Table of Contents

Table of Contents:

1. Introduction

1.1 What is LPS8v2

The LPS8v2 is an **open-source LoRaWAN Gateway**. It lets you bridge LoRa wireless network to an IP network via **WiFi , Ethernet or Cellular Network** (via Optional 4G module). The LoRa wireless allows users to send data and reach extremely long ranges at low data rates.

The LPS8v2 is fully compatible with LoRaWAN protocol. It supports different kinds of LoRaWAN Network Connections such as: **Semtech UDP Packet Forwarder, LoRaWAN Basic Station, ChirpStack MQTT Bridge**, and so on. This makes LPS8V2 work with most LoRaWAN platforms in the market.

LPS8v2 also includes a **built-in LoRaWAN Server and IoT server**, which provide the possibility for the system integrator to deploy the IoT service without cloud service or 3rd servers.

Different countries use different LoRaWAN frequency bands. LPS8v2 has these bands pre-configured. Users can also customize the frequency bands to use in their own LoRa network.

LPS8v2 supports **remote management**. System Integrator can easy to remote monitor the gateway and maintain it.

1.2 Specifications

Hardware System:

- CPU: Quad-core Cortex-A7 1.2Ghz
- RAM: 512MB
- eMMC: 4GB

Interface:

- 10M/100M RJ45 Ports x 1
- Multi-Channel LoRaWAN Wireless
- WiFi 802.11 b/g/n
- Sensitivity: -140dBm

- Max Output Power: 27dBm

Operating Condition:

- Work Temperature: -20 ~ 70°C
- Storage Temperature: -20 ~ 70°C
- Power Input: 5V, 2A, DC

1.3 Features

- Open Source Debian system
- Managed by Web GUI, SSH via WAN or WiFi
- Remote Management
- Auto-provisioning for batch deployment and management
- LoRaWAN Gateway
- 10 programmable parallel demodulation paths
- Pre-configured to support different LoRaWAN regional settings.
- Allow customizing LoRaWAN regional parameters.
- Different kinds of LoRaWAN Connections such as
  - Semtech UDP Packet Forwarder
  - LoRaWAN Basic Station
  - ChirpStack-Gateway-Bridge (MQTT)
- Built-in **ChirpStack** local LoRaWAN server
- Built-in **Node-Red** local Application server

1.4 LED Indicators

LPS8-V2 has totally four LEDs, They are:

 # Power LED: This RED LED will be solid if the device is properly powered

 # ETH LED: This RGB LED will blink GREEN when the ETH port is connecting

 # SYS LED: This RGB LED will show different colors in different states:

SOLID GREEN: The device is alive with a LoRaWAN server connection.

BLINKING GREEN: a) Device has internet connection but no LoRaWAN Connection. or b) Device is in booting stage, in this stage, it will BLINKING GREEN for several seconds and then with BLINKING GREEN together

SOLID RED: Device doesn't have an Internet connection.

 # WIFI LED: This LED shows the WIFI interface connection status.

1.5 Button Intruction

LPS8-V2 has a black toggle button, which is:

 # Long press 4-5s **:** the gateway will reload the Network and Initialize wifi configuration

LED status: ETH LED will BLINKIND BULE Until the reload is finished.

 # Long press more than 10s: the gateway will restore the factory settings.

LED status: ETH LED will SOLID BULE Until the restore is finished.

Note: Restoring factory Settings does not erase data from the LPS8-V2 built-in server

See this link for steps on how to clear data from the built-in server: **How to reset the built-in server**

When the gateway restores the factory settings is complete,

The WiFi configuration will enable WiFi Access Point by default.

The other configuration will be restored to the default configuration.

2. Quick Start

The LPS8-V2 supports network access via Ethernet or Wi-Fi connection and runs without a network.

In most cases, the first thing you need to do is make the lps8-v2 accessible to the network.

2.1 Access and Configure LPS8-V2

2.1.1 Find IP address of LPS8-V2

Method 1: Connect via LPS8-V2 WiFi

Since software version **230524**,At the first boot of LPS8-V2, it will auto generate a WiFi network called ***dragino-xxxxxx*** with password:

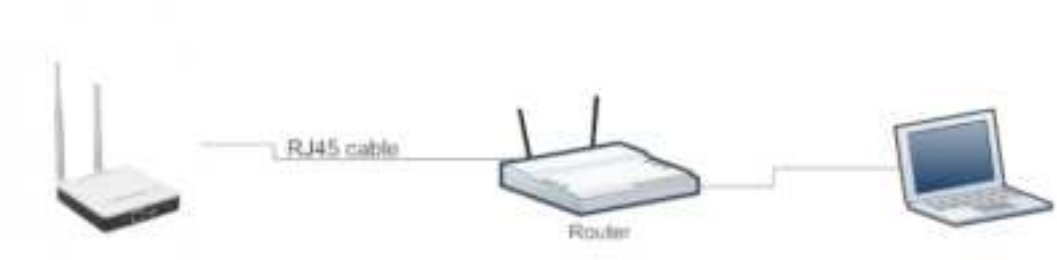
dragino+dragino

User can use a PC to connect to this WiFi network. The PC will get an IP address 10.130.1.xxx and the LPS8-V2 has the default IP **10.130.1.1**

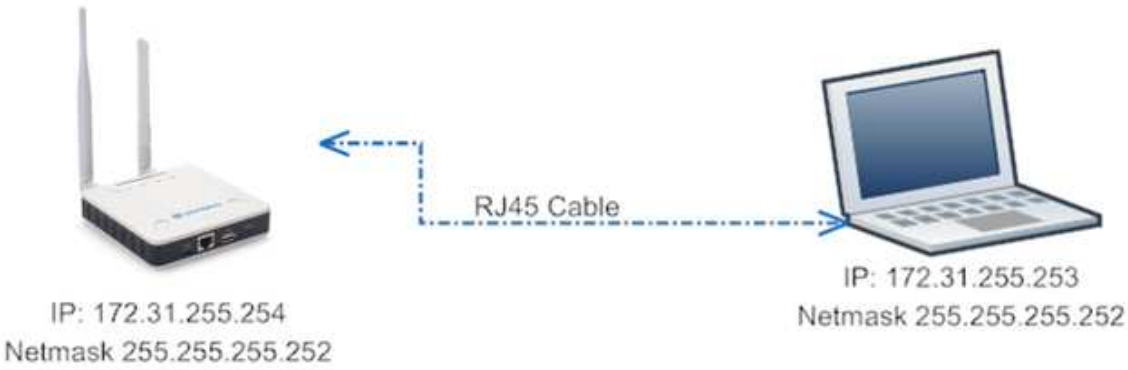
Method 2: Connect via Ethernet with DHCP IP from the router

Connect the LPS8-V2 Ethernet port to your router and LPS8-V2 can obtain an IP address from your router. In the router's management portal, you should be able to find what IP address the router has assigned to the LPS8-V2.

You can also use this IP to connect.



Method 3: Connect via LPS8-V2 Fallback IP



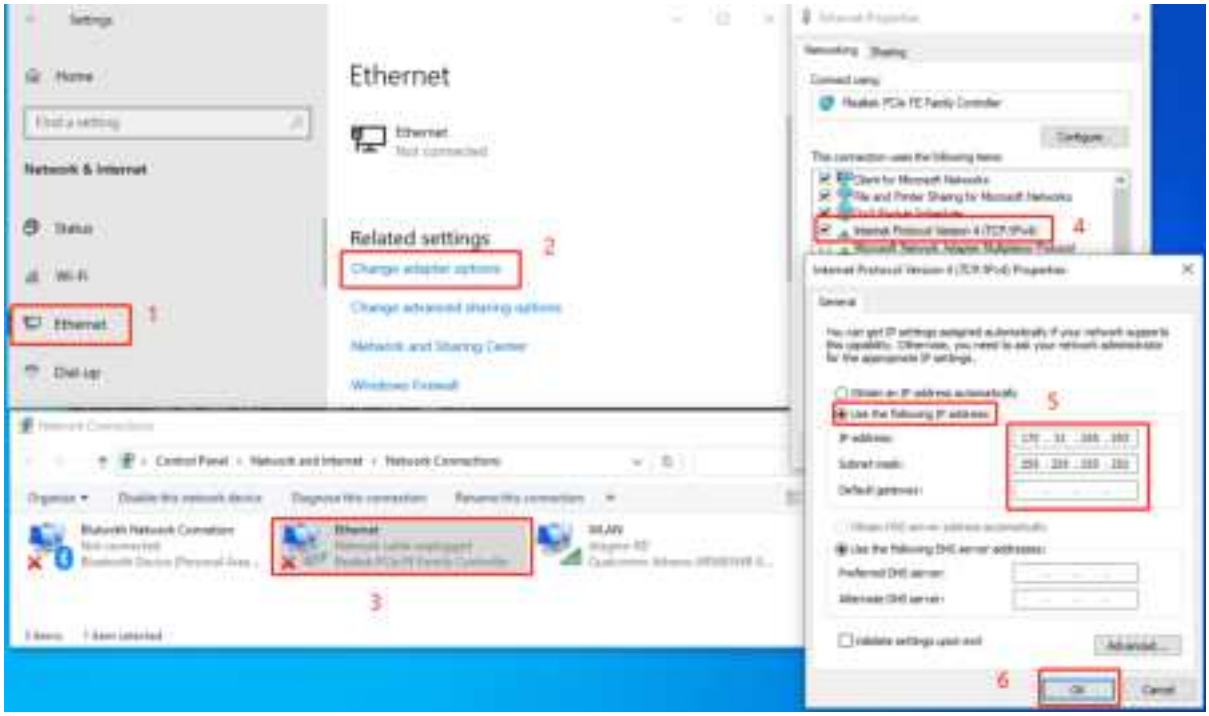
Steps to connect via fallback IP:

1. Connect the PC's Ethernet port to LPS8-V2's WAN port

2. Configure PC's Ethernet port has IP: 172.31.255.253 and Netmask: 255.255.255.252

Settings --> Network & Internet --> Ethernet --> Change advanced sharing options --> Double-click"Ethernet" --> Internet Protocol Version 4 (TCP/IPv4)

As in the below photo:



Configure computer Ethernet port steps video: **fallback ip.mp4**

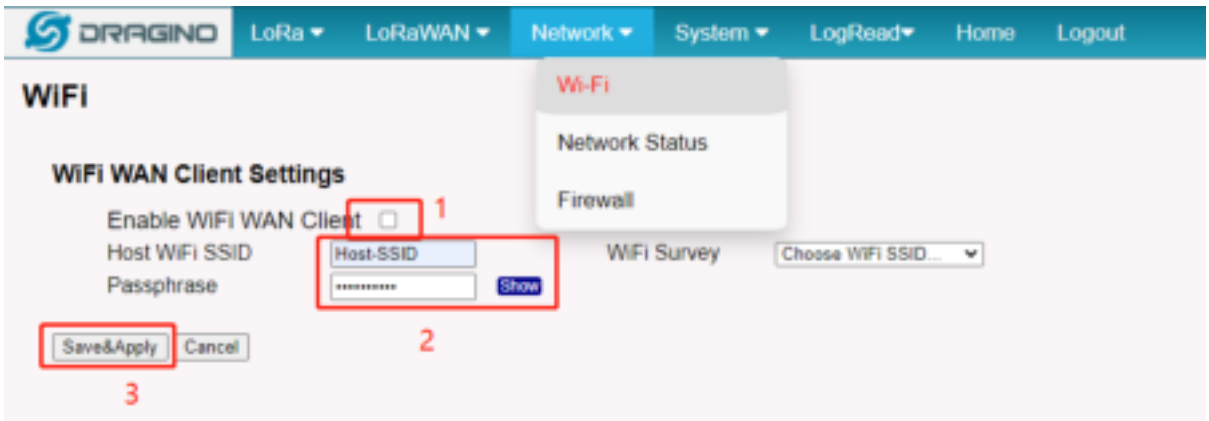
If you still can't access the LPS8-V2 fallback ip, follow this connection to debug : **Trouble Shooting**

3. In the PC, use IP address 172.31.255.254 to access the LPS8-V2 via Web or Console.

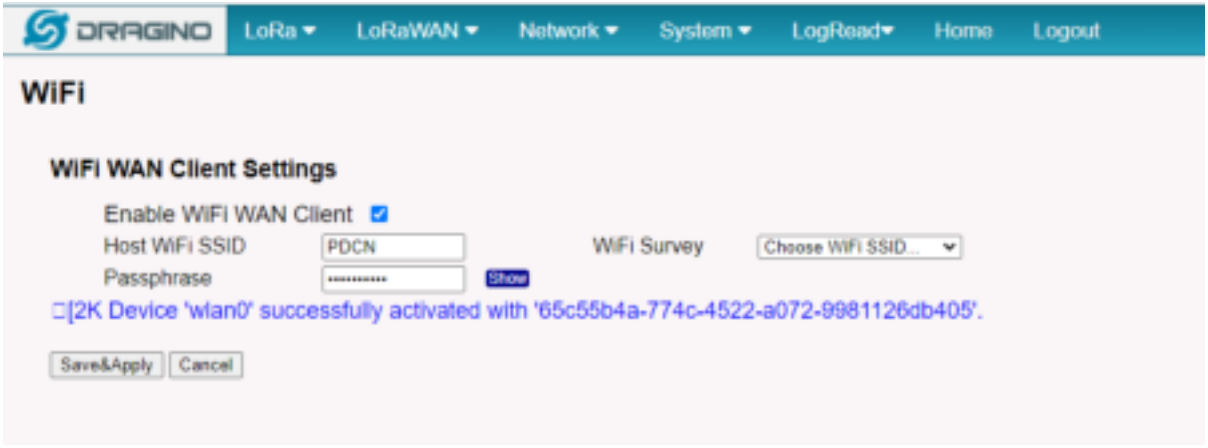

Internet
Eth
IoT
Service
LoRaWAN
Model LPS8-V2
LoRa
LoRa
WiFi
Access
Point

Method 4: Connect via WiFi with DHCP IP from the router

Fill in the WiFi information by checking the box and clicking **Save&Apply**



Wi-Fi configuration successful



2.1.2 Access Configure Web UI

Web Interface

Open a browser on the PC and type the LPS8-V2 ip address (depends on your connect method)

http://IP_ADDRESS or ***http://172.31.255.254***(Fallback IP)

You will see the login interface of LPS8-V2 as shown below.

The account details for Web Login are:

User Name: root

Password: dragino

2.2 Typical Network Setup

2.2.1 Overview

LPS8-V2 supports flexible network set up for different environment. This section describes the typical network topology can be set in LPS8-V2. The typical network set up includes:

- **WAN Port Internet Mode**
- **WiFi Client Mode**
- **Cellular Mode**

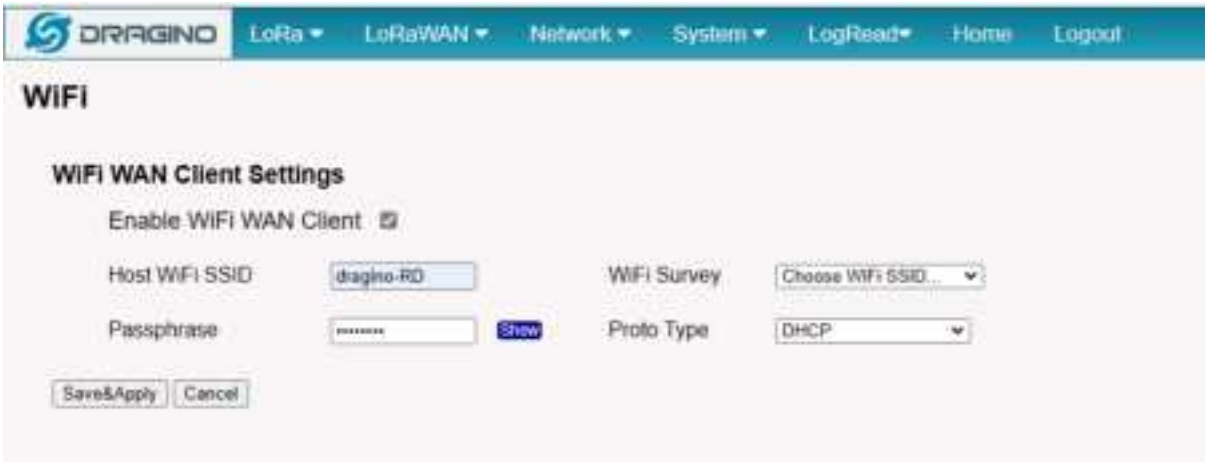
2.2.2 Use WAN port to access Internet

By default, the LPS8-V2 is set to use the WAN port to connect to an upstream network. When you connect the LPS8-V2's WAN port to an upstream router, LPS8-V2 will get an IP address from the router and have Internet access via the upstream router. The network status can be checked in the **home page**:

2.2.3 Access the Internet as a WiFi Client

In the WiFi Client Mode, LPS8-V2 acts as a WiFi client and gets DHCP from an upstream router via WiFi.

The settings for WiFi Client is under page **Network --> Wi-Fi**



In the WiFi Survey Choose the WiFi AP, and input the Passphrase then click **Save & Apply** to connect.

2.2.4 Use built-in 4G modem for internet access

Since Hardware version HP0C 1.4

Users can see whether LPS8v2 has EC25 on the label of the gateway to determine whether there is 3G/4G Cellular modem.

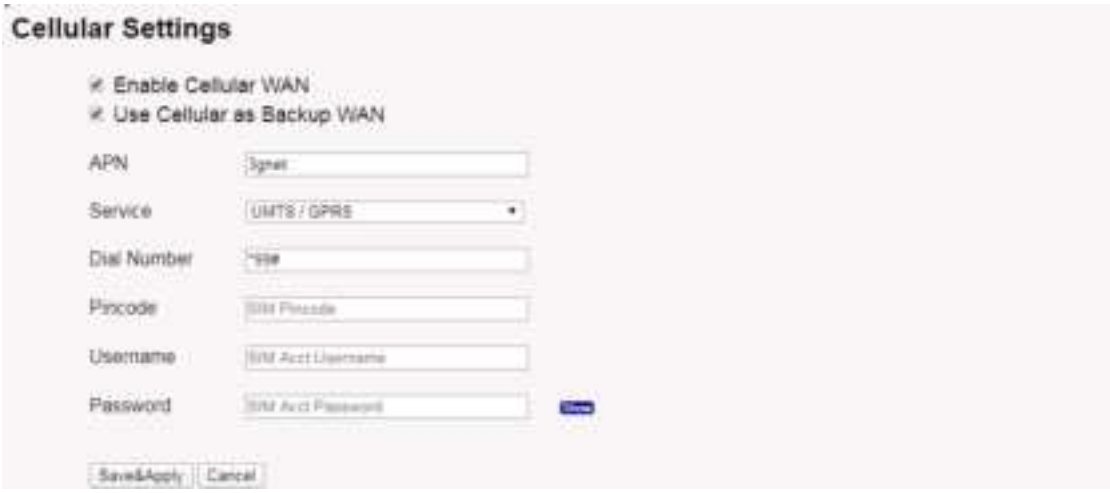
If the LPS8-V2 has 3G/4G Cellular modem, user can use it as main internet connection or back up.

First, install the Micro SIM card as below direction

Second, Power off/ ON LPS8-V2 to let it detect the SIM card.

The set up page is **Network --> Cellular**

While use the cellular as Backup WAN, device will use Cellular for internet connection while WAN port or WiFi is not valid and switch back to WAN port or WiFi after they recover.



2.2.5 Check Internet connection

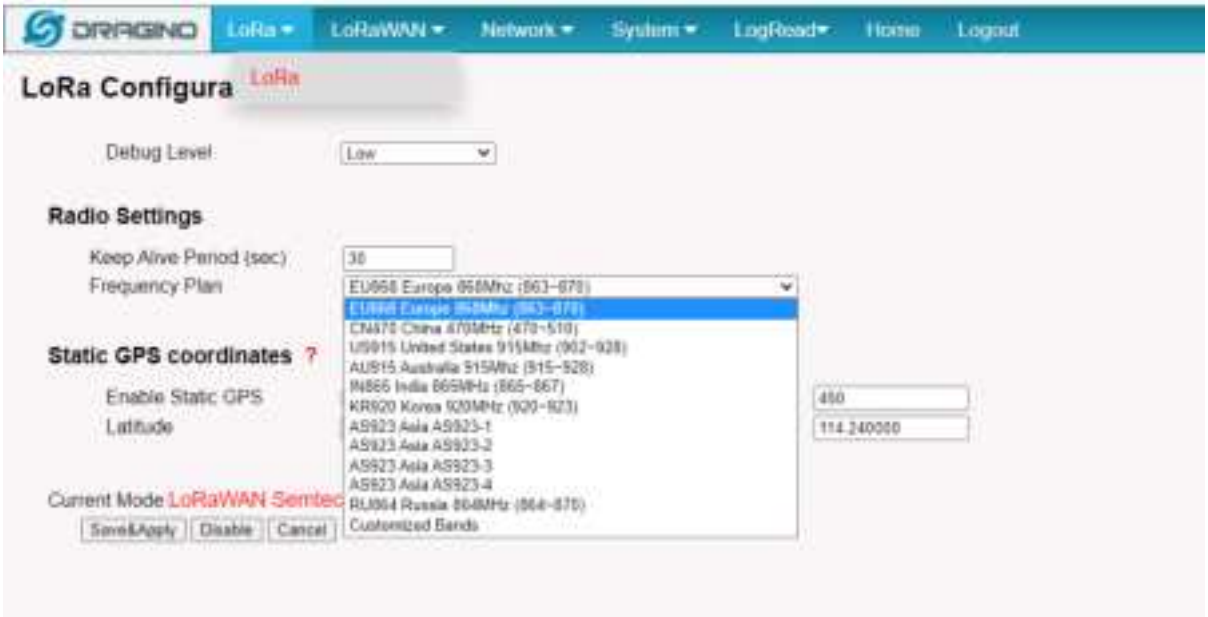
In the **home** page, we can check the Internet connection.

- GREEN Tick : This interface has Internet connection.
- Yellow Tick : This interface has IP address but don't use it for internet connection.
- RED Cross : This interface doesn't connected or no internet.

2.3 The LPS8-V2 is registered and connected to The Things Network

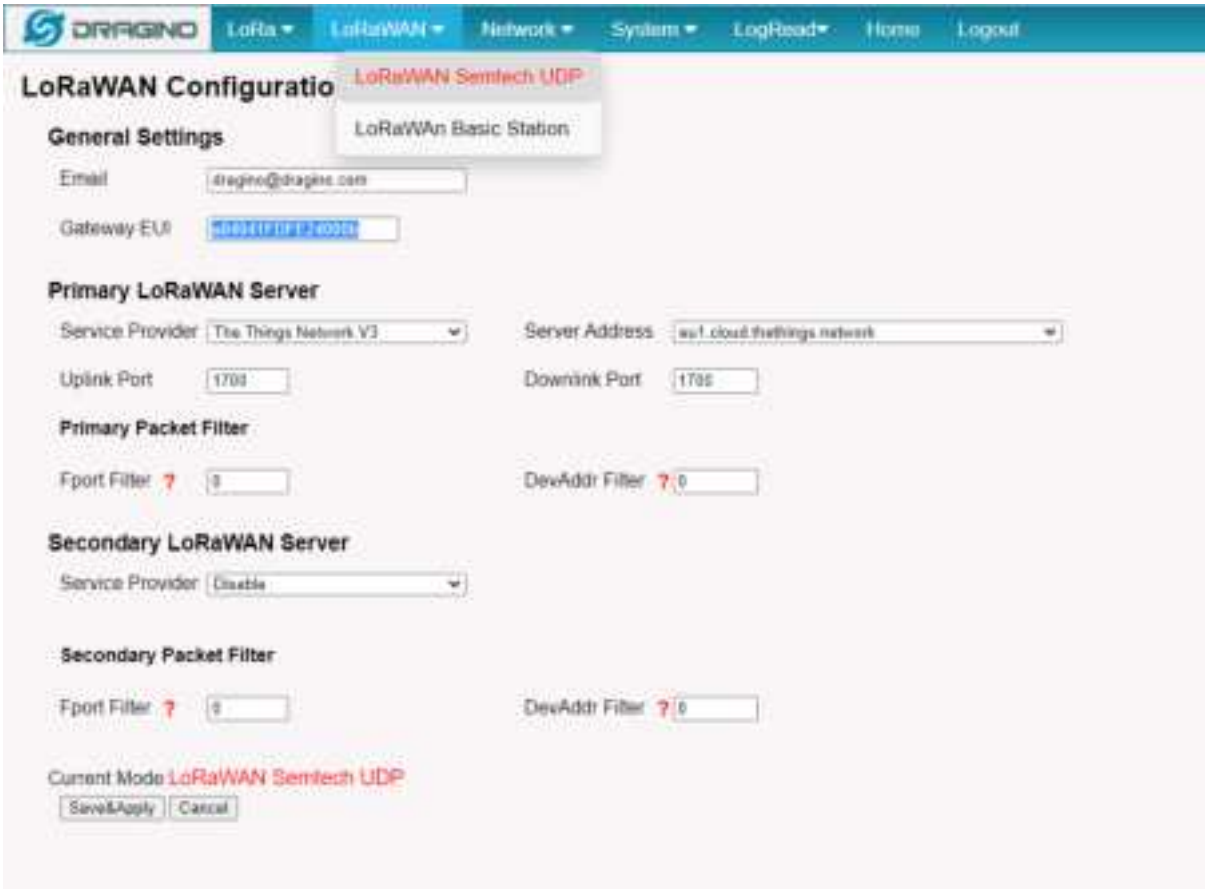
2.3.1 Select your area frequency

First, you need to set the frequency plan in LPS8-V2 to match the end node we use, so to receive the LoRaWAN packets from the LoRaWAN sensor.



2.3.2 Get the only gateway EUI

Every LPS8-V2 has a unique gateway id. The ID can be found on LoRaWAN Semtech page:



Note: Choose the cluster that corresponds to a specific Gateway server address

 # Europe 1: corresponding Gateway server address: **eu1.cloud.thethings.network**

 # North America 1: corresponding Gateway server address: **nam1.cloud.thethings.network**

 # Australia 1: corresponding Gateway server address: **au1.cloud.thethings.network**

 # Legacy V2 Console: TTN v2 shuts down in December 2021

2.3.3 Register the gateway to The Things Network

Login to The Things Network

https://console.cloud.thethings.network/

Add the gateway

Get it online

3. Web Configure Pages

3.1 Home

Shows the system running status:

3.2 LoRa Settings

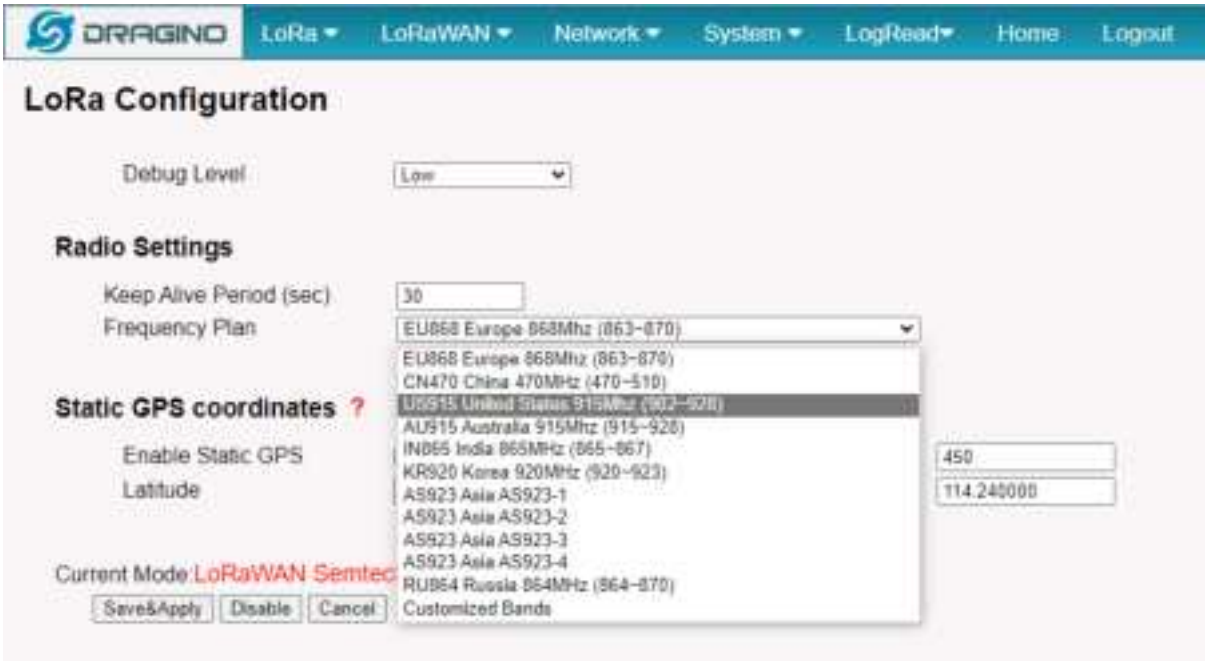
3.2.1 LoRa --> LoRa

This page shows the LoRa Radio Settings. There is a set of default frequency bands according to LoRaWAN protocol, and users can customize the band* as well.

Different LPS8v2 hardware versions can support different frequency ranges:

- **868**: valid frequency: 863Mhz ~ 870Mhz. for bands EU868, RU864, IN865, or KZ865.
- **915**: valid frequency: 902Mhz ~ 928Mhz. for bands US915, AU915, AS923 or KR920

After the user choose the frequency plan, the user can see the actual frequency is used by checking the page **LogRead --> LoRa Log**

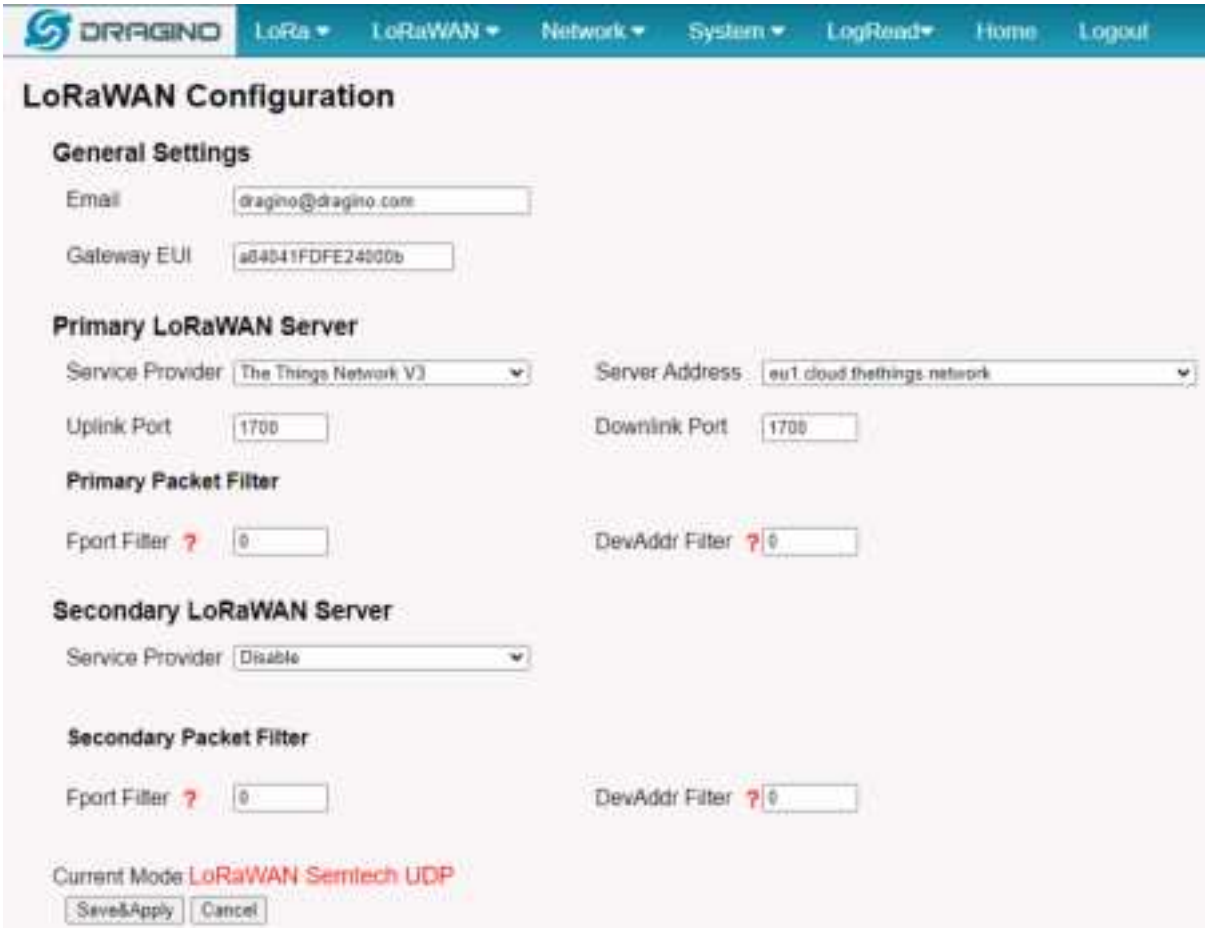


Note *: See this instruction for how to customize the frequency band: How to customized LoRaWAN frequency band - DRAGINO

3.3 LoRaWAN Settings

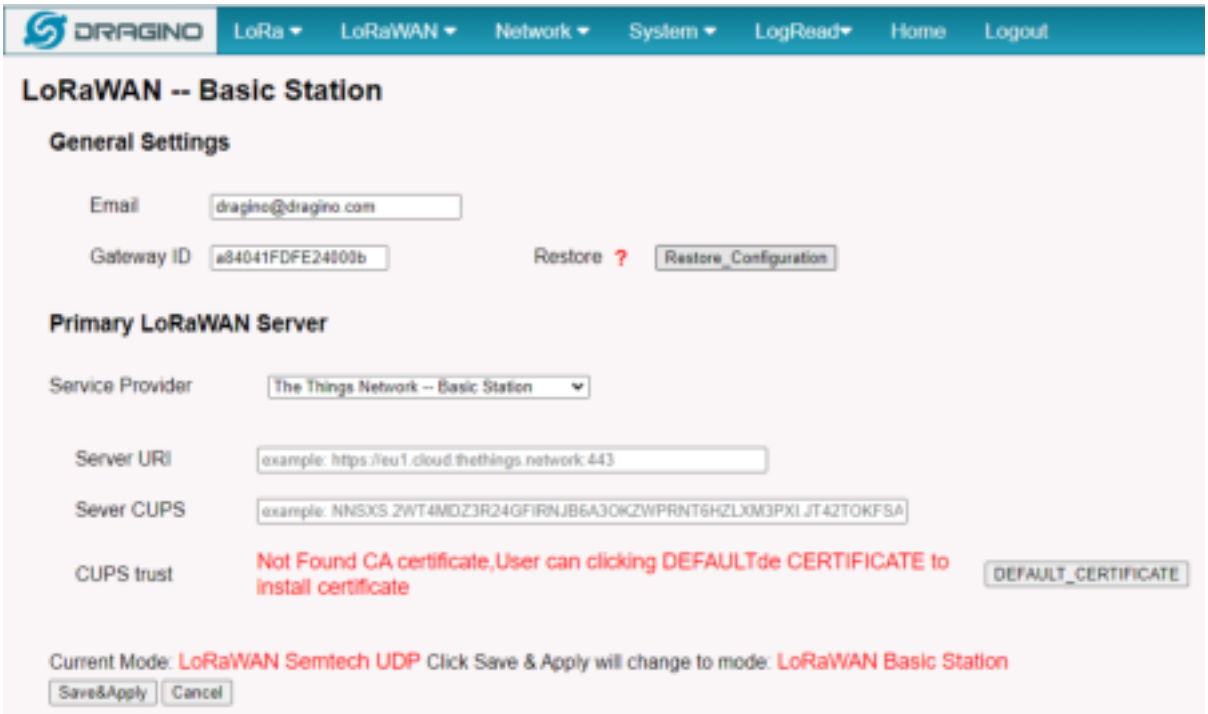
3.3.1 LoRaWAN --> LoRaWAN Semtech UDP

This page is for the connection set up to a general LoRaWAN Network server such as TTN, ChirpStack, etc.



3.3.2 LoRaWAN --> LoRaWAN Basic Station

This page is for the connection set up to the TTN Basic Station, AWS-IoT, etc.



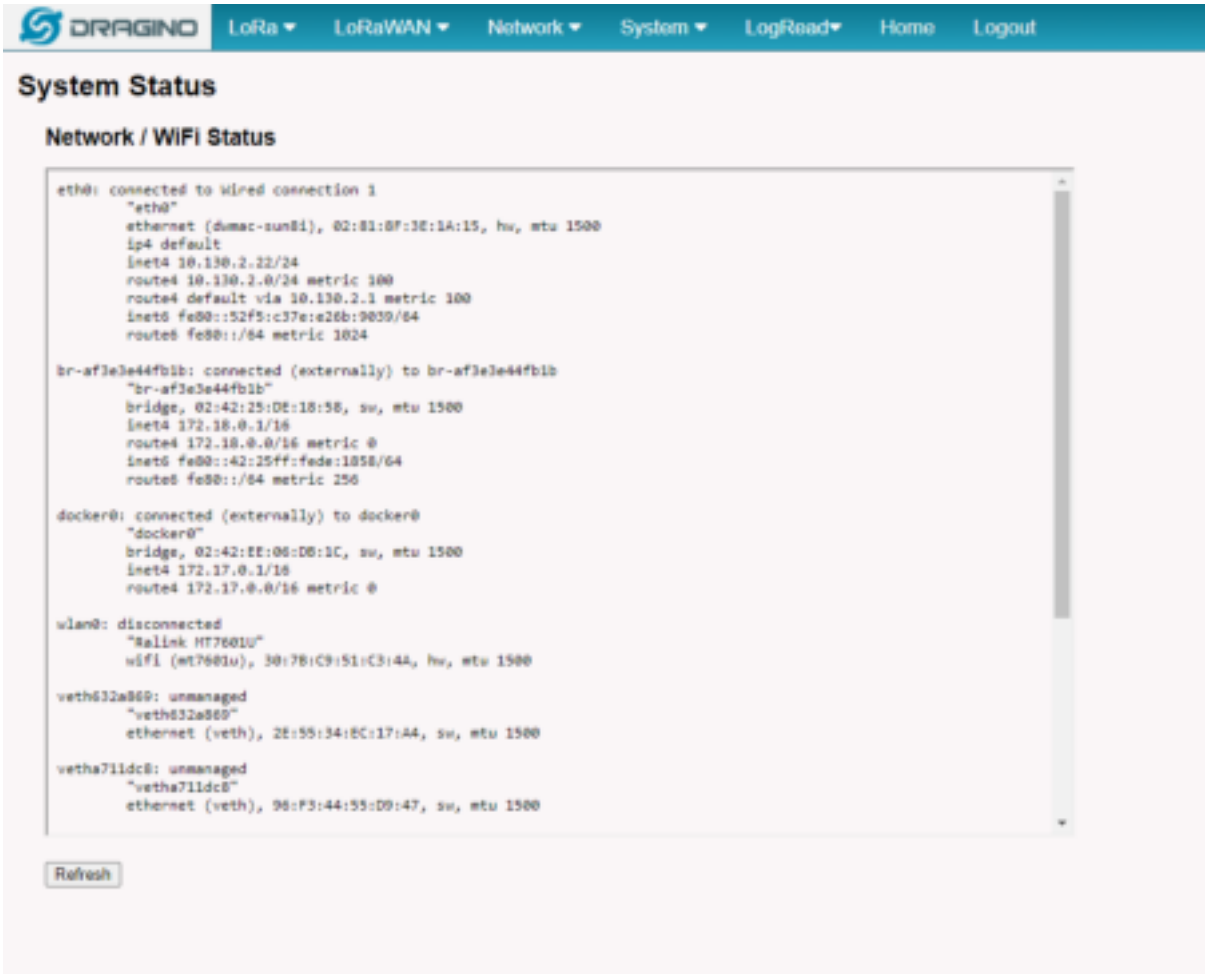
Please see this instruction to know more detail and a demo for how to use of LoRaWAN Basic Station: Use of LoRaWAN Basic Station - DRAGINO

3.4 Network Settings

3.4.1 Network --> WiFi

Users can configure the wifi WAN and enable Wifi Access Point on this interface

3.4.2 Network --> System Status



3.4.3 Network --> Network

In the **Network --> Network** interface, Users can set the Ethernet WAN static ip address.

3.4.4 Network --> Cellular

In the **Network --> Cellular** interface, Users can Enable Cellular WAN and configure Celluar.

Note: APN cannot be empty.

After the configuration is complete, return to the Home interface and put the mouse on the Cell icon to check the Cellular state.

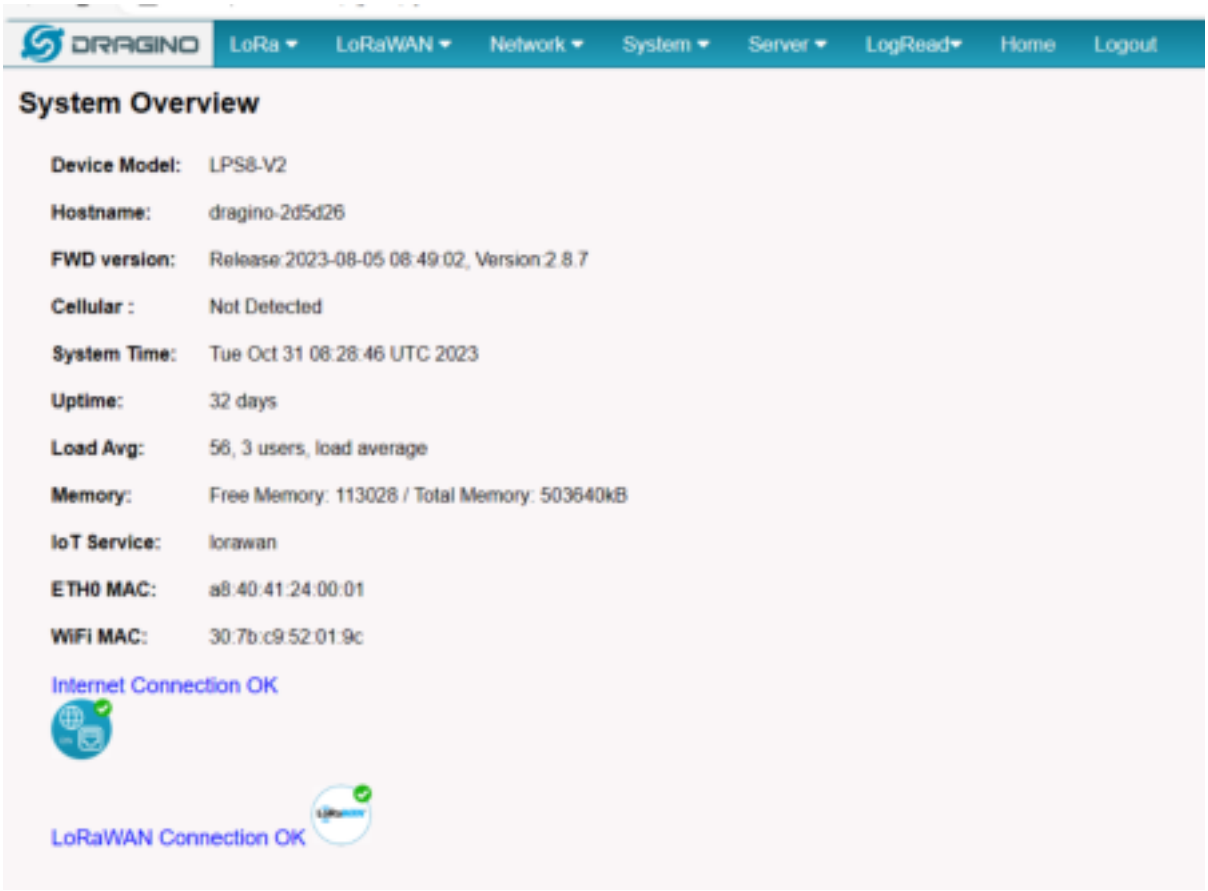
Note: Known bugs: 4g consumes a lot of data which has been fixed by the package: dragino-ui-230716

Reduce data method

3.5 System

3.5.1 System --> System Overview

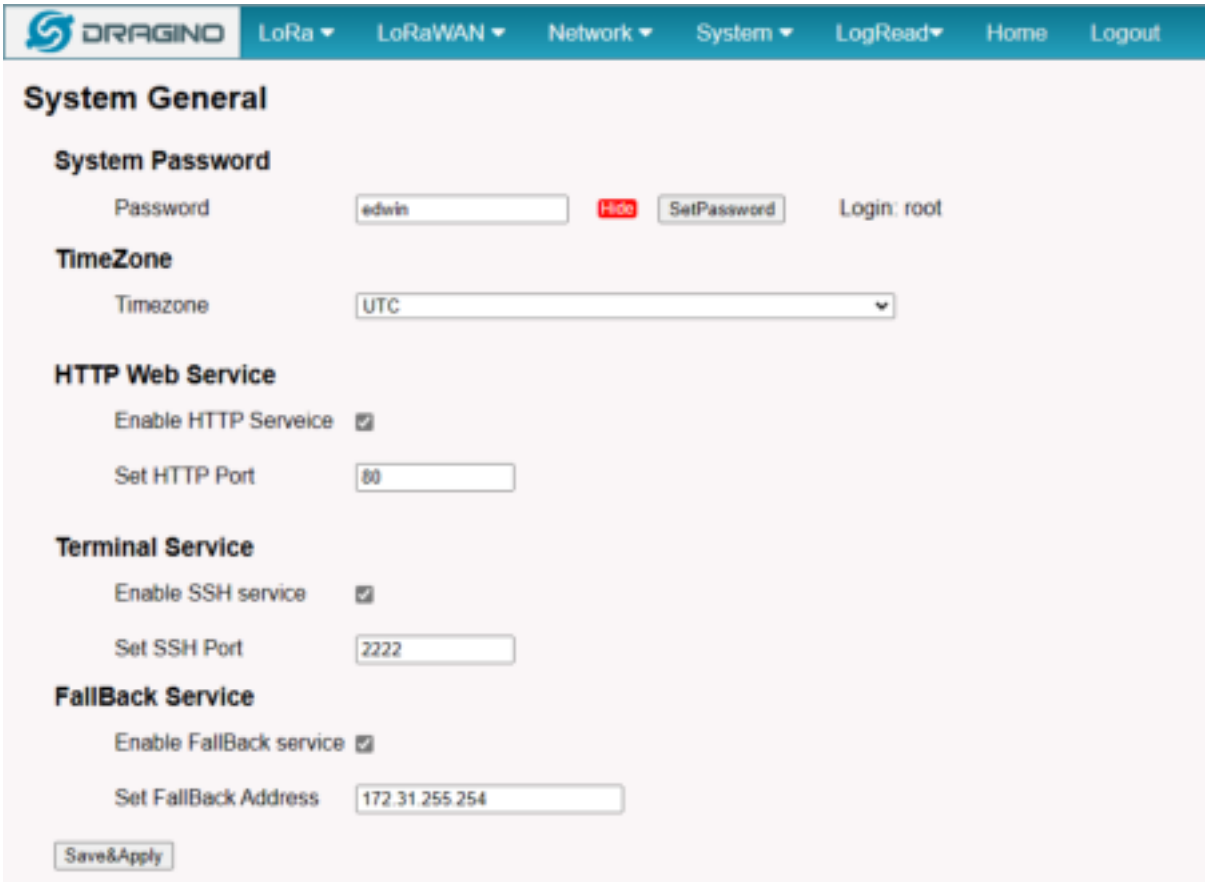
Shows the system info:



3.5.2 System --> System General

In the **System-> System General** interface, Users can customize the configuration System Password and set Timezone.

In addition, Users can customize the FallBack IP address.



3.5.3 System --> Backup/Restore

3.5.4 System --> Reboot / Reset

In the **System-> Reboot** / **Reset** interface, users can can restart or reset the gateway.

ETH LED will SOLID BULE Until the restore is finished.

When the gateway restores the factory settings is complete,

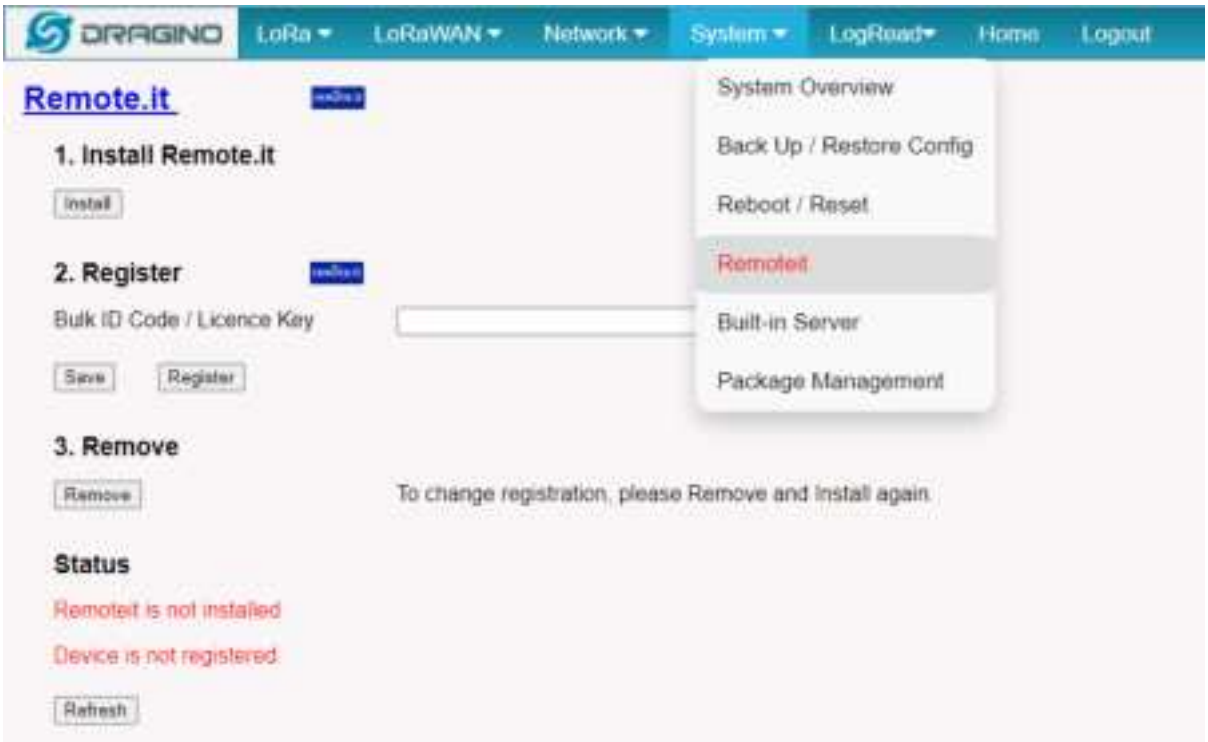
The WiFi configuration will enable WiFi Access Point by default.

The other configuration will be restored to the default configuration.

3.5.5 System --> Remoteit

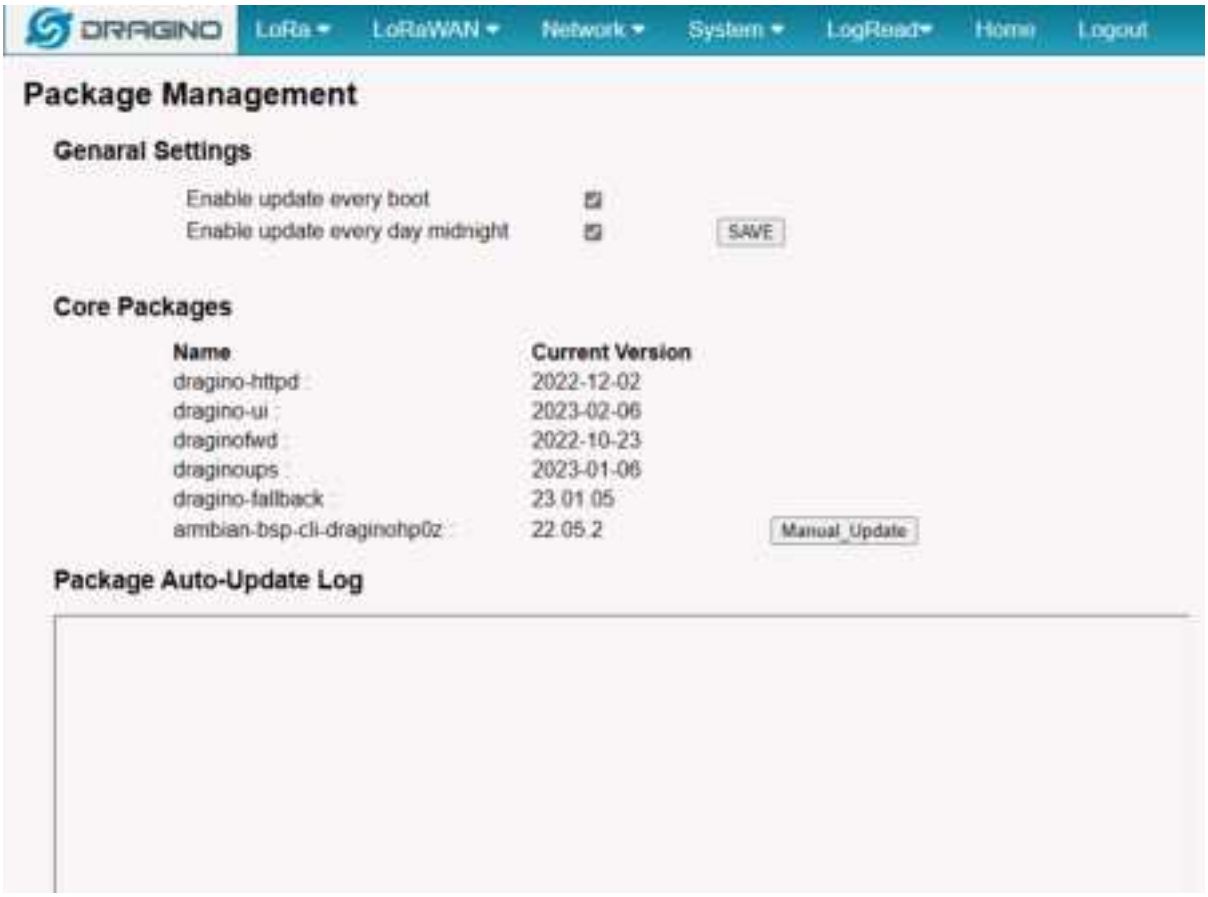
In the **System-> Remoteit** interface, users can configure the gateway to be accessed remotely via Remote.it.

the users can refer to this link to configure them: **Monitor & Remote Access Gateway**



3.5.6 System --> Package Management

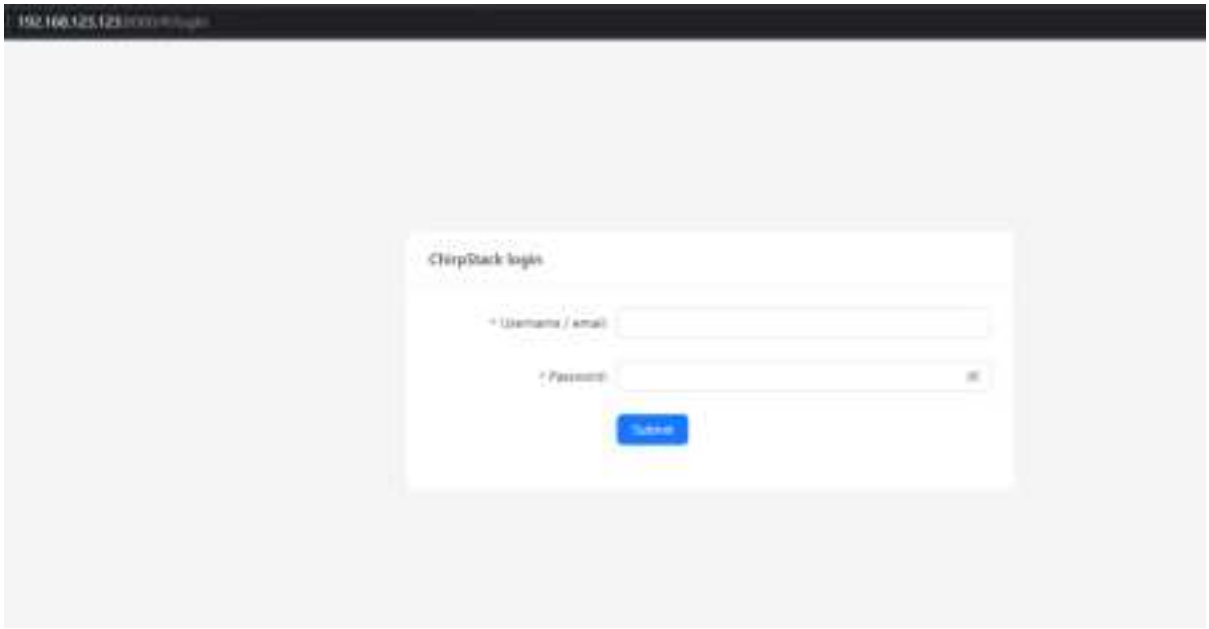
In the **System --> Package Management** interface, Users can check the current version of Core Packages.



4. Build-in Server

After the v1.7-230606 version, the LPS8-V2 default factory pre-installed the LoRaWAN Server: **ChirpStack-V4**, Application Server: **Node-Red**.

1). LoRaWAN Network Server: ChirpStack-V4



Note: The user can access the ChirpStack-V4 via click the 'Launch' button, and the login account: admin/admin

For more information on server operations see Register LPSV2 to the built-in Chirpstack

2). Application Network Server: Node-Red


DRAGINO
LoRa
LoRaWAN
Network
System
Server
LogRead
Home
Logout
Network Server
Application Server
Built-In Application Server
Platform Provider
Node-Red
Enable
Launch
Service Status
Running
Node-RED Versions
v3.0.2
Nodejs Versions
v12.22.9
npm Versions
8.5.1
Save&Apply

Note: The user can access the Node-RED via click the 'Launch' button

3). Troubleshooting:

If the URL does not jump properly.

For the ChirpStack, you can use the local IP address and the port is **8080** to access it.

For the Node-Red, you can use the local IP address and the port is **1880** to access it.

How to install InfluxDB, Garfana.

The LPS8V2 is not pre-installed with InfluxDB and Garfana, the users can install them, see InfluxDB

How to upgrade the gateway node.js to the latest version.

The user can upgrade nodejs, see Upgrade Nodejs

How to batch register device on the built-in Chirpstack network server

The user can register devices in batch on the gateway Web UI, see Batch Register

Why my gateway is not Chirpstack?

After June '23, the default factory LPS8V2 pre-installed Chirpstack-V4 instead of The Things Stack, the users can migrate to Chistack-V4, see **Change TTN Stack v3 to ChirpStack**

How to disable the built-in server

Use the following commands to start and stop the TTNv3 service:

 # start
systemctl start ttnstack

 # stop
systemctl stop ttnstack

 # enable
systemctl enable ttnstack

#disable
systemctl disable ttnstack

Use the following commands to start and stop the Node-Red service:

 # start
systemctl start nodered

 # stop
systemctl stop nodered

 # enable
systemctl enable nodered

#disable
systemctl disable nodered

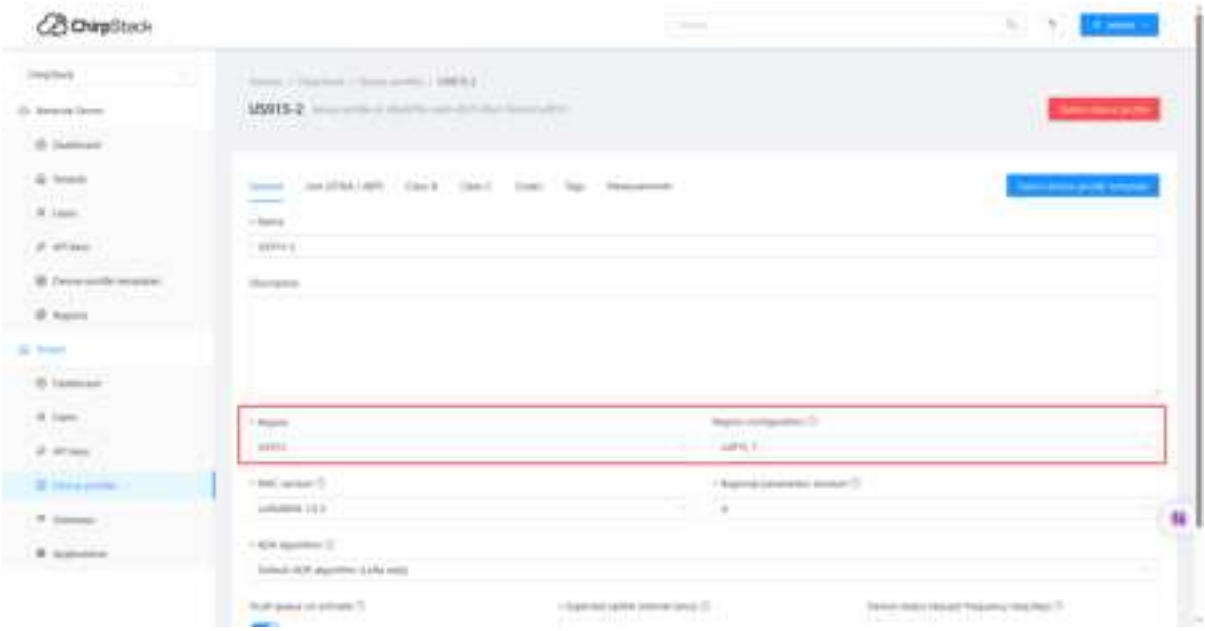
How to choose the Chirpstack server frequency SubBand

The user has to choose a SubBand if using CN470, US915, AU915, or AS923.

Note: Since the subbands of the Chirpstack are counted from 0, us915_1 of the Chirpstack is equal to US915 FSB2, so if your LoRa Rdio is using the US915 FSB2 you have to choose the us915_1 as the Chirpstack FSB.

When the configuration is complete, click **"Save&Apply"**.

Note: When adding the device profile, the selected Region configuration is also calculated from 0, so setting it to us915_1 corresponds to US915 Sub Band 2.

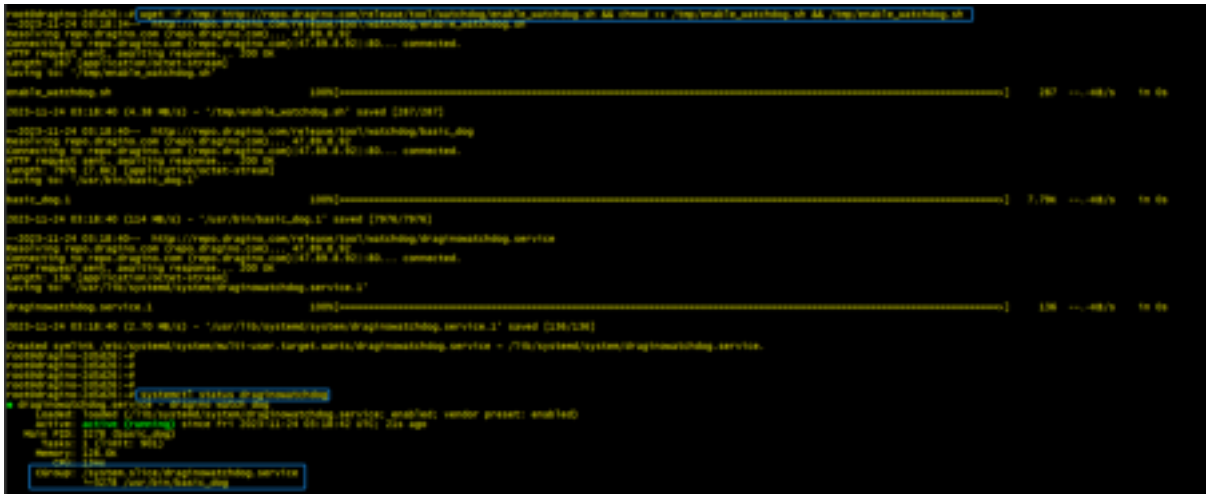


5. Watch Dog

LPS8-V2 supports the Watch Dog but is not enabled by the previous releases(2023-11-24)

The uses can be via the below method to enable Watch Dog:

wget -P /tmp/ http://repo.dragino.com/release/tool/watchdog/enable_watchdog.sh && chmod +x /tmp/enable_watchdog.sh && /tmp/enable_watchdog.sh



6. How users can access LPS8-V2 using serial USB

USB TTL to LPS8-V2 Connection:

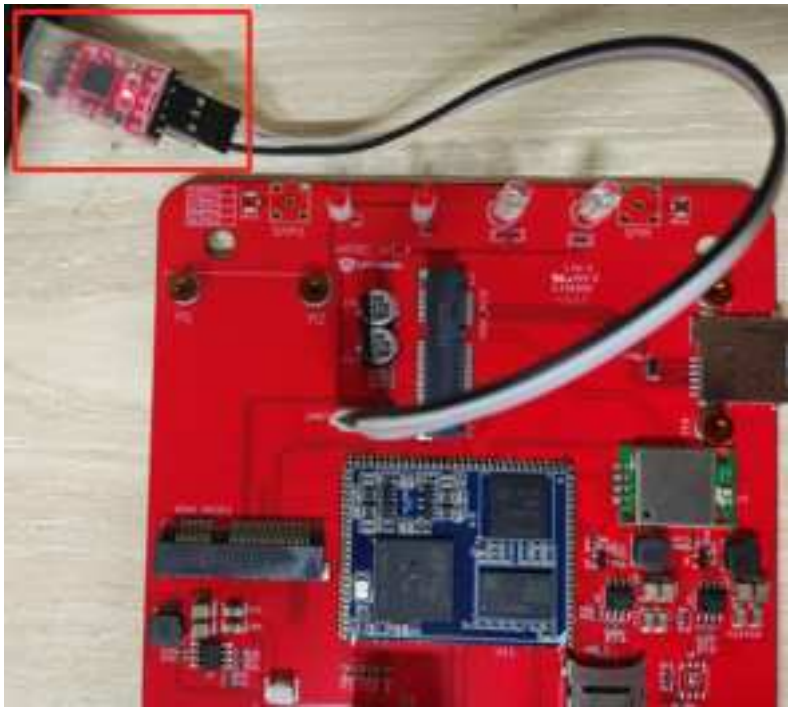
Port 1 of the UART on the LPS8-V2 is GND

TXD <---> UART RXD (Gray line)

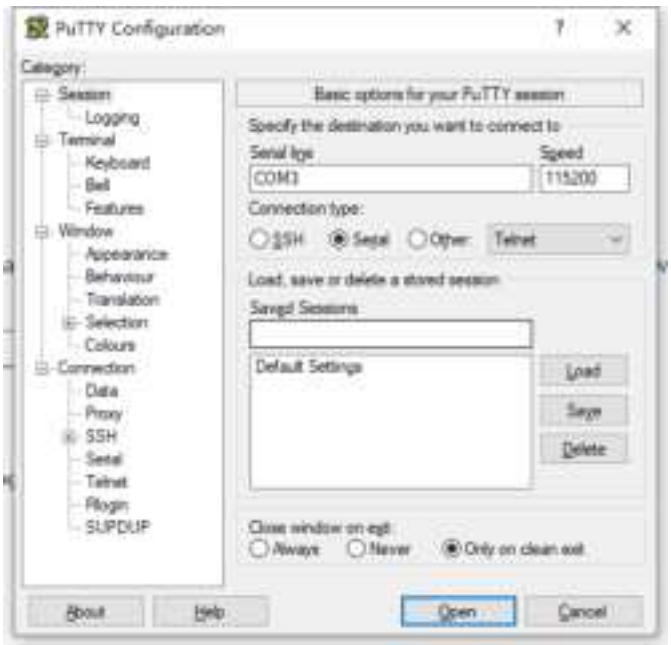
RXD <---> UART TXD (White line)

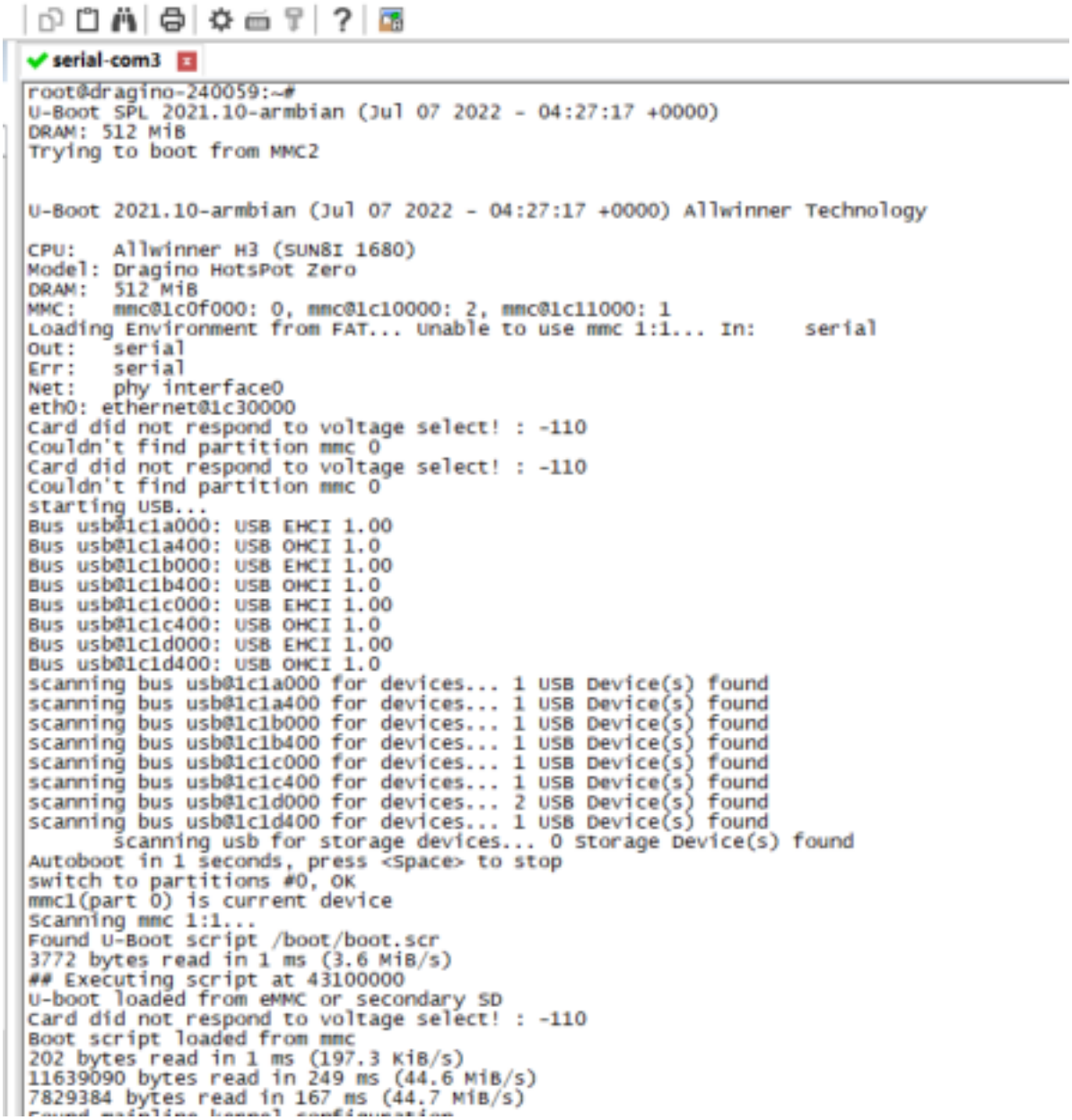
GND <---> GND (Black line)

LPS8v2 UART connection photo



In the PC,you can use the serial port tool(such as putty in Windows), you need to set the serial baud rate to **115200** to access the serial console for LPS8v2. LPS8v2 will output system info once power on as below:





7. OTA System Update

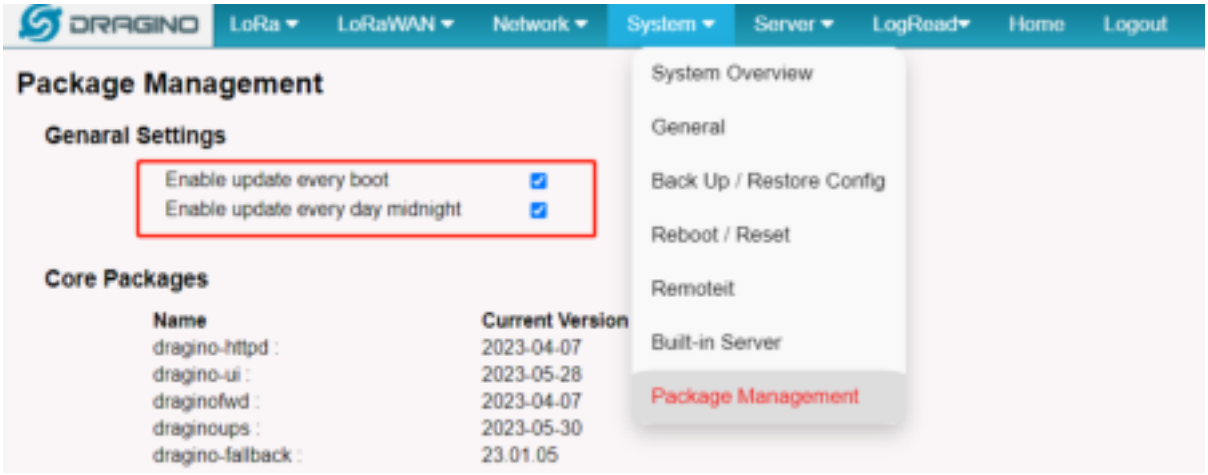
LPS8v2 supports system auto-update via OTA, please see **this URL** for the detail of this feature.

7.1 Auto-update method

The default, each gateway will enable the auto-update function.

this function will be triggered every boot and every midnight.

Users can enable/disable it via Web Page



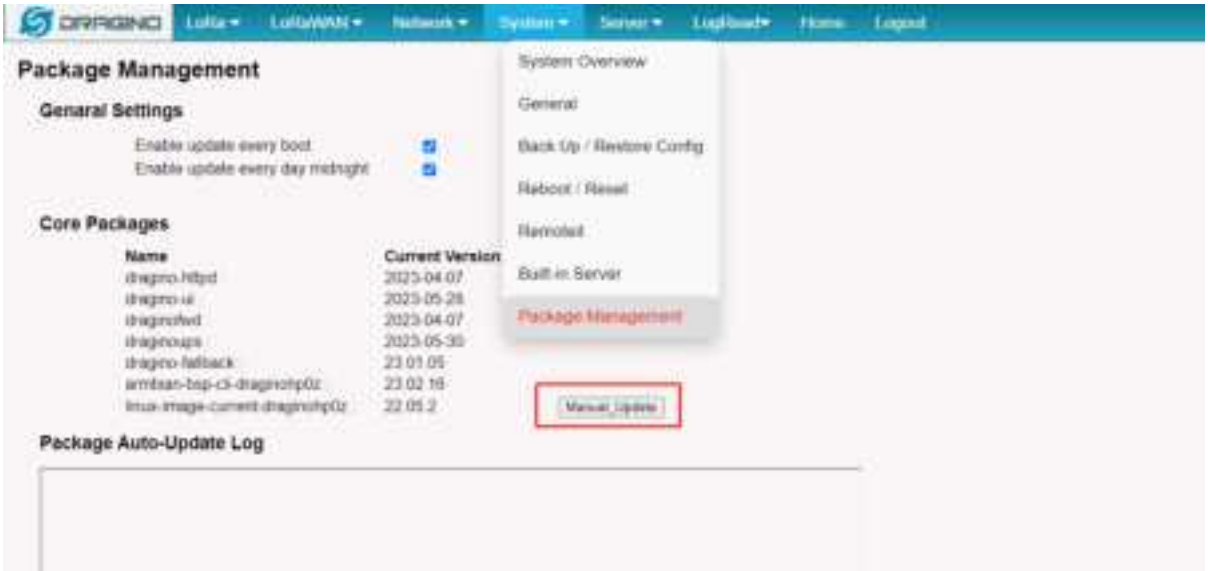
7.2 Manual upgrade method

1). Using the Linux command to upgrade the system

apt update && apt install *dragino*

2). Upgrade the system via the Web page button of "Manual Update"

Note: this method needs about 10 mins, so you will get the log after 10 mins.

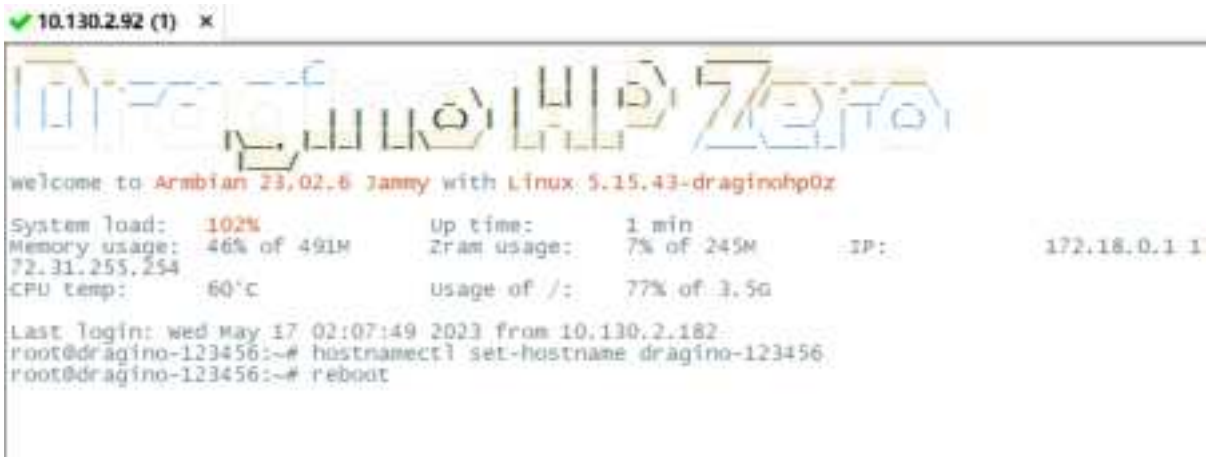


8. FAQ

8.1 How to change Hostname

By default, Hostname is dragino-xxxxxx,If the user needs to change the hostname, the user needs to access the linux console of LPS8v2 and enter the following command:

hostnamectl set-hostname dragino-123456



After the configuration is complete, run "reboot" to restart the gateway.

8.2 Build-in The Things Network migrate to ChirpStack

Migrate guide:

To stabilize the completion of the migration, The users can migrate in one of the following ways

Method 1. Using the Linux shell,

Method 2. Flash a new image with the Chirpstack

Method 1: Using the Linux shell

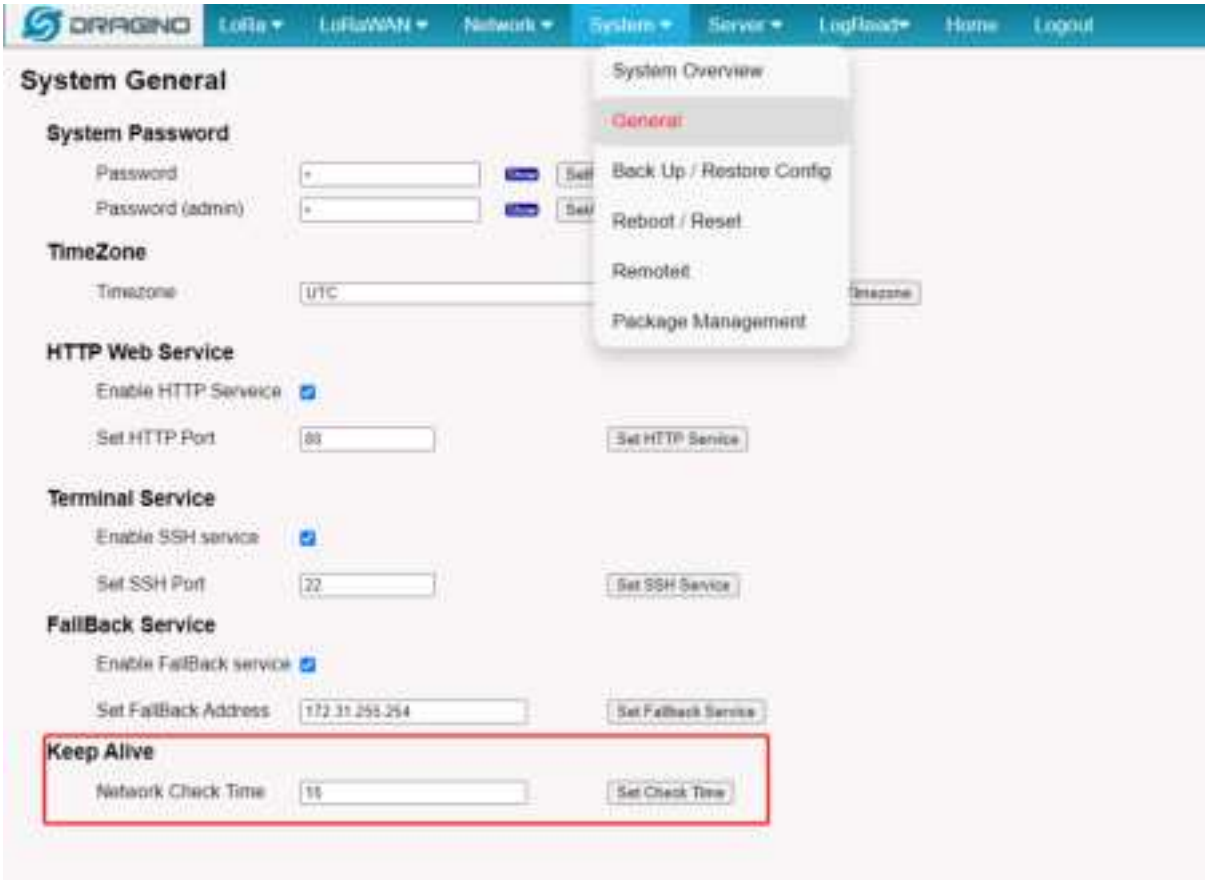
wget -P /tmp http://repo.dragino.com/release/tool/chirpstack/migrate_chirpstack && chmod +x /tmp/migrate_chirpstack && /tmp/migrate_chirpstack

Method 2: Flash a new image

Image flash steps: How to flash a new image(OS) to the gateway(LPS8V2)

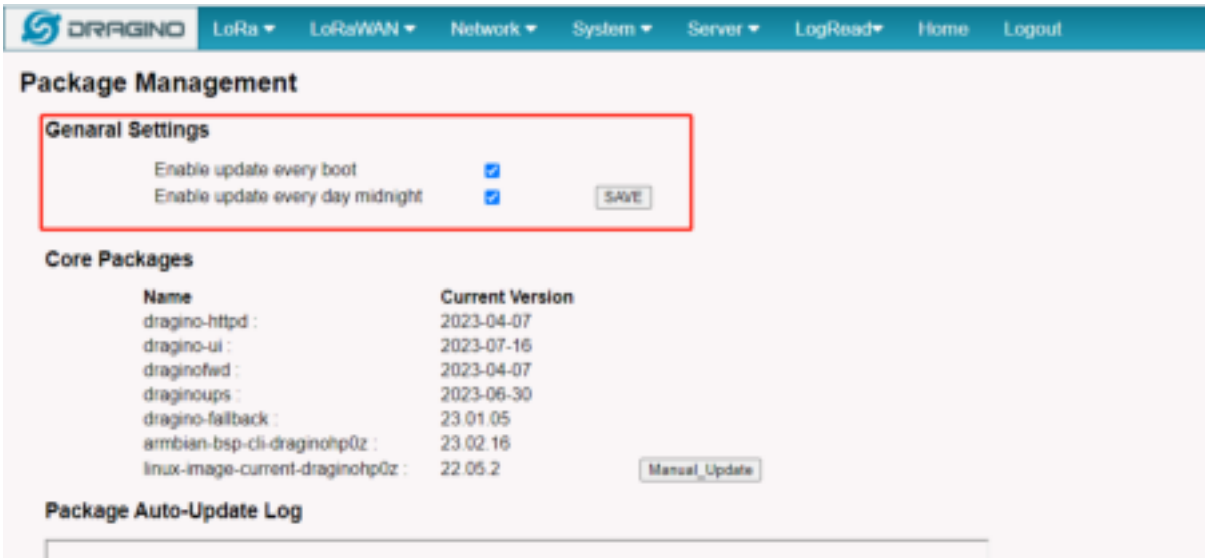
8.3 How to reduce the 4g data consumed

1). The gateway will check the network via ping 1.1.1.1/8.8.8.8 which will consume a lot of data, you can set the interval time to reduce data consume.



2. Change the LoRa status package interval time: It does not affect the connection between the gateway and the server, just the status packet interval

3. Disable the auto-update:



8.4 How to connect the helium blockchain as a Data-only hotspot

apt update && apt install helium-gateway

8.5 How to change built-in LoRaWAN Server from ChirpStack v4 to TTN Stack v3.

By default, the LPS8v2's built-in server is ChirpStack v4,

If the user needs to change the built-in server from ChirpStack v4 to TTN Stack v3, the User needs to download the image and flash it to the LPS8v2 gateway:

https://www.dropbox.com/scl/fi/qwtaw4i4dqonzramr93e4/dragino-LPS8V2-TTN-231124.rar?rlkey=nrftlkd1h8en6j07vzbhpj9ui&dl=0

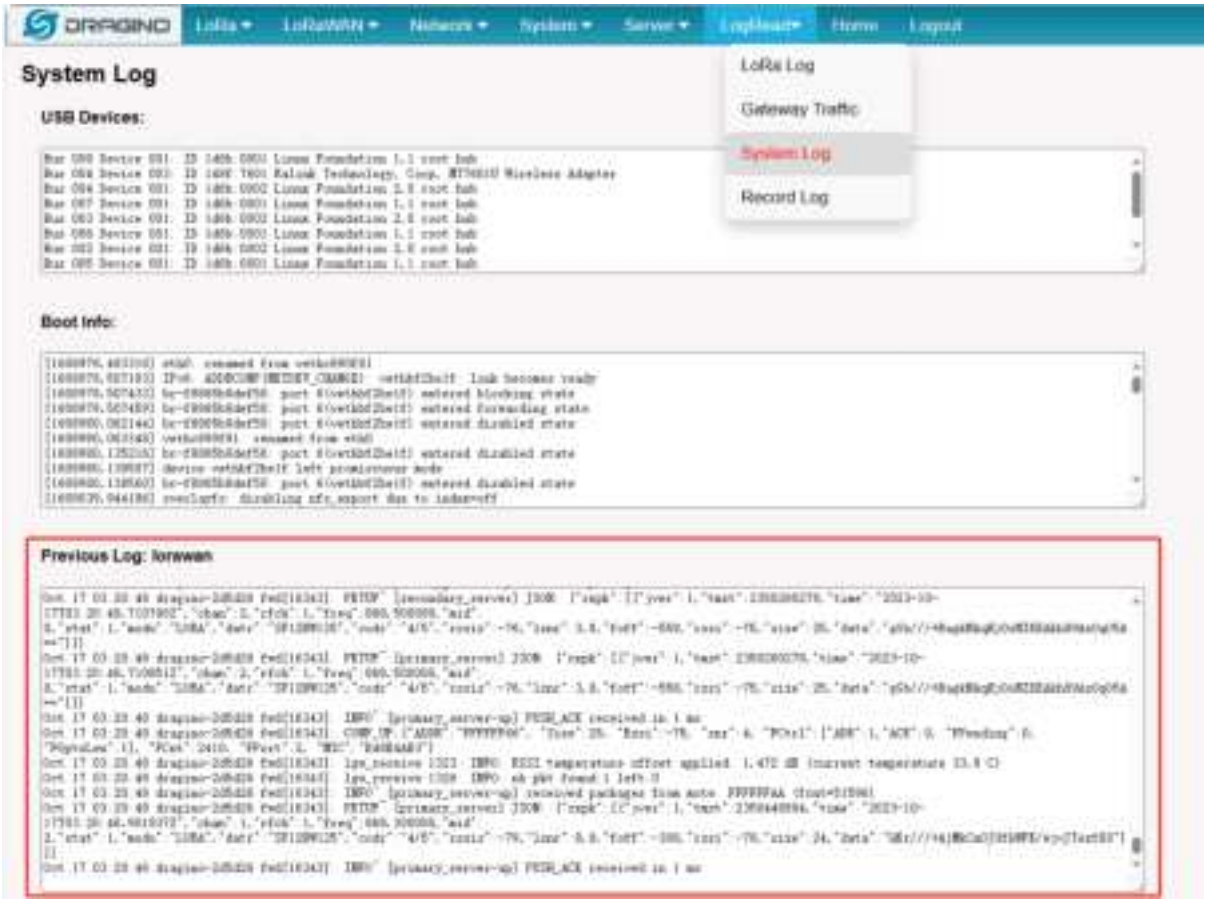
Image flash steps: How to flash a new image(OS) to the gateway(LPS8V2)

8.6 How do I view gateway logs

8.6.1 LoRaWAN Log:

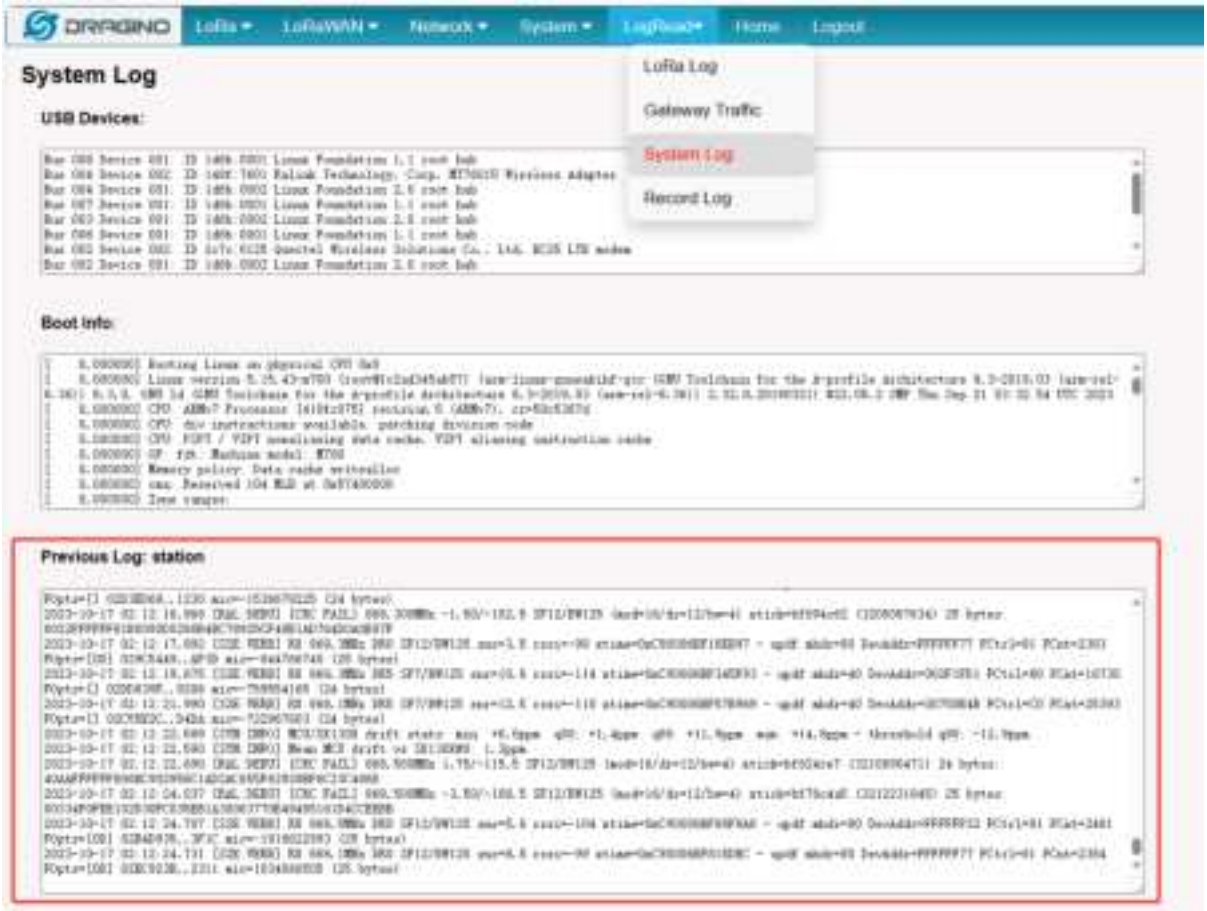
Semtech UDP Log :

When the gateway starts LoRaWAN Semtech UDP, users can check the logs of the Semtech UDP in the **LogRead --> System Log** interface



Station Log:

When the gateway starts Basic Station, users can check the logs of the station in the **LogRead --> System Log** interface



8.6.2 4G Log

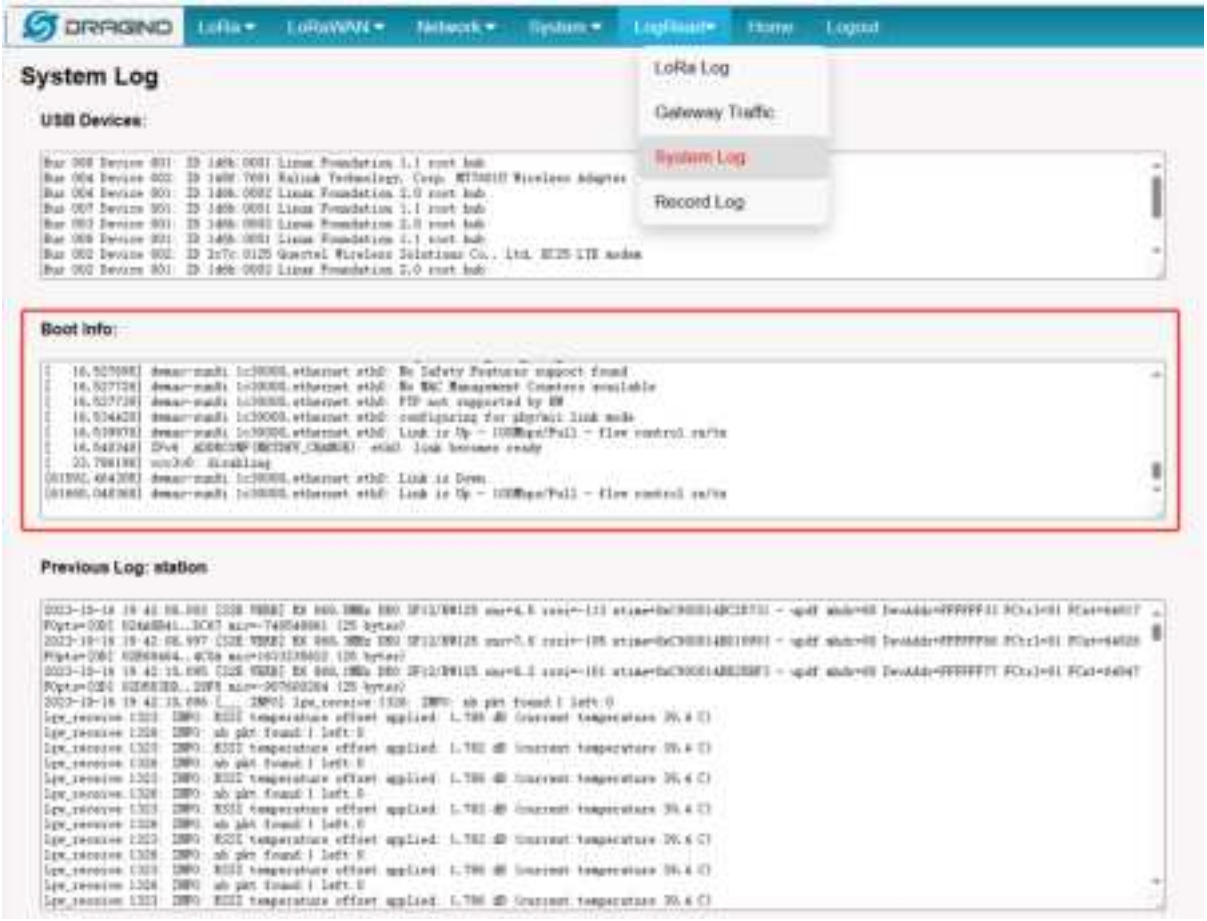
The user needs to access the Linux console of the gateway and enter the following command:

cat /var/log/qmilog.txt

```
root@m700-24d12d:~# cat /var/log/qmilog.txt
[10-16_03:17:10:214] Find /sys/bus/usb/devices/2-1 idVendor=0x2c7c idProduct=0x125, bus=0x002, dev=0x002
[10-16_03:17:10:215] Auto find qmichannel = /dev/cdc-wdm0
[10-16_03:17:10:215] Auto find usbnet_adapter = wwan0
[10-16_03:17:10:215] netcard driver = qmi_wwan, driver version = 5.15.43-m700
[10-16_03:17:10:222] Modem works in QMI mode
[10-16_03:17:10:370] cdc_wdm_fd = 8
[10-16_03:17:10:453] Get clientWDS = 20
[10-16_03:17:10:485] Get clientDMS = 1
[10-16_03:17:10:520] Get clientNAS = 4
[10-16_03:17:10:550] Get clientUIM = 1
[10-16_03:17:10:582] Get clientWDA = 1
[10-16_03:17:10:618] requestBaseBandVersion EC25EFAR06A16M4G
[10-16_03:17:10:742] requestGetSIMStatus SIMStatus: SIM_READY
[10-16_03:17:10:742] requestSetProfile[1] 3gnet///0
[10-16_03:17:10:808] requestGetProfile[1] 3gnet///0
[10-16_03:17:10:839] requestRegistrationState2 MCC: 460, MNC: 1, PS: Attached, DataCap: LTE
[10-16_03:17:10:870] requestQueryDataCall IPv4ConnectionStatus: DISCONNECTED
[10-16_03:17:10:870] ifconfig wwan0 0.0.0.0
[10-16_03:17:10:889] ifconfig wwan0 down
[10-16_03:17:10:998] requestSetupDataCall wdsConnectionIPv4Handle: 0x8729f850
[10-16_03:17:11:127] ifconfig wwan0 up
[10-16_03:17:11:156] busybox udhcpc -f -n -q -t 5 -i wwan0
[10-16_03:43:47:086] File:gl_raw_ip_mode_check Line:136 udhcpc fail to get ip address, try next:
[10-16_03:43:47:086] ifconfig wwan0 down
[10-16_03:43:47:106] echo Y > /sys/class/net/wwan0/qmi/raw_ip
[10-16_03:43:47:106] ifconfig wwan0 up
[10-16_03:43:47:124] busybox udhcpc -f -n -q -t 5 -i wwan0
[10-16_03:47:03:742] requestQueryDataCall IPv4ConnectionStatus: DISCONNECTED
[10-16_03:47:03:743] ifconfig wwan0 0.0.0.0
[10-16_03:47:03:758] ifconfig wwan0 down
[10-16_03:47:03:934] requestRegistrationState2 MCC: 0, MNC: 0, PS: Detached, DataCap: UNKNOW
[10-16_03:47:08:286] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOW
[10-16_03:47:08:319] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOW
[10-16_03:47:57:313] QmiwwanThread exit
[10-16_03:47:57:314] qmi_main exit
[10-16_03:48:27:602] Find /sys/bus/usb/devices/2-1 idVendor=0x2c7c idProduct=0x125, bus=0x002, dev=0x002
[10-16_03:48:27:604] Auto find qmichannel = /dev/cdc-wdm0
[10-16_03:48:27:604] Auto find usbnet_adapter = wwan0
[10-16_03:48:27:604] netcard driver = qmi_wwan, driver version = 5.15.43-m700
[10-16_03:48:27:604] Modem works in QMI mode
[10-16_03:48:27:621] cdc_wdm_fd = 8
[10-16_03:48:27:710] Get clientWDS = 20
[10-16_03:48:27:742] Get clientDMS = 1
[10-16_03:48:27:774] Get clientNAS = 4
[10-16_03:48:27:807] Get clientUIM = 1
[10-16_03:48:27:838] Get clientWDA = 1
[10-16_03:48:27:870] requestBaseBandVersion EC25EFAR06A16M4G
[10-16_03:48:27:999] requestGetSIMStatus SIMStatus: SIM_ABSENT
[10-16_03:48:27:999] requestSetProfile[1] 3gnet///0
[10-16_03:48:28:064] requestGetProfile[1] 3gnet///0
[10-16_03:48:28:095] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOW
[10-16_03:48:28:127] requestQueryDataCall IPv4ConnectionStatus: DISCONNECTED
[10-16_03:48:28:127] ifconfig wwan0 0.0.0.0
[10-16_03:48:28:145] ifconfig wwan0 down
[10-16_03:55:52:899] QmiwwanThread exit
[10-16_03:55:52:901] qmi_main exit
```

8.6.3 Dmesg Log

Users can check the logs of the Dmesg in the **LogRead --> System Log** interface:



8.6.4 Record Log

Users can record DMESG logs and LoRaWAN logs on the **LogRead -->Record Log** interface

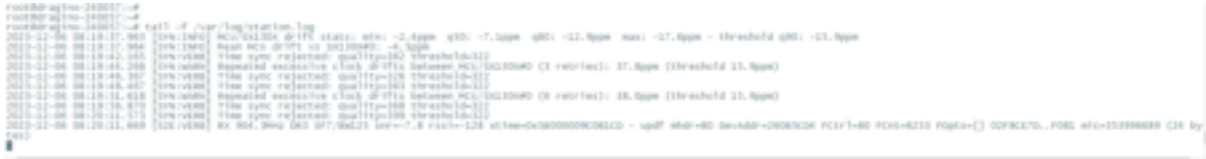
8.6.5 View gateway logs via Linux Command

Semtech UDP Log :

journalctl -u draginofwd -f

Station Log:

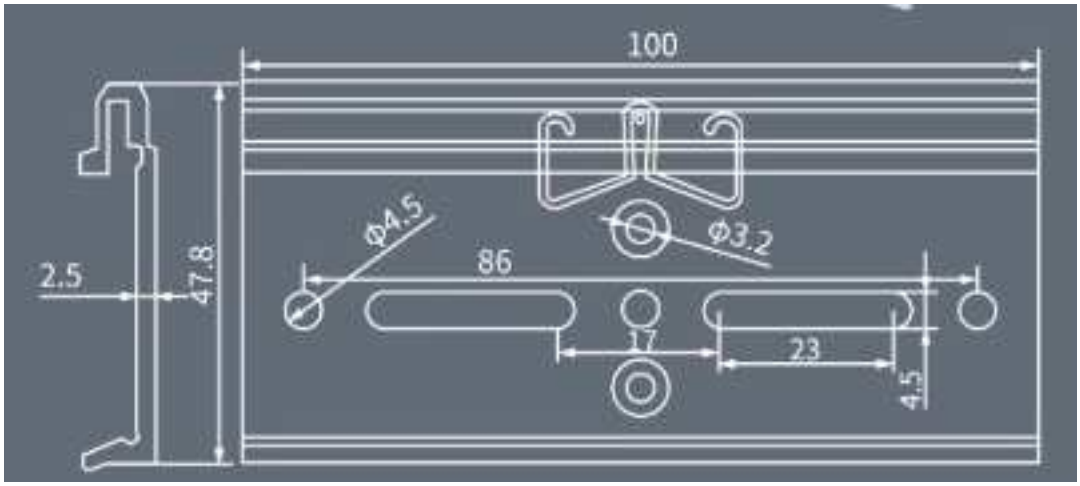
tail -f /var/log/station.log



Dmesg Log:

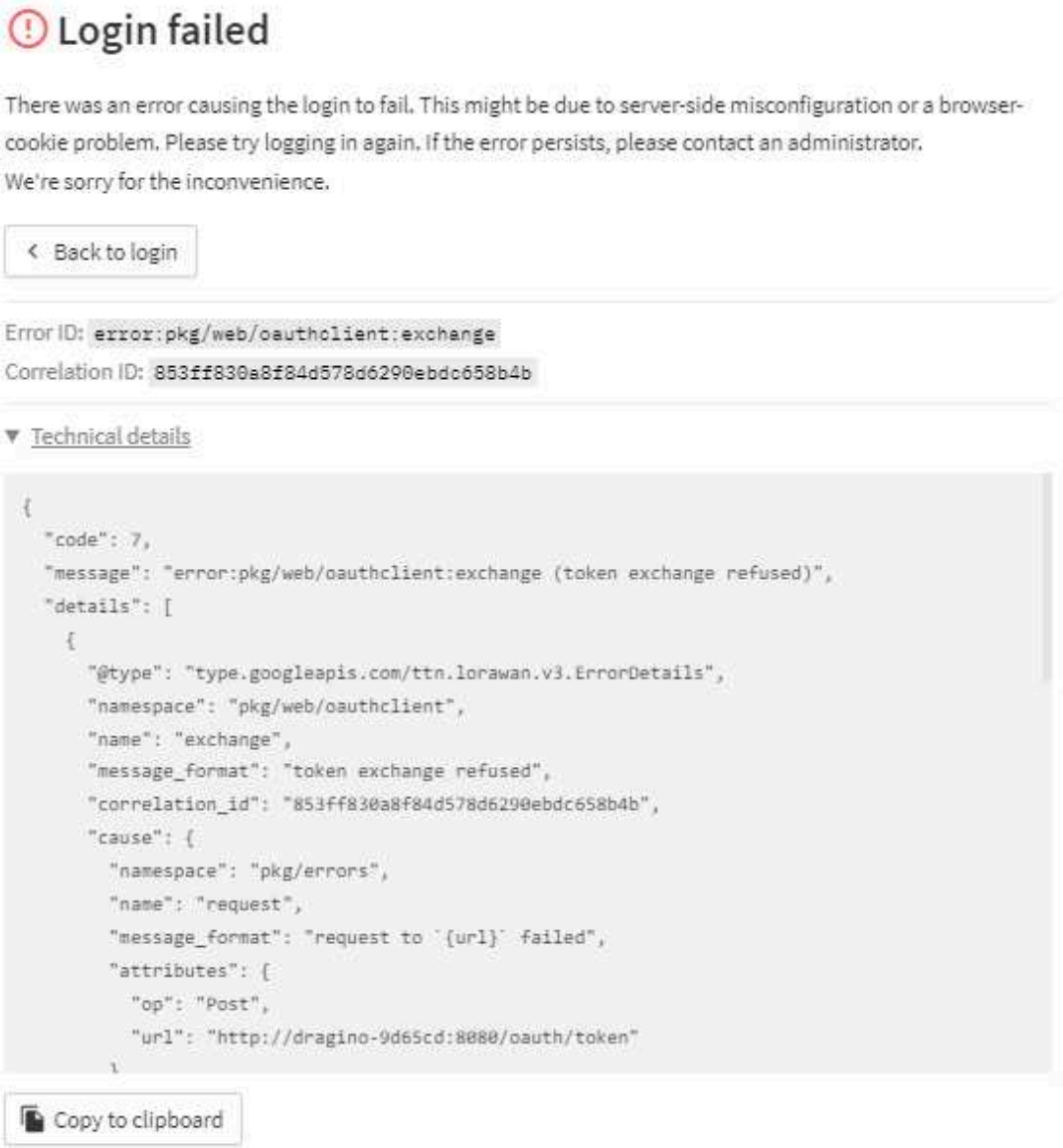
dmesg

8.7 DIN Mount Reference:


100
2.5
47.8
Φ4.5
86
Φ3.2
17
23
4.5

9. Trouble Shooting

9.1 I can't log in to the built-in Server TTN Stack which shows 'Login failed'.



This is caused by the inconsistency between the built-in TTN-Stack domain configuration and your login URL.

By default, ttn-stack uses the gateway's domain name for URL resolution, but in some networks, they prefer to resolve IP-v4 addresses.

So you can change the domain name of the TTN-Stack configuration to the IPv4 address.

Click the update URL button to configure the URL with the current eth port address.

9.2 The built-in TTN status is "Not Running" and the URI is "dragino-123456". How users fix this problem

When this problem occurs, click "**Update To DEFAULT**" ,this problem will be fixed.

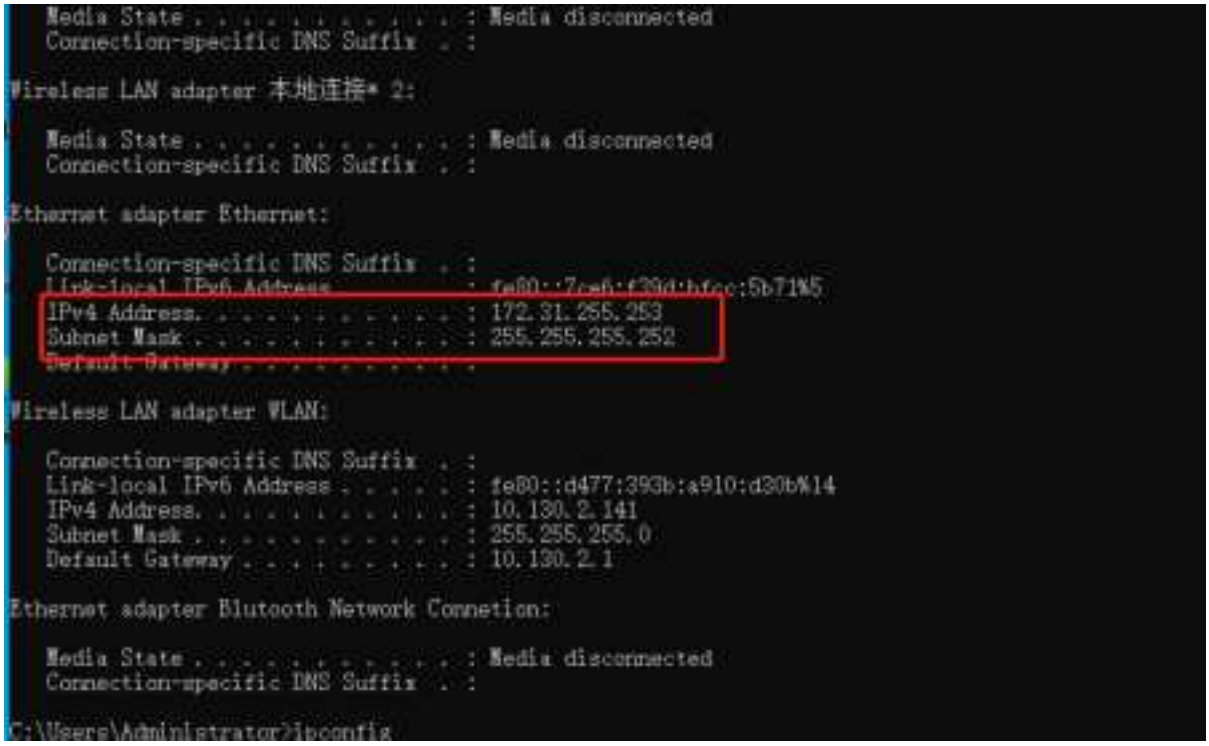
9.3 Fallback IP does not work, how can users check

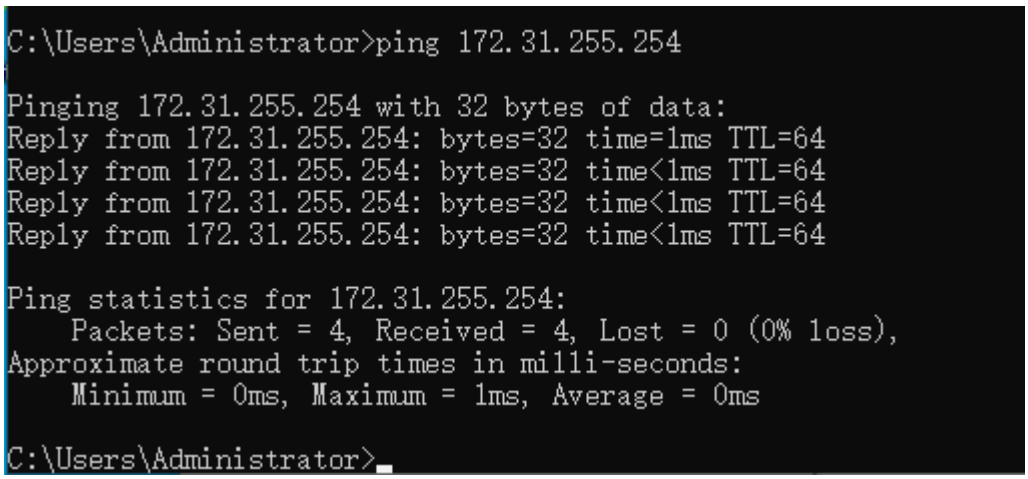
When the computer has completed the above fallback IP configuration,the LPS8v2 Web UI is still not accessible via fallback IP.

1. Check whether the configuration is correct

Run the CMD command to ipconfig and ping 172.31.255.254.

If this fails, the user needs to reconfigure.



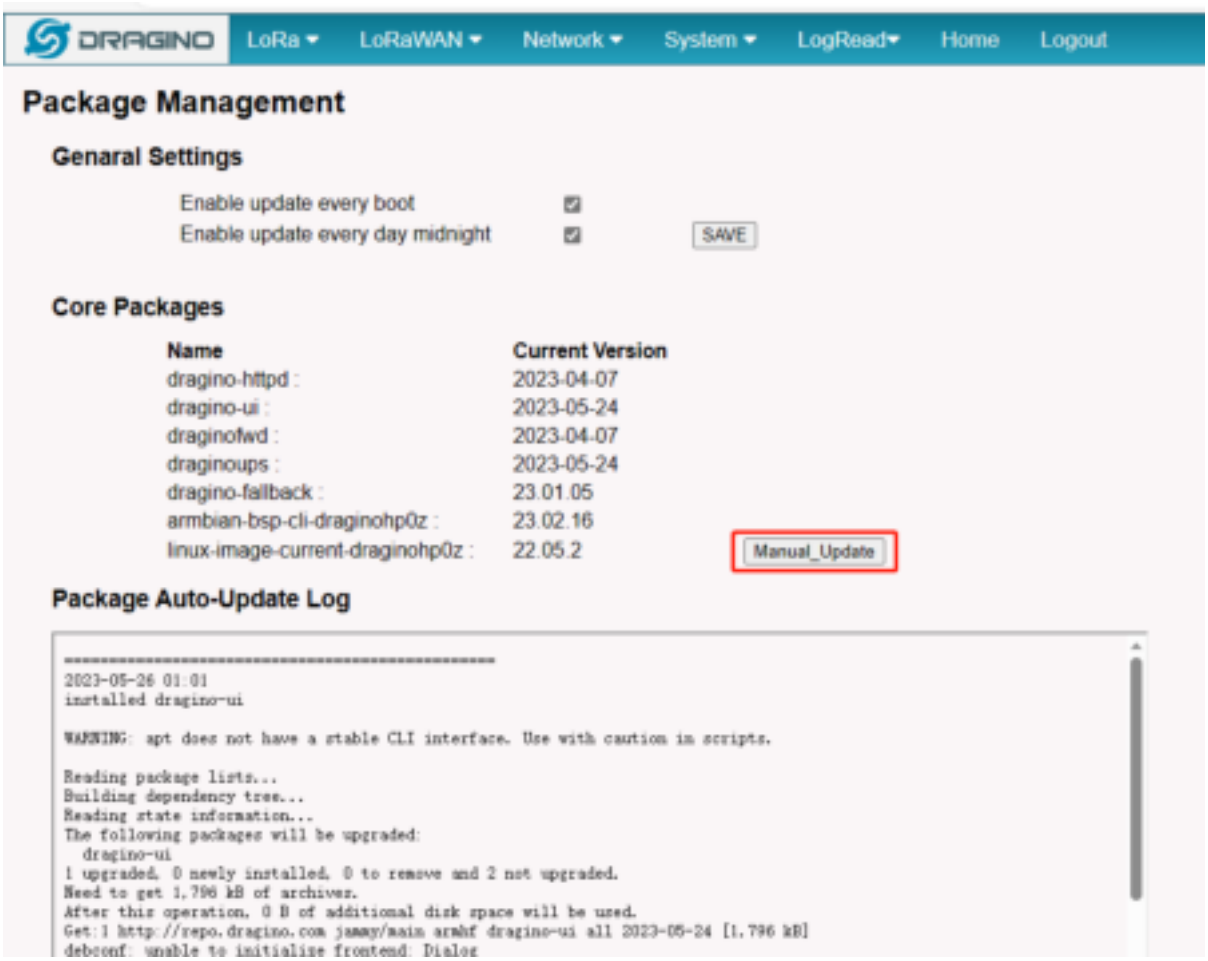


2. Check whether the firewall is disabled

If the firewall is not down, this will affect access to the gateway.

9.4 Click "Manual_Update", why there is no response?

When you click "Manual_Update", the gateway will finish updating within 10 minutes and display the update log.



9.5 Why the LPS8V2's Access Point does not do not appear & Fallback IP unable to access

Earlier versions of the LPS8V2 which missing the AP driver and not installed the fallback package, so the users have to do an extra update.

apt update && apt install *dragino*

wget -P /tmp/ http://repo.dragino.com/release/hp0c-packages/linux-image-current-draginohp0z_22.05.2_armhf.deb && dpkg -i /tmp/linux-image-current-draginohp0z_22.05.2_armhf.deb

9.6 How to reset the built-in server

1) Build-in The Things Network

Refer to this link to delete the Built-in server's device.

Delete devices from Build-in The Things Network

2) Build-in Chirpstack

Users need to click "Reset" on the Server-->NetServer interface, ChirpStack will be reset.

10. Supports

If you are experiencing issues and can't solve them, you can send mail to support@dragino.com.

With your question as detailed as possible. We will reply and help you in the shortest.

11. Reference

- Install Tago Core: Refer **Install Tago Core in LPS8v2** in Instruction.
- Advance OS Reference Guide for LPS8v2.

12. Order Info

LPS8v2-XXX-YYY

XXX: Frequency Band

- **AS923**: LoRaWAN AS923 band

- **AU915**: LoRaWAN AU915 band
- **EU868**: LoRaWAN EU868 band
- **KR920**: LoRaWAN KR920 band
- **US915**: LoRaWAN US915 band
- **IN865**: LoRaWAN IN865 band

YYY: 4G Cellular Option

- **EC25-E**: EMEA, Korea, Thailand, India
- **EC25-AFX**: America:Verizon, AT&T(FirstNet), U.S.Cellular; Canada:Telus
- **EC25-AUX**: Latin America, New Zeland, Taiwan
- **EC25-J**: Japan, DOCOMO, SoftBank, KDDI

More info about valid bands, please see EC25-E product page.

13. Manufacturer Info

Shenzhen Dragino Technology Development co. LTD

Room 202, Block B, BCT Incubation Bases (BaoChengTai), No.8 CaiYunRoad

LongCheng Street, LongGang District ; Shenzhen 518116,China

14. FCC Warning

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.

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

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.