

Technical Documentation

Kuando IoT Busylight – LoRaWAN

Version 3.1

Contents

1. Composing the LoRa payload for kuando Busylight.....	1
2. Decoding the Uplink Payload.....	2
3. ADR	3
4. LoRaWann version and LoRa FPort	3
5. Power Consumption	3
6. Uplink watchdog.....	3
7. Commands.....	4
8. Contact us.....	4

1. Composing the LoRa payload for kuando Busylight.

Before the Busylight can change color, an application controlling the logic needs to be integrated/developed. Please see documentation on LoRaWAN network server to learn how to connect an application.

Payload for the Lora Busylight is a 5 byte array.

Byte 0: Red Color intensity (0..255)

Byte 1: Blue Color intensity (0..255)

Byte 2: Green Color intensity (0..255)

Byte 3: On duration (0..255)

Byte 4: Off duration (0..255)

Example for a blue static light:

Byte[0]=0

Byte[1]=255

Byte[2]=0

Byte[3]=255

Byte[4]=0

Depending on the network provider, this byte array needs to be encoded in base64 or something similar.

The above byte array would result in this base64 string: AP8A/wA=. decoded string 00FF00FF00, a solid blue color with 100% brightness.

Other examples:

Solid Red	990000FF00
Solid Green	000099FF00
Solid Yellow	FF00FF6400
Solid Purple	FFFF006400
Blue Flashing	00FF000A0A

Use of Acknowledge.

Please consider the use of confirmed data down message when composing the integration. In many use cases the validity of the color of the light is only rarely updated but still important for the use case. Here it could make sense to explore usage of Acknowledge for downlinks.

2. Decoding the Uplink Payload

An uplink, keep alive signal, is sent every 30 minutes from the device. It is a 6 byte string structured as follows:

Byte	Structure	Content
1	7..0	RSSI from device perspective
2	7..0	SNR from device perspective
3	7..0	Downlinks received, since last join
4	7..0	Uploads sent, since last join
5	7..2	Last color(R,B,G)
5	1..0	Time On
6	7..6	Time Off
6	5..4	sw revision
6	3..2	HW revision
6	1..0	ADR state

Example of a decoded uplink payload:

Hex	2	4	6	8	Offset	Description
9DFFFFFF2200000074000000D403000000FFFF001E0B01						
9DFFFFFF	9D	FF	FF	FF	-99	RSSI from device perspective
22000000	22	00	00	00	34	SNR from device perspective
74000000	74	00	00	00	116	Downlinks received, since last join
D4030000	D4	03	00	00	980	Uploads sent, since last join
0000FF	0	0	255		#00FF00	Last color(R,B,G)
FF	255				255	Time On
00	0				0	Time Off
1E	1E				30	sw revision
0B	0B				11	HW revision
01	01				1	ADR state

3. ADR

ADR is pr default enabled on the Busylight.

We recommend NOT to enable ADR on the server side.

As the Busylight do not need optimization of battery usage and we typically have control of gateway position in indoor environments we recommend to set a standard RX2 DR for downlink messages.

Region	RX2 Data rate
EU	DR4 or DR5
US	DR2
AU	DR4

4. LoRaWann version and LoRa FPort

Busylight IoT is based on LoRaWAN MAC version 1.0.3 and uses FPort 15

5. Power Consumption

- Power Supply: SPD3303X
- Amp-meter: DVM345DI
- DUT: JSE #1 – device EUI: 2020204135260602
- Voltage setting: 5.000V
- Waiting for join (faint yellow): 9.4mA
- Joined (green): 20.4mA
- LED's off consumption: 16.5mA

Color vs. intensity consumption table (numbers are in mA):

Color/Power(%)	10% (26)	20% (51)	40% (102)	60% (153)	80% (204)	100% (255)
Red	20.4	24.9	33.3	41.9	50.5	59.1
Green	20.3	24.5	32.5	40.5	48.5	56.6
Blue	20.0	24.2	32.9	39.7	47.5	55.3
Yellow	24.8	33.0	48.4	62.3	75.7	87.2
Cyan	23.9	31.3	45.2	58.5	70.9	81.5
Purple	24.0	30.3	43.4	57.1	71.4	85.3
White	27.9	37.4	56.3	75.0	90.1	113.2

6. Uplink watchdog

There is an inbuild watchdog function (counter) that will restart the device if a given number of uplinks are sent without having received downlink. The counter is default 192 uplinks(4 days with 30 min uplink interval).

If needed the counter can be changed with a direct command to the device. See Chapter 7 for more info.

7. Commands

Commands to control the Busylight can be sent directly to the device

Please use after first uplink after join is registered in the NS.

Note: If device is reset/restarted default settings will be restored.

Command	Ctrl format	Example	Function
0xAA		AA00	Restart and reset to factory settings.
0x01		0100	Enable ADR (enabled as default)
0x02		0200	Disable ADR
0x03	Number	0330	Customized number of UL count without DL before reset. Default is 192(4days with 30min UL interval)
0x04	Time i min	040F (0F=15)	Customized count of time between uplinks in minutes. Will start when previous count runs out (example here is 15 minutes, default is 30minuttes).

8. Contact us

If you have questions or need support, please contact us [here](#):