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NEBRA INDOOR HOTSPOT ROCK PI MINER DATASHEET

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TABLE OF CONTENTS

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Product Overview

Introducing the Nebra HNT Indoor Hotspot Miner (ROCK Pi Version)

Earn HNT cryptocurrency by mining Helium and building coverage for The People's Network using the Nebra HNT Indoor Hotspot Miner (ROCK Pi Version). Anyone can join The People's Network and provide hundreds of square miles of wireless network coverage while mining HNT on the Helium Blockchain just as hotspot miners do.

- Efficient miner for a new cryptocurrency, Helium (HNT)
- Complete set-up in minutes using a smartphone
- Low Power – uses as much power as a broadband router (15W)
- Easily manage Hotspots and tokens from the mobile app

Proof of Coverage
The Nebra HNT Indoor Hotspot Miner earns HNT Helium tokens when devices connect, and for validating wireless coverage delivered by peers. Using a system called Proof-of-Coverage, Hotspot Miners earn more HNT when they're in range of other miners, but need to be at least 300 metres apart.

The range depends on the environment:
- Rural areas: ~10 miles or more
- Dense areas: ~ 1 mile
- Single HNT Hotspot Miners earn less as they can only issue Challenges over the internet, and can't participate in Proof-of-Coverage

Why earn HNT & use Helium?
Millions of compatible devices can use The People's Network and each device requires Data Credits (DC) in order to send data to the Internet. Fixed in value, DC is created by 'burning' HNT, reducing the total supply to achieve a Burn and Mint Equilibrium. The more devices using DC, the more HNT will be burned.

Helium's wireless network based on LoRaWAN is best suited for low-power scenarios like sending data to and from sensors using low-cost radio waves, eliminating reliance on more costly networks like cellular and WiFi. It's fully peer to peer and leverages a robust network of hotspots connected to the network. With just 100 to 200 hotspots, the network can usually cover most cities. In return for hosting hotspots, hosts can earn $HNT for providing access to the LongFi network.

Features:
- **LongFi** - compatible with Helium LongFi, a technology architecture that combines LoRaWAN and the Helium Blockchain
- **3dBi antenna** - Provides wider network coverage, meaning better Proof of Coverage result for increased $HNT earnings
- **Quad Core Processor** - Equipped with industrial-grade Rockchip RK3399, a high-performance hexa-core application processor
- **32GB Storage** - built-in eMMC flash for better data security and larger memory storage
- **OTA Updates** - Remotely change the miner's location settings and more without having to send it back to the manufacturer
- **Low Power** - 12V 2.5A USB-C power
- Semtech SX1301/3 - using the latest and most reliable semtech LoRaWAN module
- **Industrial Enclosure** - Keeping the ROCK Pi safe and cool with a unique heatsink style case

3

Specification

| SPECIFICATION	ROCK Pi INDOOR HOTSPOT
Dimensions	94x70x53mm (Excluding Antenna)
Weight	353g
Power Requirement	12V 2.5A USB-C***
Average Power Consumption	~8W*
Maximum Tx Power	24-27dBm**
Network Connectivity	1Gbit Ethernet, 2.4 GHz 802.ac Wi-Fi, Bluetooth 4.2
Rated Ambient Temperature	20-30C
Base SoC	ROCK Pi RK3399 Processor
CPU Specification	Dual Core Cortex A72 1.8GHz and Quad Core Cortex A53 1.4GHz with on-board Wi-Fi and Bluetooth
High Endurance Storage	32GB eMMC
Memory	2GB LPDDR4
Ingress Protection	IP30
Antenna Connection	RP-SMA Female
Enclosure	Aluminium

*Average power consumption measured at mains
**Maximum Tx power may be capped to a lower amount in some regions
***Power Supply must ONLY be used with the ROCK Pi Miner

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Block Diagram

The figure below summarises the basic building blocks of the ROCK Pi Indoor Miner. The indoor miner is the central hardware solution fo all LoRa based radio communication. It receives and transmits radio messages. The processing of the radio messages as well as the protocol tasks is done by the embeded system, which is the ROCK Pi. Received and processed radio messages are being sent to the Helium servers.
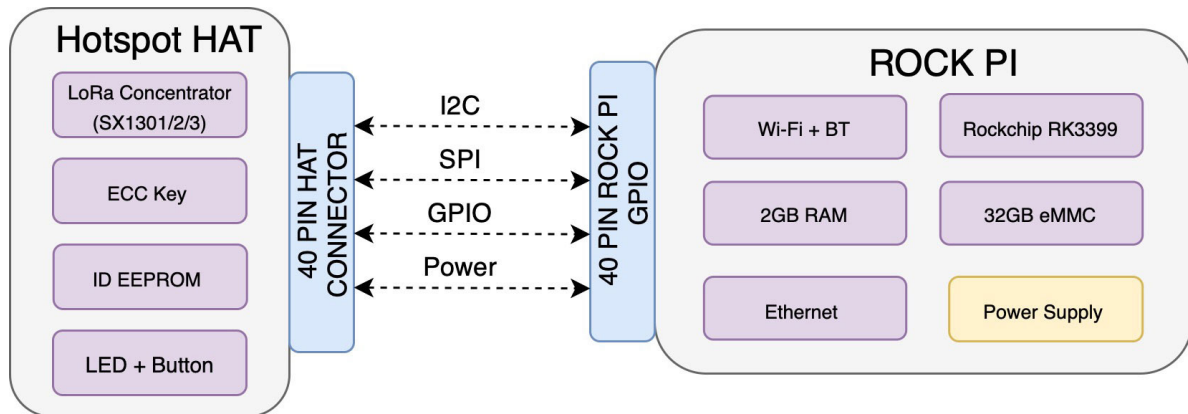
Interfaces

The ROCK Pi miner comes with a number of interfaces for its operations and current status indicator. It is designed to be fully automated with very little physical interaction required.
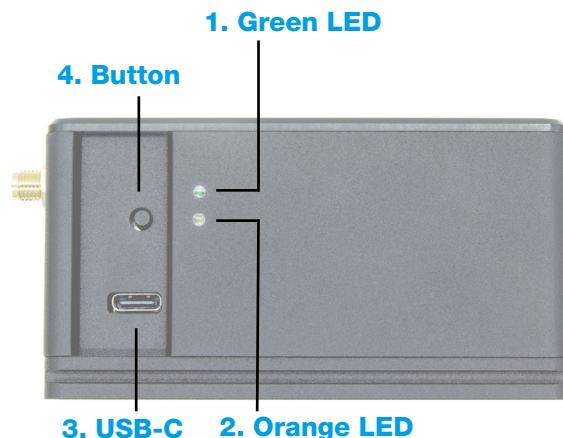
1. The Green LED will indicates the current status of the miner: OFF (Software has not started yet), ON (Operating as normal), Slow Blinking (Bluetooth pairing is enabled), Fast Blinking (Possible fault).
2. The Orange LED indicates the staus of power to the unit: ON (Unit is receiveing power), OFF (Unit does not have power).
3. USB-C connector will provide power to the miner using the supplied power supply.
4. This is used to re-enable bluetooth pairing on the hotspot, hold the button in for approximately **10 seconds** then release to start pairing. The Green LED should start blinking slowly if successful.

5. Wi-Fi Connector

6. LoRa Connector

7. Ethernet
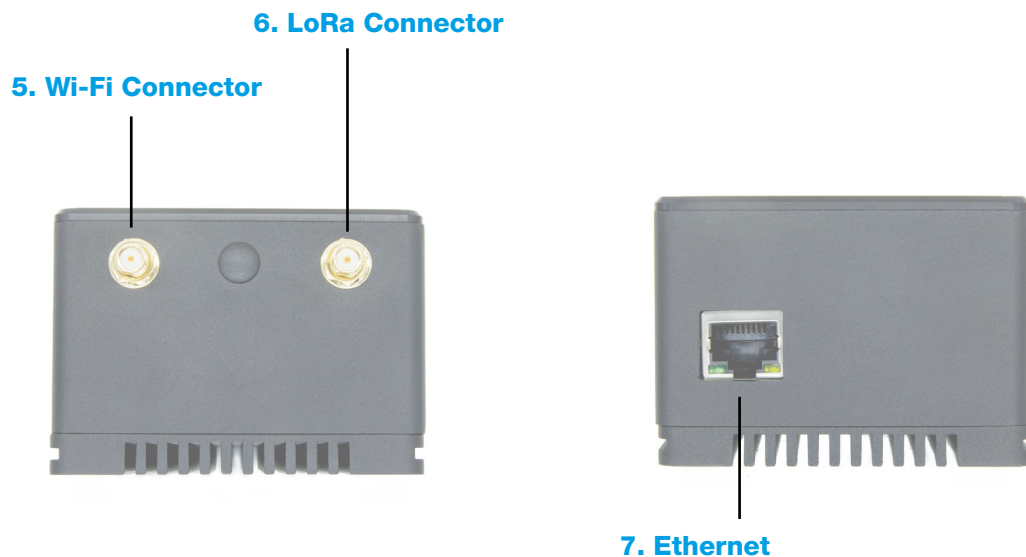
5. This connector on the left-hand side of the case is for connecting the Wi-Fi antenna. Screw the antenna in tightly and then angle the antenna upwards.
6. This connector on the right-hand side of the case is for connecting the supplied LoRa antenna.
7. The Ethernet connector is an alternative option for connecting to the internet via Ethernet. It is often preffered and more reliable than Wi-Fi.

Dimensions

Dimensions listed below exclude any pertruding connectors.

70mm

94mm

53mm

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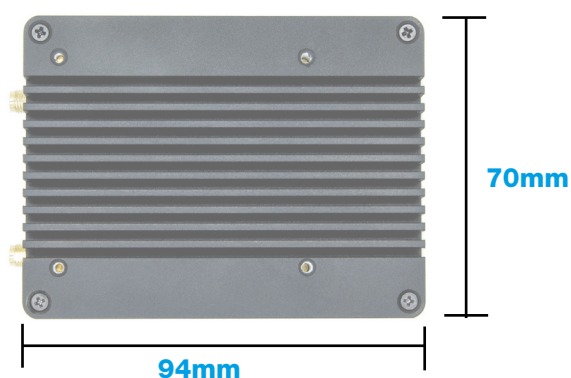
Whats Included in the box

- 1x ROCK Pi Miner Hotspot
- 1x Ethernet Cable 1m
- 1x Wi-Fi antenna
- 1x 3dBi LoRa antenna
- 1x International Power Supply 12V 2.5A
- 1x Hotspot on-boarding fee $40
- 1x First location assert feee $10

Unit Identification

Each unit has a sticker located on the base of the unit. This includes the following important Information:

- **Model:** Model number
- **FREQ:** Frequency of the Unit
- **ETH:** Ethernet MAC address
- **WiFi:** Wi-Fi MAC address
- **NSER:** Nebra Serial Number
- **SER:** Device serial Number

You will require some of this information when linking your unit to our remote management dashboard.

NEBRA   **FREQ: 868**
Helium Hotspot
Model: NEBHNT-HHRK4-868
ETH: 2E:6D:50:00:FF:EE
NSER: aabbccddeeff0011
SER: 34996b0ff093000d

Nebra LTD, UK Co No 06732600
Made in P.R.C

7

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RF Characteristics

Operating Frequencies

| Frequency	Nebra SKU	Barcode
433MHz (EU433)	NBR-0065	646648341374
470MHz (CN470)	NBR-0066	646648341381
868MHz (EU868, IN865, RU864)	NBR-0063	646648341282
915MHz (US915, AU915, KR920, AS923-1/2/3/4)	NBR-0064	646648341299

RF Features

- Mini PCIe form factor with mounted heatsink
- SX1301 base band processor emulates 49 x demodulators, 10 parallel demodulation paths. Supports 8 uplink channels and 1 downlink channel
- Built-in FT2232H
- 2x SX125X Tx/Rx front-ends high/low frequency
- Tx power up to 27 dBm, Rx sensitivity down to -139 dBm @ SF12, BW 125 kHz

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Antenna Specification

Wi-Fi

Antenna Dimension

The antennas mechanical dimensions is shown below:
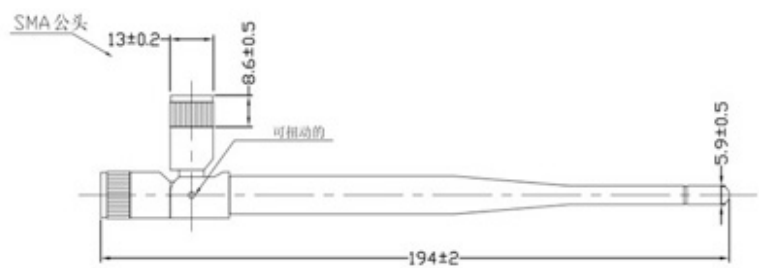
Antenna Parameters

SPECIFICATION	Wi-Fi Antenna
Frequency	2.4/5.8GHz
Gain	2-3dBi
Length	194mm
Connector Type	RP-SMA Male
Polarization Type	Vertical
Input Impedance	50 Ohms
Operating Temperature (C)	-40 - 60
Colour	Black

LoRa Antenna

Antenna Dimension

The antennas mechanical dimensions is shown below:
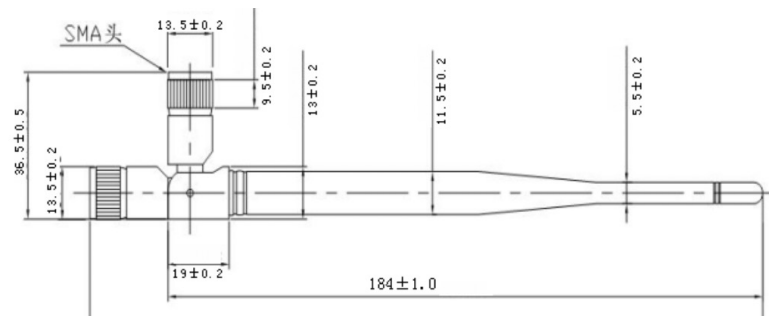
Antenna Parameters

SPECIFICATION	868MHz Model	470MHz Model
Frequency	860-930MHz	420-480MHz
Gain	3 dBi	3 dBi
Length	210mm	172mm
VSWR	< 1.8	< 2.3
Connector Type	RPSMA-J	RP-SMA Male
Polarization Type	Vertical	Vertical
Input Impedance	50 Ohms	50 Ohms
Colour	Black	Black

Environmental Requirements

This product should be operated only in a well ventilated environment to ensure there is enough heat dissapation.

The Indoor hotspot shoould be placed on a flat surface

For ideal hotspot placement please the documention here - https://helium.nebra.com/#/handy-guides/hotspot-ideal-location

Safety Instructions

To avoid malfunction or damage to this product, please observe the following:

Do not expose to water or moisture

Do not expose to any source of heat. The ROCK Pi Indoor Miner is designed for reliable operation and has been tested at normal ambient room temepratures (25°c)

Take care when handling to avoid mechanical, shock, vibration or electrical damage to the connectors or components inside

Do NOT open the case unless specifically requested to do so by a member of our support team. If opening the case please observe anti-static proceedures.

Any modification to the ROCK Pi miner will void any warranty

Compliance Information

Certification

We are working on getting the Nebra Indoor Hotspot certified in multiple regions.
Below is a list of approved regions with links to certification for viewing.

Approval	Country	Hardware Frequency	Status	Frequency Plan
CE	European Economic Area	868MHz	Completed	EU 868
UKCA	United Kingdom	868MHz	Completed	EU 868
FCC	United States of America	915MHz	Completed	US 915
RCM	Australia & New Zealand	915MHz	Completed	AU 915

Certification Codes

Certification	Code
FCC	2AZDM-HHRK4
ISED	27187-HHRK4

RoHS

All our ROCK Pi miners have been tested under the EU RoHS Directive 2011/65/
EU and its amendmant directive 2015/863/EU. You can view the certification
here - https://github.com/NebraLtd/Helium-Guides/tree/main/docs/certifications/
indoor/rock-pi/RoHS

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Software

Firmware

The Nebra Hotspots run a customised software to provide high reliability and ensure your units are as up to date as they can be.

Approximately your hotspot will update once a week in an automatic process, we will announce updates via various social media platforms when they happen.

The software is open source and available on our Helium Miner Software repo on GitHub.

Local Diagnostics

Each ROCK Pi miner ships with a local diagnostic tool built-in that you can easily access from another computer or device on the same network or you can alternatively connect the miner through Bluetooth and access through the Helium application. For further informaiton on how to access the local diagnostics page view the doucmention listed here - https://helium.nebra.com/#/handy-guides/local-diagnostics
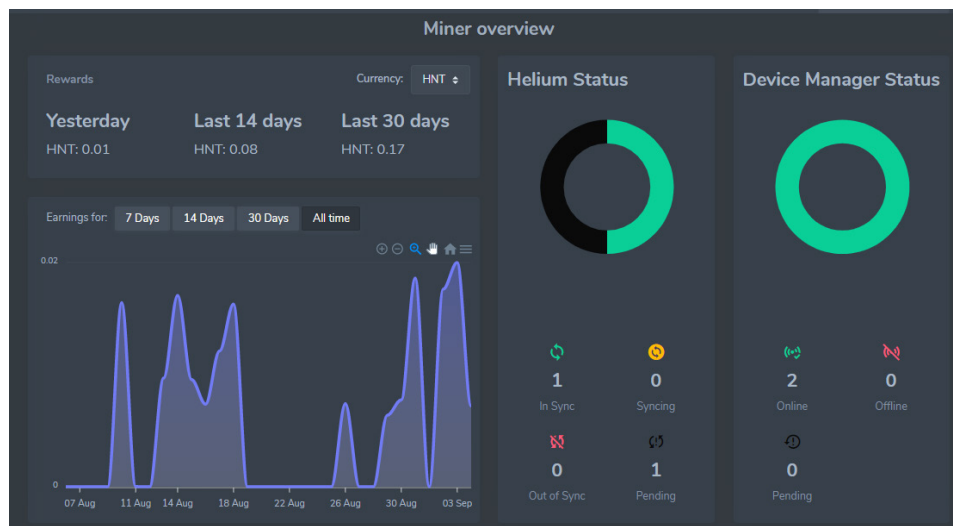
Nebra Dashboard

The Nebra Dashboard allows you to view all of your Nebra hotspot statistics in one place: keep track of rewards, sync status, and device status. You can sign-up to use the dashboard at https://dashboard.nebra.com/register/

Nebra App

Android & iOS app Coming Soon.

Trademarks

Nebra, the Nebra Logo are all trademarks of Nebra LTD t/a Pi Supply (UK Comapany Number 06732600)

ROCK Pi and the ROCK Pi logo are all trademarks of Radxa Limited

Warranty Information

All goods supplied by Nebra Ltd are warranted free from defects for 12 months from the date of supply. Warrantly will cover hardware only and where possible we will repair or replace if sufficient evidence is provided of a possible defect.

Contact Information

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Change Notes

Version	Date	Change	Initials
v2.0	07/03/2022	Draft	CR
v2.1	16/03/2022	Published copy	CR