

MANUAL

ICDM-RX/PN

Installation and Configuration



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1. Introduction

1.1. Supported Models

This *User Guide* supports the ICDM-RX/PN Industrial Gateway, which includes the following products:

- ICDM-RX/PN-DB9/RJ45-PM 1-port panel mount
- ICDM-RX/PN-DB9/RJ45-DIN and ICDM-RX/PN-ST/RJ45-DIN: 1-port DIN rail models
- ICDM-RX/PN ICDM-RX/PN-4DB9/2RJ45-DIN: 4-port DIN rail

Note: *ICDM-RX/PN Industrial Gateway products are typically referred to as ICDM-RX/PN in this User Guide unless there is product specific information.*

1.2. Installation Overview

This *User Guide* is organized to reflect the installation step order:

1. Install the hardware (Page 8).
2. Configure the IP address (Page 14).
3. If necessary, upload the latest firmware (Page 16).
4. Attach the serial device (Page 17).
5. Configure the serial port or ports (Page 24).
6. Configure the Ethernet device (Page 29).
7. Configure the ICDM-RX/PN in TIA Portal (Page 34).

In addition, this User Guide also provides the following information:

- IO data handling (Page 47)
- Provides an example project (Page 52)
- Advanced functions (Page 56)
- Provides information about the ICDM-RX/PN PNIO application web pages (Page 62)
- ICDM-RX/PN Diagnostics web pages (Page 68)
- ICDM-RX/PN maintenance and Redboot procedures (Page 76)

1.3. Software and Documentation

You can access the appropriate firmware assembly, PortVision DX, and the ICDM-RX/PN documentation from: <https://www.pepperl-fuchs.com>.

2. Hardware Installation

This chapter discusses:

- *ICDM-RX/PN-ST/RJ45-DIN Installation* on Page 8
- *ICDM-RX/PN-DB9/RJ45-DIN: 1-Port DIN Rail (DB9) Installation* on Page 9
- *ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail (DB9) Installation* on Page 11
- *Adding a Unit to an Existing Installation* on Page 12
- *Replacing Hardware* on Page 12

2.1. ICDM-RX/PN-ST/RJ45-DIN Installation

Use the following procedure to install ICDM-RX/PN-ST/RJ45-DIN. See *ICDM-RX/PN-DB9/RJ45-DIN: 1-Port DIN Rail (DB9) Installation* on Page 9 if the ICDM-RX/PN has DB9 serial connectors.

1. Attach the ICDM-RX/PN-ST/RJ45-DIN 1-Port to the DIN rail adapter.
2. Connect the power supply and apply power to the ICDM-RX/PN-ST/RJ45-DIN using the power supply specifications on the product label and the following information.



Observe proper ESD techniques when connecting and disconnecting the ICDM-RX/PN.

- a. If the DIN rail is not connected to earth ground, insert the earth ground wire into the chassis ground screw terminal.

Note: *The chassis ground connection is made only if the DIN rail is NOT connected to earth ground.*

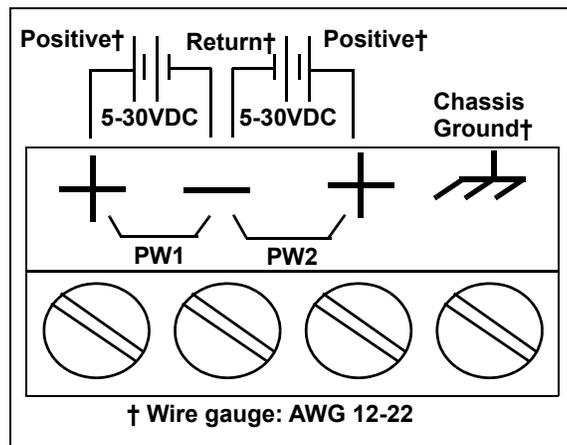
- b. Insert the DC positive wire into the + screw terminal and the DC return wire into the - screw terminal.

Refer to *ICDM-RX/PN-DB9/RJ45-DIN* and *ICDM-RX/PN-ST/RJ45-DIN: 1-Port DIN Rail Power Supply* on Page 88 for detailed power requirements.

- c. Use a small flat head screw driver to lock the wires into place.
- d. Verify that each wire has been tightened securely.
- e. Connect a UL Listed power supply and UL Listed power cord to a power source to apply power.

Note: *Do not connect multiple units until you have changed the default IP address, see *Preparing the ICDM-RX/PN for Configuration* on Page 13*

3. Connect the **10/100 port** to the same Ethernet network segment as the host PC using a standard network cable.



- Verify that the **Status** LED has completed the boot cycle and network connection for the ICDM-RX/PN-ST/RJ45-DIN is functioning using the following table.

ICDM-RX/PN-ST/RJ45-DIN LED Descriptions	
STATUS	The STATUS LED on the device is lit, indicating you have power and it has completed the boot cycle. Note: <i>The Status LED flashes while booting and it takes approximately 15 seconds for the Bootloader to complete the cycle. When the Bootloader completes the cycle, the LED flashes rapidly for several times then stays off and blinks approximately every 10 seconds when there is no PLC connection.</i>
LINK	If the LINK (green) LED is lit, it indicates a working Ethernet connection.
ACT	If the ACT (yellow) LED flashes, it indicates network activity.
Note: <i>For additional LED information, go to the Status LED table on Page 90.</i>	



Do not connect RS-422/485 devices until the IP address is configured and an appropriate port interface type has been configured. The default port setting is RS-232.

- Go to *Preparing the ICDM-RX/PN for Configuration* on Page 13 for default network settings and how to configure the ICDM-RX/PN for use.

2.2. ICDM-RX/PN-DB9/RJ45-DIN: 1-Port DIN Rail (DB9) Installation

Use the following procedure to install a ICDM-RX/PN-DB9/RJ45-DIN.

- Attach the ICDM-RX/PN-DB9/RJ45-DIN to the DIN rail adapter.
- Connect the power supply and apply power to the ICDM-RX/PN-DB9/RJ45-DIN using the power supply specifications on the product label and the following information.

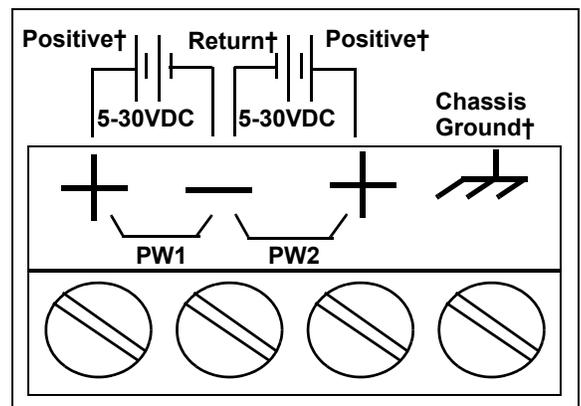


Observe proper ESD techniques when connecting and disconnecting the ICDM-RX/PN.

- If the DIN rail is not connected to earth ground, insert the earth ground wire into the chassis ground screw terminal.

Note: *The chassis ground connection is made only if the DIN rail is NOT connected to earth ground.*

- Insert the DC positive wire into one of the + screw terminals and the DC return wire into the - screw terminal.
 - A second redundant power supply can be connected to the unit by inserting the DC positive wire into the other + screw terminal and the DC return wire into the - screw terminal.
 - The ICDM-RX/PN-DB9/RJ45-DIN continues to operate if one of the two connected power supplies should fail.



† Wire gauge: AWG 12-22

Refer to *ICDM-RX/PN-DB9/RJ45-DIN* and *ICDM-RX/PN-ST/RJ45-DIN: 1-Port DIN Rail Power Supply*

on Page 88 for detailed power requirements.

- c. Use a small flat head screw driver to lock the wires into place.
- d. Verify that each wire has been tightened securely.
- e. Connect a UL Listed power supply and UL Listed power cord to a power source to apply power.

Note: Do not connect multiple units until you have changed the default IP address, see *Preparing the ICDM-RX/PN for Configuration* on Page 13

- 3. Connect the **10/100** port to the same Ethernet network segment as the host PC using a standard Ethernet cable.
- 4. Verify that the **Status** LED has completed the boot cycle and network connection for the ICDM-RX/PN-DB9/RJ45-DIN is functioning properly using the following table.

ICDM-RX/PN-DB9/RJ45-DIN LED Descriptions	
STATUS	The STATUS LED is lit, indicating you have power and it has completed the boot cycle. Note: The Status LED flashes while booting and it takes approximately 15 seconds for the Bootloader to complete the cycle. When the Bootloader completes the cycle, the LED flashes rapidly for several times then stays off and blinks approximately every 10 seconds when there is no PLC connection.
LINK	If the LINK (green) LED is lit, it indicates a working Ethernet connection.
ACT	If the ACT (yellow) LED flashes, it indicates network activity.
Note: For additional LED information, go to the <i>Status LED</i> table on Page 90.	



Do not connect RS-422/485 devices until the IP address is configured and an appropriate port interface type has been configured. The default port setting is RS-232.

- 5. Go to *Preparing the ICDM-RX/PN for Configuration* on Page 13 for default network settings and how to configure the ICDM-RX/PN for use.

2.3. ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail (DB9) Installation

Use the following procedure to install ICDM-RX/PN-4DB9/2RJ45-DIN.

1. Attach the ICDM-RX/PN to the DIN rail adapter.
2. Connect the power supply and apply power to the ICDM-RX/PN using the power supply specifications on the product label and the following information.



Observe proper ESD techniques when connecting and disconnecting the ICDM-RX/PN.

- a. If the DIN rail is not connected to earth ground, insert the earth ground wire into the chassis ground screw terminal.

Note: *The chassis ground connection is made only if the DIN rail is NOT connected to earth ground.*

- b. Insert the DC positive wire into one of the + screw terminals and the DC return wire into the - screw terminal.
 - A second redundant power supply can be connected to the unit by inserting the DC positive wire into the other + screw terminal and the DC return wire into the - screw terminal.
 - The ICDM-RX/PN continues to operate if one of the two connected power supplies should fail.

Refer to *ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail Models Power Supply* on Page 89 for detailed power requirements.

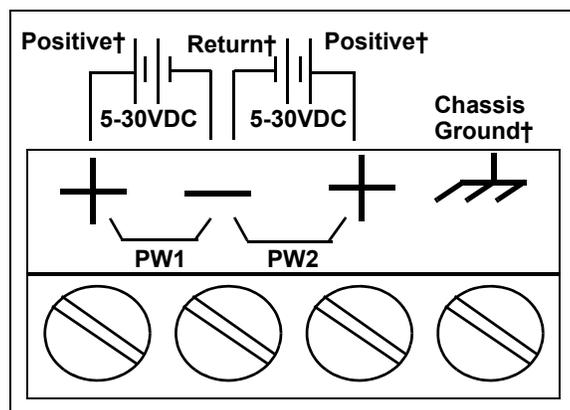
- c. Use a small flat head screw driver to lock the wires into place.
- d. Verify that each wire has been tightened securely.
- e. Connect a UL Listed power supply and UL Listed power cord to a power source to apply power.

Note: *Do not connect multiple units until you have changed the default IP address, see *Preparing the ICDM-RX/PN for Configuration* on Page 13*

3. Connect one of the 10/100 ports to the same Ethernet network segment as the host PC using a standard Ethernet cable. You can daisy-chain another ICDM-RX/PN or Ethernet device to the other port using a standard Ethernet cable.

Note: *This model provides two Ethernet ports, E1 is the first port and E2 is the second port.*

4. Verify that the **Status** LED has completed the boot cycle and network connection for the ICDM-RX/PN is functioning properly using the following table.



† Wire gauge: AWG 12-22

ICDM-RX/PN-4DB9/2RJ45-DIN LED Descriptions	
STATUS	The STATUS LED is lit, indicating you have power and it has completed the boot cycle. Note: <i>The Status LED flashes while booting and it takes approximately 15 seconds for the Bootloader to complete the cycle. When the Bootloader completes the cycle, the LED flashes rapidly for several times then stays off and blinks approximately every 10 seconds when there is no PLC connection.</i>
LINK	If the LINK (green) LED is lit, it indicates a working Ethernet connection.
ACT	If the ACT (yellow) LED flashes, it indicates network activity.

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ICDM-RX/PN-4DB9/2RJ45-DIN LED Descriptions

Note: For additional LED information, go to the Status LED table on Page 90.



Do not connect RS-422/485 devices until the IP address is configured and an appropriate port interface type has been configured. The default port setting is RS-232.

5. Go to *Preparing the ICDM-RX/PN for Configuration* on Page 13 for default network settings and how to configure the ICDM-RX/PN for use.

2.4. Adding a Unit to an Existing Installation

Use this procedure to add another ICDM-RX/PN to an existing configuration.

1. Install the ICDM-RX/PN to an Ethernet hub or server NIC using the appropriate subsection found in this chapter.

Note: Technical support recommends installing one unit at a time and testing that unit when installing multiple units. In the event troubleshooting must be done, a single unit is easier to resolve than several at once.

2. Power-up the new ICDM-RX/PN and verify that the **PWR** or **Status** LED lights.
3. Program an IP address into the new ICDM-RX/PN using PortVision DX.
4. If necessary, upload the latest firmware.
5. Configure serial ports to support the serial devices or upload configuration files from PortVision DX.
6. Connect the serial devices.

2.5. Replacing Hardware

Use this procedure to replace hardware.

1. Remove the old unit and attach a new or spare ICDM-RX/PN.
2. Connect the new ICDM-RX/PN to the network hub or server NIC.
3. Apply power to the new ICDM-RX/PN and verify that it passes the power on self-test.
4. Program the IP address of the new ICDM-RX/PN.
5. If necessary, upload the latest protocol firmware.
6. Configure any ports as necessary to match the previous unit or upload configuration files from PortVision DX.
7. Transfer *all* cabling from the old ICDM-RX/PN to the new ICDM-RX/PN.
8. *It is not necessary* to shut down and restart the host PC.

3. Preparing the ICDM-RX/PN for Configuration

The ICDM-RX/PN platform includes PortVision DX, which is the management application that you use to manage the ICDM-RX/PN.

This section contains these topics:

- *PortVision DX Overview*
- *PortVision DX Requirements* on Page 13
- *Installing PortVision DX* on Page 14
- *Configuring the Network Settings* on Page 14
- *Checking the Protocol Firmware Version* on Page 16
- *Uploading Protocol-Specific Firmware on the ICDM-RX/PN* on Page 16

Note: *If PortVision DX is already installed, go directly to Configuring the Network Settings on Page 14 to change the IP address on the ICDM-RX/PN.*

3.1. PortVision DX Overview

PortVision DX automatically detects Pepperl+Fuchs Control Ethernet-attached products physically attached to the local network segment so that you can configure the network address, upload firmware, and manage the following products:

- ICDM-RX/PN family
- IO-Link Master
- RocketLinx managed switches

In addition to identifying Pepperl+Fuchs Control Ethernet-attached products, you can use PortVision DX to display any third-party switch and hardware that may be connected directly to those devices. All non-Pepperl+Fuchs products and unmanaged RocketLinx switches are treated as non-intelligent devices and have limited feature support. For example, you cannot configure or update firmware on a third-party switch.

3.2. PortVision DX Requirements

Use PortVision DX to identify, configure, update, and manage the ICDM-RX/PN on Windows operating systems.

PortVision DX requires that you connect the Pepperl+Fuchs Control Ethernet-attached product to the same network segment as the Windows host system if you want to be able to scan and locate it automatically during the configuration process.

Before installing PortVision DX, consider the following:

- Use PortVision DX to upload firmware and apply changes to a ICDM-RX/PN that is on the same local network segment as the system on which PortVision DX is installed. You cannot apply changes through PortVision DX to a ICDM-RX/PN that is not on the same local network segment.
- Use PortVision DX to monitor any ICDM-RX/PN on the network. The ICDM-RX/PN does not have to be on the same local network segment as PortVision DX for monitoring purposes.

3.3. Installing PortVision DX

During initial configuration, PortVision DX automatically detects and identifies ICDM-RX/PN units, if they are in the same network segment.

You can download the latest version of PortVision DX.

1. Download PortVision DX from <https://www.pepperl-fuchs.com>.
2. Execute the **PortVision_DX[version].msi** file.
3. Click **Next** on the *Welcome* screen.
4. Click **I accept the terms in the License Agreement and Next**.
5. Click **Next** or optionally, browse to a different location and then click **Next**.
6. Click **Next** to configure the shortcuts.
7. Click **Install**.
8. Depending on the operating system, you may need to click **Yes** to the *Do you want to allow the following program to install software on this computer?* query.
9. Click **Launch PortVision DX** and **Finish** in the last installation screen.
10. Depending on the operating system, you may need to click **Yes** to the *Do you want to allow the following program to make changes to this computer?* query.
11. Select the Pepperl+Fuchs Control Ethernet-attached products that you want to locate and then click **Scan**.

Note: *If the Pepperl+Fuchs Control Ethernet-attached product is not on the local segment and it has been programmed with an IP address, it will be necessary to manually add the Pepperl+Fuchs Control Ethernet-attached product to PortVision DX.*

12. Go to Step 5 in the next section, *Configuring the Network Settings*, to program the ICDM-RX/PN network settings.

If you need additional information about PortVision DX, refer to the **Help** system.

3.4. Configuring the Network Settings

Use the following procedure to change the default network settings on the ICDM-RX/PN for your network. The default network settings are;

- IP address: 192.168.250.250
- Subnet mask: 255.255.0.0
- Gateway address: 192.168.250.1

Note: *Technical Support advises configuring one new ICDM-RX/PN at a time to avoid device driver configuration problems. If you want to configure multiple ICDM-RX/PNs using the **Assign IP to Multiple Devices** option, see *Configuring Multiple ICDM-RX/PNs Network Addresses* on Page 77.*

The following procedure shows how to configure a single ICDM-RX/PN connected to the same network segment as the Windows system. If the ICDM-RX/PN is not on the same physical segment, you can add it manually using *Adding a New Device in PortVision DX* on Page 77.

1. If you have not done so, install PortVision DX (*Installing PortVision DX* on Page 14).
2. Start PortVision DX using the **PortVision DX** desktop shortcut or from the **Start** button, click **Pepperl+Fuchs Control > PortVision DX**.
3. Depending on your operating system, you may need to click **Yes** to the *Do you want to allow the following program to make changes to this computer?* query.
4. Click **Scan** to locate the Pepperl+Fuchs Control Ethernet-attached products including the ICDM-RX/PN on the network.

5. Highlight the ICDM-RX/PN for which you want to program network information and open the **Properties** screen using one of these methods.
 - Double-click the ICDM-RX/PN in the *Device Tree* or *Device List* pane.
 - Right-click the ICDM-RX/PN in the *Device Tree* or *Device List* pane and click **Properties** in the popup menu
 - Highlight the ICDM-RX/PN in the *Device Tree* or *Device List* pane and click the **Properties** button.
 - Highlight the ICDM-RX/PN, click the **Manage** menu and then **Properties**.
6. *Optionally*, rename the ICDM-RX/PN in the **Device Name** field.

Note: The MAC address Device Status fields are automatically populated and you cannot change those values.

7. *Optionally*, enter the serial number, which is on a label on the ICDM-RX/PN.
8. If necessary, you can change the **Detection Type**.
 - **REMOTE** means that the ICDM-RX/PN is not connected to this segment of the network and it uses IP communications, not MAC communications.
 - **LOCAL** is not a valid selection for PROFINET IO as it requires using an IP address.
9. Change the ICDM-RX/PN network properties as required for your site.

Disable IP	Do not use this option. The ICDM-RX/PN does not support using the MAC addressing scheme.
DHCP IP†	Click this option if you want to use the ICDM-RX/PN with DHCP. Make sure that you provide the MAC address of the ICDM-RX/PN to the network administrator.
Static IP†	Click this option to program a static IP address and type the appropriate IP address, subnet mask, and default gateway values for your site in the provided boxes.
† PROFINET IO: The network address entered here must be compatible with the IP address configuration entered in the TIA Portal project. See IP Address Assignment on Page 35 for information about assigning addresses.	

Note: For additional information, open the *PortVision DX Help* system.

10. Click **Apply Changes** to update the network information on the ICDM-RX/PN.
11. Click **Close** to exit the *Properties* window.
12. If applicable, check your firmware version to make sure that it is the latest version using the next subsection, *Checking the Protocol Firmware Version*.
13. If necessary, use *Uploading Protocol-Specific Firmware on the ICDM-RX/PN* on Page 16 to update or load the firmware for your ICDM-RX/PN.

3.5. Checking the Protocol Firmware Version

Use PortVision DX to check the firmware version before configuring the ports.

Depending on the model you purchased, the ICDM-RX/PN may or may not have the protocol firmware loaded.

Note: *Models that have a protocol loaded on the ICDM-RX/PN are identified in PortVision DX and the ICDM-RX/PN is labeled accordingly.*

The following procedure shows how to use PortVision DX to check the firmware version on the ICDM-RX/PN and check for the latest files.

Note: *If you have not done so, install PortVision DX (Installing PortVision DX on Page 14).*

1. Start PortVision DX by double-clicking the PortVision DX desktop icon or click **Control > PortVision DX**.
2. Examine the *List View* pane to see if or/and what version of the firmware is loaded on the ICDM-RX/PN. If you see SocketServer or NS-Link as the *Software Version*, you must load the appropriate firmware for your protocol.
3. Check <https://www.pepperl-fuchs.com> to see if there is a later version available.
4. If applicable, download the latest version and go to Step 3 in *Uploading Protocol-Specific Firmware on the ICDM-RX/PN* on Page 16.

3.6. Uploading Protocol-Specific Firmware on the ICDM-RX/PN

You can download the latest firmware and corresponding documentation for PROFINET IO from the web site: <https://www.pepperl-fuchs.com>.

If necessary, use the following procedure to update the firmware on your ICDM-RX/PN for the appropriate protocol. See *Locating Software and Documentation* on Page 6, if you need to download the .msi file for your protocol.

Note: *If you have not done so, install PortVision DX (Installing PortVision DX on Page 14) and install the firmware.msi file.*

1. Execute the .msi file that you downloaded for the firmware.
2. Start PortVision DX by double-clicking the PortVision DX desktop icon or click **Control > PortVision DX**.
3. Right-click the device or devices for which you want to upload firmware and click the **Advanced > Upload Firmware** menu option.
Note: *Optionally, you can highlight a device and use the **Load** button.*
4. Browse and select the protocol firmware (.cmtl) file and click **Open**.
5. Click **Yes** to upload the firmware.
6. Click **OK** to the advisory message about waiting until the ICDM-RX/PN is on-line and in the next minute the ICDM-RX/PN unit or units should display **ON-LINE** in the **Status** field.
7. Go to the appropriate *Quick Start* or *User Guide* for your protocol for information about configuring the serial port or ports using the web page and programming your PLCs.
8. If you are planning on installing multiple ICDM-RX/PNs, you may want to use the *Save/Load Configuration File* feature in PortVision DX.

A configuration file can contain network settings and protocol settings. Refer to the PortVision DX help system for information about saving and loading configuration files.

9. After configuring the serial port characteristics and preparing your PLC programs, you can use the next section in this guide, to attach the serial device or devices.

4. Connecting Serial Devices

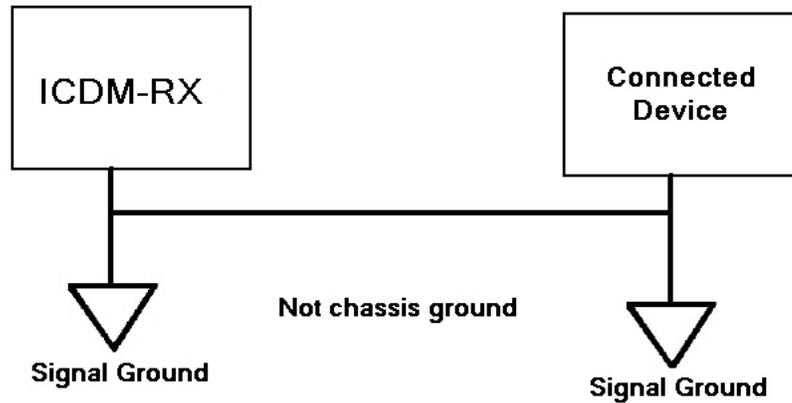
This section discusses connecting your serial devices to the ICDM-RX/PN. It also provides you with information to build serial cables and loopback connectors to test the serial ports.

- *DB9 Connectors*
- *Nine Screw Terminals (ICDM-RX/PN-ST/RJ45-DIN)* on Page 21



Caution

Make sure that you have configured the ports for the correct communications mode before connecting any devices. The default mode is RS-232. There is a remote possibility that connecting a serial device for the wrong mode could damage the serial device.



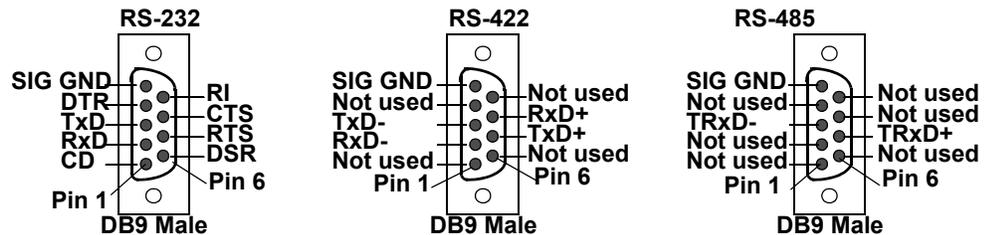
4.1. DB9 Connectors

This subsection provides the following information:

- Connector pin assignments (below)
- *DB9 Null-Modem Cables (RS-232)* on Page 19
- *DB9 Null-Modem Cables (RS-422)* on Page 19
- *DB9 Straight-Through Cables (RS-232/485)* on Page 19
- *DB9 Loopback Plugs* on Page 20
- *Connecting DB9 Serial Devices* on Page 20

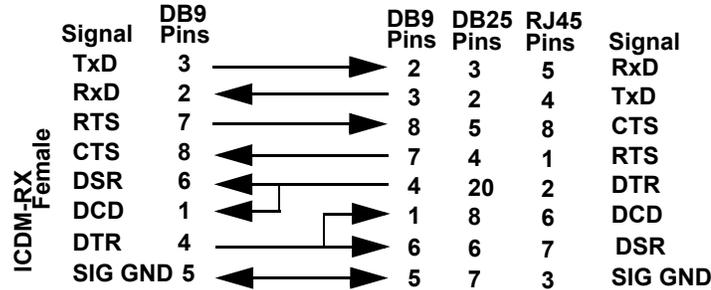
DB9 Connector Pin Outs			
Pin	RS-232	RS-422 and RS-485 Full-Duplex (Master/Slave)[†]	RS-485 Half-Duplex
1	DCD	Not used	Not used
2	RxD	RxD-	Not used
3	TxD	TxD-	TRxD-
4	DTR	Not used	Not used
5	Signal GND	Signal GND	Signal GND
6	DSR	Not used	Not used
7	RTS	TxD+	TRxD+
8	CTS	RxD+	Not used
9	RI	Not used	Not Used
[†] DIN rail models support RS-485 full-duplex.			

Refer to the hardware manufacturer's installation documentation if you need help with connector pin outs or cabling for the serial device. This illustrates the DB9 connector signals.



4.1.1. DB9 Null-Modem Cables (RS-232)

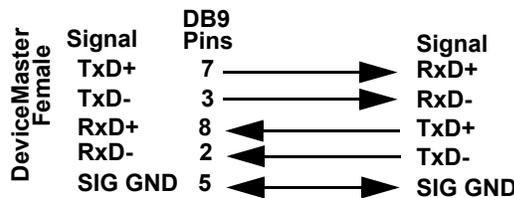
Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required for connecting DTE devices.



Note: You may want to purchase or build a straight-through cable and purchase a null-modem adapter.

4.1.2. DB9 Null-Modem Cables (RS-422)

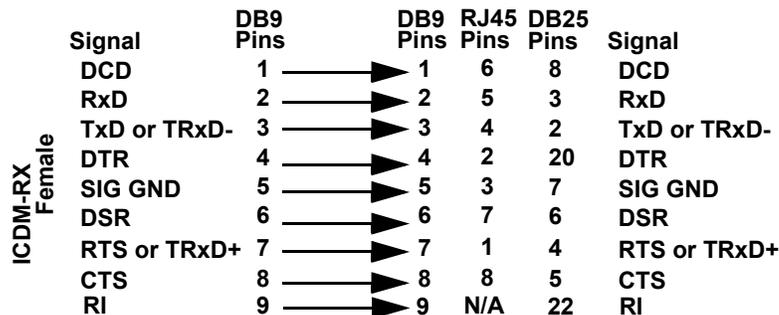
Use the following figure if you need to build an RS-422 null-modem cable.



Note: RS-422 pin outs are not standardized. Each peripheral manufacturer uses different pin outs. Refer to the peripheral documentation to determine the pin outs for the signals above.

4.1.3. DB9 Straight-Through Cables (RS-232/485)

Use the following figure if you need to build an RS-232 or RS-485 straight-through cable. Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 to a modem.



4.1.4. DB9 Loopback Plugs

Loopback connectors are DB9 female serial port plugs with pins wired together that are used in conjunction with application software to test serial ports. The ICDM-RX/PN is shipped with a single loopback plug (RS-232/422).

Not all ICDM-RX/PN protocols provide test (example programs). Refer to the User Guide for information about using those example programs.

Wire the following pins together to build additional plugs or replace a missing RS-232 loopback plug:

- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9



Wire the following pins together for an RS-422 loopback plug:

- Pins 2 to 3
- Pins 7 to 8



4.1.5. Connecting DB9 Serial Devices

You can use this information to connect serial devices to DB9 connectors.

1. Connect your serial devices to the appropriate serial port on the ICDM-RX/PN using the appropriate cable.

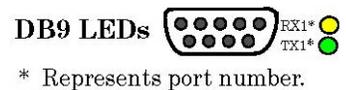
Note: Refer to the hardware manufacturer's installation documentation if you need help with connector pin outs or cabling for the peripheral device.

2. Verify that the devices are communicating properly.

Note: ICDM-RX/PN DIN models do not have TX/RX LEDs.

The RX (yellow) and TX (green) LEDs function accordingly when the cable is attached properly to a serial device.

- After power cycling the ICDM-RX/PN (appropriate models), the RX/TX LEDs are off.
 - The LEDs do not function as described until the port has been opened by an application.
3. You can refer to *ICDM-RX/PN LEDs* on Page 92 for information about the remaining LEDs.



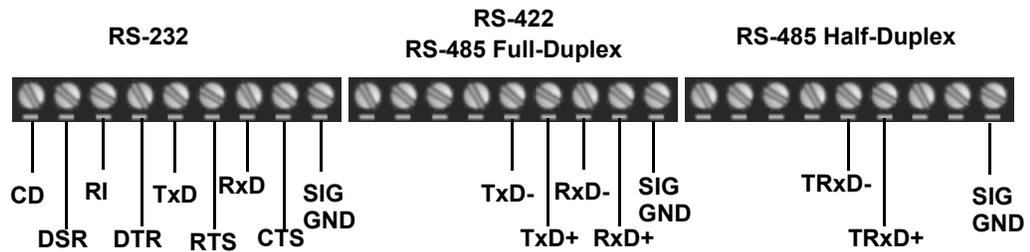
4.2. Nine Screw Terminals (ICDM-RX/PN-ST/RJ45-DIN)

This subsection discusses the following topics for the ICDM-RX/PN-ST/RJ45-DIN with 9 serial screw terminals.

- *Screw Terminal Connectors (9)* on Page 21
- *Screw Terminal (9) Null-Modem RS-232 Cables* on Page 22
- *Screw Terminal (9) Null-Modem RS-422 Cables* on Page 22
- *Screw Terminal (9) RS-232/485 Straight-Through Cables* on Page 23
- *Screw Terminal (9) Loopback Signals* on Page 23
- *Connecting Serial Devices* on Page 23

4.2.1. Screw Terminal Connectors (9)

Use the following table or drawings for signal information.



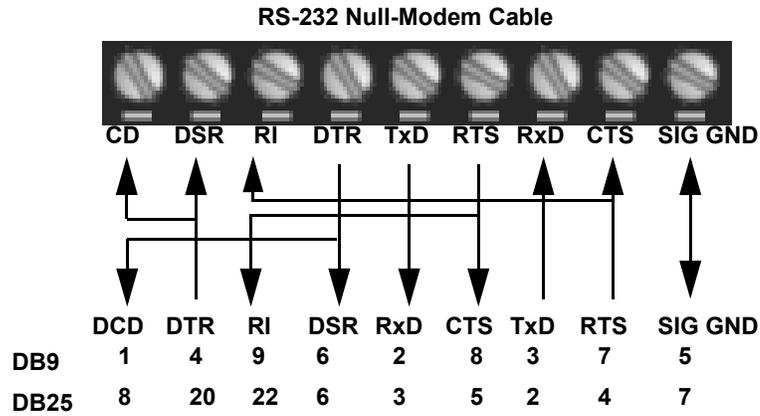
† Ground must be connected to the signal ground terminal.

RS-232	CD	DSR	RI	DTR	TxD	RTS	RxD	CTS	Signal GND
RS-422/RS-485 Full-Duplex	N/A	N/A	N/A	N/A	TxD-	TxD+	RxD-	RxD+	Signal GND
RS-485 Half-Duplex	N/A	N/A	N/A	N/A	TRxD-	TRxD+	N/A	N/A	Signal GND

† Ground must be connected to the signal ground terminal.

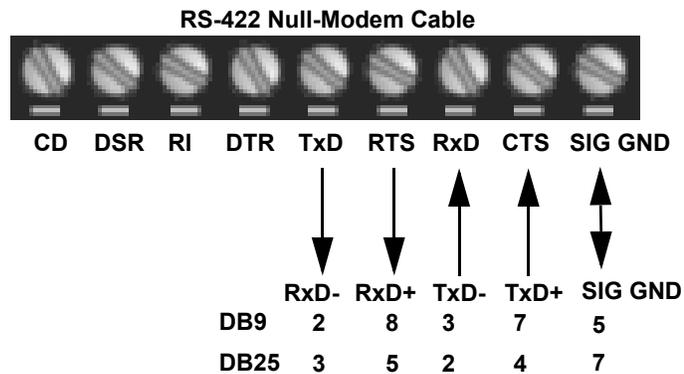
4.2.2. Screw Terminal (9) Null-Modem RS-232 Cables

An RS-232 null-modem cable is required for connecting DTE devices.



4.2.3. Screw Terminal (9) Null-Modem RS-422 Cables

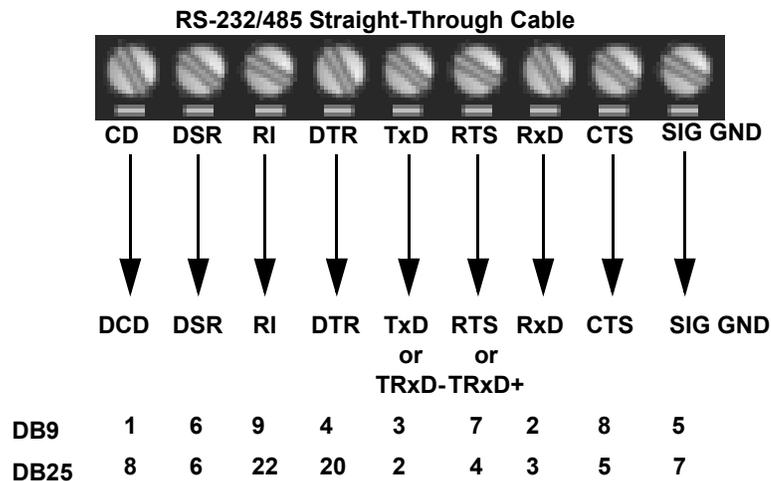
An RS-422 null-modem cable is required for connecting DTE devices.



Note: RS-422 pin outs are not standardized. Each peripheral manufacturer uses different pin outs. Please refer to the documentation for the peripheral to determine the pin outs for the signals above.

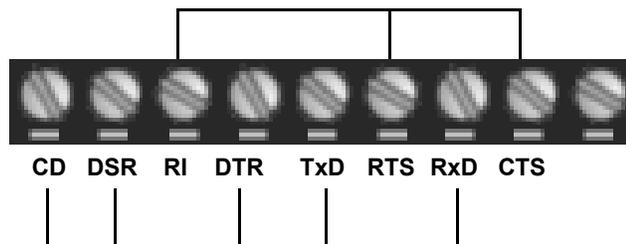
4.2.4. Screw Terminal (9) RS-232/485 Straight-Through Cables

RS-232 or RS-485 straight-through cables are used to connect modems and other DCE devices.



4.2.5. Screw Terminal (9) Loopback Signals

Use this drawing to wire a loopback, which is used in conjunction with application software to test serial ports.



Wire the terminals together to create a loopback.

- TxD to RxD
- RTS to CTS to RI
- DTR to CD to DSR

4.2.6. Connecting Serial Devices

Use the following information to connect the ICDM-RX/PN with serial terminals.

1. Connect your serial devices to the appropriate serial port on the ICDM-RX/PN using the appropriate cable. You can build your own cables or loopbacks using the appropriate discussions.

Note: Refer to the hardware manufacturer's installation documentation if you need help with connector pin outs or cabling for the serial device.

2. You can refer to *ICDM-RX/PN LEDs* on Page 92 for information about the LEDs.

5. Configuring a Serial Port

Use the following procedure to configure the serial ports.

1. Open the ICDM-RX/PN web page using your browser.
 - Note:** *The default IP address is 192.168.250.250. You can use PortVision DX to program your IP address, if necessary (3. Preparing the ICDM-RX/PN for Configuration, Page 13).*
2. Click **Serial** and the **Serial Port Overview** page displays.
3. Click the port number that you want to configure and the corresponding port page displays.
4. Configure the serial port to match the serial device that you plan on attaching to that serial port and click **Save** when you are done. Refer to the following tables if you need information about the options on the **Port Configuration** page.
 - *Serial Port Configuration - Serial Device Options on Page 24*
 - *Serial Port Configuration - Serial Packet on Page 25*
 - *Serial Port Configuration - Application TCP Connection on Page 27*

Serial Port Configuration - Serial Device Options	
Port Name	A user definable string used to describe the serial interface. Valid characters include a-z, A-Z, 0-9, underscores, spaces and dashes. All other characters are discarded. Up to 80 character ASCII string. The default is blank.
Port Mode	Select the communications mode for the serial device that you are connecting to the port. The available modes are RS-232, RS-422, and RS-485.
Baud Rate	Select a baud rate from the list. The baud rate that you select determines how fast information is transferred through a port.
Parity	Select a method for error checking. <ul style="list-style-type: none"> • None - When the parity is set to none, there is no parity bit, and ICDM-RX/PN does not perform parity checking. • Odd - Indicates that the sum of all the 1-bits in the byte plus the parity bit must be odd. When the total is odd, the parity bit is set to zero, when it is even, the parity bit is set to one. • Even - When the sum of all the 1-bits is even, the parity bit must be set to zero; when it is odd, the parity bit must be set to one.
Data Bits	Select the number of bits that make up the data. Choose from 5, 6, 7 or 8-bits.
Stop Bits	Select the number of bits to mark the end of data transmission.
Flow Control	Specifies the ability to start and stop the flow of data without the loss of bytes. Select a method for controlling the flow of data from the following list: <ul style="list-style-type: none"> • None - Indicates flow control is not in affect. • RTS/CTS - Request To Send (RTS) tells the receiving device that the sending device has data that is ready to send and Clear To Send (CTS) indicates the device is ready to accept data. • XON/XOFF - When selected, applies the standard method of controlling data flow between two modems. • Half Duplex - Transmits data in half-duplex mode.

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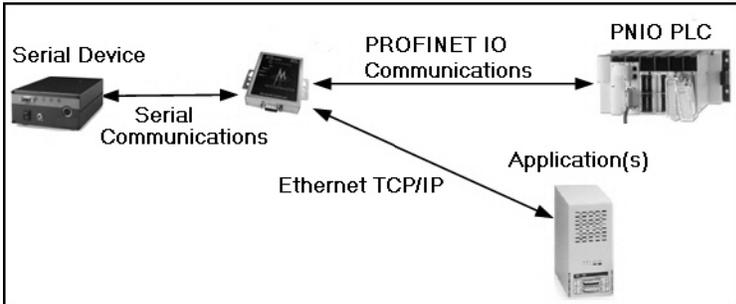
Serial Port Configuration - Serial Device Options (Continued)	
RS-485 Terminator Resistor	<p>This option displays on supported models.</p> <p>Select the state of the terminator resistor in RS-485 mode. The terminator resistor is available on the DIN rail models.</p> <ul style="list-style-type: none"> • on - Enable RS-485 Terminator Resistor • off - Disable RS-485 Terminator Resistor
DTR Mode	<p>Select the state of Data Terminal Ready (DTR).</p> <ul style="list-style-type: none"> • on - Enables DTR. • off - Disables DTR.
Rx Timeout Between Packets	<p>Specifies the following information, once the start of a packet is received:</p> <ul style="list-style-type: none"> • How long the ICDM-RX/PN should wait (in milliseconds) before timing-out, if the ETX Rx Detect length is one byte or two bytes and the ETX byte(s) are not received. • The time to wait in milliseconds between serial packets if the ETX Rx Detect length is set to none.
Discard Rx Pkts With Errors	<p>By default, this box is checked and the ICDM-RX/PN discards serial packets with errors. Clear the check box when you need to receive a serial packet with errors to troubleshoot an issue.</p>
Disable Rx Queue	<ul style="list-style-type: none"> • no - Received packets are stored in a queue and are sent to the PLC one packet at each IO update cycle. • yes - The receiving queue is disabled. Only the last received packet during an IO update cycle is sent to the PLC.
Oversize Rx Packets	<ul style="list-style-type: none"> • Truncate - Oversize packets are truncated and sent to IO controller as cyclic IO data. • SaveRec - Oversize packets are truncated and sent to IO controller as cyclic IO data. The original packets are also saved as acyclic record data. • Drop - Oversize packets are dropped.

Serial Port Configuration - Serial Packet	
<p>Rx Detect Delimiters from Serial Device</p> <p>Start of Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN detects an STX (start of transmission) byte sequence which is configured as one byte or two bytes when it receives a serial packet. The length indicates the number of STX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function and the ICDM-RX/PN accepts the first byte received after the last ETX byte(s) as the start of the next data packet. • one byte - Scans serial data for one STX byte and when the ICDM-RX/PN finds an STX byte it collects the data. If the first byte is not the STX byte, it discards the byte. The ICDM-RX/PN continues to discard the bytes until it finds an STX byte. • two bytes - Scans serial data for two STX bytes and when the ICDM-RX/PN finds two STX bytes it collects the data. If the STX bytes cannot be found, it discards the bytes. The ICDM-RX/PN continues to discard the bytes until it finds the two STX bytes. <p>Byte 1 - Specifies the character that represents the first STX byte. The ICDM-RX/PN looks for this character in the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the character that represents the second STX byte. The ICDM-RX/PN looks for this character in the second STX byte, only if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>

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Serial Port Configuration - Serial Packet (Continued)	
<p>Rx Detect Delimiters from Serial Device</p> <p>End of Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN detects an ETX (end of transmission) byte sequence that is configured as one byte or two bytes marking the end of the serial packet.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function and the ICDM-RX/PN uses the <i>Rx Timeout Between Packets</i> to indicate the end of data packet. • one byte - Scans serial data for one ETX byte and when the ICDM-RX/PN finds the ETX byte, it identifies the data as a serial packet. • two bytes - Scans serial data for two ETX bytes and when the ICDM-RX/PN finds the ETX bytes, it identifies the data as a serial packet. <p>Byte 1 - Specifies the character to scan for in the first ETX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the character to scan for in the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from PLC</p> <p>Start Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN appends an STX (start of transmission) byte sequence which is configured as one byte or two bytes to the beginning of the serial packet before it is sent.</p> <p>The length indicates the number of STX bytes, values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one STX byte before the data. • two bytes - Inserts two STX bytes before the data. <p>Byte 1 - Specifies the transmit character associated with the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second STX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from PLC</p> <p>End Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN appends an ETX (end of transmission) byte sequence which is configured as one byte or two bytes to the end of the serial packet before it is sent.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one ETX byte at the end of the data. • two bytes - Inserts two ETX bytes at the end of the data. <p>Byte 1 - Specifies the transmit character associated with the first ETX byte, if the length is set to one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from PLC</p> <p>Strip Rx STX/ETX Chars</p>	<p>When you select this check box, the ICDM-RX/PN strips STX/ETX characters from received serial packets. Clear the check box when you do not want the ICDM-RX/PN to strip STX/ETX characters from received serial packets.</p> <p>Serial Packets sent from the PLC to the ICDM-RX/PN (over Ethernet), and then sent out the serial port, are not checked for STX/ETX.</p> <p>No STX/ETX character stripping occurs in these serial packets, and framing/parity/overrun error checking does not apply.</p>

Serial Port Configuration - Serial Packet (Continued)	
<p>Tx Append Delimiters from Application</p> <p>Start Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN appends an STX (start of transmission) byte sequence which is configured as one byte or two bytes to the beginning of the serial packet before it is sent.</p> <p>The length indicates the number of STX bytes, values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one STX byte before the data. • two bytes - Inserts two STX bytes before the data. <p>Byte 1 - Specifies the transmit character associated with the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second STX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from Application</p> <p>End Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN appends an ETX (end of transmission) byte sequence which is configured as one byte or two bytes to the end of the serial packet before it is sent.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one ETX byte at the end of the data. • two bytes - Inserts two ETX bytes at the end of the data. <p>Byte 1 - Specifies the transmit character associated with the first ETX byte, if the length is set to one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from Application</p> <p>Strip Rx STX/ETX Chars</p>	<p>When you select this check box, the ICDM-RX/PN strips STX/ETX characters from received serial packets. Clear the check box when you do not want the ICDM-RX/PN to strip STX/ETX characters from received serial packets.</p> <p>Serial Packets sent from the application to the ICDM-RX/PN (over Ethernet), and then sent out the serial port, are not checked for STX/ETX.</p> <p>No STX/ETX character stripping occurs in these serial packets, and framing/parity/overrun error checking does not apply.</p>

Serial Port Configuration - Application TCP Connection	
<p>Enabled</p>	<p>This setting enables/disables the application TCP connection for a serial port. Enabling this function allows a TCP application to be connected to a serial device. If both the PLC and application are connected to the device, both can transmit to and receive data from the serial device. However, the PLC and application cannot communicate directly to each other.</p>  <p>The diagram illustrates the communication flow when the Application TCP Connection is enabled. It shows three main components: a Serial Device (represented by a rack-mounted unit), a PNIO PLC (represented by a rack-mounted unit), and one or more Applications (represented by a server rack). The Serial Device and the PNIO PLC are connected via 'Serial Communications' (indicated by a double-headed arrow). The Serial Device and the PNIO PLC are also connected via 'PROFINET IO Communications' (indicated by a double-headed arrow). The Serial Device and the Application(s) are connected via 'Ethernet TCP/IP' (indicated by a double-headed arrow). The Application(s) and the PNIO PLC are not directly connected to each other.</p>

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Serial Port Configuration - Application TCP Connection (Continued)	
Listen	<p>Enabling this setting allows the application to connect to the ICDM-RX/PN via an Ethernet TCP/IP socket.</p> <ul style="list-style-type: none"> • No - Disables listening; the ICDM-RX/PN does not accept connection attempts. • Yes - Enables listening; the ICDM-RX/PN accepts connection attempts from the specified Listen Port.
Listen Port	This is the socket port number on the ICDM-RX/PN the application connects to if the Device Listen is enabled.
Connect To Mode	<p>This setting specifies if and how the ICDM-RX/PN attempts to connect to the device at the specified Connect to IP Address and Connect Port.</p> <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not attempt to connect to the device. • Connect-Always - The ICDM-RX/PN attempts to connect to the device until a connection is made. • Connect-On-Data - The ICDM-RX/PN does not attempt to connect to the device until there is data to send to the device. Once data is received for the device, the ICDM-RX/PN attempts to connect to the device until a connection is made.
Connect Port	The device socket port number the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data .
Connect to IP Address	The device IP address the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data .
Disconnect Mode	<p>This setting specifies if and how the ICDM-RX/PN disconnects from the device.</p> <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not disconnect from the device. • Idle - The ICDM-RX/PN disconnects when there has been no transmit or received data between the device and PLC/application for a specified Idle Timer period.
Idle Timer (Milliseconds)	The idle timeout period that is used if the Device Disconnect Mode is set to Idle .

6. Configuring an Ethernet Device

Use the following procedure to configure Ethernet characteristics for the port.

1. Open the ICDM-RX/PN web page using your browser.
2. Click **Ethernet** and the **Ethernet Device Overview** page displays.
3. Click the device number that you want to configure and the corresponding page displays.
4. Configure the Ethernet settings to match the device that you plan on using and click **Save** when you are done. Refer to the following tables if you need information about the options.
 - *Ethernet Device Configuration - Ethernet Device* on Page 29
 - *Ethernet Device Configuration - Ethernet Packet* on Page 31
 - *Ethernet Device Configuration - Application TCP Connection* on Page 33

Ethernet Device Configuration - Ethernet Device	
Device Name	A user definable string used to describe the serial interface. Valid characters include a-z, A-Z, 0-9, underscores, spaces and dashes. All other characters are discarded. Up to 80 character ASCII string. The default is blank.
Enabled	<p>This setting enables/disables the <i>Device Ethernet Device</i>. Enabling this function allows an Ethernet TCP/IP device to be connected to a PLC and/or application. If both the PLC and application are connected to the device, both can transmit to and receive data from the device socket port. However, the PLC and application cannot communicate directly to each other.</p> <div style="text-align: center;"> <p>The diagram illustrates a central 'Ethernet TCP/IP' device (represented by a laptop) connected to three other components: a 'Serial Device' (represented by a rack-mounted unit), a 'PNIO PLC' (represented by a rack-mounted unit), and 'Application(s)' (represented by a server rack). Bidirectional arrows connect the central device to each of these three components. A label 'PROFINET IO Communications' is placed above the arrow connecting the central device to the PNIO PLC.</p> </div>
Listen	<p>Enabling this setting allows the device to connect to the ICDM-RX/PN via an Ethernet TCP/IP socket.</p> <ul style="list-style-type: none"> • No - Disables listening; the ICDM-RX/PN does not accept connection attempts. • Yes - Enables listening; the ICDM-RX/PN accepts connection attempts from the specified Listen Port.
Listen Port	This is the socket port number on the ICDM-RX/PN the application connects to if the Device Listen Enable is selected.

Ethernet Device Configuration - Ethernet Device (Continued)	
Connect To Mode	This setting specifies if and how the ICDM-RX/PN attempts to connect to the device at the specified Connect to IP Address and Connect Port . <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not attempt to connect to the device. • Connect-Always - The ICDM-RX/PN attempts to connect to the device until a connection is made. • Connect-On-Data - The ICDM-RX/PN does not attempt to connect to the device until there is data to send to the device. Once data is received for the device, the ICDM-RX/PN attempts to connect to the device until a connection is made.
Connect Port	The device socket port number the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data .
Connect to IP Address	The device IP address the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data .
Disconnect Mode	This setting specifies if and how the ICDM-RX/PN disconnects from the device. <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not disconnect from the device. • Idle - The ICDM-RX/PN disconnects when there has been no transmit or received data between the device and PLC/application for a specified Idle Timer period.
Idle Timer	The idle timeout period in milliseconds that is used if the Device Disconnect Mode is set to Idle .
Rx Timeout Between Packets	Specifies the following information, once the start of a packet is received: <ul style="list-style-type: none"> • How long the ICDM-RX/PN should wait (in milliseconds) before timing-out, if the ETX Rx Detect length is one byte or two bytes and the ETX byte(s) are not received. • The time to wait in milliseconds between Ethernet packets if the ETX Rx Detect length is set to none.
Disable Rx Queue	<ul style="list-style-type: none"> • no - Received packets are stored in a queue and are sent to the PLC one packet at each IO update cycle. • yes - The receiving queue is disabled. Only the last received packet during an IO update cycle is sent to the PLC.
Oversize Rx Packets	Truncate - Oversize packets are truncated and sent to IO controller as cyclic IO data. SaveRec - Oversize packets are truncated and sent to IO controller as cyclic IO data. The original packets are also saved as acyclic record data. Drop - Oversize packets are dropped.

Ethernet Device Configuration - Ethernet Packet	
<p>Rx Detect Delimiters from Ethernet Device</p> <p>Start of Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN detects an STX (start of transmission) byte sequence which is configured as one byte or two bytes when it receives a Ethernet packet.</p> <p>The length indicates the number of STX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function and the ICDM-RX/PN accepts the first byte received after the last ETX byte(s) as the start of the next data packet. • one byte - Scans Ethernet data for one STX byte and when the ICDM-RX/PN finds an STX byte it collects the data. If the first byte is not the STX byte, it discards the byte. The ICDM-RX/PN continues to discard the bytes until it finds an STX byte. • two bytes - Scans Ethernet data for two STX bytes and when the ICDM-RX/PN finds two STX bytes it collects the data. If the STX bytes cannot be found, it discards the bytes. The ICDM-RX/PN continues to discard the bytes until it finds the two STX bytes. <p>Byte 1 - Specifies the character that represents the first STX byte. The ICDM-RX/PN looks for this character in the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the character that represents the second STX byte. The ICDM-RX/PN looks for this character in the second STX byte, only if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Rx Detect Delimiters from Ethernet Device</p> <p>End of Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN detects an ETX (end of transmission) byte sequence that is configured as one byte or two bytes marking the end of the Ethernet packet.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function and the ICDM-RX/PN uses the <i>Rx Timeout Between Packets</i> to indicate the end of data packet. • one byte - Scans Ethernet data for one ETX byte and when the ICDM-RX/PN finds the ETX byte, it identifies the data as a Ethernet packet. • two bytes - Scans Ethernet data for two ETX bytes and when the ICDM-RX/PN finds the ETX bytes, it identifies the data as a Ethernet packet. <p>Byte 1 - Specifies the character to scan for in the first ETX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the character to scan for in the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from PLC</p> <p>Start Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN appends an STX (start of transmission) byte sequence which is configured as one byte or two bytes to the beginning of the Ethernet packet before it is sent.</p> <p>The length indicates the number of STX bytes, values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one STX byte before the data. • two bytes - Inserts two STX bytes before the data. <p>Byte 1 - Specifies the transmit character associated with the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second STX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>

Ethernet Device Configuration - Ethernet Packet (Continued)	
<p>Tx Append Delimiters from PLC</p> <p>End Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN appends an ETX (end of transmission) byte sequence which is configured as one byte or two bytes to the end of the Ethernet packet before it is sent.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one ETX byte at the end of the data. • two bytes - Inserts two ETX bytes at the end of the data. <p>Byte 1 - Specifies the transmit character associated with the first ETX byte, if the length is set to one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from PLC</p> <p>Strip Rx STX/ETX Chars</p>	<p>When you select this check box, the ICDM-RX/PN strips STX/ETX characters from received Ethernet packets. Clear the check box when you do not want the ICDM-RX/PN to strip STX/ETX characters from received Ethernet packets.</p> <p>Ethernet Packets sent from the PLC to the ICDM-RX/PN (over Ethernet), and then sent out the Ethernet device, are not checked for STX/ETX.</p> <p>No STX/ETX character stripping occurs in these Ethernet packets.</p>
<p>Tx Append Delimiters from Application</p> <p>Start Transmission (STX)</p>	<p>When enabled, the ICDM-RX/PN appends an STX (start of transmission) byte sequence which is configured as one byte or two bytes to the beginning of the Ethernet packet before it is sent.</p> <p>The length indicates the number of STX bytes, values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one STX byte before the data. • two bytes - Inserts two STX bytes before the data. <p>Byte 1 - Specifies the transmit character associated with the first STX byte, if the length is one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second STX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from Application</p> <p>End Transmission (ETX)</p>	<p>When enabled, the ICDM-RX/PN appends an ETX (end of transmission) byte sequence which is configured as one byte or two bytes to the end of the Ethernet packet before it is sent.</p> <p>The length indicates the number of ETX bytes, valid values for length are:</p> <ul style="list-style-type: none"> • none - Disables this function. • one byte - Inserts one ETX byte at the end of the data. • two bytes - Inserts two ETX bytes at the end of the data. <p>Byte 1 - Specifies the transmit character associated with the first ETX byte, if the length is set to one byte or two bytes. You can specify a value between 0 and 255 in decimal format.</p> <p>Byte 2 - Specifies the transmit character associated with the second ETX byte, if the length is two bytes. You can specify a value between 0 and 255 in decimal format.</p>
<p>Tx Append Delimiters from Application</p> <p>Strip Rx STX/ETX Chars</p>	<p>When you select this check box, the ICDM-RX/PN strips STX/ETX characters from received Ethernet packets. Clear the check box when you do not want the ICDM-RX/PN to strip STX/ETX characters from received Ethernet packets.</p> <p>Ethernet Packets sent from the application to the ICDM-RX/PN (over Ethernet), and then sent out the Ethernet device, are not checked for STX/ETX.</p> <p>No STX/ETX character stripping occurs in these Ethernet packets.</p>

5/28/19

Ethernet Device Configuration - Application TCP Connection	
Enabled	<p>This setting enables/disables the application TCP connection for an Ethernet device. Enabling this function allows a TCP application to be connected to an Ethernet device. If both the PLC and application are connected to the device, both can transmit to and receive data from the Ethernet device. However, the PLC and application cannot communicate directly to each other.</p> <div style="text-align: center;"> <p>The diagram illustrates the network configuration. On the left is an 'Ethernet Device' (a rack-mounted unit). Below it is a computer icon labeled 'Ethernet TCP/IP'. On the right is a 'PNIO PLC' (a rack-mounted unit). Below it is another computer icon labeled 'Application(s)'. A double-headed arrow labeled 'PROFINET IO Communications' connects the Ethernet Device and the PNIO PLC. A double-headed arrow labeled 'Ethernet TCP/IP' connects the Ethernet Device and the Application(s). The Ethernet TCP/IP connection is shown as a single-headed arrow pointing from the Ethernet Device to the Application(s).</p> </div>
Listen	<p>Enabling this setting allows the device to connect to the ICDM-RX/PN via an Ethernet TCP/IP socket.</p> <ul style="list-style-type: none"> • No - Disables listening; the ICDM-RX/PN does not accept connection attempts. • Yes - Enables listening; the ICDM-RX/PN accepts connection attempts from the specified Listen Port.
Listen Port	<p>This is the socket port number on the ICDM-RX/PN the application connects to if the Device Listen Enable is selected.</p>
Connect To Mode	<p>This setting specifies if and how the ICDM-RX/PN attempts to connect to the device at the specified Connect to IP Address and Connect Port.</p> <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not attempt to connect to the device. • Connect-Always - The ICDM-RX/PN attempts to connect to the device until a connection is made. • Connect-On-Data - The ICDM-RX/PN does not attempt to connect to the device until there is data to send to the device. Once data is received for the device, the ICDM-RX/PN attempts to connect to the device until a connection is made.
Connect Port	<p>The device socket port number the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data.</p>
Connect to IP Address	<p>The device IP address the ICDM-RX/PN connects to if the Device Connect To Mode is set to either Connect-Always or Connect-On-Data.</p>
Disconnect Mode	<p>This setting specifies if and how the ICDM-RX/PN disconnects from the device.</p> <ul style="list-style-type: none"> • Never - The ICDM-RX/PN does not disconnect from the device. • Idle - The ICDM-RX/PN disconnects when there has been no transmit or received data between the device and PLC/application for a specified Idle Timer period.
Idle Timer	<p>The idle timeout period in milliseconds that is used if the Device Disconnect Mode is set to Idle.</p>

7. Configuring the ICDM-RX/PN in TIA Portal

This section contains the following topics;

- *Installing the GSD File* on Page 34
- *Adding the ICDM-RX/PN* on Page 34
- *IP Address Assignment* on Page 35
- *Device Name Assignment* on Page 39
- *Establishing A PROFINET IO Connection* on Page 42
- *Status LED Behavior* on Page 43
- *Configuring IO Modules* on Page 43

7.1. Installing the GSD File

Use the following steps to install the ICDM-RX/PN GSD file into TIA Portal.

1. Open the ICDM-RX/PN home page, download and unzip the GSDML zip file to a working directory.

Note: *If you have not previously configured an IP address using PortVision DX, the default IP address is 192.168.250.250 with a subnet mask of 255.255.0.0. If you do not use PortVision DX to program the IP address, you may need to change your system IP address to initially communicate with the ICDM-RX/PN.*

2. Open TIA Portal V13 and click **Project View**.
3. Use the **Options | Install general station description file (GSD)** menu to install the GSD file.

7.2. Adding the ICDM-RX/PN

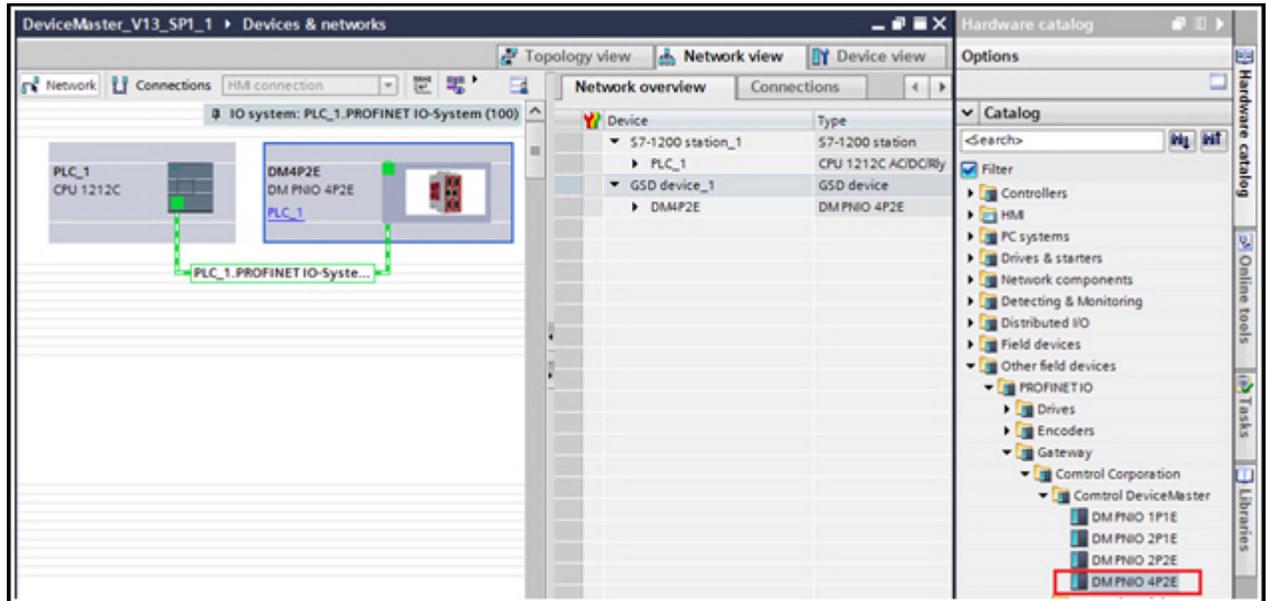
Use these steps to add the ICDM-RX/PN.

1. From the **Hardware** catalog, under **Other field devices | PROFINET IO | Gateway | Control Corporation | Control ICDM-RX/PN**, select the model corresponding to your device, and drag it into the **Network** view area.

Use the following table to choose the correct model from the hardware catalog in TIA Portal for your device. The number of serial ports (1P or 4P) and number of Ethernet ports (1E or 2E) must match your device. The form factor (panel vs DIN rail), power supply, or the type of serial port connectors (DB9 vs terminal blocks), does not matter.

Description	GSD Model
ICDM-RX/PN-DB9/RJ45-DIN	DM PNIO 1P1E
ICDM-RX/PN-ST/RJ45-DIN	
ICDM-RX/PN-4DB9/2RJ45-DIN	DM PNIO 4P2E

- To connect the device to PLC, click the link on the device and select **PLC_1.PROFINET interface_1** from the pop-up menu, as shown in this screen shot.



A valid IP address and a device name are required to establish a connection (Application Relationship) between a ICDM-RX/PN gateway and an IO controller. The next two subsections describe various methods to assign IP address and device name to the ICDM-RX/PN.

7.3. IP Address Assignment

The ICDM-RX/PN Industrial Gateway gateways supports three methods for IP address assignment according to GSDML Specification V2.32.

- **LOCAL** - A device specific method for IP address assignment. See *Assigning an IP Address Statically* on Page 35 for more information.
- **DHCP** - The Dynamic Host Configuration Protocol for IP address assignment. See *Assigning an IP Address via DHCP* on Page 38 for more information.
- **DCP** - IP address assignment via Discovery and basic Configuration Protocol (DCP). See *Assigning an IP Address via IO Controller* on Page 38 for information.

Note: The ICDM-RX/PN's default IP address is 192.168.250.250 and the default subnet mask is 255.255.0.0. You may need to change your laptop or PC IP address range to access the web interface or you can use PortVision DX to change the IP address without changing your settings. Refer to *Preparing the ICDM-RX/PN for Configuration* on Page 13 to install PortVision DX and program the IP address.

7.3.1. Assigning an IP Address Statically

IP addresses can be assigned statically using one of the following methods:

- Embedded web interface (or PortVision DX)
- Assign IP address function of TIA Portal on-line access

7.3.1.1. Assigning IP Address Statically Using the Web Page

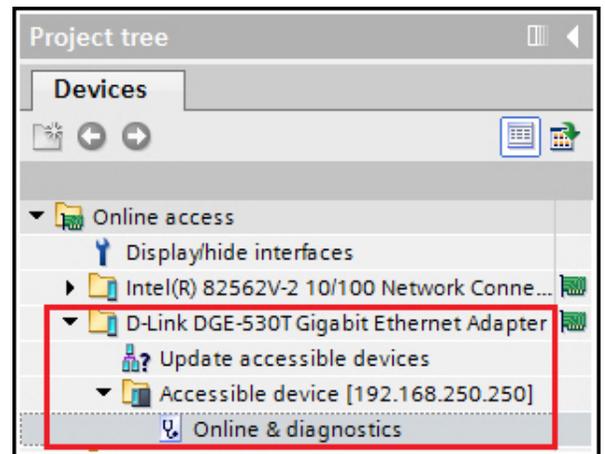
You can use the following procedure to configure a static IP address using the web interface.

1. Open a web browser and enter the ICDM-RX/PN gateway address.
2. Click **Network | Configuration**.
3. Select the **Use static config below** radio button.
4. Enter an IP address, subnet mask, and gateway address.
5. Click the **Save** button.
A reboot is required for the new IP address to take effect.
6. Click **System | Reboot** and the ICDM-RX/PN will reboot in 10 seconds or you can click on the **Reboot Now** button to reboot immediately.

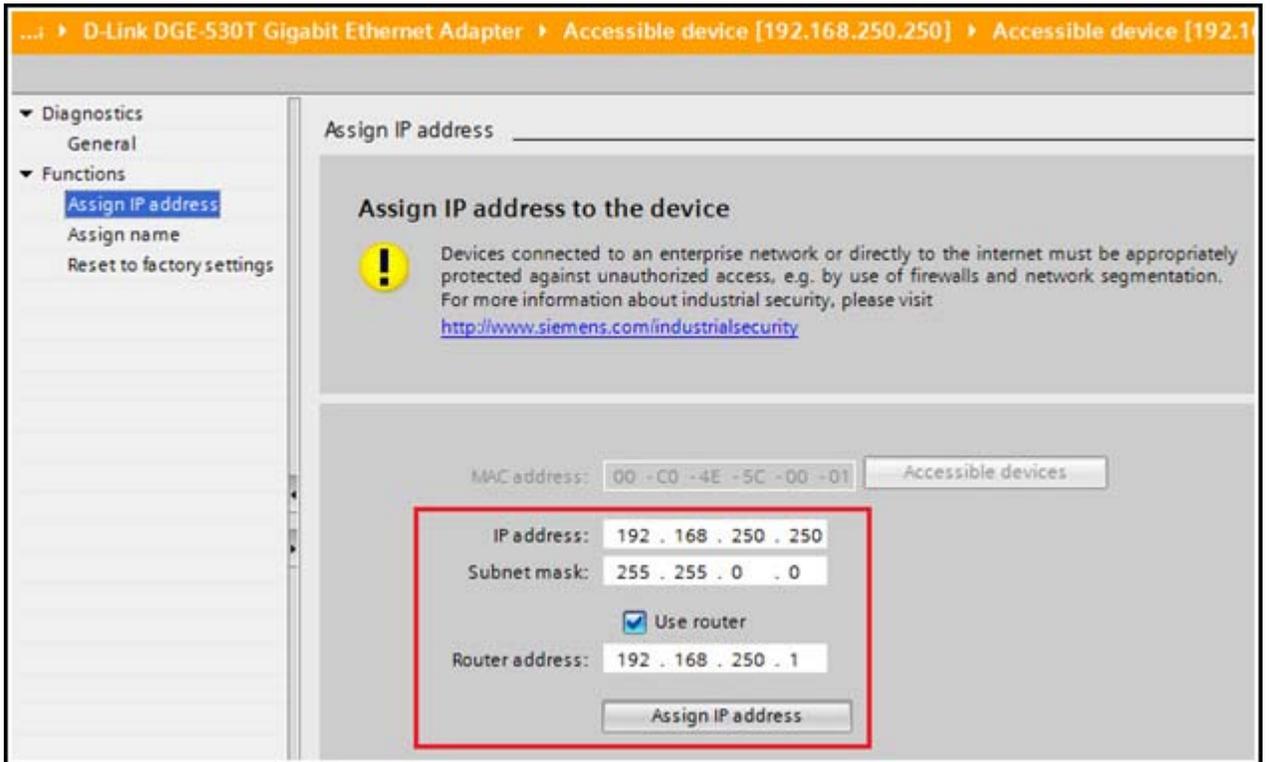
7.3.1.2. Assigning IP Address Statically Using TIA Portal

You can also use the following procedure to configure a static IP address using TIA Portal.

1. Double-click **Project tree | Online access | Your Ethernet Adapter | Accessible device [192.168.250.250] | Online & diagnostics** to open the Online access window, where **Your Ethernet Adapter** is the name of your networking interface, and **Accessible device [192.168.250.250]** is the gateway, as shown in this figure (right).
2. Click **Functions | Assign IP address** and enter the desired IP configurations, as shown in the next screen shot.
3. Click the **Assign IP address** button and then the IP configuration is assigned to the gateway.



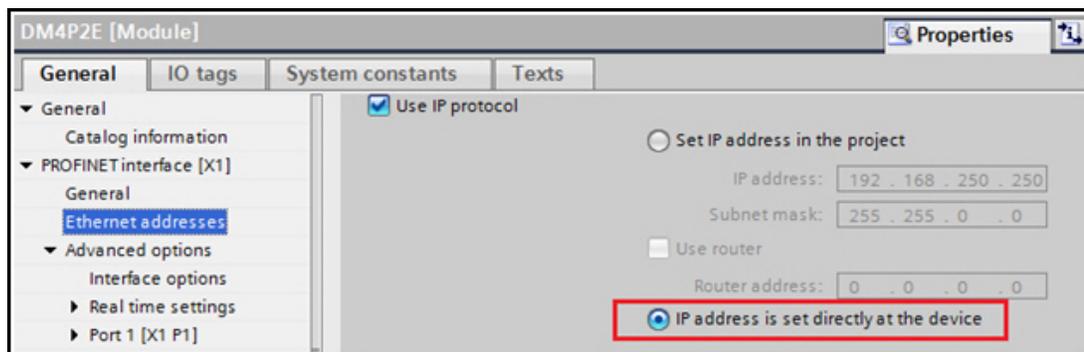
You can access the gateway using the new IP address immediately. A reboot is not required.



7.3.1.3. Configuring TIA Portal Project Not to Set IP Address

When using static IP address assignment either through the web interface or TIA Portal on-line access, you will need to configure the TIA Portal project not to set IP address in project.

1. In TIA Portal, double-click the ICDM-RX/PN module to open the **Device View**.
2. On the **Properties | General** tab, click the **PROFINET interface [X1] | Ethernet addresses**, which opens the **Ethernet addresses properties** window.
3. Make sure the **Use IP protocol** check box is checked and the **IP address is set directly at the device** radio button is selected, as shown in this figure.



7.3.2. Assigning an IP Address via DHCP

The ICDM-RX/PN gateway supports DHCP for IP address assignment. DHCP is disabled by default. Use the following steps to enable DHCP.

1. Open a web browser and enter the ICDM-RX/PN IP address. The default IP address is 192.168.250.250.
2. Click **Network | Configuration**.
3. Select the **Use DHCP** radio button and click the **Save** button.
A reboot is required for the change to take effect.
4. Click **System | Reboot** and the ICDM-RX/PN will reboot in 10 seconds or you can click on the **Reboot Now** button to reboot immediately.

Once rebooted, the gateway attempts to obtain an IP address from a DHCP server. You can use PortVision DX to find out the new IP address of the gateway or do a network scan in TIA Portal.

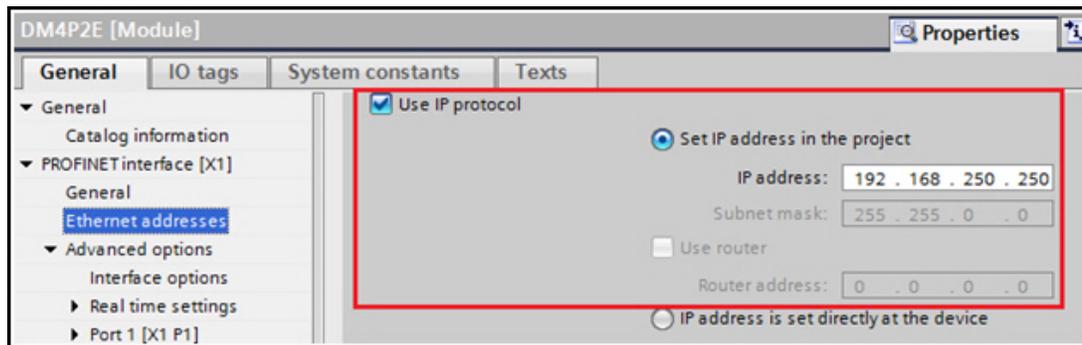
Notes:

- DHCP can only be enabled or disabled via the web interface. Certain versions of SIMATIC STEP 7 have a function to enable DHCP if a PROFINET IO device supports it. However, the ICDM-RX/PN does not support enabling DHCP through STEP 7.
- Similar to static IP address assignment, when DHCP is enabled, you will need to configure the TIA Portal project not to set IP address in project. Refer to *Configuring TIA Portal Project Not to Set IP Address* on Page 37 to set the **IP address is set directly at the device** option.

7.3.3. Assigning an IP Address via IO Controller

An IO controller can assign IP address to the ICDM-RX/PN via DCP. The IO controller and the ICDM-RX/PN gateway have to be on the same subnet.

1. In TIA Portal, double-click the ICDM-RX/PN module to open the **Device View**.
2. On the **Properties | General** tab, click the **PROFINET interface [X1] | Ethernet addresses**, which opens the **Ethernet addresses properties** window.



3. Make sure the **Use IP protocol** check box is checked and the **Set IP address in the project** radio button is selected.
4. Manually enter the IP address for the ICDM-RX/PN gateway.
5. Compile and download the project.

The new IP configuration takes effect when a connection is established between the ICDM-RX/PN and the IO controller. A reboot is not required.

Note: The **Use PLC assigned** radio box on the **Network | Configuration** page (Page 38) is for information only. Use the above steps to set the IP address in TIA Portal project. If you select the **Use PLC assigned** option and reboot the ICDM-RX/PN, the gateway will start with the 0.0.0.0 IP address and the web interface will not work. Refer to the next subsection for more information.

7.3.4. Special Considerations Regarding IP Assignment

When an IP address is assigned by an IO controller, the ICDM-RX/PN does not store the assigned IP address in the non-volatile memory. If the ICDM-RX/PN is rebooted, it starts with the 0.0.0.0 IP address after the reboot. The ICDM-RX/PN stays in that state until a connection is reestablished with the IO controller, at which point the (same) IP address is reassigned by the IO controller. This behavior is a requirement of the PROFINET specification.

Since the 0.0.0.0 is not a valid IP address, the ICDM-RX/PN is not assessable via the web interface, Telnet, or SSH. You can use PortVision DX and TIA Portal to discover the ICDM-RX/PN and assign a static IP address (*Preparing the ICDM-RX/PN for Configuration* on Page 13).

Pepperl+Fuchs recommends using static IP address assignment when possible. The web interface always works regardless of the presence of an IO controller or not.

In addition, DCP IP assignment overwrites the static or DHCP IP assignment. For example: an IO controller is configured to set IP address in the project. The IO controller is powered off temporarily. A new IP address is assigned to the ICDM-RX/PN using PortVision DX. Later when the IO controller is turned back on, it changes the gateway's IP address back to the address that was configured in the project.

7.4. Device Name Assignment

Use one of the following methods to configure the Device Name.

- Web interface - *Assigning the Device Name Using the Web Interface* on Page 39
- TIA Portal - *Assigning the Device Name in TIA Portal* on Page 40

7.4.1. Assigning the Device Name Using the Web Interface

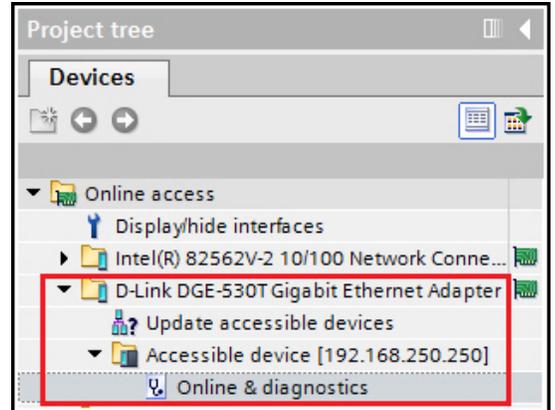
You can use the **Network | Configuration** page to assign the device name for PROFINET IO.

1. If necessary, open the gateway web interface with your web browser using the IP address.
2. Click **Network | Configuration**.
3. Enter the PROFINET IO Device Name. The PROFINET IO device name is not case-sensitive and the default is empty. The device name must be specified according to DNS conventions.
 - Restricted to a total of 240 characters (letters, digits, dash or period).
 - Parts of the name within the device name; in other words, a string between two periods, must not exceed a maximum of 63 characters.
 - No special characters such as umlauts (ä, ö etc.), brackets, underscore, slash, blank etc. The dash is the only permitted special character.
 - The device name must not begin or end with the "-" character.
 - The device name must not begin with numbers.
 - The device name must not have the structure n.n.n.n (n = 0...999).
 - The device name must not begin with the character string "port-xyz-" (x , y, z = 0...9).
4. Click the **Save** button.
A reboot is required for the new name to take effect.
5. Click **System | Reboot** to reboot the gateway.

7.4.2. Assigning the Device Name in TIA Portal

Use the following procedure to configure the Device Name using TIA Portal.

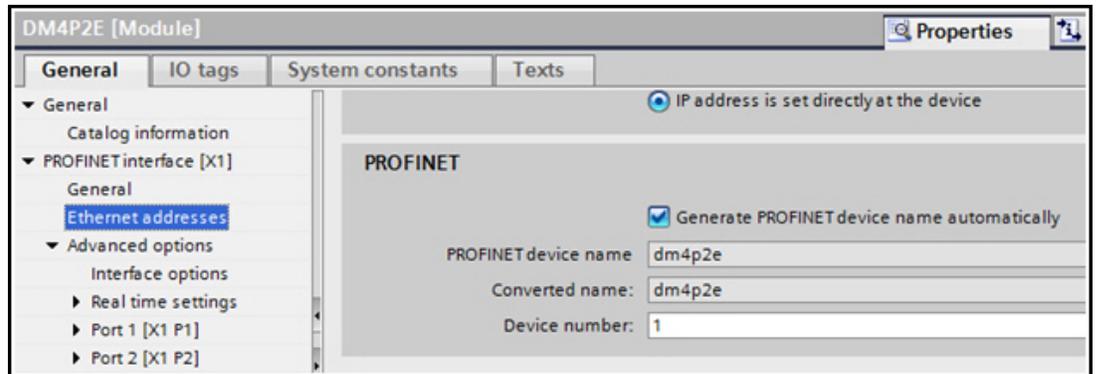
1. In TIA Portal, open on-line access.
2. Click **Function** | **Assign name**, enter the desired PROFINET device name.
3. Click the **Assign name** button. The new device name takes effects immediately. A reboot is not required.



7.4.3. Configuring Device Name in TIA Portal Project

After assigning a device name to the ICDM-RX/PN, the same device name also needs to be configured in the TIA Portal project.

1. In TIA Portal, double-click the ICDM-RX/PN module to open the **Device View**.
2. On the **Properties | General** tab, click the **PROFINET interface [X1] | Ethernet addresses**, which opens the **Ethernet addresses properties** window.
3. When the **Generate PROFINET device name automatically** check box is selected, a default device name is entered automatically. If the ICDM-RX/PN has been assigned a different device name, then un-check the check box and manually enter the device name.



4. Compile and download the project.

Notes:

- Configuring a PROFINET device name in the project does not automatically assign that name to the ICDM-RX/PN. Use the procedures in *Assigning the Device Name Using the Web Interface* on Page 39 or *Assigning the Device Name in TIA Portal* on Page 40 to assign a device name to the ICDM-RX/PN.
- The device name must be unique on the network.

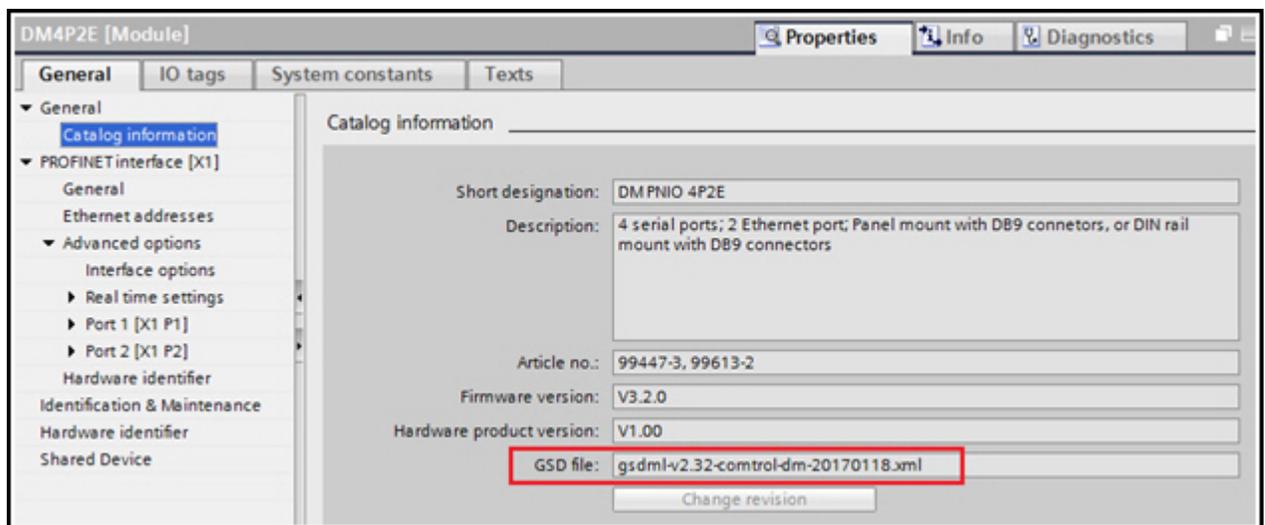
7.5. Establishing A PROFINET IO Connection

At this point, a ICDM-RX/PN gateway was added to a TIA Portal project, the IP address and device name were assigned. The next step is to establish a connection between the gateway and IO controller before starting configuration of the IO modules. You may need to compile and download the project and if necessary, reboot the ICDM-RX/PN.

Open the **Diagnostics | System Info** web page on the ICDM-RX/PN. Verify under the *PLC Interface* section, that a PROFINET IO connection has been successfully established between the gateway and IO controller, the Active Application Relationships should be 1. The Status (or PWR) LED has a solid, steady light on the ICDM-RX/PN and the status LED(s) on the IO controller should be solid green.

If a connection has not been established, here are some troubleshooting tips:

- Check if the correct GSD file is installed in TIA Portal.
- Check if the ICDM-RX/PN module in TIA Portal is using the right GSD revision. If an older version of the GSD file was installed before, you may need to remove the ICDM-RX/PN device(s) from an existing project, and reinsert it after the new GSD file is installed.



- Check if the right model is added in the project. See the table on Page 34 for supported models.
- Remove any modules and submodules of the ICDM-RX/PN in TIA project. Only keep the head module.
- Check if the gateway has a valid IP address. See *IP Address Assignment* on Page 35 for IP address assignment.
- Verify that the gateway has a valid device name. See *Device Name Assignment* on Page 39 for assigning device name.
- Make sure there are no other devices on the same network using the same IP address or device name.
- Make sure the matching device name is configured in TIA Portal project.
- Make sure there is no other IO controller that is having or trying to establish a connection with the gateway.
- Go to **Diagnostics | System Log** web page, look for any possible error messages.

7.6. Status LED Behavior

The ICDM-RX/PN has one Status (or PWR, depending on the model) LED.

Status or PWR LED	Description
Blinks every 10 seconds	No PLC connection.
On (solid)	One or more PLC connections have been established.
Flashing	<ul style="list-style-type: none"> LED flashing mode is enabled. Error detected or diagnostics information available.

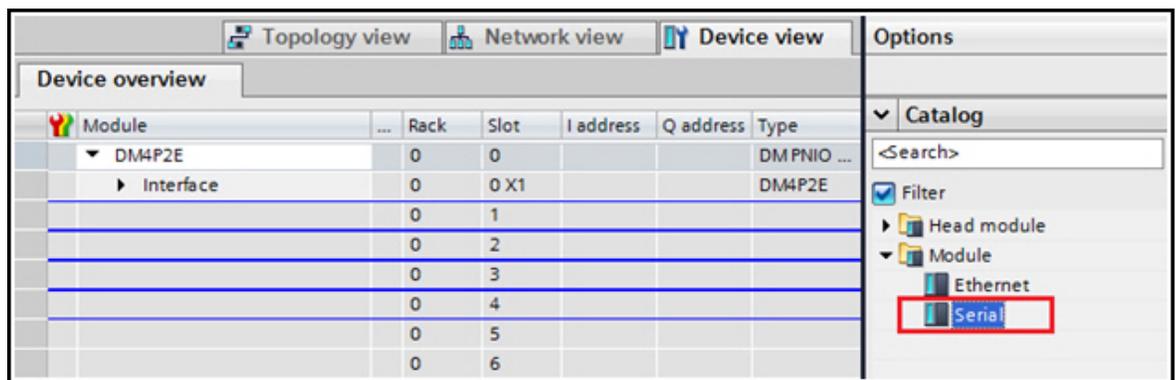
7.7. Configuring IO Modules

IO modules are used to exchange input and output data with serial devices and Ethernet devices. The ICDM-RX/PN gateway has two categories of IO modules:

- Serial Port Module – for accessing serial devices
- Ethernet Device Module – for accessing Ethernet devices

7.7.1. Inserting IO Modules and Submodules

- Double-click the ICDM-RX/PN module in the **Network** view to open the **Device overview** window.
- From the **Catalog | Module**, select the Serial or Ethernet module and drag it into one of the highlighted slots in the Device overview window.

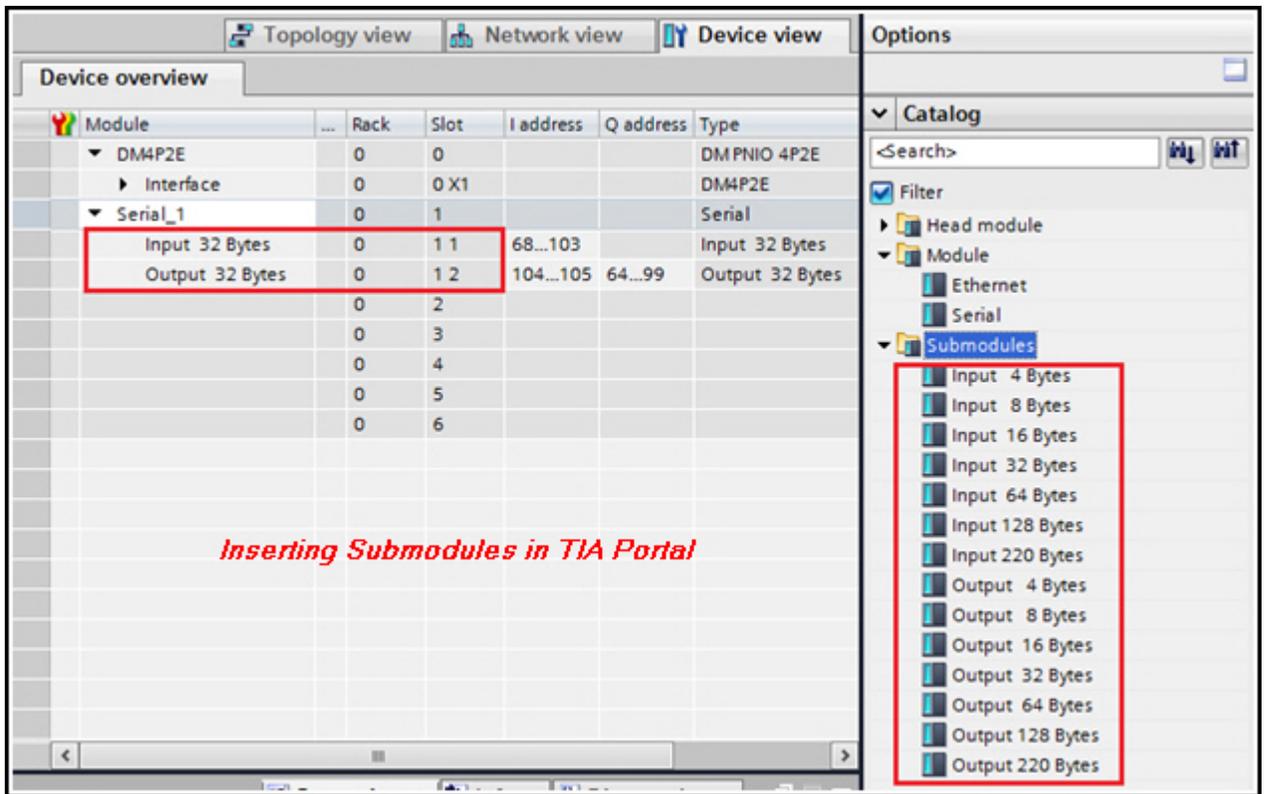


- Slot 1..N** are reserved for serial ports, where **N** is the number of available serial ports. **Slot 1** for serial port 1, **Slot 2** for serial port 2, so on and so forth.
- Slot N+1** and **N+2** are reserved for Ethernet devices. The number of supported Ethernet devices equals the number of Ethernet ports. For example, a ICDM-RX/PN-DB9/RJ45-DIN supports one Ethernet device; a ICDM-RX/PN-4DB9/2RJ45-DIN supports two Ethernet devices. **Slot N+1** is for Ethernet device 1. **Slot N+2** is for Ethernet device 2 when applicable.

The following table summarizes the available slots and corresponding IO modules for different ICDM-RX/PN gateways.

	ICDM-RX/PN-DB9/RJ45-DIN ICDM-RX/PN-ST/RJ45-DIN	ICDM-RX/PN-4DB9/2RJ45-DIN
Slot 1	Serial Port 1	Serial Port 1
Slot 2	Ethernet Device 1	Serial Port 2
Slot 3	N/A	Serial Port 3
Slot 4	N/A	Serial Port 4
Slot 5	N/A	Ethernet Device 1
Slot 6	N/A	Ethernet Device 2

Once an IO module is inserted into a slot, you can configure the submodules for that IO module. There are input and output submodules with various IO sizes.



Each submodule can be inserted to one of the two available sub-slots of an IO module. **Sub-slot 1** is reserved for an input submodule; **Sub-slot 2** is for an output submodule. The following table illustrates the available submodules and their allowed sub-slots.

Sub-slot	Allowed Submodules
1	Input submodule (4, 8, 16, 32, 64, 128, 220 bytes)
2	Output submodule (4, 8, 16, 32, 64, 128, 220 bytes)

In the *Inserting Submodules in TIA Portal* figure (above), a 32 bytes input submodule is inserted in **Slot 1 Sub-slot 1**; a 32 bytes output submodule is inserted in **Slot 1 Sub-slot 2**. Therefore Serial Port 1 is able to receive up to 32 bytes input data and transmit up to 32 bytes output data.

Similarly, you can configure an Ethernet device by inserting an Ethernet module, then inserting desired input and output submodule into the Ethernet module.

Here are some tips when configuring IO modules and submodules.

- A Serial or Ethernet module must be inserted first in order to configure the submodules.
- If you do not find an exact matching IO size, select the next size (larger). For instance, use the Input 128 Bytes submodule for a device that has 80 bytes input data.
- The input data size and output data size are independent. You can configure a serial module to have 64 bytes input data and 32 bytes output data.
- For input only devices, leave the **Sub-slot 2** open. For output only devices, leave the **Sub-slot 1** open.
- If a serial port or an Ethernet device is not in use, simply leave the corresponding slot open.

Note: *Certain versions of TIA Portal may not allow both sub-slots open. You must insert at least one submodule for a serial or Ethernet module.*

7.7.2. Input and Output Submodule Data Format

The following data type definitions apply.

Data Type	Data Type Definition
BYTE	An integer 0 - 255 (8-bit) e.g. ASCII strings are a series of bytes.
WORD	Unsigned integer (16-bit)
DWORD	Unsigned integer (32-bit)

The next table shows the data format of an input submodule. The sequence number range is from 0 to 65535 (16#FFFF). Once the sequence number reaches 65535, it restarts at 0. The data length range is from 0 to 220, indicating the number of bytes received. The actual data starts from offset 4.

Byte Offset	Input Submodule Data Type	Description
0-1	WORD	Sequence Number (Big endian)
2-3	WORD	Data Length (Big endian)
4..N	Array of BYTE	Data Array (Maximum 220 bytes)

When a packet that is larger than the configured input submodule is received, the packet is truncated by default. However, the length field always contains the original packet size. For example, a serial port is configured with a 32 byte input submodule. A packet of 40 bytes is received. The IO controller will receive the first 32 bytes input data and the length field will be 40. A length field larger than the size of input submodule indicates that the data has been truncated. Refer to *Handling Oversize Packets* on Page 56 for more information regarding oversize packets handling and the method to retrieve an entire oversize packet without losing data.

This table shows the data format of an output submodule.

Byte Offset	Output Submodule Data Type	Description
0-1	WORD	Sequence Number (Big endian)
2-3	WORD	Data Length (Big endian)
4..N	Array of BYTE	Data Array (Maximum 220 bytes)

The output data has the same format as the input data of an input submodule. The ICDM-RX/PN transmits the number of output data indicated by the length field when the sequence number field changes. The gateway only transmits the output data once. No further data is transmitted until the sequence number is changed again.

An output submodule also has a 2-byte input data, as shown in following table. This 16-bit integer is the



sequence number of the last output data packet that was transmitted. If you want to confirm that the last data written to the output data area has been transmitted, compare the sequence number of the transmitted output data with the input data of that submodule. If they are the same, the data has been transmitted successfully.

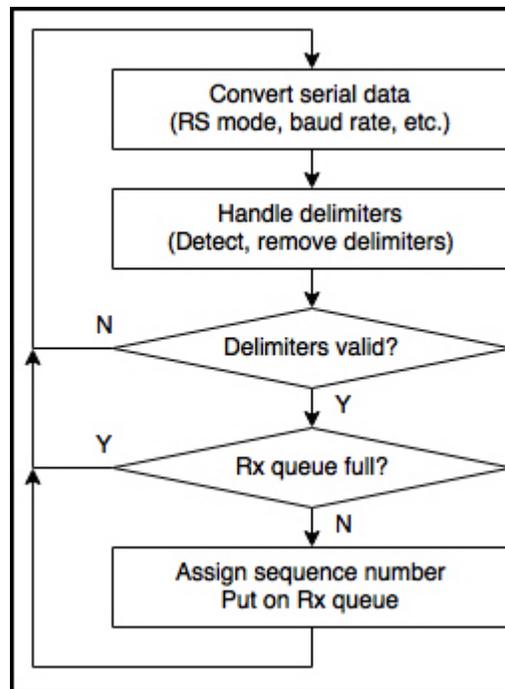
Byte Offset	Data Type	Description
0-1	WORD	Last Transmitted Sequence Number (Big endian)

8. IO Data Handling

This section describes how the ICDM-RX/PN handles IO data.

8.1. Input Data Handling

When the ICDM-RX/PN receives input data from a serial port, it first converts the low level serial signals into bytes of raw serial data. Then serial packets are created from the raw data based on delimiters and/or receiving timer. Packets that do not have valid delimiters are dropped. Valid packets are put on a receiving queue, waiting to be sent to IO controller in the next IO update cycle. The following figure shows the process.

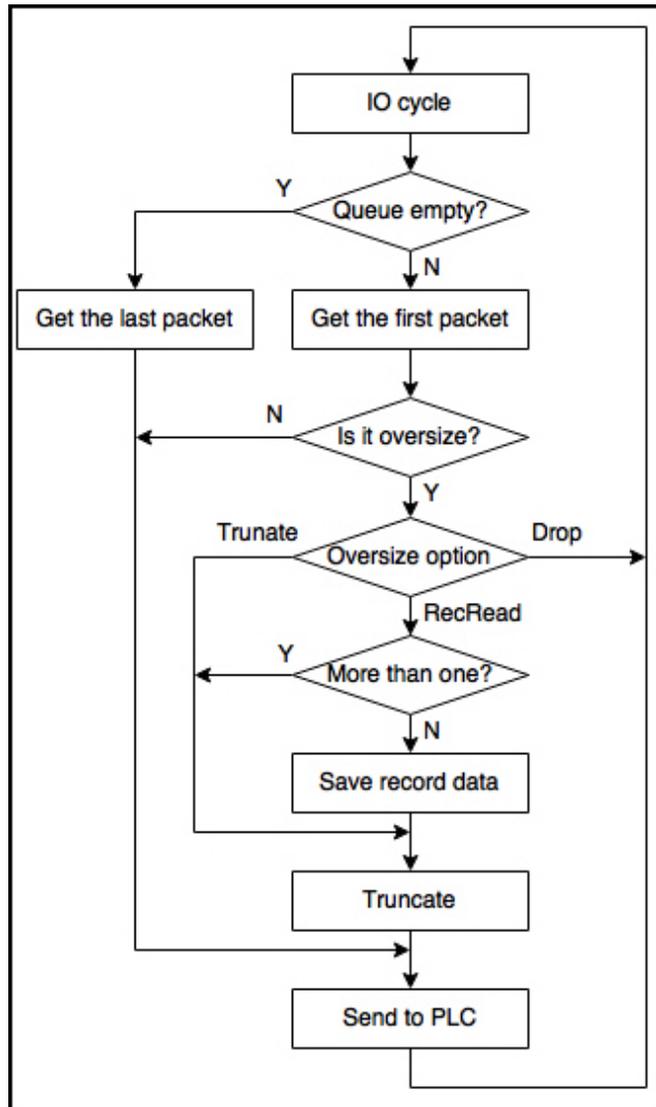


The input data from Ethernet devices are handled similarly. Instead of converting serial signals, the ICDM-RX/PN receives the input data through a TCP connection from an Ethernet device. The ICDM-RX/PN manages the connection mode, TCP port, disconnect mode, etc. Refer to *Configuring an Ethernet Device* on Page 29 for details regarding Ethernet device configurations. The reset of process is basically identical between a serial port and an Ethernet device.

At every IO update cycle, the ICDM-RX/PN gets the first packet from the receiving queue of each serial port and Ethernet device and sends it to IO controller. If the receiving queue is empty, it retransmits the last packet of that port/device.

Depending on the configuration, an oversize packet could be truncated, dropped, or saved as record data. The

following figure shows how a packet is sent to IO controller during an IO update cycle.



Packets from different serial ports and Ethernet devices are combined and sent to IO controller in one PROFINET IO frame.

For example, a ICDM-RX/PN-4DB9/2RJ45-DIN has 6 220-byte input submodules configured for 4 serial ports and 2 Ethernet devices. There are multiple packets waiting in the receiving queue on all 6 ports/devices. At the first IO update cycle, the ICDM-RX/PN takes one packet from each receiving queue, combines them into one PROFINET IO frame and sends it to the IO controller. The total amount of input data in that PROFINET IO frame is:

$$(4 \text{ bytes sequence number and length} + 220 \text{ bytes data}) \times 6 = 1344 \text{ bytes}$$

At the next IO cycle update cycle, the ICDM-RX/PN sends another PROFINET IO frame with all new input data.

8.1.1. Handling Input Data in PLC

Input data received by an IO controller is available at the input address range and can be read directly by the IO controller. Due to the nature of PROFINET IO cyclical communication, the ICDM-RX/PN sends input data to the IO controller at every IO update cycle regardless if there is new input data or not. If there is new data, the ICDM-RX/PN increments the sequence number and sends the new data. If not, it resends the last data using the same sequence number. Therefore, the sequence number is the key for the IO controller to determine whether there is new input data or not.

The IO controller should monitor the sequence number field closely during each scan. If the sequence number changes, the input data should be processed immediately or copied to other memory location before the next IO update cycle. If the IO controller fails to do so, the data could be overwritten in the next IO update cycle. To prevent that from happening, the IO controller must consume the input data faster than the ICDM-RX/PN can produce them.

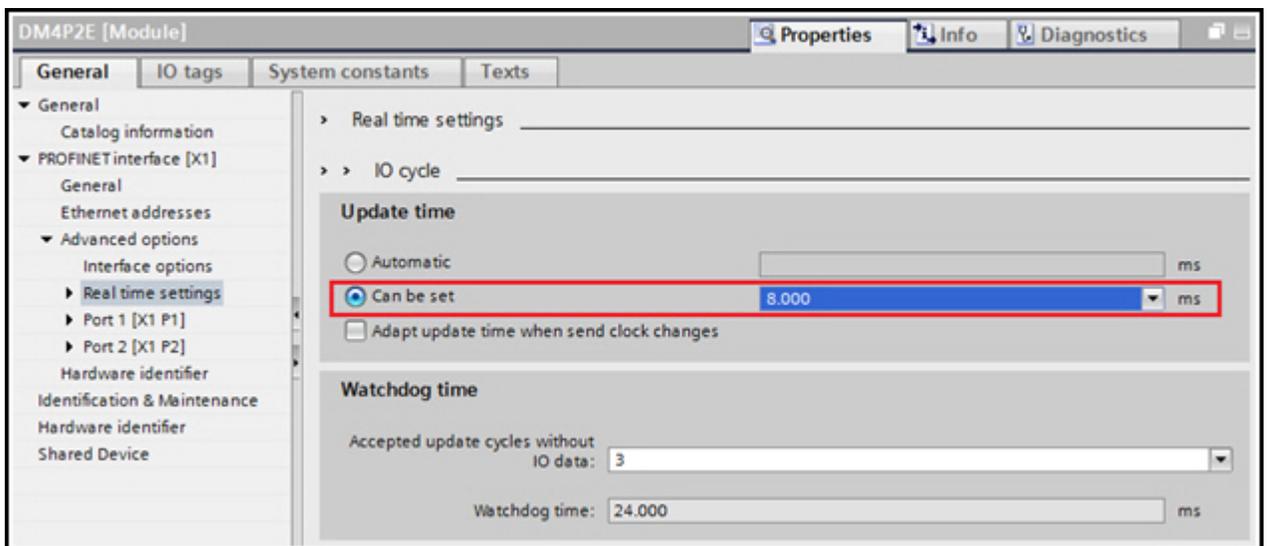
The **IO Cycle Update Time** setting can be used to control how fast the ICDM-RX/PN produces input data. Using the above example with the ICDM-RX/PN-4DB9/2RJ45-DIN with six 220 bytes input modules, assuming the IO cycle update time is 8ms. The ICDM-RX/PN can produce 1344 bytes of new data every 8ms. If the IO controller does not have the power to process them in 8ms, you can set the IO cycle update time to 16ms, which means that the ICDM-RX/PN will send data once every 16ms, giving the IO controller more time to process the data.

However, keep in mind that the ICDM-RX/PN can only hold a limited number of packets in the receiving queue for each port/device. Each receiving queue can hold 20 packets for a serial port or 10 packets for an Ethernet device. If packets are arriving at ports/devices at a rate faster than the rate that ICDM-RX/PN is configured to send data to IO controller, packet losses may occur due to overflowed queues.

8.1.2. Setting the IO Cycle Update Time

Use the following procedure to set the **IO Cycle Update Time**.

1. Double-click the ICDM-RX/PN module to open the **Device View**.
2. On the **Properties | General** tab, click the **PROFINET interface [X1] | Real time settings**, which opens the **Real time settings** window.
3. Select the **Can be set** radio button and select the desired update time. The fastest IO cycle update time is 8ms.



8.2. Output Data Handling

This subsection discusses the following topics:

- *Formatting an Output Packet* on Page 50
- *Transmitting an Output Packet* on Page 50
- *Appending Delimiters* on Page 51

8.2.1. Formatting an Output Packet

To write output data, an output packet needs to be first assembled in the IO controller's memory using the format as shown in the Output Data Format table (Page 45) of an Output Submodule. A typical way is to create a data block and define a structure for output packet, as shown in the following figure.

Fill the structure with sequence number, length, and actual output data. Then use the **DPWR_DAT** instruction to copy the entire packet to the output address of the corresponding submodule. The packet is transmitted to the ICDM-RX/PN in the next IO update cycle.

Data_block_1				
	Name	Data type	Offset	Start value
1	Static			
2	InputBuf	Struct	...	
3	SeqNum	Word	...	16#0
4	Length	Word	...	16#0
5	Data	Array[0..31] of Byte	...	
6	OutputBuf	Struct	...	
7	SeqNum	Word	...	16#0
8	Length	Word	...	16#0
9	Data	Array[0..31] of Byte	...	

8.2.2. Transmitting an Output Packet

The actual transmission of output data through a port/device is triggered when the sequence number changes. The ICDM-RX/PN transmits the output data (excluding the sequence number and length) to the corresponding port/device only when the sequence number changes.

If the transmission is successful, the ICDM-RX/PN copies the sequence number into the input space of the submodule. The following figure shows the 2-byte input data at address IW104 contains the last transmitted sequence number. After the **DPWR_DAT** instruction, compare the last transmitted sequence number with the sequence number of the output packet, if they are the same, then the output data has been transmitted successfully.

Device overview						
Module	...	Rack	Slot	I address	Q address	Type
DM4P2E		0	0			DM PNIO 4P2E
Interface		0	0 X1			DM4P2E
Serial_1		0	1			Serial
Input 32 Bytes		0	1 1	68...103		Input 32 Bytes
Output 32 Bytes		0	1 2	104...105	64...99	Output 32 Bytes

The ICDM-RX/PN expects the sequence number to be incrementing for each output packet. If a sequence number is out of order, the ICDM-RX/PN still transfers that packet, then logs an error message in the system

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log. If the length field is invalid, that is, greater than the size of the output submodule, the ICDM-RX/PN will not transmit that packet. An error is logged and the last transmitted sequence number input is not updated.

8.2.3. Appending Delimiters

For output devices that require STX and/or ETX delimiters. They can be added when formatting the output packet in IO controller. Or, you can configure the ICDM-RX/PN to append delimiters to output packets automatically.

1. Open the web interface, click **Serial | Port X**.
2. Configure the STX and ETX as desired in the **Tx Append Delimiters from PLC** section, as shown in the following figure. The ICDM-RX/PN appends the configured STX and/or ETX to all output packets before transmitting.

9. Project Example

This section demonstrates how to use a serial device to read and write IO data in the PLC. The serial device can receive and transmit ASCII string up to 32 bytes. The serial device uses STX (16#02) and ETX (16#03) to mark the beginning and end of each ASCII string. This example uses a ICDM-RX/PN-4DB9/2RJ45-DIN and the serial device is connected to serial Port 1.

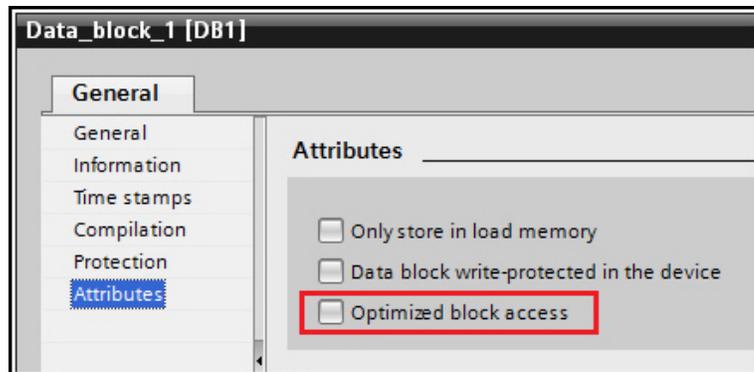
1. In a new TIA Portal project, add an IO controller and the ICDM-RX/PN-4DB9/2RJ45-DIN.
2. Insert a serial module to Slot 1.
3. Insert a 32-byte input submodule and 32-byte output submodule into Slot 1 1 and Slot 1 2, as shown in the figure below.

Device overview						
Module	...	Rack	Slot	I address	Q address	Type
DM4P2E		0	0			DM PNIO 4P2E
Interface		0	0 X1			DM4P2E
Serial_1		0	1			Serial
Input 32 Bytes		0	1 1	68...103		Input 32 Bytes
Output 32 Bytes		0	1 2	104...105	64...99	Output 32 Bytes

9.1. Reading Input Data

The input submodule has an IO address range 68..103. That's a total of 36 bytes, including 4 bytes of sequence number, length, and 32-bytes of data. The input data can be accessed directly using the IO address. However, in this example we use a different approach.

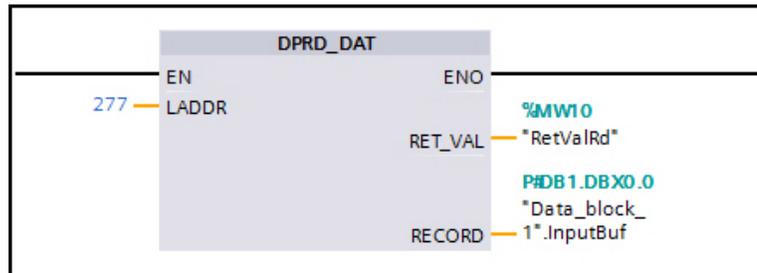
1. Add a data block **Data_block_1** to the project.
2. Right-click the data block, select **properties**.
3. Un-check the **Optimized block access** attribute, as shown in the following figure. Disabling the **Optimized Block Access** insures that the elements of the data structure that we are going to define will have a fixed address in the block.



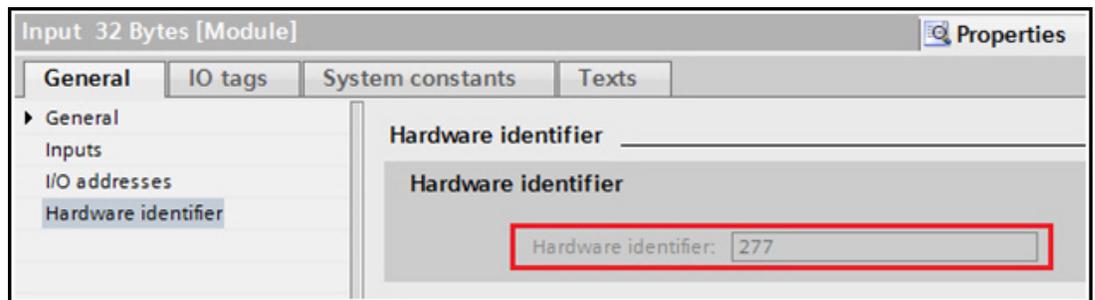
4. Create an input buffer structure called **InputBuf** that has the same format as the input data, as shown in the following figure.

Data_block_1				
	Name	Data type	Offset	Start value
1	Static			
2	InputBuf	Struct	...	
3	SeqNum	Word	...	16#0
4	Length	Word	...	16#0
5	Data	Array[0..31] of Byte	...	

5. Add a **DPRD_DAT** instruction into the main block to copy data from input address into the **InputBuf** structure in the data block, as shown in the following figure.



- Parameter **LADDR** - Enter the hardware identifier of the input submodule, which can be found in the **Properties** tab | **General** | **Hardware identifier**, as show in the following figure.
- Parameter **RECORD** - Enter **Data_block_1.InputBuf**.



6. Compile and download the project.
7. Now let's test it by sending an ASCII string of **ABCD** to the serial device.
8. Open the ICDM-RX/PN web page and click **Diagnostics** | **Serial Log**.

There should be a **(02h)ABCD(03h)** message in the Serial Log on Port 1, as shown in the following figure. Where **(02h)** and **(03h)** are the STX and ETX. **ABCD** are the actual serial data. **Rx** means it is input data.

If you do not see above message in the **Serial Log**, here are some troubleshooting tips:

- If there are no messages in the serial log or if there are messages that appear to be random/corrupted data, check the serial port configuration, including RS mode, baud rate, data bits and stop bits, flow control, and etc.
- If there are messages in the serial log but are marked as **Dropped** in the **Action** column, then the serial port delimiters are not configured correctly.

It is always a good idea to confirm that the serial port configuration is correct and that the ICDM-RX/PN can receive data from the serial device before starting reading data in IO controller.

In TIA Portal, go on-line and watch the **Data_block_1**. The following figure shows a packet with sequence number 1 and data length 4 is received. The received input data is stored in the Data array. Note that the ICDM-RX/PN removed the STX and ETX, therefore the size of input data is 4 bytes, not 6 bytes.

In a real case scenario, a PLC program should keep track of the **InputBuf.SeqNum** field. It only needs to process the input data when **InputBuf.SeqNum** changes. The IO controller must finish processing the input data before the next IO update cycle, otherwise data lose may occur, as previously discussed in *Input Data Handling* on Page 47.

Data_block_1					
	Name	Data type	Offset	Start value	Monitor value
1	Static				
2	InputBuf	Struct	0.0		
3	SeqNum	Word	0.0	16#0	16#0001
4	Length	Word	2.0	16#0	16#0004
5	Data	Array[0..31] of Byte	4.0		
6	Data[0]	Byte	0.0	16#0	16#41
7	Data[1]	Byte	1.0	16#0	16#42
8	Data[2]	Byte	2.0	16#0	16#43
9	Data[3]	Byte	3.0	16#0	16#44
10	Data[4]	Byte	4.0	16#0	16#00
11	Data[5]	Byte	5.0	16#0	16#00
12	Data[6]	Byte	6.0	16#0	16#00

9.2. Writing Output Data

Since the serial device uses STX and ETX, configure the ICDM-RX/PN to automatically append STX and ETX for all output data.

1. Open the ICDM-RX/PN web page, click **Serial | Port 1**.
2. Configure the **Tx Append Delimiters from PLC** section as shown in the following figure.
3. For the demonstration purposes, use a watch table to modify output value directly. Enter the following values:
 - Change tag **TxSeqNum** value from 0 to 1.
 - Set tag **TxLength** value to 5.
 - Enter an ASCII string **EFGHI** as the value in tags **TxData0..TxData4**.
4. Click the **Modify Once** button. The tag **LastTxSeqNum** (IW104), which is the input data of the output submodule, changes from 0 to 1 immediately. That means the ICDM-RX/PN has successfully transmitted the output through the serial port.

	Name	Address	Display format	Monitor value	Modify value
1	"LastTxSeqNum"	%IW104	Hex	16#0001	
2	"TxSeqNum"	%QW64	Hex	16#0001	16#0001
3	"TxLength"	%QW66	Hex	16#0005	16#0005
4	"TxData0"	%QB68	Hex	16#45	16#45
5	"TxData1"	%QB69	Hex	16#46	16#46
6	"TxData2"	%QB70	Hex	16#47	16#47
7	"TxData3"	%QB71	Hex	16#48	16#48
8	"TxData4"	%QB72	Hex	16#49	16#49
9	"TxData5"	%QB73	Hex	16#00	
10	"TxData6"	%QB74	Hex	16#00	

5. Open the ICDM-RX/PN web page, click **Diagnostics | Serial Log**. The following figure shows that a **(02h)EFGHI(03h)** packet has been transmitted through Port 1.

If you do not see the above message in the serial log, here are some troubleshooting tips:

- If the expected output data is not in the serial log, make sure the value of **TxLength** tag is valid. The ICDM-RX/PN will not transmit the output data if the length field is invalid, that is, larger than the size of the output submodule.
- Make sure to increment the **TxSeqNum** tag every time. The ICDM-RX/PN will not transmit output data unless the sequence number changes.
- If the expected output data is shown in the serial log, but does not seem to be received by the serial device, then check the serial port configuration, including RS mode, baud rate, start bits and stop bits, flow control, and delimiters.

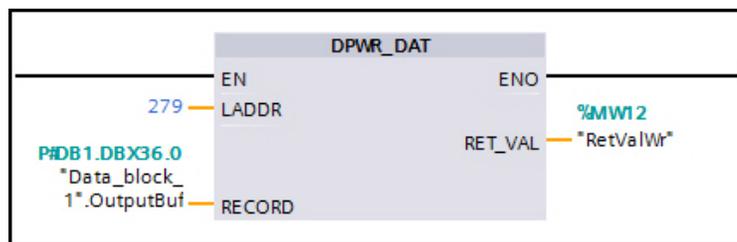
In a real case scenario, a better way to write output data is to define an output buffer structure in a data block, then use a **DPWR_DAT** instruction to copy the entire output buffer to the output address.

The following figure shows an output buffer structure called **OutputBuf**.

Data_block_1				
	Name	Data type	Offset	Start value
1	Static			
2	InputBuf	Struct	...	
3	SeqNum	Word	...	16#0
4	Length	Word	...	16#0
5	Data	Array[0..31] of Byte	...	
6	OutputBuf	Struct	...	
7	SeqNum	Word	...	16#0
8	Length	Word	...	16#0
9	Data	Array[0..31] of Byte	...	

In a PLC program, fill out the sequence number, length and data fields. Make sure that the length field is correct and the sequence number is incremented every time. The following figure shows how to use a **DPWR_DAT** instruction to copy **OutputBuf** structure to the output address.

- Parameter **LADDR** - Enter the hardware identifier of the output submodule, which can be found in the **Properties tab | General | Hardware identifier**.
- Parameter **RECORD** - Enter **Data_block_1.OutputBuf**.



Optionally, after each write, confirm the data was transmitted successfully by comparing the **LastTxSeqNum** tag with the **OutputBuf.SeqNum**.

10. Advanced Functions

This section discussed the following topics:

- *Handling Oversize Packets* on Page 56
- *Shared Device Functionality* on Page 59

10.1. Handling Oversize Packets

When a packet larger than the input size of the submodule is received, the ICDM-RX/PN's default behavior is to truncate the packet to the maximum allowed size and send it to the IO controller as normal IO data. The length field is not changed when a packet is truncated. The IO controller can determine if a packet has been truncated by checking the length field. If the length field is greater than the submodule input size, then the packet has been truncated.

The ICDM-RX/PN supports two other options for oversize input packets received from serial or Ethernet device. These are the options **Oversize Rx Packets**.

- **Truncate** (default) - Oversize packets are truncated and send to IO controller as cyclic IO data.
- **SaveRec** - Oversize packets are truncated and send to IO controller as cyclic IO data. The original packets are also saved as acyclic record data.
- **Drop** - Oversize packets are dropped.

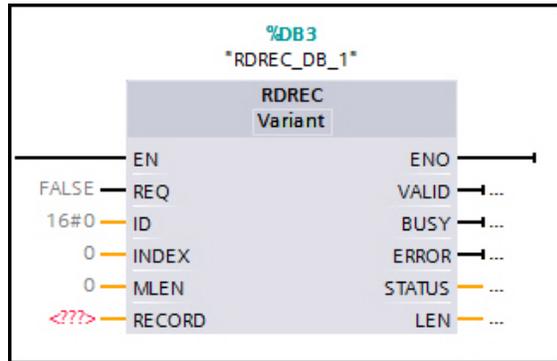
When the **SaveRec** option is selected, an oversize packet is truncated and sent to the IO controller via normal cyclic IO update, just like the default behavior. Besides, the original packet is also be stored as an acyclic record data and available for record data read. The following record indexes are used to read the saved oversize packet.

Record Indexes for Oversized Rx Packets	Description
10000 .. 10000+N-1	Saved oversize packet for an specified input submodule. Where, N is the size of the saved oversized packet, including the 4-byte sequence number and length field followed by the actual input data, the same format as shown in the table of an Input Data Format of an Input Submodule (Page 45).

The following figure shows the read data record instruction (**RDREC**) and the table lists its parameters. For more information regarding the **RDREC** instruction, refer to TIA Portal help system.

If you want to read an entire packet, the target range specified by the **RECORD** parameter must be large enough to hold a maximum size packet, including the 4 byte sequence number and length field. For a serial

port, the maximum possible size is 1518 + 4 bytes; for an Ethernet device the maximum size is 2048 + 4 bytes.



RDREC Instruction Parameters	Declaration	Description
REQ	Input	REQ = 1: Transfer data record
ID	Input	Hardware identifier of the input submodule.
INDEX	Input	Record indexes of the input submodule in the Record Indexes for Oversize Rx Packets table on Page 56.
MLEN	Input	The length in bytes of the data record to be read.
VALID	Output	New data record was received and is valid.
BUSY	Output	BUSY = 1: the reading process is not yet complete.
ERROR	Output	ERROR = 1: An error occurred during the reading process.
STATUS	Output	Block status of error information.
LEN	Output	Length of the read data record information.
RECORD	InOut	Target range for the data record read.

Example #1: A 128-byte serial data with sequence number 1 is saved as record data. The target range of RDREC instruction is 256 bytes. INDEX = 10000, MLEN = 256 (size of the target range). On return, LEN = 132. The first 4 bytes of the target range [0..3] is the sequence number (1) and length (128). The next 128 bytes [4..131] are the serial data. The rest of the target range [132..255] are not used.

Example #2: A 256 bytes serial data with sequence number 2 is saved as record data. The target range of RDREC instruction is only 128 bytes. INDEX = 10000, MLEN = 128. On return, LEN = 128. Target range [0..3] contains the sequence number (2) and length (256). Target range [4..127] contains the first 124 bytes of the 256 bytes serial data. The rest of the serial data are lost.

Reading a part of a packet at an offset is supported. When you specify the INDEX parameter = 10000 + offset and the MLEN parameter = 4 + n, only the n bytes of the data starting at the specified offset will be returned.

Example #3: A 80 bytes serial data with sequence number 3 is saved as record data. The target range of RDREC instruction is 64 bytes. INDEX = 10030, MLEN = 64. This record read attempts to read up to 60 bytes of data at offset 30. On return, LEN = 54. Target range [0..3] contains the sequence number (3) and length (80). Target range [4..53] contains the 50 bytes serial data starting at offset 30. The target range [54..63] are not used.

Notes:

- The of target range [0..3] always contains the sequence number and the original packet length. Reading a partial packet will not change the length field. The LEN parameter indicates the number of bytes that are actually read.
- The ICDM-RX/PN only saves one oversize packet per port/device. If a saved packet has not been read by IO controller, the following oversize packets will still be truncated and sent to IO controller as normal IO

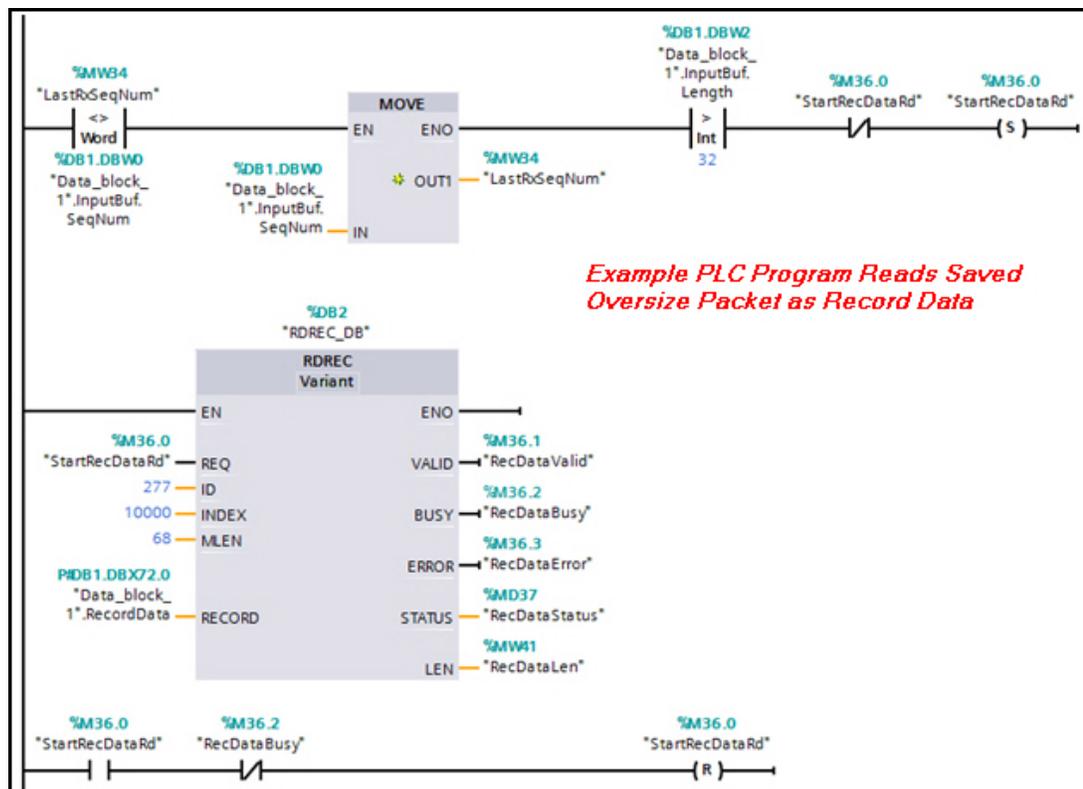
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data, however they will not be saved as record data. The **Error Saving as Record Data** count on the **Diagnostics | Communication Stats** page will be incremented.

- A saved packet can only be read once by IO controller. Whether the record read reads the whole packet or only a part of it, the ICDM-RX/PN clears the entire packet after a successful record data read. Any parts of the packet that are not read are lost.
- The minimum target range is 5 bytes, include 4 bytes sequence number and length, plus 1 byte data. The data can start at any location by using **INDEX = 10000 + offset**, **MLEN = 5**.
- An invalid record data read, such as an **INDEX** that is outside of a packet range, or there is no save packet, will increment the **PLC Record Read Error** count on the **Diagnostics | Communication Stats** page.

10.1.1. Sample PLC Program Handling Oversize Packets

The following figure shows a sample PLC program that detects oversize packets and saves them to a data block using the **RDREC** instruction.



For normal input data received during IO update cycles, we use the same **InputBuf** structure (Page 53) and the **DPRD_DAT** instruction to store them in a data block. Besides, a **RecordData** structure is defined in the same data block and is used as the target range of **RDREC** instruction, as shown in the figure below. The **RecordData** structure can hold up to 64 bytes of input data plus the sequence number and length.

10	RecordData	Struct	...
11	SeqNum	Word	16#0
12	Length	Word	16#0
13	Data	Array[0..63] of Byte	...

The tag **LastRxSeqNum** contains the sequence number of the last packet received on that port. Compare **LastRxSeqNum** with the sequence number of current packet **Data_block_1.InputBuf.SeqNum**, if they are not equal and the packet length **Data_block_1.InputBuf.Length** is also larger than the input size (32), then the tag

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StartRecDataRd is set, which starts the **RDREC** instruction.

In this example, up to 64 bytes of a saved packet will be read and stored in **Data_block_1.RecordData**. Once the **RDREC** instruction completes, the **StartRecDataRd** tag is cleared.

10.1.2.Enable Alarm for Oversize Packets

The ICDM-RX/PN can also notify the IO controller through an alarm when an oversize packet is available. The feature is disabled by default. Use this procedure to enable the alarm.

1. Open the web page and click **Network | PROFINET IO**.
2. Check the **Enable channel-specific diagnostics** and click the **Save** button.

Once enabled, the ICDM-RX/PN sends a diagnostic alarm to the IO controller when an oversize packet is saved. The alarm is a channel-specific diagnostic alarm with an error type **4096** (16#1000). Using the slot information associated with the alarm, the IO controller can start a record data read instruction to retrieve the saved packet for a certain port/device. After the packet is read, the ICDM-RX/PN clears the alarm automatically.

10.2. Shared Device Functionality

The ICDM-RX/PN supports the *shared device* functionality, which allows two IO controllers to access different serial ports or Ethernet devices through the same gateway simultaneously.

Assuming we have a ICDM-RX/PN-4DB9/2RJ45-DIN and two IO controllers. IO Controller 1 wants to access two serial devices connected to Serial Port 1 and 2. IO Controller 2 wants to access a third serial device connected to Serial Port 3. Separate TIA Portal projects need to be created for the two IO controllers.

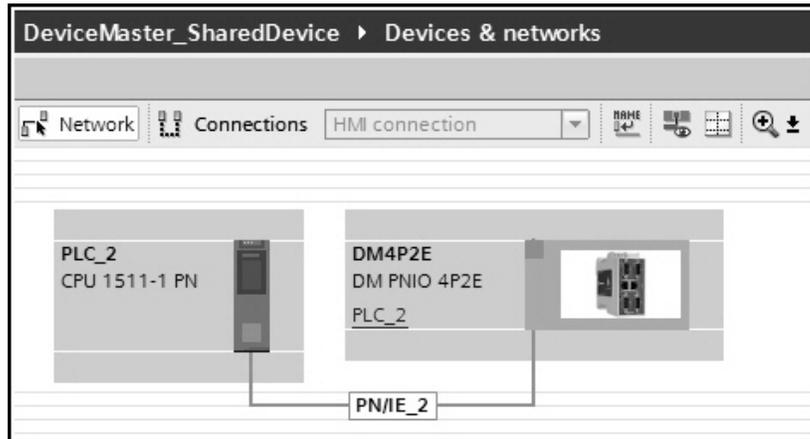
The first IO controller is considered as the *main* PLC.

1. Create a new TIA Portal project.
2. Add the PLC1 and the ICDM-RX/PN-4DB9/2RJ45-DIN.
3. Insert two serial modules in Slot 1 and Slot 2 for the two serial devices.
4. Configure the IO submodules.
5. Compile and download the project to PLC1.
6. Check the **Diagnostics | System Info** page to confirm that an application relationship has been established between the ICDM-RX/PN and PLC1.

The second IO controller is considered as the *secondary* PLC and needs special configurations.

1. Create a second TIA Portal project.
2. Add the PLC2 and the ICDM-RX/PN-4DB9/2RJ45-DIN.

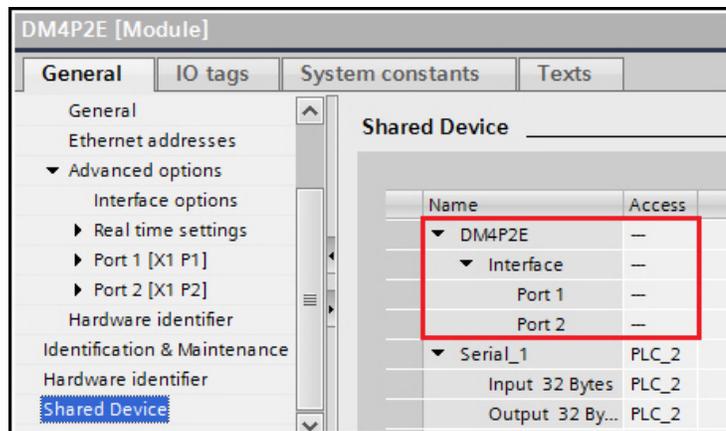
3. Name the PLC2 as PLC_2, as shown in the following figure.



4. Configure the PLC2 with a different IP address as the PLC1.
5. Configure the ICDM-RX/PN with the same IP assignment and device name as the first project.
6. Insert a serial module to Slot 3 and configure the IO submodules, as shown in following figure.

Module	Rack	Slot	I address	Q address	Type
DM4P2E	0	0			DM PNIO 4P2E
Interface	0	0 X1			DM4P2E
	0	1			
	0	2			
Serial_1	0	3			Serial
Input 32 Bytes	0	3 1	0...35		Input 32 Bytes
Output 32 Bytes	0	3 2	36...37	0...35	Output 32 Bytes
	0	4			
	0	5			
	0	6			

7. Leave Slot 1 and Slot 2 open as they are controlled by PLC1.
8. Double-click the ICDM-RX/PN, on the **General tab | Shared Device**, change the **Access** option from **PLC_2** to — for the head module **DM4P2E**, as shown in the following figure. This makes the PLC1 the only one that controls the head module.



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9. Compile and download the project to PLC2.

10. Open the web page and click **Diagnostics | System Info**. If the second PLC connection has been established successfully, the **Active Application Relationship** should be 2.

The PLC connection status is also displayed on the **Diagnostics | Communication Stats** page for each serial port and Ethernet device. The following figure shows that Serial Port 1 and Port 2 are controlled by PLC1 through the first application relationship (AR 1), while Port 3 is controlled by PLC2 through the second application relationship (AR 2). Note that Serial Port 4 is not configured in either project, therefore its PLC connection status is N/A.

If the second connection could not be established, here are some troubleshooting tips:

- Make sure the same ICDM-RX/PN module is added in both projects. The ICDM-RX/PN module must be assigned with the same IP address and same device name.
- Both IO controllers should be on the same subnet with different IP addresses.
- Any serial port or Ethernet device can only be controlled by one IO controller. The easiest way is to leave some slots open in one project, then use these unused slots in another project.
- In the second project, the access option of head module must be set to —. Like serial/Ethernet modules, the head module also can be controlled only by one IO controller.
- Some IO controllers, such as the S7-1200 CPU, do not support shared device. They can still be used as the main PLC, but cannot be used as the secondary PLC. Only IO controllers that support shared device, such as S7-1500 CPU, can be configured as the secondary PLC.
- Please refer to the *STEP 7 Professional V13 SP1 System Manual* (chapter titled: *Configuring Shared Devices*) for more information regarding shared device functionality.



11. Network Menu

Portions of the web pages under the **Network** menu may be discussed in *Configuring the ICDM-RX/PN in TIA Portal* on Page 34.

This section provides information about each **Network** menu web page:

- *Configuration Page* on Page 62
- *Password Page* on Page 64
- *Security Page* on Page 64
- *Keys/Certs Page* on Page 65
- *PROFINET IO Page* on Page 66

11.1. Configuration Page

The **Network | Configuration** page provides the options discussed in the next table.

Option	Description
General	
Device Name Default = empty	You can enter a PROFINET IO device name for this ICDM-RX/PN. The device name must be specified according to DNS conventions. <ul style="list-style-type: none"> • Restricted to a total of 240 characters (letters, digits, dash or period). • Parts of the name within the device name; in other words, a string between two periods, must not exceed a maximum of 63 characters. • No special characters such as umlauts (ä, ö etc.), brackets, underscore, slash, blank etc. The dash is the only permitted special character. • The device name must not begin or end with the "-" character. • The device name must not begin with numbers. • The device name must not have the structure n.n.n.n (n = 0...999). • The device name must not begin with the character string "port-xyz-" (x , y, z = 0...9).

Option	Description
<p>TCP Keepalive Default = 60</p>	<p>This option allows you to set the amount of time in seconds that the ICDM-RX/PN waits until it closes this connection and frees all the ports associated with it.</p> <p>The TCP protocol has an optional keepalive feature where the two network stacks periodically ping each other to make sure the connection is still up. In the UNIX world, this feature is usually known as the SOKEEPALIVE socket option.</p> <p>By default, this keepalive feature is not enabled, and the only time you know a connection is down is when you try to write something and the other end does not acknowledge you. The potential issue with the ICDM-RX/PN occurs when data flow was mostly one-way, and the receiver of the data was configured to initiate the TCP connection.</p> <p>If the sender of the data was rebooted, it would wait for the initiation a connection, discarding data. The receiver would wait forever for data and never realize that the other end wasn't connected any more and that the TCP connection needed to be re-established.</p> <p>Enabling the TCP keepalive feature for a connection solves this problem: the TCP stack periodically pings the other end. If the connection has gone away, the ICDM-RX/PN is notified, so that it can attempt to re-establish the TCP connection.</p>
<p>Boot Timeout Default 15 seconds</p>	<p>Allows you to change the bootloader time-out value before the default application, PROFINET IO loads.</p> <p>You may need to increase this time-out value to 45 for compatibility with spanning tree devices (normally switches). If you change the time-out value to 0, this prevents PROFINET IO from loading.</p>
<p>Telnet Timeout Default = 300 seconds</p>	<p>Sets the telnet timeout period (seconds).</p>
IPv4	
<p>Use DHCP</p>	<p>Configures the ICDM-RX/PN to use DHCPv4 mode.</p> <p>See your System Administrator to acquire a unique reserved IPv4 address if you are using DHCP. They will need the MAC address of the unit to provide you with an IPv4 address.</p>
<p>Use PLC assigned</p>	<p>The Use PLC assigned radio box is for information only. Use <i>Assigning an IP Address via IO Controller</i> on Page 38 to set the IP address in the TIA Portal project. If you select the Use PLC assigned option and reboot the ICDM-RX/PN, the gateway will start with the 0.0.0.0 IP address and the web interface will not work.</p>
<p>Use static config below</p>	<p>Configures the ICDM-RX/PN with the static IPv4 address information that you provide in the Address, Subnet Mask, and Default Gateway fields below.</p> <p>The ICDM-RX/PN is shipped from the factory with the following default IPv4 network settings:</p> <ul style="list-style-type: none"> • IPv4 address = 192.168.250.250 • IPv4 Netmask = 255.255.0.0 • IPv4 Gateway address = 192.168.250.1

11.2. Password Page

You can easily set up a password to secure the ICDM-RX/PN.

Note: *There is no password set from the factory.*

Use the following information to configure a password for this ICDM-RX/PN.

1. Click **Network | Password**.
2. If changing an existing password, enter that password in the **Old Password** field.
3. Enter a new password and enter the confirmation password.
4. Click the **Save** button.

When anyone attempts to log into the ICDM-RX/PN, you must enter the following:

- **admin** for the username
- The configured password for the password

11.3. Security Page

The following table discusses **Security Settings** options.

Option	Description
Enable Secure Config Mode	<p>If Secure Config mode is enabled, unencrypted access to administrative and diagnostic functions is disabled. Secure Config mode changes ICDM-RX/PN behavior as follows:</p> <ul style="list-style-type: none"> • Telnet access to administrative and diagnostic functions is disabled. SSH access is still allowed. • Unencrypted access to the web server via port 80 (http:// URLs) is disabled. Encrypted access to the web server via port 443 (https:// URLs) is still allowed. • Administrative commands that change configuration or operating state which are received using the Comtrol proprietary TCP driver protocol on TCP port 4606 are ignored. • Administrative commands that change configuration or operating state that are received using the Comtrol MAC mode proprietary Ethernet protocol number 0x11FE are ignored.
Enable Telnet/SSH (Default = Enabled)	This option enables or disables the telnet security feature after you click Save and the ICDM-RX/PN has been rebooted.
Minimum Allowed SSL/TLS Version	<p>You can select the appropriate version for your environment.</p> <ul style="list-style-type: none"> • SSLv3.0 • TLSv1.0 (default) • TLSv1.1 • TLSv1.2

Use the following steps to change security settings in the ICDM-RX/PN.

1. Click the **Network | Security**.
2. Click the appropriate check boxes in the **Security Settings** page to enable or disable security accordingly.
3. After making changes to the **Security Configuration** area, you must click **Save**.
4. You may need to configure security keys or certificates depending on your choices.

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11.4. Keys/Certs Page

The **Key and Certificate Management** page is discussed in the following table.

Key and Certificate Management	Description
RSA Key pair used by SSL and SSH servers	<p>This is a private/public key pair that is used for two purposes:</p> <ul style="list-style-type: none"> It is used by some cipher suites to encrypt the SSL/TLS handshaking messages. Possession of the private portion of this key pair allows an eavesdropper to both decrypt traffic on SSL/TLS connections that use RSA encryption during handshaking. It is used to sign the Server RSA Certificate in order to verify that the ICDM-RX/PN is authorized to use the server RSA identity certificate. <p>Note: <i>Possession of the private portion of this key pair allows somebody to pose as the ICDM-RX/PN.</i></p> <p><i>If the Server RSA Key is to be replaced, a corresponding RSA identity certificate must also be generated and uploaded or clients are not able to verify the identity certificate.</i></p>
RSA Server Certificate used by SSL servers	<p>This is the RSA identity certificate that the ICDM-RX/PN uses during SSL/TLS handshaking to identify itself. It is used most frequently by SSL server code in the ICDM-RX/PN when clients open connections to the ICDM-RX/PN's secure web server or other secure TCP ports. If a ICDM-RX/PN serial port configuration is set up to open (as a client) a TCP connection to another server device, the ICDM-RX/PN also uses this certificate to identify itself as an SSL client if requested by the server.</p> <p>In order to function properly, this certificate must be signed using the Server RSA Key. This means that the server RSA certificate and server RSA key must be replaced as a pair.</p>
DH Key pair used by SSL servers	<p>This is a private/public key pair that is used by some cipher suites to encrypt the SSL/TLS handshaking messages.</p> <p>Note: <i>Possession of the private portion of the key pair allows an eavesdropper to decrypt traffic on SSL/TLS connections that use DH encryption during handshaking.</i></p>
Client Authentication Certificate used by SSL servers	<p>If configured with a CA certificate, the ICDM-RX/PN requires all SSL/TLS clients to present an RSA identity certificate that has been signed by the configured CA certificate. As shipped, the ICDM-RX/PN is not configured with a CA certificate and all SSL/TLS clients are allowed.</p> <p>See <i>Client Authentication</i> for more detailed information.</p>

Note: *All ICDM-RX/PN units are shipped from the factory with identical configurations. They all have the identical, self-signed, Pepperl+Fuchs Server RSA Certificates, Server RSA Keys, Server DH Keys, and no Client Authentication Certificates.*

For maximum data and access security, you should configure all ICDM-RX/PN units with custom certificates and keys.

11.4.1. Client Authentication

If desired, controlled access to SSL/TLS protected features can be configured by uploading a client authentication certificate to the ICDM-RX/PN. By default, the ICDM-RX/PN is shipped without a CA (Certificate Authority) and therefore allows connections from any SSL/TLS client.

If a CA certificate is uploaded, the ICDM-RX/PN only allows SSL/TLS connections from client applications that provide to the ICDM-RX/PN an identity certificate that has been signed by the CA certificate that was uploaded to the ICDM-RX/PN.

This uploaded CA certificate that is used to validate a client's identity is sometimes referred to as a *trusted root certificate*, a *trusted authority certificate*, or a *trusted CA certificate*. This CA certificate might be that of a trusted commercial certificate authority or it may be a privately generated certificate that an organization creates internally to provide a mechanism to control access to resources that are protected by the SSL/TLS protocols.

To control access to the ICDM-RX/PN's SSL/TLS protected resources you should create your own custom CA certificate and then configure authorized client applications with identity certificates signed by the custom CA certificate.

11.4.2. Changing Keys and Certificates

Use the following steps to update security keys and certificates in the ICDM-RX/PN.

1. Click the **Network | Keys/Cert.**
2. Click **Browse** to locate the key or certificate file, highlight the file, and click **Open**.
Refer to the *Keys/Certs Page* on Page 65 subsection for detailed information.
3. Click **Upload** when you return to the **Key and Certificate Management** area.
The key or certificate notation changes from factory or **none** to **User** when the ICDM-RX/PN is secure.
Changes will not take effect until the ICDM-RX/PN is rebooted.
4. Click **System | Reboot** to reboot the ICDM-RX/PN.

11.5. PROFINET IO Page

The following table explains the options on the *PROFINET IO* page.

Miscellaneous Setting	Description
Enable channel-specific diagnostics	<p>If you enable this feature, the ICDM-RX/PN can notify the IO controller via alarm when an oversize packet is available.</p> <p>Once enabled, the ICDM-RX/PN sends a diagnostic alarm to the IO controller when an oversize packet is saved. The alarm is a channel-specific diagnostic alarm with an error type 4096 (16#1000).</p> <p>Using the slot information associated with the alarm, the IO controller can start a record data read instruction to retrieve the saved packet for a certain port/device. After the packet is read, the ICDM-RX/PN clears the alarm automatically.</p>



Miscellaneous Setting	Description
Show extended diagnostics in System log	Enabling this option provides more detailed system log information in Diagnostics System Log , such as: <ul style="list-style-type: none">• Thread name• ID• State• Priority• Stacksize• Stackused• SuspendCnt• WakeupCnt• SleepReason• WakeReason• TimerID• Type• Base• Count• Callback• UserID• Message_Queue• TaskID• Length• MaxLen• Sent• Received• Error

12. Diagnostics Menu

This section provides information about the web pages under the **Diagnostics** menu:

- *Communication Statistics Page* on Page 68
- *Serial Log* on Page 71
- *Ethernet Log* on Page 71
- *System Log* on Page 72
- *System Info* on Page 72

12.1. Communication Statistics Page

The following table provides information about the **Communication Statistics** page.

Communication Statistics	
Serial	
PLC Connection Status	Displays the application relationship number of the current PLC connection.
Tx Byte Count	Displays the number of bytes sent out of the serial port.
Tx Packet Count	Displays the number of serial packets sent out of the serial port.
Rx Byte Count	Displays the number of bytes received over the serial port.
Rx Packet Count	Displays the number of packets received over the serial port.
Rx Parity Error Count	Displays the number of received serial packets dropped due to parity errors.
Rx Framing Error Count	Displays the number of received serial packets dropped due to framing errors.
Rx Overrun Error Count	Displays the number of received serial packets dropped due to overrun error incidents.
Rx Oversize Packet Count	Displays the number of received serial data packets that were larger than the configured input module.
Rx Truncated Packet Count	Displays the number of received serial packets that were truncated before being sent to the PLC.
Rx Packet Saved as Record Data	Displays the number of received serial packets that were saved as record data when the Oversize Rx Packets option is set to SaveRec .
Error Saving as Record Data	Displays the number of errors occurred when saving serial packets as record data.
PLC Record Read Count	Displays the number serial packets that were read by PLC as record data.
PLC Record Read Error Count	Displays the number of errors occurred when reading serial packets as record data.

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Communication Statistics (Continued)	
Serial To PLC Packet Count	Displays the number of serial packets sent to the PLC.
Serial To PLC Dropped Packet Count	Displays the number of received serial packets intended for the PLC dropped: <ul style="list-style-type: none"> • No STX byte(s) found • No ETX byte(s) found • Time-outs • Packet too large • Receive buffer queue overflows
Serial To Application Dropped Packet Count	Displays the number of received serial device packets intended for the application dropped: <ul style="list-style-type: none"> • No STX byte(s) found • No ETX byte(s) found • Time-outs • Packet too large • Receive buffer queue overflows • Application connection is offline
Application TCP Connection Status	Displays the information of the application TCP connection.
To Application Tx Byte Count	Displays the number of bytes sent to application TCP connection.
To Application Tx Packet Count	Displays the number of serial packets sent to application TCP connection.
From Application Rx Byte Count	Displays the number of bytes received from application TCP connection.
From Application Rx Packet Count	Displays the number of serial packets received from application TCP connection.
Application To Serial Dropped Packet Count	Displays the number of dropped serial packets that were intended for the device.
Ethernet	
PLC Connection Status	Displays the application relationship number of the current PLC connection.
Device TCP Connection Status	Displays the information of the device TCP connection.
Tx Byte Count	Displays the number of bytes sent out of the Ethernet device.
Tx Packet Count	Displays the number of Ethernet packets sent out of the Ethernet device.
Rx Byte Count	Displays the number of bytes received over the Ethernet device.
Rx Packet Count	Displays the number of packets received over the Ethernet device.
Rx Oversize Packet Count	Displays the number of received Ethernet data packets that were larger than the configured input module.
Rx Truncated Packet Count	Displays the number of received Ethernet packets that were truncated before being sent to the PLC.
Rx Packet Saved as Record Data	Displays the number of received Ethernet packets that were saved as record data when the Oversize Rx Packets option is set to SaveRec .

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Communication Statistics (Continued)	
Error Saving as Record Data	Displays the number of errors occurred when saving Ethernet packets as record data.
PLC Record Read Count	Displays the number Ethernet packets that were read by PLC as record data.
PLC Record Read Error Count	Displays the number of errors occurred when reading Ethernet packets as record data.
Device To PLC Packet Count	Displays the number of Ethernet packets sent to the PLC.
Device To PLC Dropped Packet Count	Displays the number of received Ethernet packets intended for the PLC dropped: <ul style="list-style-type: none"> • No STX byte(s) found • No ETX byte(s) found • Time-outs • Packet too large • Receive buffer queue overflows
Device To Application Dropped Packet Count	Displays the number of received Ethernet device packets intended for the application dropped: <ul style="list-style-type: none"> • No STX byte(s) found • No ETX byte(s) found • Time-outs • Packet too large • Receive buffer queue overflows • Application connection is offline
PLC To Device Dropped Packet Count	Displays the number of Ethernet packets received from the PLC intended for the Ethernet device dropped: <ul style="list-style-type: none"> • Transmit buffer queue overflows • Ethernet device connection is offline
Application TCP Connection Status	Displays the information of the application TCP connection.
To Application Tx Byte Count	Displays the number of bytes sent to application TCP connection.
To Application Tx Packet Count	Displays the number of Ethernet packets sent to application TCP connection.
From Application Rx Byte Count	Displays the number of bytes received from application TCP connection.
From Application Rx Packet Count	Displays the number of Ethernet packets received from application TCP connection.
Application To Device Dropped Packet Count	Displays the number of dropped Ethernet packets that were intended for the device.

12.2. Serial Log

The **Serial Port Log** page provides a log of received and transmitted serial port messages. Up to 128 bytes per message and up to 128 messages are logged. It is intended to help with debugging serial connectivity problems, determining the proper start and end of transmission bytes, and diagnosing device problems.

Column	Description
Port X	Packet number of the specified serial port.
Time	Elapsed time since system started in d hh:mm:ss.mmm format. Where: <ul style="list-style-type: none"> d - days hh - hours mm - minutes ss - seconds mmm - milliseconds
Dir	Direction. Rx - Input, Tx - output
Packet	Data packet received or transmitted. <ul style="list-style-type: none"> ASCII characters displayed as characters Non-ASCII displayed in hex (xxh) format
Action	Empty - Packet was sent to PLC and/or application Dropped - Packet was dropped

12.3. Ethernet Log

The **Ethernet Device Interface Logs** page provides a log of received and transmitted Ethernet device messages. Up to 128 bytes per message and up to 128 messages are logged. It is intended to help with debugging Ethernet connectivity problems, determining the proper start and end of transmission bytes, and diagnosing device problems.

Column	Description
Device X	Packet number of the specified Ethernet device.
Time	Elapsed time since system started in d hh:mm:ss.mmm format. Where: <ul style="list-style-type: none"> d - days hh - hours mm - minutes ss - seconds mmm - milliseconds
Dir	Direction. Rx - Input, Tx - output
Packet	Data packet received or transmitted. <ul style="list-style-type: none"> ASCII characters displayed as characters Non-ASCII displayed in hex (xxh) format
Action	Empty - Packet was sent to PLC and/or application Dropped - Packet was dropped

12.4. System Log

The **System Log** displays the log of system activities.

12.5. System Info

The following table provides you information about the **Diagnostics | System Info** page.

System Info	
PLC Interface	
Active Application Relationships	The number of active application relationships.
Application Relationship 1 Uptime	The uptime of application relationship 1.
Application Relationship 2 Uptime	The uptime of application relationship 2.
Total Application Relationships	The total number of application relationships that have been established.
Transmit Retries	The number of retries occurred when transmitting PROFNET IO frames.
Transmit Errors	The number of errors occurred when transmitting PROFNET IO frames.
Transmit Sequence Number Errors	The number of output sequence numbers that were out of order.
Transmit Invalid Length Errors	The number of output data lengths that were invalid.
System Errors	The number of system errors detected: <ul style="list-style-type: none"> • Port MAC address information not available • Errors occurred when accessing Ethernet interface • Invalid application relationship number • Invalid module, submodule, slot, or subslot number
Record Read Errors	The number of errors occurred when reading record data.
Channel Diagnostics Added	The number of channel diagnostics alarms that have been added.
Channel Diagnostics Removed	The number of channel diagnostics alarms that have been removed (cleared).
Channel Diagnostics Errors	The number of errors occurred when adding/removing channel diagnostics alarms.
Ethernet Interface	
Ethernet Port Link 1 Status	The link status of Ethernet port 1.
Ethernet Port Link 2 Status	The link status of Ethernet port 2. Only available on 2E (dual Ethernet ports) models.
PROFINET IO Frames Transmitted	The number of PROFINET IO frames transmitted.
PROFINET IO Frames Received	The number of PROFINET IO frames received.



System Info	
Non PROFINET IO Frames Received	The number of non PROFINET IO frames received.
System Resource	
Heap memory (total / free)	Memory usage (total and free memory).
Idle count (min / current / max)	The minimum, current, and maximum CPU idle count.
Idle count history (1 / 5 / 15 mins)	The average CPU idle count in the last 1, 5, and 15 minutes.

13. System Menu

This section discusses the web pages under the **System** menu:

- *Update Firmware* on Page 74
- *Configuration File* on Page 74
- *Device Snapshot* on Page 75
- *Restore Defaults* on Page 75
- *Reboot* on Page 75

13.1. Update Firmware

You can upload firmware (PROFINET IO or Bootloader) using the **System | Update Firmware** page. Use the following procedure to upload the latest firmware onto the ICDM-RX/PN.

1. If necessary, download the firmware from the web site at: <https://www.pepperl-fuchs.com>.
2. Execute the **PROFINET_IO_x.x.msi** file.
3. Click the **Next** button.
4. After reviewing the license, click **I accept the terms in the License Agreement** and the **Next** button.
5. Click the **Next** button or browse to the location you want the files stored.
6. Click the **Install** button.
7. Click **Yes** to the **Do you want to allow this app to make changes to your device** pop up message.
8. Click the **Finish** button.
9. Click the **Browse** button, navigate to the file, select it and click the **Open** button.
10. Click the **Update** button.

An *Update In Progress* pop up notifies you with the upload duration, not to reset or disconnect the device or to close the page.

13.2. Configuration File

You can use the **Save Configuration** option to save a ICDM-RX/PN configuration file for recovery purposes or to quickly configure other ICDM-RX/PNs that require the same configuration using the **Load Configuration** option.

Note: *Optionally, you can use PortVision DX to save and load configuration files.*

13.2.1. Saving a Configuration File

You can use this procedure to save a ICDM-RX/PN configuration file.

1. Click **System | Configuration File**.
2. Click the **Save Configuration** button.
3. Save the configuration file following your browser prompts.

13.2.2.Loading a Configuration File

You can use this procedure to load a previously saved ICDM-RX/PN configuration file.

1. Click **System | Configuration File**.
2. Click the **Browse** button, highlight the configuration file you want to load, and click the **Open** button.
3. Click the **Load Configuration** button.

13.3. Device Snapshot

You can use the Device Snapshot page to download a snapshot of the device status, log, and configuration. You may find the information can help you diagnose a problem with the ICDM-RX/PN. In addition, this information may be requested by technical support if you have called for assistance.

1. Click the **Device Snapshot** button.
2. Save the file using the method for your browser.

13.4. Restore Defaults

You can easily some or all of your settings to factory defaults by using the procedure below.

1. Click **System | Restore**.
2. Select **Everything** or the specific setting you want to restore.
3. Click the **Restore** button.
4. The ICDM-RX/PN reboots and re-opens the web interface.

13.5. Reboot

You can reboot the ICDM-RX/PN remotely using the Reboot web page.

1. Click **System | Reboot**.
2. Click the **Reboot Now** button or wait the 10 seconds for it automatically reboot.

14. Managing the ICDM-RX/PN

This section discusses the following ICDM-RX/PN maintenance procedures:

- *Rebooting the ICDM-RX/PN*
- *Uploading Firmware to Multiple ICDM-RX/PNs on Page 77*
- *Configuring Multiple ICDM-RX/PNs Network Addresses on Page 77*
Note: *You can configure the network addresses for multiple ICDM-RX/PNs, configure common settings for the ICDM-RX/PNs, and save the settings to a configuration file that you can use to load settings up to all or selected ICDM-RX/PNs.*
- *Adding a New Device in PortVision DX on Page 77*
- *Changing the Bootloader Timeout on Page 79, which discusses changing the Bootloader timeout*
- *Managing Bootloader on Page 80, which also discusses checking the Bootloader version and downloading the latest Bootloader*
- *Restoring Factory Defaults (Specific Models - Reset Button) on Page 81*
- *Restoring Defaults on Page 81*
- *Accessing RedBoot Commands in Telnet/SSH Sessions (PortVision DX) on Page 82*

Note: *You can optionally refer to RedBoot Procedures on Page 83 if you want to perform procedures at the RedBoot level.*

14.1. Rebooting the ICDM-RX/PN

There are many ways to reboot the ICDM-RX/PN.

Method	Procedure
PortVision DX	Right-click the ICDM-RX/PN or ICDM-RX/PNs in the <i>Device List</i> pane, click Advanced >Reboot and then Yes . Note: <i>If security has been enabled in the web page, you will need to reboot the ICDM-RX/PN in the web page.</i>
Web page	System Reboot: You have 10 seconds to Cancel before the ICDM-RX/PN automatically reboots. Optionally, you can click Reboot Now .
Telnet	Type reset .
ICDM-RX/PN DIN Rail Models	ICDM-RX/PN DIN rail models have a Reset/Restore switch. <ul style="list-style-type: none"> • If the Reset/Restore switch is depressed for less than 2 seconds, the ICDM-RX/PN reboots. • If the Reset/Restore switch is depressed for greater than approximately 5 seconds it restores the ICDM-RX/PN to the factory default values.

14.2. Uploading Firmware to Multiple ICDM-RX/PNs

You can use this procedure if your ICDM-RX/PN is connected to the host PC, laptop, or if the ICDM-RX/PN resides on the local network segment.

1. If you have not done so, install PortVision DX (*Installing PortVision DX* on Page 14) and **Scan** the network.
2. Shift-click the multiple ICDM-RX/PNs on the **Main** screen that you want to update and use one of the following methods:
 - Click the **Upload** button.
 - Right-click and then click **Advanced > Upload Firmware**.
 - Click **Advanced > Upload Firmware** in the **Manage** menu.
3. Browse, click the firmware (.cmtl) file, **Open** (*Please locate the new firmware*), and then click **Yes** (*Upload Firmware*).

It may take a few moments for the firmware to upload onto the ICDM-RX/PN. The ICDM-RX/PN reboots itself during the upload process.

4. Click **Ok** to the advisory message about waiting to use the device until the status reads **ON-LINE**.

In the next polling cycle, PortVision DX updates the *Device List* pane and displays the new firmware version.

14.3. Configuring Multiple ICDM-RX/PNs Network Addresses

You can configure the network addresses for multiple ICDM-RX/PNs using the **Assign IP to Multiple Devices** option.

In addition, you can also configure common settings for the ICDM-RX/PN web page and save the settings to a configuration file that you can load to all or selected ICDM-RX/PNs. See *Configuration File* on Page 74 for more information.

The ICDM-RX/PNs must be on the same network segment for this procedure to work. Use the following steps to configure multiple ICDM-RX/PNs.

1. If you have not done so, install PortVision DX (*Installing PortVision DX* on Page 14) and **Scan** the network.
2. Shift-click the ICDM-RX/PNs for which you want to program network information, right-click, and click **Advanced > Assign IP to Multiple Devices**.
3. Enter the starting IP address, subnet mask, IP Gateway and click **Proceed**.

PortVision DX displays the programmed IP addresses in the *Device List* pane after the next refresh cycle.

14.4. Adding a New Device in PortVision DX

You can add a new ICDM-RX/PN manually, if you do not want to scan the network to locate and add new ICDM-RX/PNs, but there may be cases where you want to use the *Add New Device* window to:

- Configure ICDM-RX/PN units that are not on the local network (remote) using *Remote Using the IP Address* on Page 78.
- Pre-configure a ICDM-RX/PN in PortVision DX (local) using *Local Using the IP Address or MAC Address* on Page 78.

14.4.1.Remote Using the IP Address

Use the following procedure to add a remote ICDM-RX/PN to PortVision DX.

1. Access the *New Device* window using one of these methods:
 - Click **Add New > Device** in the *Manage* menu.
 - Right-click a folder or a RocketLinux switch in the *Device Tree* pane (anywhere in the pane, as long as a ICDM-RX/PN is not highlighted and you are in a valid folder) and click **Add New > Device**.
2. Select the appropriate ICDM-RX/PN in the **Device Type** drop list.
3. Select the appropriate model in the **Device Model** drop list.
4. Enter a friendly device name in the **Device Name** list box.
5. Select **REMOTE** for the *Detection Type*.
6. Optionally, enter the serial number in the **Serial Number** list box.
7. Enter the IP Address for the ICDM-RX/PN. It is not necessary to enter the Subnet Mask and Default Gateway.
8. Click **Ok** to close the *Add New Device* window. It may take a few moments to save the ICDM-RX/PN.
9. If necessary, click **Refresh** for the new ICDM-RX/PN to display in the *Device Tree* or *Device List* panes. The ICDM-RX/PN shows OFF-LINE if it is not attached to the network or if an incorrect IP address was entered.

14.4.2.Local Using the IP Address or MAC Address

Use the following procedure to add a local ICDM-RX/PN to PortVision DX if you do not want to scan the network.

1. Locate the network information or MAC address of the ICDM-RX/PN you want to add.
2. Access the *New Device* window using one of these methods:
 - Click **Add New > Device** in the *Manage* menu.
 - Right-click a folder or a RocketLinux switch in the *Device Tree* pane (anywhere in the pane, as long as a ICDM-RX/PN is not highlighted and you are in a valid folder) and click **Add New > Device**.
3. Select the appropriate ICDM-RX/PN in the **Device Type** drop list.
4. Select the appropriate model in the **Device Model** drop list.
5. Enter a friendly device name in the **Device Name** list box.
6. Select **LOCAL** for the *Detection Type*.
7. Enter the MAC address or network information.
Note: A MAC address label is attached to all ICDM-RX/PN units.
8. Optionally, enter the serial number in the **Serial Number** list box.
9. Click **Ok**.
10. If necessary, click **Refresh** for the new ICDM-RX/PN to display in the *Device Tree* or *Device List* panes. The ICDM-RX/PN shows OFF-LINE if it is not attached to the network or if an incorrect IP address was entered.

14.5. Changing the Bootloader Timeout

1. Use the following procedure to change the Bootloader timeout to 45 seconds. You can use this procedure to return the Bootloader timeout to 15 seconds after you have successfully uploaded the firmware. If necessary, use your browser to access the ICDM-RX/PN using the IP address.
2. Click **Network**.
3. Enter 45 in the **Boot Timeout** field and click **Save**.

Note: You should return the *Bootloader Timeout* value back to 15 seconds after you upload the firmware.

14.6. Using Configuration Files

This subsection discusses how to create (save) and load ICDM-RX/PN configuration files. You may want to create ICDM-RX/PN configuration files for these reasons:

- Save the ICDM-RX/PN configuration settings so that you can load them on similar ICDM-RX/PNs to save configuration time
- Save the ICDM-RX/PN configuration settings because you need to remove a firmware version to install a new firmware version and you want to reload the configuration settings into the new firmware.

14.6.1. Saving Configuration Files

Use this procedure to save configuration files.

1. Enter the IP address into your browser to access the web interface.
2. Click **System | Configuration File**.
3. Click the **Save Configuration** button.
4. Depending on your browser, may need to click save or direct it to a specific file location.

14.6.2.Loading Configuration Files

Use the following procedure to load configuration files.

1. If necessary, enter the IP address in your browser.
2. Click **System | Configuration File**.
3. Click the **Browse** button and select the configuration file. The default configuration file name is:
dm_XXX.XXX.XXX.XXX.ds
Where *xxx.xxx.xxx.xxx* is the IP address and *.ds* is the file extension.
4. Click the **Load Configuration** button.

14.7. Managing Bootloader

Bootloader refers to the operating system that runs on the ICDM-RX/PN hardware during the power on phase, which then loads the default application (for example, PROFINET IO firmware).

Note: *Typically, you should not update the Bootloader unless advised to do so by Pepperl+Fuchs Technical Support.*

There are several methods and tools that you can use to check the Bootloader version or update the Bootloader.

- **PortVision DX** is the easiest way to check the Bootloader version and upload the latest version.
- Optionally, RedBoot can be used to check the Bootloader version and update the Bootloader. See *RedBoot Procedures* on Page 83 for procedures.

14.7.1.Checking the Bootloader Version

The following procedure uses PortVision DX to check the Bootloader version. Optionally, you can use RedBoot, see *Determining the Bootloader Version* on Page 85.

1. If you have not done so, install PortVision DX (*Installing PortVision DX* on Page 14) and **Scan** the network.
2. Right-click the ICDM-RX/PN in the *Device List* pane and click **Advanced > Reboot**.
3. Click **Yes** to the *Confirm Reboot* query.
4. Right-click the ICDM-RX/PN in the *Device List* pane, click **Refresh**. You may need to do this several times until you catch the reboot cycle in the *Device List* pane. The Bootloader version is briefly displayed during the reboot cycle before the application (for example, PROFINET IO firmware) loads.
5. Check the <https://www.pepperl-fuchs.com> web site to see if a later version of Bootloader is available.
6. Go to the next subsection if you need upload a new version of Bootloader.

14.7.2.Uploading Bootloader

Use the following procedure to upload Bootloader to the ICDM-RX/PN. Typically, you should not update the Bootloader unless advised to do so by Pepperl+Fuchs Technical Support or a notice has been posted with the firmware at <https://www.pepperl-fuchs.com>.

Note: *Technical Support does not recommend updating Bootloader across a WAN. For best results, connect the ICDM-RX/PN directly to a PC or laptop to upload Bootloader.*



Make sure that power is not interrupted while uploading Bootloader. Power interruption while uploading Bootloader will require that the ICDM-RX/PN must

be sent into Pepperl+Fuchs so that it can be reflashed.

If you are not successful uploading firmware into the ICDM-RX/PN, do not upload Bootloader.

1. If you have not done so, install PortVision DX (*Installing PortVision DX* on Page 14) and Scan the network.
2. If necessary, check the Bootloader version (*Checking the Bootloader Version*) and download the latest version.
3. Right-click the ICDM-RX/PN for which you want to update, click **Advanced > Upload Firmware**, browse to the Bootloader .cmtl file, and then click **Open**.
4. Click **Yes** to the *Upload Firmware* message that warns you that this is a sensitive process.
5. Click **Ok** to the second *Upload Firmware* message.
6. Right-click the ICDM-RX/PN and click **Refresh** until the Bootloader version displays in the *Device List* pane and verify that the new version loaded.

14.8. Restoring Factory Defaults (Specific Models - Reset Button)

Use the following procedures to restore the ICDM-RX/PN DIN rail models to the factory defaults.

To return to default port settings, see *Restoring Defaults* on Page 81.

If Technical Support advises you to restore the ICDM-RX/PN factory defaults, depress the **Reset/Restore** switch for greater than 5 seconds.

Restoring the ICDM-RX/PN DIN rail models resets the following to their factory defaults:

- Port settings
- Network settings
- Password
- Telnet enable
- Start up time-out
- SSL enable
- Telnet time-out

14.9. Restoring Defaults

Use the following procedure to return some or all of the ICDM-RX/PN settings to factory default values.

1. Open the web interface by entering the IP address in your browser.
2. Click **System | Restore Defaults**.
3. Select the items that you want to restore to factory defaults.
4. Click the **Restore** button.

Accessing RedBoot Commands in Telnet/SSH Sessions (PortVision DX)

You can open a Telnet or SSH session using PortVision DX to access RedBoot commands.

Use the following procedure to access a telnet or SSH session with PortVision DX.

1. In PortVision DX, right-click the ICDM-RX/PN in the *Device List* pane for which you want to open a telnet session, and click **Telnet/SSH Session**.
2. Select **Telnet** or **SSH**, leave the **Selected Port** number, and click **Ok**.
3. If necessary, enter the password and press **Enter**. If a password has not been set, press **Enter**. If using an SSH session, press **Enter** to the **login** as prompt.

If the PuTTY screen flashes in the background and does not appear as shown above, make sure that **Enable Telnet/ssh** has not been disabled in the web page. To check this, return to PortVision DX, right-click the ICDM-RX/PN in the *Device List* pane, and click **Webpage**. Click the **Network | Security** and verify that the **Enable Telnet/ssh** option is enabled, If it is not, click the option and then click **Save**, and close the web interface.

4. Type **Reset**, press **Enter**, and close the telnet session.
5. Quickly re-open the telnet or SSH session using the previous steps.
6. Select **Telnet** or **SSH**, leave the **Selected Port** number, and click **Ok**.
7. Press **Enter**. You can type **help** to review the RedBoot commands. You can also refer to *RedBoot Command Overview* on Page 55.

Note: *The dm prompt should be replaced by a redboot prompt. If not, you can reset the Bootloader timeout for a longer time period and retry this procedure.*

15. RedBoot Procedures

You can use this section as a reference if you want to perform tasks in RedBoot.

- *Accessing RedBoot Overview* on Page 83
- *Establishing a Serial Connection* on Page 83
- *Establishing a Telnet Connection* on Page 84
- *Determining the Network Settings* on Page 84
- *Configuring the Network Settings* on Page 85
- *Changing the Bootloader Timeout* on Page 85
- *Determining the Bootloader Version* on Page 85
- *Resetting the ICDM-RX/PN* on Page 86
- *Configuring Passwords* on Page 86
- *RedBoot Command Overview* on Page 86

Optionally, you can install PortVision DX on a Windows system on the network and perform all of these tasks. PortVision DX provides a Telnet/SSH session, which is discussed in *Accessing RedBoot Commands in Telnet/SSH Sessions (PortVision DX)* on Page 82.

15.1. Accessing RedBoot Overview

To access RedBoot, you can use one of the following methods:

- A *serial* connection between Port 1 on the ICDM-RX/PN and a COM port on a PC (Page 83). If you plan on using the serial method, you will need a null modem cable, a terminal program installed and configured on the PC, and a **Bootloader Timeout** value in excess of 15 seconds. If the **Bootloader Timeout** value has been reduced to 1 second, this procedure will NOT be possible.

Note: Use the serial connection method, if the ICDM-RX/PN is not on the same Ethernet network segment as the PC.

If you do not know the IP address of the ICDM-RX/PN you must use a serial connection to communicate with the ICDM-RX/PN.

- A *telnet* connection (Page 84), if the ICDM-RX/PN is locally accessible by Ethernet. A *telnet connection* requires that you know the IP address. In addition, the IP address must also be valid for the network to which it is attached.

For example: The network segment must be 192.168.250.x to telnet to the ICDM-RX/PN default IP address if you have not changed the IP address to operate on your network.

15.2. Establishing a Serial Connection

Use the following procedure to set up a serial connection with a terminal server program. You can use HyperTerminal (Windows) or optionally, Test Terminal (WCom2), which can be accessed from PortVision DX using **Tools > Applications > Test Terminal (WCom2)**.

1. Connect a null-modem cable from an available COM port on your PC to **Port 1** on the ICDM-RX/PN.

Note: See *Connecting Serial Devices* on Page 17, if you need to build a null-modem cable.

2. Configure the terminal server program to the following values:

- Bits per second = 57600
- Data bits = 8
- Parity = None
- Stop bits = 1
- Flow control = None

Note: If you do not disable Bootloader from loading (Steps 3 through 5) within the time-out period (default is fifteen seconds), an application will be loaded from flash and started. If this happens, repeat Steps 3 through 5. The `#!DM` command is the only case-sensitive command and must be in uppercase.

3. Reset the ICDM-RX/PN.

Note: Depending on the model, disconnect and reconnect the power cable (external power supply and no power switch) or turn the power switch on and then off (internal power supply).

4. Immediately type `#!DM` and press **Enter** in the terminal program.

5. At the **RedBoot>** prompt, type `dis`, and press **Enter**.

6. Verify that loading has been disabled.

7. You can use the appropriate procedure listed on Page 83 or use the *RedBoot Command Overview* on Page 86 to perform the desired task.

15.3. Establishing a Telnet Connection

Use the following procedure to telnet to the ICDM-RX/PN.

1. Open a telnet session, enter the ICDM-RX/PN IP address.

If using Windows, you can use PortVision DX, see *Accessing RedBoot Commands in Telnet/SSH Sessions (PortVision DX)* on Page 82.

2. Press the **Enter** key if you did not program a password or type the password and press **Enter**.

Note: The ICDM-RX/PN does not come pre-programmed with a password.

3. Type `reset`, and close the session.

4. Open a new telnet session, enter the ICDM-RX/PN IP address, and the password.

5. Type `dis` to disable the Bootloader.

6. Verify that the system responds with a **Loading disabled** message.

15.4. Determining the Network Settings

If you are not sure what the network information is on a ICDM-RX/PN, you can perform the following procedure.

The default network settings are:

- IP address: 192.168.250.250
- Subnet mask: 255.255.0.0
- Gateway address: 192.168.250.1

1. Establish communications with the ICDM-RX/PN using the serial (Page 83) or telnet (Page 84) method.

2. At the **RedBoot** prompt, type `ip`.

The IP address, subnet mask, and IP gateway values will display.

Note: *Optionally, you can install PortVision DX on a Windows system on the network and see the IP information in the Device List pane.*

15.5. Configuring the Network Settings

Use the following procedure to program the IP address using RedBoot.

1. Establish communications with the ICDM-RX/PN using the serial (Page 83) or telnet (Page 84) method.
2. Enter **ip [addr mask gateway]** and press the **Enter** key to configure the IP address. *Where:*
 - addr* = IP address you want to use
 - mask* = matches you network subnet mask
 - gateway* = assigned by your network administrator*Make sure that each value is separated by a space.*
3. Verify that RedBoot responds with your configured network information or reissue the command.
4. Type **reset** to reset the ICDM-RX/PN, if you do not have any other related RedBoot tasks.

15.6. Changing the Bootloader Timeout

Use the following procedure to change the Bootloader timeout value.

1. Establish communications with the ICDM-RX/PN using the serial (Page 83) or telnet (Page 84) method.
2. At the **RedBoot** prompt, type **timeout**.
RedBoot responds with the current Bootloader timeout value.
3. Type **timeout** and a value to change the timeout value. For example, **timeout 45** to change the Bootloader timeout to 45 seconds.

15.7. Determining the Bootloader Version

Use the following procedure to determine what Bootloader version is loaded in the ICDM-RX/PN.

1. Establish communications with the ICDM-RX/PN using the serial (Page 83) or telnet (Page 84) method.
2. At the **RedBoot** prompt, type **version**.
The Bootloader information displays.
3. Type **reset** to reset the ICDM-RX/PN, if you do not have any other related RedBoot tasks.

Note: *Optionally, you can install PortVision DX on a Windows system on the network and see the Bootloader version in the Device List pane. Reboot the ICDM-RX/PN, right-click the ICDM-RX/PN and click Refresh Device until the Bootloader version displays. The Bootloader version is only displayed for a few moments.*

15.8. Resetting the ICDM-RX/PN

When you have completed your tasks in RedBoot, you must enter a **reset** command at the **RedBoot>** prompt for the ICDM-RX/PN to begin operation.

Note: *The LEDs on the ICDM-RX/PN will go through the power up sequence. The ICDM-RX/PN has completed its reset cycle when the Status LED is lit and it stops flashing.*

15.9. Configuring Passwords

This section discusses how to configure a password for the web and telnet server.

Use the following procedure to establish the ICDM-RX/PN password for the Web and telnet server. Establishing a password prevents unauthorized changes to the ICDM-RX/PN configuration.

1. Establish communications with the ICDM-RX/PN using the serial (Page 83) or telnet method (Page 84).
2. Type **password [your_password]** and press **Enter**.

Note: *If you forget your password, you can reprogram the password using the serial method which bypasses the password.*

Note: *The Bootloader version on your ICDM-RX/PN may be different than the version displayed in this graphic.*

See the **auth** command in the *RedBoot Command Overview* on Page 86, if you want to set up Web browser authentication.

15.10. RedBoot Command Overview

The following table is an overview of RedBoot commands available. After accessing RedBoot, you can review the list of commands on-line by entering **help** and pressing the **Enter** key..

RedBoot Commands	
auth {noaccess, none, basic, md5, invalid}	Sets or displays web authentication. The default is set to none , which means that there is no authentication required to access the web server. To deny access to the web server, click noaccess or invalid . If access is attempted, a message appears to notify the user that access is denied. To configure the web server to request an un-encrypted password, click basic . To configure the web server to request an encrypted password, click md5 . (Some browsers do not support the md5 command.)
boardrev†	Displays the board revision.
cache [ON OFF]	Manages machine caches.
channel [-1 <channel number>]	Displays or switches the console channel.
chassis	Displays chassis information.
cksum -b <location> -l <length>	Computes a 32-bit checksum [POSIX algorithm] for a range of memory.
clearconfig	Clears the application configuration.
disable	Disables automatic load of the default application.
fis {cmds}	Manages flash images.
flash	Shows flash information.

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RedBoot Commands (Continued)	
go [-w <timeout>] [-c] [-n] [entry]	Executes code at a location.
help <topic>	Displays available RedBoot commands.
history	Displays command history.
ip [addr mask gateway]	Displays or sets the IP address configuration.
load [-r] [-v] [-h <host>] [-p <TCP port>] [-m <varies>] [-c <channel_number>] [-b <base_address>] <file_name>	Loads a file from TFTP server or XModem.
loop 232 422[int port-number]	Runs loopback test on port.
mac †	Displays Ethernet MAC address.
model †	Shows model number.
password {password}	Sets or deletes the password.
ping [-v] [-n <count>] [-l <length>] [-t <timeout>] [-r <rate>] [-i <IP_addr>] -h <IP_addr>	Network connectivity test.
reset	Resets the ICDM-RX/PN.
secureconf [disable enable]	Sets or displays secure config enable.
securedata [disable enable]	Sets or displays secure data enable.
sernum [prefix] [serial_number] sernum [serial_number]†	Displays device serial number (if available).
?	Displays short help.
snmp [disable enable]	Sets or displays SNMP enable.
summary	Displays a summary that includes the bootloader version, network address information, MAC address, and security settings.
telnet [disable enable]	Sets or displays telnet server enable. Disables telnet.
teltimeout [seconds]	Shows or sets telnet time-out.
terse	Terse command response mode.
t485 port #1 port #2	Runs port-to-port RS-485 test. Port numbering is Port 0 through 15 and you must connect a straight-through cable such as Ethernet patch cord.
timeout {seconds}	Displays or sets Bootloader time-out value.
version	Displays RedBoot version information.
† Read-only items that you cannot change in Redboot.	

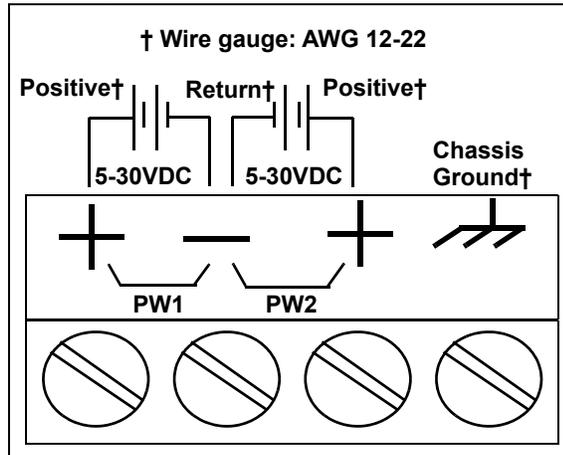
16. External Power Supply Specifications

This section discusses information that you may need if you wish to use your own external power supplies.

- *ICDM-RX/PN-DB9/RJ45-DIN and ICDM-RX/PN-ST/RJ45-DIN: 1-Port DIN Rail Power Supply* on Page 88
- *ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail Models Power Supply* on Page 89

16.1. ICDM-RX/PN-DB9/RJ45-DIN and ICDM-RX/PN-ST/RJ45-DIN: 1-Port DIN Rail Power Supply

This table provides the specifications to purchase a power supply for a ICDM-RX/PN ICDM-RX/PN-DB9/RJ45-DIN and ICDM-RX/PN-ST/RJ45-DIN 1-port DIN rail.

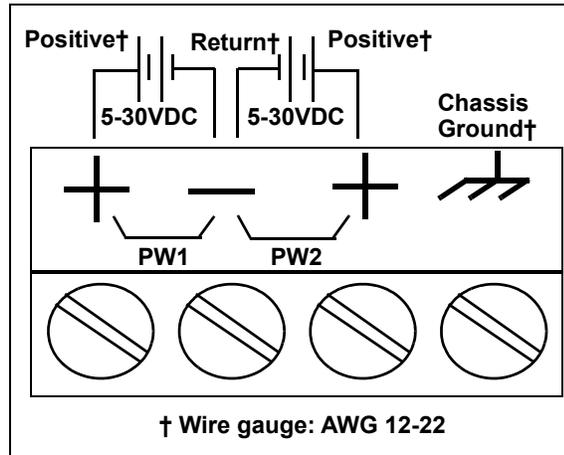


This table provides the specifications, if you intend on using your own power supply.

ICDM-RX/PN ICDM-RX/PN-DB9/RJ45-DIN and ICDM-RX/PN-ST/RJ45-DIN 1-Port DIN Rail External Power Supply	
Output voltage†	5-30VDC
Current†	100 mA (Min) @ 24VDC
Power	2.5 W
† Any power supply that meets current consumption, voltage, power, and connector pin outs requirements can be used.	

16.2. ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail Models Power Supply

This table provides the specifications to purchase a power supply for a ICDM-RX/PN ICDM-RX/PN-4DB9/2RJ45-DIN 4-port (DIN rail).



This table provides specifications if you intend on using your own power supply.

ICDM-RX/PN-4DB9/2RJ45-DIN: 4-Port DIN Rail External Power Supply	
Output voltage†	5-30VDC
Current†	100 mA (Min) @ 24VDC
Power	2.5 W
† Any power supply that meets current consumption, voltage, power, and connector pin outs requirements can be used.	

17. Troubleshooting and Technical Support

This section contains troubleshooting information for your ICDM-RX/PN. You may want to review the following subsections before calling Technical Support because they will request that you perform many of the procedures or verifications before they will be able to help you diagnose a problem.

- *Troubleshooting Checklist* on Page 90
- *General Troubleshooting* on Page 91
- *Daisy-Chaining ICDM-RX/PN With Dual Ethernet Ports* on Page 91
- *ICDM-RX/PN LEDs* on Page 92

If you cannot diagnose the problem, you can contact *Technical Support* on Page 93.

17.1. Troubleshooting Checklist

The following checklist may help you diagnose your problem:

- Verify that you are using the correct types of cables on the correct connectors and that all cables are connected securely.

Note: *Most customer problems reported to Pepperl+Fuchs Technical Support are eventually traced to cabling or network problems.*

Model	Connected to	Ethernet Cable	Connector Name
ICDM-RX/PN-DB9/RJ45-DIN ICDM-RX/PN-ST/RJ45-DIN	Ethernet hub or NIC	Standard	10/100
ICDM-RX/PN-4DB9/2RJ45-DIN	Ethernet hub or NIC	Standard	10/100 - E1/E2

- Verify that the network IP address, subnet mask, and gateway is correct and appropriate for the network. Make sure that the IP address programmed into the ICDM-RX/PN matches the unique reserved IP configured address assigned by the system administrator.
 - If IP addressing is being used, the system should be able to ping the ICDM-RX/PN.
 - If using DHCP, the host system needs to provide the subnet mask and gateway.
- Verify that the Ethernet hub and any other network devices between the system and the ICDM-RX/PN are powered up and operating.
- Reboot the system, then reset the power on the ICDM-RX/PN and watch the **PWR** or **Status** (Page 92) light activity.

PWR or Status LED	Description
5 sec. off, 3 flashes, 5 sec. off, 3 flashes...	RedBoot™ checksum failure.
5 sec. off, 4 flashes, 5 sec. off, 4 flashes...	SREC load failure.

Status or PWR LED	Description
Blinks every 10 seconds	No PLC connection.
On (solid)	One or more PLC connections have been established.

Flashing	<ul style="list-style-type: none"> LED flashing mode is enabled. Error detected or diagnostics information available.
----------	---

- If you have a spare ICDM-RX/PN, try replacing the device.

17.2. General Troubleshooting

This table illustrates some general troubleshooting tips.

Note: Make sure that you have reviewed the Troubleshooting Checklist on Page 90.

General Condition	Explanation/Action
PWR or Status LED flashing	<p>Indicates that boot program has not downloaded to the unit.</p> <ol style="list-style-type: none"> Reboot the system. Make sure that you have downloaded the most current firmware for your protocol. <p>Note: If the PWR or Status LED is still flashing, contact Technical Support.</p>
PWR or Status LED not lit and not blinking every 10 seconds	<p>Indicates that power has not been applied or there is a hardware failure. Contact Technical Support.</p>
Cannot ping the device through Ethernet hub	<p>Isolate the ICDM-RX/PN from the network. Connect the device directly to the NIC in the host system.</p>
Cannot ping or connect to the ICDM-RX/PN	<p>The default ICDM-RX/PN IP address is often not accessible due to the subnet masking from another network unless 192.168 is used in the network.</p> <p>In most cases, it will be necessary to program in an address that conforms to your network.</p>
ICDM-RX/PN continuously reboots when connected to some Ethernet switches or routers	<p>Invalid IP information may also cause the switch or router to check for a gateway address. Lack of a gateway address is a common cause.</p>

17.3. Daisy-Chaining ICDM-RX/PN With Dual Ethernet Ports

The ICDM-RX/PN models with dual Ethernet ports follow the IEEE specifications for standard Ethernet 10/100BASE-TX topologies.

When using the E1 and E2 ports, the ICDM-RX/PN is classified as a switch. When using the UP port only, it is a simple end node device.

The maximum number of daisy-chained ICDM-RX/PN units, and the maximum distance between units is based on the Ethernet standards and will be determined by your own environment and the conformity of your network to these standards.

Pepperl+Fuchs has tested with seven ICDM-RX/PN units daisy-chained together using 10 foot CAT5 cables, but this is not the theoretical limit. You may experience a performance hit on the devices at the end of the chain, so it is recommended that you overload and test for performance in your environment. The OS and the application may also limit the total number of ports that may be installed.

Following are some quick guidelines and URLs of additional information. Note that standards and URLs do occasionally change.

- Ethernet 10BASE-T Rules
 - The maximum number of repeater hops is four.
 - You can use Category 3 or 5 twisted-pair 10BASE-T cables.
 - The maximum length of each cable is 100m (328ft).

Note: *Category 3 or 5 twisted pair cables look the same as telephone cables but they are not the same. The network will not work if telephone cables are used to connect the equipment.*
- Fast Ethernet 100BASE-TX rules
 - The maximum number of repeater hops is two (for a Class II hub). A Class II hub can be connected directly to one other Class II Fast Ethernet hub. A Class I hub cannot be connected directly to another Fast Ethernet hub.
 - You must use Category 5 twisted-pair 100BASE-TX cables.
 - The maximum length of each twisted-pair cable is 100m (328ft).
 - The total length of twisted-pair cabling (across directly connected hubs) must not exceed 205m (672ft).

Note: *Category 5 twisted pair cables look the same as telephone cables but they are not the same. The network will not work if telephone cables are used to connect the equipment.*
- IEEE 802.3 specification: A network using repeaters between communicating stations (PCs) is subject to the 5-4-3 rule of repeater placement on the network:
 - Five segments connected on the network.
 - Four repeaters.
 - Three segments of the 5 segments can have stations connected. The other two segments must be inter-repeater link segments with no stations connected.

Additional information may be found by searching the web.

17.4. ICDM-RX/PN LEDs

The LEDs indicate that the default ICDM-RX/PN application is running. If you have loaded PortVision DX, you can check the ICDM-RX/PN status on-line.

Type Code	Network LEDs
ICDM-RX/PN-DB9/ RJ45-DIN ICDM-RX/PN-ST/RJ45- DIN	<ul style="list-style-type: none"> • The Status LED on the front of the unit is lit, which indicates that it has power and has completed the boot cycle. <p>Note: <i>The Status LED flashes while booting and it takes approximately 15 seconds for the Bootloader to complete the cycle. When the Bootloader completes the cycle, the LED flashes rapidly for several times then stays off and blinks approximately every 10 seconds when there is no PLC connection.</i></p> • If the LINK (green) LED is lit, it indicates a working Ethernet connection. • If the ACT (yellow) LED flashes, it indicates network activity.
ICDM-RX/PN-4DB9/ 2RJ45-DIN	<ul style="list-style-type: none"> • The STATUS LED on the device is lit, indicating you have power and it has completed the boot cycle. <p>Note: <i>The STATUS LED flashes while booting and it takes approximately 15 seconds for the Bootloader to complete the cycle. When the Bootloader completes the cycle, the LED flashes rapidly for several times then stays off and blinks approximately every 10 seconds when there is no PLC connection.</i></p> • If the LINK (green) LED is lit, it indicates a working Ethernet connection. • If the ACT (yellow) LED flashes, it indicates network activity.

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17.5. Technical Support

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