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# 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 BLINKING BLUE Until the reload is finished.

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

**LED status:** ETH LED will SOLID BLUE 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**



WiFi Network from LPS8-V2





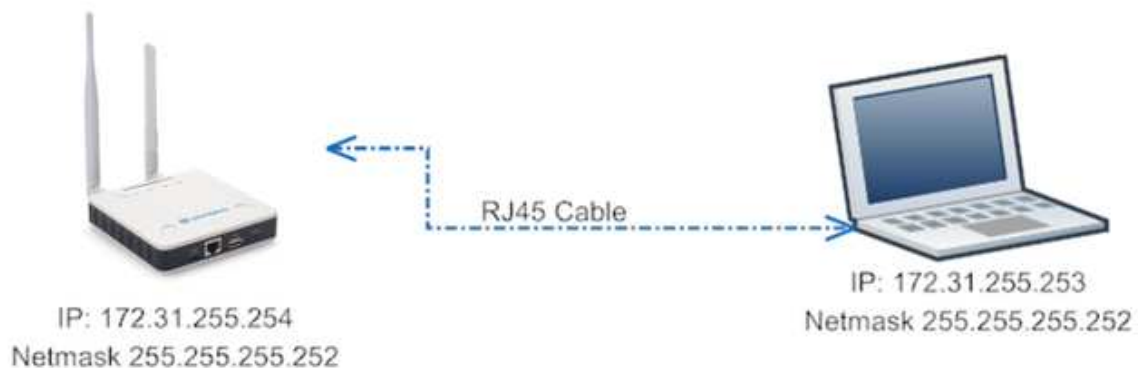
**Method 2: Connect via Ethernet with DHCP IP from the router**

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**



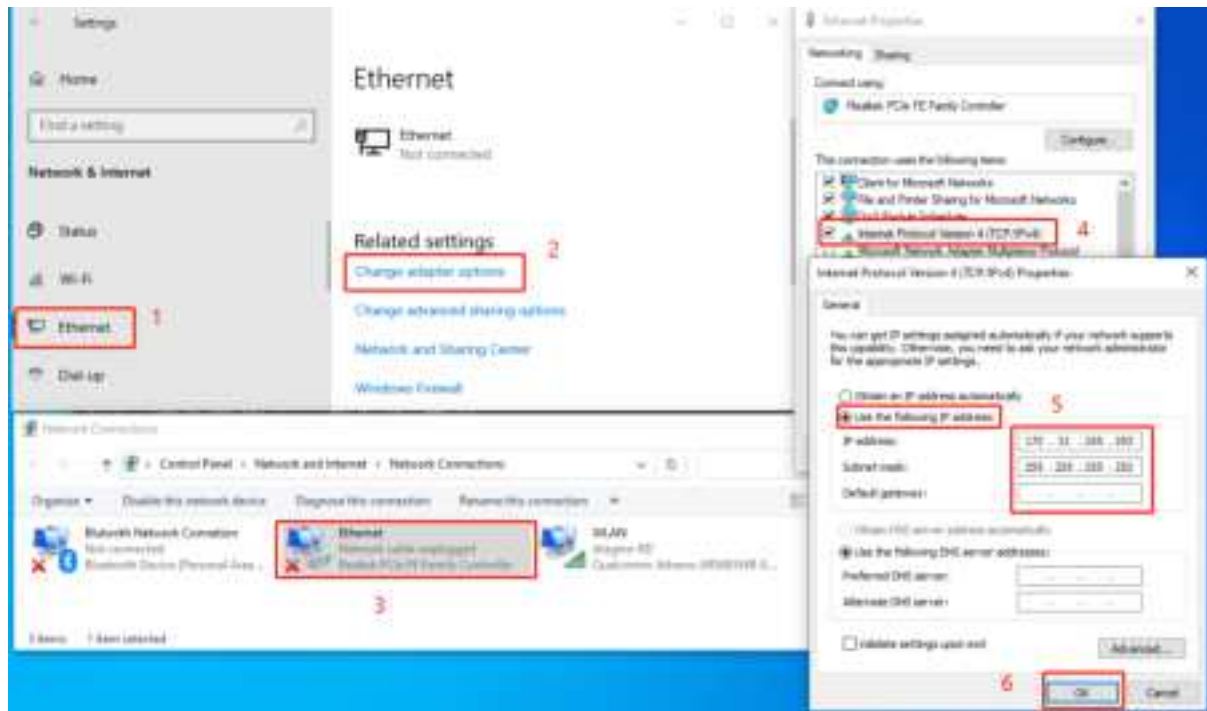
**Steps to connect via fallback IP:**

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.



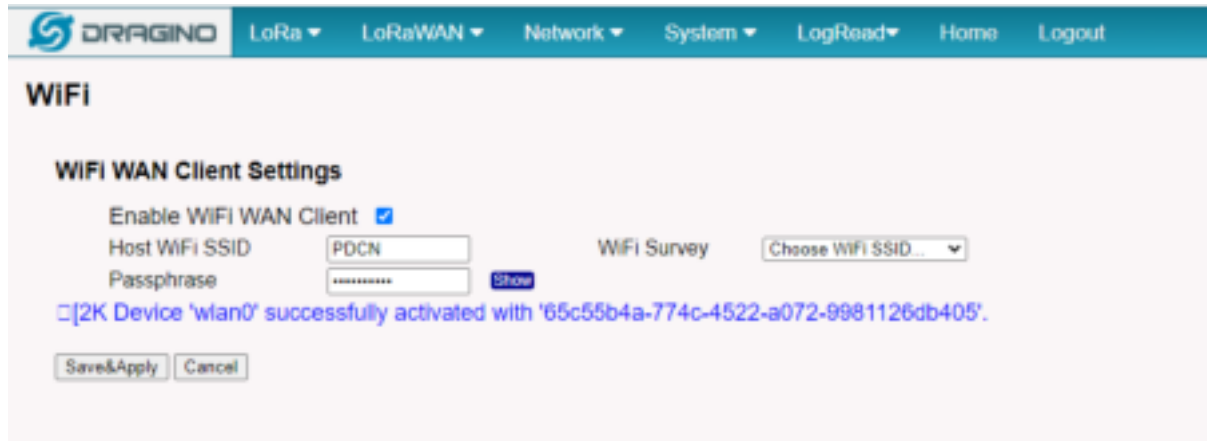
**Method 4: Connect via WiFi with DHCP IP from the router**



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](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.

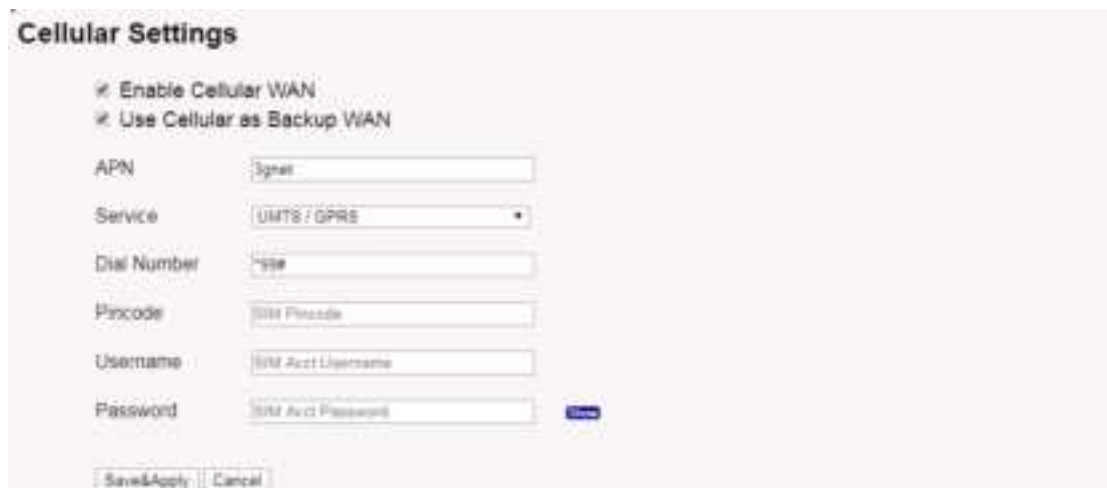
First, install the Micro SIM card as below direction

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.



The image shows a 'Cellular Settings' web form. At the top, there are two checked checkboxes: 'Enable Cellular WAN' and 'Use Cellular as Backup WAN'. Below these are several input fields: 'APN' with the value '3gnet', 'Service' with a dropdown menu showing 'UMTS / GPRS', 'Dial Number' with the value '155', 'Pincode' with the value '1234 Pincode', 'Username' with the value '3GPP Auth Username', and 'Password' with the value '3GPP Auth Password'. To the right of the Password field is a small blue button labeled 'Copy'. At the bottom of the form are two buttons: 'Save&Apply' and 'Cancel'.

## 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.

The screenshot shows the 'LoRa Configurator' web interface. At the top, there is a navigation bar with the 'ORAGINO' logo and several menu items: 'LoRa', 'LoRaWAN', 'Network', 'System', 'LogRoad', 'Home', and 'Logout'. Below the navigation bar, the page title is 'LoRa Configurator'. The main content area is divided into sections. The 'Radio Settings' section is currently active, showing a 'Debug Level' dropdown set to 'Low'. Below this, there are fields for 'Keep Alive Period (sec)' (set to 36) and 'Frequency Plan'. A dropdown menu for 'Frequency Plan' is open, displaying a list of regional frequency plans: EU868 Europe 868MHz (863-878), EU868 Europe 868MHz (863-878) (highlighted), CN470 China 470MHz (470-510), US915 United States 915MHz (902-928), AU915 Australia 915MHz (915-928), IN865 India 865MHz (865-867), KR920 Korea 920MHz (920-923), AS923 Asia AS923-1, AS923 Asia AS923-2, AS923 Asia AS923-3, AS923 Asia AS923-4, RU864 Russia 864MHz (864-875), and Customized Bands. To the right of the dropdown, there are two input fields: one for '480' and another for '114.240000'. Below the 'Radio Settings' section, there is a 'Static GPS coordinates' section with a red question mark icon, an 'Enable Static GPS' checkbox, and a 'Latitude' input field. At the bottom, there is a 'Current Mode' dropdown set to 'LoRaWAN Semtec' and three buttons: 'Save/Apply', 'Disable', and 'Cancel'.

## 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:

The screenshot displays the 'LoRaWAN Configuration' web interface. At the top, there is a navigation bar with the 'DRAGINO' logo and several menu items: 'LoRa', 'LoRaWAN', 'Network', 'System', 'LogRead', 'Home', and 'Logout'. Below the navigation bar, the 'LoRaWAN Configuration' title is shown, followed by a dropdown menu currently set to 'LoRaWAN Semtech UDP'. A tooltip for 'LoRaWAN Basic Station' is visible. The 'General Settings' section includes an 'Email' field with 'dragino@dragino.com' and a 'Gateway EUI' field with '400011F1FF740000'. The 'Primary LoRaWAN Server' section features a 'Service Provider' dropdown set to 'The Things Network V3', a 'Server Address' dropdown set to 'eu1.cloud.thethings.network', an 'Uplink Port' field set to '1703', and a 'Downlink Port' field set to '1705'. The 'Primary Packet Filter' section has 'Fport Filter' and 'DevAddr Filter' fields, both with a red question mark icon and the value '0'. The 'Secondary LoRaWAN Server' section has a 'Service Provider' dropdown set to 'Disable'. The 'Secondary Packet Filter' section also has 'Fport Filter' and 'DevAddr Filter' fields with a red question mark icon and the value '0'. At the bottom, the 'Current Mode' is 'LoRaWAN Semtech UDP', and there are 'Save&Apply' and 'Cancel' buttons.

**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

**Primary LoRaWAN Server**

Service Provider	<input type="text" value="The Things Network V3"/>	Server Address	<div><div>eu1.cloud.thethings.network</div><div>eu1.cloud.thethings.network</div><div>nam1.cloud.thethings.network</div><div>au1.cloud.thethings.network</div></div>
Uplink Port	<input type="text" value="1705"/>	Downlink Port	
<b>Primary Packet Filter</b>			
Eport Filter ?	<input type="text" value="0"/>	DevAddr Filter ?	<input type="text" value="0"/>

### 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](#)

The screenshot shows the 'LoRa Configuration' page of a DRAGINO gateway. The 'Frequency Plan' dropdown menu is open, displaying a list of regional frequency plans. The 'US915 United States 915MHz (902-928)' option is currently selected. Other visible options include EU868, CN470, AU915, IN865, KR920, AS923, and RU864. The 'Current Mode' is set to 'LoRaWAN Semtec'. The 'Latitude' field is populated with '114.240000'.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

### LoRa Configuration

Debug Level: Low

**Radio Settings**

Keep Alive Period (sec): 30

Frequency Plan: **US915 United States 915MHz (902-928)**

**Static GPS coordinates ?**

Enable Static GPS: ☐

Latitude: 114.240000

Current Mode: **LoRaWAN Semtec**

Buttons: Save&Apply, Disable, Cancel

Frequency Plan List:

- EU868 Europe 868MHz (863-870)
- EU868 Europe 868MHz (863-879)
- CN470 China 470MHz (470-510)
- US915 United States 915MHz (902-928)**
- AU915 Australia 915MHz (915-928)
- IN865 India 865MHz (865-867)
- KR920 Korea 920MHz (920-923)
- AS923 Asia AS923-1
- AS923 Asia AS923-2
- AS923 Asia AS923-3
- AS923 Asia AS923-4
- RU864 Russia 864MHz (864-870)
- Customized Bands

**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.

**LoRaWAN Configuration**

**General Settings**

Email:

Gateway EUI:

**Primary LoRaWAN Server**

Service Provider:

Server Address:

Uplink Port:

Downlink Port:

**Primary Packet Filter**

Fport Filter ?

DevAddr Filter ?

**Secondary LoRaWAN Server**

Service Provider:

**Secondary Packet Filter**

Fport Filter ?

DevAddr Filter ?

Current Mode: **LoRaWAN Semtech UDP**

### 3.3.2 LoRaWAN --> LoRaWAN Basic Station

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

The screenshot shows the 'LoRaWAN -- Basic Station' configuration page. At the top is a navigation bar with the DRAGINO logo and links for LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The main heading is 'LoRaWAN -- Basic Station'. Under 'General Settings', there are fields for 'Email' (dragino@dragino.com) and 'Gateway ID' (a84041FDFE2400b), along with a 'Restore' button with a red question mark and a 'Restore Configuration' button. The 'Primary LoRaWAN Server' section includes a 'Service Provider' dropdown (The Things Network -- Basic Station), a 'Server URI' field (example: https://eu1.cloud.thethings.network:443), a 'Server CUPS' field (example: NNSXS.ZWT4MDZ3R24GFIRNJB6A3OKZWPRNT6HZLXM3PXI.JT42TOKFSA), and a 'CUPS trust' section with a red error message 'Not Found CA certificate, User can clicking DEFAULTde CERTIFICATE to install certificate' and a 'DEFAULT\_CERTIFICATE' button. At the bottom, it shows 'Current Mode: LoRaWAN Semtech UDP' and a message 'Click Save & Apply will change to mode: LoRaWAN Basic Station', with 'Save&Apply' and 'Cancel' buttons.

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



 DRAGINO

LoRa

LoRaWAN

Network

System

Server

LogRead

Home

Logout

### WiFi Settings

WiFi Mode

WiFi WAN Client

WiFi Access Point

WiFi WAN Client

#### WiFi WAN Client Settings

Enable WiFi WAN Client

☐

Host WiFi SSID

POCN

WiFi Survey

Choose WiFi SSID

Passphrase

.....

Show

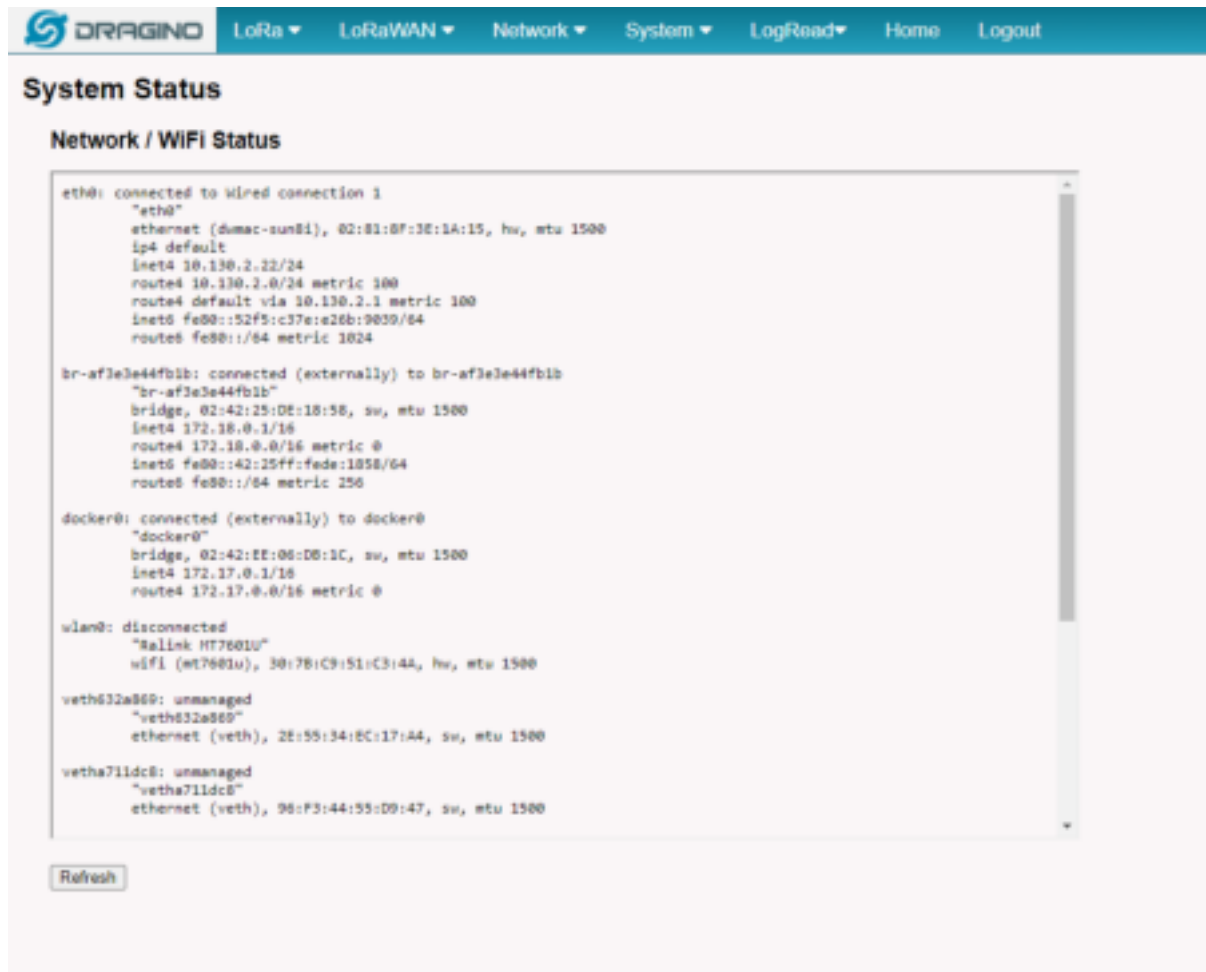
Proto Type

DHCP

Save&Apply

Cancel

3.4.2 Network --> System Status



The screenshot shows the DRAGINO System Status page. The top navigation bar includes links for LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The main heading is "System Status", and the sub-heading is "Network / WiFi Status". A text area displays the following network configuration details:

```
eth0: connected to wired connection 1
"eth0"
ethernet (dumac-sun8i), 02:81:0F:3E:1A:15, hw, mtu 1500
ip4 default
inet4 10.130.2.22/24
route4 10.130.2.0/24 metric 100
route4 default via 10.130.2.1 metric 100
inet6 fe80::52f5:c37e:a26b:9039/64
route6 fe80::/64 metric 1024

br-af3e3e44fb1b: connected (externally) to br-af3e3e44fb1b
"br-af3e3e44fb1b"
bridge, 02:42:25:0f:18:58, sw, mtu 1500
inet4 172.18.0.1/16
route4 172.18.0.0/16 metric 0
inet6 fe80::42:25ff:fede:1858/64
route6 fe80::/64 metric 256

docker0: connected (externally) to docker0
"docker0"
bridge, 02:42:ff:06:d0:1c, sw, mtu 1500
inet4 172.17.0.1/16
route4 172.17.0.0/16 metric 0

wlan0: disconnected
"Realtek MT7601U"
wifi (mt7601u), 30:78:c9:51:c3:44, hw, mtu 1500

veth632a860: unmanaged
"veth632a860"
ethernet (veth), 2e:55:34:ec:17:a4, sw, mtu 1500

vetha711dc8: unmanaged
"vetha711dc8"
ethernet (veth), 96:f3:44:55:d9:47, sw, mtu 1500
```

Below the text area is a "Refresh" button.

### 3.4.3 Network --> Network

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



The screenshot shows the 'Network' configuration page in the DRAGINO web interface. The top navigation bar includes 'LoRa', 'LoRaWAN', 'Network', 'System', 'LogRead', 'Home', and 'Logout'. The 'Network' section is active, displaying 'Ethernet WAN Settings'. The 'Mode' is set to 'Static'. There are input fields for 'IP Address', 'Gateway', 'Netmask', and 'DNS'. A 'Save&Apply' button is at the bottom left.

### 3.4.4 Network --> Cellular

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

**Note: APN cannot be empty.**



The screenshot shows the 'Cellular Settings' page in the DRAGINO web interface. The top navigation bar is the same as the previous screenshot. The 'Cellular Settings' section is active, showing a checkbox for 'Enable Cellular WAN' which is checked. Below this are input fields for 'APN' (containing '3gnet'), 'Service' (a dropdown menu showing 'UMTS / GPRS'), 'Dial Number' (containing '1555'), 'Pincode' (containing 'SIM Pincode'), 'Username' (containing 'SIM Act Username'), and 'Password' (containing 'SIM Act Password'). A 'Show' button is next to the password field. At the bottom are 'Save&Apply' and 'Cancel' buttons.

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

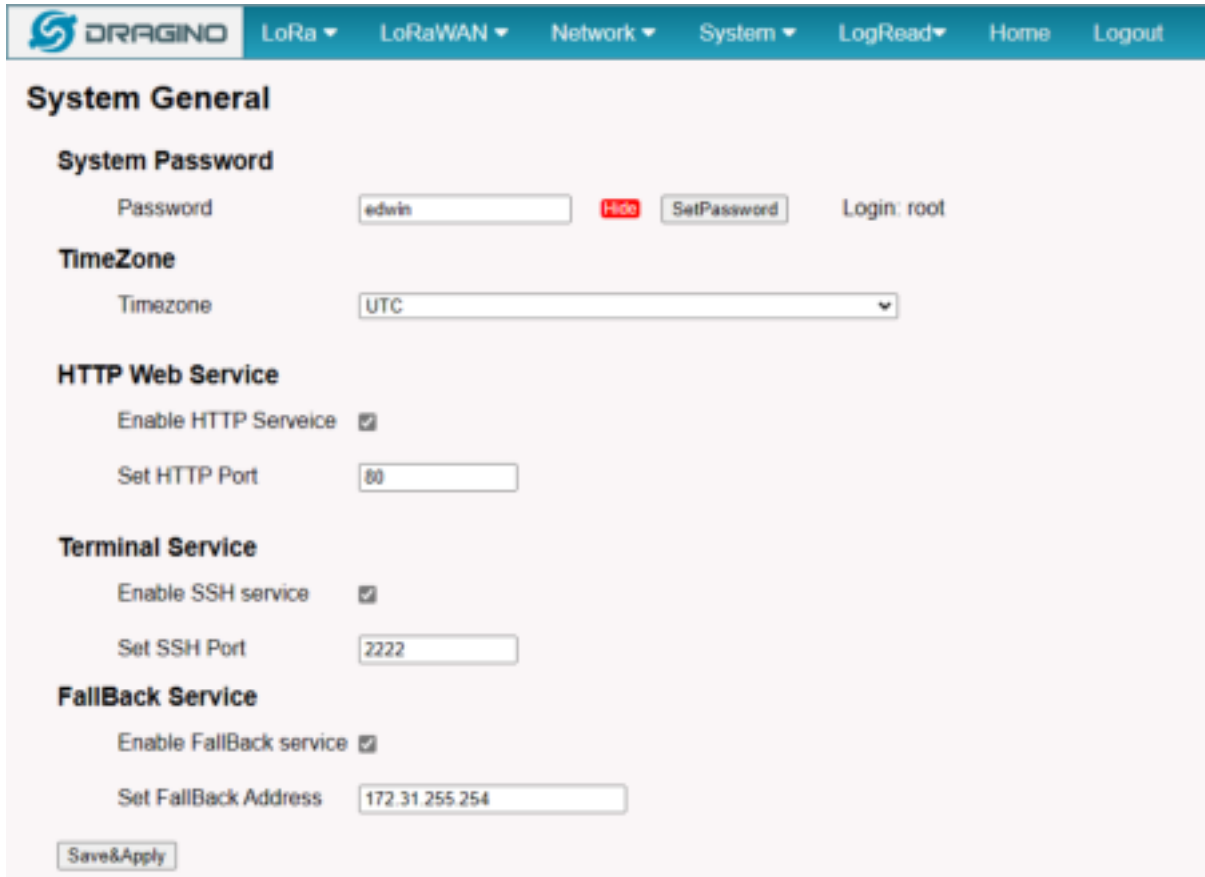
Shows the system info:



### 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.



The screenshot shows the 'System General' configuration page in the DRAGINO web interface. The page has a teal header with the DRAGINO logo and navigation links: LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The main content area is white and contains several sections:

- System Password:** A form with a 'Password' field containing 'edwin', a red 'Hide' button, a 'SetPassword' button, and a 'Login: root' label.
- TimeZone:** A 'Timezone' dropdown menu currently set to 'UTC'.
- HTTP Web Service:** An 'Enable HTTP Service' checkbox that is checked, and a 'Set HTTP Port' field containing '80'.
- Terminal Service:** An 'Enable SSH service' checkbox that is checked, and a 'Set SSH Port' field containing '2222'.
- FallBack Service:** An 'Enable FallBack service' checkbox that is checked, and a 'Set FallBack Address' field containing '172.31.255.254'.

At the bottom left of the form is a 'Save&Apply' button.

### 3.5.3 System --> Backup/Restore



The screenshot shows the 'Backup/Restore' configuration page in the DRAGINO web interface. The page has a teal header with the DRAGINO logo and navigation links: LoRa, LoRaWAN, Network, System, Server, LogRead, Home, and Logout. The main content area is white and contains the following elements:

- A note: "Click 'Generate archive' to download a tar archive of the current configuration files."
- Download backup:** A 'Generate\_archive' button and a blue link 'Download Backup File'.
- A note: "To restore configuration files you can upload a previously generated backup archive here."
- Restore backup:** Two buttons for file selection: '选择文件' (Select File) and '未选择文件' (No file selected), followed by an 'Upload\_archive' button.

### 3.5.4 System --> Reboot / Reset

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

ETH LED will SOLID BLUE Until the restore is finished.

When the gateway restores the factory settings is complete,

The WiFi configuration will enable WiFi Access Point by default.

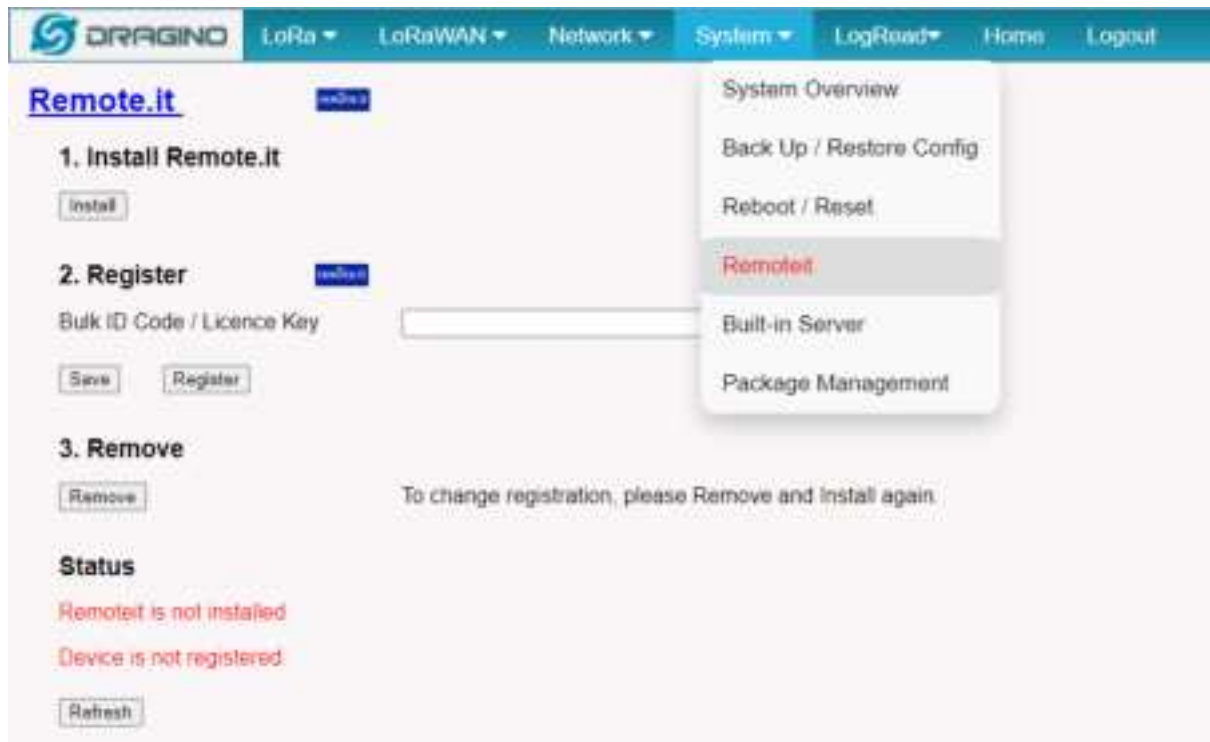
The other configuration will be restored to the default configuration.



### 3.5.5 System --> Remoteit

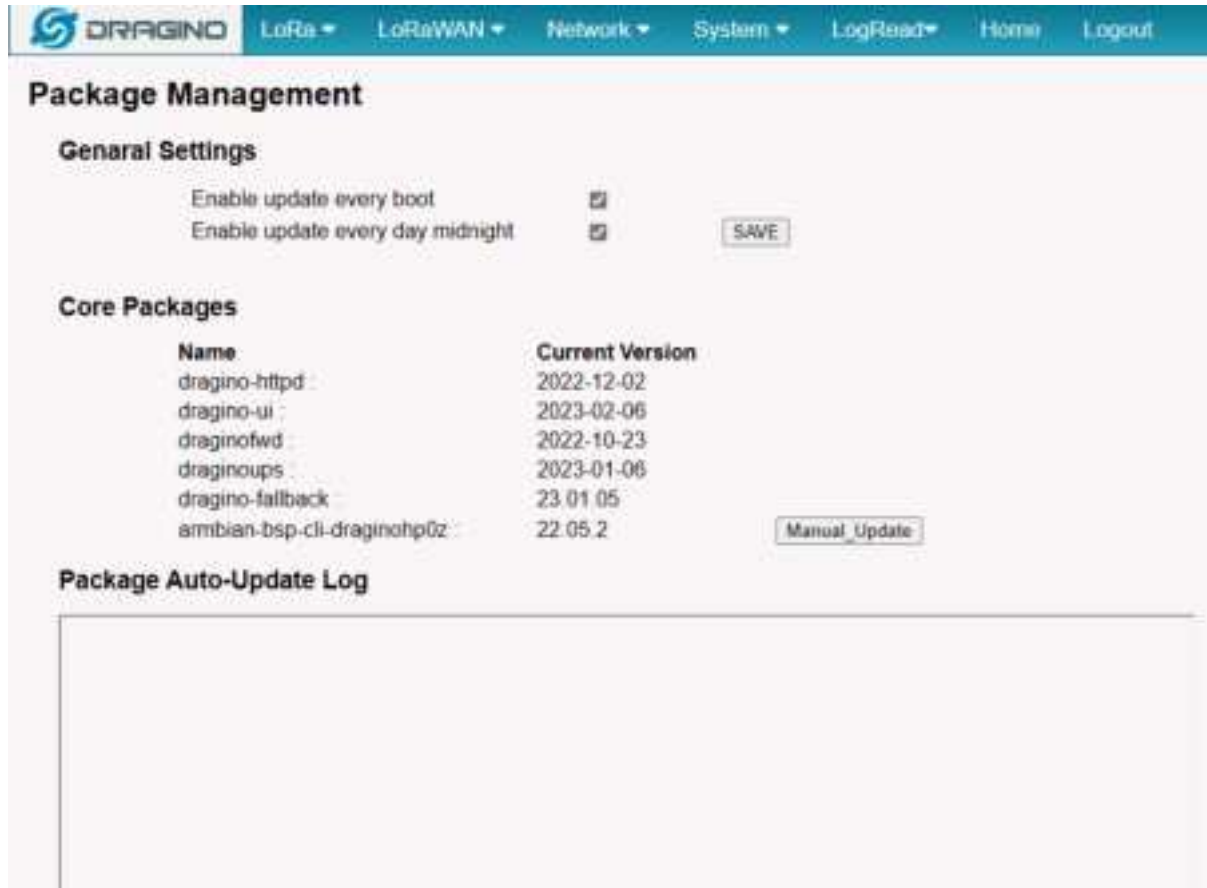
In the **System-> Remoteit** interface, users can configure the gateway to be accessed remotely via Remote.it.

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.



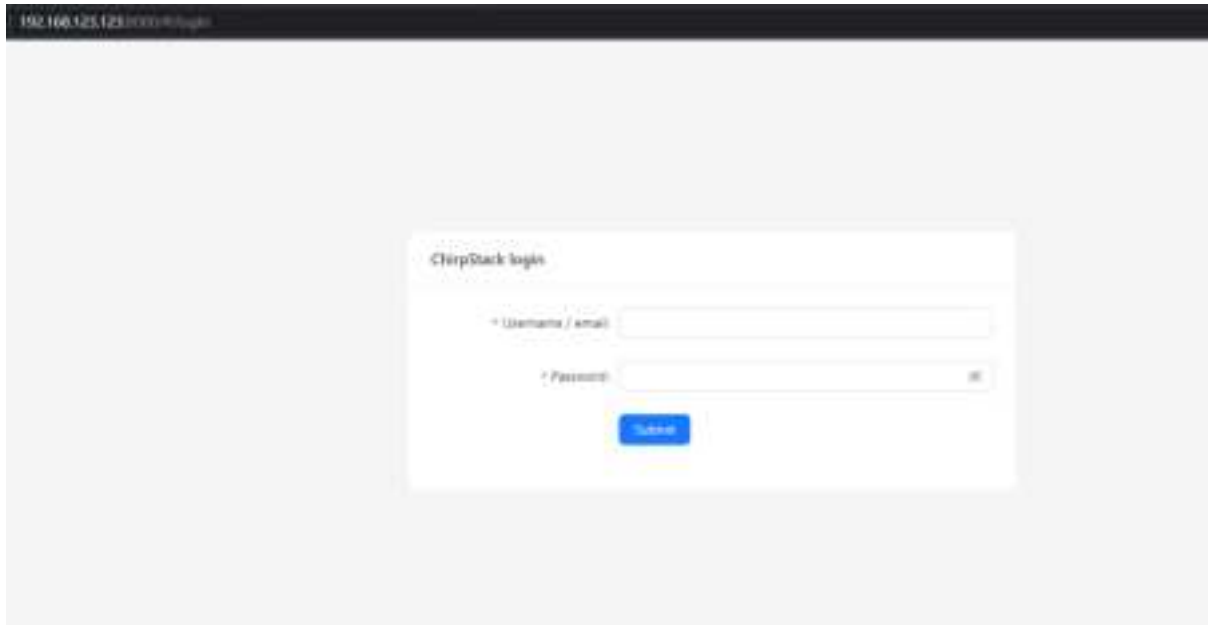
## 4. Build-in Server

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**





**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 Chirpstack-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

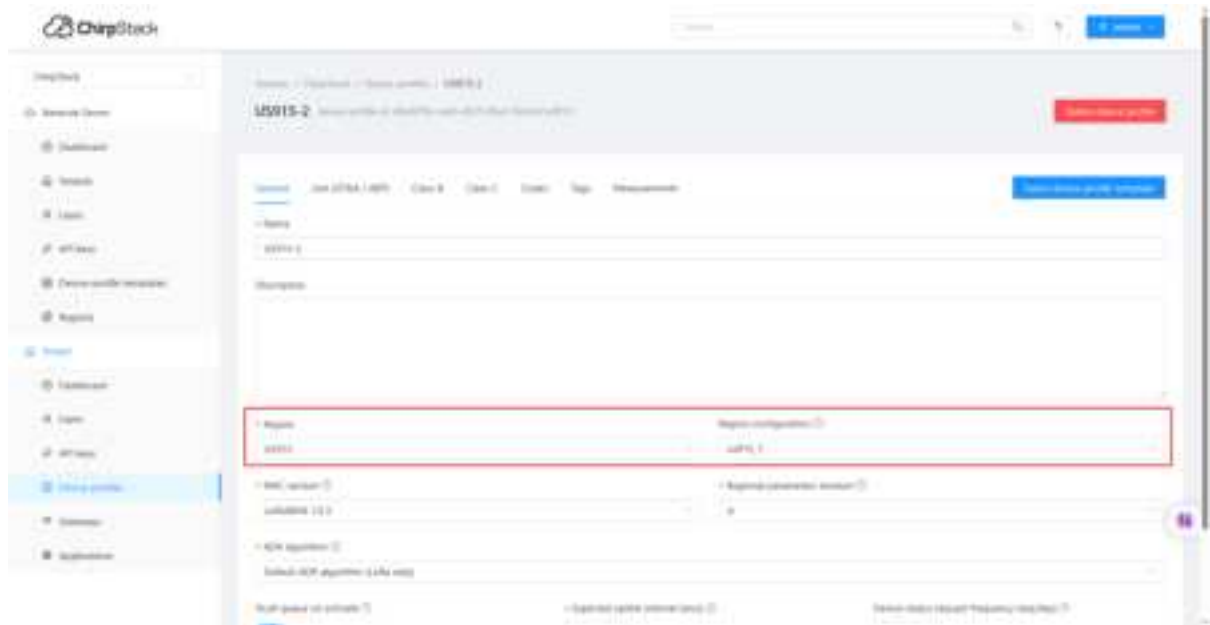
The user has to choose a SubBand if using CN470, US915, AU915, or AS923.

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 Radio 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

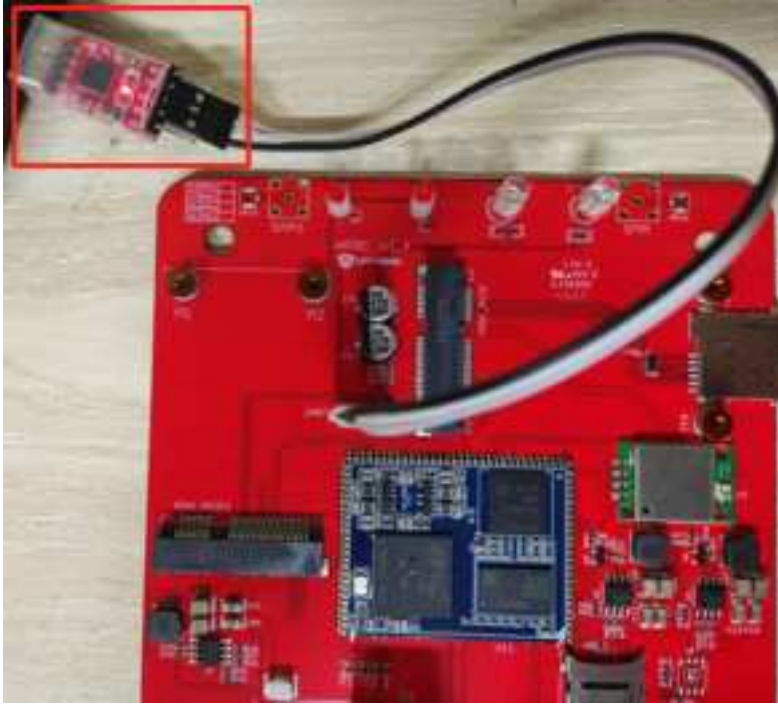
LPS8-V2 supports the Watch Dog but is not enabled by the previous releases(2023-11-24 )

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

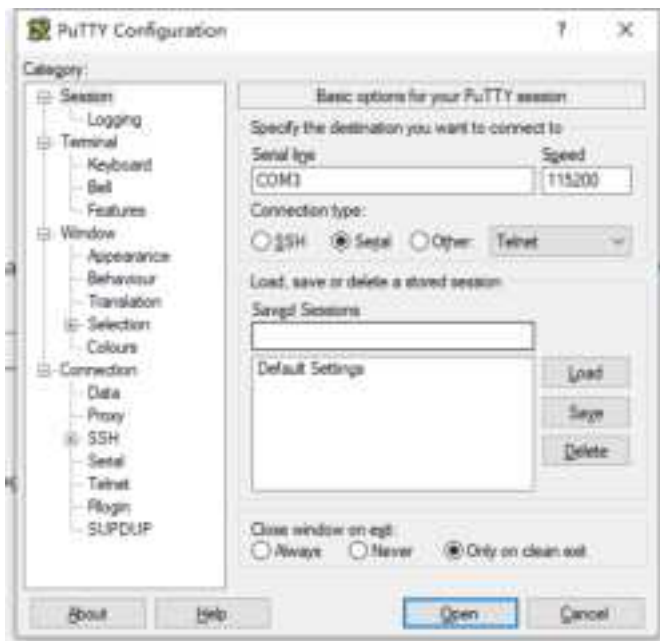
```
wget -P /tmp/ http://repo.dragino.com/release/tool/watchdog/enable_watchdog.sh && chmod +x /tmp/enable_watchdog.sh && /tmp/enable_watchdog.sh
```

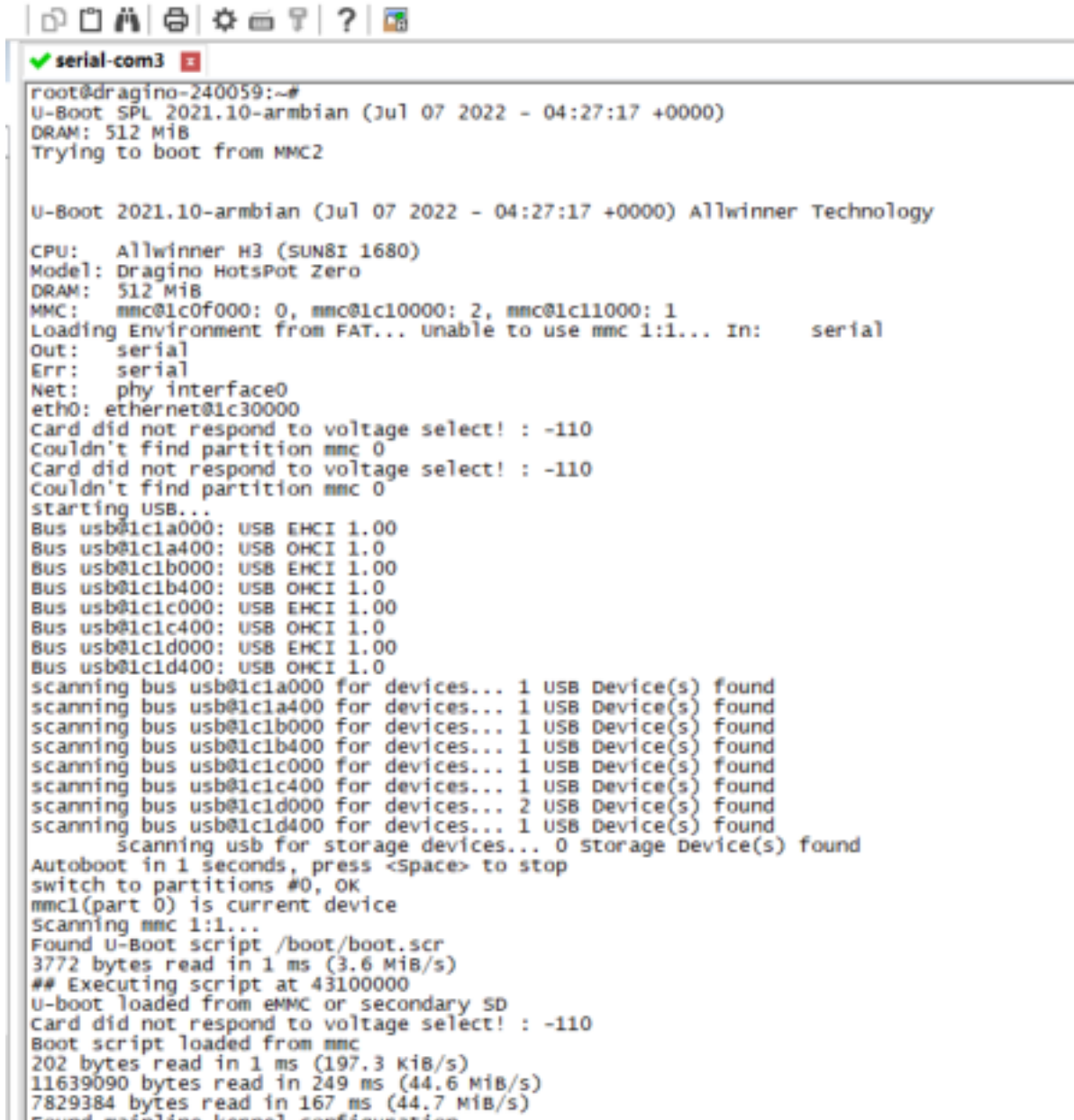






In the PC, you can use the serial port tool (such as [putty](#) in Windows), you need to set the serial baud rate to **115200** to access the serial console for LPS8v2. LPS8v2 will output system info once power on as below:





```
root@dragino-240059:~#
U-Boot SPL 2021.10-armbian (Jul 07 2022 - 04:27:17 +0000)
DRAM: 512 MiB
Trying to boot from MMC2

U-Boot 2021.10-armbian (Jul 07 2022 - 04:27:17 +0000) Allwinner Technology

CPU:   Allwinner H3 (SUN8I 1680)
Model: Dragino HotsPot Zero
DRAM:  512 MiB
MMC:   mmc@1c0f000: 0, mmc@1c10000: 2, mmc@1c11000: 1
Loading Environment from FAT... Unable to use mmc 1:1... In:   serial
Out:  serial
Err:  serial
Net:   phy interface0
eth0: ethernet@1c30000
Card did not respond to voltage select! : -110
Couldn't find partition mmc 0
Card did not respond to voltage select! : -110
Couldn't find partition mmc 0
starting USB...
Bus usb@1c1a000: USB EHCI 1.00
Bus usb@1c1a400: USB OHCI 1.0
Bus usb@1c1b000: USB EHCI 1.00
Bus usb@1c1b400: USB OHCI 1.0
Bus usb@1c1c000: USB EHCI 1.00
Bus usb@1c1c400: USB OHCI 1.0
Bus usb@1c1d000: USB EHCI 1.00
Bus usb@1c1d400: USB OHCI 1.0
scanning bus usb@1c1a000 for devices... 1 USB Device(s) found
scanning bus usb@1c1a400 for devices... 1 USB Device(s) found
scanning bus usb@1c1b000 for devices... 1 USB Device(s) found
scanning bus usb@1c1b400 for devices... 1 USB Device(s) found
scanning bus usb@1c1c000 for devices... 1 USB Device(s) found
scanning bus usb@1c1c400 for devices... 1 USB Device(s) found
scanning bus usb@1c1d000 for devices... 2 USB Device(s) found
scanning bus usb@1c1d400 for devices... 1 USB Device(s) found
scanning usb for storage devices... 0 Storage Device(s) found
Autoboot in 1 seconds, press <space> to stop
switch to partitions #0, OK
mmc1(part 0) is current device
Scanning mmc 1:1...
Found U-Boot script /boot/boot.scr
3772 bytes read in 1 ms (3.6 MiB/s)
## Executing script at 43100000
U-Boot loaded from eMMC or secondary SD
Card did not respond to voltage select! : -110
Boot script loaded from mmc
202 bytes read in 1 ms (197.3 KiB/s)
11639090 bytes read in 249 ms (44.6 MiB/s)
7829384 bytes read in 167 ms (44.7 MiB/s)
Found configuration kernel configuration
```

## 7. OTA System Update

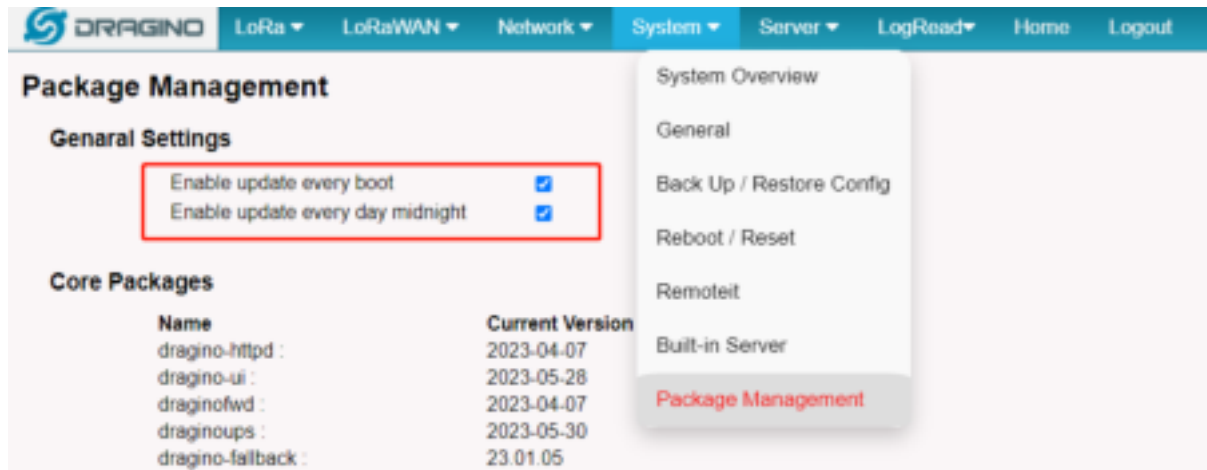
LPS8v2 supports system auto-update via OTA, please see [this URL](#) for the detail of this feature.

### 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



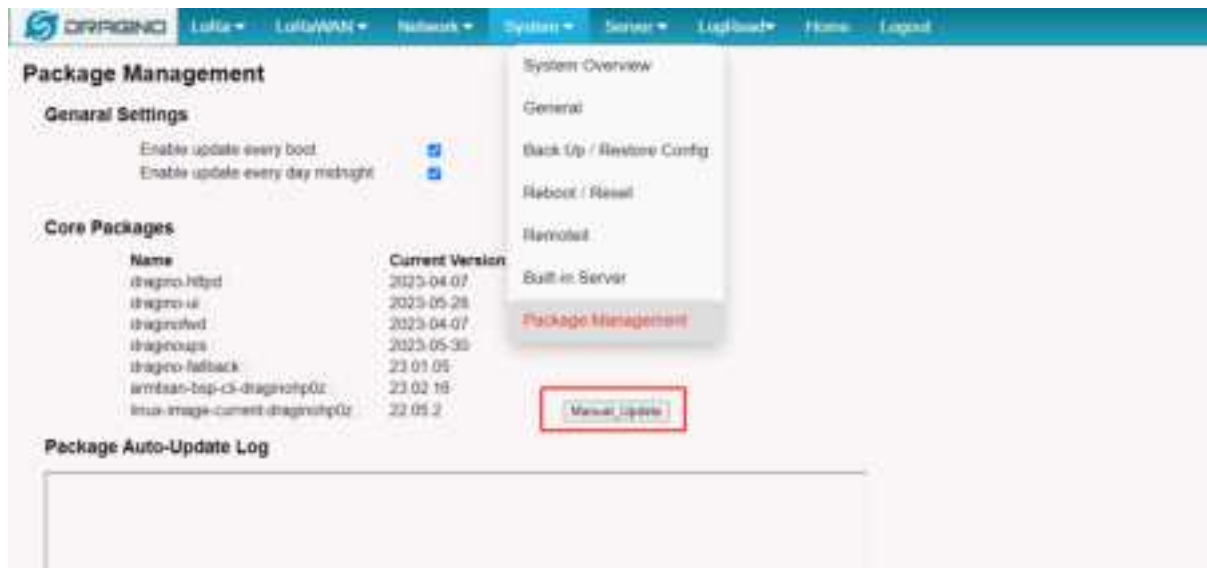
## 7.2 Manual upgrade method

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.**

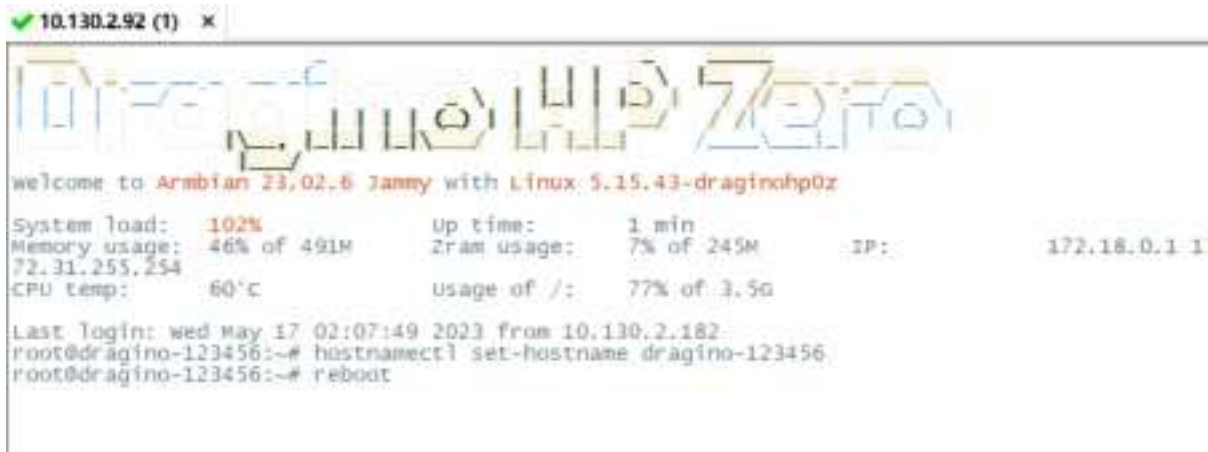


## 8. FAQ

### 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**



```
10.130.2.92 (1) x
welcome to Armbian 23.02.6 Jammy with Linux 5.15.43-draginohp0z
System load: 102%      Up time: 1 min
Memory usage: 46% of 491M  Zram usage: 7% of 245M      IP: 172.18.0.1
72.31.255.254
CPU temp: 60°C        usage of /: 77% of 3.5G
Last login: wed may 17 02:07:49 2023 from 10.130.2.182
root@dragino-123456:~# hostnamectl set-hostname dragino-123456
root@dragino-123456:~# reboot
```

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.

The screenshot displays the 'System General' configuration page of the DRAGNO LoRaWAN Gateway. The interface includes a top navigation bar with tabs for 'LoRa', 'LoRaWAN', 'Network', 'System', 'Server', 'Logback', 'Home', and 'Logout'. The 'System' tab is active, and a dropdown menu is open, showing options: 'System Overview', 'General' (highlighted), 'Back Up / Restore Config', 'Reboot / Reset', 'RemoteIt', and 'Package Management'. The 'General' section contains the following settings:

- System Password:** Fields for 'Password' and 'Password (admin)', each with a 'Set' button.
- TimeZone:** A dropdown menu currently set to 'UTC' with a 'Set Timezone' button.
- HTTP Web Service:** 'Enable HTTP Service' is checked. 'Set HTTP Port' is 80, with a 'Set HTTP Service' button.
- Terminal Service:** 'Enable SSH service' is checked. 'Set SSH Port' is 22, with a 'Set SSH Service' button.
- FallBack Service:** 'Enable FallBack service' is checked. 'Set FallBack Address' is 172.31.255.254, with a 'Set FallBack Service' button.
- Keep Alive:** 'Network Check Time' is 15, with a 'Set Check Time' button. This section is highlighted with a red box.

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

**LoRa Configur**

Debug Level: Low

**Radio Settings**

Stat Package Period (sec): 30

Frequency Plan: EU863 Europe 863-870

**Static GPS coordinates ?**

Enable Static GPS: ☐

Latitude: 22.780900

Altitude (m): 450

Longitude: 114.248000

Current Mode: LoRaWAN Semtech UDP

Save&Apply Disable Cancel

3. Disable the auto-update:

**Package Management**

**General Settings**

Enable update every boot: ☒

Enable update every day midnight: ☒

SAVE

**Core Packages**

Name	Current Version
dragino-httpd :	2023-04-07
dragino-ui :	2023-07-16
dragino-fwd :	2023-04-07
dragino-ups :	2023-06-30
dragino-fallback :	23.01.05
ambian-bsp-cli-draginohp0z :	23.02.16
linux-image-current-draginohp0z :	22.05.2

Manual Update

**Package Auto-Update Log**

## 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=nrftlkd1h8en6j07vzbhbj9ui&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









```

root@w700-24d12d:~# cat /var/log/qm1log.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 = qm1_wwan, driver version = 5.15.43-m700
[10-16_03:17:10:222] Modem works in qm1 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_03:17:11:156] File:q1_raw_ip_mode_check Line:136 udhcpc fail to get ip address, try next:
[10-16_03:17:11:156] ifconfig wwan0 down
[10-16_03:17:11:156] echo Y > /sys/class/net/wwan0/qm1/raw_ip
[10-16_03:17:11:156] ifconfig wwan0 up
[10-16_03:17:11:156] busybox udhcpc -f -n -q -t 5 -i wwan0
[10-16_03:17:11:156] requestQueryDataCall IPv4ConnectionStatus: DISCONNECTED
[10-16_03:17:11:156] ifconfig wwan0 0.0.0.0
[10-16_03:17:11:156] ifconfig wwan0 down
[10-16_03:17:11:156] requestRegistrationState2 MCC: 0, MNC: 0, PS: Detached, DataCap: UNKNOWN
[10-16_03:17:11:156] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOWN
[10-16_03:17:11:156] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOWN
[10-16_03:17:11:156] qm1wwanThread exit
[10-16_03:17:11:156] qm1_main exit
[10-16_03:17:11:156] Find /sys/bus/usb/devices/2-1 idvendor=0x2c7c idProduct=0x125, bus=0x002, dev=0x002
[10-16_03:17:11:156] Auto find qmichannel = /dev/cdc-wdm0
[10-16_03:17:11:156] Auto find usbnet_adapter = wwan0
[10-16_03:17:11:156] netcard driver = qm1_wwan, driver version = 5.15.43-m700
[10-16_03:17:11:156] Modem works in qm1 mode
[10-16_03:17:11:156] cdc_wdm_fd = 8
[10-16_03:17:11:156] Get clientWDS = 20
[10-16_03:17:11:156] Get clientDMS = 1
[10-16_03:17:11:156] Get clientNAS = 4
[10-16_03:17:11:156] Get clientUIM = 1
[10-16_03:17:11:156] Get clientWDA = 1
[10-16_03:17:11:156] requestBaseBandVersion EC25EFAR06A16M4G
[10-16_03:17:11:156] requestGetSIMStatus SIMStatus: SIM_ABSENT
[10-16_03:17:11:156] requestSetProfile[1] 3gnet///0
[10-16_03:17:11:156] requestGetProfile[1] 3gnet///0
[10-16_03:17:11:156] requestRegistrationState2 MCC: 460, MNC: 0, PS: Detached, DataCap: UNKNOWN
[10-16_03:17:11:156] requestQueryDataCall IPv4ConnectionStatus: DISCONNECTED
[10-16_03:17:11:156] ifconfig wwan0 0.0.0.0
[10-16_03:17:11:156] ifconfig wwan0 down
[10-16_03:17:11:156] qm1wwanThread exit
[10-16_03:17:11:156] qm1_main exit

```

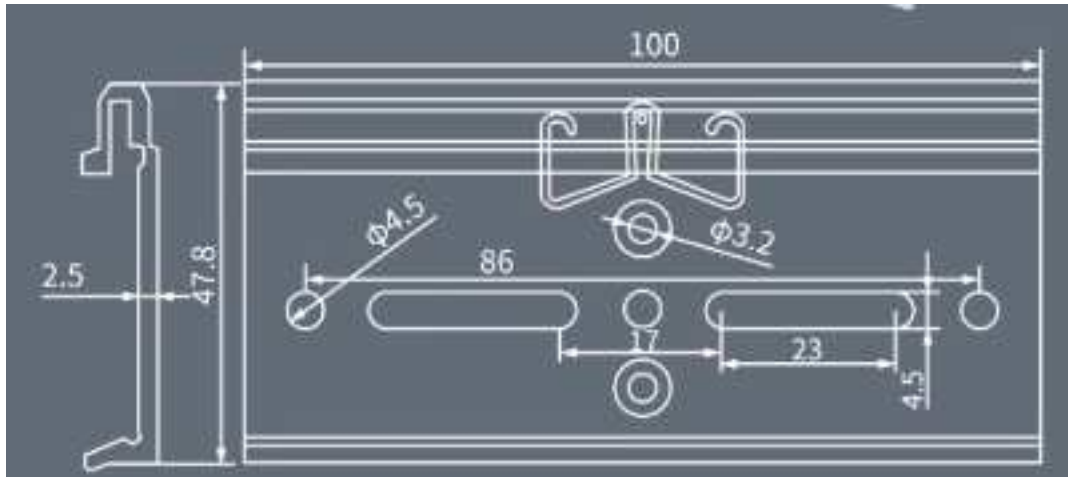
### 8.6.3 Dmesg Log

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











## 9. Trouble Shooting

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

#### Login failed

There was an error causing the login to fail. This might be due to server-side misconfiguration or a browser-cookie problem. Please try logging in again. If the error persists, please contact an administrator. We're sorry for the inconvenience.


[< Back to login](#)

Error ID: `error:pkg/web/oauthclient:exchange`

Correlation ID: `853ff830a8f84d578d6290ebdc658b4b`

#### ▼ [Technical details](#)

```
{
  "code": 7,
  "message": "error:pkg/web/oauthclient:exchange (token exchange refused)",
  "details": [
    {
      "@type": "type.googleapis.com/ttn.lorawan.v3.ErrorDetails",
      "namespace": "pkg/web/oauthclient",
      "name": "exchange",
      "message_format": "token exchange refused",
      "correlation_id": "853ff830a8f84d578d6290ebdc658b4b",
      "cause": {
        "namespace": "pkg/errors",
        "name": "request",
        "message_format": "request to `{url}` failed",
        "attributes": {
          "op": "Post",
          "url": "http://dragino-9d65cd:8080/oauth/token"
        }
      }
    }
  ]
}
```

 [Copy to clipboard](#)

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.**



Type	Name	Status	URL	
LoRaWAN-Server	TTN-Stack	Running	<a href="http://10.130.2.22:8080/console">http://10.130.2.22:8080/console</a>	<a href="#">Update URL</a> <a href="#">Restart TTN</a>
Application-Server	Node-Red	Running	<a href="http://dragino-3c1a151880">http://dragino-3c1a151880</a>	<a href="#">Restart NodeRed</a>

## 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.



Type	Name	Status	URL	
LoRaWAN-Server	TTN-Stack	Not Running	<a href="http://dragino-123456:8080/console">http://dragino-123456:8080/console</a>	<a href="#">Update To ETH</a> <a href="#">Update To WLAN</a> <a href="#">Update To DEFAULT</a> <a href="#">Restart THE TTN</a>
Application-Server	Node-Red	Running	<a href="http://dragino-2407f1680">http://dragino-2407f1680</a>	<a href="#">Restart NodeRed</a>

## 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.



```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Wireless LAN adapter 本地连接* 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::7ca6:f39d:bfee:5b71%5
IPv4 Address. . . . . : 172.31.255.253
Subnet Mask . . . . . : 255.255.255.252
Default Gateway . . . . . :
Wireless LAN adapter WLAN:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::d477:393b:a910:d30b%14
IPv4 Address. . . . . : 10.130.2.141
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.130.2.1
Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
C:\Users\Administrator>ipconfig
```

```
C:\Users\Administrator>ping 172.31.255.254

Pinging 172.31.255.254 with 32 bytes of data:
Reply from 172.31.255.254: bytes=32 time=1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64
Reply from 172.31.255.254: bytes=32 time<1ms TTL=64

Ping statistics for 172.31.255.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Users\Administrator>
```

## 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.

The screenshot shows the Dragino web interface. At the top is a navigation bar with the Dragino logo and links for LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The main content area is titled 'Package Management' and contains two sections: 'General Settings' and 'Core Packages'.

**General Settings**

Enable update every boot ☒  
Enable update every day midnight ☒ SAVE

**Core Packages**

Name	Current Version
dragino-httpd :	2023-04-07
dragino-ui :	2023-05-24
draginoofd :	2023-04-07
draginoops :	2023-05-24
dragino-fallback :	23.01.05
armbian-bsp-cli-draginohp0z :	23.02.16
linux-image-current-draginohp0z :	22.05.2

Manual\_Update

**Package Auto-Update Log**

```
-----
2023-05-26 01:01
installed dragino-ui

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Reading package lists...
Building dependency tree...
Reading state information...
The following packages will be upgraded:
  dragino-ui
1 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
Need to get 1,796 kB of archives.
After this operation, 0 B of additional disk space will be used.
Get:1 http://repo.dragino.com jessy/main armhf dragino-ui all 2023-05-24 [1,796 kB]
debconf: unable to initialize frontend: Dialog
```

## 9.5 Why the LPS8V2's Access Point does 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](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](http://repo.dragino.com/release/hp0c-packages/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](mailto: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.