PantherX2 Product Manual

www.panther.global

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1. Product description

Since Panther Global launched the Panther X1 Hotspot, the product has been a big success and welcomed by most users for its exclusive advantage s such as abundant storage, full-duplex LoRa mode, multi-hotspot management configuration, high-speed synchronization, and advanced customization.

As Panther Global focuses on building a series of high-quality products in the Internet of Things field in the future, the team has been committed to continuously advancing the research, development, and iteration of PantherX series products. Following the successful launch of Panther X1, we completed the research and development of Panther X2 Hotspot and laun ched it to the public.

Panther X2 has a 4-core high-performance processor, ultra-low power consumption, and ultra-long-distance IoT hotspot gateway. In addition, as an information converter for the LoRa communication protocol, PantherX2 acts as a bridge between network servers and end nodes.
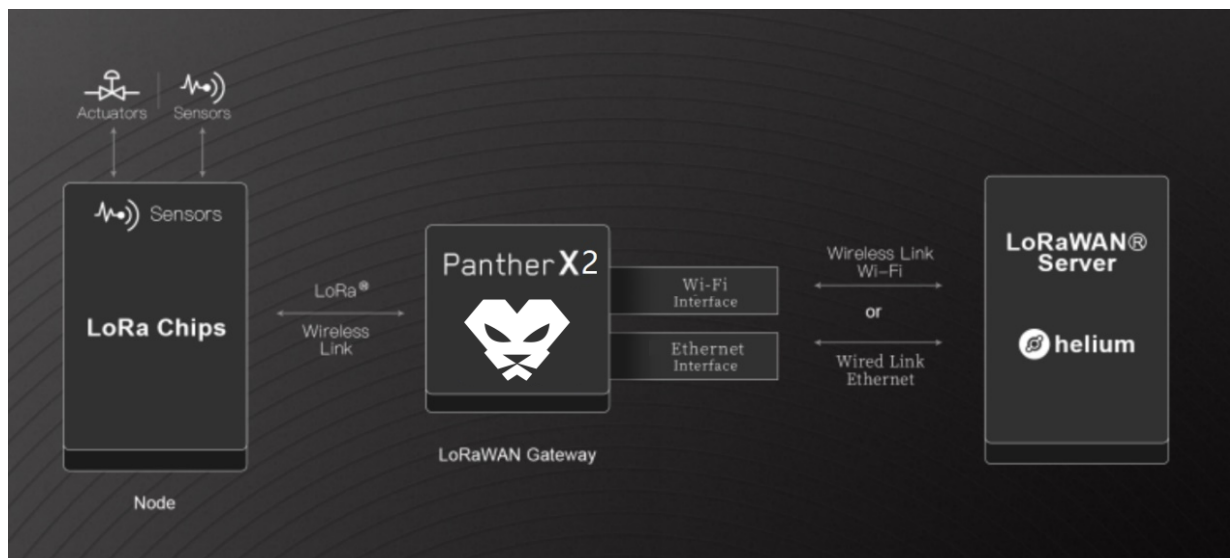
Panther X2, featuring a signal coverage of around 10-20 km, runs at an ultra- low -power (5W) and can connect to over 2,000 LoRaWAN end nodes within its range. It is susceptible, safe, reliable, and easy to interact with and can be used

for environmental monitoring, asset tracking, smart agriculture, and other long-range ultra-low-power IoT applications.

Panther X2 is compatible with the Helium LongFi network and can be used as a hotspot to obtain Helium digital token, HNT. In addition, the device supports block synchronization and remote control. Users can use the official Helium application to complete the Panther X2 in one minute quickly.

2. Architecture

Panther X2 sends and receives LoRa data, modulates/demodulates signals, processes LoRa data and higher-level protocol-related tasks, and eventually transmits data to the server via Ethernet or Wi-Fi.

3. Solution

LongFi^{TM} Technology

Helium LongFi is a technical architecture that combines advanced wireless technology LoRaWAN and Helium blockchain. LongFi is optimized for the coverage and battery life of IoT devices.

Proof of Coverage (PoC)

The Panther X2 Hotspot obtains the digital token HNT when the device is connected to the Helium mainnet and is used to verify the wireless coverage provided by the peer. Using a proof of coverage mechanism, Panther X2 Hotspots can obtain more HNT when Panther X2 Hotspots are within the coverage range of other Panther X2 Hotspots.

The coverage depends on the use environment:

- Open area: 10 kilometers or more.
- Built-up areas: 1~10 kilometers.

A single hotspot obtains fewer HNT because it can only issue challenges through the Internet and not participate in the proof of coverage mechanism.

About LoRa

LoRa is an innovative radio frequency physical layer modulation technology that provides long-range wireless connectivity, excellent power supply efficiency, extremely high receiver sensitivity, full spread spectrum, and secure, encrypted

transmission. It is operated on free industrial, scientific, and medical (ISM) radio bands with 863-870 MHz frequency spectrum and its subsets reserved for Europe, the Middle East, Africa, and India, and 902-928 MHz for the Americas and Asia-Pacific countries/regions. The ISM band primarily used in China is 470-510MHz.

About LoRaWAN

LoRaWAN is a Media Access Control (MAC) layer protocol developed by the LoRa Alliance, serving as a supplement to the physical layer implementation of LoRa. It draws support from an established ecosystem of LoRaWAN-compatible devices, which can be obtained from multiple suppliers and is accredited by the LoRa Alliance for Device Interoperability.

LoRaWAN defines the network's communication protocol and system architecture, while the LoRa physical layer enables the long-range communication link. As a result, the protocol and network architecture have the most influence in determining the battery lifetime of a node, the network capacity, the quality of service, the security, and the variety of applications served by the network.

4. Advantages

High-performance configuration: Powered by the latest quad-core Cortex-A55 1.8GHz processor; Semtech LoRaWAN chip; 4GB DDR4 memory; 32GB eMMC and 64GB TF card;

Secure and trustworthy: With a built-in ECC encryption chip, Panther X2 promises highly secure authentication and reliable connection;

Comprehensive Coverage: Featuring enhanced 3dBi antennas, Panther X2 offers broader and more stable network coverage；

More extensive RAM and storage: 4GB DDR4 with faster-running speed and shorter response time, built-in 32GB eMMC and 64GB TF card, Panther X2 meets the RAM and storage requirements brought by the rapid development of Helium network;

Easy setup: Easy steps to set up Panther X2;

Hotspot Placement: Easier management and configuration of multiple hotspots;

5. Connectors

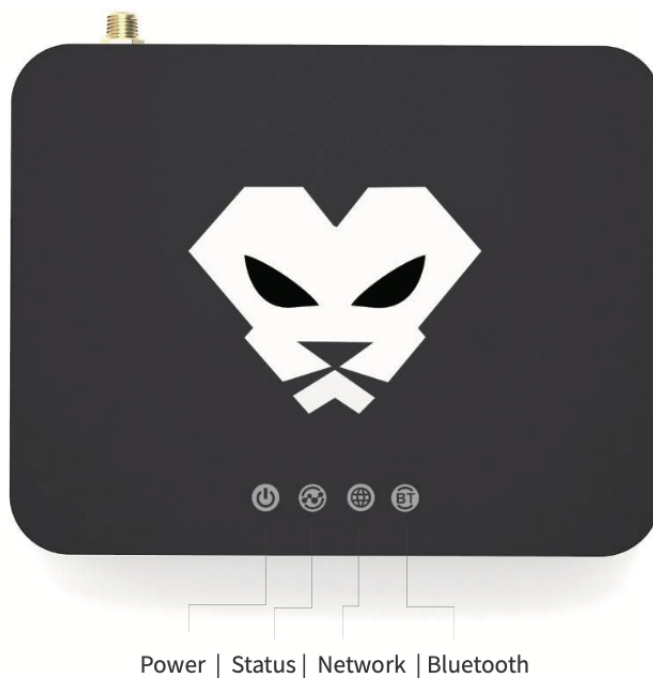Bluetooth Connect Button   Power   Ethernet   USB2.0   TF Card   LoRa

6. Product specifications

Product name	Panther X2
LoRa Specifications	
LoRa Channel Plan	AS923/ EU868/US915/
LoRa Frequency Band	923MHz/868MHz/915MHz
Channel capacity	8 channels
LoRa output power	Maximum 30dBm
Receiving sensitivity	-141 dBm @SF12 BW 125kHz； -127 dBm @SF7 BW 125 kHz； -111 dBm @FSK 50 kbps
Platform	
CPU	Quad-core Cortex-A55 up to 1.8GHz
Memory	DDR4 4GB
Storage	eMMC 32GB+ TF Card 64GB
Wi-Fi radio	2.4GHz 802.11 b/g/n
BLE radio	BLE 5.2
Input Voltage	DC 12V 2A
Connectors	
LoRa Antenna	RP-SMA-K
Ethernet	RJ45 Gigabit
Power	5.5*2.1mm, 12V DC

7. Environment requirements

Environment	
Operating temperature	0°C ~ +40°C
Storage Temperature	-10°C ~ +70°C
Relative Humidity	5%RH ~ 95%RH (non-condensed relative humidity) 20%~90%, non-condensing
Heat Dissipation	Radiator grille

8. Indicators

Power | Status | Network | Bluetooth

Indicator light	Status
Power	Steady light: Power on No light: Power off
Status	Steady light: The system operates normally Blinking light: System is booting (Bluetooth operations are possible)
Internet	Steady light: Connected to the Helium network No light: Not connected to the Helium network
Bluetooth	Steady light: Bluetooth has been paired successfully No light: Bluetooth pairing is off

9. Dimensions

10 . Box contents

1 Panther X2 Hotspot Gateway

1 LoRa antenna

1 Power adapter

1 User guide

1 Pin tool