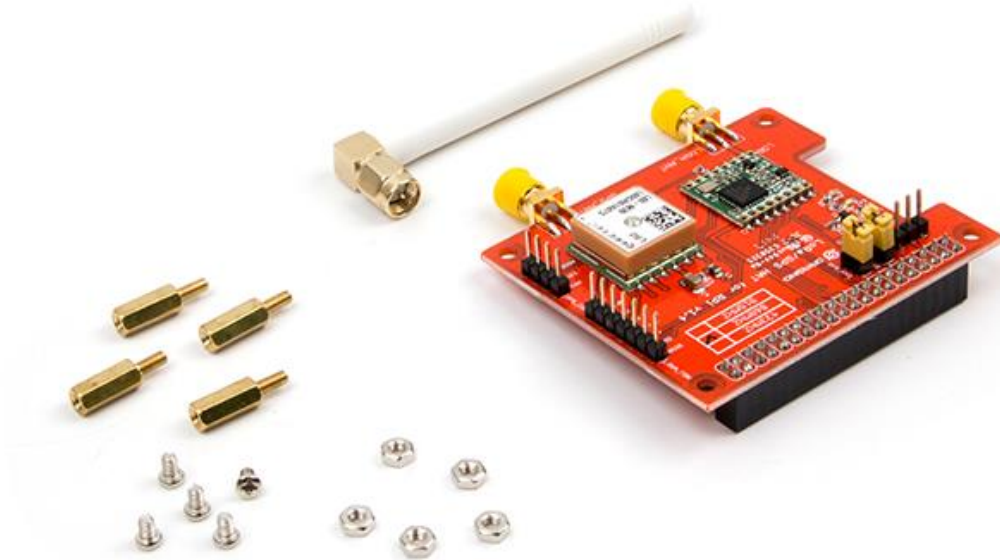


## Raspberry Pi LoRa/GPS HAT - support 868M frequency



### Description

The Dragino Lora/GPS HAT is an expansion module for LoRaWan and GPS uses with the Raspberry Pi. This product is intended for those interested in developing LoRaWAN solutions.

The Lora/GPS HAT is based on the SX1276/SX1278 transceiver. The add on L80 GPS (Base on MTK MT3339) is designed for applications that use a GPS connected via the serial ports to the Raspberry Pi such as timing applications or general applications that require GPS information.

The transceivers of the Lora/GPS HAT feature the LoRa™ long range modem that provides ultra-long range spread spectrum communication and high interference immunity whilst minimising current consumption. The Lora/GPD HAT can achieve a sensitivity of over -148dBm using a low cost crystal and bill of materials. The high sensitivity combined with the integrated +20 dBm power amplifier yields industry leading link budget making it optimal for any application requiring range or robustness. LoRa™ also provides significant advantages in both blocking and selectivity over conventional modulation techniques, solving the traditional design compromise between range, interference immunity and energy consumption.

This board can calculate and predict orbits automatically using the ephemeris data (up to 3 days) stored in internal flash memory, so the HAT can fix position quickly even at indoor signal levels with low power consumption. With AlwaysLocate™ technology, the Lora/GPS HAT can adaptively adjust the on/off time to achieve balance between positioning accuracy and power consumption according to the environmental and motion conditions. The GPS also supports automatic antenna switching function. It can achieve the switching between internal patch antenna and external active antenna. Moreover, it keeps positioning during the switching process.

## Features

- Frequency Band: 868 MHz
- Compatible with Raspberry Pi 2 Model B/Raspberry Pi 3.
- LoRa™ Modem
- FSK, GFSK, MSK, GMSK, LoRa™ and OOK modulation
- Preamble detection
- Baud rate configurable
- Built-in temperature sensor and low battery indicator
- Excellent blocking immunity
- Automatic RF Sense and CAD with ultra-fast AFC
- Support DGPS, SBAS(WAAS/EGNOS/MSAS/GAGAN)
- GPS automatic switching between internal patch antenna and external active antenna
- PPS VS. NMEA can be used in time service
- Support SDK command
- Built-in LNA for better sensitivity
- EASY™, advanced AGPS technology without external memory
- AlwaysLocate™, an intelligent controller of periodic mode
- GPS FLP mode, about 50% power consumption of normal mode
- GPS support short circuit protection and antenna detection

## Specifications

### Lora Spec:

- 168 dB maximum link budget.
- +20 dBm - 100 mW constant RF output vs. +14 dBm high efficiency PA.
- Programmable bit rate up to 300 kbps.
- High sensitivity: down to -148 dBm.
- Bullet-proof front end: IIP3 = -12.5 dBm.
- Excellent blocking immunity.
- Low RX current of 10.3 mA, 200 nA register retention.
- Fully integrated synthesizer with a resolution of 61 Hz.
- FSK, GFSK, MSK, GMSK, LoRa™ and OOK modulation.
- Built-in bit synchronizer for clock recovery.
- Preamble detection.
- 127 dB Dynamic Range RSSI.
- Automatic RF Sense and CAD with ultra-fast AFC.
- Packet engine up to 256 bytes with CRC.
- Built-in temperature sensor and low battery indicator.

**GPS Spec:**

- Power Acquisition: 25mA, Power Tracking: 20mA.
- Compliant with GPS, SBAS.
- Programmable bit rate up to 300 kbps.
- Serial Interfaces UART: Adjustable 4800~115200 bps, Default: 9600bps.
- Update rate: 1Hz (Default), up to 10Hz.
- Protocols: NMEA 0183, PMTK.
- Horizontal Position Accuracy: Autonomous < 2.5 m CEP.
- TTFF@-130dBm with EASY™: Cold Start < 15s, Warm Start < 5s, Hot start < 1s; TTFF@-130dBm without EASY™: Cold Start < 35s, Warm Start < 30s, Hot Start < 1s.
- Timing Accuracy: 1PPS out 10ns, Reacquisition Time < 1s.
- Velocity Accuracy Without aid < 0.1m/s, Acceleration Accuracy Without aid 0.1m/s<sup>2</sup>.
- Sensitivity Acquisition -148dBm, Tracking -165dBm, Reacquisition -160dBm.
- Dynamic Performance Altitude Max. 18000m, Maximum Velocity Max. 515m/s, Maximum Acceleration 4G.
- L1 Band Receiver (1575.42MHz) Channel 22 (Tracking) / 66 (Acquisition).

**Technical Details**

Weight	G.W 61g
Battery	Exclude

**Part List**

Lora/GPS HAT	1
Brass cylinders	4
Screws	4
Nuts	4
Glue Stick Antenna (868 MHz)	1