The PACSystems* RX3i PROFINET Scanner (PNS) module, IC695PNS001, connects a remote universal RX3i I/O rack of Series 90-30 or RX3i modules to a PROFINET IO-Controller. The PROFINET Scanner scans the modules in its rack, retrieving input data and providing output data, and exchanges that data on the PROFINET IO LAN at the configured production rate.

The PNS manages PROFINET communication and module configuration between an IO-Controller and modules in the remote rack. If network communications are lost, the PNS manages IO states according to the individual module configurations.

The PNS supports 10/100/1000 Mbps Copper, 100/1000 Mbps Multi-mode Fiber, and 100/1000 Mbps Single-mode Fiber. PROFINET communications on the network require 100 or 1000 Mbps link speed. Although 10 Mbps cannot be used for PROFINET communications, 10 Mbps can be used for other types of Ethernet traffic such as PING.

Features of the RX3i PNS include:

- Programming and configuration services for all supported Series 90-30 and RX3i IO Modules using Proficy Machine Edition. For a list of currently supported IO modules, see "Supported Modules, Power Supplies and Backplanes," on page 9.

- Support for daisy-chain/line, star, or ring (redundant media) topologies.

- Four switched Ethernet ports - two 8-conductor RJ-45 shielded twisted pair 10/100/1000 Mbps copper interfaces and two Small Form-factor Pluggable (SFP) cages for user-supplied SFP devices.

- The network can include media interfaces of more than one type.

- Support for transfer of IO-Device Name to another PNS module using an SD card. This eliminates the need to connect a configuration tool, such as Proficy Machine Edition when replacing a module.

- A USB port for field updates of firmware using WinLoader.

Note: The USB port is for firmware upgrades only. It is not intended for permanent connection.

Ordering Information

IC695PNS001	PACSystems RX3i PROFINET Scanner Module 10/100/1000 with four Ports (two SFP connections, two Copper) Includes a blank SD card, two mounting screws and a USB port cover
IC695SPC100	RX3i 10/100/1000Base-T copper SFP
IC695SPF002	RX3i 100Base-FX (fiber 2 km) SFP (Multi mode fiber - MMF)
IC695SPF550	RX3i 1000Base-SX (fiber 550 m) SFP (MMF)
IC695SPF010	RX3i 1000Base-LX (fiber 10 km) SFP (Single mode fiber - SMF)

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PNS Specifications

PROFINET Support	PROFINET Version 2.3 Class A IO-Device
Controller CPU Version Required	CPU315/CPU320 with firmware version 7.10 or later CPE305/CPE310 with firmware version 7.10 or later RXi Controller firmware with version 7.80
Proficy Machine Edition Version Required	Version 8.0 or later
Power Requirements	3.3V: 1.2A with no SFP devices installed 1.9A maximum (two SFP devices installed, 0.35A per SFP)
	5V: 1.1A maximum

Operating Temperature Range	0 to 60°C
	Derated to 57°C:
	   • If 100MB Fiber SFPs installed, or
	   • If Copper SFPs operating at 1GB

Number of Port Connectors	Two RJ-45 and Two SFP Cages (SFP devices not included, available separately.)
USB Connector (for firmware upgrades)	One Micro-B connector. USB 2.0 compliant running at Full-speed (12 MHz)
SD Card	Supports SD and SDHC cards.
PNS Status and Control Bits	32 input status bits and 32 output control bits
PROFINET IO production rate (IO Update Rate)	Configurable selections: 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms, 256ms or 512ms
Number of IP addresses	One. Supports Classless Inter-Domain Routing (CIDR)
Number of MAC Addresses	Five. One per external port and one internal.
IO Station Maximum Limits	**Number of IO Modules per station**: Number of backplane slots minus one for PNS and at least one for a power supply
	IO data per station: 2880 bytes total 1440 bytes of input data 1440 bytes of output data
Configuration	V2.3 GSDML file is included with Proficy Machine Edition; available for import into 3rd-Party tools. **Note:** Configuration software that supports GSDML V2.3 MenuList elements (such as Proficy Machine Edition 8.0 or later) is required to display the configuration parameters of most IC695xxx I/O modules.

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

Additional Information

For additional information, please refer to the manuals listed below. Manuals can be downloaded from the Support website, http://support.ge-ip.com.

PACSystems RX3i PROFINET Scanner Manual, GFK-2737

PACSystems RX3i PROFINET Controller Manual, GFK-2571

PACSystems RX3i PROFINET Controller Command Line Interface Manual, GFK-2572

PACSystems CPU Reference Manual, GFK-2222

PACSystems RX3i System Manual, GFK-2314

General Installation Requirements

This product is intended for use with the RX3i system. Its components are considered open equipment [having live electrical parts that may be accessible to users] and must be installed in an ultimate enclosure that is manufactured to provide safety. As a minimum, the enclosure shall provide a degree of protection against solid objects up to 12mm (e.g. fingers). This equates to a NEMA/UL Type 1 enclosure or an IP20 rating (IEC60529) providing at least a pollution degree 2 environment.

Installation in Hazardous Areas

The system containing the RX3i PNS001 module must be mounted within an ultimate enclosure that can be accessed only by the use of a tool.

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

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 OR ZONE 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D, ZONE 2 OR NON-HAZARDOUS LOCATIONS ONLY

- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2;

- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND

- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

PROFINET Scanner Status and Control Data

The RX3i PROFINET Scanner provides 32 bits of input status data and receives 32 bits of output control data. The application program in the IO-Controller system can monitor the input status bits for the PNS module. The output control bits are reserved for future use and have no function at this time.

Output Control Bits: The PROFINET Scanner's 32 bits of control output are reserved for future use.

Input Status Bits The PROFINET Scanner's 32 bits of input status provide information about the scanner. All status bits are active high.

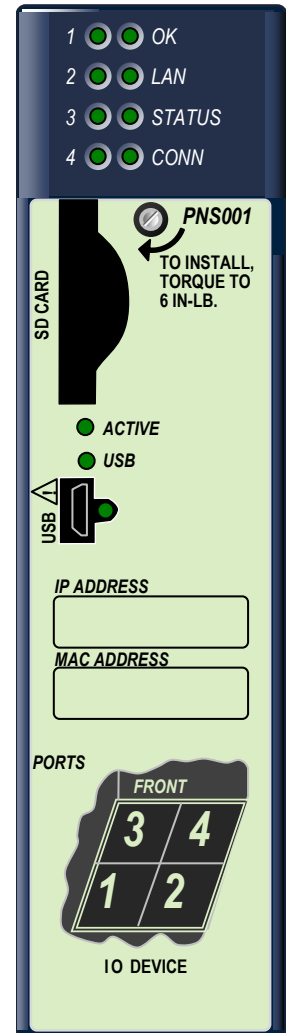| Status Bits	Name	Description
1	Module OK	Indicates the health of the module. A value of 0 indicates the module is powering up or has failed. A value of 1 indicates the module is functioning properly.
2	Reserved	Set to 0
3	Port1 Link Up	1 = port is connected to another device and is communicating. 0 = port is not connected to another device, or the port has some sort of error preventing communications.
4	Port2 Link Up	
5	Port3 Link Up	
6	Port4 Link Up	
7-10	Reserved	Set to 0
11	MRP Enabled	Indicates whether MRP has been enabled or not. A value of 0 indicates that MRP is not enabled. A value of 1 indicates that MRP is enabled.
12	MRP Role	Indicates the MRP role the PNS is operating as when MRP is enabled. A value of 0 indicates that the PNS is currently an MRP Client. A value of 1 indicates that the PNS is currently an MRP Manager, however the PNS does not currently support MRP Manager configuration. If MRP is not enabled, then this bit will be set to zero.
13-32	Reserved	Set to 0

LEDs on the PROFINET Controller Module

Powerup LED Patterns

At powerup, the LEDs show the patterns described below. The LEDs also blink diagnostic patterns for certain operating errors and for module identification.

Step	LED/ Blink pattern	Description
1	All LEDs off	Initial state
2	STATUS LED solid green	Normal operation
	OK LED blinks amber with special blink code	Fatal initialization or diagnostics failure; H/W Module Identity Information not available
	STATUS LED blinks red with special blink code	Fatal initialization failure.
	OK, LAN, and STATUS LEDs blink green in unison (0.5 second ON/ 0.5 second OFF)	Invalid firmware detected or firmware update initiated. Module is waiting for firmware update. Blink pattern continues during firmware update. After the automatic update completes, the LAN and STATUS LEDs blink amber and the module resets, which restarts the powerup process.
	STATUS and LAN LEDs blink green in unison (0.5 seconds ON/ 0.5 seconds OFF)	Internal update in process following a firmware update. Unit should complete update and restart automatically.
3	LAN and STATUS LED solid green	Normal operation
4	OK LED solid green	Normal operation. Powerup completed.

Note: Under certain ambient operating temperatures, the PROFINET Scanner could momentarily display the over temperature pattern during power up, while it is calibrating its thermal protection functions. This indication can be ignored. For details, see "Microprocessor Over Temperature" in the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737.

Normal Operation of Individual LEDs

The PNS's LEDs can operate in tandem to indicate fatal error, module location/identification, microprocessor over temperature, and update conditions. For details on these blink patterns, refer to *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737.

OK LED

The OK LED indicates whether the module is able to perform normal operation.

🟢	Green, on	OK
⚪	Off	Not OK

LAN LED

The LAN LED indicates access to and activity on the Ethernet network. The LAN LED indicates network packets are being processed by the network interface (not just passing through the embedded switch).

🟢	Blinking on	The module's network interface is active
⚪	Off	No activity

STATUS LED

The STATUS stays Green during normal operation.

🟢	Green, on	Normal Operation
🔴	Red, blinking	A MAC address read from nonvolatile memory is invalid. Ports with invalid MAC addresses remain disconnected from the Ethernet network.

CONN LED

The CONN LED indicates the status of PROFINET connections.

🟢	Green, on	At least one PROFINET connection (AR) exists with an IO-Controller.
🟡	Amber, blinking	No device name configured.
⚪	Off	No PROFINET connection (AR) exists.

Port LEDs

The PROFINET Controller has four Port LEDs, PORT1, PORT2, PORT3, and PORT4 that indicate link speed, link connection and link activity corresponding to the four possible external Ethernet ports.

🔵	Blue, on	Link connected, 1000 Mbps
🔵	Blue, blinking	Port active, 1000 Mbps
🟢	Green, on	Link connected, 100 Mbps
🟢	Green, blinking	Port active, 100 Mbps
🟣	Purple, on	Link connected, 10 Mbps
🟣	Purple, blinking	Port active, 10 Mbps
⚪	Off	The associated Ethernet port is not connected to an active link
🔴	Red, on	Port 3 and port 4 only. Incompatible SFP plugged into port.

ACTIVE LED

The active LED indicates the Scanner is connected to a PROFINET IO Controller that is controlling the IO data for the PNS's IO modules.

🟢	Green, on	PNS is connected to a PROFINET IO-Controller that is controlling IO Module IO data.
⚪	Off	PNS is not connected to a PROFINET-IO Controller.

USB LED

The USB LED indicates activity on the USB port.

🟢	Green, on	A USB cable is connected.
🟢	Green, blinking	USB port activity
⚪	Off	No USB port activity

Quick Start Guide

Installation and initial startup procedures for the PNS include the following steps. Before installing and operating the PNS, refer to the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737 for detailed information.

1.   Pre-Installation check

Upon receiving your RX3i equipment, carefully inspect all shipping containers for damage. If any part of the system is damaged, notify the carrier immediately. The damaged shipping container should be saved as evidence for inspection by the carrier.

As the consignee, it is your responsibility to register a claim with the carrier for damage incurred during shipment. However, GE Intelligent Platforms will fully cooperate with you, should such action be necessary.

After unpacking the RX3i equipment, record all serial numbers. Serial numbers are required if you should need to contact Customer Care during the warranty period. All shipping containers and all packing material should be saved should it be necessary to transport or ship any part of the system.

2. Installing the PNS in an RX3i backplane

The Scanner can be installed in slot 1 or 2 of a 7, 12, or 16-slot RX3i Universal Backplane, or in slot 6 of a 7-slot RX3i Universal Backplane. The installation slot must match the slot that is selected in the module's hardware configuration.

The back of the PNS has an exposed heat sink and backplane connector. Before inserting the module into the backplane, the removable conduction cooling cover must be removed from backplane.

Removable plastic for the module's heat-sink.
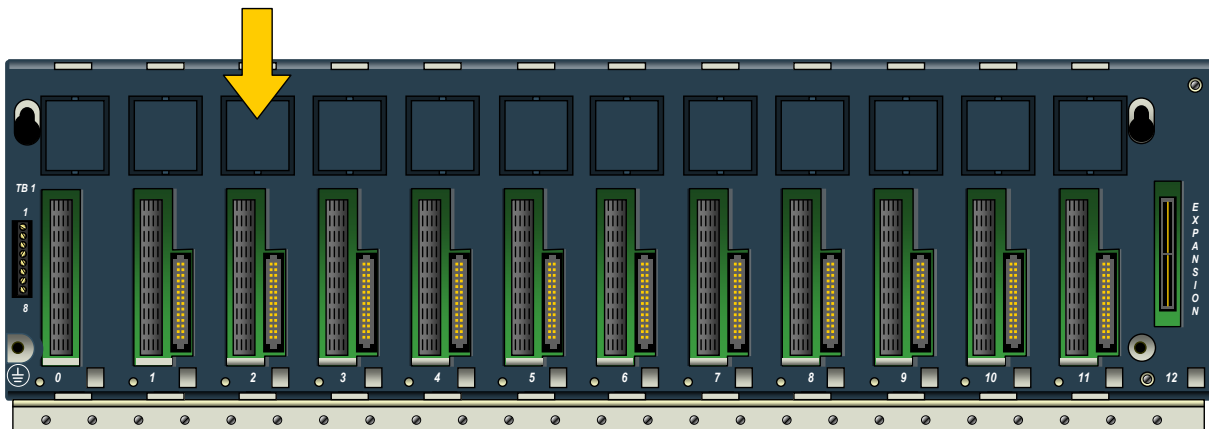
- ▪ RX3i rack power must be turned off. The PNS does not support insertion/removal while power is applied to the system (hot swap).

- ▪ Holding the module firmly, align the module with the correct slot and connector.

- ▪ Engage the module's rear pivot hook in the notch on the top of the backplane (1).

- ▪ Swing the module down (2) until the module's connector engages the backplane's backplane connector.

- ▪ Visually inspect the module to be sure it is properly seated.

- ▪ Secure the bottom of the module to the backplane using the machine screws provided with the module (3).

- ▪ Tighten the heat sink screw on the front of the module in the threaded hole in the backplate to 6 in-lbs, using a flat-tip screwdriver.
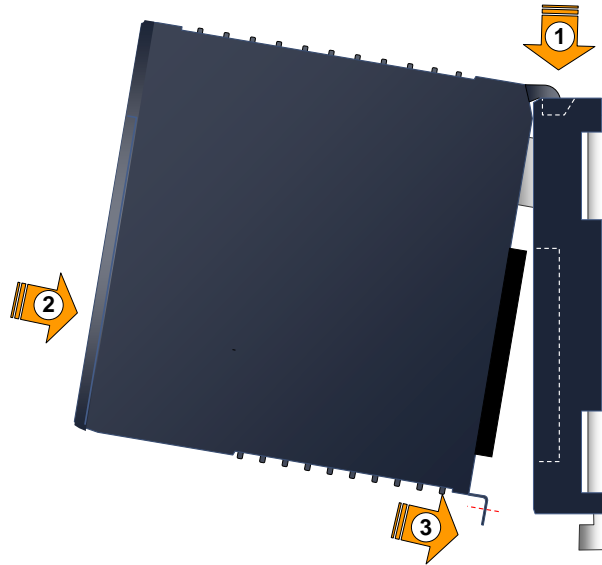
3. Connecting the PNS to the PROFINET network and to a 10BaseT, 100BaseTX or 1000BaseT IEEE 802.3 network for general Ethernet communications

> **Caution**
>
> **Do not connect two or more ports on the PNS to the same device, either directly or indirectly.**

Each port on an RX3i PNS operates independently, so devices that operate at different speeds and/or duplex modes may be attached to the ports. By default, all ports, including empty, unconfigured SFP cages, are set for Automatic, which enables auto-negotiation for the widest range of options supported by the port. For other options, refer to the user's manual, GFK-2737.
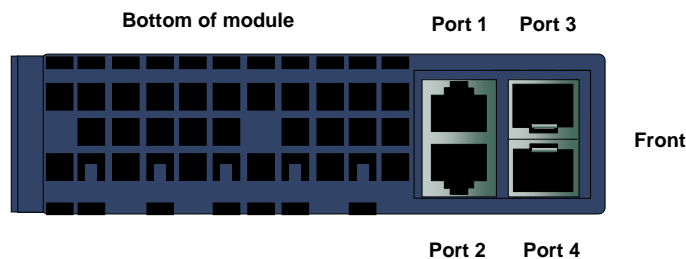
4. Installing SFP devices

Warning

Optical SFPs use an invisible laser to generate a fiber-optic signal. Always keep the port covered if a cable is not installed. Do not look into the open port if a cable is not installed.

Warning

If the surrounding air operating temperature of the PNS is greater than 40 °C,SFP devices could have operating temperatures over 70 °C (158 °F). Under these conditions, for your safety, do *not* use bare hands to remove an SFP device from the SFP cage. Use protective gloves or a tool (needle-nose pliers) to avoid handling the hot SFP device directly when removing the SFP device.

For a list of SFP module types and network cabling details, refer to "SFP Modules for Ethernet Ports" in the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737.

5. Installing the USB port driver (optional)

The PNS provides a micro USB port for connection to a computer running Windows 2000, Windows XP, Windows Vista, or Windows 7 operating system. The USB port is used only for firmware updates. USB driver files are provided as part of upgrade packages compatible with the PROFINET Scanner. The PNS includes a driver-install application that can be used to enable a computer to communicate with a PNS via its USB port.

6. Assigning an IO Device Name to the PNS

Before attempting to connect to or configure the RX3i PNS, the IO Device Name must be set with a Discovery and Configuration Protocol (DCP) tool, such as the Proficy Machine Edition Discovery Tool.

7. Configuring the PNS and its IO Modules on a PROFINET network

Proficy Machine Edition is the primary tool used to configure an RX3i PROFINET network. The PNS must be installed in the slot that is selected in the module's hardware configuration. The GSDML file for the RX3i PNS is included with Proficy Machine Edition. To obtain the GSDML for import into a 3rd-Party tool, contact GE Technical Support.

Supported Modules, Power Supplies and Backplanes,

The following modules can be used with this release of the RX3i PROFINET Scanner IO-Device:

Catalog Number	Module Description	Distinguishing Classes [1]
	Discrete Input Modules	
IC693ACC300	Input Simulator Module (8pt & 16pt operation)	8 in, 16 in
IC693MDL230	8 Circuit Input 120 VAC Isolated	8 in
IC693MDL231	8 Circuit Input 240 VAC Isolated	8 in
IC693MDL240	16 Circuit Input 120 VAC	16 in
IC693MDL241	16 Circuit Input 24 VAC / VDC	16 in
IC693MDL250	16 Circuit Isolated Input 120 VAC, Input Filtering Off	16 in
IC693MDL250	16 Circuit Isolated Input 120 VAC, Input Filtering On	none
IC693MDL260	32 Circuit Input 120 VAC, Input Filtering Off	32 in
IC693MDL260	32 Circuit Input 120 VAC, Input Filtering On	32 in/out
IC693MDL632	8 Circuit Input 125 VDC Positive / Negative Logic	8 in
IC693MDL634	8 Circuit Input 24 VDC Positive / Negative Logic	8 in
IC693MDL635	16 Circuit Input 125 VDC Positive / Negative Logic	16 in
IC693MDL645	16 Circuit Input 24 VDC Positive / Negative Logic	16 in
IC693MDL646	16 Circuit Input 24 VDC Positive / Negative Logic Fast	16 in
IC693MDL648	16 Circuit Input 48 VDC Positive / Negative Logic Fast	16 in
IC693MDL654	32 Circuit Input 5/12 VDC Positive / Negative Logic	32 in
IC693MDL655	32 Circuit Input 24 VDC Positive / Negative Logic Fast	32 in
IC693MDL660	32 Circuit Input 24 VDC Positive / Negative Logic, Input Filtering Off	32 in
IC693MDL660	32 Circuit Input 24 VDC Positive / Negative Logic, Input Filtering On	32 in/out
IC694ACC300	Input Simulator Module (8pt& 16pt Mode)	8 in, 16 in
IC694MDL230	8 Circuit Input 120 VAC Isolated	8 in
IC694MDL231	8 Circuit Input 240 VAC Isolated	8 in
IC694MDL240	16 Circuit Input 120 VAC	16 in
IC694MDL241	16 Circuit Input 24 VAC / VDC	16 in
IC694MDL250	16 Circuit Input 120 VAC Isolated	none
IC694MDL260	32 Circuit Input 120 VAC	none
IC694MDL632	8 Circuit Input 125 VDC Positive / Negative Logic	8 in
IC694MDL634	8 Circuit Input 24 VDC Positive / Negative Logic	8 in
IC694MDL635	16 Circuit Input 125 VDC Positive / Negative Logic	16 in
IC694MDL645	16 Circuit Input 24 VDC Positive / Negative Logic	16 in
IC694MDL646	16 Circuit Input 24 VDC Positive / Negative Logic Fast	16 in
IC694MDL654	32 Circuit Input 5/12 VDC Positive / Negative Logic	32 in
IC694MDL655	32 Circuit Input 24 VDC Positive / Negative Logic Fast	32 in
IC694MDL658	32 Circuit Input 48 VDC Positive / Negative Logic Fast	32 in
IC694MDL660	32 Circuit Input 24 VDC Positive / Negative Logic	none
IC695MDL664	16 Circuit Smart Input 24VDC Positive Logic[2]	none

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[1] The PNS cannot distinguish between modules within the same Distinguishing Class type. This means that any module physically present that is within the same class as the one configured will not alert the user with a System Configuration Mismatch fault on the Controller Fault Table. *See GFK-2222 Chapter 3 for CPU operation during System Configuration Mismatch faults.*
[2] The PNS currently does not support "Fault Reporting" from this module.

Catalog Number	Module Description	Distinguishing Classes [1]
Discrete Output Modules		
IC693MDL310	12 Circuit Output 120 VAC 0.5A	16 out
IC693MDL330	8 Circuit Output 120/240 VAC 2A	8 out
IC693MDL340	16 Circuit Output 120 VAC 0.5A	16 out
IC693MDL350	16 Circuit Output 120/240 VAC Isolated	16 out
IC693MDL390	5 Circuit Output 120/240 VAC 2A Isolated	8 out
IC693MDL730	8 Circuit Output 12/24 VDC 2A Positive	8 out
IC693MDL731	8 Circuit Output 12/24 VDC 2A Negative	8 out
IC693MDL732	8 Circuit Output 12/24 VDC 0.5A Positive	8 out
IC693MDL733	8 Circuit Output 12/24 VDC 0.5A Negative	8 out
IC693MDL734	6 Circuit Output 125 VDC 1A Positive/Negative	8 out
IC693MDL740	16 Circuit Output 12/24 VDC 0.5A Positive	16 out
IC693MDL741	16 Circuit Output 12/24 VDC 0.5A Negative	16 out
IC693MDL742	16 Circuit Output 12/24 VDC 1A Positive	16 out
IC693MDL748	8 Circuit Output 48 VDC 0.5A Positive	8 out
IC693MDL752	32 Circuit Output 5/24 VDC 0.5A Negative	32 out
IC693MDL753	32 Circuit Output 12/24 VDC 0.5A Positive	32 out
IC693MDL754	32 Circuit Output 24 VDC 0.75A Positive Diagnostics Off	32 out
IC693MDL754	32 Circuit Output 24 VDC 0.75A Positive Diagnostics On	32 in/out
IC693MDL760	Solenoid Valve Output Module	16 out
IC693MDL916	16 Circuit Output 4A Relay	16 out
IC693MDL930	8 Circuit Output 4A Relay Isolated	8 out
IC693MDL931	8 Circuit Output Relay Form BC Isolated	8 out
IC693MDL940	16 Circuit Output 2A Relay	16 out
IC694MDL310	12 Circuit Output 120 VAC 0.5A	16 out
IC694MDL330	8 Circuit Output 120/240 VAC 2A	8 out
IC694MDL340	16 Circuit Output 120 VAC 0.5A	16 out
IC694MDL350	16 Circuit Output 120/240 VAC Isolated	none
IC694MDL390	5 Circuit Output 120/240 VAC 2A Isolated	8 out
IC694MDL732	8 Circuit Output 12/24 VDC 2A Positive	8 out
IC694MDL734	6 Circuit Output 125 VDC 1A Positive/Negative	8 out
IC694MDL740	16 Circuit Output 12/24 VDC 0.5A Positive	16 out
IC694MDL741	16 Circuit Output 12/24 VDC 1A Negative	16 out
IC694MDL742	16 Circuit Output 12/24 VDC 1A Positive	16 out
IC694MDL752	32 Circuit Output 5/24 VDC 0.5A Negative	32 out
IC694MDL753	32 Circuit Output 12/24 VDC 0.5A Positive	32 out
IC694MDL754	32 Circuit Output with ESCP	none
IC694MDL916	16 Circuit Output 4A Relay	none
IC694MDL930	8 Circuit Output 4A Relay Isolated	8 out
IC694MDL931	8 Circuit Output Relay Form BC Isolated	8 out
IC694MDL940	16 Circuit Output 2A Relay	16 out
IC695MDL765	16 Circuit Smart Output 24/125 VDC 2A Positive Logic[2]	none
Discrete Mixed Modules		
IC693MAR590	8 Circuit Mixed 120 VAC Input / Relay Output	8 in/out
IC693MDR390	8 Circuit Mixed 24 VDC Input / Relay Output	8 in/out

Catalog Number	Module Description	Distinguishing Classes [1]
Analog Input Modules		
IC693ALG220	4 Point Analog Voltage Input	ALG IN 4
IC693ALG221	4 Point Analog Current Input	ALG IN 4
IC693ALG222	16 Point Analog Voltage Input	ALG IN 16
IC693ALG223	16 Point Analog Current Input	ALG IN 16
IC694ALG220	4 Point Analog Voltage Input	ALG IN 4
IC694ALG221	4 Point Analog Current Input	ALG IN 4
IC694ALG222	16 Point Analog Voltage Input	ALG IN 16
IC694ALG223	16 Point Analog Current Input	ALG IN 16
IC695ALG616	16 Point Analog Current / Voltage Input[3]	none
Analog Output Modules		
IC693ALG390	2 Point Analog Voltage Output	ALG OUT 2
IC693ALG391	2 Point Analog Current Output	ALG OUT 2
IC693ALG392	8 Point Analog Current / Voltage Output	ALG OUT 8
IC694ALG390	2 Point Analog Voltage Output	ALG OUT 2
IC694ALG391	2 Point Analog Current Output	ALG OUT 2
IC694ALG392	8 Point Analog Current / Voltage Output	ALG OUT 8
IC695ALG708	8 Point Analog Current / Voltage Output[3]	none
Analog Mixed Modules		
IC693ALG442	4 Input / 2 Output, Current / Voltage	ALG IN 4, ALG OUT 2
IC694ALG442	4 Input / 2 Output, Current / Voltage	ALG IN 4, ALG OUT 2
RTD Input Modules		
IC695ALG508	8 Channel Isolated RTD Input[3]	none
Power Supply Modules		
IC695PSA040	Universal 120/240 VAC, 125VDC 40W Power Supply	none
IC695PSA140	Multifunctional 120/240 VAC, 125VDC 40W Power Supply	none
IC695PSD040	24VDC 40W Power Supply	none
IC695PSD140	Multifunctional 24VDC 40W Power Supply	none
Small Form-factor Pluggable (SFP) Modules		
IC695SPC100	10/100/1000Base-T Copper SFP	none
IC695SPF002	100Base-FX (fiber 2km) SFP	none
IC695SPF010	1000Base-LX (fiber 10km) SFP	none
IC695SPF550	1000Base-SX (fiber 550m) SFP	none

The RX3i PROFINET Scanner can be used in the following PACSystems backplanes:

Catalog Number	Backplane Type [4]
IC695CHS007	7 Slot RX3i Universal Backplane
IC695CHS012	12 Slot RX3i Universal Backplane
IC695CHS016	16 Slot RX3i Universal Backplane

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[3] The PNS currently does not support "Fault Reporting" or "Interrupts" from this module.
[4] The PNS cannot distinguish between the different rack sizes. Choosing the wrong type will not generate a System Configuration Mismatch fault on the Controller Fault Table.

Release History

Version	Firmware Revision	Date	Comments
IC695PNS001-ABAC	1.10	July 2013	Support for additional RX3i I/O modules, listed in "New Features and Enhancements in this Release" on page 13.
IC695PNS001-ABAA	1.00	June 2013	Hardware update for improved manufacturability. No changes to features, functions or compatibility
IC695PNS001-AAAA	1.00	March 2013	Initial release.

Important Product Information for this Release

Compatibility

The following CPU firmware, programming software and backplane hardware versions are required to use the features introduced in the PNS release:

Controller CPU firmware	CPU315/CPU320 firmware version 7.10 or later CPE305/CPE310 firmware version 7.10 or later RXi Controller firmware version 7.80 or later
Programmer software	Proficy Machine Edition version 8.0 or later
RX3i PROFINET Controller	IC695PNC001 with firmware version 1.20 or later
RX3i backplane hardware	The following minimum backplane hardware revision **must** be used: IC695CHS012-BAMP IC695CHS016-BAMP IC695CHS012CA-BAMP IC695CHS016CA-BAMP or IC695CHS012-CA (or later) IC695CHS016-CA (or later) IC695CHS012CA-CA (or later) IC695CHS016CA-CA (or later) or IC695CHS007-AA (or later) When installing, operating, or maintaining the IC695PNS001, personnel must insure any electrostatic charge is discharged through the use of a grounded ESD strap or other means. This requirement does not apply if the IC695PNS001 is used with the following backplane revisions: IC695CHS012-EA (or later) IC695CHS016-EA (or later) IC695CHS012EA-CA (or later) IC695CHS016EA-CA (or later) or IC695CHS007-BA (or later)
Small form-factor pluggable modules	IC695SPC100A or later IC695SPF002A or later IC695SPF550A or later IC695SPF010A or later
RX3i modules	For a complete list, refer to "Supported Modules, Power Supplies and Backplanes," on page 9.

New Features and Enhancements in this Release

Release 1.10 adds support for the following RX3i modules:

- **IC695MDL664 (16 Circuit Smart Input 24VDC Positive Logic)**

  Operational Notes:
  - o   Options related to "Fault Reporting" are not currently supported.
  - o   Configuration rule checking is performed by the PROFINET Scanner at PROFINET connection time. Rule check failures will transition the module to default operation and point faults energized for assigned I/O. (See the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737A for additional details.)

- **IC695MDL765 (16 Circuit Smart Output 24/125 VDC 2A Positive Logic)**

  Operational Notes:
  - o   Options related to "Fault Reporting" are not currently supported.
  - o   Output Command Feedback data is not currently supported.
  - o   Configuration rule checking is performed by the PROFINET Scanner at PROFINET connection time. Rule check failures will transition the module to default operation and point faults energized for assigned I/O. (See the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737A for additional details.)

- **IC695ALG508 (8 Channel Isolated RTD Input)**

  Operational Notes:
  - o   Options related to "Fault Reporting" are not currently supported.
  - o   Options related to "Interrupts" are not currently supported.
  - o   Options related to "Rate of Change" are not currently supported.
  - o   Configuration rule checking is performed by the PROFINET Scanner at PROFINET connection time. Rule check failures will transition the module to default operation and point faults energized for assigned I/O. (See the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737A for additional details.)

- **IC695ALG616 (16 Channel Analog Input Current / Voltage)**

  Operational Notes:
  - o   Options related to "Fault Reporting" are not currently supported.
  - o   Options related to "Interrupts" are not currently supported.
  - o   Options related to "Rate of Change" are not currently supported.
  - o   Configuration rule checking is performed by the PROFINET Scanner at PROFINET connection time. Rule check failures will transition the module to default operation and point faults energized for assigned I/O. (See the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737A for additional details.)

- **IC695ALG708 (8 Channel Analog Output Current / Voltage)**

  Operational Notes:
  - o   Options related to "Fault Reporting" are not currently supported.
  - o   Options related to "Interrupts" are not currently supported.
  - o   Output Command Feedback Reference data is not currently supported.
  - o   Configuration rule checking is performed by the PROFINET Scanner at PROFINET connection time. Rule check failures will transition the module to default operation and point faults energized for assigned I/O. (See the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737A for additional details.)

Problems Resolved by this Revision

Subject	Description
Loss of IO During Hot insertion of I/O module	In earlier versions, while hot inserting an I/O Module, the PNS could disable outputs on other Output Modules in the rack to their Default/Hold Last State operation and mark Input Module data as **bad** in PROFINET messages back to the IO-Controller. (For GE-IP controllers, this is represented as IO Point Fault contacts.) This could occur for up to 5ms and then I/O continued normally.
RX3i PNS names starting or ending with a hyphen not prevented from storing to the RX3i PNS from an SD Card	PROFINET specifies that IO Device names should neither start nor end with a hyphen. Previous releases did not prevent names starting or ending with a hyphen from being stored to the RX3i PNS from the SD Card.

Restrictions and Open Issues in this Release

Subject	Description
PROFINET connection losses with MRP enabled and IO update rates of 1 ms	Applications with MRP Ring network topologies and IO Devices configured with IO Update Rates of 1 ms on either 100 Mbps or 1000 Mbps may encounter PROFINET Connection Losses of PROFINET IO Devices during a ring-break event. Use of MRP with 1 ms IO Update rates is not recommended with this release. Refer to "Media Redundancy Protocol Support" in the *PACSystems RX3i PROFINET Scanner Manual,* GFK-2737, for details on recommended MRP configurations.
Connecting Ethernet ports not configured as ring ports to the MRP ring may inhibit ring-break detection	In order to insure correct MRP ring-break detection, it is important to connect the correct Ethernet ports of the RX3i PNS to the MRP ring. The ports connected to the ring must be the same ports configured as MRP Ring Ports. Failure to connect the configured ports will prevent the PNS from correctly participating in the MRP ring, may inhibit ring-break detection, and may result in losses of IO Devices upon ring-break events. It is recommended during system commissioning that the physical network connections be verified with the system configuration for ring ports in system's hardware configuration. Refer to "Media Redundancy Protocol Support" in *the PACSystems RX3i PROFINET Scanner Manual,* GFK-2737, for details on recommended MRP configuration.
More than three ALG508/ALG616/ALG708 modules in a PNS rack cause system to transition to STOP/FAULTED during store of hardware configuration	IC695ALG508, IC695ALG616, IC695ALG708 modules have larger configurations than other modules. If more than three of these modules are placed in a PNS rack, an IOC Software Fault - Module Firmware Fault could be generated on the RXi Controller (v7.80 or earlier) or RX3i PNC (v1.22 and earlier). If this happens, the system will go to STOP/FAULTED state. Future versions of the RXi Controller and IC695PNC001 firmware will remove this restriction. With the current PNC or RXi firmware, you must limit the number of ALG508, ALG616, and ALG708 modules to three in a single PNS rack to avoid this issue. This limit does NOT apply to the main PLC rack.

Operational Notes

Subject	Description
IOPS of power supplies do not update when power supply is switched off	The IOPS (status) of a power supply is marked **good** or **bad** at the start of each PROFINET IO connection. The IOPS is not updated when the power supply is turned on and off.
RX3i PNS allows firmware update while connected to a running PROFIENT IO Controller	The RX3i PNS does not prevent initiation of module Firmware Update via Winloader if it is actively connected to an IO Controller. Do not initiate Firmware Update of an RX3i PNS until you have placed its controlling PROFINET IO Controller into Stop mode (no longer driving output and collecting inputs from the RX3i PNS).
Port LED for Ethernet ports configured to 100 Mbps may briefly flash blue before changing to green	During power-up, the Port LEDs of the RX3i PNS Ethernet ports configured for 100 Mbps operation may briefly flash blue before turning green. The port remains configured for 100 Mbps operation during the power-up process and afterwards.
PROFINET Alarms are not supported	PROFINET Alarms are not issued from the RX3i PNS in this release.
Some power supplies use two backplane slots, but this is not indicated in the change module list interface of HWC	Note that the IC695PSA040 and IC695PSA140 each utilize two backplane slots, but are shown using only one slot in the Change Module List interface for the RX3i PNS. Configuring a module for the already utilized slot will result in a Loss of I/O Module fault.
The PNS module is supported only in certain backplane slots.	The RX3i PROFINET Scanner module is configurable for use in Slot 1, Slot 2, and when installed in the IC695CHS007 backplane, also Slot 6.
Explore PROFINET Networks tool not supported on submodules	The Proficy Machine Edition Explore PROFINET Networks tool does not return submodule information for IO modules within its RX3i rack in this release. Submodule information for the RX3i PNS itself is returned.
SFP modules do not support hot swap	In this release of the RX3i PNS, SFP modules do not support hot swap. This means that if an SFP module is hot-inserted into the RX3i PNS, no Fault Table entry will be logged and configuration parameters will not be applied to the SFP until the RX3i PNS is power cycled. Until the RX3i PNS is power cycled, the SFP will remain enabled and active with auto negotiation turned on.
IO modules hot inserted while an invalid configuration is stored require re-insertion or power cycle to recover	If an invalid configuration for an IO module in the PNS is stored to the CPU, such as a default value outside the engineering units range, and the IO module using that configuration is hot inserted in the PNS, the hot insertion process fails. No Addition of IO Module fault is generated and the module is left at its default operation. The configuration of that module will not be retried until the module is re-inserted or the PNS rack is power cycled, even if the configuration is corrected in the CPU.