Atop Technologies, Inc.

# CR5201B/SE5201B Series

*Low-Power Wide-Area LTE Cat.1/LTE Cat.M1 Gateway*

**User Manual**

**v1.1**

**May 28th, 2024**

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We have checked the contents of this manual for agreement with the hardware and the software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual is reviewed regularly and any necessary corrections will be included in subsequent editions.
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## Documentation Control

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# 1 Preface

## 1.1 *Purpose of the Manual*

This manual supports user during the installation and configuring of the CR5201B/SE5201B Industrial Device Server Series. It explains the technical features available with the product. For example, it contains some advanced network management knowledge, instructions, examples, guidelines, and general theories to assist user's device management in both hardware and software. A background in general theory is necessary when reading it. Please refer to the Glossary for technical terms and abbreviations (if any).

## 1.2 *Who Should Use This User Manual*

This manual is to be used by any qualified network personnel or support technicians who are familiar with network operations. It might be useful for system programmers or network planners as well. This manual also provides helpful and handy information for the first-time users. For any problems on this manual, please contact your local distributor. If they are unable to assist you, please redirect your inquiries to www.atop.com.tw or www.atoponline.com.

## 1.3 *Supported Platform*

This manual is designed for **CR5201B/SE5201B Low-Power Gateway** only**.**

## 1.4 *Manufacturers' FCC Declaration of Conformity Statement*

NOTE: 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 can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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/her own expense.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause an undesired operation.

**Note:** all the figures herein are intended for illustration purposes only. This software and certain features work only on certain Atop's devices.

# 2 Introduction

## 2.1 Overview

The CR5201B/SE5201B is a Low-Power Wide-Area (LPWA) LTE Cat.1/Cat.M1 gateway, serving as a communication bridge between Ethernet (TCP/UDP) ports and the built-in RS-232/RS-485 ports on the SE5201B. The data transmission through the SE5201B is transparent to both host computers (using Ethernet) and serial devices (using RS-232/RS-485). Data sent from the Ethernet port is relayed to the appropriate RS-232/RS-485 port, and vice versa, enabling full-duplex and bidirectional communication.

In sectors like computer-aided manufacturing or industrial automation, field devices can connect directly to an Ethernet network through the SE5201B. For standard PCs or laptops, our virtual COM software allows the creation of a virtual COM port to remotely access serial data from the SE5201B via Ethernet. It is important to note that the SE5201B does not support RS-422 and 4-wired RS-485 configurations. With the SE5201B, remote communication with serial devices over a LAN or even the Internet is feasible, significantly enhancing reachability and scalability.

Figure 2-1 illustrates an example of multiple charging stations connected to the SE5201B. The SE5201B can streamline the process of transforming traditional lighting systems into electric vehicle charging stations. Several charging stations are connected to the SE5201B via an Ethernet interface, while a monitoring device communicates with the SE5201B through an RS-232/RS-485 interface. The SE5201B provides low-power, reliable, and secure connectivity, enabling the transmission of device data to the control center for remote monitoring and management.

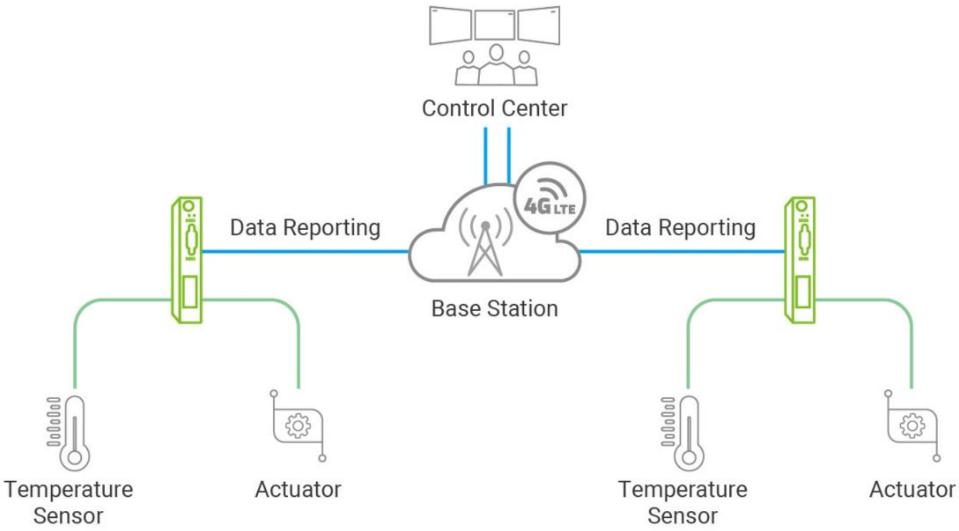


Figure 2-1 An Application of SE5201B with Multiple Charging Piles

## 2.2 Features

The CR5201B/SE5201B Low-Power Gateway share the same software platform on different available hardwares. It provides

- Flexible hardware platform, in different port variants based on your needs
- TCP Server/Client, UDP, Virtual COM and Tunneling modes supported
- Remotely monitor, manage, and control industrial field devices
- Configuration via Web Browser/Serial Console/Telnet Console/Atop's Windows Utility (Device Management Utility)
- Rugged metal housing with IP30 protection for wall or DIN-Rail mount
- Wide range power supply input between 9 - 48 VDC

**Caution**

Beginning from here, extreme caution must be exercised.

Never install or work with electricity or cabling during periods of lightning activity. Never connect or disconnect power when hazardous gases are present.

Warning: HOT!

**WARNING**: Disconnect the power and allow unit to cool for 5 minutes before touching.

# 3 Getting Started

## 3.1 *Packing List*

Inside the purchased package, you will find the device and following items.

Table 3.1 Packing List

| Item | Part Number | CR5201B-TB | SE5201B-DB | SE5201B-TB | SE5201B-DB-GPS | SE5201B-TB-GPS | SE5201B-M1-DB | SE5201B-M1-TB |
|---|---|---|---|---|---|---|---|---|
| Terminal Block (7P) | 50707741G | N/A | 1 | 1 | 1 | 1 | 1 | 1 |
| Terminal Block (5P) | 50706091G | N/A | N/A | 1 | N/A | 1 | N/A | 1 |
| Terminal Block (3P) | 50706701G | 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| LTE Antenna | 59908151G | 2 | 2 | 2 | 2 | 2 | N/A | N/A |
| LTE Antenna | 59902471G | N/A | N/A | N/A | N/A | N/A | 1 | 1 |
| GPS Antenna | 59908381G | N/A | N/A | N/A | 1 | 1 | N/A | N/A |
| Hardware Installation Guide<br>(Warranty card is included) | 89900648G | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Note:

- Notify your sales representative immediately if any of the above items is missing or damaged upon delivery.
- Atop’s utility software Device View©, Serial Manager©, and Device Management Utility® are obsolete and replaced by Network Management Utility®.

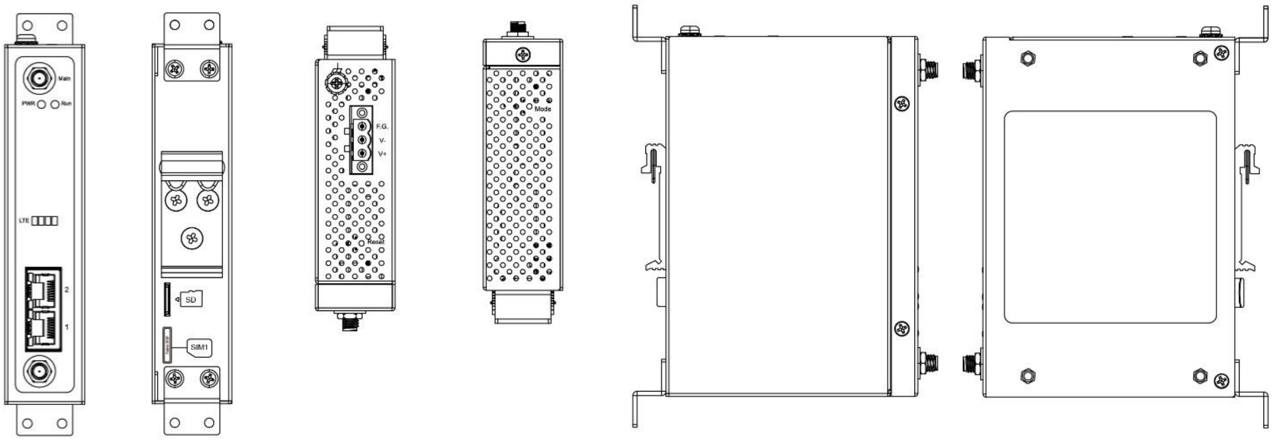
Table 3.2 Description of Optional Accessories

| Optional Accessories | | |
|---|---|---|
| **Model Name** | **Part Number** | **Description** |
| UN315-1212 US-Y | 50500151120003G | Y-Type power adapter, 100~240VAC input, 1.25A @ 12VDC output, US plug, LV6 |
| UNE315-1212 EU-Y | 50500151120013G | Y-Type power adapter, 100~240VAC input, 1.25A @ 12VDC output, EU plug, LV6 |
| ADP-DB9(F)-TB5 | 59906231G | Female DB9 to Female 3.81mm TB5 Converter |
| WMK-315-Black | 70100000000050G | Black Aluminium Wall Mount Kit |

## 3.2 *Appearance, Front and Rear Panels*

The following figures show CR5201B/SE5201B series device’s front and rear panels.

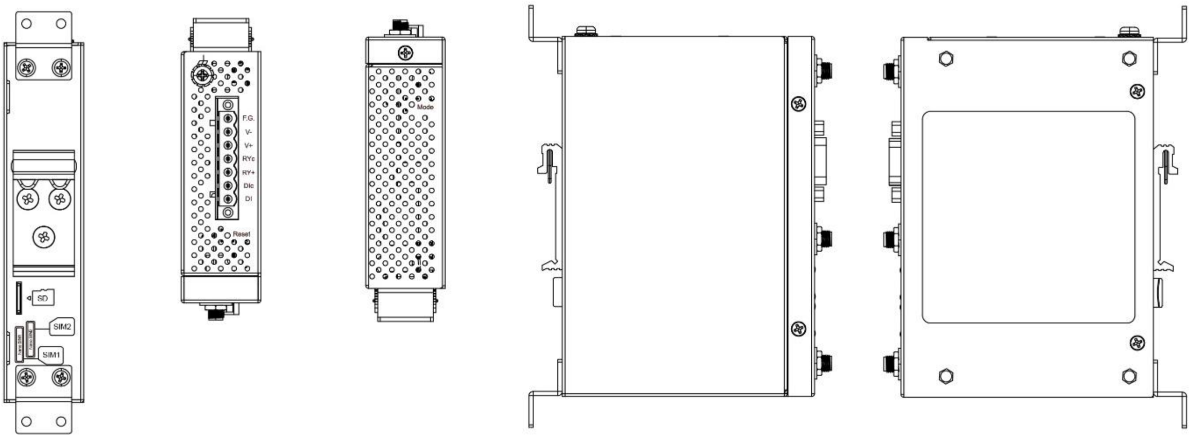
CR5201B



Front Rear Top Buttom Left Side Right Side

Figure 3-1CR5201B panels

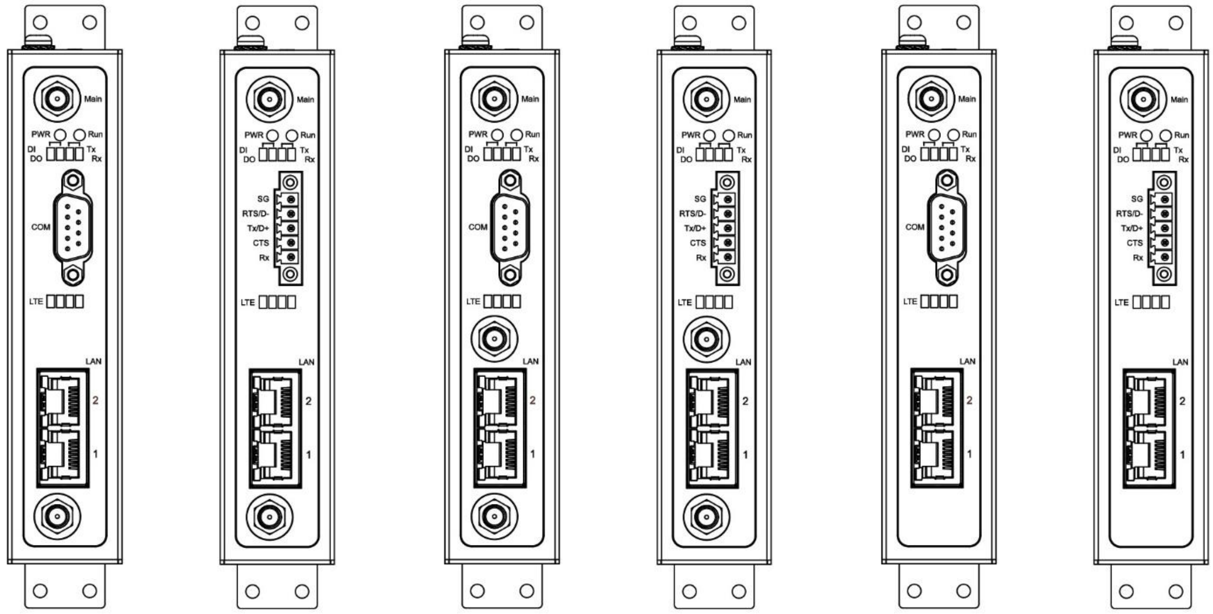
SE5201B All Series



Rear Top Buttom Left Side Right Side

Figure 3-2 SE5201B All Series Pannel except Front View

SE5201B All Series Front View



Cat.1 DB- Cat.1 TB Cat.1 DB-GPS Cat.1 TB-GPS Cat.M1 DB Cat.M1 TB

Figure 3-3 SE5201B All Series Front View

## 3.3 *First Time Installation*

Before installing the device, please follow strictly all safety procedures described in the hardware installation guide supplied inside the product. Atop will not be liable for any damages to property or personal injuries resulting from the installation or overall use of the device. Do not attempt to manipulate the product in any way if unsure of the steps described here. In such cases, please contact your dealer immediately.

Note that some specific installation instructions are not provided here in this manual since they may differ considerably based on the purchased hardware.

## 3.4 *Factory Default Settings*

### 3.4.1 *Network Default Settings*

The CR5201B/SE5201B Low-Power Gateway is equipped with two LAN interfaces with one default IP address. Its default network parameters are listed in Table 3.3.

Table 3.3 Network Default Settings

| Interface | Device IP | Subnet Mask | Gateway IP | DNS |
|---|---|---|---|---|
| LAN1 | 10.0.50.100 | 255.255.255.0 | 10.0.50.254 | - |

### 3.4.2 *Other Default Settings*

The CR5201B/SE5201B comes with the following default settings.

Table 3.4 Security, Serial, and SNMP Default Settings

| **Parameter** | **Default Values** |
|---|---|
| **Security** | |
| User Name | admin |
| Password | default |
| **Serial** | |
| COM1 | RS-232, 9600 bps, 8 data bits, No Parity bit,1 stop bit, No Flow Control<br>No Packet Delimiter timer |
| **SNMP** | |
| SysName of SNMP | System |
| SysLocation of SNMP | Location |
| SysContact of SNMP | Contact |
| SNMP | Disabled |
| Read Community | public |
| Write Community | private |
| SNMP Trap Server | 0.0.0.0 |

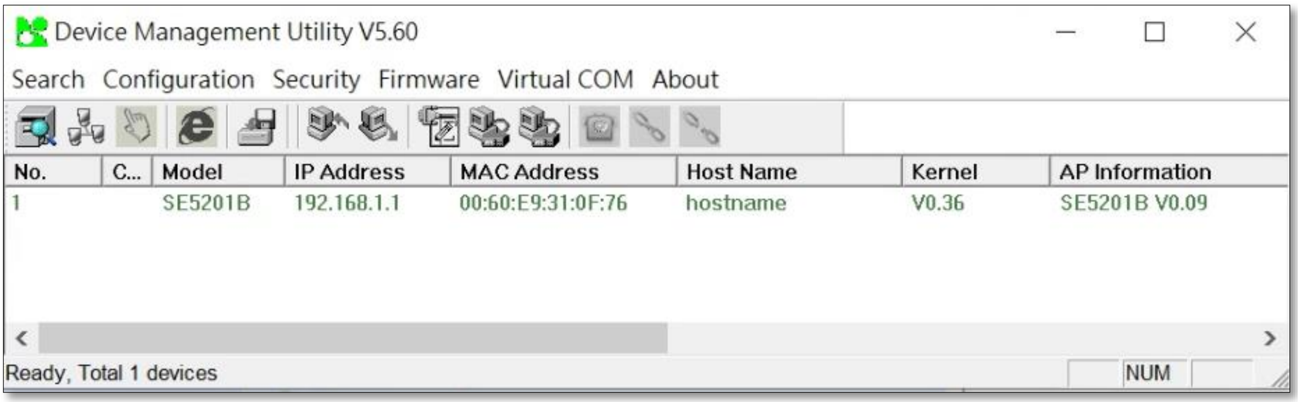
Note: Press the “**Reset**” button on the front panel for 5 seconds, to restore the CR5201B/SE5201B Series Low-Power Gateway to the factory default settings.

# 4 Configuration and Setup

It is strongly recommended for the user to first set network parameters through **Device Management Utility**© first. Other device-specific configurations can later be carried out via Atop's user-friendly Web-Interface.

## 4.1 *Configuration of Network Parameters through Device Management Utility*

Please install Atop's configuration utility program called **Device Management Utility**® that comes with the Product CD or can be downloaded from our websites (www.atop.com.tw or www.atoponline.com). For more information on how to install **Device Management Utility**®, please refer to the manual that comes in the Product CD. After you start **Device Management Utility**®, if the CR5201B/SE5201B Low-Power Gateway is already connected to the same subnet as your PC, the device can be accessed via broadcast packets. **Device Management Utility**® will automatically detect your CR5201B/SE5201B device and list it on **Device Management Utility**®'s window. Alternatively, if you did not see your CR5201B/SE5201B device on your network, press "**Rescan**" icon, a list of devices, including your CR5201B/SE5201B device currently connected to the network will be shown in the window of **Device Management Utility**® as shown in Figure 4-1.



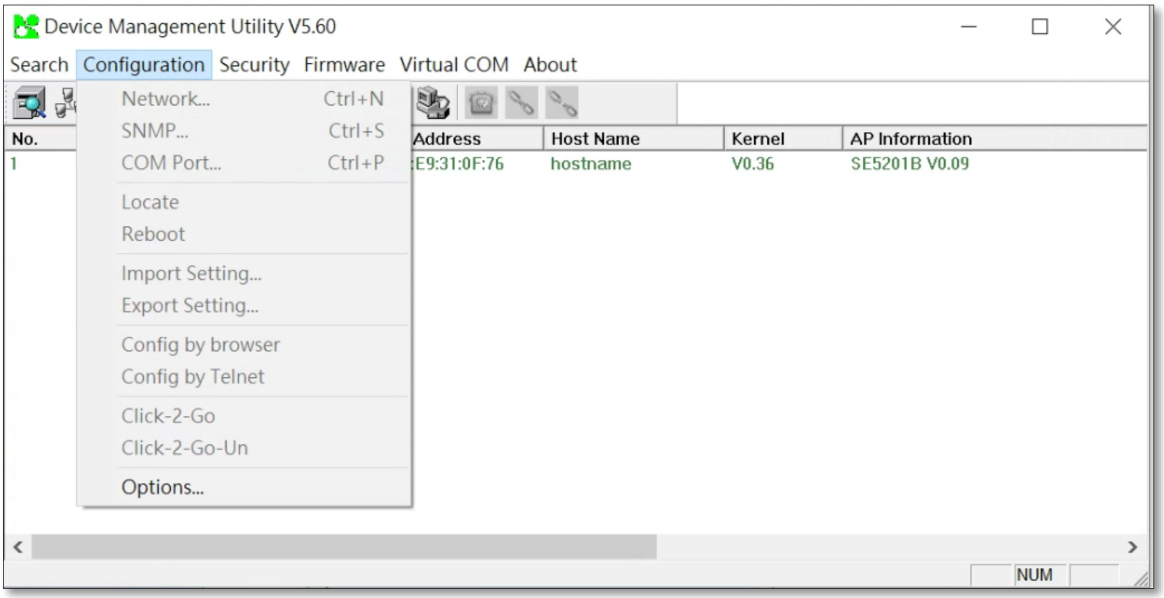
| No. | C... | Model | IP Address | MAC Address | Host Name | Kernel | AP Information |
|---|---|---|---|---|---|---|---|
| 1 | | SE5201B | 192.168.1.1 | 00:60:E9:31:0F:76 | hostname | V0.36 | SE5201B V0.09 |

Ready, Total 1 devices

Figure 4-1 List of Device in Device Management Utility

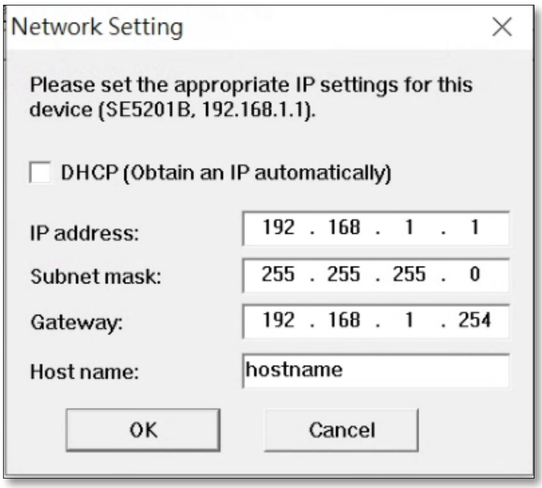
**Note:** This figure is for illustration purpose only. Actual values/settings may vary between devices.

Sometime the CR5201B/SE5201B device might not be in the same subnet as your PC; therefore, you will have to use Atop's utility to locate it in your virtual environment. To configure each device, first click to select the desired CR5201B/SE5201B device (default IP: 10.0.50.100) in the list of **Device Management Utility**©, and then click "**Configuration → Network…**" (or Ctrl+N) menu on **Device Management Utility**© as shown in Figure 4-2 or click on the second icon called **Network** on the menu icon bar, and a pop-up window will appear as shown in Figure 4-3.



| No. | Address | Host Name | Kernel | AP Information |
|---|---|---|---|---|
| 1 | E9:31:0F:76 | hostname | V0.36 | SE5201B V0.09 |

Figure 4-2 Pull-down Menu of Configuration and Network...


Network Setting

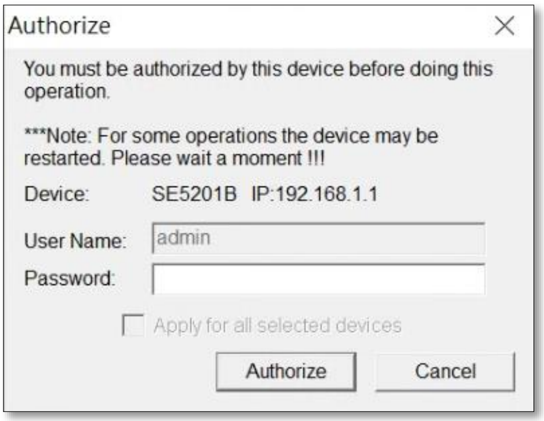
Please set the appropriate IP settings for this device (SE5201B, 192.168.1.1).

☐ DHCP (Obtain an IP automatically)

| | |
|---|---|
| IP address: | 192 . 168 . 1 . 1 |
| Subnet mask: | 255 . 255 . 255 . 0 |
| Gateway: | 192 . 168 . 1 . 254 |
| Host name: | hostname |

Figure 4-3 Pop-up Window of Network Setting

You may proceed then to change the IP address to avoid any IP address conflict with other hosts on your LAN or to connect the device to your existing LAN as shown in Figure 4-3. The system will prompt you for a credential to authorize the changes. It will ask you for the **Username** and the **Password** as shown in Figure 4-4. The default username is “**admin**”, while the default password is “**default**”. After clicking on the **Authorize** button, a notification window will pop-up as shown in Figure 4-5 and some device may be restarted. After the device is restarted (for some model), it will beep twice to indicate that the unit is running normally. Then, the CR5201B/SE5201B device can be found on a new IP address. It may be listed automatically by the **Device Management Utility©** or it can be found by clicking on the “**Rescan**” icon. Note that if you did not change the IP address but changed other parameter(s), you may encounter another notification window as shown in Figure 4-6.



Authorize

You must be authorized by this device before doing this operation.

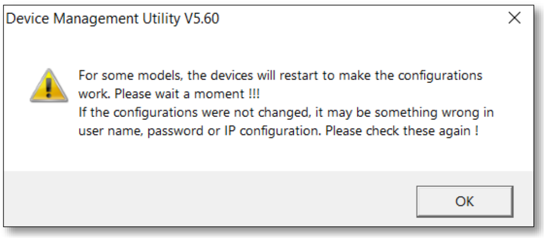
***Note: For some operations the device may be restarted. Please wait a moment !!!

Device: SE5201B IP:192.168.1.1

User Name: admin

Password:

Figure 4-4 Authorization for Change of Network Settings

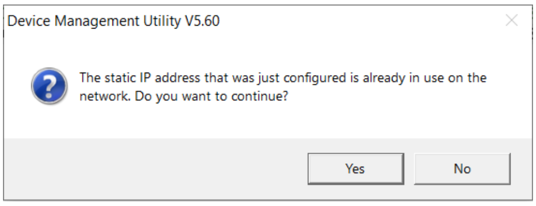


Device Management Utility V5.60

For some models, the devices will restart to make the configurations work. Please wait a moment !!!
If the configurations were not changed, it may be something wrong in user name, password or IP configuration. Please check these again !

Figure 4-5 Pop-up Notification Window after Authorization

Please consult your system administrator if you do not know your network’s subnet mask and gateway address.



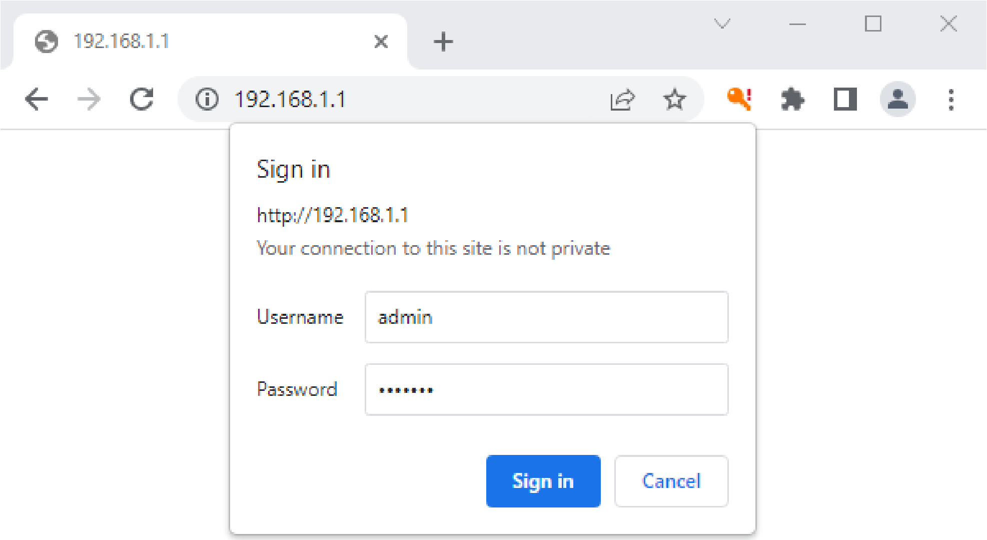
Device Management Utility V5.60

The static IP address that was just configured is already in use on the network. Do you want to continue?

Figure 4-6 Pop-up Notification Window when there is the same IP address in the network

## 4.2 *Configuring through Web/CLI Interface*

Every CR5201B/SE5201B Low-Power Gateway is equipped with a built-in web server in the firmware. Therefore, the device can be accessed by using a web browser for configuring by entering the device's IP address (default value is 192.168.1.1) in the URL field of your web browser. As shown in Figure 4-7, an authentication will be required and you will have to enter the username and password for accessing the web interface. The default value for username and password are "admin" and "default", respectively. The overview page of the web interface is illustrated as shown in Figure 4-8. Figure 4-9 lists all the menus and submenus for web configuration. Please see Section 3.4 for the default values.



Sign in

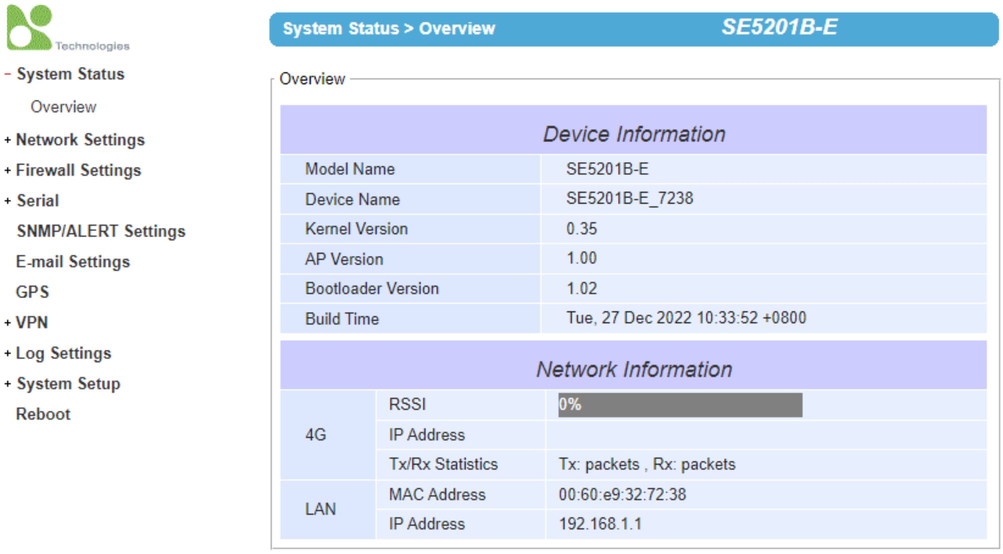
http://192.168.1.1

Your connection to this site is not private

Username: admin

Password: •••••••

Figure 4-7 Require Authentication for Accessing Web Interface



System Status > Overview SE5201B-E

Overview

| Device Information | |
|---|---|
| Model Name | SE5201B-E |
| Device Name | SE5201B-E_7238 |
| Kernel Version | 0.35 |
| AP Version | 1.00 |
| Bootloader Version | 1.02 |
| Build Time | Tue, 27 Dec 2022 10:33:52 +0800 |

| Network Information | | |
|---|---|---|
| 4G | RSSI | 0% |
| | IP Address | |
| | Tx/Rx Statistics | Tx: packets , Rx: packets |
| LAN | MAC Address | 00:60:e9:32:72:38 |
| | IP Address | 192.168.1.1 |

Figure 4-8 Overview Webpage of SE5201B Low-Power Gateway

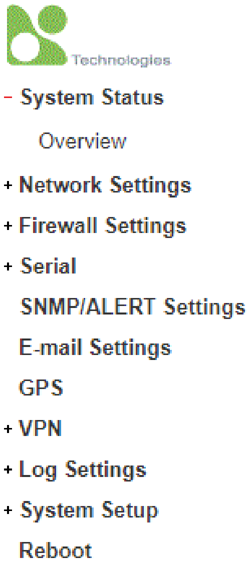
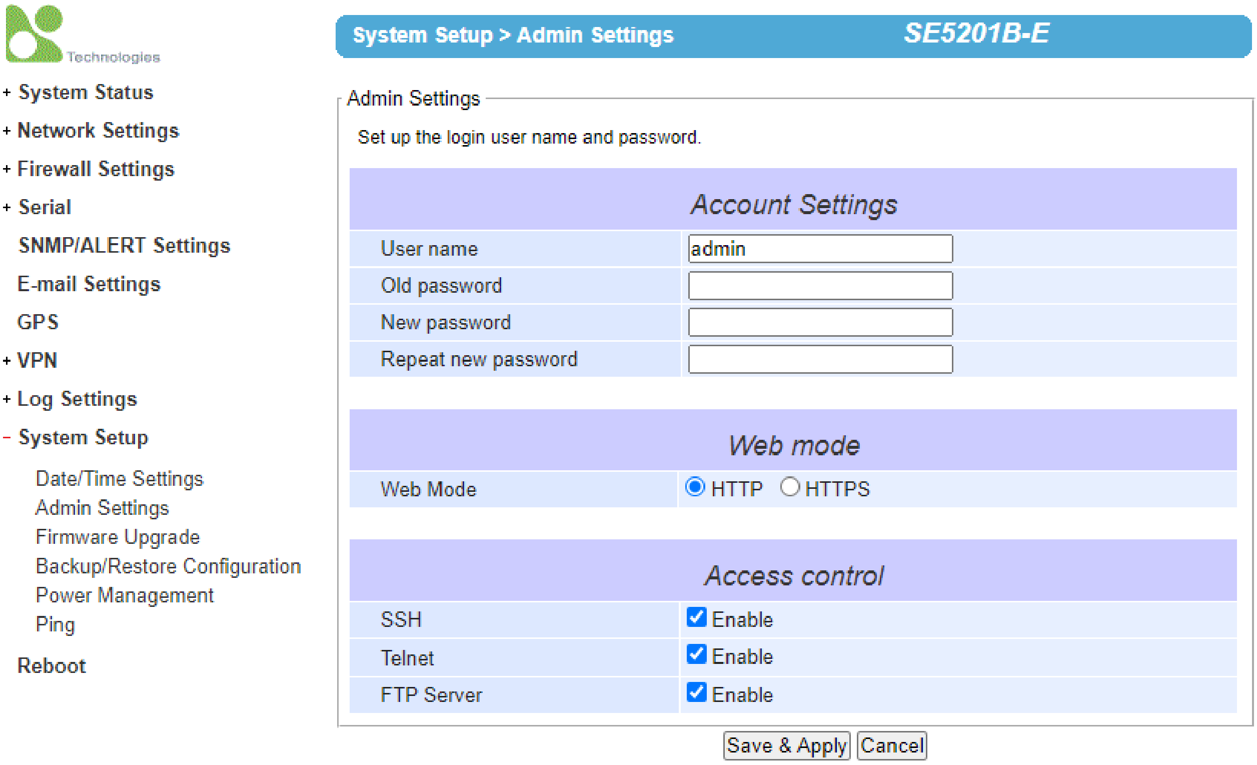


Figure 4-9 Memu of Configuring Web Page on SE5201B Low-Power Gateway

Typically, users are more familier to use web interface for configuring the device. It is the most recommended and the most common method used for CR5201B/SE5201B Low-Power Gateway. Please go to its corresponding section for a detailed explanation.

A Command Line Interface (CLI) such as Telnet/SSH can also be used to configure SE5201B through a console port. However, users need to enable the “**Account Settings**” field, as shown in Figure 4-10. Please refer to **System Setup → Admin Settings** in Section 4.13.2 for more details. Then, users can input command in the CLI interface, as shown in Figure 4-11.



Admin Settings

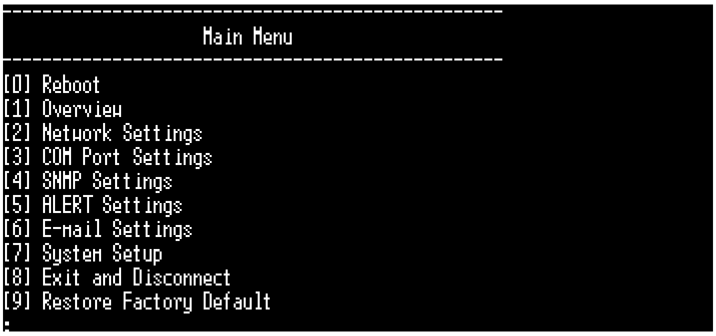
Set up the login user name and password.

| Account Settings | |
|---|---|
| User name | admin |
| Old password | |
| New password | |
| Repeat new password | |

| Web mode | |
|---|---|
| Web Mode | ● HTTP ○ HTTPS |

| Access control | |
|---|---|
| SSH | ☑ Enable |
| Telnet | ☑ Enable |
| FTP Server | ☑ Enable |

Figure 4-10 Access control



```
--------------------------------------------------
                 Main Menu
--------------------------------------------------
[0] Reboot
[1] Overview
[2] Network Settings
[3] COM Port Settings
[4] SNMP Settings
[5] ALERT Settings
[6] E-mail Settings
[7] System Setup
[8] Exit and Disconnect
[9] Restore Factory Default
:
```

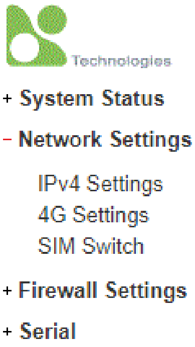
Figure 4-11 CLI interface

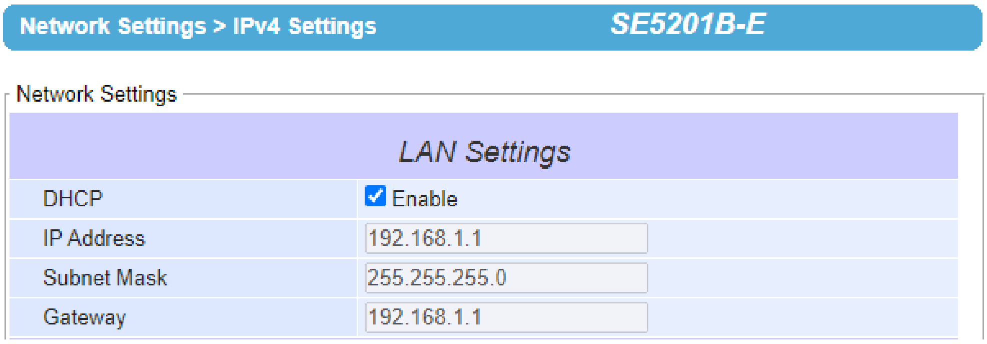
Please note that any change to IP address will require you to restart the CR5201B/SE5201B device.

## 4.3 *Configuring Automatic IP Assignment with DHCP*

A DHCP server can automatically assign IP addresses, Subnet Mask, and Network Gateway to LAN interface. You can simply check the **"DHCP (Obtain an IP Automatically)"** checkbox in the Network Setting dialog as shown in Figure 4-3 using Atop's **Device Management Utility©** and then restart the device. Once restarted, the IP address will be configured automatically.

Figure 4-12 Selecting DHCP Option





Network Settings > IPv4 Settings SE5201B-E

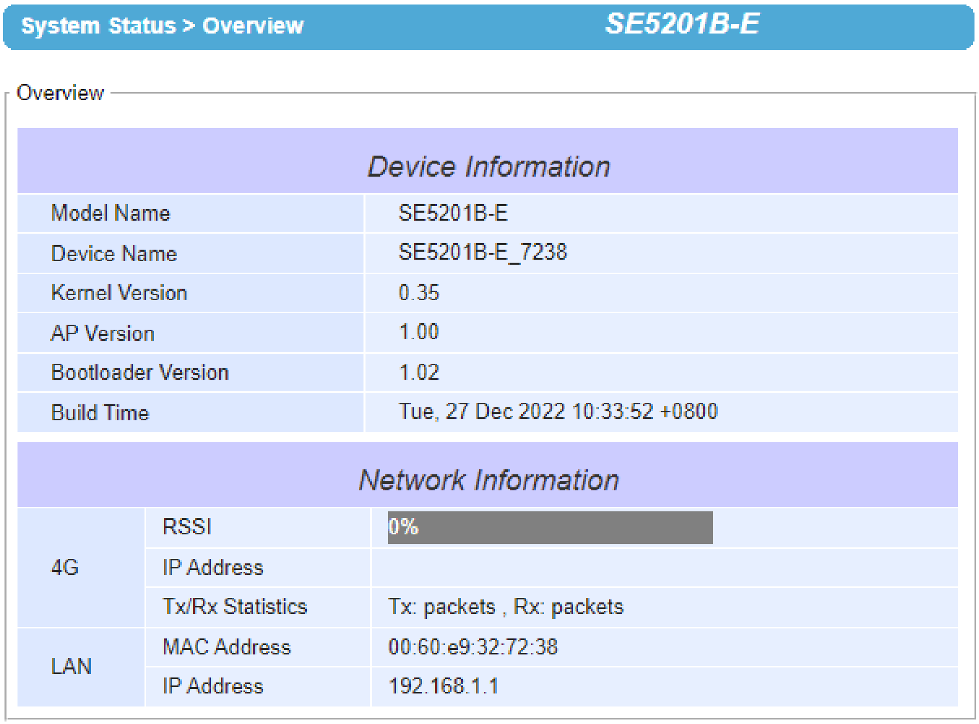
Network Settings

| LAN Settings | |
|---|---|
| DHCP | ☑ Enable |
| IP Address | 192.168.1.1 |
| Subnet Mask | 255.255.255.0 |
| Gateway | 192.168.1.1 |

Figure 4-13 Enable DHCP Option

## 4.4 *Web Overview*

In this section, current information on the device's status and settings will be displayed. An example of SE5201B-E's overview page is shown in Figure 4-14.



System Status > Overview SE5201B-E

Overview

| Device Information | |
|---|---|
| Model Name | SE5201B-E |
| Device Name | SE5201B-E_7238 |
| Kernel Version | 0.35 |
| AP Version | 1.00 |
| Bootloader Version | 1.02 |
| Build Time | Tue, 27 Dec 2022 10:33:52 +0800 |

| Network Information | | |
|---|---|---|
| 4G | RSSI | 0% |
| | IP Address | |
| | Tx/Rx Statistics | Tx: packets , Rx: packets |
| LAN | MAC Address | 00:60:e9:32:72:38 |
| | IP Address | 192.168.1.1 |

Figure 4-14 Overview Web Page (example on SE5201B-E)

In details, the following information is given and divided into 2 parts (Device Information and Network Information):

- Device Information
  - **Model Name**, as its name implies, shows the device·s model.
  - **Device Name** shows a given name of the device in which the default value is the MAC address of the LAN interface.
  - **Kernel Version** is the value of the version of the kernel firmware of the device.
  - **AP Version** is the version of the application firmware of the device.
  - **Bootloader Version** is the version of the program that loads the operating system of the device.
  - **Build Time** is the time that the kernel based on its configuration is compiled.
- **Network Information** shows information about the wired and wireless network interfaces on the device.
  - **3G/4G:** The RSSI (Received Signal Strength Indicator) of the 3G/4G signal is shown, as well as its assigned IP address. The Tx/Rx statistics are also displayed here.
  - **LAN:** This will display the current **MAC Address**, and **IP Address** of the Ethernet interface.

## 4.5 *Network Settings*

In this section, both network interfaces and related network settings of the SE5201B device can be configured. The **Network Settings** menu has four submenus which are **IPv4 Settings**, **4G Settings**, and **SIM Switch**. Figure 4-15 shows the menu and its submenus.

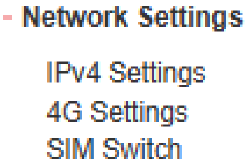
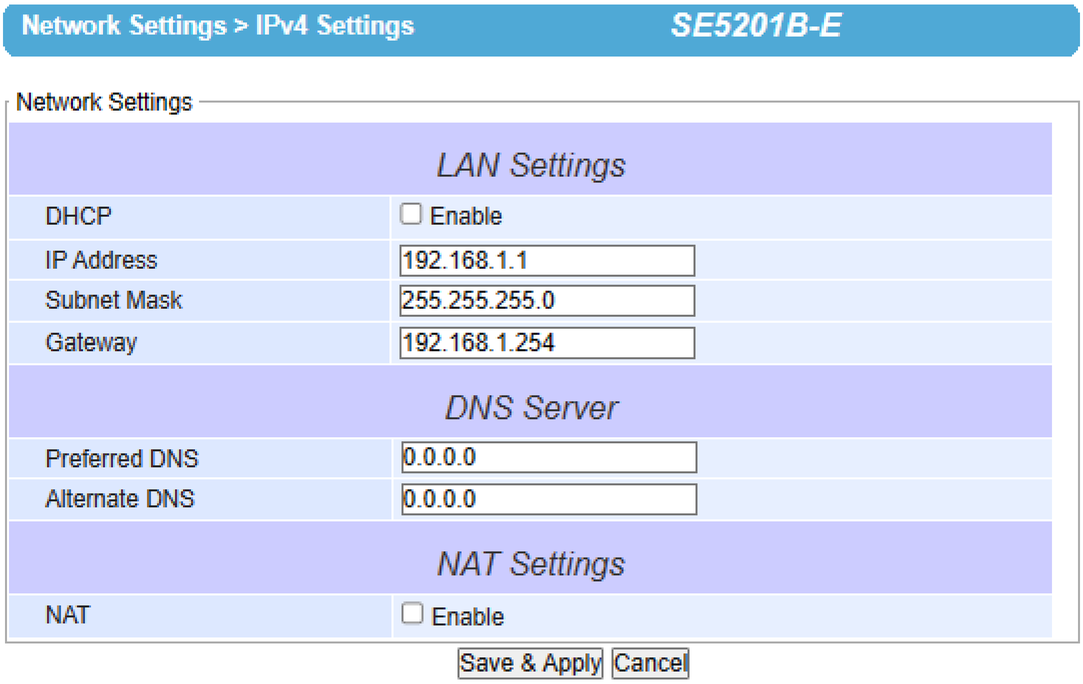


Figure 4-15 Three Submenus of the Network Settings Menu

### 4.5.1 *IPv4 Settings*

In the first submenu (**IPv4 Settings**), there are two sets of parameters which are **LAN Settings** and **DNS Server** that the user can input information, as shown in Figure 4-16. Note that there is another set of parameters: **NAT Settings** for CR5201B/SE5201B only. More information on this parameter will be elaborated later. For the first parameter (**LAN Settings),** you can configure the **IP Address**, **Subnet Mask**, and **Default Gateway** for your wired LAN network. You can check the box behind **DHCP** option to obtain an IP address automatically. If you checked the box, the rest of the options for **LAN1 Settings** will be greyed out or disabled. For the Second parameter (**DNS Server**), you can specify the IP Address of your **Preferred DNS** (Domain Name Server) and **Alternate DNS**. If the CR5201B/SE5201B device is connected to the Internet and should connect to other servers over the Internet to get some services such as Network Time Protocol (NTP) server, you will need to configure the DNS server in order to be able to resolve the host name of the NTP server. Please consult your network administrator or internet service provider (ISP) to obtain local DNS's IP addresses.



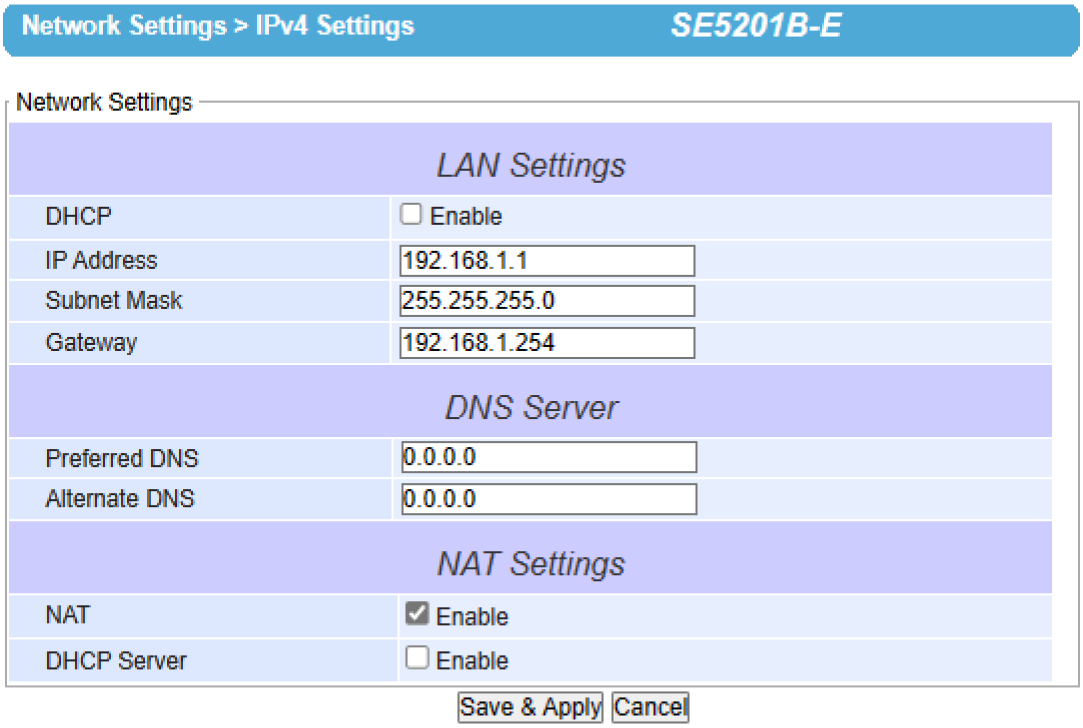
Network Settings > IPv4 Settings SE5201B-E

Network Settings

| | |
|---|---|
| *LAN Settings* | |
| DHCP | □ Enable |
| IP Address | 192.168.1.1 |
| Subnet Mask | 255.255.255.0 |
| Gateway | 192.168.1.254 |
| *DNS Server* | |
| Preferred DNS | 0.0.0.0 |
| Alternate DNS | 0.0.0.0 |
| *NAT Settings* | |
| NAT | □ Enable |

Figure 4-16 IPv4 Setting within the Network Settings Menu

As mentioned, there is **NAT Settings** for CR5201B/SE5201B only that can be configured at the end of the **IPv4 Settings** web page (under **Network Settings** menu) as shown in Figure 4-16 and Figure 4-17. NAT is referred to Network Address Translation which is a technique that allows CR5201B/SE5201B to create a local IP network or subnetwork with private IP addresses that can connect to the Internet through a public IP address via its Wide Area Network (WAN) port. The CR5201B/SE5201B will map the private IP address and port of a local device connected to its local interface to a public port on its public interface (WAN port). To enable **NAT** function on CR5201B/SE5201B, check on the **Enable** box behind **NAT** option under **NAT Settings** part as shown in Figure 4-17.



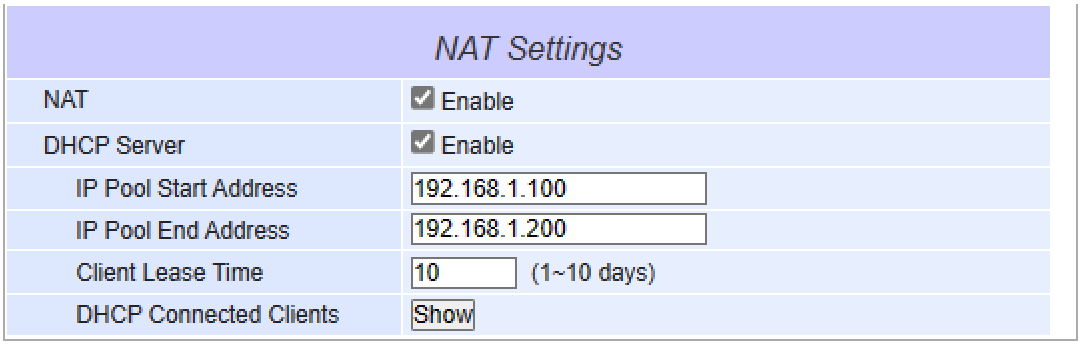
Network Settings > IPv4 Settings SE5201B-E

Network Settings

| LAN Settings | |
|---|---|
| DHCP | □ Enable |
| IP Address | 192.168.1.1 |
| Subnet Mask | 255.255.255.0 |
| Gateway | 192.168.1.254 |
| **DNS Server** | |
| Preferred DNS | 0.0.0.0 |
| Alternate DNS | 0.0.0.0 |
| **NAT Settings** | |
| NAT | ☑ Enable |
| DHCP Server | □ Enable |

Figure 4-17 NAT Settings under IPv4 Settings Web Page for SE5201B

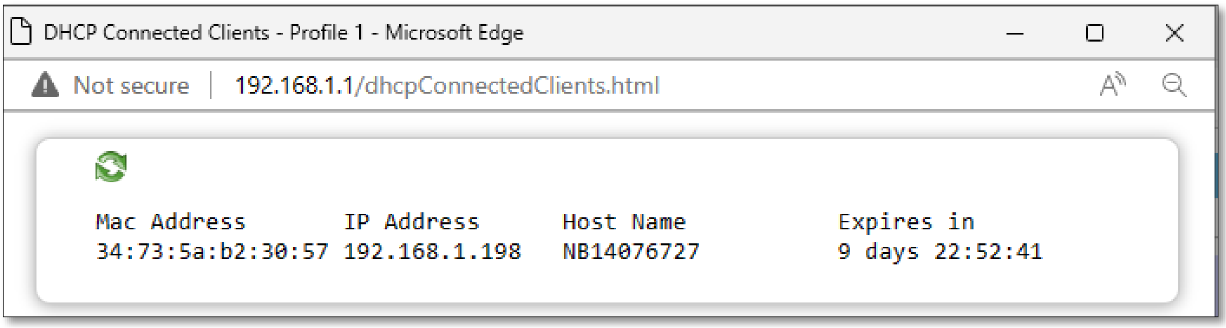
When **NAT** function is enabled on CR5201B/SE5201B , additional set of parameters which is **DHCP Server** field will appear as shown in Figure 4-18. The **DHCP Server** or Dynamic Host Configuration Protocol Server is another function on CR5201B/SE5201B under the **NAT Settings**. This will allow CR5201B/SE5201B to automatically assign IP address for its local network. If the **DHCP Server** option is enabled (by checking the **Enable** box behind **DHCP Server** option), **IP Pool Start Address** and **IP Pool End Address** fields will appear under it. The IP Pool Addresses are the range of addresses that **DHCP Server** will be used to configure local IP addresses. The user can enter the starting and ending addresses inside these two fields**. The DHCP** Server function inside CR5201B/SE5201B can only support one LAN port and provide that port with IP address in the given range (from **IP Pool Start Address** to **IP Pool End Address**). Note that the range must be in NAT LAN port's network segment.



| NAT Settings | |
|---|---|
| NAT | ☑ Enable |
| DHCP Server | ☑ Enable |
| IP Pool Start Address | 192.168.1.100 |
| IP Pool End Address | 192.168.1.200 |
| Client Lease Time | 10 (1~10 days) |
| DHCP Connected Clients | Show |

Figure 4-18 Enabling of NAT Settings with Additional Parameters for CR5201B/SE5201B

Finally, the last field is the **DHCP Connected Clients** which has a **Show** button that allows the user to see a list of currently connected DHCP Clients and their related IP addresses. When the **Show** button is clicked a pop-up window will show up with a table where each record contains Number, Client MAC Address, Client IP address, and Client name (if there is any). An example of one record is shown in Figure 4-19. Note that at the two green arrows that form a circle s a **Refresh** button that can check the latest list of DHCP connected clients when the user clicked on the arrows.


DHCP Connected Clients - Profile 1 - Microsoft Edge
Not secure
192.168.1.1/dhcpConnectedClients.html

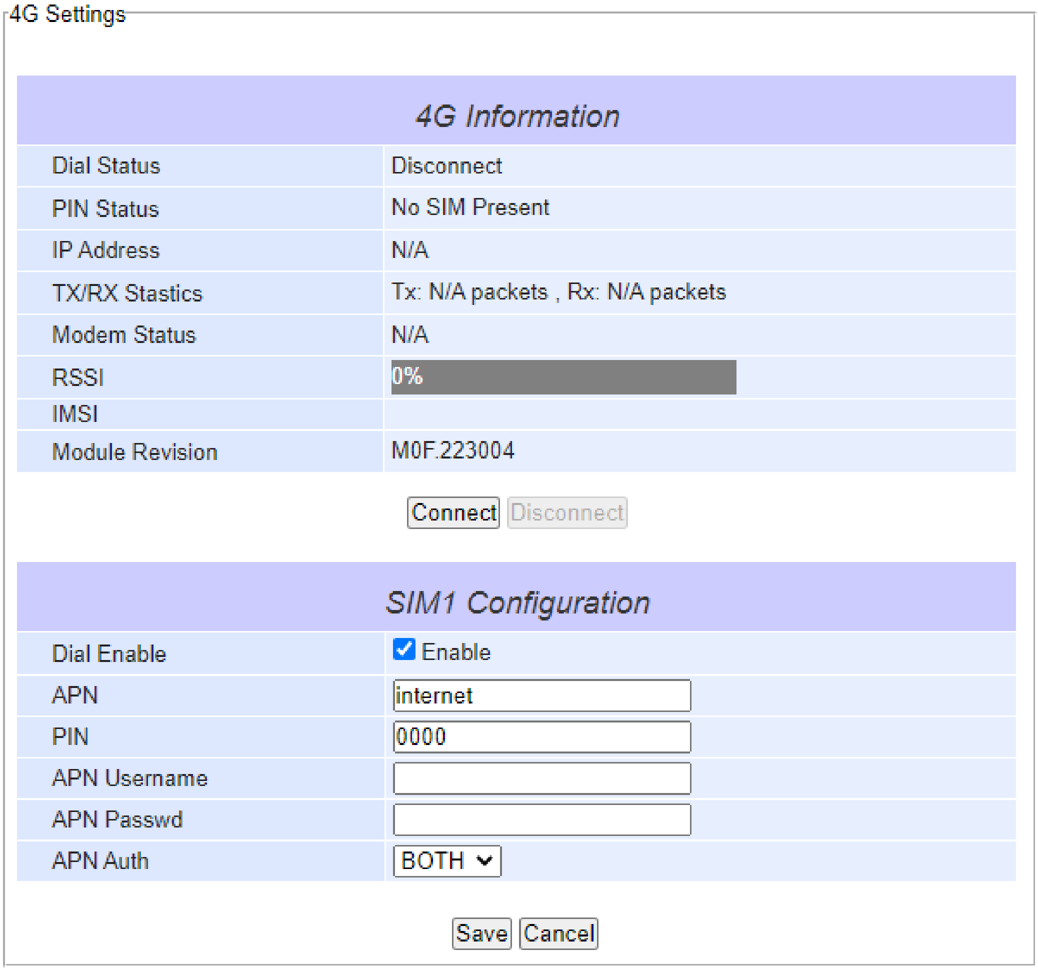
```
Mac Address       IP Address    Host Name         Expires in
34:73:5a:b2:30:57 192.168.1.198 NB14076727        9 days 22:52:41
```

Figure 4-19 A pop-up window shows an empty list of DHCP Connected Clients.

After finishing the network settings (or IPv4 settings) configuration, please click the **Save & Apply** button to save all changes that have been made. Finally, the web browser will be redirected to the **Overview** page as shown in Figure 4-14. If you would like to discard any setting, please click the **Cancel** button.

### 4.5.2 *4G Settings (Cellular Settings)*

Atop's CR5201B/SE5201B series provide the 4G settings page that allowed users to configure the cellular settings for AP (Access Point). Figure 4-20 illustrates the 4G Settings page. In the segment of 4G Information, users can manually connect/disconnect the 4G connection by clicking the **Connect/Disconnect** button.



| 4G Information | |
|---|---|
| Dial Status | Disconnect |
| PIN Status | No SIM Present |
| IP Address | N/A |
| TX/RX Stastics | Tx: N/A packets , Rx: N/A packets |
| Modem Status | N/A |
| RSSI | 0% |
| IMSI | |
| Module Revision | M0F.223004 |

| SIM1 Configuration | |
|---|---|
| Dial Enable | ☑ Enable |
| APN | internet |
| PIN | 0000 |
| APN Username | |
| APN Passwd | |
| APN Auth | BOTH |

Figure 4-20 4G Settings Web Page

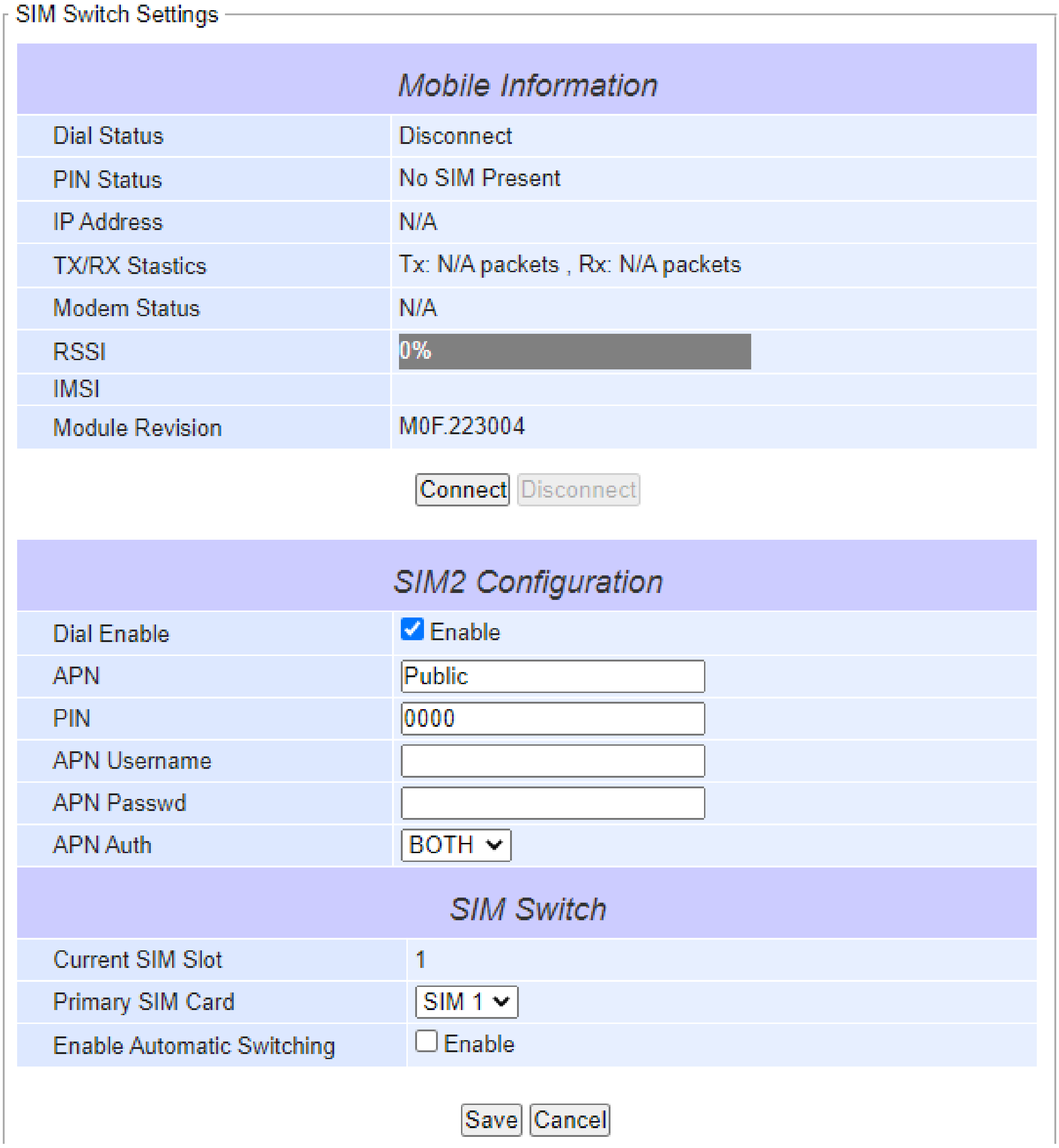
In the segment of SIM1 Configuration, users need to follow the requirements of cellular's AP (Access Point) to configure the settings. After finishing configurations, please click on the **Save** button to save all changes and enable your settings. Otherwise, click on the **Cancel** button to discard your settings. Table 4.1 summarizes the fields of 4G Settings web page.

Table 4.1 Descriptions of 4G Settings

| Field Name | Description | Factory Default |
|---|---|---|
| **Dial Enable** | Check the **Enable** box to active the 4G dialing process when system start-up. Otherwise, the 4G connection will not be activated when system start-up. | Uncheck |
| **APN** | Access point name, this is determined by the carrier. | Public |
| **PIN** | PIN code used to unlock the SIM. This is required only when the SIM is locked. | 0000 |
| **APN Username** | The users name used to establish the connection during the dialing process. The requirement of this field is determined by the carrier. | NULL |
| **APN Passwd** | The password used to establish the connection during the dialing process. The requirement of this field is determined by the carrier. | NULL |
| **APN Auth** | Authentication method. The requirement of this field is determined by the carrier. | BOTH |

### 4.5.3 *SIM Switch*

Atop's SE5201B supports two SIM card slots (SIM1 and SIM2) on the chasis of the device. Users can configure the parameters for SIM2 and enabling the switching of the SIMs on this SIM Switch web page. Noted that CR5201B only supports 1 SIM card slot. Figure 4-21 shows the **SIM Switch Settings** web page which consists of Mobile Information, SIM2 Configuration, and SIM switch sections. The first section called Mobile Information provides current information related to the device's mobile connectivity. The second section called SIM2 Configuration can be used to set the cellular's Access Point (AP) parameters for SIM card slot number 2. Note that the parameters are the same as described in Table 4.1. The third section called SIM Switch can be used to set which SIM card is the primary SIM card and enabling the automatically switching of primary SIM card.



SIM Switch Settings

Mobile Information

| | |
|---|---|
| Dial Status | Disconnect |
| PIN Status | No SIM Present |
| IP Address | N/A |
| TX/RX Stastics | Tx: N/A packets , Rx: N/A packets |
| Modem Status | N/A |
| RSSI | 0% |
| IMSI | |
| Module Revision | M0F.223004 |

SIM2 Configuration

| | |
|---|---|
| Dial Enable | ☑ Enable |
| APN | Public |
| PIN | 0000 |
| APN Username | |
| APN Passwd | |
| APN Auth | BOTH |

SIM Switch

| | |
|---|---|
| Current SIM Slot | 1 |
| Primary SIM Card | SIM 1 |
| Enable Automatic Switching | □ Enable |

Figure 4-21 SIM Switch Settings Web Page

Table 4.2 Description of SIM Switch's parameters

| Field Name | Description | Factory Default |
|---|---|---|
| **Current SIM Slot** | Display the current SIM card slot that is the primary SIM | 1 |
| **Primary SIM Card** | Drop-down list of the available SIM slots: SIM1 and SIM2 | SIM1 |
| **Enable Automatic Switching** | This option allows the automatic switching of SIM card slot | Disable |

The following procedures can be used to verify the cellular connection on the Atop's CR5201B/SE5201B.

**1. Check the LED display.**

- Check the LTE LEDs on the front panel.
- If the LTE LEDs are steady, it means that the CR5201B/SE5201B is connected to the 4G LTE network.
- If the LTE LEDs are off, it means that a SIM card is not installed or not detected, or the SIM card has not established a 4G data communication link.
- Check the LTE signal strength LEDs to see the current signal strength level. If the LTE signal strength LEDs are not on, this indicates that the CR5201B/SE5201B has not established a data service. Make sure that you enter the correct APN information in the web setting page described above.

**2. Check the Overview page on the web.**

- Log in to the web interface of CR5201B/SE5201B to display the Overview page. Check the Cellular RSSI, Cellular WAN IP address, and Cellular Mode fields to identify any connection problems.
- For Cellular RSSI (Received Signal Strength Indication), make sure that the value is above 60% to maintain a stable connection.
- If the Cellular WAN IP address is not available but the Cellular RSSI is more than 80%, make sure that the APN configuration is correct. The service provider might assign a private WAN IP address, which is not accessible externally.

**3. Test the cellular network access on your computer.**

Users with public SIM cards (instead of SIM cards with MDVPN service enabled) can test the connection to the Internet on your computer (assuming that your computer is connected to an Ethernet port on the CR5201B/SE5201B).

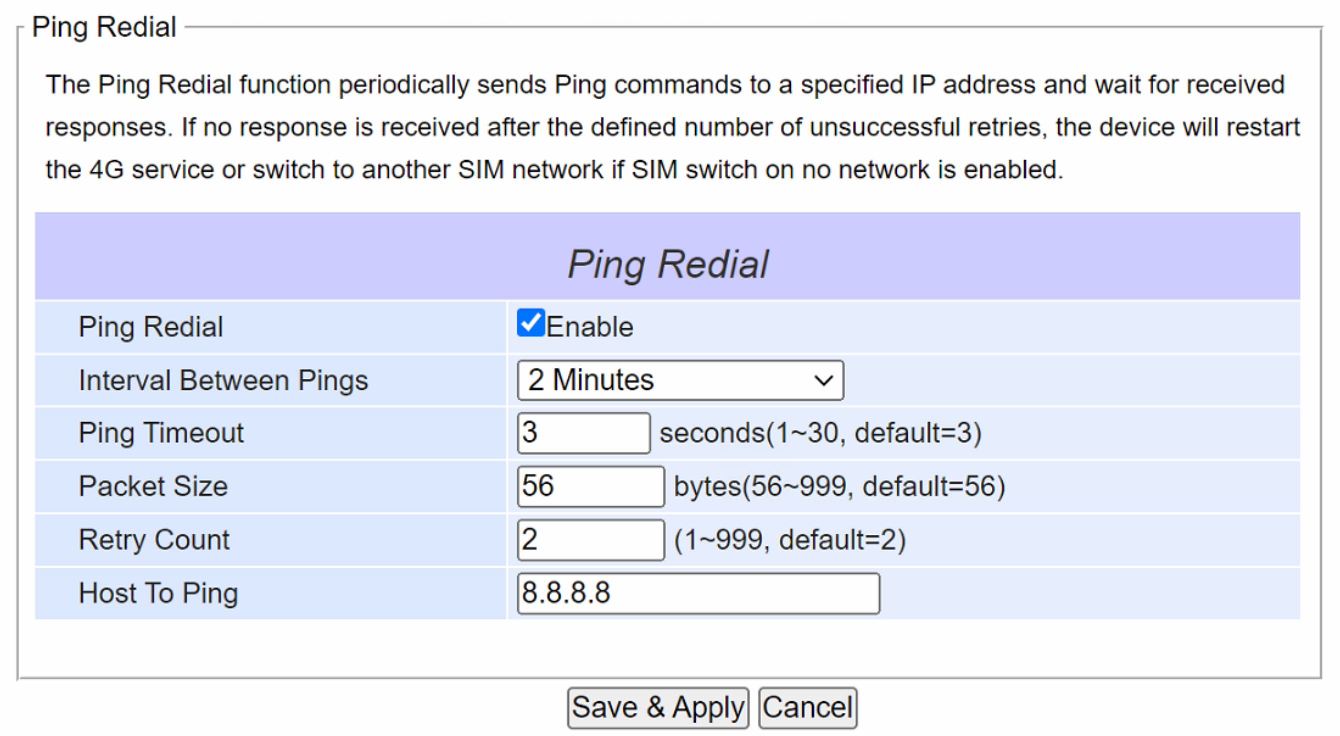
An example of the configuration settings on the computer is given below:

- Laptop IP Address: 192.168.1.4 (on the same subnet as the SE5201B gateway)
- Laptop Subnet Mask: 255.255.255.0 (on the same subnet as the SE5201B gateway)
- Laptop Default Gateway: 192.168.1.1 (the SE5201B gateway IP address)
- Laptop Primary DNS Server: 8.8.8.8 (test with Google's public DNS server)
- Laptop Primary DNS Server: 8.8.4.4 (test with Google's public DNS server)

After the configuration process is complete, your computer will be able to access the Internet.

### 4.5.4 *Ping Redial*

To guarantee the quality of LTE communication, the user could enable the **Ping Reboot** function under the **Network Settings** menu. The device will send packets periodically to specified destination (**Host To Ping**) via PING protocol. Once SE5901B detected that there was no response from the specified destination, it will initialize or reboot the 3G/4G module. Figure 4.5.4 shows the Ping Reboot web page and its parameters.



Ping Redial

The Ping Redial function periodically sends Ping commands to a specified IP address and wait for received responses. If no response is received after the defined number of unsuccessful retries, the device will restart the 4G service or switch to another SIM network if SIM switch on no network is enabled.

| Ping Redial | |
|---|---|
| Ping Redial | ☑ Enable |
| Interval Between Pings | 2 Minutes |
| Ping Timeout | 3 seconds(1~30, default=3) |
| Packet Size | 56 bytes(56~999, default=56) |
| Retry Count | 2 (1~999, default=2) |
| Host To Ping | 8.8.8.8 |

Figure 4.5.4 Ping Reboot Web Page under Network Settings

Table 4.5.4 Descriptions of Ping Reboot's Parameters

| Field Name | Description | Factory Default |
|---|---|---|
| **Ping Redial** | Check the **Enable** box to active the **Ping Reboot** function. Input 0.0.0.0 or 127.0.0.1 in "Host to Ping" column can **disable** Ping Redial function too. | Enable |
| **Interval Between Pings** | The period that SE5201B will send out the Ping packet. | 2 minutes |
| **Ping Timeout** | The timeout when there is no response from a destination host. | 3 seconds |
| **Packet size** | The payload size of ICMP (Internet Control Message Protocol) used by Ping. You need to confirm that the destination host could accept the packet size that you defined. | 56 Bytes |
| **Retry Count** | The number of retries if there is no response from a destination host. | 2 times |
| **Host to Ping** | The specific IPv4 destination that SE5201B will send Ping packet to. | 8.8.8.8 |

## 4.6 *Firewall Setting*

Atop's CR5201B/SE5201B provides firewall features to improve security for your network. You can configure the firewall mechanisms under the Firewall Setting menu. Figure 4-22 shows the submenus of SE5201B under the Firewall Setting.

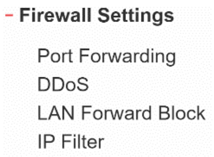


Figure 4-22 Firewall Setting Menu on CR5201B/SE5201B

### 4.6.1 *Port Forwarding*

Port forwarding is an application of Network Address Translation (NAT) that redirects a communication request from one address and port number combination to another while the packets are traversing a network gateway. Figure 4-23 depicts an example of port forwarding through a SE5201B device (green pattern). In this example, a host or device behind the SE5201B (on the left of the figure) has a private IP address of 10.0.50.101 with port number 80. This is a http service that can be accessed through a public IP (on the SE5201B device) with IP address with port number 8080. This public IP address can be reached by a SCADA control center over the Internet. In other words, the SCADA system could access the IP address of SE5201B with specified port and the SE5201B will forward the packet from the SCADA system to the host on the LAN port of SE5201B with specified port.

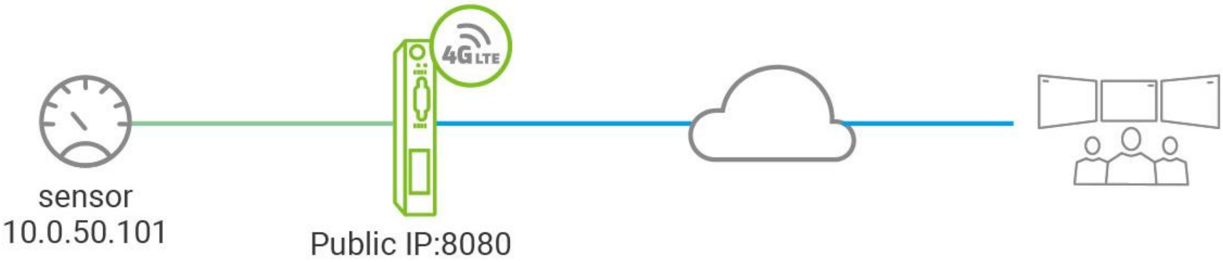
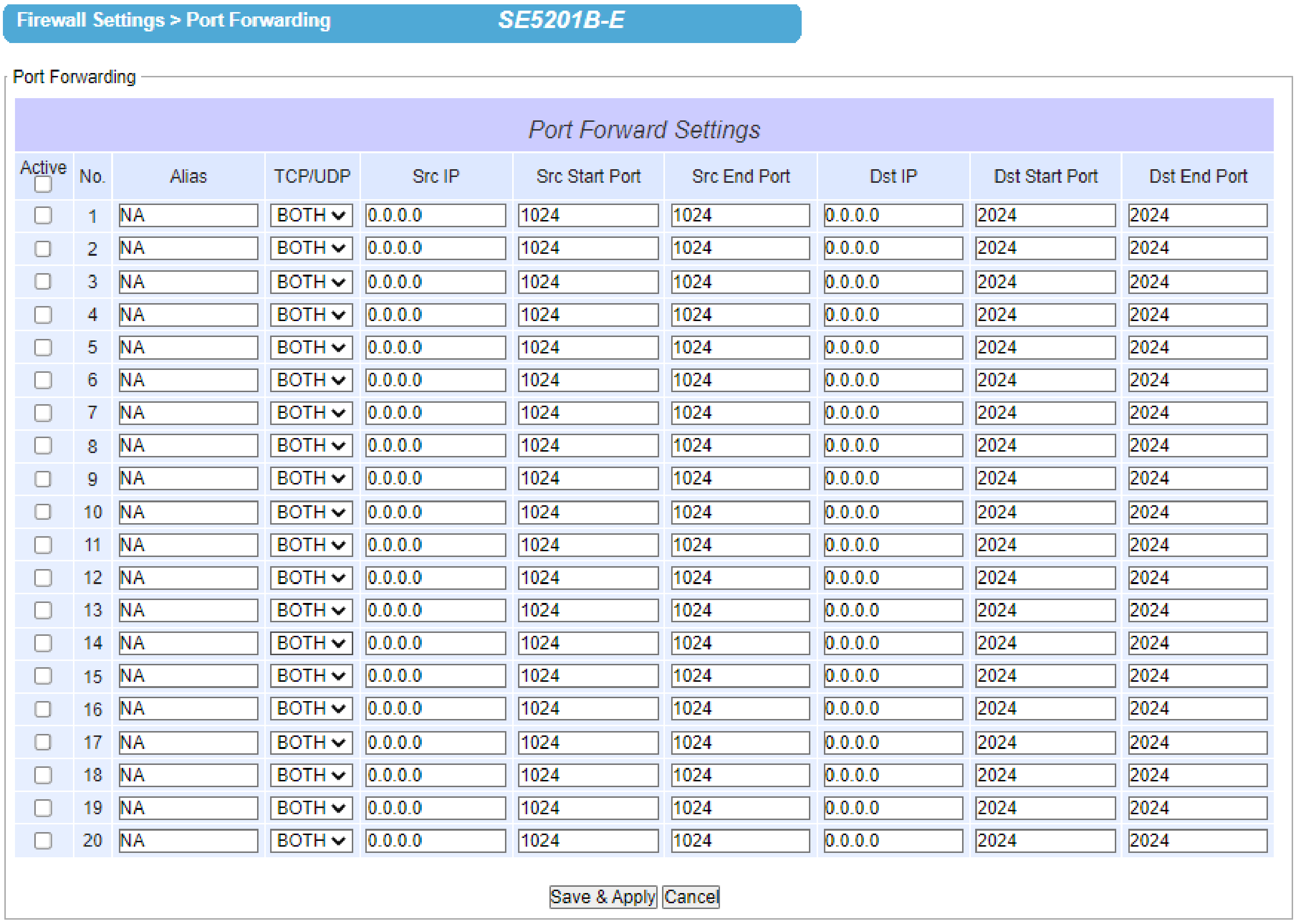


Figure 4-23 Example of Port Forwarding through SE5201B Low-Power Gateway

For CR5201B/SE5201B, when the user clicked on the **Port Forwarding** menu, the **Port Forwarding** web page will be displayed as shown in Figure 4-24. This port forwarding feature allows the user to configure port forwarding from WAN to LAN. This feature can redirect specific packets from a remote host on the WAN to a server on the LAN. It hides the IP address of a local server and prevents remote hosts from accessing the local server directly. This feature can also filter out unrecognized packets to protect your LAN network when computers connected to CR5201B/SE5201B are not visible to the WAN. Note that this feature is the result of **NAT Settings** described above. The user can configure port forwarding up to 20 entries. For each entry, the user can set an **Alias** (short name), allowable transport protocol(s) (**TCP/UDP**), source IP address (**Src IP**), source start port (**Src Start Port**), source end port (**Src End Port**), destination IP address (**Dst IP**), destination start port (**Dst Start Port**), and destination end port (**Dst End Port**). Table 4.3 describes each field (or column) in the Port Forwarding table.

After finishing the **Port Forwarding** configuration, please click the **Save & Apply** button to save all changes that have been made. If you would like to discard any setting, please click the **Cancel** button.



Port Forward Settings

| Active □ | No. | Alias | TCP/UDP | Src IP | Src Start Port | Src End Port | Dst IP | Dst Start Port | Dst End Port |
|---|---|---|---|---|---|---|---|---|---|
| □ | 1 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 2 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 3 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 4 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 5 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 6 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 7 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 8 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 9 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 10 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 11 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 12 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 13 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 14 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 15 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 16 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 17 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 18 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 19 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |
| □ | 20 | NA | BOTH | 0.0.0.0 | 1024 | 1024 | 0.0.0.0 | 2024 | 2024 |

Figure 4-24 Port Forwarding Web Page of CR5201B/SE5201B series

Table 4.3 Description of Fields in Port Forwarding Table

| Field Name | Description | Factory Default |
|---|---|---|
| **Active** | This radio button allows individually enabling or disabling each entry of the port forwarding configuration. | Disable |
| **No.** | This is the number of the row on the table which are from 1 up to 20. | - |
| **Alias** | This is a fillable textbox that allows to configure a short and easy-to-remember name for each port forwarding entry. | NA (Null) |
| **TCP/UDP** | This is the transport protocol that can be allowed on this port forwarding entry. The available options are TCP, UDP, or BOTH. | BOTH |
| **Src IP** | IPv4 address of the source (on WAN) which will be redirected through CR5201B/SE5201B. | 0.0.0.0 |
| **Src Start Port** | The starting port number of the source which can be between 0 to 65535. | 1024 |
| **Src End Port** | The ending port number of the source which can be between 0 to 65535. | 1024 |
| **Dst IP** | IPv4 address of the destination (on LAN) which is the translated destination IP address | 0.0.0.0 |
| **Dst Start Port** | The starting port number of the destination which can be between 0 to 65535. | 2024 |
| **Dst End Port** | The ending port number of the destination which can be between 0 to 65535. | 2024 |

### 4.6.2 *DoS*

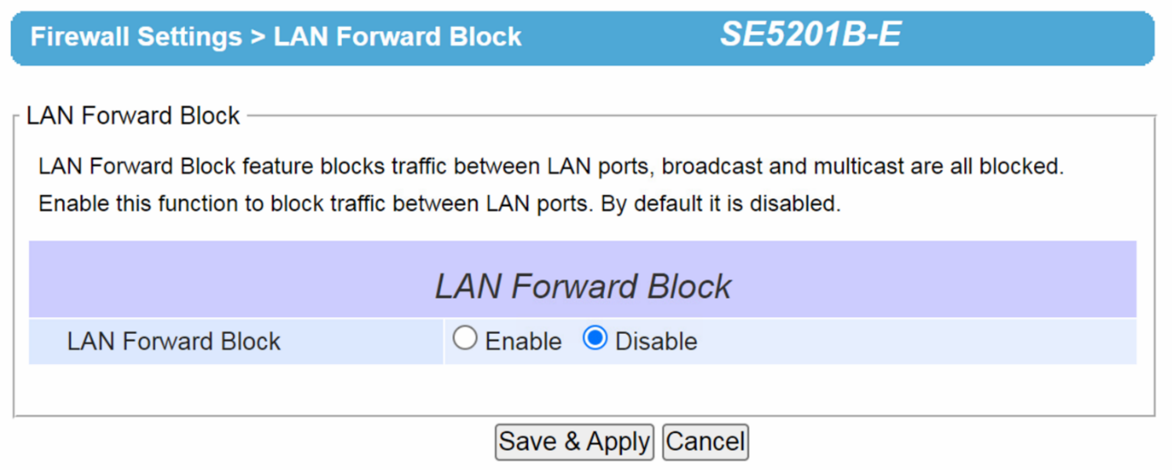
Atop's CR5201B/SE5201B also has built-in distributed denial-of-service (DoS) protection mechanism. In network computing, a denial-of-service (DoS) attack is a cyber-attack that is accomplished by flooding the targeted machine such as CR5201B/SE5201B device with superfluous or fake requests in attempt to overload system and preventing some or all legitimate requests from being fulfilled. To enable this mechanism, users can choose the **DoS Setting** web page from the **DoS** submenu under the **Firewall Settings** menu. Figure 4-25 shows the option under the **DoS Settings** that can enable the DDoS Protection mechanism by selecting the **Yes** radio button.

TBD

Figure 4-25 DoS Settings Web Page

### 4.6.3 *LAN Forward Block (SE5201B-E Only)*

The LAN Forward Block feature is a simple network management tool designed to enhance the security and efficiency of Local Area Networks (LANs). This functionality enables network administrators to control and limit packet forwarding between devices within the LAN. Specifically, it can either block all packets or allow all packets to pass through, depending on the administrator's settings.



Firewall Settings > LAN Forward Block SE5201B-E

LAN Forward Block

LAN Forward Block feature blocks traffic between LAN ports, broadcast and multicast are all blocked.
Enable this function to block traffic between LAN ports. By default it is disabled.

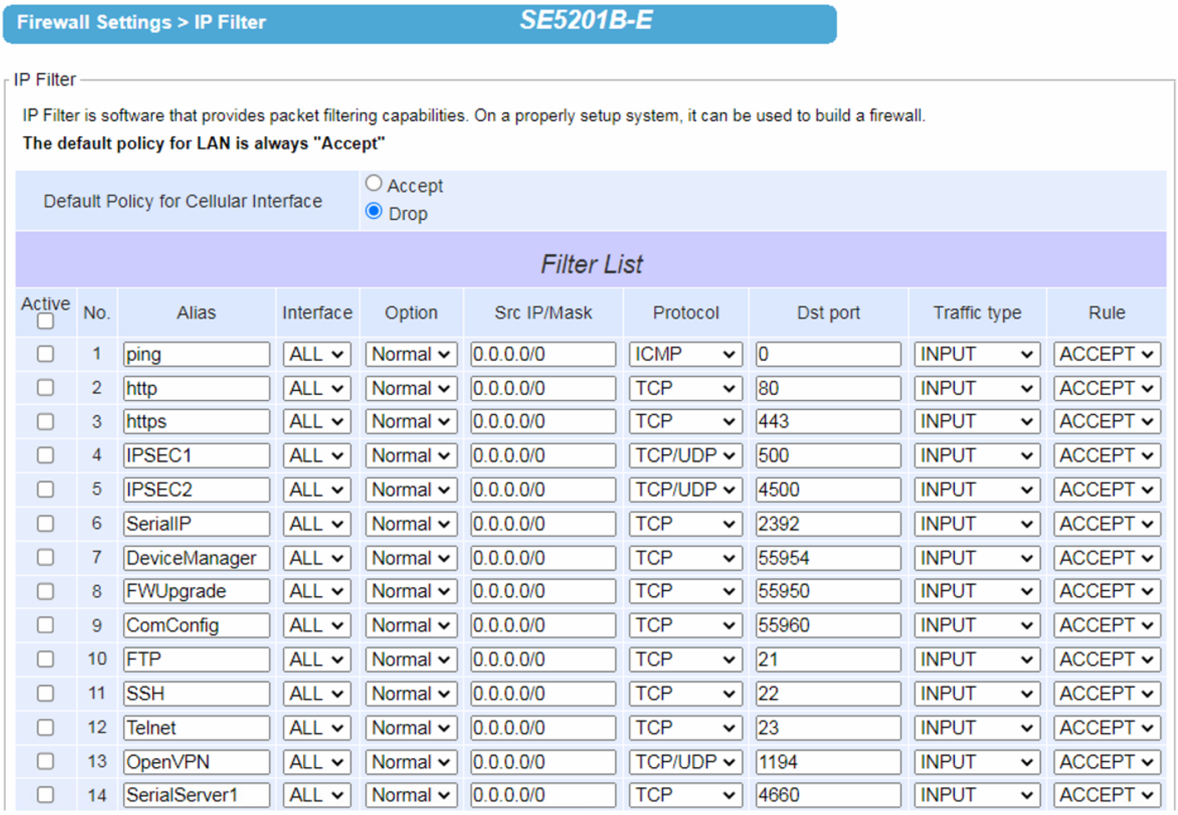
| LAN Forward Block | |
|---|---|
| LAN Forward Block | ○ Enable ● Disable |

### 4.6.4 *IP Filter (SE5201B-E Only)*

One of the firewall features is to filter network traffic based on protocols, source addresses, and port numbers. Under the **IP Filter** web page shown in below Figure, you can configure the filtering for different network services. The first part of the **IP Filter** page is the **Default Policy** and the second part is the **Filter List**. By default, the policy is set in **Accept** mode in which all services on the device are accepted by the firewall. To deny a number of service types through the firewall, you can enable the filtering by selecting the **Drop** policy. Next, you can configure each denied service in the Filter List. Note that up to 30 entries can be set in the Filter List.

Under the **Filter List**, there are seven columns which are **Alias, Interface, Option, IP Addr/mask, Protocol**, **Port**, and **Rule**. The first three entries on the list are provided as examples for Ping, http, and https services. To enable each entry, you can check the box in front of that entry. Then, you can enter the short name or **Alias** for each entry to provide hint on the service that you allow. This name usually is the protocol service at the application layer. Next, you can select the transport protocol from the drop-down list under the **Interface** column. The choices for the interface are All, LAN1, and LAN2. The selection items depend on supported LAN interfaces on your device. The **Option** drop-down field allowed you to select the filtering rule is a normal or invert rule of **IP Addr/mask**. Next, you can enter the **IP Addr/mask, Protocol** and the **Port** number that will fit in the filtering rule. Then, you can determine the configured rule is Accept or Drop by the device from Rule drop-down list. Table below summarizes the description of each filed on the IP Filter web page.

After finishing configuring the **IP Filter**, please click on the **Save & Apply** button to save all changes and enable your setting. Otherwise, click on the **Cancel** button to discard you setting.



Firewall Settings > IP Filter SE5201B-E

IP Filter

IP Filter is software that provides packet filtering capabilities. On a properly setup system, it can be used to build a firewall.

**The default policy for LAN is always "Accept"**

Default Policy for Cellular Interface ○ Accept ● Drop

Filter List

| Active □ | No. | Alias | Interface | Option | Src IP/Mask | Protocol | Dst port | Traffic type | Rule |
|---|---|---|---|---|---|---|---|---|---|
| □ | 1 | ping | ALL | Normal | 0.0.0.0/0 | ICMP | 0 | INPUT | ACCEPT |
| □ | 2 | http | ALL | Normal | 0.0.0.0/0 | TCP | 80 | INPUT | ACCEPT |
| □ | 3 | https | ALL | Normal | 0.0.0.0/0 | TCP | 443 | INPUT | ACCEPT |
| □ | 4 | IPSEC1 | ALL | Normal | 0.0.0.0/0 | TCP/UDP | 500 | INPUT | ACCEPT |
| □ | 5 | IPSEC2 | ALL | Normal | 0.0.0.0/0 | TCP/UDP | 4500 | INPUT | ACCEPT |
| □ | 6 | SerialIP | ALL | Normal | 0.0.0.0/0 | TCP | 2392 | INPUT | ACCEPT |
| □ | 7 | DeviceManager | ALL | Normal | 0.0.0.0/0 | TCP | 55954 | INPUT | ACCEPT |
| □ | 8 | FWUpgrade | ALL | Normal | 0.0.0.0/0 | TCP | 55950 | INPUT | ACCEPT |
| □ | 9 | ComConfig | ALL | Normal | 0.0.0.0/0 | TCP | 55960 | INPUT | ACCEPT |
| □ | 10 | FTP | ALL | Normal | 0.0.0.0/0 | TCP | 21 | INPUT | ACCEPT |
| □ | 11 | SSH | ALL | Normal | 0.0.0.0/0 | TCP | 22 | INPUT | ACCEPT |
| □ | 12 | Telnet | ALL | Normal | 0.0.0.0/0 | TCP | 23 | INPUT | ACCEPT |
| □ | 13 | OpenVPN | ALL | Normal | 0.0.0.0/0 | TCP/UDP | 1194 | INPUT | ACCEPT |
| □ | 14 | SerialServer1 | ALL | Normal | 0.0.0.0/0 | TCP | 4660 | INPUT | ACCEPT |

Table 4.4 Descriptions of Parameters for Services under IP Filter Setting

| Field Name | Description | Factory Default |
|---|---|---|
| **Default Policy** | **Accept** all services or **Deny** specified services for the SE5201B. | Accept |
| **Alias** | Check the box in front of the entry and enter the alias name for the filtering rule. | Null |
| **Interface** | Select the interface that the filtering rule will activate on it. The interface depends on available network ports on your device. | All |
| **Option** | Select the option to determine this is a **Normal** or **Invert** rule of following settings. | Normal |
| **IP Addr/mask** | Enter the IP address that will be accepted or denied by the SE59XX service.<br>Noted that you can enter one the followings:<br>1) IP address: only this unique IP address will match in the filtering rule.<br>2) IP with subnet mask: IP addresses within this subnet mask will match in the filtering rule. | 0.0.0.0/0 |
| **Protocol** | Select the protocol used by the service from the list: TCP, UDP, TCP/UDP, or ICMP | - |
| **Port** | Port number of TCP/UDP protocol | - |
| **Rule** | Select the rule to **Accept** or **Drop** to determine the filtering rule will be accepted or denied by the device. | Accept |

## 4.7 *Serial*

Since SE5201B is a Low-Power Gateway, it supports serial communication with COM port(s). Note that typical SE5201B model will have only one COM port (**COM1**). Figure 4-26 shows the **Serial** menu on the left frame of the web interface of SE5201B. The following subsections will describe how to configure these COM ports.

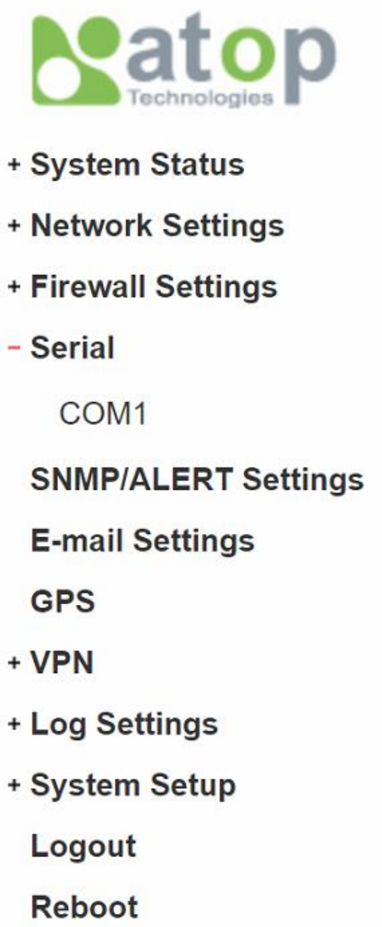
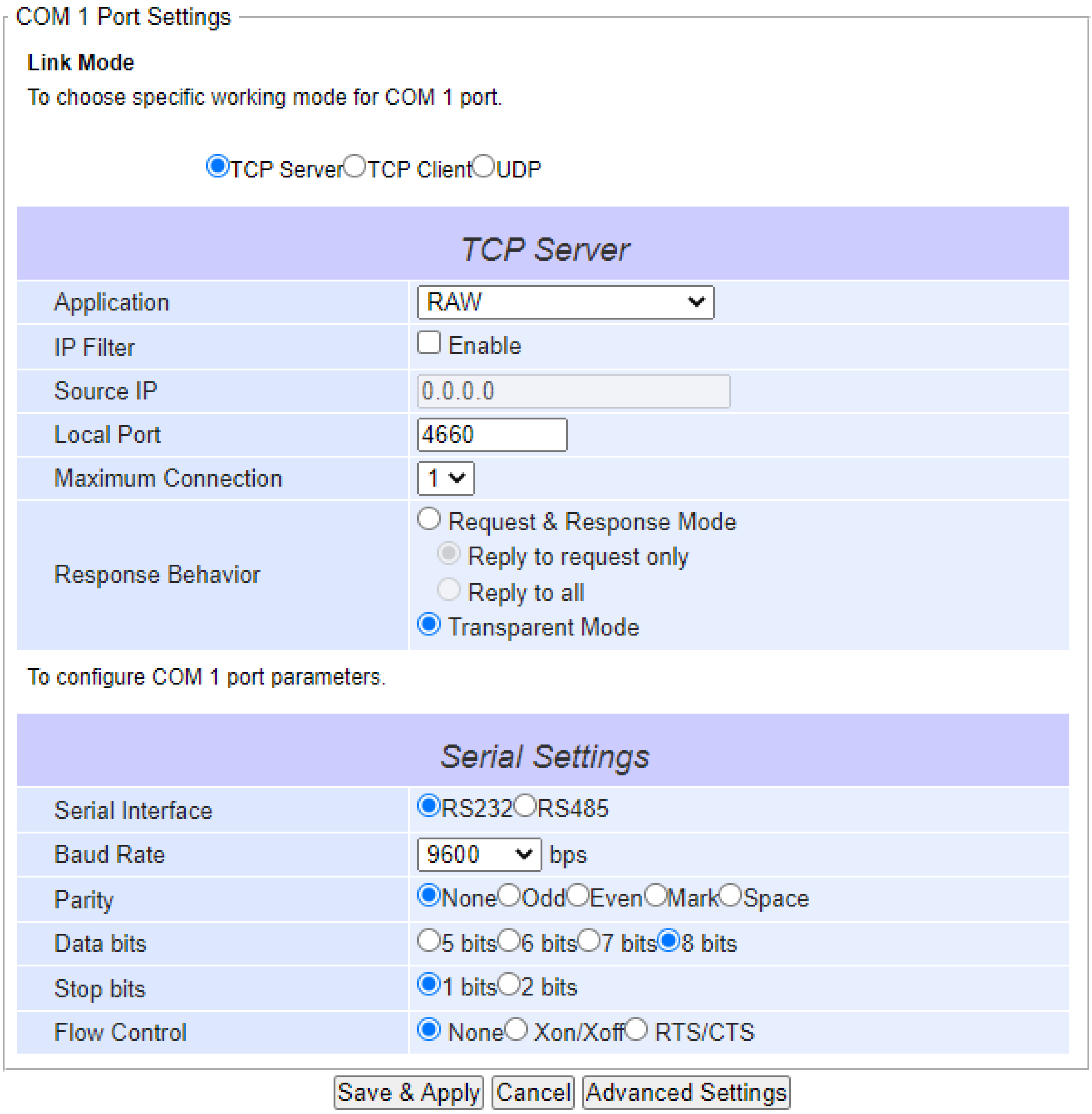


Figure 4-26 Serial Menu (Example on SE5201B)

### 4.7.1 *COM Port Overview*

Since details on **Link Mode** connectivity protocols and its settings of SE52XX series are given in Chapter 5 Link Modes and Applications, this section will only focus on the **Serial Settings** only. Figure 4-27 shows an example of the **COM 1 Port Settings** where the upper part is dedicated for **Link Mode** settings and the lower part is dedicated for **Serial Settings**.



COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

| TCP Server | |
|---|---|
| Application | RAW |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

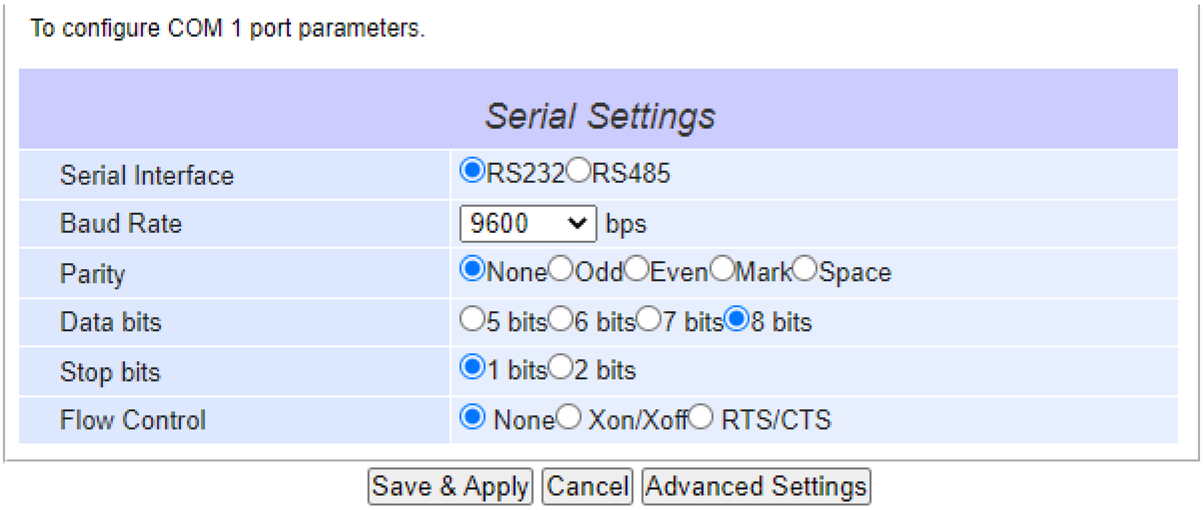
To configure COM 1 port parameters.

| Serial Settings | |
|---|---|
| Serial Interface | ● RS232 ○ RS485 |
| Baud Rate | 9600 bps |
| Parity | ● None ○ Odd ○ Even ○ Mark ○ Space |
| Data bits | ○ 5 bits ○ 6 bits ○ 7 bits ● 8 bits |
| Stop bits | ● 1 bits ○ 2 bits |
| Flow Control | ● None ○ Xon/Xoff ○ RTS/CTS |

Figure 4-27 COM 1 Port Settings Web Page

### 4.7.2 *COM Configuration*

Figure 4-28 excerpts the **Serial Settings** part of **COM** port settings of SE5201B. Note that these settings need to match the parameters on the serial port of the serial device. Each option is described as follows.



To configure COM 1 port parameters.

Serial Settings

| | |
|---|---|
| Serial Interface | ● RS232 ○ RS485 |
| Baud Rate | 9600 bps |
| Parity | ● None ○ Odd ○ Even ○ Mark ○ Space |
| Data bits | ○ 5 bits ○ 6 bits ○ 7 bits ● 8 bits |
| Stop bits | ● 1 bits ○ 2 bits |
| Flow Control | ● None ○ Xon/Xoff ○ RTS/CTS |

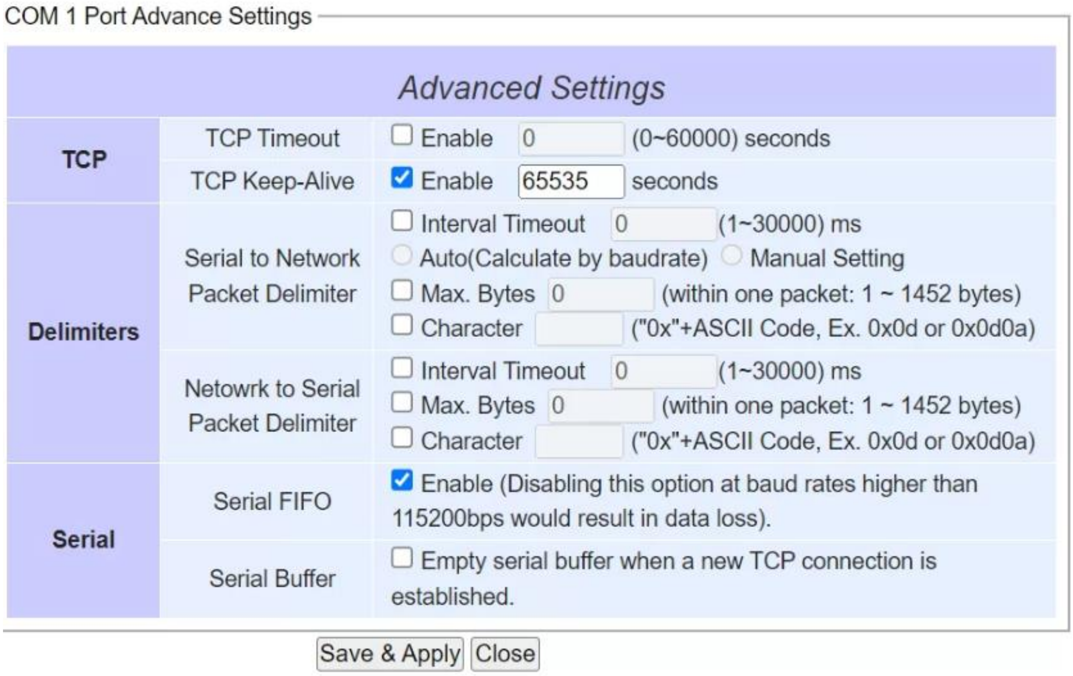
Figure 4-28 Serial Setting Part of COM 1 Port

- **Serial Interface**: This option allows selection between **RS-232** and **RS-485** standards.
  **Note:**
  - RS-485 refers to 2-Wire RS-485.
  - SE5201B models do not support RS-422 and RS-485 (4-Wire).
- **Baud Rate**: The user can select one of the baud rates (from 1200 to 921600 bps) from the drop-down list.
- **Parity**: The available Parity options are **None**, **Odd**, **Even**, **Mark**, or **Space**.
- **Data Bits**: The setting for Data Bits can be **5 bits**, **6 bits**, **7 bits**, or **8 bits**.
- **Stop Bits**: The number of Stop Bits can be either **1 bit** or **2 bits**.
- **Flow Control**: The user can choose among **None** (No Flow Control), **RTS/CTS** (Hardware Flow Control), or **Xon/Xoff** (Software Flow Control). If Xon/Xoff is selected, the Xon and Xoff characters are changeable. Defaults are 0x11 for Xon and 0x13 for Xoff. Note that these are hexadecimal number of ASCII characters (i.e., 0x11 = '1' and 0x13 = '3').

After finishing configuring the COM Port **Serial Settings**, please click on **Save & Apply** button to keep the change that you have made. Note that after click **Save & Apply**, the web browser will be refreshed and remain on the **Serial Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button. The **Advanced Settings** button will be described in the next subsection.

### 4.7.3 *COM Configuration: Advanced Settings*

For advanced details of COM port setting, you can click on **Advanced Settings** button at the end of **Serial Settings** page which will open another web browser window as shown in Figure 4-29. Description of each option is explained as follows.



COM 1 Port Advance Settings

Advanced Settings

| | | |
|---|---|---|
| TCP | TCP Timeout | □ Enable 0 (0~60000) seconds |
| | TCP Keep-Alive | ☑ Enable 65535 seconds |
| Delimiters | Serial to Network Packet Delimiter | □ Interval Timeout 0 (1~30000) ms<br>○ Auto(Calculate by baudrate) ○ Manual Setting<br>□ Max. Bytes 0 (within one packet: 1 ~ 1452 bytes)<br>□ Character ("0x"+ASCII Code, Ex. 0x0d or 0x0d0a) |
| | Netowrk to Serial Packet Delimiter | □ Interval Timeout 0 (1~30000) ms<br>□ Max. Bytes 0 (within one packet: 1 ~ 1452 bytes)<br>□ Character ("0x"+ASCII Code, Ex. 0x0d or 0x0d0a) |
| Serial | Serial FIFO | ☑ Enable (Disabling this option at baud rates higher than 115200bps would result in data loss). |
| | Serial Buffer | □ Empty serial buffer when a new TCP connection is established. |

Figure 4-29 COM 1 Advanced Settings Web Page

**TCP**

- **TCP timeout:** By clicking the **Enable** box of **TCP Timeout** and input value in seconds between 0 and 60000, SE5201B will check if there's any data from serial port. If time expired, SE5201B will disconnect to its peer.
- **TCP Keep-alive:** By clicking the Enable box of TCP Keep-alive and input value in seconds, SE5201B will check if its peer is still alive. Noted that it will retry three times and timeout is 5 seconds by default.

**Delimiters**

- **Serial to Network Packet Delimiter**: Packet delimiter is a way of packing data in the serial communication. It is designed to keep packets intact. SE5201B provides three types of delimiter: **Time Delimiter**, **Maximum Bytes** and **Character Delimiter**. Note that the following delimiters (Interval, Max Byte and Character) when they are selected are programmed in the OR logic. Meaning that if any of the three conditions were met, SE5201B would transmit the serial data in its buffer over the network.
  - **Interval timeout**: SE5201B will transmit the serial data in its buffer when the specified time interval has reached and no more serial data comes in. The default value is calculated automatically based on the baud rate which is the **Auto (calculate by baudrate)** option. If the automatic value results in chopped data, the timeout could be increased manually by switching to "**Manual setting**" (checking the radio button in Figure 4-29) and specifying a larger value in the text box above. Note that the maximum interval is 30,000 milliseconds.

**Attention**
**Manual Calculation of Interval Timeout**
The optimal “Interval timeout” depends on the application, but it must be at least larger than one-character interval within the specified baud rate. For example, assuming that the serial port is set to 1200 bps, 8 data bits, 1 stop bit, and no parity. In this case, the total number of bits needed to send a character is 10 bits (included 1 start bit), and the time required to transfer one character is (10 (bits)/1200 (bits/s)) *1000 (ms/s) = 8.3 ms. Therefore, you should set the “Interval timeout” to be larger than 8.3 ms. Rounding 8.3 ms to the next integer would give you 9 ms. Which can be set as your interval timeout.

- **Max Bytes**: SE5201B will transmit the serial data in its buffer when the specified length in the unit of bytes has reached. The range of maximum bytes is between 1 to 1452 bytes. Enabling this option by checking the box in front of **Max. Bytes**, if you would like SE5201B to queue the data until it reaches a specific length. This option is disabled by default.

- **Character**: SE5201B will transmit the serial data in its buffer when it sees the incoming data that includes the specified character (in hexadecimal (HEX) format). This field allows one or two characters. If character delimiter is set to 0x0d, SE5201B will push out its serial buffer when it sees 0x0d (carriage return) in the serial data. This option is disabled by default.

- **Network to Serial Packet Delimiter**: This group of options is the same as the delimiters described above, but they control data flow in the opposite direction. SE5201B will store data from the network interface in its queue. Until one of the delimiter conditions described above is met then SE5201B will send the data over to the serial interface.

- **Character Send Interval**: This option specifies the time gap between each character. When set to one second (1000ms), SE5201B would split the data in the queue and only transmit one character (a byte) every 1 second. The maximum value for this option is 1000 milliseconds or 1 second. This option is disabled by default.

**Serial**

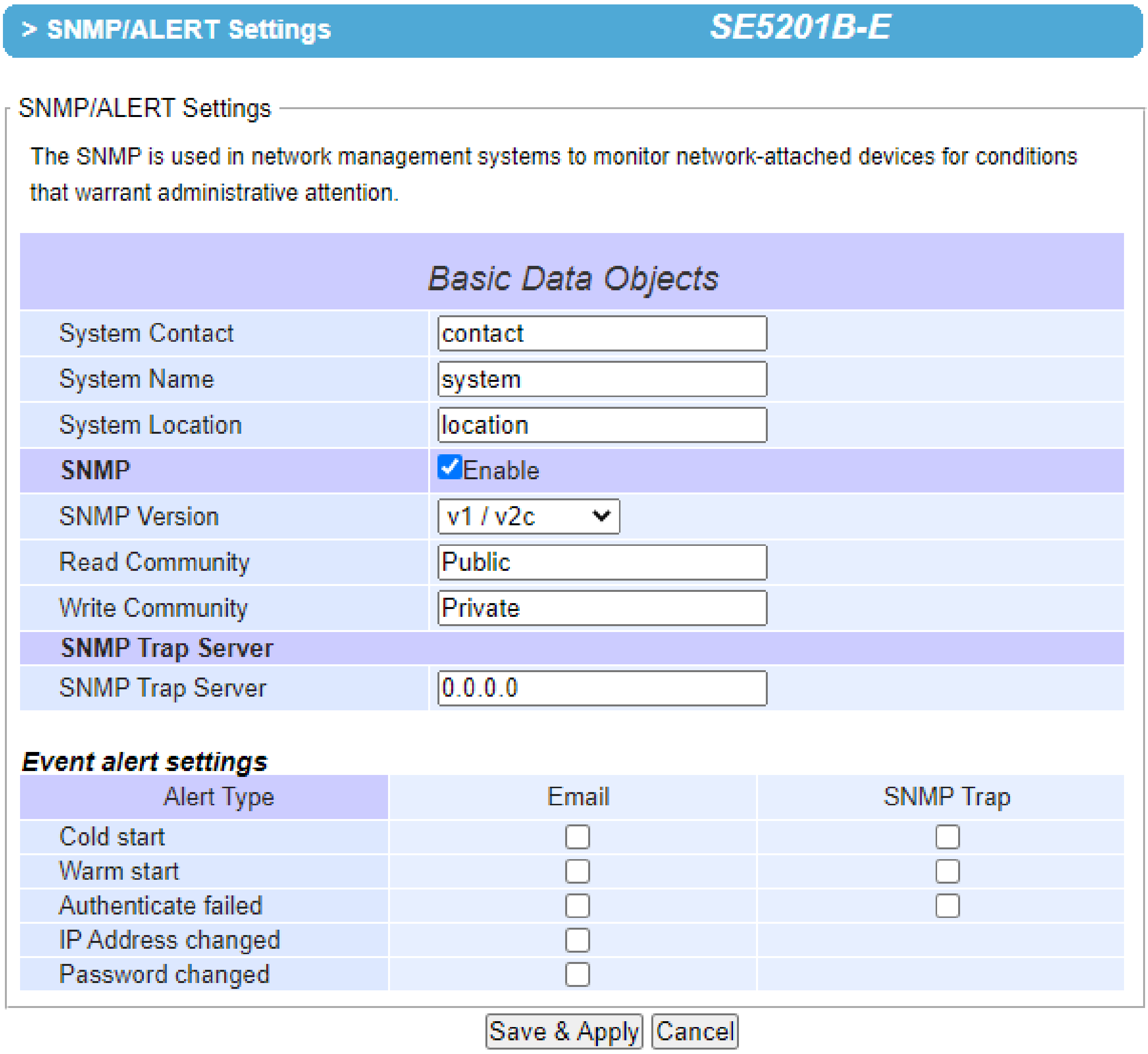
- **Serial FIFO**: By default, SE5201B has its First-In-First-Out (FIFO) function enabled to optimize its serial performance. In some applications (particularly when the flow control mechanism is enabled), it may deem necessary to disable the FIFO function to minimize the amount of data that is transmitted through the serial interface after a flow off event is triggered to reduce the possibility of overloading the buffer inside the serial device. Please note that disabling this option on baud rates higher than 115200bps would noticeably reduce the data integrity.

- **Serial Buffer**: By default, SE5201B 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, you can disable this option.

After finishing configuring the COM Port’s **Advanced Settings**, please click on **Save & Apply** button to keep the change that you have made. Then, the **Advanced Settings** browser window can be closed by clicking on **Close** button and you will be returned to **COM 1 Port Setting** page.

## 4.8 *SNMP/ALERT Settings*

The Simple Network Management Protocol (SNMP) is used by network management software to monitor devices in a network, to retrieve network status information of the devices, and to configure network parameters of the devices. The **SNMP/ALERT Settings** page showed in Figure 4-30 allows user to configure CR5201B/SE5201B device so that it can be viewed by third-party SNMP software, and allows CR5201B/SE5201B to send alert events to administrator and SNMP trap server.



> SNMP/ALERT Settings SE5201B-E

SNMP/ALERT Settings

The SNMP is used in network management systems to monitor network-attached devices for conditions that warrant administrative attention.

| Basic Data Objects | |
|---|---|
| System Contact | contact |
| System Name | system |
| System Location | location |
| **SNMP** | ☑ Enable |
| SNMP Version | v1 / v2c |
| Read Community | Public |
| Write Community | Private |
| **SNMP Trap Server** | |
| SNMP Trap Server | 0.0.0.0 |

***Event alert settings***

| Alert Type | Email | SNMP Trap |
|---|---|---|
| Cold start | □ | □ |
| Warm start | □ | □ |
| Authenticate failed | □ | □ |
| IP Address changed | □ | |
| Password changed | □ | |

Figure 4-30 SNMP/Alert Settings Web Page

CR5201B/SE5201B provides three basic SNMP fields under the **Basic Data Objects** part which are: "**System Contact**" usually used to specify the device's contact information in case of emergency (default value is "contact"), "**System Name**" usually used to identify this device (default value is "System"), and "**System Location"** usually used to specify the device location (default value is "location").

To make the device's information available for public viewing/editing, you can enable the **SNMP** function by checking the **Enable** box and fill in the two passphrases (or SNMP Community Strings) below it. Note that when the SNMP is unchecked, three setting option lines will not show up as depicted in Figure 4-30. By filling in the passphrase for the "**Read Community**", CR5201B/SE5201B device allows other network management software to read its information. By filling in the passphrase for the "**Write Community**", CR5201B/SE5201B device allows other network management software to read/modify its information. The default CR5201B/SE5201B's SNMP Community Strings (or passphrases) for **Read Community** and **Write Community** as shown in Figure 4-30 are "public" and "private", respectively.

Additionally, you can setup a **SNMP Trap Server** in the network to receive and collect all alert messages from CR5201B/SE5201B. To configure CR5201B/SE5201B to dispatch alert messages originated from any unexpected incidents, you can fill in the IP Address of the **SNMP Trap Server** in the field shown in Figure 4-30. Note that any changes in these settings will take effect after the CR5201B/SE5201B device is restarted.

Under the **SNMP Trap Server** part, there is a list of **Alert Type** under **Event alert settings** box in Figure 4-30. There can be up to two possible actions for each alert event: **Email** and **SNMP Trap**. You can enable the associated action(s) of each alert event by checking the box under the column of **Email** and/or **SNMP Trap**. When the **Email** box is checked and the corresponding event occurs, it will trigger an action for CR5201B/SE5201B to send an e-mail alert to designated addresses configured in the E-Mail Settings (described in the next section). When the **SNMP Trap** box is checked and the corresponding event occurs, it will trigger an action for CR5201B/SE5201B to send a trap alert to the designated SNMP Trap server (specified in the above paragraph). There are five events that will trigger the alarm from SE5201B as listed in Figure 4-30. However, some event can only be reported by e-mail. These alerts are useful for security control or security monitoring of the CR5201B/SE5201B device:

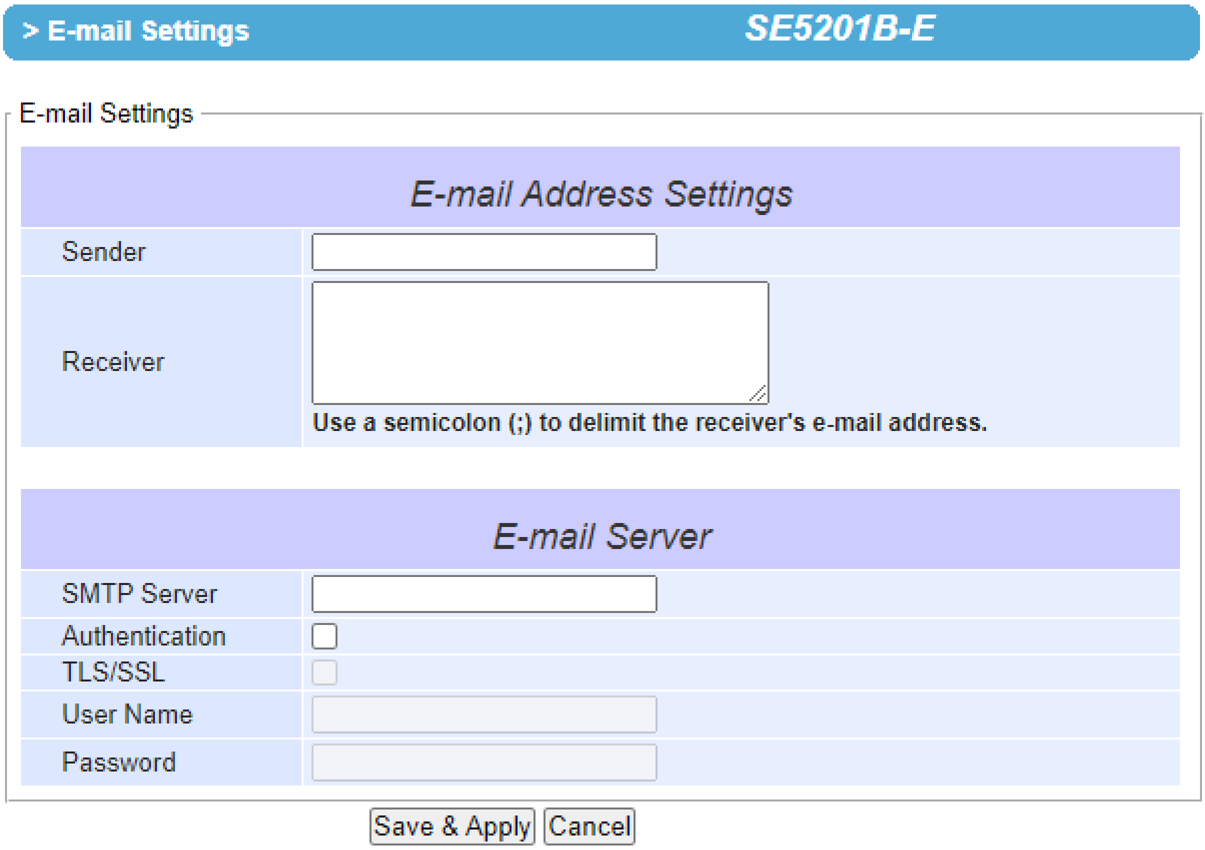
- **Warm Start**: This event occurs when the device resets.
- **Authentication Failure**: This event occurs when an incorrect username and/or password are entered which could indicate an unauthorized access to the CR5201B/SE5201B.
- **IP Address Changed**: This event occurs when the CR5201B/SE5201B device's IP address is changed.
- **Password Changed**: This event occurs when the administrator password is changed.

After finishing configuring the **SNMP/Alert Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. When the saving and applying are finished, the web browser will remain on the **SNMP/Alert Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

**Note:** The options of "Cold Start" and "LAN Link Down-Relay" are only available for some specified models. For un-supported models, the "Cold Start" event option will not be shown on the page.

## 4.9 *E-Mail Settings*

When CR5201B/SE5201B device raises an alert and/or a warning message, it can send an e-mail to an administrator's mailbox. This **E-mail Settings** page allows you to set up the CR5201B/SE5201B to be able to send an e-mail. Figure 4-31 shows the **E-mail Settings** page in which there are two configurable parts: **E-mail Address Settings** and **E-mail Server**. First for the **E-mail Address Settings** part, a **Sender**'s e-mail address is required to be filled in the **Sender**'s text box which will be used in the **From** field of the e-mail. Note that the maximum length of sender email address is 48 characters. Then, for the **Receiver**'s text box you can enter multiple recipients which will be used in the **To** field of the e-mail. Note that to fill in multiple receiver e-mail addresses in the **Receiver**'s text box, please separate each e-mail address with semicolon (;).



> E-mail Settings SE5201B-E

E-mail Settings

| E-mail Address Settings | |
|---|---|
| Sender | |
| Receiver | Use a semicolon (;) to delimit the receiver's e-mail address. |

| E-mail Server | |
|---|---|
| SMTP Server | |
| Authentication | □ |
| TLS/SSL | □ |
| User Name | |
| Password | |

Figure 4-31 E-mail Setting Web Page

Second for the **E-mail Server** part, you must enter an **IP address** or **Host Name** of a **Mail Server** which is in your local network in the **SMTP Server**'s text box. Note that the maximum length of SMTP server address is 31 characters. If your Mail Server (or Simple Mail Transfer Protocol (SMTP) Server) requires a user authentication, you must check the "**SMTP server authentication required**" box in the **Authentication** option. Depending on your SMTP server, it may need to enable the TLS/SSL encryption method, too. After enabling the Authentication option, you can fill in the **Username** and the **Password** below. Please consult your local network administrator for the **IP address** of your **Mail Server** and the required **Username** and **Password**.

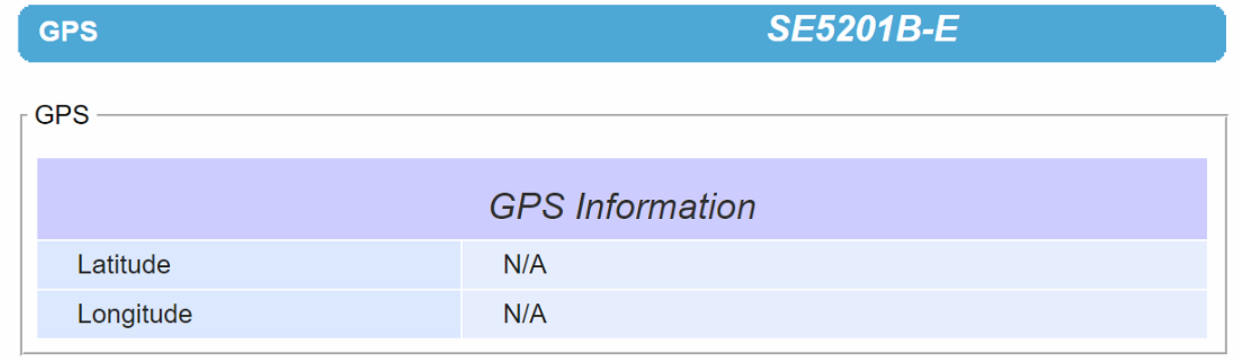
**Attention**

**It is also important to setup Default Gateway and DNS Servers in the Network Settings properly so that SE5201B can lookup domain names and route the e-mails to the proper default gateway. Please see the Default Gateway and DNS Sever Settings in Section 4.5.1.**

After finishing configuring the **E-mail Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. When the saving and applying are finished, the web browser will remain on the **E-mail Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

## 4.10 *GPS (GPS model only)*

Atop's SE5201B-GPS series is equipped with GPS receiver to allows the device to acquire its current location. **The Global Positioning System (GPS)** is a space-based radio navigation system in which the GPS receiver requires signals from GPS's satellites orbiting the earth to calculate its location. Users do not need to activate the GPS module on the SE5201B since the GPS function is always enabled. However, please make sure that you plugged in the GPS antenna. When users selected the GPS menu, the device will provides the current location, including latitude and altitude information on the GPS web page as shown in Figure 4-32.



GPS SE5201B-E

GPS

| GPS Information | |
|---|---|
| Latitude | N/A |
| Longitude | N/A |

Figure 4-32 GPS Web Page

## 4.11 *VPN*

A virtual private network (VPN) extends a private network across a public network, such as the Internet. It enables a computer to send and receive data across shared or public networks as if it were directly connected to the private networks, while benefiting from the functionality, security and management policies of the private network. This is done by establishing a virtual point-to-point connection through the use of dedicated connections, encryption, or a combination of the two. Figure 4-33 illustrates a VPN scenario of Atop's CR5201B/SE5201B device (green pattern) for your reference.

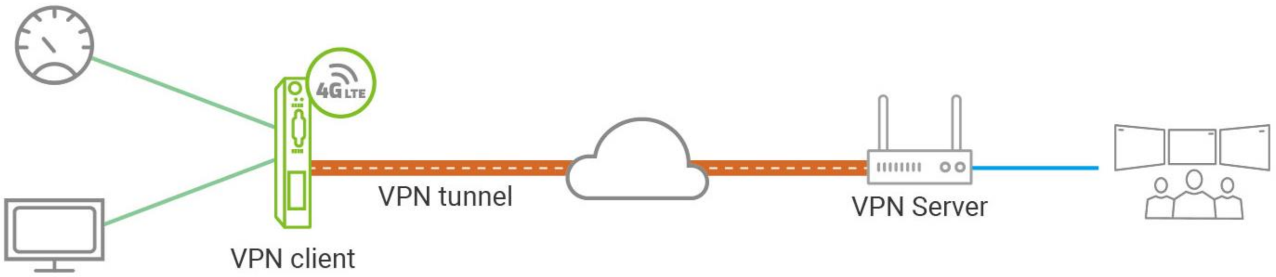


Figure 4-33 VPN Scenario of CR5201B/SE5201B Series

CR5201B/SE5201B Low-Power Gateway supports a number of VPN protocols which are IPsec (Internet Protocol Security), and OpenVPN. In order to configure VPN, please click on the related item in the dedicated VPN sub-menu on the left side of the screen, as shown in Figure 4-34 below. IPsec's basic will be discussed in Section 4.11.1 while IPsec related setting will be described in Section 4.11.2. Finally, OpenVPN Settings and Keys are described in Section 4.11.8 and Section 4.11.9, respectively.

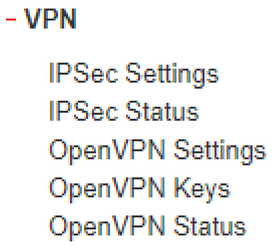


Figure 4-34 VPN Menu Structure

### 4.11.1 *IPsec*

IPsec (or Internet Protocol Security) which is a network protocol suit that can establish secure and reliable communications for different application scenarios. IPsec enables data confidentiality, data integrity, data origin authentication, and antireplay. For example, a corporate head quarter and its branch offices in the fields do not need to apply for dedicated communication lines for sharing their network resources securely. To securely communicate and shared company's resources over the Internet, IPsec connections can be employed to secure all applications at the IP layer. In another case, when employees are on a business trip, they can establish IPsec connections with their company over their mobile devices or the public network to access the internal network resources in their company.

CR5201B/SE5201B has an IPsec connection function to establish a secure communication link between **host-to-host**, **host-to-subnet** (or host-to-network), and **subnet-to-subnet** (or network-to-network). Note that at the other endpoint of the Internet, a router or gateway with full IPsec capability is required to successfully establish the secure communication. There are two types of IPsec connection modes or types supported by CR5201B/SE5201B which are **Tunnel mode** and **Transport mode**.

- In **Tunnel mode**, the entire IP packet is encrypted and authenticated. The IP packet is then encapsulated into a new IP packet with a new IP header. The **Tunnel mode** which is used to create Virtual Private Network (VPN) can be applied to the **host-to-host**, the **host-to-subnet**, and the **subnet-to-subnet** communications. The packet (datagram) format for **Tunnel mode** is as follow:

| | | | |
|---|---|---|---|
| New IP Header | IPsec Header | Original IP Packet | Optional IPsec Trailer |

- In **Transport mode**, only the payload of the IP packet is usually encrypted or authenticated. The routing is intact because the IP header is not modified and not encrypted. However, when the authentication header is used, the IP addresses cannot be modified by Network Address Translation (NAT). The **Transport mode** can only be applied in the **host-to-host** communication. The packet (datagram) format for **Transport mode** is as follow:

| | | | |
|---|---|---|---|
| Original IP Header | IPsec Header | Original IP Packet | Optional IPsec Trailer |

A **host-to-host** connection is typically used in a simple point-to-point communication. It is useful for a direct communication with a server or between the device Host A (CR5201B/SE5201B) and a peer device Host B (such as another SE5201B). Note that this type of connection cannot be use for accessing entire sub-network resources. Figure 4-35 illustrates an example of host-to-host connection. This configuration can be set in both **Tunnel mode** and **Transport mode**.

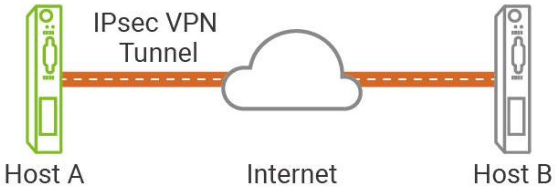


Figure 4-35 An Example of Host-to-Host Connection

A **host-to-subnet** (or host-to-network) connection is mainly applied when one endpoint needs to access the other side's sub-networks. Typical applications are employees who are travelling on business and would like to connect back to their corporate headquarters via mobile devices. They can establish IPsec connections to access the internal corporate network resources. Figure 4-36 illustrates a road-warrior application in which CR5201B/SE5201B can access a remote sub-network resource via a peer gateway. Figure 4-37 illustrates a gateway application in which Host A CR5201B/SE5201B can passively accept connection requests from remote sides Host B and provide access to the CR5201B/SE5201B sub-network resources. Note that both of these configurations must set the connection type to **Tunnel mode** only.

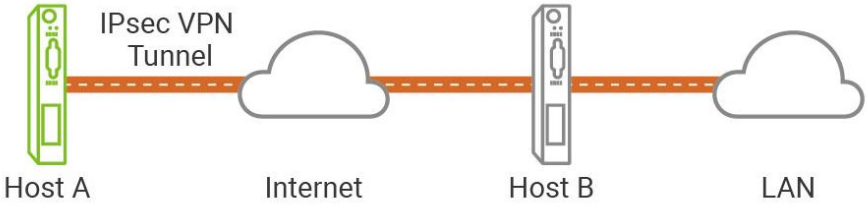


Figure 4-36 Roadwarrior Application using Host-to-Subnet Connection

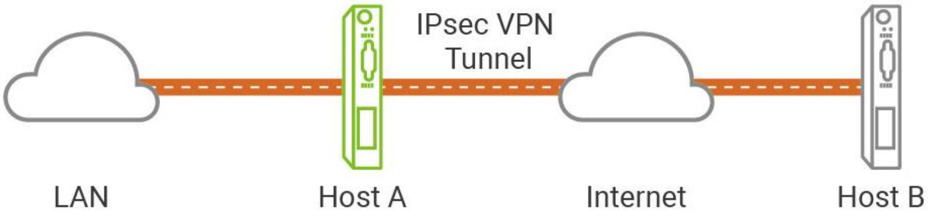


Figure 4-37 Gateway Application using Host-to-Subnet Connection

A **subnet-to-subnet** connection is mainly used to connect two subnets from different sides together. Typically, applications are corporate headquarters and branch offices that share internal network resources. A specific application can also be set up as one side's subnet to establish IPsec VPN tunnels for accessing a device in the other side's subnet or as a device in one's side subnet to establish IPsec VPN tunnels for accessing another device in the other side's subnet. Figure 4-38 illustrates an example of the subnet-to-subnet connection with a network application. A host inside the remote subnet can also connect to a local subnet (host-network application) based on this subnet-to-subnet connection as shown in Figure 4-39. On the other hand, two different devices on two different subnets (host-host application) can be connected via an IPsec VPN tunnel based on this subnet-to-subnet connection as shown in Figure 4-40. Note that all subnet-to-subnet configurations must set the connection type to **Tunnel mode** only.

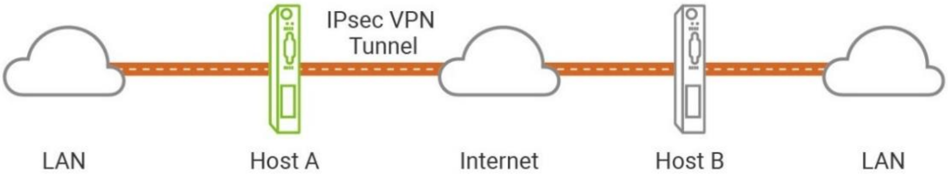


Figure 4-38 An example of network application using a subnet-to-subnet connection via the CR5201B/SE5201B and a peer device

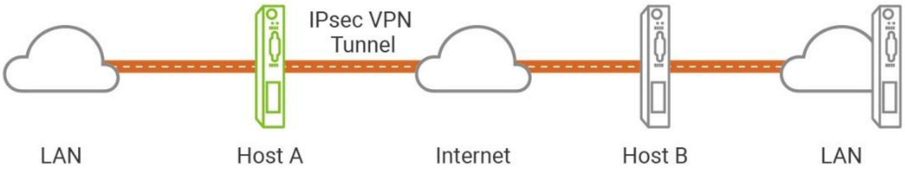


Figure 4-39 An example of host-network application via the subnet-to-subnet connection

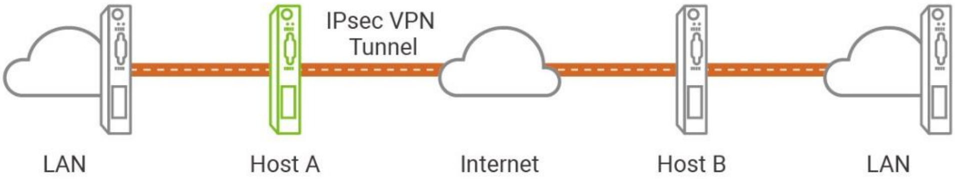


Figure 4-40 An example of host-host application via the subnet-to-subnet connection

In some network configuration, there is an implementation of network address translation (NAT) on its gateway/routers. NAT is typically used to allow private IP addresses on private networks behind gateways/routers with a single public IP address connecting to the public Internet. The internal network devices can communication with hosts on the external network by changing the source address of outgoing requests to that of the NAT device (gateway/router) and relaying replies back to the originating device. IPsec virtual private network (VPN) clients use network address translation (NAT) traversal in order to have Encapsulating Security Payload (ESP) packets traverse NAT. IPsec uses several protocols in its operation, which must be enabled to traverse firewalls and network address translators (NATs), such as

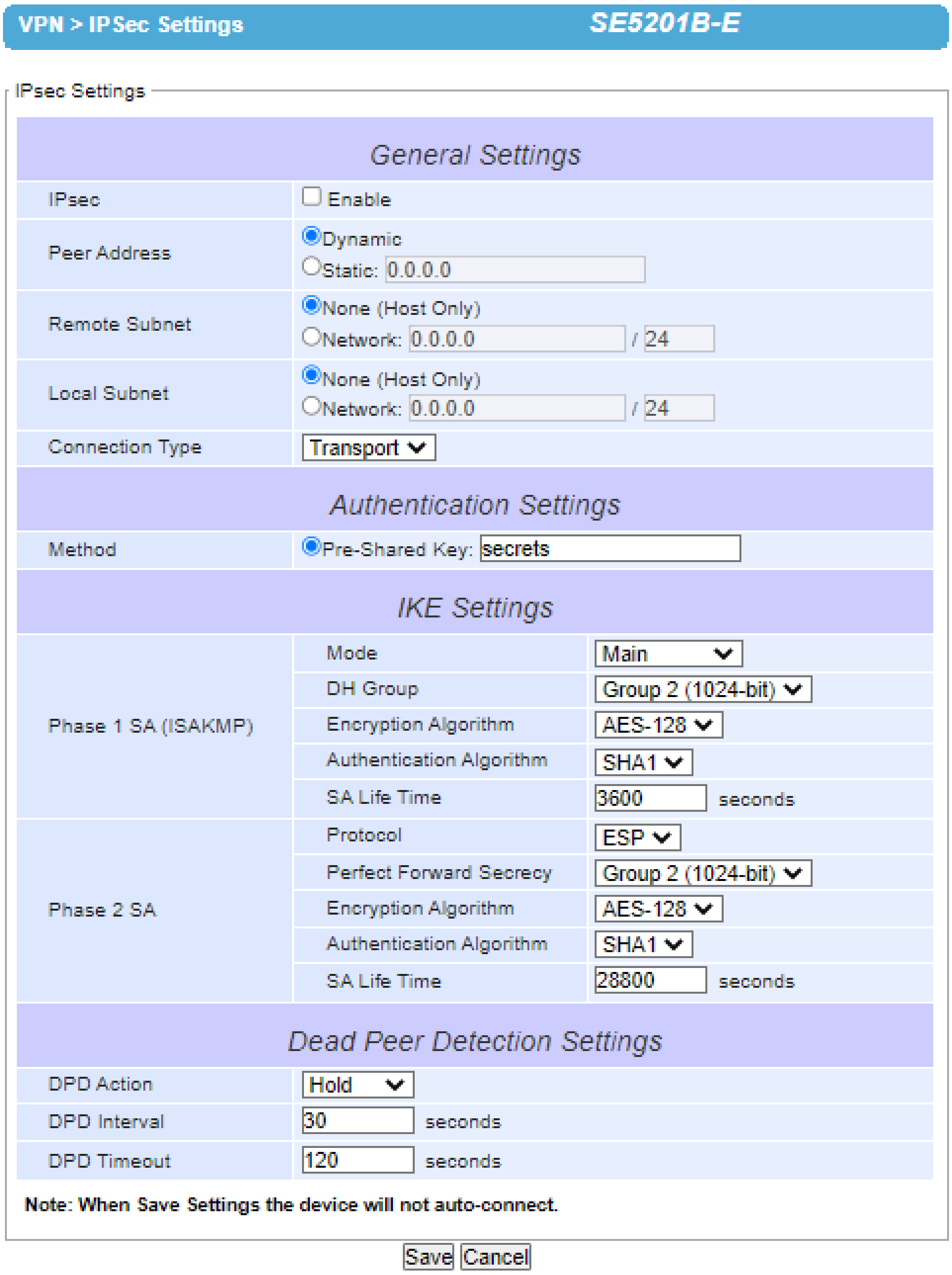
- Internet Key Exchange (IKE) protocol uses User Datagram Protocol (UDP) port number 500.
- Encapsulating Security Payload (ESP) uses IP protocol number 50.
- Authentication Header (AH) uses IP protocol number 51.
- IPsec NAT traversal uses UDP port number 4500 when NAT traversal is in use.

CR5201B/SE5201B also has a feature called NAT traversal (NAT-T) that allows the IPsec tunnel to pass through the NAT in its network. CR5201B/SE5201B will activate this option automatically and encapsulate the IPsec packets inside UDP port 4500 to be able to pass through a NAT router.

To provide security service for all types of tunnel connections and applications described above, SE5201B utilizes the Internet Key Exchange (IKE) protocol to set up a security association (SA) in the IPsec protocol suite. Note that IKE builds upon the Oakley protocol and ISAKMP (Internet Security Association and Key Management Protocol). IKE uses X.509 certificates for authentication either pre-shared or distributed using DNS (preferably with DNSSEC). IKE also uses a Diffie-Hellman key (DH) key exchange to set up a shared session secret from which cryptographic keys are derived. The IPsec security association (SA) is divided into two phases. In phase one, IKE creates an authenticated secure channel between CR5201B/SE5201B and its peer device, which is called the IKE Security Association. The Diffie-Hellman (DH) key agreement is always performed in this phase to create a shared secret key or DH key. In phase two, IKE negotiates the IPsec security associations and generates the required key material for IPsec. This IPsec key which is a symmetrical key will be used for bulk data transfer inside the IPsec tunnel. A new Diffie-Hellman agreement can be done in phase two, or the keys can be derived from the phase one shared secret.

### 4.11.2 *IPsec Settings*

Figure 4-41 shows the IPsec Settings web page under the IPsec Settings menu. There are four sections on this page: **General Settings**, **Authentication Settings**, **IKE Settings**, and **Dead Peer Detection Settings**.



VPN > IPSec Settings SE5201B-E

IPsec Settings

General Settings

| | |
|---|---|
| IPsec | □ Enable |
| Peer Address | ● Dynamic<br>○ Static: 0.0.0.0 |
| Remote Subnet | ● None (Host Only)<br>○ Network: 0.0.0.0 / 24 |
| Local Subnet | ● None (Host Only)<br>○ Network: 0.0.0.0 / 24 |
| Connection Type | Transport |

Authentication Settings

| | |
|---|---|
| Method | ● Pre-Shared Key: secrets |

IKE Settings

| | | |
|---|---|---|
| Phase 1 SA (ISAKMP) | Mode | Main |
| | DH Group | Group 2 (1024-bit) |
| | Encryption Algorithm | AES-128 |
| | Authentication Algorithm | SHA1 |
| | SA Life Time | 3600 seconds |
| Phase 2 SA | Protocol | ESP |
| | Perfect Forward Secrecy | Group 2 (1024-bit) |
| | Encryption Algorithm | AES-128 |
| | Authentication Algorithm | SHA1 |
| | SA Life Time | 28800 seconds |

Dead Peer Detection Settings

| | |
|---|---|
| DPD Action | Hold |
| DPD Interval | 30 seconds |
| DPD Timeout | 120 seconds |

Note: When Save Settings the device will not auto-connect.

Figure 4-41 IPsec Tunnels Web Page under IPsec Setting Menu

To configure IPsec Settings, first you need to configure the **General Settings** section under the **IPsec Settings** menu. Under the **General Settings**, there are five parameters that need to be set as follows:

- **IPsec**: By checking the box for this option, you enable the IPsec feature for CR5201B/SE5201B.
- **Peer Address:** This option is to specify the IP address of a remote host or peer host or remote gateway. There are two choices for the **Peer Address** which are **Dynamic** and **Statics**:

  - **Dynamic**: When you selected the **Dynamic** by choosing the **Dynamic** radio button, the **Peer Address** or the remote device IP address is not fixed or unknown. Note that when **Peer Address** is set to dynamic mode, the SE5201B can accept remote connection request or will be the responder.
  - **Static**: On the other hand, if you know the IP address of the remote device, you can choose the ratio button for **Static** option and enter the IP address in the text box behind it. The CR5201B/SE5201B will be the initiator/responder.
- **Remote Subnet**: This option is to indicate whether you want to create an IPsec connection to the remote subnetwork. There are also two choices for **Remote Subnet** access:
  - **None (Host Only**): This option is to specify that the remote subnet is not supported or no remote subnet and only host access is supported. That is the remote end of the IPsec tunnel is a host or peer device only.
  - **Network**: This option is to specify the **Remote Subnet** by entering the **Subnet IP Address** and the number of **Subnet Masking Bits** or associated routing prefix. This option supports the Classless Inter-Domain Routing (CIDR) notation. For example, Subnet IP Address is 192.168.11.0 and Subnet mask are 24 bits (from 255.255.255.0).
- **Local Subnet:** This option is to enable an IPsec connection to the local subnetwork. There are two choices for **Local Subnet** access:
  - **None (Host Only):** This option is to specify that the local subnet is not supported or no local subnet and only local host access is supported. That is the local end of the IPsec tunnel is a host or peer device only.
  - **Network:** This option is to specify the **Local Subnet** by entering the **Subnet IP Address** and the number of **Subnet Masking Bits** or associated routing prefix. This option supports the Classless Inter-Domain Routing (CIDR) notation. For example, Subnet IP Address is 192.168.11.0 and Subnet mask are 24 bits (from 255.255.255.0).
- **Connection Type**: This option is to specify the IPsec connection type which can be either **Tunnel** mode or **Transport** mode. Please select the corresponding connection type from the drop-down list. Note that the **Tunnel mode** can be applied to the **host-to-host**, the **host-to-subnet**, and the **subnet-to-subnet** communications. The **Transport mode** can only be applied in the **host-to-host** communication.

The second part of **IPsec Settings** is the **Authentication Settings**. Here you have an authentication's **Method** which already selected as the **Pre-Shared Key**. Then, you must enter in a secret key or a pass-phrase in the textbox behind it. Both ends of the the VPN tunnel must use the same secret key or password. The pre-shared key can be 1 to 60 case-sensitive ASCII characters and special symbols.

The third part of **IPsec Settings** is the **IKE** (Internet Key Exchange) **Settings.** Internet Key Exchange (IKE) that SE5201B supports is the IKE version 1 or **IKEv1.** Within the **Phase 1 SA (ISAKMP)**, there are five security options to be configured. In phase 1, the two VPN gateway exchange information about the encryption algorithms that they support and then establish a temporary secure connection to exchange authentication information.

- First option is the **Mode** of IKE session which defines how many steps or packets will be used or exchanged during the IKE SA negotiation. You can choose either **Main Mode** or **Aggressive Mode**. The **Main Mode** will send SA proposals, Diffie-Hellman public key, and ISAKMP session authentication in three exchange packets, while the **Aggressive Mode** will put all SA proposals, DH public key, and ISAKMP session authentication in to one exchange packet. **Aggressive Mode** makes the IKE negotiation quicker than **Main Mode**. The difference between **Main Mode** and **Aggressive Mode** is that the "identity protection" is used in the **Main Mode**. The identity is transferred encrypted in the **Main Mode** but it is not encrypted in **Aggressive Mode**. Typically, the **Main Mode** is recommended.
- Second option is the selection of Diffie-Hellman's group (**DH Group**) of standardized global unique prime numbers and generators that will be used to provide secure asymmetric key exchange. The **DH Group** is

used to encrypt this IKE communication. SE5201B supports two **DH groups** which are **DH Group 2**, which is a 1024-bit modular exponentiation group (MODP), and **DH Group 5**, which is a 1536-bit MODP group.

- Third option is the selection of **Encryption Algorithm** which can be either **AES-128** or **3DES**. This option will select the key size and encryption algorithm to be used in the IKEv1 Phase 1. The default value is **AES-128**.
- Fourth option is the selection of **Authentication Algorithm** which can be either **SHA1** or **MD5**. This option will select which hash algorithm will be used to authenticate packet data in the IKEv1 Phase 1. The default value is **SHA1**.
- Fifth option is the **SA Life Time** which must be set in unit of seconds. This value represents the lifetime of the IKE key which is dedicated at Phase 1 between both end host or network. The default **SA Life Time** is 10800 seconds. The configurable range for **SA Life Time** is between 300 to 86400 seconds.

Within the **Phase 2 SA**, there are five security options to be configured. Similar to **Phase 1 SA**, SE5201B and its peer device will negotiate or exchange proposals to determine which security parameters will be used in this Phase 2 SA. A Phase 2 proposal also includes a security **Protocol** (first option), which you can choose either Encapsulating Security Payload (**ESP**) or Authentication Header (**AH**). The second option is the **Perfect Forward Secrecy** which is a property of key-agreement protocol to ensure that a session key derived from a set of long-term keys cannot be compromised if one of the long-term keys is compromised in the future. In Phase 2 SA, CR5201B/SE5201B also supports two **DH groups** which are **DH Group 2** (1024-bit) and **DH Group 5** (1536-bit).

Then you can proceed to select encryption and authentication algorithms. Third option is the selection of **Encryption Algorithm** which can be either **AES-128** or **3DES**. This encryption algorithm will be used in the IPsec tunnel. The default setting is the **AES128**. Fourth option is the selection of **Authentication Algorithm** which can be either **SHA1** or **MD5**. This is the hash algorithm that will be used to authenticate packet data in the IPsec tunnel. The default selection is the **SHA1**. Finally, the last option is the **SA Life Time** for phase 2 which must be set in unit of seconds. The range of this setting can be from 180 to 86400 seconds. The default **SA Life Time** is 3,600 seconds.

The final part of the **IPsec Settings** is the **Dead Peer Detection Settings**. Dead peer detection (DPD) is a mechanism that CR5201B/SE5201B use to verify the existence of a remote Internet Key Exchange (IKE) gateway or the peer device of CR5201B/SE5201B. To detect the peer device, CR5201B/SE5201B will send encrypted IKE Phase 1 notification payloads (or hello message) to its peer device and wait for DPD acknowledgement from the peer device. If CR5201B/SE5201B does not receive an acknowledge message during a specific time interval (**DPD timeout**), it will consider that the peer device is dead. Then, SE5201B will remove the Phase 1 Security Association and all Phase 2 Security Association of that dead peer device. Under the **Dead Peer Detection Settings**, you will have to choose the **DPD Action** that the CR5201B/SE5201B will perform if it found that the peer device is dead. You can choose either **Hold** to still hold the security association for the peer device and wait for the peer device to return or **Restart** to restart the security association process again. The **DPD Interval** is the period of time for sending the hello message to the peer device or the interval that CR5201B/SE5201B will repeatedly check the endpoint with keep-alive message. The **DPD interval** can be ranged from 1 to 65535 seconds. The default value for **DPD Interval** is 30 seconds. The **DPD Timeout** will be the time that CR5201B/SE5201B declares the peer device dead if it did not receive any reply or traffic from the peer device. If the keep-alive check fails before this time period expires, the CR5201B/SE5201B will take the PDP action. The **DPD Timeout** value range from 1 to 65535 seconds. The default value of **DPD Timeout** is 120 seconds. Description of each parameter in the IPsec Tunnels web page is summarized in Table 4.5.

Table 4.5 Description of Parameters in IPsec Tunnels Web Page

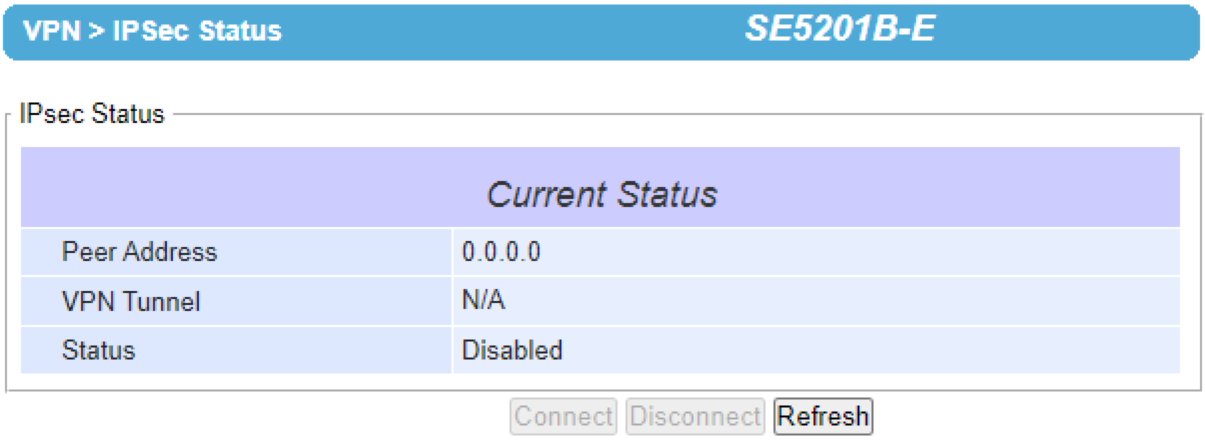
| **Field Name** | | **Description** | **Default Value** |
|---|---|---|---|
| **General Settings** | | | |
| **IPsec** | | Enable the IPsec Tunnel | Disable |
| **NAT Traversal** | | Enable the NAT Traversal mechanism | Enable |
| **Peer Address** | | IP address of the remote device which can be dynamic (any address) or static (fixed address) | Dynamic |

| Field Name | | Description | Default Value |
|---|---|---|---|
| **Remote Subnet** | | Remote subnet can be either None (Host only) or Network (IP and Netmask) | None (Host Only) |
| **Local Subnet** | | Local subnet can be either None (Host Only) or Network (IP and Netmask) | None (Host Only) |
| **Connection type** | | Tunnel mode or Transport mode | Tunnel |
| **Authentication Settings** | | | |
| **Method** | | Pre-Shared Key | secrets |
| **IKE Settings** | | | |
| **Phase 1 SA** | **Mode** | Choose how IKE negotiation is performed between Main Mode and Aggressive Mode | Main Mode |
| | **DH Group** | Diffie-Hellman groups, determine the strength of the key used in the key exchange process：DH Group 2 (1024-bit) or DH Group 5 (1536-bit) | Group 2 (1024-bit) |
| | **Encryption Algorithm** | Encryption algorithm used in the key exchange process：Either 3DES or AES | AES128 |
| | **Authentication Algorithm** | Hash algorithm used to authenticate packet data in the key exchange process of IKEv1 phase 1：Either MD5 or SHA1 | SHA1 |
| | **SA Life Time** | How long a particular instance of a connection (a set of encryption/authentication keys for user packets) should last, from successful negotiation to expiry. The value can be from 300 to 86,400 seconds. | 3600 |
| **Phase 2 SA** | **Protocol** | Choose how IP packet will be encrypted and verify: either Encapsulate Security Payload (ESP) or IP Authentication Header (AH) | ESP |
| | **Perfect Forward Secrecy** | Diffie-Hellman groups for Perfect Forward Secrecy of keys, determine the strength of the key used in the key exchange process：DH Group 2 (1024-bit) or DH Group 5 (1536-bit) | Group 2 (1024-bit) |
| | **Encryption Algorithm** | Select which key size and encryption algorithm will be used in IPsec tunnel: either 3DES or AES128 | AES128 |
| | **Authentication Algorithm** | Section of hash algorithm to be used to authenticate packet data in the IPsec tunnel: either MD5 or SHA1 | SHA1 |
| | **SA Life Time** | Value that represents the lifetime of the IKE key which is dedicated in Phase 2 between both end host or network. The available setting ranges is from 180 to 86,400 seconds. | 28800 |
| **Dead Peer Detection Settings** | | | |
| **DPD Action** | | Select either Hold or Restart the tunnel’s security association for the peer. Note that Hold is suitable for a statistically defined tunnel. | Hold |
| **DPD Interval** | | Duration of time for sending hello message to the peer device: value from 1 to 65535 seconds. | 30 seconds |
| **DPD Timeout** | | Duration of time to declare that the peer is dead: value from 1 to 65535 seconds. | 120 seconds |

After finishing the **IPsec settings** configuration, please click the **Save** button to save all changes that have been made. If you would like to discard any setting, please click the **Cancel** button.

### 4.11.3 *IPsec Status*

On this web page, you can check the status of your IPsec connection between CR5201B/SE5201B and its peer device in different connection types and modes. The first information is the **Peer Address** which is the IP address of the other device that is connected to CR5201B/SE5201B. The second information is the **VPN Tunnel**'s status. The third information is the **Status** of the IPsec connection which can be **Disabled**, **Listening**, or **Connected**. Figure 4-42 shows the **IPsec Status** web page under the **IPsec Settings** menu. There are three buttons at the end of the web page which are **Connect**, **Disconnect**, and **Refresh**. The **Connect** and **Disconnect** buttons allow you to establish or tear down the IPsec connection. The **Refresh** button enable you to check the latest status of the connection.



| Current Status | |
|---|---|
| Peer Address | 0.0.0.0 |
| VPN Tunnel | N/A |
| Status | Disabled |

Figure 4-42 IPsec Status Web Page

### 4.11.4 *Examples of IPsec Settings*

The following subsections provide examples of **IPsec settings**. However, each example will be focused only on the **General Settings** part. The other parts of the **IPsec Settings** can be configured according to the user's preference. Please consult previous section on the details of **Authentication Settings**, **IKE Settings**, and **Dead Peer Detection Settings**.

**Note** that the network-to-network (or subnet-to-subnet) connections are now supported in new firmware of CR5201B/SE5201B.

### 4.11.5 *Host-to-Host Connections*

Two scenarios can be configured for host-to-host connections: with static peer and with dynamic peer. A host-to-host topology for both scenarios is illustrated in Figure 4-43

. Please follow the steps provided next for each scenario to set the **General Settings**.

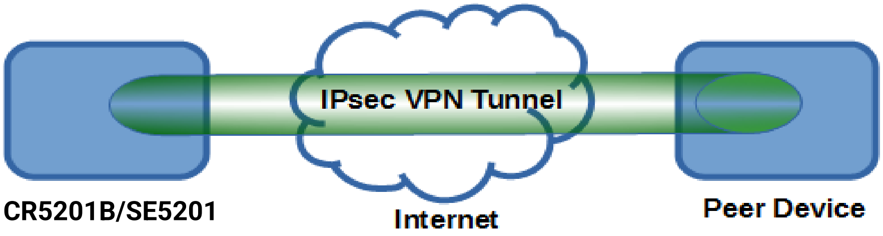
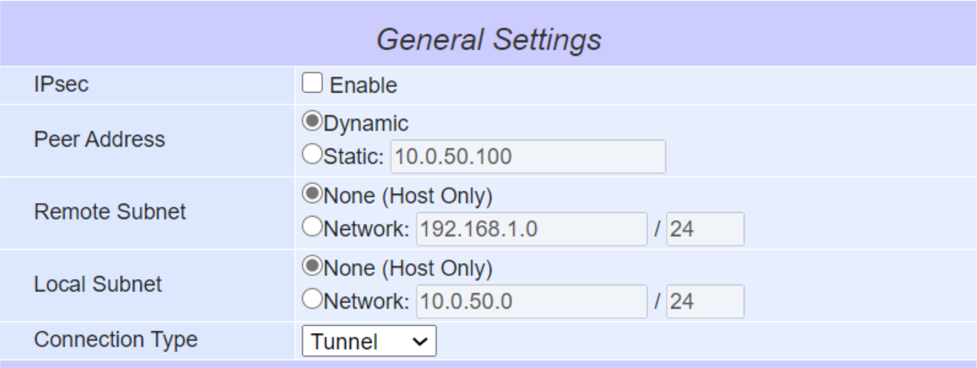


Figure 4-43 IPsec VPN Tunnel with Host-to-Host Topology

**Scenario: host-to-host with static peer as shown in** Figure 4-44

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Static** option and enter the peer IPv4 address.
  <u>**Note:**</u> When peer address is entered as the static address, the CR5201B/SE5201B acts as an **initiator** which takes the initiative and establishes a connection. The CR5201B/SE5201B also acts as a **responder** and passively accepts the connection initiated by the remote gateway.
- Select the radio button for **None (Host Only)** in the **Remote Subnet** field.
- Since this VPN connection is established on two hosts, the **Connection Type** option can be either **Transport** or **Tunnel**.



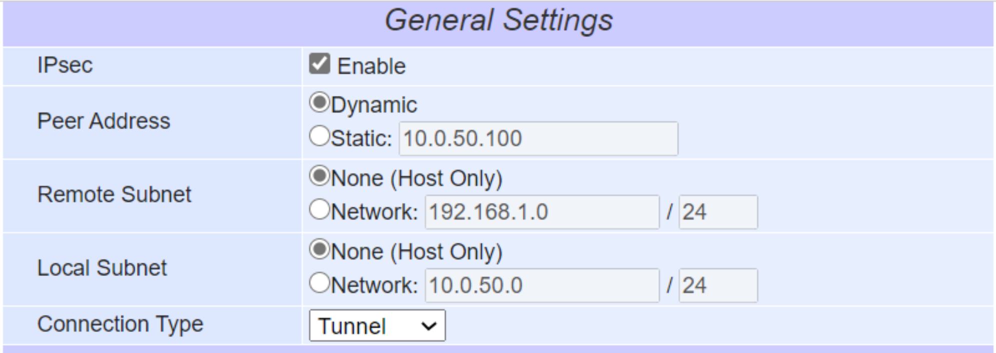
General Settings

| | |
|---|---|
| IPsec | □ Enable |
| Peer Address | ● Dynamic<br>○ Static: 10.0.50.100 |
| Remote Subnet | ● None (Host Only)<br>○ Network: 192.168.1.0 / 24 |
| Local Subnet | ● None (Host Only)<br>○ Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-44 General Settings for Host-to-Host with Static Peer

**Scenario: host-to-host with dynamic peer as shown in** Figure 4-45

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Dynamic** option.
  <u>**Note:**</u> When VPN connects to a peer with dynamic IP address, the CR5201B/SE5201B acts as a **responder** and passively accepts the connection initiated by the remote gateway.
- The remaining settings are the same as the host-to-host with static peer scenario described above.



General Settings

| | |
|---|---|
| IPsec | ☑ Enable |
| Peer Address | ● Dynamic<br>○ Static: 10.0.50.100 |
| Remote Subnet | ● None (Host Only)<br>○ Network: 192.168.1.0 / 24 |
| Local Subnet | ● None (Host Only)<br>○ Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-45 General Settings for Host-to-Host with Dynamic Peer

### 4.11.6 *Host-to-Network Connections*

Two scenarios can also be configured for host-to-network (or host-to-subnet or host-to-site) connections: with static peer and with dynamic peer. Note that the CR5201B/SE5201B is the host in these scenarios. A host-to-network topology for both scenarios is illustrated in Figure 4-46. Please follow the steps provided next for each scenario to set the **General Settings**.

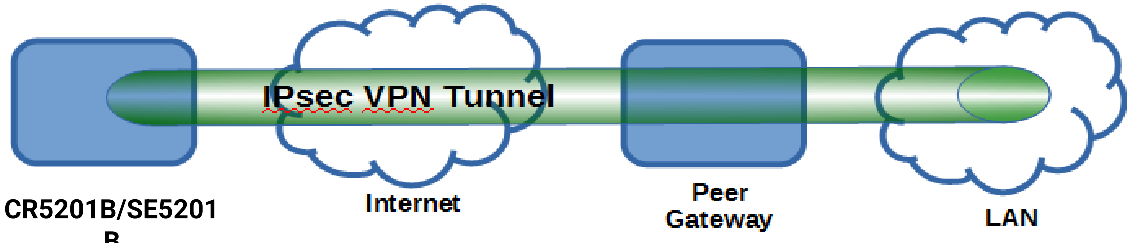
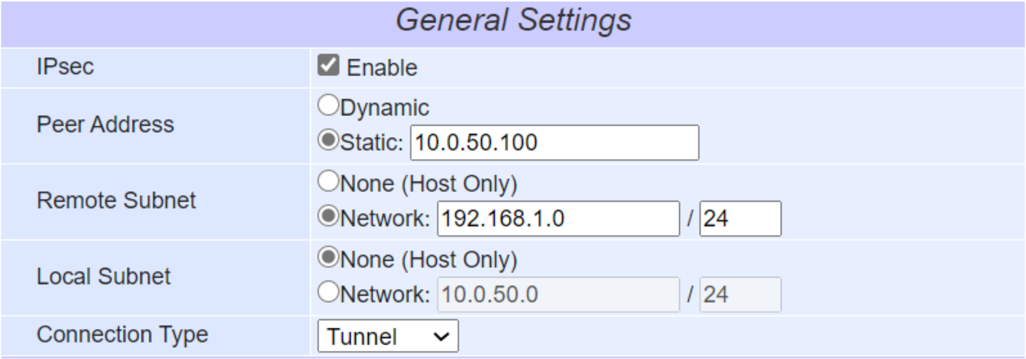


Figure 4-46 IPsec VPN Tunnel with Host-to-Network Topology

**Scenario: host-to-network with static peer as shown in** Figure 4-47

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Static** option and enter the peer IPv4 address.
  <u>**Note:**</u> When peer address is entered as a static address, the CR5201B/SE5201B is an **initiator** which takes the initiative and establish a connection, or can be a **responder** waiting for connection. The CR5201B/SE5201B also acts as a **responder** and passively accepts the connection initiated by the remote gateway.
- Set the network IPv4 address in the **Remote Subnet** with the number of bits for subnet mask in "address prefix length" or behind the "**/**" symbol.
- Because this IPsec VPN connection has a subnet at one end, the **Connection Type** option must be set to **Tunnel** only.



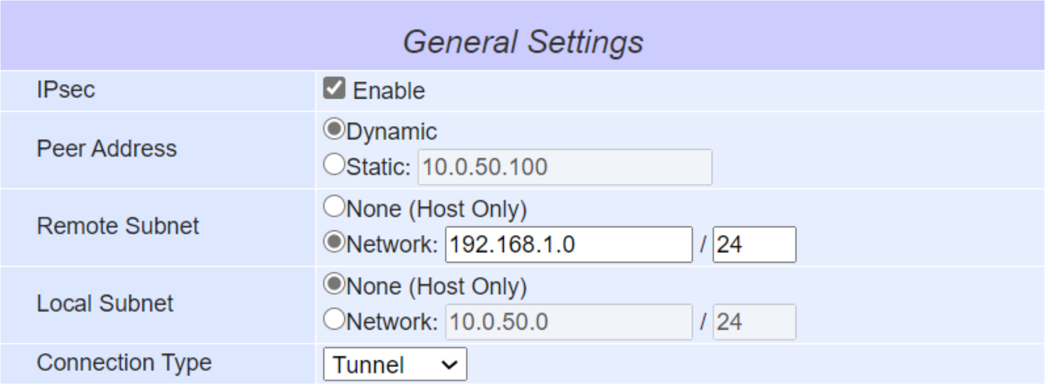
*General Settings*

| | |
|---|---|
| IPsec | ☑ Enable |
| Peer Address | ○Dynamic<br>●Static: 10.0.50.100 |
| Remote Subnet | ○None (Host Only)<br>●Network: 192.168.1.0 / 24 |
| Local Subnet | ●None (Host Only)<br>○Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-47 General Settings for Host-to-Network with Static Peer

**Scenario: host-to-network with dynamic peer as shown in** Figure 4-48

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Dynamic** option.
  <u>**Note:**</u> When VPN connection is set to a peer with dynamic IP address, the CR5201B/SE5201B will act as a **responder** and will passively accept the connection initiated by the remote gateway.
- Set the network IPv4 address in the **Remote Subnet** with the number of bits for subnet mask in "address prefix length" or behind the "/" symbol.
- Because this IPsec VPN connection has a subnet at one end, the **Connection Type** option must be set to **Tunnel** only.



| General Settings | |
|---|---|
| IPsec | ☑ Enable |
| Peer Address | ● Dynamic<br>○ Static: 10.0.50.100 |
| Remote Subnet | ○ None (Host Only)<br>● Network: 192.168.1.0 / 24 |
| Local Subnet | ● None (Host Only)<br>○ Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-48 General Settings for Host-to-Network with Dynamic Peer

## 4.11.7 *Network-to-Network (Subnet-to-Subnet) Connections*

Two scenarios can also be configured for network-to-network (or subnet-to-subnet) connections: with static peer or with dynamic peer. A VPN tunnel will be created between two separate private sub-networks. Note that theCR5201B/SE5201B is the gateway to a local network in these scenarios. A network-to-network topology for both scenarios is illustrated in Figure 4-49. Please follow the steps provided next for each scenario to set the **General Settings**.

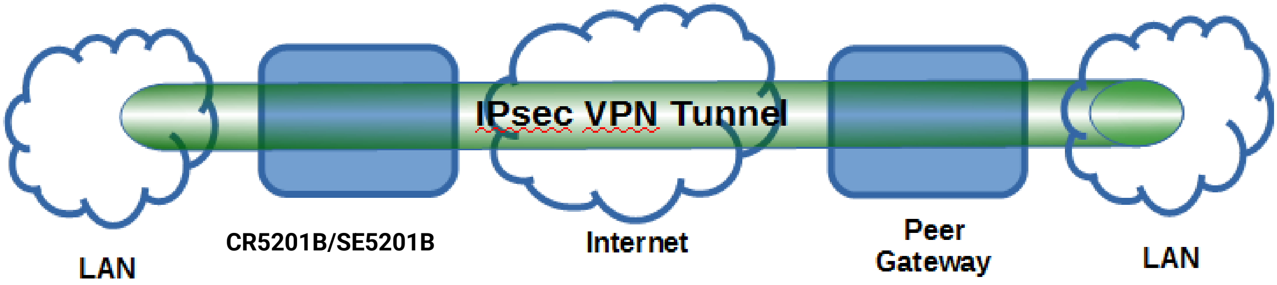
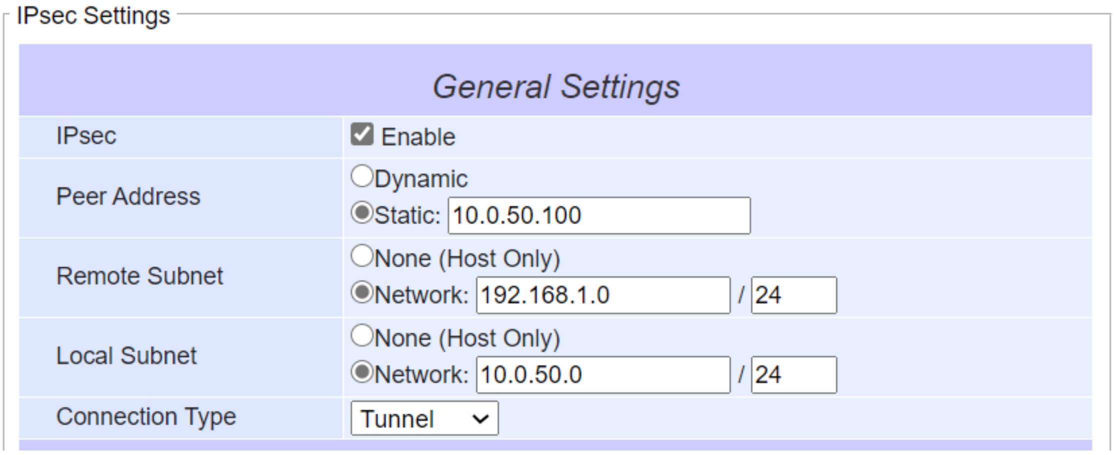


Figure 4-49 IPsec VPN Tunnel with Network-to-Network Topology

**Scenario: network-to-network with static peer as shown in** Figure 4-50

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Static** option and enter the peer IPv4 address.
  **<u>Note:</u>** When peer address is entered as a static address, the CR5201B/SE5201B is an **initiator** which takes the initiative and establish a connection, or can be a **responder** waiting for connection. The CR5201B/SE5201B also acts as a **responder** and passively accepts the connection initiated by the remote gateway.
- Set the network IPv4 address in the **Remote Subnet** with the number of bits for subnet mask in “address prefix length” or behind the “/” symbol.
- Set the network IPv4 address in the **Local Subnet** with the number of bits for subnetmask in “address prefix length” or behind the “/” symbol.
- Because this IPsec VPN connection has subnets at both ends, the **Connection Type** option must be set to **Tunnel** only.



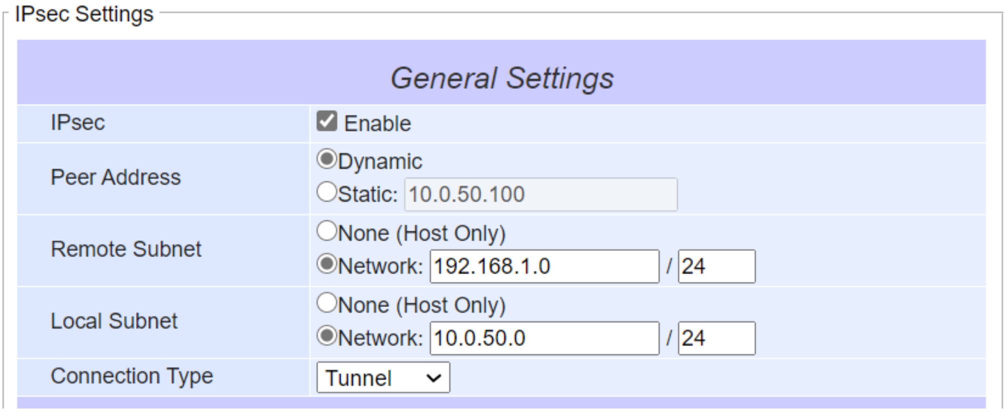
IPsec Settings

| General Settings | |
|---|---|
| IPsec | ☑ Enable |
| Peer Address | ○ Dynamic<br>● Static: 10.0.50.100 |
| Remote Subnet | ○ None (Host Only)<br>● Network: 192.168.1.0 / 24 |
| Local Subnet | ○ None (Host Only)<br>● Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-50 General Settings for Network-to-Network with Static Peer

**Scenario: network-to-network with dynamic peer as shown in** Figure 4-51

- Check the **Enable** box for **IPsec**.
- In the **Peer Address** field, select the **Dynamic** option.
  **Note:** When VPN connection is set to a peer with dynamic IP address, the CR5201B/SE5201B will act as a **responder** and will passively accept the connection initiated by the remote gateway.
- Set the network IPv4 address in the **Remote Subnet** with the number of bits for subnet mask in “address prefix length” or behind the “/” symbol.
- Set the network IPv4 address in the **Local Subnet** with the number of bits for subnetmask in “address prefix length” or behind the “/” symbol.
- Because this IPsec VPN connection has subnets at both ends, the **Connection Type** option must be set to **Tunnel** only.



IPsec Settings

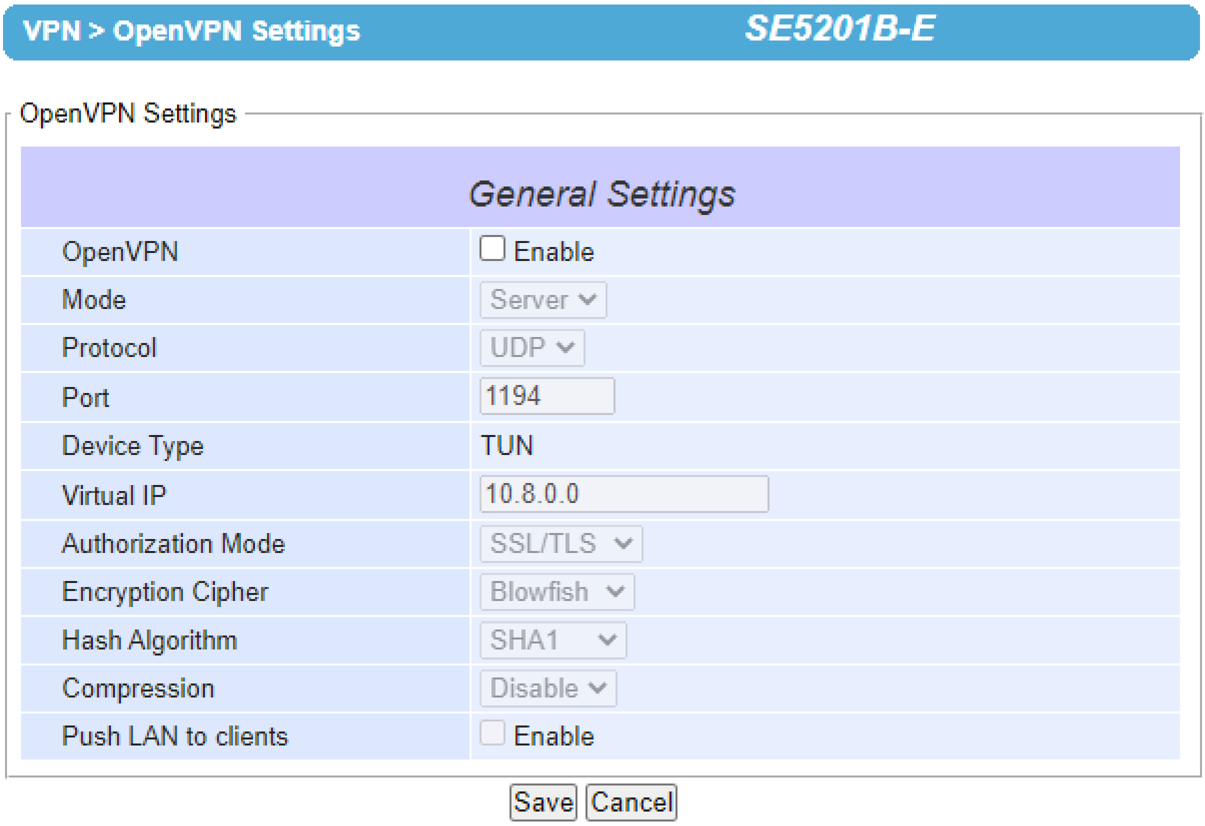
| General Settings | |
|---|---|
| IPsec | ☑ Enable |
| Peer Address | ● Dynamic<br>○ Static: 10.0.50.100 |
| Remote Subnet | ○ None (Host Only)<br>● Network: 192.168.1.0 / 24 |
| Local Subnet | ○ None (Host Only)<br>● Network: 10.0.50.0 / 24 |
| Connection Type | Tunnel |

Figure 4-51 General Settings for Network-to-Network with Dynamic Peer

### 4.11.8 *OpenVPN Setting*

OpenVPN is an application that implements VPN for creating secure point-to-point or site-to-site connections in routed or burdged configurations and remote access facilities. It uses a custom security protocol that utilizes SSL/TLS for key exchange. OpenVPN allows peers to authenticate each other using a Static Key (pre-shared key) or certificates. When used in a multi-client-server configuration, it allows the server to release an authentication certificate for every client, using signature and certificate authority.
There are two OpenVPN connection scenarios. They are the TAP and TUN scenario. The product can create ether a layer-3 based IP tunnel (TUN), or a layer-2 based Ethernet TAP that can carry any type of Ethernet traffic. In addition to configuring the device as a Server or Client, you have to specify which type of OpenPVN connection scenario is to be adopted. Currently CR5201B/SE5201B series only support TUN mode.

In order to configure OpenVPN, click on the VPN tab in the left side of the menu and then **OpenVPN Settings**. The user interface is shown in Figure 4-52.



| | |
|---|---|
| OpenVPN | □ Enable |
| Mode | Server |
| Protocol | UDP |
| Port | 1194 |
| Device Type | TUN |
| Virtual IP | 10.8.0.0 |
| Authorization Mode | SSL/TLS |
| Encryption Cipher | Blowfish |
| Hash Algorithm | SHA1 |
| Compression | Disable |
| Push LAN to clients | □ Enable |

Figure 4-52 OpenVPN Setting

The OpenVPN parameters are described as followings:

**OpenVPN**: Check this box to enable OpenVPN.

**Mode**: This parameter specifies what the role of this device will be which can be either **Server** or **Client**. When choosing server mode, the device will play as server role and will standby for client connection.

**Protocol**: The user can select the transport layer protocol that will be used for VPN (**TCP** or **UDP**).

**Port**: This parameter defines the port number for TCP/UDP connection.

**Device Type**: OpenVPN tunnel connection by TUN (Tunnel) mode or TAP mode. Currently CR5201B/SE5201B series only supports **TUN** (Tunnel) mode.

**Virtual IP** (only when "OpenVPN Server" mode is selected): This field specifies the server's virtual IP. Virtual IP will only be available when SSL/TLS is chosen as the Authentication Mode. The Server's virtual IP address will be 10.8.0.1/24 and client virtual IP address will be 10.8.0.x/24.

**Local/Remote endpoint IP** (only when "OpenVPN Client" mode is selected): This fields specifies the local and remote endpoint virtual IP address of this OpenPVN gateway. Local/Remote endpoint IP will be available when static key is chosen in Authentication Mode.

**Authentication Mode**: This parameter specifies the authorization mode of the OpenVPN server. There are two options available:

**SSL/TLS** and **SSL/TLS (TLS Auth)**: When OpenVPN uses TLS authorization mode, the CA Cert, Server Cert and DH PEM will be used. See the next Section for mode details.

**Static Key**: When OpenVPN uses static key authorization, the static key will be used. See the next Section for mode details.

**Encryption Cipher**: This parameter specifies the Encryption cipher. There are five options available: **Blowfish**, **AES 256**, **AES 192**, **AES 128** and **Disable**. When Disable option is selected, no encryption will be used.

**Hash Algorithm**: This parameter specifies the Hash algorithm. There are five options available: **SHA1**, **MD5**, **SHA 256**, **SHA 512** and **Disable**.When Disable option is selected, no Hash algorithm will be used.

**Compression**: This parameter specifies whether or not the tunnel packets will be compressed. There are three options available: **LZ4**, **LZO** and **Disable**. When Disable option is chosen, the packet will not be compressed.

**Push LAN to clients** (only when "OpenVPN Server" mode is selected): When this option is enabled, CR5201B/SE5201B will push the LAN port subnet to the OpenVPN remote client so that the remote client will add a route to the CR5201B/SE5201B local network. Only CR5201B/SE5201B supports this function.

### 4.11.9 *OpenVPN Keys*

OpenVPN requires encryption keys (unless Encryption Cipher is disabled). In order to key-in, import or generate encryption keys, please select "OpenVPN Keys" from the VPN menu on the left side of the user interface. The OpenVPN Keys web page is shown in Figure 4-53. The following terms are related to the OpenVPN keys:

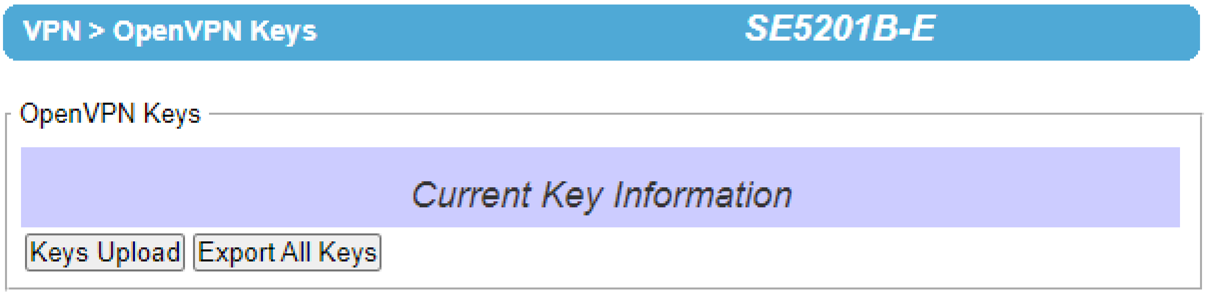


Figure 4-53 OpenVPN Keys web page

**Certificate Authority**: A certificate authority (CA) is an entity that issues digital certificates. A digital certificate certifies the ownership of a public key by the named subject of the certificate. A CA acts as a trusted third party, trusted both by the owner and by the party relying upon the certificate.

**Server Certificate**: It shows the information of server certificate. You can check the information if you use upload server certificate file.

**Server Key**: It shows the information of server key. You can check the information if you use upload server key file.

**Diffie Hellman parameters**: It shows the information of Diffie Hellman parameters.

When CR5201B/SE5201B acts as OpenVPN server, the user can import his/her own certification information by clicking on the **Key Upload** button. When clicking on the **Keys Upload** button, a pop-up window shown in Figure 4-54 will show up and will allow you to import the related server certificates. Note that for OpenVPN client, the pop-up window is slightly different as shown in Figure 4-55.

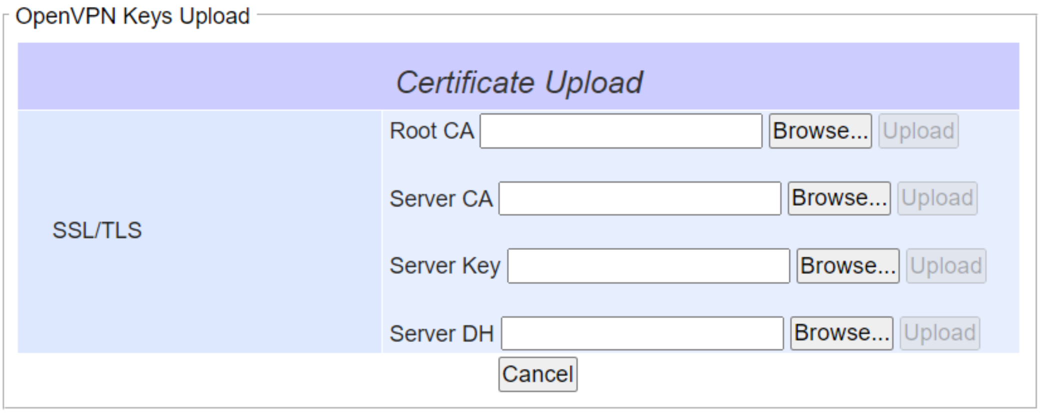
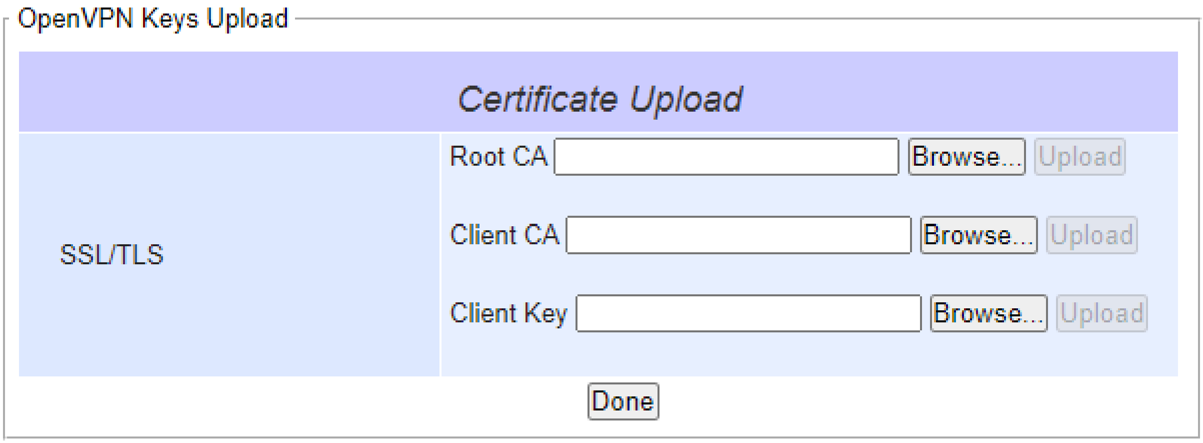


Figure 4-54 Certificate Upload for OpenVPN Server



OpenVPN Keys Upload

Certificate Upload

| | |
|---|---|
| SSL/TLS | Root CA [ ] Browse... Upload<br>Client CA [ ] Browse... Upload<br>Client Key [ ] Browse... Upload |

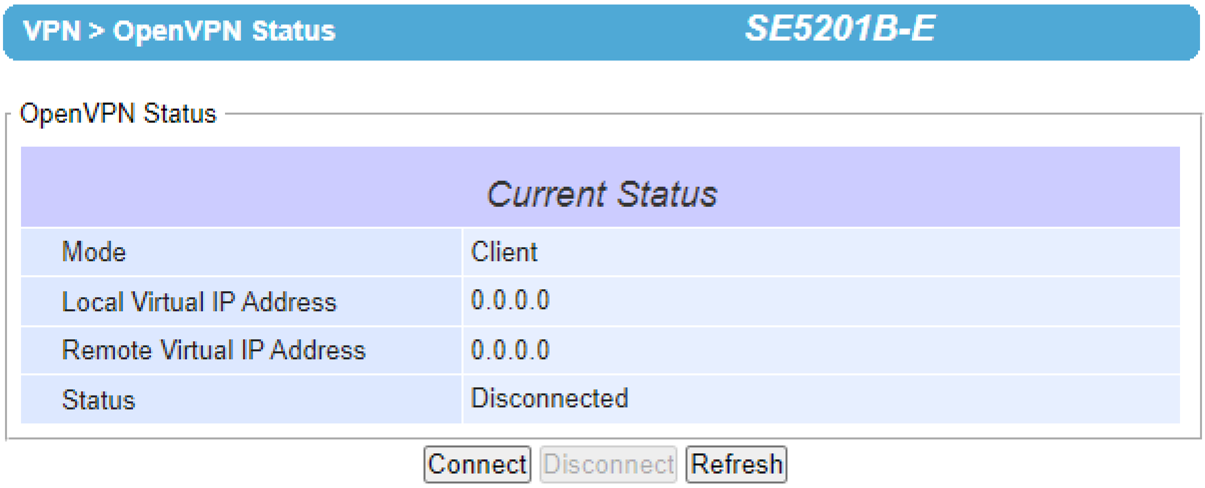
Done

Figure 4-55 Certificate Upload for OpenVPN Client

Click the **Browse** button to select your own server or client certificate and click on the **Upload** button. When CR5201B/SE5201B acts as an OpenVPN server, use the **Export All Keys** button to download all the necessary certificates including CA.crt, CA.key and the certificate and key for client side.

### 4.11.10 *OpenVPN Status*

In order to check the current OpenVPN connection status, click “OpenVPN status” in the VPN menu on the left side of the screen. A web page similar to Figure 4-56 or Figure 4-57 will show up depending whether OpenVPN is set as a Client or a Server.



VPN > OpenVPN Status SE5201B-E

OpenVPN Status

Current Status

| | |
|---|---|
| Mode | Client |
| Local Virtual IP Address | 0.0.0.0 |
| Remote Virtual IP Address | 0.0.0.0 |
| Status | Disconnected |

Connect Disconnect Refresh

Figure 4-56 OpenVPN Client Status

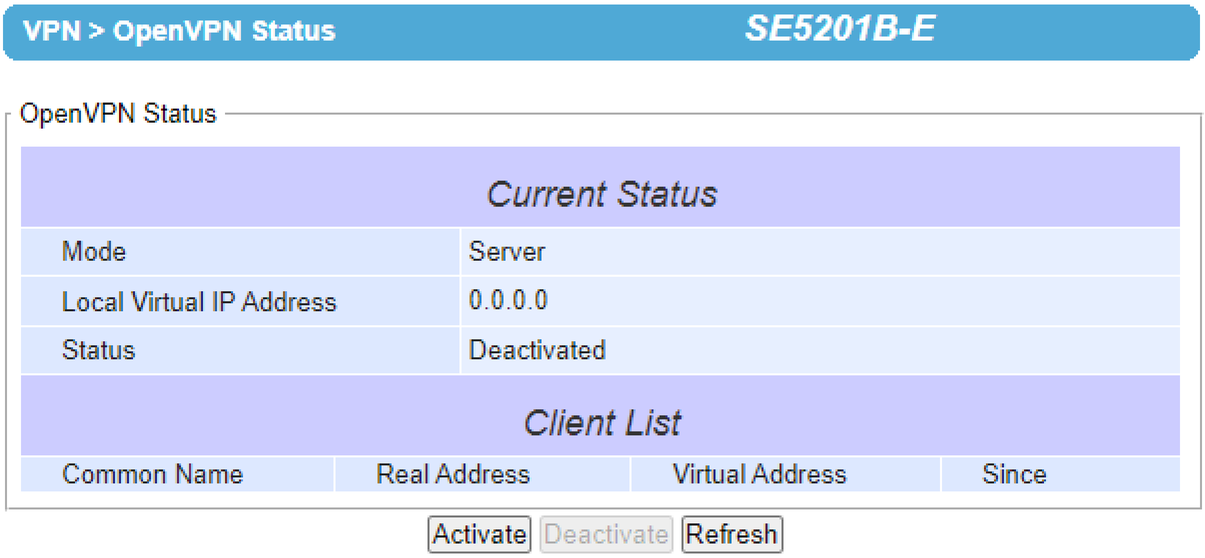
The description of each field under the Current Status of OpenVPN when it is in Client mode is as follows.

**Mode**: This indicates the OpenVPN mode that CR5201B/SE5201B is currently running as.

**Local Virtual IP address**: This field displays the Local virtual IP address.

**Remote Virtual Status**: This field displays the Remote virtual IP address.

**Status**: This field displays the current status of OpenVPN connection. It can be: Disconnected, Connecting or Connected.



VPN > OpenVPN Status SE5201B-E

OpenVPN Status

| Current Status | |
|---|---|
| Mode | Server |
| Local Virtual IP Address | 0.0.0.0 |
| Status | Deactivated |

Client List

| Common Name | Real Address | Virtual Address | Since |
|---|---|---|---|

Figure 4-57 OpenVPN Server Status

The description of each field under the Current Status of OpenVPN when it is in Server mode is as follows.

**Mode**: This indicates the OpenVPN mode that CR5201B/SE5201B is currently running as.

**Local Virtual IP address**: This field displays the Local virtual IP address.

**Status**: This filed displays the current status of OpenVPN connection. It can be: Deactivated, Activating, Disconnected, Connecting or Connected.

**Client List**: This table provide the list of clients and their information which are Common Name, Real Address, Virtual Address, and Since (the timestamp).

## 4.12 *Log Settings*

Under the **Log Settings** menu of web interface of CR5201B/SE5201B series Low-Power Gateway, you can configure various data logging for the device. Figure 4-58 lists the sub-menu under the **Log Settings**. It consists of **System Log Settings**, **COM Log Settings**, **System Log**, **COM log** and **Mobile Log.** Each of this sub-menu will be described in the following subsections.

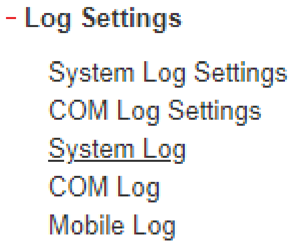
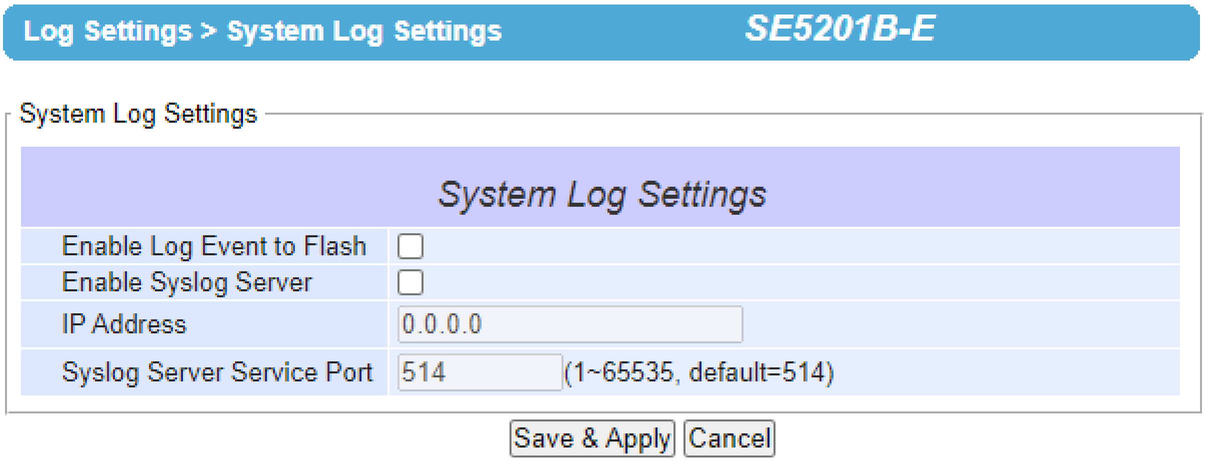


Figure 4-58 Log Setting Menu

### 4.12.1 *System Log Settings*

The Syslog function is turned on by default and cannot be turned off for CR5201B/SE5201B. It is used to keep log for system events and report to an external Syslog server if necessary. Figure 4-59 shows the **System Log Settings** page under the **Log Settings** menu. Description of each option is provided as follows.



Log Settings > System Log Settings SE5201B-E

System Log Settings

System Log Settings

| | |
|---|---|
| Enable Log Event to Flash | □ |
| Enable Syslog Server | □ |
| IP Address | 0.0.0.0 |
| Syslog Server Service Port | 514 (1~65535, default=514) |

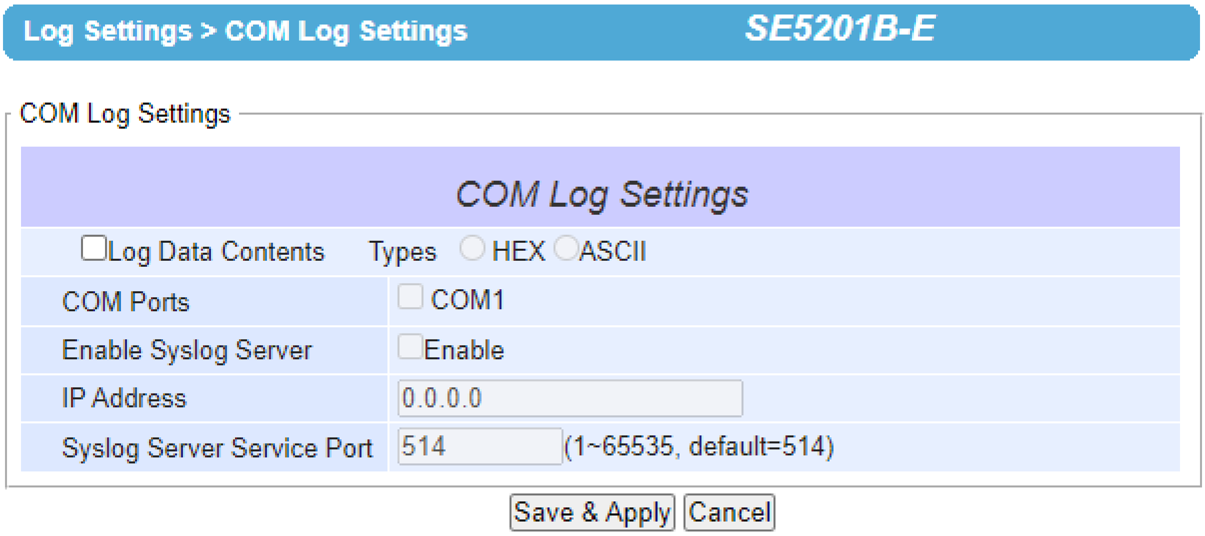
Figure 4-59 Log Settings Web Page under Log Settings

- **Enable Log Event to Flash**: When the check box is enabled, CR5201B/SE5201B will write log events to the local flash. Otherwise, the log events would be cleared when the device restarts because they are stored in the RAM by default.
- **Enable Syslog Server:** When the check box is enabled, it will allow CR5201B/SE5201B to send Syslog events to the remote Syslog server with the specified IP address (next option). All the data sent/received from serial interface will be logged and sent to Syslog Server.
- **IP Address**: The user must specify the IP address of a remote Syslog Server in this field.
- **Syslog Server Service Port**: This option allows user to specify the remote Syslog Server Port number between 1 and 65535. Note that the default port number is 514.

After finishing configuring the **Log Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. When the saving and applying are finished, the web browser will remain on the **Log Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

### 4.12.2 *COM Log Settings*

Transmitted data through COM port could be logged for recording or debugging purposes. Additionally, the logs could be reported to an external Syslog server as well. Figure 4-60 shows the **COM Log Settings** page under the **Log Settings** menu. Description of each option is explained as follows.



Log Settings > COM Log Settings SE5201B-E

COM Log Settings

COM Log Settings

| | |
|---|---|
| □Log Data Contents | Types ○HEX ○ASCII |
| COM Ports | □ COM1 |
| Enable Syslog Server | □Enable |
| IP Address | 0.0.0.0 |
| Syslog Server Service Port | 514 (1~65535, default=514) |

Figure 4-60 COM Log Settings Web Page under System Setup

- **Log Data Contents**: if this option is enabled, the COM logging function will log the content's data that is being transmitted and received in raw bytes. If this option is disabled, COM logging function will only log the length of data to reduce system load.

**Note**: CR5201B/SE5201B can store up to 100 KBytes internally. A request or a response will be in one line, and the data longer than 512 bytes will go into another line. You can retrieve logs by using an **FTP Client.** The FTP login is the same as the WebUI login. Logs are located in **/var/log/logcomxx** (xx is the port number). When the reserved space is full, new logs will replace old logs. We strongly recommend sending COM logs to a remote Syslog server.

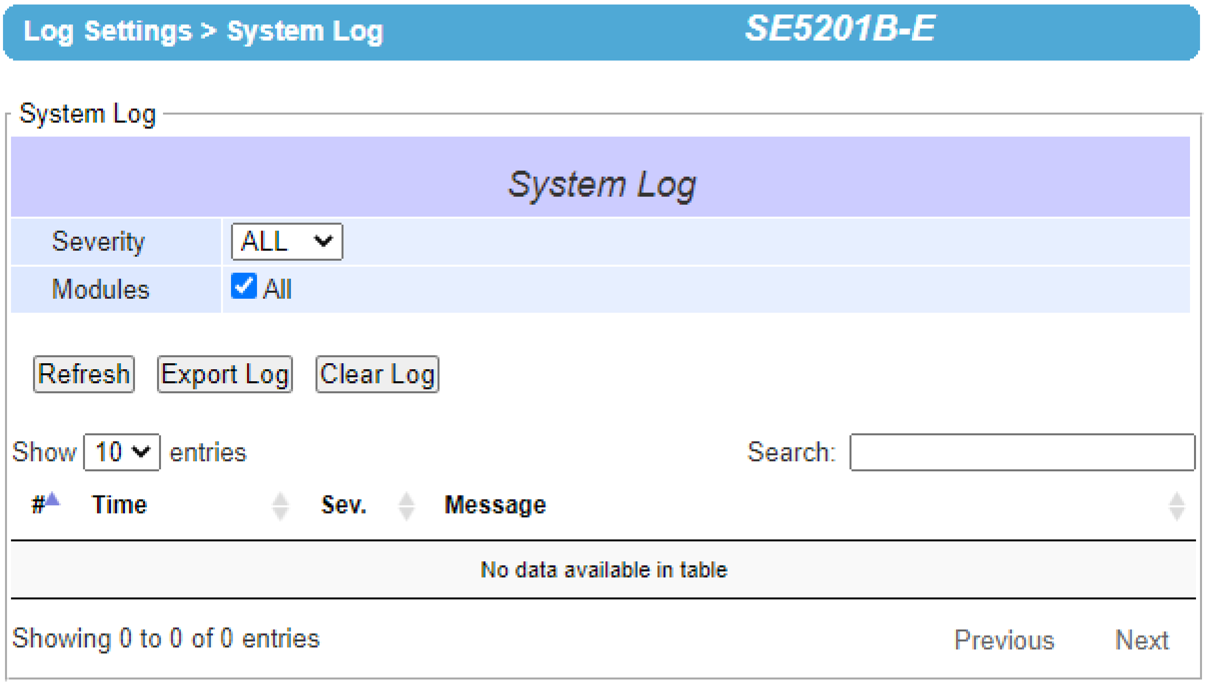
- Data **Types**: There are two radio buttons which are hexadecimal (**HEX**) and **ASCII** for user to select the desired logged data's format.
- **COM Ports:** The user can select which port(s) will be logged by checking the corresponding boxes.
- **Enable Syslog Server**: Enabling this option would allow user to send COM logs to a remote Syslog server. It is possible to send COM logs to the same Syslog server used previously for event logging.
- **IP Address**: When the Syslog Server is enabled in the previous option, please specify the remote Syslog server's IP address in this field.
- **Syslog Server Service Port**: This option allows user to specify the remote Syslog Server Port number between 1 and 65535. Note that the default port number is 514.

After finishing configuring the **COM Log Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. When the saving and applying are finished, the web browser will remain on the **COM Log Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

### 4.12.3 *System Log*

This page displays the current event log or system log stored in the CR5201B/SE5201B device. Figure 4-61 shows an example of logged event. In the **Severity** option, the user can choose the level of severity (i.e., All, Err, Warn, Info) to inspect from the drop-down box. The **Modules** option allows user to view only log from today or all available logs.

Each record of the **System Log** consists of **Time**, **Sev.** (short for Severity), and **Message** description.



Log Settings > System Log SE5201B-E

System Log

System Log

| | |
|---|---|
| Severity | ALL |
| Modules | ☑ All |

| # | Time | Sev. | Message |
|---|---|---|---|
| No data available in table | | | |

Showing 0 to 0 of 0 entries

Figure 4-61 System Log Web Page under System Setup

At the end of the **System Log** page, there are two hyperlinks which can be used to navigate through all records. You can click on the "**Previous**" link to go to the last page of the log and click on the "**Next**" button to go to the next page. At the top of the **System Log** table, there are three buttons: **Refresh**, **Export Log**, and **Clear Log**. To display the latest event, you can click on "**Refresh**" button. When you click on the Export Log button, a log file will be saved on to your PC. By clicking on "**Clear Log**" button, you can clear all events stored in the device and the **System Log** will be empty. A message "No data available in table" will be displayed in the middle of the table. Moreover, you can choose from the drop-down list of 10 or 25 entries for the **Show entries**. Finally, you can search over the **System Log** by entering a keyword in the **Search** box.

### 4.12.4 *COM log*

This page displays the current COM log stored in the device. The desired **COM** port number can be selected from the **COM x Log** drop-down list in Figure 4-62, which allows it to display logs from different COM ports. An example of **COM 1 Log** is shown in Figure 4-62. Each record of the log consists of **Time**, **COM** #, Direction (**T/R**) and **Data**.

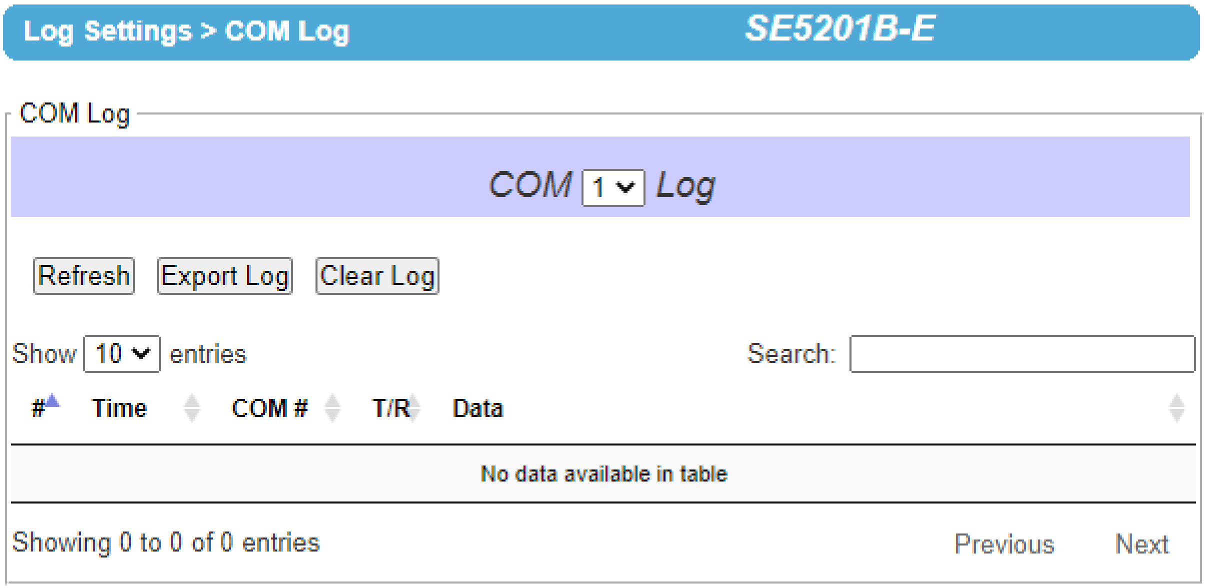


Figure 4-62 COM Datalog Web Page under Log Settings

Under the COM *x* Log header, there are three buttons: **Refresh**, **Export Log**, and **Clear Log**. First, the **Refresh** button can be used to update the COM Log table below with the latest information. Second, the **Export Log** button will enable the user to save the log data onto their PC. The default file name of the exported data log will be "**DataLog.txt**". Finally, the **Clear Log** button will clear all events stored in the device and the COM Datalog will be empty with a message "No data available in table". At the end of the **COM Log** page, there are two hyperlinks which can be used to navigate through all records. You can click on the "**Previous**" link to go to the previous page of the log and click on the "**Next**" link to go to the next page.

### 4.12.5 *Mobile Log*

The Mobile Log menu provides log data related to the mobile interface on the CR5201B/SE5201B. The first line graph on this web page is the the Mobile Signal which plots the mobile Received Signal Strength Indication (RSSI) versus time as shown in Figure 4-63. The second line graph on this web page is the Mobile Temperature. This plots the temperature of the mobile module inside the CR5201B/SE5201B chasis versus the time as shown in Figure 4-64. Note that the mobile signal and the mobile temperature will be updated every 2 minutes and the system will record the data up to the maximum of 2 hours.

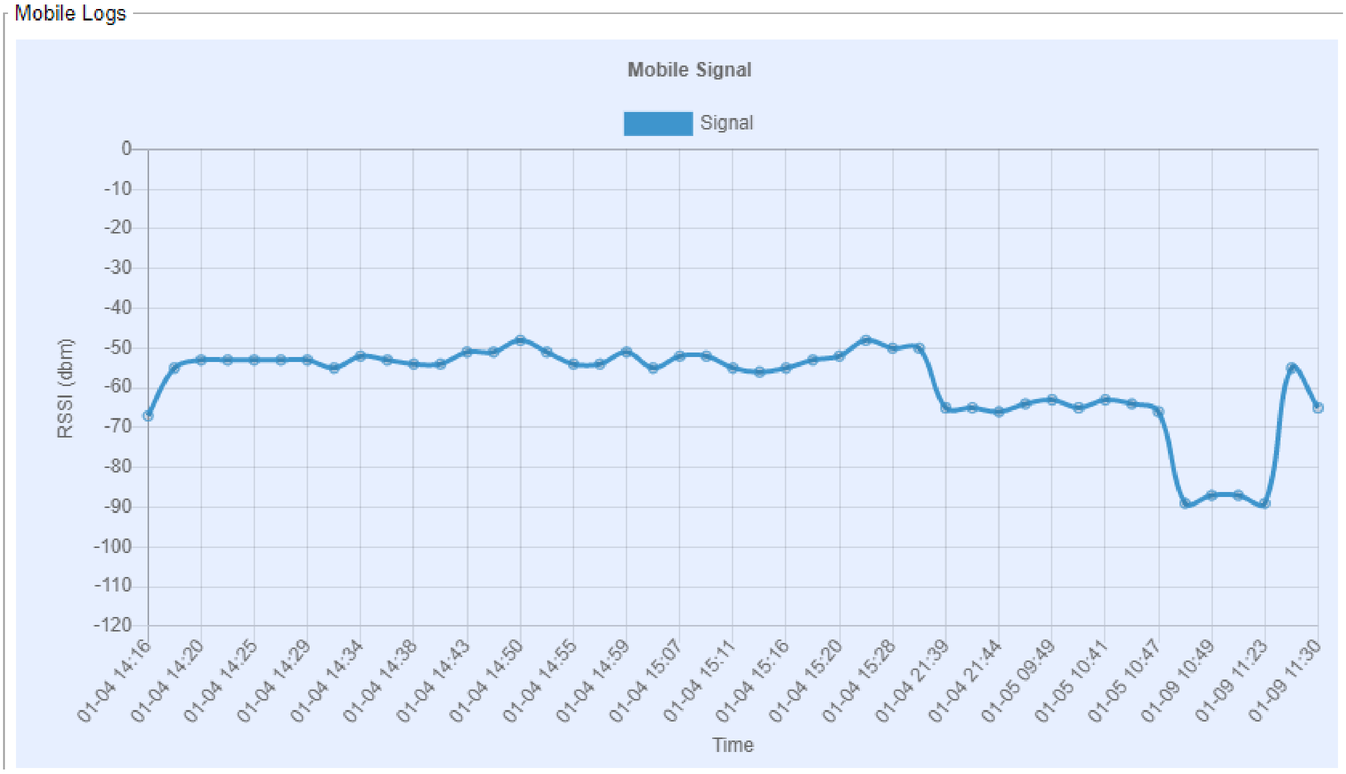


Figure 4-63 Mobile Log: Mobile Signal

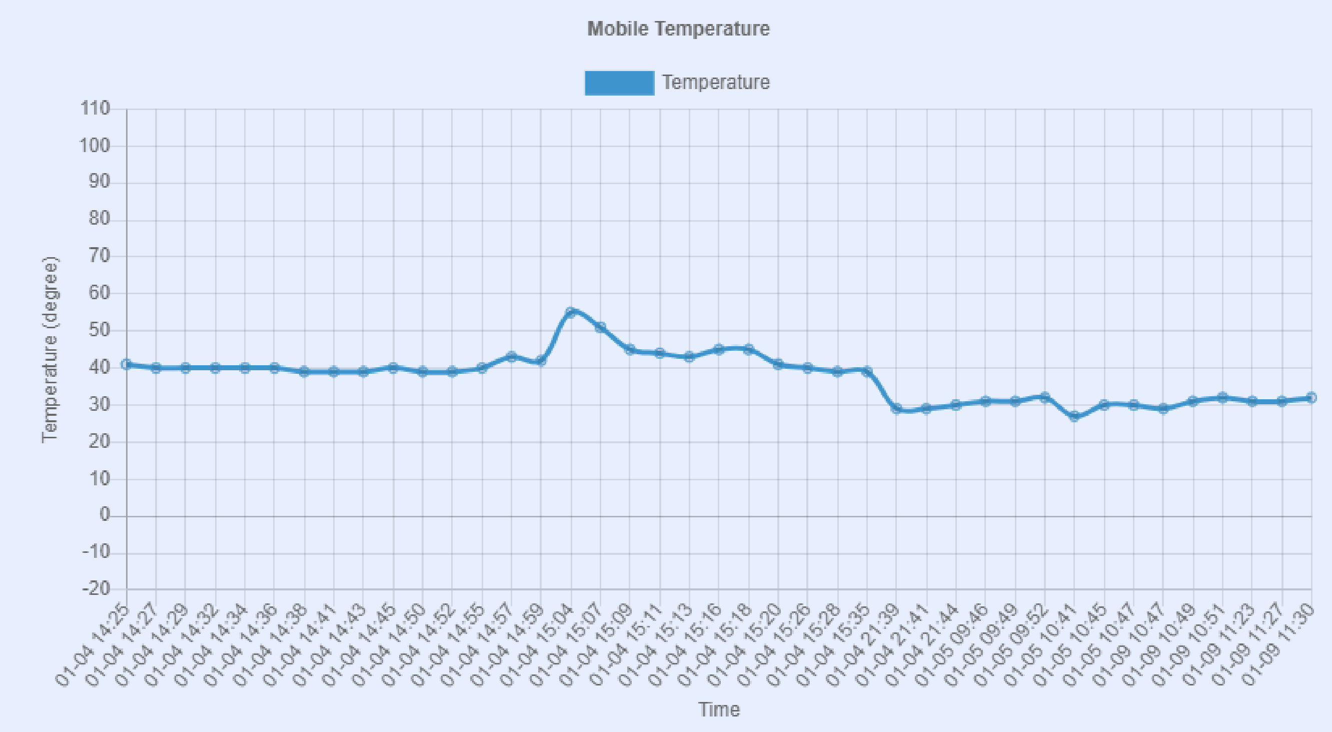


Figure 4-64 Mobile Log: Mobile Temperature

## 4.13 *System Setup*

Under the **System Setup** menu of web interface of CR5201B/SE5201B Low-Power Gateway, you can perform a number of administration tasks for the device. Figure 4-65 lists the sub-menu under the **System Setup**. It consists of **Date/Time Settings**, **Admin Settings**, **Firmware Upgrade**, **Account Settings (Only SE5201B-E Model is available)**, **Web Settings (Only SE5201B-E Model is available)**, **Backup/Restore Configuration**, **Power Management**, and **Ping**. Each of this sub-menu will be described in the following subsections.

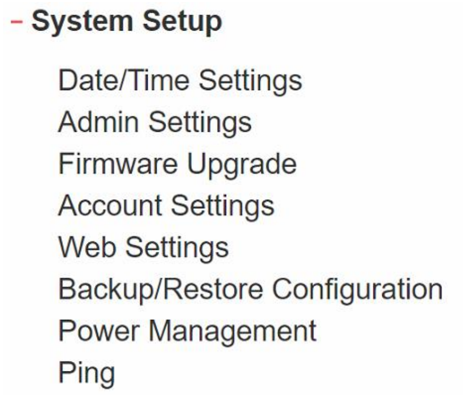
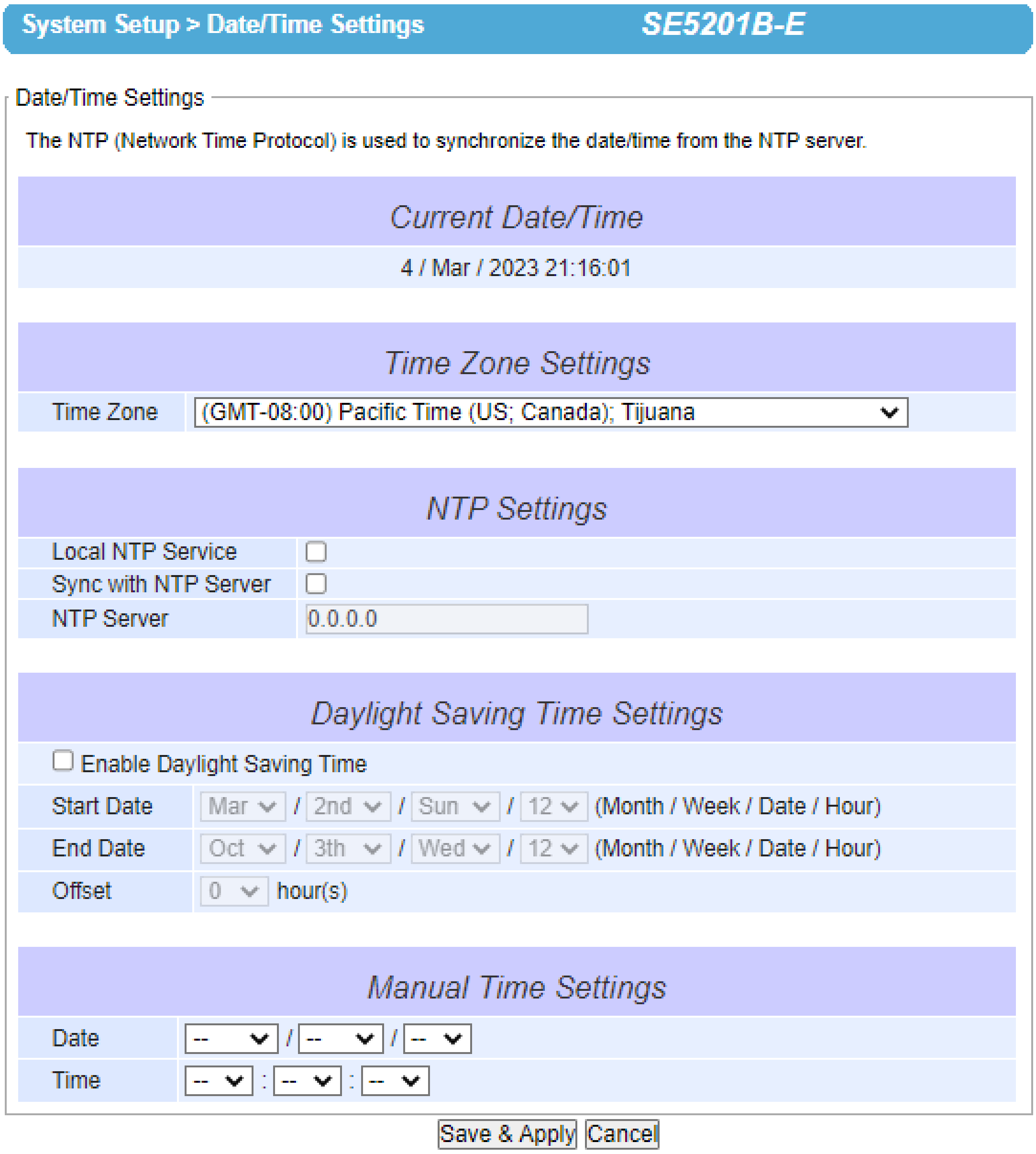


Figure 4-65 System Setup Menu

### 4.13.1 *Date/Time Settings*

Date and time can be set manually or using Network Time Protocol (NTP) to automatically synchronize date and time of CR5201B/SE5201B with a Time Server. Figure 4-66 shows the **Date/Time Settings** page. The first part of the page is the latest **Current Date/Time** which is in the format of **DD/Month/YYYY HH:MM:SS**. The second part of the page is the **Time Zone Settings**. You can select your local **Time Zone** from the drop-down list. The third part of the page is the **NTP Server Settings**. In this part, you can either enable the local NTP service inside CR5201B/SE5201B by checking the option **Local NTP Service** below **NTP Settings** part or automatically synchronize with a time server or NTP server. To enable automatic time synchronization, please check the box behind the **Sync with NTP Server** option. Then proceed to enter the **IP address** or **host name** for the **NTP Server**. Note that if a host name is entered, the DNS server must be configured properly (see detail in Section 4.5.1). The fourth part is the **Daylight Saving Time Settings** that can be enabled when **Enable Daylight Saving Time** box is checked. When it is enabled, the user can select the detailed setting of the daylight saving period, such as **Start Date** and **End Date** with **Offset**. Finally, the last part of the page is the **Manual Time Settings** where you can set **Date** and **Time** using corresponding drop-down lists in Figure 4-66.



System Setup > Date/Time Settings SE5201B-E

Date/Time Settings

The NTP (Network Time Protocol) is used to synchronize the date/time from the NTP server.

**Current Date/Time**

4 / Mar / 2023 21:16:01

**Time Zone Settings**

| | |
|---|---|
| Time Zone | (GMT-08:00) Pacific Time (US; Canada); Tijuana |

**NTP Settings**

| | |
|---|---|
| Local NTP Service | □ |
| Sync with NTP Server | □ |
| NTP Server | 0.0.0.0 |

**Daylight Saving Time Settings**

□ Enable Daylight Saving Time

| | |
|---|---|
| Start Date | Mar / 2nd / Sun / 12 (Month / Week / Date / Hour) |
| End Date | Oct / 3th / Wed / 12 (Month / Week / Date / Hour) |
| Offset | 0 hour(s) |

**Manual Time Settings**

| | |
|---|---|
| Date | -- / -- / -- |
| Time | -- : -- : -- |

Figure 4-66 Date/Time Settings Web Page under System Setup

**Attention**

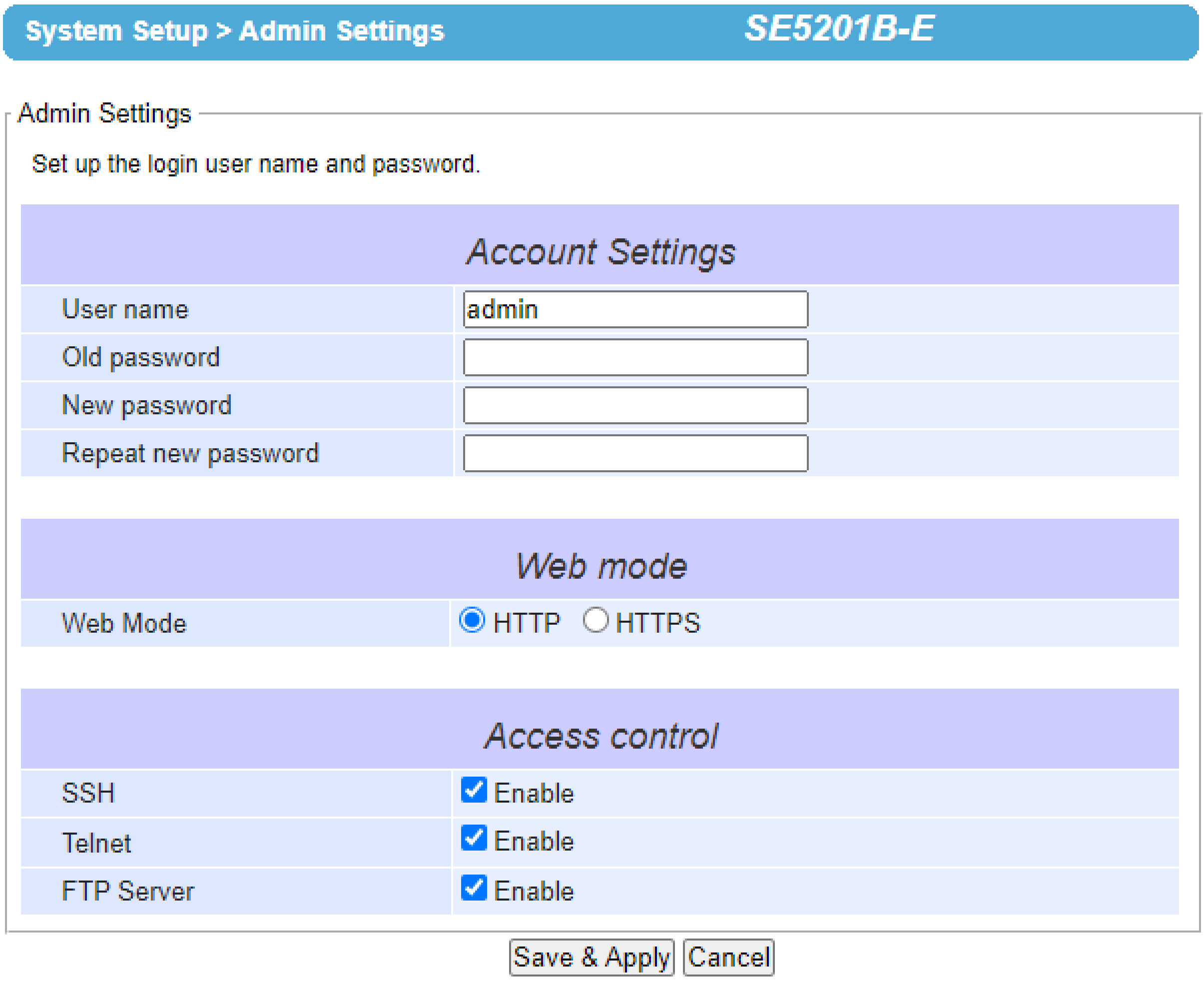
**It is also important to setup Default Gateway and DNS Servers in the Network Settings properly (See Section 4.5.1), so CR5201B/SE5201B can lookup DNS names and point to the proper NTP server.**

After finishing configuring the **Date/Time Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. When the saving and applying are finished, the web browser will remain on the **Date/Time Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

### 4.13.2 *Admin Settings*

The CR5201B/SE5201B Series allows user and password management through this **Admin Settings** page under **System Setup** menu. By default, the User name is “**admin**” and the password is “**default**”. To set or change their values, you can enter the information in the **User name**, the **Old password**, the **New password** and the **Repeat new**

**password** fields under the **Account Settings** part as shown in Figure 4-67. The second part of the **Admin Settings** web page, there is the **Web mode** part which allow the user to select the radio button of normal **HTTP** or **HTTPS** for secure communication with the device's web user interface (Web UI). The thirt part of the web page allows the user to change the **Access Control** of three utilities: **SSH**, **Telnet**, and **FTP Server** by checking the corresponding **Enable** boxes.



Admin Settings

Set up the login user name and password.

| Account Settings | |
|---|---|
| User name | admin |
| Old password | |
| New password | |
| Repeat new password | |

| Web mode | |
|---|---|
| Web Mode | ● HTTP ○ HTTPS |

| Access control | |
|---|---|
| SSH | ☑ Enable |
| Telnet | ☑ Enable |
| FTP Server | ☑ Enable |

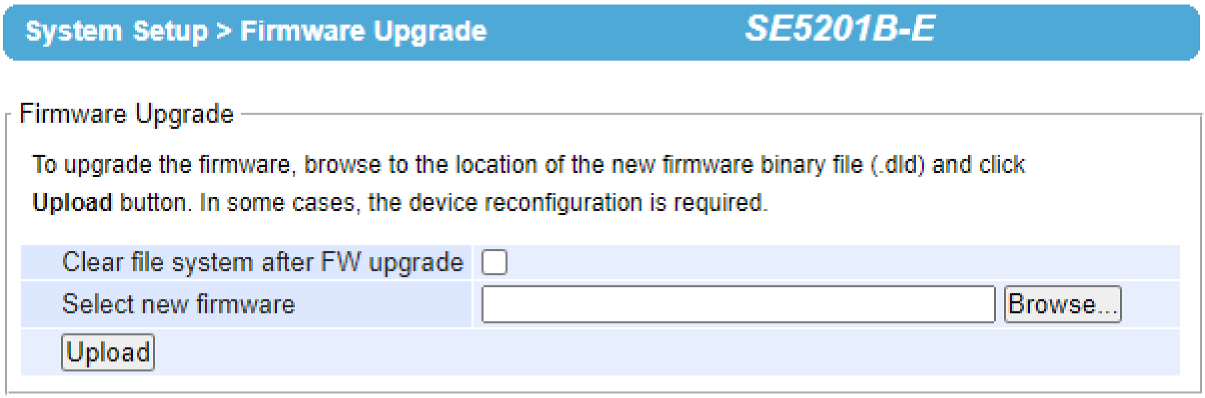
Figure 4-67 Admin Settings Web Page under System Setup

After finishing configuring the **Admin Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. Another pop-up window will be displayed to re-authenticate the user to access the Web UI of CR5201B/SE5201B as shown in Figure 4-7. You must re-enter the username and the password to login to the CR5201B/SE5201B. When the saving, applying, and re-authentication are finished, the web browser will remain on the **Admin Settings** page. If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

### 4.13.3 *Firmware Upgrade*

Updated firmware for CR5201B/SE5201B is provided by Atop from time to time (for more information please visit Atop News & Events webpage) to fix bugs and optimize performance. It is very important that the device must **<u>NOT be turned off or powered off during the firmware upgrading</u>**, (**please be patient as this whole process might take up to 5 minutes**). Before upgrading the firmware, please make sure that the device has a reliable power source that will not be powered off or restarted during the firmware upgrading process.

To upgrade a new firmware to CR5201B/SE5201B, please downloaded the latest firmware for your CR5201B/SE5201B model from the download tab on the CR5201B/SE5201B product page or from the Download page under the Support link on Atop's main webpage. Then, copy the new firmware file to your local computer. Note that the firmware file is a binary file with ".dld" extension. Next, open the Web UI and select **Firmware Upgrade** page under the **System Setup** menu. Then, click "**Browse…**" button as shown in Figure 4-68 below to find and choose the new firmware file. Then, you can choose to tick the checkbox of "**Clear file system after FW upgrade**" if it's required to erase the user storage after firmware (FW) upgraded successfully, and click "**Upload**" button to start the firmware upgrade process. The program will show the upload status. Please wait until the uploading process is finished (the amount of time varies depending on the equipment used). Finally, the CR5201B/SE5201B device will then proceed to restart itself. In some cases, you might require to re-configure your CR5201B/SE5201B device. To restore your backup configuration from a file, please see the procedure in the next subsection.



To upgrade the firmware, browse to the location of the new firmware binary file (.dld) and click **Upload** button. In some cases, the device reconfiguration is required.

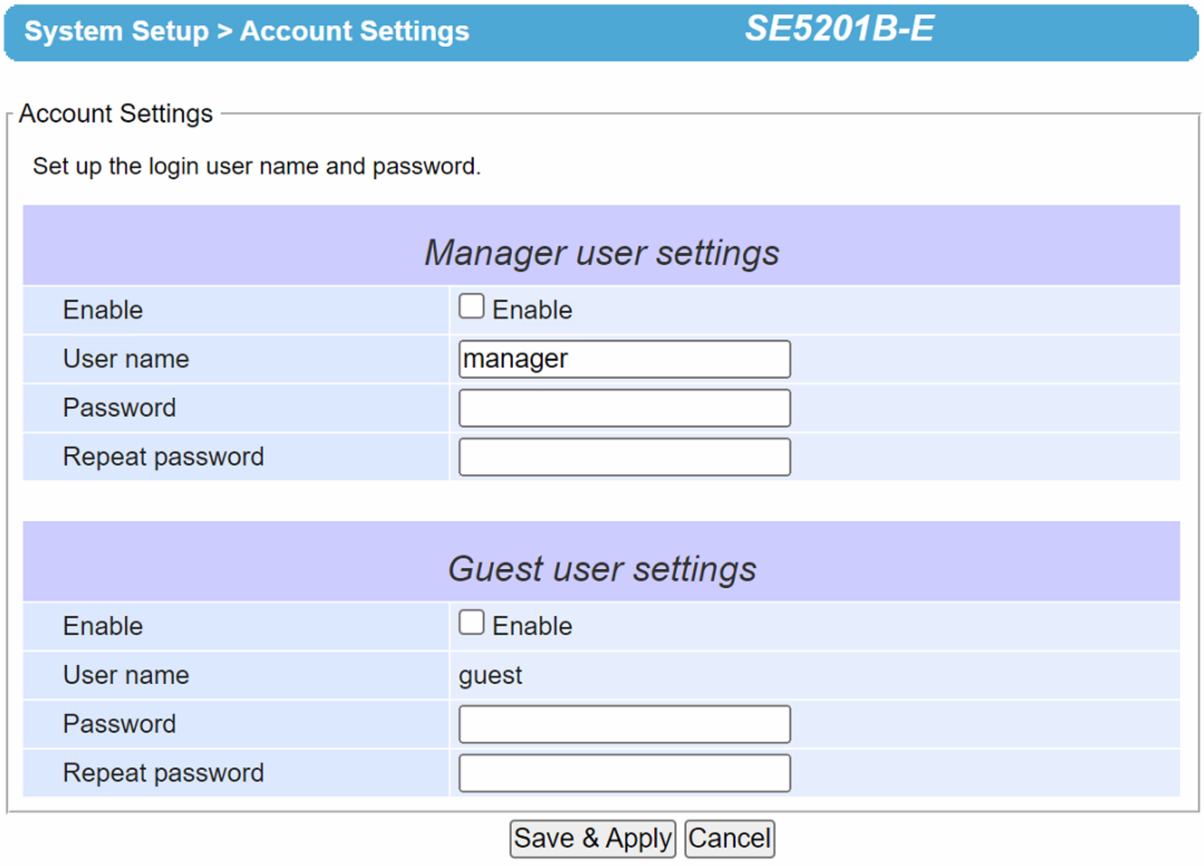
| | |
|---|---|
| Clear file system after FW upgrade | □ |
| Select new firmware | [ ] Browse... |
| Upload | |

Figure 4-68 Firmware Upgrade Web Page under System Setup

**Note 1:** If the checkbox of "**Clear file system after FW upgrade**" is enabled, the space of user storage will be erased after firmware upgraded successfully. The system would be restored to default settings, and the certifications will be re-generated after reboot.

### 4.13.4 *Account Settings (SE5201B Only)*

The account settings offer two optional accounts for users: one manager account, which has the same authority as an admin, and one guest account, which can only view the system status.



System Setup > Account Settings SE5201B-E

Account Settings

Set up the login user name and password.

Manager user settings

| | |
|---|---|
| Enable | □ Enable |
| User name | manager |
| Password | |
| Repeat password | |

Guest user settings

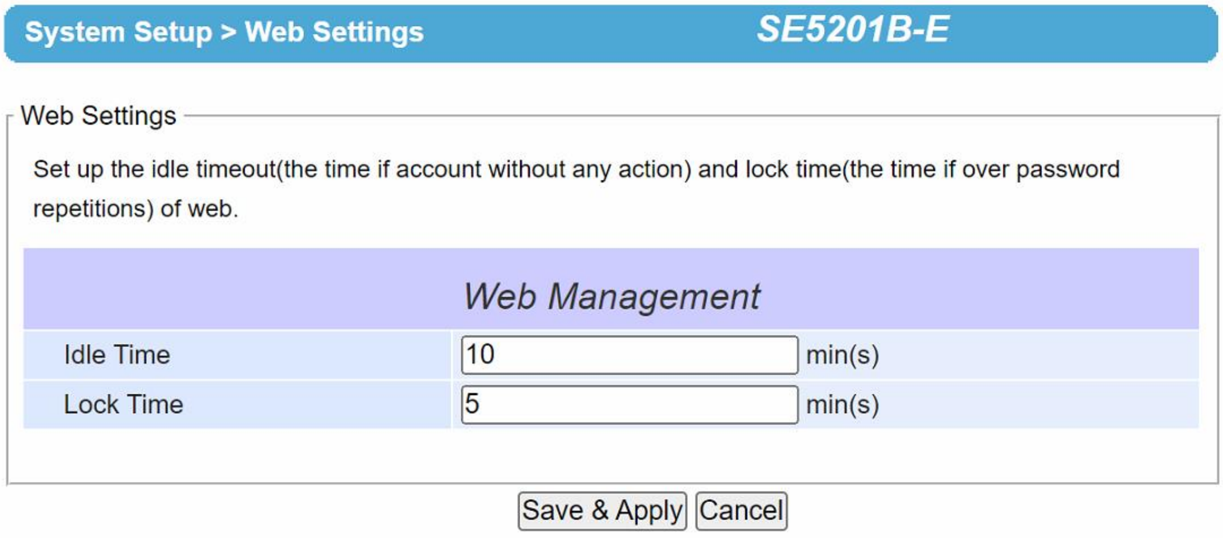
| | |
|---|---|
| Enable | □ Enable |
| User name | guest |
| Password | |
| Repeat password | |

Figure 4-69 Account Settings under System Setup

### 4.13.5 *Web Settings (SE5201B Only)*

This function allows users to configure idle and lock time settings for enhanced web security and efficiency.

- **Idle Time**: Defines the duration of inactivity after which a logged-in user is automatically logged out.
- **Lock Time**: Specifies the duration of the lockout period following 4 unsuccessful login attempts.



System Setup > Web Settings SE5201B-E

Web Settings

Set up the idle timeout(the time if account without any action) and lock time(the time if over password repetitions) of web.

Web Management

| | |
|---|---|
| Idle Time | 10 min(s) |
| Lock Time | 5 min(s) |

Figure 4-70 Web Settings under System Setup

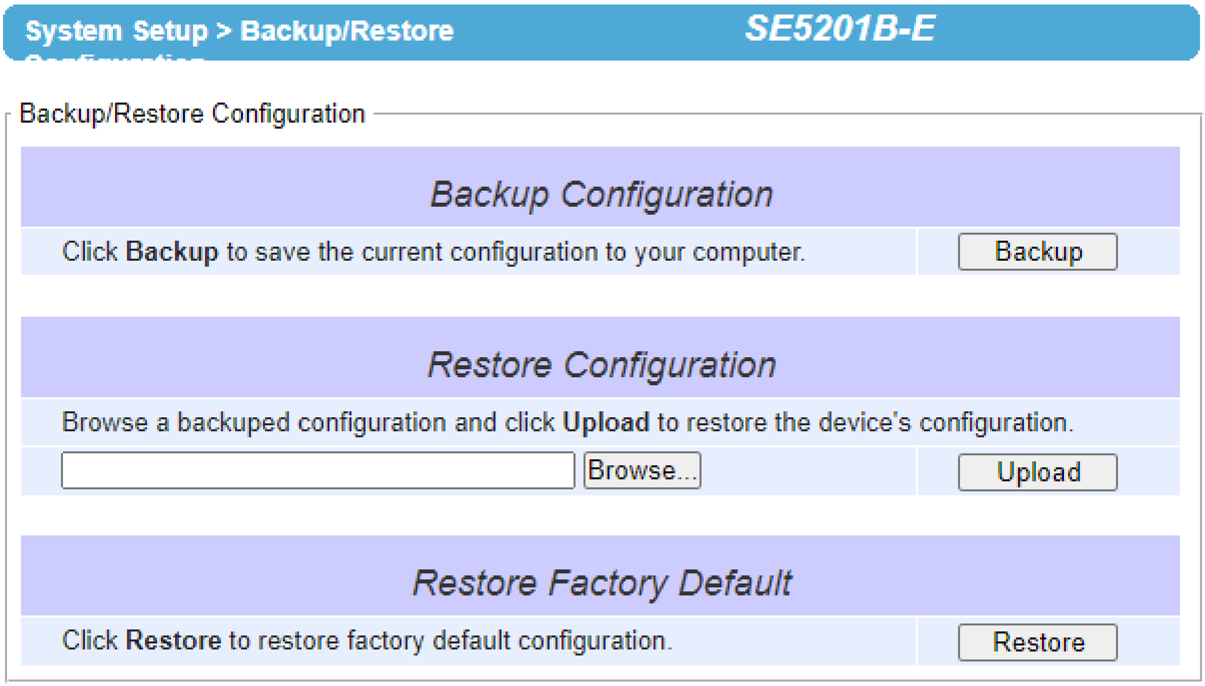
### 4.13.6 *Backup/Restore Configuration*

Once all the configurations are set and the device is working properly, the user should back up the current configuration of CR5201B/SE5201B. The backup configuration file can be used when the new firmware is uploaded and the device is reset to a factory default setting. This is done to prevent accidental loading of incompatible old settings. The backup configuration file could also be used to efficiently deploy multiple CR5201B/SE5201B Series devices of similar settings by uploading these settings to all devices.

To back up configuration, click "**Backup**" button under the **Backup Configuration** part as shown in Figure 4-71, and the backup file (ModelName-MACAddress.dat) will be automatically saved on your computer. It is important **NOT to manually modify the saved configuration file by any editor. Any modification to the file may corrupt the file and it may not be used for later restoration**. Please contact Atop's authorized distributors for more information on this subject.

To restore the backup configuration, click "**Browse**" button under the **Restore Configuration** part as shown in Figure 4-71 to locate the backup configuration file on user's computer. Then, click on "**Upload**" button to upload the backup configuration file to the device. Once the backup configuration file is successfully uploaded, the device will restart. Note that the time needed for this process may vary on the equipment used.

If you need to restore the CR5201B/SE5201B device to its factory default configuration, you can click on the **Restore** button under the **Restore Factory Default** section as shown in Figure 4-71.



Click **Backup** to save the current configuration to your computer.

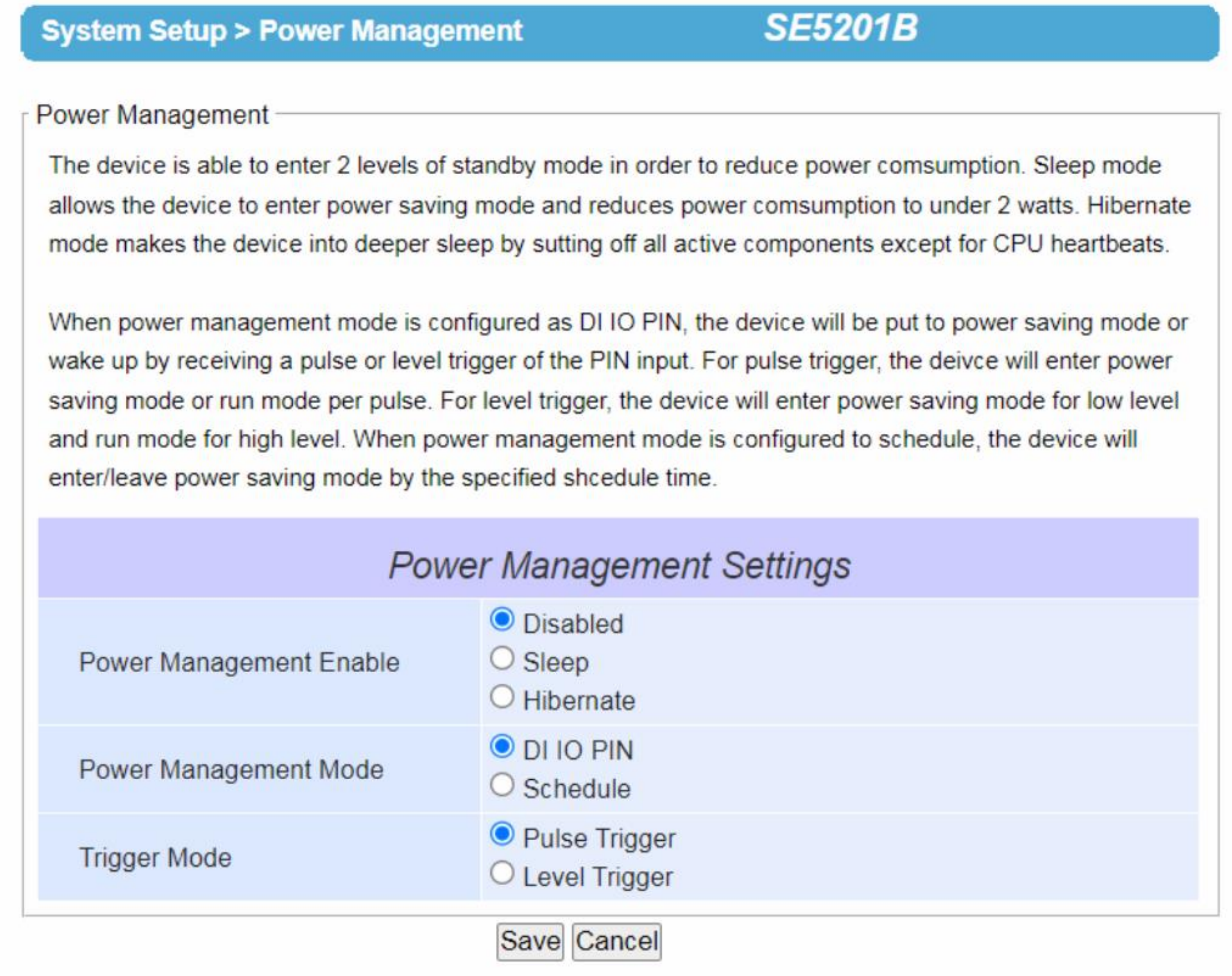
Browse a backuped configuration and click **Upload** to restore the device's configuration.

Click **Restore** to restore factory default configuration.

Figure 4-71 Backup/Restore Settings Web Page under System Setup

### 4.13.7 *Power Management*

The CR5201B/SE5201B is able to enter two levels of standby mode to reduce power consumption when the CR5201B/SE5201B is idle. First, **Sleep** mode allows the CR5201B/SE5201B's CPU to enter power saving mode and effectively reduces the power consumption to less than 2 watts. While the cellular connection is still alive, the CR5201B/SE5201B can be woken up from sleep by DI control or by setting a regular schedule. Second, **Hibernate** mode puts the CR5201B/SE5201B into deeper sleep by shutting off all active components except for its CPU heartbeat. You can only wake the CR5201B/SE5201B from hibernation by using the schedule management function. shows the Power Management web page.



System Setup > Power Management SE5201B

Power Management

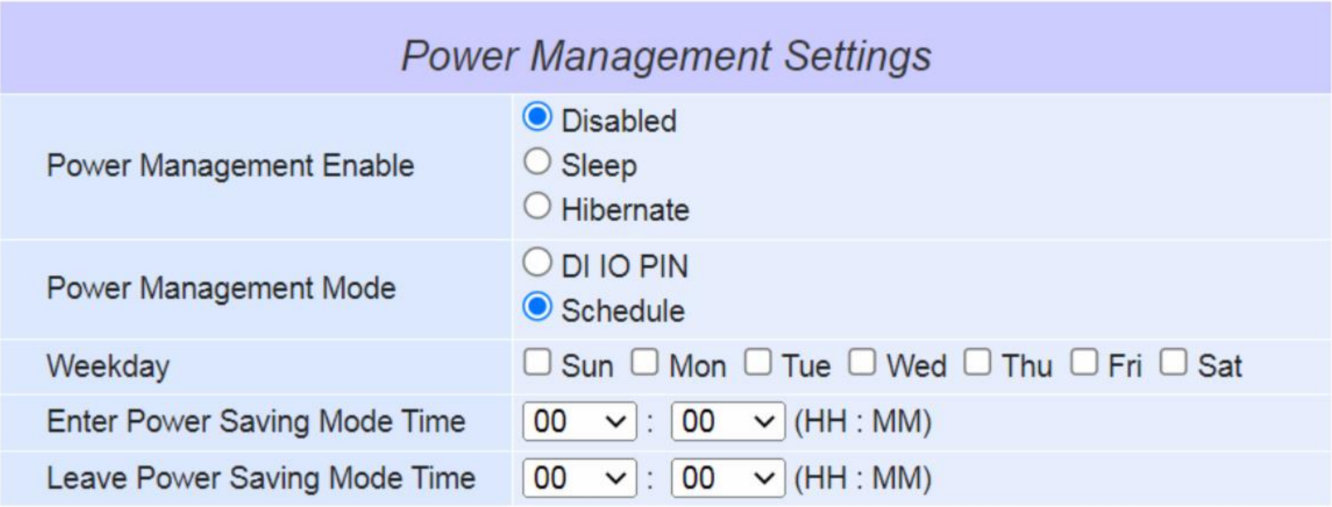
The device is able to enter 2 levels of standby mode in order to reduce power comsumption. Sleep mode allows the device to enter power saving mode and reduces power comsumption to under 2 watts. Hibernate mode makes the device into deeper sleep by sutting off all active components except for CPU heartbeats.

When power management mode is configured as DI IO PIN, the device will be put to power saving mode or wake up by receiving a pulse or level trigger of the PIN input. For pulse trigger, the deivce will enter power saving mode or run mode per pulse. For level trigger, the device will enter power saving mode for low level and run mode for high level. When power management mode is configured to schedule, the device will enter/leave power saving mode by the specified shcedule time.

| Power Management Settings | |
|---|---|
| Power Management Enable | ● Disabled<br>○ Sleep<br>○ Hibernate |
| Power Management Mode | ● DI IO PIN<br>○ Schedule |
| Trigger Mode | ● Pulse Trigger<br>○ Level Trigger |

Figure 4-72 Power Management Web Page

When Power Management Mode option is configured as **DI IO PIN** (its radio button is selected), the device will be put to power saving mode or wake up by receiving a pulse or level trigger of the PIN input. When power management mode is configured to **Schedule** (its radio button is selected), the device will enter or leave power saving mode by specified schedule of day and time. When the Schedule option is selected, additional setting options are active as shown in Figure 4-73. Users can select the day of week and set the starting time (Enter Power Saving Mode Time) and stopping time (Leaving Power Saving Mode Time) with format of hours (HH) and minutes (MM).



Power Management Settings

| | |
|---|---|
| Power Management Enable | ● Disabled<br>○ Sleep<br>○ Hibernate |
| Power Management Mode | ○ DI IO PIN<br>● Schedule |
| Weekday | □ Sun □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat |
| Enter Power Saving Mode Time | 00 : 00 (HH : MM) |
| Leave Power Saving Mode Time | 00 : 00 (HH : MM) |

Figure 4-73 Options for Schedule Power Management Mode

There are two trigger modes that can be chosen by selecting corresponding radio button. For **Pulse trigger** mode, the device will enter power saving mode or run mode per pulse. For **Level trigger** mode, the device will enter power saving mode for low level and run mode for high level. Table 4.6 summarizes the description of each power management option.

Table 4.6 Description of Power Management Settings

| Field Name | Description | Factory Default |
|---|---|---|
| **Power Management Enable** | **Disabled:** No power saving.<br>**Sleep:** Power saving mode with power consumption under 2Watts.<br>**Hibernate:** Deeper power saving mode with only CPU's heartbeat active. | Disabled |
| **Power Management Mode** | **DI IO PIN:** The power management mode is changed by triggering of signal through Digital Input/Output pin.<br>**Schedule**: The power management mode is changed by the predefined schedule of day and time. | DI IO PIN |
| **Trigger Mode** | **Pulse Trigger:** The condition of signal that will change the power management mode is based on the pulse of signal. Need at least 100ms pulse from 4.3V to 36V.<br>**Level Trigger:** The condition of signal that will change the power management mode is based on the level of signal. If the voltage of the signal is lower than 2.5V for at least 10 seconds, then CR5201B/SE5201B will enter the sleep or hibernate mode. If the voltage of the signal is higher than 4.3V for at least 3 seconds, then CR5201B/SE5201B will wake up. | Pulse Trigger |

### Example of Entering Hibernate Mode through DI pin in Pulse Trigger Mode

Figure 4-74 shows an example of how to create a trigger to entering the Hibernate mode. Users can wire DI and DIc pins to the two pins of the switch breaker as shown in the figure. Noted that CR5201B does not support DIDO feature. While the device (SE5201B) is in ready state, users can switch the breaker to “I” first then to “O”. Alternatively, users can short circuit between the DI and the SG pins for at least 100ms then open circuit between the DI and the SG pins. This will cause the device to enter Hibernate mode. During the Hibernate mode, all of the LEDs in the front panel will turn off except the power LED as shonw in Figure 4-75.

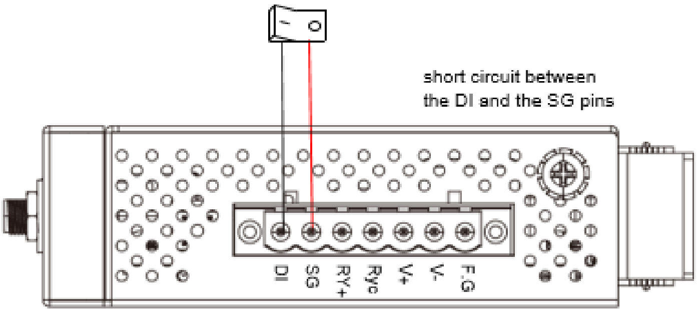


Figure 4-74 Example of Connecting a Switch Breaker between DI and DIc Pins on the SE5201B

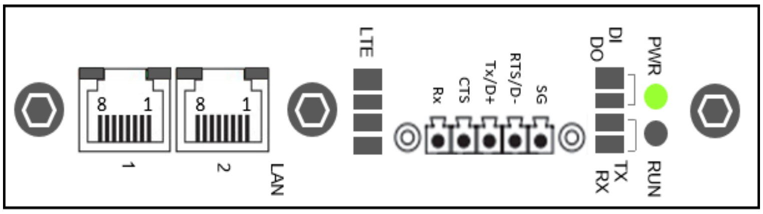


Figure 4-75 Example of LED status while device is in the Hibernate mode

### Example of Leaving Hibernate Mode or Wake Up through DI pin in Pulse Trigger Mode

To wake up from Hibernate mode in pulse trigger mode with the same setup in Figure 4-74, users can switch the breaker to “I” then to “O” again. The device (SE5201B) will wake up as shown in Figure 4-76.

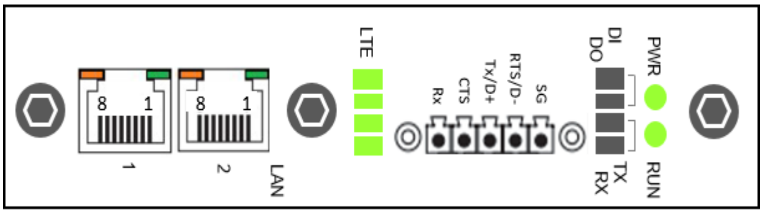


Figure 4-76 Example of Device in Wake Up State.

### Example of Entering Hibernate Mode through Power Saving Button in Pulse Trigger Mode

The device (SE5201B) can be put into Hibernate mode by pressing the Power Saving Button on the side of the chasis. Figure 4-77 shows the location of the Power Saving or Hibernate button. By pressing this Power Saving or Hibernate button for at least 100 ms while the system is in ready state, the device will enter the Hibernate mode.

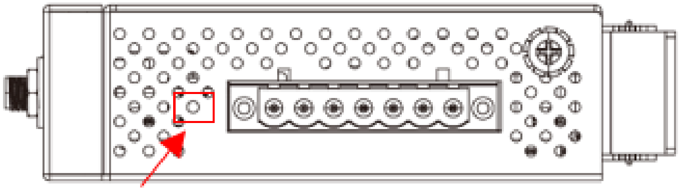


Figure 4-77 Location of the Hibernate button on the side of the chassis

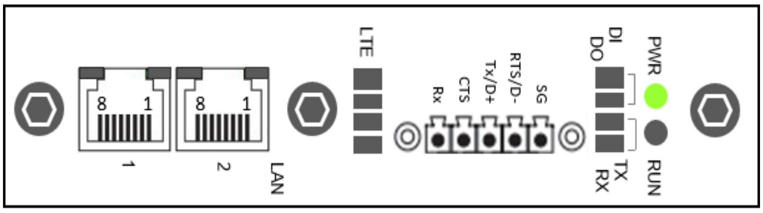


Figure 4-78 Example of LED status while device is in the Hibernate mode

### Example of Leaving Hibernate Mode or Wake up through Power Saving Button in Pulse Trigger Mode

To leave the Hibernate mode or wake up, users can press the Power Saving/Hibernate button for at least 100ms while the device is in Hibernate mode. The device will wake up as shown in Figure 4-79.

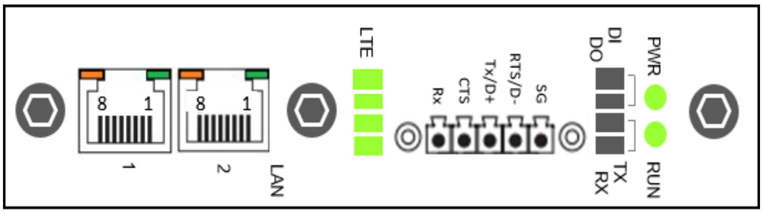
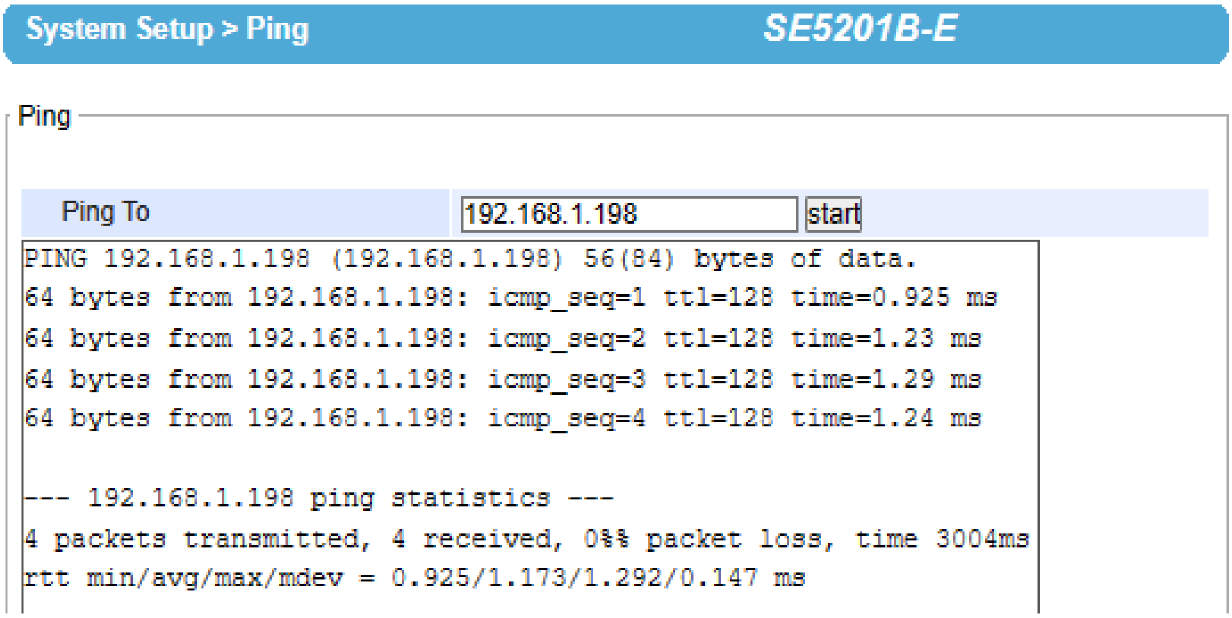


Figure 4-79 Example of Device in Wake Up State

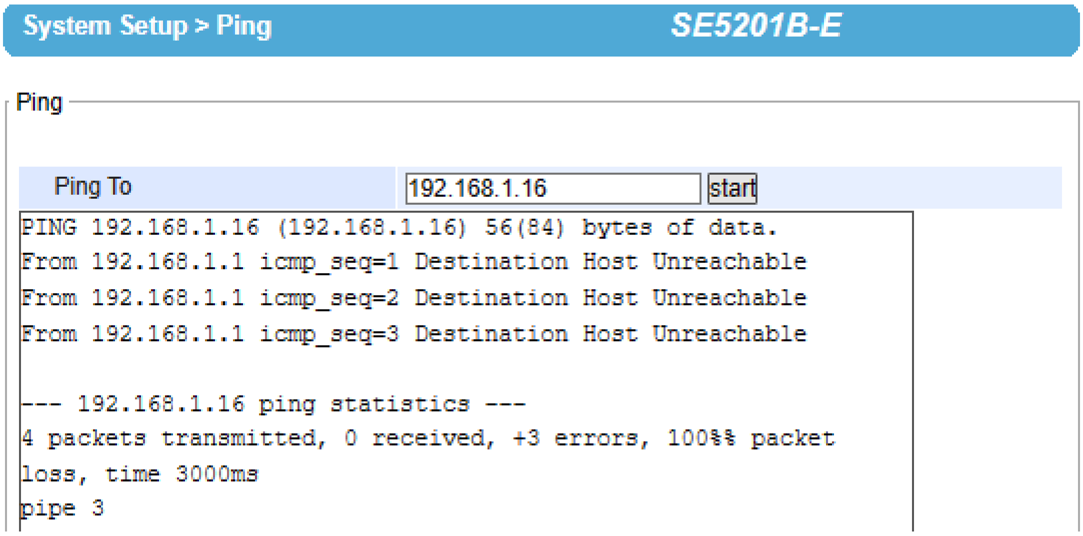
### 4.13.8 *Ping*

The Web UI of CR5201B/SE5201B has an interface to call **Ping** which is a network diagnostic utility for testing reachability. You can use the **Ping** function to determine whether CR5201B/SE5201B can reach the gateway or other devices in the network. To use the **Ping**, enter a destination IP address in the text box behind the **Ping To** and click **Start** button as shown in Figure 4-80. This process usually takes around 20 seconds. Figure 4-80 represents a successful ping without packet loss from CR5201B/SE5201B to the address 10.0.50.101 and back, while Figure 4-81 indicates that the connecting device at the address 10.0.50.202 is unreachable in which no packets have returned from the transmitted ping packets.



```
PING 192.168.1.198 (192.168.1.198) 56(84) bytes of data.
64 bytes from 192.168.1.198: icmp_seq=1 ttl=128 time=0.925 ms
64 bytes from 192.168.1.198: icmp_seq=2 ttl=128 time=1.23 ms
64 bytes from 192.168.1.198: icmp_seq=3 ttl=128 time=1.29 ms
64 bytes from 192.168.1.198: icmp_seq=4 ttl=128 time=1.24 ms

--- 192.168.1.198 ping statistics ---
4 packets transmitted, 4 received, 0%% packet loss, time 3004ms
rtt min/avg/max/mdev = 0.925/1.173/1.292/0.147 ms
```

Figure 4-80 Ping Web Page under System Setup



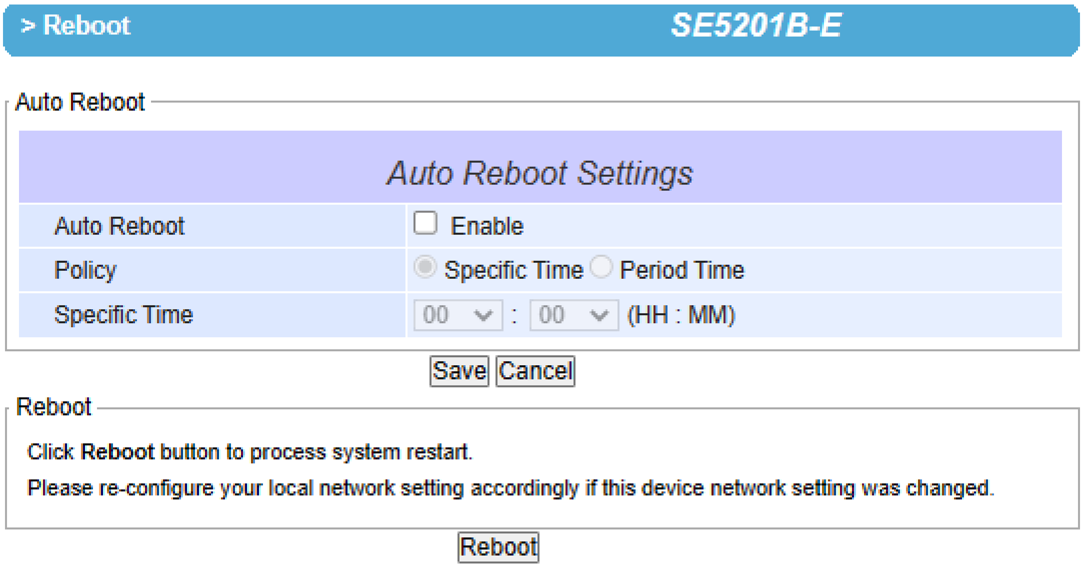
```
PING 192.168.1.16 (192.168.1.16) 56(84) bytes of data.
From 192.168.1.1 icmp_seq=1 Destination Host Unreachable
From 192.168.1.1 icmp_seq=2 Destination Host Unreachable
From 192.168.1.1 icmp_seq=3 Destination Host Unreachable

--- 192.168.1.16 ping statistics ---
4 packets transmitted, 0 received, +3 errors, 100%% packet
loss, time 3000ms
pipe 3
```

Figure 4-81 Unreachable Ping Example

## 4.14 *Reboot*

### 4.14.1 *Auto Reboot*

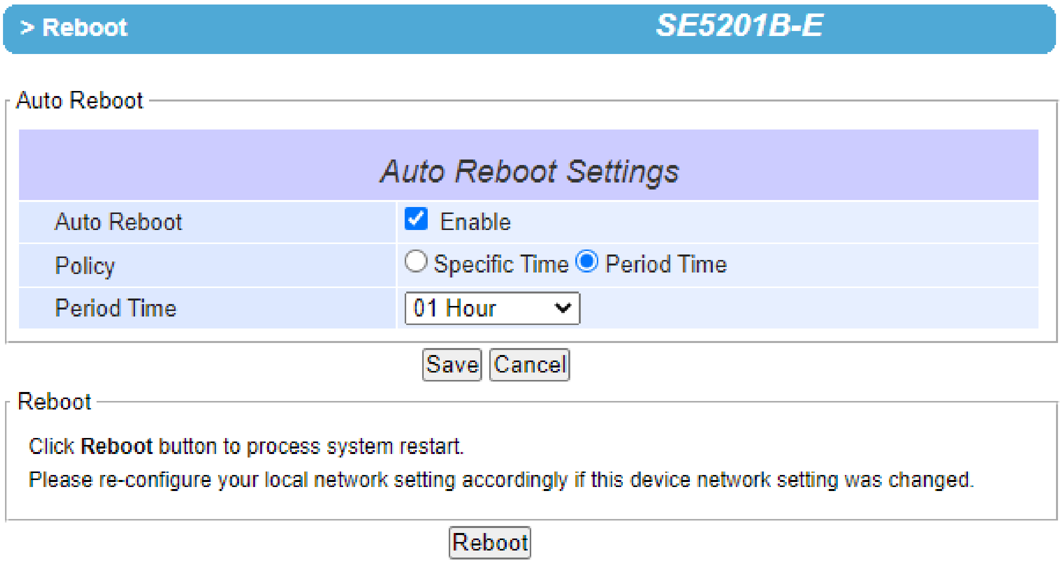
CR5201B/SE5201B can be configured for automatic rebooting or **Auto Reboot** under the **Reboot** menu. To enable the **Auto Reboot** option, select the **Reboot** menu and under the **Auto Reboot Settings** check **Enable** box as shown in Figure 4-82. There are two auto reboot policies: **Specific Time** or **Period Time**. When **Specific Time Policy** is selected, the **Specific Time** option is active for setting the hour (**HH**) and minute (**MM**) that the device will be reboot. When **Period Time Policy** is selected, the device will be rebooted every period of hour(s) which can be selected from a drop-down list. After you finished setting, click on the **Save** button at the bottom of the **Auto Reboot** section or click **Cancel** button to discard any settings.



| Auto Reboot Settings | |
|---|---|
| Auto Reboot | □ Enable |
| Policy | ● Specific Time ○ Period Time |
| Specific Time | 00 : 00 (HH : MM) |

Click **Reboot** button to process system restart.
Please re-configure your local network setting accordingly if this device network setting was changed.

Figure 4-82 Reboot Web Page with Specific Time Policy



| Auto Reboot Settings | |
|---|---|
| Auto Reboot | ☑ Enable |
| Policy | ○ Specific Time ● Period Time |
| Period Time | 01 Hour |

Click **Reboot** button to process system restart.
Please re-configure your local network setting accordingly if this device network setting was changed.

Figure 4-83 Reboot Web Page with Period Time Policy

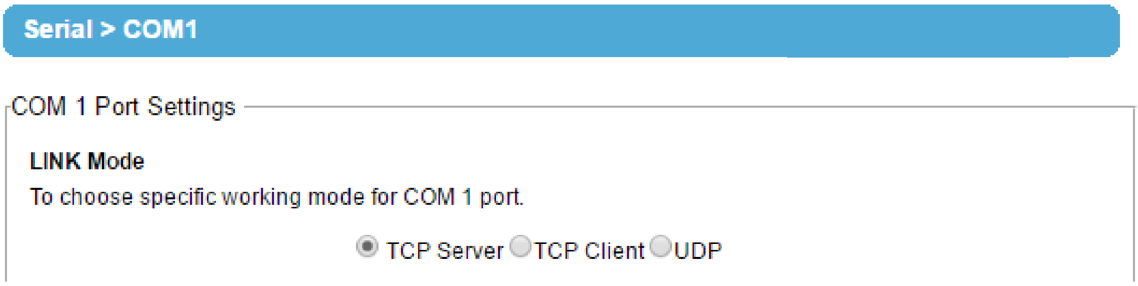
### 4.14.2 *Manual Reboot*

To manually reboot the CR5201B/SE5201B device, click on the "**Reboot**" button at the end of the **Reboot** page as shown in Figure 4-82. The device will then restart. When the rebooting process is finished, you will hear the beep sound twice from the device and you might need to refresh your web browser to log into the web interface of the CR5201B/SE5201B again.

# 5 Link Modes and Applications

## 5.1 *Link Mode Configuration*

/SE5201B series supports three different **Link Modes** which are **TCP Server**, **TCP Client**, and **UDP**. The **Link Mode** describes the role of SE5201B and the connection between SE5201B device and other remote devices in the network which would like to communicate with serial devices on SE5201B's COM port(s). Under the three Link Modes, **TCP Server** mode can support **RAW**, **Virtual COM**, **Reverse Telnet**, and **Pair Connection Master** applications, while **TCP Client** mode can only support **RAW**, **Virtual COM**, and **Pair Connection Slave** applications. Note that **UDP** mode does not have the same supported applications as the previous two TCP modes. Discussion on how to setup different Link Modes properly will be presented in the following sections. Figure 5-1shows the **Link Mode** options for **COM 1** port which can be found on **COM1** page under **Serial** menu of Web UI (See details on Serial Settings in Section 0). Note that on SE5201B model with IO interface will have one COM port.



Serial > COM1

COM 1 Port Settings

LINK Mode

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

Figure 5-1 Link Mode Options for COM1 Port

### 5.1.1 *Link Mode: Configure SE5201B as a TCP Server*

SE5201B series can be configured as a Transport Control Protocol (TCP) server in a TCP/IP network to listen for an incoming TCP client connection to a serial device. Figure 5-2 depicts an example of a PLC (serial) device which is connected to SE5201B on a serial bus, where a remote host computer is sending a connection request via Ethernet network. After the connection is established between the serial device server (green pattern) and the remote TCP client (gray pattern), data can then be transmitted in both directions. This statement is also applied, whenever the Virtual COM (VCOM) application is running on server mode. Please note that this TCP server mode is the SE5201B device's default link mode.

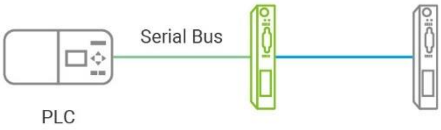
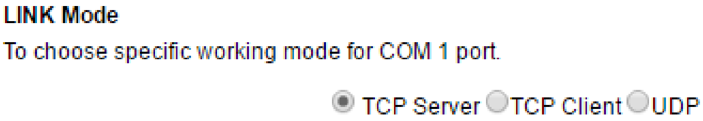


Figure 5-2 CR5201B/SE5201B is set as a TCP Server Link Mode

The default Link Mode of SE5201B is the **TCP Server** mode. Figure 5-3 shows an example of the setting configuration for **TCP Server** Link Mode under the **COM 1** page. There are additional connection settings that can be configured, as shown in Figure 5-3. By selecting the TCP Server Link Mode, a TCP client program on a remote host computer should be prepared to connect to SE5201B. Please do the following steps to configure connection settings of the Link Mode for each COM port.



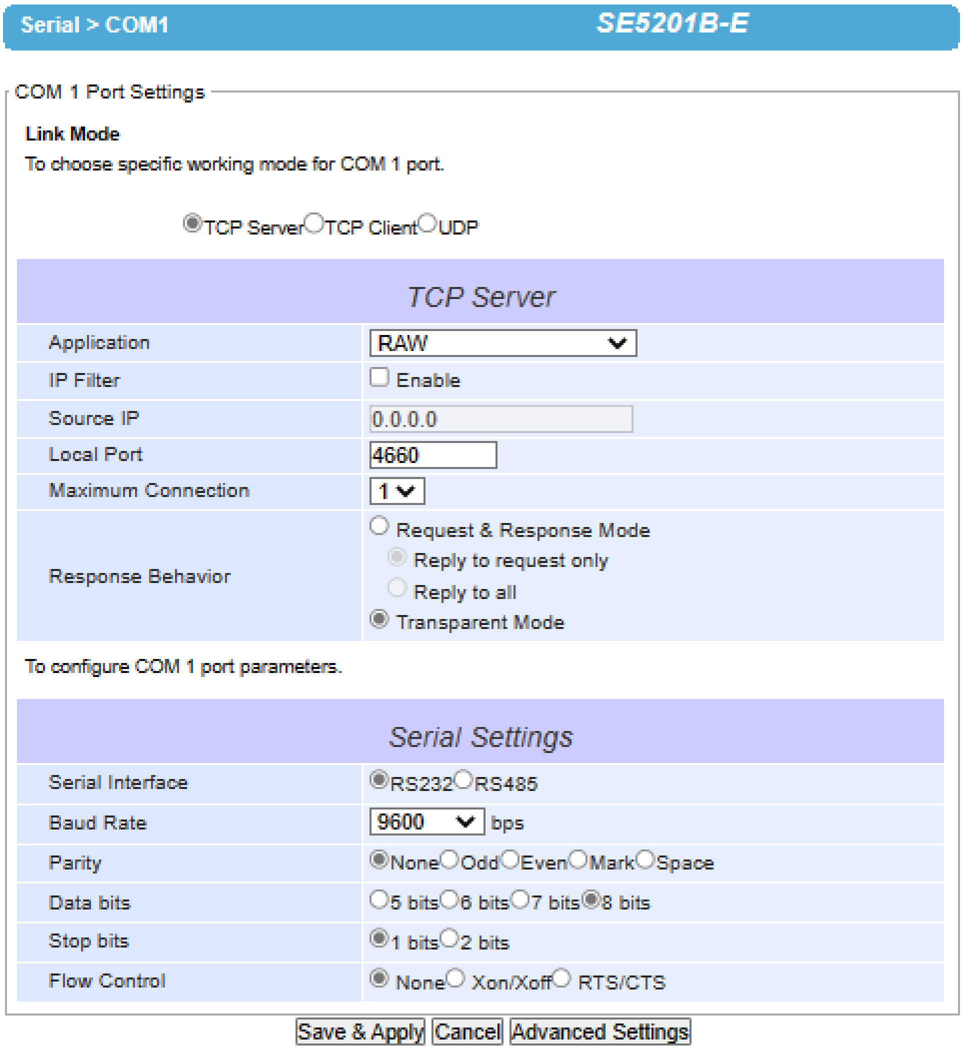
LINK Mode

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

Figure 5-3 Connection Settings for TCP Server  Link Mode

- Click on the "**COM1**" link on the menu frame on the left side of Web UI to go to **COM 1** page as shown in Figure 5-4.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

| TCP Server | |
|---|---|
| Application | RAW |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

To configure COM 1 port parameters.

| Serial Settings | |
|---|---|
| Serial Interface | ● RS232 ○ RS485 |
| Baud Rate | 9600 bps |
| Parity | ● None ○ Odd ○ Even ○ Mark ○ Space |
| Data bits | ○ 5 bits ○ 6 bits ○ 7 bits ● 8 bits |
| Stop bits | ● 1 bits ○ 2 bits |
| Flow Control | ● None ○ Xon/Xoff ○ RTS/CTS |

Figure 5-4 TCP Server Link Mode Settings under COM 1 Page

- Select **TCP Server** radio button in the Link Mode options. Note that **TCP Server** is the default Link Mode for COM port of SE5201B.
- Under the **TCP Server** section, you will find the following options.
  - **Application**: Here, there are three different communication applications to choose from:
    - **RAW**: There is no protocol on this mode which means that the data is passed through transparently.
    - **Virtual COM**: The Virtual COM protocol is enabled on the serial device to communicate with a virtualized port from a remote client. It is possible to create a Virtual COM port on Windows/Linux in order to communicate with the serial device as a remote client.
    - **Reverse Telnet**: This application is used to connect the serial device and another serial device (usually a Terminal Server) with a Telnet program. Telnet programs in Windows/Linux usually require special handshaking to get the outputs and formatting to show properly. The SE5201B series will interact with those special commands (CR/LF commands) once Reverse Telnet application is enabled.
    - **Pair Connection Master**: This application is used when the user needs to pair two serial devices over the Ethernet network.
  - **IP Filter**: This option will enable the **Source IP** option below. When this option is checked, SE5201B will block or filter out all other IP addresses from accessing the COM port except the one specified in the **Source IP**.

- **Source IP**: This option specifies the remote client's **Source IP** which will be transmitting data to our TCP Server (on SE5201B). In other words, our TCP Server will only allow data from this IP address to flow (hence its own name implies Source IP). Note that only one source is allowed at a time.
- **Local Port**: This option specifies the port number that the TCP server (on SE5201B) should listen to. It is also used by the remote TCP client to connect to the TCP server. The default value for local port is 0. You can enter any port number in this option.
- **Maximum Connection**: This option specifies the maximum number of remote devices/clients (with maximum of 4 clients) that can be connected to the serial device on this COM port.
- **Response Behavior**: This option specifies how SE5201B will proceed or behave when it receives requests from remote connected hosts. The following options are available:
    - **Request & Response Mode**: Under this mode, the COM port on SE5201B will hold requests from all other remote connected hosts until the serial device replies; however, unrequested data sent from the serial device would be forwarded to all connected hosts. Additionally, user can specify how a reply message from the serial device will be sent to the remote connected hosts with two possible options:
        - **Reply to requester only**: The COM port will only reply to the remote connected host which has previously requested data.
        - **Reply to all**: A reply is sent to all remote connected hosts.
    - **Transparent mode**: The COM port on SE5201B will forward requests from all remote connected hosts to the serial device immediately and reply to all remote connected hosts once it receives data from the serial device.
- For other **Serial Settings** on the same configuration page, please go to Section 4.7.2 and for **Advanced Settings** please go to Section 4.7.3.
- After finishing configuring the **Link Mode**, please scroll down to the bottom of the page and click on "**Save & Apply**" button to save all the changes that you have made.

**Note**: LINK1 is associated with COM1;

### 5.1.2 *Link Mode: Configure SE5201B as a TCP Client*

CR5201B/SE5201B series can be configured as a TCP client in TCP/IP network to establish a connection to a TCP server on a remote host computer. Figure 5-5 depicts an example of two serial card readers connected to two different SE5201B devices where both SE5201B devices (green pattern) are on the same Ethernet network as the remote host device (gray pattern). The arrow in Figure 5-5 indicates that the connection request from the client side of TCP connection. After the connection is established, data can be transmitted between a serial device (connected to the COM port of each SE5201B) and a remote host computer in both directions. This also applies to Virtual COM application running in the client mode.

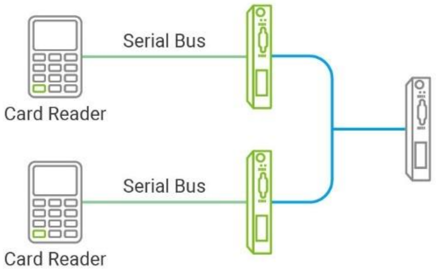
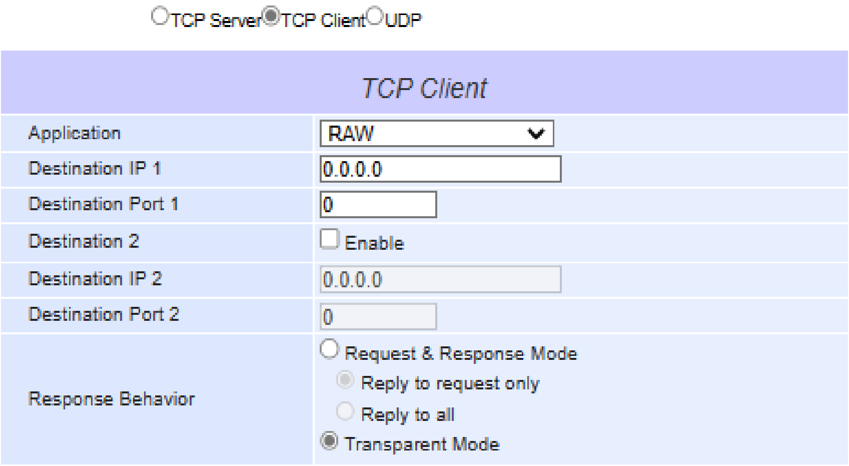


Figure 5-5 Example of SE5201B Configured as TCP Client Link Mode

Figure 5-6 shows an example of configuration setting for **TCP Client** Link Mode under the **COM 1** page. There are additional connection settings that can be configured as shown in Figure 5-7. By selecting the **TCP Client** Link Mode, a TCP server program on a remote host computer should be prepared to accept a connection request from SE5201B. Please do the following steps to configure connection settings of the Link Mode for each COM port.

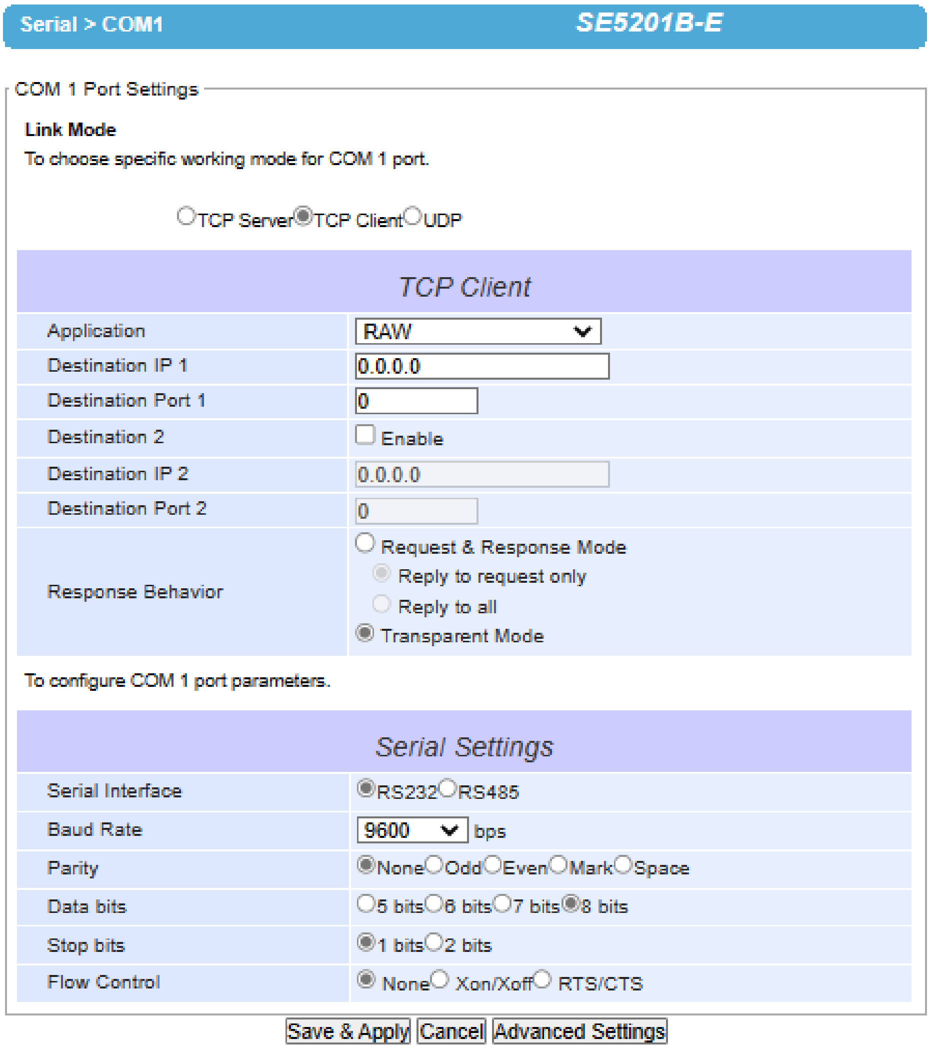


○TCP Server ●TCP Client ○UDP

| TCP Client | |
|---|---|
| Application | RAW |
| Destination IP 1 | 0.0.0.0 |
| Destination Port 1 | 0 |
| Destination 2 | □ Enable |
| Destination IP 2 | 0.0.0.0 |
| Destination Port 2 | 0 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 5-6 Connection Settings for TCP Client Link Mode

- Click on the "**COM1**" link on the menu frame on the left side of Web UI to go to **COM 1** page as shown in Figure 5-7.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ●TCP Client ○UDP

| TCP Client | |
|---|---|
| Application | RAW |
| Destination IP 1 | 0.0.0.0 |
| Destination Port 1 | 0 |
| Destination 2 | □ Enable |
| Destination IP 2 | 0.0.0.0 |
| Destination Port 2 | 0 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

To configure COM 1 port parameters.

| Serial Settings | |
|---|---|
| Serial Interface | ●RS232 ○RS485 |
| Baud Rate | 9600 bps |
| Parity | ●None ○Odd ○Even ○Mark ○Space |
| Data bits | ○5 bits ○6 bits ○7 bits ●8 bits |
| Stop bits | ●1 bits ○2 bits |
| Flow Control | ● None ○ Xon/Xoff ○ RTS/CTS |

Figure 5-7 Setting in TCP Client Link Mode

- Select **TCP Client** radio button in the **Link Mode** options.
- Under the TCP Client section, you will find the following options.
  - **Application**: Only three communication applications are available here: **RAW**, **Virtual COM** and **Pair Connection Slave** in which their definitions are the same as described above in Section 5.1.1.

  - **Destination IP 1**: Please specify the preferred **Destination IP** address of the TCP server program on the remote host in this field. This should match the IP settings of the TCP server program.
  - **Destination Port 1**: Please specify the preferred port number of the TCP server program on the remote host in this field. Once again, this should match the IP setting of the TCP server program.
  - **Destination 2**: You can enable second remote destination for TCP connection if it is necessary by checking on the **Enable** box in this option. Two different TCP servers can be set for redundancy.
  - **Destination IP 2**: Please specify the preferred **Destination IP** address of the second TCP server program on the remote host in this field. This should match the IP settings of the second TCP server program.
  - **Destination Port 2**: Please specify the preferred port number of the second TCP server program on the remote host in this field. Once again, this should match the IP setting of the second TCP server program.
  - **Response Behavior**: This option specifies how the device will proceed or behave when it receives request from remote connected hosts. The description of each option is the same as described in previous subsection (Section 5.1.1 Link Mode: Configure as a TCP Server).

- For other **Serial Settings** on the same configuration page, please go to other section and for **Advanced Settings** please go to other section COM Configuration: Advanced Settings.
- After finish configuring the **Link Mode**, please scroll down to the bottom of the page and click on "**Save & Apply**" button to save all the changes that you have made.

### 5.1.3 *Link Mode: Configure SE5201B in UDP*

Since User Datagram Protocol (UDP) is a faster transport protocol than TCP but it is a connectionless transport protocol, it does not guarantee the delivery of network datagram. SE5201B also supports connectionless UDP protocol compared to the connection-oriented TCP protocol. The SE5201B series can be configured to transfer data using unicast or multicast UDP from the serial device to one or multiple host computers. The data can be transmitted between a serial device and a remote host computer in both directions.

There is no server or client concept on this protocol. All networked devices are called peers or nodes. Therefore, you only need to specify the **Local Port** that SE5201B should listen to and specify the **Destination IPs** of the remote UDP nodes. Figure 5-8 illustrates an example of UDP Link Mode in which a serial display device is connected on a serial bus and SE5201B (green pattern). Two remote host devices (green pattern), which are on the same Ethernet network as SE5201B, can both send UDP datagram or messages to the serial display device through SE5201B.

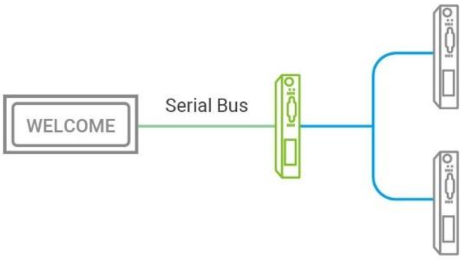
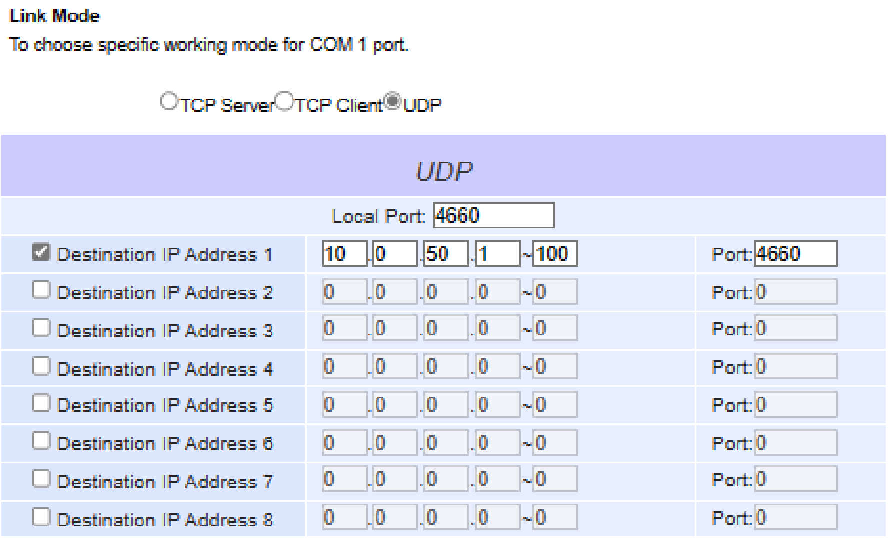


Figure 5-8 Example of CR5201B/SE5201B Configured in UDP Link Mode

Figure 5-9 shows an example of configuration setting for **UDP Link Mode** under the **COM 1** page. There are additional connection settings that can be configured as shown in Figure 5-10. Please beware 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. Please do the following steps to configure connection settings of the **Link Mode** for each **COM** port.



**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ○TCP Client ●UDP

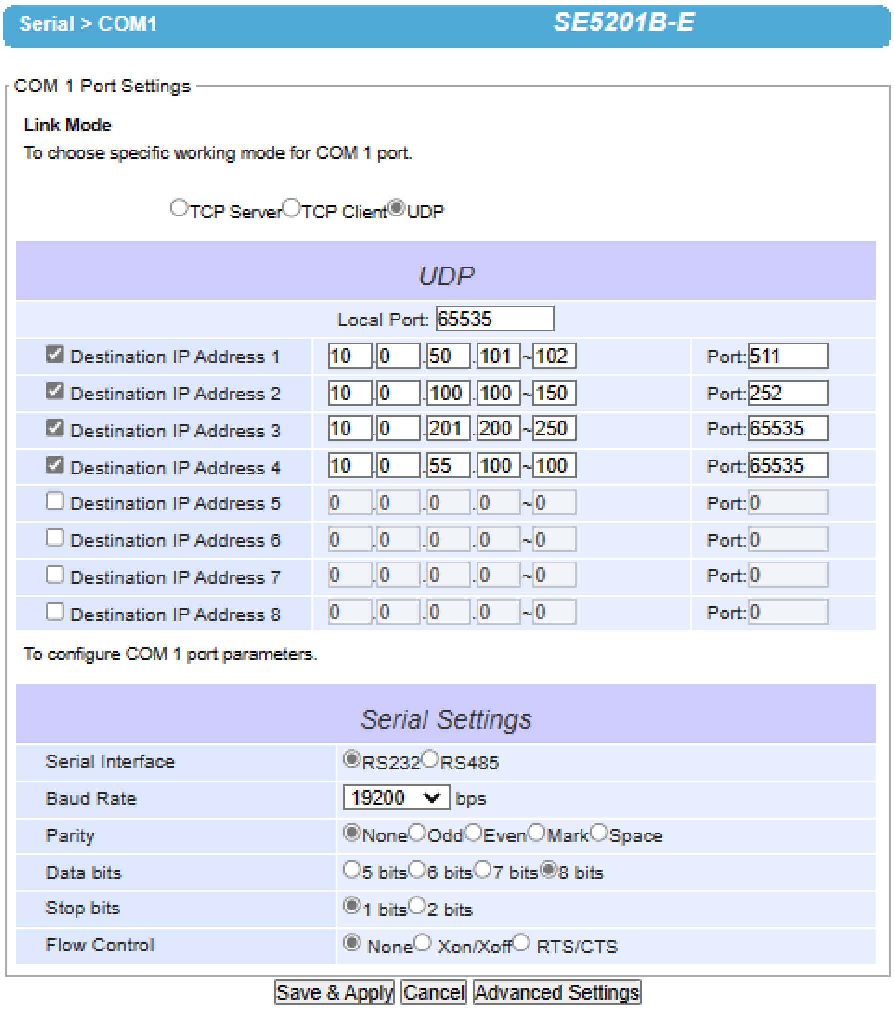
UDP

Local Port: 4660

| | | |
|---|---|---|
| ☑ Destination IP Address 1 | 10 . 0 . 50 . 1 ~ 100 | Port: 4660 |
| □ Destination IP Address 2 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 3 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 4 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 5 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 6 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 7 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 8 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |

Figure 5-9 Connection Setting in UDP Link Mode

Click on the "**COM1**" link on the menu frame on the left side of Web UI to go to **COM 1** page as shown in Figure 5-10.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ○TCP Client ●UDP

UDP

Local Port: 65535

| | | |
|---|---|---|
| ☑ Destination IP Address 1 | 10 . 0 . 50 . 101 ~ 102 | Port: 511 |
| ☑ Destination IP Address 2 | 10 . 0 . 100 . 100 ~ 150 | Port: 252 |
| ☑ Destination IP Address 3 | 10 . 0 . 201 . 200 ~ 250 | Port: 65535 |
| ☑ Destination IP Address 4 | 10 . 0 . 55 . 100 ~ 100 | Port: 65535 |
| □ Destination IP Address 5 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 6 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 7 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |
| □ Destination IP Address 8 | 0 . 0 . 0 . 0 ~ 0 | Port: 0 |

To configure COM 1 port parameters.

Serial Settings

| | |
|---|---|
| Serial Interface | ●RS232 ○RS485 |
| Baud Rate | 19200 bps |
| Parity | ●None ○Odd ○Even ○Mark ○Space |
| Data bits | ○5 bits ○6 bits ○7 bits ●8 bits |
| Stop bits | ●1 bits ○2 bits |
| Flow Control | ● None ○ Xon/Xoff ○ RTS/CTS |

Figure 5-10 UDP Link Mode Setting under COM 1 Page

Select **UDP** radio button in the **Link Mode** options.

- Under the **UDP** section, you will find the following options.

- ○ **Local Port**: This field specifies the local port number for **UDP Link Mode** on SE5201B which it will be listening to and it can be any number between 1 and 65535. Note that typically the port number that is larger than 1024 is recommended to avoid conflicting with the well-known port numbers. You should match this setting with the remote UDP program. Note that this number is usually called destination port in the remote UDP program.
- ○ **Destination IP Address 1** to **8** and its **Port Numbers**: Each line of these options can specify the range of IP addresses and port number that will be communicating with SE5201B. The user can define the **Begin** and **End IP Addresses** here. Eight groups of ranges of IP addresses are allowed. Please check the box in front of that particular line to enable it. These are the IP Addresses of the remote UDP programs and the Port that they are listening to. Note that the maximum number of UDP nodes that SE5201B can handle would highly depend on the traffic load. We have tested that /SE5201B can handle up to 200 UDP nodes (with baud rate of 9600 bps, request interval of 100ms, and data length of 30 bytes).

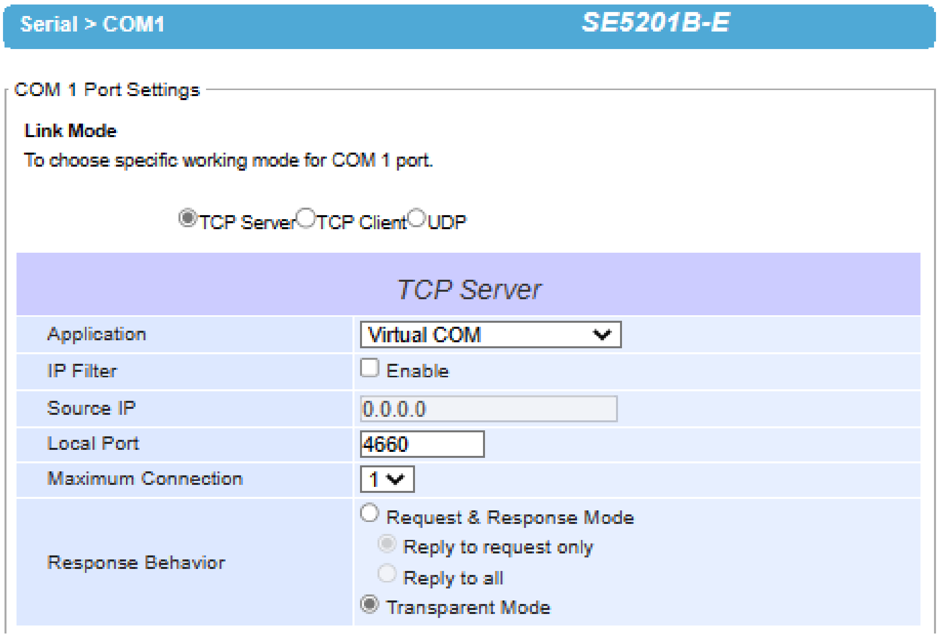
- ■ For other Serial Settings on the same configuration page, please go to other section and for Advanced Settings please go to other section.
- ■ After finishing configuring the **Link Mode**, please scroll down to the bottom of the page and click on "**Save & Apply**" button to save all the changes that you have made.

## 5.2 *Link Mode Applications*

This section describes application options for the **TCP Server**, **TCP Client**, and **UDP Link Modes**. The application options will define how the serial data communication will be emulated over the network communication link. The user will have flexibility in choosing the suitable application that matches their need for serial data communication.

### 5.2.1 *TCP Server Application: Enable Virtual COM*

CR5201B/SE5201B will encapsulate control packets on top of the real data when **Virtual COM** is enabled. This will allow the Virtual COM port on the Windows/Linux operating system to access SE5201B's COM ports. The benefit of using Virtual COM is that it is unnecessary to rewrite an existing COM program to read IP packets. In other words, it is possible to use an ordinary or legacy serial (COM) program. The conversion/virtualization of IP to COM is all done in the system driver transparently. Figure 5-11 shows SE5201B in **TCP Server** mode with **Virtual COM** application enabled. Please follow these steps to enable **Virtual COM** application in **TCP Server Link Mode**.



Serial > COM1 SE5201B-E

COM 1 Port Settings

Link Mode
To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

TCP Server

| | |
|---|---|
| Application | Virtual COM |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 5-11 Virtual COM Application in TCP Server Link Mode

- ■ Follow steps in Section 5.1.1 to configure SE5201B in **TCP Server Link Mode** properly.

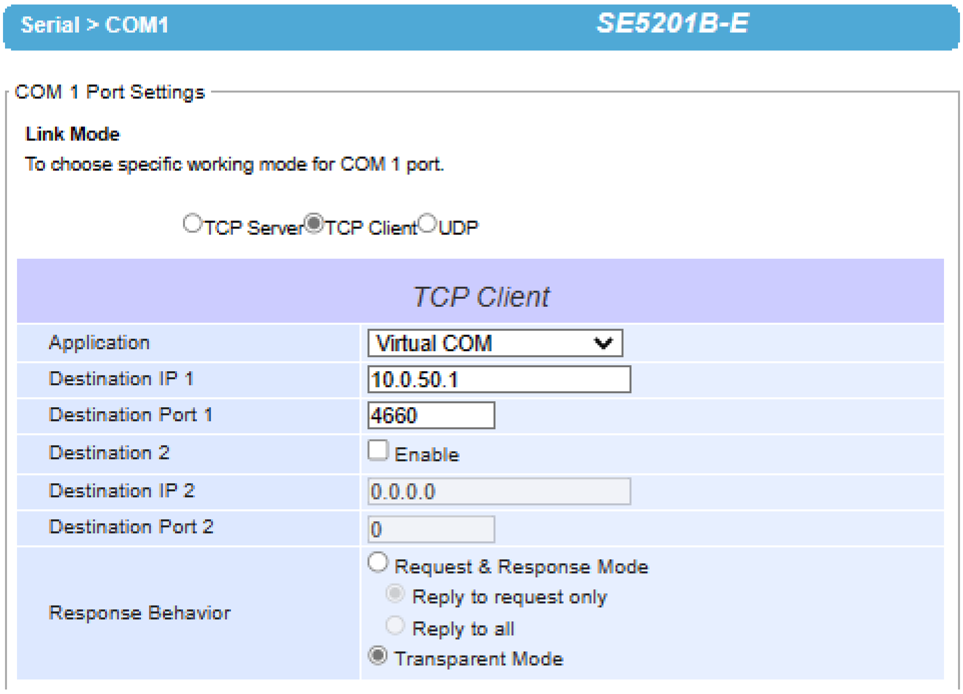
- Click on the drop-down list of the **Application** option under **TCP Server** section and switch to "**Virtual COM**" to enabled Virtual COM application in SE5201B.
- Scroll down to the bottom of the page and click on "**Save & Apply**" button to save the changes.
- Configure Virtual COM in the Operating System on the remote host computer. For Windows, please refer to Chapter 6 for necessary instructions. Please remember SE5201B's IP address and the **Local Port** number configured on this page in order to enter the same information in Serial/IP Virtual COM's Control Panel later. Note that a Serial/IP Virtual COM Redirector software is provided as a utility software by Atop Technologies.

### 5.2.2 *TCP Server Application: Enable RFC 2217 through Virtual COM*

The underlying protocol of Virtual COM is based on RFC 2217 which is the Telnet COM Control Option. Therefore, it is possible to use RFC 2217 with SE5201B in the TCP Server mode. Note that the RFC 2217 allows a remote client, which can be any network device, to initiates a Telnet session to an access server (i.e. SE5201B) to communicate with serial device on the access server's COM port. To do so, please refer to Section 5.2.1 (previous section) to enable Virtual COM so that SE5201B becomes aware of the command names and codes defined in RFC 2217. Note that there is no need to configure Virtual COM on the Operating System of the remote host computer because Virtual COM ports would not be used.

### 5.2.3 *TCP Client Application: Enable Virtual COM*

It is also possible to run Virtual COM in TCP Client Link Mode. Figure 5-12 shows a configuration of Virtual COM application in TCP Client Link Mode. It is usually easier to use Virtual COM in the TCP Client Link Mode if SE5201B uses dynamic IP (via DHCP) because setting a static IP address in Virtual COM's Control Panel in the Operating System is not possible. Please follow these steps to enable Virtual COM application in TCP Client Link Mode.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ●TCP Client ○UDP

TCP Client

| | |
|---|---|
| Application | Virtual COM |
| Destination IP 1 | 10.0.50.1 |
| Destination Port 1 | 4660 |
| Destination 2 | □ Enable |
| Destination IP 2 | 0.0.0.0 |
| Destination Port 2 | 0 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 5-12 Virtual COM Application in TCP Client Link Mode

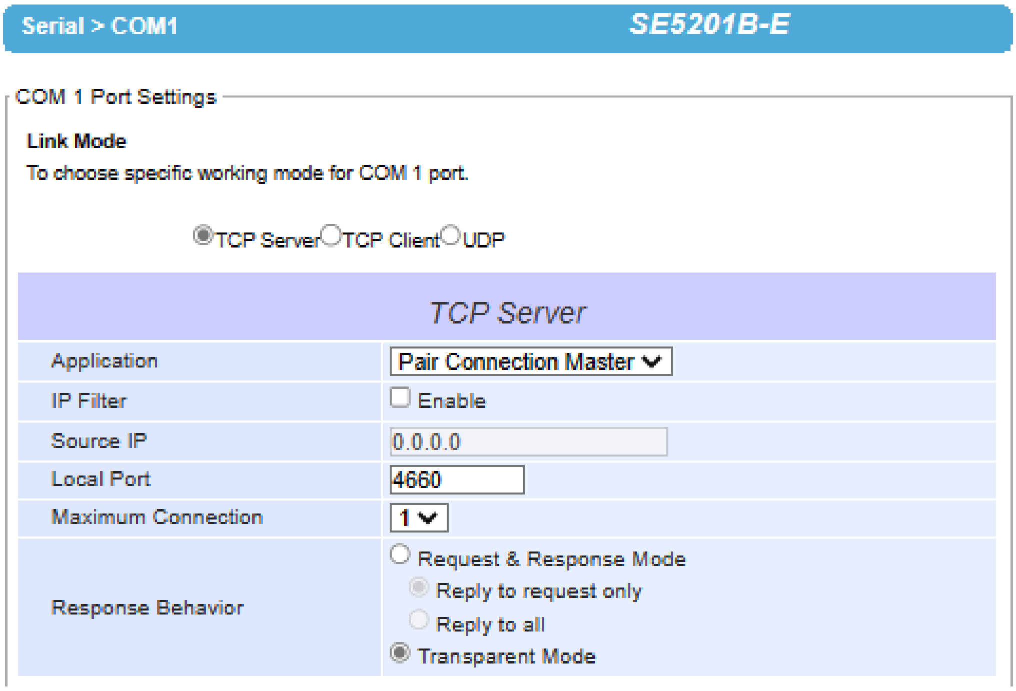
- Follow step in Section 5.1.2 to configure SE5201B in TCP Client Link Mode properly.
- Click on the drop-down list of the Application option under TCP Client section and switch to "Virtual COM" to enabled Virtual COM application in SE5201B.
- Scroll down to the bottom of the page and click on "**Save & Apply**" button to save the changes.
- Configure Virtual COM in the Operating System on the remote host computer. For Windows, please refer to Chapter 6 for necessary instruction. Please remember the **Destination Port** number configured on this page in order to enter this information in Serial/IP Virtual COM's Control Panel later.

### 5.2.4 *TCP Client Application: Enable RFC 2217 through Virtual COM*

The underlying protocol of Virtual COM is based on RFC 2217 which is the Telnet COM Control Option. Therefore, it is possible to use RFC 2217 with SE5201B in the TCP Client mode. Note that the RFC 2217 allows a client, which is SE5201B in this case, to initiates a Telnet session to a remote host computer to communicate with serial device or serial (COM) program on the remote host computer. To do so, please refer to Section 5.2.3 (previous section) to enable Virtual COM so that SE5201B becomes aware of the command names and codes defined in RFC 2217. Note that there is no need to configure Virtual COM on the Operation System of the remote host computer because Virtual COM ports would not be used.

### 5.2.5 *TCP Server Application: Configure SE5201B as a Pair Connection Master*

A Pair Connection application is useful when pairing up two serial devices over the Ethernet or when it is impossible to install Virtual COM in the serial devices. However, the pair connection application does require two SE5201B to work in pair. One would be the Pair Connection Master and the other would be the Pair Connection Slave. Figure 5-13 shows a configuration of Pair Connection Master application in TCP Server Link Mode. Please follow these steps to enable Pair Connection application and set the SE5201B as Master in TCP Server Link Mode.



COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

TCP Server

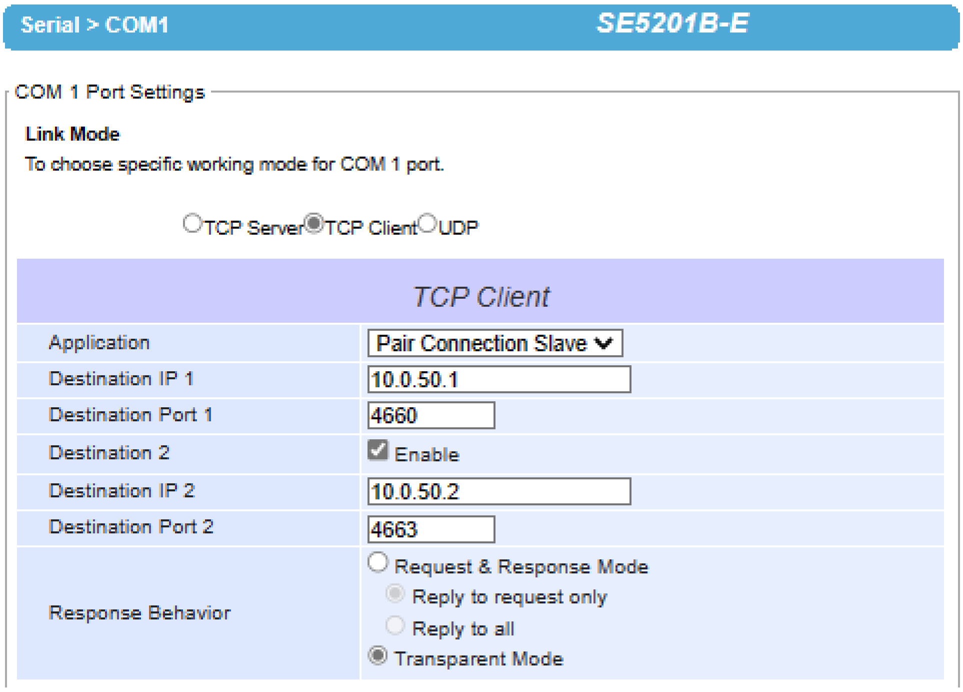
| | |
|---|---|
| Application | Pair Connection Master |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 5-13 Pair Connection Master Application in TCP Server Link Mode

- Follow steps in Section 5.1.1 to configure SE5201B in TCP Server Link Mode properly.
- Click on the drop-down list of the **Application** option under TCP Server section and switch to "**Pair Connection Master**" to enable Pair Connection application in SE5201B.
- Scroll down to the bottom of the page and click on "**Save & Apply**" button to save the changes.
- Please remember Pair Connection Master's IP address (i.e. SE5201B's IP address on your desired network interface (either Ethernet or Wi-Fi)) and Local Port number here, in order to enter the information in another SE5201B device with the Pair Connection Slave setting later.
- Proceed to the next section to configure a Pair Connection Slave to connect to this Master.

### 5.2.6 *TCP Client Application: Configure SE5201B as a Pair Connection Slave*

A Pair Connection Slave application is configured for SE5201B under TCP Client Link Mode, as shown in Figure 5-14. It is necessary to pair up with a Pair Connection Master, as described in previous section. Please setup a Pair Connection Master on another SE5201B device first before proceeding. Please do the following steps to enable Pair Connection application and set this SE5201B device as Slave in TCP Client Link Mode.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ●TCP Client ○UDP

TCP Client

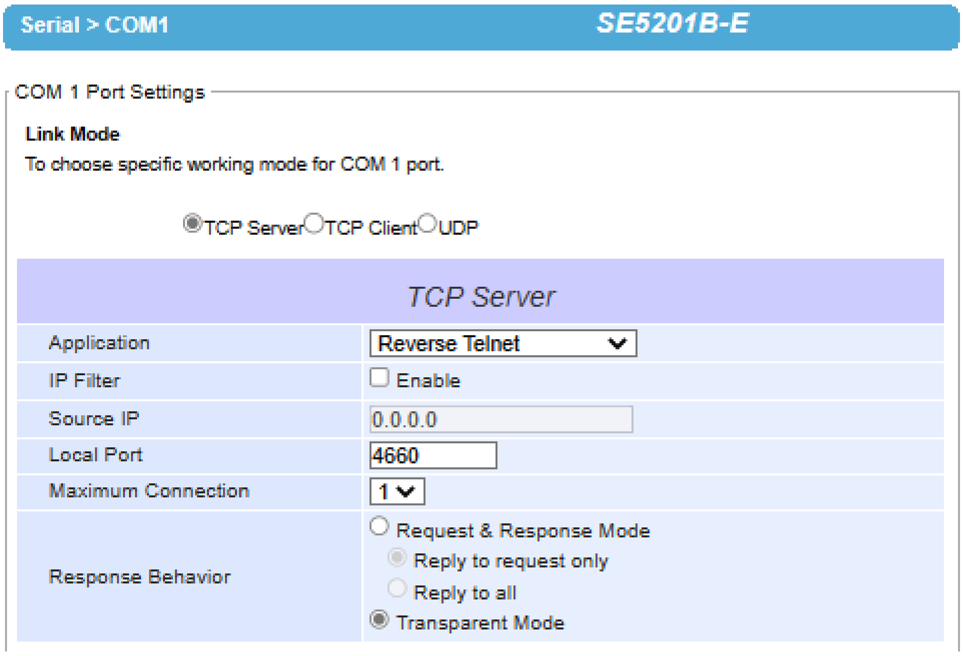
| | |
|---|---|
| Application | Pair Connection Slave |
| Destination IP 1 | 10.0.50.1 |
| Destination Port 1 | 4660 |
| Destination 2 | ☑ Enable |
| Destination IP 2 | 10.0.50.2 |
| Destination Port 2 | 4663 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 5-14 Pair Connection Slave Application in TCP Client Link Mode

- Follow steps in Section 5.1.2 to configure SE5201B in TCP Client Link Mode properly.
- Click on the drop-down list of the **Application** option under TCP Client section and switch to "**Pair Connection Slave**" to enabled Pair Connection application in SE5201B.
- Enter the **Destination IP** address and the **Destination Port** number (for Destination 1 and (optionally Destination 2)) that match to the settings of Pair Connection Master (another SE5201B device)'s IP and port number that were setup previously.
- Scroll down to the bottom of the page and click on "**Save & Apply**" button to save the changes.

### 5.2.7 *TCP Server Application: Enable Reverse Telnet*

**Reverse Telnet** application is useful when connecting SE5201B and its serial interface to a Terminal Server with the Telnet program. In Windows/Linux operating systems, telnet programs require special handshaking so that the outputs and the character formatting are shown properly. SE5201B will interact with those special commands, such as CR/LF commands, if **Reverse Telnet** is enabled. Figure 5-15 shows a configuration of **Reverse Telnet** application in the **TCP Server Link Mode**. Note that the **Reverse Telnet** application is only available when SE5201B is configured as **TCP Server Link Mode**. Please follow these steps to enable **Reverse Telnet** application under the **TCP Server Link Mode**.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

| TCP Server | |
|---|---|
| Application | Reverse Telnet |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

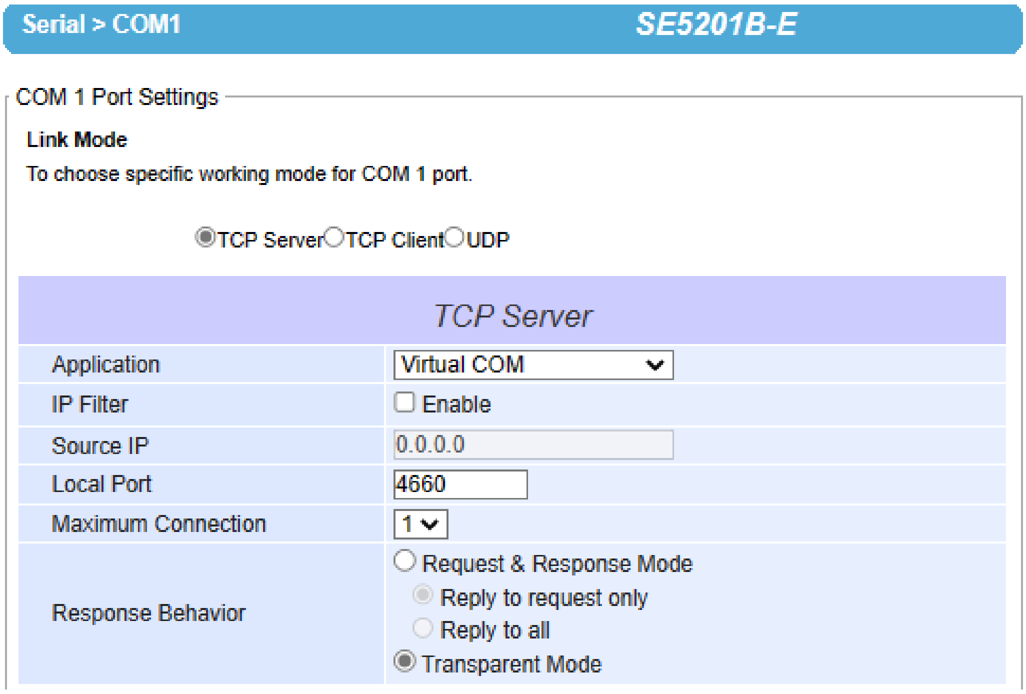
Figure 5-15 Reverse Telnet Application in TCP Server Link Mode

- Follow steps in Section 5.1.1 to configure SE5201B in **TCP Server Link Mode** properly.
- Click on the drop-down list of the **Application** option under **TCP Server** section and switch to "**Reverse Telnet**" to enabled reverse telnet application in SE5201B.
- Scroll down to the bottom of the page and click on "**Save & Apply**" button to save the changes.

# 6 VCOM Installation & Troubleshooting

## 6.1 *Enabling VCOM*

SE5201B will encapsulate control packets on top of the actual serial data when **Virtual COM** (VCOM) **Application** is enabled. This will allow the Virtual COM port in the Windows/Linux system to access SE5201B's COM ports. Please note that **Virtual COM Application** can only be enabled in **TCP Server Link Mode** as shown in Figure 6-1 or **TCP Client Link Mode** as shown in Figure 6-2.



Serial > COM1 SE5201B-E

COM 1 Port Settings

Link Mode

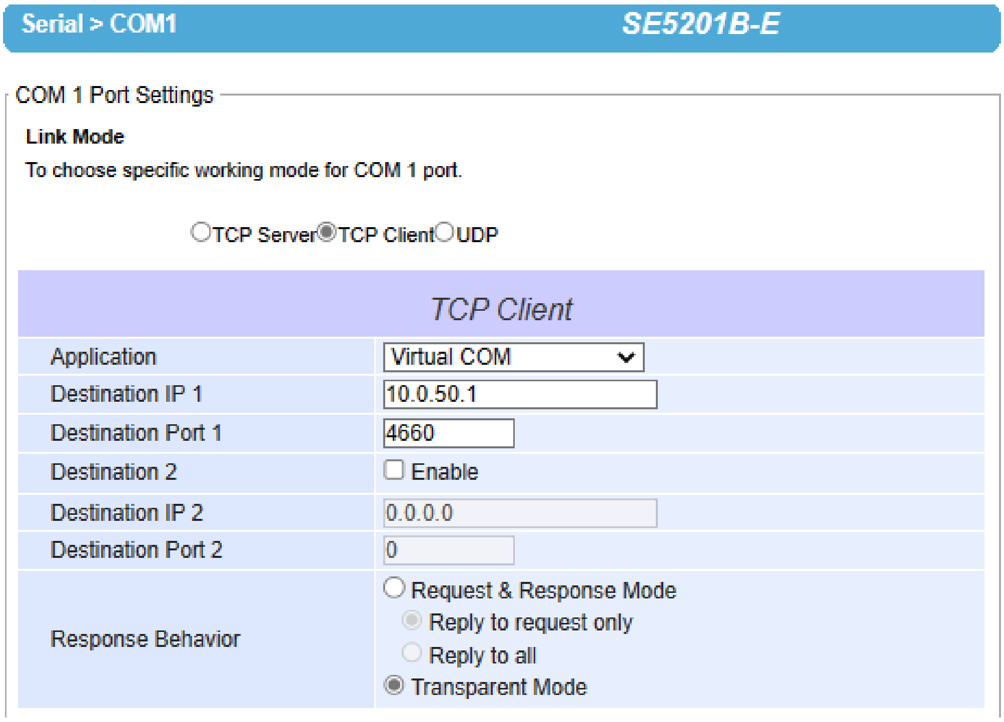
To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

TCP Server

| | |
|---|---|
| Application | Virtual COM |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>○ Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 6-1 Enable a Virtual COM Application When Setting the Link Mode as the TCP Server



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

○TCP Server ●TCP Client ○UDP

| TCP Client | |
|---|---|
| Application | Virtual COM |
| Destination IP 1 | 10.0.50.1 |
| Destination Port 1 | 4660 |
| Destination 2 | □ Enable |
| Destination IP 2 | 0.0.0.0 |
| Destination Port 2 | 0 |
| Response Behavior | ○ Request & Response Mode<br>● Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 6-2 Enable a Virtual COM Application When Setting the Link Mode as the TCP Client

Virtual COM on host computer allows remote access of serial devices over TCP/IP networks through Serial/IP Virtual COM ports that work like local native COM ports. Figure 6-3 is an example of Virtual COM application diagram. In the diagram, multiple serial servers (i.e. SE5201B devices, green pattern) in which each one connects to serial device are connected over an Ethernet hub. Their serial devices can be accessed through the TCP/IP network of the hub. Note that there are traditionally only two Physical COM ports (COM 1 and COM 2) on the personal computer (PC) while there can be several Virtual COM ports such as COM 3, 4, 5, and so on. In SE5201B case, the TCP/IP network can be wired network such as Ethernet.

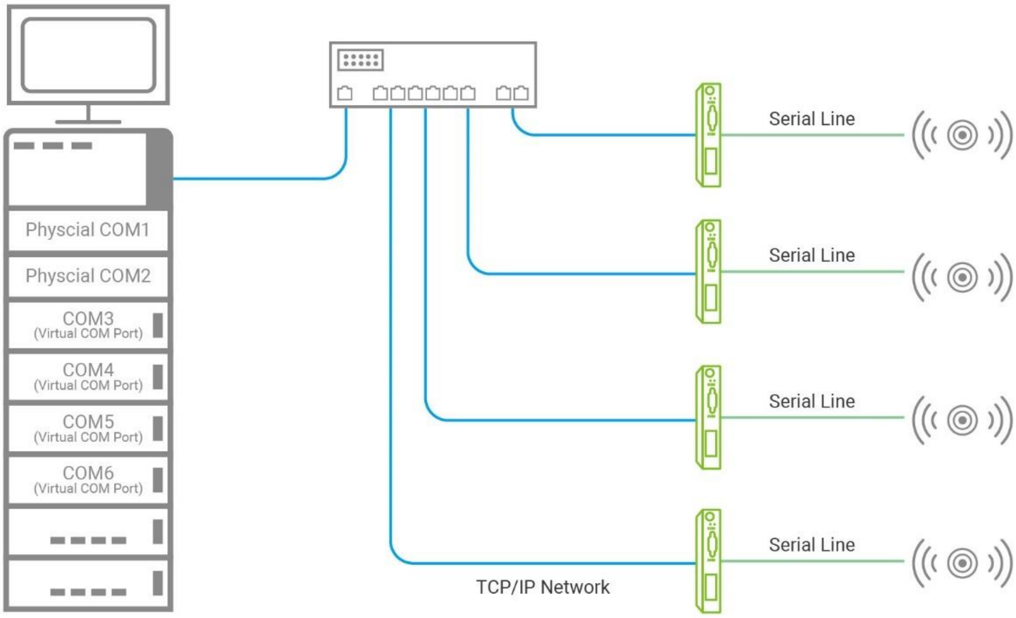


Figure 6-3 An Example Diagram of Virtual COM Application over TCP/IP Network

To enable Virtual COM on host computer, you will require a software utility or VCOM driver software to emulate the COM port. For Windows operating system, a software utility called **Serial/IP** is supported by Atop to be used for this purpose. Please see discussion about the VCOM driver utility in the following subsections.

### 6.1.1 *VCOM driver setup*

The supported VCOM driver or Serial/IP utility has the following requirements.

- System Requirements
    - Windows Operating System Supported Platform (32/64 bits)
        - Win10
        - Win8
        - Win7
        - Vista
        - XP
        - 2008
        - 2003 (also Microsoft 2003 Terminal Server)
        - 2000 (also Microsoft 2000 Terminal Server)
        - NT (also Microsoft NT Terminal Server)
        - 4.0
        - 9x
    - Citrix MetaFrame Access Suite
    - Linux operating system also available, but first you might need to download a separate package called Virtual COM driver for Linux (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.

### 6.1.2 *Limitation*

The Virtual COM driver allows up to 256 Virtual COM ports in a single PC. Selection of COM port number can be allowed in the range from COM1 to COM4096. Note that COM ports that are already occupied by the system or other devices will not be available.

### 6.1.3 *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 your operating system. Please turn off your anti-virus software and try again if the installation fails. At the end of the installation, please select at least one Virtual COM port from the Serial/IP Control Panel.

### 6.1.4 *Uninstallation*

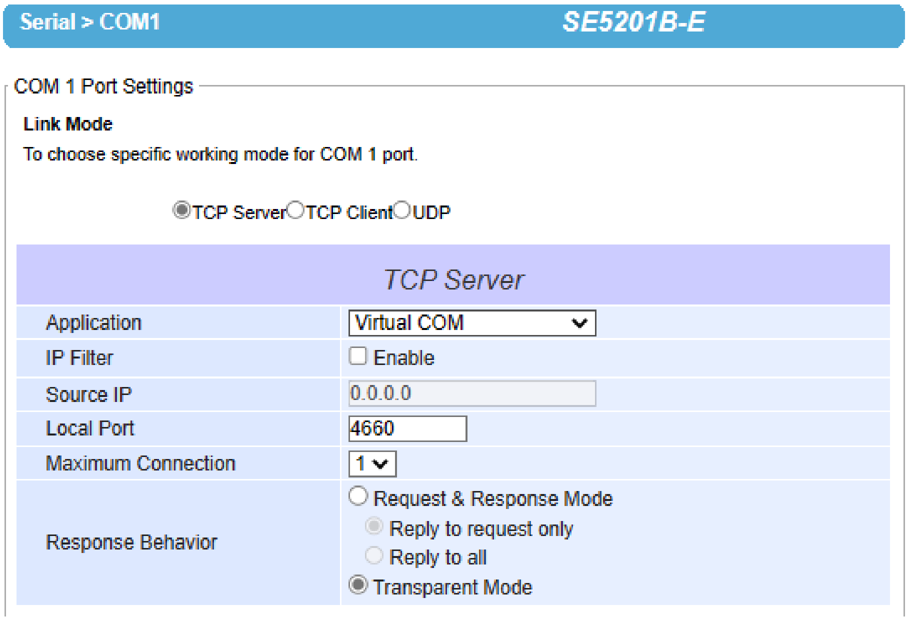
From Windows Start Menu select Control Panel then select Add/Remove Programs. Select Serial/IP Version x.x.x in the list of installed software. Click the Remove button to remove the program.

## 6.2 *Enable VCOM in Serial Device servers and Select VCOM in Windows*

This section will provide the procedure to enable Virtual COM (VCOM) on SE5201B and Windows based PC. Please follow the steps described here to configure your Virtual COM application.

### 6.2.1 *Enable VCOM in Serial Device servers*

Enable **Virtual COM** in our serial device servers (i.e. SE5201B) by logging into the Web UI. It is located under **COM 1** or other **COM** configuration under **Serial** menu as described in Section 5.2.1. Figure 6-4 shows how to enable **Virtual COM** in **TCP Server Link Mode** in SE5201B. For a detail of **Link Mode** configuration with **Virtual COM**, please refer to the previous chapter starting from Section 5.1.



Serial > COM1 SE5201B-E

COM 1 Port Settings

**Link Mode**

To choose specific working mode for COM 1 port.

● TCP Server ○ TCP Client ○ UDP

| TCP Server | |
|---|---|
| Application | Virtual COM |
| IP Filter | □ Enable |
| Source IP | 0.0.0.0 |
| Local Port | 4660 |
| Maximum Connection | 1 |
| Response Behavior | ○ Request & Response Mode<br>○ Reply to request only<br>○ Reply to all<br>● Transparent Mode |

Figure 6-4 Enable Virtual COM Application for COM 1 in TCP Server Link Mode

### 6.2.2 *Running Serial/IP Software Utility in Windows*

After installation of Virtual COM driver on Windows operating system as described in Section 6.1.3, you can open **Serial/IP Control Panel** by following any one of these methods:

1) Click on Windows' Start menu → Select All Programs → Select Serial/IP → Select Control Panel.
2) In the Windows' Control Panel, open the Serial/IP applet.
3) In the Windows notification area as shown in Figure 6-5, right click on the Serial/IP tray icon and click on Configure… menu to open the Serial/IP's Control Panel.

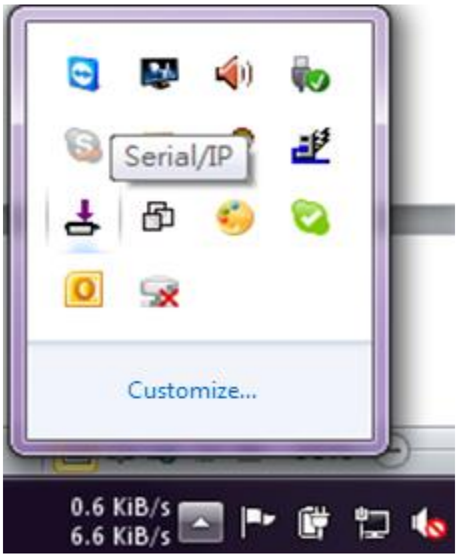
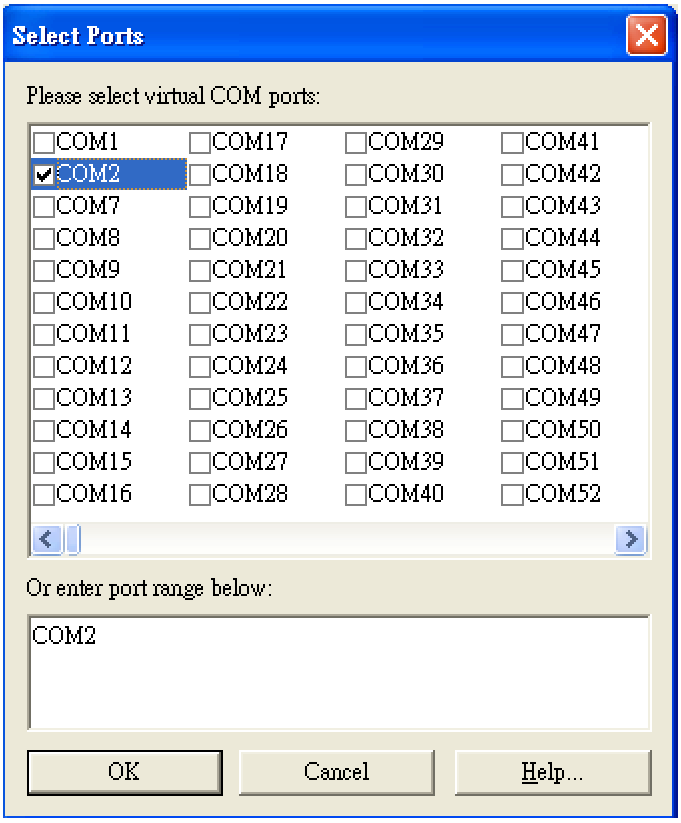


Figure 6-5 Serial/IP Tray Icon on Windows Notification Area

If no Virtual COM port is selected, a “**Select Ports**” dialog window will pop up and ask the user to select at least one COM port as the Virtual COM port before proceeding as shown in the pop-up window of Figure 6-6. You can select a COM port by checking the box in front of the list of virtual COM ports. Note that if a COM port number is not on the list, it may be used by other application or your operating system. The user may want to select a range of multiple COM ports to be used as Virtual COM ports by entering the range of COM port in the text box below the list. After selecting the virtual COM ports, please click OK button to proceed.



Select Ports

Please select virtual COM ports:

☐COM1
☑COM2
☐COM7
☐COM8
☐COM9
☐COM10
☐COM11
☐COM12
☐COM13
☐COM14
☐COM15
☐COM16
☐COM17
☐COM18
☐COM19
☐COM20
☐COM21
☐COM22
☐COM23
☐COM24
☐COM25
☐COM26
☐COM27
☐COM28
☐COM29
☐COM30
☐COM31
☐COM32
☐COM33
☐COM34
☐COM35
☐COM36
☐COM37
☐COM38
☐COM39
☐COM40
☐COM41
☐COM42
☐COM43
☐COM44
☐COM45
☐COM46
☐COM47
☐COM48
☐COM49
☐COM50
☐COM51
☐COM52

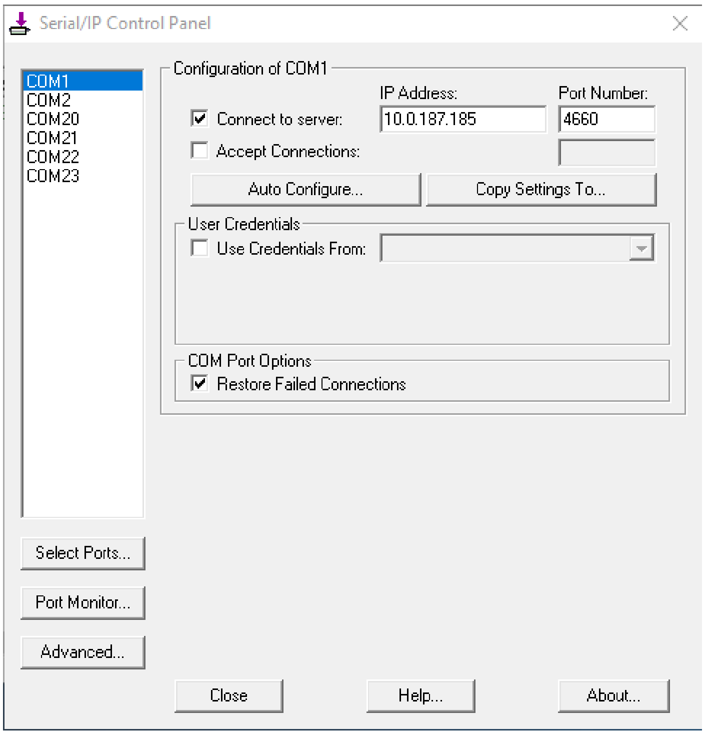
Or enter port range below:

COM2

Figure 6-6 A Pop-up Window for Selecting Virtual COM Ports

After at least one Virtual COM port is selected, the **Serial/IP Control Panel** window will show up as illustrated in Figure 6-7. The left side of the **Control Panel** window shows the list of selected Virtual COM ports. You can click on **Select Ports…** button below the list to add or remove Virtual COM ports from the list. The right side of the **Serial/IP Control Panel** window shows the configurations of the selected Virtual COM port marked in blue on the list. Each Virtual COM port can have its own settings. Details on how to configure the Virtual COM port will be described in the next subsection.

**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.



Serial/IP Control Panel

COM1
COM2
COM20
COM21
COM22
COM23

Configuration of COM1

IP Address: 10.0.187.185

Port Number: 4660

☑ Connect to server:

□ Accept Connections:

User Credentials

□ Use Credentials From:

COM Port Options

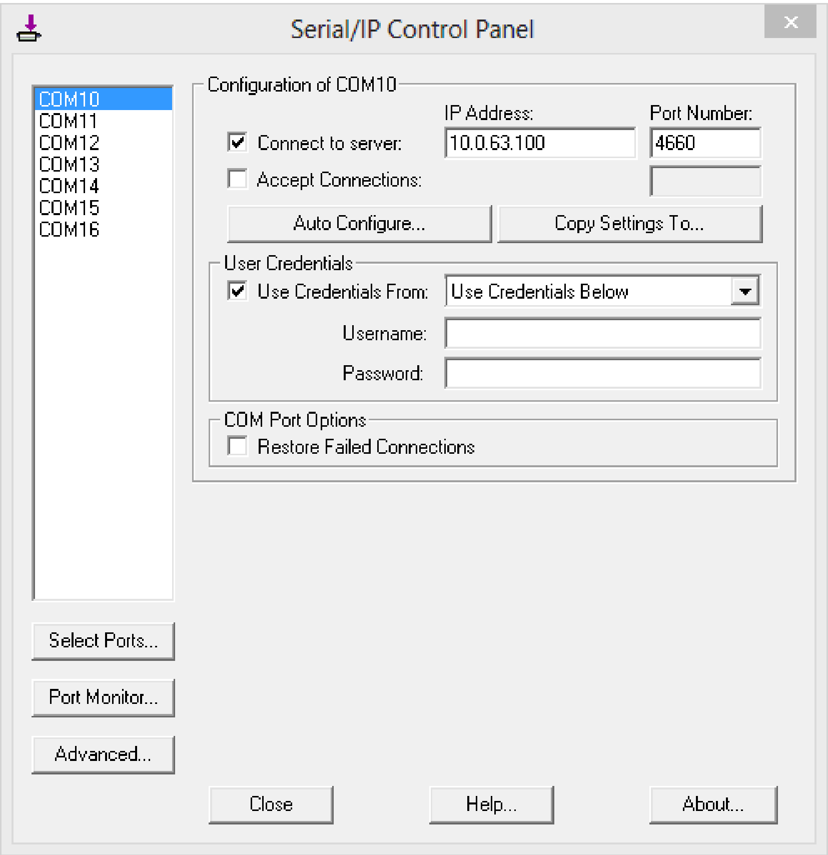
☑ Restore Failed Connections

Figure 6-7 Serial/IP Control Panel Window

### 6.2.3 *Configuring VCOM Ports*

For each VCOM port selected on the listed on the left side of the **Serial/IP Control Panel**, you can use the following procedures to configure that VCOM port.

1. If the serial device server (i.e. SE5201B) is running in **TCP Server Link Mode** (recommended), the **Serial/IP** utility on the host computer should be configured as the TCP client connecting to the serial device server. Enable **Connect to Server** option (by checking the box in front of it as shown in Figure 6-8) and enter the IP Address of the serial device server with the specified **Port Number**. The **Port Number** here is the **Local Listening Port** for the serial device server which is specified in the **Local Port** field of Figure 5-11.
2. If the serial device server (i.e. SE5201B) is running in **TCP Client Link Mode**, the **Serial/IP** utility on the host computer should be configured as the TCP server waiting for a serial device server to connect to the host computer. Enable **Accept Connections option** (by checking the box in front of it) and enter the specified **Port Number**. This **Port Number** is the **Destination Port** of the serial device server. Do not enable **Connect to Server** option and **Accept Connections** option simultaneously.
3. Under **User Credentials** box, you can enable **Use Credentials From:** option by checking the box in front of it then select options from the drop-down list. The available sources of credentials are: **Prompt on COM Port Open**, **Prompt at Login**, and **Use Credentials Below** as shown in Figure 6-8. If you select **Use Credentials Below** option as shown in Figure 6-9, please specify the **Username** and the **Password** in their corresponding text boxes.



Serial/IP Control Panel

COM10
COM11
COM12
COM13
COM14
COM15
COM16

Configuration of COM10

☑ Connect to server: IP Address: 10.0.63.100 Port Number: 4660

□ Accept Connections:

User Credentials

☑ Use Credentials From: Use Credentials Below

Username:

Password:

COM Port Options

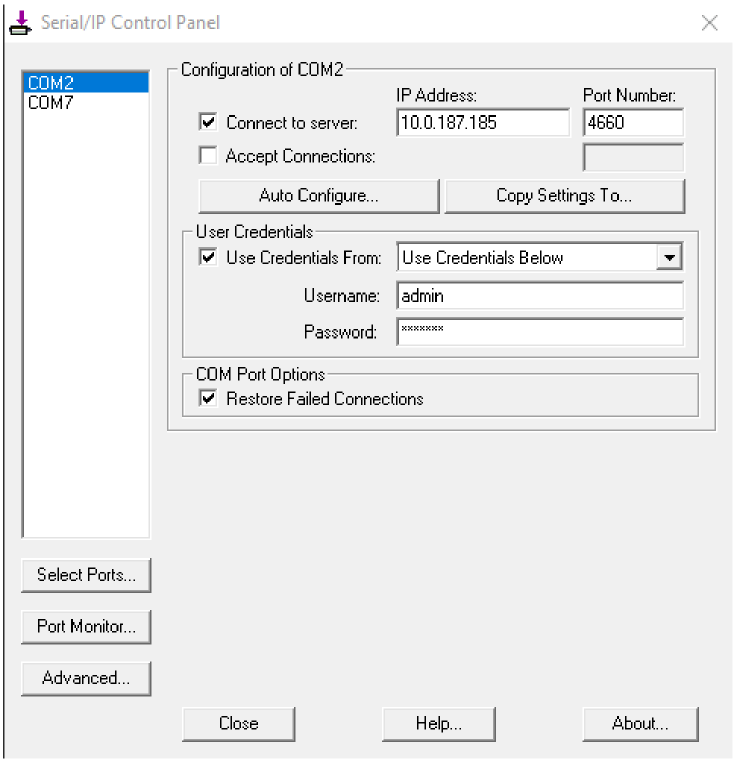
□ Restore Failed Connections

Figure 6-8 Available Options for Use Credential From in Serial/IP Control Panel Version 4.9.10

4. Under **COM Port Options** box, you can enable **Restore Failed Connections** option by checking the box in front of it to force Virtual COM to automatically restore failed connections with the serial device server in case of unstable network connections.

5. To test the Virtual COM connection, you can click the **Auto Configure…** button and then click the **Start** button in the pop-up window as shown in Figure 6-10. If the test passes, all checks under the **Status** text box should be green. In this **Configuration Wizard** window, you can change the **IP Address** of Server, **Port Number**, **Username** (if **Use Credential** option is enabled), and **Password** (if **Use Credential** option is enabled). To apply the changes in the Configuration Wizard window to the Serial/IP Control Panel, please click on **Use Settings** button at the bottom of the window in Figure 6-10. You can also click on **Copy** button to copy the results to the PC system clipboard.

6. To transfer the settings between Virtual COM ports, click on the **Copy Settings To** button as shown in Figure 6-9.



Serial/IP Control Panel

COM2
COM7

Configuration of COM2

IP Address: 10.0.187.185

Port Number: 4660

☑ Connect to server:

□ Accept Connections:

User Credentials

☑ Use Credentials From: Use Credentials Below

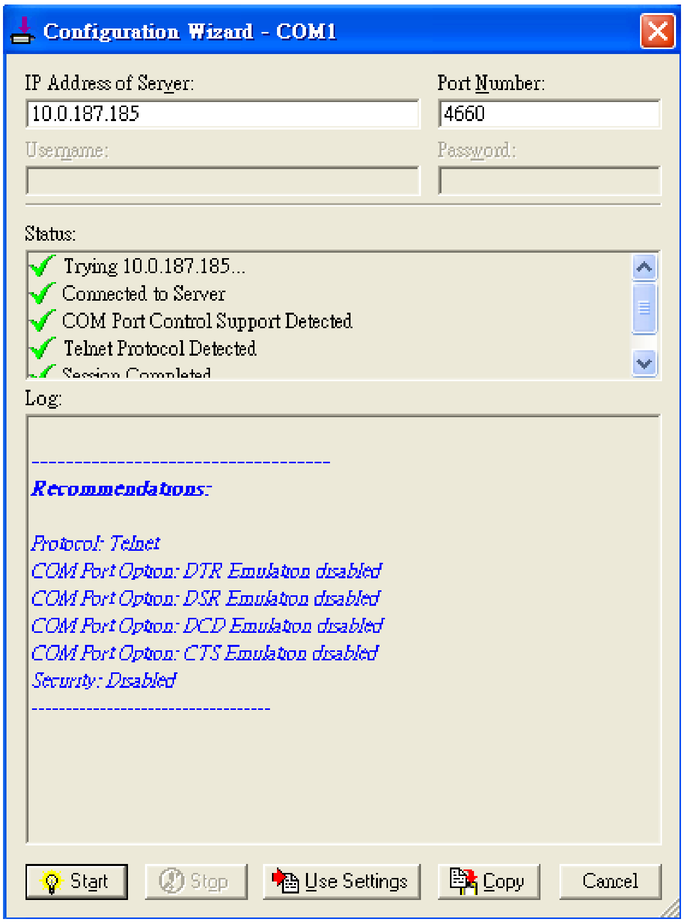
Username: admin

Password: *******

COM Port Options

☑ Restore Failed Connections

Figure 6-9 Configuring Virtual COM 2 Port as TCP Client



Configuration Wizard - COM1

IP Address of Server: 10.0.187.185

Port Number: 4660

Username:

Password:

Status:

```
✓ Trying 10.0.187.185...
✓ Connected to Server
✓ COM Port Control Support Detected
✓ Telnet Protocol Detected
✓ Session Completed
```

Log:

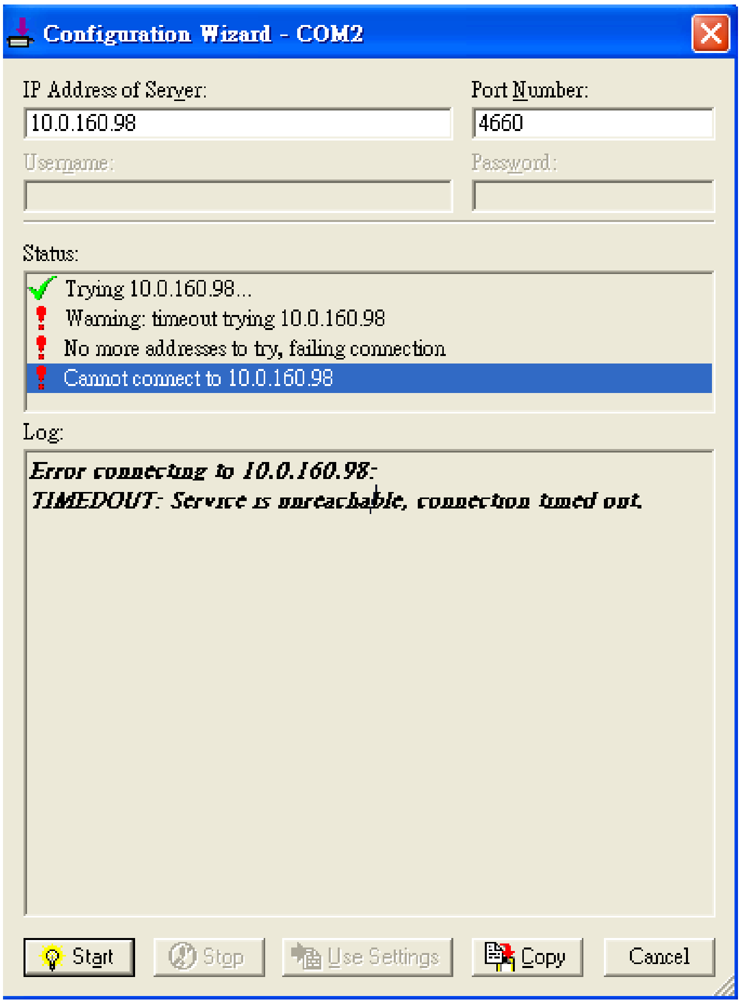
```
-----------------------------------
Recommendations:

Protocol: Telnet
COM Port Option: DTR Emulation disabled
COM Port Option: DSR Emulation disabled
COM Port Option: DCD Emulation disabled
COM Port Option: CTS Emulation disabled
Security: Disabled
-----------------------------------
```

Figure 6-10 Auto Configure (formerly Configuration Wizard) Window for COM 1

## 6.3 *Exceptions*

This section lists possible exceptions which may occur when the user tested the VCOM connection through the **Auto Configure…** (formerly Configuring Wizard…) button. If there is a problem with the connection, there will be error(s) or warning(s) reported in the **Status and Log** text boxes. The possible correction or trouble shooting hint for each exception is given in each case.

- If the status reports with an exclamation mark with a message "Warning: timeout trying x.x.x.x" as shown in Figure 6-11, please recheck or correct the VCOM IP address and Port number configuration or the PC's network configuration.



IP Address of Server: 10.0.160.98

Port Number: 4660

Username:

Password:

Status:

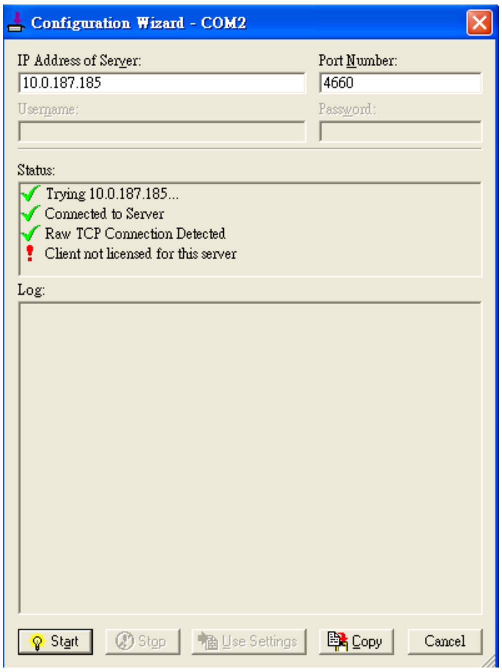
```
✓ Trying 10.0.160.98...
! Warning: timeout trying 10.0.160.98
! No more addresses to try, failing connection
! Cannot connect to 10.0.160.98
```

Log:

```
Error connecting to 10.0.160.98:
TIMEDOUT: Service is unreachable, connection timed out.
```

Figure 6-11 Timeout Warning on VCOM Connection

If the status reports with a check with a message "**Raw TCP Connection Detected**" and an exclamation mark with a message "**Client not licensed for this server**" as shown in Figure 6-12. Please enable the Virtual COM option in the serial Device server.


Configuration Wizard - COM2

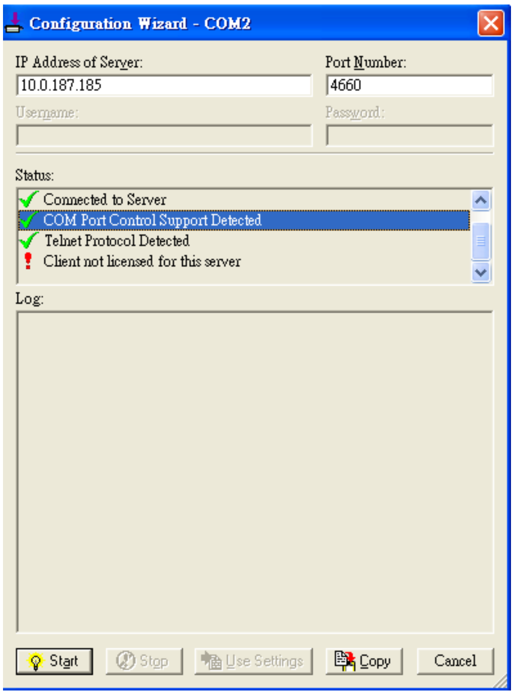
IP Address of Server: 10.0.187.185
Port Number: 4660
Username:
Password:

Status:
✓ Trying 10.0.187.185...
✓ Connected to Server
✓ Raw TCP Connection Detected
! Client not licensed for this server

Log:

Figure 6-12 Error of Client not licensed for this server

If the status reports with a check with a message “**Telnet Protocol Detected**” and an exclamation mark with a message “**Client not licensed for this server**” as shown in Figure 6-13. This means that there is a licensing issue between the serial gateway (i.e. CR5201B/SE5201B) and the Serial/IP Utility Software. Please contact Atop technical support to obtain the correct VCOM software.


Configuration Wizard - COM2

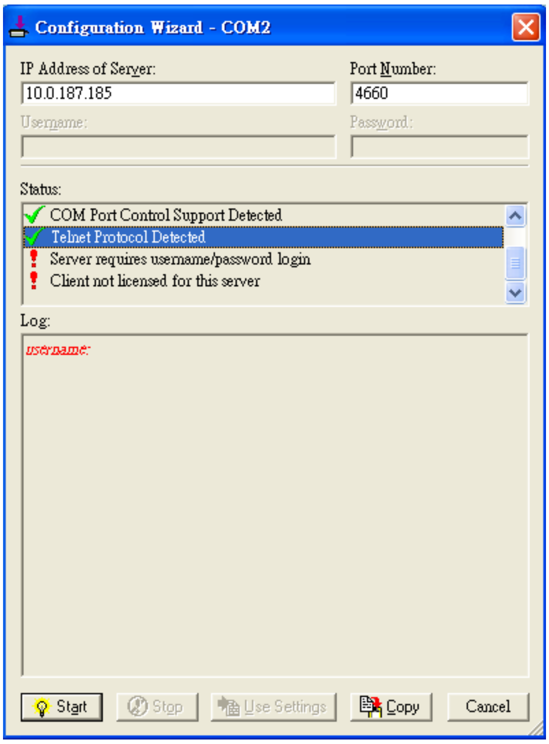
IP Address of Server: 10.0.187.185
Port Number: 4660
Username:
Password:

Status:
✓ Connected to Server
✓ COM Port Control Support Detected
✓ Telnet Protocol Detected
! Client not licensed for this server

Log:

Figure 6-13 Licensing Issue of Serial/IP Utility Software

If the status reports with an exclamation mark with a message “**Server requires username/password login**” as shown in Figure 6-14. This means that the **VCOM Authentication** option in the serial device server (i.e. CR5201B/SE5201B) is enabled but the **User Credentials** option in the **Serial/IP** utility software is not enabled. Please follow the steps in other section for enabling the user credentials option and entering the username and the password.

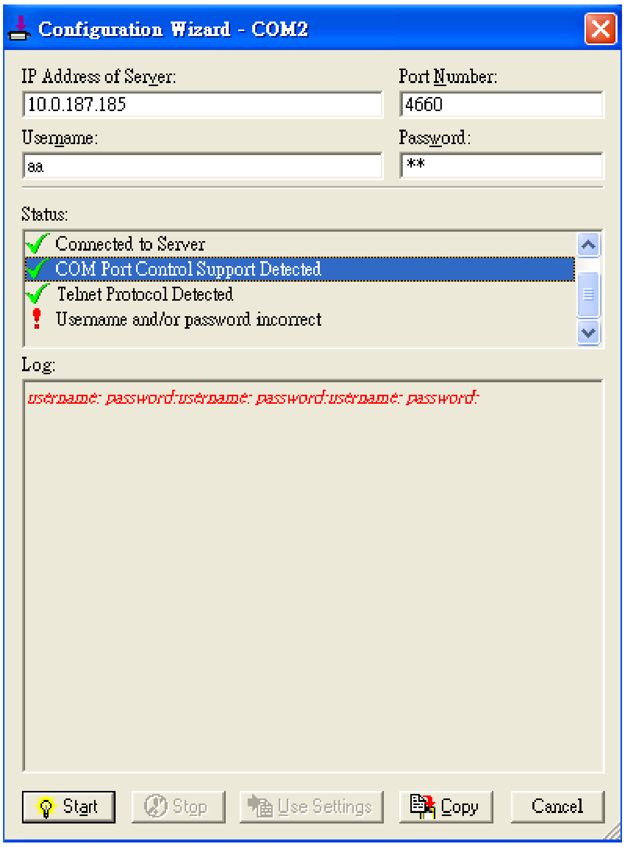


✓ COM Port Control Support Detected
✓ Telnet Protocol Detected
! Server requires username/password login
! Client not licensed for this server

```
username:
```

Figure 6-14 VCOM Authentication failed due to Missing Username/Password

If the status reports with an exclamation mark with a message "**Username and/or password incorrect**" as shown in Figure 6-15. This means that the wrong username and/or password were entered and the authentication process failed.

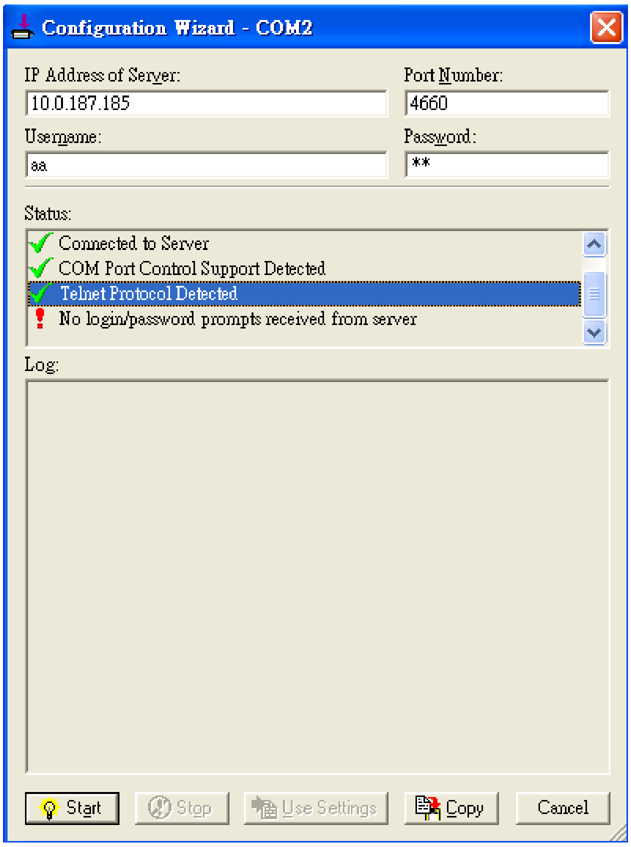


✓ Connected to Server
✓ COM Port Control Support Detected
✓ Telnet Protocol Detected
! Username and/or password incorrect

```
username: password:username: password:username: password:
```

Figure 6-15 VCOM Authentication failed due to incorrect Username and/or Password

If the status reports with an exclamation mark with a message "**No login/password prompts received from server**" as shown in Figure 6-16. This means that the **User Credentials** option in the Serial/IP utility software is enabled but the VCOM Authentication option in the serial device server (i.e. CR5201B/SE5201B) is not enabled. Please enable the **VCOM Authentication** option on the CR5201B/SE5201B by setting a new and non-blank administrator's Username and Password for CR5201B/SE5201B as described in Section. Note that the **Username** and the **Password** for VCOM authentication are the same username and password of CR5201B/SE5201B Web UI login. The default account, which has the username as "admin" and the password as "default", is considered as an unsecured account or no authentication option.



IP Address of Server: 10.0.187.185

Port Number: 4660

Username: aa

Password: **

Status:

- ✓ Connected to Server
- ✓ COM Port Control Support Detected
- ✓ Telnet Protocol Detected
- ! No login/password prompts received from server

Log:

Figure 6-16 VCOM Authentication failed due to disabled VCOM Authentication on SE5201B

## 6.4 *Using Serial/IP Port Monitor*

Serial/IP Port Monitor is another utility software provided for Atop's user. It allows user to monitor the activities or status of Virtual COM port and display the exchanged serial message which is called trace over the port.

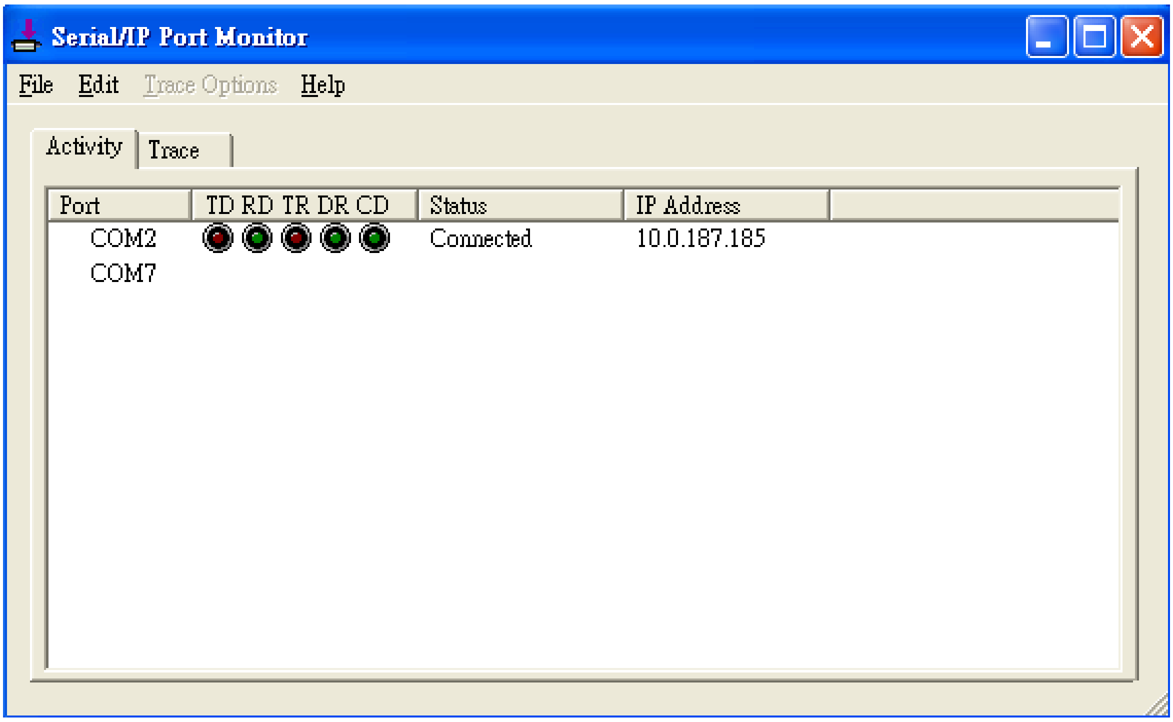
### 6.4.1 *Opening the Port Monitor*

The Serial/IP Port Monitor utility can be opened by one of the following methods:

- Click on Windows's Start menu → Select All Programs → Select Serial-IP → Select Port Monitor.
- Double click the Serial/IP tray icon in the Windows' notification area.
- In the Windows' notification area, right click on 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's window.

### 6.4.2 *The Activity Panel*

The **Activity** panel provides a real-time display of the status of all Serial/IP COM ports as shown in Figure 6-17. If the Virtual COM Port is opened and is properly configured to connect to a serial device server (i.e. SE5201B), the status would be **Connected**. If Serial/IP utility software cannot find the specified serial device server, the status would be **Offline**.



| Port | TD RD TR DR CD | Status | IP Address |
|---|---|---|---|
| COM2 | 🔴 🟢 🔴 🟢 🟢 | Connected | 10.0.187.185 |
| COM7 | | | |

Figure 6-17 Activity Panel of Serial/IP Port Monitor

Each column in the **Activity Panel** is described as follows:

- **Port**: This is the virtual COM port number.
- **Line signal indicators**: Red color means no activity while green color indicates activity.
  - **TD** indicates data are being sent to the server.
  - **RD** indicates data are being received from the server.
  - **TR** (DTR) is the signal from the application to the server that the application has opened the virtual COM port. The most common use of DTR is to programmatically lower it to signal a modem to disconnect.
  - **DR** (DSR) is the signal from the server to the application that a modem or serial device is connected to the server and ready to communicate.

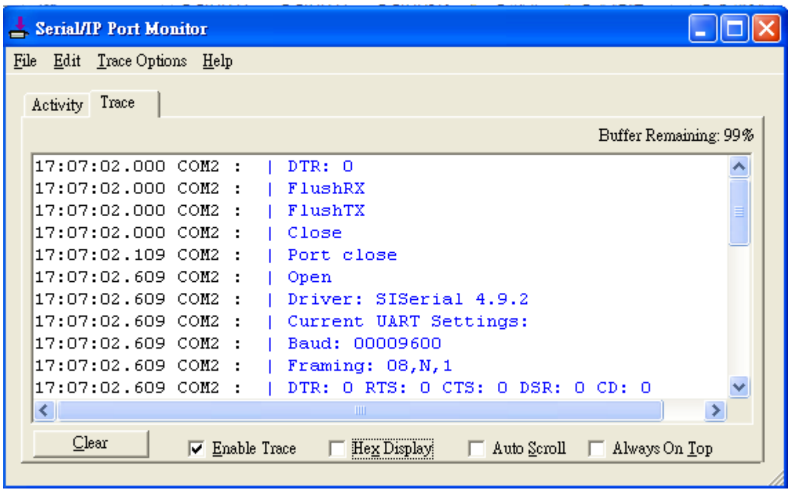
  - ○ **CD** (DCD) is the signal from the server to the application that a modem has successfully negotiated a connection with another device.
- **Status**: This indication the connection status of the software and serial device server which can be **connected** or **offline**.
- **IP Address**: This is the IP address of the serial device server.

Notes:

- The line signal indicators appear only when the virtual COM port is currently opened by an application.
- The TR, DR, and CD indicators appear only if the COM Port Control protocol is being used or if the COM port options are enabled.

### 6.4.3 *The Trace Panel*

The **Trace** panel provides a detailed, time-stamped, real-time display of all Serial/IP COM ports operations as shown in Figure 6-18. Click on **Enable Trace** box to start logging Virtual COM communication. To stop logging, uncheck the **Enable Trace** box. The user can toggle the format of the display between ASCII text (more readable) and hexadecimal format (most detailed) by checking the **Hex Display** box. Click on **Auto Scroll** box will cause the display to show the most recent trace data continuously. To ensure that **Port Monitor**'s window is always on top of other application's windows, please check the **Always on Top** box. If you want to clear the displayed data in **Trace** panel, click on the **Clear** button.



```
17:07:02.000 COM2 :  | DTR: 0
17:07:02.000 COM2 :  | FlushRX
17:07:02.000 COM2 :  | FlushTX
17:07:02.000 COM2 :  | Close
17:07:02.109 COM2 :  | Port close
17:07:02.609 COM2 :  | Open
17:07:02.609 COM2 :  | Driver: SISerial 4.9.2
17:07:02.609 COM2 :  | Current UART Settings:
17:07:02.609 COM2 :  | Baud: 00009600
17:07:02.609 COM2 :  | Framing: 08,N,1
17:07:02.609 COM2 :  | DTR: 0 RTS: 0 CTS: 0 DSR: 0 CD: 0
```

Figure 6-18 Trace Panel of Serial/IP Port Monitor

The pull-down menu of the **Port Monitor** windows allows the user to save the log and customize the capturing data of serial communication.

- **File**: To save the log file which you can send the log to Atop for further analysis if problems occurs with the Virtual COM connection, please click on **File** menu then click **Save As**.
- **Trace Options**:
  - ○ **Select Ports to Capture…:** This menu allows you to reduce the number of ports that are being traced to a subset of all configured Virtual COM ports. This feature can reduce the impact of tracing on memory and system performance for large applications.
  - ○ **Select Ports to Display…:** This menu allows you to reduce the number of ports that appear in the display to a subset of the ports being captured. For large applications, this feature provides a way to focus on ports of interest among all those being captured.
  - ○ **Buffer Size:** This menu allows the change on the amount of RAM being used for tracing which can be normal or large.
  - ○ **System Debug Output:** This menu allows user to enable the sending of trace data to the system debug channel and optionally put a label on them.

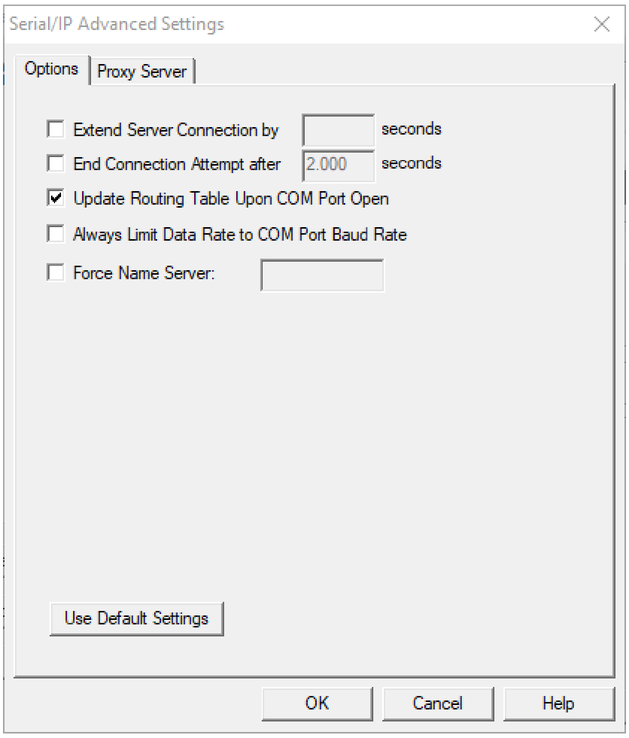
The **Trace** panel shows one serial event per line and in time order. Every event begins with a time tag. The transmit events will be shown in green and preceded by "»" while the receive event will be shown in red and preceded by "«". The control events will be shown in blue and preceded by "|".

Notes:

- The **Trace** display covers up to 512k bytes of event data which is enough to cover a reasonably extensive tracing session. However, if the limit is reached, the trace clears and starts over.

## 6.5 *Serial/IP Advanced Settings*

In the **Serial/IP Control Panel**, you can click on the **Advanced…** button to open **Serial/IP Advanced Settings** window as shown in Figure 6-19. The **Serial/IP Advanced Settings** window contains two tabs: **Options** and **Proxy Server**. On the **Options** tab, you can click on **Use Default Settings** button to load the default settings. Detail description of each options and how to set a proxy server will be explained in the following subsections.



Serial/IP Advanced Settings

☐ Extend Server Connection by [ ] seconds

☐ End Connection Attempt after [2.000] seconds

☑ Update Routing Table Upon COM Port Open

☐ Always Limit Data Rate to COM Port Baud Rate

☐ Force Name Server: [ ]

Figure 6-19 Serial/IP Advanced Settings Window

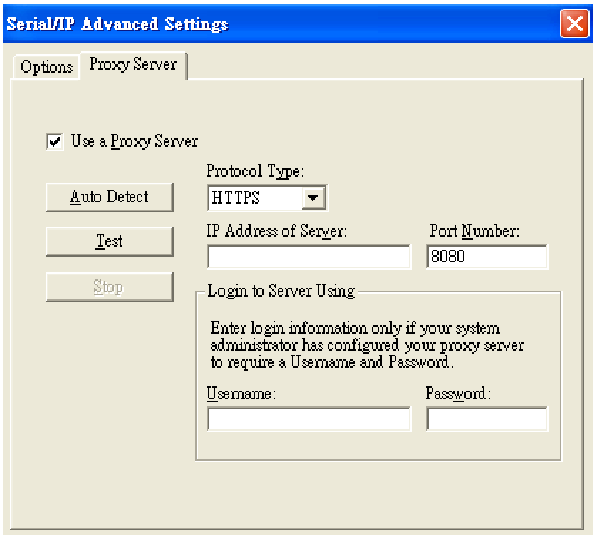
### 6.5.1 *Advanced Setting Options*

Under the **Options** tab, you can enable a number of advanced settings and enter required parameters for Serial/IP software. Description of each option is provided as follows.

- **Extend Server Connection:** When enabled, this option maintains the TCP connection for specified amount of time after COM port is closed. The default time value is 8000 milliseconds.
- **End Connection Attempt after**: When enabled, this option terminates pending connection attempts if they do not succeed in the specified time. The default time value is 2000 milliseconds.
- **Update Routing Table Upon COM Port Open**: When enabled, this option maintains IP route to a server in a different subnet by modifying the IP routing table.
- **Always Limit Data Rate to COM Port Baud Rate**: When enabled, this option limits the data rate to the baud rate that is in effect for the virtual COM port.
- **Force Name Server:** This option allows the user to enter the desired Name Server IP address.

### 6.5.2 *Using Serial/IP with a Proxy Server*

The **Serial/IP Redirector** also 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 Network Address Translation (NAT). You can enable Serial/IP support of Virtual COM port through the proxy server using **Serial/IP Proxy Server settings**. You can find **Proxy Server** settings from the **Advanced Settings** windows and click on the **Proxy Server** tab as shown in Figure 6-20. To enable the use of proxy server, check the box in front of **Use a Proxy Server** option. Then, select **the Protocol Type** which can be **HTTPS** or **Socks V4** or **Socks V5** from a drop-down list. Then, enter the IP address of the proxy server in the text box under **IP Address of Server** field and specify the **Port Number**. Note that the default port number for **HTTPS** is 8080, while for **Socks V4** and **V5** is 1080. Optionally, you can enter the **Username** and **Password** which may be required by your proxy server in the **Login to Server Using** box. Alternately, you can click on the **Auto Detect** button to have the software automatically detect the proxy server settings for you. Finally, you can test the proxy server settings by clicking on the **Test** button and stop the testing by clicking on **Stop** button.



☑ Use a Proxy Server

Protocol Type: HTTPS

Port Number: 8080

Enter login information only if your system administrator has configured your proxy server to require a Username and Password.

Figure 6-20 Proxy Server Tab under Serial/IP Advanced Settings

# 7 Specifications

## 7.1 *Hardware*

Table 7.1 Hardware Specification

| **System** | |
|---|---|
| CPU | Nuvoton NUC980, Arm926EJ-S, 300MHz |
| Flash Memory | 32MB |
| RAM | CR5201B/SE5201B DDR2 64MB |
| EEPROM | 8 KB |
| Reset | Built-in Recessed Key (Restore to Factory Defaults) |
| Watchdog | Hardware built-in |
| **Network** | |
| Ethernet Interface | 2x 10/100 BaseT(X) ports with RJ-45 connectors |
| **Serial** | |
| Serial Interface | RS-232/RS-485 Software Selectable (Default: RS-232) |
| Serial Connector | Connector Type<br>• SE5201B – 1 Serial Port (TB-5 or DB-9)<br>• CR5201B– N/A |
| Protection | CR5201B/SE5201B (1.5Kv isolation) |
| Serial Port Communication | Baud-rate: 1200 ~ 230400 bps<br>Parity: None, Even, Odd, Mark, or Space<br>Data Bits: 5, 6, 7, 8<br>Stop Bits: 1, 2 Software Selectable<br>Flow Control: RTS/CTS (RS-232 only), XON/XOFF, None |
| **LED Indicator** | |
| LED indication | Power x 1<br>RUN x 1<br>LAN: 2x Orange/Yellow LED, 2x Green LED<br>COM port: SE5201B-C1/SE5201B-M1: 1x TX- LED, 1x RX-LED<br>(CR5201B doesn't has COM LED) |
| DIO | 1x DI LED, 1x DO LED,<br>(CR5201B doesn't has COM LED) |
| **Power Requirement & EMC** | |
| Input | DC Power: 9 ~ 48VDC (±10%) |
| Consumption | Max. < 8W (TBD, wait for HW update)<br>Min. < 100mW (@12VDC) |
| **Mechanical** | |
| Dimensions (W x H x D, mm) | 136 x 95 x 30 |
| Enclosure | IP30 protection, metal housing |
| **Environmental** | |
| Temperature | Operations -30°C ~ +75°C<br>Storage -40°C ~ +85°C |
| Relative Humidity | 5 ~ 95%RH, (non-condensing) |

## 7.2 Serial port Pin Assignments

### 7.2.1 CR5201B/SE5201B Pin Assignments for Serial Interfaces

**DB9 to RS-232 /RS-485 connectors**

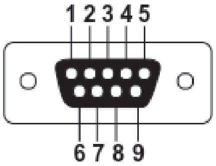


Figure 7-1 DB9 Pin Number

Table 7.2 CR5201B/SE5201B Pin Assignment for DB9 to RS-232 /RS-485 Connector

| Pin# | RS-232<br>Full Duplex | 2-Wire RS-485<br>Half Duplex |
|---|---|---|
| 1 | N/A | N/A |
| 2 | RxD | N/A |
| 3 | TxD | Data+ |
| 4 | N/A | N/A |
| 5 | SG (Signal Ground) | SG (Signal Ground) |
| 6 | N/A | N/A |
| 7 | RTS | Data- |
| 8 | CTS | N/A |
| 9 | N/A | N/A |

**5-pin (Male Terminal Block) for RS-232/RS485 Connector**

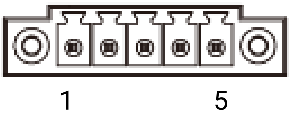


Figure 7-2 TB5 Pin Number

Table 7.3 CR5201B/SE5201B Pin Assignment for TB5 to RS-232/ RS-485 Connector

| Pin# | RS-232<br>Full Duplex | 2-Wire RS-485<br>Half Duplex |
|---|---|---|
| 1 | RxD | N/A |
| 2 | CTS | N/A |
| 3 | TxD | Data+ |
| 4 | RTS | Data- |
| 5 | SG (Signal Ground) | SG (Signal Ground) |

### 7.2.2 *CR5201B/SE5201B Pin Assignments for Terminal Block*

**3-pin 2.54mm lockable Terminal Block (CR5201B only)**

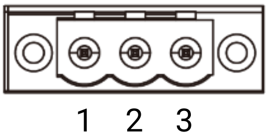


Figure 7-3 3-pin 3.81mm lockable Terminal Block

Table 7.4 CR5201B Pin Assignments for Terminal Block

| Pin# | Description |
|---|---|
| *1* | V+ |
| *2* | V- |
| *3* | F.G. |

**7-pin 45.72mm lockable Terminal Block (SE5201B only)**

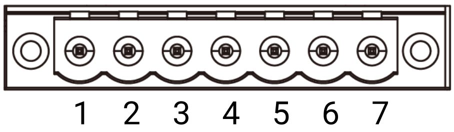


Figure 7-4  SE5201B Pin Assignments for Terminal Block

Table 7.5  SE5201B Power Connector& DIO

| Pin# | Description |
|---|---|
| *1* | DI |
| *2* | COM |
| *3* | NC |
| *4* | NC |
| *5* | V+ |
| *6* | V- |
| *7* | F.G. |

## 7.3 *LED Indicators*

Table 7.6 Color Interpretation of LED Indicators of CR5201B/SE5201B

| Name | Colour | Status | Message |
|---|---|---|---|
| PWR (Power) | 🟢 Green | Steady/On | Power On and Power is being supplied |
| | | Off | Power Off and |
| TX | 🟢 Green | Blinking | COM port is transmitting data |
| | | Off | COM port is not transmitting data |
| RX | 🟢 Green | Blinking | COM port is receiving data |
| | | Off | COM port is not receiving data |
| | | Off | COM port is not receiving data |
| DIO | 🟢 Green | On | Activated |
| | | Off | Deactivated |
| RUN | 🟢 Green | Blinking | AP Firmware is running normally |
| | | On/Off | System is not ready or halt |
| LAN | 🟠 Orange (Speed) | Solid: Link is established | Solid: Link is established<br>Blink: Transmission (Tx/Rx events) is activated |
| | | Off | Deactivated or no transmission data |
| | 🟢 Green (Data) | On | Ethernet is transmitting at 100 Mbps |
| | | Off | Ethernet is transmitting at 10 Mbps |
| LTE Cat1/Cat M1 Signal Strength | 🟢 Green | On | 0-LED on (■ ■ ■ ■) No signal (RSSI <= -95dBm)<br>1-LED on (🟩 ■ ■ ■) Poor (-95dBm > RSSI <= -80dBm)<br>2-LED on (🟩 🟩 ■ ■) Fair (-80dBm > RSSI <= -75dBm)<br>3-LED on (🟩 🟩 🟩 ■) Good (-75dBm > RSSI <= -65dBm)<br>4-LED on (🟩 🟩 🟩 🟩) Excellent (RSSI > -65dBm) |

## 7.4 *Software*

Table 7.7 Software Tools and Utilities

| **Software** | |
|---|---|
| Utility | Windows Virtual COM Driver and Linux TTY Driver: Linux 2.4.x, Linux 2.6.x, 3.x |
| Configuration Tool | ■ Web console<br>■ Serial console<br>■ SSH console<br>■ Telnet console<br>■ **Network Management Utility©** |

# 8 Warranty

### Limited Warranty Conditions

Products supplied by Atop Technologies Inc. are covered in this warranty for undesired performance or defects resulting from shipping, or any other event deemed to be the result of Atop Technologies Inc. mishandling. The warranty does not cover; however, equipment which has been damaged due to accident, misuse, abuse, such as:

- Use of incorrect power supply, connectors, or maintenance procedures
- Use of accessories not sanctioned by us
- Improper or insufficient ventilation
- Improper or unauthorized repair
- Replacement with unauthorized parts
- Failure to follow our operating Instructions
- Fire, flood, "Act of God", or any other contingencies beyond our control.

### RMA and Shipping Reimbursement

- Customers must always obtain an authorized **"RMA" number** from us before shipping the goods to be repaired.
- When in normal use, a sold product shall be replaced with a new one within 3 months upon purchase. The shipping cost from the customer to us will be reimbursed.
- After 3 months and still within the warranty period, it is up to us whether to replace the unit with a new one; normally, as long as a product is under warranty, all parts and labour are free-of-charge to the customers.
- After the warranty period, the customer shall cover the cost for parts and labour.
- Three months after purchase, the shipping cost from the customer to us will not be reimbursed, but the shipping costs from us to the customer will be paid by us.

### Limited Liability

Atop Technologies Inc. shall not be held responsible for any consequential losses from using our products.

### Warranty

Atop Technologies Inc. provides a 5-year maximum warranty for Low-Power Gateway products.

*Atop Technologies, Inc.*

www.atoponline.com

## Technical Support

www.atoponline.com/request-support

## Contact Information

www.atoponline.com/contact-us/