XS121 Satellite Board Product Brief

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Proprietary and Confidential

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1. Introduction

The A121 EVK is an evaluation kit designed to evaluate the Acconeer A121 pulsed coherent radar sensor. The kit consists of three boards: the XC120, XE121 and XS121. The XC120 board carries a cortex M7 MCU which is to be flashed with a software dedicated to stream data from the A121 radar sensor to Acconeer's "Exploration Tool" via USB HS 2.0[1]. The XC120 is intended to be used with the exploration server for streaming radar sensor data only and after flashing, no further configuration by the user is expected. The XE121 features an on board A121 pulsed coherent radar sensor and the possibility to add up to four additional A121 radar sensors via FFC (Flat Flexible Cable) to the XS121 radar sensor boards. This document focuses on the XS121 board. For details on XC120 and XE121 refer to the respective product briefs. For details on how to use the XC120, XE121 and XS121, refer to the A121 EVK Hardware User Guide available on the Acconeer Developer page: https://developer.acconeer.com/

Below a system overview is shown:

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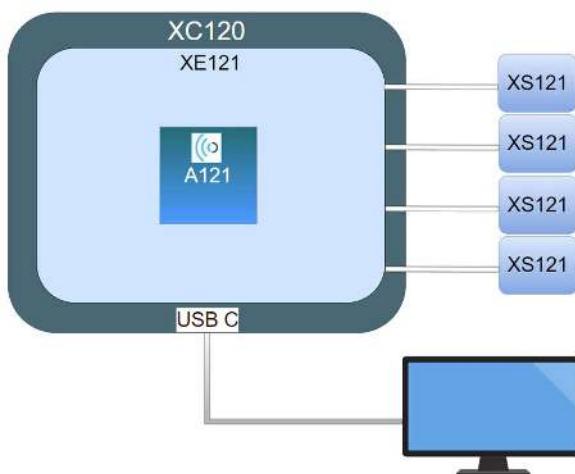
[1] Acconeer's "Exploration Tool" is supported by Linux and Windows OS.

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2. XS121 Satellite Board

2.1. Overview

The XS121 is a small satellite board equipped with an A121 pulsed coherent radar sensor that via FFC (Flat Flexible Cable) can be connected to the Acconeer Evaluation Board XE121. It is not a mandatory component in the Acconeer A121 Evaluation Kit but can come in handy when you want to evaluate multi sensor use cases or a use case where space for sensor placement is limited. It is not possible to operate the XS121 without an XE121 Evaluation board. The XS121 is delivered with an FFC cable from Molex: 0151660225. The FFC has 20 channels, 0.5mm pitch. The XS121 is compatible with the Acconeer LH112 lens kit.

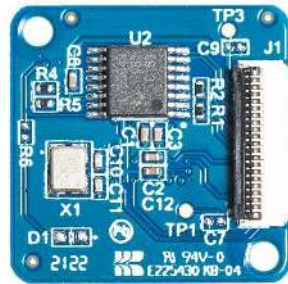Picture 1 shows the block diagram of XS121:
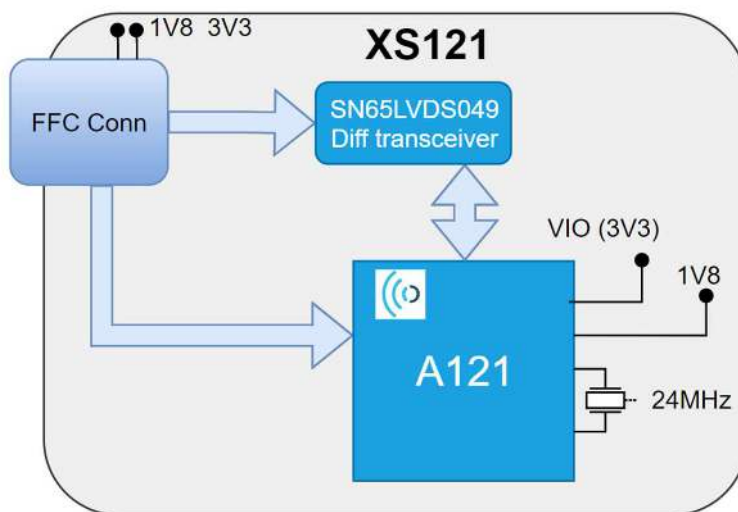
Picture 1. XS121 block diagram.

In the pictures below, the XS121 front and reverse sides are shown as well as XS121 connected to XE121 and XC120.

Picture 2. XS121 Satellite board, front side.

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Picture 3. XS121 satellite board, reverse side.

Picture 4. XS121 connected to XE121 which in turn is connected to XC120.

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2.2. Power

The XS121 satellite board is powered from the XE121 which in turn is powered from the XC120, Raspberry Pi or Nucleo Development board. Depending on your use case, if you run simultaneous radar measurements on more than 1 XS121, the power delivered from XC120 powered via USB connector (or Nucleo and Raspberry Pi powered via USB connector) may not be enough. In this case an external power supply is needed. The XC120 has such an option. Refer to XC120 Product Brief fore details: https://developer.acconeer.com/

For details how to use the Nucleo development board and the Raspberry Pi with external power supply, refer to official product information:

https://www.st.com/content/st_com/en.html
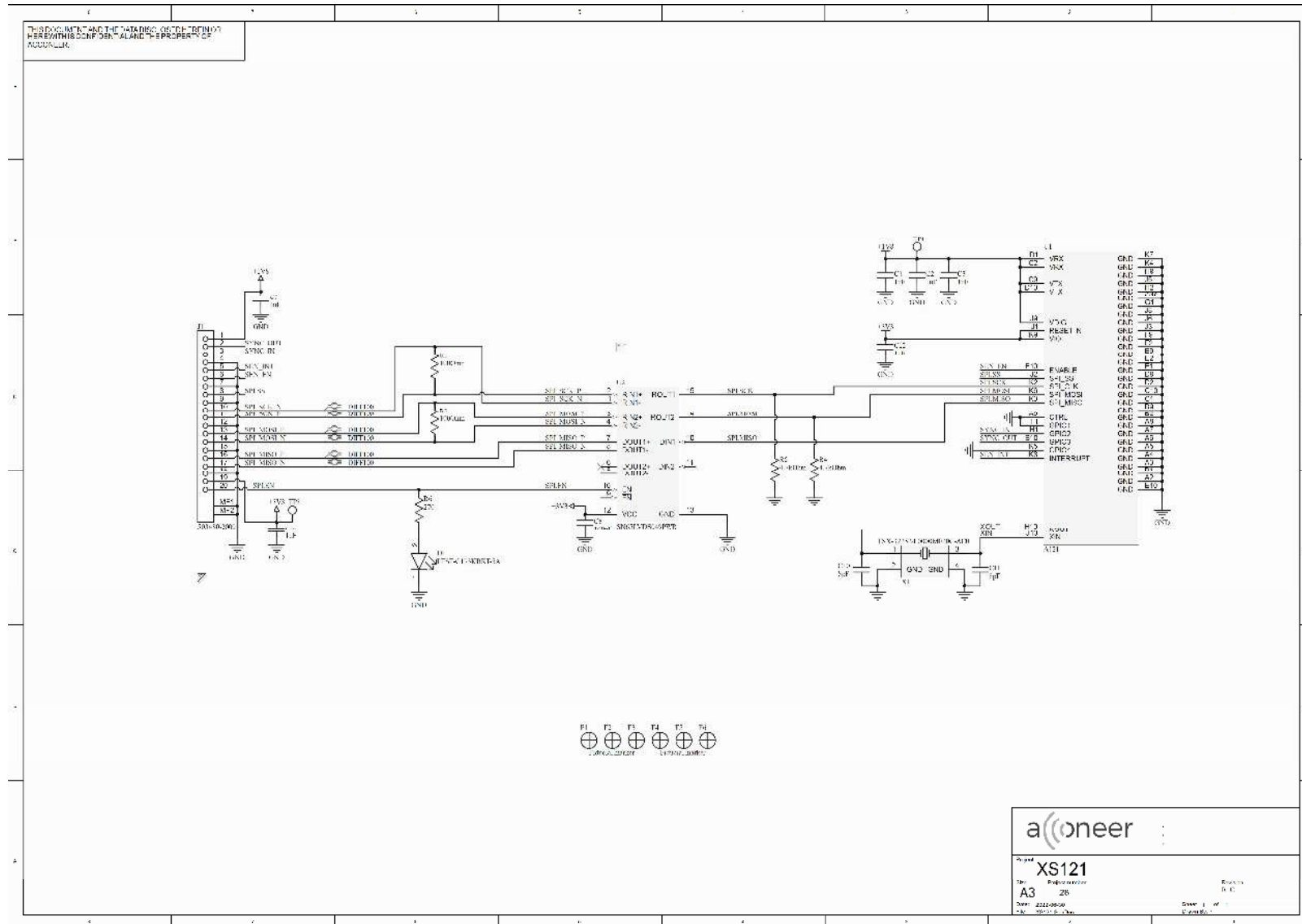
https://www.raspberrypi.com/documentation/computers/raspberry-pi.html - power-supply

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2.3. Electrical Schematics

On the following pages, please find the electrical schematics for the XS121:

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2.4. Bill of Material

Table 1 shows the BOM for the XS121

Component ref.	Part Number	QTY	Value	Comment
C1, C3	10/UF/K/X5R/50V/3216	2	10uF	
C10, C11, C2, C21, C23, C25, C28, C31, C33, C35, C37, C39, C4, C42, C44, C46, C5, C55, C6, C7, C8, C9	100/NF/J/50V/X5R/1005	22	100nF	
C20, C27, C34, C41	3.9/NF/K/50V/X7R/1005	4	3900pF	
C24, C26, C30, C32, C38, C40, C45, C47	1/UF/K/10V/X5R/1005	8	1uF	
L1	MURATA, DFE252012R-H-1R0M=P2	1	1uH	
J1, J2, J3, J4	Molex 503480-1600	4		16Pin 0.5 FPCB CONN BACKFLIP
J5	CNC, JINLIN, FH254-40DSMT/2.54MM 2*20 SMD	1		
R1, R10, R11, R12, R18, R19, R2, R20, R21, R3, R38, R39, R4, R40, R41, R9	0/OHM/J/1005	16	0Ohm	
R13, R14, R15, R16, R17, R22, R23, R24, R25, R5, R6, R7, R8, R42, R43, R44, R45	10/KOHM/F/1005	17	10kOhm	
R27, R28, R30, R31, R33, R34, R36, R37	51/OHM/J/1005	8	51Ohm	
U1	M24128-DRDW8TP/K	1		
U2	TPS62061DSGR	1		
U3, U4	74LVC125APW	2		
U5	NLSV4T244MUTAG	1		
U6, U7, U8, U9	SN65LVDS049PW	4		

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2.5.   Pinning

Table 2 shows the FFC connector pinout for XS121.

Pin Number	Description
1	+3.3V
2	+5V
3	SDA1 connected to EEPROM
4	Not connected
5	SCL1 connected to EEPROM
6	GND
7	Not connected
8	Not connected
9	GND
10	Not connected
11	PMU_EN
12	SPI_S1_ENABLE_N, selects sensor 1 to respond to SS_N.
13	SPI_S2_ENABLE_N, selects sensor 2 to respond to SS_N.
14	GND
15	SPI_S3_ENABLE_N, selects sensor 3 to respond to SS_N.
16	ENABLE_S1_3V3, selects sensor 1 to respond to ENABLE_N.
17	+3.3V
18	INTERRUPT_S3_3V3, interrupt from sensor 3.
19	SPI_MOSI_3V3
20	GND
21	SPI_MISO_3V3
22	INTERRUPT_S4_3V3, interrupt from sensor 4.
23	SPI_CLK_3V3
24	SS_N, SPI slave select signal.
25	GND
26	SPI_S4_ENABLE_N, selects sensor 4 to respond to ENABLE_N.
27	Not connected
28	Not connected
29	ENABLE_S2_3V3, selects sensor 2 to respond to ENABLE_N.
30	GND
31	ENABLE_N, sensor enable signal.

Pin Number	Description
32	ENABLE_S3_3V3, selects sensor 3 to respond to ENABLE_N.
33	Not connected
34	GND
35	Not connected
36	Not connected
37	ENABLE_S4_3V3, selects sensor 4 to respond to ENABLE_N.
38	INTERRUPT_S1_3V3, interrupt from sensor 1.
39	GND
40	INTERRUPT_S2_3V3, interrupt from sensor 2.

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3. Revision History

Date	Version	Changes
2022-07-06	1.0	Original Version

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