# PACSystems* RX3i/Series 90*-30
## DeviceNet Master IC694DNM200, IC693DNM200

# IMPORTANT PRODUCT INFORMATION

The DeviceNet Master Module allows a control system CPU to send and receive data over a DeviceNet network. The module can act as master for up to 63 slaves on the DeviceNet network. It can also be configured to simultaneously function as a slave to another master on the bus.
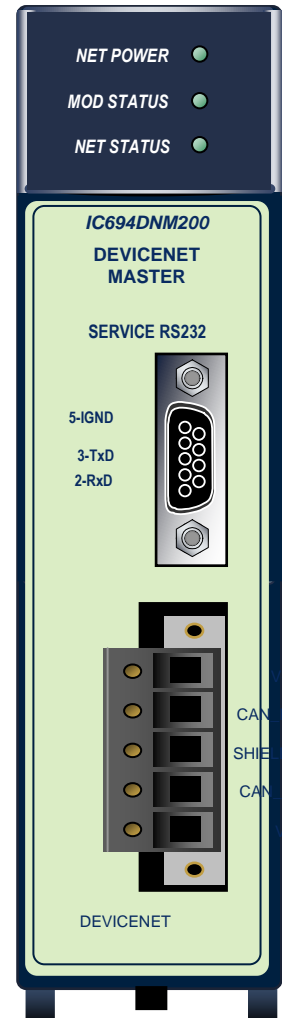
## Features

The DeviceNet Master Module allows a PACSystems RX3i or a Series 90-30 PLC to send and receive I/O data from a DeviceNet network. Module features include:

- Support for all standard data rates (125K, 250K, 500K)
- Support for 255 bytes input data transfer and 255 bytes output data transfer per slave
- Support for 3972 bytes of input data transfer and 3972 bytes of output data transfer per master.
- Support for two I/O connections per Slave. Typically, one connection is used for Polled and the other is used for Strobe, Cyclic, or COS
- Support for Poll, Strobe, Cyclic and COS I/O Connections, and Explicit Messaging
- Support for Unconnected Message Manager (UCMM) with one proxy connection per slave device
- Support for configuration of the global scan rate
- Support for configuration of update rates for Poll and COS/Cyclic on a connection basis.
- Support for PLC-application initiated explicit messaging via a COMMREQ
- Master can be configured to operate as a slave simultaneously with master operation
- Configurable fault behavior on loss of communication
- Reports loss or reestablishment of communication with slaves in PLC fault table (configurable)
- Support for 64 network device status bits. (Note: the bit for the master itself is always zero.)
- Firmware update via service port on module

## Compatibility

- Compatible with PACSystems RX3i IC695CPU310 CPU. Requires PACSystems release 3.5 or later CPU firmware.
- Compatible with any Series 90-30 CPU except IC693CPU321 and IC693CPU340. Configuration size is limited for CPU311/313/331, as described under *Operating Notes*. Requires Series 90-30 release 8.0 or later CPU firmware. Release 10 or later is recommended, if available for the particular CPU in use.
- Support in Series 90-30 requires Proficy* Machine Edition Logic Developer PLC version 3.0 SP1 Special 2 or later. Support in RX3i requires Machine Edition Logic Developer PLC version 5.5 or later.
- Not compatible with the VersaPro*, Control, or Logicmaster* programming software applications.
- The Series 90-30 Hand-Held Programmer (IC693PRG300) cannot be used to configure this module.
- The DNM200 supercedes the HE693DNT250 master module for new applications. It may be retrofitted into existing applications of the HE693DNT250 master module, but its functional differences must be taken into account. For details, see *Operating Notes* on page 4.

## *Specifications: DNM200*

| Catalog Numbers | IC693DNM200, IC694DNM200 |
|---|---|
| Description | Master Module for DeviceNet networks |
| Mounting Location<br>        Series 90-30 | Series 90-30 main rack: Any slot except slots 0 and 1. |
|         PACSystems RX3i | RX3i main rack: Any slot except slot 0. |
|  | DeviceNet Master modules cannot be installed in remote or expansion racks. |
| Environment | Storage temperature:  -40°C to 85°C<br>Operating temperature:  0°C to 60°C |
| Backplane Current Consumption | 450mA at 5VDC (typical) |
| Data rates | Supports all standard DeviceNet data rates (125K, 250K, and 500K Baud) |

For product standards and general specifications:

- ▪ PACSystems RX3i — refer to the *PACSystems RX3i System Manual*, GFK-2314
- ▪ Series 90-30 — refer to *Product Agency Approvals, Standards, General Specifications,* GFK-0867

## *Release Information*

### *Release History*

| IC694DNM200 Catalog Suffix | Firmware Version | Boot Firmware Version | EDS File Version (9030master.eds) | Date | Comments |
|---|---|---|---|---|---|
| CC | 1.25 | 1.00 | 1.04 | Dec, 2017 | RoHS Conversion. No changes to features, performance or compatibility |
| BB | 1.25 | 1.00 | 1.04 | Jul. 2011 | Label change. No changes to features, performance or compatibility. |
| AB | 1.25 | 1.00 | 1.04 | Jul. 2006 | Firmware Version 1.25 corrects issue with faults caused by multiple successive COMMREQs. |
| AA | 1.22 | 1.00 | 1.04 | Aug 2004 | |
| IC693DNM200 Catalog Suffix | Firmware Version | Boot Firmware Version | EDS File Version (9030master.eds) | Date | Comments |
| CD | 1.25 | 1.00 | 1.04 | Jul. 2011 | Label change. No changes to features, performance or compatibility. |
| BD | 1.25 | 1.00 | 1.04 | Jul. 2006 | Firmware Version 1.25 corrects issue with faults caused by multiple successive COMMREQs. |
| BC | 1.22 | 1.00 | 1.04 | Nov 2004 | |
| AB | 1.18 | 1.00 | 1.04 | Dec 2003 | |
| AA | 1.16 | 1.00 | 1.04 | Aug 2002 | |

### *Upgrades*

Firmware version 1.25 of the DeviceNet module firmware replaces all previous versions. It is backward compatible with all previous firmware versions of the DeviceNet modules, IC693DNM200 and IC693DNS201.

The module can be field-upgraded to firmware version 1.25 using the following upgrade kit, which can be downloaded from the Support website, http://support.ge-ip.com.

> **Upgrade kit:** 44A752253-G03

## Known Restrictions and Open Issues in this Release

| Restriction | Description |
|---|---|
| Rack Locations Supported | The DeviceNet Master modules (DNM200) are supported in the following rack types:<br>     For the RX3i: main rack only, any slot except slot 0.<br>     For the Series 90-30: main rack only, any slot except slots 0 and 1.<br>The DeviceNet Master modules are NOT supported in remote or expansion racks. |
| Input Scan Rate | Whenever the PLC is in RUN mode, the DNM200 module requires the CPU to scan its inputs at least once per second. If more than 1 second expires between one input scan and the next, the module declares a PLC fault, defaults its outputs according to its "Fault State Transmission" setting, and does not recover (until the rack containing the module is power-cycled). Because of this, if you have a DNM200 module in your PLC, do not execute a SUS_IO function block or SVC_REQ #45 (Skip Next I/O Scan).<br>RX3i users should use caution when configuring the DNM200 for a scan set that is not scanned every sweep (the # of sweeps times the sweep time cannot exceed 1000ms. Finally, RX3i users should not let the CPU's sweep time approach a length of 1000ms. |
| DNM Rejects SET_PLC_DATA, GET_PLC_DATA for greater than 255 bytes | The DeviceNet server function rejects any SET_PLC_DATA service request that contains more than 255 bytes and any GET_PLC_DATA service request that asks for more than 255 bytes. If more than 255 bytes are attempted, then SET_PLC_DATA will return error 15h, FFh (too much data), and GET_PLC_DATA will return error 11h, FFh (reply data too large). The descriptions of these requests in Chapter 7 of *Series 90-30 Programmable Controller DeviceNet Modules,* GFK-2196 will be updated in the next revision of the manual. |
| DNM Network Status Only Reported when Slave Configured | The DeviceNet Master module (DNM200) does not present valid network status/firmware ID inputs unless at least one slave is configured.<br>The DNM200's configuration should always include at least one slave module. |
| RX3i Logs Fault when Upgrading DNM Firmware. | The RX3i CPU will log an Unsupported Hardware fault against the DNM200 when upgrading the DNM200's firmware. This fault can be safely ignored. |
| Configuration Download with no Network Power | The DeviceNet Master module (DNM200) fails during the second store of HWC when there is no network power.<br>Users should make every effort to ensure that DeviceNet network power is available to the DNM200 when<br>   -   storing Hardware Configuration,<br>   -   power cycling the PLC with configuration available in retentive memory,<br>   -   reading Hardware Configuration from Flash/EEPROM.<br>If the module fails because of this issue, restore network power and power cycle the rack that contains the DNM200. |
| Module Restart Complete | The *Module Restart Complete* fault is not supported for either DNM200 or DNS201, as indicated in the user's manual (GFK-2196). This will be corrected in the next revision of the manual. |
| Configuration as POLL and COS/CYC | The DeviceNet specification does not allow a single device to be configured as both Polled on one connection, and COS or Cyclic on the other connection. If configured this way, one of the connections will only consume data and will not produce data back to the master device. |
| Server Status "EX" bit | The EX bit in the module's Server Status field will be 1 even when Explicit Messaging is disabled in the module's hardware configuration. |

# Operating Notes

## Limits on the Size of the Total Configuration

The number and type of slave devices and the amount of data they can exchange with the master may be limited by the CPU memory available. The amount of CPU memory available for the DeviceNet configuration depends on the CPU model being used, the version of the CPU firmware, the number and type of other modules in the configuration, the number and type of slave devices configured, and the amount and type of communication in progress with an external programmer or HMI devices.

With Logic Developer-PLC, the size of the current configuration can be read by selecting "Data View" for the hardware configuration and adding the sizes of the components listed. LD-PLC will not allow configurations for the 90-30 CPU to be larger than 65,535 bytes. The size of the DeviceNet configuration is also limited by the size of the user configuration space for the models listed below:

| CPU 311/313 | 4,736 bytes available |
|-------------|-----------------------|
| CPU 331     | 4,673 bytes available |

For the RX3i, the size of the configuration is limited only by the total amount of user memory available.

## Migrating from the HE693DNT250 Module

If the IC693/IC694DNM200 DeviceNet Master Module will be used to replace a HE693DNT250 master module in an existing application, the following differences must be taken into account:

- *Configuration:* The HE693DNT250 module must be configured via its serial port prior to adding it to the rack configuration of the PLC. No such initial module configuration is required for the DNM200. All configuration is done using the programmer.

- *Slave Status Reporting:* The HE693DNT250 reports slave status (called "Online Status") in four words of %AI memory. The DNM200 DeviceNet Master reports slave status in 64 contiguous bits of any reference memory as configured, default location is %I.

- *Additional Status Information:* The DNM200 DeviceNet Master has three additional words of optional status information: server status, CAN status, and firmware revision. See the *Series 90-30 DeviceNet Modules User's Manual* (GFK-2196) for more information.

- *Explicit Messaging:* When sending an explicit message with the HE693DNT250 module, the message must be created in a block of %R memory, then the block's starting location and length must be moved into 4 words of %AQ memory, and finally the "Send Explicit Message" bit in the Output Data Assembly must be set. Errors are reported in bits in the Input Data Assembly.

- When sending an explicit message with an DNM200 DeviceNet Master Module, the message is built in a block of memory, then a COMMREQ is issued to send the message. Errors are reported in the COMMREQ status word and in Word 5 of the response

- *Block Move Function:* The DNM200 has no equivalent to the "Block Move" configuration parameter (used for backward compatibility between newer and older versions of the HE693DNT250).

- *Fault Reporting:* Fault reporting in the DNM200 can be disabled to match the behavior of the HE693DNT250.

- *Serial Port Functionality:* The RS-485 port on the HE693DNT250 is used to supply configuration information to the module prior to PLC rack configuration. The RS-232 port on the DNM200 DeviceNet Master Module is used for firmware upgrades.

# *Hardware Installation*

## *Pre-installation Check*

Upon receiving your 90-30 and 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. GE Intelligent Platforms will fully cooperate with you, however, should such action be necessary.

After unpacking the 90-30 and 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.

Verify that all components of the system have been received and that they agree with your order. If the system received does not agree with your order, contact Customer Care.

## *Installation Location*

This product is intended to be for use with the 90-30 and RX3i systems. Its components are considered open equipment [having live electrical parts that may be accessible to users] and must be installed in a protective enclosure or incorporated into an assembly that is manufactured to provide safety. As a minimum, the enclosure or assembly 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 Locations*

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 shall be installed in an ultimate 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.

⚠ **Warning** – WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND

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

### *ATEX Zone 2*

This product 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.