



# PACSystems\* RX3i CPL410

## Outcome Optimizing Controller featuring PACEdge Technology



### Designed for Real-world Demands

GE's PACSystems RX3i is a flexible and high-performance control system ideal for a range of applications, including water/wastewater, metro, industrial steam, automotive, chemical, oil and gas, discrete manufacturing, and modular machine designs. These diverse applications require a compact controller that delivers the high performance and flexibility needed to run application-specific control reliably.

The PACSystems RX3i CPL410, part of GE's Industrial Internet Control System, augments real-time deterministic control with embedded PACEdge technology, delivering near-real-time advice through market analysis, fleet and enterprise data, or asset/process knowledge to optimize business outcomes.

The CPL410 includes PACEdge with Linux and provides an open platform for reliable, secure communication and analytics using either cloud-based or edge-based outcome optimizing apps. Controls can now be programmed to dynamically influence business outcomes, generate new forms of revenue, and improve profitability.

### Reliable, High-Speed Performance

The PACSystems RX3i CPL410 runs on a real-time operating system allowing it to deliver reliable and secure industrial applications. It offers premier high-speed performance and secure data handling for any multi-disciplined control system.

A generous working memory accommodates large programs and extensive data storage. The quad-core high-speed microprocessor executes programs faster than ever before. It supports industry-standard PROFINET with I/O update rates as fast as 8ms for 16 devices. With Ethernet interface rates up to 1 Gbps, the CPL410 is built for rapid, reliable data interchange.

### Industrial Internet Enabled with PACEdge Technology

Outcome optimizing controllers use real-time hypervisor technology to run real-time deterministic control applications concurrently with the PACEdge with Linux technology in a safe and cooperative manner without impacting each other.

PACEdge technology is an Industrial Internet enabled coprocessor platform that enables customers to not only connect to their preferred cloud service, but also allows them to develop and run data processing Linux-based applications next to the control system to optimize their processes for better outcomes.

Fleet-level analytics and access to real-time information enabled by the CPL410 is critical to OEMs and machine builders looking to get the most from their equipment fleets, minimize travel and maintenance costs, and quickly create and deploy intellectual property to differentiate their machines.

### Key Benefits

**Cloud Agnostic Platform.** PACEdge with Linux technology allows for secure connection to the customer's preferred cloud, leveraging data to analyze and optimize business operations and improve profitability.

**Co-processor Engine.** A co-processor engine means that existing Linux-based applications can be quickly integrated with CPL410 to enable more intelligent controls.

**Reduced Risk.** Built on the strong foundation of GE's 40 years' experience providing real-time, deterministic controls for the world's industrial assets. The controller is secure by design, enabling secure operations and connectivity from edge to cloud.

**Reduced Lifecycle Cost.** Advanced capabilities simplify system architecture and reduce applied engineering costs. Costs are further reduced with embedded PROFINET, accommodating dedicated I/O for application-specific needs.

**Maximum Uptime.** Built on GE's market-leading PACSystems high-availability solutions, CPL410 offers a best-in-class high-availability control system for concurrent maintainability and elimination of single points of failure, maximizing uptime.

## Advanced Security

In today's Internet age, industrial controls are constant targets of cyber threats. GE understands the risk involved in securing our customers' most important assets. We believe in defense-in-depth architectures to secure assets from potential cyber threats.

The RX3i CPL410 has been developed to be secure by design, incorporating technologies such as Trusted Platform Modules, and secure, trusted, and measured boot. A centralized configuration allows encrypted firmware updates to be executed from a secure central location. A broad suite of cyber-security technology and tools help prevent unauthorized updates while built-in security protocols help protect against man-in-the-middle and denial of service attacks.

## Flexible Redundancy Tailored to Your Needs

Building on GE's market leadership and decades of expertise in mission critical backup power and critical cooling solutions, PACSystems High Availability with PROFINET is a flexible and intelligent high-availability control system that helps ensure maximum uptime while reducing total cost of ownership (TCO) through easier configuration, operation, and maintenance.

Built on a scalable, synchronized, hot-standby redundancy control platform, the PACSystems High Availability on CPL410 solutions provide uninterrupted control of your applications and processes with total transparency.

## Specifications

- Microprocessor Specification – 1.2 GHz AMD G Series Quad Core
- Operating System – VxWorks

### Temperature Range

- -40°C to 70°C

### Power Requirements

- Input Power (Max) – 20 Watts
- Input Voltage (Min) – 18 Vdc
- Input Voltage (Max) – 30 Vdc
- Memory Backup Mechanism – Energy Pack: IC695ACC403

### Firmware Upgrade

- CPU Firmware Upgrade Mechanism – Web Interface/Ethernet Port

### Display

- OLED Display – Yes

### Program Portability

- RX3i PACSystems Applications using Family Type Conversion

### Program Security

- Secure Boot – Yes
- Trusted Platform Module (TPM) – Yes

### Program Storage

- RAM – 64 Mbytes
- Non-Volatile Flash – 64 Mbytes
- Life Expectancy, Energy Pack Capacitors – 5 years

### Auxiliary Storage

- Micro SD – Pending
- Remote Data Storage Device (RDSD) – USB - pending

### Marine

- ABS, DNV-GL, BV, LR

### Communications

- LAN1 – 10/100/1000 Mbps supported by 1x unswitched RJ-45
- LAN2 – 10/100/1000 Mbps supported by 2x switched RJ-45 connectors
- LAN3 – 10/100/1000 Mbps supported by 2x switched RJ-45 connectors
- PACEdge with Linux – 10/100/1000 Mbps supported by 1x RJ-45
- USB – USB-A 3.0 x2 (Left port dedicated to PACEdge, right port functionality pending)

### Protocols

- SRTTP
- Modbus TCP
- Ethernet Global Data (EGD)
- HART Passthrough
- PROFINET – Yes
- MRP – Yes
- OPC-UA Server<sup>1</sup> – Y15
- DNP3.0 Ethernet Outstation – L3 (Pending)

### PACEdge Default Software Components

- Ubuntu Linux v16.04
- SQLite database
- OPC-UA Client
- Python script interpreter
- Apache webserver

### EU

- CE Mark
- EMC Directive
  - IEC/EN 61131-2: 2007 (sections 8-10, Zone B)
  - IEC/EN 61000-6-2: 2005 Ed 2.0
  - IEC/EN 61000-6-4: 2006 Ed 2.0
  - CISPR 11:2009 +A1: 2010 / EN 55011: 2009 +A1: 2010
  - CISPR 22: 2010 / EN55022: 2010/AC:2011, (Class A)
  - CISPR 24: 2010 / EN55024: 2010
  - IEC/EN 61131-2: 2007 (sections 4 & 6)
- ATEX Directive
  - Category 3 equipment - [II 3 G]
  - EN 60079-0: 2012 A+11:2013
  - EN 60079-7: 2015 [Type of Protection Ex ec]
- RoHS Directive
- REACH Regulation
- WEEE Directive

### US

- FCC 47 CFR 15 Subpart B, Class A
- Hazardous Locations
  - ISA 12.12.01: 2015, Class I Div. 2 Groups ABCD
  - UL 60079-0 Ed 6.0 (2013), Class I, Zone 2 Gas Group ABCD
  - UL 60079-15 Edition 4.0 (2013), [Ex nA]

### Canada

- ICES-003:2016 (Class A)
- Hazardous Locations
  - CSA C22.2 No. 213-15
  - CAN/CSA-C22.2 NO. 60079-0:15, Class I, Zone 2
  - CAN/CSA-C22.2 NO. 60079-15:12
- WEEE & Battery Regulations

### Environmental

- IEC/EN 61131-2: 2007 (sections 5 & 6)
- Storage
  - Dry Heat - IEC 60068-2-2: 1974 test Bb (70°C @ 16hrs, unpowered)
  - Cold Temp - IEC 60068-2-1: 2007 test Ab (-40°C @ 16hrs, unpowered)
- Damp Heat
  - IEC 60068-2-30: 2005 test Db (unpowered, 55°C, 2x)
- Marine Damp Heat
  - IEC 60068-2-30: 2005 test Db (powered & unpowered, 55°C, 95%RH, 12hr x 2cycles)
- Sinusoidal Vibration
  - IEC 60068-2-6: 1995 (test Fc)
- Shock
  - IEC 60068-2-27: 1987 (test Ea)

<sup>1</sup> For a discussion of OPC UA, refer to PACSystems RX7i & RX3i TCP/IP Ethernet Communications User Manual, GFK-2224M Chapter 10.