Problems which might occur with the LightShaker 3.0

# Hardware issues

## Problems with the LDO

Since it was impossible to connect a current version of the LightShaker to the PC by using the ST-Link V2, some investigations were done to find out, why it’s not possible to connect the LightShaker to the PC even if several ST supported software was used. The reason why the connection failed was, that the lower voltage level, provided by the LDO (MAX1765 – IC18), was 4.1V instead of 3.3V. Because the SWD (serial wire debug) just works up to the voltage level of 3.6V, the reason why the connection failed was the high voltage level. After several tries and changes – the IC18 was changed at four completely soldered LightShakers – the result of the too high voltage level was still the same. Even by measuring the voltage on a pre-soldered (just the ICs were soldered by the manufacturer), the voltage level was around 3.9V instead of 3.3V.

The reason for this problem is, that the internal voltage reference of the MAX1765 is 1.37V instead of the 1.25V which were given in the datasheet. The datasheet also emphasizes, that this reference voltage must be something between 1.23V and 1.27V. It wasn’t possible to find out why this voltage level was too high since the last review of the MAX1765 was in 2011 (see on datasheet). Furthermore, no information about a new MAX or somebody who had the same problem weren’t found on the internet.

The reason, why anyone haven’t noticed this problem before might be, that the programs on the LightShaker (Level, POV-Display) still work properly.

The solution now is to exchange the voltage divider for the back coupling to the voltage adjusting input of the MAX1765 against the advice given on the datasheet.

If the manufacturer of the MAX1765 does a review of the device and fixes the internal reference voltage level, the proportions of the voltage divider’s resistors is wrong again and must be reset to the values given before the adjustment.

## Thickness of the PCB-USB connector

Due to reduce costs the thickness of the LightShaker’s PCB is a standard measure. This has caused the issue that the LightShaker wiggles when connecting it to a USB port of the PC. That could cause problems during the programming process by loosing the connection to the microcontroller. By attaching 4 layers of **3M 467MP 58µm adhesive transparent plastic foil** the wiggling can be avoided. Furthermore, the foil will be resistive enough to plug in the LightShaker several times before it starts wiggling again.

# Software issues

## USB-controller or USB-device

It might be the case, that the Windows PC doesn’t recognize the LightShaker as an USB controller in DFU-Mode **(STM Device in DFU Mode – as mentioned in the User Manual)** when setting the controller in Bootloader-Mode by pressing the button S2 before plugging in the LightShaker in the computer. The Window PC then recognize the LightShaker as an USB device **(STM32 BOOTLOADER)**. If that’s the case, the actual used software (dpist\_amd64) won’t work anymore because the LightShaker cannot be found as device since it’s not in DFU-Mode.

This problem doesn’t have anything to do with the LightShaker itself. The reason for that is cased most likely by an automatically installed Windows driver update.

The solution for this problem is to use the **STM32CubeProgrammer** software.

## Problems with the STM32CubeProgrammer

The good thing about this software is, that the handling is very simple, and the biggest effort is, that not every compiled project has to be converted in a .dfu file. The software is capable to directly program .bin, .hex or .elf files which the compiler generates automatically without changing setting manually.

It’s also possible to upload this file via USB.

The drawback is, that the connection to the LightShaker is very unstable when the LightShaker is directly plugged into the Laptop. When the LightShaker is plugged into the docking station, the connection is stable.

## WinUSB connection

The implemented WinUSB won’t work properly since the enumeration process doesn’t work properly. The VID, PID an serial number are enumerated correctly as well as the name of the device but the Class-GUID number won’t change and is set to {00000-00000……}.

For the future it’s recommended to use the old version of the firmware until the problem with the enumeration has been solved and the communication has been tested.