Serial-to-Ethernet Gateway Users Manual

Model Aport-311, Aport-312

Artila Electronics Inc.

Home Page: www.artila.com

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1   Introduction

The Aport-31x Ethernet serial server connects RS-232, 422, 485 serial devices to an Ethernet LAN/WAN providing a reliable communication connection. Existing Windows based serial software using standard Windows API does not have to be modified to communicate over an Ethernet LAN to a serial device. The Aport-31x virtual COM port will make this an easy transition.

The Aport-31x operates in "Direct IP Mode", "Virtual COM Mode", and "Paired Mode". The Aport-311 has one asynchronous DB-9 serial port and Aport-312 has two asynchronous DB-9 serial ports, they all have one 10/100 Mbps Ethernet RJ-45 connection. The Ethernet port will auto-select 10BaseT or 100BaseTX.

The Aport-31x Windows driver installs virtual COM ports in the Device Manager of the operating system. The virtual COM port is designed to establish a connection with the Aport-31x. This in turn will allow communications with the connected serial device in the same manner as a device connected to the COM port on a PC. The LAN becomes transparent to the serial device and the software running on the PC.

The Aport-31x can be configured as a TCP or UDP Client/Server. In direct IP and virtual COM modes, Aport-31x should be configured as a server. Aport-31x also offers a Heart Beat feature to insure a reliable communications connection.

1.1   Features

> DIN rail or Panel mount
> Supports 10/100 Mbps Ethernet
> Supports RS-232, RS-422, and RS-485 serial interface
> Supports LAN and WAN communications
> In Server mode supports individual client sessions for security.
> Management access password protected.
> Virtual COM drivers for Windows NT/98/ME/2000/XP

1.2 Product Specifications

Serial Memory:	output: 64K bytes per port
	Input: 8K bytes per port
LAN:	10/100 Mbps Auto-detecting – 10 Base T, 100 Base TX
Serial Connection:	DTE – BD-9 male
Serial Port:	Port 1: RS-232/422/485 (Aport 311 and 312)
	Port 2: RS-232 Full (Aport 312 Only)
Serial Interfaces:	**RS-232** - TX, RX, RTS, CTS, DTR, DSR, DCD, GND
	RS-422 – TX+, TX-, RX+, RX-, RTS+, RTS-, CTS+, CTS-, GND
	RS-485 - Data +, Data –, GND
Data Rate:	110 bps to 230.4 k bps
Parity:	none, even, odd, mark, space
Data Bits:	5, 6, 7 or 8
Stop Bits:	1, 1.5 or 2
Protocol:	TCP, IP, ARP, DHCP, Telnet, HTTP, UDP, ICMP
Management:	Manager software, Serial Console, Telnet, Web server Firmware upgradeable

Power & Environment

Power Requirements:	9 ~15 VDC @ 400mA
Operating Temperature:	0 to 50 °C (32 to 122 °F)
Storage Temperature:	-20 to 60 °C (-4 to 140 °F)
Humidity:	0 – 90% Non-Condensing
Approvals:	CE, FCC

Dimensions:
85 x 115 x 23 mm (3.35 x 4.5 x 0.90 in)

1.3   Default Settings

|	
Server name:	Aport-311, Aport-312
Serial number:	Fixed – see bottom label
Password:	Blank
DHCP:	Disable
IP address:	192.168.1.1
Sub Netmask:	255.255.255.0
Gateway:	192.168.1.254
MAC address:	Fixed – see bottom label
Version & Date:	current firmware version number and date
Serial port:	1
Baud rate:	19200
Data/Stop bits:	8-1
Parity:	None
Flow control:	None
Protocol:	TCP
Serial timeout:	0 seconds
TCP alive timeout:	0 minutes
Connection mode:	Server
Delimiter HEX 1:	00
Delimiter HEX 2:	00
Force transmit:	0 ms
TCP/UDP port:	**port 1**: 4000 (Aport-311/Aport-312)
	port 2: 4001 (Aport-312)
Serial port mode:	RS-232
Maximum connection:	1
Remote IP address:	255.255.255.255

2   Communication Modes

The Aport-31x allows serial devices to communicate over a LAN or Intranet network. Serial devices are no longer 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 will also allow traditional PC COM ports access to a serial device anywhere on the LAN network.

2.1   Direct IP Mode

Direct IP connections allow applications using TCP/IP or UDP/IP network socket programs to communicate with the asynchronous serial port on the Aport-31x. In this type of application the Aport-31x is configured to TCP or UDP server. The socket program running on the PC establishes a communication connection with the Aport-31x. The raw data is sent directly to and from the serial port.

2.2   Virtual COM Mode

The Virtual COM mode requires the installation of a driver. When installed a new COM port is added to the Device Manager. Windows programs using standard Windows API calls will be able to interface with Virtual ports. The PC will act as the host connecting to the Aport-31x when the program opens the virtual COM port.
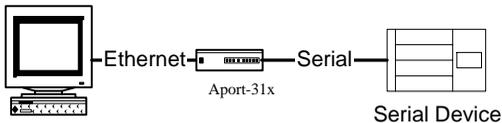
Once the connection is made, the LAN is transparent to the serial device. Applications work just as if the serial device is connected a host's physical COM port. The virtual COM port converts the application's data into IP packet destined for the Aport-31x, which in turn converts the IP packet back to serial data.

In this mode, the Aport-31x must be set to either TCP/server or UDP/server in the menu with a designated communication port number. The virtual COM driver is a TCP or UDP client.

2.3   Paired Mode

Paired mode is also called serial tunneling. When this type of configuration is selected additional software will not have to be loaded on a host PC. In fact a PC is not required to make the connection. Any two dumb serial devices that can communicate with each other through a serial link will be able to communicate using two Aport-31xs and the LAN.

Two Aport-31xs are configured with one setup as a TCP or UDP client and the other to 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.
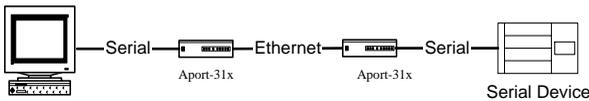
2.4   Heart Beat

The Aport-31x provides a convenient way to establish reliable communications between two devices. Communication port 5300 is reserved for the Heartbeat Protocol. Without this feature a device that loses a connection and stops communicating would not be able to reconnect without personally attending to the problem. 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 5 seconds until communications is established again. The Heart Beat feature is available to use with the Virtual COM Mode, Paired Mode and Direct IP Mode. This is not available when using a UDP application.

3 Making the Hardware Connections

The following information is provided to give the user an understanding of how to connect the Aport-31x to the LAN and serial device. A review of the switch settings and the functionality of the LED's are also provided.

3.1 Serial Connection

The Aport-31x has one, two or four DB-9 male connectors. The serial port is configured as a DTE (data terminal equipment) device. All PC COM ports are DTE ports. A null modem cable is required to make a connection between the COM port on a PC and the Aport-31x serial port. A straight through cable is required to connect the Aport-31x serial port to a DCE device.

3.2 Power Connection

The Aport-31x has a two pins terminal block and power jack. Power can apply on either terminal block or the power jack. It accepts 9VDC-15VDC 500mA power supply. When power is apply a green light label as run will flash every one second to indicate the system is up and running.

3.3 Ethernet Connection

A straight-through Ethernet cable can be used to connect the serial server to an Ethernet hub, switch, or wall plate. A crossover Ethernet cable can be used to make a connection directly to the NIC (Network Interface Card) on a PC or laptop.

3.4 Reset Button

The reset button can be found between the switch and terminal block. To reset the unit manually apply power, insert a small plastic tool, and press lightly depressing switch. Hold for 3 seconds and release. The Link and Run light will go out and turn back on.

3.5 LED Definition

Led Name	Led Function
Link	Green – 100 BaseTX Ethernet connection established
	Yellow – 10 BaseT Ethernet connection established
Run	Flashing Green – system is ready
Serial 1/2	Green – connection established
	Flashing Green – data is transmitting

3.6   Dip Switches

A double DIP switch allows the Aport-311/ Aport-312 to be placed into Console/Loop back/Default/Data Mode.

SW1	SW2	Mode
ON	ON	Console
ON	OFF	Loop back
OFF	ON	Factory
OFF	OFF	Data

When all these switches are moved into the ON position, the Aport-311/ Aport-312 enters Console Mode, allowing configuration of the Aport-311/ Aport-312 from a PC running a terminal program such as HyperTerminal. When the Aport-311/ Aport-312 enters Console Mode, the Console Mode screen will appear in the HyperTerminal program window. The serial port settings must be 8-N-1 at 19200 baud.

When the DIP switches are switched to the ON OFF position, the Aport-311/Aport-312 will work at Loop back Mode, all data is sent back immediately.

When the DIP switches are switched to the OFF ON position, the Aport-311/Aport-312 will revert to its factory version firmware no matter what newer firmware has been upgraded.

When all of the DIP switches are switched back to the OFF position, the Aport-311/Aport-312 will enter Data Mode (RS-232, RS-422 or RS-485).

3.7   Serial Ports

The Aport-311 has one serial port. The port can be configured as a Console Mode connection or as RS-232, RS-422 or RS-485 interface to the Aport-311 (if all of the DIP switches are in the OFF position) using the Manager software, via Telnet, or using the Web Server.

The Aport-312 has two serial ports. Port 1 operates the same as the Aport-311 serial port. Port 2 on the Aport-312 is a RS-232 only interface.

The RS-232 interfaces are configured as DTEs (Data Terminal Equipment). The connectors for all ports are DB-9M.

3.8   Serial Server/Port Operational Modes

Using the Manager software, the Aport-31x serial server can be put into Console Mode, Default Mode or Upgrade Mode. The serial ports can be configured for RS-232, RS-422 or RS-485 operation. The Aport-311/ Aport-312 serial server also can be put into Console Mode by placing all the DIP switches into the ON position.

3.8.1   Console Mode

The console mode allows access to the Aport-31x setup menu. This is one way to reconfigure the default settings for the application. A serial connection is made between a COM port on the PC and the Aport-31x serial port 1 with a null modem cable. In console mode, the serial port defaults to an RS-232 interface.

The Aport-31x serial port default settings are, baud rate 19200, 8 data bits, no parity, and 1 stop bit. Hyper Terminal should be used for this type of setup. Hyper Terminal's serial settings are configured the same as the mentioned default settings of the Aport-31x and must be set to VT100 emulation mode. The default settings are used only if they have not been changed.

See Chapter 10 for details.

3.8.2   Upgrade Mode

The newest firmware can be installed on the Aport-31x using the PC's serial port or the Virtual COM port.

See Chapter 13 for details.

3.8.3   Default Mode

When Default Mode is selected and the Server Properties are updated (saved), all configuration settings return to their default values.

3.8.4   RS-232 Mode

The RS-232 supports 8 channels plus Signal Ground and is configured as DTE like a computer. Signals are single ended and referenced to Ground. To use handshaking, Flow Control must be set to RTS/CTS during Configuration. Refer to the Pin out table for connections.

3.8.5   RS-422 Mode

The RS-422 mode supports 4 channels with full duplex operation for Receive, Transmit, RTS (Request To Send) and CTS (Clear To Send). The data lines are in differential pairs. Ground provides a common mode reference. To use handshaking

Flow Control must be set to RTS/CTS during configuration. Refer to the Pin out table for connections.

3.8.6 RS-485 Mode

The RS-485 mode supports the Transmit and Receive Channels using 2-wire half-duplex operation. The data lines are differential pair Ground provides a common mode reference. Refer to the Pin out table for connections.

RS-485 Receiver Biasing can be implemented from the Aport-31x serial server if the network does not supply it. Remove the two side-cover screws of the serial server, slide the cover off and re-position the bias jumpers to enable biasing (shorting).

3.9   DB9 Pin Configuration

Pin	RS-232	RS-422	RS-485
1	DCD	RXD (-)	
2	RXD	RXD (+)	
3	TXD	TXD (+)	D (+)
4	DTR	TXD (-)	D (-)
5	GND	GND	GND
6	DSR	CTS (-)	
7	RTS	CTS (+)	
8	CTS	RTS (+)	
9	RI	RTS (-)	

4   Aport-31x Software Installation

It is recommended the user install the Manager software and do a search for all Aport-31xs connected to the LAN. When this is completed a window will list the devices making them available for configuration.

Configuring the serial server to meet your LAN and application requirement is an easy process with the available setup menu in the Manager software.
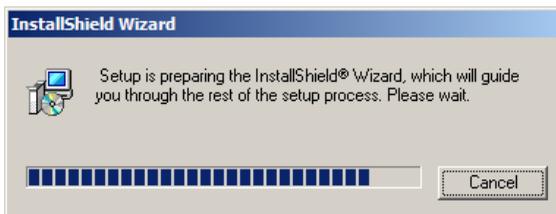
4.1   New Installation

The following procedure installs the Aport-31x Manager software.

1. Inserting the Aport-31x CD in the CD-ROM will automatically launch the Install Shield Wizard.
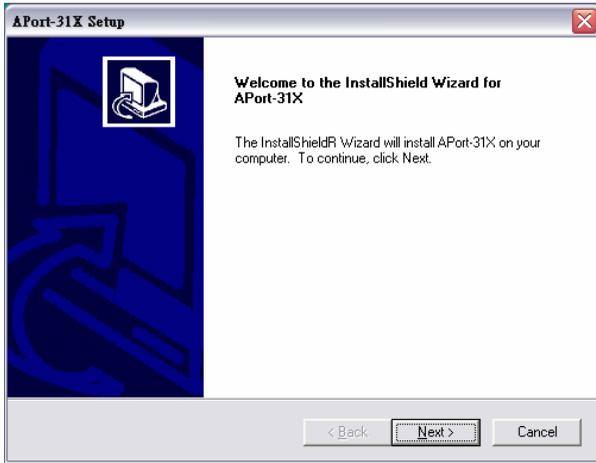
    To manually start the software installation, select the **Start** button on the desktop. At the Run command line type D:start.exe Then select OK. The D: is the drive letter for the CD Rom.
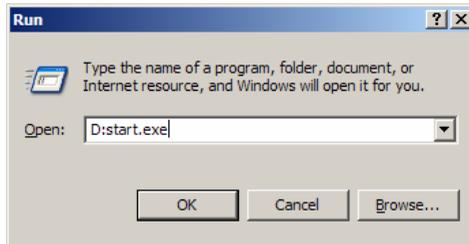
2. The **Install Shield Wizard** window automatically displays to begin the setup procedure.

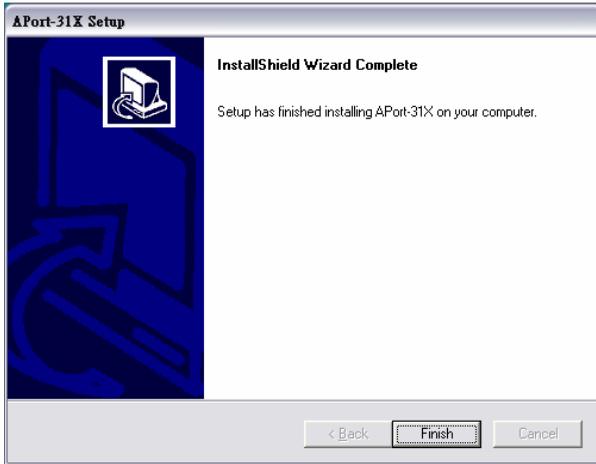3. Select Next when the **Aport-31x Setup** window appears.

4. In the **Choose Destination Location** window select Next to install the Manager software in the default location. Select Browse to install into a user selected directory.
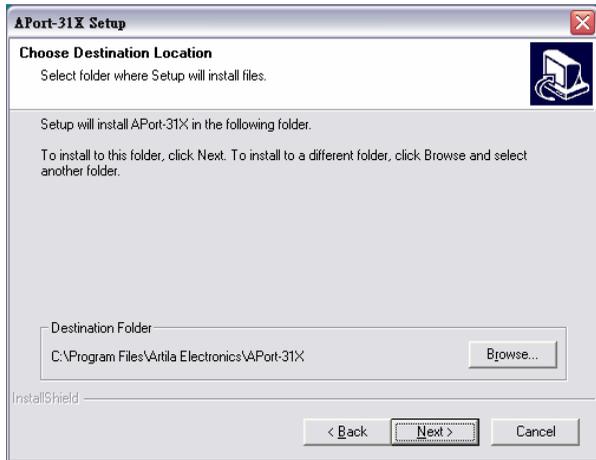
The installation progress will be shown until complete.

5. Select Finish when the **Install Shield Wizard Complete** screen appears.

When the installation is complete the Install window closes allowing the user to access the Manager software in the program files. If loaded in the default location Go to Start/Programs/Artila/SE-31X Manager to open.

Connect the Aport-31x to the LAN and apply power. The Run LED will flash indicating power has been applied and communications with the unit can begin; and the Link LED indicates an Ethernet connection has been made.

4.2 Updating an Existing Installation

If an older version of the Manager software is already installed, the Modify, repair or remove the program window will appear when the installation process is initiated:
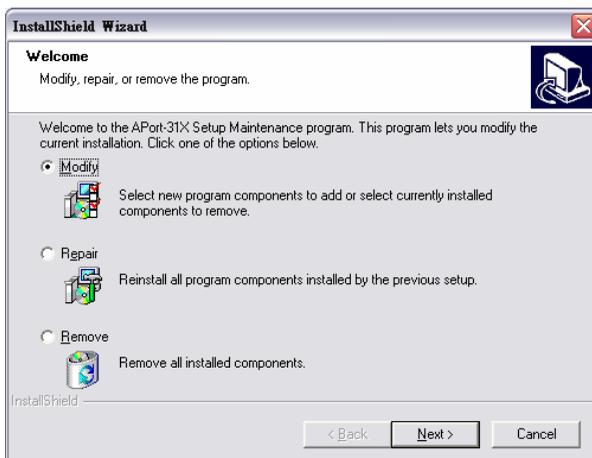
The recommended procedure is to remove all installed components first. Once the software has been removed, install the new software.

5   Using Manager Software

The Manager software performs several functions:

- Searching for Aport-31x connected to the network
- Displaying and changing the configuration of Aport-31x
- Installing virtual COM ports on a computer
- Displaying and configuring virtual COM ports
- Uninstalling virtual COM ports on a computer
- Upgrading the Aport-31x firmware
- Monitoring Port Status
- Saving and Loading Configuration Files

Once the Aport-31x is connected to the LAN the Manager software will be able to search the LAN for all connected Aport-31x servers and will display them in a window by name and IP address.

5.1   Searching LAN for Aport-31x

1. Select Aport-31x Manager in the program file menu. If the default location was selected during the installation the program will be found under Start/Programs/PNI/Aport-31x Servers. Select Aport-31x Manager. As soon as the Aport-31x Manager opens it will initiate Searching Server and after a few seconds the Serial Server List will display all (Aport-31x) serial servers on the network.

2. To manually initiate a search for servers, on the menu side bar select Searching Server button. The Search Setup box will appear. It provides two options for searching for servers on the network:

   - Specify the IP address of the Serial Server
   - Search all reachable servers

   Enter the IP Address assigned to the desired Serial Server or click Search all reachable servers, then OK. The Searching window is shown until all active Serial Servers on the LAN are listed in the Serial Server List window.
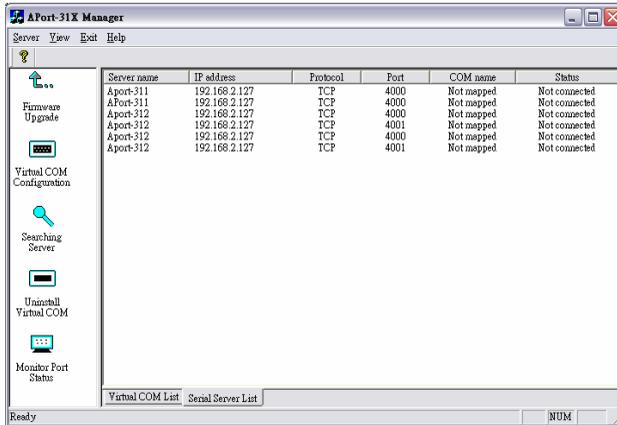
5.2 Configuring Server Properties

Highlight the serial server in the Serial Server List window and double click to open the Server Properties window.

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

After configuring as needed, click Update to store the configuration in the server and click Yes to restart the server to make sure all settings are changed to conform to the desired application.

6   Server Properties

There are four ways to access the Server Properties and program the Aport-31x: Manager software, Console mode, Telnet or Web Server.

Instructions on how to move around in the user interface and change settings pertains to the Manager software but are similar in others.

6.1   Server Name

The server name is user configurable. It is recommended users with more than one Aport-31x connected to the LAN assign a new name to each. When the Manager software searches for servers on the LAN it will display the server name allowing the user to distinguish between Aport-31xs.

6.2   Serial Number

Each Aport-31x has a unique serial number. This is fixed and cannot be changed.

6.3   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.

6.4   DHCP

DHCP servers are a part of numerous LAN management systems. The DHCP field has two selections, "Enable" or "Disable". Arrow to the desired selection and select enter.

When enabled, Aport-31x will send a DHCP request to the DHCP server, which will assign a dynamic IP address, netmask, and gateway to the Aport-31x. If a DHCP server is not available on the network the Aport-31x will time out after 10 seconds and the default values will remain. When DHCP is enabled, the IP address, Netmask and Gateway fields become inaccessible and cannot be changed by the user.

6.5   IP Address

A static IP address can also be assigned in this section of the menu. A dynamic address assigned by the DHCP server may change if the Aport-31x looses 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. It is recommended to use a static IP address.

A static IP address is permanent and will not change unless changed in the menu. In most cases the network administrator establishes the static address to be used.

6.6   Netmask

The default LAN netmask is configured for a Class C address. This maybe reconfigured by the user.

6.7   Gateway

The gateway IP address allows users to access the serial server from outside the LAN.

6.8   MAC Address

The MAC address is not adjustable. This is assigned in the factory. Every Ethernet device manufactured has it own unique MAC address.

6.9   Version & Date

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

6.10 Link Status

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

6.11 Server Serial Port

This field indicates the number of the port for with serial server properties are currently being displayed. Changing the number in this field will cause all the other fields to display the properties for the specified port. Note, however, that before changing ports, any change to properties must be Updated (Saved) or the serial server will not retain them.

6.12 Baud Rate

The serial port baud rate on the Aport-31x 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.

6.13 Data/Parity/Stop

This setting will have to match the data format of the connected device unless using Virtual COM mode. In Virtual COM mode the software program will establish serial settings.

6.14 Flow Control

The flow control setting must match the connected serial device unless using Virtual COM mode. In Virtual COM mode the software program will establish serial settings.

6.15 Protocol

Select TCP or UDP protocol. If the application does not require a UDP connection, select TCP. TCP guarantees reliable communication with error checking whereas UDP provides faster transmission.

When UDP mode is chosen the *Serial timeout*, *TCP alive timeout*, *Connection mode*, *Connection at*, *Maximum connection* and *Remote IP address* fields are replaced with the following three fields*: Destination IP address range*, *Port number* and *Source IP address range*. In this mode the server can be configured to broadcast data to and receive data from multiple IP addresses. Four IP address range fields are provided.

Server Properties

Artila Electronics
AP0rt-311

Server name:	AP0rt-311	Serial port:	1	Delimiter HEX	00
Serial number:	1101000050	Baud rate:	19200	Delimiter HEX	00
Password:		Data/Stop bits:	8-1	Force transmit:	0 x100ms
DHCP:	Disable	Parity:	None	Port status:	Not Connected
IP address:	192.168.2.127	Flow control:	None	TCP/UDP port:	4000
Netmask:	255.255.255.0	Protocol:	TCP	Serial port mode:	RS232
Gateway:	0.0.0.0				
MAC address:	00:0B:B4:81:00:2E	Serial timeout:	0 (0-65535 sec)	Connection at:	Power up
Version & Date:	1.7 & 11/17/05	TCP alive timeout:	0 (0-255 min)	Maximum connection:	1
Link status:	100/Full Duplex	Connection mode:	Server	Remote IP address:	255.255.255.255
Hardware ID:	NA				

Update   Cancel

6.16 Serial Timeout

Default is 0, or no timeout. Setting timeout to any value between 1 and 65535 seconds activates it. If communications are idle for specified timeout value the serial server will reset and make itself available for another connection.

6.17 TCP Alive Timeout

This monitors TCP activity. If TCP activity stops for the length of time specified in this field the connection will be closed. This field can be set to any value between 0 and 255 minutes. If zero, or no value, is entered into this field the server will not disconnect.

6.18 Connection Mode

The Connection mode field has three options, Server, Client and Client (no heartbeat). When Client or Client (no heartbeat) is selected, the *Connection at* field automatically becomes active (allowing the user to select Power up or Data arrival).
- 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).

6.19 Delimiter HEX1 and Delimiter HEX 2

These two fields allow the user to enter two ASCII characters (in hex format) that delimit the beginning and end of a message. When a message with both these delimiters is received at the serial port, the data contained in the serial buffer is placed in an Ethernet packet and sent out the Ethernet port. If only Delimiter 1 is set (Delimiter 2 is zero or blank), upon receiving Delimiter 1 the Aport-31x will put all the data in the serial buffer in an Ethernet packet and send it out the Ethernet port. If serial data greater than 1 kilobyte is received it will automatically be placed in an Ethernet packet and sent out the Ethernet port.

6.20 Force Transmit

This field allows the user to set a maximum time limit between transmissions of data. The value set in this field multiplied by 100 ms determines the Force Transmit time. When the elapsed time reaches the time configured in this field, the TCP/IP protocol will pack the data currently in the serial buffer into a packet and send it out the Ethernet port.

6.21 Port Status

This field indicates whether a serial port is connected to a server or by a client.

6.22 TCP/UDP Port

The TCP/UDP Port defines a communication port number. In all modes of operating, Virtual COM, Direct IP, and Paired modes, both the TCP/UDP Client and server port settings must match.

For example the Virtual COM default setting TCP/UDP Port # 4000. If the port # of the Aport-31x is changed to 4001, the Virtual COM TCP/UDP Port will have to be changed to 4001.

6.23 Serial Port Mode

This allows configuration of the serial server for the following modes of operation:

- Console – When this mode is selected and the server is updated, a PC running a communication program such as HyperTerminal can communicate with the serial server via the Console Mode serial port (Port 1 on Aport-31x), displaying the Server Properties 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 the Console Mode serial port or a virtual COM port mapped to the number of the Console Mode serial port.

- **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 is updated, the selected serial port will become a RS-232 serial port on the server.
- **RS-422** – When this mode is selected and the server is updated, the selected serial port will become a RS-422 serial port on the server.
- **RS-485** – When this mode is selected and the server is updated, the selected serial port will become a RS-485 serial port on the server.

6.24 Connection At

When the Connection Mode field is set to Client or Client (no heartbeat), this field becomes active, allowing the Aport-31x (acting as a client) to connect to the server either on Power up or on Data Arrival (first character arriving).

6.25 Maximum Connection

This field allows the user to configure the Serial Server to have up to eight TCP connections.

6.26 Remote IP Address

This is a security feature that is activated when the IP address of the desired client is programmed into the remote IP Address setting of the menu. This tells the Aport-31x to communicate with only the listed IP address and to filter out all other requests for connection. The Aport-31x is setup in the menu as a TCP or UDP server to us this feature.

The default setting is 255.255.255.255. It is recommended not to change this setting until the application has been tested and is communicating properly. At that point the address filtering feature of the Aport-31x can be activated.

6.27 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.

### 6.27.1 Updating the Server Properties in Manager Software

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.
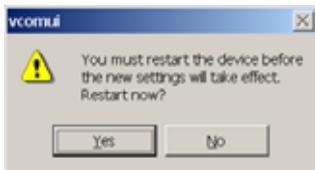
6.27.2 Saving Configuration Data in Console Mode or Telnet

Saving (updating) server properties is done from the Configuration screen. Access the Configuration screen by tabbing through the list of screens on the left side of the window and highlighting Configuration. There are four options shown on the right side of the Configuration screen: Save, Default, Running and Reset. Use Tab, Backspace, or arrow keys to move the cursor to the option position, then press Enter.
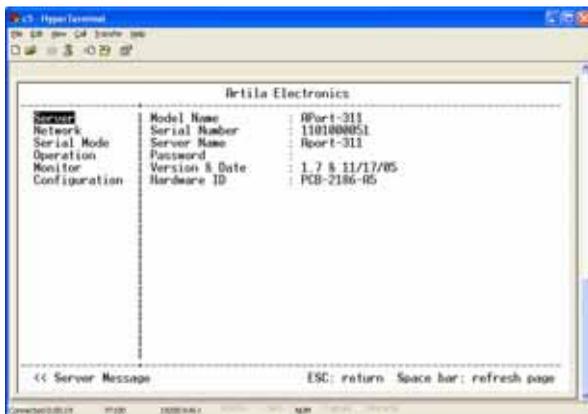
- Save – stores the configuration data to the Serial Server flash memory and resets it.
- Default – restores the configuration data to factory default settings.
- Running – restores the configuration data to the last values stored in the flash memory.
- Reset – re-boots the Serial Server, making it available for a client connection.

6.27.3 Web Server Interface

The Web Server interface provides the same updating options as Console Mode and Telnet. These are located at the bottom of all three Web Server pages. If a field is changed, you must click Save before leaving that page or the changes will be ignored.
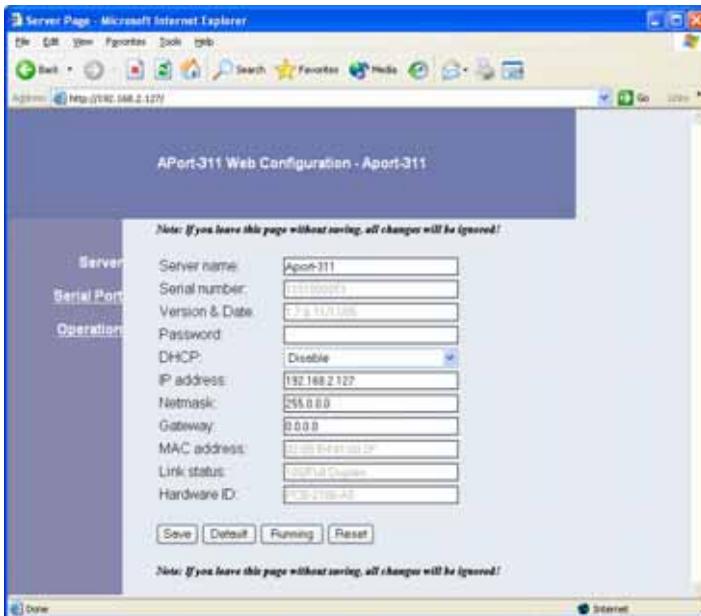
# 7   Installing Virtual COM Port

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

Running the Install Virtual COM port software adds a COM Port in the Device Manager of the operating system. The COM port will look like a standard COM port to Windows software used in most applications allowing the software to open a connection with the serial port located anywhere on the LAN. When using the virtual COM port the Aport-31x is configured as a TCP or UDP Server.

1. On the Desk Top select Start/Programs/PNI/Aport-31x Servers/**Install Virtual COM**.

2. Select the **Search all reachable servers** check box, then click OK.

3. The **Install Virtual COM** program will automatically search the LAN for all available Aport-31x serial servers and display them in the **Found Server** window. Highlight the desired serial server and select OK.
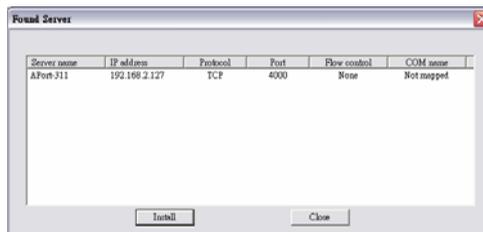

4. When the **COMInst** window opens select COM port # to map the serial server to. The Flow Control, Protocol, IP Address, and Port Number will mirror the settings of the selected serial server. Highlight the desired COM port # and select OK.

If any settings are changed in this part of the Virtual COM setup it will only affect the settings in the operating system Device Manager. It will not change the settings in the Aport-31x.

The settings of the Virtual COM port in the Device Manager and the Aport-31x Configuration menu must match. If the settings do not, the software connecting to the Virtual COM port will be unsuccessful in opening the COM port.

5. **Note:** In **Windows XP** a Hardware Installation window stating that the drivers have not been tested by Microsoft may appear. Select "Continue Anyway" to proceed with the installation.

6. When finish, click **Cancel** on the **Found Server** window. To confirm installation, go to the Device Manager and select Ports (COM & LPT). The installed Virtual COM port will be displayed as Aport-31x COM#.
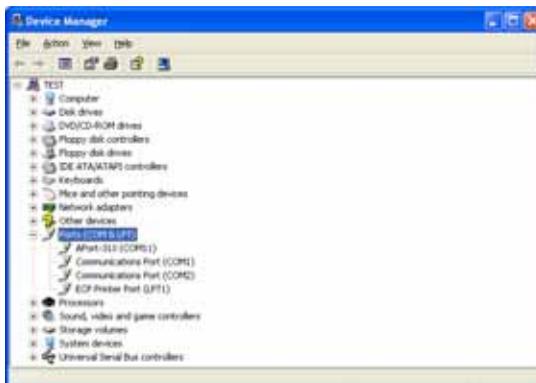
# 8   Configuring Virtual COM Port

The Virtual COM port can be configured in the Device Manager of the operating system or the Manager software. In either case the IP Address, Port #, Protocol, and Flow Control settings must match the Aport-31x settings for the software to open the Virtual COM port.

8.1   Configuration with Manager Software

1. At the Desk Top select Start/Programs/PNI/Aport-31x Servers/Aport-31x Manager. Double click the Virtual COM Configuration button.
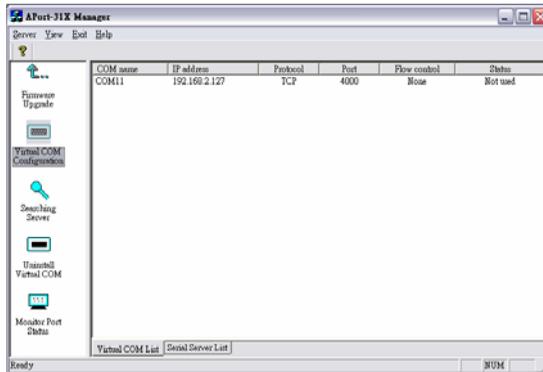
2. Double click the COM # displayed in the screen to open the configuration window.
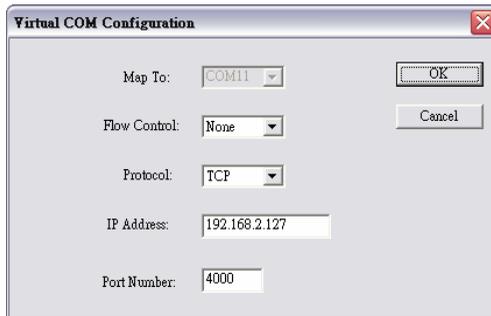
3. Make the adjustments and select OK to complete the changes.

8.2   Configuration with Device Manager

1. On the Desk Top select Start/Settings/Control Panel. Select the System Icon when the Control Panel window opens.

2. In the System Properties window select the Device Manager button.

3. In the Device Manager select the + button next to Ports (COM & LPT) to expand and see the Aport-31x (COM #). Double click Aport-31x (COM #) to open the Properties window.
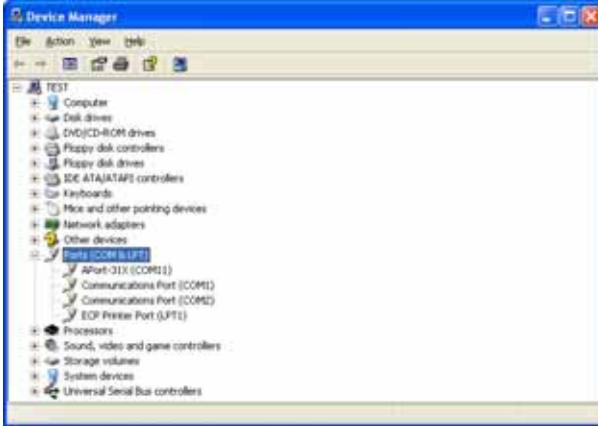
4. Select the Configuration tab. From here the same settings found in the Aport-31x Manager can be adjusted.
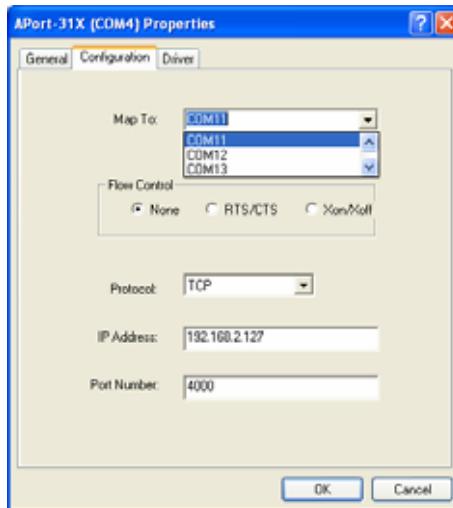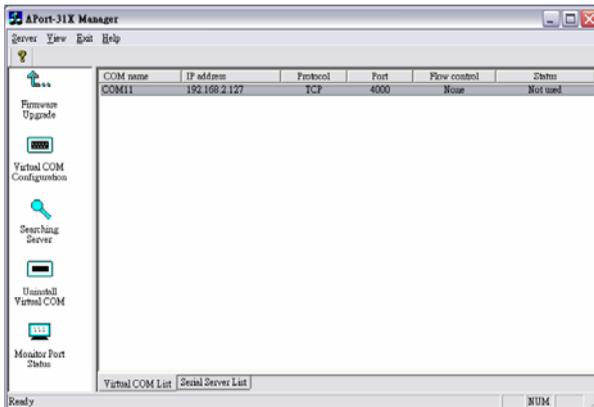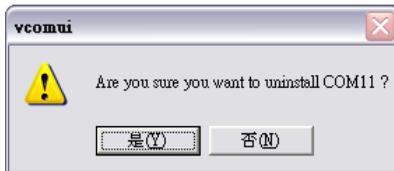
9 Uninstalling the Virtual COM Port

The Aport-31x Manager software **Uninstall Virtual Com port** feature will remove the mapped COM port in the Device Manager of Windows 2000 and XP operating systems. It may also be removed in the Device Manager of Windows 98, ME, NT, 2000, and XP. Windows 98 users will also find a Remove Virtual COM feature in the programs file.

9.1 Removing the Virtual COM port with Manager Software

1. At the Desk Top select Start/Programs/PNI/ Aport-31x Servers/ Aport-31x Manager

2. In the Manager window select Virtual COM Configuration. Highlight the mapped COM port number to be removed.


3. Select Uninstall Virtual COM button. The Manager will ask for confirmation. Select Yes to complete the uninstall procedure.

9.2 Removing the Virtual COM Port using Device Manager

The screen shots were taken from a Windows XP operating system

1. On the Desktop select Start/Settings/Control Panel. Select the System icon when the Manager window opens.

2. Select Device Manager in the Systems Properties window. In the Device Manger window select the + next to Ports (COM & LPT) to expand.
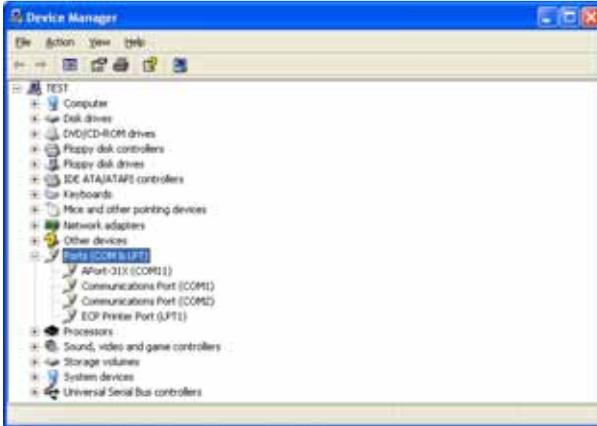
3. Highlight Aport-31x (COM #) to be removed, go the Action tab at the top of window and select uninstall. A confirm Device Removal window will appear. Select OK to proceed.
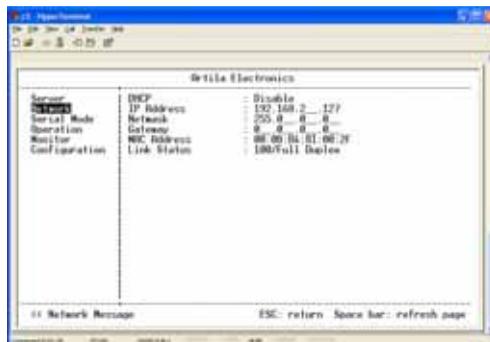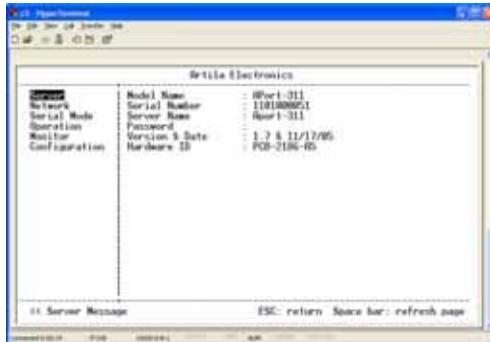

4. The Aport-31x COM # will be removed and the Device Manager window will refresh and display the remaining COM ports.
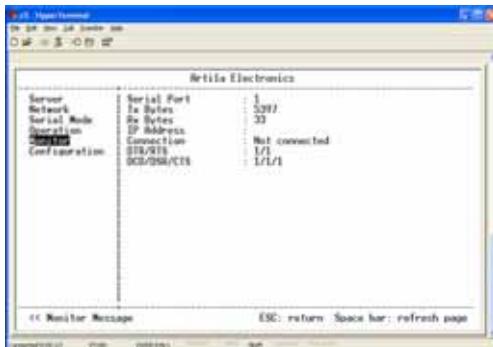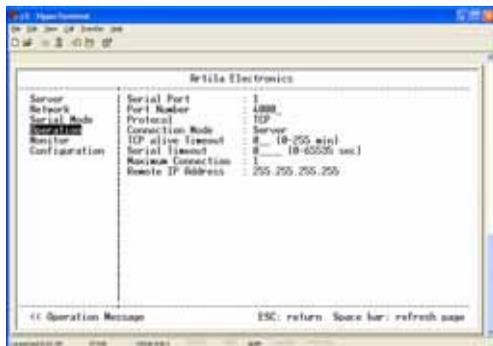
10 Using Console

Before the Aport-31x is installed on a LAN the Console Mode can be used to change the settings from the defaults. Connect a null modem cable between the serial port on the Aport-31x and the COM port on the PC. Apply power to the Aport-31x. The Run LED will flash. See chapter 6 for details on Server Properties.

Using Hyper Terminal open the connected PC COM port at a baud rate of 19200, Data bits 8, Parity None, Stop bits 1, and Flow control None. Ensure all the DIP switches are in the ON position for Aport-311 and Aport-312.

To view the menu hit the space bar. There are six **Console Mode** screens: **Server**, **Network**, **Serial Mode**, **Operation**, **Monitor** and **Configuration**. **Tab**, **Back Space** and **arrow** keys can be used to highlight the desired function on the screen list. Pressing **Enter** moves the cursor to the first field with the current screen. The configuration fields can be changed by pressing **Enter** and selecting from the list that appears. The **Escape** key moves the cursor back to the screen list. Pressing the **Space Bar** refreshes the page.

```
Artila Electronics

Server             Serial Port        : 1
Network            Baud Rate          : 19200
Serial Mode        Data/Stop bits     : 8-1
Operation          Parity             : None
Monitor            Flow Control       : None
Configuration      Serial Port Mode   : RS-232
                   Delimiter HEX 1    : 00
                   Delimiter HEX 2    : 00
                   Force Transmit     : 0____ x 100ms (0-65535)


<< Serial Mode Message              ESC: return  Space bar: refresh page
```



```
Artila Electronics

Server             Serial Port        : 1
Network            Port Number        : 4000_
Serial Mode        Protocol           : TCP
Operation          Connection Mode    : Server
Monitor            TCP alive Timeout  : 0__ (0-255 min)
Configuration      Serial Timeout     : 0____ (0-65535 sec)
                   Maximum Connection : 1
                   Remote IP Address  : 255.255.255.255


<< Operation Message                ESC: return  Space bar: refresh page
```



```
Artila Electronics

Server             Serial Port        : 1
Network            Tx Bytes           : 5397
Serial Mode        Rx Bytes           : 33
Operation          IP Address         :
Monitor            Connection         : Not connected
Configuration      DTR/RTS            : 1/1
                   DCD/DSR/CTS        : 1/1/1


<< Monitor Message                  ESC: return  Space bar: refresh page
```

Once all the changes have been made move to the **Configuration** screen, select **Save** and press **Enter**. The restart message will appear. Select **Yes** to save changes. This is necessary to write the settings to the server.

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. See chapter 6 for details on Server Properties.

Ensure the PC and Aport-31x are connected to the LAN, and the serial server is in RS-232, RS-422 or RS-485 mode before you can telnet to it and access the configuration screens. From the **Desktop**, click **Start**, then **Run.** The Run dialogue box will open. Type in Telnet and the IP address of the Serial Server to be configured, then click **OK**.
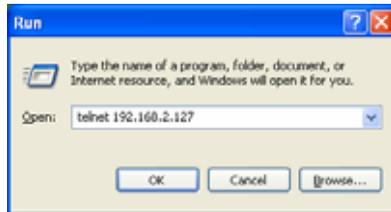

The **Telnet** window will open and the **Server** screen will appear. See chapter 10 for configuration screens and navigation.

12 Using 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 three browser pages. See chapter 6 for details on 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 the **Enter** key. The following window will appear:
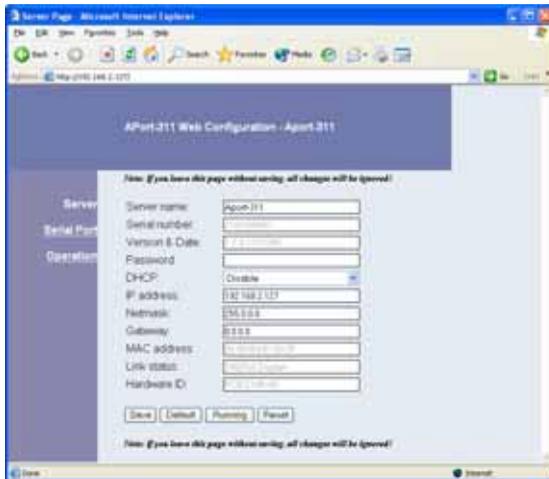
Navigate and change properties as required using the mouse and keyboard. To change serial port properties, click **Serial Port** on the left side of the browser window. The following page will appear:
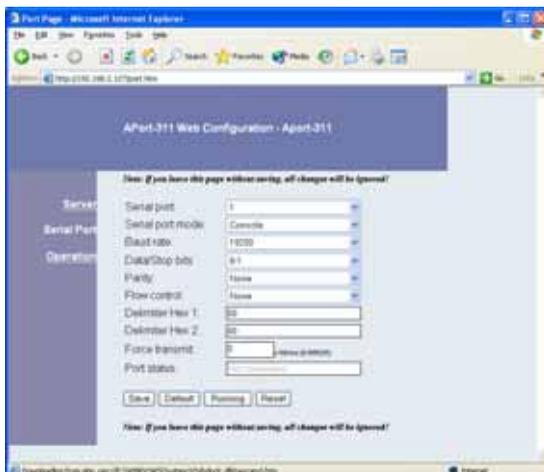
To change other operational properties, click **Operation** on the left side of the
browser window. The following page will appear:
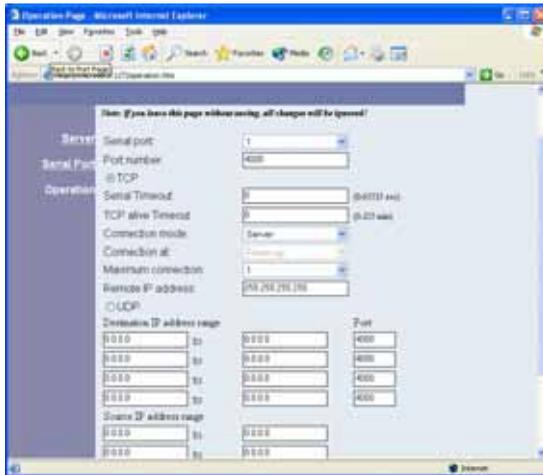
Click **Save** to store changes to the Serial Server. Settings for each Port must be saved
separately.

13   Upgrading the Serial Server Firmware

New firmware may be available at times on our web site and may be
downloaded and flashed to the Aport-31x currently in use. The user can upgrade
using a direct connection to the Aport-31x serial port or the Virtual COM port
feature.

1.   Download the new upgrade .hex file and place in a folder.

2.   Set Aport-31x to Upgrade mode. Ensure that the DIP switches on Aport-311
     or Aport-312 are all in the OFF position.

3.   Connect a null modem cable between the PC and the Aport-31x. When using
     the Virtual COM mode a cable is not required.

4.   Open the Manager software and select the **Firmware Upgrade** button.

5.   In the Serial Port selection options select the COM port number used to
     connect the PC to the Aport-31x. If using the Virtual COM port select that
     number.

6.   Select Browse, find the location of the firmware, select Open, and then select
     the upgrade button.
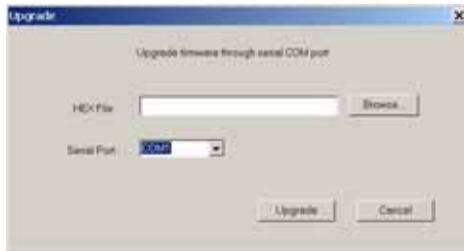
7.   A serial menu will appear allowing the upgrade software to be setup the same
     as the Aport-31x serial settings. **The settings must match or the upgrade
     will fail.**

8. A window showing the Upgrade progress will appear followed by a window indicating the Upgrade was successful.
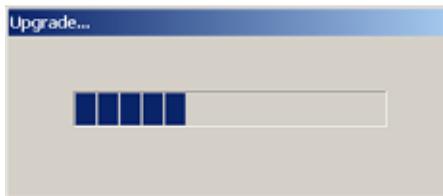
9. Aport-31x will reset itself to complete the upgrade process.

14 Troubleshooting

Q: Why sometimes HyperTerminal loses characters or display funny characters?
A: This happens when you open a new HyperTerminal connection and keep inputting the same character. The reason is before HyperTerminal receiving two different characters from the other end, its status is **Auto detect**, and your port settings haven't fully take effect, so the transferred data is not predicable. To solve this problem, input two different characters from the other end, then the HyperTerminal status will show your port settings such as 19200 8-N-1, save this HyperTerminal connection. Next you open your saved HyperTerminal connection, everything will be fine.

Q: What should I do when I forget the IP address or baud rate setting of a Aport-31x?
A: You can use the searching capability to get the information of all Aport-31x on the network. Double clicks on the searched result will show the detail configuration parameters of the device.

Q: Why I cannot open virtual COMx?
A: The server settings and virtual COMx settings may not match, please make sure their IP address, protocol, port and flow control mode are the same, and the remote IP address should be the host IP address. Besides the Aport-31x cannot be at Console mode.

Q: Why the arrow keys of HyperTerminal in Windows 2000 do not work in Console mode and telnet?
A: Please download new version of HyperTerminal. The HyperTerminal comes with Windows 2000 does not send the arrow key code properly.

RS-232 Loopback Connections

DTE (Computer) Loopback   **DB9**   Connections

Pin# DB9 RS-232 Signal Names	Signal Direction
#1 Carrier Detector (DCE)	
#2 Receive Data (Rx)	
#3 Transmit Data (Tx)	
#4 DTE Ready/Data Terminal Ready (DTR)	
#5 Signal Ground/Common (SG)	
#6 DCE Ready/Data Set Ready (DSR)	
#7 Request to Send (RTS)	
#8 Clear to Send (CTS)	
#9 Ring Indicator (RI)	

DB9 Male
Outside

#1

#9