

Time-of-Flight (ToF) sensors software expansion for STM32Cube

Application	Ranging measurement example
Hardware abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Expansion Board X-NUCLEO-53L9A1



Product links	
ToF sensors software expansion for STM32Cube	X-CUBE-53L9A1
ToF sensors expansion boards for STM32 Nucleo	X-NUCLEO-53L9A1
STM32 Nucleo development board	STM32 Nucleo H563Z

Features

- Complete software framework for building applications using the VL53L9CX high-performance lidar direct Time-of-Flight (dToF) sensor on the X-NUCLEO-53L9A1 expansion board
- Several example applications showcasing the innovative technology and accurate distance and depth-ranging capabilities
- Sample application for transmitting real-time sensor data to a PC
- Precompiled binaries are available for the boards listed above
- Easy portability across the STM32H563Z MCU family thanks to STM32Cube
- Free, user-friendly license terms

Description

The X-CUBE-53L9A1 expansion software package for STM32Cube runs on the X-NUCLEO-53L9A1 expansion board with the STM32 Nucleo H563Z development board. It includes drivers that detect the VL53L9CX sensor and perform simple ranging on one or multiple devices.

Built on STM32Cube software technology, the package facilitates portability across STM32 microcontrollers used with Nucleo boards. The package also includes sample driver implementations for the VL53L9CX development boards connected to the STM32 Nucleo H563Z board.

1 Technical overview

1.1 STM32Cube

The STM32Cube is a complete set of PC software tools and embedded software blocks for STM32 microcontrollers and microprocessors.

It includes:

- **STM32CubeMX** configuration tool for any STM32 device. It generates initialization C code for Cortex®-M cores and Linux device tree source files for Cortex®-A cores.
- **STM32CubeIDE** integrated development environment that uses open-source solutions, such as Eclipse and the GNU C/C++ toolchain. It also offers advanced debugging features and compilation reporting features.
- **STM32CubeProgrammer** programming tool, which offers an easy-to-use and efficient environment for reading, writing, and verifying devices and external memories. You can use it with many communication interfaces, including JTAG, SWD, UART, USB DFU, I²C, SPI, and CAN.
- **STM32CubeMonitor** family of tools, including STM32CubeMonRF, STM32CubeMonUCPD, and STM32CubeMonPwr, to help developers monitor and customize their applications in real time.
- **STM32Cube packages** available for each STM32 series. They include drivers such as the hardware abstraction layer (HAL) and low-layer drivers, middleware, and many example codes for a wide range of real-world use cases.
- **STM32Cube expansion packages** for application-oriented solutions.

1.2 Software integration with STM32Cube

This software is based on the STM32Cube HAL for STM32 microcontrollers.

The package extends STM32Cube by providing a board support package (BSP) for the sensor expansion board. The drivers abstract the low-level hardware details and allow applications to access sensor data in a hardware-independent manner.

Sensor data can be logged to a file selected by the user.

The package is compatible with STM32CubeMX. It can be downloaded from and installed directly into STM32CubeMX, as described in UM1718, which is freely available on www.st.com.

Revision history

Table 1. Document revision history

Date	Version	Changes
12-May-2026	1	Initial release

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