

Firmware for the STEVAL-LLL008V1 evaluation board for street lighting applications using 6LoWPAN wireless mesh networks

User interfaces and utilities	Android LED lighting app			
Applications & demonstrations	Dual stage high Power Factor LED driver	6LoWPAN wireless Mesh networking	Dimming control	Comprehensive protections
Middleware				
Hardware Abstraction	Hardware Abstraction Layer API		Board Support Package	
Hardware	STM32L071 SPSGRFC	HVLED001B, HVLED002, STH3R03CG STPS2H100AF, STL4N10F7, STF23N80K5		
	STEVAL-LLL008V1			

Features

- Firmware designed to support Smart City street lighting applications
- 6LoWPAN wireless mesh networking functionality for remote control of multiple nodes
- 1% dimming resolution plus On/Off control
- Firmware designed to run on [STM32L071](#) 32-bit microcontrollers
- Source code freely available for download from www.st.com
- Developer friendly license terms
- Android application available to demonstrate the complete functionality of the [STEVAL-LLL008V1](#) evaluation board



Description

This firmware demonstrates street lighting control in a Smart City scenario based on 6LoWPAN wireless mesh networking technology, which enables remote dimming and On/Off control of entire street lighting networks from a single smart device.

A data concentrator unit (DCU) and a mobile Android application have been developed to help you explore the functionality of the [STEVAL-LLL008V1](#) evaluation board. The DCU consists of a [NUCLEO-F401RE](#) development platform, plus the [X-NUCLEO-IDS01A4](#) for sub 1-GHz communication with the LED driver board and an [X-NUCLEO-IDB05A2](#) board for Bluetooth communication with the mobile device.

The ST 6LoWPAN Smart Streetlight mobile application (available on Google Play store), collects lighting nodes represented by the microcontroller and RF module on the evaluation board in a 6LoWPAN mesh network.

The firmware consists of two .bin files, one running on the DCU and one running on the [STM32L071KZ](#) microcontroller embedded on the [STEVAL-LLL008V1](#) evaluation board, featuring the [HVLED001B](#) high brightness LED driver.

The firmware is freely available for download from the [STSW-LLL008FW](#) web page with developer friendly license terms, so you can use it to test the [SPSGRFC](#) sub-1 GHz connectivity and [HVLED001B](#) LED power control functionality of the evaluation board, as well as to develop your own custom solutions.

Product summary	
Firmware for STEVAL-LLL008V1 evaluation kit	STSW-LLL008FW
Dual stage LED driver evaluation board with High Power Factor	STEVAL-LLL008V1
HPF flyback controller with constant voltage primary-sensing and ultra-low standby consumption	HVLED001B
high performance current mode LED controller	HVLED002
ultra-low-power ARM Cortex-M0+ MCU	STM32L071KZ
sub-1 GHz programmable transceiver module	SPSGRFC
Other utilities	Android LED Lighting app
Applications	LED Street Lighting

1 LED street lighting in Smart City applications

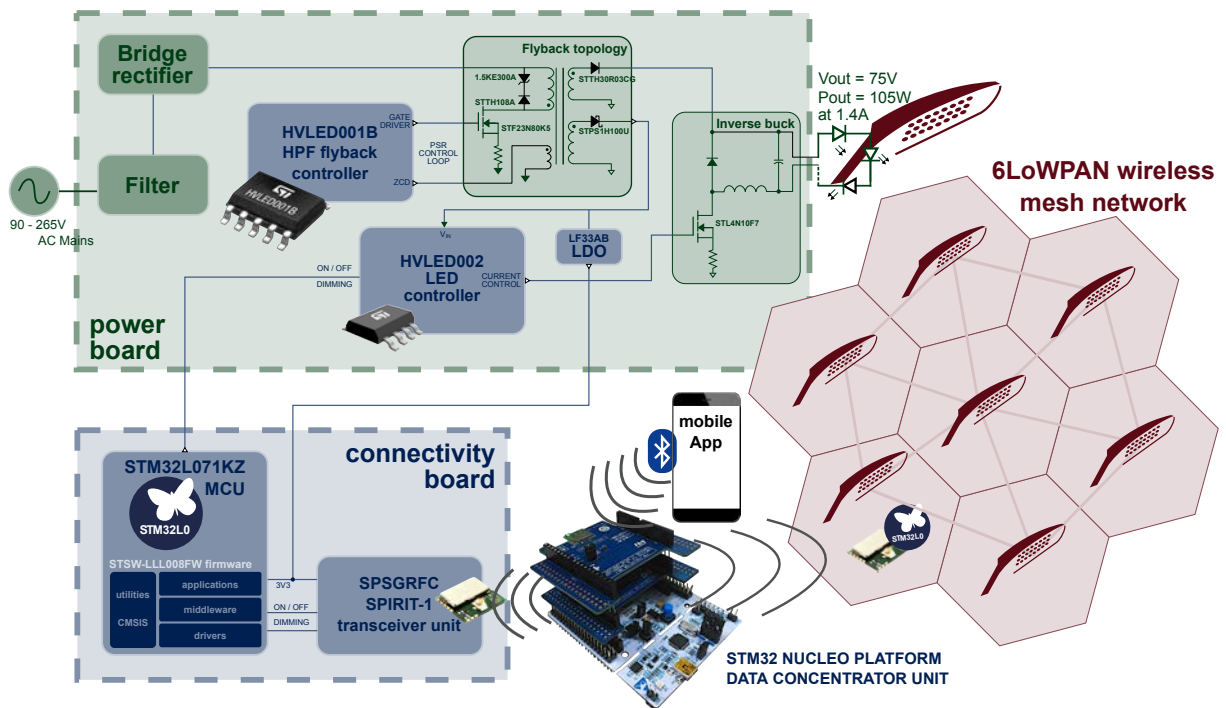
High voltage LED street and zone lighting applications typically require robust but highly efficient power supplies able to generate tightly regulated output currents with high power factor, low THD and minimal voltage ripple.

The design achieves very high efficiency through the HVLED001B controller, which drives a STF23N80K5 power MOSFET on the primary side of an AC/DC HPF flyback converter and regulates the voltage on the same primary side.

The flyback converter output is then regulated by the inverse buck stage, which is driven by the HVLED002 controller through the STL4N10F7 power MOSFET. The HVLED002 translates external dimming commands into current limitation on the inverse buck converter to achieve the desired dimming effect.

Networking and connectivity solutions are also often implemented for the simultaneous control of several lighting nodes in a certain area. The STEVAL-LLL008V1 power converter is coupled with a SPSGRFC module to provide sub-1 GHz connectivity for remote dimming and on/off control. The STSW-LLL008FW firmware for the evaluation kit provides 6LoWPAN functionality to allow wireless mesh network control of multiple nodes, with the addition of a data concentrator unit able to provision devices on a 6LoWPAN network and interface with an app to deliver Smart City lighting control.

Figure 1. LED street lighting application with high voltage LED controller



RELATED LINKS

[STM32Cube function pack for IoT sensor node connection to 6LoWPAN networks through sub-1GHz RF communication](#)

Revision history

Table 1. Document revision history

Date	Version	Changes
16-Nov-2019	1	Initial release.
06-May-2020	2	Substituted X-NUCLEO-IDB05A1 (no longer recommended for new designs) with X-NUCLEO-IDB05A2

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