



Modbus[®]/TCP

Interface Configuration Quick Start



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Chapter 1. Installation Overview

Use this document to locate software and installation documentation for the DeviceMaster UP to quickly configure:

- Interfaces to serial Modbus/RTU and Modbus/ASCII slaves and masters
- Read-only devices such as barcode scanners and some RFID readers
- Read/write devices such as printers and some weigh scales

Use the following steps to install the DeviceMaster UP.

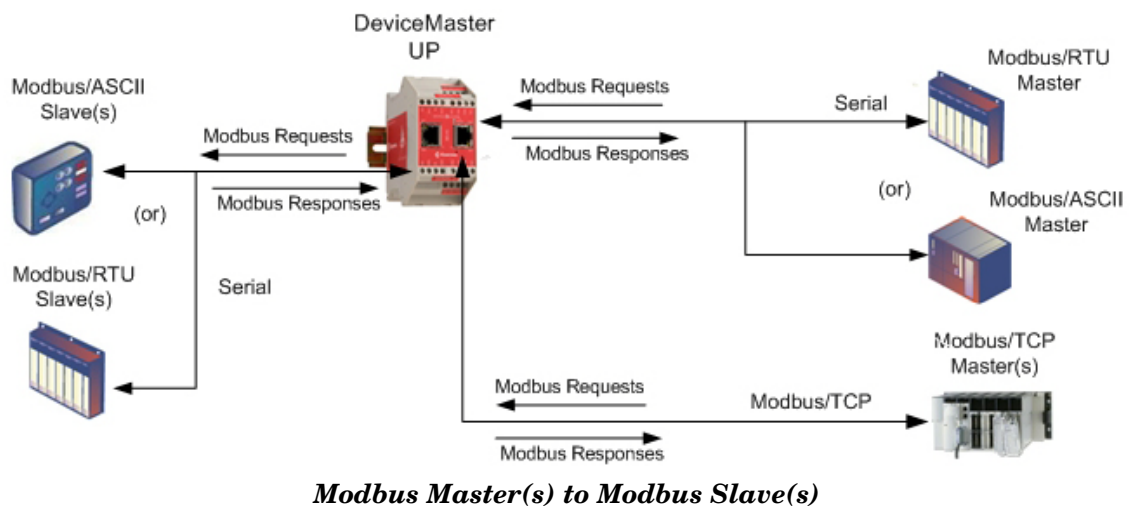
1. [Connect the DeviceMaster UP](#) to the network.
 2. Install PortVision Plus from the CD or download and install the latest version.
 3. [Configure the DeviceMaster UP](#) network settings using PortVision Plus.
 4. *Depending on the DeviceMaster UP model, do the following:*
 - *Models without Modbus/TCP loaded, you must install the software assembly (.msi) from the CD or download and install the latest file, which contains the Modbus/TCP firmware and supporting files required for Step 5.*
 - *Models with Modbus/TCP loaded on the DeviceMaster UP, you should check to see if a later version of Modbus/TCP is available for installation. Check the Modbus/TCP version in PortVision Plus against the web site to see if a later version is available. Typically, you should download and install the latest .msi file and upload the latest version, which may include updates or enhancements.*
- Note:** *Models that have Modbus/TCP loaded on the DeviceMaster UP are identified in PortVision Plus and the DeviceMaster UP is labeled accordingly.*
5. [If necessary, upload](#) the Modbus/TCP firmware into the DeviceMaster UP using PortVision Plus.
 6. Configure serial or Ethernet TCP/IP characteristics using the DeviceMaster UP embedded web page (*Server Configuration*).
 - Modbus/RTU serial slave devices ([Page 8](#))
 - Modbus/ASCII serial slave devices ([Page 9](#))
 - Modbus/RTU serial master ([Page 10](#))
 - Modbus/ASCII serial master ([Page 11](#))
 - Read-only raw/ASCII serial devices ([Page 13](#))
 - Read-only raw/ASCII Ethernet devices ([Page 21](#))
 - Read/write raw/ASCII serial devices ([Page 32](#))
 - Read/write raw/ASCII Ethernet devices ([Page 44](#))
- Optionally, the [Modbus/TCP User Guide](#) provides detailed information about each web page. You may want to reference the [Programming Interface](#) chapter in the *DeviceMaster UP Modbus/TCP User Guide*.
7. Optionally, reference the [example PLC programs](#) in the *DeviceMaster UP Modbus/TCP User Guide*.
 8. [Connect](#) any serial device or devices.
 9. Verify any Ethernet TCP/IP devices are connected to the same subnet as the DeviceMaster UP.

Software and Documentation	Web
<i>DeviceMaster UP Hardware Installation and Configuration Guide</i>	
PortVision Plus	
Modbus/TCP firmware	
<i>Modbus/TCP Interface Configuration Quick Start (this document)</i>	
<i>Modbus/TCP User Guide</i>	
<i>DeviceMaster UP Filtering and Data Extraction Reference Guide</i>	

Chapter 2. Configuring Modbus/RTU and Modbus/ASCII Slaves and Masters

For pure Modbus devices, the DeviceMaster UP supports:

- Modbus/RTU serial slaves
- Modbus ASCII serial slaves
- Modbus/RTU serial masters
- Modbus/ASCII serial masters
- Modbus/TCP masters



Note: All masters can communicate to all slaves.

2.1. Prerequisites

Before you can configure the serial ports for this mode, make sure that you have done the following:

- Installed the hardware
- Installed PortVision Plus
- Configured the DeviceMaster UP IP address using PortVision Plus
- If necessary, uploaded the latest Modbus/TCP firmware using PortVision Plus

Note: The DeviceMaster UP provides an Modbus/TCP interface, which may or may not have the Modbus/TCP firmware loaded (depending on the model you purchased). Models that have Modbus/TCP loaded on the DeviceMaster UP are identified in PortVision Plus and the DeviceMaster UP is labeled accordingly.

If you need to perform any of these procedures or locate the latest files, see [Chapter 1. Installation Overview](#) on Page 5.

2.2. Configuring Modbus/RTU Slaves

Use the following procedure to configure a serial interface to Modbus/RTU slave(s).

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
 3. Click **Port N** for the port you want to configure.
 4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set up the *Serial Configuration* for your device.

Serial Configuration

Mode:	RS-232
Baud:	9600
Parity:	none
Data Bits:	8
Stop Bits:	1
Flow:	none
DTR:	off
Rx Timeout Between Packets:	200 (ms)

6. Configure the serial port for **Modbus/RTU-to-Slaves** operation. Under *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Modbus/RTU-to-Slaves**.
 - b. Enable **Discard Rx Packets With Errors**.
 - c. Under *Modbus Slave and Raw-Data Device Settings*, set the **Device Response Timeout** value or leave at the default.
 - d. *2/4-port models only*: Under *Modbus Slaves Only*, enable **Lost Device Search Enable** if you want the DeviceMaster UP to search for a lost Modbus slave device on other Modbus/RTU and/or Modbus/ASCII slave ports that also have this option enabled.

General Protocol Settings

Serial Port Protocol:	Modbus/RTU-to-Slaves
Discard Rx Packets With Errors:	<input checked="" type="checkbox"/>

Modbus Slave and Raw-Data Device Settings

Response Timeout:	250 (ms)
-------------------	----------

Modbus Slaves Only

Lost Device Search Enable:	<input checked="" type="checkbox"/>
----------------------------	-------------------------------------

2.3. Configuring Modbus/ASCII Slaves

Use the following procedure to configure a serial interface to Modbus/ASCII slave(s).

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
 3. Click **Port N** for the port you want to configure.
 4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set up the *Serial Configuration* for your device.

Serial Configuration

Mode:	RS-232
Baud:	9600
Parity:	none
Data Bits:	8
Stop Bits:	1
Flow:	none
DTR:	off
Rx Timeout Between Packets:	200 (ms)

6. Configure the serial port for **Modbus/ASCII-to-Slaves** operation. Under *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Modbus/ASCII-to-Slaves**.
 - b. Enable **Discard Rx Packets With Errors**.
 - c. Under *Modbus Slave and Raw-Data Device Settings*, set the **Device Response Timeout** value or leave at the default.
 - d. *2/4-port models only*: Under *Modbus Slaves Only*, enable **Lost Device Search Enable** if you want the DeviceMaster UP to search for a lost Modbus slave device on other Modbus/RTU and/or Modbus/ASCII slave ports that also have this option enabled.

General Protocol Settings

Serial Port Protocol:	Modbus/ASCII-to-Slaves
Discard Rx Packets With Errors:	<input checked="" type="checkbox"/>

Modbus Slave and Raw-Data Device Settings

Response Timeout:	250 (ms)
-------------------	----------

Modbus Slaves Only

Lost Device Search Enable:	<input checked="" type="checkbox"/>
----------------------------	-------------------------------------

2.4. Configuring Modbus/RTU Master

Use the following procedure to configure a serial interface to Modbus/RTU master.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
 3. Click **Port N** for the port you want to configure.
 4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set up the *Serial Configuration* for your device.

Serial Configuration

Mode:	RS-232
Baud:	9600
Parity:	none
Data Bits:	8
Stop Bits:	1
Flow:	none
DTR:	off
Rx Timeout Between Packets:	200 (ms)

6. Configure the serial port for **Modbus/RTU-to-Master** operation. Under *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Modbus/RTU-to-Master**.
 - b. Enable **Discard Rx Packets With Errors**.

General Protocol Settings

Serial Port Protocol:	Modbus/RTU-to-Master
Discard Rx Packets With Errors:	<input checked="" type="checkbox"/>

2.5. Configuring Modbus/ASCII Master

Use the following procedure to configure a serial interface to Modbus/ASCII master.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
 3. Click **Port N** for the port you want to configure.
 4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set up the *Serial Configuration* for your device.

Serial Configuration

Mode:	RS-232
Baud:	9600
Parity:	none
Data Bits:	8
Stop Bits:	1
Flow:	none
DTR:	off
Rx Timeout Between Packets:	200 (ms)

6. Configure the serial port for **Modbus/ASCII-to-Master** operation. Under *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Modbus/ASCII-to-Master**.
 - b. Enable **Discard Rx Packets With Errors**.

General Protocol Settings

Serial Port Protocol:	Modbus/ASCII-to-Master
Discard Rx Packets With Errors:	<input checked="" type="checkbox"/>

Chapter 3. Configuring Read-Only Raw/ASCII Devices

This chapter contains these subsections:

- [3.1. Prerequisites](#) (below)
- [3.2. Read-Only Raw /ASCII Serial Devices](#) (below)
- [3.3. Read-Only Raw /ASCII Ethernet Devices](#) on Page 21

3.1. Prerequisites

Before you can configure the ports, make sure that you have done the following:

- Installed the hardware
- Installed PortVision Plus
- Configured the DeviceMaster UP IP address using PortVision Plus
- If necessary, uploaded the latest Modbus/TCP firmware using PortVision Plus

Note: *The DeviceMaster UP provides a Modbus /TCP interface, which may or may not have the Modbus /TCP firmware loaded (depending on the model you purchased). Models that have Modbus /TCP loaded on the DeviceMaster UP are identified in PortVision Plus and the DeviceMaster UP is labeled accordingly.*

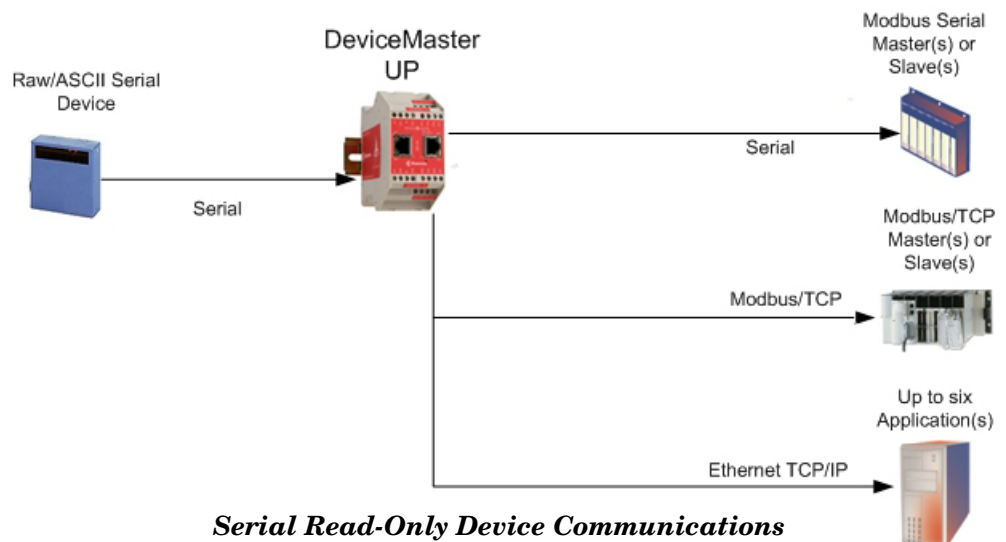
If you need to perform any of these procedures or locate the latest files, see [Chapter 1. Installation Overview](#) on Page 5.

3.2. Read-Only Raw/ASCII Serial Devices

Read-only raw/ASCII serial devices use the *Serial Device Configuration* page to:

- Allow connections between a serial device, such as a barcode scanner or RFID reader, to PLC(s) and/or application(s).
- Provide an optional filtering mechanism for string, RFID, and barcode data.

The PLC and application can both communicate to the serial device, but they cannot communicate directly to each other.



3.2.1. Embedded Web Page Configuration

Use the following procedure to configure read-only raw/ASCII serial devices.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
 3. Click **Port N** for the port that you want to configure.



Serial Device Configuration

- [Server Configuration Home](#)
- [Ethernet Device Configuration](#)
- [Communication Statistics](#)
- [PLC Interface Diagnostics](#)
- [Display All Modbus Slave Devices](#)
- [Display Serial Logs](#)

Port 1

Click the port number you want to configure.

4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set the *Serial Configuration* for your device.

Serial Configuration

Mode:	<input type="text" value="RS-232"/>
Baud:	<input type="text" value="9600"/>
Parity:	<input type="text" value="none"/>
Data Bits:	<input type="text" value="8"/>
Stop Bits:	<input type="text" value="1"/>
Flow:	<input type="text" value="none"/>
DTR:	<input type="text" value="off"/>
Rx Timeout Between Packets:	<input type="text" value="200"/> (ms)

6. Set the *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Raw-Data**.
 - b. Enable **Discard Rx Packets With Errors**.

General Protocol Settings
 Serial Port Protocol: Raw-Data
 Discard Rx Packets With Errors:

7. Set the *Message Transfer* mode, by setting the **Raw-Data Message Transfer Mode** to **Data-Stream**.

Modbus Slave and Raw-Data Device Settings
 Response Timeout: 250 (ms)
Modbus Slaves Only
 Lost Device Search Enable:
Raw-Data Only
 Raw-Data Message Transfer Mode: Data-Stream
 Cmd/Resp Age Time, Discard Responses After: 10 (sec)
 Cmd/Resp Expected Responses Per Command: 1
 Cmd/Resp Mode Response To Modbus/TCP Based On: IP-Address

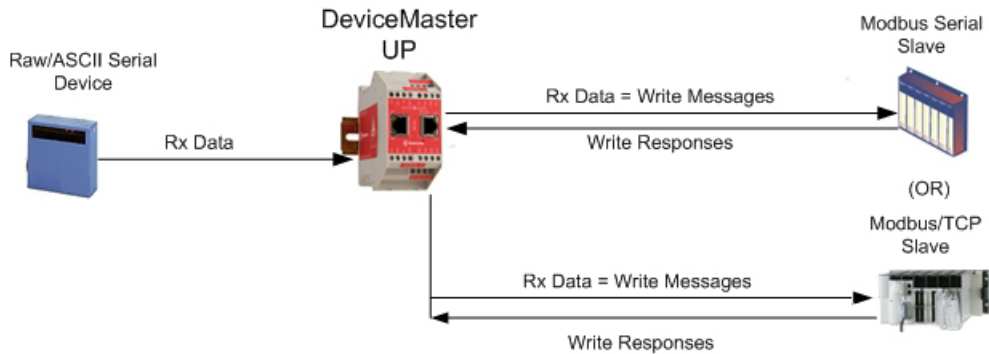
8. Set up the serial packet identification (*Serial Packet ID Settings (Raw Data Only)*).

- Set the **STX (Start of transmission) Rx Detect** in decimal format.
- Set the **ETX (End of transmission) Rx Detect** in decimal format.
- Enable the **Strip Rx STX/ETX** option if you do not want the STX and ETX bytes returned to the PLC or application(s).

Serial Packet ID Settings (Raw-Data Only)
 STX (Start of Transmission) Rx Detect: one byte Byte 1: 2 Byte 2:
 ETX (End of Transmission) Rx Detect: one byte Byte 1: 3 Byte 2:
PLC Specific Settings
 STX (Start of Transmission) Tx Append: none Byte 1: Byte 2:
 ETX (End of Transmission) Tx Append: none Byte 1: Byte 2:
 Strip Rx STX/ETX:
Application Specific Settings
 STX (Start of Transmission) Tx Append: none Byte 1: Byte 2:
 ETX (End of Transmission) Tx Append: none Byte 1: Byte 2:
 Strip Rx STX/ETX:

Note: Refer to your device's User Manual for the Start and End of Transmission byte(s) settings. You may also be able to use the Serial Interface Logs page to determine these settings.

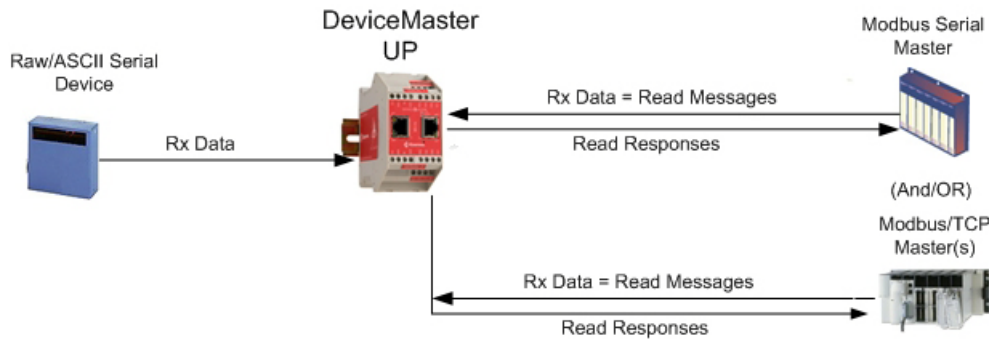
9. Configure the *Modbus/TCP and/or Serial Modbus Master Settings* for your environment using one of the following settings:
 - **Master Receive Transfer** mode (recommended) writes data directly into the memory of a Modbus/TCP slave or serial Modbus slave attached to this gateway. This requires the least amount of PLC programming, requires the least amount of PLC overhead, and provides minimal latency.



You can use the **Master Receive Transfer** method only if your PLC can operate as a Modbus/TCP slave, Modbus/RTU serial slave, or Modbus/ASCII serial slave.

Go to Step [10](#) on Page 17 to configure *Master Receive Transfer* mode.

- **Slave Receive Transfer** mode requires the PLC to poll for received data. This method is provided for PLC programmers who prefer polling for data or those who have PLCs that can only operate in master mode.



You can use the **Slave Receive Transfer** method only if your PLC can operate as a Modbus/TCP master, Modbus/RTU serial master, or Modbus/ASCII serial master.

Go to Step [11](#) on Page 19 to configure *Slave Receive Transfer* mode.

10. Master Receive Transfer Mode Only

Use the following procedure to configure *Master Receive Transfer* mode.

Under *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)*:

- a. Set **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set **Tx (From PLC) Transfer Mode** to either **Slave (PLC Writes)** or **Off**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. For writing to a Modbus/TCP slave or Modbus serial slave, this can be a maximum of 1,518 bytes.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be sent to the PLC.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under *Modbus/TCP Master Rx/Tx Settings (Raw-Data Only)*:

g. Enter the **PLC IP Address**:

- For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*

h. Enter the **PLC Device ID**:

- For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*

i. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.

j. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.

k. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID:

 (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address:

 (Base 1)

Maximum PLC Update Rate:

 (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address:

 (Base 1)

PLC Tx Poll Rate:

 (msec)

PLC Tx Poll Message Length:

 (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address:

 (Base 1)

Note: Go to Step [12](#) on Page 19 to complete configuration.

11. *Slave Receive Transfer Mode Only:*

Use the following procedure to configure *Slave Receive Transfer* mode.

Under *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)*:

- a. Set **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- b. Set **Tx (From PLC) Transfer Mode** to either **Slave (PLC Writes)** or **Off**
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in Slave Rx mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Slave (PLC Polls) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

12. Set up the filtering/data extraction settings:

- If no filtering/data extraction is required, leave all filtering/data extraction settings to defaults (off).
- If filtering/data extraction is required, see [Chapter 5. Filtering / Data Extraction Configuration](#) on Page 57.

13. Set up the application socket interface settings:

- If no application socket interface is required, leave all application socket interface settings at defaults and the application **Enable** option unselected.
- If an application socket interface is required, see [Chapter 6. Application Socket Configuration](#) on Page 63.

14. Verify **Reset Port** and **Save in Flash** are selected and click **Submit**.

3.2.2. Modbus Raw Data Addressing

The serial port receive data addresses used for polling:

Serial Port Raw/ASCII Addressing	Serial Port 1	Serial Port 2	Serial Port 3	Serial Port 4	Access Rule
Unit ID	255 (FF Hex)	255 (FF Hex)	255 (FF Hex)	255 (FF Hex)	N/A
Receive Data Address	1000 (Base 0) 1001 (Base 1)	2000 (Base 0) 2001 (Base 1)	3000 (Base 0) 3001 (Base 1)	4000 (Base 0) 4001 (Base 1)	Read Only

3.2.3. Received Message Format

If all is set up correctly, the data packets will be written into the PLC memory space starting at the specified memory location. The first word received is the sequence number. This is incremented with each new data packet. The next word is the length, which indicates the number of data bytes received. The rest is data.

The format of received serial data sent to or returned to the PLC:

Name	Data Type	Data Value(s)	Access Rule
Receive (DeviceMaster UP to PLC) message data. Structure of: Produced data sequence Data length (in bytes) Data array	WORD WORD Array of WORD	0-65535 (FFFF Hex) 1-1024 (Master Rx Mode) 0-246 (Slave Rx Mode) 0-65535	Get

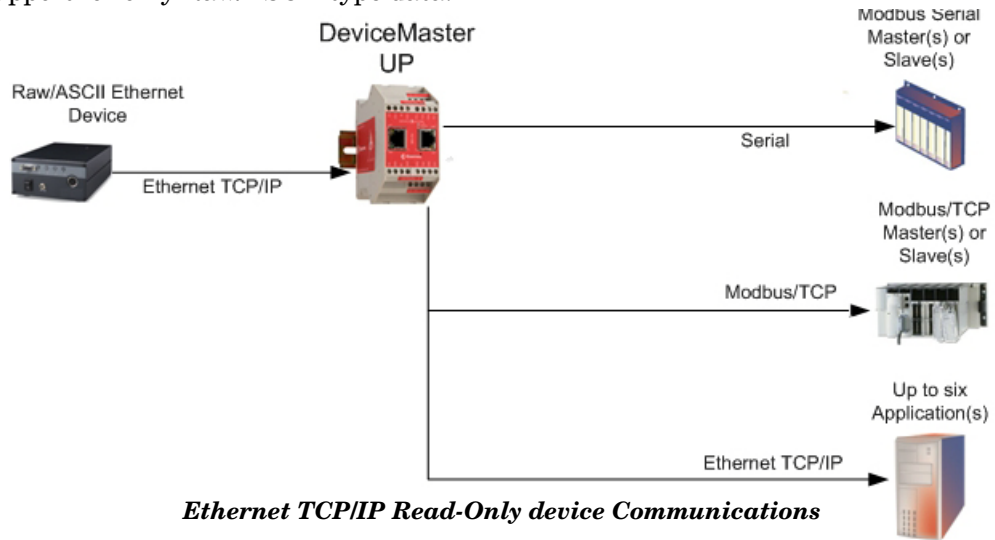
General requirements:

- The memory area must be defined in 16 bit words and large enough to handle the largest serial packet plus two words for the produced sequence number and data length parameters.
- The **Maximum Rx Data Packet Size** must be set large enough to accept the largest possible packet.
- For large received data packets over 246 bytes (This may be less for your PLC):
The **Rx (To PLC) Transfer Mode** must be set to **Master (Write to PLC)**.
 - The data will automatically be placed in continuous memory.
 - All data will have been transferred to the PLC when the sequence number is updated.

3.3. Read-Only Raw/ASCII Ethernet Devices

Read-only raw/ASCII Ethernet devices use the *Ethernet Device Configuration* page to:

- Allow connections between devices that communicate over Ethernet TCP/IP, such as a barcode scanner, RFID reader, or weigh scale, and a PLC and/or application.
- Provide an optional filtering mechanism for string, RFID, and barcode data.
- Provide support for only Raw/ASCII type data.



Verify that you have an actual Ethernet device in which to connect to and that the Ethernet device supports Ethernet TCP socket connections.



Do not use this configuration page for serial devices.

3.3.1. Embedded Web Page Configuration

Use the following procedure to configure read-only Ethernet devices.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.

If you are using Internet Explorer and it does not display the web page correctly, please do the following:

- a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Ethernet Device Configuration** option to open the *Ethernet Device Configuration* page.
Note: The Ethernet device must be a target Ethernet device such as a barcode scanner, RFID reader, weigh scale, or some other device that is to be connected to a PLC and/or application.
 3. Click **Socket N** for the port that you want to configure.



Ethernet Device Configuration (Raw-Data Only)

- [Server Configuration Home](#)
- [Serial Device Configuration](#)
- [Communication Statistics](#)
- [PLC Interface Diagnostics](#)
- [Display Ethernet Device Logs](#)

Socket 1

Click the socket number you want to configure.

4. If desired, enter an *Ethernet Interface Name*.

Ethernet Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Click **Enable** under *Device TCP Connection Configuration* and configure the settings for your environment using one of the following procedures.

- If your Ethernet TCP/IP device requires another device to connect to it, configure the socket port on the DeviceMaster UP to **Connect** mode:
 - Leave **Listen** unselected.
 - Set **Connect To Mode** to **Connect-Always**.
 - Set the **Connect Port** to the socket port number of your Ethernet device.
 - Set the **Connect IP Address** to the IP address of your Ethernet device.

Device TCP Connection Configuration

Enable:

Listen:

Listen Port:

Connect To Mode:

Connect Port:

Connect IP Address:

Disconnect Mode:

Idle Timer: (msec)

Connect Mode Set Up

Do not enter the IP address of the DeviceMaster UP or PLC here.

- Set **Disconnect Mode** to **Never**.

- If your Ethernet TCP/IP device is configured to connect to another device, configure the socket port on the DeviceMaster UP to **Listen** mode:
 - Select **Listen**.
 - Use the default **Listen Port** on the DeviceMaster UP of 8xxx or designate your own.
 - Set **Connect To Mode** to **Never**.
 - Set **Disconnect Mode** to **Never**.
 - Configure your Ethernet device to connect to the DeviceMaster UP at the DeviceMaster UP IP address and **Listen Port**.

Device TCP Connection Configuration

Enable:

Listen:

Listen Port:

Connect To Mode:

Connect Port:

Connect IP Address:

Disconnect Mode:

Idle Timer: (msec)

Listen Mode Set Up

- If you do not know if your device will connect to another Ethernet device, but do know your device's socket port and IP address, you can do the following to enable both the **Listen** and **Connect** modes:
 - Select **Listen**.
 - Use the default **Listen Port** on the DeviceMaster UP of 8xxx or designate your own.
 - Set **Connect To Mode** to **Connect-Always**.
 - Set the **Connect Port** to the port number of your Ethernet device.
 - Set the **Connect IP Address** to the IP address of your Ethernet device.

Device TCP Connection Configuration

Enable:

Listen:

Listen Port:

Connect To Mode:

Connect Port:

Connect IP Address:

Disconnect Mode:

Idle Timer: (msec)

Listen and Connect Modes Set Up

Do not enter the IP address of the DeviceMaster UP or PLC here.

- Set **Disconnect Mode** to **Never**.
- Optionally configure your Ethernet device to connect to the DeviceMaster UP at the DeviceMaster UP IP address and **Listen Port**.

6. Set up the *Message Transfer Settings*, by setting the **Message Transfer Mode** to **Data-Stream**.

Message Transfer Settings

- Message Transfer Mode:**
- Cmd/Resp Response Timeout:**
- Cmd/Resp Age Time, Discard Responses After:**
- Cmd/Resp Expected Responses Per Command:**
- Cmd/Resp Response To Modbus/TCP Based On:**

(ms)

(sec)

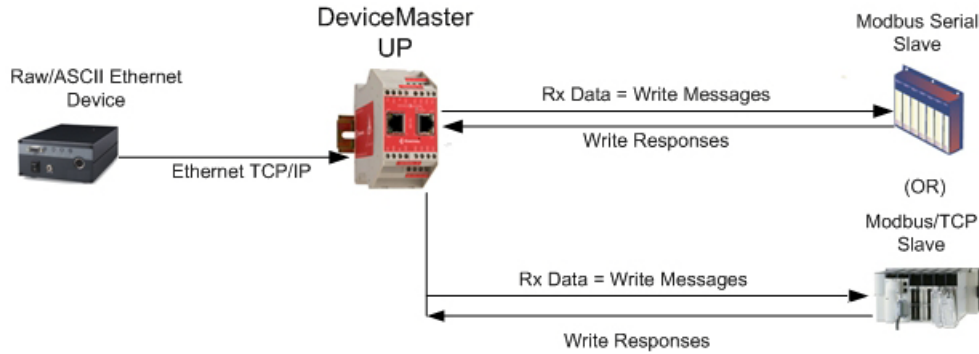
7. Set up the *Socket Packet Identification*.

- a. Set the **Rx Timeout Between Packets**. Set to zero to stream data with the **Rx STX/ETX Detect** settings set to none. For normal settings, typical values are 10 to 50 ms.
- b. Set the **STX (Start of transmission) Rx Detect** in decimal format.
- c. Set the **ETX (End of transmission) Rx Detect** in decimal format.
- d. Enable the **Strip Rx STX/ETX** option if you do not want the STX and ETX bytes returned to the PLC or application.

Socket Packet ID Settings	
Rx Timeout Between Packets:	<input type="text" value="0"/> (ms)
STX (Start of Transmission) Rx Detect:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Rx Detect:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
PLC Specific Settings	
STX (Start of Transmission) Tx Append:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Tx Append:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
Strip Rx STX/ETX:	<input type="checkbox"/>
Application Specific Settings	
STX (Start of Transmission) Tx Append:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Tx Append:	<input type="text" value="none"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
Strip Rx STX/ETX:	<input type="checkbox"/>

Note: Refer to your device's User Manual for the Start and End of Transmission byte(s) settings. You may also be able to use the Ethernet Device Interface Logs page to determine these settings.

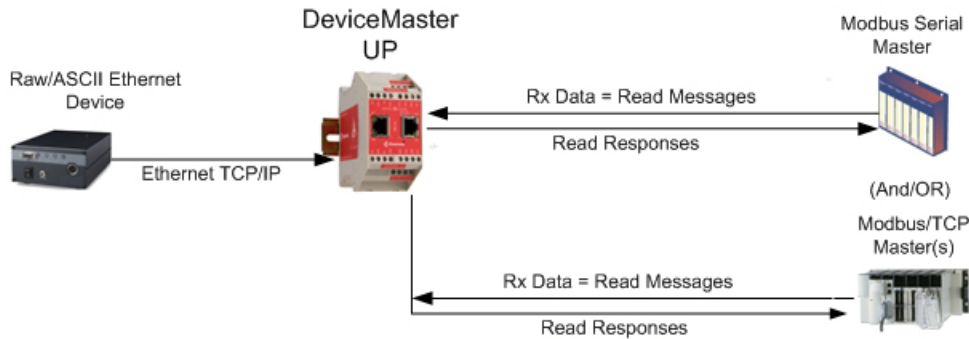
8. Configure the *Modbus/TCP and/or Serial Modbus Master Settings* for your environment using one of the following methods.
 - **Master Receive Transfer** mode (*recommended*) writes data directly into the memory of a Modbus/TCP slave or serial Modbus slave attached to this gateway. This requires the least amount of PLC programming, requires the least amount of PLC overhead, and provides minimal latency.



You can use the **Master Receive Transfer** method only if your PLC can operate as a *Modbus/TCP slave, Modbus/RTU serial slave, or Modbus/ASCII serial slave*.

Go to Step [9](#) on Page 26 to configure *Master Receive Transfer* mode.

- **Slave Receive Transfer** mode requires the PLC to poll for received data. This method is provided for PLC programmers who prefer polling for data or those who have PLCs that can only operate in master mode.



You can use the **Slave Receive Transfer** method only if your PLC can operate as a *Modbus/TCP master, Modbus/RTU serial master, or Modbus/ASCII serial master*.

Go to Step [10](#) on Page 28 to configure *Slave Receive Transfer* mode.

9. **Master Receive Transfer Mode Only:**

Use the following procedure to configure *Master Receive Transfer* mode.

Under *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)*:

- a. Set **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set **Tx (From PLC) Transfer Mode** to either **Slave (PLC Writes)** or **Off**
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. For writing to a Modbus/TCP slave or Modbus serial slave, this can be a maximum of 1,518 bytes.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be sent to the PLC.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▼
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▼
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▼
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under *Modbus/TCP Master Rx/Tx Settings (Raw-Data Only)*:

g. Enter the **PLC IP Address**:

- For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*

h. Enter the **PLC Device ID**:

- For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*

i. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.

j. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.

k. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID:

 (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address:

 (Base 1)

Maximum PLC Update Rate:

 (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address:

 (Base 1)

PLC Tx Poll Rate:

 (msec)

PLC Tx Poll Message Length:

 (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address:

 (Base 1)

l. Go to Step [11](#) on Page 28 to complete configuration.

10. *Slave Receive Transfer Mode Only:*

Use the following procedure to configure the *Slave Receive Transfer* mode.

Under *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)*:

- a. Set **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- b. Set **Tx (From PLC) Transfer Mode** to either **Slave (PLC Writes)** or **Off**
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in Slave Rx Mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Slave (PLC Polls) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

11. Set up the *Filtering/Data Extraction Configuration* settings:

- If no filtering/data extraction is required, leave all filtering/data extraction settings to defaults (off).
- If filtering/data extraction is required, see [Chapter 5. Filtering/Data Extraction Configuration](#) on Page 57.

12. Set up the *Application TCP Connection Configuration* settings:

- If no application socket interface is required, leave all application socket interface settings at defaults and the application **Enable** option unselected.
- If an application socket interface is required, see [Chapter 6. Application Socket Configuration](#) on Page 63.

13. Verify **Reset Port** and **Save in Flash** are selected and click **Submit**.

3.3.2. Modbus Addressing

The receive data addresses used for polling are as follows:

Socket Port Raw/ ASCII Addressing	Socket Port 1	Socket Port 2	Socket Port 3	Socket Port 4	Access Rule
Unit ID	254 (FF Hex)	254 (FF Hex)	254 (FF Hex)	254 (FF Hex)	N/A
Receive Data Address	1000 (Base 0) 1001 (Base 1)	2000 (Base 0) 2001 (Base 1)	3000 (Base 0) 3001 (Base 1)	4000 (Base 0) 4001 (Base 1)	Read Only

3.3.3. Received Message Format

If all is set up correctly, the data packets will be written into the PLC memory space starting at the specified memory location. The first word received is the sequence number. This is incremented with each new data packet. The next word is the length, which indicates the number of data bytes received. The rest is data.

The format of received socket data sent to the PLC:

Name	Data Type	Data Value(s)	Access Rule
Receive (DeviceMaster UP to PLC) message data. Structure of: Produced data sequence Data length (in bytes) Data array	 WORD WORD Array of WORD	 0-65535 (FFFF Hex) 1-2048 (Master Rx Mode) 0-246 (Slave Rx Mode) 0-65535	 Get

General requirements:

- The memory area must be defined in 16 bit words and large enough to handle the largest serial packet plus two words for the produced sequence number and data length parameters.
- The **Maximum Rx Data Packet Size** must be set large enough to accept the largest possible packet.

For large received data packets over 246 bytes (This may be less for your PLC):

- The **Rx (To PLC) Transfer Mode** must be set to **Master (Write to PLC)**.
- The data will automatically be placed in continuous memory.
- All data will have been transferred to the PLC when the sequence number is updated.

Chapter 4. Configuring Read/Write Raw/ASCII Devices

This section discusses the following:

- [4.1. Prerequisites](#)
- [4.2. Read/Write Raw/ASCII Serial Devices](#)
- [4.3. Read/Write Raw/ASCII Ethernet Devices](#) on Page 44

4.1. Prerequisites

Before you can configure the ports, make sure that you have done the following:

- Installed the hardware
- Installed PortVision Plus
- Configured the DeviceMaster UP IP address using PortVision Plus
- If necessary, uploaded the latest Modbus/TCP firmware using PortVision Plus

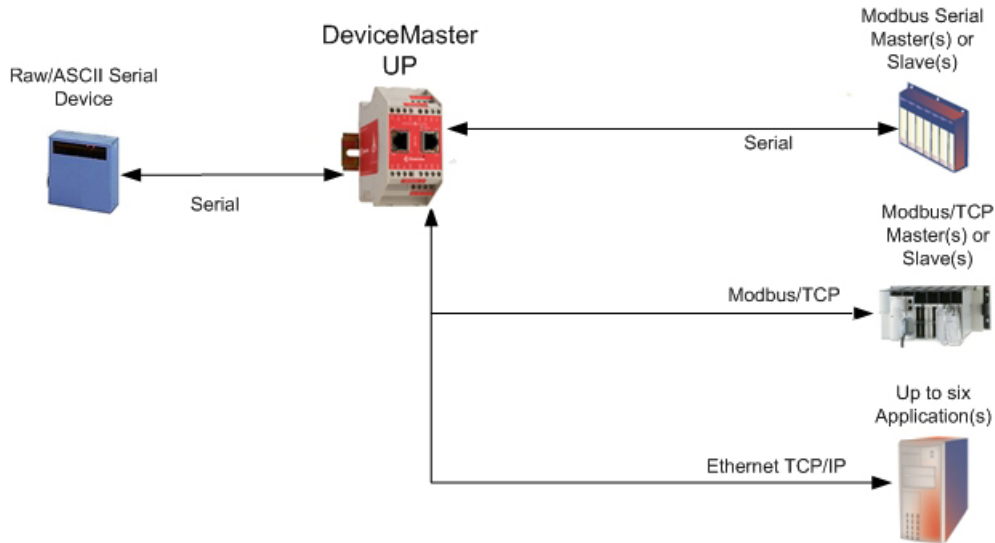
Note: *The DeviceMaster UP provides a Modbus/TCP interface, which may or may not have the Modbus/TCP firmware loaded (depending on the model you purchased). Models that have Modbus/TCP loaded on the DeviceMaster UP are identified in PortVision Plus and the DeviceMaster UP is labeled accordingly.*

If you need to perform any of these procedures or locate the latest files, see [Chapter 1. Installation Overview](#) on Page 5.

4.2. Read/Write Raw/ASCII Serial Devices

Read/write raw/ASCII serial devices use the *Serial Device Configuration* page to:

- Allow connections between a serial device, such as a barcode scanner or RFID reader, and a PLC and/or application(s).
- Provide an optional filtering mechanism for string, RFID, and barcode data.



Serial Read/Write Device Communications

Note: The PLC and application(s) can both communicate to the serial device, but they cannot communicate directly to each other.

4.2.1. Embedded Web Page Configuration

Use the following procedure to configure read/write raw/ASCII serial devices.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.
If you are using Internet Explorer and it does not display the web page correctly, please do the following:
 - a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Serial Device Configuration** option to open the *Serial Device Configuration* page.
3. Click **Port N** for the port that you want to configure.
4. If desired, provide a **Serial Interface Name**.

Serial Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Set up the *Serial Configuration* for your device.

Serial Configuration

Mode:

Baud:

Parity:

Data Bits:

Stop Bits:

Flow:

DTR:

Rx Timeout Between Packets: (ms)

6. Select the Modbus/TCP communication method and set up the Modbus/TCP Interface settings under *General Protocol Settings*:
 - a. Set **Serial Port Protocol** to **Raw-Data**.
 - b. Enable **Discard Rx Packets With Errors**.

General Protocol Settings

Serial Port Protocol:

Discard Rx Packets With Errors:

7. Set the *Raw-Data Message Transfer* mode:
 - Selecting **Data-Stream** enables asynchronous communication to the device.
 - Transmit data is sent immediately from all Modbus and active Application interfaces.
 - Received data will be returned to the Modbus interface and all active Application interfaces.
 - If **Data-Stream** is selected, the rest of the options in this section are N/A (not applicable).
 - Selecting **Command/Response** enables synchronous communications with the device.
 - Transmit data will expect one or more responses.
 - Responses will only be returned to the transmit message originator.

If **Command/Response** is selected:

 - Set the **Response Timeout** to a valid timeout period for your device.
 - The **Cmd/Resp Age Time** will set the time at which old responses to the Modbus interface are discarded.
 - The **Cmd/Resp Expected Responses Per Command** indicates the number of responses expected per transmitted message. This is typically 1.

- Set the **Cmd/Resp Mode Response To Modbus/TCP Based On** option to:
 - **IP-Address** if there is only one Modbus/TCP interface per IP-Address communicating to this port. This is typically used for PLC or single OPC Server/SCADA systems.
 - **TCP-Connection** if there is more than one Modbus/TCP interface per IP-Address communicating to this port. This typically is required for multiple OPC Server/ SCADA systems running on the same computer.

Modbus Slave and Raw-Data Device Settings

Response Timeout: (ms)

Modbus Slaves Only

Lost Device Search Enable:

Raw-Data Only

Raw-Data Message Transfer Mode:

Cmd/Resp Age Time, Discard Responses After: (sec)

Cmd/Resp Expected Responses Per Command:

Cmd/Resp Mode Response To Modbus/TCP Based On:

8. Set up the serial packet identification (*Serial Packet ID Settings (Raw Data Only)*).

- Set the **STX (Start of transmission) Rx Detect** in decimal format.
- Set the **ETX (End of transmission) Rx Detect** in decimal format. Refer to your serial device's User Manual for these settings.
- Enable the **Strip Rx STX/ETX** option if you do not want the STX and ETX bytes returned to the PLC or application.
- If desired, set the **STX (Start of transmission) Tx Append** in decimal format. This will append the STX byte(s) to transmitted messages from the PLC or application.
- If desired, set the **ETX (End of transmission) Tx Append** in decimal format. This will append the ETX byte(s) to transmitted messages from the PLC or application.

Serial Packet ID Settings (Raw-Data Only)

STX (Start of Transmission) Rx Detect: Byte 1: Byte 2:

ETX (End of Transmission) Rx Detect: Byte 1: Byte 2:

PLC Specific Settings

STX (Start of Transmission) Tx Append: Byte 1: Byte 2:

ETX (End of Transmission) Tx Append: Byte 1: Byte 2:

Strip Rx STX/ETX:

Application Specific Settings

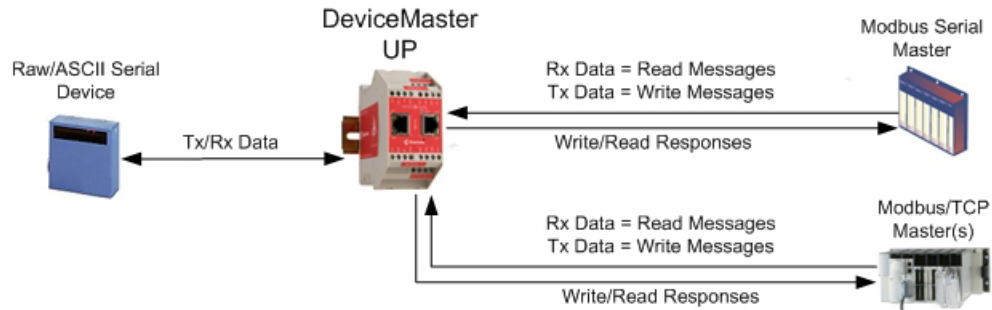
STX (Start of Transmission) Tx Append: Byte 1: Byte 2:

ETX (End of Transmission) Tx Append: Byte 1: Byte 2:

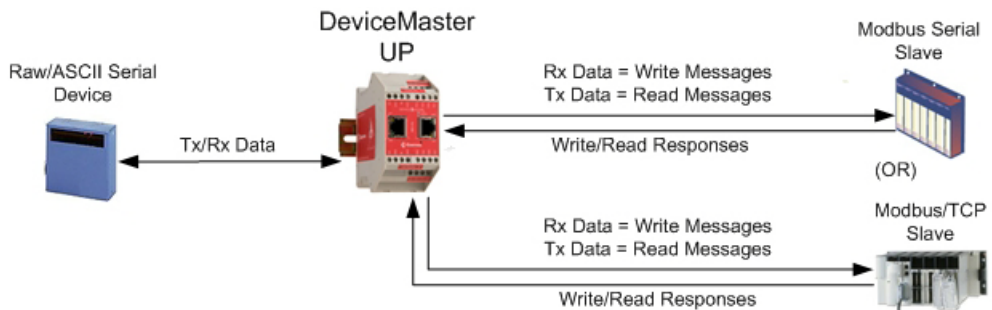
Strip Rx STX/ETX:

9. Configure the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* settings for your environment using one of the following methods.

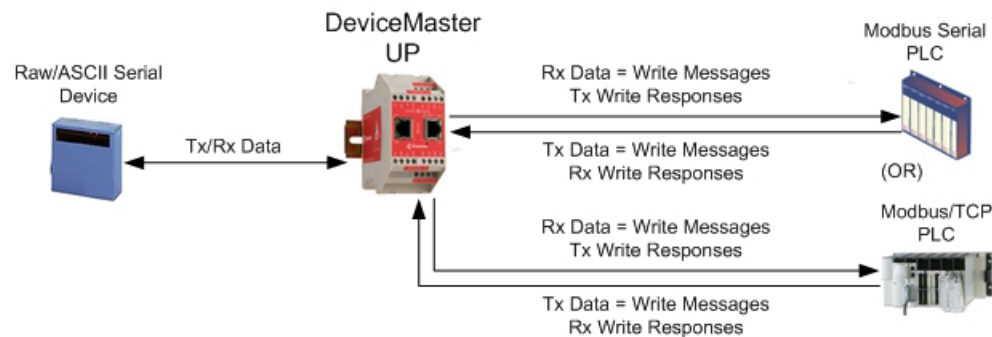
- **PLC Master/DeviceMaster UP Slave** mode. You can use the *PLC Master/DeviceMaster UP Slave* method only if your PLC can operate as a Modbus/TCP master, Modbus/RTU serial master, or Modbus/ASCII serial master. Go to Step [10](#) on Page 36 for configuration procedures.



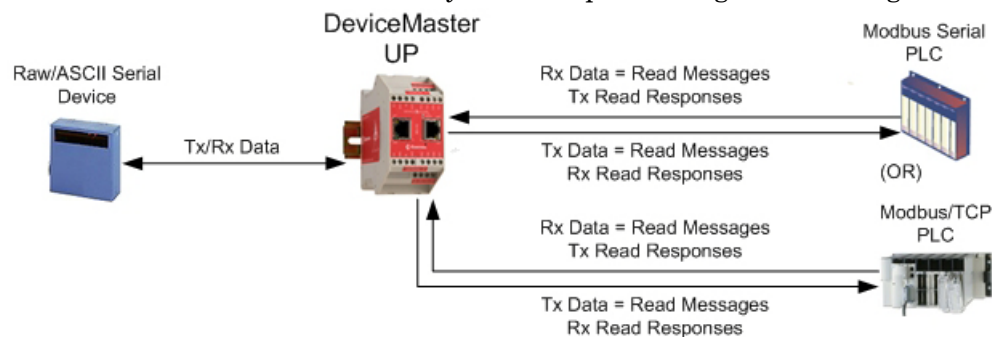
- **PLC Slave/DeviceMaster UP Master** mode. You can use the *PLC Slave/DeviceMaster UP Master* method only if your PLC can operate as a Modbus/TCP slave, Modbus/RTU serial slave, or Modbus/ASCII serial slave. Go to Step [11](#) on Page 37 for configuration procedures.



- **Dual Master - Write** mode. You can use *Dual Master - Write* method only if your PLC can operate as a Modbus master and slave simultaneously. Go to Step [12](#) on Page 39 for configuration procedures.



- **Dual Master - Read** mode. You can use *Dual Master - Read* method only if your PLC can operate as a Modbus master and slave simultaneously. Go to Step [13](#) on Page 40 for configuration procedures.



10. PLC Master/DeviceMaster UP Slave Mode Only:

Use the following procedure to configure *PLC Master/DeviceMaster UP Slave* mode.

- a. Set **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- b. Set **Tx (From PLC) Transfer Mode** to **Slave (PLC Writes)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in **Slave Rx Mode**.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)
- h. Set the **Disable Tx Sequence Number Check** option if you want to disable the transmit sequence number checking.
 - If selected, the transmit sequence number checking is disabled. All transmit messages will be transmitted if the sequence number has been incremented or not.
 - If not selected, the sequence number is checked and the message will only be transmitted if the sequence number has been incremented.

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Slave (PLC Polls) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

- i. Go to Step [14](#) on Page 41 to complete configuration.

11. PLC Slave/DeviceMaster UP Master Mode Only:

Use the following procedure to configure *PLC Slave / DeviceMaster UP Master* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- a. Set **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set **Tx (From PLC) Transfer Mode** to **Master (Poll the PLC)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 1518 bytes in **Master Rx Mode**.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▾
Tx (From PLC) Transfer Mode:	Master (Poll the PLC) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under the *Modbus/TCP Master Rx/TX Settings (Raw-Data Only)* section:

- h. Enter the **PLC IP Address**:
 - For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*
- i. Enter the **PLC Device ID**:
 - For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*
- j. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- k. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.
- l. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage.
- m. Set the **PLC Tx Data Address** to the PLC memory address at which to request the transmit data message. This is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- n. Set the **PLC Tx Poll Rate** to the rate at which you would like the DeviceMaster UP to poll for

transmit messages. If **Tx Sequence Number Syncing** is disabled, this rate must be faster than the rate at which you wish to transmit data. If not, transmit messages will be lost.

- o. Set the **PLC Tx Poll Message Length** to the length in bytes of your longest transmit data packet plus four bytes for the sequence number and length parameters at the start of the transmit message (maximum of 250 bytes). Any additional bytes requested will be left unused.
- p. If you wish to enable synchronization of the transmit data messages between the PLC and the DeviceMaster UP:
 - Enable **Tx Sequence Number Syncing Enable**.
 - Set the **PLC Tx Consumed Sequence Address** to the PLC memory address at which you wish the DeviceMaster UP to write the transmit consumed sequence number. This memory address must point to a 16-bit word and, like the other address definitions, is base 1. When the Tx Produced Sequence Number (at the **PLC Tx Data Address**) and this consumed sequence number are equal, the DeviceMaster UP has transmitted the last message and is ready for the next transmit message.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID: (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address: (Base 1)

Maximum PLC Update Rate: (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address: (Base 1)

PLC Tx Poll Rate: (msec)

PLC Tx Poll Message Length: (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address: (Base 1)

Note: Go to Step [14](#) on Page 41 to complete configuration.

12. *Dual Master – Write Mode Only:*

Use the following procedure to configure *Dual Master – Write* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- a. Set the **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set the **Tx (From PLC) Transfer Mode** to **Slave (PLC Writes)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 1518 bytes in Master Rx Mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be returned.)
- h. Set the **Disable Tx Sequence Number Check** option if you want to disable the transmit sequence number checking.
 - If selected, the transmit sequence number checking is disabled. All transmit messages will be transmitted if the sequence number has been incremented or not.
 - If not selected, the sequence number is checked and the message will only be transmitted if the sequence number has been updated.

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▼
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▼
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▼
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under the *Modbus/TCP Master Rx/TX Settings (Raw-Data Only)* section:

- i. Set the **PLC IP Address** to that of your PLC in *xxx.xxx.xxx.xxx* format.
- j. Set the **PLC Device ID** to that of your PLC. This is typically 1.
- k. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- l. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.

- m. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID: (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address: (Base 1)

Maximum PLC Update Rate: (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address: (Base 1)

PLC Tx Poll Rate: (msec)

PLC Tx Poll Message Length: (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address: (Base 1)

Note: Go to Step [14](#) on Page 41 to complete configuration.

13. Dual Master – Read Mode Only:

Use the following procedure to configure *Dual Master – Read* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- Set the **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- Set the **Tx (From PLC) Transfer Mode** to **Master (Poll the PLC)**.
- Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in *Slave Rx Mode*.
- Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- Set **Rx MS Byte First** if you want to receive data most significant byte first.
- Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:

Tx (From PLC) Transfer Mode:

Maximum Rx Data Packet Size: (bytes)

Oversized Rx Packet Handling:

Rx MS Byte First:

Tx MS Byte First:

Disable Non-Filtered To PLC Rx Queue (Data-Stream only):

Disable Tx Sequence Number Check:

Under the *Modbus/TCP Master Rx/TX Settings (Raw-Data Only)* section:

h. Enter the **PLC IP Address**:

- For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*

i. Enter the **PLC Device ID**:

- For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
- For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*

j. Set the **PLC Tx Data Address** to the PLC memory address at which to request the transmit data message. This is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.

k. Set the **PLC Tx Poll Rate** to the rate at which you would like the DeviceMaster UP to poll for transmit messages. If **Tx Sequence Number Syncing** is disabled, this rate must be faster than the rate at which you wish to transmit data. If not, transmit messages will be lost.

l. Set the **PLC Tx Poll Message Length** to the length in bytes of your longest transmit data packet plus four bytes for the sequence number and length parameters at the start of the transmit message (maximum of 250 bytes). Any additional bytes requested will be left unused.

m. If you wish to enable synchronization of the transmit data messages between the PLC and the DeviceMaster UP:

- Enable **Tx Sequence Number Syncing Enable**.
- Set the **PLC Tx Consumed Sequence Address** to the PLC memory address at which you wish the DeviceMaster UP to write the transmit consumed sequence number. This memory address must point to a 16-bit word and, like the other address definitions, is base 1. When the Tx Produced Sequence Number (at the **PLC Tx Data Address**) and this consumed sequence number are equal, the DeviceMaster UP has transmitted the last message and is ready for the next transmit message.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID: (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address: (Base 1)

Maximum PLC Update Rate: (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address: (Base 1)

PLC Tx Poll Rate: (msec)

PLC Tx Poll Message Length: (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address: (Base 1)

14. Set up the filtering/data extraction settings:

- If no filtering/data extraction is required, leave all filtering/data extraction settings to defaults (off).
- If filtering/data extraction is required, see [Chapter 5. Filtering / Data Extraction Configuration](#) on Page 57.

15. Set up the application socket interface settings:

- If no application socket interface is required, leave all application socket interface settings at defaults and the application **Enable** option unselected.
- If an application socket interface is required, see [Chapter 6. Application Socket Configuration](#) on Page 63.

16. Verify **Reset Port** and **Save in Flash** are selected and click **Submit**.

4.2.2. Modbus Addressing

The DeviceMaster UP serial port data addressing used for slave modes:

Serial Port Raw/ ASCII Addressing	Serial Port 1	Serial Port 2	Serial Port 3	Serial Port 4	Access Rule
Unit ID	255 (FF Hex)	255 (FF Hex)	255 (FF Hex)	255 (FF Hex)	N/A
Receive Data Address	1000 (Base 0) 1001 (Base 1)	2000 (Base 0) 2001 (Base 1)	3000 (Base 0) 3001 (Base 1)	4000 (Base 0) 4001 (Base 1)	Read Only
Transmit Data Address	1300 (Base 0) 1301 (Base 1)	2300 (Base 0) 2301 (Base 1)	3300 (Base 0) 3301 (Base 1)	4300 (Base 0) 4301 (Base 1)	Read/Write

4.2.3. Receive and Transmit Message Formats

The format of received serial data messages sent to or returned from the PLC:

Name	Data Type	Data Value(s)	Access Rule
Receive (DeviceMaster UP to PLC) message data. Structure of: Produced data sequence Data length (in bytes) Data array	 WORD WORD Array of WORD	 0-65535 (FFFF Hex) 1-1024 (Master Rx Mode) 0-246 (Slave Rx Mode) 0-65535	 Read

General requirements:

- The memory area must be defined in 16 bit words and large enough to handle the largest serial packet plus two words for the produced sequence number and data length parameters.
- The **Maximum Rx Data Packet Size** must be set large enough to accept the largest possible packet.

For large received data packets over 246 bytes (This may be less for your PLC):

- The **Rx (To PLC) Transfer Mode** must be set to **Master (Write to PLC)**.
- The data will automatically be placed in continuous memory.
- All data will have been transferred to the PLC when the sequence number is updated.

The format of the transmit serial data received from the PLC:

Name	Data Type	Data Value(s)	Access Rule
Transmit (PLC to DeviceMaster UP) message data. Structure of: Produced data sequence Data length (in bytes) Data array	WORD WORD Array of WORD	0-65535 (FFFF Hex) 1-236 (Slave Mode) 1-246 (Master Mode) 0-65535	Read/Write

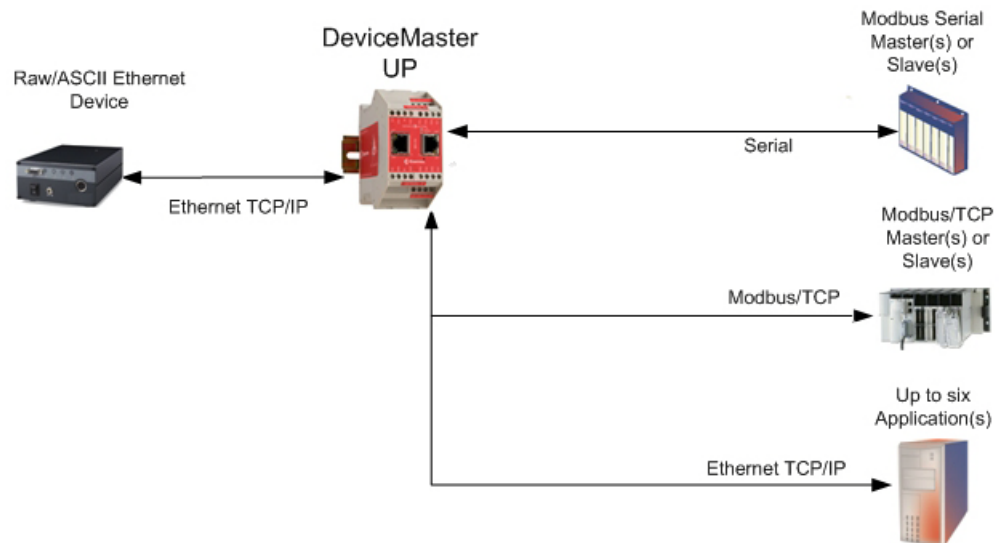
Transmit messages have the following characteristics:

- All data is transferred in 16 bit words.
- If operating in Tx (From PLC) Transfer Mode of Master (Poll the PLC): The sequence number must be incremented when there is new data to transmit.
- If operating in Tx (From PLC) Transfer Mode of Slave (PLC Writes): The sequence number must be incremented when there is new data to transmit only if the Disable Tx Sequence Number Check is not selected.
- The data length field indicates the number of valid bytes contained in this message.
- The actual length of the message received from a PLC may contain extra, unused data.
- Unused data is ignored.
- A request for transmit data returns the last transmit data message.

4.3. Read/Write Raw/ASCII Ethernet Devices

Read/write raw/ASCII Ethernet devices use the *Ethernet Device Configuration* page to:

- Allow connections between an Ethernet device, such as a barcode scanner, RFID reader, or weigh scale, and a PLC and/or an application.
- Raw/ASCII data is the only supported data type.
- The Ethernet device must support Ethernet TCP socket connections.



Note: *The PLC and applications can both communicate to the Ethernet device, but they cannot communicate directly to each other.*

4.3.1. Embedded Web Page Configuration

Use the following procedure to configure read/write Ethernet devices.

1. Select the **Web Mgr** button on the PortVision Plus toolbar or open an Internet browser and type the DeviceMaster UP IP address.
If you are using Internet Explorer and it does not display the web page correctly, please do the following:
 - a. Click **Tools** and **Internet Options...**
 - b. Click the **Clear History** button.
 - c. Click the **Delete Files...** button.
 - d. Click **Refresh** when you return to your browser.
2. Click the **Ethernet Device Configuration** option to open the *Ethernet Device Configuration* page.

Note: *The Ethernet device must be a target Ethernet device such as a barcode scanner, RFID reader, weigh scale, or some other device that is to be connected to a PLC and/or application.*

3. Click **Socket N** for the port that you want to configure.



Ethernet Device Configuration (Raw-Data Only)

- [Server Configuration Home](#)
- [Serial Device Configuration](#)
- [Communication Statistics](#)
- [PLC Interface Diagnostics](#)
- [Display Ethernet Device Logs](#)

Socket 1

Click the socket number you want to configure.

4. If desired, enter an *Ethernet Interface Name*.

Ethernet Interface Name: (80 chars max)
Note: Valid chars are a-z, A-Z, 0-9, underscores, spaces, and dashes.

5. Click **Enable** under *Device TCP Connection Configuration* and configure the settings for your environment using one of the following procedures.

- If your Ethernet TCP/IP Device requires another device to connect to it, configure the socket port on the DeviceMaster UP to **Connect** mode:
 - Leave **Listen** unselected.
 - Set **Connect To Mode** to **Connect-Always**.
 - Set the **Connect Port** to the socket port number of your Ethernet device.
 - Set the **Connect IP Address** to the IP Address of your Ethernet device.

Device TCP Connection Configuration

Enable:

Listen:

Listen Port:

Connect To Mode: Connect-Always

Connect Port:

Connect IP Address:

Disconnect Mode: Never

Idle Timer: (msec)

Connect Mode Set Up

Do not enter the IP address of the DeviceMaster UP or PLC here.

- Set **Disconnect Mode** to **Never**.
- If your Ethernet TCP/IP Device is configured to connect to another device, configure the socket port on the DeviceMaster UP to **Listen** mode:
 - Select **Listen**.
 - Use the default **Listen Port** on the DeviceMaster UP of 8xxx or designate your own.
 - Set **Connect To Mode** to **Never**.
 - Set **Disconnect Mode** to **Never**.
 - Configure your Ethernet device to connect to the DeviceMaster UP at the DeviceMaster UP IP address and **Listen Port**.

Device TCP Connection Configuration

Enable:

Listen:

Listen Port:

Connect To Mode: Never

Connect Port:

Connect IP Address:

Disconnect Mode: Never

Idle Timer: (msec)

Listen Mode Set Up

- If you do not know if your device will connect to another Ethernet device, but do know your device’s socket port and IP address, you can do the following to enable both the **Listen** and **Connect** modes:

Device TCP Connection Configuration

Enable:
 Listen:
 Listen Port:
 Connect To Mode:
 Connect Port:
 Connect IP Address:
 Disconnect Mode:
 Idle Timer: (msec)

- Select **Listen**.
- Use the default **Listen Port** on the DeviceMaster UP of 8xxx or designate your own.
- Set **Connect To Mode** to **Connect-Always**.
- Set the **Connect Port** to the port number of your Ethernet device.
- Set the **Connect IP Address** to the IP address of your Ethernet device.

Listen and Connect Modes Set Up

Do not enter the IP address of the DeviceMaster UP or PLC here.

- Set **Disconnect Mode** to **Never**.
- Optionally configure your Ethernet device to connect to the DeviceMaster UP at the DeviceMaster UP IP Address and **Listen Port**.

6. Set the *Message Transfer* mode:

- Selecting **Data-Stream** will enable asynchronous communication to the device.
 - Transmit data will be sent immediately from all Modbus and active Application interfaces.
 - Received data will be returned to the Modbus interface and all active Application interfaces.
 - If **Data-Stream** is selected, the rest of the options in this section are N/A (not applicable).
- Selecting **Command/Response** will enable synchronous communications with the device.
 - Transmit data will expect one or more responses.
 - Responses will only be returned to the transmit message originator.

If **Command/Response** is selected:

- Set the **Cmd/Resp Response Timeout** to a valid timeout period for your device.
- The **Cmd/Resp Age Time** will set the time at which old responses to the Modbus interface are discarded.
- The **Cmd/Resp Expected Responses Per Command** indicates the number of responses expected per transmitted message. This is typically 1.
- Set the **Cmd/Resp Mode Response To Modbus/TCP Based On** option to:
 - **IP-Address** if there is only one Modbus/TCP interface per IP-Address communicating to this port. This is typically used for PLC or single OPC Server/SCADA systems.
 - **TCP-Connection** if there is more than one Modbus/TCP interface per IP-Address communicating to this port. This typically is required for multiple OPC Server/ SCADA systems running on the same computer.

Message Transfer Settings

Message Transfer Mode:
 Cmd/Resp Response Timeout: (ms)
 Cmd/Resp Age Time, Discard Responses After: (sec)
 Cmd/Resp Expected Responses Per Command:
 Cmd/Resp Response To Modbus/TCP Based On:

7. Set up the *Socket Packet Identification*.

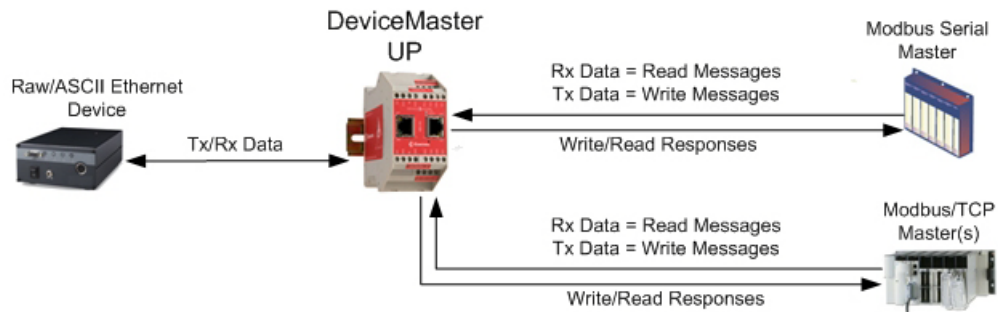
Socket Packet ID Settings	
Rx Timeout Between Packets:	<input type="text" value="0"/> (ms)
STX (Start of Transmission) Rx Detect:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Rx Detect:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
PLC Specific Settings	
STX (Start of Transmission) Tx Append:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Tx Append:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
Strip Rx STX/ETX:	<input type="checkbox"/>
Application Specific Settings	
STX (Start of Transmission) Tx Append:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
ETX (End of Transmission) Tx Append:	none <input type="button" value="v"/> Byte 1: <input type="text"/> Byte 2: <input type="text"/> (dec)
Strip Rx STX/ETX:	<input type="checkbox"/>

- a. Set the **Rx Timeout Between Packets**. Set to zero to stream data with the **Rx STX/ETX Detect** settings set to none. For normal settings, typical values are 10 to 50 ms.
- b. Set the **STX (Start of transmission) Rx Detect** in decimal format.
- c. Set the **ETX (End of transmission) Rx Detect** in decimal format.
- d. Enable the **Strip Rx STX/ETX** option if you do not want the STX and ETX bytes returned to the PLC or application.

Note: Please refer to your device's User Manual for the Start and End of Transmission byte(s) settings. You may also be able to use the Ethernet Device Interface Logs page to determine these settings.

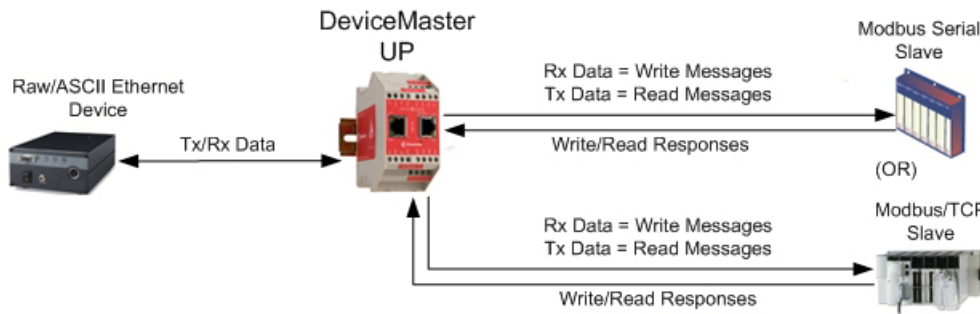
8. Configure the *Modbus/TCP Settings* for your environment using one of the following methods.

- **PLC master/DeviceMaster UP Slave** mode, go to Step 9 on Page 49 for configuration procedures.



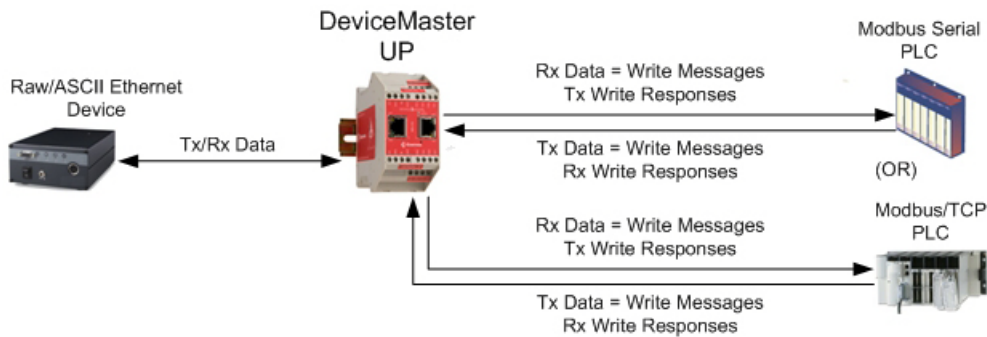
Note: You can use the **PLC Master/DeviceMaster UP Slave** method only if your PLC can operate as a Modbus/TCP master, Modbus/RTU serial master, or Modbus/ASCII serial master.

- **PLC slave/DeviceMaster UP Master** mode, go to Step [10](#) on Page 50 for configuration procedures.



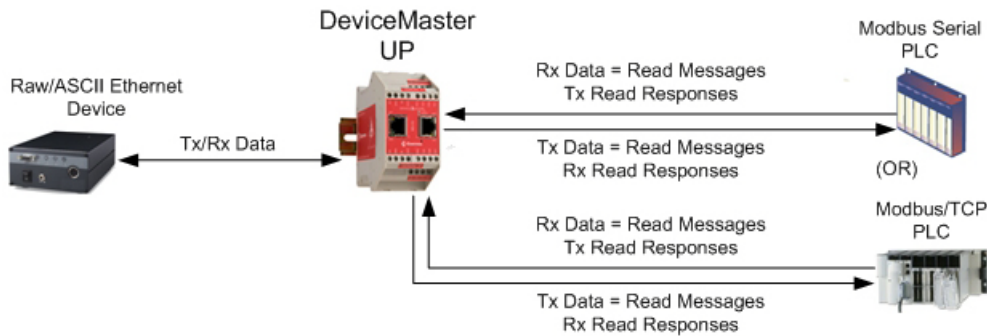
Note: You can use the **PLC Slave/DeviceMaster UP Master** method only if your PLC can operate as a Modbus/TCP slave, Modbus/RTU serial slave, or Modbus/ASCII serial slave.

- **Dual Master - Write** mode, go to Step [11](#) on Page 52 for configuration procedures.



Note: You can use the **Dual Master - Write** method only if your PLC can operate as a Modbus master and slave, simultaneously.

- **Dual Master - Read** mode, go to Step [12](#) on Page 54 for configuration procedures.



Note: You can use the **Dual Master - Read** method only if your PLC can operate as a Modbus master and slave, simultaneously.

9. *PLC Master/DeviceMaster UP Slave Mode Only:*

Use the following procedure to configure *PLC Master/DeviceMaster UP Slave* mode.

- a. Set **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- b. Set **Tx (From PLC) Transfer Mode** to **Slave (PLC Writes)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in Slave Rx mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)
- h. Set the **Disable Tx Sequence Number Check** option if you want to disable the transmit sequence number checking.
 - If selected, the transmit sequence number checking is disabled. All transmit messages will be transmitted if the sequence number has been incremented or not.
 - If not selected, the sequence number is checked and the message will only be transmitted if the sequence number has been updated.

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Slave (PLC Polls) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Note: Go to Step [13](#) on Page 55 to complete configuration.

10. PLC Slave/DeviceMaster UP Master Mode Only:

Use the following procedure to configure *PLC Slave/DeviceMaster UP Master* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- a. Set **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set **Tx (From PLC) Transfer Mode** to **Master (Poll the PLC)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 2048 bytes in Master Rx mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▼
Tx (From PLC) Transfer Mode:	Master (Poll the PLC) ▼
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▼
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under the *Modbus/TCP Master Rx/Tx Settings (Raw-Data only)* section:

- h. Enter the **PLC IP Address**:
 - For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*
- i. Enter the **PLC Device ID**:
 - For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*
- j. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- k. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.
- l. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage.
- m. Set the **PLC Tx Data Address** to the PLC memory address at which to request the transmit data message. This is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.

- n. Set the **PLC Tx Poll Rate** to the rate at which you would like the DeviceMaster UP to poll for transmit messages. If **Tx Sequence Number Syncing** is disabled, this rate must be faster than the rate at which you wish to transmit data. If not, transmit messages will be lost.
- o. Set the **PLC Tx Poll Message Length** to the length in bytes of your longest transmit data packet plus four bytes for the sequence number and length parameters at the start of the transmit message (maximum of 250 bytes). Any additional bytes requested will be left unused.
- p. If you wish to enable synchronization of the transmit data messages between the PLC and the DeviceMaster UP:
 - Enable **Tx Sequence Number Syncing Enable**.
 - Set the **PLC Tx Consumed Sequence Address** to the PLC memory address at which you wish the DeviceMaster UP to write the transmit consumed sequence number. This memory address must point to a 16-bit word and, like the other address definitions, is base 1. When the Tx Produced Sequence Number (at the **PLC Tx Data Address**) and this consumed sequence number are equal, the DeviceMaster UP has transmitted the last message and is ready for the next transmit message.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID:

 (1-255, 0=broac

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address:

 (B:

Maximum PLC Update Rate:

 (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address:

 (B:

PLC Tx Poll Rate:

 (msec)

PLC Tx Poll Message Length:

 (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address:

 (B:*Note: Go to Step [13](#) on Page 55 to complete configuration.*

11. *Dual Master – Write Mode Only:*

Use the following procedure to configure *Dual Master - Write* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- a. Set the **Rx (To PLC) Transfer Mode** to **Master (Write to PLC)**.
- b. Set the **Tx (From PLC) Transfer Mode** to **Slave (PLC Writes)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 2048 bytes in Master Rx mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received during the **Maximum PLC Update Rate** time period, only the last received data packet will be returned.)
- h. Set the **Disable Tx Sequence Number Check** option if you want to disable the transmit sequence number checking.
 - If selected, the transmit sequence number checking is disabled. All transmit messages will be transmitted if the sequence number has been incremented or not.
 - If not selected, the sequence number is checked and the message will only be transmitted if the sequence number has been updated.

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Master (Write to PLC) ▾
Tx (From PLC) Transfer Mode:	Slave (PLC Writes) ▾
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▾
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under the *Modbus/TCP Master Rx/Tx Settings (Raw-Data only)* section:

- i. Enter the **PLC IP Address**:
 - For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*
- j. Enter the **PLC Device ID**:
 - For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*
- k. Set the **PLC Rx Data Address** to the PLC memory address where you want to place the received data message. This address is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- l. Set the **Maximum PLC Update Rate** to the fastest rate your PLC can reliably receive and process data. This is typically longer than the scan rate. The default of 40 milliseconds is usually sufficient, but your system may require a longer time period.
- m. Set the **Use Maximum Sized Modbus Messages** option if you are receiving messages over 196 bytes, your PLC can receive messages larger than 200 bytes, and you want to decrease latency and network usage.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:
PLC Device ID: (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address: (Base 1)
Maximum PLC Update Rate: (msec)
Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address: (Base 1)
PLC Tx Poll Rate: (msec)
PLC Tx Poll Message Length: (bytes)
Tx Sequence Number Syncing Enable:
PLC Tx Consumed Sequence Number Address: (Base 1)

Note: Go to Step [13](#) on Page 55 to complete configuration.

12. Dual Master - Read Mode Only:

Use the following procedure to configure *Dual Master - Read* mode.

Under the *Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)* section:

- a. Set the **Rx (To PLC) Transfer Mode** to **Slave (PLC Polls)**.
- b. Set the **Tx (From PLC) Transfer Mode** to **Master (Poll the PLC)**.
- c. Set the **Maximum Rx Data Packet Size** to that of the largest expected receive data packet. This can be a maximum of 246 bytes in Slave Rx mode.
- d. Set the **Oversized Rx Packet Handling** to either **Truncate** or **Drop**, depending how you want to handle oversized received packets.
- e. Set **Rx MS Byte First** if you want to receive data most significant byte first.
- f. Set **Tx MS Byte First** if you want to transmit data most significant byte first.
- g. Set the **Disable Non-Filtered To PLC Rx Queue** option if you only want to receive the last received data packet. (If two or more packets are received between received data requests, only the last received data packet will be returned.)

Serial Modbus Master and Modbus/TCP Settings (Raw-Data Only)

Rx (To PLC) Transfer Mode:	Slave (PLC Polls) ▼
Tx (From PLC) Transfer Mode:	Master (Poll the PLC) ▼
Maximum Rx Data Packet Size:	246 (bytes)
Oversized Rx Packet Handling:	Truncate ▼
Rx MS Byte First:	<input type="checkbox"/>
Tx MS Byte First:	<input type="checkbox"/>
Disable Non-Filtered To PLC Rx Queue (Data-Stream only):	<input type="checkbox"/>
Disable Tx Sequence Number Check:	<input type="checkbox"/>

Under the *Modbus/TCP Master Rx/Tx Settings (Raw-Data only)* section:

- h. Enter the **PLC IP Address**:
 - For *Modbus/TCP slaves*, set the PLC IP Address to that of your PLC in xxx.xxx.xxx.xxx format.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC IP Address to that of this DeviceMaster UP in xxx.xxx.xxx.xxx format.

Note: *The Modbus serial slave must be attached to one of the serial ports on this DeviceMaster UP chassis.*
- i. Enter the **PLC Device ID**:
 - For *Modbus/TCP slaves*, set the PLC Device ID to that of your PLC. This is typically 1.
 - For *Modbus/RTU* or *Modbus/ASCII serial slaves*, set the PLC Device ID to that of the serial slave device.

Note: *This must be a unique device id attached to this DeviceMaster UP chassis.*
- j. Set the **PLC Tx Data Address** to the PLC memory address at which to request the transmit data message. This is Base 1, which means the address starts at 1 (or 400001 for some PLCs). If your address range is Base 0, or starts at zero, you will need to add one to your address.
- k. Set the **PLC Tx Poll Rate** to the rate at which you would like the DeviceMaster UP to poll for transmit messages. If **Tx Sequence Number Syncing** is disabled, this rate must be faster than the rate at which you wish to transmit data. If not, transmit messages will be lost.
- l. Set the **PLC Tx Poll Message Length** to the length in bytes of your longest transmit data packet plus four bytes for the sequence number and length parameters at the start of the transmit message (maximum of 250 bytes). Any additional bytes requested will be left unused.

m. If you wish to enable synchronization of the transmit data messages between the PLC and the DeviceMaster UP:

- Enable **Tx Sequence Number Syncing Enable**.
- Set the **PLC Tx Consumed Sequence Address** to the PLC memory address at which you wish the DeviceMaster UP to write the transmit consumed sequence number. This memory address must point to a 16-bit word and, like the other address definitions, is base 1. When the Tx Produced Sequence Number (at the **PLC Tx Data Address**) and this consumed sequence number are equal, the DeviceMaster UP has transmitted the last message and is ready for the next transmit message.

Modbus/TCP Master Rx/Tx Settings (Raw-Data only)

PLC IP Address:

PLC Device ID: (1-255, 0=broadcast)

Note: Use gateway's IP Address to access local Modbus Slaves.

Master Rx Mode Only

PLC Rx Data Address: (Base 1)

Maximum PLC Update Rate: (msec)

Use Maximum Sized Modbus Messages:

Master Tx Mode Only

PLC Tx Data Address: (Base 1)

PLC Tx Poll Rate: (msec)

PLC Tx Poll Message Length: (bytes)

Tx Sequence Number Syncing Enable:

PLC Tx Consumed Sequence Number Address: (Base 1)

13. Set up the *Filtering / Data Extraction Configuration* settings:

- If no filtering/data extraction is required, leave all filtering/data extraction settings to defaults (off).
- If filtering/data extraction is required, see [Chapter 5. Filtering / Data Extraction Configuration](#) on Page 57.

14. Set up the *Application TCP Connection Configuration* settings:

- If no application socket interface is required, leave all application socket interface settings at defaults and the application **Enable** option unselected.
- If an application socket interface is required, see [Chapter 6. Application Socket Configuration](#) on Page 63.

15. Verify **Reset Port** and **Save in Flash** are selected and click **Submit**.

4.3.2. Modbus Addressing

The DeviceMaster UP socket port data addressing used for slave modes:

Socket Port Raw/ASCII Addressing	Socket Port 1	Socket Port 2	Socket Port 3	Socket Port 4	Access Rule
Unit ID	254 (FF Hex)	254 (FF Hex)	254 (FF Hex)	254 (FF Hex)	N/A
Receive Data Address	1000 (Base 0) 1001 (Base 1)	2000 (Base 0) 2001 (Base 1)	3000 (Base 0) 3001 (Base 1)	4000 (Base 0) 4001 (Base 1)	Read Only
Transmit Data Address	1300 (Base 0) 1301 (Base 1)	2300 (Base 0) 2301 (Base 1)	3300 (Base 0) 3301 (Base 1)	4300 (Base 0) 4301 (Base 1)	Read/Write

4.3.3. Receive and Transmit Message Formats

The format of received serial data sent to or returned to the PLC:

Name	Data Type	Data Value(s)	Access Rule
Receive (DeviceMaster UP to PLC) message data. Structure of: Produced data sequence Data length (in bytes) Data array	WORD WORD Array of WORD	0-65535 (FFFF Hex) 1-2048 (Master Rx Mode) 0-246 (Slave Rx Mode) 0-65535	Read

General requirements:

- The memory area must be defined in 16 bit words and large enough to handle the largest serial packet plus two words for the produced sequence number and data length parameters.
- The **Maximum Rx Data Packet Size** must be set large enough to accept the largest possible packet.

For large received data packets over 246 bytes (This may be less for your PLC):

- The **Rx (To PLC) Transfer Mode** must be set to **Master (Write to PLC)**.
- The data will automatically be placed in continuous memory.
- All data will have been transferred to the PLC when the sequence number is updated.

The format of the transmit serial data received from the PLC:

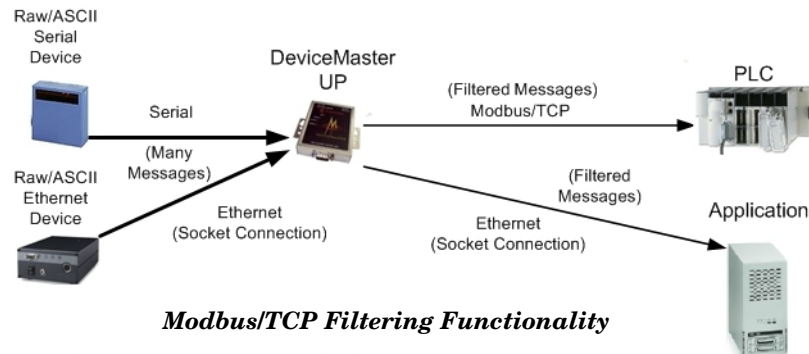
Name	Data Type	Data Value(s)	Access Rule
Transmit (PLC to DeviceMaster UP) message data. Structure of: Produced data sequence Data length (in bytes) Data array	WORD WORD Array of WORD	0-65535 (FFFF Hex) 1-236 (Slave Mode) 1-246 (Master Mode) 0-65535	Read/Write

Transmit messages have the following characteristics:

- All data is transferred in 16 bit words.
- If operating in **Tx (From PLC) Transfer** mode of *Master (Poll the PLC)*: The sequence number must be incremented when there is new data to transmit.
- If operating in **Tx (From PLC) Transfer** mode of *Slave (PLC Writes)*: The sequence number must be incremented when there is new data to transmit only if the **Disable Tx Sequence Number Check** is not selected.
- The data length field indicates the number of valid bytes contained in this message.
- The actual length of the message received from a PLC may contain extra, unused data.
- Unused data is ignored.
- A request for transmit data returns the last transmit data message.

Chapter 5. Filtering/Data Extraction Configuration

The filtering/data extraction configuration provided for each serial and Ethernet interface port provides filtering for string, RFID, and barcode data. It also extracts the various parameters from EPCglobal RFID tag and UPC/EAN barcode data. This feature is intended to greatly simplify both PLC and application programming tasks.



Select your filtering modes:

- Use **String Filtering** if:
 - Your received data can be no greater than 128 bytes in length.
 - Your received data is not in EPCglobal or Barcode UPC/EAN formats or you do not want the DeviceMaster UP to extract the RFID tag or Barcode parameters.
 - You want to filter and eliminate duplicate received messages.
- Use **RFID Filtering** if:
 - You have an Alien or Intermec RFID reader or another reader that can provide RFID tag data in ASCII Hexadecimal format similar to either an Alien or Intermec reader.
 - Your data is in EPCglobal format and you want the DeviceMaster UP to extract the RFID tag data parameters and filter based on those parameters.
- Use **Barcode Filtering** if your barcode data is in UPC-A, UPC-E, EAN-13, JAN, EAN-14, or EAN-8 formats and you want the DeviceMaster UP to extract the barcode data parameters and filter based on those parameters.

Filtering/Data Extraction Configuration

To PLC Filter Mode:

To PLC Filter Options (RFID Only):

 Antenna Filter Value Serial Number
 Company Product/Location Encoding/Numbering

To PLC Filter Options (RFID/Barcode):

To Application Filter Mode:

To Application Filter Options (RFID Only):

 Antenna Filter Value Serial Number
 Company Product/Location Encoding/Numbering

To Application Filter Options (RFID/Barcode):

RFID Antenna Grouping:

RFID Reader Interface Type:

Barcode UPC/EAN Standard 12-14 Digit Format:

Barcode UPC/EAN Eight Digit Format:

Filter Age Time (Time filtered after last read):

 (min) (sec) (msec)

Discard Unrecognized Data (RFID/Barcode):

5.1. PLC Filtering/Data Extraction

Use the following procedure to configure PLC filtering/data extraction. Under the *Filtering/Data Extraction Configuration* section corresponding to the desired serial or socket port:

1. Set **To PLC Filter Mode** to the desired mode.
2. For **String (128 char max)**, set the **Filter Age Time** to how long after the last read you want an entry to be filtered.
3. For **RFID (EPCglobal formats)**:
 - Set any or all of the **To PLC Filter Options (RFID Only)** filtering options.
 - Set any or all of the **To PLC Filter Options (RFID/Barcode)** filtering options.

Note: You must select at least one filtering option for filtering/data extraction to function.

- If **Antenna Grouping** is desired, set **RFID Antenna Grouping** option to reflect your antenna configuration.
- Set the **RFID Reader Interface Type** to that of your RFID Reader configuration. If your RFID Reader is not listed, refer to the *Filtering and Data Extraction Reference Manual* for the supported RFID reader interfaces. If your RFID reader format matches one the listed formats, then set the **RFID Reader Interface Type** to that format.
- Set the **Filter Age Time** to how long after the last read you want an entry to be filtered.
- If you want the DeviceMaster UP to discard any non-RFID tag messages, set the **Discard Unrecognized Data** to either **To-PLC** or **To-PLC/Application**.

Refer to the *Filtering and Data Extraction Reference Manual* for formatting and other information.

To PLC RFID Data Format

When the PLC interface is operating in RFID filtering mode, all data sent to the PLC will be in the following format:

Field	Data Type	Description
Produced data sequence number	UINT Values = 0-65535 (FFFF Hex)	Sequence number that is incremented with each new message.
Length of RFID message	UINT Values = 20-148	Length in bytes of following data.
Company Code	DWORD[2]	Company Code extracted from tag data. Depending on encoding scheme, this field may include Company Prefixes, Company Prefix Indexes, or Government Managed Identifier.
Product/Location Code	DWORD[2]	Product Code extracted from tag data. Depending on encoding scheme, this field may include the Item reference, location reference, asset reference, object class, or be set to zero.
Serial Number	DWORD[2]	Serial Number extracted from tag data. Depending on the encoding scheme, this field may include the Serial Number or individual asset reference.
Encoding Scheme	UINT	Encoding Scheme from tag data
Filtering Value	UINT	Filtering value from tag data
Antenna Number	UINT	Antenna number on RFID Reader/Scanner
Tag Data Length	UINT	Length of RFID tag string in bytes

Field	Data Type	Description
Tag Data	BYTE[128]	Tag data string (variable length field) May also include non-tag messages, which can optionally be sent to the PLC and/or application.

4. For **Barcode (UPC/EAN formats)**:

- Set any or all of the **To PLC Filter Options (RFID/Barcode)** filtering options. (You must select at least one for the filtering/data extraction to function.)
- If you are using standard twelve to fourteen-digit UPS/EAN barcodes, set the **Barcode UPC/EAN 12-14 Digit Format** to match that of your barcodes. The **Company-5/Product-5** is the most popular format.
- If you are using eight-digit UPC/EAN barcodes, set the **Barcode UPC/EAN 8 Digit Format** to match that of your barcodes.
- If you want the DeviceMaster UP to discard any non-RFID tag messages, set the **Discard Unrecognized Data** to either **To-PLC** or **To-PLC/Application**.
- Refer to the *Filtering and Data Extraction Reference Manual* for formatting and other information.

To PLC Barcode Data Format

When the PLC interface is operating in *Barcode Filtering* mode, all data sent to the PLC is in the following format:

Field	Size	Description
Produced data sequence number	UINT Values = 0-65535 (FFFF Hex)	Sequence number that is incremented with each new message.
Length	UINT Values = 12-140	Length in bytes of following data.
Company Code	DWORD	Company Code
Product Code	DWORD	Product Code
Numbering Code	UINT	Numbering Code (from first byte(s) of barcode data)
Barcode Data Length	UINT	Length of barcode string in bytes
Barcode Data	BYTE[128]	Barcode data string (variable length field)

Note: *The Company Code will be set to zero for all EAN-8 codes.*

5.2. Application Filtering/Data Extraction

Use the following procedure to configure application filtering/data extraction. Under the *Filtering/Data Extraction Configuration* section corresponding to the desired serial or socket port:

1. Set **To Application Filter Mode** to the desired mode.
2. For **String (128 char max)**: set the **Filter Age Time** to how long after the last read you want an entry to be filtered.
3. For **RFID (EPCglobal formats)**:
 - Set any or all of the **To Application Filter Options (RFID Only)** filtering options.
 - Set any or all of the **To Application Filter Options (RFID/Barcode)** filtering options.

Note: You must select at least one filtering option for filtering/data extraction to function.

- If Antenna Grouping is desired, set **RFID Antenna Grouping** option to reflect your antenna configuration.
- Set the **RFID Reader Interface Type** to that of your RFID Reader configuration. If your RFID Reader is not listed, please refer to the *Filtering and Data Extraction Reference Manual* for the supported RFID reader interfaces. If your RFID reader format matches one the listed formats, then set the **RFID Reader Interface Type** to that format.
- Set the **Filter Age Time** to how long after the last read you want an entry to be filtered.
- If you want the DeviceMaster UP to discard any non-RFID tag messages, set the **Discard Unrecognized Data** to either *To-Application* or *To-PLC/Application*.

Refer to the *Filtering and Data Extraction Reference Manual* for formatting and other information.

To Application RFID Data Format

When the application interface is operating in RFID filtering mode, all data sent to the application will be in the following format:

Field	Data Type	Description
Company Code	DWORD[2]	Company Code extracted from tag data. Depending on encoding scheme, this field may include Company Prefixes, Company Prefix Indexes, or Government Managed Identifier.
Product/Location Code	DWORD[2]	Product Code extracted from tag data Depending on encoding scheme, this field may include the Item reference, location reference, asset reference, object class, or be set to zero.
Serial Number	DWORD[2]	Serial Number extracted from tag data. Depending on the encoding scheme, this field may include the Serial Number or individual asset reference.
Encoding Scheme	UINT	Encoding Scheme from tag data
Filtering Value	UINT	Filtering value from tag data
Antenna Number	UINT	Antenna number on RFID Reader/Scanner
Tag Data Length	UINT	Length of RFID tag string in bytes

Note: The RFID parameters will be sent to the application in big-endian format. All parameters, with the exception of the Tag data string, will have to be byte-swapped for use on a little-endian system.

4. For **Barcode (UPC/EAN formats)**:

- Set any or all of the **To Application Filter Options (RFID/Barcode)** filtering options. (You must select at least one for the filtering/data extraction to function.)
- If you are using standard twelve to fourteen digit UPS/EAN barcodes, set the **Barcode UPC/EAN 12-14 Digit Format** to match that of your barcodes. The **Company-5/Product-5** is the most popular format.
- If you are using eight digit UPC/EAN barcodes, set the **Barcode UPC/EAN 8 Digit Format** to match that of your barcodes.
- If you want the DeviceMaster UP to discard any non-RFID tag messages, set the **Discard Unrecognized Data** to either **To-Application** or **To-PLC/Application**.

Refer to the *Filtering and Data Extraction Reference Manual* for formatting and other information.

To Application Barcode Data Format

When the application interface is operating in Barcode filtering mode, all data sent to the application will be in the following format:

Field	Size	Description
Company Code	DWORD	Company Code
Product Code	DWORD	Product Code
Numbering Code	UINT	Numbering Code (from first byte(s) of barcode data)
Barcode Data Length	UINT	Length of barcode string in bytes
Barcode Data	BYTE[128]	Barcode data string (variable length field)

Note: *The Company Code will be set to zero for all EAN-8 codes.*

The Barcode parameters will be sent to the application in big-endian format. All parameters, with the exception of the Barcode data string, will have to be byte-swapped for use on a little-endian system.

Chapter 6. Application Socket Configuration

Use the *Application Socket Configuration* connection only for connecting to an application such as a configuration, database, telnet, or a control application when you want to communicate to a serial or Ethernet device.

Please note the following:

- When the application socket is connected to an application, it will allow the application to send and receive data from the serial or Ethernet device.
- The application socket cannot send data directly to the PLC. Nor can the PLC send data directly to the application.
- If the PLC interface is also enabled, data received from the serial or Ethernet device will be sent to both the PLC and application.
- **Do not connect the application socket to the DeviceMaster UP or to the PLC.** This may cause erroneous operation.

Use the following procedure to configure the application socket connection.

1. Under *Application TCP Connection Configuration*, select **Enable**.

2. If your Ethernet TCP/IP application requires another device to connect to it, configure the socket port on the DeviceMaster UP to **Connect** mode:

- Leave **Listen** unselected.
- Set up the *Application Rx Packet ID Settings*. This is recommended for all application connections and necessary for installations where multiple connections can be active at one time. to **Connect-Always**.
- Set the **Connect Port** to the socket port number of your Ethernet application.
- Set the **Connect IP Address** to the IP address of your Ethernet application.

Do not enter the IP address of the DeviceMaster UP or PLC here.

e. Set **Disconnect Mode** to **Never**.

3. If your Ethernet TCP/IP application is configured to connect to another device, configure the socket port on the DeviceMaster UP to **Listen** mode:

- Select **Listen**.
- Use the default **Listen Port** on the DeviceMaster UP of *8xxx* or designate your own.
- Set **Connect To Mode** to **Never**.
- Set **Disconnect Mode** to **Never**.
- Configure your Ethernet application to connect to the DeviceMaster UP at the DeviceMaster UP IP address and **Listen Port**.

Application TCP Connection Configuration

Enable:	<input checked="" type="checkbox"/>
Listen:	<input type="checkbox"/>
Listen Port:	<input type="text"/>
Connect To Mode:	Connect-Always ▾
Connect Port:	9000
Connect IP Address:	192.168.2.50
Disconnect Mode:	Never ▾
Idle Timeout:	0 (msec)

Connect Mode Set Up

Application TCP Connection Configuration

Enable:	<input checked="" type="checkbox"/>
Listen:	<input checked="" type="checkbox"/>
Listen Port:	8000
Connect To Mode:	Never ▾
Connect Port:	<input type="text"/>
Connect IP Address:	<input type="text"/>
Disconnect Mode:	Never ▾
Idle Timeout:	0 (msec)

Listen Mode Set Up

4. If you do not know if your application will connect to another Ethernet device, but do know your application's socket port and IP address, you can do the following to enable both the **Listen** and **Connect** modes:

Application TCP Connection Configuration

Enable:	<input checked="" type="checkbox"/>
Listen:	<input checked="" type="checkbox"/>
Listen Port:	<input type="text" value="8000"/>
Connect To Mode:	<input type="text" value="Connect-Always"/>
Connect Port:	<input type="text" value="9000"/>
Connect IP Address:	<input type="text" value="192.168.2.50"/>
Disconnect Mode:	<input type="text" value="Never"/>
Idle Timeout:	<input type="text" value="0"/> (msec)

Listen and Connect Mode Set Up

- Select **Listen**.
- Use the default **Listen Port** on the DeviceMaster UP of *8xxx* or designate your own.
- Set **Connect To Mode** to **Connect-Always**.
- Set the **Connect Port** to the socket port number of your Ethernet application.
- Set the **Connect IP Address** to the IP address of your Ethernet application.

Do not enter the IP address of the DeviceMaster UP or PLC here.

- Set **Disconnect Mode** to *Never*.
 - Optionally configure your Ethernet application to connect to the DeviceMaster UP at the DeviceMaster UP IP address and **Listen Port**.
5. Set up the *Application Rx Packet ID Settings*. This is recommended for all application connections and necessary for installations where multiple connections can be active at one time.

If the start and end of transmission characters are known:

- Set the **Rx Timeout Between Packets** to a time that ensures that an entire message is received. Values in the 60 to 100 millisecond range are typical.
- Set the **STX (Start of Transmission) Rx Detect** to the known value. Typical values are:
 - none*
 - Standard STX character: *one byte, Byte 1 = 2*.
- Set the **ETX (End of Transmission) Rx Detect** to the known value. Typical values are:
 - none*
 - Standard ETX character: *one byte, Byte 1 = 3*
 - CR, LF: *two bytes, Byte 1 = 13, Byte 2 = 10*

If the start and end of transmission characters are not known, set the **Rx Timeout Between Packets** to a time that ensures that an entire message is received. Values in the 60 to 100 millisecond are typical.

Application Rx Packet ID Settings

Rx Timeout Between Packets:

 (ms)

STX (Start of Transmission) Rx Detect:

none Byte 1: Byte 2: (dec)

ETX (End of Transmission) Rx Detect:

none Byte 1: Byte 2: (dec)

Chapter 7. Alias Device ID Functionality

Use the *Alias Modbus Device ID Configuration page* to set up Alias device IDs. Alias Device IDs convert received message device IDs to alias device IDs and then route the modified Modbus message.


Note the following:

- The Alias Modbus Device ID functionality allows modification of device IDs only when messages are received from Modbus masters.
- Alias device ID configurations can convert a Modbus message to address a Modbus device (device ID 1-247), a serial raw/ASCII device (device ID = 255), or a Ethernet TCP/IP raw/ASCII device (device ID = 255).
- The Alias Device ID functionality is intended to help solve problems that occur when:
 - A serial Modbus device ID cannot be changed to match a Modbus master program, such as for a PLC.
 - A Modbus master program, such as for a PLC or SCADA system, cannot be modified.
 - A Modbus master with one connection, such as serial PLC, requires connectivity to multiple Modbus slave devices with the same device ID and one or more of the slave devices are connected remotely to different gateways.

Note: *The Modbus Router firmware has been designed to provide network-wide Modbus connectivity for serial Modbus masters.*

Use the following procedure to add one or Alias Modbus Device ID configurations:

1. Go to the **Alias Modbus Device ID Configuration/Status** page.



Alias Modbus Device ID Configuration/Status


[Home](#) [Serial Interface Configuration](#) [Ethernet Device Configuration](#)
[Display Serial Logs](#) [Display Ethernet Device Logs](#) [Alias Modbus Device ID Config/Status](#)
[Communication Statistics](#) [PLC Interface Diagnostics](#) [Display All Modbus Slave Devices](#)

[Add/Modify Alias Modbus Device ID List](#)
[Delete Entire Alias Modbus Device ID List](#)

Alias Modbus Device ID List:

	<u>Rx Device ID</u>	<u>Alias Device ID</u>	<u>Mb/TCP Mstr</u>	<u>Mb Serial Mstr</u>	<u>Mb/TCP Cnt</u>	<u>Mb Serial Cnt</u>
Edit Delete	50	10	yes	yes	12721	0
Edit Delete	51	11	yes	yes	0	10406
Edit Delete	52	12	yes	yes	12721	0
Edit Delete	53	13	yes	yes	0	10407
Edit Delete	100	254	yes	yes	0	20814
Edit Delete	101	255	yes	yes	61609	20814
Edit Delete	202	254	yes	no	9334	0

- Click on **Add/Modify Alias Modbus Device ID List**.



Add/Modify Alias Device ID Configuration

[Alias Modbus Device ID Config/Status](#)

Alias Device ID 1:

Received Device ID (0=do not add): (1-247)

Alias Device ID (convert ID to): (1-247,254,255)

Modbus/TCP Master Enable:

Modbus RTU/ASCII Serial Master Enable:

Alias Device ID 2:

Received Device ID (0=do not add): (1-247)

Alias Device ID (convert ID to): (1-247,254,255)

Modbus/TCP Master Enable:

Modbus RTU/ASCII Serial Master Enable:

Alias Device ID 3:

Received Device ID (0=do not add): (1-247)

Alias Device ID (convert ID to): (1-247,254,255)

Modbus/TCP Master Enable:

Modbus RTU/ASCII Serial Master Enable:

Alias Device ID 4:

Received Device ID (0=do not add): (1-247)

Alias Device ID (convert ID to): (1-247,254,255)

Modbus/TCP Master Enable:

Modbus RTU/ASCII Serial Master Enable:

Save in Flash

- Under Alias Device ID 1: Enter the **Received Device ID**. This is the device ID that you want to convert.
- Enter the **Alias Device ID**. This is the device ID that you want the received device ID converted to.
- Select **Modbus/TCP Master Enable** if you want the alias device ID configuration applied to messages received from Modbus/TCP masters.
- Select **Modbus Serial Master Enable** if you want the alias device ID configuration entry applied to messages received from Modbus serial masters.
- Repeat for up to four alias configuration entries at one time.
- Select **Save in Flash** to make the entries persistent.
- Click on **Submit**.

Chapter 8. Troubleshooting and Technical Support

This section contains troubleshooting information for your DeviceMaster UP. You should 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.

- [8.1. Troubleshooting Checklist](#) on Page 69
- [8.2. General Troubleshooting](#) on Page 70
- [8.3. Daisy-Chaining DeviceMaster UP 2E/4-Port Units](#) on Page 71

If you cannot diagnose the problem, you can contact [8.4. Technical Support](#) on Page 72.

8.1. 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 Control Technical Support are eventually traced to cabling or network problems.*

- Isolate the DeviceMaster UP from the network by connecting the device directly to a NIC in a host system.

Model	Connected to	Ethernet Cable	Connector Name
1-Port	Ethernet hub or NIC	Standard	10/100 ETHERNET
1-Port Embedded	Ethernet hub or NIC	Standard	RJ45 port (not labeled)
2-Port - 1E (All models)	Ethernet hub or NIC	Standard	10/100
2-Port - 2E (All dual Ethernet ports)	NIC or Ethernet hub	Standard	10/100 - E1/E2
4-Port	NIC	Standard	DOWN
	Ethernet hub	Standard	UP

- Verify that the Ethernet hub and any other network devices between the system and the DeviceMaster UP are powered up and operating.
- Reset the power on the DeviceMaster UP and watch the **PWR** or **Status** 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.
5 quick flashes	The default application is starting up.
10 sec. on, .1 sec. off, 10 sec. on .1 sec. off ...	The default application is running.

- If the device has a power switch, turn the device's power switch off and on, while watching the LED diagnostics.
- If the DeviceMaster UP does not have a power switch, disconnect and reconnect the power cord.
- Verify that the network IP address, subnet mask, and gateway is correct and appropriate for the network. If IP addressing is being used, the system should be able to ping the DeviceMaster UP.
- Verify that the IP address programmed into the DeviceMaster UP matches the unique reserved IP configured address assigned by the system administrator.
- If using DHCP, the host system needs to provide the subnet mask and gateway.
- Reboot the system and the DeviceMaster UP.
- If you have a spare DeviceMaster UP, try replacing the device.

8.2. General Troubleshooting

This table illustrates some general troubleshooting tips.

Note: Make sure that you have reviewed the [8.1. Troubleshooting Checklist](#) on Page 69.

General Condition	Explanation/Action
PWR or Status LED flashing	Indicates that boot program has not downloaded to the unit. <ol style="list-style-type: none"> 1. Reboot the system. 2. Make sure that you have downloaded the most current firmware for your protocol: http://www.comtrol.com/support/download.asp. Note: If the PWR or Status LED is still flashing, contact Technical Support.
PWR or Status LED not lit	Indicates that power has not been applied or there is a hardware failure. Contact Technical Support.
Cannot ping the device through Ethernet hub	Isolate the DeviceMaster UP from the network. Connect the device directly to the NIC in the host system (see Page 69).
Cannot ping or connect to the DeviceMaster UP	The default IP address is often not accessible due to the subnet masking from another network unless 192.168 is used in the network. In most cases, it will be necessary to program in an address that conforms to your network.
DeviceMaster UP continuously reboots when connected to some Ethernet switches or routers	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.

8.3. Daisy-Chaining DeviceMaster UP 2E/4-Port Units

The DeviceMaster UP 2E/4-port models with external power supplies follow the IEEE specifications for standard Ethernet topologies.

When using the **UP** and **DOWN** ports, the DeviceMaster UP 2E/4 is classified as a switch. When using the **UP** port only, it is a simple end node device.

The maximum number of daisy-chained DeviceMaster UP 2E/4 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.

Control has tested with seven DeviceMaster UP 2E/4 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. Please note that standards and URLs do 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.

See <http://www.optronics.gr/Tutorials/ethernet.htm> for more specific information.

Additional information may be found at <http://compnetworking.about.com/cs/ethernet1/> or by searching the web.

8.4. Technical Support

It contains troubleshooting procedures that you should perform before contacting Technical Support since they will request that you perform, some or all of the procedures before they will be able to help you diagnose your problem. If you need technical support, use one of the following methods.

Control Contact Information	
Downloads	ftp://ftp.control.com/html/up_modbus_tcp_main.htm
Web site	http://www.control.com
Phone	763.494.4100