



LPN Lighting Bridge SW Specification / V0.10

Comtac AG
CH-8247 Flurlingen



History

Date	Description
2017-09-27-Kd	REV02 for Softwareversion V00.00
2017-12-18-Zs	Layout changed
2018-07-23-Kd	Correct the example
2019-04-12-Kd	V0.10 Added DALI Config. Doc

Changes are added in this history, if a new version has been issued.

Content

1	Features LPN Lighting Bridge REV02+03	3
1.1	Configuration via USB interface.....	3
2	Function of LEDs.....	3
3	Function of the Input	3
4	LoRa Up- and Downlink.....	4
4.1	LoRa uplink payload structure port 1	4
4.1.1	LoRa uplink payload example	4
4.2	LoRa downlink payload structure port 1.....	5
5	Configuration via USB interface	6
5.1	LoRa configuration in LORA_CFG.TXT	6
5.2	DALI configuration in LORA_CFG.TXT	6
6	SW update via USB bootloader	7

1 Features LPN Lighting Bridge REV02+03

The DALI light control works in LoRaWAN V1.0 class C over the Port 1 commands.
After a power up, the DALI Value is 100% until a message is received.

For DALI tests change the arc power value (light value) manually by activating the ext. input, while active the light value will incremented in a 200ms interval until reaching 100%, then it will restart from 0% (sawtooth signal form).

1.1 Configuration via USB interface

After connecting the LPN Lighting Bridge on a PC via USB-cable, there appears an USB-Stick (FAT12) called «LoRaDaliMas». On the stick is a configuration file called "LORA_CFG.TXT". In this file different LoRa and device configurations can be done. The description is directly in the file.

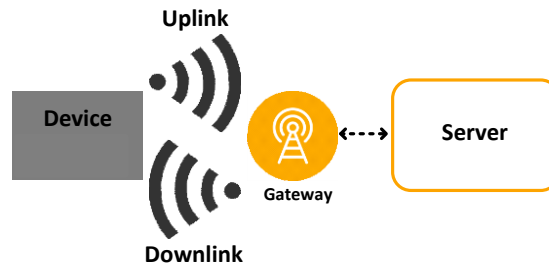
2 Function of LEDs

LED	Function/Meaning	Remarks
Orange	LoRaWAN Status	During operation flashes if a downlink is received
Blue	LoRaWAN Status	During operation flashes if a LoRa command is sent.

3 Function of the Input

Input	Function/Meaning	Remarks
S1 – S2	During Power Up	Is the Input S1 – S2 during power connected, the orange and blue LED flashes for 2 seconds. During this time, the LORA_CFG.TXT is set to default values.
S1 – S2	During operation	Depends on specific firmware version

4 LoRa Up- and Downlink



The LPN Lighting Bridge works as OTA or ABP device in a public LoRaWAN network. The Multicast-Address works only with APB (Key's were fixed). To the LPN Lighting Bridge a command can send over the Device-Address (DevAddr) or over the Multicast Address (BroadcastAddr).

4.1 LoRa uplink payload structure port 1

After power up the LPN Lighting Bridge sends a message under the following conditions:

- In the Interval of the "Livesign" configured (sends Confirmed-Uplink)
- By switching the ext. Input (sends Confirmed-Uplink)
- Or by LoRaWAN ACK request of a confirmed downlink with a status on port 1 (sends Unconfirmed-Uplink)

Byte No. [0...X]	Function/Meaning	Remarks
0	DALI Status	Bit1 DALI communication failure Bit3 DALI Lamp has a light value >0
1	LPN DALI value	Last over LoRa received DALI Value in procent
2	DALI lamp value	Last DALI value which the LPN Lighting Bridge has sent to the lamp (0...253) (QueryActLevel-Cmd)
3	DALI Status	Bit 0: Status of Ballast (0 = ok) Bit 1: Lamp failure (0 = ok) Bit 2: Lamp arc power on (0 = off) Bit 3: Query: Limit Error (0 = Last requested arc power level is between MIN...MAX or OFF) Bit 4: Fade ready (0 = fade is ready, 1 = fade is running) Bit 5: Query: Reset state (0 = No) Bit 6: Query: Missing Short Address (0 = No) Bit 7: Query: Power failure (0 = No)
4	DALI-Device Versionnr.	QueryVersionnr-Cmd
5	DALI-Device Devicetype	QueryDeviceType-Cmd

4.1.1 LoRa uplink payload example

04 64 fd 00 08 06

Byte No. [0...X]	Function/Meaning	Remarks
0	DALI Status	0x04 = 0b0000 0100 Bit3 DALI Lamp has a light value >0
1	LPN DALI value	0x64 = 100% Last over LoRa received DALI Value in procent
2	DALI lamp value	0xfd = 253 Last DALI value which the LPN Lighting Bridge has sent to the lamp (0...253) (QueryActLevel-Cmd)
3	DALI Status	0x00 = Bit 0: Status of Ballast (0 = ok)
4	DALI-Device Versionnr.	0x08 QueryVersionnr-Cmd
5	DALI-Device Devicetype	0x06 QueryDeviceType-Cmd

4.2 LoRa downlink payload structure port 1

Byte No. [0...X]	Function/Meaning	Remarks
0	DALI Light value	Light value in percent 0..100 (Confirmed-Downlink request an unconfirmed status Uplink)

5 Configuration via USB interface

Insert the USB cable and open CFG.TXT, where all settings for LoRa and Modbus can be configured (not working in USB-CDC mode). **Configuration changes only take effect after a restart.**

5.1 LoRa configuration in LORA_CFG.TXT

```
App.vers.:00.11
Livesign=000 (000..255 minutes, 000 for no livesignes)

OTA=0    0 = ABP; 1 = OTA
OTA(OverTheAirActivation):
DevEUI=70B3D5FFFE0E90A9
AppEUI=70B3D5FFFE297001
AppKey=AB89EFC2301674554761032DCF98BA
ABP(DeviceActivationByPersonalization):
DevAddr=0x013a0024
NetwSesKey=1122336789ABCDEFEDCBA9876543211
AppSesKey=EEEEBA98765432100123456789ABCDEE

BroadcastAddr=0x00000000
BroadcastNetwSesKey=2233446789ABCDEEEEDCBA9876543222
BroadcastAppSesKey=DDDDBA98765432111123456789ABCDDD

LoRaMAC Datarate (0..7; DR_0..DR_7; SF12..FSK):
MinDatarate=0
MaxDatarate=7
DefDatarate=0
Rx2DefDatarate=0

DALI:
TxInterval=01 (01..60 seconds, 00 for 200ms interval, >60 for no repeating)
TxOnChange=1 (0 for send only on interval, 1 for send immediately)
```

5.2 DALI configuration in LORA_CFG.TXT

```
DALI:
TxInterval=01 (01..60 seconds, 00 for 200ms interval, >60 for no repeating)
TxOnChange=1 (0 for send only on interval, 1 for send immediately)
```

Set *TxInterval* to 01 or higher, in case of fading is interrupted of too fast repeating DirectArcPowerControl-Commands. The *TxOnChange* should be set to 1, that a group of lights will change their light concurrently.

The following DALI broadcast query commands are send one after the other in a 400ms interval (1.6s for all):

- Query Actual Level (YAAAAAAS = 0xff; Cmd 160)
- Query Version Number (YAAAAAAS = 0xff; Cmd 151)
- Query Device Type (YAAAAAAS = 0xff; Cmd 153)
- Query Status (YAAAAAAS = 0xff; Cmd 144)

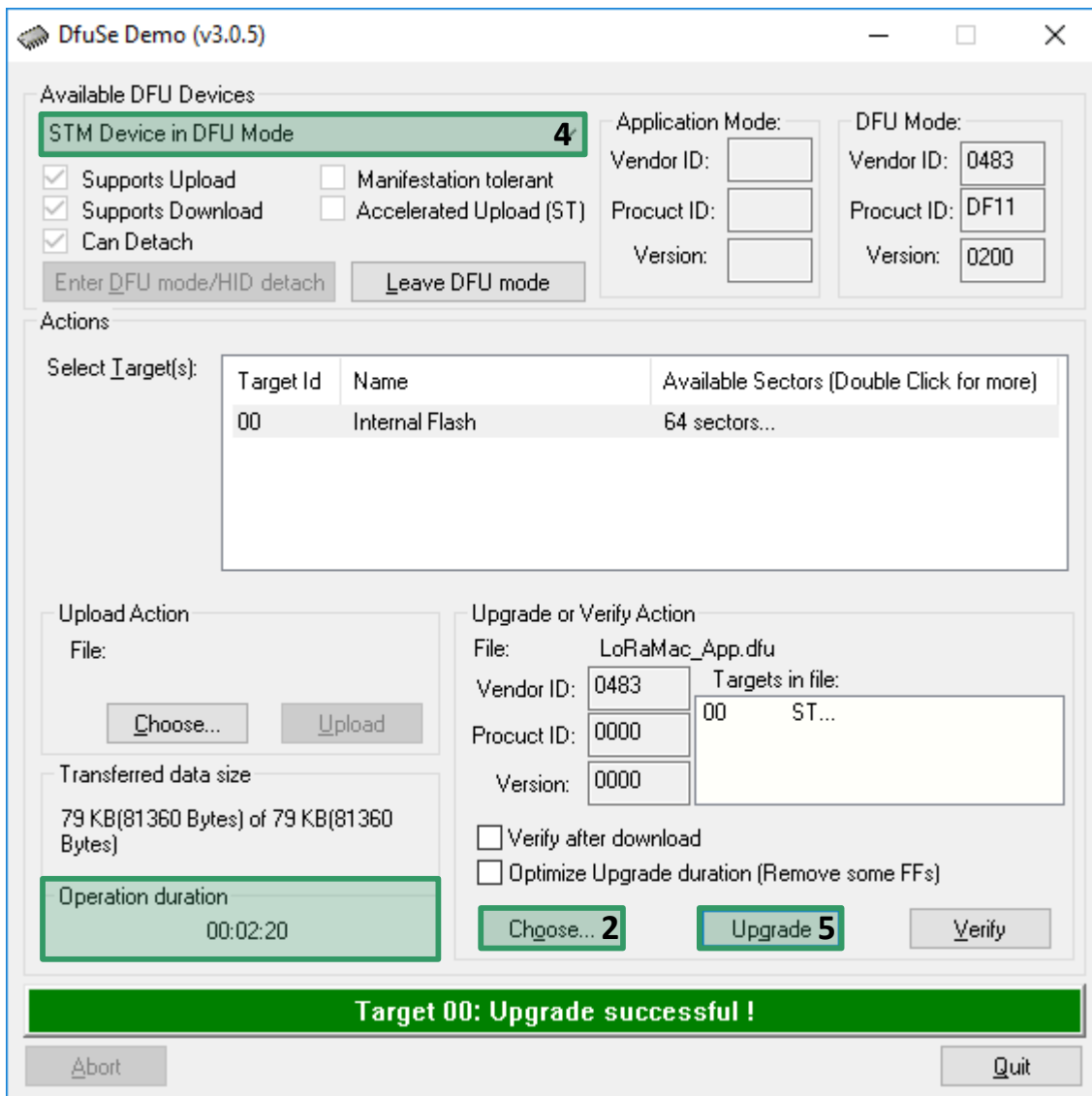
In the idle time the following DALI broadcast command is send in the configured *TxInterval* (00 -> as fast as possible, < 200ms) or in case of *TxOnChange* also as fast as possible (< 200ms) on level change:

- DAPC (DirectArcPowerControl) (YAAAAAAS = 0xfe) direct arc power level following

6 SW update via USB bootloader

If necessary, the device can be updated using USB DFU:

- 1) DFU tool «DFuSe demo» start (link → <http://www.st.com/en/development-tools/stsw-stm32080.html>).
- 2) Click "Choose..." under **upgrade or verify action** (bottom right) to load the current DFU file.
- 3) **Switch off the device, connect the Input S1 - S2**, plug in USB cable and then turn on the device.
- 4) The device should be now in bootloader mode (device appears under «available DFU devices» and both LEDs blink time-shifted every 500ms).
- 5) Click «Upgrade» and ignore any messages. The update takes about 2 minutes and 20 seconds.
- 6) Once the update is finished, unplug the USB cable and restart the device (take out batteries, and put them back in).



Important: After having installed the DFU tool, look up the UM0412.pdf file. Before starting with the first update, the driver path must be searched manually (C:\Program files (x 86)\STMicroelectronics\Software\DfuSe v3.0.5\Bin\Driver\).