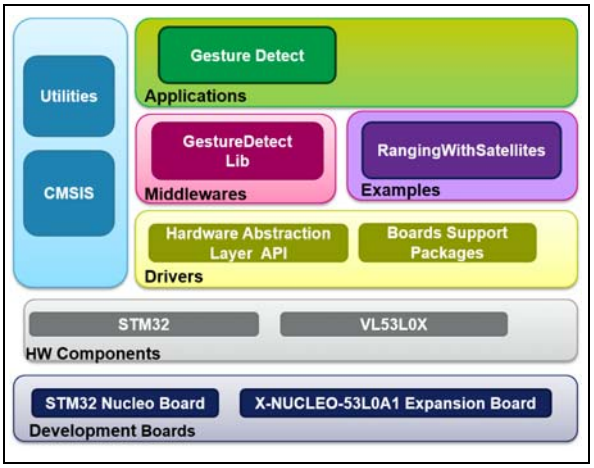
X-CUBE-53L0A1

VL53L0X Time-of-Flight (TOF) ranging and gesture detection sensor software expansion for STM32Cube

Data brief



Features

- Driver layer (VL53L0X API) for complete management of the VL53L0X ranging and gesture detection sensor integrated in the X-NUCLEO-53L0A1 expansion board.
- Easy portability across different MCU families, on the strength of STM32Cube.
- Free, user-friendly license terms.
- Example code for ranging measurement with typical settings in order to address most common use cases, like long range, high speed, high accuracy.
- Example code for ranging with multiple VL53L0X sensors. Up to 3x VL53L0X devices can be controlled using the X-NUCLEO-53L0A1 expansion board equipped with 2x satellites.
- Data logging capabilities through serial com over USB.
- Example code of gesture recognition.

Description

The X-CUBE-53L0A1 software package is an expansion for STM32Cube, to go along with the X-NUCLEO-53L0A1 expansion board for STM32 Nucleo.

The source code of this package is based on STM32Cube and is aligned with the “Multi-Platform” file & directory structure to ease portability and code sharing across different STM32 MCU families.

The VL53L0X is the latest product based on ST’s patented FlightSense™ technology. This is a ground-breaking technology allowing absolute distance to be measured independent of target reflectance. Instead of estimating the distance by measuring the amount of light reflected back from the object (which is significantly influenced by color and surface), the VL53L0X precisely measures the time the light takes to travel to the nearest object and reflect back to the sensor (Time-of-Flight).

What is STM32Cube?

STMCube™ represents an original initiative by STMicroelectronics to ease developers' life by reducing development effort, time and cost. 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, TCP/IP, graphics
  - All embedded software utilities, including a full set of examples

How does this software complement STM32Cube?

The proposed software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a Board Support Package (BSP) for the X-NUCLEO-53L0A1 expansion board and a VL53L0X API component (in Drivers\BSP\Components\vl53L0X directory) to program, control and range with the VL53L0X device.

Example projects for STM32 F401 and STM32 L476 are included in the Projects\Multi\Examples\VL53L0X and Projects\Multi\Applications\VL53L0X directories, the developer can use these examples to start experimenting with the code.
These examples are ready to be compiled using Keil (MDK-ARM), IAR (EWARM) or STM32 Workbench (SW4STM32). Pre-compiled binaries are also available (drag and drop onto STM32 Nucleo to start the demo):

- **RangingWithSatellites** example features
  - Simultaneous ranging from main VL53L0X plus up to 2 satellites
  - Ranging measurement displayed on 7-segment display
  - Long range, high speed, high accuracy ranging configurations selectable through the Nucleo board blue button.
- **GestureDetect** example features
  - Vertical gesture like “Tap” or horizontal gesture like “swipe” using the VL53L0X integrated in the X-NUCLEO-53L0A1 expansion board.
  - Directional lateral gesture like “Swipe”, from left to right or from right to left, using the two VL53L0X left and right satellites.

Typical settings are available in the API in order to address most common use cases, like high speed, high resolution and high accuracy.

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

Revision history

Table 1. Document revision history

Date	Revision	Changes
13-May-2016	1	Initial release.