



Lobaro LoRaWAN GPS Documentation

Version 5.0 - 12.04.2018

Most recent Firmware: v4.0.4+LoRa3.2

General Function

The GPS tracker has two modes: "Active" and "Alive", depending on the mode a different schedule is used to send out LoRaWAN Messages.

A motion detection sensor is used to switch between the modes. Once a shock is detected the mode is switch to active and a LoRaWAN message is send out.

Key Features

- Low Power Consumption
- Water and Dust resistant case (IP67 alike)
- No potentially dangerous Lipo battery
- Works at low temperatures (tested till -20°C)
- Easy configuration

LoRaWAN Data

The box sends the following payload on port 1:

```
var active = bytes[0];
var Temp10tel = (bytes[1] << 8) | (bytes[2] << 0);
var VBat1000tel = (bytes[3] << 8) | (bytes[4] << 0);
var lat_deg = bytes[5];
var lat_min = bytes[6];
var lat_10000min = (bytes[7] << 8) | (bytes[8] << 0);
var long_deg = bytes[9];
var long_min = bytes[10];
var long_10000min = (bytes[11] << 8) | (bytes[12] << 0);
var gpsValid = (bytes[13] !== 0);
var satCnt = bytes[14];
```

Convertible to:

```
var gps = {
  latitude:lat_deg + lat_min / 60 + (lat_10000min / 10000) / 60,
  longitude:long_deg + long_min / 60 + (long_10000min / 10000) / 60,
};

var TempDegree = Temp10tel / 10.0;
var Battery_Voltage = VBat1000tel / 1000.0;
```

Example:

Hex Payload: **01 00 d0 09 95 35 1c 0f f6 09 37 26 b3 01 05**

Active = **01** -> Active mode

Temp = **00 d0** -> 208 -> 20,8°C

VBat = **09 96** -> 2453 -> 2,453 V

GPS = **35 1c 0f f6 09 37 26 b3** -> 53.47347666666667, 9.933178333333332

gpsValid = **01** -> GPS Location is valid

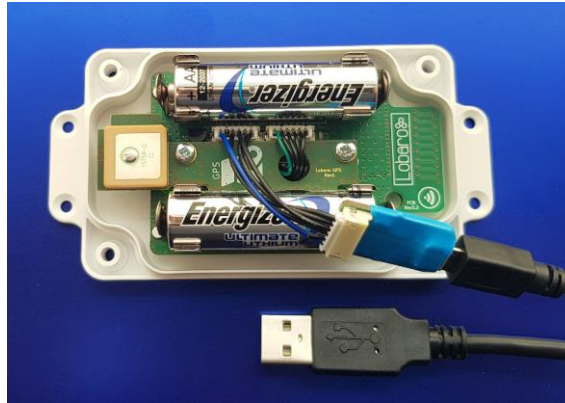
satCnt = **05** -> 5 Satellites

Configuration

The configuration will be done with the Lobaro Maintenance Tool for Mac, Linux and Windows. The free download can be found here:

<https://www.lobaro.com/lobaro-maintenance-tool/>

The Lobaro Serial-USB adapter cable must be attached to “config” port:



| PARAMETER | VALUE | TYPE |
|------------|---|----------|
| OTAA | true | bool |
| AppEUI | 70 B3 D5 7E F0 00 32 F0 | [Juint8] |
| DevEUI | 00 04 A3 0B 00 04 17 DA | [Juint8] |
| AppKey | C8 04 2C B1 FB 3E 7A BD E2 F0 14 69 34 CE E1 EC | [Juint8] |
| NetSKey | 3D 2B 57 02 EE 2B 37 53 A8 8C E0 90 83 EE E5 49 | [Juint8] |
| AppSKey | 47 93 5B 37 5B E1 86 B9 26 9F DE BC 49 2A 33 3C | [Juint8] |
| DevAdr | 00 04 17 DA | [Juint8] |
| SF | 11 | uint64 |
| TxPower | 14 | uint64 |
| ActiveCron | 0 0/1 **** | string |
| gpsTO | 60 | uint64 |
| actTO | 65 | uint64 |
| AliveCron | 0 0 0/12 *** | string |
| memsTn | 5 | uint64 |

Available parameters are:

- OTAA Use OTAA (over the air activation), else ABP (activation by personalization)
- AppEUI Required for LoRaWAN OTAA Join
- DevEUI Required for LoRaWAN OTAA Join
- AppKey Required for LoRaWAN OTAA Join
- NetSKey Required for LoRaWAN ABP only (not recommended)
- AppSKey Required for LoRaWAN ABP only (not recommended)
- DevAdr Required for LoRaWAN ABP only (not recommended)
- SF LoRaWAN Spreading Factor (7-12)
- TxPower LoRaWAN Transmit Power (2-14 dBm)

- ActiveCron Cron Expression to schedule send when active mode
- AliveCron Cron Expression to schedule send when in alive mode
- gpsTO Time in seconds to wait for GPS fix
- actTO Time in minutes to switch back from active to alive mode
- memsTh Threshold for mems to detect motion according to LIS3DH spec

LoRaWAN Duty Cycling SRD-868 (1%) is always considered.

CRON Parameters

To configure schedules, Linux CRON expressions are used. All CRON Expressions are based on the internal clock which gets a reset on power down.

The CRON expression consists of 6 fields:

- Second (0-59)
- Minute (0-59)
- Hour (0-23)
- Day (1-31)
- Month (1-12)
- Day of Week (MON-FRI)

Examples:

- 0 1/10 * * * * 10 10 minute cycle starting at minute 1, second 0
- 0 5 * * * * hourly at minute 5, second 0
- 0 0 6 * * * daily at 6:00:00
- 0 0 13 1,15 * * monthly at day 1 and 15 at 13:00:00 Uhr
- 0 0 9 1-5 * * every month daily from day 1. to 5.at 9:00:00

Energy consumption:

Energy supply: 2x AA Batteries (1.5V)

Energy usage idle: < 2.5mA

Energy usage DeepSleep (with GPS in standby / fast restart mode): < 30µA

Energy usage GPS: 40mA (peek value)

Energy usage Send: 80mA @14 dBm (peek value)