OPTIGA™ Trust Adapter

User Guide

About this document

Scope and purpose

This document describes the OPTIGA™ Trust Adapter.

The OPTIGA™ Trust Adapter is a PCB adapter for easy and fast evaluation of OPTIGA™ embedded security solutions. The add-on boards shown in this document are not part of the OPTIGA™ Trust Adapter and have to be ordered separately.

Intended audience

This document is intended for system design and verification engineers, who use the OPTIGA™ Trust Adapter for the evaluation of OPTIGA™ embedded security solutions.

Table of contents

1 Introduction

The OPTIGA™ Trust Adapter is a PCB adapter to connect add-on boards or sample chips from the OPTIGA™ product family to microcontroller evaluation kits with Arduino compatible connectors.

- Add-on boards can be connected via the mikroBUS or Shield2Go compatible sockets
- Samples can be connected without soldering via product specific Target Adapters

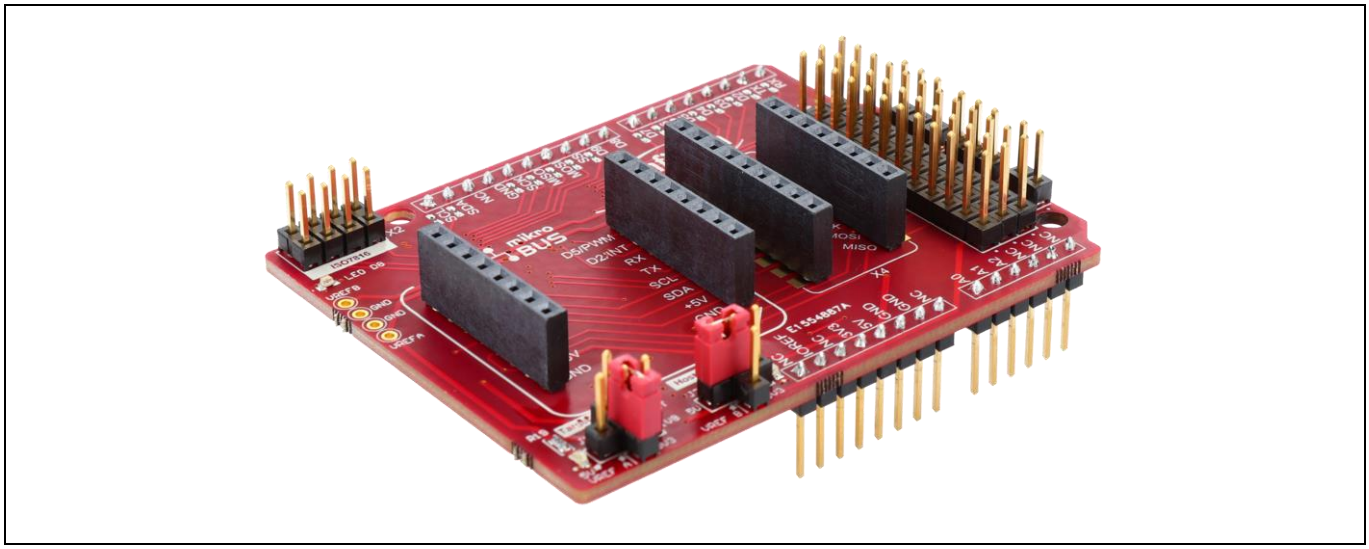

Figure 1 OPTIGA™ Trust Adapter

2 Pinout

Figure 2 describes the pinout of the OPTIGA™ Trust Adapter. For easier readability the signals are hightlighted in colors which are described in the legend.

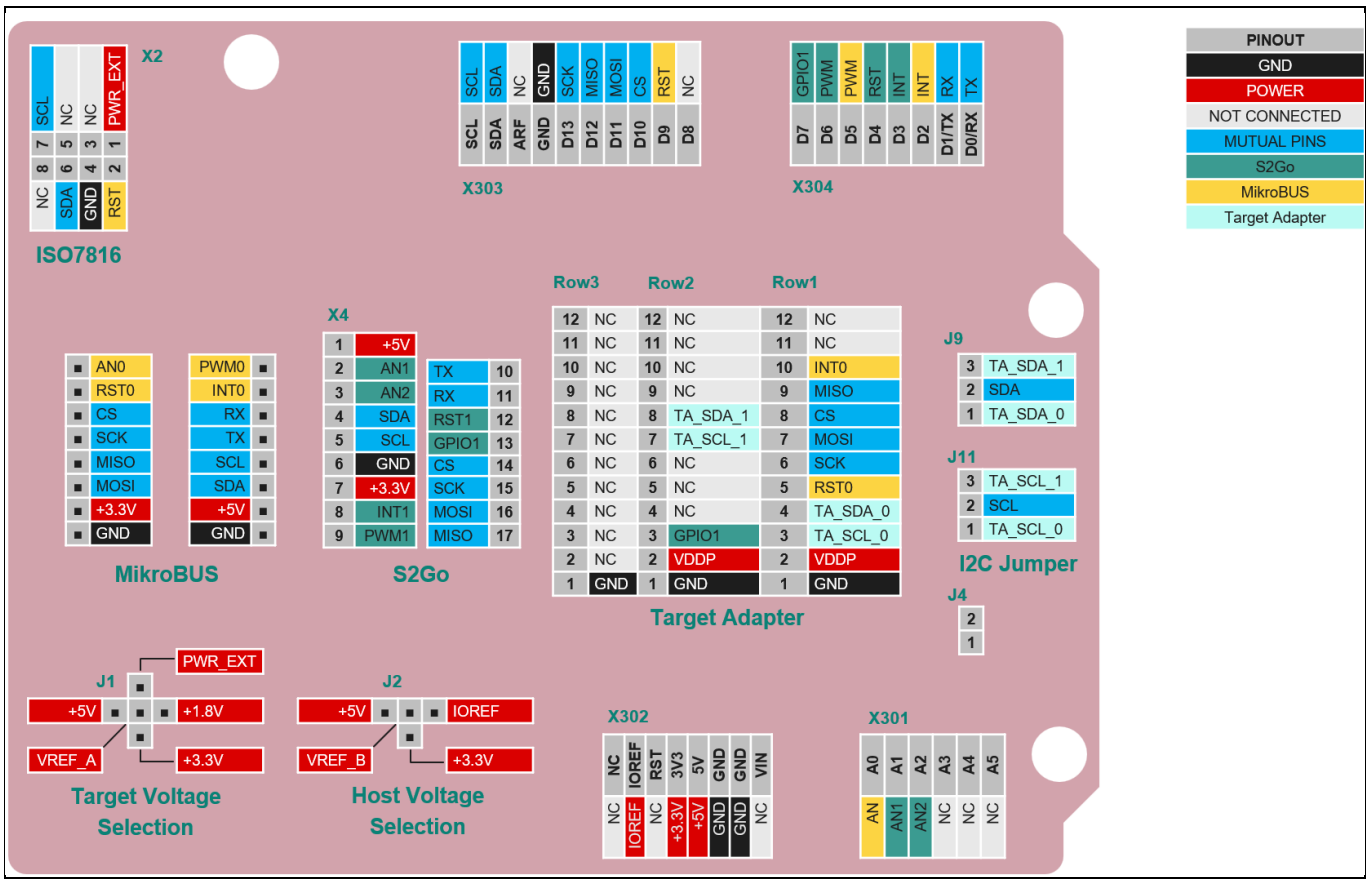

Figure 2 OPTIGA™ Trust Adapter pinout

3 Add-on boards

The OPTIGA™ Trust Adapter has sockets for mikroBUS and Shield2Go compatible add-on boards.

Please note: The SPI Chip Select (CS) signal signal is shared between the mikroBUS and Shield2Go socket, therefore the SPI bus cannot be shared by the sockets.

3.1 mikroBUS

Figure 3 shows the OPTIGA™ Trust Adapter used with a mikroBUS compatible add-on board.

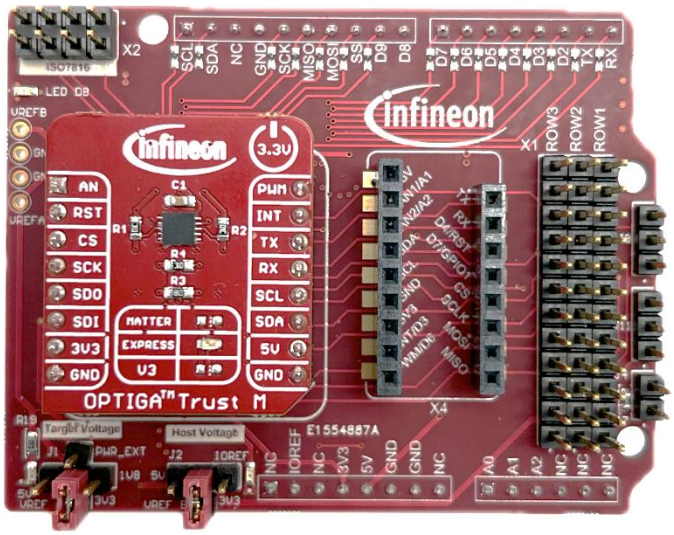

Figure 3 OPTIGA™ Trust Adapter with mikroBUS compatible add-on board

3.2 Shield2Go

Figure 4 shows the OPTIGA™ Trust Adapter used with a Shield2Go compatible add-on board.

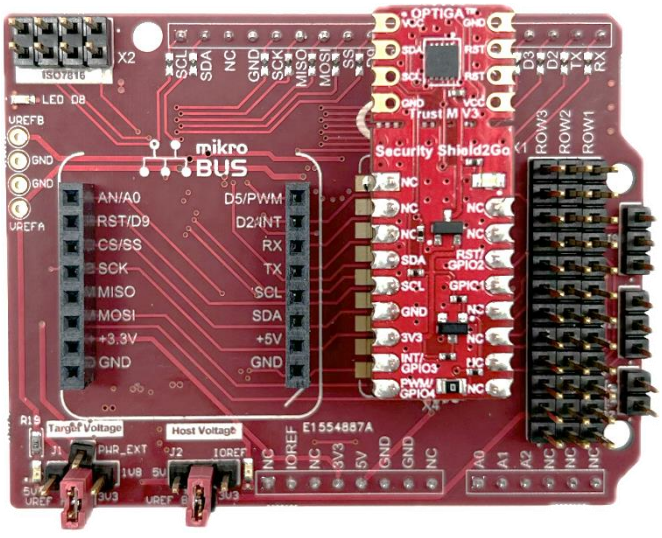

Figure 4 OPTIGA™ Trust Adapter with Shiled2Go compatible add-on board

4 Level shifters

Supply voltage is typically 5.0 V as common voltage for the boards compatible with Arduino Uno.

Level shifting is available to convert the logic level. Possible combinations of Target and Host Voltage are shown in Table 1.

Table 1 Level shifting

		Target Voltage		
		5.0 V	**3.3 V**	**1.8 V**
Host Voltage	**5.0 V**	x	x	X
	3.3 V		x	x

Please note:

- The Target Voltage must not be higher than the Host Voltage
- The voltage class jumpers do not affect the supply voltage of the add-on board sockets which have dedicated pins for 3.3V and 5V.

4.1 Voltage class jumper

Use the voltage class jumpers (J1 & J2) shown in Figure 5 to set the level shifting appropriately.

- Target Voltage (J1): VREF_A
  - PWR_EXT
  - 1V8 (Voltage regulator)
  - 3V3 (X302 or voltage regulator)
  - 5V (X302)
- Host Voltage (J2): VREF_B
  - IOREF (X302)
  - 3V3 (X302 or voltage regulator)
  - 5V (X302)

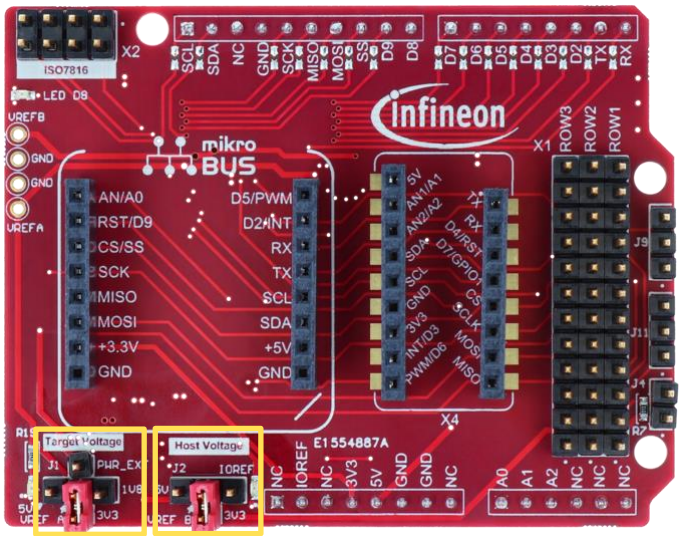

Figure 5 Voltage class jumper

Set the target voltage (J1) appropriate for the connected add-on board.

- The power supply voltage of the add-on boards remains unaffected
- E.g. for add-on boards with 3.3 V power supply set target voltage to 3V3
- Connector X1 with VDDP which is set by J1 allows arbitrary target voltage selection (e.g. 1V8, PWR_EXT)

Set host voltage (J2) according to the signal level of your host.

- If the host uses output IOREF to signal the voltage level set host voltage to IOREF

4.2 Level shifter bypass

The level shifters (U2, U4) can be bypassed.

- E.g. if host and target logic level is 5V (see LSF0108QPWRQ1 datasheet)

To bypass the level shifters.

- Disable level shifters by removing R1 & R2 on the bottom side, see Figure 6
- Bypass signals with solder jumpers on the top side, see Figure 7

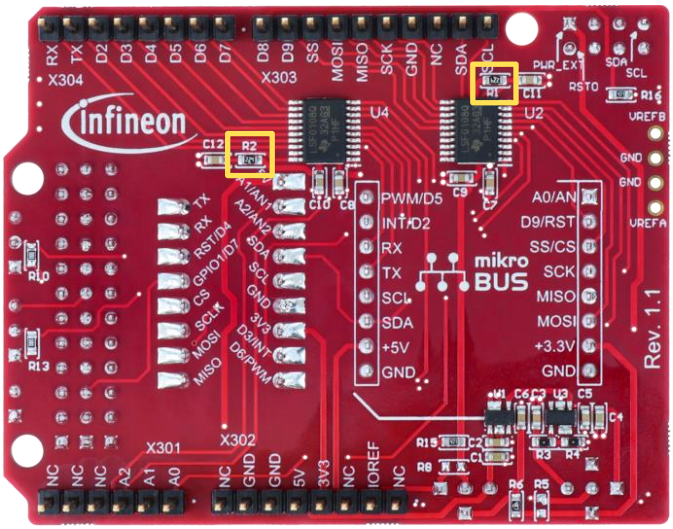

Figure 6 Disable level shifters on the bottom side

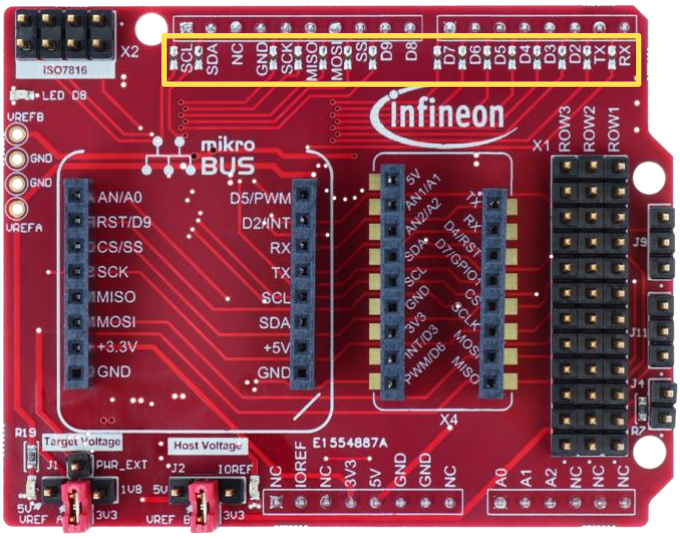

Figure 7 Level Shifter Bypass on the top side

5 Additional features

5.1 Power LEDs

The target voltage (VREF_A) and the host voltage (VREF_B) are indicated by LED D1 and LED D2.

5.2 Host LED

The LED D8 is connected to connector X303 pin 10 and can be controlled by the connected host.

5.3 Current measurement

The jumper J4 can be used to measure the current at the VDDP pin.

Please note that only the connector X1 uses VDDP. The mikroBUS and Shield2Go compatible sockets have dedicated pins for 3.3 V and 5 V which are used for powering the shields.

6 Example use case

In Figure 9 the OPTIGA™ Trust Adapter is used to connect the OPTIGA™ Trust M shield to PSoC™ 62S2 Wi-Fi BT Pioneer Kit. Both PSoC™ and OPTIGA™ Trust M are using 3.3 V logic levels therefore both voltage class jumpers are configured to 3V3.

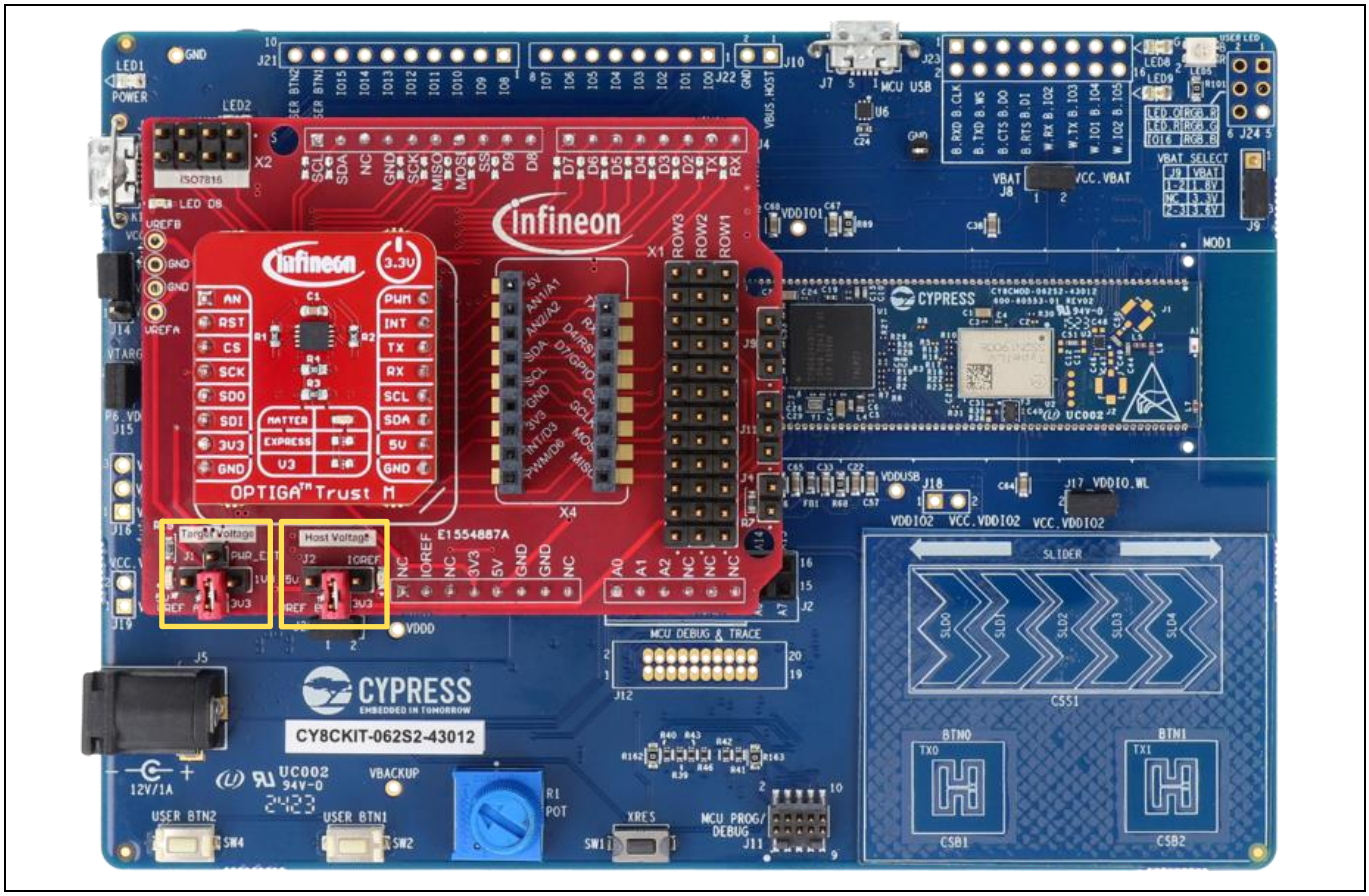

Figure 8 Using OPTIGA™ Trust Adapter to connect OPTIGA™ Trust M Shield to PSoC™ 62S2 Wi-Fi BT Pioneer Kit

7 System design

7.1 Schematics

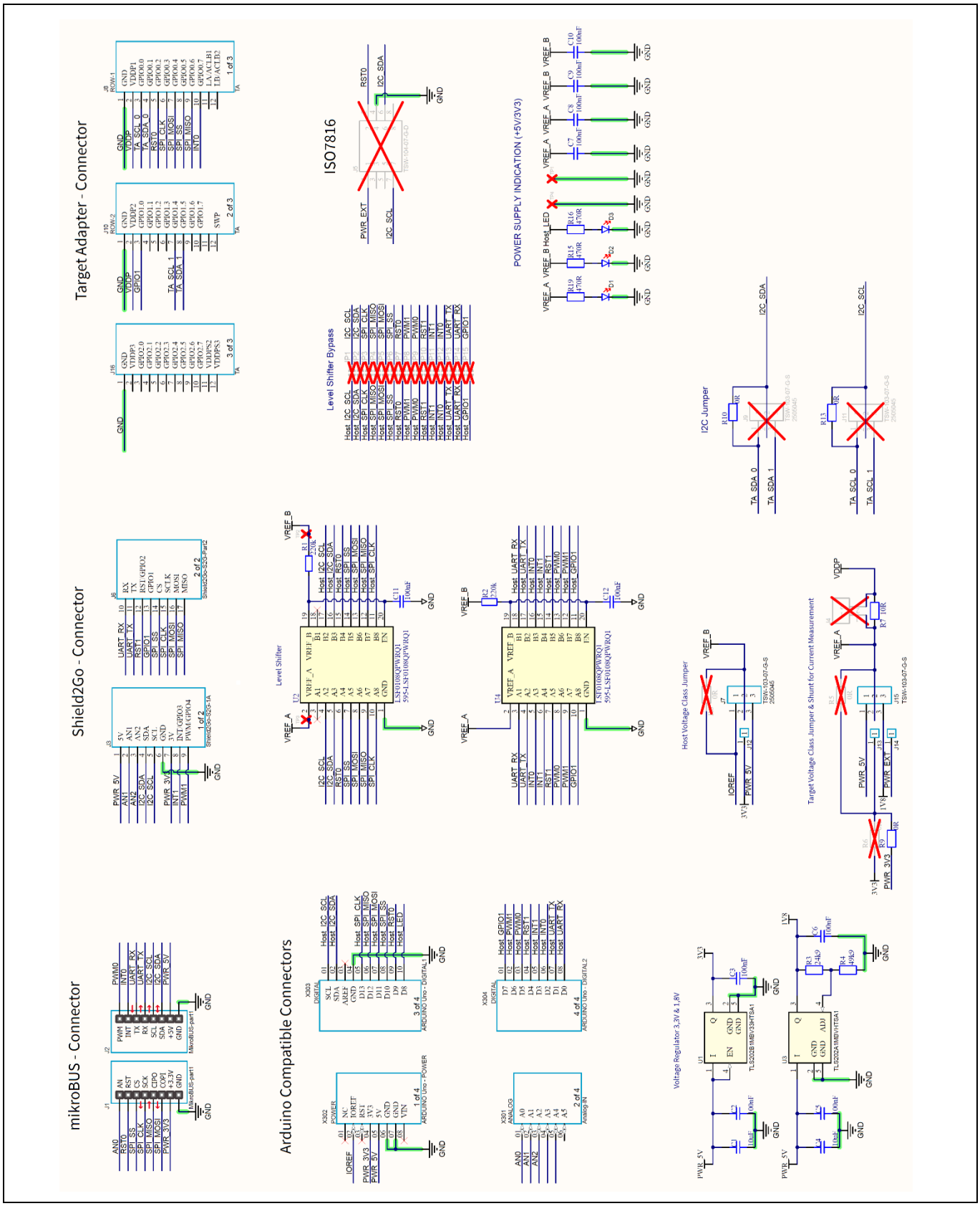

Figure 9 OPTIGA™ Trust Adapter schematic

7.2 Bill of material

The complete bill of material is available on request.

Table 2 BOM of the most important/critical parts

#	Ref Designator	Description	Manufacturer	Manufacturer P/N	Populated
1	R1, R2	RES 220K OHM 1% 1/10W 0603			Yes
2	R3	RES 24.9K OHM 1% 1/4W 0603			Yes
3	R4	RES 49.9K OHM 1% 1/4W 0603			Yes
4	R5, R6, R8	RES 0 OHM JUMPER 1/10W 0603			No
5	R7	RES 10 OHM 1% 1/4W 0603			Yes
6	R9, R10, R13	RES 0 OHM JUMPER 1/10W 0603			Yes
7	U2, U4	IC 8CH LEVEL TRANS BIDIR	Texas Instruments	LSF0108QPWRQ1	Yes
8	U1	TLS202A1MBVHTSA1	Infineon Technologies	LDO Regulator Pos 1.2V to 5.25V 0.15A 5-Pin SCT-595 T/R	Yes
9	U3	TLS202B1MBV33HTSA1	Infineon Technologies	LDO Regulator Pos 3.3V 0.15A 5-Pin SCT-595 T/R	Yes

7.3 Connector details

Table 3 Connectors

Label	Function
X1	Socket for Infineon Target Adapter Extended
X2	ISO7816 connector
X4	Socket for Add-on boards with Shield2Go compatible connector
mikroBUS	Socket for Add-on boards with mikroBUS compatible connector
X301, X302, X033, X304	Arduino compatible connectors

Glossary

PCB
printed circuit board (PCBP)

CS
chip select (CS)

Revision history

Document revision	Date	Description of changes
1.0	2024-06-04	Initial release
1.1	2024-10-30	Updated Figure 2, Figure 3 and Figure 4

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Edition 2024-10-30
Published by

Infineon Technologies AG
81726 Munich, Germany

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Document reference
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