface
In NUcast Packets	Non-unicast packets received on the Ethernet interface
In Discards	Inbound packets received on the Ethernet interface but discarded
In Packet Drops	The number of incoming packet drops on all interfaces, including backplanes, that are caused by overloading one or more adapter CPUs with high network traffic.
In Errors	Inbound packets that contain errors (does not include In Discards)
In Unknown Protos	Inbound packets with unknown protocol
Out Octets	Octets sent on the Ethernet interface
Out Ucast Packets	Unicast packets sent on the Ethernet interface
Out NUcast Packets	Non-unicast packets sent on the Ethernet interface
Out Discards	Outbound packets discarded
Out Errors	Outbound packets that contain errors

Ring Statistics

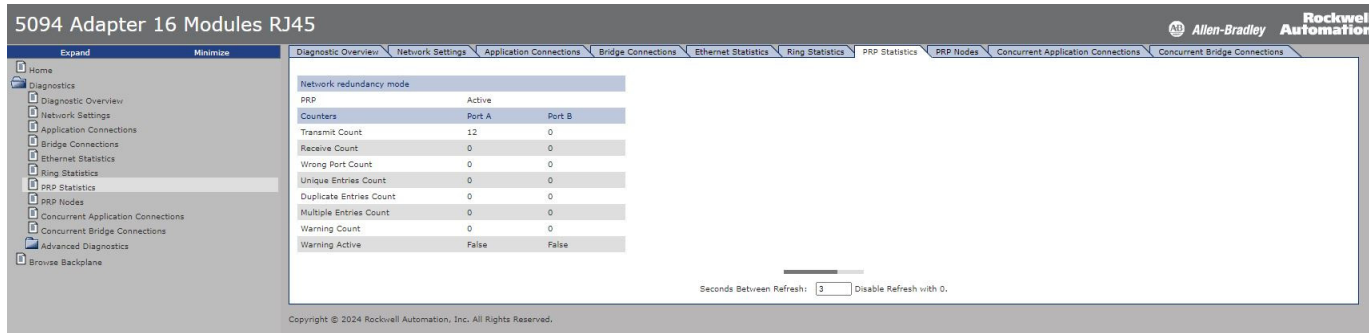
The Ring Statistics diagnostic webpage shows the status of the DLR.



IMPORTANT DLR diagnostics data is available only when the adapter is in DLR mode.

PRP Statistics

The PRP Statistics diagnostic webpage shows the statistics for Port A and Port B of the adapter.



IMPORTANT The PRP statistics data is available only when the adapter is in PRP mode. Under Network redundancy mode, the PRP setting displays "Active".

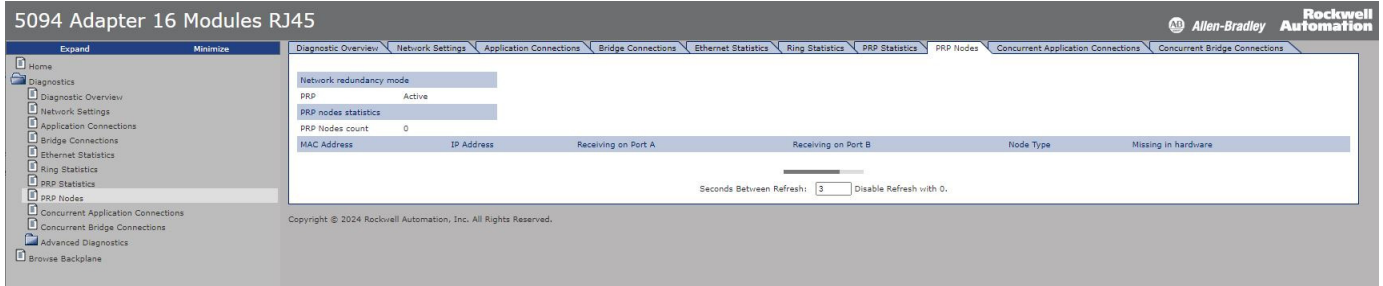


Table 19 - FLEX 5000 EtherNet/IP Adapter PRP Statistics Parameters

Parameter	Description
Network Status	Specifies whether the network is operating normally or otherwise
Network Fault Count	Increments each time the PRP Network Status changes to Fault
Transmit Count	The number of PRP-tagged frames that are transmitted over each LAN since the last Reset Counters operation or powerup
Receive Count	The number of PRP-tagged frames that are received on each LAN since the last Reset Counters operation or powerup
Wrong LAN Count	The count of PRP packets received on one PRP port that should have been received on the other PRP Port
Unique Entry Count	The count of PRP packets only received on the current port
Duplicate Entry Count	The count of PRP packets received on one PRP Port after the same packet was received on the other PRP port
Multiple Entry Count	The count of PRP packets received on one port more than once
Warning Count	A potential issue with the PRP ports exists. Count increments every time Active transitions from False to True.
Warning Active	Active is True when no PRP packets are received on this LAN in the previous 3 seconds, or if an entry in the PRP nodes table has False in the corresponding Receiving on Port A/B column (one of redundant network is disconnected). Active is True when redundant network cables are mismatched (for example, a cable network A connected to a network B socket).

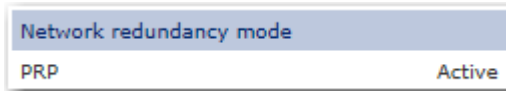
PRP Nodes

The PRP Nodes diagnostic webpage displays all active PRP nodes. Any node that the adapter module communicates with displays on the PRP Nodes page, including DANs, SANs, RedBoxes, and VDANs.



IMPORTANT

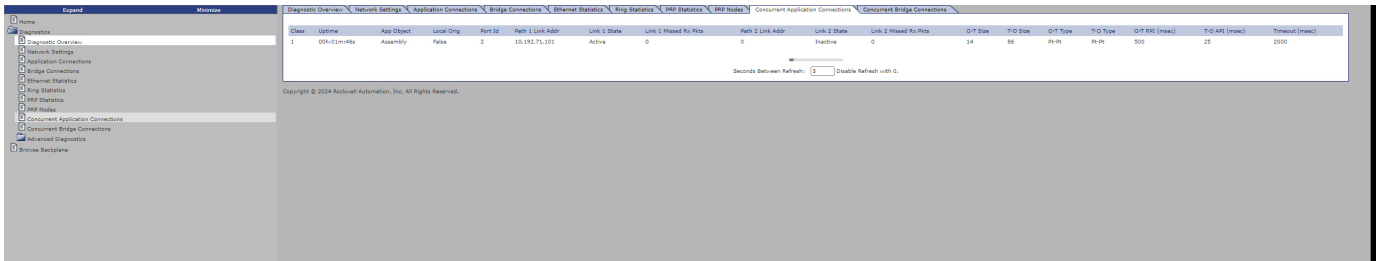
The PRP Statistics data is available only when the adapter is in PRP mode. Under Network redundancy mode, the PRP setting displays "Active".



The fields to monitor are Receiving on Port A and Receiving on Port B. If either of those fields are False, it indicates a loss of PRP redundancy. Some IP addresses can display as 0.0.0.0. An IP address displayed as 0.0.0.0 is an indication that the adapter is not communicating directly with that device.

Concurrent Application Connections

The Concurrent Application Connections webpage displays the parameters and information of established concurrent application connections.



Module Tags

The module tags are created when you add the adapter to a controller project and set the connection to Status.

FLEX 5000 Adapter Tags

The following table describes the FLEX 5000 EtherNet/IP adapter module tags:

Table 20 - FLEX 5000 EtherNet/IP Adapter Module System Tags

Tag Name	Data Type	Definition	Valid Values
RunMode	BOOL	Modules operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = The connection is running. 1 = The connection is not running.
DiagnosticActive	BOOL	Indicates if any diagnostics are active or the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostic is active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	Indicates if the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = The module is not synced. 1 = The module is synced.
CIPSyncTimeout	BOOL	Indicates if the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
OverTemperature	BOOL	Indicates if the module is at its maximum thermal rating.	<ul style="list-style-type: none"> 0 = The module is not at its maximum thermal rating. 1 = The module is at its maximum thermal rating.
CriticalTemperature	BOOL	Indicates if the temperature is approaching (but below) the point of thermal runaway.	<ul style="list-style-type: none"> 0 = The temperature is not approaching the point of thermal runaway. 1 = The temperature is approaching the point of thermal runaway.
Port1Connected	BOOL	Indicates if the numbered Ethernet port is active.	<ul style="list-style-type: none"> 0 = Ethernet port is not active. 1 = Ethernet port is active.
Port2Connected	BOOL	Indicates if the numbered Ethernet port is active.	<ul style="list-style-type: none"> 0 = Ethernet port is not active. 1 = Ethernet port is active.
Port1FullDuplex	BOOL	Indicates if the numbered Ethernet port is running in full-duplex mode or half-duplex mode (if it is connected).	<ul style="list-style-type: none"> 0 = Ethernet port is running in half-duplex mode. 1 = Ethernet port is running in full-duplex mode.
Port2FullDuplex	BOOL	Indicates if the numbered Ethernet port is running in full-duplex mode or half-duplex mode (if it is connected).	<ul style="list-style-type: none"> 0 = Ethernet port is running in half-duplex mode. 1 = Ethernet port is running in full-duplex mode.

Table 20 - FLEX 5000 EtherNet/IP Adapter Module System Tags (Continued)

Tag Name	Data Type	Definition	Valid Values
Port1AutoNegotiationStatus	SINT	Indicates the status of link auto-negotiation.	<ul style="list-style-type: none"> • 0 = Auto-negotiation in progress • 1 = Auto-negotiation and speed detection failed. Using default values for speed and duplex. Default values are product dependent. Recommended defaults are 10 Mbps and half-duplex. • 2 = Auto negotiation failed, but detected speed. Duplex was defaulted. Default value is product dependent. Recommended default is half-duplex mode. • 3 = Successfully negotiated speed and duplex mode • 4 = Auto-negotiation not attempted. Forced speed and duplex mode.
Port2AutoNegotiationStatus	SINT	Indicates the status of link auto-negotiation.	<ul style="list-style-type: none"> • 0 = Auto-negotiation in progress • 1 = Auto-negotiation and speed detection failed. Using default values for speed and duplex. Default values are product dependent. Recommended defaults are 10 Mbps and half-duplex. • 2 = Auto negotiation failed, but detected speed. Duplex was defaulted. Default value is product dependent. Recommended default is half-duplex mode. • 3 = Successfully negotiated speed and duplex mode • 4 = Auto-negotiation not attempted. Forced speed and duplex mode.
Port1Speed	INT	Indicates the actual port speed in Mbps.	10, 100, 1000
Port2Speed	INT	Indicates the actual port speed in Mbps.	10, 100, 1000
TCPConnections	INT	The number of TCP/IP connections currently open to the adapter	All positive values
CIPConnections	INT	The number of CIP connections currently open to and through the adapter	All positive values
CIPLostPackets	DINT	A running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections that are consumed by the adapter and its children.	All positive values
CIPTimeouts	DINT	A running count of the number of connections that time out, both originated and targeted, and connections to and through the adapter.	All positive values
HMIPacketRate	DINT	The number of Class 3 packets and unconnected packets that are sent and received by the device in the previous second.	All
IOPacketRate	DINT	The number of class 0 and class 1 packets transmitted or received by the adapter in the previous second.	All positive values
EthernetErrors	DINT	The sum over all ports of the Ethernet Link object values: In Discards, In Errors, In Unknown Protos, Out Discards, Out Errors, 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, and MAC Receive Errors.	All positive values
CPUUtilization	INT	The percentage of the capacity of the products compute engine (whether that is a CPU, or a core of a CPU, or a thread) most important to the performance of communication of packets by the product. The value equals the percentage.	0..100
DLRNetworkState	SINT	The current value of the Network Status instance attribute of the DLR object for devices with multiple Ethernet ports that support DLR.	<ul style="list-style-type: none"> • 0 = Normal • 1 = Ring Fault • 2 = Unexpected Loop Detected • 3 = Partial Network Fault • 4 = Rapid Fault/Restore Cycle

Table 20 - FLEX 5000 EtherNet/IP Adapter Module System Tags (Continued)

Tag Name	Data Type	Definition	Valid Values
DLRSupervisorState	SINT	The current value of the Ring Supervisor Status instance attribute of the DLR object for devices with multiple Ethernet ports that support DLR.	<ul style="list-style-type: none"> 0 = Device is functioning as a backup. 1 = Device is functioning as the active ring supervisor. 2 = Device is functioning as a normal ring node. 3 = Device is operating in a non-DLR topology. 4 = Device cannot support the current ring parameters (Beacon Interval and Beacon Timeout).
LSystemPowerAlarm	BOOL	Indicates if the input system power voltage has moved below the configured Low System Power Limit. If it is below the configured Low System Power Limit, it remains set until the input system power voltage moves above the configured Low System Power Alarm Limit.	<ul style="list-style-type: none"> 0 = Power voltage is not below the configured Low System Power Limit. 1 = Power voltage is below the configured Low System Power Limit.
HSystemPowerAlarm	BOOL	Indicates if the input system power voltage moves above the configured High System Power Limit. If it is above the configured High System Power Limit, it remains set until the input system power voltage moves below the configured High System Power Alarm Limit.	<ul style="list-style-type: none"> 0 = Power voltage is not above the configured High System Power Limit. 1 = Power voltage is above the configured High System Power Limit.
EndCapFault	BOOL	Indicates if the end cap is properly connected.	<ul style="list-style-type: none"> 0 = End cap is present on bus types that support end cap detection. 1 = End cap is not present on bus types that support end cap detection.
InternalFault	BOOL	Shows whether one or more of several internal diagnostics indicate an internal issue in the product.	<ul style="list-style-type: none"> 0 = No internal issue found in the product 1 = One or more of several internal diagnostics indicate an internal issue in the product.
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All
LocalClockOffsetTimestamp	LINT	The time when the Local Clock Offset was sampled. This value is initially zero, and the first time stamp occurs when the module synchronizes with the master clock.	N/A
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to.	All
PRPPort1Fault	BOOL	Indicates PRP network A fault state. Fault state may be caused by missing duplicate packets (one of redundant network disconnected) or network cables mismatch.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
PRPPort2Fault	BOOL	Indicates PRP network B fault state. Fault state may be caused by missing duplicate packets (one of redundant network disconnected) or network cables mismatch.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
DLREnabled	BOOL	Indicates if DLR network redundancy mode is enabled.	<ul style="list-style-type: none"> 0 = DLR disabled 1 = DLR enabled
PRPEnabled	BOOL	Indicates if PRP network redundancy mode is enabled.	<ul style="list-style-type: none"> 0 = PRP disabled 1 = PRP enabled
ConcurrentConnectionsLostPackets	DINT	Indicates the number of concurrent connection packets that are lost.	All positive values and zero
PRPModeFault	BOOL	Indicates that the configuration of the adapter in the Studio 5000 Logix Designer application project is for PRP mode but the PRP/DLR switch on the adapter is not configured for PRP mode.	<ul style="list-style-type: none"> 0 = Configuration is correct. The Module Properties configuration matches the PRP/DLR switch setting. 1 = The Module Properties configuration does not match with the PRP/DLR switch setting.
DLRModeFault	BOOL	Indicates that the configuration of the adapter in the Studio 5000 Logix Designer application project is for DLR mode but the PRP/DLR switch on the adapter is not configured for DLR mode.	<ul style="list-style-type: none"> 0 = Configuration is correct. The Module Properties configuration matches the PRP/DLR switch setting. 1 = The Module Properties configuration does not match with the PRP/DLR switch setting.
DLRFault	BOOL	Indicates if there is a ring fault in the network. To use the bit, the adapter needs to act as an active or backup Ring Supervisor. Once the bit is triggered, the bit can be cleared by using the Reset Counter ⁽¹⁾ .	<ul style="list-style-type: none"> 0 = Network is healthy. 1 = Ring fault

(1) Reset Counter option is available in all softwares (Studio 5000 Logix Designer application, FactoryTalk Linx software, and RSLinx software). You can also use message (MSG) instruction to reset the Ring fault. See Acknowledging Rapid Ring Faults Condition in order to resume normal operation in DLR with message instruction Answer ID [610875](#) for detailed instructions.

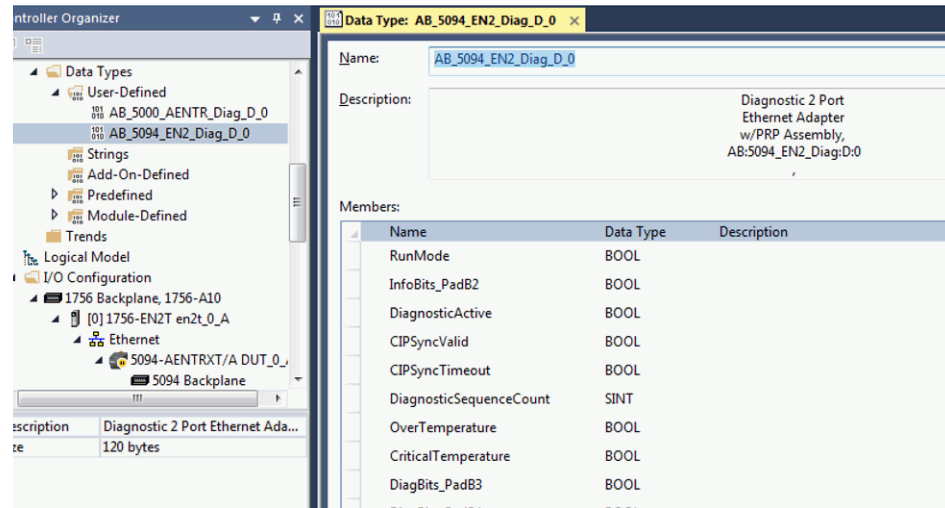
Table 21 - FLEX 5000 EtherNet/IP Adapter Module Configuration Tags

Tag Name	Data Type	Definition	Valid Values
SystemPowerAlarmDisable	BOOL	Disables the system power alarm	<ul style="list-style-type: none"> 0 = System power alarm monitoring enabled 1 = System power alarm monitoring disabled
LSystemPowerAlarmLimit	REAL	The low system power alarm trigger point. The values are validated by the adapter firmware that triggers the LSystemPowerAlarm when the input system power moves below this limit. Units are Volts.	18.0...32.0 but ≤ High System Power Alarm Limit
HSystemPowerAlarmLimit	REAL	The high system power alarm trigger point. The values are validated by the adapter firmware that triggers the LSystemPowerAlarm when the input system power moves above this limit. Units are Volts.	18.0...32.0 but ≥ Low System Power Alarm Limit

Adapter Diagnostic Assembly

Create User-defined Diagnostic Assembly Types

You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.



From the Controller Organizer pane, expand Data Types and create four user-defined types:

- Diagnostic Ethernet w/PowerDiagnostics Adapter
 - DATATYPE: AB:5000_AENTR_Diag:D:0
 - Instance ID: 0x30E (782)
 - Size = 72 bytes

Follow the information in [Table 22](#) to add each member.

Table 22 - Diagnostic Assembly Instance 782

Name	Data Type	Byte
RunMode	BOOL	1
InfoBits_PadB2 ⁽¹⁾	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
DiagnosticSequenceCount	SINT	1
OverTemperature	BOOL	2
CriticalTemperature	BOOL	
DiagBits_PadB3 ⁽¹⁾	BOOL	
DiagBits_PadB4 ⁽¹⁾	BOOL	
LSystemPowerAlarm	BOOL	
HSystemPowerAlarm	BOOL	
EndCapFault	BOOL	
InternalFault	BOOL	
DiagBits_PadS2 ⁽¹⁾	SINT	
Pad1	SINT	
Pad2	SINT	1

Table 22 - Diagnostic Assembly Instance 782 (Continued)

Name	Data Type	Byte
DLRNetworkState	SINT	1
DLRSupervisorState	SINT	1
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID	SINT[8]	8
Reserved	LINT[5]	40

(1) These data types act as padding to ensure byte alignment. They can be renamed.

2. Diagnostic 2 Port Ethernet Adapter w/PRP^(a)
 - DATATYPE: AB:5094_EN2_Diag:D:0
 - Instance ID: 0x3C7 (967)
 - Size = 120 bytes

Follow the information in [Table 23](#) to add each member.

Table 23 - Diagnostic Assembly Instance 967

Name	Data Type	Byte
RunMode	BOOL	1
InfoBits_PadB2 ⁽¹⁾	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
DiagnosticSequenceCount	SINT	1
OverTemperature	BOOL	2
CriticalTemperature	BOOL	
DiagBits_PadB3 ⁽¹⁾	BOOL	
DiagBits_PadB4 ⁽¹⁾	BOOL	
LSystemPowerAlarm	BOOL	
HSystemPowerAlarm	BOOL	
EndCapFault	BOOL	
InternalFault	BOOL	
DiagBits_PadS2 ⁽¹⁾	SINT	
ModuleStatus_PadB1 ⁽¹⁾	BOOL	
ModuleStatus_PadB2 ⁽¹⁾	BOOL	2
ModuleStatus_PadB3 ⁽¹⁾	BOOL	
ModuleStatus_PadB4 ⁽¹⁾	BOOL	
ModuleStatus_PadB5 ⁽¹⁾	BOOL	
ModuleStatus_PadB6 ⁽¹⁾	BOOL	
PRPPort1Fault	BOOL	
PRPPort2Fault	BOOL	1
DLREnabled	BOOL	
PRPEnabled	BOOL	
DLRNetworkState	SINT	
DLRSupervisorState	SINT	
LocalClockOffset	LINT	
LocalClockOffsetTimestamp	LINT	
GrandMasterClockID	SINT[8]	
Reserved	LINT[7]	
Port1	SINT[16]	
Port2	SINT[16]	16

(1) These data types act as padding to ensure byte alignment. They can be renamed.

(a) Available for firmware revision 4.011 or higher.

3. Diagnostic Counters 2 Port Ethernet Adapter PRP Duplex Assembly^(a)

- DATATYPE: AB:5000_EN2_FT:DC:0
- Instance ID: 0x8000 (32768)
- Size = 88 bytes

Follow the information in [Table 24](#) to add each member.

Table 24 - Diagnostic Assembly Instance 0x8000

Name	Data Type	Bytes
RunMode	BOOL	1
Info_PadB2	BOOL	
DiagnosticActive	BOOL	
DiagnosticSequenceCount	SINT	1
TCPConnections	INT	2
CPUUtilization	INT	2
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
HMIIPacketRate	DINT	4
IOPacketRate	DINT	4
EthernetErrors	DINT	4
ConcurrentConnectionsLostPackets	DINT	4
PRPPort1NetworkFaultCount	DINT	4
PRPPort1TransmitCount	DINT	4
PRPPort1ReceiveCount	DINT	4
PRPPort1WrongLANCount	DINT	4
PRPPort1UniqueEntryCount	DINT	4
PRPPort1DuplicateEntryCount	DINT	4
PRPPort1MultipleEntryCount	DINT	4
PRPPort2NetworkFaultCount	DINT	4
PRPPort2TransmitCount	DINT	4
PRPPort2ReceiveCount	DINT	4
PRPPort2WrongLANCount	DINT	4
PRPPort2UniqueEntryCount	DINT	4
PRPPort2DuplicateEntryCount	DINT	4
PRPPort2MultipleEntryCount	DINT	4

4. Diagnostic 2 Port Ethernet Adapter w/PRP Updated Assembly^(a)

- DATATYPE: AB:5094_EN2_Diag:D:1
- Instance ID: 0x800F (32783)
- Size = 128 bytes

Follow the information in [Table 25](#) to add each member.

Table 25 - Diagnostic Assembly Instance 0x800F

Name	Data Type	Bytes
RunMode	BOOL	1
Info_PadB2	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
DiagnosticSequenceCount	SINT	1

(a) Available for firmware revision 6.011 or later.

Table 25 - Diagnostic Assembly Instance 0x800F (Continued)

Name	Data Type	Bytes
OverTemperature	BOOL	2
CriticalTemperature	BOOL	
DiagBits_PadB3	BOOL	
DiagBits_PadB4	BOOL	
LSystemPowerAlarm	BOOL	
HSystemPowerAlarm	BOOL	
EndCapFault	BOOL	
InternalFault	BOOL	
ModuleStatusPadB1	BOOL	
ModuleStatusPadB2	BOOL	
ModuleStatusPadB3	BOOL	2
ModuleStatusPadB4	BOOL	
ModuleStatusPadB5	BOOL	
ModuleStatusPadB6	BOOL	
PRPPort1Fault	BOOL	
PRPPort2Fault	BOOL	
DLREnabled	BOOL	
PRPEnabled	BOOL	
DLRFault	BOOL	
DLRNetworkState	SINT	
DLRSupervisorState	SINT	1
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID	SINT[8]	8
LSystemPowerAlarmTimestamp	LINT	8
HSystemPowerAlarmTimestamp	LINT	8
OverTemperatureTimestamp	LINT	8
CriticalTemperatureTimestamp	LINT	8
InternalFaultTimestamp	LINT	8
PRPPort1FaultTimestamp	LINT	8
PRPPort2FaultTimestamp	LINT	8
DLRFaultTimestamp	LINT	8
Port1	SINT[16]	16
Port2	SINT[16]	16

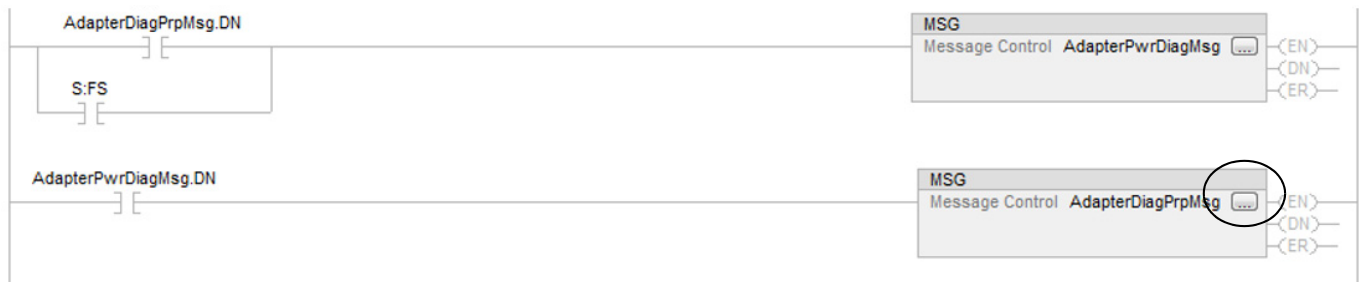
Create Message Type User Tags

Create two MESSAGE type user tags for requests and two associated response user tags with the new user-defined diagnostic assembly types.

Name	Usage	Value	Force Mask	Style	Data Type
AdapterDiagPrpMsg	Local	{...}	{...}	{...}	MESSAGE
AdapterDiagPrpRes	Local	{...}	{...}	{...}	AB_5094_EN2_Diag_D_0
AdapterPwrDiagMsg	Local	{...}	{...}	{...}	MESSAGE
AdapterPwrDiagRes	Local	{...}	{...}	{...}	AB_5000_AENTR_Diag_D_0

From the Controller Organizer pane, expand Tasks → MainTask → MainProgram

5. Create two MESSAGE type user tags for requests.
6. Create two associated response user tags with the new user-defined diagnostic assembly types.
7. Add the four user tags to your ladder program.



8. Expand the message tag to open the message configuration dialog.
9. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance: 782 for Diagnostic Ethernet w/PowerDiagnostics Adapter type, or 967 for Diagnostic 2 Port Ethernet Adapter w/PRP type
 - Destination element: User-defined type suitable for the instance entered.
10. On the Communication tab, select the path to the adapter that you wish to send the messages to.
11. Download the project and set to Run mode.

You can monitor the user defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

Program Parameters and Local Tags - Main Program

The screenshot shows the 'Program Parameters and Local Tags - MainProgram' window in the Controller Organizer software. The window displays a table of parameters and local tags for the 'MainProgram' scope. The table has columns for Name, Value, Force Mask, Style, and Data Type. A red box highlights the 'AdapterPwrDiagRes' parameter and its sub-parameters.

Name	Value	Force Mask	Style	Data Type
▶ AdapterDiagPrpRes	{...}	{...}	{...}	AB_5094_EN2_Diag_D_0
▶ AdapterPwrDiagMsg	{...}	{...}	{...}	MESSAGE
▶ AdapterPwrDiagRes	{...}	{...}	{...}	AB_5000_AENTR_Diag_D_0
▶ AdapterPwrDiagRes.RunMode	1		Decimal	BOOL
▶ AdapterPwrDiagRes.InfoBits_PadB2	0		Decimal	BOOL
▶ AdapterPwrDiagRes.DiagnosticActive	0		Decimal	BOOL
▶ AdapterPwrDiagRes.CIPSyncValid	1		Decimal	BOOL
▶ AdapterPwrDiagRes.CIPSyncTimeout	0		Decimal	BOOL
▶ AdapterPwrDiagRes.DiagnosticSequenceCo...	0		Decimal	SINT
▶ AdapterPwrDiagRes.OverTemperature	0		Decimal	BOOL
▶ AdapterPwrDiagRes.CriticalTemperature	0		Decimal	BOOL
▶ AdapterPwrDiagRes.DiagBits_PadB3	0		Decimal	BOOL
▶ AdapterPwrDiagRes.DiagBits_PadB4	0		Decimal	BOOL
▶ AdapterPwrDiagRes.LSystemPowerAlarm	0		Decimal	BOOL
▶ AdapterPwrDiagRes.HSystemPowerAlarm	0		Decimal	BOOL
▶ AdapterPwrDiagRes.EndCapFault	0		Decimal	BOOL
▶ AdapterPwrDiagRes.InternalFault	0		Decimal	BOOL
▶ AdapterPwrDiagRes.DiagBits_PadS1	0		Decimal	SINT
▶ AdapterPwrDiagRes.Pad1	0		Decimal	SINT
▶ AdapterPwrDiagRes.Pad2	0		Decimal	SINT
▶ AdapterPwrDiagRes.DLRNetworkState	0		Decimal	SINT
▶ AdapterPwrDiagRes.DLRSupervisorState	3		Decimal	SINT
▶ AdapterPwrDiagRes.LocalClockOffset	1593128209233824178		Decimal	LINT
▶ AdapterPwrDiagRes.LocalClockOffsetTimest...	1593504577023597388		Decimal	LINT
▶ AdapterPwrDiagRes.GrandMasterClockID	{...}	{...}	Decimal	SINT[8]
▶ AdapterPwrDiagRes.Pad3	{...}	{...}	Decimal	LINT[5]

Troubleshoot the Adapter

This chapter describes how to identify and troubleshoot issues with the FLEX 5000 adapter.

Table 26 - FLEX 5000 EtherNet/IP Adapter Hardware Faults

Indicators	Type of Issue	Cause of Issue	Corrective Action
<ul style="list-style-type: none"> Status indicator is flashing red. Adapter status tag InternalFault is set to TRUE. 	Major recoverable fault – Internal fault	Adapter cannot perform I/O addressing with connected terminal bases and IO modules.	<ol style="list-style-type: none"> Disconnect the module power from the adapter. Remove all I/O modules from the terminal bases. Verify that the terminal bases and backplane are assembled correctly. Verify that all terminal bases are mounted completely on the DIN rail. Apply the module power. Install the I/O modules one at a time, starting with the terminal base next to the adapter. Wait for the I/O module status indicator to flash green (I/O module has a slot assignment and is ready to receive a CIP connection) before inserting the next I/O module. If the status indicator still flashes red or the InternalFault tag is set to True, replace one of the following: <ol style="list-style-type: none"> The I/O module that was just installed. The terminal base that the I/O module was just installed on. The terminal base adjacent and closer to the adapter (Slot-1) to the terminal base that the I/O was just installed on. Continue the process until all I/O modules are installed and the system is operating properly.
<ul style="list-style-type: none"> Status indicator is flashing red. No communication to I/O modules but can communicate with adapter. AOP dialog for Device Information section indicates Major Fault status. 	Major recoverable fault – The module count is exceeded.	The I/O modules installed outside of maximum supported chassis size – 8 or 16 depending on product code.	<ol style="list-style-type: none"> Verify if any installed I/O module is outside of maximum supported chassis size (>8 slots or >16 slots). Verify if any empty terminal base is outside of maximum supported chassis size (>8 slots or >16 slots). Remove any I/O modules or terminal bases that are outside the maximum supported bank size. Cycle power to the adapter as for any other major recoverable fault.
	Major recoverable fault – Configuration on flash is invalid.	Firmware image is invalid.	Use the ControlFLASH™ tool to update the device firmware. If this fault recurs, or if the corrupt image cannot be rewritten, the physical flash memory is corrupted and the device must be replaced with new one.
<ul style="list-style-type: none"> Status indicator is steady red. No communication to I/O module. Other indicators are off. 	Major unrecoverable fault	Hardware malfunction	Major device functionality is corrupted and the device can no longer be used. Replace the device with a new one. Contact Rockwell Automation for instructions on replacing the device.
<ul style="list-style-type: none"> Status indicator is flashing red. When device is configured, NET, LINK 1, and LINK 2 indicators may indicate that links are UP and IP address is taken. The device can communicate with Studio 5000 Logix Designer application. AOP dialog for Device Information section indicates Minor Fault status. 	Minor recoverable fault	Several possible root causes: <ul style="list-style-type: none"> Problems with SFP module IP address switches or DLR/PRP switch changed on runtime ACD conflicts or DLR errors. 	<p>Issues with SFP module:</p> <ol style="list-style-type: none"> The SFP module plugged into a slot may not be recognized by the firmware. Check if all the SFP modules used are listed in Supported SFP Modules on page 19. Check for cable condition, possible TX Fault. If using manual port configuration, for example, network speed and duplex, verify that manually selected configuration values are supported by currently inserted SFP modules. <p>Note: If one of the SFP modules connected to one of the device ports works correctly, verify port set up and SFP module status on the Ethernet section of HTTP webpages.</p> <p>Issues with Rotary or PRP/DLR switches:</p> <ol style="list-style-type: none"> Check if the switch position is changed while the module was in RUN mode. Set the required values for the DLR/PRP or IP address switch and cycle power to implement the required settings. <p>Issues with ACD:</p> <ol style="list-style-type: none"> Check your network for IP address conflicts. Another device on the network may already be using the IP address assigned to the faulted device. Remove duplicate IP address condition. <p>Issues with DLR:</p> <p>Check that the DLR network cables and devices are properly connected.</p>

Table 26 - FLEX 5000 EtherNet/IP Adapter Hardware Faults (Continued)

Indicators	Type of Issue	Cause of Issue	Corrective Action
Status indicator is steady red.	Major unrecoverable fault	Physical DLR/PRP switch is set to PRP position during adapter boot up and firmware revision is 1.011, 2.011, or 3.011.	<p>PRP mode is not supported:</p> <ol style="list-style-type: none"> 1. The physical switch on the adapter has been set to PRP mode. 2. The adapter cannot establish connection with I/O modules when the DLR/PRP switch is in the PRP position with firmware version 3.011 or lower. 3. Upgrade to firmware revision 4.011 or later, or switch the DLR/PRP back to the DLR position.
	Minor recoverable fault	Physical DLR/PRP switch is changed from DLR to PRP position during adapter operation and firmware revision is 1.011, 2.011, or 3.011.	

Table 27 - FLEX 5000 EtherNet/IP Adapter System Warnings

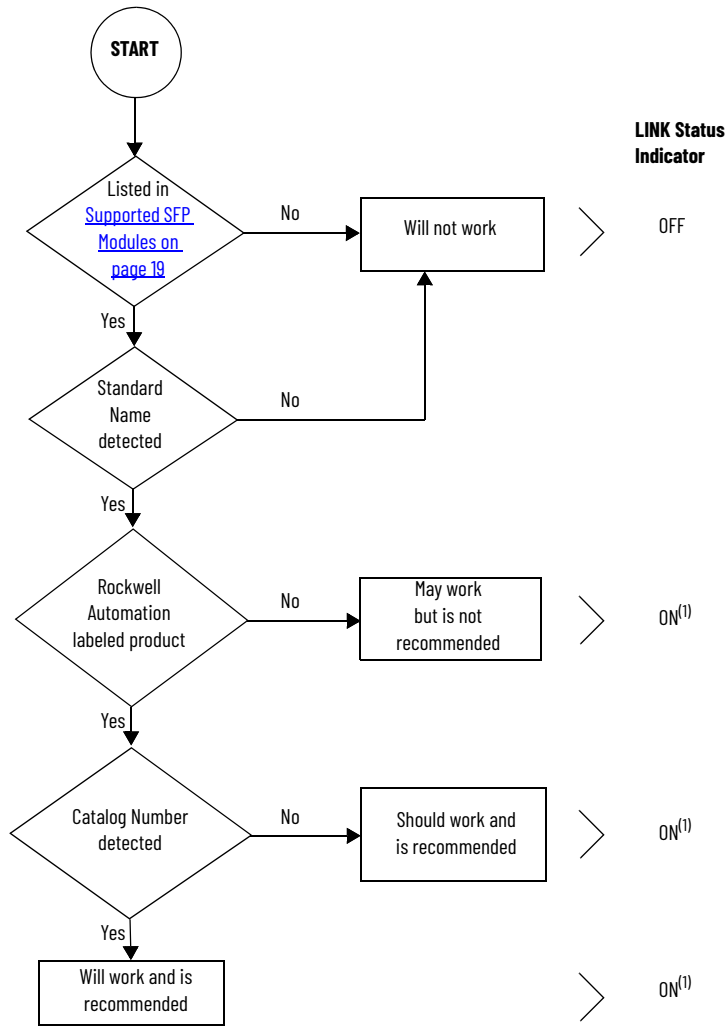
Warning	Indicators	Cause of Warning	Corrective Action
End cap fault	Adapter status tag EndCapFault is set to TRUE.	Adapter cannot validate End Cap status as positive.	<ol style="list-style-type: none"> 1. Install or verify the proper installation of the end cap. 2. If the end cap is installed and is verified as not broken, for example, the gold metal plate is in the right place, and the End Cap Absent fault occurs, the fault is likely in a terminal base. 3. Start with only the adapter and the end cap. Add one terminal base at a time to locate the affected terminal base. 4. If the end cap is replaced under power, wait at least 5 seconds for the adapter to refresh the end cap status. <p>Although an end cap is not required for proper operation, it helps the adapter to diagnose backplane issues, it protects contacts at the end of the terminal base, and it prevents electrical shorts or arcs from occurring in hazardous areas. The use of end caps is recommended.</p>
Undervoltage alarm	Adapter status tag LSystemPowerAlarm is set to TRUE	An alarm is triggered. The power supply voltage level is below alarm configured threshold.	<ul style="list-style-type: none"> • Check power supply for shorts or overloading. • Consider using a stronger power supply unit if the power supply is overloaded.
Overvoltage alarm	Adapter status tag HSystemPowerAlarm is set to TRUE.	An alarm is triggered. The power supply voltage level is above alarm configured threshold.	Immediately replace power supply with one that works.
Over temperature alarm	Adapter status tag OverTemperature is set to TRUE.	The device is overheating as a result of poor cooling conditions.	Improve cooling conditions by allowing proper air flow around the device or, if possible, by reducing the environment temperature.
Critical temperature alarm	Adapter status tag OverTemperature is set to TRUE.		
PRP LAN A or B cables connections mismatch	The LINK 1 or LINK 2 indicator is flashing red. Adapter status tag PRPPort1Fault or PRPPort2Fault is set to TRUE.	The LAN A or B cables are connected to wrong Ethernet sockets at adapter device (for example, cable network A connected to network B socket).	<ul style="list-style-type: none"> • Connect LAN A cable to Ethernet port 1 and LAN B cable to Ethernet port 2. • Check other devices at network for cable to socket mismatch.
PRP LAN A or B is disconnected	The LINK 1 or LINK 2 indicator is flashing red. Adapter status tag PRPPort1Fault or PRPPort2Fault is set to TRUE.	Unique network packets detected as a result of break in one of redundant networks (A or B). Path between the controller and an adapter at one of the network is disconnected. Unique packets count can be examined at adapter webpages. Go to PRP Statistics diagnostic webpage and check the parameter Unique Entries Count.	Check all devices and cable connections in this redundant LAN which indicates an error.

Table 28 - FLEX 5000 EtherNet/IP Adapter Network Faults

Indicator	Type of Issue	Cause of Issue	Corrective Action
NET indicator is Off	Major recoverable fault	An invalid IP address is configured on the rotary switch.	Check whether the device has a valid IP address. The last octet of the network IP address must be within the range from 001...254. See Connect to the EtherNet/IP Network on page 21 for more information on how to set the correct IP address.
Cannot open diagnostic HTTP Pages	HTTP server disabled	HTTP server is disabled.	Check if the HTTP server is enabled. For security reasons the HTTP server may be disabled. 1. In Studio 5000 Logix Designer application, enter online mode and open adapter properties. 2. From the properties dialog, select the Servers section in the tree view. 3. From the Servers dialog, select the Enable checkbox for Hypertext Transfer Protocol (HTTP) and select the Apply button.
Cannot query SNMP service	SNMP server disabled	SNMP service is disabled.	Check if the SNMP server is enabled. For security reasons the SNMP server may be disabled. 1. In Studio 5000 Logix Designer application, enter online mode and open adapter properties. 2. From the properties dialog, select the Servers section in the tree view. 3. From the Servers dialog, select the Enable checkbox for Simple Network Management Protocol (SNMP) and select the Apply button.
<ul style="list-style-type: none"> The LINK 1 or LINK 2 indicator is flashing red. Adapter status tag PRPPort1Fault or PRPPort2Fault set to TRUE. The PRP Statistics from adapters webpage indicate warning. 	An adapter receives data from particular DAN (Dual Attached Node) on only one Ethernet port.	There are disturbances on the network (for example, one of the Ethernet cable is interrupted). The PRP warnings can occur when cycling power to one of the PRP devices in the network. There is a possibility that an unequal number of frames are sent on both LANs during the power up process due to the asynchronous character of Link Up in multi port devices.	<p>Issues with network:</p> <ol style="list-style-type: none"> Check that the network cables and devices are properly connected. Check for the cable condition. Check for other possible issues and resolve them. <p>Issues with cycling power:</p> <p>Wait for the Links connection to stabilize.</p>

SFP Module Compatibility

To simplify the transceiver module selection process and to troubleshoot, follow these guidelines:



⁽¹⁾The corresponding LINK status indicator is ON if the network cable is connected between transceiver and an operating network device.



WARNING: Using an SFP module that is not recommended may cause data loss, hardware damage, or may interfere with control process.

Other Information

The Rockwell Automation Knowledgebase contains additional information that may help you to troubleshoot issues. The following lists some of the articles related to FLEX 5000 EtherNet/IP adapters.

1. Grounding the Ethernet Cable Shield in an EtherNet/IP System, Answer ID [167121](#).
2. FLEX 5000 adapters do not support empty slots in the rack, Answer ID [1076307](#).

History of Changes

This appendix contains the new or updated information for each revision of this publication. These lists include substantive updates only and are not intended to reflect all changes. Translated versions are not always available for each revision.

Change Log

5094-UM005D-EN-P, September 2024

Change
Added Inclusive Language Acknowledgment
Updated Additional Resources
Updated topic Controller Compatibility
Updated Module Compatibility table
Updated topic FLEX 5000 Adapter EtherNet/IP Features
Added topic Concurrent Communication with FLEX 5000 Safety I/O Modules
Added topic Set the IP Address with the FactoryTalk Linx Software
Updated chapter Configure the Adapter with latest AOP data
Updated important note to select appropriate connection type for Logix SIS solution
Updated sections Restrictions Imposed By Implicit Protection Mode and Restrictions Imposed By Explicit Protection Mode
Added tip note for Knowledgebase article SNMP Password and MIB Configuration Answer ID 34413
Updated table FLEX 5000 EtherNet/IP Adapter Status Indicators
Updated chapter FLEX 5000 Adapter Diagnostics with latest AOP data
Added an important note for section Alarms
Added topic Diagnostics with FactoryTalk Linx Software
Updated home diagnostic webpage in section Access Web Browser Support
Updated diagnostic webpages for Diagnostic Overview, Network Settings, Ethernet Statistics, Ring Statistics, PRP Statistics, and PRP Nodes
Added topics Concurrent Application Connections and Concurrent Bridge Connections
Updated table FLEX 5000 EtherNet/IP Adapter Module System Tags
Updated topic Create User-defined Diagnostic Assembly Types
Updated table FLEX 5000 EtherNet/IP Adapter Network Faults

5094-UM005C-EN-P, October 2020

Change
Updated Controller and Software Compatibility with High Availability information
Updated list of modules in Firmware and Software Compatibility list
Updated list of FLEX 5000 Adapter Features
Added instructions to add the adapter to a project
Updated Connection Category information
Added Adapter Diagnostic Assembly chapter
Added DLR/PRP switch troubleshooting

5094-UM005B-EN-P, April 2019

Change
Updated screenshots related to Studio 5000 Logix Designer and FLEX 5000 EtherNet/IP adapters web pages.
Updated FLEX 5000 Adapter Features topic with information on FLEX 5000 I/O interconnect cable and support for FLEX 5000 Safety I/O modules.
Updated FLEX 5000 Adapter EtherNet/IP Features table with PRP support.
Updated Important table with information about PRP support under Set the IP Address with Rotary Switches topic.
Added topic Select the Network Redundancy Mode.
Added section Performance Impact of PRP Network Redundancy Mode.
Updated LINK 1 and LINK 2 descriptions in FLEX 5000 EtherNet/IP Adapter Status Indicators table.
Added Alarms category to Diagnostics with the Logix Designer Application topic.
Added Network category to Diagnostics with the Logix Designer Application topic.
Added Important table related to DLR diagnostics data to Ring Statistics section.
Added PRP Statistics section to EtherNet/IP Adapter Diagnostic Web Pages topic.
Added PRP Nodes section to EtherNet/IP Adapter Diagnostic Web Pages topic.
Added tags related to PRP to FLEX 5000 EtherNet/IP Adapter Module System Tags table.
Added warnings related to PRP to FLEX 5000 EtherNet/IP Adapter System Warnings table.
Added fault indicators related to PRP to FLEX 5000 EtherNet/IP Adapter Network Faults table.
Added Other Information topic to Troubleshoot the Adapter appendix.

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Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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