

LPMDL-110x MQTT protocol v5

Low power mobile data logger

ThingsLog LPMDL-110x Data logger

© iTransformers Labs Ltd
11 Magnaurska shkola str., fl. 3, office 315 (Hightech Business Park, BIC IZOT),

1784, Sofia, Bulgaria

Phone (+359) 875 32 80 70• Email: info@thingslog.com

Document Version

Version	Description
1.0	This is the first version of the document

1.1	Added command statuses to RelaySwitch and SingleRelaySwitch commands
1.2	Added MQTT readings payload data
1.3	Added On/Off readings, Added alarm status, Added Very High and Very Lo

MQTT readings payload data

MQTT message payload v5

The device send data in the following queues:

- `/<root_topic>/<device_number>/alarm/{sensor_index}`

The structure of the message in this topic is:

octet_index	description
0	version: 85
1-4	Timestamp epoch (device zone)
5	bits: 7-5 - alarm type (0 - on/off alarm, 1 - no_zero, 2 - low level, 3 - high level, 4 - very low level, 5 - very high level); bit: 4 - alarm status (1 - active, 0 - inactive), bits 3 -0 - reserved
6	value: bits 15-8
7	value: bit 7-0

- `/<root_topic>/<device_number>/battery`

The structure of the message in this topic is:

octet_index	description
0	version: 85
1-4	Timestamp epoch (device zone)
5	battery: bits 15-8
6	battery: bit 7-0

- `/<root_topic>/<device_number>/signal`

octet_index	description
0	version: 85
1-4	Timestamp epoch (device zone)
5	rsi

6	ber
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- `/<root_topic>/<device_number>/readings/<sensor_index>`

Readings

For analog, pulse and on_off readings we have three formats distinguished by readings type field

The format of analog readings is:

octet_index	description
0	version 85
1-4	Timestamp epoch (device zone)
5	bits(7-6) - record period: 0 - minutes, 1 - hours, 2 - day, 3 - seconds; bit(5-4) - reading type: 2 - analog; bits(3-0) - sensor_index (the same as in the topic);
6	every: if record period is 0 the timing between readings is the value of every in minutes
7	number of readings n: bits 15-8
8	number of readings n: bits 7-0
9	reading_1 bits 15-8

10	reading_1: bits 7-0
11	reading_2 bits 15-8
12	reading_2: bits 7-0
...	...
$10 + 2*n - 2$	reading

The value each reading is the raw value from the device ADC, in order to convert this value to mA, one have to use the following formula: $I[mA] = (\text{reading}_i(\text{bits}_{15-8}) \ll 8 + \text{reading}_i(\text{bits}_{7-0})) / 50$

Example:

```

payload: 85 64 65 D9 AB 22 01 00 02 10 10 11 11
 85 - version
 64 65 D9 AB - epoch
 22 - 7-6 bits: 00b (record period min); 5-4 bits: 10b = 2 (analog reading);
 3-0 bits: 0010b (sensor index 2) => 00100010b
 01 - every
 00 02 - number of readings
 10 10 - reading 1
 11 11 - reading 2

```

The format of on_off readings is:

octet_index	description
0	version 85
1-4	Timestamp epoch (device zone)
5	bits(7-6) -record period: 0 - minutes, 1 - hours,2 - day, 3 - seconds; bit(5-4) - reading type: 1 - on_off; bits(3-0) - sensor_index (the same as in the topic);
6	every: if record period is 0 the timing between readings is the value of every in minutes
7	number of readings n: bits 15-8
8	number of readings n: bits 7-0
9	reading_1: bits 7-0
10	reading_2: bits 7-0
...	...
0 + n - 1	reading

The value each reading is 0 or 1. 0 - off, 1 - on

Example:

```

payload: 85 64 65 D9 AB 14 01 00 02 01 00
85 - version
64 65 D9 AB - epoch
14 - 7-6 bits: 00b (record period min); 5-4 bits: 01b = 1 (on off reading);
3-0 bits: 0100b (sensor index 4) => 00010100b
01 - every
00 02 - number of readings
01 - reading 1
00 - reading 2

```

The format of pulse readings is:

octet_index	description
0	version 85
1-4	Timestamp epoch (device zone)
5	bits(7-6) -record period: 0 - minutes, 1 - hours,2 - day, 3 - seconds; bit(5-4) - reading type: 0 - pulse differential readings; bits(3-0) - sensor_index (the same as in the topic)
6	every: if record period is 0 the timing between readings is the value of every in minutes
7	number of readings n: bits 15-8

8	number of readings n: bits 7-0
9	reading_1 bits 15-8
10	reading_1: bits 7-0
11	reading_2 bits 15-8
12	reading_2: bits 7-0
...	...
$10 + 2*n - 3$	reading_n bits 31-24
$10 + 2*n - 2$	reading_n: bits 23-16
$10 + 2*n - 1$	reading_n bits 15-8
$0 + n - 1$	reading_n: bits 7-0

The reading from 1 to n-1 are differential from the next reading.

In order to obtain the full readings one has to start from the last full reading with number n and subtract the value of the previous n-1.

The reading with number n-2 is obtained when we subtract the differential value of n-2 reading from the full value of n-1 reading.

Example:

```
payload: 85 64 65 D9 AB 00 01 00 02 00 01 00 00 12 34
85 - version
64 65 D9 AB - epoch
00 - 7-6 bits: 00b (record period min); 5-4 bits: 00b = 0 (pulse
differential readings); 3-0 bits: 0000b (sensor index 0) => 00000000b
01 - every
00 02 - number of readings
00 01 - diff reading 1
00 00 12 34 - full reading 2
```