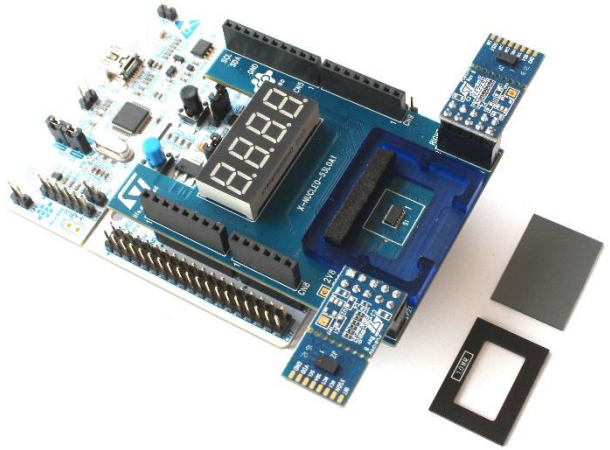
VL53L0X Quick Start Guide

Version 1.1



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History

Version	Date	Comments
1.0	6 June 2016	Initial
1.1	24 June 2016	SW Pre-requisites slide moved before SW deliverables description

VL53L0X eco-system

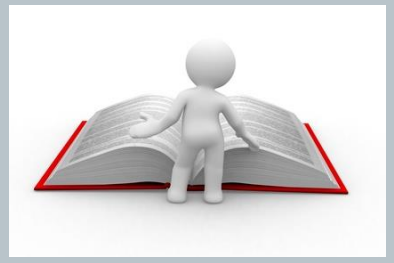
A color code is used in the document for each component of the eco-system

VL53L0X GUI
User Manual - Embedded

X-CUBE-53L0A1 (STM32Cube)
User Manual – UM2046

X-NUCLEO-53L0A1 (HW)
User Manual – UM2047

Documentation



VL53L0X API User Manual - UM2039

VL53L0X Datasheet – DS11555
VL53L0X Quick Start Guide
Applications Notes

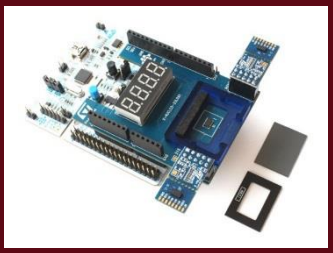
VL53L0X Eval GUI - STSW-IMG006
Get ranging live curves on your PC
Change key settings of the device
Data logging capabilities

STSW-LINK009

STSW-LINK007

STM32 Cube
STM32 Nucleo
STM32 Open Development Environment

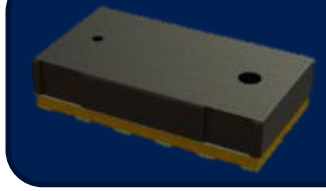
X-CUBE-53L0A1 package
Full integration in STM32 MCU (real-time)
All source code provided
Full access to product settings
Data logging capabilities
Ranging and Gesture detection demo



Hardware
P-NUCLEO-53L0A1
X-NUCLEO-53L0A1

C Programming

VL53L0X C API package – STSW-IMG005
Discover API Source code



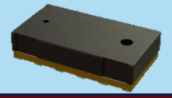
VL53L0X : Miniature ToF Ranging & Gesture Sensor

st.com site map

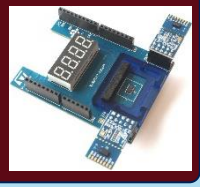
VL53L0X Main Page

VL53L0X documentation
- DB2846 - Data brief
- DS11555 - Datasheet
- UM2039 - API user manual
- Quick start guide
- Application notes

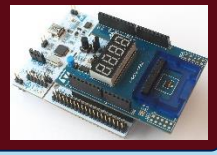
Link
- API software



Link
- X-NUCLEO-53L0A1



Link
- P-NUCLEO-53L0A1



Link
- 53L0-SATEL-I1

API documentation (STSW-IMG005)
- DB2903 - Data brief

API software
STSW-IMG005

X-NUCLEO-53L0A1 documentation
- DB2901 - Data brief
- UM2047 – User manual (Hw)
- Quick start guide

Link
- X-CUBE-53L0A1 software

Link
- PC GUI software

P-NUCLEO-53L0A1 documentation
- DB2905 - Data brief

X-NUCLEO-53L0A1 documentation
- UM2047 – User manual (Hw)
- Quick start guide

Link
- PC GUI software

Link
- X-CUBE-53L0A1 software

53L0-SATEL-I1 documentation
- DB2912 - Data brief

X-CUBE-53L0A1 documentation
- DB2902 - Data brief
- UM2046 – User manual

X-NUCLEO-53L0A1 documentation
- Quick start guide

X-CUBE-software

GUI documentation (STSW-IMG006)
- DB2904 - Data brief
- User manual

PC-GUI software
STSW-IMG006

*As for all X-NUCLEO boards, **LINK007** and **LINK009** STM32 software are accessible from P-NUCLEO-53L0A1 and X-NUCLE0-53L0A1 web pages*

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VL53L0X eco-system glossary & links

Name	Definition	Links
VL53L0X	ST's FlightSense Time-of-Flight ranging and gesture detection sensor	• Search for **vl53l0x** on st.com to go to the product main page.
VL53L0X Quick Start Guide	This document	• Search for **VL53L0X Quick Start Guide** on st.com
VL53L0X Datasheet	VL53L0X product datasheet	• Search for **DS11555** on st.com
VL53L0X API	Set of C functions to control VL53L0X and get ranging data	• Search for **STSW-IMG005** on st.com
VL53L0X API User Manual	Document describing VL53L0X API in details	• Search for **UM2039** on st.com

VL53L0X eco-system glossary & links

Name	Definition	Links
NUCLEO (F401 or L476)	STM32-based board which can be combined with an expansion board for evaluation purpose	• Search for **nucleo** on st.com
X-NUCLEO-53L0A1	Nucleo expansion board with VL53L0X sensor plus optional VL53L0X satellites	• Search for **X-NUCLEO-53L0A1** on st.com
P-NUCLEO-53L0A1	Hardware pack composed of the X-NUCLEO-53L0A1 expansion board plus one STM32 F401Nucleo board, and 2x VL53L0X satellites	• Search for **P-NUCLEO-53L0A1** on st.com
X-CUBE-53L0A1	Software package containing source code for P-NUCLEO-53L0A1 hardware	• Search for **X-CUBE-53L0A1** on st.com
X-CUBE-53L0A1 User Manual	X-CUBE package detailed documentation	• Search for UM2046 on st.com
VL53L0X Eval GUI	PC Graphical User Interface to display ranging data from VL53L0X	• Search for **STSW-IMG006** on st.com
VL53L0X GUI User Manual	PC GUI detailed documentation	• Install the GUI and open the embedded documentation
STSW-LINK009	PC driver to enable Virtual Com Port with Nucleo board (used for data logging, GUI)	• Search for **STSW-LINK009** on st.com
STSW-LINK007	Nucleo STLINK FW upgrade to get best speed performances through Virtual Com Port	• Search for **STSW-LINK007** on st.com

Evaluation tools HW description

- VL53L0X Evaluation tools are based on following hardware elements:
  1. STM32 F401RE Nucleo board
  2. X-NUCLEO-53L0A1 Nucleo Expansion board, which includes:
     - Two VL53L0X satellites
     - One cover glass and 3x spacers with different heights

- Search for ***P-NUCLEO-53L0A1*** on st.com to order the full pack (1+2)

- or search for **X-NUCLEO-53L0A1** to get only the Nucleo expansion board (2)

- Hardware documentation (schematics) also available on st.com

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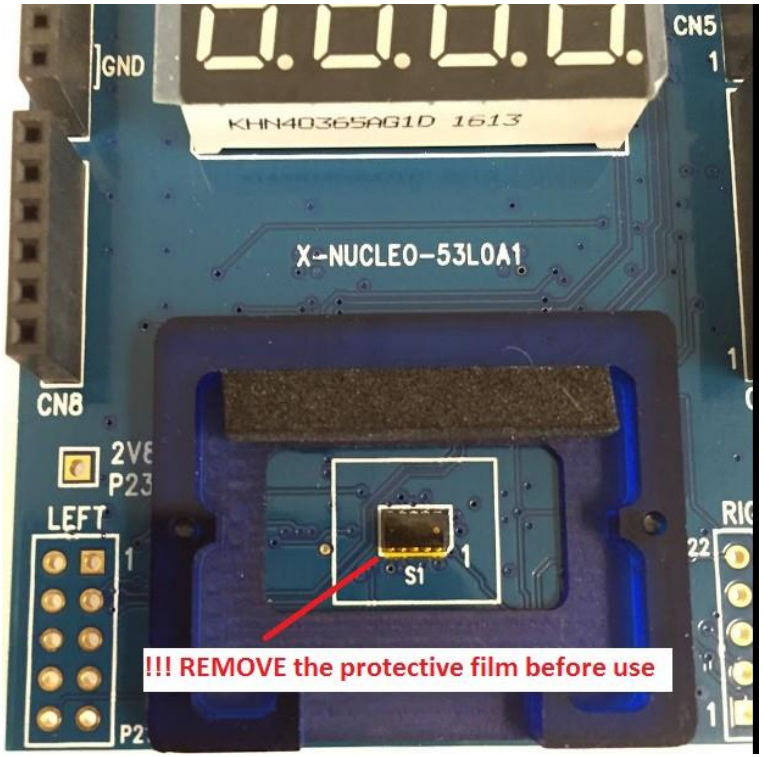
Hardware Description:

Removing the protective liner on the sensor

- When using the VL53L0X sensor, or the X-NUCLEO expansion board, remove the liner before use !
- Don’t touch too much the sensor with fingers



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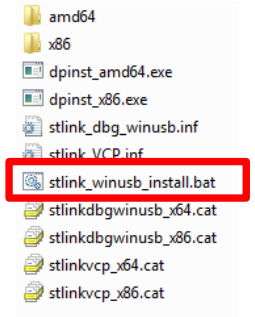
SW pre-requisites : to be done once

- API examples, X-CUBE data logging and GUI communicate with Nucleo through Serial com over USB (Virtual Com Port). Following SW packages must be installed
  - STSW-LINK009 : PC USB driver
  - STSW-LINK007 : Nucleo ST-LINK FW upgrade

- Connect the Nucleo pack to the PC through USB
  - Wait for the board to be recognized as a mass storage device (some drivers will be installed automatically)

- Install ST-Link Virtual Com port drivers on the PC (**STSW-LINK009**)
  - Search for STSW-LINK009 on st.com, download, unzip
  - Launch stlink_winusb_install.bat



- Upgrade ST-Link FW on the Nucleo board to get the latest version and benefit from best performances for UART over USB transfers (**STSW-LINK007**)
  - Search for STSW-LINK007 on st.com, download, unzip
  - Connect Nucleo board to the PC through USB
  - Launch ST-LinkUpgrade.exe, press Device Connect, then Yes

VL53L0X API : Purpose

- Small SW package containing VL53L0X API source code and few basic examples than can be run on the PC connected with Nucleo hardware pack (P-NUCLEO-53L0A1)
- Starting from this software package, user can:
  - Discover VL53L0X API (browse the code, read Doxygen documentation)
  - Run simple .exe programs on the PC to do ranging from VL53L0X
- Related documentation:
  - VL53L0X API User Manual
- Download from st.com searching for **STSW-IMG005**

X-CUBE-53L0A1 : Purpose

- Give a full example of how VL53L0X device is integrated into a MCU sub-system taking benefit from the STM32 Open Development Environment
- Starting from this software package, user can:
  - Run Ranging and Gesture detection demos with a simple drag & drop
  - Get basic data logging on PC through Virtual Com Port (Teraterm, Putty, etc…) to collect data or build simple PC GUIs
  - Import a project in his favorite IDE (Keil, IAR or STM32 Workbench) to browse the code, (re) compile, (re)flash Nucleo and debug (breakpoints, step into the code, etc…)
  - Understand how VL53L0X API has been ported on Nucleo
  - Get a working and real-time example of interrupt-based ranging mode
  - Modify the project code to change VL53L0X settings for the targeted application
- Related Documentation
  - X-CUBE-53L0A1 User Manual (UM2046)
- Download from st.com searching for **X-CUBE-53L0A1**

VL53L0X GUI : Purpose

- PC Graphical User Interface which allows to:
  - Display (in live) key ranging data (distance, signal rate)
  - Change key parameters of VL53L0X
  - Perform calibration phases (offset and xTalk with cover glass)
  - Get data logging (.csv file)
- GUI is running on the PC connected to a P-NUCLEO-53L0A1 pack
  - VL53L0X API running on the PC side
  - Run simple .exe programs on the PC to do ranging from VL53L0X
- Related Documentation
  - User Manual embedded in the tool (See the About tab)
- Download from st.com searching for **STSW-IMG006**
  - Run the installer with Admin privileges or change default installation directory