

HCBG01

Bluetooth Gateway

User Guide

Document information

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1.Preparation

Welcome to use the Bluetooth gateway, Before proceeding to the next step, please prepare the following devices:

1. One Computer (with WiFi and Ethernet ports);
2. One Bluetooth gateway;
3. One Bluetooth gateway power adapter;
4. One wireless router.

2.Network Configuration

In order to come more families with the characteristics of Bluetooth gateway, it is recommended to follow the order of chapters 2.1, 2.2, and 2.3.

2.1 Directly Connect

Connect the computer directly to the Bluetooth gateway, quickly familiarize yourself with the Bluetooth gateway. The computer is connected to the Bluetooth gateway through WiFi, and the Bluetooth gateway can be configured through the computer. The computer can also act as a server to observe gateway data.



Step:

(1) Power the Bluetooth gateway through the power adapter, and the power indicator light is on. When the WiFi indicator light flashes, the Bluetooth gateway's WiFi can be connected through the computer, with SSID GW_*****, The connection password is: 66668888;



(2)After successful connection, enter 10.10.10.254 in the web browser to enter the gateway configuration interface, and the login password is: admin;

(3) The Bluetooth gateway will assign an IPaddress to the computer. Please check the IPaddressobtained by the computer Wireless network interface controller, such as10.10.10. * * *;

(4) Configure the target server address of the gateway in the gateway configuration interface as10.10.10.***(default is10.10.10.100), and the port defaults to7628(if7628port is already occupied, please modify it to another port such as7629).

(5) The default configuration of the gateway isUDPprotocol, with Bytearray data format.

(6) Users can use networkdebug assistantssuch asNet Assist, to listen to Bluetooth gateway data. The Net Assisttool is configured as:

Protocol type:UDP

Local host address:10.10.10. * * *(needs to be consistent with the gateway)

Local host port:7628(needs to be consistent with the gateway)

SelectHEXin the receiving and sending settings



(7) After successful configuration,Net Assistwill receive data from the gateway.Can be parsed based on Bluetooth gateway data protocol;

(8)IfTCP is required, modify the gateway target server protocol toTCP, fill in the correspondingIPand port number, and configure the Net Assisttool as follows:

Protocol type:TCP Server

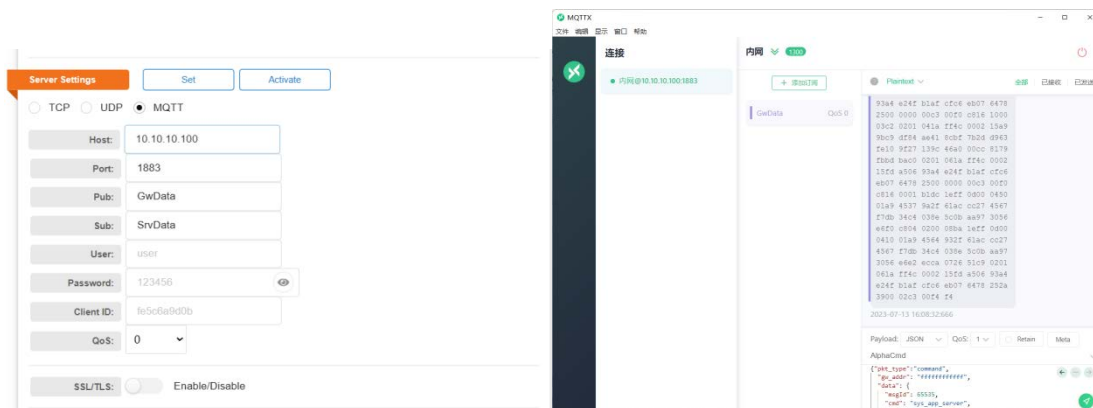
Local host address:10.10.10. * * *(needs to be consistent with the gateway)

Local host port:7628(needs to be consistent with the gateway)

SelectHEXin the receiving and sending settings,as shownin the following figure:



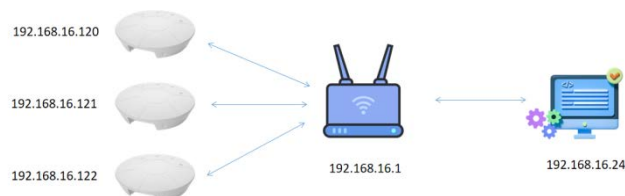
(9) If you need to useMQTT, build your ownMQTTserver and fill in the correspondingMQTTnode address and related subscription topics, as shown in the following figure:



2.2 Local area networks

Bluetooth gatewayand computer are connected to a router.

The Bluetooth gateway is connected to the router through a network cable, and the computer is also connected to the same router. The computer acts as a server to obtain gateway data.



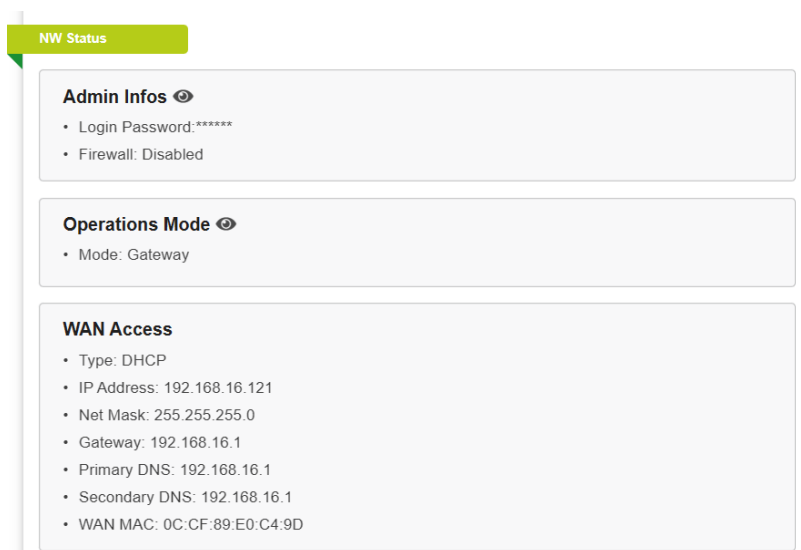
Step:

(1) Power the Bluetooth gateway through the power adapter, and the power indicator lightis on. When the Wi-Fiindicator light flashes, the Bluetooth gateway'sWiFican be connected through the computer, with SSIDGW_*****, The connection password is:66668888;



(2) After successful connection, enter 10.10.10.254 in the web browser to enter the gateway configuration interface, and the login password is: admin;

(3) Configure a Bluetooth gateway to connect to the router through wired or wireless means (please refer to the relevant content on gateway configuration in this document). After successful connection, the router assigns IP addresses to the gateway, such as 192.168.16.120, 192.168.16.121, and 192.168.16.122. As shown in the following figure:



Connect the computer to the router through a network cable. Assuming that the IP address assigned by the router to the wired network card of the computer is 192.168.16.24, the computer, router, and gateway form a local area network.

(4) Enter the Bluetooth gateway configuration interface again and set the target server address of the Bluetooth gateway to the IP address obtained by the computer from the router: 192.168.16.24. The default port is 7628 (if the 7628 port is already occupied, please modify it to another port such as 7629).

(5) The default configuration of the gateway is UDP protocol, with Bytearray data format.

(6) Users can listen to Bluetooth gateway data through network tools such as Net Assist, which is configured as:

Protocol type:UDP

Local host address:192.168.16.24(needs to be consistent with the gateway)

Local host port:7628(needs to be consistent with the gateway)

Select HEX in the receiving and sending settings



(7) After successful configuration, Net Assist will receive data from the gateway. Can be parsed based on Bluetooth gateway data protocol;

(8) If TCP is required, modify the gateway target server protocol to TCP, fill in the corresponding IP and port number, and configure the Net Assist assistant tool as follows:

Protocol type:TCP Server

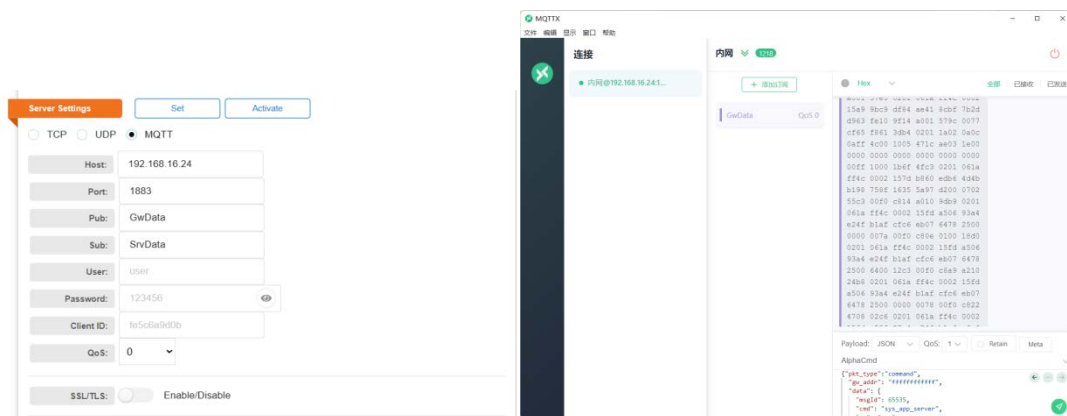
Local host address:192.168.16.24(needs to be consistent with the gateway)

Local host port:7628(needs to be consistent with the gateway)

Select HEX in the receive and send settings, as shown in the following figure:

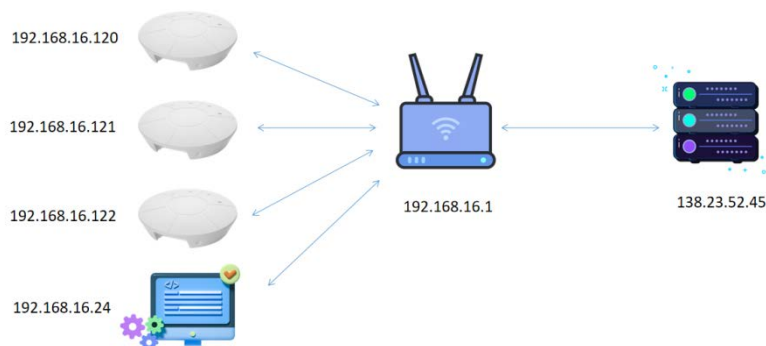


(9) If you need to use MQTT, build your own MQTT server and fill in the corresponding MQTT node address and related subscription topics, as shown in the following figure:



2.3 Wide Area Network

The Bluetooth gateway connects to the external network through a router, and users can obtain gateway data from the server. This application scenario requires routers to be able to connect to external networks.



Step:

(1) Power the Bluetooth gateway through the power adapter, and the power indicator light is on. When the

WiFi indicator light flashes, the Bluetooth gateway's WiFi can be connected through the computer, with SSID GW_*****, The connection password is: 66668888;



(2) After successful connection, enter 10.10.10.254 in the web browser to enter the gateway configuration interface, and the login password is: admin;

(3) Configure a Bluetooth gateway to connect to the router through wired or wireless means (please refer to the relevant content on gateway configuration in this document). After successful connection, the router assigns IP addresses to the gateway, such as 192.168.16.120, 192.168.16.121, 192.168.16.122;

(4) Assuming the existing cloud server IP is 138.23.52.45 (please refer to the relevant content on gateway configuration in this document for details). Enter the Bluetooth gateway configuration interface again and set the target server address of the Bluetooth gateway to the cloud server IP address: 138.23.52.45. The default port is 7628 (if the 7628 port is already occupied, please modify it to another port such as 7629).

(5) The default configuration of the gateway is UDP protocol, with Bytearray data format.

(6) Users can listen to Bluetooth gateway data on the server through network tools such as Net Assist

(7) After successful configuration, Net Assist will receive data from the gateway. Can be parsed based on Bluetooth gateway data protocol;

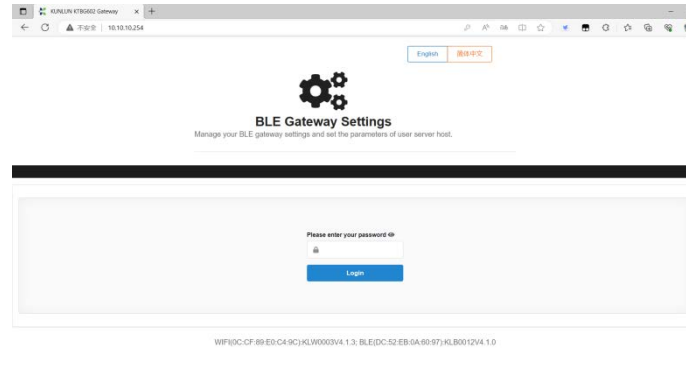
(8) If TCP or MQTT is required, corresponding modifications can be made on the gateway and Net Assist sides.

3. Gateway Configuration

3.1 Login Gateway

3.1.1 It is recommended to use Google Chrome to open the page: <http://10.10.10.254> ;

3.1.2 Enter the default password: "admin".

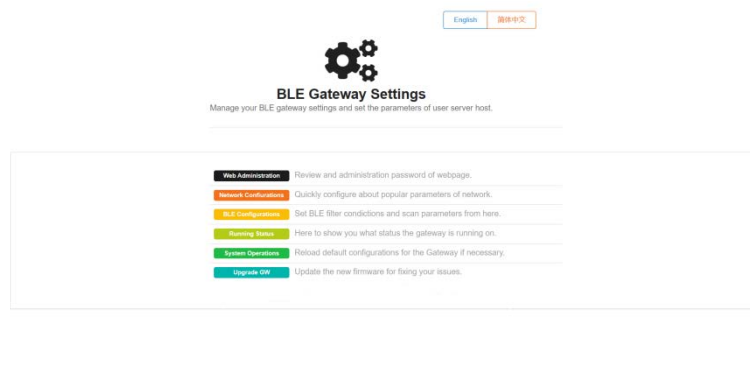


3.2 Gateway Home Page

3.2.1 The title corresponds to each gateway operation.

3.2.2 Web Administration: Review and administration password of webpage

- Network Configuration: Quickly configure about popular parameters of network
- BLE Configurations: Set filter conditions and scan parameters from here
- Running Status: Here to show you what status the gateway is running on
- System Operations: Reload default configurations for the Gateway if necessary
- Upgrade GW: Update the new firmware for fixing your issues



3.3 Using wired networks

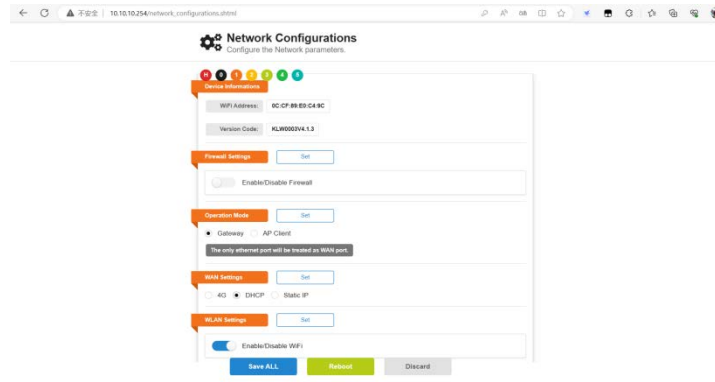
3.3.1 Open the gateway network configuration;

3.3.1 Select Gateway mode;

3.3.3 Choose dynamic DHCP or static IP as needed;

3.3.4 Bluetooth gateway connects to the router LAN port through a network cable;

3.3.5 Click "Save All" and then click "Reboot" to restart and take effect.



3.4 Using Wireless Networks

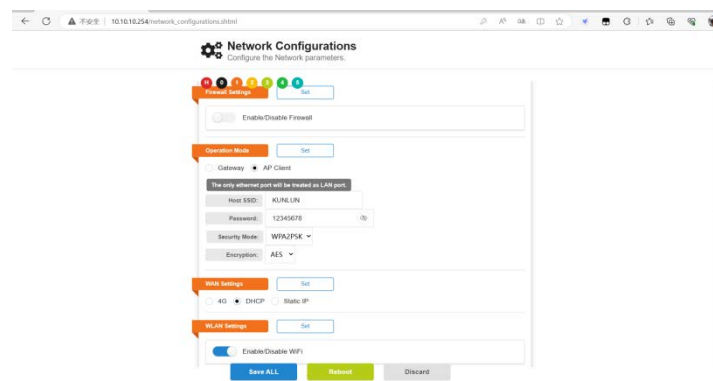
3.4.1 When the Bluetooth gateway uses WiFi to connect to the WiFi router, the network port of the Bluetooth gateway should not be connected to a network cable.

3.4.2 Open the gateway network configuration;

3.4.3 Select the AP/Client mode and fill in the SSID, password, Security Mode, and Encryption of the connected WiFi router;

3.4.4 Choose dynamic DHCP or static IP as needed;

3.4.5 Click "Save All" and then click "Reboot" to restart and take effect.

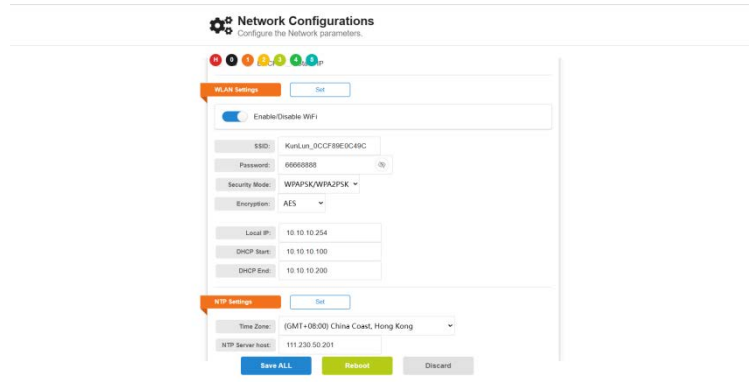


3.5 Modifying Gateway Hotspots

3.5.1 Turn on or off the WiFi of the Bluetooth gateway itself;

3.5.2 Modify the SSID and password of WiFi;

3.5.3 Click "Save All" and then click "Reboot" to restart and take effect.



Network Configurations
Configure the Network parameters.

WLAN Settings [Set]

☒ Enable/Disable WiFi

SSID: Kurlun_RCCF8BE9C49C

Password: 66666666

Security Mode: WPA2PSK/WPA3PSK

Encryption: AES

Local IP: 10.10.10.254

DHCP Start: 10.10.10.100

DHCP End: 10.10.10.200

NTP Settings [Set]

Time Zone: (GMT+08:00) China Coast, Hong Kong

NTP Server host: 111.230.50.201

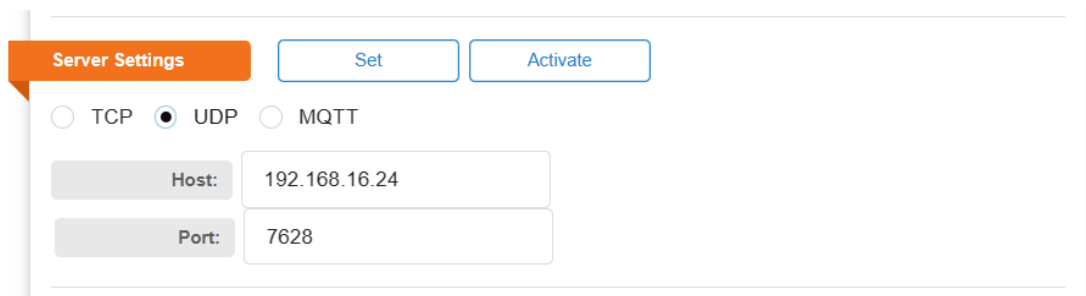
[Save ALL] [Reboot] [Discard]

3.6 Setting the Target Server

3.6.1 Select the server protocol type;

3.6.2 Fill in the corresponding parameters;

3.6.3 After clicking the "SET" button, click "Activate" to take effect.



Server Settings [Set] [Activate]

☐ TCP ☒ UDP ☐ MQTT

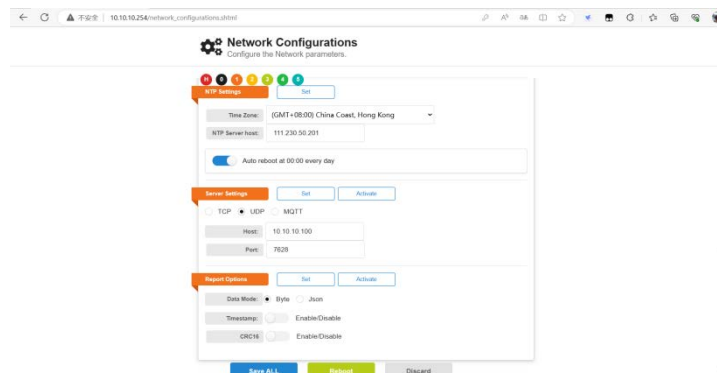
Host: 192.168.16.24

Port: 7628

3.7 Setting Data Format

3.7.1 Choose Bytearray or Jsonstring format;

3.7.2 There are corresponding document protocols for different formats. Please refer to the specific protocol documents provided by the manufacturer.



Network Configurations
Configure the Network parameters.

NTP Settings [Set]

Time Zone: (GMT+08:00) China Coast, Hong Kong

NTP Server host: 111.230.50.201

☒ Auto reboot at 00:00 every day

Server Settings [Set] [Activate]

☐ TCP ☒ UDP ☐ MQTT

Host: 10.10.10.100

Port: 7628

Report Options [Set] [Activate]

Data Mode: ☒ Byte ☐ Json

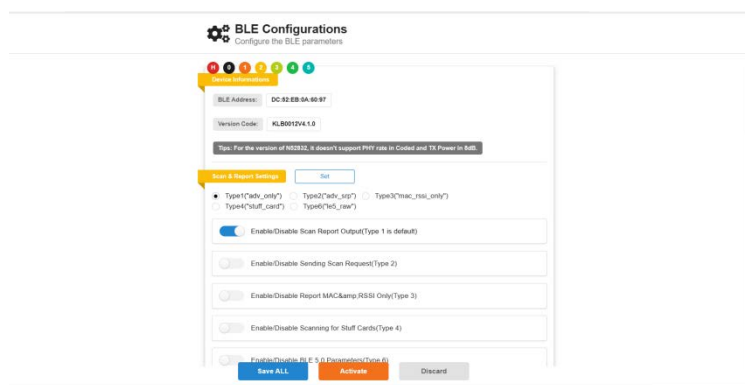
Timestamp: ☐ Enable/Disable

CRC16: ☐ Enable/Disable

[Save ALL] [Reboot] [Discard]

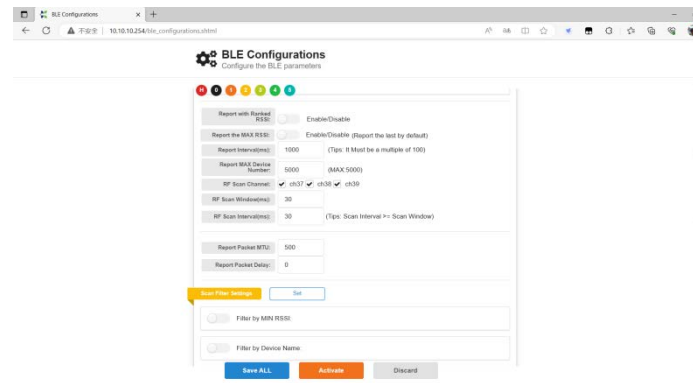
3.8 Setting Data Content

- 3.8.1 Type 1: Only scan and report surrounding Bluetooth broadcast packets;
- 3.8.2 Type 2: Add a scanning report response package and report it together with Type 1;
- 3.8.3 Type 3: Only scan and report device MAC and RSSI values;
- 3.8.4 Type 4: Only scan and report specific Bluetooth work card devices;
- 3.8.5 Type 5: scan and report BLE devices;
- 3.8.6 Click on "Save All" and then click on "Activate" to take effect.



3.9 Setting Scan Parameters

- 3.9.1 Reporting cycle interval, default to once every 1 second; Indicates the centralized reporting of devices scanned within one second;
- 3.9.2 Maximum cache, default maximum value of 5000, with a maximum cache of 5000 devices in one cycle;
- 3.9.3 Scanning channel: default to fully open 37/38/39 channels, full scan;
- 3.9.4 Scan interval/scan window: default 30ms. Indicates scanning once every 30ms, with each scan lasting for 30ms and scanning continuously. If it is 100/50ms, it means scanning once every 100ms, lasting 50ms each time, and not scanning for the remaining 50ms.
- 3.9.5 Number of devices per packet: default to 500. If 1000 devices are scanned within one second, the data packet will be sent in two batches of 500 each.



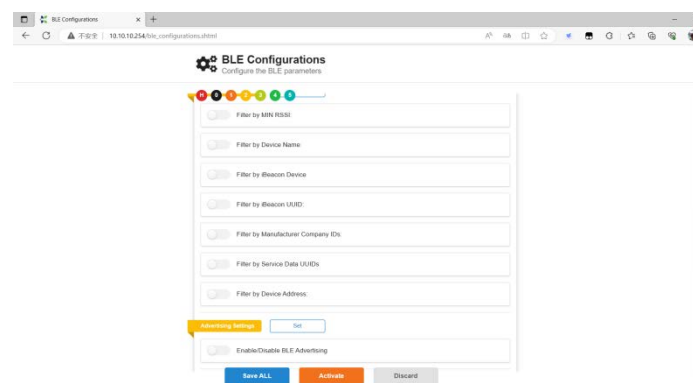
The screenshot shows the 'BLE Configurations' web interface. It includes a header with a gear icon and the title 'Configure the BLE parameters'. Below this, there are several configuration sections:

- Report with Bluetooth:** A toggle switch labeled 'Enable/Disable'.
- Report Interval:** A text input field set to '1000' with a note '(Tip: It must be a multiple of 100)'.
- Report RSSI:** A text input field set to '5000' with a note '(MAX 5000)'.
- RF Scan Channel:** A dropdown menu with 'ch37' selected.
- RF Scan Window:** A text input field set to '30'.
- RF Scan Interval:** A text input field set to '30' with a note '(Tip: Scan Interval > Scan Window)'.
- Report Packet BWT:** A text input field set to '500'.
- Report Packet Delay:** A text input field set to '0'.

 At the bottom, there are buttons for 'Save ALL', 'Activate', and 'Discard'. There is also a 'Filter by MIN RSSI' section with a text input field and a 'Filter by Device Name' section with a text input field.

3.10 Setting Scan Filtering

- 3.10.1Support multiple sets of UUIDfiltering;
- 3.10.2Support signal strength filtering;
- 3.10.3Support filtering of multiple sets of device names;
- 3.10.4SupportiBeacontype filtering;
- 3.10.5Supportfiltering of multiple sets of Company IDs;
- 3.10.6Support multi group serviceUUIDfiltering;
- 3.10.7SupportMACaddress range filtering.



The screenshot shows the 'Advertising' section of the 'BLE Configurations' web interface. It includes a header with a gear icon and the title 'Configure the BLE parameters'. Below this, there are several filtering options:

- Filter by MIN RSSI:** A text input field.
- Filter by Device Name:** A text input field.
- Filter by iBeacon Device:** A text input field.
- Filter by iBeacon UUID:** A text input field.
- Filter by Manufacturer Company IDs:** A text input field.
- Filter by Service Data UUIDs:** A text input field.
- Filter by Device Address:** A text input field.

 At the bottom, there are buttons for 'Save ALL', 'Activate', and 'Discard'. There is also a 'Filter by MIN RSSI' section with a text input field and a 'Filter by Device Name' section with a text input field.

3.11 Gateway Status

- 3.11.1In the running status interface, you can see all the status of the gateway;
- 3.11.2Gateway firmware version andMACinformation

Device Address

- WiFi: 0C:CF:89:E0:C4:9C
- BLE: DC:52:EB:0A:60:97

Firmware Version

- WiFi: KLV0003V4.1.3
- BLE: KLB0012V4.1.0

System Information

- System Up Time: 16:55:30 up 1:32, load average: 0.11, 0.15, 0.15
- CRC Flag 3100

3.11.3Distribution Network Status

NW Status

Admin Infos

- Login Password: *****
- Firewall: Disabled

Operations Mode

- Mode: Gateway

WAN Access

- Type: DHCP
- IP Address: 192.168.16.121
- Net Mask: 255.255.255.0
- Gateway: 192.168.16.1
- Primary DNS: 192.168.16.1
- Secondary DNS: 192.168.16.1
- WAN MAC: 0C:CF:89:E0:C4:9D

3.11.4Gateway Time Synchronization Status

NTP

- Current Time: 2023-07-13 17:00:36
- Time Zone: CST_008
- NTP Server: 111.230.50.201
- Auto Reboot: Enabled

3.11.5Target Server Connection Status

Application Server

- State: Connecting
- Type: MQTT
- Host: 192.168.16.24
- Port: 1883
- Pub: GwData
- Sub: SrvData
- User:
- Password: *****
- Client ID:
- QoS: 0
- SSL/TLS: Disabled
- Broker CA Enabled: False
- Broker CA File:
- Client Certificate Enabled: False
- Client Certificate File:
- Client Key File:

3.11.6Gateway Data Format

Report Options

- Data Mode: Byte
- Timestamp: No
- Check Code: XOR

3.11.7Gateway Scan Parameters and Report Data Types

Scan & Report

- Packet State: Type 1("adv_only")
- Report Output: Yes
- Report Interval: 1000ms
- Report MAX RSSI: No
- MAX Device Number: 5000
- Rank RSSI: No
- MAC & RSSI Only: No
- Scan Request: No
- Scanning for Stuff Cards: No
- RF Scan Channel: 37,38,39
- RF Scan Window: 30ms
- RF Scan Interval: 30ms
- Report Packet MTU: 500
- Report Packet Delay: 0ms
- Scanning with BLE5.0: No
- Primary PHYs Scan Timing: 1M:0S, Coded: 0S

3.11.8 Gateway Scan Filter Parameters

Scan Filters

- by MIN RSSI: No
- MIN RSSI: -127
- by Device Name: No
- Device Name List:
- by iBeacon Device: No
- by iBeacon UUID: No
- iBeacon UUID Value:
- by Company ID: No
- Company ID List:
- by Service UUID: No
- Service UUID List:
- by Device Address: No
- Address Range: 00:00:00:00:00:00 ~FF:FF:FF:FF:FF:FF

3.11.9 Gateway BeaconBroadcast Parameters

Advertising

- State: OFF
- Device Name: K*
- ADV Interval: 1000ms
- Tx Power: 0dB
- iBeacon UUID: FDA50693A4E24FB1AFCFC6EB07647825
- iBeacon Major: 0
- iBeacon Minor: 0
- RSSI at 1M: -61
- BLE5: OFF
- Primary PHY: 1Mbps
- Secondary PHY: 1Mbps

3.11.10 Gateway Custom Broadcast Parameters

User Advertising

- State: OFF
- Packet Type: Type1(Self Input Data)
- Command SN: 0
- Alternate: No
- BLE5: False
- Primary PHY: 1Mbps
- Secondary PHY: 1Mbps
- ADV Interval: 500 ms
- ADV Timeout: 60S
- Rest Time: 0S
- Working Time: 0S

3.11.11 Network care packet skip interval

Heartbeats

- Bluetooth HB Interval: 300S
- Server HB Activation: No

3.11.12 Gateway Connection BLE Device Parameters

Connection Options

- Packet Cache Number: 0
- Packet Cache Timeout: 1S
- Connection Scan Options: Enabled
- Connection Scan RF Interval&window:: 50,30
- Init GAP Parameters: Accept Request,40,75,0,4000
- Extended Connection Events: Enabled
- Connections TX Power: 0

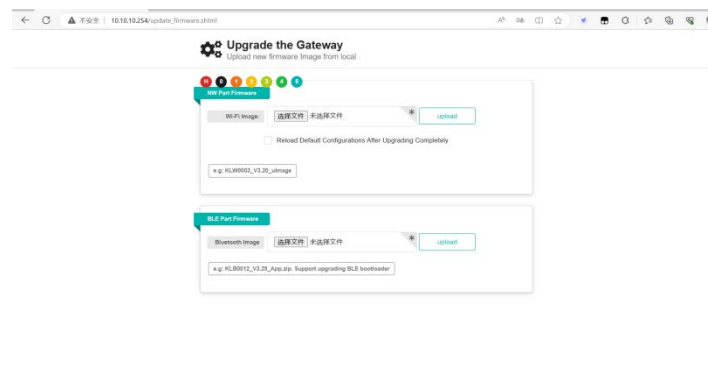
3.12 Firmware Upgrade

3.12.1 Support WiFi firmware upgrade, firmware provided by the manufacturer, file name

format:KLW00x_Vxxx_ UImage;

3.12.2 Support Bluetooth firmware upgrade. Firmware provided by the manufacturer, file name

format:KLB00xx_Vxxx_ App. zip.



4. Server and Bluetooth Gateway Business Logic

4.1 The Bluetooth gateway can be connected to a router through a network cable or WiFi;

4.2 Configure the server address and port on the Bluetooth gateway configuration interface, with data protocols such as TCP, UDP, and MQTT, and data formats such as HEX array or JSON;

4.3 Server monitoring to obtain raw scan data reported by the Bluetooth gateway;

4.4 The server analyzes and scans the data, and according to the actual configuration of the Bluetooth gateway, refer to the data protocol HCBG01 Gateway Bluetooth JSON Format Protocol 5.7V2.01.

docxandHCBG01Gateway Bluetooth Hexadecimal Format ProtocolV2.01. docx;

4.5 The server obtains the gateway uniqueMACaddress (BluetoothMACaddress)from the dataas the gateway unique identifier;

4.6 The server analyzes the Bluetooth device signals and device broadcast data around the Bluetooth gateway based on the reported data, and implements relevant business logic such as asset management, personnel positioning, and data collection;

4.7 The server analyzes the Bluetooth devices around the Bluetooth gateway based on the reported data, and issues instructions as needed to connect the devices. After establishing the connection, the server can send data or instructions to the Bluetooth devices through the Bluetooth gateway, such as causing the Bluetooth bracelet to vibrate and the Bluetooth light to light up, and other business logic;

4.8If necessary, the server issues a disconnect command, requiring the gateway to disconnect from surrounding Bluetooth devices to avoid occupying internal resources of the gateway;

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.