

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE PACSYSTEMS RX3I

IC695CPU320-HU

RX3I CPU CONTROLLER

Used with the applicable PACSystems RX3i controllers configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: GE official manufacturer documentation

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PACSystems CPU Models

<i>Family</i>	<i>Catalog Number</i>	<i>Description</i>
RX3i CPUs	IC695CPU310	300MHz Celeron CPU, 10 MB user memory
	IC695CPU320	1 GHz Celeron-M CPU, 64 MB user memory
	IC695NIU001	300MHz Celeron NIU. For information, see the <i>PACSystems RX3i Ethernet NIU User's Manual</i> , GFK-2439
RX7i CPUs with embedded Ethernet Interface	IC698CPE010	300MHz, Celeron CPU, 10MB user memory
	IC698CPE020	700MHz, Pentium CPU, 10 MB user memory,
	IC698CPE030	600MHz, Pentium-M CPU, 64MB user memory
	IC698CPE040	1800MHz, Pentium-M CPU, 64MB user memory
RX7i Redundancy CPUs with embedded Ethernet Interface	IC698CRE020	700MHz, Pentium CPU, 10 MB user memory
	IC698CRE030	600MHz, Pentium-M CPU, 64MB user memory
	IC698CRE040	1800MHz, Pentium-M CPU, 64MB user memory

PACSystems CPU models have the following features in common:

- Programming in Ladder Diagram, Function Block Diagram, Structured Text and C.
- Floating point (real) data functions.
- Configurable data and program memory.
- Battery-backed RAM for user data (program, configuration, register data, and symbolic variable) storage
- Non-volatile built-in flash memory for user data (program, configuration, register data, and symbolic variable) storage. Use of this flash memory is optional.
- Battery backup for program, data, and time of day clock.
- Configurable Run/Stop mode switch.
- Embedded RS-232 and RS-485 communications.
- Up to 512 program blocks. Maximum size for a block is 128KB.
- Auto Located Symbolic Variables, which allows you to create a variable without specifying a reference address.
- Bulk memory area accessed via reference table %W. The upper limit of this memory area can be configured to the maximum available user RAM.
- Larger reference table sizes, compared to Series 90 CPUs: 32Kbits for discrete %I and %Q and up to 32K words each for analog %AI and %AQ.
- Online Editing mode that allows you to easily test modifications to a running program. (For details on using this feature, refer to the programming software online help and *Proficy™ Logic Developer Getting Started*, GFK-1918.)
- Bit in word referencing that allows you to specify individual bits in a WORD reference in retentive memory as inputs and outputs of Boolean expressions, function blocks, and calls that accept bit parameters.
- In-system upgradeable firmware.

IC695CPU320

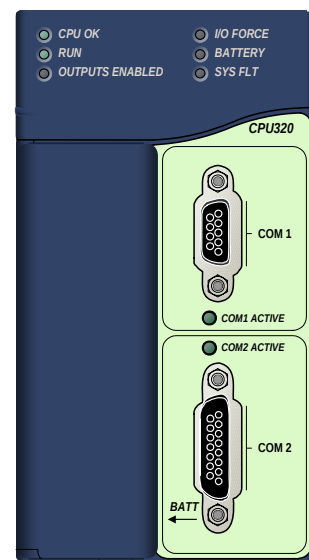
- IC695CPU320: 1 GHz CPU microprocessor

Serial Ports

The CPU has two independent, on-board serial ports, accessed by connectors on the front of the module. Ports 1 and 2 provide serial interfaces to external devices. Either port can be used for firmware upgrades. For serial port pin assignments and details on serial communications, refer to chapter 12.

Indicators

The eight CPU LEDs indicate the operating status of various CPU functions.



LED State ● On ✚ Blinking ○ Off			CPU Operating State
●	CPU OK	On	CPU has passed its powerup diagnostics and is functioning properly.*
○	CPU OK	Off	CPU problem. RUN and OUTPUTS ENABLED LEDs may be blinking in an error code pattern, which can be used by technical support for troubleshooting. This condition and any error codes should be reported to your technical support representative.
✚	CPU OK, OUTPUTS ENABLED, RUN	Blinking in unison	CPU is in boot mode and is waiting for a firmware update through a serial port.
✚	OK	Blinking Other LEDs off.	CPU in Stop/Halt state; possible watchdog timer fault. Refer to the fault tables. If the programmer cannot connect, cycle power with battery attached and refer to fault tables.
○	RUN	Off	CPU is in Stop mode.
●	OUTPUTS ENABLED	On	Output scan is enabled.
○	OUTPUTS ENABLED	Off	Output scan is disabled.
●	I/O FORCE	On	Override is active on a bit reference.
●	BATTERY	On	Battery has failed or is not attached. Note: To provide reliable backup, routine maintenance should include scheduled battery replacement. See "Specifications" on page 2-15.
●	SYSTEM FAULT	On	CPU is in Stop/Faulted mode because a fatal fault has occurred.
✚	COM1 COM2	Blinking Blinking	Signal activity on port.

*After initialization sequence is complete.

Message (17): Report Device Type

Format:

Address	Func 17	Error Check
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Query

Address	Func 17	Byte Count	Device Type 43	Slave Run Light	Data	Error Check
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Normal Response

Query:

The Report Device Type query is sent by the master to a slave in order to learn what type of programmable control or other computer it is.

- An address of zero is not allowed as this cannot be a broadcast request.
- The function code is 17.

Response:

- The byte count field is one byte in length and is equal to 5.
- The device type field is one byte in length and is equal to 43 (hexadecimal) for the PACSystems
- The slave run light field is one byte in length. The slave run light byte is equal to OFFH if the CPU is in RUN mode. It is equal to 0 if the CPU is not in RUN mode.
- The data field contains three bytes. For PACSystems CPUs, the first byte is the Minor Type, and the remaining bytes are zeroes. The following table lists minor types.

Response Data (Minor Type)	CPU Model
02 hex	IC698CPE010
04 hex	IC698CPE020
05 hex	IC698CRE020
06 hex	IC698CPE030
08 hex	IC698CPE040
0A hex	IC695CPU310
10 hex	IC695CPU320

Appendix *Performance Data*

A

This appendix contains instruction and overhead timing collected for each PACSystems CPU module. This timing information can be used to predict CPU sweep times. The information in this appendix is organized as follows:

Boolean Execution Times	A-1
Instruction Timing	A-2
Overhead Sweep Impact Times	A-12

Note: All performance data for all CPUs was not available at the time this manual was printed. Additional information will be added to a future edition.

Boolean Execution Times

<i>CPU Model</i>	<i>Boolean execution speed per 1000 Boolean contacts/coils, typical</i>
IC695CPU310	0.181ms
IC695CPU320	0.047ms
IC698CPE010	0.183ms
IC698CPE020	0.078ms
IC698CRE020	0.14ms
IC698CPE030/CRE030	0.069ms
IC698CPE040/CRE040	0.02ms

Instruction Timing

The tables in this section list the execution and incremental times in microseconds for each function supported by the PACSystems CPUs. These figures were obtained by testing the following CPU versions:

Model <i>All functions except as listed below</i>	Firmware Version
IC695CPU310	5.0
IC695CPU320	5.10
IC698CPE010	3.6
IC698CPE020	3.5
IC698CRE020	2.04 (with ECC enabled)
IC698CPE030/CRE030	3.6
IC698CPE040/CRE040	3.6
All Models LREAL Functions, EXP_REAL, EXPT_REAL and SCAN_SET_IO	5.5

Function Execution Times

Two execution times are shown for each function.

Execution Time	Description
Enabled	Time, in microseconds, required to execute the function or function block when power flows into the function with valid inputs.
Disabled	Time, in microseconds, required to execute the function when it is not enabled.

Notes:

- All times represent typical execution time. Times may vary with input and error conditions.
- Enabled time is for single length units of word-oriented memory.
- COMMREQ time was measured between CPU and Ethernet module with NOWAIT option.
- DOIO time was measured using a discrete output module.
- Timers are updated each time they are encountered in the logic by the amount of time consumed by the last sweep.
- Performance for the CRE020 was measured with Error Checking and Correction (ECC) enabled.