Maverick

Ultra-low power consumption battery powered mesh node with powerful LoRa radio and suite of sensors.

Highlights

Product name	Maverick
Power input	2.5V – 4.2V 1S LiPo, or 5V trough USB.
Mounting	100x22mm (2mm hole size)
Dimension	PCB: 103mm (L) x 33mm (W) x 18mm (H)
MCU	Nordic nRF52840, ARM Cortex M4F, 64 MHz, 1MB Flash, 256KB RAM
Bluetooth	Bluetooth 5.3 / Thread / Zigbee, 2.4GHz, 8dBm, range 120 meters, integrated PCB mounted antenna
LoRa	Semtech SX1268 433/470MHz or 868/915MHz, 1W-30dBm, built-in PA and LNA. range up to 12km, uFl to Antenna
GPS/GNSS	U-blox SAM-M10Q, GPS, GLONASS, Galileo, and BeiDou, integrated LNA and integrated PCB mounted antenna
Battery / charger	Li-ion battery connection and integrated 800 mA USB/solar charger
Temperature, pressure & humid	Bosch BME280, high linearity and high accuracy sensor and low current consumption.

Features

- Highly efficient MCU, with integrated BLE antenna

Nordic Semiconductor nRF52840 is an ultra-low power, highly flexible, ideal for wireless applications. We use a specialized Integrated PCB trace antenna that increases Bluetooth range. A full-speed (12Mbs) USB 2.0 controller is also included on-chip. An extensive range of peripherals are available with a number of high-performance digital interfaces.

- Powerfull LoRa radio

Semtech SX1268/1262 as main core, the Power Amplifier and Low Noise Aamplifier is built-in, which makes the maximum transmission power 1W*. The overall communication stability is greatly improved compared to the products without power amplifiers and low noise amplifiers. The anti-interference performance and communication distance have been further improved compared to the previous generation LoRa transceiver, and far superior to the current FSK and GFSK modulation products. The product can cover an ultra-wide frequency range of 433/470MHz or 868/915MHz. Communication distance tested is up to 12km. *

- Precision GNSS module with PCB integrated antenna

The u-blox M10 Professional grade precision GNSS platform, provides exceptional sensitivity and acquisition time for all L1 GNSS signals. The M10 platform supports concurrent reception of four GNSS (GPS, GLONASS, Galileo, and BeiDou). The high number of visible satellites enables the receiver to select the best signals. This maximizes the position availability, in particular under challenging conditions such as in deep urban canyons. The extremely low power consumption of 25 mW in continuous tracking mode allows great power autonomy, without compromising on GNSS performance. The SAM-M10Q GNSS includes an integrated patch antenna. No need to wire yet another antenna. The RF signal is further filtered and amplified by an internal SAW filter and a low-noise amplifier (LNA).The Ublox factory tuned integrated antenna is less sensitive to surroundings and has high tolerance against frequency detuning.

- Battery charger

A high quality charger optimized for high impedance input sources like solar. Makes it possible to efficiently charge the battery with a small solar panel. Almost all other chargers are optimized for low impedance input sources like USB. You can charge the battery at a current charge up to 800 mA trough Solar and or USB. Recommended solar panel size 1.5-3.5W 6V. This makes Maverick the perfect device for solar charged repeaters. The larger battery and more efficient and powerful charger will make it more efficient during winter when the sun is lower or at higher longitude places where less sun can be collected.

- Temperature, pressure & humidity

Bosch BME280, high linearity and high accuracy sensor and low current consumption. The sensor offers an extremely fast response time and therefore supports emerging applications such as context awareness, and high accuracy over a wide temperature range.

- Inertial Measurement Unit

A 3-axis accelerometer and 3-axis gyroscope with very low power consumption enabling always-on features for an optimal motion experience.

- Ambient light sensor

Built in high accuracy ambient light sensor. With wide dynamic range for ambient light detection from 0 lx to about 140 klx with resolution down to 0.0042 lx/ct, supports very low and very high light conditions.

- Battery monitoring sensor

Built in battery voltage monitoring and current sensor. This means you can very accurately see and log the state of charge and current consumption. So you will be able to see if Maverick is being charged by solar or USB remotely.

- Oled display

Removable 0.96 inch OLED display with 128x64 pixel resolution and bright white color on black background.

- USB-C IP rated

Waterproof USB-C connector for data communication and charging. You can do serial over USB. This means you can connect a phone to the node and use USB to configure and use the node or update the firmware. When combined with waterproof housing this makes it waterproof, yet easy accessible.

- Solar panel connector

The Maverick is perfect for solar projects, it has very low power consumption. A 45% larger battery and 60% more powerful charger. Recommended solar panel size 1.5-3.5W 6V MAX.

- Extension connector + Qwiic connector

An extension connector footprint with all the connections for an Ethernet adapter is on the back of the board.. It has UART, SPI and GPIO’s. There is also a Qwiic connector is onboard for easy connection to the large ecosystem of Qwiic sensors.

- 3x status LED

A red, green and blue LED for dynamic status feedback, user programmable.

- Push button, for user input

- Slide switch for switching ON/OFF battery

- 1S Battery protection onboard

- SWD connection

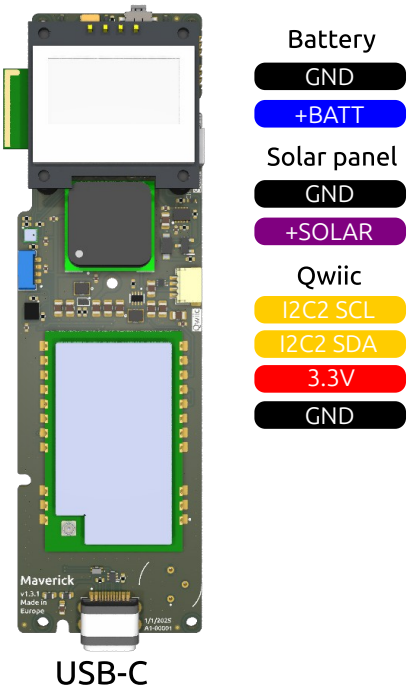
- Made in Europe 🇪🇺

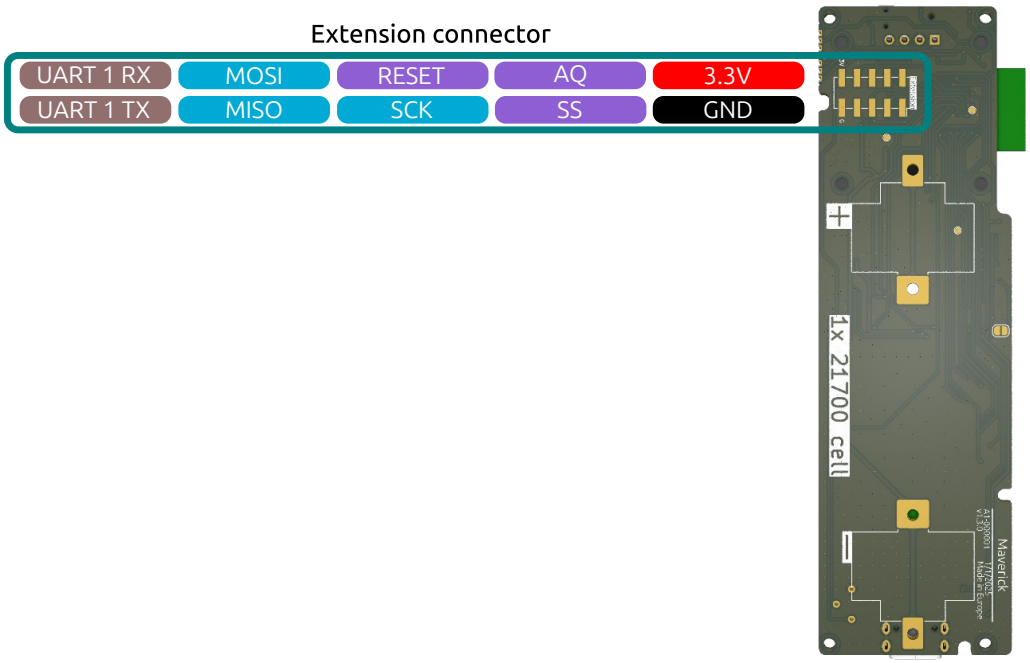
* Unless local regulations do not allow for maximum radio power.

Hardware specifications

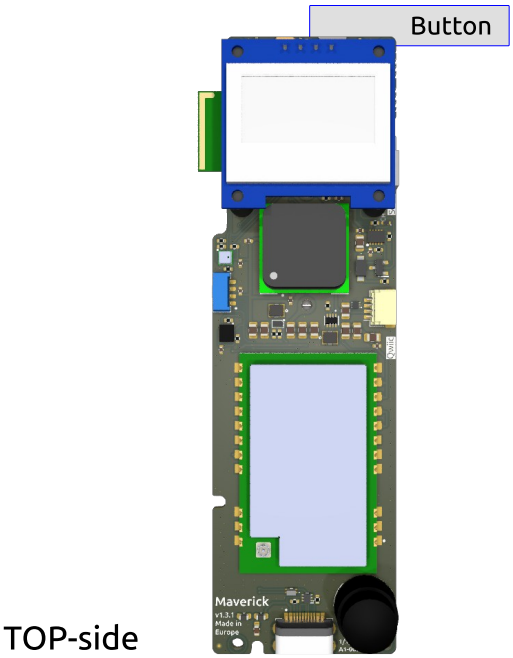
MCU	Nordic nRF52840, ARM Cortex M4F, 64 MHz, 1MB Flash, 256KB RAM Bluetooth 5.3 / Thread / Zigbee, 2.4GHz, 8dBm, range 120 meters
LoRa	Semtech SX1268 433/470MHz, 1W-30dBm, built-in PA and LNA. range 12km
GPS/GNSS	U-blox SAM-M10Q, GPS, GLONASS, Galileo, and BeiDou, integrated LNA and U-blox patch antenna
Battery	JST connector for battery, recommended size 1 000mAh – 5 000mAh Optional footprints for ‘keystone 246TR’ 21700 battery holder, do not use together with battery connected to JST battery connector.
Battery charger	Integrated 800 mA USB/solar charger
Temp, pressure & humid	Bosch BME280, high linearity and high accuracy sensor and low current consumption
6DoF IMU	STM LSM6DS3TR-C
Ambient light sensor	Vishay VEML7700
Battery monitoring sensor	Analog Devices MAX17048X
MEMS Microphone	TDK MMICT3902-00-012
Footprint for PIR detection sensor	Footprint for high quality PIR: EKMB1107112
Oled display	Removable 0.96 inch OLED display with 128x64 pixel resolution, bright white color on black background.
USB-C IP-rated	Waterproof USB-C connector for data communication and charging
Push button	For user input
Slide switch	Slide switch for switching ON/OFF battery
Battery protection	1S battery protection onboard
3x User LED	User programmable status LED
Solar panel connector	Up to 3.5W, 5-8V solar panel
Extension connector	UART + SPI + GPIO (can be used for Wiznet W5X00 Ethernet adapter)
Qwiic connector	I²C + 3.3V power for Qwiic sensors

Pinout

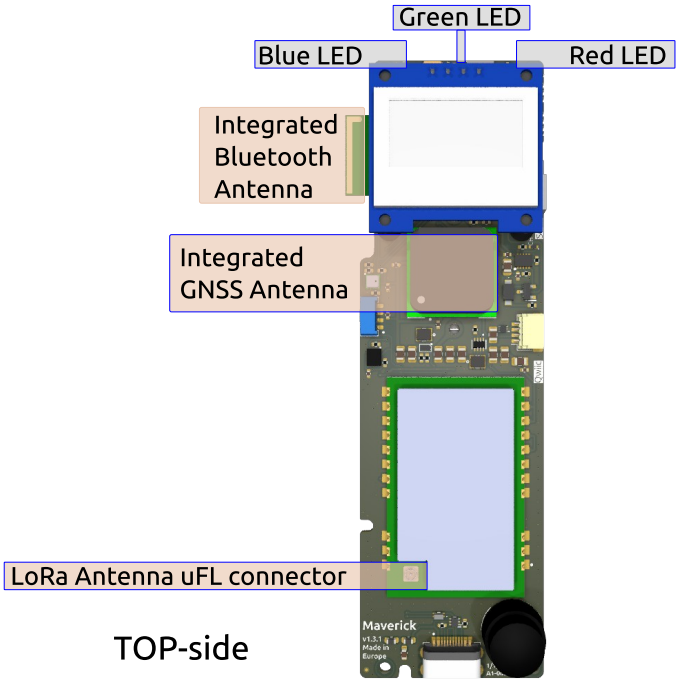




LED’s and buttons



TOP-side



TOP-side

Software

Meshtastic firmware for the Maverick can be downloaded on the Meshtastic website.

As a backup and documentation hub for the Maverick, we have made a github repo where you can find pre-release firmware:

https://github.com/GearUp-Company/Maverick

Electrical characteristics

MAX IO voltage level	3.3V
MAX +VBAT voltage level	4.2V (1S)
MAX current 3.3V	0.5A
MAX current 5V	1.8A
Expected battery time: always on, light communication 3000mAh battery	5-7 days
Expected battery time: power save, 1 update per hour * 3000mAh battery	2-3 years

* When using as a tracker with power save enabled, 1x per hour GNSS location send trough LoRa.

Environment characteristics

Temperature range	0 - 70 °C
Humidity	0 - 90%, no condensation allowed

Antenna’s

For LoRa there is uFl connector for connecting the Antenna.
The Maverick uses an internal PCB mounted GNSS antenna.
The Maverick uses an internal PCB mounted BLE antenna.

Recommended Antenna’s for LoRa 868MHz

Type	Length	Gain	Connector	Link
Large 90° bendable uFl	**200mm**	**3dBi**	**SMA**	TX868-JKD-20
Small straight	40mm	2dBi	SMA	TX868-JZ-5

Recommended Antenna’s for LoRa 433MHz

Type	Length	Gain	Connector	Link
Medium rubber straight	**100mm**	**3dBi**	**SMA**	TX433-JZ-10
Medium 90° bendable uFl	210mm	3dBi	uFl	TX433-JKS-IPX20
Small straight	40mm	3dBi	SMA	TX433-JZ-4
Large rubber Whip	173mm	3.3dBi	uFl	ANT-433-PW-QW-UFL

Order numbers

Order number	Frequency	Antenna	Oled	Housing
Maverick-433	433/470MHz	Medium rubber straight	Yes	IP67
Maverick-868	868/915MHz	Large 90° bendable uFl	Yes	IP67
Maverick-433-3D	433/470MHz	Medium rubber straight	Yes	3D print
Maverick-868-3D	868/915MHz	Large 90° bendable uFl	Yes	3D print
Maverick-433-PCB	433/470MHz	UFL to PCB antenna	Yes	No
Maverick-868-PCB	868/915MHz	UFL to PCB antenna	Yes	No
Maverick-433-PCB-S	433/470MHz	UFL to PCB antenna	No	No
Maverick-868-PCB-S	868/915MHz	UFL to PCB antenna	No	No

Housing

Variant 1, IP67 housing

- Complete IP 67 housing for maverick.
- IP-68 USB-C in combination with IP-68 u-Fl to SMA and IP-68 membrane push button.
- The OLED is made waterproof by an extra plastic transparent cover.
- All LED’s are visible externally, yet waterproof.

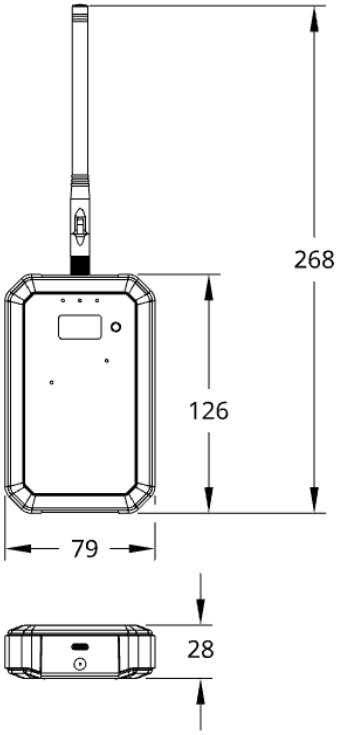
Variant 2, 3D printed housing

- Complete 3D printed housing for maverick.
- Push button accessible.
- OLED is visible.
- All LED’s are visible externally.

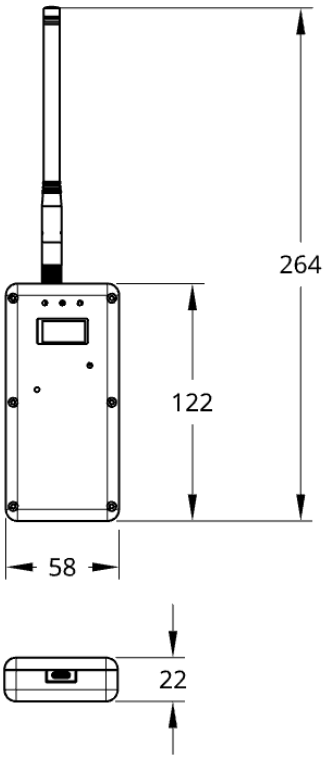
Design files can be downloaded at:
https://github.com/GearUp-Company/Maverick

Mechanical drawing

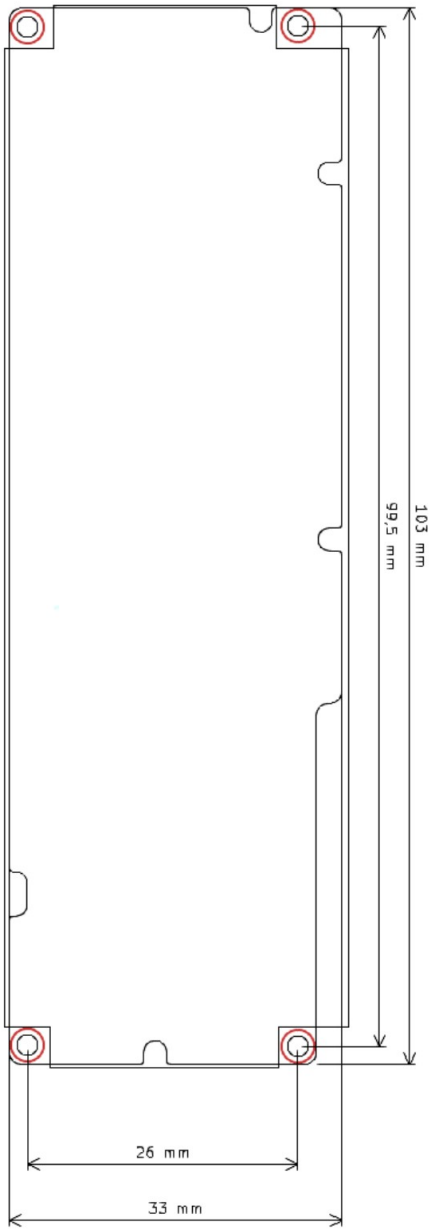
Housing IP-67 (in mm):



Housing 3D print (in mm):



PCB:



Safety Information

- This product is intended as a mesh communication device.
- Not a toy. Only to be installed by qualified users familiar with electronic safety.
- Maximum input voltage: 4.2 V DC. Exceeding this may damage the device.
- Operate within 0–60 °C and 0–90% RH, non-condensing.
- Handle only in ESD-safe environments.

Installation & Use

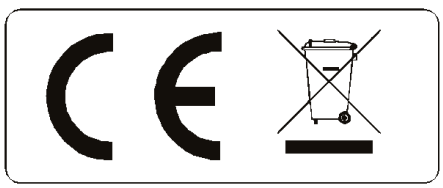
- Connect only to supported systems.
- Ensure correct polarity of power input. Reverse polarity may cause permanent damage.
- Mount securely to minimize vibration.
- Do not operate near flammable materials.

Regulatory & Compliance

- **CE Compliance**:
  This product has been designed and tested for conformity with the essential requirements of:
  - Electromagnetic Compatibility (EMC) Directive 2014/30/EU
  - Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU (as amended by 2015/863)
  - Radio Equipment Directive (RED) 2014/53/EU
- **CE Marking**:
  The CE mark affixed to this product indicates conformity with applicable EU legislation.
  The EU Declaration of Conformity for this product is available at: **www.takeyourgear.com/compliance**
- **Electromagnetic Compatibility (EMC)**:
  The device has undergone EMC testing. Users must install and operate the product according to this manual to maintain EMC performance.
- **RoHS Compliance**:
  All electronic components and assemblies are compliant with RoHS substance restrictions.
- **WEEE / Disposal**:
  This product is subject to EU Waste Electrical and Electronic Equipment (WEEE) regulations. Do not dispose of this product with household waste. At end of life, return it to an authorized collection facility for recycling.
- **ESD Precautions**:
  This product contains sensitive electronic components. Handle only in an ESD-safe environment and use proper grounding measures.

Disclaimer

- Improper installation or misuse may result in loss of vehicle control.
- Always follow local UAV regulations when operating.
- The manufacturer is not liable for damages resulting from misuse or modification.



Sales & support

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Made in Belgium