

Getting started with the LED platform static RGB reference design

Preview user guide

About this document

Scope and purpose

This user guide provides instructions for using the reference design. The reference design is designed to evaluate the associated system solutions for static interior lighting. This user guide provides an overview of the whole system offering for static interior lighting, and extensive technical information on the board.

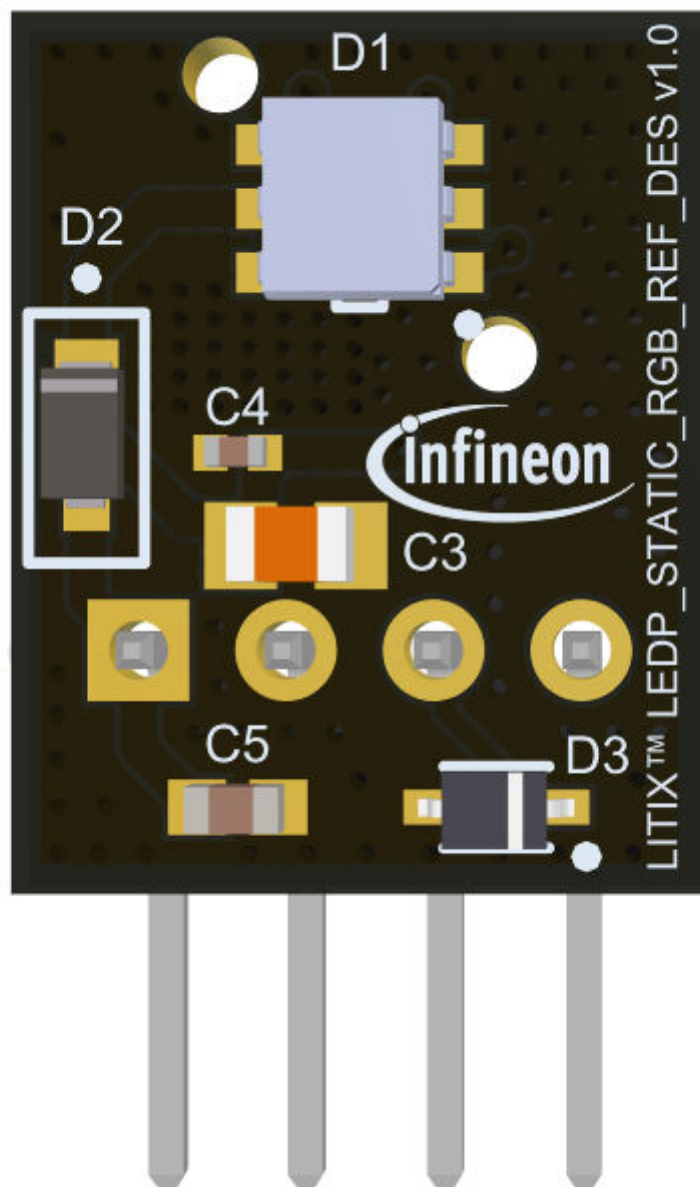


Figure 1 Static RGB reference design board

Intended audience

This document is intended for anyone using Infineon's Static RGB reference design.

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Safety precautions

Table 1 Safety precautions

	Caution: <i>The heat sink and device surfaces of the evaluation or reference board may become hot during testing. Hence, necessary precautions are required while handling the board. Failure to comply may cause injury.</i>
	Caution: <i>Only personnel familiar with the drive, power electronics and associated machinery should plan, install, commission and subsequently service the system. Failure to comply may result in personal injury and/or equipment damage.</i>
	Caution: <i>The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.</i>

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1 System offering

1 System offering

1.1 Introduction to LED platform static interior lighting system offering

Infineon's system offering for static interior lighting encompasses a range of components that work together to provide a comprehensive solution.

Key Components:

- **Infineon LED platform static RGB reference design:** a reference for the design of static interior lighting applications with the LITIX™ TLD4020-3ET. For more information, refer to [Introduction to the LED platform static RGB reference design](#)
- **Infineon LED platform power and communication Arduino shield:** a robust hardware foundation to supply the LED Platform boards with the OPTIREG™ DC-DC TLS4125D0EP V50. The shield can be applied on the Traveo™ II Starter Kit and due to the OPTIREG™ SBC TLE9461ES, it enables the communication with the LED Platform Animated Exterior reference design. For more information, refer to [Introduction to the LED platform power and communication Arduino shield](#)
- **Traveo™ II Starter Kit:** is the evaluation environment for Traveo™ II Body Entry devices of the Infineon Traveo™ *microcontroller* family. For more information, refer to [Introduction to the Traveo™ II starter kit](#)
- **LITIX™ static interior RGB application software:** this application software is intended to be executed on the LITIX™ TLD4020-3ET. Enabling for accurate interpretation of messages from the MCU and precise color mixing. For more information, refer to [Introduction to the LITIX™ static interior RGB application software](#)
- **Traveo™ II static Interior RGB application software:** this application software is intended to be executed on the Traveo™ II Starter Kit. Enabling the charge pump of the OPTIREG™ SBC TLE9461ES, and showing a predefined color on the reference design. For more information, refer to [Introduction to the Traveo™ II static interior RGB application software](#)
- **uIO-Stick V2:** an interface device for controlling Infineon boards during run time. It provides a built-in [controller area network \(CAN\)](#) transceiver, for programming and controlling the LITIX™ devices. For more information, refer to [Introduction to the uIO-Stick V2](#)
- **Infineon *bootstrap loader (BSL)* programming tool for MCUs:** a PC tool consisting of a [graphical user interface \(GUI\)](#) for programming the LITIX™ TLD4020-3ET device on the LED Platform Static RGB reference design, over the BSL. For more information, refer to [Introduction to Infineon BSL programming tool for MCUs](#)

1 System offering

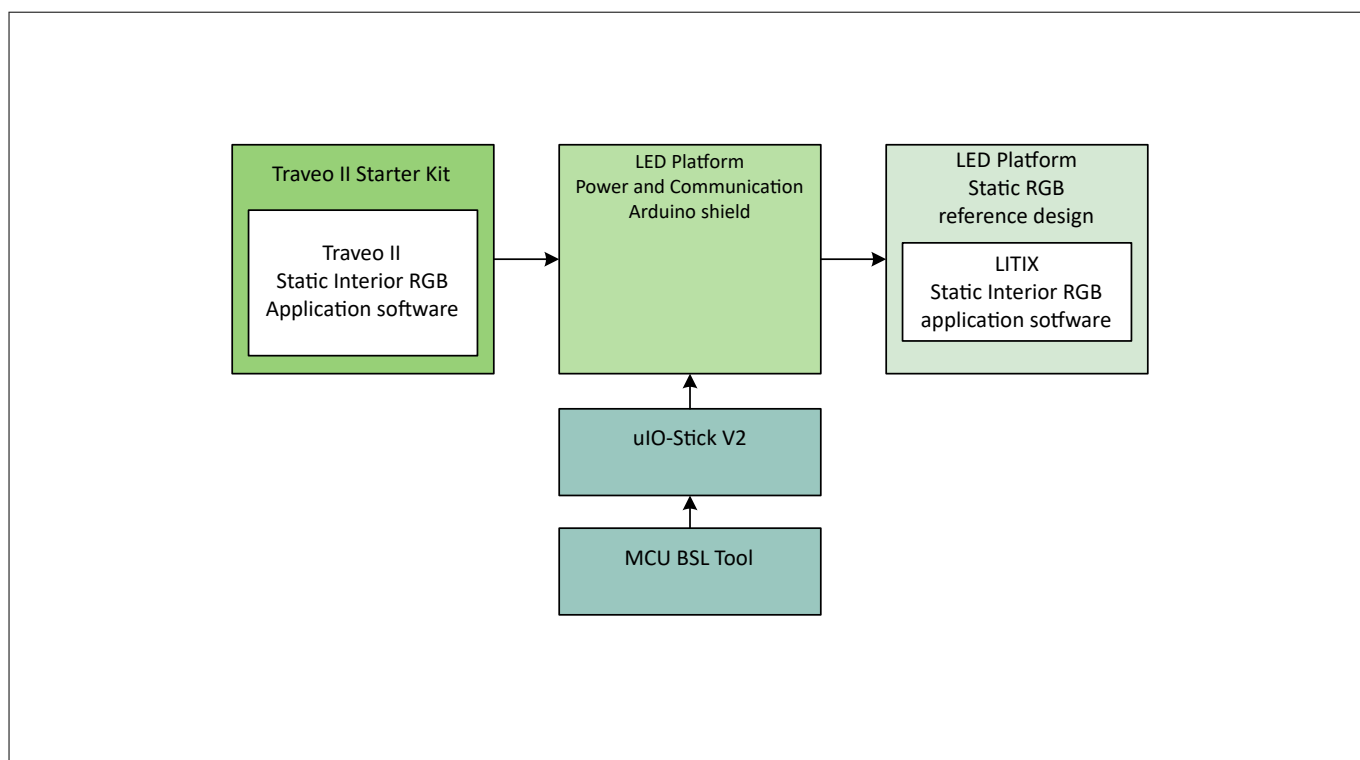


Figure 2 Infineon's static interior lighting system offering

1.1.1 Introduction to the LED platform static RGB reference design

The reference design combines the LITIX™ TLD4020-3ET device with Nichia NSSM313A-V1 RGB LED. The reference design is supplied and controlled by the adapter board with the LED Platform Power and Communication Arduino shield.

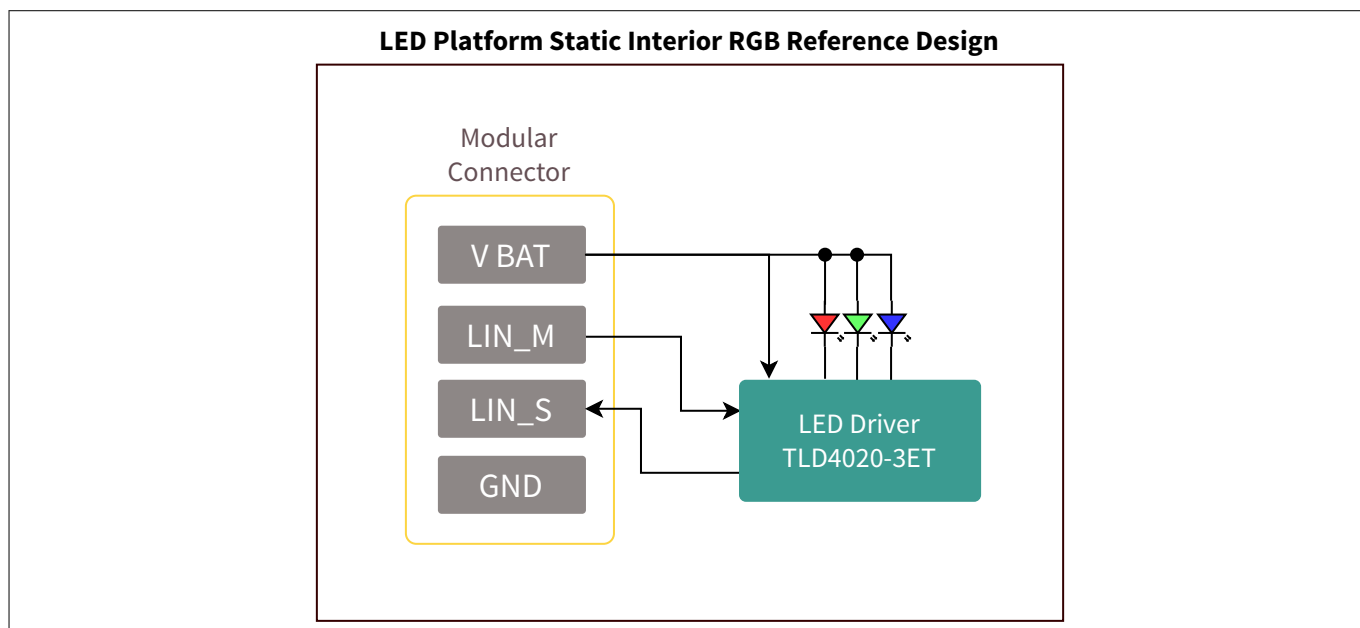


Figure 3 Block diagram

1 System offering

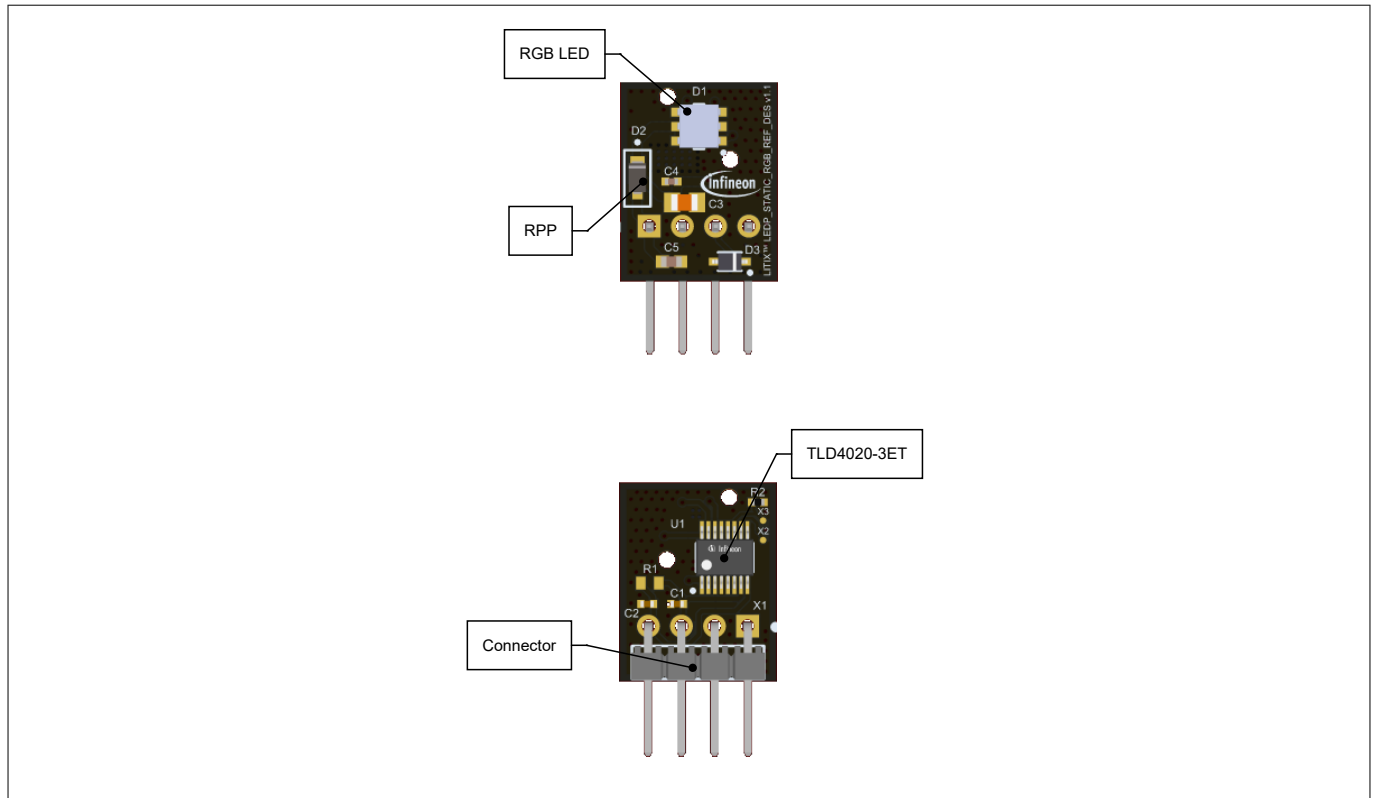


Figure 4 Board description

1.1.2 Introduction to the LED platform power and communication Arduino shield

The LED platform power and communication Arduino shield enables communication between the TRAVEO™ II Starter kit and the [light-emitting diode \(LED\)](#) Platform reference designs, and supplies them.

The LED platform reference designs can be supplied through the banana jacks on the power and communication Arduino shield, with 12 V DC. The board is protected against the reverse polarity of the input voltage supply, with the OptiMOS™-7 IAUZN04S7N049 for the power part of the circuit, and with the BAS3010A for the logic part. The NMOS reverse polarity is managed by the charge pump function of the OPTIREG™ [system basis chip \(SBC\)](#) TLE9461ES.

The LEDs on the LED platform reference designs are powered by the OPTIREG™ switcher TLS4125D0EP V50, which provides a fixed 5 V output voltage.

1 System offering

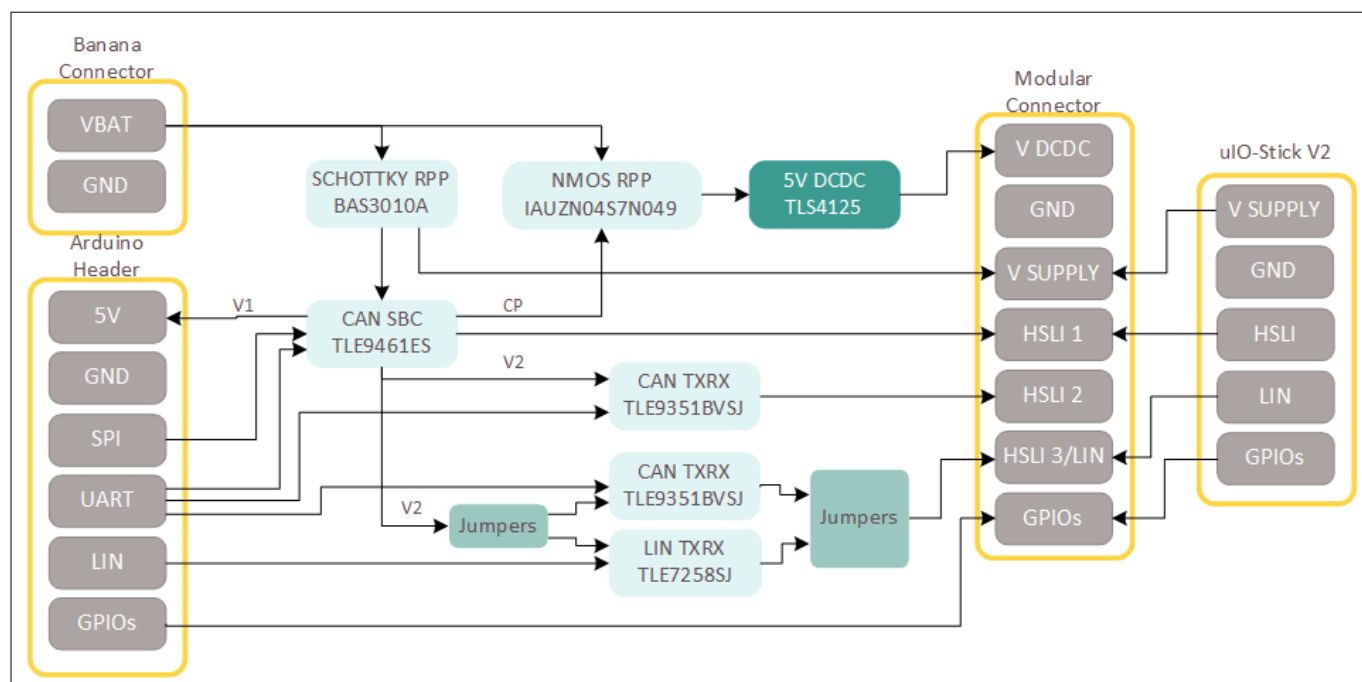


Figure 5 Block diagram

1 System offering

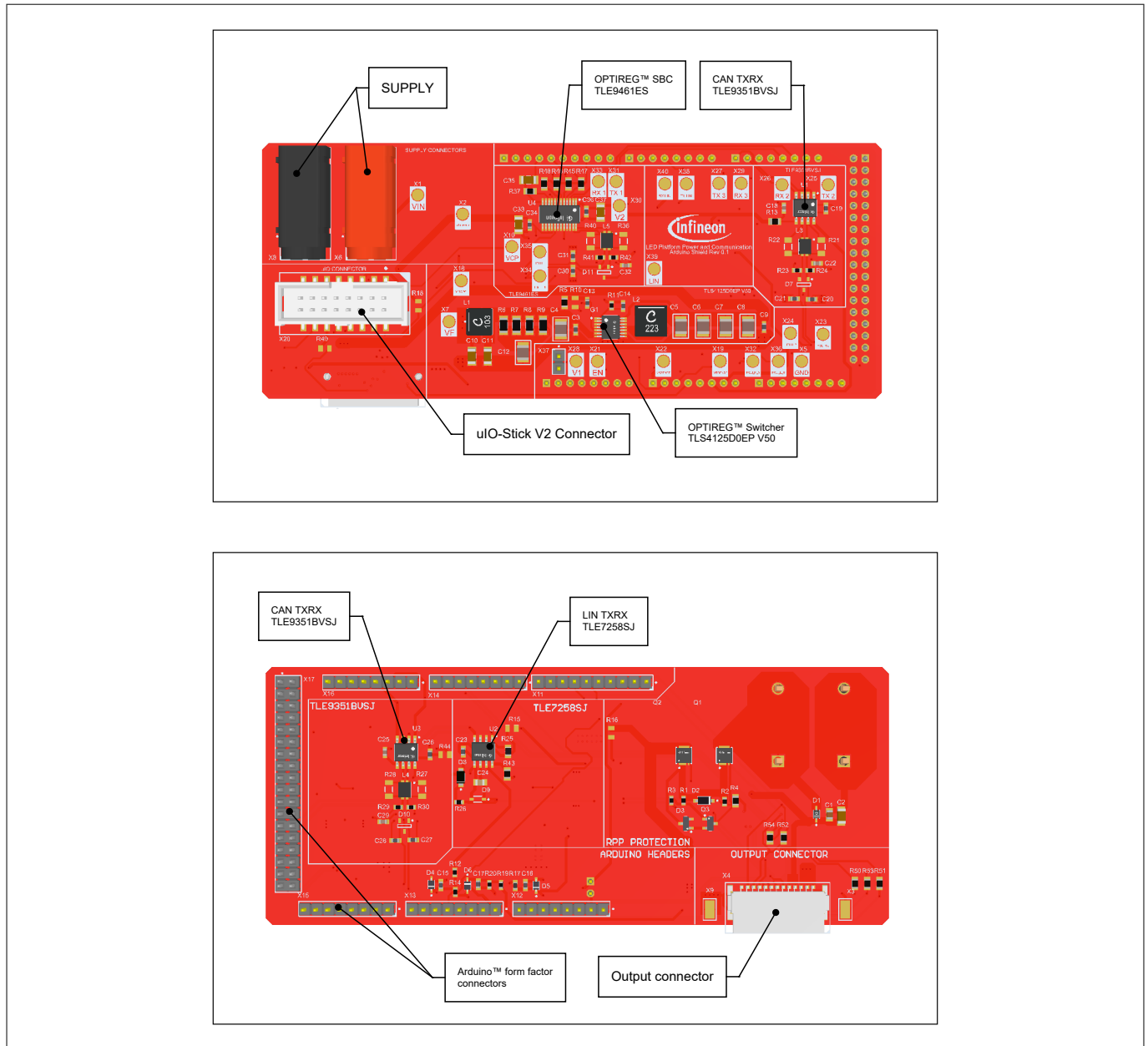


Figure 6 Board description

1.1.3 Introduction to the Traveo™ II starter kit

The Traveo™ II starter kit (also referred to as CYTVII-B-E-1M-SK) is an easy-to-use evaluation board based on the Traveo™ II body entry family of devices. The CYTVII-B-E-1M-SK board features a CYT2B7 [microcontroller unit \(MCU\)](#), which consists of the following:

- A robust 32-bit MCU core led by the 160 MHz Arm® Cortex®-M4 single
- A memory spectrum of 1 MB flash
- A 96 KB work flash
- A 128 KB SRAM

The application software for the Traveo™ II starter kit can be flashed using the on-board PSoC™ 5-based Kitprog3.

1 System offering

The application software leverages the [application programming interface \(API\)](#)s provided in the embedded software libraries, including the Traveo™ II Peripheral Driver Library and the OPTIREG™ SBC TLE9461ES example software generated by the Configuration Wizard for SBC tool. All these embedded software libraries are integrated in the application software. This approach enables developers to easily integrate the devices into their evaluation projects.

1.1.6 Introduction to the uIO-Stick V2

The uIO-Stick V2 is a versatile interface device that enables real-time control of the LED Platform reference designs from a PC, providing a comprehensive solution for development and testing. The uIO-Stick V2 controls LITIX™ devices through the [local interconnect network \(LIN\)](#). Additionally, the uIO-Stick V2 can supply 3.3 V or 5 V digital levels, and with the aid of a built-in boost converter, it can also generate a 12 V supply to the target device.



Figure 8 uIO-Stick V2

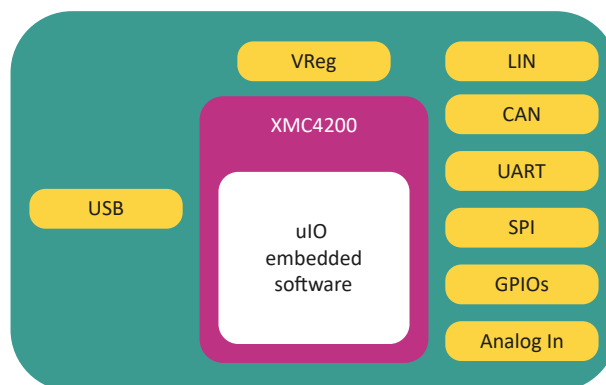


Figure 9 Block diagram

1 System offering

1.1.7 Introduction to Infineon BSL programming tool for MCUs

The Infineon [BSL](#) programming tool for MCUs is a user-friendly PC tool that features a [GUI](#) for programming LITIX™ TLD4020-3ET devices over the BSL. The GUI is compatible with [LED](#) drivers that utilize the uIO-Stick V2 as an interface. Specifically, the Static RGB reference design supports the Infineon BSL programming tool for MCUs when used with the uIO-Stick V2 and the LED Platform Power and Communication Arduino shield.

The Infineon BSL programming tool for MCUs offers a range of functionalities, including the ability to read the existing memory of the LITIX™ TLD4020-3ET devices.

1.2 How to get the system offering

1.2.1 How to get the LED platform boards and the uIO-Stick V2

To order an [LED](#) Platform board or the uIO-Stick V2:

1. Go to <https://www.infineon.com>
2. In the search bar, enter your required product, for example, LED Platform Static RGB reference design
3. Once you have found the product page, navigate to the **Order** section
4. To place an order for the product directly from Infineon or from a distribution partner, click **Order online**

1 System offering

Home / Evaluation Boards / UIO STICK V2



Active and preferred

UIO STICK V2

uIO-Stick v2 is an interface device for controlling Infineon boards/kits during run time

[User Manual](#) [Board](#)

Product details Documents Design resources Register product Partner solutions Developer community

Product details

Parameters **Ordering** Description Features Benefits

OPN ⓘ

Product Status

Infineon Package

Package Name

Packing Size

Packing Type

Moisture Level

Moisture Packing

Lead-free

Halogen Free

RoHS Compliant

RECOMMENDED
UIOSTICKV2TOBO1
Active And Preferred
N/A
N/A
1
CONTAINER
NA
NON DRY
No
No
No

−

1

+

Add to Cart

[View distributor's inventory](#)

Figure 10 Navigation on the web page to order the board

1 System offering

1.2.2 How to get the LED platform application software

To download the embedded software packages:

1. Go to <https://softwaretools.infineon.com/software>
2. In the search field, enter the name of the embedded software package
3. Click **Request**, as shown in [Figure 1](#)
4. Click the cart
5. Click **Request**
6. Fill in the questionnaire, accept the license terms, and click **Submit request**, as shown in [Figure 2](#)
7. After a few minutes, the software package is available for download in the **My Space** tab under **My Software**. Click **Details**, and then **Download**

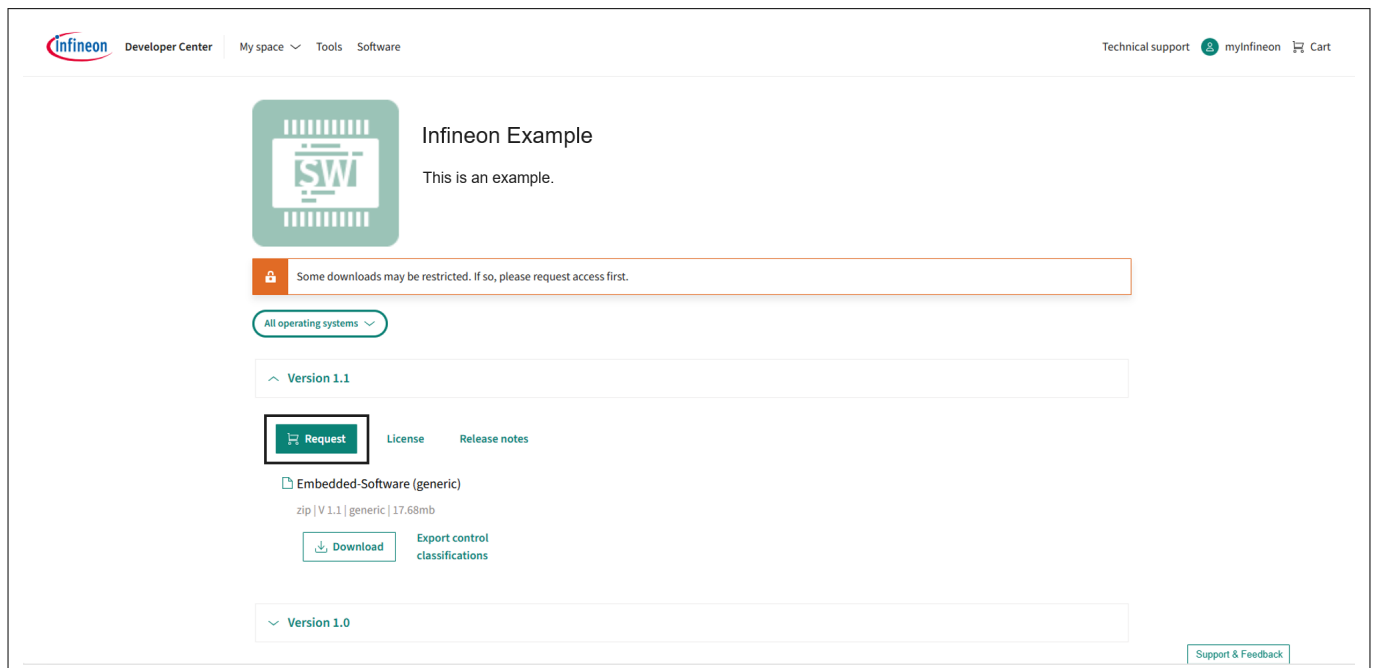
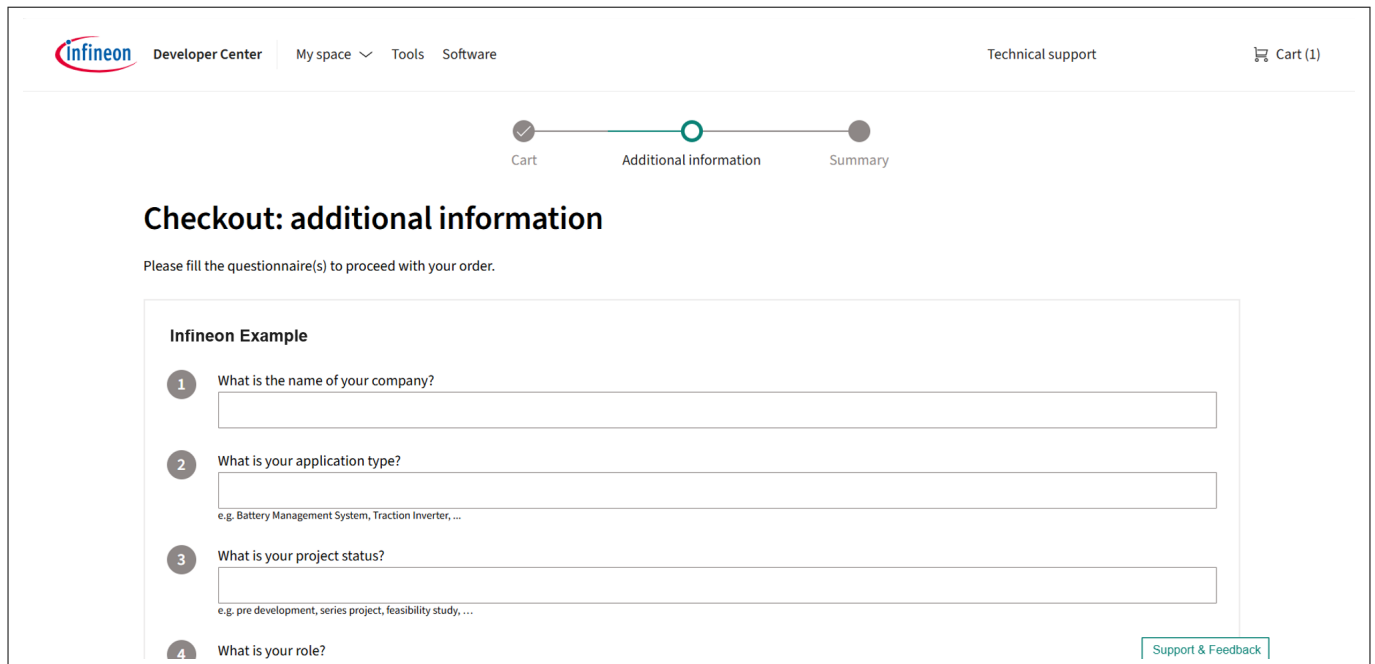


Figure 11 Software package within the Infineon Developer Center

1 System offering



The screenshot shows the Infineon Developer Center interface. At the top, there's a navigation bar with the Infineon logo, 'Developer Center', 'My space' (with a dropdown arrow), 'Tools', and 'Software'. On the right, there's 'Technical support' and a shopping cart icon labeled 'Cart (1)'. Below the navigation bar is a progress indicator with three steps: 'Cart' (completed, marked with a checkmark), 'Additional information' (current step, marked with a circle), and 'Summary' (pending, marked with a circle). The main heading is 'Checkout: additional information'. Below it, a message says 'Please fill the questionnaire(s) to proceed with your order.' The questionnaire is titled 'Infineon Example' and contains four numbered questions, each with a text input field: 1. 'What is the name of your company?' 2. 'What is your application type?' with a hint 'e.g. Battery Management System, Traction Inverter, ...' 3. 'What is your project status?' with a hint 'e.g. pre development, series project, feasibility study, ...' 4. 'What is your role?' At the bottom right of the questionnaire is a 'Support & Feedback' button.

Figure 12 Requesting download of software package

1.2.3 How to get the Infineon BSL programming tool for MCUs

The tool can be installed from the Infineon Developer Center Launcher, which can be downloaded [here](#)

To download the [GUI](#) from the Infineon Developer Center Launcher:

1. Open the Infineon Developer Center Launcher and click **Manage Tools**
2. In the search field, enter Infineon **BSL** programming tool for MCUs
3. Click **Install**
4. After a few minutes, the software package is available on the **Launcher** in the **My tools** tab
5. In the new window that appears, click **TLD4xxx devices** to start the tool

1 System offering

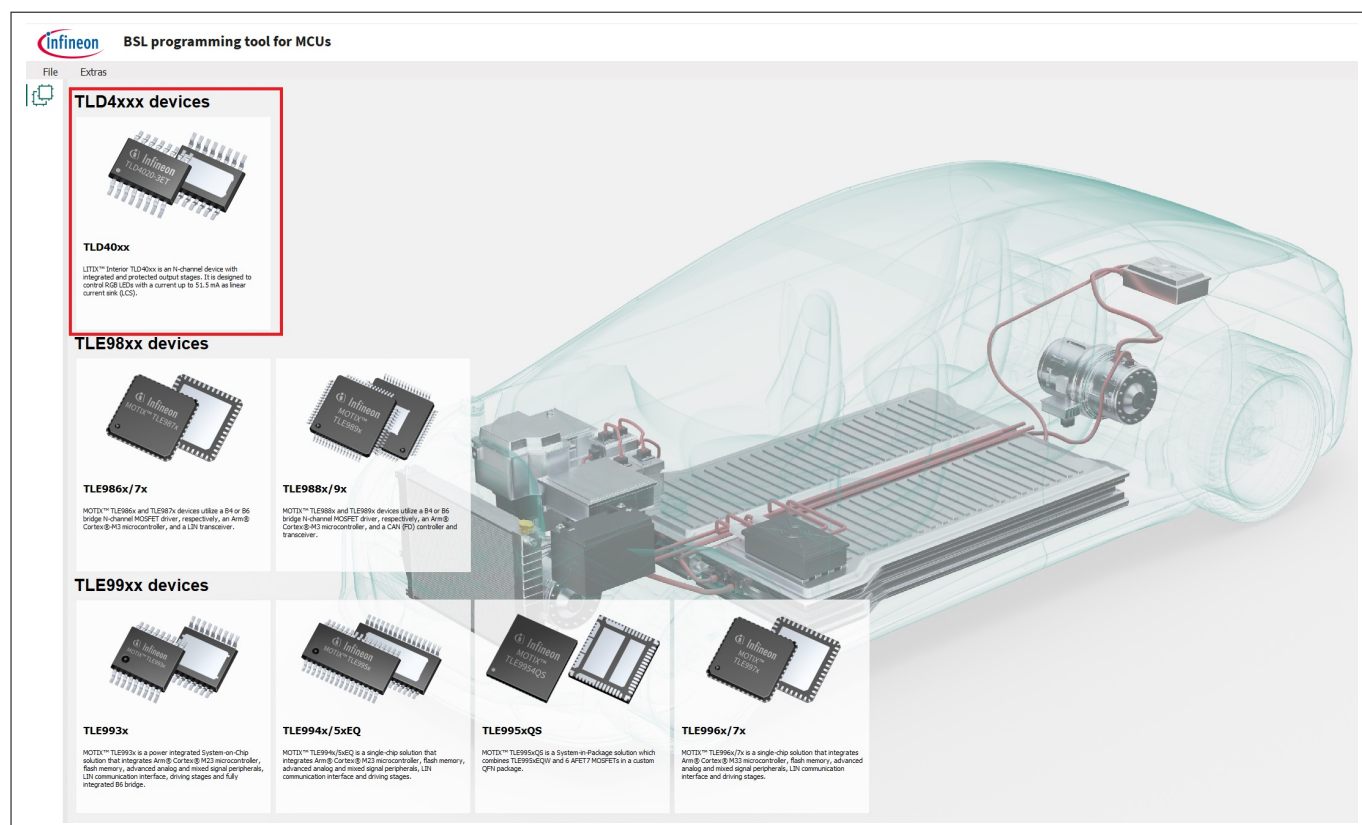


Figure 13 Infineon BSL programming tool for MCUs

2 Setting up the LED platform static RGB reference design

2 Setting up the LED platform static RGB reference design

Box delivery content

The Static RGB reference design is delivered together with a QR code on the box. This QR code provides access to the board's exclusive content, such as [printed circuit board \(PCB\)](#) design files.

Exclusive content

To access exclusive content, click [here](#).

2.1 Application setup

The Application setup is needed for the main use-case of the reference design, where the application software is executed by the Traveo™ II and the [LED](#) on the reference design shows a color. The Application setup represents a comprehensive setup that consists of:

- The Traveo™ II Starter Kit
- The LED Platform Power and Communication Arduino Shield
- The LED Platform reference design
- The LITIX™ application software
- The Traveo™ II application software

By combining these components, users are able to create a fully functional setup that closely resembles a real-world application, enabling a seamless transition to the final product.

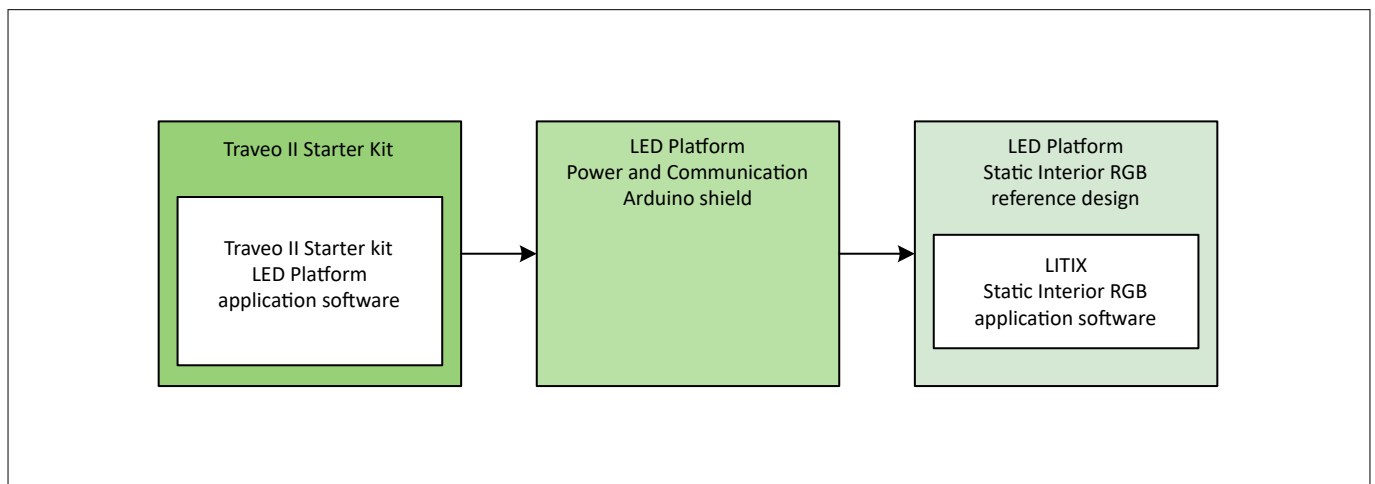


Figure 14 Application setup system offering

The Traveo™ II Starter Kit requires reflashing by the user to run the Application setup using the Traveo™ II application software. For the LED Platform, the recommended programming interface is the onboard KitProg3 programmer, used with the IAR Embedded Workbench for ARM®.

To program and debug the kit using the IAR Embedded Workbench for Arm tool and the onboard KitProg3 programmer/debugger, use the following steps:

1. Before connecting any power or cables, ensure that the solder jumpers on the LED Platform Power and Communication Arduino Shield are set at the default position. Refer to the figures below where the default solder jumpers are highlighted in red

2 Setting up the LED platform static RGB reference design

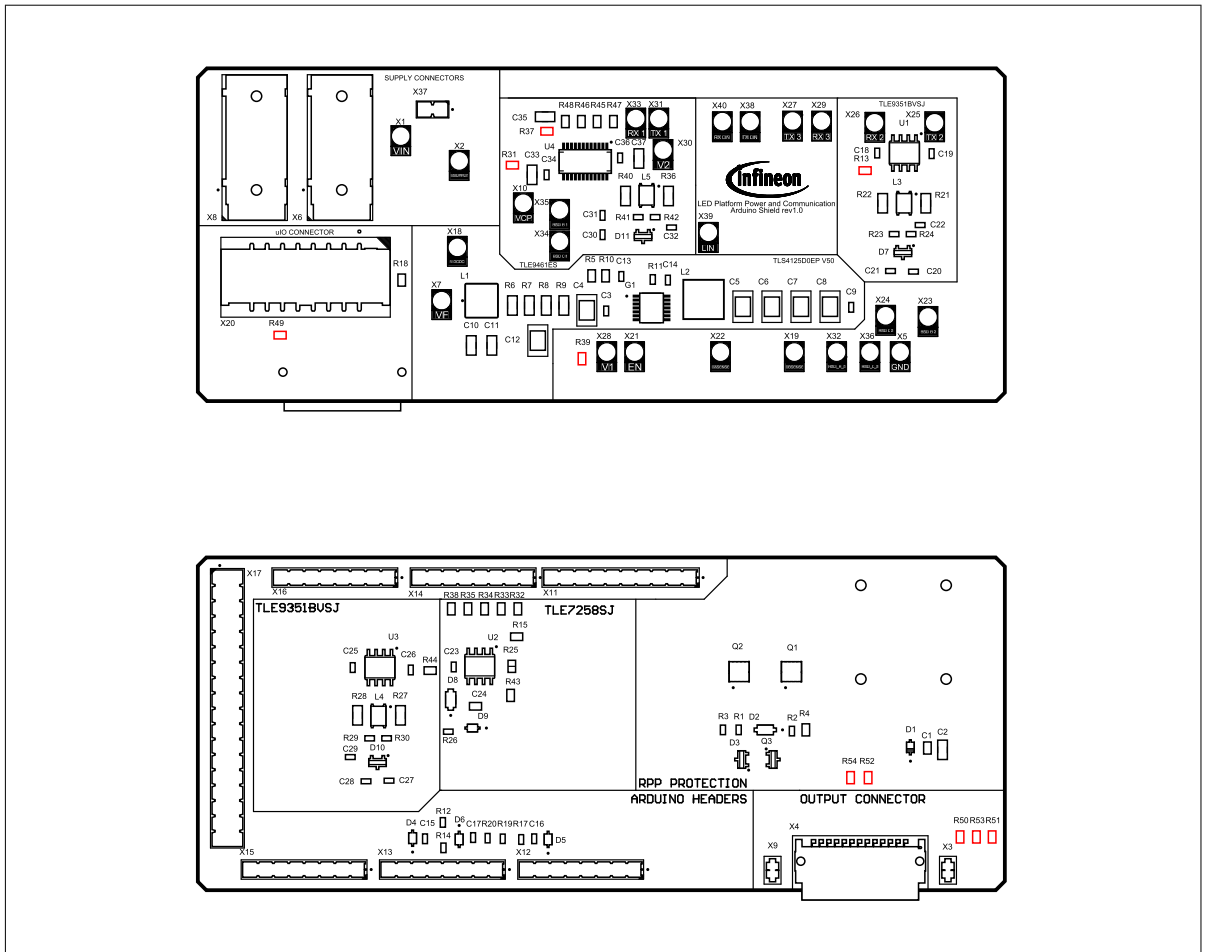


Figure 15 Default solder jumpers LED Platform Power and Communication Arduino Shield

2. To power the LIN transceiver, remove the solder jumper **R13** and solder jumpers **R15** and **R18** highlighted in red

2 Setting up the LED platform static RGB reference design

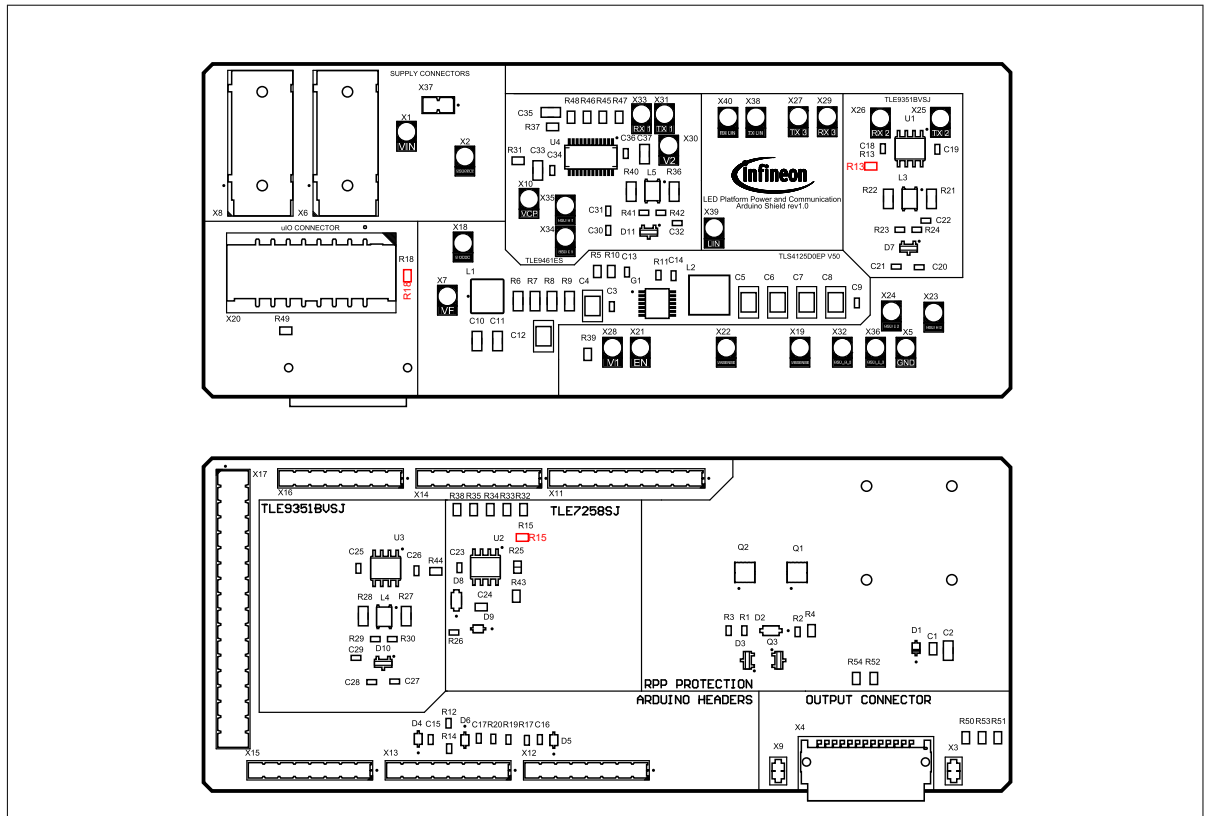


Figure 16 Changes on solder jumpers configuration for LIN communication

3. Mount the LED Platform Power and Communication Arduino Shield onto the Traveo™ board's Arduino form-factor connectors
4. Connect the USB micro-B cable between the KitProg3 on the Traveo™ II Starter kit and the PC's USB port
5. Download the application software as explained here, [How to get the LED platform application software](#), then unzip the folder and open the IAR Embedded Workbench workspace within the unzipped folder
6. Build the project by going to the menu option **Project** and select **Rebuild All**. Once the build process is finished, download it to the board by clicking **Project** > **Download** > **Download active application**
7. Connect the LED Platform Static reference design to the adapter board, ensuring the LED faces the Infineon logo
8. Connect the adapter board to the LED Platform Power and Communication Arduino Shield by inserting the X10 connector into the X4 connector on the shield
9. Connect the LED Platform Power and Communication Arduino Shield to a 12 V power supply using the banana connectors (X6, X8) on the board

2 Setting up the LED platform static RGB reference design

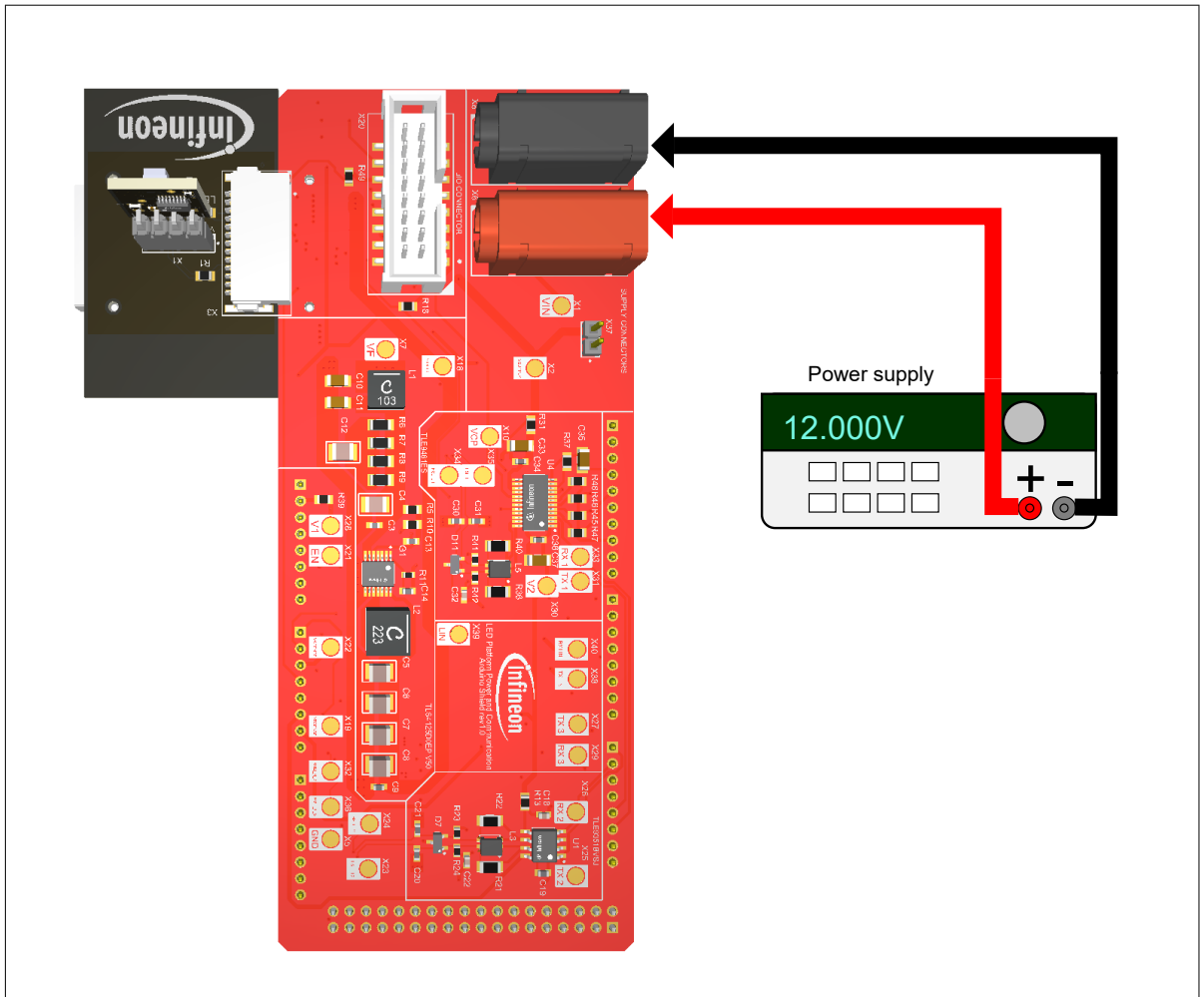


Figure 17 Application setup power supply

10. Finally, press the reset button on the Traveo™ II Starter Kit to complete the download process
11. The reference design should illuminate with the predefined color, indicating a successful programming process

2.2 Programming setup

The Programming setup allows users to program the LITIX™ TLD4020-3ET device in the reference design. The Programming setup consists of:

- The [LED Platform Power and Communication Arduino Shield](#)
- The LED Platform Static RGB reference design
- The uIO-Stick V2
- The MCU BSL Tool

By integrating these components, users can quickly and easily program a new HEX file directly in the LITIX™ TLD4020-3ET device, providing a streamlined solution for testing and development.

2 Setting up the LED platform static RGB reference design

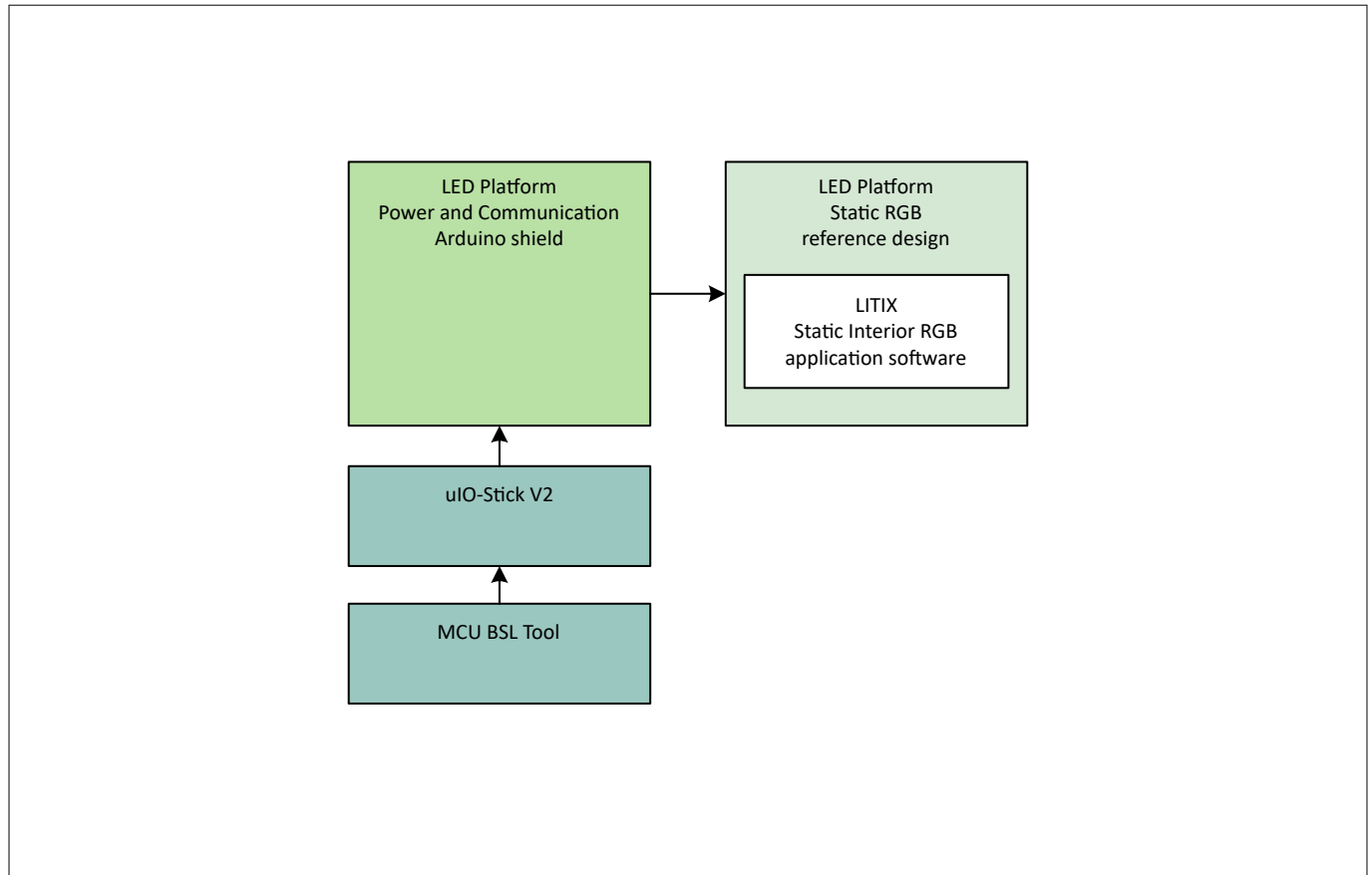


Figure 18 Programming setup system offering

To load a new firmware, follow these steps:

1. Before connecting any cables, ensure that the jumpers highlighted in red in the figure below are soldered on the LED Platform Power and Communication Arduino Shield

2 Setting up the LED platform static RGB reference design

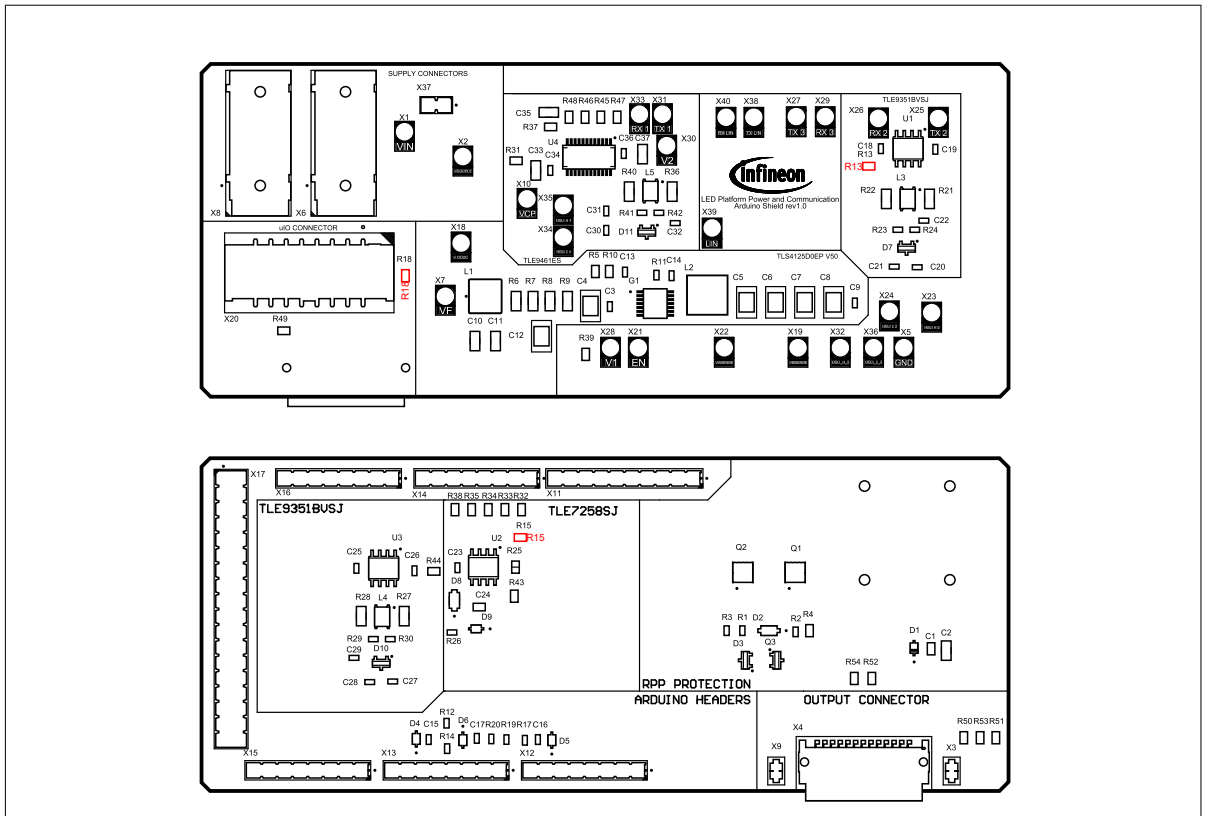


Figure 19 Solder jumpers LED Platform Power and Communication Arduino Shield

2. Connect the LED Platform Static reference design to the adapter board, ensuring the LED faces the Infineon logo
3. Connect the adapter board to the LED Platform Power and Communication Arduino Shield by inserting the X10 connector into the X4 connector on the shield
4. Connect the LED Platform Power and Communication Arduino Shield to a 12 V power supply using the banana connectors (X6, X8) on the board. If the LEDs are turning ON, the setup is correct and you can move to the next step

2 Setting up the LED platform static RGB reference design

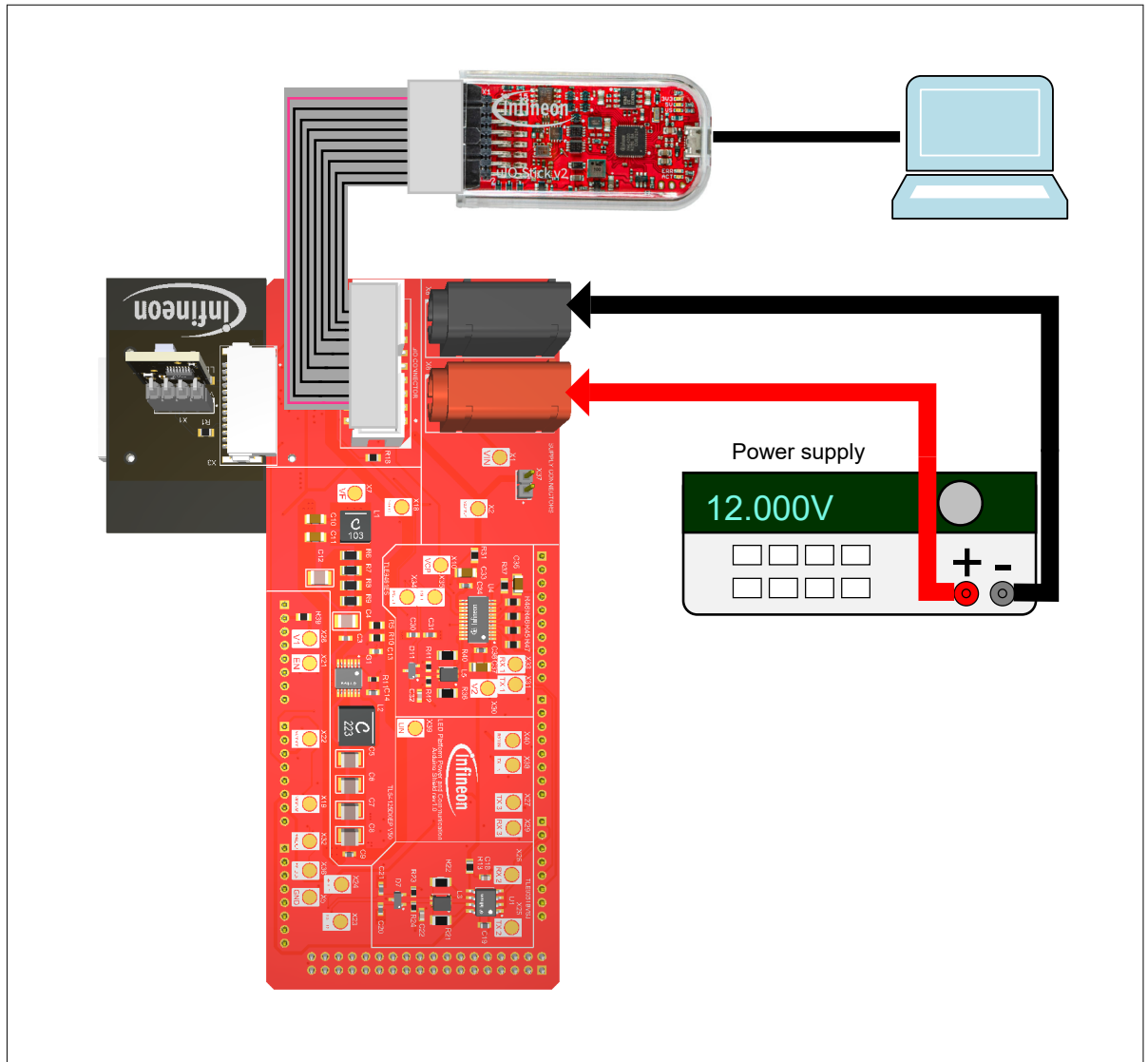


Figure 20 Programming Setup power supply

5. Open the **BSL programming tool for MCUs** and select the **LITIX™ TLD40xx** icon. Then, select **Connect** button, this will enable the connected device to enter in **BSL** mode
6. If you want to program a new HEX file, upload it with the button **Select input HEX file**, then select **Program**
7. Finally, press the **Disconnect** button to complete the download process

3 In detail: LED platform static RGB reference design

3 In detail: LED platform static RGB reference design

3.1 Technical data

The supply's technical data is outlined in the table below. Note that the current capability is limited by the power dissipation on the board, and higher current levels typically result in increased temperatures on the [PCB](#).

Table 2 Technical data

System Parameter	Symbol	Value
Digital supply voltage	V_{SUPPLY}	Typ. 12 V (max. 28 V)
Digital supply current	I_{SUPPLY}	Typ. 40 mA
Board size		15 mm x 12 mm

3.2 Functional description

3.2.1 Functional blocks

The LED Platform Static RGB reference design is composed of one main functional block:

- **LED Driver:** this functional block comprises of the LITIX™ TLD4020-3ET LED Driver to drive the RGB LED in the reference design

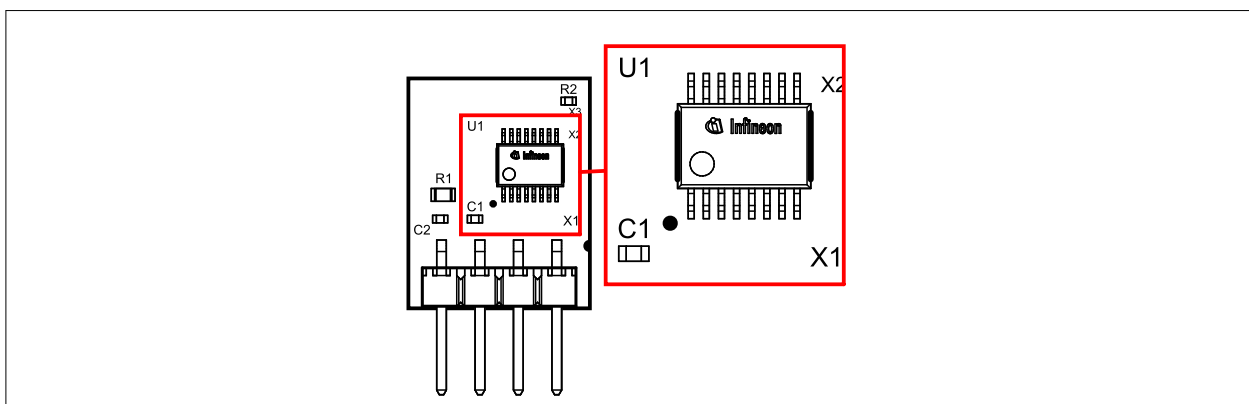


Figure 21 LED Driver functional block

3.2.2 Functional connectors

The [LED](#) Platform Static RGB reference design features a pin header that replicates the interface of the final application connector.

3 In detail: LED platform static RGB reference design

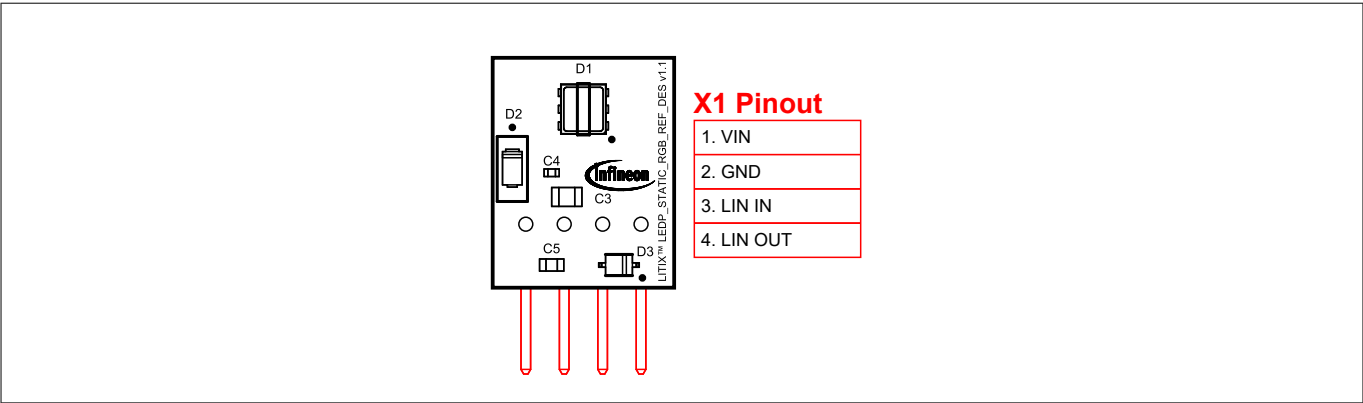


Figure 22 Pin header LED Platform Static RGB reference design

Table 3 Pin header pinout description

Pin	Symbol	Function
1	VIN	Power supply voltage pin
2	GND	Ground potential for digital, analog and power
3	LIN IN	Input pin for LIN
4	LIN OUT	Output pin for LIN

Glossary

API

application programming interface (API)

A set of defined rules that enables various software components to communicate with each other.

BSL

bootstrap loader (BSL)

A small program or routine that is responsible for initializing the system and loading the main operating system or application into the memory of the target device during the system boot-up process.

CAN

controller area network (CAN)

GUI

graphical user interface (GUI)

An interface that enables users to interact with electronic devices through icons and visual indicators.

LED

light-emitting diode (LED)

A semiconductor circuit that emits light when activated.

LIN

local interconnect network (LIN)

MCU

microcontroller unit (MCU)

A small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.

microcontroller

microcontroller

A small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.

PCB

printed circuit board (PCB)

A board that mechanically supports and electrically connects electronic components using conductive tracks, pads, and other features etched from copper sheets laminated onto a non-conductive substrate.

SBC

system basis chip (SBC)

An integrated circuit that includes various functions of automotive electronic control units (ECU) on a single die. It includes digital standard functionality like communication bus interfaces and analog or power functionality. Common features of SBCs include communication transceivers, voltage regulators, diagnostics, supervision functions, switches, and wake inputs.

Revision history

Document version	Date of release	Description of changes
Rev. 1.00	2026-06-05	Initial document release

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