UC-8540 Series Software User's Manual (MIRF)

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www.moxa.com/product

UC-8540 Series Software User's Manual (MIRF)

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Introduction

In this manual, we briefly introduce the MIRF 2.0 tool and show you how to use it on the UC-8540 computer. Moxa's Mobile Intelligent Routing Framework (MIRF) is an open-platform, multiple-WAN management tool that helps provide unbeatable wireless service for train passengers as the train travels through different regions. As a train enters a new region, it must contend with different wireless interfaces such as Wi-Fi, UMTS, HSPA, WiMAX, and LTE. MIRF's full-stack software framework simplifies the coding of multiple-WAN routing applications for wireless computers, speeding up application development processes and significantly shortening custom development times.

2

Basic Configuration

1. Connect your PC/Notebook and UC-8540's LAN2 to the same network.

2. Open a browser and connect to https://192.168.4.127.

3. Click **Get Started** to continue and type the default username and password:
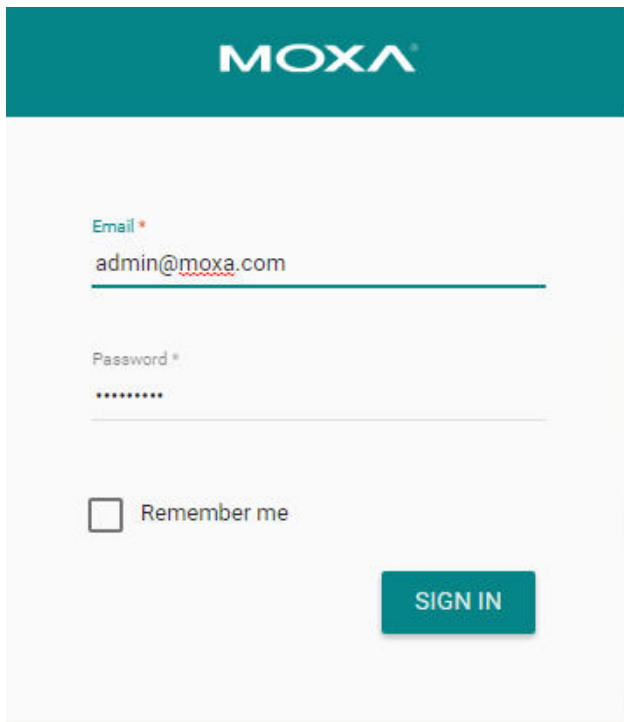
   Username: admin@moxa.com
   Password: admin1234

   For the root account, use the following information:
   Username: root@moxa.com
   Password: root1234

4. Click **Sign In** to continue. The MIRF 2.0 dashboard and configuration page is displayed.
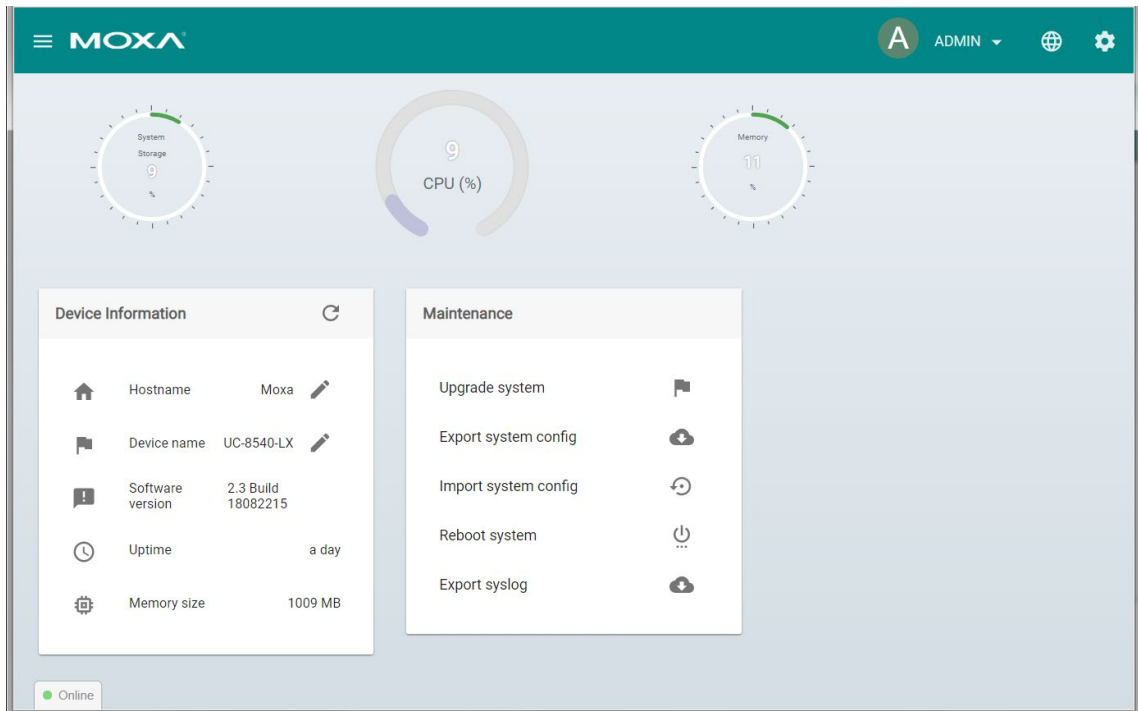
Dashboard Component	Description
System	Indicates how the system storage capacity is used
CPU	Indicates the current CPU usage
Memory	Indicates the current system memory usage

3

Editing User Profiles

After you have successfully connected to the UC-8540, you can start configuring the MIRF 2.0 functions. You might first want to update your user profile.

To update your profile:

1. Click on the ADMIN box on the upper-right corner of the main page and select **Profile**.
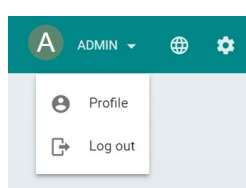
2. Click on **EDIT** to edit the profile.
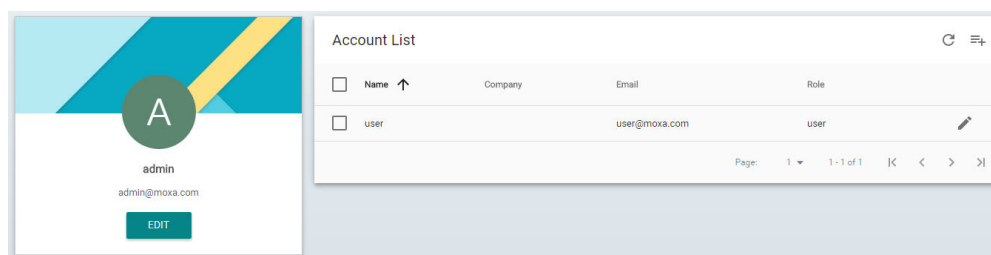
3. Click **SAVE** to save the changes.

To add new users, click the add icon on the top right corner of the screen.

4

Using the Control Panel

The following topics are covered in this chapter:

❒ **Using the Control Panel**
❒ **Device Information**
❒ **Editing the Hostname**
❒ **Editing the Device Name**
❒ **Checking the Software Version**
❒ **Checking the System Uptime**
❒ **Checking the System Memory Size**

Using the Control Panel

MIRF 2.0 provides a control panel that you can use to view, enable, or disable specific system settings. Click the Control Panel icon on the main page to access the panel.
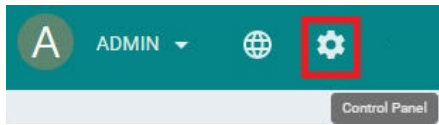
You can view the current status of the settings or enable/disable the settings directly from the Control Panel page.
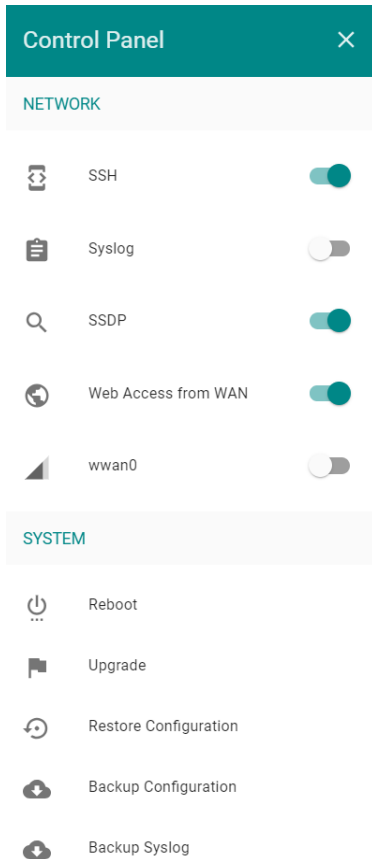
WARNING

Turning off the **Web Access from WAN** setting will disconnect MIRF 2.0 from the Server.

Device Information

This function allows users to update system hostname and device name, and view the system status, such as software version, system uptime, and system memory size.
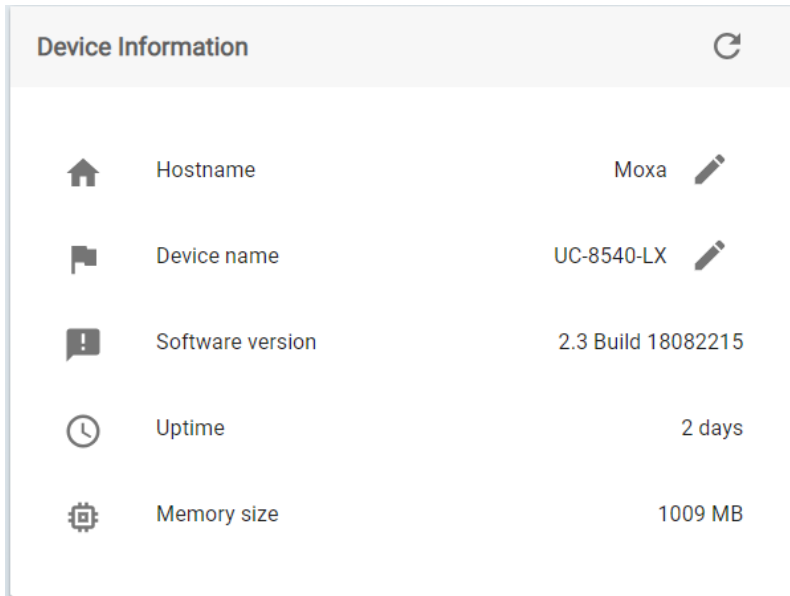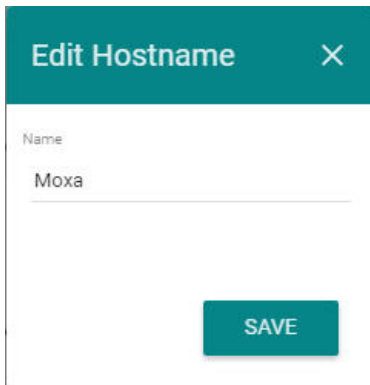

Editing the Hostname

On the **Device Information** page, click the edit icon to edit the hostname.

Provide the hostname in the field. When finished, click **SAVE**.
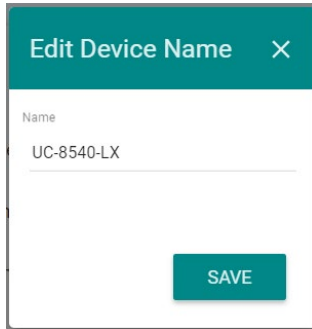
Editing the Device Name

In **Device Information**, click the edit icon, and edit the device name

Provide the device name in the field. When finished, click **SAVE**.

Checking the Software Version

You can check the software version from the control panel.

Software version   2.3 Build 18082215

Checking the System Uptime

You can check the system uptime from the control panel.

Uptime   2 days

Checking the System Memory Size

You can check the system memory size from the control panel.

Memory size   1009 MB

5

Maintenance

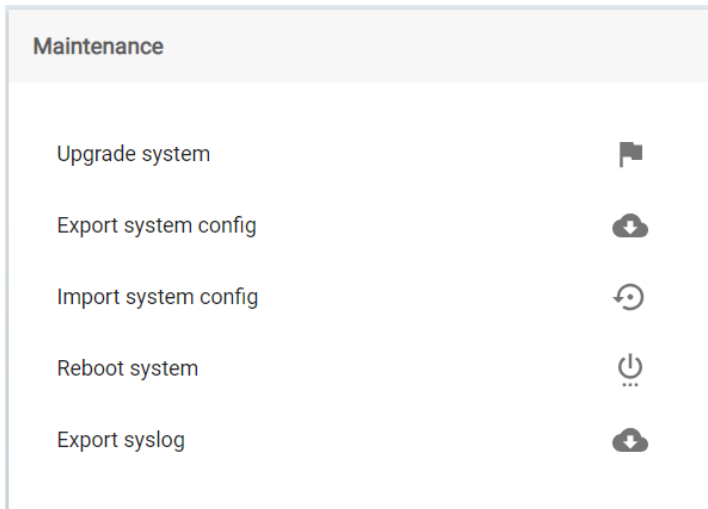The following topics are covered in this chapter:

❒ **Maintenance**
❒ **Upgrading the Firmware**
❒ **Exporting the System Configuration File**
❒ **Importing a System Configuration File**
❒ **Rebooting the System**
❒ **Exporting the System Log Files**

Maintenance

This function allows users to update various system settings.

Maintenance	
Upgrade system	⚑
Export system config	☁
Import system config	↺
Reboot system	⏻
Export syslog	☁

Upgrading the Firmware

On the **Maintenance page**, click the icon next to **Upgrade system** to use the firmware provided by Moxa.

Upgrade system	⚑

Select the firmware file (*.**frm)** or drop the file into the upgrade page.

Upgrade System ✕

Click to select a file or drop a file here!
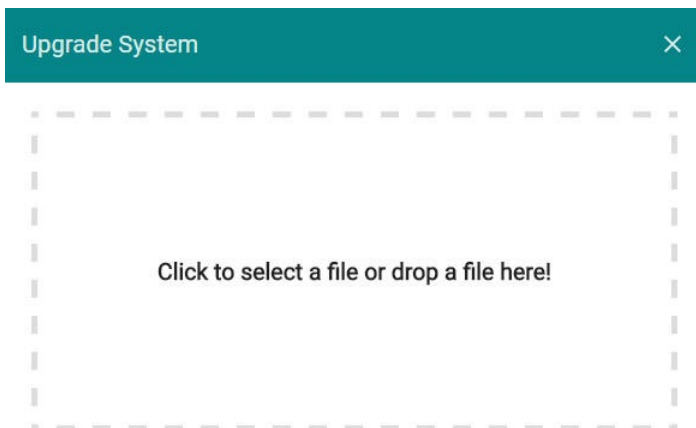
Wait for a few minutes for the system to upgrade.

⚠ **ATTENTION**

A system upgrade that uses an incorrect firmware file can cause system damage or failure. Contact Moxa technical support before upgrading your system.

Exporting the System Configuration File

On the **Maintenance** page, click the icon next to **Export system config**.

Export system config

A system configuration file in the **tar.gz** format will be downloaded to your computer.

Importing a System Configuration File

On the **Maintenance** page, click the icon next to **Import system config**. This function can help restore your system to a previous status.

Import system config

You can select the specific items you want to recover or select **All** to recover the whole system.

Import System Config			✕
☐ All			
☐ System	☐ Ethernet	☐ Cellular	
☐ DHCP Server	☐ DNS	☐ Serial	
☐ Time	☐ Port Forwarding	☐ OpenVPN Client	
☐ Data Logger (Overwrite Only)	☐ Applications	☐ User Programs	
☐ CS Remote Control			

Click to select a file or drop a file here!

Rebooting the System

On the **Maintenance** page, click the icon next to **Reboot system**.

Reboot system

Click **Yes** to reboot the system.

Would you like to reboot the system ?

You will need to wait a few minutes while the system restarts.

CANCEL   YES

The following screen will appear,

Wait for the reboot process to finish.

Connection is down because system is rebooting.

Wait for the system to reboot before reconnecting, and please note that the IP address may change.

Exporting the System Log Files

On the **Maintenance** page, click the icon next to **Export syslog**.

Export syslog

A system log file in the **tar.gz** format will be downloaded to your system.

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Configuration Menu

The following topics are covered in this chapter:

- ❒ **Configuration Menu**
- ❒ **Configuring MIRF 2.0**
- ❒ **Configuring a Gateway**
- ❒ **Configuring Network Settings**
- ❒ **Configuring WAN Settings**
- ❒ **Configuring LAN Settings**
- ❒ **Configuring Wi-Fi Settings**
- ❒ **Configuring Cellular Settings**
- ❒ **Configuring Routing Client Settings**
- ❒ **Configuring OpenVPN Client Settings**
- ❒ **Configuring SSH Settings**
- ❒ **Configuring QoS Settings**
- ❒ **Configuring Load Balance Settings**
- ❒ **Configuring SNMP Settings**
- ❒ **Configuring VRRP Settings**
- ❒ **Configuring Firewall Settings**
- ❒ **Configuring System Settings**
- ❒ **Configuring Serial Settings**
- ❒ **Configuring the System Time**
- ❒ **Configuring Admin Settings**
- ❒ **Configuring GPS Settings**
- ❒ **Configuring Remote Control Settings**

Configuration Menu

You can use the configuration menu for various MIRF 2.0 settings.
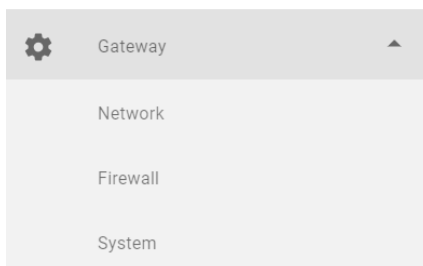
Configuring MIRF 2.0

This section helps you configure your MIRF 2.0. Click the menu bar icon to continue.
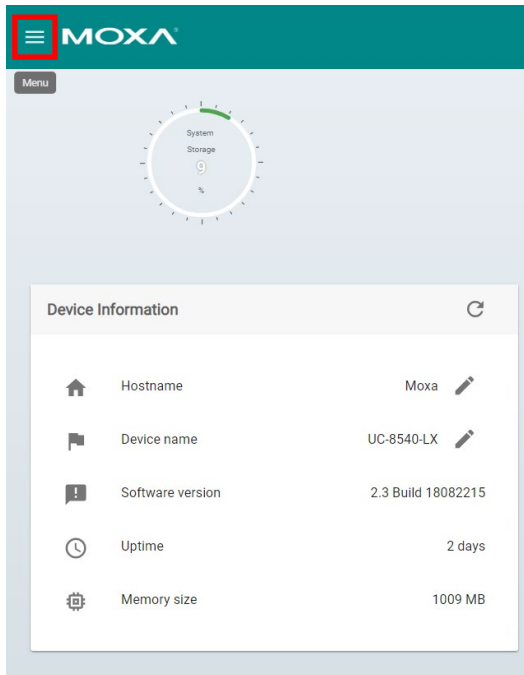
Configuring a Gateway

Click **Gateway** to configure settings such as Network, Firewall, and System.

Configuring Network Settings

This function includes various settings, including LAN, Wi-Fi, Cellular, DCHP Server, DNS, OpenVPN Client, and SSH.

Configuring WAN Settings

Click **WAN** to view the current WAN settings.

To configure the WAN interface settings:

1. Click **Edit**.

2. Specify the necessary information, such as IP address, Netmask, Gateway, Primary DNS, and Secondary DNS for the WAN interface.

    The default **WAN Type** is `Static`. To change it, select `DHCP` for **WAN Type** and slide the scroll bar to **Enable option 61.** Select the condition for based on which the DHCP server should assign IPs.

NOTE	Specify the IP address of the UC-8540 device in the **IP Address** field and the IP address of the router that the UC-8540 will connect to in the **Gateway** field.

3. Click **SAVE**.

Configuring the IPSec Mode

You can select from two IPSec modes: **Transport** mode and **Tunnel** mode.

Transport Mode

Local Machine

Out SPI: 10000
In SPI: 20000

IPSec Encrypted Tunnel

Remote Host

IP: 10.127.1.1
Out SPI: 20000
In SPI: 10000
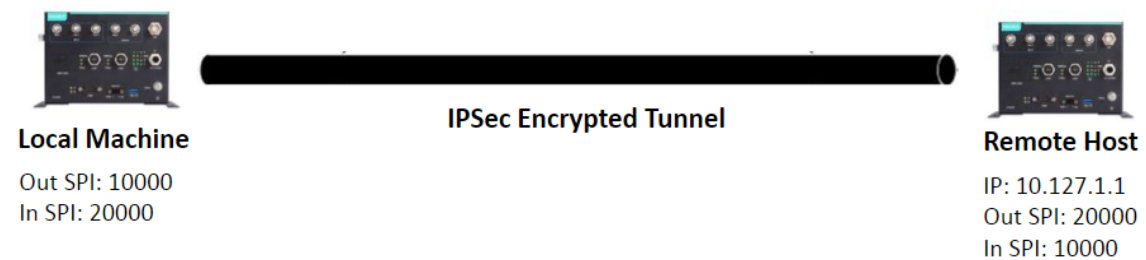
To Configure Transport mode, do the following:

1. Select the **Transport** option.
2. Specify the necessary information: **Remote Host IP**, **Out SPI**, and **In SPI**.
3. **Enable Authentication** and **Enable Encryption** if you want these functions to be activated
4. Select a **WAN IP Type**.
5. Click **SAVE** to apply the changes.

NOTE	The **Out SPI** of the local machine should be the same as the **In SPI** of the remote Host and vice versa.

NOTE   The Authentication key for the local machine should be the same as the remote host. The same applies to the Encryption key.

ETH0

Wan Type
IPSec

IPSec Mode

◉ Transport

○ Tunnel

Remote Host IP *
10.127.1.1

Out SPI *
10000

In SPI *
20000

🔵 Authentication
Authentication Key *
0123456789123456

🔵 Encryption
Encryption Key *
123456789012345678901234

WAN IP Type

◉ DHCP

○ Static

Tunnel Mode

Local Machine
VPN IP: 192.168.0.1

IPSec Encrypted Tunnel

Remote Host
IP: 10.127.1.1
VPN IP: 192.168.1.1
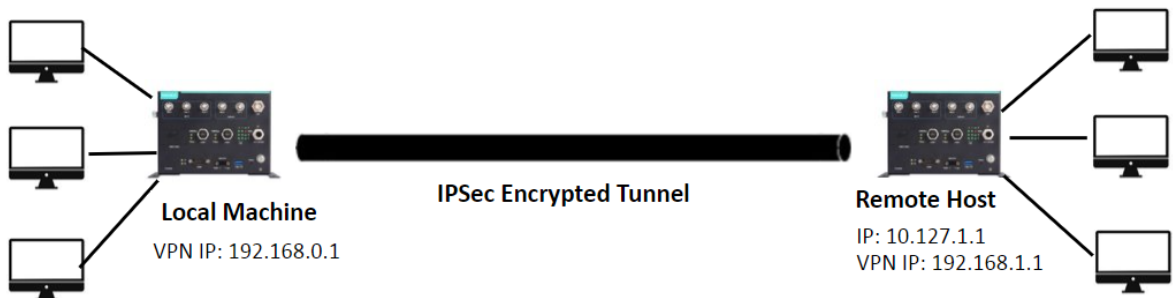
To configure Tunnel mode, do the following:

1. Select the **Tunnel** option.
2. Specify the necessary information: **Remote Host IP**, **Local VPN IP**, **Local VPN Netmask**, **Remote VPN IP**, and **Remote VPN Netmask**.
3. Specify the **Pre-shared Key**.
4. Select the hash and encryption algorithm
5. Select a **WAN IP Type**.
6. Click **SAVE** to apply the changes.

Configuring LAN Settings

Click **LAN** to view the current LAN settings on the main page. Edit to configure the settings

Check **Enable** if you want DHCP Server to be activated

Configure the DHCP server for **ETH1**. Provide the necessary information, such as **Start IP, End IP, Lease time, Primary DNS, Secondary DNS**, and **Domain name**.

Configure all settings. When finished, click **SAVE**.

Configuring Wi-Fi Settings

The UC-8540 can support both Wi-Fi AP and client modes.

To configure the Wi-Fi Client mode, do the following:

1. Select the **Wifi Client** operation mode and click **Add a Wi-Fi Network**

2. Click **SCAN**
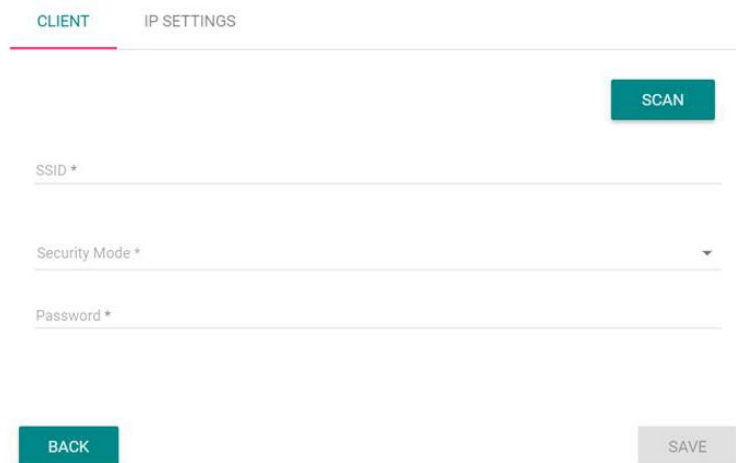
3. Select a Wi-Fi AP from the AP List
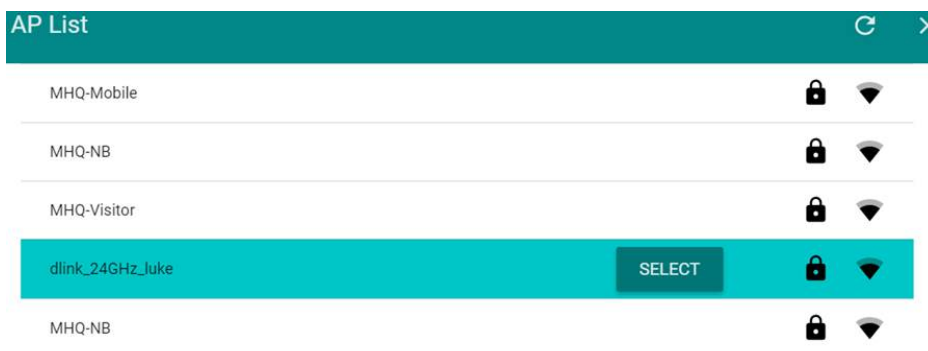
4. Configure Security mode and Password and then Click Save

CLIENT   IP SETTINGS

SCAN

SSID *
dlink_24GHz_luke

Security Mode *
WPA/WPA2 Personal   ▼

Password *

BACK   SAVE

WIFI   ↻   ⊞

CLIENT   **NETWORK**

○ DHCP

⦿ Static IP

IP *
127.0.0.1

Netmask *
127.0.0.1

Gateway
127.0.0.1

DNS 1
127.0.0.1

DNS 2
127.0.0.1

SAVE

5. Check **Enable** if you want this function to be activated and then Click Save

◉ Enable Wireless Client   ☰+

☐   dlink_24GHz_luke   WPA/WPA2 Personal   ✎

SAVE

6. Click on the **WAN** link and go to the **WLAN0 tab** to configure the IP settings.
    You may choose to set your IP using **DHCP** or **Static**. If you select **Static**, enter all the necessary
    information, and click **SAVE**.
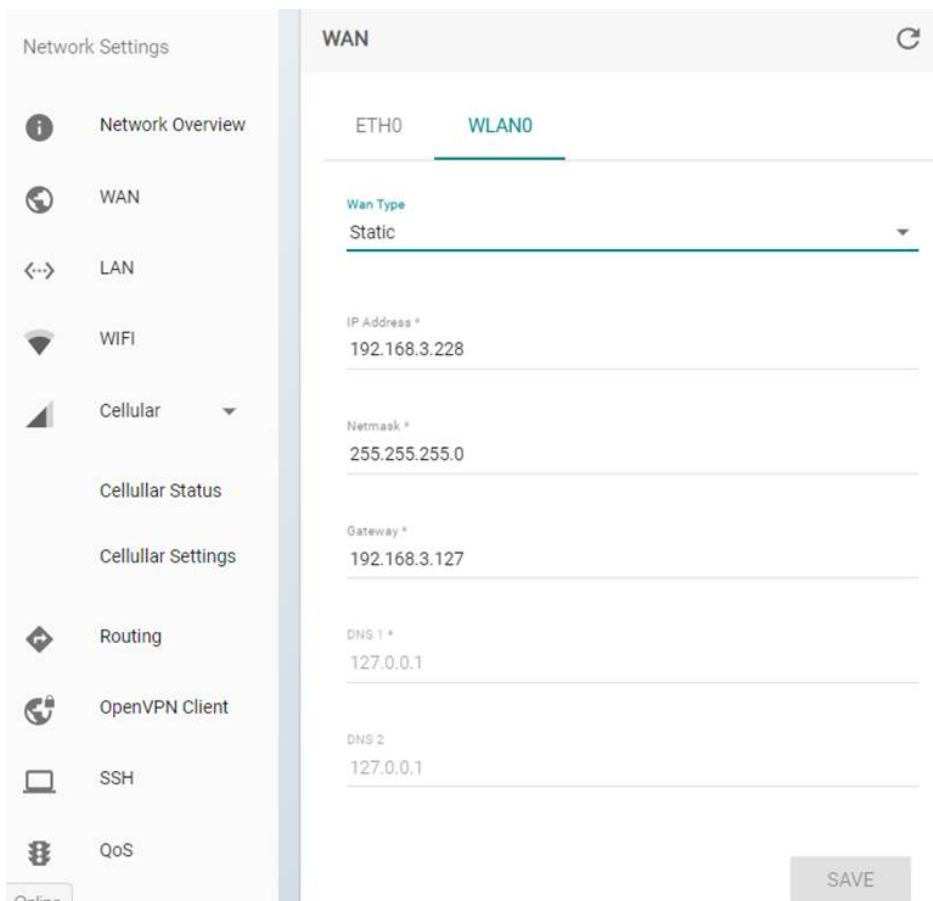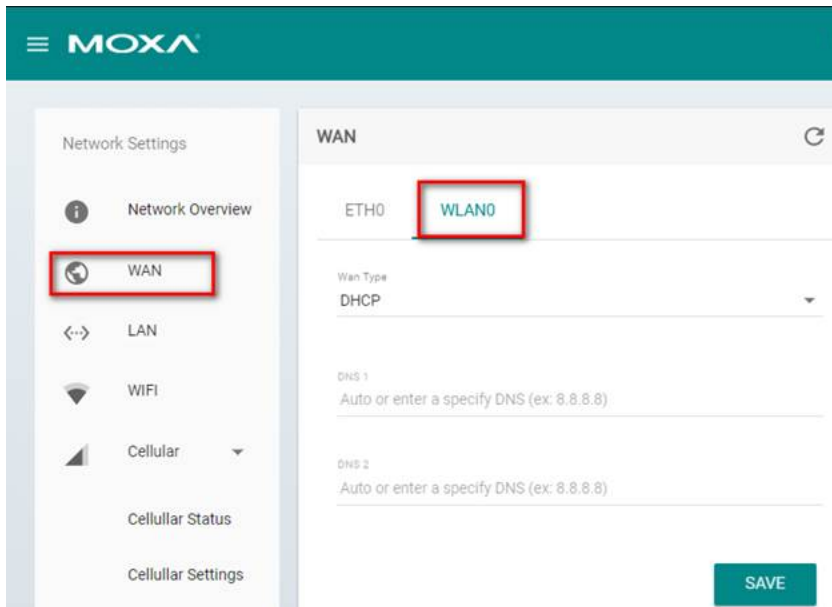
7. Click on the **Network Overview** link and go to the **WLAN0** tab to check wireless client status.

To configure the Wi-Fi AP mode, do the following:

1. Select the **Access Point** operation mode and configure the SSID and Password.

2. If you need to configure advanced options of Wi-Fi Access point, Click **Show ADVANCE.**

    The default Security mode is WPA/WPA2 Personal

3. Click **SAVE**.

Configuring Cellular Settings

Click **Cellular Status** to view the current cellular settings, including basic information, IP information and data usage.

To configure the cellular settings, do the following:

1. Click on the **Cellular Settings** link and click on the edit icon.

a. Turn on **Enable Cellular Module** to enable the WWAN0 interface.
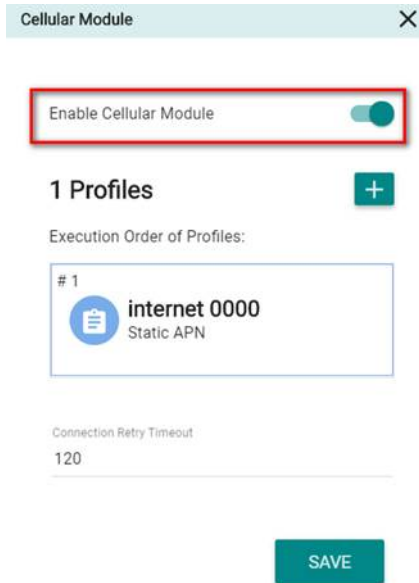
b. Click on the default cellular profile and configure cellular settings
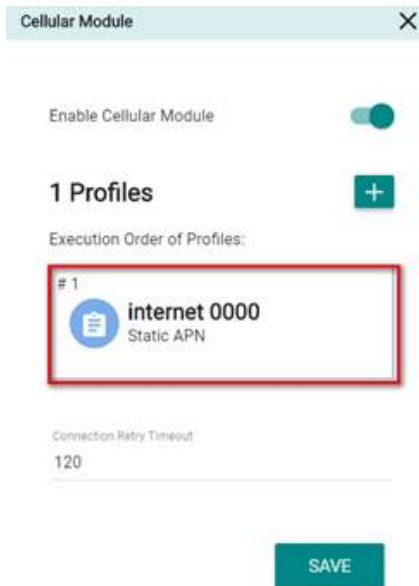
NOTE	UC-8540 supports dual SIM slots for one cellular module allows you to use the same or different cellular providers for redundancy. To use dual SIM for redundancy, you need to create second Cellular profile.

c. Select the **Static APN** option (default)**,** Configure APN settings**,** select the **SIM** slot, and configure **Pin Code**.

d. Click **SAVE**.

e. Click on **Cellular Status** to check the connection status**.**

2. Configure the **Keep-Alive** function.

    Sometimes cellular connection may be terminated abnormally. Enable Keep-Alive function to set the UC-8540 to check the cellular the connection by performing remote host Ping. If the connection check fails after 3 retries, the UC-8540 starts the connection recovery process.

    a. To enable the keep-alive function, click on the edit icon.

    Keep-alive

    Target Host   8.8.8.8
    Ping Interval   60
    Reboot Setting   On
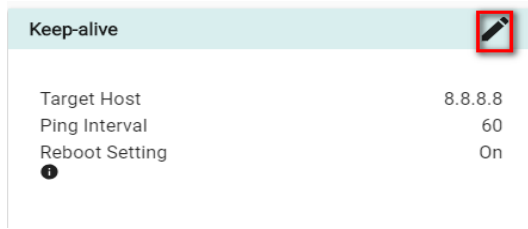
    b. Slide the **Enable Keep-alive** scroll bar and specify the Target Host and Ping Interval. You can also choose to **Reboot system after disconnected from Internet for 20 min**. When finished, click **SAVE**.

    Keep-alive   ✕

    Enable Keep-alive

    Target Host
    8.8.8.8

    Ping Interval
    60

    ☑ Reboot system after disconnected from internet for 20 mins
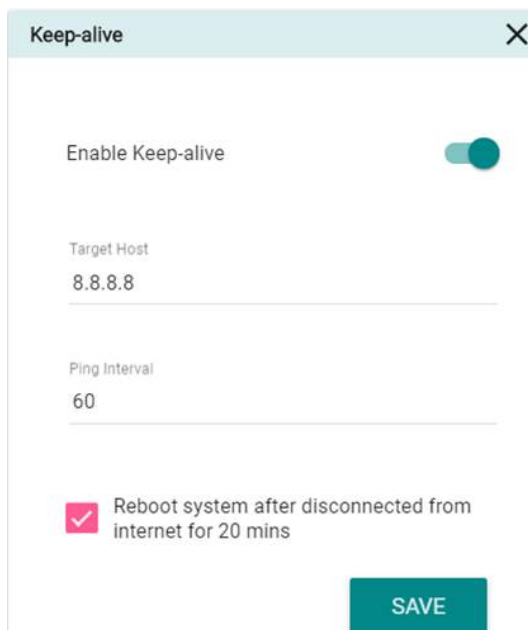
                                                          SAVE

3. Configure **Switch Carrier**

    If you use a North American telecommunication provider, you can select a provider from the drop-down list.
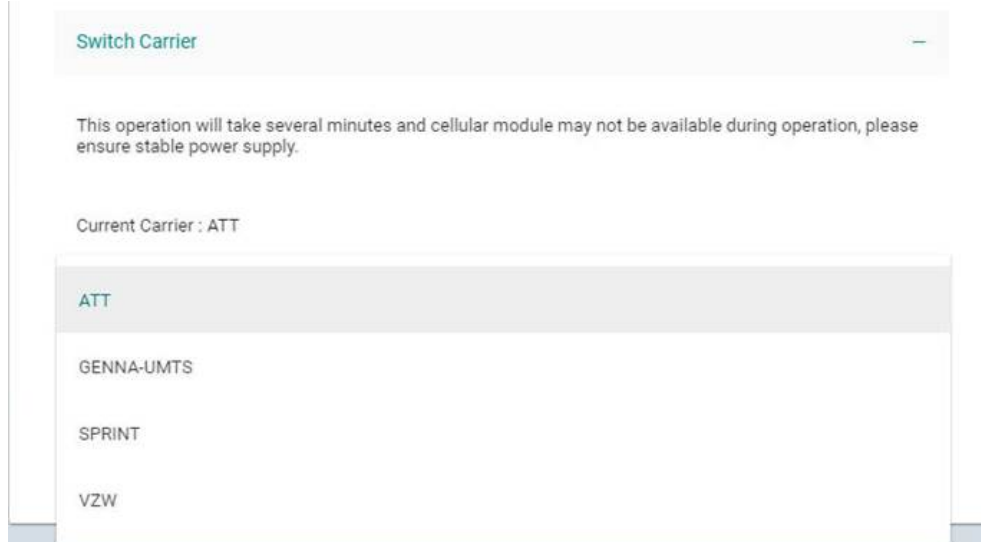
    Switch Carrier   —

    This operation will take several minutes and cellular module may not be available during operation, please ensure stable power supply.

    Current Carrier : ATT

    ATT

    GENNA-UMTS

    SPRINT

    VZW

When finished, click **Save**.

Configuring Routing Client Settings

Click on the **Routing** link to view the current routing settings.

Select an interface and click the up or down arrows to change the routing priority. Click **SAVE.**

Configuring OpenVPN Client Settings

Click **OpenVPN Client** to view the current OpenVPN settings.

To configure the settings, click the edit icon.
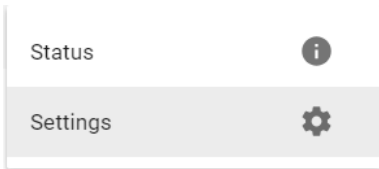
Select **Settings**.

You can download an OpenVPN setting sample file by clicking on the download icon.
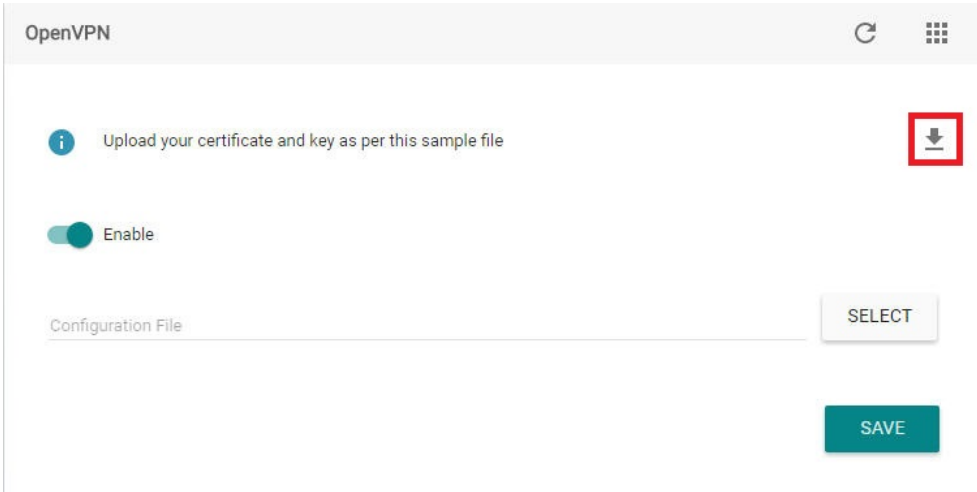
Select **Enable**, and then select the file from your computer, and then upload to the MIRF 2.0. When the file upload is complete (as indicated by the status bar), click **SAVE**.

Check the **Connection status** icon. If the icon is green, the OpenVPN client is connected. If the icon remains gray, the client is not connected.
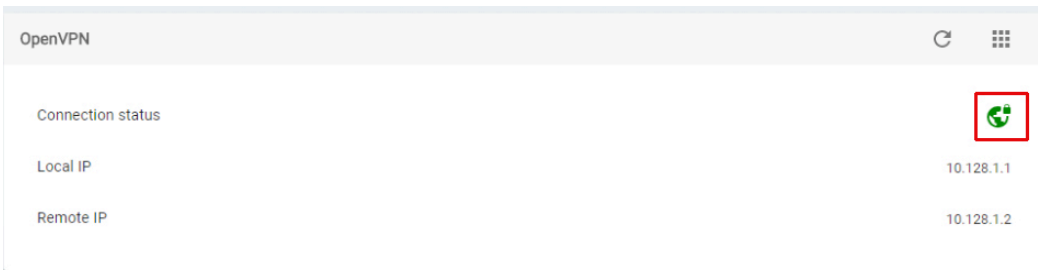
Configuring SSH Settings

Click **SSH** to view the current SSH settings.
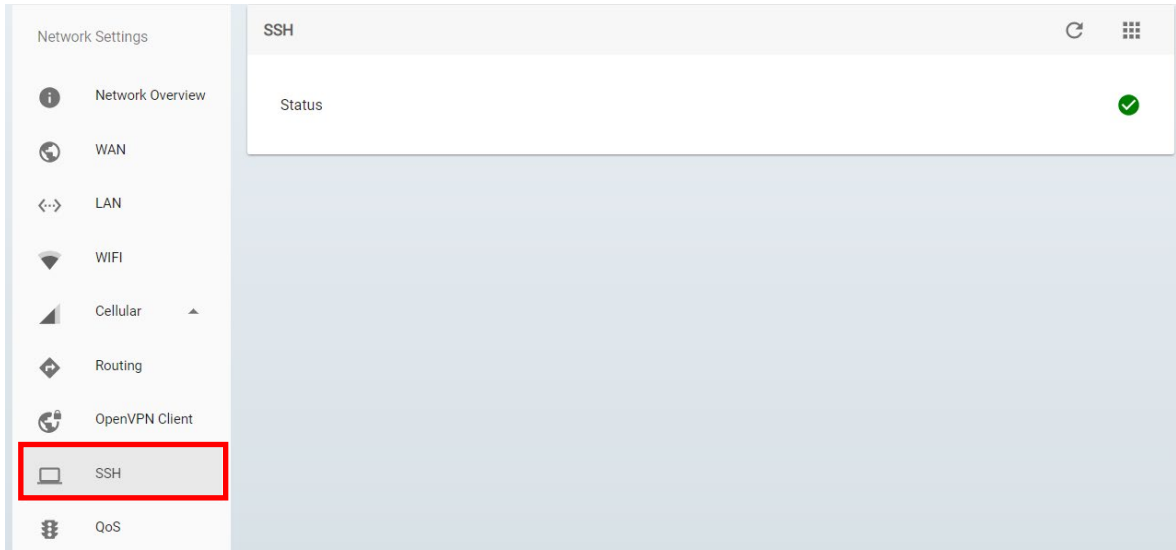
To configure the settings, click the edit icon.
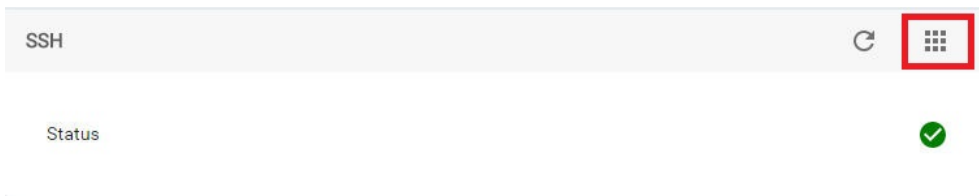
Select **Settings** to continue.
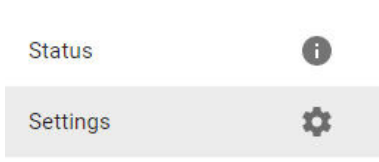
Select **Enable** and provide password. When finished, click **SAVE**.
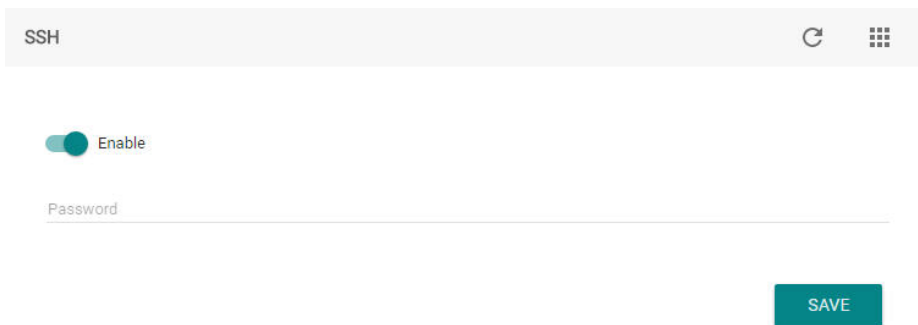
Configuring QoS Settings

Click **QoS** to view the current QoS settings.
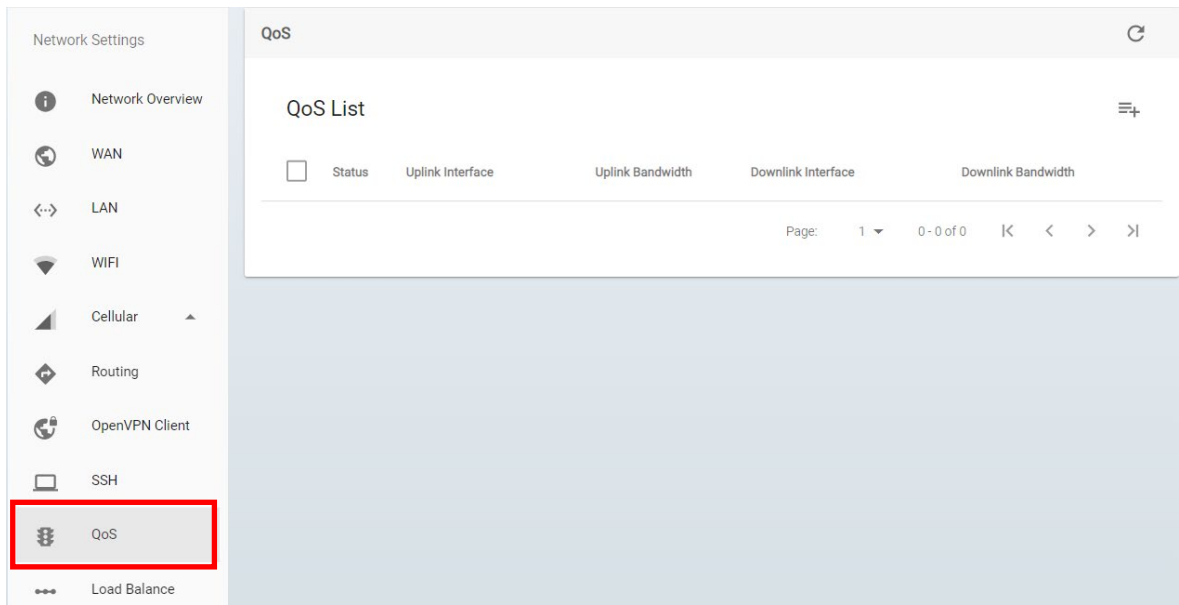
To add a new rule for QoS List, click the icon.
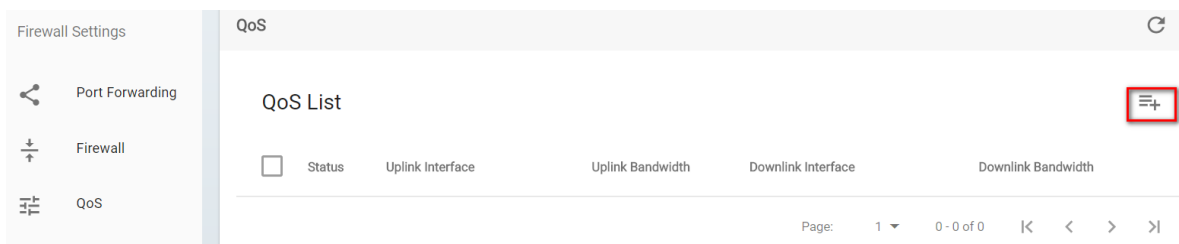
Select **Enable**, and then provide the necessary information. When finished, click **SAVE**.

Configuring Load Balance Settings

Click **Load Balance** to view the current Load Balance settings.

Select specific interface and click arrow to set load balance priority. Scroll the Toggle bar to set the weight of specific interface, click **SAVE**

Configuring SNMP Settings

Click **SNMP** to view the current SNMP settings.

To configure the settings, click the edit icon.
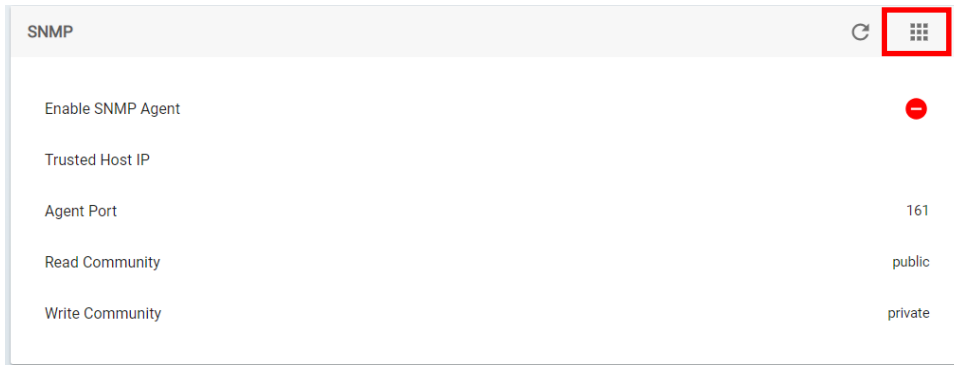
Select **Settings** to continue.
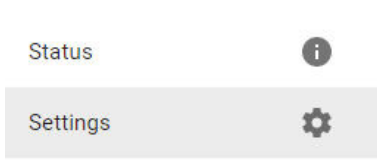
Select **Enable** SNMP Agent. Edit **Trusted Host IP** and **Agent Port**, click **SAVE**.
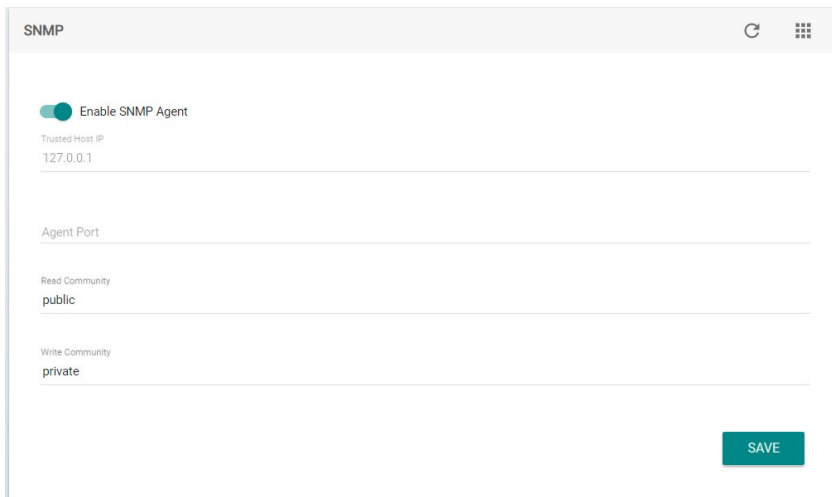
Configuring VRRP Settings

The Virtual Router Redundancy Protocol (VRRP) enables a group of routers to form a single virtual router with a virtual IP address. The LAN clients can then be configured with the virtual router's virtual IP address as their default gateway. The virtual router is the combination of a group of routers, also known as a VRRP group

Click **VRRP** to view the current VRRP settings.
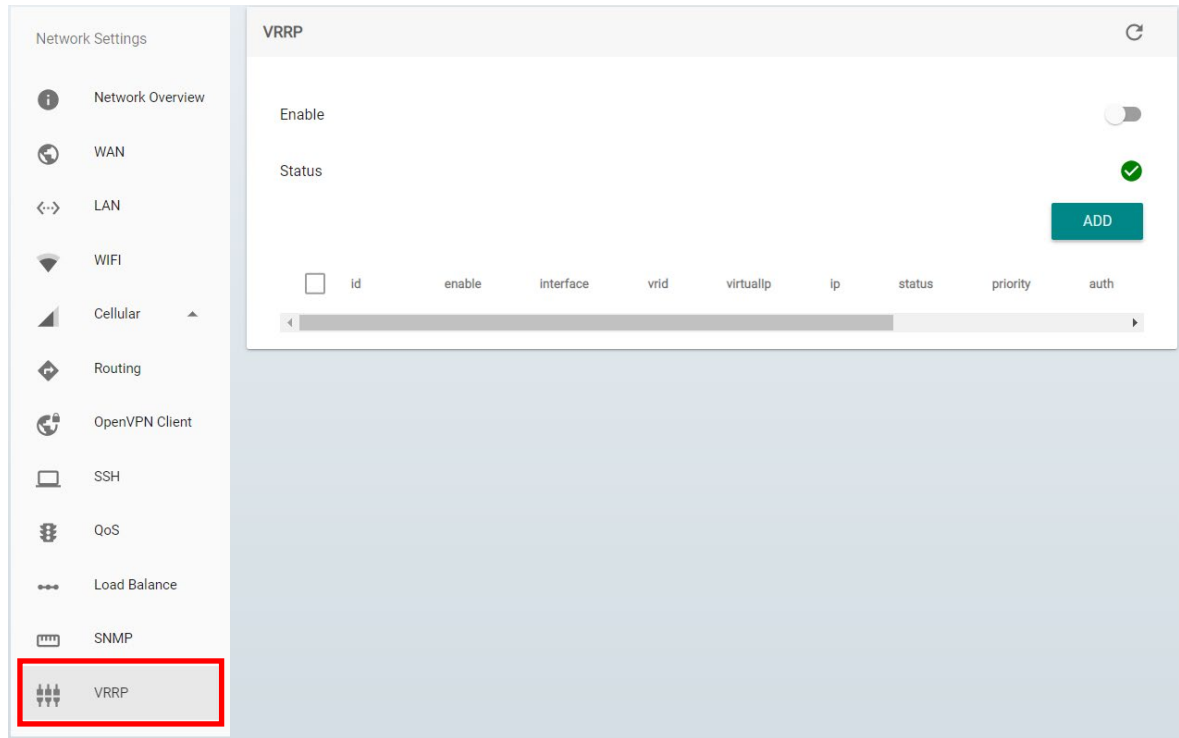
To configure the settings, click the **ADD** icon.

Check **Enable Entry** to create VRRP entry and configure **Virtual IP** & **Priority**.

Determines priority in a VRRP group. The priority value range is 1 to 245, with 245 the highest priority and default priority is 100. If several settings have the same priority, the router with higher IP address will have the higher priority. The usable range is "1 to 254".

Set authority for current entry and input password if necessary

Set Advertisement Interval for from 1 to 255 seconds, with default 1 second.

Check to enable Preemption Mode

NOTE	Enabling **Preemption Mode** allows the primary router to be preempted by a backup router with a higher priority.

Select **Enable** after adding all VRRP entries.

Configuring Firewall Settings

To configure firewall settings, select **Firewall** from the main menu.
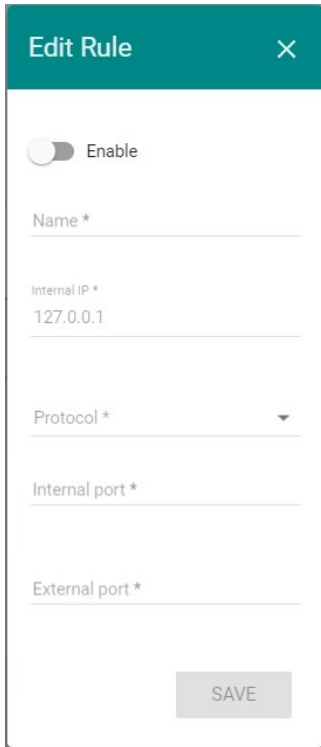
Select **Port Forward** to view the current firewall settings.
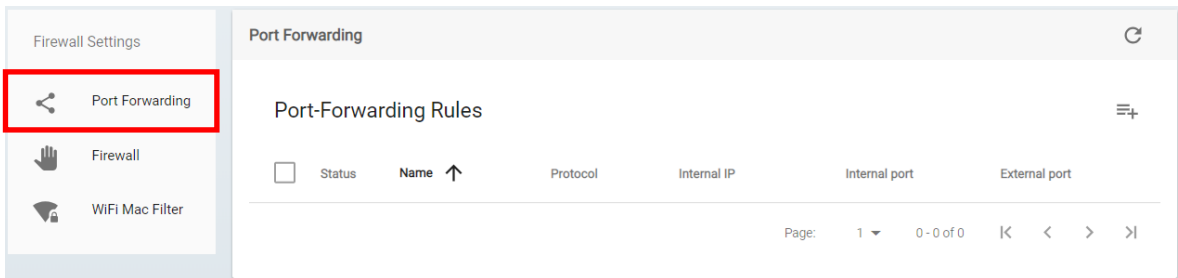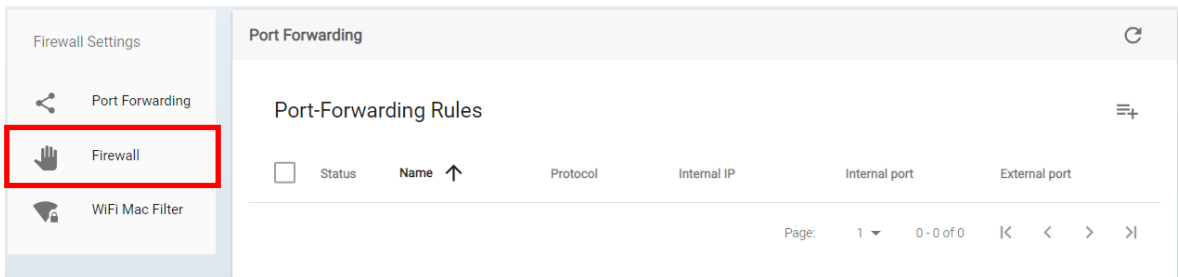
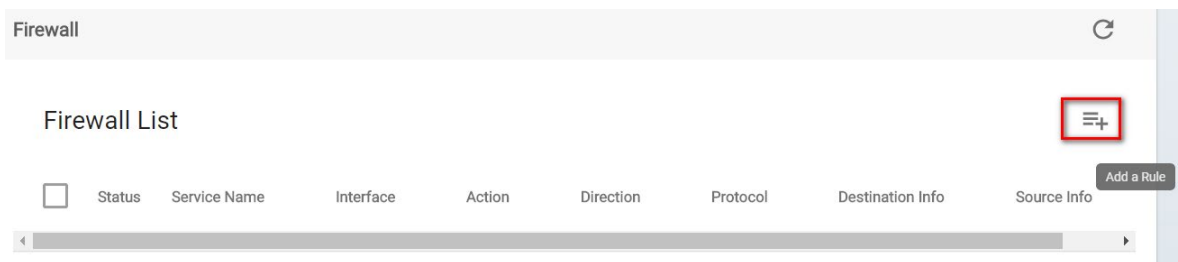To add a new rule for port forward, click the icon.
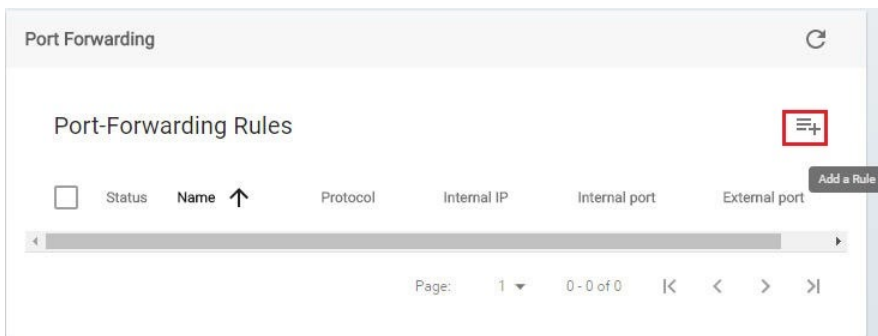
Select **Enable**, and then provide the necessary information. When finished, click **SAVE**.

Select Firewall to view the current firewall settings.

To add a new rule for Firewall, click the icon.

Select **Enable**, and then provide the necessary information. When finished, click **SAVE**.

Select **WiFi Mac Filter** to view the current MAC Filter settings.

To add a new rule for MAC Filter, click the edit icon.
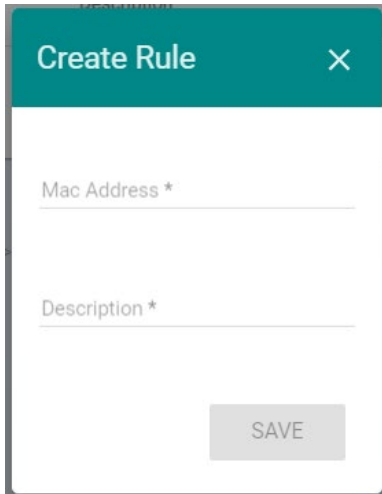
Edit MAC Address and related description, click **SAVE**.

Configuring System Settings

Select **System** from the menu.
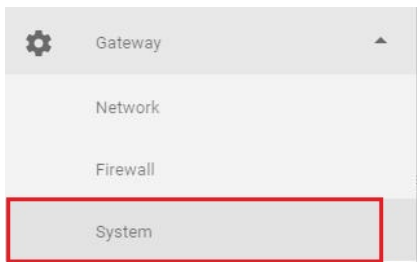
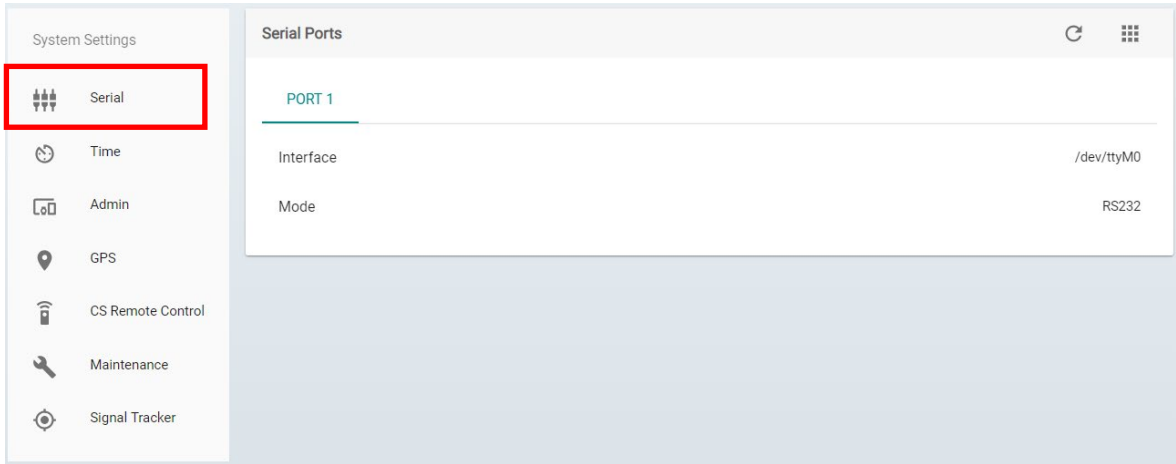System settings include various options, such as **Serial**, **Time**, **Admin**, **GPS**, **CS Remote Control**, **Maintenance** and **Signal Tracker**.
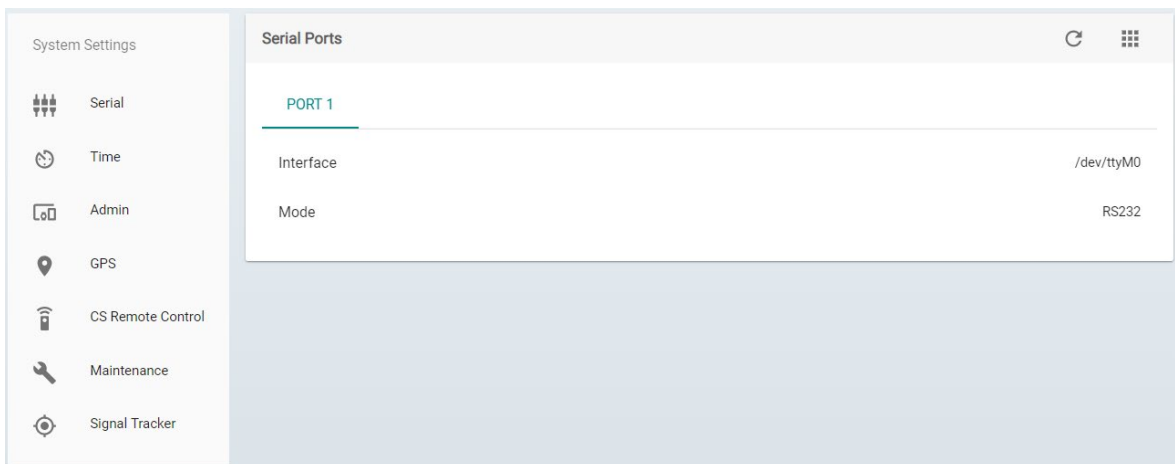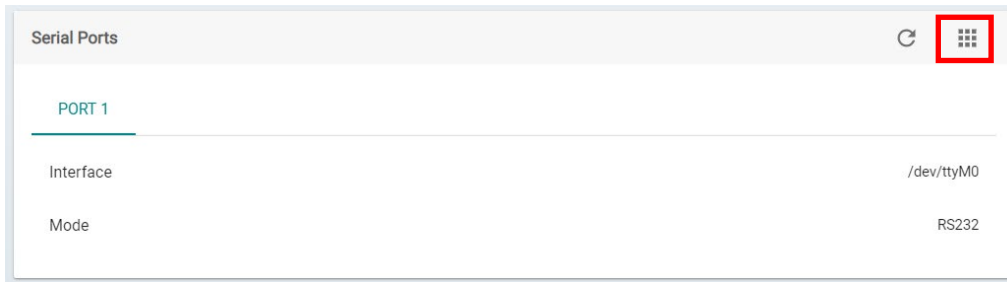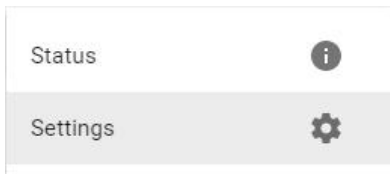
Configuring Serial Settings

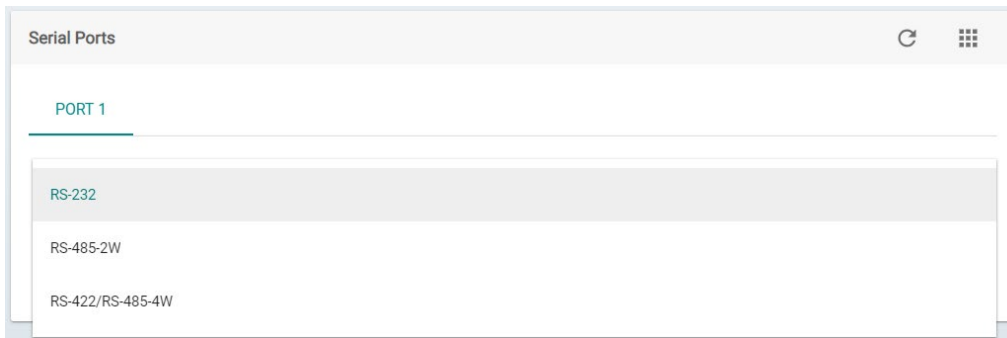Select **Serial** to view the current serial settings.

To configure the serial settings, click the edit icon.
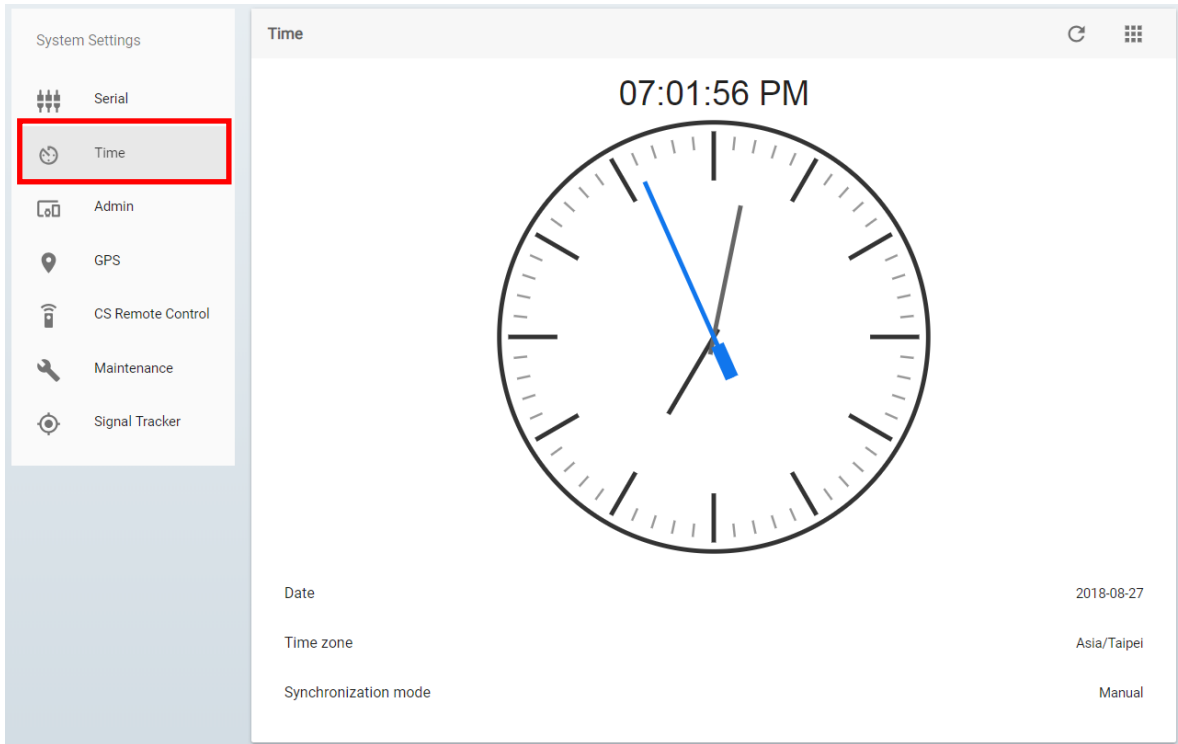

Select **Settings**.

Configure the serial port interface by selecting from the drop-down list. When finished, click **SAVE**.
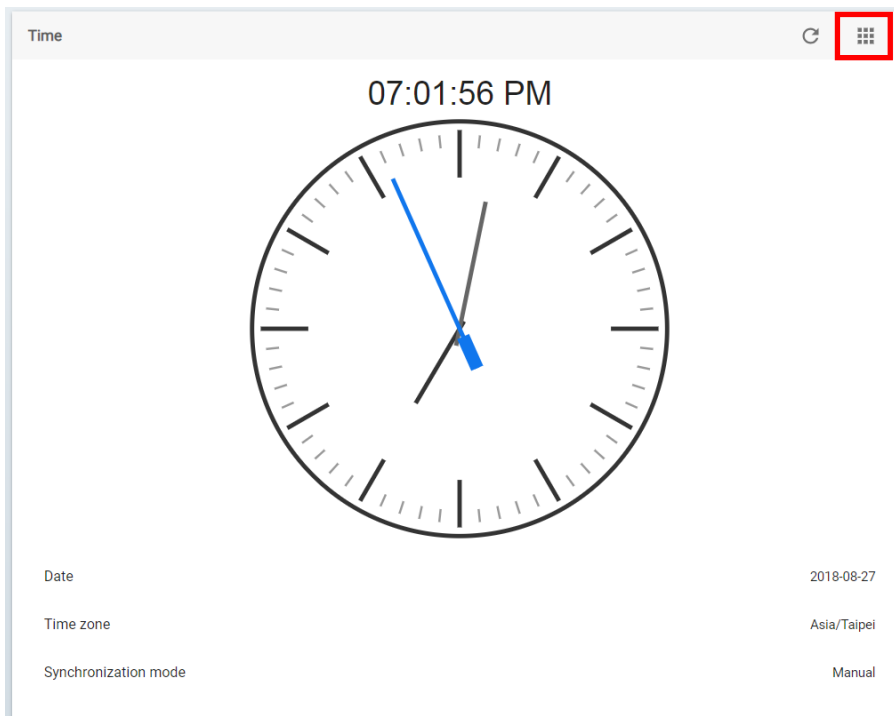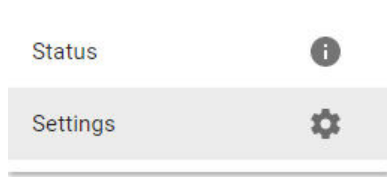
Configuring the System Time

Select **Time** to view the current system time.

To configure the system time, click the edit icon.

Select **Settings**.

Select **Synchronization Mode** if you want to specify the **Time Server** name and **Time Interval** values. When finished, click **SAVE**.

Configuring Admin Settings

Select **Admin** to view the current HTTP/HTTPS services settings and corresponding port number.
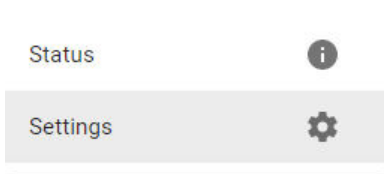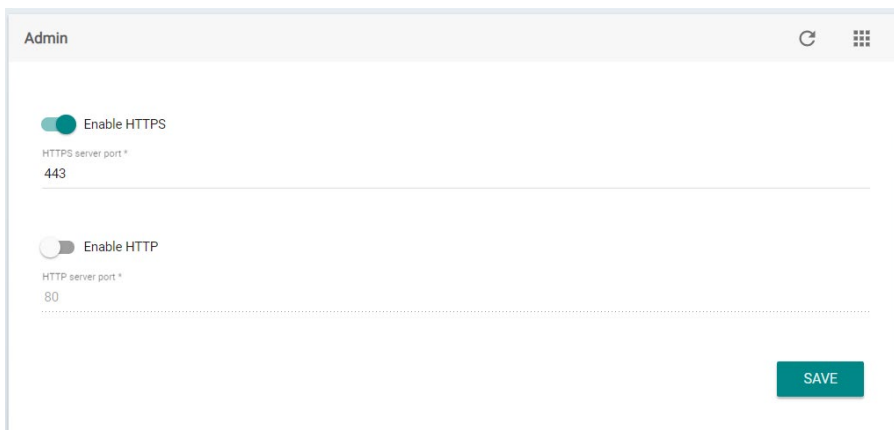
To configure the settings, click the edit icon.

Select **Settings**.

Use the Toggle bars to enable/disable HTTPS and HTTP services for the current ThingsPro Gateway. You can assign a port to each of these two services. When finished, click SAVE.
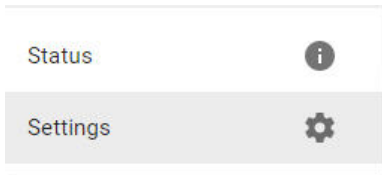

Configuring GPS Settings

Select GPS to view the current GPS settings.

To configure the GPS settings, click the edit icon.

Select **Settings**.

Select **Enable** to automatically receive GPS data. Specify the allocated interface for the major GPS module and set the data refresh interval. Click **SAVE**.

If you don't enable the GPS function, you can manually enter the Latitude and Longitude values in the fields. When finished, click **SAVE.**
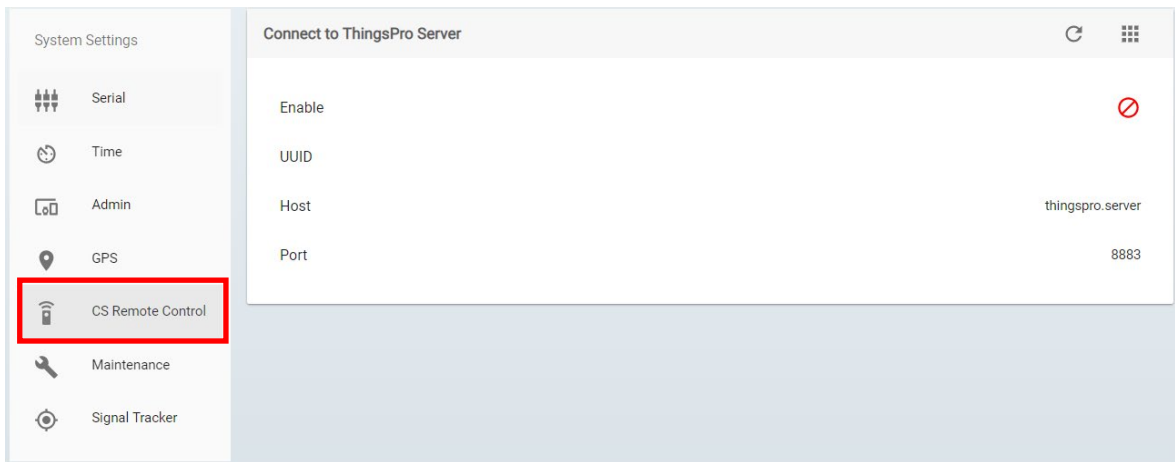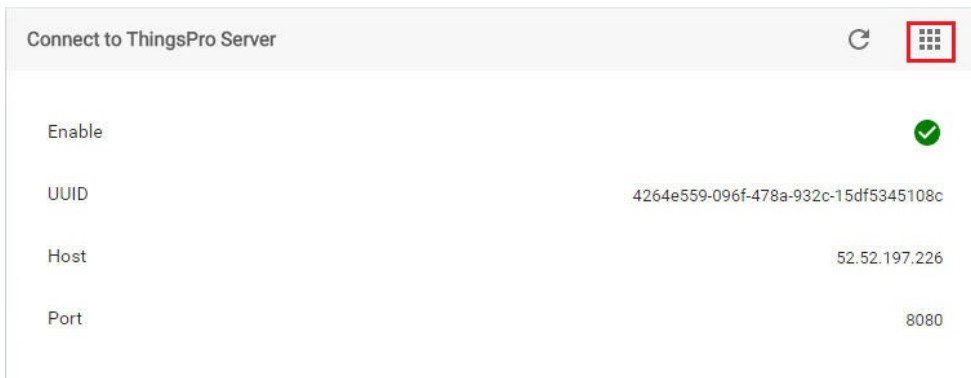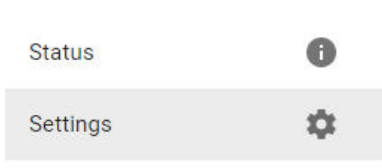
Configuring Remote Control Settings

Select **CS Remote Control** to view the current settings. This allows you to remotely connect to ThingsPro Server. You can get this information during the Enablement Utility registration process.

To configure, click the edit icon.

Select **Settings**.

Select **Enable**, and provide the values for **Host**, **Port**, and **PSK**.

You can click **TEST CONNECTION** or **SAVE** to finish.

7

System Maintenance

The following topics are covered in this chapter:

- ❑ **System Maintenance**
- ❑ **Configuring Signal Tracker Settings**
- ❑ **Managing User Accounts**
- ❑ **Creating a New Account**
- ❑ **Editing the Administrator Information**
- ❑ **Updating User Account Information**
- ❑ **Deleting a User Account**
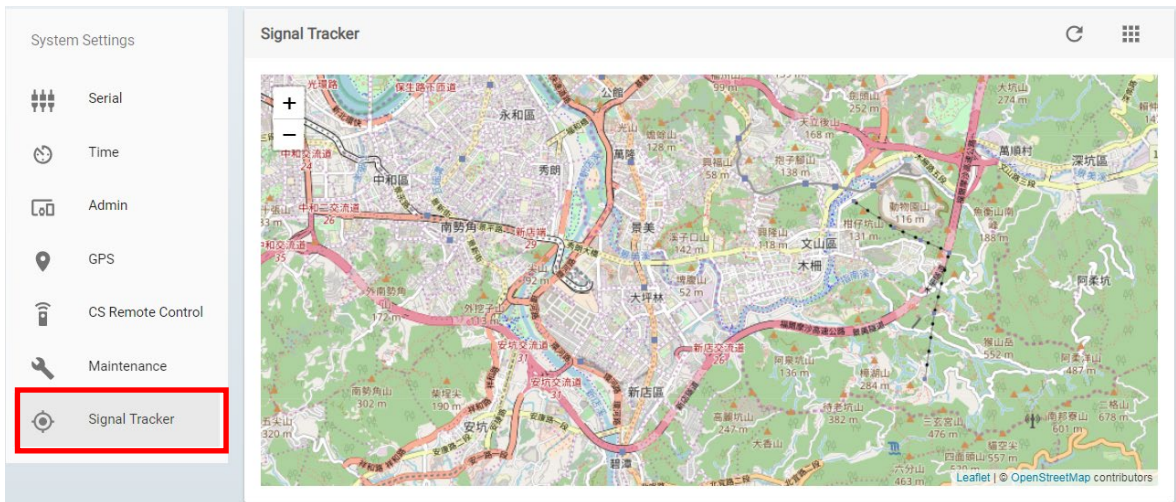- ❑ **Managing User Programs**

System Maintenance

This section is the same as the procedure in Maintenance in the main menu section. Refer to *Maintenance* section.
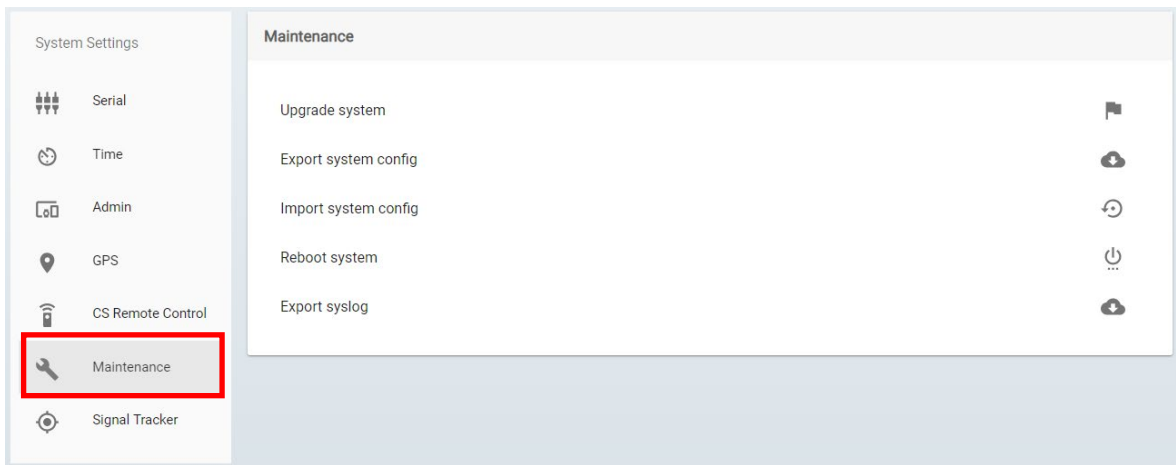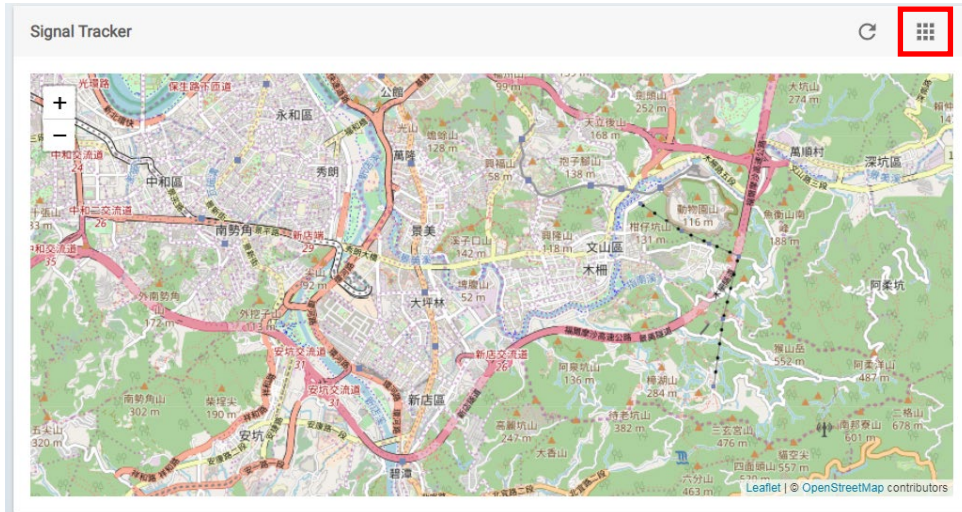

Configuring Signal Tracker Settings

Select Signal Tracker to view the current GPS location from map.

To configure, click the edit icon.

Check **Enable** to active Signal Tracker function.

Set **Interval in minutes** from 1 to 60 minutes, with default 1 minute.

Set **Max records** from 100 to 10000, with default 100.
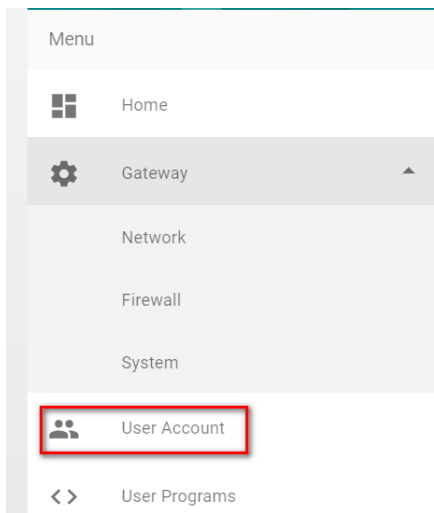

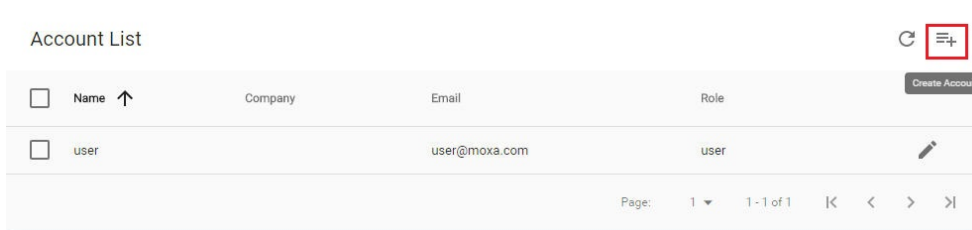Click **SUBMIT** while you complete the configuration.

Managing User Accounts

This section describes how to add a new account and manage an existing account. Select **User Account** from the menu.
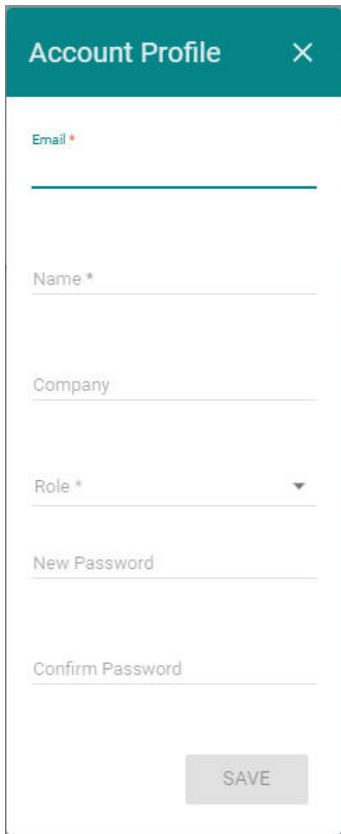

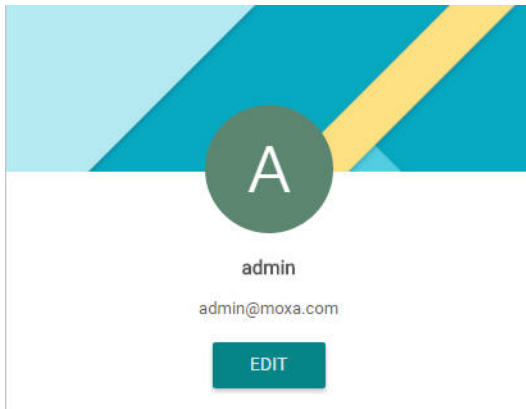# Creating a New Account

To create a new account, select the icon.

Provide the necessary information for the new account. When finished, click **SAVE**.

Editing the Administrator Information

To edit the administrator information, click **Edit**.

Edit the information in the specific fields. When finished, click **SAVE**.

Updating User Account Information

To update an existing user, check the user, and then select the edit icon.

For access rights of the root, admin, and user, refer to the following table.

	Configuration	**API Token**
root	read/write	write
admin	read/write	N/A
user	read	N/A

Edit the information in the specific fields. When finished, click **SAVE**.

Deleting a User Account

To delete an account, select the account, and then click the delete icon.
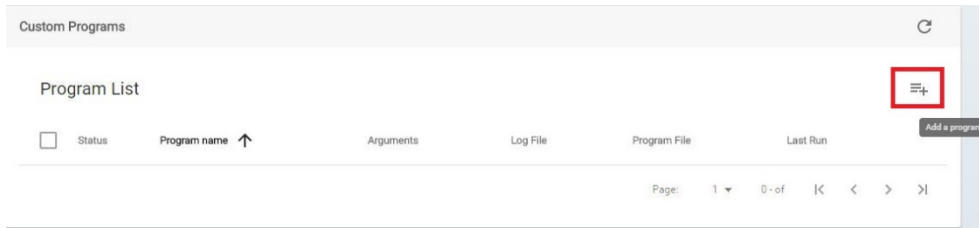

Managing User Programs

MIRF 2.0 allows developers to develop their own programs or applications and upload them to MIRF 2.0 . Select the **User Programs** tab from the main menu.
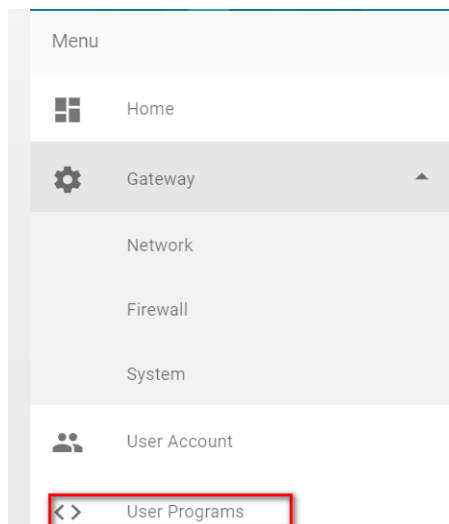
To add a program, click the add icon.

Select **Enable**, provide the name of the program, and select the file from a specific location (refer to the following example to create the file you want to upload). You can also specify when the program should run. For example, whenever the system starts up or at a periodic interval. When finished, click **SAVE**.

Example

Scenario: Synchronize system time with network time server every minute.

Follow the steps below to create the script file and upload it to MIRF 2.0:

1. Connect to the UC-8540 computer through the console port or via an Ethernet cable. Log in to the computer.
2. Create a working directory on the MIRF 2.0.

```
moxa@Moxa:~$ mkdir myproject
```

3. Enter this working directory and create a shell script file in this folder. The name of this file must be "exec".

   The content of this example shell script is:

```
#! /bin/sh
ntpdate $1
```

NOTE   The UC-8540 computer generally supports C, C++, Python, shell script, and JavaScript. You may use these programming languages to develop your program.
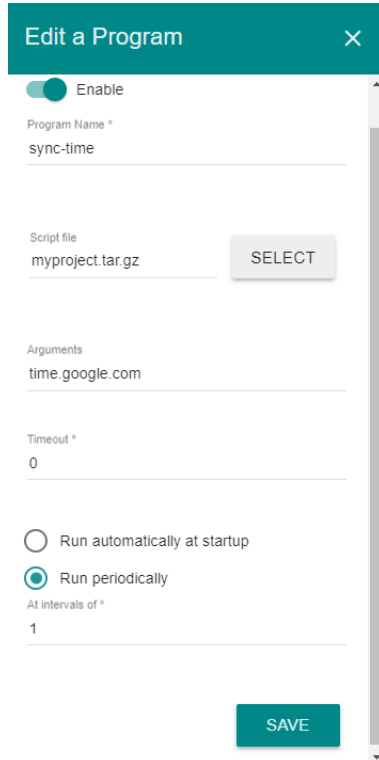
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4. When you finish developing the program, set the "exec" file to have execution permissions.

```
moxa@Moxa:~/myproject$ chmod +x exec
```

5. Use the tar command to compress all files created in this folder.

```
moxa@Moxa:~/myproject$ tar cvzf myproject.tar.gz .
```

Enter a name for the program, then click **Select** to upload the compressed file. The shell script needs an argument to specify the network time server. MIRF 2.0 will terminate the user program after the "timeout" value expires. If the timeout value is set to 0, then MIRF 2.0 will leave the user program running permanently.

6. After clicking the **SAVE** button, the program will be available under the **User Programs** section of the main menu.