Product Specifications

LoRa® USB Dongle

LD-50H

VER: 1.0

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Product Description

LD-50H is low power-consuming, half-duplex dongle. It can wirelessly transmit data to long-distance. It is built-in high speed and low power-consuming MCU and SX1276 modulation chipset. This chipset is applied with the forward error correction technique which greatly improves interference immunity and advances sensitivity. The coding can detect errors and automatically filter out errors and false data. LD-50H is suitable for long-distance transmission or harsh environments.

Product Feature

- Built-in standard LoRaWAN™ FW and proprietary MOST-Link FW in the same module
- Support setting various parameters like baud rate, transmission power, transmission speed, etc.
- USB interface, could be directly connected to PC or mobile devices for development and test
- Ultra-high sensitive receiving ability by LoRa® spread spectrum modulation technology
- Long-distance transmission (1KM to 10KM)
- Instant wake up over the air
- LoRa®/ FSK/ GFSK/ OOK modulation, 2-way half –duplex communication, strong anti-interfere
- Maximal output power 100mW (20dBm), output power adjustable between 5-20 dBm
- Accord FCC,ETSI,TELEC standard

Hardware Specifications

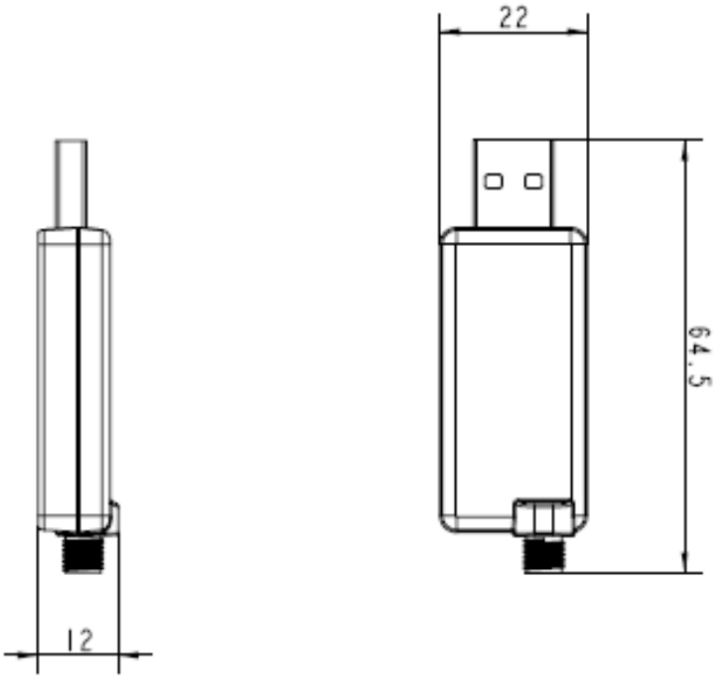
Item	Content
LoRa® Module	Globalsat Dual-mode LoRa® module LM-513H
Antenna	RPSMA/ 50 Ω
Frequency	863 ~ 870 MHz (EU) 902 ~ 928 MHz (US) 920 ~ 928 MHz (ROA)
Connection type	USB Type-A
Transmission media	UART
UART	**Baud rate**: 57600 bps **Parity:** 8N1
Operation Voltage	3.5 ~ 6V
Current consumption	**Receiving:** 33 mA (Typical) **Transmitting:** 140 mA (Typical) **Sleeping:** 10.3 mA (Typical)
Transmission distance	LoRaWAN™: 1 ~ 10 KM @ 980 bps MOST-Link: 1 ~ 10 KM @ 0.81 Kbps
Receiving sensitivity	LoRaWAN™: -132 dBm @ 980 bps MOST-Link: -132 dBm @ 0.81 Kbps
Operation Temperature	-40 ~ 85°C
Humidity	5 ~95% (Non-condensing)
Dimension	22 x 64.5 x 12 mm
Weight	13g

LED Definition

Color	Sign	Definition	Description
Orange		Rx	**On:** Receiving data. It would be Off after receiving data.
Green		Tx	**On:** Transmitting data. It would be Off after transmitting data.

Product Size

Unit: mm



LoRaWAN™ Configuration

Activation of an end-device can be achieved in two ways, either via Over-The-Air Activation (OTAA) when an end-device is deployed or reset, or via Activation By Personalization (ABP) in which the two steps of end-device personalization and activation are done as one step.

- **Over-the-Air Activation**

For over-the-air activation, end-devices must follow a join procedure prior to participating in data exchanges with the network server. An end-device has to go through a new join procedure every time it has lost the session context information. The join procedure requires the end-device to be personalized with the following information before its starts the join procedure: a globally unique end-device identifier (DevEUI), the application identifier (AppEUI), and an AES-128 key (AppKey).

- **Activation by Personalization**

Under certain circumstances, end-devices can be activated by personalization. Activation by personalization directly ties an end-device to a specific network by-passing the join request join accept procedure.

Activating an end-device by personalization means that the DevAddr and the two session keys NwkSKey and AppSKey are directly stored into the end-device instead of the DevEUI, AppEUI and the AppKey. The end-device is equipped with the required information for participating in a specific LoRa network when started. Each device should have a unique set of NwkSKey and AppSKey. Compromising the keys of one device shouldn‘t compromise the security of the communications of other devices.

■ **Operation Mode**

· **Bi-directional end-devices (Class A):** End-devices of Class A allow for bi-directional communications whereby each end-device's uplink transmission is followed by two short downlink receive windows. The transmission slot scheduled by the end-device is based on its own communication needs with a small variation based on a random time basis (ALOHA-type of protocol). This Class A operation is the lowest power end-device system for applications that only require downlink communication from the server shortly after the end-device has sent an uplink transmission. Downlink communications from the server at any other time will have to wait until the next scheduled uplink.

· **Bi-directional end-devices with maximal receive slots (Class C)**:

End-devices of Class C have nearly continuously open receive windows, only closed when transmitting. Class C

MOST-Link Configuration

There are three operating modes in MOST-Link configuration state as below.

1. Normal mode
2. Wake-up mode
3. Power-saving mode

The different operation modes are switched by AT-command.

- **Mode 1: Normal mode**

  UART is opened. Wireless channel is opened. Penetrating transmission.

- **Mode 2: Wake-up mode**

  UART is opened. Wireless channel is opened. The only difference from normal mode is that its preamble is longer than normal mode's, so that it can make sure the receiver could be waked in the power-saving mode.

- **Mode 3: Power-saving mode**

  UART is closed. The wireless channel is in power-saving mode. You can set up an interval from 0.5 to 5 seconds to wake up in power-saving mode to check if there is preamble. If the receiver receives preamble, it will open UART, and wake MCU to process the received data and return data. After that, it will return to the power-saving mode.

Note:
The receiver could be waked no matter it is in normal mode or wake-up mode or power-saving mode.
The receiver would automatically add the RSSI.