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User Manual 2-Port TCP to RTU Gateway, Model SC10MK2 485 IOT 502

Table of Contents

Introduction

SC10MK2 485 IOT 502 Modbus TCP to RTU Gateway provides easy way of connecting Modbus RTU devices to Wireless and Ethernet LAN. The wireless supports 802.11 b/g/n in AP/Station mode with WEP/WPA/WPA2 encryption for data transmission security. The Ethernet support 10/100 Mbps auto-detecting communication speeds. This Gateway is designed to operate 2 Serial ports (RS-232/RS-422/485 Auto detect) over Wireless and Ethernet network. It allows users to integrate Modbus/RTU and Modbus Serial devices to the TCP/IP network with 8 TCP Masters simultaneously and 32 requests simultaneous per TCP Master.

SC10MK2 485 IoT 502 embedded with MT7688AN MIPS chipset makes it become the ideal device for transmitting the data from your RS-232 or RS-422/485 Serial interface devices, such as PLCs, Meters and Sensors to an IP-based Wi-Fi and Ethernet LAN. It is a high performance design composed with carefully selecting qualified components from reliable and certified sources. This operation manual will guide you to configure functions step by step.

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Product Specifications

System

- CPU: MT7688AN MIPS CPU, 580 MHz
- RAM: 128M Bytes DDR2 RAM
- ROM: 32M Bytes Flash ROM
- OS : OpenWrt Linux OS
- TCP to RTU support 8 simultaneous TCP Master, 32 simultaneous requests per Master.
- RTU to TCP is not available

Ethernet

- Port Type: RJ-45 Connector
- Speed: 10 /100 M bps (Auto Detecting)
- Protocol: ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, NTP
- Setup: HTTP Browser Setup (IE, Chrome, Firefox)
- Security: Setup Password
- Protection: Built-in 1.5KV Magnetic Isolation

WiFi port (option)

- Support AP / Station
- Standard : 2.4G IEEE 802.11b/g/n
- Data Rate : 11/54/72.2 Mbps @ 20Mhz Band Width
- Modulation : DSSS; OFDM
- Frequency : 2.4GHz
- Tx Power 11b : Max. 22dBm
- Tx Power 11g/n : Max. 19dBm
- Rx Sensitivity : -76dBm @ 54Mbps; -89.5dBm @ 11Mbps
- Tx Rate : Max. 54Mbps with auto fallback
- Tx Distance : Up to 100m
- Security : WEP 64-bit / 128-bit data encryption, WPA / WPA2 personal
- Antenna : 2 dBi ; RP-SMA connector
- Network Mode: Infrastructure; Soft AP (for Setup)
- Setup : HTTP Browser Setup (IE, Chrome, Firefox)
- Security : Login Password

Serial Ports *2

- Port : RS-232/422/485 * 2 Ports (RS-232 with RX/TX/GND only)
- Port : RS-422 / 485 (Surge Protect)
- Speed : 300 bps ~ 921.6 K bps
- Parity : None , Odd , Even , Mark , Space
- Data Bit : 5 , 6 , 7 , 8
- Stop Bit : 1 , 2
- RS-232 Pins : Rx , Tx , GND
- RS-422 : Rx+ , Rx- , Tx+ , Tx- (Surge Protect)
- RS-485 : Data+ , Data- (Surge Protect)
- 15KV ESD for all signals

Power

- DC 9~24 V, 1000mA@12V
- support DC Jack & Terminal Input

Mechanical and Environment

- Operating Temperature : -20^{0}C to 70^{0}C
- Storage Temperature : -25^{0}C to 80^{0}C
- Dimensions : 120 * 110 * 30 mm (W * D * H)
- Weight : 460 ± 5gm
- Housing: metal.

Other Features (**not this model, for programming purpose)

- **Digital Input / Output : GPIO * 8 Pins
- **2C Interface * 1 port
- **SD Interface : micro SD card (for 16G storage)
- **USB (Host * 1 port) : for Memory Storage, CAMERA

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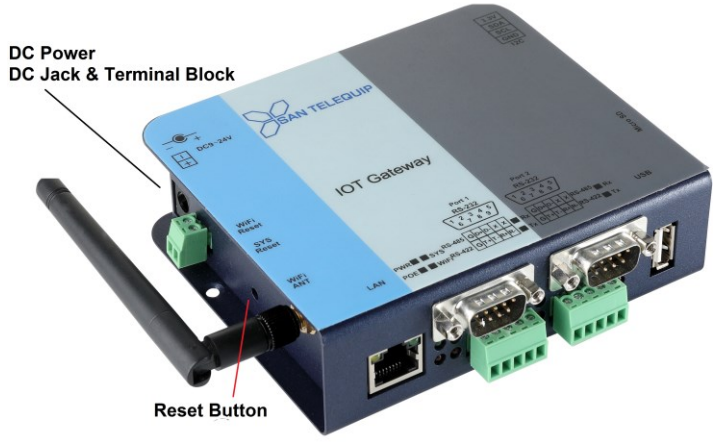
- **Buzzer
- Led Lamp : SYS, PWR, PoE(option), WiFi, RX, TX, LAN
- RTC : Real Time Clock
- Watch Dog Function
- Software : TCP, Modbus TCP Master to Modbus RTU Slave

Product Panel Views

Antenna Connector
The connector for antenna is a standard reverse SMA jack. Simply connect it to a 2.0dBi dipole antenna (Standard Rubber Duck) and it is 50 Ohms impedance and can support 2.4GHz frequency.

Ethernet Port
The connector for network is the usual RJ45. Simply connect it to your network switch or Hub. When the connection is made, the green color LED of Ethernet port will light on. When data traffic (Rx/Tx) occurs on the network, yellow color LED will blink during data transferring.

Serial Port of RS-232/RS-422/RS-485
Connect the serial data cable between the SC10MK2 converter and the Serial interface device. Follow the web page parameter setup procedures to configure the converter.



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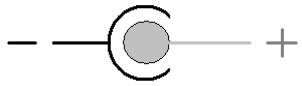
DC-IN Power Outlet

The Serial to Ethernet+WiFi Converter is powered by a single 12V DC (Inner positive, outer negative) power supply and 1A Current. Connect the power adaptor to the AC power socket and put the DC Jack plug into the outlet of device. The “SYS” green color LED will be ON when power is properly supplied. Terminal Block 2 wires power supply is an option.

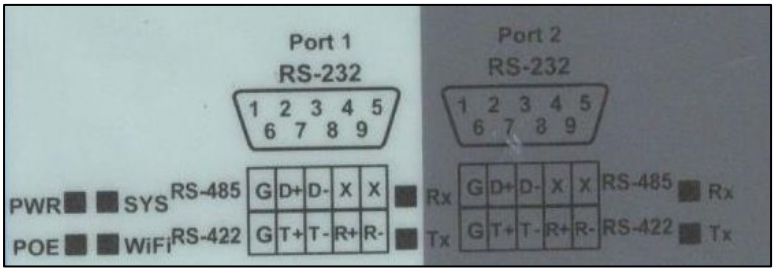
DC Power outlet



Reset Button (WIFI)

If any chance you forgot the login password, or have incorrect settings making converter inoperable. When the power is on and the “SYS” LED light on, use a point tip to press this button and hold it and wait for more than 25 seconds. All the parameters will be reset to the factory default.

LED Indicators



PWR (Green) : After power on, this LED is always ON.
SYS (Green) : LED is ON after power on, and then start blinking per second a after system running.
POE (Red) : for PoE (Power on Ethernet) indication if device with this function.
WIFI (Red) : LED is ON after power on, then off a while. It starts blinking after Wi-Fi module is ON.
TX / RX (Red / Green) : Data sending or receiving indicator. When data sent out to the network or receiving from the network, the LED will be blinking.

Antenna Connector

The connector for antenna is a standard reverse SMA jack. Simply connect it to a 2.0dBi dipole antenna (Standard Rubber Duck). It is 50 Ohms impedance and can support 2.4GHz frequency.

Ethernet Port

The connector for network is the usual RJ45. Simply connect it to your network switch or Hub. When the connection is made, the green color LED of Ethernet port will blink. When data traffic (Rx/Tx) occurs on the network, yellow color LED will blink during data transferring.

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DC-IN Power Outlet

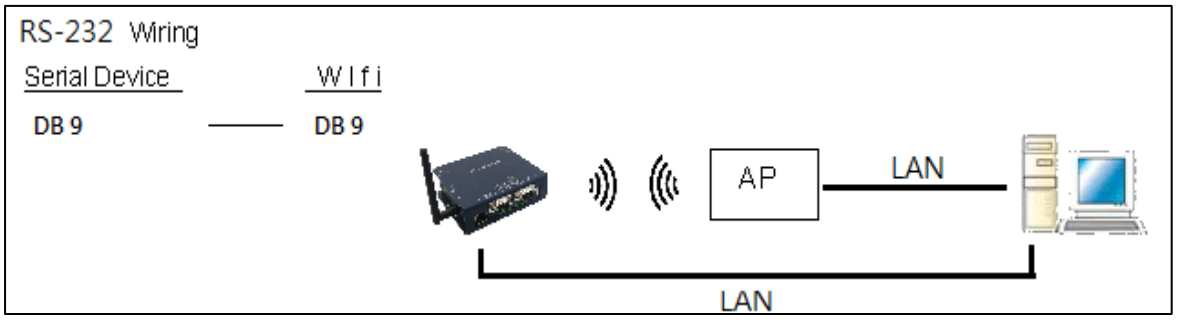
The Device is powered by a 12V DC (Inner positive, outer negative), 1.0A power supply. Plugging the power adaptor to the AC power socket and put the DC Jack plug into the outlet of the Device. The “SYS” green color LED will be ON when power is properly supplied. Terminal Block 2 wires power supply is an option.

Serial Port of RS-232/RS-422/RS-485

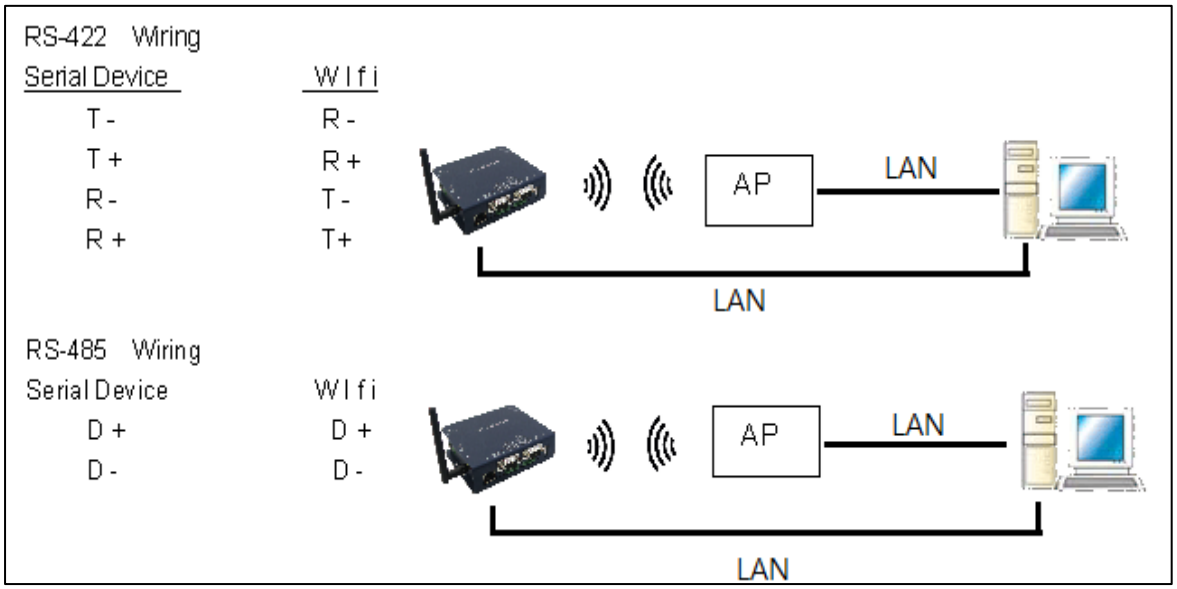
Connect the Serial data cable between the device and the Serial interface device. Follow the procedure of web page configuration to set up parameters.

Wiring Architecture

1. RS-232



2. RS-422/RS-485



When you finish the steps mentioned above and the LED indicators are as shown, the Gateway is installed correctly. You can check the Software Setup CD to find Utility to setup the IP Address. To proceed with the parameters setup, please use a web browser (IE or Chrome) to continue the settings.

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Configuration

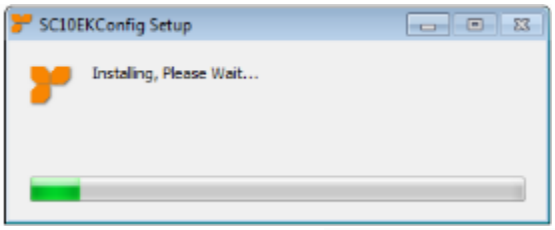
When setting up your Gateway for the first time, the first thing you should do is to configure the IP address.

The following topics are covered in this chapter:

- ✓ **IP Search Utility Setup**
- ✓ **Web Browser Configuration**

IP Search Utility Setup

1. Download SC10MK2-485 IOT. "SC10MK2-485 IOT utility" from Web site to your host computer.
2. "SC10MK2-485 IOT utility" is a self-extract-install program. Double click it to install this Wi-Fi IP Searching tool into host computer.



3. Upon running IP search tool SC10MK2-485 IOT. (SC10MK2-485), if a firewall warning pop up, please click to accept the program pass through firewall.

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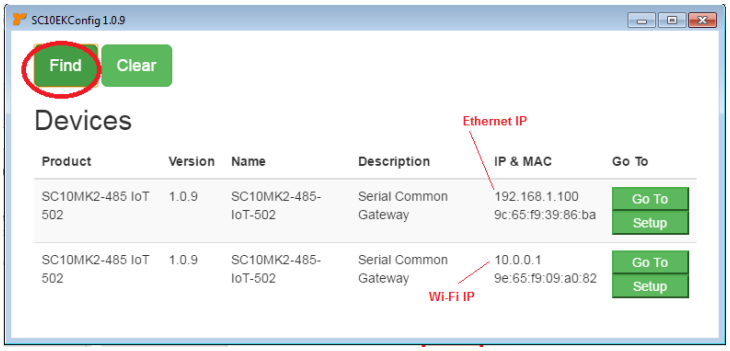
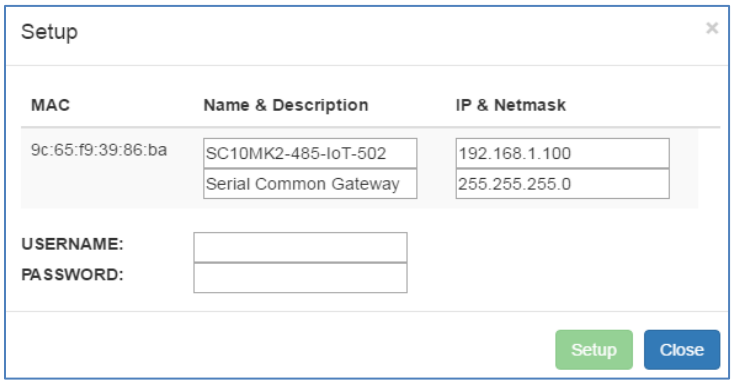
4. SC10MK2-485 IOT will pop up on the screen after installation or you may double click the icon on desk top of host computer to open this tool.

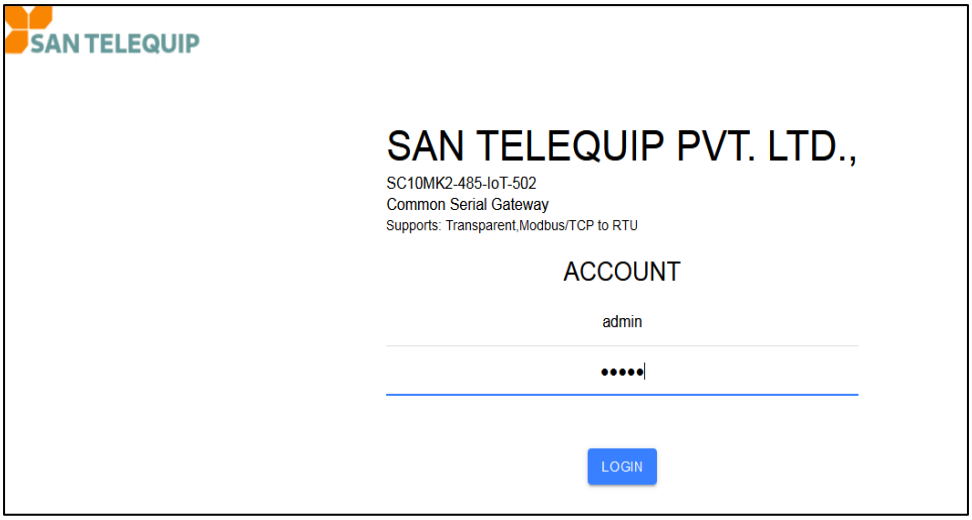
5. Click on "**Find**" button. It will scan the network and show up the IP of Gateway.



6. Click "Setup" button will pop up a window. You may change Name, Description, IP, Netmask of device. Click "Setup" to save setup. The device's IP must be same subnet with host PC enable to use web browser open configuration page.

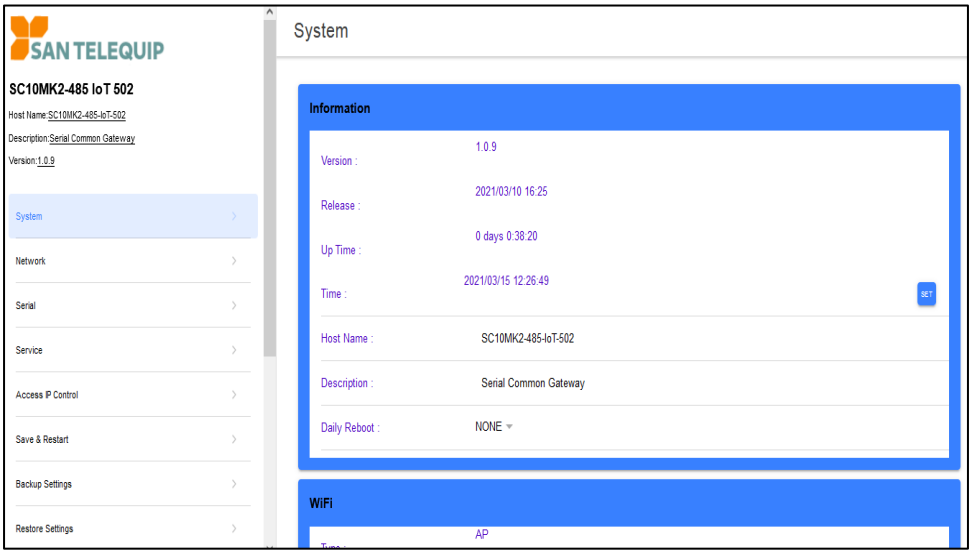


7. Click “Goto” button will open a web page of configuration



Login:
User name : admin
Password : admin

8. The web page comes to appearance as below means Gateway connection is successful.



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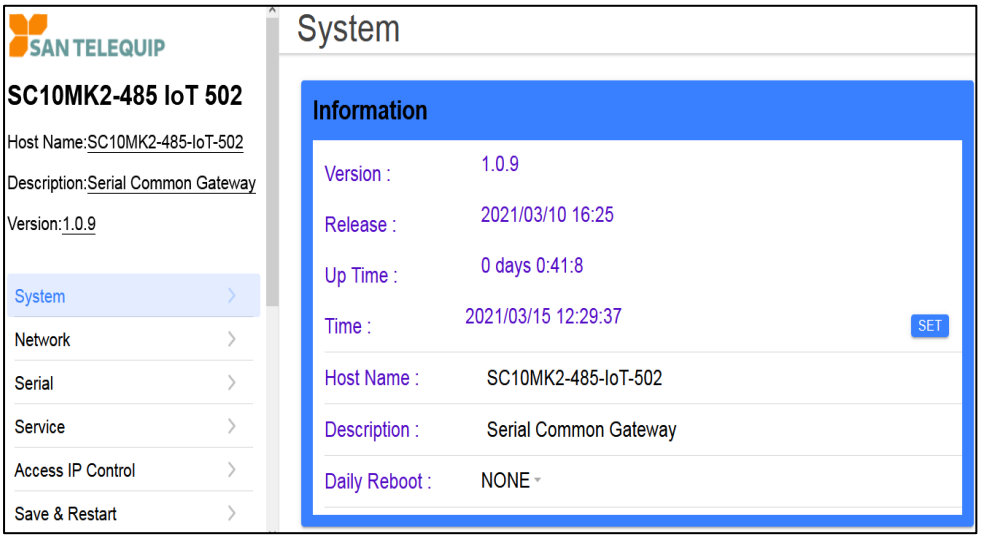
Web Browser Configuration

1. System Setup

1.1 Information:



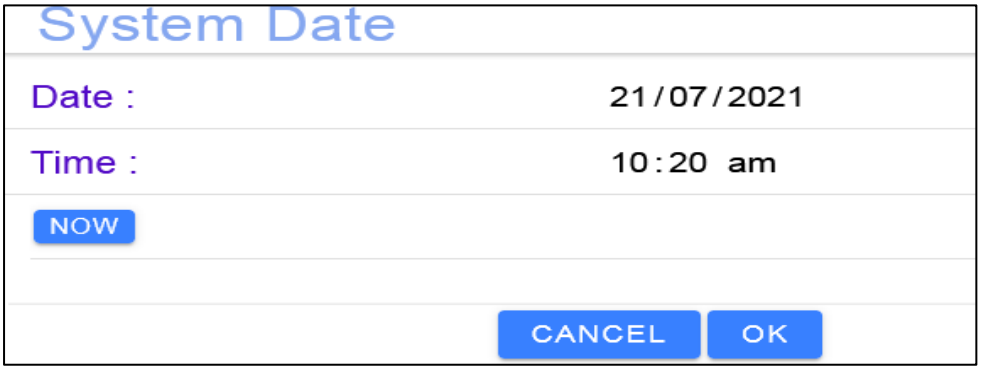
1.1.1 Version: This number to be updated after firmware changed.

1.1.2 Release: The released date of existing version.

1.1.3 Up Time: The running time of this device since power on.

1.1.4 Time: The existing date and time on the device. To click “SET” button can modify the date (yyyy/mm/dd) and time.

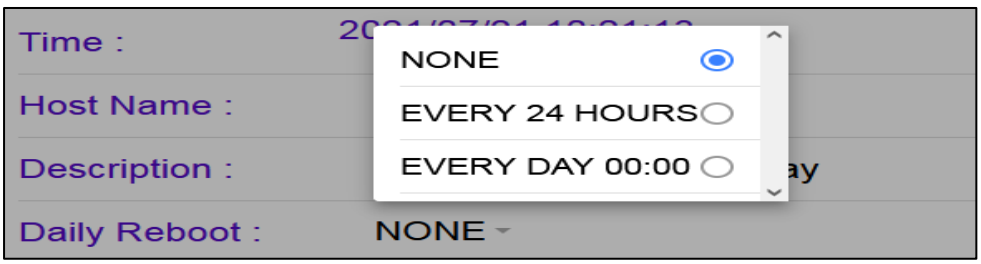
1.1.4.1 The Date and Time can be set manually or to click “NOW” to update the Date and Time. The “OK” button must be clicked to confirm the modification.



1.1.5 Host Name: To assign name of this device.

1.1.6 Description: To describe this device.

1.1.7 Daily Reboot: To set the time for the device reboot on daily basis.



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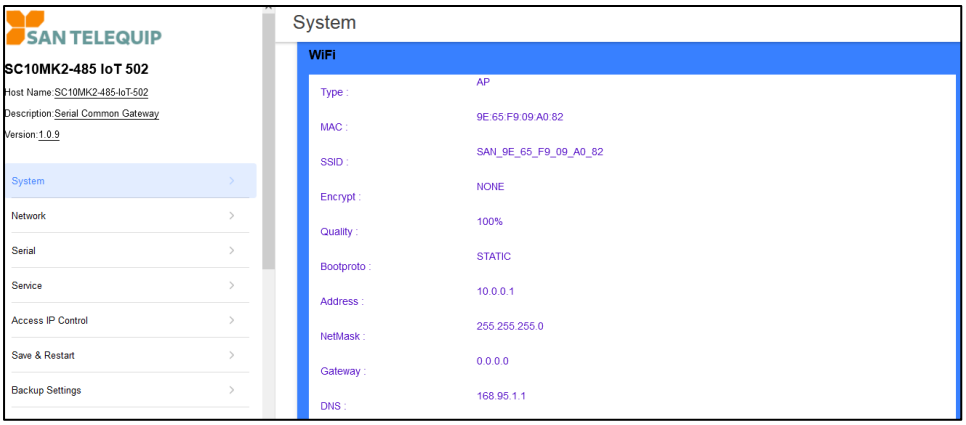
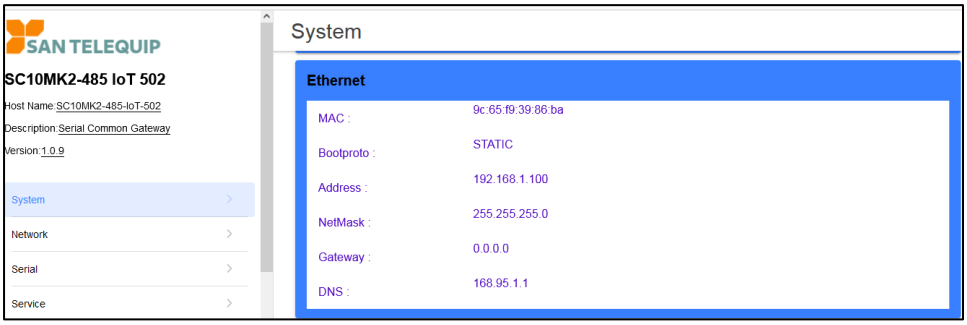
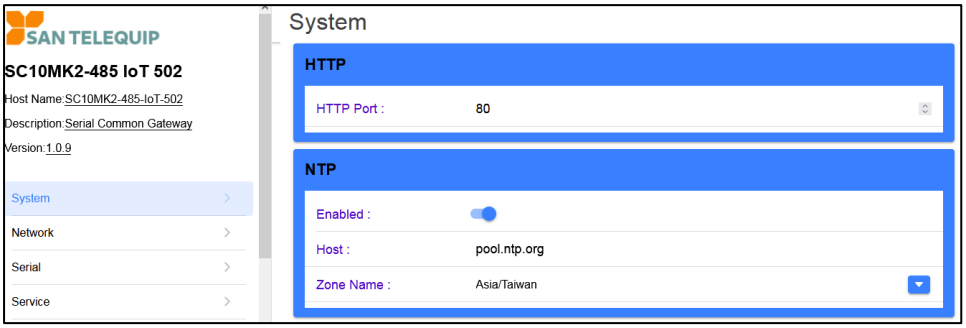
1.2 Wi-Fi (option): The appearance of existing parameters in this device. This section is not editable.



1.3 Ethernet: The appearance of existing parameters in this device. This section is not editable.



1.4 HTTP, NTP



1.4.1 HTTP Port: Server port default 80 is modifiable.
1.4.2 NTP Enabled: This switch can be Enable/Disable selectable.
1.4.3 NTP Host: Server domain name is modifiable.
1.4.4 NTP Zone Name: Time zone is modifiable.

1.5 Up to now, setting is successfully configured and saved temporarily. Please go to chart “Save & Restart” to click “YES” will be permanent configured and reboot this device to work. You may hold this action until all configurations of every section are completed.

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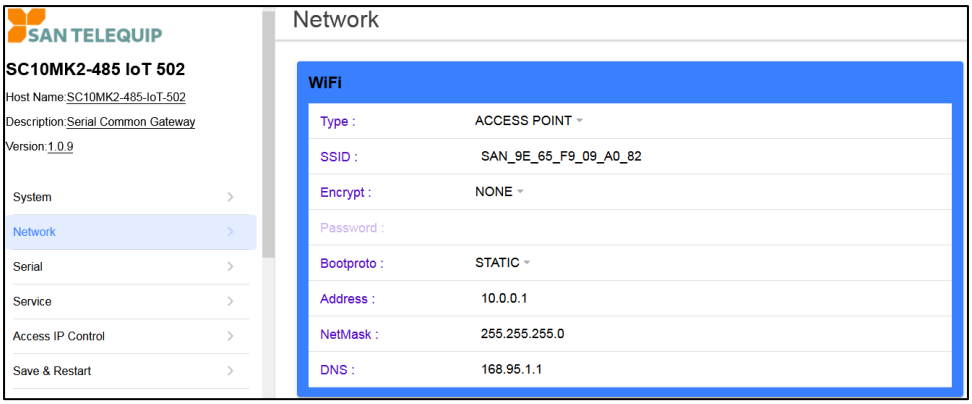
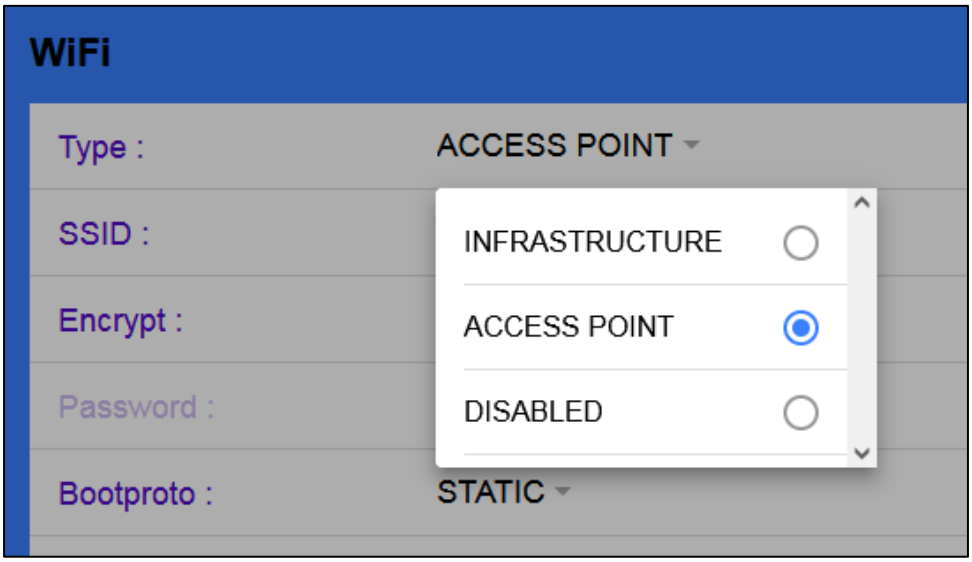
2. Network

2.1 Wi-Fi (option): this section for modifying parameters of WiFi connection.

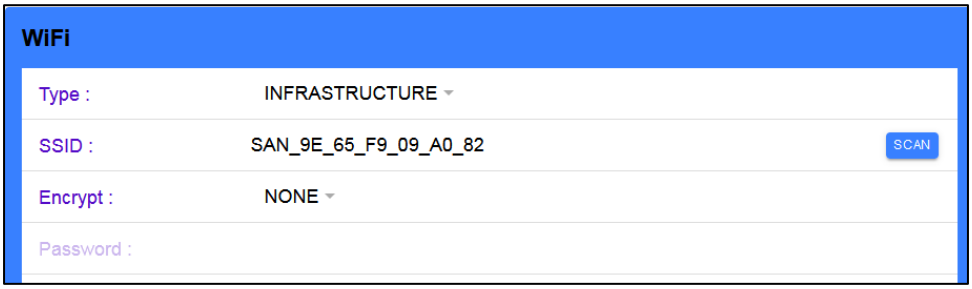


2.1.1.1 Type: Click to select “ACCESS POINT”, “INFRASTRUCTURE”, “DISABLED”

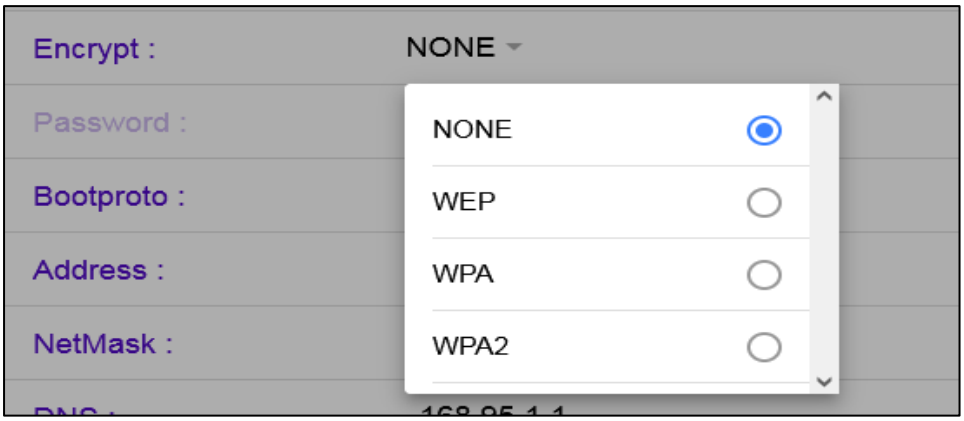


2.1.1.2 If selected “ACCESS POINT” to set this device itself as an AP: SSID is editable to broadcast. The default SSID “SAN_XX_XX_XX_XX_XX_XX” will be seen. PC /NB can search and login to this SSID then be able to open web page with default IP of this Device.

2.1.1.3 If selected “INFRASTRUCTURE” to set this device itself as a station in local LAN. Click “SCAN” button to scan available SSID of Access Points. WiFi AP List will pop up. Choose one SSID to link with.

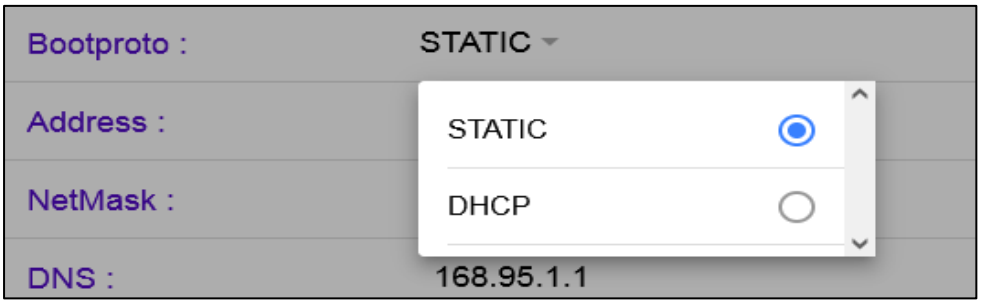


2.1.2 Encrypt:



2.1.3 Password: It's editable.

2.1.4 Bootproto:

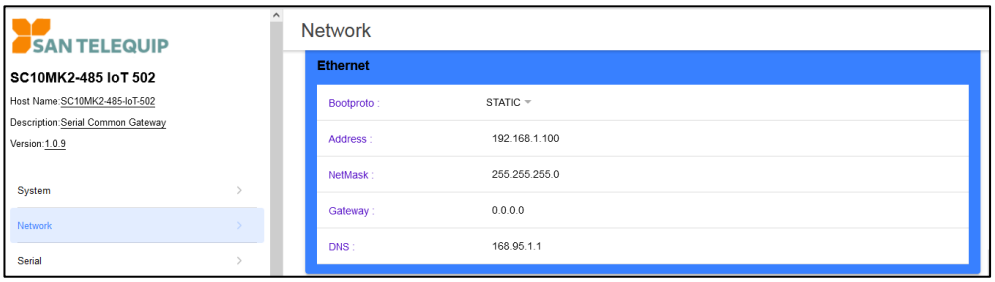


2.1.5 Address : It's editable when "STATIC" is selected. Input IP address.

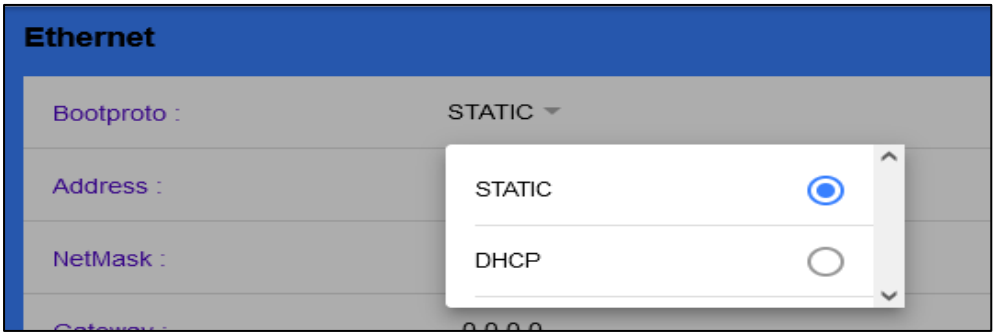
2.1.6 NetMask: It's editable when "STATIC" is selected.

2.1.7 DNS : It's editable.

2.2 Ethernet: this section for modifying parameters of Ethernet connection.



2.2.1 Bootproto: click to assign "STATIC" or "DHCP" for IP assignment.



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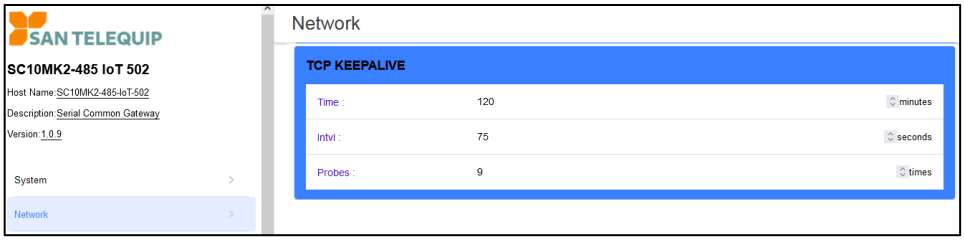
2.2.2 Address: It's editable when "STATIC" is selected. Input IP address.
2.2.3 Netmask: It's editable when "STATIC" is selected.
2.2.4 Gateway: It's editable when "STATIC" is selected.
2.2.5 DNS : It's editable.

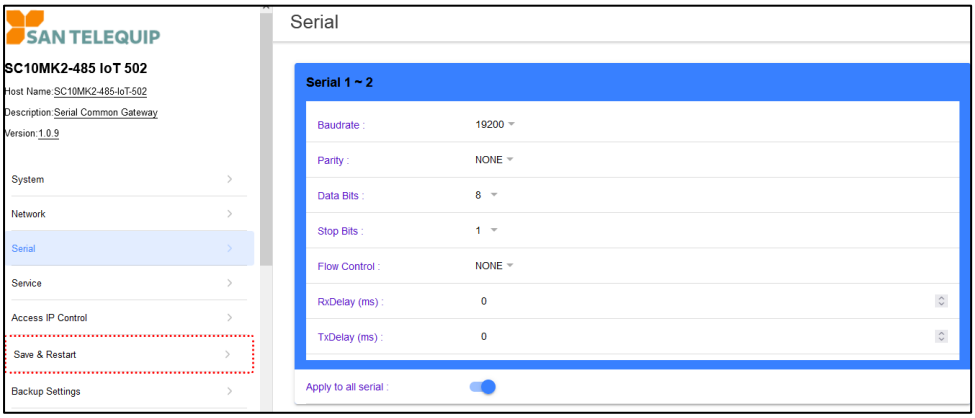
2.3 TCP KEEPALIVE: Time, Interval and Probes are editable.



2.3.1 Time : It's editable for idle time setting. The Probes will start after the idle time.
2.3.2 Intvl : It's editable for the interval time between every Probes.
2.3.3 Probes : It's editable for number of Probes to find out whether TCP connection broken or not.

2.4 Up to now, setting is successfully configured and saved temporarily. Please go to "Save & Restart" to click "YES" will be permanent configured and reboot this device to work. You may hold this action until all configurations of every section are completed.

3. Serial



3.1 Baud rate : 300 ~ 921600 bps selectable.
3.2 Parity : NONE, ODD, EVEN, MARK, SPACE
3.3 Data Bits : 5, 6, 7, 8,
3.4 Stop Bits : 1,2
3.5 Flow Control : XON/XOFF, RTS/CTS, DTR/DSR, NONE
3.6 RxDelay(ms) : no function.
3.7 TxDelay(ms) : no function.

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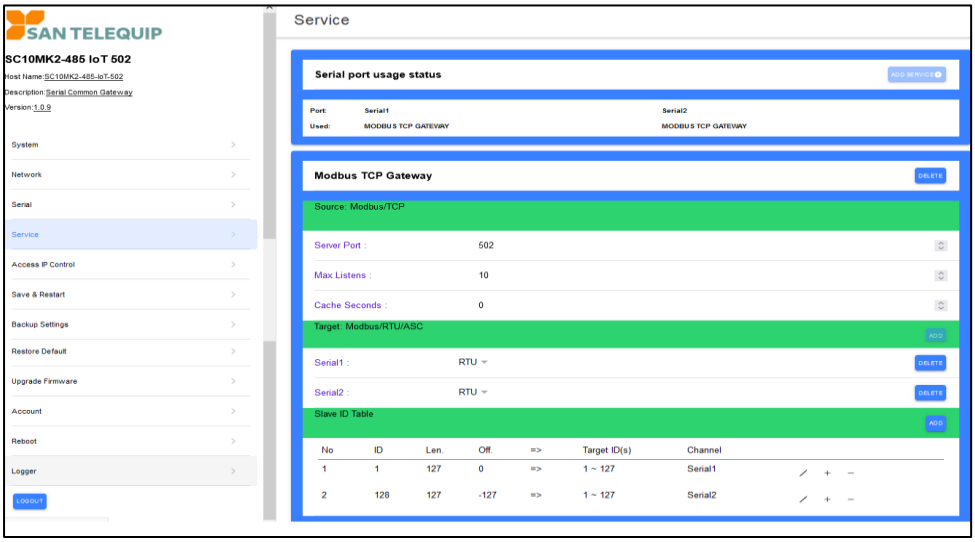
3.8 Apply to all serial: Select “On” to make same setting for both 2 Serial ports. Select “Off” will pop up the section of 2nd Serial port.

3.9 Up to now, setting is successfully configured and saved temporarily. Please go to “Save & Restart” to click “YES” will save configuration and reboot this device to work. You may hold this action until configurations of all sections are completed.

3.9 Service: Modbus TCP Gateway - Select both Serial1 and Serial2 at the same time against a specified TCP socket port commonly.

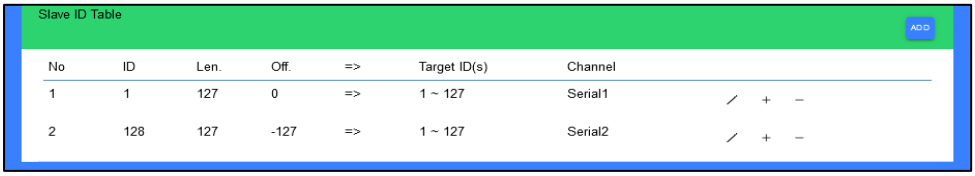


3.9.1 Server Port: to input TCP port number.

3.9.2 Max Listens: to input number of remote connection. Be careful of too many connection decrease performance.

3.9.3 Modbus RTU/ASCII: to RTU or ASCII selectable.

3.9.4 Slave ID Table: “pen symbol“ to edit content, +” to add line, “-“ to reduce line.



3.9.5 Item “Target ID(s)”: this is real ID of RTU devices.

3.9.6 Item “ID”: this is the mapping ID for “Target ID(s)”. It comes from “offset” function to change the ID number of “Target ID(s)”. For example the ID number 5, 7 are mapping from Target ID(s) 3, 4. Remote Master query ID 5,7 but actually it query ID 3,4.

3.9.7 “Len.”: Length of ID means several RTU devices line up in a serial port.

3.9.8 “Off.”: Offset value to add or to minus numbers of “Target ID(s)” make new ID numbers for Remote Master to query.

3.9.9 Notice that mapping “ID” should not be duplicate in the “Len.”(Length) of other ID otherwise the query will fail.

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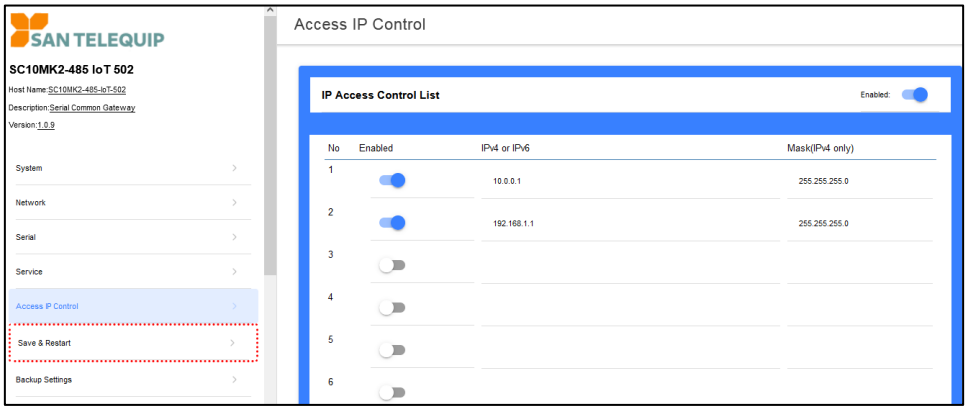
4.4 Up to now, setting is successfully configured and saved temporarily. Please go to “Save & Restart” to click “YES” will be permanent configured and reboot this device to work. You may hold this action until all configurations of every section are completed.

4. Access IP Control



4.1 “Enabled” button at top right corner: to click this button enable ON or off this function. If no any IP assigned in the list, this button should be OFF otherwise it make no one can link with this device.

4.2 “Enabled” button in the list: to allow the IP address can link with this device. Ensure the assigned IP is real exist and not to leave it in blank otherwise it makes no one can link with this device.

4.3 Default Ethernet IP 192.168.1.1 Mask 255.255.255.0 allow outsider’s IP under 192.168.1 are able to login

4.4 Default WiFi IP 10.0.0.1 Mask 255.255.255.0 allow outsider’s IP under 10.0.0 are able to login

4.5 To limit only the IP in the list can login to web page, the “Mask (IPv4 only)” must be in blank or input “255.255.255.255” otherwise the outsider with same subnet can login. For example, set “Mask 255.255.255.0” allow outsider’s IP under 192.168.1 are able to login.

4.6 When enabled the IP ACCESS, do remember to set an IP 10.0.0.1 adopt Mask 255.255.255.0

4.7 The IP Access Control List allow to set 16 no’s IPs.

5.4 Up to now, setting is successfully configured and saved temporarily. Please go to “Save & Restart” to click “YES” will be permanent configured and reboot this device to work. You may hold this action until all configurations of every section are completed.

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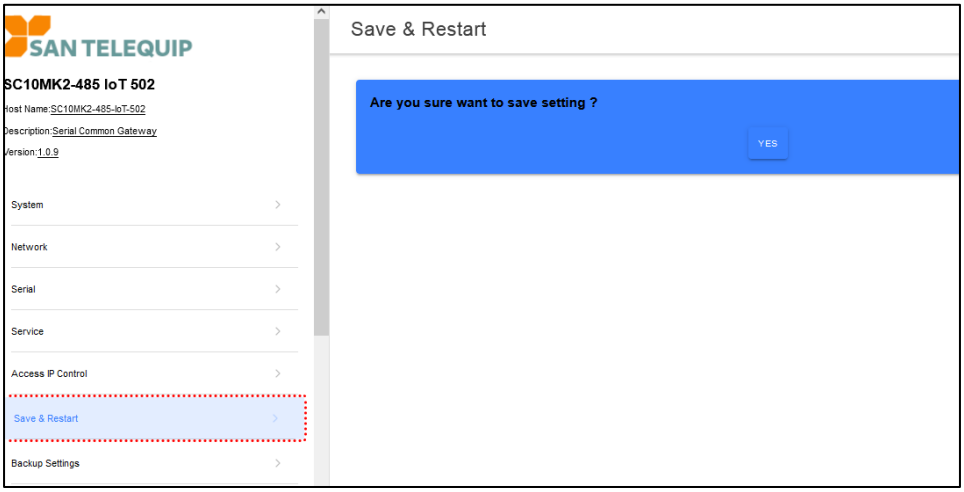
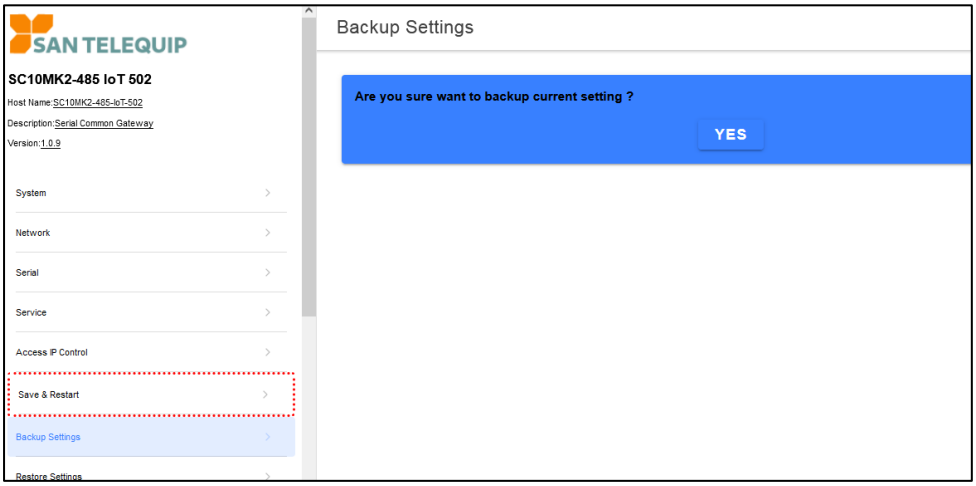
5. Save & Restart

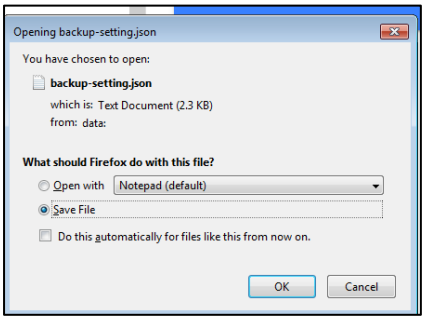


Click “YES” will save configuration and reboot this device to work. You may hold this action until configurations of all sections are completed.

6. Backup Settings



Click “YES” will download a backup file “backup-setting.json”.



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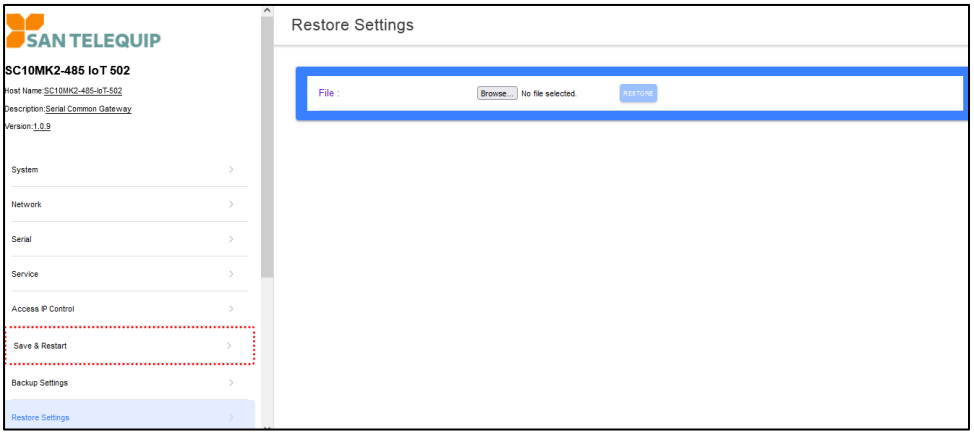
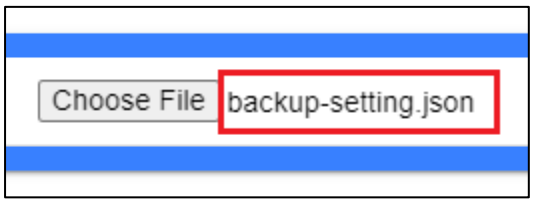
7. Restore Settings

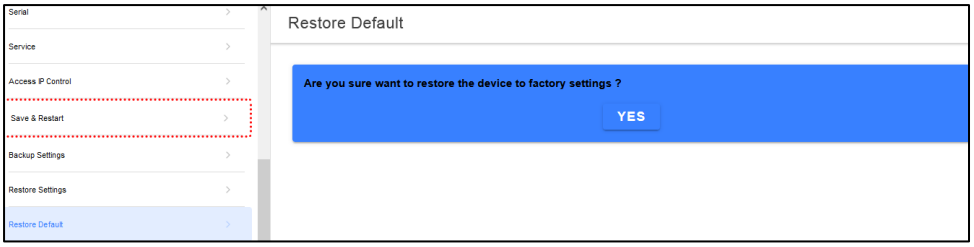


Click “Choose File” to open file folder then select the backup file “backup-setting.json”.



Click “RESTORE” to upload the file. The device will be rebooted in 60 seconds to work.

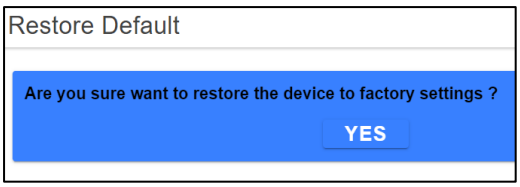
8. Restore Default

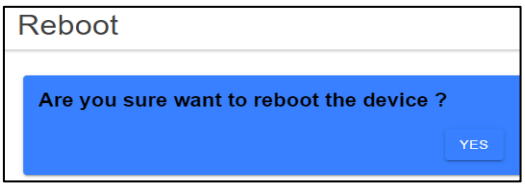


Click “YES” to restore device back to factory default.

9. Upgrade Firmware

This function must be checked with firmware provider in advance before use. After file completely loaded, please do “Restore Default” and “Reboot”.





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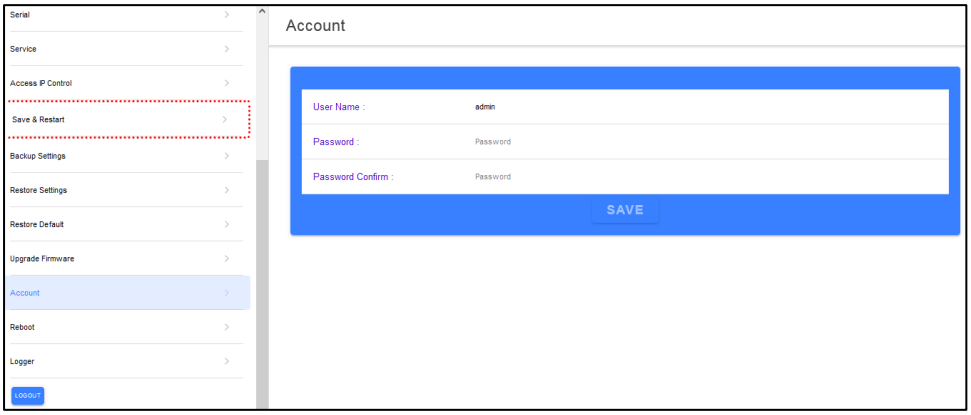
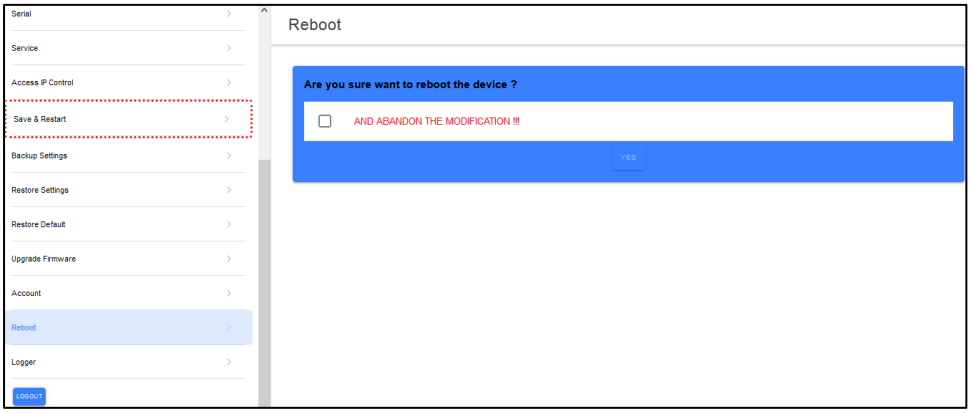
10. Account



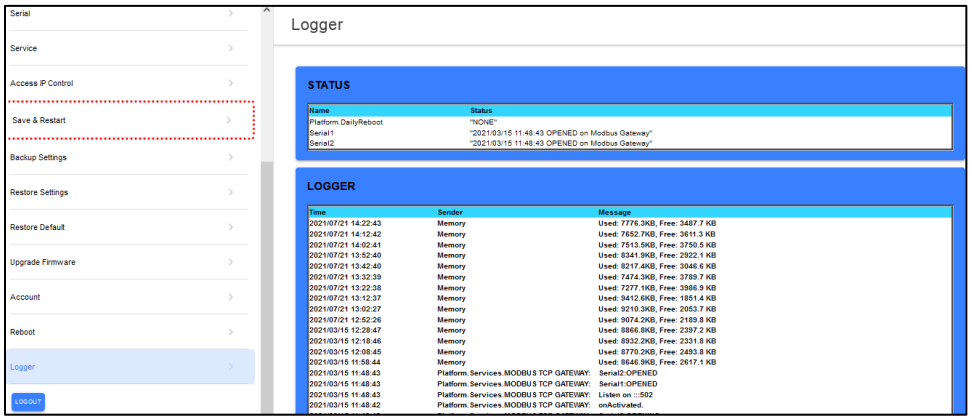
To change User Name and Password for login into this device.

11. Reboot



Click “YES” to reboot device. If not check “AND ABANDON THE MODIFICATION”, any change in this login not yet do “Save & Restart” will be saved.

12. Logger



Status of works will be updated periodically.

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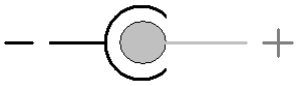
13. Reset (if needed)

Upon the power is on, press “Reset” button until the SYS and WIFI LED flashing and then release button will make SC10MK2 485 IOT 502 reset configuration back to factory default. Device will reboot to work.

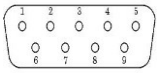
DC Power outlet – DC 9-24V



RS-232 Pin Assignment

The pin assignment scheme for a 9-pin male connector on a DTE is given below.

PIN 1: DCD PIN 2: RXD PIN 3: TXD PIN 4: DTR
PIN 5: GND PIN 6: DSR PIN 7: RTS PIN 8: CTS
PIN 9: X



RS232 Connection Details

SC10MK2 Side	COM Port Side
TX	RX
RX	TX
RTS	CTS
CTS	RTS
DSR	DTR
DTR	DSR

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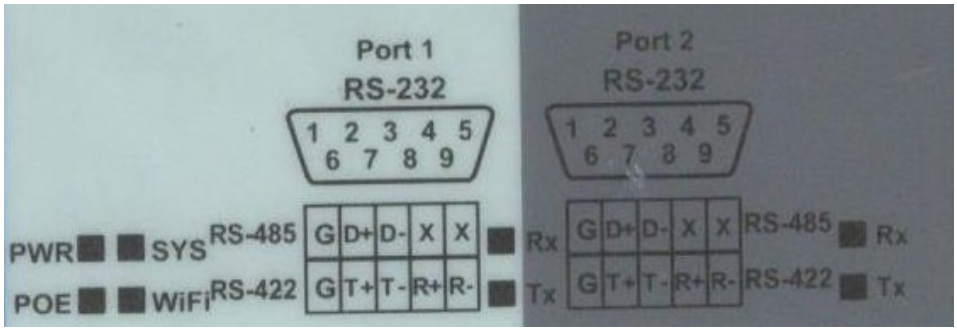
RS-422/485 Pin Assignment

The pin assignment scheme for 4-pin RS-422 and 2-pin RS-485 as below.



RS422 Connection Details.

Signal of SC10MK2 485	Will Connect to
GND	GND of your device
T+/ D+	RX + of your device.
T- / D-	RX -- of your device.
R +	TX + of your device.
R --	TX – of your device.

RS485- 2 Wire Connection Details

Signal of SC10MK2 485	Will Connect to
GND	GND of your device
T+/ D+	TX+ /D+ of your device.
T- / D-	TX–/D- of your device.