

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GENERAL ELECTRIC

IC695PNC001-AB

PROFINET IO CONTROLLER MODULE

Used with the applicable PACSystems RX3i configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

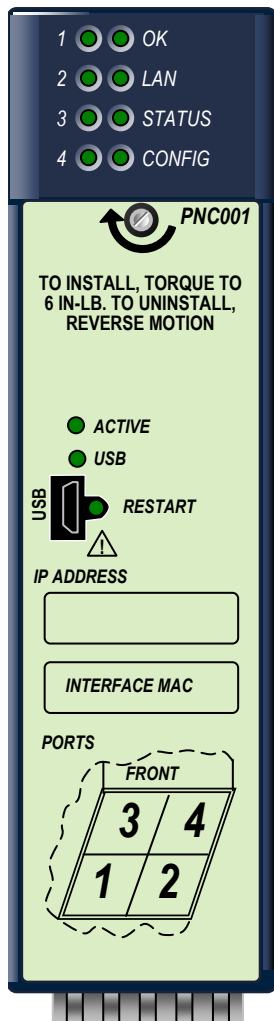
Source: GE Intelligent Platforms GFK-2573A, PROFINET Controller Module

PACSystems* RX3i

IC695PNC001

PROFINET Controller Module

GFK-2573A
December 2011



The PACSystems* RX3i PROFINET Controller (PNC) module, IC695PNC001, connects a PACSystems RX3i controller to a high-speed PROFINET local area network. It enables the RX3i controller to communicate with IO-Devices on the LAN. The PNC provides all the functions, services, and protocols required for certification as a PROFINET IO Version 2.2 IO Controller, running at both 100 Mbps and 1 Gbps.

The PNC supports 10/100/1000 Mbps Copper, 100/1000 Mbps Multi-mode Fiber, and 100/1000 Mbps Single-mode Fiber. The LAN can include media interfaces of more than one type. PROFINET communications on the LAN require 100 and 1000 Mbps link speed. 10 Mbps cannot be used for PROFINET communications. However, 10 Mbps can be used for other types of Ethernet traffic such as ping and telnet.

Features of the RX3i PNC include:

- Full programming and configuration services for the PROFINET Controller, VersaMax PROFINET Scanner and third-party IO-Devices using Proficy Machine Edition .
- Firmware upgrades using the WinLoader software utility.
- Built-in Command Line Interface function that provides direct monitoring and partial configuration via the micro USB port or using telnet.
Note: The USB port is for system setup and diagnostics only. It is not intended for permanent connection.
- Support for star, ring, and daisy-chain/line network 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.
- Internal clock synchronized with the RX3i CPU for time-stamped diagnostics entries.
- Restart pushbutton to manually restart the PNC without power cycling the system.
- LEDs: OK, LAN, STATUS, CONFIG, ACTIVE, USB, and four Port LEDs.
- Compliant with EU RoHS Directive using the following exemptions identified in the Annex: 7c-I and 7c-III.

Ordering Information

IC695PNC001	PACSystems RX3i PROFINET Controller Module 10/100/1000, 4 Ports - 2 SFP connections, 2 Copper
IC200PNS001	VersaMax PROFINET Scanner, 10/100, 2 Ports, Copper
IC200PNS002	VersaMax PROFINET Scanner, 10/100, 2 Ports, Multimode Fiber
IC695SPC100**	RX3i 10/100/1000base-TX (CAT5 100m) SFP
IC695SPF002**	RX3i 100Base-FX (fiber 2 km) SFP

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** Available at a later date.

GFK-2573A

PNC Specifications

PROFINET Support	PROFINET Version 2.2 General Class A IO-Controller
CPU Compatibility	Requires CPU315 or CPU320, with firmware version 7.0 or higher.
Power Requirements	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device)
	5 V: 1.5 A maximum
Operating Temperature Range	0 to 60°C maximum surrounding air temperature without a fan. A lower maximum temperature may be required depending on PNC location and SFP population. Refer to "Operating Range for Air Temperature" in the <i>PACSystems RX3i PROFINET Controller Manual</i> , GFK-2571.
Number of Port Connectors	Two RJ-45 and Two SFP Cages (Not included, available separately)
Micro USB Connector	One, for communication with a computer using Command Line Interface.
LAN	IEEE 802.2 Logical Link Control Class I IEEE 802.3 CSMA/CD Medium Access Control 10/100/1000 Mbps
Maximum I/O Memory	128 Kbytes of combined input/output memory per PROFINET Controller
CPU Status Bits	32
PROFINET I/O Device Data Update Rates on the PROFINET LAN	Configurable: 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms and 512 ms
Number of IP addresses	One
Number of MAC Addresses	Five. One per external port and one internal.
System Maximum Limits	
PROFINET Controllers per RX3i CPU	4. Must be located in main rack. Cannot be located in a remote node.
IO-Devices per IO-Controller	64 per PROFINET Controller
IO-Devices per Network	128 per network, spread across up to 8 IO-Controllers
IO-Devices per RX3i CPU	128 per RX3i CPU, spread across up to 4 PROFINET Controllers
IO-Controllers per network	8
Number of PROFINET Slots per device	256
Number of PROFINET Subslots per slot	256
Number of PROFINET Submodules per RX3i CPU	2048
Programmer Limits	
Number of IO-Controllers	128 (32 RX3i CPU targets × 4 IO-Controllers per RX3i CPU)
Number of IO-Devices	2048 (128 per network × 16 PROFINET networks)
Total number of devices	2176 (does not include backplanes, power supplies, or I/O modules)
Hot-swappable	Yes

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

Sweep Impact of PNC and PROFINET I/O

The PLC CPU sweep impact for a PROFINET I/O network is a function of the number of PNCs, the number of PROFINET devices, and the number of each PROFINET device's I/O modules. The table below shows the measured sweep impact of the RX3i PROFINET Controller, supported VersaMax PROFINET devices, and I/O-modules.

Sweep Impact (μs)

	CPU315/CPU320
RX3i PROFINET Controller (PNC)	50
VersaMax Product Family	
Profinet Scanner (PNS) (IC200PNS001)	40
Discrete Input Module (8/16/32 pt.)	23
Discrete Output Module (8/16/32 pt.)	18
Analog Input Module (15 channel)	59
Analog Output Module (12 channel)	21
CMM020 (64AI/64AQ)	204

To calculate the total expected PLC sweep impact for a PROFINET I/O network, add the individual sweep impact times for each PROFINET Controller, PROFINET Device, and PROFINET Device I/O module, using the times provided above.

Example

For a PROFINET I/O network that consists of one PNC and one VersaMax Profinet Scanner that has both an 8 point input and an 8 point output module:

$$\begin{aligned} \text{Expected PLC sweep Impact} &= 50 \text{ (PNC)} + 40 \text{ (PNS)} + 23 \text{ (8pt. Input)} + 18 \text{ (8pt. Output)} \\ &= 131 \text{ } \mu\text{s.} \end{aligned}$$

Installation in Hazardous Areas

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 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY
- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 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.
-  WARNING - EXPLOSION HAZARD - USB PORT IS ONLY FOR USE IN NONHAZARDOUS LOCATIONS, DO NOT USE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.

ATEX Marking

 II 3 G Ex nA IIC T5 X Ta: 0 - 60C

Quick Start

Installation and initial startup procedures for the PNC include the following steps. Before installing and operating the PNC, refer to the *PACSystems RX3i PROFINET Controller Manual*, GFK-2571 for detailed information.

1. Pre-Installation check

2. Installing the PNC in an RX3i backplane

The PNC must be installed in the main (CPU) rack of the RX3i system, using a Universal Backplane such as IC695CHS007, CHS012 or CHS016. The PNC supports insertion/removal while power is applied to the system (hot swap). This includes backplane power and field power supplied to the PNC.

Warning

Inserting or removing a PNC with power applied to the system may cause an electrical arc. This can result in unexpected and potentially dangerous action by field devices. Arcing is an explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before removing or inserting a PNC.

3. Connecting the PNC 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 PNC to the same device, either directly or indirectly, unless Media Redundancy is enabled in the PNC's configuration.

If Media Redundancy will be used, do not close the network ring until after the Media Redundancy configuration which contains one node as a Media Redundancy Manager (MRM) has been downloaded to the PNC. If a Media Redundancy Manager is not present, packets can continuously cycle on the network, using up significant network bandwidth.

Note: Shielded cable is required for 1 Gbps operation.

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 PNC 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.

5. Installing the USB port driver (optional)

The PNC provides a micro USB port for connection to a computer running Windows 2000, Windows XP, Windows Vista, or Windows 7 operating system. The computer can access the PNC's Command Line Interface function using a terminal application such as Hyperterm. The PNC is provided with a driver-install application that can be used to enable a computer to communicate with a PNC via its USB port. For details on using the Command Line Interface, refer to the *Command Line Interface Manual*, GFK-2572.

6. Configuring the PNC and its IO Devices on a PROFINET network

Proficy Machine Edition is the primary tool used to configure an RX3i PROFINET network. In addition, certain parameters can be set from a computer through the PNC's Command Line Interface. For details on system planning and configuration, refer to chapter 3 of the *PACSystems RX3i PROFINET Controller Manual*, GFK-2571.

Caution

If an RX3i PNC is extracted from a powered RX3i backplane, it loses power immediately which may result in data loss. Do not remove or insert the device while downloading hardware configuration to the system.

When the PNC is plugged back into a powered backplane, the PNC restores data from the internal non-volatile memory. If however, the RX3i CPU has configuration data for the PROFINET Controller, it re-delivers the data to the PNC, superseding parameters previously stored in non-volatile memory.