# MESR901 Modbus Gateway





**KESSLER-ELLIS PRODUCTS** 

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## 1. Introduction

Thank you for purchasing a MESR901 Modbus Gateway product! This product has been manufactured to the highest standards of quality and performance to ensure your complete satisfaction.



Figure 1. An MESR921 Modbus Gateway

## About MESR901 Modbus Gateways

**MESR901 Modbus Gateways** 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. MESR901 Modbus Gateways feature 10BaseT or 100BaseTX copper network media. MESR901 Modbus Gateways are built for use in industrial environments, featuring an IP30 approved slim line DIN rail mountable case. They operate from a range of DC power supply voltages and feature pluggable terminal block power connectors. An external power supply, sold separately, is required. MESR901 units have one Ethernet port and one serial port.

## MESR901 Modbus Gateway Model Numbering

#### **Model Description**

MESR901 Modbus Gateway with 1 Ethernet Port and 1 Serial Port

## **MESR901 Modbus Gateway Features**

- Four series models
  - MESR901-x (single serial port, single Ethernet Port)
  - MESR902T-x (two serial ports with pluggable terminal blocks, single Ethernet port)
  - MESR921-x (single serial port, two Ethernet Ports)
  - MESR922T-x (two serial ports with pluggable terminal blocks, two Ethernet Ports)
  - On models with two Ethernet Ports, the second port is an Ethernet pass-through port. This port functions much like an unmanaged switch.
- Fiber models available for each of the above series
- Multi-interface serial ports
- DB-9M and pluggable terminal block serial port connector options
- All ports are software selectable as RS-232, RS-422 or RS-485 2- and 4-wire
- Configuration can be done via network 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 2000, XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), 2008 Server (32/64 bit), Windows 7 (32/64 bit)
- Configuration of Ethernet and serial port settings using Vlinx Manager software

## **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. Hardware

## 2. MESR901 Modbus Gateway Hardware

MESR901 Modbus Gateways are enclosed in DIN rail mountable enclosures and feature LED indicators, power, Ethernet and serial connectors and a recessed Mode switch.

#### Package Checklist

MESR901 Modbus Gateways are shipped with the following items included:

- MESR901 Modbus Gateway Module
- Quick Start Guide
- CD with User Manual, Quick Start Guide and firmware, and configuration software.

#### **MESR901 Modbus Gateway Enclosures and Mounting**

The MESR901 Modbus Gateway models are built into enclosures that are DIN rail mountable.



Figure 2. Front View of an MESR901 Modbus Gateway

### **LED** Indicators

MESR901 Modbus Gateways have three types of LED indicators: **Ethernet Link LEDs**, a **Ready LED** and **Serial Port LEDs**.



Figure 3. Ready Ethernet Port LEDs on 1 and 2 Ethernet Port Modbus Gateways

#### E1/E2 Ethernet Link LED

The **Ethernet Link** LED (E1 or E2) illuminates (green) if the Ethernet is connected. When the LED is blinking it indicates that there is data traffic on the Ethernet link.

E1 is used for all models to connect to the network. E2 is used on MESR92X models, and is a pass-through Ethernet connector.

#### Ready LED

The **Ready** LED (green) blinks if the system is operating correctly, once per second in normal operating conditions, or three times per second in reset, configuration mode, or when loading factory defaults. If the LED is off or steady, it indicates the system is not operating correctly.

#### Serial Port LEDs

MESR901-x Modbus Gateways feature one serial port. MESR902D, and MESR902T-x Modbus Gateways feature two serial ports. Each serial port has an associated LED. Serial Port LEDs blink (green) when data is being transmitted or received on the serial port. When the LED is On it indicates the serial port is open.



Figure 4. Serial Port LEDs on 1 and 2 Serial Port Modbus Gateways

## Mode Switch

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

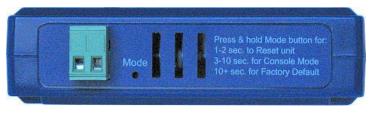


Figure 5. Mode Switch

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**

The MESR901 Modbus gateway uses a 10BaseT/100BaseTX network connection with an RJ45 receptacle. The Modbus gateway is connected to a standard Ethernet network drop using a straight-through RJ45 (male) Ethernet cable.



Figure 6. Ethernet Connectors.

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

## Serial Port Connectors

• MESR901 Modbus Gateways feature one serial port and use a DB-9M connector for RS-232 and a five-position removeable terminal block for RS-422 and RS-485 connections.



Figure 8. DB-9 Female Serial Port Connector



Figure 9. Five-Position Pluggable Terminal Block

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

### **Power Connector**

The power connector is a 2-position pluggable terminal block.



Figure 10. Power Connection

### Mounting Hardware

MESR901 Modbus Gateway modules can be DIN rail mounted. The DIN mounting clip and spring is included on each module.



Figure 11. DIN Clips on Modbus Gateway Modules

## 3. Modbus Gateway 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 for MESR901 units.



Figure 12. MESR Power Connection

#### Connecting MESR901 Modbus Gateways to Modbus networks

MESR901 Modbus Gateways 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 and no flow control implemented.

**RS-422** 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 MESR901

The **MESR901** has one serial connection that supports RS-232, RS-422 and RS-485 (2- and 4-wire). The unit has two connectors: a DB-9M connector and a 5-position terminal block.

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 MESR901 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 DCT ports are complementary, the **Output** signals on a DTE port are *Inputs* to a DCE port, and *Output* signals on 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)	)B9	DTE to DCE Connections	DCE Device (Modern)	DB9	
Pin# DB9 RS-232 Signal Names		Signal Direction	Pin# DB9 RS-232 Signal Names		
#1 Carrier Detector (DCD)	CD		#1 Carrier Detector (DCD)	CD	
#2 Receive Data (Rx)	RD	1∛	#2 Receive Data (Rx)	RD	
#3 Tran smit 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	
#9 Ring Indicator	RI		#9 Ring Indicator	RI	
Soldered to DB9 Metal - Shield	FGND		Soldered to DB9 Metal - Shield	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.

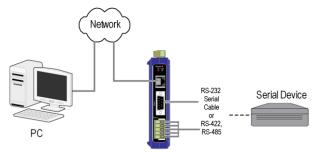


Figure 13. MESR901 Connections

### Connecting MESR901 Modbus Gateways 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.

## **MESR901 Modbus Gateway Configuration Connections**

MESR901 Modbus Gateways 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 16. Modbus Gateway Manager Installation Welcome Screen

b. Click "Next." The License Agreement Screen will be displayed on your computer.

👹 Modbus Gateway Mana	ager Setup	
License Agreement You must agree with the li	icense agreement below to proceed.	
PURCHASE AND L	LICENSE AGREEMENT OF CUSTO <u>PROGRAM</u>	DM SOFTWARE
Date") between B&B Ele	t is entered into prior to this installa ectronics (herein referred to as "B& layton Road, Ottawa, IL 61350 and SER").	B"), with its principal
1. CERTAIN DE	FINITIONS:	<b>•</b>
Wise Installation Wizard (R)	I accept the license agreement     I do not accept the license agreeme        < Back	nt Next > Cancel

Figure 17. 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.

🙀 Modbus Gateway Mar	nager Setup	_ <b>_</b> X
User Information Enter the following inform	nation to personalize your installation.	Ø
Full N <u>a</u> me:	I	1
Organization:		
	pplication can be installed for the current user or for all You must have administrator rights to install the settings l ication for: Anyone who uses this computer O Only for me ()	
Wise Installation Wizard (R)	< Back Next >	Cancel

Figure 18. 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.

🙀 Modbus Gateway Mana	iger Setup		_ <b>_</b> ×			
Destination Folder Select a folder where the a	application will be install	led.	Ø			
The Wise Installation W following folder.	/izard will install the files	s for Modbus Gateway N	fanager in the			
To install into a different You can choose not to Wise Installation Wizard	install Modbus Gatewa					
Destination Folder C:\Program Files\B <u>B</u>	Destination Folder C:\Program Files\B <u>B</u> Electronics\Vlinx\Modbus Gateway Ma\ Browse					
You can install the soft	tware on the following o	drives:				
Volume	Disk Size	Available	Re 🔺			
<b>C</b> :	74GB	58GB				
🖃 H:	7168MB	669MB				
🖃 J:	136GB	32GB				
	136GB	16GB				
Wise Installation Wizard (R) —						
		< Back Next :	Cancel			

Figure 19. 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.

🙀 Modbus Gateway Manager Setup	_ 🗆 🗙
Ready to Install the Application Click Next to begin installation.	Ø
Click the Back button to reenter the installation information or click Cancel to exit the wizard.	
Wise Installation Wizard (R)	Cancel

Figure 20. Ready to Install Application Screen

f. Click "Next." The software will begin installing.

🚰 Modbus Gateway Manager Setup	
Updating System The features you selected are currently being installed.	Ø
Extracting properties	
UserSID	
Wise Installation Wizard (R)	Cancel

Figure 21. Software Installing Screen

g. After the installation is complete, an information screen will be displayed containing contact information and release notes. Click "Next."

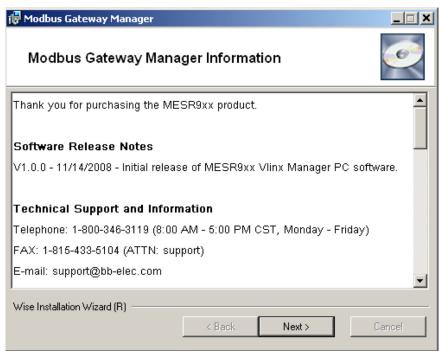


Figure 22. Information Screen

h. Click "Next." The Installation Complete screen will be displayed on your computer. Click "Finish" to finish the installation.



Figure 23. Installation Complete Screen

#### Configuring the MESR901 Modbus Gateway 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**

MESR901 Modbus Gateways can be configured over the network Modbus Configuration manager software running on a PC.

To open Modbus Configuration Manager:

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

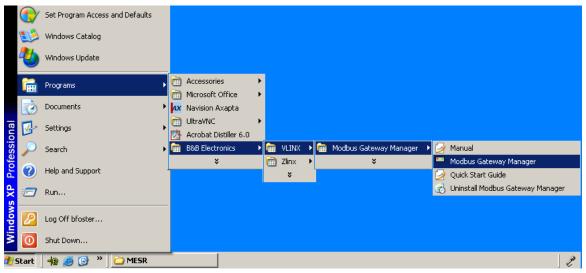


Figure 24. Opening Vlinx Modbus Gateway Manager



Figure 25. Vlinx Modbus Gateway Manager Shortcut Icon

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

Modbus Configuration Manager 1.0.0.0	
Modbus Gateway	
Connection How do you want to connect to the device? • Network • Serial Port	Progress:
Network Options I don't know the IP address of the device. The device is at this IP address.	
	, Connect Exit

Figure 26. Vlinx 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 MESR901 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.

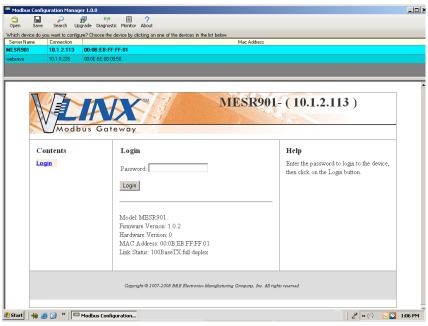


Figure 27. Configuration Manager Screen

- 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. The default password is no password. Click the "Login" button. The "General" Settings screen will be displayed on your computer.
- 6. Vlinx Modbus Manager Settings Screen Overview

Which device do you want to configure           Server Name         Connection           MESR901         10.1.2.113	(*)     (	Mac Addre:	• (10.1.2.113)	× □_
Contents General Network Modbus TCP Port 1 Serial Port 1 D Remap Modbus ID Routing Modbus Priority Save		C	Heip Hodras Gateway Name is a unique name instrumente de barrel i server. It must be a valid instrumente de la dera de by RC-923 and RPC- 123. Name requirements aux 123. Name requirements aux 124. Name da anteres are symbol form 'd' to 2, form 'a' to '2, numbers from '0' to '9' and '2. 15 not allowed to use 'i symbol as the first 16 not anteres ant consist of numbers only. It is not ance ant consist of numbers only.	
Logout	Copyright © 2007-2003 B&B Electronics Manufactu	ring Company, Inc. All rights	s reserved.	

Figure 28. 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

📟 Modbus Config	uration Manage	er 1.0.0		
Open Save		grade Diagnostic Monitor About		
	u want to configu	ire? Choose the device by clicking on one of the devices in the li		
Server Name	Connection		Mac Address	
MESR901	10.1.2.113	00:0B:EB:FF:FF:01		
websave	10.1.0.226	00:0E:BE:00:00:50		
	dbus G		ESR901- (10.1.2.113)	
Contents		General	Help	
General Network Modbus TCF	<b>,</b>	The name of this Modbus Gateway is: MESR901	Modbus Gateway Name is a unique name assigned to the senial server. It must be a valid "hostname" is defined by RFC-952 and RFC- 1123. Name requirements are:	
Port 1 Serial	-	$\Box$ I want to change the password.	<ol> <li>Allowed characters are symbols from 'A' to 'Z', from 'a' to 'z', numbers from '0' to '9' and '- '.</li> </ol>	
Port 1 Modbi Port 1 ID Rer		Save Next	<ol> <li>It's not allowed to use '-' symbol as the first or the last one.</li> </ol>	
Modbus ID F Modbus Prio		1	<ol> <li>The name can't consist of numbers only.</li> </ol>	
Save Logout				
		Copyright © 2007-2008 B&B Electronics Manufacturin	g Company, Inc. All rights reserved.	

Figure 29. 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.

🃟 Modbus Configu	ation Manager 1.0.0	_	. <mark>D X</mark>
😋 🛄 Open Save	Search Upgrade Diagnostic Monitor About		
Which device do you	want to configure? Choose the device by clicking on one of the devices in the list below.		
		Address	
MESR901	10.1.2.113 00:0B:EB:FF:FF:01		
websave	0.1.0.226 00:0E:BE:00:00:50		
	MESR90	01- (10.1.2.113)	-
Contents	General	Help	
<mark>General</mark> <u>Network</u> Modbus TCP	The name of this Modbus Gateway is: MESR901	<b>Modbus Gateway Name</b> is a unique name assigned to the serial server. It must be a valid "bostname" as defined by RFC-92 and RFC- 1123. Name requirements are:	
Port 1 Serial	$\checkmark$ I want to change the password.	<ol> <li>Allowed characters are symbols from 'A' to 'Z', from 'a' to 'z', numbers from '0' to '9' and '-</li> </ol>	
Port 1 Modbu Port 1 ID Rem	Tripo the port pagemend	<ol><li>It's not allowed to use '-' symbol as the first or the last one.</li></ol>	
		<ol><li>The name can't consist of numbers only.</li></ol>	
Modbus ID Re Modbus Prior		<b>Password</b> is the password assigned to the Modbus Gateway. Valid value range is from 'A' to 'Z', 'a' to 'Z', '0' to '9'.	
Save Logout	Save Next	<b>Password Confirmation</b> is the password entered a second time to confirm that it was entered correctly. Valid value range is from 'A' to 'Z', 'a' to 'z', 'U' to 'S'.	
	Copyright © 2007-2008 B&B Electronics Manufacturing Company, Inc. Al	l rights reserved.	

Figure 30. 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.

📟 Modbus Config	uration Manage	er 1.0.0		_ 🗆 ×
Open Save		厚 (10) 🔲 ? grade Diagnostic Monitor About		
		ire? Choose the device by clicking on one of the devices in the list below.		
Server Name	Connection	Mac Addre	\$\$	
MESR901	10.1.2.113	00:0B:EB:FF:FF:01		
websave	10.1.0.226	00:0E:BE:00:00:50		
	odbus G	MESR901-	(10.1.2.113)	ĺ
Contents		Network	Help	
General Network Modbus TCf Port1Serial Port1Modb Port1ID Rei Modbus ID F Modbus Pric Save Logout	- map Routing	✓ I want DHCP to setup the network.           Save         Back         Next	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 configures an IP address in the range of 169.254.0.0 through 169.254.255.255 with a subnet mask 255.255.0.0	
		Copyright © 2007-2008 B&B Electronics Manufacturing Company, Inc. All right	s reserved.	

Figure 31. 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 1169.254.255.255 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.

🏴 Modbus Config	uration Manage	er 1.0.0		_ <u>8</u> ×
😋 🔛 Open Save		诗 (印) <b>日 ?</b> grade Diagnostic Monitor About		
	u want to configu	re? Choose the device by clicking on one of the devices in the list below.		
Server Name	Connection	Mac Addr	ess	
MESR901-	10.1.2.113	00:0B:EB:FF:FF:01		
websave	10.1.0.226	00:0E:BE:00:00:50		
	odbus G	MESR901	- (10.1.2.113)	<u></u>
Contents		Network	Help	
<u>General</u> Network		$\Box$ I want DHCP to setup the network.	DHCP controls whether or not a DHCP server is used to set the IP address, subnet mask and default gateway of the Modbus Gateway.	
Modbus TCF	2	IP Address:	When DHCP option is enabled but the DHCP server is not found, the Modbus Gateway will automatically configure an IP address in the	
Port 1 Serial Port 1 Modbu		Subnet Mask:	range of 169.254.0.0 through 169.254.255.255 with a subnet mask 255.255.0.0	
Port 1 ID Rer		Default Gateway:	IP Address field contains static internet protocol address of the Modbus Gateway.	
Modbus ID P Modbus Prio		Save Back Next	Subnet Mask field contains mask that is used to define sub network.	
Save			For Class A network (IP addresses 0.0.0.0 through 127.255.255.255), the default subnet mask is 255.0.0.0.	
Logout			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	•

Figure 32. Network Settings Screen (DHCP not Selected)

- d. More information about assigning an IP address without using a DHCP Server is contained in the section <u>Configuring the VESR90x Serial Server on Networks</u> 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.

Open       Save       Note       Note       About         Which device do you ward to configure? Choose the devices by dekking on one of the devices in the list below.       Mac Addees:         Server Name       Connection       Mac Addees:         Webswere       101.0.25       00.0E.BE.000.050         Work device do you ward to configure?       Mac Addees:         Webswere       101.0.25       00.0E.BE.000.050         Work device do you ward to configure?       Modbus TCP         General       Nodbus TCP         Connect to Port:       DD2         Port 1 Senial       Connect to Port:       DD2         Port 1 Senial       Response Timeout:       100         Port 1 Senial       Response Timeout:       100         Modbus ID Routing       TCP Server Settings       Machades Gates yn in UCP. Settings         Machadus Flority       Listen on Port       DD2         Listen on Port       DD2       Machadus Gates yn in UCP server settings         Listen on Port       DD2       Machadus Gates yn in UCP server settings         Listen on Port       DD2       Machadus Gates yn in UCP server settings         Listen on Port       DD2       Machadus Gates yn in UCP server settings         Lingout       e and allow everyone to connect	Modbus Configuration Manager 1.0	).0		_ 8 ×
Which device by clicking on one of the devices in the list below.         Server Name       Correction         LESR901       10.1 2.13       00.06.E.EF.FF.F01         websave       10.1 0.225       00.0E.EE.FF.FT.01         Websave       10.1 0.226       00.0E.EE.FF.FF.01         Contents       Modbus TCP       Englassing         General       TCP Client Settings       TCP Client Settings         Part 1.Serial       Response Timeout:       100         Part 1.Modbus       Response Timeout:       100         Valid valas range is from 1 to 6533.       Modbus TCP.       Valid valas range is from 1 to 6533.         Modbus ID Routing       ICF Server Settings       Modbus ICP clouts that can be control:         Modbus ID Routing       Listen on Port:       502       Save         Lagoud       C and allow everyone to connect       C and allo				
Server Name       Connection       Mac Address         MESBOD:       10.1.2.113       00.00:EB:FF:FF:01         websave       10.1.0.205       000:EB:CF:FF:F01         Contents       Modbus TCP       Seneral         Seneral       TCP Client Settings       Connect to Port:         Modbus TCP       Connect to Port:       502         Port 1 Serial       Response Timeout:       100         Port 11:D Remap       Response Timeout:       100         Modbus ID Routing       TCP Server Settings       Listen on Port:       502         Modbus ID Routing       Listen on Port:       502       Maintum Client controls the number of connections ID         Stave       Limit the number of connections to:       16 connections ID       Connect:         Lagoud       @ and allow everyone to connect       C and allow a specific TP address to connect       C and allow a specific Targe of IP addresses to connect		-		
Verbase     101.0.226     000E BE:00.00.50       Modbus Gateway     Holp       Contents     Modbus TCP       General     TCP Client Settings       Modbus TCP     Connect to Port:       Port 1 Serial     Response Timeout:       Port 1 DR emage     Response Timeout:       Modbus ID Routing     TCP Server Settings       Modbus Priority     Listen on Port       Save     Limit the number of connections to:       Lagout     © and allow everyone to connect       © and allow a specific IP address to connect			358	
Modbus Gateway         Contents       Modbus TCP         General       TCP Chent Settings         Modbus TCP       Connect to Port:         Contents       Connect to Port:         Same       Connect to Port:         Port I Serial       Response Timeout:         Port I Demap       TCP Server Settings         Modbus ID Routing       TCP Server Settings         Modbus Priority       Listen on Port:         Saxe       Limit the number of connections to:         Logout       © and allow everyone to connect         © and allow a specific IP address to connect       C and allow a specific range of IP addresses to connect	MESR901- 10.1.2.113 00:	OB:EB:FF:FF:01		
Contents     Modbus TCP       General     TCP Client Settings       Modbus TCP     Connect to Port:       Port1 Serial     Connect to Port:       Port1 Serial     Response Timeout:       Port1 ID Remap     IOD       Modbus ID Routing     TCP Server Settings       Modbus Priority     Listen on Port:       Save     Limit the number of connections to:       Logout     © and allow everyone to connect       C and allow a specific IP addresses to connect       C and allow a specific IP addresses to connect	websave 10.1.0.226 00:0	E:8E:00:00:50		
Contents     Modbus TCP       General     TCP Client Settings       Modbus TCP     Connect to Port:       Pont 1 Serial     Connect to Port:       Pont 1 Serial     Response Timeout:       Pont 1 ID Remap     IOP Server Settings       Modbus Priority     Listen on Port:       Save     Limit the number of connections to:       Logout     © and allow everyone to connect       C and allow a specific IP address to connect				
Contents     Modbus TCP       General     TCP Client Settings       Modbus TCP     Connect to Port:       Port1 Serial     Connect to Port:       Port1 Serial     Response Timeout:       Port1 ID Remap     IOD       Modbus ID Routing     TCP Server Settings       Modbus Priority     Listen on Port:       Save     Limit the number of connections to:       Logout     © and allow everyone to connect       C and allow a specific IP addresses to connect       C and allow a specific IP addresses to connect				
Contents     Modbus TCP       General     TCP Client Settings       Modbus TCP     Connect to Port:       Port1 Serial     Connect to Port:       Port1 Serial     Response Timeout:       Port1 ID Remap     IOD       Modbus ID Routing     TCP Server Settings       Modbus Priority     Listen on Port:       Save     Limit the number of connections to:       Logout     © and allow everyone to connect       C and allow a specific IP addresses to connect       C and allow a specific IP addresses to connect	Modbus Gat	eway		<b>_</b>
General       TCP Client Settings         Modbus TCP       Connect to Port:         Port 1 Serial       Connect to Port:         Port 1 Serial       Response Timeout:         Port 1 LD Remap       TCP Server Settings         Modbus ID Routing       TCP Server Settings         Modbus Priority       Listen on Port:         Seve       Limit the number of connections to:         Logout       © and allow everyone to connect         © and allow a specific IP address to connect       © and allow a specific IP addresses to connect				
Server       Listen on Port:       502         Modbus TCP       Connect to Port:       502         Port 1 Serial       Response Timeout:       100         Port 1 ICP Remap       TCP Server Settings       Listen on Port:         Modbus ID Routing       TCP Server Settings       Maximum Clents controls which TCP elients that can be connected.         Serve       Listen on Port:       502         Logout       © and allow everyone to connect       © and allow a specific IP address to connect	Contents	Modbus TCP	Help	
Connect to Port:       502         Port 1 Serial       Response Timeout:         Port 1 I/D Remap       Response Timeout:         Modbus ID Routing       TCP Server Settings         Modbus Priority       Listen on Port:         Save       Limit the number of connections to:         Logout       © and allow everyone to connect         C and allow a specific IP address to connect       C and allow a specific IP addresses to connect	Network	TCP Client Settings	used by the Modbus Gateway in TCP client mode. Valid value range is from 1 to 65535.	
Port 1 Modbus       Response Timeout:       100         Port 1 ID Remap       Isten on port identifies TCP port to be used by the Modbus Gateway in TCP server mode.         Modbus ID Routing       TCP Server Settings         Modbus Priority       Listen on Port:         Save       Limit the number of connections to:         Logout       © and allow everyone to connect         C and allow a specific IP address to connect         C and allow a specific range of IP addresses to connect		Connect to Port: 502	of time to wait for a response to request that is sent to the device connected through TCP.	
Modbus ID Routing Modbus Priority       TCP Server Settings       simultaneous TCP clients that can be connected.         Save       Listen on Port:       502       Connection Filter Mode controls which TCP clients can connect.         Logout       © and allow everyone to connect C and allow a specific IP address to connect       •         C and allow a specific IP address to connect       •       •         C and allow a specific range of IP addresses to connect       •       •		Response Timeout: 100	by the Modbus Gateway in TCP server mode.	
Logout Listen on Port: 502 Limit the number of connections to: 16 connections  Connection Filter Mode controls which TCP clients can connect. C and allow a specific Trage of IP address to connect C and allow a specific range of IP addresses to connect C and allow a specific range of IP addresses to connect		TCP Server Settings	simultaneous TCP clients that can be	
Limit the number of connections to: 16 connections		Listen on Port: 502		
• and allow everyone to connect • and allow a specific IP address to connect • and allow a specific range of IP addresses to connect	Save	Limit the number of connections to: 16 connections		
C and allow a specific IP address to connect C and allow a specific range of IP addresses to connect	Logout			
		○ and allow a specific ℙ address to connect ○ and allow a specific range of ℙ addresses to connect		

Figure 33. 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.

📟 Modbus Config	juration Manage	r 1.0.0		_ 8 ×
😂  🔛	P 1	9 9 2 ?		
Open Save		rade Diagnostic Monitor About		
Server Name	Connection	e? Choose the device by clicking on one of the devices in the list below. Mac Addr	855	
MESR901		00:0B:EB:FF:FF:01		
websave	10.1.0.226	00:0E:BE:00:00:50		
Modbus ID F		TCP Server Settings	simultaneous TCP clients that can be connected.	
Modbus Pric	onty	Listen on Port: 502	Connection Filter Mode controls which TCP clients can connect.	
Logout		Limit the number of connections to: 16 connections 💌		
		<ul> <li>C and allow everyone to connect</li> <li>              œ and allow a specific IP address to connect          </li> <li>C and allow a specific range of IP addresses to connect     </li> </ul>		
		These are the IP addresses I want to allow to connect.		
		☑ IP address: 0.0.0.0		
		□ IP address: 0.0.0.0		
		□ IP address: 0.0.0.0		
		□ IP address: 0.0.0.0		
		Save Back Next		

Figure 34. 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.

📟 Modbus Config	guration Manag	er 1.0.0	_ 8 ×
Gen Save	Search Up	過 ((i) 目 ? grade Diagnostic Monitor About	
Which device do y	you want to configu	ure? Choose the device by clicking on one of the devices in the list below.	
Server Name	Connection	Mac Address	
MESR901	10.1.2.113	00:08:E8:FF:FF:01	
websave	10.1.0.226	00:0E:8E:00:00:50	
Logout			
		C and allow everyone to connect	
		C and allow a specific IP address to connect	
		• and allow a specific range of IP addresses to connect	
		These are the IP address range I want to allow to connect:	
		□ IP address: 0.0.0.0 through:	
		0.0.0	
		□ IP address: 0.0.0.0 through:	
		0.0.0.0	
		□ IP address: 0.0.0.0 through:	
		0.0.0	
		□ IP address: 0.0.0.0 through:	
		0.0.0	
		Save Back Next	

Figure 35. TCP Connection Filter "Allow Specific Range of IP Addresses to Connect

#### 10. PORT x Serial Settings

- a. To access this screen, click the "Next" button or click the Port X Serial link on the left side of the screen. X = The Serial Port number (1 or 2).
- b. This screen allows you to change the serial port settings.



Figure 36. Serial Port Screen

- c. 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.
- d. Mode Controls the physical communications mode for the. The Mode can be RS-232, RS-422 (4-Wire), RS-485 (2-Wire), or RS-485 (4-Wire).
- e. Baud Rate Controls the communications speed of the serial port. The Baud Rate can be 2400, 7200, 9600, 14400, 19200, 14400, 28800, 38400, 57600, 115200, or 230400.
- f. Stop Bits Controls the number of bits to end a character. Choices are 1 or 2.
- g. Parity Controls the error checking mode. Choices are Odd, Even, Mark, or Space.
- h. Save settings by clicking the "Save" button.
- 11. Port X Modbus

- a. To access this screen, click the "Next" button or click the "Port X Modbus" Link on the left side of the screen. X = The Serial Port Number (1 or 2).
- b. This screen allows you to change the Modbus settings for the port.

📟 Modbus Config	uration Manag	er 1.0.0	
😋 🛄 Open Save		房 (空) 目 ? grade Diagnostic Monitor About	
	u want to configu	ire? Choose the device by clicking on one of the devices in the list below.	
Server Name	Connection	MacAdo	dress
MESR901-	10.1.2.113	00:0B:EB:FF:FF:01	
websave	10.1.0.226	00:0E:BE:00:00:50	
	odbus G	ateway	-(10.1.2.113)
Contents		Port 1 - Modbus	Help
General Network Modbus TCF	2	Attached: Master • Modbus: RTU •	Attached is selectable between Master and Slaves IF Master is selected, the Modeu Gateway will mun in TCP server mode, if Slaves is selected, it will run in TCP client mode. Modeu indicates the protocol of the device
Port 1 Serial			connected to the port. It can be either RTU or ASCII.
Port 1 Mod Port 1 ID Rer		Enable modbus broadcast	<b>Modbus Broadcast</b> is used to send Modbus broadcasts to a specific serial port. Modbus broadcast is Slave ID Oh. If selected the
Modbus ID F		<ul> <li>Enable 0Bh Exception</li> <li>Enable serial message buffering</li> </ul>	Gateway will send broadcast messages out the serial port and will not expect a response. If unselected it will use slave ID Oh as a standard address.
Modbus Prio	<u>my</u>	Image of an encoded of the second	Modbus OBh Exception. When the Modrus slave device does not respond before the timeout has been reached or has a bad response (check sum does not match), the OBh exception code is transmitted to the Master that mittated the Modess message.
		100     Milliseconds TX Delay       Save     Back       Next     Advanced	Modbus Serial Message Buffering. If option is selected, the gateway will buffer up to 32 messages request per port. If this option is uuselected, the gateway will respond with a 06h if it has a message out on the port with no response yet.
			Modbus Serial Retries is the maximum number of times that the Modbus gateway will

Figure 37. Modbus Port Screen

- c. 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.
- d. Modbus indicates the protocol of the device connected to the port. It can be either RTU or ASCII.
- e. 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.
- f. 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.
- g. 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.

- h. 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.
- i. 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.
- j. 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.
- k. Save settings by clicking the "Save" button.

12. Port x ID Remap

- a. To access this screen, click the "Next" button or click the "Port x ID Remap" link on the left side of the screen.
- b. This screen allows you to set Modbus Slave ID Remap settings.

📟 Modbus Configuration Manage	r 1.0.0		_ 🗆 ×
	الم (م) 🗐 ? rade Diagnostic Monitor About		
	e? Choose the device by clicking on one of the devices in the list below.		
Server Name Connection	Mac Addre	888	
MESR901- 10.1.2.150	00:0B:EB:FF:FF:01		
websave 10.1.0.226	00:0E:BE:00:00:50		
	MESR901	-(10.1.2.150)	
Modbus G	ateway		
Contents	Port 1 - Modbus Slave ID Remapping	Help	
<u>General</u> Network	□ From Port □ - □ To ID: D: - □ - □ - □ - □ - □ - □ - □ - □ - □ -	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 255.	
Modbus TCP Port1 Serial	□ From Port □ - □ To D: D: - □ - □ - □	The second box in line is the last serial port of that range. Valid value range is from 1 to 255.	
Port 1 ID Remap	□ From Port □ - □ To D: D: - □ - □ - □ - □ - □ - □ - □ - □ - □ -	The third box in line is the starting ID of a range to remap to. Valid value range is from 1 to 255.	
Modbus ID Routing	□ From Port □ - □ To ID: □D: - □ - □ □	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 255.	
Modbus Priority Save	□ From Port □ - □ To ID: - □		
Logout	Save Back Next		

Figure 38. 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 255.
- d. The second box in line is the last serial port of that range. Valid value range is from 1 to 255.

- e. The third box in line is the starting ID of a range to remap to. Valid value range is from 1 to 255.
- 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 255.
- 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.

Modbus Configuration Manager 1	(p) 🗐 ?	
Open Save Search Upgrad	le Diagnostic Monitor About Choose the device by clicking on one of the devices in the list below. Mac Addre	**
	D:0B:EB:FF:FF:01	**
	):0E:BE:00:00:50	
General Network Modbus TCP Port 1 Serial Port 1 Modbus Port 1 ID Remap Modbus 1D Routing Modbus Priority Save Logout	ID:       -       To       101.0.213         IP:       -       To       101.0.213         ID:       -       To       101.0.213         ID:       -       To       112.0.213         ID:       -       To       1	The first box in line is the starting ID of a range you want to route. Valid value range is from 1 to 255. The second box in line is the lot ID of that range. Valid value range is from 1 to 255. The third box in line is a port or IP address which has slave devices attached. The forum there in line is an IP address of the slave device if IP address is chosen in the third box.
	ID: - To IPAddress V Save Back Next Advanced	

Figure 39. 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.

Modbus Configuration Manager 1.	0.0			_ 🗆 🗡
🖄 🛄 🔎 👸 Open Save Search Upgrade	(()) () Diagnostic Monitor About			
	<ul> <li>Diagnostic Monitor About</li> <li>Choose the device by clicking on one of the device</li> </ul>	es in the list helow		
Server Name Connection	should be device by clicking on one of the device	Mac Address		- -
Modbus Gat	eway			
Contents	Modbus Priority		Help	
General Network Modbus TCP Port 1 Serial Port 1 Modbus Port 1 ID Remap Modbus ID Routing Modbus Priority Save Logout	Priority 1      Priority 1      Priority 1      P Address:      Modbus ID:      Function Code:  Priority 2      Priority 3      IP Address:      Modbus ID:      Function Code:  Priority 4      IP Address:      Modbus ID:      Function Code:  Priority 4      IP Address:      Modbus ID:      Function Code: Priority 5      IP Address:      Modbus ID:      Function Code: Priority 5      IP Address:      Modbus ID:      IP Address:      Modbus ID:     IP Address:     IP Address     IP Addres     IP Address     IP Address     IP Address     IP A		Introp. These settings allow the gateway to move high priority messages to the front of the senal message buffer. The priority can be based on the originating IP address, the Modbus ID, the Modbus IP address is the internet protocol address for the Modbus ID and valid value range from 1 to 255. Modbus ID has valid value range from 1 to 59.	
	Tunction Cado.			

Figure 40. 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

MESR901 Modbus Gateways can be configured over the network using a standard internet 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.

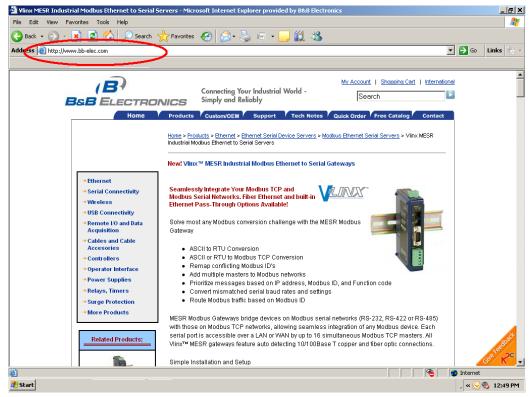


Figure 41. Open Web Browser

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

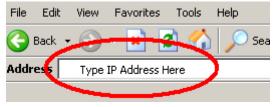


Figure 42. Type IP Address

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.

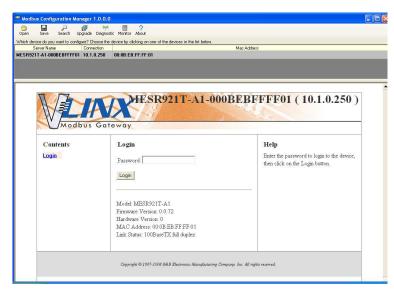


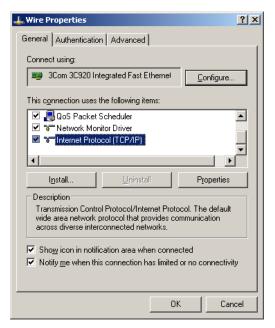
Figure 43. Modbus Gateway Login Screen

3. The screens for configuring your gateway using a web browser are the same as those used to configure using the <u>Vlinx Modbus Manager software</u>.

# Configuring the MESR901 Modbus Gateway 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 <u>169.254.102.39</u>. 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

Internet Protocol (TCP/IP) Propertie	s ?x				
General					
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.					
O Obtain an IP address automatical	y				
Use the following IP address: —					
IP address:	169.254.102.1				
S <u>u</u> bnet mask:	255.255.0.0				
Default gateway:	169 . 254 . 102 . 100				
O Obtain DNS server address autor	natically				
Use the following DNS server add	Iresses:				
Preferred DNS server:	· · ·				
Alternate DNS server:	· · ·				
Advanced					
	OK Cancel				

c. Use the Vlinx<sup>™</sup> 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. Open Hyper Terminal or similar serial emulation software and connect to the COM port used in step one. Ensure the port is configured to 115,200 baud, 8 data bits, no parity, and 1 stop bit.
  - c. Enter Console Mode. Press and hold the Modbus Gateway's for 2 to 10 seconds. The LED indicators will respond as follows:

Model	Port 1 LED	Port 2 LED	Ready LED
MESR9x1	OFF	XXXXXXX	ON
MESR9x2	OFF	ON	OFF

- d. Release the reset button. The READY LED will blink once per second for five seconds. This indicates that the Modbus Gateway is re-booting in Console Mode.
- e. When the Modbus Gateway has successfully restarted in Console Mode, the READY LED will be OFF and the PORT 1 LED will be ON.
- f. Open the Vlinx<sup>TM</sup> Modbus Manager Software and select "Serial Port" as the method to connect to the Modbus Gateway.
- g. After logging in, click on <Network>.
- h. Un-check the box next to "I Want DHCP to setup the Network."
- i. 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

- j. Save the settings and remove power from the Modbus Gateway.
- k. Re-apply power. Open the Vlinx<sup>™</sup> Modbus Manager Software and select "Network" as the method to connect to the device.

## *Configuring the MESR901 Modbus Gateway via the Serial Port (Console Mode)*

Your Modbus gateway can be configured via a serial port using Vlinx Modbus Manager. 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 44. 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 three times per second while the button is being pressed.
- 2. The Modbus gateway is in Console Mode when:
  - On the MESR901: Port 1 LED is On and the Ready LED is Off.

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

1. Under Connection, select "Serial Port."

Modbus Configuration Manager 1.0.0	
Connection How do you want to connect to the device? Network © Serial Port Serial Port Options Serial Port Options	a y Progress:
C The device is connect to this serial port.	Connect Exit

Figure 45. Connection

2. 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.

Modbus Configuration Manager 1.0.0		
Modbus Gateway		
	gress:	
Serial Port Options C Search all serial ports for the device. The device is connect to this serial port.		
COM1		
СОМ1 СОМ2 СОМ16 СОМ17	Connect	Exit

Figure 46. Serial Port Selection

3. The remaining screens are identical to those shown in configuring your gateway using a <u>network connection</u>.

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

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

#### **MESR901 Modbus Gateway Operational Connections**

MESR901 Modbus Gateways can operate in Direct IP Mode.

#### Using MESR901 Modbus Gateways 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 Vlinx Modbus Manager or the web interface).
- 3. Configure your software application with the appropriate IP address and port number to communicate with the Modbus network(s).

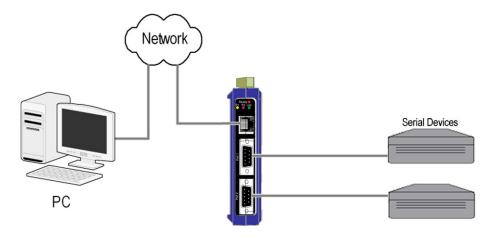


Figure 47. Direct IP Connection

#### 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 three times per second while the button is being pressed.
- 2. The Modbus gateway is in Reset Mode when:
  - On the MESR901: Port 1 LED is On and the Ready LED is Off.
- 3. The LEDs go back to their normal states when the device resumes normal operation.

### **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.
- 2. The Modbus gateway is in Factory Default Mode when:
  - On the MESR901: Port 1 LED and the Ready LED are both On.
  - The Modbus gateway reloads all factory default configuration parameters.
- 3. The LEDs go back to their normal states when the device resumes normal operation.

Note: Factor default parameters are listed in Appendix A

# 4. Upgrading the Modbus Gateway Firmware

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

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

📼 Vlinx Manager		
I want to change the firmwar	e of this serial server:	
VESR901-000EBE000001		
from firmware version 1.0.0 t	to the firmware contained	in:
SS-V1_0_1.hex		•
The selected firmware file cor	ntains:	
This firmware increases the Progress:	port connection speed.	
Writing record 1022 of 1024 Writing record 1023 of 1024 Writing record 1024 of 1024 The firmware has been char	4. OK 4. OK	
Internet Browse	Upgrade	Close

Figure 48. 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. Only firmware that is compatible with the selected Modbus gateway is available in this list.

#### 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 Modubs Manager 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.

📟 Modbus Configuration Manager	
I want to test:	Computer Information:
MESR921	Ethernet Adapter - Local Area Connection:
Vlinx Information:	Subnet Mask: 255.255.255.0
Server Name: MESR921 IP Address: 192.168.0.5	DefaultGateway: 192.168.0.1
Test Progress:	
	~
Save	StartCancel

Figure 49. 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.

Modbus Configuration Manager	
I want to test:	Computer Information:
MESR921	Ethernet Adapter - Local Area Connection:
Vlinx Information:	IP Address: 192.168.0.2 Subnet Mask: 255.255.255.0
Server Name: MESR921 IP Address: 192.168.0.5	DefaultGateway: 192,168.0.1
Test Progress: Pinging 192.168.0.5 with 32 bytes of data:	
Reply from 192.168.0.5: bytes=32 time<1ms 1 Reply from 192.168.0.5: bytes=32 time<1ms 1 Reply from 192.168.0.5: bytes=32 time<1ms 1 Reply from 192.168.0.5: bytes=32 time<1ms 1	TL=255 TL=255
Ping statistics for 192.168.0.5: Packets: Sent = 4, Received = 4, Lost = 0 Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average	
Save	Start Cancel

Figure 50. 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. Application 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. Contact B&B Electronics technical support for information on other applications.

#### **Ethernet Master and Serial Slaves**

Your Modbus gateway can be used to integrate serial slave devices on a Modbus TCP network. This allows TCP Masters to control serial slave devices. The example below is using a gateway with two serial ports.

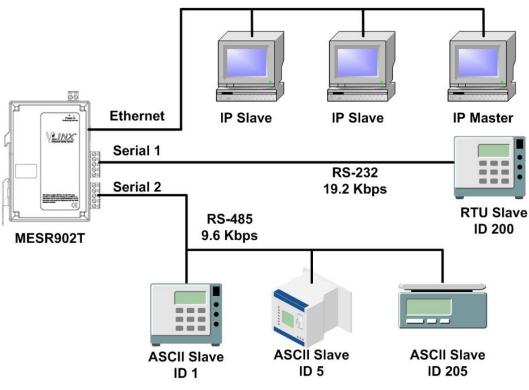


Figure 51. Ethernet Master With Serial Slaves

- 1. Log into your gateway.
- 2. Access the serial port one setup screen by clicking the link on the left side of the screen.

odbus Configuration Mana		
	Jpgrade Diagnostic Monitor About	
	gure? Choose the device by clicking on one of the devices in the list below.	
Server Name C 902T-000BEB000040 1	Connection 0.1.2.121 00:08:EB:00:00:40	Mac Address
	0.1.2.121 00.08:E8:00:00:40	
5021-000BEB000045	0.12.123 00.00.28.00.00.43	
	MESR902T-0	00BEB000040 (10.1.2.121)
	WILDIC OLI O	000000000 (10.112.121)
Modbus	Gateway	
Contents	Port 1 - Serial	Help
eneral etwork	Description: Serial Port 1	Description sets the description for this serial port. Maximum length is 32 symbols. Allowed characters are symbols from 'X to 27, from 'X'
odbus TCP		to 'z', numbers from '0' to '9' and the space.
	Mode: RS-232	Mode controls the physical communications mode.
ort 1 Serial	Baud Rate: 9600	Baud Rate controls the communications speed of the serial port.
ort 1 ID Remap		Data Bits controls the number of bits of data
	Data Bits: 8-Bits	in each character.
ort 2 Serial	Stop Bits: 1-Bit	Only 8 data bits is valid when the protocol of the device connected to the port is RTU.
ort 2 Modbus	Stop Bits.	Stop Bits controls the number of bits to
ort 2 ID Remap	Parity: No Parity -	indicate the end of a character.
odbus ID Routing		Parity controls the error checking mode.
odbus Priority	Save Back Next	
ave		
qout		
La contra de		
	Copyright @ 2007-2008 B&B Electronics Manufacturing Company,	Inc. All rights reserved.

Figure 52. Serial Port 1 Setup

- 3. Configure Serial Port 1. In this case it is RS-232, 19.2 kbps, 8 data bits, 1 stop bit, and even parity. Save the settings
- 4. Access Port 1 Modbus by clicking the link on the left side of the screen.

lodbus Configuration Manage	er 1.0.0		_ 0
	<b>B</b> (m) <b>B</b> (?)		
	grade Diagnostic Monitor About		
	re? Choose the device by clicking on one of the devices in the list below.	Mac Address	
GR902T-000BEB000040 10.	Watcher Conner		
R902T-000BEB000043 10.1	1.2.123 00:08:EB:00:00:43		
	MESR002T_0001	<b>3EB000040 (10.1.2.121)</b>	
	WIESICO21-0001	DED000040 (10.1.2.121)	
Modbus G	ateway		
Contents	Port 1 - Modbus	Help	
General		Attached is selectable between Master and	
Network	Attached: Slaves -	Slaves. If Master is selected, the Modbus Gateway will run in TCP server mode, if Slaves	
Modbus TCP		is selected, it will run in TCP client mode.	
	Modbus: RTU 💌	Modbus indicates the protocol of the device connected to the port. It can be either RTU or	
Port 1 Serial		connected to the port. It can be either KIU or ASCII.	
Port 1 Modbus	Enable modbus broadcast	Modbus Broadcast is used to send Modbus	
Port 1 ID Remap		broadcasts to a specific serial port. Modbus broadcast is Slave ID 0h. If selected the	
	Enable 0Bh Exception	Gateway will send broadcast messages out the serial port and will not expect a response. If	
Port 2 Serial		unselected it will use slave ID 0h as a standard	
Port 2 Modbus	Enable serial message buffering	address.	
Port 2 ID Remap		Modbus 0Bh Exception. When the Modbus slave device does not respond before the	
	1 Modbus Serial Retries	timeout has been reached or has a bad response (check sum does not match), the OBh	
Modbus ID Routing		exception code is transmitted to the Master that initiated the Modbus message.	
Modbus Priority	2000 Milliseconds Modbus Message Timeout		
25		Modbus Serial Message Buffering. If option is selected, the gateway will buffer up to	
Save	100 Milliseconds TX Delay	32 messages request per port. If this option is unselected, the gateway will respond with a 06h	
Logout		if it has a message out on the port with no response yet.	
100000	Save Back Next Advanced	Modbus Serial Retries is 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.	
		Modbus Message Timeout is the maximum amount of time to wait for a response to the	

Figure 53. Port 1 Modbus

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

Modbus Configuration Manage	er 1.0.0		
	局 (10) 圖 ? grade Diagnostic Monitor About		
	re? Choose the device by clicking on one of the devices in the list below.		
		ac Address	
ESR902T-000BEB000040 10.	1.2.121 00:0B:EB:00:00:40		
ESR902T-000BEB000043 10.1	1.2.123 00:08:EB:00:00:43		
			1
	NECDAGET GOOD	ED000040 (10 1 0 101)	1
	MESR9021-000B	EB000040 (10.1.2.121)	
Modbus G	ateway		
Contents	Port 2 - Modbus Slave ID Remapping	Help	
General	From ID: - To Port ID: -	The first box in line is the starting ID of a range you want to remap. Valid value range is	
Network		from 1 to 255.	
Modbus TCP	From ID: - To Port ID: -	The second box in line is the last ID of that range. Valid value range is from 1 to 255.	
Port 1 Serial	From ID: - To Port ID: -	The third box in line is the start of the	
Port 1 Modbus	From ID: - To Port ID: -	remap range on the serial port. Valid value range is from 1 to 255.	
Port 1 ID Remap		The fourth box in line is auto filled in based	
	From ID: - To Port ID: -	on the range filled in the first 3 boxes. Valid value range is from 1 to 255.	
Port 2 Serial			
Port 2 Modbus Port 2 ID Remap	Save Back Next		
Port 2 ID Remap			
Modbus ID Routing			
Modbus Priority			
Save			
Logout			
2.2			
	Copyright @ 2007-2008 B&B Electronics Manufacturing Company, Inc. All right	hts reserved.	

Figure 54. Port x Modbus Slave ID Remapping

8. 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.

10. 10. 10. 10. 10. 10. 10. 10. 10. 10.	ere? Choose the device by clicking on one of the devices in the list below.      nection      1.2.121 00:08:E8:00:00:40      12.123 00:08:E8:00:00:43	Mac Address
10.1	12.123 (UNB-EB-U/10.43	
Modbus G		BEB000040 (10.1.2.121)
Contents	Modbus Slave ID Routing	Help
eneral	ID: 🔽 200 - 200 To Serial Port 1 🔹	The first box in line is the starting ID of a range you want to route. Valid value range is
etwork	ID: ₩ 1 - 5 To Serial Port2 ▼	from 1 to 255.
odbus TCP	ID: ₩ 205 - 205 To Serial Port 2 ▼	The second box in line is the last ID of that range. Valid value range is from 1 to 255.
ort 1 Serial	ID: D - To IP Address	The third box in line is a port or IP address which has slave devices attached.
ort 1 Modbus		The fourth box in line is an IP address of the
ort 1 ID Remap		slave device if IP address is chosen in the third box.
ort 2 Serial		
ort 2 Modbus ort 2 ID Remap		
Ditz io Reinap		
lodbus ID Routing		
odbus Priority		
ave	Save Back Next Advanced	
gout		
12000		

Figure 55. Modbus ID Routing

9. Access Modbus Priority and configure as necessary.

Modbus Configuration Manage	er 1.0.0		_ <u> </u>
	grade Diagnostic Monitor About		
	re? Choose the device by clicking on one of	the devices in the list below.	
Server Name Cor	nnection	Mac Address	
MESR902T-000BEB000040 10.			
MESR902T-000BEB000043 10.	1.2.123 00:08:EB:00:00:43		
Modbus	Gateway.	MESR902T-000BEB000040 (10	.1.2.121 )
Contents	Modbus Priority	Help	
General Network Modbus TCP Port J Serial Port 1 Modbus Port 1D Remap Port 2 Serial Port 2 Modbus Port 2 ID Remap Modbus 1D Routing Modbus 1D Routing Modbus Priority	Priority 1      IP Address:      Modbus ID:      Function Code:  Priority 2      IP Address:      Modbus ID:      Function Code:  Priority 3      IP Address:      Modbus ID:      Function Code:  Priority 4      IP Address:      Modbus ID:      Function Code:  Priority 5	priority message to massage toffer. To the containing Dade the containing Dade the three. Up to five set. IP Address set a address for the Modifie Modess ID has valie 225.	d value range from 1 valid value range from 1
1	L commentants		× .

Figure 56. Modbus Priority

#### Serial & Ethernet Masters, Serial & Ethernet Slaves

Your Modbus Gateway can also integrate multiple master devices onto serial and Ethernet Networks.

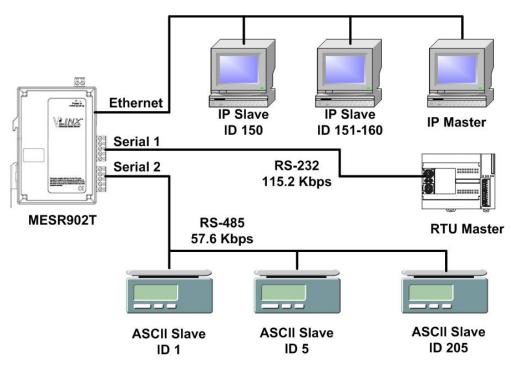


Figure 57. Serial & Ethernet Masters, Serial & Ethernet Slaves

1. In this example, Serial Port 1 has an RTU Master attached. Configure the serial port settings as appropriate for the device. Access the Port 1 Modbus screen and configure it the port for Modbus Master and RTU.

dbus Configuration Manag	er 100		-
	grade Diagnostic Monitor About		
device do you want to config	re? Choose the device by clicking on one of the devices in the list below.		
and the second state of th		Mac Address	
R902T-000BEB000040 10	.1.2.121 00:0B:EB:00:00:40		
902T-000BEB000043 10.	1.2.123 00:0B:EB:00:00:43		
	MESR902T_000F	<b>BEB000040</b> (10.1.2.121)	
	WIESKOU21-0001	DED000040 (10.1.2.121)	
Modbus C	atoway		
Moubus C	Jareway		
Contents	Port 1 - Modbus	Help	
ieneral		Attached is selectable between Master and Slaves. If Master is selected, the Modbus	
letwork	Attached: Master	Gateway will run in TCP server mode, if Slaves is selected, it will run in TCP client mode.	
lodbus TCP			
	Modbus: RTU	Modbus indicates the protocol of the device connected to the port. It can be either RTU or	
ort 1 Serial		ASCII.	
Port 1 Modbus	Enable modbus broadcast	Modbus Broadcast is used to send Modbus	
Port 1 ID Remap		broadcasts to a specific serial port. Modbus broadcast is Slave ID 0h. If selected the	
	Enable 0Bh Exception	Gateway will send broadcast messages out the serial port and will not expect a response. If	
ort 2 Serial		unselected it will use slave ID 0h as a standard	
Port 2 Modbus	Enable serial message buffering	address.	
ort 2 ID Remap		Modbus 0Bh Exception. When the Modbus slave device does not respond before the	
	1 Modbus Serial Retries	timeout has been reached or has a bad response	
Indbus ID Routing		(check sum does not match), the 0Bh exception code is transmitted to the Master	
Addbus Priority	2000 Milliseconds Modbus Message Timeout	that initiated the Modbus message.	
and the second s		Modbus Serial Message Buffering. If	
ave	100 Milliseconds TX Delay	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	
ogout	Save Back Next Advanced	if it has a message out on the port with no response yet.	
		Modbus Serial Retries is the maximum	
		number of times that the Modbus gateway will retry to send a Modbus message to a Modbus	
		client, before reporting a OBh exception if it is	
		client, before reporting a OBh exception if it is	

Figure 58. Port 1 Modbus

2. Configure the Modbus Slave ID routing. In this case Modbus Slaves 1 through 5 and 205 are on Serial Port 2. Modbus Slaves 150 and 151 through 160 have IP assignments.

02T-000BEB000040 10.	nection 1.2.121 00:08:E8:00:00:40 12.123 00:08:E8:00:00:43	Mac Address
Modbus G		00BEB000040 ( 10.1.2.121 )
ontents	Modbus Slave ID Routing	Help
neral	ID: 🔽 150 - 150 To IP Address 💌 10.1.2.200	The first box in line is the starting ID of a range you want to route. Valid value range is
work dbus TCP	ID: 🔽 1 - 5 To Serial Port 2 -	from 1 to 255.
1003 TOP	ID: 🔽 205 - 205 To Serial Port 2 -	The second box in line is the last ID of that range. Valid value range is from 1 to 255.
t1 Serial	ID: 🔽 151 - 160 To IP Address 💌 10.1.2.57	The third box in line is a port or IP address which has slave devices attached.
t 1 ID Remap	ID: To IP Address	The fourth box in line is an IP address of the
CHO Remap	ID: To IP Address	slave device if IP address is chosen in the third box.
t2 Serial	ID: To PAddress	
t 2 Modbus t 2 ID Remap	ID:  To P Address	
and a substrate		
dbus ID Routing		_
dbus Priority	10 10 10 10 10 10 10 10 10 10 10 10 10 1	
<u>'e</u>	Save Back Next Advanced	
out		
2.23		

Figure 59. Modbus Slave ID Routing

### Serial Masters, IP Slaves

Serial Masters can be used to control IP Slaves.

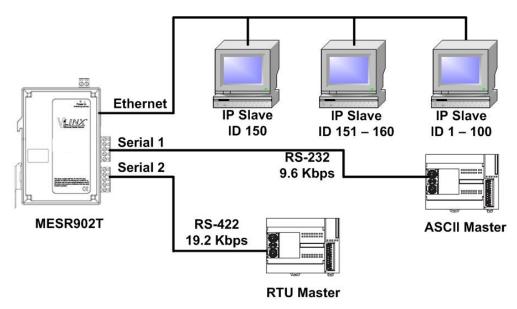


Figure 60. Serial Masters, IP Slaves

1. In this example, and ASCII Master is connected to Serial Port 1 and an RTU Master is connected to Serial Port 2. Configure the serial ports as appropriate for these devices.

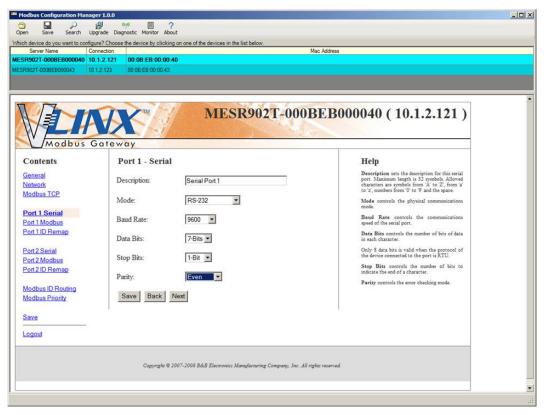


Figure 61. Port 1 Serial

Modbus Configuration Manage	er 1.0.0			_0
	grade Diagnostic Monitor About			
	grade Diagnostic Monitor About ure? Choose the device by clicking on (	one of the devices in the list below		
	nnection	Mac Addres	5	
ESR902T-000BEB000040 10.				
SR902T-000BEB000043 10.	1.2.123 00:0B:EB:00:00:43			
Modbus G		MESR902T-000BEB	.000040 ( 10.1.2.121 )	
Contents	Port 2 - Serial		Help	
General Network Modbus TCP	Description:	Serial Port2	Description sets the description for this serial port. Maximum length is 32 symbols. Allowed characters are symbols from 'X to 'Z', from 'a' to 'z', numbers from '0 to '9' and the space.	
and the second second	Mode:	RS-422 (4-Wire) 💌	Mode controls the physical communications mode.	
Port 1 Serial Port 1 Modbus	Baud Rate:	19200 💌	Baud Rate controls the communications speed of the serial port.	
Port 1 ID Remap	Data Bits:	8-Bits 💌	Data Bits controls the number of bits of data in each character.	
Port 2 Serial Port 2 Modbus	Stop Bits:	2-Bits -	Only 8 data bits is valid when the protocol of the device connected to the port is RTU.	
Port 2 ID Remap			Stop Bits controls the number of bits to indicate the end of a character.	
Modbus ID Routing	Parity:	No Parity	Parity controls the error checking mode.	
Modbus Priority	Save Back Next	t		
Save	U.		1	
Logout				
2				
	Copyright @ 2007-	2008 B&B Electronics Manufacturing Company, Inc. All rights reserve	nd, j	

Figure 62. Port 2 Serial

2. Access the Modbus screen for each port and configure as appropriate. In this case, Port 1 has an ASCII Master and Port 2 has an RTU Master attached.

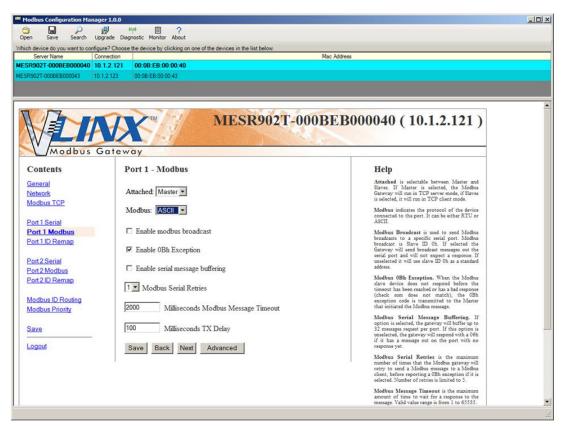


Figure 63. Port 1 Modbus

	弱 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	
	re? Choose the device by clicking on one of the devices in the list below.	
	nnection	Mac Address
R902T-000BEB000040 10.	1.2.121 00:0B:EB:00:00:40	
R902T-000BEB000043 10.	1.2.123 00:0B:EB:00:00:43	
	NECDAOT 000	DED000040 (10 1 2 121)
	MIESK9021-000	<b>BEB000040</b> (10.1.2.121)
		9
Modbus G	ateway	
<b>C</b>		
Contents	Port 2 - Modbus	Help
General		Attached is selectable between Master and
Network	Attached: Master	Slaves. If Master is selected, the Modbus Gateway will run in TCP server mode, if Slaves
Modbus TCP	For PETERS AND A STREET, A SUBJECT AND A STREET, AND A STR	is selected, it will run in TCP client mode.
ing specify 1 of	Modbus: RTU 🔻	Modbus indicates the protocol of the device
Port 1 Serial		connected to the port. It can be either RTU or ASCII.
	Enable modbus broadcast	
Port 1 Modbus	L Enable modbus broadcast	Modbus Broadcast is used to send Modbus broadcasts to a specific serial port. Modbus
Port 1 ID Remap	Enable 0Bh Exception	broadcast is Slave ID Oh. If selected the Gateway will send broadcast messages out the
	<ul> <li>спасе ова Ехсериоп</li> </ul>	serial port and will not expect a response. If
Port 2 Serial	E Falls and I was here in	unselected it will use slave ID Oh as a standard address.
Port 2 Modbus	Enable serial message buffering	
Port 2 ID Remap		Modbus 0Bh Exception. When the Modbus slave device does not respond before the
	1 Modbus Serial Retries	timeout has been reached or has a bad response (check sum does not match), the OBh
Modbus ID Routing		exception code is transmitted to the Master
Modbus Priority	2000 Milliseconds Modbus Message Timeout	that initiated the Modbus message.
		Modbus Serial Message Buffering. If
Save	100 Milliseconds TX Delay	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
Logout	Save Back Next Advanced	if it has a message out on the port with no response yet.
1.0		Modbus Serial Retries is the maximum
	E.	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.
		Modbus Message Timeout is the maximum amount of time to wait for a response to the

Figure 64. Port 2 Modbus

3. Setup the Slave ID Routing to associate IP addresses with the appropriate Slave ID.

Server Name Con 002T-000BEB000040 10.	Poetscript	2 Address
02T-000BEB000043 10.1	2.123 00:08:£8:00:00:43	
Modbus G		EB000040 ( 10.1.2.121 )
Contents	Modbus Slave ID Routing	Нер
General	ID: 🔽 150 - 150 To IP Address 💌 10.1.2.200	The first box in line is the starting ID of a range you want to route. Valid value range is
<u>Network</u> Modbus TCP	ID: 🔽 1 - 100 To IP Address 💌 10.1.2.57	from 1 to 255.
100000101	ID: 🗆 205 - 205 To	The second box in line is the last ID of that range. Valid value range is from 1 to 255.
Port 1 Serial	ID: 🔽 151 - 160 To IP Address 💌 10.1.2.57	The third box in line is a port or IP address which has slave devices attached.
Port 1 Modbus Port 1 ID Remap	ID:  To IP Address	The fourth box in line is an IP address of the
on no reindy		slave device if IP address is chosen in the third box.
Port 2 Serial		
Port 2 Modbus Port 2 ID Remap		
NATE IN THE MADE		
Modbus ID Routing		
Modbus Priority	ID: C - To PAddress	
	Save Back Next Advanced	
Save		
Logout		

Figure 65. Modbus Slave ID Routing

### Identical Hard Coded Slaves

In this example, two slave devices that are hard coded with the same ID are required. This is accomplished by putting them on different serial ports.

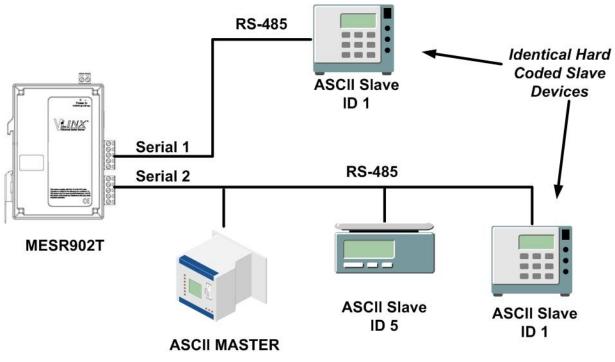


Figure 66. Identical Hard Coded Slaves

### **Identical Production Lines**

In this example, identical or backup production lines can be controlled by the same IP Master. This allows the duplicate networks to be configured identically, saving documentation and maintenance time.

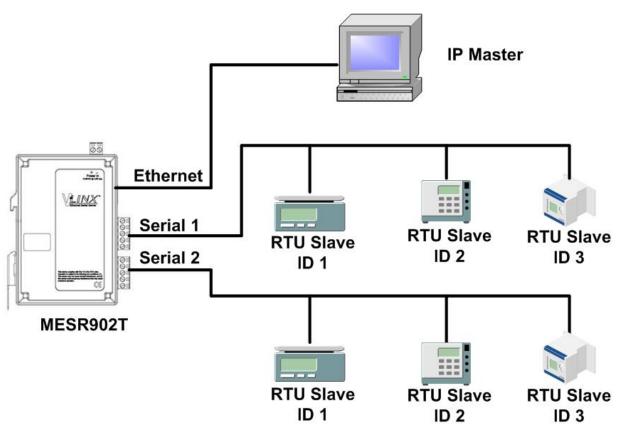


Figure 67. Identical Production Lines

# 7. Modbus Help

## 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. AS-CII 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 – call our technical support and verify if you're an exception, at 815.433.5100 option 3.

A sometimes difficult problem is difference in grounding voltage between various network locations. Stray voltage from lightning or other sources may also find its way onto the network. These conditions make isolation necessary in many settings.

# 8. Appendices

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
GatewayName	User assigned
Password	password field is blank from factory
DHCP	Enabled
IP Address	DHCP will configure. If a DHCP Server is not availablethe unit will default to 169.254.102.39
Net Mask	255.2550.0
Gateway	169.254.102.100
MAC Address	Fixed- see bottom label
Firmware Version	(Vx.x.x)
Hardware Version	(Vx.x.x)
Port	1, 2
Serial port mode	RS-232
Baud Rate	9600
Data bits	8
Parity	None
Stop bits	1
Flow Control	None
Protocol	ТСР
Serial timeout	0 seconds
Inter-character timer	0 ms
TCPport	Port 1 = 4000 Port 2 = 4001
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**

Hardware and included accessories	Device	MESR901-x, MESR902D-x or MESR902T-x Modbus gateway module
	CD	CD with Vlinx Modubs Manager software for Windows 2000, XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), 2008 Server (32/64 bit), Windows 7 (32/64 bit)
Optional Accessories	Cable	232NM9 Null Modem Crossover Cable for DTE to DTE connection
	Rail	ERS35 one-meter length of steel 35mm DIN Rail
Configuration Options	Via serial port	Using Vlinx Modbus Manager via a serial connection, (press Reset button to enter Console Mode)
	Via network	Using Vlinx Modbus Manager via a Ethernet connection
		Using a standard web browser such as Internet Explorer 6.0/7.0 or Firefox 1.5/2.0
Software	Vlinx Modbus Manager for Modbus gateway configuration	Windows 2000, XP (32/64 bit), 2003 Server (32/64 bit), Vista (32/64 bit), 2008 Server (32/64 bit), Windows 7 (32/64 bit)
Environment	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
Certifications	FCC	Part 15 Class A
	CE	
	UL	UL Listed, File E222870
	UL Class1 Div2	Groups A, B, C, D (HAZLOC) File E245458
	TS2	
Enclosure	Rating	IP30
	Mounting	DIN rail mount (35 mm)
	Dimensions, Medium Case (MESR92x)	1.2 x 4.5 x 6.2 in (2.8 x 11.4 x 15.7 cm)
	Dimensions, Small Case (MESR90x)	1.2 in x 3.3 x 4.7 in (3.1 x 8.4 x 11.9 cm)
Power Supply (External Supply	Voltage Requirements	10 to 48 VDC (58 VDC Max)
(External Supply Required)	Power Consumption	MESR90x – 4.0W (Max) MESR92x – 6.0W (Max)

Terminal Blocks	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

## Controls, Indicators and Connector Specifications

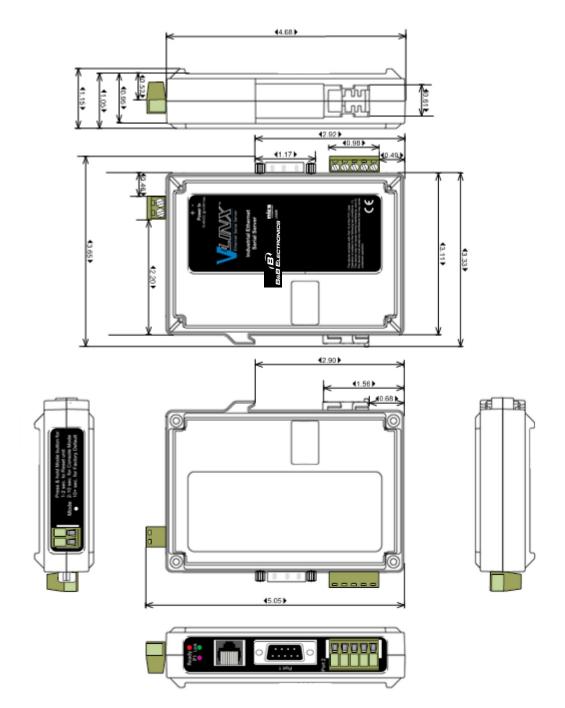
Switches	Reset button	Hold in for 0 to 2 seconds for hardware reset Hold in for 2 to 10 seconds for Console Mode (Do a hardware reset or recycle power to exit Console Mode) Hold in for more than 10 seconds to reset to factory defaults
	Serial LED (one per port)	Color = Green On = Port open Blink = Data traffic
Indicators	Link LED	Color = Green On = 100BaseTX Off = 10BaseT Blink = Data traffic
	Ready LED	Color = Green Blink (once per second) = System OK Off = System NOT OK
	10BaseT/100BaseTX Ethernet	Single RJ-45F (8 pin)
	SC fiber	SC connector
	ST fiber	ST connector
Connectors		MESR901-x: one DB-9M connector
	Serial	MESR902D-x: Two DB-9M connectors
		MESR902T-x: Two pluggable lockable 5.08 mm terminal blocks
	DC Power	5.08mm 2-position pluggable, lockable terminal block

## 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	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, 14400, 19200, 28800, 38400, 57600, 115200, 230400
Data Bits	5, 6, 7, 8
Parity	None, even, odd, mark, space
Stop bits	1, 1.5, 2
Flow control	None, RTS/CTS, XON/XOFF
RS-422/485 biasing	Auto 4.7K ohm pullups and pulldowns
RS-422/485 termination	Auto termination with thru hole resistor (user supplied)
RS-485 data control	Auto control via MCU

### **Network Specifications**

Memory	Serial Memory	10 K bytes per port
	Network Memory	10 K bytes
I/P Port Addresses	5300	Configuration setting in TCP Mode
	8888	MESR901 update
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 and 100BaseTX
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
Character count		0 to 65535
Timeouts	Character	0 to 65535 ms, default set at 10 ms
	Modbus Message	0 to 65535 ms, default set at 1,000 ms
	Serial	0 to 65535 sec

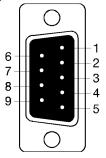


# Appendix C: Dimensional Diagrams

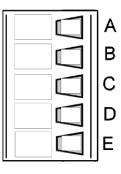
Figure 68. Dimensional Diagram of an MESR901 Modbus Gateway

# Appendix D: Connector Pinouts

#### **MESR901 Serial Port Pinouts**

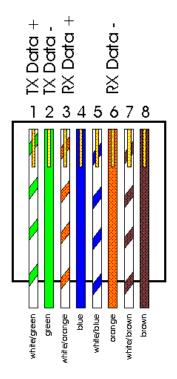


DB9M Pin	Direction	R\$232
1	Input	DCD
2	Input	RXD
3	Output	TXD
4	Output	DTR
5		GND
6	Input	DSR
7	Output	RTS
8	Input	CTS
9	Input	RI



Terminal	RS-422/485 4-Wire	RS-4852-Wire
А	TDA (-)	Data A <del>(</del> )
В	TDB (+)	Data B (+)
С	RDA (-)	
D	RDB (+)	
E	GND	GND

#### Standard Ethernet Cable RJ-45 Pin-out



RJ-45 Pin	Signal	Wire Color
1	TX+	WhiteGreen
2	TX+	Green
3	RX+	WhiteOrange
4	Not used	Blue
5	Not used	WhiteBlue
6	RX-	Orange
7	Not used	WhiteBrown
8	Not used	Brown

# 9. Glossary

Term	Definition
ADU	Application Data Unit
ASCII	American Standard Code for Information Interchange
Baud Rate	Number of bits per second
CRC	Cyclical Redundancy Checking
Data Bits	Number of bits per byte, normally 7 with Modbus ASCII, and 8 with Modbus RTU
DHCP	Dynamic Host Configuration Protocol
Flow Control	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
Modbus Gateway	A bridge to get from Modbus TCP to Modbus Serial
GUI	Graphical User Interface
IP	Internet Protocol
IPv4	Internet Protocol version 4
LED	Light emitting diode. Used as a visual indicator
MBAP	MODBUS Application Protocol
MEI	Multi Electrical Interface via RS-232/422/485
MES1A	B&B's Ethernet Modbus gateway, RS-232 on serial port
MES1B	B&B's Ethernet Modbus gateway, RS-422/485 on serial port
MESR922T	B&B's Ethernet Modbus gateway, Dual Ethernet ports, Dual serial ports with MIE and terminal blocks
Modbus	A request/reply protocol and offers services specified by function codes.
Parity Bit	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).
PDU	Protocol Data Unit

Term	Definition
RS-232	Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange
RS-422	Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Point to Point Systems
RS-485	Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems
RTU	Remote Terminal Unit
Stop Bit	Number of bit times after a character is transmitted before the next character can start transmission.
ТСР	Transmission Control Protocol
Unit ID	Unit Identifier. This is the same as the slaves address.
MESR	B&B's Modbus Ethernet Gateway Series
Vlinx	B&B's family name for the Gateway line