

# KIT\_A3G\_TC4D7\_LITE AURIX™ lite kit user guide

## About this document

### Scope and purpose

This user guide provides detailed instructions for using the KIT\_A3G\_TC4D7\_LITE, a low-cost evaluation kit based on the TC4D7 device from the AURIX™ third-generation microcontroller family. It highlights the features and functions of the KIT\_A3G\_TC4D7\_LITE and includes comprehensive information about the available interfaces as well as the operation of all hardware components.

**Note:** *This user manual applies to KIT\_A3G\_TC4D7\_LITE version 2.x.*

### Intended audience

This document is designed for software and hardware engineers evaluating the TC4D7 device from the AURIX™ third-generation microcontroller family. It provides a comprehensive guide to the features and applications of the device, offering essential insights and practical guidance for testing software and developing hardware designs.

### Evaluation board

This board is to be used during the design-in process for evaluating and measuring characteristic curves, and for checking datasheet specifications.

**Note:** *PCB and auxiliary circuits are NOT optimized for final customer design.*

---

**Important notice****Important notice**

**“Evaluation Boards and Reference Boards” shall mean products embedded on a printed circuit board (PCB) for demonstration and/or evaluation purposes, which include, without limitation, demonstration, reference and evaluation boards, kits and design (collectively referred to as “Reference Board”).**

**Environmental conditions have been considered in the design of the Evaluation Boards and Reference Boards provided by Infineon Technologies. The design of the Evaluation Boards and Reference Boards has been tested by Infineon Technologies only as described in this document. The design is not qualified in terms of safety requirements, manufacturing and operation over the entire operating temperature range or lifetime.**

**The Evaluation Boards and Reference Boards provided by Infineon Technologies are subject to functional testing only under typical load conditions. Evaluation Boards and Reference Boards are not subject to the same procedures as regular products regarding returned material analysis (RMA), process change notification (PCN) and product discontinuation (PD).**

**Evaluation Boards and Reference Boards are not commercialized products, and are solely intended for evaluation and testing purposes. In particular, they shall not be used for reliability testing or production. The Evaluation Boards and Reference Boards may therefore not comply with CE or similar standards (including but not limited to the EMC Directive 2004/EC/108 and the EMC Act) and may not fulfill other requirements of the country in which they are operated by the customer. The customer shall ensure that all Evaluation Boards and Reference Boards will be handled in a way which is compliant with the relevant requirements and standards of the country in which they are operated.**

**The Evaluation Boards and Reference Boards as well as the information provided in this document are addressed only to qualified and skilled technical staff, for laboratory usage, and shall be used and managed according to the terms and conditions set forth in this document and in other related documentation supplied with the respective Evaluation Board or Reference Board.**

**It is the responsibility of the customer’s technical departments to evaluate the suitability of the Evaluation Boards and Reference Boards for the intended application, and to evaluate the completeness and correctness of the information provided in this document with respect to such application.**

**The customer is obliged to ensure that the use of the Evaluation Boards and Reference Boards does not cause any harm to persons or third party property.**

**The Evaluation Boards and Reference Boards and any information in this document is provided "as is" and Infineon Technologies disclaims any warranties, express or implied, including but not limited to warranties of non-infringement of third party rights and implied warranties of fitness for any purpose, or for merchantability.**

**Infineon Technologies shall not be responsible for any damages resulting from the use of the Evaluation Boards and Reference Boards and/or from any information provided in this document. The customer is obliged to defend, indemnify and hold Infineon Technologies harmless from and against any claims or damages arising out of or resulting from any use thereof.**

**Infineon Technologies reserves the right to modify this document and/or any information provided herein at any time without further notice.**

---

## Safety precautions

## Safety precautions

### Safety precautions

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

**Table 1**      **Safety precautions**

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Caution:</b> 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. |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

**Table of contents**
**Table of contents**

|          |                                                  |    |
|----------|--------------------------------------------------|----|
|          | <b>About this document</b> .....                 | 1  |
|          | <b>Important notice</b> .....                    | 2  |
|          | <b>Safety precautions</b> .....                  | 3  |
|          | <b>Table of contents</b> .....                   | 4  |
| <b>1</b> | <b>Introduction</b> .....                        | 5  |
| 1.1      | Block diagram .....                              | 5  |
| <b>2</b> | <b>Hardware description</b> .....                | 6  |
| 2.1      | Power supply .....                               | 8  |
| 2.2      | User push buttons, LEDs, and Potentiometer ..... | 9  |
| 2.3      | Debugging and onboard miniWiggler .....          | 9  |
| 2.3.1    | USB-C connector .....                            | 9  |
| 2.3.2    | Serial connection to the PC .....                | 9  |
| 2.3.3    | miniWiggler JDS .....                            | 10 |
| 2.4      | Reset .....                                      | 10 |
| 2.5      | CAN transceiver .....                            | 10 |
| 2.6      | I2C EEPROM .....                                 | 11 |
| 2.7      | Ethernet .....                                   | 11 |
| 2.8      | Optional Infineon SEMPER™ (Secure) Flash .....   | 12 |
| 2.9      | Optional F-RAM .....                             | 12 |
| <b>3</b> | <b>Configuration</b> .....                       | 12 |
| 3.1      | Boot mode .....                                  | 12 |
| 3.2      | Config signals .....                             | 13 |
| 3.3      | Optional resistors .....                         | 13 |
| <b>4</b> | <b>Connector pin assignment</b> .....            | 14 |
| 4.1      | Pinout of X1 and X2 connectors .....             | 14 |
| 4.2      | Shield2Go and mikroBUS pinout .....              | 15 |
| 4.3      | Connectors compatible with Arduino .....         | 16 |
| 4.4      | Infineon DAP debug connector (10-pin) .....      | 18 |
| <b>5</b> | <b>Schematics and placement</b> .....            | 20 |
| <b>6</b> | <b>Bill of materials</b> .....                   | 25 |
|          | <b>Revision history</b> .....                    | 40 |
|          | <b>Disclaimer</b> .....                          | 41 |

## 1 Introduction

### 1 Introduction

This document provides an overview of the features and hardware details of the KIT\_A3G\_TC4D7\_LITE development kit, which is equipped with a 32-bit single-chip AURIX™ TriCore™-based microcontroller, the TC4D7x, from Infineon. The kit is supported on Infineon's Eclipse-based Integrated Development Environment (IDE), AURIX™ Development Studio.

The AURIX™ Development Studio is a comprehensive development platform that integrates an advanced C-compiler, multi-core debugger, and Infineon's low-level driver (iLLD). It offers unrestricted access with no time or code-size limitations, allowing seamless application code editing, compiling, and debugging.

[Table 2](#) outlines the key specifications of the KIT\_A3G\_TC4D7\_LITE development board.

**Table 2 Board specifications overview**

|                  |                                                                                                                                                                                                                                                                                                                                                                  |                       |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| CPU core AURIX™  | Manufacturer order number                                                                                                                                                                                                                                                                                                                                        | SAK-TC4D7XP-20MF500MC |
| Board dimensions | 66.0 x 131.0 mm                                                                                                                                                                                                                                                                                                                                                  |                       |
| Power            | <ul style="list-style-type: none"> <li>Onboard miniWiggler USB-C interface</li> <li>External power supply: 5 V–16 V (recommended range: 7 V–14 V)</li> </ul>                                                                                                                                                                                                     |                       |
| Connectors       | <ul style="list-style-type: none"> <li>Most AURIX™ pins accessible through expansion connectors (X1, X2)</li> <li>Two Infineon Shield2Go connectors</li> <li>Arduino-compatible connectors for 3.3 V Arduino shields</li> <li>mikroBUS connector</li> <li>USB-C connector</li> <li>DAP debug connector</li> <li>CAN connector</li> <li>RJ45 connector</li> </ul> |                       |
| Others           | <ul style="list-style-type: none"> <li>CAN transceiver (TLE9371VSJ) from Infineon</li> <li>Low power 10/100 Mbps Ethernet physical layer transceiver (DP83825I) from Texas Instruments</li> <li>One user push-button and two user LEDs</li> <li>Reset push-button</li> <li>Potentiometer (250 kΩ) for variable analog input</li> </ul>                           |                       |

**Note:** These boards are not optimized for cost or size and are not intended to serve as reference designs.

### 1.1 Block diagram

[Figure 1](#) shows the main components of the KIT\_A3G\_TC4D7\_LITE board and their interconnections.

## 2 Hardware description

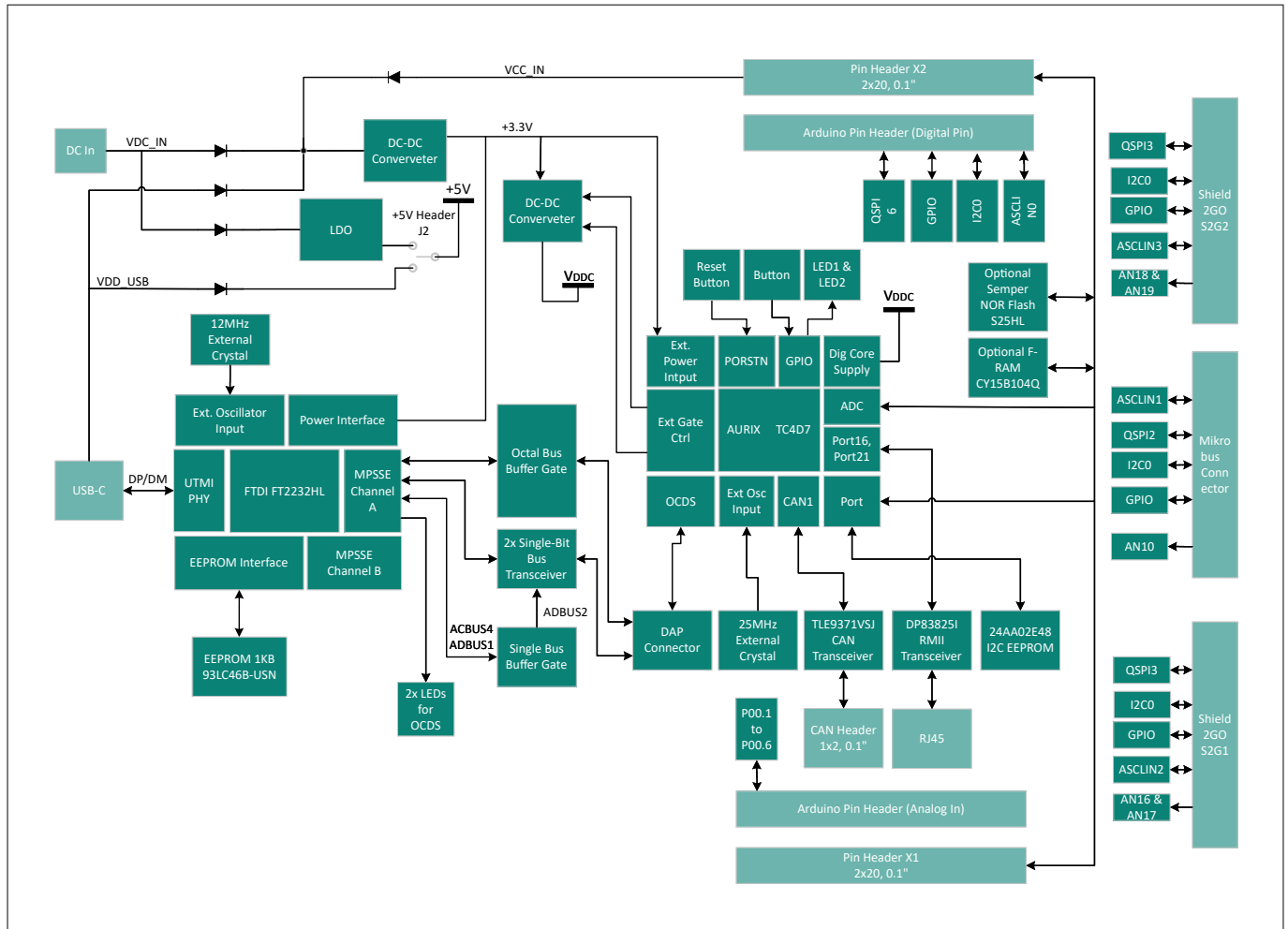


**Figure 1** Block diagram of the KIT\_A3G\_TC4D7\_LITE board

## 2 Hardware description

The following chapters provide a detailed description of the board hardware and its usage. The various components of the kit are shown in [Figure 2](#) and [Figure 3](#).

## 2 Hardware description

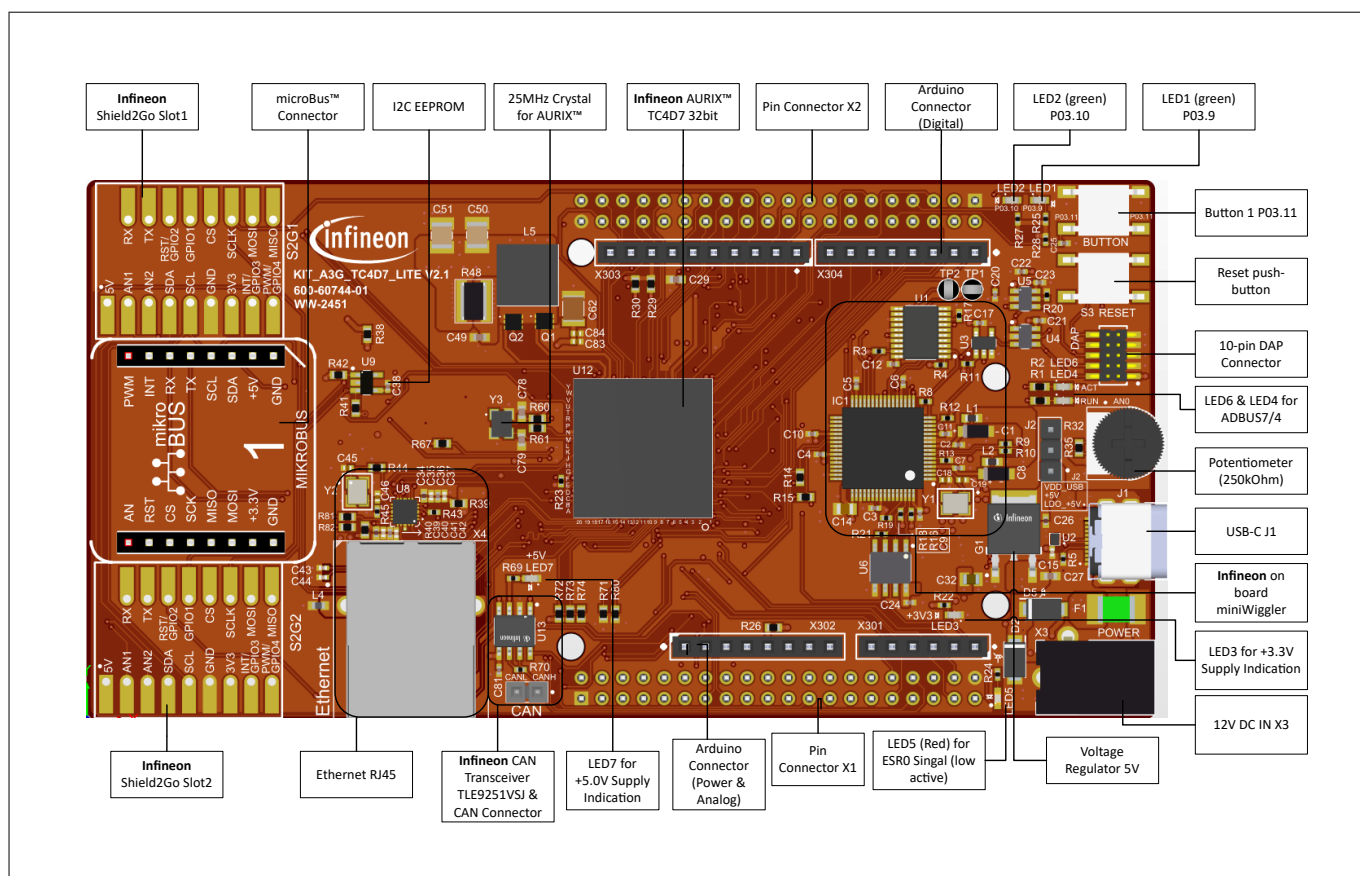


**Figure 2** Front view of the KIT\_A3G\_TC4D7\_LITE board

## 2 Hardware description

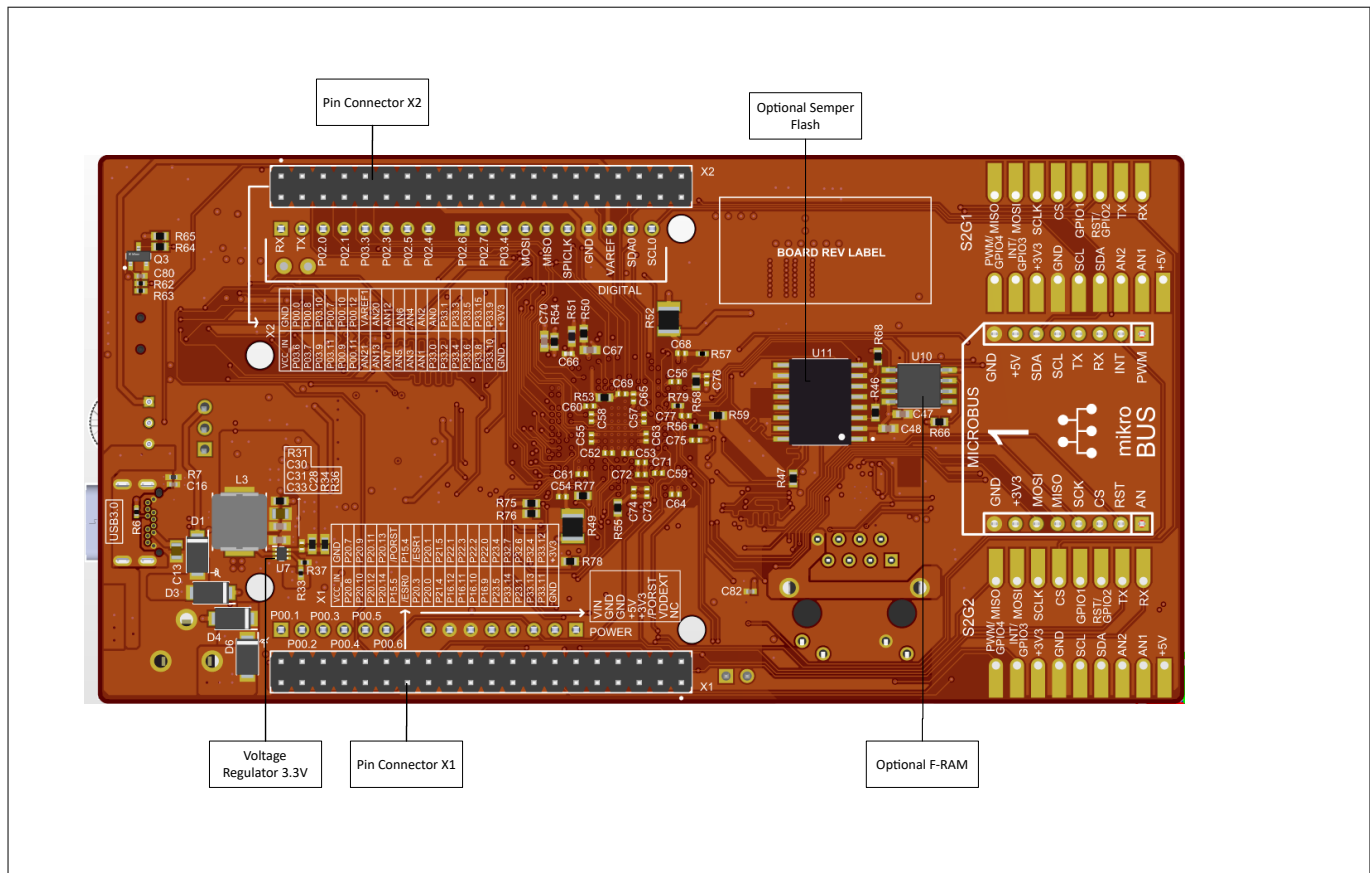


**Figure 3** Rear view of the KIT\_A3G\_TC4D7\_LITE board

### 2.1 Power supply

The KIT\_A3G\_TC4D7\_LITE requires an external DC power supply, which can be provided through the DC plug X3 (recommended voltage range: +7 V to +14 V) or the USB-C plug J1 (+5 V). The green power LED indicators, LED3 and LED4, show the presence of the 3.3 V and 5.0 V supply voltages.

For the DC plug X3, use a female DC supply plug with an outer diameter of 5.5 mm and an inner diameter of 2.1 mm or 2.5 mm. Ensure that the inner contact is positive, and the outer contact is ground.

When the board is powered via the USB-C plug J1, the input voltage to the U7 +3.3 V buck converter is slightly less than 5 V (approximately 4.5 V) due to the protection provided by the Schottky diode (D3). It is possible to use both X3 and J1 simultaneously. The power source priority is as follows:

- If the voltage on X3 exceeds +7 V, the board is powered via X3
- If the voltage on X3 is less than +5.5 V, the board is powered via J1
- Between +5.5 V and +7 V on X3, the board is powered by both X3 and J1 together

For the 5 V supply, the source can be selected between the 5 V from the USB plug J1 or the LDO output G1 (powered via X3) using jumper J2.

If the board is powered via the USB-C plug J1 and/or the DC plug X3, do not apply an additional power supply to any of the power pins (VDDEXT, +5 V, +3.3 V) on the pin headers X1, X2, the Arduino power header X302, the Shield2GO slots, or the mikroBUS connectors. This is because there is no protection against reverse current flowing into an external power supply. These power pins are designed to supply power to external circuits and should only be used as outputs.

## 2 Hardware description

### 2.2 User push buttons, LEDs, and Potentiometer

The KIT\_A3G\_TC4D7\_LITE is equipped with a user push-button and a reset push-button, complemented by two LEDs and a potentiometer. Additionally, LED5 serves to indicate the reset state of the device via ESR0 (Emergency Service Request). LED4 and LED6 provide visual feedback on activities through the onboard miniWiggler.

**Table 3** AURIX™ pin mapping for user LEDs

| Name | AURIX™ pin | Color | Active                        |
|------|------------|-------|-------------------------------|
| LED1 | P03.9      | Green | Low-active (pull against GND) |
| LED2 | P03.10     | Green | Low-active (pull against GND) |
| LED5 | ESR0       | Red   | Low-active (pull against GND) |

**Table 4** miniWiggler pin mapping for user LEDs

| Name | AURIX™ Pin     | Color | Active                        |
|------|----------------|-------|-------------------------------|
| LED4 | ADBUS4 (ACTIV) | Green | Low-active (pull against GND) |
| LED6 | ADBUS7 (RUN)   | Green | Low-active (pull against GND) |

**Table 5** AURIX™ push buttons and potentiometer

| Name   | AURIX™ pin | Active                        |
|--------|------------|-------------------------------|
| Button | P03.11     | Low-active (pull against GND) |
| Reset  | /PORST     | Low-active (pull against GND) |
| R32    | AN0        | -                             |

**Note:** Desoldering resistor R35 enables AN0 for other functions but disables potentiometer functionality.

### 2.3 Debugging and onboard miniWiggler

The KIT\_A3G\_TC4D7\_LITE supports debugging through two channels:

- Onboard miniWiggler via USB-C J1
- 10-pin DAP connector

#### 2.3.1 USB-C connector

The USB-C connector connects the board to a PC. It allows powering the board, using ASCLIN0 as a serial connection via USB, and debugging through DAS.

**Note:** Before connecting the board to the PC, ensure that DAS software is installed on the PC.

The DAS installer is available on the DAS Tool Interface [webpage](#).

#### 2.3.2 Serial connection to the PC

When the kit is connected to a PC via USB for the first time, the required driver installs automatically, and a new COM port is created on the PC. This COM port facilitates communication with the board via ASCLIN0 (UART) or via ASCLIN11 if R14 and R15 are assembled.

## 2 Hardware description

By default, ASCLIN0 is assigned to P14.0 and P14.1 (for example, for the generic bootstrap loader). Since ASCLIN0 is also used for the Arduino pins, ASCLIN11 can be used as an alternative. In this case, ensure that P14.0 and P14.1 are not configured, and R14 and R15 are mounted.

### 2.3.3 miniWiggler JDS

The miniWiggler JDS is a low-cost debug interface that provides access to the device via DAP. Ensure that the latest version of DAS is installed on your PC. Debugging is performed through the DAS server 'UDAS.'

When the kit is connected to the PC and the DAS server is running, a successful connection is indicated by the green LED6 (ADBUS4). The status LED4 (ADBUS7, green) is controlled by the DAS server and is toggled on or off depending on the debugger (client) in use.

**Note:** Ensure that there is no connection or a tristated connection on the DAP connector when LED4 (indicating miniWiggler use) is on.

## 2.4 Reset

The power-on reset input pin (/PORST) of the AURIX™ family is a bi-directional input/output pin designed for triggering power-related resets externally. If the /PORST pin remains asserted after a power event, the reset is extended until it is internally deasserted. This does not replace the functional reset provided by the ESR pins. An internal pull-up resistor (2.2 kΩ) keeps the /PORST pin high during normal operation. A low signal at this pin triggers a warm power-on reset. In the case of an internal MCU reset, the /PORST pin drives a low signal.

A reset signal can be issued through the following sources:

- Onboard reset push-button (RESET)
- Onboard miniWiggler via IC FT2232HL (IC1.27 – ACBUS1)
- Onboard DAP connector (DAP.10)
- Arduino power header (X302.3, /PORST)
- Pin header X1 (X1.30, /PORST)

An internal AURIX™ circuit ensures a safe power-on reset. The KIT\_A3G\_TC4D7\_LITE does not require any additional external components to generate a reset signal during power-up. For further details, refer to the datasheet or user manual of the assembled AURIX™ device.

## 2.5 CAN transceiver

The KIT\_A3G\_TC4D7\_LITE provides a CAN interface through the CAN connector. TLE9371VSJ is Infineon's high-speed CAN transceiver, designed for use in HS-CAN networks for both automotive and industrial applications. It complies with the ISO 11898-2 (2016) physical layer specification and the SAE standards J1939 and J2284.

The CAN bus signals (CANH, CANL) are terminated with a 120 Ω resistor. The transceiver is connected to the CAN node 1 of the TriCore™ device. By default, the transceiver operates in standby mode. To switch it to normal operating mode, the CAN\_STB pin must be driven low by the CPU.

See [Table 6](#) for details on using the CAN pins.

**Table 6** CAN signals and AURIX™ pin mappings

| Signal | Pin assignment for CAN pin header | AURIX™ pin function |
|--------|-----------------------------------|---------------------|
| CANH   | 1                                 | -                   |
| CANL   | 2                                 | -                   |

(table continues...)

## 2 Hardware description

**Table 6** (continued) CAN signals and AURIX™ pin mappings

| Signal  | Pin assignment for CAN pin header | AURIX™ pin function                  |
|---------|-----------------------------------|--------------------------------------|
| CAN_TX  | -                                 | P01.3, CAN01_TXD (CAN node 1 output) |
| CAN_RX  | -                                 | P01.4, CAN01_RXDC (CAN node 1 input) |
| CAN_STB | -                                 | P03.5, P03.5 OUT (GPIO)              |

### 2.6 I2C EEPROM

The KIT\_A3G\_TC4D7\_LITE provides a 2 Kb I2C serial EEPROM with a pre-programmed EUI-48 MAC ID (Microchip 24AA02E48). The slave address of this EEPROM is fixed at 0x50.

The upper half of the memory array (80h–FFh) is permanently write-protected. Write operations to this address range are blocked, but read operations remain unaffected. This upper half contains the pre-programmed EUI-48 node address, which can be used as the MAC ID for Ethernet.

The remaining 128 bytes of memory are writable and available for user applications.

**Table 7** AURIX™ pin mapping for I2C EEPROM signals

| Signal | AURIX™ pins and its corresponding functions |
|--------|---------------------------------------------|
| SCL    | P13.1, I2C0_SCL                             |
| SDA    | P13.2, I2C0_SDA                             |

### 2.7 Ethernet

The KIT\_A3G\_TC4D7\_LITE provides an RJ45 connector (X4) for standard twisted-pair Ethernet connections. The board uses the DP83825I low power 10/100 Mbps Ethernet physical layer transceiver (PHY) from Texas Instruments as the physical layer device. For more details about the Ethernet module, see the AURIX™ user manual, and for information about the PHY, see the [DP83825I](#) datasheet.

The AURIX™ Ethernet MAC and the PHY are connected via the RMII interface.

For details on using the Ethernet signals, see [Table 8](#).

**Table 8** AURIX™ pin mapping for Ethernet signals

| DP83825I PHY signal | AURIX™ pins and its corresponding functions                               |
|---------------------|---------------------------------------------------------------------------|
| MDIO                | P21.3, GETH0_PX_MDIOD/GETH0_PX_MDIO3 (PortX MDIO input/Port0 MDIO output) |
| MDC                 | P21.2, GETH0_P0_MDC (Port0 MDIO Clock)                                    |
| TX_EN               | P16.13, GETH0_P0_RMIIC_TX_EN (GETH PortX RMII transmit enable)            |
| TX_D0               | P16.6, GETH0_P0_RMIIC_TXD0 (GETH PortX RMII transmit data bit 0)          |
| TX_D1               | P16.8, GETH0_P0_RMIIC_TXD1 (GETH PortX RMII transmit data bit 1)          |
| CRS_DV              | P16.1, GETH0_P0_CRSDVC (Port0 RMII Carrier Sense and Receive Data Valid)  |
| RX_D0               | P16.4, GETH0_P0_RXD0D (Port0 RMII receive data bit 0)                     |
| RX_D1               | P16.0, GETH0_P0_RXD1D (Port0 RMII receive data bit 1)                     |
| 50 MHz Out          | P16.2, GETH0_P0_REFCLKD (Port0 Reference Clock input for RMII)            |

### 3 Configuration

#### 2.8 Optional Infineon SEMPER™ (Secure) Flash

The KIT\_A3G\_TC4D7\_LITE provides the option to assemble an external flash. Supported devices include the Infineon SEMPER™ NOR flash device family (S25HL) and the Infineon SEMPER™ Secure NOR flash device family (S35HL) in an SOIC-16 package. For more information about the flash devices, see [SEMPER™ NOR Flash](#).

If an external flash is assembled, ensure that the ceramic capacitor C48 (100 nF, size 0603) and the resistors R46 and R47 (0 Ω, size 0603) are also assembled.

**Table 9** AURIX™ pin mapping for SEMPER™ Flash signals

| Signal | AURIX™ pin and corresponding function           |
|--------|-------------------------------------------------|
| CS#    | P23.1, QSPI4_SLSO6 (Master slave select output) |
| SCK    | P22.3, QSPI4_SCLK_F (Master SPI clock output)   |
| MOSI   | P22.0, QSPI4_MTSR_F (Master SPI data output)    |
| MISO   | P22.1, QSPI4_MRSTB_F (Master SPI data input)    |
| INT#   | P20.6, GPIO                                     |

#### 2.9 Optional F-RAM

The KIT\_A3G\_TC4D7\_LITE provides the option to assemble an external serial F-RAM. Supported devices include the Infineon F-RAM FM25VN10-G and the Infineon F-RAM Series CY15B in an SOIC-8 package (SO8-150). For more information about the F-RAM devices, see [F-RAM \(Ferroelectric RAM\)](#).

If an F-RAM is assembled, ensure that the ceramic capacitor C47 (100 nF, size 0603) and the resistors R68 and R66 (10 kΩ, size 0603) are also assembled.

The F-RAM is connected to pins P22.0, P22.1, and P22.3 (QSPI4). Pin P23.5 (slave select output 4 of QSPI4) is used as the slave select.

**Table 10** AURIX™ pin mapping for F-RAM signals

| Signal | AURIX™ pin and corresponding function             |
|--------|---------------------------------------------------|
| CS#    | P23.5, QSPI4_SLSO4_F (Master slave select output) |
| SCK    | P22.3, QSPI4_SCLK_F (Master SPI clock output)     |
| MOSI   | P22.0, QSPI4_MTSR_F (Master SPI data output)      |
| MISO   | P22.1, QSPI4_MRSTB_F (Master SPI data input)      |

## 3 Configuration

### 3.1 Boot mode

**Table 11** User startup modes

| HWCFG[3..4] | Boot type                                                                        | R73 | R74 | R75 | R76 |
|-------------|----------------------------------------------------------------------------------|-----|-----|-----|-----|
| 00          | Generic BSL P14.0/1 (CAN/ASC)                                                    | NA  | A   | NA  | A   |
| 10          | ASC BSL P15.2/3                                                                  | A   | NA  | NA  | A   |
| X1          | Start from BHMD. If BHMD is not programmed, fall back to HARR or the generic BSL | X   | X   | A   | NA  |

### 3 Configuration

**Note:** 'A' indicates assembled, 'NA' indicates not assembled, and 'x' represents the don't-care states.

## 3.2 Config signals

**Table 12** Config signals

| Short name | Description                               | Comment                                                                                                                                                                                            |
|------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P14.5      | HWCFG[1] (EVRCON/EVRCOFF)                 | Resistor R72 (4.7 KΩ) pulls HWCFG[1] high, and resistor R71 (4.7 KΩ) pulls HWCFG[2] low (assembled initially). As a result, EVRCON with VDDEXT = 3.3 V (where 3.3 V ≤ VDDEXTDC ≤ 5 V) is selected. |
| P14.2      | HWCFG[2] (EVRCON/EVRCOFF)                 |                                                                                                                                                                                                    |
| P14.3      | HWCFG[3] (See <a href="#">Boot mode</a> ) | -                                                                                                                                                                                                  |
| P10.5      | HWCFG[4] (See <a href="#">Boot mode</a> ) | -                                                                                                                                                                                                  |
| P14.4      | HWCFG[6] (Default Pad state)              | Resistor R80 pulls HWCFG[6] low (assembled initially). As a result, all GPIO pins are in a tri-state configuration after reset.                                                                    |

## 3.3 Optional resistors

Some resistors or bridges enable, disable, or modify the functions of specific signals, as shown in [Table 13](#). To disable a signal, the corresponding resistor must be removed. To enable a signal, the corresponding resistor must be assembled.

For example, desoldering the initially assembled resistor R35 disables the potentiometer and the analog signal AN0 of the AURIX™, making it available for other purposes.

**Table 13** Signal mapping of the optional resistors

| Resistor | Res. | Assembled | Signal       | Size (Imperial) | Comment                                                             |
|----------|------|-----------|--------------|-----------------|---------------------------------------------------------------------|
| R35      | 0 Ω  | Yes       | AN0          | 0603            | Disassemble to disable the potentiometer (R32)                      |
| R61      | 0 Ω  | Yes       | XTAL2        | 0603            | Use a serial resistor to reduce oscillator amplitude, if needed.    |
| R38      | 0 Ω  | No        | +5 V         | 0603            | Assemble to connect 5 V to the mikroBUS and Shield2Go connectors    |
| R14      | 0 Ω  | No        | P14.1, P21.1 | 0603            | Assemble to use ASCLIN11 (P21.1) instead of ASCLIN0 (P14.1) via USB |
| R15      | 0 Ω  | No        | P14.0, P21.0 | 0603            | Assemble to use ASCLIN11 (P21.0) instead of ASCLIN0 (P14.0) via USB |

## 4 Connector pin assignment

### 4 Connector pin assignment

#### 4.1 Pinout of X1 and X2 connectors

The pin headers X1 and X2 can be used to extend the evaluation board or perform measurements on the AURIX™ TC4D7. The available GPIOs and signals at these pin headers are shown in [Table 14](#) and [Table 15](#). The pin table is printed on the bottom side of the PCB.

**Table 14** X1 pins

| Header pin | Pin description | Header pin | Pin description |
|------------|-----------------|------------|-----------------|
| X1.1       | GND             | X1.2       | +3.3 V          |
| X1.3       | P33.11          | X1.4       | P33.12          |
| X1.5       | P33.13          | X1.6       | P32.4           |
| X1.7       | P23.1           | X1.8       | P32.6           |
| X1.9       | P33.14          | X1.10      | P32.7           |
| X1.11      | P23.5           | X1.12      | RST_S2G1        |
| X1.13      | P16.9           | X1.14      | P22.0           |
| X1.15      | P16.10          | X1.16      | P22.2           |
| X1.17      | P16.11          | X1.18      | P22.3           |
| X1.19      | P16.12          | X1.20      | P22.1           |
| X1.21      | P21.4           | X1.22      | P21.5           |
| X1.23      | TXD_S2G2        | X1.24      | P20.1           |
| X1.25      | RXD_S2G2        | X1.26      | /ESR1           |
| X1.27      | /ESR0           | X1.28      | P15.4           |
| X1.29      | P15.5           | X1.30      | /PORST          |
| X1.31      | P20.14          | X1.32      | P20.13          |
| X1.33      | P20.12          | X1.34      | P20.11          |
| X1.35      | P20.10          | X1.36      | P20.9           |
| X1.37      | P20.8           | X1.38      | P20.7           |
| X1.39      | VCC_IN          | X1.40      | GND             |

**Table 15** X2 pins

| Header pin | Pin description | Header pin | Pin description |
|------------|-----------------|------------|-----------------|
| X2.1       | GND             | X2.2       | VCC_IN          |
| X2.3       | P00.0           | X2.4       | P03.6           |
| X2.5       | CS_S2G2         | X2.6       | P03.7           |
| X2.7       | P03.10          | X2.8       | P03.9           |
| X2.9       | P00.7           | X2.10      | P03.11          |
| X2.11      | P00.10          | X2.12      | P00.9           |

(table continues...)

## 4 Connector pin assignment

**Table 15** (continued) X2 pins

| Header pin | Pin description | Header pin | Pin description |
|------------|-----------------|------------|-----------------|
| X2.13      | P00.12          | X2.14      | P00.11          |
| X2.15      | VAREF1          | X2.16      | AN21            |
| X2.17      | AN20            | X2.18      | AN13            |
| X2.19      | AN12            | X2.20      | AN7             |
| X2.21      | AN6             | X2.22      | AN5             |
| X2.23      | AN4             | X2.24      | AN3             |
| X2.25      | AN2             | X2.26      | AN1             |
| X2.27      | AN0             | X2.28      | P33.0           |
| X2.29      | P33.1           | X2.30      | P33.2           |
| X2.31      | P33.3           | X2.32      | P33.4           |
| X2.33      | P33.5           | X2.34      | P33.6           |
| X2.35      | P33.15          | X2.36      | P33.8           |
| X2.37      | P33.9           | X2.38      | P33.10          |
| X2.39      | +3V3            | X2.40      | GND             |

### 4.2 Shield2Go and mikroBUS pinout

The pin connectors for Shield2Go connectors 1 and 2, as well as mikroBUS, can be used to extend the evaluation board or perform measurements on the AURIX™ TC4D7\_COM. The table below lists the available signals at these connectors. The pin table is also printed on the top side of the KIT\_A3G\_TC4D7\_LITE.

**Table 16** Shield2Go connector 1

| S2G1 pins | Pin description | MCU port pin | S2G1 pins | Pin description | MCU port pin |
|-----------|-----------------|--------------|-----------|-----------------|--------------|
| 1         | +5 V            | -            | -         | -               | -            |
| 2         | AN1             | AN16         | 10        | RX              | P02.10       |
| 3         | AN2             | AN17         | 11        | TX              | P02.9        |
| 4         | SDA             | P13.2        | 12        | RST/GPIO2       | P23.4        |
| 5         | SCL             | P13.1        | 13        | GPIO1           | P32.2        |
| 6         | GND             | -            | 14        | CS              | P02.2        |
| 7         | +3V3            | -            | 15        | SCLK            | P01.7        |
| 8         | INT/GPIO3       | P10.3        | 16        | MOSI            | P01.6        |
| 9         | PWM/GPIO4       | P14.9        | 17        | MISO            | P01.5        |

**Table 17** Shield2Go connector 2

| S2G2 pins | Pin description | MCU port pin | S2G2 pins | Pin description | MCU port pin |
|-----------|-----------------|--------------|-----------|-----------------|--------------|
| 1         | +5 V            | -            | -         | -               | -            |

(table continues...)

## 4 Connector pin assignment

**Table 17** (continued) Shield2Go connector 2

| S2G2 pins | Pin description | MCU port pin | S2G2 pins | Pin description | MCU port pin |
|-----------|-----------------|--------------|-----------|-----------------|--------------|
| 2         | AN1             | AN18         | 10        | RX              | P20.3        |
| 3         | AN2             | AN19         | 11        | TX              | P20.0        |
| 4         | SDA             | P13.2        | 12        | RST/GPIO2       | P02.11       |
| 5         | SCL             | P13.1        | 13        | GPIO1           | P32.5        |
| 6         | GND             | -            | 14        | CS              | P00.8        |
| 7         | +3V3            | -            | 15        | SCLK            | P01.7        |
| 8         | INT/GPIO3       | P10.8        | 16        | MOSI            | P01.6        |
| 9         | PWM/GPIO4       | P14.10       | 17        | MISO            | P01.5        |

**Table 18** mikroBUS connector

| mikroBUS pins | Pin description | MCU port pin | mikroBUS pins | Pin description | MCU port pin |
|---------------|-----------------|--------------|---------------|-----------------|--------------|
| 1             | AN              | AN10         | 16            | PWM             | P02.8        |
| 2             | RST             | P10.6        | 15            | INT             | P10.7        |
| 3             | CS              | P14.7        | 14            | RX              | P15.1        |
| 4             | SCK             | P15.8        | 13            | TX              | P15.0        |
| 5             | MISO            | P15.7        | 12            | SCL             | P13.1        |
| 6             | MOSI            | P15.6        | 11            | SDA             | P13.2        |
| 7             | +3.3 V          | -            | 10            | +5 V            | -            |
| 8             | GND             | -            | 9             | GND             | -            |

### 4.3 Connectors compatible with Arduino

The mapping of GPIOs and AURIX™ pin functions to Arduino-compatible functions is provided in [Table 19](#). The Arduino-compatible connector supports the following:

- SPI interface
- I<sup>2</sup>C interface
- UART interface
- PWM signal outputs
- ADC input
- Interrupt input

**Table 19** Arduino header pin details

| Header pin  | Pin description | MCU port pins and its corresponding functions |
|-------------|-----------------|-----------------------------------------------|
| <b>X302</b> |                 |                                               |
| 1           | NC              | -                                             |
| 2           | IOREF           | -                                             |
| 3           | RESET           | /PORST                                        |

(table continues...)

#### 4 Connector pin assignment

**Table 19** (continued) Arduino header pin details

| Header pin  | Pin description | MCU port pins and its corresponding functions |
|-------------|-----------------|-----------------------------------------------|
| 4           | +3V3            | -                                             |
| 5           | +5 V            | -                                             |
| 6           | GND             | -                                             |
| 7           | GND             | -                                             |
| 8           | VIN             | -                                             |
| <b>X301</b> |                 |                                               |
| 1           | ADC0            | P00.1, ADC_TMADC2CH11                         |
| 2           | ADC1            | P00.2, ADC_TMADC2CH10                         |
| 3           | ADC2            | P00.3, ADC_TMADC2CH9                          |
| 4           | ADC3            | P00.4, ADC_TMADC2CH8                          |
| 5           | ADC4            | P00.5, ADC_TMADC2CH7                          |
| 6           | ADC5            | P00.6, ADC_TMADC2CH6                          |
| <b>X304</b> |                 |                                               |
| 1           | RX              | P15.3, ASCLIN0_ARXB                           |
| 2           | TX              | P15.2, ASCLIN0_ATX                            |
| 3           | PWM_2           | P02.0, EGTM_TOUT0_F                           |
| 4           | PWM_3           | P02.1, EGTM_TOUT1_F                           |
| 5           | PMW_4           | P03.3, EGTM_TOUT274                           |
| 6           | PWM_5           | P02.3, EGTM_TOUT3_F                           |
| 7           | PWM_6           | P02.5, EGTM_TOUT5_F                           |
| 8           | PWM_7           | P02.4, EGTM_TOUT4_F                           |
| <b>X303</b> |                 |                                               |
| 1           | PWM_8           | P02.6, EGTM_TOUT6_F                           |
| 2           | PWM_9           | P02.7, EGTM_TOUT7_F                           |
| 3           | SS/PWM_10       | P03.4, QSPI3_SLSO0/EGTM_TOUT275               |
| 4           | MOSI            | P03.2, QSPI6_MTSR                             |
| 5           | MISO            | P03.0, QSPI6_MRSTC                            |
| 6           | SPICLK          | P03.1, QSPI6_SCLKC                            |
| 7           | GND             | -                                             |
| 8           | AREF            | VAREF                                         |
| 9           | SDA0            | P13.2, I2C0_SDA/I2C_SDAB                      |
| 10          | SCL0            | P13.1, I2C0_SCL                               |

**Note:** The KIT\_A3G\_TC4D7\_LITE operates with 3.3 V logic levels. Therefore, boards that use 5 V logic levels are not compatible.

## 4 Connector pin assignment

### 4.4 Infineon DAP debug connector (10-pin)

Infineon's 10-pin device access port (DAP) debug connector is a two-wire tool access port designed for microcontrollers and similar devices. It supports robust, high-speed connections over long cables, making it suitable for automotive applications. The pin assignment for the DAP debug connector is shown [Table 20](#).

The board includes a DAP connector, which can be used to connect DAP hardware. When using this connector, ensure that the miniWiggler JDS is inactive (LED4 is off). For more details, see [AP2400314](#).

**Table 20 Pin assignment of the DAP debug connector**

| Pin | Name  | AURIX™ pin | Direction | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|-------|------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | VREF  | VEXT       | O         | The supply voltage from the target system must be sufficient to power the target side of the level shifters within the tool hardware at operating frequencies of up to 20 MHz DAP. The required supply current is approximately 5 mA, primarily due to signal switching. This current can be reduced by lowering the operating frequency and capacitance. For frequencies beyond 20 MHz, the tool hardware must power the level shifters from an alternate source, using this pin solely as a voltage reference. |
| 2   | DAP1  | TMS        | IO        | DAP: Data pin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|     | SPD   |            | IO        | SPD: Data pin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|     | UART  |            | IO        | Single-write UART: A serial communication interface (used for the Bootstrap Loader (BSL))                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3   | GND   | GND        | -         | Recommended pin for the signal return of DAP1 to ensure high-frequency impedance matching                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4   | DAP0  | TCK        | I         | DAP: Data clock                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|     | SUP   |            | I         | SPD: Optional user pin for feedback into the target system; otherwise, it is reserved                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5   | GND   | GND        | -         | Recommended pin for the signal return of DAP0 to ensure high-frequency impedance matching                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6   | DAP2  | P21.7      | IO        | DAP: Optional second data pin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|     | USER0 |            | IO/O      | Generic signal that can be used for unspecified functions                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

(table continues...)

#### 4 Connector pin assignment

**Table 20** (continued) Pin assignment of the DAP debug connector

| Pin | Name               | AURIX™ pin | Direction | Description                                                                                                                                                                                                                                                                                                                                                    |
|-----|--------------------|------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7   | KEY (GND in cable) | GND        | -         | If the recommended connector with a keying shroud is not used, this pin offers an alternative option to enforce polarization. In this case, the pin is removed from the target connector, and the associated jack in the cable connector is closed with a plastic pin, for example.                                                                            |
| 8   | DAP3               | P21.6      | IO        | DAP: Optional third data pin                                                                                                                                                                                                                                                                                                                                   |
|     | USER1              |            | IO/I      | Generic signal that can be used for non-specified functions                                                                                                                                                                                                                                                                                                    |
|     | (DAPEN)            |            | I         | Optional indicator showing that the tool is connected, which can be used to enable the DAP interface of the device.                                                                                                                                                                                                                                            |
| 10  | RESET              | /PORST     | IO        | Target reset signal: An open-drain, active-low signal that can be used bi-directionally to drive or sense the target reset signal. It is typically driven by the tool to reset the target system. The target system must provide a pull-up resistor to VREF on this signal to establish a logic high. The pull-up resistor must have a value of at least 1 kΩ. |

## 5 Schematics and placement

### 5 Schematics and placement

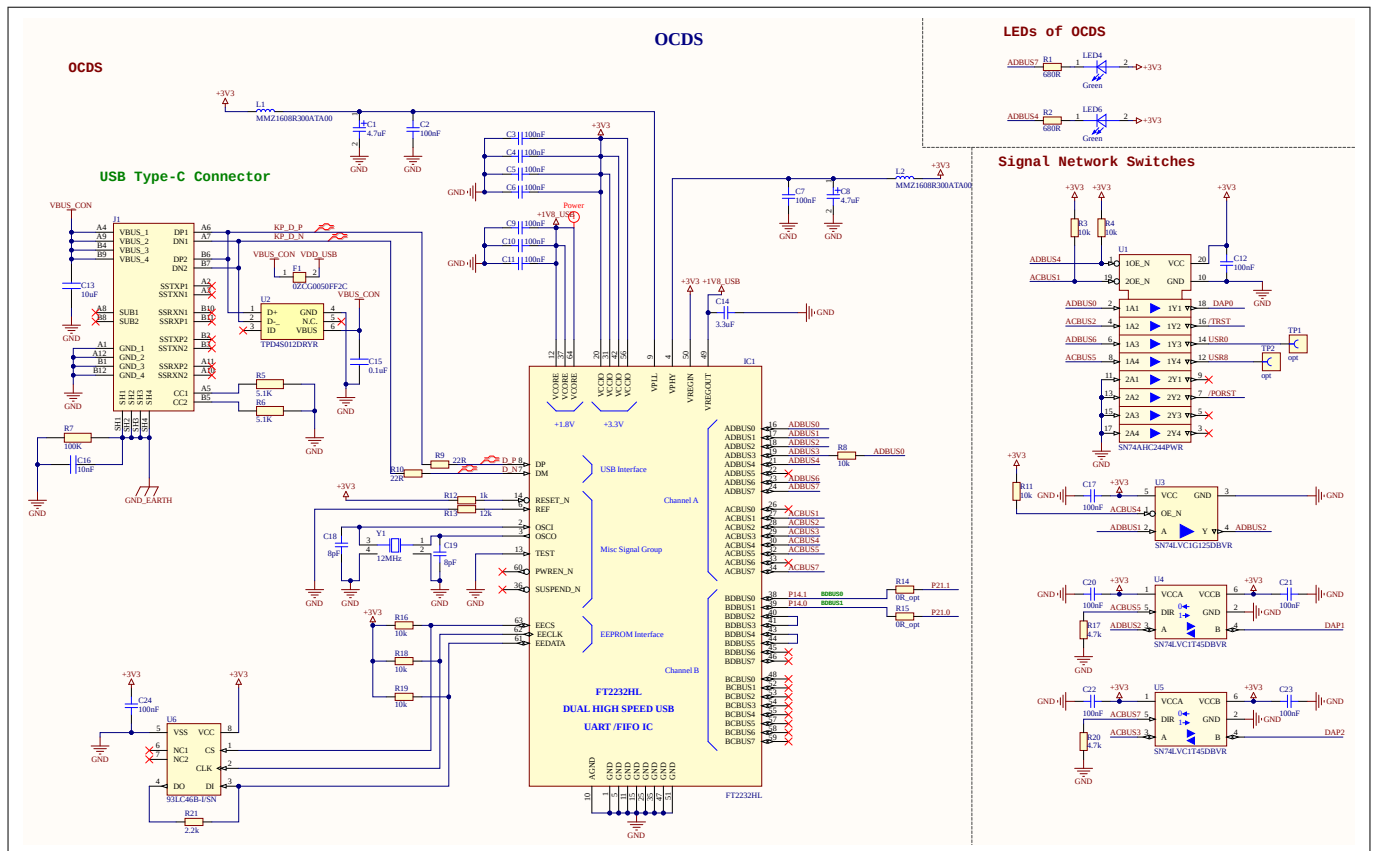


Figure 4 OCDS

## 5 Schematics and placement

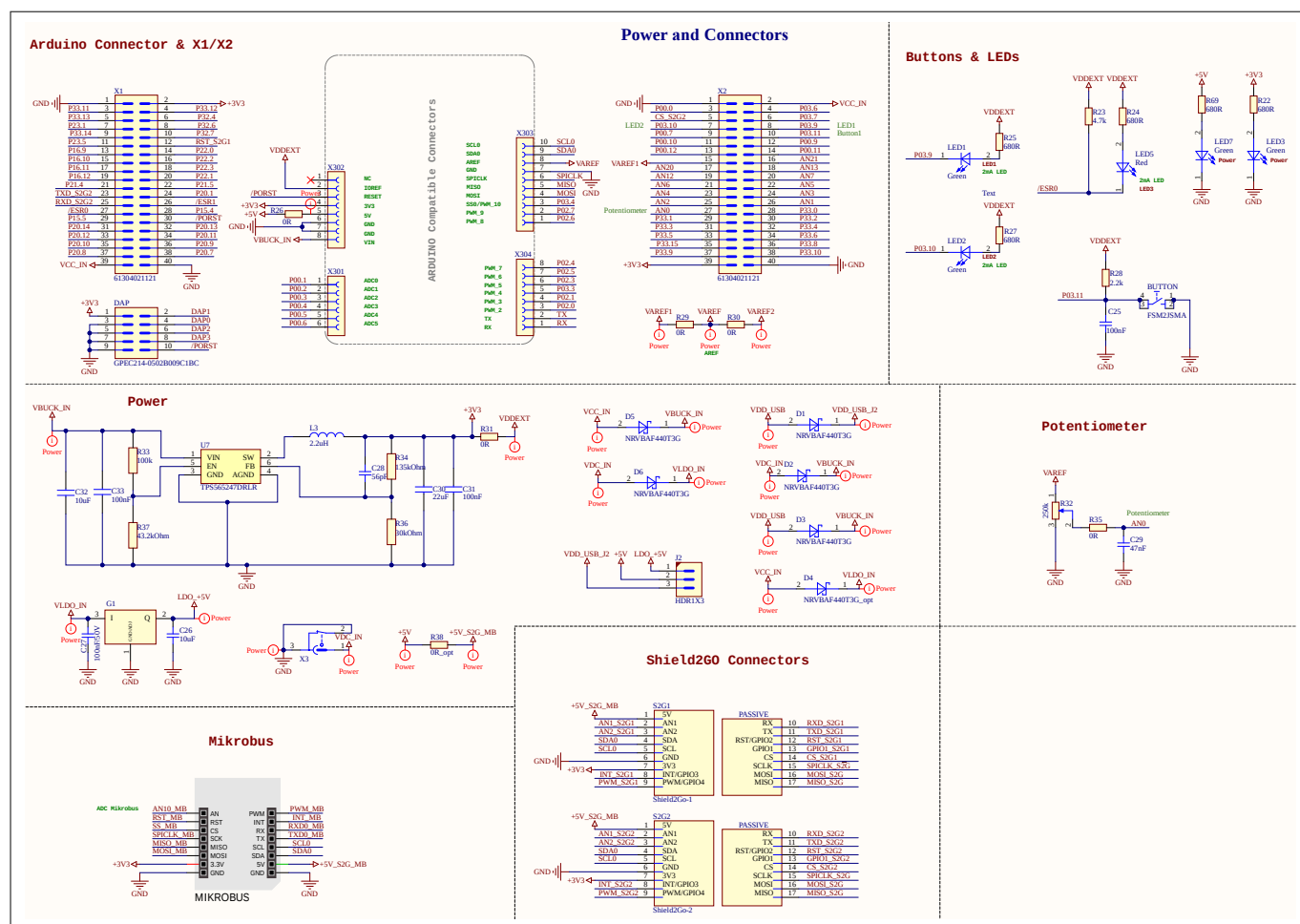


**Figure 5** Power supply and expansion connectors

**TC447 Power supply, Clock and Debug**

The diagram illustrates the power supply, clock, and debug circuitry for the TC447 device. The power supply section includes a detailed schematic of the power supply, clock, and debug circuitry. The clock section shows a 25MHz oscillator circuit. The debug section includes a JTAG interface circuit. A table on the right lists the pin connections for the TC447 device, categorized by power supply, clock, and debug signals.

| Pin | Signal | Pin  | Signal |
|-----|--------|------|--------|
| G0  | VSS    | L2   | VSS    |
| G1  | VSS    | L3   | VSS    |
| G2  | VSS    | L4   | VSS    |
| G3  | VSS    | L5   | VSS    |
| G4  | VSS    | L6   | VSS    |
| G5  | VSS    | L7   | VSS    |
| G6  | VSS    | L8   | VSS    |
| G7  | VSS    | L9   | VSS    |
| G8  | VSS    | L10  | VSS    |
| G9  | VSS    | L11  | VSS    |
| G10 | VSS    | L12  | VSS    |
| G11 | VSS    | L13  | VSS    |
| G12 | VSS    | L14  | VSS    |
| G13 | VSS    | L15  | VSS    |
| G14 | VSS    | L16  | VSS    |
| G15 | VSS    | L17  | VSS    |
| G16 | VSS    | L18  | VSS    |
| G17 | VSS    | L19  | VSS    |
| G18 | VSS    | L20  | VSS    |
| G19 | VSS    | L21  | VSS    |
| G20 | VSS    | L22  | VSS    |
| G21 | VSS    | L23  | VSS    |
| G22 | VSS    | L24  | VSS    |
| G23 | VSS    | L25  | VSS    |
| G24 | VSS    | L26  | VSS    |
| G25 | VSS    | L27  | VSS    |
| G26 | VSS    | L28  | VSS    |
| G27 | VSS    | L29  | VSS    |
| G28 | VSS    | L30  | VSS    |
| G29 | VSS    | L31  | VSS    |
| G30 | VSS    | L32  | VSS    |
| G31 | VSS    | L33  | VSS    |
| G32 | VSS    | L34  | VSS    |
| G33 | VSS    | L35  | VSS    |
| G34 | VSS    | L36  | VSS    |
| G35 | VSS    | L37  | VSS    |
| G36 | VSS    | L38  | VSS    |
| G37 | VSS    | L39  | VSS    |
| G38 | VSS    | L40  | VSS    |
| G39 | VSS    | L41  | VSS    |
| G40 | VSS    | L42  | VSS    |
| G41 | VSS    | L43  | VSS    |
| G42 | VSS    | L44  | VSS    |
| G43 | VSS    | L45  | VSS    |
| G44 | VSS    | L46  | VSS    |
| G45 | VSS    | L47  | VSS    |
| G46 | VSS    | L48  | VSS    |
| G47 | VSS    | L49  | VSS    |
| G48 | VSS    | L50  | VSS    |
| G49 | VSS    | L51  | VSS    |
| G50 | VSS    | L52  | VSS    |
| G51 | VSS    | L53  | VSS    |
| G52 | VSS    | L54  | VSS    |
| G53 | VSS    | L55  | VSS    |
| G54 | VSS    | L56  | VSS    |
| G55 | VSS    | L57  | VSS    |
| G56 | VSS    | L58  | VSS    |
| G57 | VSS    | L59  | VSS    |
| G58 | VSS    | L60  | VSS    |
| G59 | VSS    | L61  | VSS    |
| G60 | VSS    | L62  | VSS    |
| G61 | VSS    | L63  | VSS    |
| G62 | VSS    | L64  | VSS    |
| G63 | VSS    | L65  | VSS    |
| G64 | VSS    | L66  | VSS    |
| G65 | VSS    | L67  | VSS    |
| G66 | VSS    | L68  | VSS    |
| G67 | VSS    | L69  | VSS    |
| G68 | VSS    | L70  | VSS    |
| G69 | VSS    | L71  | VSS    |
| G70 | VSS    | L72  | VSS    |
| G71 | VSS    | L73  | VSS    |
| G72 | VSS    | L74  | VSS    |
| G73 | VSS    | L75  | VSS    |
| G74 | VSS    | L76  | VSS    |
| G75 | VSS    | L77  | VSS    |
| G76 | VSS    | L78  | VSS    |
| G77 | VSS    | L79  | VSS    |
| G78 | VSS    | L80  | VSS    |
| G79 | VSS    | L81  | VSS    |
| G80 | VSS    | L82  | VSS    |
| G81 | VSS    | L83  | VSS    |
| G82 | VSS    | L84  | VSS    |
| G83 | VSS    | L85  | VSS    |
| G84 | VSS    | L86  | VSS    |
| G85 | VSS    | L87  | VSS    |
| G86 | VSS    | L88  | VSS    |
| G87 | VSS    | L89  | VSS    |
| G88 | VSS    | L90  | VSS    |
| G89 | VSS    | L91  | VSS    |
| G90 | VSS    | L92  | VSS    |
| G91 | VSS    | L93  | VSS    |
| G92 | VSS    | L94  | VSS    |
| G93 | VSS    | L95  | VSS    |
| G94 | VSS    | L96  | VSS    |
| G95 | VSS    | L97  | VSS    |
| G96 | VSS    | L98  | VSS    |
| G97 | VSS    | L99  | VSS    |
| G98 | VSS    | L100 | VSS    |

OPT. RESISTOR R84, R75 TO BE REMOVED FOR TC447 DEVICES ONLY

002-41555 Rev. \*A  
2026-05-12

## 5 Schematics and placement

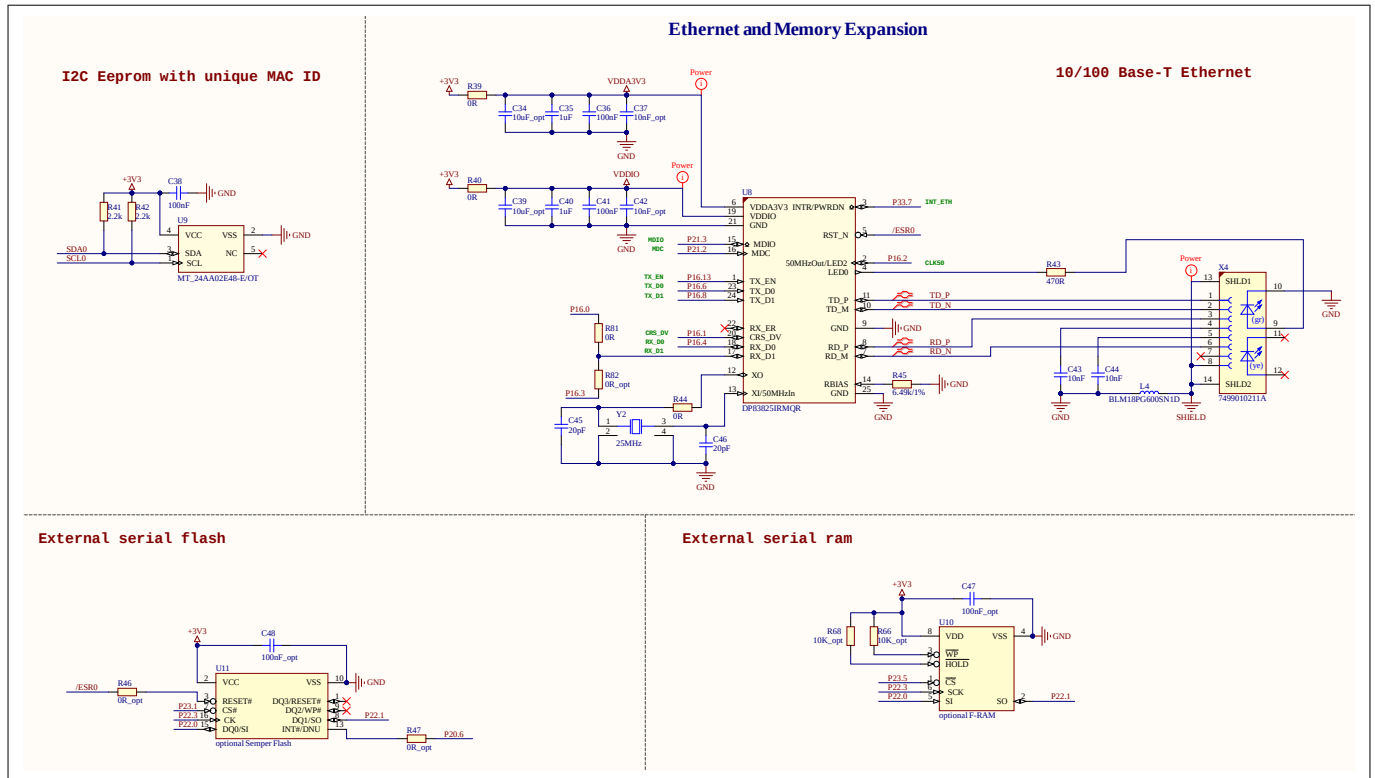


Figure 8 Ethernet and memory expansion

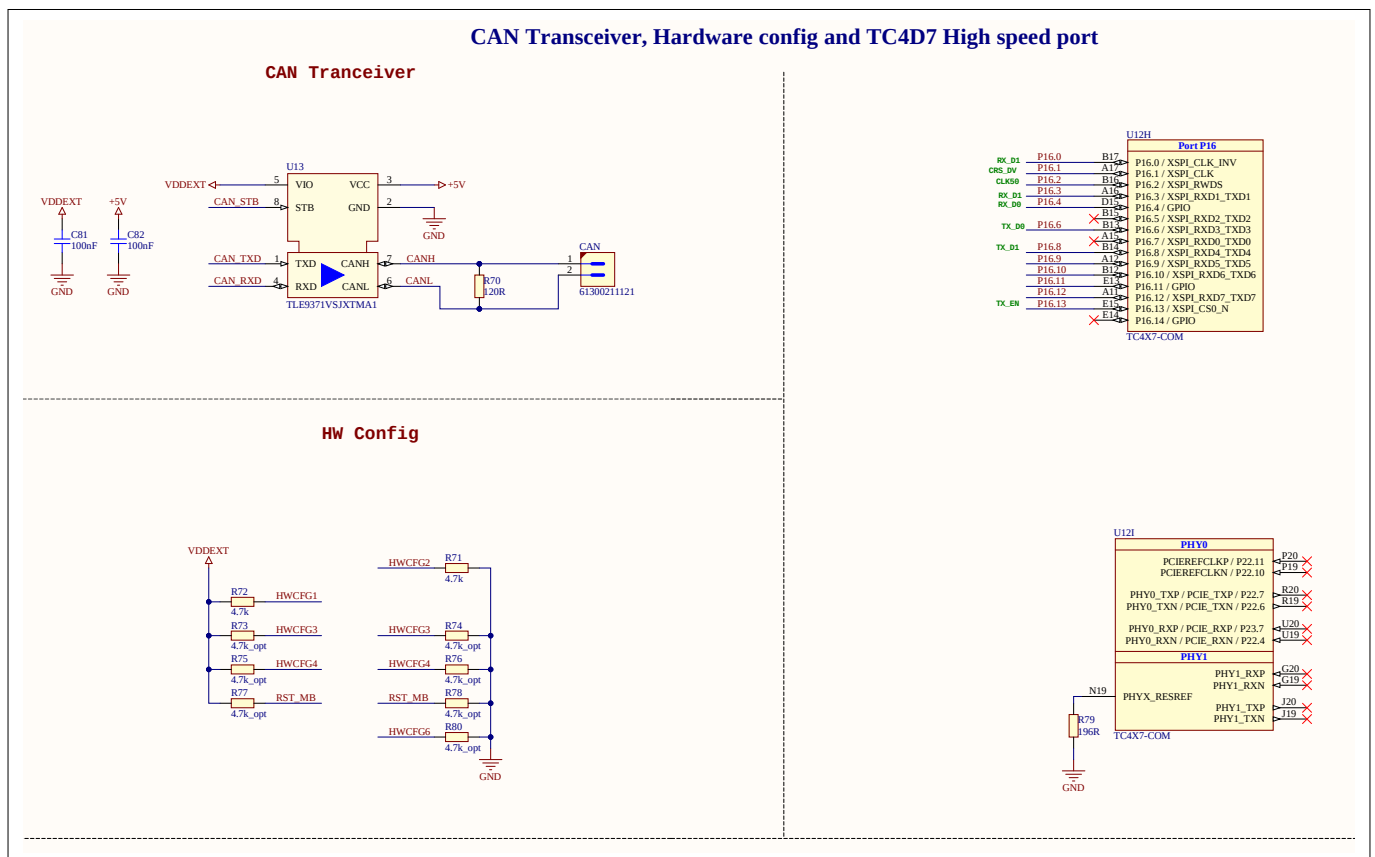


Figure 9 CAN transceiver, hardware config, and TC4D7 high-speed port

## 5 Schematics and placement

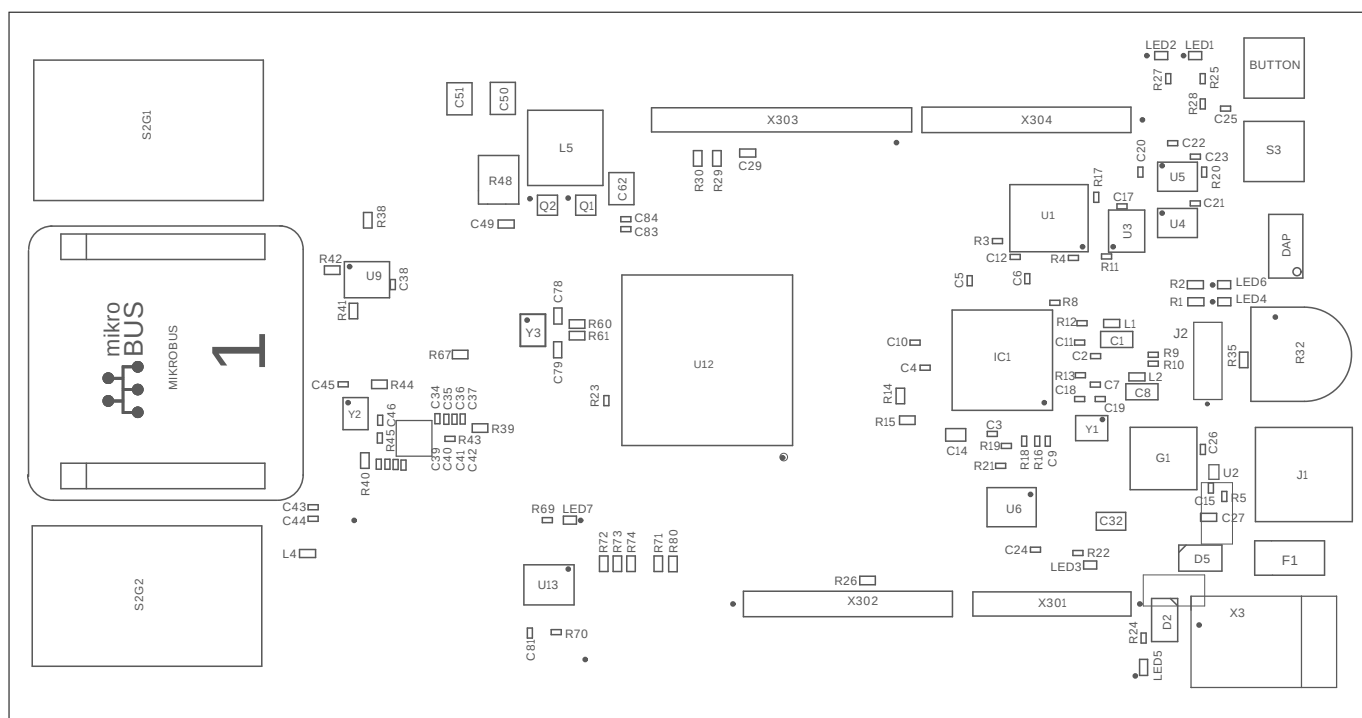


**Figure 10** Primary side assembly

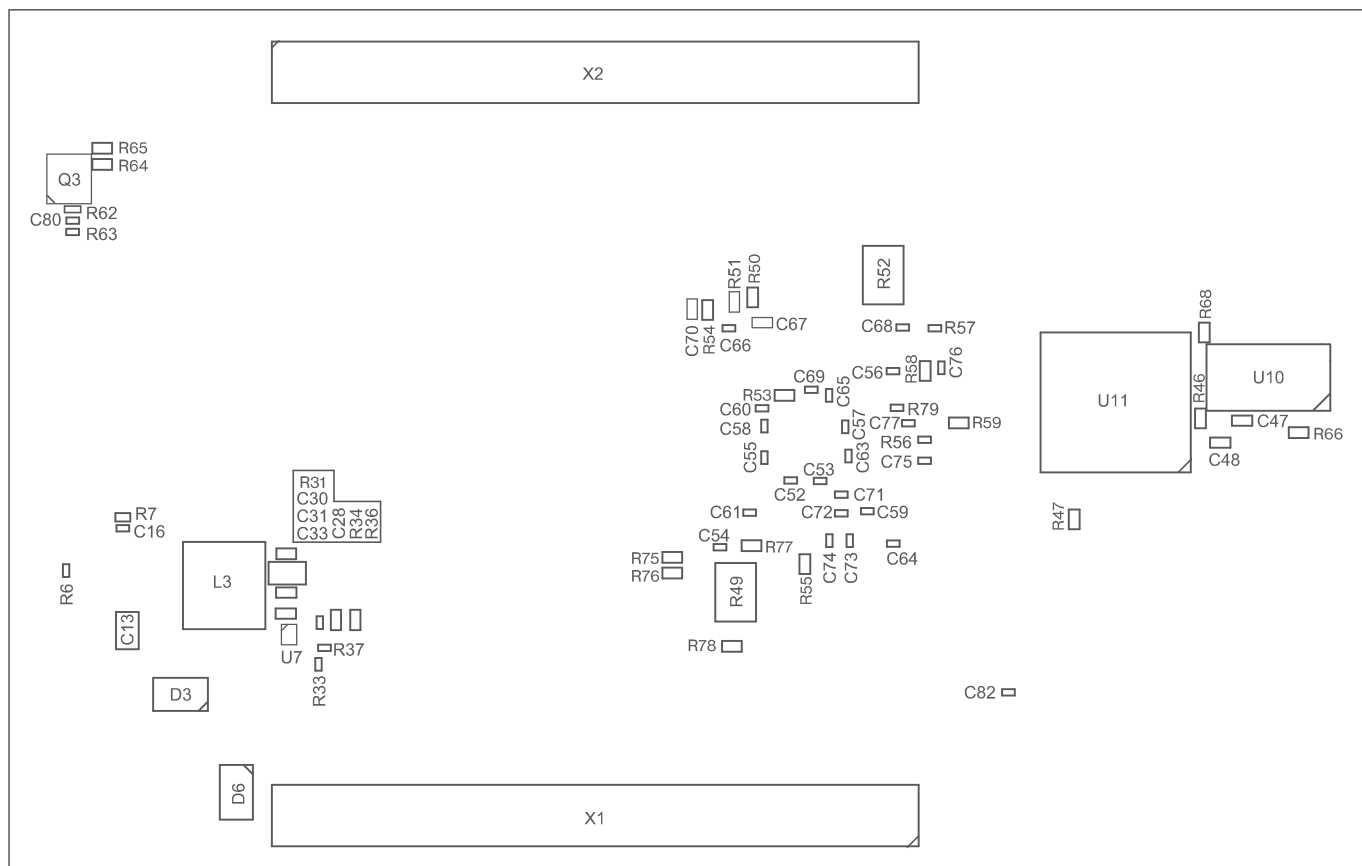


**Figure 11** Secondary side assembly

## 6 Bill of materials

## 6 Bill of materials

Table 21 Bill of materials

| Quantity | Designator                                                                                            | Description                                                              | Footprint       | Manufacturer                        | Manufacturer order number | Comment                          |
|----------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------|-------------------------------------|---------------------------|----------------------------------|
| 1        | BUTTON                                                                                                | Tactile Switch SPST-NO Top Actuated Surface Mount                        | FSM2JSMA        | TE Connectivity ALCOSWITCH Switches | FSM2JSMA                  | Tactile Switch SPST-NO 0.05A 24V |
| 2        | C1, C8                                                                                                | 4.7 $\mu$ F Molded Tantalum Capacitors 10 V 1206 (3216 Metric) 50hm      | CAPMP3216X18 0N | Kemet                               | T491A475K010 AT           | 4.7 uF                           |
| 22       | C2, C3, C4, C5, C6, C7, C9, C10, C11, C12, C17, C20, C21, C22, C23, C24, C25, C36, C38, C41, C81, C82 | 0.1 $\mu$ F $\pm$ 10% 16 V Ceramic Capacitor X7R 0402 (1005 Metric)      | CAPC1005X55N -1 | TDK Corporation                     | CGA2B1X7R1C1 04K050BC     | 100 nF                           |
| 1        | C13                                                                                                   | 10 $\mu$ F $\pm$ 10% 25 V Ceramic Capacitor X5R 0805 (2012 Metric)       | CAPC2012X145 N  | TDK                                 | C2012X5R1E10 6K125AB      | 10 uF                            |
| 1        | C14                                                                                                   | 3.3 $\mu$ F $\pm$ 10% 10V Ceramic Capacitor X5R 0805 (2012 Metric)       | CAPC2013X95N    | Samsung Electro-Mechanics           | CL21A335KPFN NNE          | 3.3 uF                           |
| 1        | C15                                                                                                   | 0.1 $\mu$ F -20%, +80% 16 V Ceramic Capacitor Y5V (F) 0402 (1005 Metric) | CAPC1005X55N    | Samsung Electro-Mechanics           | CL05F104ZO5N NNC          | 0.1 uF                           |
| 1        | C16                                                                                                   | 10000 pF $\pm$ 5% 50 V Ceramic Capacitor X7R 0402 (1005 Metric)          | CAPC1005X55N -1 | muRata Electronics                  | GRM155R71H1 03JA88D       | 10 nF                            |
| 2        | C18, C19                                                                                              | 8 pF $\pm$ 0.05 pF 50 V Ceramic Capacitor C0G, NP0 0402 (1005 Metric)    | CAPC1005X55N -0 | muRata                              | GJM1555C1H8 R0WB01D       | 8 pF                             |

(table continues...)

## 6 Bill of materials

Table 21 (continued) Bill of materials

| Quantity | Designator    | Description                                                           | Footprint        | Manufacturer       | Manufacturer order number | Comment    |
|----------|---------------|-----------------------------------------------------------------------|------------------|--------------------|---------------------------|------------|
| 1        | C26           | 10 $\mu$ F $\pm$ 20% 10 V Ceramic Capacitor X5R 0402 (1005 Metric)    | CAPC1005X70N     | Samsung            | CL05A106MP6N UN8          | 10 $\mu$ F |
| 1        | C27           | 0.1 $\mu$ F $\pm$ 20% 100 V Ceramic Capacitor X7S 0603 (1608 Metric)  | CAPC1608X90N -4  | TDK Corporation    | CGA3E3X7S2A1 04M080AB     | 100 nF     |
| 1        | C28           | 56 pF $\pm$ 5% 50 V Ceramic Capacitor C0G, NP0 0402 (1005 Metric)     | CAPC1005X55N -0  | KYOCERA AVX        | KGM05ACG1H5 60JH          | 56 pF      |
| 1        | C29           | 0.047 $\mu$ F $\pm$ 10% 50 V Ceramic Capacitor X7R 0603 (1608 Metric) | CAPC1608X90N -4  | TDK Corporation    | CGA3E2X7R1H4 73K080AA     | 47 nF      |
| 1        | C30           | 22 $\mu$ F $\pm$ 20% 10 V Ceramic Capacitor X5R 0805 (2012 Metric)    | CAPC2012X145 N   | muRata Electronics | GRT21BR61A22 6ME13L       | 22 $\mu$ F |
| 2        | C31, C33      | 0.1 $\mu$ F $\pm$ 10% 25 V Ceramic Capacitor X7R 0603 (1608 Metric)   | CAPC1608X90N     | muRata Electronics | GCJ188R71E10 4KA12D       | 100 nF     |
| 1        | C32           | 10 $\mu$ F $\pm$ 20% 25 V Ceramic Capacitor X5R 0805 (2012 Metric)    | CAPC2012X145 N_1 | muRata Electronics | GRM21BR61E1 06MA73L       | 10 $\mu$ F |
| 3        | C35, C40, C66 | 1 $\mu$ F $\pm$ 10% 10 V Ceramic Capacitor X5R 0402 (1005 Metric)     | CAPC1005X55N     | Kemet              | C0402C105K8P ACTU         | 1 $\mu$ F  |
| 2        | C43, C44      | 10000 pF $\pm$ 10% 16 V Ceramic Capacitor X7R 0402 (1005 Metric)      | CAPC1005X55N     | Kemet              | C0402C103K4R ACAUTO       | 10 nF      |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator                                                           | Description                                                            | Footprint        | Manufacturer              | Manufacturer order number | Comment     |
|----------|----------------------------------------------------------------------|------------------------------------------------------------------------|------------------|---------------------------|---------------------------|-------------|
| 2        | C45, C46                                                             | 20 pF $\pm 2\%$ 50 V Ceramic Capacitor C0G, NP0 0402 (1005 Metric)     | CAPC1005X55N-0   | YAGEO                     | CC0402GRNPO 9BN200        | 20 pF       |
| 1        | C49                                                                  | 3.3 $\mu$ F $\pm 10\%$ 6.3 V Ceramic Capacitor X5R 0603 (1608 Metric)  | CAPC1608X90N-3_1 | TDK Corporation           | CGA3E3X5R0J3 35K080AB     | 3.3 $\mu$ F |
| 2        | C50, C51                                                             | 33 $\mu$ F $\pm 20\%$ 10 V Ceramic Capacitor X7S 1210 (3225 Metric)    | CAPC3225X280 N-3 | TDK                       | CGA6M1X7S1A3 36M200AC     | 33 $\mu$ F  |
| 2        | C52, C53                                                             | 0.047 $\mu$ F $\pm 10\%$ 25 V Ceramic Capacitor X7R 0402 (1005 Metric) | CAPC1005X55N-0   | muRata                    | GCM155R71E47 3KA55D       | 47 nF       |
| 14       | C54, C56, C58, C59, C61, C64, C68, C69, C71, C73, C75, C76, C83, C84 | 0.1 $\mu$ F $\pm 10\%$ 50 V Ceramic Capacitor X7R 0402 (1005 Metric)   | CAPC1005X55N-0   | muRata                    | GCM155R71H1 04KE02J       | 100 nF      |
| 1        | C55                                                                  | 0.47 $\mu$ F $\pm 10\%$ 10 V Ceramic Capacitor X7R 0402 (1005 Metric)  | CAPC1005X55N-0   | muRata                    | GRT155R71A47 4KE01D       | 470 nF      |
| 1        | C57                                                                  | 0.15 $\mu$ F $\pm 10\%$ 16 V Ceramic Capacitor X7R 0402 (1005 Metric)  | CAPC1005X55N-0   | muRata                    | GCM155R71C15 4KE02D       | 150 nF      |
| 1        | C60                                                                  | 0.68 $\mu$ F $\pm 10\%$ 10 V Ceramic Capacitor X7S 0402 (1005 Metric)  | CAPC1005X55N-0   | muRata                    | GCM155C71A68 4KE38D       | 680 nF      |
| 1        | C62                                                                  | 22 $\mu$ F $\pm 10\%$ 16 V Ceramic Capacitor X7R 1210 (3225 Metric)    | CAPC3225X280 N-0 | Samsung Electro-Mechanics | CL32B226KOJV PNE          | 22 $\mu$ F  |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator            | Description                                                                             | Footprint                              | Manufacturer             | Manufacturer order number | Comment                    |
|----------|-----------------------|-----------------------------------------------------------------------------------------|----------------------------------------|--------------------------|---------------------------|----------------------------|
| 2        | C63, C65              | 6800 pF ±10%<br>25 V Ceramic<br>Capacitor X7R<br>0402 (1005<br>Metric)                  | CAPC1005X55N<br>-0                     | muRata                   | GCM155R71E68<br>2KA37D    | 6.8 nF                     |
| 2        | C67, C70              | 10 µF ±20% 10<br>V Ceramic<br>Capacitor X7T<br>0603 (1608<br>Metric)                    | CAPC1608X100<br>N                      | muRata                   | GRM188D71A10<br>6MA73D    | 10 uF                      |
| 2        | C72, C74              | 2200 pF ±10%<br>50 V Ceramic<br>Capacitor X7R<br>0402 (1005<br>Metric)                  | CAPC1005X55N<br>-0                     | muRata                   | GRM155R71H2<br>22KA01D    | 2.2 nF                     |
| 1        | C77                   | 0.33 µF ±10%<br>10 V Ceramic<br>Capacitor X5R<br>0402 (1005<br>Metric)                  | CAPC1005X55N<br>-0                     | muRata                   | GRM155R61A33<br>4KE15D    | 330 nF                     |
| 2        | C78, C79              | 12 pF ±2% 50 V<br>Ceramic<br>Capacitor C0G,<br>NP0 0603 (1608<br>Metric)                | CAPC1608X90N                           | YAGEO                    | CC0603GRNPO<br>9BN120     | 12 pF                      |
| 1        | C80                   | 4.7 µF ±10% 10<br>V Ceramic<br>Capacitor X5R<br>0402 (1005<br>Metric)                   | CAPC1005X65N                           | TDK<br>Corporation       | C1005X5R1A47<br>5K050BC   | 4.7 uF                     |
| 1        | CAN                   | Connector<br>Header<br>Through Hole 2<br>position 0.100"<br>(2.54 mm)                   | HDRV2W64P25<br>4_1X2_496X248<br>X838B  | Samtec                   | 61300211121               | 2-pin header<br>(2.54 mm)  |
| 5        | D1, D2, D3,<br>D5, D6 | Diode 40 V 4A<br>Surface Mount<br>SMA-FL                                                | SODFL5126X11<br>0N                     | onsemi                   | NRVBAF440T3G              | Diode Schottky<br>40V 4A   |
| 1        | DAP                   | 1.27 Pin Header<br>Dual Rows Smt<br>Type, Brass, 1<br>Amp, 1000<br>Mohm min, 300<br>vAC | CON-M-SMD-<br>GPEC214-0502<br>B009C1BC | Greenconn<br>Corporation | GPEC214-0502<br>B009C1BC  | 10-pin header<br>(1.27 mm) |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator | Description                                                                                                                                        | Footprint                          | Manufacturer                            | Manufacturer order number | Comment                   |
|----------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------|---------------------------|---------------------------|
| 1        | F1         | Polymeric PTC Resettable Fuse 16V 500 mA 1h Surface Mount 1812 (4532 Metric), Concave                                                              | 0ZCG0050FF2C                       | Bel Fuse Inc.                           | 0ZCG0050FF2C              | PTC Reset Fuse 0.5 A/16 V |
| 1        | G1         | Linear Voltage Regulator IC Positive Fixed 1 Output 1A PG-TO252-3-11                                                                               | INF-PG-TO252-3-11_N                | Infineon Technologies                   | TLE4284DV50A TMA1         | Voltage regulator 1A      |
| 1        | IC1        | IC USB HS DUAL UART/ FIFO 64-LQFP                                                                                                                  | QFP50P1200X1 200X160-64N           | Future Technology Devices International | FT2232HL-REEL             | USB to UART/DAP Bridge    |
| 1        | J1         | USB-C (USB TYPE-C) USB 3.2 Gen 2 (USB 3.1 Gen 2, Superspeed + (USB 3.1)) Receptacle Connector 24 Position Surface Mount, Right Angle; Through Hole | DX07S024XJ1R 1100                  | JAE Electronics                         | DX07S024XJ1R 1100         | USB-C Connector           |
| 1        | J2         | Connector Header Through Hole 3 position 0.100" (2.54mm)                                                                                           | HDRV2W110P0 X254_1X3_508X 254X854P | Würth Elektronik                        | 61300311121               | 3-pin header              |
| 2        | L1, L2     | 30 Ohms @ 100 MHz 1 Signal Line Ferrite Bead 0603 (1608 Metric) 1.5A 50mOhm                                                                        | INDC1608X95N_MMZ1608               | TDK Corporation                         | MMZ1608R300 ATA00         | Ferrite Bead 30 OHM       |
| 1        | L3         | 2.2 µH Shielded Molded Inductor 9 A 16.5 mOhm Max Nonstandard                                                                                      | INDPM6965X30 0N                    | Vishay                                  | IHLP2525CZER 2R2M11       | Fixed Inductor 2.2 uH 9 A |

(table continues...)

## 6 Bill of materials

Table 21 (continued) Bill of materials

| Quantity | Designator                         | Description                                                                             | Footprint               | Manufacturer                | Manufacturer order number | Comment                            |
|----------|------------------------------------|-----------------------------------------------------------------------------------------|-------------------------|-----------------------------|---------------------------|------------------------------------|
| 1        | L4                                 | 60 Ohms @ 100 MHz 1 Power Line Ferrite Bead 0603 (1608 Metric) 500 mA 100 mOhm          | INDC1608X95N-2          | muRata                      | BLM18PG600S N1D           | Ferrite Bead 60 OHM                |
| 1        | L5                                 | 2.2 µH Shielded Molded Inductor 12.9 A 15.07 mOhm Max Nonstandard                       | XAL7030-222M EC         | Coilcraft                   | XAL7030-222M EC           | Fixed Inductor 2.2 uH 12.9 A       |
| 6        | LED1, LED2, LED3, LED4, LED6, LED7 | Green 574 nm LED Indication - Discrete 1.9V 0603 (1608 Metric)                          | LED-SMD-LG L29K-XXXX-24 | Bivar Inc.                  | SM0603GCL                 | LED Green Clear                    |
| 1        | LED5                               | Red LED Indication - Discrete 2V 0603 (1608 Metric)                                     | LEDSC160X80X 80-2N      | Lumex Opto/ Components Inc. | SML-LX0603IW-TR           | LED Red Diffused                   |
| 1        | MIKROBUS                           | mikroBUS Host Socket                                                                    | MIKROBUS HOST CONN.     |                             | PPTC081LFBN-RC            | MIKROBUS HOST CONN.                |
| 1        | Q1                                 | N-Channel 20 V 8.5A (Ta), 26A (Tc) 2W (Ta), 19W (Tc) Surface Mount DFN2020MD-6          | BUK4D1620X              | Nexperia USA Inc.           | BUK4D16-20H               | Small Signal N-Channel MOSFETS     |
| 1        | Q2                                 | P-Channel 20 V 6A (Ta), 18A (Tc) 2W (Ta), 19W (Tc) Surface Mount DFN2020MD-6            | BUK4D3820PX             | Nexperia USA Inc.           | BUK4D38-20PX              | Small Signal P-Channel MOSFETS     |
| 1        | Q3                                 | Bipolar (BJT) Transistor NPN 30 V 100 mA 100 MHz 300 mW Surface Mount SOT-23-3 (TO-236) | SOT95P240X11 0-3N_01    | onsemi                      | BC848CLT1G                | Bipolar Transistor NPN 30 V 100 mA |

(table continues...)

## 6 Bill of materials

Table 21 (continued) Bill of materials

| Quantity | Designator                                   | Description                                                                                                                | Footprint          | Manufacturer                          | Manufacturer order number | Comment |
|----------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------|---------------------------|---------|
| 2        | R1, R2                                       | 680 Ohms $\pm 1\%$<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Moisture<br>Resistant Thick<br>Film         | RESC1608X55N<br>-1 | Yageo                                 | RC0603FR-0768<br>0RL      | 680 R   |
| 8        | R3, R4, R8,<br>R11, R16,<br>R18, R19,<br>R63 | 10 k $\Omega$ $\pm 1\%$<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film | RESC1005X40N       | Vishay                                | CRCW040210K0<br>FKED      | 10 k    |
| 2        | R5, R6                                       | 5.1 k $\Omega$ $\pm 5\%$<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Moisture<br>Resistant Thick<br>Film | RESC1005X40N       | Yageo                                 | RC0402JR-075K<br>1L       | 5.1 k   |
| 1        | R7                                           | 100 k $\Omega$ $\pm 5\%$<br>0.1W, 1/10W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film  | RESC1005X40N<br>_1 | Panasonic<br>Electronic<br>Components | ERJ-2GEJ104X              | 100 k   |
| 2        | R9, R10                                      | 22 Ohms $\pm 1\%$<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film       | RESC1005X40N       | Vishay                                | CRCW040222R<br>0FKED      | 22 R    |
| 3        | R12, R56,<br>R57                             | 1 k $\Omega$ $\pm 5\%$<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Moisture<br>Resistant Thick<br>Film   | RESC1005X40N<br>-1 | Yageo                                 | RC0402JR-131K<br>L        | 1 k     |

(table continues...)

## 6 Bill of materials

Table 21 (continued) Bill of materials

| Quantity | Designator                                                                             | Description                                                                                                                         | Footprint              | Manufacturer                            | Manufacturer order number | Comment |
|----------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------|---------------------------|---------|
| 1        | R13                                                                                    | 12 kΩ ±1%<br>0.2W, 1/5W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200,<br>Pulse<br>Withstanding<br>Thick Film | RESC1005X40N           | Vishay                                  | CRCW040212K0<br>FKEDHP    | 12 k    |
| 3        | R17, R20,<br>R23                                                                       | 4.7 kΩ ±1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Moisture<br>Resistant Thick<br>Film                        | RESC1005X40N<br>-1     | Yageo                                   | RC0402FR-074K<br>7L       | 4.7 k   |
| 2        | R21, R28                                                                               | 2.2 kΩ ±1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film                       | RESC1005X40N           | Vishay                                  | CRCW04022K20<br>FKED      | 2.2 k   |
| 5        | R22, R24,<br>R25, R27,<br>R69                                                          | 680 Ohms ±1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film                     | RESC1005X40N           | Stackpole<br>Electronics Inc,<br>Vishay | RMCF0402FT68<br>0R        | 680 R   |
| 14       | R26, R29,<br>R30, R31,<br>R35, R39,<br>R40, R44,<br>R53, R55,<br>R58, R61,<br>R64, R81 | 0 Ohms<br>Jumper Chip<br>Resistor 0603<br>(1608 Metric)<br>Automotive<br>AEC-Q200,<br>Pulse<br>Withstanding<br>Thick Film           | RESC1609X50N           | Vishay                                  | CRCW06030000<br>Z0EAHP    | 0 R     |
| 1        | R32                                                                                    | 250 kΩ 0.5W,<br>1/2W Through<br>Hole<br>Thumbwheel<br>Potentiometer<br>Top<br>Adjustment                                            | TRIM_3352T-1-<br>254LF | Bourns Inc.                             | 3352T-1-254LF             | 250 k   |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator       | Description                                                                                                                 | Footprint    | Manufacturer | Manufacturer order number | Comment |
|----------|------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------|--------------|---------------------------|---------|
| 1        | R33              | 100 k $\Omega$ $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film  | RESC1005X40N | Vishay       | CRCW0402100K<br>FKED      | 100 k   |
| 1        | R34              | 135 k $\Omega$ $\pm$ 0.1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric) Thin<br>Film                             | RESC1608X55N | Yageo        | RT0603BRD071<br>35KL      | 135 k   |
| 1        | R36              | 30 k $\Omega$ $\pm$ 1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Moisture<br>Resistant Thick<br>Film      | RESC1608X55N | Yageo        | RC0603FR-0730<br>KL       | 30 k    |
| 1        | R37              | 43.2 k $\Omega$ $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film | RESC1005X40N | Vishay Dale  | CRCW040243K2<br>FKED      | 43.2 k  |
| 3        | R41, R42,<br>R65 | 2.2 k $\Omega$ $\pm$ 1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film    | RESC1609X50N | Vishay       | CRCW06032K20<br>FKTA      | 2.2 k   |
| 1        | R43              | 470 Ohms $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric) Thick<br>Film                                  | RESC1005X40N | Vishay       | CRCW0402470<br>RFKEDC     | 470 R   |

(table continues...)

## 6 Bill of materials

Table 21 (continued) Bill of materials

| Quantity | Designator | Description                                                                                                                              | Footprint          | Manufacturer | Manufacturer order number | Comment |
|----------|------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------|---------------------------|---------|
| 1        | R45        | 6.49 kΩ ±1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film                           | RESC1005X40N       | Vishay       | CRCW04026K49<br>FKED      | 6.49 k  |
| 1        | R48        | 0 Ohms<br>Jumper Chip<br>Resistor Wide<br>1812 (4532<br>Metric), 1218<br>Automotive<br>AEC-Q200,<br>Moisture<br>Resistant Thick<br>Film  | RESC3246X60N       | Yageo        | AC1218JK-070R<br>L        | 0 R     |
| 2        | R49, R52   | 0 Ohms<br>Jumper Chip<br>Resistor 1210<br>(3225 Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film                                          | RESC3225X60N       | Vishay       | CRCW12100000<br>Z0EA      | 0 R     |
| 2        | R50, R54   | 2.2 Ohms ±1%<br>0.333W, 1/3W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Automotive<br>AEC-Q200,<br>Pulse<br>Withstanding<br>Thick Film | RESC1609X50N       | Vishay       | CRCW06032R2<br>0FKEAHP    | 2.2 R   |
| 1        | R51        | 620 mOhms<br>±1% 0.125W,<br>1/8W Chip<br>Resistor 0603<br>(1608 Metric)<br>Thick Film                                                    | RESC1608X55N<br>-2 | Bourns       | CRL0603-FW-<br>R620ELF    | 0.62 R  |
| 1        | R59        | 1.2 Ohms ±1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film                            | RESC1609X50N       | Vishay       | CRCW06031R2<br>0FKEA      | 1.2 R   |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator       | Description                                                                                                                | Footprint             | Manufacturer                              | Manufacturer order number | Comment                                                                        |
|----------|------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------|---------------------------|--------------------------------------------------------------------------------|
| 1        | R62              | 4.7 k $\Omega$ $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film | RESC1005X40N          | Vishay                                    | CRCW04024K70<br>FKED      | 4.7 k                                                                          |
| 3        | R67, R71,<br>R72 | 4.7 k $\Omega$ $\pm$ 1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film   | RESC1609X50N          | Vishay                                    | CRCW06034K70<br>FKEA      | 4.7 k                                                                          |
| 1        | R70              | 120 Ohms $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film       | RESC1005X40N          | Vishay                                    | CRCW0402120<br>RFKED      | 120 R                                                                          |
| 1        | R79              | 196 Ohms $\pm$ 1%<br>0.063W, 1/16W<br>Chip Resistor<br>0402 (1005<br>Metric)<br>Automotive<br>AEC-Q200 Thick<br>Film       | RESC1005X40N          | Vishay                                    | CRCW0402196<br>RFKED      | 196 R                                                                          |
| 1        | S3               | Tactile Switch<br>SPST-NO Top<br>Actuated<br>Surface Mount                                                                 | FSM2JSMA              | TE Connectivity<br>ALCOSWITCH<br>Switches | FSM2JSMA                  | Tactile switch<br>SPST NO                                                      |
| 1        | U1               | Buffer, Non-<br>Inverting 2<br>Element 4 Bit<br>per Element 3-<br>State Output<br>20-TSSOP                                 | SOP65P640X12<br>0-20N | Texas<br>Instruments                      | SN74AHC244P<br>WR         | Buffer, Non-<br>Inverting 2<br>Element 4 Bit<br>per Element 3-<br>State Output |
| 1        | U2               | Clamp 3A (8/20<br>$\mu$ s) Ipp Tvs<br>Diode Surface<br>Mount 6-SON<br>(1.45x1)                                             | TPD4S012DRYR          | Texas<br>Instruments                      | TPD4S012DRYR              | TVS Diode<br>5.5VWM                                                            |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity | Designator | Description                                                                       | Footprint               | Manufacturer          | Manufacturer order number | Comment                                                          |
|----------|------------|-----------------------------------------------------------------------------------|-------------------------|-----------------------|---------------------------|------------------------------------------------------------------|
| 1        | U3         | Buffer, Non-Inverting 1 Element 1 Bit per Element 3-State Output SOT-23-5         | SOT95P280X14 5-5N-2     | Texas Instruments     | SN74LVC1G125 DBVR         | Buffer, Non-Inverting 1 Element 1 Bit per Element 3-State Output |
| 2        | U4, U5     | Voltage Level Translator Bidirectional 1 Circuit 1 Channel 420 Mbps SOT-23-6      | SOT95P280X14 5-6N-6     | Texas Instruments     | SN74LVC1T45D BVR          | Voltage Level Translator Bidirectional 1 Circuit 1 Channel       |
| 1        | U6         | EEPROM Memory IC 1 Kbit Microwire 2 MHz 8-SOIC                                    | SOIC127P600X 175-8N-1   | Microchip Technology  | 93LC46BT-I/SN             | EEPROM 1 Kbit Microwire                                          |
| 1        | U7         | Buck Switching Regulator IC Positive Adjustable 0.6V 1 Output 6A SOT-563, SOT-666 | SOTFL50P160X 60-6N      | Texas Instruments     | TPS565247DRL R            | Buck Switching Regulator                                         |
| 1        | U8         | 1/1 Transceiver Full, Half Ethernet, IEEE 802.3 24-WQFN (3x3)                     | DP83825IRMQR            | Texas Instruments     | DP83825IRMQR              | RMII Ethernet Transceiver                                        |
| 1        | U9         | EEPROM Memory IC 2 Kbit I <sup>2</sup> C 400 kHz 900 ns SOT-23-5                  | SOT95P270X14 5-5N-1     | Microchip Technology  | 24AA02E48T-E/OT           | EEPROM Memory IC 2 Kbit I2C                                      |
| 1        | U12        | TC4D7 MCU                                                                         | TC4X7_292BGA            | Infineon Technologies | SAK-TC4D7XP-20MF 500MC AA | TC4D7 MCU                                                        |
| 1        | U13        | 1/1 Transceiver CAN bus PG-DSO-8                                                  | SOIC127P600X 175-8N-3   | Infineon Technologies | TLE9371VSJXT MA1          | CAN Transceiver                                                  |
| 2        | X1, X2     | Connector Header Through Hole 40 position 0.100" (2.54 mm)                        | CON-M-THT-68691-440 HLF | Würth Elektronik      | 61304021121               | 20-pin header (2.54 mm)                                          |

(table continues...)

## 6 Bill of materials

**Table 21** (continued) Bill of materials

| Quantity                  | Designator | Description                                                                       | Footprint                | Manufacturer                | Manufacturer order number  | Comment                                             |
|---------------------------|------------|-----------------------------------------------------------------------------------|--------------------------|-----------------------------|----------------------------|-----------------------------------------------------|
| 1                         | X3         | 2.1 mm and 2.5 mm Right Angle PCB Mount DC Power Socket 5A, 12V dc, Nickel Plated | CON-THT-JACK-FC681465P   | Cliff                       | FC681465P                  | Power Barrel Connector Jack 2.1mm for +12V DC input |
| 1                         | X4         | 1 Port RJ45 Through Hole 10/100 Base-T, Auto MDIX                                 | CON-THT-RJ45-7499010211A | Würth Elektronik            | 7499010211A                | RJ45 Through Hole 10/100 Base-T                     |
| 1                         | X301       | 6 Position Header Connector 0.100" (2.54 mm) Through Hole Tin                     | CON-F-THT-SSQ-106-03-G-S | Sullins Connector Solutions | PPTC061LFBN-RC             | 6-pin header (2.54 mm)                              |
| 2                         | X302, X304 | 8 Position Header Connector 0.100" (2.54 mm) Through Hole Tin                     | CON-F-THT-PPTC081LFBN-RC | Sullins Connector Solutions | PPTC081LFBN-RC             | 8-pin header (2.54 mm)                              |
| 1                         | X303       | 10 Position Header Connector 0.100" (2.54 mm) Through Hole Tin                    | CON-F-THT-SSQ-110-03-F-S | Sullins Connector Solutions | PPTC101LFBN-RC             | 10-pin header (2.54 mm)                             |
| 1                         | Y1         | 12 MHz $\pm 15$ ppm Crystal 8 pF 120 Ohms 4-SMD, No Lead                          | XTAL-SMD-NX3225SA        | Nihon Dempa Kogyo           | NX3225SA-12.000M-STD-CRS-2 | 12 MHz Crystal                                      |
| 1                         | Y2         | 25 MHz $\pm 50$ ppm Crystal 18 pF 50 Ohms 4-SMD, No Lead                          | XTAL-SMD-FA-238_1        | Epson                       | FA-238 25.0000MB-C3        | 25 MHz Crystal                                      |
| 1                         | Y3         | 25 MHz $\pm 20$ ppm Crystal 12 pF 40 Ohms 4-SMD, No Lead                          | ECS2501233QJ ESTR        | ECS Inc                     | ECS-250-12-33 Q-JES-TR     | 25 MHz Crystal                                      |
| <b>No load components</b> |            |                                                                                   |                          |                             |                            |                                                     |
| 2                         | C34, C39   | 10 $\mu$ F $\pm 20\%$ 10V Ceramic Capacitor X5R 0402 (1005 Metric)                | CAPC1005X70N             | Samsung                     | CL05A106MP6N UN8           | 10 uF optional                                      |

(table continues...)

## 6 Bill of materials

**Table 21 (continued) Bill of materials**

| Quantity | Designator                                 | Description                                                                                                            | Footprint              | Manufacturer          | Manufacturer order number    | Comment                    |
|----------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|------------------------------|----------------------------|
| 2        | C37, C42                                   | 10000 pF ±10%<br>16V Ceramic Capacitor X7R<br>0402 (1005 Metric)                                                       | CAPC1005X55N           | Kemet                 | C0402C103K4R<br>ACAUTO       | 10 nF optional             |
| 2        | C47, C48                                   | 0.1 µF ±20%<br>100V Ceramic Capacitor X7S<br>0603 (1608 Metric)                                                        | CAPC1608X90N<br>-4     | TDK Corporation       | CGA3E3X7S2A1<br>04M080AB     | 100 nF optional            |
| 1        | D4                                         | Diode 40 V 4A<br>Surface Mount<br>SMA-FL                                                                               | SODFL5126X11<br>0N     | onsemi                | NRVBAF440T3G                 | Schottky diode<br>40 V 4 A |
| 7        | R14, R15,<br>R38, R46,<br>R47, R60,<br>R82 | 0 Ohms<br>Jumper Chip Resistor 0603<br>(1608 Metric)<br>Automotive<br>AEC-Q200,<br>Pulse<br>Withstanding<br>Thick Film | RESC1609X50N           | Vishay                | CRCW06030000<br>Z0EAHP       | 0 R optional               |
| 2        | R66, R68                                   | 10 kΩ ±5%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608 Metric)<br>Automotive<br>AEC-Q200 Thick Film                   | RESC1609X50N           | Vishay                | CRCW060310K0<br>JNEA         | 10 k optional              |
| 7        | R73, R74,<br>R75, R76,<br>R77, R78,<br>R80 | 4.7 kΩ ±1%<br>0.1W, 1/10W<br>Chip Resistor<br>0603 (1608 Metric)<br>Automotive<br>AEC-Q200 Thick Film                  | RESC1609X50N           | Vishay                | CRCW06034K70<br>FKEA         | 4.7 k optional             |
| 2        | TP1, TP2                                   | Black bead<br>terminal<br>assembly 1.02<br>mm hole                                                                     | TPCW100D120<br>H460B   | Vero Technologies     | 20-2137                      | PCB Test point<br>optional |
| 1        | U10                                        | FRAM<br>(Ferroelectric<br>RAM) Memory<br>IC 4 Mbit SPI 40<br>MHz 8-SOIC                                                | SOIC127P800X<br>203-8N | Infineon Technologies | 448-<br>CY15B104Q-<br>SXI-ND | F-RAM optional             |

(table continues...)

---

**6 Bill of materials****Table 21** (continued) Bill of materials

| Quantity | Designator | Description                                                                | Footprint                  | Manufacturer             | Manufacturer order number | Comment                   |
|----------|------------|----------------------------------------------------------------------------|----------------------------|--------------------------|---------------------------|---------------------------|
| 1        | U11        | FLASH - NOR<br>Memory IC 512<br>Mbit SPI - Quad<br>I/O 133 MHz 16-<br>SOIC | SOIC127P1030<br>X265-16N-1 | Infineon<br>Technologies | S25HL512TDP<br>MHI010     | SEMPER™ Flash<br>optional |



Revision history

Revision history

| Document version | Date of release | Description of changes                                                                                                    |
|------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------|
| **               | 2025-05-15      | Initial release                                                                                                           |
| *A               | 2026-05-12      | Updated the title of the document.<br>Updated <a href="#">Introduction</a> .<br>Updated <a href="#">USB-C connector</a> . |

#### **Trademarks**

All referenced product or service names and trademarks are the property of their respective owners.

**Edition 2026-05-12**

**Published by**

**Infineon Technologies AG**  
**81726 Munich, Germany**

**© 2026 Infineon Technologies AG**  
**All Rights Reserved.**

**Do you have a question about any aspect of this document?**

**Email: [erratum@infineon.com](mailto:erratum@infineon.com)**

**Document reference**  
**IFX-mfa1731391624325**

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com))

#### **Warnings**

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.