

# PACSystems™ RX3i

## IEC-61850 ETHERNET COMMUNICATION MODULE (IC695ECM850)



## Documentation

PACSystems RX3i IEC 61850 Ethernet Communication Module User Manual, GFK-2849.

PACSystems RX3i IEC 61850 Ethernet Communication Module Quick Start Guide, GFK-2851.

For user manuals, product updates and other information go to the Support website:

<https://www.emerson.com/Industrial-Automation-Controls/support> and refer to *Controllers and IO, RXi Controllers*.

## Upgrades

The IC695ECM850 is field-upgradeable using the firmware upgrade utility. To upgrade an existing ECM850 to firmware version 1.01, you will need the upgrade kit 41G1836-MS10-001-A1.zip, which can be downloaded from:

[https://emerson-mas.force.com/communities/en\\_US/Article/IC695ECM850-Landing-Page](https://emerson-mas.force.com/communities/en_US/Article/IC695ECM850-Landing-Page).

## Release History

| Catalog No.                        | Firmware Version | Date           | Comments  |
|------------------------------------|------------------|----------------|---|
| IC695ECM850CA-DB<br>IC695ECM850-DB | 1.01             | Oct 2021       | The product's labels have been updated to show compliance with new certifications.<br>For updated certifications, please refer to <a href="https://emerson-mas.force.com/communities/en_US/Article/Certifications-and-Agency-Approvals-Landing-Page">https://emerson-mas.force.com/communities/en_US/Article/Certifications-and-Agency-Approvals-Landing-Page</a> . |
| IC695ECM850-CB                     | 1.01             | Feb 2021       | Security Enhancement  |
| IC695ECM850-CA                     | 1.00             | October 2020   | Change in product manufacturing location. No changes to material, process, form, fit or functionality.  |
| IC695ECM850-BA                     | 1.00             | September 2019 | Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality.  |
| IC695ECM850-AA                     | 1.00             | February 2014  | Initial release.  |

## Functional Compatibility

| Subject                         | Minimum Version Required  |
|---------------------------------|---|
| Programmer version requirements | PAC Machine Edition Logic Developer, Release 8.00 SIM 7   |
| RX3i CPU version requirements   | CPU320/CPU315 Primary Firmware Release 8.05<br>CPU320/CPU315 Boot Firmware Release 5.10<br><br>CPE310/CPE305 Primary Firmware Release 9.65<br>CPE310/CPE305 Boot Firmware Release 7.10<br><br>CPE330 Primary Firmware Release 8.45<br>CRU320 Primary Firmware Release 8.05<br>CRU320 Boot Firmware Release 5.10<br>(Other CPU models are not supported) |

## New Features in Release 1.00

The PACSystems RX3i IEC 61850 Ethernet Communication Module, catalog number IC695ECM850, or ECM850, connects a PACSystems RX3i controller to an IEC 61850 network, enabling the controller to act as an IEC 61850 Client

and communicate with Intelligent Electronic Devices (IEDs, IEC 61850 Servers) on the network using the IEC 61850 protocol.

## Features of the RX3i ECM850 include:

- Support for the following IEC 61850 client features:
  - Multiple connections to IEC 61850 servers by TCP/IP
  - Read and write of data / dataset values
  - Control Model: all models
  - Reporting by exception: buffered and un-buffered reporting

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**Note:** Refer to the PICS, MICS and PIXIT appendices in GFK-2849 for details.

- Supports 10/100/1000Mbps copper, 100/1000Mbps multi-mode fiber, and 100/1000Mbps single-mode fiber
  - Supports star (switched), and linear (daisy-chain) network topologies.
  - Supports operation in hot standby redundant system
  - Supports secure firmware upgrade using Winloader software utility.
  - Built-in Command Line Interface (CLI) using the Micro-B USB port.
  - Simple Network Time Protocol (SNTP) client support (Multicast and Broadcast)
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## Problems Resolved by Release 1.01

| Subject               | ID code | Description   |
|-----------------------|---------|---|
| Cyber Security Update | DE5507  | Added security enhancements to harden the product against a malicious actor |

## Restrictions and Open Issues in Release 1.00

| Restriction/Open Issue  | Description  |
|---|--|
| On Clear configuration command from Programmer, ECM850 closes, re-connects and re-closes connection with IED(s) | On Clear configuration command from the Programmer, ECM850 closes connection with IED(s) and again momentarily re-connects and re-closes the connection with IED(s). This does not impact any operations.  |
| Command Line Interface (CLI): page function not available   | The output paging function, as described in the shConfig command, is not currently functioning. This is only for display purpose.  |
| CLI: response to invalid command entry  | The error message displayed in response to an invalid show port help command does not provide useful information. Example: show port fdp help is an invalid command.<br>To see a list of valid parameters for the show port command, type show port?           |
| CLI: "telnetd" command response   | The CLI does not echo the new number of max connections in its response to the telnetd <maxconnections> command. However, the command still functions properly, and updates the maximum number of telnet connections.  |
| CLI: "log details" command response   | When displaying numerous local log table entries using the log details command, sometimes erroneous blank characters appear within the display. Use the log details <log entry number> command to view the disrupted log table entry. Example: log details 99. |
| CLI: "term" command response  | Occasionally, the CLI does not respond to the "term" command. To recover, restart the terminal emulation program.  |

## Operational Notes

| Subject   | Description   |
|---|---|
| Secure SD card slot is not supported  | PACSystems CPU (CPE330) goes to stop fault mode when SD card is inserted in ECM850 module and the unit is powered-up. As described in GFK-2894A, SD card is not supported on ECM850 module.   |
| Operational behavior when Data model configuration in IEC 61850 Server device is changed during runtime   | If the Data model configuration changes in the IED during runtime, then ECM850 will not update values or operate on the changed Data Object/Data Attribute (DO/DA) variables.<br>ECM850 must be re-configured for the new Data model of the IED before variable updates will occur. |
| Operational behavior when read operations are performed on a Data Object/Data Attribute (DO/DA) which is non-existent or configured as not accessible in device | If the configured data attributes are "non-existent" or are configured as "access denied" in the IED, then values for such variables will not be updated in the RX3i controller and the reasons for this cannot be known to the controller.   |

## Sweep Impact of ECM850

The impact of the ECM850 on RX3i CPU sweep time is a function of the number of ECM850 modules in the RX3i hardware configuration (four maximum) and the I/O data size configured for each ECM850 module. The table below shows the measured sweep impact of a single ECM850 module for a range of I/O data sizes. Use the data in this table to calculate expected impact on RX3i CPU sweep times. The configured IO Data size will be available in the message zone of the IEC 61850 Configurator after configuration validation.

**Sweep Impact of One ECM850 as a Function of I/O Data Size**

| I/O Data Size (Kbytes) | Sweep Impact (milliseconds) |               |
|------------------------|-----------------------------|---------------|
|                        | CPE305/CPE310               | CPU315/CPU320 |
| 0 <sup>1</sup>         | 0.05                        | 0.03          |
| 4                      | 6.68                        | 6.00          |
| 8                      | 11.84                       | 10.84         |
| 16                     | 23.43                       | 21.44         |
| 32                     | 45.82                       | 42.77         |

<sup>1</sup> ECM850 module with no IED configured

## General Contact Information

Home link: <http://www.emerson.com/industrial-automation-controls>  
Knowledge Base: <https://www.emerson.com/industrial-automation-controls/support>

## Technical Support

### Americas

Phone: 1-888-565-4155  
1-434-214-8532 (If toll free option is unavailable)

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Technical Support: [support.mas.apac@emerson.com](mailto:support.mas.apac@emerson.com)

Any escalation request should be sent to: [mas.sfdcescalation@emerson.com](mailto:mas.sfdcescalation@emerson.com)

**Note:** If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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