

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Rockwell Automation pages

ALLEN-BRADLEY CONTROLLOGIX

1756-EN4TR

ETHERNET/IP COMMUNICATION MODULE

Selected official pages cover product features, network specifications, device properties, addressing and redundant-adapter configuration.

About This Publication

This manual describes how you can use ControlLogix® EtherNet/IP™ communication modules with a Logix 5000® controller and communicate with various devices on the Ethernet/IP network.

Use this manual if you program applications that use EtherNet/IP networks with ControlLogix controllers.

Conventions

Be sure to understand these concepts and tools:

- FactoryTalk® Linx
- Studio 5000 Logix Designer® application
- ControlFLASH Plus™
- HMIs
- SNMP tools

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as Add-on Profiles, Electronic Data Sheets, Device Type Manager), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Summary of Changes

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

This manual was revised to add or update the information that is listed in this table.

Topic	Page
Added chapter on Concurrent Communication.	23

Additional Resources

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

Resource	Description
1756 EtherNet/IP Communication Modules Installation Instructions, publication 1756-IN050	Provides information on how to install EtherNet/IP™ modules.
1756 ControlLogix Communication Modules Specifications, publication 1756-TD003	Specifications for ControlLogix communication modules.
Redundancy Systems User Manual, publication 1756-UM015	Describes how to set up, configure, program, monitor, and troubleshoot Logix SIS, ControlLogix 5580, and ControlLogix 5570 redundancy systems.
Deploying Device Level Ring within a Converged Plantwide Ethernet Architecture Design and Implementation Guide, publication ENET-TD015	Highlights the key IACS application requirements, technology, and supporting design considerations to help with the successful design and deployment of these specific use cases within the CPwE framework.
Ethernet Design Considerations Reference Manual, publication ENET-RM002	Provides details about how to use EtherNet/IP communication modules with Logix 5000 controllers and communicate with other devices on the EtherNet/IP network.
EtherNet/IP Device Level Ring Application Technique, publication ENET-AT007	Describes DLR network operation, topologies, configuration considerations, and diagnostic methods.
EtherNet/IP Media Planning and Installation Manual This manual is available from the Open DeviceNet® Vendor Association (ODVA) at: http://www.odva.org .	Provides details about how to install, configure, and maintain linear and Device Level Ring (DLR) networks by using Rockwell Automation EtherNet/IP devices that are equipped with embedded switch technology.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to use EtherNet/IP communication modules in Logix 5000 control systems.
EtherNet/IP Parallel Redundancy Protocol Application Technique, publication ENET-AT006	Describes how you can configure a Parallel Redundancy Protocol (PRP) network with a compatible device or switch.
EtherNet/IP Socket Interface Application Technique, publication ENET-AT002	Describes the socket interface that you can use to program MSG instructions to communicate between a Logix 5000 controller via an EtherNet/IP module and Ethernet devices that do not support the EtherNet/IP application protocol, such as barcode scanners, RFID readers, or other standard Ethernet devices.
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.
Troubleshoot EtherNet/IP Networks Application Technique, publication ENET-AT003	Provides details about how to assign IP addresses to and how to troubleshoot EtherNet/IP networks and devices.

You can view or download publications on Literature Library: rok.auto/literature.

ControlLogix EtherNet/IP Network Device Overview

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Overview

EtherNet/IP™ networks are communication networks that offer a comprehensive suite of messages and services for many automation applications.

This open network standard uses commonly available Ethernet communication products to support real-time I/O messaging, information exchange, and general messaging.

ControlLogix Network Device Features

The ControlLogix® EtherNet/IP network devices:

- Facilitate high-speed data transfer between Logix 5000® controllers and remote I/O modules.
- Connect to multiple EtherNet/IP network topologies.

Table 1 - EtherNet/IP Communication Modules

Cat. No. ⁽¹⁾	Description	Media	Communication Rate
1756-EN2F, 1756-EN2FK	EtherNet/IP bridge, fiber	Fiber	100 Mbps, no auto-negotiation.
1756-EN2T 1756-EN2TK	EtherNet/IP bridge, copper	Copper	10/100 Mbps
1756-EN2TP, 1756-EN2TPK	EtherNet/IP bridge, PRP support, copper	Dual Copper	10/100 Mbps
1756-EN2TPXT	ControlLogix-XT™, extended temperature EtherNet/IP bridge, PRP support	Dual Copper	10/100 Mbps
1756-EN2TR, 1756-EN2TRK	EtherNet/IP bridge, embedded switch, copper	Dual copper	10/100 Mbps
1756-EN2TXT	ControlLogix-XT, extended temperature EtherNet/IP bridge, copper, for extreme environments	Copper	10/100 Mbps
1756-EN2TRXT	ControlLogix-XT, extended temperature EtherNet/IP bridge, embedded switch, copper	Dual copper	10/100 Mbps
1756-EN3TR, 1756-EN3TRK	EtherNet/IP bridge, embedded switch, copper	Dual copper	10/100 Mbps
1756-EN4TR, 1756-EN4TRK	EtherNet/IP bridge, embedded switch, copper	Dual Copper	10/100 Mbps 1 Gbps
1756-EN4TRXT	ControlLogix-XT, extended temperature EtherNet/IP bridge, embedded switch, copper	Dual Copper	10/100 Mbps 1 Gbps
1756-ENBT, 1756-ENBTK	EtherNet/IP bridge, copper	Copper	10/100 Mbps
1756-EWEB	Ethernet web server module	Copper	10/100 Mbps

(1) A catalog number ending in a K denotes a conformal coating.

EtherNet/IP Network Specifications

Table 2 - ControlLogix EtherNet/IP Connections Specifications⁽¹⁾

Cat. No.	Connections		CIP™ Unconnected Messages (backplane + Ethernet)
	TCP	CIP ⁽²⁾	
1756-ENBT	64	128	64 + 64
1756-EN2F	128	256	128 + 128
1756-EN2T	128	256	128 + 128
1756-EN2TP	128	256	128 + 128
1756-EN2TR	128	256	128 + 128
1756-EN3TR	128	256	128 + 128
1756-EN4TR	512	1000 I/O, 528 messaging/HMI	256+256
1756-EWEB	64	128	128 + 128

(1) Includes the K conformal coating catalog numbers and the XT extreme environment catalog numbers.

(2) Except for the 1756-EN4TR, which has separate I/O and messaging/HMI CIP connections, these connections can be used for any combination of I/O and messaging/HMI.

Table 3 - ControlLogix EtherNet/IP Data Specifications⁽¹⁾

Cat. No.	Produced/Consumed Tags		Socket Services	Duplicate IP Detection (starting revision)
	Number of Multicast Tags, Max ⁽²⁾	Unicast Available in RSLogix 5000® Software		
1756-EN2F	32	Version 16.03.00 or later	Yes	All Revisions
1756-EN2T		Version 16.03.00 or later	Yes	
1756-EN2TP		Version 24.00.00 or later	Yes	
1756-EN2TR		Version 17.01.02 or later	Yes	
1756-EN3TR		Version 18.02.00 or later	Yes	
1756-EN4TR		Version 24.00.00 or later	Yes	
1756-ENBT		Version 16.03.00 or later	No	Revision 3.3
1756-EWEB	N/A		Yes	Revision 2.2

(1) Includes the K conformal coating catalog numbers and the XT extreme environment catalog numbers.

(2) Each controller can send a maximum of 32 multicast produced tags to one single consuming controller. If these same tags are sent to multiple consumers, the maximum number is 31.

Table 4 - ControlLogix EtherNet/IP Specifications⁽¹⁾

Cat. No.	Firmware Revision	RSLogix 5000 Software Version	RSLinx® Software Version	Packet Rate Capacity (packets/second) ⁽²⁾		Support for Extended Environment ⁽³⁾	Integrated Motion on the EtherNet/IP Network Axes
				I/O	HMI/MSG		
1756-ENBT	Any	8.02.00 or later	2.30 or later	5000	900	No	N/A
1756-EN2F	2.x	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later ⁽⁴⁾		25,000 ⁽⁵⁾			Up to 8 axes supported ⁽⁵⁾
1756-EN2T	2.x or earlier	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later ⁽⁴⁾		25,000 ⁽⁵⁾			Up to 8 axes supported ⁽⁵⁾
1756-EN2TXT	2.x	15.02.00 or later	2.51 or later	10,000	2000	Yes	N/A
	3.6 or later	18.02.00 or later ⁽⁴⁾		25,000 ⁽⁵⁾			Up to 8 axes supported ⁽⁵⁾
1756-EN2TP	Any	24.00.00 or later ⁽⁴⁾	4.10 or later	25,000 ⁽⁵⁾	2000	No	Up to 8 axes supported ⁽⁵⁾
1756-EN2TPXT	10.x or later	24.00.00 or later	4.10 or later	25,000 ⁽⁵⁾	2000	Yes	Up to 8 axes supported ⁽⁵⁾
1756-EN2TR	2.x	17.01.02 or later	2.55 or later	10,000	2000	No	N/A
	5.x or later	18.02.00 or later ⁽⁴⁾	2.56 or later	25,000 ⁽⁵⁾			Up to 8 axes supported ⁽⁵⁾
1756-EN2TRXT	5.028 or later	20.01.00 or later	2.56 or later	25,000 ⁽⁵⁾	2000	Yes	Up to 8 axes supported ⁽⁵⁾
1756-EN3TR	3.6 or later	18.02.00 or later ⁽⁴⁾	2.56 or later	25,000 ⁽⁵⁾	2000	No	Up to 256 axes supported ⁽⁵⁾
1756-EN4TR	Any	24.00.00 or later ⁽⁶⁾	4.10 or later	• 50,000 without CIP Security™ • 25,000 with integrity • 15,000 with integrity and confidentiality	• 3,700 without CIP Security • 2,700 with integrity • 1,700 with integrity and confidentiality	No	Up to 256 axes supported ⁽⁵⁾
1756-EN4TRXT	Any	24.00.00 or later ⁽⁶⁾	4.10 or later	• 50,000 without CIP Security • 25,000 with integrity • 15,000 with integrity and confidentiality	• 3,700 without CIP Security • 2,700 with integrity • 1,700 with integrity and confidentiality	Yes	Up to 256 axes supported ⁽⁵⁾

(1) Includes the K conformal coating catalog numbers.

(2) I/O numbers are maximums; they assume no HMI/MSG. HMI/MSG numbers are maximums, they assume no I/O. Packet rates vary depending on packet size. For more details, see Troubleshoot EtherNet/IP Application Technique, publication [ENET-AT003](#), and the EDS file for a specific catalog number.

(3) Module operates in a broad temperature spectrum, -20...+70 °C (-4...+158 °F), and meets ANSI/ISA-S71.04-1985 Class G1, G2 and G3, and cULus, Class 1 Div 2, C-Tick, CE, ATEX Zone 2 and SIL 2 requirements for increased protection against salts, corrosives, moisture/condensation, humidity, and fungal growth.

(4) This version is required to use CIP Sync™ technology, Integrated Motion on the EtherNet/IP Network, or Exact Match keying.

(5) This value assumes the use of a 1756-L8x or a 1756-L7x ControlLogix controller. For a 1756-L6x ControlLogix controller, see ControlLogix Controllers User Manual, publication [1756-UM001](#).

(6) CIP Security requires FactoryTalk® Linx version 6.11.00 or later.

Physical Level

During transmission, the duplicated data passes along physical connections from the 1756-EN4TR EtherNet/IP communication modules and the FLEXHA 5000 EtherNet/IP adapter. Physical network redundancy is provided whether the system is operating in a PRP or DLR topology. Thus, the system has increased resiliency.

The physical network redundancy is achieved via redundant paths between the 1756-EN4TR EtherNet/IP communication module and the FLEXHA 5000 EtherNet/IP adapter as follows:

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

Communication Module Configuration

To use concurrent communication with FLEXHA 5000 I/O modules, you must configure the 1756-EN4TR ControlLogix EtherNet/IP communication module on the Device Definition dialog box in your Studio 5000 Logix Designer application project to use concurrent communication.

1756-EN4TR Communication Module Configuration

The screenshot shows the 'Device Definition' dialog box for a '1756-EN4TR 1756 Ethernet Bridge, 2-Port, Twisted-pair Media'. The 'Name' field is 'Ethernet_IO_comm_module'. The 'Revision' is '7.001'. The 'Electronic keying' is 'Compatible Module'. The 'Rack connection' is 'None'. The 'Time sync and motion connection' is 'Yes'. The 'Concurrent communication' dropdown menu is highlighted with a red box and is set to 'Yes'. The 'Redundant' field is empty. The 'Ethernet Address Module 1' and 'Ethernet Address Module 2' fields are both set to 'IP address' with values '192.168.1.101' and '192.168.1.102' respectively. The 'OK', 'Cancel', and 'Help' buttons are at the bottom right.

IMPORTANT

You can configure the 1756-EN4TR EtherNet/IP communication module for concurrent communication, to use with I/O modules such as FLEXHA 5000 I/O modules. Or you can configure the 1756-EN4TR EtherNet/IP communication module for standard I/O, for example, remote 1756 ControlLogix I/O modules. You can only configure the module for one or the other.

If the 1756-EN4TR EtherNet/IP communication module is configured for concurrent communication, you can still use it for class 3 communications, for example, HMI, program upload/download/monitor.

You must disable IP address swapping in the 1756-EN4TR EtherNet/IP communication modules in the redundant chassis pair.

Concurrent Communication in a PRP Topology

This section shows how data is transmitted from one ControlLogix 5580 controller in a redundant controller pair to a duplex pair of FLEXHA 5000 I/O modules.

In this scenario, concurrent communication transmits data as follows.

1. The controller establishes concurrent communication to the 1756-EN4TR EtherNet/IP communication module in the same chassis.

At this point, the communication is not redundant.

2. Redundant communication starts at the communication module. The communication module opens two legs of the concurrent communication and transmits duplicates of the data across those legs.

Additionally, the communication module is connected to a redundant PRP network, that is, LAN A and LAN B. The PRP network redundancy introduces further data duplication.

- Numbers 1A and 2A represent the two legs of the concurrent communication on one physical cable between the communication module and the LAN A switch.
- Numbers 1B and 2B represent the physical duplication of the two legs of the concurrent communication between the communication module and the LAN B switch.

3. Duplicate data is transmitted across the two legs, and physical duplication of these legs, to the FLEXHA 5000 EtherNet/IP adapters.

