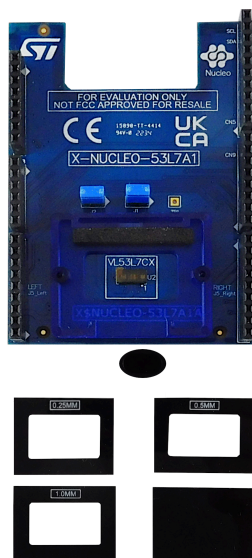## Time-of-Flight 8x8 multizone ranging sensor with 90° FoV expansion board based on the VL53L7CX for STM32 Nucleo

Features

- VL53L7CX Time-of-Flight 8x8 multizone ranging sensor with 90° FoV
- Accurate absolute ranging distance, independent of the reflectance of the target
- Up to 350 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-53L7A1 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 VL53L7CX Time-of-Flight 8x8 multizone ranging sensor with 90° FoV.

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 VL53L7CX applications with Bluetooth® Low Energy or Wi-Fi interfaces.

Product summary	
Time-of-Flight 8x8 multizone ranging sensor with 90° FoV expansion board based on the VL53L7CX for STM32 Nucleo	X-NUCLEO-53L7A1
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

DB4808 - Rev 1 - September 2022
For further information contact your local STMicroelectronics sales office.

www.st.com

1 Ordering information

Table 1. Ordering information

Order code	Core product
X-NUCLEO-53L7A1	VL53L7CX

2   Laser safety considerations

The VL53L7CX 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 VL53L7CX breakout boards

The SATEL-VL53L7CX is designed to connect remotely the VL53L7CX sensor to any type of electronic controller.

Attention: *The VL53L7CX 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 VL53L7CX breakout boards can be directly plugged onto the X-NUCLEO-53L7A1 expansion board through two six-pin connectors (Figure 2) or through flying wires (Figure 3).

You can buy the breakout boards separately as SATEL-VL53L7CX. This order code package includes two breakout boards.

Figure 2. SATEL-VL53L7CX breakout boards connected to the X-NUCLEO-53L7A1 expansion board

Figure 3. **VL53L7CX mini PCB flying wires connection to X-NUCLEO-53L7A1 expansion board**
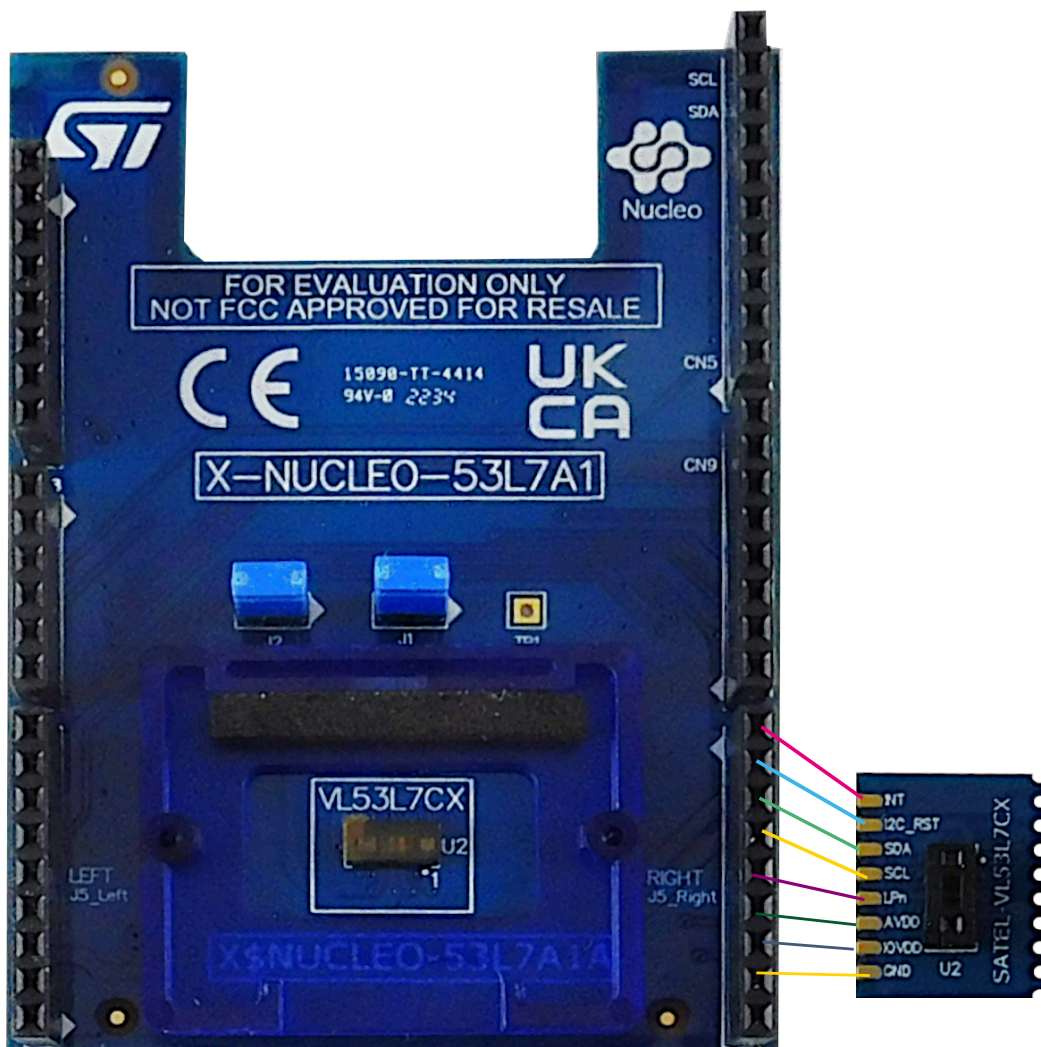
4 Simplified schematics

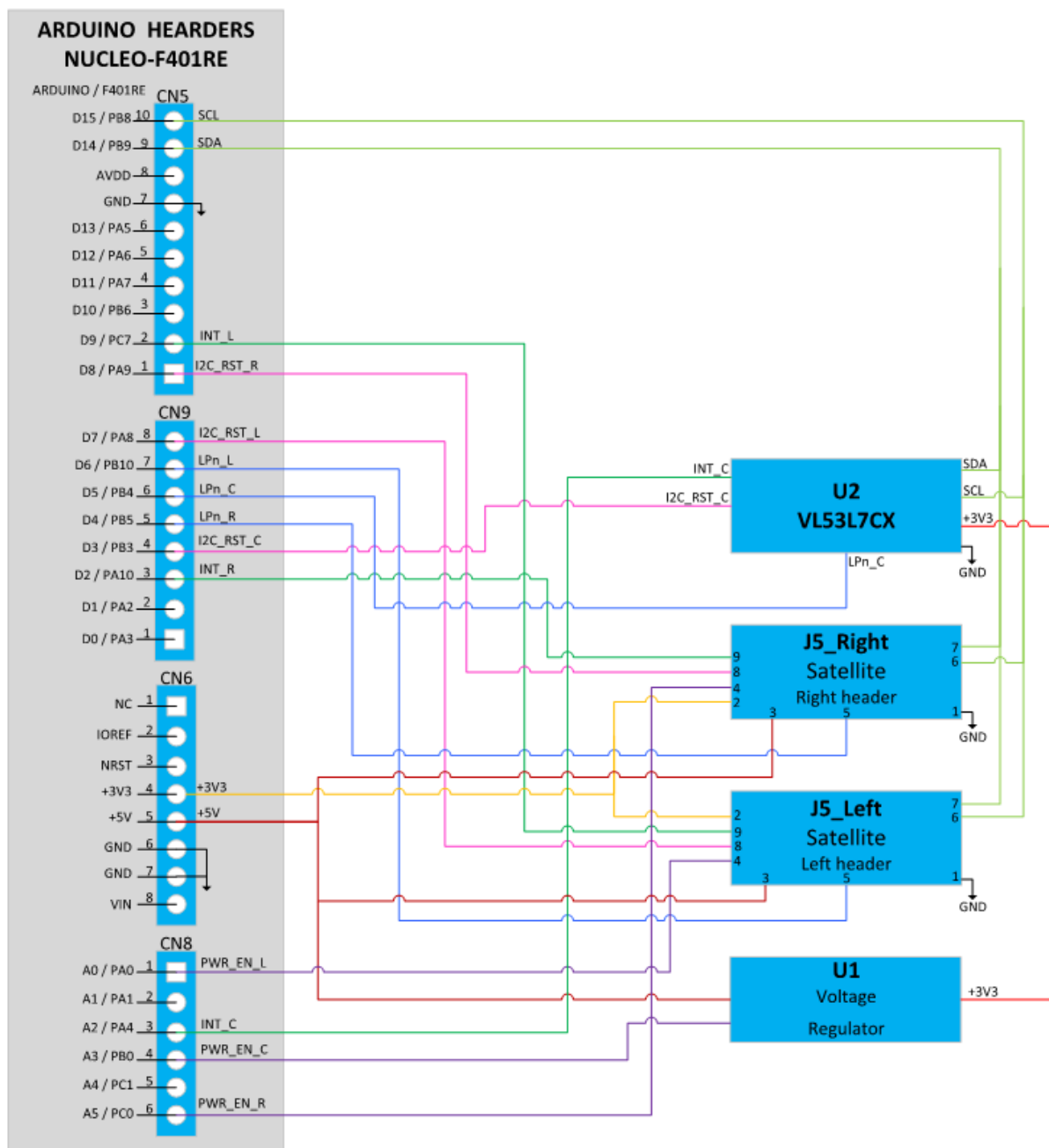Figure 4. **X-NUCLEO-VL53L7CX simplified schematic**
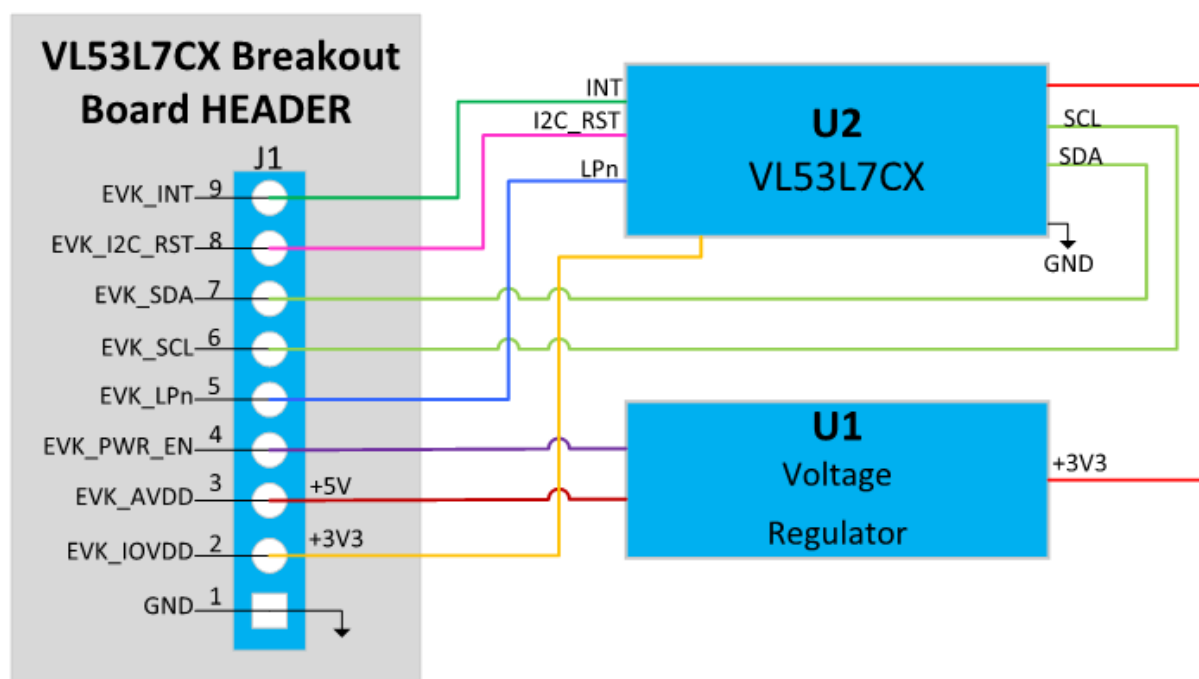
Figure 5. SATEL-VL53L7CX simplified schematic
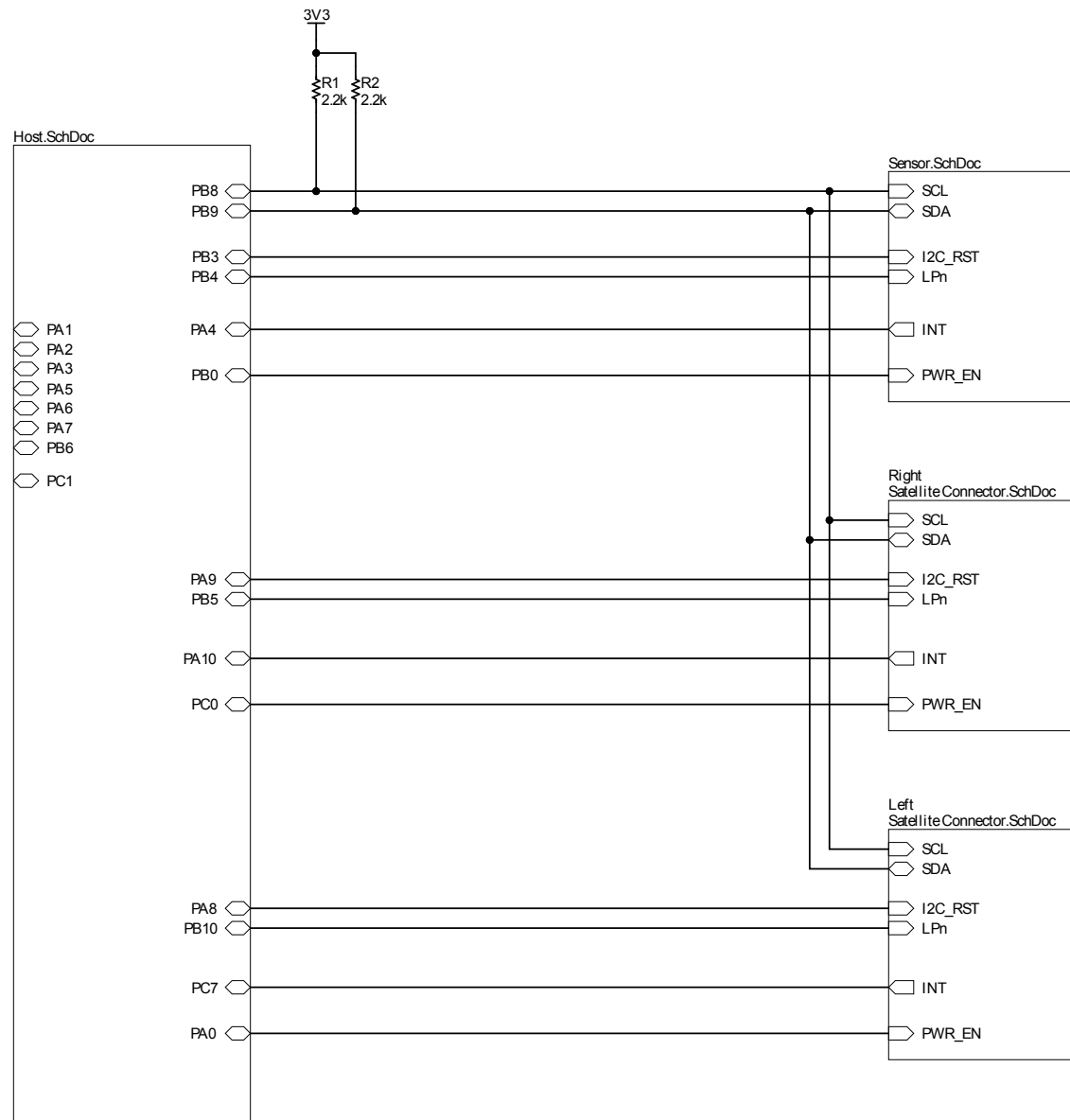
Figure 6. **X-NUCLEO-53L7A1 circuit schematic (1 of 5)**
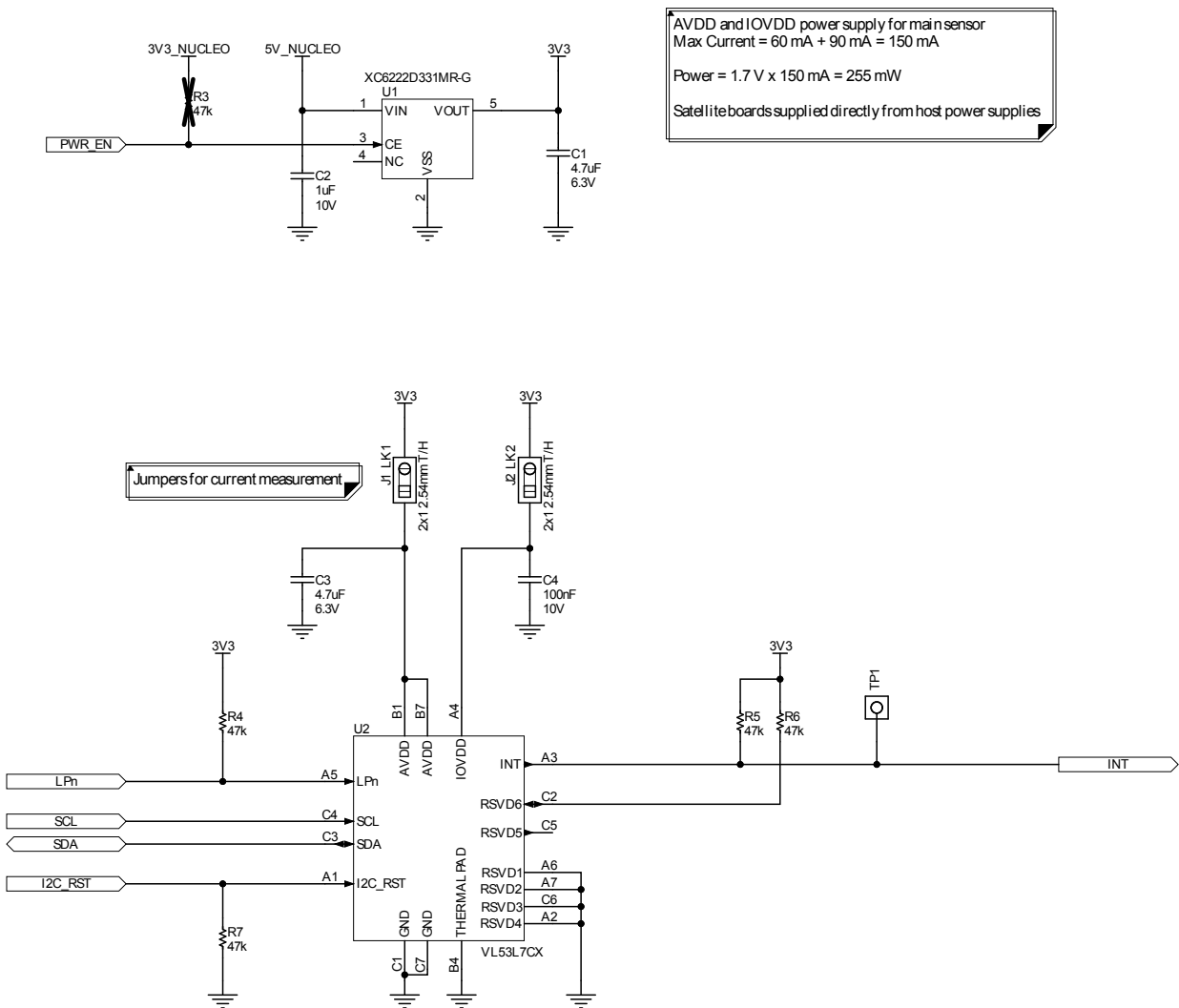
Figure 7. **X-NUCLEO-53L7A1 circuit schematic (2 of 5)**

AVDD and IOVDD power supply for main sensor
Max Current = 60 mA + 90 mA = 150 mA

Power = 1.7 V x 150 mA = 255 mW

Satellite boards supplied directly from host power supplies

3V3_NUCLEO 5V_NUCLEO

R3
47k

PWR_EN

C2
1uF
10V

XC6222D331MR-G
U1
1 VIN VOUT 5
3 CE
4 NC
VSS
2

3V3

C1
4.7uF
6.3V

Jumpers for current measurement

3V3   3V3

J1 LK1   J2 LK2
2x1 2.54mm T/H   2x1 2.54mm T/H

C3
4.7uF
6.3V

C4
100nF
10V

3V3

R4
47k

LPn

SCL

SDA

I2C_RST

R7
47k

U2

A5 LPn

C4 SCL
C3 SDA

A1 I2C_RST

B1 B7 A4
AVDD AVDD IOVDD

INT A3

RSVD6 C2
RSVD5 C5

RSVD1 A6
RSVD2 A7
RSVD3 C6
RSVD4 A2

GND GND THERMAL PAD
C1 C7 B4

VL53L7CX

3V3

R5 R6
47k 47k

TP1

INT

Figure 8. X-NUCLEO-53L7A1 circuit schematic (3 of 5)

Nucleo Arduino Connectors

CN6

5V_NUCLEO   3V3_NUCLEO

8x1, 2.54mm, T/H
SSQ-108-03-F-S

CN5

PB8
PB9
PA5
PA6
PA7
PB6
PC7
PA9

10x1, 2.54mm, T/H
SSQ-110-03-F-S

CN8

PA0
PA1
PA4
PB0
PC1
PC0

6x1, 2.54mm, T/H
SSQ-106-03-F-S

CN9

PA8
PB10
PB4
PB5
PB3
PA10
PA2
PA3

8x1, 2.54mm, T/H
SSQ-108-03-F-S
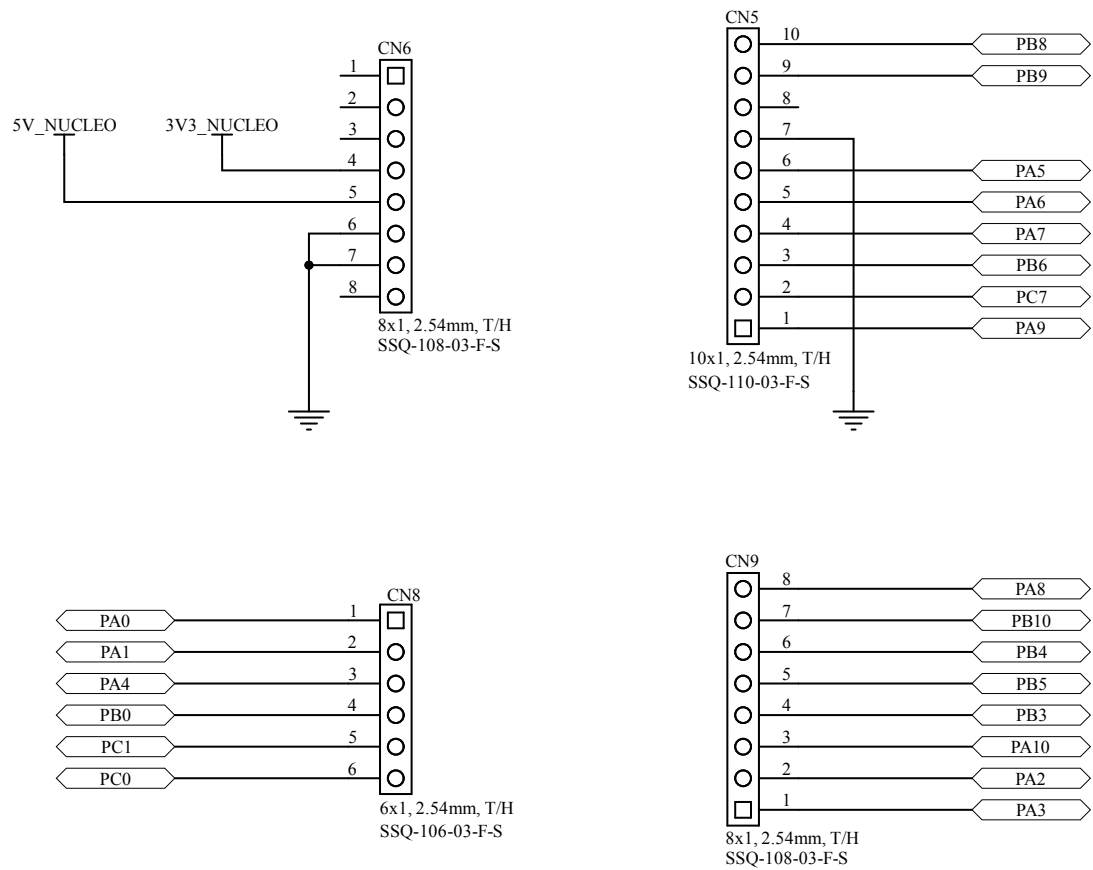
Figure 9. X-NUCLEO-53L7A1 circuit schematic (4 of 5)

3V3_NUCLEO   5V_NUCLEO

J5_Left

INT — 9
I2C_RST — 8
SDA — 7
SCL — 6
LPn — 5
PWR_EN — 4
3
2
1

9x1, 2.54mm, T/H
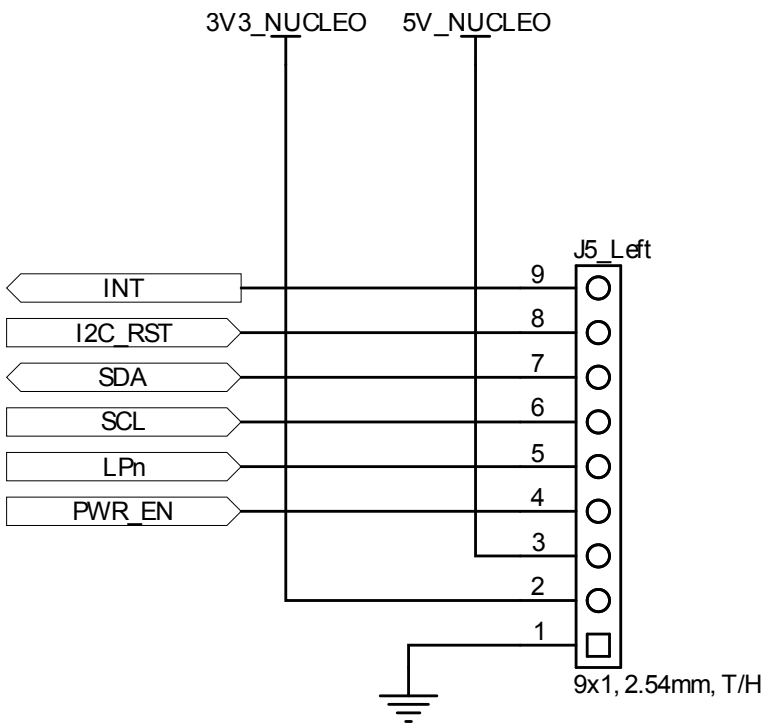
Figure 10. X-NUCLEO-53L7A1 circuit schematic (5 of 5)

3V3_NUCLEO   5V_NUCLEO

J5_Right

INT	9
I2C_RST	8
SDA	7
SCL	6
LPn	5
PWR_EN	4
	3
	2
	1

9x1, 2.54mm, T/H
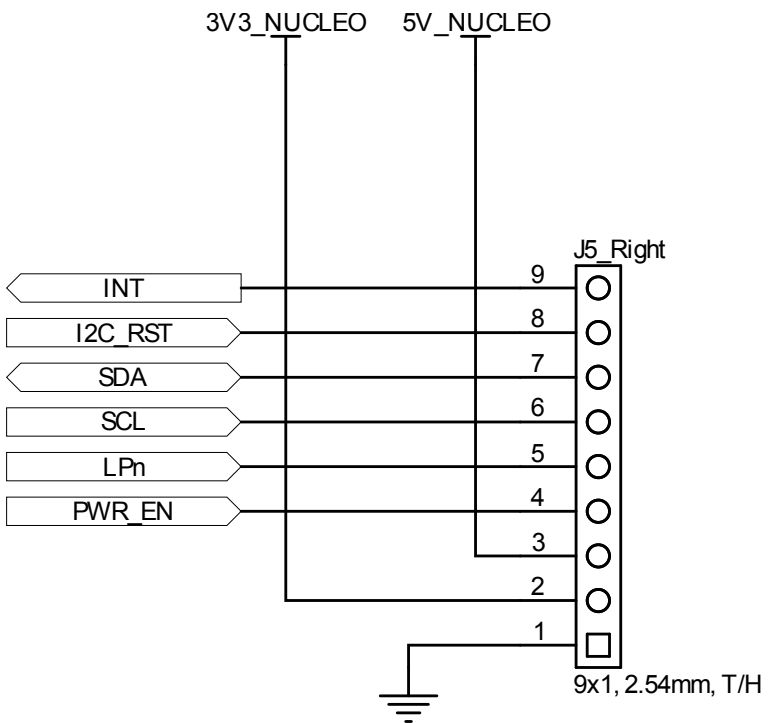
6 Board versions

Table 2. **X-NUCLEO-53L7A1 versions**

PCB version	Schematic diagrams	Bill of materials
X$NUCLEO-53L7A1- [1]	X$NUCLEO-53L7A1- schematic diagrams	X$NUCLEO-53L7A1-bill of materials

1.   *This code identifies the X-NUCLEO-53L7A1 expansion board first version. It is printed on the board PCB.*

Revision history

Table 3. Document revision history

Date	Revision	Changes
26-Sep-2022	1	Initial release.

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