SE5001 Serial Device Server

User's Manual

Version 1.6

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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 Serial Device Server (Model SE5001)

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 other devices to this equipment by RS-232 or RS-485 ports.

Be cautioned that changes or modifications not expressly approved by the party responsible for compliance could void ones authority to operate the equipment.

Contents

1. Introduction

SE5001, the Ethernet Serial device server is a gateway between Ethernet (TCP/UDP) and RS-232/RS-422/RS-485 communications. The information transmitted by SE5001 is transparent to both host computers (Ethernet) and serial devices (RS-232/RS-422/RS-485). Data coming from the Ethernet is sent to the designated RS-232/RS-422/RS-485 port and data received from RS-232/RS-422/RS-485 port is sent to the Ethernet transparently allowing bidirectional communication.

In the computer-aided manufacturing or industrial automation areas, SE5001 is used by field devices to directly connect to an Ethernet network. The user can then use a network application or use the Virtual COM software to simulate a virtual com port in the PC to fetch serial data from SE5001 remotely over the Ethernet.

With SE5001, it is possible to communicate with a remote serial device in the LAN or even in the Internet, which increases the communication distance and scalability dramatically.

1.1 SE5001 Series Comparison

Model	Serial Type	Serial Interface	Serial Isolation	Power Interface
SE5001	RS-232 / RS-422 / RS-485	DB9	No	DC Jack* and 5.08mm TB3
SE5001-S2	RS-232	DB9	No	DC Jack* and 5.08mm TB3
SE5001-S5	RS-422 / RS-485	DB9	No	DC Jack* and 5.08mm TB3
SE5001-S5-TB5	RS-422 / RS-485	5.08mm TB5	No	DC Jack* and 5.08mm TB3
SE5001-S5is	RS-422 / RS-485	5.08mm TB5	Yes	TB3

*The DC connector of the Adapter should have the following dimensions to fit the DC Jack:

1.35mm inner radius, 3.5mm outer radius, and 7.5mm length

1.2 Packaging

The package should contain following items:

- Atop SE5001 Ethernet Serial device server x 1
- 5 pins Terminal Block for Serial Connector x 1 (SE5001-S5is/SE5001-S5-TB5 only)
- 3 pins Terminal Block for Power Connector x 1
- Product CD containing configuration utility x 1
- Wall-mounting screws x 2
- Atop Serial device server quick start guide x 1

Optional Accessories		
Name	Part Number	Description
DK-25	30200000000022G	DIN-Rail Kit
UN305-0510(US-DC)	50500051500001G	DC jack (1.35/3.5/7.5 mm) power adaptor, 100-240VAC input, 1.0A @ 5 VDC output, US plug
UNE305-0510(EU-DC)	50500051500011G	DC jack (1.35/3.5/7.5 mm) power adaptor, 100-240VAC input, 1.0A @ 5 VDC output, EU plug
US315-12(US-TB3)	70100000000027G	3-pin Terminal block (5.08 mm) power adaptor, 100-240VAC input, 1.25A @ 12VDC output, US plug
USE315-12(EU-TB3)	70100000000028G	3-pin Terminal block (5.08 mm) power adaptor, 100-240VAC input, 1.25A @ 12VDC output, EU plug

1.3 Application Connectivity

TCP Server Mode：SE5001 can be configured as a TCP server in TCP/IP Network to listen for an incoming TCP client connection to the serial device. After the connection is established between the serial device server and the host computer, data can be transmitted in both directions. This also applies to Virtual COM running in the server mode.

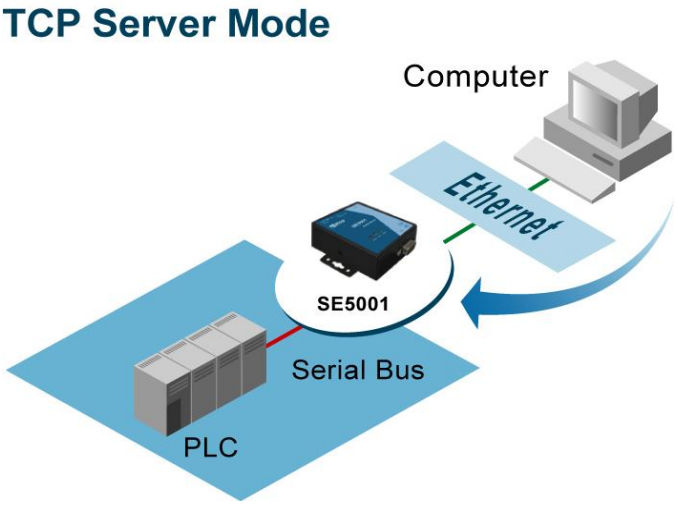


Figure 1.1 TCP Server Mode

TCP Client Mode：SE5001 can be configured as a TCP client in TCP/IP Network to establish a connection with a TCP server in the host computer. After the connection is established, data can be transmitted between serial device and host computer in both directions. This also applies to Virtual COM running in the client mode.

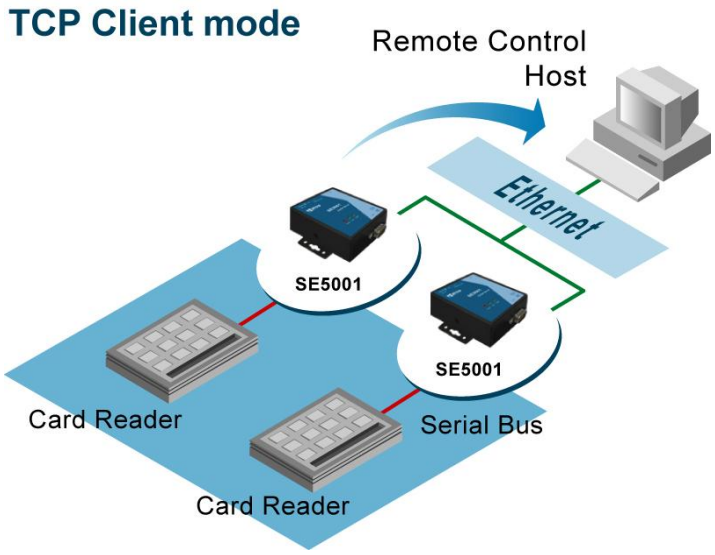


Figure 1.2 TCP Client Mode

UDP Mode：UDP is a faster but connectionless network protocol. It does not guarantee the delivery of network datagrams. SE5001 can be configured to transfer data using unicast or multicast UDP from the serial device to one or multiple host computers. Data can be transmitted between serial device and host computer in both directions.

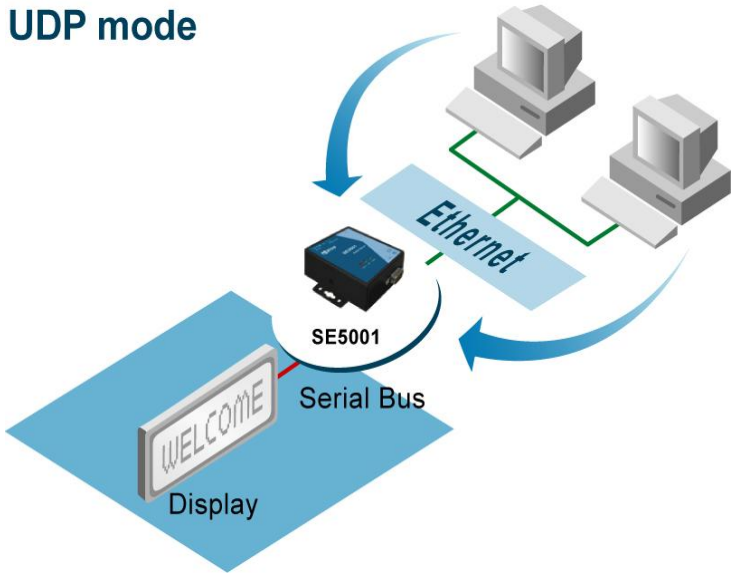


Figure 1.1 UDP Mode

Tunneling Mode：In the case that the serial device needs to communicate with each other without a host computer, two SE5001s can be pair together (pair connection) to communicate over TCP or UDP transparently.

The serial device would be unaware of the change in the communication medium.

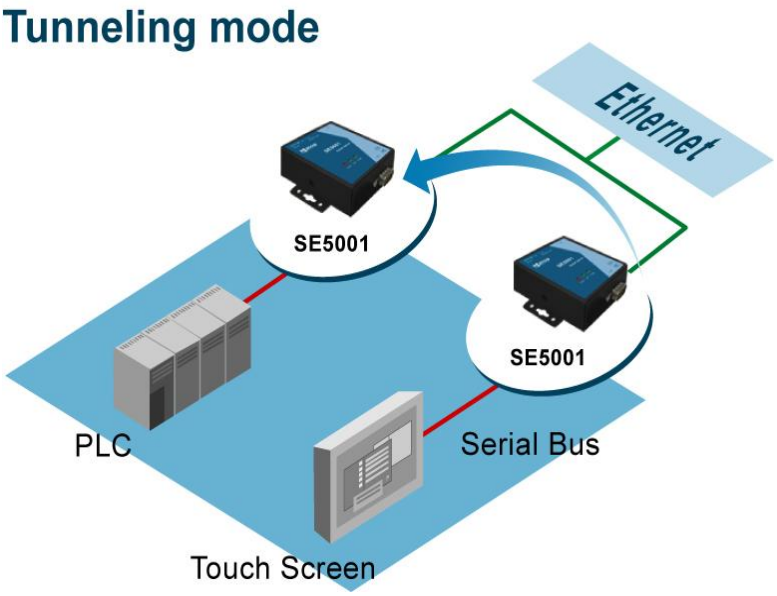


Figure 1.1 Tunneling Mode

2. Hardware Installation

NOTE:

1. Find SE5001 Panel layout in section **A.3.1 Panel Layout**.
2. SE5001-S5-TB5 has a TB5 serial interface instead of DB9.
3. Press the reset button on SE5001 to reset the settings back to the default value

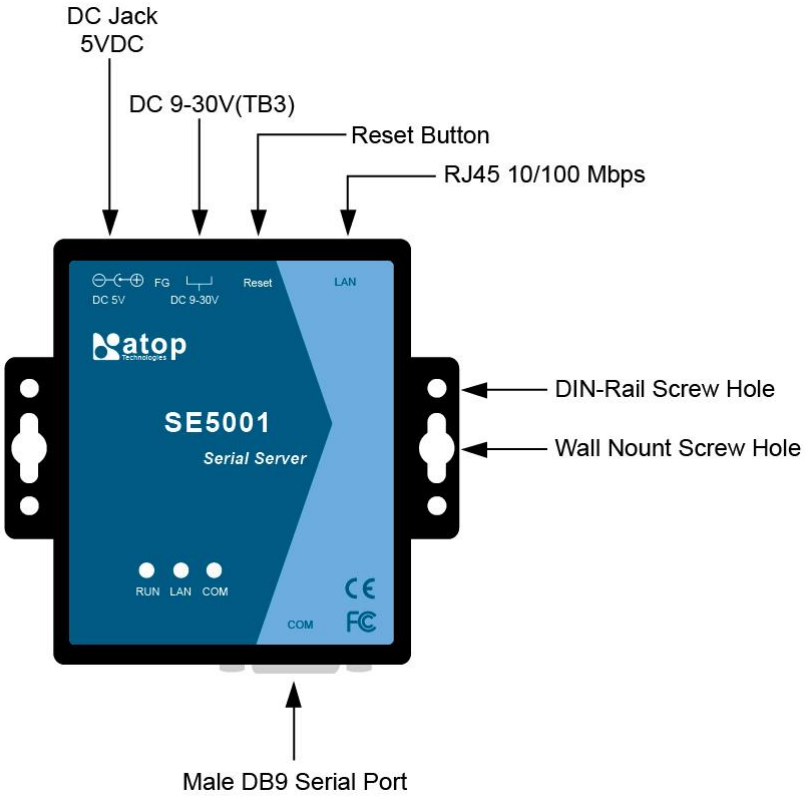


Figure 2.1 SE5001 Interfaces (SE5001, SE5001-S2, SE5001-S5, SE5001-S5-TB5)

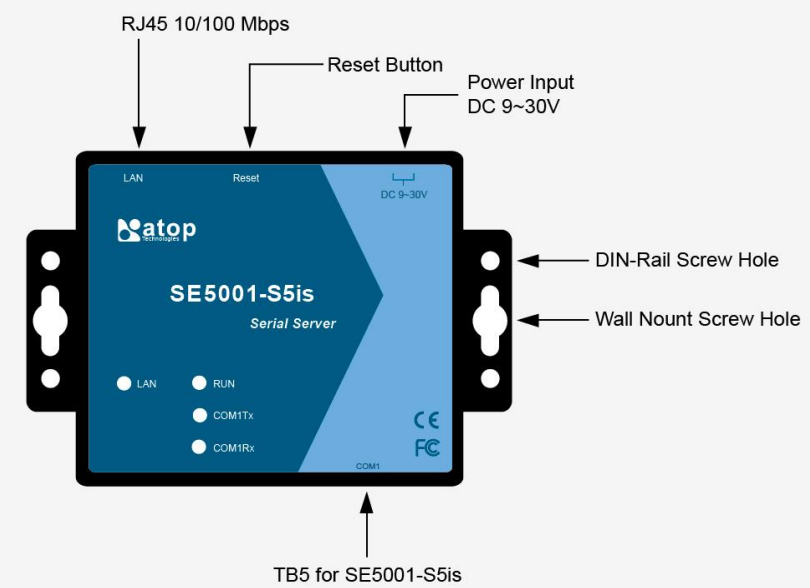


Figure 2.2 SE5001 Interfaces (SE5001-S5is)

2.1 Installation Procedure

Step 1: Connect SE5001 to a power source using its 5V DC Jack or its 9-30V DC Terminal Block. Note that the DC Jack is 5V only and should be used with a power adaptor.

Note：SE5001 provides two power inputs that can be connected simultaneously to different DC power sources. If any of the power inputs fail, the other power source can act as a backup to support the power needs automatically. The redundant dual DC power inputs give one extra assurance of non-stop operation.

Step 2: Connect SE5001 to the Ethernet network. Use a standard straight-through Ethernet cable when connecting to a hub/switch. To simply the setup, a cross-over Ethernet cable can be used to connect the serial device server to a PC directly. Please make sure that the PC is in the same network subnet as SE5001.

Step 3: Connect SE5001's serial port to a serial device.

Step 4: Placement options: Mount SE5001 to a wall/panel (Mounting screws included) or Din-Rail rack (optional Din-Rail-Kit DK-25).

Attention

Disconnect the device from power source completely before installing and wiring the server.

Do not exceed the maximum allowable current of the power cord and common wire. Applying the wire over its specification would cause the wire to overheat and cause serious damage to the connected and neighboring equipment.

The casing could become too hot to touch when operating in harsh environments. Please handle with care.

Attention

This product is intended to be grounded properly. Please do so via the Frame Ground.

3. Software Setup

SE5001 Ethernet Serial device 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**
User Name	**admin**
Password	**Null(leave it 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 SerialManager

3.1.1. Static IP

Use **SerialManager** in the product CD to configure network parameters of SE5001.

->Execute SerialManager (Figure 3.1)

->In SerialManager, click on the SE5001 that needs to be configured.

->Click on "**Configuration**"->**"Network"** or the **"Network"** button.

->Enter the desired network settings in the **"Network Settings"** window (Figure 3.2).

->Click "**OK**" and SE5001 will restart and apply new settings.

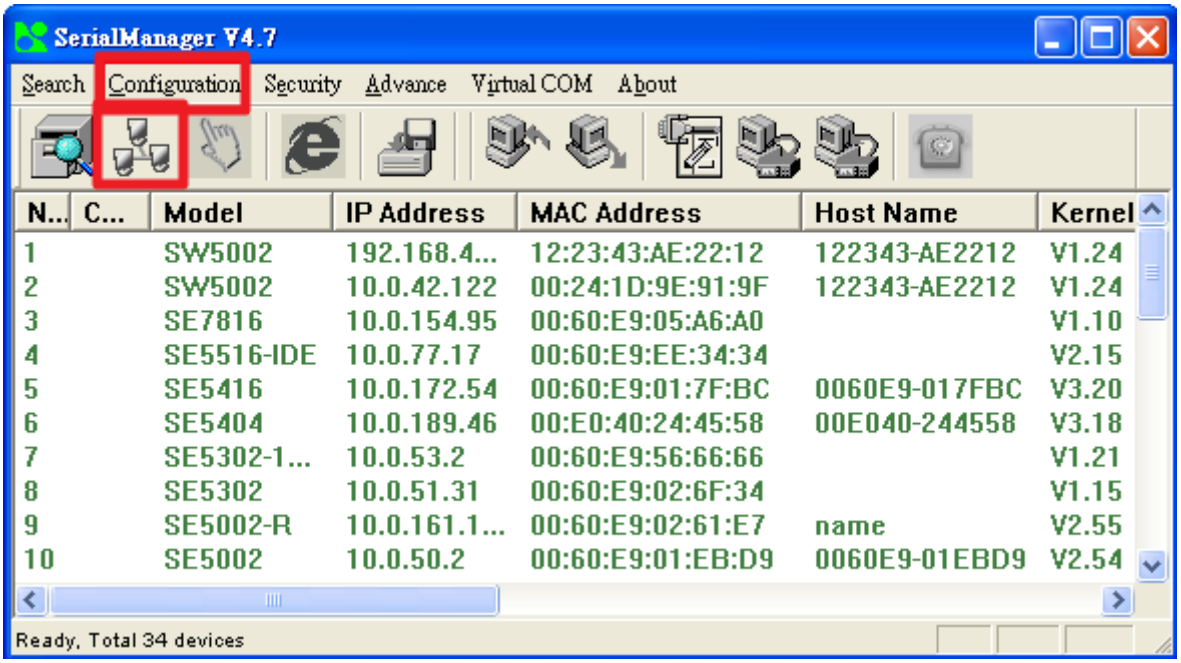


Figure 3.1 Configure by SerialManager

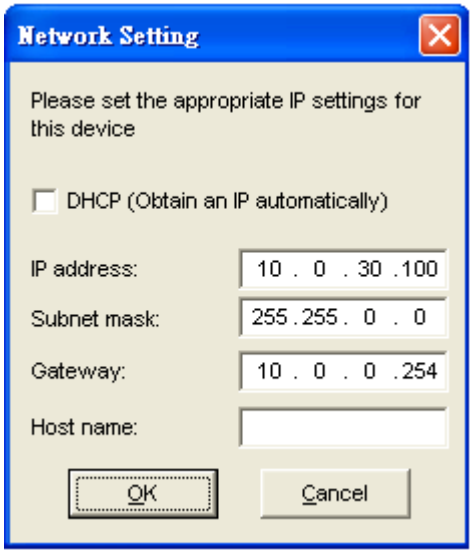


Figure 3.2 Static IP setup dialog window

3.1.2. Auto IP (Dynamic IP)

A DHCP server can automatically assign an IP address and network settings to SE5001. By default, the DHCP function in SE5001 is disabled. Use SerialManager to enable the DHCP function.

->Execute SerialManager (Figure 3.1)

->In SerialManager, click on the SE5001 that needs to be configured.

->Click on "**Configuration**"->**"Network"** or the **"Network"** button.

->Enable **"DHCP"** on the Network Settings window (Figure 3.3).

->Click "**OK**" and SE5001 will restart and get an IP from the DHCP server automatically.

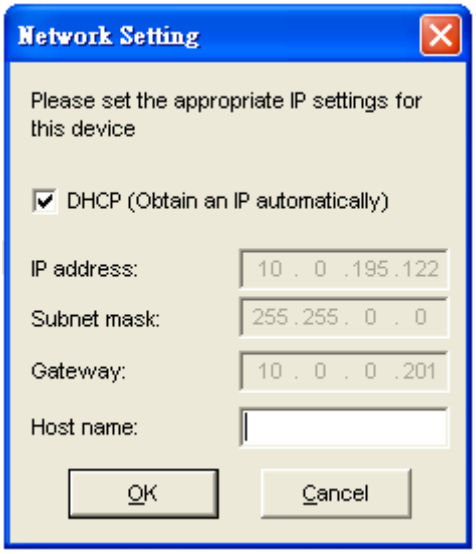


Figure 3.3 SerialManager Auto IP Dialog Window

3.2 Configuration by Telnet Utility

One can use Telnet utility to change configuration settings of SE5001 by following steps：

3.2.1. Login to the System

->Open MS-DOS command prompt window or any other telnet application

->Telnet to SE5001 using command "**telnet IP_address**". (For example："**telnet 10.0.50.100"** in MS-DOS command prompt window). After telnet into SE5001, system will prompt for a password, the default password is blank. (Figure 3.4)

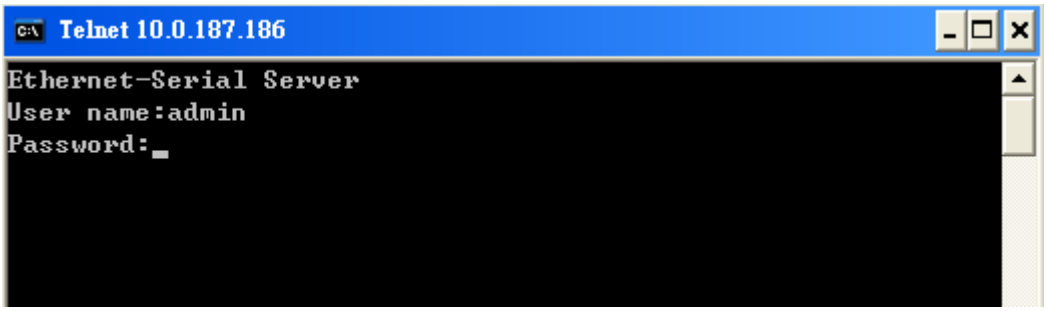


Figure 3.4 Login to the system

Note: Press the default button of SE5001 to reset the password to the default value.

1. After verifying the password, the following terminal screen appears (Figure 3.5).

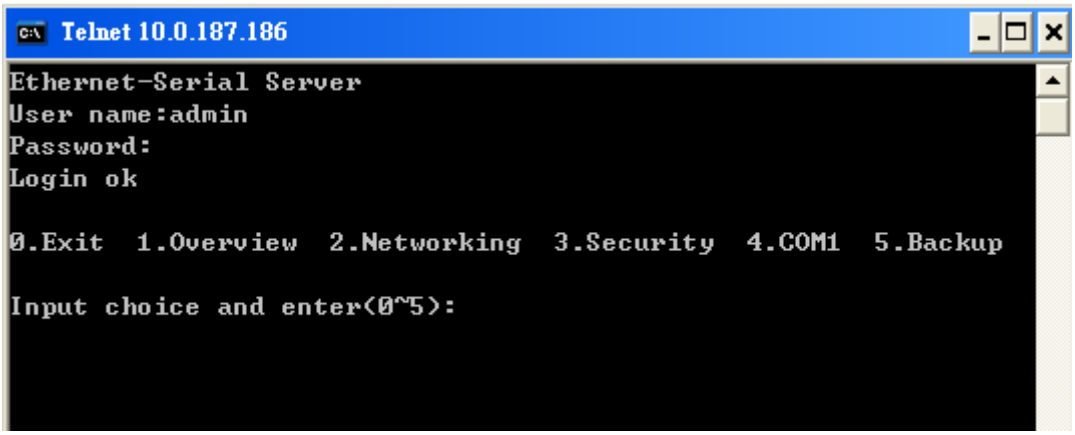


Figure 3.5 Main menu

Note:

1. If SE5001 does not receive any commands within **1 minute**, Telnet connection will terminate automatically.
2. After "0. Exit" is selected, the console will ask the user to save the configurations.
3. Changes to networking parameters will take effect only SE5001 is restarted.

->Select "**1**" from "**Input choice and enter (0~4):**" to enter **"Overview"** (Figure 3.6):

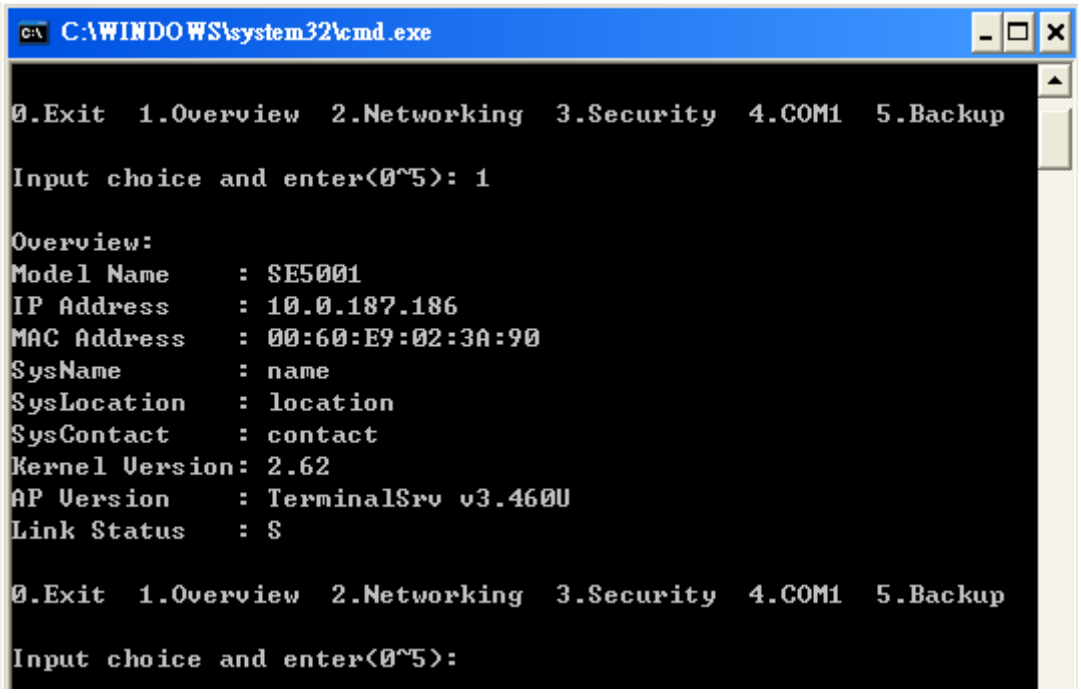


Figure 3.6 Overview

This page gives one the general information of SE5001 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 Networking page as following (Figure 3.7):

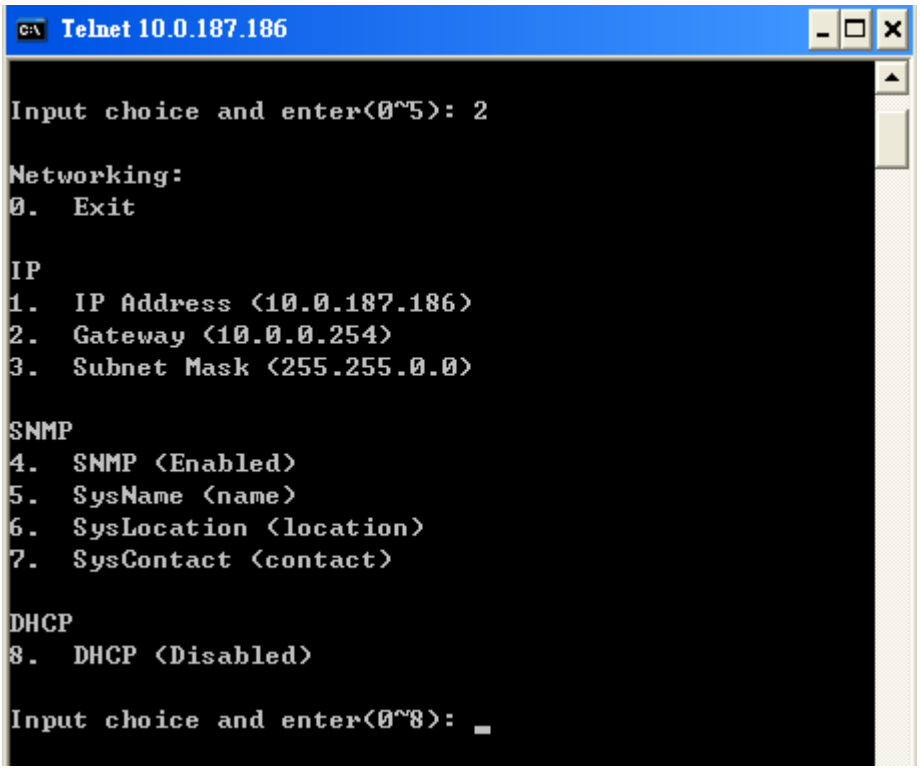


Figure 3.7 Network settings

Change network settings of the device including IP address, subnet mask, gateway IP address and SNMP information on this page. Please note that any changes made on this page won't take effect until the device is restarted.

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)

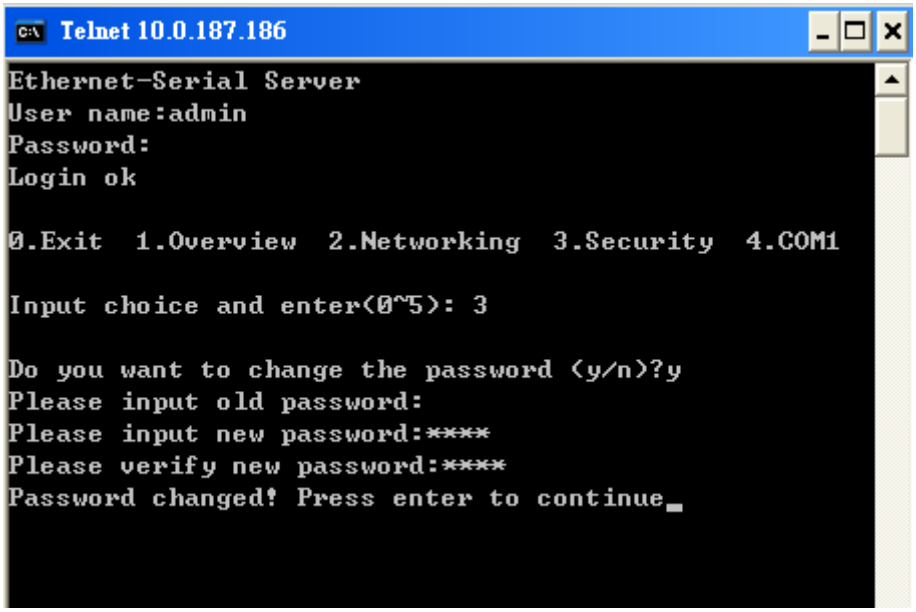


Figure 3.8 Change the Password

3.2.4. COM1 Setup

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

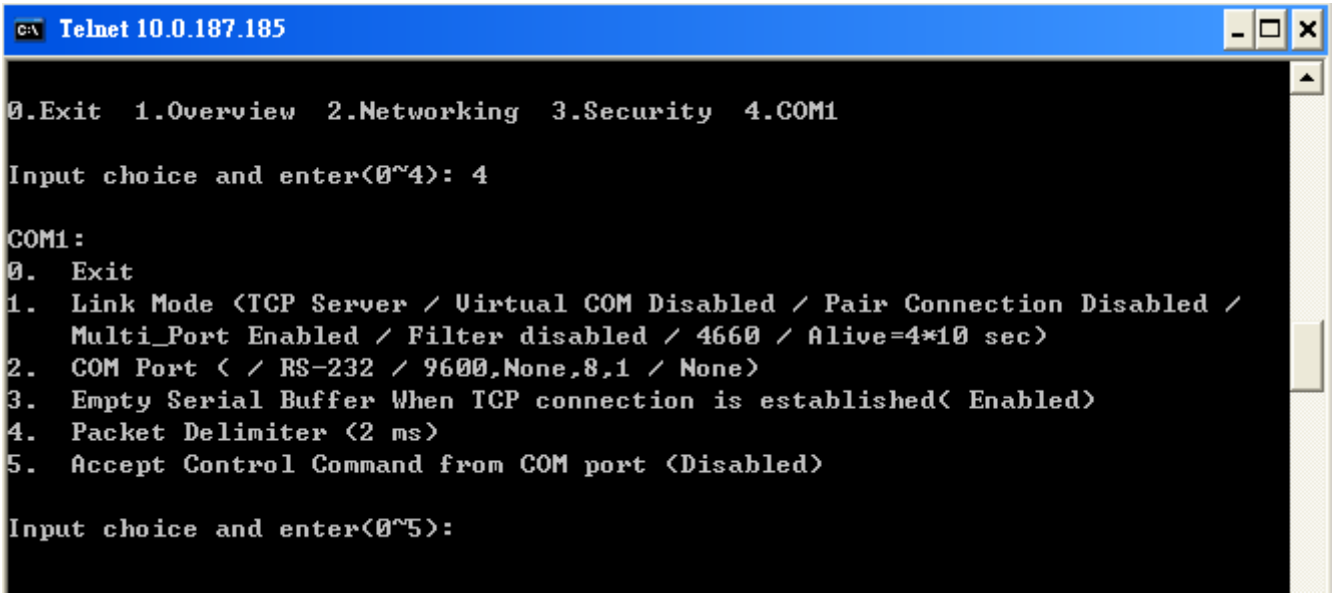


Figure 3.9 Com1 setup

This page includes the option to configure different COM1 parameters, including link mode, serial port settings, serial buffer, packet delimiter, and advanced control commands.

3.2.5. Configure SE5001 as TCP server

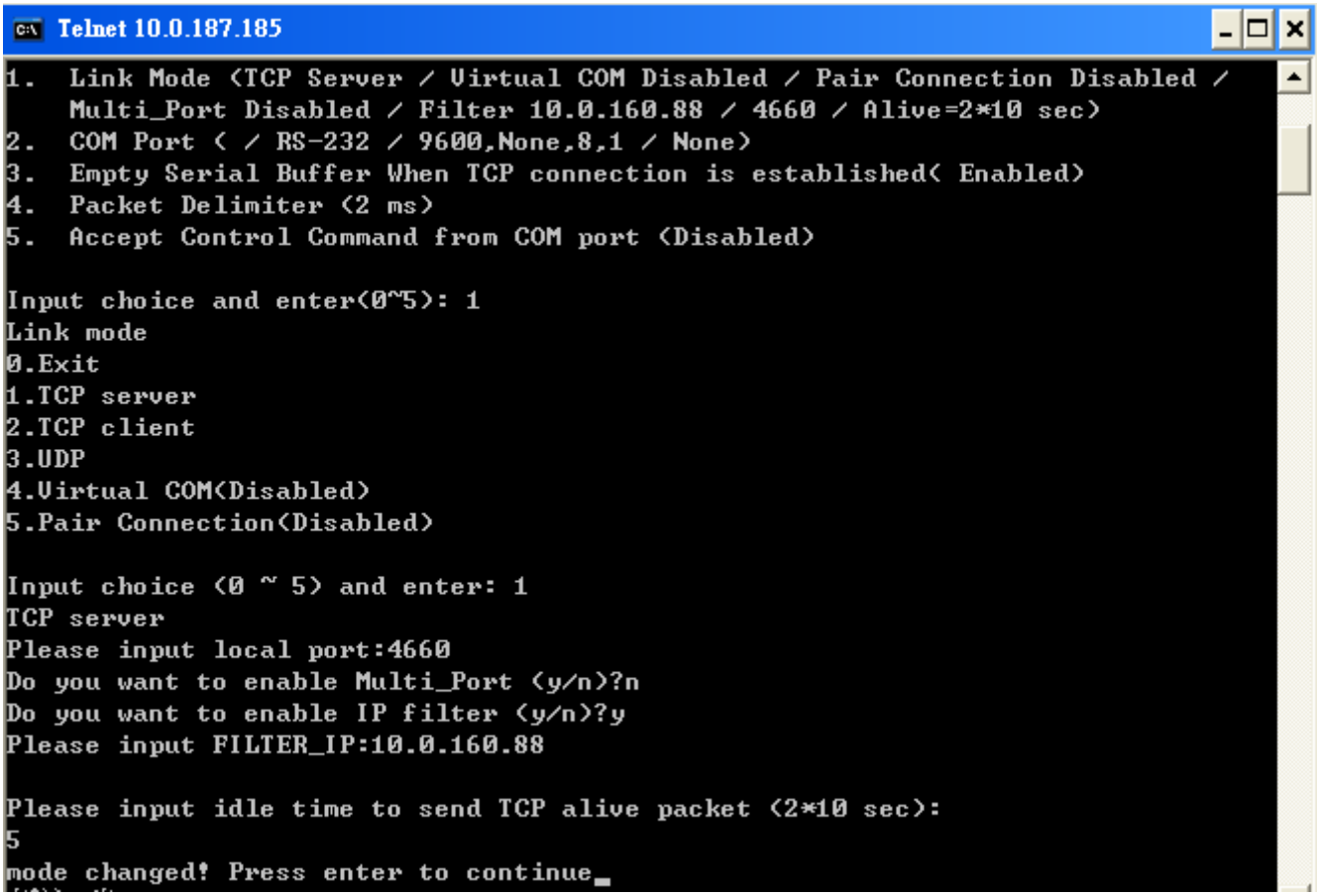


Figure 3.10 Link Mode: TCP Server Setup

➔ Type **1 (Link Mode)** from "**Input choice and enter (1~4):**" of COM1

➔ Type **1 (TCP Server)** in the "**Input choice(1~5) and enter：**"

➔ Input local port in the "**Please input local port：**"

To Enable IP filter：

➔ Input **y** in the "**Do one want to enable IP filter(y/n)?**" to enable IP Filter. Otherwise input **n**.

➔ Input source IP in the "**Please input Filter_IP ：”**

➔ Double click "**Enter**" key

➔ Input idle time in "**Please input idle time to send TCP alive packet(x*10sec)：**"(ex. Input **2** to change the sending TCP keep alive packet period to 20 sec)

Note:

1. IP filtering function is disabled if setting FILTER_IP to "0.0.0.0".
2. IP filter is disabled by default

3. If IP filter is enabled, only source IP assigned can connect to SE5001's COM.
4. If the multi-connection firmware is installed, SE5001 will prompt for "Multi_Port", meaning multiple connection

3.2.6. Configure SE5001 as TCP Client

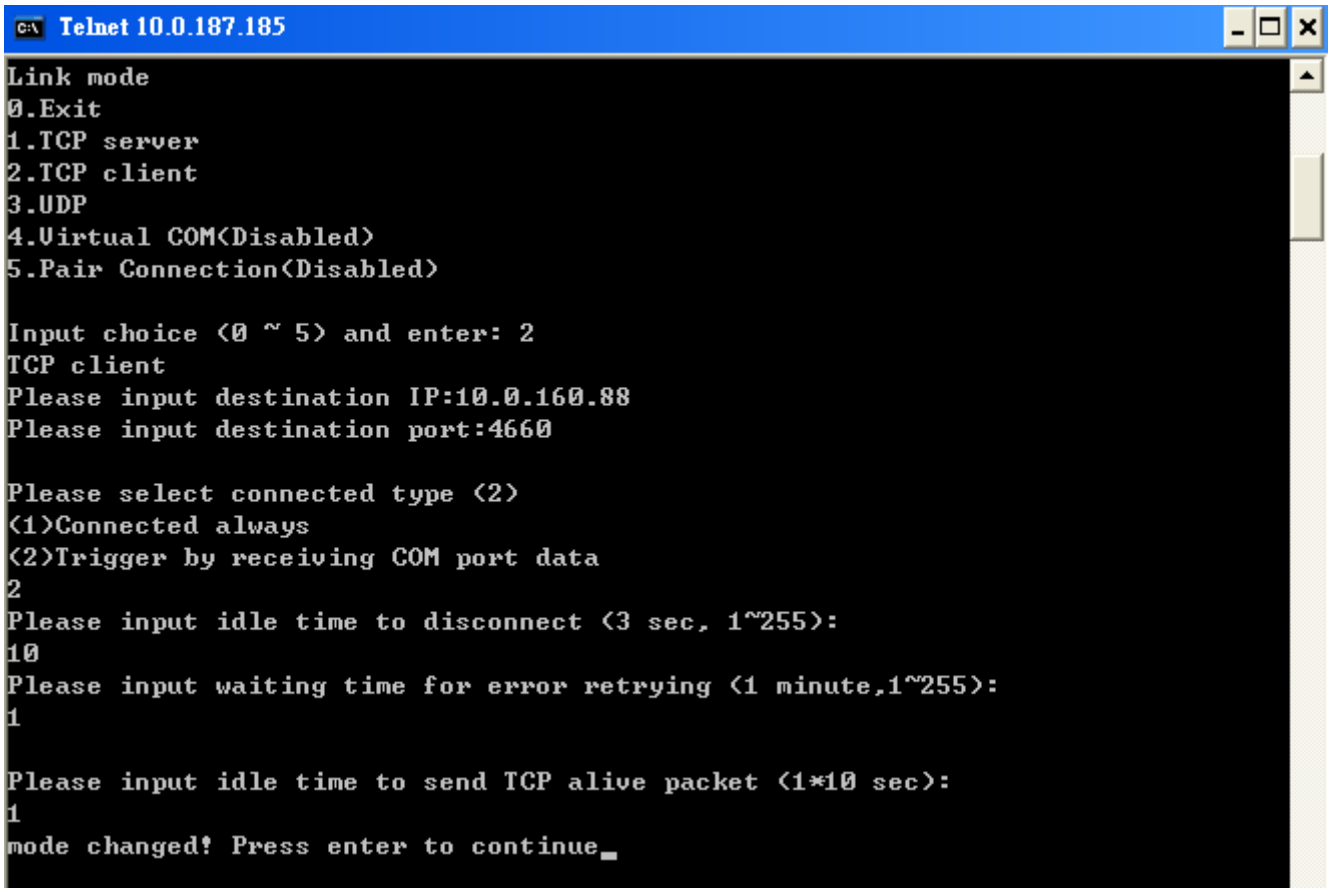


Figure 3.11 Link Mode: TCP Client Setup

➔ Type **2** in the "**Input choice(1~5) and enter：**"

➔ Input destination IP in the "**Please input Destination IP：**"

➔ Input destination port in the "**Please input Destination port：**"

➔ Select TCP connection behavior: **1** for connect always, **2** for connect on serial data

If **2** is selected, console will prompt for additional configurations.

- Input idle time to disconnect in the "**Please input idle time to disconnect(0sec , 1~255)：**" (Input **0** to disable; Input **2** to disconnect TCP connection after 2 seconds of serial Inactivity)
- Input error retrying time in "**Please input waiting time for error retrying(0 minute,1~255)：**" (Input **0** to disable; Input **2** to try to connect to a TCP Server every 2 minutes)

➔ Input idle time in "**Please input idle time to send TCP alive packet(x*10sec)：**"(Input **2** to the send TCP keep alive packet every 20 seconds)

3.2.7. Configure SE5001 as UDP

UDP is a connectionless protocol. It is faster than TCP, but does not guarantee packet delivery to the remote host. Figure 3.12 shows how to setup UDP.

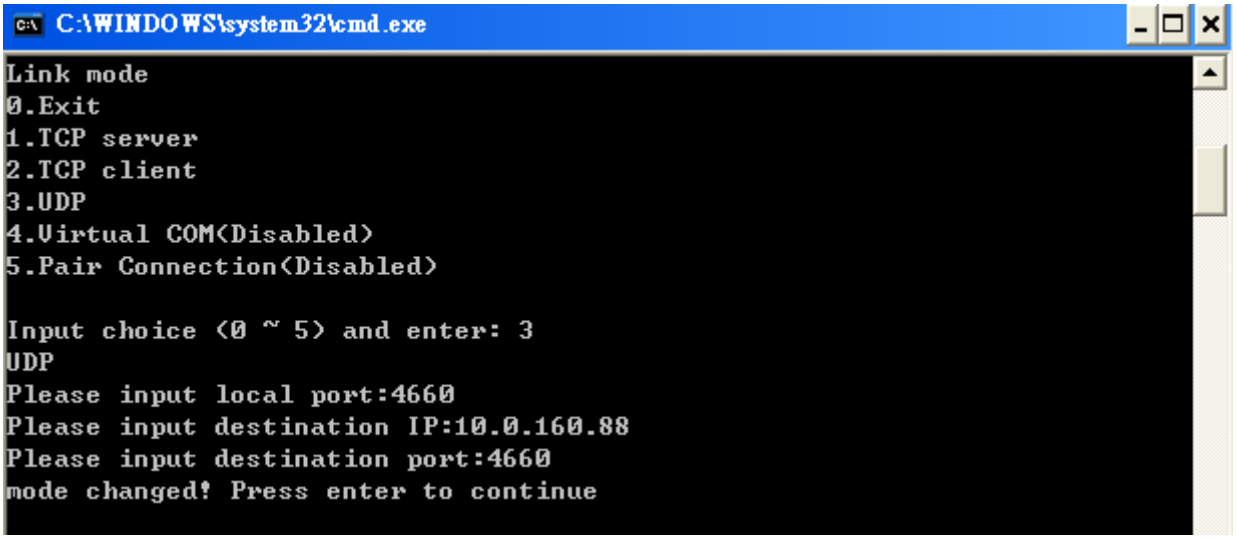


Figure 3.12 Link Mode: UDP Client Setup

- ➔ Type **3** in the "**Input choice(1~5) and enter：**"
- ➔ Input SE5001's local listening port in the "**Please input local port：**"
- ➔ Input remote device's IP in the "**Please input Destination IP：**"
- ➔ Input remote device's listening port in the "**Please input Destination port：**"

3.2.8. Enable / Disable Virtual COM

Enable or disable Virtual COM on this page. For more information on how to setup Virtual COM on different operating systems, please refer to chapter **4. Using Virtual COM**.

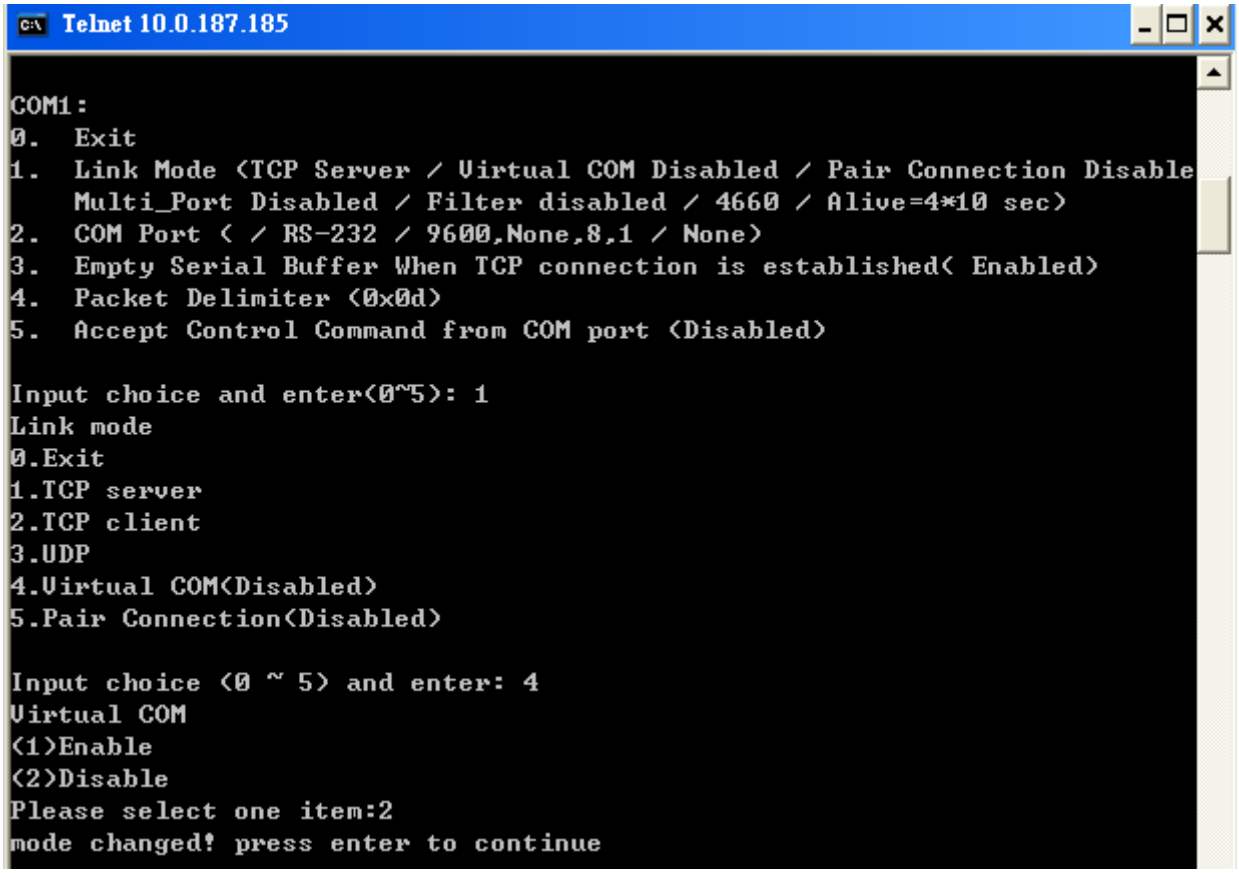


Figure 3.13 Configure Virtual COM

3.2.9. Enable / Disable Pair Connection

Enable or disable “Pair Connection” on this page. For more information on how to configure two serial device servers to work in pair connection, please refer to the pair connection section **3.3.13**.

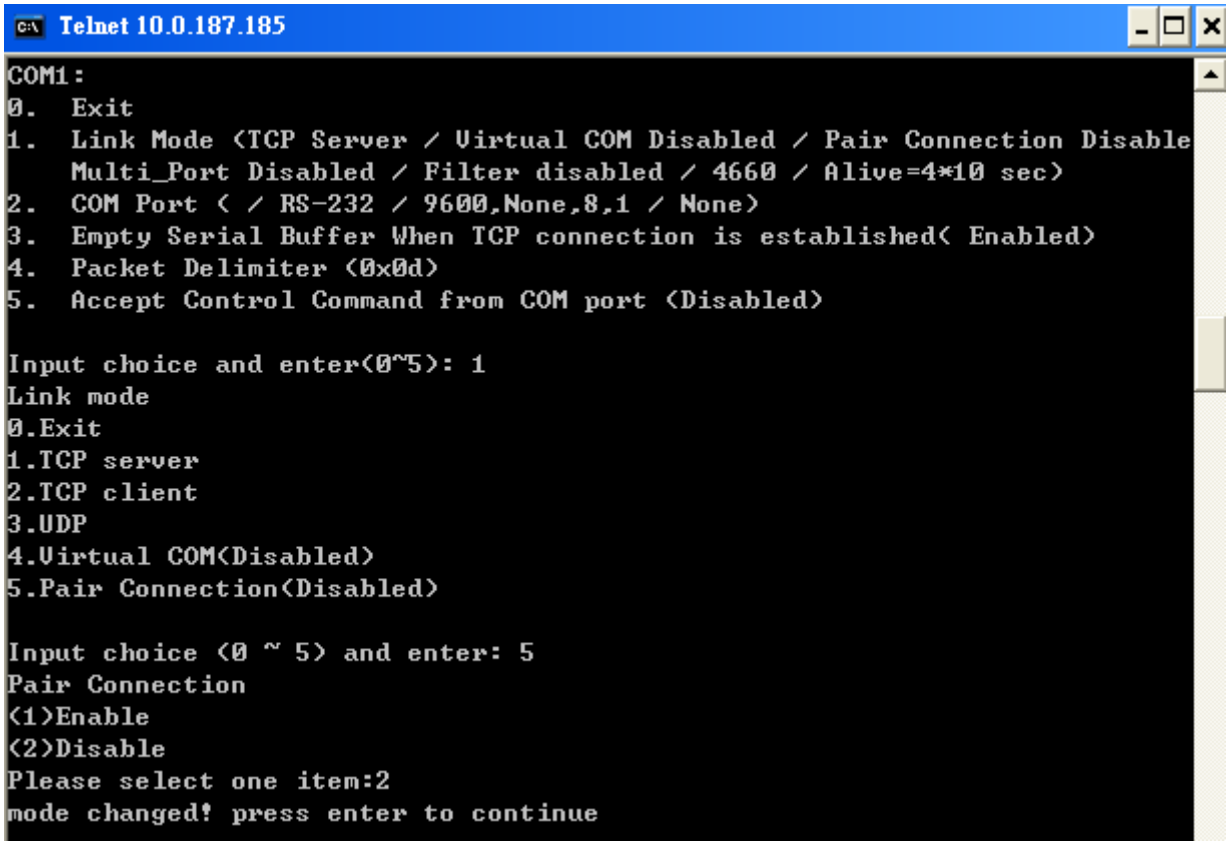


Figure 3.14 Configure Pair Connection

3.2.10. COM Port Setting

Type **2** from "**Input choice and enter (1~4):**" of COM1, the following screen appears. It is possible to give the COM port alias name, set the baud rate and parity, determine number of data bit and stop bit, and the type of flow control to use here (Figure 3.15).

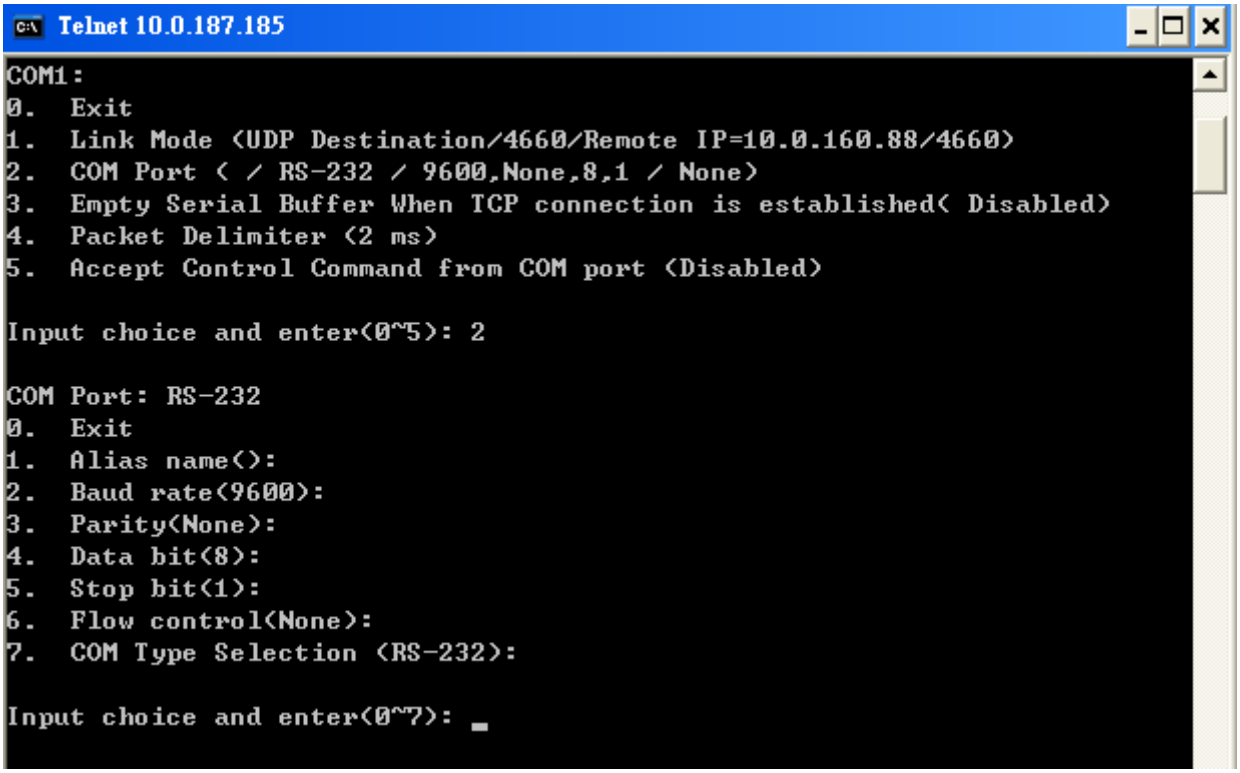


Figure 3.15 COM Port Settings

3.2.11. Emptying Serial Buffer when TCP connection is established

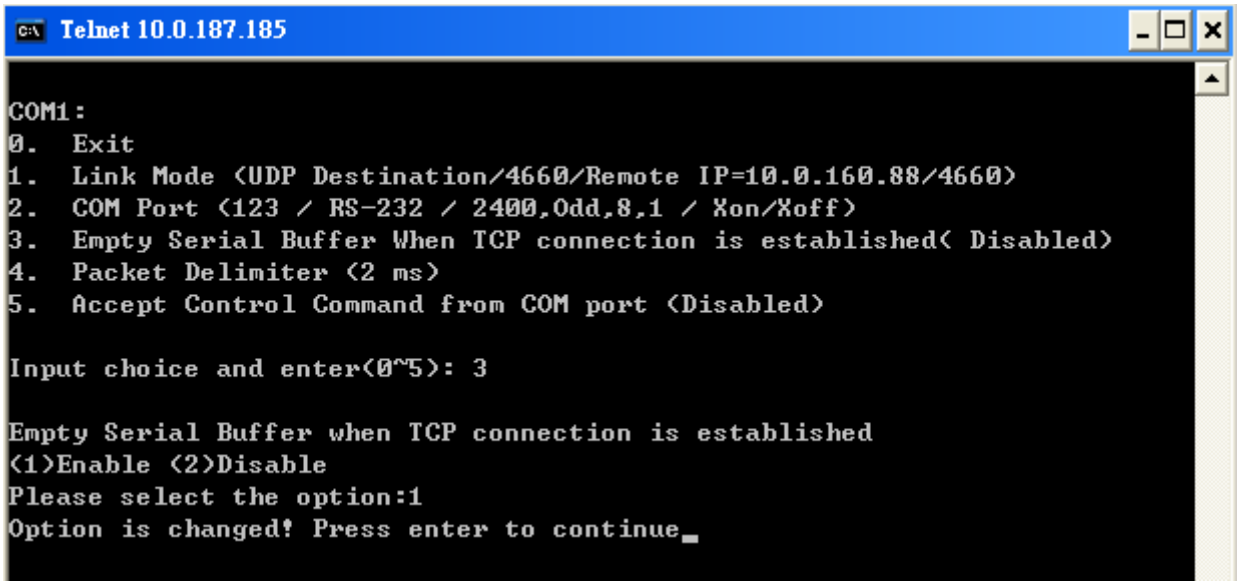


Figure 3.16 Com Port: Enabling Serial Buffer

Type **3** from "**Input choice and enter (1~4):**" of COM1, by default COM port serial buffer is enabled meaning that once a TCP connection is established, old serial data received from serial device before the connection will be

emptied. If this option is disabled, SE5001 will keep old serial data when the connection is broken (Figure 3.16).

3.2.12. Setting Packet Delimiter

Packet delimiter is a way of packaging serial data. It can prevent serial data from being truncated by packing them in the same Ethernet packet. SE5001 provides two kinds of packet delimiter: Timer and Character. The default timer is 2 ms (0ms to disable this function). This means that if SE5001 does not receive new serial data within 2ms, it will send out all the serial data in buffer in one packet over Ethernet. The way to change the delimiter timer is shown in the following figure (Figure 3.17):

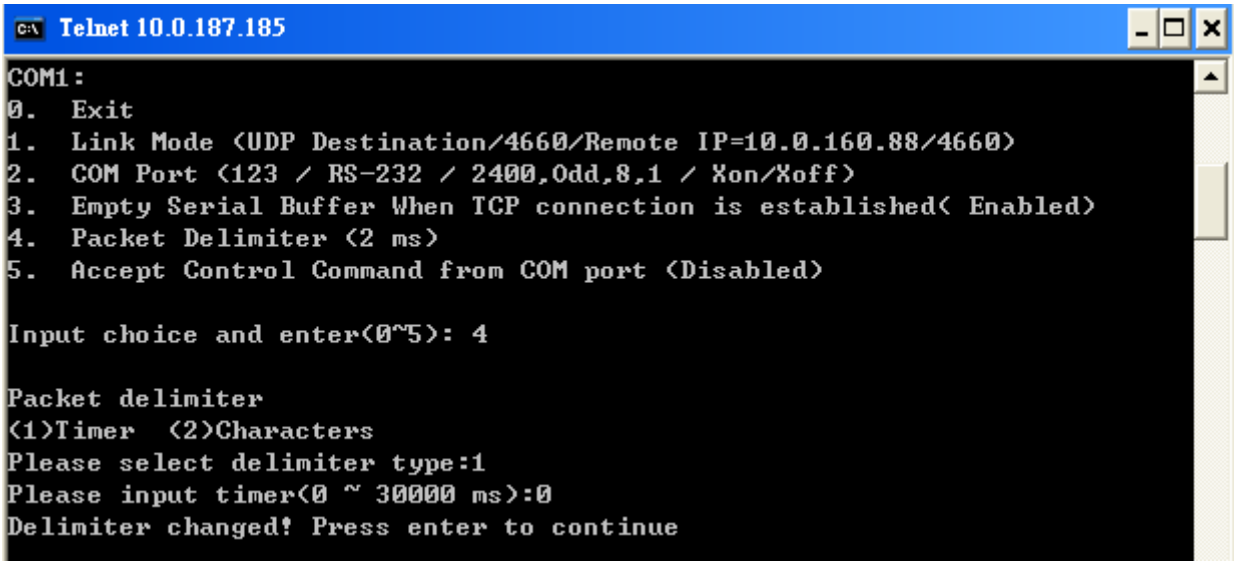


Figure 3.17 Setting packet delimiter timer

Another kind is character delimiter. If the character delimiter is set to 0x0d, this means SE5001 will send out all the serial data in buffer in one packet over Ethernet only if it reads 0x0d. The following figure shows how to configure character delimiter:
(Figure 3.18)

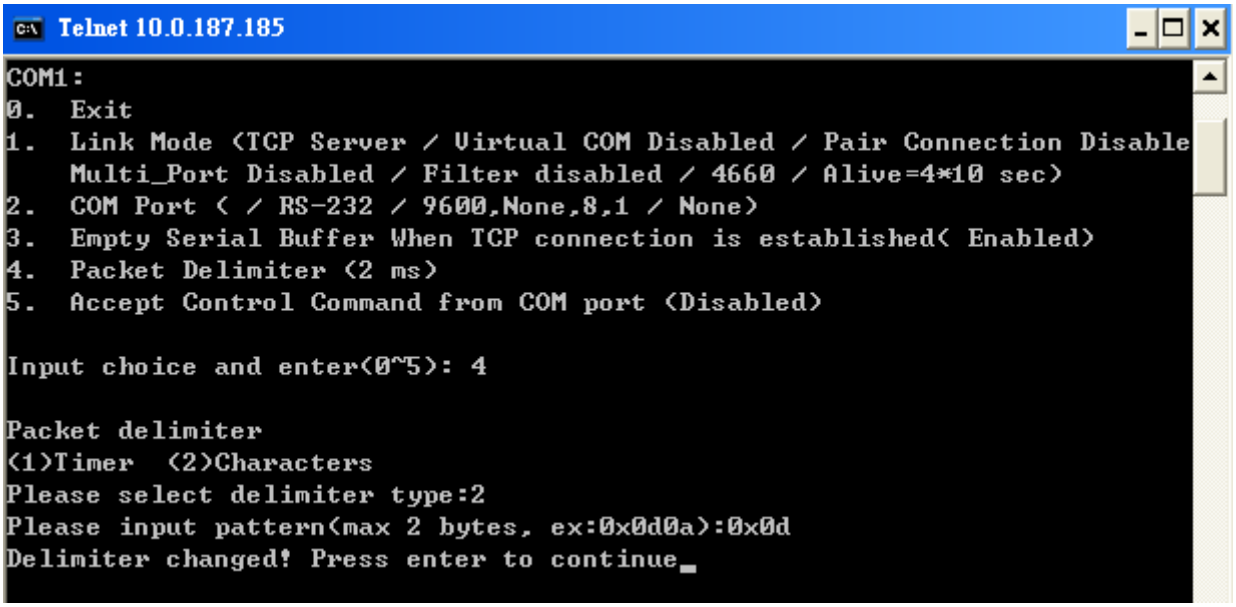


Figure 3.18 Setting Packet Delimiter: Character Pattern

3.2.13. Accept Control Command from COM port

SE5001 can also accept serial control commands (RFC2217) directly from the COM port. For more detail about this function, please contact our Technical Support for more information.

3.2.14. Backup EEPROM to Flash

Select "**5**" from "***Input choice and enter (0~5):***" the following screen should appear (Figure 3.19):

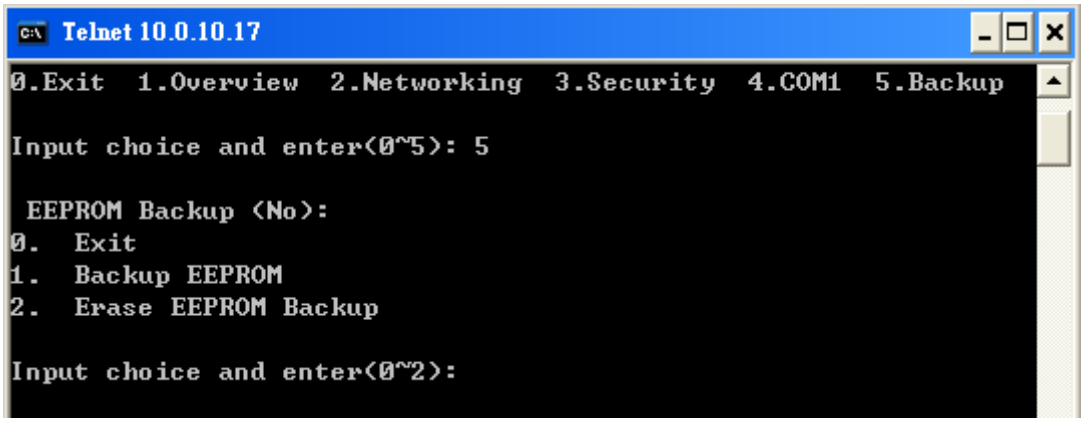


Figure 3.19 Backup EEPROM to Flash

- Type **1** from "**Input choice and enter (0~2):**" to back up the settings from the EEPROM to the Flash. SE5001 would then show "**EEPROM Backup (Yes)".**
- Type **2** from "**Input choice and enter (0~2):**" to erase the settings stored in the Flash. SE5001 would then show "**EEPROM Backup (No)".**

3.3 Configuration Using Web Browser

1. Make sure the PC is located in the same network sub-net as SE5001
2. Open a web browser, then Enter in the IP address of SE5001. Default user name is **admin** and default password is **null (leave it blank)**.
3. SE5001'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***" button in "***System***" link 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

1. After opening the web browser, ex. Microsoft IE, Firefox or any other web browser, enter the IP address of SE5001 in the URL bar. **Example: http://10.0.50.100**
2. The following authentication screen should appear. Enter the **user name** and **password** then click on "**OK / Log in**". The default user name is **admin** and password is Null *(Leave it blank)*.

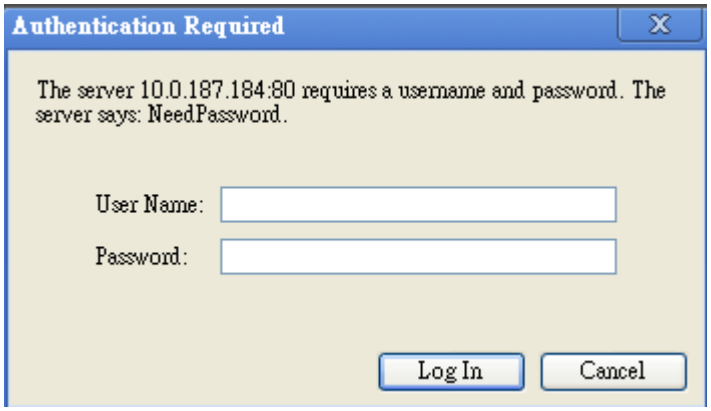


Figure 3.20 Login Security Check

3. The following overview page should show (Figure 3.21). Click on the links on the left to go to different configuration pages, which are **"Networking"**, **"Security"**, and **"COM"**.

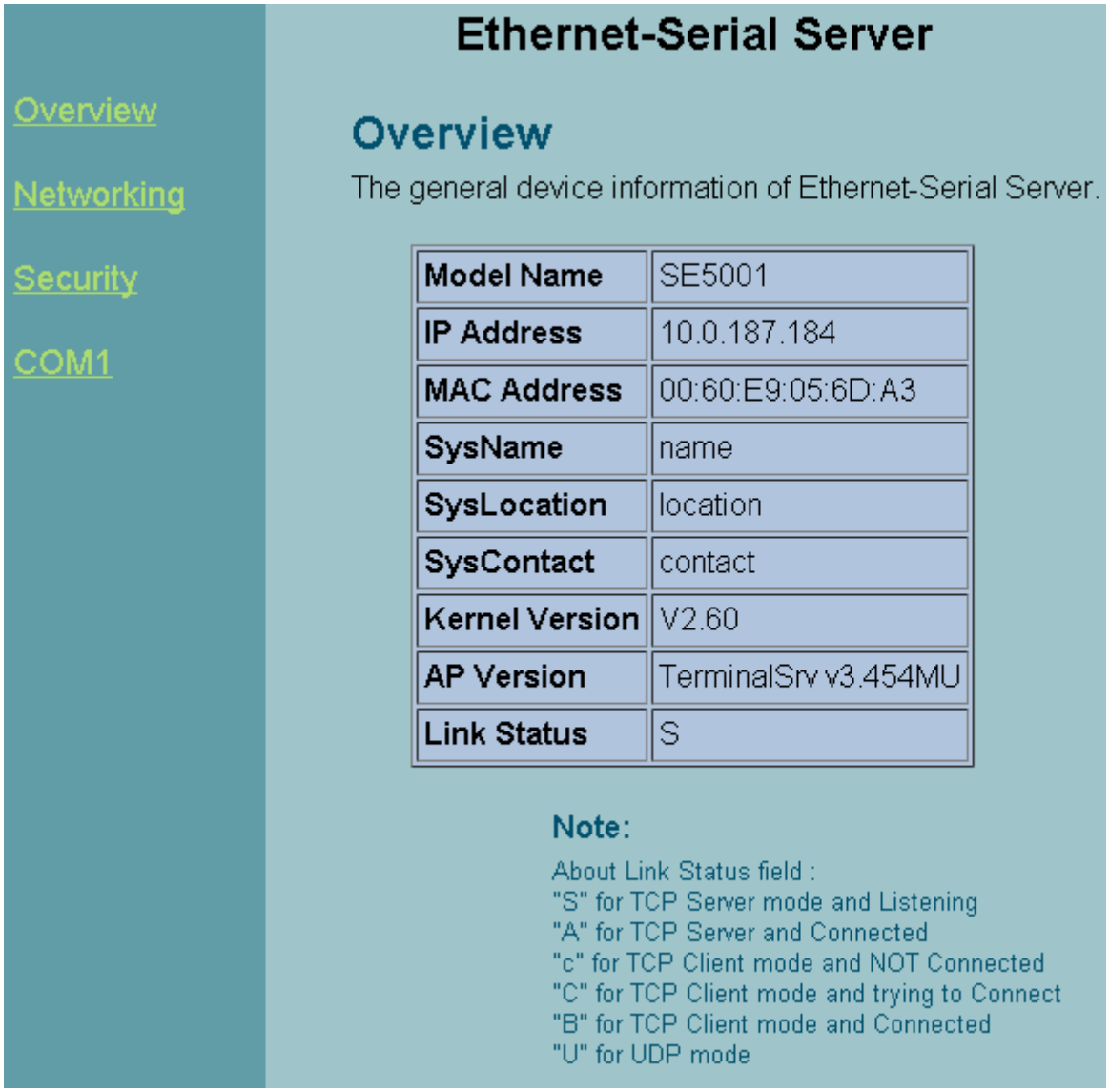


Figure 3.21 Overview

3.3.2. Networking Setup

Configure IP, SNMP, and alert settings on this page. Please fill in the IP information in the fields under the TCP/IP header (Figure 3.22). Alternatively, enable DHCP to obtain IP address, gateway and subnet mask from a DHCP server automatically.

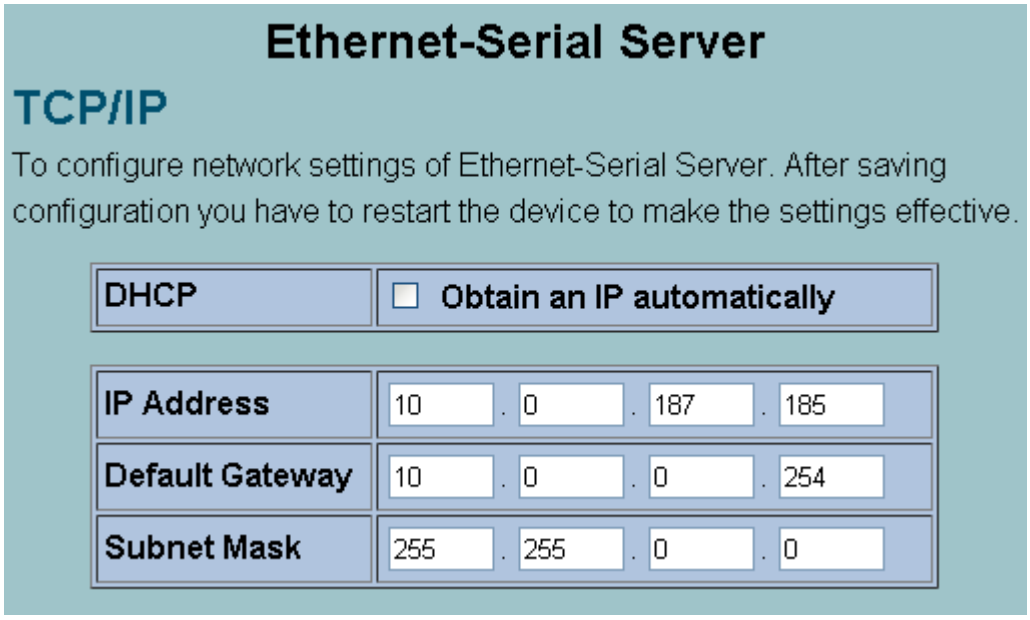


Figure 3.22 IP Information Setup

Enable SNMP and Alert Events by checking "**Enable**" (Figure 3.23). Fill in SNMP information in the fields under the SNMP header. Enable different Alert Events to send these events to a SNMP Trap Server.

Cold/Warm Start: Triggers when the device is rebooted from the application level or physical level.

Link Down: Triggers when the TCP connection of the designated COM port is closed

Link Up: Triggers when the TCP connection of the designated COM port is established

Authentication Failure: Triggers when the username/password entered in the Telnet console or the WebUI is incorrect.

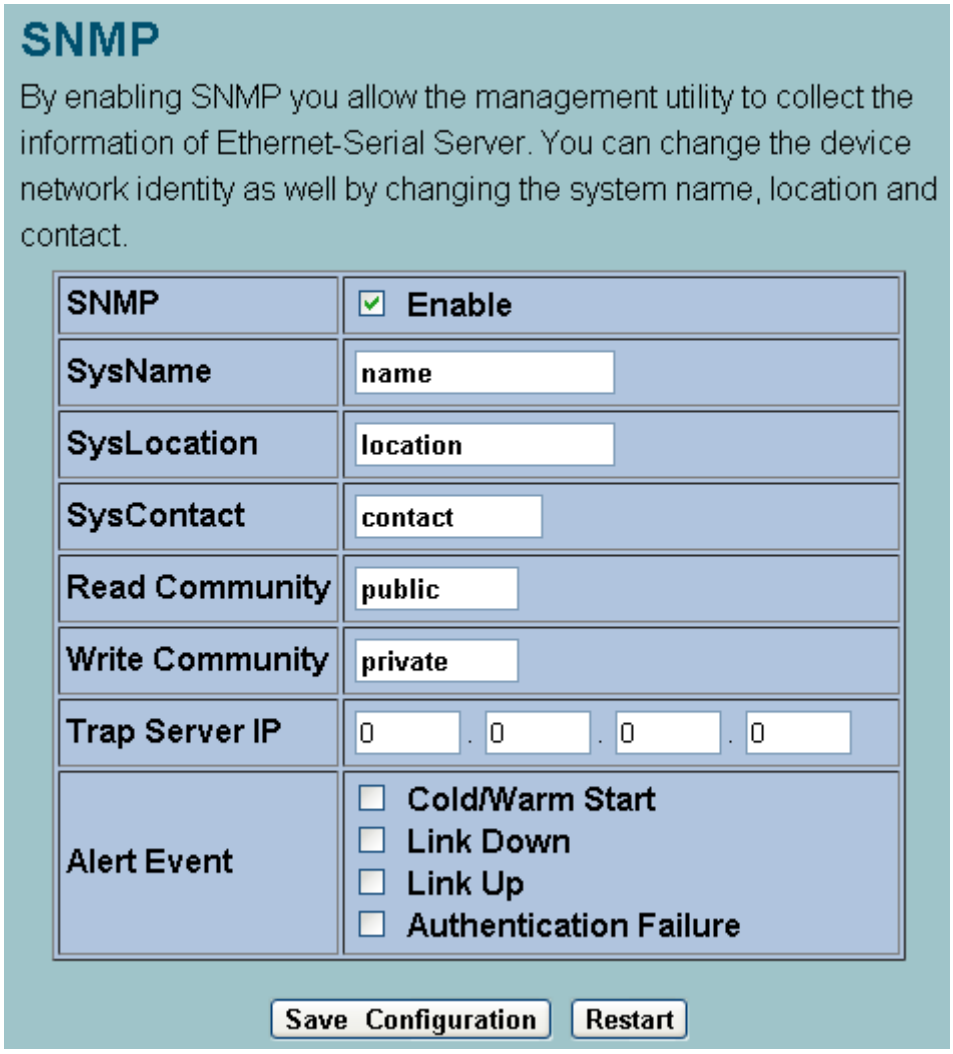


Figure 3.23 SNMP Setup

After all the settings are entered, please click on the **"Save Configuration"** button to save the changes. Note that the settings would become active only after SE5001 is restarted.

3.3.3. Security Setup

Change the login password on this page (Figure 3.24).

Figure 3.24 Security Setup

Please enter the old password in the "**Old Password**" field and enter the new password in the "**New Password**" and the "**Verified Password**" fields. Then click on the "**Save Configuration**" to save and apply the new password.

Note: Press the reset button next to the RJ-45 Jack to reset the settings back to the default value.

3.3.4. Backup EEPROM to Flash

This backup function could recover settings from the Flash to the EEPROM if the settings in the EEPROM are lost. If SE5001 detects that there is an EEPROM backup in the flash. It will compare the backup values in the Flash and EEPROM. If the values do not match, it will write the backup settings in the Flash to the EEPROM. To enable this function, follow Figure 3.24 in the Security Settings.

- Click on **Backup EEPROM** to back up the settings from the EEPROM to the Flash. SE5001 would then show **Have Backup.**
- Click on **Erase Backup** to erase the settings stored in the Flash. SE5001 would then show **No Backup.**

3.3.5. Link Mode Configuration

SE5001 supports different Link Modes, which are TCP Server, TCP Client, and UDP (Figure 3.25). Under the three Link Modes, TCP Server can support Virtual COM, Pair Connection, or Reverse Telnet applications. TCP Client can support Virtual COM or Pair Connection application. If none of the application is enabled, the SE5001 will run in RAW mode. In the upcoming sections, we will discuss how to setup different Link Modes properly.

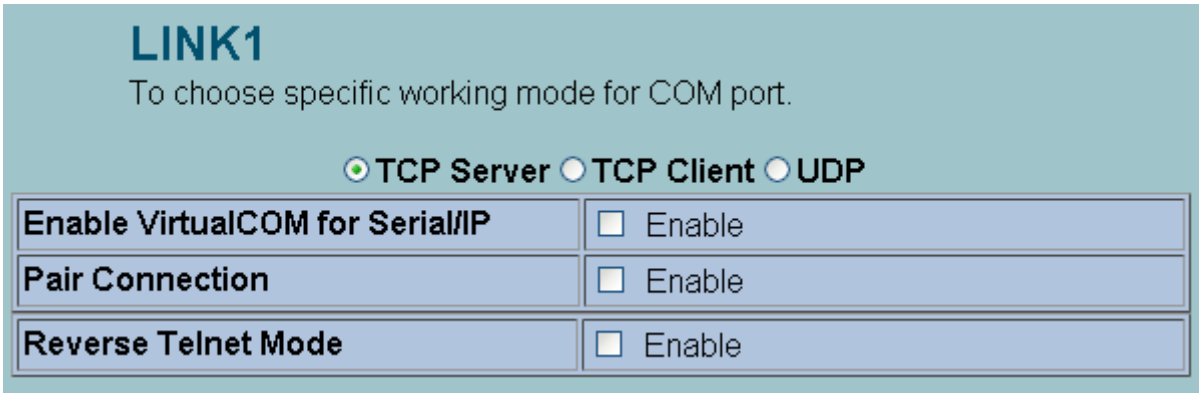


Figure 3.25 Link Modes

3.3.6. Link Mode: Configure SE5001 as a TCP Server

SE5001 defaults in TCP Server mode, there are additional connection settings that can be configured (Figure 3.26). By selecting the TCP Server mode, a TCP Client program should be prepared to connect to SE5001.

- ➔ Click on the ***"COM1"*** link on the left hand side.
- ➔ Select **TCP Server**. TCP Server is the default link mode.
- ➔ Enter the **Local Listening Port**. This is the port specified in the TCP Client program connecting to the serial device server. The default local port is 4660.
- ➔ **IP Filter**: Only the designated IP address will be able to access the COM port if this option is enabled. This option is disabled by default.
- ➔ **TCP Keep-Alive:** Specify the interval in the "**Idle Time Before Sending TCP Alive Packet**" to force SE5001 to send TCP Keep-Alive packets in the set interval to prevent disconnection from the client. Note that this field has a multiplier of 10, so the default value 4 means to send Keep-Alive packets every 40 seconds.
- ➔ **TCP Inactivity Timeout:** Specify the value in "**TCP Inactivity Time Before Disconnect**" to force SE5001 actively close a TCP connection after some specific inactivity time (no packets). The default value is 0, which means the SE5001 would never close an established connection.
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Go to the **Application Configuration** section starting from **3.3.9** to apply Virtual COM, Pair Connection, or Reverse Telnet application if applicable. Otherwise go to the **COM Configuration** (section **3.3.19**) for serial settings directly.

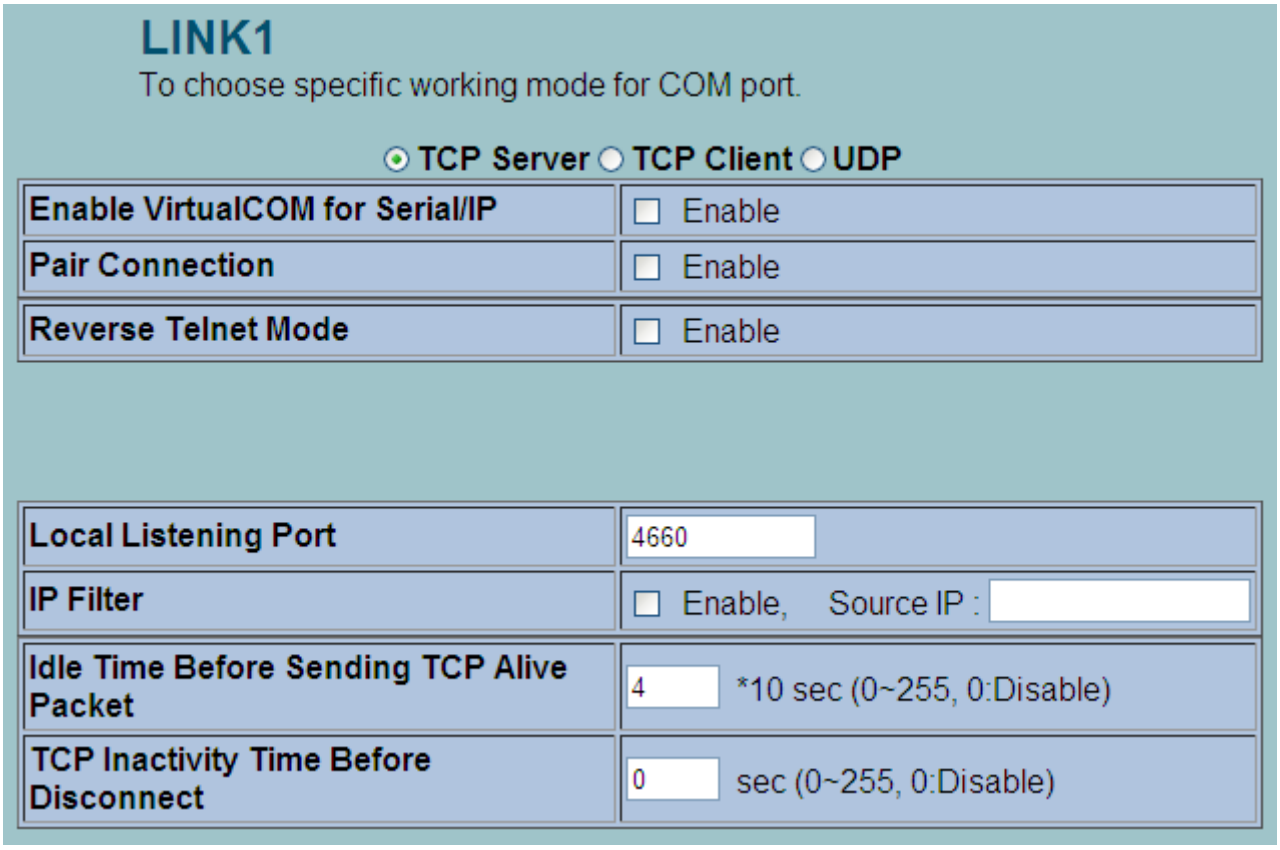


Figure 3.26 TCP Server Setup

Note:

LINK1 is associated with COM1; LINK2 is associated with COM2, and so on.

3.3.7. LINK Mode: Configure SE5001 as a TCP Client

By selecting the TCP Client mode, it means that a TCP Server program should be prepared to connect to SE5001. Figure 3.27 shows all the settings provided for the TCP Client.

- ➔ Click on the ***"COM1"*** link on the left hand side.
- ➔ Select **TCP Client**.
- ➔ Enter the preferred **Destination IP** and **Port**. This should match the IP settings of the TCP Server program.
- ➔ **Connect Rule**: Decide how SE5001 should connect to the TCP Server here. If SE5001 should always keep the connection, select **TCP Connect on Power-on**. This means SE5001 would connect to the TCP Server program when SE5001 is powered on. By default, **TCP Connect on Any Serial Character** is selected. This means that SE5001 would only connect to the TCP Server program when it receives data from its serial interface. If **TCP Connect on Any Serial Character** is selected, there are two additional options to change, which are **Serial Inactivity Time Before Disconnect** and **Waiting Time Between Re-connect Attempts**. **Serial Inactivity Time Before Disconnect** determines how long SE5001 should wait before closing a TCP connection if there is no incoming serial data. The default value is 40 seconds. **Waiting Time Between Re-connect Attempts** determines the time SE5001 should wait before it tries to establish a connection with a TCP Server again if it fails to connect to the TCP Server. The default value is

1 minute.

➔ **TCP Keep-Alive:** Specify the interval in the "**Idle Time Before Sending TCP Alive Packet**" to force SE5001 to send TCP Keep-Alive packets in the set interval to prevent disconnection from the client. Note that this field has a multiplier of 10, so the default value 4 means to send Keep-Alive packets every 40 seconds.

➔ **TCP Inactivity Timeout:** Specify the value in "**TCP Inactivity Time Before Disconnect**" to force SE5001 actively close a TCP connection after some specific inactivity time (no packets). The default value is 0, which means the SE5001 would never close an established connection.

➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.

➔ Go to the **Application Configuration** section starting from **3.3.11** to apply Virtual COM, Pair Connection, or Reverse Telnet application if applicable. Otherwise go to the **COM Configuration** (section **3.3.19**) for serial settings directly.

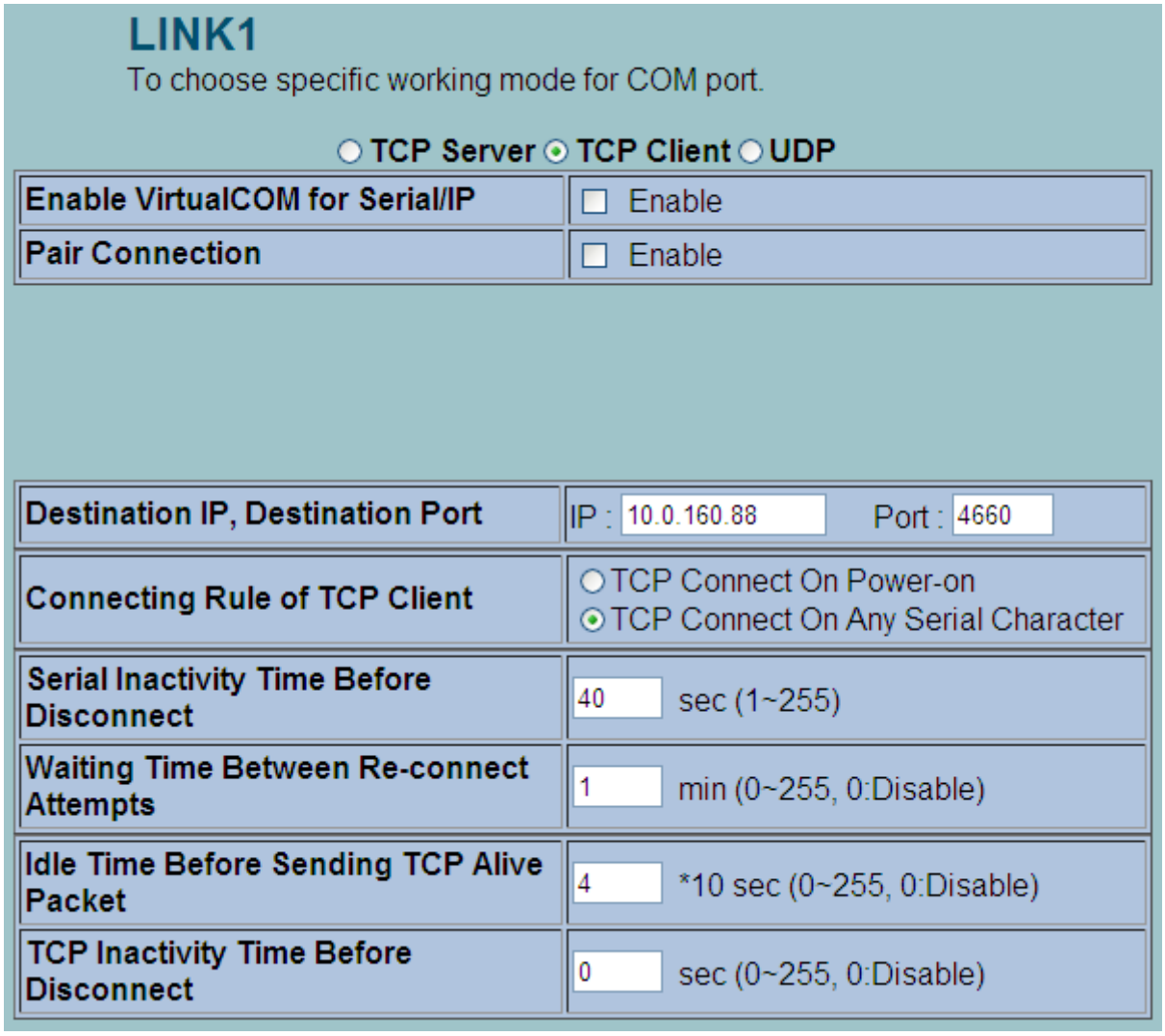


Figure 3.27 TCP Client Setup

3.3.8. Link Mode: Configure SE5001 in UDP

SE5001 also supports connectionless UDP protocol compared to the connection-oriented TCP protocol. Please be aware that even though UDP provides better efficiency in terms of response time and resource usage, it does not guarantee data delivery. It is recommended to utilize UDP only with cyclic polling protocols where each request is repeated and independent, such as Modbus Protocol. Figure 3.28 shows the UDP settings.

- ➔ Click on the ***"COM1"*** link on the left hand side.
- ➔ Select **UDP**.
- ➔ **Destination IP and Port:** Specify the **Begin** and **End IP** here. Four groups of range IPs are allowed. This is the **IP** address of the UDP program and the **Port** it is listening to. Note that the maximum number of UDP nodes that SE5001 can handle would highly depend on the traffic load. *We have tested that SE5001 can handle up to 32 UDP nodes (baud rate 9600 bps, request interval 100ms, and data length 30bytes).*
- ➔ Enter the **Local Listening Port**. This is the port that SE5001 should listen to. Match this setting in the UDP program (usually called destination port in the UDP program).
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Go to the section **3.3.16** to apply Pair Connection application if applicable. Otherwise go to the **COM Configuration** (section **3.3.19**) for serial settings directly.

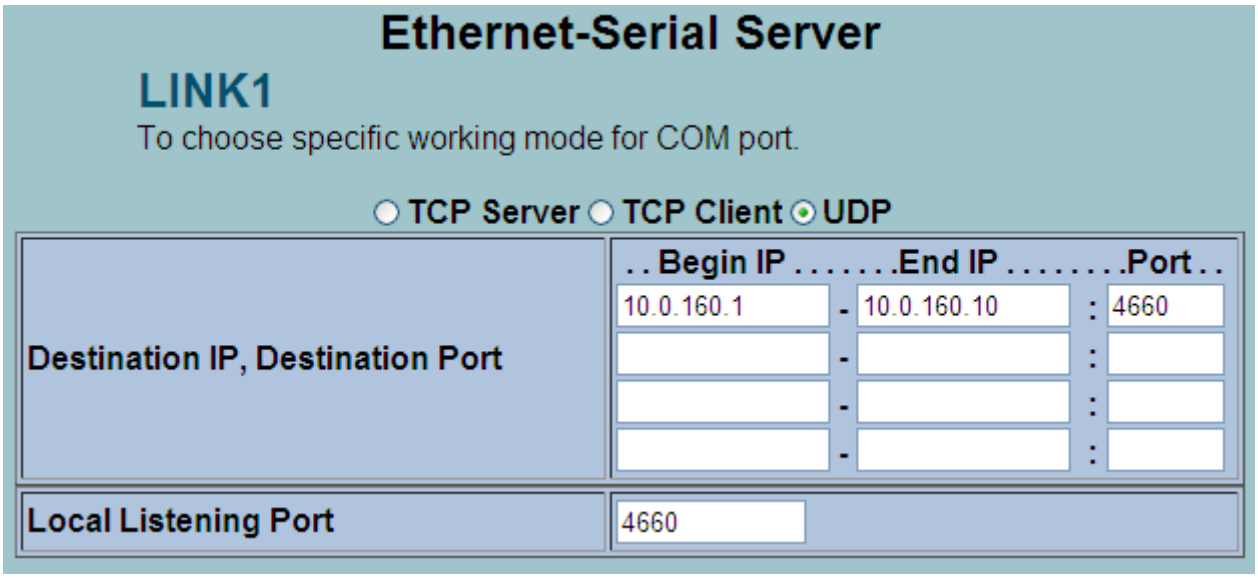


Figure 3.28 UDP Setup

3.3.9. TCP Server Application: Enable Virtual COM

SE5001 will encapsulate control packets on top of the real data when Virtual COM is enabled. This will allow the Virtual COM port in the Windows/Linux system to access SE5001's COM ports. The benefit of using Virtual COM is that rewriting an existing COM program to read IP packets is unnecessary. In other words, it is possible to use an ordinary serial (COM) program. The conversion/virtualization of IP to COM is all done in the system driver transparently. Figure 3.29 shows SE5001 in TCP Server mode with Virtual COM enabled.

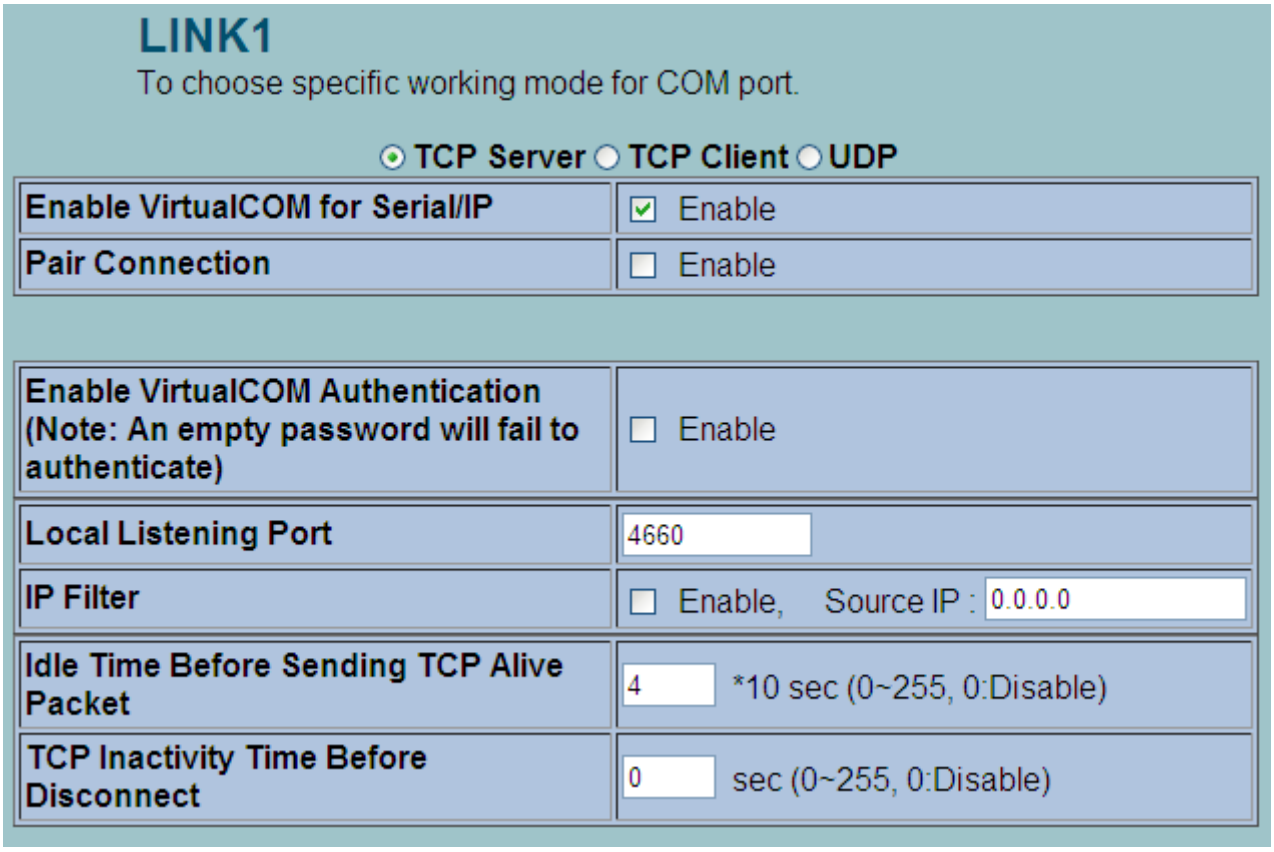


Figure 3.29 TCP Server with Virtual COM Enabled

- ➔ Follow section **3.2.5** to configure SE5001 in TCP Server mode properly.
- ➔ Check **Enable VirtualCOM for Serial/IP** to enabled Virtual COM application in SE5001.
- ➔ Check **Enable VirtualCOM Authentication (Note: An empty password will fail to authenticate)** to lock up Virtual COM access with SE5001's login password.
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Configure Virtual COM in the Operating System. For Windows, refer to **4. Using Virtual COM**. Remember SE5001's IP address and the **Local Listening Port** here in order to enter this information in Serial/IP Virtual COM's Control Panel later.

3.3.10. TCP Server Application: Enable RFC 2217

The underlying protocol of Virtual COM is based on RFC 2217, the Telnet COM Control Option. Therefore, it is possible to use RFC 2217 with SE5001 in the TCP Server mode. To do so, refer to section **3.3.9** to enable Virtual COM, so that SE5001 becomes aware of the commands. Note that there is no need to configure Virtual COM on the Operating System because Virtual COM ports would not be used.

3.3.11. TCP Client Application: Enable Virtual COM

It is also possible to run Virtual COM in TCP Client mode (Figure 3.30). It is usually easier to use Virtual COM in the Client mode if SE5001 uses dynamic IP (DHCP) because setting a static IP address in Virtual COM's Control Panel

is not possible.

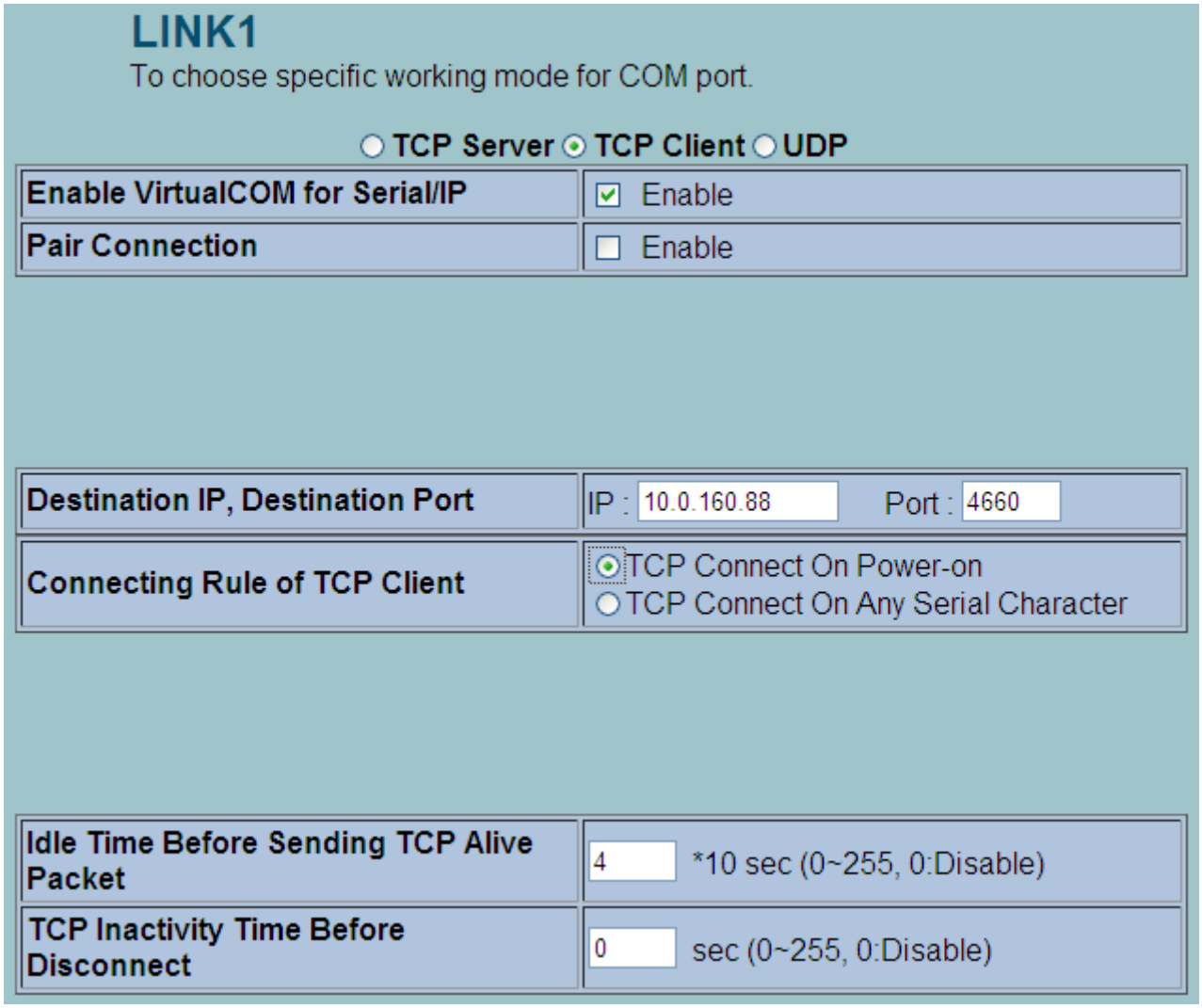


Figure 3.30 TCP Client with Virtual COM Enabled

- ➔ Follow section **3.2.6** to configure SE5001 in TCP Client mode properly.
- ➔ Check **Enable VirtualCOM for Serial/IP** to enabled Virtual COM application in SE5001.
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Configure Virtual COM in the Operating System. For Windows, refer to **4. Using Virtual COM**. Remember SE5001's IP address and the **Local Listening Port** here in order to enter this information in Serial/IP Virtual COM's Control Panel later.

3.3.12. TCP Client Application: Enable RFC 2217

The underlying protocol of Virtual COM is based on RFC 2217, the Telnet COM Control Option. Therefore, it is possible to use RFC 2217 with SE5001 in the TCP Client mode. To do so, refer to section **3.3.11** to enable Virtual COM, so that SE5001 becomes aware of the commands. Note that there is no need to configure Virtual COM on the Operating System because Virtual COM ports would not be used.

3.3.13. TCP Server Application: Configure SE5001 as a Pair Connection Master

Pair Connection is useful when pairing up two serial devices over the Ethernet or when it is impossible to install Virtual COM in the serial device. Pair connection does require two SE5001s to work in pair, one would be the Pair Connection Master (0) and the other would be the Pair Connection Slave.

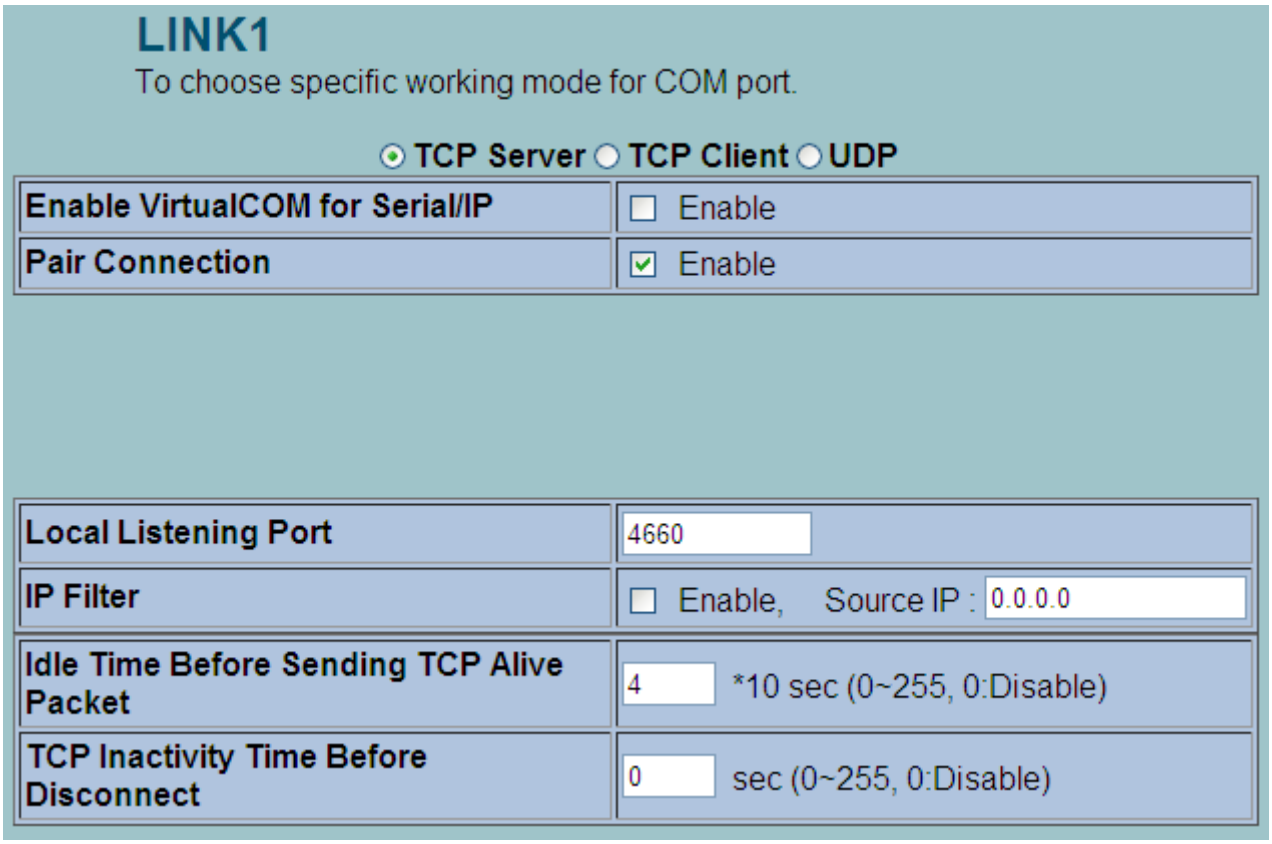


Figure 3.31 TCP Server with Pair Connection Enabled

- ➔ Follow section **3.2.5** to configure SE5001 in TCP Server mode properly.
- ➔ Check **Enable Pair Connection** to enabled Pair Connection application in SE5001.
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Go to the Pair Connection Slave Setup below (section **3.3.14**). Remember SE5001's IP address and the **Local Listening Port** here in order to enter this information in the Pair Connection Slave later.

3.3.14. TCP Client Application: Configure SE5001 as a Pair Connection Slave

A Pair Connection Slave (Figure 3.32) needs to pair up with a Pair Connection Master. Please setup a Pair Connection Master first before proceeding.

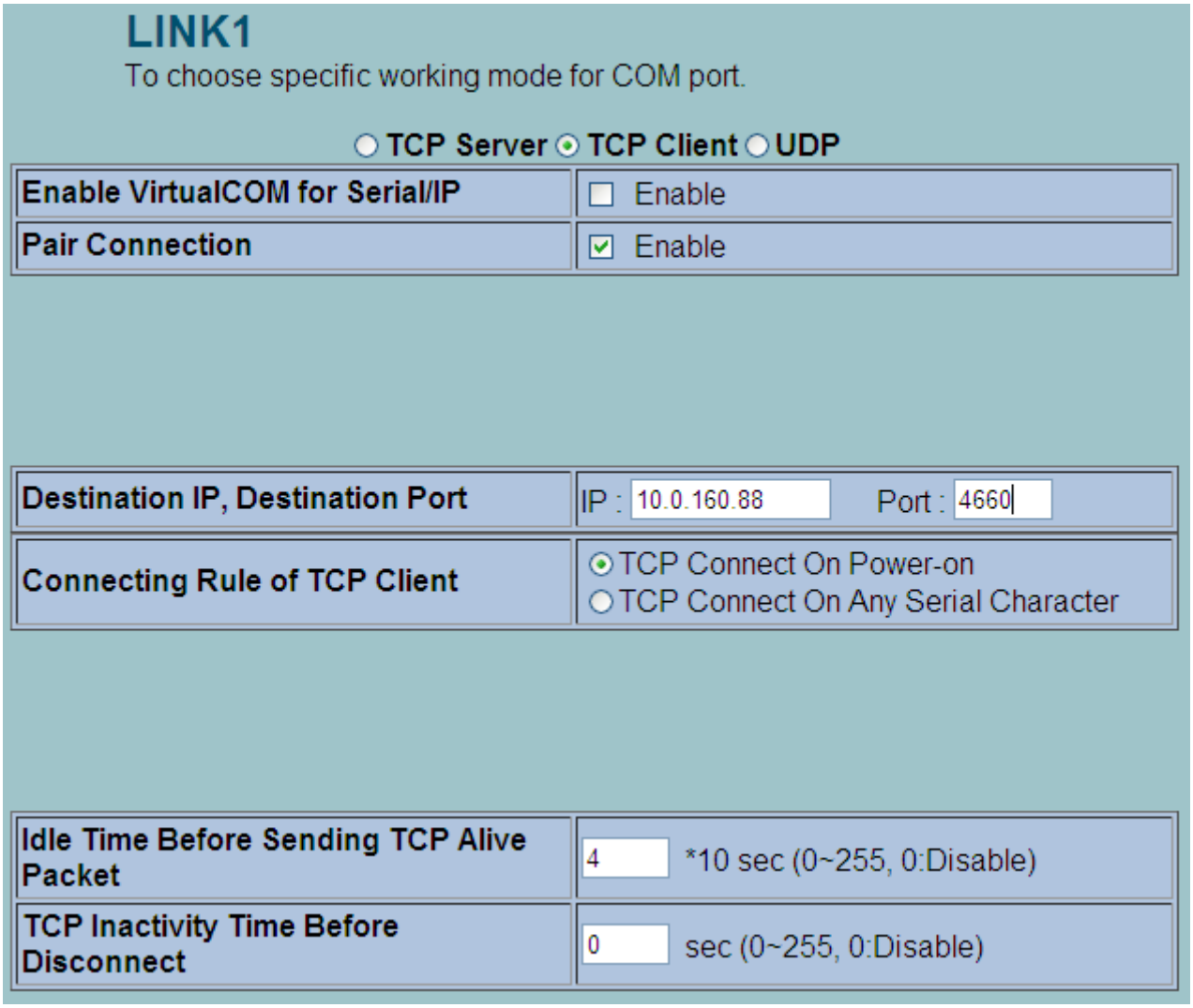


Figure 3.32 TCP Client with Pair Connection Enabled

- ➔ Follow section **3.2.6** to configure SE5001 in TCP Client mode properly.
- ➔ Check **Enable Pair Connection** to enabled Pair Connection application in SE5001.
- ➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.
- ➔ Match the **Destination IP and Port** here with the settings of Pair Connection Master's IP and **Listening Port** setup previously.

3.3.15. TCP Server Application: Enable Reverse Telnet

Reverse Telnet application is useful if a telnet program is used to connect to SE5001 and the serial interface of the SE5001 is connected to a Terminal Server. Telnet programs in Windows / Linux usually require special handshaking to get the outputs and formatting show properly. SE5001 will interact with those special commands (CR/LF commands) if Reverse Telnet is enabled.

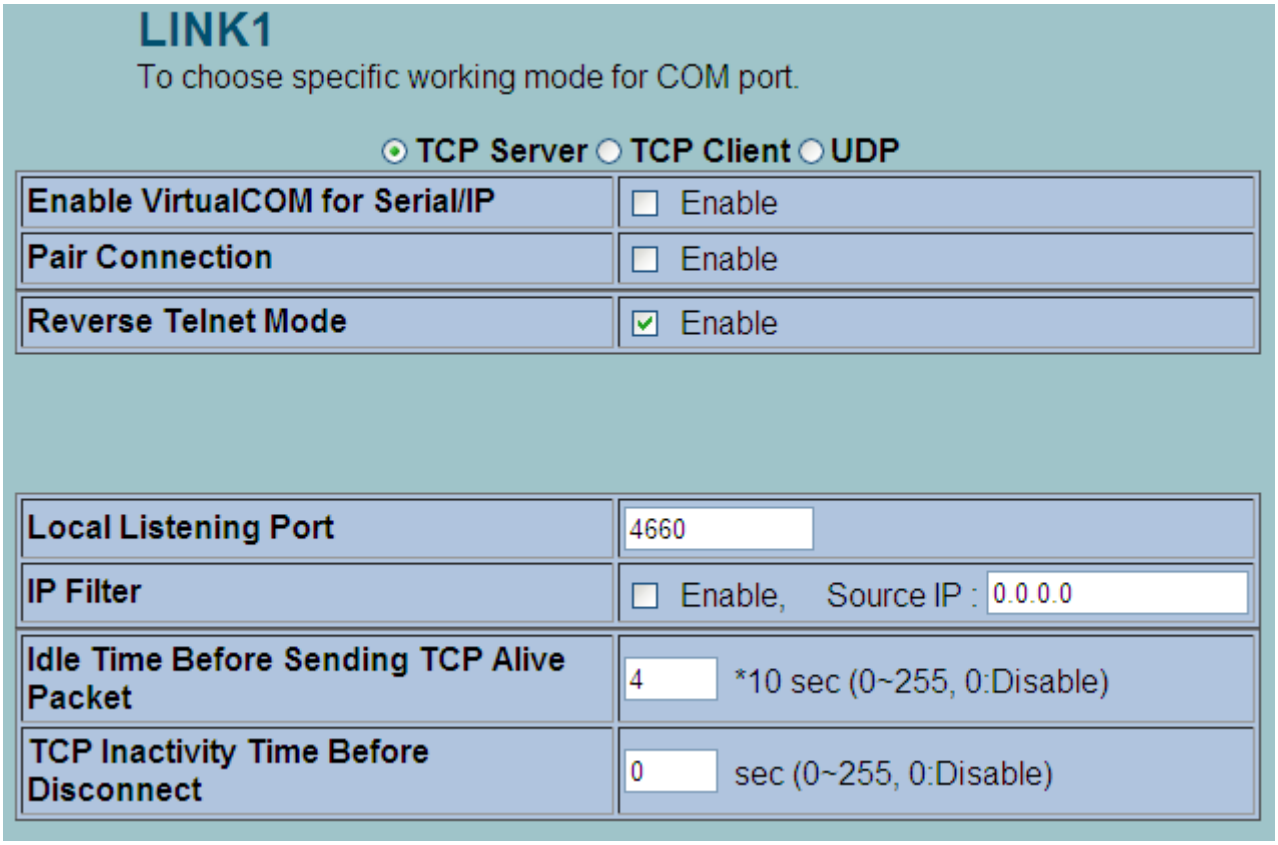


Figure 3.33 TCP Server with Reverse Telnet Enabled

➔ Follow section 3.2.5 to configure SE5001 in TCP Server mode properly.

➔ Check **Enable Pair Connection** to enabled Pair Connection application in SE5001.

➔ Scroll to the bottom of the page and click on "**Save Configuration**" button to save the changes.

3.3.16. UDP Application: Multi-Point Pair Connection

It is also possible to setup pair connection in UDP mode to have more than one Pair Connection Master or Slave to communicate to each other. For example, it is possible to setup one Modbus Master and six Modbus Slaves in UDP (Figure 3.34). Note again that UDP does not guarantee data delivery and **only data would be transmitted over Ethernet; other serial pings are not transmitted.** If RS-232 along with flow control, it is recommended to use Multi-Point Pair Connection in TCP (section 3.3.18).

➔ Note that the Destination IP and Port of the Slaves need to be equal to the Master's IP and Port. Local Listening Port of the Slaves needs to be equal to the Master's Destination Port.

Sample Configuration:

	IP Address	Link Mode	Local Listening Port	Destination IP	Destination Port
SE5001 Master	10.0.50.100	UDP	5000	10.0.50.200~10.0.50.207	5000

SE5001 Slave 1	10.0.50.200	UDP	5000	10.0.50.100	5000
SE5001 Slave 2	10.0.50.201	UDP	5000	10.0.50.100	5000
SE5001 Slave 3	10.0.50.202	UDP	5000	10.0.50.100	5000
SE5001 Slave 4	10.0.50.203	UDP	5000	10.0.50.100	5000
SE5001 Slave 5	10.0.50.204	UDP	5000	10.0.50.100	5000
SE5001 Slave 6	10.0.50.205	UDP	5000	10.0.50.100	5000

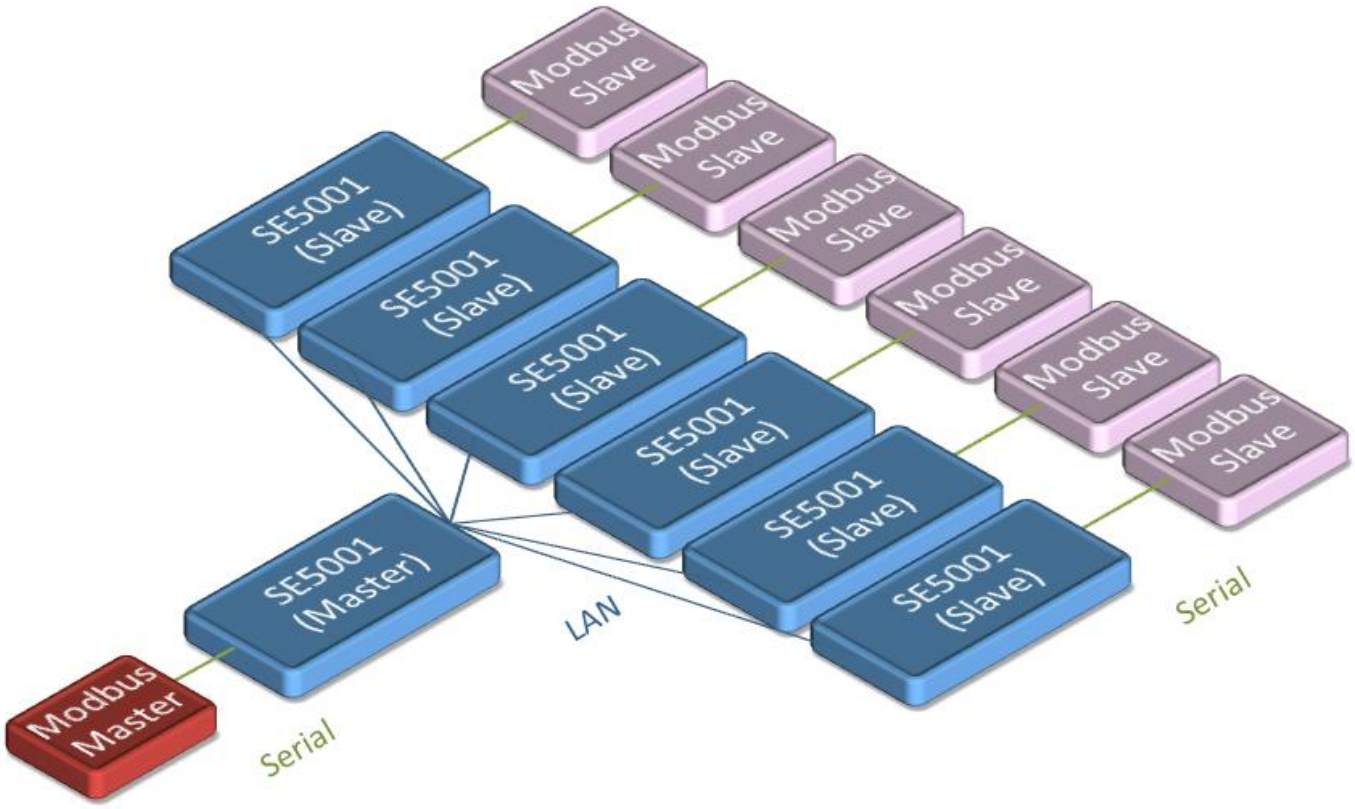


Figure 3.34 Multi-Point UDP Pair Connection with Modbus

3.3.17. TCP Server Application: Multiple TCP Connections

To have more than one TCP Client connecting to SE5001 in TCP Server mode, contact Atop Technical Support to obtain a special multi-connection version firmware. After the firmware is uploaded to SE5001, the WebUI will have one additional option called "**Multiple_Connections**" (Figure 3.35). The Multi-Connection option will allow up to a maximum of four TCP Client connections. SE5001 will broadcast serial data to all connected TCP Clients. Note that it is also possible to use this multi-connection feature in conjunction with other TCP Server applications, such as Virtual COM, Pair Connection, and Reverse Telnet. For example, enabling multi-connection along with Pair connection will result in Multi-Point Pair Connection in TCP mode (section **3.3.18**).

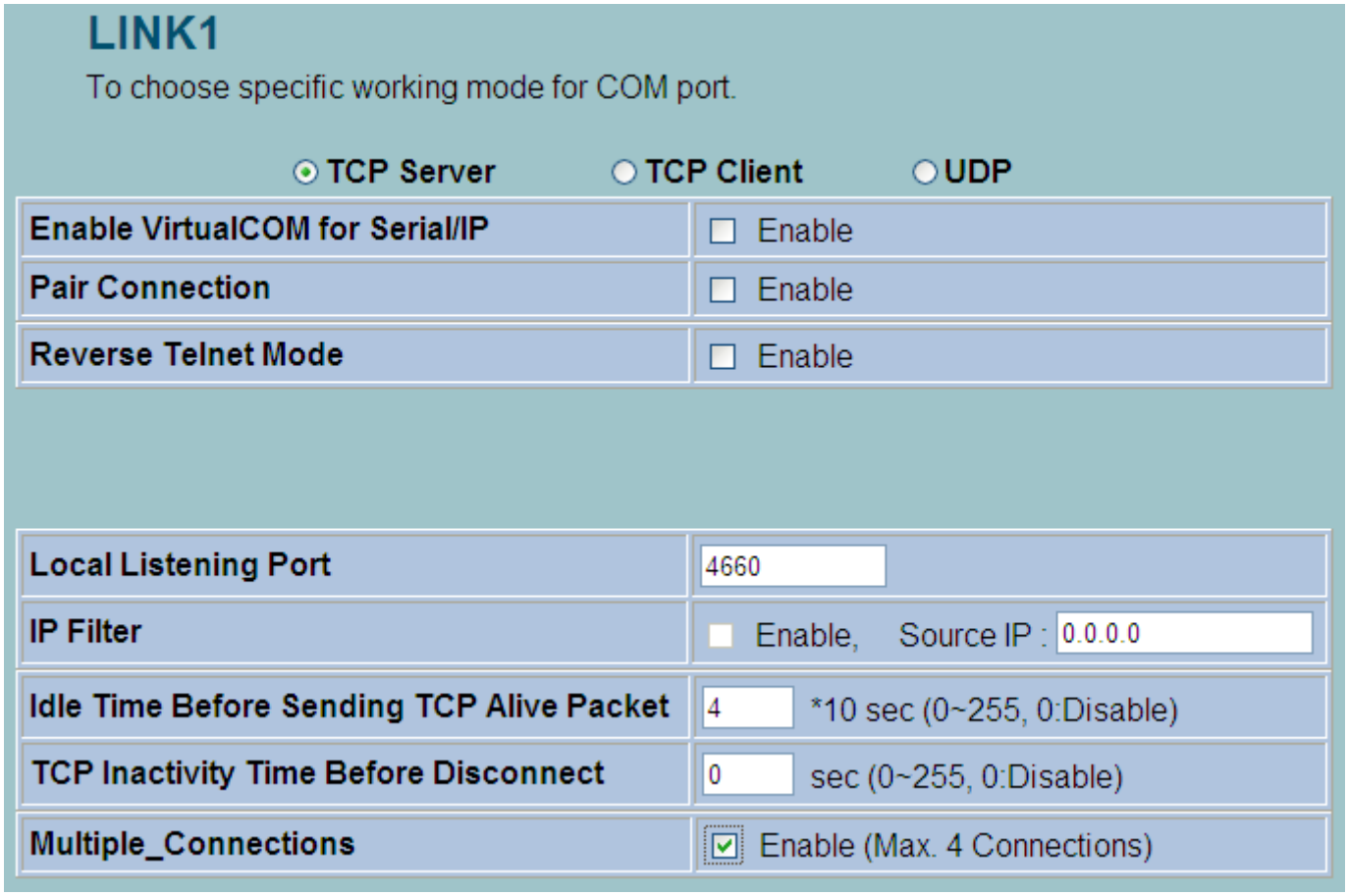


Figure 3.35 TCP Server with Multiple Connections Enabled

3.3.18. TCP Server Application: Multi-Point TCP Pair Connections

The difference between Multi-Point TCP Pair Connection and Multi-Point UDP Pair Connection is that the TCP implementation would also exchange flow controls pins of RS-232. However, the TCP Server is limited to a maximum of four connections. If there are than four serial devices and does not use flow control pins with RS-232 or RS-485, it is possible to setup pair connection in UDP mode (section 3.3.16). After multi-connection is enabled in the WebUI, refer to the following table to setup Pair Connection as in Figure 3.36.

	IP Address	Link Mode	Local Listening Port	Destination IP	Destination Port
SE5001 Master	10.0.50.100	TCP Server	5000	-	5000
SE5001 Slave 1	10.0.50.200	TCP Client	5000	10.0.50.100	5000
SE5001 Slave 2	10.0.50.201	TCP Client	5000	10.0.50.100	5000
SE5001 Slave 3	10.0.50.202	TCP Client	5000	10.0.50.100	5000
SE5001 Slave 4	10.0.50.203	TCP Client	5000	10.0.50.100	5000

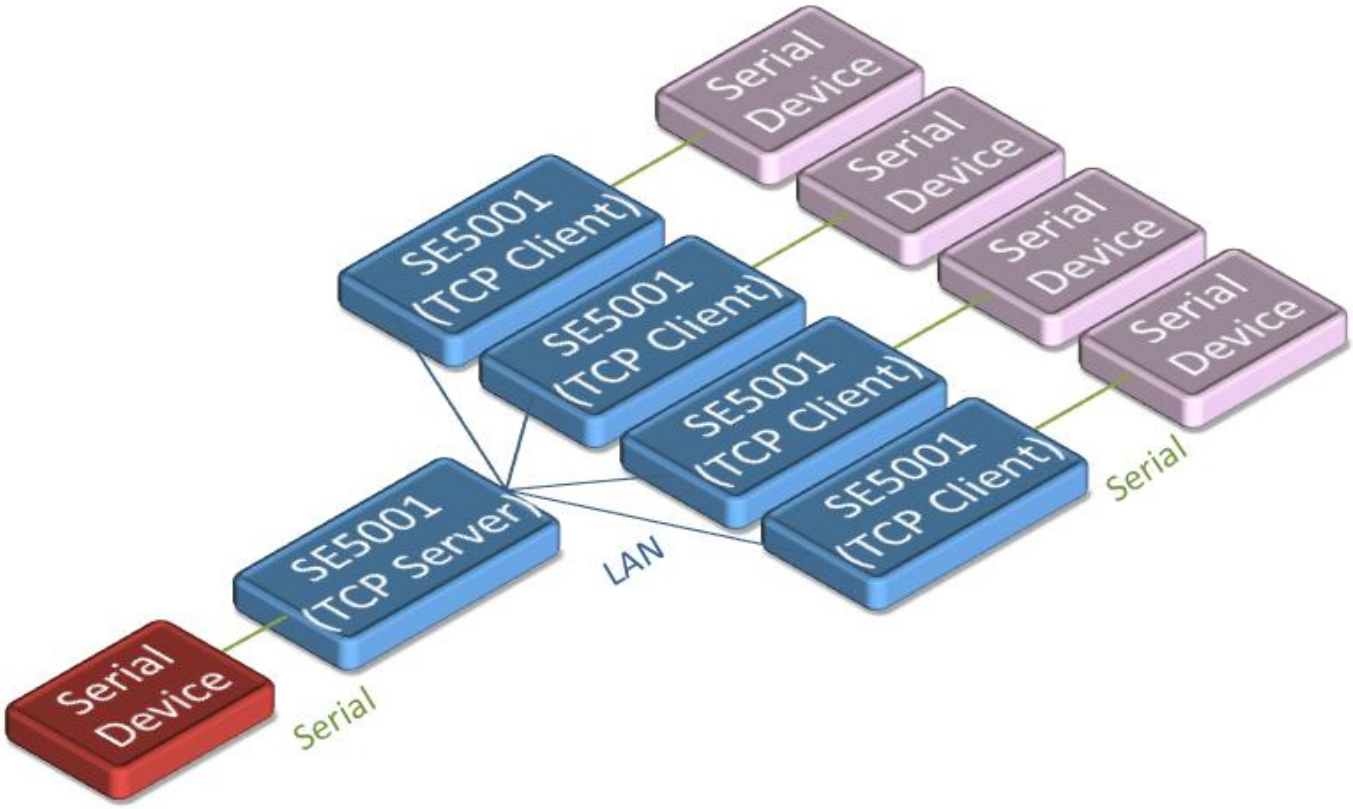


Figure 3.36 Multi-Point TCP Pair Connection

3.3.19. COM Configuration

Configure serial settings in this page (Figure 3.37). Note that these settings need to match the ones in the serial device.

Alias Name:

This field is for identification purpose only.

Baud Rate:

Select one of the baudrates from the dropdown box, or select Other and then enter the desired baudrate in the input box. Baudrates higher than 230400bps are not supported.

Parity / Data Bits / Stop Bits:

Configure them accordingly.

Flow Control:

Choose between No Flow Control, RTS/CTS (Hardware Flow Control), DTR/DSR, Xon/Xoff (Software Flow Control). If Xon/Xoff is selected, Xon and Xoff characters are changeable. Defaults are 0x11 for Xon and 0x13 for Xoff. If the serial device uses Xon/Xoff in conjunction with DTR/DSR, enable **Controlling DTR to simulate receiving Xon/Xoff and reading DSR to get Xon/Xoff currently.**

Empty Serial Buffer When TCP Connection is Established:

By default, SE5001 will empty its serial buffer when a new TCP connection is established. This means that the TCP application will not receive buffered serial data during a TCP link breakage. To keep the serial data when there is no TCP connection and send out the buffered serial data immediately after a TCP connection is established, set this option to **No.**

Data Packet Delimiter:

Packet delimiter is a way of packing data in the serial communication. It is designed to keep packets in track. SE5001 provides two types of delimiter: Time Delimiter and Character Delimiter.

- ➔ Time Delimiter: SE5001 will transmit the serial data in its buffer when the specified time interval has reached and no more serial data comes in. The default time is 2ms, which means SE5001 will push out its serial buffer if it does not receive any serial data with in 2ms.
- ➔ Character Delimiter: SE5001 will transmit the serial data in its buffer when it sees the specified character. The default character delimiter is 0x0d, which means SE5001 will push out its serial buffer if it sees 0x0d (carriage return) in the serial data.

COM Type Selection:

Select between RS-232, RS-422, and RS-485. Note that RS-485 refers to 2-Wire RS-485 and RS-422 is compatible with 4-Wire RS-485.

Click on "**Save Configuration**" button to save the changes.

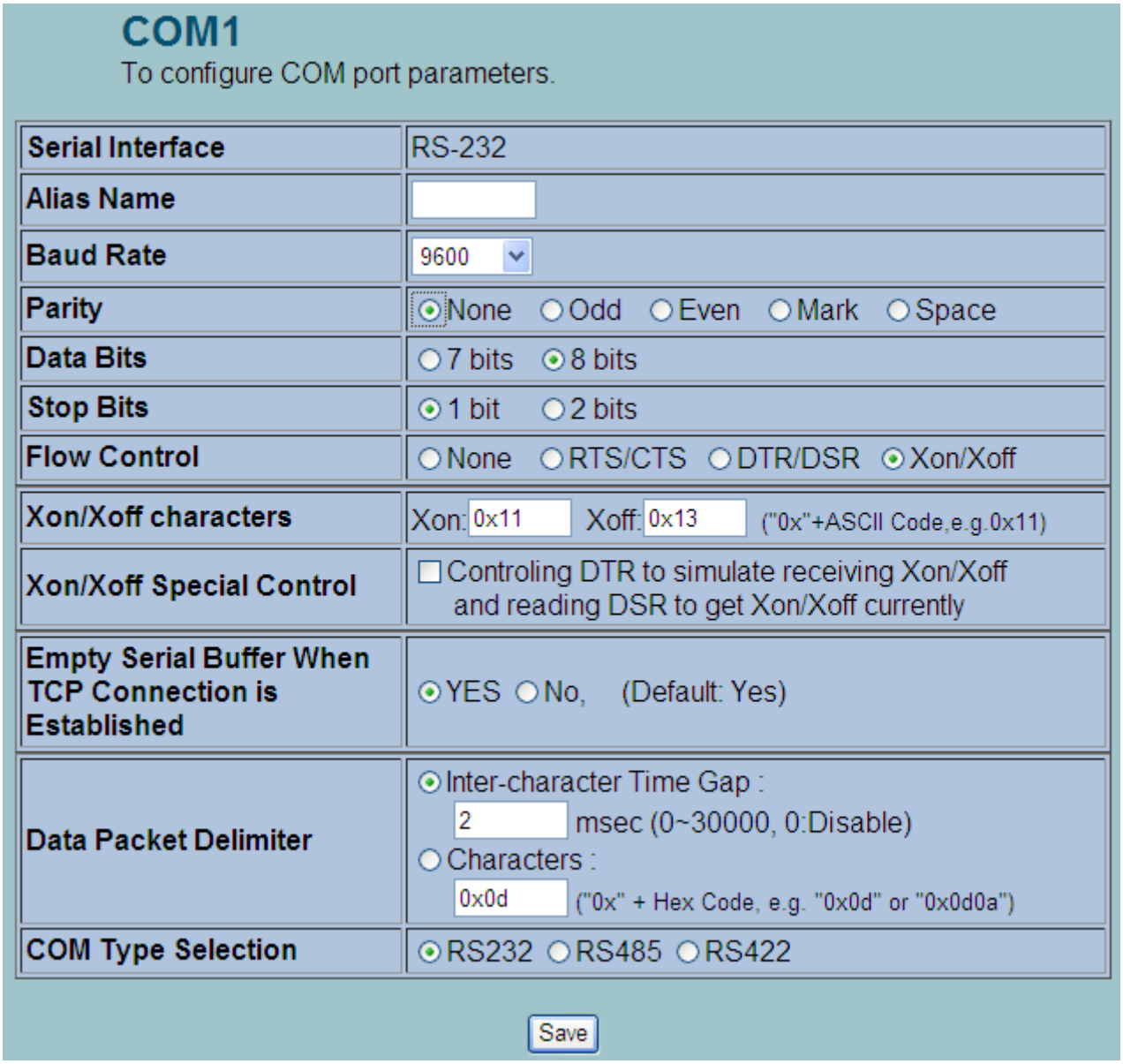


Figure 3.37 COM Configuration

*For SE5001-S5, SE5001-S5-TB5 and SE5001-S5is, COM Type Selection will only show 2 Wires (RS-485) and 4 Wires (RS-422 / 4 Wire RS-485).

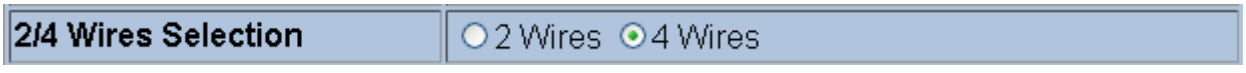


Figure 3.38 COM Configuration

4. Using Virtual COM

Virtual COM allows remote access of serial devices over TCP/IP networks through Serial/IP Virtual COM ports that work like local native COM ports. The following figure is a Virtual COM connection diagram. (Figure 4.1)

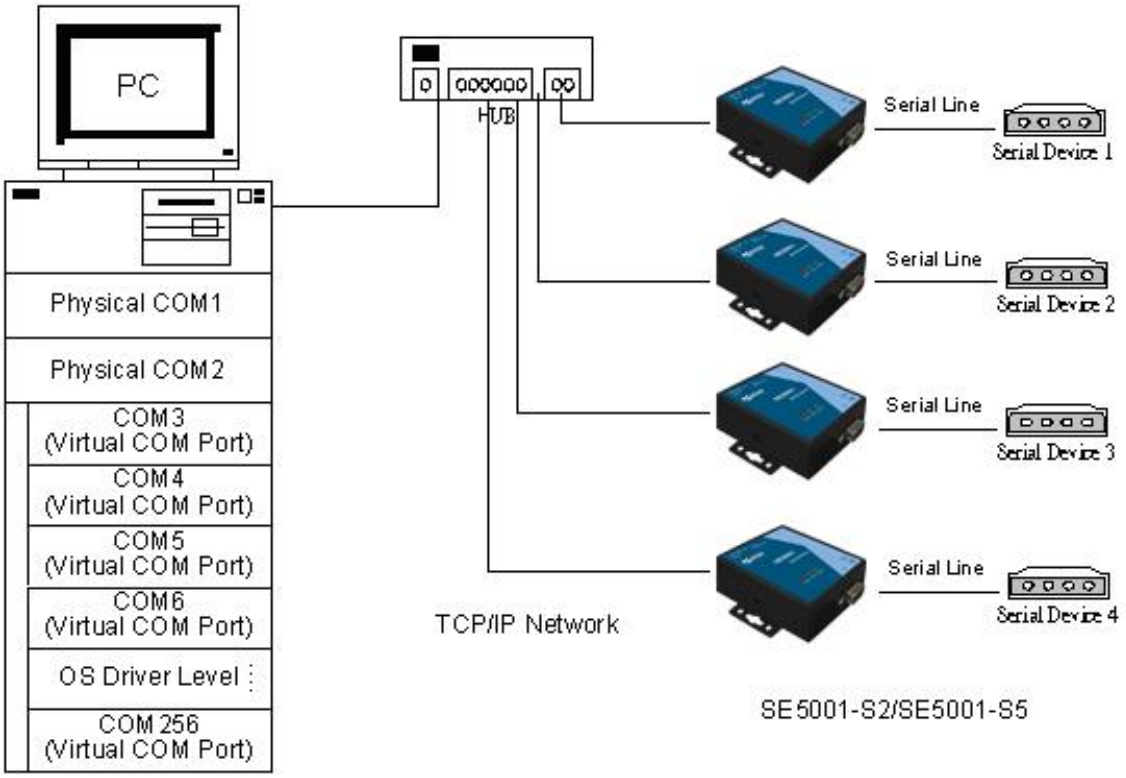


Figure 4.1 Virtual Com connection diagram

4.1 Setup of a Virtual COM Driver

4.1.1 System Requirements

Windows 7, 2008, Vista, 2003, XP, 2000, NT 4.0, 9x, Microsoft NT/2000/2003 Terminal Server, Citrix MetaFrame Access Suite, native and virtual, 32 and 64-bit versions. Note that upgrading the operating systems to the latest Service Packs is required, especially for older Windows versions.

To run Virtual COM in Linux, there is a separate package called TTYredirector available for download on Atop website or in the product CD. The zipped package includes a binary file for installation and a manual for Linux systems.

4.1.2 Limitation

The Virtual COM driver allows up to 256 **Virtual COM ports** in a single PC. Selecting in the range from COM1 to COM4096 is allowed. Note that COM ports already occupied by the system or other devices will not be available.

4.1.3 Installation

Run the Virtual COM setup file included in the CD or download a copy from our website to install the Virtual COM driver for the operating system. Turn off anti-virus software and try again if installation fails. At the end of the installation, please select at least one Virtual COM port from the Serial/IP Control Panel.

4.1.4 Uninstalling

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

4.2 Enable Virtual COM Serial device servers and Select Virtual COM in Windows

4.2.1 Enable Virtual COM in Serial Device Servers

Enable Virtual COM in our serial device servers by logging into our WebUI. It is located under COM configuration. Following figures show how to enable Virtual COM in different serial device servers that we offer. For detailed Link Mode configuration with Virtual COM, please refer to the previous sections starting from section **3.3.9** on Link Mode configurations.

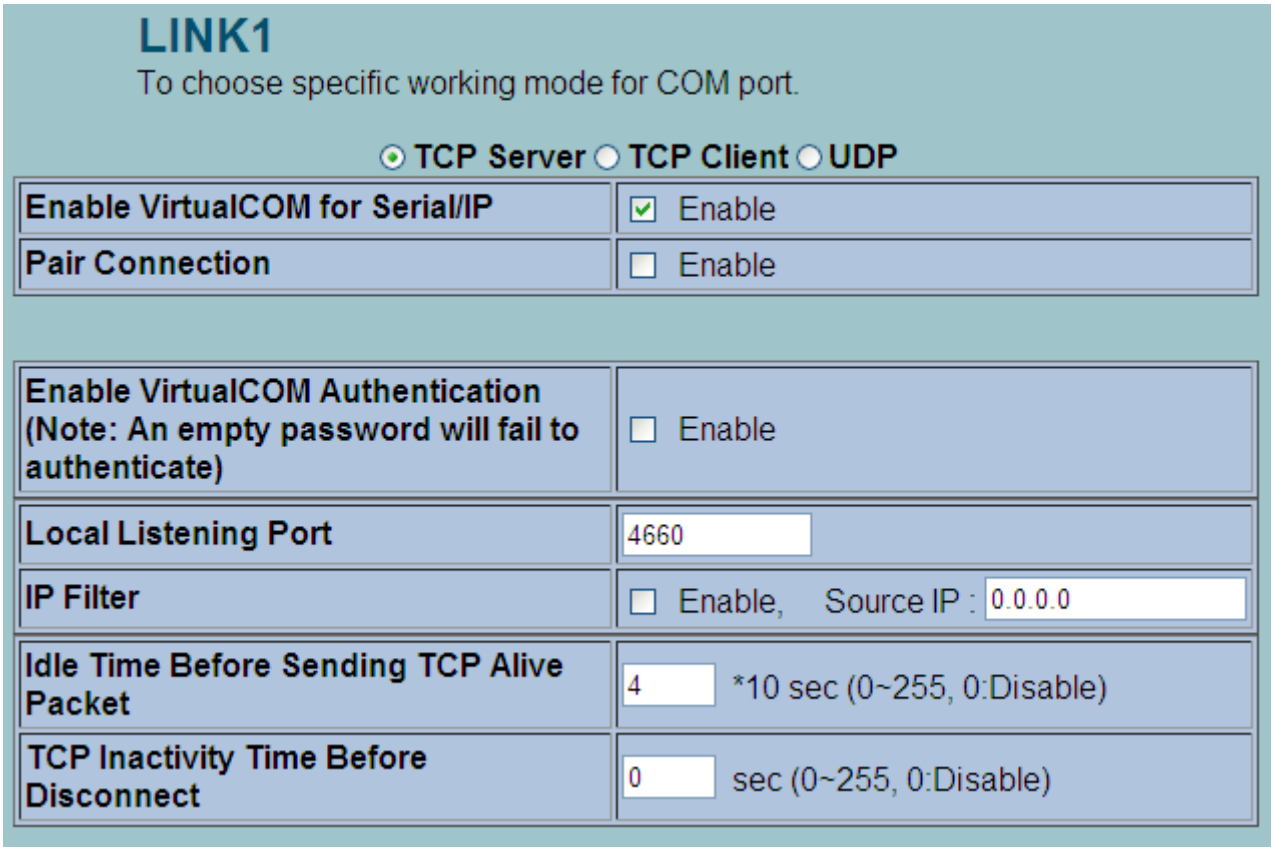


Figure 4.2 Enable Virtual COM in SE5001, SE5002, or GW series

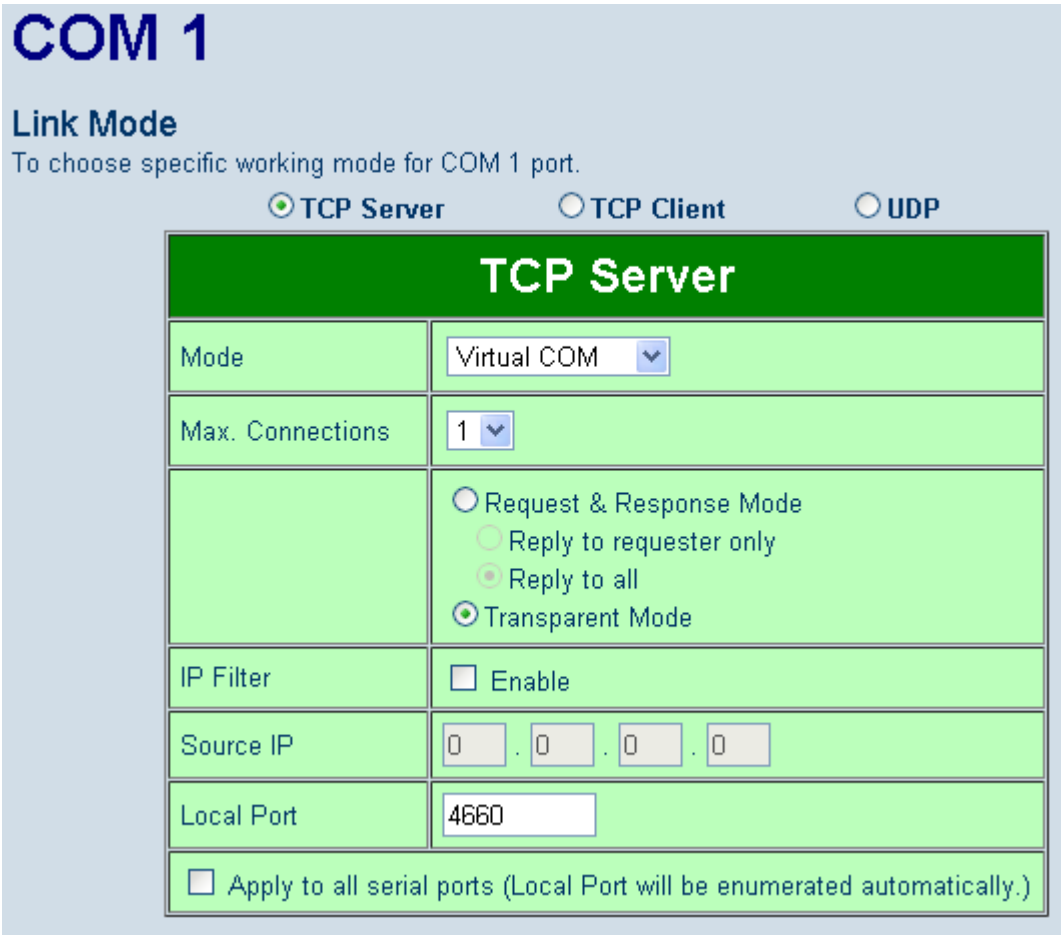


Figure 4.3 Enable Virtual COM in SE540x, SW500x, or EW5302

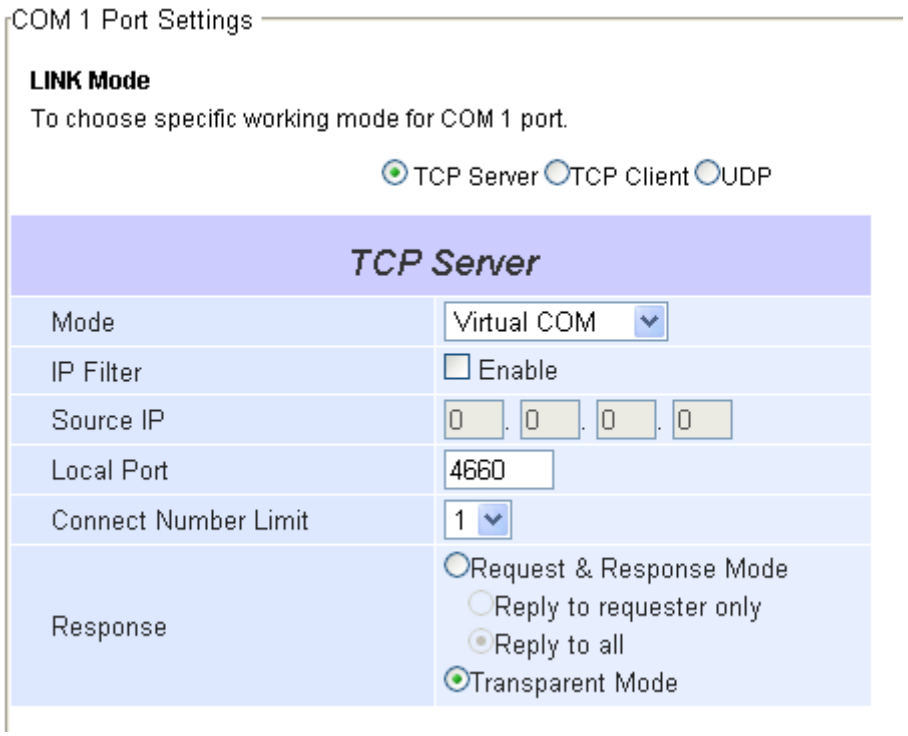


Figure 4.4 Enable Virtual COM in SW550x

It is also possible to enable Virtual COM in serial device servers using Telnet. Please refer to the section **3.2.8** on Telnet.

4.2.2 Running Serial/IP in Windows

Find Serial/IP Control Panel from:

- Start->All Programs-> Serial/IP->Control Panel
- In the Windows Control Panel, open the Serial/IP applet.
- In the Windows notification area (Figure 4.5), right click in the Serial/IP tray icon and click on **Configure** to open the Control Panel.

Figure 4.5 Serial/IP Notification Tray Icon

If no Virtual COM port is selected, a dialog will pop up and asks to select at least one port as the Virtual COM port before proceeding (Figure 4.6).

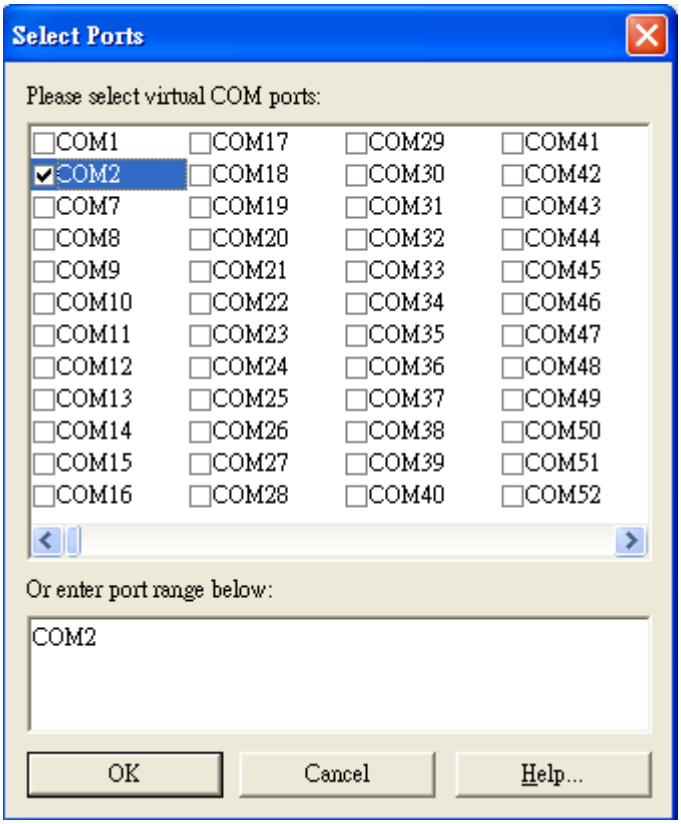


Figure 4.6 Select Virtual COM Ports

After at least one Virtual COM port is seletected, the Control Panel will show (Figure 4.7).

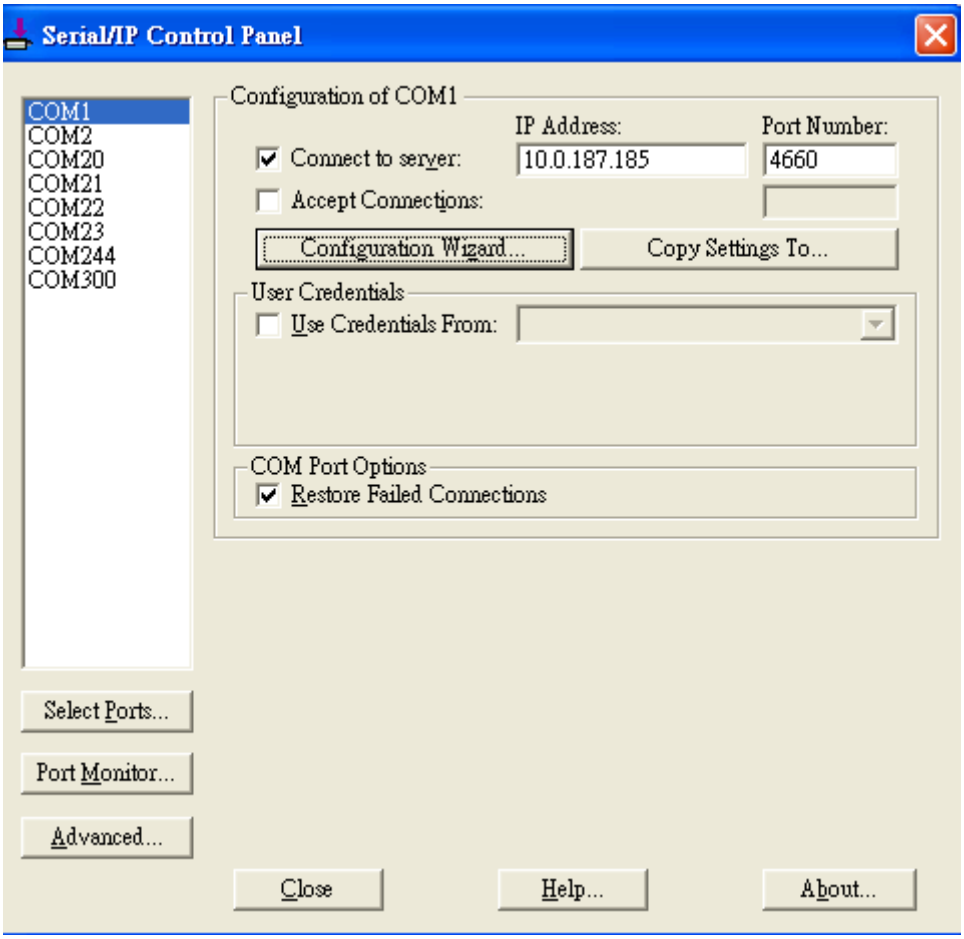


Figure 4.7 Serial/IP Control Panel

The left hand side of the Control Panel shows the list of selected Virtual COM ports. Click on **Select Ports** to add or remove Virtual COM ports from the list. The right hand side of the Control Panel shows the configurations of the selected Virtual COM port marked in blue. Each Virtual COM port can have its own settings.

Note: The changes to Virtual COM ports apply immediately, so there is no need to save the settings manually. However, if the Virtual COM port is already in use, it is necessary to close the Virtual COM port and open it after the TCP connection closes completely in order for the changes to take effect.

4.3 Configuring Virtual COM Ports

To Configure Virtual COM ports (Figure 4.7):

1. If the serial device server is running in TCP Server mode (recommended), Serial/IP should be the TCP Client connecting to the serial device server. Enable **Connect to Server** and enter the **IP Address** of the serial device server with the **Port Number** specified. The **Port Number** here is the Local Listening Port of the serial device server.
2. If the serial device server is running in TCP Client mode, Serial/IP should be the TCP Server waiting for SE5001 to connect it. Enable **Accept Connections** and enter the **Port Number**. The **Port Number** here

is the Destination Port of the serial device server. Do not enable **Connect to Server** and **Accept Connections** together.

3. If **Enable VirtualCOM Authentication** is enabled in the serial device server (this is only available in limited serial device servers), it is necessary to enable **Use Credentials From** and select **Use Credentials Below** from the list (Figure 4.8). Enter the **Username** and **Password** of the serial device server in the respective fields.

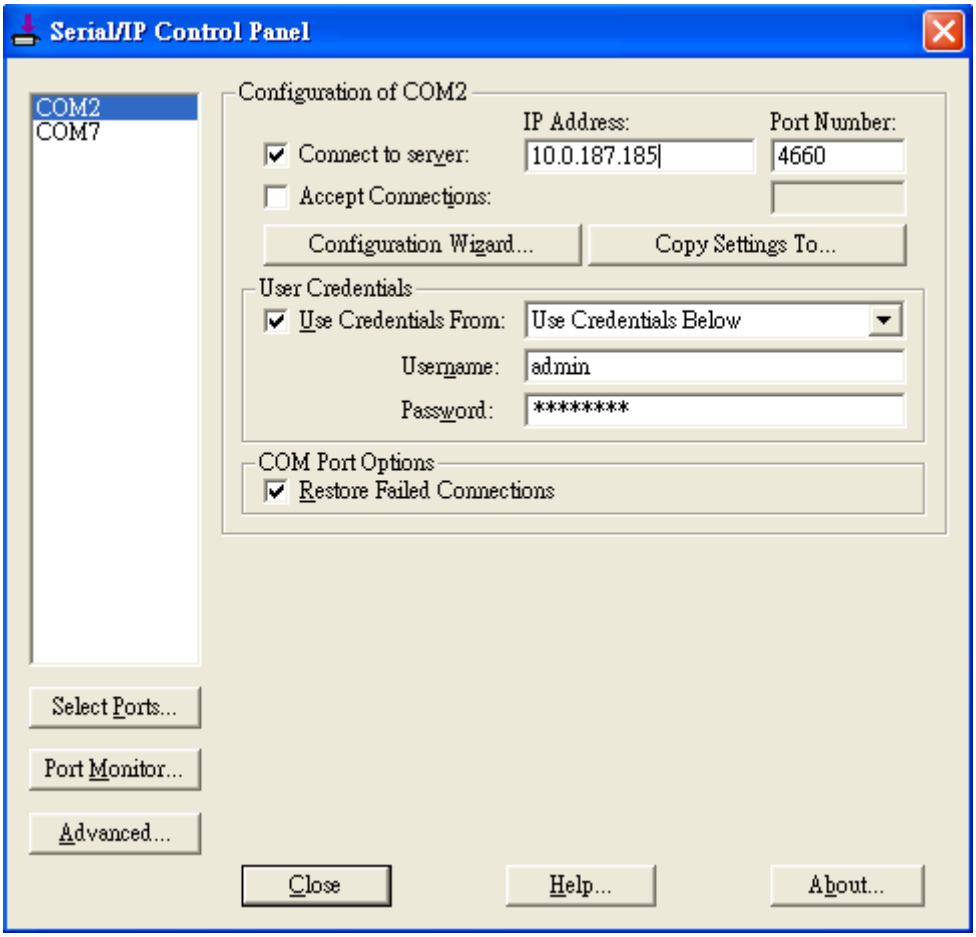


Figure 4.8 Virtual COM with Credentials

4. Enable **Restore Failed Connections** to force Virtual COM to automatically restore failed connections with the serial device server in the case of unstable network connections.
5. To test the Virtual COM connection, click the Configuration Wizard button and then click **Start** button in the pop up window (Figure 4.9). If the test passes, all checks should be in green. To apply the changes in the Configuration Wizard window to the Control Panel, click on **Use Settings**. Click on **Copy** to copy the results to the system clipboard.
6. To transfer the settings between Virtual COM ports, click on the **Copy Settings To** button.

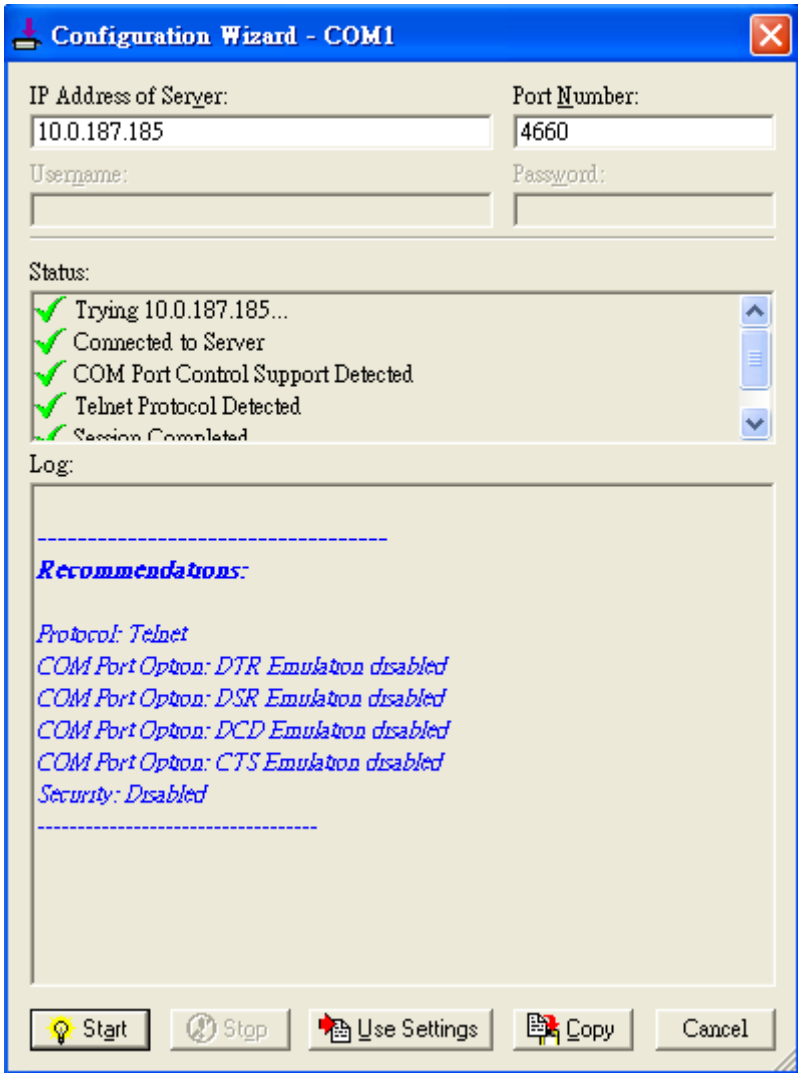


Figure 4.9 Configuration Wizard

Exceptions:

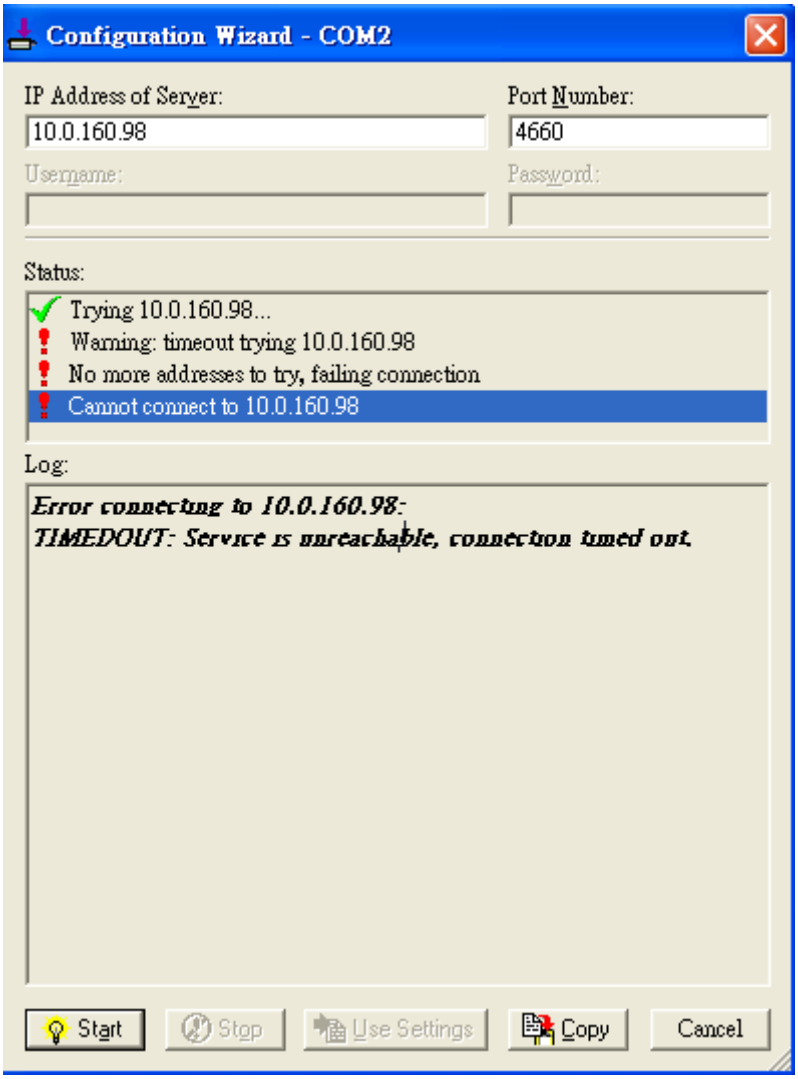


Figure 4.10 Virtual COM Timeout Exception

a. If the exclamation mark begins with **Warning: timeout trying x.x.x.x** (Figure 4.10), recheck the Virtual COM IP and Port configuration or the PC's network configuration.

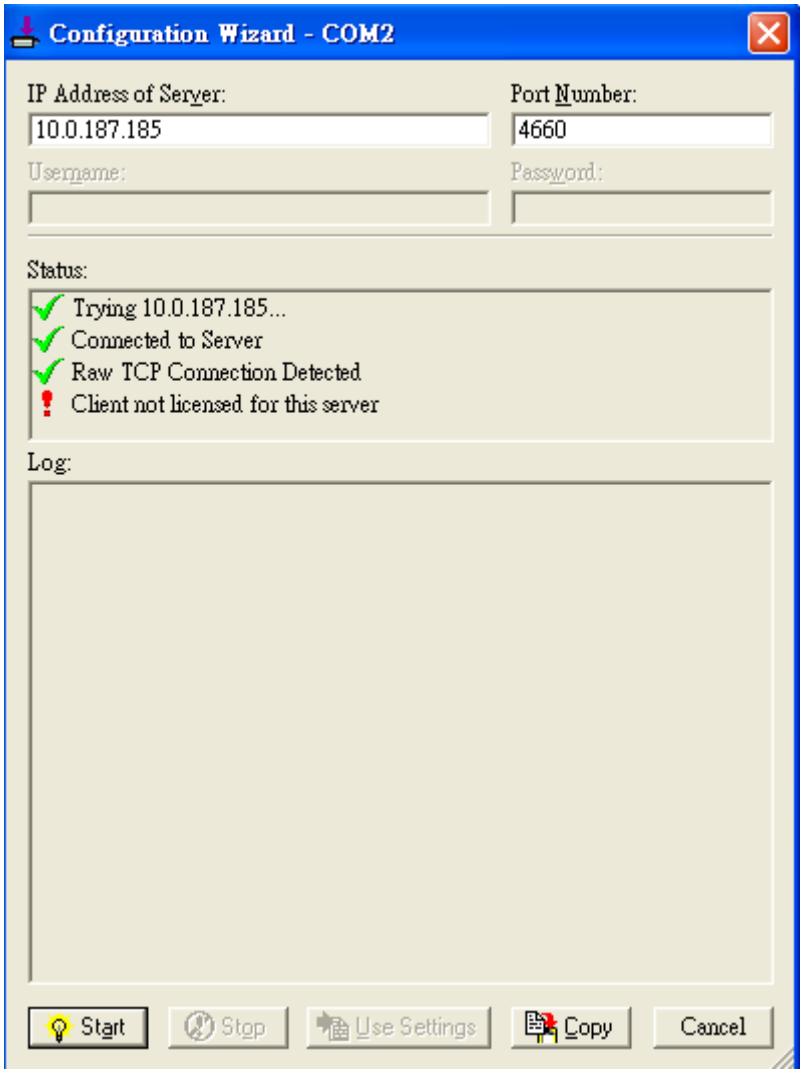


Figure 4.11 Virtual COM Raw Connection Exception

b. If there is a check with **Raw Connection Detected** and an exclamation mark with **Client not licensed for this server** (Figure 4.11), enable Virtual COM in the serial device server.

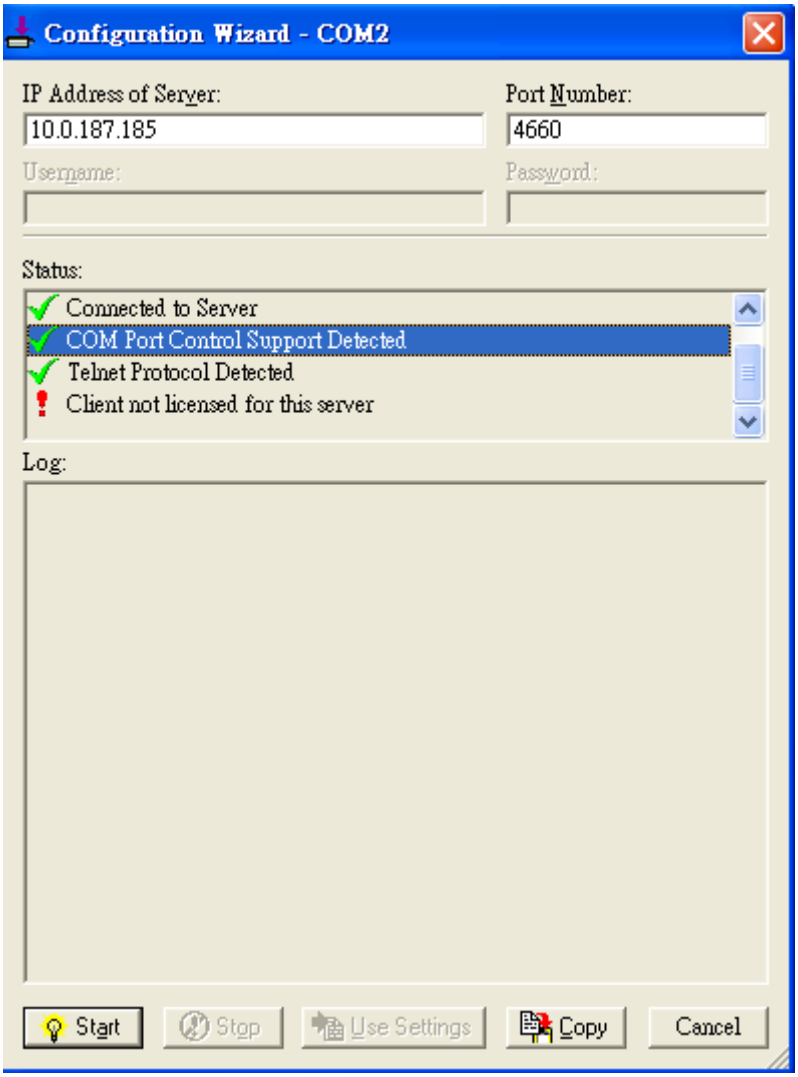


Figure 4.12 Virtual COM License Exception

c. If there is a check with **Telnet Protocol Detected** and an exclamation mark with **Client not licensed for this server** (Figure 4.12), this means that there is a licensing issue between the serial device server and Serial/IP. Please contact Atop technical support to obtain the correct Virtual COM software.

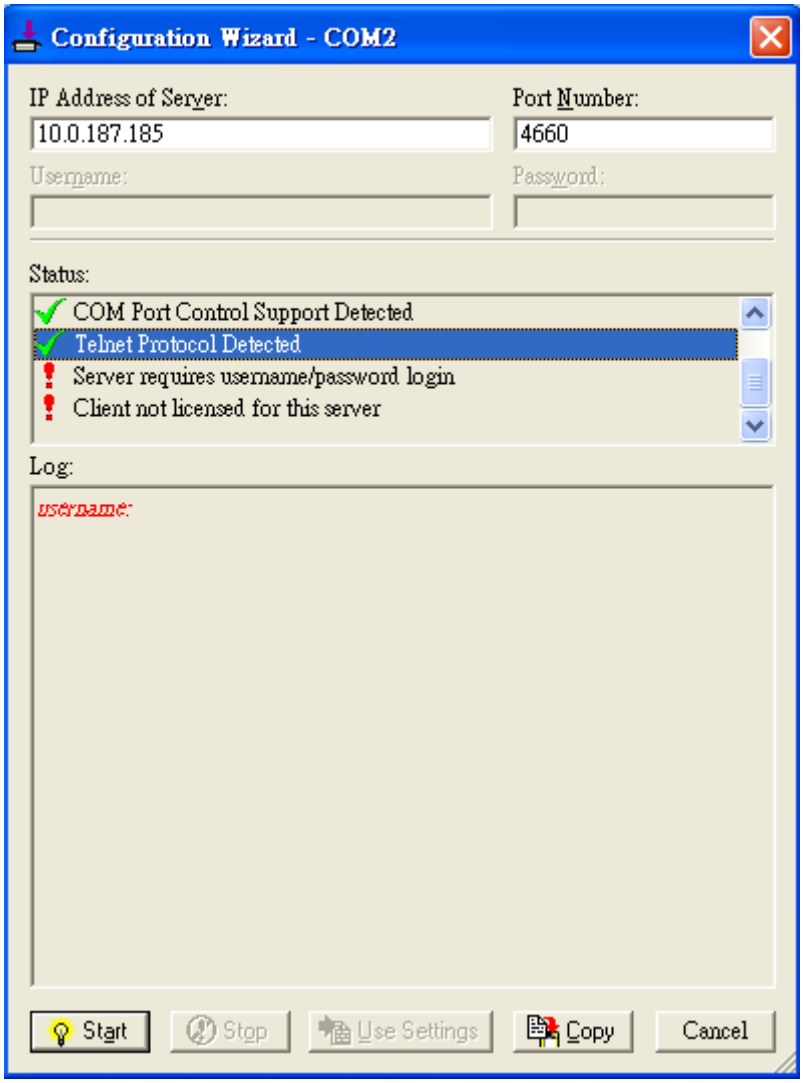


Figure 4.13 Virtual COM Credentials Exception

d. If the exclamation mark begins with **Server requires username/password login** (Figure 4.13), it means VirtualCOM Authentication in the serial device server is enabled, but credentials in the Serial/IP is not enabled.

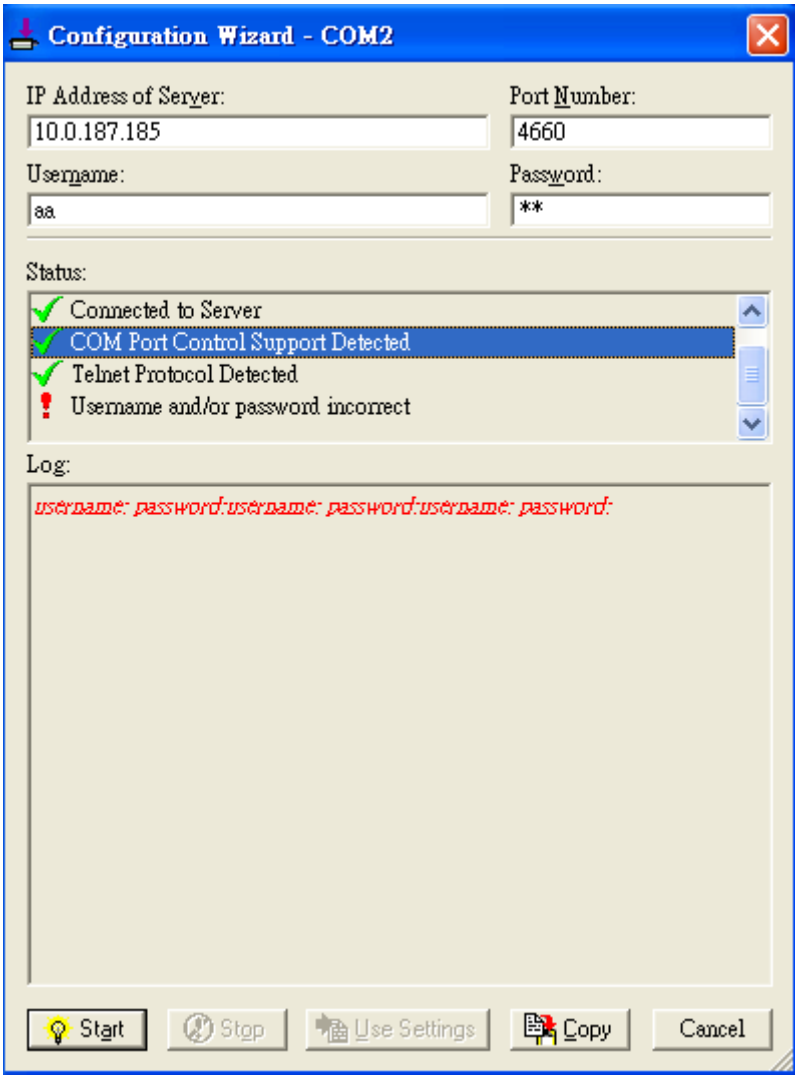


Figure 4.14 Virtual COM Username Password Exception

e. If the exclamation mark begins with **Username and/or password incorrect** (Figure 4.14), this means the wrong username and/or password was entered and the authentication failed.

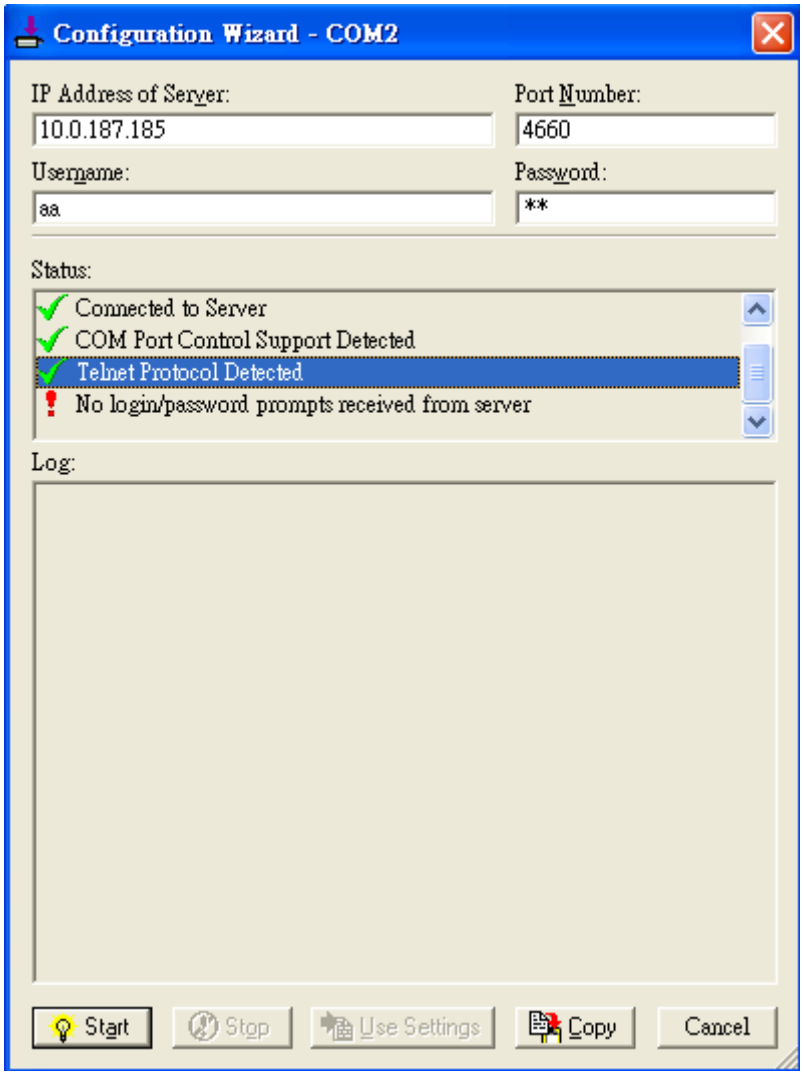


Figure 4.15 Virtual COM Credentials Exception

f. If the exclamation mark begins with **No login/password prompts received from server** (Figure 4.15), it means credentials in the Serial/IP is enabled, but VirtualCOM Authentication in the serial device server is not enabled.

4.4 Using Serial/IP Port Monitor

4.4.1. Opening the Port Monitor

The Serial/IP Port Monitor can be opened by:

- Start->All Programs-> Serial/IP->Port Monitor
- Double click the Serial/IP tray icon in the Windows notification area (Figure 4.5).
- In the Windows notification area (Figure 4.5), right click in the Serial/IP tray icon and click on **Port Monitor** to open the Port Monitor.
- Click on the **Port Monitor** button in the Serial/IP Control Panel

4.4.2. The Activity Panel

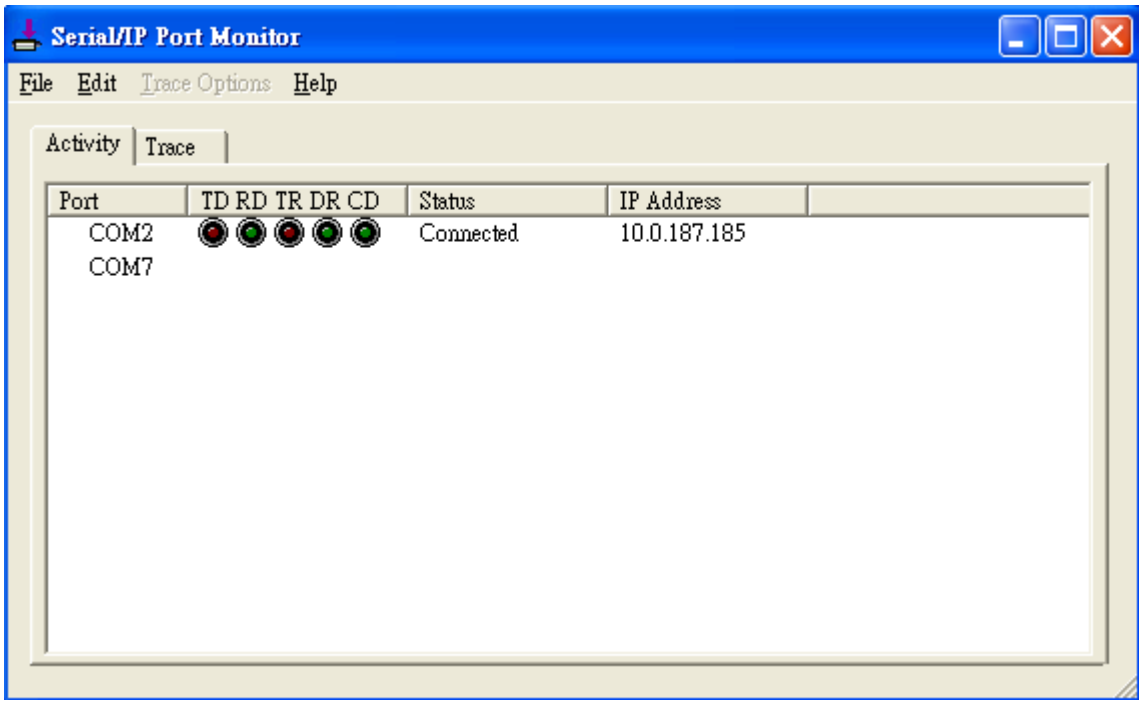


Figure 4.16 Port Monitor Activity Panel

The Activity panel provides a real-time display of the status of all Serial/IP COM ports (Figure 4.16). If the Virtual COM Port is open and is properly configured to connect to a serial device server, the status would be **Connected.** If Serial/IP cannot find the specified serial device server, the status would be **Offline**.

4.4.3. The Trace Panel

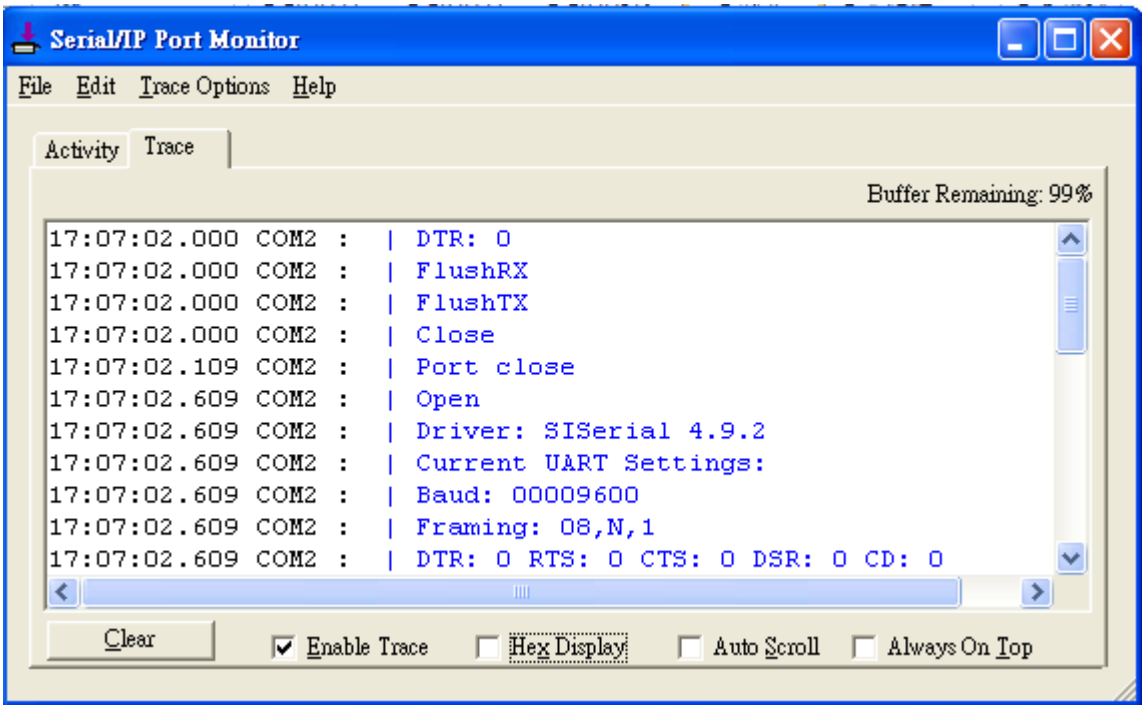


Figure 4.17 Port Monitor Trace Panel

The Trace panel provides a detailed, time-stamped, real-time display of all Serial/IP COM ports operations (Figure 4.17). Click on **Enable Trace** to start logging Virtual COM communication. Click on File->Save As and send the log to Atop for analysis If problems arises with Virtual COM.

4.5 Serial/IP Advanced Settings

In the Serial/IP Control Panel, Click on the **Advanced** button to open Advanced Settings window (Figure 4.18). Click on **Use Default Settings** to load the default settings.

Extend Server Connection

Maintains the TCP connection for specified amount of time after COM port is closed

Attempt Server Connection

Terminates pending connection attempts if they do not succeed in the specified time

Synchronize with Server Upon COM Port Open

Required by NT Systems (2000, XP, Vista, 7)

Update Routing Table Upon COM Port Open

Maintains IP route to a server in a different subnet by modifying the IP routing table

Enable Nagle Algorithm

Provides better network efficiency by imposing a minor latency on the data stream while it waits to fill network packets

Always Limit Data Rate to COM Port Baud Rate

Limits the data rate to the baud rate that is in effect for the virtual COM port

Attempt Server Connection

If credential is set to Windows Credentials, VCOM automatically adds the current Windows domain to the username

COM Port Control Keep-Alive

Controls the interval at which VCOM will issue the keep-alive message, if no there is no activity

Maximum Connection Recovery Interval

Controls the maximum time for “Restore Failed Connection”

Enable SETXON/SETXOFF COM Port Commands

This option enables additional negotiation on SETXON and SETXOFF commands and is only available for the “V” series serial device servers. If the application requires SETXON/SETXOFF feature, please contact Atop Tech Support.

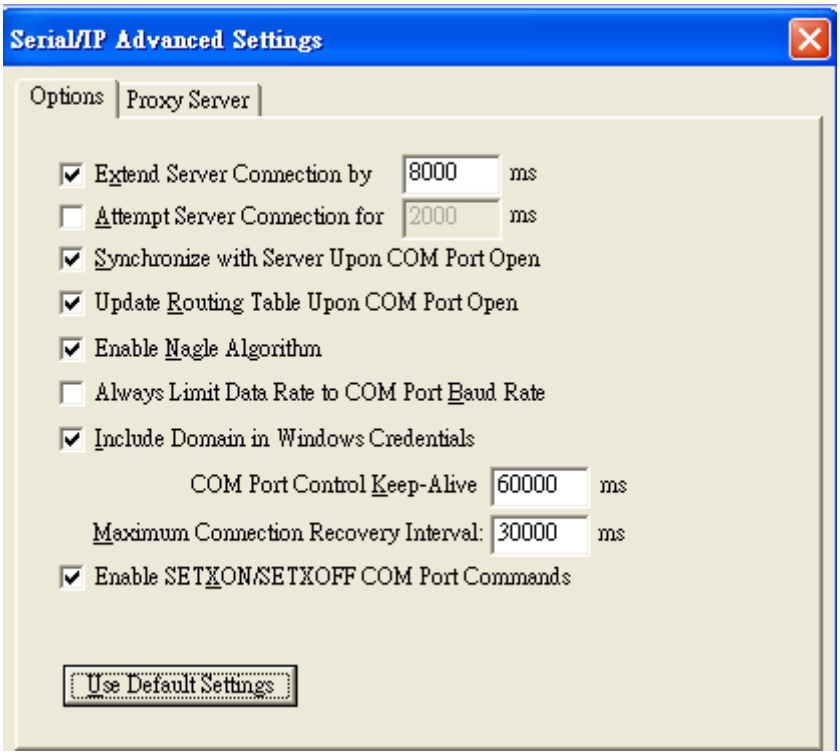


Figure 4.18 Serial/IP Default Advanced Settings

4.6 Using Serial/IP with a Proxy Server

The Serial/IP Redirector supports TCP network connections made through a proxy server, which may be controlling access to external networks (such as the Internet) from a private network that lacks transparent IP-based routing, such as NAT. Find Proxy Server settings from the Advanced Settings windows and switch to the **Proxy Server** tab (Figure 4.19)

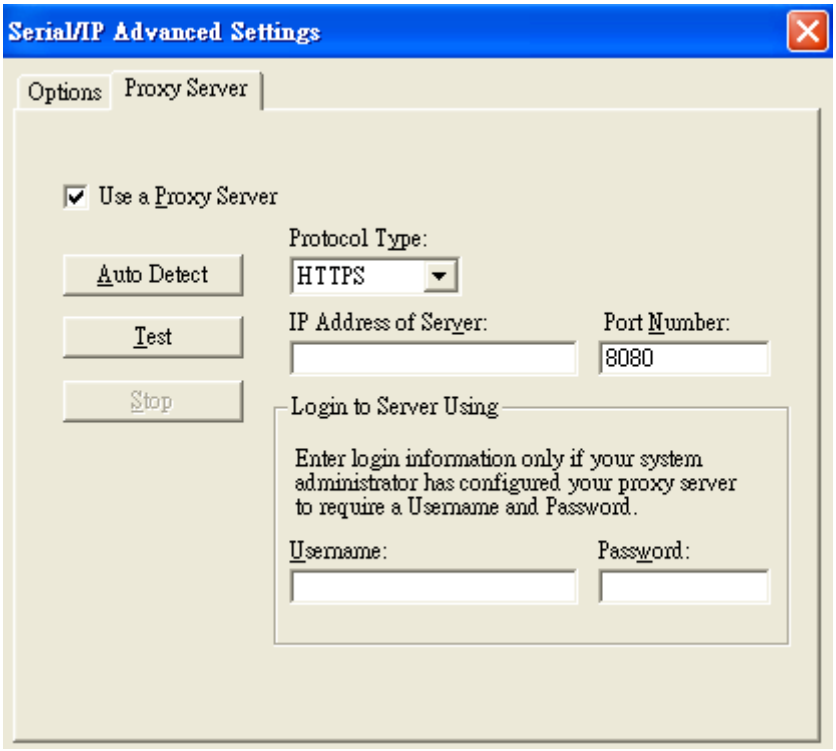


Figure 4.19 Serial/IP Proxy Settings

5. Writing a TCP Program

Before working on the sample TCP program, please make sure the serial device server is properly configured to the TCP server mode. The sample program is a TCP Client that connects to the serial device server.

5.1 Running the Sample Program

Sample programs written in Microsoft Visual Basic 6 and Visual C++ 6 are included in the CD with their source codes. Find them inside **\sample\vb_ap** and **\sample\vc_ap** respectively.

5.1.1 TCPTEST in Microsoft Visual Basic 6

This sample program is written in Visual Basic 6.0 with Winsock Controls. It demonstrates how to send and receive data from a PC to SE5001 via Ethernet using two TCP sockets.

Open the project file by double clicking tcptest.vbp or open it in Visual Basic (Figure 5.1). Press the **Start** button to launch TCPtest in debug mode.

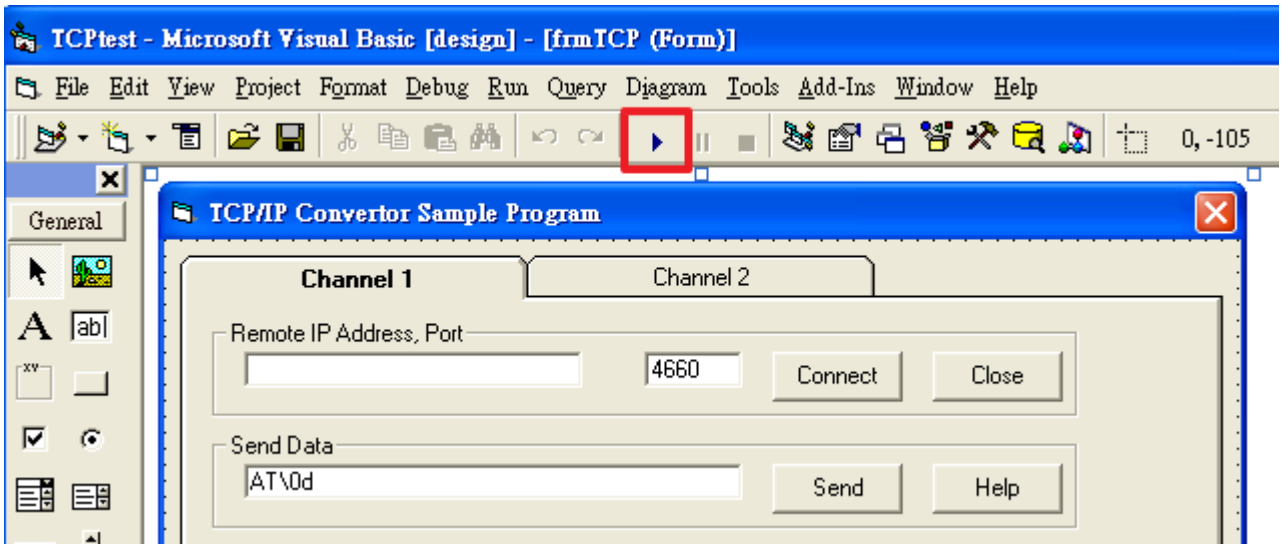


Figure 5.1 TCP Test Sample Program in Visual Basic

It is also possible to launch the precompiled program (Figure 5.2) without installing Visual Basic, double click on Tcptest.exe to launch. Make sure Visual Basic 6 Runtime is installed.

Service Pack 6 for Visual Basic 6.0: Run-Time Redistribution Pack from Microsoft:

http://www.microsoft.com/download/en/details.aspx?id=24417

The sample program first connects to the serial device server located at 10.0.187.185 with port 4660 and send Hello World! Note that the serial interface of the serial device server is in a loopback configuration (Rx and Tx are

shorted), so Hello World is returned by the serial device server back to the sample program. Start with backslash (\) to send hexadecimal bytes directly. For example, \0d sends 0d.

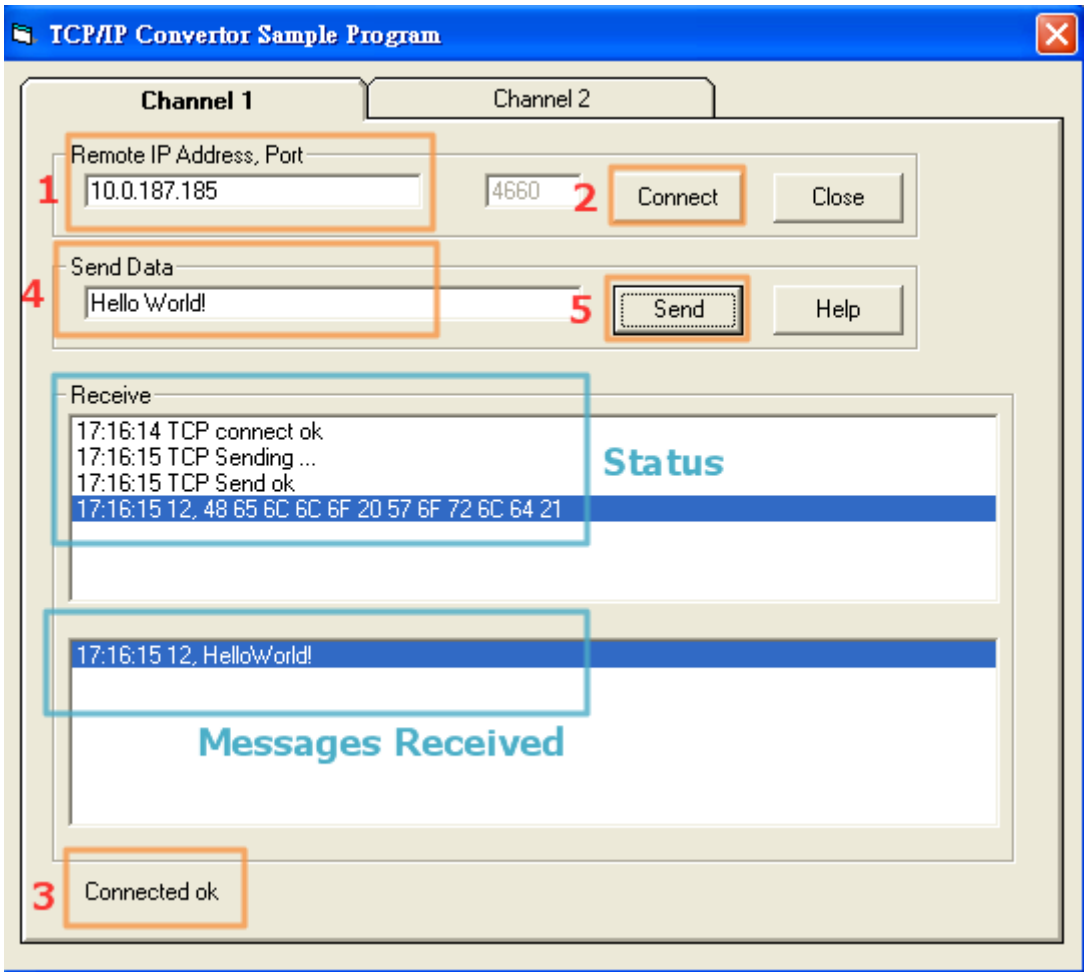


Figure 5.2 TCP Test GUI

5.1.2 TCPTEST2 in Microsoft Visual C++ 6

To modify the program, open the project file by double clicking tcptest2.dsw or open it in Visual C++ (Figure 5.3).

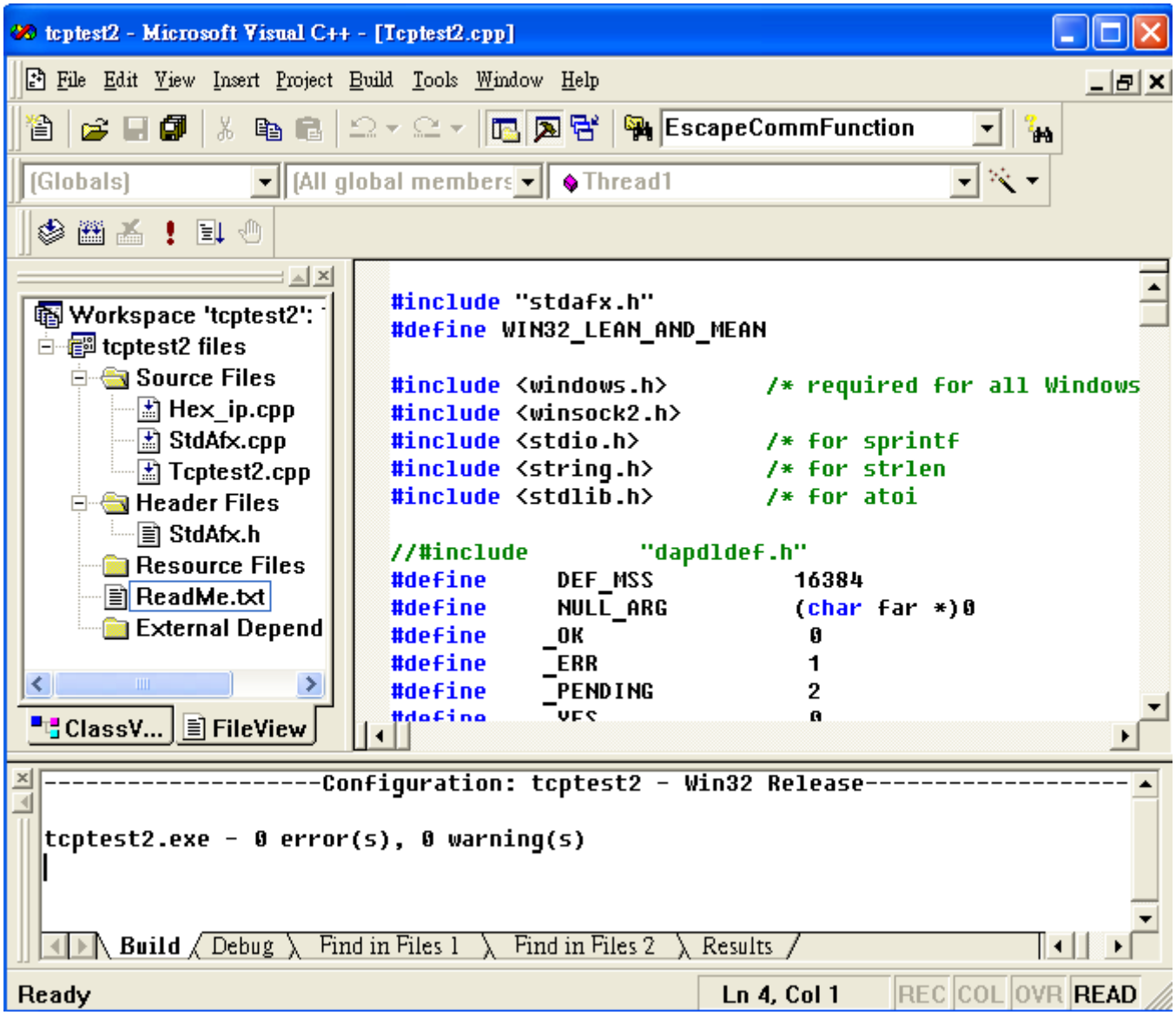


Figure 5.3 TCP Test Sample Program in Visual C++

To run the precompiled program, open the Windows command console, switch to the folder where the executable is located (vc_ap\Release\) and enter the following commands (Figure 5.3):

TCPTEST2 IP_Address Port_Number

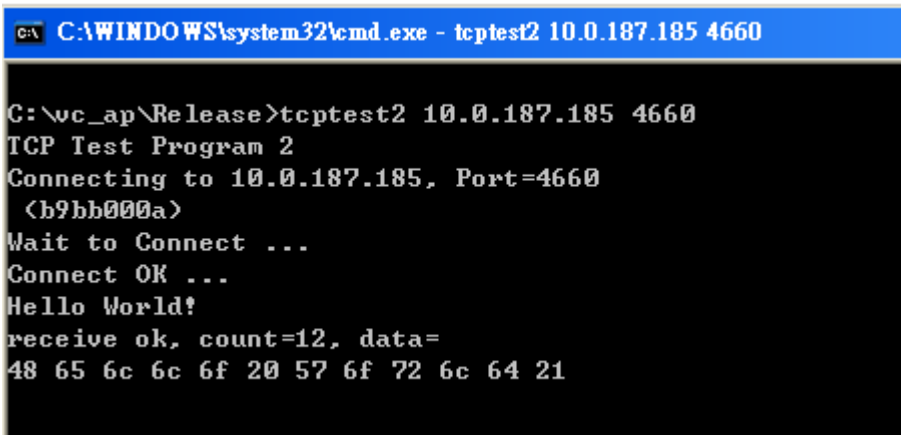


Figure 5.4 TCP Test Console

The sample program first connects to the serial device server located at 10.0.187.185 with port 4660 and send Hello World! Note that the serial interface of the serial device server is in a loopback configuration (Rx and Tx are shorted), so Hello World is returned by the serial device server back to the sample program. Start with backslash (\) to send hexadecimal bytes directly. For example, \0d sends 0d. Enter “=” or use Ctrl+C to exit the program.

6. Diagnostics

There are several ways to can check the status and availability of the serial device server.

6.1 Use Standard Ping Command

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

If the serial device server can receive ping requests sent from the host, it will reply to the ping message (Figure 6.1). If the ping request cannot reach the serial device server, timed out message will show (Figure 6.2).

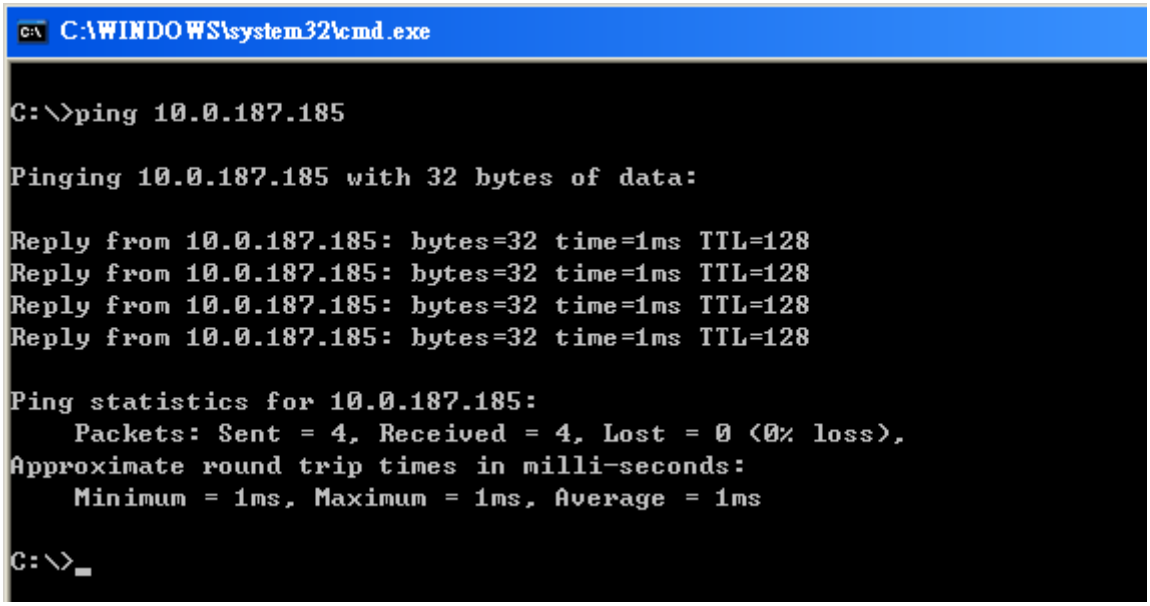


Figure 6.1 Successful Ping Reply

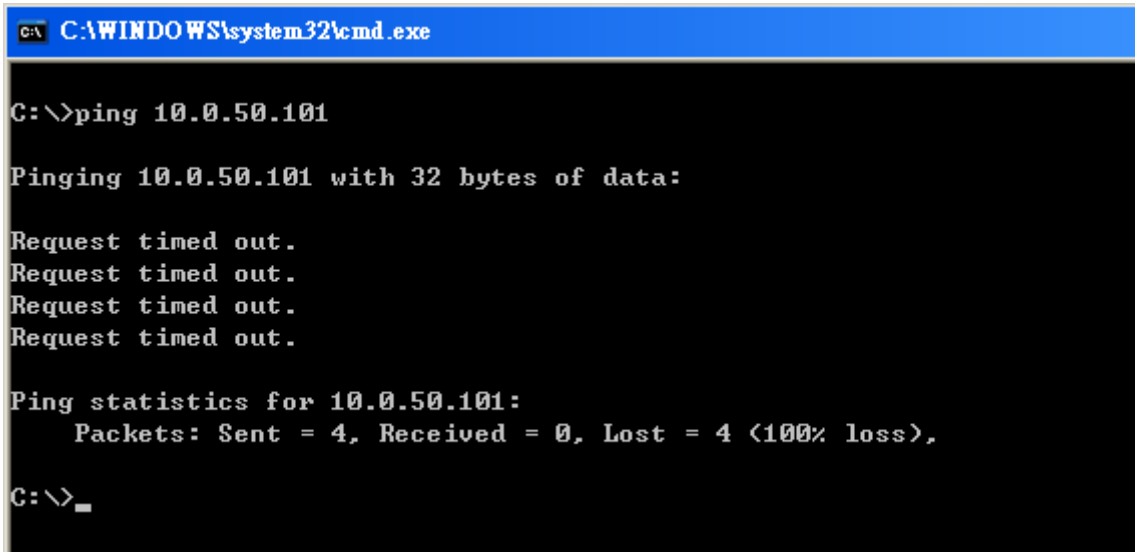


Figure 6.2 Ping Command Failed

6.2 Use SerialManager Configuration Utility

Use **SerialManager** configuration utility that comes with the product CD or download from Atop website to check on the status of the serial device server. The status and version can be read from the tool. For example, **'S'** means that COM1 is in TCP Server mode and is not connected to a TCP Client (Figure 6.3). **'A'** means that COM1 is in server mode and is connected to a TCP Client.

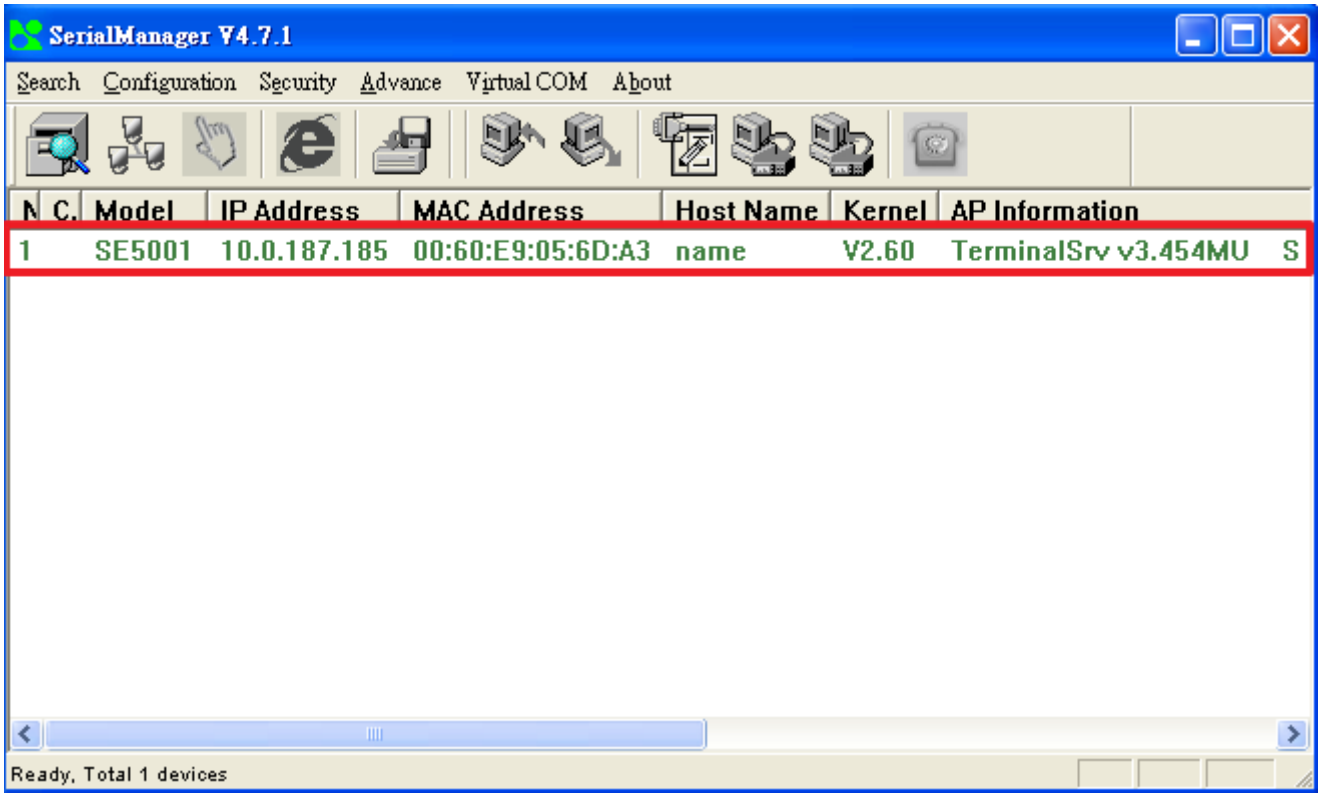


Figure 6.3 SerialManager Utility

6.3 Use TCPTEST.exe or TCPTEST2.exe Sample Program

Use sample programs TCPTEST.exe and TCPTEST2.exe that comes with the product CD to check the status of the serial device server. Please refer to chapter **5. Writing a TCP Program**.

Appendix A: Specifications

A.1 Hardware Specifications

	Specifications
CPU	▪ 16-bit Embedded CPU ▪ 100MHz
Flash Memory	▪ 512K Bytes
SDRAM	▪ 512K Bytes
EEPROM	▪ 512 Bytes
Reset	▪ Built-in reset to default button
Watch Dog Timer	▪ 1.34 second software auto reset ▪ Power failure threshold: 4.75V
Serial Communication	▪ RS-232/RS-485/RS-422 (SE5001) ▪ RS-232 (SE5001-S2) ▪ RS-422 / RS-485 (SE5001-S5 / SE5001-S5-TB5) ▪ RS-422 / RS-485 with serial isolation (SE5001-S5is) ▪ Serial mode is software selectable ▪ Parameters 1) Baud-rate: 1200 bps ~ 230Kbps 2) Parity: None, Even, Odd, Mark, Space 3) Data bits: 7,8 4) Stop bits: 1,2 5) Flow Control: None, CTS/RTS, DTR/DSR, Xon/Xoff 6) Packet Delimiter: time or character delimiter
LED indication	▪ RUN x 1 ▪ LAN x 1 ▪ COM port1
Power Requirement	▪ 5VDC Jack with Power Adaptor or DC +9-30V Terminal Block ▪ 1.5 Watt Max
Temperature	▪ Operation: 0℃ to 60℃ ▪ Storage: -40℃ to 85℃
Humidity	▪ 5%~95% non-condensing
Housing	▪ 65mm(L) x 78mm(W) x 28mm(H)

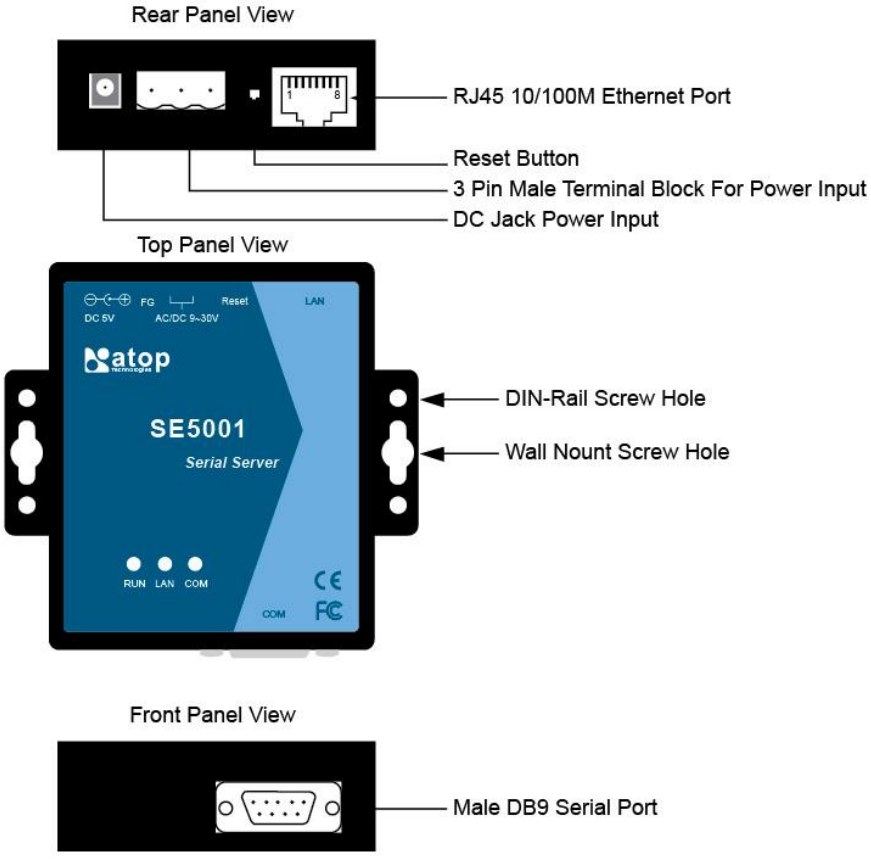
A.2 Software Specifications

Protocol	▪ IPv4, TCP, UDP, ICMP, DHCP, SNMP, HTTP, Telnet, RFC2217
Configuration	▪ WebUI, Windows Utility, Telnet
Internal Buffer Size	▪ 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

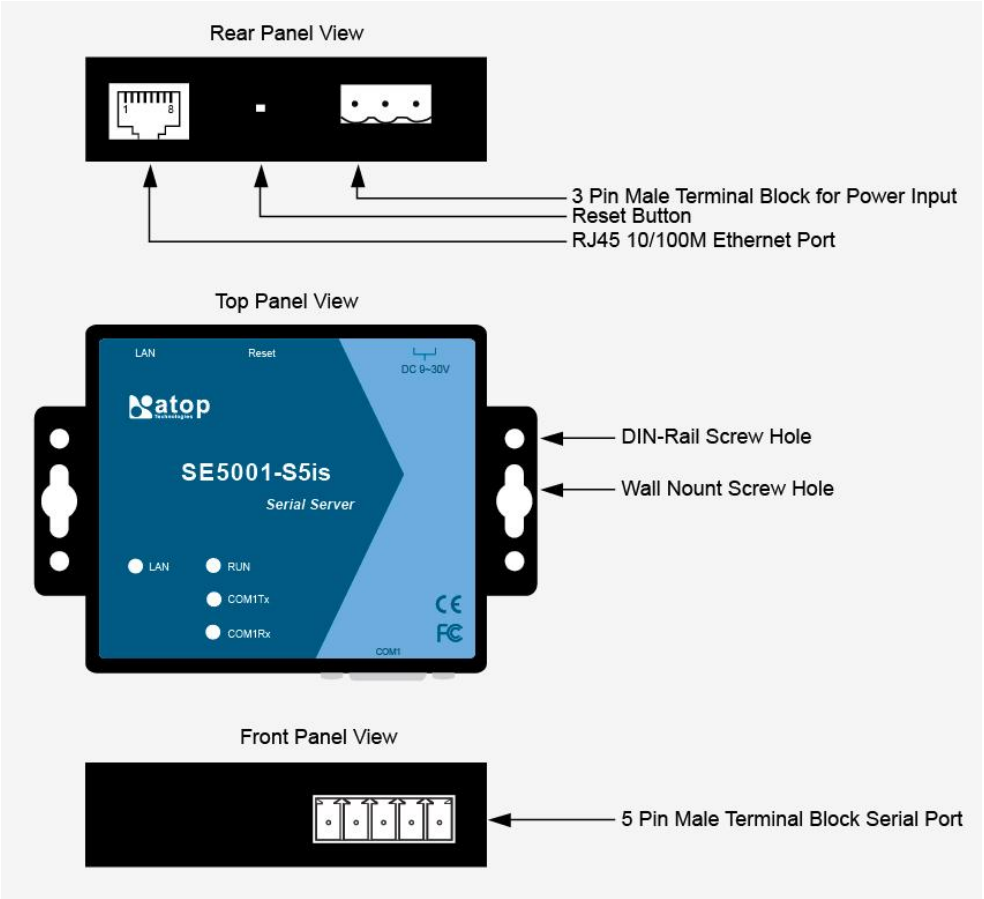
A.3.1.1 SE5001 / SE5001-S2 / SE5001-S5



A.3.1.2 SE5001-S5-TB5

*Only the serial interface is different between SE5001-S5 and SE5001-S5-TB5

A.3.1.2 TB5 for SE5001-S5is



A.3.2 Serial Pin Assignments

A.3.2.1 DB9 Pin Assignments

The pin assignments of DB9 connector is shown in the following table:

Pin#	RS-232 Full Duplex	2-Wire RS-485 Half Duplex	RS-422/4-Wire RS-485 Full Duplex
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)

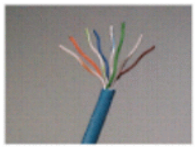
6	DSR	N/A	N/A
7	RTS	**DATA-**	**RXD-**
8	CTS	N/A	**TXD-**
9	N/A	N/A	N/A

A3.2.2 TB5 Pin Assignments

Pin#	2-Wire RS-485 Half Duplex	RS-422/4-Wire RS-485 Full Duplex
1	NC	T+
2	NC	T-
3	DATA+	R+
4	Data-	R-
5	SG (Signal Ground)	SG (Signal Ground)

A.3.3 Ethernet Port (RJ-45)

1. Category 5 UTP Ethernet cable.



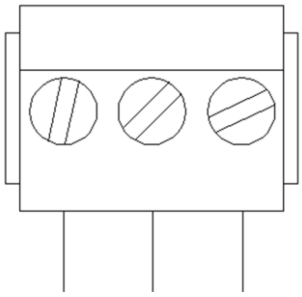
2. RJ45 Connector.

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. If one want to make a crossover cable, one should use 568A and 568B definition respectively in each terminal of a UTP cable.

A.3.4 Power Terminal Block Connector



F.G. VIN- VIN+

Note: Note: Reverse polarity protection is available in SE5001, so VIN+ and VIN- could be reversed.

A.4 Buzzer/LED Message

A.4.1 Buzzer

“ ^ “: Beep twice

“ = “: Beep off

Message	Description
^===^===^===^===^===^===^... (1sec)	Watchdog problem, return service is required
^^^^^^^^^^^^^^^^^^^^^^^^...	Memory problem, return service is required
^==^========^^ (5sec)	Startup OK but AP firmware is disabled
^==^========^^^ (5sec)	Startup OK and AP firmware is enabled
Table 1. Buzzer Message	

A.4.2 LAN LED

Message	Description
LED Off	Ethernet Disconnected
LED blinking with Green	Data is transmitting on Ethernet for 100Mbps
LED blinking with Orange	Data is transmitting on Ethernet for 10Mbps
Table 2. LAN LED Message	

A.4.3 COM Port LED

Message	Description
LED off	No data is transmitting on COM port
LED on blinking state	Data is transmitting on COM port

Table 3. COM Port LED Message

A.4.4 RUN LED

Message	Description
LED on	AP firmware is disabled
LED blinking (rate: 0.5Sec)	AP firmware is running
Table 4. RUN LED Message	

Appendix B: Upgrade System Firmware

Firmware is available for download on Atop website: http://www.atop.com.tw. Subscribe to our RSS system http://www.atop.com.tw/en/rss.php to receive our latest firmware updates automatically.

B.1 Upgrade Procedures

This section introduces the command-line firmware upgrade utility included in the CD. Alternatively, use the GUI management utility SerialManager to upgrade the system firmware. Refer to section **D.3.2** to use SerialManager to upgrade the system firmware.

After the new firmware is obtained, follow the procedures below to upgrade SE5001.

1. Connect a PC (Windows systems) and the SE5001 to the same subnet. Use **ping** command or SerialManager utility to verify its availability.
2. Locate dapdl.cfg (configuration file), gwdl.exe (download executable utility), and download.bat (download batch file) in the \download folder of the CD. Copy them to the system disk.
3. Locate the new system kernel and/or AP firmware to download. Move them inside the copied \download directory.
4. Double click on **download.bat** to start the firmware upgrade process.

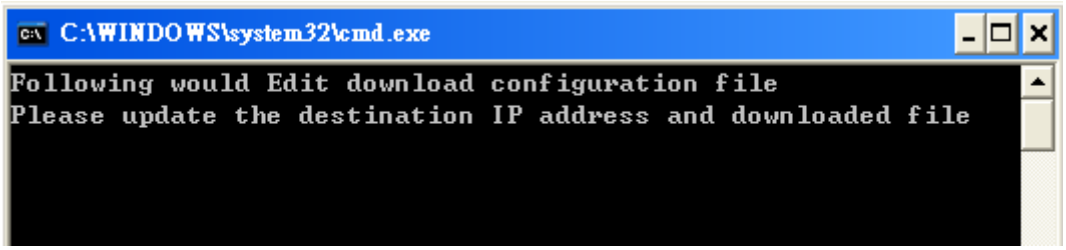


Figure B.1 Prompt of download.bat

Note: It is also possible to edit **dapdl.cfg** and run **gwdl.exe** manually without using the batch file **download.bat**.

5. Press any key to continue.
6. An editor will open **dapdl.cfg** automatically. Edit the content to match the IP address of SE5001 and the file name of the new firmware. **"dapdl.cfg"** has the following structure:

Remote_IP	**10.0.50.100**
Load	**firmware.hex**

The first line identifies the IP address of SE5001, the second line identifies the name of the firmware (.Hex file) to be downloaded.

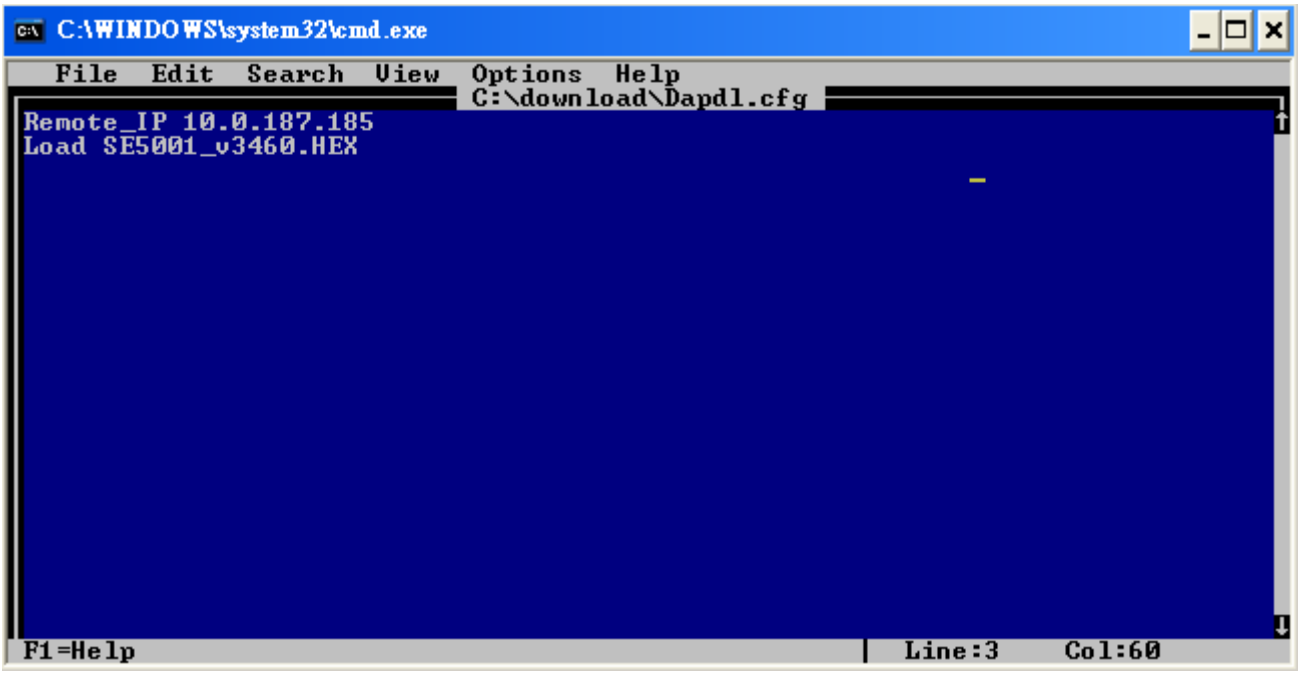


Figure B.2 Dapdl.cfg Opened with an Editor

7. File->**Save** and File->**Exit** the text editor.
8. Enter the admin as the userid and the password of SE5001. If a password is not set, press enter. The batch file will upgrade the system firmware. SE5001 will restart automatically after the new firmware is uploaded.

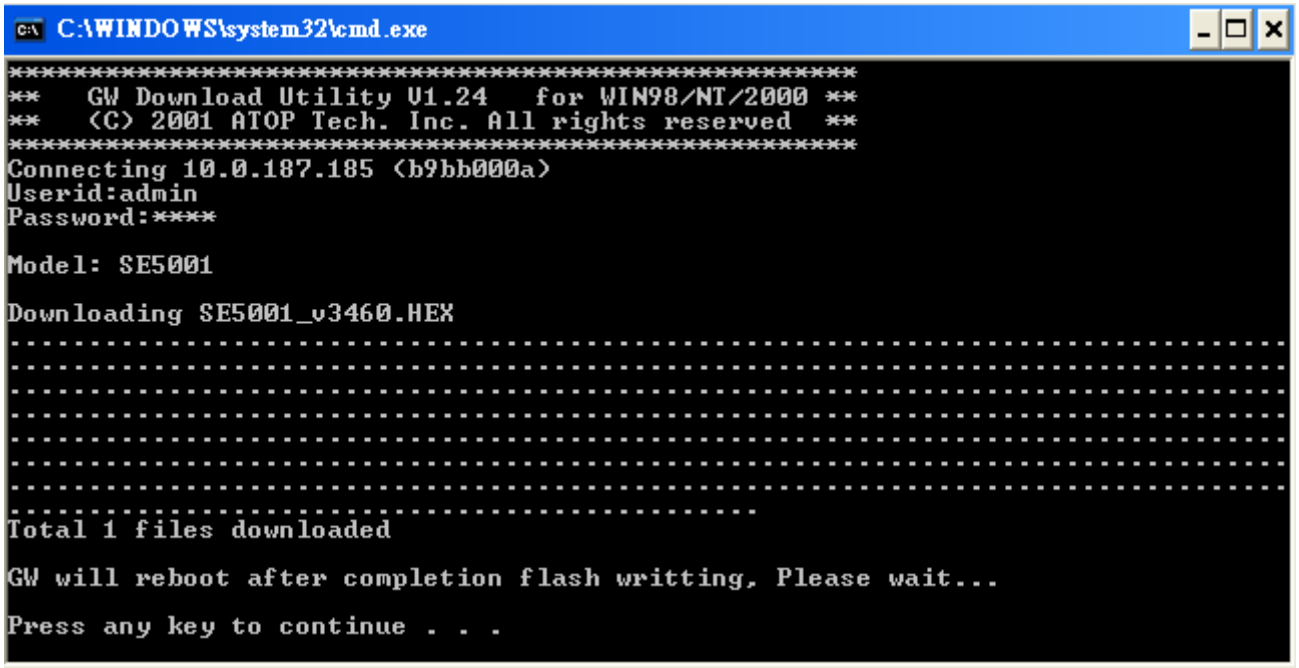


Figure B.3 System Firmware Upgraded

9. Repeat the process above again for kernel or AP firmware if necessary.

Note: After the upgrading process finishes, SE5001 will program the flash memory and buzzer beeps 6 times then restarts. Normally, it takes around 10 seconds to complete the programming process. If an error occurs during the programming process, SE5001 will clear the corresponding memory and the system remains intact of what it was.

B.2 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	
SE5001 handshaking problem	SE5001 ACK Start Address Error SE5001 ACK Length Error SE5001 Response Command Error	
Configuration file	Remote IP not found Open configuration file failure	

Appendix C: Disable System Firmware

The AP (application program) firmware of SE5001 can be disabled to restore the device to the proper firmware in case an incompatible firmware was downloaded and the system crashes while loading the AP.

To disable the AP firmware and prevent it from executing, please do the following.

1. Power off the device.
2. While the reset button is pressed, power on the device.
3. In SerialManager, SE5001 will show up with a default kernel firmware and no AP firmware.
4. Download the correct AP firmware to SE5001.
5. The device will restart and recover to the downloaded firmware.

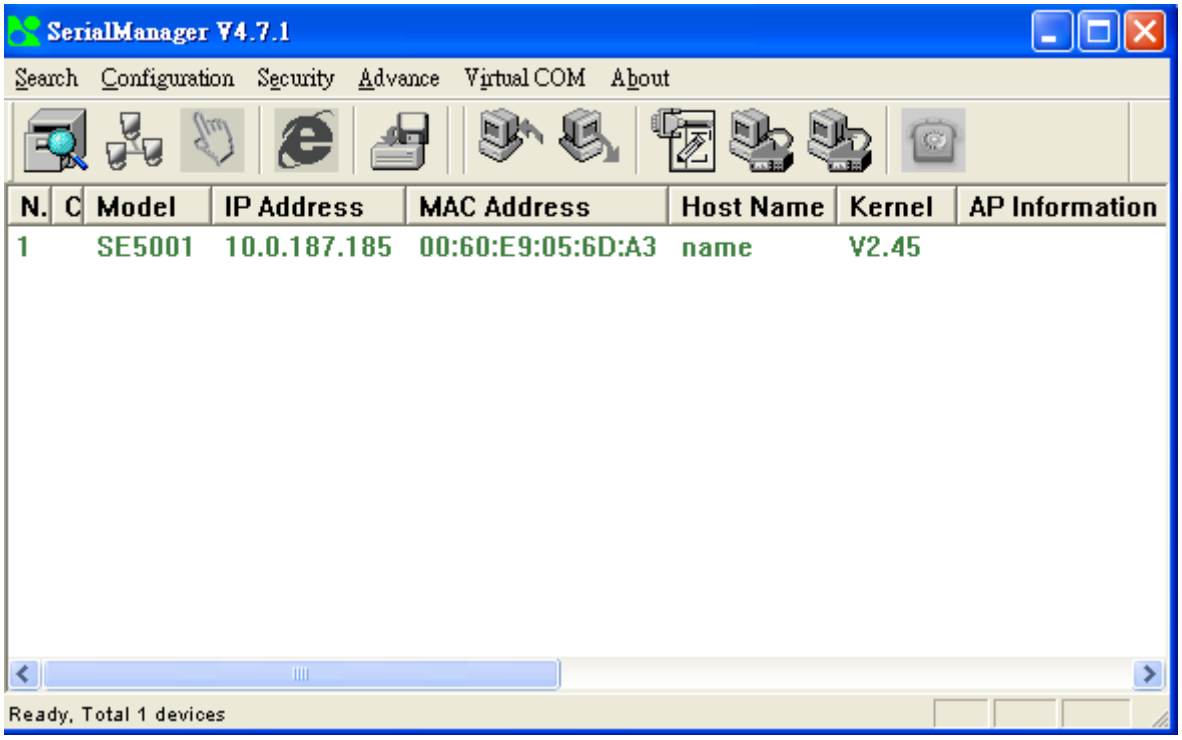


Figure C.1 SE5001 with no AP firmware disabled

Appendix D: Using SerialManager Utility

D.1 SerialManager utility Introduction

SerialManager, the utility developed by ATOP, is a special tool for device management and configuration. It can realize the daily management of various ATOP network devices for address search, device positioning, parameter configuring, and firmware downloading. Note that SE5404D is used to demonstrate the functionality of SerialManager instead of SE5001.

D.2 Interface

The operating interface of the **SerialManager utility** is shown below:

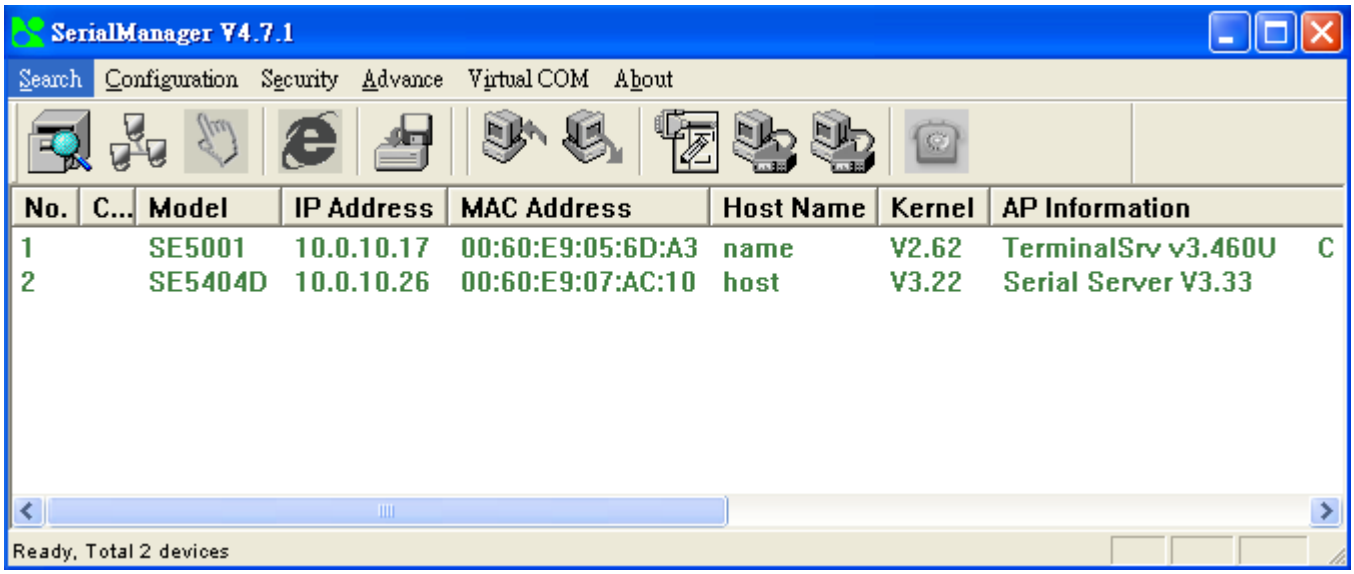


Figure D.1 GUI of SerialManager

Caution Field	Description
!	IP conflict. There are two devices with the same IP address in the network.
@	The device is using DHCP.
<	The device is being located.
+	Logged into the device.
?	MAC conflict. There are two devices with the same MAC address in the network.

Other than the type of Application loaded and its versions, the last few characters of the AP information will show the AP connection status. The number of letters displayed depends on the number of COM ports that the serial device server has. For example, AP information will show "….. AS" meaning that the serial device server has two COM ports. The first COM port is in TCP Server mode and is connected to a TCP client, while the second COM port is not connected.

AP Information	Description

S	The COM port of the serial device server is in TCP Server mode and is not connected to a TCP Client
A	The COM port of the serial device server is in TCP Server mode and is connected to a TCP Client
C	The COM port of the serial device server is in TCP Client mode and is trying to connect to a TCP Server
c	The COM port of the serial device server is in TCP Client mode and will enter **C** state soon.
B	The COM port of the serial device server is in TCP Client mode and is connected to a TCP Server
U	The COM port of the serial device server is in UDP mode

D.3 Functions

D.3.1 Device Search

This function scans all Atop devices in the network. There are three methods to search for devices: Search by Broadcast, Search by IP Address, and Search by MAC Address. Click on **"Search"** in the main menu shown below to select the search method.

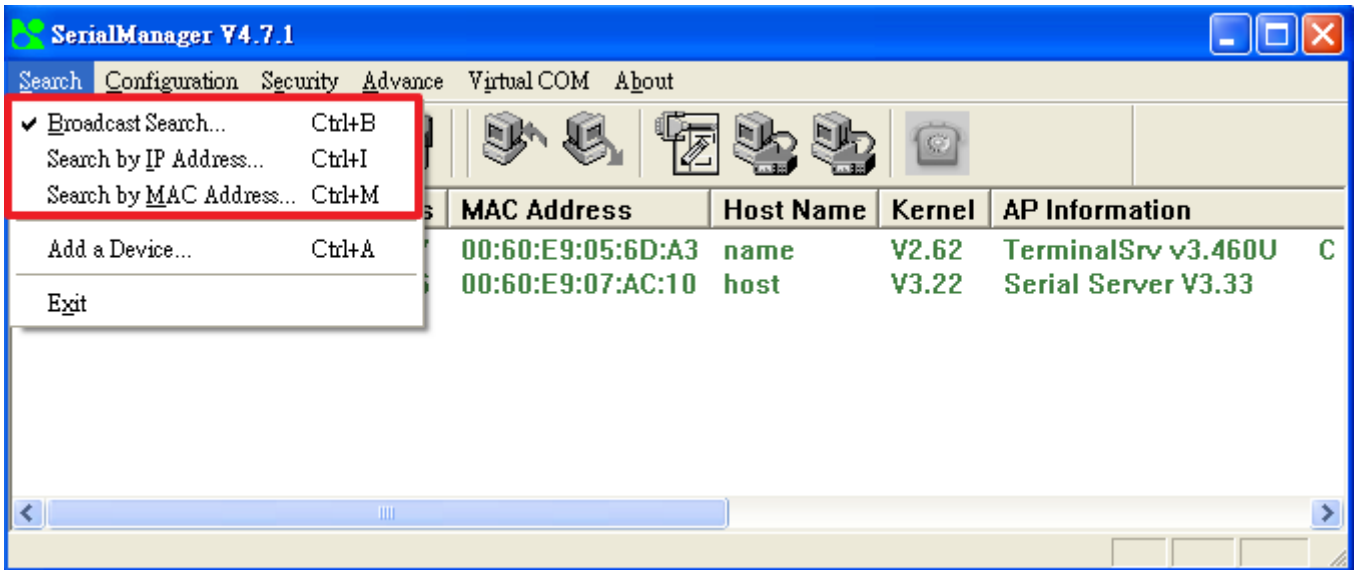


Figure D.2 Search Function of SerialManager

To rescan for the devices in the network, press the **Rescan** button in the toolbar shown below.

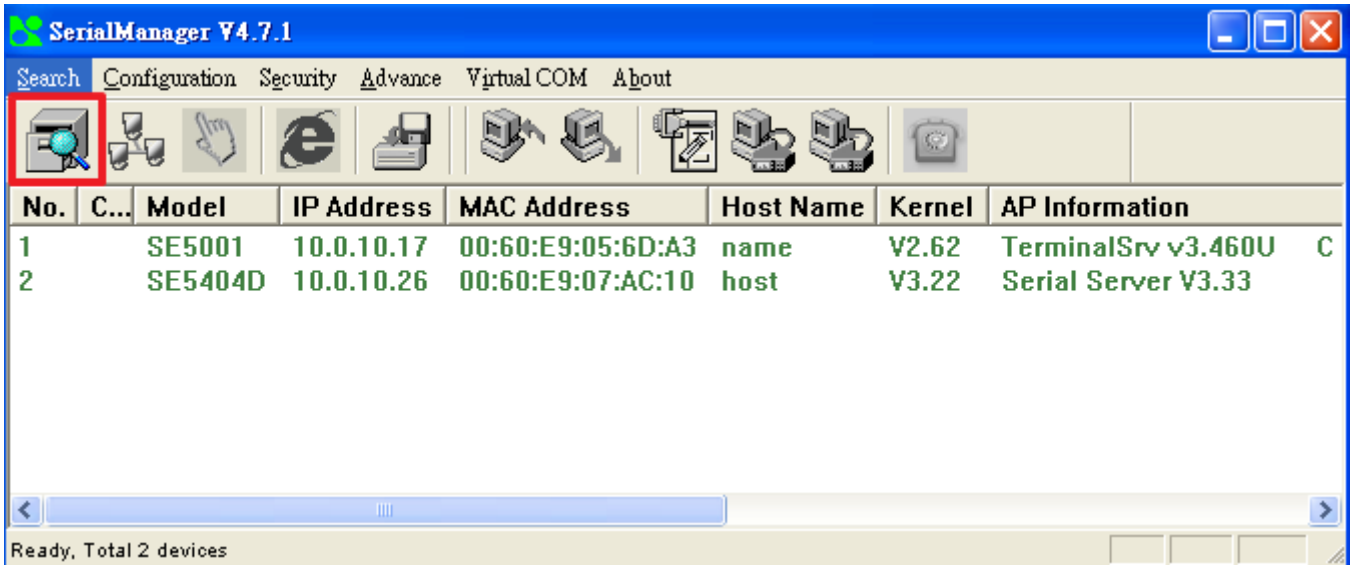


Figure D.3 Search Function Button in SerialManager

Broadcast Search

Once “Broadcast Search” is selected, a box will pop up as below. Input or select different broadcast address based on the requirement.

Figure D.4 Broadcast Search IPs Pop-up Dialog

Search by IP address

Once “Search by IP Address” is selected, an interface will pop up as below. Two options are available: Select an IP address to search or Search device in the range of IP address.

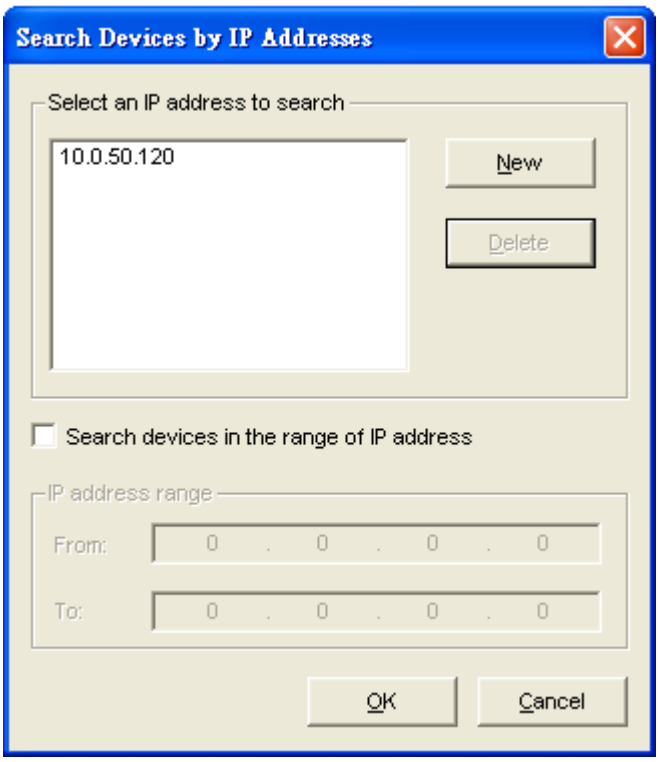


Figure D.5 Search by Device IPs Pop-up Dialog

Search by MAC Address

If “Search by MAC Address” is selected, another box will pop up as below. There are two ways to filter the search results: “Select a MAC address to search” or “Search devices in the range of MAC address.”

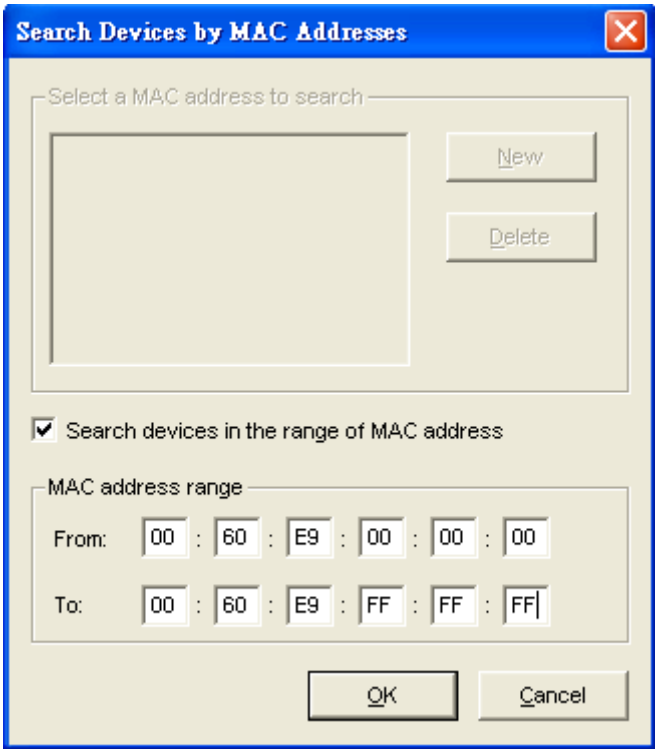


Figure D.6 Search by Device MAC Pop-up Dialog

Rescan

Click the “Rescan” button in the toolbar, SerialManager shall rescan devices with the selected search method.

D.3.2 Firmware

This function is used to upload a new firmware to the device. First click on the designated device and in the main menu click Advanced->Firmware->Firmware Download or click the **Upgrade from Disk** button directly.

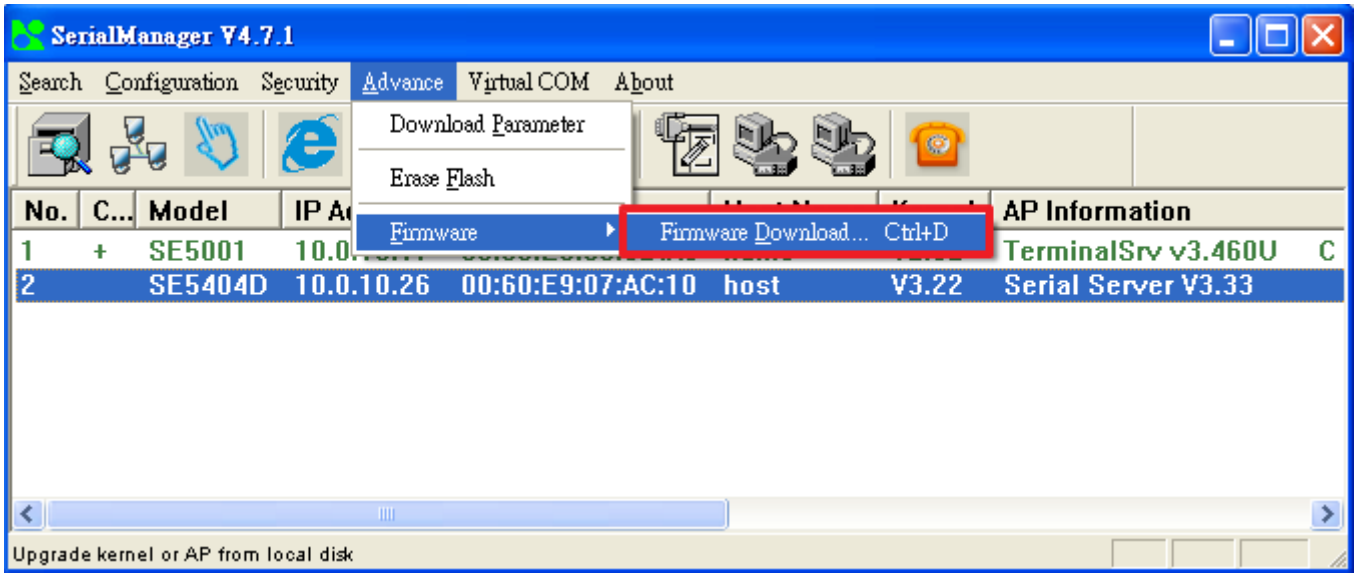


Figure D.7 Firmware Upgrade Option in the Menu

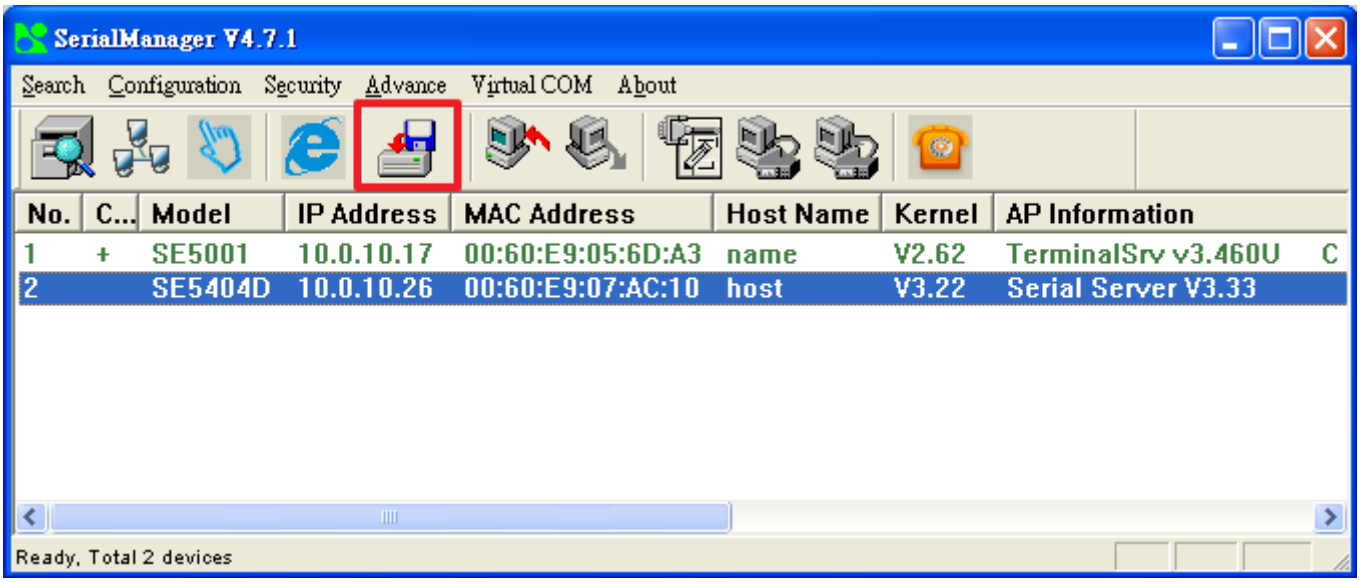


Figure D.8 Firmware Upgrade Button in SerialManager

Select the required firmware from the disk, as shown in the figure below. Press **Upgrade** to start uploading the new firmware to the device. Select more than one device and enable **Apply for all selected devices have same model** to upgrade multiple devices all at once.

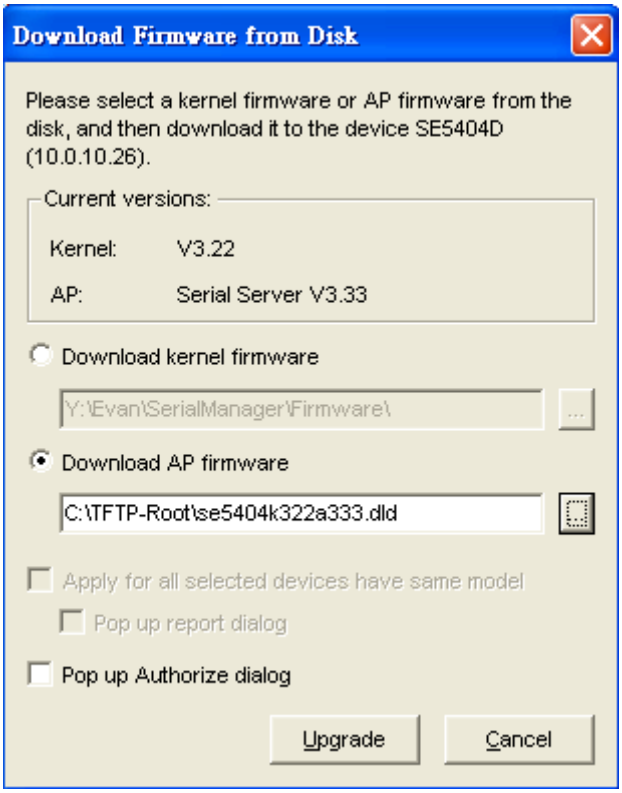


Figure D.9 Firmware Upgrade Pop-up Dialog

D.3.3 Configuration

The configuration submenu provides different device settings and options to access the device as shown in the figure below.

Note:

1) Greyed out fields require logging into the device before they enable.
2) Configurations can apply to multiple devices of the same kind by selecting multiple devices in the SerialManager and checking “Apply for all selected devices” option.

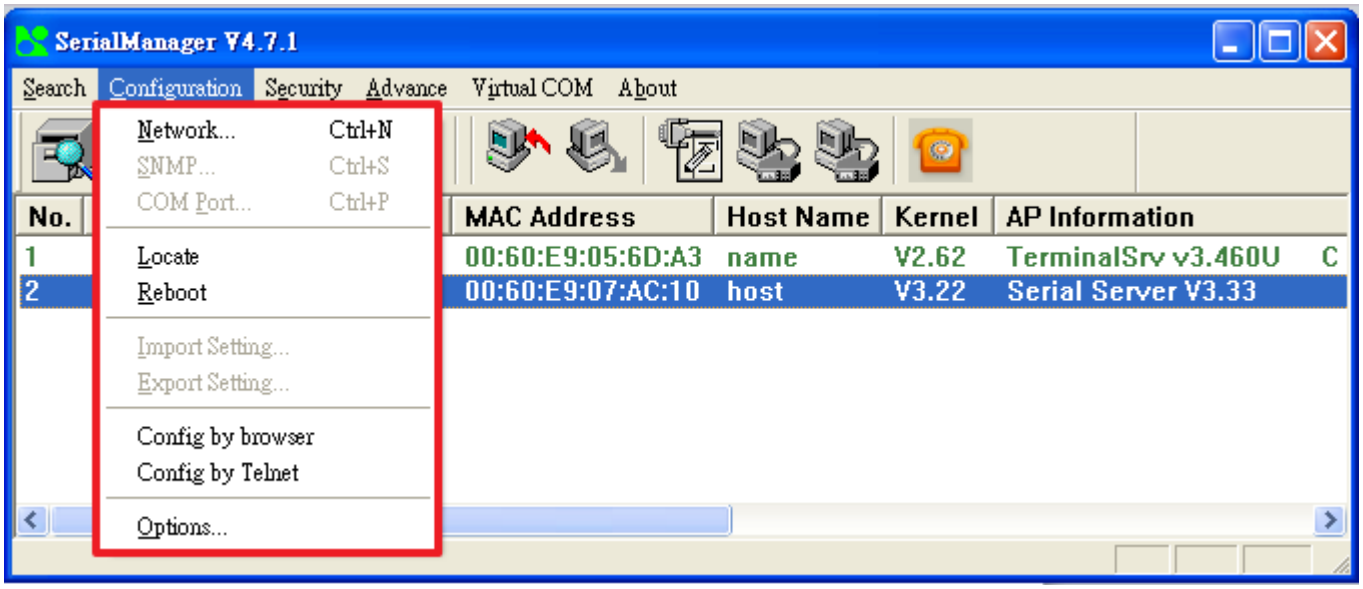


Figure D.10 Configuration Options Menu in SerialManager

Network

Modify the Network Settings of the selected device shown as the figure below. Statically assign IP address, subnet mask, gateway, and host name. Select the DHCP option to obtain IP information from a DHCP server automatically.

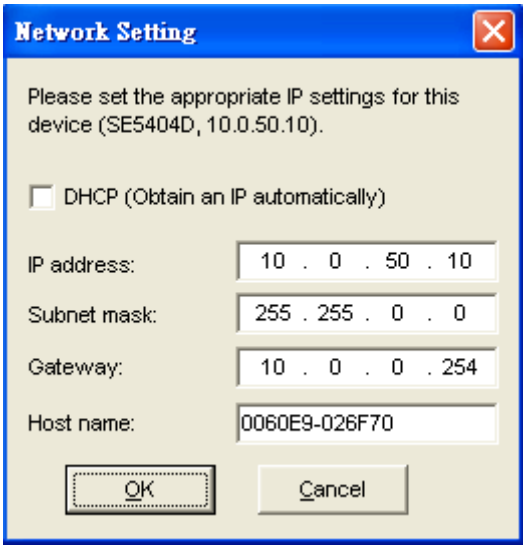


Figure D.11 Network Settings Pop-up Dialog

SNMP

Modify the SNMP Settings of the selected device shown as the figure below. SNMP fields supported are Name, Location, and Contact.

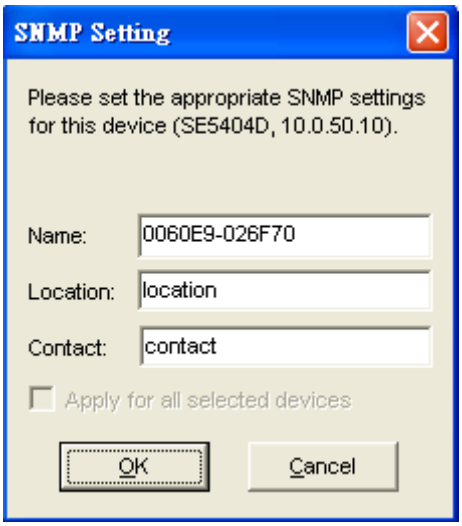


Figure D.12 SNMP Settings Pop-up Dialog

COM Port

ATOP has developed various Serial device server products. Different serial device sever could offer different COM settings. SerialManager could only offer the most important settings here. For the complete settings, please use the WebUI. The COM Port setting dialog is shown below.

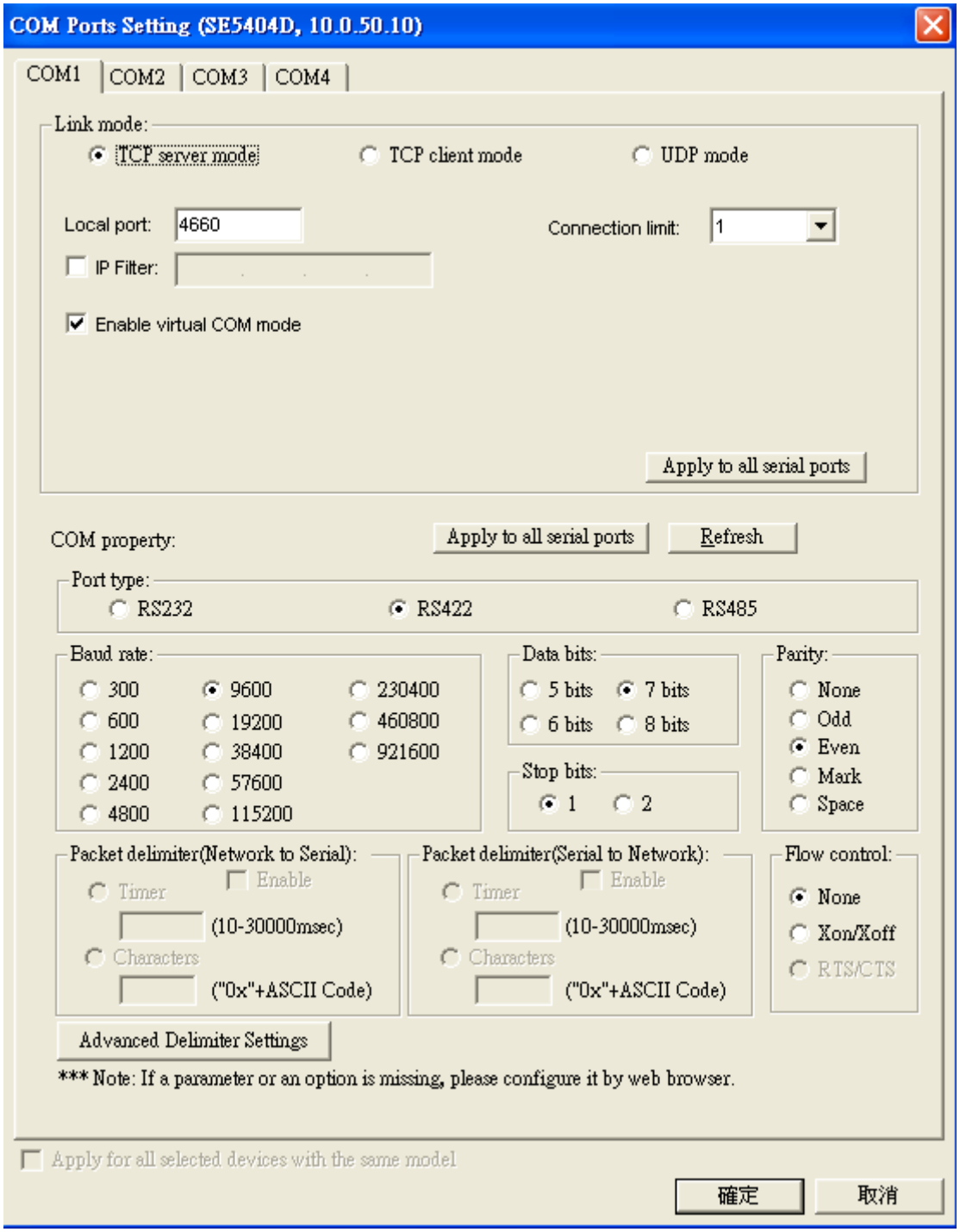


Figure D.13 COM Settings Pop-up Dialog

❋ **Note: COM tabs: Generated automatically according to the COM port number of the device. If a device has 4 COM ports, there will be, for example, 4 tabs, COM1, COM2, COM3, and COM4.**

Link mode: This is to setup the COM port in TCP Server, TCP Client or UDP modes.

Local Port: This is the port that the COM port is listening to (TCP Server and UDP modes only).

Destination IP and Port: This is the IP and the port that the COM port should connect to (TCP Client and UDP only).

IP Filter: Enable this option to restrict network access of this COM port to a specific IP Address (TCP Server only).

Enable Virtual COM Mode: Enable or Disable Virtual COM application on this COM port.

COM property: Select or enter the desired parameters, including alias name, serial port type, baud rate, data bit, stop bit, parity, flow control, packet delimiter, and serial buffer control. The options vary depending on the model you have.

Locate

To locate a device, select **Locate** in the submenu or click on the **Locate** button in the toolbar. Use this function to locate a device that shows up in the SerialManager, but its location is unknown. A located device would beep until it is de-located by pressing the **Locate** again.

Reboot

To reboot a device, select **Reboot** in the submenu.

Import Setting

If there are a lot of devices to manage, it should be easier to utilize the export and import function to import similar settings to multiple devices all at once. Import the configuration file by selecting **Import setting** in the submenu or by clicking the **Import setting** button on the toolbar. The Import Settings dialog is shown below.

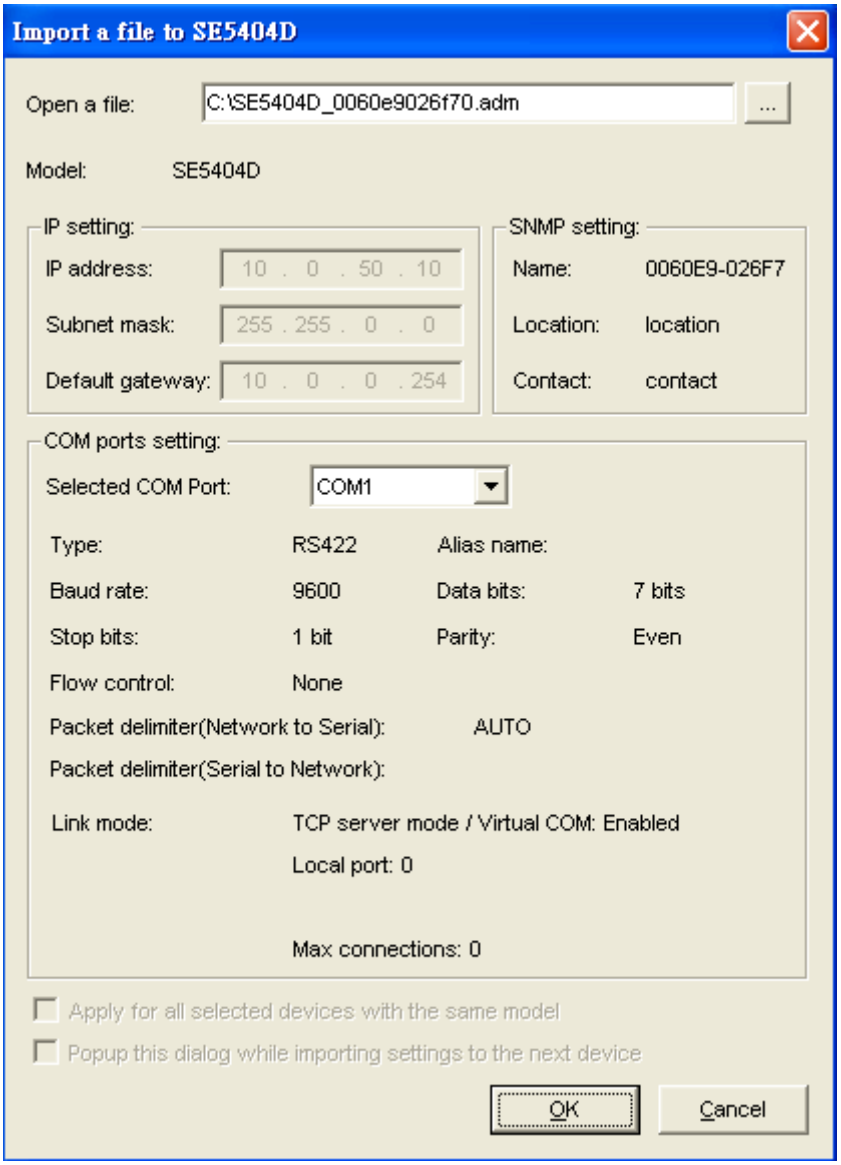


Figure D.14 Import Function Pop-up Dialog

Export Setting

Export settings from the device for backup purpose or import to another device. Export the settings to a file by selecting **Export setting** in the submenu or clicking the **Export setting** button in the toolbar The Export Setting dialog is shown in the figure below.

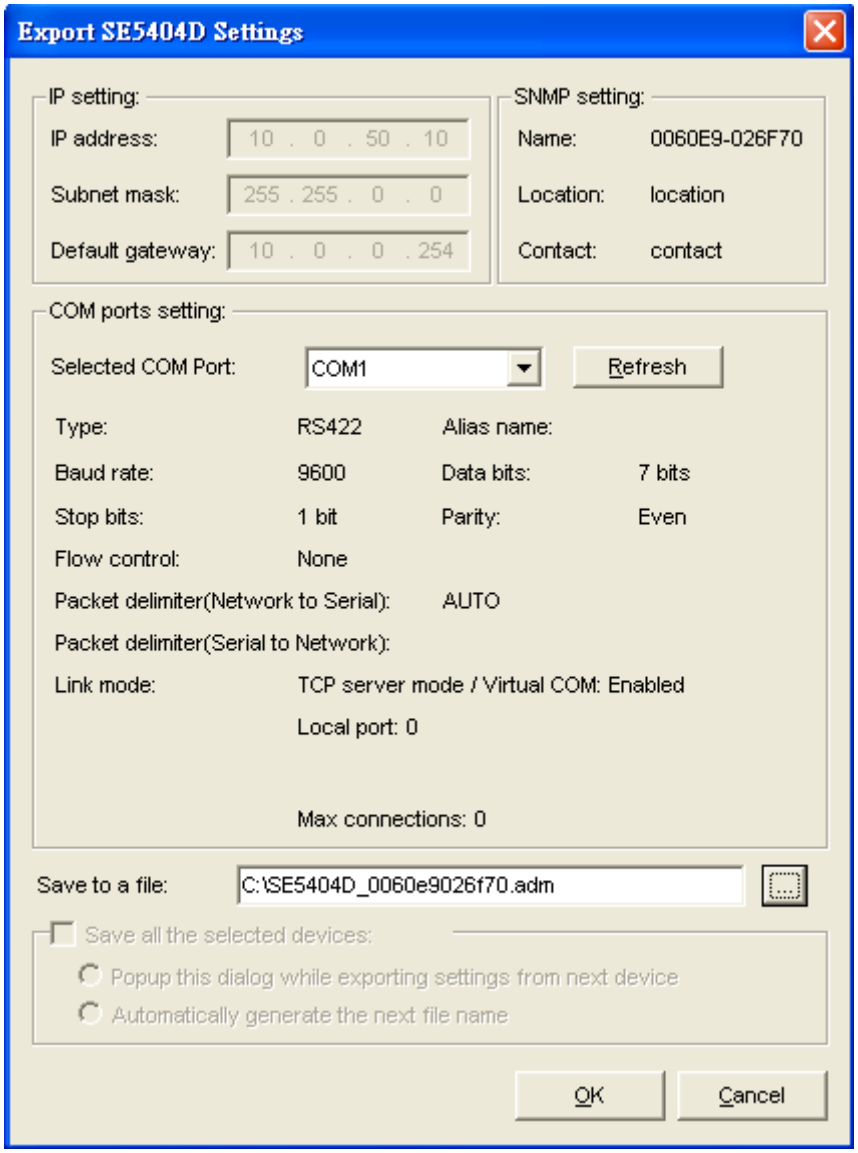


Figure D.15 Export Function Pop-up Dialog

Configure by Browser

The WebUI provides additional device-specific parameters that SerialManager does not provide. This is the recommended way to configure the device. Select “Config by Browser” in the submenu or click on the browser button in the toolbar to launch the WebUI in the browser. A sample WebUI is shown below.

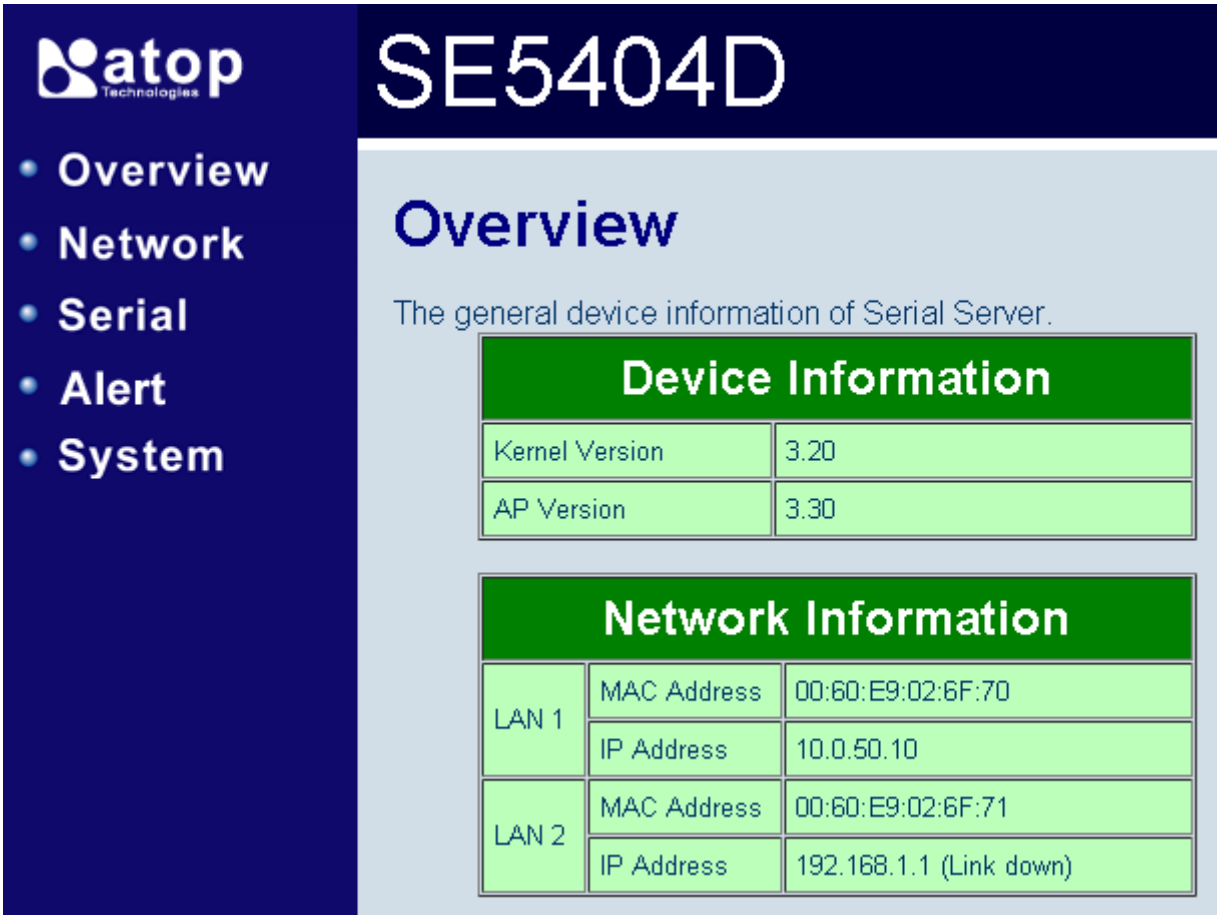


Figure D.16 WebUI of the Serial Device Server

Configure by Telnet

Select “Config by Telnet” in the submenu or click the on the **Telephone** button in the toolbar to launch the telnet console connecting to the device.

Option

Configure SerialManager preferences in this dialog:

1. Set the SerialManager’s scan interval
2. If device tip option is turned on, SerialManager will show additional information when the mouse cursor stays on the device.
3. Select which Network Interface Card that SerialManager uses. If this option is set to DEFAULT, SerialManger will use the default NIC that the operating system assigns.

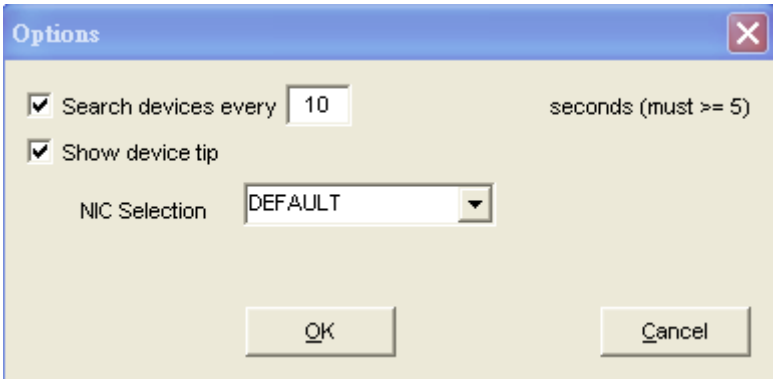


Figure D.17 Preferences of SerialManager

D.3.4 Security

The Security submenu provides: **Login**, **Logout** and **Change Password** functions, shown in the figure below.

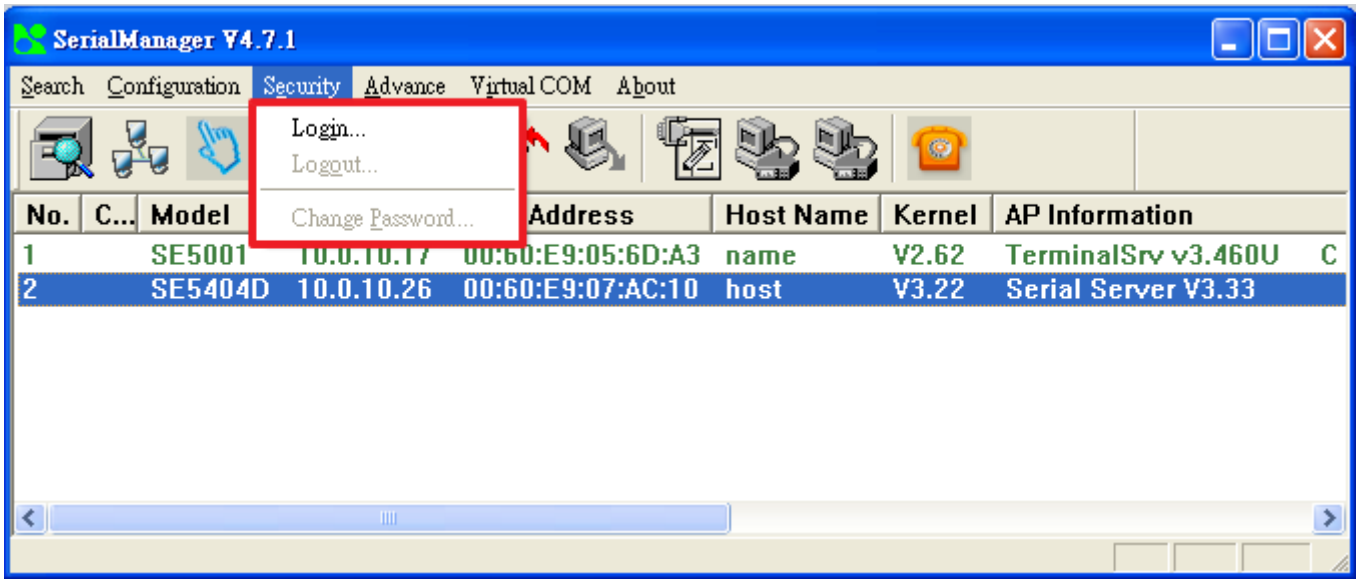


Figure D.18 Security Menu in SerialManager

Login

In order to configure sensitive information in the device, a successful login would be required before those options enable. Select **Login** from the submenu or press the **Login** button in the toolbar and enter the correct password to login to the device as shown in the following figure.

Note: Double clicking on the device would also login/log out from the device.

Figure D.19 Login Pop-up Dialog

Logout

Select **Logout** from the submenu or press the **Logout** button in the toolbar after a successful login to logout from the device as shown in the following figure.

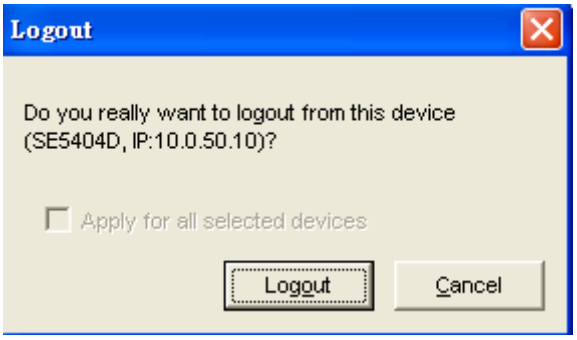


Figure D.20 Logout Pop-up Dialog

Change Password

Select **Change Password** from the submenu after a successful login to change the login password of the device as shown in the following figure.

Figure D.21 Change Password Pop-up Dialog

D.3.5 Virtual COM

Most serial device servers are supplied with the Virtual COM function. Virtual COM settings are integrated in the SerialManager. Use this integrated Virtual COM working area or the original Serial/IP Tools to configure Virtual COM.

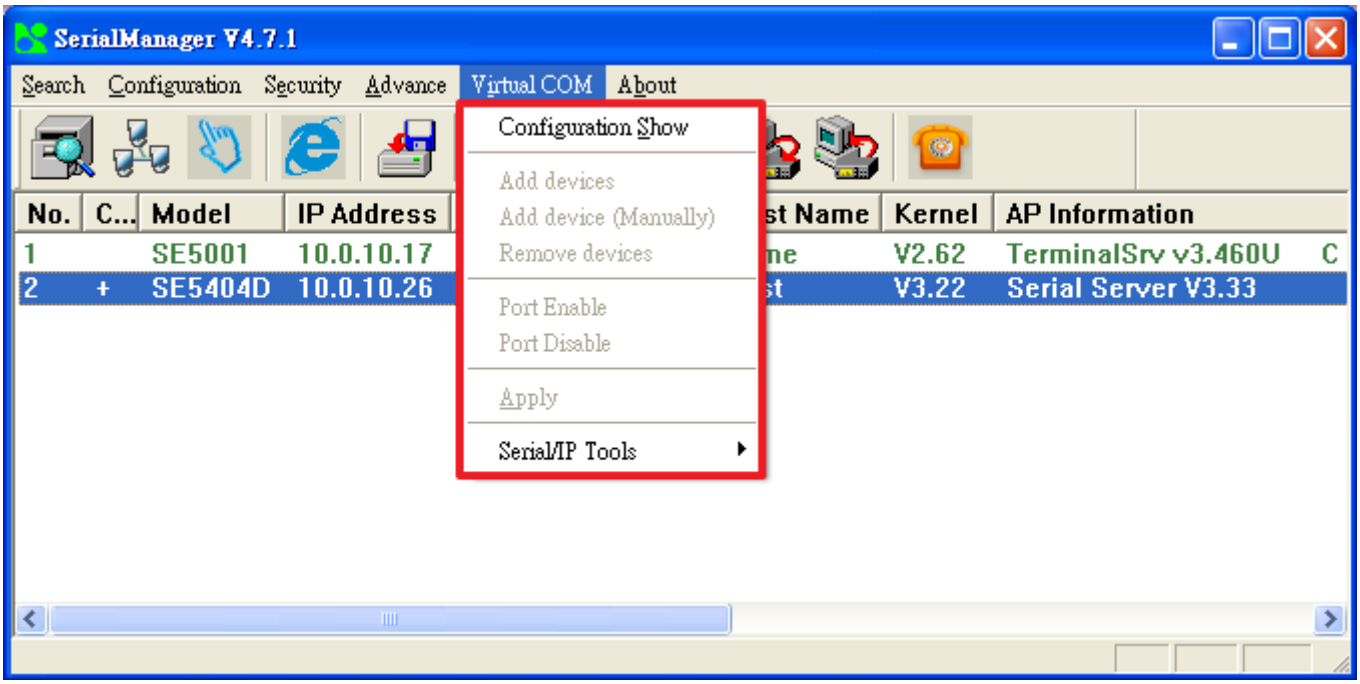


Figure D.22 Virtual COM Confirmation Menu in SerialManager

Select Configuration Show, a new **Virtual COM Working Area** would appear.

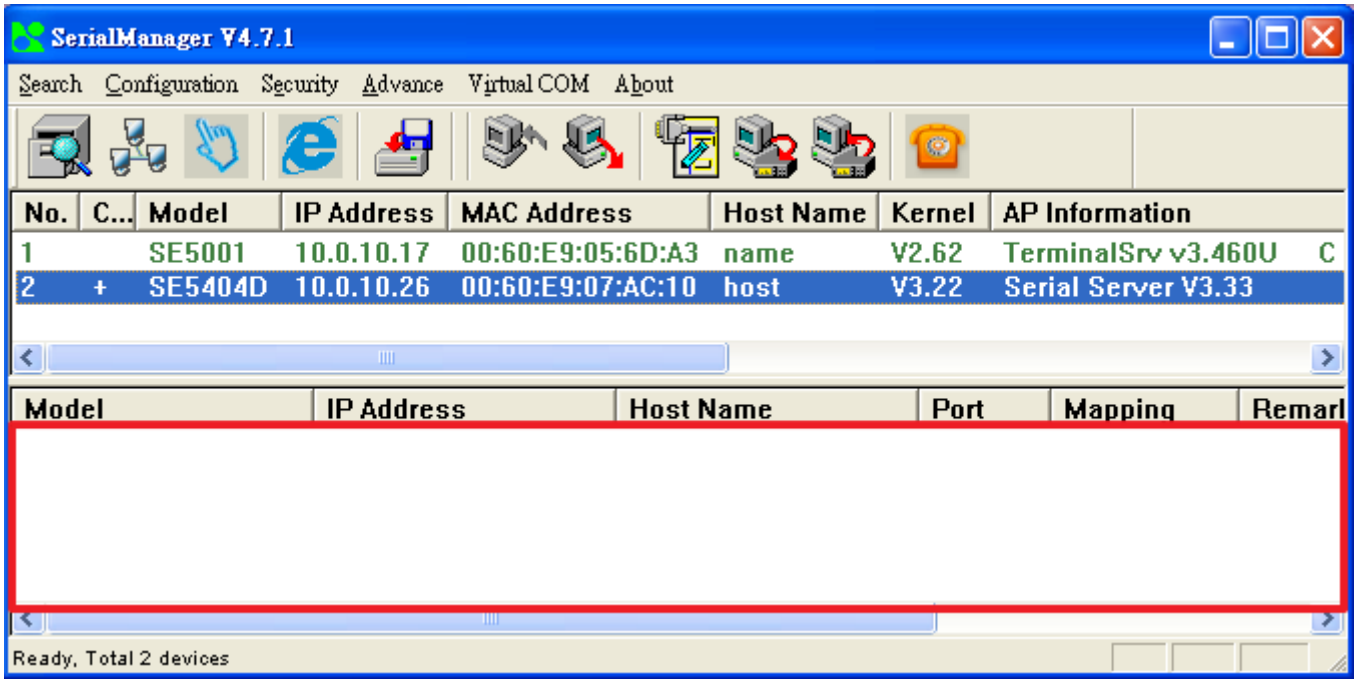


Figure D.23 Virtual COM Working Area in SerialManager

Select one device or multiple devices to be added. After the device is selected, right click in the blank working area and select “Add devices”.

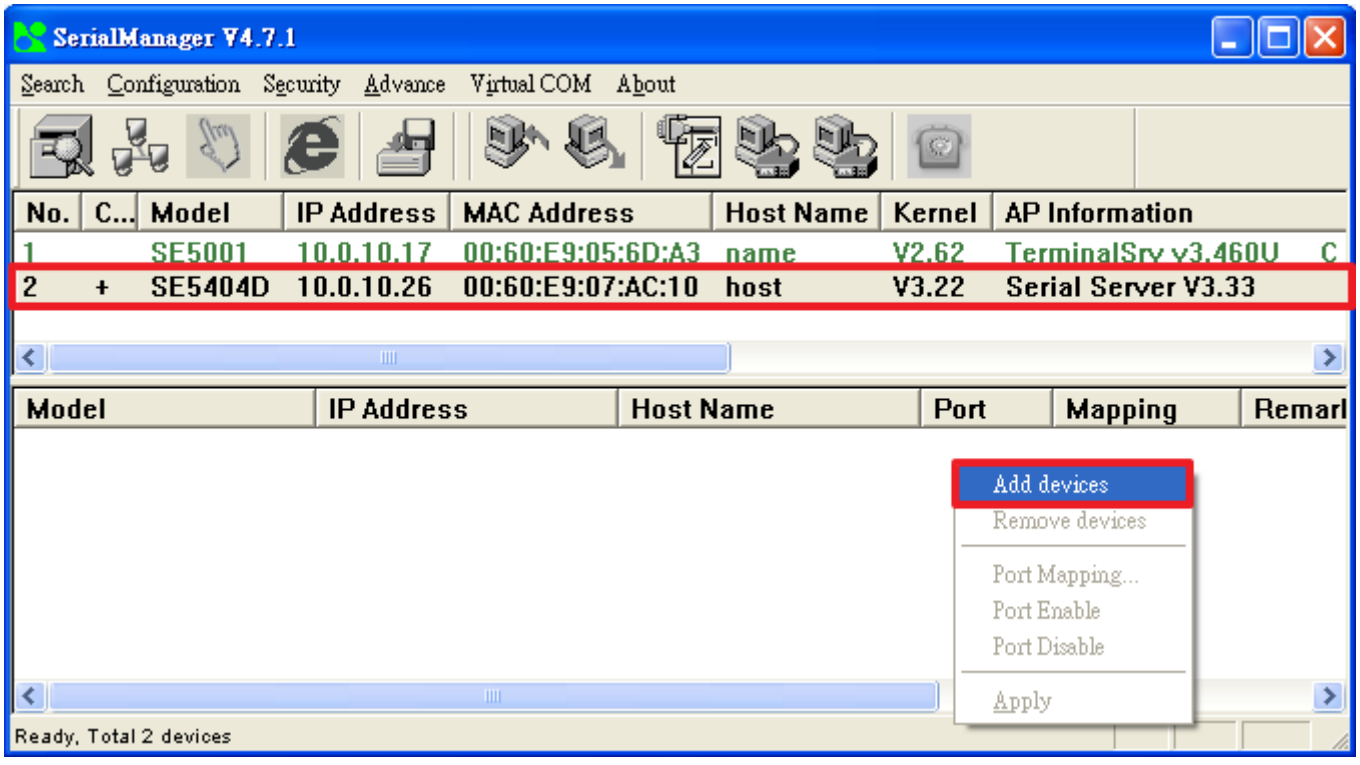


Figure D.24 Add a Device to the Working Area in SerialManager

The device should be added. Right click on any port and a context menu will show. Remove the device from the Virtual COM working area by selecting “Remove devices.” Disable Virtual COM for a specific port by selecting “Port Disable”. Remember to click **Apply** to apply any changes.

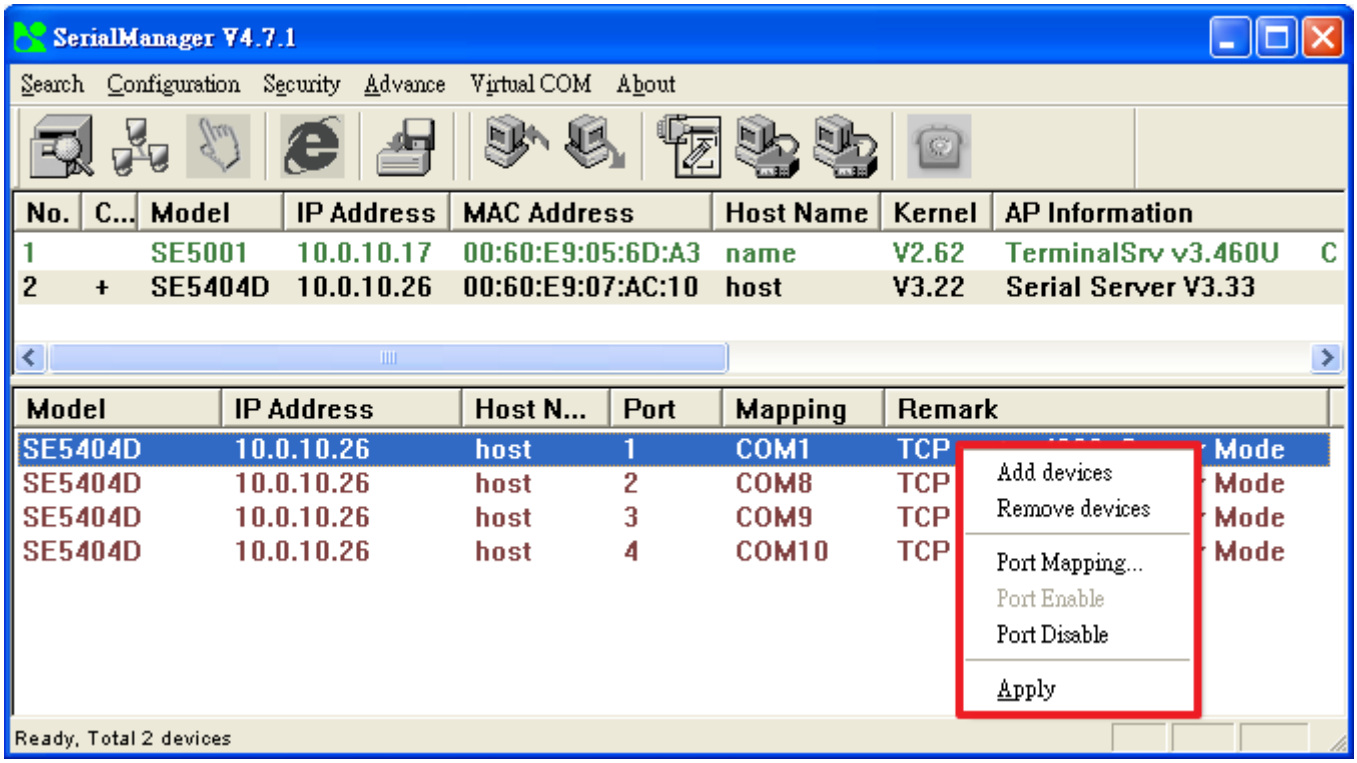


Figure D.25 Virtual COM Right-Click Context Options

Select **Port Mapping** to setup the Virtual COM port accordingly.

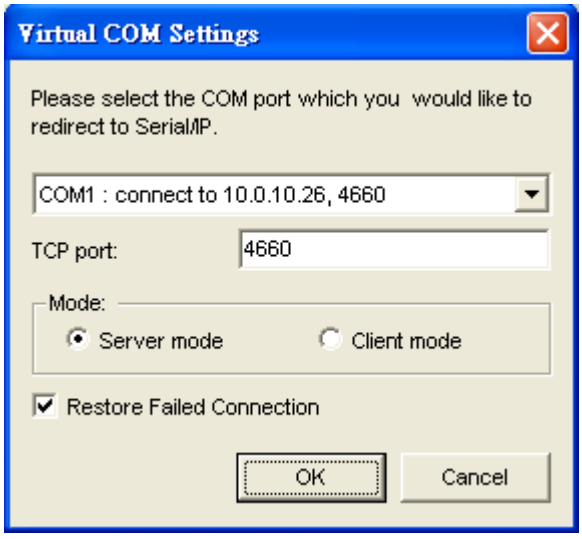


Figure D.26 Virtual COM Settings Pop-up Dialog

D.3.6 About

The about page contains the SerialManager logo shown below.

Figure D.27 About Page Pop-Up