# X-NUCLEO-53L8A1

Data brief

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


STM32 Nucleo

## Features

- Time-of-Flight expansion board based on the VL53L8 series for STM32 Nucleo:
  - VL53L8CX Low-power high-performance 8x8 multizone ToF sensor
  - VL53L8CH Artificial intelligence enabler, high performance 8x8 multizone ToF sensor
- Accurate absolute ranging distance, independent of the reflectance of the target
- 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 |

# 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.

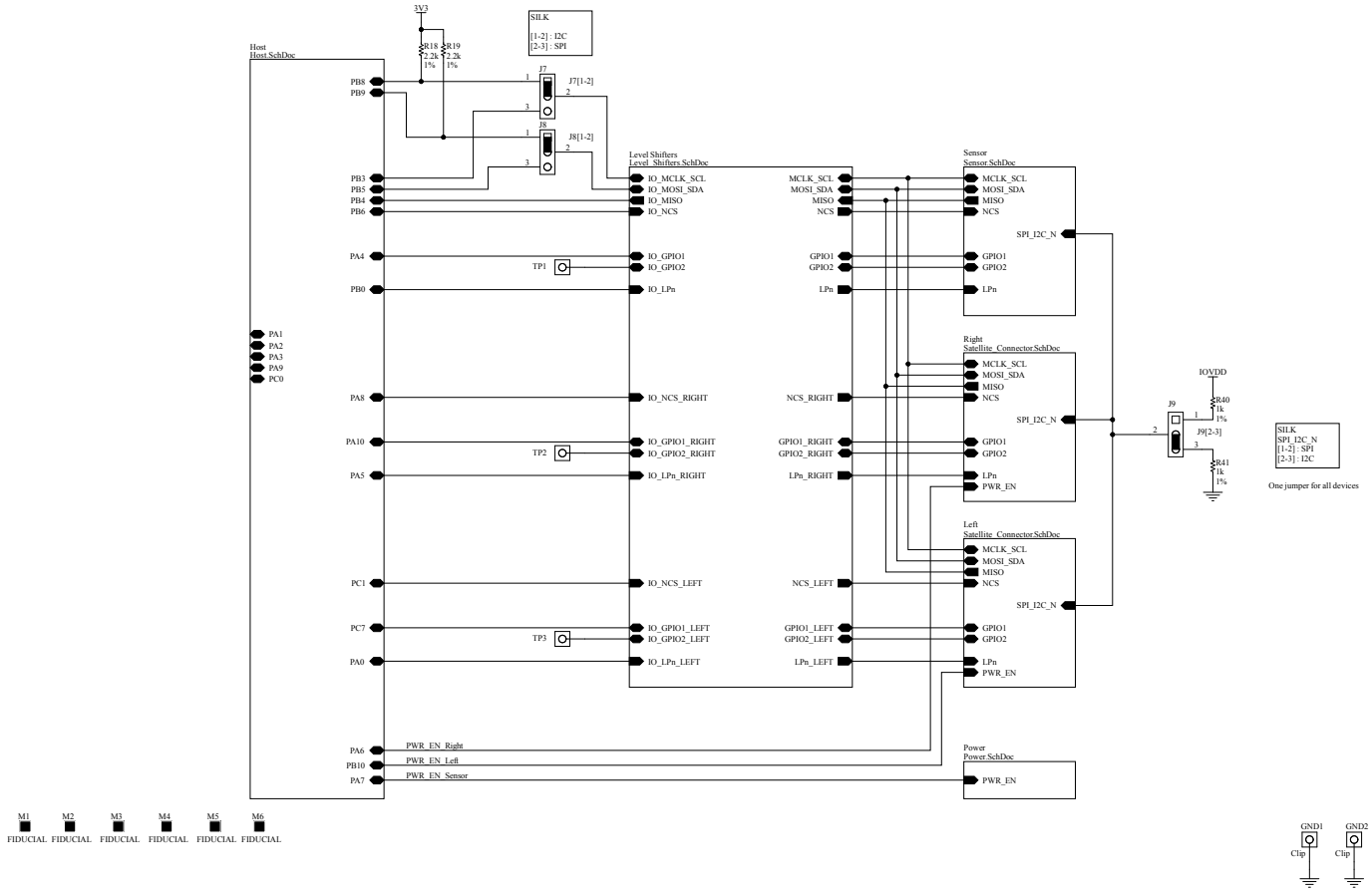
**Table 2. Ordering information for the VL53L8 ToF sensor**

| PN | CPN | Datasheet | Features |
|---|---|---|---|
| VL53L8CX | VL53L8CXV0GC/1 | DS14161 | Low-power high-performance 8x8 multizone Time-of-Flight sensor |
| VL53L8CH | VL53L8CHV0GC/1 | DS14310 | Artificial intelligence enabler, 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

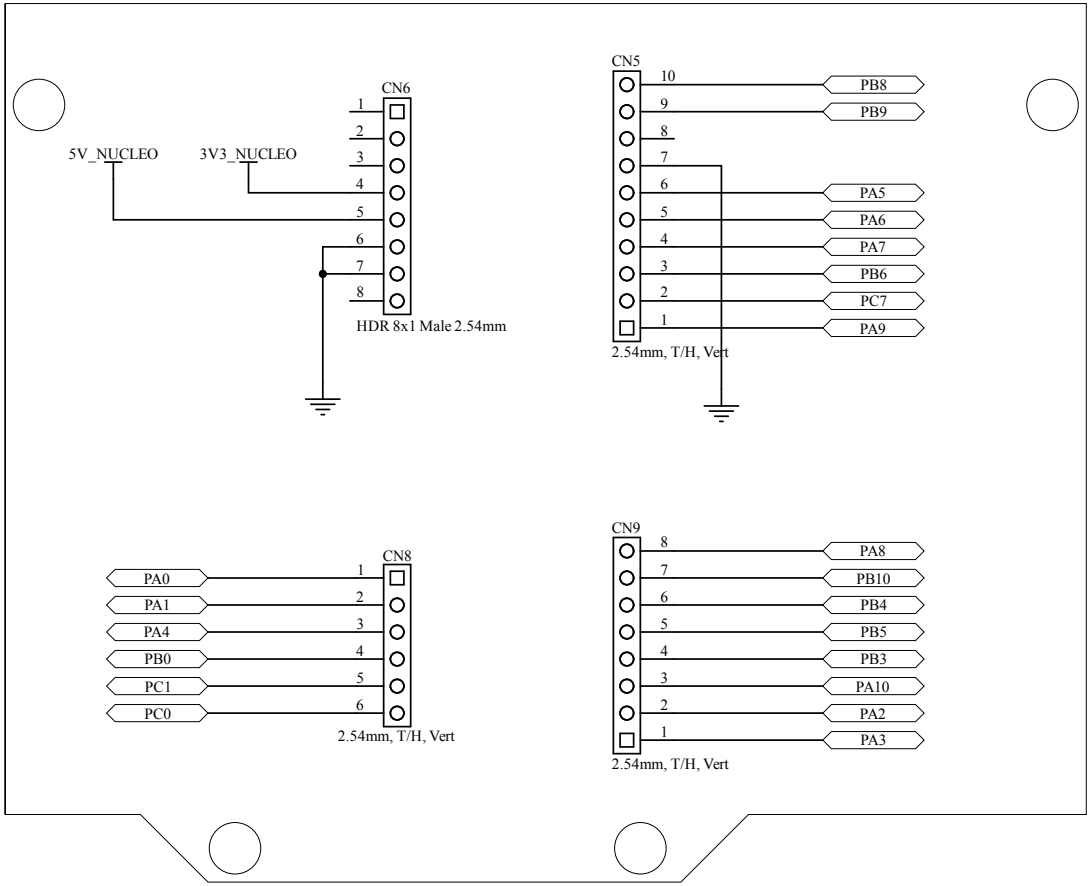
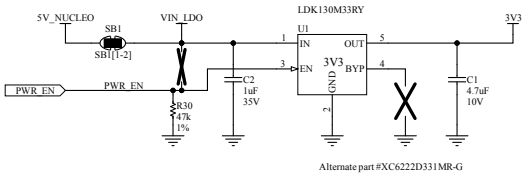


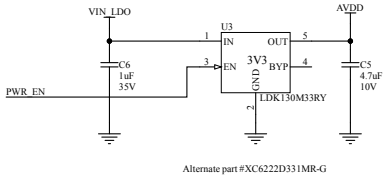
**Figure 3. X-NUCLEO-53L8A1 circuit schematic (3 of 5)**

## Power Section

3.3V LDO for Level shifters




3.3V LDO for AVDD




1.8V LDO for CORE_1V8 and IOVDD

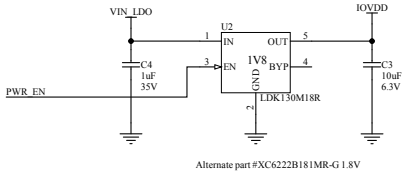


Figure 4. **X-NUCLEO-53L8A1 circuit schematic (4 of 5)**

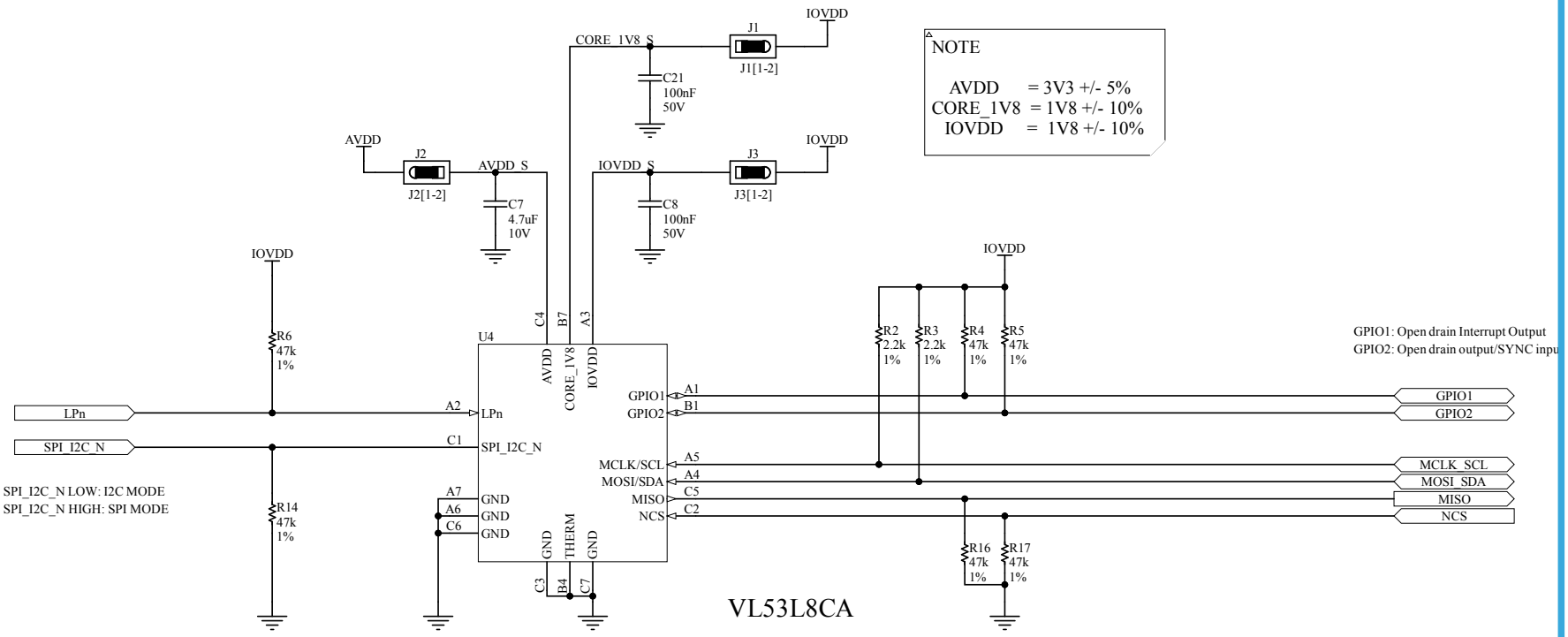
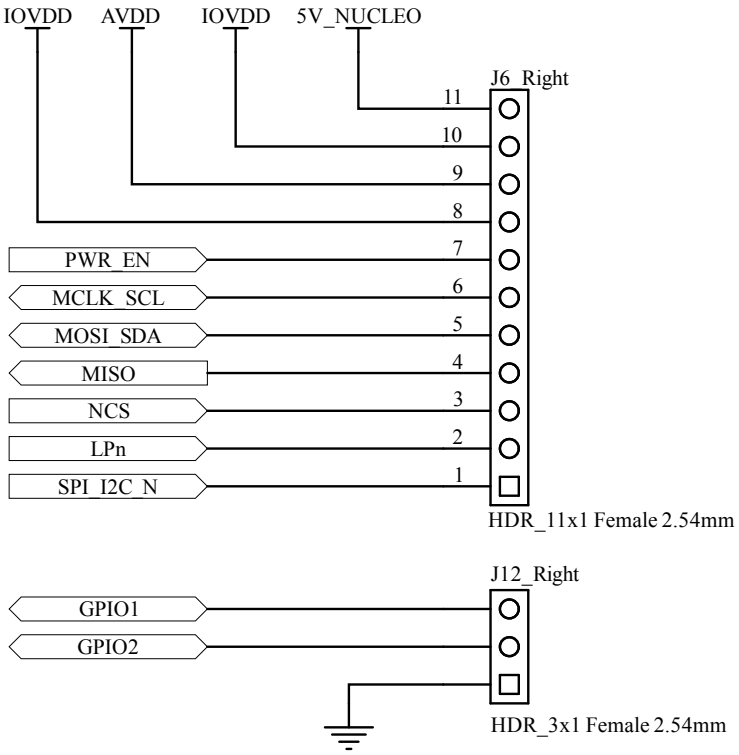


Figure 5. **X-NUCLEO-53L8A1 circuit schematic (5 of 5)**

# Satellite board connector

NOTE

CORE_1V8 and IOVDD is from the same 1.8V regulator



# 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. |
| 04-Aug-2023 | 2 | Updated features in cover page and *Section 2 Ordering information for the VL53L8 series ToF sensor*. |
| 04-Oct-2023 | 3 | Updated cover image. |