

Lobaro[®]

Industrial IoT Solutions

– LoRaWAN GPS Tracker –

User Manual



Product Name: GPS-LoRaWAN
Related Firmware: \geq V4.0.7
Document Date: 2018-08-22

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1. Overview

The LoRaWAN GPS Tracker (GPS-LoRaWAN) is a battery powered tracking device, that uses the satellite based positioning service GPS to determine its location and transmits the obtained coordinates via LoRaWAN radio technology. Intervals between measurements can be freely configured, in order to adjust the device to individual needs.

An integrated motion sensor detects changes in the device's movement (if it is picked up or transported in a vehicle). This allows the device to switch between an 'Active Mode' in which frequent updates are uploaded during phases of movement and an 'Alive Mode' that saves battery power by sending only few updates. While not sending updates, the device enters a sleep mode that only uses $\sim 30 \mu\text{A}$.

Figure 1 shows the GPS Tracker with opened casing. The most important components are indicated and explained.

Please read the manual carefully before operating the device. A safe operation of the device is only possible if you follow the guides provided in this manual. Using the device differently than intended by Lobaro may cause damage to people, the environment, or the device.

1.1. The Device

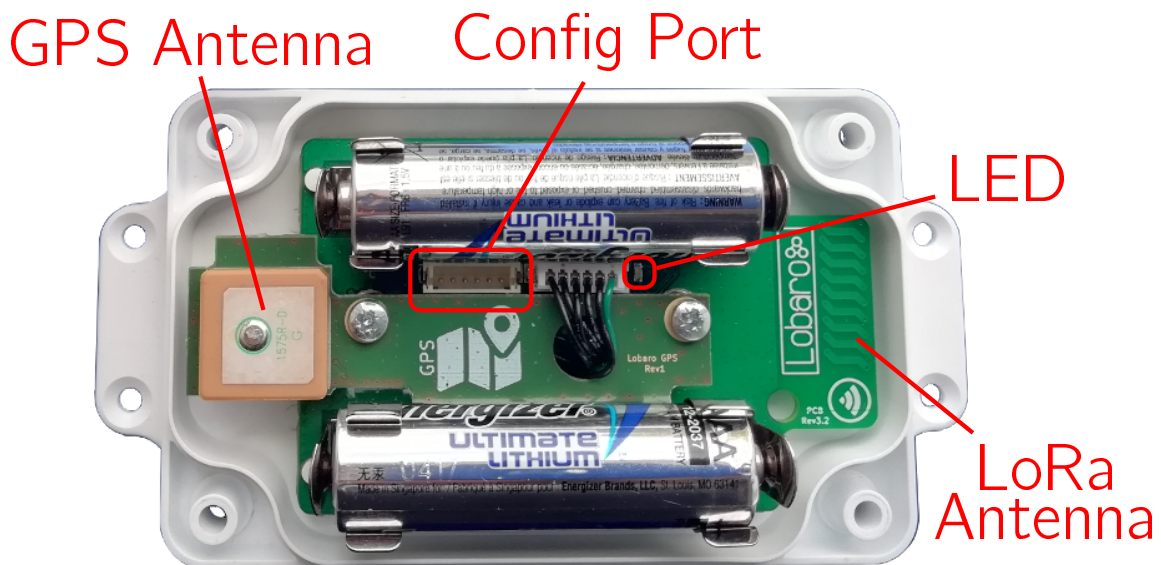


Figure 1: Device, opened

2. Operating the GPS Tracker

Once appropriate batteries are inserted into the device, it will start working. The Tracker will most likely need to be adjusted to your personal LoRaWAN configuration (see chapter 4).

2.1. Batteries

The LoRaWAN GPS Tracker default power supply consists of two series connected off-the-shelf 1.5V 'AA' sized batteries. Be sure to get the polarity right, see the '+'-Symbol on the board. In general only AA cells of the types Alkali-Manganese (1.5V, LR6) and Lithium-Iron-Sulphide (1.5V, FR6) are allowed to be inserted in the device. Lobaro recommends the use of FR6 batteries like the *Energizer Ultimate Lithium* over LR6 types because of the higher capacity and better discharge properties.

Other Batteries or accumulators with a nominal voltage of more than 1.5V must not be inserted into the device under any circumstances. In particular, lithium based cells with a nominal voltage of 3.6V or 3.7V must not be used on the AA battery slots!

On request we can supply custom product variants with special housings powered by even bigger batteries. For example a 3.6V C sized mono cell typically has a capacity of 9Ah with leads to a 3x increased battery life compared to the standard AA-cells. With D sized cells of typically 19Ah capacity this value can be doubled once again (6x). Also available on request are options with permanent external power supply (230V, 9-24V, 5V USB).

2.2. Installation

The device must be fixed on a flat surface using the lateral mounting holes of the case, see chapter 6.1 for a detailed description of all housing dimensions. Alternatively we offer as accessory a mounting clip for a standard 35mm DIN rail. The device can then easily snapped on a such rails. It can therefore be added to a variety of racks alongside other devices.

Under any circumstances the device must not be mounted higher than 2 meters above ground to avoid any risks in case of falling down!

For optimal RF performance (e.g. LoRa range) any metal obstacles near the internal antenna should be avoided. In this case 'near' is defined as keep-out distance of about 3-5 centimeters around the antenna. The internal helix antenna can be identified by the winding pcb traces near the white printed encircled 'connectivity' symbol. In any case a device mounting directly on top of a metal surface is not advisable since it will degrade the possible RF range. Stone walls, wood or plastic standoffs are perfectly ok.

In case of challenging installation locations (e.g. in basements) or unavoidable long distances to the next LoRaWAN gateway, Lobaro offers on request custom product variant equipped with a 'SMA' connector to support a external antenna connection.

3. Work Cycle

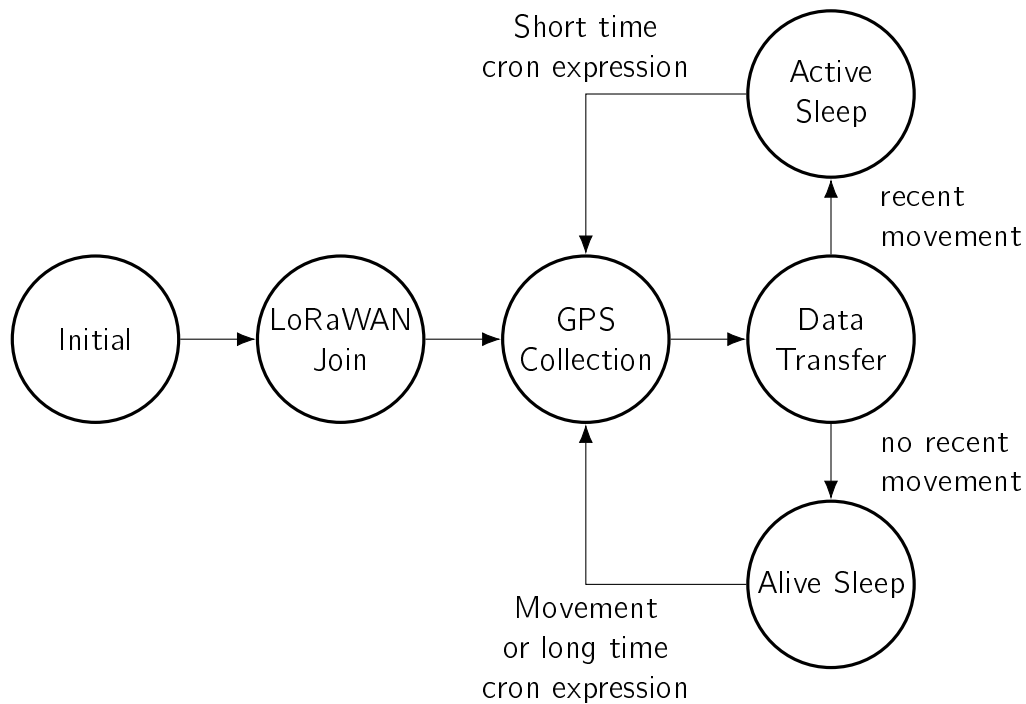


Figure 2: Workflow of the Tracker explaining 'Active' and 'Alive' modes

The GPS Tracker has a work cycle that adapts to detected motion of the device. It is illustrated in figure 2.

3.1. Initial Phase

This is the phase that is executed after the device is started or restarted. The LED flashes once and the configuration is evaluated. If successful, the LoRaWAN Join phase is executed next.

3.2. LoRaWAN Join Phase

If the Device is configured to use over the air activation (OTAA), the OTAA Join is performed at this point. The device will repeatedly try to join its LoRaWAN network until the process is successful. It then enters the Data Collection Phase.

If the Device is configured to use ABP instead of OTAA, this phase is left immediately and the Data Collection Phase is entered.

3.3. GPS Collection Phase

During the GPS Collection Phase the device will try to determine its coordinates (latitude, longitude, and height) using GPS. You can identify this phase by the onboard LED flashing on and off in one second intervals.

Once the position has been determined successfully (or the attempt timed out and failed, because of bad GPS reception), the device enters the Data Transfer Phase

3.4. Data Transfer Phase

During the Data Transfer Phase the Tracker uploads the GPS coordinates to the LoRaWAN network. The message contains the information if the measurement was successful. Some status information about the device are included as well.

For a detailed description of the data sent refer to chapter 5.

After data transfer, the GPS Tracker enters a sleep state to save power. Depending on how much time passed since the last physical movement of the device (determined by the internal motion sensor), the Tracker enters different sleep phases. If the time since the last detected motion is less than a timeout value (configurable, standard value is 65 minutes), the device remains in 'Active' mode enters only a short sleep phase ('Active Sleep'). If no motion was detected for a time longer than the timeout, the device enters the 'Alive Sleep' Phase, which typically has a much longer sleeping time, but in which the device will also be activated through movement.

3.5. Active Sleep Phase

Even in Active Mode, the device spends most of its time in a deep sleep state to conserve energy. The frequency with which the Tracker wakes up in Active Mode can be configured using a Cron expression (see chapter 4.4). Typical values for active sleep time are 5 or 15 minutes.

When in Active Sleep Phase, the device will not be triggered to gather more GPS positions through motion, but movement of the device will still be registered to keep the Tracker in Active Mode.

3.6. Alive Sleep Phase

When no movement has been detected for a long amount of time (configurable), the device stops sending updates, since there is not much point in sending frequent position information when the device does not change its position. In Alive Mode, only very few updates are sent

to keep the network informed about the device's health. Typically one message is sent per day in this mode (frequency can be configured with a cron expression, see chapter 4.4).

When physical movement is detected by the internal motion sensor during this phase, the GPS Tracker immediately wakes up and switches to Active Mode.

4. Configuration

4.1. The Lobaro Maintenance Tool

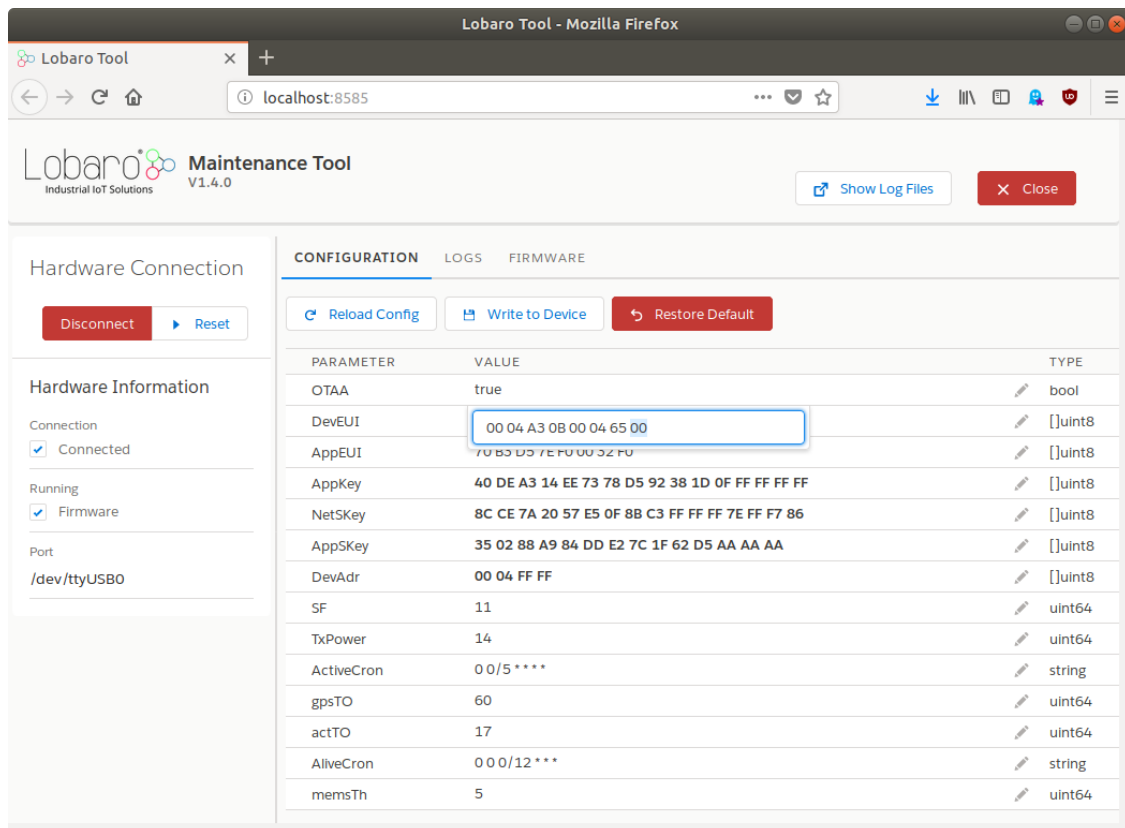


Figure 3: Lobaro maintenance tool (Windows, Linux, Mac)

The initial device configuration can be done very comfortably from your PC via the serial configuration interface. Beside the needed Lobaro USB to UART adapter the *Lobaro Maintenance Tool*¹ needs to be installed. This tool is freely available for various operating systems including Windows, Linux, Mac and Linux-ARM (e.g. Raspberry-PI) on and works with all Lobaro sensors.

Technically this software opens a webserver on port 8585 that runs in a background console window. The actual user interface can be accessed normally using a standard web browser at address <http://localhost:8585> (see fig. 3). Normally your default browser should be opened with this URL automatically after tool startup. Even remote configuration and log-observation over the Internet is possible, e.g. having a Raspberry PI via USB connected to the Lobaro device and accessing the maintenance tool from a remote machines browser over the Internet.

Additionally to the device setup the tool can also be used for firmware updates ('Firmware Tab'), watching real-time device diagnostic output ('Logs Tab') and initiating device restarts.

¹Lobaro Maintenance Tool free download: <https://www.lobaro.com/lobaro-maintenance-tool/>

Please note that the device is automatically restarted each time the configuration has been changed!

4.2. Connecting the USB config adapter

For configuration and firmware updates we provide a special serial-USB adapter that can be connected as shown in figure 4. The corresponding connector on the PCB is marked with the word 'Config'.

The USB-adapter will add a virtual serial 'COM' Port to your system. Your operating system needs the *CP210x USB to UART Bridge*² driver installed. A download link is provided next to the 'Connect' button when you start the Maintenance Tool.

While the config adapter is connected, the device will be powered from the USB port with a regulated voltage of 3.3V. It is not necessary – although it would be no problem – having batteries inserted or a different supply connected while using the config adapter. All configuration parameters will be kept non-volatile regardless of the power supply.



Figure 4: Connected Lobaro USB configuration adapter

4.3. System parameters

After being successfully connected to the hardware using the Lobaro Maintenance Tool you can press 'Reload Config' in the 'Configuration' tab to read the current configuration from the

²<https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>

device. For every parameter a default value is stored non volatile inside the hardware to which you can revert using the 'Restore default' button in case anything got miss configured.

All LoRaWAN & other firmware parameters are explained in the following.

4.3.1. LoRaWAN network parameters

A large part of the configuration parameters are used to control the device's usage of LoRaWAN. Table 1 lists all of them. There are two different ways to use LoRaWAN: *over-the-air activation* (OTAA) and *activation by personalization* (ABP). Some configuration parameters are only used with one of those methods, others are used for both.

Name	Type	Used	Description
OTAA	bool	both	<i>true</i> : use over-the-air activation (OTAA) <i>false</i> : use activation by personalization (ABP)
DevEUI	bytes[8]	OTAA	the 8 byte long DevEUI is used with OTAA to identify the device on join. The default is predefined in the hardware and guarantees an ID that is unique world wide. Should not be changed unless required by the network provider. Hex format without 0x prefix.
AppEUI	bytes[8]	OTAA	ID defining the application used in the LoRaWAN network. Hex format without 0x prefix.
AppKey	bytes[16]	OTAA	Application Key as defined by the LoRaWAN network operator. This is used to encrypt communication, so keep it secret. Hex format without 0x prefix.
OTAADelay	int	OTAA	Seconds to wait for a new attempt after an unsuccessful OTAA join. The actual waiting time will be randomly increased by up to a third of that amount, in order to avoid devices repeatedly interfering with each other through bad timing. The default value is 300, which means the timeout between attempts is 300-400 seconds.
AppSKey	bytes[16]	ABP	App Session Key as defined by the LoRaWAN network operator. Hex format without 0x prefix.
NetSKey	bytes[16]	ABP	Network Session Key as defined by the LoRaWAN network operator. Hex format without 0x prefix.
DevAdr	bytes[4]	ABP	Device Address as defined by the LoRaWAN network operator. Hex format without 0x prefix.
SF	int	both	Initial LoRa spreading factor used for transmissions. Valid range is 7-12. The actual spreading factor used might change during operation of the device if Adaptive Data Rate (ADR) is used.
TxPower	int	both	Initial transmission output power in dBm. The LoRaWAN protocol allows only specific values: 2, 5, 8, 11, 14. The actual power used might change during operation if Adaptive Data Rate (ADR) is used.
ADR	bool	both	<i>true</i> : use adaptive data rate (ADR) <i>false</i> : don't use adaptive data rate (ADR)

Table 1: LoRaWAN network parameters

4.4. GPS configuration parameters

The behaviour of the GPS Tracker and how it switches between its two operation modes ('Active' and 'Alive') can be adjusted to your needs. Table 2 explains the configuration parameters used for this.

Name	Type	Description
ActiveCron	string	Cron expression defining how often the device will take a measurement and send its position over LoRaWAN while the Tracker is in Active Mode. This expression should trigger much more frequent than the one for Alive Mode. The standard is <code>0 0/15 * * * *</code> , which will trigger every 15 minutes. See chapter 4.4.1 for an introduction to cron expressions.
AliveCron	string	Cron expression defining how often the device will wake up when in Alive Mode. This should be less frequent than in Active Mode. The standard is <code>0 0 0/12 * * *</code> , which translates to twice each day. See chapter 4.4.1 for an introduction to cron expressions.
gpsT0	int	Time in seconds to wait for GPS to get a fix before timing out. The standard value is 60 seconds.
actT0	int	Time in minutes without movement after which the Tracker switches to Alive Mode. The standard value is 65 minutes.
memsTh	int	Threshold for the internal motion detector to register movement. Values range from 2 to 255. A higher value makes the device less sensitive. <ul style="list-style-type: none"> 2 Environment (wind or steps) may trigger. 5 Standard, picking up the device will activate it. 20 Carefully picking it up will not trigger the device. 50 When carried, running will trigger, walking won't. 100+ Shaking will activate, dropping the device might not.

Table 2: GPS configuration parameters

4.4.1. Cron expressions

Cron expressions are used to define specific points in time and regular repetitions of them. The schedule for data collecting phases is defined using the Cron³ format which is very powerful format to define repeatedly occurring events⁴.

³For more information about Cron see <https://en.wikipedia.org/wiki/Cron>

⁴Online introduction: <https://github.com/lobaro/docs/wiki/CRON-Expressions>

Standard Lobaro devices typically do not need to know the real time for proper operation. All times are relative to the random time when batteries are inserted. If needed by the target application Lobaro can deliver on request special hardware support for keeping data acquisition intervals based on a real time clock which stays in sync with the *real* time. Please contact Lobaro directly if you need such a custom product variant.

A cron expression consists of 6 values separated by spaces:

- Seconds (0-59)
- Minutes (0-59)
- Hours (0-23)
- Days (1-31)
- Month (1-12)
- Day of Week (SUN-SAT $\hat{=}$ [0,6])

Examples of CRON definitions:

0 5 * * * *	Hourly at minute 5, second 0 (at 00:05:00, 01:05:00, ...)
0 1/10 * * * *	every 10 minutes from minute 1, second 0 (minutes 1, 11, 21, ...)
0 0 6 * * *	Daily at 6:00:00
0 0 13 1,15 * *	1st and 15th day of every month at 13:00:00
0 0 9 1-5 * *	Every month daily from day 1 till 5 at 9:00:00

5. LoRaWAN Data Upload Formats

After reading GPS coordinates (either successfully or unsuccessfully), the Tracker uploads the data using LoRaWAN. As LoRaWAN can only transmit very short messages, the message formats contain only data bytes, no keys or data types are included. The meaning of a byte is determined by its position within a message. Only a single message format is used by the GPS Tracker, it has a fixed length of 15 bytes. Multi byte integers are transmitted as *big endian*. Values that would require decimal places are transmitted in smaller units (e.g. mV instead of V).

Figure 5 and table 3 explain the message format used. We provide a JavaScript reference implementation of a decoder for the data packages on GitHub⁵, which can be used directly for decoding in The Things Network⁶.

⁵<https://github.com/lobaro/ttn-data-formats/blob/master/gps-tracker/decoder.js>

⁶The Things Network (TTN): An open source LoRaWAN provider – <https://www.thethingsnetwork.org/>

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
flag	temp		v_bat	latitude			longitude			valid	sat			
				deg	min	min/10000	deg	min	min/10000					

Figure 5: Bytes, Data Packet

name	type	description	example / range
flags	uint8	Status flags, for internal use	0
temp	int16	Temperature inside the device in $\frac{1}{10}^{\circ}\text{C}$	246 \equiv 24.6 $^{\circ}\text{C}$
v_bat	uint16	Current battery voltage in mV	3547 \equiv 3.547 V
latitude deg	int8	Whole degrees of the latitude	-90 to 90
latitude min	uint8	Whole minutes of the latitude	0 to 59
latitude $\frac{\text{min}}{10000}$	uint16	Decimal places of latitude minutes	0 to 9999
longitude deg	uint8	Whole degrees of the longitude	-180 to 180
longitude min	uint8	Whole minutes of the longitude	0 to 59
longitude $\frac{\text{min}}{10000}$	uint16	Decimal places of longitude minutes	0 to 9999
valid	uint8	Validity of the last measurement	0 \equiv invalid 1 \equiv valid
sat	uint8	Number of satellites used for measurement	7

Table 3: Fields, Data Packet

5.1. Example

As an illustration, if the received data would consist of the 15 bytes (hexencoded):



00 01 18 0D 69 35 1C 0F 71 09 38 02 4B 01 06

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
flag	temp		v_bat	latitude			longitude			valid	sat			
00	01	18	0D	69	35	1C	0F	71	09	38	02	4B	01	06

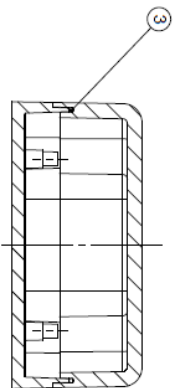
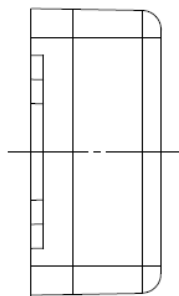
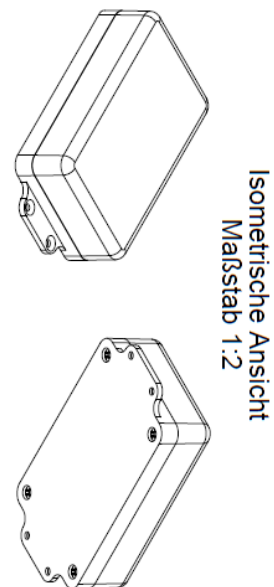
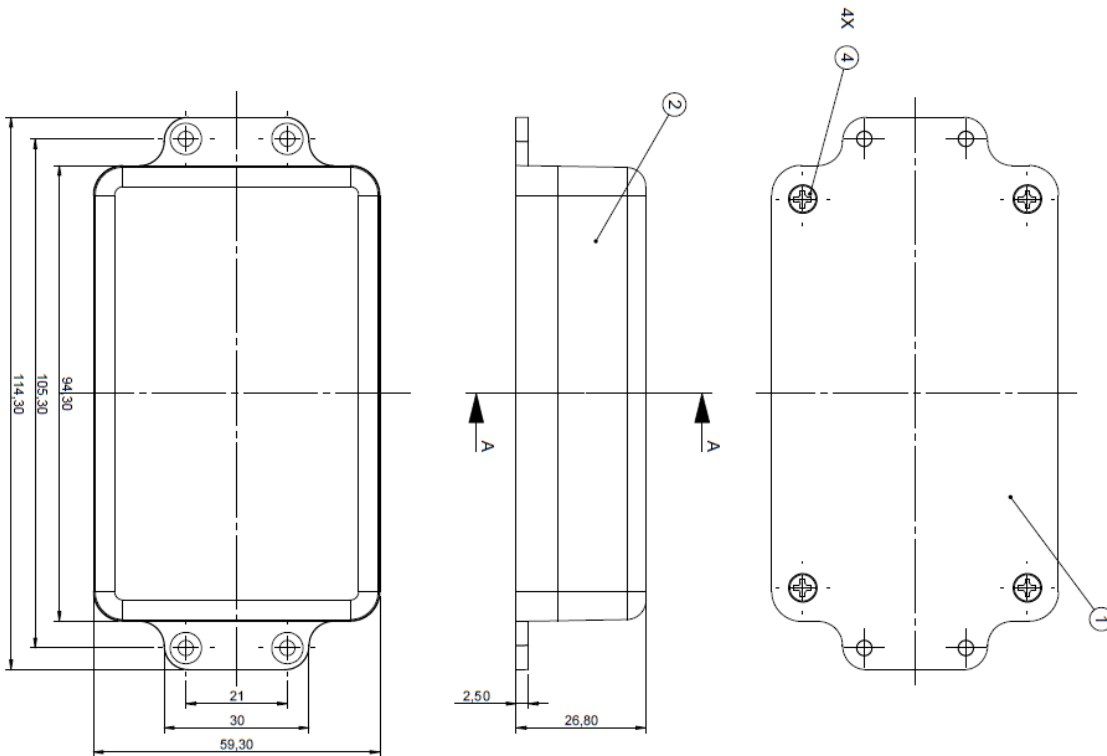
Figure 6: Bytes, Example

flag	for internal use, ignore
temp	0118 _{hex} = 0280 _{dec} \equiv 280 d $^{\circ}\text{C}$ = 28.0 $^{\circ}\text{C}$
v_bat	0D89 _{hex} = 3465 _{dec} \equiv 3465 mV = 3.465 V
latitude	35 _{hex} = 53 _{dec} \equiv 53 $^{\circ}$, 1C _{hex} = 28 _{dec} \equiv 28', 0F71 _{hex} = 3953 _{dec} \equiv 0.3953' 351C0F71 \equiv 53 $^{\circ}$ 28.3952' = 53.473 255 $^{\circ}$ = 53 $^{\circ}$ 28'23.718" North
longitude	09 _{hex} = 09 _{dec} \equiv 09 $^{\circ}$, 38 _{hex} = 56 _{dec} \equiv 56', 024B _{hex} = 0587 _{dec} \equiv 0.0587' 0938024B \equiv 9 $^{\circ}$ 56.0587' = 9.934 312 $^{\circ}$ = 9 $^{\circ}$ 56'3.522" East
valid	01 _{hex} \equiv valid measurement, could receive GPS signal
sat	06 _{hex} = 06 _{dec} \equiv Signal of 6 satellites received for measurement

6. Technical characteristics

Product	
Type name	GPS-LoRaWAN
Description	LoRaWAN GPS Tracker
RF transceiver	
Type	Semtech SX1272
Frequency	863 MHz to 870 MHz
Max. TX Power	max. +14 dBm
Typical RF Range	≤2 km
Ideal RF Range	≤10 km (free line of sight)
LoRa communication	
Protocol	Class A LoRaWAN 1.0.1 EU868
Activation method	Over-the-air activation (OTAA) Activation by personalization (ABP)
Encryption	AES128
Power	
Power supply	2×AA sized battery, 1.5 V, LR6/FR6
Supply voltage	$U_{Nom} = 3.0\text{ V}$, $U_{Min} = 2.2\text{ V}$, $U_{Max} = 3.7\text{ V}$
Capacity	~ 30000 LoRaWAN messages @SF11
Current consumption @3V	
Normal	≤3 mA
LoRa RX	≤14 mA
LoRa TX	≤80 mA
Sleep with GPS standby and MEMS	≤30 μA
Mechanical dimensions	
Size	114.3 mm × 59.3 mm × 26.8 mm
Housing Material	ABS plastic
Environmental Requirements (Box)	
Operating temperature	-20 °C to 55 °C
Max installation height	2 m
Conformity	
 	

6.1. Housing Dimensions



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All dimensions in mm

A. CE Declaration of Conformity



Declaration of Conformity

RED directive (2014/53/EU)
RoHS directive (2011/65/EU)

We, the manufacturer

Lobaro GmbH
Tempowerkring 21d
21079 Hamburg
Germany



declare on our sole responsibility that the product with following identification:

GPS-LoRaWAN

to which this declaration relates is in conformity with the essential requirements and other relevant requirements of the RED directive (2014/53/EU) if used for its intended purpose and in accordance with the manufacturers operating instructions. The mentioned product is also compliant to the RoHS directive (2011/65/EU).

The following norms, standards, or documents have been applied:

Health and safety (RED Art. 3(1)(a)):

IEC 62368-1:2014 (Ed. 2) + Cor.:2015
IEC 62479:2010

EMC (RED Art.3(1)(b)):

ETSI EN 301 489-1 V1.9.2 (V2.2.0)[†]
ETSI EN 301 489-3 V1.6.1 (V3.2.0)[†]
IEC 61000-6-2:2005

Radio spectrum (RED Art. 3(2)):

ETSI EN 300 220-1 V3.1.1 (2017-02)
ETSI EN 300 220-2 V3.1.1 (2017-02)
ETSI EN 303 413 V1.1.1 (2017-06)

[†]Referenced newer standard versions in parenthesis will supersede its predecessors. At time of testing the newer standards were not harmonized yet. All tests were carried out successfully in accordance to the already harmonized standards as well as to the superseding ones.

Hamburg, 27.07.2018

Place and date of issue



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B. Disposal

This chapter informs you on our policy in respect to EU 'Waste electrical and electronic equipment Directive' 2002/96/EC, implemented in German law by the 'Gesetz über das Inverkehrbringen, die Rücknahme und die umweltverträgliche Entsorgung von Elektro- und Elektronikgeräten (Elektro- und Elektronikgerätegesetz – ElektroG)' The following statements about the disposal of retired Lobaro devices are binding for customers in Germany. Customers in other countries should contact their local authorities in order to acquire equivalent information for their respective country.

It is a major goal of EU directive 2002/96/EC reduce the amount of retired electronic devices disposed in household waste, but have them gathered in special facilities instead for recycling and orderly disposal. Electronic devices often contain hazardous substances which are harmful to the environment as well as to human health. Under no circumstances should they be disposed in household trash.

B.1. WEEE

The WEEE-directive is the EU-directive 'Waste of Electrical and Electronic Equipment' (2002/96/EC). It aims to reduce the growing amount of electrical and electronic waste created by disposed electronic devices. The goal is to avoid and reduce disposal, and to make the disposal more friendly for the environment, by including the manufacturer in a broader responsibility.



B.1.1. Proper disposal of Lobaro B2B devices

Lobaro develops and manufactures devices for professional use. Because of this, our products have been recognised by the responsible agency 'Stiftung EAR' (Elektro-Altgeräte Register) as B2B (business to business) products. Lobaro GmbH is registered under DE18824018.

Classification as B2B implies that Lobaro is not required to pick up disposed electronic devices from local recycling points, as the law 'ElektroG' dictates manufacturers of consumer electronics to do.

Consequently, our products may not be disposed in this way.

Instead, we offer our customers to take back retired Lobaro devices and dispose them properly free of charge. Devices to be disposed must be sent to Lobaro GmbH postpaid and marked with the words 'ZUR ENTSORGUNG'.

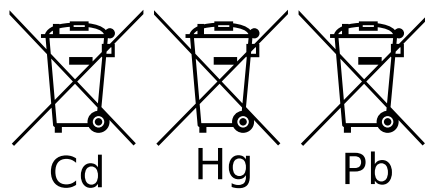
B.2. RoHS

As a manufacturer of industrial devices of information and telecommunication technology we are producing conforming to RoHS as specified in the EU-directive 2011/65/EU.

B.3. Batteries

Conforming to the German law about the disposal of used batteries (§ 12 Satz 1 Nr. 1-3 BattV (Verordnung über die Rücknahme und Entsorgung gebrauchter Batterien und Akkumulatoren (BattVO) vom 27. März 1998 (BGBl. I S. 658))), we as the manufacturer advise you, that the customer and end-consumer is required by law to return used batteries for a proper disposal. After usage, batteries can be returned to the vendor or at a place close proximity free of charge. If used batteries are sent to the vendor, parcels must be sent fully postpaid.

The following symbol indicates, that a battery contains heavy metal or other hazardous substances, and that it must not be disposed in common household or industrial waste. The abbreviations under the symbol stand for: 'Cd' (Cadmium), 'Li' (Lithium) / 'Li-Ion' (Lithium-Ion), 'Ni' (Nickel), 'Mh' (Metal Hydride), 'Pb' (Lead), 'Zi' (Zinc).



C. Entsorgung (German)

Dieses Kapitel informiert Sie über das Vorgehen der Lobaro GmbH in Bezug auf die EU Richtlinie 2002/96/EC über Elektro- und Elektronikaltgeräte (engl. WEEE), umgesetzt in deutsches Recht durch das „Gesetz über das Inverkehrbringen, die Rücknahme und die umweltverträgliche Entsorgung von Elektro- und Elektronikgeräten (Elektro- und Elektronikgerätegesetz – ElektroG)“. Die nachfolgend gemachten Aussagen über die Entsorgung von außer Gebrauch genommenen Lobaro Geräten gelten verbindlich nur für Kunden innerhalb Deutschlands. Kunden in anderen Ländern sollten ihre örtlichen Behörden kontaktieren, um entsprechende Informationen zu erhalten.

Ein vordringliches Ziel der EU Richtlinie 2002/96/EC ist es, die Entsorgung von Elektro-/Elektronikaltgeräten zusammen mit dem unsortierten Hausmüll zu minimieren und einen hohen Grad an getrennter Sammlung und Verwertung von Elektro-/Elektronikaltgeräten zu erreichen. Elektronische Geräte können Stoffe enthalten, die schädlich für die Umwelt und die menschliche Gesundheit sind und auf keinen Fall zusammen mit dem Hausmüll entsorgt werden sollten.

C.1. WEEE

Die WEEE-Richtlinie (von engl.: Waste of Electrical and Electronic Equipment; deutsch: Elektro- und Elektronikgeräte-Abfall) ist die EU-Richtlinie 2002/96/EC zur Reduktion der zunehmenden Menge an Elektronikschrott aus nicht mehr benutzten Elektro- und Elektronikgeräten. Ziel ist das Vermeiden, Verringern sowie umweltverträgliche Entsorgen der zunehmenden Mengen an Elektronikschrott durch eine erweiterte Herstellerverantwortung.



C.1.1. Ordnungsgemäße Entsorgung von B2B Lobaro Geräten

Lobaro Geräte werden für den professionellen Gebrauch entwickelt und vermarktet. Dementsprechend sind sie von der zuständigen deutschen Agentur Stiftung EAR (Elektro- Altgeräte Register) als B2B (business to business) Produkte anerkannt worden. Die Lobaro GmbH ist dort unter der Nr. DE18824018 registriert.

Die B2B Klassifizierung bedeutet, dass Lobaro nicht zur Abholung von Elektro-/Elektronikaltgeräten bei den kommunalen Sammelstellen verpflichtet ist, wie es das ElektroG den Produzenten von für den Konsumenten-Markt bestimmten Elektro-/Elektronikgeräten vorschreibt.

Folglich dürfen unsere Produkte auch nicht auf diesem Wege entsorgt werden.

Stattdessen bieten wir unseren Kunden an, nicht mehr gebrauchte Lobaro Geräte zurückzunehmen und auf unsere Kosten ordnungsgemäß zu entsorgen.

Geräte zur Entsorgung müssen mit bezahltem Porto an die Lobaro GmbH eingeschickt werden und mit der Kennzeichnung „ZUR ENTSORGUNG“ versehen sein.

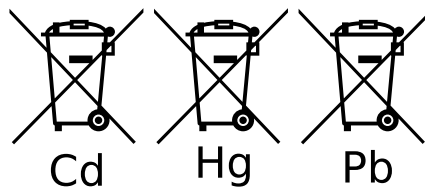
C.2. RoHS

Als Hersteller von industriellen Geräten der Informations- und Telekommunikationstechnik produzieren wir RoHS konform, gemäß den Inhalten der EU-Richtlinie 2011/65/EU.

C.3. Batteriegesetz

Gemäß § 12 Satz 1 Nr. 1-3 BattV (Verordnung über die Rücknahme und Entsorgung gebräuchter Batterien und Akkumulatoren (BattVO) vom 27. März 1998 (BGBl. I S. 658)) weisen wir als Verkäufer darauf hin, dass der Kunde als Endverbraucher zur Rückgabe gebräuchter Batterien gesetzlich verpflichtet ist. Batterien können nach Gebrauch beim Verkäufer oder in dessen unmittelbarer Nähe unentgeltlich zurückgegeben werden. Werden Batterien an den Verkäufer übersandt, ist das Paket ausreichend zu frankieren.

Das nachfolgende Symbol bedeutet, dass es sich um schwermetallhaltige, schadstoffhaltige Batterien handelt, die nicht mit dem einfachen Haus- oder Gewerbeabfall entsorgt werden dürfen. Die unter dem Symbol befindlichen Abkürzungen bedeuten: „Cd“ (Cadmium), „Li“ (Lithium) / „Li-Ion“ (Lithium-Ionen), „Ni“ (Nickel), „Mh“ (Metallhydrid), „Pb“ (Blei), „Zi“ (Zink).



D. Document Versions

Changes to this document:

- 2018-08-22 – Complete rewrite of manual.