

HT-M02

## Edge LoRa Gateway

Linux 4.14 Kernel, Debian Stretch 9.8, LoRaWAN Protocol

**1-GHz ARM® Cortex®-A8 32-Bit RISC, 512MB DDR3, 4G eMMC**

## “HT-M02 user manual” release version

Version	Chang Log	Release time
R1.0	First release	2019-8-15

## Contents

“HT-M02 user manual” release version.....	2
Contents .....	3
1. Description .....	4
1.1 Features.....	5
1.2 Appearance.....	6
1.2.1 Mechanical dimensions.....	6
1.2.2 Indicator LED .....	7
2. Usage manual .....	7
2.1 Power on for the first time .....	8
2.2 Configuration HT-M02.....	8
➤ Load HT-M02 configuration page.....	9
2.3 How to connect HT-M02 to TTN.....	10
3. Reference.....	12
3.1 LoRaWAN Frequency Plans and Regulations by Country .....	12
3.2 Uplink/Downlink frequency in each working band of the LoRaWAN protocol:.....	12
Contract us .....	12
Appendix 1 .....	13
TTN LoRa server address in each frequency band .....	13

## 1. Description

In practice, the working environment of the equipment may not be as good as expected, on the contrary, it may be very bad... For example, in the industrial environment, the site may have tremendous vibration, noise, dust, high temperature, and other issues. In the city environment, sunshine and rain, low temperature in winter and high temperature in summer are always unavoidable...

HT-M02 considers and solves all the above problems and design strictly with industrial standards, Integrated Linux Operating System (4.14 Kernel, Debian Stretch 9.8). IP67 waterproofing, no fan or motor heat dissipation structure, 1-GHz Sitara™ ARM® Cortex®-A8 32-Bit RISC Processor, 512MB DDR3, 4G eMMC. PoE power supply or 110 / 220V AC power supply (110 / 220V AC power supply version use 4G upload LoRa data).



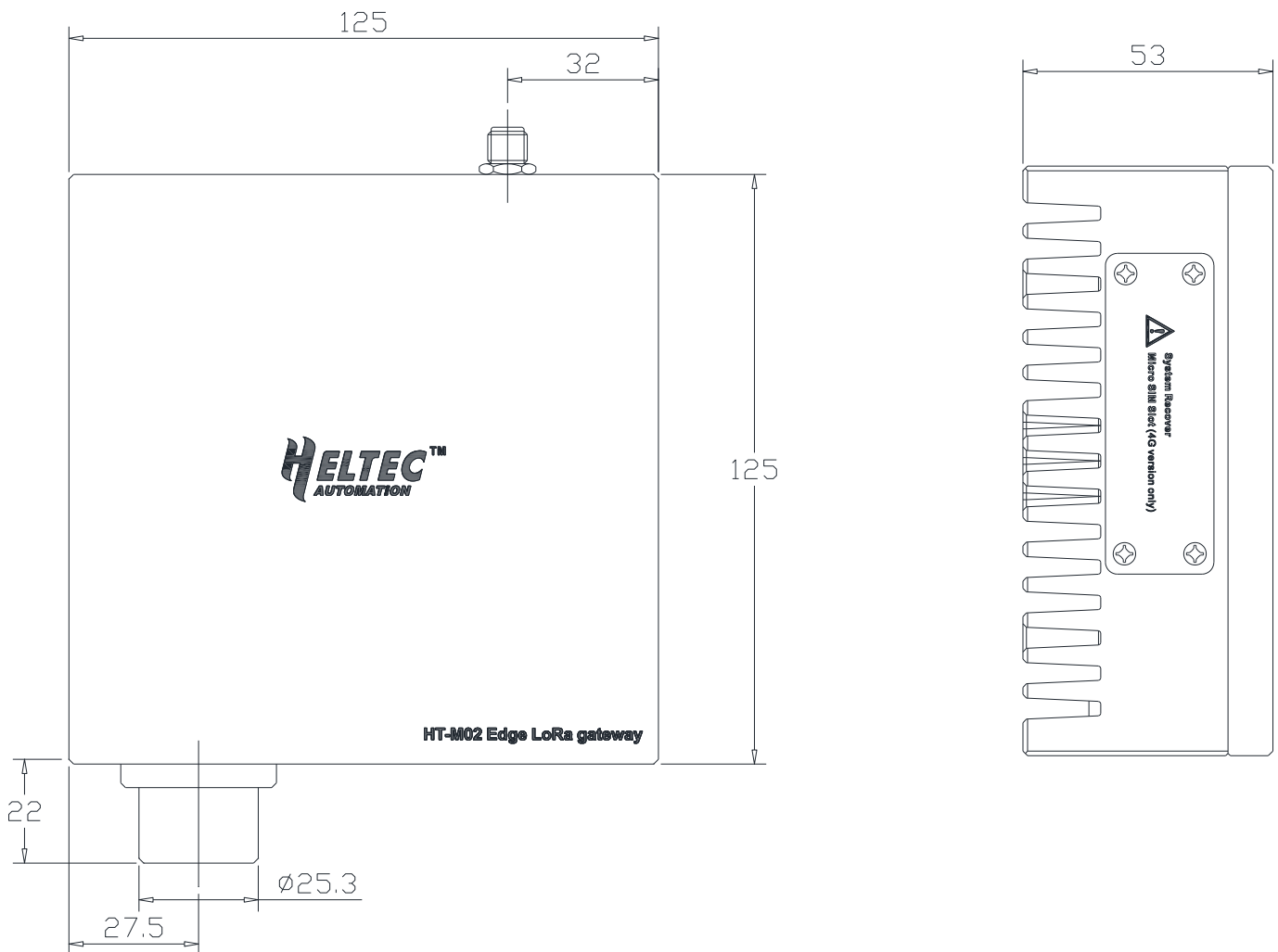
## 1.1 Features

- CE and FCC Certificate;
- Integrated Linux Operating System (4.14 Kernel, Debian Stretch 9.8);
- IP65 waterproofing;
- No fan or motor heat dissipation structure;
- 1-GHz Sitara™ ARM® Cortex®-A8 32 Bit RISC Processor, 512MB DDR3, 4G eMMC;
- PoE power supply;
- SX1301 digital baseband chip;
- Size: 125(+40) x 125 x 52 mm;
- Emulates 49 LoRa demodulators and 1 FSK demodulator;
- 10 programmable parallel demodulation paths;
- Dynamic data-rate adaptation (ADR);
- Automatic adaptive spread spectrum factor, SF7 to SF12 for each channel is optional
- Maximum output:  $20 \pm 1$  dBm;
- Up to -139dBm sensitivity with SX1257 or SX1255 TX/RX front-end;
- Support for LoRaWAN Class A, Class C protocols;
- Specially designed heat conduction structure, transfer heat to the aluminum box, make sure the system be more stable;
- -20°C to 70°C working temperature range;
- Working bands:
  - EU863 – 870
  - EU433

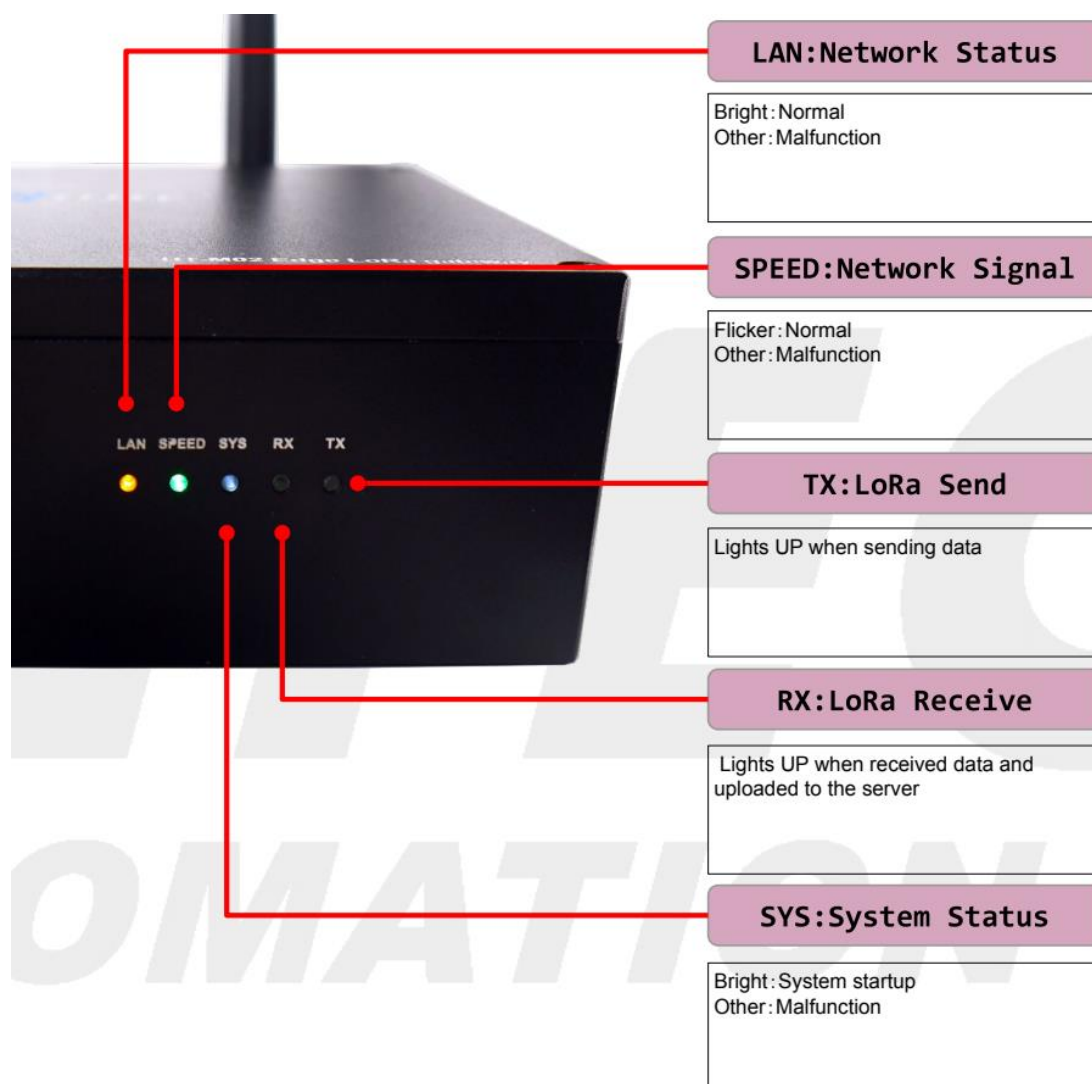
- CN470 – 510
- AU915 – 928
- AS923
- KR920 – 923
- IN865 – 867

## 1.2 Appearance

### 1.2.1 Mechanical dimensions



### 1.2.2 Indicator LED



## 2. Usage manual

Before powering up for the first time, make sure the antenna is properly installed in the appropriate location. The standard antenna itself is not water-discharged. If it is necessary to use it outdoors for a long time, it is recommended to use a plastic film to properly block the antenna part.

## 2.1 Power on for the first time

This version only supports the PoE power supply mode. Connect the cable as shown in Figure 2-1. It is recommended to connect the network cable on the HT-M02 before plugging the PoE adapter into the 220V/110V AC.

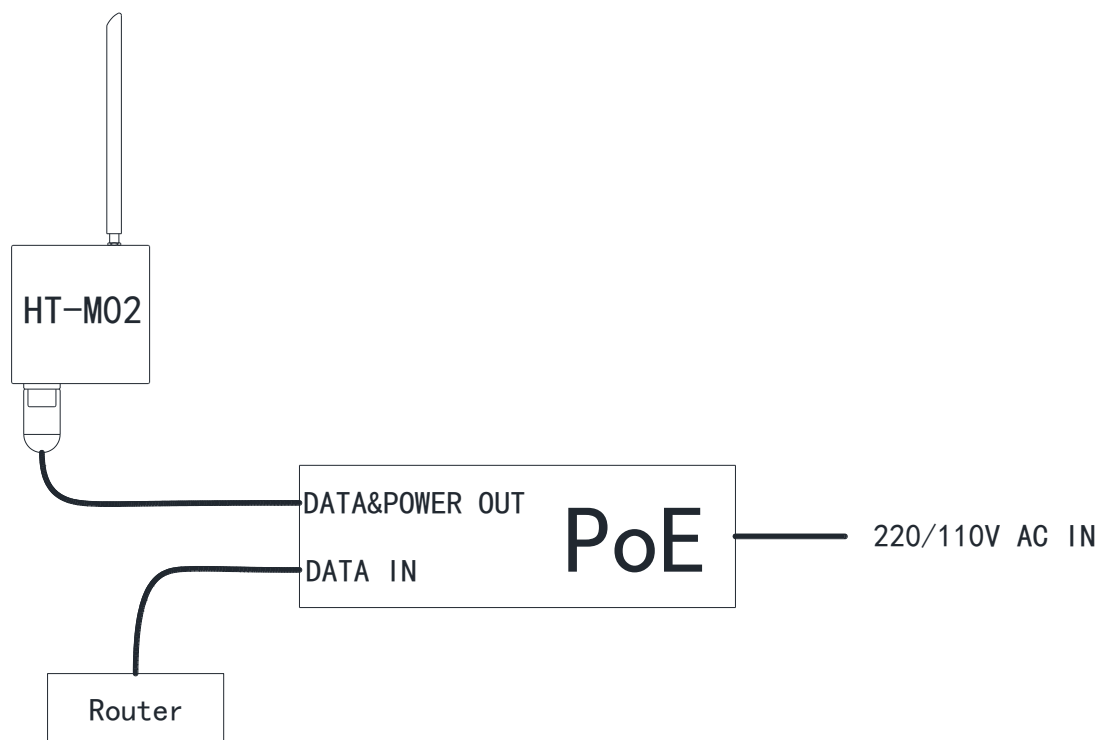


图 2-1

If everything goes well, the system will run automatically, and the LED lights will start working. When the system kernel starts successfully, the SYS LED will be on. After the processes and services are started, the TX indicator will flash once and the system will enter the normal working state. The entire startup process lasts approximately 40 seconds.

## 2.2 Configuration HT-M02

When PoE supplies power to the HT-M02, it will provide Ethernet at the same time. The DHCP service is enabled by default in the HT-M02 system. If the





very important. Remove the label after the installation is completed.

- **Server\_address:** LoRa server address, the TTN server in the above figure is taken as an example (Appendix 1: LoRa server address in each band of TTN);
- **Serv\_port\_up:** LoRa server receive uplink port, default is 1700.

### 2.3 How to connect HT-M02 to TTN

- Open <https://www.thethingsnetwork.org/> and register an account;
- Open <https://console.thethingsnetwork.org/gateways/register>, register a gateway. While adding the gateway, make sure you had choosed “**I'm using the legacy packet forwarder**” .

The screenshot shows the 'REGISTER GATEWAY' form in the TTN console. It includes a 'Gateway EUI' field with a value starting with '5' and a 'Description' field with the value 'HT-M02 Edge LoRa Gateway'. A checkbox labeled 'I'm using the legacy packet forwarder' is checked and highlighted with a red box. Below the form, there is a note: 'If everything goes well, you can see “connected” in the GATEWAY OVERVIEW.'

If everything goes well, you can see “connected” in the GATEWAY OVERVIEW.

The screenshot shows the 'GATEWAY OVERVIEW' page for a gateway. The 'Status' is shown as 'connected' with a green dot, and this is highlighted with a red box. Other details include Gateway ID 'eui-508cb1ffedfab8d', Description 'Heltec HT-M02 Edge LoRa Gateway', Owner 'hunter8801', Frequency Plan 'China 470-510MHz', Router 'ttn-router-asia-se', and Gateway Key.

Now, the gateway configuration is complete, and can communicate with the

## LoRa node through the LoRaWAN protocol.

**GATEWAY TRAFFIC** beta

uplink | downlink | join 0 bytes X ▶ resume 🗑 clear

time	frequency	mod.	CR	data rate	airtime (ms)	cnt	
▼ 21:44:33	501.5	loro	4/5	SF 7 BW 125	41.2	0	dev addr: 26 [redacted] C payload size: 12 bytes
▲ 21:44:32	471.5	loro	4/5	SF 7 BW 125	56.6	0	dev addr: 2 [redacted] C payload size: 21 bytes
⚡ 21:44:31	501.1		4/5	SF 7 BW 125	51.5		
⚡ 21:44:27	471.1		4/5	SF 7 BW 125	61.7		appeui: 70 [redacted] 20 dev eui: 2 [redacted] 16

### 3. Reference

#### 3.1 LoRaWAN Frequency Plans and Regulations by Country

<https://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country.html>

#### 3.2 Uplink/Downlink frequency in each working band of the LoRaWAN protocol:

<https://www.thethingsnetwork.org/docs/lorawan/frequency-plans.html>

#### Contract us

- Website: <https://heltec.org>
  - Document Page: <https://docs.heltec.cn>
  - Forum: <http://community.heltec.cn/>
  - Twitter: <https://twitter.com/HeltecOrg>
  - Face Book: <https://www.facebook.com/heltec.automation.5>
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## **Appendix 1**

### **TTN LoRa server address in each frequency band**

<b>Region</b>	<b>Router address</b>
router.eu.thethings.network	EU 433 and EU 863-870
router.us.thethings.network	US 902-928
router.cn.thethings.network	China 470-510 and 779-787
router.as.thethings.network	Southeast Asia 923 MHz
router.as1.thethings.network	Southeast Asia 920-923 MHz
router.as2.thethings.network	Southeast Asia 923-925 MHz
router.kr.thethings.network	Korea 920-923 MHz
router.jp.thethings.network	Japan 923-925 MHz
thethings.meshed.com.au	Australia 915-928 MHz
as923.thethings.meshed.com.au	Australia (Southeast Asia 923MHz frequency plan)
ttn.opennetworkinfrastructure.org	Switzerland (EU 433 and EU 863-870)

Reference:

<https://www.thethingsnetwork.org/docs/gateways/packet-forwarder/semtech-udp.html>