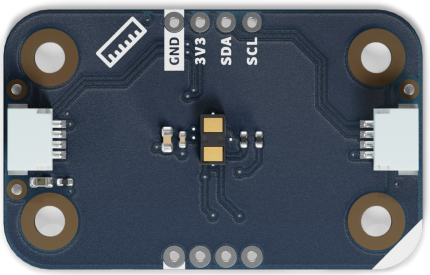
Product Reference Manual
SKU: ABX00102



Description

The Modulino® Distance, featuring the **VL53L4CDV0DH/1** time-of-flight sensor, provides accurate distance measurements in a compact, easy-to-use form factor. Ideal for proximity detection, obstacle avoidance, and various smart sensing applications.

Target Areas

Maker, beginner, education

Contents

1 Application Examples

- **Robotics Navigation** Detect objects or obstacles up to about 1200 mm away, enabling mobile robots to sense and avoid collisions.
- **Proximity Sensing** Trigger actions when an object is within a user-defined range, such as auto-locking doors or touchless controls.
- **Smart Home Devices** Monitor open/close states of containers or doors, measure fluid levels, or create interactive installations.

2 Features

- Uses the **VL53L4CDV0DH/1** sensor for precise **time-of-flight** distance measurements (0–1200 mm).
- **I2C (Qwiic)** interface for solder-free integration; operates at **3.3 V**.
- **Additional GPIO1** pin for interrupt signaling, **XSHUT** pin for power saving or reset.
- Ideal for **proximity detection**, **collision avoidance**, and general distance measuring tasks.

2.1 Contents

SKU	Name	Purpose	Quantity
ABX00102	Modulino® Distance	Time-of-flight distance sensing	1
	I2C Qwiic cable	Compatible with the Qwiic standard	1

3 Related Products

- *SKU: ASX00027* – Arduino® Sensor Kit
- *SKU: K000007* – Arduino® Starter Kit
- *SKU: AKX00026* – Arduino® Oplà IoT Kit

4 Rating

4.1 Recommended Operating Conditions

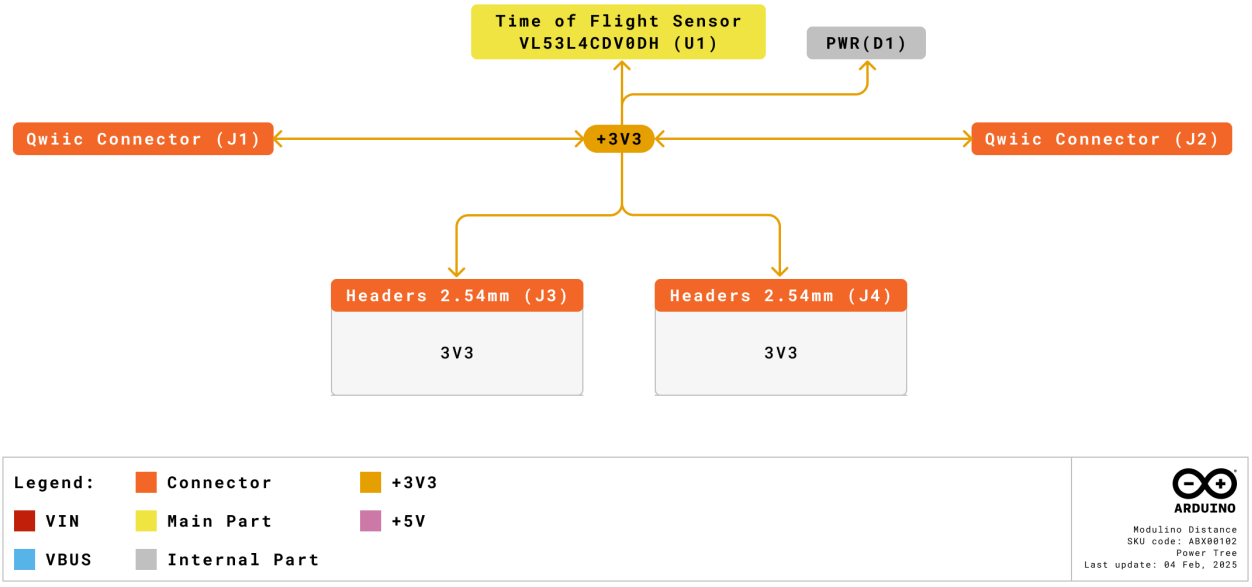
- **Sensor supply range:** 2.6 V – 3.5 V
- **Powered at 3.3 V** through the Qwiic interface (in accordance with the Qwiic standard)
- **Operating temperature:** –40 °C to +85 °C

Typical current consumption:

- ~40 mA peak (active ranging)
- ~24 mA during active measurement, ~4 mA I2C idle

5 Power Tree

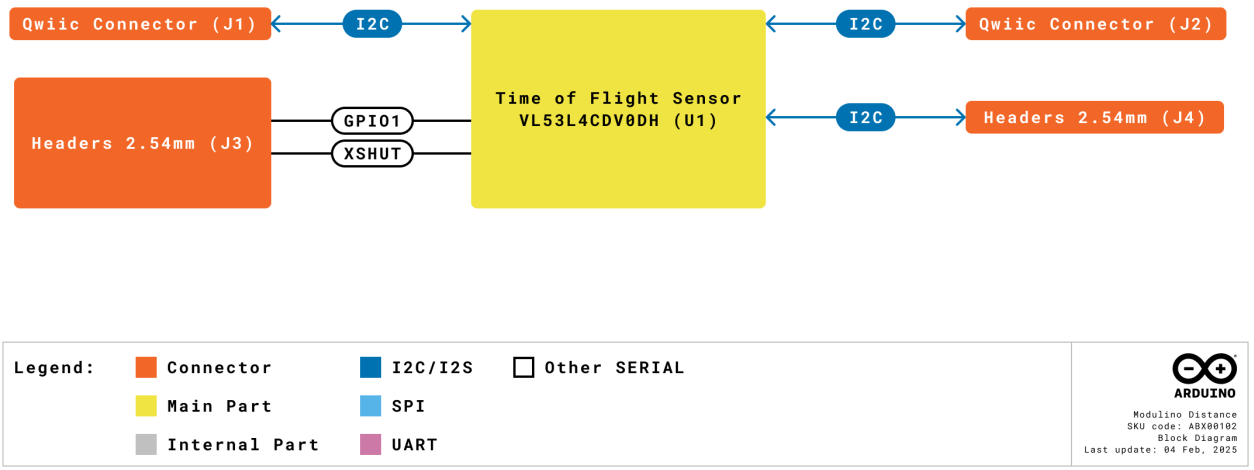
The power tree for the modulino can be consulted below:



Modulino® Distance Power Tree

6 Block Diagram

This module is designed to be placed on an I2C bus, allowing the on-board VL53L4CDV0DH/1 sensor to communicate with a host microcontroller via I2C.



Modulino® Distance block diagram

7 Functional Overview

The Modulino® Distance node uses a **time-of-flight** measuring principle to detect objects from 0 to ~1200 mm. It communicates via I2C (through the Qwiic connector at 3.3 V). **GPIO1** can signal an interrupt when a threshold is reached or measurement is ready, while **XSHUT** can place the sensor in shutdown mode to save power.

7.1 Technical Specifications

Specification	Details
Sensor	VL53L4CDV0DH/1
Supply Voltage	Min: 2.6 V, Max: 3.5 V
Power Consumption	~24 mA active, 4 mA idle, 40 mA peak
Range	0–1200 mm
Accuracy	±7 mm to ±3%
Resolution	1 mm
Communication	I2C

7.2 Pinout

Qwiic / I2C (1×4 Header)

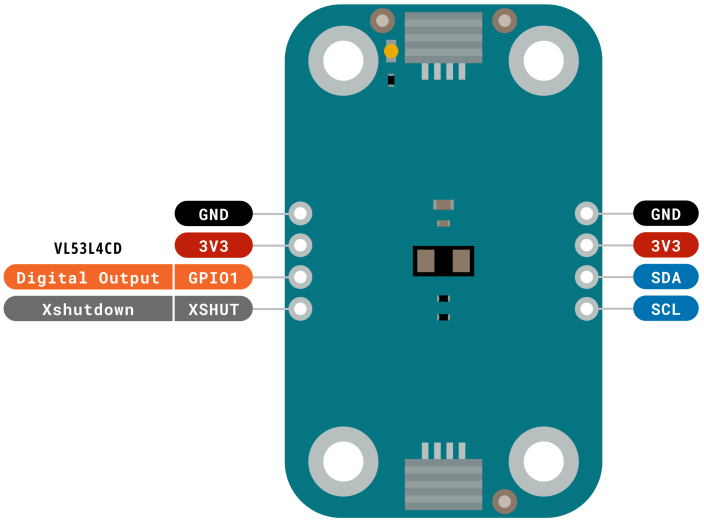
Pin	Function
GND	Ground
3.3 V	Power Supply (3.3 V)
SDA	I2C Data
SCL	I2C Clock

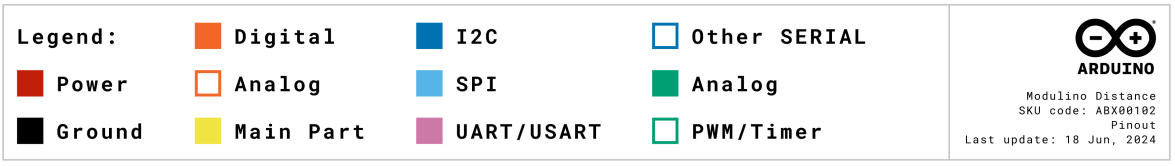
These pads and the Qwiic connectors share the same I2C bus. You can optionally solder header pins here.

Additional 1×4 Header (Distance Sensor Signals)

Pin	Function
GPIO1	Interrupt output (open-drain)
XSHUT	Active-low shutdown input

Note: On-board 10 kΩ pull-ups to 3.3 V exist for GPIO1 and XSHUT.



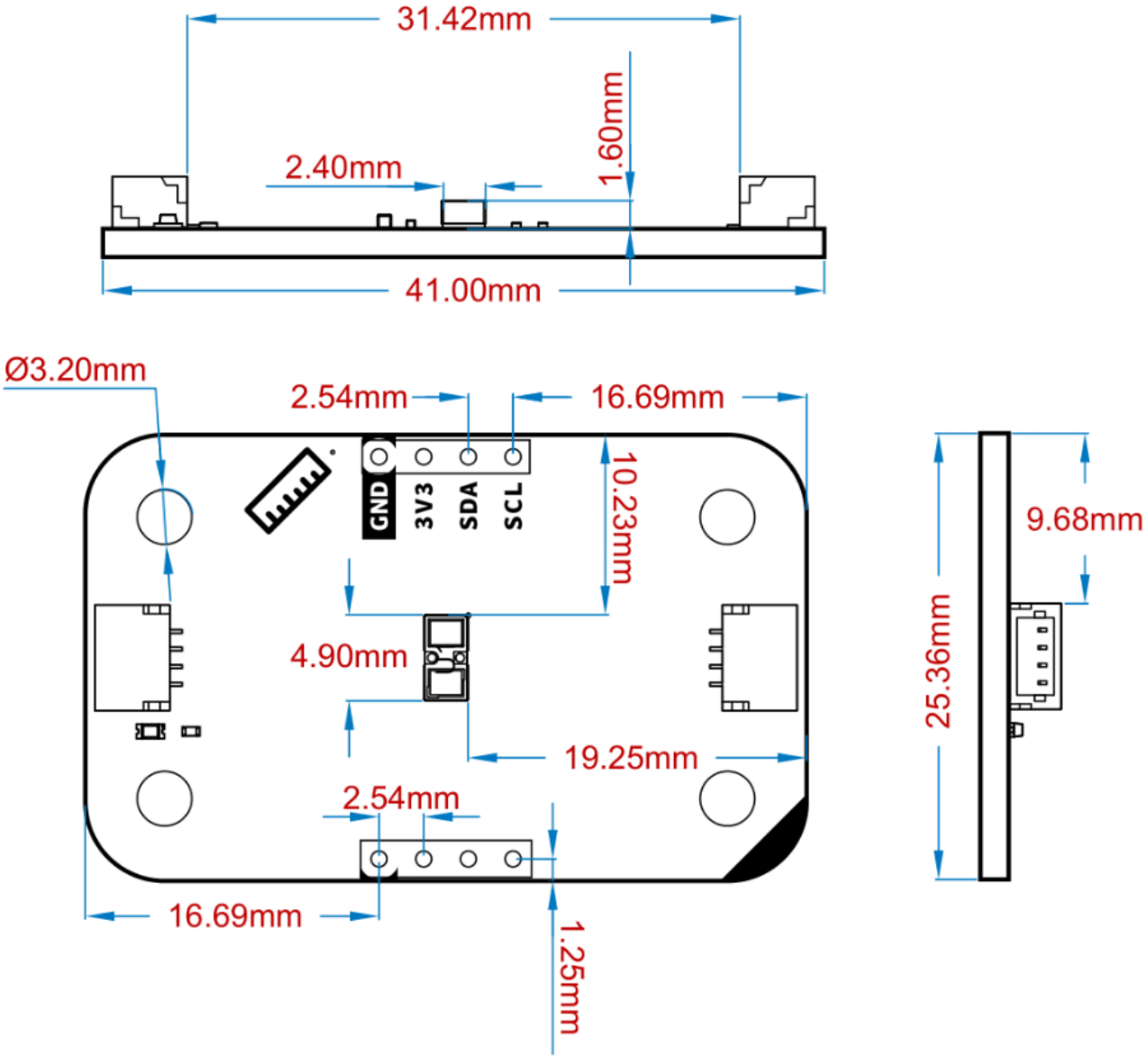


Pinout Overview

7.3 Power Specifications

- **Nominal operating voltage:** 3.3 V via Qwiic
- **Sensor voltage range:** 2.6 V–3.5 V

7.4 Mechanical Information



Modulino® Distance Mechanical Information

- Board dimensions: 41 mm × 25.36 mm
- Thickness: 1.6 mm (±0.2 mm)
- Four mounting holes (Ø 3.2 mm)
  - Hole spacing: 16 mm vertically, 32 mm horizontally

7.5 I2C Address Reference

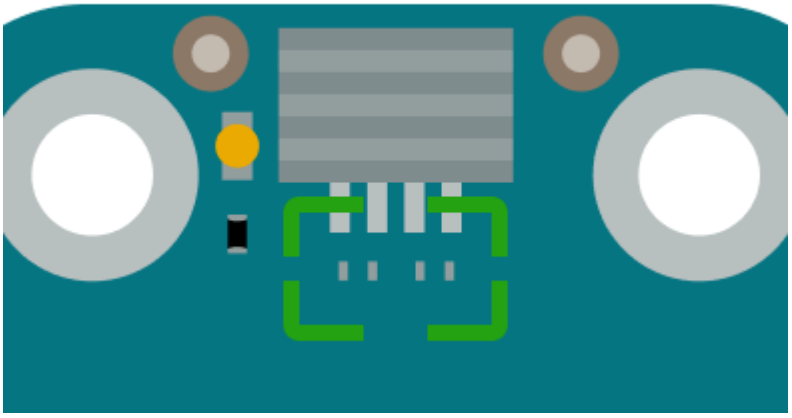
Board Silk Name	Sensor	Modulino I2C Address (HEX)	Editable Addresses (HEX)	Hardware I2C Address (HEX)
MODULINO DISTANCE	VL53L4CDV0DH/1	0x29	Any custom address (via software config.)	0x29

Note: The default address is **0x29**. Multiple units of the same sensor may require address reconfiguration in software to avoid collisions.

7.5.1 Pull-Up Resistors

The module has pads for optional I2C pull-up mounting in both data lines. No resistors are mounted by default but in case the resistors are need 4.7 K resistors in an SMD 0402 format are recommended.

These are positioned near the Qwiic connector on the power LED side.



Generic pull-up resistor position

8 Device Operation

The Modulino® Distance node operates as an I2C target device on the Qwiic bus. A host microcontroller can read distance values, set thresholds, or configure measurement timing. If using multiple distance sensors, you may need to set unique addresses or toggle XSHUT lines.

8.1 Getting Started

Use any standard Arduino or microcontroller environment at 3.3 V. Library support for the VL53 series sensors can simplify reading distance measurements. Ensure the sensor's field of view is unobstructed for accurate results.

8.2 Board Recovery

All Arduino® boards have a built-in bootloader which allows flashing the board via USB. In case a sketch locks up the processor and the board is not reachable anymore via USB, it is possible to enter bootloader mode by double-tapping the reset button right after the power-up.

Company Information

Company name	Arduino SRL
Company Address	Via Andrea Appiani, 25 - 20900 MONZA (Italy)

Reference Documentation

Ref	Link
Arduino IDE (Desktop)	https://www.arduino.cc/en/Main/Software
Arduino Courses	https://www.arduino.cc/education/courses
Arduino Documentation	https://docs.arduino.cc/
Arduino IDE (Cloud)	https://create.arduino.cc/editor
Cloud IDE Getting Started	https://docs.arduino.cc/cloud/web-editor/tutorials/getting-started/getting-started-web-editor
Project Hub	https://projecthub.arduino.cc/
Library Reference	https://github.com/arduino-libraries/
Online Store	https://store.arduino.cc/

Revision History

Date	Revision	Changes
11/07/2024	1	First release