

# RS-232/422/485 / Current Loop Six-Port Multi-Interface Ethernet Serial Server

Model: ESP906CL







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# Chapter 1: INTRODUCTION

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The **VLINX Model ESP906CL Six-Port Ethernet Serial Server** provides Ethernet to Serial connections for RS-232, RS-422, RS-485 or current loop devices. The serial ports can be accessed over a LAN/WAN using **Direct IP Mode**, **Virtual COM Port**, or **Paired Mode** connections. The 10/100 Mbps Ethernet connection auto-selects 10BaseT or 100BaseTX and indicates the type of connection with a bi-color link light.

## Features

- **4 multi-interface serial ports** - RS-232, RS-422, RS-485; software selectable connections
- **2 current loop ports**
- **10/100 Mbps Ethernet** with Auto Selection
- **LAN and WAN Communications**
- **TCP or UDP Client or Server operation** - configurable
- **Software Support** - Windows 98/ME/2000/2003 server/XP/Vista/NT 4.0
- **Firmware Upload** for Future Revisions/Upgrades
- **Configuration** of Ethernet and serial port settings can be accomplished using any of four methods:

**VLINX ESP Manager Software for Windows** allows configuration via a network connection or direct from the Ethernet port of a computer (using an Ethernet crossover cable).

**Web Server** allows configuration via the network using any web browser.

**Telnet** allows configuration via the network by accessing the setup configuration menu.

**Console Mode** allows configuration through an RS-232 serial port in using a VT100 Terminal Emulation program and an RS-232 crossover cable.

- **Virtual COM Driver Software for Windows** - installs a virtual COM port, viewable in the Windows Device Manager under **Ports (COM & LPT)**. Virtual COM port provides access to any of the ports on the ESP906CL, like any other serial port (legacy, PCI, USB or PCMCIA) on the computer. Any program running on the computer and using

Windows-based COM ports can access the serial devices attached to the ESP906CL. The LAN becomes transparent to the serial device and the software running on the PC.

- **Heart Beat Connection** - selectable protocol ensures reliable communications in Virtual COM Port or Paired Connection modes. This feature restores the connections if communications are temporarily lost at either end due to loss of power or the Ethernet connection.

## Communication Modes

The **ESP906CL Serial Server** enables communication with serial devices over a LAN or WAN. Serial devices no longer are limited to a physical connection to the PC COM port. They can be installed anywhere on the LAN using TCP/IP or UDP/IP communications. This allows traditional Windows PC software access to serial devices anywhere on the LAN/WAN network.

### Direct IP Mode

**Direct IP** connections allow applications using TCP/IP or UDP/IP socket programs to communicate with the asynchronous serial ports on the Serial Server. In this type of application the Serial Server is configured as a TCP or UDP server. The socket program running on the PC establishes a communication connection with the Serial Server. The data is sent directly to and from the serial port on the server.

### Virtual COM Mode

**Install Virtual COM** allows the user to add a driver, to provide a virtual COM port on the computer. The new COM port shows up in the Device Manager. Windows programs using standard Windows API calls are able to interface to virtual COM ports. When a program on the PC opens the new COM port, it communicates with the remote serial device connected to one of the ports on the Serial Server.

After connection, the LAN is transparent to the program and serial device. Applications are able to work just as if the serial device is connected directly to a physical COM port on the computer. The virtual COM port software converts the application's data into IP packets, sends it across the network to the Serial Server, which converts the IP packet back to serial data and sends the data out a serial port located on the Serial Server.

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To use this mode, the Serial Server must be set to either TCP/server or UDP/server with a designated communication port number. The virtual COM driver is the TCP or UDP client.

## **Paired Mode**

**Paired Mode** is also called *serial tunneling*. In this mode any two serial devices that can communicate with a serial link will be able to communicate using two Serial Servers and the LAN.

Two Serial Servers are connected to a network, one configured as a TCP or UDP client and the other as a TCP/UDP server. When setting up the server the remote IP address section must contain the address of the client. This will allow the client's IP address to pass the IP address-filtering feature of the server. Conversely, the Remote IP address of the client must contain the server's IP address. Both communication port numbers must be the same.

## **Heart Beat**

The **Heart Beat** protocol connection provides a reliable communications connection in **Virtual COM Port Mode** or with **Paired Connection Mode**. This feature restores the connection if communications are temporarily lost at either end due to loss of power or Ethernet connection.

Without this feature a device that loses a connection and stops communicating would not be able to reconnect without human intervention. A TCP data connection can be lost when there is a power failure or temporary loss of an Ethernet connection on either the client or server. If a loss occurs the Heart Beat feature will try to reconnect the TCP data connection every five seconds until communications is established again. The Heart Beat feature is available for use in **Virtual COM Port Mode** and **Paired Connection** mode. This is not available when using a UDP application.

## ESP906CL Quick Start Guide

For descriptive purposes this Quick Start Guide considers a typical configuration consisting of a **PC** connected via an Ethernet LAN to a **Serial Server**, which is connected to the RS-232 port of a serial device.

### Hardware Setup

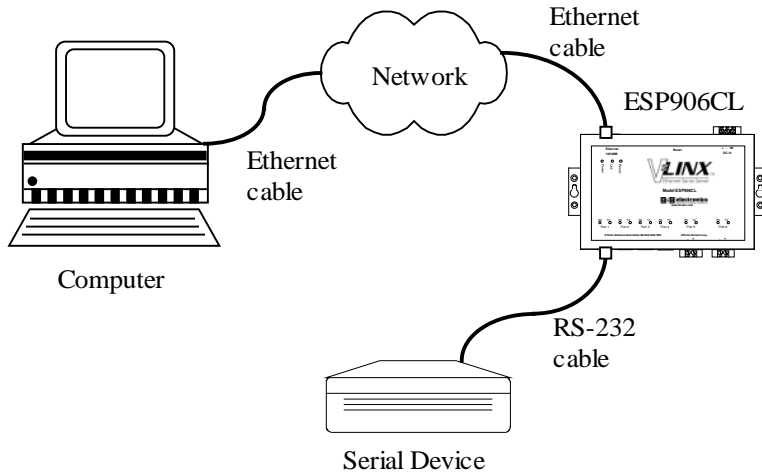


Figure 1. Quick Start Hardware Setup

**Step 1:** Connect the **Serial Server** to the network using a standard network cable

**Step 2:** Connect the **Serial Server** to the RS-232 **serial device**.

#### **Note:**

*If the serial device is configured as a DCE use a straight-through serial cable. If the serial device is configured as a DTE use a crossover (null modem) cable.*

**Step 3:** Apply power to the **Serial Server**.

### Software Installation

Using the CD included with the **Serial Server**, install the **VLINX ESP Manager** software on the configuring computer.

## ESP906CL Configuration

**Step 1:** From the Windows Start menu, run the **ESP Manager**. Upon opening, it will automatically search for any reachable (ESP90x) **Serial Servers**. Then double click the **Searching Server** icon. A list of servers will appear in the **Serial Server List** window.

**Step 2:** Double click the desired **Serial Server** port on the list to bring up the **Server Properties** configuration screen.

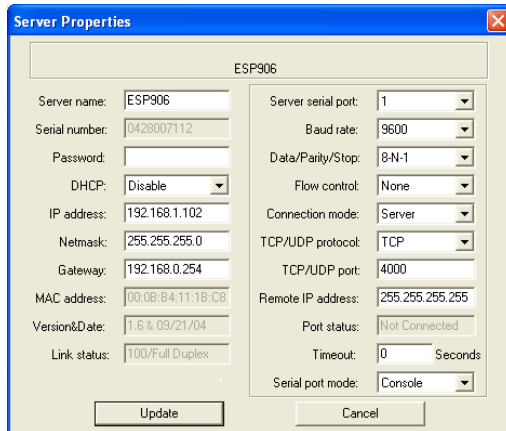


Figure 2. The Server Properties Window

**Step 3:** Change the **Server Properties** as required.

- Enable **DHCP** to allow the **Serial Server** to generate its own IP address
- OR**
- Obtain appropriate static **IP**, **Netmask** and **Gateway** addresses from your Network Administrator (**recommended**)
  - Set the **Console Mode** property to RS-232 to match the serial device connected to the **Serial Server**.
  - Set **Baud Rate**, **Data/Parity/Stop**, and **Flow Control** to match the configuration of the serial device connected to the **Serial Server** port

**Step 4:** When the parameters have been set, click **Update**. Following the prompts in the dialogue boxes, **Restart** the Serial Server and **Search all reachable servers** again.

**Step 5:** Re-enter **Server Properties** to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.

## Install Virtual COM Ports on PC

**Step 1:** From the **Windows Start** menu, run the **Install Virtual COM Ports** utility included with the VLINX software,

**Step 2:** Search for all servers on the network

**Step 3:** Select a port and map it to an unused COM port (e.g. Port 15). Configure it for TCP protocol and the appropriate IP address (determined in the last section).

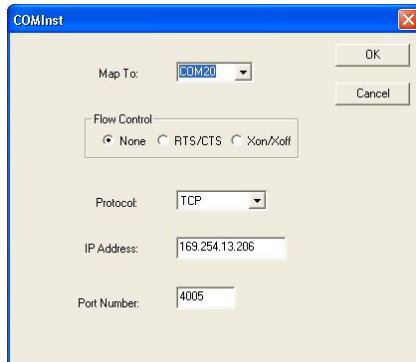


Figure 3. Configuring the Virtual COM Port

## Check Communications

**Step 1:** From the **Windows Start** menu, run **HyperTerminal**

**Step 2:** Configure **HyperTerminal** to connect using the COM port configured in the last section (e.g. Port 15).

**Step 3:** Set **Baud Rate**, **Data/Parity/Stop**, and **Flow Control** to match the configuration of the serial device connected to the **Serial Server** serial port.

**Step 4:** Communications with the serial device should now be operational.



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# Chapter 2: MAKING THE HARDWARE CONNECTIONS

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## Package Checklist

The ESP906CL six port serial server is shipped with the following items included:

- ✓ ESP906CL Serial Server Module
- ✓ Power supply
- ✓ RS-232 Serial RJ-45M to DB-9M adapter cable (gray)
- ✓ RS-422/485 Serial RJ-45M to DB-9 adapter cable (black)
- ✓ This manual
- ✓ CD-ROM disc with manual, VLINX ESP Manager and Virtual COM Driver software for Windows 98/ME/2000/2003 server/XP/Vista/NT 4.0

## ESP906CL Connections, Indicators and Reset Switch

The ESP906CL has:

- 15 indicator LEDs
- One Ethernet connector (RJ-45 female)
- A power connector (8 pin mini DIN)
- A recessed reset switch
- Four serial port connectors (RJ-45 female)
- Two Current Loop connectors (two-wire removable terminal blocks)

## Indicator Lights

Light	Indication
Power	Red - power is applied
Link	Yellow – 10BaseT Ethernet connection established Green – 100BaseTX Ethernet connection established
Ready	Flashing Green – system is ready
Serial (6)	<p><b>When set up as a TCP server:</b></p> <p>Steady Green - client has made a connection</p> <p>Flashing Green – data being transmitted at the serial port</p> <p>Flashing Red – data being received at the serial port</p> <p>Light off – connection closed</p> <p><b>When setup in UDP mode:</b></p> <p>Steady Green (all ports)</p> <p>Flashing Green – data being transmitted at the serial port</p> <p>Flashing Red – data being received at the serial port</p>

Figure 4. Indicator Lights

## Ethernet Connector

The **ESP906CL** has a standard RJ-45 receptacle mounted in the top edge of the chassis. The ESP906CL can be connected to an Ethernet hub, switch, or wall plate using a standard straight-through RJ-45 (male) Ethernet cable. To connect directly to an RJ-45 Ethernet port on a PC or laptop a crossover Ethernet cable must be used.

**Note:**

Refer to Appendix D for details on Network Cables

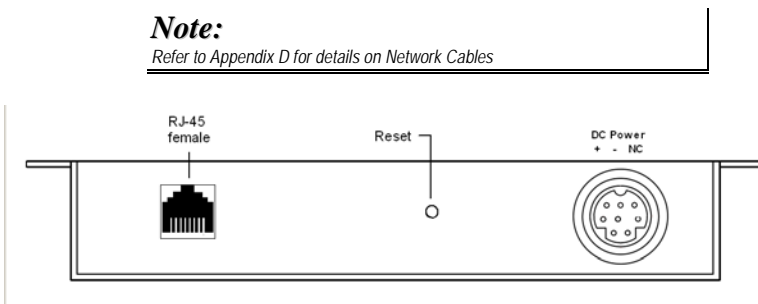


Figure 5. Top View of the ESP906CL

## Power Connector

Power is applied to the ESP906CL from a power module via 8 pin male mini DIN connector to the 8 pin female mini DIN on the unit. There are 3 output

voltages supplied by the wall power supply via 36VDC1, 36VDC2 and 5VDC.

The mini DIN connectors are polarized and will fit only 1 way. Line up the holes accordingly and connect them together. Plug the supply into a standard 110VAC outlet. When power is applied the Red power light will illuminate.

### **Reset Switch**

The Reset switch resets the unit, similar to the effect of removing/applying power. The switch is recessed to avoid accidental operation. To reset the unit, insert a small plastic tool, press lightly and hold for three seconds. The Link and Ready lights will go out and then come back on.

### **Serial Ports**

The ESP906CL has six serial ports. Ports 1 through 4 are configurable through software as RS-232, RS-422 or RS-485 interfaces. Ports 5 and 6 are 34 mA digital current loop ports.

Ports 1 through 4 in the ESP906CL use RJ-45 receptacles. Connection to these ports is accomplished using cables terminated in RJ-45 male connectors. (Two RS-45M to DB-9M adapter cables are included.) The gray adapter cable may be used when ports are configured for RS-232 operation. The black adapter cable may be used when ports are configured for RS-422 or RS-485 operation.)

Ports 5 and 6 use two-position removable terminal blocks with locking screws.

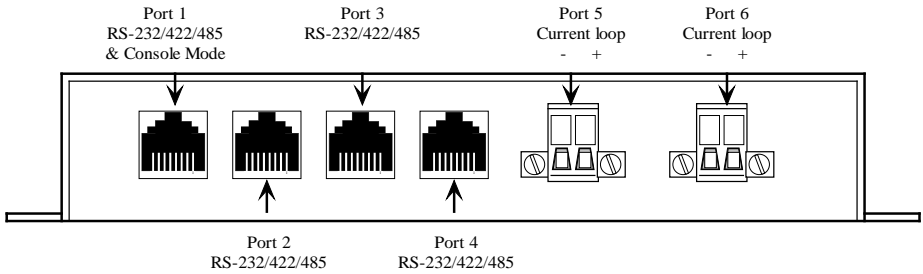


Figure 6. The ESP906CL Serial Port Connectors

## Serial Server/Port Operational Modes

Configuration of the Serial Server can be accomplished from the **ESP Manager**, **Console Mode**, **Telnet** or **Web Server**. Any of these user interfaces allow you to configure the Serial Server for **Console Mode**, **Default Mode** or **Upgrade Mode**. In **Console Mode** Serial Port 1 is automatically configured to allow access of the **Console Mode** screen for configuration of the server via direct serial port connection. The serial ports can be configured for RS-232, RS-422 or RS-485 operation.

### RS-232 Operation

Ports in **RS-232 Mode** support eight RS-232 signal lines plus Signal Ground and are configured as DTEs like a computer. When connecting from a DTE device (such as a computer serial port) to these ports a crossover cable is required. When connecting to DCE devices, a straight through cable is required. Signals are single ended and referenced to Ground. To use handshaking, Flow Control must be set to RTS/CTS during configuration.

**Note:**

Refer to Appendix A for RS-232 connection pin-outs.

### RS-422 Operation

Ports in **RS-422 Mode** support two RS-422 signal channels, allowing full duplex operation for **Receive** and **Transmit**. The data lines are differential pairs (A & B) in which the B lines positive relative to the A lines in the Mark state. Ground provides a common mode reference.

**Note:**

Refer to Appendix B RS-422 connection pin-outs.

## RS-485 Operation

Ports in **RS-485 Mode** support transmit (TX) and receive (RX) signal channels using 2-wire, half-duplex operation. The data lines are differential with the Data B line positive relative to Data A in the Mark state. Ground provides a common mode reference.

### Note:

Refer to Appendix C for RS-485 connection pin-outs.

## RS-485 Receiver Biasing

**RS-485 Receiver Biasing** can be implemented from the ESP906CL if the network does not supply it. Remove the two side-cover screws of the ESP906CL, slide the cover off and re-position the bias jumpers (shown open in the figure below) to enable biasing (shorting).

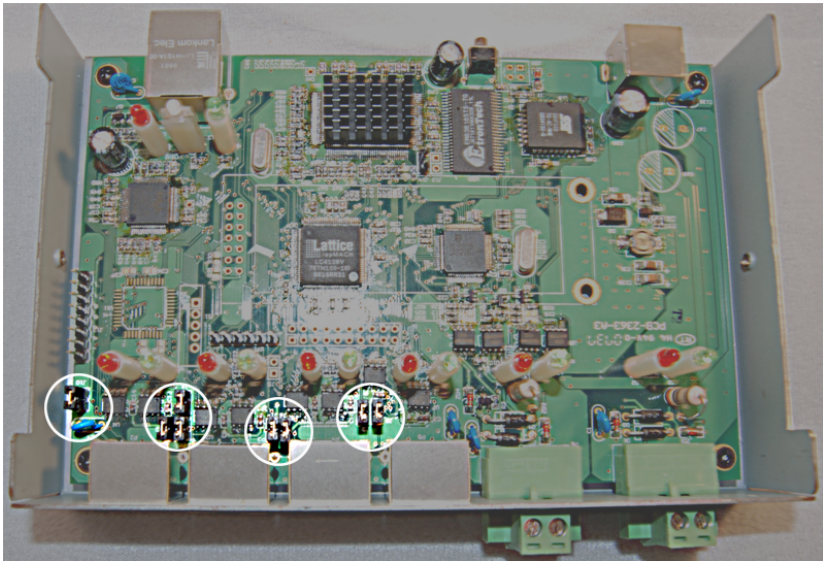



Figure 7. Locations of Straps to Select RS-485 Bias

### Note:

(For more information on RS-485 Receiver Biasing, see B&B Electronics RS-422/485 Application Note available at [www.bb-elec.com](http://www.bb-elec.com))

## Serial Ports 1 to 4 Connector Pin-outs

RS-232, RS-422 and RS-485 pin-outs for serial ports 1 through 4 are shown below.



Looking into connector

RJ-45 Pin	RS-232 Signal Name	DTE	RS-422	RS-485	
1	Data Set Ready	DSR	In	RXDA (-)	
2	Request To Send	RTS	Out	TXDA (-)	Data A (-)
3	Signal Ground	GND	---	GND	GND
4	Transmit Data	TXD	Out	TXDB (+)	Data B (+)
5	Receive Data	RXD	In	RXDB (+)	
6	Carrier Detect	DCD	In		
7	Clear To Send	CTS	In		
8	Data Terminal Ready	DTR	Out		

Figure 8. Serial Connection Pin-outs for RS-232/RS-422/RS-485

**Note:**

For more information on RS-232, RS-422 and RS-485 pin-outs, cable connections and loopback connections refer to Appendices A, B and C

## Port 1 Configuration

When the **Server Properties** window is opened for Port 1 the **Serial Port Mode** drop down list provides the following options:

- Default
- Console
- Upgrade
- RS-232
- RS-422
- RS-485

### Default Mode

When the ESP906CL **Serial Port Mode** parameter is set to **Default**, and then **Updated**, the server's properties will revert to the factory default values. Ports 1 to 4 default to RS-485 operation (9600 baud, 8, N, 1)

#### **Note:**

See Chapter 12 for a complete list of factory default settings

### Console Mode

When the ESP906CL **Serial Port Mode** parameter is set to **Console**, and then **Updated**, the server can be configured via a direct RS-232 connection through **Port 1** using a PC running a communications program such as HyperTerminal.

In **Console Mode** the default serial port settings are: **9600** baud, **8 data bits**, **No parity**, and **1 stop bit**.

#### **Note:**

Refer to Chapter 9 for details on Console Mode

### Upgrade Mode

When the ESP906CL **Serial Port Mode** parameter is set to **Upgrade**, and then **Updated**, the server's firmware can be upgraded using either of the following methods:

1. Via a direct RS-232 connection through **Port 1** using a PC running ESP Manager.

2. Via the network, using the ESP Manager software and a virtual COM port mapped to the ESP906CL Port 1.

In **Upgrade Mode** the default serial port settings are: **9600** baud, **8 data bits, No parity**, and **1 stop bit**. However, usually the baud rate typically is reconfigured to 115.2 kbps to facilitate a faster upload speed.

**Note:**

Refer to Chapter 8 for details on Upgrade Mode

*RS-232 Mode*

When the ESP906CL **Serial Port Mode** parameter is set to **RS-232**, and then **Updated**, the server Port 1 will operate as a serial server port, communicating across the network.

*RS-422 Mode*

When the ESP906CL **Serial Port Mode** parameter is set to **RS-422**, and then **Updated**, the server Port 1 will operate as a serial server port, communicating across the network.

*RS-482 Mode*

When the ESP906CL **Serial Port Mode** parameter is set to **RS-485**, and then **Updated**, the server Port 1 will operate as a serial server port, communicating across the network.

## Ports 2, 3 and 4 Configuration

When the **Server Properties** window is opened for Ports 2, 3 or 4, the **Serial Port Mode** drop down list provides the following options:

- RS-232
- RS-422
- RS-485

For each port, when the ESP906CL **Serial Port Mode** parameter is set to one of the above interface standards, and then **Updated**, the server Port 1 will operate as a serial server port, communicating across the network.

**Note:**

Refer to Chapter 5 for details on configuring the serial server properties



## Ports 5 and 6 Configuration

When the **Server Properties** window is opened for Ports 5 or 6, the **Serial Port Mode** drop down list provides only one option: **Current Loop**

Ports 5 and 6 are active two-wire, 36 mA simplex current loop ports. They use two position removable terminal blocks with locking screws, allowing bare wires to be connected. The connection can be temporarily removed by unscrewing the locking screws and unplugging the connector.

### Note:

For additional information on digital current loops download "Current Loop Application Note" from B&B Electronics website at: [www.bb-elec.com](http://www.bb-elec.com)

Ports 5 and 6 can be connected to two-wire field devices with passive 20 mA current loop connections as shown in the diagram below:

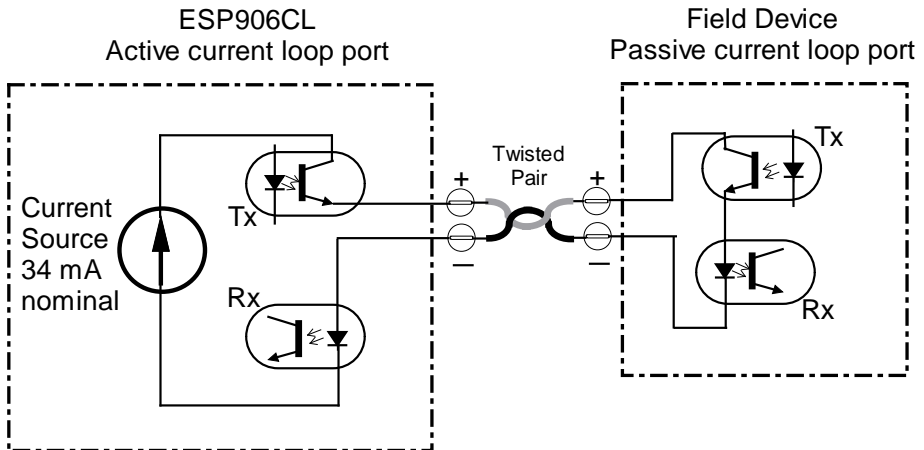


Figure 9. Connection to a Two-wire Current Loop Device

### Note:

Refer to Appendix E for additional connector and wiring details for Ports 5 and 6



# Chapter 3: INSTALLING THE VLINX ESP SOFTWARE

The Windows-based **ESP Manager** and **Virtual COM Port** software makes configuration fast and easy. If using Windows, installing the ESP Manager software and setting up virtual COM ports to configure the ESP906CL is recommended.

## Software Installation

The **VLINX ESP** software includes:

- **ESP Manager**
- **Install Virtual COM Ports**
- **Uninstall Virtual COM Ports**

## Automatic Installation

**Step 1a:** Inserting the VLINX CD in the CD-ROM should automatically launch the Install Shield Wizard.

## Manual Installation

**Step 1b:** To manually start the software installation, from the **Windows Desktop**, click **Start** button. At the **Run** command line type **D:\start.exe**. Then select **OK**. (**D:** is the drive letter for the CD ROM.)

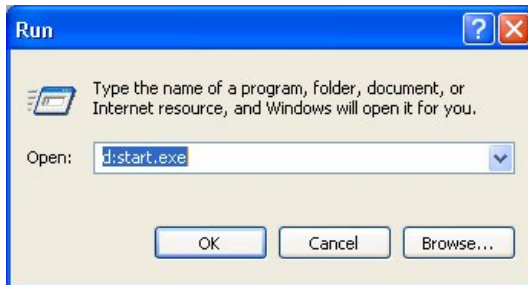


Figure 10. The Run Dialogue Box

The **Install Shield Wizard** window will be displayed.

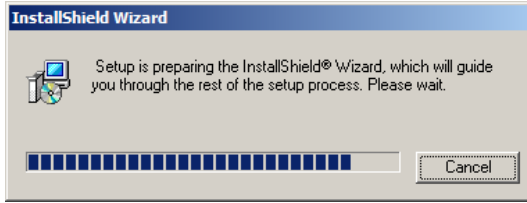


Figure 11. The Install Shield Wizard Window

**Step 2:** When the **VLINX ESP Setup** window appears, click **Next**.

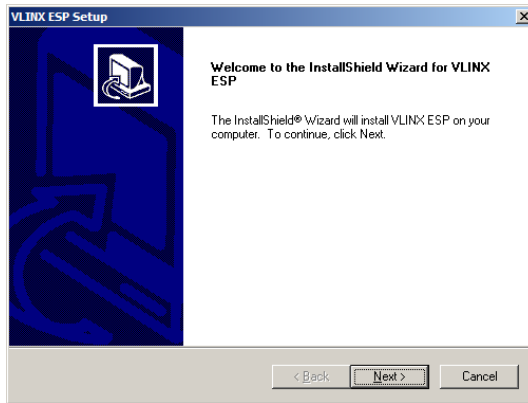


Figure 12. VLINX ESP Setup Window

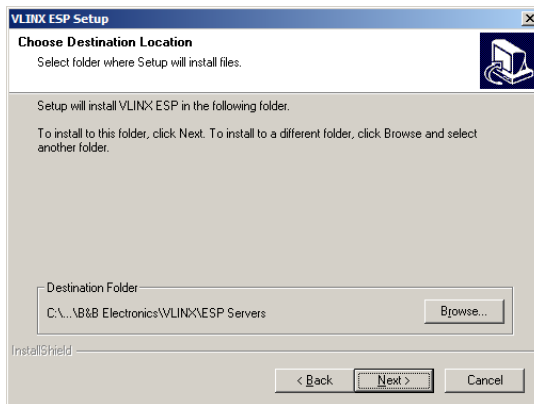


Figure 13. The Choose Destination Window

**Step 3:** When Choose Destination Location appears, click **Next**.

The installation progress will be shown until complete.

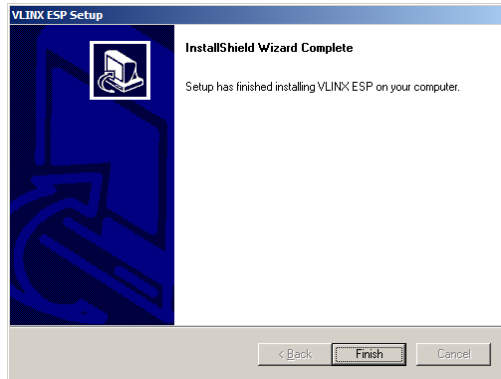


Figure 14. The Install Shield Wizard Complete Window

**Step 4:** Click **Finish** when the **Install Shield Wizard Complete** dialogue appears. When finished, dialogue box will close.

### Updating an Existing Installation

If an older version of the **ESP Manager** software is already installed, the **Modify, repair or remove the program window** will appear when the installation process is initiated:



Figure 15. The InstallShield Wizard Modify, Repair or Remove Screen

The recommended procedure is to **Remove all installed components** first, then follow the prompts to **Install** the new software.

## Opening the ESP Manager

**Step 5:** If the Serial Server is not already connected to the network or to the Ethernet port on the computer, connect it and apply power.

The **Power** indicator should light red, the **Link** light should indicate which type of Ethernet connection has been made and the **Ready** LED will flash, indicating configuration can begin.

**Step 6:** Start the **ESP Manager** software:

**Start → Programs → B&B Electronics → VLINX → ESP Servers → VLINX ESP Manager.**

As soon as the **ESP Manager** opens it will initiate **Searching Server** and after a few seconds the **Serial Server List** will display all (ESP90x) **Serial Servers** on the network.

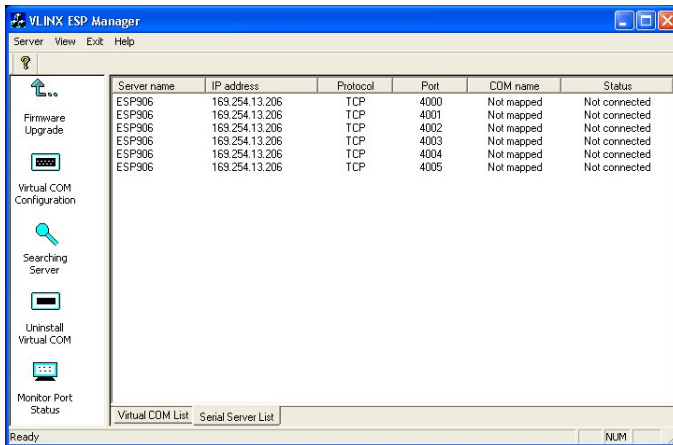


Figure 16. ESP Manager Displaying all ESP90x Serial Servers

# Chapter 4: USING ESP MANAGER

The **ESP Manager** software allows:

- Searching for servers connected to the network
- Displaying and changing the configuration of those servers
- Installing virtual COM ports on a computer
- Displaying and configuring virtual COM ports
- Uninstalling virtual COM ports on a computer
- Upgrading the **Serial Server** firmware
- Monitoring Port Status
- Saving and Loading Configuration Files

## Hardware Setup:

**Step 1:** Connect the **Serial Server** to the LAN or to a computer Ethernet port.

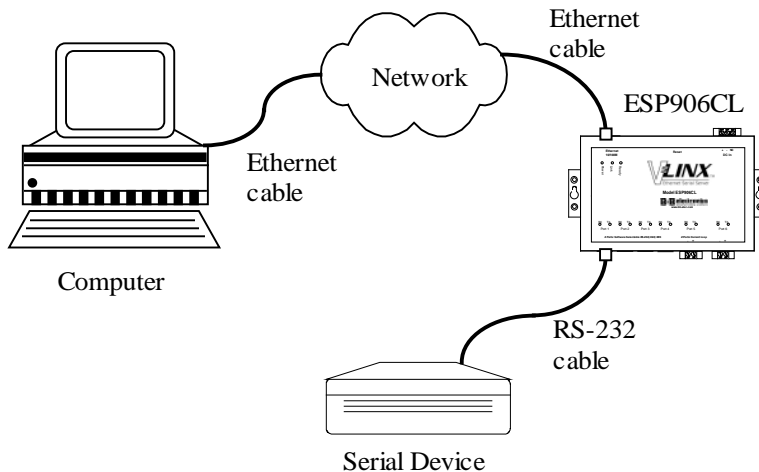


Figure 17. Ethernet Connection via a LAN

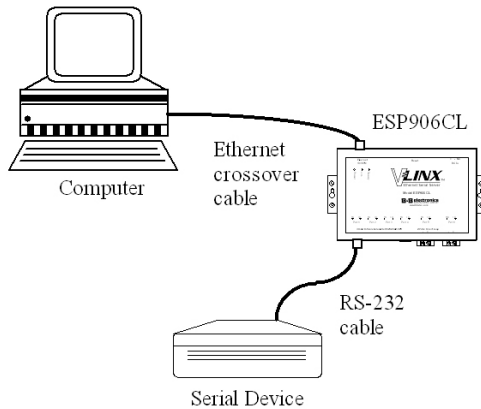


Figure 18. Direct Ethernet Connection using a Crossover Cable

**Note:**

Use an Ethernet Crossover Cable if connecting directly to a computer LAN card.

**Step 2:** Apply power. The red Power indicator will light, the Link indicator lights when an Ethernet connection is made, and the Ready indicator will flash.

## Software Setup:

**Step 3:** To run the **ESP Manager** from the **Programs** menu click:

**Start → Programs → B&B Electronics → VLINX → ESP Servers → VLINX ESP Manager**

As soon as the **ESP Manager** opens it will initiate **Searching Server** and after a few seconds the **Serial Server List** will display all (ESP90x) **Serial Servers** on the network.



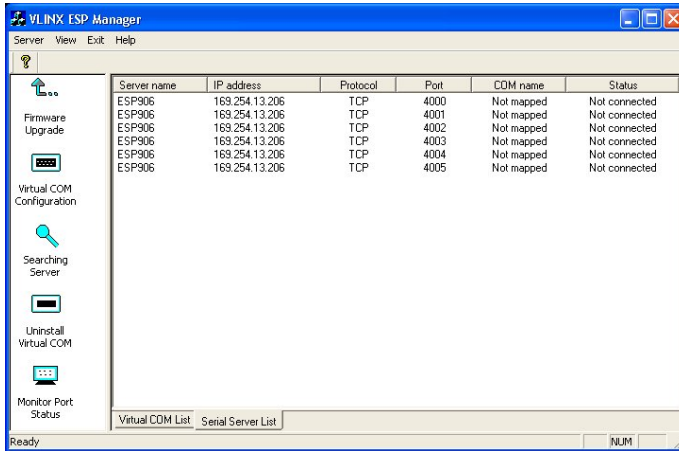


Figure 19. The VLINX ESP Manager Window

## Software Overview:

The **VLINX ESP Manager** window provides the following information:

- **Menus** (Server, View, Exit, Help)
- **Server Icons** (Firmware Upgrade, Virtual COM Configuration, Searching Server, Uninstall Virtual COM, Monitor Port Status)
- **Serial Server / Virtual COM Lists**
- **Software Status** (Ready, Updating, Searching, etc)

## Menus

### Server

- **Firmware Upgrade** - Used when downloading new firmware to the **Serial Server**.

#### **Note:**

*See Chapter 8 for more information on upgrading firmware.*

- **Virtual COM Configuration** - Selects the **Virtual COM List**. Double clicking on any COM port in the **Virtual COM List** brings up a window that allows changing the virtual COM settings such as **Flow Control**, **Protocol**, **IP address**, and **Port Number**. Virtual COM settings must match Serial Server port settings.

- **Searching Server** - Searches for **Serial Servers** on the network and brings back configuration information that will be displayed in the **Server Properties** window.
- **Uninstall Virtual COM** - Allows virtual COM ports to be uninstalled from the **ESP Manager** window.
- **Monitor Port Status** - Brings up a screen that displays the following information associated with the selected serial port.

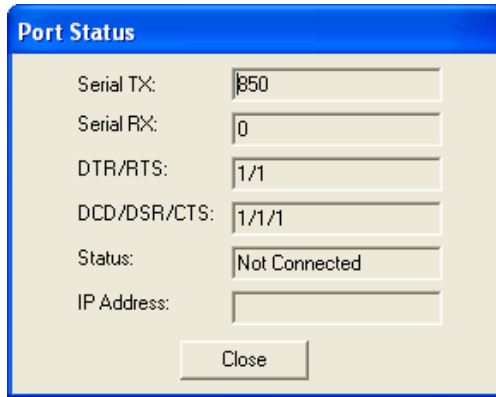


Figure 20. The Port Status Window

**Serial TX:** Displays the number of bytes of data sent to the **serial device** since the IP connection was established.

**Serial RX:** Displays the number of bytes of data received from the connected **serial device** since the IP connection was established.

**DTR/RTS:** The **DTR/RTS Port Status** indicator displays the current logic state of the DTR and RTS hardware handshake (output) lines for the selected **Serial Server** port (1 = asserted, 0 = not asserted)

**DCD/DSR/CTS:** The **DCD/DSR/CTS Port Status** indicator displays the current logic state being received on the DCD, DSR and CTS hardware handshake (input) lines of the selected **Serial Server** port (1 = asserted, 0 = not asserted)

**Status:** Indicates whether the client software has made a connection with the **Serial Server**.

**IP Address:** Displays the IP address of the connected client when there is a client connection

- **Save Configuration File** - Allows the user to save the current configuration information to a file with a .vcom extension.
- **Load Configuration File** - Allows the user to load a configuration file.

### *View*

Provides three viewing options for the ESP Manager screen:

- **Toolbar** – allows the toolbar (directly under the menu bar) to be viewable or hidden
- **Status Bar** – allows the Status Bar (at the bottom of the screen to be viewable or hidden
- **Split** – allows the position of the split between the Icons pane and the Virtual COM List / Serial Server List panes to be dragged horizontally using the mouse

### *Exit*

- Allows you to **Exit** the **ESP Manager** program

### *Help*

- Accesses the **About vcomui** dialogue box, which indicates the software version number

## **Server Icons Pane**

**Firmware Upgrade, Virtual COM Configuration, Searching Server, Uninstall Virtual COM and Monitor Port Status** can also be selected using icons located in the left window.

## **Serial Server / Virtual COM Lists**

To make management of lists of serial server easier, lists can be sorted by clicking on any tab heading. Scrolling bars facilitate scrolling through long lists.

### *Serial Server List*

- **Server Name** - Displays the name of the **Serial Server**. The name is listed once for each port.
- **IP Address** - Displays the IP Address for the **Serial Server**. All ports in a **Serial Server** have the same the same IP address.

- **Protocol** - Displays the currently selected TCP or UDP mode for the **Serial Server**.
- **Port** - Displays the port number for each **Serial Server** port.
- **COM Name** - Displays the name of the computer COM port mapped to each **Serial Server** port. If no computer port has been mapped it displays **Not mapped**.
- **Status** - The Status indicates the mapped virtual COM port condition.

**Not Connected** is shown when a program does not have the port Open.

**Connected** is shown when that mapped port is Open for use.

#### *Virtual COM List*

- **COM Name** - Displays the number of the COM port mapped to each **Serial Server** port.
- **IP Address** - Displays the IP Address for the **Serial Server**. All ports in a **Serial Server** have the same IP address.
- **Protocol** - Displays the currently selected TCP or UDP mode for the **Serial Server**.
- **Port** - Displays the port number for each **Serial Server** port.
- **Flow Control** - Indicates what type of flow control is configured for each port.
- **Status** - Indicates whether each port is currently **In Use** or **Not Used**.

### **Status Bar**

Displays the current status of the software in the bottom, left corner of the screen

- Ready
- Updating
- Searching reachable servers...

### **Search for Servers:**

Upon opening the **ESP Manager** software it will automatically execute Search Server and search for all reachable ESP90x serial servers.

**Step 4:** To manually initiate a search for servers, click **Searching Servers** (under the **Servers** menu or the icon on the left side of the screen). The **Search Setup** box will appear.

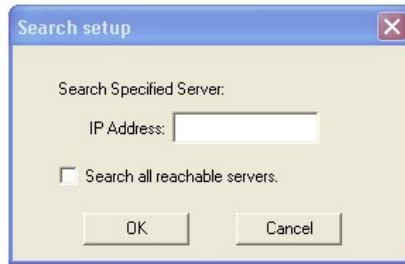


Figure 21. The Search Setup Window

**Step 5:** Enter the **IP Address** assigned to the **Serial Server** or click **Search all reachable servers**, then **OK**. **IP Address** is used to find ESP906CL units that are not on the same subnet. (Routers on the network will block the standard broadcast used to find servers if **Search all reachable servers** is selected.) The user must set an IP address that conforms to the LAN addressing scheme.

The Searching window is shown until all active **Serial Servers** on the LAN are listed in the **Serial Server List** window.

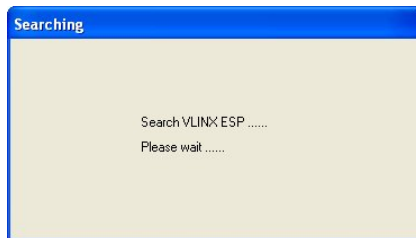


Figure 22. The Search VLINX ESP Dialogue Box

## Configure Server Properties

The **Server Properties** window displays the current configuration properties for the currently selected server.

**Step 6:** To open the **Server Properties** window, highlight the **Serial Server** in the **Serial Server List** window, double-click to open.

The **Server Properties** window is used to configure and store the Server configuration settings. Details for setting Properties are shown in the next chapter.

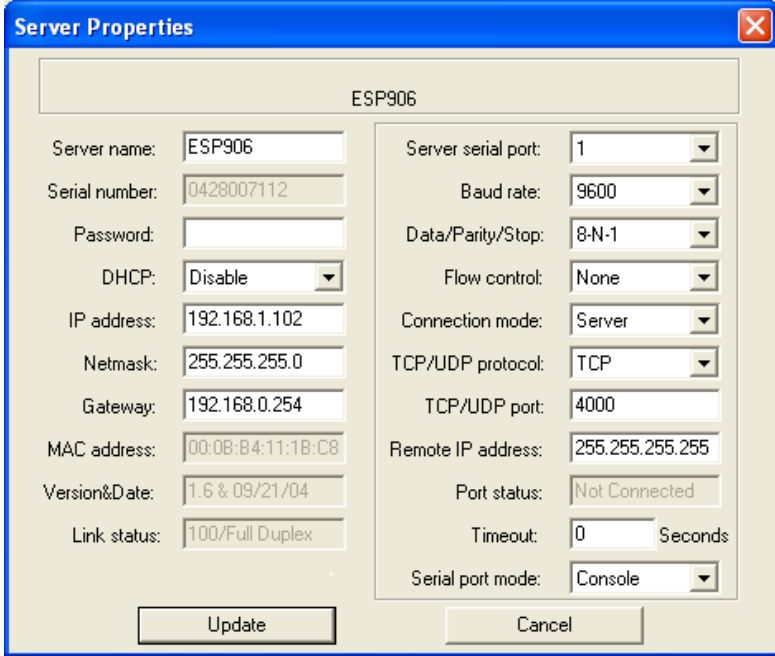


Figure 23. The Server Properties Window

### Note:

ESP Manager Navigation:

- Use the mouse to select the property and parameters or
- Tab to move to the next property
- Tab+Shift to move back to previous property
- Arrows to move between properties or change values or contents of the current property
- Enter to select update or cancel

**Step 7:** After configuring as needed, click **Update** to store the configuration in the server. The following window will appear:

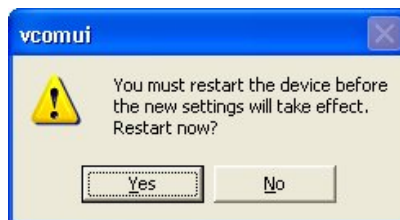


Figure 24. The vcomui Window

**Step 9:** Click **Yes** to restart. The following dialogue box will appear:

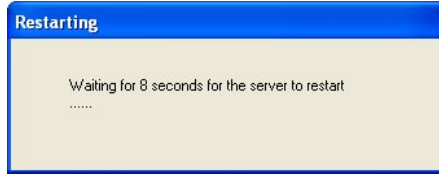


Figure 25. The Restarting Dialogue Box

After eight seconds a dialogue box will ask whether you want to search for all reachable servers again.

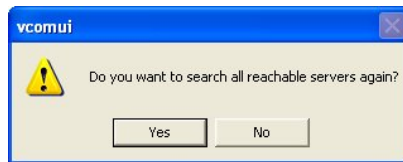


Figure 26. The Server Search Dialogue Box

While the Serial Server is searching for all reachable servers the following dialogue box appears:



Figure 27. The Search VLINK ESP Dialogue Box

After that port has been updated you may want to re-enter **Server Properties** to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.





# Chapter 5: CONFIGURING THE ESP906CL SERVER PROPERTIES

The **VLINX Serial Server** can be configured using any of four different user interfaces: the **ESP Manager** software, the **Web Server**, **Console Mode** or **Telnet**. The **Server Properties** described in this chapter can be changed from any of these user interfaces.

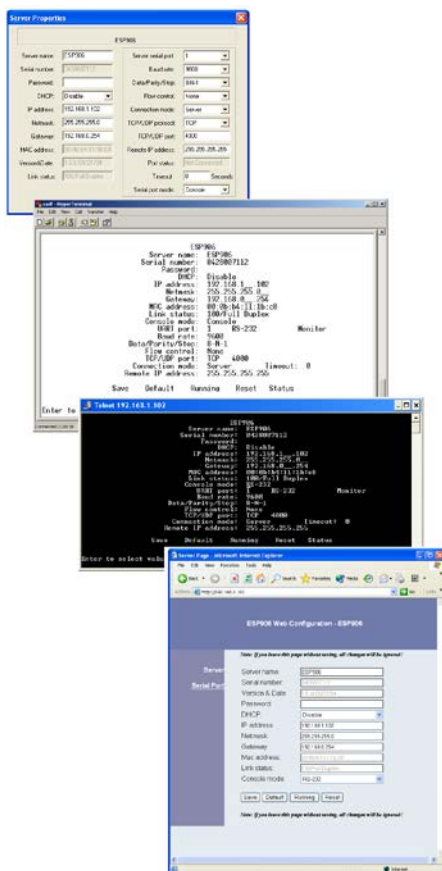


Figure 28. The Four Methods of Configuring Server Properties

The configuration for each port is displayed one at a time. In the **ESP Manager**, double-click the port in the **Serial Server List**. This brings up the **Server Properties** window for that port.

Make any desired changes to the configuration and then click **Update**. Only the settings for the port shown are stored.

**Note:**

*Click Update to store settings for each port before changing to the other port.*

Using **Telnet** or **Console Mode**, **Save** stores settings for all ports simultaneously.

## Description of the Server Properties

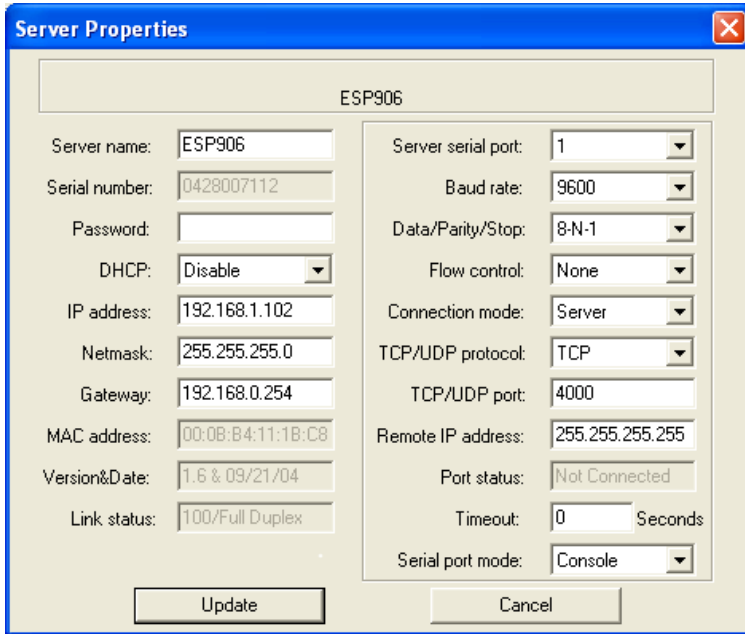


Figure 29. The Server Properties Window

### Server Name

This field displays the name that has been assigned to the **Serial Server**. A new **Server Name** of up to 16 characters can be entered. If more than one **Serial Server** is connected on the LAN it is recommended that a new name be assigned to each. When the **ESP Manager** finds a **Serial Server** on the

---

LAN it displays the server name and IP Address allowing the user to distinguish between **Serial Servers**.

## Serial Number

Each Serial Server has a unique serial number. This is fixed and cannot be changed.

## Password

Entering a password activates a security feature on the **Serial Server**. Once a password is entered it will be required to access the menu and make changes.

## DHCP

DHCP servers are a part of numerous LAN management systems. The DHCP field provides two choices: **Disable** and **Enable**. Disable is the normal, or default, setting. When enabled, the **Serial Server** will send a DHCP request to the DHCP server, which will assign a dynamic IP address, net mask, and gateway to the **Serial Server**. If a DHCP server is not available on the network the **Serial Server** will time out after 10 seconds and the default values will remain.

### **Note:**

*A dynamic address assigned by the DHCP server may change if the ESP906CL loses the Ethernet connection or power is removed. The host (client) communication software requests a connection to the specific IP address of the serial server. If the DHCP reassigns a different IP address the software will not be able to communicate with the hardware. Therefore, using a static IP address is recommended.*

## IP Address

Software or hardware attempting to access the **Serial Server** via the network must know the **IP Address** of the server. A static IP address is retained and remains the same each time the server is powered up or starts/restarts. The default IP address of the **Serial Server** is printed on a label on its bottom cover. Entering an appropriate address in the IP Address field and updating the server will change the server's IP address. The network administrator can assign/establish the static address or group of addresses to be used.

The IP Address of the **Serial Server** can be confirmed using the DOS Ping command.

**Note:**

- To use **Ping** to check for communications:
- Access a DOS window (in XP click **Start**, then **Run**)
- At run prompt enter: **CMD**
- In the DOS window enter: **Ping xxx.xxx.xxx.xxx** (IP address for the ESP906CL to be confirmed)
- The command will return the Ping results indicating 4 replies

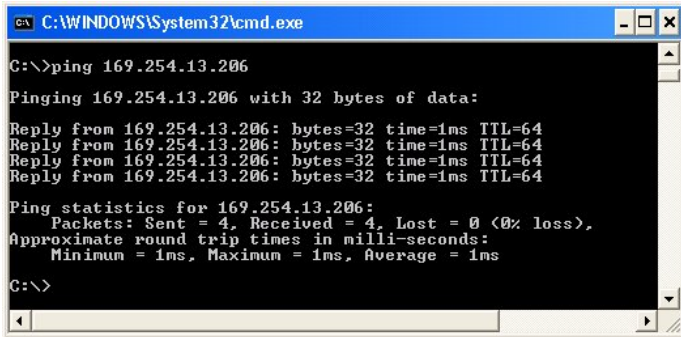


Figure 30. Pinging using the DOS command window

**Netmask**

The default LAN netmask is configured for a Class C address. The user may change this. Default is 255.255.255.0

**Gateway**

The Gateway IP address allows users to access the **Serial Server** from outside the LAN.

**MAC Address**

The MAC address is fixed and cannot be changed. It is assigned in the factory. Every Ethernet device manufactured has its own unique MAC address.

**Version & Date**

The currently loaded version of the firmware, and when it was released, is shown here.

---

## Link Status

Link status automatically displays the type of Ethernet connection. It will either display 10BaseT or 100BaseTX in full duplex or half duplex. This will depend on the LAN, switches, hubs used in the LAN topology.

## Server Serial (UART) Port

This field displays the number of the port for which the configuration data is being displayed. The **Server Properties** for another port can be displayed by changing the number in this field.

## Baud Rate

The serial port baud rate on the **Serial Server** must match the serial baud rate of the connected device unless using Virtual COM mode. In Virtual COM mode the software program will establish serial settings.

## Data/Parity/Stop

Set this to match the data format used by the device connected when the Virtual COM mode is not being used.

## Flow Control

The Flow Control setting must match the requirements of the device connected.

**Note:**

Select None when setting ESP Port 1 as RS-485 or 4-wire RS-422.

## Connection Mode

The Connection Mode field has three options: **Server**, **Client** and **Client (no heartbeat)**

- When using the **Virtual COM Port** feature, select **Server**.
- When using a **TCP** or **UDP Socket** program, select **Server**.
- When using **Paired Mode** communication between two serial servers set up one as a **Client** and the other as a **Server**.
- When connecting to a server that does not support **Heartbeat**, select **Client (no Heartbeat)**.

## TCP/UDP Protocol

Select TCP (Transmission Control Protocol) or UDP (User Datagram Protocol) protocol. If the application does not require a UDP connection, select TCP. TCP guarantees reliable communication with error checking whereas UDP provides faster transmission.

## TCP/UDP Port

This sets the port number for connection. The default port number is **4000**, **4001**, **4002**, **4003**, **4004** and **4005** for serial ports 1, 2, 3, 4, 5 and 6 respectively.

In all modes of operation, **Direct IP** or **Virtual COM**, the port number set in the **Server Properties** menu must match the **Virtual COM** or socket software port settings.

### **Note:**

*Example: The Virtual COM default setting is TCP/UDP Port 4000. If the port # property is changed to 4001, the virtual COM port will have to be changed to 4001. The hardware settings can be changed from the ESP Manager or Console Configuration Menu. The Virtual COM port setting also can be changed within the Device Manager of the computer on which it is installed.*

## Remote IP Address

This is a security feature activated by entering the IP address of the desired client. The **Serial Server** will only communicate with the listed IP address and all other requests for connection will be filtered out. The **Serial Server** must be set up as a **TCP** or **UDP Server** to use this feature. The default setting is **255.255.255.255**.

If **Paired Mode** is not being used, do not change this setting until the application has been tested and is communicating properly. Then activate the address filtering feature.

### **Note:**

*Refer to Chapter 1 Paired Mode*

## Port Status

This field indicates whether a serial port is connected via the serial server to a virtual COM port of a device on the network.

---

## Timeout

Default for the **Timeout** property is 0, or no timeout. Setting **Timeout** to any value between 1 and 255 seconds activates it. If **Timeout** is set to 5 seconds and the **Serial Server** is configured as a **Server**, the **Client** makes a connection and communications starts. If communications are ideal for 5 seconds the **Serial Server** will reset and make itself available for another client connection.

## Serial Port Mode

The **Serial Port Mode** field is a drop down list with several options. These options vary depending on which port you currently are configuring (selected in the **Server Serial Port** field).

### Port 1

The following choices are available when configuring Port 1:

- **Console** – When this mode is selected and the server is updated, a PC running a communications program such as HyperTerminal can communicate (RS-232) with the ESP906CL via Port 1, displaying the **Console Mode** screen and allowing configuration of the server and its ports.
- **Upgrade** – When this mode is selected and the server is updated, firmware can be uploaded into the Serial Server via Port 1 (RS-232) or via a virtual COM port mapped to Port 1.
- **Default** – When this mode is selected and the server is updated, it will revert the server to its default configuration.
- **RS-232** – When this mode is selected and the server updated, Port 1 will become an RS-232 serial port on the server.
- **RS-422** – When this mode is selected and the server updated, Port 1 will become an RS-422 serial port on the server.
- **RS-485** – When this mode is selected and the server updated, Port 1 will become an RS-485 serial port on the server.

### Ports 2, 3 and 4

*The following choices are available when configuring Ports 2, 3 and 4:*

- **RS-232** – When this mode is selected and the server updated, the selected port will become an RS-232 serial port on the server.
- **RS-422** – When this mode is selected and the server updated, the selected port will become an RS-422 serial port on the server.

- **RS-485** – When this mode is selected and the server updated, the selected port will become an RS-485 serial port on the server.

*Ports 5 and 6*

- When configuring ports 5 and 6 the only choice available is **Current Loop/**

## Update/Save

Server properties must be updated separately for each serial port. Updating varies slightly depending on which of the four configuration user interfaces are used.

### *Updating the Server Properties in ESP Manager*

From the **Server Properties** screen, click the **Update** button to store the configuration settings for the currently selected port. The vcomui dialogue box will appear indicating you must restart the device before the new settings will take effect. Click **Yes**.

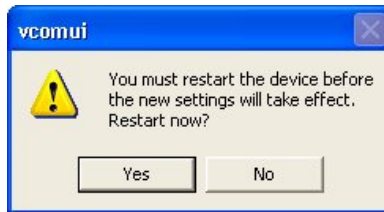


Figure 31. The Restart Dialogue Box

The following dialogue box will appear:

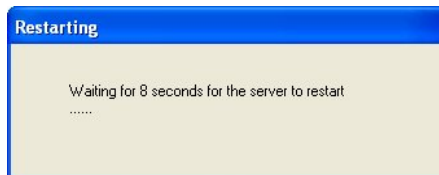


Figure 32. The Restarting Dialogue Box

After eight seconds a dialogue box will ask whether you want to search for all reachable servers again.



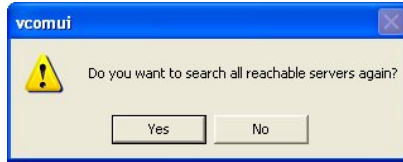


Figure 33. The Server Search Dialogue Box

While the Serial Server is searching for all reachable servers the following dialogue box appears:



Figure 34. The Search VLINX ESP Dialogue Box

After that port has been updated you may want to re-enter **Server Properties** to verify the changes have taken effect, or to view/change the configuration of other ports. Each port must be configured separately.

#### *Saving Configuration Data in Console Mode or Telnet*

If using the **Configuration Menu** in **Telnet** or **Console Mode**, Tab to **Save**, then press **Enter**.

There are five options shown at the bottom of the menu: **Save**, **Default**, **Running**, **Reset** and **Status**. Use Tab, Backspace, or arrow keys to move the cursor to the option position, and then press **Enter**.

- **Save** stores the configuration data to **Serial Server** flash memory, and resets it.
- **Default** restores the editing configuration data to factory default settings.
- **Running** restores the editing configuration data to the last values stored in the flash memory.
- **Reset** re-boots the **Serial Server**, making it available for a client connection.

- **Status** displays how many Ethernet packets and serial bytes are transmitted and received. A refresh button is available to update the displayed figures.
- **Refresh/Space Bar**: Press to refresh the configuration page

*Saving using the Web Server Interface*

- Operates the same as the Configuration Menu except it does not have the **Status** feature.

# Chapter 6: INSTALLING VIRTUAL COM PORTS

The **Virtual COM Port** feature allows Windows platform software, using standard API calls, to be used in an Ethernet application.

The **Install Virtual COM Port** software adds a **Serial Server** (COM#) port to the computer. This shows up in the **Device Manager**. The COM number can be selected from a list of available numbers. For example, in a computer already having a COM1 and COM2, COM3 to COM 254 is available for the **Serial Server**. It is recommended that COM Port 5 or higher be selected. The virtual COM port looks like a standard COM port to most Windows based applications which allows the software to open a connection with the serial port located anywhere on the LAN/WAN. When using the virtual COM port the **Serial Server** is configured as a TCP or UDP Server.

## Virtual COM Port Installation

**Step 1:** In Windows, select **Install Virtual COM** from the **Programs** list.

**Start → Programs → B&B Electronics → VLINX → ESP Servers  
→ Install Virtual COM**

The **Search Setup** window will appear.

**Step 2:** Click **Search all reachable servers** and click **OK**.

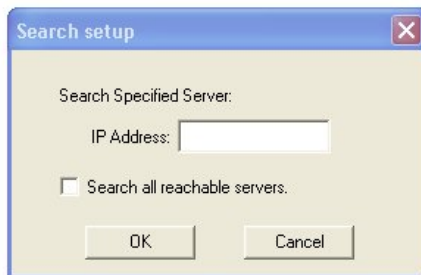


Figure 35. The Search Setup Window

The program searches the LAN for all available **Serial Servers**. When complete, the **Found Server** window appears and displays a list of the servers that were found.

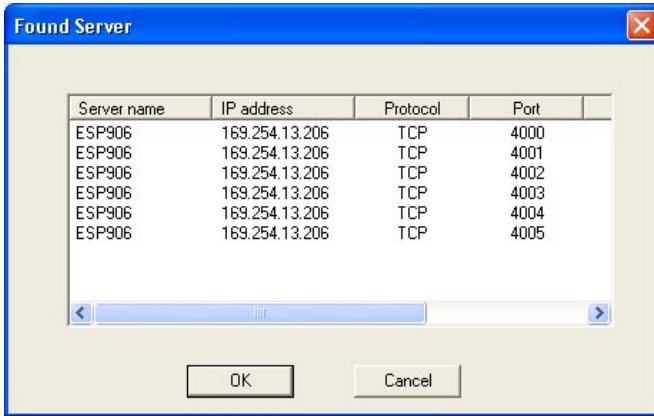


Figure 36. The Found Server Window

**Step 3:** Highlight the **Serial Server** at the IP Address to be mapped to a virtual COM port, then select **OK**.

The COM Inst window will appear. The **Protocol TCP/UDP, IP Address, and Port Number** will mirror the settings of the selected serial server. The default **Flow Control** setting is **None**. RTS/CTS can be selected if used by the application program and serial hardware.

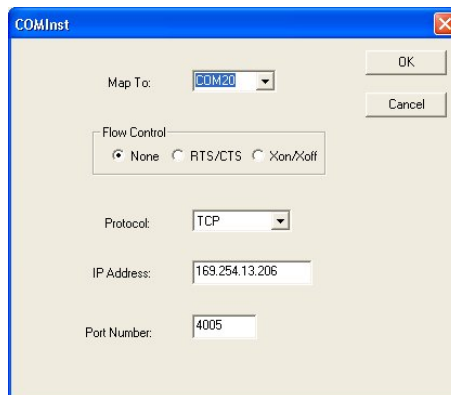


Figure 37. The COMInst Window

**Step 4.** Choose the virtual COM port number to map to and select **OK**.

**Note:**

*PCs may have hardware COM ports and devices such as Modems, IR ports or USB based COM ports that are not currently connected Try selecting a COM number above COM4 if problems occur.*

A **Windows Logo testing** window will appear.



Figure 38. Figure 26. The Windows Logo Testing Window

**Note:**

*This XP feature simply indicates that these drivers have not yet undergone the Microsoft testing procedures required to use the Windows XP Logo on the packaging. Driver compatibility is not affected.*

**Step 5:** Select **Continue Anyway** to proceed with the installation.

**Step 6:** After all **Serial Server** serial ports have been set up as virtual COM ports, select **Cancel** on the **Found Server** form.

## Matching the Serial Server and Virtual COM Port Settings

The settings of the virtual COM ports in the **Device Manager** and the **Serial Server Configuration Menu** must match. If the settings do not match, the virtual COM ports will not work. If these settings are changed in the **Device Manager**, it will only affect the operation of the virtual COM port. It will not change the settings stored in the **Serial Server**. Use the **ESP Manager** to change the **Serial Server** settings.

**Step 1:** Use Device Manager to **View New Ports**

Confirm the virtual COM ports in the Device Manager.

**Step 2:** Double-click **Ports** to view the list of COM port numbers.

The installed Virtual COM port will be displayed as **VLINX ESP (COM #)**.

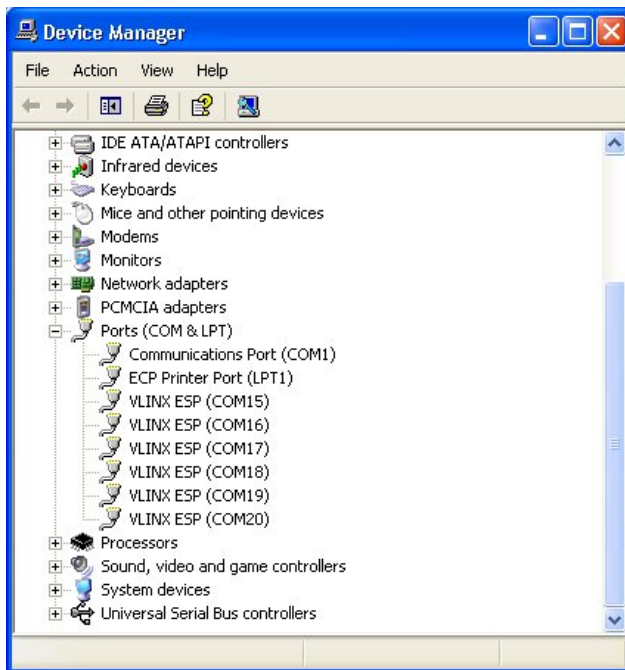
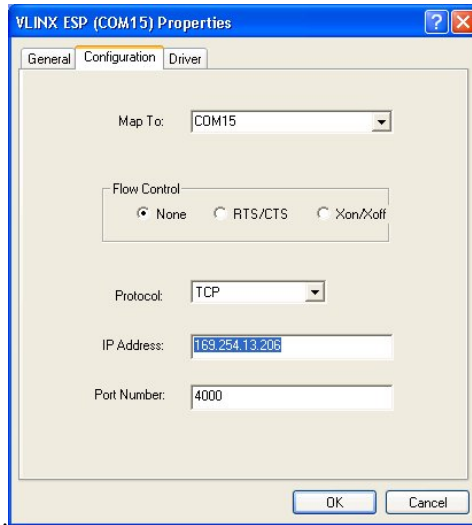


Figure 39. The Device Manager Window

**Step 3:** In the Device Manager select a **VLINX ESP COM#**. Double-click it to bring up the **Properties** window.



*Figure 40. The VLINX ESP (COM3) Properties Window*

**Step 4:** Select the **Configuration** or **Port Settings** tab. This screen allows the settings to be changed if necessary. Click **Cancel** to keep the existing settings.

**Step 5:** Click **OK** to change the settings. Use **Refresh** in the Device Manager if Windows does not auto refresh.





# Chapter 7: REMOVING VIRTUAL COM PORTS

The **ESP Manager** software **Uninstall Virtual COM Port** feature will remove a mapped COM port in the Device Manager of Windows 2000, 2003 server, XP, and Vista operating systems. It may also be removed in the Device Manager of Windows 98, ME, NT, 2000, 2003 server, XP, and Vista. Windows 98 users also will find a **Remove Virtual COM** feature in the Programs file.

## Removing the Virtual COM port with ESP Manager

**Step1:** In Windows, select VLINX ESP Manager from the **Programs** list.

**Start → Programs → B&B Electronics → VLINX → ESP Servers → VLINX ESP Manager**

**Step 2:** In the **ESP Manager** window select the **Virtual COM List** tab. Highlight the mapped COM port number to be removed.

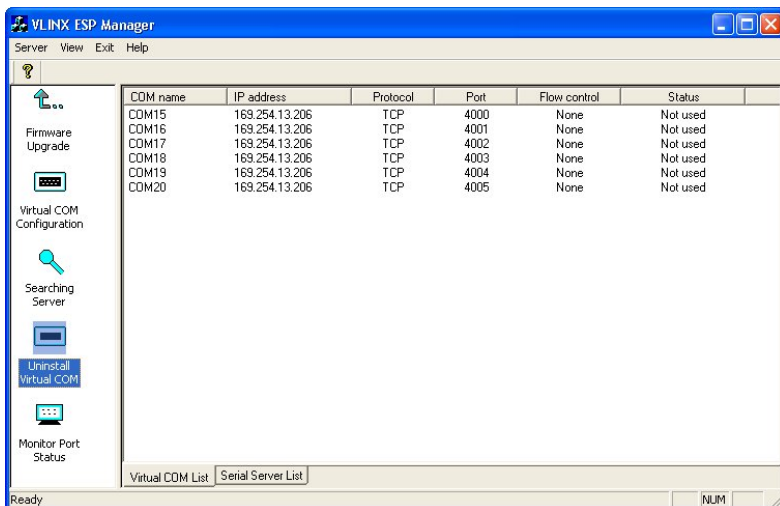


Figure 41. The ESP Manager Window

**Step 3:** Select **Uninstall Virtual COM** button. The Manager will ask for conformation. Select **OK** to complete the uninstall procedure.

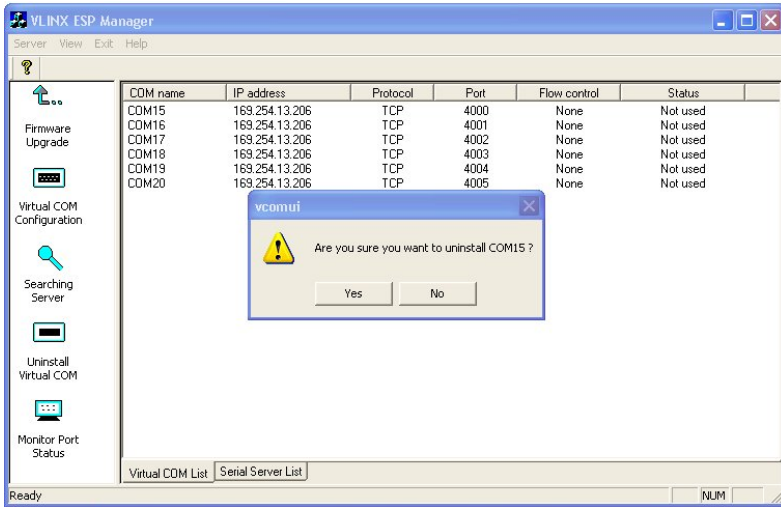


Figure 42. The vcomui Dialogue Box

## Removing the Virtual COM Port using Device Manager

**Note:**

The screen shots were taken from a Windows XP operating system

**Step 1:** On the **Desktop** select **Start → Settings → Control Panel**.

**Step 2:** Select the **System** icon when the manager window opens.

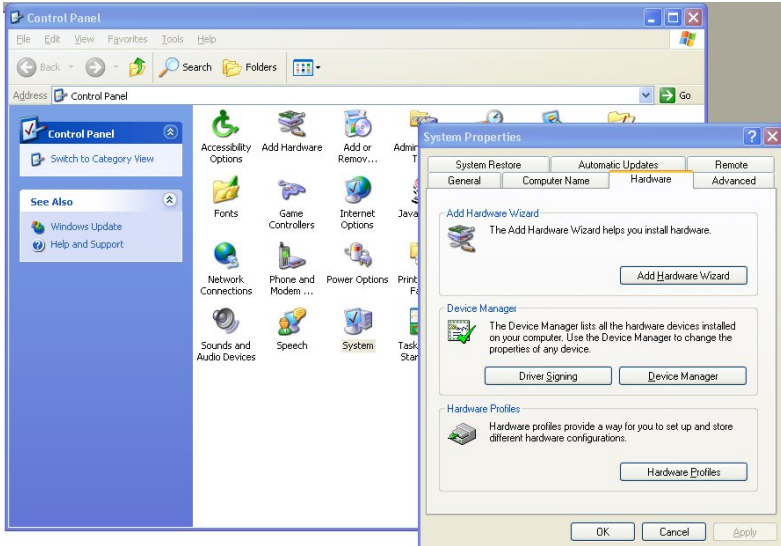


Figure 43. The Control Panel Window

**Step 3:** Select Device Manager in the **Systems Properties** window. In the Device Manager window select the **+** next to **Ports (COM LPT)** to expand.

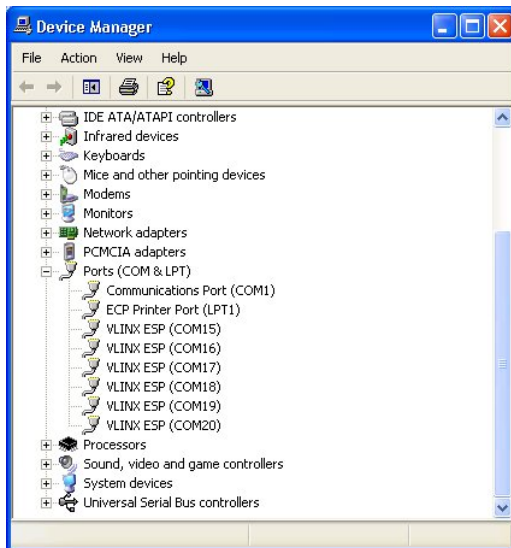


Figure 44. The Device Manager Window

**Step 4:** Highlight **ESP906CL (COM #)** to be removed, go the **Action** tab at the top of window and select **Uninstall**. A confirm **Device Removal** window will appear.

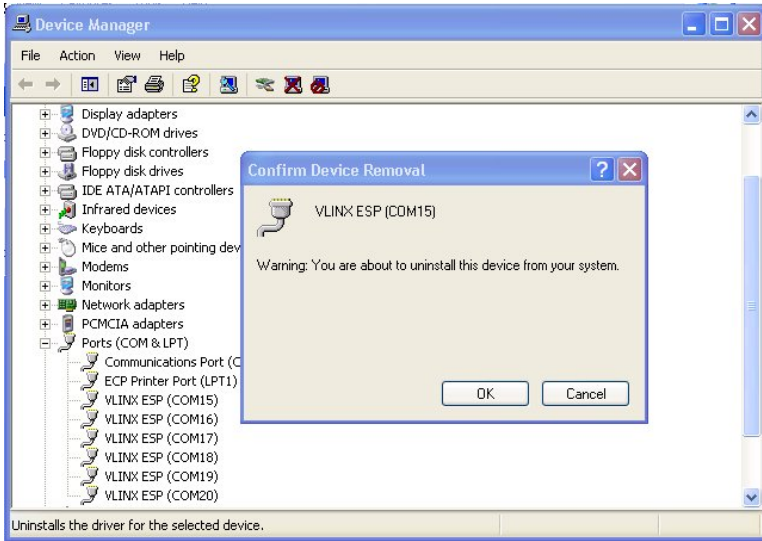


Figure 45. Confirm Device Removal

**Step 5:** Select **OK** to proceed.

The ESP906CL COM # will be removed and the Device Manager window will refresh and display the remaining COM ports

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# Chapter 8: UPGRADING THE SERIAL SERVER FIRMWARE

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New **Serial Server** firmware updates may become available through the B&B Electronics website for installation into the server. The firmware can be uploaded using either a virtual COM port connection or hardware COM port connection.

## Downloading the Firmware

Make a folder to receive the firmware file. Download the compressed software file from the B&B Electronics website. Unzip or expand the file into the (.hex) format so it will be ready to upload to the **Serial Server**.

## Upgrading Via ESP Manager

The **ESP Manager** software can upload new firmware to the server using a direct PC connection via Port 1 of the **Serial Server**, or using a virtual COM port mapped to Port 1.

### **Note:**

*If connecting directly to a computer serial port, connect a null modem cable between the Computer RS-232 port and the ESP906CL Port1 serial port.*

## Preparing the Software

**Step 1:** From the **ESP Manager**, in the **Serial Server List** window, double click the server to be upgraded. The **Server Properties** window will appear.

**Step 2:** Set the baud rate to **115200** to increase the speed of the upload.

**Step 3:** Set the **Console Mode** field to upgrade and click the **Update** button.

**Step 4:** Click **Yes** on the **vcomui** window to restart the **Serial Server**.

## Upgrading the Firmware

**Step 5:** Double-click the **Firmware Upgrade** icon (or click the **Server** menu and **Firmware Upgrade**)

**Step 6:** In the **Upgrade** window, select **Browse**. The Open dialogue box will appear. Locate the folder that contains the firmware .hex file. **Select** the file and click **Open**. The Open dialogue box will disappear.

**Step 7:** In the **Upgrade** window select the serial port to be used in transferring the firmware.

If connected directly from the computer to a **Serial Server** port it will typically be COM1 or COM2

If using a virtual COM port to upgrade via the network, identify the virtual COM number and address mapped to Port 1 on the **Serial Server**.

**Step 8:** Click **Upgrade**

**Step 9:** In the **Port Settings** window set the **Bits per second**, **Data bits**, **Parity** and **Stop** bits to the same values as set up in the **Server Properties** window. Click **OK**.

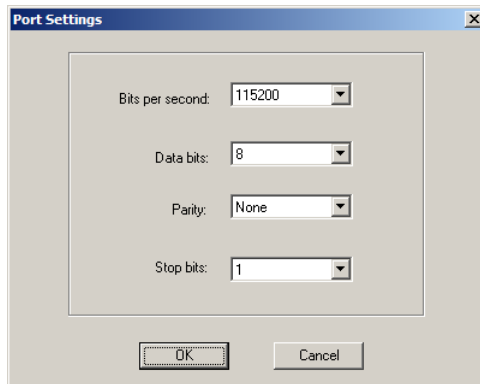


Figure 46. The Port Settings Window

The **Upgrade progress** dialogue will appear and indicate the progress of the transfer. When complete the **Upgrade finished!** message will be shown.

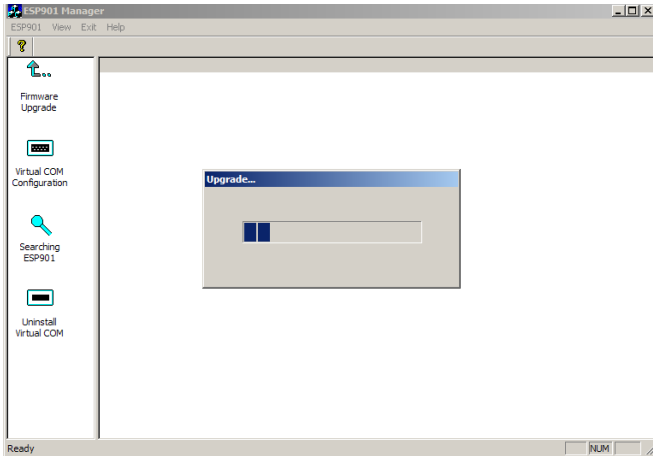


Figure 47. Upgrading in Progress

**Step 10:** Click **OK**.





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## Chapter 9: USING CONSOLE MODE

---

**Console Mode** can be used to configure the ESP906CL server properties using a PC connected to Port 1 on the **Serial Server** via a crossover (null modem) cable. The ESP906CL must be in Console Mode before communications can occur. Put the server into Console Mode via a network connection using **ESP Manager**, **Telnet** or **Web Server**.

### Console Mode Setup

**Step 1:** Apply power to the **Serial Server**. The power and ready LED will light.

**Step 2:** Using a VT100 Terminal emulation program (typically **HyperTerminal** in Windows) open the computer COM port connected to the **Serial Server** Port 1 (via an RS-232 crossover cable).

**Step 3:** In the HyperTerminal **Port Settings** window set:

Baud rate: 9600  
Data bits: 8  
Parity: None  
Stop bits: 1  
Flow control: None

Click **OK**

**Step 4:** To view the **Configuration Menu**, press the **space bar**.

If the ESP906CL is already in Console Mode the Configuration Menu will appear. If not, you will have to use a networked PC running **ESP Manager**, **Telnet** or **Web Server**.

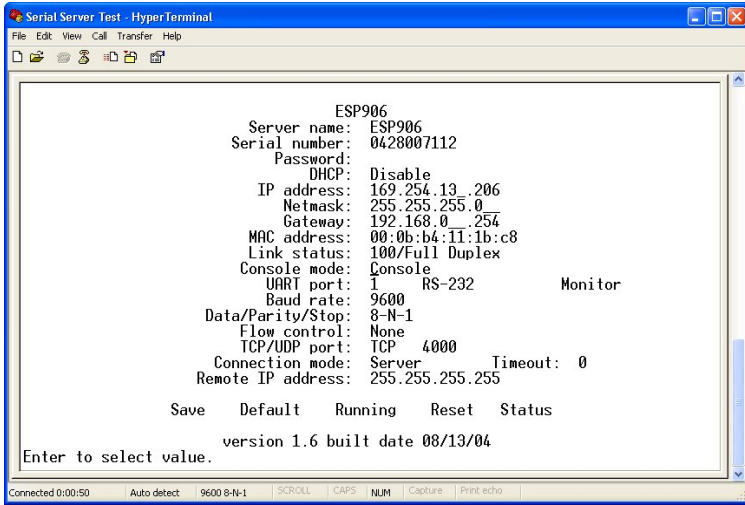


Figure 48. The Console Mode Server Configuration Screen

## Navigating the Configuration Menu

Pressing the Space Bar refreshes the page. Tab, Back Space and arrow keys can be used to navigate to the desired field. The configuration fields can be changed by pressing **Enter** and selecting from the list that appears.

**Step 5:** Once all the changes have been made move to the **Save** field and select **Enter**.

### *Note:*

See Chapter 5 for details of each Server Property Settings.

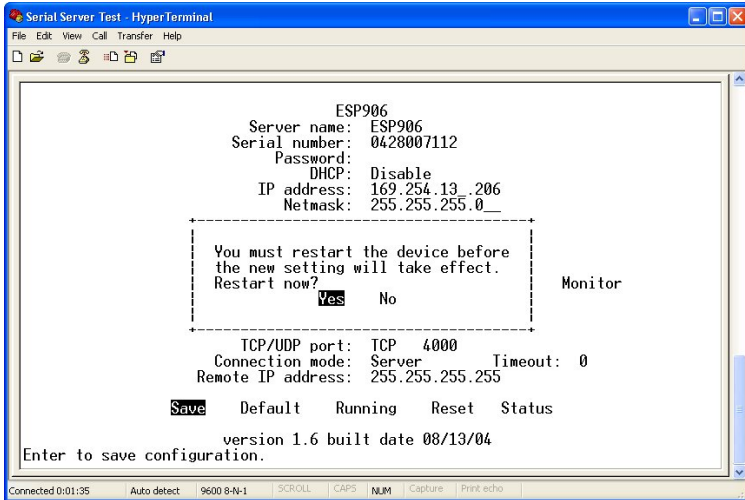


Figure 49. Saving and Restarting the Configuration

The restart message will appear.

**Step 6:** Select **Yes** to save changes. This is necessary to write the settings to the server.

**Step 7:** To view the changes press the **space bar**. The screen will reappear.

## Using a Password

If a password is used it must be entered before the Configuration screen can be seen. If the server is accessed with a password but no changes are made, **Reset** to end before disconnecting.

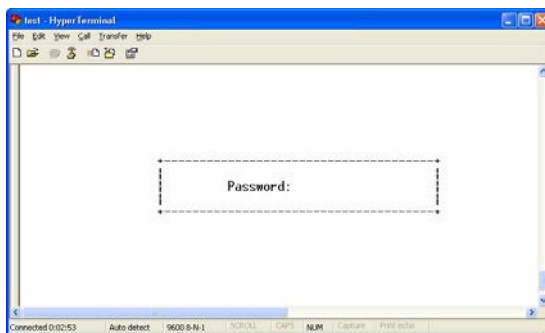


Figure 50. Assigning a Password



# Chapter 10: USING THE WEB SERVER

The **Web Server** can be used to configure the Serial Server from any web browser software (such as Internet Explorer). Server properties can be set up using two browser pages.

**Note:**

See Chapter 5 for details on Server Properties.

## Setting Server Properties

In Internet Explorer type the IP Address of the **Serial Server** into the address field near the top of the window and press **Enter**. The following window will appear:

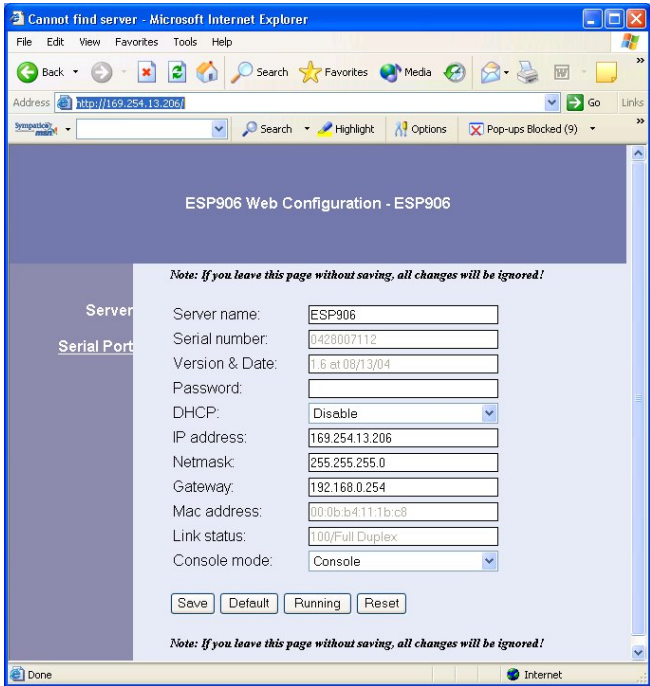


Figure 51. The Web Server Page

Navigate and change properties as required using the mouse and keyboard.

To change serial port properties, click **Serial Port** on the left side of the browser window. The following page will appear:

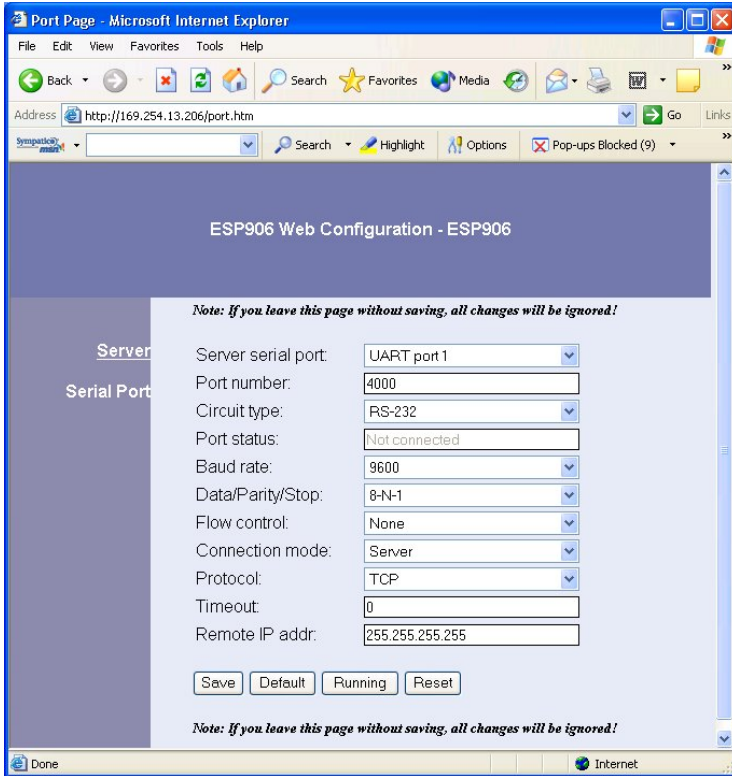


Figure 52. The Web Server Serial Port Properties Page

Click **Save** to store changes to the **Serial Server**. Settings for each Port must be saved separately.

**Note:**

*If new property settings are not saved before leaving this page they will not take effect.*

Return to the main Server page by clicking on **Server** on the left side of the browser window.

# CHAPTER 11: Using Telnet

**Telnet** can be used to configure the Serial Server from any PC on the LAN. The Telnet window displays the same configuration information shown in Console Mode and allows server properties to be configured. To use telnet to access the configuration screen the ESP906CL cannot be in Console Mode. If the ESP906CL is in Console Mode you must use a PC connected directly to Port 1 or ESP Manager or Web Server via the network.

**Note:**

See Chapter 5 for details on Server Properties.

## Configuration Using Telnet

**Step 1:** Ensure the PC and Serial Server are connected to the LAN.

**Step 2:** Apply power to the **Serial Server**. The power and ready LED will light.

**Step 3:** From the **Desktop**, click **Start**, then **Run**. The Run dialogue box will open.

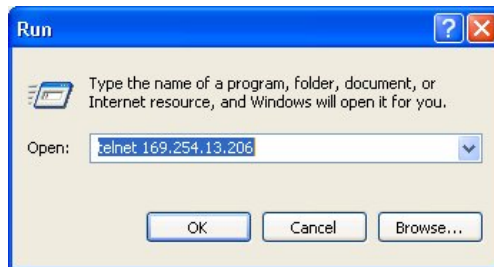


Figure 53. The Run dialogue box

The DOS window will open.

**Step 4:** Type in **telnet** and the IP address of the **Serial Server**. Click **OK**.

If the ESP906CL is in any other mode than Console Mode, the configuration menu will appear.

```

Telnet 169.254.13.206
Server name: ESP906
Serial number: 0428007112
Password:
DHCP: Disable
IP address: 169.254.13.206
Netmask: 255.255.255.0
Gateway: 192.168.0.254
MAC address: 00:0b:b4:11:1b:c8
Link status: 100/Full Duplex
Console mode: RS-232
UART port: T RS-232 Monitor
Baud rate: 9600
Data/Parity/Stop: 8-N-1
Flow control: None
TCP/UDP port: TCP 4000
Connection mode: Server Timeout: 0
Remote IP address: 255.255.255.255
Save Default Running Reset Status
version 1.6 built date 08/13/04
Enter to select value.

```

Figure 54. The Telnet configuration window

## Navigating the Configuration Menu

Pressing the Space Bar refreshes the page. Tab, Back Space and arrow keys can be used to navigate to the desired field. The configuration fields can be changed by pressing **Enter** and selecting from the list that appears.

**Step 5:** Once all the changes have been made move to the **Save** field and select **Enter**. The restart message will appear.

```

Telnet 192.168.1.103
B&B Electronics Manufacturing Company
ESP902
Server name: ESP902
Serial number: 0331003656
Password:
DHCP: Disable
IP address: 192.168.1.103
Netmask: 255.255.255.0
TCP/UDP port: TCP 4000
Connection mode: Server Timeout: 0
Remote IP address: 255.255.255.255
Save Default Running Reset Status
version 1.6 built date 04/12/04
Enter to save configuration.

```

Figure 55. Saving and Restarting the Configuration

**Step 6:** Select **Yes** to save changes. This is necessary to write the settings to the server. The Telnet window will disappear.

**Step 7:** To view the changes re-enter telnet and re-establish communications (Steps 3 to 6). The configuration menu will appear and display the current settings.



# Chapter 12: ESP906CL Technical Data

<b>Power &amp; Environment</b>	<p><b>Power Requirements:</b> 36 VDC1 @ 35 mA 36 VDC2 @ 35 mA 5 VDC @ 410 mA</p> <p><b>Isolation:</b> 1500VAC min isolation between each current loop port, serial ports and power</p> <p><b>Operating Temp:</b> 0 to 40 °C</p> <p><b>Storage Temp:</b> -20 to 85 °C</p> <p><b>Humidity:</b> 0 – 90% non-condensing</p> <p><b>Approvals:</b> CE, FCC</p>
<b>Indicators</b>	<p><b>Power:</b> Red LEDs</p> <p><b>Link:</b> Yellow or green LED (10BaseT or 100BaseTX)</p> <p><b>Ready:</b> Flashing green LED</p> <p><b>Serial Ports (6):</b> Flashing green TX LED when data out (see Ch. 2) Flashing red RX LED when data in (see Ch. 2)</p>
<b>Connectors</b>	<p><b>Ethernet:</b> Single RJ-45 female</p> <p><b>Serial:</b> <b>Ports 1-4:</b> RJ-45 female DTE (software selectable as RS-232, 422, or 485) <b>Ports 5, 6:</b> 2 position removable terminal blocks with locking screws</p> <p><b>DC Power:</b> 8 pin mini DIN</p>
<b>Serial Interfaces</b>	<p><b>RS-232 (DTE):</b> TXD, RXD, RTS, CTS, DTR, DSR, DCD, GND</p> <p><b>RS-422:</b> TXDB(+), TXDA(-), RXDB(+), RXDA(-) and GND</p> <p><b>RS-485:</b> Data B (+), Data A (-) and GND</p> <p><b>Current Loop:</b> Two wire (+, -) Active, 34 mA @ 28 VDC max load</p> <p><b>Baud Rate:</b> <b>Ports 1-4:</b> 110 bps to 230.4 kbps plus 5787 bps <b>Ports 5, 6:</b> 110 bps to 19.2 kbps</p> <p><b>Parity:</b> None, even, odd</p> <p><b>Data Bits:</b> 7 or 8</p> <p><b>Stop Bits:</b> 1 or 2</p>
<b>Memory</b>	<b>Serial Memory:</b> 8K bytes per port
<b>Network Communications</b>	<b>LAN:</b> 10/100 Mbps Auto-detecting 10 BaseT or 100 BaseTX
<b>Protocols</b>	TCP, IP, ARP, DHCP, Telnet, HTTP, UDP, ICMP
<b>Configuration Options</b>	<p><b>Console Mode:</b> RS-232 with VT100 emulation</p> <p><b>Telnet Mode:</b> HyperTerminal with VT100 emulation</p> <p><b>ESP Manager:</b> Windows 98/ME/2000/2003 server/XP/Vista/NT 4.0</p>

	<b>Web Server:</b> Standard web browser such as Internet Explorer
<b>Default Server Settings</b>	<p><b>Server Name:</b> ESP906CL</p> <p><b>Serial Number:</b> XXXXXXXXXXXX</p> <p><b>Password:</b> Blank</p> <p><b>DHCP:</b> Disable</p> <p><b>IP Address:</b> 192.168.0.1</p> <p><b>Net Mask:</b> 255.255.255.0</p> <p><b>Gateway:</b> 192.168.0.254</p> <p><b>MAC Address:</b> Fixed – see bottom label</p> <p><b>Port 1, 2, 3, 4:</b> RS-485 mode</p> <p><b>Baud Rate:</b> 9600</p> <p><b>Data/Parity/Stop:</b> 8-N-1</p> <p><b>Flow Control:</b> None</p> <p><b>TCP/UDP Ports:</b> TCP Port 1 – 4000 TCP Port 2 – 4001 TCP Port 3 – 4002 TCP Port 4 – 4003 TCP Port 5 – 4004 TCP Port 6 – 4005</p> <p><b>Connection Mode:</b> Server</p> <p><b>Remote IP Address:</b> 255.255.255.255</p>
<b>Hardware and Included Accessories</b>	<p><b>ESP906CL Serial Server module</b></p> <p><b>Power Supply:</b> switching adaptor with 8 pin male mini DIN 36 VDC1 @ 100mA maximum 36 VDC2 @ 100mA maximum 5 VDC @ 1000mA maximum</p> <p><b>Power Plug:</b> North America type – 2 prongs 100 – 240 VAC @ 50/60Hz</p> <p><b>Manual:</b> Paper copy of this manual, PDF available</p> <p><b>CD-ROM disc:</b> VLINX ESP Manager and Virtual COM Driver software for Windows 98/ME/2000/2003 server/XP/Vista/NT 4.0</p> <p><b>Pigtail cable adapters:</b> #1 - RS-232 Serial RJ-45M to DB-9M, 3 inch, gray #2 – RS-422/485 Serial RJ-45M to DB-9M, 3 inch, black</p>
<b>Optional Accessories</b>	<p><b>DRAD35</b> DIN Rail mounting clips for 35mm DIN Rail</p> <p><b>ERS35</b> one-meter length of steel 35mm DIN Rail</p>
<b>Dimensions</b>	<b>ESP906CL:</b> 4.20 x 7.28 x 1.15 in (10.7 x 18.5 x 2.93 cm)

Figure 56. ESP906CL Specifications

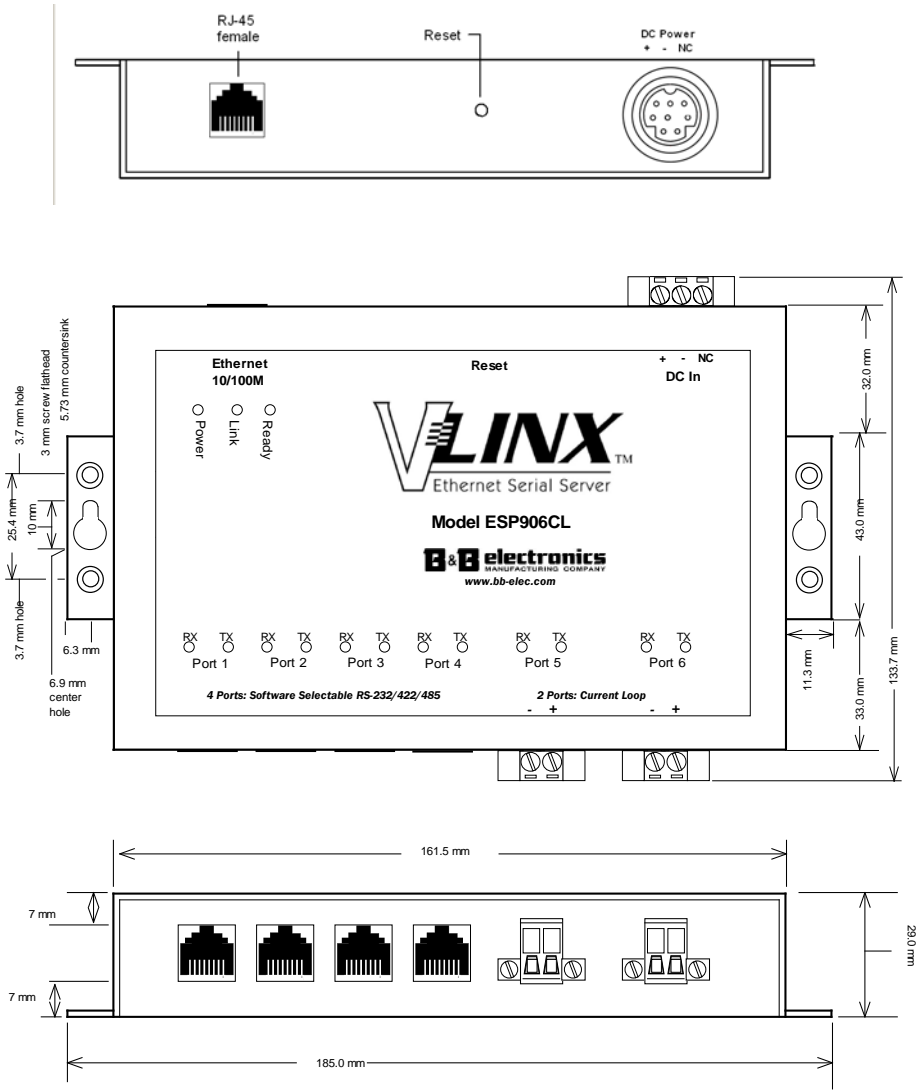
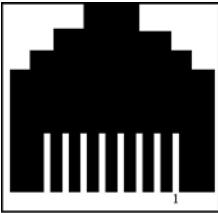


Figure 57. Dimensional Diagram of the ESP906CL



# APPENDIX A: RS-232 CONNECTIONS

## ESP906CL RJ-45 Pin-outs in RS-232 Mode



Looking into connector

RS-232 Signal Name	DTE	RS-232	RJ-45M Pin
Data Set Ready	In	DSR	1
Request To Send	Out	RTS	2
Signal Ground	---	GND	3
Transmit Data	Out	TXD	4
Receive Data	In	RXD	5
Carrier Detect	In	DCD	6
Clear To Send	In	CTS	7
Data Terminal Ready	Out	DTR	8

Figure 58. RS-232 Connections in an RJ-45 Connector

## Wall Power Supply 8 pin male mini DIN

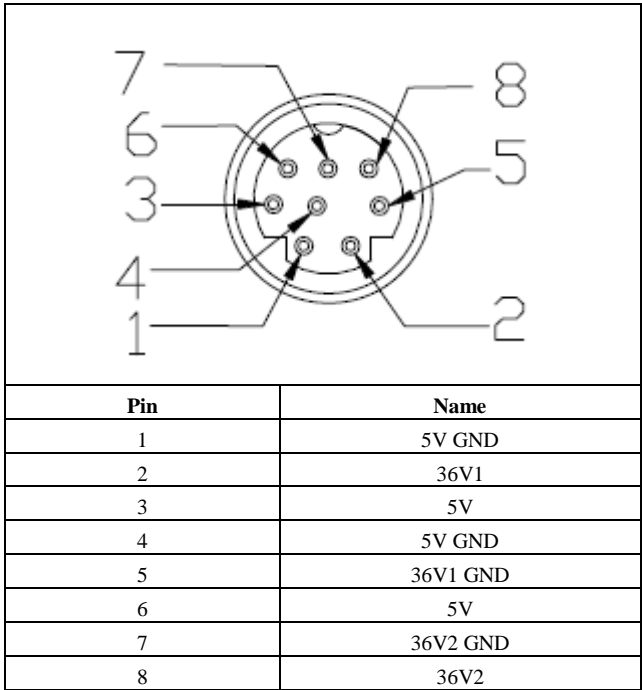
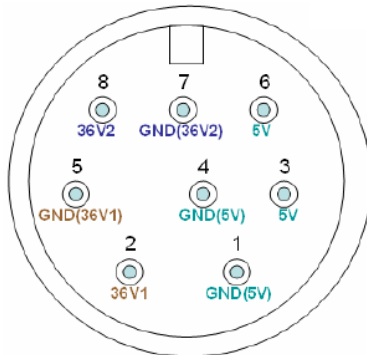


Figure 59. 8 pin male mini DIN connector on the wall power supply

## ESP906CL 8 pin female mini DIN



Front View

Figure 60. 8 pin female mini DIN connector on the ESP906CL unit

## Pigtail style cable adapter

The cable adapter shown bellows is included with all ESP906CL Serial Servers. It converts the server's RJ-45 connection to a standard DB-9M connection.

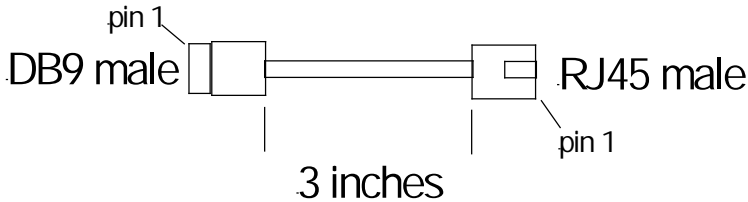


Figure 61. Pigtail Style Cable Adapter (gray)

## Cable Adapter #1 – RS-232 Serial RJ-45M to DB-9M

RJ45 Pin	DB9 Pin	RS-232
1	6	DSR
2	7	RTS
3	5	GND
4	3	TD
5	2	RD
6	1	DCD
7	8	CTS
8	4	DTR

Figure 62. Cable Adapter #1 – RS-232 Serial RJ-45M to DB-9M (Gray)

## DB-9 Cable Connections

To use the following cable with the ESP906CL you will need to employ the gray RJ-45 to DB-9 pigtail adapter included with your ESP906CL.

### DB-9 to DB-9 Crossover Cable

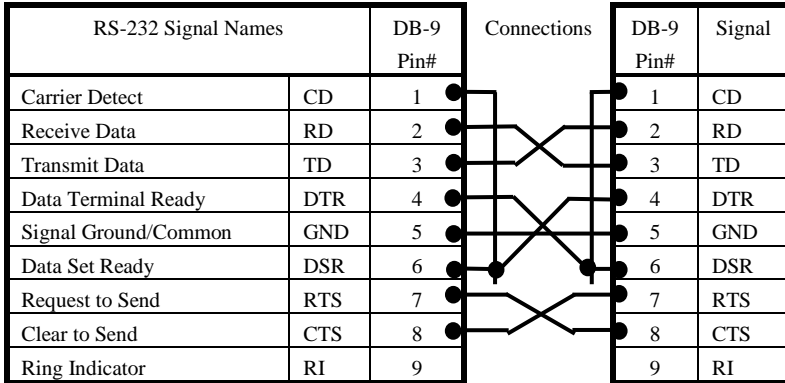


Figure 63. RS-232 DB-9 to DB-9 Crossover Cable Pinout

### DB-9 to DB-25 Crossover Cable

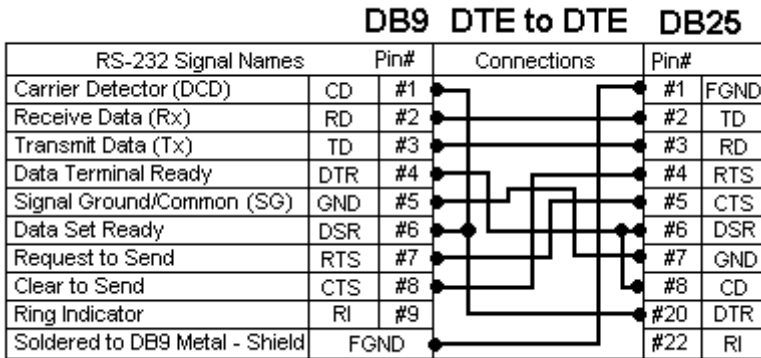


Figure 64. DB-9 to DB-25 Crossover Cable Pinout



**DB-9 to DB-25 Straight Through Cable Pinout**

RS-232 Signal Names		Pin#	Connections	Pin#	
Carrier Detector (DCD)	CD	#1		#1	FGND
Receive Data (Rx)	RD	#2		#2	TD
Transmit Data (Tx)	TD	#3		#3	RD
Data Terminal Ready	DTR	#4		#4	RTS
Signal Ground/Common (SG)	GND	#5		#5	CTS
Data Set Ready	DSR	#6		#6	DSR
Request to Send	RTS	#7		#7	GND
Clear to Send	CTS	#8		#8	CD
Ring Indicator	RI	#9		#20	DTR
Soldered to DB9 Metal - Shield	FGND			#22	RI

Figure 65. DB-9 to DB-25 Straight-through Cable Connections

**RS-232 DTE Loopback Connections**

RS-232 Signal Names		Pin#	Direction	
Carrier Detector (DCD)	CD	#1	←	CD Option
Receive Data (Rx)	RD	#2	←	
Transmit Data (Tx)	TD	#3	→	
Data Terminal Ready	DTR	#4	→	
Signal Ground/Common (SG)	GND	#5		
Data Set Ready	DSR	#6	←	RI Option
Request to Send	RTS	#7	→	
Clear to Send	CTS	#8	→	
Ring Indicator	RI	#9	←	

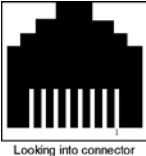
Figure 66. Loopback Connections for RS-232

For Transmit and Receive loopback, connect only those lines.

When Flow Control setting on the Serial Server is set for RTS/CTS, those lines must be looped. Usually DTR and DSR must also be looped. The Flow Control setting for the program must match the Server settings. The CD connection is needed by some terminal programs to simulate Carrier.

# APPENDIX B: RS-422 CONNECTIONS

## ESP906CL RJ-45 Pin-outs in RS-422 Mode



RS-422 Signal Name	Direction	RS-422	RJ-45 Pin
Receive Data A (-)	In	RXDA (-)	1
Transmit Data A (-)	Out	TXDA (-)	2
Signal Ground	---	GND	3
Transmit Data B (+)	Out	TXDB (+)	4
Receive Data B (+)	In	RXDB (+)	5
NA			6
NA			7
NA			8

Figure 67. RS-422 Connections in a RJ-45 Connector

### Pigtail style cable adapter

The cable adapter shown bellows is included with all ESP906CL Serial Servers. It converts the server's RJ-45 connection to a standard DB-9M connection.

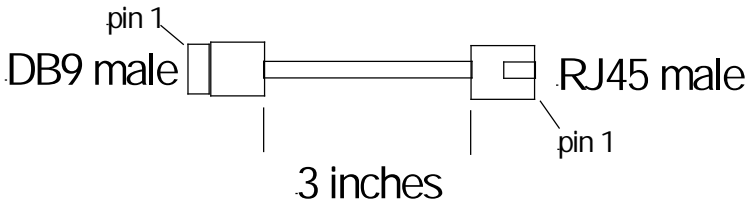


Figure 68. Pigtail Style Cable Adapter (black)

## Adapter 2 – RS-422/485 Serial RJ-45M to DB-9M

RJ45 Pin	DB9 Pin	RS-422
1	1	TDA –
2	4	RDA –
3	5	GND
4	3	RDB +
5	2	TDB +
6	6	NA
7	7	NA
8	8	NA

Figure 69. Adapter/cable 2 – RS-422/485 Serial RJ-45M to DB-9M (black)

### RS-422 Loopback Connector Pinout

#### RS-422 Mode

Pin	Name
#3	TXDB(+)
#4	TXDA(-)
#2	RXDB(+)
#1	RXDA(-)
#8	RTSB(+)
#9	RTSA(-)
#7	CTSB(+)
#6	CTSA(-)
#5	GND

Figure 70. Loopback Connections for RS-422

The RS-485 Connections are half duplex, either Receive or Transmit, so another half duplex device must be used to check operation.

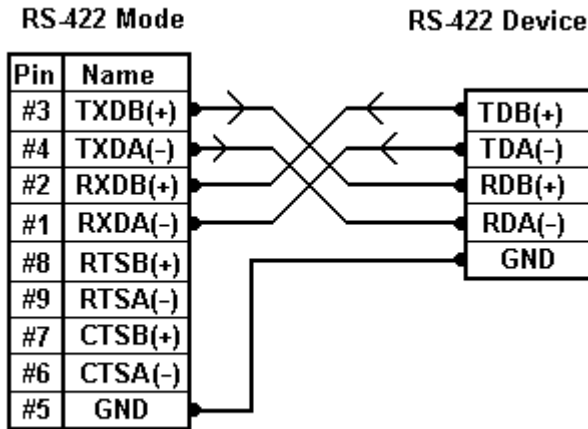
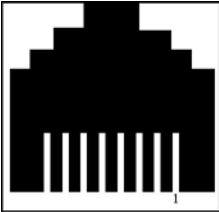


Figure 71. RS-422 Connection with No Flow Control



# APPENDIX C: RS-485 CONNECTIONS

## ESP906CL RJ-45 Pin-out in RS-485 Mode



Looking into connector

RS-485 Signal Name	Direction	RS-485	RJ-45 Pin
NA	NA	NA	1
Data A (-)	In/Out	DATA A (-)	2
Signal Ground	---	GND	3
Data B (+)	In/Out	DATA B (+)	4
NA	NA	NA	5
NA	NA	NA	6
NA	NA	NA	7
NA	NA	NA	8

Figure 72. RJ-45 Pin-out in RS-485 Mode

## Pigtail style cable adapter

The cable adapter shown below is included with all ESP906CL Serial Servers. It converts the server's RJ-45 connection to a standard DB-9M connection.

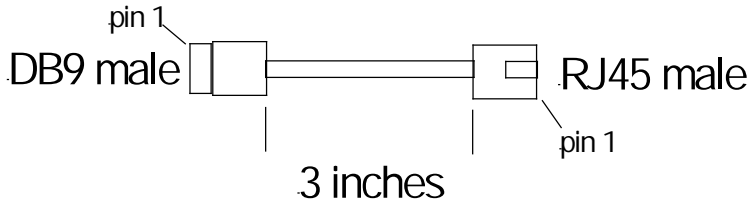


Figure 73. Pigtail Style Cable Adapter (black)

## Adapter 2 – RS-485 Serial RJ-45M to DB-9M Connections

RJ45 Pin	DB9 Pin	RS-485
1	1	Data A –
2	4	NA
3	5	GND
4	3	NA
5	2	Data B +
6	6	NA
7	7	NA
8	8	NA

Figure 74. RS-485 Serial RJ-45M to DB-9M Connections (black)

### Note:

Some RS-485 devices are marked opposite the RS-485 standard, which defines the Data B line as positive relative to Data A during a Mark state before enabling the transmitter, and after transmitting before tri-stating. If an RS-485 device does not respond, try swapping the Data B and Data A lines.

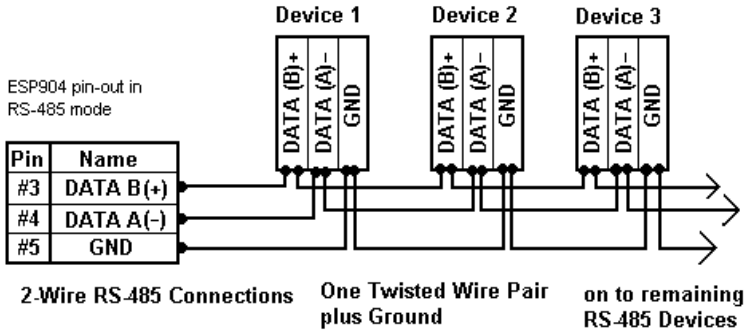


Figure 75. 2-wire RS-485 Connection

To connect 4-wire RS-485 devices, the RS-422 Mode can be used provided the ESP906CL will be connected as a master in a single master system. If using multiple masters, the ESP906CL cannot be used, as it does not tri-state the transmitter in RS-422 mode.

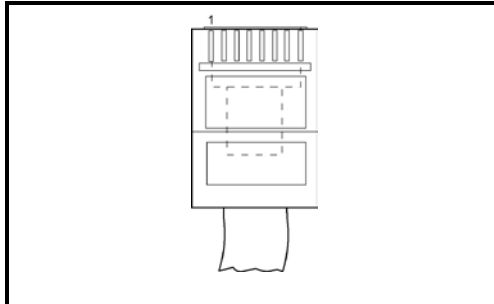






# APPENDIX D: NETWORK CONNECTIONS

## Standard Ethernet Cable RJ-45 Pin-out



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

Figure 76. Pin-out for a Standard Ethernet Cable

## Crossover Ethernet Cable RJ-45 Pin-out

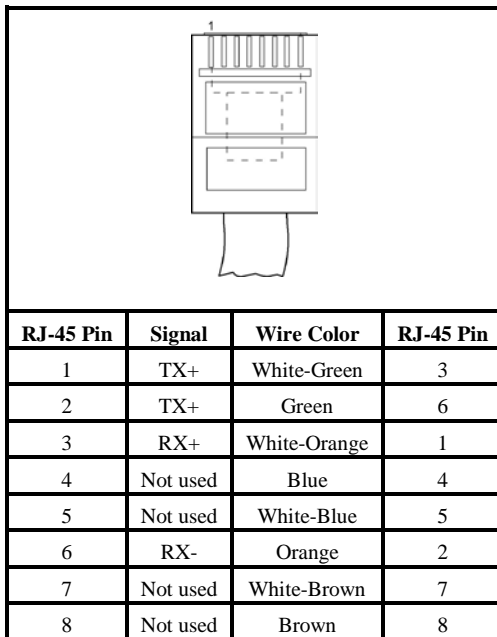


Figure 77. Pin-out for a Crossover Ethernet Cable

# Appendix E: Current Loop Connections

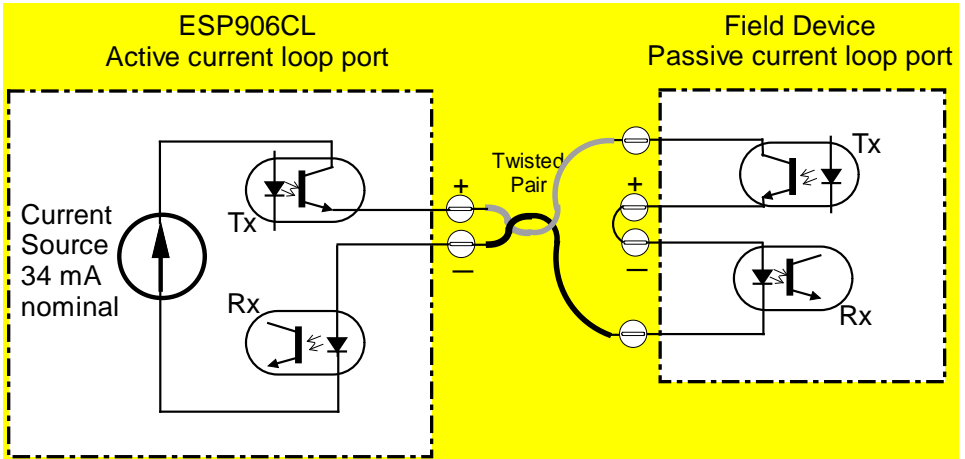


Figure 78. Connection to a 4-wire passive current loop port



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