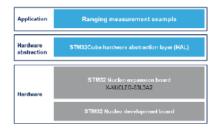# Time-of-Flight ranging sensor with multi target detection expansion of STM32Cube

Features

- Driver layer, VL53L3CX application programming interface (API), for complete management of the VL53L3CX ranging sensor integrated in the X-NUCLEO-53L3A2 expansion board
- Easy portability across different MCU families, on the strength of STM32Cube
- Free, user-friendly license terms
- Example code for getting started with a simple ranging measurement
- Data logging capabilities through serial com over USB

Description

The X-CUBE-53L3A2 software package is an expansion of the STM32Cube, to go with the X-NUCLEO-53L3A2 expansion board for the STM32 Nucleo.

The source code of this package is based on the STM32Cube and is aligned with the "multi platform" file and directory structure to ease portability and code sharing across different STM32 MCU families.

The VL53L3CX is the latest Time-of-Flight (ToF) product from STMicroelectronics and embeds ST's third generation FlightSense patented technology. It combines a high performance proximity and ranging sensor, with multi target distance measurements and automatic smudge correction. The miniature reflowable package integrates a single photon avalanche diode (SPAD) array and physical infrared filters to achieve the best ranging performance in various ambient lighting conditions, with a wide range of cover glass windows.

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1 What is STM32Cube ?

- The STMCube represents an original initiative by STMicroelectronics to ease the life of developers by reducing development effort, time and cost. The STM32Cube covers the STM32 portfolio. Version 1.x of STM32Cube includes:
- STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
- A comprehensive embedded software platform, delivered per series (such as the STM32CubeF4 for STM32F4 series).
- STM32Cube HAL, an STM32 abstraction layer embedded software, ensuring maximized portability across the STM32 portfolio:
    - A consistent set of middleware components, such as RTOS, USB, and TCP/IP graphics
    - All embedded software utilities, including a full set of examples

2 How does X-CUBE-53L3A2 software complement STM32Cube

The proposed X-CUBE-53L3A2 software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends the STM32Cube by providing a board support package (BSP) for the X-NUCLEO-53L32A expansion board and a VL53L3CX API component (in the Drivers\BSP\Components \vl53l3cx directory) to program, control and get ranging values from the VL53L3CX device.

One example project for the STM32F401 and STM32L467 is included in the Projects\STM32F401RE-Nucleo \Examples\VL53L3CX\ or Projects\STM32L476RG-Nucleo\Examples\VL53L3CX\ directory. The developer can use this example to start experimenting with the code using a basic ranging measurement.

This example is ready to be compiled using Keil (MDK-ARM), IAR (EWARM) or STM32 CubeIDE. Precompiled binaries are also available (which can be dragged and dropped onto the STM32 Nucleo to start the demo).

Typical settings are available in the API to address the most common use cases.

Ranging data logging is also available through a serial virtual com over the USB.

Revision history

Table 1. Document revision history

Date	Version	Changes
03-Apr-2020	1	Initial release

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