Time-of-Flight expansion board based on the VL53L8 series for STM32 Nucleo
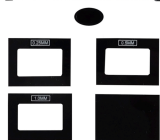
Features

- VL53L8CX Time-of-Flight 8x8 multizone sensor with enhanced ranging performances
- Accurate absolute ranging distance, independent of the reflectance of the target
- Up to 400 cm ranging
- Histogram-based technology
- Multiobject detection capability
- 0.25, 0.5, and 1 mm spacers to simulate air gaps
- One cover glass to protect the sensor from dust
- Compatible with STM32 Nucleo development boards
- Equipped with Arduino® UNO R3 connectors
- Full system software supplied, including code examples and graphical user interface
- RoHS, CE, UKCA, and China RoHS compliant

Description

The X-NUCLEO-53L8A1 is an expansion board for any STM32 Nucleo board equipped with the Arduino R3 connectors. It provides a complete evaluation kit that allows you to learn, evaluate, and develop applications based on the VL53L8 series Time-of-Flight sensors.

The expansion board is delivered with a cover glass holder in which you can fit three different spacers of 0.25, 0.5, and 1 mm height below the cover glass to simulate various air gaps.

Several ST expansion boards can be stacked through the Arduino® connectors, which allow, for example, the development of VL53L8 series ToF applications with Bluetooth® Low Energy or Wi-Fi interfaces.

Product summary	
Time-of-Flight 8x8 multizone sensor with enhanced ranging performances expansion board based on the VL53L8CX for STM32 Nucleo	X-NUCLEO-53L8A1
Time-of-Flight sensor software expansion for STM32Cube	X-CUBE-TOF1
STM32 Nucleo-64 development board with STM32F401RE MCU	NUCLEO-F401RE
Applications	Personal Electronics - Audio and Video/Gaming and Drones/Virtual - Augmented Reality/Wearable

DB4921 - Rev 1 - March 2023
For further information contact your local STMicroelectronics sales office.

www.st.com

1 Ordering information

Table 1. Ordering information

Order code	PCB version	Core product
X-NUCLEO-53L8A1A	X$NUCLEO-53L8A1A	VL53L8

2 Ordering information for the VL53L8 series ToF sensor

This board is equipped with a non commercial VL53L8CA evaluation purposes only Time of Flight sensor.

Equivalent orderable products are listed in the following table.

For a detailed description of each sensor, please refer to its datasheet on the product web page.

Additional information is available from the user manual and collateral documents of the target ToF sensor.

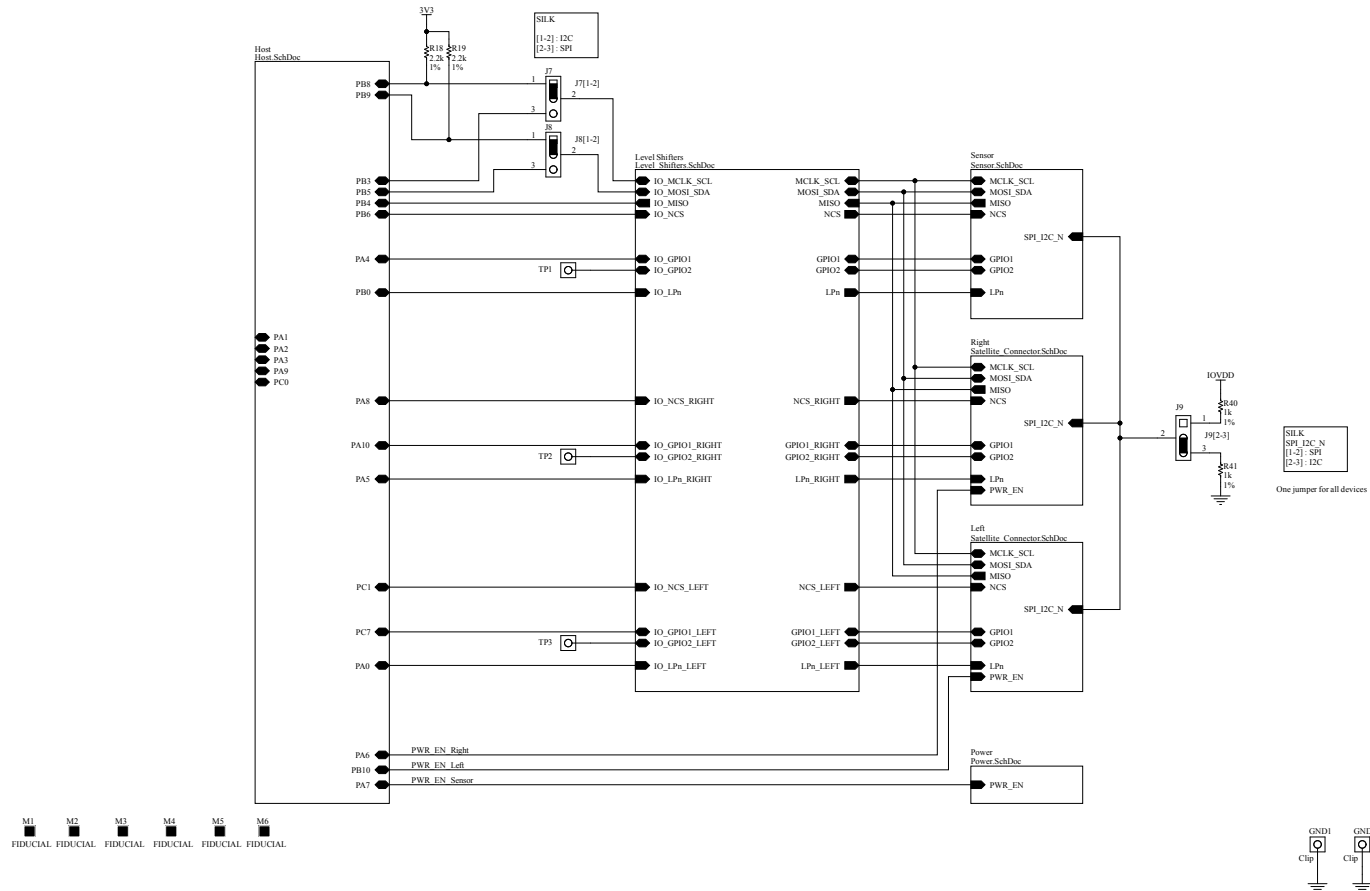**Table 2.** Ordering information for the VL53L8 ToF sensor

PN	CPN	Datasheet	Features
VL53L8CX	VL53L8CXV0GC/1	DS14161	Low-power high-performance 8x8 multizone Time-of-Flight sensor

3 Schematic diagrams

Note: *These schematic diagrams refer to the board latest version.*

Figure 1. X-NUCLEO-53L8A1 circuit schematic (1 of 5)

Note: *The display connector is an optional connector to connect an SSD1306 I2C OLED display to output the ranging data or other meaningful information if required. The related application note and example code will be available on st.com.*

Figure 2. **X-NUCLEO-53L8A1 circuit schematic (2 of 5)**
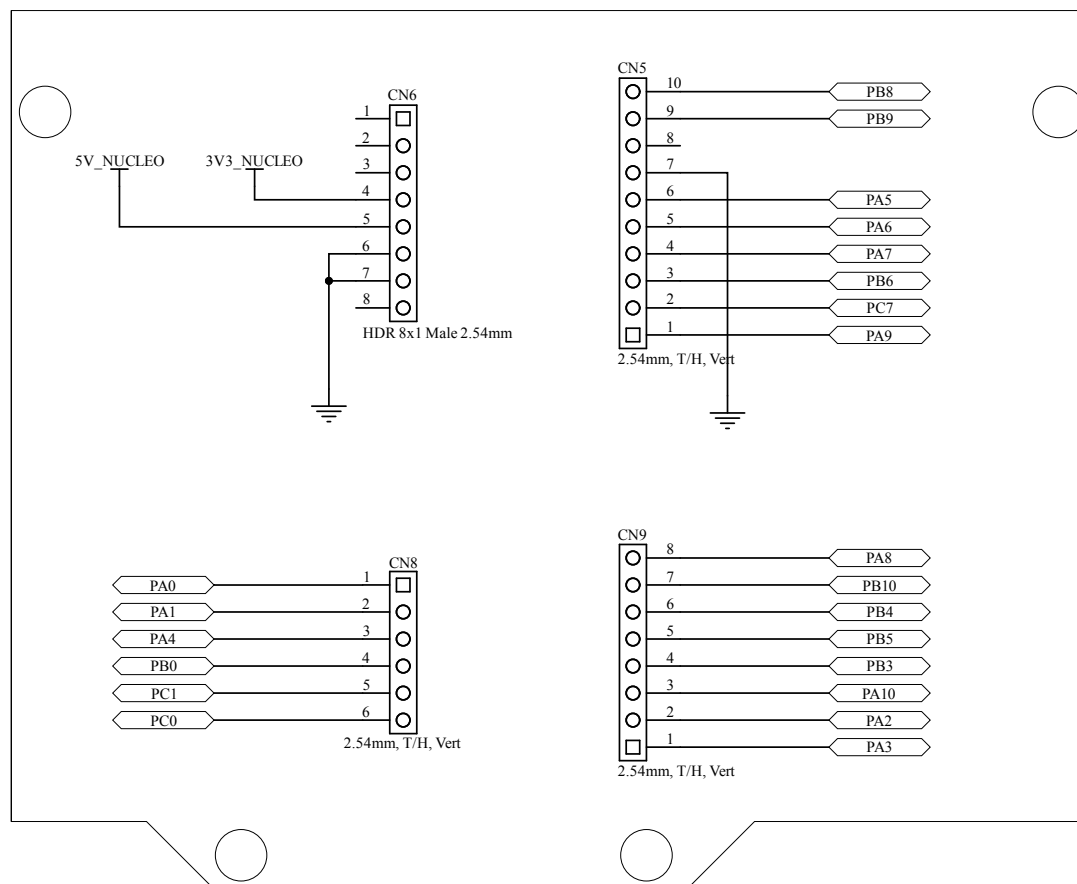
Nucleo Arduino connectors

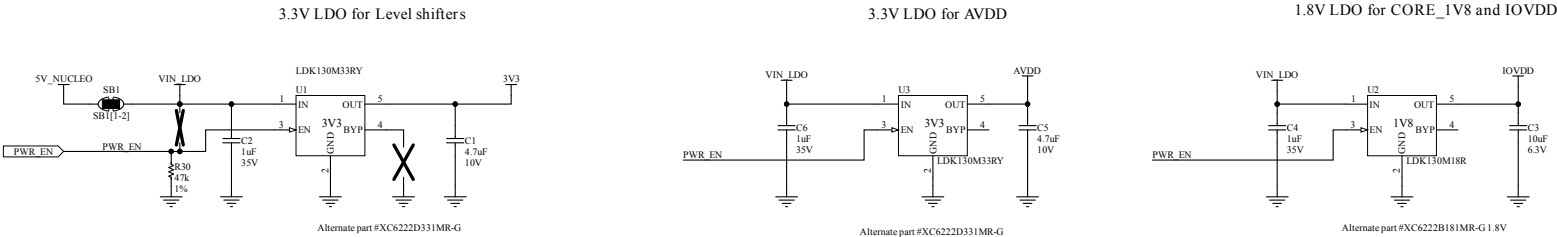**Figure 3. X-NUCLEO-53L8A1 circuit schematic (3 of 5)**

Power Section

3.3V LDO for Level shifters

3.3V LDO for AVDD

1.8V LDO for CORE_1V8 and IOVDD

Alternate part #XC6222D331MR-G

Alternate part #XC6222D331MR-G

Alternate part #XC6222B181MR-G 1.8V

Figure 4. X-NUCLEO-53L8A1 circuit schematic (4 of 5)

SENSOR

NOTE

AVDD = 3V3 +/- 5%
CORE_1V8 = 1V8 +/- 10%
IOVDD = 1V8 +/- 10%

U4
VL53L8CA

GPIO1: Open drain Interrupt Output
GPIO2: Open drain output/SYNC input
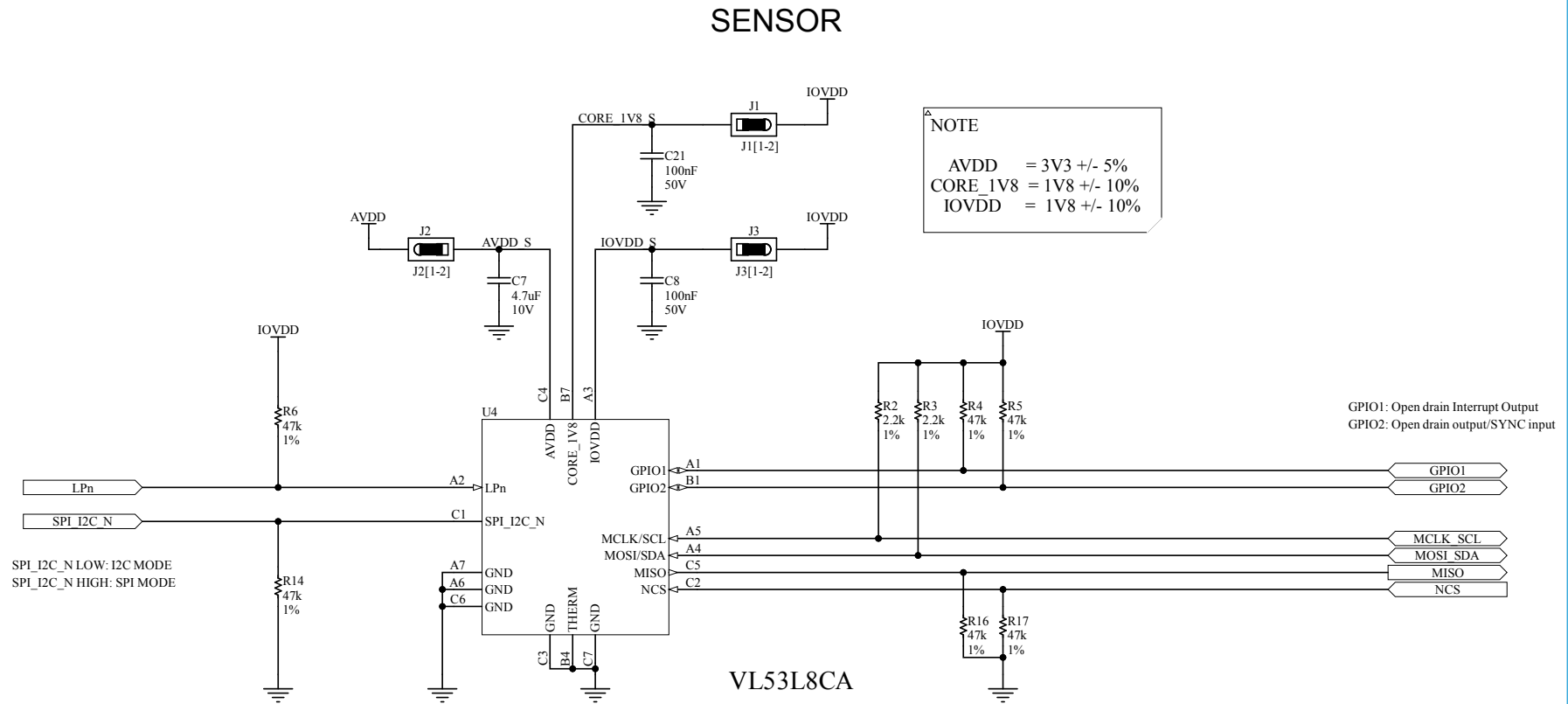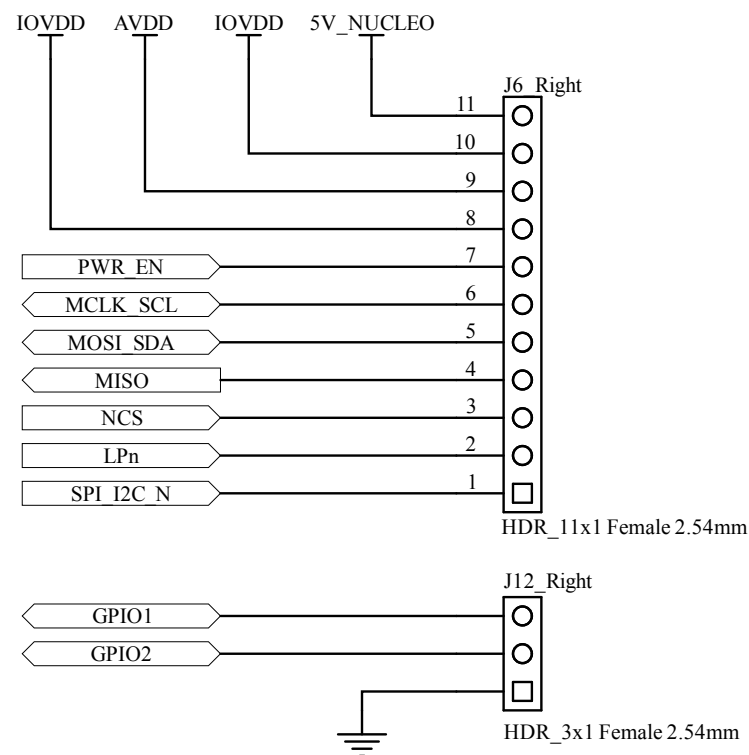
SPI_I2C_N LOW: I2C MODE
SPI_I2C_N HIGH: SPI MODE

Figure 5. X-NUCLEO-53L8A1 circuit schematic (5 of 5)

Satellite board connector

NOTE

CORE_1V8 and IOVDD is
from the same 1.8V regulator

IOVDD   AVDD   IOVDD   5V_NUCLEO

J6_Right

11	
10	
9	
8	
PWR_EN	7
MCLK_SCL	6
MOSI_SDA	5
MISO	4
NCS	3
LPn	2
SPI_I2C_N	1

HDR_11x1 Female 2.54mm

J12_Right

GPIO1	
GPIO2	

HDR_3x1 Female 2.54mm

4 Board versions

Table 3. X-NUCLEO-53L8A1 versions

PCB version	Schematic diagrams	Bill of materials
X$NUCLEO-53L8A1A[1]	X$NUCLEO-53L8A1A schematic diagrams	X$NUCLEO-53L8A1A bill of materials

1. This code identifies the X-NUCLEO-53L8A1 evaluation board first version. It is printed on the board PCB.

Revision history

Table 4. Document revision history

Date	Revision	Changes
07-Mar-2023	1	Initial release.

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