GFK-3003H
December 2018

1.2GHz 64MB Rackless CPUs

IC695CPE400-ABAK[1]
IC695CPL410-AAAB[1]
1.2GHz 64MB Rackless CPUs

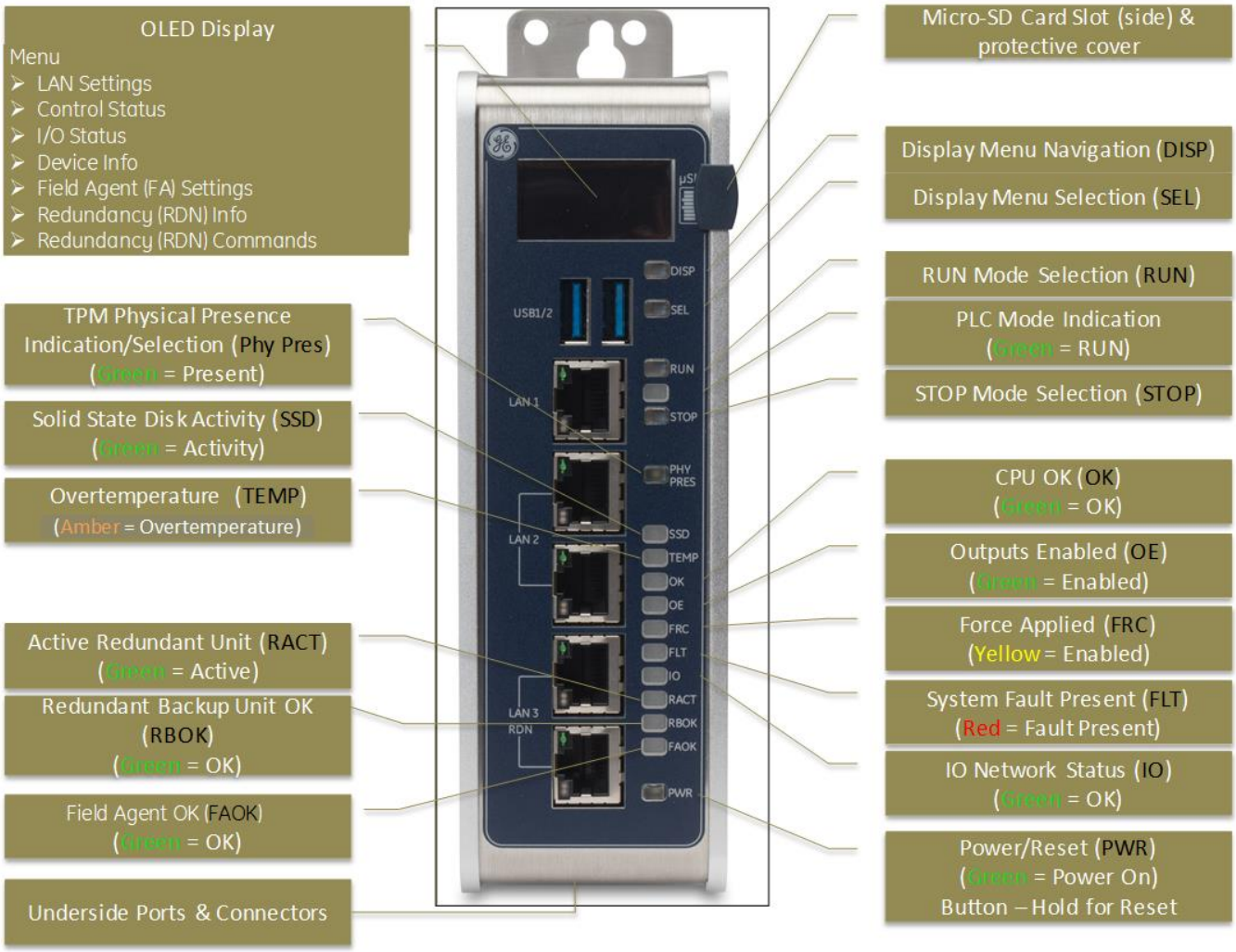


Figure 1: Front Panel Features

[1] Includes conformal coat and low temperature module variants, if available.

IC695CPE400

The PACSystems* RX3i CPE400, part of GE's Industrial Internet Control System, is the industry's first outcome optimizing controller. It augments real-time deterministic control with Field Agent technology, delivering near real time advice through market analysis, fleet and enterprise data, or asset/process knowledge to optimize the outcomes that today's businesses require. The Predix™ enabled CPE400 provides 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.

Introducing the IC695CPL410

The PACSystems RX3i CPL410, another part of GE's Industrial Internet Control System, is a controller with integrated Linux. It augments real-time deterministic control with an Ubuntu 16.04 LTS server Linux, open to modifications and enhancements. With the product, customers can implement custom data processing like Edge- or Cloud-based analytics, Cloud storage, WEB visualization and much more. Full Linux root access is granted, allowing the user to enhance the CPL410 in a virtually limitless manner, thereby achieving outcomes that today's businesses require. Use cloud services which best fit your application; install freely-available data visualization tools and analytics programs or use professional software to turn the CPL410 into your custom controller.

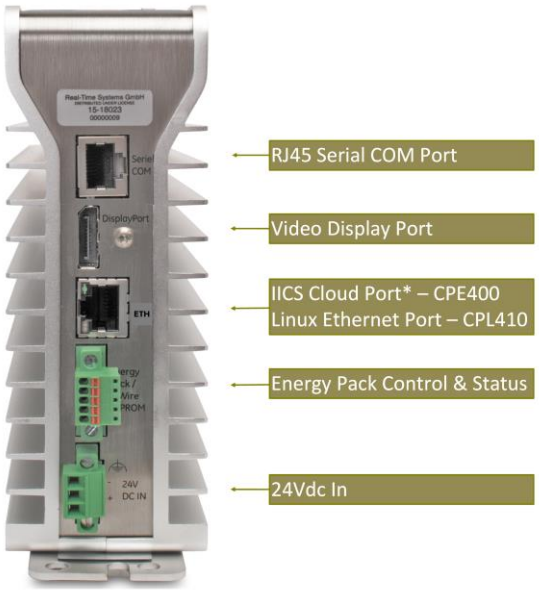
With the CPL410, the following features are provided and supported on the general purpose Linux:

- The ETH port can be configured with a static IP address or use DHCP.
- The Virtual Network Interface between Linux and the PACEngine allows Linux to access the PACS OPC-UA server without using the external network.
- Example Python script allows Web interface to connect to PACEngine OPC-UA server.
- Example Python script allows browsing of OPC-UA tag space.
- Example Python script allows Get/Set of tag data.
- Example Python script allows Get and Store of tag data in a sample sqlite database.
- Install standard Ubuntu Linux packages to create fully custom applications.
- Factory Reset allows the user to restore Linux to its original state, with the exception of the /home directory.

CPE400/CPL410 Features

The stand alone CPE400 and CPL410 use a 1.2GHz quad-core microprocessor and real-time hypervisor technology to run real-time deterministic control applications concurrently with Field Agent technology or Linux without any adverse impact of one over the other:

- A built-in RX3i PLC
  - User may program in Ladder Diagram, Structured Text, Function Block Diagram, or C.
  - Contains 64Mbytes of configurable data and program memory.
  - Supports auto-located Symbolic Variables that can use any amount of user memory.
  - Reference table sizes include 32k bits for discrete %I and %Q and up to 32k words each for analog %AI and %AQ. Bulk memory (%W) also supported for data exchanges.
  - Supports up to 768 program blocks. Maximum block size is 128KB.
- The CPE400 Field Agent is a platform for securely connecting to Predix™, GE's platform for the Industrial Internet. With the Field Agent, you can get connected to an end-to-end Asset Performance Management solution such as Equipment Insight, Brilliant Manufacturing, or Machine and Equipment Health. The Field Agent also provides a platform for developing your own Edge to Cloud Industrial Internet solutions. As an appliance, you can collect and transmit data to Predix Time Series or run pre-existing Edge Apps. As a development platform, you can develop your own Edge Apps or Analytics and deploy them via Predix Edge Manager.
- Supports four independent 10/100/1000 Ethernet LANs. Three are located on the front panel, as shown in Figure 1. LAN1 attaches via the upper, dedicated RJ 45 connector. LAN2 and LAN3 each attach via a pair of internally-switched RJ 45 connectors. The fourth LAN, labeled EFA (Embedded Field Agent), is located on the underside (Figure 2), and is specifically used for Field Agent connectivity.



* The IICS Cloud Port is labeled "EFA" instead of "ETH" on some versions of the CPE400.

Figure 2: Underside Ports & Connectors

- The embedded communications interface has dedicated processing capability, which permits the CPU to independently support LAN1 and LAN2 with:
  - up to 48 simultaneous SRTP Server connections;
  - up to 16 simultaneous Modbus/TCP Server connections;
  - 32 Clients are permitted; each may be SRTP or Modbus/TCP.
  - OPC UA Server with support for up to 5 concurrent sessions with up to 10 concurrent variable subscriptions and up to 12,500 variables;
  - up to 255 simultaneous Class 1 Ethernet Global Data (EGD) exchanges.
- The embedded PLC may use one or both of the Ethernet LAN2 ports to support the embedded Simplex PROFINET I/O Controller. PROFINET supports up to 32 I/O devices with update rates of 1 – 512ms. I/O device update rates of 8ms and faster are possible with 16 or fewer devices. Update rates of 16ms and higher result whenever more than 16 devices are configured.
- Embedded SNTP Client allows synchronization of the high-resolution Time of Day Clock to an SNTP network time server.
- Media Redundancy Protocol (MRP) allows the embedded PLC to participate in a PROFINET I/O network with MRP ring technology. This eliminates the I/O network as a single point of failure. The PLC may be used as either a Media Redundancy Manager or Media Redundancy Client.
- The embedded PLC supports Hot Standby Redundancy with PROFINET IO. Only the Primary and Secondary CPUs may be attached to LAN3, which is used as a high-speed data synchronization link between the two CPUs. Two OLED menu items support Redundancy operation: RDN Info and RDN Command. The RACT and RBOK LEDs reflect the status of the Redundant CPUs.
- The embedded PLC supports Redundant IP addresses on LAN 1 and LAN 2.

- The Embedded PLC supports Serial IO protocol using the Serial COM port located on the underside (Figure 2) of the controller.
- The rackless CPUs are secure by design, incorporating technologies such as Trusted Platform Modules, secure boot, and encrypted firmware updates.
- Achilles Level 2 Communications Certification[2]
- Supports secure firmware update. The controller authenticates new firmware prior to installation and continues to use the current version if non-authentic firmware is detected.
- Optional Energy Pack, IC695ACC403, allows the embedded PLC to instantly save user memory to non-volatile storage in the event of loss of power.
- OPC UA Sweep Mode & Sweep Time: The Embedded PLC's sweep mode and sweep time are available through the OPC UA server. The Sweep Mode variable reports the controller's current mode: Stop Disabled, Run Enabled, Stop Enabled, Run Disabled, Stop Faulted, and Stop Halted. The Sweep Time variable reports the sweep time in seconds. These variables are located under GE Device Information -> PACSystems RX3i -> Controller.
- An OLED display that provides access to basic status and control information including each LAN's configured IP Address.
- Coordinated Universal Time (UTC) and Day Light Savings Time (DST) support.
- Operating temperature range -40°C to 70°C. (-40°F to 158°F) The maximum operating temperature varries according to installation altitude: 70°C at 0m to 2000m, 65°C at 2000m to 3000m, and 60°C at 3000m to 4000m.
- The rackless CPUs, when shipped, are configured for DIN-rail mount. An alternate panel-mount adaptor plate is included in the ship-set.

[2] The CPE400's PACSystems Runtime is Achilles Level 2 certified in R9.20. Embedded Field Agent (EFA) certification is planned for a future release.

Current Release Information

Catalog Number[1]	Date	Firmware Version (Build Number)				
		Field Upgradeable Elements				
		PACSystems	FPGA	CPLD	ACC403 EP Base	Additional Firmware
IC695CPE400-ABAK	December 2018	9.70 (EAKR)	02.03.00	02.03.03	3.03	Field Agent 2018_06_15_144951
IC695CPL410-AAAB						Linux UBUNTU_16.04.4_4.4.0-130-generic_20180710

Upgrade Strategy

PACSystems CPU firmware version 9.70 and Field Agent 2018_06_15_144951 are released to manufacturing for production and as a downloadable upgrade kits. Linux UBUNTU_16.04.4_4.4.0-130-generic_20180710 is released to manufacturing for production.

All production versions of the CPE400 and CPL410 are field upgradeable to this PACSystems CPU release using the upgrades available for download on the Landing Pages found at www.geautomation.com. All production versions of the CPE400 may be updated to this Field Agent release. (See details below.)

Release in line with software license compliance requirements.

PACSystems CPU Upgrade

The RX3i firmware upgrade process may take up to four minutes to complete, depending on the contents of the update. During the update, the RUN and OUTPUTS ENABLED LEDs blink GREEN in unison and the CPE400 / CPL410 may automatically reset one or more times. All LEDs will be off during the automatic resets. The IC695ACC403 Energy Pack (if present) may also be updated. The energy pack blinks all LEDs GREEN and performs an automatic reset following its update.

Note: Do not manually power cycle the CPE400 / CPL410 or remove the energy pack (if present) or the cap pack from the energy pack base during the updates as this may place the CPU and energy pack in an unrecoverable and unusable state.

CPE400 PACSystems CPU Upgrade Kit

Download Link: https://digitalsupport.ge.com/communities/en_US/Article/IC695CPE400-Landing-Page
Kit Part Number: 41G2376-FW01-000-A5
Kit File Name: CPE400_FW9_70_41G2376-FW01-000-A5.zip

CPL410 PACSystems CPU Upgrade Kit

Download Link: https://digitalsupport.ge.com/communities/en_US/Article/IC695CPL410-Landing-Page
Kit Part Number: 41G2617-FW01-000-A1
Kit File Name: CPL410_FW9_70_41G2617-FW01-000-A1.zip

Field Agent Upgrade

The Embedded Field Agent's operating system is Ubuntu Linux. Like many other Linux distributions, it is divided into a number of independently maintained and versioned software packages. GE and the Linux community are continuously releasing new versions of these packages to provide feature enhancements, bug fixes, and security patches. GE strongly recommends that customers keep the Linux packages on each the Embedded Field Agent up-to-date.

Customers can choose one of three methods for keeping their Linux packages up-to-date. A method must be selected while performing the one-time configuration of the Embedded Field Agent from its Field Agent Updater web page (refer to the *Field Agents User Guide,* GFK-2993 and the *Field Agents Upgrade Guide*, GFK-3017).

- Method 1: Manual Local (offline) Update Using a Local Area Network
- Method 2: Manual Cloud Update over the Internet
- Method 3: Automatic Cloud Update over the Internet

By default, the Embedded Field Agent is configured for manual update. However, GE recommends that users configure the Embedded Field Agent to schedule automatic updates at a time or period that works with their environment. (e.g. 1am Sunday morning).

In order to upgrade to Predix Machine 17.2.3, customer must ensure that they already have Predix Machine 17.1.2 on their EFA. Note that upgrading an EFA to Predix Machine 17.1.2 is a two-step process:

1) first update the EFA to at least version 2017_07_10_160104 and then
2) perform a Local Update using the custom upgrade file EfaUpgradeToPredixMachine17.1.2.MAX.

The latest application and configuration templates are available for download on the CPE400 Landing Page found at https://ge-ip.force.com/communities/en_US/Article/IC695CPE400-Landing-Page.

The Field Agent Upgrade does not have a kit number since all elements are subject to continuous update. The landing page directs the user to the most recent build.

GP Linux Upgrade

Like the Embedded Field Agent, the Linux operating system in the CPL410 is Ubuntu Linux. Users may use the APT tools to upgrade the OS and the installed packages when updates become available. Users may revert to the factory released version by performing the Factory Reset function on the OLED display.

The CPL410's Linux operating system does not have a kit number since all elements are subject to continuous update using the built-in APT tools.

GE strongly recommends that customers keep the Linux packages up-to-date.

Release History

CPE400

Catalog Number[1]	Date	Firmware Version (Build Number)				
		Field Upgradeable Elements				
		PACSystems	FPGA[3]	CPLD	ACC403 EP Base	Field Agent
IC695CPE400-ABAK	December 2018	9.70 (EAKR)	02.03.00	02.03.03	3.03	2018_06_15_144951
IC695CPE400-ABAJ	August 2018	9.55 (EA1Y)	02.03.00	02.03.03	3.03	2018_06_15_144951
IC695CPE400-ABAH	July 2018	9.40 (E91K)	02.03.00	02.02.00	3.03	2018_06_15_144951
IC695CPE400-ABAG	February 2018	9.40 (E91K)	02.03.00	02.02.00	3.03	2017_07_10_160104
IC695CPE400-ABAF	October 2017	9.30 (E8JL)	02.03.00	02.02.00	3.03	2017_07_10_160104
IC695CPE400-ABAE	July 2017	9.20 (E7QB)	02.02.00	02.02.00	3.03	2017_07_10_160104
IC695CPE400-ABAC	April 2017	9.20 (E7QB)	02.02.00	02.02.00	3.03	2017_01_19_182114
IC695CPE400-ABAB	January 2017	9.00 (E79S)	02.02.00	02.02.00	3.03	2017_01_19_182114
IC695CPE400-AAAA	December 2016	9.00 (E79S)	02.02.00	02.02.00	3.03	2016_12_14_220042

CPL410

Catalog Number[1]	Date	Firmware Version (Build Number)				
		Field Upgradeable Elements				
		PACSystems	FPGA	CPLD	ACC403 EP Base	Linux
IC695CPL410-AAAB	December 2018	9.70 (EAKR)	02.03.00	02.03.03	3.03	UBUNTU_16.04.4_4.4.0-130-generic_20180710
IC695CPL410-AAAA	August 2018	9.55 (EA1Y)	02.03.00	02.03.03	3.03	UBUNTU_16.04.4_4.4.0-130-generic_20180710

[3] Prior to version 9.20, only the last two digits of the FPGA version were displayed on the Firmware Update Web Page. For example, if the FPGA version were 2.2.0, the web page would display 2.00. This issue was resolved in version 9.20 and later.

RX3i PLC: Functional Compatibility

Compatibility Issue	*Description*		
	Feature	**Minimum Version of PME Required**	
Proficy™ Machine Edition Logic Developer PLC Programmer Version Requirements	Increased Program Block Count	Proficy™ Machine Edition Logic Developer PLC 9.50 SIM 13 and PACSystems PLC Firmware R9.70, or later is required to support user programs with more than 512 blocks, up to a maximum of 768 blocks.	
	CPE400 Hot Standby Redundancy with PROFINET IO.	PME 9.50 SIM 5, or later is required for configuration of Hot Standby Redundancy with PROFINET IO.	
	CPE400 functionality including Embedded Simplex PROFINET I/O Controller and Embedded Field Agent.	PME 9.00 SIM 8 or later is required for native configuration support of the CPE400.	
	SNTP Client Configuration	PME 9.00 SIM 10, or 9.50 SIM 2, or later	
	CPL410 Configuration	PME 9.50 SIM 10 or later	
Backwards Compatibility	To convert an existing project which uses any other PLC, use the *Family Conversion* feature in PME. Be aware of the constraints involved, as will be notified in PME. For instance, the first PROFINET Controller in an RX3i CPU320 application will be assigned to the embedded PROFINET Controller feature of the CPE400 or CPL410.		
C Toolkit Compatibility	**Feature**	**Minimum Version of C Toolkit Required**	**Note:**
	The CPE400/CPL410 support 64-bit C blocks compiled with the C Toolkit Version 8.00 or later. All pre-existing C blocks must be recompiled as a 64-bit C block before downloading to the CPE400 or CPL410.	**8.00**	*The Series 90 Toolkit (IC641SWP709/719) is not compatible with PACSystems.*
	The function PLCC_get_plc_version() will return a new value for PLC_version_info->model when a toolkit app runs on the CPL410. It is 0x002C (44). The CPE400 will continue to return 0x0026 (38).		
PROFINET IO Compatibility	**Feature***	**Minimum Version of CPE400 Required**	**Minimum Version of 3iPNS Required**
	SVC_REQ 20 Read Extended IO Fault Table with Remote Fault Record[4]	9.40	N/A
	Remote Get HART Device Information COMMREQ[5]	9.00	2.41
	Extended PROFINET Subslot Numbers[6]	9.00	N/A
	Redundantly controlled PROFINET IO (up to 32 devices, 20 of which may be redundant)	9.30	2.00
	32 Simplex (non-redundantly controlled) PROFINET IO[7]	9.00	N/A
	*These features are supported by all versions of the CPL410.		

[4] Refer to *PACSystems RX7i, RX3i and RSTi-EP CPU Programmer's Reference Manual,* GFK-2950C (or later) for syntax and format.
[5] Refer to the *PACSystems RX3i System Manual*, GFK-2314M or later for COMMREQ details.
[6] With this feature, it is possible to configure 3rd party PROFINET devices that use subslot numbers up to 21845.
[7] Refer to the *PACSystems RX3i PROFINET IO Controller User Manual*, GFK-2571F or later, for operational details.

Compatibility Issue	Description
Hot Standby Redundancy	CPE400 firmware release 9.30 and CPL410 release 9.55 support Hot Standby Redundancy with PROFINET IO. Hot Standby Redundancy with Genius IO is supported using the IC695GCG001 RX3i Genius Communications Gateway. Hot Standby Redundancy with Ethernet Global Data (EGD) is not supported.
LAN3 restriction	LAN3 is used only to synchronize the Primary and Secondary CPUs in a Hot Standby Redundancy configuration. No additional hardware may be attached to LAN3. Use of both ports is recommended when used in this fashion, as this provides a redundant synchronization link between the two CPUs.
Redundant IP Support	CPE400 firmware release 9.30 and CPL410 release 9.55 support two independent Redundant IP addresses, one for LAN 1 and one for LAN 2. LAN 2 Redundant IP is supported when configured for Ethernet mode only. Redundant IP is supported by the SRTP Server, Modbus TCP Server, and EGD protocols. It is not possible to use Redundant IP with the OPC UA Server or with the Ethernet firmware update web page.
Ethernet AUP File Support	The CPE400 and CPL410 do not support Advanced User Parameter (AUP) files for their Embedded Ethernet interfaces. Instead, use Proficy Machine Edition to set the Ethernet configuration parameters for SNTP and advanced Ethernet Global Data applications.
Service Request 56 & 57 Logic Driven Read/Write to Flash Support	The IC695ACC403 Energy Pack automatically saves user memory to non-volatile storage when the CPE400/CPL410 is powered off and restores it to RAM when the CPE400/CPL410 is turned on. Consequently, the CPE400 and CPL410 do not support Service Requests 56 & 57 Logic Driven Read/Write to Flash. The service request function block's ENO output returns no power flow if these service requests are executed. Whenever an RX3i application that uses service requests 56 & 57 is being migrated to a CPE400 or CPL410, an IC695ACC403 Energy Pack should be used to provide equivalent functionality, since the service requests themselves will have no effect and should ideally be removed.
Embedded PROFINET Controller HART Pass Through Support	HART Pass Through is supported on all versions of the CPE400 and CPL410 with PACSystems HART Device Type Manager v1.1 and PACSystems HART Multiplexer v1.1.
Remote Get HART Device Information COMMREQ	The *Remote Get HART Device Information COMMREQ* is supported by these products: • RX3i CPUs with version 8.95 or later (which includes all versions of CPE400) • IC695PNC001 RX3i PROFINET Controller version 2.26 or later • IC695PNS001 RX3i PROFINET Scanner version 2.41 or later • IC695PNS001 RX3i PROFINET Scanner GSDML-V2.3-GEIP-RX3iPNS-20160602.xml
Supported Browsers for Firmware Update	The CPE400 and CPL410 support secure firmware update over Ethernet using a web browser. Supported browsers are listed below along with the minimum required version: • Chrome: 62.0.3202.94 (or later) • Firefox: 57.0.2 (or later) • Microsoft Edge 38.14393.1066.0 (or later) • Safari: 11.0.2 (12604.4.7.1.6) (or later)
CIMPLICITY OPC UA Client	PACSystems OPC UA servers support up to five concurrent sessions with up to ten concurrent variable subscriptions and up to 12,500 variables. The subscription limit is shared across all available sessions. When using CIMPLICITY OPC UA Client, ensure the total number of subscriptions does not exceed the maximum. CIMPLICITY OPC UA Client is configured to create one subscription for every 500 items by default. If, for example, a project contains 1000 monitored items, CIMPLICITY creates two subscriptions. The number of items per subscription may be modified from the Device Configuration Panel / OPC UA DA Configuration / Subscriptions / Max. Number of Monitored Items.

Compatibility Issue	*Description*
PACSystems Energy Pack Compatibility	The only energy pack compatible with the IC695CPE400 and CPL410 is the IC695ACC403. The CPE400 and CPL410 are not compatible with the ICRXIACCEPK01 RXi Controller Energy Pack, the IC695ACC400 CPE305/310 Energy Pack, or the IC695ACC402 CPE330 Energy Pack. • It is not possible to connect the CPE400/CPL410 and the IC695ACC400 CPE305/310 Energy Pack together. • It is possible to connect the ICRXIACCCPK01A RXi Capacitor Pack to the IC695ACC403 Energy Pack Base. If this occurs, the capacitor pack operates normally. • It is possible to connect the IC695ACC403 CPE400/CPL410 Energy Pack and IC695ACC413 Capacitor Pack to an ICRXICTL000 controller. If this occurs no errors are logged however user memory may not be preserved under all conditions **Do not use the CPE400 Energy Pack or Capacitor Pack with the RXi Controller.** • It is physically possible to connect the IC695ACC403 CPE400/CPL410 Energy Pack to an IC695CPE330 controller. If this occurs, no errors are logged. However, it will not allow any future firmware updates to the ACC403 Energy Pack. **Do not use the ACC403 Energy Pack with the RX3i CPE330 Controller.** • It is physically possible to connect the IC695ACC402 CPE330 Energy Pack and IC695ACC412 Capacitor Pack to an IC695CPE400 or CPL410 controller. If this occurs no errors are logged. However, it will not allow any future firmware updates to the ACC402 and the capacitors will reach their end-of-life threshold faster than the RX3i Capacitor Pack IC695ACC413. **Do not use the ACC402 Energy Pack or ACC412 Capacitor Pack with the RX3i CPE400 or CPL410 Controller.** • It is physically possible to connect the ICRXIACCEPK01A RXi Energy Pack to an IC695CPE400 or CPL410 controller. If this occurs no errors are logged. However, it will not allow any future firmware updates to the EPK01A and user memory may not be preserved under all conditions. **Do not use the EPK01A RXi Energy Pack with the RX3i CPE400 or CPL410 Controller.**
Ethernet Station Manager Compatibility	Ethernet Station Manager Utility Version 1.3 Build 2 or later is recommended for use with the CPE400 and CPL410. Earlier versions are compatible; however, they may not display all the Ethernet parameters after issuing a *parm all* command. Should this issue occur, pressing *enter*, or issuing another command will cause the station manager to display the remaining parameters.
Set Temporary IP Address not supported	Since the configured IP Addresses may be viewed using the CPE400/CPL410 OLED display, the Set Temporary IP Address tool in PME is not required for CPE400/CPL410 and is therefore not supported for CPE400 and CPL410.
RDSD Support	RDSD support using a USB memory stick or a micro SD card is not available with the current release.
Supported Primary and Secondary CPUs	The Primary and Secondary CPUs in a redundant system must be the same model. For example, two CPE400s may be paired together as the Primary and Secondary CPUs. Likewise, two CPL410s may be paired together. Pairing a CPE400 and CPL410 as Primary and Secondary CPUs in a redundant system is not permitted.
Display Port is not operational	The Display port, located on the underside of the CPE400 and CPL410 (Figure 2) is not operational.
USB Ports	The CPE400's USB ports are reserved and not available for use. The CPL410's left USB port is assigned to Linux. The right USB port is reserved.
Micro SD Card	The Micro SD Card Slot is reserved and not available for use.
Serial IO Protocol	Serial IO Protocol is supported on the CPE400 effective with firmware release 9.40 and on the CPL410 effective with release 9.55.

Field Agent: Functional Compatibility

Compatibility Issue	Description
EGD	Field Agent release **2018_06_15_144951** does not support Ethernet Global Data (EGD) streaming.
Edge Manager	**2017_07_10_160104** Factory Production Release and the custom upgrade package **EfaUpgradeToPredixMachine17.1.2.MAX** both allow access to Predix West. Just upgrading to an existing Field Agent with the **2017_07_10_160104** field upgrade will NOT allow access to Predix West.

CPL410 GP Linux: Functional Compatibility

Compatibility Issue	Description
N/A	N/A

RX3i PLC: Problems Resolved in Current Release

Problem Resolved	ID code	Description
PROFINET IO Not Scanned After Loss of Both Critical Ring Ports	**DE4586 SFDC132443**	A PNSR redundancy system may fail to detect a loss of critical network ports and stop scanning IO if both critical ring ports are disconnected on the *Primary* (*Active*) controller, the *Primary* (now *Backup*) is power cycled and placed into RUN Mode without re-connecting the critical ring ports, and a role switch is performed to transition the *Primary* from the *Backup* to the *Active* controller. Correcting the original issue of *Loss of all Critical Ports* on the *Primary* controller before going back to *RUN* Mode prevents this situation.
CPU Clock Not Adjusted for DST in Europe	**DE4111 SFDC00460908**	The CPE400/CPL410 do not automatically adjust the clock for Daylight Saving Time changes in Europe because the week in which the last Sunday in March or October varies from week 4 to week 5 depending on the year. Starting with Release 9.70, European users should set the DST Start and End Week parameters to 5 so that the CPU will transition to and from DST on the last Sunday of the month.
Addition of IO Module causes IO Device to disconnect	**DE4772 CS0193050**	Causing an Addition of IO Module (hot insertion of module) on some IO Devices, such as VersaMax PROFINET Scanner, causes the IO Device to disconnect and reconnect. The Addition of IO Module has to occur after more than 60 seconds has passed since the initial connection.
IP Address Reverts to Previous Value After Power Cycle	**DE4900 SFDC00617968**	IP address changes do not persist after a power cycle if the hardware configuration was redundant when stored. This has been corrected.

Field Agent: Problems Resolved in Current Release

Problem Resolved	ID code	Description
Bricking during OS Updates	**N/A**	The EFA was allowing installation of upgrades that could potentially brick the unit. This issue is fixed and the EFA will reject upgrades if it could brick the unit.

CPL410 GP Linux: Problems Resolved in Current Release

Problem Resolved	ID code	Description
N/A	**N/A**	Initial release of the IC695CPL410 1.2 GHz 64MB Rackless CPU w/Linux.

RX3i PLC: New Features and Enhancements in Current Release

Increased Program Block Count	The IC695CPE400 and IC695CPL410 now support a maximum of 768 user program blocks. (Prior versions supported a maximum of 512 blocks.)

Field Agent: New Features and Enhancements in Current Release

Predix Machine 17.2.3	EFA release 2018_06_15_144951 contains Predix Machine 17.2.3, which enables functionality for Event Hub and On-Demand Events. Please refer to the *Field Agents Upgrade Guide*, GFK-3017D or later, for instructions on how to update to 17.2.3.

CPL410 GP Linux: New Features and Enhancements in Current Release

IC695CPL410	Initial release of the IC695CPL410 1.2GHz 64MB Rackless CPU w/Linux. The PACSystems Rx3i CPL410, part of GE's Industrial Internet Control System, is a controller with integrated Linux. It augments real-time deterministic control with an Ubuntu 16.04 Server Linux, open to modifications and enhancements. With this product, customers can implement custom data processing like Edge- or Cloud-based analytics, Cloud storage, WEB visualization and many more. Full Linux root access is granted, allowing the user to enhance CPL410 in a virtually limitless manner, thereby achieving outcomes that today's businesses require. Use cloud services which best fit your application; install freely-available data visualization tools and analytics programs or use professional software to turn GE´s CPL410 into your custom controller. The CPL410 can be programmed to dynamically influence business outcomes, generate new forms of revenue, and improve profitability.

RX3i PLC: Restrictions and Open Issues

CPE400 & CPL410 CPUs & Embedded Ethernet:

Open Issue	ID code	Description
Firmware Update Login Timeout	**DE196** **DE205** **DE2626**	The CPU enforces a 2-minute login activity timeout on the *Firmware Update* web page. Selecting an update package on the *Firmware Update* page and pressing the *Upload File* button after the timer expires initiates a firmware update. However, instead of displaying the firmware update status, one of these scenarios may occur: • Another login page is presented. After entering the user name and password the update status is displayed. • The web browser loses connection with the CPE400 and is unable to display update status because the CPU is automatically resetting while applying the firmware update. After the reset completes, pressing the refresh button in the browser shows the installed firmware version. • An error message is displayed indicating the firmware update was not successful however, returning to the firmware update home page shows that the new firmware version was installed. These timeout issues may be avoided by having the firmware file ready so that the firmware update can be initiated immediately after logging in.
Running applications with fatal faults from flash	**DE86**	If an application that generates a fatal fault (such as a watchdog timeout) is stored to flash, the controller is configured to power-up from flash and go to RUN, and the RUN/STOP switch is disabled, the application may become stuck in an endless loop. (Power-up from flash, go to RUN, watchdog timeout, repeat.) Return the CPE400 to the factory if this condition is encountered. It is recommended that users thoroughly test their application before writing it to flash.
Clear All clears PLC_BAT and masks Energy Pack failures	**DE715**	A *Clear All* operation clears the values of all %S bits. After this operation, the PLC_BAT status bit value may not reflect the actual status of the Energy Pack. For example, an Energy Pack in a failed state prior to the *Clear All* operation will remain in the failed state after the *Clear All*. Nonetheless, the PLC_BAT bit will indicate a good state as a result of the *Clear All* operation. Remove the Cap Pack and reinstall it in order to reassert the PLC_BAT status bit.
Using OEM Passwords with Enhanced Security Disabled	**DE755**	Single character OEM passwords are not supported when enhanced security is disabled.
PME cannot display reference tables with Enhanced Security Enabled and OEM Locked	**DE781**	When Enhanced Security is enabled, and OEM protection is engaged, only reference areas specified within the Access Control List can be viewed by a programmer, or HMI, regardless of privilege level. For example, if viewing %R memory from words 1 to 400 then the Access Control List must include read access to %R words 1 to 400. A custom reference view table with smaller reference sizes may also be used.
Controller Communication Window Timer settings below 10 ms are ignored	**DE845**	Normal sweep allows the configuration of the Controller Communications Window Timer for Limited operation and a time range from 0 to 255 ms (default 10 ms). However, the system is currently ignoring settings in the 0 to 9 ms range which results in an effective window time of 10 ms for this configuration range. This means a sweep impact of up to 10 ms may occur for some complex Controller Communication Window operations. If this operation is undesired then it is recommended to use a different sweep mode, such as Constant Sweep or Constant Window.

Open Issue	*ID code*	*Description*
Selecting Variable Publish State = Internal causes variable to be published in Address Space	**DE1330**	PME allows users to select a Variables Publish State to Internal. In some cases, this will cause the variable to be published to the OPC-UA address space. The manual states users should select *External Read/Write* or *External Read-Only* to publish to the address space. This is the recommended approach.
OPC-UA Server Restart Fails to complete	**DE1326**	The OPC-UA server may fail to restart after a large number (~200) of restart sequences are attempted without an intervening power cycle. A restart sequence will occur with the following operations: Run Mode or Stop Mode Store when published variables change and OPCUA server is running. Whenever this occurs, the *server restart bit* will stay on indefinitely. The issue is contained to OPC-UA server operation only. Power cycling the controller is the only way to address the issue.
Abrupt Power-down Fault	**DE2256**	An *Abrupt power-down detected at power-up* fault is recorded in the CPE400 PLC Fault Table if both the *Logic/Configuration Power-up Source* and *Data Power-up Source* in the hardware configuration are set to *Always Flash* or *Conditional Flash* and the CPE400 is turned off without an energy pack connected. This fault indicates that user memory was not preserved across the power cycle and does not interfere with normal operation because the application is already configured to power up from flash if there is no energy pack connected.
Dual Hardware Configuration Not Created When Uploading Redundant CPE400/CPL410 Application	**DE3052**	A dual hardware configuration is not automatically created in PME when uploading a redundant CPE400/CPL410 application. Before uploading the primary application, dual hardware configuration must by manually enabled by setting the CPE400 or CPL410's *Enable Redundancy* target property to *True*. The secondary application may then be uploaded.
Memory Not Preserved After Turning CPE400/CPL410 Off with Power Button	**DE3975**	The CPE400 and CPL410 do not preserve user memory when the *Power Button* is used to turn the CPU off while an energy pack is connected.
Multibit ECC Memory Error Causes Hardware Watchdog	**DE4181**	The CPE400 and CPL410's hardware watchdog timer expires and the CPU reboots into STOP HALT mode if an uncorrectable (multi-bit) ECC memory error is detected. Correctable (single-bit) errors are automatically repaired as expected. No ECC memory faults are logged in the fault table whenever either occurs.
***Sequence Store Failure* Downloading Redundant Hardware Configuration**	**DE4254**	It is possible to download a redundant hardware configuration with a non-zero %W transfer list length to a CPE400 or CPL410 which has no %W memory configured. The downloaded configuration is not valid since no %W memory is configured, so none should be allowed in the transfer list. If this occurs, the CPU enters *STOP / FAULT* Mode and a *Sequence Store Failure* is listed in the *PLC Fault Table*. PROFICY Machine Edition's *Feedback Zone* shows *Error 8097: Controller Error - Controller program reference exceeds configured reference [0x05][0x90] [0x80310015]* This issue may be resolved by correcting the hardware configuration to either remove %W memory from the transfer list or allocate %W memory in the CPU corresponding to the length configured in the transfer list. Once corrected, place the CPE400 or CPL410 into STOP / NOIO Mode by clearing the *PLC Fault Table* and download the hardware configuration again.

Open Issue	ID code	Description
Run Mode Store of EGD Causes Sequence Store Failure & CPU Software Event Faults	**DE4130** **SFDC 00406176**	Performing a RUN Mode Store of a project where the total number of variables in EGD exchanges is near the maximum of 30,000 may result in a Controller Sequence Store Failure (Group: 137; Error Code 4) and CPU Software Event fault. (Group: 140; Error Code 145) If this occurs, the project may be successfully downloaded while the controller is in STOP Mode.
Ethernet COMMREQs not always delivered on the first logic sweep	**ISS183540**	In certain instances, where User Logic is of sufficient size and a COMMREQ is issued on first logic sweep, a race condition existing between determination of the CPU Run/Stop state and logic-driven issuance of a COMRREQ which may cause the COMMREQ to be aborted before its transmission is attempted. To the user, it would appear as if the COMMREQ was never issued. The condition is much more observable on COMMREQs issued from the CPU's embedded Ethernet port. To avoid the possibility of encountering this condition, users should avoid issuing COMMREQs on first logic sweep.
Ethernet Disconnect During Word for Word Change	**CR-2234**	If the Ethernet connection is broken during a word–for-word change, the programmer may not allow a subsequent word-for-word change after reconnecting due to the fact that it thinks another programmer is currently attached. To correct the issue, go offline and then back online again.
Simultaneous Clears, Loads and Stores Not Supported	**CR-3118** **CR-3300**	Currently, PACSystems CPUs do not support multiple programmers changing CPU contents at the same time. The programming software may generate an error during the operation. Simultaneous loads from a single PLC are allowed.
Hardware Configuration Not Equal After Changing Target Name	**CR-3181**	If the user stores a hardware configuration to flash that sets *Logic/Config Power up Source* to *Always Flash* or *Conditional Flash* and then subsequently changes the name of the target in the programming software, the hardware configuration will go Not Equal and will not Verify as equal.
PLC and IO Fault Tables May Need to be Cleared Twice to Clear Faulted State	**CR-3191**	Both PLC and IO fault tables may need to be cleared to take the CPU out of Stop/Fault mode. If one of the tables contains a recurring fault, the order in which the tables are cleared may be significant. If the CPU is still in Stop/Fault mode after both tables are cleared, try clearing the fault tables again.
Setting Force On/Off by Storing Initial Value	**CR-3317**	Once a *Force On* or *Force Off* has been stored to the PLC, the user cannot switch from *Force On* to *Force Off* or vice-versa directly by downloading initial values. The user can turn off the force by doing a download, and then change the *Force On* or *Force Off* by another download.
Second programmer can change logic while in Test & Edit mode	**CR-4223**	While currently active in a Test and Edit session using Machine Edition on one PC, Machine Edition running on another PC is not prevented from storing new logic to the PLC.
Must have Logic if Powering up from Flash	**CR-4633**	If the application will configure the CPU to retrieve the contents of flash memory at power-up, be sure to include logic along with hardware configuration when saving to flash memory.
Extended Memory Types for IO Triggers	**CR-5952** **CR-6319**	%R, %W and %M cannot be used as IO triggers.
Possible PME inability to connect	**CR-6067**	Infrequently, an attempt to connect a programmer to a PLC via Ethernet will be unsuccessful. The normal connection retry dialog will not be displayed. Rebooting the computer that is running the programmer will resolve the behavior.

Open Issue	*ID code*	*Description*
Do not use multiple targets	**CR-6450**	In a system in which the hardware configuration is stored from one target and logic is stored from a different target, powering-up from flash will not work. The observed behavior is that, following a power up from flash, PME reports hardware configuration and logic *not equal*.
Sequence Store Failure	**CR-6586 ISS176888**	When downloading projects with very large hardware configuration or which use large amounts of user memory, it is possible to encounter a *PLC Sequence Store Failure* error when writing the project to flash. To work around this error, either or both of the following actions may be helpful: 1. Perform an explicit clear of flash prior to performing the write. 2. Increase the operation timeout used by PME prior to performing the write. This is done by expanding the Additional Configuration in the Inspector window for the target controller and adjusting the Request Timeout. The timeout may need to be increased to as much as 60000 ms, depending on the amount of memory used and the condition of the flash memory.
C Toolkit PlcMemCopy Documentation Incorrect	**CR-7082**	This routine does allow the destination and source pointers to be outside of reference memory. If the destination points to discrete reference memory, overrides and transitions will be honored. Note that the header for PlcMemCopy has been updated in Release 3.50 of the C toolkit.
Logic and HWC not equal after power cycle	**ISS168431**	If the Hardware Config from Target 1, with Logic/Configuration Power-up Source and Data Source both set to *Always from Flash*, is stored in Flash, then Logic and Hardware Config from Target 2, with Logic/Configuration Power-up Source both set to *Always from RAM*, are stored to RAM and there is a good battery, then when power is cycled the programmer may show that Logic and Hardware Config are not equal. The remedy is to clear Flash and re-store the Logic and Hardware Config from Target 2.
Multiple Log Events	**CR-2014**	The Ethernet Interface sometimes generates multiple exception log events and PLC Fault Table entries when a single error condition occurs. Under repetitive error conditions, the exception log and/or PLC Fault Table can be completely filled with repetitive error messages.
Spurious Ethernet Fault	**CR-4104**	In rare instances, after power cycle, the Ethernet Interface may log the following fault, Event = 28H, Entry 2 = 000eH. This fault can be safely ignored.
Clear of large hardware configurations may cause log event 08/20	**CR-6577**	A Log event 08/20 may occur when very large hardware configurations are cleared, and transfers are active on other Server connections. This log event can be safely ignored.
PLC response timeout errors (8/08) in Ethernet exception log under extremely heavy SRTP traffic	**ISS010006**	Under extremely heavy SRTP traffic conditions, the Ethernet Interface may log an event in the Ethernet exception log (Event 8, Entry 2 = 08H) indicating an overload condition. This error terminates the SRTP connection. If this event appears, either the traffic load should be reduced, or the application should use an alternate communications method to verify that critical data transfers were not lost due to the overload.
SRTP channel transfers may take up to 20 seconds after power cycle	**ISS155214**	When SRTP communications are interrupted by a power cycle, the Ethernet interface may require up to 20 seconds to reestablish TCP connection used for SRTP communications.
Intermittent Ethernet log event 8H/15H after power cycle	**ISS163056**	When starting after a power cycle, the Ethernet Interface may intermittently log an exception (entry 8H, Entry 2 = 15H, Entry 3 = 0000H, Entry 4 = 00aaH). This exception is benign and may be ignored.

Open Issue	ID code	Description
Station Manager *parm* command help text is wrong	**ISS181788**	Although the *parm v* Station Manager command works correctly, the "v" subsystem code (SRTP server) is not shown as supported by the online help.

CPE400 & CPL410 Embedded PROFINET Controller Restrictions & Open Issues:

Open Issue	ID code	Description
IP Address changes to Embedded PROFINET Controller may cause Loss of Communications with PNS & GCG	**DE3423**	Downloading a new hardware configuration with a different IP Address for the CPU's embedded PROFINET interface to a CPU that already has a PROFINET configuration may cause configured PNSs and GCGs to disconnect from the embedded PROFINET interface. (This issue is observed when using both PME 8.6 SIM 12/13 and PME 9.0 SIM 4.) If this issue occurs, disconnect PME from the CPU, remove the Energy Pack if one is attached to the CPU, and cycle power to the main rack. Then reconnect PME and download the hardware configuration again.
Embedded PROFINET Controller indicates premature MRP Ring closure and logs extra Ring Closed/Ring Open faults when network cable reconnected	**DE1461**	There are two scenarios that can cause the Embedded PROFINET Controller to indicate that an MRP Ring is closed when in fact it is still open. The scenarios are: 1. When either an RX3i PNS or PROFINET Controller that participate in the MRP ring as an MRP Client communicating via Copper or Fiber SFPs is powered-up in the MRP ring, extra Ring Closed/Ring Open faults are logged in the I/O fault table. A Ring Closed fault occurs during the initial stage of the PNS/PNC power-up, followed by a Ring Open fault in the middle of the PNS/PNC power-up sequence, and finally a Ring Closed fault occurs when the PNS/PNC completes power-up (OK LED on). 2. When the first of two MRP ring breaks is restored, extra Ring Closed/Ring Open faults are logged in the I/O fault table. Upon restoration of the first ring break, a Ring Closed fault occurs, followed by a Ring Open fault. Then upon restoration of the second ring break, a final Ring Closed fault occurs. The duration between faults is a function of the PNC's configured MRP Default Test Interval and Test Monitoring Count. When either of the two scenarios is invoked, the user sees extra Ring Closed/Ring Open faults in the IO Fault Table. The extra Ring Closed/Ring Open fault may be ignored.
STXPNS001 Firmware revision is not displayed correctly when viewed using PME PROFINET Explorer	**DE568** **ISS182843**	Firmware revision information for the STXPNS001 does not display correctly using PROFICY Machine Edition. The correct firmware revision information can be viewed on the module using HyperTerminal.
***Loss of IOC* and *Backplane Communications* Faults after Clearing Hardware Configuration with Mismatched STXPNS001 Configuration**	**DE569** **ISS182293**	Clearing the CPU's hardware configuration after downloading a mismatched RSTi STXPNS001 PROFINET Network Adapter configuration causes a Loss of IOC and a Backplane communications with Controller fault; lost request fault to be recorded in the fault table. Communication with Proficy Machine Edition is also lost. If this issue occurs, power cycle both the CPU and STXPNS001. (When power cycling the CPU, disconnect its energy pack if one is connected.) Then, correct the STXPNS001 hardware configuration in PME so that it matches the physical hardware in the IO node and download the updated hardware configuration to the CPU.

Open Issue	*ID code*	*Description*
Loss of IO Device following hot insertion of mismatched VersaMax I/O module	**DE579**	In very rare cases, hot insertion of a mismatched VersaMax I/O module (i.e., MDL650 in a slot configured for an MDL640) into the VersaMax PNS can cause a loss of connection between the PNS and the Embedded PROFINET Controller. No user action is required. When this behavior is seen, the Embedded PROFINET Controller will automatically re-connect to the VersaMax PNS.
IOC SW Fault with large configurations	**DE838**	When storing a PROFINET configuration that is close to the upper limit of the CPU's user memory the store may fail with an IOC Software Fault logged in the I/O Fault Table. Clearing the PLC's existing Hardware Configuration (and I/O Fault Table if the controller is Faulted) before attempting the store should allow the store to succeed.
Breaking & reconnecting an MRP ring by pulling either of the 2 MRM ports causes extra ring open/close faults	**DE1140**	In some cases, if the network is broken and repaired at either of the two ring ports of a CPU configured to be the MRM, extra "I/O Bus Fault-Redundant Ethernet network ring broken (open)" and "I/O Bus Fault-Redundant Ethernet network ring okay (closed)" faults are logged in both the I/O Fault Table and the PROFINET Controller Local Log when the ring is repaired. These additional faults may safely be ignored as long as the last fault to be logged is *I/O Bus Fault-Redundant Ethernet network ring okay (closed)*.
Unexpected Loss & Addition of Redundant PROFINET Device	**DE4239**	The Primary CPE400 or CPL410 in a redundant system may log *Loss & Addition of Device* faults for its PROFINET IO if it is in *STOP* Mode when the Secondary is unit powered *ON* and configured to go to *RUN* Mode on power up. Should this issue occur, the Primary unit may be placed in *RUN* Mode to resume synchronization with the Secondary unit and become the Backup controller.
INFO CPU SOFTWR – CPU Software Event Fault	**DE3792**	Rarely, a CPE330, CPE400, or CPL410 may log an INFO_CPU_SOFTWR – CPU software event fault. (Group140; Error 430; Extra Data 01 28 0a 91 80 4a 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00) Should this issue occur, the CPE400/CPL410 continues to run normally. No additional action is required, and the fault may be cleared from the fault table.
Unintended operation of PNIO DEV COMM function block	**ISS181379**	The power flow output of the PNIO_DEV_COMM function block provides validation of the input parameters and confirms that the Embedded PROFINET Controller has locally processed the configuration of the specified I/O Device. As currently implemented, the power flow output will not turn ON until after the Embedded PROFINET Controller has made its first attempt to connect to the specified I/O Device. Therefore, we recommend the user not rely on power flow output for parameter validation.

CPE400 Embedded Field Agent Restrictions and Open Issues:

Open Issue	*ID code*	*Description*
Keep Store & Forward enabled	**TA22803**	By default, the Field Agent sends data to the cloud with Store & Forward enabled. With Store & Forward enabled, if the Field Agent connection to the Internet is lost, data will be buffered and then sent to the cloud when the connection is re-established. Users should not change this setting. If Store & Forward is disabled, over time lost data packets will accumulate in memory and will result in a failure to send data the cloud. The Field Agent must be rebooted to recover.

Open Issue	ID code	Description
Network Time Sync	**DE3861**	Network time sync using HTTPS through a proxy server is not supported by the Field Agent. It is recommended that users operate with the default setting for NTP.
OPC UA Machine Adapter may fail to reuse its OPC UA session	**DE3526**	Occasionally, the OPC UA Machine Adapter will fail to reuse its OPC UA session when Predix Machine or the OPC UA Machine Adapter is restarted. (Storing a new configuration to the Field Agent is an example of an action that will result in Predix Machine restarting.) If all sessions on the server were already in use, the OPC UA Machine Adapter will fail to reconnect until a session becomes available. *Restarting the OPC UA Server would free up the unused session prior to timeout; however, it would also cause any other Clients to disconnect.*

CPL410 GP Linux Restrictions and Open Issues:

Open Issue	ID code	Description
N/A	**N/A**	There are no open issues for GP Linux.

Operational Notes: CPE400/CPL410 CPU & Embedded Ethernet

<table>
<tr><th>Operational Note</th><th>Description</th></tr>
<tr><td>Default IP Addresses for Embedded Ethernet</td><td>The IP Address of any CPE400/CPL410 LAN may be viewed via the OLED menu. The default IP Addresses programmed at the factory are:
<table>
<tr><th></th><th><u>LAN1</u></th><th><u>LAN2</u></th><th><u>LAN3</u></th></tr>
<tr><td>IP Address:</td><td>192.168.0.100</td><td>10.10.0.100</td><td>N/A</td></tr>
<tr><td>Subnet Mask:</td><td>255.255.255.0</td><td>255.255.255.0</td><td>N/A</td></tr>
<tr><td>Gateway:</td><td>0.0.0.0</td><td>0.0.0.0</td><td>N/A</td></tr>
</table></td></tr>
<tr><td>Connecting to the Embedded Ethernet when IP Addresses are not Known</td><td>If the IP addresses of the CPE400 or CPL410's embedded LAN 1 and LAN 2 Ethernet interfaces are not known, communication may be established by using the OLED display to read the currently configured IP addresses.</td></tr>
<tr><td>C Block support</td><td>C Programmer's Toolkit Rel 8.00 provides C Block support for the CPE400 and CPL410. To compile a project use the command "compileCPACRX". This will create a .gefElf64 file in the plc directory. Add the .gefElf64 file to a CPE400/CPL410 project using the "Add C Block..." option. Existing 32-bit C blocks (.gefElf files) must be rebuilt as 64-bit for the CPE400 and CPL410. Once the rebuild is complete, simply update the block.
To build C blocks for other RX3i products continue to use C Programmer's Toolkit Rel 7.10.</td></tr>
<tr><td>Unable to Download C Blocks</td><td>When downloading an application containing C Blocks to a CPE400 or CPL410, PME may display an error indicating that the CPE400/CPL410 does not support 32-bit C Blocks. This occurs even if the project validates successfully and all the C Blocks in the application are 64-bit.
If this issue occurs, select Clean Build Folders from the Target ribbon and re-download to successfully store the application.</td></tr>
<tr><td>Ethernet Event Log not Preserved Across Power Cycle</td><td>The CPU's Ethernet event log for its embedded Ethernet interfaces is not maintained across a power-cycle. Ethernet log events will be reported in the PLC Fault Table as with other RX3i CPUs. The PLC Fault Table entries will be preserved if an Energy Pack is attached.</td></tr>
<tr><td>Station Manager Commands</td><td>The CPU's embedded Ethernet interfaces support a subset of Station Manager Commands (monitor only commands). Refer to PACSystems TCP/IP Ethernet Communications Station Manager Manual, GFK-2225, for details.
Beginning with CPE400 R9.30, the plcread and egdread commands are no longer supported by the Ethernet Station Manager. (All versions of the CPL410 do not support these commands.) PROFICY Machine Edition may be used to read data in reference memory and EGD exchanges.</td></tr>
<tr><td>Power-up Time</td><td>The CPE400 and CPL410 power up as follows:
When an IC695ACC403 Energy Pack is not connected, the CPU requires approximately 75 seconds to complete power-up. When power is applied, all the Ethernet Port LEDs turn on and the status indicator LEDs on the front of the unit flash several times and turn off. Next, the PWR LED turns on green and the SSD LED flashes. After approximately 60 seconds, the Ethernet port LEDs flash and then indicate the port mode. The OE LED will turn on and then off. When power up is complete, the OK LED turns on and the OE LED turns off.
When an energy pack is connected, the CPU requires up to 135 seconds to complete power up. The CPU's power up sequence begins after the energy pack is fully charged. Charging may require up to 60 seconds depending on the capacitor pack's initial charge. (The energy pack's STAT LED blinks green while it is charging and turns solid green when charging is complete.)</td></tr>
</table>

Operational Note	Description
Insertion of Cap-Pack during Controller Power-up could cause Failed Battery Fault	If the Energy Pack is powered on without a Cap Pack and a Cap Pack is then inserted during power-up of the CPU, the CPU could log a failed battery fault. The CPU expects the Energy Pack to report fully charged within a certain amount of time. This time limit may not be met if the Cap Pack is absent at power-up.
Avoid Overlapping IP Subnets when Configuring Embedded LAN IP Address and Subnet Mask	The CPU contains two LAN interfaces, each one supporting a unique IP Address. Care must be taken when assigning IP Addresses and subnet masks to each LAN so that an overlapping IP subnet is not created. Intermittent or no Ethernet communication may result if an overlapping IP subnet is created and the two interfaces are NOT connected (cabled) to the same physical network. By default, PME prohibits configuring both LAN interfaces on an overlapping IP subnet. (This may be changed by going to Controller General Options and changing the *Multiple Embedded LANs on Same Subnet* to *Show as Warning*.)
Avoid Overlapping Remote IP Networks when Configuring Embedded LAN IP Address and Subnet Mask	The CPU contains multiple LAN interfaces, each one supporting a unique IP address. Care must be taken when assigning IP Addresses and subnet masks to each LAN so that each network does not overlap any remote subnets in the network infrastructure. Intermittent or no Ethernet communication may result if the local networks on the CPU overlap a remote subnet.
Embedded Ethernet Gateway Operation	The CPU allows configuration of an Ethernet gateway on the Embedded LAN interfaces. Since the CPU contains two LAN interfaces, each one supporting a unique IP Address, only one gateway is active at a time: • If a gateway is configured on only one of the LAN interfaces and the other is not configured (0.0.0.0) then, the single gateway is shared by both interfaces. • If a gateway is configured on multiple LAN interfaces, then the LAN1 gateway is given priority over the LAN2 gateway as long as LAN1 is functional. If, for example, the LAN1 cable is disconnected then the CPU will use the LAN2 gateway as a backup.
Embedded Ethernet Protocols & Performance	The rackless CPUs have four independent Ethernet LANs with six auto-negotiating, full duplex 10/100/1000 Ethernet Ports: LAN 1 & LAN 2 support two IP Addresses and the following protocols: • OPC UA Server with support for up to 5 concurrent sessions with up to 10 concurrent variable subscriptions and up to 12,500 variables • SRTP Server with support for up to 48 simultaneous connections • Modbus/TCP Server with support for up to 16 simultaneous server connections • SRTP and Modbus/TCP Client with support for up to 32 clients; each may be SRTP or Modbus/TCP • Ethernet Global Data (EGD) Class 1 LAN 3 is used to synchronize the Primary and Secondary CPUs in a Hot Standby Redundancy configuration. No other LAN devices are permitted on LAN 3 in this configuration. Use of both LAN 3 ports is recommended since this provides a redundant communications path between the two CPUs. Applications using Ethernet communication should be validated to ensure adequate throughput is available to meet the needs of the application.

Operational Note	*Description*
Multiple Consumptions of Multicast EGD Exchanges	In the event that the Embedded LANs are physically connected to the same Ethernet network then any multicast EGD consumer exchanges may be consumed multiple times (once per each Ethernet interface) if the LAN interfaces use the same multicast IP addresses. This multiple consumption occurs because the CPU has more than one LAN interface and it is possible for the CPU to see duplicate multicast packets (one from each interface) and consume each. If this occurs, issuing a *stat g* station manager command shows that the multicast consumer exchange updates at a rate that is faster than producer sends it. To avoid this issue, connect each Embedded LAN to physically separate Ethernet networks (i.e. no Ethernet switches in common).
PME Connection Lost After Configuration Download that Swaps IP Addresses Between LAN 1 & LAN 2	Proficy Machine Edition may lose connection with a CPE400 or CPL410 that has PROFINET enabled on LAN 2 if a configuration that swaps the IP addresses between LAN 1 and LAN 2 is downloaded. Even though the connection is lost, the store operation completes successfully. Re-connecting using the newly configured IP addresses shows the hardware configuration and logic are equal.
LAN Interface Status Bits	The CPE400 and CPL410 use the same LAN Interface Status Bit definition as the IC695CPE330. Refer to *Section 12.6 Monitoring the Ethernet Interface Status Bits* in *PACSystems RX7i, RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual,* GFK-2224P (or later) for additional information.
Reserved IP Subnet 192.168.180.x	The IP subnet 192.168.180.x is reserved and is not available for configuration on any of the CPU's Ethernet ports.
OPC UA Server Start-up Time	The OPC UA server takes up to fifteen minutes to start if the server's configuration files and certificates need to be generated. This occurs the first time the server is started on a new CPU or after the server is cleared. While the OPC UA server is starting, the OPC UA *SERVER_STATUS* service request returns 0010h *OPC UA Server Starting*.
Modbus/TCP & SRTP Client COMMREQ Function Block SYSID & TASK	Modbus/TCP and SRTP Client Channels are supported. Set the COMMREQ SYSID to 0x0000 and TASK to 0x10000 in order to use these functions on the CPU.
Secondary CPE400/CPL410 Redundancy CPU Power-up Wait Time	During power-up, when a CPE400 or CPL410 is configured as a secondary redundancy CPU, it waits up to 70 seconds to detect the primary unit. (The CRU320 waits 30 seconds.) If the primary unit is not detected within this wait time, the secondary unit assumes the primary unit is not present. In this case, if the secondary unit is configured to transition to Run on power-up, it becomes an active unit without a backup unit.
STOP to RUN Transition in CPE400/CPL410 Redundancy System with PROFINET I/O	A Primary CPE400/CPL410 waits a maximum of 20 seconds during power-up for PROFINET device connections when there is no redundant link with the secondary unit. As soon as one PROFINET device connection is established (and no secondary PROFINET device connection exists) the Primary CPU can power-up in RUN mode. Otherwise, the Primary CPU powers-up in STOP mode. If a PROFINET connection is established after the timeout period expires, the standalone Primary CPU must be manually switched from STOP to RUN mode. In comparison, the CRU320 waits 3 seconds during power-up before attempting to go to RUN, which is not enough time to establish connections to its PROFINET devices. This means that a standalone Primary CRU320 always powers up in STOP mode.
Using OPC UA Server with Limited Communications Window	When running an OPC UA Server with a Limited Communications Window, the Server can process enough requests to use the entire window which will add that time to your PLC Logic sweep. For example, a 100 ms Limited Backplane Communications Window could add the full 100 ms to your PLC Logic Sweep. Caution should be taken to ensure the Communication Window is configured within the tolerances of the system.

Operational Note	Description
Redundant Link Communication Failure Fault During Dual Synchronization	When both CPE400s or CPL410s in a redundant system are powered on at the same time and perform a dual synchronization, it is possible for the secondary unit to log *Redundant Link Communication Failure* faults if it completes power up before the primary unit. In this scenario, these faults occur because the primary unit is not yet online and do not indicate a redundant link failure. As soon as the primary unit completes power up it takes control and normal system operation begins with the primary controlling I/O and the secondary in standby mode.
***RUN* & *OE* LED Operation During Firmware Update**	During a firmware update, the *RUN* and *OE* LEDs blink in unison to indicate that the FPGA is being updated. Occasionally, instead of blinking in unison, the *RUN* and *OE* LEDs blink alternately. If this occurs, no additional action is required. The firmware update will complete successfully.
Setting the Time-of-Day Clock	The CPU's Time-of-Day Clock may be set by the PACSystems Runtime, the Field Agent, or the GP Linux operating system: • The clock may be set from PACSystems using utilities in Proficy Machine Edition. • The CPE400's clock may be set from the Field Agent using the Technician Console or a network time server. • The CPL410's clock may be set using standard Linux commands or a network time server. • Regardless of whether the clock is set from the PACSystems Runtime, the Field Agent, or the GP Linux operating system, the CPU must be rebooted after the clock is set so that the time change is applied across all applications. • The CPE400's clock must be set to UTC time when using the Field Agent to publish data to the Predix Cloud.
Field Agent OK System Bit %S49 *FA_OK*	System Bit %S49 *FA_OK* indicates the state of the CPE400 Field Agent: When the %S49 *FA_OK* bit is set, the Field Agent is Running, Predix Edge is Running, and the system is connected to the Cloud. The status of the OPC UA data exchange between the PACSystems Runtime and the Field Agent is independent of the state of this bit.
LAN 3 Redundant Synchronization Link Failure Faults on Active Unit Power Loss	Powering off the Active CPE400 or CPL410 in a redundant system causes the Backup unit to log any of these faults as the LAN 3 redundant synchronization links fail due to the loss of power: 1. *Redundant Link Communication Failure* 2. *Redundant Link has Timed Out* 3. *Fail Wait Time Exceeded* In this scenario, these faults indicate a *Redundant Link Communication Failure* and require no user action.
Restoring LAN 3 Redundant Synchronization Link when Backup Unit has No Connectivity to Redundant IO Devices	If the CPE400 or CPL410's LAN 3 redundant synchronization link is lost while the backup unit has no connectivity to its redundant IO devices, both controllers will become Non-Synchronized Active Units (NSAU). To restore synchronization, do one of the following: 1. Restore connectivity between the backup and its devices first, then restore the LAN 3 redundant synchronization link. In this scenario, the backup unit will become active and the active will transition to *STOP* Mode. 2. Restore the LAN 3 redundant synchronization link first, then transition the backup unit from *STOP* to *RUN* Mode. In this scenario, the backup until will transition from NSAU to backup, and the active will remain active.
LAN System Software Fault After Redundant Unit Role Switch when Using Redundant IP	In a redundant system, when Redundant IP is configured on either the CPU's Embedded Ethernet interface, a *LAN System Software Fault; Resuming* message may be logged in the fault table when a role switch occurs between the *Active* and *Backup* units. This fault indicates that SRTP connections on the previously active Ethernet interface were terminated due to the role switch. This fault does not impact normal operation and no additional action is necessary should this occur.

Operational Note	*Description*
CPE400 Background Window Does Not Execute by Default when Redundancy is Enabled	PROFICY Machine Edition versions prior to 9.50 SIM 6 set the *Background Window Timer* to *0ms* by default in CPE400 redundancy projects. This prevents the Background Window from running CRC memory tests on the user logic. It is recommended that the *Background Window Timer* is set to a minimum of *5ms* in both the Primary and Backup CPE400 hardware configurations. The *Background Window Timer* setting may be found on the *Scan* Tab in the CPE400's hardware configuration. PROFICY Machine Edition versions 9.50 SIM 6 or later resolve this issue by generating a validation warning if the *Background Window Timer* is set to a value less than *5ms*.
Length of Serial I/O buffer	The *Set Up Input Buffer Function* will always allocate a buffer containing 2097 bytes.

Operational Notes for All RX3i CPUs:

The following apply generically to any RX3i CPU:

Operational Note	*Description*
SRTP or Modbus Channel COMMREQ Error Response with Gateway	SRTP & Modbus TCP Channel commands on RX3i CPUs with embedded Ethernet (IC695CPE3xx and IC695CPE4xx) and the IC695ETM001 RX3i Ethernet module provide different COMMREQ error codes whenever a request is sent to an unreachable server. When an Ethernet gateway is configured, the COMMREQ returns error code 0290H; when a gateway is not configured, the COMMREQ returns error code AA90H.
Cannot Clear Controller Passwords Loaded in Flash	WARNING: Passwords loaded to Flash (including OEM Password) cannot be cleared using clear Flash or by downloading new firmware. Users MUST document the password as it is not possible for the user to restore a unit to the default, no passwords condition (NULL).
OEM Protection not enforced on power-up from User Flash unless engaged before power cycle.	The OEM Protection Lock must be explicitly set before power down to ensure the OEM lock will be set on power-up regardless of the type of security being used.
When passwords are set with Enhanced Security, connecting with PME or establishing SRTP connections can cause a temporary increase in sweep times.	Due to the complex math involved with Enhanced Security authentication, creating SRTP connections and changing privilege levels will take additional sweep time (several milliseconds) not required when passwords are set with legacy security. If consistent sweep time is important to the application, then it is recommended to configure the sweep mode for Constant Sweep. Alternately, Constant Window or a Normal Sweep with both Limited Backplane Window and Limited Controller Comm Windows can be configured. These sweep modes will limit the sweep impact of Enhanced Security authentication and result in authentication processing across multiple sweeps.
C Toolkit Application Compatibility	Beginning with Rel 7.00 of the C Toolkit, writes to %S memory will now fail to compile where in previous releases a compilation warning was issued. This affects use of the GE-supplied C Toolkit macros Sw(), Si(), and Sd().
Undefined Symbols in C Blocks	In Release 5.00 or later, if an attempt is made to download a C block containing undefined symbols, the download will fail. Machine Edition will display the following message in the Feedback Zone: Error 8097: Controller Error – Controller aborted the request [0x05][0xFF] Prior to Release 5.00, C blocks containing undefined symbols could be successfully downloaded, but if they were executed the CPU would transition to Stop/Halt mode.

Operational Note	Description
LD-PLC operations	Machine Edition LD-PLC no longer supports a function that connects to the PLC, downloads, and then disconnects from the PLC. The connect and download functions are now separate. To perform a download to the PLC, you must first connect to the PLC.
Logic Executed in Row Major instead of Column Major	Logic execution in PACSystems RX3i is performed in row major order (similar to the Series 90-30). This is different from the Series 90-70 that executes in column major order. This means that some complicated rungs may execute slightly differently on PACSystems RX3i and Series 90-70. For specific examples, see the programming software on-line help.
NaN Handled Differently than in S90-30	The PACSystems RX3i CPU may return slightly different values for *Not A Number* as compared to Series 90-30 CPUs. In these exception cases (e.g., 0.0/0.0), power flow out of the function block is identical to Series 90-30 operation and the computed value is still Not A Number.
PID Algorithm Improved	The PID algorithm used in PACSystems has been improved and therefore PID will function slightly differently on PACSystems RX3i than on the Series 90-30. The differences are that the elapsed time is computed in 100 µS instead of 10 mS units. This smoothes the output characteristic, eliminating periodic adjustments that occurred when the remainder accumulated to 10mS. Also, previous non-linear behavior when the integral gain is changed from some value to 1 repeat/second was eliminated.
Some Service Requests different from 90-30 or No Longer Supported	• Service Requests 6, 15, and 23 have slightly different parameters. Refer to *PACSystems RX7i, RX3i and RSTi-EP CPU Programmer's Reference Manual*, GFK-2950. • PACSystems PLCs support Service Request 26/30 functionality via fault locating references. • Service Request 13 requires a valid value in the input parameter block (Refer to *PACSystems RX7i, RX3i and RSTi-EP CPU Programmer's Reference Manual*, GFK-2950 for details). On the Series 90-30 and Series 90-70 the parameter block value was ignored. • Service Requests 48 and 49 are no longer supported (there is no auto-restart) because most faults can be configured to be *not fatal*.
IL and SFC	IL and SFC are not available.
DO I/O Instruction	The Series 90-30 Enhanced DO I/O instruction is converted to a standard DO I/O instruction (the ALT parameter is discarded and ignored.)
END Instruction	The Series 90-30 END instruction is not supported. Alternate programming techniques should be used.
Non-nested JUMP, LABEL, MCR, & ENDMCR Instructions	Non-nested JUMPs, LABELs, MCRs, & ENDMCRs are translated to the corresponding nested JUMPs, LABELs, MCRs, & ENDMCRs when converting from Series 90-30 to PACSystems RX3i.
Changing IP Address of Ethernet Interface while Connected	Storing a hardware configuration with a new IP Address to the RX3i while connected via Ethernet will succeed, then immediately disconnect because the RX3i is now using a different IP Address than the Programmer. You must enter a new IP Address in the Target Properties in the Machine Edition Inspector window before reconnecting.
Timer Operation	Care should be taken when timers (ONDTR, TMR, and OFDTR) are used in program blocks that are NOT called every sweep. The timers accumulate time across calls to the sub-block unless they are reset. This means that they function like timers operating in a program with a much slower sweep than the timers in the main program block. For program blocks that are inactive for large periods of time, the timers should be programmed in such a manner as to account for this catch up feature. Related to this are timers that are skipped because of the use of the JUMP instruction. Timers that are skipped will NOT catch up and will therefore not accumulate time in the same manner as if they were executed every sweep.

Operational Note	*Description*
Constant Sweep	Constant Sweep time, when used, should be set at least 10 ms greater than the normal sweep time to avoid any over-sweep conditions when monitoring or performing on-line changes with the programmer. Window completion faults will occur if the constant sweep setting is not high enough.
Large Number of COMMREQs sent to Module in one sweep Causes Faults	A large number of COMMREQs (typically greater than 8) sent to a given board in the same sweep may cause Module Software faults to be logged in the PLC fault table. The fault group is MOD_OTHR_SOFTWR (16t, 10h) and the error code is COMMREQ_MB_FULL_START (2). When this occurs, the *FT* output of the function block will also be set. To prevent this situation, COMMREQs issued to a given board should be spread across multiple sweeps so that only a limited number (typically 8 or less) of COMMREQs are sent to a given board in each sweep. In addition, the *FT* output parameter should be checked for errors. If the *FT* output is set (meaning an error has been detected), the COMMREQ could be re-issued by the application logic.
C Block Standard Math Functions Do Not Set errno	In C Blocks, standard math functions (e.g. sqrt, pow, asin, acos) do not set errno to the correct value and do not return the correct value if an invalid input is provided.
Proper IP Addressing is Always Essential	The PACSystems Ethernet Interface must be configured with the correct IP Address for proper operation in a TCP/IP Ethernet network. Use of incorrect IP Addresses can disrupt network operation for the PACSystems and other nodes on the network. Refer to *PACSystems RX7i, RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual*, GFK-2224 for important information on IP Addressing. When storing a new HW configuration to the RX3i, be sure that the HW configuration contains the proper Ethernet addressing data (IP Address, Subnet Mask, and Gateway IP Address) for the RX3i. **Note:** Machine Edition programming software maintains the target IP Address (used to connect the programmer to the target) independent of the contents of the HW Configuration for that target). The target IP Address is set in the Target Properties in the Machine Edition Inspector window. Storing a HW Configuration whose Ethernet addressing data contains an IP Address that is different from the RX3i target IP Address will change the IP Address used by the target RX3i as soon as the Store operation is completed; this will break the Programmer connection. Before attempting to reconnect the Programmer, you must change the target IP Address in the *Target Properties* in the Machine Edition *Inspector* window to use the new IP Address. To regain communication at the former IP Address, use the manual corrective action described above. Storing a HW Configuration containing an incorrect Ethernet addressing data to the PACSystems RX3i will result in loss of the Programmer connection and will require manual corrective action as described above.
Network Architecture and Overload	The hub or switch connections in an Ethernet network must form a tree and not a ring; otherwise duplication of packets and network overload may result. In this situation, the RX3i Ethernet modules will continually reset.  **Caution** The hub or switch connections in an Ethernet network must form a tree and not a ring; otherwise duplication of packets and network overload may result
Reporting of Duplicate IP Address	The PACSystems RX3i does not log an exception or a fault in the PLC Fault Table when it detects a duplicate IP Address on the network.
SRTP Connections Remain Open after IP Address Changed	The Ethernet Interface does not terminate all open SRTP connections before changing its IP Address. Once the local IP Address has changed, any existing open TCP connections are unable to normally terminate. This can leave SRTP connections open until their underlying TCP connections time out.

Operational Note	Description
Send Information Report (COMMREQ 2010) requests may fail at minimum intervals less than 200 ms from embedded Ethernet port.	*Send Information Report* COMMREQ requests, with a minimum interval between host accesses of 200 ms or less, may fail if issued from the CPU's embedded Ethernet port. A COMMREQ Status Word value of 0290H, *Period expired before transfer completed; still waiting on transfer* indicates this condition occurred. To work around this issue, the user can set the *minimum interval between host accesses* to a value greater than 200 ms if issuing a *Send Information Report* COMMREQ from the embedded Ethernet port of the CPU.
Modbus/TCP Client Channels require at least a 10 ms delay between bulk channel close and bulk channel open processing	On CPUs with embedded Ethernet ports, a delay of at least 10 ms must occur between logic-driven attempts to close sixteen Modbus/TCP Channels simultaneously and then re-open sixteen Modbus/TCP Channels. This delay is necessary to provide external Modbus/TCP Servers sufficient time to close all channels before the Client issues channel open requests.
Incorrect COMMREQ Status for Invalid Program Name	The program name for PACSystems is always *LDPROG1*. When another program name is used in a COMMREQ accessing %L memory, an Invalid Block Name (05D5) error is generated.
COMMREQ Status Words Declared in Bit Memory Types must be Byte-Aligned	In previous releases, the CPU allowed configuration of COMMREQ Status Words in bit memory types on a non-byte-aligned boundary. Even though the given reference was not byte-aligned, the firmware would adjust it the next-lowest byte boundary before updating status bits, overwriting the bits between the alignment boundary and specified location. To ensure that the application operates as expected, release 3.50 requires configuration of COMMREQ Status Words in bit memory types to be byte-aligned. For example if the user specified status bit location of %I3, the CPU aligns the status bit location at %I1. Release 3.50 firmware requires the user to specify the appropriate aligned address (%I1) to ensure that the utilized location is appropriate for their application. Note that the actual reference location utilized is not changed, but now is explicitly stated for the user.
STOP and RUN Mode Transition Priority	The PACSystems CPU receives requests to change between stop and run mode from many different sources. These include (but are not limited to) Proficy Machine Edition, HMIs, the user application, and the RUN/STOP switch. Since there are many potential sources for a mode change request, it is possible to receive a new mode change request while another is already in progress. When this scenario occurs, the CPU evaluates the priority of the new mode change request with the mode change that is in progress. If the new mode change request has an equal or higher priority than the one already in progress, the CPU transitions to the new mode instead of the one in progress. If, however, the new mode change request has a lower priority than the one in progress, the new mode request is discarded and the CPU completes the mode change that is in progress. The sweep mode priorities are (listed from highest to lowest priority) STOP HALT, STOP FAULT, STOP, and RUN. (NOTE: The IO ENABLED/DISABLED state is not part of the mode priority evaluation.) For example, a CPU is in RUN IO ENABLED mode and a Service request 13 function block is executed to place the CPU into STOP IO DISABLED mode. Before the transition to STOP IO DISABLED is completed, the RUN/STOP switch is changed from RUN IO ENABLED to RUN IO DISABLED. In this case, the CPU ignores the new request from the RUN/STOP switch to go to RUN IO DISABLED mode because it is already processing a request to go to STOP IO DISABLED mode and STOP mode has a higher priority than RUN mode.
Suspend IO Function Block does not Suspend EGD	In a S90-70 the SUSPEND_IO function block suspends EGD in addition to IO Scan. In PACSystems controllers the SUSPEND IO only suspends IO Scan.

Operational Note	*Description*
Uploaded Controller Supplemental Files lose date and time	Controller Supplemental Files uploaded from the CPU are time stamped as 8/1/1980 12:08AM regardless of PC or PLC time.
CPU Parameters Reset to Default Values After Replacing CPU Module in PME	When replacing CPU modules in Proficy Machine Edition, some parameters may be reset to default values. After replacing a CPU module, it is recommended that all parameters are evaluated for application compatibility including the *Controller Communication Window Mode*, *Controller Communications Window Timer*, *Backplane Communication Window Mode*, and *Backplane Communications Window Timer*.
OPC UA Sessions, Subscriptions, & Variables	PACSystems OPC UA servers support up to five concurrent sessions with up to ten concurrent variable subscriptions and up to 12,500 variables. The subscription limit is shared across all available sessions.

Operational Notes: Embedded PROFINET Controller

Operational Note	*Description*
PROFINET Command Line Interface	The Embedded PROFINET Controller does not support the Command Line Interface (CLI).
Mirroring Redundant CPE400 Hardware Configuration Creates Multiple MRMs	Mirroring a Primary CPE400's hardware configuration to the Secondary in PROFICY Machine Edition (PME) version 9.50 SIM 6 or earlier results in a hardware configuration containing two Media Ring Managers (MRM) if the Primary is configured as an MRM in a PROFINET MRP ring. Validating the project in PME is successful and it may be downloaded to both the Primary and Secondary CPE400s however, they enter *STOP / FAULTED* mode because only one MRM is allowed in an MRP ring. If this occurs, change one of the CPE400s to be a Media Ring Client (MRC), clear the fault tables, and re-download the configuration to both controllers. PME version 9.50 SIM 7 or later resolves this issue so that the Secondary CPE400 is automatically configured as a MRC.
PROFINET DCP – Direct Connection indicates that "no valid Ethernet adapters are available for PROFINET DCP discovery (must run PME as Administrator to use this feature)"	The PME PROFINET DCP tool requires elevation to administrator privilege to run when it is launched by right-clicking on a PROFINET Controller. Since the PME installation does not setup PME or any of its internal tools to run at the administrator privilege level, you will have to inform Windows that you want it to run PME as an administrator. There are two ways do this: 1. Right click on the PME icon (and any other shortcuts associated with PME) and select properties. Then select the Compatibility tab and check the checkbox for "Run this program as an administrator." 2. Right click on the PME icon and select properties. Then select the Advanced button and check the checkbox "Run as administrator." This method shows "Run as administrator" in **bold** when you right click on the icon in the future. You may also launch the PROFINET DCP tool from the Utilities tab menu in PME. However, this launch method does not provide full functionality of the tool. That is, it does not compare I/O devices found to any configuration in the PME Project. Also, if PME was not launched as an administrator, this method of launching the DCP tool requests the user's permission to elevate access to administrator privilege.

Operational Note	Description
***PNIO_DEV_COMM* Function Block Usage**	The *PNIO_DEV_COMM* function block may require multiple logic scans to return the status of an I/O device. It must continue to receive power flow until: a) The *ENO* output turns on indicating that the function block's parameters are successfully validated and the PROFINET Controller completed its first attempt to connect to the specified I/O device or; b) The *OK* output turns on indicating the PROFINET Controller is successfully communicating with the I/O device
Monitoring Remote IO Device Availability	Applications using PROFINET IO should monitor the availability of remote IO devices and take appropriate action if the device becomes unavailable due to a network connectivity issue, power failure at the remote device, etc. PROFINET IO device status is available by monitoring the Controller's *All Devices Connected* status bit, using the *PNIO_DEV_COMM* function block, or monitoring the CPU's IO Fault Table for *Loss of Device* faults. Individual IO modules within a PROFINET IO device should also be monitored so that appropriate action may be taken if the IO module becomes unavailable. The status of input modules may be monitored by enabling point faults and monitoring the fault contact within the application. Outputs may be monitored by looping critical points to an input module and verifying the output value.

Operational Notes: CPE400 Embedded Field Agent

Operational Note	Description
Field Agent collects data for CPE400 only	The CPE400 Field Agent collects data from the embedded RX3i controller only.
Maintain Power during Updates	Users should ensure that power is maintained during Field Agent Updates and Factory Reset. Note that Factory Reset may take up to four minutes to complete. Factory Resets are complete on the EFA when the FAOK LED is solid or blinking fast (1Hz). Factory Resets are complete on the MFA when the ON LED is solid.
OPCUA Subscription Rate	Some OPCUA Servers may negotiate a different interval at the time of the connection if the configured PublishInterval does not match its available subscription intervals. It is recommended to confirm that the OPCUA Server to which the Embedded Field Agent is connected can serve data at the requested interval.
Embedded Field Agent Documentation	The *PACSystems RX7i, RX3i and RSTi-EP CPU Reference Manual*, GFK-2222Y contains instructions for configuring the CPE400 Embedded Field Agent. The *Field Agents User Guide*, GFK-2993, also contains instructions for configuring the Field Agent. Be aware: a) Certain sections are specific to other Field Agents. b) Performance data for the CPE400 Embedded Field Agent is not available at this time to supplement section 5.2.4 (*Guidelines for Maximum Configured Variables*).
***ETH*[8] Ethernet Port Protocols**	The *ETH*[8] Ethernet port on the underside of the CPE400 supports communications with the Predix cloud.

[8] The Embedded Field Agent's IICS Cloud Port is labeled *EFA* instead of *ETH* on some versions of the CPE400.

Operational Notes: CPL410 GP Linux

Operational Note	Description
N/A	N/A

Product Documentation

PACSystems RX3i 1.2GHz 64MB Rackless CPU w/Field Agent Quick Start Guide	GFK-3002
PACSystems RX7i, RX3i and RSTi-EP CPU Reference Manual	GFK-2222
PACSystems RX7i, RX3i and RSTi-EP CPU Programmer's Reference Manual	GFK-2950
PACSystems RX7i, RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual	GFK-2224
PACSystems TCP/IP Ethernet Communications Station Manager Manual	GFK-2225
PACSystems Hot Standby CPU Redundancy User Manual	GFK-2308
PACSystems RX3i System Manual	GFK-2314
PACSystems RX3i PROFINET IO Controller User Manual	GFK-2571
PACSystems RXi, RX7i, RX3i and RSTi-EP Controller Secure Deployment Guide	GFK-2830
PROFINET I/O Devices Secure Deployment Guide	GFK-2904
Field Agents User Guide	GFK-2993
Field Agent Secure Deployment Guide	GFK-3009
Field Agents Upgrade Guide	GFK-3017
PACSystems RX3i 1.2GHz 64MB Rackless CPU w/Linux Quick Start Guide	GFK-3053
PACSystems RX3i CPU with Linux Secure Deployment Guide	GFK-3055
C Programmer's Toolkit for PACSystems User's Manual	GFK-2259

User manuals, product updates and other information sources are available on the GE support website, http://geautomation.com/support.

If you purchased this product through an Authorized Channel Partner, please contact the seller directly.

General Contact Information

Online technical support and GlobalCare	http:// www.geautomation.com/support
Additional information	http://www.geautomation.com/
Solution Provider	solutionprovider.ip@ge.com

Technical Support

If you have technical problems that cannot be resolved with the information in this manual, please contact us by telephone or email, or on the web at www.geautomation.com/support

Technical Support (Americas)

Phone	1-800-433-2682
	780-420-2010 (if toll free 800-option is unavailable)
Email	digitalsupport@ge.com
Primary language of support	English

Technical Support (Europe, Middle East, & Africa)

Phone	+800-1-433-2682
	+ 420-296-183-331 (if toll free 800-option is unavailable or if dialing from a mobile telephone)
Email	digitalsupport.emea@ge.com
Primary languages of support	English, French, German, Italian, Spanish

Technical Support (Asia)

Phone	+86-400-820-8208
	+86-21-3877-7006 (India, Indonesia & Pakistan)
Email	digitalsupport.apac@ge.com
Primary languages of support	Chinese, English