Important Product Information

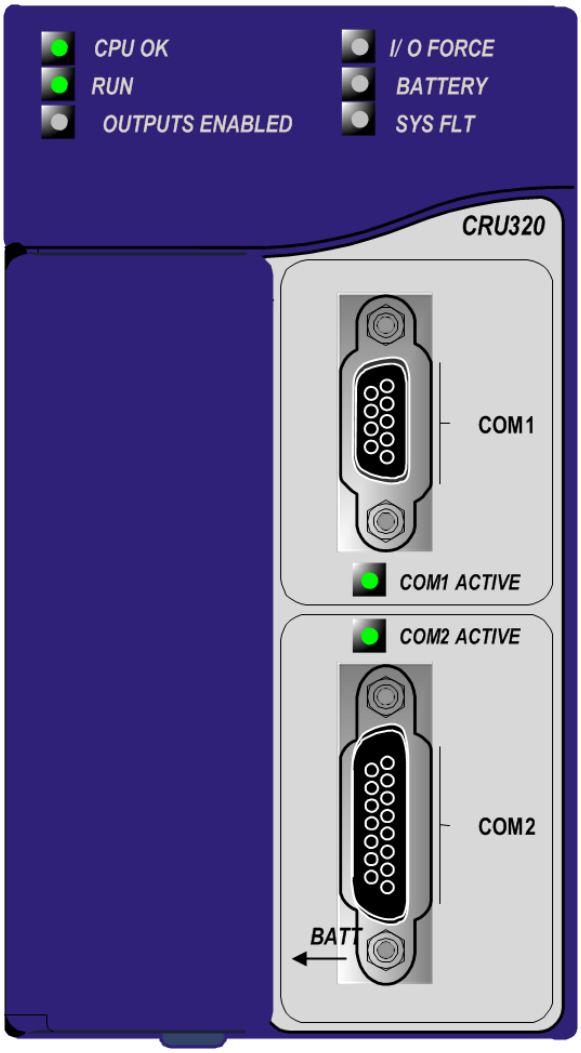
PACSystems RX3i*

IC695CRU320-EW

Redundancy CPU

GFK-2514AA

June 2015



The PACSystems* RX3i Redundancy CPU can be used to perform real time control of machines, processes, and material handling systems. The CPU communicates with the programmer and HMI devices via a serial port using SNP Slave protocol. It communicates with I/O and smart option modules over a dual backplane bus that provides:

- High-speed PCI backplane for fast throughput of new advanced I/O.
- Serial backplane for easy migration of existing Series 90*-30 I/O.

Features

- Hot standby (HSB) redundancy. Two redundant units make up a redundancy system. Each unit requires one Redundancy CPU (IC695CRU320) and a redundancy Memory Xchange module (IC695RMX128/228) configured as a redundancy link.
- Contains 64 Mbytes of battery-backed user memory and 64 Mbytes of non-volatile flash user memory.
- Provides access to bulk memory via reference table %W.
- Configurable data and program memory.
- Programming in Ladder Diagram, Structured Text, Function Block Diagram, and C. Refer to *PACSystems RX7i & RX3i CPU Programmer's Reference Manual, GFK-2950.*
- 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 32K words each for analog %AI and %AQ.
- Supports most Series 90-30 modules and expansion racks. For a list of supported I/O, Communications, Motion, and Intelligent modules, refer to the *PACSystems RX3i System Manual,* GFK-2314F or later.
- Supports up to 512 program blocks. Maximum size for a block is 128KB.
- CPU firmware may be upgraded in the field.
- CPU supports firmware upgrades of modules in its backplane.
- Two serial ports: an RS-485 serial port and an RS-232 serial port.
- Ethernet communications via the rack-based Ethernet Interface module (IC695ETM001). For details on Ethernet capabilities, refer to *PACSystems RX7i & RX3i TCP/IP Ethernet Communications User Manual,* GFK-2224.
- Time Synchronization to SNTP Time Server on Ethernet network when used with Ethernet Release 5.0 or later.
- Compliant with EU RoHS Directive 2002/95/EC using the following exemptions identified in the Annex: 7(a), 7(c)-I, & 7(c)-III.

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Ordering Information

Catalog Number	Description
IC695CRU320	RX3i 1GHz Celeron M CPU with 64MB User Memory
IC695ACC302	Smart Auxiliary Battery for Memory Retention
IC693ACC302	Auxiliary Battery for Memory Retention
IC690RBT001	Rechargeable Battery for Memory Retention

Warning – Use only GEIP approved auxillary battery packs listed above. Use of another battery may present a risk of fire or explosion.

Hot Standby CPU Redundancy Features

For details on the configuration and operation of a Hot Standby CPU redundancy system, refer to the *PACSystems Hot Standby CPU Redundancy User's Manual,* GFK-2308.

- Supports single and redundant Ethernet remote I/O LANs through Ethernet Network Interface Unit (ENIU) modules
- Supports simplex and redundantly controlled PROFINET remote IO (requires firmware version 8.00 or later)
- Survives any one single point of failure
- Bumpless switching
  - Synchronized CPUs
  - One scan switching
  - Transfer data size up to 2Mbytes; selected in CPU hardware configuration and in variable properties
- Supports two redundancy communications links
- Online repair of failed component
- Online programming
- Redundancy Memory Xchange Module
  - Manual toggle switch for role switching, which transitions control from the active unit to the backup unit
  - Redundancy status LEDs
- Application-initiated role switching to switch the active unit to backup status
- Redundancy status bits and message logging
- Memory error checking and correction (ECC) single bit correcting and multiple bit checking
- Background diagnostics

HSB Control Strategy

The HSB control strategy has the following characteristics:

- Active unit does not automatically switch to primary on resynchronization
- Critical control data plus all redundant outputs must be included in the output data transfer
- Bumpless switchover from active unit to backup unit

Specifications: CRU320

CPU Performance	For CRU320 performance data, refer to Appendix A of the *PACSystems CPU Reference Manual*, GFK-2222V or later.
Battery: Memory retention	For battery selection, installation and estimated life, refer to the *PACSystems RX3i and RX7i Battery and Energy Pack Manual*, GFK-2741
Program storage	Up to 64 MB of battery-backed RAM 64 MB of non-volatile flash user memory
Power requirements	+3.3 Vdc: 1.0 Amps nominal +5 Vdc: 1.2 Amps nominal
Operating Temperature	0 to 60°C (32°F to 140°F)
Floating point	Yes
Time of Day Clock accuracy	Maximum drift of 2 seconds per day
Elapsed Time Clock (internal timing) accuracy	0.01% maximum
Embedded communications	RS-232, RS-485
Serial Protocols supported	Modbus RTU Slave, SNP, Serial I/O
Backplane	Dual backplane bus support: RX3i PCI and high-speed serial bus
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 RAM Symbolic: configurable up to 64 Mbytes
Flash memory endurance rating	100,000 write/erase cycles minimum
Memory error checking and correction (ECC)	Single bit correcting and multiple bit checking.
Switchover Time[1]	Maximum 1 logic scan, minimum 3.133 msec.
Typical Base Sweep Time (Reference Data Transfer List Impact)[2]	3.66 msec: 1K Discrete I/O, 125 Analog I/O and 1K Registers 3.87 msec: 2K Discrete I/O, 250 Analog I/O and 2K Registers 4.30 msec: 4K Discrete I/O, 500 Analog I/O and 4K Registers 5.16 msec: 8K Discrete I/O, 1K Analog I/O and 8K Registers
Maximum amount of data in transfer list	Up to 2 Mbytes
Number of redundancy links supported	Up to two IC695RMX128/228 synchronization links are supported.

For product standards, general operating specifications, and installation requirements, refer to *PACSystems RX3i System Manual*, GFK-2314.

[1] Switchover time is defined as the time from failure detection until backup CPU is active.

[2] Symbolic variable and Reference data can be exchanged between controllers. Up to 2 Mbyte of data is available for transfer

Installation Location

This product is intended for use with the RX3i system. Its components are considered open equipment (having live electrical parts that may be accessible to users) and must be installed in an ultimate enclosure that is manufactured to provide safety. At a minimum, the enclosure shall provide a degree of protection against solid objects as small as 12mm (fingers, for example). This equates to a NEMA/UL Type 1 enclosure or an IEC60529 IP20 rating providing at least a pollution degree 2 environment. For details about installing RX3i rack systems, refer to *PACSystems RX3i System Manual*, GFK-2314.

Installation in Hazardous Areas

The following information is for products bearing the UL marking for Hazardous Areas or ATEX marking for explosive atmospheres:

CLASS 1 DIVISION 2 GROUPS ABCD

- This equipment is an open-type device and is meant to be installed in an enclosure suitable for the environment that is only accessible with the use of a tool.
- Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations, or nonhazardous locations only.

Warning – EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

Warning – WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.

Warning – EXPLOSION HAZARD - BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS.

ATEX Zone 2

This module must be mounted in an enclosure certified in accordance with EN60079-15 for use in Zone 2, Group IIC and rated IP54. The enclosure shall only be able to be opened with the use of a tool.

Release History

Catalog Number	Firmware Revision	Date	Comments
IC695CRU320-EW	8.50	May 2015	Add support for HART® Pass Through feature. Refer to *PACSystems RX3i HART Pass Through User Manual,* GFK-2929.
IC695CRU320-EV	8.40	Jan 2015	The CRU320 now supports 255 PROFINET I/O Devices in a PACSystems RX3i Hot Standby CPU Redundancy system. PROFINET operation uses the PROFINET I/O Controller module IC695PNC001. Redundant operation conforms to PROFINET V2.3 Type S-2 System Redundancy. PROFINET I/O operation in a HSB CPU Redundancy system is described in the following user manuals: • *PACSystems Hot Standby CPU Redundancy User's Manual,* GFK-2308K • *PACSystems RX3i PROFINET IO Controller User Manual,* GFK-2571D
IC695CRU320-EU	8.15	May 2014	Adds support for IC695RMX228 128 MB Reflective Memory Module with Single Mode Transceiver. Adds ability to read reflective memory status bits for IC695CMX128, IC695RMX128, and IC695RMX228 (reflective memory modules). Resolves issue of Serial I/O Read Bytes COMMREQ (4402) always returning error code 100Dh in the event of an error, regardless of the error.

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Catalog Number	*Firmware Revision*	*Date*	*Comments*
IC695CRU320-ET	8.05	Feb 2014	Adds support for the new IC695ECM850 (IEC 61850 Ethernet Communication Module), which operates as an IEC 61850 Client and provides connectivity to IEC 61850 Server devices. Resolves issue of CPU halting when the inner FOR_LOOP's Start is greater than End input in a nested FOR_LOOP.
IC695CRU320-ES	8.00	Dec 2013	Adds remote PROFINET IO to PACSystems RX3i Hot Standby Redundancy systems. Resolves issue with LREAL operands within complex relational expressions.
IC695CRU320-ER	7.81	Oct 2013	Resolves an issue where the CRU320 would go into halt mode when downloading to a CRU320 (Firmware 7.70 and later) that has GBCs in the configuration and the partner CRU320 is not configured.
IC695CRU320-EP	7.80	Sep 2013	Resolves the three issues listed in *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514T.
IC695CRU320-EN	7.75	May 2013	Corrects an issue in versions 7.15 – 7.70 that required setting OEM lock in Enhanced Security in order to preserve the OEM lock through a power cycle. Adds support for RX3i CMX/RMX modules version –CG (hardware version Cx with firmware version 2.00 and later).
IC695CRU320-EM	7.70	Feb 2013	Adds support for the following new modules: IC694MDL758 and IC695CNM001.
IC695CRU320-EL	7.18	Nov 2012	Adds the ability to monitor a new interface between the CPU and the CMX/RMX Memory Xchange modules (CMX/RMX Memory Xchange module firmware 1.06 and later). In the rare occasion the CMX/RMX Memory Xchange module detects a failure in a read operation, the CMX/RMX Memory Xchange module will indicate the last read is invalid. The CPU will then retry the previous read operation.
IC695CRU320-EK	7.17	Oct 2012	Adds the ability to monitor the new queue alignment flag provided by CMX/RMX Memory Xchange modules with firmware version 1.05 or greater. If a queue alignment problem is detected, the CPU retries the read operation where the problem occurred.
IC695CRU320-EJ	7.15	July 2012	Adds native support for the IC694PSM001 module and resolves several issues. Also introduces new features to augment security in the CPU firmware and Proficy Machine Edition software. For details, see *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514N
IC695CRU320-EH	7.14	Jun 2012	Corrects the issue described in *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514M.
IC695CRU320-EH	7.13	Apr 2012	Corrects issues with *Logic Driven Write to Flash* (Service Request 57) and Run mode store in HSB redundancy systems with synchronized CPUs.
IC695CRU320-EG	6.72	Aug 2011	Corrects an issue with the RS-485 (COM2) serial port.
IC695CRU320-DF	6.71	May 2011	Corrects the behavior of the *Logic Driven Read/Write to Flash* service requests, SVC_REQ 56 and SVC_REQ 57.
IC695CRU320-DE	6.70	Mar 2011	Implements a hardware design update that improves the noise immunity of the CPU module during power up from flash operations.
IC695CRU320-CE	6.70	Dec 2010	For features introduced and problems resolved, see *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514G.
IC695CRU320-CD	6.02	Aug 2010	Provides capability for low battery detection. The new hardware is EU-ROHS compliant. For details, see *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514F.
IC695CRU320-BC	6.01	Mar 2010	Provides for OEM protection in flash-based systems that do not use a battery. For additional problems resolved, see *PACSystems RX3i CPU IC695CRU320 IPI*, GFK-2514E.
IC695CRU320-BB	6.00	May 2010	See *PACSystems RX3i CPU IC695CRU320 IPI,* GFK-2514D for new features and problems resolved.
IC695CRU320-BA	5.70	July 2009	Hardware-only upgrade to enhance manufacturability. Does not affect product features or functional compatibility.
IC695CRU320-AA	5.70	Feb 2009	Initial release.