



Serial-Ethernet Server

STE-501C

User's Manual

Version 2.0

IMPORTANT ANNOUNCEMENT

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This document is intended to provide customers with brief descriptions on the product and to assist customers to get started. For detail information and operations of the product, please refer to the manual in the CD attached.

FCC WARNING

Class A for Ethernet Serial Server

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expenses.

A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord can be used.

Use only shielded cables to connect the device's RS-232 or RS-485 port.

Be cautioned that changes or modifications not explicitly approved by Antaira Technologies could void your authority to operate the equipment.

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1. Introduction

The STE-501C Ethernet Serial Server is a gateway between Ethernet (TCP/IP) and RS-232 or RS-485/RS-422 communications. The information transmitted by STE-501C is transparent to both host computers (Ethernet) and devices (RS-232 or RS-485/RS-422). Data coming from the Ethernet (TCP/IP) is sent to the designated RS-232 or RS-485/RS-422 port and data being received from RS-232 or RS-485/RS-422 port is sent to the Ethernet (TCP/IP) transparently.

In the computer integration manufacturing or industrial automation area, the STE-501C Ethernet Serial Server is used for field devices to directly connect to the Ethernet network. The terminal server (main control program run in STE-501C) transforms whatever data received from RS-232 or RS-485/RS-422 to TCP/UDP port then connect devices to the Ethernet network via a single application program or multiple application programs.

Many control devices provide the ability to communicate with hosts through RS-232 or RS-485/RS-422, however RS-232 or RS-485/RS-422 serial communication has its limitations. It is hard to transfer data through a long distance. With STE-501C, it is possible to communicate with a remote device in the Intranet environment or even in the Internet and thus, increases the communication distance dramatically.

STE-501C offers one RS-232 or RS-485/RS-422 port, one RJ45 Ethernet and Watch-Dog Timer etc.

1.1 Packaging

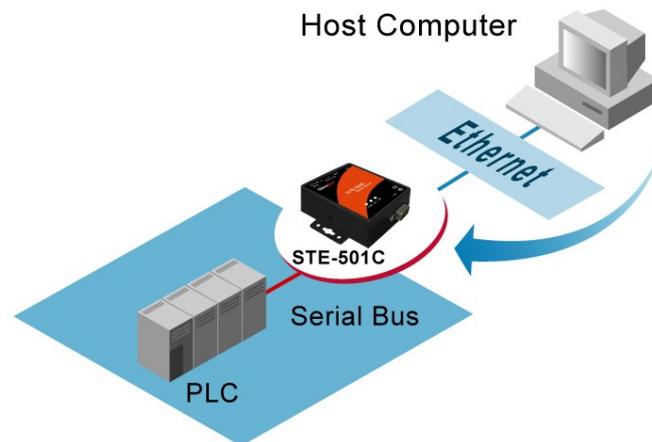
Please check that the package contains the following items:

- STE-501C Serial Server
- Quick Start Guide
- Product CD
- Wall mounting screws
- 3 pin terminal block for power input

1.2 Application Connectivity

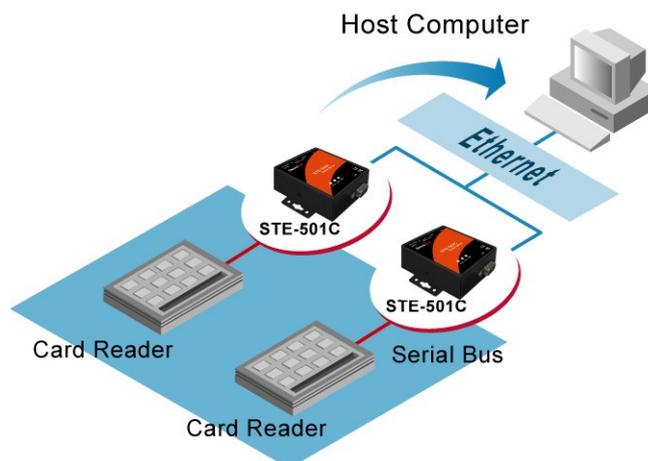
TCP Server Mode : The STE-501C can be configured as a TCP server on TCP/IP Networks to wait for other applications (clients) in the host computer to establish a connection with the serial device. After the connection is established between serial device and the host computer, data can be transmitted in both directions.

TCP Server Mode



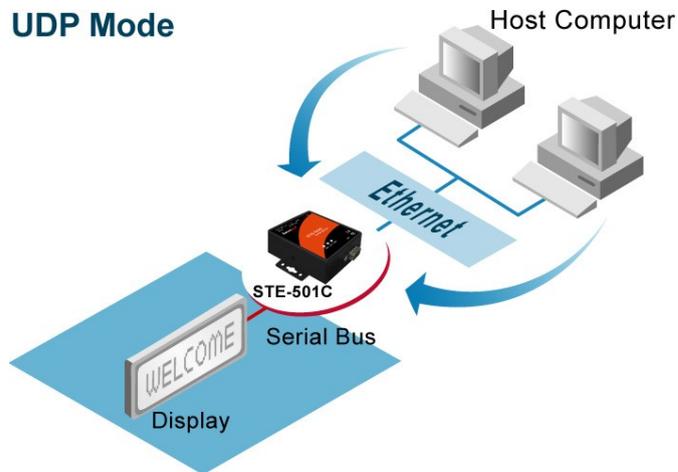
TCP Client Mode : The STE-501C can be configured as a TCP client on TCP/IP Networks to establish a connection with other applications (server) in the host computer actively. After the connection is established, data can be transmitted between serial device and the host computer in both directions.

TCP Client Mode



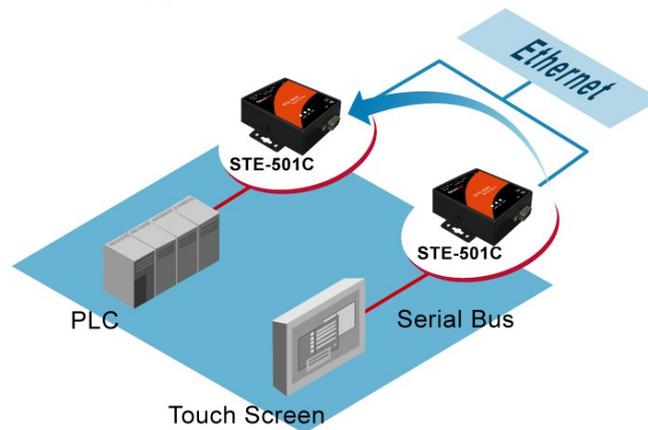
UDP Mode: UDP is a faster but it's a non-guaranteed datagram delivery protocol. STE-501C can be configured in UDP mode on a TCP/IP Network to establish a connection using unicast or multicast data from the serial device to one or multiple host computers. Vice versa is also true.

UDP Mode



Tunneling Mode: The serial connection can be established with two or more STE-501Cs to send data over TCP/IP Network. It can avoid RS-232 interface 15-meter distance limitation imposed.

Tunneling Mode



2. Hardware Setup

NOTE:

1. Panel layout in Appendix A.3.1
2. Press the reset button of STE-501C to reset the settings to the default values. *Figure 2.1* shows the interfaces.

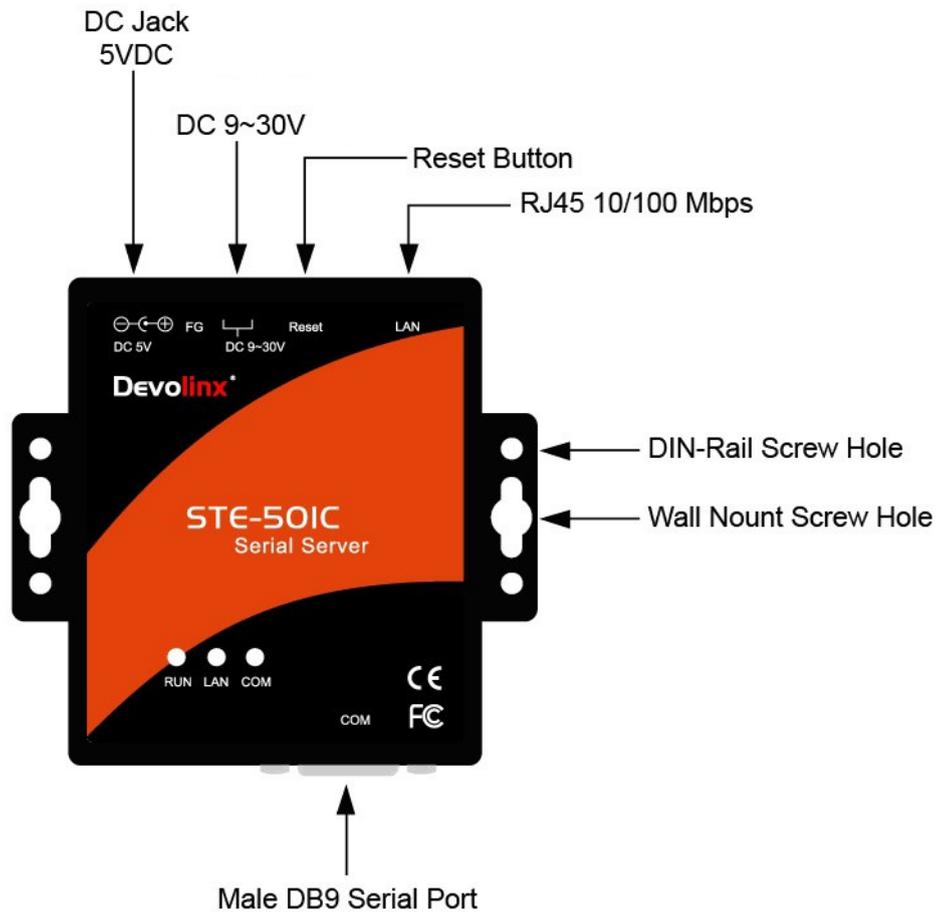


Figure 2.1

STE-501C interfaces

2.1 LED Indicators

2.1.1 LAN LED

Message	Description
Off	Ethernet Disconnected
Blinking with Green	Data is transmitting on Ethernet for 100Mbps
Blinking with Orange	Data is transmitting on Ethernet for 10Mbps
Table 1. LAN LED Message	

2.1.2 COM Port LED

Message	Description
Off	No data is transmitting on COM port
Blinking	Data is transmitting on COM port
Table 2. COM Port LED Message	

2.1.3 RUN LED

Message	Description
On	Jumper JP1 Pin1 and Pin2 are shorted to disable AP firmware running
Blinking (rate: 0.5 Sec)	AP firmware is running normally
Table 3. RUN LED Message	

2.2 Installation Procedures

1. Connect STE-501C to power source using 5VDC jack (or 9~30VDC terminal block power source).

Note : STE-501C provides two power inputs that can be connected simultaneously to live DC power sources. If any one of the power inputs fails, the other live source acts as a backup to support power needs automatically. The redundant dual DC power inputs give one extra assurance of non-stop operation.

2. Connect STE-501C to the Ethernet network. Use a standard straight-through Ethernet cable when connecting it to a hub/switch; one also can connect it to the PC's Ethernet port via a cross-over Ethernet cable for easy set up. However, in this case it is necessary to make sure the PC is in the same network sub-net as the STE-501C.
3. Connect STE-501C's serial port to a serial device.
4. Placement options: Mount STE-501C to a wall/panel (mounting screws included) or Din-Rail rack (requires optional item model: Din-Rail-Kit DK-25).

3. Software Setup

STE-501C Ethernet Serial Server is shipped with default settings shown in the following table:

Property	Default Value
IP Address	10.0.50.100
Gateway	10.0.0.254
Subnet Mask	255.255.0.0
Firmware 3.609 or Greater	
User Name	admin
Password	default
Firmware 3.605 or earlier	
User Name	admin
Password	Null (leave blank)
COM 1	9600, None, 8, 1, No flow control, buffer disabled, packet delimiter timer 2ms
Link 1	Type: TCP Server, Listen port 4660, Filter=0.0.0.0, Virtual COM disabled
SysName of SNMP	Name
SysLocation of SNMP	location
SysContact of SNMP	contact

3.1 Configuration by Monitor.exe Utility

3.1.1 Static IP

Use **monitor.exe** that comes with the product CD to configure the network parameters of STE-501C. Please click **Config**, see *Figure 3.1*, then give it a static IP information, see *Figure 3.2*.

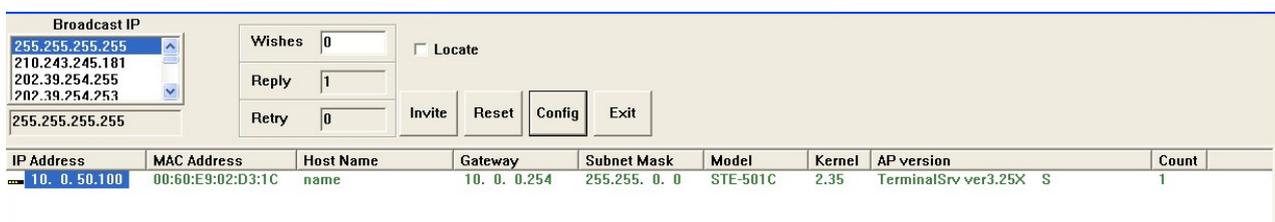


Figure 3.1 Configure by monitor.exe utility

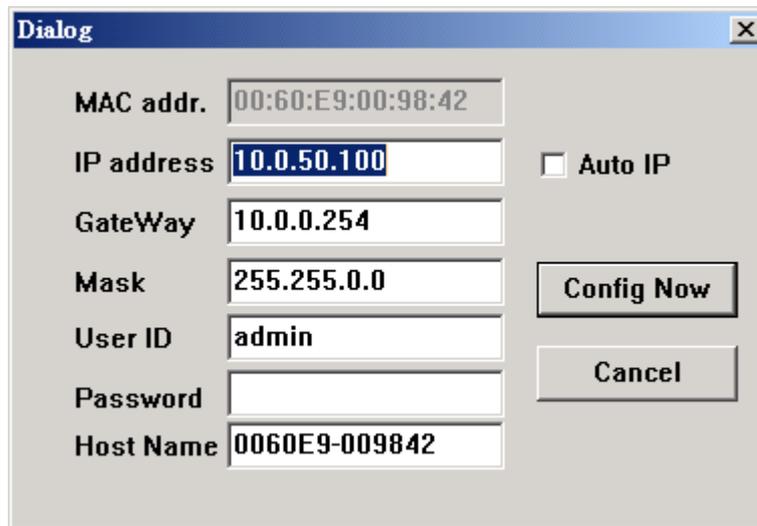


Figure 3.2 Static IP setup dialog window

3.1.2 Auto IP (Dynamic IP)

A DHCP server can automatically assign the IP address and network settings. STE-501C supports the DHCP function. By default, the DHCP function on STE-501C is disabled; one can use Monitor.exe software to search network information automatically by following steps:

1. Execute Monitor.exe (Figure 3.1)
2. Click on the IP address of STE-501C in monitor
3. Click **Config** (It will pop-up Dialog Window)
4. Check **Auto IP** (Figure 3.3)
5. Click **Config Now** (The STE-501C will restart and get IP from DHCP server automatically)

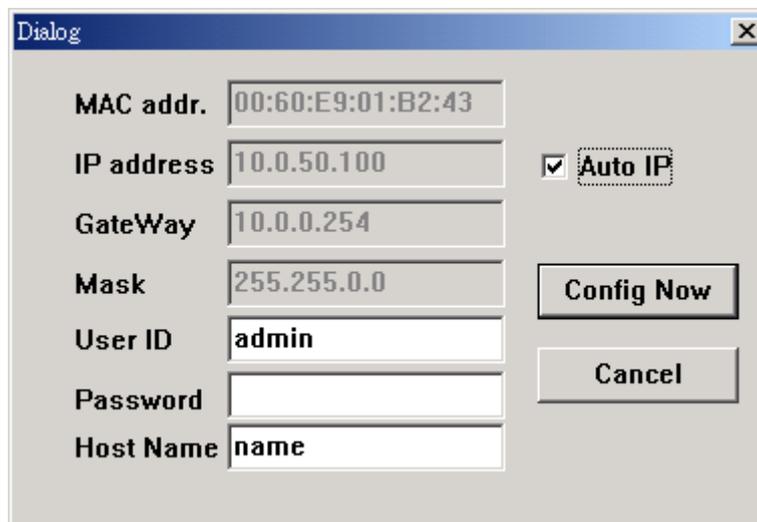


Figure 3.3 monitor.exe Auto IP Dialog Window

3.2 Configuration by Telnet Utility

One can use Telnet utility to change configuration settings of STE-501C by following steps:

3.2.1 Login to the System

1. Open Ms-DOS command prompt window.
2. Telnet to STE-501C using command **Telnet IP address**. (For example: Input **Telnet 10.0.50.100** in Ms-DOS command prompt window). After telnet to STE-501C, system prompts for a password, the default password is default. (Figure 3.4)

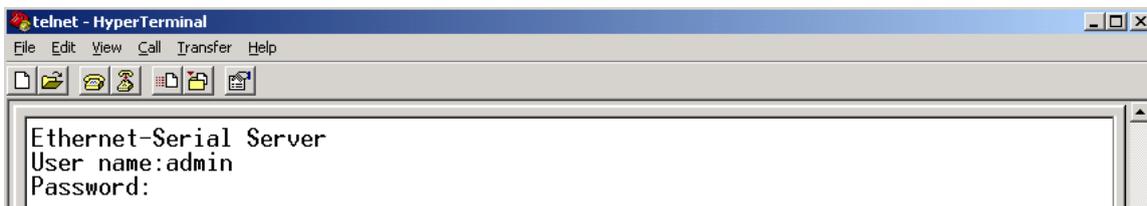


Figure 3.4 Login to the system

Note: One can press the default button of STE-501C to reset the password to the default value.

3. After verifying the password, the following terminal screen appears, as shown below in Figure 3.5.

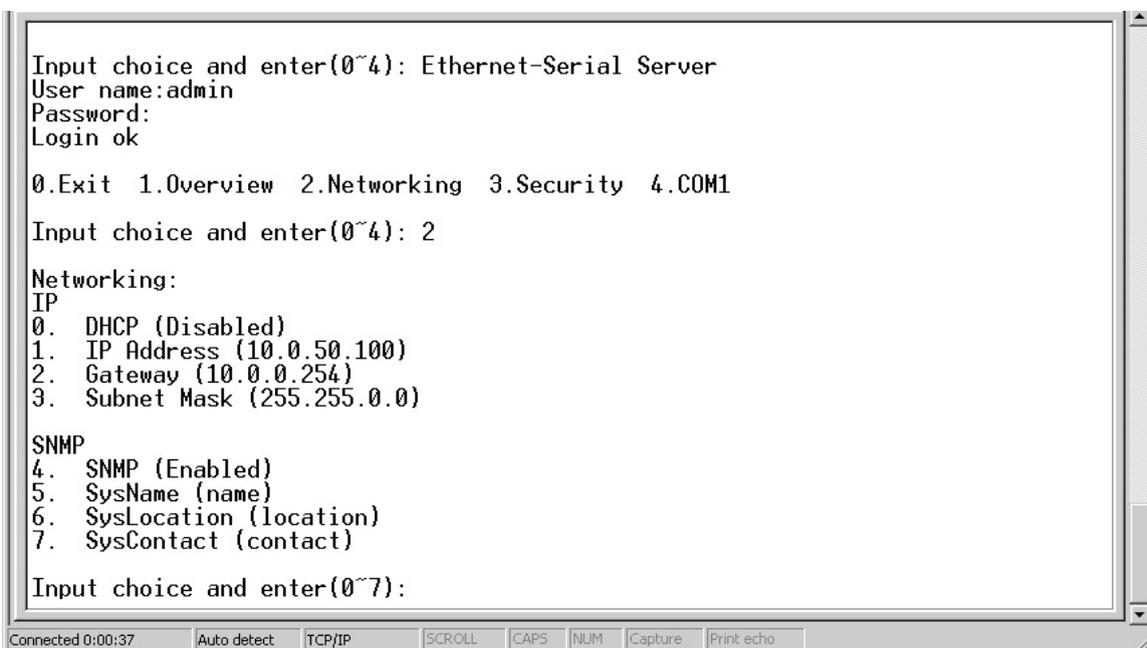


Figure 3.5 Main menu

Note:

- If the STE-501C does not receive any command within 1 minute, telnet will be terminated automatically.
- The changes of the networking parameters will take effect only when the STE-501C is exited and restarted.

4. Select **1** from **Input choice and enter (0~4):** to enter the overview page as follows:(Figure 3.6)

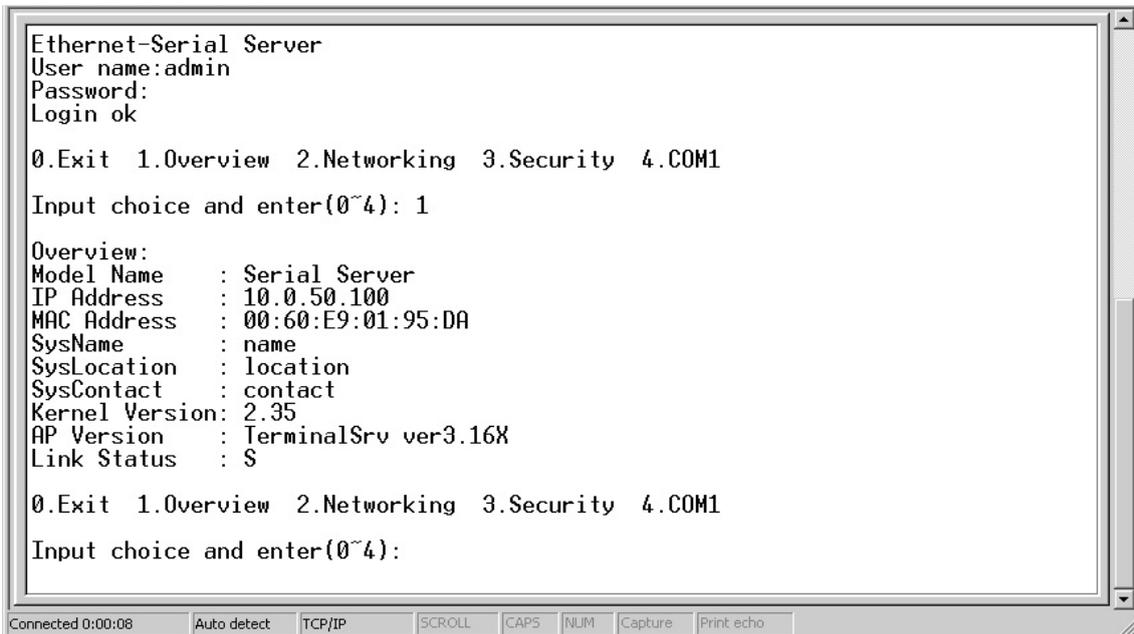


Figure 3.6 Overview

This page gives the general information of the STE-501C including IP and MAC address, SNMP information, kernel and AP version, and connection status of the device.

3.2.2 Networking

Select **2** from **Input choice and enter (0~4):** to enter the networking page as follows: (Figure 3.7)

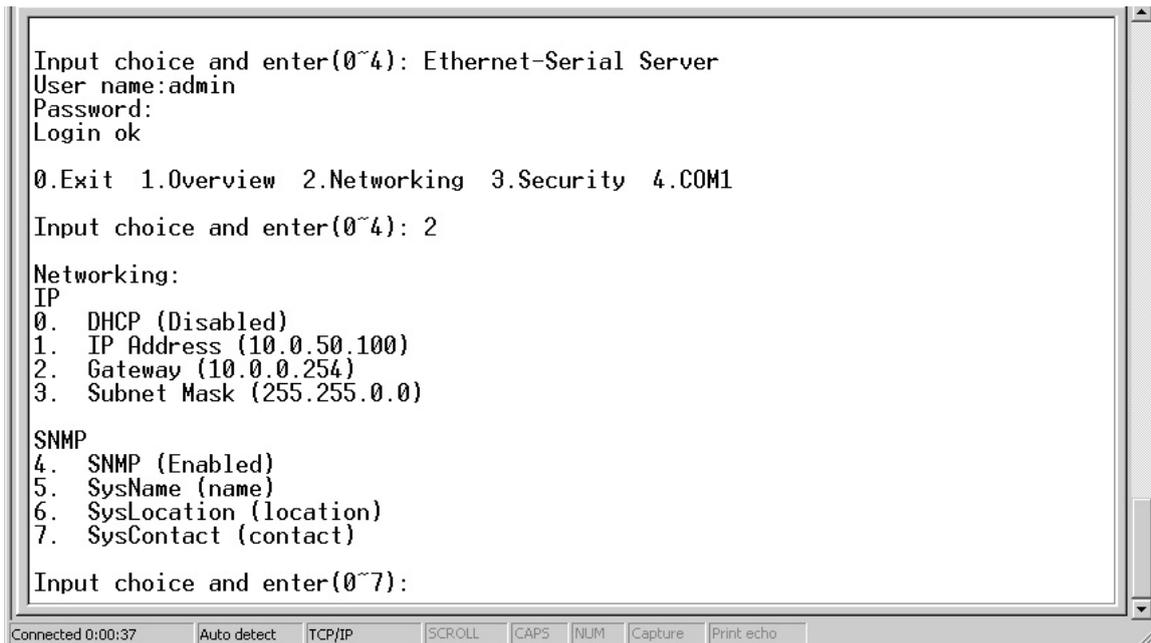


Figure 3.7 Network settings

This page allows a change of the network settings of the device including IP address, subnet mask, gateway IP address and SNMP information of the STE-501C. Please notice that any setting change made on this page won't take effect until one restart the device.

Note: Press **ESC** key to return to the previous menu.

3.2.3 Change the Password

1. Select **3** from **Input choice and enter (0~4)**: the following screen appears. (Figure 3.8)

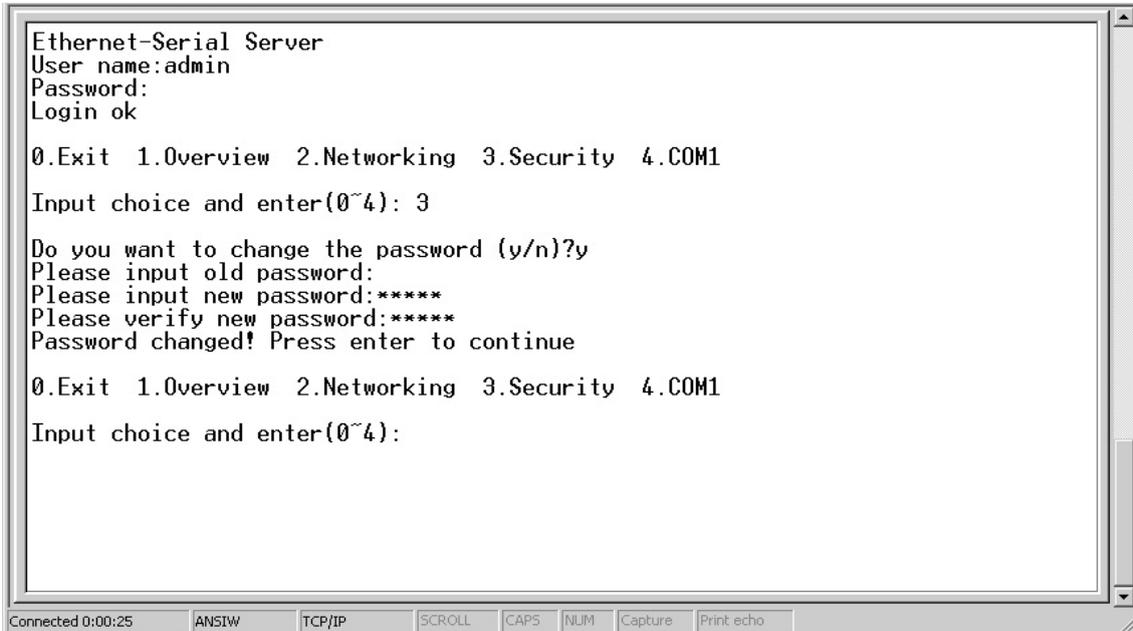


Figure 3.8 Change the password

2. To change the password, please type the old password in the **Please input old password** field. Type the new password in the **Please input new password** and the **Please verify new password** fields.

Note: One can press the default key of product to reset password to the default value.

3.2.4 COM1 Setup

- Select **4** from **Input choice and enter (0~4)**: the following screen appears: (Figure 3.9)

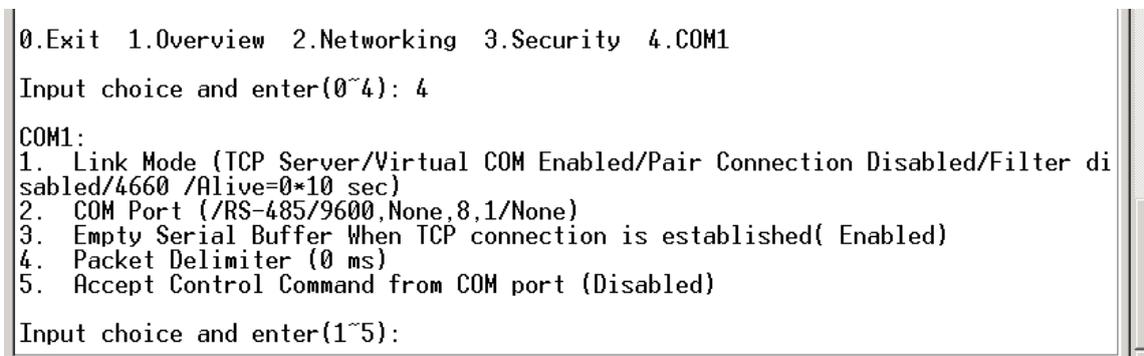


Figure 3.9 Com1 setup

The page gives the opportunity to configure parameters of COM1 setting which include COM1 working mode, port parameters, enabling or disabling serial buffer's data, and setting packet delimiter.

LINK Mode Setup **Configure STE-501C as TCP server:** (Figure 3.10)

1. Type **1** from **Input choice and enter (1~4):** of COM1
2. Type **1** in the **Input choice (1~5) and enter:**
3. Input local port in the **Please input local port :**
 - A. To enable IP filter if desired:
 1. Input **y** in the **Do one want to enable IP filter (y/n)?**
 2. Input source IP in the **Please input Filter_IP:**
 3. Double click **Enter** key
 - B. If user doesn't want to enable IP filter:
 1. Input **n** in the **Do one want to enable IP filter(y/n)?**
 2. Double click **Enter** key
3. Input idle time in **Please input idle time to send TCP alive packet(4*10sec) :** (If **2** is inputted->the sending TCP keep alive packet period will be changed to 2*10 sec)

Note:

- IP filtering function is disabled if setting FILTER_IP to "0.0.0.0".
- IP filter is disabled by default.
- If IP filter is enabled, only source IP assigned can connect to STE-501C.

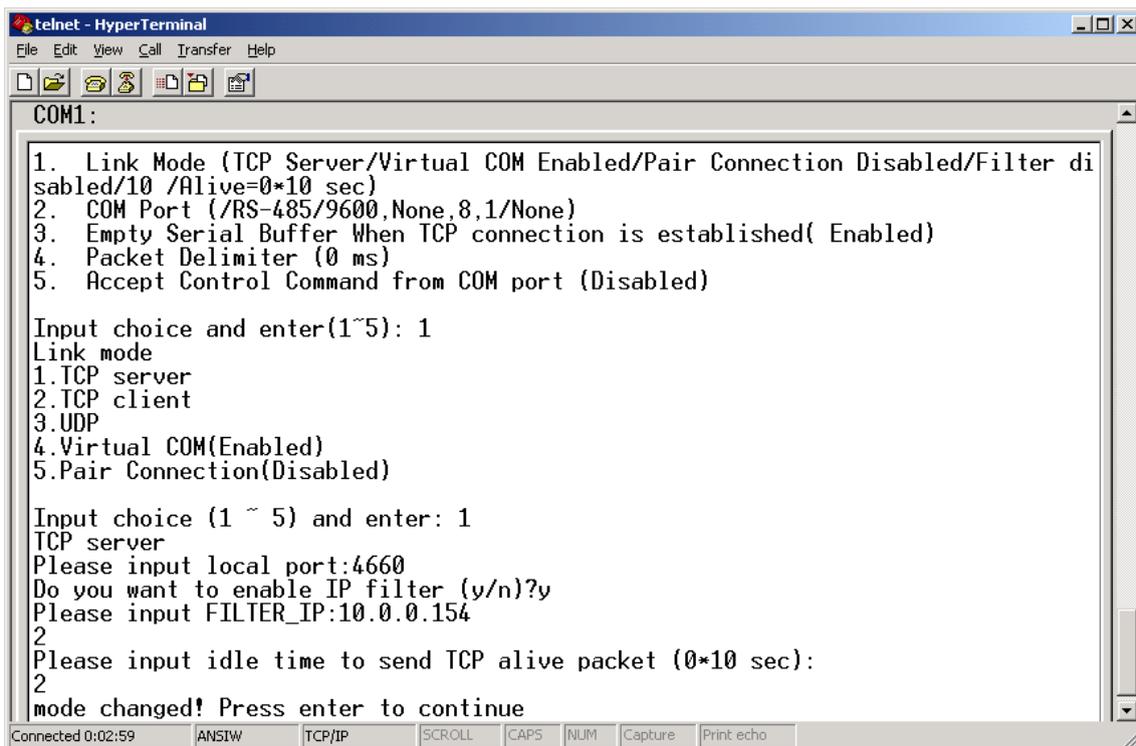


Figure 3.10 Link Mode-TCP server setup

3.2.5 Configure STE-501C as TCP Client

1. Type **2** in the **Input choice (1~5)** and enter : (Figure 3.11)
2. Input destination IP in the **Please input Destination IP** :
3. Input destination port in the **Please input Destination port** :
 - A. Type **1** for Connected always:
 1. Double click **Enter** key
 2. Input idle time in **Please input idle time to send TCP alive packet(4*10sec)** : (If **2** is inputted->the sending TCP keep alive packet period will be changed to 2*10 sec)
 - B. Type **2** for Trigger by receiving COM port data:
 1. Input idle time to disconnect in the **Please input idle time to disconnect (0sec, 1~255)** : (If **0** is inputted->disabled the function; if **2** is inputted ->the serial inactivity beyond 2 sec will cause disconnect)
 2. Input error retrying time in "**Please input waiting time for error retrying (0 minute,1~255)** : " (If **0** is inputted->disabled the function; if **2** is inputted->the serial inactivity beyond 2 sec will cause disconnect)
 3. Double click **Enter** key
 4. Input idle time in **Please input idle time to send TCP alive packet (4*10sec)** : (If **2** is inputted->the sending TCP keep alive packet period will be changed to 2*10 sec)

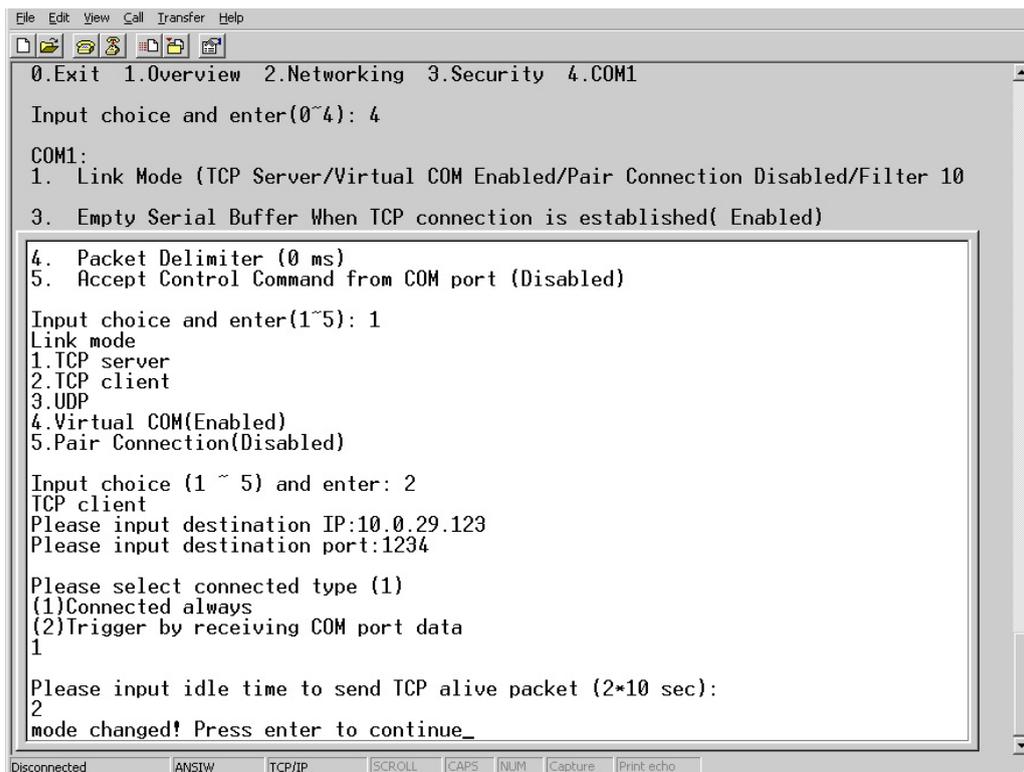


Figure 3.11 Link Mode-TCP client setup

3.2.6 Configure STE-501C as UDP Client

For example, the local port is 4660, the destination IP is 10.0.29.254, destination port is 1234.
(Figure 3.12)

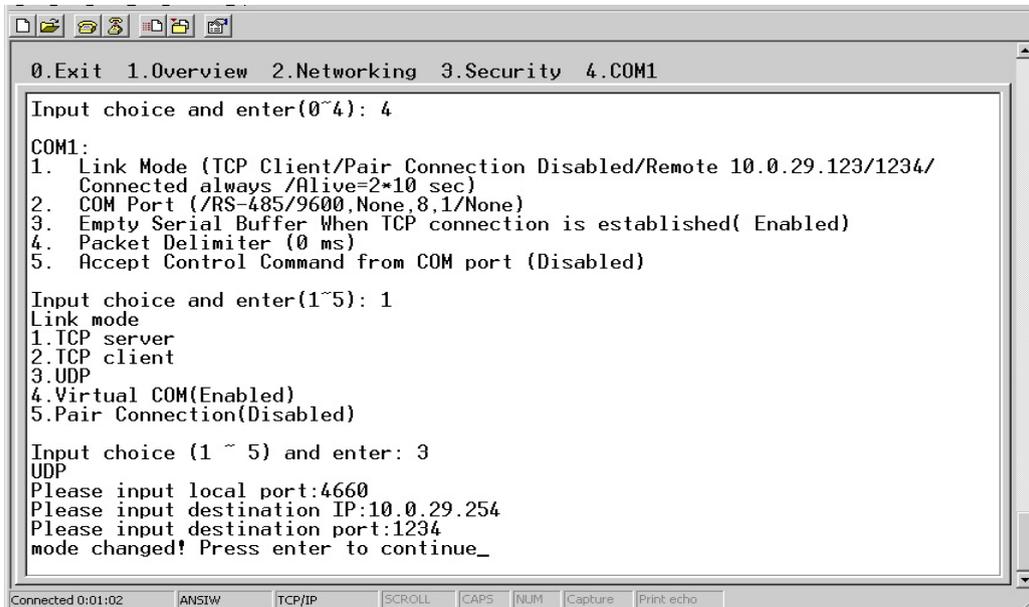


Figure 3.12 Link Mode-UDP client setup

3.2.7 COM Port Setting

Type 2 from **Input choice and enter (1~4):** of COM1, the following screen appears, the COM port alias name can be given, the baud rate and parity can be set, the number of data bit and stop bit can be determined, and the use of flow control and the type of flow control to be used can be decided. (Figure 3.13)

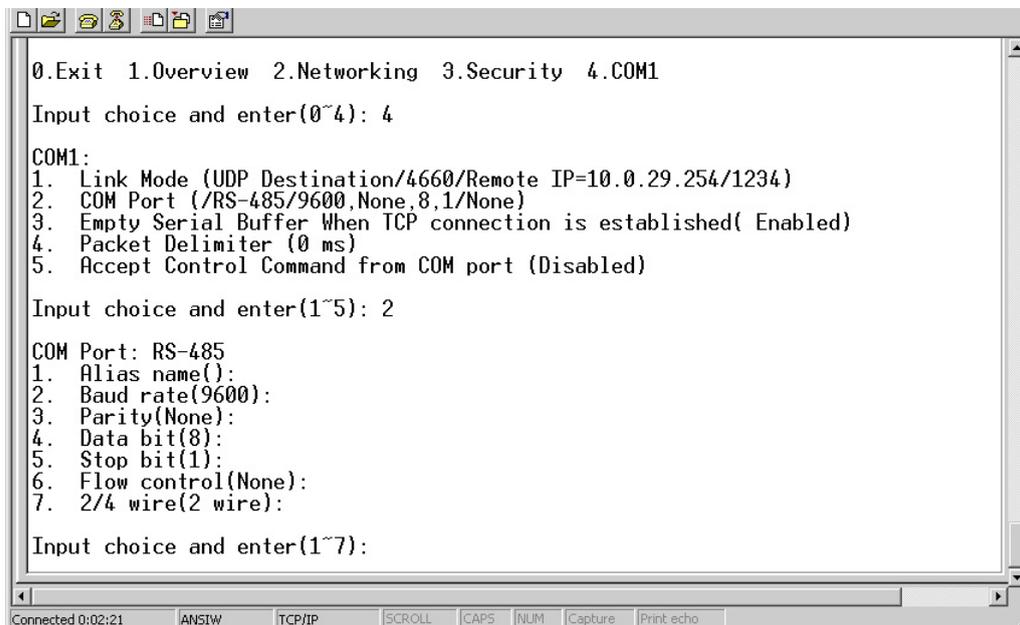


Figure 3.13 Com port setting

3.2.8 Enabling Serial Data Buffer

Type 3 from **Input choice and enter (1~4)**: of COM1, by default COM port serial data buffer is enabled meaning that when TCP/IP Ethernet connection is broken, serial data collected from serial device will be empty in STE-501C once TCP/IP connection is resumed. The serial data will be sent through Ethernet connection, which can be disabled if desired. (Figure 3.14)

```
0.Exit 1.Overview 2.Networking 3.Security 4.COM1
Input choice and enter(0~4): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-485/9600,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established( Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 3
Empty Serial Buffer when TCP connection is established
(1)Enable (2)Disable
Please select the option:1
Option is changed! Press enter to continue
```

Figure 3.14 Com port-Enabling serial data buffer

3.2.9 Setting Packet Delimiter

Packet delimiter is a way of controlling packets within serial communication. It can prevent packets from being cut, thus keeping the packets complete. STE-501C provides two ways of parameter setting as inter character timer and terminator. By default, packet delimiter timer is 1 ms, the timer can be changed as shown in the following figure:(Figure 3.15)

```
0.Exit 1.Overview 2.Networking 3.Security 4.COM1
Input choice and enter(0~4): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-485/9600,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established( Enabled)
4. Packet Delimiter (0 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 4
Packet delimiter
(1)Timer (2)Characters
Please select delimiter type:1
Please input timer(0 ~ 30000 ms):2
Delimiter changed! Press enter to continue_
```

Figure 3.15 Setting packet delimiter timer

One can also choose character pattern as the packet delimiter indicated in the following figure: (Figure 3.16)

```
0.Exit 1.Overview 2.Networking 3.Security 4.COM1
Input choice and enter(0~4): 4
COM1:
1. Link Mode (UDP Destination/4660/Remote IP=10.0.29.254/1234)
2. COM Port (/RS-485/9600,None,8,1/None)
3. Empty Serial Buffer When TCP connection is established( Enabled)
4. Packet Delimiter (2 ms)
5. Accept Control Command from COM port (Disabled)
Input choice and enter(1~5): 4
Packet delimiter
(1)Timer (2)Characters
Please select delimiter type:2
Please input pattern(max 2 bytes, ex:0x0d0a):
```

Figure 3.16 Setting packet delimiter-character pattern

3.2.10 Accept Control Command from COM Port

STE-501C can also accept serial control commands directly over the network following RFC2217 format. For more detail about this function, please contact Technical Support for more information.

3.3 Configuration Using Web Browser

1. Make sure the PC is located on the same network sub-net as STE-501C
2. Open a web browser, then type in the IP address of STE-501C to be configured. Default user name is **admin** and default password is **default** (password is blank for firmware versions 3.605 or earlier).
3. STE-501C's network, link mode and COM ports settings can be configured in different web pages.
4. Click **Save Configuration** to save settings.
5. Click **Restart** to make the change effective if necessary.

It is also possible to modify various settings through the web server interface. To do so, please follow the steps below.

3.3.1 Log in to the System

- From web browser, type in the IP address of STE-501C in the URL.
Example: http://10.0.50.100
- The following authentication screen appears. (Figure 3.17) Please type in user name and password then click on **OK**. The user name is **admin** and password is **default**.



Figure 3.17 login the system via Web

- The following overview page appears. (Figure 3.18)

Devolinx Ethernet-Serial Server

Overview

The general device information of Ethernet-Serial Server

Model Name	STE-501C
IP Address	10.0.50.100
MAC Address	00:60:E9:0B:4D:69
SysName	name
SysLocation	location
SysContact	contact
Kernel Version	V2.62
AP Version	TerminalSrv v3.522-79
Link Status	S

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Note:
About Link Status field :
"S" for TCP Server mode and Listening
"A" for TCP Server and Connected
"c" for TCP Client mode and NOT Connected
"C" for TCP Client mode and trying to Connect
"B" for TCP Client mode and Connected
"U" for UDP mode

Figure 3.18 Overview

3.3.2 Change the password

- Click on the **Security** link and the following screen appears. (Figure 3.19)

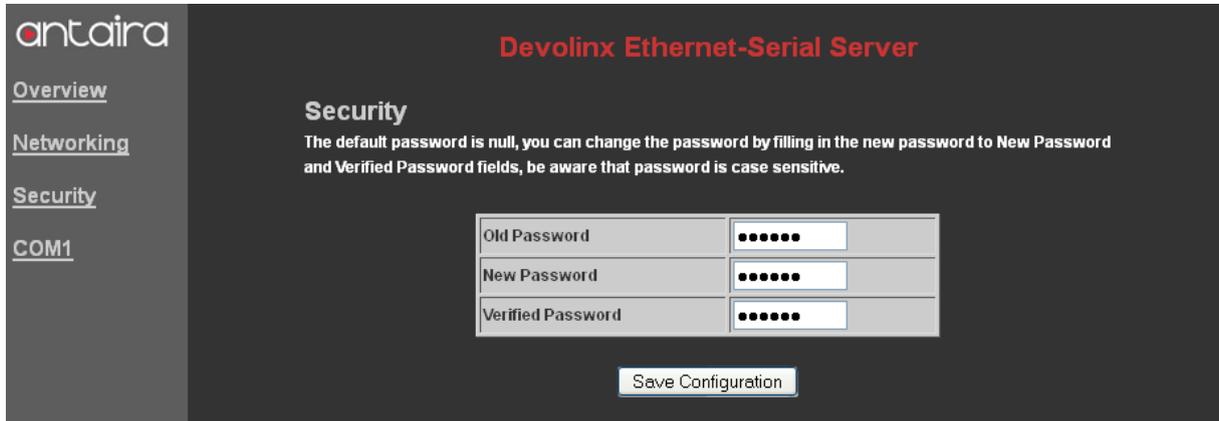


Figure 3.19 Change the password

- Please input the old password in the **Old Password** field, input the new password in the **New Password** and the **Verified Password** fields, and then click on **Save Configuration** to update the password.

Note: One can press the default key of product to reset password to the default value.

3.3.3 Network Setup

Click on the **Networking** link and the following screen appears. Fill in IP information under TCP/IP field. Alternatively, one can do the configuration by clicking on DHCP to obtain auto IP address, gateway, and subnet mask information.

Enable SNMP by checking **Enable**, fill in network identification information under SNMP field and click on the **Save Configuration** button to save the changes, please notice that the setting will not become effective until the STE-501C is restarted. (Figure 3.20)

The screenshot shows the configuration page for a Devolinx Ethernet-Serial Server. On the left is a navigation menu with 'COM1' selected. The main area is titled 'TCP/IP' and contains a DHCP section with an unchecked 'Obtain an IP automatically' checkbox. Below this is a table for IP configuration:

IP Address	10	0	50	100
Default Gateway	10	0	0	254
Subnet Mask	255	255	0	0

Below the IP settings is the 'SNMP' section, which is enabled. It includes fields for SysName (name), SysLocation (location), SysContact (contact), Read Community (public), Write Community (private), and Trap Server IP (0.0.0.0). An 'Alert Event' section has checkboxes for Cold/Warm Start, Link Down, Link Up, and Authentication Failure. At the bottom are 'Save Configuration' and 'Restart' buttons.

Figure 3.20 Network setup

3.3.4 Configure STE-501C as TCP Server

The STE-501C can be configured as transparent mode by default (Figure 3.21).

1. Click on the **COM1** link and the following screen appears.
 2. Configure STE-501C as TCP server
 3. Input local listening port **4660**
- A. To enable IP filter if desired :
1. Check **IP filter**
 2. Input source IP in the **Source IP**
- B. If enabling IP filter is not desired :
1. Don't check **IP filter**.
 2. Input idle time in **Please input idle time to send TCP alive packet(sec)** : (If one input 2->the sending TCP keep alive packet period will be change to 2*10 sec).

3. Input TCP inactivity time in **TCP Inactivity Time Before Disconnect (sec)** : (If 2 is inputted->TCP inactivity beyond 2 sec will cause a disconnect).
4. Click on **Save Configuration** button to save the changes.

Note:

- IP filtering function is disabled if setting FILTER_IP to "0.0.0.0".
- IP filter is disabled by default.
- If IP filter is enabled, only source IP assigned can connect to STE-501C.

The screenshot shows the configuration interface for the Devolinx Ethernet-Serial Server. It is divided into two main sections: LINK1 and COM1.

LINK1 Configuration:

- Mode: TCP Server, TCP Client, UDP
- Enable VirtualCOM for Serial/IP: Enable
- Pair Connection: Enable
- Reverse Telnet Mode: Enable
- Local Listening Port: 4660
- IP Filter: Enable, Source IP: 0.0.0.0
- Idle Time Before Sending TCP Alive Packet: 4 *10 sec (0~255, 0:Disable)
- TCP Inactivity Time Before Disconnect: 0 sec (0~255, 0:Disable)

COM1 Configuration:

- Serial Interface: RS-232
- Alias Name: [Empty]
- Baud Rate: 9600
- Parity: None, Odd, Even, Mark, Space
- Data Bits: 7 bits, 8 bits
- Stop Bits: 1 bit, 2 bits
- Flow Control: None, RTS/CTS, DTR/DSR, Xon/Xoff
- Empty Serial Buffer When TCP Connection is Established: YES, No, (Default: Yes)
- Data Packet Delimiter: Inter-character Time Gap : 2 msec (0~30000, 0:Disable), Characters : 0x0d ("0x" + Hex Code, e.g. "0x0d" or "0x0d0a")
- COM Type Selection: RS232, RS485, RS422

A **Save** button is located at the bottom of the configuration area.

Figure 3.21 Com1 setup-TCP server

Note:

- Default port number of STE-501C is 4660 and it is associated with serial port COM1 respectively. After

the application program connects to the TCP port 4660 of STE-501C, data being sent to this TCP connection from the application program are transparent to the COM1 of STE-501C. Vice versa is also true.

- The serial interface will show different port interfaces according to the model of the serial server.

3.3.5 Configure STE-501C as TCP Client

1. Configure STE-501C as TCP client. For example, the destination IP is 10.0.29.11, destination port is 4660. (Figure 3.22)
 2. Input destination IP **10.0.29.11**
 3. Input destination port in the **4660**
 4. Input idle time in **Please input idle time to send TCP alive packet (sec)** : (If one input 4->the sending TCP keep alive packet period will be change to 4*10 sec)
- Select **TCP Connect On Power-on**: to keep trying to establish TCP connection after Power on
 - Select **TCP Connect On Any Serial Character**: Any serial character will trigger to establish the TCP connection
5. Input idle time to disconnect in the **Serial Inactivity Time before disconnect (0sec, 1~255)** : (If one input 0->disable the function; if one input 2 ->the serial Inactivity beyond 2 sec will cause disconnect)
 6. Input error retrying time in **“Waiting Time Between Re-connect Attempts (0 minute,1~255) : ”** (If one input 0->disable the function; if one input 2 ->the serial Inactivity beyond 2 sec will cause disconnect)
 7. Click on **Save Configuration** button to save the changes

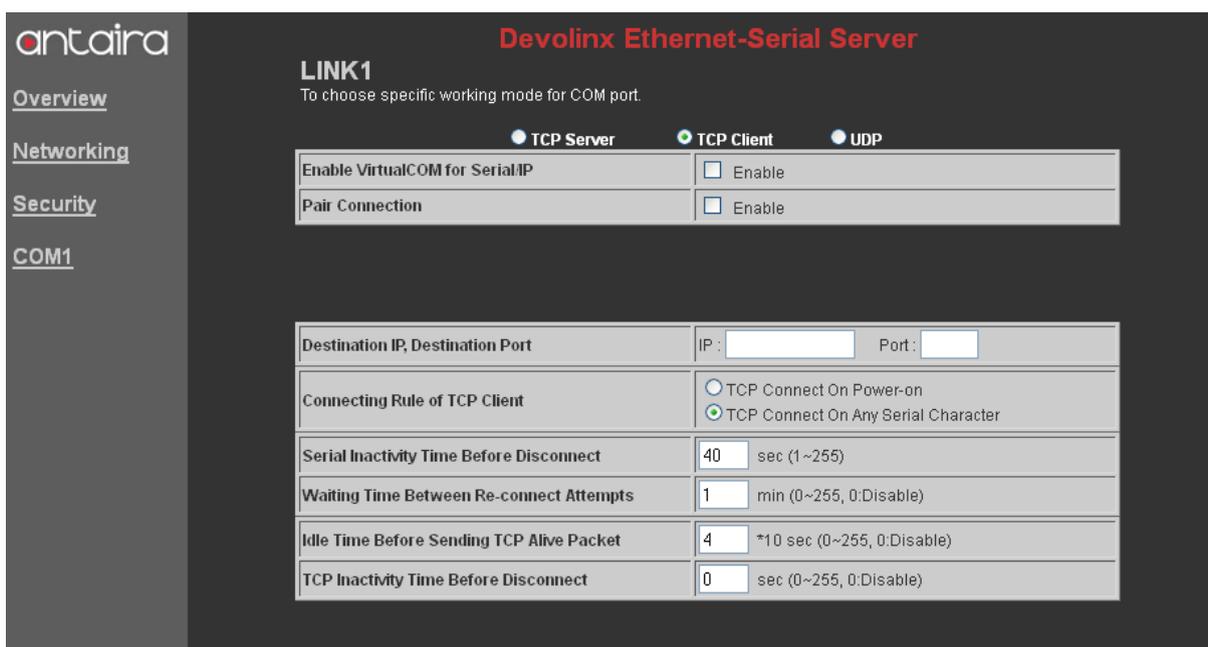


Figure 3.22 Com1 setup-TCP client

3.3.6 Pair Connection

In the case of the serial connection being established with two or more STE-501C's to send data over an Ethernet network, i.e. pair connection mode, “**pair connection**” can be chosen which is indicated in the following figure to configure with any type of serial device. (Figure 3.23)

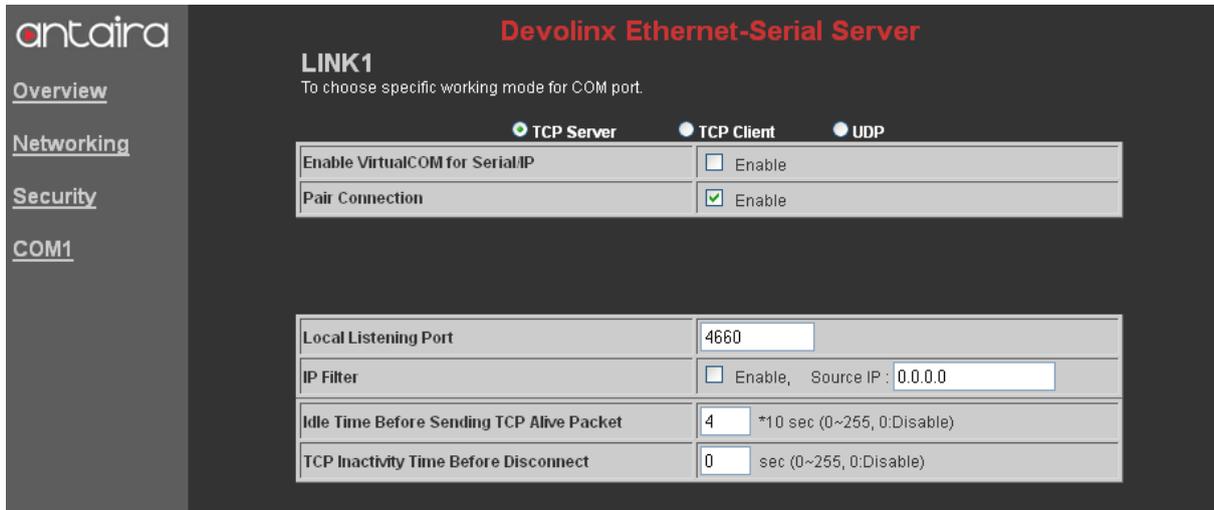


Figure 3.23 Com1 setup –pair connection

Configure STE-501C as UDP mode. Local port is 4660, destination IP is **10.0.29.254** and destination port is **1234**. (Figure 3.24)

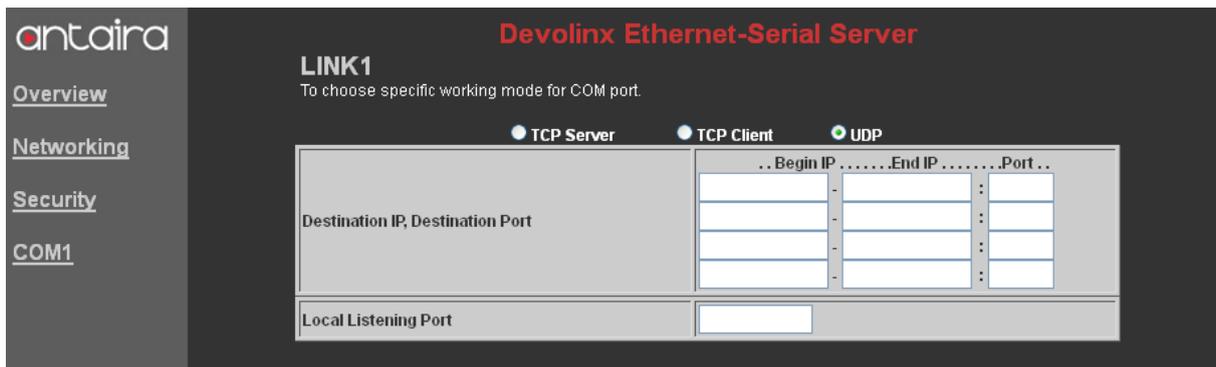


Figure 3.24 Com 1 setup –UDP mode

- Click on **Save Configuration** to save the changes.
- If the update is successful, the following screen appears. (Figure 3.25)



Figure 3.25 Configure success

3.4 Assign a New IP Address by ARP Command

Use ARP command to assign a static IP address of the STE-501C using its hardware MAC address. The MAC address is printed on the rear side of device in the format of "0060E9-xxxxxx". The following example shows how it works within MS-DOS command prompt window.

(For example, change IP from 10.0.50.100 to 10.0.50.101, and the MAC address of STE-501C is 00-60-e9-11-11-01)

1. Add the new host IP to ARP table
 - a. Open Ms-DOS command prompt window
 - b. Input `arp -s 10.0.50.101 00-60-E9-11-11-01` (Figure 3.26)

```
C:\Documents and Settings\Administrator>arp -s 10.0.50.101 00-60-e9-11-11-01  
C:\Documents and Settings\Administrator>
```

Figure 3.26. Ms-DOS command prompt window

2. Change to new IP via telnet port 1 (Figure 3.27)
 - a. Input telnet `10.0.50.101 1`

Note: If the telnet fails, the STE-501C will be restarted automatically. After restart the IP address should be changed to 10.0.50.101

3. Using new IP to configure STE-501C via telnet
 - a. Input telnet `10.0.50.101`

Note:

- When using this method to change IP address, PC's IP address and STE-501C 's IP address must belong to the same subnet.
- The changed IP address must be legal, otherwise it will be changed back to the default value (10.0.50.100) after restart.

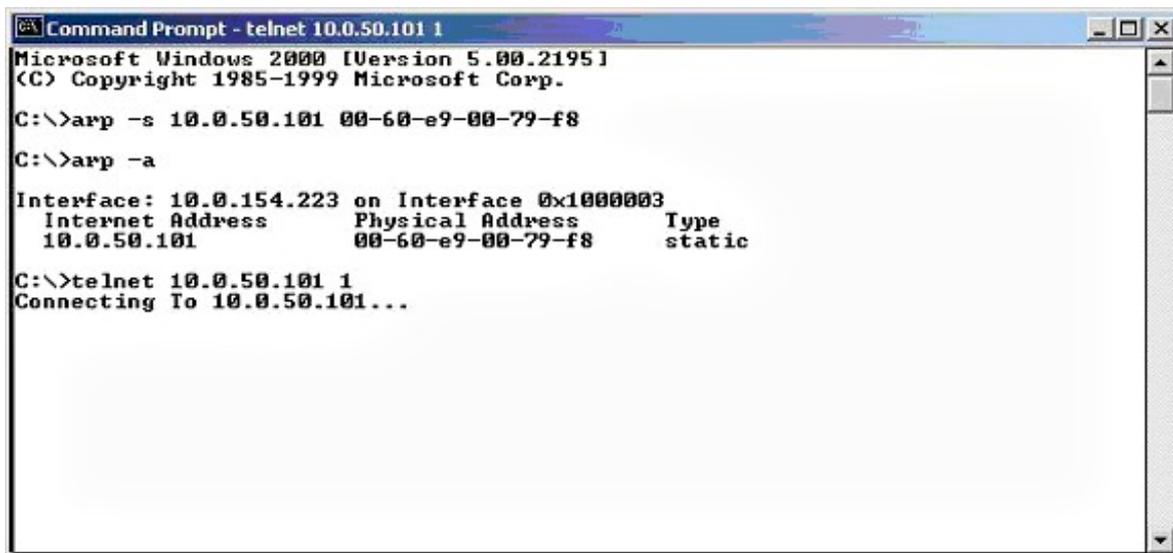


Figure 3.27. Assigning a new IP address by ARP command

4. Using Virtual COM

Virtual COM driver mode for windows converts COM data to LAN data to control the RS-232 port on a STE-501C via the LAN. By creating virtual COM ports on the PC, the Virtual COM driver redirects the communications from the virtual COM ports to an IP address and port number on a STE-501C that connects the serial line device to the network. The following figure is Virtual COM connection diagram. (Figure 4.1)

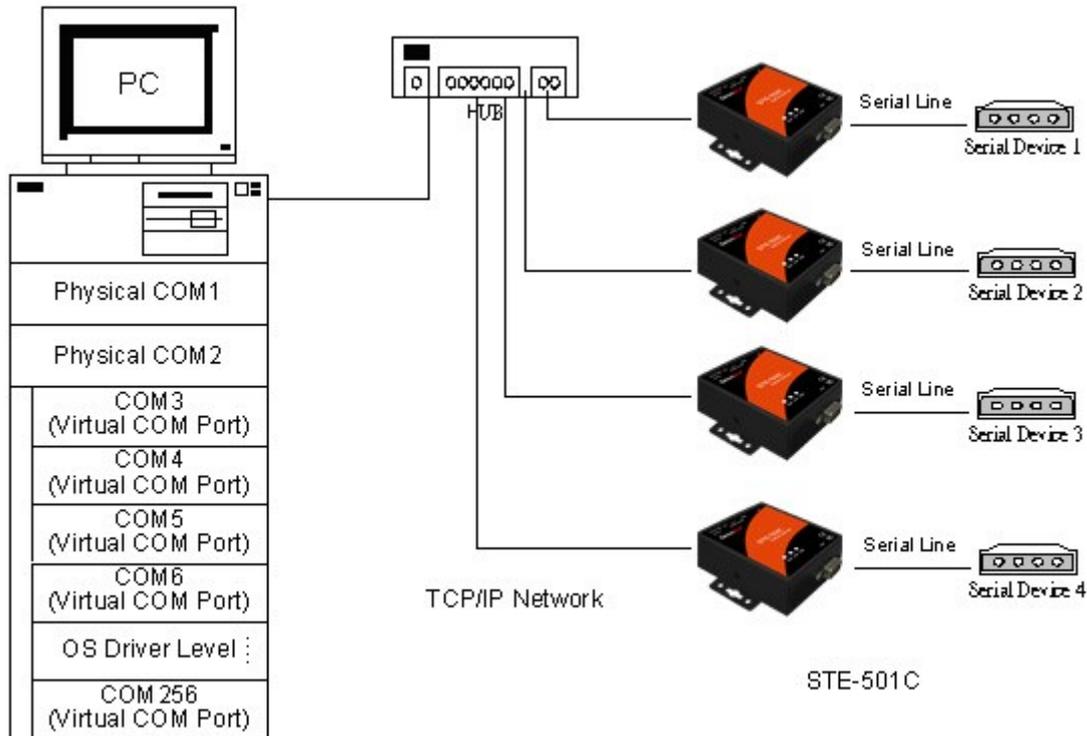


Figure 4.1 Virtual Com connection diagram

4.1 Setup of a Virtual COM Driver

4.1.1 Pre-installation Requirements

Please check that operation system on the PC complies with the following requirements:

- Processor: Intel-compatible, Pentium class
- Operation system: Windows Server 2003, Windows XP, Windows 2000, Windows NT 4.0 SP5 or later, Windows Me, Windows 98, Windows 95, Microsoft NT/2000 Terminal Server, Citrix Meta Frame

4.1.2 Cautions on Use

The Virtual COM driver supports firmware AP v3.0 and later of the STE-501C Serial-Ethernet Servers.

4.1.3 Limitation

The Virtual COM driver allows the user to select up to 256 COM ports as Virtual COM ports in a monitoring PC. The user can select them from a list of COM ports, which is from COM1 up to COM256.

4.1.4 Installation

Make sure all anti-virus software is turned off before beginning the installation. Run the Virtual COM setup file included in the CD to install Virtual COM driver for the operating system.

At the end of the installation, please select one or two COM ports to become the Virtual COM ports.

4.1.5 Uninstalling

1. From Windows Start menu select Setting, Control Panel, Add/Remove Programs.
2. Select **Serial IP** in the list of installed software.
3. Click the **Add/Remove** button to remove the program, or From Windows Start menu select Programs, Serial IP, **Uninstall Serial IP** to remove the program.

4.2 Virtual COM Communication

4.2.1 Enable Virtual COM on STE-501C

From the web browser access of STE-501C (by typing its IP address), click on **COM1** link to access COM1 page. On the top half of the page, click on **TCP Server** and enable Virtual COM by putting a check in front of the **Enable** button. Then type in the local port number in the **Local Port** field as indicated in the following figure. (Figure 4.2)

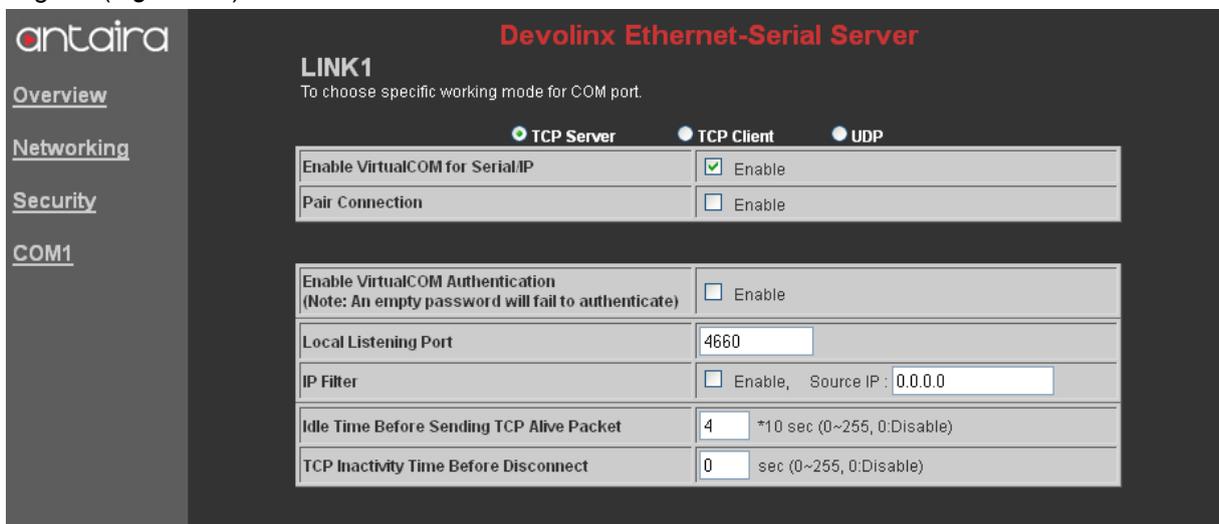


Figure 4.2 Enable Virtual Com

Virtual COM can also be enabled through telnet configuration by setting COM1 as TCP server. Type in the local port number for COM1, then enable virtual COM as shown in the following figure. (Figure 4.3)

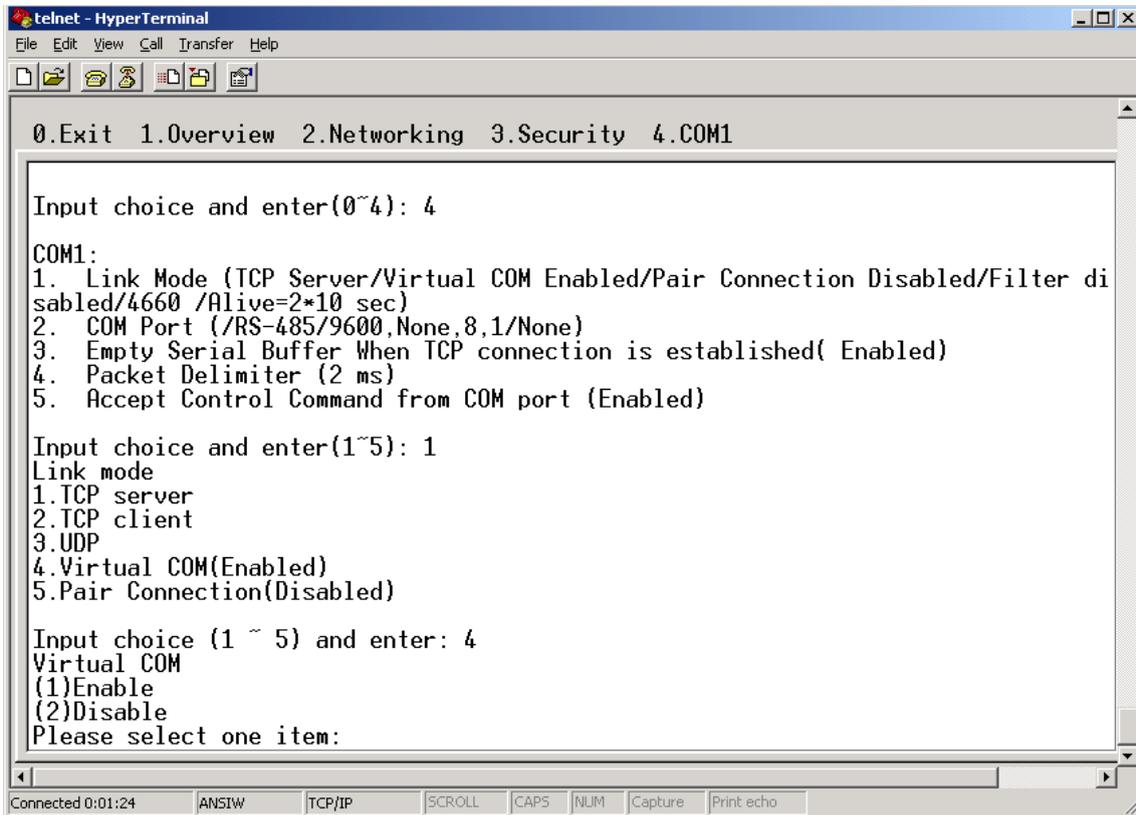


Figure 4.3 Enable Virtual Com via telnet

4.2.2 Run Serial/IP on Monitoring PC

In the Window Start Menu, go to **Programs**, select **Serial/IP**, then select **Control Panel**. When **Select Port** windows pop-up, please select the serial port that is desired to configure. Then the configuration window will appear. (Figure 4.4)

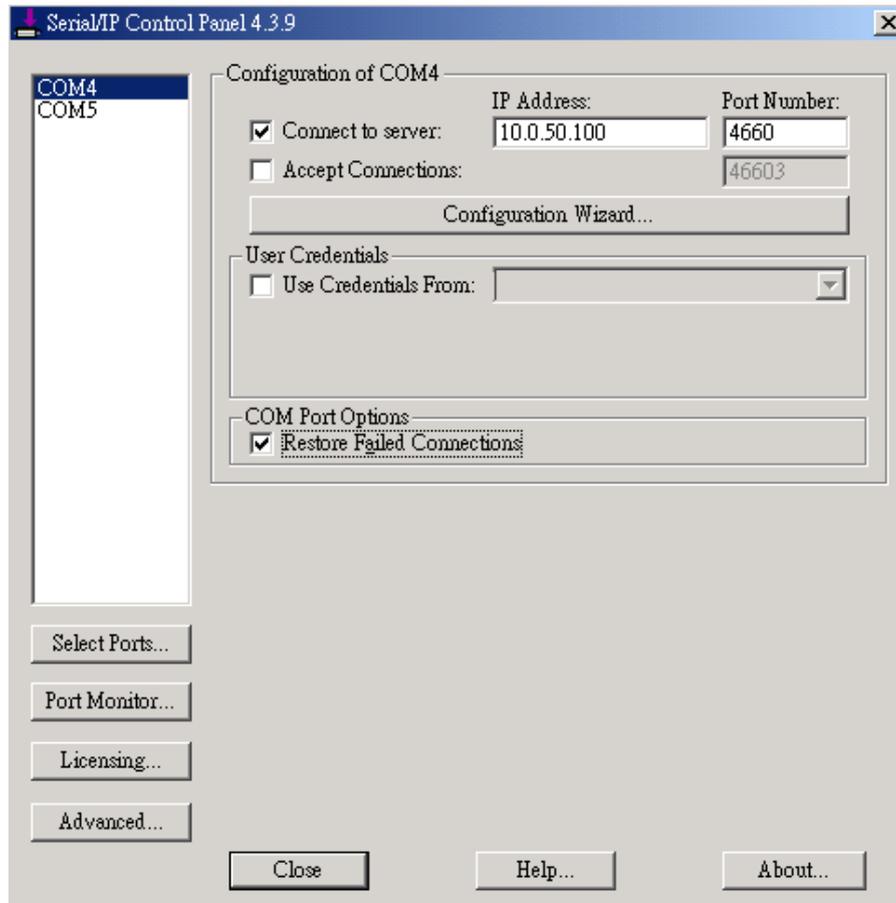


Figure 4.4 Serial/IP configuration

On the right side of Figure 4.4, there is a sample Virtual COM control panel window. On the left side, there is the list of the COM ports that have been selected (in the Select Ports window) for use by the Virtual COM Redirector. If it is desired to change which ports appear on this list, use the **Select Ports** button.

Each COM port has its own settings. When a COM port is selected, the control panel display changes to reflect the settings for that COM port.

Note: When a COM port's settings are changed, the changes are effective immediately. There is no separate confirmation dialog to confirm or cancel the changes.

4.3 Configuring Virtual COM Ports

Please configure each Serial/IP COM port as follows: (Figure 4.5)

1. Select a COM port on the list.
2. For **IP Address of Server**, enter a numeric IP address for the serial server.
3. For **Port Number**, enter the TCP port number that the serial server uses to provide its serial ports to the network.

4. For **Server Credentials**, the default is **No Login Required**. If the serial server does require a login by the Virtual COM Redirector, the Virtual COM Redirector needs to provide a username and/or password every time an application tries to use the serial server.
5. Click the **Configuration Wizard** button and then click the **Start** button that appears in the wizard window.
 - This important step verifies that the Virtual COM Redirector can communicate with the serial server using the settings that the user has provided. If the Log display does not show errors, click the **Use Settings** button in the wizard. This makes the recommended settings effective and returns one to the control panel to continue with the following steps. (Figure 4.5)

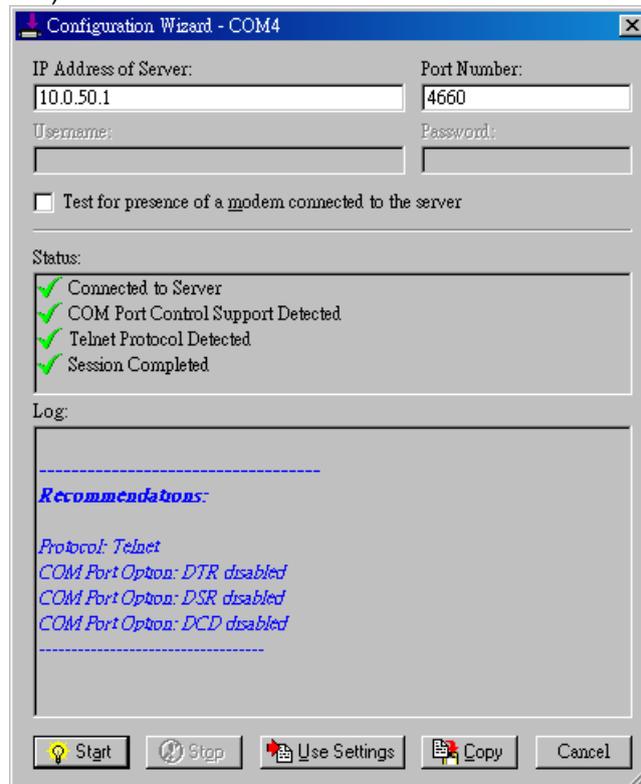


Figure 4.5 Configuration Wizard

6. For **Connection Protocol**, the setting must match the TCP/IP protocol that the serial server supports. The Configuration Wizard is usually able to determine the correct setting.
7. For **COM Port Options**, the settings must match the COM port behavior expected by the PC application that will use this COM port. The Configuration Wizard will recommend a combination of settings.

5. SNMP Setup

5.1 SNMP Network Management Platform

STE-501C is an SNMP device that allows many popular SNMP Network management platforms, such as HP OpenView and SunNet Manager, to conduct monitoring on the device.

Depending on the network management tools that are being used, device STE-501C information can be collected from running the management tools including IP address, DNS name, system descriptions and NIC information, etc.

6. Start Writing One's Own Applications

Before writing one's host applications or programs to interact with the STE-501C, please make sure to have done the following:

6.1 Preparing the System

1. Properly connect STE-501C hardware including power, Ethernet, and serial cable.
2. Properly configure the parameters of STE-501C including connection type, IP address, gateway IP address, and network mask accordingly (see chapter 3 Hardware Installation section).
3. Configure STE-501C as TCP Server using default TCP port number 4660.
4. The host (PC) application program must be configured as a TCP client and connects to STE-501C with designated TCP port number 4660 for COM1.
5. Make sure STE-501C is running by checking the running status through **monitor.exe** configuration utility.

6.2 Running the Sample Program

Sample programs written in VB and VC++ included in the package are provided for reference, source codes are also included. Test programs can be found in the product CD or diskette under the directory of `\sample\vb_ap\` and `\sample\vc_ap\` respectively.

There are two test programs. TCPTTEST written in Visual Basic and TCPTTEST2 written in Visual C++.

6.2.1 TCPTTEST in Visual Basic

This sample program is written in Visual Basic 5.0 with Winsock Controls. It shows how to send and receive data between host (PC) and STE-501C via Ethernet in two socket ports.

Run Visual Basic and open sample program `tcptest.vbp`, after the program is started successfully, one can start testing functions (*Figure 6.1*). For more information, please press **Help** in the program to get a detailed explanation.

Note: Please be sure the Microsoft Visual Studio family software is installed on the computer. Otherwise the sample program will not run.

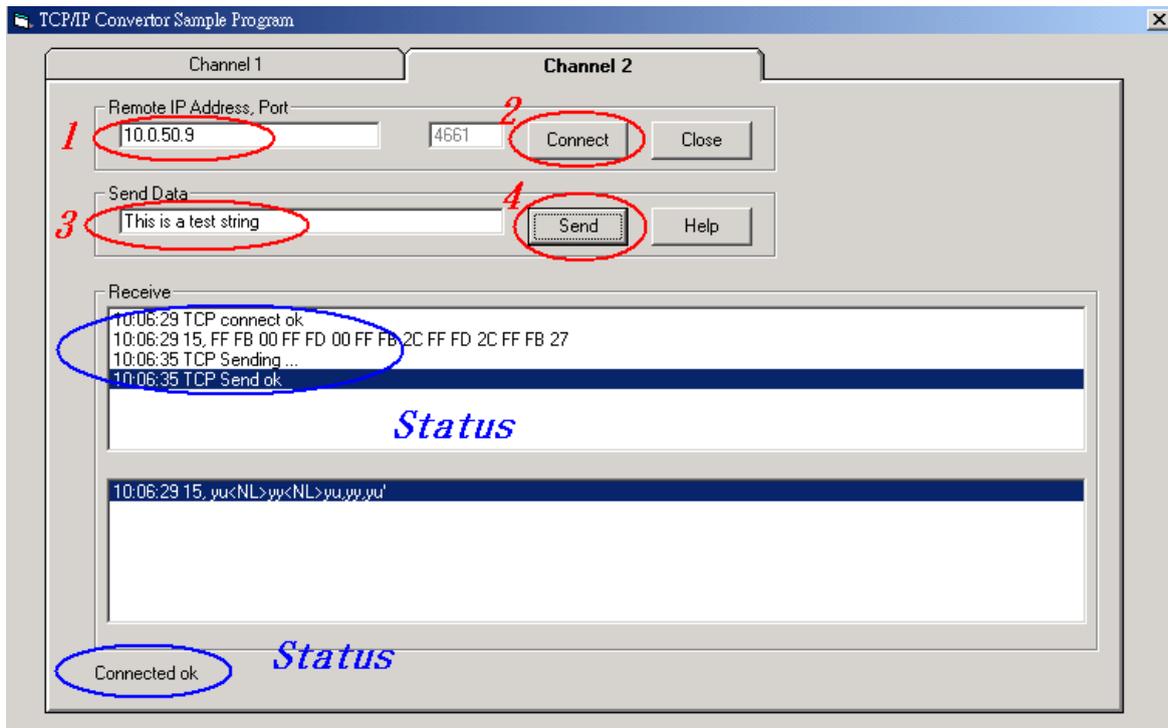


Figure 6.1 TCP test sample program in Visual Basic

6.2.2 TCPTTEST2 in Visual C

To start the program, please type in the following command in the command line prompt (Figure 6.2):

TCPTTEST2 IP_Address Port_Number



Figure 6.2 TCP test sample program in Visual C

The command **tcptest2 10.0.50.100 4660** connects to a TCP server with IP address *10.0.50.100* and port number *4660*. The received data is displayed on the screen and the data typed in is sent to the TCP server of the designated port number. Binary data can also be sent in hex format with a leading character "\". For example, "\00" and "\FF" represent ASCII code 0 and 255 respectively.

A modem can also be used to connect to the serial server. Command "**AT10d**" sends standard AT commands to the modem which in return responds with "**OK10D10A**" message to the host application.

Always use '=' then **Enter** key to exit the program.

7. Diagnostics

There are several ways to can check on the status and availability of the STE-501C.

7.1 Use Standard TCP/IP Utility Ping Command

From Windows **Start** menu, select **Run** and type in **ping <TCP Server IP address>**

If the connection is established, the reply messages are displayed, otherwise it will indicate Request timed out (*Figure 7.1*).

```
C:\WINNT\system32\cmd.exe
C:\>ping 10.0.50.100

Pinging 10.0.50.100 with 32 bytes of data:

Reply from 10.0.50.100: bytes=32 time=10ms TTL=64
Reply from 10.0.50.100: bytes=32 time<10ms TTL=64
Reply from 10.0.50.100: bytes=32 time<10ms TTL=64
Reply from 10.0.50.100: bytes=32 time=10ms TTL=64

Ping statistics for 10.0.50.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 5ms

C:\>ping 10.0.50.100

Pinging 10.0.50.100 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.50.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Figure 7.1 Standard TCP/IP utility ping command

7.2 Use Monitor.exe Configuration Utility Program

Use the monitor.exe configuration program that comes with the product CD or diskette to check on the status of STE-501C. The status can be read from **AP version** column of the tool.

Status	Descriptions
S	The system is configured as a TCP Server and Listing.
A	The TCP Server is connected.
C	The system is configured as a TCP Client and not yet connected.
C	The system is configured as a TCP Client and trying to Connect.
B	The TCP Client is connected.
U	The system is configured as an UDP Mode.

For example, 'S' means that COM1 is server mode and is not connected (*Figure 7.2*).

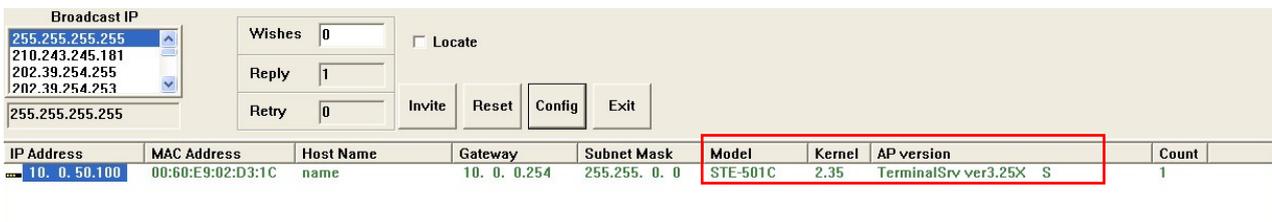


Figure 7.2 Monitor configuration utility

7.3 Use TCPTTEST.exe or TCPTTEST2.exe Sample Program

Use sample programs TCPTTEST.exe and TCPTTEST2.exe that comes with the product CD to check on the status of the STE-501C. Please refer to chapter 6.2 to run the sample programs.

Appendix A: Specifications

A.1 Hardware Specifications

	Specifications
CPU	<ul style="list-style-type: none"> ▪ 16-bit Embedded CPU ▪ 100MHz
Flash Memory	<ul style="list-style-type: none"> ▪ 512K Bytes
SDRAM	<ul style="list-style-type: none"> ▪ 512K Bytes
EEPROM	<ul style="list-style-type: none"> ▪ 512 Bytes
Host Communication	<ul style="list-style-type: none"> ▪ IEEE802.3 base band ▪ TCP/IP, UDP, SNMP, HTTP, Telnet, ARP, BOOTP, DHCP, ICMP
Reset	<ul style="list-style-type: none"> ▪ Built-in default key to restore factory default settings
Watch Dog Timer	<ul style="list-style-type: none"> ▪ 1.34 second hardware auto reset ▪ Power failure threshold: 4.75V
SerialPort Communication	<ul style="list-style-type: none"> ▪ One RS-232 or RS-485/RS-422 selectable ▪ RS-232: EIA-RS-232C standard, Full Duplex, DB9 ▪ RS-485: 2/4 wires, Half/Full duplex, Terminal Block ▪ RS-422: 4 wires, Half/Full duplex, Terminal Block ▪ Parameters <ol style="list-style-type: none"> 1) Baud-rate: 1200 bps ~ 230Kbps 2) Parity: None, Even, Odd, Mark, Space 3) Data bits: 7,8 4) Stop bits: 1,2 5) Packet Delimiter: by inter-character timeout, by characters delimiter 6) Flow Control: None, Hardware CTS/RTS, Software Xon/Xoff
LED indication	<ul style="list-style-type: none"> ▪ RUN x 1 ▪ LAN x 1 ▪ COM port1
Power Requirement	<ul style="list-style-type: none"> ▪ 5VDC Jack or DC +9~30V Terminal Block, 2.8 WattMax
Temperature	<ul style="list-style-type: none"> ▪ Operation: 0°C to 60°C ▪ Storage: -20°C to 70°C
Humidity	<ul style="list-style-type: none"> ▪ 20%~90% non-condensing
Housing	<ul style="list-style-type: none"> ▪ 65mm(L) x 78mm(W) x 28mm(H)

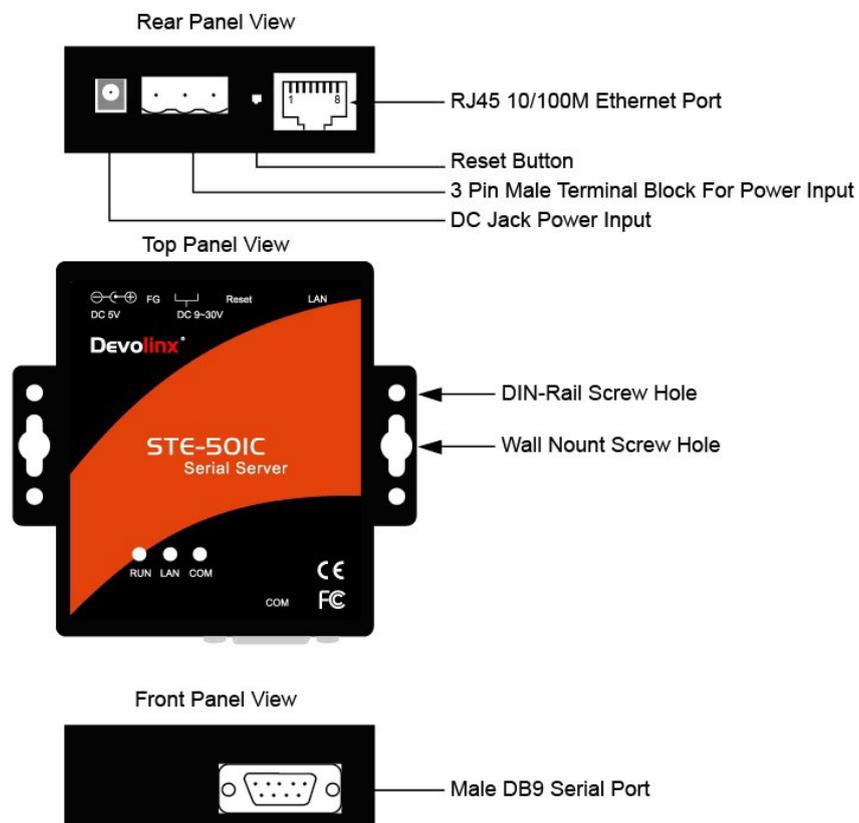
A.2 Software Specifications

Item	Specifications
Protocol	<ul style="list-style-type: none"> TCP/IP, UDP, HTTP, SNMP, ARP, Telnet, ICMP, BOOTP, DHCP, SMTP(Note)
Configuration	<ul style="list-style-type: none"> Configuration information for both TCP/IP and serial ports is kept in the EEPROM. Configuration utilities of Windows 95/98/2000/NT/XP/2003 are provided for configuring settings.
Internal Buffer Size	<ul style="list-style-type: none"> TCP receiving buffer size = 8K bytes TCP transmitting buffer size = 16K bytes RS-232 or RS-485/RS-422 receiving buffer size = 4K bytes RS-232 or RS-485/RS-422 transmitting buffer size = 4K bytes

A.3 Panel Layout and Connector Pin Assignments

A.3.1 Panel Layout

A.3.1.1 DB9 for STE-501C



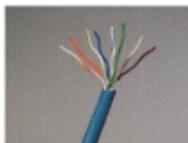
A.3.2 DB9 Pin Assignments

The pin assignments of DB9 connector on STE-501C is shown in the following table:

Pin#	RS-232 Full Duplex for STE-501C Model	RS-485 2-wire Half Duplex for STE-501C Model	RS-422/RS-485 4-wire Full Duplex for STE-501C Model
1	DCD	N/A	N/A
2	RXD	N/A	TXD+
3	TXD	DATA+	RXD+
4	DTR	N/A	N/A
5	SG (Signal Ground)	SG (Signal Ground)	SG (Signal Ground)
6	DSR	N/A	N/A
7	RTS	DATA-	RXD-
8	CTS	N/A	TXD-
9	N/A	N/A	N/A

A.3.3 Ethernet Port (RJ-45)

1. Category 5 UTP cable, 8 core wire.



2. RJ45 Connector.

3. RJ45 Pin Assignment

Pin Assignment	568A Definition	568B Definition
Pin1	Green-White	Orange-White
Pin2	Green	Orange
Pin3	Orange-White	Green-White
Pin4	Blue	Blue
Pin5	Blue-White	Blue-White
Pin6	Orange	Green
Pin7	Brown-White	Brown-White
Pin8	Brown	Brown

One can choose either 568A or 568B definition. To make a crossover cable, one should use 568A and 568B definition respectively in each terminal of a UTP cable.

A.4.4 RUN LED

Message	Description
LED on	Jumper JP1 pin1 and pin2 are short to disable AP firmware in the flash memory.
LED blinking (rate: 0.5Sec)	AP firmware is running

Table 4. RUN LED Message

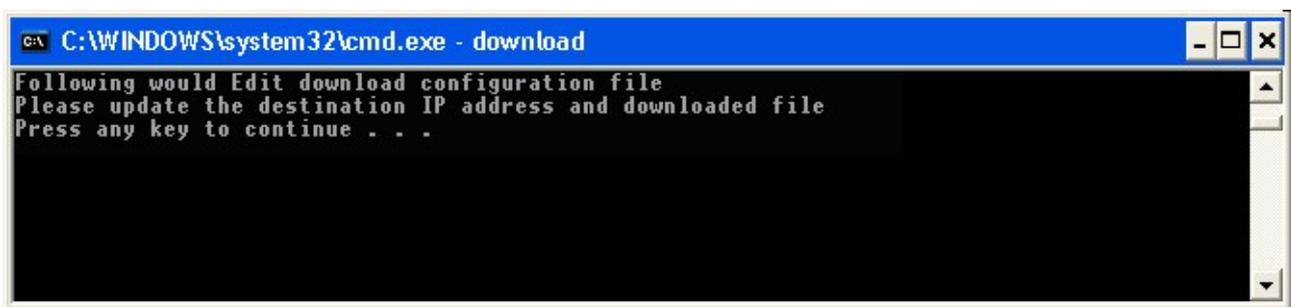
Appendix B: Upgrade System Firmware

New version of firmware can be downloaded from www.antaira.com

B.1 Upgrade Procedures

When a new software version becomes available, please follow the sequences below to upgrade the STE-501C.

1. Connect a PC (Windows 95/98/NT/2000/XP) and STE-501C to upgrade the firmware in the same TCP/IP network. Use command **ping** or **monitor.exe** utility program to verify their availability.
2. Prepare the download tool and press any key to edit its configuration file **dapdl.cfg**. **dapdl.cfg** file can be found in the product CD.



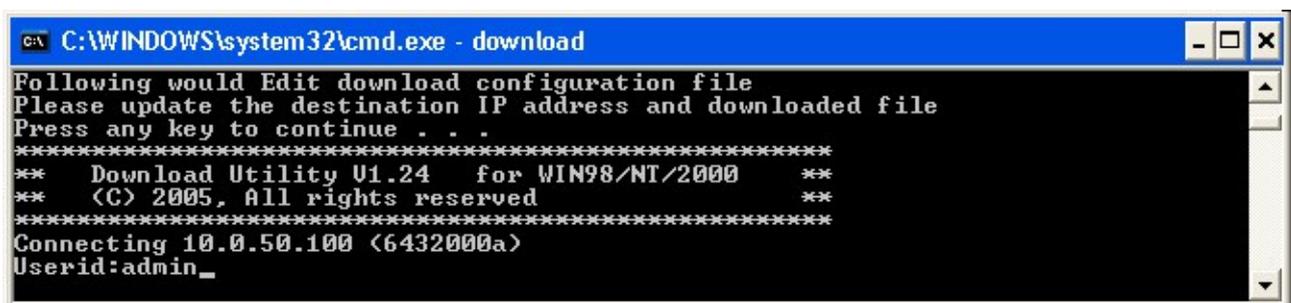
```
C:\WINDOWS\system32\cmd.exe - download
Following would Edit download configuration file
Please update the destination IP address and downloaded file
Press any key to continue . . .
```

3. Edit the "**dapdl.cfg**" file to fit the system need. The content of the file looks like the following. Be sure to save the modifications after the change is made.

```
Remote_IP    10.0.50.100
Load         U5001ap.hex
```

The first line identifies the IP address of STE-501C, the second line identifies the firmware (.Hex file) name to be downloaded.

4. Execute the utility program **download.bat**. It can be found in the product CD.
5. Input the user name and password credentials. The new firmware will then be downloaded.



```
C:\WINDOWS\system32\cmd.exe - download
Following would Edit download configuration file
Please update the destination IP address and downloaded file
Press any key to continue . . .
*****
** Download Utility V1.24 for WIN98/NT/2000 **
** (C) 2005, All rights reserved **
*****
Connecting 10.0.50.100 (6432000a)
userid:admin_
```

6. STE-501C will automatically restart each time the firmware is successfully downloaded.

B.3 Error Messages

Firmware upgrade may not be successful if errors occur during the process.

Error Cause	Message	Comments
Illegal Hex file format	Hex File Text Error Hex File Check-Sum Error Hex File Format Error Hex File End of Record Error	
STE-501C handshaking problem	STE-501C ACK Start Address Error STE-501C ACK Length Error STE-501C Response Command Error	
Configuration file	Remote IP not found Open configuration file failure	

Appendix C: Disable System Firmware

The AP (application program) firmware of STE-501C can be disabled. This function is used in the situation that one downloaded a wrong version of firmware that caused the system to crash.

To disable the current version of firmware and prevent it from executing, please do the following:

1. Turn the power off, open STE-501C case.
2. Short pin1 and pin2 of jumper JP1 on the right-top corner from the main board to disable AP firmware.
3. Power on STE-501C.
4. Download the correct AP firmware to STE-501C.
5. Remove the pin 1 and pin2 of jumper JP1 to enable AP firmware.
6. Close the case and continue operations.

Appendix D: Using Monitor.exe Utility

The configuration utility **monitor.exe** comes with the product CD or diskette is the main utility program to demonstrate and configure the STE-501C's settings.

D.1 Run the utility

Start the program under Windows 95/98/NT/2000 environment and the following window appears (*Figure D1*).

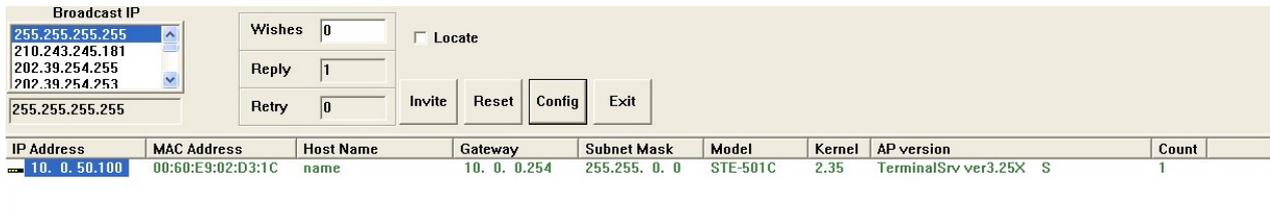


Figure D1. Main window of monitor.exe utility program

D.2 Detect Operational Devices

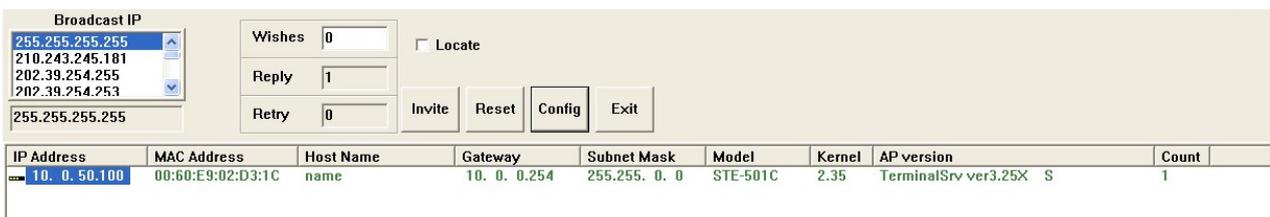
Do the following steps to detect devices currently available on the network.

1. Start **monitor.exe** utility program.
2. Select an item from the **Broadcast IP** list.
3. Specify a number in the **Wishes** box.
4. Click on the **Invite** button. This will display all the devices information that has been requested.

D.3 Configure Devices

One may use **monitor.exe** configuration utility to configure the settings of devices on the network. To do so, please follow the steps below.

1. Repeat the steps in the section of **D.2** to bring up the device's information.
2. Select the device to configure from the **IP Address** column. Click on the **Config** button and a configuration window will pop up as shown in *Figure D2*.



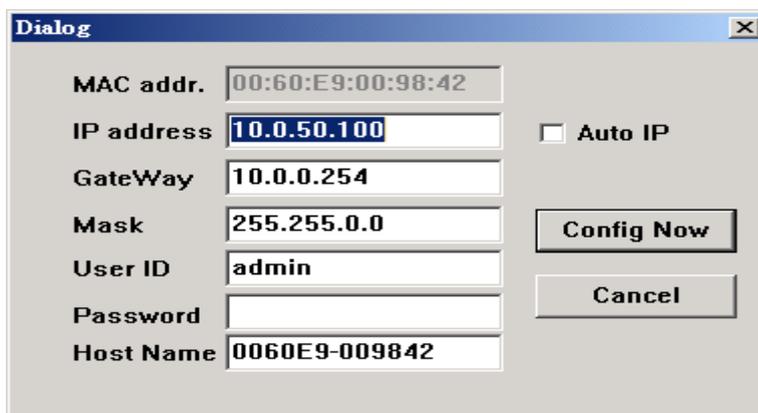


Figure D2. Configuration dialog box

3. After clicking the “Configure Now” button, the target device will return an ACK message indicating the modification is successful as shown in the following:



The following table lists the functional descriptions for all the fields.

Field Name	Field Descriptions
Broadcast IP	Except for the default IP 255.255.255.255, other items (IPs) are read from the file "seg.cfg". This field specifies a detecting IP range. It may be a designated IP or a broadcast IP.
Wishes	Specifies minimum number of the devices desired to get replies from after sending an Invite request. If there is not as many devices responding to invitation, the system repeatedly sends invitation until the request is fulfilled.
Reply	Indicates the actual number of devices this utility program detected.
Retry	Specify the number of times that an invite request is re-sent.
Locate	Locate the specified device.
Reset	Reset the selected device.
Config	Configure the selected device.
Exit	Exit this utility.
IP Address	Indicate the IP address of the device that replied to a request. <ul style="list-style-type: none">• Leading tag "!" stands for IP address collision, possibly caused by duplicated IP addresses on the network.• Leading tag "?" stands for Mac address collision, possibly caused by duplicated Mac addresses on the network.
MAC Address	Indicates the MAC address of responding device.
Gateway	Indicates the IP address of the gateway.
Subnet Mask	Indicates the TCP/IP network mask.
OS	Indicates the OS version of the responding device.
AP Version	Indicates the AP version of the responding device.
Model	Indicates the model number of the responding device. This field is only available for monitor.exe version 2.0 and above.