

# *Vlinx*

## *MESR321*

### *Isolated Industrial Modbus Gateway*



# Vlinx MESR321

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## Models MESR321

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**Documentation Number:** *MESR321-xx\_R001\_2113m*

*This product was designed and manufactured in Ottawa, Illinois, USA, Using domestic and imported parts by*



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# Table of Contents

|  |           |
|--|-----------|
| <b>1. Introduction</b>                                     | <b>3</b>  |
| About MESR321s   | 3         |
| MESR321 Model Numbering                                    | 3         |
| MESR321 Features   | 4         |
| Configuration Software                                     | 4         |
| <b>2. MESR321 Hardware</b>                                 | <b>5</b>  |
| Package Checklist  | 5         |
| MESR321 Enclosures and Mounting                            | 5         |
| LED Indicators   | 6         |
| Mode Switch  | 6         |
| Ethernet Connector   | 7         |
| Fiber Optic Connectors                                     | 7         |
| Serial Port Connectors                                     | 7         |
| Power Connector  | 8         |
| Mounting Hardware  | 10        |
| <b>3. Setup and Connections</b>                            | <b>11</b> |
| Connecting the Power Supply                                | 11        |
| Connecting MESR321s to Modbus networks                     | 11        |
| Connecting the MESR321                                     | 12        |
| Connecting MESR321s to a Network                           | 13        |
| Network Connection (10BaseT/100BaseTX)                     | 14        |
| Fiber Optic Connection                                     | 14        |
| MESR321 Configuration Connections                          | 14        |
| Installing Modbus Configuration Manager Software           | 15        |
| Configuring the MESR321 via the Network Connection         | 18        |
| Configuring the MESR321 on Networks without a DHCP Server  | 36        |
| Configuring the MESR321 via the Serial Port (Console Mode) | 38        |
| MESR321 Operational Connections                            | 41        |
| Using MESR321s in Direct IP Mode                           | 41        |
| Initiating a Hardware Reset on the Modbus Gateway          | 42        |
| Reloading Factory Defaults                                 | 42        |
| <b>4. Upgrading Firmware</b>                               | <b>43</b> |
| Downloading Firmware Files                                 | 44        |
| Uploading the Firmware to the Modbus Gateway               | 44        |
| <b>5. Diagnostics</b>                                      | <b>45</b> |
| Testing a Modbus Gateway Connection                        | 45        |
| Monitor Function   | 47        |
| <b>6. Setup Examples</b>                                   | <b>48</b> |
| <b>7. Modbus Help</b>                                      | <b>52</b> |
| Modbus ASCII/RTU Basics                                    | 52        |
| Hints and Tips   | 53        |
| <b>8. Appendices</b>                                       | <b>54</b> |
| Appendix A: Default Gateway Settings                       | 55        |
| Appendix B: Product Specifications                         | 56        |
| General Specifications                                     | 57        |
| Controls, Indicators and Connector Specifications          | 58        |
| Approvals and certifications                               | 59        |

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|   |           |
|---|-----------|
| <i>Fiber Optic Cable Information</i> .....    | 59        |
| <i>Serial Interface Specifications</i> .....  | 60        |
| <i>Network Specifications</i> .....           | 61        |
| <i>Appendix C: Dimensional Diagrams</i> ..... | 62        |
| <i>Appendix D: Connector Pinouts</i> .....    | 65        |
| <i>MESR321 Serial Port Pinouts</i> .....      | 65        |
| <i>MESR321 Serial Port Pinouts</i> .....      | 66        |
| <b>9. Glossary</b> .....                      | <b>67</b> |

# 1. Introduction

Thank you for purchasing a MESR321 product! This product has been manufactured to the highest standards of quality and performance to ensure your complete satisfaction.

## About MESR321s

**MESR321s** connect Modbus networks (RS-232, RS-422 or RS-485) to Ethernet networks, allowing the Modbus network to become a node on the network. The serial ports can be accessed over a LAN/WAN using Direct IP Mode connections. MESR321s feature 10BaseT or 100BaseTX copper network media and fiber optic media options, depending upon the model.

MESR321s are built for use in industrial environments, featuring an IP30 slim line DIN rail mountable case. They operate over a range of DC power supply voltages and feature pluggable terminal block power connectors. An external power supply, sold separately, is required.

## MESR321 Model Numbering

MESR321s are a growing family of products. Network connection options include 10BaseT/100BaseTX copper or LC fiber optic options.

### List of MESR321 Models

| Model Number  | Features   |
|---|--|
| <b>MESR321</b>  | 1 Terminal Block/DB9 Port, DIN, 2 CU Ethernet                          |
| <b>MESR321-SL</b>   | 1 Terminal Block/DB9 Port, DIN, 1 CU Ethernet, 1 LC Fiber, single-mode |
| <b>MESR321-ML</b>   | 1 Terminal Block/DB9 Port, DIN, 1 CU Ethernet, 1 LC Fiber multi-mode   |
| <p>The models listed above are standard build options.<br/>           The following build options are possible for large projects:<br/>           -- Models with 2 fiber optic ports.<br/>           -- Models with long range fiber optic ports such as 40km and 80km single-mode.</p> |  |
| <p><b>Please contact B&amp;B Electronics for more information</b></p>   |  |

## **MESR321 Features**

- DB9M and pluggable terminal block serial port connector options
- The DB9 port is for RS-232.
- The terminal block serial port is software selectable as RS-422 or RS-485 2- and 4-wire
- Configuration of Ethernet and serial port settings using software
- Configuration can be done via network, web page or direct serial connection
- Slim line DIN rail mountable case
- Accepts DC power over a wide voltage range
- 10/100 Mbps Ethernet with Auto Selection, Auto MDI/MDIX
- LAN and WAN Communications
- TCP Client or Server operation - configurable
- Firmware Upload for future revisions/upgrades
- Software Support - Windows XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), 2008 Server (32/64 bit), Windows 7 (32/64 bit)

## **Configuration Software**

The configuration software enables you to find connected Modbus gateways, configure them, upgrade Modbus gateway firmware, and save/load configuration files. It features a graphical user interface (GUI) that is convenient and easy to use.

## **2. MESR321 Hardware**

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MESR321s are enclosed in DIN rail mountable enclosures and feature LED indicators, power, Ethernet and serial connectors and a recessed Mode switch.

### ***Package Checklist***

**MESR321 Modbus Gateways** are shipped with the following items included:

- **MESR321** Modbus Gateway Module
- DIN rail and panel mounting hardware
- Quick Start Guide
- CD with User Manual, Quick Start Guide and firmware, and configuration software.

### ***MESR321 Enclosures and Mounting***

All **MESR321** models are built into similar enclosures. Modules are DIN rail and panel mountable.

## LED Indicators

MESR321s have a **Power LED**, a **Ready LED** and **Data LEDs**.

| LEDs                     |       |                                |
|--------------------------|-------|--------------------------------|
| POWER                    | OFF   | Power is not connected         |
|                          | ON    | Power is connected             |
| READY                    | OFF   | System is in Console Mode      |
|                          | BLINK | System is in Normal Mode       |
| P1 DATA                  | ON    | Serial Port is available       |
|                          | BLINK | Data is present on serial port |
| RJ45 Ethernet Port LEDs  |       |                                |
| SPEED                    | OFF   | 10BaseT connection             |
|                          | ON    | 100BaseTX connection           |
| LINK                     | ON    | Ethernet Connected             |
|                          | BLINK | Data present on Ethernet port  |
| Fiber Ethernet Port LEDs |       |                                |
| LINK                     | OFF   | No connection                  |
|                          | ON    | 100BaseFX connection           |

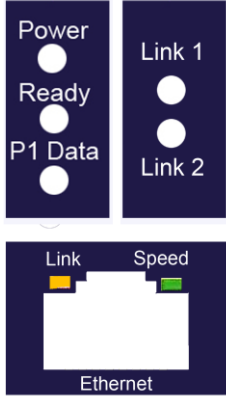


Figure 1. LEDs

## Mode Switch

A recessed momentary reset switch is located on the front left side of the enclosure. To activate the switch, insert a small plastic tool through the hole in the enclosure and press gently.



Figure 2. Mode Switch

The Mode switch can be used to:

- Initiate a Hardware Reset
- Enter Console Mode
- Reload factory defaults



Note: Refer to Section 3: Modbus Gateway Setup and Connections for more information on using the Mode switch.

## **Ethernet Connector**

Modbus gateway models using 10BaseT/100BaseTX network connections use an RJ45 receptacle. The Modbus gateway is connected to a standard Ethernet network drop using a straight-through RJ45 (male) Ethernet cable.



Figure 3. Ethernet Connectors. E2 is pass-through.

Note: Refer to Appendix D for connection pin-outs.

## **Fiber Optic Connectors**

MESR321 family serial servers use LC fiber connectors.

## **Serial Port Connectors**

MESR321 family serial servers feature one DB9M connector for RS-232 and a five-position removable terminal block for RS-422 and RS-485 connections.



Figure 4. DB-9 Serial Port Connector



Figure 5. Five-Position Pluggable Terminal Block

Note: Refer to Appendix D for connection pin-outs.

## **Power Connector**

Power options include a 5.08 mm 3-position pluggable terminal block and 2.5 mm barrel connector.



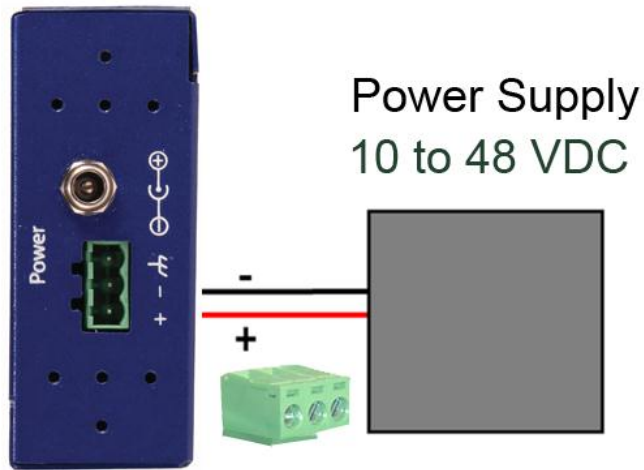


Figure 6. Power Connection

## Mounting Hardware

MESR321 modules can be DIN rail mounted. The DIN mounting clip is included with each module.



Figure 7. DIN Clip on Modbus Gateway Module.

## 3. Setup and Connections

Note: In this section devices to be connected to the Modbus gateway's serial connection are simply referred to as the "Modbus network".

### Connecting the Power Supply

Connect a DC power supply to the power terminals on the top of the Modbus gateway. Polarity of the wires is indicated on the label on the side of the Modbus gateway. Acceptable voltages are between 10 VDC and 48 VDC. The power supply must be capable of supplying 4 watts.

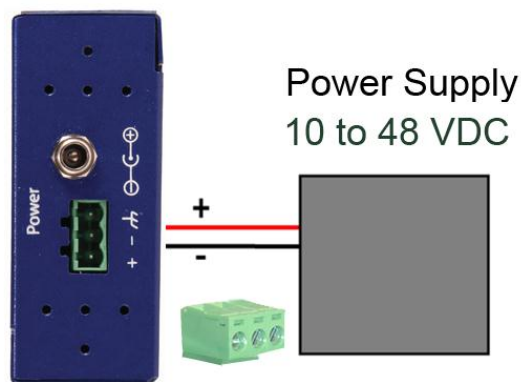


Figure 8. MESR Power Connection

### Connecting MESR321s to Modbus networks

MESR321s can be configured to connect to Modbus networks using RS-232, RS-422, RS-485 2-wire and RS-485 4-wire.

**RS-232** connections support eight signal lines plus Signal Ground. Signals are single ended and referenced to Ground. Default communications parameters are 9600, 8, N, 1..

**RS-422** 4-wire connections support two signal pairs: RXA(-), RXB(+) and TXA(-), TXB(+), plus GND. The data lines are differential pairs (A & B) in which the B line

is positive relative to the A line in the idle (mark) state. Ground provides a common mode reference.

**RS-485** connections support 2-wire or 4-wire operation.

When configured for **4-wire operation** the connection supports two signal pairs: RXA(-), RXB(+) and TXA(-), TXB(+), plus GND. This makes full-duplex operation possible. The data lines are differential pairs (A & B) in which the B line is positive relative to the A line in the idle (mark) state. Ground provides a common mode reference.

When configured for **2-wire operation** the connection supports one signal pair: DataB(+) and DataA(-) signal channels using half-duplex operation. The data lines are differential with the Data B line positive relative to Data A in the idle (mark) state. Ground provides a common mode reference.

## **Connecting the MESR321**

The **MESR321** has one DB9M serial connector that supports RS-232; it also has a 5-position terminal block connector that supports RS-422 and RS-485 (2- and 4-wire).

If you select RS-232 mode when you configure the Modbus gateway, you must connect the Modbus serial network to the Modbus gateway via a serial cable. The MESR321 is a DTE. If the Modbus network is a DTE, use a null modem (cross-over) cable. If the Modbus network is a DCE, use a straight-through cable. DTE and DCE ports are complementary, the **Output** signals on a DTE port are **Inputs** to a DCE port, and **Output** signals on a DCE port are **Inputs** to a DTE port. The signal names match each other and connect pin for pin. Signal flow is in the direction of the arrows. (See figure below)

**Modem Cable - Straight Cable DB9 to DB9**

| DTE Device (Computer)          |                           |                     | DTE to DCE Connections |  | DCE Device (Modem)             |                           |                     |
|--------------------------------|---------------------------|---------------------|------------------------|--|--------------------------------|---------------------------|---------------------|
| Pin#                           | DB9                       | RS-232 Signal Names |                        |  | Pin#                           | DB9                       | RS-232 Signal Names |
| #1                             | Carrier Detector (DCD)    | CD                  | ←                      |  | #1                             | Carrier Detector (DCD)    | CD                  |
| #2                             | Receive Data (Rx)         | RD                  | ←                      |  | #2                             | Receive Data (Rx)         | RD                  |
| #3                             | Transmit Data (Tx)        | TD                  | →                      |  | #3                             | Transmit Data (Tx)        | TD                  |
| #4                             | Data Terminal Ready       | DTR                 | →                      |  | #4                             | Data Terminal Ready       | DTR                 |
| #5                             | Signal Ground/Common (SG) | GND                 | →                      |  | #5                             | Signal Ground/Common (SG) | GND                 |
| #6                             | Data Set Ready            | DSR                 | ←                      |  | #6                             | Data Set Ready            | DSR                 |
| #7                             | Request to Send           | RTS                 | →                      |  | #7                             | Request to Send           | RTS                 |
| #8                             | Clear to Send             | CTS                 | ←                      |  | #8                             | Clear to Send             | CTS                 |
| Soldered to DB9 Metal - Shield |                           |                     |                        |  | Soldered to DB9 Metal - Shield |                           |                     |
|                                |                           | FGND                |                        |  |                                |                           | FGND                |

If you select RS-422 mode, RS-485 2-wire mode, or RS-485 4-wire mode when you configure the Modbus gateway, you must connect the Modbus network appropriately, via the 5-position terminal block.

Note: Refer to Appendix D for connector pin out information.

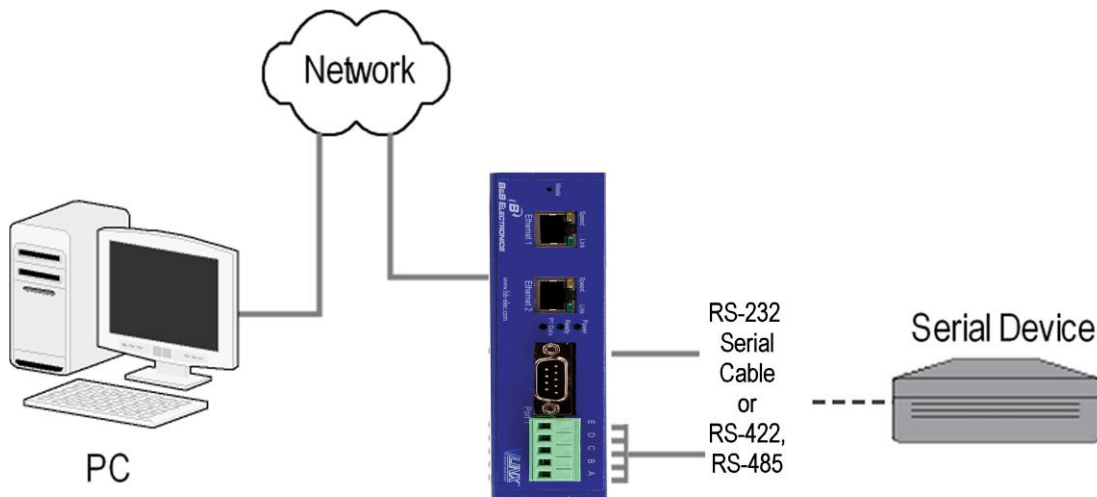


Figure 9. MESR321 Connections

**Connecting MESR321s to a Network**

**Network Connection (10BaseT/100BaseTX)**

**When connecting a Modbus gateway equipped with a 10BaseT/100BaseTX network connection** (RJ45 connector) a standard network cable is connected from the Modbus gateway to a network drop. PCs configuring and/or communicating with the Modbus gateway are also connected to the network.

**Fiber Optic Connection**

**When connecting a Modbus gateway equipped with a fiber optic interface to a fiber optic link** the appropriate fiber optic cable must be connected between the Modbus gateway and the network interface.

**MESR321 Configuration Connections**

MESR321s can be configured over the network or via a serial port.



## Installing Modbus Configuration Manager Software

1. The Modbus Configuration Manager Software is contained on the CD which is packaged with the product. Insert the CD into your CD ROM drive. The software should automatically begin the installation process. If AUTO RUN is disabled on your computer, open the CD drive and double click on the executable file. The file name is Modbus Gateway Manager Vx.x.x.
  - a. The following screen will be displayed on your computer.



Figure 10. Modbus Gateway Manager Installation Welcome Screen

- b. Click “Next.” The License Agreement Screen will be displayed on your computer.

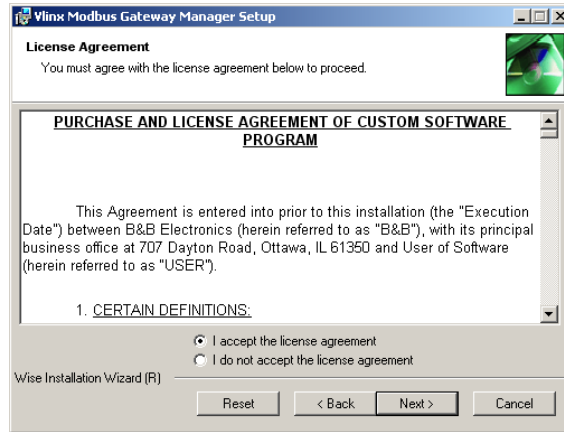


Figure 11. Modbus License Acceptance Screen

- c. Click "Next." The User Information Screen will be displayed on your computer. Enter your name and organization (optional) and select if the software will be accessible to your account or anyone who uses the computer.

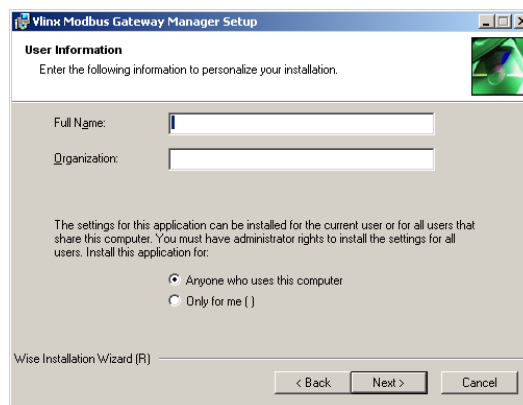


Figure 12. User Information Screen

- d. Click "Next." The Destination Folder Screen will be displayed on your computer. The default directory is:  
C:\Program Files\BB Electronics\Vlinx\Modbus Gateway Manager\  
If desired, you can select another location by pressing the "Browse" button.

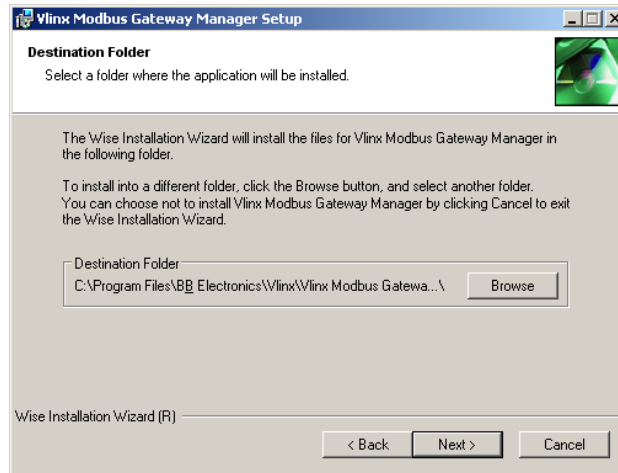


Figure 13. Destination Folder Screen

- e. Click “Next.” The Ready to Install Application Screen will be displayed on your computer. You can select the “Back” button to change destination folder.

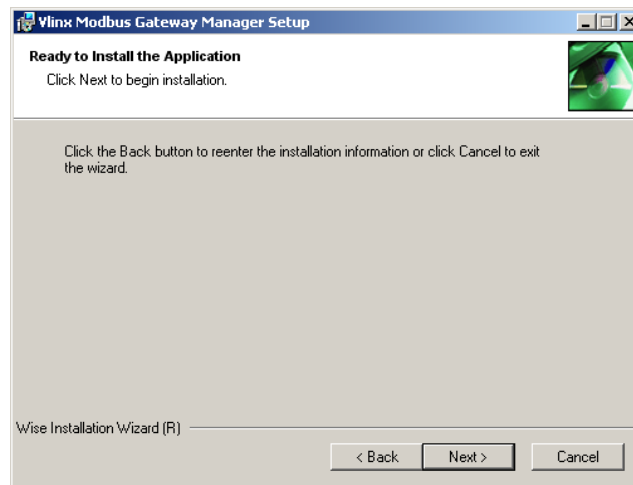


Figure 14. Ready to Install Application Screen

- f. Click “Next.” The software will begin installing.

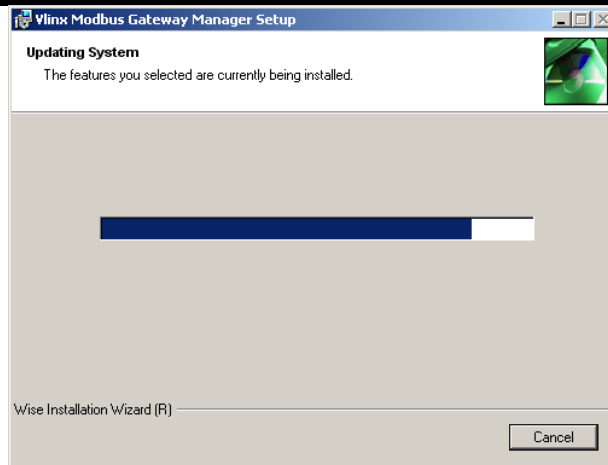


Figure 15. Software Installing Screen

- g. Click “Next.” The Installation Complete screen will be displayed on your computer. Click “Finish” to finish the installation.



Figure 16. Installation Complete Screen

## **Configuring the MESR321 via the Network Connection**

When configuring via the network, either Modbus Configuration software or the web interface can be used.

### **Configuring with Modbus Configuration Manager**

MESR321s can be configured over the network Modbus Configuration manager software running on a PC.

To open Modbus Configuration Manager:

1. From the Desktop, click Start → Programs → B&B Electronics → Vlinx → Vlinx Modbus Gateway Manager → Modbus Gateway Manager. An alternate method is to double click the shortcut installed on the desktop.

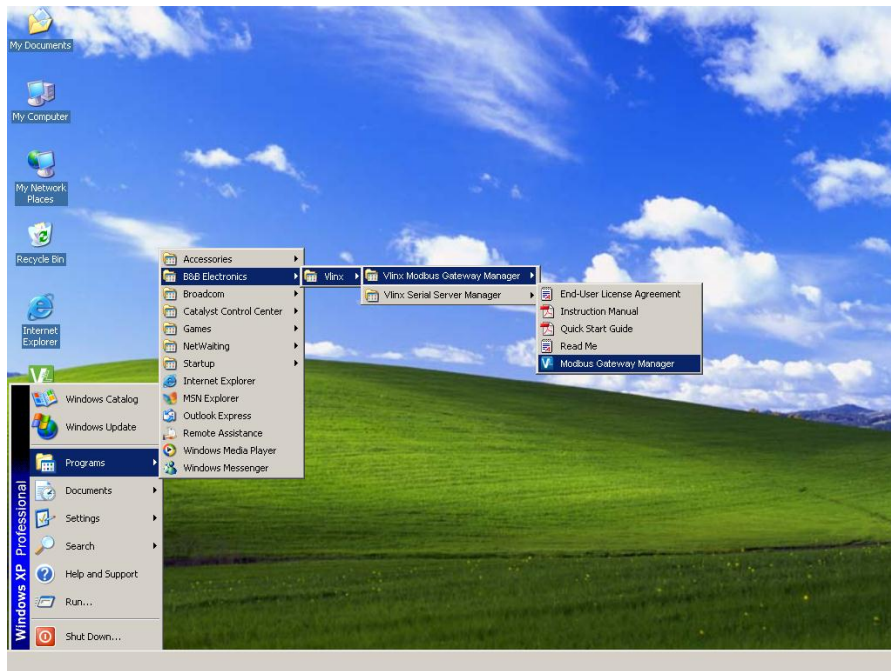


Figure 17. Opening Vlinx Modbus Gateway Manager

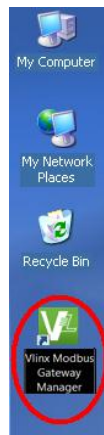


Figure 18. Vlinx Modbus Gateway Manager Shortcut Icon

2. The Vlinx Modbus Configuration Manager Device Discovery window appears.

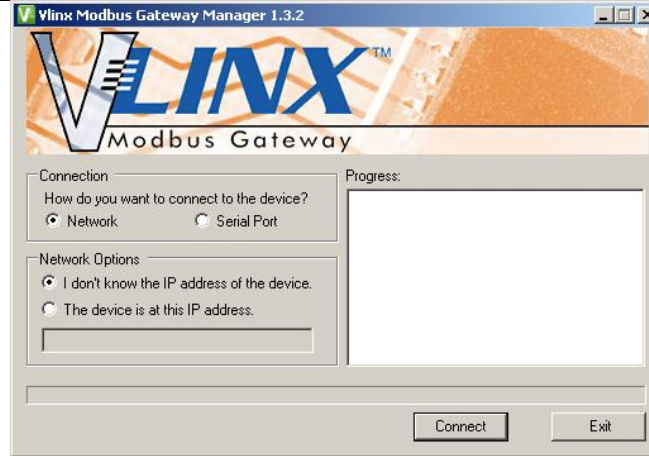


Figure 19. Modbus Configuration Manager Discovery Window

3. If you do not know the IP address, check the “Network” and “I don’t know the IP address of this device” selections and press the “Connect Button.” The software will discover any MESR321 Gateways on the network. The configuration manager screen will be displayed on your computer. All available devices will be listed on the top portion of this screen. If you know the IP address, you may select “The Device is located at this IP address” and input the address in the box provided.

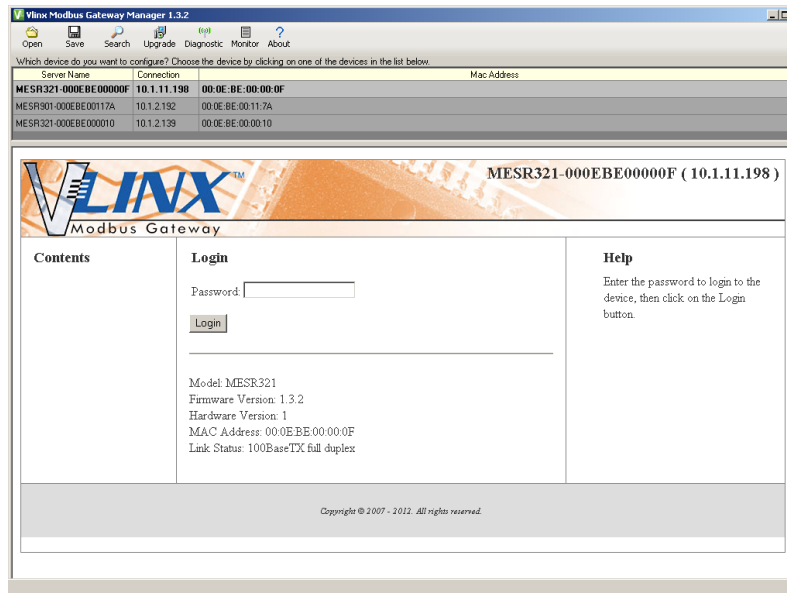


Figure 20. Configuration Manager Screen

4. All Modbus Gateways on the network will be displayed in the top portion of the screen. To select a gateway, simply click the appropriate device on the top portion of the screen.

- a. The main portion of the screen displays the Model, Firmware version, Hardware Version, MAC Address, and Link Status. The IP Address is also displayed on the top portion of the screen and title graphic area.
5. There is no password unless you choose to enter one. The default password is no password at all. Click the “Login” button. The “General” Settings screen will be displayed on your computer.
6. Vlinx Modbus Manager Settings Screen Overview

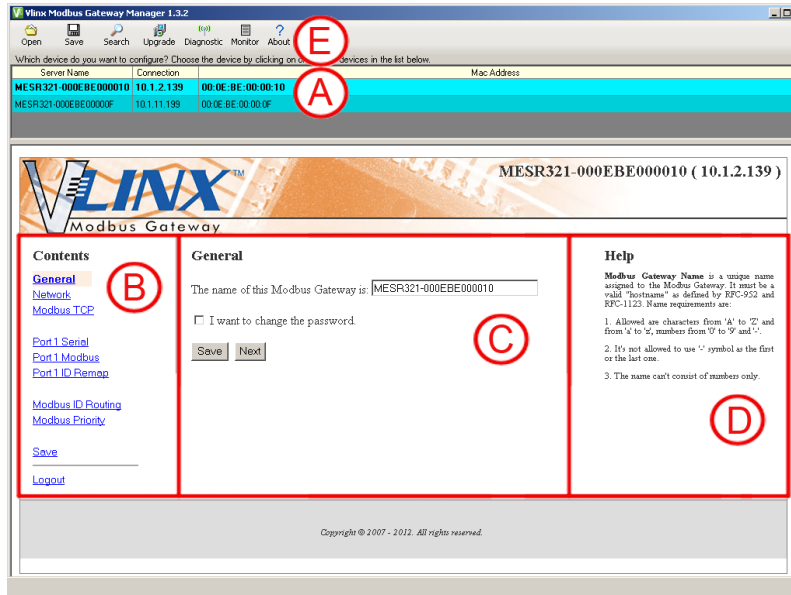


Figure 21. Settings Screen Overview

- a. This area shows Modbus Gateways available on the network.
- b. This area is used to skip directly to the specific configuration screen you need to access. An alternate method of accessing the configuration screens is to use the “Next” button in area C.
- c. This area contains dialog boxes specific the configuration screen.
  1. **Note: Any configuration changes you make need to be saved using the “Save” button.**
- d. This area contains helpful information about the configuration screen you are currently on.
- e. This area contains shortcuts to specific functions.
  1. “Open” allows you to load a previously saved configuration file into your Modbus Gateway.

2. “Save” allows you to save your configuration to a file. This should not be confused with the “Save” button described in 6.c above.
  3. “Search” allows you to search for Modbus Gateways on the network.
  4. “Upgrade” allows you to upgrade your Modbus Gateway’s firmware.
  5. “Diagnostic” allows you to test a configured Modbus Gateway. See Section 5.
  6. “Monitor” allows you to monitor a Modbus Gateway. See Section 5.
  7. “About” contains information about your Modbus Gateway.
7. General Settings

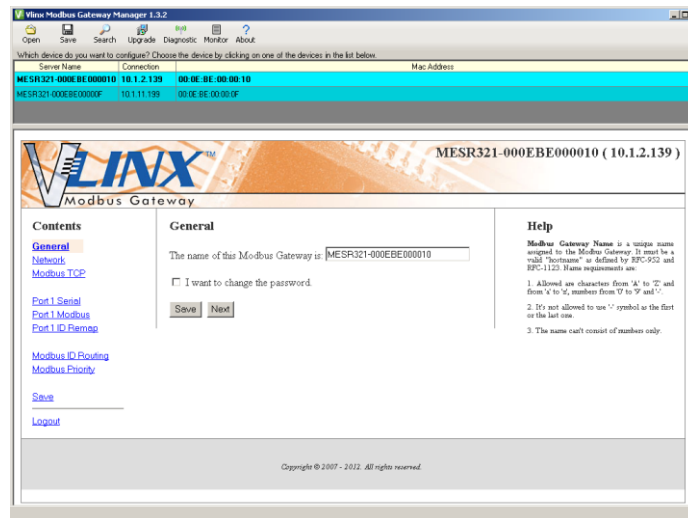


Figure 22. General Settings Screen

- a. This screen enables you to assign a unique name to the gateway. This allows you to easily identify a particular gateway when multiple devices are used on the same network. To change the name, type a new name in the “The Name of this Modbus Gateway is” box. The name must be a valid “hostname” as defined by RFC-952 and RFC-1123. Allowed characters are A to Z, a to z, 0 to 9 and “-“. The “-“symbol cannot be the first or last character. The name cannot consist of numbers only. **To save the new name click the “Save” button.**



- b. You can also change the gateway's password on this screen. To do this, check the "I want to change the password" box. New password entry boxes will appear on the screen.

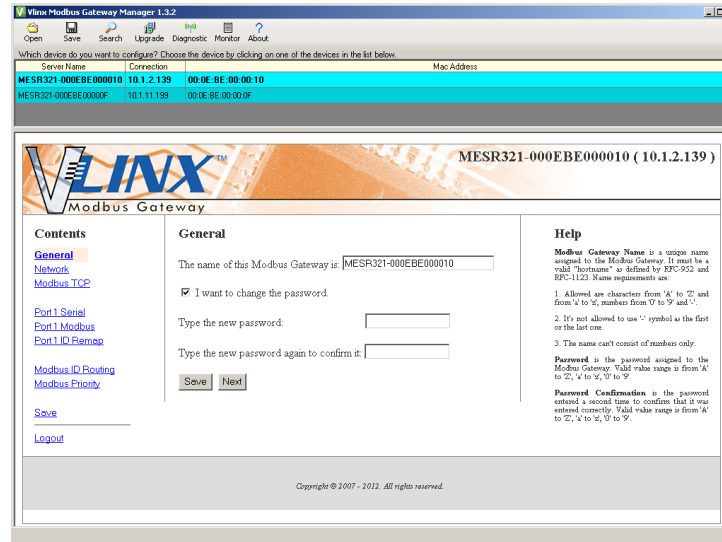


Figure 23. Changing The Password

- c. Type your new password in the "Type the new password box." Verify the password by typing it again in the box provided. **To save the new password click the "Save" button.**
8. Network Settings
- a. To get to the Network Settings Screen you can either click the "Next Button" or click on the "Network" link on the left side of the screen.

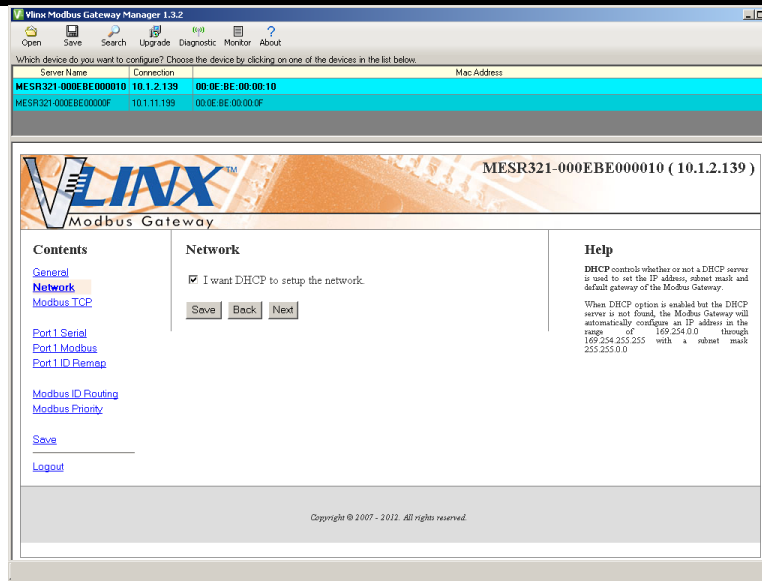


Figure 24. Network Settings Screen (DHCP Selected)

- b. The default network configuration is to receive an IP address assignment from a DHCP server. **DHCP** controls whether or not a DHCP server is used to set the IP address, subnet mask and default gateway of the Modbus Gateway. When DHCP option is enabled but the DHCP server is not found, the Modbus Gateway will automatically configure IP address 169.254.102.39 with a subnet mask 255.255.0.0
- c. To configure your Modbus Gateway without using a DHCP Server, uncheck the “I want DHCP to setup the network” box. You will need to know the IP Address, Subnet Mask, and Default Gateway.

**IP Address** field contains static internet protocol address of the Modbus Gateway.

**Subnet Mask** field contains mask that is used to define sub network.

For Class A network (IP addresses 0.0.0.0 through 127.255.255.255), the default subnet mask is 255.0.0.0.

For Class B network (IP addresses 128.0.0.0 through 191.255.255.255), the default subnet mask is 255.255.0.0.

For Class C network (IP addresses 192.0.0.0 through 223.255.255.255), the default subnet mask is 255.255.255.0.

For Class D network (IP addresses 224.0.0.0 through 239.255.255.255) and Class E network (IP addresses 240.0.0.0 through 255.255.255.255), the subnet mask is ignored.

**Default Gateway** field contains default route to remote networks.

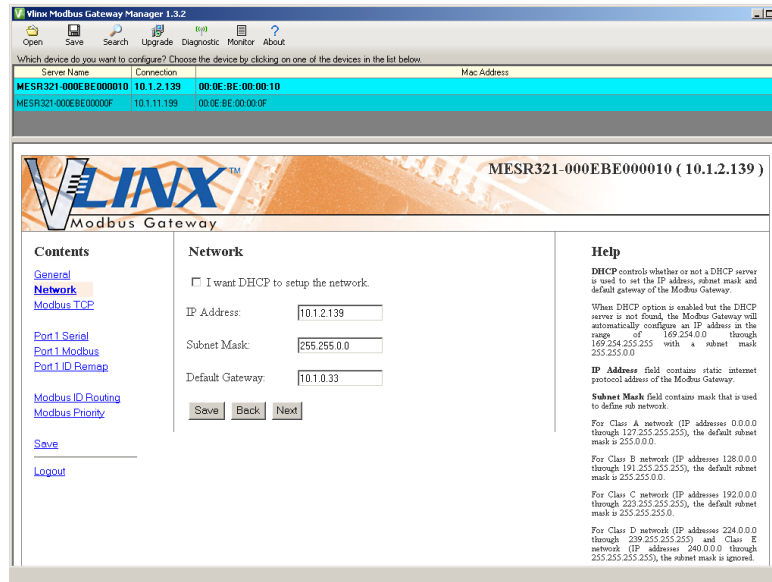


Figure 25. Network Settings Screen (DHCP not Selected)

- d. More information about assigning an IP address without using a DHCP Server is contained in the section Configuring the MESR321 on Networks without a DHCP Server.
  - e. Save changes by Clicking the “Save” button.
9. Modbus TCP Settings
- a. To access this screen, click the “Next Button” or click on the Modbus TCP link on the left side of the screen.
  - b. This screen allows you Modbus TCP client and server settings

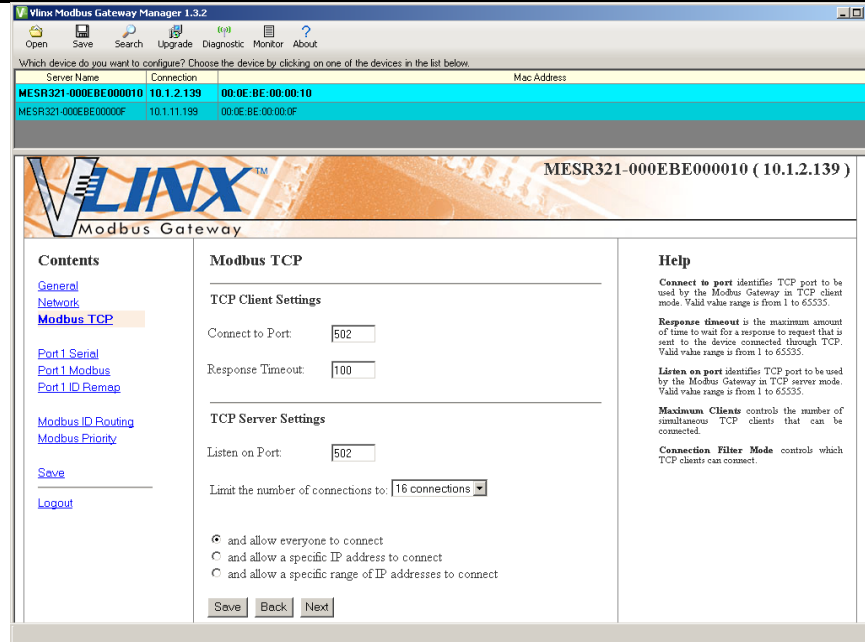


Figure 26. Modbus TCP Settings Screen

### c. TCP Client Settings

1. Connect to Port identifies TCP port to be used by the Modbus Gateway in TCP client mode. Valid value range is from 1 to 65535.
2. Response Timeout is the maximum amount of time to wait for a response to a request that is sent to the device connected through TCP. Valid value range is from 1 to 65535.
3. Save settings by clicking the “Save” button.

### b. TCP Server Settings

1. Listen on Port identifies TCP port to be used by the Modbus Gateway in TCP server mode. Valid value range is from 1 to 65535.
2. “Limit the number of connections to” pull down box allows you to control the number of simultaneous TCP clients that can be connected. Choices are 1 through 16.
3. Connection Filter Mode controls which TCP clients are able to connect. The default is: “and allow everyone to connect.”
  - a. You can select “allow specific IP addresses to connect.” This filter is limited to 4 IP addresses.

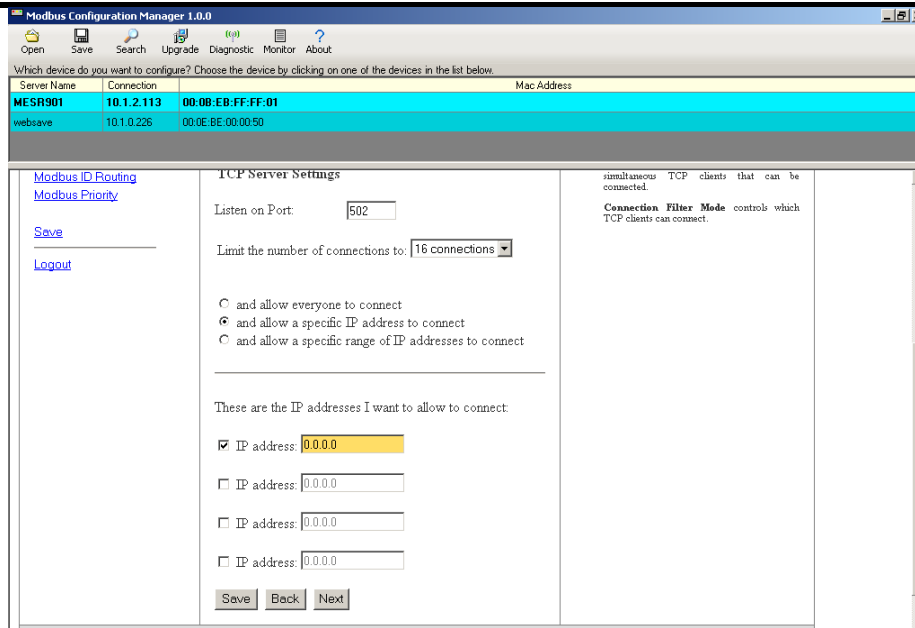


Figure 27. TCP Connection Filter “Allow Specific IP addresses to Connect”

- b. You can select “a specific range of IP addresses to connect.” This filter is limited to 4 IP address ranges.
- c. Save settings by clicking the “Save” button.

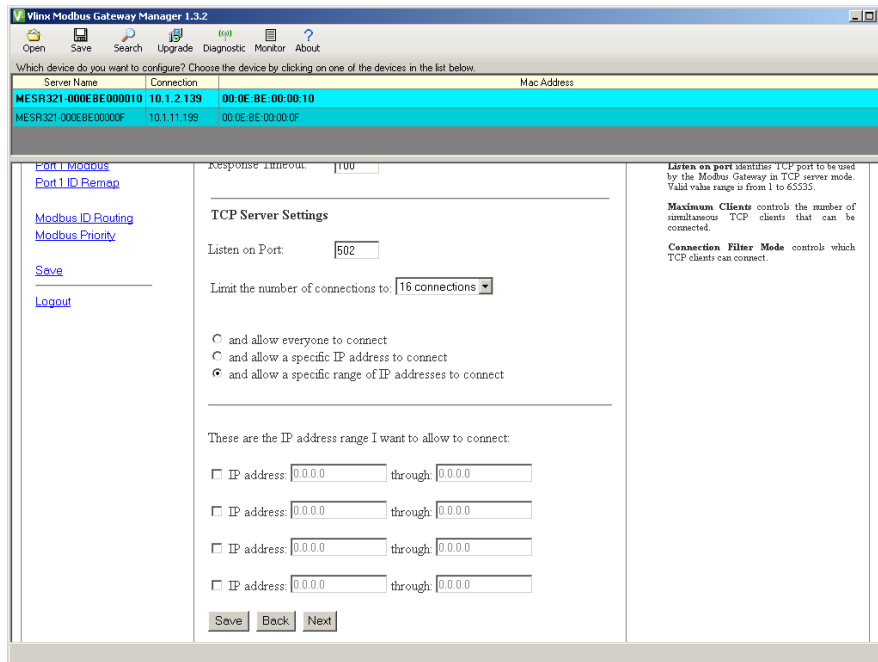


Figure 28. TCP Connection Filter “Allow Specific Range of IP Addresses to Connect”

## 10. Port 1 Settings

To access this screen, click the “Next” button or click the Port 1 Serial link on the left side of the screen.

- a. This screen allows you to change the serial port settings.

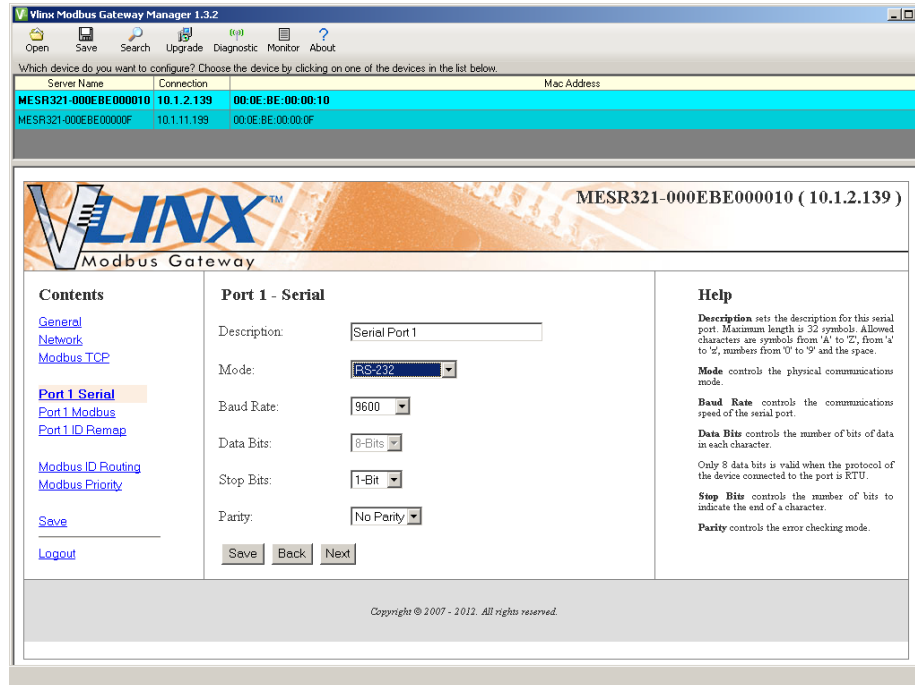


Figure 29. Serial Port Screen

- b. Description - sets the description for this serial port. Maximum length is 32 symbols. Allowed characters are symbols from 'A' to 'Z', from 'a' to 'z', numbers from '0' to '9' and the space.
- c. Mode – Controls the physical communications mode for the MESR321. The Mode can be RS-232, RS-422 (4-Wire), RS-485 (2-Wire), or RS-485 (4-Wire).
- d. Baud Rate – Controls the communications speed of the serial port. The Baud Rate can be 75, 150, 300, 600, 1200, 2400, 4800, 7200, 9600, 14.4k, 19.2k, 28.8k, 38.4k, 57.6k, 115.2k, 230.4k.
- e. Stop Bits – Controls the number of bits to end a character. Choices are 1 or 2.
- f. Parity – Controls the error checking mode. Choices are Odd, Even, Mark, or Space.
- g. Save settings by clicking the “Save” button.

## 11. Port 1 Modbus

- a. To access this screen, click the “Next” button or click the “Port 1 Modbus” Link on the left side of the screen. This screen allows you to change the Modbus settings for the port.

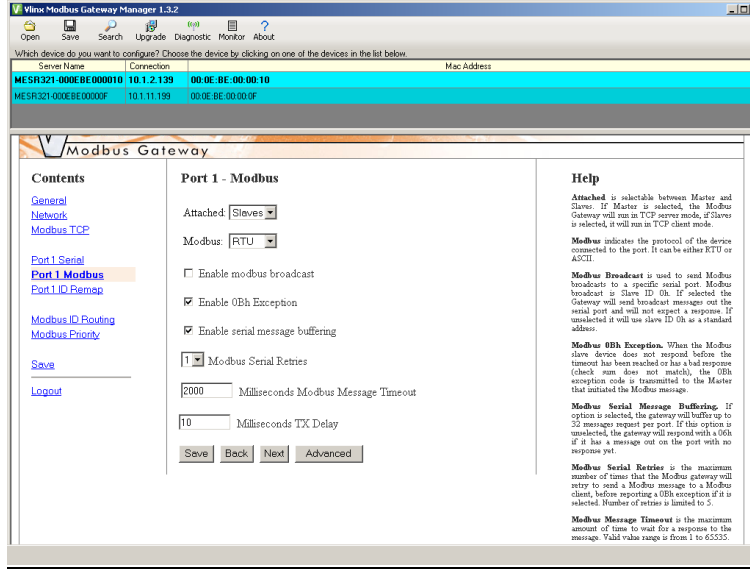


Figure 30. Modbus Port Screen

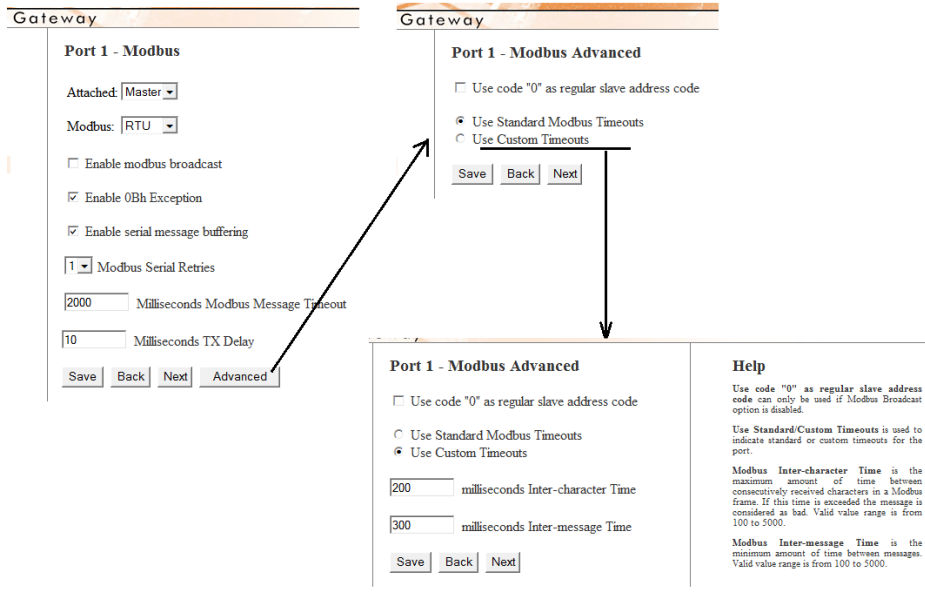


Figure 31. Modbus Port Screen Advanced



- b. Attached – This is selectable between Master and Slaves. If Master is selected, the Modbus Gateway will run in TCP server mode, if Slaves is selected, it will run in TCP client mode.
  - c. Modbus – indicates the protocol of the device connected to the port. It can be either RTU or ASCII.
  - d. Modbus Broadcast – Check this box to send Modbus broadcasts to a specific serial port. Modbus broadcast is Slave ID 0h. If selected the Gateway will send broadcast messages out the serial port and will not expect a response. If unselected it will use slave ID 0h as a standard address.
  - e. Enable 0Bh Exception – Check this box to enable. When the Modbus slave device does not respond before the timeout has been reached or has a bad response (check sum does not match), the 0Bh exception code is transmitted to the Master that initiated the Modbus message.
  - f. Enable Serial Message Buffering – If this option is selected, the gateway will buffer up to 32 messages request per port. If this option is unselected, the gateway will respond with a 06h if it has a message out on the port with no response yet.
  - g. Modbus Serial Retires – Select 0 through 5. This sets the maximum number of times that the Modbus gateway will retry to send a Modbus message to a Modbus client, before reporting a 0Bh exception if it is selected. Number of retries is limited to 5.
  - h. Milliseconds Modbus Message Timeout – This is the maximum amount of time to wait for a response to the message. Valid value range is from 1 to 65535.
  - i. Milliseconds TX Delay – This is the minimum amount of time after receiving a response before the next message can be sent out. Valid value range is from 1 to 65535.
  - j. Save settings by clicking the “Save” button.
12. Port 1 ID Remap
- a. To access this screen, click the “Next” button or click the “Port 1 ID Remap” link on the left side of the screen.
  - b. This screen allows you to set Modbus Slave ID Remap settings.

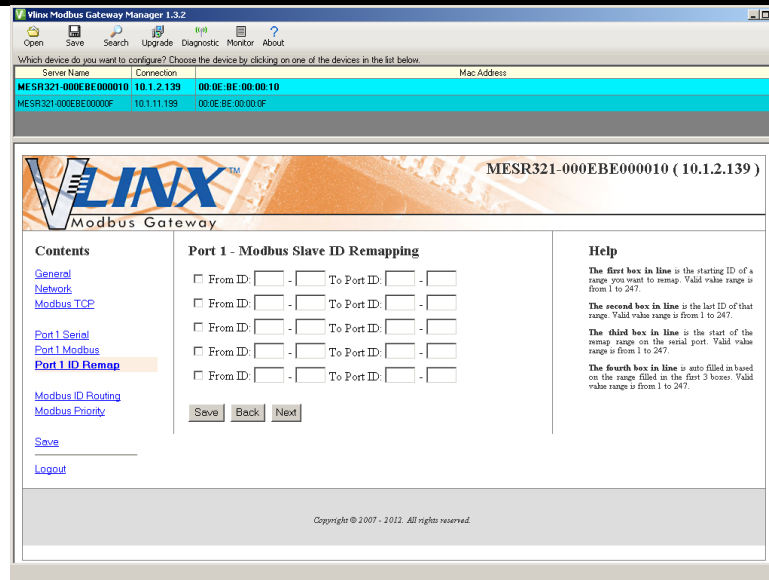


Figure 32. Port ID Remap Screen

- c. The first box in line is the start of the remap range on the serial port you want to remap. Valid value range is from 1 to 247.
  - d. The second box in line is the last serial port of that range. Valid value range is from 1 to 247.
  - e. The third box in line is the starting ID of a range to remap to. Valid value range is from 1 to 247.
  - f. The fourth box in line is auto filled in based on the range filled in the first 3 boxes. Valid value range is from 1 to 247.
  - g. Save settings by clicking the “Save” button.
13. Modbus ID Routing
- a. To access this screen click the “Next” button or click the “Modbus ID Routing” Link on the left side of the screen.
  - b. This screen allows you to set the Modbus Slave ID routing.

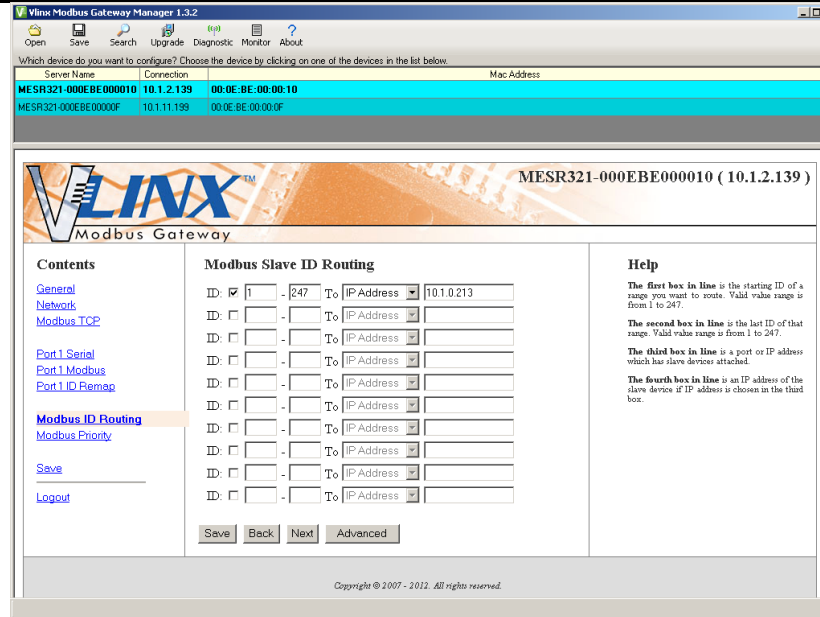


Figure 33. Modbus ID Routing Screen

- c. The first box in line is the starting ID of a range you want to route. Valid value range is from 1 to 255.
  - d. The second box in line is the last ID of that range. Valid value range is from 1 to 255.
  - e. The third box in line is a port or IP address which has slave devices attached.
  - f. The fourth box in line is an IP address of the slave device if IP address is chosen in the third box.
  - g. Save settings by clicking the “Save” button.
14. Modbus Priority
- a. To access this screen, click the “Next” button or click the “Modbus Priority” link on the left side of the screen.
  - b. This screen allows you to configure the gateway to move high priority messages to the front of the serial message buffer.

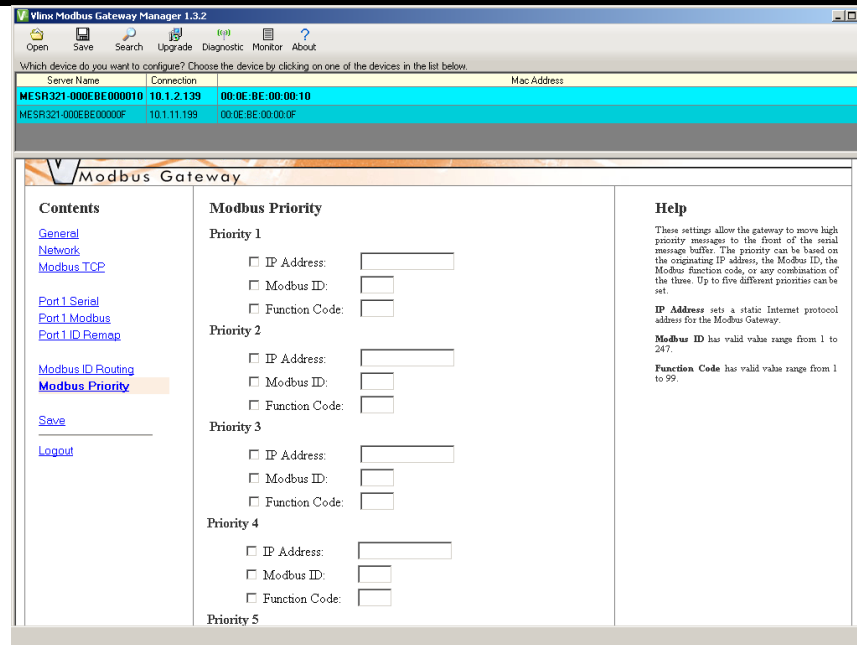


Figure 34. Modbus Priority Screen

- c. These settings allow the gateway to move high priority messages to the front of the serial message buffer. The priority can be based on the originating IP address, the Modbus ID, the Modbus function code, or any combination of the three. Up to five different priorities can be set.
- d. IP Address – Used to set a static Internet protocol address for the Modbus Gateway.
- e. Modbus ID – Valid range is from 1 to 255.
- f. Function Code – Valid range is from 1 to 99.
- g. Save settings by clicking the “Save” button.

Note: For more information on configuration options refer to Section 4: Description of Modbus gateway Properties.

## Configuring with the Web Interface

MESR321s can be configured over the network using a standard web browser such as Internet Explorer or Firefox.

To open the web configuration interface:

1. On a PC connected to the network, open a web browser.

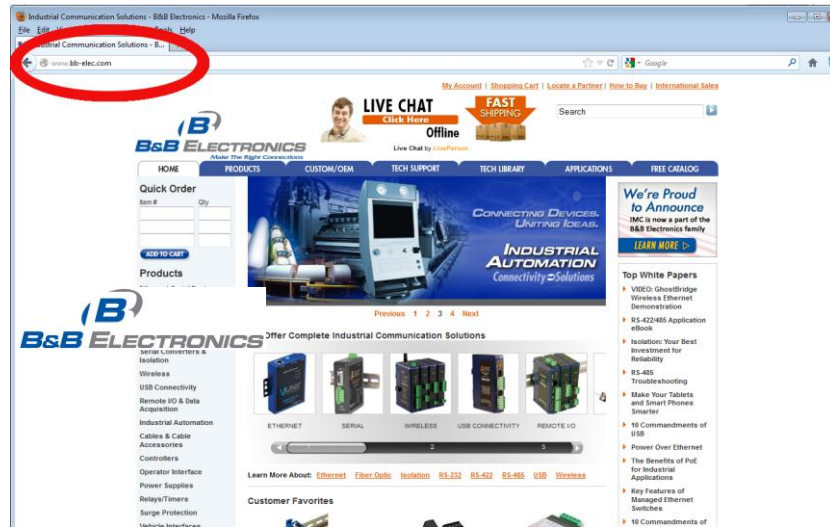


Figure 35. Open Web Browser

2. In the browser's address bar, type the IP address of the Modbus gateway.

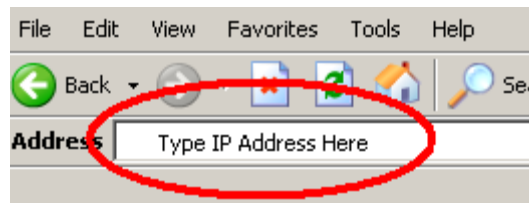


Figure 36. Type IP Address

Note: Your Modbus gateway comes from the factory pre-configured to receive an IP address assignment from a DHCP server. If a DHCP Server is not available on your network, it will default to 169.254.102.39.

The web interface Login page appears.

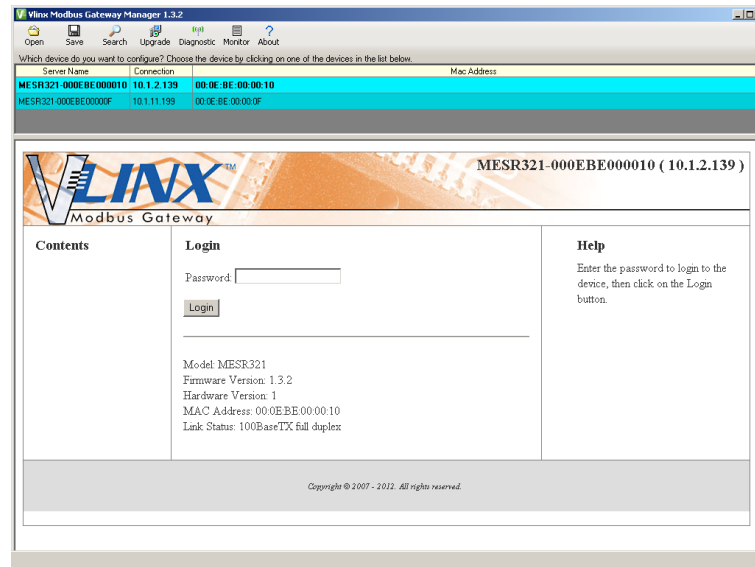


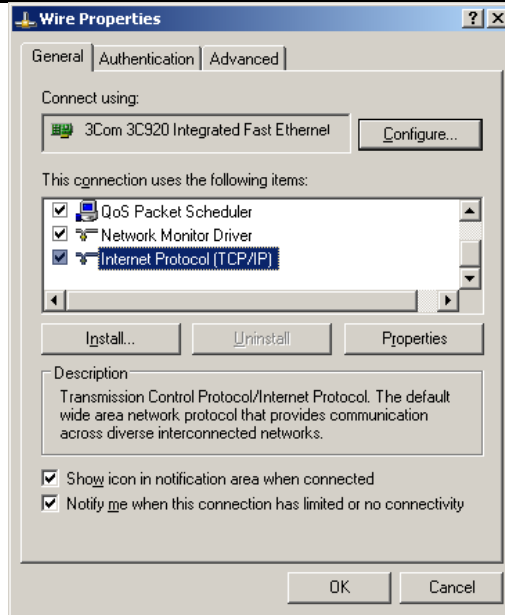
Figure 37. Modbus Gateway Login Screen

3. The screens for configuring your gateway using a web browser are the same as those used to configure using the [Vlinx Modbus Manager software](#).

### **Configuring the MESR321 on Networks without a DHCP Server**

Your Modbus Gateway comes from the factory set up to receive an IP assignment from a DHCP Server. If there is not a DHCP server on your network, the Modbus Gateway will default to IP address **169.254.102.39**. If this address does not work with your PC, there are two methods to manually configure the network information.

1. Method 1: Change your PC Network to Match the Modbus Gateway
  - a. Open your network connection

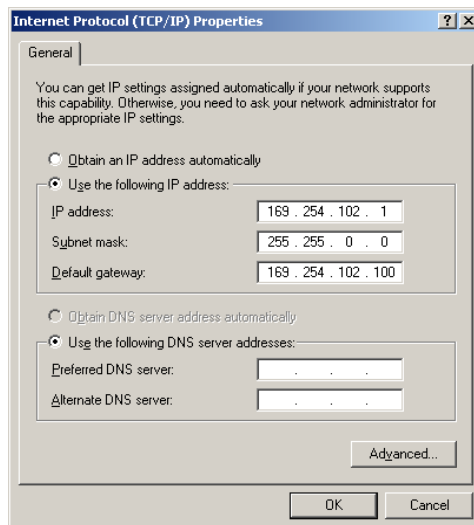


- b. Click on Internet Protocol (TCP/IP) and click <properties>. Change the parameters to the following:

IP Address = 169.254.102.1

Subnet Mask = 255.255.0.0

Default Gateway = 169.254.102.100



- c. Use the Vlinx Modbus Manager Software to search for, discover, and configure the Modbus Gateway.

2. Method 2: Change the Modbus Gateway's network settings to match your PC using Console Mode
  - a. Connect a null modem serial cable (crossover cable) from Port 1 on the Modbus Gateway to an available COM port on your PC.
  - b. Enter Console Mode. Press and hold the Modbus Gateway's Mode switch for 2 to 10 seconds. Release the reset button. The READY LED will blink for five seconds. This indicates that the Modbus Gateway is re-booting in Console Mode.
  - c. When the Modbus Gateway has successfully restarted in Console Mode, the READY LED will be OFF and the PORT 1 LED will be ON.
  - d. Open the Vlinx Modbus Manager Software and select "Serial Port" as the method to connect to the Modbus Gateway.
  - e. After logging in, click on <Network>.
  - f. Un-check the box next to "I Want DHCP to setup the Network."
  - g. Re-configure the Modbus Gateway's network settings to something within the range of your PC's network settings. For example:

PC Network Settings

IP Address = 192.168.0.1

Subnet Mask = 255.255.0.0

Default Gateway = 192.168.0.100

Change the Modbus Gateway's network settings to:

IP Address = 192.168.0.50

Subnet Mask = 255.255.0.0

Default Gateway = 192.168.0.100

- h. Save the settings and remove power from the Modbus Gateway.
- i. Re-apply power. Open the Vlinx Modbus Manager Software and select "Network" as the method to connect to the device.

### **Configuring the MESR321 via the Serial Port (Console Mode)**



Your Modbus gateway can be configured via a serial port using the Vlinx Modbus Manager software. To use this feature the Modbus gateway's serial port must be connected to the serial port of a PC (using a null modem cable).

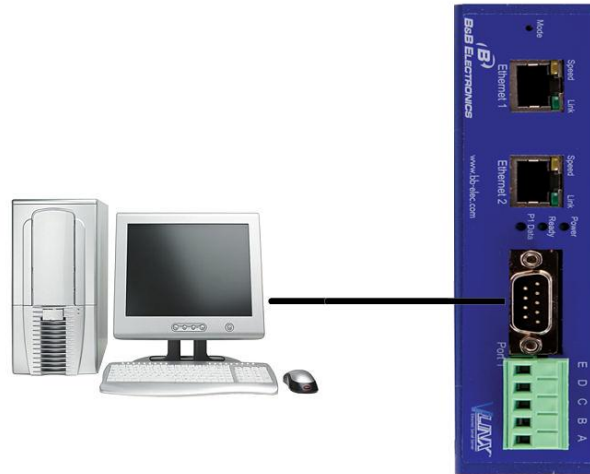


Figure 38. Console Mode Setup

To configure the Modbus gateway it must be put into Console Mode, using the Mode switch.

**To enter Console Mode**, press and hold the Mode switch for between two and ten seconds. The LED indicators respond as follows:

1. The Ready LED blinks while the button is being pressed.
2. When the Modbus gateway has booted into Console Mode the Ready LED will be OFF.

**To configure the Modbus gateway**, open the software and set up the Modbus gateway's parameters as required.

2. Under Connection, select "Serial Port."

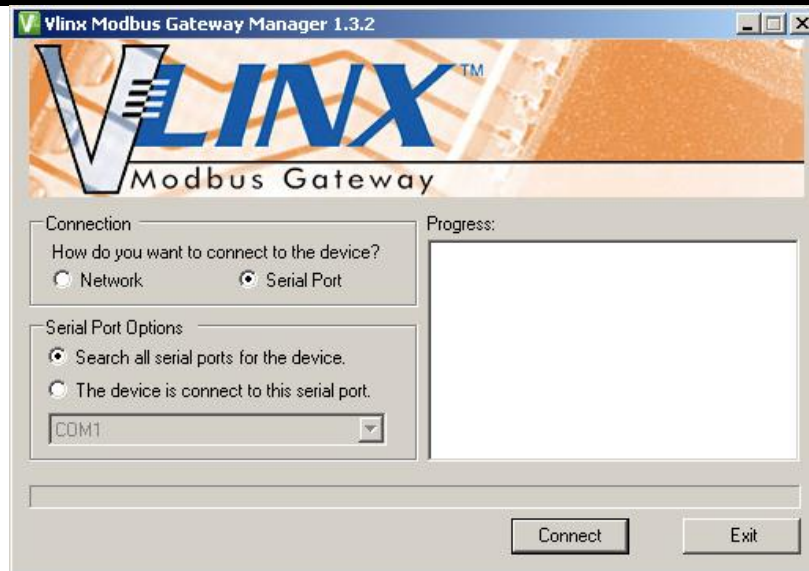


Figure 39. Connection

3. If you do not know which COM port your gateway is connect to, select “Search all serial ports for the device” under Serial Port Options. If you do know, you may specify the COM port by selecting “The device is connected to this serial port” under Serial Port Options and using the pull down menu to choose the COM port.

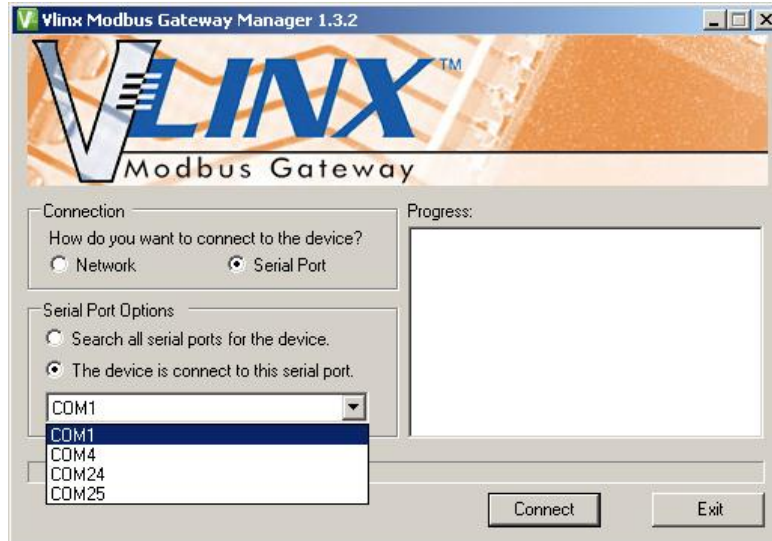


Figure 40. Serial Port Selection

4. The remaining screens are identical to those shown in configuring your gateway using a network connection.

**To exit Console Mode**, press and hold the Reset switch for two seconds.

**Saving your configuration will also take you out of Console Mode.**

The LEDs go back to their normal states when the device resumes normal operation.

## ***MESR321 Operational Connections***

### ***Using MESR321s in Direct IP Mode***

A Direct IP connection allows applications using TCP/IP socket programs to communicate with the COM ports on the Modbus gateway. In this type of application the Modbus gateway is configured as a TCP server. The socket program running on the PC establishes a communication connection with the Modbus gateway. The data is sent directly to and from the serial port on the server.

To set up a Direct IP Mode connection:

1. Connect the Modbus gateway to the network and a Modbus network as described in previous sections.
2. Configure the Modbus gateway with the appropriate network settings (using or the web interface).
3. Configure your software application with the appropriate IP address and port number to communicate with the Modbus network(s).

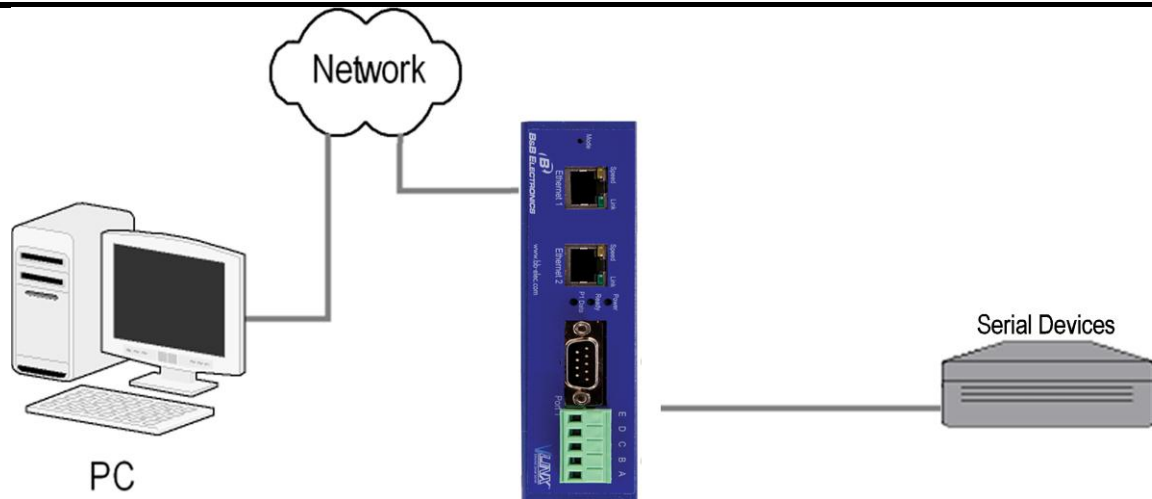


Figure 41. Direct IP Connection

## Initiating a Hardware Reset on the Modbus Gateway

**To initiate a Hardware Reset on the Modbus gateway**, press and hold the Mode switch for 0 to 2 seconds, and then release it. The LED indicators respond as follows:

1. The Ready LED blinks while the button is being pressed.
2. When the Modbus gateway has reset and rebooted into Normal Mode the Ready LED will be blinking.

## Reloading Factory Defaults

**To reload Factory Defaults**, press and hold the Mode switch for more than 10 seconds. The LED indicators respond as follows:

1. The Ready LED blinks three times per second while the button is being pressed.  
The Modbus gateway reloads all factory default configuration parameters. When the device has reset and rebooted the Ready LED will be blinking.
2. The LEDs go back to their normal states when the device resumes normal operation.

Note: Factory default parameters are listed in Appendix A

## 4. Upgrading Firmware

Occasionally, updated firmware may become available for your Modbus gateway. The firmware can be upgraded using the Vlinx Manager software. The following procedure describes the firmware updating process:

1. Click the **Upgrade** button to open the **Firmware Upgrade** dialog box.

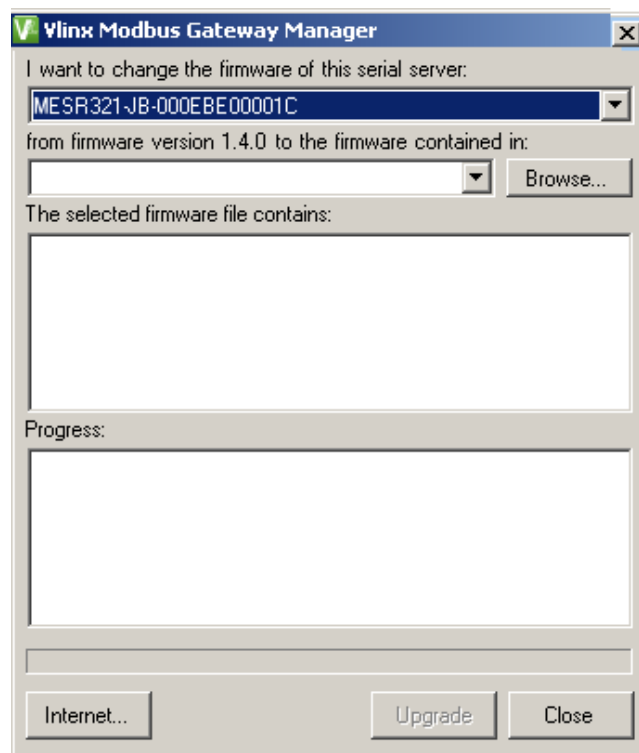


Figure 42. Firmware Upgrade Dialog Box

The name of the currently selected Modbus gateway appears in the top drop down list. Other Modbus gateways (that have already been discovered) can be selected from the drop down list, if desired.

The current firmware version of the selected Modbus gateway is shown in the text below the Modbus gateway name.

Information about the selected firmware file is shown in the third text box.

## Downloading Firmware Files

The **Firmware File** list (second box) displays all firmware files in the firmware installation folder.

### To download the latest firmware files from an FTP site on the Internet:

1. Click the **Internet** button at the bottom of the window.

The Vlinx Modbus Manager software connects to an FTP server on the Internet.

2. Click the **Check for Updates** button.

**Progress Bar** and **Progress Box** display information about and progress of the download.

### To download the latest firmware files from a file:

1. Click the **Browse** button to open an **Open File** dialog box.
2. Browse to the drive and folder containing the firmware file.
3. Select and download the file to the local firmware folder.

## Uploading the Firmware to the Modbus Gateway

### To upgrade the firmware:

1. In the **Modbus Gateway Selection** drop down list, select the Modbus gateway to be upgraded.
2. In the **Firmware Description** drop down list, select the firmware to upload to the Modbus gateway.
3. Click the **Upgrade** button.

**Progress Bar** and **Progress Box** provides information on the progress of the transfer.

4. In the **Firmware File** drop down list, select the firmware file to upload to the Modbus gateway.
5. Click **Upgrade**.

The Progress box and Progress bar display information on the upgrading process.

6. When the upgrade process is complete, click **Close**.

## 5. Diagnostics

Clicking the **Diagnostics** icon opens the **Diagnostics** dialog box and enables you to check the operation of connected Modbus gateways on the local computer.

The **Computer Information** box displays information about the type of network connections, the IP addresses, Subnet Masks and Default Gateways in use.

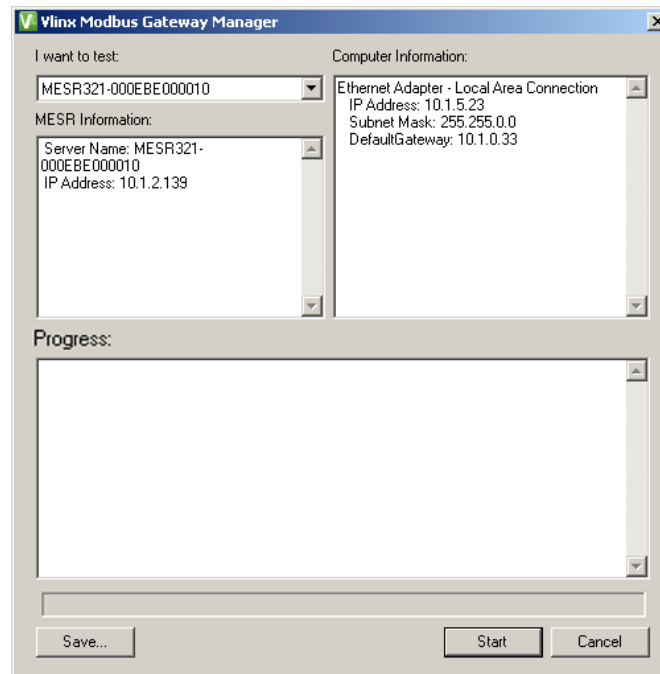


Figure 43. Diagnostics Dialog Box

### Testing a Modbus Gateway Connection

To run diagnostics on a Modbus gateway:

1. Click the **Diagnostics** icon.

The **Diagnostics** dialog box appears.

2. In the drop down box select the specific Modbus gateway you want to check.
3. Click the **Start** button

Information about the progress of the pinging process is displayed in the **Test Progress** box.

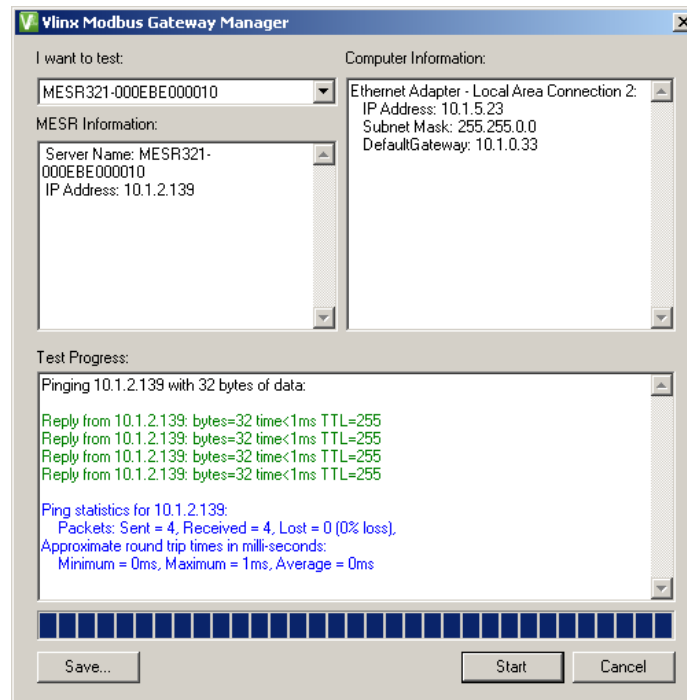


Figure 44. Testing a Modbus Gateway Connection



## **Monitor Function**

The Monitor button is used to display a screen that shows information about events and data transfer through the Modbus Gateway.

To start monitoring, select a Modbus Gateway and press the **“Start”** button.

The **“Auto Scroll”** check box enables and disables automatic scrolling of the displayed text.

The **“Clear”** button clears the displayed text.

Press the **“Stop”** button to stop monitoring.

Press the **“Save”** button to save the information to a file.

## 6. Setup Examples

Modbus gateways can be used to integrate Modbus networks in a wide variety of settings. But as each setting has its own requirements, users may not understand how a gateway helps, or if it's appropriate for their specific needs.

The following scenarios are examples only, and many others are possible. Refer to the Modbus Serial Server page on the B&B Electronics web site for detailed information regarding other applications.

Log into your gateway.

1. Access the serial port one setup screen by clicking the link on the left side of the screen.

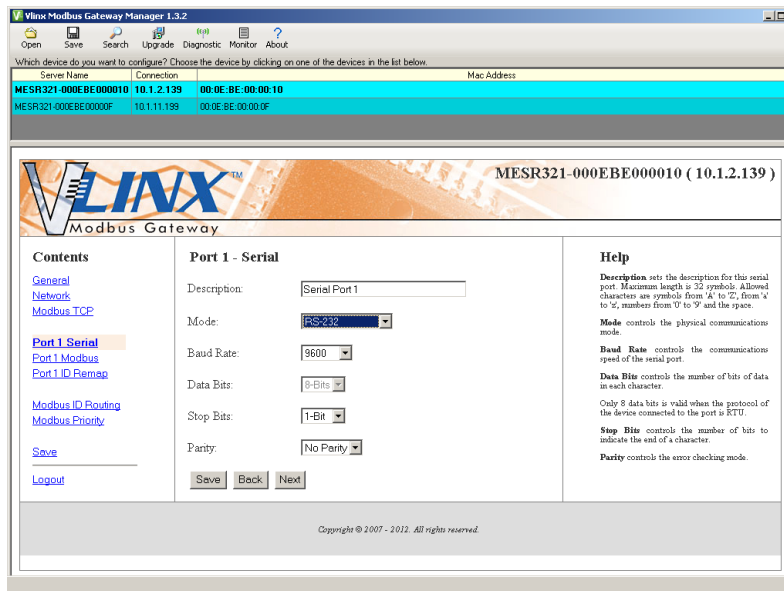


Figure 45. Serial Port 1 Setup

2. Configure Serial Port 1. In this case it is RS-232, 19.2 kbps, 8 data bits, 1 stop bit, and no parity. Save the settings

3. Access Port 1 Modbus by clicking the link on the left side of the screen.

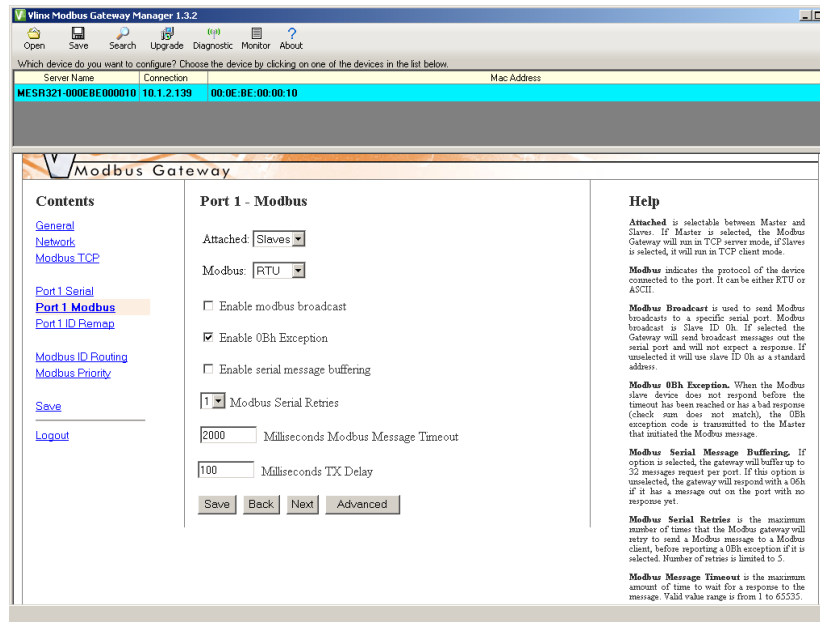


Figure 46. Port 1 Modbus

4. Configure the Port 1 Modbus Settings. In this case Attached should be slaves, Modbus should be RTU. The other settings depend on your application.
5. Configure Port 2 Serial and Modbus in the same fashion.
6. Access Modbus ID Remapping for each port and configure as necessary.

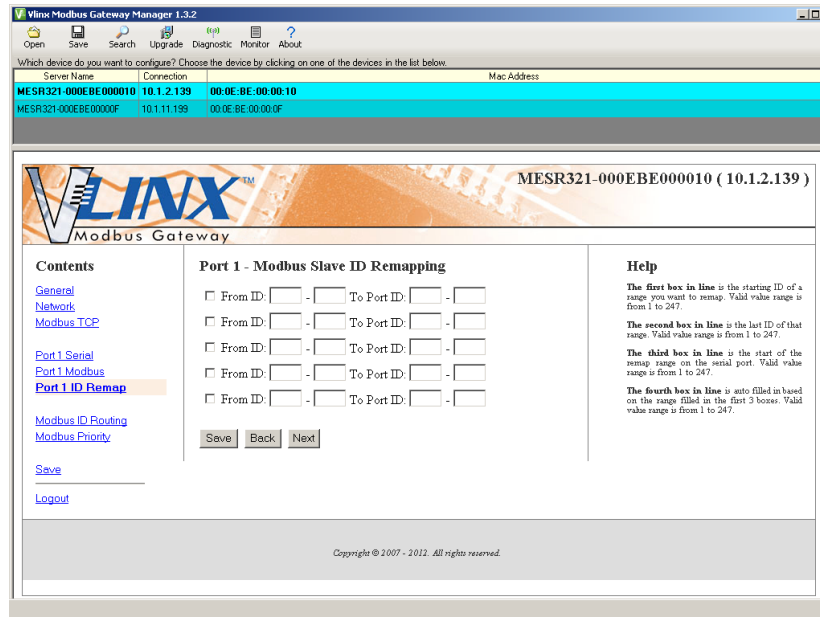


Figure 47. Port 1 Modbus Slave ID Remapping

7. Access Modbus ID Routing. Configure as necessary. In this example, Slave ID 200 is mapped to serial Port 1, Slave ID 1 through 5 and 205 are mapped to serial port 2.

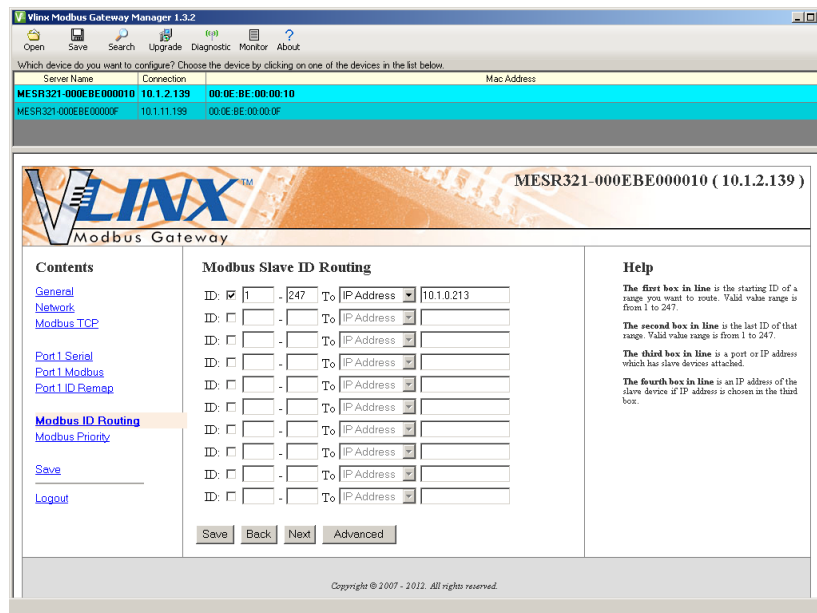


Figure 48. Modbus ID Routing

## 8. Access Modbus Priority and configure as necessary.

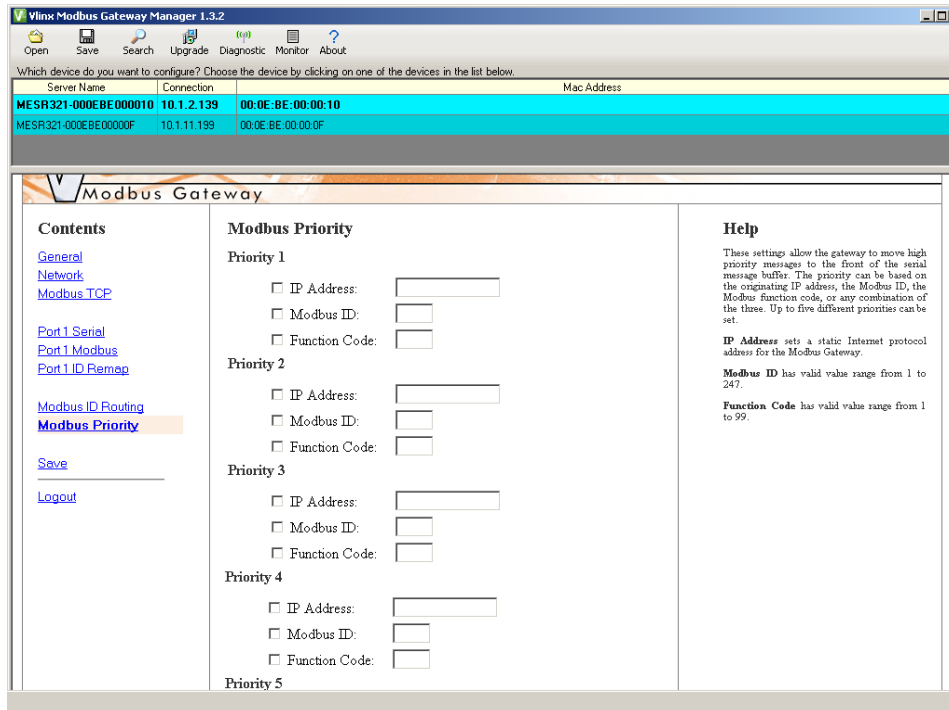


Figure 49. Modbus Priority

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## 7. Modbus Help

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### Modbus ASCII/RTU Basics

The Modbus protocol emerged in the mid-1970s as an early protocol for linking terminals with Modicon PLCs using a master/slave (sometimes called a master/client) relationship. A simple, open, message-based protocol, it caught on quickly and became a de facto standard in the industry. It supports asynchronous point-to-point and multidrop communications and can be used with a variety of serial interfaces (RS-232, RS-422, RS-485, modems, etc).

The original Modbus specification included two possible transmission modes: ASCII and RTU. Modbus RTU mode is the most common implementation, using binary coding and CRC error-checking. Modbus ASCII messages, though somewhat more readable because they use ASCII characters, is less efficient and uses less effective LRC error checking. ASCII mode uses ASCII characters to begin and end messages whereas RTU uses time gaps (3.5 character times) of silence for framing. The two modes are incompatible so a device configured for ASCII mode cannot communicate with one using RTU.

All Modbus communications are initiated by Modbus masters using a polling query/response format. The master can send broadcast messages (using a slave address of 0), which all slaves accept, but do not reply to. More commonly the master polls individual slaves sequentially. In each poll it sends a message containing a **device address**, followed by a **function code**, any **data** that maybe required, and an **error check** field. The addressed slave responds with a similar message structure. Typically it repeats back its address and the function code, and then sends a field indicating the number of bytes of data it is sending, followed by the data and the error check field.

Slave addresses can range from 1 to 247. Function codes include several common ones typically used in all applications, and additional ones that may be implemented in specific cases. Common function codes include: Read Coil Status (01), Read Input Status (02), Read Holding Registers (03) and Read Input Registers (04).

When a master sends a message to a slave it expects to receive a valid response within certain length of time. If the slave does not receive the message, or if the slave receives the message but an error is detected, it does not respond.

If the slave cannot respond appropriately for some other reason (e.g. it does not recognize the function code), it will return a message containing an exception response.

## ***Hints and Tips***

A few simple suggestions that may assist you if your system is experiencing problems include:

- Slowing down the polling rate may be helpful if power cycling doesn't cure the problem.
- A common misperception is that every serial network must terminate with a resistor. While this was true of early serial network configurations, it's typically the wrong answer.

## **8. Appendices**

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This section includes the following Appendices:

- Appendix A: Default Gateway Settings
- Appendix B: Product Specifications
- Appendix C: Dimensional Diagrams
- Appendix D: Connector Pinouts



## Appendix A: Default Gateway Settings

| Setting               | Default Value   |
|-----------------------|---|
| Gateway Name          | User assigned   |
| Password              | password field is blank from factory  |
| DHCP                  | Enabled from factory  |
| IP Address            | DHCP will configure. If a DHCP Server is not available, the unit will default to 169.254.102.39 |
| Net Mask              | 255.255.0.0   |
| Default Gateway       | 169.254.1.1   |
| MAC Address           | Fixed - see bottom label  |
| Firmware Version      | (Vx.x.x)  |
| Hardware Version      | (Vx.x.x)  |
| Port                  | 1   |
| Serial port mode      | RS-485  |
| Baud Rate             | 9600  |
| Data bits             | 8   |
| Parity                | None  |
| Stop bits             | 1   |
| Protocol              | TCP   |
| Serial timeout        | 0 seconds   |
| Inter-character timer | 0 ms  |
| TCP port              | 502   |
| Max connection        | 1   |

## **Appendix B: Product Specifications**

This section includes the following specifications:

- General Specifications
- Controls, Indicators and Connector Specifications
- Serial Interface Specifications
- Network Specifications

## General Specifications

|  |                                  |   |
|--|----------------------------------|---|
| <b>Hardware and included accessories</b>       | Device                           | Modbus gateway module   |
|  | CD                               | CD with software for Win XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), 2008 Server (32/64 bit), Windows 7 (32/64 bit) |
| <b>Optional Accessories</b>                    | Cable                            | 232NM9 Null Modem Crossover Cable for DTE to DTE connection   |
|  | Rail                             | ERS35 one-meter length of steel 35mm DIN Rail   |
| <b>Configuration Options</b>                   | Via serial port                  | Using via a serial connection, (press Reset button to enter Console Mode)   |
|  | Via network                      | Using via a Ethernet connection<br>Using a standard web browser such as Internet Explorer, Firefox or Chrome                        |
| <b>Software</b>                                | for Modbus gateway configuration | Win XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), Windows 7 (32/64 bit), Windows 2008 Server (32/64 bit)              |
| <b>Environment</b>                             | Operating Temperature            | -40 to 80 °C (-40 to 176 °F)  |
|  | Storage Temperature              | -40 to 85 °C (-40 to 185 °F)  |
|  | Operating Humidity               | 10 to 95% non-condensing  |
| <b>Enclosure</b>                               | Rating                           | IP30  |
|  | Mounting                         | DIN rail mount (35 mm)  |
|  | Dimensions                       | 5.5 x 3.5 x 1.4 in (13.9 x 8.7 x 3.5 cm)  |
| <b>Power Supply (External Supply Required)</b> | Voltage Requirements             | 10 to 48 VDC  |
|  | Power Consumption                | 4.0W (Max)  |
| <b>Terminal Blocks</b>                         | Wire Size                        | 28 to 16 AWG  |
|  | Wire Type                        | Copper Wire Only  |
|  | Tightening Torque                | 5 KG-cm   |
|  | Wire Temp Rating                 | 105°C Minimum, Sized for 60°C Ampacity  |
|  | Note                             | One conductor per terminal  |
| <b>Port to Port Isolation</b>                  | Serial to Ethernet               | 2 kV  |
|  | Serial to Power                  | 2 kV  |
|  | Ethernet to Power                | 1.5 kV  |

**Controls, Indicators and Connector Specifications**

|                   |                            |  |
|-------------------|----------------------------|--|
| <b>Switches</b>   | Reset button               | Hold in for 0 to 2 seconds for hardware reset<br>Hold in for 2 to 10 seconds for Console Mode (Do a hardware reset or recycle power to exit Console Mode)<br>Hold in for more than 10 seconds to reset to factory defaults |
| <b>Indicators</b> | Serial LED                 | Color = Green<br>On = Port open<br>Blink = Data traffic  |
|                   | RJ45 Ethernet Link LED     | Color = Green<br>On = 100BaseTX<br>Off = 10BaseT<br>Blink = Data traffic   |
|                   | Ready LED                  | Color = Green<br>Blink (once per second) = System in Normal Mode<br>Off = System in Console Mode   |
|                   | Fiber Ethernet Link LED    | Off= No connection<br>On = 100BaseFX connection  |
| <b>Connectors</b> | 10BaseT/100BaseTX Ethernet | Single RJ-45F (8 pin)  |
|                   | LC fiber                   | LC connector   |
|                   | Serial                     | One DB9M (RS-232) connector and one pluggable lockable 5.08 mm terminal (Rs-422/485)   |
| <b>DC Power</b>   |                            | One barrel plug and one terminal block   |

### Approvals and certifications

|                 |                                      |   |  |
|-----------------|--------------------------------------|---|--|
| Emissions       | FCC Class B, CISPR Class B (EN55022) |   |  |
| CE              | EN61000-6-2:2005                     | (Heavy Industrial)                              |  |
|                 | EN61000-4-2:2008                     | (ESD)   | +/-8kV Contact, +/-15kV Air                |
|                 | EN61000-4-3:2006                     | (RI)  | 10V/m, 80-1000MHz; 3V/m, 1.3 to 2.7 GHz    |
|                 | EN61000-4-4:2004                     | (EFT Burst)                                     | +/-2kV DC ports; +/-1kV signal ports       |
|                 | EN61000-4-5:2005                     | (Surge)   | +/- 0.5 kV DC Ports, +/- 1 kV Signal Ports |
|                 | EN61000-4-6:2005                     | (CI)  | 10 VRMS, 0.15 to 80 MHz                    |
|                 | EN61000-4-8:2001                     | (Magnetic)                                      | 10A/m, 50Hz & 60Hz                         |
| Shock           | IEC60068-2-27                        | 50G peak, 11ms, 3 axes                          |  |
| Vibration       | IEC60068-2-6                         | 10-500Hz, 4G, 3 axes                            |  |
| Freefall (Drop) | IEC60068-2-32                        | 10 total drops from sides, corner and edges, 1M |  |

### Fiber Optic Cable Information

| Mode and Distance   | Wavelength | Output Power   | Receive Sensitivity |
|---------------------|------------|----------------|---------------------|
| Multi-mode (2 km)   | 1310 nm    | -23 to -14 dBm | <=/= -31 dBm        |
| Single-mode (15 km) | 1310 nm    | 15 to -8 dBm   | <=/= -34 dBm        |
| Single-mode (40 km) | 1310 nm    | -5 to 0 dBm    | <=/= -35 dBm        |
| Single-mode (80 km) | 1550 nm    | -5 to 0 dBm    | <=/= -34 dBm        |

### Serial Interface Specifications

|                       |  |
|-----------------------|--|
| Mode Selection        | RS-232/422/485 software selectable   |
| RS-232 lines          | TXD, RXD, RTS, CTS, DTR, DSR, DCD, GND   |
| RS-422 lines (4 wire) | TXDA(-), TXDB(+), RXDA(-), RXDB(+), GND  |
| RS-485 lines (2 wire) | Data(-), Data(+), GND  |
| RS-485 lines (4 wire) | TXDA(-), TXDB(+), RXDA(-), RXDB(+), GND  |
| Baud Rates            | 75, 150, 300, 600, 1200, 2400, 4800, 7200, 9600, 14.4k, 19.2k, 28.8k, 38.4k, 57.6k, 115.2k, 230.4k |
| Data Bits             | 5, 6, 7, 8   |
| Parity                | None, even, odd, mark, space   |
| Stop bits             | 1, 1.5, 2  |
| RS-422/485 biasing    | Auto 1 K ohm pullups and pulldowns   |
| RS-485 data control   | Auto control via MCU   |

## Network Specifications

|                                  |                 |   |
|----------------------------------|-----------------|---|
| Memory                           | Serial Memory   | 8 K-bytes per port  |
|                                  | Network Memory  | 8 K-bytes   |
| TCP Ports                        | 80              | Web Server  |
|                                  | 502             | Modbus client/server port – user configurable                             |
|                                  | 7000            | TCP Configuration   |
| UDP Ports                        | 7000            | UDP Configuration   |
|                                  | 8899            | Device Discovery  |
| Network Communications           | LAN             | 10/100 Mbps Auto-detecting 10BaseT or 100BaseTX                           |
| Network Physical Layer Standards | Ethernet        | IEEE 802.3 auto-detecting & auto MDI/MDX 10BaseT, 100BaseTX and 100BaseFX |
| Protocols Supported              |                 | TCP, IPv4, ARP, HTTP 1.0, ICMP/PING, DHCP/BOOTP                           |
|                                  | IP Mode         | Static, DHCP or Auto IP   |
|                                  | TCP             | User definable  |
| Connection Modes                 |                 | Server, Client,   |
| Search                           |                 | Serial direct COM and Ethernet auto search or specific IP                 |
| Firmware Upgrade                 |                 | Via serial, Ethernet or auto web search                                   |
| Timeouts                         | Modbus Message  | 1 to 65535 ms, default set at 2,000 ms                                    |
|                                  | TX Delay        | 1 to 65535 ms, default set at 10 ms                                       |
|                                  | Custom Timeouts |   |
|                                  | Inter-character | 100 to 5000 ms, default set at 0 – user to set if enabled                 |
|                                  | Inter-message   | 100 to 5000 ms, default set at 0 – user to set if enabled                 |

## Appendix C: Dimensional Diagrams

Figure 50. Dimensional Diagram of an MESR321 Modbus Gateway With Two Copper Ports

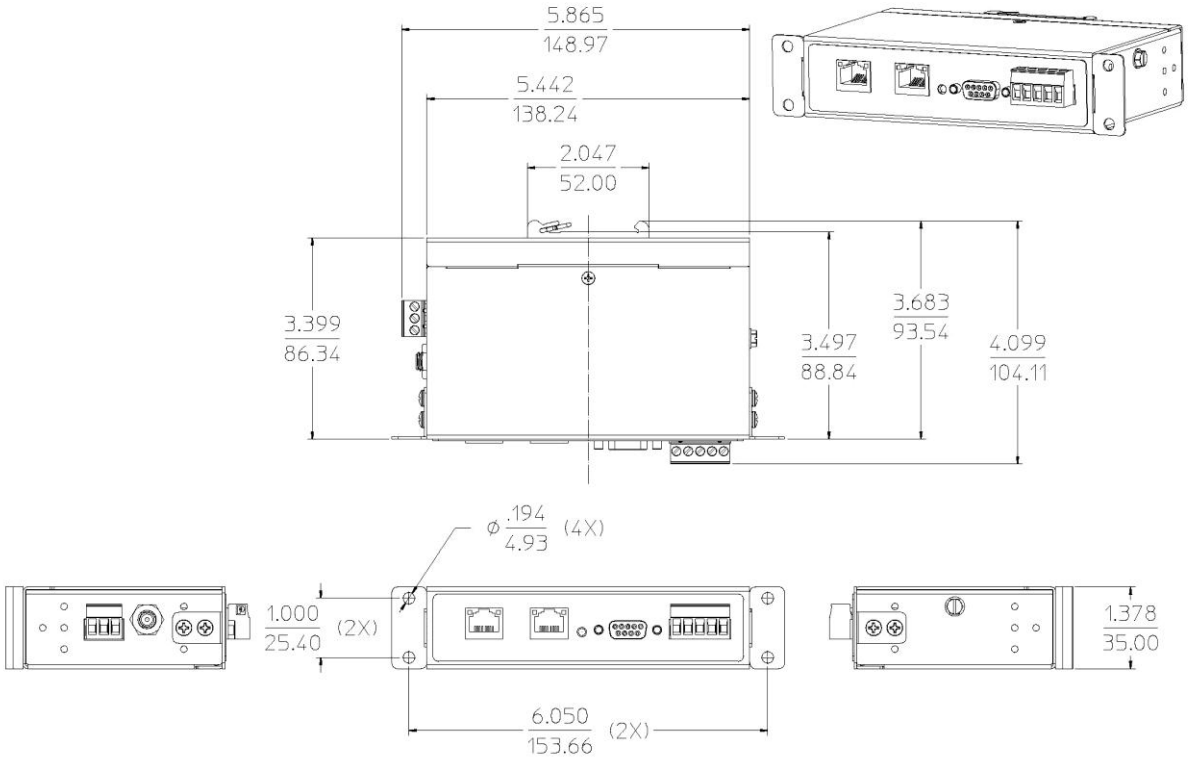




Figure 51. Dimensional Diagram of an MESR321 Modbus Gateway with Two Fiber Ports

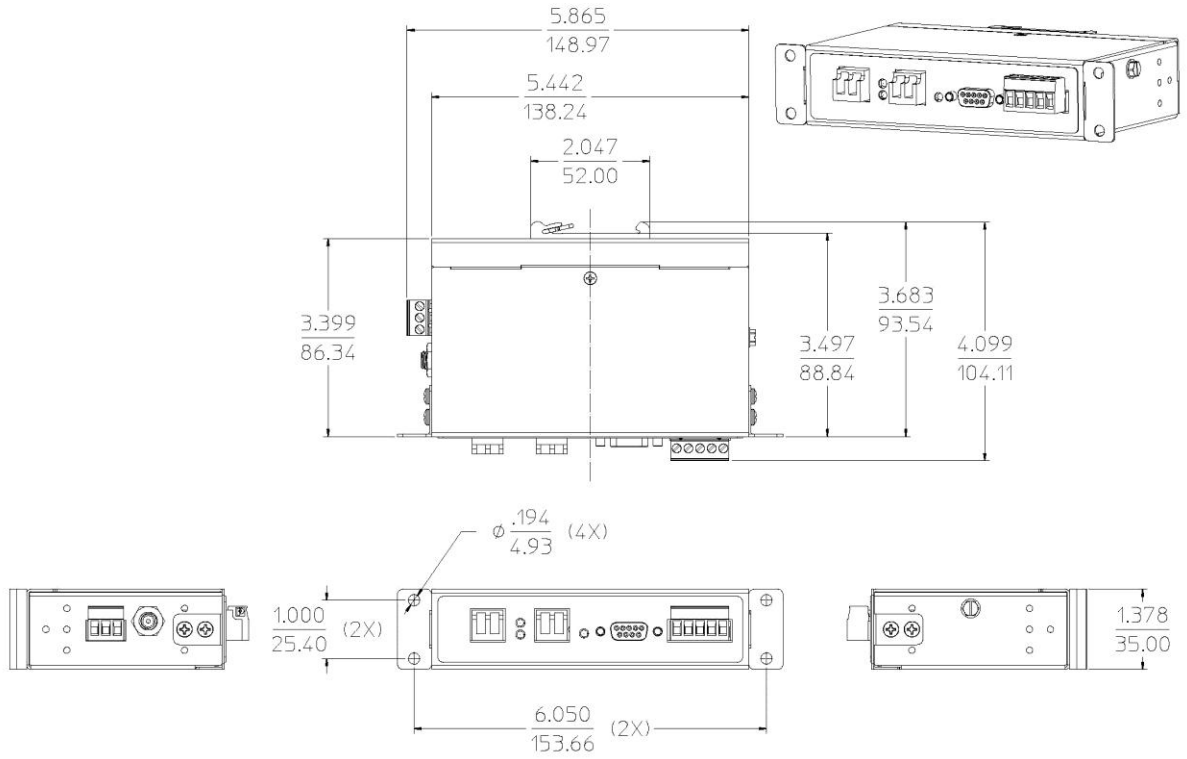
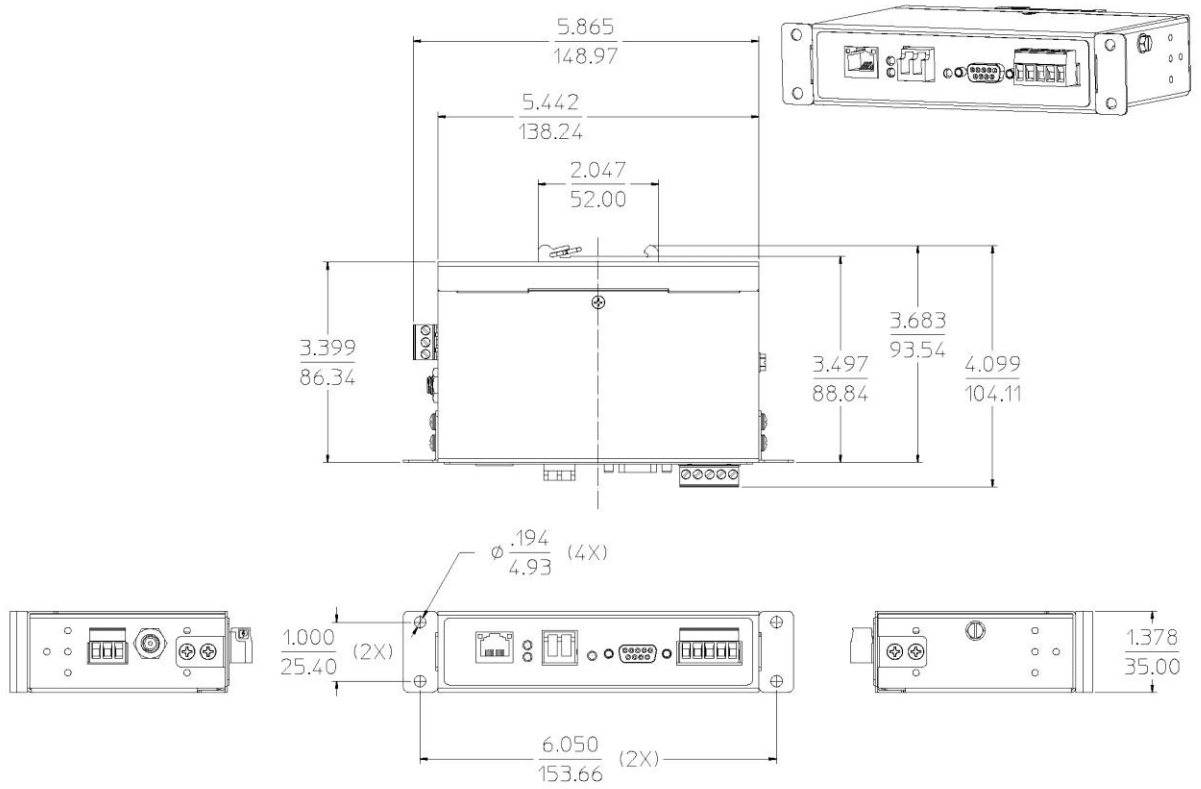
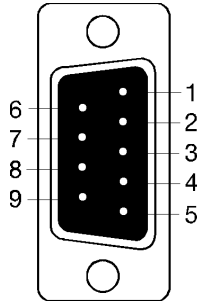


Figure 52. Dimensional Diagram of an MESR321 Modbus Gateway with One Copper and One Fiber Port



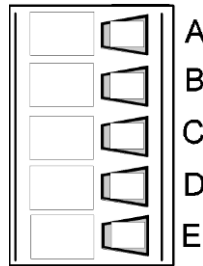
## Appendix D: Connector Pinouts

### MESR321 Serial Port Pinouts



| DB9 M Pin | Direction     | RS-232 |
|-----------|---------------|--------|
| 1         | Input         | DCD    |
| 2         | Input         | RXD    |
| 3         | Output        | TXD    |
| 4         | Output        | DTR    |
| 5         | ---           | GND    |
| 6         | Input         | DSR    |
| 7         | Output        | RTS    |
| 8         | Input         | CTS    |
| 9         | No Connection |        |

### MESR321 Serial Port Pinouts



| Terminal | RS-422  | RS-485     |
|----------|---------|------------|
| A        | TDA (-) | Data A (-) |
| B        | TDB (+) | Data B (+) |
| C        | RDA (-) | ---        |
| D        | RDB (+) | ---        |
| E        | GND     | GND        |

In the RS-422 mode, TX lines are outputs and RX lines are inputs. Connect the Modbus gateway TXB(+) line to the RXB(+) line of the Modbus network, and the Modbus gateway TXA(-) to the RXA(-) of the Modbus network.

Ground is signal ground and provides a common mode reference for the RS-422 Receiver and Transmitters.

## 9. Glossary

| <b>Term</b>           | <b>Definition</b>   |
|-----------------------|---|
| <b>ADU</b>            | Application Data Unit   |
| <b>ASCII</b>          | American Standard Code for Information Interchange  |
| <b>Baud Rate</b>      | Number of bits per second   |
| <b>CRC</b>            | Cyclical Redundancy Checking  |
| <b>Data Bits</b>      | Number of bits per byte, normally 7 with Modbus ASCII, and 8 with Modbus RTU  |
| <b>DHCP</b>           | Dynamic Host Configuration Protocol   |
| <b>Flow Control</b>   | The process of managing the rate of data transmission between two nodes.  |
| <b>Function Code</b>  | A code field that tells the Gateway what kind of action to perform  |
| <b>Modbus Gateway</b> | A bridge to get from Modbus TCP to Modbus Serial  |
| <b>GUI</b>            | Graphical User Interface  |
| <b>IP</b>             | Internet Protocol   |
| <b>IPv4</b>           | Internet Protocol version 4   |
| <b>LED</b>            | Light emitting diode. Used as a visual indicator  |
| <b>MBAP</b>           | MODBUS Application Protocol   |
| <b>MEI</b>            | Multi Electrical Interface via RS-232/422/485   |
| <b>Modbus</b>         | A request/reply protocol and offers services specified by function codes.   |
| <b>Parity Bit</b>     | A binary digit that is added to ensure that the number of bits with value of one in a given set of bits is always even or odd. It may also be a Mark (1), or a Space (0). |
| <b>PDU</b>            | Protocol Data Unit  |
| <b>RS-232</b>         | Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange   |

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| <b>Term</b>     | <b>Definition</b>   |
|-----------------|---|
| <b>RS-422</b>   | Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Point to Point Systems |
| <b>RS-485</b>   | Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems     |
| <b>RTU</b>      | Remote Terminal Unit  |
| <b>Stop Bit</b> | Number of bit times after a character is transmitted before the next character can start transmission.    |
| <b>TCP</b>      | Transmission Control Protocol   |
| <b>Unit ID</b>  | Unit Identifier. This is the same as the slaves address.  |
| <b>MESR</b>     | B&B's Modbus Ethernet Gateway Series  |
| <b>Vlinux</b>   | B&B's family name for the Gateway line  |