DNP3 Outstation Module

IC695EDS001-DE RX3i DNP3 Outstation Module

The PACSystems* RX3i DNP3 Outstation Module IC695EDS001 is an Ethernet-connected module which fits in the RX3i backplane and permits the RX3i to behave as an Outstation on the DNP3 network, where it may interact with up to eight DNP3 masters.

Module features include:

- Two auto-sensing RJ-45 Ethernet ports with LED indicators
  - Connects via Ethernet at 10BaseT or 100BaseTX
  - Internal network switch with Auto-negotiate, Sense, Speed, and crossover detection
  - Supports Linear (daisy-chained) and Star network configurations
  - TCP/IP and LLA protocols supported
  - One Ethernet MAC Address and one IP Address per module
  - Time synchronization to SNTP Time Server
  - Recessed Ethernet Restarts pushbutton to manually restart the Ethernet firmware without power-cycling the module.
- Dedicated RS-232 Station Manager Port for network supervision
- LED behavior same as ETM001
- DNP3 configuration via a single COMMREQ command
  - Data exchanges up to 12,072 points and 24,000 events supported
  - Eight DNP3 Objects supported: DI, DI w/time, DO, DO w/time, CROB, analog output values, time setting, and class polls
  - Multiple RX3i memory types may be utilized for DNP3 data exchange
  - Binary DI/DO
  - Analog (32-bit signed, 16-bit signed, or single-precision floating point)
  - Supports unsolicited data communications with DNP3 Master
  - Master IP Address and LLA Address White listing
- Compatible with those RX3i CPUs as noted on page 3, including redundant controllers
  - Up to 4 EDS001 per RX3i, as allowed by available power and slots
  - Module can be installed in any available RX3i main rack I/O slot
  - Module supports insertion into and removal from an RX3i backplane which is under power.
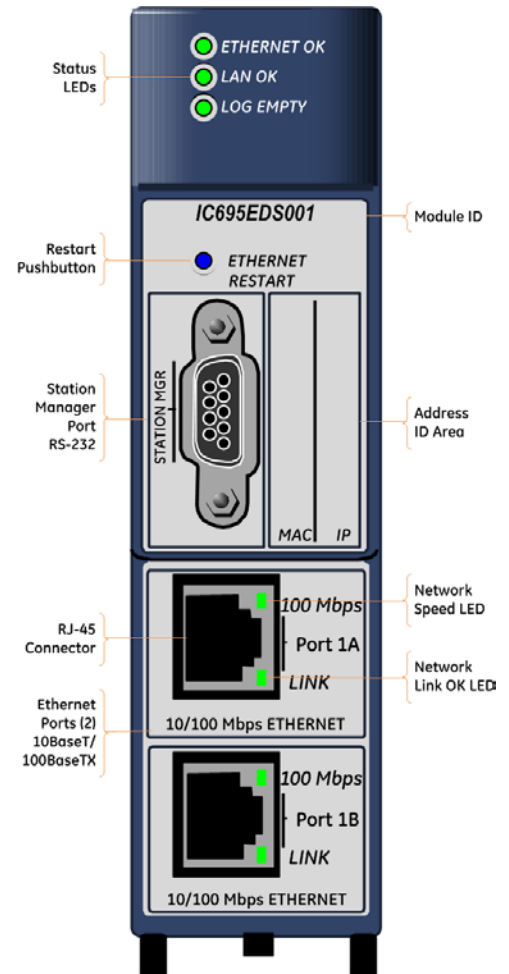 - Firmware upgrade via RX3i CPU using WinLoader software utility

Figure 1: EDS001 Features at a Glance

Current Release Information

Catalog Number	Firmware Version	Date	Comments
IC695EDS001-DE	6.41/1.40	Mar 2017	This hardware release addresses a component obsolescence issue. There are no changes to form, fit, or function.

Upgrade Kit: 41G2060-MS10-000-A4

This combines a compatible Ethernet Firmware Upgrade Kit and DNP3 Outstation Firmware Kit in one package.

Hardware ID	Catalog Number	Board ID	Board Revision
IC695EDS001 Ethernet DNP3	IC695EDS001-DE	EX4B1	41G1299-BA10-000-D3
Ethernet TCP Firmware ID	Version: 6.41 Build 05A1		
Ethernet Boot Firmware ID	Version: 3.71 Build 43A1		
Ethernet Toolkit Plugin3 -DNP3 Slave License	N/A		
Ethernet Toolkit Plugin2 -DNP3 Slave Application	Version: 140 (0xD303)		
Ethernet Programmable Parts	**Part ID**	**Revision**	
	PLD	44I725580-1401B	
	Flash Memory - U3	41G1299-FW10-000-A4	
	Flash Memory - U4	41G1299-FW10-001-A4	
	Microcontroller 405GPR –U66	41G1911-FW10-000-A0	

Release History

Catalog Number	Firmware Version	Date	Comments
IC695EDS001-DE	Firmware 6.41 /1.40	Mar 2017	This hardware release addresses a component obsolescence issue. There are no changes to form, fit, or function.
IC695EDS001-CE	Firmware 6.41 /1.40	Feb 2016	An enhancement was made to prevent the module from becoming unresponsive and requiring a power cycle if it was subjected to heavy network storm traffic.
IC695EDS001-CD	Firmware 6.31 /1.30 Boot 3.71	Dec 2015	This hardware release addresses an issue identified, where the module can unexpectedly go into firmware update mode (Ethernet OK, LAN OK, and Log Empty LEDs blink in unison). While in firmware update mode, the module is unresponsive to Ethernet traffic. There are no changes to form, fit, or function. This Firmware provides enhancements to configure the Event Buffer size separately for Digital Inputs (BI – Binary Inputs and BO – Binary Output status) and Analog Inputs (AI – Analog Inputs and AOS – Analog Output status) and also support specific DNP3 object variations. This also fixes issue with module going unexpectedly in firmware update mode, as part of the Web upgrade kit.
IC695EDS001-BC	1.20	Jul 2015	This firmware release fixes the issue related to IIN Bits indicating Class1 and Clas2 Data Available status to DNP3 Master. The firmware also corrects the control code for Close and Trip Control (Close=101) and (Trip =110) in the CROB Control DWORD to be consistent with description in User manual –Section 6.9.2.
IC695EDS001-BB	1.10	Apr 2015	Added a feature to support different control codes like PULSE ON/OFF, CLOSE, TRIP and LATCH ON/OFF for the CROB Control objects. This also enhanced the Quality functionality for ensuring that events are generated when quality is offline, and appropriate quality status is updated. This hardware release addresses a component obsolescence issue. There are no changes to form, fit, or function.
IC695EDS001-AA	1.00	Oct 2014	Initial release.

Functional Compatibility

Subject	Minimum Version Required
Programmer Version Requirements	Proficy* Machine Edition Logic Developer Release 8.5 SIM 7 or later.
Ethernet Firmware Version Requirements	Ethernet (ETM001) Primary Firmware Release 6.30 (Build: 41A1) Ethernet (ETM001) Boot Firmware Release 3.60 (Build: 45A1)
Module Hardware Requirements	The newly-released EDS001 firmware is compatible with original hardware (IC695EDS001-AA) and with new hardware (IC695EDS001-BB). ***Note:*** It is not compatible with IC695ETM001 hardware.
RX3i CPU version Requirements	CPU320/CPU315 Primary Firmware Release 8.05 CPE310/CPE305 Primary Firmware Release 8.05 CRU320 Primary Firmware Release 8.05 CPE330 Primary Firmware Release 8.45 (Other RX3i CPU/CPE models are not supported)

Problems Resolved by this Revision

Subject	ID code	Description
Network Storm Denial of Service	ISS182314	An enhancement was made to prevent the module from becoming unresponsive and requiring a power cycle if it was subjected to heavy network storm traffic.

New Features and Enhancements

Subject	Description
N/A	N/A

Restrictions and Open Issues

Subject	ID code	Description
Byte Swap Error	00259269	During long runs for Object type 30, the Controller reference memory data reported in response to a poll request from the Master was intermittently observed to contain corrupted data. Data was being swapped between the high and low bytes.
White Listing of Master LLA	DE1839	The EDS001 module allows the establishment of a white list of allowed connections, both TCP/IP and LLA Master Station addresses. The parameters for this feature are such that they can be enabled independently. However LLA white listing is to be used **with** TCP/IP white listing, not by itself.

Operational Notes

Subject	Description
Station Manager unresponsive	Station Manager can become unresponsive when there is high polling rate, or high point load on the EDS001 module.
Use of Redundant IP with the EDS001 in a CRU application	DNP3 is a connection oriented protocol, and during a role switch of a CRU controller the MAC Address of the Redundant IP will change, typically causing TCP/IP connections to be disrupted, then reconnected. It is likely that a DNP3 Master with a connection to an EDS001 module in this type of configuration will experience a connection change, causing the DNP3 data to be temporarily unavailable.
Use of SOE parameter with the EDS001 in a CRU application	It is not recommended that SOE be used in CRU applications, as, on a role switch, the EDS001 module can lose buffered events, or hold them for a future role switch.
Use of Master Set DNP3 Unsolicited mode with the EDS001 in a CRU application	It is not recommended that a Master use unsolicited mode with CRU applications, as, on a role switch, the EDS001 module can lose buffered events, or hold them for a future role switch. Also, on a role switch, the Master may not know to reissue the Unsolicited Enable command to the EDS001 module.
Synchronizing the LSI bits between CRU CPUs	In redundancy applications, synchronizing the LSI (LAN Status Interface) bits is not recommended, as it may cause the ST block that contains the COMMREQ setup to execute prematurely on a role switch. Independent bits, or Symbolic bits, should be used for the LSI data.
Using Point Push with Analog Data	Analog points, when pushed, will take on the default variance size specified by the COMMREQ parameter.

Additional Information

PACSystems RX3i User Manuals

PACSystems RX7i & RX3i TCP/IP Ethernet Communications User Manual	GFK-2224
PACSystems TCP/IP Ethernet Communications Station Manager Manual	GFK-2225
PACSystems RX3i DNP3 Outstation Module IC695EDS001 User Manual	GFK-2911
PACSystems RX3i DNP3 Outstation Module IC695EDS001 Quick Start Guide	GFK-2912
PACSystems RX3i Ethernet Module IC695ETM001 IPI	GFK-2332
PACSystems RX3i Ethernet DNP3 Outstation Module IC695EDS001 IPI	GFK-2333

User manuals, product updates and other information sources are available on the website, www.geautomation.com, under *Controllers and IO, RX3i Controllers.*

GE Automation & Controls Contact Information
Americas: 1-800-433-2682 or 1-434-978-5100

Global regional phone numbers are available on our website www.geautomation.com