



## XE125 Evaluation Board Product Brief



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# 1. Introduction

This document describes the Acconeer XE125 Evaluation board containing the XM125 Entry+ module. The evaluation board provides access to the interfaces from the XM125 Entry+ module so that it can easily be flashed and debugged. The XE125 is compatible with Acconeer LH132 lens kit (LH132 is also compatible with evaluation kit XE132). LH132 is sold separately. For more information please read:

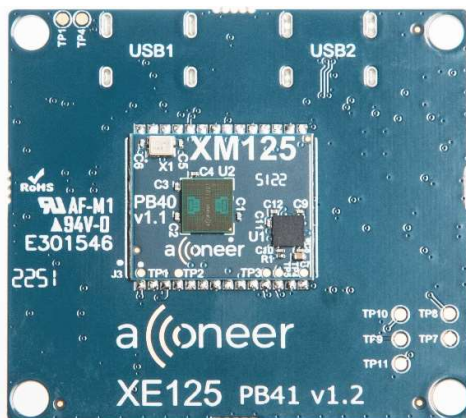
- [XM125 Datasheet](#)
- [Acconeer XE125 Entry+ Module EVK HW User Guide](#)



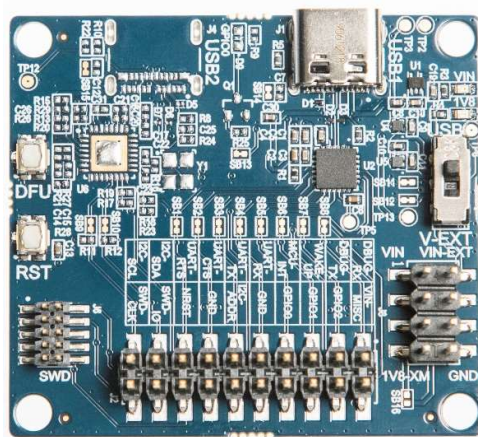
## 2. XE125 Evaluation Board

### 2.1. Overview

The XE125 is an evaluation board including the XM125 Entry+ module. It makes the interfaces from the XM125 module accessible for evaluation and debug. It also enables flashing of the XM125 via USB-UART or SW-DP. The XM125 Entry+ module is included in the XE125 Evaluation board. In Picture 1 you will find the XE125 front side where the XM125 is mounted. Picture 2 shows the back side of XE125.



Picture 1. The XE125 top side where XM125 is mounted.



Picture 2. The XE125 back side.

In Figure 1 the block-diagram of the XE125 is shown.

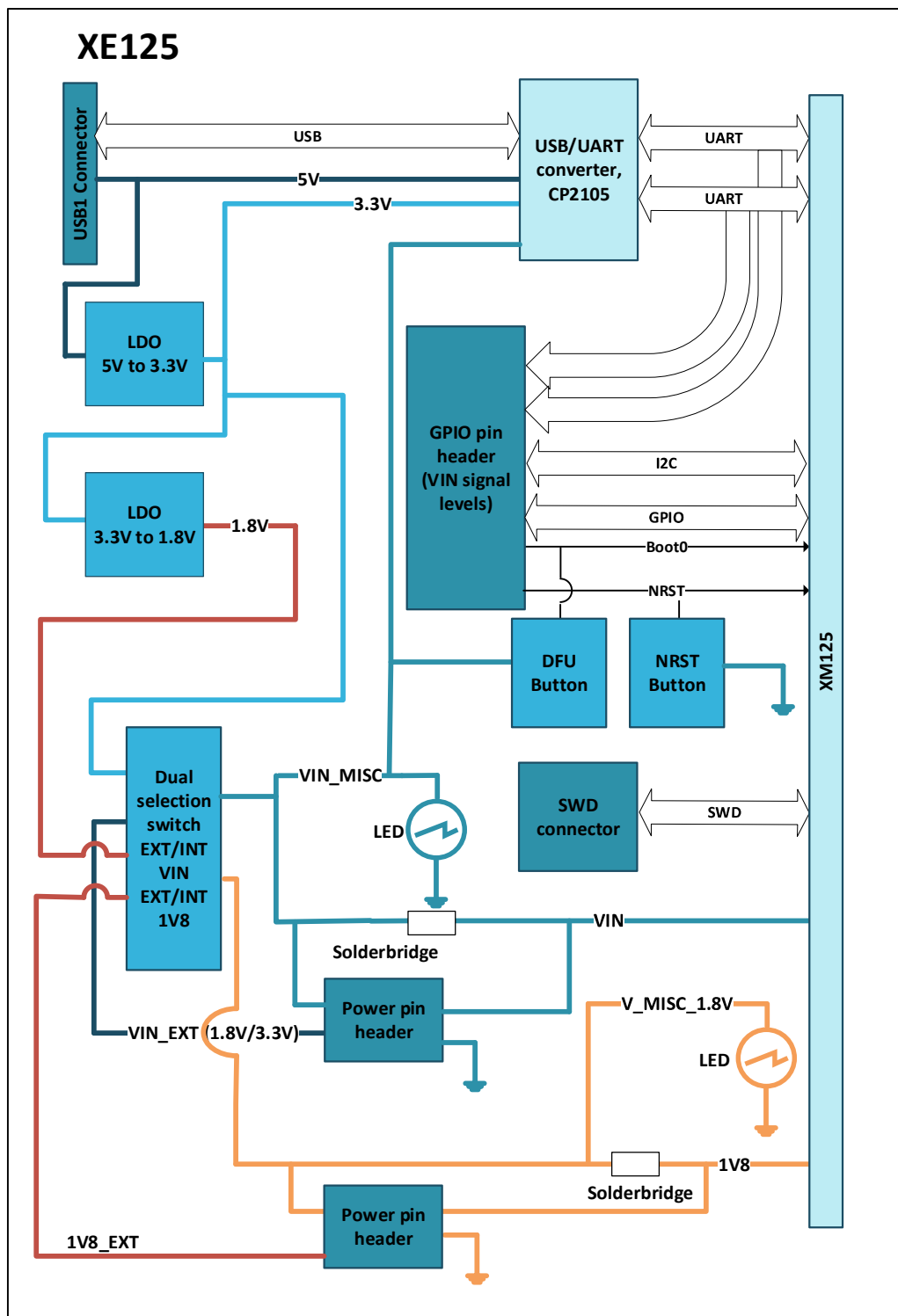


Figure 1 The block-diagram of the XE125.

## 2.2. Power

In the text below, the reference designators refer to the Electrical Schematic of XE125 in chapter 2.6.



The XE125 is powered via the USB connector J1 and/or via the pin header J8. The USB 5V power domain supplies the USB-UART chip (U2). If the USB-UART interface is not used, a dedicated USB charger can be used.

The XM125 module mounted on the XE125 can be powered either from on-board linear regulators U4 (3.3V LDO) and U5 (1.8V LDO) which are supplied from the USB 5V power domain or from “VIN\_EXT” and 1V8\_EXT in the J8 pin header. VIN\_EXT can be either 1.8V or 3.3V.

The power source for XM125 is determined by the setting of the switch “SW3”. When the LEDs D4 and D8 on the XE125 are lit, both power domains (VIN and 1V8) of the XM125 are powered.

It should be noted that regardless whether “VIN\_EXT” or the internal LDOs on XE125 are used to power XM125, the LEDs D4 and D8 will consume power since they are connected to “VIN\_MISC” and V\_MISC\_1V8 respectively. If one wants to measure only the current consumed by XM125, power should be supplied to XE125 via the pins “VIN\_XM125” and 1V8\_XM125 (pins 3 and 7 in pin header J8). In this case, the solder-bridges “SB11” and “SB12” should be cut. This way, all components on XE125 are supplied from the on-board LDOs, but XM125 is supplied from the external power supplies. D4 and D8 will not indicate if XM125 is powered after SB11 and SB12 have been cut.

The intention of the power pin header J8 is that it can be used both for supplying power to XM125 and for measuring current over a measurement resistor. SB11 and SB12 are short-circuited solder-bridges, but the user can change it to a low-value measurement resistor with high accuracy to perform very accurate measurements of the XM125 current. See Table 1 for the pin assignment of pin header J8.

## 2.3. Not Mounted Components

As can be seen in the schematic in chapter 2.6, USB connector J4 and several other components are “No Mount”. These components are related to the FTDI I2C-USB bridge chip FT4222H which can be mounted on the PCB. It was added for internal Acconeer use. The I2C interface is also accessible in pin header J2. Refer to Table 3.

## 2.4. Connectors

### 2.4.1. Power pin header (J8)

The power pin header J8 provides the possibility to supply the XM125 module with power from external power supplies. In Table 1, the pin assignment of J8 is shown:

**Table 1. The pin assignment of the power pin header J8.**

| Pin Number | Signal     | Pin Number | Signal  |
|------------|------------|------------|---------|
| 1          | VIN_MISC   | 2          | VIN_EXT |
| 3          | VIN_XM125  | 4          | GND     |
| 5          | V_MISC_1V8 | 6          | 1V8_EXT |
| 7          | 1V8_XM125  | 8          | GND     |

### 2.4.2. 2x5 JTAG/SWD pin header (J6)

The 2x5 JTAG/SWD pin header (1.27mm pitch) contains the signals needed for flashing the XM125 MCU via the SWD interface. The pinout matches that of the Cortex 10-pin JTAG/SWD Connector and is found in Table 2.



Table 2. The pinout of J6.

| Pin Number | Signal | Pin Number | Signal                     |
|------------|--------|------------|----------------------------|
| 1          | VIN    | 2          | SWD_IO                     |
| 3          | GND    | 4          | SWD_CLK                    |
| 5          | GND    | 6          | NC (no TRACESWO available) |
| 7          | NC     | 8          | NC                         |
| 9          | GND    | 10         | NRESET                     |

### 2.4.3. 2x10 pin header (J2)

The 2x10 pin header (2.54mm pitch) contains the interface and GPIOs from the XM125. All signals are on the VIN\_MISC voltage level (3.3V if on-board LDO used, otherwise VIN = 1.8 or 3.3V). The pinout is found in Table 3.

Table 3. The pinout of J2.

| Pin Number | Signal                     | Pin Number | Signal           |
|------------|----------------------------|------------|------------------|
| 1          | DEBUG_UART_RX <sup>1</sup> | 2          | VIN_MISC         |
| 3          | DEBUG_UART_TX <sup>2</sup> | 4          | MISC_GPIO2_BOOT0 |
| 5          | WAKE_UP                    | 6          | MISC_GPIO1       |
| 7          | MCU_INT                    | 8          | MISC_GPIO0       |
| 9          | UART_RX <sup>1</sup>       | 10         | GND              |
| 11         | UART_TX <sup>2</sup>       | 12         | I2C_ADDRESS      |
| 13         | UART_CTS <sup>3</sup>      | 14         | GND              |
| 15         | UART_RTS <sup>4</sup>      | 16         | NRESET           |
| 17         | I2C_SDA                    | 18         | SWD_IO           |
| 19         | I2C_SCL                    | 20         | SWD_CLK          |

## 2.5. Switches and buttons

There is one switch on XE125. SW3 determines if XM125 is powered from the XE125 on-board LDOs (U4 and U5) or from external power supplies via pin header J8 (VIN\_EXT/1V8\_EXT).

There are two buttons on the XE125. SW1 controls the signal “BOOT0” connected to XM125 and SW2 controls “NRESET” connected to the XM125. In Table 4 the state of the buttons and the corresponding signal states are listed.

<sup>1</sup> UART\_RX is connected to UART\_RX on XM125. If external UART device is connected, this pin should be connected to TX of external device.

<sup>2</sup> UART\_TX is connected to UART\_TX on XM125. If external UART device is connected, this pin should be connected to RX of external device.

<sup>3</sup> UART\_CTS is connected to UART\_CTS on XM125. If external UART device is connected, this pin should be connected to RTS of external device.

<sup>4</sup> UART\_RTS is connected to UART\_RTS on XM125. If external UART device is connected, this pin should be connected to CTS of external device.





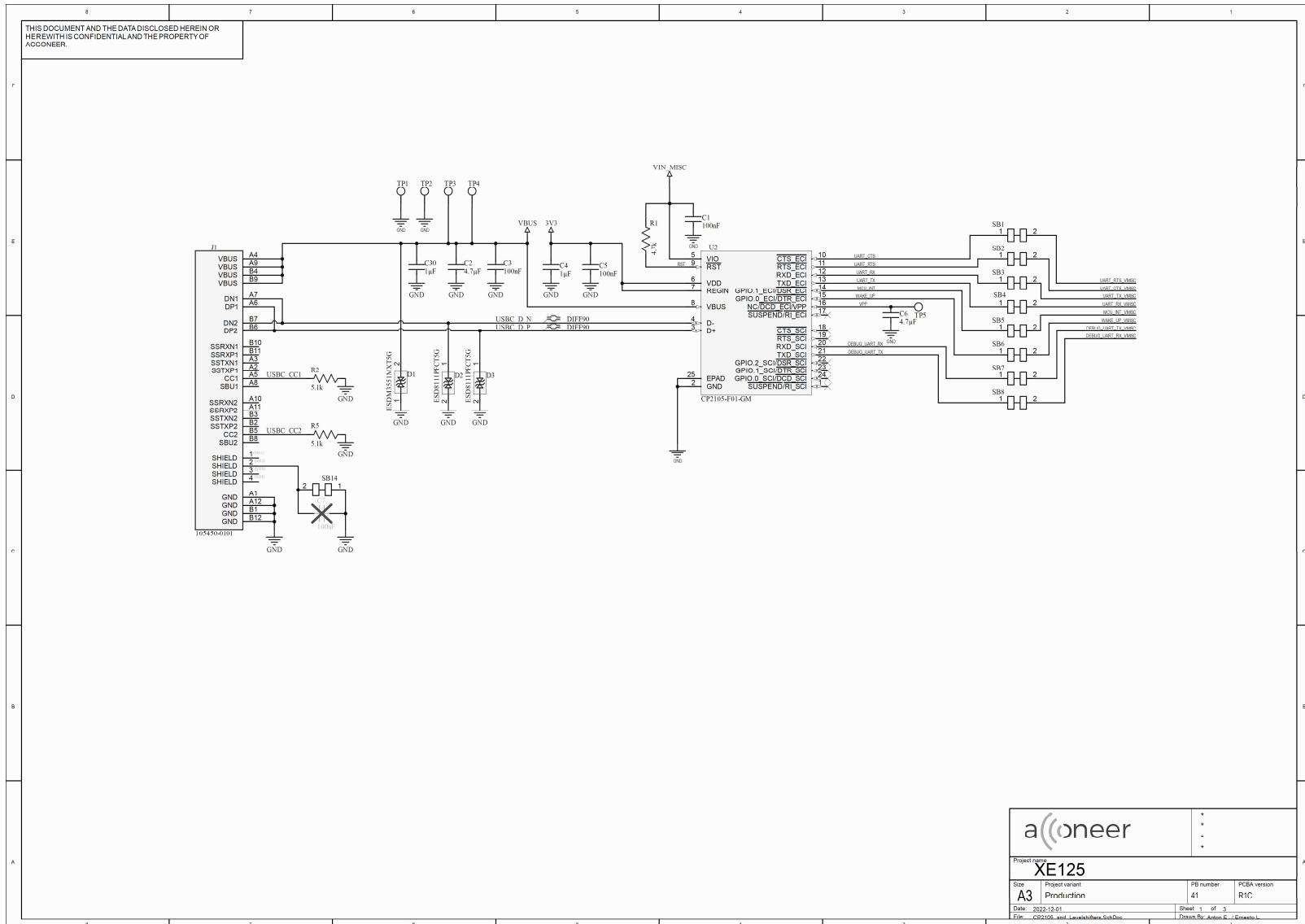
**Table 4. The states of the buttons SW1 and SW2.**

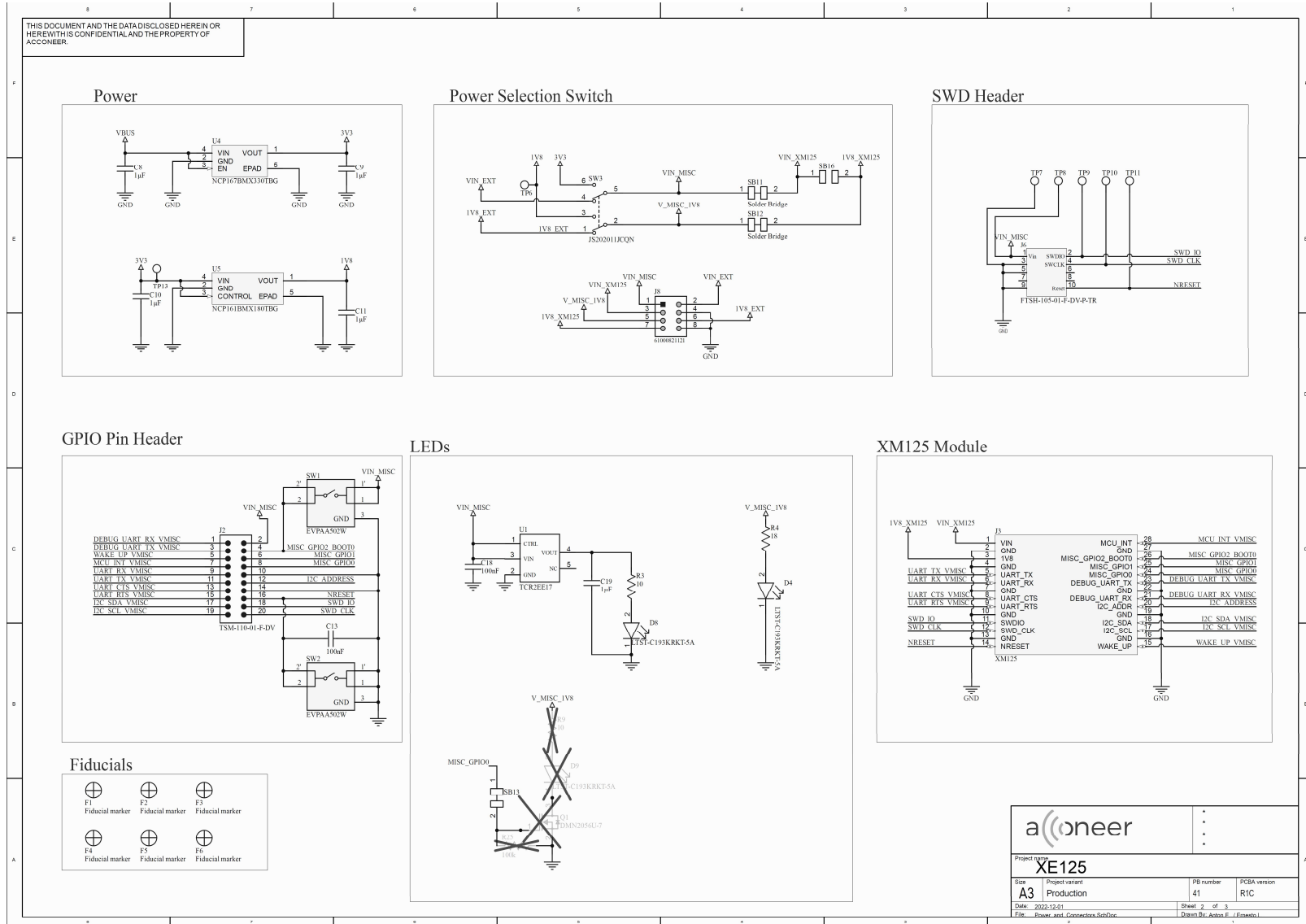
| <b>Button</b> | <b>Open (default)</b> | <b>Closed</b> |
|---------------|-----------------------|---------------|
| SW1           | BOOT0=0               | BOOT0=1       |
| SW2           | NRST=1                | NRST=0        |

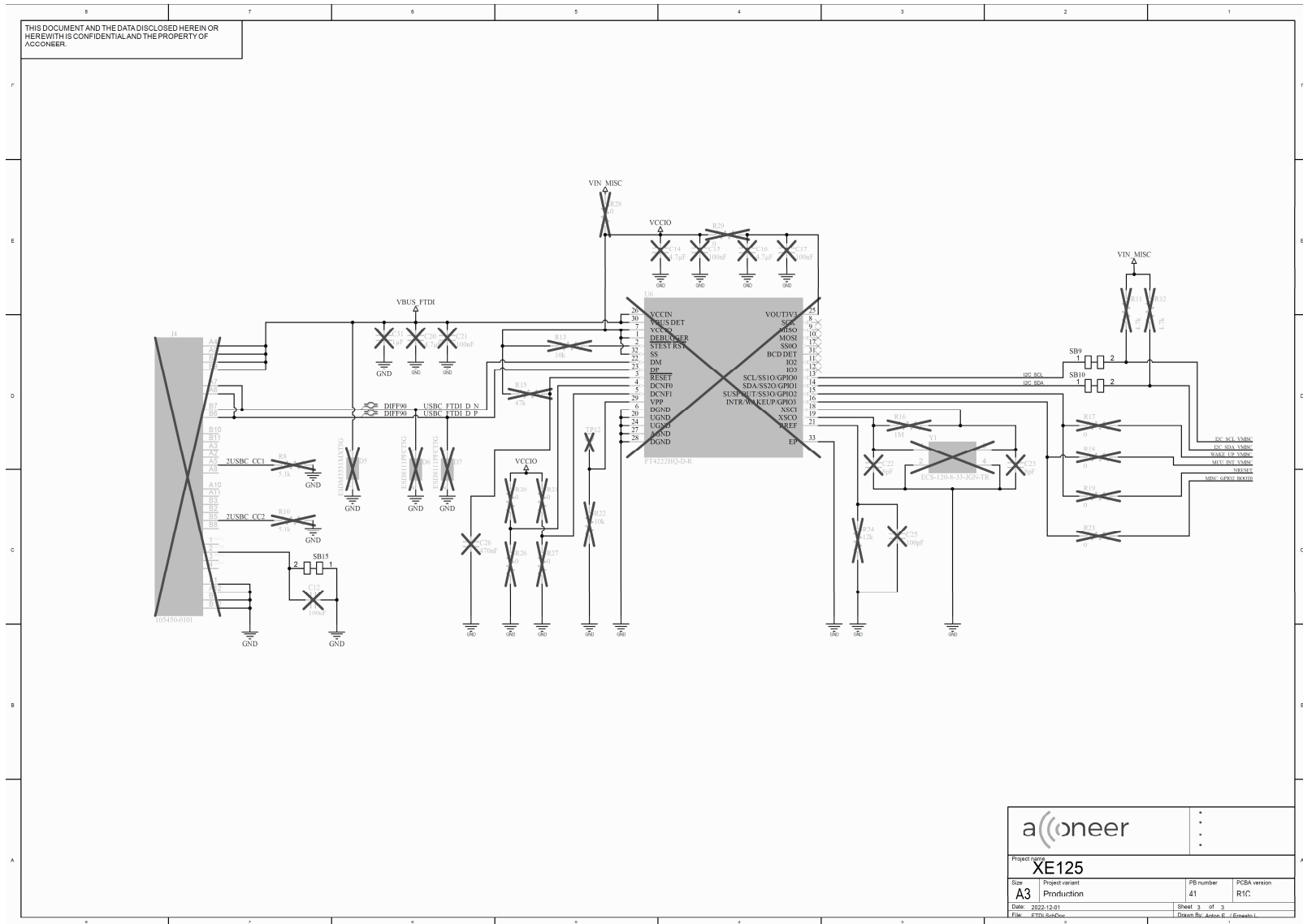


## 2.6. Electrical Schematic

On the following pages, please find the Electrical Schematic for XE125:









## 2.7. Bill of Material

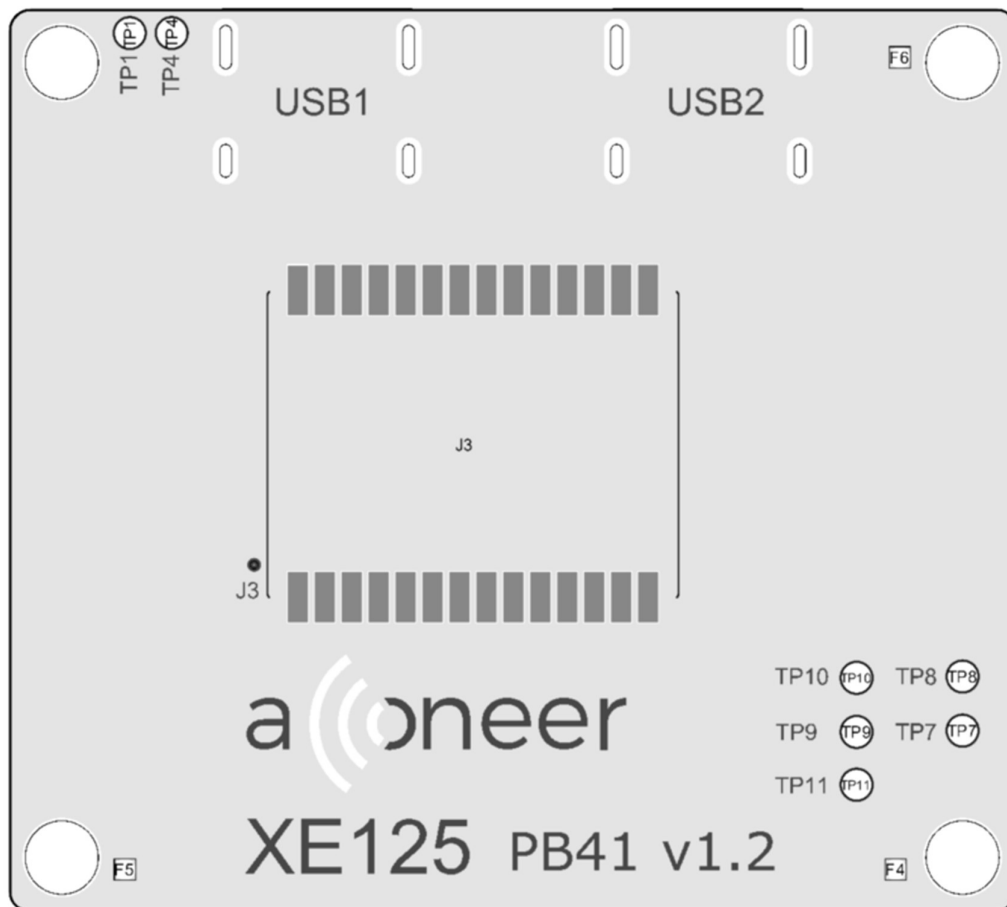
Table 5 shows the BOM for the XE125

**Table 5 The BOM for the XE125.**

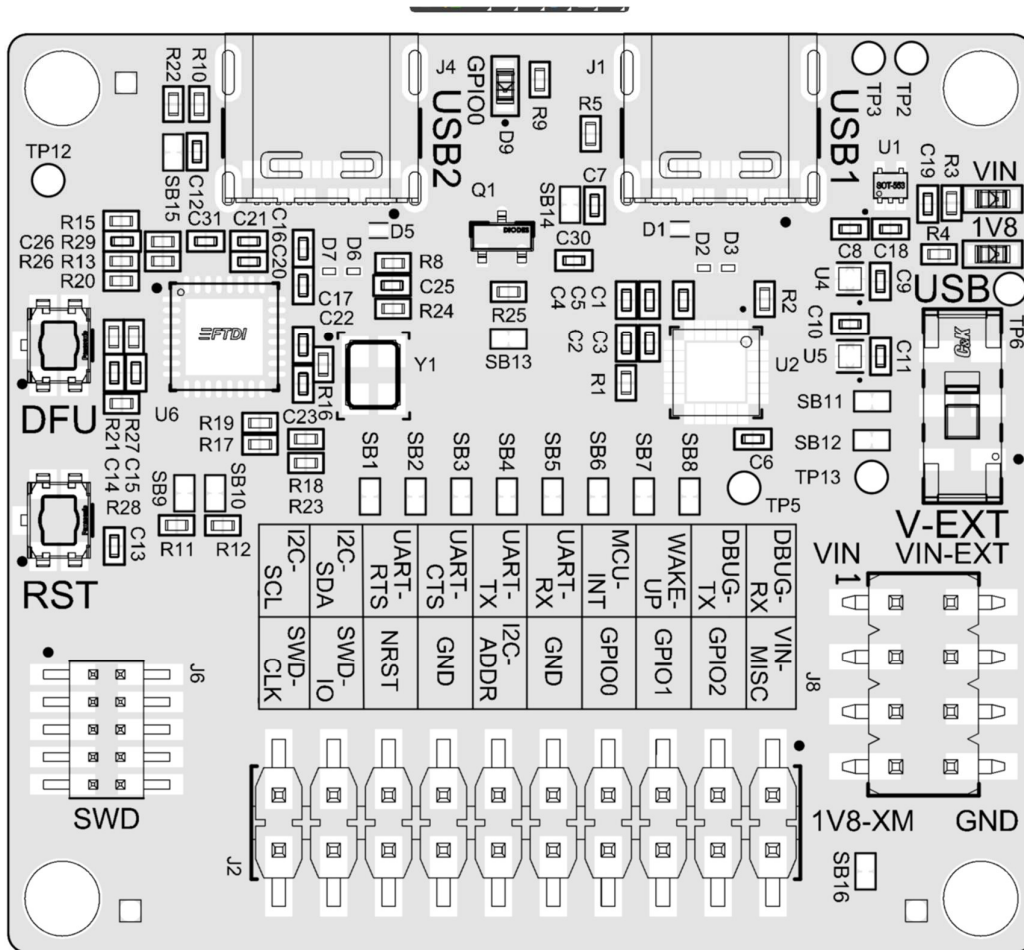
| Designator                     | Name                           | Qty | Value       | Tolerance | Voltage rating | Manufacturer          |
|--------------------------------|--------------------------------|-----|-------------|-----------|----------------|-----------------------|
| C4, C8, C9, C10, C11, C19, C30 | Capacitor 1uF, metric 1005     | 7   | 1 $\mu$ F   | 20%       | 10V            |                       |
| C2, C6                         | Capacitor 4.7uF, metric 1005   | 2   | 4.7 $\mu$ F | 20%       | 10V            |                       |
| C1, C3, C5, C13, C18           | Capacitor 100nF, metric 1005   | 5   | 100nF       | 20%       | 10V            |                       |
| R1                             | Resistor 4.7 kOhm, metric 1005 | 1   | 4.7k        | 1%        |                |                       |
| R2, R5                         | Resistor 5.1 KOhm, metric 1005 | 2   | 5.1k        | 1%        |                |                       |
| R3                             | Resistor 10 Ohm, metric 1005   | 1   | 10          | 1%        |                |                       |
| R4                             | Resistor 18 Ohm, metric 1005   | 1   | 18          | 1%        |                |                       |
| D1                             | ESDM3551MXT5G                  | 1   |             |           |                | ON Semiconductor      |
| D2, D3                         | ESD8111PFCT5G                  | 2   |             |           |                | ON Semiconductor      |
| D4, D8                         | LTST-C193KRKT-5A               | 2   |             |           |                | Vishay Lite-On        |
| SW1, SW2                       | EVPA502W                       | 2   |             |           |                | Panasonic             |
| SW3                            | JS202011JCQN                   | 1   |             |           |                | ITT C&K               |
| U1                             | TCR2EE17                       | 1   |             |           |                | Toshiba Semiconductor |
| U2                             | CP2105-F01-GM                  | 1   |             |           |                | Silicon Labs          |
| U4                             | NCP167BMX330TBG                | 1   |             |           |                | ON Semiconductor      |
| U5                             | NCP161BMX180TBG                | 1   |             |           |                | ON Semiconductor      |
| J1                             | 105450-0101                    | 1   |             |           |                | Molex                 |
| J2                             | TSM-110-01-F-DV                | 1   |             |           |                | Samtec                |
| J3                             | XM125                          | 1   |             |           |                |                       |
| J6                             | FTSH-105-01-F-DV-P-TR          | 1   |             |           |                | Samtec                |
| J8                             | 61000821121                    | 1   |             |           |                | Würth Electronics     |

## 2.8. Component Placement Drawing

In Picture 3 and Picture 4 the component placement drawing of XE125, top and bottom side, are found:



Picture 3. The component placement of XE125 top side.



Picture 4. The component placement of XE125 bottom side.





## 3. Safety

### 3.1. Electrostatic precautions



Please take electrostatic precautions, including using ground straps, when using the EVK or any of its components. An electrostatic discharge could damage the device.



## 4. Revision History

| Date       | Revision | Changes                            |
|------------|----------|------------------------------------|
| 2023-03-30 | 1.0      | Original version                   |
| 2023-07-03 | 1.1      | Updated table 3 (corrected error). |
|            |          |                                    |
|            |          |                                    |
|            |          |                                    |
|            |          |                                    |



## 5. Disclaimer

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