HP0D Full Hotspot for Helium

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HP0D Full Hotspot for Helium User Manual

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1. Introduction

1.1 What is HP0D

The HP0D is an outdoor LoRaWAN Gateway. It lets you bridge LoRa wireless network to an IP network via WiFi,Ethernet, optional 3G or 4G. The LoRa wireless allows users to send data and reach extremely long ranges at low data rates.

HP0D has passed Helium Full Hotspot Approval. It supports the **miner feature from Helium** and has a built-in ATECC608 encryption chip. It can be used as a Helium Full Hotspot for the project. It also supports Semtech packet forwarder and LoRaWAN Station connection, it is fully compatible with LoRaWAN protocol.HP0D supports two LoRaWAN servers at the same time, **users can use HP0D for helium mining and connects max 2 x LoRaWAN servers at the same time**.

Dragino already paid HP0D $40 onboarding cost and $10 location cost for each HP0D. It is ready to use for Helium, user only needs to input HNT wallet address and use QR Code to onboarding HP0D when it arrives.

HP0D has pre-configured standard LoRaWAN frequency bands to use for different countries. Users can also customize the frequency bands to use in their own LoRaWAN network.

1.2 Specifications

Hardware System:

Linux Part:

- Raspberry Pi 4

Interface:

- 10M/100M RJ45 Ports x 1
- LoRaWAN Wireless
- Power Input: 12V 2A, DC

Operating Condition:

- Work Temperature: -20 ~ 65°C
- Storage Temperature: -20 ~ 65°C
- Power Input: 12V 2A, DC

1.3 Features

- Open-Source Linux system
- RPi4 with 2G /4G or 8G RAM
- Managed by Web GUI, SSH via Internet
- Support Semtech UDP packet forwarder
- Support LoRaWAN Station Connection
- Support Helium Miner
- External fiberglass antenna
- Firmware OTA
- 802.3af PoE
- Lighting Protection
- Remote Monitoring
- Support Helium LoRaWAN server and secondary LoRaWAN server
- Include prepaid $40 onboarding cost and $10 location cost.
- Remote.it remote management (https://wiki.dragino.com/index.php?title=Reverse_SSH_Access#Use_Remote.it_service) .

1.4 Label info and login name

Label information:
Device host name: dragino-xxxxxx
Band: US915/AU915/AS923_1-AS923_4/KR920/EU868/IN865/RU864
Miner animal name: xxx-xxx-xxx
Miner address: 112xxxxxx
Eth MAC address: A8: 40: 41: EF: FE: CD
Login: root/d59f2d5b (the root is the Login account for the Web-UI and SSH.)
SN: device serial number.

2. Quick Start & Onboarding

The HP0D is configured as a Wi-Fi Access Point by factory default. You can access and configure the HPD after connecting to its Wi-Fi network, or via its WAN Ethernet port.

2.1 Connect HP0D Web UI

2.1.1 via HP0D's Access Point

At the first boot of HP0D, it will auto generate a Wi-Fi network

called : ***HPD-dragino-xxxxxx***

with password: ***dragino+dragino***

You can use a PC to connect to this Wi-Fi network. The PC will get an IP address 10.130.1.xxx and the HP0D has the default IP 10.130.1.1

2.1.2 Connect via HP0D hostname

Connect the HP0D Ethernet port to your router and HP0D will obtain an IP address. If your PC(Windows/Mac/Ubuntu) connect the same network with the HP0D, you can access the HP0D Web-UI via HP0D's hostname.

Like: ***http://dragino-4ba54a***

2.1.3 Connect via Ethernet Port

Connect the HP0D Ethernet port to your router and HP0D will 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 HP0D.

If you get the IP address form route, like: ***10.130.2.42***, you can use this IP address to connect the WEB UI or SSH access of HP0D.

2.2 Generate QR Code

Go to **Miner** --> **QR Generate**, input your Helium Wallet Address, and click Generate.

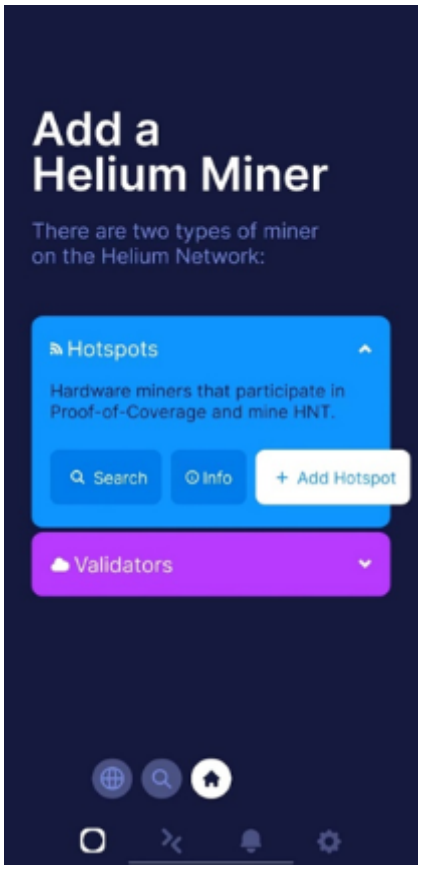
Note: After onboarding, this wallet will become owner of this hotspot.

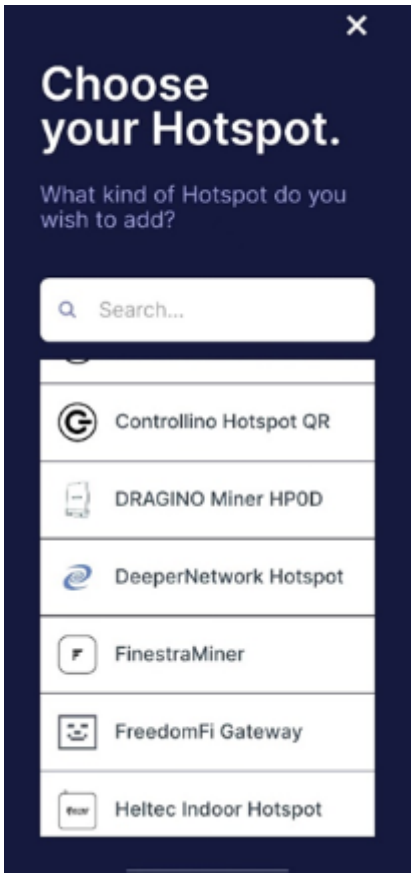
2.3 Onboarding Hotspot

1. Download the Helium Hotspot APP from the Apple or Google Play store.

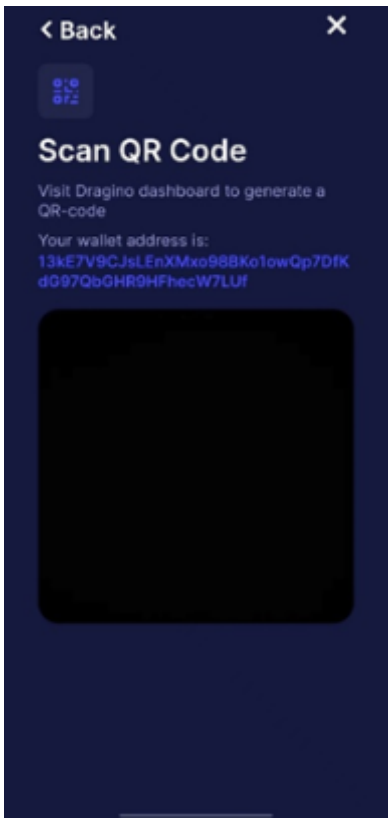
Note: the APP version need to be greater than 3.11.

2. To add a hotspot, select “Hotspot”. On this tab, click the ‘+ Add Hotspot’ in the mid where choose the ‘DRAGINO Miner HP0D’



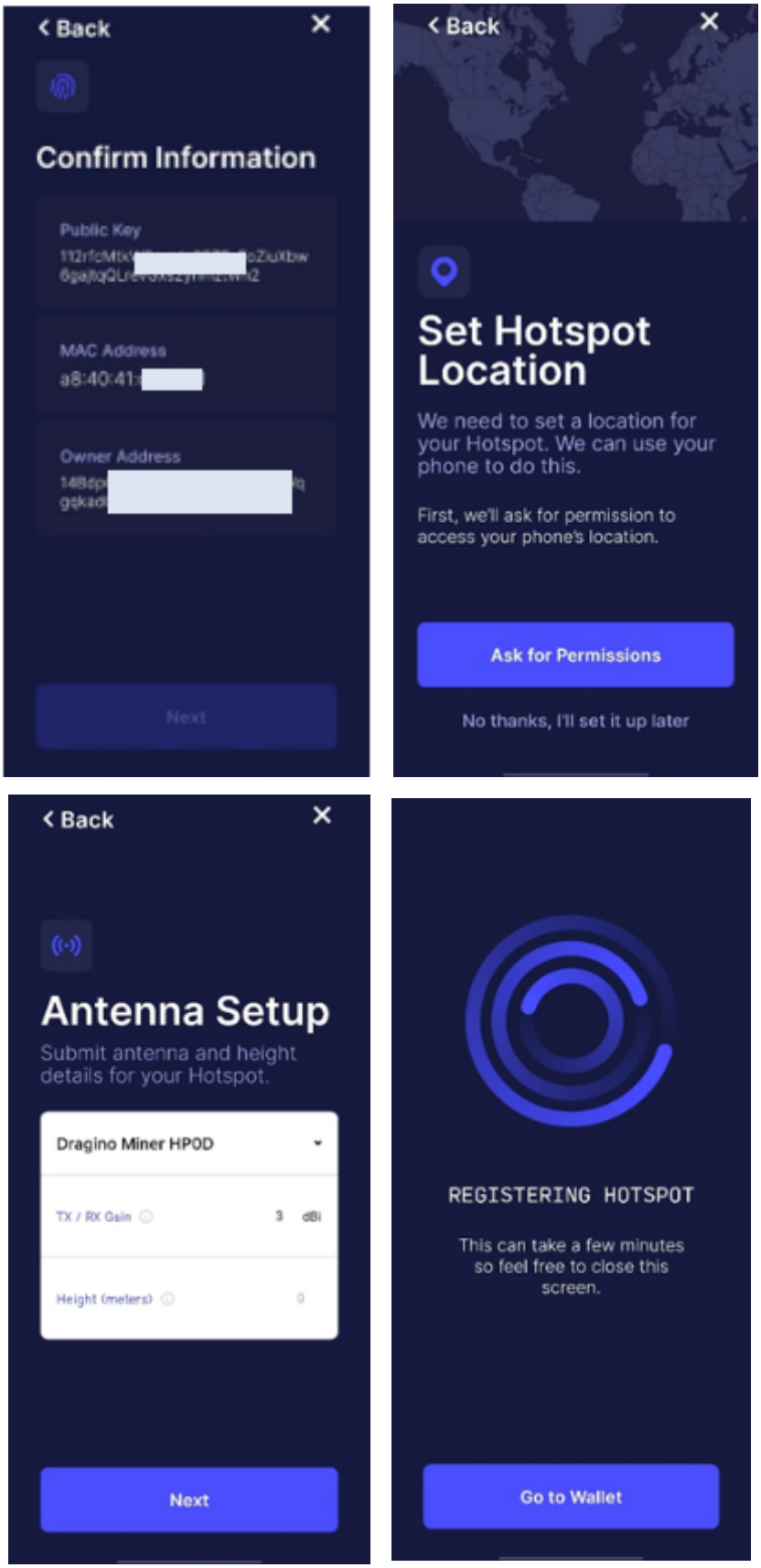


3. Scan the QR Code you generated in the previous step.



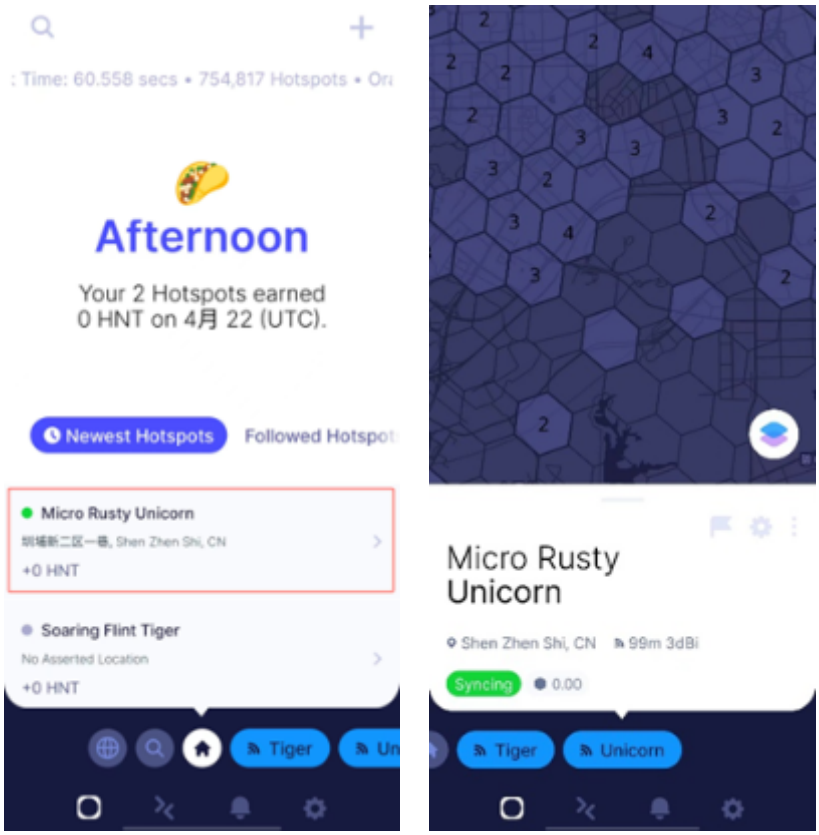
4. Onboarding your device

Mobile APP will get info from onboarding server. If MAC address doesn't appear, it means the network connection of mobile to onboarding server might have issue.



5. Check onboarding status

You can check from mobile:

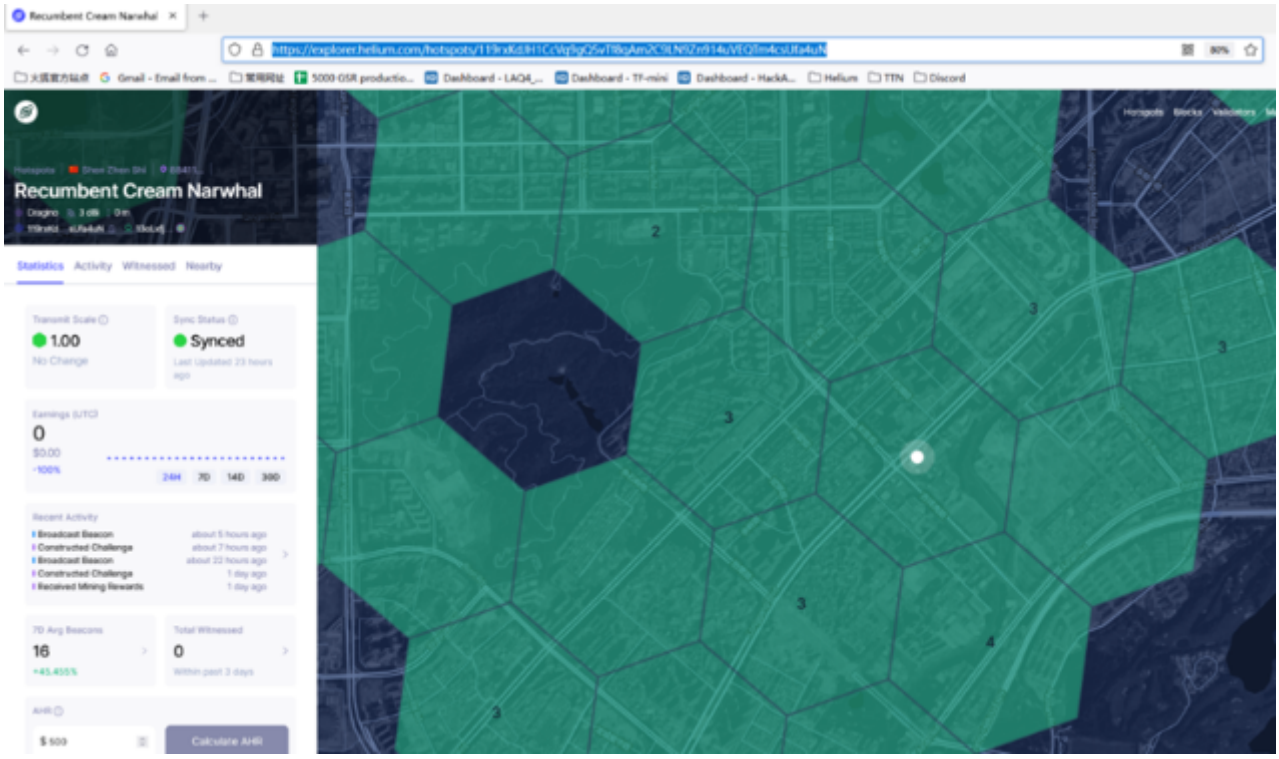


You can also see the hotspot status in below link:

https://explorer.helium.com/hotspots/***<YOUR_HOTSPORT_KEY>***

Example:

Green Synced means hotspot works normal.



2.4 Set the Port Forwarding

Helium Hotspots may not work if the Hotspot is behind a firewall or uses an incompatible NAT type. Other times it may be because of a router configuration or the internet is offline. This article aims to help resolve any issues you may have.

- **44158/TCP**: the Miner communicates to other Miners over this port. The networking logic knows how to get around a lack of forwarding here, but you will get better performance by forwarding the port
- **1680/UDP**: the radio connects to the Miner over this port. You will not be able to forward packets or participate in Proof of Coverage without this

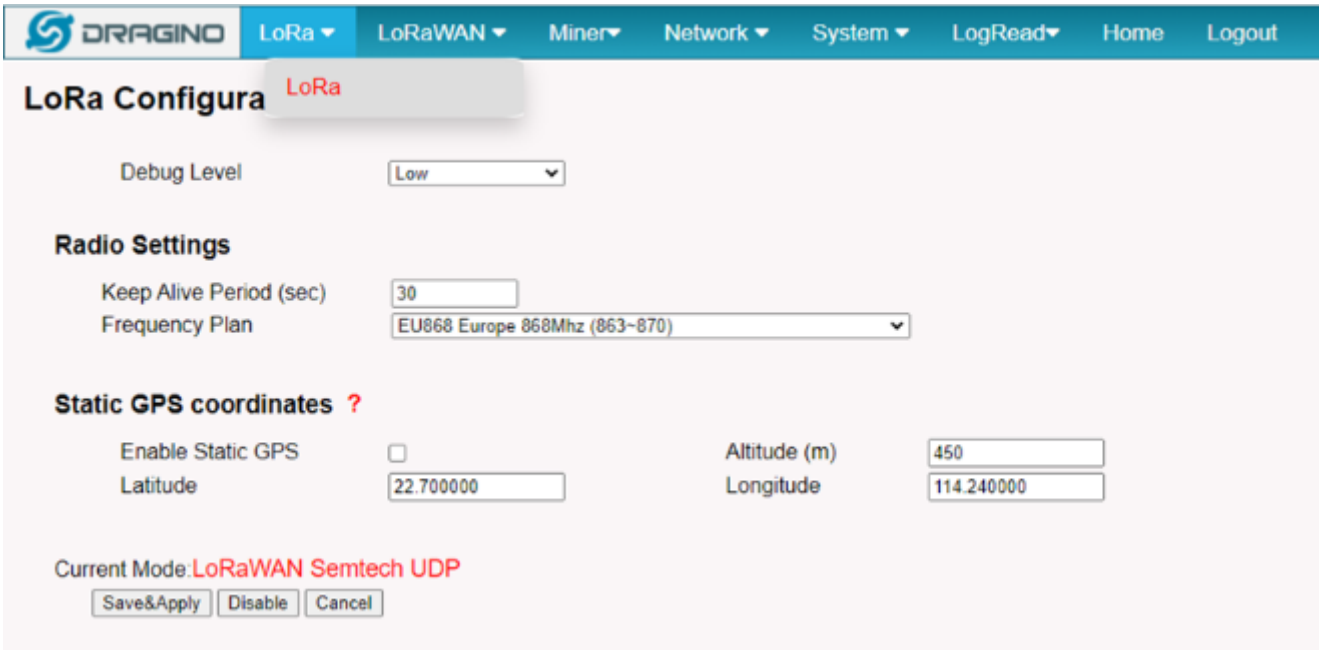
Note: Please refer to more detailed Settings

https://docs.helium.com/troubleshooting/network-troubleshooting/ (https://docs.helium.com/troubleshooting/network-troubleshooting/)

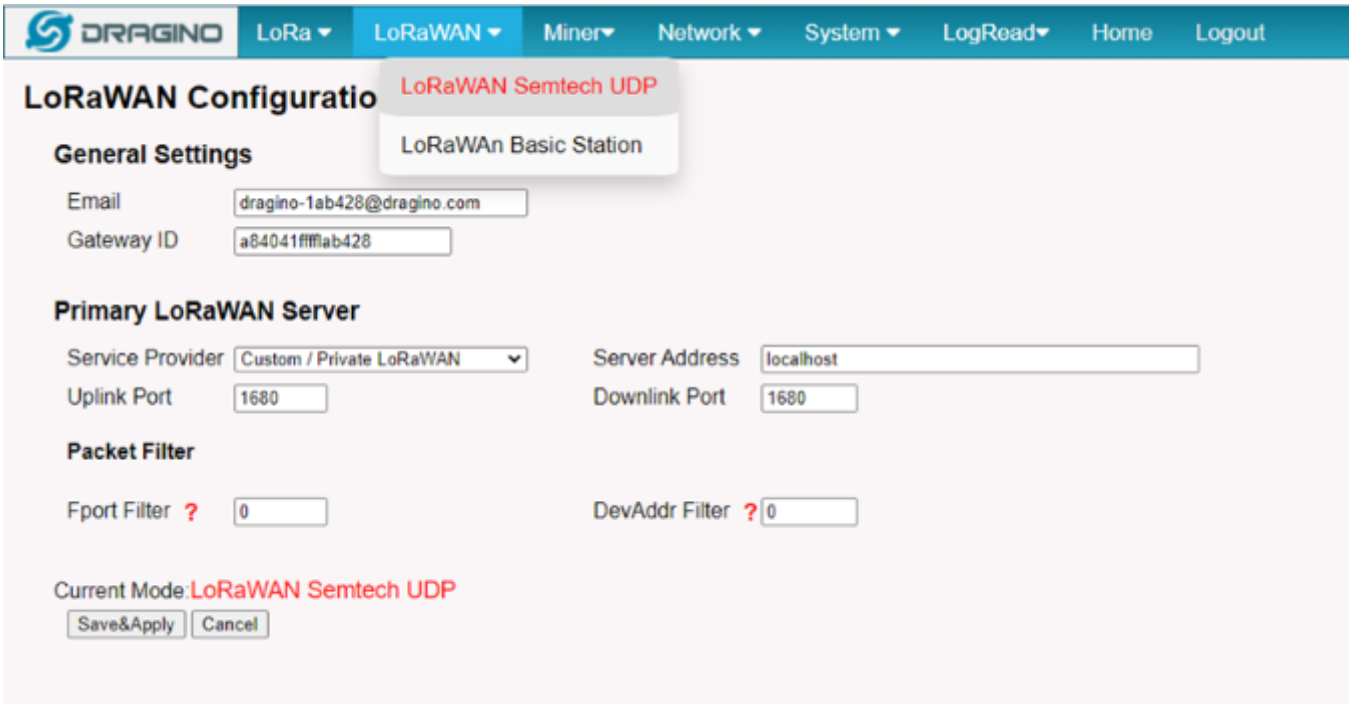
https://www.youtube.com/watch?v=GKusVC7ovrE (https://www.youtube.com/watch?v=GKusVC7ovrE)

3. Check the configuration of HP0D

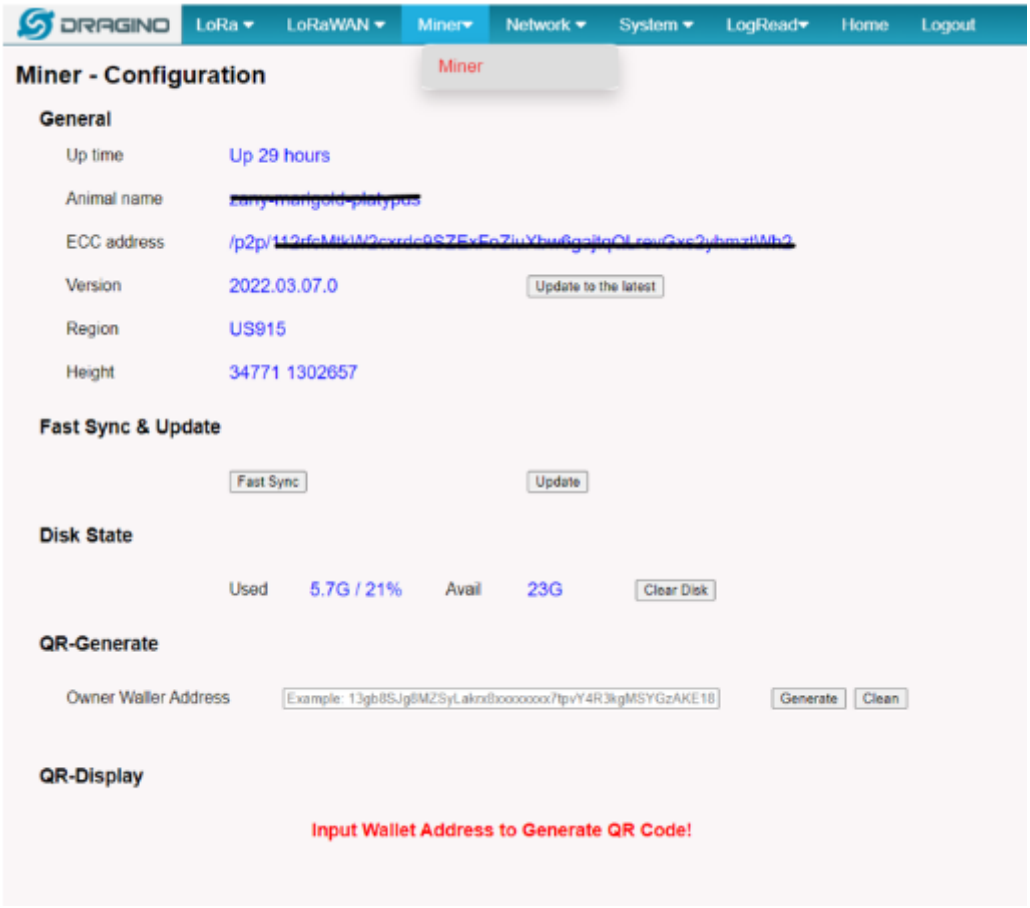
3.1 LoRa frequency configuration



3.2 Check the LoRaWAN Server Address



3.3 Check Miner configuration



Note: Check the Region and Height, the default height is greater than 1, if it is 1 please Click the mid button of Update, and then wait 10mins to check here.

4. Installation of Antenna

HP0D use Fiber Glass Antenna.

User need to connect antenna cable's SMA connector to the HP03 and connect N-Type connector to antenna and install as below:

5. SSH Access for Linux console

IP address: IP address of HP0D or hostname of HP0D (Such as dragino-63920a)

Port: 22

User Name: **root**

Password: **Randomly generated （found on device's label）**

After logging in, you will be in the Linux console and can enter commands as shown below.

```
Linux dragino-63920a 5.10.92-v8+ #1514 SMP PREEMPT Mon Jan 17 17:39:38 GMT 2022 aarch64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Mar 21 00:59:01 2022 from 10.130.2.182
root@dragino-63920a:~#
```

6. How to change the Wireless function of HP0D

The wireless function is configured as AP by default and the web page does not support configuration, if you want to configure it as client connection mode, you need to configure it manually in Linux CIL.

6.1 Access the Linux console.

Follow the previous step of Step 5.

6.2 Install the package of network-manager

Run commands:

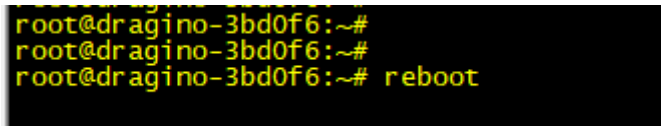
```
apt update
apt install network-manager
```

```
root@dragino-3bd0f6:/home/dragino# apt update
Hit:1 http://47.89.8.92 hparm64 InRelease
Hit:2 http://security.debian.org/debian-security bullseye-security InRelease
Hit:3 http://deb.debian.org/debian bullseye InRelease
Hit:4 http://archive.raspberrypi.org/debian bullseye InRelease
Hit:5 http://deb.debian.org/debian bullseye-updates InRelease
Hit:6 https://download.docker.com/linux/debian bullseye InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
27 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@dragino-3bd0f6:/home/dragino# apt install network-manager
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  libteam-utils
The following NEW packages will be installed:
  network-manager
0 upgraded, 1 newly installed, 0 to remove and 27 not upgraded.
Need to get 2,864 kB of archives.
After this operation, 15.5 MB of additional disk space will be used.
Get:1 http://deb.debian.org/debian bullseye/main arm64 network-manager arm64 1.30.0-2 [2,864 kB]
Fetched 2,864 kB in 3min 52s (12.3 kB/s)
Selecting previously unselected package network-manager.
(Reading database ... 55690 files and directories currently installed.)
Preparing to unpack .../network-manager_1.30.0-2_arm64.deb ...
Unpacking network-manager (1.30.0-2) ...
Setting up network-manager (1.30.0-2) ...
Processing triggers for dbus (1.12.20-2) ...
Processing triggers for man-db (2.9.4-2) ...
root@dragino-3bd0f6:/home/dragino#
```

6.3 Reboot the device

Run command:

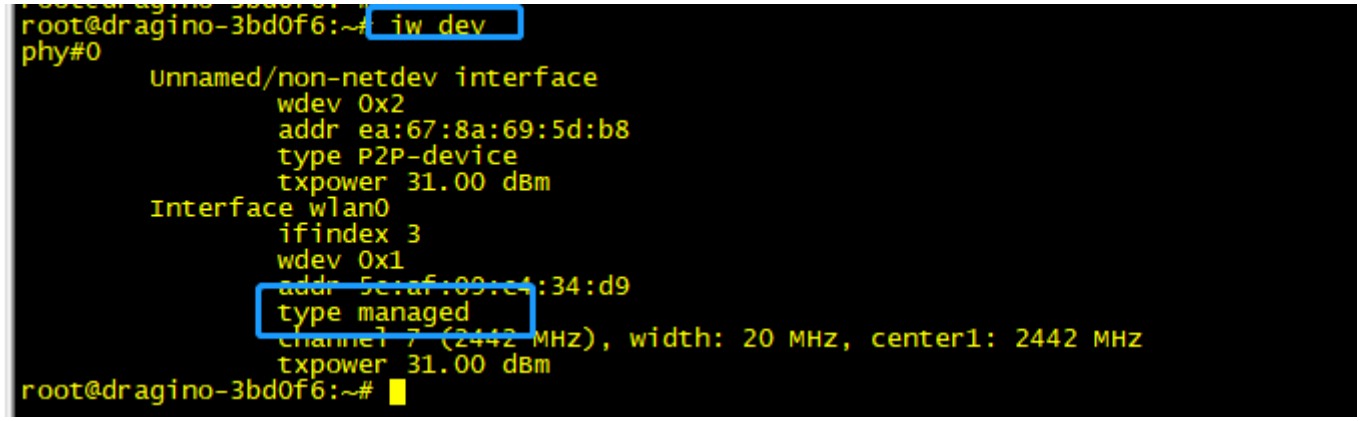
```
reboot
```



6.4 Check the wireless type

Run command:

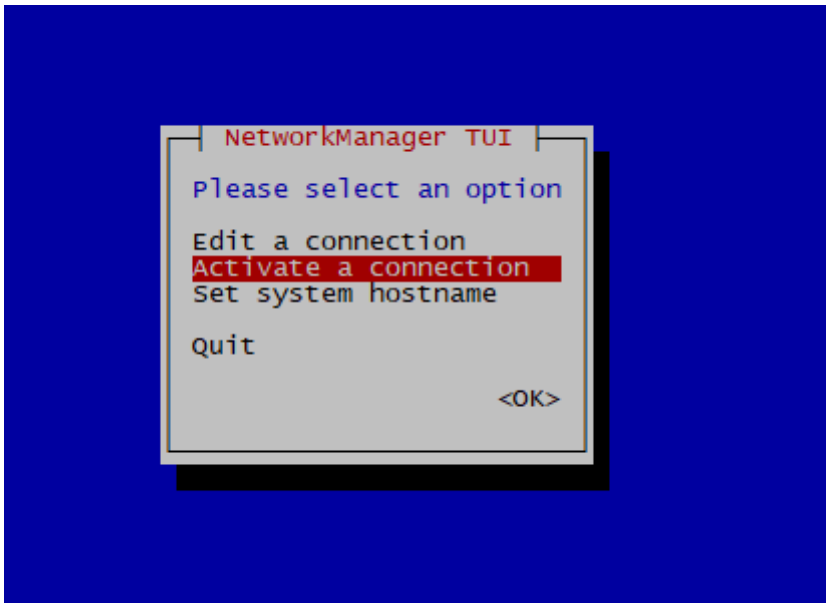
```
iw dev
```



6.5 Connect the WiFi

Run command:

```
nmtui
```



7. Trouble Shootings

7.1 How to get a wallet address?

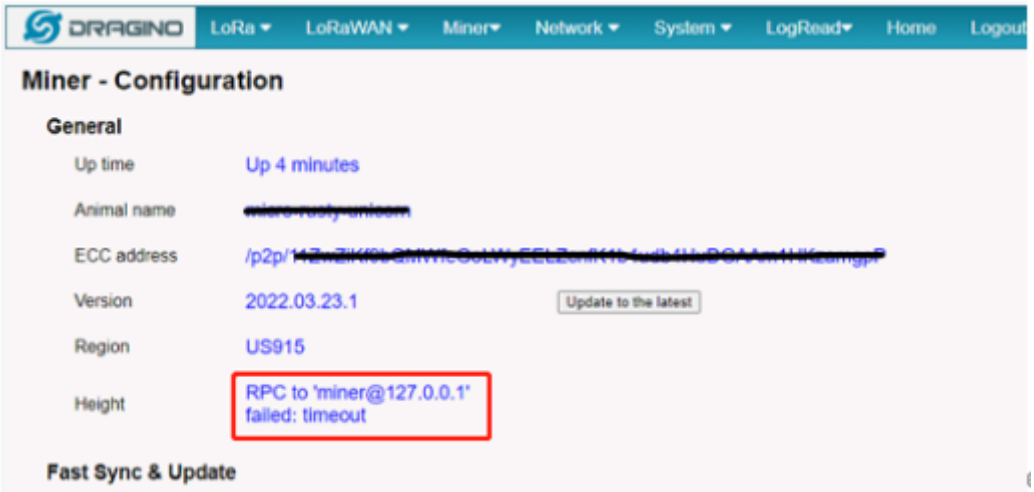
Download the helium Hotspots APP on the Apple or Google Play store to generate own wallet.

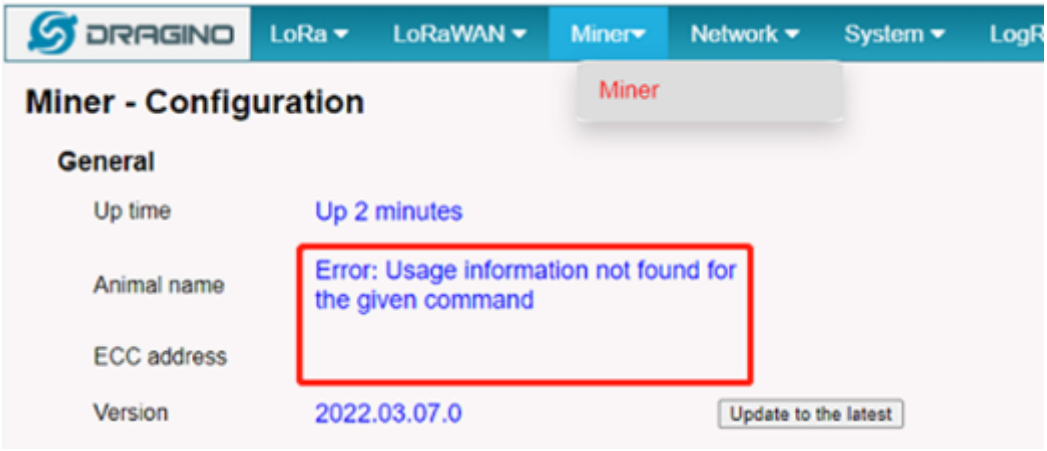
7.2 Onboarding -- Unable to access Web-UI --> Miner

User can login the HP0D, able to access other Web Pages except miner page.

If you first boot the device where you need to wait for 10 mins for initialization connection to Helium server.

7.3 Onboarding -- Some parameters in miner page show timeout

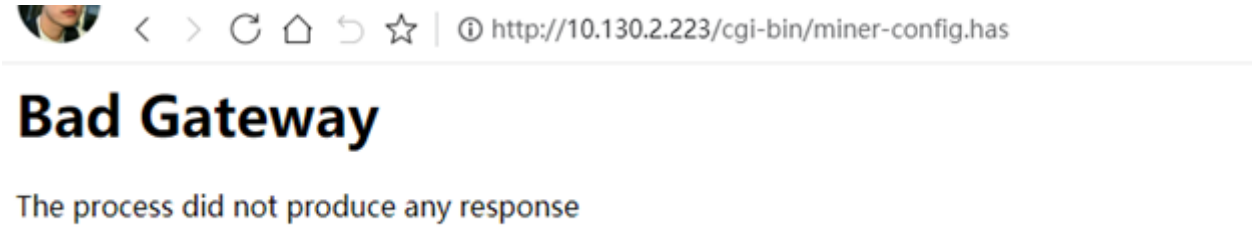




HP0D is establish connection to Helium server and not finished. And you might see above.

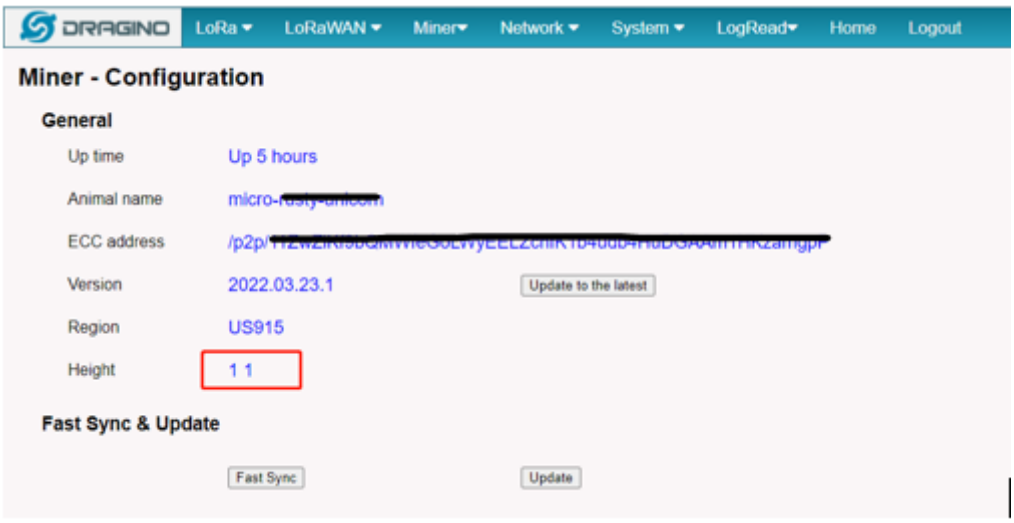
It might relate to the network where might up to 10mins.

7.4 Onboarding – Bad Gaterway



This is caused by the process leads too long which just need to refresh the page.

7.5 Onboarding -- Why did QR Code generate is aways fail?



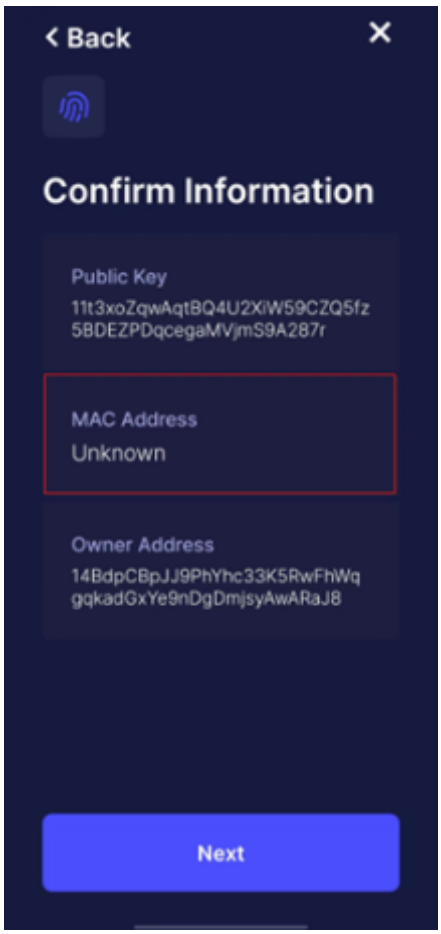
This may be related to the current block height, if the device is synchronizing to the latest height or if the device block height is much lower than the current height as the above picture like '1 1', the QR code generation may fail.

7.6 Onboarding -- Why is the QR Code not quite the same

as the manual?

Please ensure that you enter the correct wallet address and that your network is up and running, the user can click the button of ‘Clean’ to re-generate the QR Code.

7.7 Onboarding – MAC address is ‘Unknown’ after scan QR Code

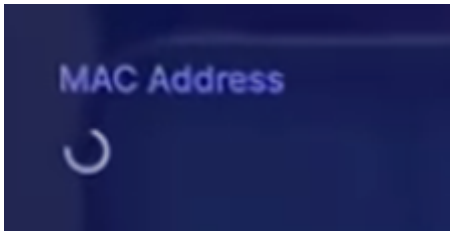


If you see the MAC Address shows the ‘Unknown’ where is due to the provision error,please contact us to help you solve.

7.8 Onboarding – MAC address is being refreshed after scan QR Code

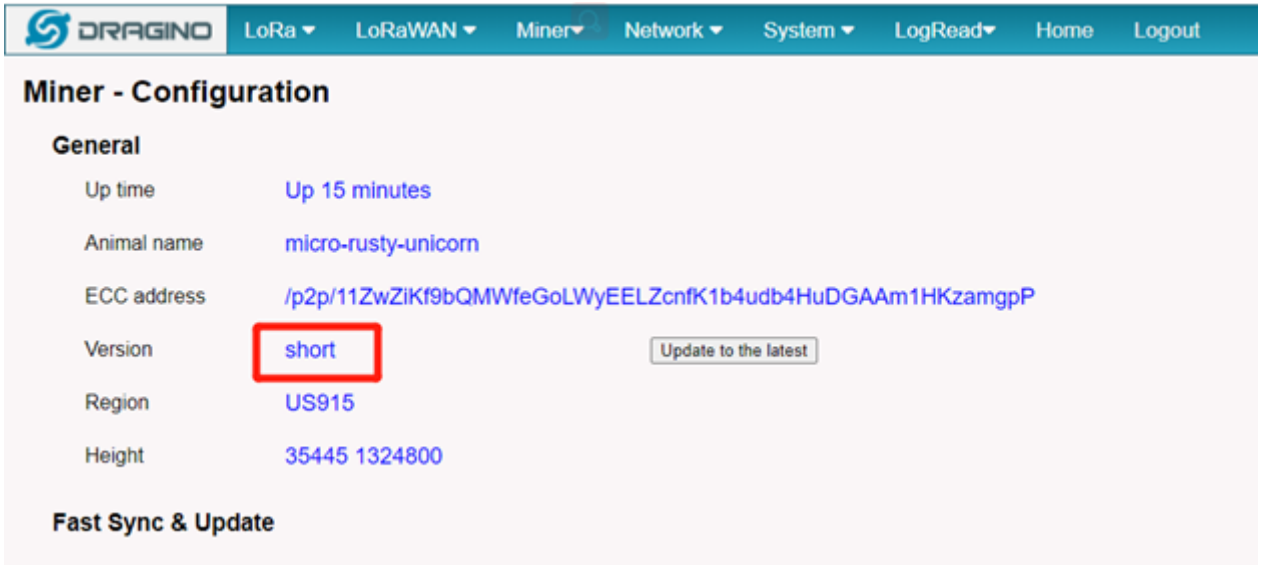
After scan QR Code, Mobile APP will connect Helium onboarding server and provide the public key/ wallet address to onboarding server. Server will return the match MAC address for this hotspot.

If you don’t see MAC address, make sure your mobile has good internet connection.



7.9 HP0D Web --> Miner --> Version shows ‘short’

This is caused by the server connection delay, which does not affect the normal use.



7.10 Mobile APP crash after scan the QR Code?

- Make sure you have input the correct Wallet address to generate QR Code.
- Make sure your mobile app uses the same wallet address as the one to generate QR Code.
- Make sure your mobile app’s relevant permission are enabled.
- Known: The Android 11 version may cause this kind of issue.

7.11 Why the frequency/region is not the same what I purchased?

Each HP0D is inspected and configured prior to shipping.

If your HP0D Web-UI – Miner region is not the same with the shell labels, please contact our support team that will solve this issue for you.

7.12 Can use the frequency to a region where is not support?

Please make sure that the region supports this frequency, you can confirm the appropriate frequency through this link:

https://docs.helium.com/lorawan-on-helium/frequency-plans (https://docs.helium.com/lorawan-on-helium/frequency-plans)

7.13 Can change the frequency of the HP0D Miner?

We do not recommend doing this, it may damage your device

8. OTA Version Info

When OTA update happen?

HP0D will check OTA update on a) Every Booting . b) Every Night. Below are the OTA update version info

2022/05/14

1. Update to the latest miner version: miner-arm64_2022.05.13.0_GA
2. Add postinst after auto-update
3. Add Miner version mark.
4. Add fast sync if miner GAP is large

9. Supports

If you are experiencing issues and can't solve, you can send mail to support@dragino.com (mailto:support@dragino.com) .

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

10. Order Info

HP0D-XXX

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

11. 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

12. 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.