



# XE123/124 Evaluation Board Product Brief



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Proprietary and Confidential

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## Table of Contents

1	Introduction .....	4
2	XE123/124 Evaluation Board.....	5
2.1	Overview .....	5
2.2	Power.....	8
2.3	Not Mounted Components .....	8
2.4	Connectors.....	8
2.4.1	Power pin header (J5).....	8
2.4.2	2x5 JTAG/SWD pin header (J6) .....	9
2.4.3	2x10 pin header (J2).....	9
2.4.4	Switches and buttons .....	10
2.5	Electrical Schematics .....	11
2.6	Bill of Material .....	15
2.7	Component Placement Drawing.....	15
3	References .....	18
4	Revision History.....	19
5	Disclaimer .....	20



# 1 Introduction

This document describes the Acconeer XE123/124 Evaluation board containing the XM123 or XM124 Entry+ module. The evaluation board provides access to the interfaces from the XM123/124 Entry+ module so that it can easily be flashed and debugged. The XE123/124 is compatible with Acconeer LH132 lens kit (LH132 is also compatible with evaluation kit XE132). LH132 is sold separately.

For More information please read:

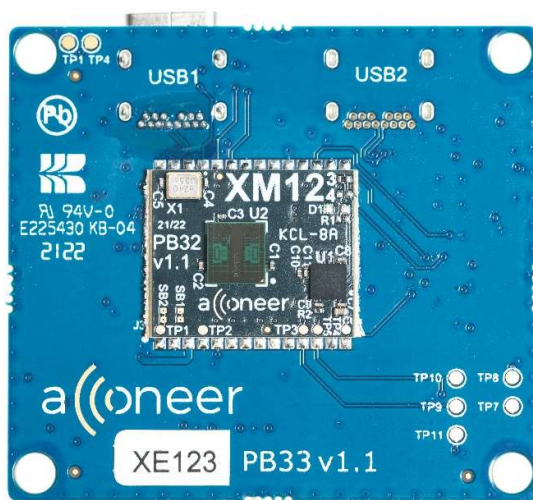
- [XM123/124 Datasheet](#)
- [Acconeer Entry+ Module EVK HW User Guide](#)



## 2 XE123/124 Evaluation Board

### 2.1 Overview

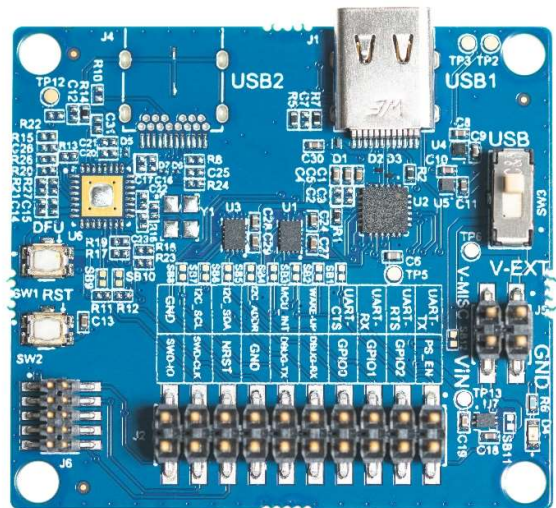
The XE123/124 is an evaluation board including the XM123 or XM124 Entry+ module. It makes the interfaces from the XM123/124 module accessible for evaluation and debug. It also enables flashing of the XM123/124 via USB-UART or SW-DP. The XM123/124 Entry module is included in the XE123/124 Evaluation board. In Picture 1 and Picture 2 you will find the XE123 and XE124 top sides where the XM123 and XM124 is mounted. Picture 3 shows the bottom side of XE123/XE124.



Picture 1. The XE123 top side where XM123 is mounted.



Picture 2. The XE124 top side where XM123 is mounted.



Picture 3. The XE123/124 bottom side.

The block diagram of XE123/XE124 is found in Figure 1 below.

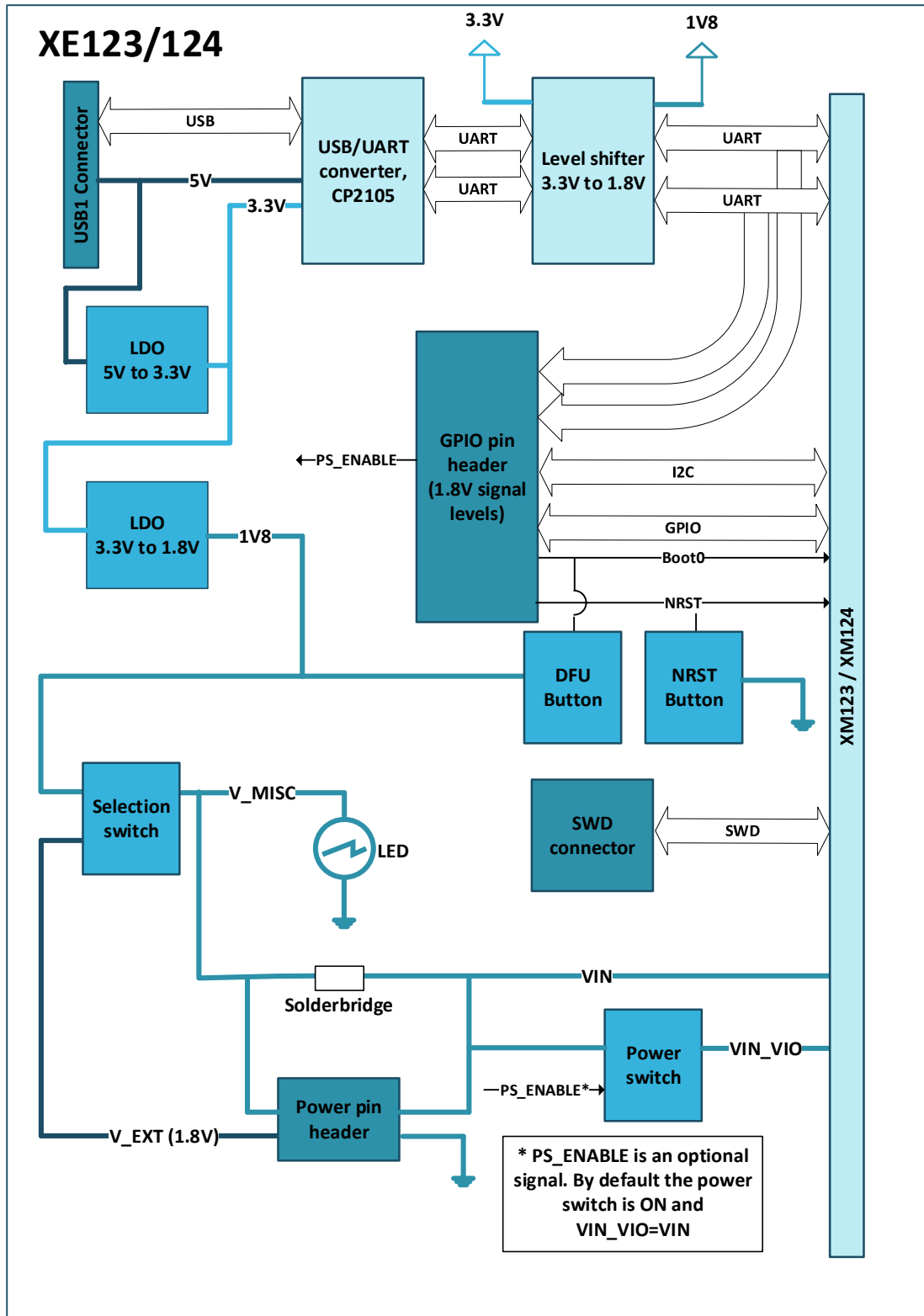


Figure 1. The block diagram of XE123/XE124.



## 2.2 Power

In the text below, the reference designators refer to the Electrical Schematic of XE123/XE124 in chapter 2.5.

The XE123/124 is powered via the USB connector J1 and/or via the pin header J5. 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 XM123/XM124 module mounted on the XE123/124 can be powered either from a 1.8V LDO (U5) which is supplied from the USB 5V power domain or from “V\_EXT” in the J5 pin header. V\_EXT should be 1.8V.

The power source for XM123/XM124 is determined by the setting of the switch “SW3”. When the LED D4 on the XE123/124 is lit, the XM123/XM124 is powered

It should be noted that regardless of if “V\_EXT” or “1.8V” is used to power XM123/XM124, the LED D4 will consume power since it is connected to “V\_MISC”. If one wants to measure only the current consumed by XM123/XM124, power should be supplied to XE123/124 via the pin “VIN” (pin 4 in pin header J5). In this case, the solder-bridge “SB12” should be cut. This way, all components on XE123/XE124 are supplied from the 1.8V LDO, but XM123/XM124 is supplied from the external power supply. D4 will not indicate if XM123/XM124 is powered after SB12 has been cut.

The intention of the power pin header J5 is that it can be used both for supplying power to XM123/XM124 and for measuring current over a measurement resistor. SB12 is a short-circuited solder-bridge, but the customer can change it to a low-value measurement resistor with high accuracy in order to perform very accurate measurements of the XM123/XM124 current. See Table 1 for the pin assignment of pin header J5.

To minimize the current consumption of the XM123/XM124 module, the voltage to “1V8” (VIN\_VIO) can be turned off when the A111 radar sensor is disabled (ENABLE=0). To do this, the power switch U7 must be controlled by a GPIO of your choice from XM123/XM124. If a GPIO on pin header J2 is connected to the signal “PS\_EN” (PIN 2 on J2), and solder bridge “SB11” is cut, the power switch ON/OFF state is controlled by this GPIO. The SW to do this is not provided by Acconeer and must be implemented by the customer. By default, the power switch U7 is always on.

## 2.3 Not Mounted Components

As can be seen in the schematic in chapter 2.5, 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, but customers are of course free to mount these components if they wish. The I2C interface is also accessible in pin header J2. Refer to Table 3.

## 2.4 Connectors

### 2.4.1 Power pin header (J5)

The power pin header J5 provides the possibility to supply the XM123/XM124 module with power from an external power supply. In Table 1, the pin assignment of J5 is shown:



**Table 1. The pin assignment of the power pin header J5.**

Pin Number	Signal	Pin Number	Signal
1	V_EXT	2	GND
3	V_MISC	4	VIN

#### 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 XM123/XM124 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 miscellaneous GPIOs from the XM123/XM124. The pinout is found in Table 3.

**Table 3. The pinout of J2.**

Pin Number	Signal	Pin Number	Signal
1	UART_TX_1V8 <sup>1</sup>	2	PS_ENABLE
3	UART_RTS_1V8 <sup>2</sup>	4	MISC_GPIO2_BOOT0
5	UART_RX_1V8 <sup>3</sup>	6	MISC_GPIO1
7	UART_CTS_1V8 <sup>4</sup>	8	MISC_GPIO0
9	WAKE_UP_1V8	10	DEBUG_UART_RX_1V8 <sup>3</sup>
11	MCU_INT_1V8	12	DEBUG_UART_TX_1V8 <sup>1</sup>
13	I2C_ADDRESS	14	GND
15	I2C_SDA	16	NRESET

<sup>1</sup> This signal is connected to RX on XM123/XM124. If external UART device is connected, this pin should be connected to TX of external device.

<sup>2</sup> This signal is connected to CTS on XM123/XM124. If external UART device is connected, this pin should be connected to RTS of external device.

<sup>3</sup> This signal is connected to TX on XM123/XM124. If external UART device is connected, this pin should be connected to RX of external device.

<sup>4</sup> This signal is connected to RTS on XM123/XM124. If external UART device is connected, this pin should be connected to CTS of external device.



Pin Number	Signal	Pin Number	Signal
17	I2C_SCL	18	SWD_CLK
19	GND	20	SWD_IO

#### 2.4.4 Switches and buttons

There is one switch on XE123/124. SW3 determines if XM123/XM124 is powered from the 1.8V LDO (U5) on XE123/124 or from an external power supply via pin header J5 (V\_EXT).

There are two buttons on the XE124. SW1 controls the signal “BOOT0” connected to XM124 and SW2 controls “NRST” connected to the XM124. In Table 4 the state of the buttons and the corresponding signal states are listed.

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

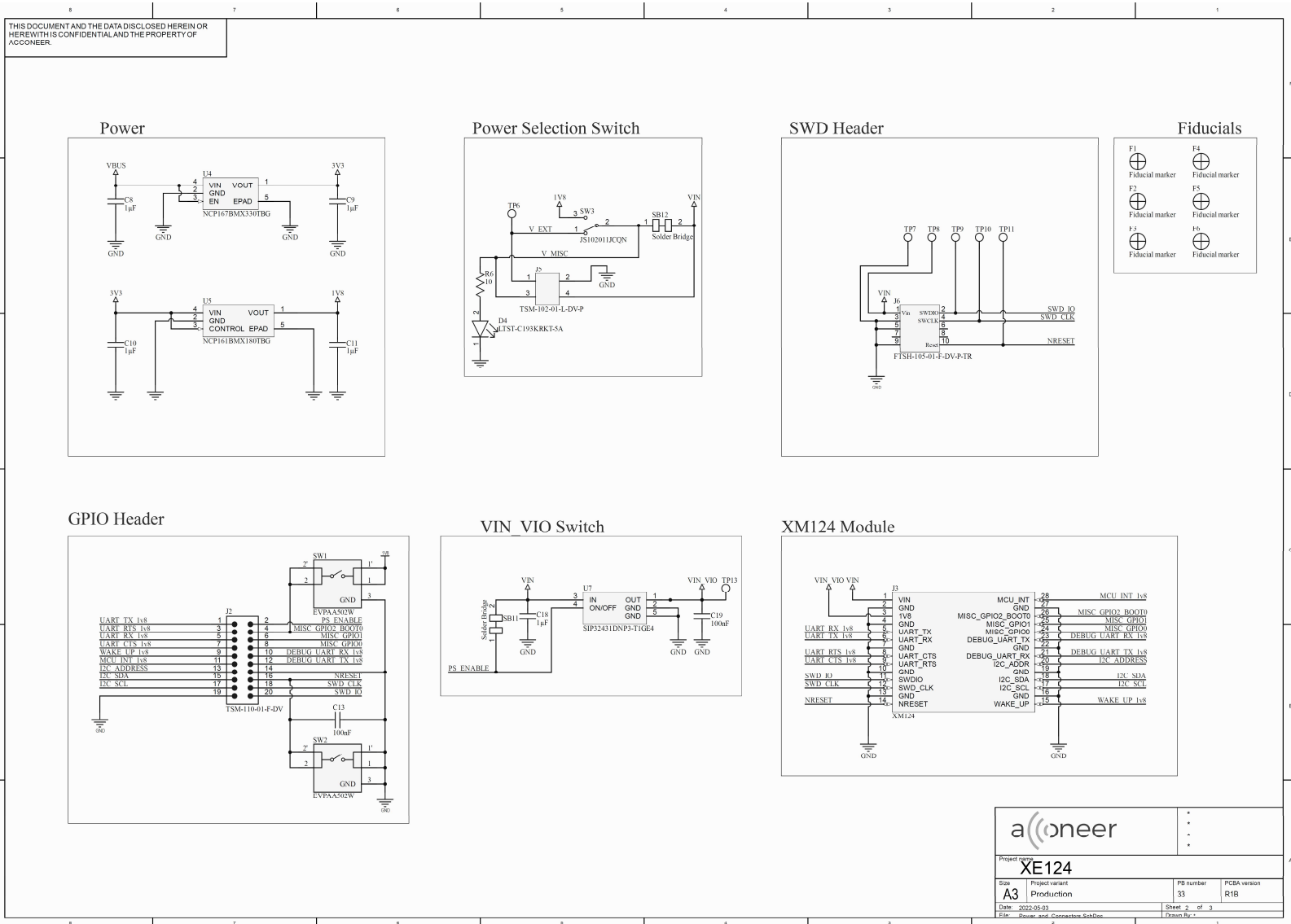
Button	Open (default)	Closed
SW1	BOOT0=0	BOOT0=1
SW2	NRST=1	NRST=0

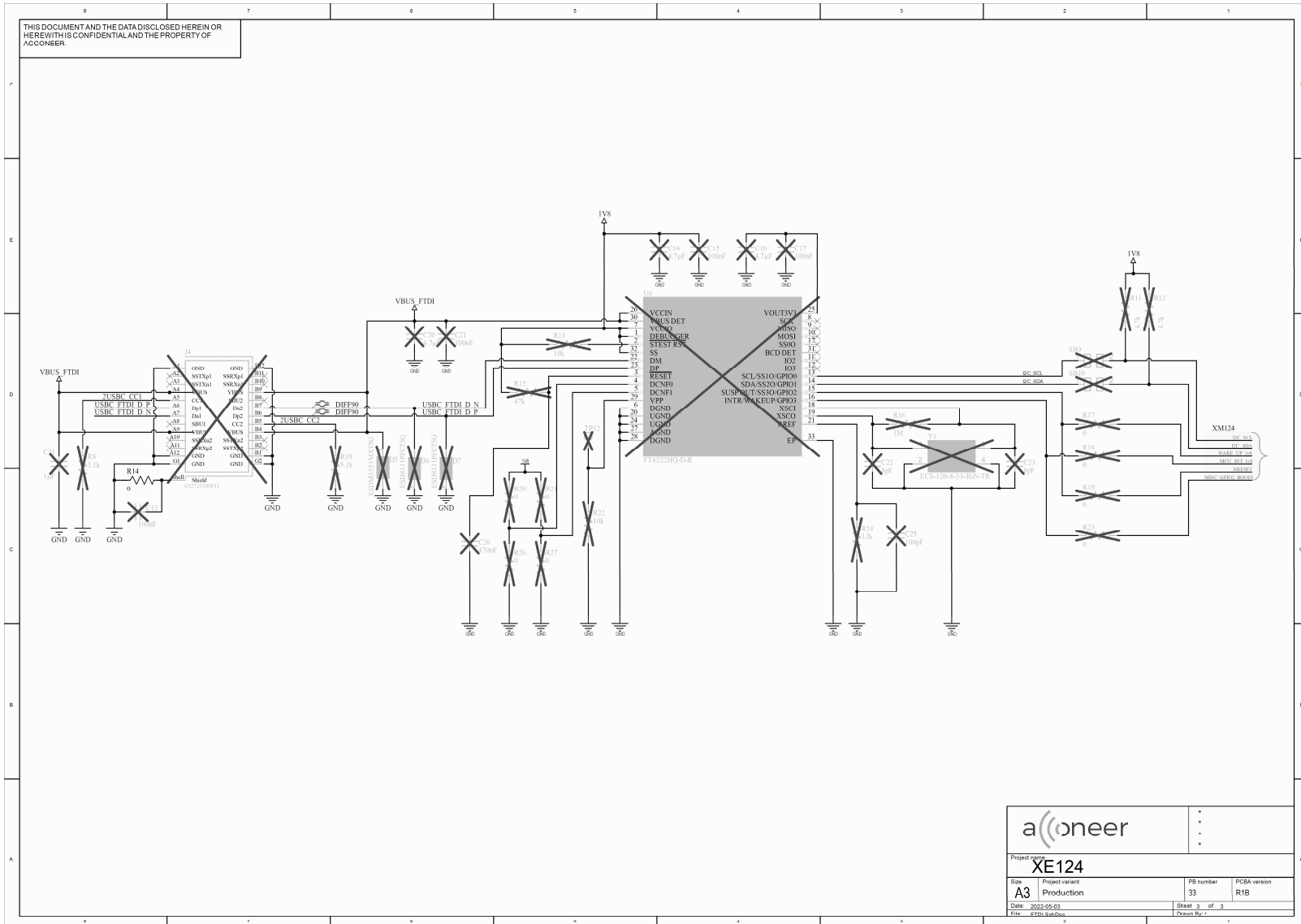


## 2.5 Electrical Schematics

The electrical schematics for the XE123/124 are found on the following pages:









## 2.6 Bill of Material

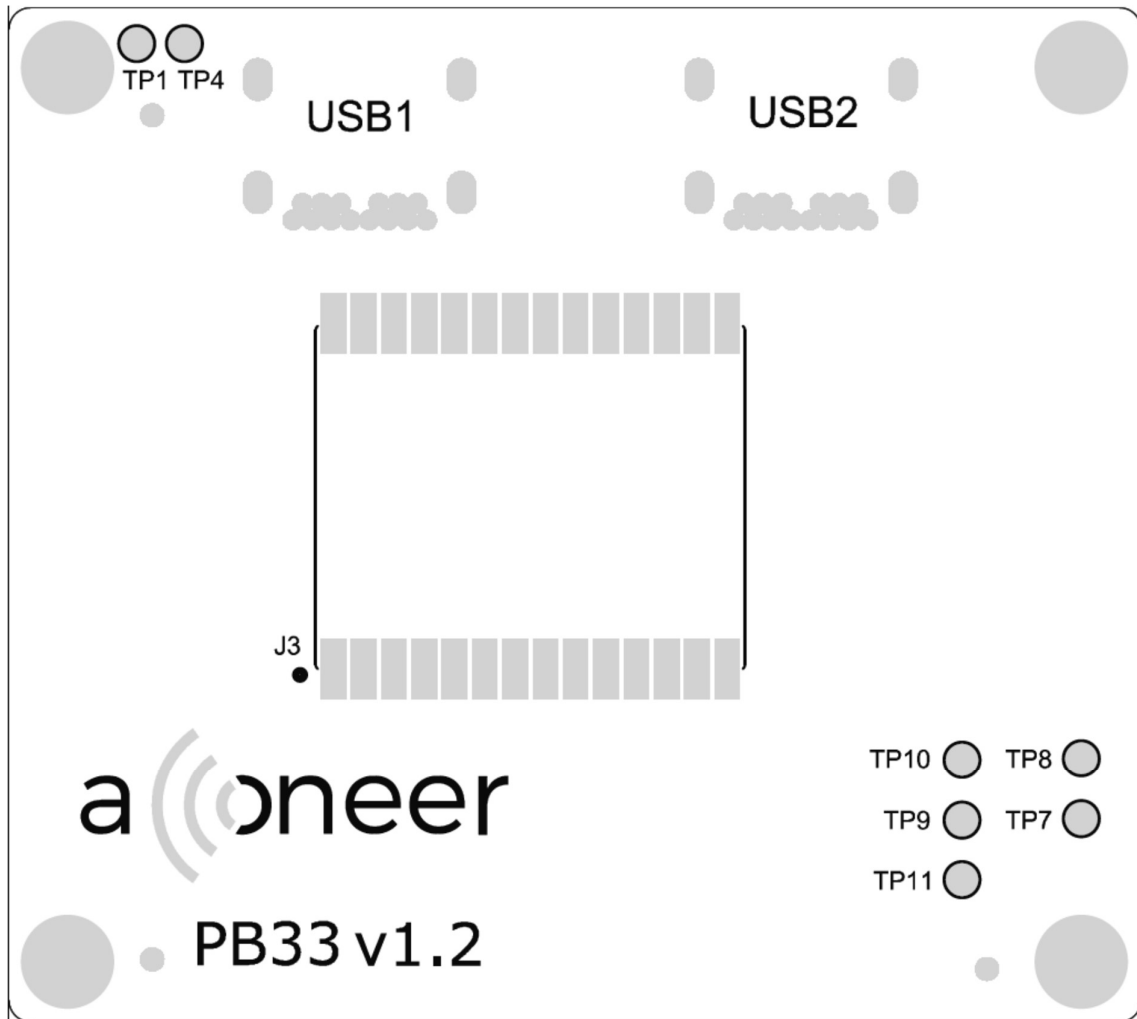
Table 5 shows the BOM for the XE123/124

**Table 5 The BOM for the XE123/124.**

Designator	Name	Qty	Value	Tolerance	Voltage rating	Manufacturer
C4, C8, C9, C10, C11, C18, C30	Capacitor 1uF, metric 1005	7	1 $\mu$ F	20%	10V	
C6	Capacitor 4.7uF, metric 1005	1	4.7 $\mu$ F	20%	10V	
C1, C5, C13, C19, C24, C27, C28, C29	Capacitor 100nF, metric 1005	8	100nF	20%	10V	
R7, R14	Resistor 0 Ohm, metric 1005	2	0	1%		
R1	Resistor 4.7 kOhm, metric 1005	1	4.7k	1%		
R2, R5	Resistor 5.1 KOhm, metric 1005	2	5.1k	1%		
R6	Resistor 10 Ohm, metric 1005	1	10	1%		
U1, U3	74AVCH4T245GU	2				NXP Semiconductors
J1	632723300011	1				Wurth Electronics
U2	CP2105-F01-GM	1				Silicon Labs
D2, D3	ESD8111PFCT5G	2				ON Semiconductor
D1	ESDM3551MXT5G	1				ON Semiconductor
SW1, SW2	EVPA502W	2				Panasonic
J6	FTSH-105-01-F-DV-P-TR	1				Samtec
SW3	JS102011JCQN	1				ITT C&K
D4	LTST-C193KRKT-5A	1				Vishay Lite-On
U5	NCP161BMX180TBG	1				ON Semiconductor
U4	NCP167BMX330TBG	1				ON Semiconductor
U7	SIP32431DNP3-T1GE4	1				Vishay Siliconix
J5	TSM-102-01-L-DV-P	1				Samtec
J2	TSM-110-01-F-DV	1				Samtec
J3	XM124 or XM123	1				

## 2.7 Component Placement Drawing

Picture 4 and Picture 5 show the component placement drawing of XE123/XE124, top and bottom side:



Picture 4. XE123/XE124 component placement drawing, top side.







### 3 References

1. XM123/XM124 datasheet:  
<https://developer.acconeer.com/>
2. Acconeer Entry Module EVK HW User Guide – XE123/XE124  
<https://developer.acconeer.com/>



## 4 Revision History

Date	Version	Changes
2022-07-06	1.0	Original Version



## 5 Disclaimer

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