Configuration Guide

Model: G1

Version: V2.0.0

Contents

Preface

This specification applies to G1-B,G1-C gateway.

Revision	Date	Author	Description
v1.3.0	2018.01.12	Yancy	Initial draft
v1.4.0	2018.08.25	Yancy	1.Add ***Configuration via LAN*** 2.Add ***LAN Upgrade*** 3.Add ***Automatic Management*** 4.Add ***Open the AP*** in Web UI interface 5.Improve the ***LED strip configuration*** 6.Add three way to configure ***Repeater Connection***
v2.0.0	2019.6.22	Yancy	1.Update ***Sync system time with NTP server*** 2.Add ***Set system time manually*** 3.Add ***BLE Configuration***

1. Basic Configuration

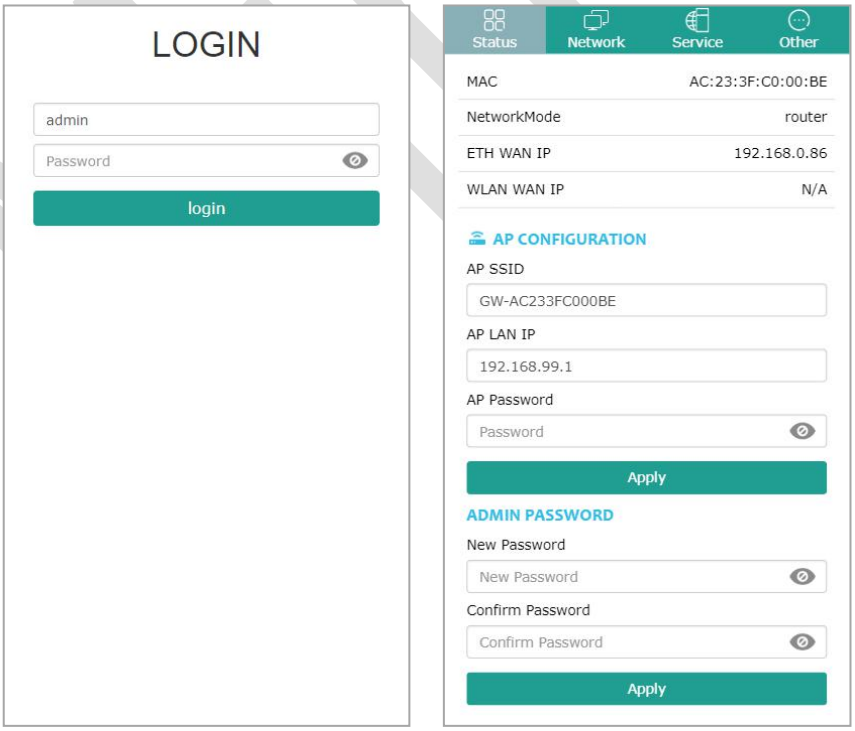
G1 BLE & WiFi gateway can be configured throught a simple WEB configuration interface.

1.1 Configuration way

There are two ways to get access to the WEB Configuration interface.

1.1.1 Configuration via AP

AP mode is only applicable to gateway configuration without influencing the networking method that current gateway is used as client.
AP mode provides WIFI hotspot with SSID name of "GW-XXXXXXXXXXXX", where XXXXXXXXXXXX is hexadecimal uppercase character corresponding to the MAC address of gateway. Users may scan and connect via computer or cell phone.
In default, no password is needed for connecting this WIFI. For the sake of access control, it is available to modify AP SSID name in WEB configuration interface with setting IP address into the format of 192.168.X.1 (Make sure the 192.168.X.1 segment[1] is not the same as the senior router), and then set WIFI connecting password.
After connecting gateway WIFI, please open the link http://192.168.99.1 through computer or cell phone to access configuration interface (see picture below).



[1] Subnet mask of the AP LAN is fixed 255.255.255.0. So in general, IP is 192.168.X.1, if X is the same,it means the same segment of IP, otherwise is different segment.

The detailed description of interface fields is as follows:

Field	Name	Description
MAC	Gateway MAC	Hexadecimal uppercase character of gateway MAC address
Network Mode	Network Mode	Displays the modes of networking, including router(default), repeater
ETH WAN IP	IP address of Ethernet outer network	IP acquired when connecting client to Ethernet; displays N/A when fail to connect
WLAN WAN IP	IP address of WLAN outer network	IP acquired when connecting client to WLAN; displays N/A when Fail to connect
AP SSID	AP SSID	AP SSID of Gateway
AP LAN IP	IP address of AP intranet	IP address of AP mode for configuration, the default is 192.168.99.1
AP Password	AP Password	Connecting password of AP mode for configuration
New Password	New Password	Password reset for WEB configuration interface access control
Confirm Password	Confirm Password	Password confirm for WEB configuration interface access control

1.1.2 Configuration via LAN

As long as computer or the other devices with browsers are in the same LAN as the gateway, computer can access to the gateway's configuration page via type IP addresses in the browser without connecting to the gateway's WiFi AP. Only this IP address is no longer 192.168.99.1 and needs to be scanned by the ARP scanning tool for the IP addresses that the gateway assigned from the LAN.

- ***View from Router,which provides the LAN***

Some router's configuration pages can view the ARP lists (lists of IP addresses corresponding to MAC

addresses).

- ***View from Linux PC,which in the same LAN as GW***

--> Take Ubuntu as example, install arp-scan with following command

$ sudo apt-get install arp-scan

--> Run arp-scan command to view the IP-MAC lists

$ sudo arp-scan -l

--> Run grep to filter out the GW's MAC address

$ sudo arp-scan -l | grep "ac:23"

```
lyx@ubuntu:~/openwrt/openwrt_thingoo_g1-c$ sudo arp-scan -l | grep "ac:23"
192.168.0.90    ac:23:3f:c0:00:be       (Unknown)
192.168.0.122   ac:23:3f:c0:07:d6       (Unknown)
192.168.0.140   ac:23:3f:c0:00:f4       (Unknown)
```

- ***View from Windows PC,which in the same LAN as GW***

arp-scan tool can be fetched from the github: https://github.com/QbsuranAlang/arp-scan-windows-

If your LAN is 192.168.0.1, and where subnet mask is 255.255.255.0

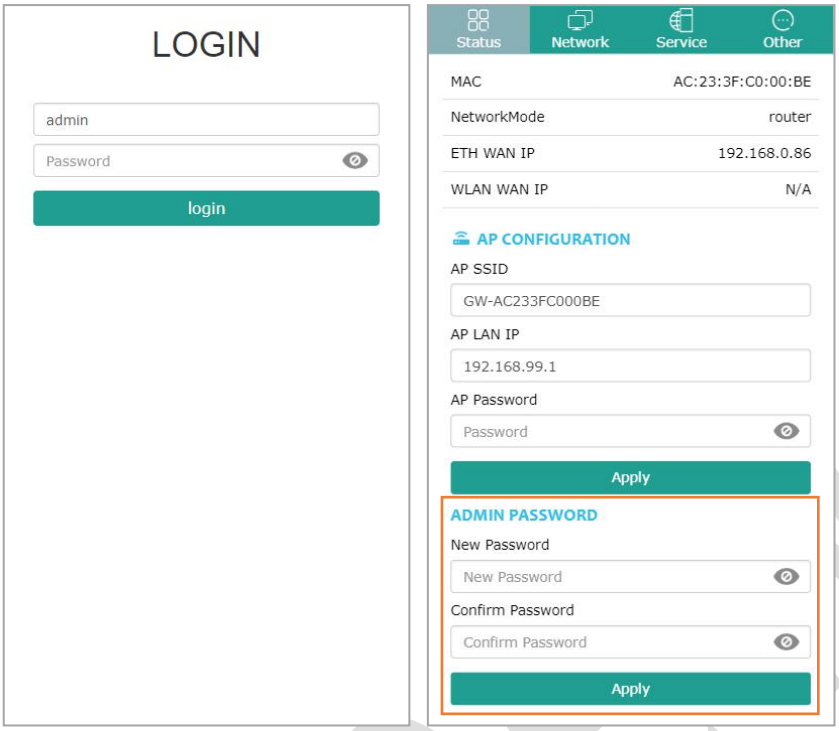
--> You should run the follow command:

$ arp-scan -t 192.168.0.1/24

Where means scan the IP address: 192.168.0.x(from 192.168.0.1 to 192.168.0.255),"24" means the number of subnet mask's bit 1 in binary.

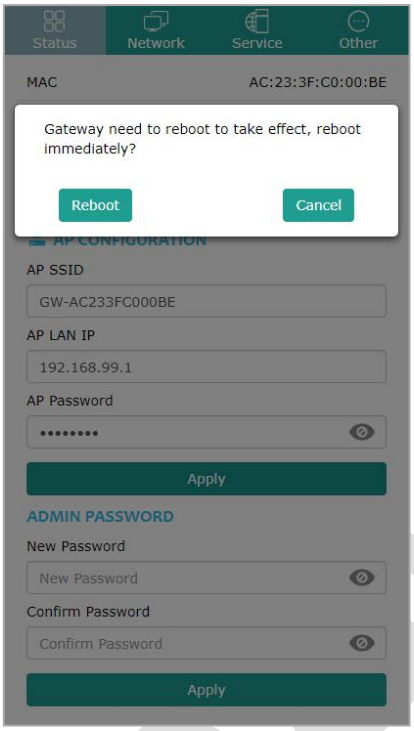
```
C:\Users\Administrator\Desktop\arp-scan-windows--master\arp-scan-windows--master\arp-scan\Release(x86)>arp-scan.exe
Usage: arp-scan.exe -t [IP/slash] or [IP]

C:\Users\Administrator\Desktop\arp-scan-windows--master\arp-scan-windows--master\arp-scan\Release(x86)>arp-scan.exe -t 192.168.0.1/24
Reply that DC:FE:18:25:F8:A9 is 192.168.0.1 in 0.881312
Reply that 4C:CC:6A:8E:8E:3D is 192.168.0.3 in 11.043234
Reply that 0C:4B:54:D6:83:F5 is 192.168.0.4 in 11.794980
Reply that 94:D9:B3:2B:E5:C3 is 192.168.0.5 in 11.415704
Reply that 94:D9:B3:3F:FE:0A is 192.168.0.6 in 10.672595
Reply that 34:96:72:FB:0B:4F is 192.168.0.7 in 0.783680
Reply that E0:62:90:32:E0:02 is 192.168.0.8 in 10.805041
Reply that 1C:87:2C:77:8E:99 is 192.168.0.13 in 0.898064
Reply that 2C:4D:54:57:10:30 is 192.168.0.20 in 0.047900
Reply that 24:69:68:E4:B9:81 is 192.168.0.21 in 12.689903
Reply that 50:FA:84:03:45:E4 is 192.168.0.26 in 0.885762
Reply that 00:CF:E0:32:4B:97 is 192.168.0.35 in 1.220540
```

1.2 Login Password of Configuration Page



The default login password of gateway configuration page is empty. You can log on directly by clicking login button. For security, please set up administrator login password in the "ADMIN PASSWORD" column of the "Status" tab.

1.3 Password of AP



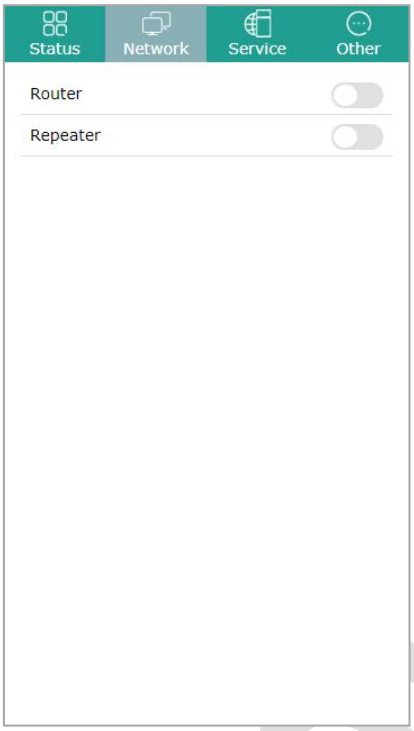
In the "AP CONFIGURATION" column under the "Status" tab of the gateway WEB configuration interface, users can set the connection password in the AP mode (see the above picture). It will ask whether to reboot gateway after clicking "Apply" button. You can click on "Reboot" to reboot the gateway immediately, or you can click "Cancel" to reboot manually later, after the gateway is rebooted, the configuration will take effect.

2. Network Configuration

G1 Gateway realizes network connection through two methods (Router, Repeater), as shown in following picture. Factory default is in Router-dhcp mode.

Router means connect with Ethernet cable.

Repeater means WIFI network extension.

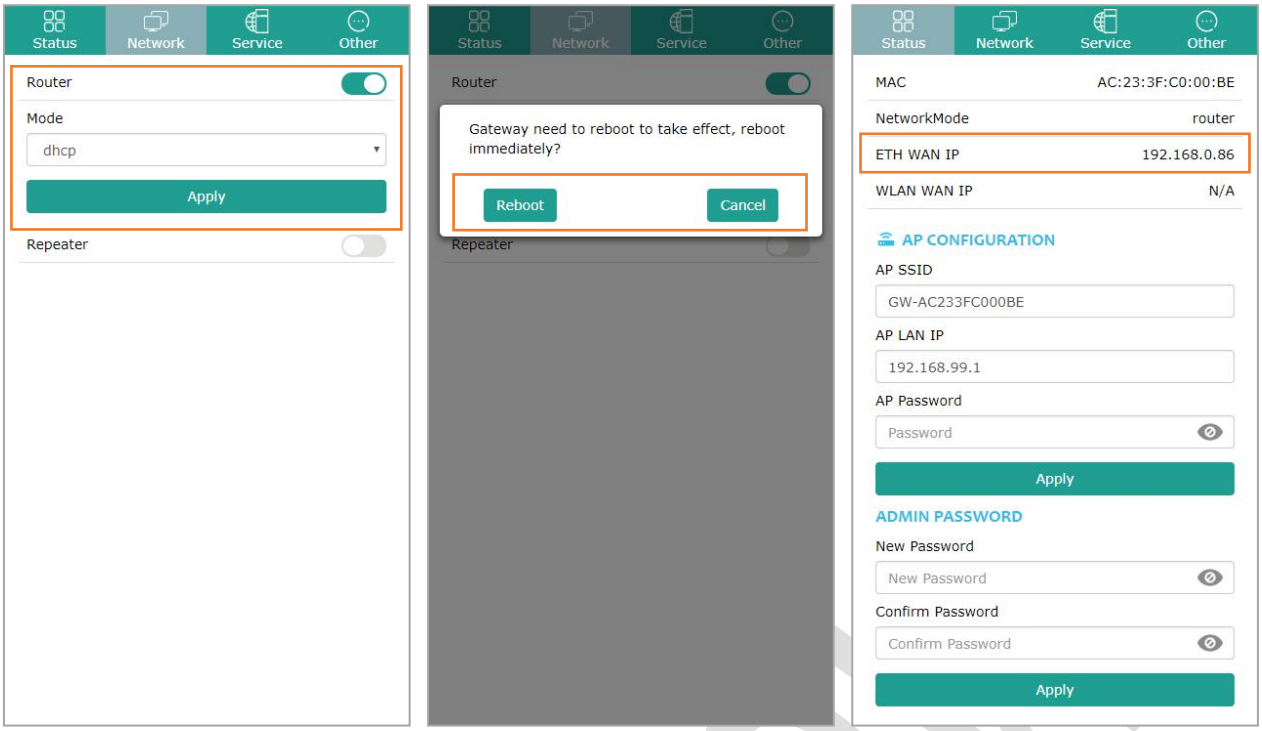


2.1 Router Connection

G1 gateway can connect with Ethernet cables directly to realize data communication with server.
There are two sub modes in Router mode, dhcp mode (default) and static mode. dhcp mode is that gateway automatically obtains IP address from higher level router, and static mode manually assigns a fixed IP address to gateway.

2.1.1 dhcp mode

In the "***Router***" column under the "***Network***" tab of the gateway WEB configuration interface, select the dhcp mode. It will ask whether to reboot gateway after clicking "***Apply***" button. You can click on "***Reboot***" to reboot the gateway immediately, or you can click "Cancel" to reboot later manually, after the gateway is rebooted, the configuration will take effect.
G1 BLE gateway connects to superior router reticle; after reboot, it automatically acquires IP address from superior router through dhcp protocol, so as to connect network. See picture below. The state item in gateway WEB configuration interface will display current connection state and gateway IP address.

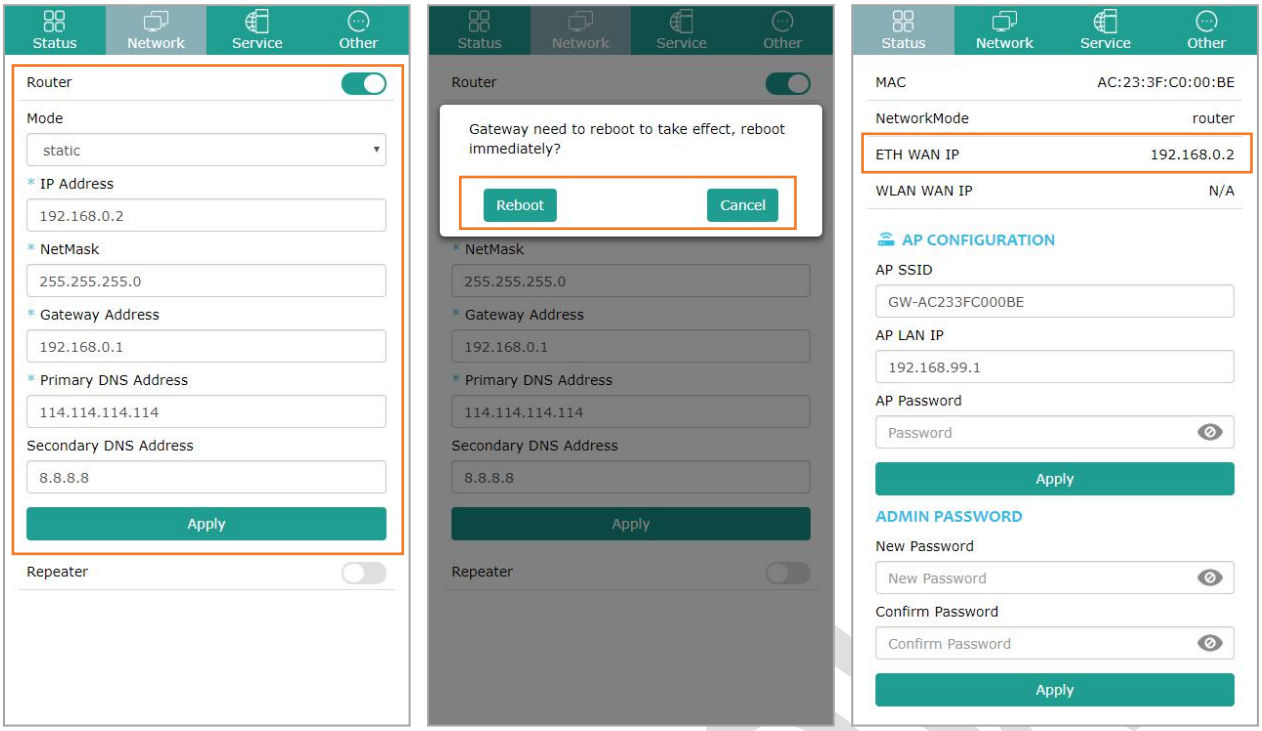


2.1.2 static mode

In the "***Router***" column under the "***Network***" tab of the gateway WEB configuration interface, select the static mode and fill in the IP address information.

You can click on "***Reboot***" to reboot the gateway immediately, or you can click "***Cancel***" to reboot later manually, after the gateway is rebooted, the configuration will take effect.

G1 gateway connects to senior router reticle; after reboot, it automatically acquires the IP address which you have just assigned from the senior router, so as to connect network. See picture below. The state item in gateway WEB configuration interface will display current connection state and gateway IP address.



The detailed description of interface fields is as follows:

Field	Description
Mode	dhcp mode or static mode
IP Address	Confirm the IP address you allocate is not occupied by other devices
Netmask	Confirm the same as the subnet mask of the senior router
Primary DNS	Primary DNS Address, default: 114.114.114.114
Secondary DNS	Secondary DNS Address, default: 8.8.8.8

2.2 Repeater Connection

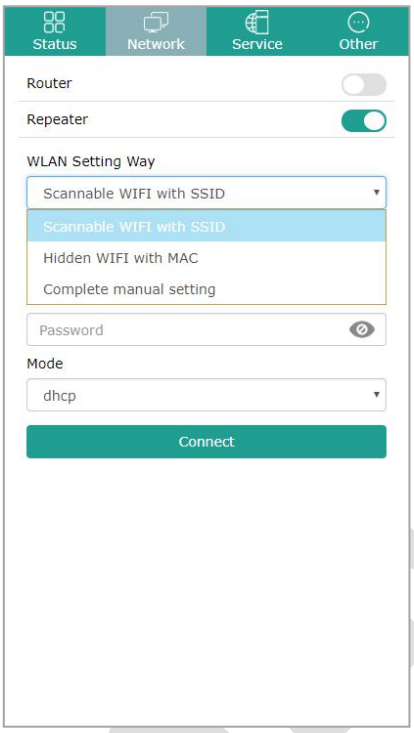
G1 gateway can be connected to WLAN AP as WLAN client to realize the data communication with server.

There are also two sub modes in Repeater mode, dhcp mode and static mode. dhcp mode is that gateway automatically obtains IP address from senior router, and static mode manually assigns a fixed IP address to gateway.

Three ways to configure Repeater

There are three ways to configure Repeater mode,including ***Scannable WIFI with SSID***(Connect the

scannable and visible AP with SSID), ***Hidden WIFI with MAC***(Connect the scannable but hidden AP with BSSID) and ***Complete manual setting***(Manually set up the WiFi not on site). You can choose according to your needs.

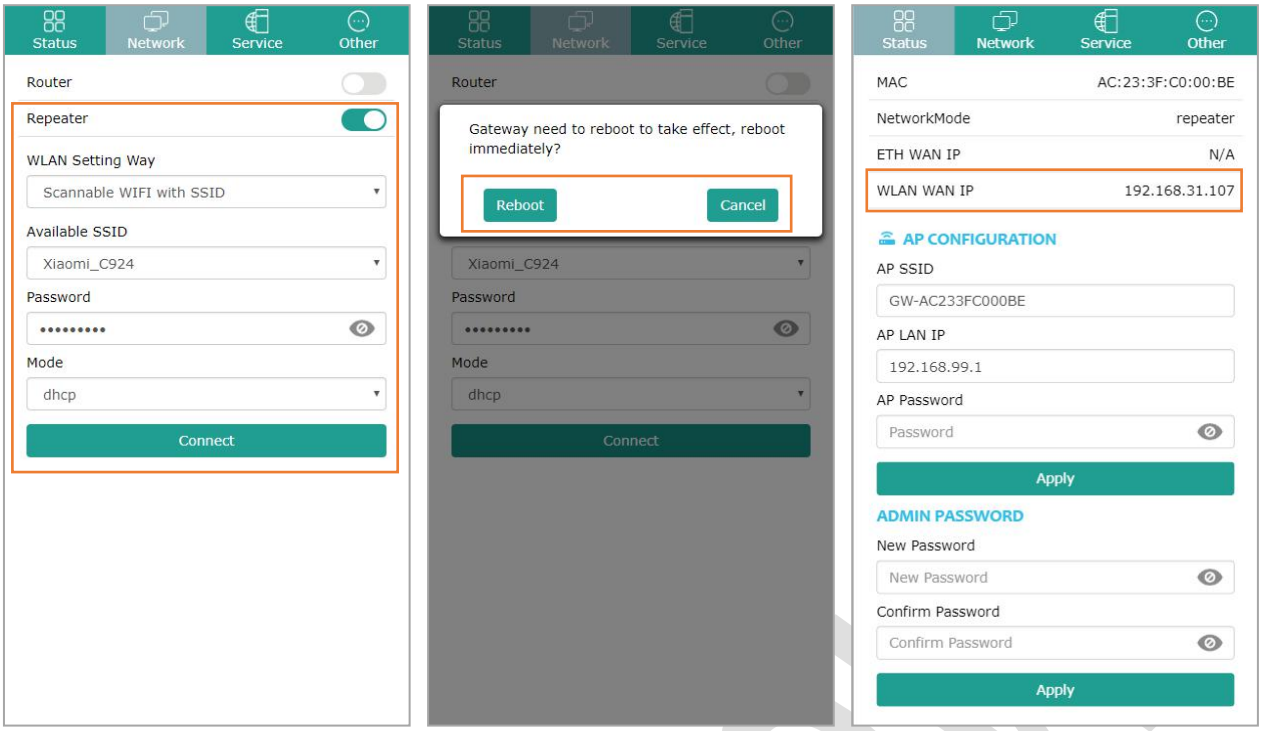


Note: The repeater mode requires that the channel of the gateway AP should be the same as that of the higher level router wifi, that is, if the channel of the higher level router changes, the gateway will automatically adjust the channel to be the same as that of the the higher level router wifi. This process requires the gateway to be rebooted before the gateway takes effect. If the gateway cannot be accepted to reboot, the wifi channel of higher level router can be configured to a fixed channel to fix this issue.

2.2.1 dhcp mode

In the "***Repeater***" column under the "***Network***" tab of the gateway WEB configuration interface,select the dhcp mode ,select the WLAN SSID to be connected to gateway from *Available SSID* list and fill in the *Password*, then click "***Connect***" (see picture below).
It will ask whether to reboot gateway and the network setting takes effect after reboot. You may click

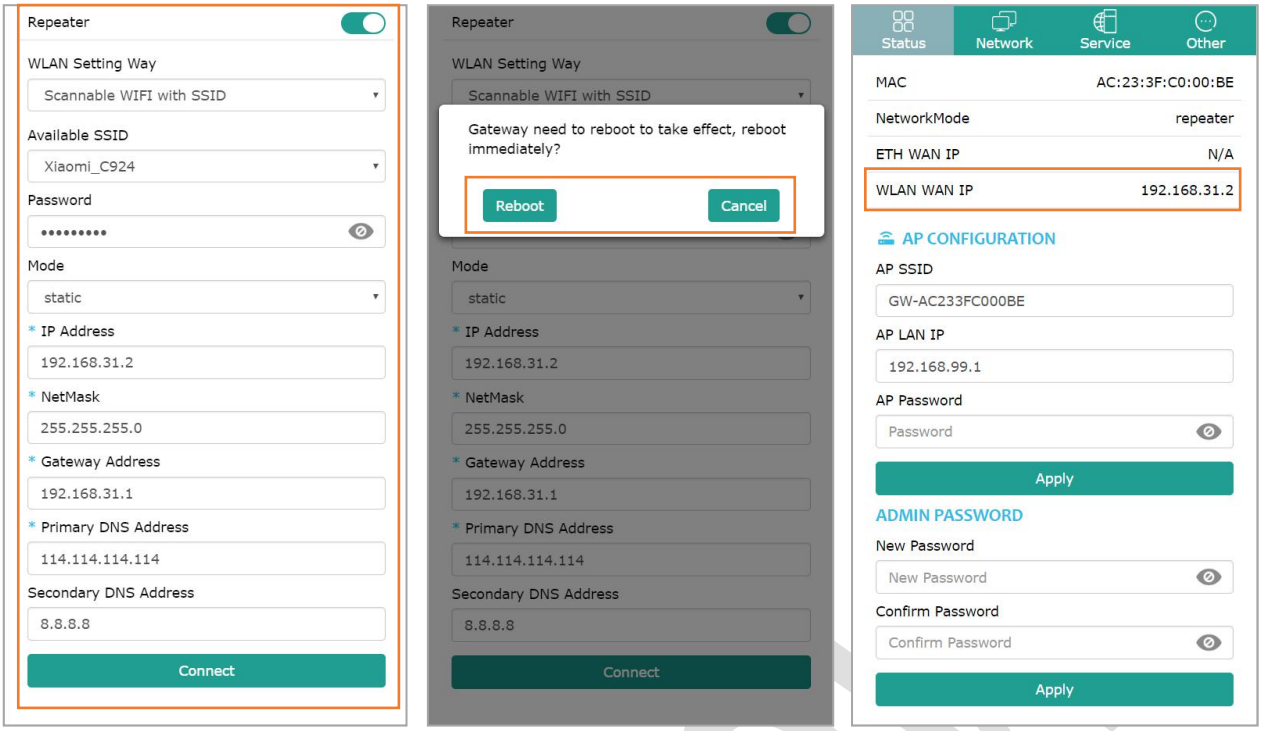
"***Cancel***" to reboot manually later, or click "***Reboot***" to reboot gateway immediately. It will connect to designate WLAN upon finishing restarting gateway. If has connected to designated WLAN, the state item will display the IP of WLAN connected; otherwise, it displays ***N/A***.



2.2.2 static mode

In the "***Repeater***" column under the "***Network***" tab of the gateway WEB configuration interface, select the WLAN SSID to be connected to gateway from ***Available SSID*** list and fill in the ***Password***, select the static mode and fill in the IP address information, then click "***Connect***" (see picture below).

It will ask whether to reboot gateway and the network setting takes effect after reboot. You may click "***Cancel***" to reboot manually later, or click "***Reboot***" to reboot gateway immediately. It will connect to designate WLAN upon finishing restarting gateway. If has connected to designated WLAN, the state item will display the IP address of WLAN connected; otherwise, it displays ***N/A***.



The detailed description of interface fields is as follows:

Field	Description
Available SSID	Automatically acquire applicable WLAN SSID nearby as client
Password	Password for connecting designated WLAN
Mode	dhcp mode or static mode
IP Address	Confirm the IP address you allocate is not occupied by other devices
NetMask	Confirm the same as the subnet mask of the senior router
Gateway Address	Confirm the same as the IP address of the senior router
Primary DNS	Primary DNS Address, default: 114.114.114.114
Secondary DNS	Secondary DNS Address, default: 8.8.8.8

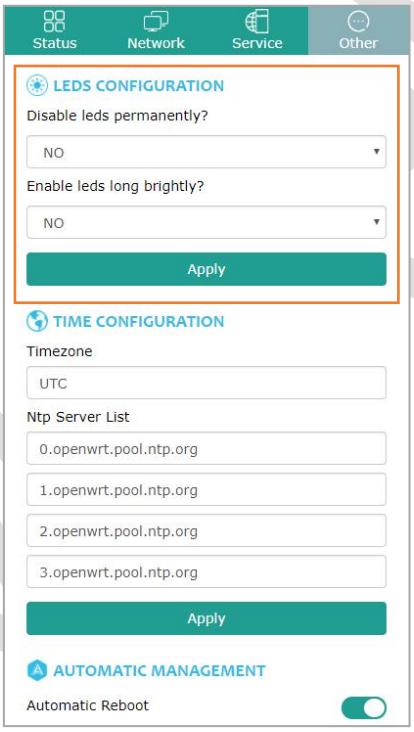
3. Other Configuration

3.1 LED Strip Lights Configuration

In default, when the G1 gateway works in normal (Dynamic breathing lights), the colorful LED strip will be closed automatically after 1 minute. In the "LEDS CONFIGURATION" column under the "Other" tab of

the gateway WEB configuration interface,choose the "YES" and click "Apply" to enable LED strip long brightly. More info about LED configuration is as following table.

Field	Description
Disable leds permanently?	YES: the colorful LED strip will be closed after G1 is totally started. Don't show Dynamic LED Strip Lights rotation even in unreachable server status. NO: enable colorful LED strip. Default option.
Enable leds long brighly?	YES: enable the colorful LED strip lights all the time. NO: the colorful LED strip will be colsed to step into power-saving mode after last 1 min in dynamic breathing lights. Note: this field is unavailable if you disable leds permanently.



3.2 Firmware Upgrade

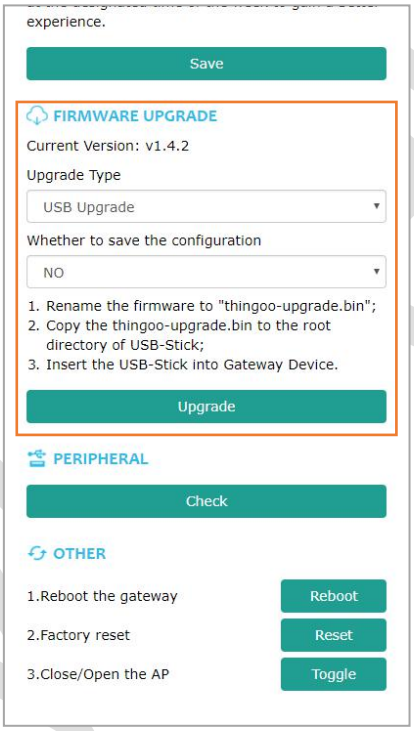
G1 gateway provides 4 different ways to upgrade the firmware: ***USB***,***OTA***(over the air,fetching upgrading firmware from our minew's HTTP File Server),***LAN***(over-ther-air,fetching upgrading firmware from your own HFS) and ***Customization***(It's essentially OTA).

Note: During the upgrade process, the top colorful LED strip will be turned off from static six-color lights until they become dynamic lights (the whole upgrade process will last 2 to 3 minutes, USB upgrade is the fastest, and the upgrade time for OTA depends on the network status). Do not disconnect the gateway power until the gateway color lights become dynamic lights. Otherwise there will be brick risk. If the

gateway does not display a static six-color lights after clicking on the upgrade button 2 minutes, the gateway must fail in fetching upgrading firmware. You should checkout newtwork and try it again.

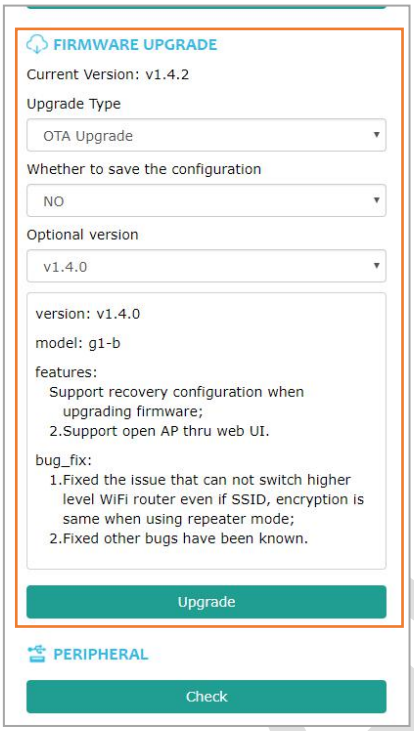
3.2.1 USB Upgrade

In the "FIRMWARE UPGRADE" column under the "Other" tab of the gateway WEB configuration interface, choose the "USB Upgrade".
Rename the firmware to "thingoo-upgrade.bin", then copy thingoo-upgrade.bin to the root directory of USB-Stick, and last, insert the USB-Stick into gateway device, If you wanna save the current configuration, Plz configure “Whether to save the configuration” to YES, then click the "Upgrade" button and "Ok" button to confirm your upgrade.
If the top LED strip lights go out or become static, this indicated that the upgrade is running. Do not cut off the power supply in the process of upgrade. Waiting about 2 minutes, until the LED strip is turned on or dynamic again, this indicates that the upgrade is done successfully.



3.2.2 OTA Upgrade

After gateway can connected with external network, choose "OTA Upgrade" from the Upgrade Type list, If you wanna save the current configuration, Plz configure “Whether to save the configuration” to YES , and then click "Upgrade" button and "OK" button to confirm your upgrade.
After confirming the upgrade, there will be a period of time to download the firmware and keep the network unblocked during the process of downloading the firmware from the server.
If the top LED strip is turned off or static, this indicated that the new version gateway firmware has been downloaded and the upgrade is running. Do not cut off the power supply in the process of upgrade. Waiting about 2 minutes, until the LED strip is turned on or dynamic again, this indicates that the upgrade is done successfully.

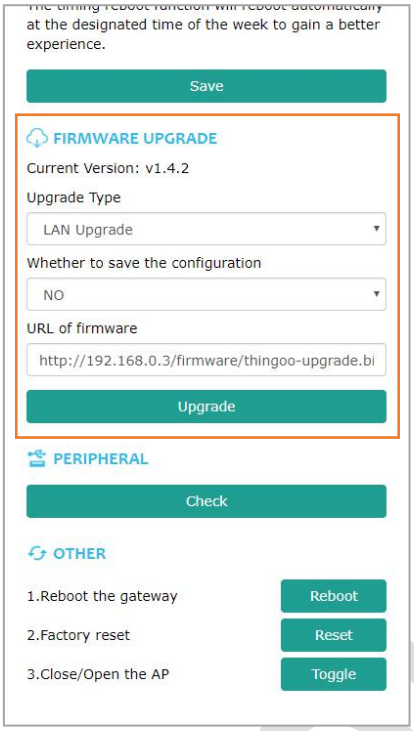


3.2.3 LAN Upgrade

If your gateway can't access the external network and you don't wanna use the USB Upgrade option,the LAN upgrade would meet your need. Choose "LAN Upgrade" from the Upgrade Type list. You should setup HFS ,which can fetch from the link: https://sourceforge.net/projects/hfs/. Put the upgrading firmware to the HFS path. Modify the URL of firmware to meet your real situation. If you wanna save the current configuration, Plz configure "Whether to save the configuration" to YES , and then click "Upgrade" button and "OK" button to confirm your upgrade.

After confirming the upgrade, there will be a period of time to download the firmware and keep the network unblocked during the process of downloading the firmware from the server.

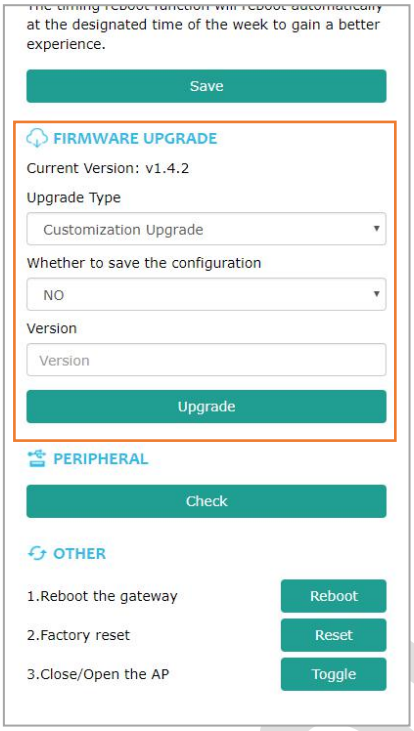
If the top LED strip is turned off or static, this indicated that the new version gateway firmware has been downloaded and the upgrade is running. Do not cut off the power supply in the process of upgrade. Waiting about 2 minutes, until the LED strip is turned on or dynamic again, this indicates that the upgrade is done successfully.



3.2.4 Customization Upgrade

Customization Upgrade is also essentially OTA Upgrade. After gateway can connected with external network, choose "Customization Upgrade" from the Upgrade Type list, fill in the version number of our company to customize the firmware for our customers ,and then click "Upgrade" button and "OK" button to confirm your upgrade.After confirming the upgrade, there will be a period of time to download the firmware and keep the network unblocked during the process of downloading the firmware from the server.

If the top LED strip is turned off or static, this indicated that the new version gateway firmware has been downloaded and the upgrade is running. Do not cut off the power supply in the process of upgrade. Waiting about 2 minutes, until the top LED strip is turned on or dynamic again, this indicates that the upgrade is done successfully.



3.3 Time Configuration

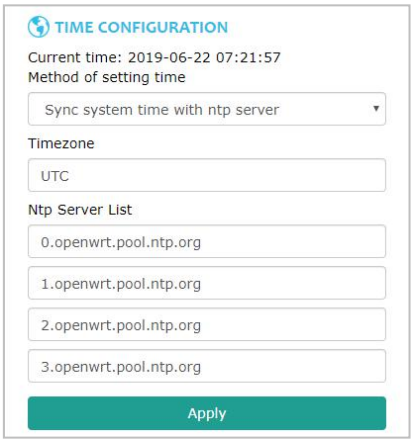
The gateway has no RTC clock, so it needs to synchronize the time of NTP server to get the exact time or manually synchronize the time of browser host to the gateway.

3.3.1 Sync system time with NTP server

The time zone and the NTP server address are all can be configured.

In the time column of page "Other", you can set the time zone (UTC by default) and the NTP server. After filling up your information, click the "Apply" button to configure successfully, it will take effect immediately. As shown in the following figure.

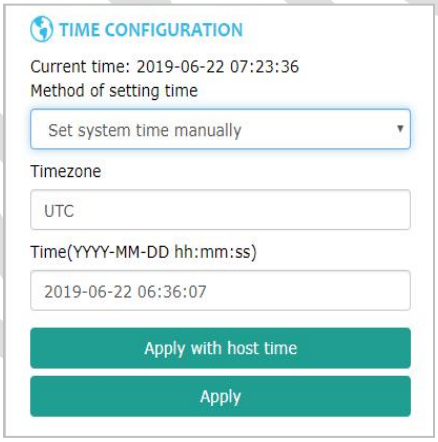
The default UTC time zone is called Coordinated Universal Time. If in the east time zone, timezone can be set to UTC-{time zone number}, for example, UTC-8 is the East eight zone.
If in the Western Time Zone, timezone can be set to UTC+{time zone number}, such as UTC+8 is the time zone of the Western Eighth Zone.



3.3.2 Set system time manually

As how to manually set the gateway system time, you can click ***Apply with host time*** or ***Apply***. ***Current time*** shows the time of the gateway system. As shown in the figure below.

When you click ***Apply with host time***, the gateway will actively get the time of the browser's host and synchronize it to the gateway. Before clicking ***Apply with host time***, the Timezone parameter must be in the same time zone as the time zone of the browser's host.

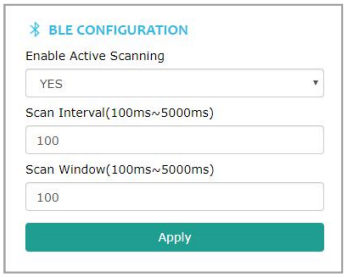


Warm hint: For more detailed Timezone settings please refer to:

https://wiki.openwrt.org/doc/uci/system

3.4 BLE Configuration

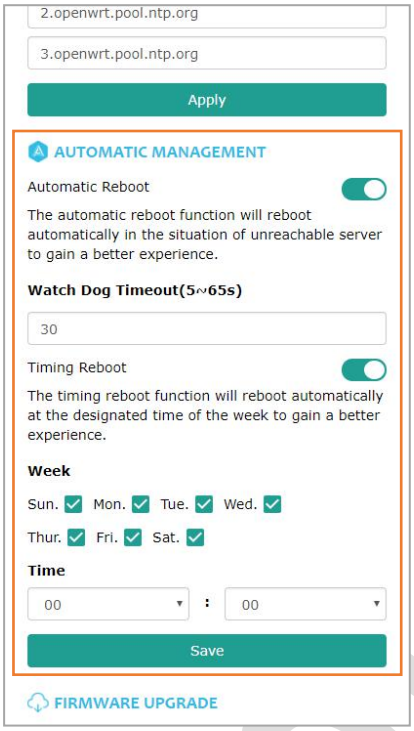
These parameters are used to configure the scanning strategy of BLE module. As shown in the figure below.



parameter	Description
Enable Active Scanning	1. There are two types of advertising packets in BLE tags,including advertising packet and scan response packet. Advertising packets are broadcasted actively by BLE tags, while scan response packets are broadcasted passively by BLE tags after receiving requests from scanner. 2. There are two scanning strategies for the BLE module of the gateway,including active scanning and passive scanning. Active scanning sends requests for scan response packets to the BLE tag, while passive scanning only receives advertising packets and does not send requests for scan response packets. 3. If your BLE tag does not have the scan response packet, you can set this parameter to NO, which can improve the scanning rate of the BLE advertising packets.
Scan Interval	The scan interval and the scan window are used together. The scan window parameter should not be larger than the scan interval parameter. When the two parameters are equal, the scanning rate can reach to 100%.
Scan Window	

3.5 Automatic Management

Automatic management includes Automatic Reboot and Timing Reboot. As shown in the following screenshot.



3.5.1 Automatic Reboot

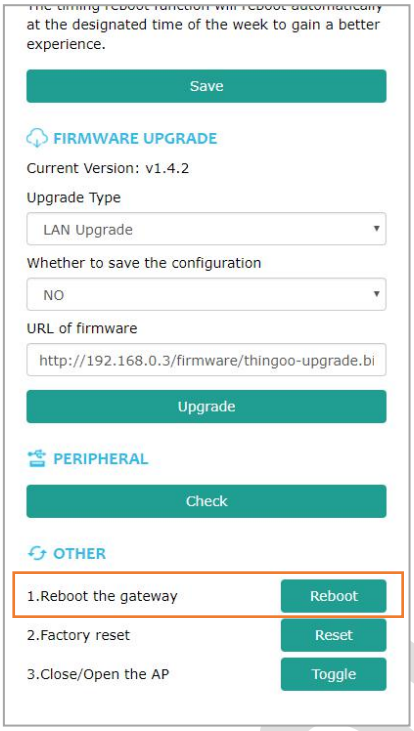
Automatic reboot, also known as watchdog function, if the gateway disconnect with server from the stable connection exceeds the specified watchdog time (the reason for the disconnection may be the server, may also be the reason for the gateway's network) ,the gateway will automatically reboot. If the gateway is not connected to the server after reboot,it won't reboot again. Automatic reboot will only occur during the disconnection from stable connection process.

3.5.2 Timing Reboot

The timing reboot function is not open by default. When enabled, the gateway will reboot at a specified time (the time zone be used is from the previous time configuration).

3.6 Gateway Reboot

In the "OTHER" column under the "Other" tab of the gateway WEB configuration interface, click the "Reboot the gateway" button will reboot the gateway. As shown in the following figure.



3.7 Factory Reset

There are two ways to restore the factory settings: the reset Button or the web page configuration. According to any of the following methods, if the top LED strip lights go out or become static, wait for a few seconds and then the static LED strip lights turn on again, it is indicated that the gateway is successfully restored and the gateway is starting.

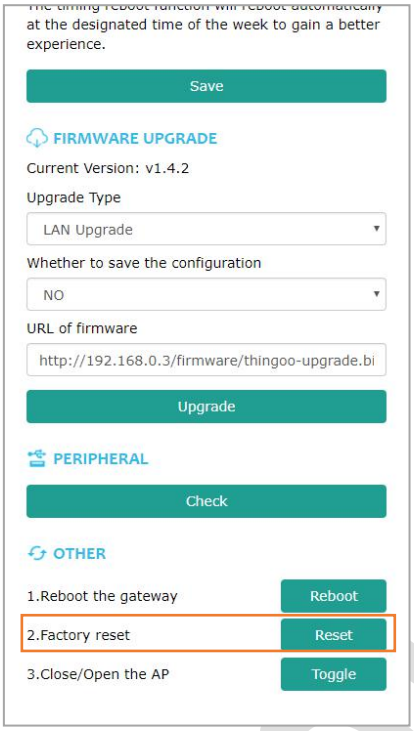
Since the factory settings are restored, the previous configuration will be lost. Please operate carefully.

3.7.1 Reset Button

When the top LED strip lights are dynamical, press the Reset Button for more than 5s and loosen with a thin needle then the device will restore the factory settings.

3.7.2 Web Page

In the "OTHER" column under the "Other" page of the gateway WEB configuration interface,click the "Factory Reset" button also will restore the factory settings.



3.8 Close WiFi AP

The hotspot AP(access point) of gateway WIFI is always open, and there are two ways to control the AP of the gateway WIFI: the reset Button or the web page configuration.
The WiFi hotspot AP can be open or closed by the reset Button and web page.

Note: the closure of the WiFi hot spot does not affect the Repeater mode of the current gateway as a client.

3.8.1 Reset Button

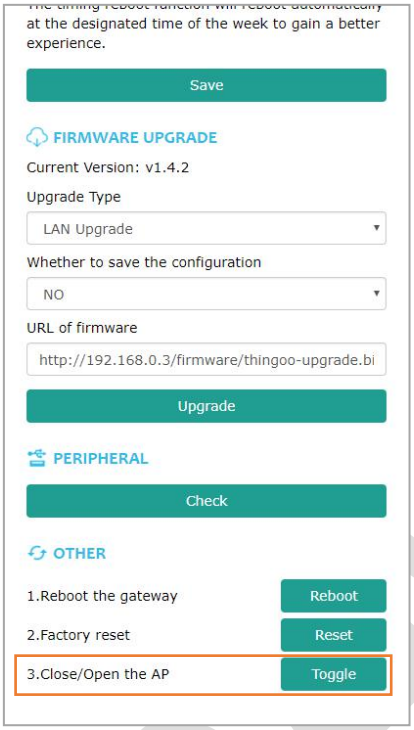
When the top LED strip lights are dynamical, press the reset Button for no more than 2s and loosen with a thin needle then the device will open or close the hotspot AP of gateway WIFI.

Note: the time of holding the Reset Button does not exceed two seconds, and the factory settings will be restored when the time is over 5 seconds.

3.8.2 Web Page

In the "OTHER" column under the "Other" tab of the gateway WEB configuration interface,click the

"Close/Open the AP" button also will toggle the AP.



Notes: It is subject to any changes without prior notification. MINEW reserves the final right of interpretation.

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