

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE PACSYSTEMS RX3i

IC695CPE305-AFBA

CPE305 PROGRAMMABLE CONTROLLER

Used with the applicable PACSystems RX3i controllers configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

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PACSystems RX3i

IC695CPE305

Central Processing Unit

GFK-2714B

April 2012

The PACSystems* RX3i CPE305 can be used to perform real time control of machines, processes, and material handling systems. The CPU communicates with the programmer via the internal Ethernet port or a serial port. It communicates with I/O and Intelligent Option modules over a dual PCI/Serial backplane.

Features

- Contains 5 Mbytes of user memory and 5 Mbytes of non-volatile flash user memory.
- Battery-less retention of user memory.
- Optional Energy Pack,* which on system power loss powers CPU long enough to write user memory to non-volatile storage (NVS).
- Configurable data and program memory.
- Programming in Ladder Diagram, Structured Text, Function Block Diagram, and C.
- Supports auto-located Symbolic Variables that can use any amount of user memory.
- Reference table sizes include 32Kbits for discrete %I and %Q and up to 32Kwords each for analog %AI and %AQ.
- Supports most Series 90-30 modules and expansion racks. For supported I/O, Communications, Motion, and Intelligent modules, see the *PACSystems RX3i Hardware and Installation Manual*, GFK-2314.
- Supports up to 512 program blocks. Maximum size for a block is 128KB.
- An RS-232 serial port
- Embedded Ethernet interface supports a maximum of two programmer connections.
- Rack-based Ethernet Interface module (IC695ETM001) supports a complete set of Ethernet functionality. For details, see *TCP/IP Ethernet Communications*, GFK-2224.
- Time synchronization to SNTP Time Server on Ethernet network when used with a rack-based Ethernet module (IC695ETM001) version 5.0 or later.
- Ability to display serial number and date code in programmer Device Information Details.
- Ability to transfer applications to and from USB 2.0 A-type compatible RDSDs (removable data storage devices).
- Compliant with EU RoHS Directive 2002/95/EC using the following exemptions identified in the Annex: 7(a), 7(c)-I and III, and 15.



Ordering Information

Description	Catalog Number
RX3i 1.1GHz CPU	IC695CPE305
Standard Pwr Supplies 120/240VAC, 125VDC 24VDC	IC695PSA040 IC695PSD040
Multifunctional Pwr Supplies 120/240 VAC, 125 VDC 24 VDC	IC695PSA140 IC695PSD140
Rx3i Universal Backplane 7 Slot 12 Slot 16 Slot	IC695CHS007 IC695CHS012 IC695CHS016
Real Time Clock Battery	IC690ACC001
RX3i CPU Energy Pack	IC695ACC400
Energy Pack Cable	IC695CBL001
RS-232 cable	IC693CBL316
Note: For Conformal Coat option, please consult the factory for price and availability.	

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Specifications

Memory retention	The non-volatile storage (NVS) can retain data indefinitely without loss of data integrity. When CPU power is restored, data stored in NVS is transferred back to user memory and the NVS is cleared. An optional IC695ACC400 Energy Pack powers the CPU long enough to write its user memory contents to non-volatile storage during a system power loss. For details on the Energy Pack, refer to publication GFK-2724.
Program storage	5 Mbytes of non-volatile flash user memory
Power requirements	+3.3 VDC: 1.0 A +5 VDC: 1.0 A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.5A at startup, 0.1 A during run time (Applies only if Energy Pack is connected to the CPE305.)
Operating Temperature	0 to 60°C (32°F to 140°F)
Floating point	Yes
Boolean execution speed, typical	0.072 ms per 1000 Boolean instructions
Time of Day Clock accuracy	Maximum drift of 2 seconds per day
Elapsed Time Clock (internal timing) accuracy	0.01% maximum
Embedded serial communications	RS-232
Real Time Clock battery	Estimated life of 5 years; must be replaced every 5 years on a regular maintenance schedule.
Serial Protocols supported	Modbus RTU Slave, SNP Slave, Serial I/O
Backplane	Dual backplane bus support: RX3i PCI and 90-30-style serial
PCI compatibility	System designed to be electrically compliant with PCI 2.2 standard
Program blocks	Up to 512 program blocks. Maximum size for a block is 128KB.
Memory	%I and %Q: 32Kbits for discrete %AI and %AQ: configurable up to 32Kwords %W: configurable up to the maximum available user memory Symbolic: configurable up to 5 Mbytes
<i>Embedded Ethernet interface specifications</i>	
Max. no. of connections	Two programmer connections
Ethernet data rate	10Mb/sec and 100Mb/Sec
Physical interface	10BaseT RJ-45
Remote Station Manager over UDP	Yes. Refer to the <i>Station Manager Manual</i> , GFK-2225J or later for supported commands.
Configurable Advanced User Parameters	Yes. Refer to <i>TCP/IP Ethernet Communications for PACSystems</i> , GFK-2224K or later for supported AUPs.
For environmental specifications and compliance to standards (for example, FCC or European Union Directives), refer to the PACSystems RX3i Hardware and Installation Manual, GFK-2314.	

Quick Start

For initial start-up and configuration of the CPE305, complete the following steps. For details on CPE305 operation, refer to *PACSystems CPU Reference Manual*, GFK-2222R or later. If you are swapping a CPE305 with a CPU310 in an existing system, also refer to “Migrating RX3i CPU310 Applications to a CPE305” on page 4.

1. Remove the pull-tab from the Real Time Clock (RTC) battery, located on the back of the CPE305.
2. Remove power from the RX3i rack and install the CPE305. The CPE305 can be installed in any pair of slots in the RX3i Main rack, except the two highest-numbered slots.
3. Mount the Energy Pack on the left side of the module in slot 0 of the rack. Use cable IC695CBL001 to connect the Energy Pack to the connector on the bottom of the CPE305.
4. Apply power to the rack.

Note: When the Energy Pack is powered up for the first time, or is in a system that has been powered down long enough to completely discharge the Energy Pack, it may require a few seconds for it charge to its operating level. The CPU's STATUS LED will blink green during this time.

5. Connect the CPE305 to the Ethernet network.
6. Using Proficy Machine Edition (PME) software, configure a CPE305 in an RX3i target and assign a new IP address to the embedded Ethernet interface.

The CPE305 has the same configuration parameters as the CPU310, with the following exceptions.

- **Universal Serial Bus:** The RDSB (USB) port is enabled by default in the Controller and in the Proficy Machine Edition hardware configuration.

If a configuration with Universal Serial Bus set to Disabled is stored to the CPE305, USB port operation can be restored by storing a configuration with the port enabled or by performing a Clear All operation (power cycling the CPU with the Energy Pack disconnected).

Note: The USB port is for transfer of application data only. It is not intended for permanent connection.

- **Modbus Address Space Mapping** is not supported.
- **Ethernet configuration:** The embedded Ethernet interface must be initially configured by downloading a CPE305 configuration to the RX3i from Machine Edition.

To configure the embedded Ethernet interface in Machine Edition, expand the CPU slot to display the Ethernet daughterboard. The Settings tab for the embedded Ethernet module contains IP Address, Subnet Mask and Gateway IP Address. Consult your network administrator for the proper values for these parameters.

Note: This release does **not** support the alternate methods of setting a temporary IP address: the Set Temporary IP Address tool in PME, BOOTP, or the Station Manager CHSOSW command.

7. Go online with the target and download the configuration. You can use one of the following methods for the initial connection to the CPE305:
 - Through the Ethernet port, using the factory-loaded IP address, 192.168.0.100. This address is intended only for initial connection in order to complete the configuration and must be changed before connecting to the Ethernet network. When you store a hardware configuration with a different IP address, the temporary IP address is lost; it is not restored by a Clear operation.
 - Through the RS-232 COM1 serial port - This is a DCE (data communications equipment) port that allows a simple straight-through cable to connect with a standard nine-pin AT-style RS-232 port.
 - Through the Ethernet connection of an ETM001 in the same rack with a known IP address configuration

Migrating RX3i CPU310 Applications to a CPE305

The CPE305 supports legacy CPU310 projects that fit within 5 Mbytes of user memory. **The project's configuration must be changed to support this conversion.**

CPE305 versus CPU310 Performance Differences

The following differences should be considered when converting legacy applications or developing new applications on the CPE305.

- Some exceptionally lengthy CPE backplane operations, such as MC_CamTableSelect, Data Log and Read Event Queue functions, will take longer to complete compared to other RX3i CPU models, and may delay backplane operations to IC695 modules.

For example, when an MC_CamTableSelect function block is executed on the PMM335 module, the CPU's acknowledgement of the PMM355 module interrupt may be delayed. In this situation, you may see the following fault in the I/O Fault Table, even when the interrupt has not been dropped: *Error initiating an interrupt to the CPU.*

- Because the CPE305 has less user memory than the other RX3i CPUs, operations that involve transferring large files could fail.

For example, depending on the number and sizes of Data Log files already stored, the Get_DL (Get Data Log) command could fail with a C10 hex (file transfer failure occurred while sending the data log file to the CPU) error. To correct this error

1. Upload the data logs to Machine Edition and delete the logs from the CPU.
 2. Take steps to reduce the size of the log file, such as reducing the number of samples, the sample rate, or the number of parameters logged.
- Performance specifications for many features, such as power-up time, function block execution times and I/O module sweep times have changed. For details, refer to Appendix A of GFK-2222R or later.
 - The RS-232 port on the CPE305 does not provide 5V power on pin 5.

Release History

<i>Catalog Number</i>	<i>FW Version</i>	<i>Comments</i>
IC695CPE305-ABAC	7.13	Corrects issues with Logic Write to Flash (Service Request 57).
IC695CPE305-ABAB	7.11	Resolves the issues detailed in GFK-2714A.
IC695CPE305-AAAA	7.10	Initial release.