LoRa Boat Monitor

Voltage: 12V (reverse polarity protected, 10 ... 35V DC)
Current: 0.1A (0.15A with relay on)
Power: 1.2W
Frequency: 868MHz
Transmission power: 100mW
Antenna: λ / 4, 5dBi, SWR 1.50, 868MHz, SMA
LoRa channel: EU868 dynamic 0 ... 7 or fixed 0 ... 7 (adjustable via return channel)
US915 / AU915 dynamic 8 ... 15 or fixed 8 ... 15 (adjustable via return channel)
Spreading factor: SF7 ... SF12 (adjustable via return channel)
Send interval: every 300s (5min)
Telegram length: 40 bytes (12 measured values)
GPS: 50 channels, -161dBm, 1Hz, max.2.5m resolution, fix = flashing LED
Float switch: closed = 0, open = 1
Temp sensor: -55 ... + 125 ° C, moisture-proof
Relay: 12V / 3A (adjustable via return channel with time limit)
5V output: 2A, short-circuit proof, **Attention! Do not connect 12V**

Buttons and LEDs LoRa Modul

PRG: programming (without function)
RST: Reset the software, also triggers a telegram transmission and resets the counter
LED orange: charge status of the Lipo battery (without function, may light up or flicker)
LED white: status of the relay (on: relay active, off: relay inactive)
USB: programming and debug messages, 8N1, 115200Bd

Conector

	Alarm +12V	Alarm GND	Level sensor 2 signal, 0-180 Ohm	Level sensor 2 GND 0-180 Ohm	DS18B20 Temp sensor, +5V	DS18B20 Temp sensor, 1Wire	DS18B20 Temp sensor, GND
top	**AL**	**AL**	**TA2**	**GND**	**+5V**	**1W**	**GND**
buttom	**+12V**	**GND**	**TA1**	**GND**	**NC**	**C**	**NO**
	Power +12V	Power GND	Level sensor 1 signal, 0-180 Ohm	Level sensor 1 GND	Relay Normaly Close	Relay Center	Relais Normaly Open

AL: Potential-free digital alarm input (0V high / 12V low) Float switch, door contact, etc.
TA1 / 2: Tank sensor input 0-180 Ohm
Caution! Do not connect 12V
1W: 1Wire data line for external temperature sensor DS18B20 (0 ... 3.3V) Temperature monitoring for battery
Caution! Do not connect 12V
Relay: Potential-free changeover switch for 12 ... 24V / 3A

Display values

A: Alarm input [1 = 0V, 0 = 12V]
C: Telegram counter 0...n
D: Dewpoint [°C]
dT: Send interval [s]
H: rel. Humidity [%]
L: Level value 1 [%]
L2: Level value 2 [%]
P: Air pressure [mbar]
R: State Relay
T: Temperature [°C] (BME280)
T2: Temperature extern [°C] (DS18B20)
X: GPS Longitude [° dez]
Y: GPS Latitude [° dez]

Decoding Payload

```
var counter = ((bytes[1] << 8) | bytes[0]);
var temperature = (((bytes[3] << 8) | bytes[2]) / 100) - 50;
var pressure = ((bytes[5] << 8) | bytes[4]) / 10;
var humidity = ((bytes[7] << 8) | bytes[6]) / 100;
var dewpoint = (((bytes[9] << 8) | bytes[8]) / 100) - 50;
var voltage = ((bytes[11] << 8) | bytes[10]) / 100;
var tempbattery = (((bytes[13] << 8) | bytes[12]) / 100) - 50;
var longitude = ((bytes[15] << 8) | bytes[14]) + ((bytes[17] << 8) | bytes[16]) / 10000;
var latitude = ((bytes[19] << 8) | bytes[18]) + ((bytes[21] << 8) | bytes[20]) / 10000;
var level1 = ((bytes[23] << 8) | bytes[22]) / 100;
var level2 = ((bytes[25] << 8) | bytes[24]) / 100;
```

Coding Return Channel

The following settings can be made with 3 bytes via the LoRa return channel:

- Byte 0 Change relay state with time function
- Byte 1 Setting of the LoRa spreeding factor
- Byte 2 Setting of the transmission interval

The values for the spreeding factor and transmission interval are permanently saved in the EEPROM and are power off save.

Meaning

The settings must be entered as hexadecimal values for TTN. It is not necessary that all bytes are transmitted. The relay status can also be changed with just one byte.

Byte 0: 0x00...0xFF (0=off, 1...255 * 5 min)
Byte 1: 0x07...0x0A (7...10 = SF7...SF10)
Byte 2: 0x01...0xFF (1...255 * 30s)

Sample:

0x02 0x0A 0x0A
|____ Send interval 300s
|_____ Spreeding faktor SF10
|_____ Relay on for 10 min

0x00 Relay off

0x00 0x07 Relay off, SF7

The values for Downlink can be entered in the TTN console under Device. Port 1 should be used and the data should be sent with confirmation. The return channel data is only received by the LoRa boat monitor for 2 seconds after the LoRa measured values have been sent out. Depending on the connection quality and the transmission interval setting, it can take several hours until the information is received by the LoRa boat monitor. The relay switch-on time must be selected carefully, as it may not be possible to switch the relay off again for a short time.