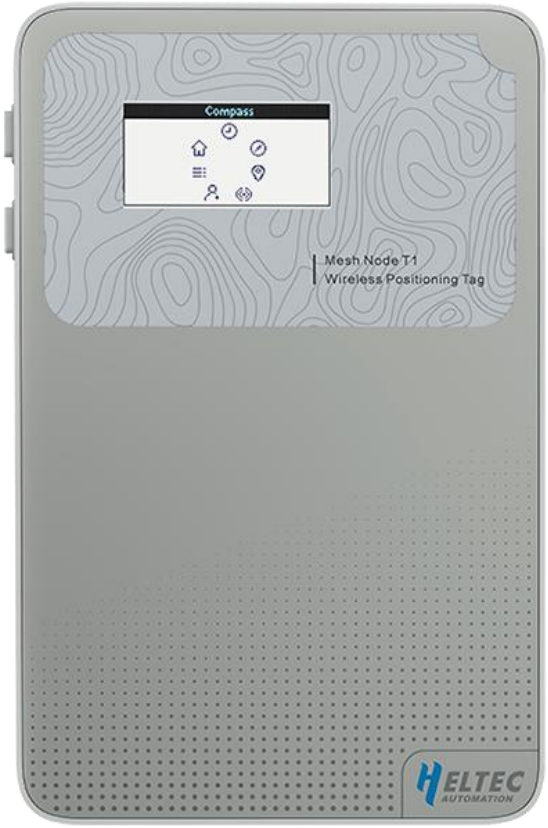
Mesh Node T1

Wireless Position Tag

Datasheet



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Document Version

Version	Time	Description	Remark
Rev. 1.0.0	2026-5-16	Preliminary version	Richard

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Content

1 Introduction

Mesh Node T1 is a lightweight, rugged card-sized LoRa terminal, built around the nRF52840 and SX1262, it supports both BLE (short-range high-speed) and LoRa (long-range low-power wide-area coverage). Integrated multi-constellation GNSS, a 9-axis IMU, a buzzer, and a 0.96-inch TFT colour display provide comprehensive situational awareness including location, heading, and motion alerts. With an 11 μA sleep current and an 1850 mAh battery, it ensures extended outdoor operation, while its IP65 rating protects against rain, dust, and humidity. The native firmware supports peer search and map track drawing, and is compatible with open-source projects such as Meshtastic and MeshCore. It also allows custom Arduino-based development for implementing private protocols.

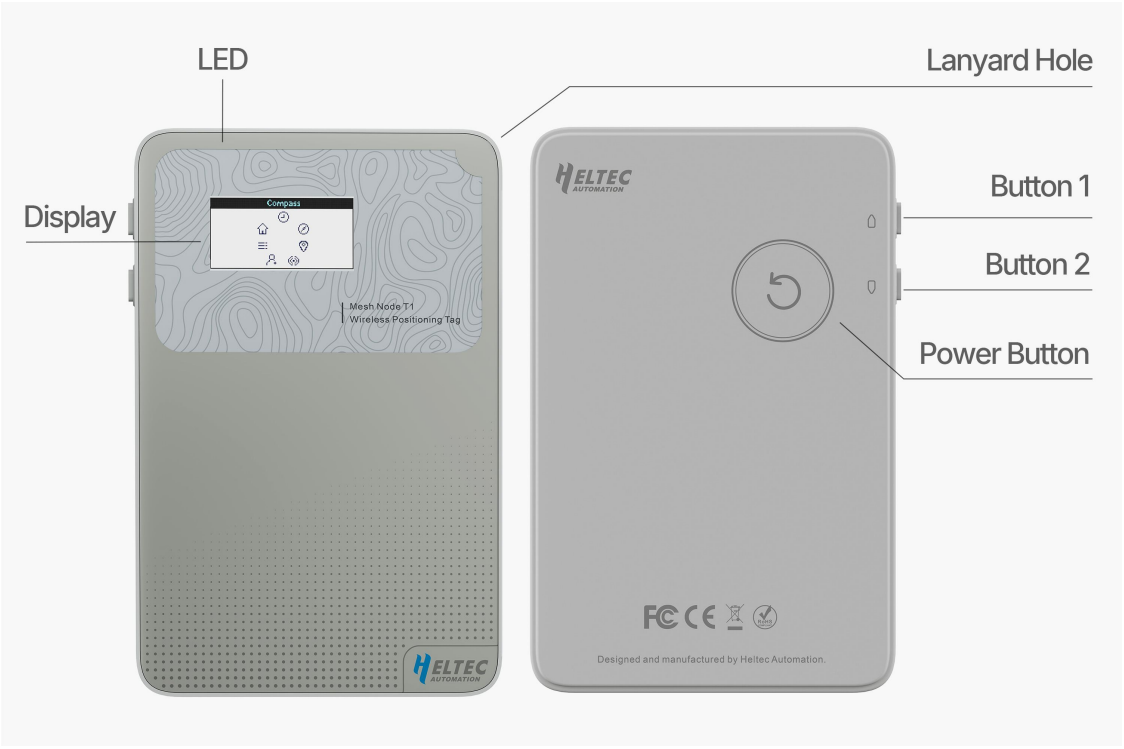
1.1 Product Features

- **11μA** Ultra-**Low Powe**r, **1850mAh** Long Battery Life
- **IP65** Industrial-Grade Protection, Wide-Temperature Operation from -10°C to 65°C
- Equipped with waterproof **USB-C** port for easy firmware upgrading and charging.
- **GNSS** multi-constellation positioning (GPS/Beidou/GLONASS/Galileo, etc.)
- **9-axis IMU**: 3-axis accelerometer + 3-axis gyroscope + 3-axis magnetometer
- **Buzzer** for local audible and visual alerts
- Default firmware supports peer search, map track drawing.
- Natively compatible with Meshtastic and MeshCore,
- Provides LoRa / LoRaWAN Arduino development environment and libraries, and supports custom programming.

1.2 Typical Applications

- Outdoor personnel/asset tracking and trajectory logging
- Decentralized mesh messaging and data transfer (Meshtastic node)
- Indoor-outdoor integrated positioning for smart construction sites and warehouses
- R&D, teaching, and LoRa mesh prototyping
- Emergency rescue, border patrol, and communications in areas without cellular coverage

2 Components



2.1 Button

Note: *The button functions depend on the firmware. Please refer to the documentation from the firmware developer for detailed operation instructions.*

Button	Condition	Description
Power Button	Long press 3s	Power on / Power off
	Short press	Reboot
	Double-click	Enter DFU mode
Button 1	USER key, connected to P1.10	
Button 2	Function key, connected to P0.14	

2.2 LED

LED Color	Description
RED	Charging
White	Function LED, connected to P0.09

3 Specifications

3.1 General Specification

Table3.1: General specification

Parameters	Description
MCU	nRF52840
LoRa Chip	SX1262
GNSS	UC6580
Accelerometer	MMC5983MA, ICM-42607-P
Memory	1M ROM; 256KB SRAM
Bluetooth	Bluetooth 5, Bluetooth mesh, BLE.
Charging temperature	0~45℃
Operating temperature	-20~60℃
Power Supply	5V USB-C
Battery	1850mA Lithium battery
Display	0.96inch TFTLCD
IP Rating	IP65
Weight	53g
Dimensions	85mm x 55mm x 9.5mm

3.2 Consumption

Table 3.2: Consumption

Mode	Condition	Consumption
LoRa TX	5dBm	57mA
	10dBm	73mA
	15dBm	96mA
	20dBm	110mA
LoRa RX		20mA
BT	8dBm TX	18mA
GNSS		35mA
Display		15-20mA
Sleep		11uA

3.3 LoRa RF Characteristics

Table3.3: Transmit power

Operating frequency band(MHz)	Maximum power value/[dBm]
863~870	21 ± 1
902~928	21 ± 1

3.4 GNSS

Table3.4: GNSS Specifications

Item	Description
Chip Model	UC6580
Satellite Systems	GPS, BDS, GLONASS, Galileo, QZSS, NavIC, SBAS
Supported Bands	L1 + L5 (Mode 1)①
Consumption	Acquisition: < 40 mA Tracking: < 40 mA Backup Mode: 5 μA
Accuracy (RMS)	Single Point: < 1.5 m (Horizontal), < 2.5 m (Vertical)

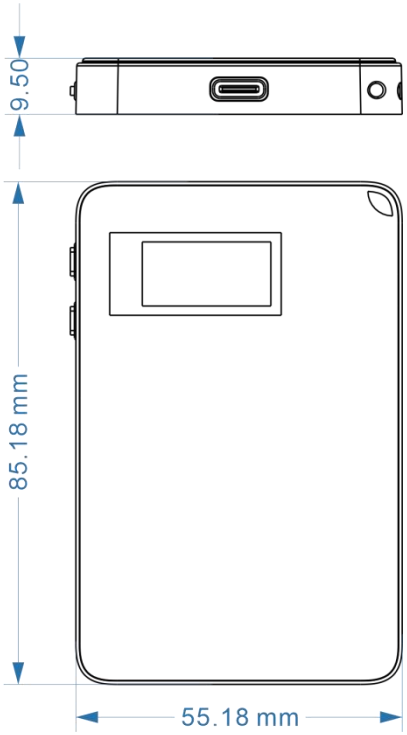
3.5 Display

Table3.5: Display Specifications

Item	Description
Model	N096-1608TBBIG09-C08
LCD Size	0.96 inch
Active area	10.8(H) x 21.7(V) mm
Mode	Normally black
Resolution	80(H)RGB x 160(V)
Interface	4 Line SPI
Drive IC	ST7735S
Backlight	1 White LED
Operation Temp	-20~+70℃

① The antenna is an L1 antenna.

4 Physical Dimensions



5 Resource

5.1 SDK: Heltec nRF52

5.2 LoRaWAN Server: SnapEmu IoT Platform

5.3 User Manual: Mesh Node T1 Wiki

5.4 Schematic Diagram

5.5 Related Resource

6 Heltec Contact Information

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