

KIT_A3G_TC487_LITE AURIX™ A3G LITE KIT user guide

About this document

Scope and purpose

This user guide provides detailed instructions for using the KIT_A3G_TC487_LITE, a low-cost evaluation kit based on the TC487 device from the AURIX™ third-generation microcontroller family. It highlights the features and functions of the KIT_A3G_TC487_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_TC487_LITE version 1.x.*

Intended audience

This document is designed for software and hardware engineers evaluating the TC487 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 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 the final customer design.*

Important notice

Important notice

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Safety precautions

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

Table 1 Safety precautions

	Caution: The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.
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Table of contents
Table of contents

	Table of contents	4
1	Introduction	5
1.1	Block diagram	5
2	Hardware description	7
2.1	Power supply	8
2.2	User push button, LEDs, and Potentiometer	8
2.3	Debugging on board miniWiggler	9
2.3.1	USB-C connector	9
2.3.2	Serial connection to PC	9
2.3.3	miniWiggler JDS	10
2.4	Reset	10
2.5	CAN transceiver	10
2.6	I ² C EEPROM	11
2.7	Ethernet	11
2.8	Optional Infineon SEMPER™ (Secure) Flash	12
2.9	Audio codec	12
2.10	10Base-T1S (optional)	13
3	Configuration	14
3.1	Boot mode	14
3.2	Config signals	14
3.3	Optional resistors	14
4	Connector pin assignment	16
4.1	Pinout for X1 and X2 connectors	16
4.2	Shield2Go and mikroBUS pinout	17
4.3	Connectors compatible with Arduino	18
4.4	Infineon DAP connectors	20
5	Schematics and placement	22
6	Bill of materials	41
	Revision history	52
	Disclaimer	53

1 Introduction

1 Introduction

This document provides an overview of the features and hardware details of the KIT_A3G_TC487_LITE development kit, which is equipped with a 32-bit single-chip AURIX™ TriCore™-based microcontroller, the TC487x, from Infineon. The kit supports 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 Key specifications of the KIT_A3G_TC487_LITE development board

Parameter	Specification	
CPU core AURIX™	Manufacturer order number	SAK-TC487QP-16NF400MC-AA
Board dimensions	66.0 x 131.0 mm	
Power	- Onboard miniWiggler USB-C interface - External power supply: 5 V–16 V (recommended range: 7 V–14 V)	
Connectors	- Most AURIX™ pins are accessible through expansion connectors (X1 and X2) - Two Infineon Shield2Go connectors - Arduino-compatible connectors for 3.3 V Arduino shields - mikroBUS connector - USB-C connector - DAP debug connector - CAN connector - RJ45 connector 3.5 mm Jack for audio	
Others	- CAN transceiver (TLE9371VSJ) from Infineon - Low power 10/100 Mbps Ethernet physical layer transceiver (DP83825I) from Texas Instruments - One user push-button and three user LEDs - Reset push-button - Potentiometer (10 kΩ) for variable analog input - Optional xSPI memory(selectable between Ethernet)	

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_TC487_LITE board and their interconnections.

1 Introduction

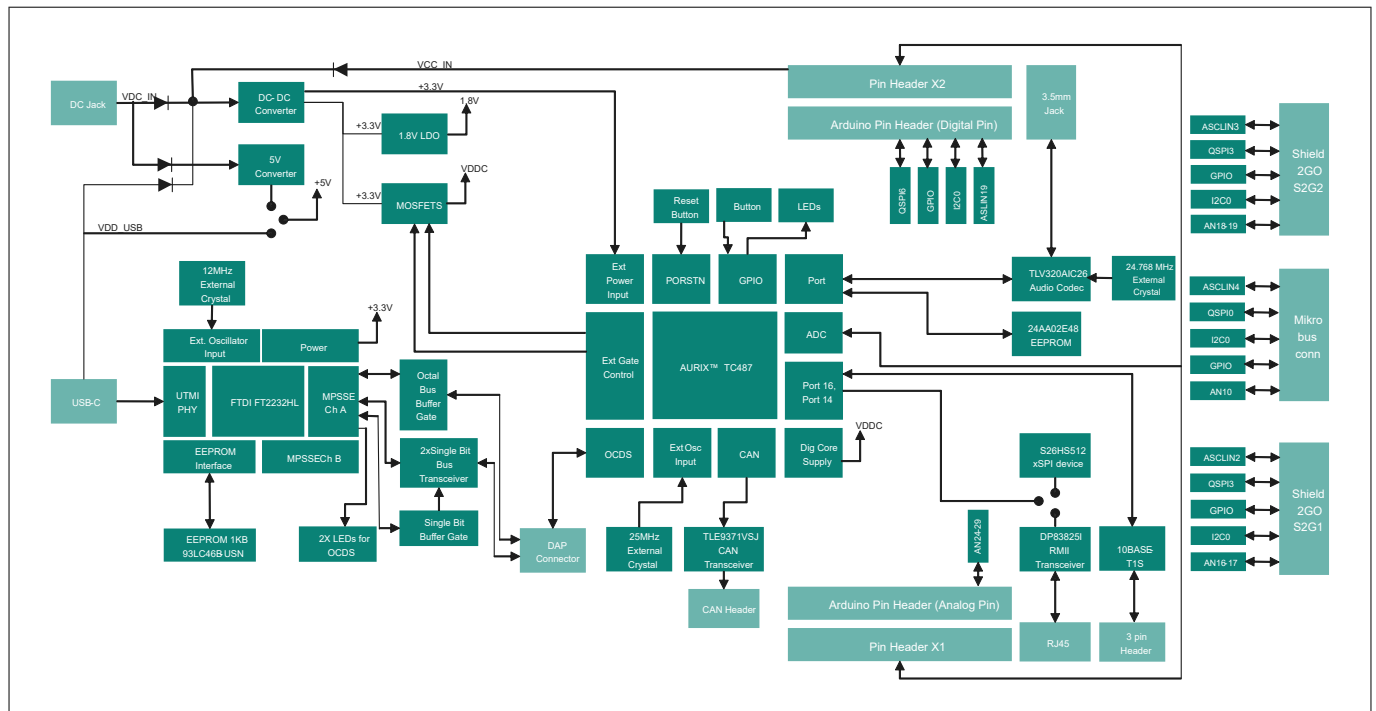


Figure 1 Block diagram of the KIT_A3G_TC487_LITE board

2 Hardware description

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](#).

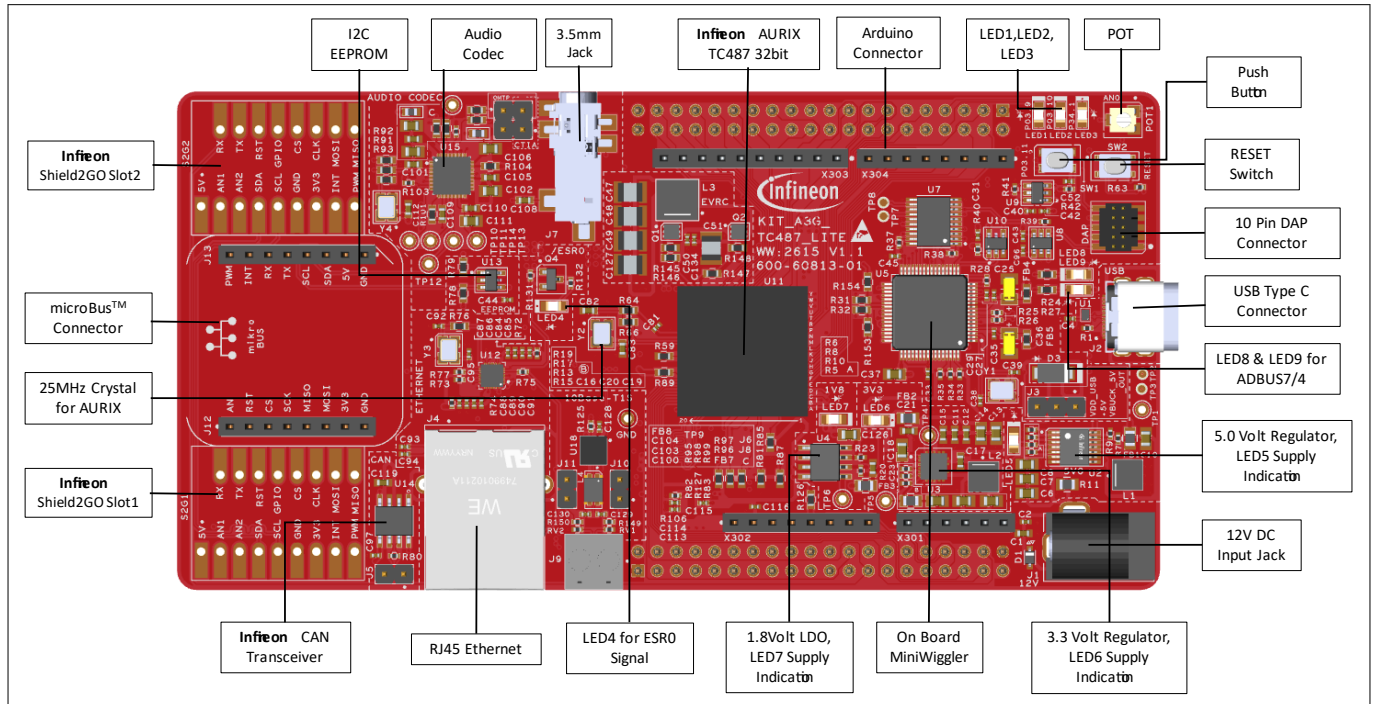


Figure 2 Top view of the KIT_A3G_TC487_LITE board

2 Hardware description

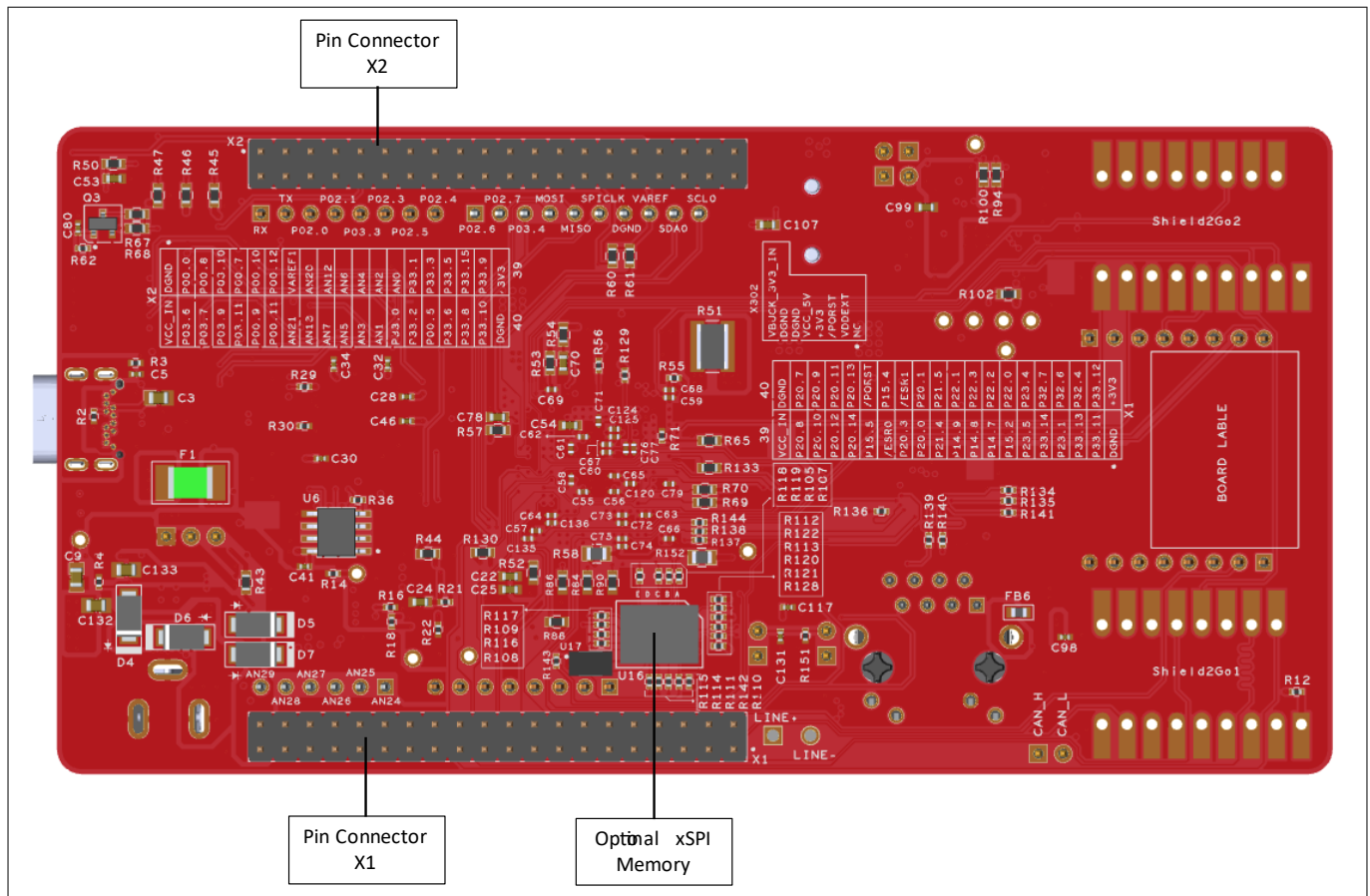


Figure 3 **Bottom view of the KIT_A3G_TC487_LITE board**

2.1 Power supply

The KIT_A3G_TC487_LITE requires an external DC power supply, which can be provided through the DC plug J1 (recommended voltage range: +7 V to +14 V) or the USB-C plug J1 (+5 V). The green power LED indicators, LED6, LED7 and LED5, show the presence of the 3.3 V, 1.8 V, and 5.0 V supply voltages.

For the DC plug J1, 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 J2, the input voltage to the U3 +3.3 V buck converter is slightly less than 5 V. It is possible to use both J1 and J2 simultaneously. The power source priority is as follows:

- If the voltage on J1 exceeds +7 V, the board is powered via J1
- If the voltage on J1 is less than +5.5 V, the board is powered via J2
- Between +5.5 V and +7 V on J1, the board is powered by both J1 and J2

For the 5 V supply, the source can be selected between the 5 V from the USB plug J1 or the regulator output U2 (powered via X3) using jumper J3. If the board is powered via the USB-C plug J2 and/or the DC plug J1, 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.

2.2 User push button, LEDs, and Potentiometer

The KIT_A3G_TC487_LITE is equipped with a user push-button and a reset push-button, complemented by three LEDs and a potentiometer. Additionally, LED4 serves to indicate the reset state of the device via ESR0

2 Hardware description

(Emergency Service Request). LED8 and LED9 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)
LED3	P34.1	Green	Low-active (pull against GND)
LED4	ESR0	Red	Low-active (pull against GND)

Table 4 miniWiggler pin mapping for user LEDs

Name	AURIX™ pin	Color	Active
LED8	ADBUS4	Green	Low-active (pull against GND)
LED9	ADBUS7	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)
POT1	AN0	-

2.3 Debugging on board miniWiggler

The KIT_A3G_TC487_LITE supports debugging through two channels:

- Onboard miniWiggler via USB-C J2
- 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 ASCLIN1 as a USB serial connection, and debugging through DAS.

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

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

2.3.2 Serial connection to 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 ASCLIN1 (UART) or via ASCLIN11 if R31 and R32 are assembled.

2 Hardware description

By default, ASCLIN1 is assigned to P15.0 and P15.1 (for example, for the generic bootstrap loader). ASCLIN11 can be used as an alternative. In this case, ensure that P21.0 and P21.1 are not configured, and R31 and R32 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 the 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 LED9 (ADBUS4, green). The status LED8 (ADBUS7, green) is controlled by the DAS server and toggles 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 LED8 (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_TC487_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_TC487_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 and 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 AURIX™ pin mapping for CAN

Signal	Pin assignment for CAN pin header	AURIX™ pins and its corresponding functions
CANH	1	-
CANL	2	-

(table continues...)

2 Hardware description

Table 6 (continued) AURIX™ pin mapping for CAN

Signal	Pin assignment for CAN pin header	AURIX™ pins and its corresponding functions
CAN_TX	-	P01.3 - CAN01_TXD
CAN_RX	-	P01.4 - CAN01_RXDC
CAN_STB	-	P03.5 - GPIO

2.6 I²C EEPROM

The KIT_A3G_TC487_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. The pre-programmed EUI-48 node address is stored in this upper half and 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	P00.2 - I2C0_SCL
SDA	P00.3 - I2C0_SDA

2.7 Ethernet

The KIT_A3G_TC487_LITE provides an RJ45 connector (J4) 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. For information about the PHY, see the [DP83825I](#) datasheet.

The AURIX™ Ethernet MAC and the PHY connect 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	P16.11 - LETH0_P0_MDIO
MDC	P16.14 - LETH0_P0_MDC
TX_EN	P16.13 - LETH0_P0_RMIIC_TXEN
TX_D0	P16.9 - LETH0_P0_RMIIC_TXD0
TX_D1	P16.8 - LETH0_P0_RMIIC_TXD1
CRS_DV	P16.1 - LETH0_P0_RMII_CRSDVC
RX_D0	P16.4 - LETH0_P0_MII_RMII_RXD0C
RX_D1	P16.3 - LETH0_P0_MII_RMII_RXD1C
50 MHz Out	P16.2 - LETH0_P0_REFCLK
INT_ETH/PWRDN	P33.7 - SCU_E_REQ4A

2 Hardware description

2.8 Optional Infineon SEMPER™ (Secure) Flash

The KIT_A3G_TC487_LITE provides an optional xSPI flash selectable based on the assembling and disassembling a few resistors on the KIT_A3G_TC487_LITE kit. The details are found in section [Optional resistors](#). When xSPI is enabled, disable Ethernet by disassembling a few resistors as described in [Optional resistors](#).

The assembled xSPI is the Infineon 512b SEMPER™ Flash, S26HS512TGBHM000. The device connects to the AURIX™ MCU via HYPERBUS™ protocol, which supports a clock rate of 133 MHz.

The details about xSPI can be found in the AURIX™ user manual, and details about SEMPER™ flash can be found in the SEMPER™ Flash datasheet.

Table 9 AURIX™ pin mapping for xSPI signals

Signal	AURIX™ pins and its corresponding functions
CLK	P16.1 - XSPIO_CLKA
CLK#	P16.0 - XSPIO_CLKA_INV
DQ0	P16.7 - XSPIO_RXD0A/XSPIO_TXDA0
DQ1	P16.3 - XSPIO_RXD1A/XSPIO_TXDA1
DQ2	P16.5 - XSPIO_RXD2A/XSPIO_TXDA2
DQ3	P16.6 - XSPIO_RXD3A/XSPIO_TXDA3
DQ4	P16.8 - XSPIO_RXD4A/XSPIO_TXDA4
DQ5	P16.9 - XSPIO_RXD5A/XSPIO_TXDA5
DQ6	P16.10 - XSPIO_RXD6A/XSPIO_TXDA6
DQ7	P16.12 - XSPIO_RXD7A/XSPIO_TXDA7
RWDS	P16.2 - XSPIO_RWDSA
CS0	P16.13 - XSPIO_CSA0_N
CS1	P16.4 - XSPIO_CSA1_N

2.9 Audio codec

The KIT_A3G_TC487_LITE provides a 3.5 mm jack to connect OMTP or CTIA supported earphones. The support between OMTP or CTIA earphones can be selected based on jumper configuration of J6 and J8 (refer [Table 10](#)). The audio codec used in the KIT_A3G_TC487_LITE kit is TLV320AIC26 from Texas instruments. For more details about the TDM module, see the AURIX™ user manual, and for information about the audio codec, see the TLV320AIC26 datasheet. The AURIX™ TDM module and the audio codec are connected via the I²S interface.

Table 10 AURIX™ pin mapping for Audio Codec signals

TLV320AIC36 Audio codec signal	AURIX™ pins and its corresponding functions
MCLK	P13.3 - AUDIO0_TDM0_TXSMCKO
	P14.6 - AUDIO0_TDM0_RXMCKID
	AUDIO0_EXT_MCK (External master clock)
BCLK	P13.2 - AUDIO0_TDM0_TXSCKO
	P14.1 - AUDIO0_TDM0_RXSCKID

(table continues...)

2 Hardware description

Table 10 (continued) AURIX™ pin mapping for Audio Codec signals

TLV320AIC36 Audio codec signal	AURIX™ pins and its corresponding functions
LRCLK	P13.1 - AUDIO0_TDM0_TXFSYNCO
	P14.0 - AUDIO0_TDM0_RXFSYNCID
DIN	P13.0 - AUDIO0_TDM0_TXSDO
DOUT	P15.5 - AUDIO0_TDM0_RXSDID
SCLK	P22.3 - QSPI4_SCLK_F
MISO	P22.1 - QSPI4_MRSTB_F
MOSI	P22.0 - QSPI4_MTSR_F
SS	P22.2 - QSPI4_SLSO3_F

2.10 10Base-T1S (optional)

The board supports a 10BASE-T1S PMD transceiver in HVSON8 package. Due to availability issues, the transceiver is not assembled by default. If a PMD transceiver is available, it needs to be assembled at U18. The transceiver is connected to the AURIX™ on LETH0 interface.

Table 11 AURIX™ pin mapping for 10BASE-T1S signals

10Base-T1s Signals	AURIX™ pins and its corresponding functions
RX	P03.15 - LETH0_P2_RXDD
ED	P03.14 - LETH0_P2_EDD
TX	P14.10 - LETH0_P2_TXD

3 Configuration

3 Configuration

3.1 Boot mode

Table 12 User startup modes

HWCFG [4,3]	Boot type	R83	R84	R85	R86
00	Generic BSL P14.0/1 (CAN/ ASC)	NA	A	NA	A
10	ASC BSL P15.2/3	NA	A	A	NA
X1	Start from BHMD. If BHMD is not programmed, fall back to HARR or the generic BSL	A	NA	X	X

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

3.2 Config signals

Table 13 Config signals

PIN	Description	Comment
P14.5	HWCFG[1] (EVRCON/EVRCOFF)	Resistor R81 (4.7 KΩ) pulls HWCFG[1] high, and resistor R82 (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 Boot mode)	See Boot mode
P10.5	HWCFG[4] (See Boot mode)	See Boot mode
P14.4	HWCFG[6] (Default Pad state)	Resistor R90 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 14](#). 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 R50 disables the potentiometer and the analog signal AN0 of the AURIX™, making it available for other purposes.

3 Configuration

Table 14 Signal mapping of the optional resistors

Resistor	Value	Assembled	Signal	Size	Comment
R50	0E	Yes	AN0	0603	Disassemble to disable the potentiometer (POT1)
R66	0E	Yes	XTAL2	0603	Use a serial resistor to reduce the oscillator amplitude, if needed.
R12	0E	Yes	+5V	0402	Disassemble to disconnect 5 V to the mikroBUS and Shield2Go connectors
R31, R32	0E	No	ASCLIN11	0603	Assemble to use ASCLIN11 instead of ASCLIN1, disassemble R153, and R154
R93	0E	No	AUDIO_EXT_MCK	0603	Assemble to use external clock as MCLK to Audio codec
R105, R107, R108, R109, R111, R114, R115, R116, R117, R188, R119, R120, R121, R122, R142	0E	No	xSPI signals	0402	Assemble to use xSPI device. When using xSPI, disassemble resistors for Ethernet port.
R58	0E	No	1.8 Supply	0805	Assemble to use xSPI, Disassemble R152
R134, R135	0E	Yes	MDIO, MDC	0402	Disassemble while using xSPI
R136, R137, R138, R139, R140, R141	22E	Yes	RMII Signals	0402	Disassemble while using xSPI

4 Connector pin assignment

4 Connector pin assignment

4.1 Pinout for X1 and X2 connectors

The pin headers X1 and X2 can be used to extend the evaluation board or to perform measurements on the AURIX™ TC487. The available GPIOs and signals at these pin headers are shown in [Table 15](#) and [Table 16](#). The pin table is printed on the bottom side of the PCB.

Table 15 X1 pins

Header pin	Pin description	Header pin	Pin description
X1.1	GND	X1.2	+3V3
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	P23.4
X1.13	P15.2	X1.14	P22.0
X1.15	P14.7	X1.16	P22.2
X1.17	P14.8	X1.18	P22.3
X1.19	P14.9	X1.20	P22.1
X1.21	P21.4	X1.22	P21.5
X1.23	P20.0	X1.24	P20.1
X1.25	P20.3	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 16 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	P00.8	X2.6	P03.74
X2.7	P03.10	X2.8	P03.9
X2.9	P00.7	X2.10	P03.11

(table continues...)

4 Connector pin assignment

Table 16 (continued) X2 pins

Header pin	Pin description	Header pin	Pin description
X2.11	P00.10	X2.12	P00.9
X2.13	P00.12	X2.14	P00.11
X2.15	VREF1	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	P00.5
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™ TC487_COM. The available signals at these connectors are shown in [Table 17](#), [Table 18](#) and [Table 19](#). The pin table is also printed on the top side of the KIT_A3G_TC487_LITE.

Table 17 Shield2Go connector 1

S2G1 pins	Pin description	AURIX™ pin	S2G1 pins	Pin description	AURIX™ pin
1	+5V	-	-	-	-
2	AN1	AN16	10	RX	P02.10
3	AN2	AN17	11	TX	P02.9
4	SDA	P00.2	12	RST/GPIO2	P23.4
5	SCL	P00.3	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	P22.11	17	MISO	P01.5

4 Connector pin assignment

Table 18 Shield2Go connector 2

S2G1 pins	Pin description	AURIX™ pin	S2G1 pins	Pin description	AURIX™ pin
1	+5V	-	-	-	-
2	AN1	AN18	10	RX	P20.3
3	AN2	AN19	11	TX	P20.0
4	SDA	P00.2	12	RST/GPIO2	P02.11
5	SCL	P00.3	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	P22.10	17	MISO	P01.5

Table 19 mikroBUS connector

mikroBus pins	Pin description	AURIX™ pin	mikroBus pins	Pin description	AURIX™ pin
1	AN	AN10	16	PWM	P02.8
2	RST	P03.12	15	INT	P10.7
3	CS	P22.4	14	RX	P34.2
4	SCK	P22.7	13	TX	P34.3
5	MISO	P22.6	12	SCL	P00.2
6	MOSI	P22.5	11	SDA	P00.3
7	+3.3V	-	10	+5V	-
8	GND	-	9	GND	-

4.3 Connectors compatible with Arduino

The mapping of GPIOs and AURIX™ pin functions to Arduino-compatible functions is shown in [Table 20](#). The Arduino-compatible connector supports the following:

- SPI interface
- I²C interface
- UART interface
- PWM signal outputs
- ADC input
- Interrupt input

Table 20 Arduino header pin details

Header pin	Pin description	AURIX™ pins and its corresponding functions
X302		
1	NC	-

(table continues...)

4 Connector pin assignment

Table 20 (continued) Arduino header pin details

Header pin	Pin description	AURIX™ pins and its corresponding functions
2	IOREF	VDDEXT
3	RESET	/PORST
4	+3V3	-
5	+5V	-
6	GND	-
7	GND	-
8	VIN	VBUCK_3V3_IN
X301		
1	ADC0	AN24
2	ADC1	AN25
3	ADC2	AN26
4	ADC3	AN27
5	ADC4	AN28
6	ADC5	AN29
X304		
1	RX	P15.6
2	TX	P15.7
3	PWM_2	P02.0
4	PWM_3	P02.1
5	PWM_4	P03.3
6	PWM_5	P02.3
7	PWM_6	P02.5
8	PWM_7	P02.4
X303		
1	PWM_8	P02.6
2	PWM_9	P02.7
3	SS/PWM_10	P03.4
4	MOSI	P03.2
5	MISO	P03.0
6	SPICLK	P03.1
7	GND	
8	AREF	VAREF
9	SDA0	P00.3

(table continues...)

4 Connector pin assignment

Table 20 (continued) Arduino header pin details

Header pin	Pin description	AURIX™ pins and its corresponding functions
10	SCL0	P00.2

Note: The KIT_A3G_TC487_LITE operates with 3.3 V logic levels. Therefore, boards that use 5 V logic levels are not compatible.

4.4 Infineon DAP connectors

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 in [Table 21](#).

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 (LED8 is off). For more details, see [AP2400314](#).

Table 21 Details of DAP 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		
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

(table continues...)

4 Connector pin assignment

Table 21 (continued) Details of DAP Connector

Pin	Name	AURIX™ Pin	Direction	Description
	USER0		IO/O	Generic signal that can be used for unspecified functions
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, for example, with a plastic pin.
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 bidirectionally 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

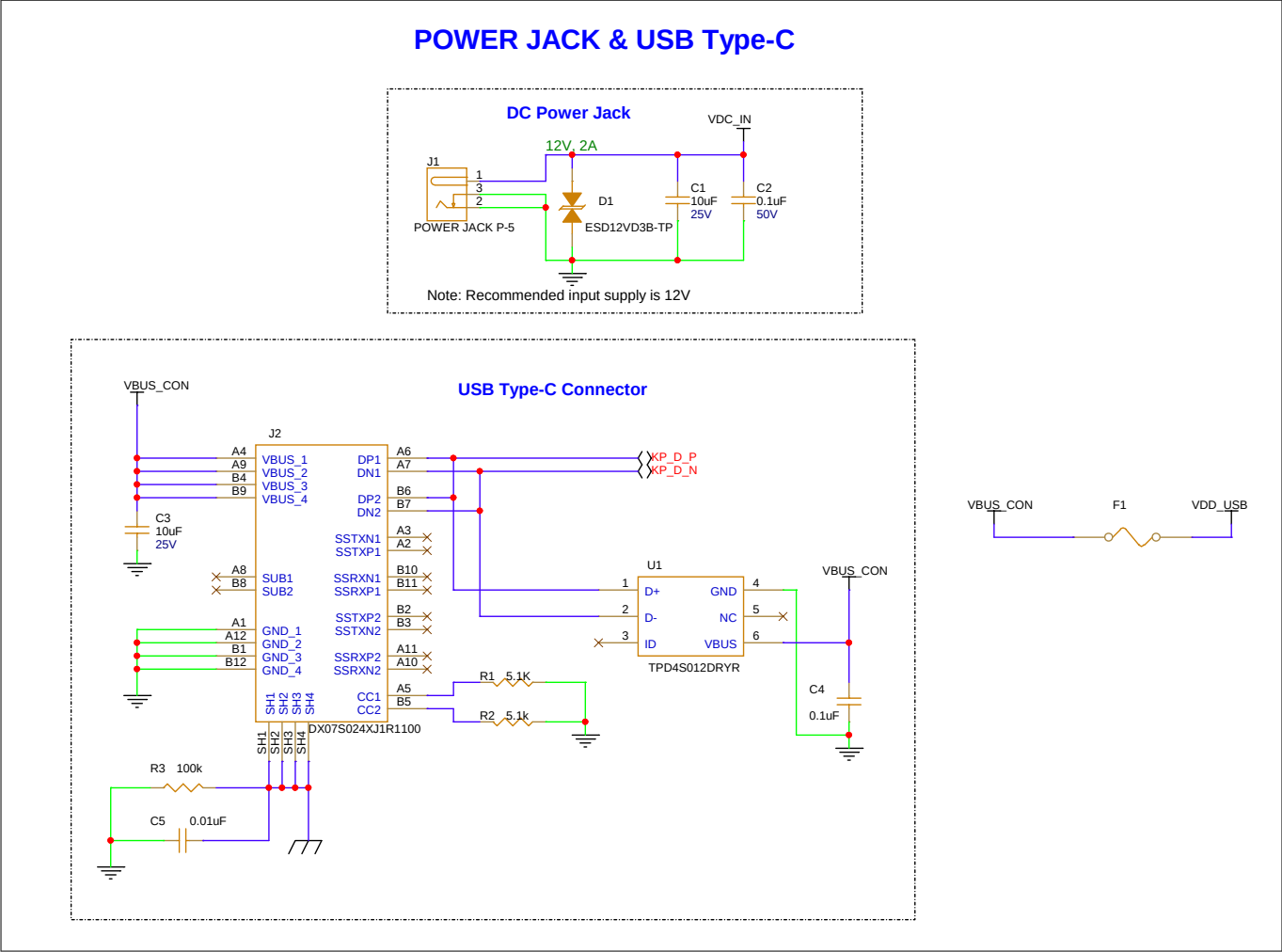


Figure 4 Power input

5 Schematics and placement

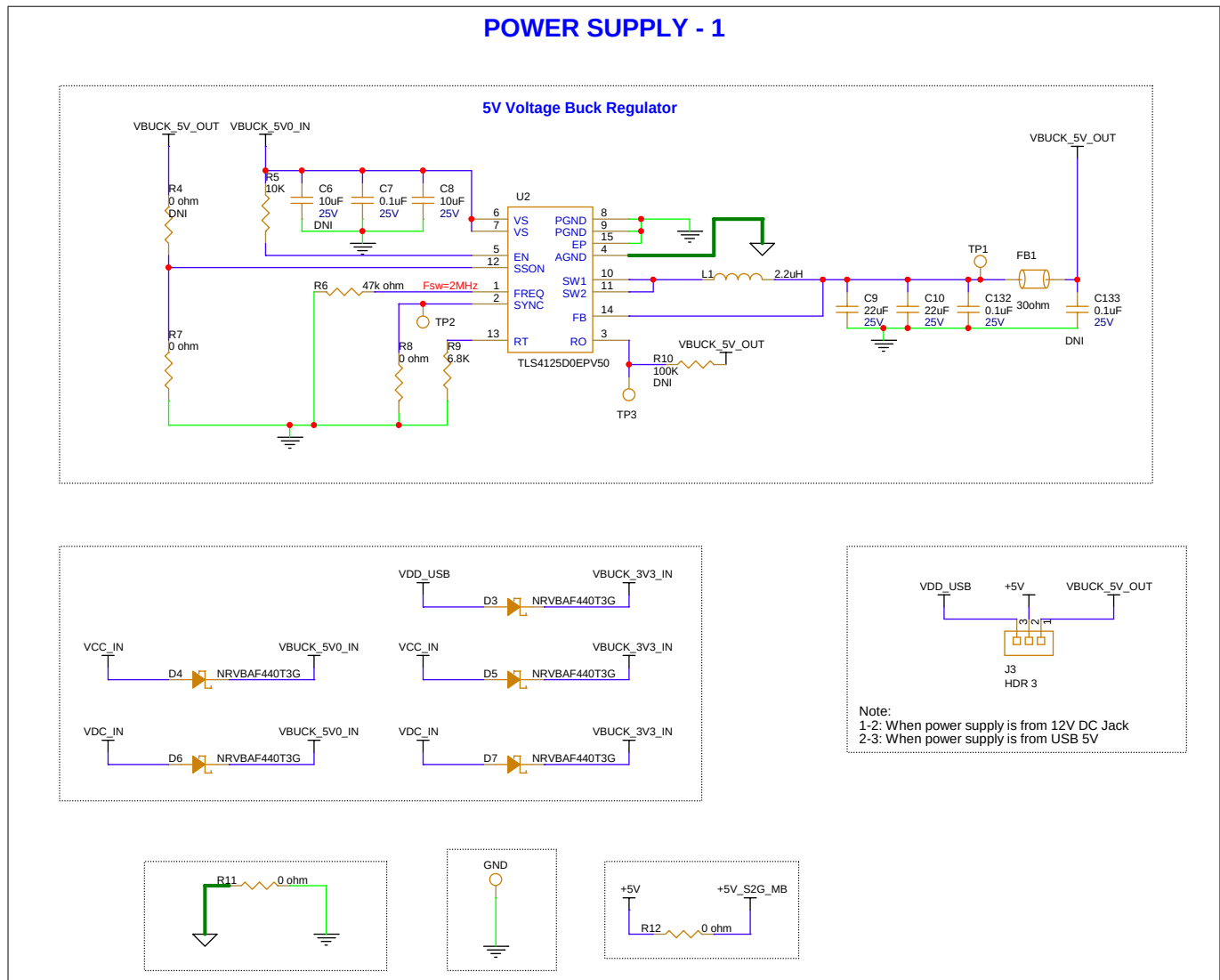


Figure 5 Power regulator (5 V)

5 Schematics and placement

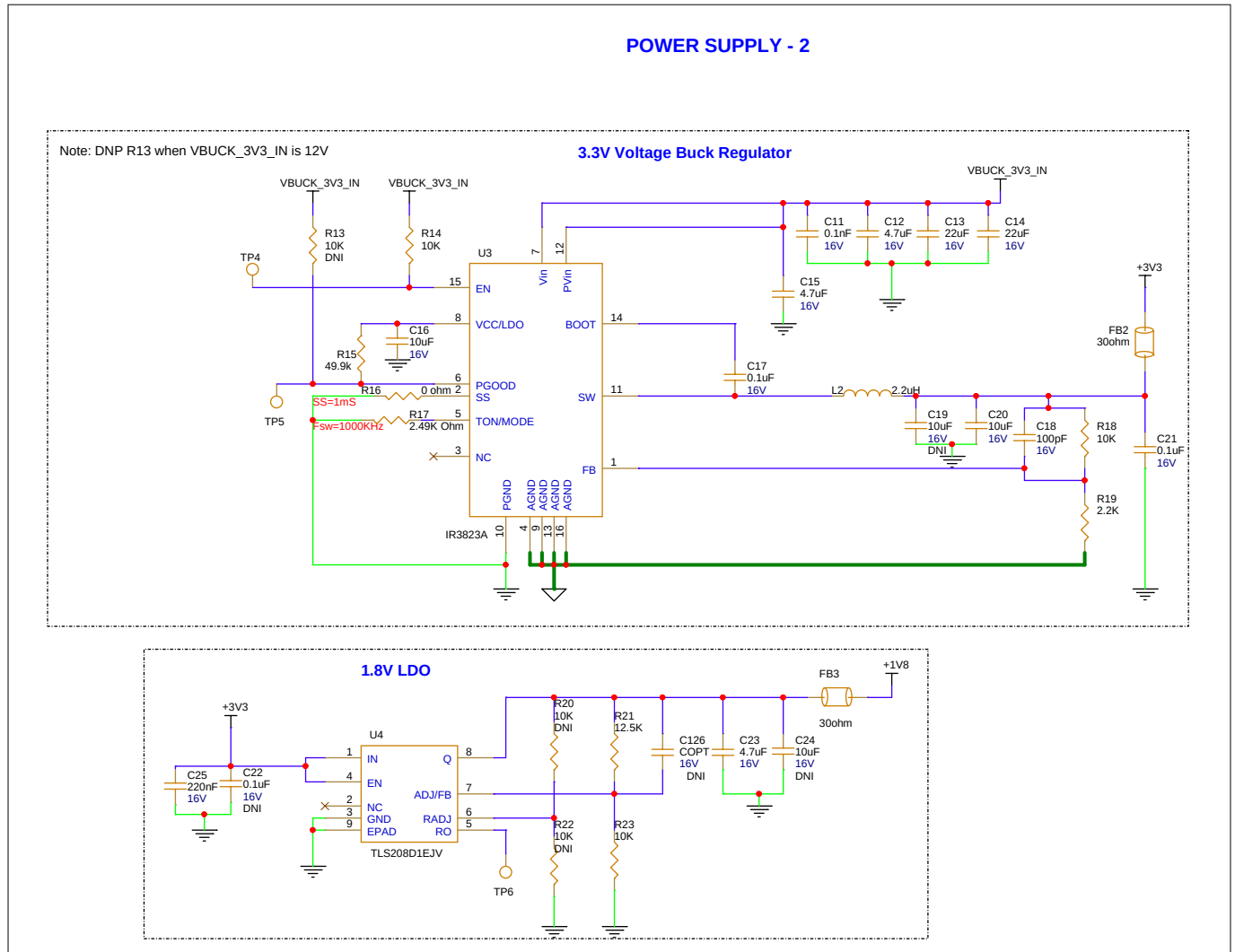


Figure 6 Power regulator (3.3 V) and LDO (1.8 V)

5 Schematics and placement

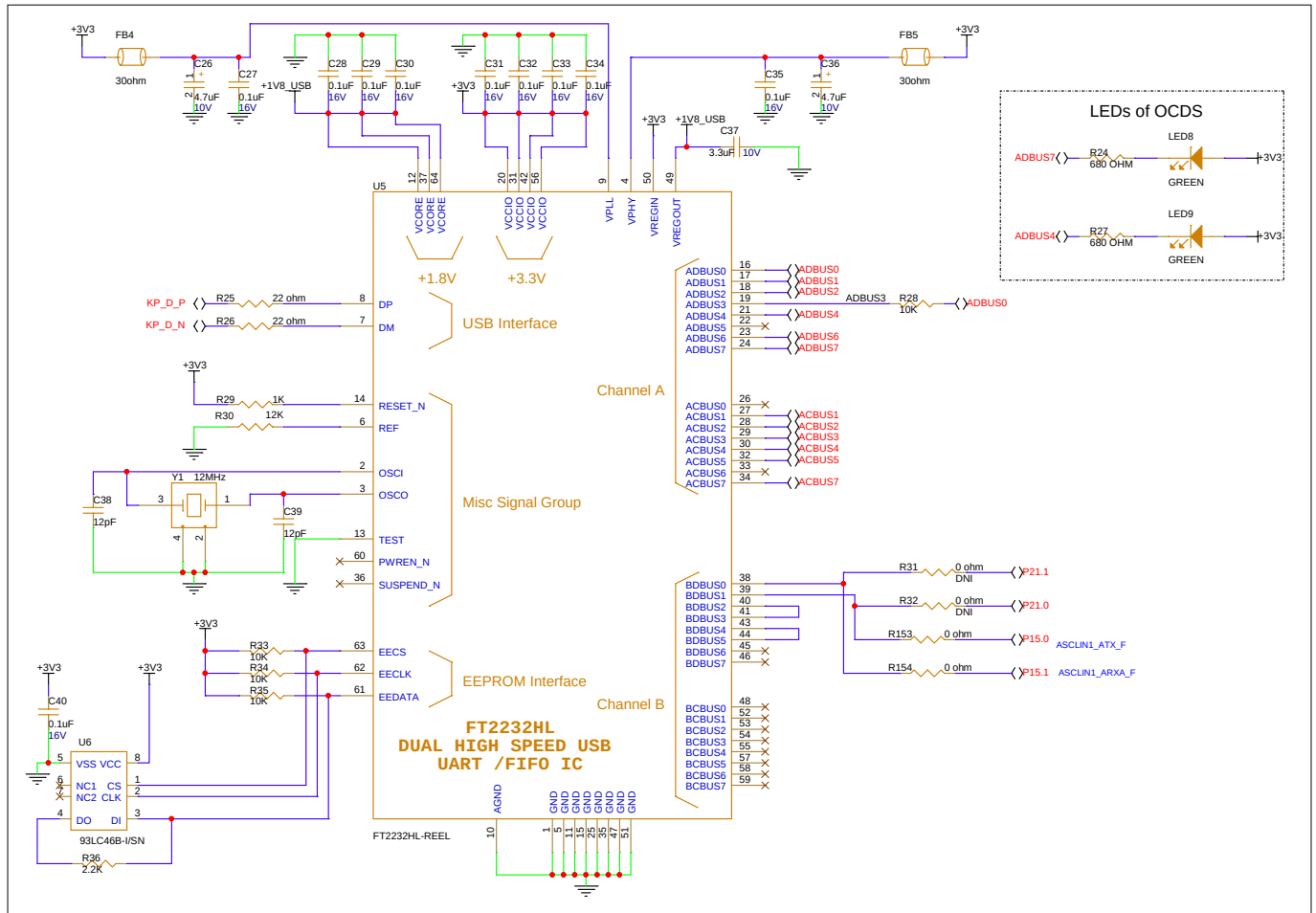


Figure 7 MiniWiggler

5 Schematics and placement

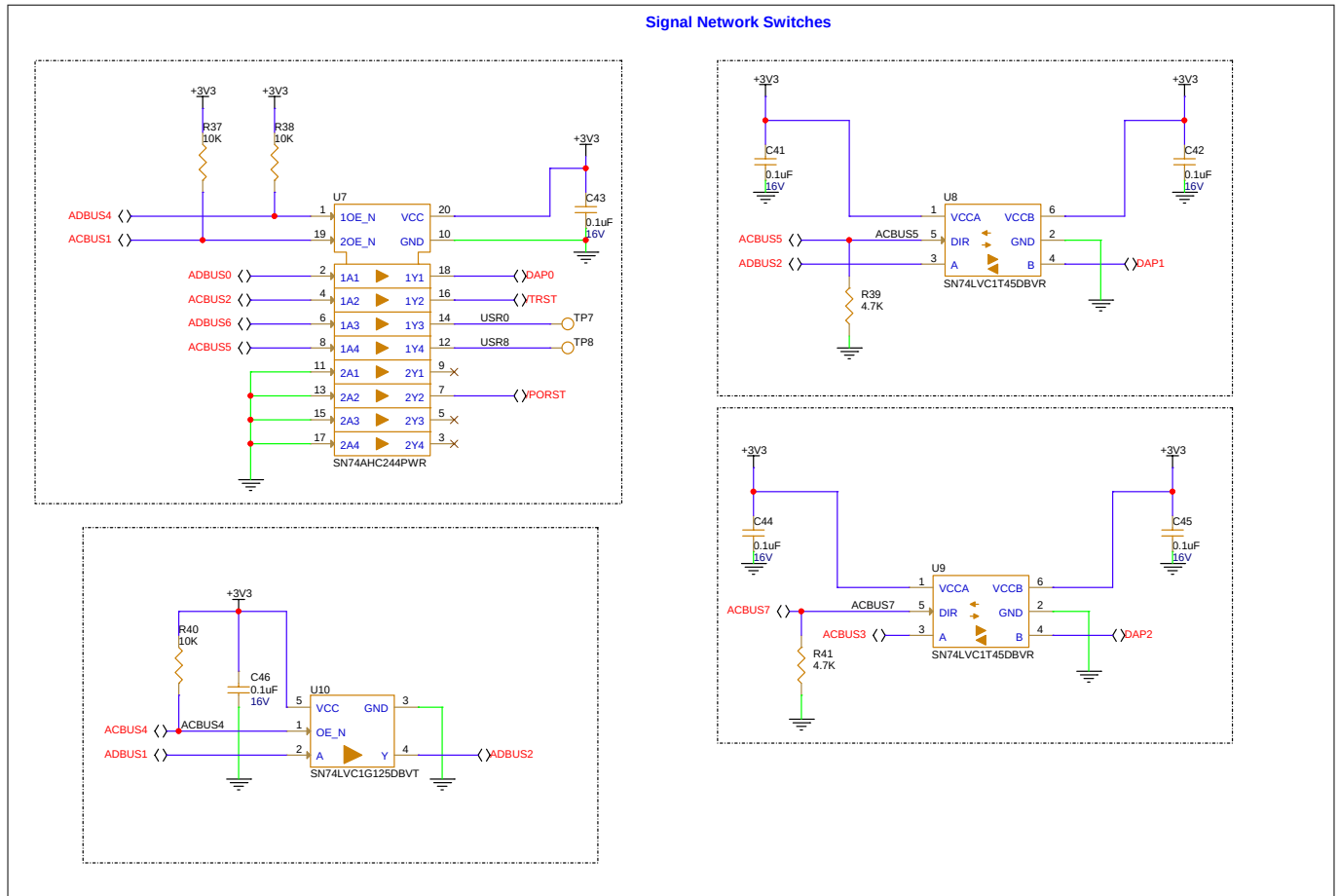


Figure 8 Buffers for debug signals

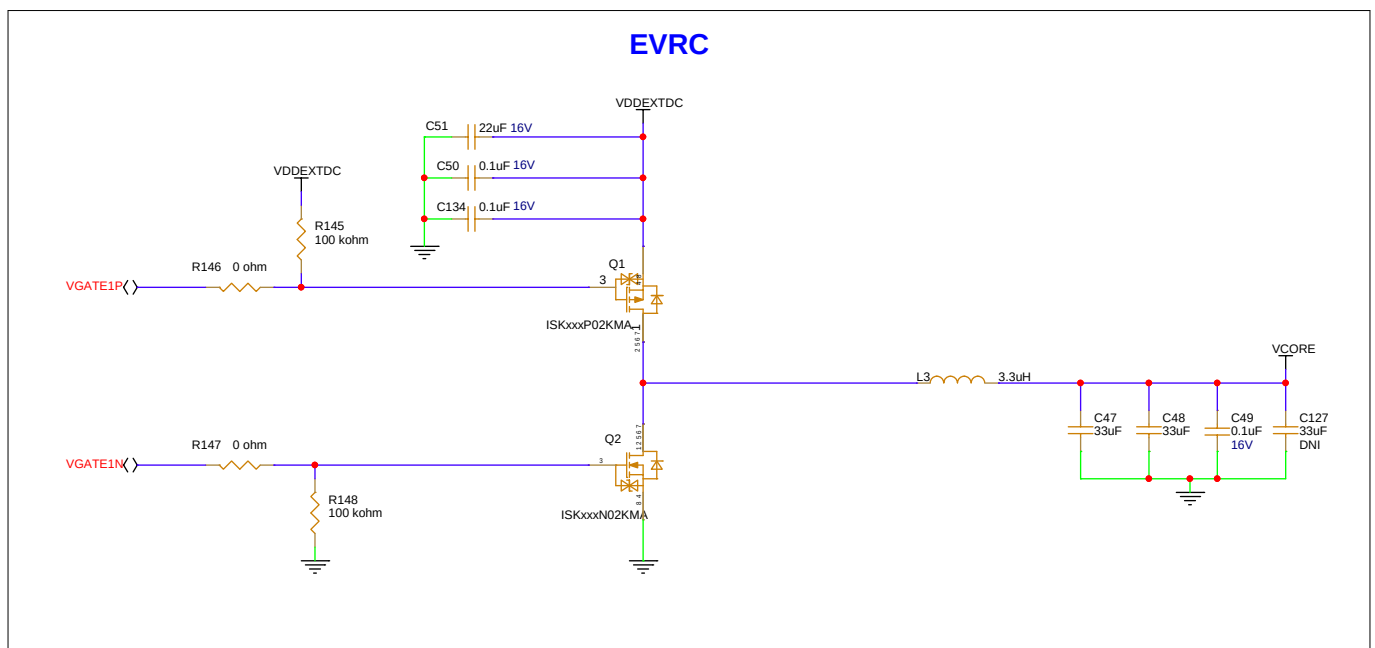


Figure 9 EVRC section to generate VCORE

5 Schematics and placement

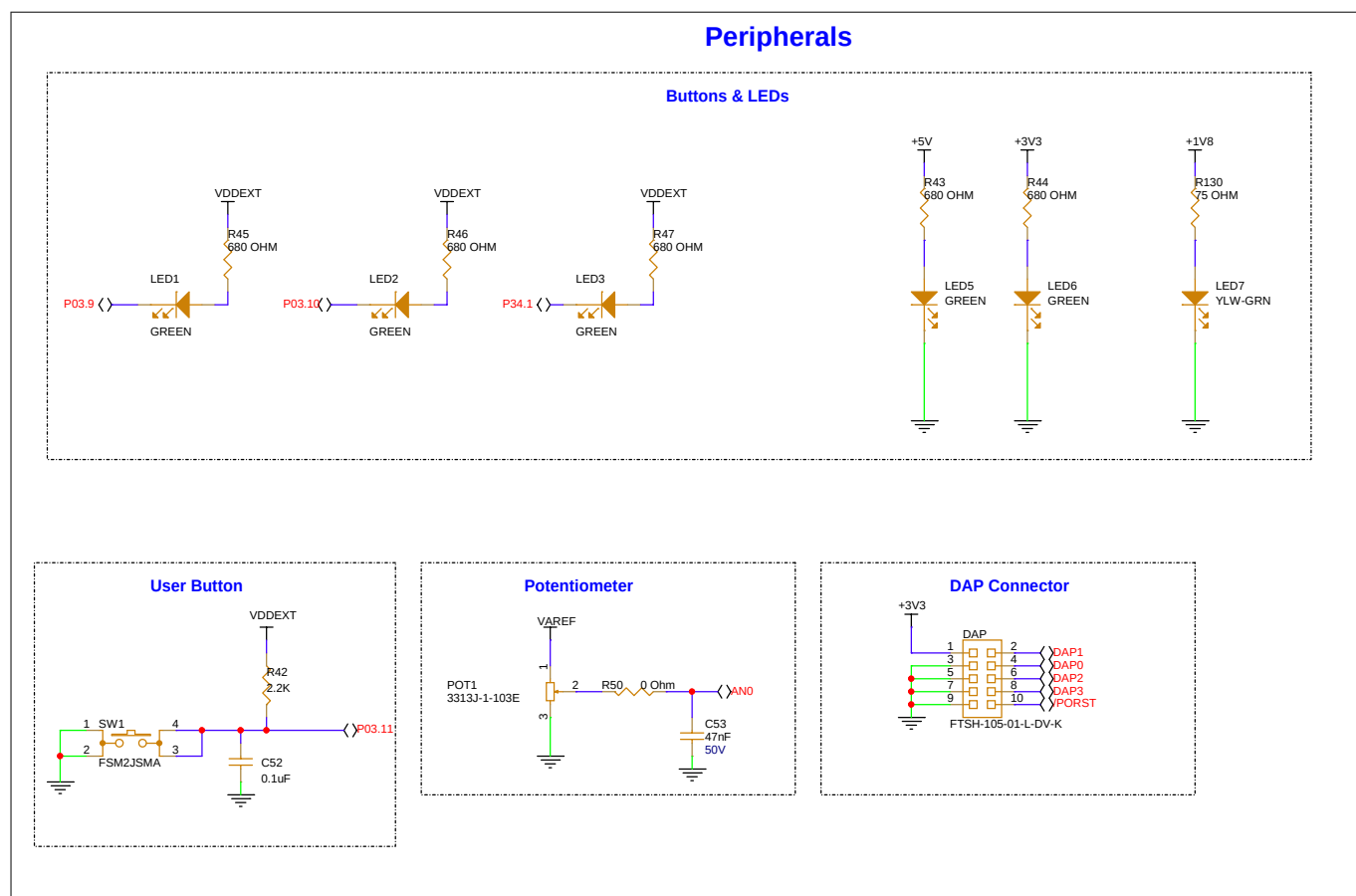


Figure 10 GPIO LEDs, Push button, and Potentiometer

5 Schematics and placement

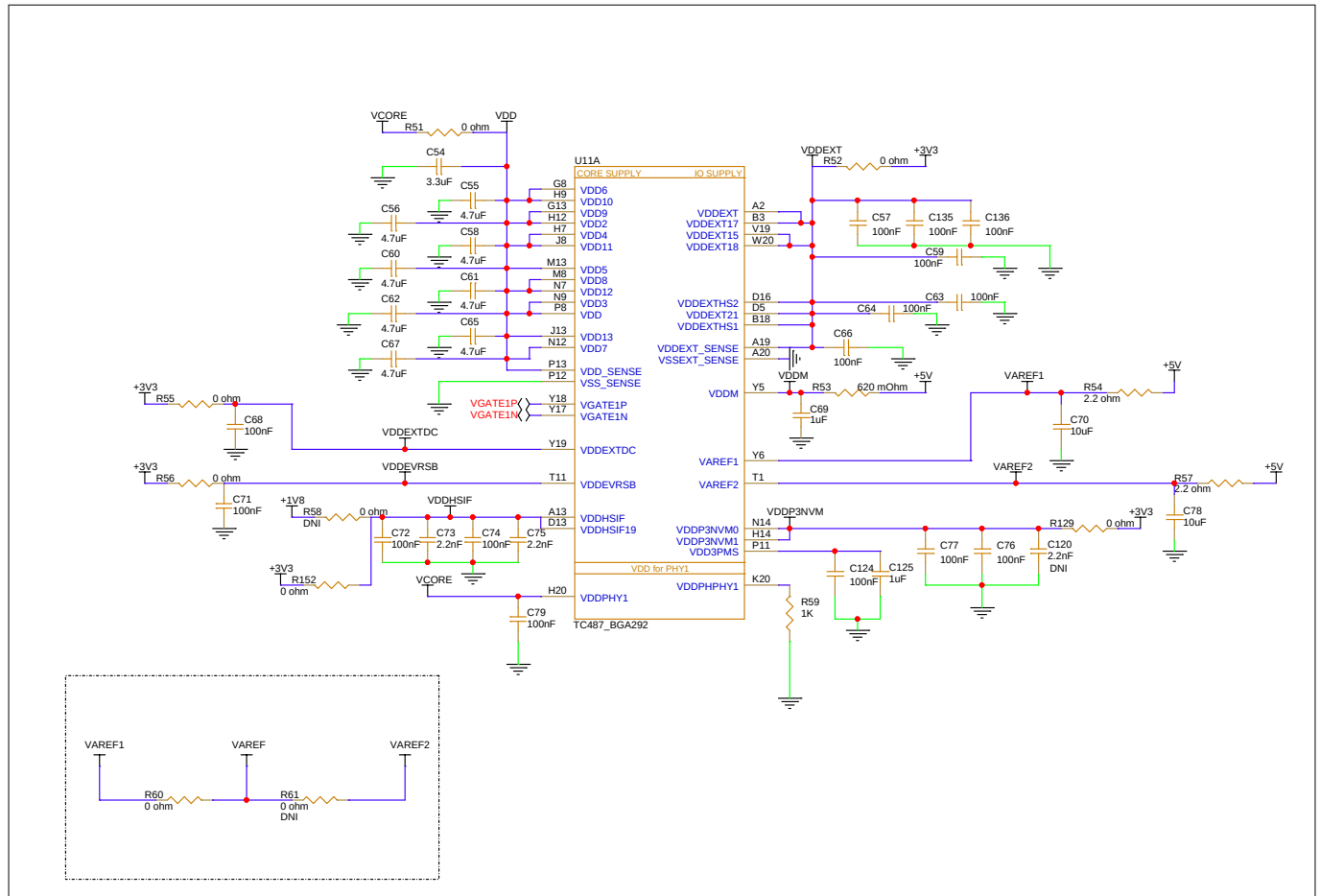


Figure 11 Power supply to AURIX™ TC487 MCU

U11B

VSS

G9
G10
G11
G12
H10
H11
J7
J10
J11
J14
K7
K8
K9
K10
K11
K12
K13
K14

VSS32
VSS
VSS1
VSS2
VSS3
VSS4
VSS5
VSS6
VSS7
VSS8
VSS9
VSS10
VSS11
VSS42
VSS43
VSS12
VSS13
VSS14

VSS15
VSS16
VSS17
VSS18
VSS19
VSS20
VSS21
VSS22
VSS23
VSS24
VSS25
VSS26
VSS27
VSS28
VSS29
VSS30

VSSM

Y4

VAGND1
VAGND2

VSSHSIF
VSSHSIF34

VSS for IO

VSSEXT
VSSEXT35
VSSEXT36
VSSEXT37
VSSEXT38
VSSEXT41
VSSEXT40

VSSEXT45
VSSEXT44

VSS for PHY1

VSSPHY39

TC487_BGA292

L7
L8
L9
L10
L11
L12
L13
L14
M7
M10
M11
M14
N10
N11
P9
P10

A14
D14

A1
B2

Y20

OPT RESISTOR R84, R79 TO BE REMOVED FOR TC487 DEVICES ONLY

002-43040 Rev. **
2026-06-09

5 Schematics and placement

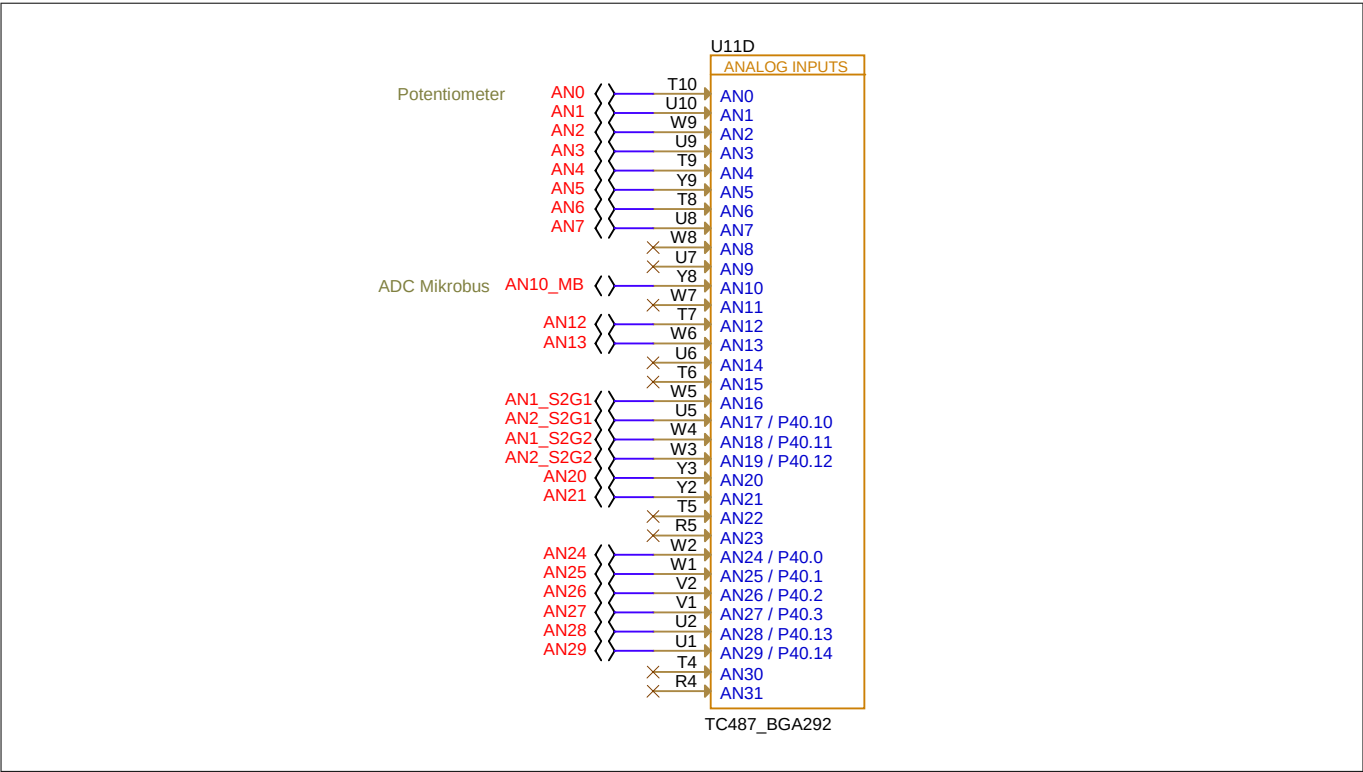


Figure 14 Analog inputs to AURIX™ TC487 MCU

5 Schematics and placement

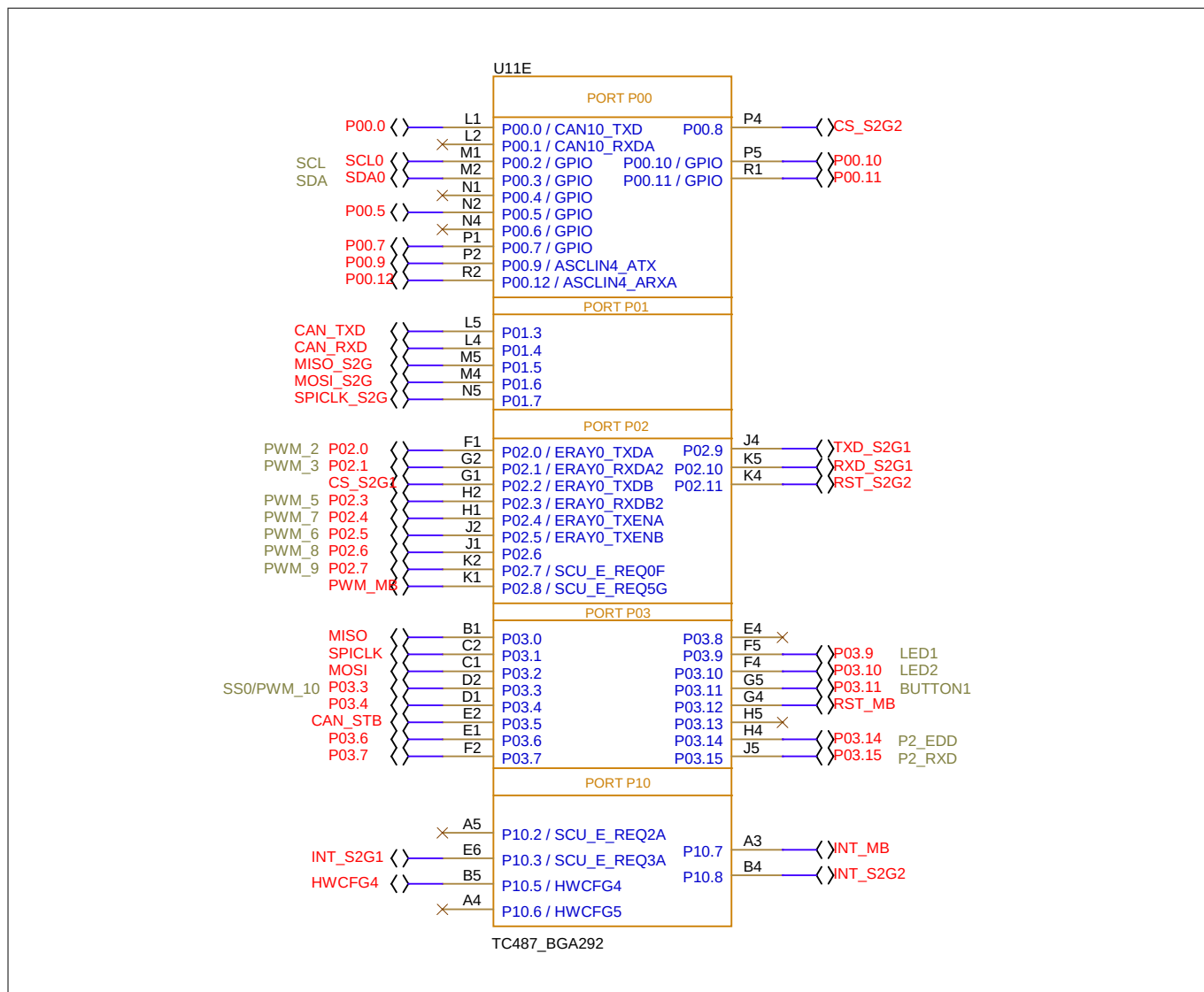


Figure 15 Digital input and outputs to AURIX™ TC487 MCU

5 Schematics and placement

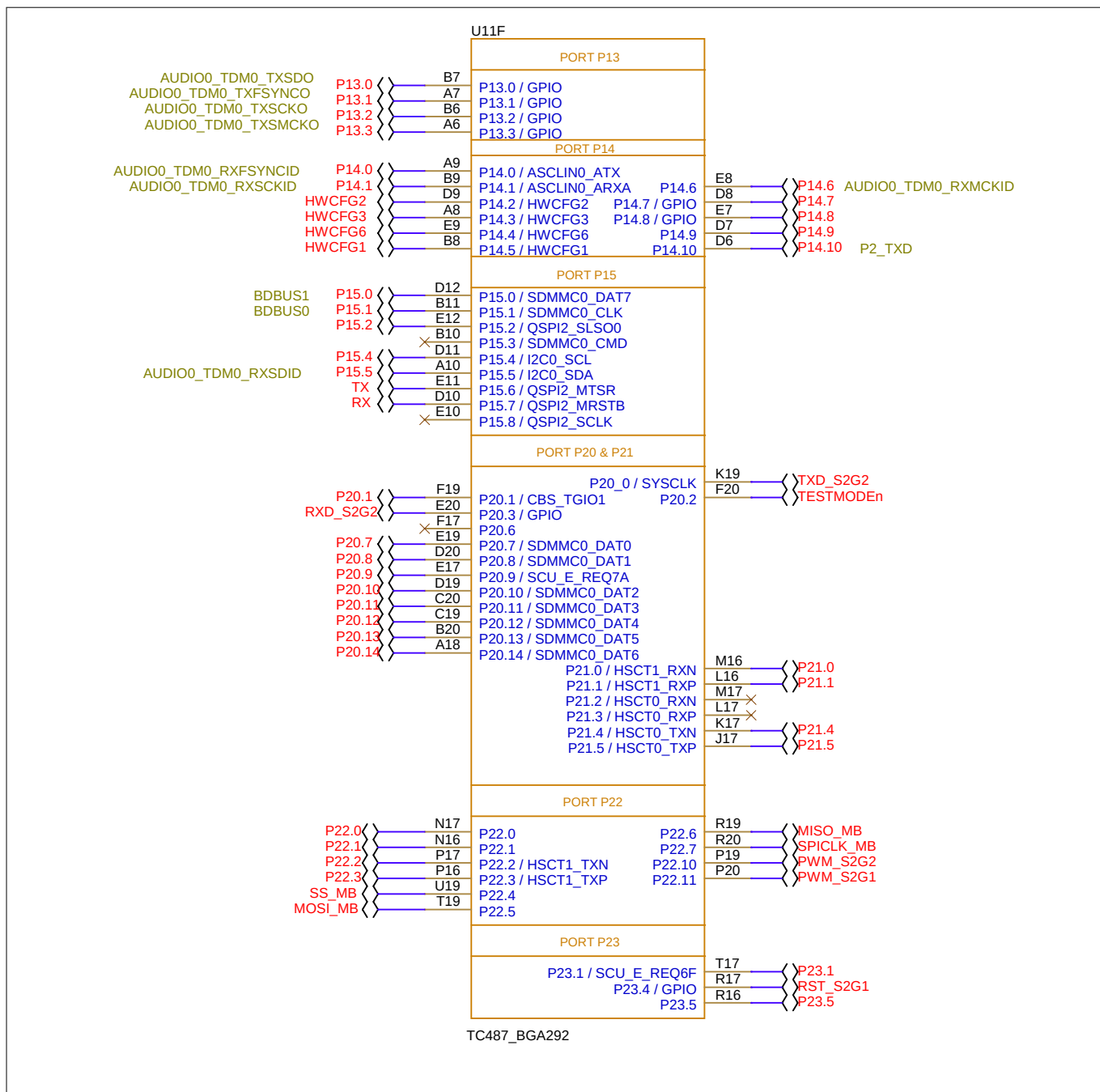


Figure 16 Digital input and outputs to AURIX™ TC487 MCU

5 Schematics and placement

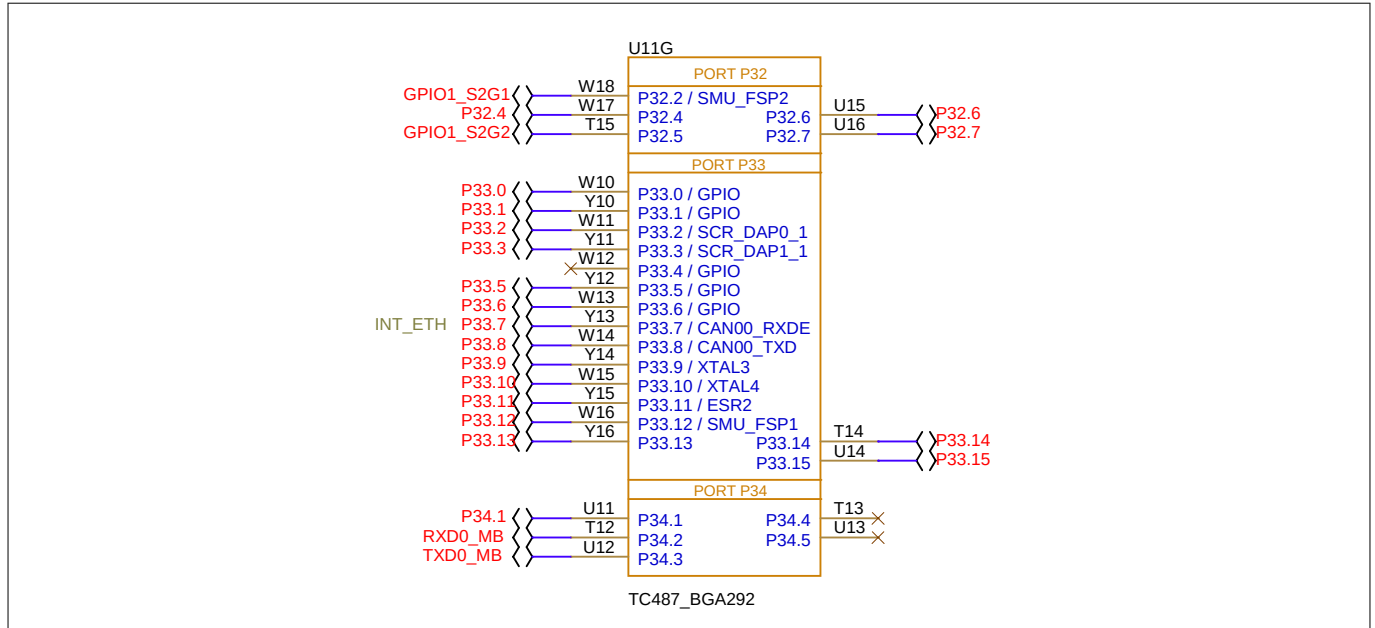


Figure 17 Digital input and outputs to AURIX™ TC487 MCU

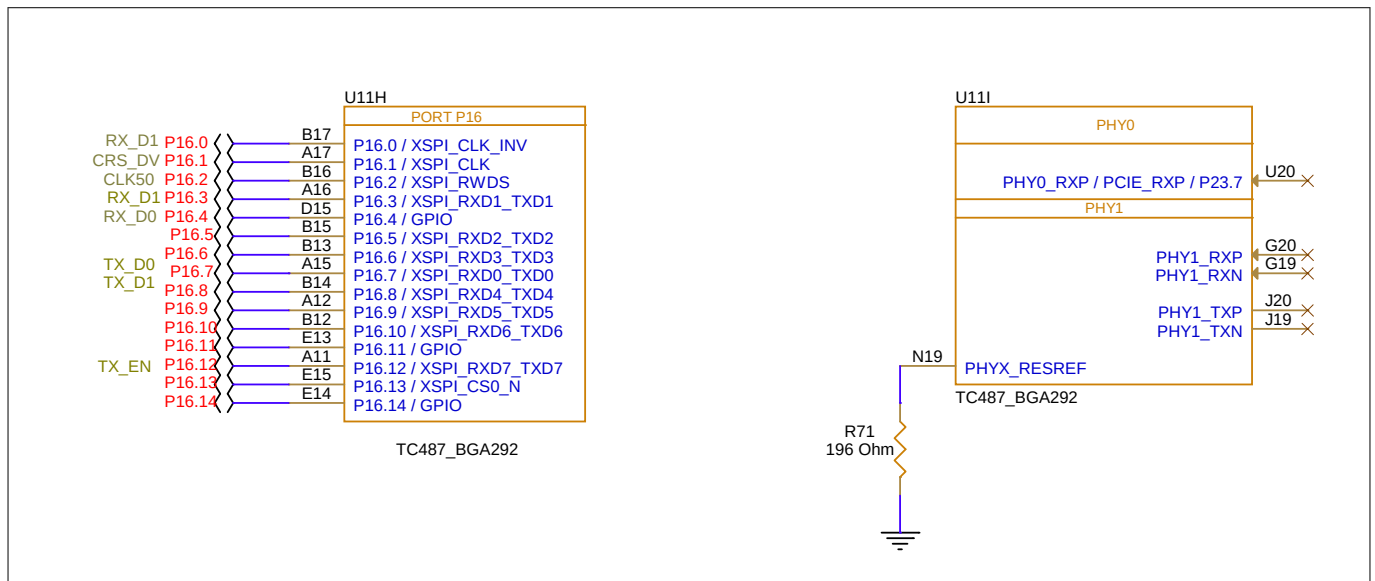


Figure 18 Digital input and outputs to AURIX™ TC487 MCU

5 Schematics and placement

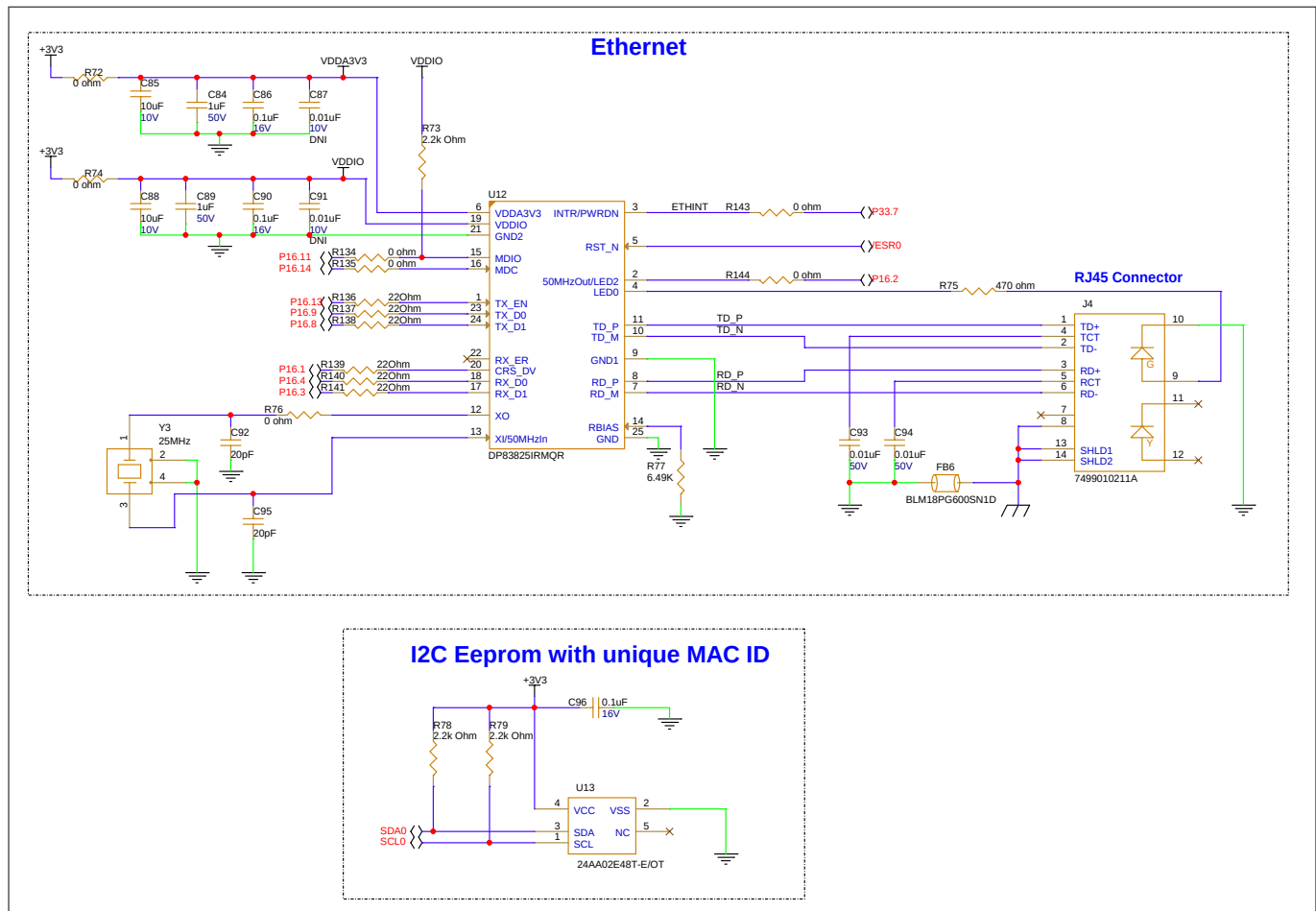


Figure 19 Ethernet (10/100 Mbps) Interface

5 Schematics and placement

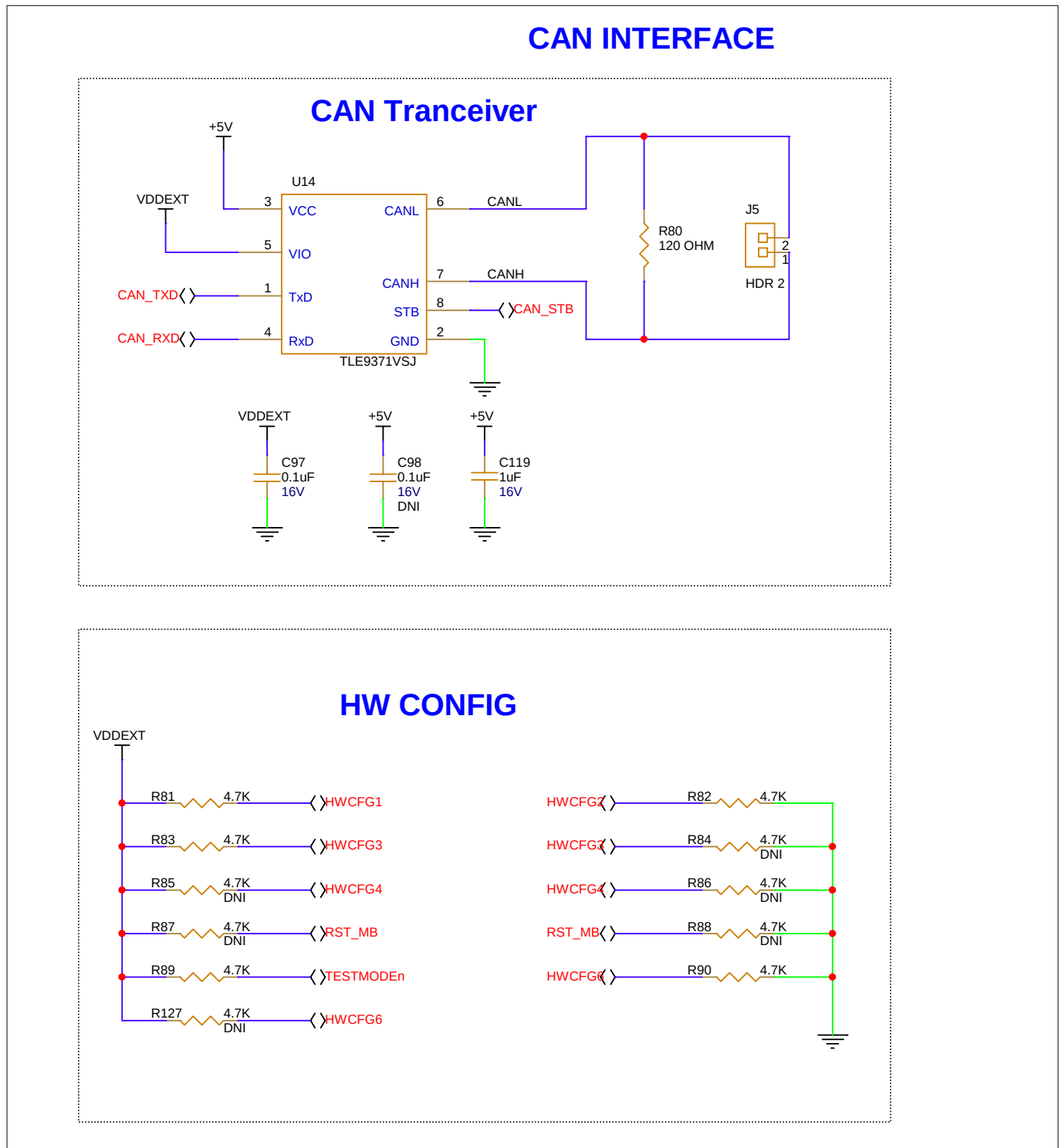


Figure 20 CAN interface and HWCFG section

5 Schematics and placement

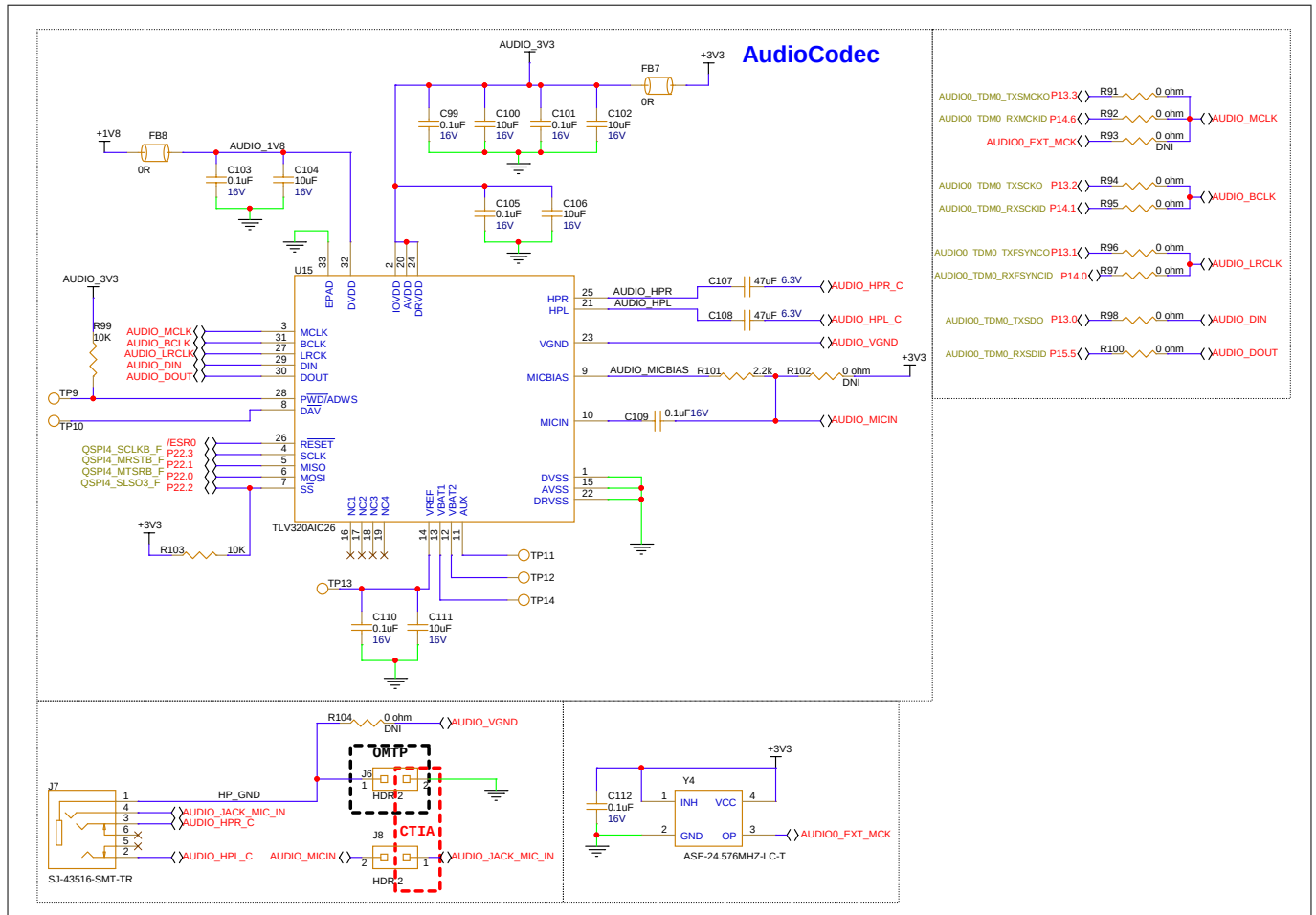


Figure 21 Audio Codec section

xSPI memory

The schematic diagram illustrates the xSPI memory interface. It features two SPI controllers, U16 and U17, connected to an S26HS512TGABHM000 memory and a TXS0102DCUR level shifter. The diagram shows the following connections:

- U16 (S26HS512TGABHM000):**
 - VCC (B4, D1, E4) connected to +1V8 via R106 (0 Ohm).
 - VSSQ2 (E5), VSS (B3), and VSSQ1 (C1) connected to ground.
 - RSTO# (A2) connected to +1V8 via R112 (10k).
 - INT# (A5) connected to +1V8 via R110 (10k).
 - RESET# (A4) connected to +1V8 via R113 (10k).
 - CS# (C2) connected to +1V8 via R108 (10k).
 - CK# (B1), CK (B2), DQ0 (D1), DQ1 (D2), DQ2 (D3), DQ3 (D4), DQ4 (D5), DQ5 (E1), DQ6 (E2), DQ7 (E3), and DS (C3) connected to the memory.
 - DNU2, DNU4, and DNU5 are connected to ground.
- U17 (TXS0102DCUR):**
 - VCCB (7) and VCCA (3) connected to +3V3 via C115 (100nF).
 - GND (2) connected to ground.
 - OE (6) connected to +1V8 via C116 (100nF).
 - B1 (8) and B2 (1) connected to /ESR0 (P33.7).
 - A1 (4) and A2 (5) connected to RESETn and xSPI_INT#_ETHINT.

The right side of the diagram shows the pin connections for the xSPI memory interface, including the xSPI_RSTO# pin, xSPI_INT# pin, xSPI_CS#0 pin, xSPI_CS#1 pin, xSPI_DS pin, xSPI_DQ0 pin, xSPI_DQ1 pin, xSPI_DQ2 pin, xSPI_DQ3 pin, xSPI_DQ4 pin, xSPI_DQ5 pin, xSPI_DQ6 pin, xSPI_DQ7 pin, xSPI_DS pin, xSPI_CS#0 pin, xSPI_CS#1 pin, xSPI_RSTO# pin, and xSPI_INT#_ETHINT pin.

[illegible]

002-43040 Rev. **
2026-06-09

5 Schematics and placement

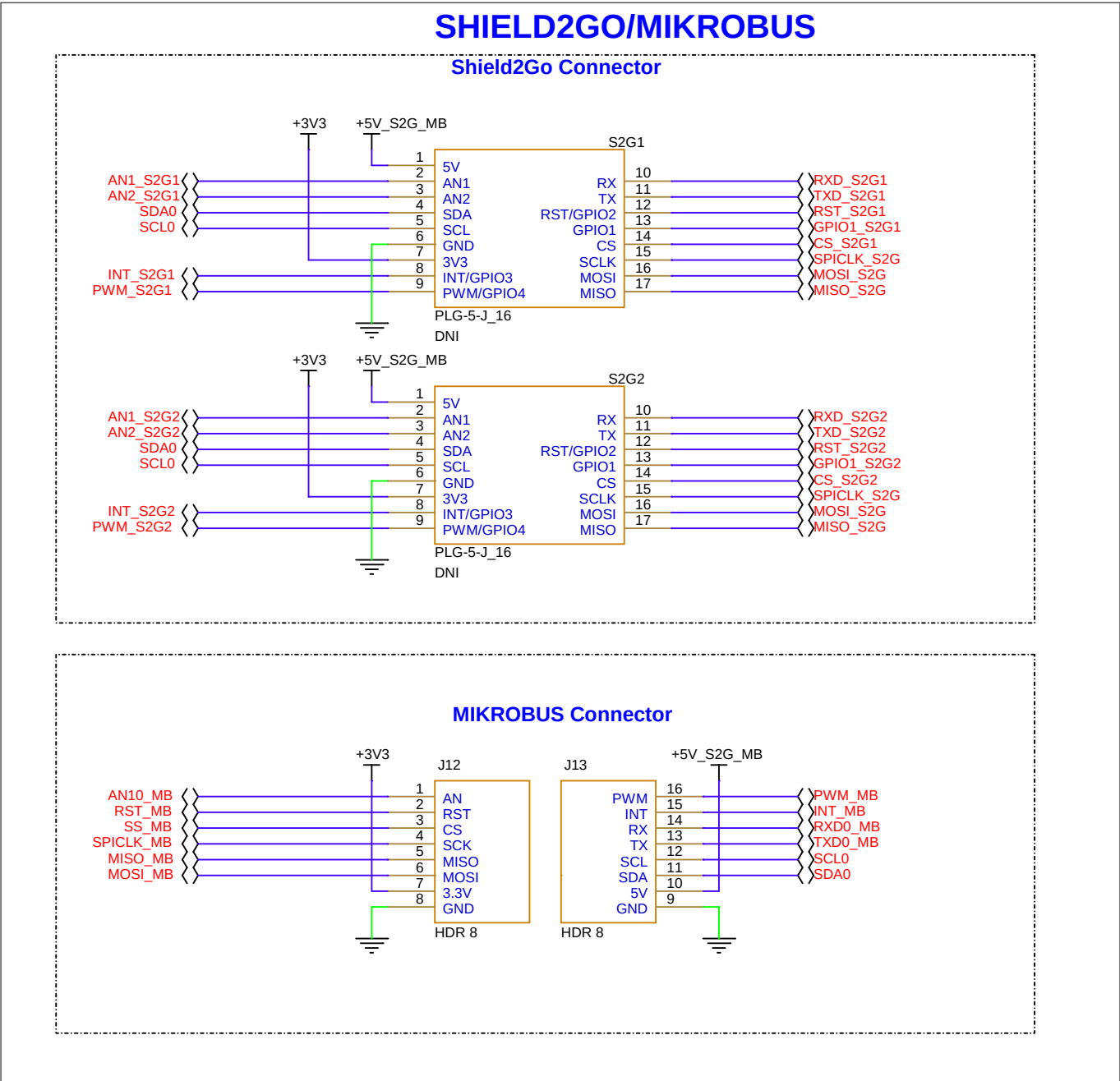


Figure 24 Shield2GO and mikroBus Connectors

5 Schematics and placement

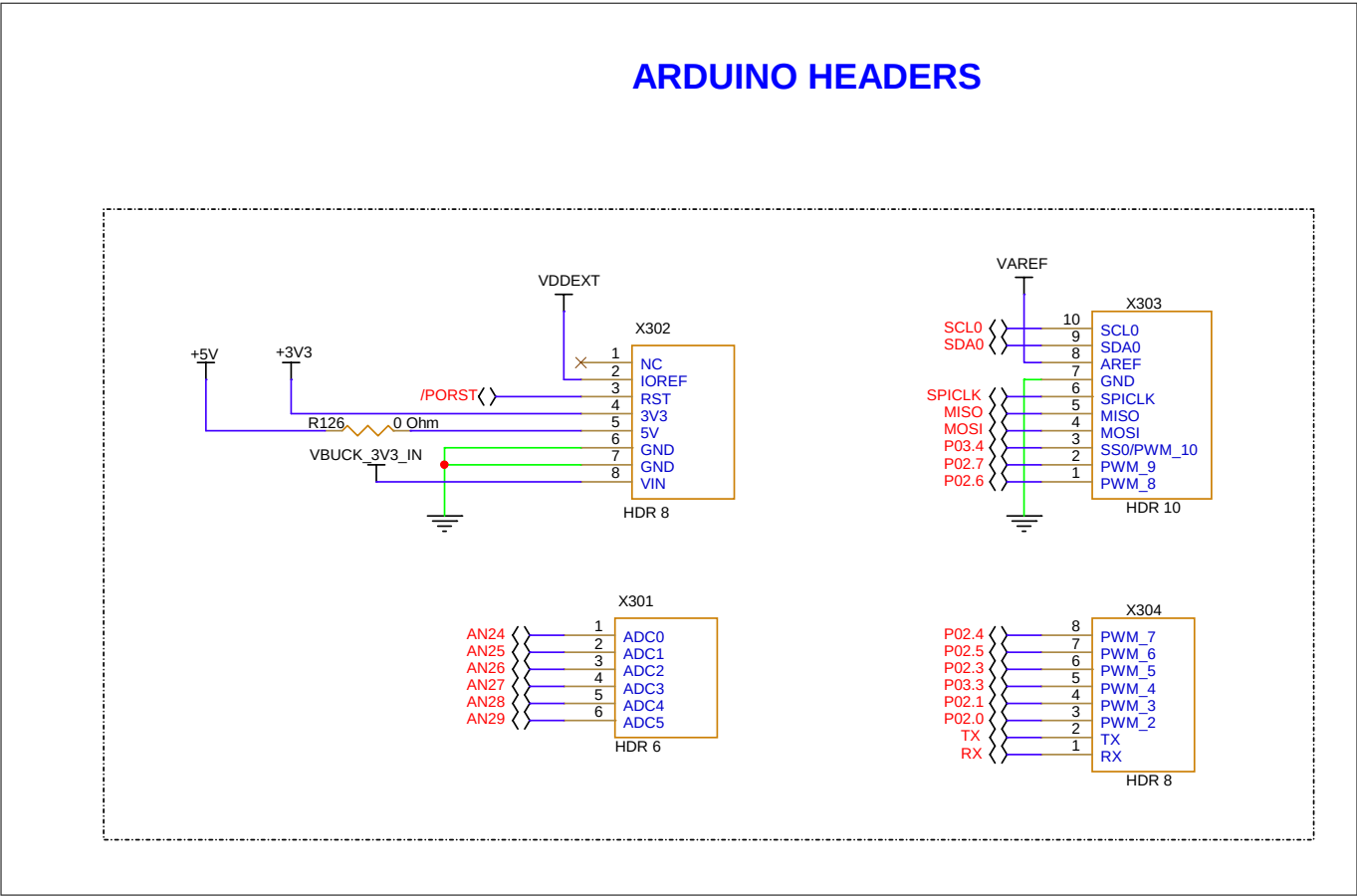


Figure 25 Aurdino headers

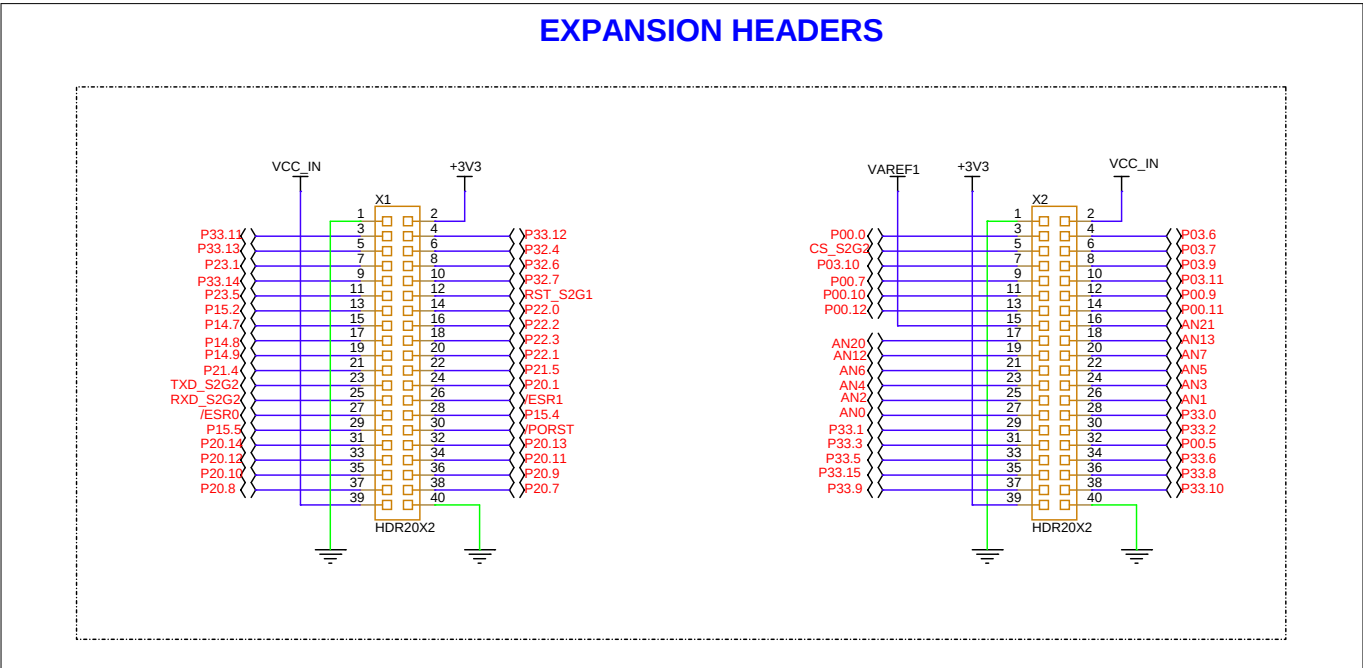


Figure 26 Expansion connectors

The image shows the TC487_LITE PCB, a compact board designed for integration into a small form factor. Key features include:

- Microcontroller:** Infineon TC487_LITE (U1) with WW: 2615 V1.1 and 600-60813-01.
- Connectors:** J12 (5V, AN, RST, C5, SCK, MISO, MOSI, 3V3, GND), J13 (5V, AN1, AN2, SDA, SCL, GP10, GND, C5, 3V3, CLK, INT, MOSI, PWM, MISO), J14 (CAN), J15 (Ethernet), J16 (USB).
- LEDs:** LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9, LED10, LED11, LED12, LED13.
- Buttons:** SW1, SW2, RESET.
- Other Components:** Various resistors (R1-R100), capacitors (C1-C50), and other passive components.

The image shows a detailed PCB layout for a custom board, likely a Raspberry Pi 40-pin header adapter. The board features a central microcontroller (U6) and various peripheral components including resistors (R1-R50), capacitors (C1-C17), and connectors (X1, X2, X302). It includes two 28-pin headers (Shield2Go1, Shield2Go2) and a 40-pin header (X1). The layout is populated with numerous components, including a USB connector (X302), a micro-USB connector (X1), and a 40-pin header (X1). The board is labeled with component values and pin numbers, and includes a "BOARD LABEL" area.

002-43040 Rev. **
2026-06-09

6 Bill of materials

6 Bill of materials

Table 22 Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	C1	CAP CER 10UF 25V X5R 0603	0603	Murata Electronics	GRM188R61E106 KA73D	10 uF
1	C2	CAP CER 0.1UF 50V X7R 0402	0402	TDK Corporation	CGA2B3X7R1H104 K050BB	0.1 uF
2	C3, C8	CAP CER 10UF 25V X7R 0805	0805	Murata Electronics	GRM21BZ71E106 KE15K	10 uF
1	C4	CAP CER 0.1UF 25V X7R 0402	0402	TDK Corporation	CGA2B3X7R1E104 K050BB	0.1 uF
1	C5	CAP CER 10000PF 10% 25V X7R 0402	0402	Murata Electronics	GCM155R71E103 KA37D	0.01 uF
2	C7, C132	CAP CER 0.1UF 25V X7R 0805	0805	KYOCERA AVX	08053C104K4T2A	0.1 uF
2	C9, C10	CAP CER 22UF 25V X5R 0805	0805	Yageo	CC0805MKX5R8B B226	22 uF
1	C11	CAP CER 0603 100PF 16V ULTRA STA	0603	KEMET	C0603C101K4HAC AUTO	0.1 nF
3	C12, C15, C23	CAP CER 4.7UF 16V X5R 0603	0603	KYOCERA AVX	0603YD475KAT2A	4.7 uF
2	C13, C14	CAP CER 22UF 16V X5R 0805	0805	Samsung Electro-Mechanics	CL21A226KOQNN NG	22 uF
7	C16, C20, C100, C102, C104, C106, C111	CAP CER 10UF 16V X7R 0805	0805	Murata Electronics	GRM21BZ71C106 KE15L	10 uF
9	C17, C21, C99, C101, C103, C105, C109, C110, C112	CAP CER 0.1UF 16V X7R 0603	0603	Murata Electronics	GCJ188R71C104K A01D	0.1 uF
1	C18	CAP CER 100PF 10% 16V X7R 0805	0805	KEMET	C0805C101K4RAC TU	100 pF
2	C26, C36	CAP TANT 4.7UF 10% 10V 1206	1206	KEMET	T491A475K010AT	4.7 uF
23	C27, C28, C29, C30, C31, C32, C33, C34, C35, C40, C41, C42, C43, C44, C45, C46, C50, C52, C86, C90, C96, C97, C134	CAP CER 0.1UF 10% 16V X7R 0402	0402	TDK Corporation	CGA2B1X7R1C104 K050BC	0.1 uF

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	C37	CAP CER 3.3UF 10% 10V X5R 0805	0805	Samsung Electro-Mechanics	CL21A335KPFNN NE	3.3 uF
2	C38, C39	CAP CER 12PF 50V C0G/NP0 0402	0402	Murata Electronics	GCM1555C1H120 FA16J	12 pF
2	C47, C48	CAP CER 33UF 10V X5R 1210	1210	TDK Corporation	C3225X5R1A336M 200AC	33 uF
1	C49	CAP CER 0.1UF 16V X7R 1210	1210	KYOCERA AVX	KGM32RR71C104 ML	0.1 uF
1	C51	CAP CER 22UF 16V X7R 1210	1210	TDK Corporation	GCM32ER71C226 KE19L	22 uF
1	C53	CAP CER 0.047UF 50V X7R 0603	0603	TDK Corporation	CGA3E2X7R1H473 K080AA	47 nF
1	C54	CAP CER 3.3UF 10V X5R 0603	0603	TDK Corporation	CGA3E1X5R1A335 K080AC	3.3 uF
8	C55, C56, C58, C60, C61, C62, C65, C67	CAP CER 4.7UF 16V X5R 0402	0402	KYOCERA AVX	KGM05CR51C475 MH	4.7 uF
15	C57, C59, C63, C64, C66, C68, C71, C72, C74, C76, C77, C79, C124, C135, C136	CAP CER 0.1UF 16V X7R 0402	0402	YAGEO	AC0402JRX7R7BB 104	100 nF
2	C69, C125	CAP CER 1UF 10% 10V X7R 0402	0402	Murata Electronics	GRM155Z71A105K E01J	1 uF
2	C70, C78	CAP CER 10UF 16V X5R 0603	0603	MuRata	GRT188R61C106K E13D	10 uF
2	C73, C75	CAP CER 2200PF 16V X7R 0402	0402	YAGEO	AC0402KRX7R7BB 222	2.2 nF
1	C80	CAP CER 4.7UF 10% 10V X5R 0402	0402	TDK Corporation	0402ZD475KAT2A	4.7 uF
1	C81	CAP CER 0.33UF 10% 10V X5R 0402	0402	Murata Electronics	GRM155R61A334 KE15D	0.33 uF
2	C82, C83	CAP CER 20PF 50V C0G 0603	0603	Murata Electronics	GRM1885C1H200 GA01J	20 pF
2	C84, C89	CAP CER 1UF 50V X5R 0402	0402	Murata Electronics	GRM155R61H105 KE05D	1 uF
2	C85, C88	CAP CER 10UF 10V X5R 0402	0402	Murata Electronics	GRT155R61A106M E13J	10 uF

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
2	C92, C95	CAP CER 20PF 2% 50V C0G/NPO 0402	0402	YAGEO	CC0402GRNPO9B N200	20 pF
2	C93, C94	CAP CER 10000PF 50V X7R 0402	0402	Würth Elektronik	8.85012E+11	0.01 uF
2	C107, C108	CAP CER 47UF 6.3V X5R 0603	0603	Murata Electronics	GRM188R60J476 ME15D	47 uF
5	C113, C115, C116, C129, C130	CAP CER 0.1UF 16V X7R 0402	0402	YAGEO	AC0402JRX7R7BB 104	100 nF
1	C114	CAP CER 1UF 10% 10V X7R 0402	0402	Murata Electronics	GRM155Z71A105K E01J	1 uF
2	C117, C128	CAP CER 2.2UF 10% 10V X7S 0402	0402	TDK Corporation	GRT155C71A225K E13D	2.2 uF
1	C131	CAP CER 4700PF 16V X7R 0402	0402	MuRata	GRM155R71C472 KA01D	4.7 nF
1	DAP	CONN HEADER SMD 10POS 1.27MM	ftsh-105-01- l-dv-k	Samtec Inc.	FTSH-105-01-L- DV-K	FTSH-10 5-01-L- DV-K
1	D1	TVS DIODE 12VWM 15.5VC SOD323	DIO2_SOD3 23_BIQ	Micro Commercial Co	ESD12VD3B-TP	ESD12V D3B-TP
5	D3, D4, D5, D6, D7	DIODE SCHOTTKY 40V 4A SMA-FL	SODFL5126 X110N	onsemi	NRVBAF440T3G	NRVBAF 440T3G
3	FB1, FB2, FB3	FERRITE BEAD 30 OHM 0805 1LN	0805	Fair-Rite Products Corp.	2508053007Y3	30 Ω
2	FB4, FB5	FERRITE BEAD 30 OHM 0603 1LN	0603	TDK Corporation	MMZ1608R300AT A00	30 Ω
1	FB6	FERRITE BEAD 60 OHM 0603 1LN	0603	Murata Electronics	BLM18PG600SN1 D	BLM18P G600SN 1D
2	FB7, FB8	FERRITE BEAD 0 OHM 0603 1LN	0603	TE Connectivity Passive Product	2176743-1	0R
1	F1	PTC RESET FUSE 6V 3A 1812	FUSC4632X 155N	Bel Fuse Inc.	0ZCG0300FF2B	FUSE
1	J1	CONN PWR JACK 2X5.5MM SOLDER	power_barr el	CUI Devices	PJ-102A	POWER JACK P-5
1	J2	CONN RCP USB3.1 TYPEC 24P SMD RA	DX07S024XJ 1R1100	JAE Electronics	DX07S024XJ1R11 00	DX07S0 24XJ1R 1100

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	J3	CONN HEADER VERT 3POS 2.54MM	hdr1x3	Würth Elektronik	61300311121	HDR 3
1	J4	1 Port RJ45Through Hole 10/100 Base- T, AutoMDIX	7499010211 A	Würth Elektronik	7499010211A	7499010 211A
5	J5, J6, J8, J10, J11	CONN HEADER VERT 2POS 2.54MM	hdr1x2	Würth Elektronik	61300211121	HDR 2
1	J7	CONN JACK 4COND 3.5MM SMD R/A	sj-43515rs- smt	Same Sky	SJ-43516-SMT-TR	SJ-4351 6-SMT- TR
1	J9	TERM BLK 2P SIDE ENT 3.81MM PCB	TE_1776113 -2	TE Connectivity AMP Connectors	1776113-2	1776113 -2
3	J12, X302, X304	CONN HEADER VERT 8POS 2.54MM	HDRV8W64 P254_8X1	Würth Elektronik	61300811821	HDR 8
1	J13	CONN HEADER VERT 8POS 2.54MM	HDRV8W64 P254_8X1_1	Würth Elektronik	61300811821	HDR 8
7	LED1, LED2, LED3, LED5, LED6, LED8, LED9	LED GREEN DIFFUSED 0805 SMD	0805	Visual Communications Company - VCC	CMD17-21VGD/TR 8	GREEN
1	LED4	LED RED DIFFUSED 0805 SMD	0805	Visual Communications Company - VCC	CMD17-21VRD/TR 8	RED
1	LED7	LED YLW-GRN CLEAR 0805 SMD	0805	Venkel	CTL0805FGR1T- CT	YLW- GRN
2	L1, L2	FIXED IND 2.2UH 8A 23.5MOHM SM	IND_XFL402 0-152MEC	Coilcraft	XFL4020-222MEC	2.2 uH
1	L3	FIXED IND 3.3UH 8.1A 23.3MOHM SM	ind_xal5030 -222meh	Coilcraft	XAL5030-332MEC	3.3 uH
1	L4	CMC 240UH 70MA 2LN SMD AEC- Q200	act1210d-1 31	Abracon LLC	ACT1210E-241-2P -TL00	ACT121 0E-241- 2P-TL00
1	POT1	TRIMMER 10KOHM 0.125W J LEAD TOP	3313J-1-103 E	Bourns Inc.	3313J-1-103E	3313J-1 -103E

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	Q1	PMOS	DFN2020	Infineon Technologies	ISKxxxP02KMA	ISKxxxP02KMA
1	Q2	NMOS	DFN2020	Infineon Technologies	ISKxxxN02KMA	ISKxxxN02KMA
1	Q3	TRANS NPN 30V 0.1A SOT23-3	SOT23-3	onsemi	BC848CLT1G	BC848CLT1G
1	Q4	TRANS PNP 30V 0.1A PG-SOT23	SOT23	Infineon Technologies	BC858CE6327HTS A1	BC858C
2	RV1, RV2	VARISTOR 220V 500MA 0402	0402	TDK Corporation	AVRH10C221KT1R 5YA8	220 V
2	R1, R2	RES SMD 5.1K OHM 5% 1/16W 0402	0402	YAGEO	AC0402JR-075K1L	5.1k
2	R3, R151	RES 100K OHM 5% 1/10W 0402	0402	KOA Speer Electronics	RK73B1ETTP104J	100k
18	R5, R14, R23, R28, R33, R34, R35, R37, R38, R40, R63, R99, R103, R110, R112, R113, R128, R131	RES 10K OHM 5% 1/16W 0402	0402	Yageo	RC0402JR-0710KL	10K
1	R6	47 kΩ ±1% 0.063W, 1/16W 0402(1005 Metric)	0402	Vishay Dale	RCA040247K0FKE DSR	47 kΩ
14	R7, R8, R12, R16, R55, R56, R72, R74, R106, R129, R134, R135, R143, R144	RES 0 OHM JUMPER - 0402	0402	Panasonic Electronic Components	ERJ-S020R00X	0 Ω
1	R9	RES SMD 6.8K OHM 1% 1/16W 0402	0402	Yageo	AF0402FR-076K8L	6.8K
2	R11, R152	RES SMD 0 OHM JUMPER 1/8W 0805	0805	Yageo	AC0805JR-070RL	0 Ω
1	R15	RES 49.9K OHM 1% 1/8W 0805	0805	Yageo	RC0805FR-0749K9 L	49.9k
1	R17	RES 2.49K OHM 1% 1/10W 0402	0402	Panasonic Electronic Components	ERJ-U02F2491X	2.49 KΩ

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	R18	RES SMD 10K OHM 1% 1/16W 0402	0402	Yageo	AF0402FR-0710KL	10K
3	R19, R36, R42	RES SMD 2.2K OHM 1% 1/16W 0402	0402	Vishay Dale	CRCW04022K20F KEDC	2.2K
1	R21	RES 12.5K OHM 0.1% 1/16W 0402	0402	Vishay Dale	MCS04020D1252B E100	12.5K
7	R24, R27, R43, R44, R45, R46, R47	RES 680 OHM 1% 1/10W 0603	0603	YAGEO	RC0603FR-07680R L	680 Ω
2	R25, R26	RES 22 OHM 1% 1/16W 0402	0402	Yageo	RC0402FR-0722RL	22 Ω
1	R29	RES SMD 1K OHM 5% 1/10W 0402	0402	Panasonic Electronic Components	ERJ-2GEJ102X	1K
1	R30	RES 12K OHM 5% 1/16W 0402	0402	Yageo	RC0402JR-0712KL	12K
3	R39, R41, R62	RES 4.7K OHM 1% 1/16W 0402	0402	Yageo	RC0402FR-074K7L	4.7K
19	R50, R52, R60, R66, R67, R76, R91, R92, R94, R95, R96, R97R98, R100, R126, R146, R147, R153, R154	RES SMD 0 OHM JUMPER 1/3W 0603	0603	Yageo	CRCW06030000Z0 EAHP	0 Ω
1	R51	RES SMD 0 OHM 1W 1812 WIDE	1812	Vishay Dale	RCL12180000Z0E K	0 Ω
1	R53	RES 620mOHM 1% 1/8W 0603	0603	Bourns Inc.	CRL0603-FW-R620ELF	620 mΩ
2	R54, R57	RES SMD 2.2 OHM 5% 1/3W 0603	0603	Vishay Dale	CRCW06032R20J NEAHP	2.2 Ω
1	R59	RES SMD 1K OHM 1% 1/10W 0603	0603	Vishay Dale	CRCW06031K00F KEAC	1K
1	R65	RES SMD 1.2 OHM 1% 1/10W 0603	0603	YAGEO	AC0603FR-071R2L	1.2 Ω
3	R68, R78, R79	RES SMD 2.2K OHM 1% 1/10W 0603	0603	Vishay Dale	CRCW06032K20F KTA	2.2k Ω

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
8	R69, R70, R81, R82, R83, R89, R90, R133	RES SMD 4.7K OHM 1% 1/10W 0603	0603	Vishay Dale	CRCW06034K70F KEAC	4.7K
1	R71	RES 196 OHM 1% 1/10W 0402	0402	Vishay Dale	CRCW0402196RF KED	196 Ω
1	R73	RES SMD 2.2K OHM 1% 1/16W 0402	0402	YAGEO	AF0402FR-072K2L	2.2k Ω
1	R75	RES SMD 470 OHM 0.1% 1/16W 0402	0402	Panasonic Electronic Components	ERA-2ARB471X	470 Ω
1	R77	RES 6.49K OHM 1% 1/16W 0402	0402	Yageo	RC0402FR-076K49 L	6.49K
1	R80	RES 120 OHM 1% 1/16W 0402	0402	Yageo	RC0402FR-07120R L	120 Ω
1	R101	RES SMD 2.2k OHM 0.1W, 1/10W 0603	0603	Vishay Dale	RCA06032K20FKE ASR	2.2k
1	R130	RES SMD 75 OHM 1% 1/10W 0603	0603	YAGEO	AF0603FR-0775RL	75 Ω
1	R132	RES 120 OHM 1% 1/16W 0402	0603	Vishay Dale	CRCW0402120RF KEDC	120 Ω
6	R136, R137, R138, R139, R140, R141	RES 22 OHM 1% 1/10W 0402	0603	Panasonic Electronic Components	ERJ-U02F22R0X	22 Ω
2	R145, R148	RES SMD 100K OHM 1% 1/10W 0603	0603	Vishay Dale	CRCW0603100KF KEAC	100 kΩ
2	R149, R150	49.9 Ω ±1% 0.063W, 1/16W Chip Resistor 0402	0402	Vishay Dale	RCA040249R9FKE DSR	49.9 Ω
1	SW1	Tactile Switches 4.2x3.2x2.5 mm 260gf Surface Mount	sw_skrpace 010	Alps Alpine	SKRSPACE010	FSM2JS MA
1	SW2	SWITCH TACTILE SPST-NO 0.05A 16V	SW_PTS810_SJM_250_SMTR_LFS	C&K	PTS810SJG250SM TR LFS	PTS810 SJG250 SMTR LFS

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	U1	TVS DIODE 5.5VWM 6SON	PSON50P14 5X100X60-6 N	STMicroelectronics	TPD4S012DRYR	TPD4S012DRYR
1	U2	IC REG BUCK 5V 2.5A TSDSO-14-5	sop65p600x 115-15n	Infineon Technologies	TLS4125D0EPV50 XUMA1	TLS4125D0EPV50
1	U3	IC REG BUCK ADJ 3A 19IQFN	IR3823AM	Infineon Technologies	IR3823AMTRPBFA UMA1	IR3823A
1	U4	IC REG LIN POS ADJ 800MA DSO-8	soic127p60 0x170-9n-3	Infineon Technologies	TLS208D1EJVXUM A1	TLS208D1EJV
1	U5	IC USB HS DUAL UART/FIFO 64- LQFP	QFP50P120 0X1200X160 -64N	FTDI	FT2232HL-REEL	FT2232HL-REEL
1	U6	IC EEPROM 1KBIT MICROWIRE 8SOIC	SOIC127P60 0X175-8N_A	Microchip Technology	93LC46B-I/SN	93LC46B-I/SN
1	U7	IC BUFF NON- INVERT 5.5V 20- TSSOP	SOP65P640 X120-20N	Texas Instruments	SN74AHC244PWR	SN74AHC244PWR
2	U8, U9	IC XLTR VL BIDIR SOT-23-6	SOT95P280 X145-6N	Texas Instruments	SN74LVC1T45DBV R	SN74LVC1T45DBVR
1	U10	IC BUFF NON- INVERT 5.5V SOT-23-5	SOT95P280 X145-5N	Texas Instruments	SN74LVC1G125DB VT	SN74LVC1G125DBVT
1	U11	IC TriCore™ Aurix™ TC487 microcontroller	TC_4X7_BG A292	Infineon Technologies	SAK-TC487QP-16NF40 0MC-AA	TC487_BGA292
1	U12	IC TXRX FULL/ HALF 1/1 24WQFN	XCVR_DP83 825IRMQR	Texas Instruments	DP83825IRMQR	DP83825IRMQR
1	U13	IC EEPROM 2KBIT I2C SOT23-5	SOT95P280 X145-5N	Microchip Technology	24AA02E48T-E/OT	24AA02E48T-E/OT
1	U14	IC TRANSCEIVER HALF 1/1 PGDSO8	SOIC127P60 0X175-8N_A	Infineon Technologies	TLE9371VSJ	TLE9371VSJ
1	U15	IC STEREO AUDIO CODEC LP 32- VQFN	IC_CDCLVC1 310RHBR	Texas Instruments	TLV320AIC26IRHB R	TLV320AIC26

(table continues...)

6 Bill of materials

Table 22 (continued) Bill of materials

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	U16	IC FLASH 512MBIT HYPERBUS™ 24FBGA	fbga024_S2 6HS512	Infineon Technologies	S26HS512TGABH M000	S26HS5 12TGAB HM000
1	U17	IC XLTR VL BIDIR 8-VSSOP	SOP50P310 X90-8N	Texas Instruments	TXS0102DCUR	TXS010 2DCUR
2	X1, X2	CONN HEADER VERT 40POS 2.54MM	HDRV40W64 P254_20X2	Würth Elektronik	61304021121	HDR20X 2
1	X301	WR-PHD 2.54 MM SOCKET HEADER 6 P	HDRV6W64 P254_6X1	Würth Elektronik	61300611821	HDR 6
1	X303	CONN HDR 10POS 0.1 GOLD PCB	HDRV10W64 P254_10X1	Würth Elektronik	61301011821	HDR 10
1	Y1	12 MHz ±15 ppm Crystal 8 pF 120 Ω 4-SMD, No Lead	OSCCC320X 250X60N	Diodes Incorporated	FL1200138	12 MHz
1	Y2	25 MHz ±20 ppm Crystal 12 pF 40 Ω 4-SMD, No Lead	ECS2501233 QJESTR	ECS Inc.	ECS-250-12-33Q- JES-TR	25 MHz
1	Y3	25 MHz ±50 ppm Crystal 18 pF 50 Ω 4-SMD, No Lead	XTAL_FA-23 8_250000M B-C3	EPSON	FA-238 25.0000MB-C3	25 MHz
1	Y4	XTAL OSC XO 24.5760MHZ CMOS SMD	XTAL_FA-23 8_250000M B-C3	Abracon LLC	ASE-24.576MHZ- L-C-T	ASE-24. 576MHZ -LC-T

Table 23 No load Components

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	C6	CAP CER 10UF 25V X7R 0805	0805	Murata Electronics	GRM21BZ71E106 KE15K	10 uF
1	C19	CAP CER 10UF 16V X7R 0805	0805	Murata Electronics	GRM21BZ71C106 KE15L	10 uF
1	C22	CAP CER 0.1UF 16V X7R 0603	0603	Murata Electronics	GCJ188R71C104K A01D	0.1 uF
1	C24	CAP CER 10UF 16V X5R 0603	0603	MuRata	GRT188R61C106K E13D	10 uF

(table continues...)

6 Bill of materials

Table 23 (continued) No load Components

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	C25	0.22 μ F $\pm$ 10% 16V Ceramic Capacitor X7R 0603	0603	Murata	GCJ188R71C224K A01D	220 nF
2	C87, C91	CAP CER 0.01 μ F 10V X7R 0402	0402	YAGEO	CC0402KRX7R6BB 103	0.01 μ F
1	C98	CAP CER 0.1 μ F 10% 16V X7R 0402	0402	TDK Corporation	CGA2B1X7R1C104 K050BC	0.1 μ F
1	C119	CAP CER 1 μ F 16V X7R 0603	0603	Murata Electronics	GCM188R71C105 KA64D	1 μ F
1	C120	CAP CER 2200PF 16V X7R 0402	0402	YAGEO	AC0402KRX7R7BB 222	2.2 nF
1	C126	CAP CER 4.7 μ F 16V X7R 0805	0805	KYOCERA AVX	GCM21BR71C475 KA73L	COPT
1	C127	CAP CER 33 μ F 10V X5R 1210	1210	TDK Corporation	C3225X5R1A336M 200AC	33 μ F
1	C133	CAP CER 0.1 μ F 25V X7R 0805	0805	KYOCERA AVX	08053C104K4T2A	0.1 μ F
16	R4, R105, R107, R108, R109, R111, R114, R115, R116, R117, R118, R119, R120, R121, R122, R142	RES 0 OHM JUMPER - 0402	0402	Panasonic Electronic Components	ERJ-S020R00X	0 Ω
1	R10	RES SMD 100K OHM 1% 1/16W 0402	0402	Yageo	AF0402FR-07100K L	100K
4	R13, R20, R22, R125	RES 10K OHM 5% 1/16W 0402	0402	Yageo	RC0402JR-0710KL	10K
7	R31, R32, R61, R64, R93, R102, R104	RES SMD 0 OHM JUMPER 1/3W 0603	0603	Yageo	CRCW06030000Z0 EAHP	0 Ω
1	R58	RES SMD 0 OHM JUMPER 1/8W 0805	0805	Yageo	AC0805JR-070RL	0 Ω
6	R84, R85, R86, R87, R88, R127	RES SMD 4.7K OHM 1% 1/10W 0603	0603	Vishay Dale	CRCW06034K70F KEAC	4.7K
2	S2G1, S2G2	Shield2go	S2G-1P	-	-	PLG-5-J_16

(table continues...)

6 Bill of materials**Table 23** (continued) No load Components

Qty	Reference	Description	PCB footprint	Manufacturer	MPN	Value
1	U18	10BASE-T1S PMD Transceiver	SOT782-1			



Revision history

Revision history

Document version	Date of release	Description of changes
**	2026-06-09	Initial release

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