

PACSystems™ RX3i

PROFIBUS MASTER MODULE (IC695PBM300)



Warnings and Caution Notes as Used in this Publication

WARNING

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

CAUTION

Caution notices are used where equipment might be damaged if care is not taken.

DANGER

MAY CAUSE DEATH

Observe all precautionary signs posted on the equipment.

Failure to do so may result in death or serious injury to personnel.

Note: Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Introduction

The PACSystems RX3i PROFIBUS Master Module, IC695PBM300, allows the host RX3i CPU to send and receive data via a PROFIBUS-DP network.

The IC695PBM300 module provides the following PROFIBUS communications features:

- Supports all standard data rates
- Supports a maximum of 3,584 bytes of input data and 3,584 bytes of output data
- Supports a maximum of 125 PROFIBUS-DP slaves and 9 kilobytes of parameter data
- Supports a maximum of 244 bytes of input data and 244 bytes of output data for each slave
- Supports Sync and Freeze modes
- Supports DP-V1 Read, Write and Alarm messages
- Has PROFIBUS-compliant module and network status LEDs
- The PROFIBUS Master module must be in an RX3i Universal Backplane and requires a host RX3i CPU with firmware version 2.9 or later.
- The PROFIBUS module receives its firmware upgrades indirectly via the host controller CPU using the WinLoader software utility. WinLoader is supplied with any updates to the PROFIBUS module software.

Release Information

Version 1.04 of the IC695PBM300 RX3i PROFIBUS Master resolves the following issues:

- When multiple Lumberg devices (8in/4out) are connected to the bus and power is removed from these devices, but the PBM300 remains powered, the inputs assigned to the Lumberg devices will toggle between 1 and 0.
- Configuring slaves with a large amount of parameter data returns the correct error code when parameter data exceeds the available memory space.

The IC695PBM300 is field upgradable to firmware version 1.04 using the firmware upgrade utility.

Upgrade Kit: 44A753033-G02

Release History

Catalog Number	Date	Firmware Version	Comments
IC695PBM300-EC	Feb 2022	1.04	Addition to PROFIBUS Master Module feature list: "Supports a maximum of 125 PROFIBUS-DP slaves and 9 kilobytes of parameter data"
IC695PBM300-EC	Sep 2019	1.04	Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality.
IC695PBM300-DC	Aug 2016	1.04	Serial Flash Memory Obsolescence addressed. No change in form fit functionality.
IC695PBM300-CC	June 2010	1.04	Label change only. No change in functionality, performance or compatibility.

Catalog Number	Date	Firmware Version	Comments
IC695PBM300-BC	May 2006	1.04	When multiple Lumberg devices (8in4out) are connected to the bus and power is removed from these devices, but the PBM300 remains powered, the inputs assigned to the Lumberg devices will toggle between 1 and 0. Configuring slaves with a large amount of parameter data returns the correct error code when parameter data exceeds the available memory space.
IC695PBM300-BB	Apr 2005	1.02	The number of Message Segments used to hold mail messages has been doubled from 32 to 64.
IC695PBM300-BA	Feb 2005	1.00	UL Class I, Groups A, B, C & D, Div 2 Hazardous Locations
IC695PBM300-AA	Dec 2004	1.00	Initial Release of Product

PBM300 Functional Compatibility

Subject	Description
Series 90™-30 PROFIBUS	Customers using existing Series 90-30 PROFIBUS products should review the PACSystems RX3i PROFIBUS Modules User's Manual, GFK-2301. Changes have been made in items such as CommReq status words and data fields. This module will report additional information in some instances, and less information in other instances. This product also supports PROFIBUS DP-V1 functionality.
Programmer Version Requirements	The IC695PBM300 can be configured and programmed with Machine Edition Logic Developer PLC version 5.0 Build 3227 SP2 or later.
Total Configuration Size	The number and types of slave devices that can exchange data with the master are constrained by various memory resources within the module. The amount of memory available for the PROFIBUS configuration is affected by the number and types of slave modules in the network configuration. The total slave configuration data size is limited to approximately 9KB.
Data Sizes	The amount of data that can be configured on the IC695PBM300 PROFIBUS network provides up to 3584 input bytes and 3584 output bytes.
DOIO Functionality	DOIO functionality is not supported in the embedded PROFIBUS interface at this time. The DOIO function block returns an error if it is executed using the embedded PROFIBUS as a target.
PLC C Toolkit Version Requirements	Version 4.00 Build 50A1 or later of the PLC C Toolkit must be used for C programming.

Problems Resolved by this Revision

None

PBM300 Restrictions and Open Issues

Subject	Description
Get Master Status CommReq returns "1 or More Slaves Not in IO Exchange Mode" on First Scan	When a Get Master Status CommReq is called on the first scan of the PLC, the CommReq may return a false positive saying that the PROFIBUS network has "1 or More Slaves Not in IO Exchange Mode." The Get Master Status CommReq should not be called or relied upon for any data during the first scan of the PLC.
Machine Edition Logic Developer PLC displays incorrect information for Master Type and Device ID	The Network Settings window, which can be displayed while configuring a PBM300 in Machine Edition, does not indicate correct information for Master Type and Device ID. This information is only displayed to the user and does not affect any underlying configuration information sent to the master module or its slaves. The Device ID (also known as PROFIBUS Ident Number), if correctly displayed should be 0x0934.

Specifications: IC695PBM300

Specification	Description
Environment	Storage temperature = -40°C to 85°C Operating temperature = 0°C to 60°C
Backplane Compatibility	RX3i PCI
Backplane Current Consumption	440 mA @ 3.3 Vdc
Data rates	Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)
Status Information Available	Slave Status Bit Array Table Network Diagnostic Counters DP Master Diagnostic Counters Firmware Module Revision Slave Diagnostic Address
Data Sizes	The amount of data that can be configured on the PBM300 PROFIBUS network provides up to 3584 bytes input and 3584 bytes output.
For product standards and general specifications, refer to the PACSystems RX3i System Manual, GFK-2314.	

LEDs

LED	Color	State	Frequency	Meaning
PROFIBUS OK	Green	Static On	NA	Module has power and backplane reset is complete.
	Off	NA	NA	Module does not have power or backplane reset is not complete.
NETWORK	Yellow	Static On	n/a	Module is holding the PROFIBUS token and can transmit PROFIBUS telegrams.
		Flashing Non-cyclic	Between 0.5 Hz and 100 Hz	Module is sharing the PROFIBUS token with other master on the network.
		Off	NA	Module is not configured or has not received the token permission from the network.
	Red	Static On	NA	Module has found a communication problem with at least one network slave, usually connection timeout.
MOD STATUS	Green	Flashing Cyclic	5 Hz	No error in configuration found; module is ready for communication; it tries to open a connection to a slave but is not connected yet.
		Flashing Non-cyclic	3 times fast at 5 Hz, 8 times between 0.5 Hz and 1 Hz	Power Up: Configuration missing. For details on hardware configuration, refer to Chapter 3. Runtime: Firmware has found a critical problem, such as a watchdog timeout.
		Static On	NA	Module has established at least one connection to another device on the network.
	Yellow	Flashing Cyclic	1 Hz	Module is in boot-loader mode and is waiting for firmware download.
		Flashing Cyclic	5Hz	Firmware download is in progress.
		Flashing Non-cyclic	3 times fast at 5 Hz, 8 times between 0.5 Hz and 1 Hz	Hardware or non-recoverable runtime error detected, module may need to be replaced.
	Off	NA	NA	No power.

Module Status Information

For details on using the Communication Request function to communicate with the PROFIBUS master module, refer to the PACSystems RX3i PROFIBUS Modules User's Manual, GFK-2301.

Slave Status Bit Array

The Slave Status bit array contains a bit for each slave. If communication with a slave has no errors, the bit corresponding to the slave (determined by its network address) is set. If the communication has errors or is not occurring for any reason, the bit is cleared. The Master also maintains its own status in the bit corresponding to its network address.

Slave Diagnostics ID Array

If diagnostics are pending, the first word of this two-word array contains the station address of the first slave that has diagnostics. The diagnostics can be read using the Get Device Diagnostics COMMREQ (command 4). This clears the word and the master then places the next pending diagnostic address into the Slave Diagnostics word. If this word is zero, there are no pending diagnostics.

The second word of this array is reserved and set to 0.

DPV1 Alarm Status Array

The 32-bit DPV1 Alarm Status array is used at the beginning of a scan to receive the station address of a slave that has sent a DPV1 Alarm message. If another slave has sent a DPV1 alarm message, it is ignored until the first one has been serviced, and will then appear in a subsequent scan. For details on the status format, refer to “DPV1 Alarm Acknowledge COMMREQ” in GFK-2301.

Slave Configured Bits

This 128-bit array indicates which slaves on the PROFIBUS network are configured. Each slave has a corresponding bit in this array. A slave's configuration status address equals Start Address + Station Address of the slave. For example, if the configuration status bits are mapped to %I00001, the status for the slave at Station Address 5 would be found at %I00001 + 5=%I00006.

Slave Diagnostic Bits

This 128-bit array indicates which slaves on the PROFIBUS network have diagnostic data available. The diagnostics can be read using the Get Device Diagnostics COMMREQ (command 4).

Each slave has a corresponding bit in this array. A slave's diagnostic status address equals Start Address + Station Address of the slave. For example, if the configuration status bits are mapped to %I00001, the status for the slave at Station Address 5 would be found at %I00001 + 5=%I00006.

Connecting the Module to the PROFIBUS Network

The module contains a standard female DB9 connector, labeled “PROFIBUS,” that can be connected to a PROFIBUS bus terminal that complies with EN 50170.

The PROFIBUS module has no built-in termination. If termination is required, you must use a bus terminal that has built-in selectable termination.

- PROFIBUS DB-9 connector recommendation: Siemens 6ES7-972-0BB50-OXAO (12MB)

CAUTION

- Do not connect any devices to the +5Vdc pin (pin 6). It is to be used for termination purposes only. Doing so could damage equipment or cause erratic behavior.

Installation Location

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

If you need technical help, contact Technical Support. For phone numbers and email addresses, see the back cover of this Guide.

Installation in Hazardous Areas

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

CLASS 1 DIVISION 2 GROUPS ABCD

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

WARNING

- EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2
- WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES

DANGER

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

ATEX Zone 2

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

General Contact Information

Home link: <http://www.emerson.com/industrial-automation-controls>
Knowledge Base: <https://www.emerson.com/industrial-automation-controls/support>

Technical Support

Americas

Phone: 1-888-565-4155
1-434-214-8532 (If toll-free option is unavailable)

Customer Care (Quotes/Orders>Returns): customercare.mas@emerson.com
Technical Support: support.mas@emerson.com

Europe

Phone: +800-4444-8001
+420-225-379-328 (If toll-free option is unavailable)
+39-0362-228-5555 (from Italy - if toll-free 800 option is unavailable or dialing from a mobile telephone)

Customer Care (Quotes/Orders>Returns): customercare.emea.mas@emerson.com
Technical Support: support.mas.emea@emerson.com

Asia

Phone: +86-400-842-8599
+65-6955-9413 (All other Countries)

Customer Care (Quotes/Orders>Returns): customercare.cn.mas@emerson.com
Technical Support: support.mas.apac@emerson.com

Any escalation request should be sent to: mas.sfdcescalation@emerson.com

Note: If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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