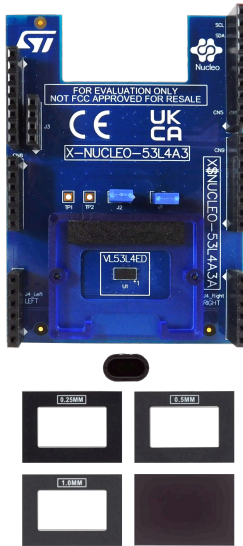


Time-of-Flight high-accuracy proximity sensor expansion board based on the VL53L4ED for STM32 Nucleo



Features

- VL53L4ED Time-of-Flight high accuracy proximity sensor with extended temperature capability
- Accurate absolute ranging distance, independent of the reflectance of the target
- Effective sensor temperature range from -40 to 105°C
- 0.25, 0.5, and 1 mm spacers to simulate air gaps
- Two different cover glasses 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-53L4A3 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 using the VL53L4ED Time-of-Flight high-accuracy proximity sensor with extended temperature capability.

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. A small oval cover glass fitting the sensor is included.

Several ST expansion boards can be stacked through the Arduino connectors, which allow, for example, the development of VL53L4ED applications with Bluetooth or Wi-Fi interfaces.

The evaluation boards shall be tested exclusively under normal temperature conditions. The board is not rated for high temperature operation.

Product summary	
Time-of-Flight high-accuracy proximity sensor expansion board based on the VL53L4ED for STM32 Nucleo	X-NUCLEO-53L4A3
Time-of-Flight sensor software expansion for STM32Cube	X-CUBE-TOF1
STM32 Nucleo-64 development board with STM32F401RE MCU	NUCLEO-F401RE
Applications	Industrial Robots

1 Ordering information

Table 1. Ordering information

Order code	Core product
X-NUCLEO-53L4A3	VL53L4ED

2 Laser safety considerations

The VL53L4ED contains a laser emitter and the corresponding drive circuitry.

The laser output is designed to remain within Class 1 laser safety limits under all reasonable foreseeable conditions, including single faults, in compliance with the IEC 60825-1:2014 (third edition).

The laser output remains within Class 1 limits as long as you use the STMicroelectronics recommended device settings and respect the operating conditions specified in the data sheet.

The laser output power must not be increased and no optics should be used with the intention of focusing the laser beam.

Figure 1. Class 1 laser product label



3 Optional VL53L4ED breakout boards

The SATEL-VL53L4ED is designed to connect remotely the SATEL-VL53L4ED sensor to any type of electronic controller.

Attention: *The VL53L4ED is delivered with a liner to prevent potential foreign material from piercing the module holes during the assembly process. Remove this liner before use.*

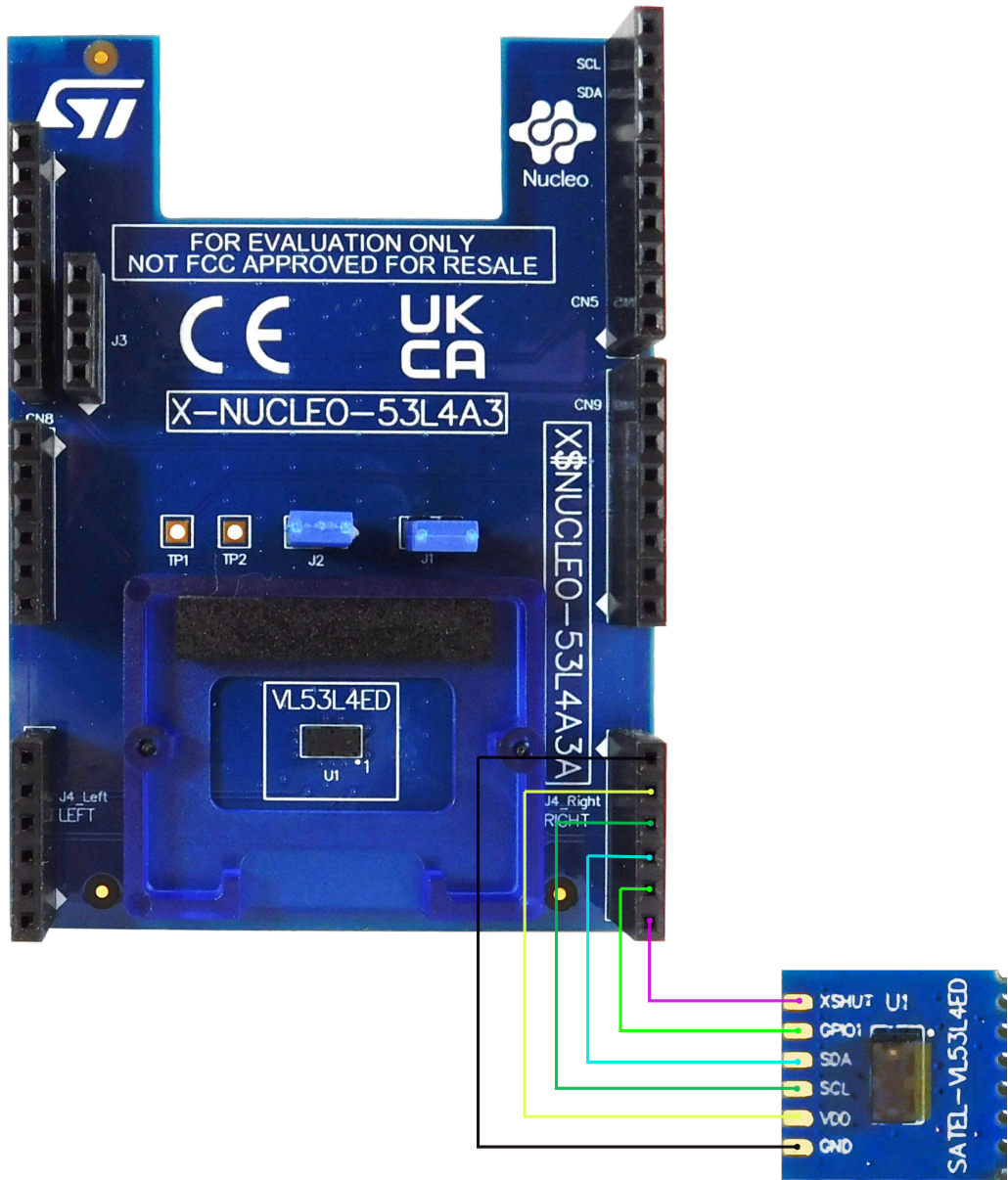
The VL53L4ED breakout boards can be directly plugged onto the X-NUCLEO-53L4A3 expansion board through two six-pin connectors (Figure 2. SATEL-VL53L4ED breakout boards connected to the X-NUCLEO-53L4A3 expansion board) or through flying wires (Figure 3. VL53L4ED mini PCB flying wires connection to X-NUCLEO-53L4A3 expansion board).

You can buy the breakout boards separately as SATEL-VL53L4ED. This order code package includes two breakout boards.

Figure 2. SATEL-VL53L4ED breakout boards connected to the X-NUCLEO-53L4A3 expansion board



Figure 3. VL53L4ED mini PCB flying wires connection to X-NUCLEO-53L4A3 expansion board



4 Simplified schematics

Figure 4. X-NUCLEO-53L4A3 simplified schematic

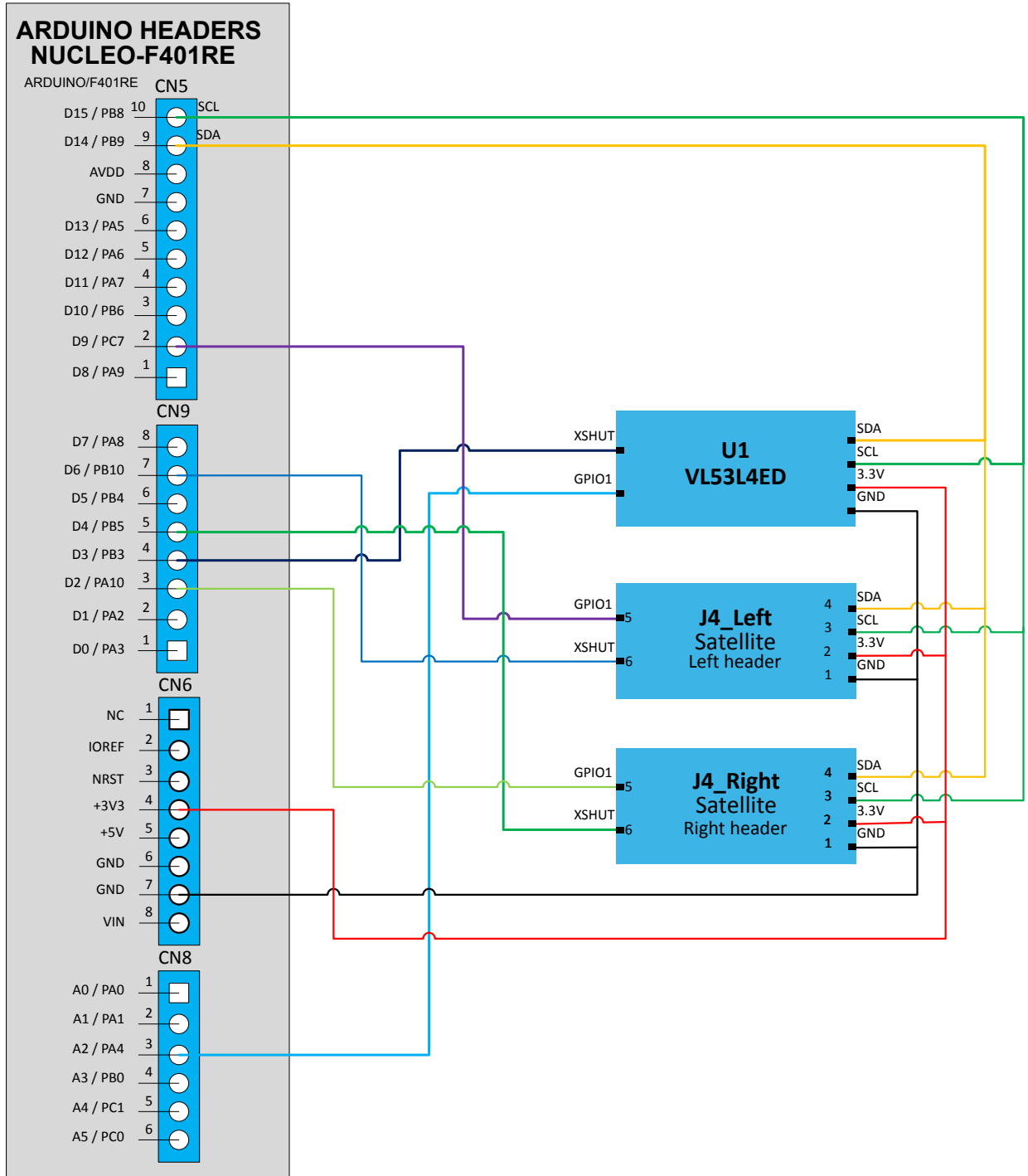
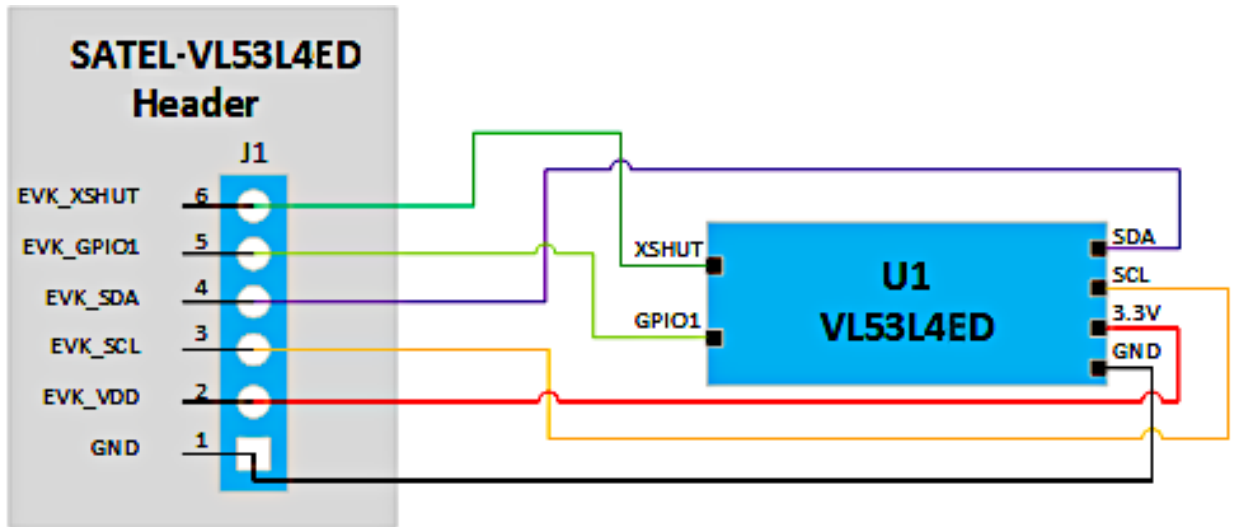


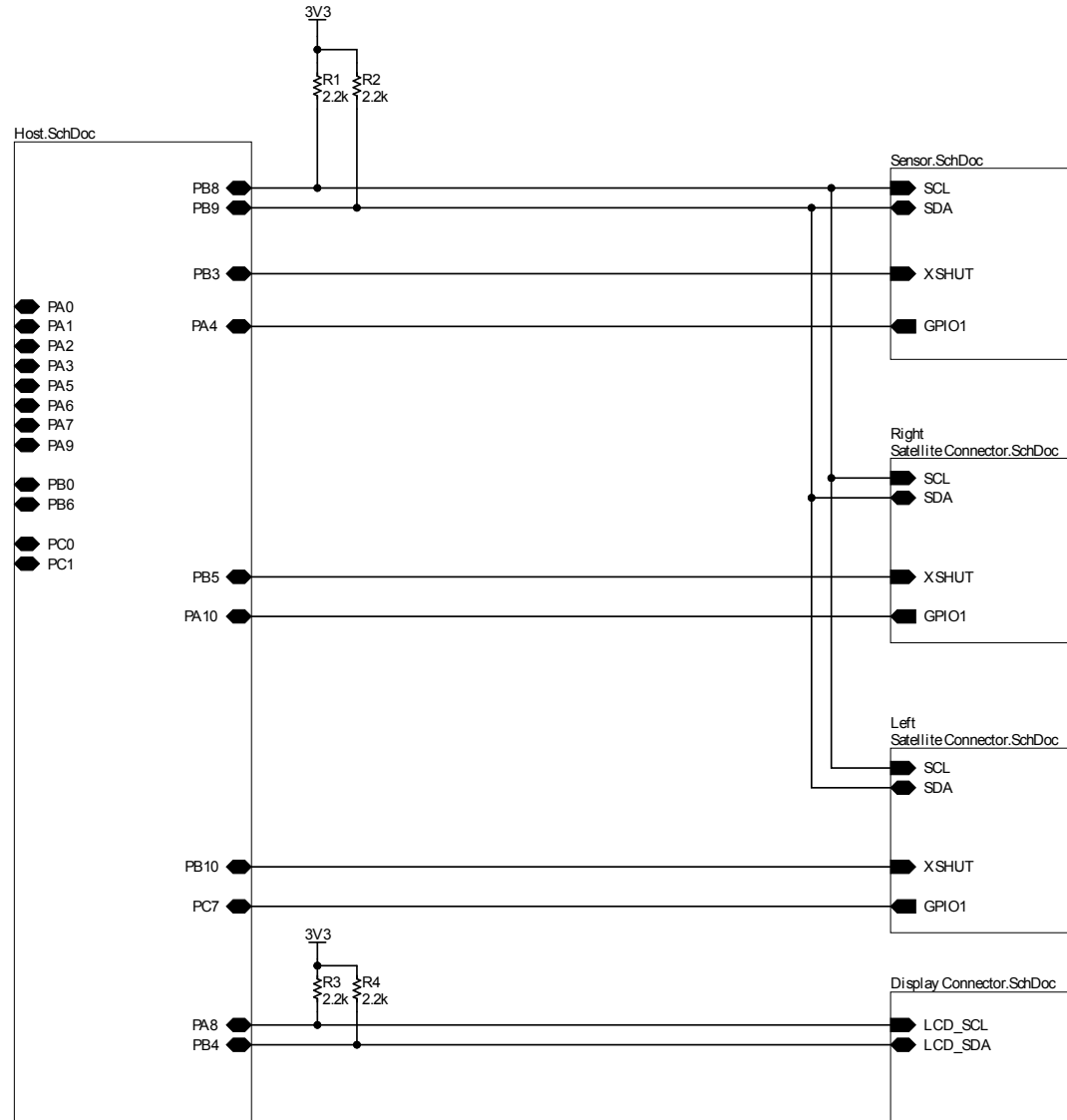
Figure 5. SATEL-VL53L4ED simplified schematic



5 Schematic diagrams

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

Figure 6. X-NUCLEO-53L4A3 circuit schematic (1 of 6)



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 7. X-NUCLEO-53L4A3 circuit schematic (2 of 6)

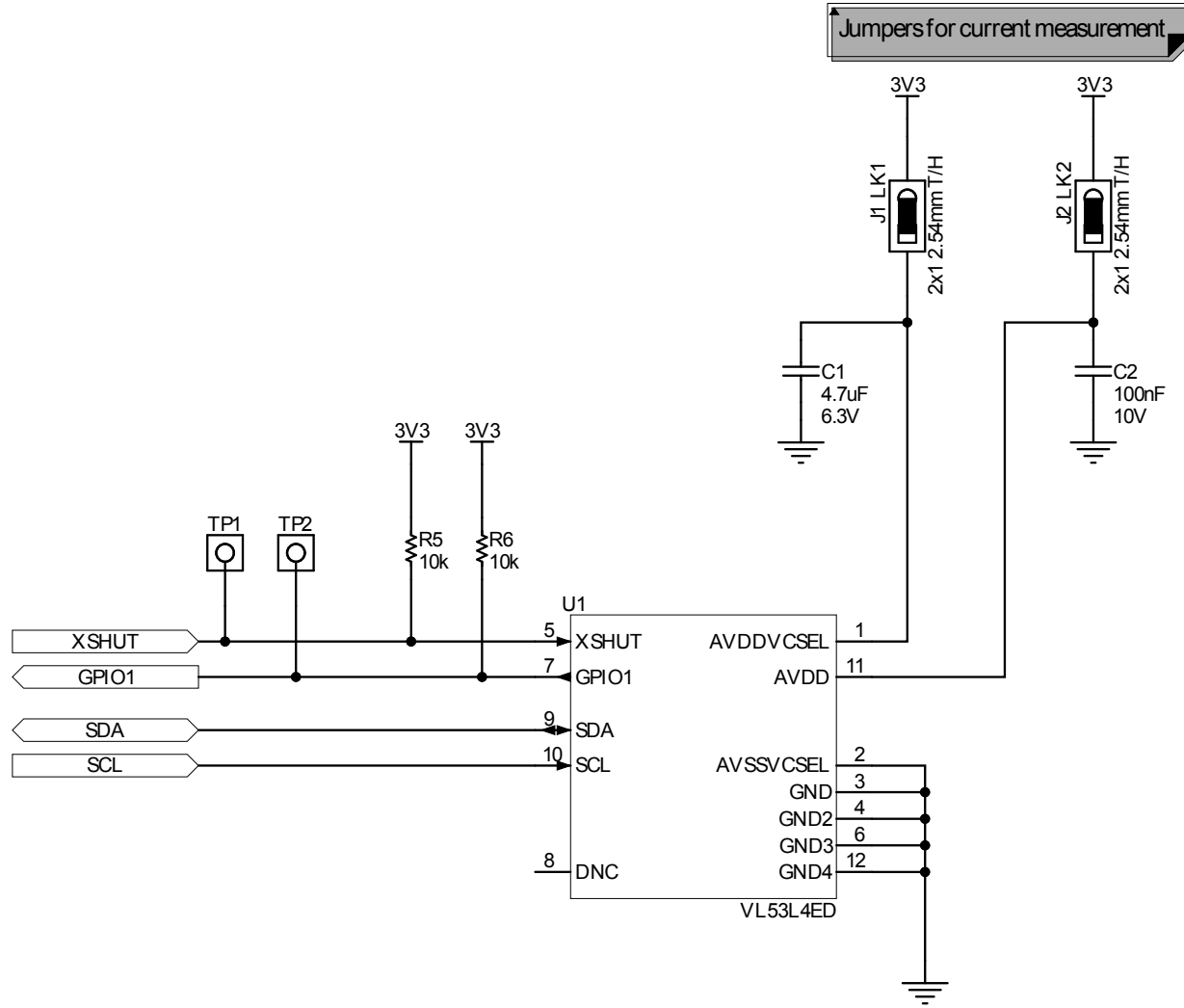


Figure 8. X-NUCLEO-53L4A3 circuit schematic (3 of 6)

Nucleo Arduino Connectors

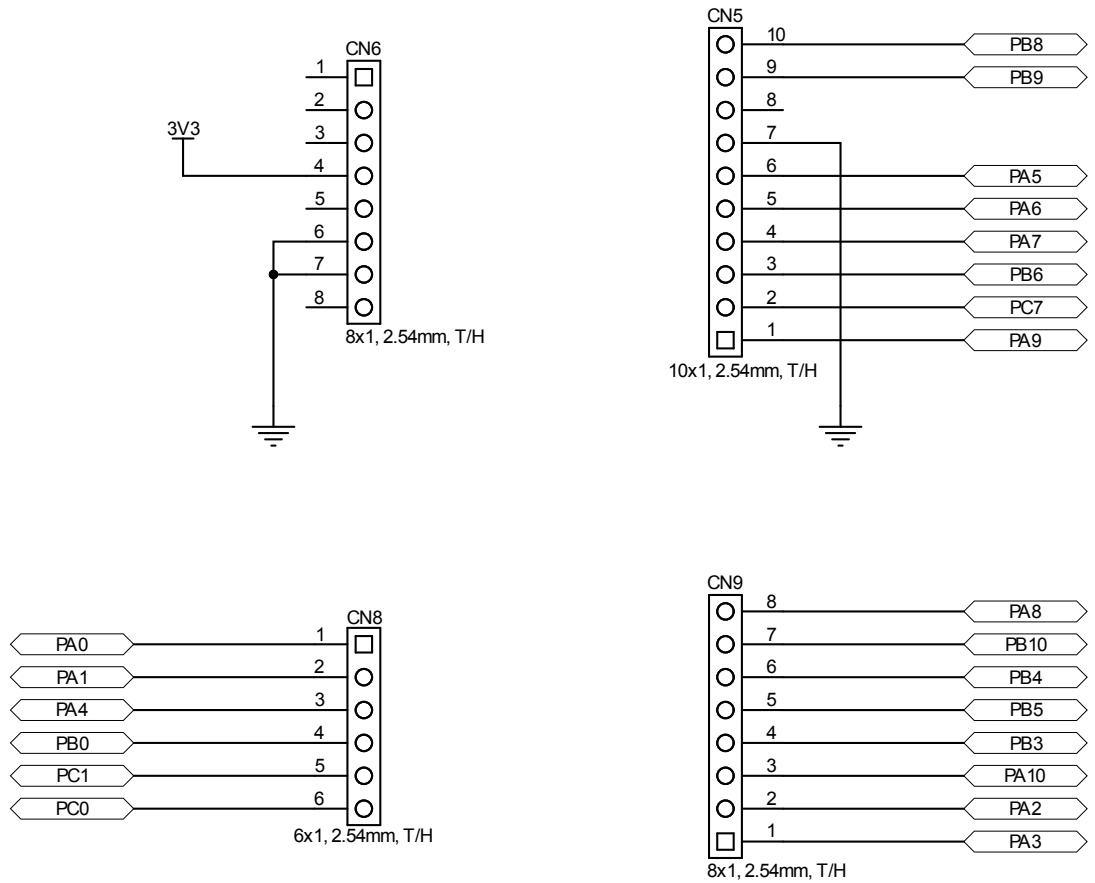


Figure 9. X-NUCLEO-53L4A3 circuit schematic (4 of 6)

Header for LCD

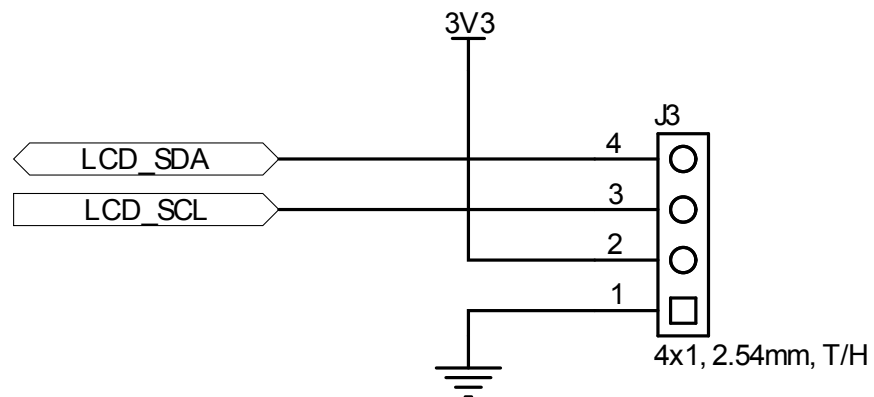


Figure 10. X-NUCLEO-53L4A3 circuit schematic (5 of 6)

Header for Satellite Board

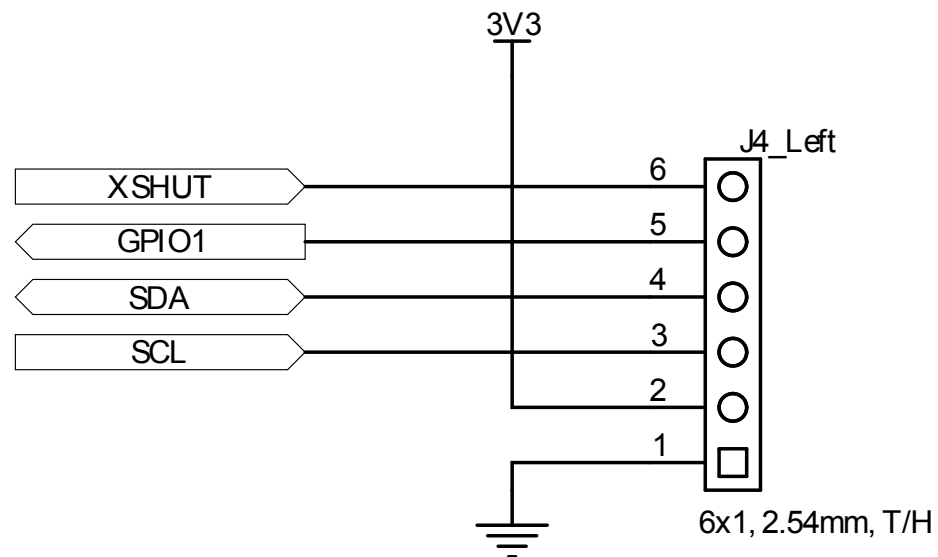
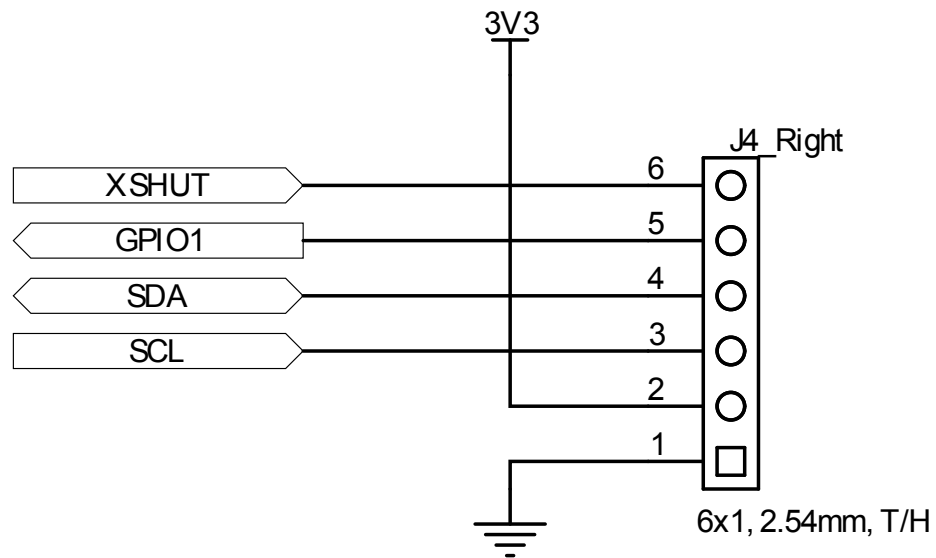


Figure 11. X-NUCLEO-53L4A3 circuit schematic (6 of 6)

Header for Satellite Board



6 Board versions

Table 2. X-NUCLEO-53L4A3 versions

FG version	Schematic diagrams	Bill of materials
X\$NUCLEO-53L4A3A ⁽¹⁾	X\$NUCLEO-53L4A3A schematic diagrams	X\$NUCLEO-53L4A3A bill of materials

1. This code identifies the X-NUCLEO-53L4A3 expansion board first version. It is printed on the board PCB.

Revision history

Table 3. Document revision history

Date	Revision	Changes
20-Sep-2023	1	Initial release.

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