
LPS8v2 LoRaWAN Indoor Gateway User Manual

last modified by Xiaoling

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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 *The Things Network* local LoRaWAN server
- Built-in *Node-Red* local Application server

1.4 Block Diagram

1.5 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.

1.6 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.

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.

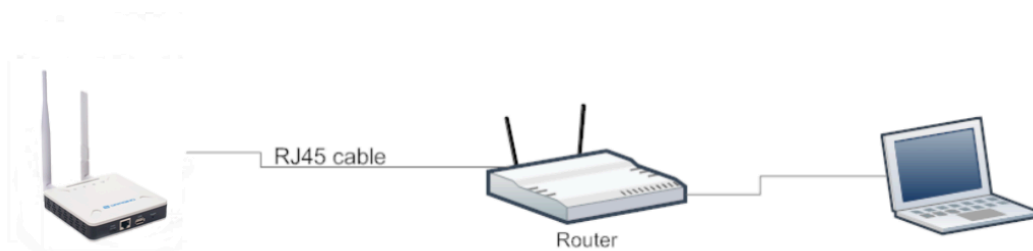
2.1 Connects to the network and accesses the gateway Web UI

2.1.1 connect the network

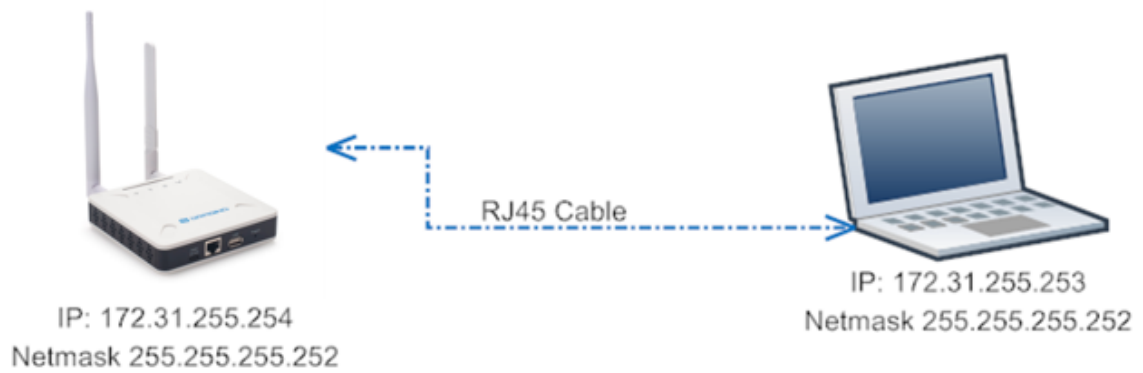
Method 1: Connect via Ethernet with DHCP IP from the router

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 2: Connect via LPS8-V2 Fallback IP



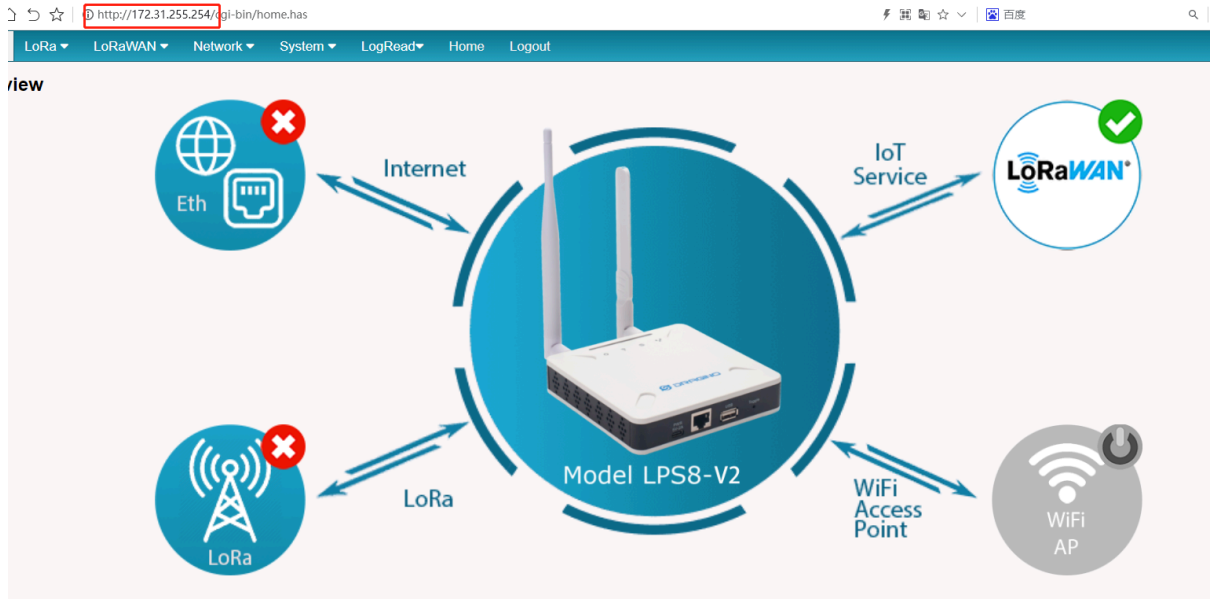
Steps to connect via fallback IP:

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

As in the below photo:



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



Method 3: Connect via WiFi with DHCP IP from the router



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

The screenshot shows the DRAGINO web interface. The top navigation bar includes the DRAGINO logo and menu items: LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The main content area is titled "WiFi" and contains "WiFi WAN Client Settings".

- The "Enable WiFi WAN Client" checkbox is checked and highlighted with a red box labeled "1".
- The "Host WiFi SSID" section contains a "Host-SSID" input field and a "Passphrase" input field, both highlighted with a red box labeled "2". A "Show" button is next to the passphrase field.
- The "Save&Apply" button is highlighted with a red box labeled "3".
- A "Cancel" button is located next to the "Save&Apply" button.
- A "WiFi Survey" link and a "Choose WiFi SSID..." dropdown menu are also visible.
- A "Wi-Fi" dropdown menu is open, showing options for "Network Status" and "Firewall".

Wi-Fi configuration successful

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

WiFi

WiFi WAN Client Settings

Enable WiFi WAN Client

Host WiFi SSID WiFi Survey

Passphrase [Show](#)

[2K Device 'wlan0' successfully activated with '65c55b4a-774c-4522-a072-9981126db405'.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

System Overview

The diagram illustrates the system overview for the Model LPS8-V2 router. It is connected to several services: WiFi, Eth, LoRa, IoT Service, and WiFi Access Point. Each connection is represented by a circular icon with a double-headed arrow pointing to the central router. The WiFi, Eth, LoRa, and IoT Service icons have a green checkmark, indicating they are active. The WiFi Access Point icon is greyed out and has a power button icon, indicating it is not active.

WiFi Internet	
SSID:	PDCN
IP Addr:	192.168.123.55
Tx Bytes:	4.4KB
Rx Bytes:	780.6KB
Signal:	signal:-17dBm
Bit Rate:	rxbitrate:135.0MB/s txbitrate:135.0MB/s

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)

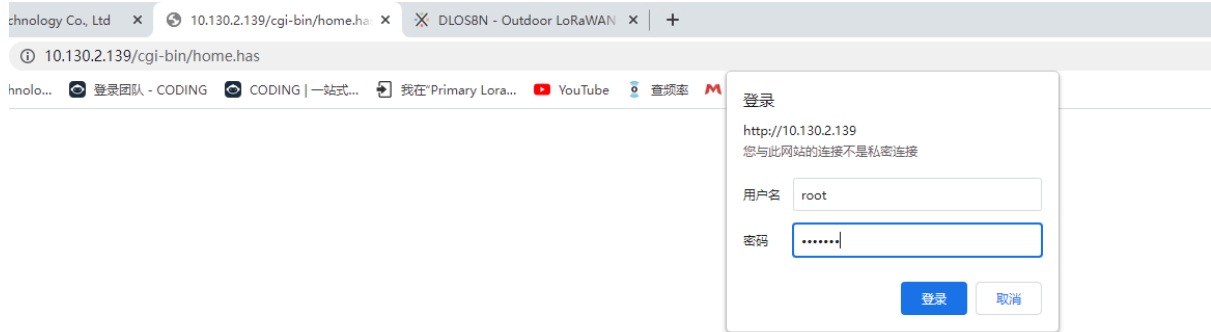
http://IP_ADDRESS or <http://172.31.255.254>(Fallback IP)

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

2.2.1 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.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

LoRa Configura LoRa

Debug Level

Radio Settings

Keep Alive Period (sec)

Frequency Plan

- EU868 Europe 868Mhz (863-870)
- 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

Static GPS coordinates ?

Enable Static GPS

Latitude

Longitude

Current Mode: LoRaWAN Semtec

2.2.2 Get the only gateway EUI

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

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

LoRaWAN Configuratio LoRaWAN Semtech UDP

LoRaWAN Basic Station

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

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 Server Address
Uplink Port Downlink Port
Primary Packet Filter
Fport Filter DevAddr Filter

2.2.3 Register the gateway to The Things Network

Login to The Things Network

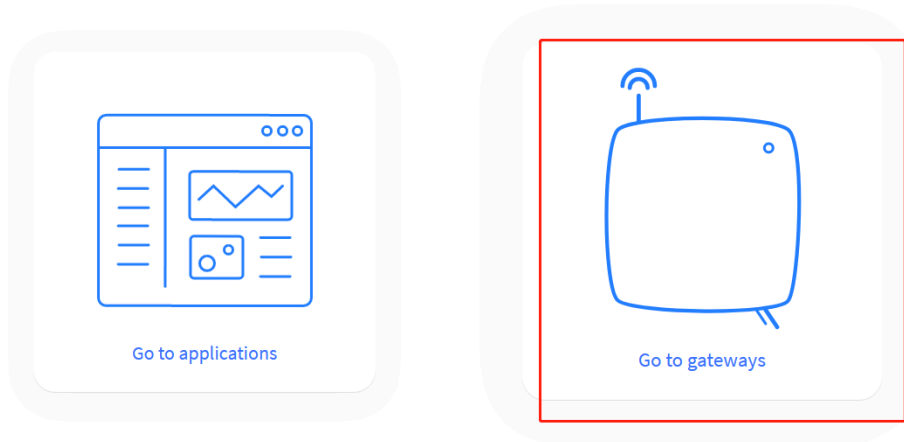
<https://console.cloud.thethings.network/>

Add the gateway

Welcome back, xiaoye0! 🙌

Walk right through to your applications and/or gateways.

Need help? Have a look at our [Documentation](#) or [Get support](#).



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](#)


LoRa ▾
LoRaWAN ▾
Network ▾
System ▾
LogRead ▾
Home
Logout

LoRa Configuration

Debug Level

Radio Settings
 Keep Alive Period (sec)
 Frequency Plan

Static GPS coordinates ?
 Enable Static GPS
 Latitude

Current Mode: **LoRaWAN Semtec**


- EU868 Europe 868Mhz (863~870)
- 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.

 [LoRa](#) [LoRaWAN](#) [Network](#) [System](#) [LogRead](#) [Home](#) [Logout](#)

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.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

LoRaWAN -- Basic Station

General Settings

Email

Gateway ID Restore ?

Primary LoRaWAN Server

Service Provider

Server URI

Sever CUPS

CUPS trust Not Found CA certificate, User can clicking DEFAULTde CERTIFICATE to install certificate

Current Mode: LoRaWAN Semtech UDP Click Save & Apply will change to mode: LoRaWAN Basic Station

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

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

WiFi

WiFi WAN Client Settings

Enable WiFi WAN Client

Host WiFi SSID WiFi Survey

Passphrase

3.4.2 Network --> System Status



System Status

Network / WiFi Status

```
eth0: connected to Wired connection 1
"eth0"
ethernet (dwmac-sun8i), 02:81:8F: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:e26b:9039/64
route6 fe80::/64 metric 1024

br-af3e3e44fb1b: connected (externally) to br-af3e3e44fb1b
"br-af3e3e44fb1b"
bridge, 02:42:25:DE: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:EE:06:DB:1C, sw, mtu 1500
inet4 172.17.0.1/16
route4 172.17.0.0/16 metric 0

wlan0: disconnected
"Ralink MT7601U"
wifi (mt7601u), 30:7B:C9:51:C3:4A, hw, mtu 1500

veth632a869: unmanaged
"veth632a869"
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
```

Refresh

3.4.3 Network --> Network

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

DRAGINO LoRa ▼ LoRaWAN ▼ Network ▼ System ▼ LogRead ▼ Home Logout

Network

Ethernet WAN Settings

Mode

IP Address Gateway

Netmask DNS

3.4.4 Network --> Cellular

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

Note: APN cannot be empty.

DRAGINO LoRa ▼ LoRaWAN ▼ Network ▼ System ▼ LogRead ▼ Home Logout

Cellular Settings

Enable Cellular WAN

APN

Service

Dial Number

Pincode

Username

Password

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

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

System Overview

The diagram illustrates the system overview for the Model LPS8-V2 router. The router is centrally located and connected to four main components: Internet, IoT Service, LoRa, and WiFi Access Point. Each connection is represented by a double-headed arrow. The Internet, IoT Service, and LoRa connections are shown with green checkmarks, indicating they are active. The WiFi Access Point connection is shown with a power icon, indicating it is not active. A 'Cellular Internet' status window is open in the bottom left corner, displaying the following information:

Cellular Internet	
IP Addr:	10.192.2.199
TX Bytes:	(4.8MB)
RX Bytes:	(771.5KB)
SIM:	READY
Network:	"CHN-UNICOM"
Signal:	28.99 -57 dBm
IMEI:	860548046075948
Internet:	OK

3.5 System

3.5.1 System --> System Overview

Shows the system info:

System Overview

Device Model: LPS8V2
Hostname: dragino-1ab428
Firmware: lgw-5.4.1661909863
Build Time: Build Wed 31 Aug 2022 09:37:43 AM CST
FWD version: Release:2022-09-05 15:34:27, Version:2.0.6
Cellular : Not Detected
System Time: Sat Sep 17 05:50:31 UTC 2022
Uptime: 6 days
Load Avg: 22, load average
Memory: Free Memory: 18200 / Total Memory: 60192kB
IoT Service: lorawan
ETH0 MAC: A8:40:41:1A:B4:2B
ETH1 MAC: A8:40:41:1A:B4:2A
WiFi MAC: AA:40:41:1A:B4:28

Internet Connection OK



LoRaWAN Connection OK



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.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

System General

System Password

Password Hide Login: root

TimeZone

Timezone

HTTP Web Service

Enable HTTP Service

Set HTTP Port

Terminal Service

Enable SSH service

Set SSH Port

FallBack Service

Enable FallBack service

Set FallBack Address

3.5.3 System --> Backup/Restore

DRAGINO LoRa LoRaWAN MQTT TCP Custom Network System LogRead Home Logout

Backup/Restore

Click "Generate archive" to download a tar archive of the current configuration files."

Download backup: [Download Backup File](#)

To restore configuration files, you can upload a previously generated backup archive here.

Restore backup: 未选择任何文件

3.5.4 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](#)

The screenshot shows the DRAGINO web interface. At the top, a navigation bar contains the DRAGINO logo and several menu items: LoRa, LoRaWAN, Network, System, LogRead, Home, and Logout. The 'System' menu is currently open, displaying a list of options: System Overview, Back Up / Restore Config, Reboot / Reset, Remoteit (highlighted in red), Built-in Server, and Package Management. Below the navigation bar, the 'Remote.it' configuration page is visible. It features three main sections: 1. Install Remote.it with an 'Install' button; 2. Register, which includes a text input field for 'Bulk ID Code / Licence Key', 'Save', and 'Register' buttons; 3. Remove, with a 'Remove' button and a note: 'To change registration, please Remove and Install again.' A 'Status' section at the bottom shows two red error messages: 'Remoteit is not installed' and 'Device is not registered', along with a 'Refresh' button.

3.5.5 System --> Package Management

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

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

Package Management

General Settings

Enable update every boot
Enable update every day midnight SAVE

Core Packages

Name	Current Version
dragino-httpd :	2022-12-02
dragino-ui :	2023-02-06
draginofwd :	2022-10-23
draginoups :	2023-01-06
dragino-fallback :	23.01.05
ambian-bsp-cli-draginohp0z :	22.05.2

Manual_Update

Package Auto-Update Log

4. Build-in Server

The default factory version of LPS8-V2 is installed with the built-in Applicant server: [Node-Red](#), and LoRaWAN Server: [The Things Network - Stack \(Open Source 3.19 Version\)](#).

DRAGINO			
LoRa ▾ LoRaWAN ▾ Network ▾ System ▾ LogRead ▾ Home Logout			
Built-in Server			
Type	Name	Status	URL
LoRaWAN-Server	TTN-Stack	Running	http://dragino-240057:8080/console
	<input type="button" value="Update To ETH"/> <input type="button" value="Update To WLAN"/> <input type="button" value="Update To DEFAULT"/> <input type="button" value="Restart THE TTN"/>		
Application-Server	Node-Red	Running	http://dragino-240057:1880 <input type="button" value="Restart NodeRed"/>

Note:

Path: System --> Built-in Server

Troubleshooting:

1. URL does not jump properly

For the ttn-stack, you can click the update the URL which will update the configuration where change the hostname to the current local IP address as the URL.

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

4.1 LoRaWAN Network Server -- The Things Network - Stack (TTN-V3)

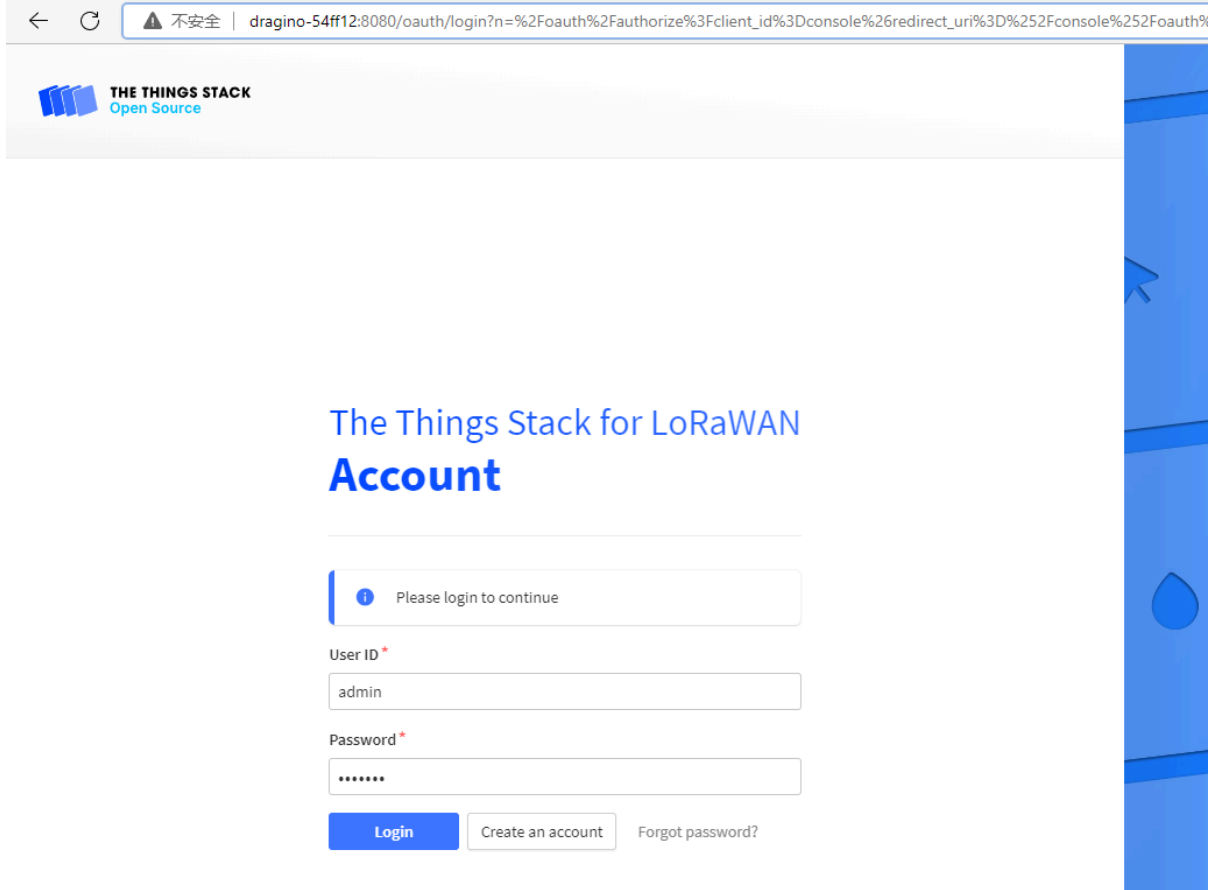
You can access the gateway's built-in LNS server of **The Things Network - Stack** via the URL(<http://<hostname>:8080> or <http://<local-IPV4-address>>) in your browser.

Such as <http://dragino-54ff12:8080> or <http://<Local-IPV4-Address>>

Login account:

User ID: **admin**

Password: **dragino**



4.1.1 The LPS8-V2 is registered and connected to Built-in The Things Network

Users need to set the Service Provider to **Local Host/Build-in Server** and click "Save&Apply"

The registration steps are basically similar to [LPS8-V2 is registered and connected to The Things Network](#)

DRAGINO
LoRa ▾
LoRaWAN ▾
Network ▾
System ▾
LogRead ▾
Home
Logout

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 Downlink Port

Uplink Port

Secondary Packet Filter

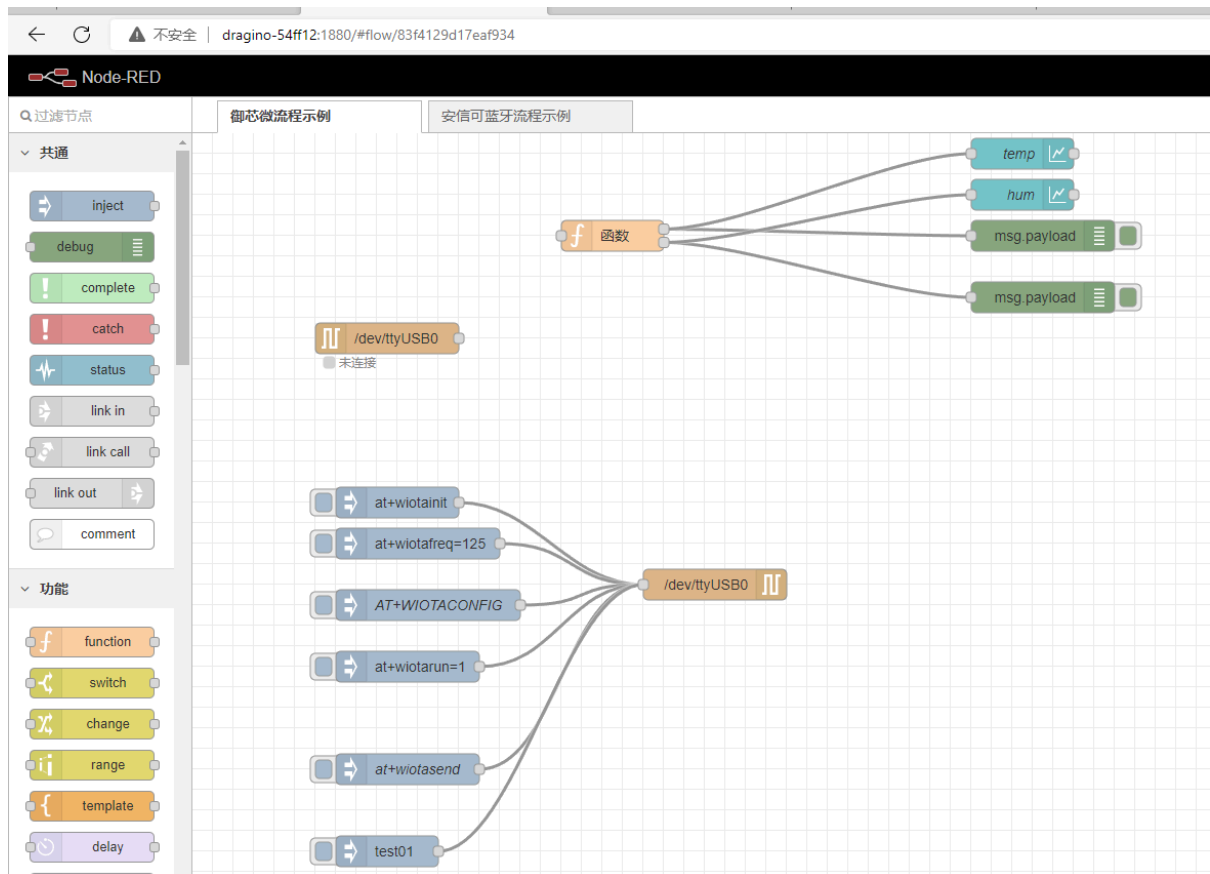
Fport Filter DevAddr Filter

Current Mode: LoRaWAN Semtech UDP

4.2 Application Server -- Node-Red

You can access the gateway's built-in AS server of **Node-Red** via the URL (<http://<hostname>:1880> or <http://<local-IPV4-address>>) in your browser.

Such as <http://dragino-54ff12:1880> or <http://<Local-IPV4-Address>>



Using Node-Red, InfluxDB and Grafana

The LPS8-V2 supports this combination, the default, Node-red is pre-installed but the InfluxDB and Grafana is not pre-installed.

the users can refer to this link to install them.

<http://wiki.dragino.com/xwiki/bin/view/Main/Armbian%20OS%20instruction/#H2.6HowtoinstallGrafanaandinfluxdb>

4.3 How to disable the built-in server

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

start

```
systemctl start ttntstack
```

stop

```
systemctl stop ttntstack
```

enable

```
systemctl enable ttntstack
```

#disable

```
systemctl disable ttntstack
```

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
```

4.4 How to use ChirpStack on LPS8-V2

By default, the built-in LoRaWAN network server used on LPS8v2 is TTNv3, so users need to disable TTNv3 services and follow this link to install chirpstack:

[ChirpStack open-source LoRaWAN® Network Server documentation](#)

```
root@dragino-2d5d26:~#  
root@dragino-2d5d26:~#  
root@dragino-2d5d26:~# systemctl stop ttntstack  
root@dragino-2d5d26:~# systemctl disable ttntstack  
Removed /etc/systemd/system/multi-user.target.wants/ttntstack.service.  
root@dragino-2d5d26:~#  
root@dragino-2d5d26:~#  
root@dragino-2d5d26:~#
```

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

USB TTL to LPS8-V2 Connection:

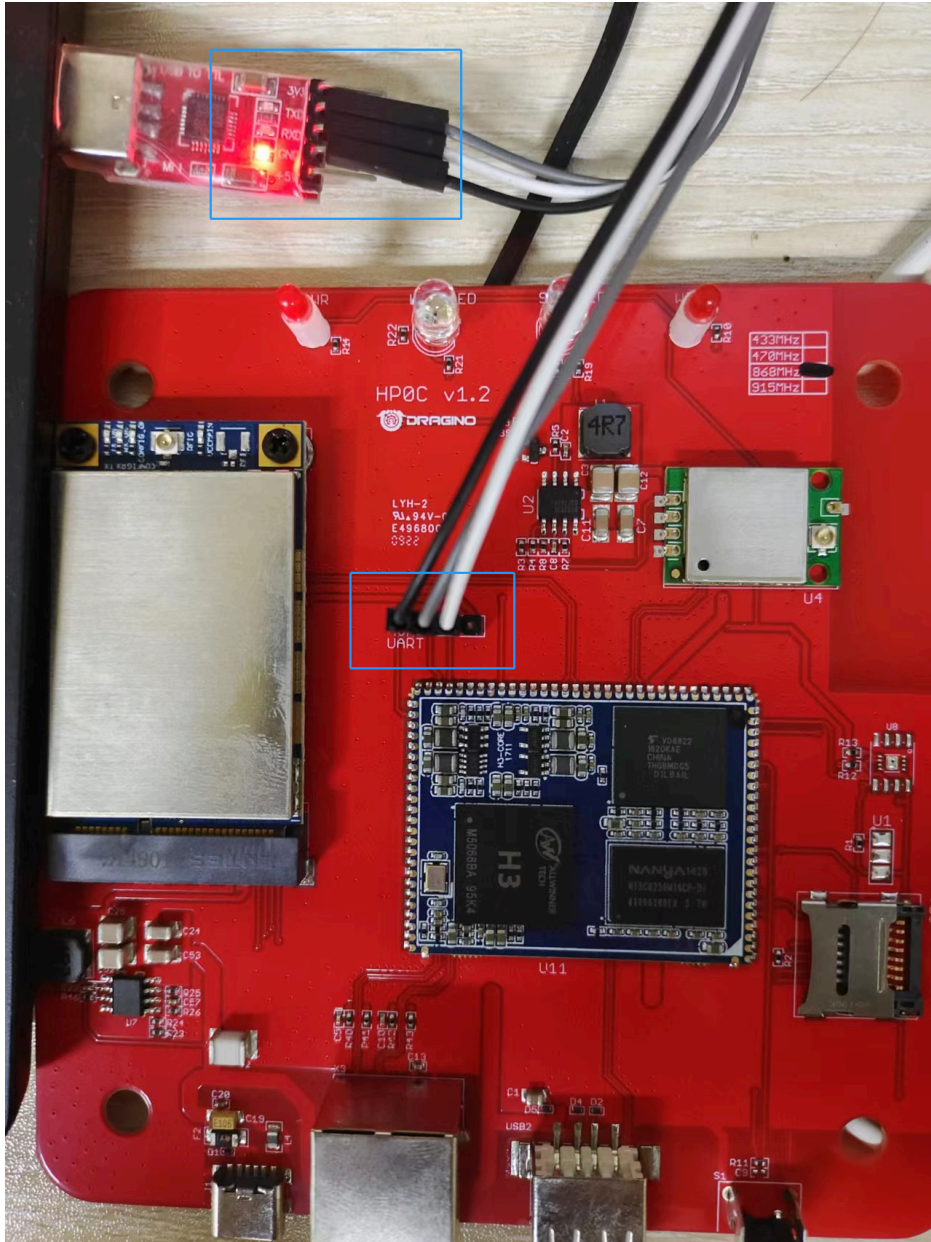
Port 1 of the UART on the LPS8-V2 is GND

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

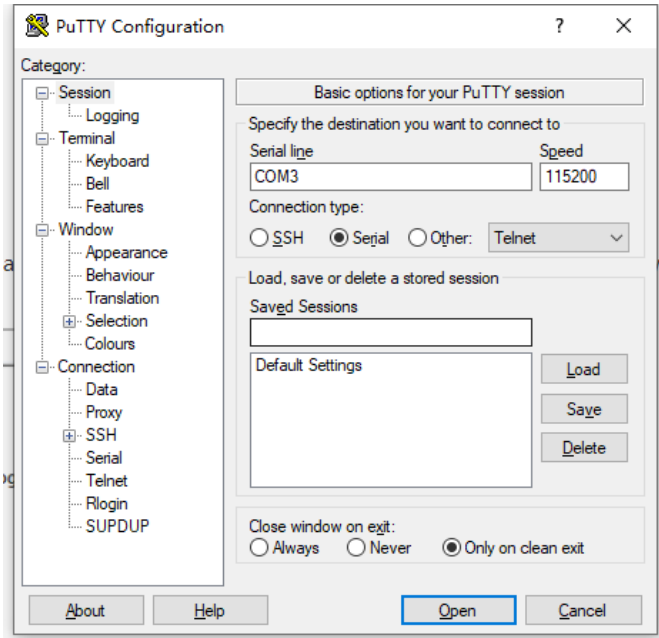
RXD <---> UART TXD (White line)

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:



```
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 mainline kernel configuration
```

6. Use the helium gateway-rs as the Data-only Hotspot

Step 1: Configure Frequency Band

Each country has a requirement for frequency region. Choose the right one for your area.

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

LoRa Configura LoRa

Debug Level

Radio Settings

Keep Alive Period (sec)
Frequency Plan
Frequency Sub Band

Static GPS coordinates ?

Enable Static GPS Altitude (m)
Latitude Longitude

Current Mode: LoRaWAN Semtech UDP

Step 2: Configure the forward address

Select one of the servers to configure.

For example:

DRAGINO LoRa LoRaWAN Network System LogRead Home Logout

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 Server Address

Uplink Port Downlink Port

Secondary Packet Filter

Fport Filter ? DevAddr Filter ?

Current Mode: **LoRaWAN Semtech UDP**

Step 3: Download and Install the Helium-gateway-rs

Access the gateway CLI via SSH.

```

Dragino HP Zero
Welcome to Armbian 22.05.2 Jammy with Linux 5.15.43-sunxi
system load: 6%          up time: 6:48
Memory usage: 44% of 491M  IP: 172.18.0.1 172.17.0.1 10.130.2.23
CPU temp: 40°C          Usage of /: 72% of 3.5G
[ 21 security updates available, 51 updates total: apt upgrade ]
Last check: 2022-09-05 02:04
Last login: Mon Sep  5 07:23:25 2022 from 10.130.2.182
root@dragino-3e1a15:~#
root@dragino-3e1a15:~#

```

Download gateway-rs.

```

Dragino HP Zero
Welcome to Armbian 22.05.2 Jammy with Linux 5.15.43-sunxi

System load: 11%      Up time: 6:51      Local users: 2
Memory usage: 45% of 491M  IP: 172.18.0.1 172.17.0.1 10.130.2.23
CPU temp: 39°C      Usage of /: 72% of 3.5G

[ 21 security updates available, 51 updates total: apt upgrade ]
Last check: 2022-09-05 02:04

Last login: Mon Sep  5 08:55:48 2022 from 10.130.2.182
root@dragino-3e1a15:~# wget http://repo.dragino.com/release/tool/gateway-rs/helium-gateway-v1.0.0-alpha.31-raspi234.deb
--2022-09-05 08:56:24-- http://repo.dragino.com/release/tool/gateway-rs/helium-gateway-v1.0.0-alpha.31-raspi234.deb
Resolving repo.dragino.com (repo.dragino.com)... 47.89.8.92
Connecting to repo.dragino.com (repo.dragino.com)|47.89.8.92|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1038772 (1014K) [application/octet-stream]
Saving to: 'helium-gateway-v1.0.0-alpha.31-raspi234.deb'

helium-gateway-v1.0.0-alpha.31-raspi234.deb      100%[=====]
2022-09-05 08:56:25 (7.12 MB/s) - 'helium-gateway-v1.0.0-alpha.31-raspi234.deb' saved [1038772/1038772]

root@dragino-3e1a15:~#

```

Command: `wget http://repo.dragino.com/release/tool/gateway-rs/helium-gateway-v1.0.0-alpha.31-raspi234.deb`

Install gateway-rs.

```

root@dragino-adc624:~# dpkg -i helium-gateway-v1.0.0-alpha.31-raspi234.deb
Selecting previously unselected package helium_gateway.
(Reading database ... 32668 files and directories currently installed.)
Preparing to unpack helium-gateway-v1.0.0-alpha.31-raspi234.deb ...
Unpacking helium_gateway (1.0.0-alpha.31) ...
Setting up helium_gateway (1.0.0-alpha.31) ...
Created symlink /etc/systemd/system/multi-user.target.wants/helium_gateway.service → /lib/systemd/system/helium_gateway.service.
root@dragino-adc624:~#

```

Command: `dpkg -i helium-gateway-v1.0.0-alpha.31-raspi234.deb`

Modify configuration.

```

Dragino HP Zero
Welcome to Armbian 22.05.2 Jammy with Linux 5.15.43-sunxi

System load: 16%      Up time: 7:34      Local users: 2
Memory usage: 45% of 491M  IP: 172.18.0.1 172.17.0.1 10.130.2.23
CPU temp: 40°C      Usage of /: 73% of 3.5G

[ 21 security updates available, 51 updates total: apt upgrade ]
Last check: 2022-09-05 02:04

Last login: Mon Sep  5 09:31:21 2022 from 10.130.2.182
root@dragino-3e1a15:~# region=US915 \
&& sed -i '/region/d' /etc/helium_gateway/settings.toml && sed -i "1 i\region = \"\$region\"" /etc/helium_gateway/settings.toml \
&& sed -i '/region/d' /etc/helium_gateway/default.toml && sed -i "22 i\region = \"\$region\"" /etc/helium_gateway/default.toml
root@dragino-3e1a15:~#

```

```

region=<Enter regional parameters> \
&& sed -i '/region/d' /etc/helium_gateway/settings.toml && sed -i "1 i\region = \"\$region\"" /etc/helium_gateway/settings.toml \
&& sed -i '/region/d' /etc/helium_gateway/default.toml && sed -i "22 i\region = \"\$region\"" /etc/helium_gateway/default.toml

```

Restart the helium_gateway

```

Dragino HP Zero
welcome to Armbian 22.05.2 Jammy with Linux 5.15.43-sunxi

System load: 17%          Up time: 7:04          Local users: 2
Memory usage: 46% of 491M  IP: 172.18.0.1 172.17.0.1 10.130.2.23
CPU temp: 39°C          Usage of /: 72% of 3.5G

[ 21 security updates available, 51 updates total: apt upgrade ]
Last check: 2022-09-05 02:04

Last login: Mon Sep 5 09:07:06 2022 from 10.130.2.182
root@dragino-3e1a15:~# systemctl restart helium_gateway
root@dragino-3e1a15:~#

```

systemctl restart helium_gateway

Check the helium_gateway Log:

```

root@dragino-3e1a15:~# systemctl restart helium_gateway
root@dragino-3e1a15:~# journalctl -u helium_gateway -f
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: starting server, key: 13hqVwETRV6qrjyp51cu1yvpDxvzkGxaDCJfMFCX2eowbzfH, version: 1.0.0-alpha.31
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: starting, module: gateway, listen: 127.0.0.1:1680
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: starting, module: dispatcher, region: US915
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: default router, module: dispatcher, uri: http://44.238.156.97:8080/, pubkey: 11w77yQlHgUt8HUJrMtntGGr97RyXmof5Sct2ELm
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: default router, module: dispatcher, uri: http://13.37.13.24:8080/, pubkey: 11afuQsrnk52mgLU91AdtDxbJ9nmq8Uxc3hw
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: seed gateway, module: dispatcher, uri: http://13.125.32.225:8080/, pubkey: 11BgGq83rUwE8PH1mzQPyXmVd3oc
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: starting, module: updater
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: starting, listen: 127.0.0.1:4467, module: api
Sep 05 09:39:13 dragino-3e1a15 helium_gateway[29797]: new packet forwarder client: 02:81:8F:FD:FE:3E:1A:15, 127.0.0.1:35022, module: gateway
Sep 05 09:39:20 dragino-3e1a15 helium_gateway[29797]: no update found, module: updater
Sep 05 09:39:24 dragino-3e1a15 helium_gateway[29797]: selecting new gateway in 12s, module: dispatcher

```

journalctl -u helium_gateway -f

Note: if your device is not finished the onboarding, which is unable to connect to the Helium console.

where the helium gateway log is shown:

```

root@dragino-adc624:~# journalctl -u helium_gateway -f
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 10, uri: http://212.159.65.101:8080/, pubkey: 11YmZtWtPEUwMSFGxze1x9TdfGeZn7vXevLu7i1je9
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 9, uri: http://44.238.156.97:8080/, pubkey: 11w77yQlHgUt8HUJrMtntGGr97RyXmof5Sct2ELm
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 6, uri: http://185.34.141.81:8080/, pubkey: 11awcus8vURkXX3FbK7Kf6bE9R2qPzVf1TEYABML
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 4, uri: http://54.193.165.228:8080/, pubkey: 11263kvw3GzPAvag5SQtYB151b25azStsw015tza9kl
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 2, uri: http://54.176.88.149:8080/, pubkey: 1124CJ9yJahq4D6u9yPCDnsSbzq1k61CLBqD9Wih1vsUa
Sep 05 09:45:00 dragino-adc624 helium_gateway[666]: starting, oui: 1, uri: http://52.8.80.146:8080/, pubkey: 112qB3Yah5bZkcNKA5URH7TBTGNv2Y5B4smV1jsmvGUzGk
Sep 05 09:45:03 dragino-adc624 helium_gateway[666]: no update found, module: updater
Sep 05 09:45:07 dragino-adc624 helium_gateway[666]: uplink #17491062_us_868_10_mhz_ok(dataRate=SE7_bw125)), snr: -2, rssi: -124, len: 28 from 02:81:4C:F
Sep 05 09:45:07 dragino-adc624 helium_gateway[666]: ignoring failed uplink Service(Rpc(Status { code: Unknown, message: "routing_not_found", metadata: MetaData
Sep 05 09:45:07 dragino-adc624 helium_gateway[666]: ation/grpc+proto", "grpc-encoding": "identity"}), source: None })), oui: 9, uri: http://44.238.156.97:8080/, pubkey: 11w77yQlHgUt8HUJrMtntGGr97RyXmof5Sct2ELm
Sep 05 09:45:07 dragino-adc624 helium_gateway[666]: ignoring failed uplink Service(Rpc(Status { code: Unknown, message: "routing_not_found", metadata: MetaData
Sep 05 09:45:07 dragino-adc624 helium_gateway[666]: ation/grpc+proto", "grpc-encoding": "identity"}), source: None })), oui: 16, uri: http://13.37.13.24:8080/, pubkey: 11afuQsrnk52mgLU91AdtDxbJ9nmq8Uxc3hw
Sep 05 09:45:13 dragino-adc624 helium_gateway[666]: uplink #23983076_us_868_10_mhz_ok(dataRate=SE7_bw125)), snr: 3.8, rssi: -118, len: 42 from 02:81:4C:F
Sep 05 09:45:13 dragino-adc624 helium_gateway[666]: ignoring failed uplink Service(Rpc(Status { code: Unknown, message: "routing_not_found", metadata: MetaData
Sep 05 09:45:13 dragino-adc624 helium_gateway[666]: ation/grpc+proto", "grpc-encoding": "identity"}), source: None })), oui: 9, uri: http://44.238.156.97:8080/, pubkey: 11w77yQlHgUt8HUJrMtntGGr97RyXmof5Sct2ELm
Sep 05 09:45:13 dragino-adc624 helium_gateway[666]: ignoring failed uplink Service(Rpc(Status { code: Unknown, message: "routing_not_found", metadata: MetaData
Sep 05 09:45:13 dragino-adc624 helium_gateway[666]: ation/grpc+proto", "grpc-encoding": "identity"}), source: None })), oui: 16, uri: http://13.37.13.24:8080/, pubkey: 11afuQsrnk52mgLU91AdtDxbJ9nmq8Uxc3hw

```

So you have to finish the onboarding, ---Please refer to [Step 2.7](#) to onboarding your LPS8-V2.

7. OTA System Update

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

8. Trouble Shooting

8.1 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.

Built-in Server				
Type	Name	Status	URL	
LoRaWAN-Server	TTN-Stack	Running	http://10.130.2.22:8080/console	<input type="button" value="Update URL"/> <input type="button" value="Restart TTN"/>
Application-Server	Node-Red	Running	http://dragino-3e1a15:1880	<input type="button" value="Restart NodeRed"/>

9. 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.

10. Reference

- Install Tago Core: Refer **Install Tago Core in LPS8v2** in [Instruction](#).
- [Advance OS Reference Guide for LPS8v2](#).

11. 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

- **E:** EMEA, Korea, Thailand, India.
- **A:** North America/ Rogers/AT&T/T-Mobile.
- **AU:** Latin America, New Zeland, Taiwan
- **J:** Japan, DOCOMO/SoftBank/ KDDI

More info about valid bands, please see [EC25-E product page](#).

12. 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

13. 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.