

KIT_T2G-B-H_LITE TRAVEO™ T2G Body High Lite Kit user guide

About this document

Scope and purpose

This document provides a comprehensive understanding of the TRAVEO™ T2G Body High Lite (KIT_T2G-B-H_LITE) low-cost Evaluation Kit. The kit is based on the TRAVEO™ T2G CYT4BF device from the TRAVEO™ Body High family of microcontrollers.

This document serves to describe the features and functions of the TRAVEO™ T2G Body High Lite kit. In addition, it offers a detailed information on the available interfaces and guidelines for using the hardware interfaces. By the end of this guide, users should have a thorough understanding of how to utilize the TRAVEO™ T2G Body High Lite kit and its various capabilities.

Intended audience

This document is designed for all customers who are interested in evaluating the capabilities of the TRAVEO™ T2G Body High family CYT4BF device. Its main purpose is to offer a comprehensive guide that outlines the various features of the device and how it can be used in a range of applications. Whether you are testing new software or exploring different hardware designs, this document can provide valuable insights and guidance to help you achieve your goals.

Evaluation board

The purpose of this board is to assist with the software evaluation during the design-in process. However, it is important to note that while this board can be a helpful tool during the design process, it is not intended for use in the final customer design. The PCB and auxiliary circuits are not optimized to meet the specific needs and requirements of the end user. Instead, they are designed to provide a simplified and streamlined platform exclusively for software evaluation purposes.

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Safety precautions

Safety precautions

Note: Please note the following warnings regarding the hazards associated with development systems.

Table 1 Safety precautions



	<p>Caution: 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.</p>
	<p>Caution: The evaluation or reference board is shipped with packing materials that need to be removed prior to installation. Failure to remove all packing materials that are unnecessary for system installation may result in overheating or abnormal operating conditions.</p>

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1 Getting started

1 Getting started

This section provides an overview of the TRAVEO™ T2G Body High Lite kit and offers step-by-step guidance on how to set up and power up the kit. Additionally, it provides instructions on how to run the preprogrammed firmware and default jumper configuration to ensure a seamless experience.

1.1 Kit overview

This section provides the brief overview of the KIT_T2G-B-H_LITE kit and the details about all the various interfaces and peripherals available.

1.1.1 Introduction

The KIT_T2G-B-H_LITE kit enables you to evaluate and develop applications using the TRAVEO™ T2G Body High family CYT4BF device.

The TRAVEO™ T2G B-H MCU is specifically designed for automotive applications and features up to two 350 MHz Arm® Cortex®-M7 processors as the primary application processors, a 100-MHz Arm® Cortex®-M0+ processor that supports low-power operations, up to 8 MB flash and 1 MB SRAM, and programmable analog and digital peripherals that allow for faster time-to-market.

The TRAVEO™ T2G B-H Lite kit is equipped with a TRAVEO™ T2G B-H family CYT4BF MCU, two expansion headers, two Shield2Go connectors, headers that are compatible with Arduino shield and mikroBUS.

Additionally, the board features an onboard programmer/debugger (KitProg3), a 512-Mbit Dual QSPI NOR flash, a CAN FD transceiver, an Ethernet PHY transceiver with RJ45 connector interface, a micro-B connector for an USB device interface, three user LEDs, one potentiometer, and two push buttons. The board supports operating voltages from 3.3 V to 5.0 V for the TRAVEO™ T2G B-H MCU.

To develop and debug projects on the TRAVEO™ T2G B-H Lite kit, you can use the ModusToolbox™ software, which is a set of tools that enable you to integrate these devices into your existing development methodology.

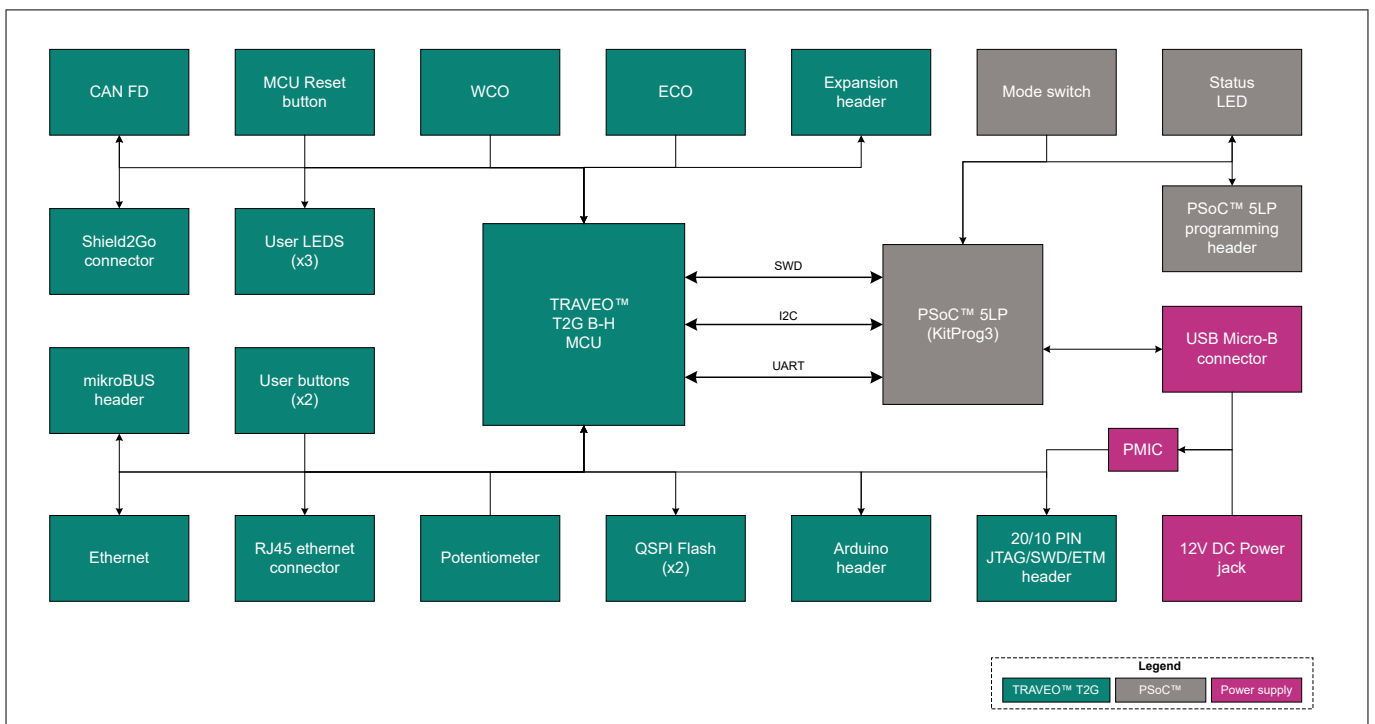


Figure 1 Block diagram of TRAVEO™ T2G B-H Lite kit

1 Getting started

1.1.2 Peripheral details

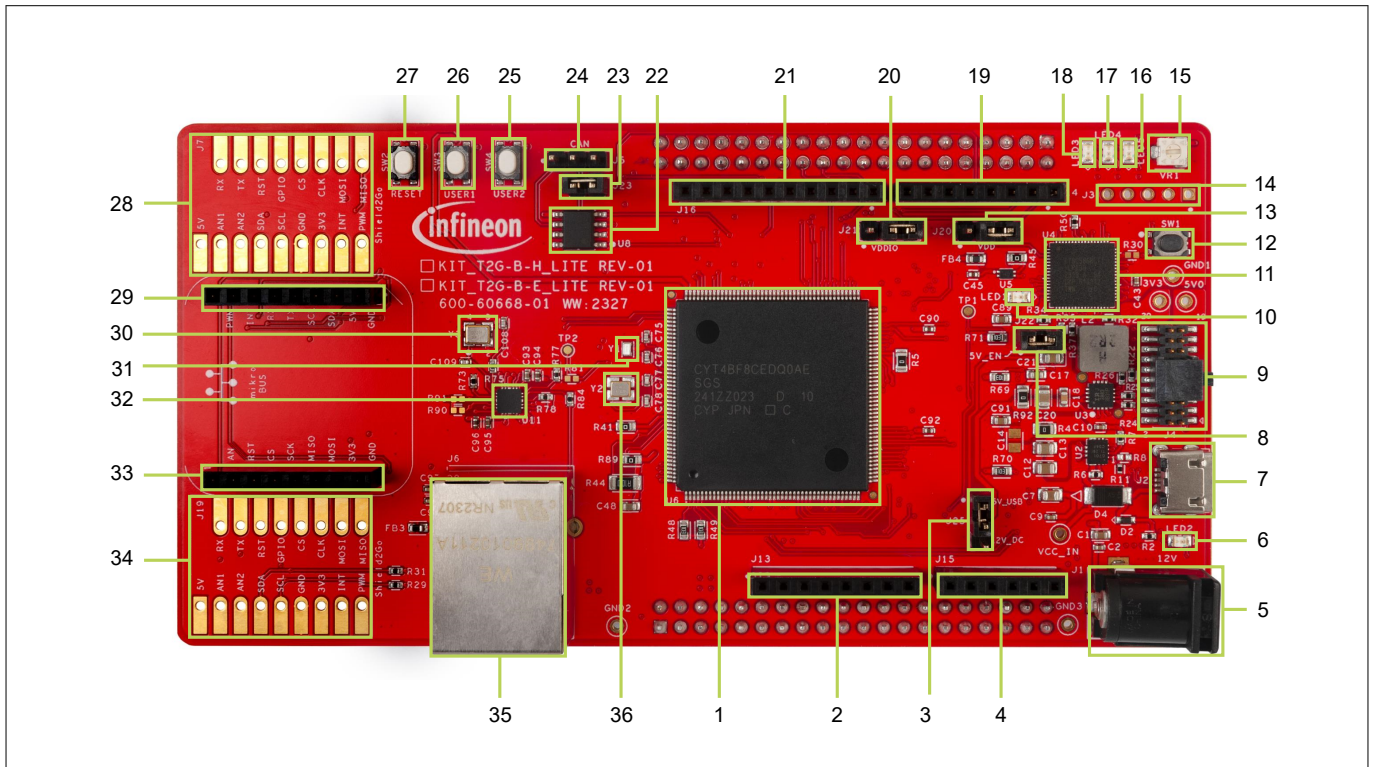


Figure 2 Peripheral and interfaces in the TRAVEO™ T2G B-H Lite kit front side

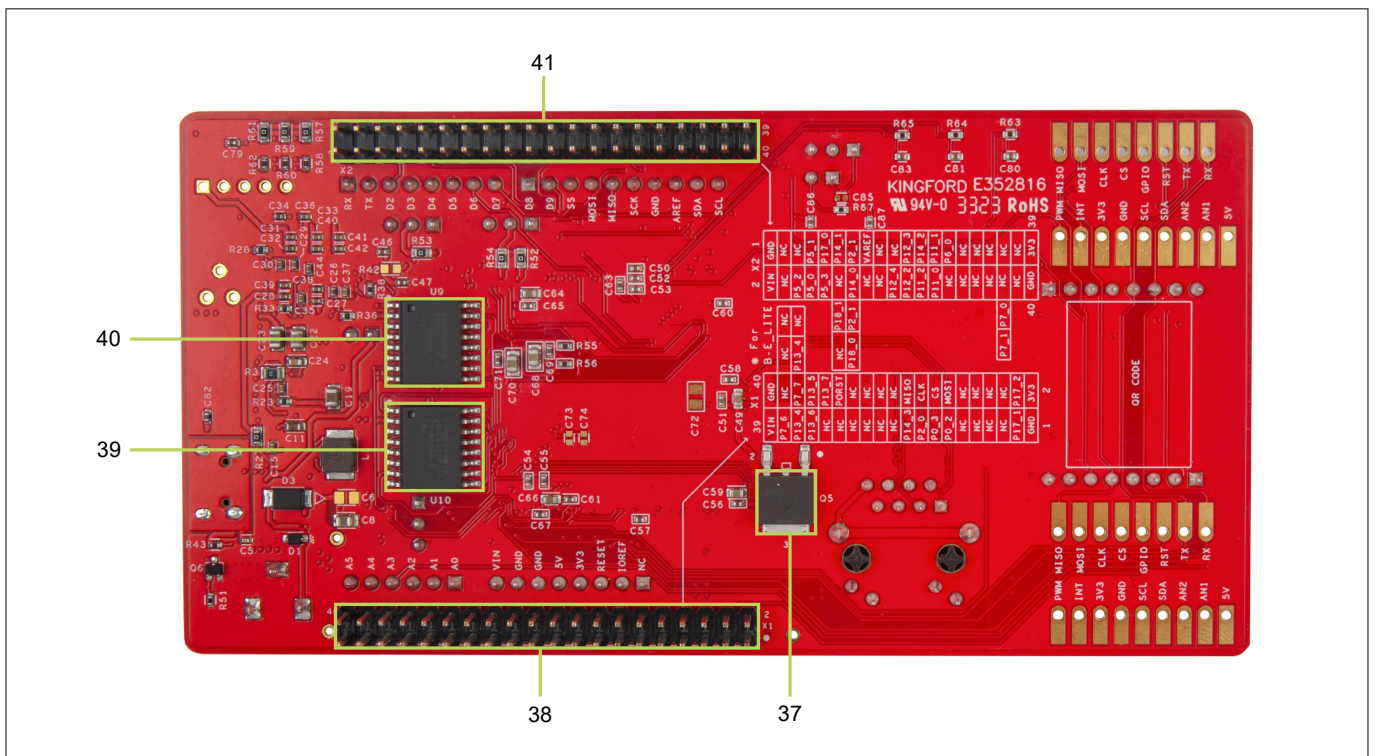


Figure 3 Peripheral and interfaces in the TRAVEO™ T2G B-H Lite kit back side

1 Getting started

Table 2 Peripheral details

Markup	Schematic reference designator	Peripheral	Description
1	U6	TRAVEO™ T2G MCU	TRAVEO™ T2G CYT4BF MCU device is used on the kit.
2	J13	Arudino header	Powers the Arduino shields. It also has a provision to power the kit through the VIN input.
3	J25	3-pin Jumper	For input power supply selection.
4	J15	Arudino header	Bring out pins from TRAVEO™ T2G B-H MCU to interface with Arduino shields. Some of these pins are multiplexed with onboard peripherals and are not connected to TRAVEO™ T2G B-H MCU by default.
5	J1	12 V DC power jack	Connect to external 12 V/3 A DC power adapter.
6	LED2	Power LED	Power supply ON/OFF LED status indicator.
7	J2	USB Micro-B connector	Connect to a PC to use the onboard programmer and debugger KitProg3 and also to provide power to the kit.
8	J22	2-pin jumper	5 V supply enable for feeding to the input of buck regulator.
9	J4	MIPI-20 Cortex® debug + ETM connector	Connect to an Embedded Trace Macrocell (ETM)-compatible programmer/debugger.
10	LED1	KitProg3 status LED	Amber LED indicates the status of KitProg3.
11	U4	PSoC™ 5LP	The PSoC™ 5LP device (CY8C5868LTI-LP039) serving as KitProg3, is a multi-functional system, which includes an SWD programmer, debugger, USB-I2C bridge, and USB-UART bridge.

(table continues...)

1 Getting started

Table 2 (continued) Peripheral details

Markup	Schematic reference designator	Peripheral	Description
12	SW1	KitProg3 mode select button	Use this button to switch between various modes of operation of KitProg3. Note that this board supports only CMSIS-DAP BULK mode. This button function is reserved for future use.
13	J20	3-pin jumper	VDD current measurement jumper.
14	J3	PSoC™ 5LP programming header	Can be used for programming the PSoC™ 5LP device.
15	VR1	Potentiometer	10 kΩ potentiometer connected to TRAVEO™ T2G B-H MCU pin P6.0.
16	LED5	User LED 3	The user LEDs can operate at the entire operating voltage range of the TRAVEO™ T2G B-H MCU.
17	LED4	User LED 2	The user LEDs can operate at the entire operating voltage range of the TRAVEO™ T2G B-H MCU.
18	LED3	User LED 1	The user LEDs can operate at the entire operating voltage range of the TRAVEO™ T2G B-H MCU.
19	J14	Arduino header	Bring out pins from TRAVEO™ T2G B-H MCU to interface with Arduino shields. Some of these pins are multiplexed with onboard peripherals and are not connected to TRAVEO™ T2G B-H MCU by default.
20	J21	3-pin jumper	VDDIO current measurement jumper

(table continues...)

1 Getting started

Table 2 (continued) Peripheral details

Markup	Schematic reference designator	Peripheral	Description
21	J16	Arduino header	Bring out pins from TRAVEO™ T2G B-H MCU to interface with Arduino shields. Some of these pins are multiplexed with onboard peripherals and are not connected to TRAVEO™ T2G B-H MCU by default.
22	U8	CAN FD transceiver	High-speed CAN FD transceiver which support speed up to 5 Mbps.
23	J23	2-pin jumper	120 Ω termination resistor between CANH and CANL in CAN bus.
24	J5	CAN FD interface connector	Connector to connect the kit to the other CAN FD nodes.
25	SW4	User button 2	Provide input to TRAVEO™ T2G B-H MCU. Note that by default the button connects the TRAVEO™ T2G B-H MCU pin to the ground when pressed, so you need to configure the TRAVEO™ T2G B-H MCU pin as a digital input with resistive pull-up for detecting the button press.
26	SW3	User button 1	Provide input to TRAVEO™ T2G B-H MCU. Note that by default the button connects the TRAVEO™ T2G B-H MCU pin to the ground when pressed, so you need to configure the TRAVEO™ T2G B-H MCU pin as a digital input with resistive pull-up for detecting the button press.
27	SW2	TRAVEO™ T2G B-H MCU reset button	Resets TRAVEO™ T2G B-H MCU. It connects the TRAVEO™ T2G B-H MCU reset (XRES) pin to the ground.
28	J7	Shield2Go connector	Optional connector for Shield2Go Interface (DNI)

(table continues...)

1 Getting started

Table 2 (continued) Peripheral details

Markup	Schematic reference designator	Peripheral	Description
29	J12	mikroBUS header	Optional header for mikroBUS Interface
30	Y3	Crystal oscillator	25 MHz crystal for Ethernet transceiver
31	Y1	Crystal oscillator	32.768 kHz watch crystal oscillator
32	U11	Ethernet PHY transceiver	Ethernet PHY transceiver (DP83825IRMQR)
33	J11	mikroBUS header	Optional header for mikroBUS Interface
34	J19	Shield2Go connector	Optional connector for Shield2Go Interface (DNI)
35	J6	RJ45 Ethernet connector	RJ45 Ethernet connector port to connect the kit to the Ethernet network
36	Y2	Crystal oscillator	16 MHz external crystal oscillator
37	Q5	Transistor	Pass transistor
38	X1	Expansion header	These headers provide connectivity to TRAVEO™ T2G B-H MCU GPIOs that are not connected to the other onboard functions.
39	U10	QSPI flash memory	512 Mb external Quad SPI NOR flash
40	U11	QSPI flash memory	512 Mb external Quad SPI NOR flash
41	X2	Expansion header	These headers provide connectivity to TRAVEO™ T2G B-H MCU GPIOs that are not connected to the other onboard functions.

1 Getting started

1.2 Kit content

This section provides a detailed list of the components that are included in the kit.

Table 3 Kit contents

Quantity	Description	Remarks
1	KIT_T2G-B-H_LITE rev-01	TRAVEO™ T2G Body High Lite Kit
1	USB Micro-B cable	To power up the board in addition to programming and debugging the lite kit.



Figure 4 Kit content of the TRAVEO™ T2G B-H Lite kit rev-01

Note: The kit does not include a Quick Start Guide (QSG) in the box. However, you can find the QSG along with the additional resources on the [KIT_T2G-B-H_LITE](https://www.infineon.com/traveobhkit) webpage.

1 Getting started

1.3 Initial jumper configuration

This section describes the default jumper configuration and location required for each module. Because a few interfaces are multiplexed, the default interface selection is mentioned in Table 4.

This initial configuration also helps to generate all the power supplies from the regulators and distribute them to safely power-up the lite kit.

Table 4 Default jumper configuration

Jumper	Function	Position
J20	VDD current measurement jumper	2-3: short
J21	VDDIO current measurement jumper	2-3: short
J22	5 V supply enable jumper	1-2: short
J23	CAN bus 120 Ω termination resistor jumper	1-2: short
J25	Input power supply selection jumper	1-2: short

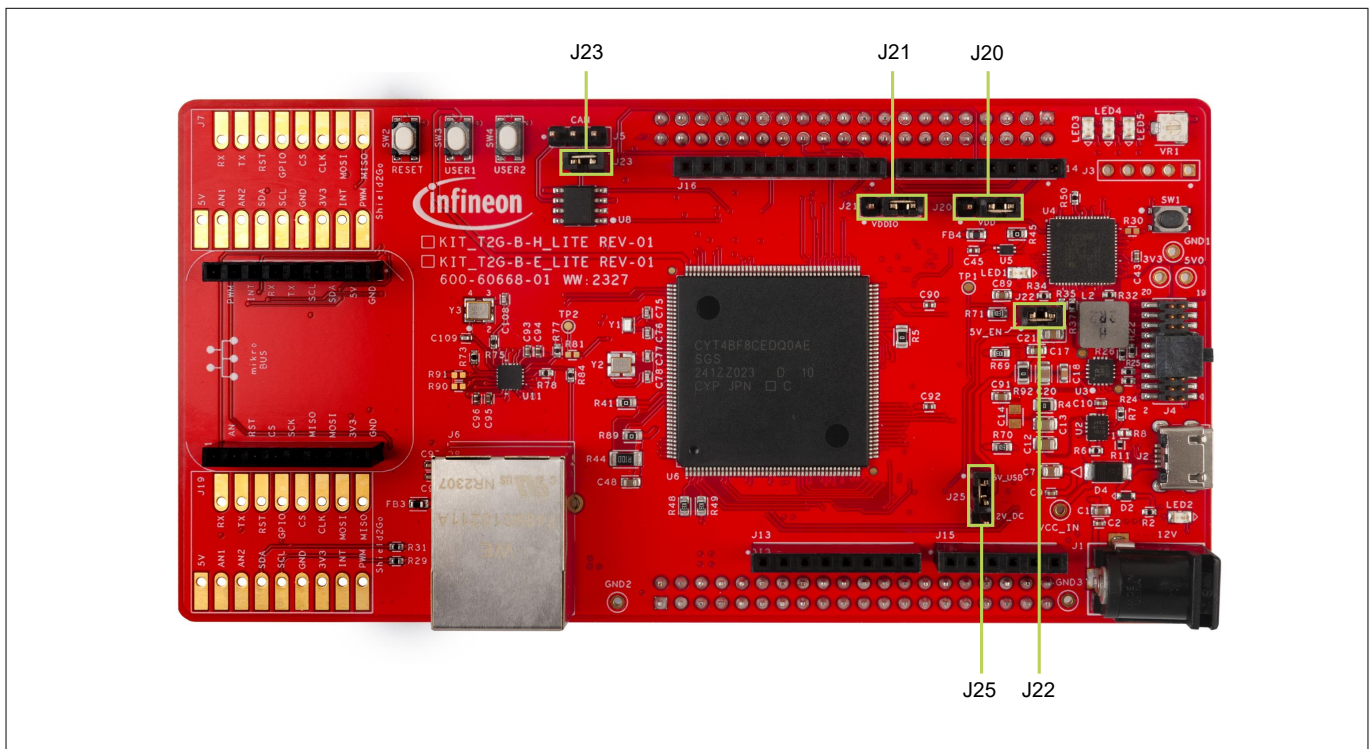


Figure 5 Jumpers location in the TRAVEO™ T2G B-H Lite kit

1.4 Powering up the kit

This section provides basic information on the different powering options that are available for the TRAVEO™ T2G B-H Lite kit.

The TRAVEO™ T2G B-H Lite kit can be powered using one of two options:

1 Getting started

- The default powering option is to use a USB Micro-B cable, which can be connected to the USB Micro-B connector (J2). This option is capable of powering both the MCU and the on-board programmer/debugger KitProg3
- If you prefer, use a 12 V DC power adapter to supply power to the kit through the 12 V DC power jack. However, it is important to note that this option is not able to power the KitProg3, but the USB Micro-B option is. To power up the TRAVEO™ T2G B-H Lite kit using either of two options

1.4.1 Powering-up the kit through USB Micro-B

1. Ensure that the power is disconnected from the kit
2. Short the jumper (J25) between position 1-2
3. Short the jumper (J22)
4. Connect the USB Micro-B cable from the PC to the USB connector (J2)
5. Observe that the power LED is glowing green
6. Additionally, observe that the Kitprog3 status LED begins glowing in amber

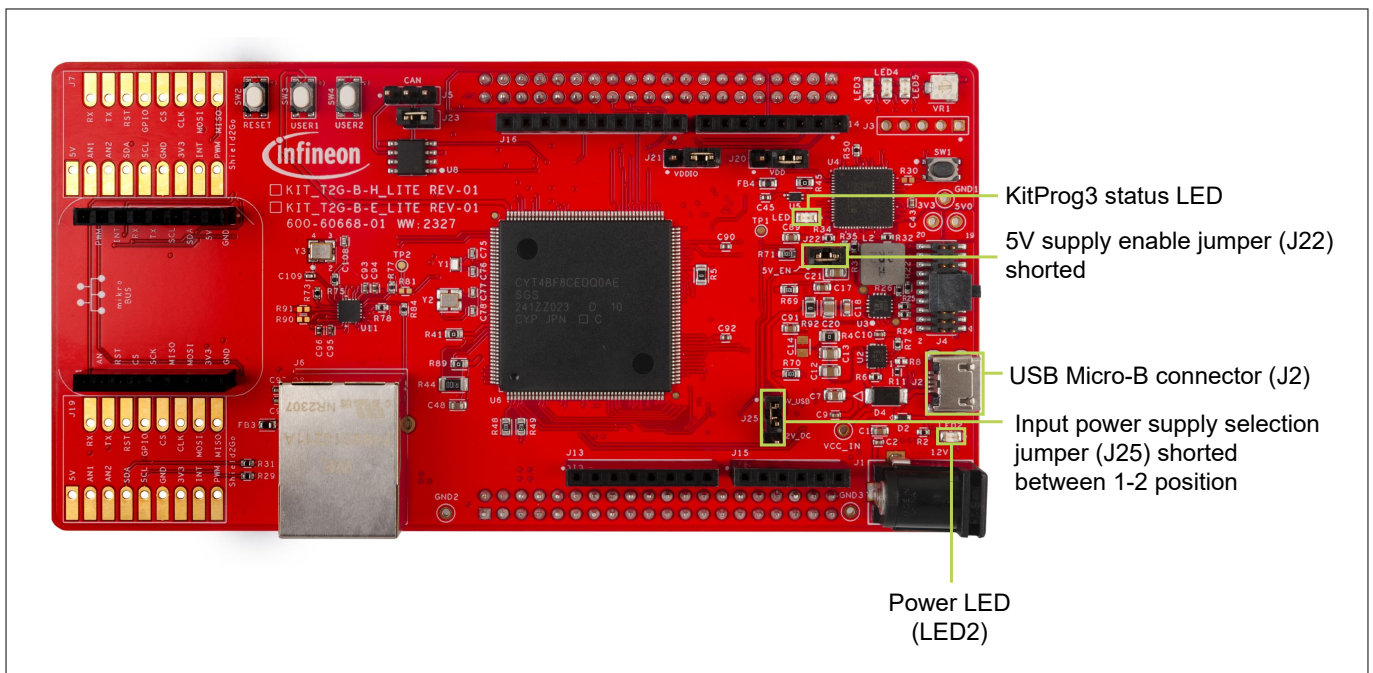


Figure 6 Powering the kit through USB Micro-B

1 Getting started

1.4.2 Powering-up the kit through 12 V DC power adapter

1. Ensure that the power is disconnected from the kit
2. Short the jumper (J25) between position 2-3
3. Connect the 12 V DC power adapter to power jack (J1)
4. Observe that the power LED is glowing green

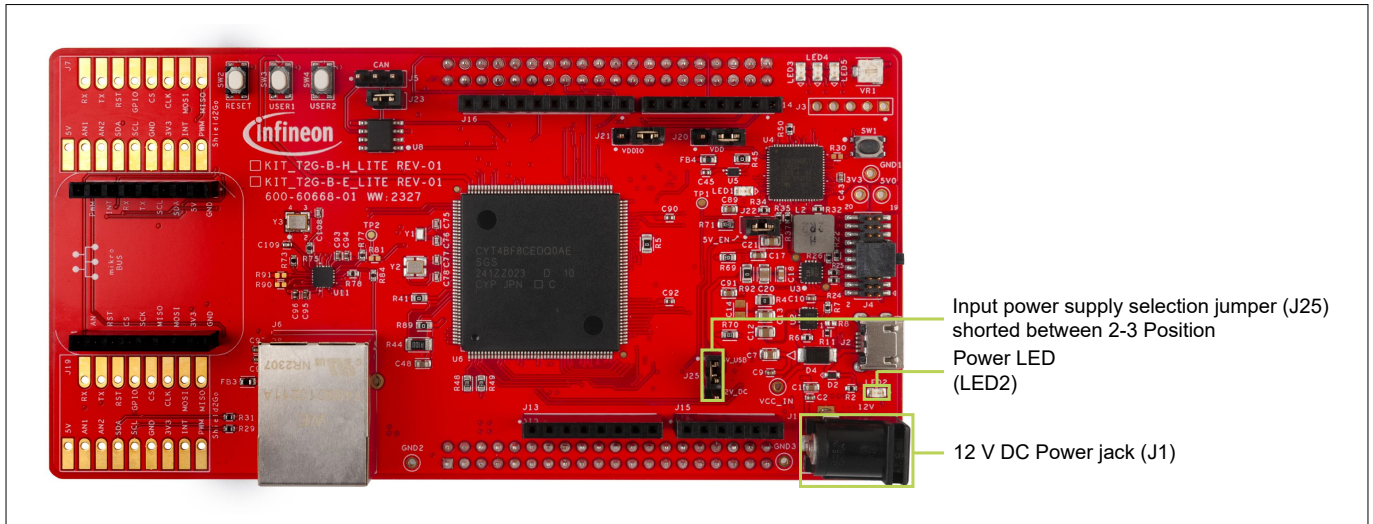


Figure 7 Powering the kit through 12 V DC power adapter

1.5 Preprogrammed firmware

The TRAVEO™ T2G B-H Lite kit is shipped with preloaded software that is ready to run as soon as the kit is powered up. This software includes the results of all the interfaces tests and can be a valuable resource for developers who want to verify the functionality status of the kit, ensuring it is in a working condition.

To get started with the preloaded software, ensure that you have followed the correct jumper settings and powered up the TRAVEO™ T2G B-H Lite kit. Then, do the following to view the full test logs on the screen, along with a blinking pattern of the user LEDs:

1. Connect the lite kit with your PC via the USB Micro-B cable
2. Open any serial terminal software (such as TeraTerm) in your PC
3. Configure the connection for “Serial” and choose the port that shows “KitProg3 USB-UART” in the port option
4. Go to **Setup > Serial port > Speed** and select 115200 as the baud rate. Click the New setting button to create a new configuration
5. Press the MCU reset button (SW2) on the Lite kit. The silicon details and test results of the peripherals are printed on serial terminal screen
6. Observe that the user LEDs on the kit starts blinking in a pattern

1 Getting started

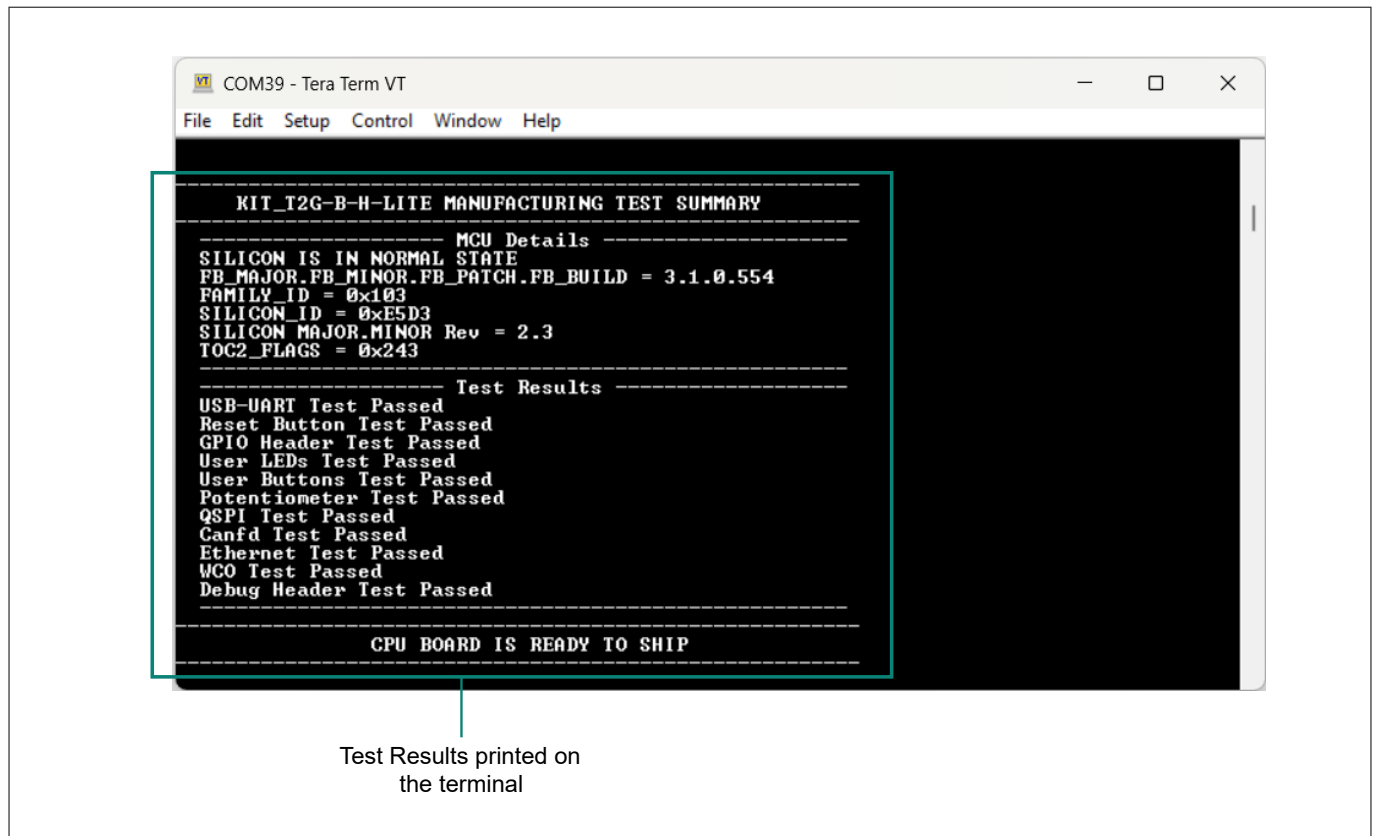


Figure 8 Test logs printed on the serial terminal window (TeraTerm)

2 Programming the kit

2 Programming the kit

This section provides the instructions for installing the ModusToolbox™ IDE and how to program the Lite kit using the ModusToolbox™ IDE.

If you are new to the TRAVEO™ T2G-B-H Lite kit and ModusToolbox™ software, see the [AN235305 - Getting started with TRAVEO™ T2G Family MCUs in ModusToolbox™ software](#). This note provides detailed instructions and guidance on how to get started with the TRAVEO™ T2G kit and use the Eclipse IDE for ModusToolbox™ software to create your own designs.

2.1 ModusToolbox™ IDE

This section explains how to install ModusToolbox™ in your PC.

2.1.1 Software installation

To install the [ModusToolbox™](#) software on your PC, do the following:

1. Download the latest version of the [ModusToolbox™](#) software
2. Run the [ModusToolbox™](#) installer file on your PC with administrative rights
3. Follow the on-screen prompts to complete the installation process, which includes accepting the license agreement, selecting a destination folder for the software, and choosing any additional components that you want to install (keep default settings)
4. Once the installation is complete, open the [ModusToolbox™](#) software. A prompt will appear, asking you to select a directory as the workspace. Use the default path or change the path as per your requirement
5. After launching the [ModusToolbox™](#) IDE, you can use [ModusToolbox™](#) IDE with the TRAVEO™ T2G B-H Lite kit

2.1.2 ModusToolbox™ overview

[Figure 9](#) shows the overview of the Eclipse IDE for ModusToolbox™. The following are the sections available in the Eclipse IDE:

- **Menus and Toolbars:** This section contains the main navigation menus and toolbars granting the access to a wide range of functions and features within ModusToolbox™
- **Project Explorer:** This area showcases the hierarchical structure of the current project, allowing easy navigation and management of files, folders, and project settings
- **Quick Panel:** The Quick Panel provides quick access to frequently used tools, commands, and settings, streamlining the development process
- **Code Editor:** This space serves as the central workspace for writing, editing, and managing code files, offering essential features for coding and software development
- **Console:** The console window provides real-time feedback by displaying system messages, build output, and debugging information, enhancing the development experience

2 Programming the kit

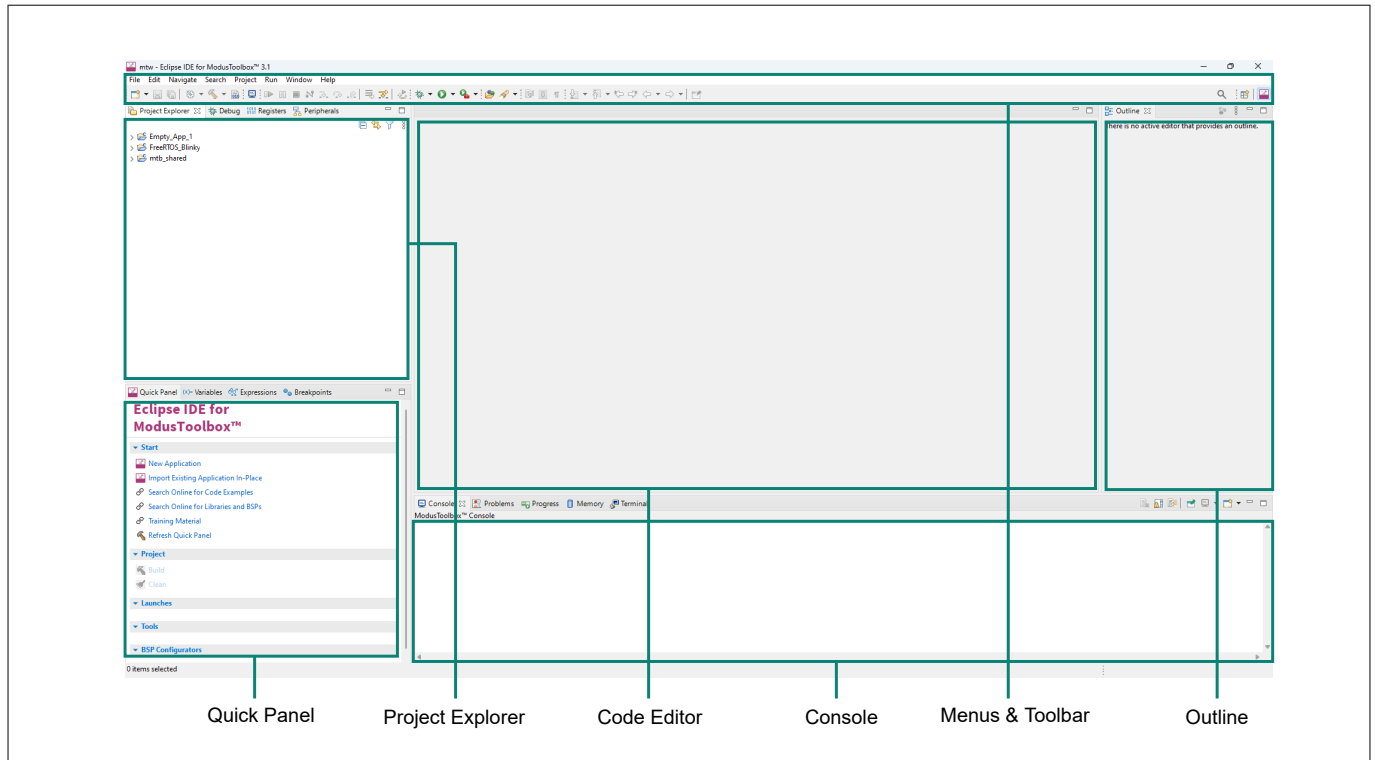


Figure 9 **ModusToolbox™ overview**

2.2 **Blink the LED**

The procedure for programming the kit and blinking the user LEDs is as follows:

1. Ensure that the jumpers are configured according to the USB Micro-B powering option, and then connect the lite kit to the PC using the USB Micro-B cable
2. Open ModusToolbox™ in your PC with the default workspace
3. Navigate to the **Quick Panel** window located at the bottom left corner of the screen, and then click on the **New Application** option
4. Once the loading is complete, click on the “TRAVEO™ BSPs” and select the “KIT_T2G-B-H_LITE” in the kit name, and then press “next” button (as shown in [Figure 10](#))

2 Programming the kit

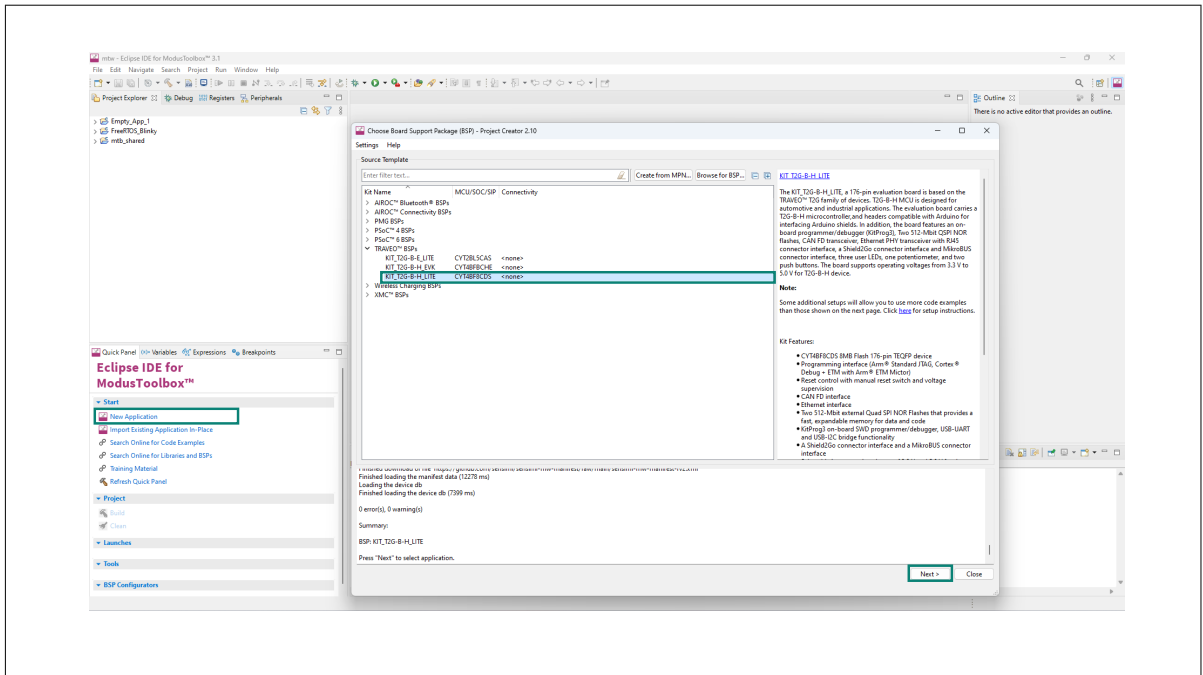


Figure 10 Selecting the TRAVEO™ T2G B-H Lite kit BSP

5. After loading the code examples, click on the **Getting Started** and select the **Hello World** code example. Keep the default application name and then press the **Create** button
6. Once the project is created successfully, go to the "Project Explorer" and expand the Hello_World project and see the *main.c* file (as shown in [Figure 11](#))
7. Click on the *main.c* file. It opens the C code in the "Code Editor". Then, go to the **Quick Panel** window and press the **Build Application**, which compiles the code
8. Once the compiling and building is completed, "Build Finished" message appears in the console window. Then, go to **Quick Panel** and select "Hello_World Program" under the **Launches** tab, and wait until the device is flashed
9. After flashing the device successfully, observe that the user LED (LED1) starts to blink continuously

2 Programming the kit

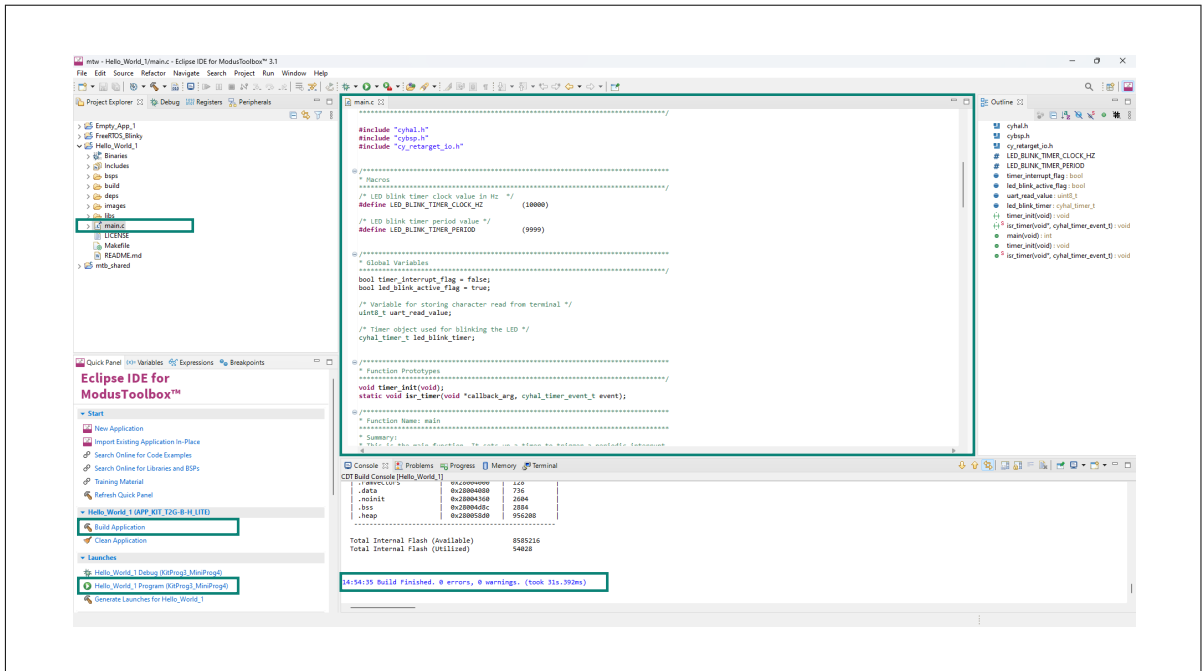


Figure 11 Building and then programming the LED Blinky code

10. To view "Hello World" in the terminal window, make sure to open the serial terminal and connect it to the KitProg3 USB-UART COM port with baud rate of 115200. You can access the serial terminal available in the ModusToolbox™ near the console window (see [Figure 12](#))

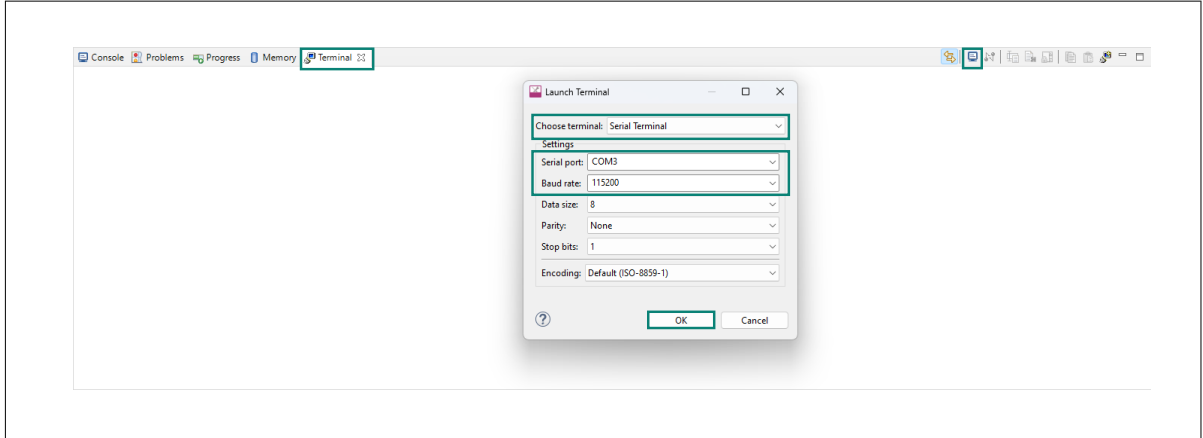


Figure 12 Opening the serial terminal window and connecting to USB-UART for LED blink code

3 Functional description

3 Functional description

This section provides an overview of the major hardware blocks included in the TRAVEO™ T2G B-H Lite kit. Understanding these blocks helps in understanding the capabilities and features of the kit and developing more effective designs and applications.

The major hardware blocks included in the TRAVEO™ T2G B-H Lite kit include the TRAVEO™ T2G B-H MCU itself. This powerful and flexible device supports a wide range of applications. Additionally, the kit includes the KitProg3 onboard programmer/debugger, which is a valuable tool for development and testing. Furthermore, the kit incorporates various interfaces and connectors that provide connectivity to the other devices and systems.

3.1 TRAVEO™ T2G MCU

The TRAVEO™ T2G B-H Lite kit is specifically designed to evaluate the various features and functionality of the TRAVEO™ T2G CYT4BF device, which is a high-performance microcontroller that is targeted at automotive systems such as high-end body-control units. The CYT4BF device features two powerful Arm® Cortex®-M7 CPUs that are designed for primary processing and an Arm® Cortex®-M0+ CPU that is used for peripheral and security processing.

These devices include a range of embedded peripherals that support various communication protocols such as controller area network with flexible data rate (CAN FD), local interconnect network (LIN), Gigabit Ethernet, and FlexRay. The TRAVEO™ T2G devices are manufactured using an advanced 40-nm process, and incorporate a low-power flash memory, multiple high-performance analog and digital peripherals, and other features that enable the creation of a secure computing platform.

The TRAVEO™ T2G B-H Lite kit provides a comprehensive set of functionalities and features that are designed to support a wide range of development and testing requirements. However, due to the design limitations and the availability of certain peripherals and pins, few functionalities and features supported by the TRAVEO™ T2G B-H CYT4BF MCU may not be available on the Lite kit.

Table 5 provides an overview of the functionalities and features supported on the TRAVEO™ T2G B-H Lite kit, as compared with the TRAVEO™ T2G B-H CYT4BF MCU.

Table 5 Functionalities available on TRAVEO™ T2G B-H Lite kit

Functionality/feature	Supported on TRAVEO™ T2G B-H Lite kit
FlexRay	Not supported
Ethernet	Supported
CAN FD	Supported
LIN	Not supported
UART	Supported
I2C	Supported
SPI	Supported
ADC	Supported
DMA	Supported
RTC	Supported
TCPWM	Supported
SMIF	Supported

(table continues...)

3 Functional description

Table 5 (continued) Functionalities available on TRAVEO™ T2G B-H Lite kit

Functionality/feature	Supported on TRAVEO™ T2G B-H Lite kit
IO	Supported
SDHC	Not supported
CRYPTO	Supported
I2S	Not supported

3.2 Power supply

This section provides a detailed information about the power supply and power flow in the TRAVEO™ T2G B-H Lite kit, including how power is generated and fed to the TRAVEO™ T2G B-H MCU and various components and peripherals in this kit.

Use the following options to power the TRAVEO™ T2G B-H Lite kit:

- USB Micro-B¹
- 12 V DC power adapter²

There is an 'OR'ing between the two power sources that ensures whichever power source is connected will supply power to both the 5 V buck boost regulator and the 3.3 V buck regulator, which will then give the output of 5 V and 3.3 V that can feed to the TRAVEO™ T2G B-H MCU depending upon in which position the jumper J20 and J21 are shorted.

The functionality of the power jumpers (J20, J21, J22, and J25) are highlighted in [Table 6](#).

Table 6 Functionality of power jumpers

Jumper	Configuration	Functionality
J20	1 – 2: shorted	TRAVEO™ T2G B-H MCU (VDDD) will receive 3.3 V power
	2 – 3: shorted	TRAVEO™ T2G B-H MCU will receive 5 V power
J21	1 – 2: shorted	General purpose I/O pins (VDDIO) will receive 3.3 V power
	2 – 3: shorted	General purpose I/O pins will receive 5 V power
J22	Shorted	Enable the 5 V power for input of 3.3 V buck regulator coming from the USB connector
	Opened	Disable the 5 V power for input of 3.3 V buck regulator coming from the USB connector
J25	1 – 2: shorted	Enable the 5 V power to be the input for 3.3 V buck regulator coming from USB connector
	2 – 3: shorted	Enable the 12 V power to be the input for 3.3 V buck regulator coming from 12 V DC power adapter

Notes:

1. *KitProg3 is powered up only in this option. Therefore, if you want to use KitProg3, ensure that you are using this powering option*
2. *Ensure that the power adapter should support minimum 12 V/1 A power; however, 12 V/3 A is the default adapter for using with this kit*

[Figure 13](#) shows the power generation in the TRAVEO™ T2G B-H Lite kit.

3 Functional description

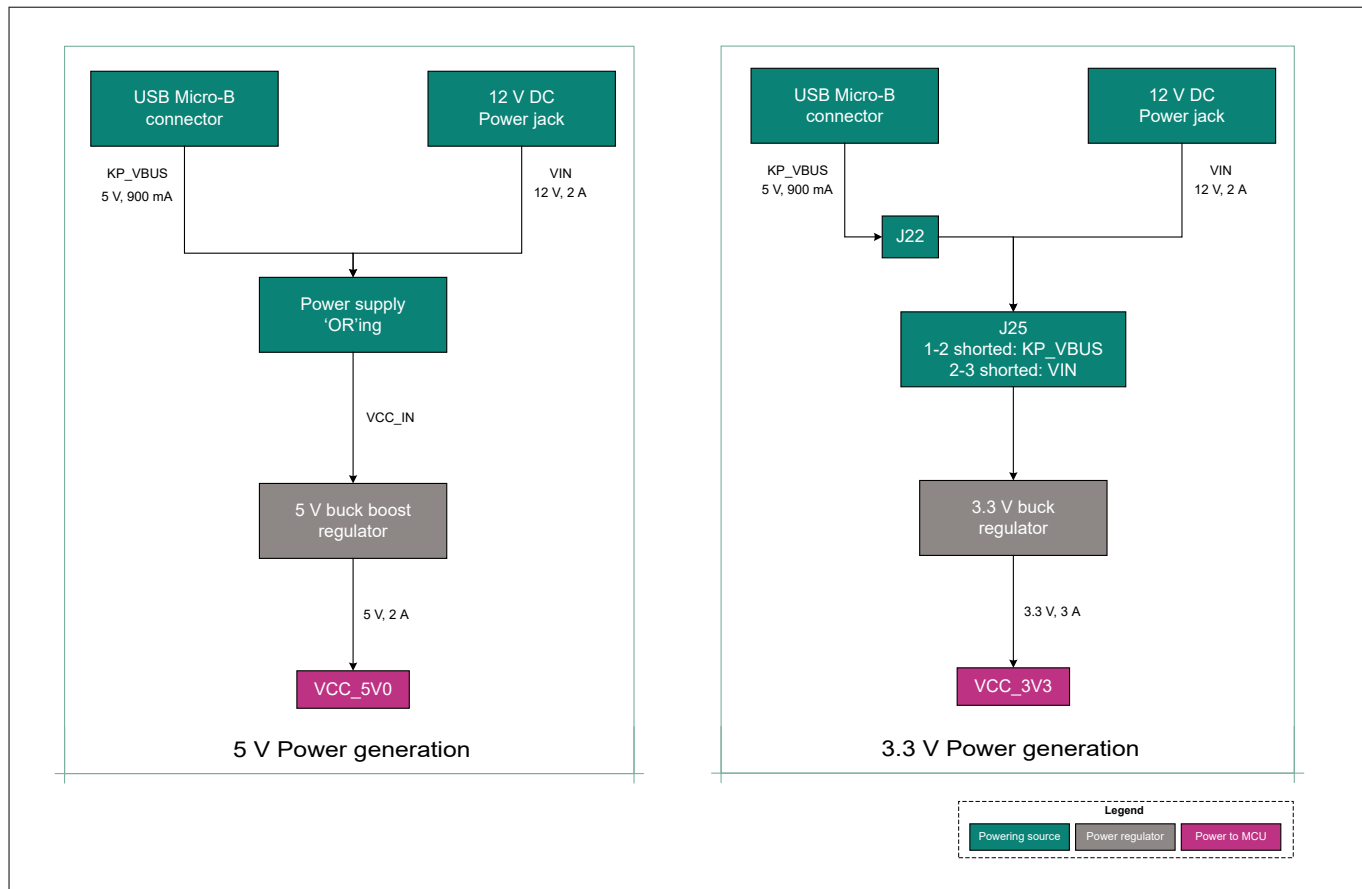


Figure 13 Block diagram of various power generation in the Lite kit

3 Functional description

Figure 14 shows the power supply to the TRAVEO™ T2G B-H MCU based on jumper selections.

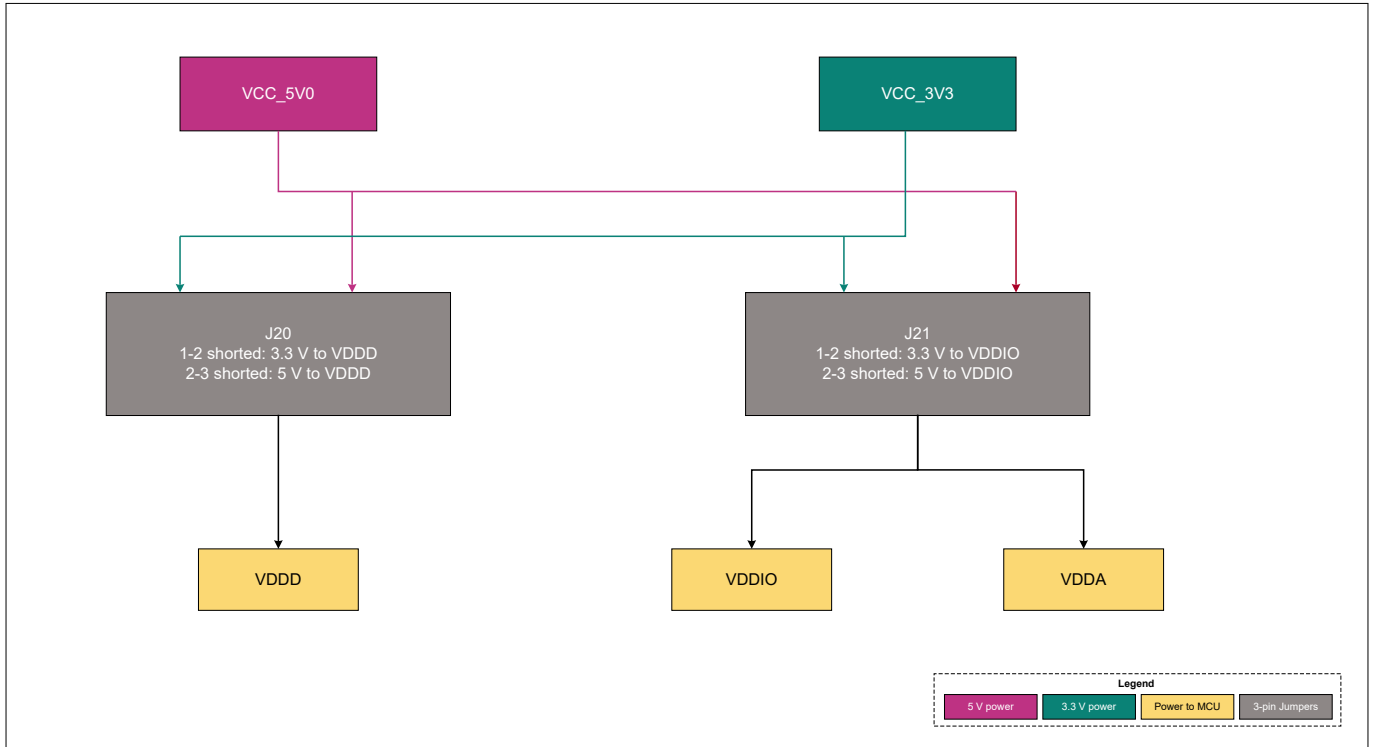


Figure 14 Power to the TRAVEO™ T2G B-H MCU

3.3 Clock

This section provides information about the various crystal oscillators available on the TRAVEO™ T2G B-H Lite kit that are used for clocking the TRAVEO™ T2G B-H MCU and other peripherals.

The TRAVEO™ T2G B-H Lite kit contains several crystal oscillators for clocking the TRAVEO™ T2G B-H MCU and other peripherals that are listed in Table 7.

Table 7 Crystals available in the Lite kit

Crystal oscillator	Reference designator	Frequency
Watch crystal oscillator (WCO)	Y1	32.768 kHz
External crystal oscillator (ECO)	Y2	16 MHz
Crystal oscillator for Ethernet PHY	Y3	25 MHz

3 Functional description

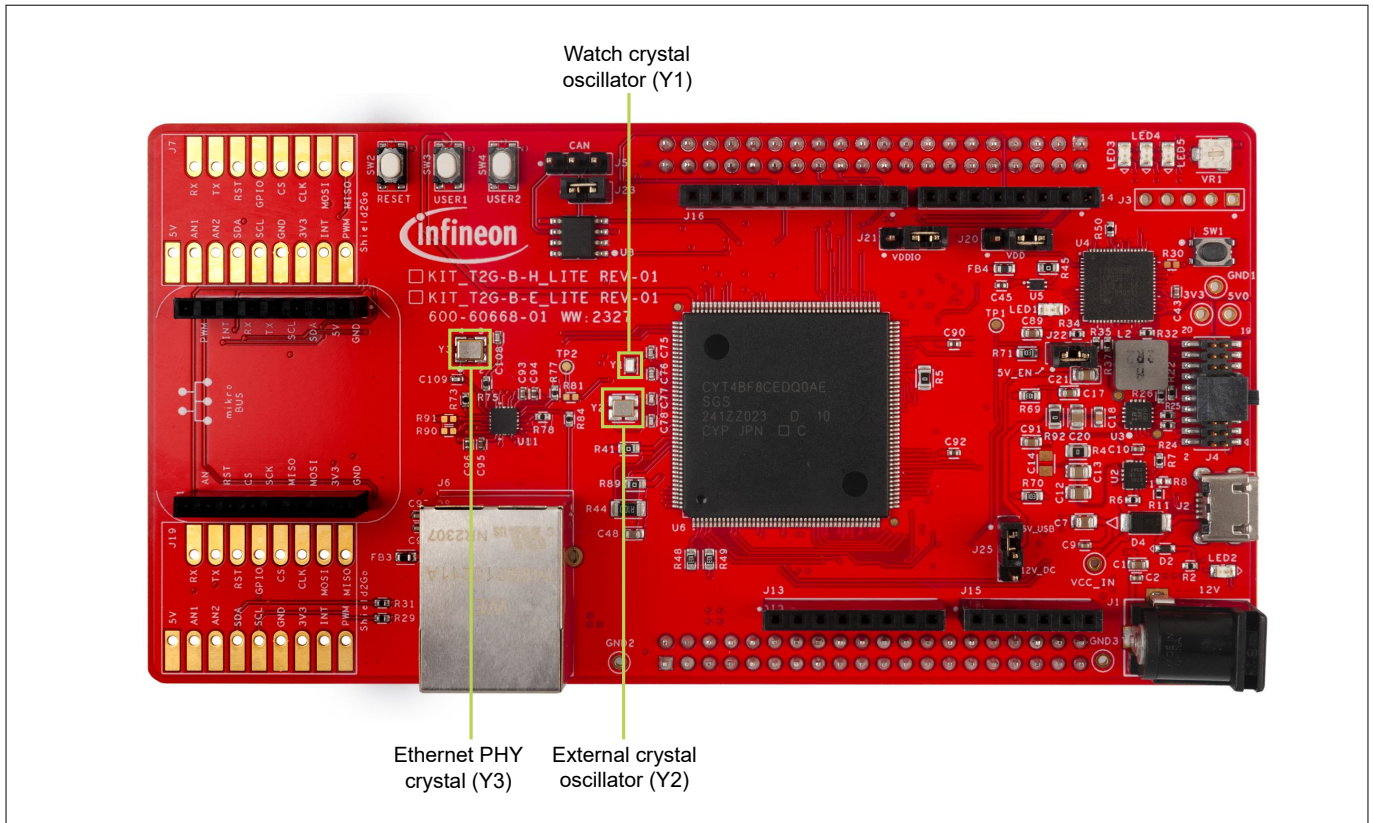


Figure 15 Location of various crystals in the Lite kit

3.4 Reset

This section describes to reset the TRAVEO™ T2G B-H Lite kit MCU using the reset button (SW2). The reset button (SW2) is specifically designed to reset the TRAVEO™ T2G B-H Lite kit MCU and is connected to the XRES pin of the MCU via a 4.7K resistor. To reset the TRAVEO™ T2G B-H Lite kit MCU, simply press the reset button, which will connect the XRES pin to ground, initiating the reset process.

Table 8 Reset

User interface	Reference designator	MCU	
		Pin number	Port pin
Reset button	SW2	152	XRES

3 Functional description

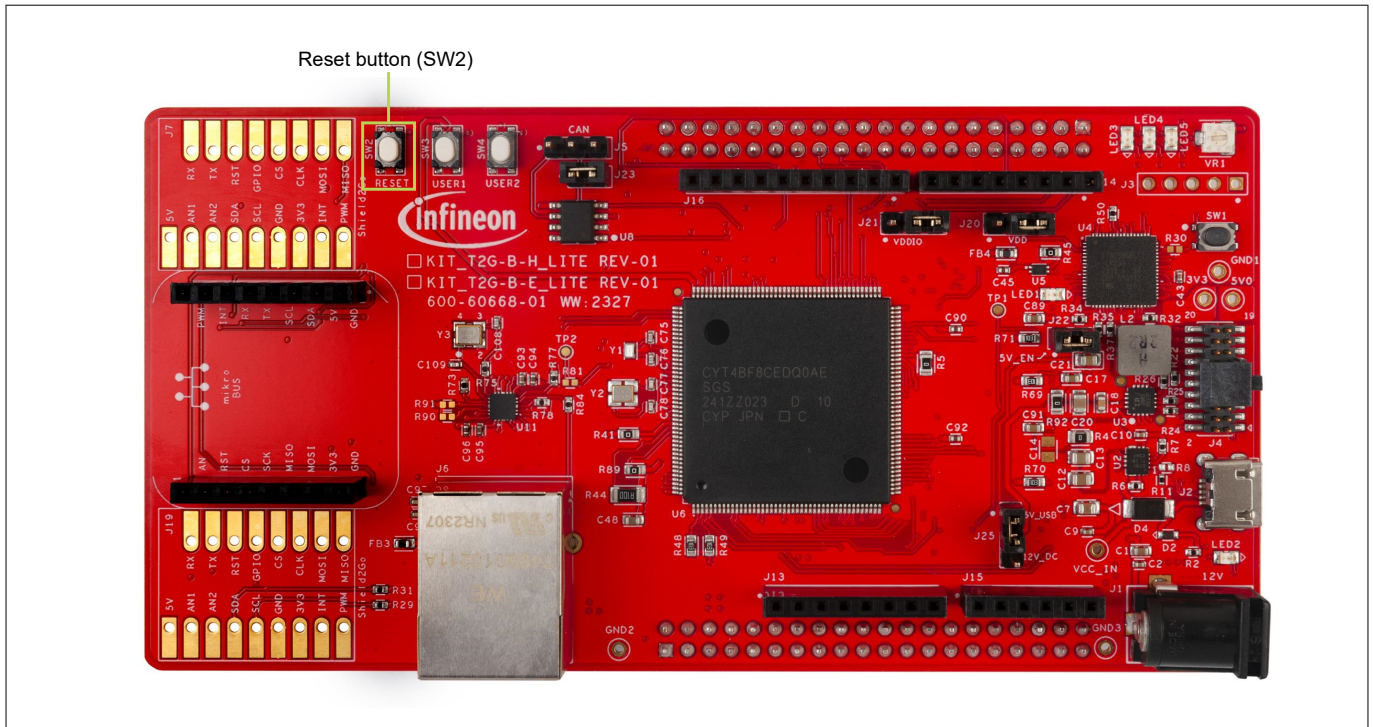


Figure 16 Location of the reset button in the Lite kit

3.5 User interfaces

The TRAVEO™ T2G B-H Lite kit provides several interfaces for user interaction such as three user LEDs, two push buttons, and a potentiometer interface. These interfaces are intended to facilitate with the kit for developers and testers, allowing them to perform various operations and tests.

3.5.1 User LEDs

The user LEDs on the TRAVEO™ T2G B-H Lite kit can operate across the entire voltage range of the TRAVEO™ T2G B-H MCU. These LEDs function as active LOW, requiring the pins to be grounded to turn them ON.

Table 9 User LEDs

User interface	Reference designator	CYT4BF MCU	
		Pin number	Port pin
User LED 1	LED3	29	P5.0
User LED 2	LED4	30	P5.1
User LED 3	LED5	31	P5.2

3.5.2 User push buttons

The user push buttons on the TRAVEO™ T2G B-H Lite kit provide a means of input to the TRAVEO™ T2G B-H MCU. By default, this button connects the TRAVEO™ T2G B-H MCU pin to ground when pressed. Therefore, to detect the button press, you need to configure the TRAVEO™ T2G B-H MCU pin as a digital input with resistive pull-up.

3 Functional description

Table 10 User push button

User interface	Reference designator	CYT4BF MCU	
		Pin number	Port pin
User push button 1	SW3	32	P5.3
User push button 2	SW4	116	P17.0

3.5.3 Potentiometer

The TRAVEO™ T2G B-H Lite kit features a 10-kΩ potentiometer that is connected to the TRAVEO™ T2G B-H MCU pin P6[0]. The potentiometer is used to simulate a sensor output to the TRAVEO™ T2G B-H MCU.

Table 11 Potentiometer

User interface	Reference designator	CYT4BF MCU	
		Pin number	Port pin
Potentiometer	VR1	35	P6.0

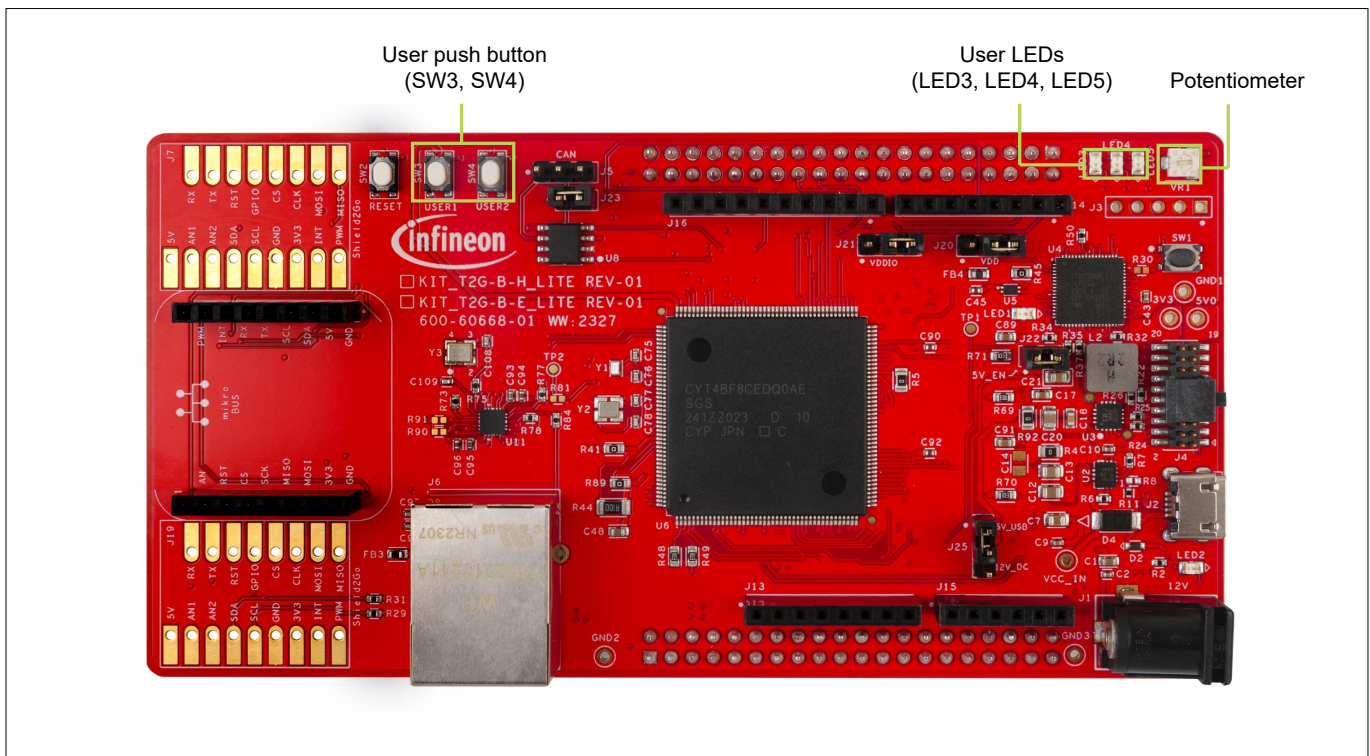


Figure 17 Location of various user interfaces available

3.6 Communication interfaces

The TRAVEO™ T2G B-H Lite kit provides a range of high-speed communication interfaces. These interfaces include CAN FD and Ethernet, and can be used for a variety of purposes, such as connecting to external devices or communicating with other systems.

3 Functional description

3.6.1 CAN FD

The TRAVEO™ T2G B-H Lite kit provides a CAN FD transceiver (TLE9251VSJ), which supports data transmission rates of up to 5 MBit/s. For connecting to other CAN FD nodes, the TRAVEO™ T2G B-H Lite kit features a 3-pin CAN FD interface connector (J5), with pin 1 serving as the CANL pin, pin 2 serving as the CANH pin, and pin 3 serving as the common GND.

In addition, if you require a termination resistor in the CAN FD bus, you can short the 120 Ω termination resistor jumper (J23) on the board. This jumper provides a 120 Ω termination resistor that is connected between the CANL and CANH pins.

3.6.2 Ethernet

The TRAVEO™ T2G B-H Lite kit provides a DP83825IRMQR Ethernet PHY transceiver, which can be used to connect the kit with other peer devices through the RJ45 Ethernet connector (J6) on the board. Additionally, the kit features a crystal oscillator for Ethernet, the 25 MHz crystal oscillator (Y3).

In addition, the kit features an activity indication LED that is connected to the Ethernet PHY pin 4. This LED provides information on transmit and receive activity, as well as the status of the link. The LED is ON when the link is good, and blinks when the transmitter or receiver is Active.

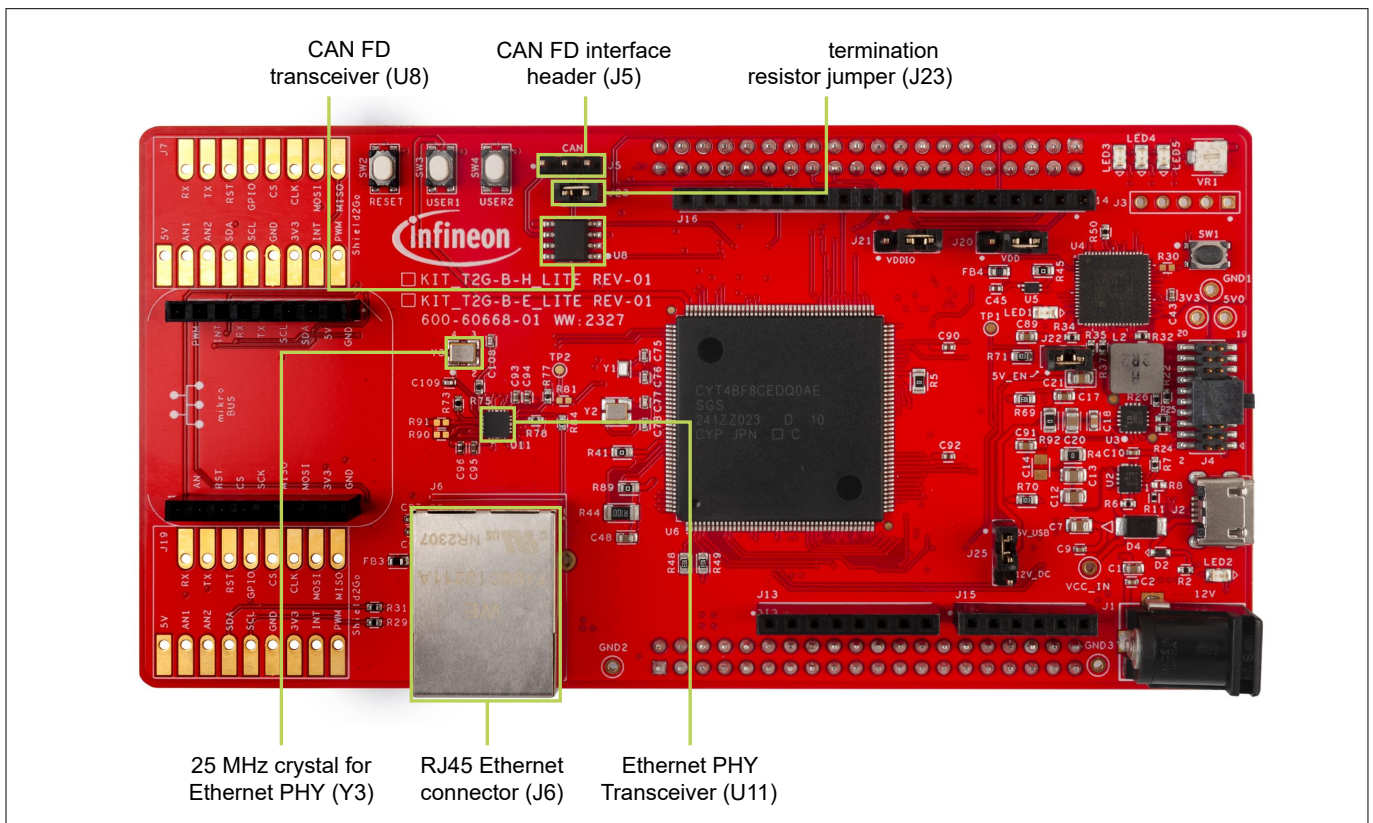


Figure 18 Location of CAN FD and Ethernet transceivers in the Lite kit

3.7 Serial memory interface

The TRAVEO™ T2G B-H Lite kit includes a serial memory interface (SMIF) that serves as a master, providing a low pin count connection to off-chip SPI devices such as EEPROM, FRAM, MRAM, or NAND memories, in SDR or DDR mode, as well as HYPERBUS™ devices such as HYPERFLASH™ (NOR flash) and HYPERRAM™ (PSRAM and pseudo static RAM).

3 Functional description

3.7.1 Dual-Quad SPI

The TRAVEO™ T2G B-H Lite kit features two 512 Mb external Quad SPI NOR flash devices (S25HL512) that are connected in dual QSPI mode. These devices provide fast, expandable memory for data and code, and can be a valuable tool for storing and retrieving data during development and testing.

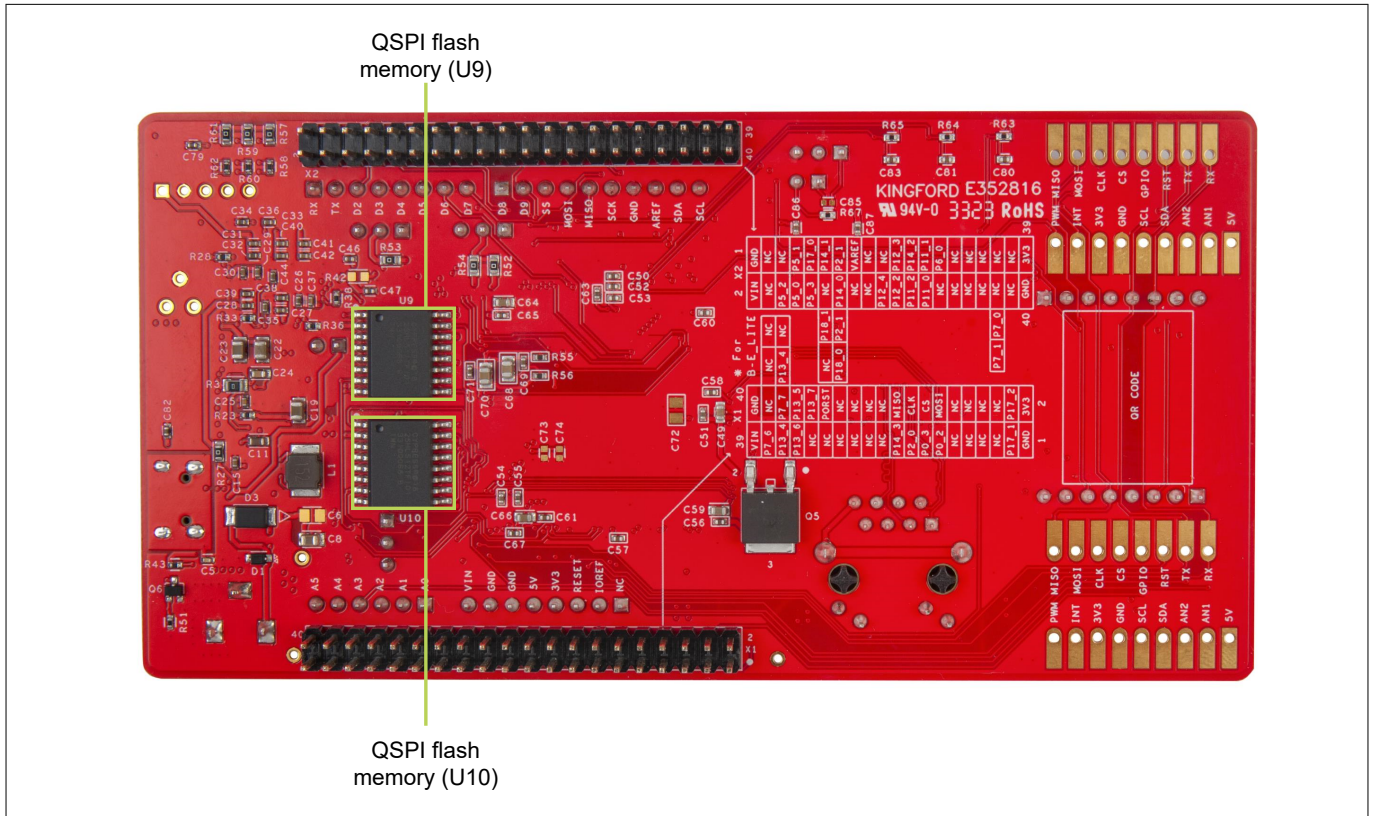


Figure 19 Location of the Quad SPI flash memories

3.8 Program and debug interface

The TRAVEO™ T2G B-H Lite kit includes an onboard programmer/debugger called KitProg3, which can be used to program and debug the MCU on the kit. The KitProg3 provides USB-UART, USB-I2C, and USB-SPI Bridge functionality, although USB-SPI is not supported on this board.

3.8.1 PSoC™ 5LP

The KitProg3 (onboard programmer/debugger) is implemented using a PSoC™ 5LP device (CY8C5868LTI-LP039), which is a true programmable embedded system-on-chip that integrates configurable analog and digital peripherals, memory, and a microcontroller on a single chip. The PSoC™ 5LP is used to implement the low-level communication firmware for programming and debugging and provides communication between a programming tool (such as PSoC™ Programmer) and a target, such as the TRAVEO™ T2G B-H MCU.

Additionally, KitProg3 on the TRAVEO™ T2G B-H Lite kit can act as a USB-UART bridge. The UART RX and TX pins of KitProg3 are connected to the TRAVEO™ T2G B-H MCU UART pins as follows:

3 Functional description

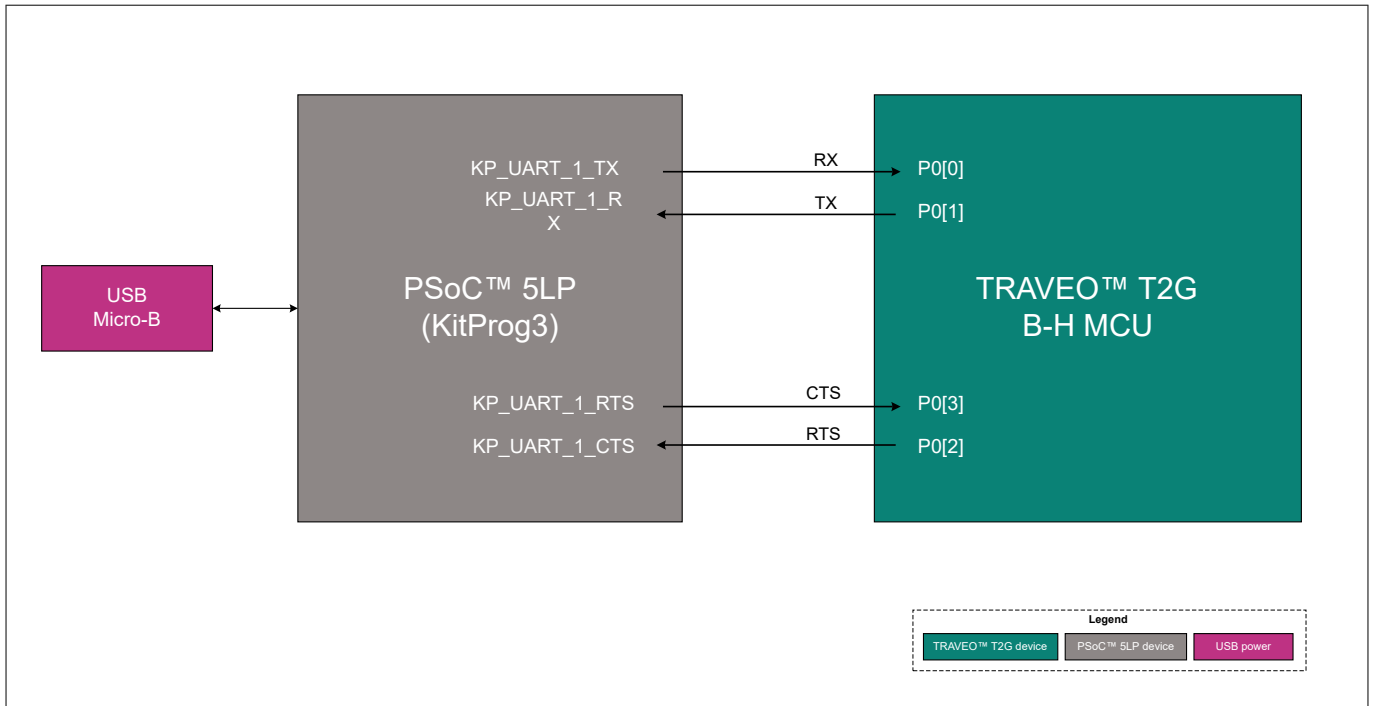


Figure 20 UART connection between KitProg3 and TRAVEO™ T2G B-H MCU

Use the onboard programmer/debugger KitProg3 on the TRAVEO™ T2G B-H Lite kit simply by connecting the USB Micro-B cable to the USB connector (J2) and the PC to program and debug the TRAVEO™ T2G B-H Lite kit. The kit also features a mode switch (SW1) and status LED (LED1) for the KitProg3. These interfaces can be used to switch between various modes of operation of KitProg3, and LED to monitor the status of the KitProg3. Note that this board supports only CMSIS-DAP BULK mode.

The mode switch will change the mode of operation of the KitProg3 device. While communicating with the TRAVEO™ T2G device, make sure that the KitProg3 device should be in CMSIS DAP mode (LED1 is solid ON).

In addition, there is an optional programming header for programming the PSoC™ 5LP, which is available via the 5-pin header (J3) (footprint only). It is important to note that the KitProg3 hardware revision ID is 0x0D.

Table 12 Mode button

User interface	Reference designator	PSoC™ 5LP	
		Pin number	Port pin
Mode switch	SW1	13	P1[2]

3 Functional description

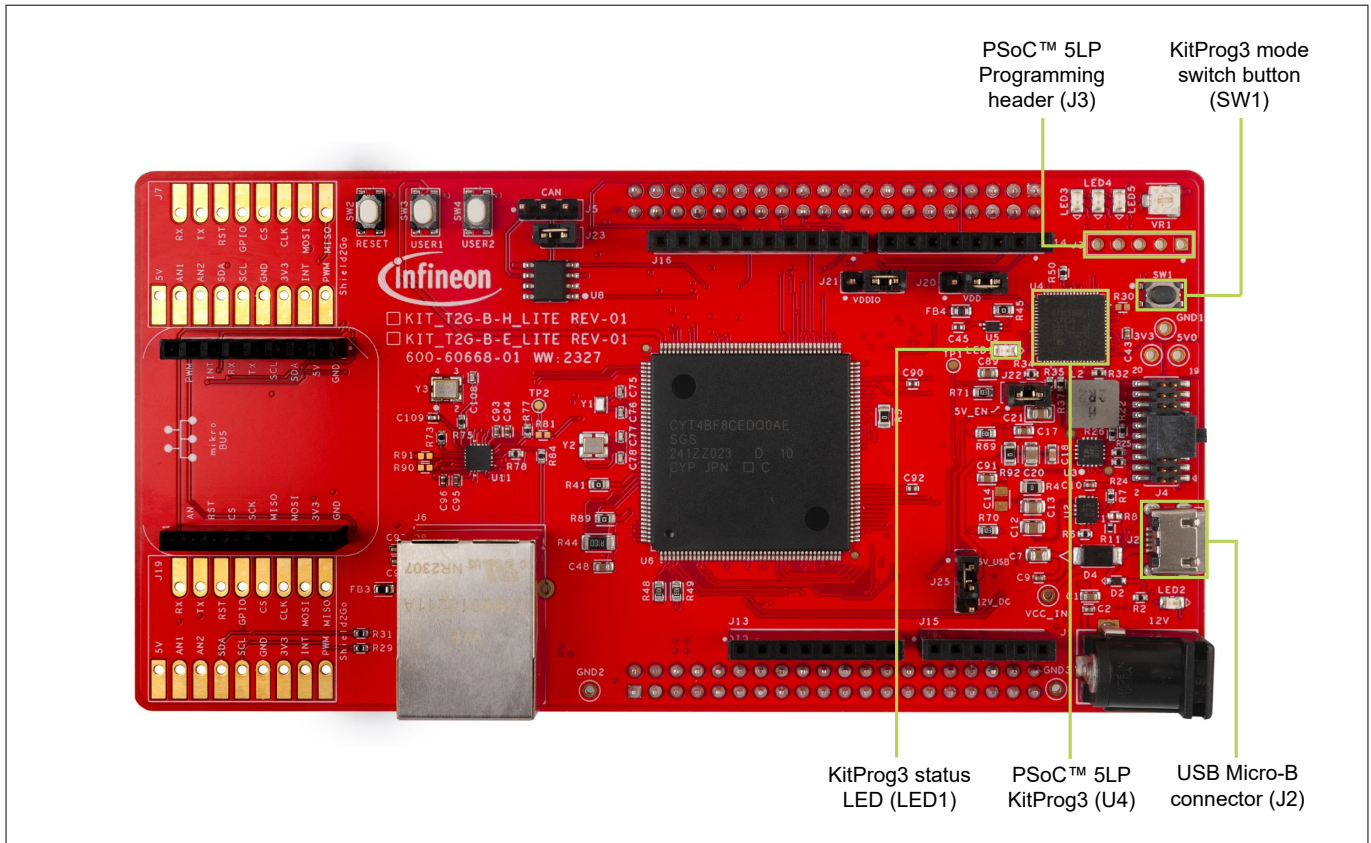


Figure 21 Location of KitProg3 and their interfaces

3.8.2 MIPI-20 Cortex® debug connector

The TRAVEO™ T2G B-H Lite kit is equipped with a MIPI-20 Cortex® debug + ETM connector, which serves as a programming interface when connected to a debugger. Additionally, you have the flexibility to utilize other programming tools for connecting and programming the Lite kit.

3 Functional description

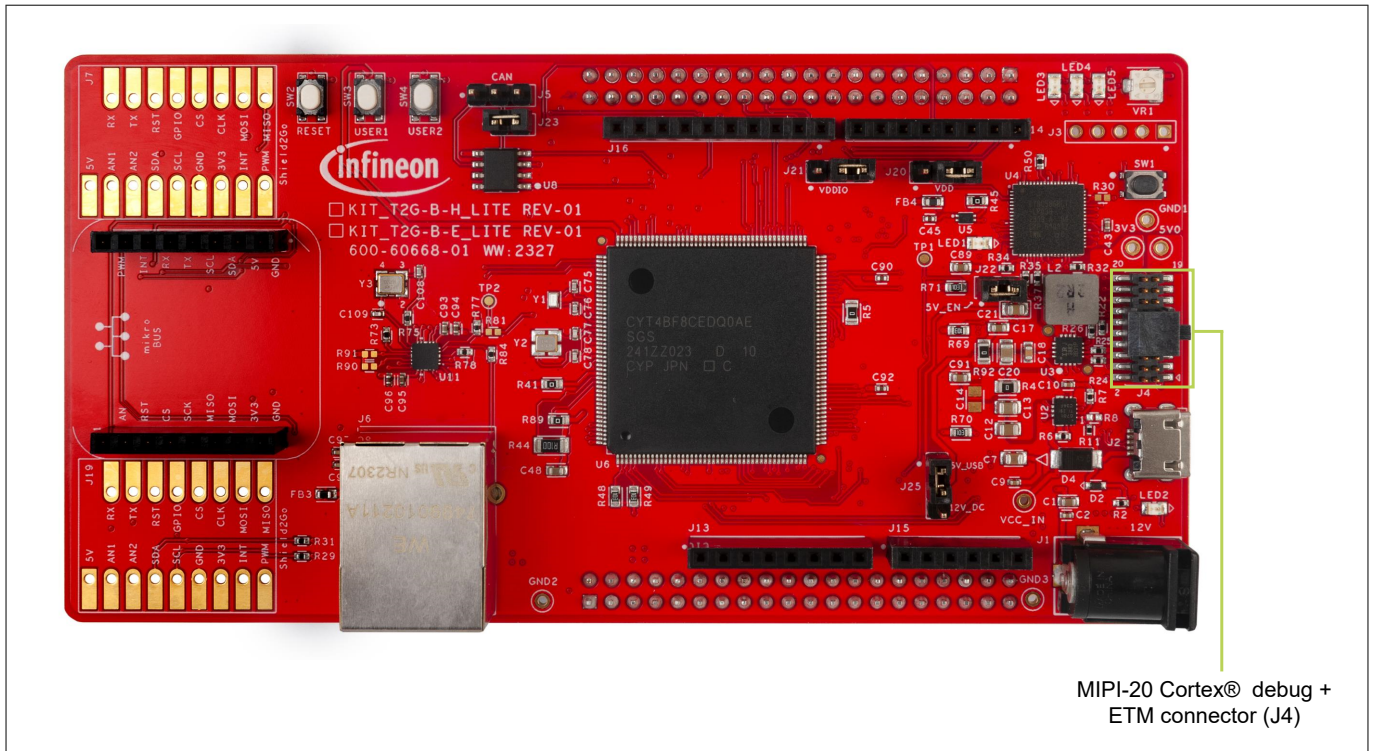


Figure 22 Other programming and debug interface available in the Lite kit

3.9 General purpose IO headers

The TRAVEO™ T2G B-H Lite kit provides a range of general-purpose I/O headers, which include two expansion headers, an Arduino header, a mikroBUS header, and two Shield2Go footprints.

Figure 23 shows the pinout diagram of all the general purpose IO headers available in the TRAVEO™ T2G B-H Lite kit.

3 Functional description

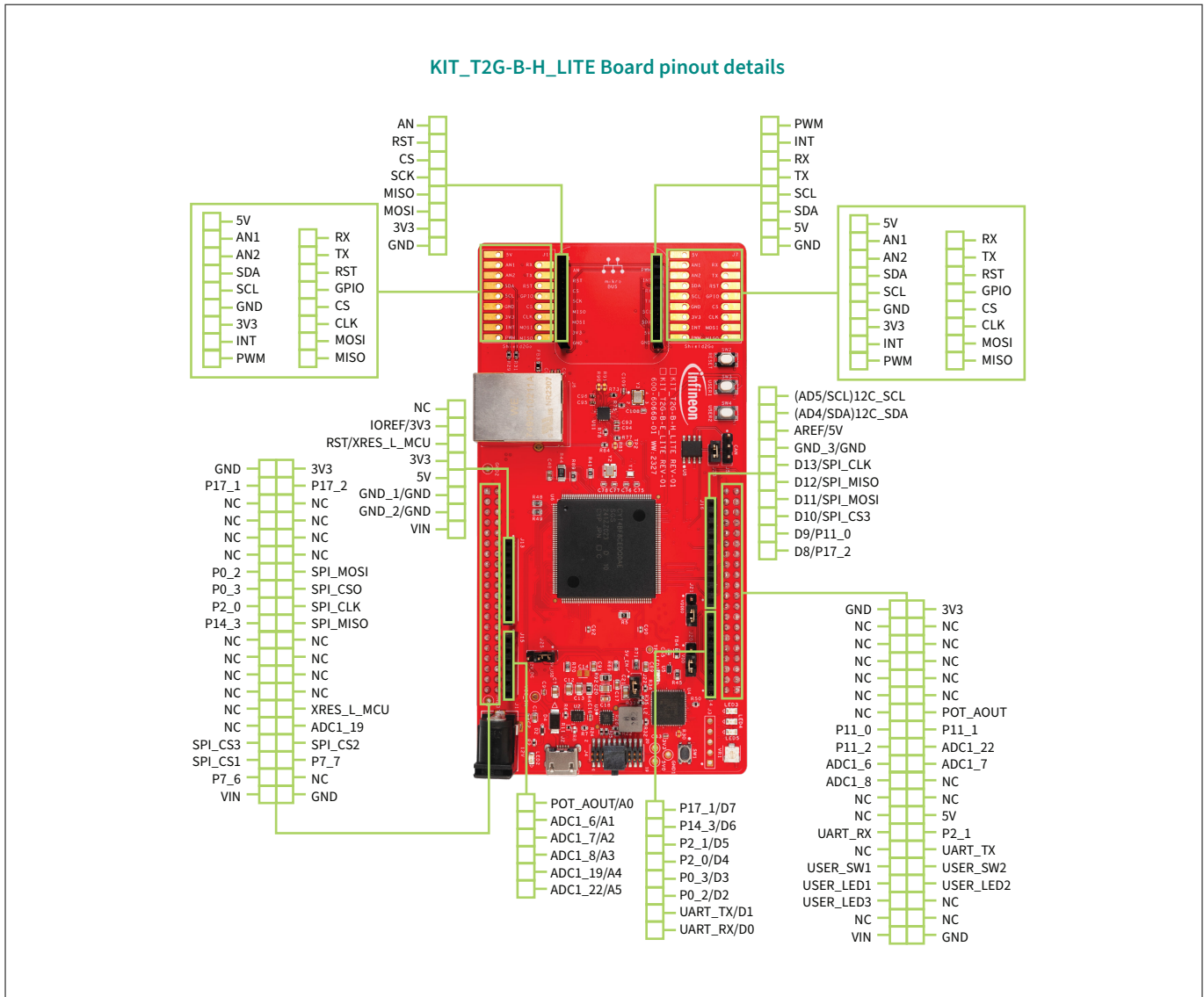


Figure 23 TRAVEO™ T2G B-H Lite kit pinout details

3.9.1 Expansion headers

Table 13 Expansion I/O header pin details

Header pin	Connected to MCU's port pin	Pin description
X1 pins		
X1.1	–	GND
X1.2	–	3V3
X1.3	P17.1	P17_1
X1.4	P17.2	P17_2
X1.13	P0.2	P0_2
X1.14	P13.1	SPI_MOSI

(table continues...)

3 Functional description

Table 13 (continued) Expansion I/O header pin details

Header pin	Connected to MCU's port pin	Pin description
X1.15	P0.3	P0_3
X1.16	P13.3	SPI_CS0
X1.17	P2.0	P2_0
X1.18	P13.2	SPI_CLK
X1.19	P14.3	P14_3
X1.20	P13.0	SPI_MISO
X1.30	–	XRES_L_MCU
X1.32	P13_7	ADC1_19
X1.33	P13.6	SPI_CS3
X1.34	P13.5	SPI_CS2
X1.35	P13.4	SPI_CS1
X1.36	P7.7	P7_7
X1.37	P7.6	P7_6
X1.39	–	VIN
X1.40	–	GND
X2 pins		
X2.1	–	GND
X2.2	–	VIN
X2.6	P5.2	USER_LED3
X2.7	P5.1	USER_LED2
X2.8	P5.0	USER_LED1
X2.9	P17.0	USER_SW2
X2.10	P5.3	USER_SW1
X2.11	P14.1	UART_TX
X2.13	P2.1	P2_1
X2.14	P14.0	UART_RX
X2.15	5V	VAREF
X2.20	P12.4	ADC1_8
X2.21	P12.3	ADC1_7
X2.22	P12.2	ADC1_6
X2.23	P14.2	ADC1_22
X2.24	P11.2	P11_2
X2.25	P11.1	P11_1

(table continues...)

3 Functional description

Table 13 (continued) Expansion I/O header pin details

Header pin	Connected to MCU's port pin	Pin description
X2.26	P11.0	P11_0
X2.27	P6.0	POT_AOUT
X2.39	–	3V3
X2.40	–	GND

3.9.2 Arduino headers

Table 14 Arduino header pin details

Header pin	Connected to MCU's port pin	Pin description
J13 pins		
J13.1	–	NC
J13.2	–	3V3
J13.3	–	XRES_L_MCU
J13.4	–	3V3
J13.5	–	5V
J13.6	–	GND
J13.7	–	GND
J13.8	–	VIN
J14 pins		
J14.1	P14.0	UART_RX/D0
J14.2	P14.1	UART_TX/D1
J14.3	P0.2	P0_2/D2
J14.4	P0.3	P0_3/D3
J14.5	P2.0	P2_0/D4
J14.6	P2.1	P2_1/D5
J14.7	P14.3	P14_3/D6
J14.8	P17.1	P17_1/D7
J15 pins		
J15.1	P6.0	POT_AOUT/A0
J15.2	P12.2	ADC1_6/A1
J15.3	P12.3	ADC1_7/A2
J15.4	P12.4	ADC1_8/A3
J15.5	P13.7	ADC1_19/A4
J15.6	P14.2	ADC1_22/A5

(table continues...)

3 Functional description

Table 14 (continued) Arduino header pin details

Header pin	Connected to MCU's port pin	Pin description
J16 pins		
J16.1	P17.2	P17_2/D8
J16.2	P11.0	P11_0/D9
J16.3	P13.6	SPI_CS3/D10
J16.4	P13.1	SPI_MOSI/D11
J16.5	P13.0	SPI_MISO/D12
J16.6	P13.2	SPI_CLK/D13
J16.7	–	GND
J16.8	–	AREF/5V
J16.9	P6.1	I2C_SDA (AD4/SDA)
J16.10	P6.2	I2C_SCL (AD5/SCL)

3.9.3 mikroBUS headers

Table 15 mikroBUS header pin details

Header pin	Connected to MCU's port pin	Pin description
J12 pins		
J12.1	–	GND
J12.2	–	5V
J12.3	P6.1	I2C_SDA
J12.4	P6.2	I2C_SCL
J12.5	P14.1	UART_TX
J12.6	P14.0	UART_RX
J12.7	P17.2	INT
J12.8	P14.3	PWM
J11 pins		
J11.1	P14.2	AN
J11.2	P11.2	RST
J11.3	P13.5	SPI_CS2
J11.4	P13.2	SPI_CLK
J11.5	P13.0	SPI_MISO
J11.6	P13.1	SPI_MOSI
J11.7	–	3V3
J11.8	–	GND

3 Functional description

3.9.4 Shield2Go connectors

Table 16 Shield2Go connector pin details

Header pin	Connected to MCU's port pin	Pin description
J7 pins		
J7.1	–	5V
J7.2	P12.2	AN1
J7.3	P12.3	AN2
J7.4	P6.1	I2C_SDA
J7.5	P6.2	I2C_SCL
J7.6	–	GND
J7.7	–	3V3
J7.8	P0.2	INT/GPIO3
J7.9	P0.3	PWM/GPIO4
J7.10	P14.0	UART_RX
J7.11	P14.1	UART_TX
J7.12	P11.0	RST/GPIO2
J7.13	P17.1	GPIO1
J7.14	P13.3	SPI_CS0
J7.15	P13.2	SPI_CLK
J7.16	P13.1	SPI_MOSI
J7.17	P13.0	SPI_MISO
J19 pins		
J19.1	–	5V
J19.2	P12.4	AN1
J19.3	P13.7	AN2
J19.4	P6.1	I2C_SDA
J19.5	P6.2	I2C_SCL
J19.6	–	GND
J19.7	–	3V3
J19.8	P2.0	INT/GPIO3
J19.9	P2.1	PWM/GPIO4
J19.10	P14.0	UART_RX
J19.11	P14.1	UART_TX
J19.12	P11.1	RST
J19.13	P17.2	GPIO1

(table continues...)

3 Functional description

Table 16 (continued) Shield2Go connector pin details

Header pin	Connected to MCU's port pin	Pin description
J19.14	P13.4	SPI_CS1
J19.15	P13.2	SPI_CLK
J19.16	P13.1	SPI_MOSI
J19.17	P13.0	SPI_MISO

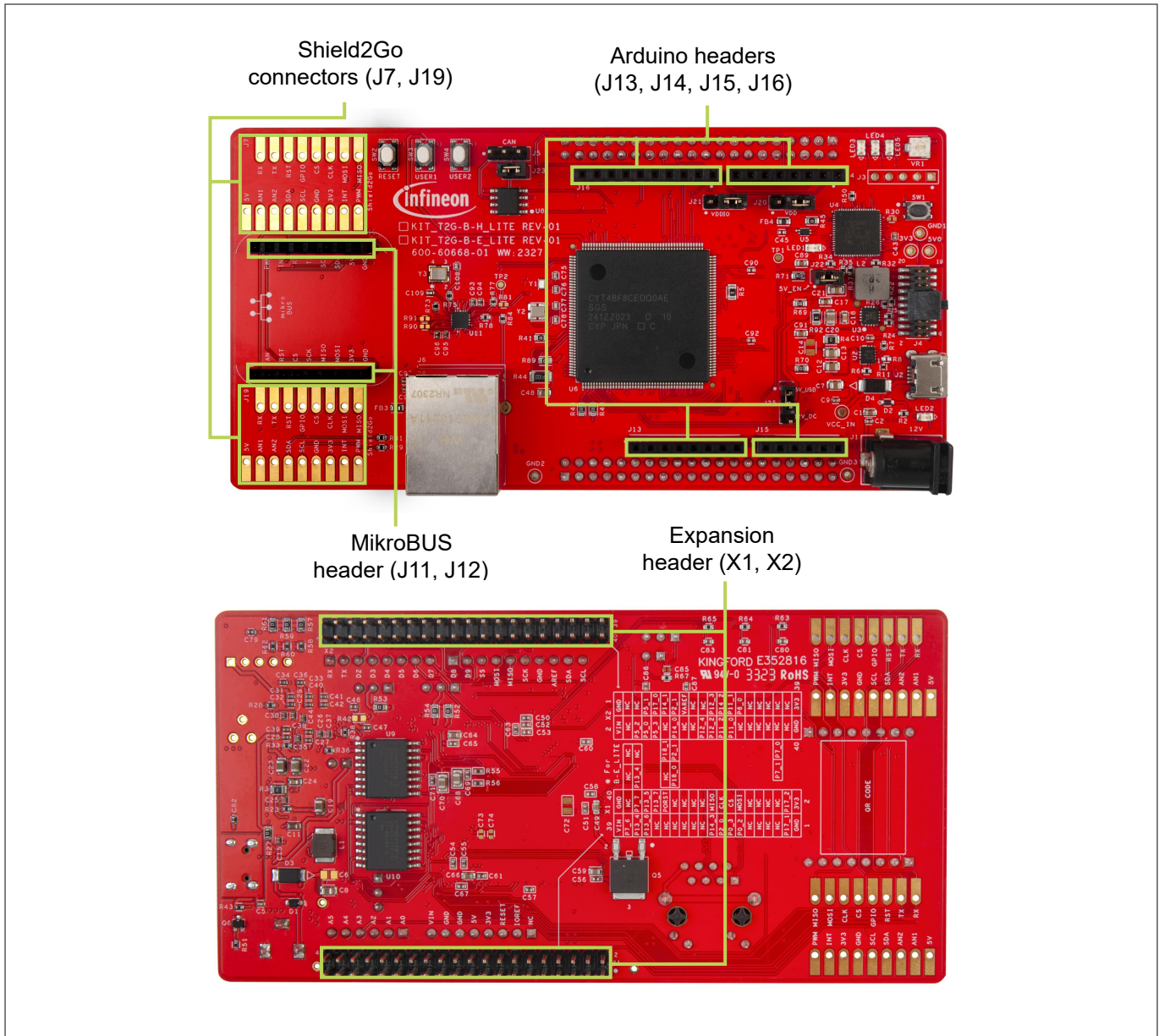


Figure 24 Location of GPIO headers in the Lite kit

4 Kit design documents

4 Kit design documents

This section provides a detailed information on resources that can be used to understand the layout, design, and components of the TRAVEO™ T2G B-H Lite kit. These resources include layout images, schematics, assembly drawings, bills of materials (BOM), and pinout details, which can be used to build a deeper understanding of how the kit is put together and how it can be used.

4.1 Schematic images

This section provides the schematics for the TRAVEO™ T2G B-H Lite kit rev-01, which can be used to understand the electrical connections and components of the kit.

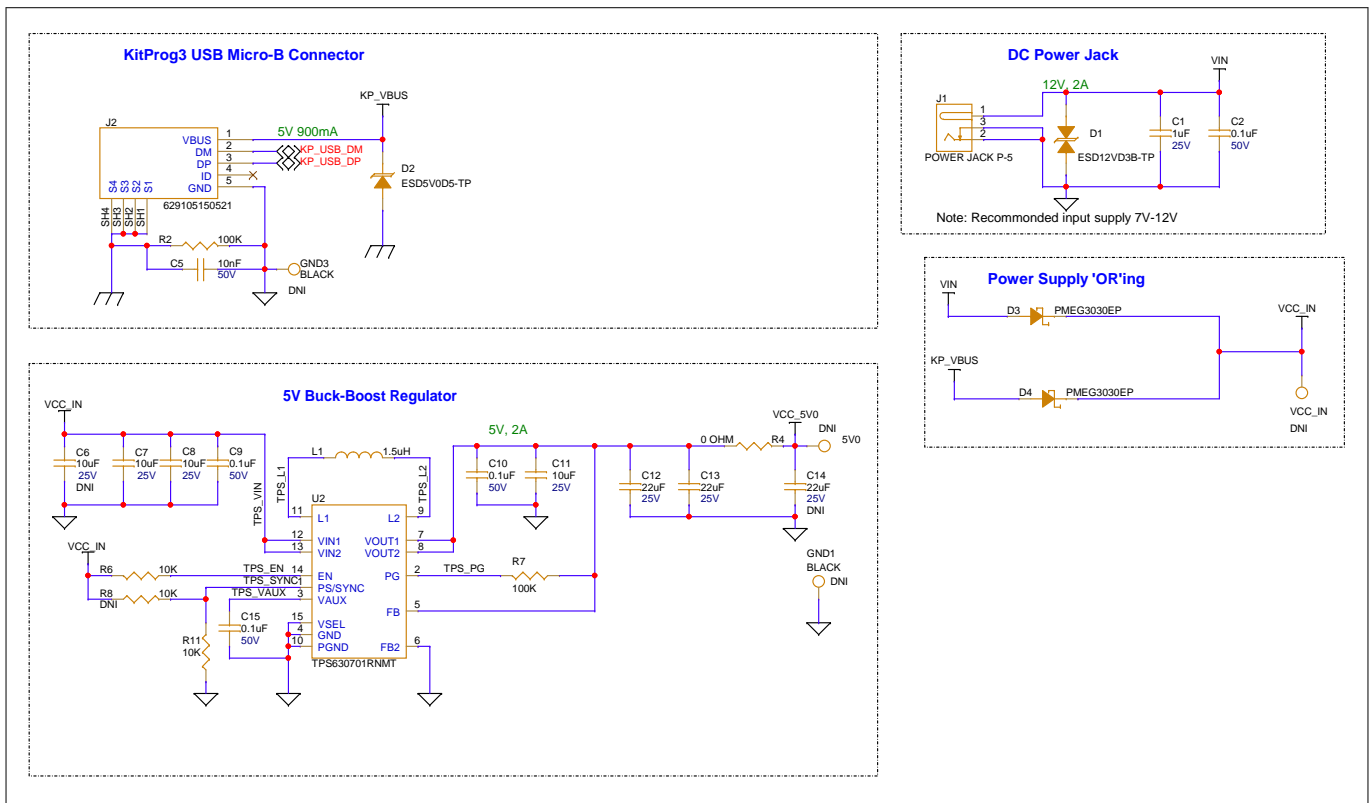


Figure 25 Power supply 1

4 Kit design documents

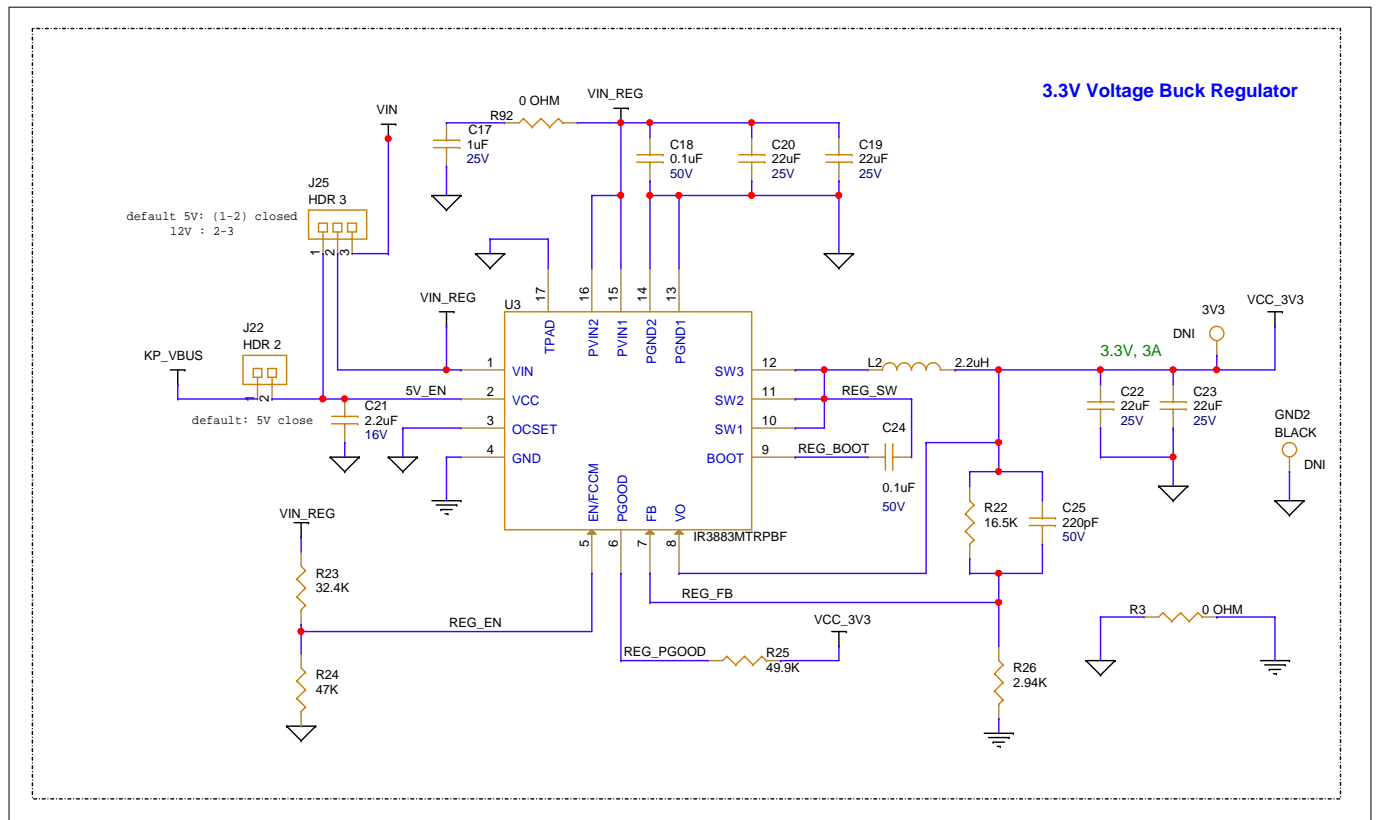


Figure 26 Power supply 2

4 Kit design documents

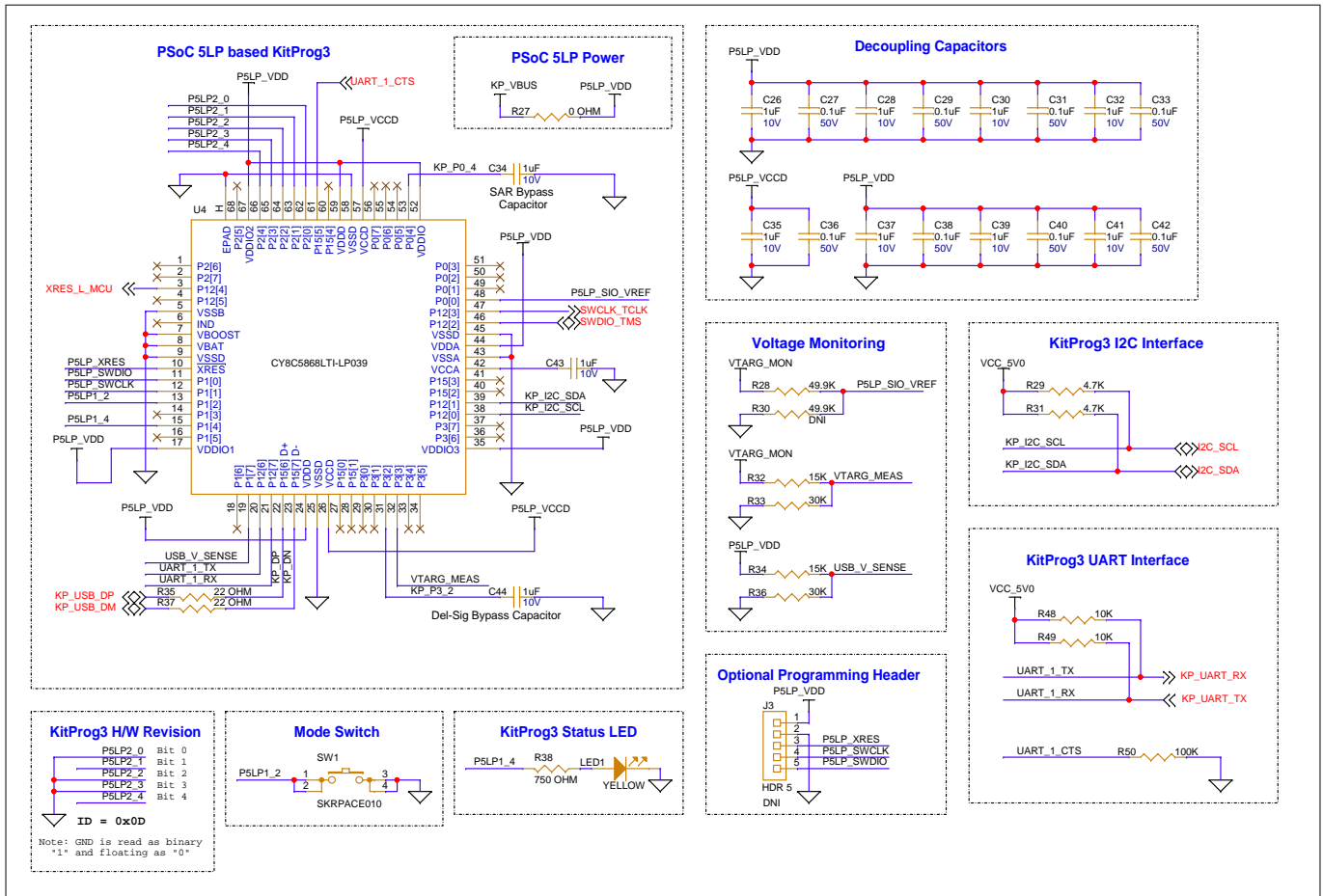


Figure 27 KitProg3 interface

4 Kit design documents

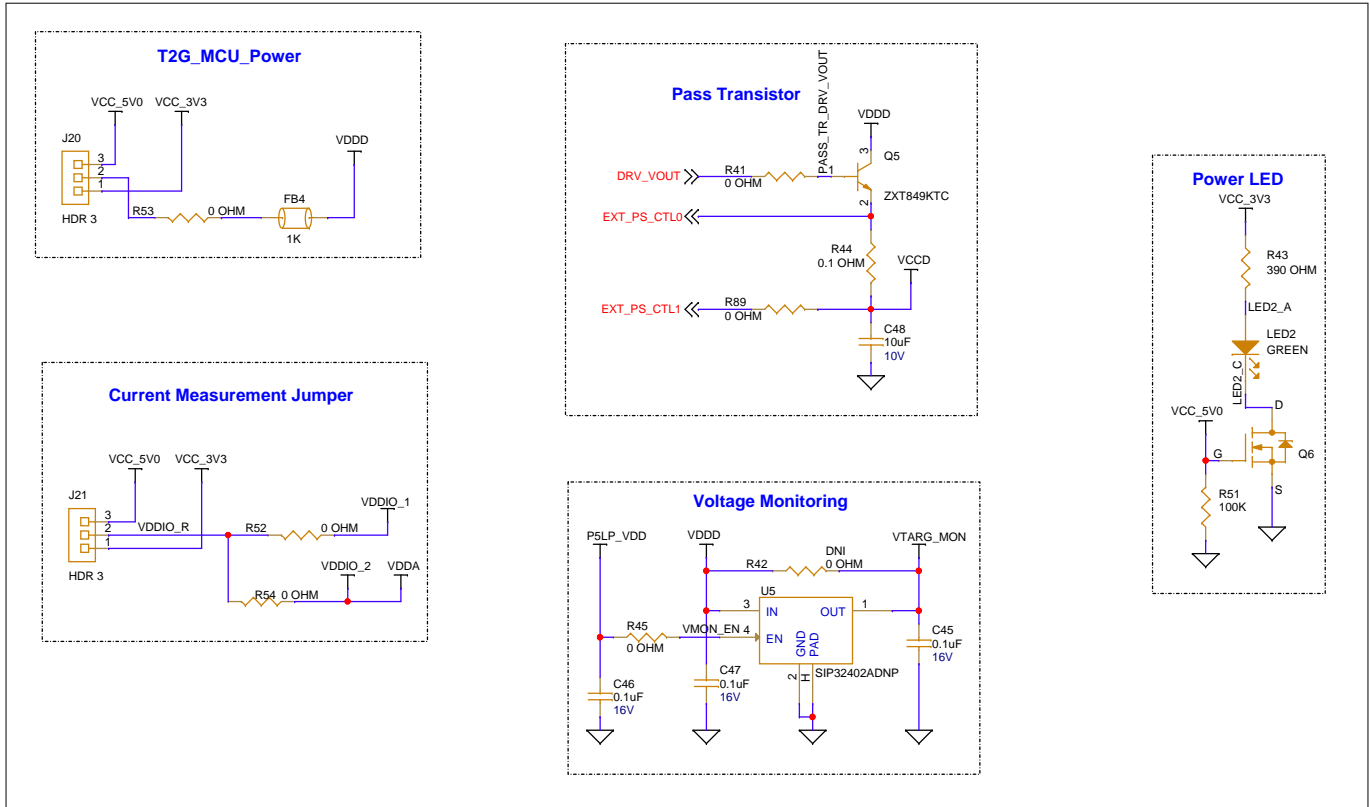


Figure 28 T2G MCU power

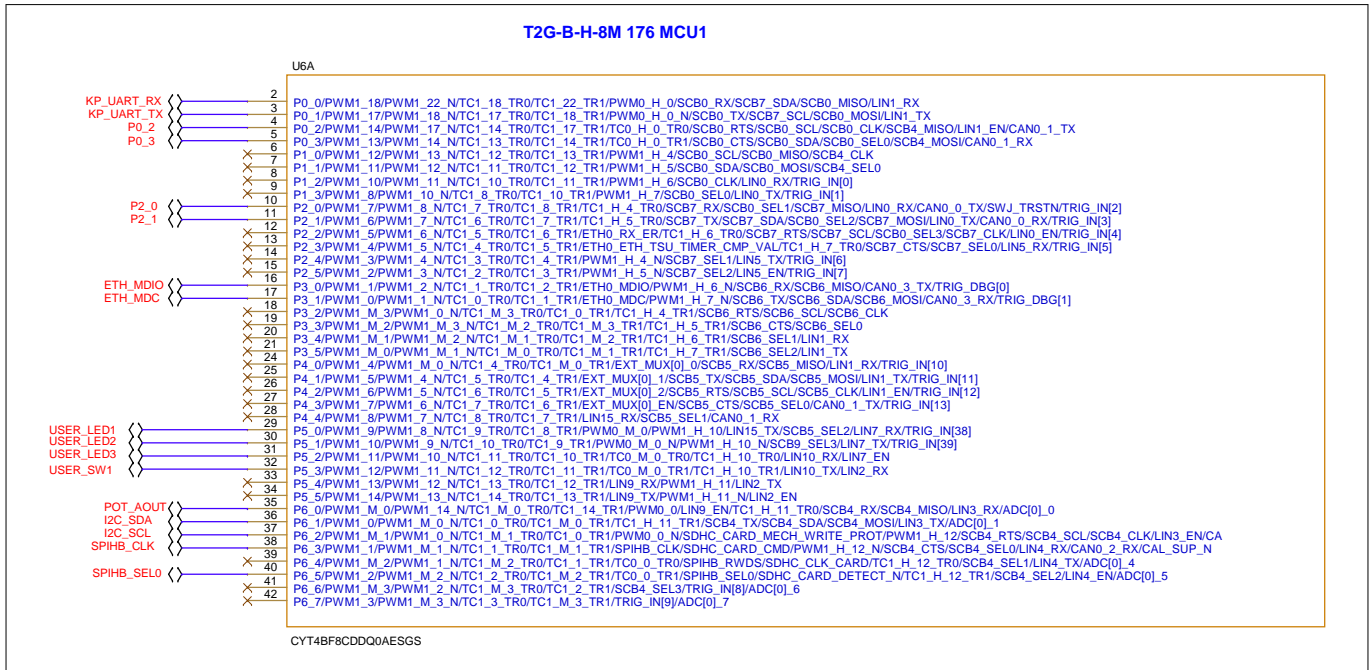


Figure 29 T2G-B-H-8M 176 MCU1

4 Kit design documents

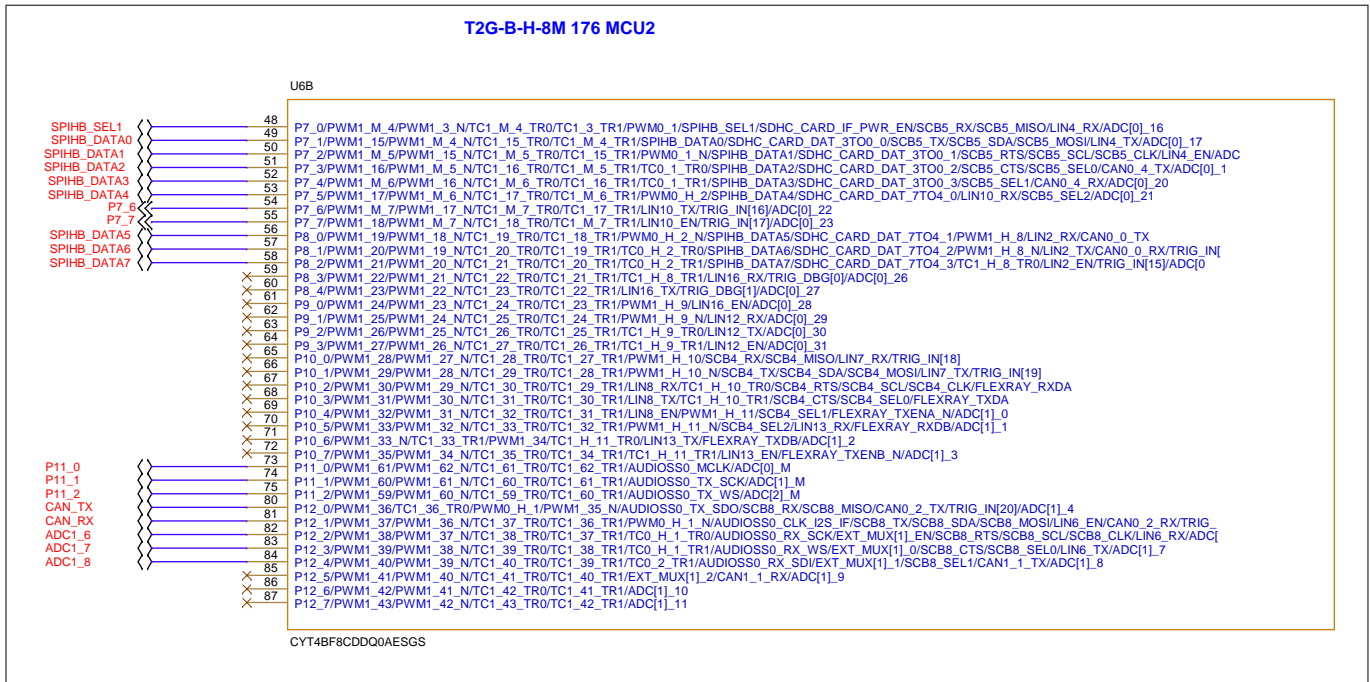


Figure 30 T2G-B-H-8M 176 MCU2

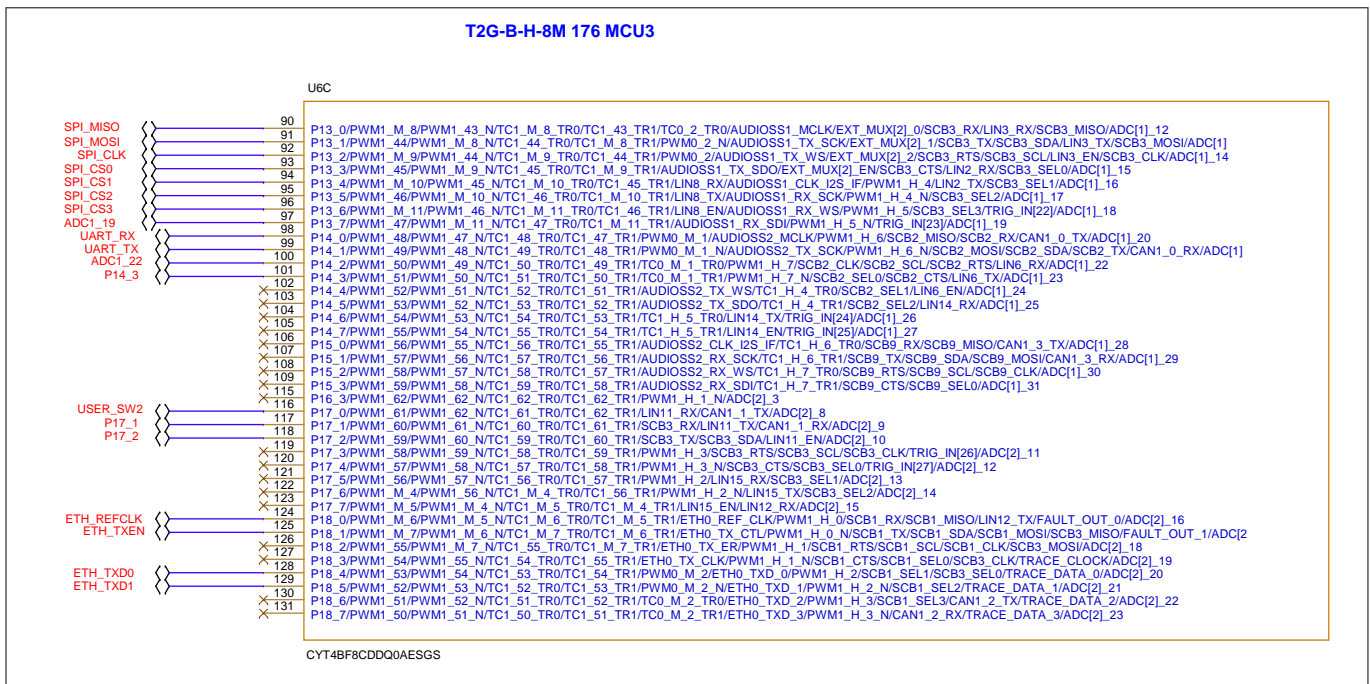


Figure 31 T2G-B-H-8M 176 MCU3

4 Kit design documents

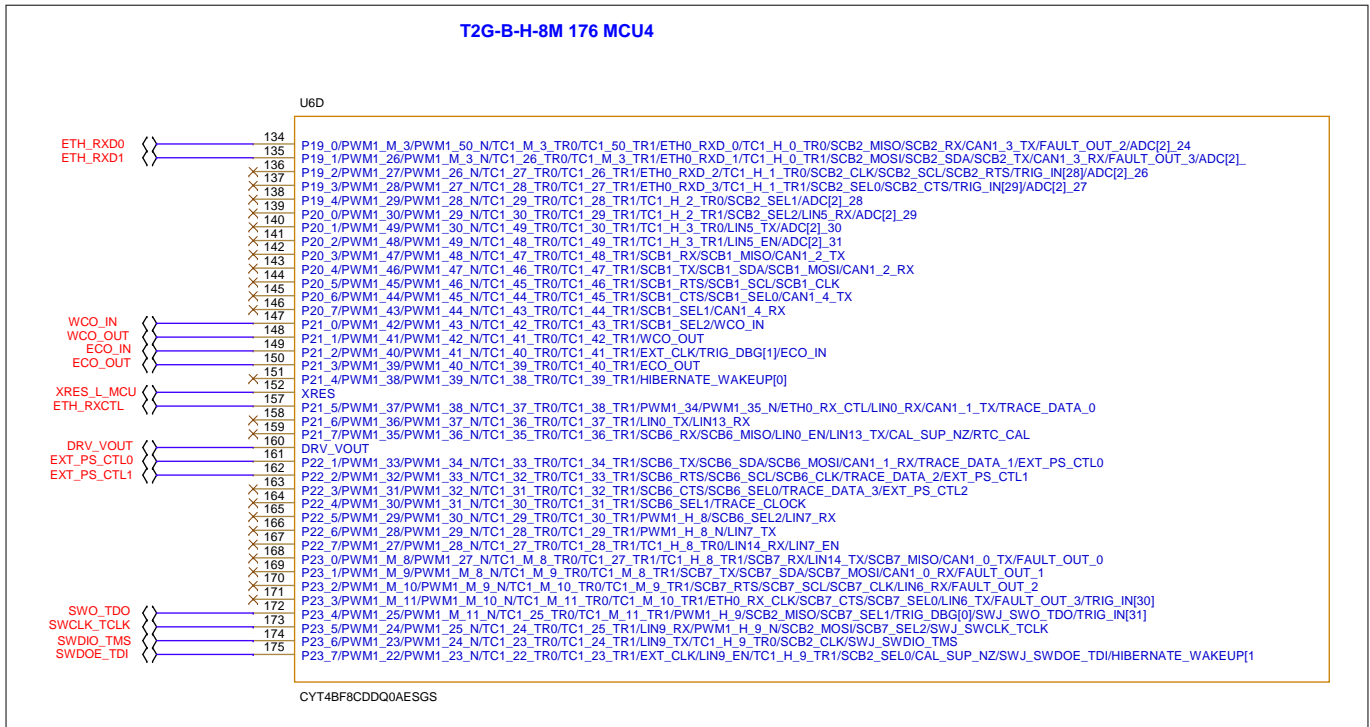


Figure 32 T2G-B-H-8M 176 MCU4

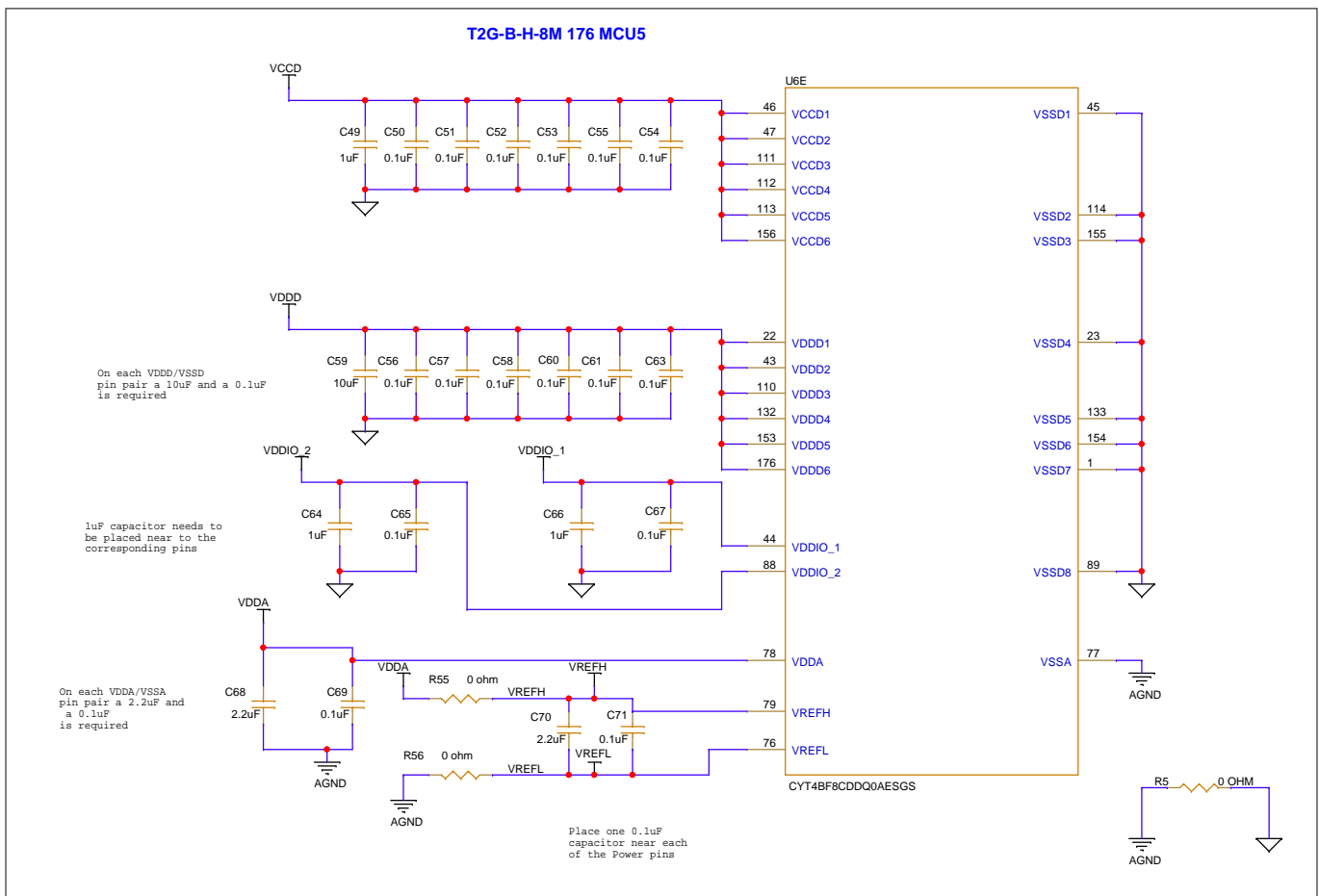


Figure 33 T2G-B-H-8M 176 MCU5

4 Kit design documents

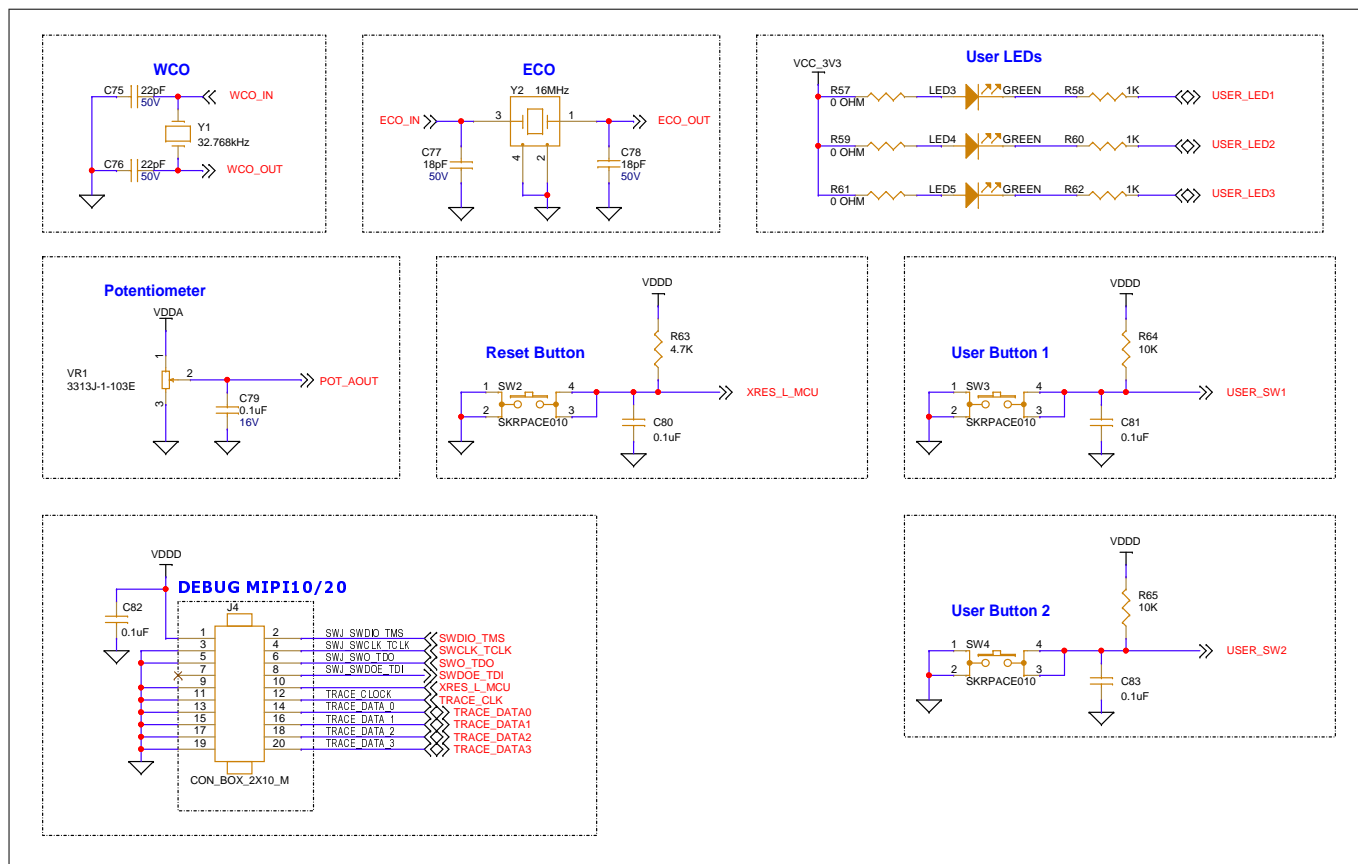


Figure 34 Peripheral interface

4 Kit design documents

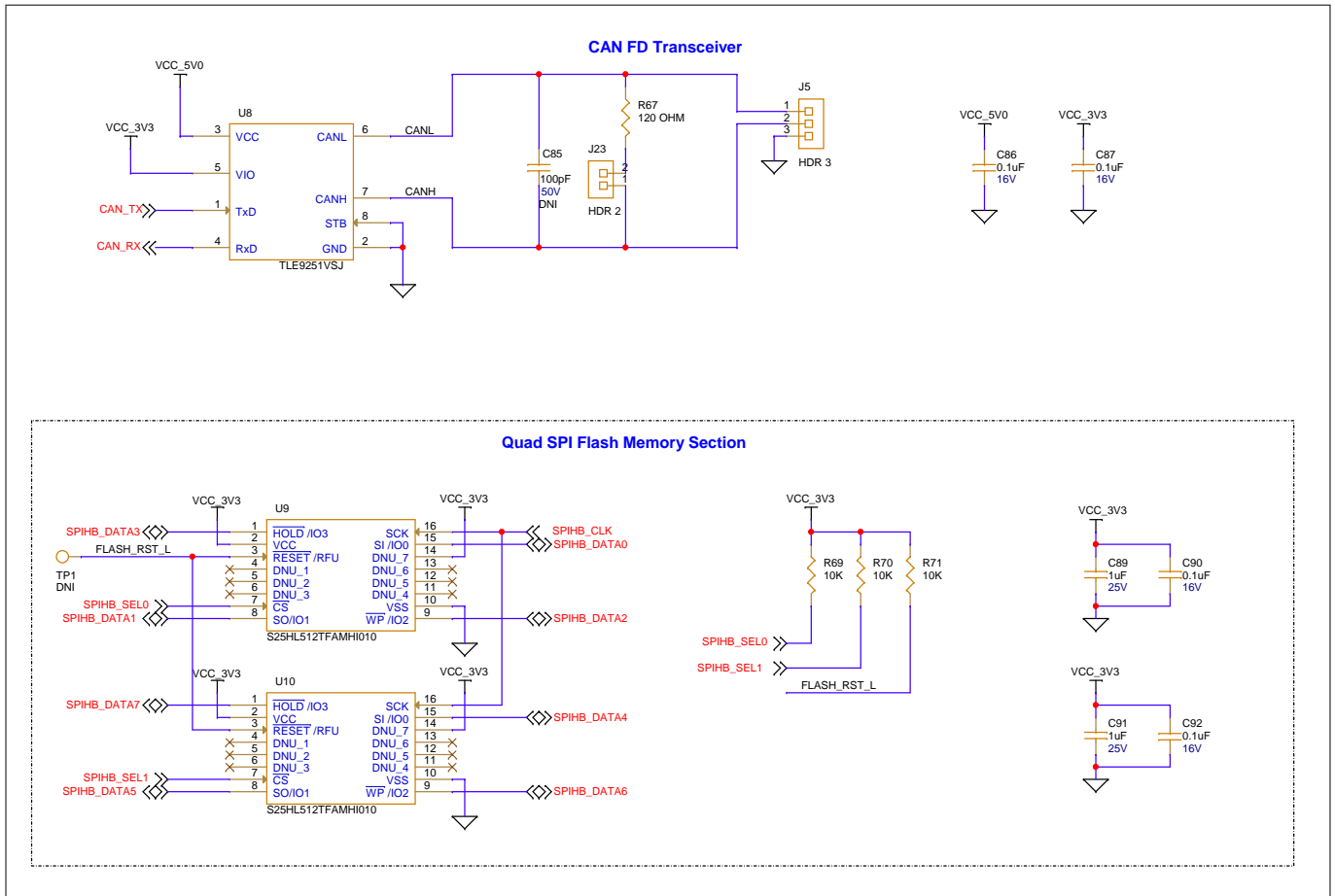


Figure 35 CAN FD and QSPI interface

4 Kit design documents

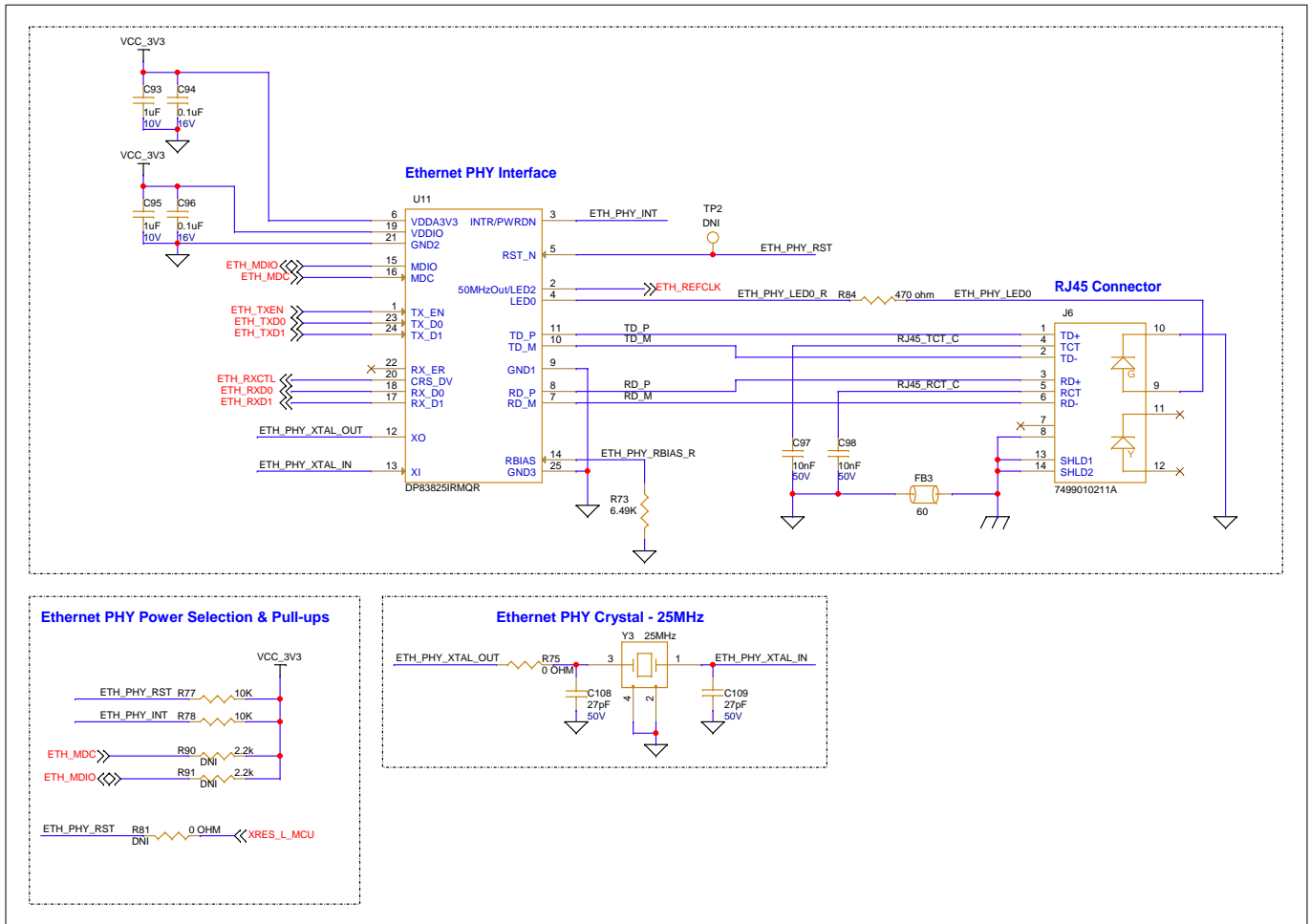


Figure 36 Ethernet interface

4 Kit design documents

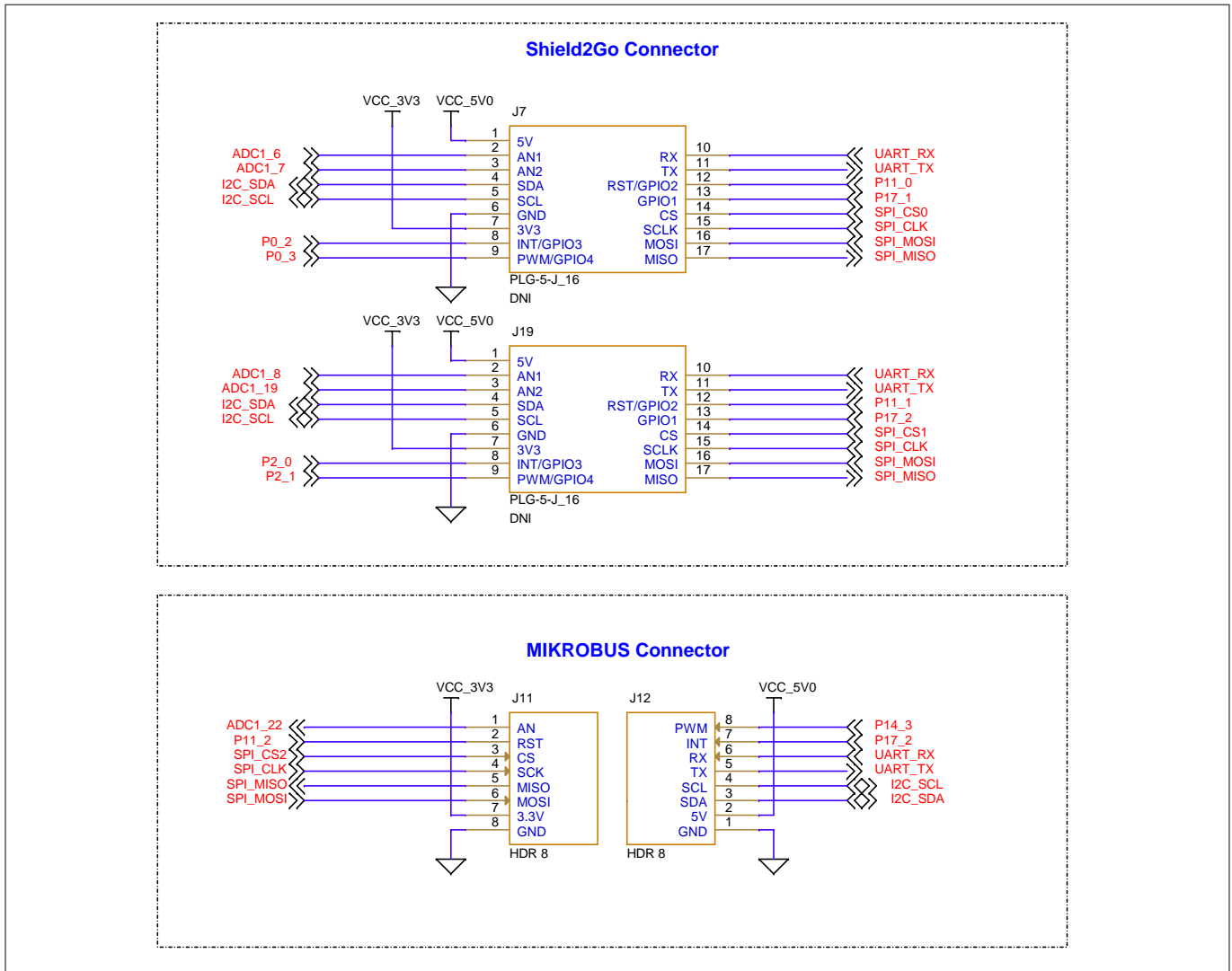


Figure 37 Shield2Go and mikroBUS

4 Kit design documents

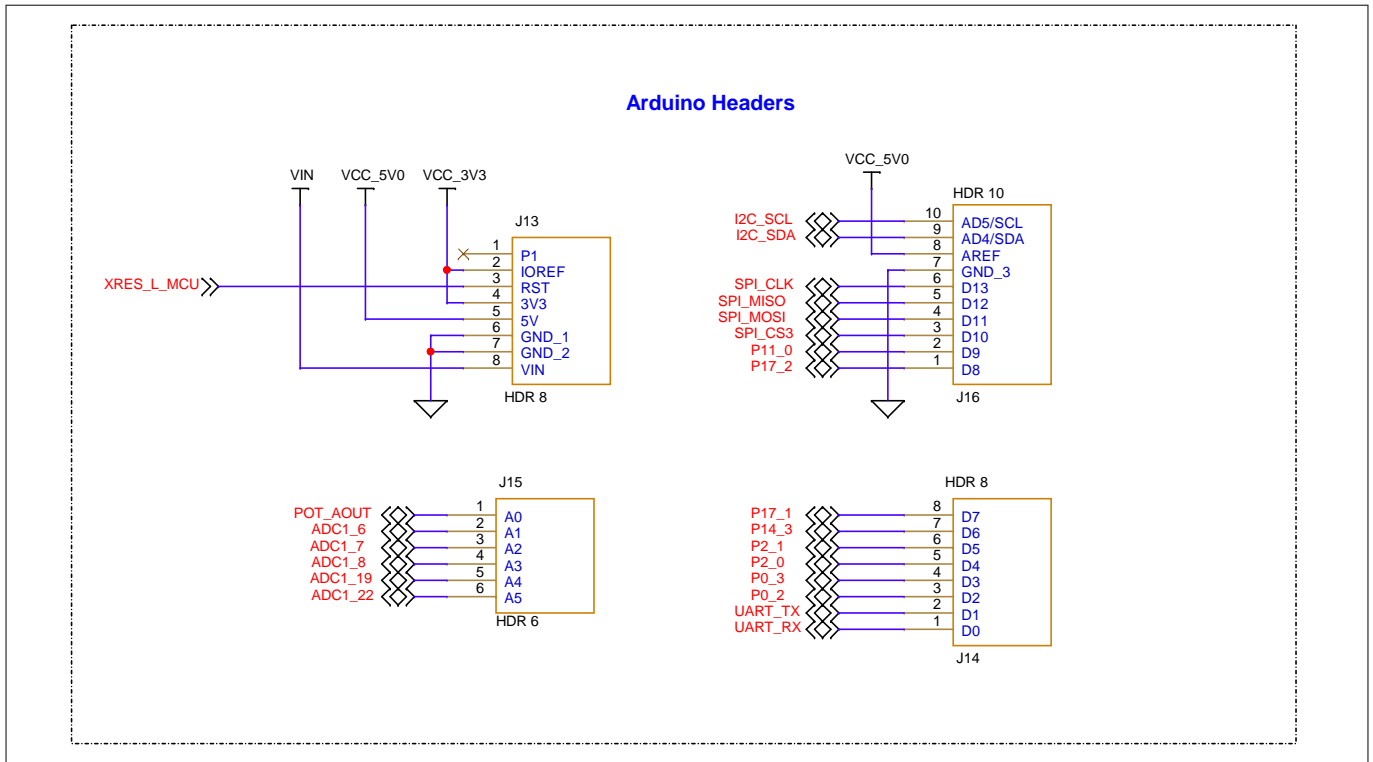


Figure 38 Arduino headers

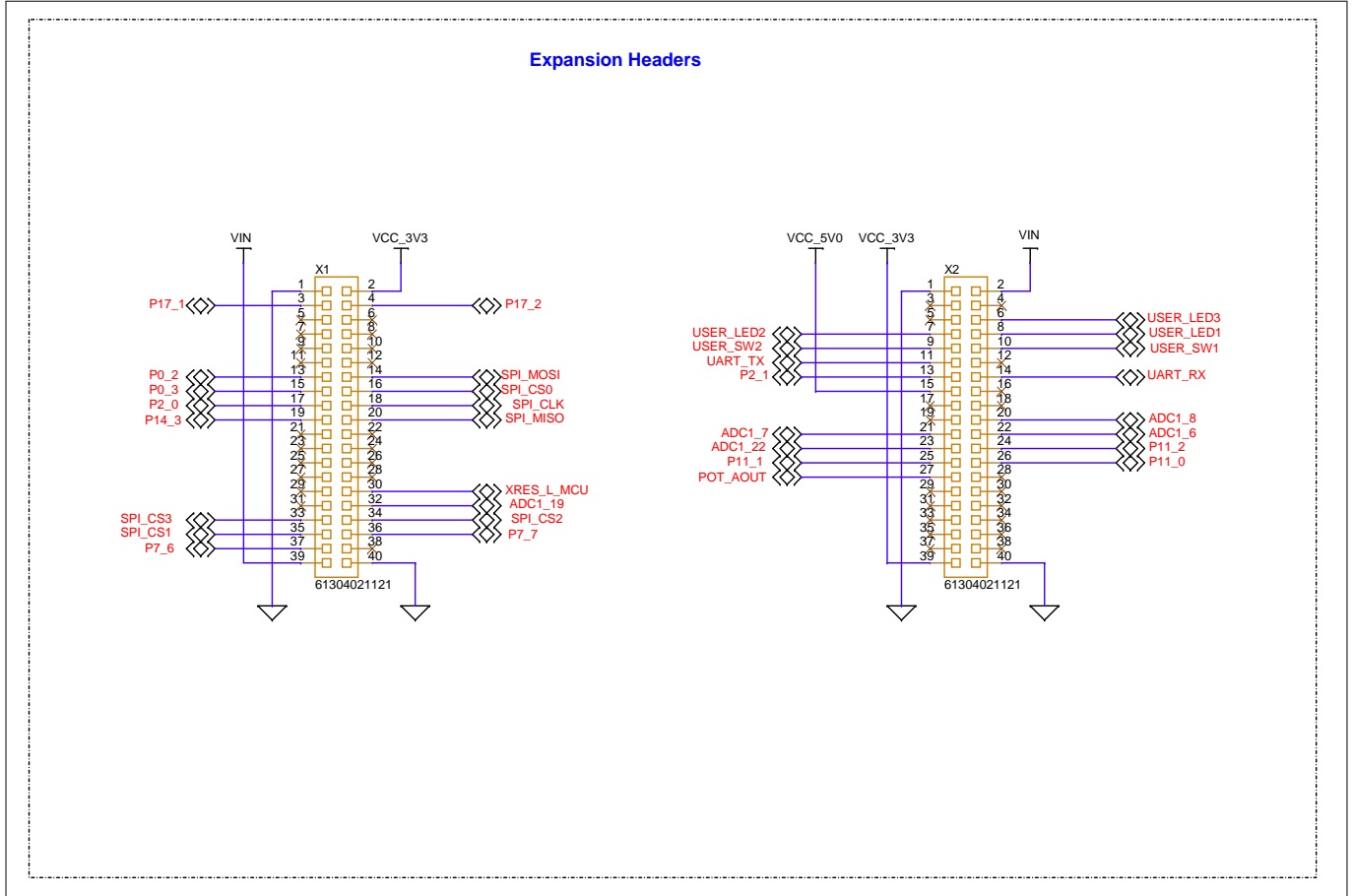


Figure 39 Expansion headers

4 Kit design documents

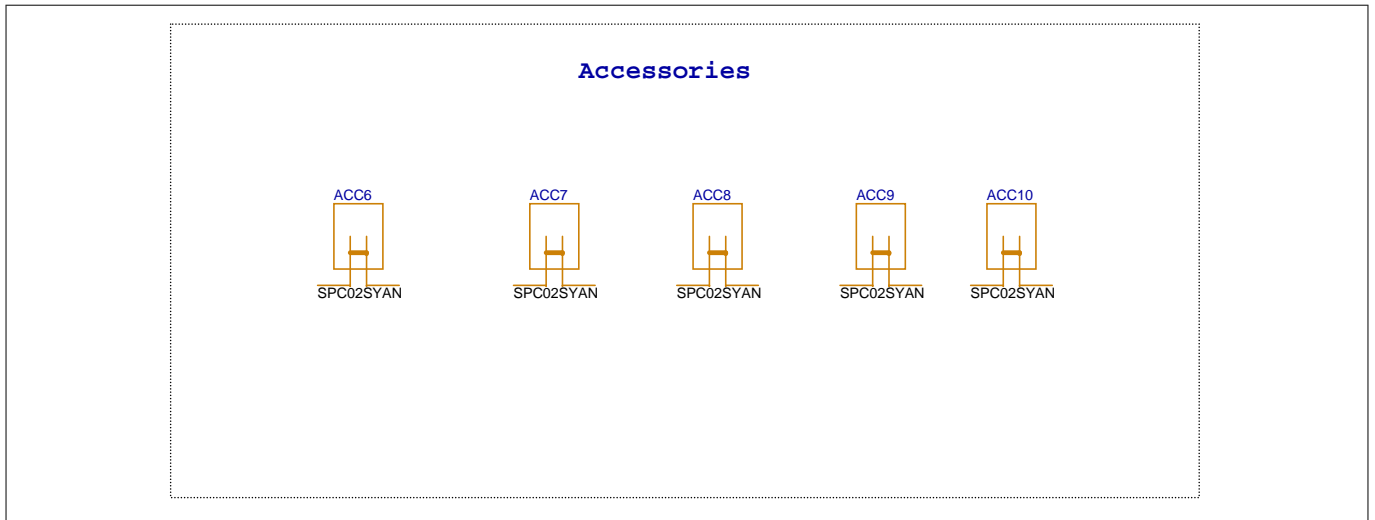


Figure 40 Accessories

4 Kit design documents

4.2 Assembly drawings

This section provides primary and secondary side assembly drawings for the TRAVEO™ T2G B-H Lite kit rev-01, which can be used to understand the physical layout and assembly of the kit.

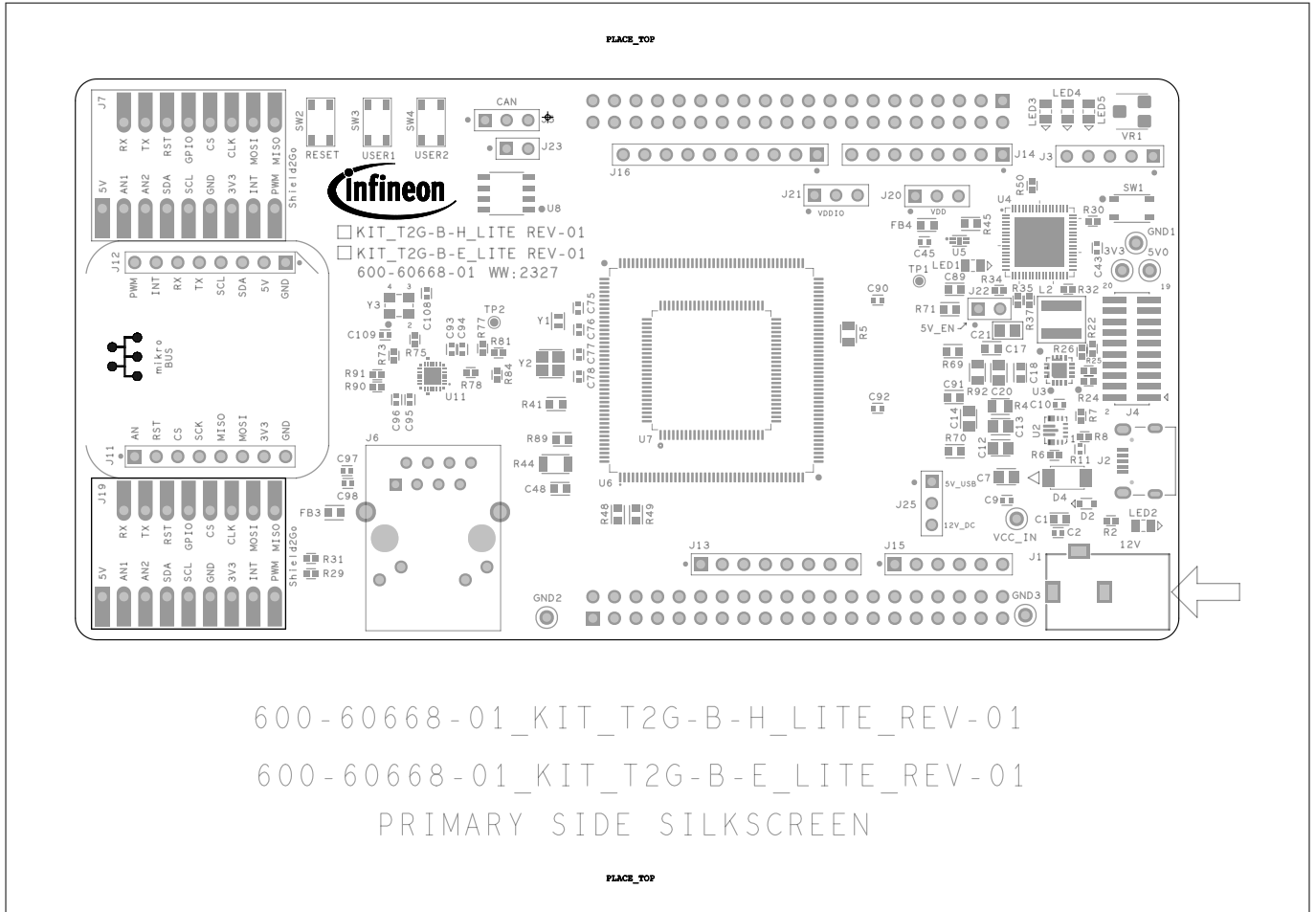


Figure 41 Primary side assembly of TRAVEO™ T2G B-H Lite kit rev-01

4 Kit design documents

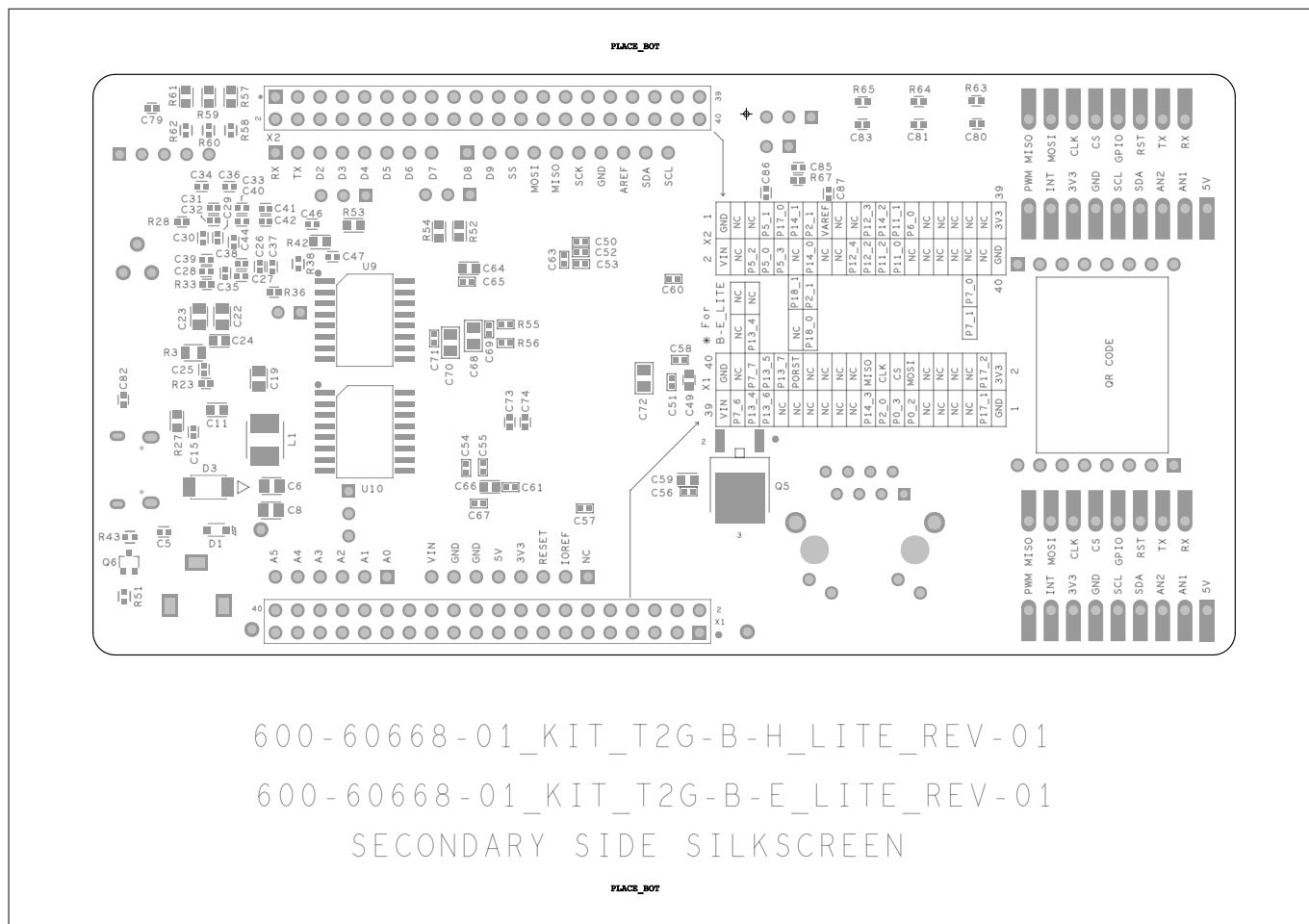


Figure 42 Secondary side assembly of TRAVEO™ T2G B-H Lite kit rev-01

4 Kit design documents

4.3 Layout images

This section provides primary and secondary side layout images of the TRAVEO™ T2G B-H Lite kit rev-01.

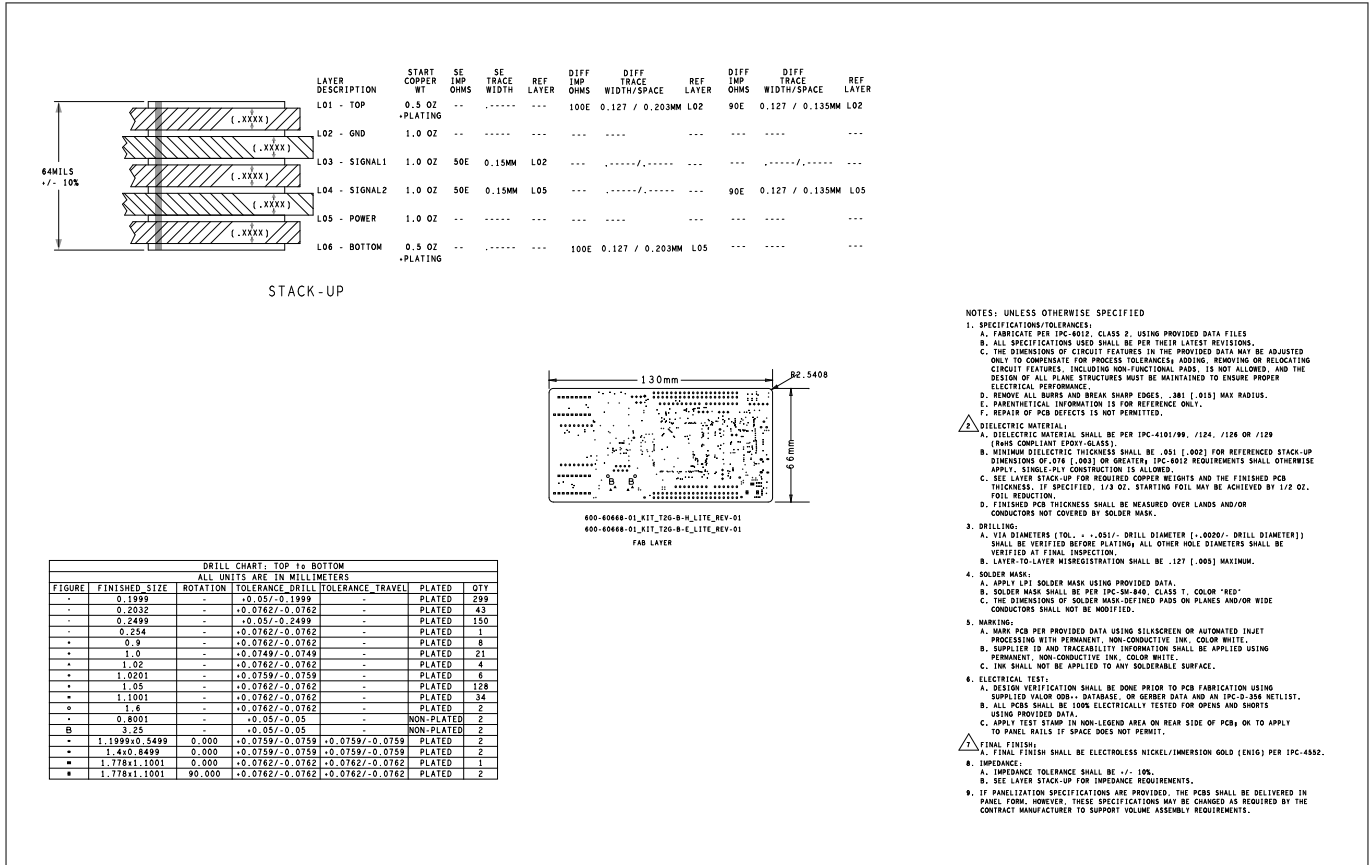


Figure 43 PCB fabrication

4 Kit design documents

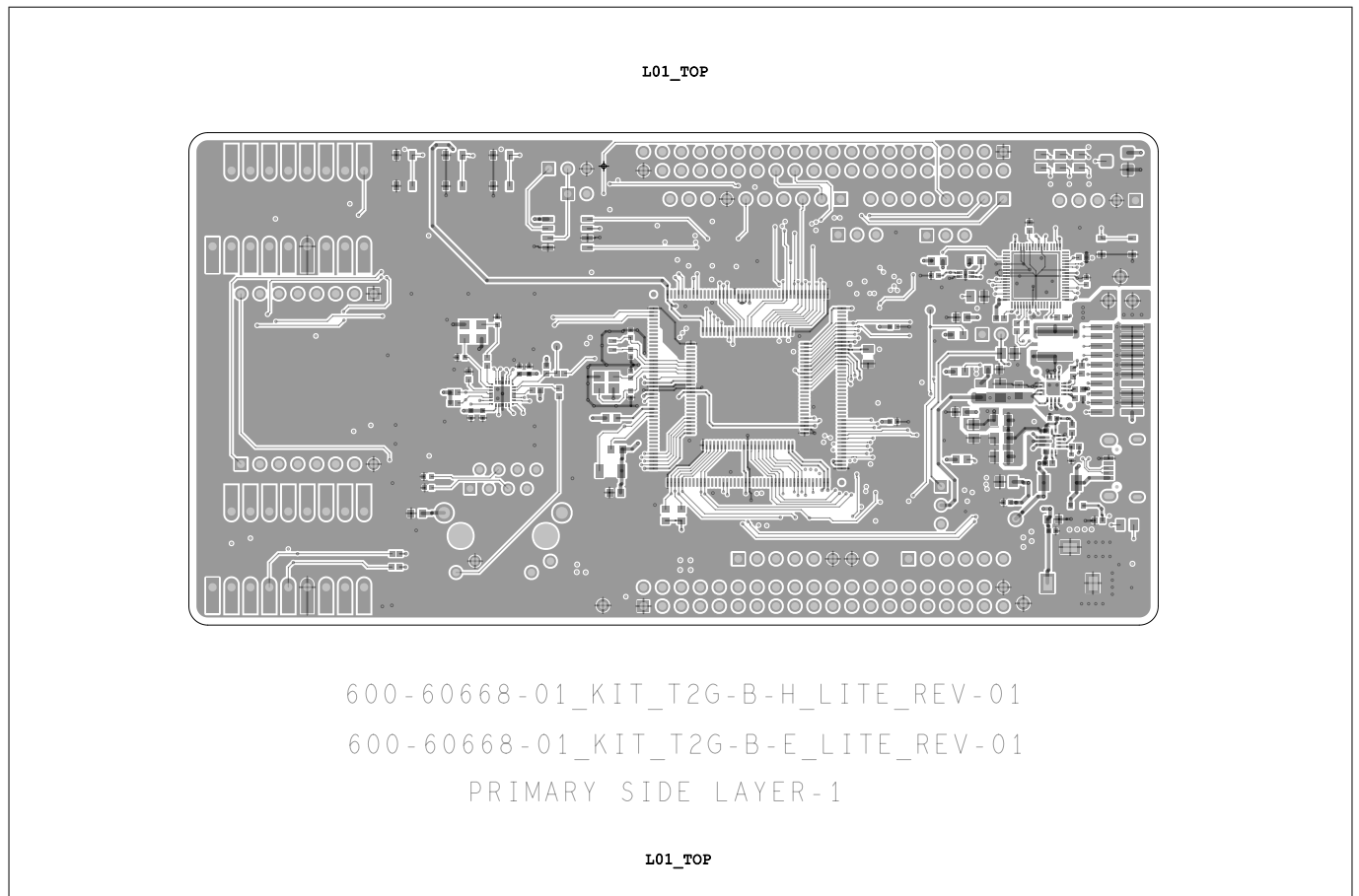


Figure 44 Primary side layer 1

4 Kit design documents

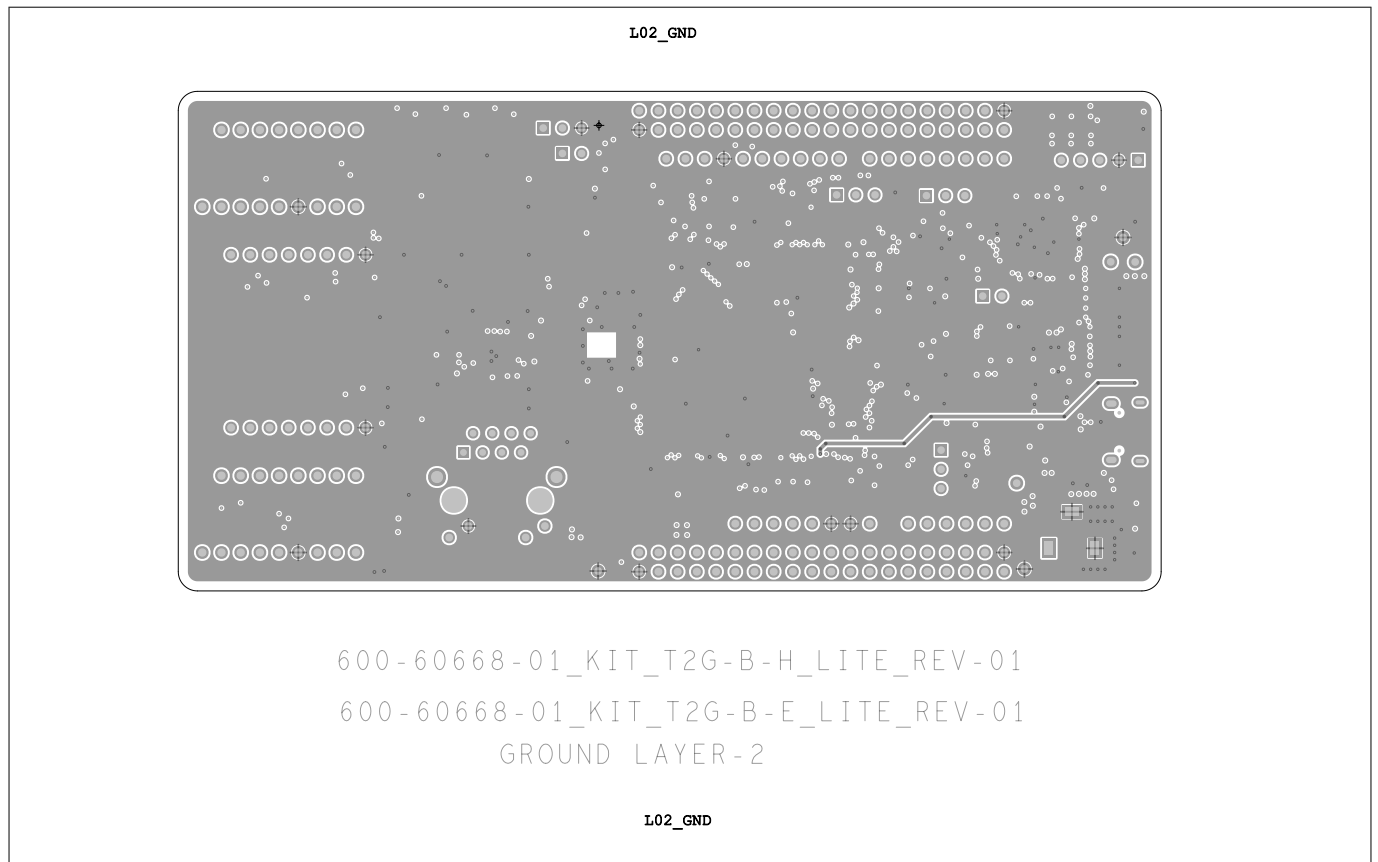


Figure 45 Ground layer 2

4 Kit design documents

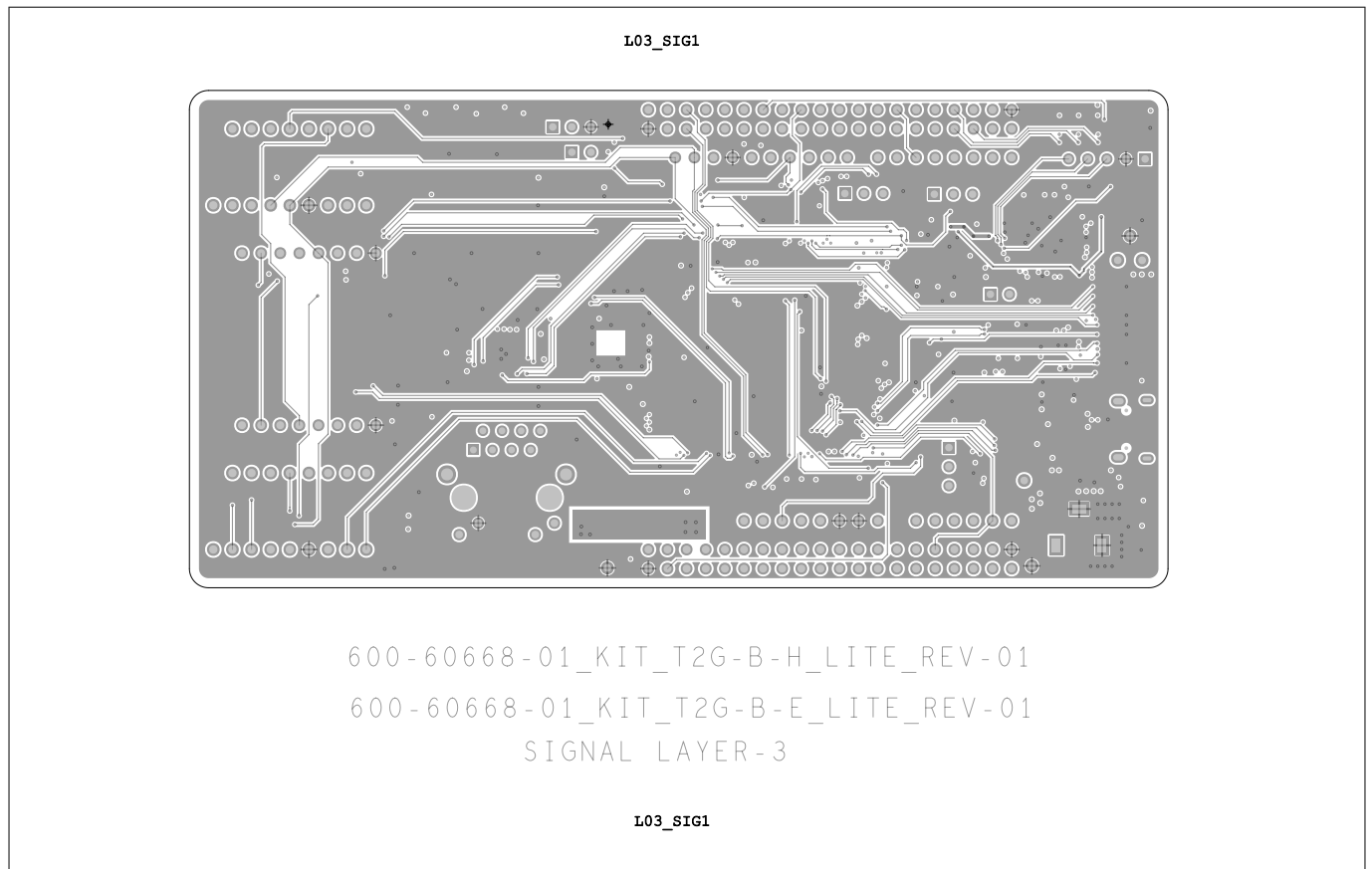


Figure 46 Signal layer 3

4 Kit design documents

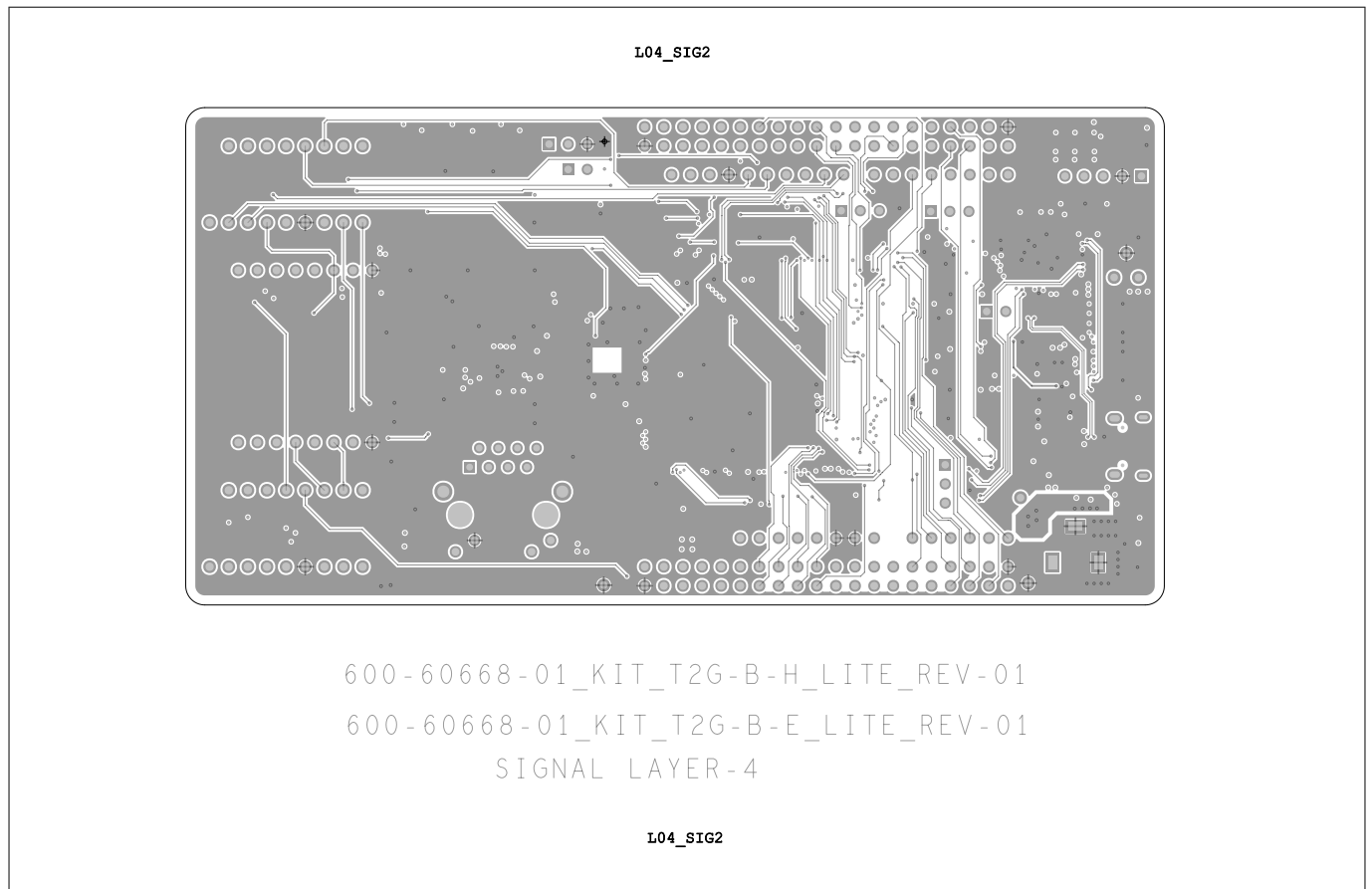


Figure 47 Signal layer 4

4 Kit design documents

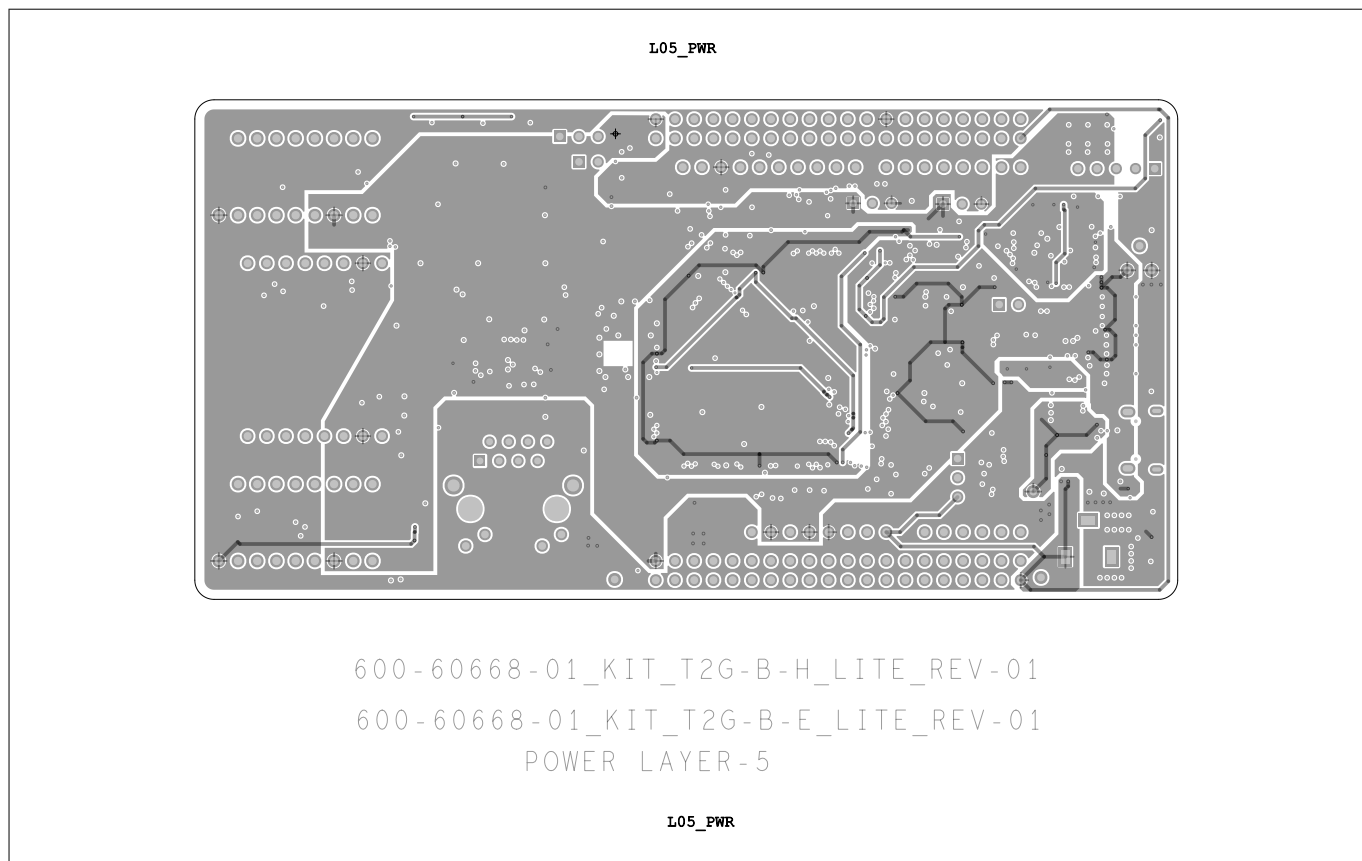


Figure 48 Power layer 5

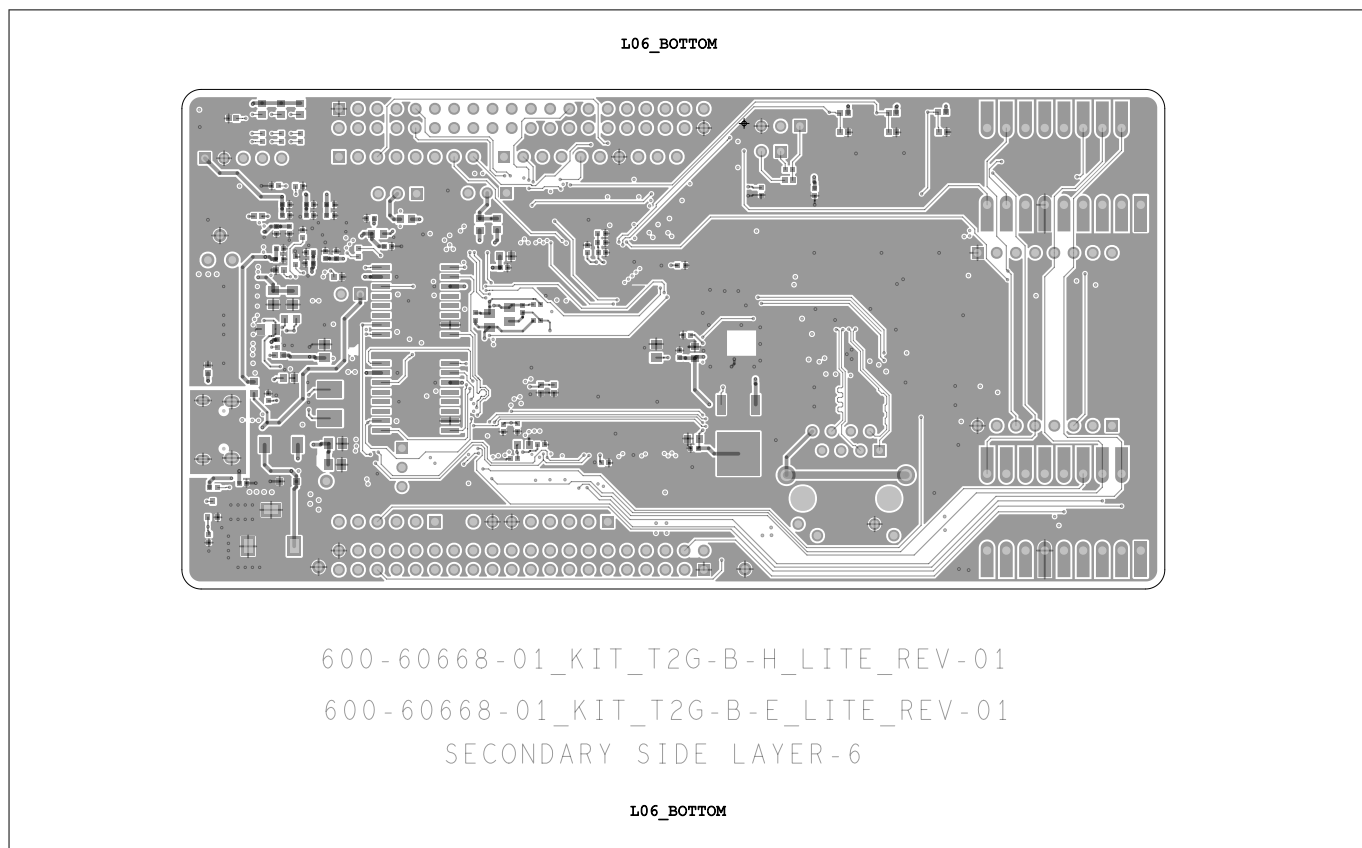


Figure 49 Secondary side layer 6

4 Kit design documents

4.4 Bill of materials (BOM)

This section provides the BOM for the TRAVEO™ T2G B-H Lite kit, which is a detailed list of all the components and parts that are included in the kit (see [Table 17](#)).

Table 17 KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
5	ACC6,ACC7,ACC8,ACC9,ACC10	HW, CONN, rectangular, mini jumper, 6 mm, OPEN TYPE, BLACK, NICKEL	Sullins Connector Solutions	SPC02SYAN	SPC02SYAN	–
7	C1,C17,C49,C64,C66,C89,C91	CAP CER 1 µF 10% 25 V X7R 0603	Murata Electronics	GCM188R71E105K A64D	1 µF	–
12	C2,C9,C10,C15,C27,C29,C31,C33,C36,C38,C40,C42	CAP CER 0.1 µF 50 V X5R 0402	Murata Electronics	GRM155R61H104 KE14D	0.1 µF	–
3	C5,C97,C98	CAP CER 10000PF 50 V X7R 0402	Würth Elektronik	885012205067	10 nF	–
2	C7,C8	CAP CER 10 µF 25 V X5R 0805	Murata Electronics	GRM21BR61E106K A73L	10 µF	–
1	C11	CAP CER 10 µF 25 V X5R 0603	Murata	GRM188R61E106 MA73D	10 µF	–
6	C12,C13,C19,C20,C22,C23	CAP CER 22 µF 25 V X5R 0805	Yageo	CC0805MKX5R8BB 226	22 µF	–
2	C18,C24	CAP CER 0.1 µF 50 V X7R 0603	Würth Elektronik	885012206095	0.1 µF	–
3	C21,C68,C70	CAP CER 2.2 µF 10% 16 V X7R 0805	Murata Electronics	GCM21BR71C225 KA64L	2.2 µF	–
1	C25	CAP CER 220PF 50 V X7R 0402	Würth Elektronik	885012205057	220 pF	–
13	C26,C28,C30,C32,C34,C35,C37,C39,C41,C43,C44,C93,C95	CAP CER 1 µF 10% 10 V X7R 0402	Murata Electronics	GRM155Z71A105K E01J	1 µF	–
9	C45,C46,C47,C86,C87,C90,C92,C94,C96	CAP CER 0.1 µF 10% 16 V X7R 0402	Murata Electronics	GRT155R71C104K E01D	0.1 µF	–

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
2	C48,C59	CAP CER 10UF 10% 10V X7R 0603	Murata Electronics	GRM188Z71A106K A73D	10 µF	-
16	C50,C51,C52,C53,C54,C55,C56,C57,C58,C60,C61,C63,C65,C67,C69,C71	CAP CER 0.1 µF 10% 16 V X7R 0402	Murata Electronics	GRT155R71C104K E01D	0.1 µF	-
1	C72	CAP CER 4.7UF 10% 25V X7R 0805	TDK Corporation	CGA4J1X7R1E475 K125AD	4.7 µF	-
7	C73, C74, C79, C80, C81, C82, C83	CAP CER 0.1 µF 10% 16 V X7R 0402	Murata Electronics	GRT155R71C104K E01D	0.1 µF	-
2	C75, C76	CAP CER 22PF 50 V C0G/NP0 0402	Würth Elektronik	885012005057	22 pF	-
2	C77, C78	CAP CER 18PF 50 V C0G/NPO 0402	Yageo	CC0402FRNPO9B N180	18 pF	-
2	C108,C109	CAP CER 27PF 50 V C0G/NP0 0402	Murata	GCM1555C1H270J A16D	27 pF	-
1	D1	TVS DIODE 12 VWM 15.5 VC SOD323	Micro Commercial Co	ESD12VD3B-TP	ESD12VD3B-TP	-
1	D2	TVS DIODE 5 VWM 18.6 VC SOD523	Micro Commercial Co	ESD5V0D5-TP	ESD5V0D5-TP	-
2	D3,D4	DIODE SCHOTTKY 30 V 3 A SOD128	Nexperia USA Inc.	PMEG3030EP,115	PMEG3030EP	-
1	FB3	Ferrite bead 60 Ω 0603 1LN	Murata Electronics	BLM18PG600SN1 D	60	-
1	FB4	Ferrite bead 1 K Ω 0603 1LN	Murata Electronics	BLM18KG102SN1 D	1K	-
1	J1	CONN PWR jack 2X5.5 mm solder	CUI Devices	PJ-102A	Power jack P-5	-

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
1	J2	CONN RCPT USB2.0 Micro-B SMD R/A	Würth Elektronik	629105150521	629105150521	-
1	J4	CONN header SMD 20 POS 1.27 mm	Samtec Inc.	FTSH-110-01-F-DV-K	CON_BOX_2X10_M	-
1	J5	CONN header VERT 2POS 2.54 mm	Würth Elektronik	61300311121	HDR 3	-
1	J6	1 Port RJ45 through hole 10/100 Base-T, AutoMDIX	Würth Elektronik	7499010211A	7499010211A	-
4	J11,J12,J13,J14	CONN header VERT 8POS 2.54 mm	Würth Elektronik	61300811821	HDR 8	-
1	J15	WR-PHD 2.54 mm socket header 6 P	Würth Elektronik	61300611821	HDR 6	-
1	J16	CONN HDR 10 POS 0.1 GOLD PCB	Würth Elektronik	61301011821	HDR 10	-
3	J20,J21,J25	CONN header VERT 3 POS 2.54 mm	Würth Elektronik	61300311121	HDR 3	-
1	J22	CONN header VERT 2 POS 2.54 mm	Würth Elektronik	61300211121	HDR 2	-
1	J23	CONN, HDR, MALE, SINGLE, 2 POS, 2.54 mm, GOLD, STR, TH	Würth Elektronik	61300211121	HDR 2	-
1	LED1	LED, YELLOW, CLEAR, 585 nm, 2.0 V, 0805	Visual Communications Company - VCC	CMD17-21VYC/TR 8	YELLOW	-
4	LED2,LED3,LED4,LED5	LED GREEN CLEAR 0805 SMD	Visual Communications Company - VCC	CMD17-21VGC/TR 8	GREEN	-
1	L1	FIXED IND 1.5 UH 5.2 A 36 M Ω SMD	Pulse Electronics	PA4332,152NLT	1.5 μH	-

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
1	L2	FIXED IND 2.2 UH 9.7 A 14.5 M Ω SMD	Abracon LLC	ASPIAIG-F5030-2R2M-T	2.2 μ H	-
1	Q5	TRANS NPN 30 V 7A TO252-3	Diodes Inc	ZXT849KTC	ZXT849KTC	-
1	Q6	MOSFET N-CH 30 V 180 MA SOT323	NXP	NX3020NAKW,115	NX3020NAKW,115	-
2	R2,R50	RES 100K Ω 5% 1/16 W 0402	Yageo	RC0402JR-07100KL	100K	-
4	R3,R4,R5,R92	RES 0 Ω jumper 2 A 0805	Yageo	AC0805JR-070RL	0 Ω	-
5	R6,R64,R65,R77,R78	RES 10K Ω 5% 1/16 W 0402	Yageo	RC0402JR-0710KL	10K	-
1	R7	RES 100K Ω 1% 1/16 W 0402	Yageo	RC0402FR-07100KL	100K	-
1	R11	RES 10K Ω 5% 1/16 W 0402	Yageo	RC0402JR-0710KL	10K	-
1	R22	RES 16.5K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0716K5L	16.5K	-
1	R23	RES 32.4K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0732K4L	32.4K	-
1	R24	RES 47K Ω 1% 1/16 W 0402	Vishay	CRCW040247K0FKEDC	47K	-
2	R25,R28	RES 49.9K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0749K9L	49.9K	-
1	R26	RES 2.94K Ω 1% 1/16 W 0402	Yageo	RC0402FR-072K94L	2.94K	-
10	R27,R41,R45,R52,R53,R54,R57,R59,R61,R89	RES 0 Ω jumper 1/10 W 0603	Yageo	RC0603JR-070RL	0 Ω	-
3	R29,R31,R63	RES 4.7K Ω 5% 1/16 W 0402	Yageo	RC0402JR-074K7L	4.7K	-
2	R32,R34	RES 15K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0715KL	15K	-
2	R33,R36	RES 30K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0730KL	30K	-
2	R35,R37	RES 22 Ω 1% 1/16 W 0402	Yageo	RC0402FR-0722RL	22 Ω	-

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
1	R38	RES 750 Ω 5% 1/16 W 0402	Yageo	RC0402JR-07750RL	750 Ω	-
1	R43	RES SMD 390 Ω 5% 1/10 W 0402	Panasonic Electronic Components	ERJ-2GEJ391X	390 Ω	-
1	R44	RES 0.1 Ω 1% ¼ W 1206	Yageo	RL1206FR-070R1L	0.1 Ω	-
5	R48,R49,R69,R70,R71	RES 10K Ω 5% 1/10 W 0603	Yageo	RC0603JR-0710KL	10K	-
1	R51	RES 100K Ω 5% 1/16 W 0402	Yageo	RC0402JR-07100KL	100K	-
2	R55,R56	RES SMD 0 Ω 1/16 W 0402	YAGEO	AF0402JR-070RL	0 Ω	-
3	R58,R60,R62	RES 1K Ω 5% 1/10 W 0402	Panasonic Electronic Components	ERJ-2GEJ102X	1K	-
1	R67	RES 120 Ω 1% 1/16 W 0402	Yageo	RC0402FR-07120RL	120 Ω	-
1	R73	RES 6.49K Ω 1% 1/16 W 0402	Yageo	RC0402FR-076K49L	6.49K	-
1	R75	RES 0 Ω jumper 1/16 W 0402	Yageo	RC0402JR-070RL	0 Ω	-
1	R84	RES SMD 470 Ω 0.1% 1/16 W 0402	Panasonic Electronic Components	ERA-2ARB471X	470 Ω	-
1	SW1	Tact switch 4.2X3.2 mm vertical T	Würth Elektronik	434123025826	SKRSPACE010	-
3	SW2,SW3,SW4	Tactile switches 4.2x3.2x2.5 mm 260 gf surface mount	Alps Alpine	SKRSPACE010	SKRSPACE010	-
1	U2	IC REG BCK BST 5V 2A 15VQFN	Texas Instruments	TPS630701RNMT	TPS630701RNMT	-
1	U3	IC REG buck adjustable 3 A 16PQFN	Infineon Technologies	IR3883MTRPBF	IR3883MTRPBF	-
1	U4	IC MCU 32BIT 256 KB flash 68QFN	Infineon Technologies	CY8C5868LTI-LP039	CY8C5868LTI-LP039	-

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
1	U5	IC PWR switch N-CHAN 1:1 4TDFN	Vishay Siliconix	SIP32402ADNP-T1GE4	SIP32402ADNP	-
1	U6	T2G MCU IC 32-Bit Quad-Core 100 MHz, 350 MHz 8.1875 MB flash 176-TEQFP	Infineon Technologies	CYT4BF8CDDQ0AE SGS	CYT4BF8CDDQ0 AESGS	-
1	U8	IC transceiver 1/1 DSO-8	Infineon Technologies	TLE9251VSJ	TLE9251VSJ	-
2	U9,U10	IC flash 512 MBIT SPI/QUAD 16SOIC	Infineon Technologies	S25HL512TFAMHI010	S25HL512TFAMHI010	-
1	U11	IC TXRX FULL/HALF 1/1 24WQFN	Texas Instruments	DP83825IRMQR	DP83825IRMQR	-
1	VR1	TRIMMER 10K Ω 0.125 W J LEAD TOP	Bourns Inc.	3313J-1-103E	3313J-1-103E	-
2	X1,X2	CONN header VERT 40 POS 2.54 mm	Würth Elektronik	61304021121	61304021121	-
1	Y1	Crystal 32.7680 KHz 12.5PF SMD	TXC CORPORATION	9H03277003	32.768 kHz	-
1	Y2	Crystal 16.0000 MHz 10PF SMD	Abracon LLC	ABM10-16.000 MHz-D30-T3	16 MHz	-
1	Y3	Crystal 25.0000 MHz 18PF SMD	ECS Inc	ECS-250-18-33-JGN-TR	25 MHz	-
1	C6	CAP CER 10 µF 25V X5R 0805	Murata Electronics	GRM21BR61E106K A73L	10 µF	DNI
1	C14	CAP CER 22 µF 25V X5R 0805	Yageo	CC0805MKX5R8BB 226	22 µF	DNI
1	C85	CAP CER 100PF 50 V C0G 0402	TDK Corporation	CGA2B2C0G1H101 J050BA	100 pF	DNI
3	GND1,GND2,GND3	PC test point miniature black	Keystone Electronics	5001	BLACK	DNI

(table continues...)

4 Kit design documents

Table 17 (continued) KIT_T2G-B-H_LITE rev-01 bill of materials

Quantity	Reference designator	Description	Manufacturer name	Manufacturer part number	Value	Load
1	J3	CONN header VERT 5 POS 2.54 mm	Molex	22284050	HDR 5	DNI
2	J7,J19	Shield2go	-	-	PLG-5-J_16	DNI
1	R8	RES 10K Ω 5% 1/16 W 0402	Yageo	RC0402JR-0710KL	10K	DNI
1	R30	RES 49.9K Ω 1% 1/16 W 0402	Yageo	RC0402FR-0749K9 L	49.9K	DNI
1	R42	RES 0 Ω jumper 1/10 W 0603	Yageo	RC0603JR-070RL	0 Ω	DNI
1	R81	RES 0 Ω jumper 1/16 W 0402	Yageo	RC0402JR-070RL	0 Ω	DNI
2	R90,R91	RES SMD 2.2K Ω 5% 1/16 W 0402	Vishay Dale	CRCW04022K20JN ED	2.2k	DNI
2	TP1,TP2	PC test point miniature red	Keystone Electronics	5000	RED	DNI
3	3V3,5V0,VCC_IN	PC test point miniature red	Keystone Electronics	5000	RED	DNI

4.5 Pinout details

This section provides information about the primary onboard functionalities of the TRAVEO™ T2G B-H MCU pins on the lite kit, as well as details about pins and where these pins are routed on the board.

Table 18 TRAVEO™ T2G B-H MCU pin details

Pin	Primary onboard function	Secondary onboard function	Connection details
XRES	Hardware reset	-	-
P0[0]	KP_UART_RX	-	This pin is connected between TRAVEO™ T2G B-H MCU RX and KitProg3 TX
P0[1]	KP_UART_TX	-	This pin is connected between TRAVEO™ T2G B-H MCU TX and KitProg3 RX
P12[0]	CAN transmit CAN_TX	-	Connected to TxD of CAN FD transceiver TLE9251VSJ
P12[1]	CAN receive CAN_RX	-	Connected to RxD of CAN FD transceiver TLE9251VSJ
P6[3]	SPIHB_CLK	-	Connected to SCK of QSPI flash S25HL512TFAMHI010

(table continues...)

4 Kit design documents

Table 18 (continued) TRAVEO™ T2G B-H MCU pin details

Pin	Primary onboard function	Secondary onboard function	Connection details
P6[5]	SPIHB_SEL0	–	Connected to CS of QSPI flash S25HL512TFAMHI010
P6[0]	Potentiometer (POT) output POT_AOUT	Arduino header (J15.1)	–
P7[1]	SPIHB_DATA0	–	Connected to IO0 of QSPI flash S25HL512TFAMHI010 (U9)
P7[2]	SPIHB_DATA1	–	Connected to IO1 of QSPI flash S25HL512TFAMHI010 (U9)
P7[3]	SPIHB_DATA2	–	Connected to IO2 of QSPI flash S25HL512TFAMHI010 (U9)
P7[4]	SPIHB_DATA3	–	Connected to IO3 of QSPI flash S25HL512TFAMHI010 (U9)
P7[5]	SPIHB_DATA4	–	Connected to IO0 of QSPI flash S25HL512TFAMHI010 (U10)
P8[0]	SPIHB_DATA5	–	Connected to IO0 of QSPI flash S25HL512TFAMHI010 (U10)
P8[1]	SPIHB_DATA6	–	Connected to IO0 of QSPI flash S25HL512TFAMHI010 (U10)
P8[2]	SPIHB_DATA7	–	Connected to IO0 of QSPI flash S25HL512TFAMHI010 (U10)
P13[0]	D12 – Arduino header (J16.5)	Expansion header (X1.20)	–
P13[1]	D11 – Arduino header (J16.4)	Expansion header (X1.14)	–
P13[2]	D13 – Arduino header (J16.6)	Expansion header (X1.18)	–
P13[6]	D10 – Arduino header (J16.3)	Expansion header (X1.33)	–
P11[0]	D9 – Arduino header (J16.2)	Shield2Go connector (J7.12) Expansion header (X2.26)	–
P17[2]	D8 – Arduino header (J16.1)	Shield2Go connector (J19.13) Expansion header (X1.4)	–
P14[0]	UART_RX	Arduino header (J14.1) Shield2Go connector (J7.10, J19.10) mikroBUS connector (J12.6)	This pin is connected to the UART RX pin

(table continues...)

4 Kit design documents

Table 18 (continued) TRAVEO™ T2G B-H MCU pin details

Pin	Primary onboard function	Secondary onboard function	Connection details
P14[1]	UART_TX	Arduino header (J14.2) Shield2Go connector (J7.11, J19.11) mikroBUS connector (J12.5)	This pin is connected to the UART TX pin
P0[2]	Pin D2 of connector J14.3 compatible with Arduino	–	–
P0[3]	Pin D3 of connector J14.4 Arduino header	–	–
P2[0]	Pin D4 of connector J14.5 Arduino header	–	–
P2[1]	Pin D5 of connector J14.6 Arduino header	–	–
P14[3]	Pin D6 of connector J14.7 Arduino header	–	–
P17[1]	Pin D7 of connector J14.8 Arduino header	–	–
P12[2]	A1 – Arduino header (J15.2)	–	–
P12[3]	A2 – Arduino header (J15.3)	–	–
P12[4]	A3 – Arduino header (J15.4)	–	–
P13[7]	A4 – Arduino header (J15.5)	–	–
P14[2]	A5 – Arduino header (J15.6)	–	–
P6[1]	I2C SDA - Common I2C SDA pin for KitProg3 USB-I2C bridge	I2C SDA pin Arduino header (J16.9)	–
P6[2]	I2C SCL - Common I2C SCL pin for KitProg3 USB-I2C bridge	I2C SCL pin on Arduino header (J16.10)	–
P5[0]	User LED1 (LED1)	Expansion connector (X2.8)	–
P5[1]	User LED2 (LED2)	Expansion connector (X2.7)	–
P5[2]	User LED3 (LED3)	Expansion connector (X2.6)	–
P5[3]	User button (USER BUTTON1)	Expansion connector (X2.10)	–
P17[0]	User button (USER BUTTON2)	Expansion connector (X2.9)	–
P21[0]	WCO IN (Y1)	–	32.768-kHz watch crystal oscillator input
P21[1]	WCO OUT (Y1)	–	32.768-kHz watch crystal oscillator output

(table continues...)

4 Kit design documents

Table 18 (continued) TRAVEO™ T2G B-H MCU pin details

Pin	Primary onboard function	Secondary onboard function	Connection details
P21[2]	ECO IN (Y2)	–	16-MHz external crystal oscillator input
P21[3]	ECO OUT (Y2)	–	16-MHz external crystal oscillator input
P23[4]	SWO_TDO	DEBUG MIPI 10/20 connector (J4.6)	–
P23[5]	SWCLK_TCLK	DEBUG MIPI 10/20 connector (J4.4)	–
P23[6]	SWDIO_TMS	DEBUG MIPI 10/20 connector (J4.2)	–
P23[7]	SWDOE_TDI	DEBUG MIPI 10/20 connector (J4.8)	–
P18[0]	ETH_REFCLK	–	The Ethernet signals are connected to Ethernet PHY transceiver (U11) in RMI configuration mode.
P18[4]	ETH_TXD0	–	
P18[5]	ETH_TXD1	–	
P18[1]	ETH_TXEN	–	
P19[0]	ETH_RXD0	–	
P19[1]	ETH_RXD1	–	
P21[5]	ETH_RXCTL	–	
P3[1]	ETH_MDC	–	
P3[0]	ETH_MDIO	–	

5 Additional information

5 Additional information

This section describes the test points available and the advance features in this Lite kit.

5.1 Test points

Table 19 lists all the test points available in the Lite kit.

Test point	Description
TP1	Connected to the flash reset line of both Quad SPI flash memory pin 3 (U9.3 and U10.3)
TP2	Connected to the Ethernet PHY reset line of Ethernet PHY transceiver pin 5 (U11.5)
VCC_IN	Connected to monitor the voltage coming after power supply 'OR'ing
5V0	Connected to monitor the 5 V power output from the 5 V buck boost regulator
3V3	Connected to monitor the 3.3 V power output from the 3.3 V buck regulator
GND1	Connected to common ground point of the kit
GND2	Connected to common ground point of the kit
GND3	Connected to common ground point of the kit

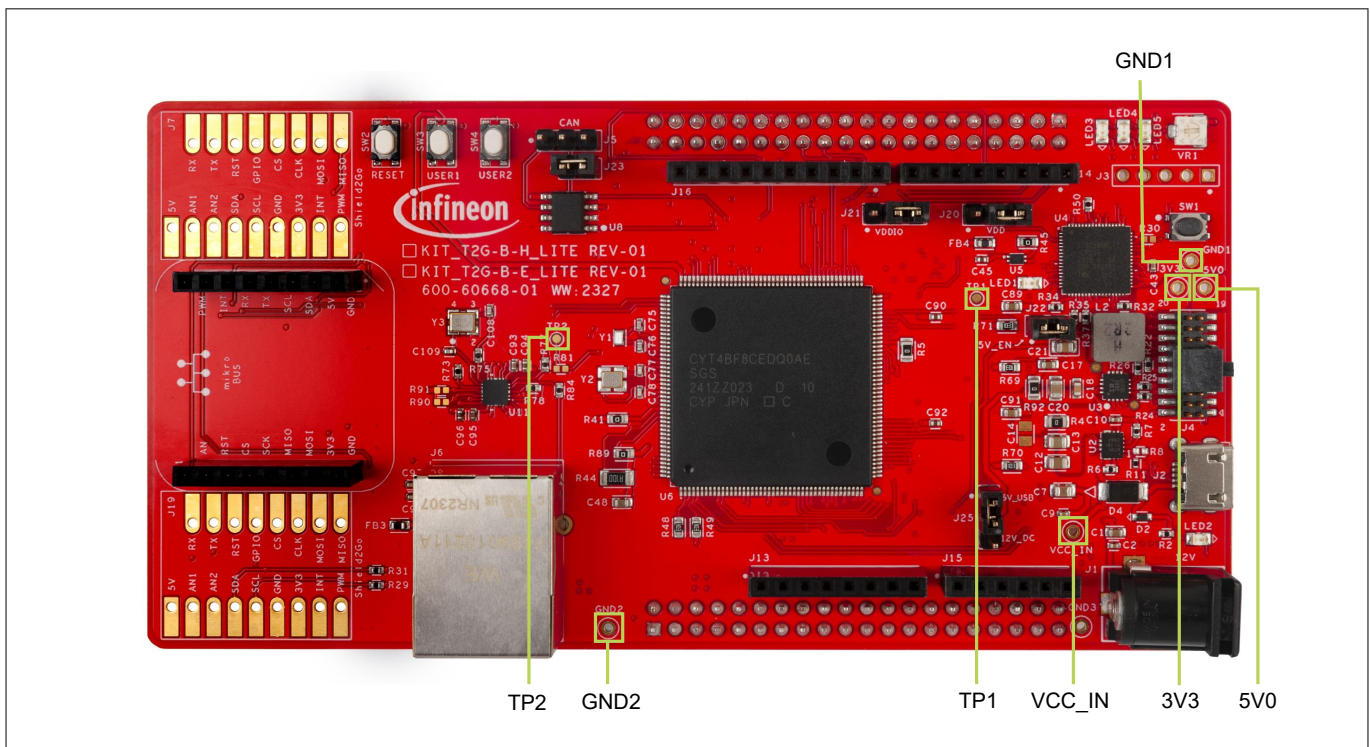


Figure 50 Location of various test points available in the Lite kit

5.2 Advance features

The TRAVEO™ T2G B-H Lite kit provides few advance features that can be used as per the requirements:

- To reset the QSPI flash memories on the TRAVEO™ T2G B-H Lite kit by connecting a jumper between the GND pin and the TP1 which results in the reset of the QSPI flash memories (see Figure 51). You can also connect the test point to GPIO, to control the reset from the software.

5 Additional information

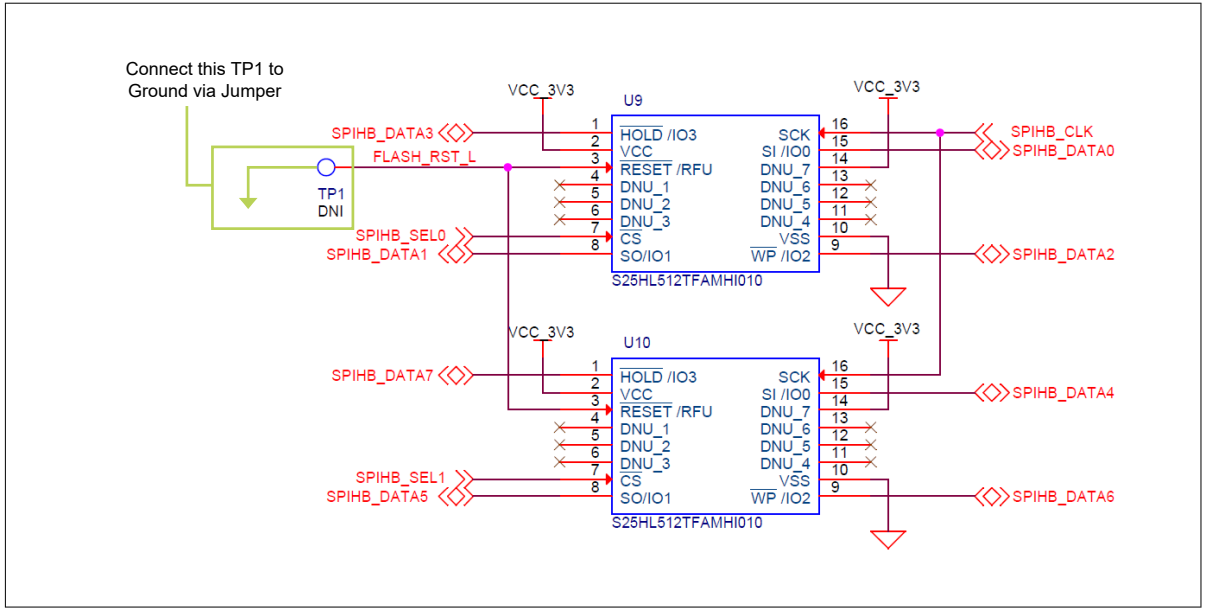


Figure 51 Reset the QSPI flash memories

- To reset the Ethernet PHY on the TRAVEO™ T2G B-H Lite kit, connect a jumper between the GND pin and the TP2 (see Figure 52).

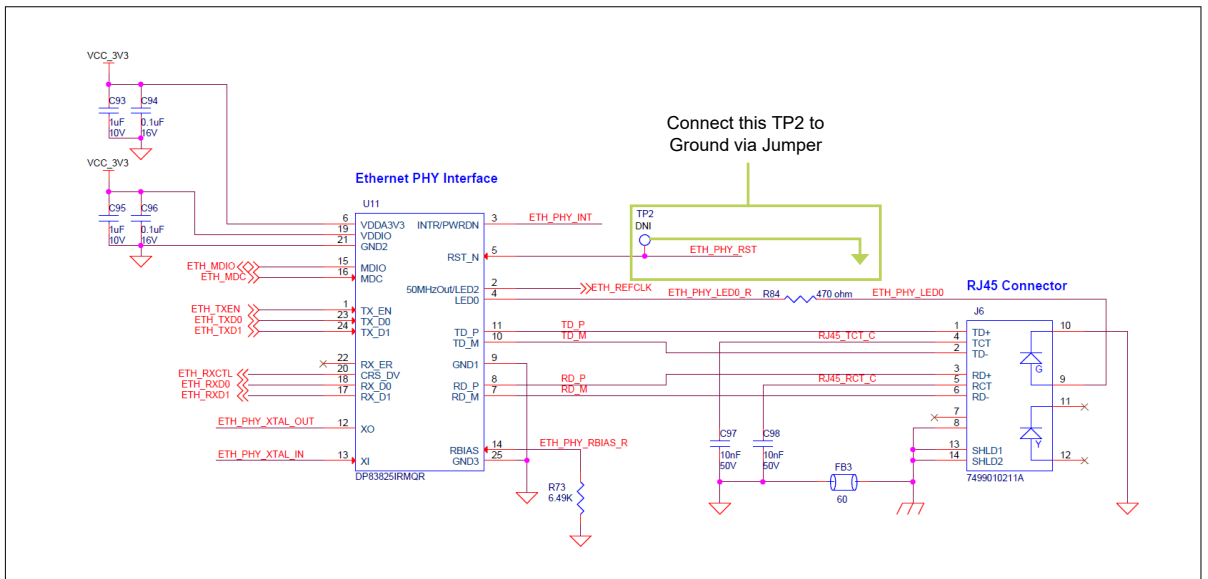


Figure 52 Reset the Ethernet PHY

References

References

- [1] Datasheet
 - [TRAVEO™ T2G 32-bit Automotive MCU](#)
 - [PSoC™ 5LP: CY8C58LP family](#)
 - [TLE9251V High-speed CAN transceiver](#)
 - [Texas Ethernet PHY transceiver](#)
 - [Quad SPI NOR flash](#)
 - [TPS63070 2-V to 16-V buck-boost converter with 3.6 A switch current](#)
 - [Infineon IR3883MTRPBF datasheet](#)
 - [2] User guides
 - [KIT_T2G-B-H_LITE kit page](#)
 - [Eclipse IDE for ModusToolbox™ user guide](#)
 - [KitProg3 user guide](#)
 - [3] Reference manuals
 - [TRAVEO™ T2G Automotive MCU body controller high architecture reference manual](#)
 - [TRAVEO™ T2G CYT4BF register reference manual](#)
 - [4] [TRAVEO™ T2G B-H Lite kit Quick Start Guide](#)
 - [5] [ModusToolbox™ software](#)
- Note:** *For any questions regarding any peripheral block or code examples, visit the [Infineon Developer Community](#) for solutions.*

Glossary

Glossary

AC

alternating current

ADC

analog-to-digital converter

B-H

body high

BOM

bill of materials

CAN

controller area network

CAN FD

controller area network flexible data rate

CAP

capacitor

CO

crystal oscillator

CPU

central processing unit

DAC

digital-to-analog converter

DC

direct current

ECO

external crystal oscillator

ESD

electrostatic discharge

ETH

Ethernet

GPIO

general-purpose input output

HFLASH

HYPERFLASH™

HRAM

hyper random-access memory

Glossary

I/O

input output

I2C

inter-integrated circuit

I2S

inter-IC sound

IC

integrated circuit

IDE

integrated development environment

LDO

low dropout voltage regulator

LED

light-emitting diode

LIN

Local Interconnect Network

LPO

low power oscillator

MCU

microcontroller unit

PC

personal computer

PMIC

power management integrated circuits

POT

potentiometer

QSPI

quad serial peripheral interface

SCB

serial communication block

SDK

software development kit

SMIF

Serial Memory Interface

SPI

Serial Peripheral Interface

Glossary

SRAM

static random-access memory

SWD

Serial Wire Debug

T2G

TRAVEO™ 2nd Generation

TP

test point

Revision history**Revision history**

Document revision	Date	Description of changes
**	2023-07-20	Initial release
*A	2023-10-19	Added a note about schematics. Fixed pinout (Figure 3) and fixed schematics
*B	2024-06-14	Updated the template Added content for the kit KIT_T2G-B-H_LITE rev. 01.

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