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Time-of-Flight ranging sensor with multi object detection and programming FoV expansion board based on VL53L1 for STM32 Nucleo

Features

- VL53L1 Time-of-Flight ranging sensor with multi object detection and field of view (FoV) programming
- Accurate absolute ranging distance measurement, independent of the reflectance of the target
- 0.25, 0.5 and 1 mm spacers to simulate air gaps between ToF sensor and cover window
- Two different cover windows
- Two VL53L1 breakout boards which can be connected onto the X-NUCLEO-53L1A2 expansion board through flying wires to integrate the VL53L1 into the customer's application
- Compatible with STM32 Nucleo board family
- Equipped with Arduino™ UNO R3 connector
- RoHS compliant
- Full system software (SW) is supplied, including code examples and graphical user interface. All this can be downloaded from the folder "Tools & Software", section "Embedded software" on the product page

Description

The X-NUCLEO-53L1A2 is an expansion board for the NUCLEO-F401RE and NUCLEO-L476RG development boards. It provides a complete evaluation kit which allows anyone to learn, evaluate, and develop their applications using the VL53L1 ToF ranging sensor with advanced multi object detection and FoV programming.

The X-NUCLEO-53L1A2 expansion board is delivered with a cover glass holder in which three different spacers of 0.25, 0.5, and 1 mm height can be fitted below the cover glass to simulate various air gaps.

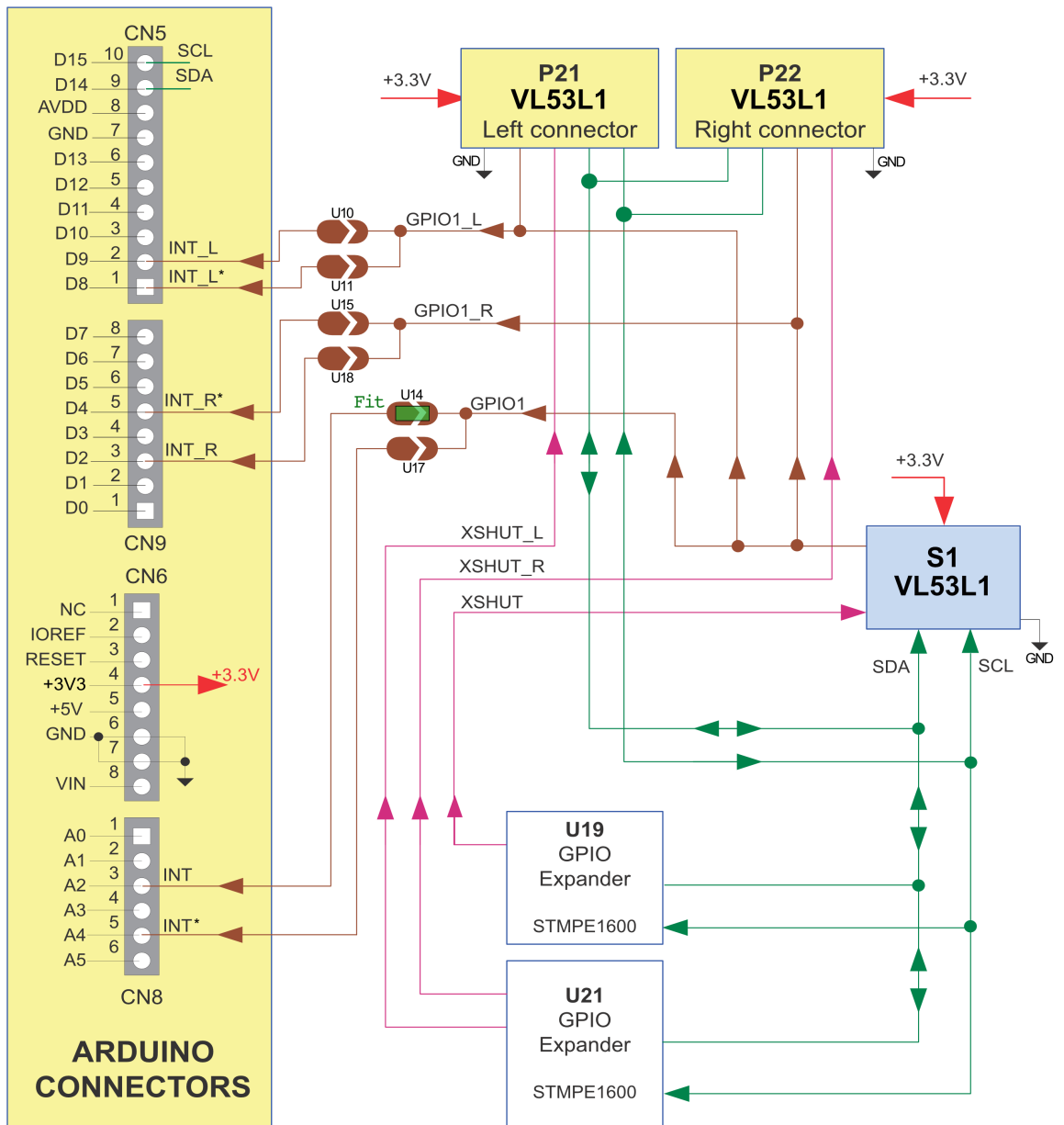Two VL53L1 breakout boards can be connected using two 10-pin connectors.

The X-NUCLEO-53L1A2 expansion board is compatible with the STM32 nucleo board family, and with the Arduino UNO R3 connector layout.

Several ST expansion boards can be superposed through the Arduino connectors which allows, for example, the development of VL53L1 applications with Bluetooth or Wi-Fi interfaces.

Order code	Description
X-NUCLEO-53L1A2	Expansion board for STM32 nucleo board family

DB4214 - Rev 2 - April 2021
For further information contact your local STMicroelectronics sales office.

www.st.com

1 Block diagram

The figure below describes the X-NUCLEO-53L1A2 expansion board features.

**Figure 1. X-NUCLEO-53L1A2 circuit diagram**

2   Optional VL53L1 breakout boards

The VL53L1 breakout boards can be directly plugged onto the VL53L1 expansion board through two 10-pin connectors. Alternatively, they can be connected to the board through flying leads.

When connected through flying leads, developers should break off the mini PCB from the breakout board, and use only the "VL53L1 mini PCB" which is smaller and integrates more easily into customers devices.

Figure 2. Connections of VL53L1 breakout boards
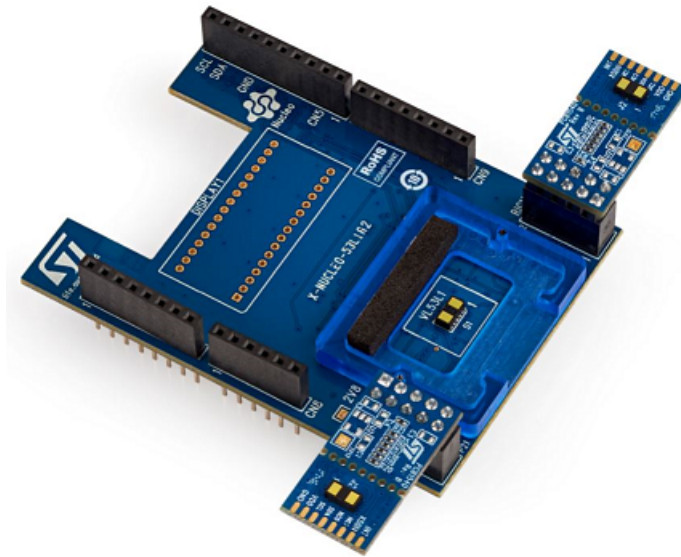
3 Laser considerations

The VL53L1 contains a laser emitter and corresponding drive circuitry. The laser output is designed to remain within Class 1 laser safety limits under all reasonably foreseeable conditions, including single faults, in compliance with IEC 60825-1:2014 edition 3. The laser output remains within Class 1 limits as long as STMicroelectronic's recommended device settings are used and the operating conditions specified in the datasheet are respected. The laser output power must not be increased by any means and no optics should be used with the intention of focusing the laser beam.

Figure 3. Class 1 laser product label

4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

Revision history

Table 1. Document revision history

Date	Version	Changes
07-Jul-2020	1	Initial release
23-Apr-2021		Updated Figure 1. X-NUCLEO-53L1A2 circuit diagram

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