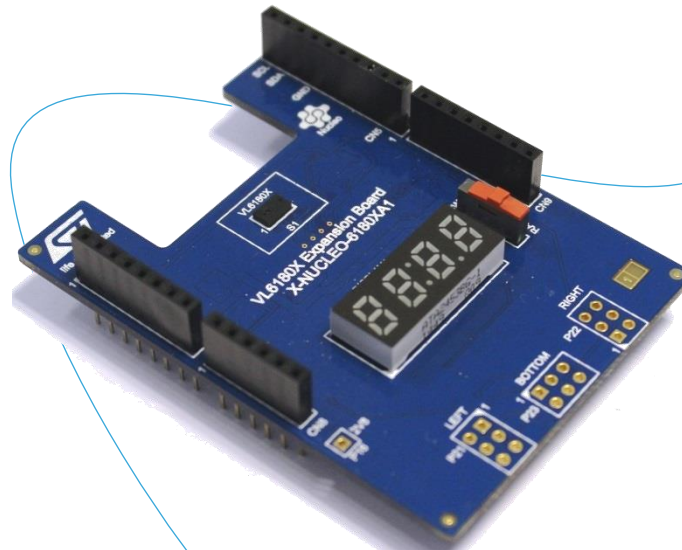


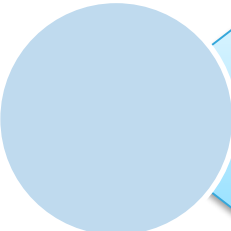
Quick Start Guide

Proximity, gesture and ambient light sensor expansion board based on VL6180X for STM32 Nucleo (X-NUCLEO-6180XA1)

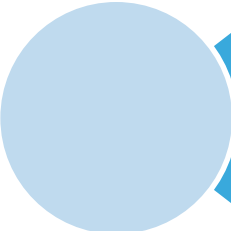


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X-NUCLEO-6180XA1: Proximity, gesture and ambient light sensor expansion board
Hardware and Software overview



Setup & Demo Examples
Documents & Related Resources



STM32 Open Development Environment: Overview

Proximity, gesture and ambient light sensor expansion board

Hardware Overview (1/2)

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X-NUCLEO-6180XA1 Hardware Description

- The X-NUCLEO-6180XA1 is proximity and ambient light sensor evaluation and development board system, designed around VL6180X, a device based on ST's FlightSense™, Time-of-Flight technology.
- The VL6180X communicates with STM32 Nucleo developer board host microcontroller through an I2C link available on the Arduino UNO R3 connector.

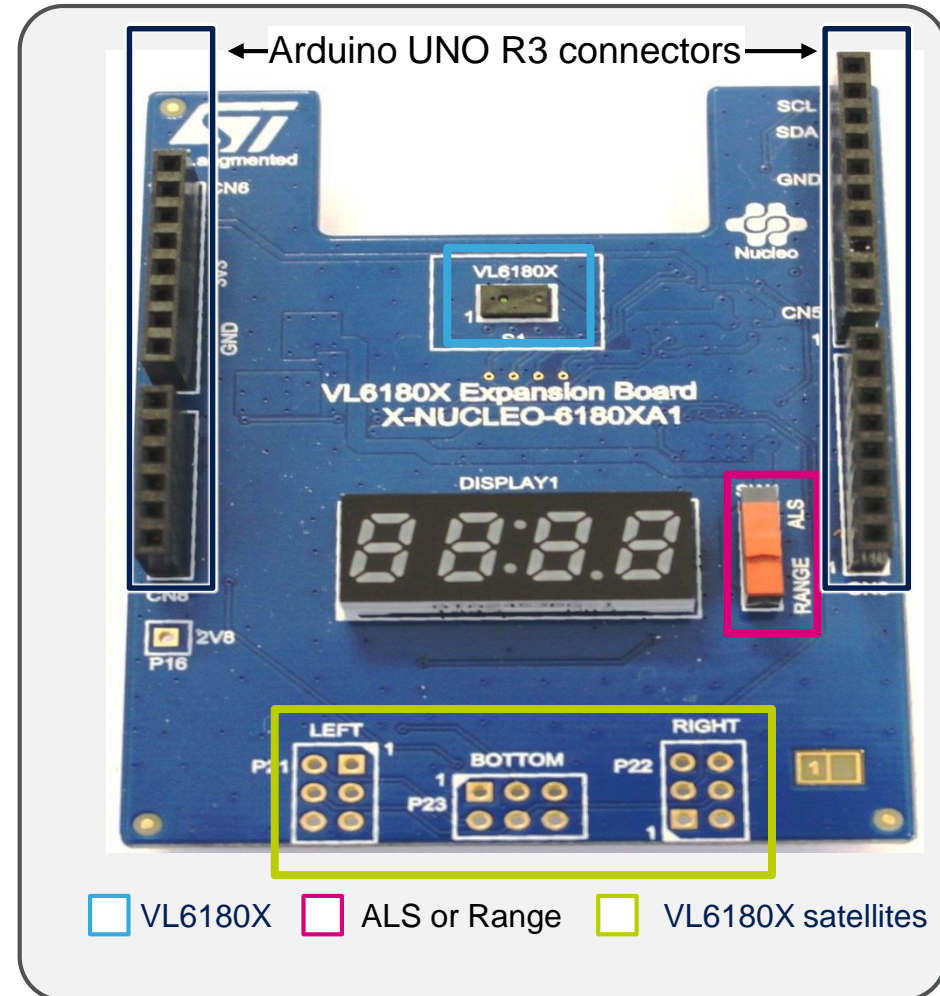
Key Products on board

VL6180X

Proximity, gesture and Ambient Light sensor (ALS)

Selection between Ranging and ALS measurement

Possibility to add 3x VL6180X external satellite boards (order code: VL6180X-SATEL – 2 satellites)



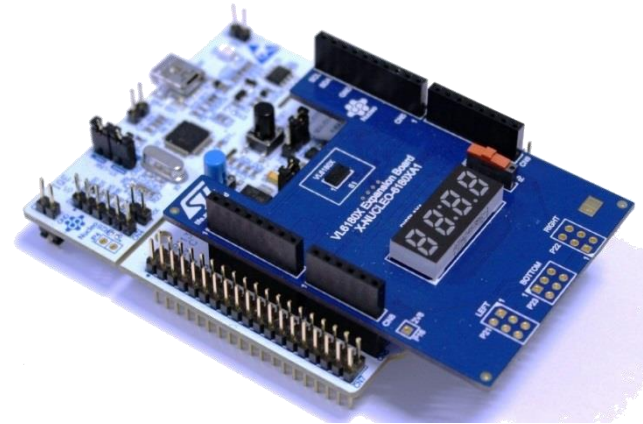
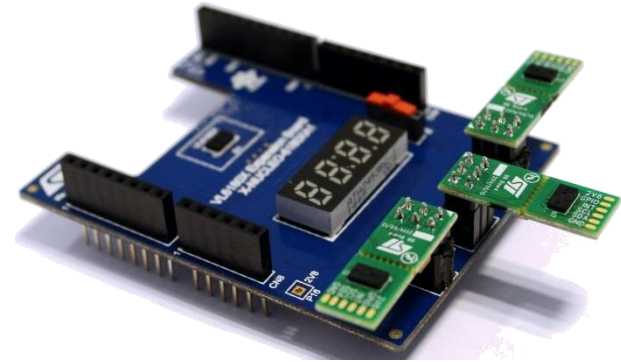
Latest info available at www.st.com
X-NUCLEO-6180XA1

Proximity, gesture and ambient light sensor expansion board

Hardware Overview (2/2)

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- X-NUCLEO-6180XA1 with VL6180X-SATEL plug-in
 - In order to easily integrate multiple VL6180X's into customer devices, up to 3 external satellite VL6180X boards can be connected to the expansion board.
- X-NUCLEO-6180XA1 also available as a Nucleo pack (P-NUCLEO)
 - The X-NUCLEO-6180XA1 expansion board can also be ordered on st.com under two variants of Nucleo packs, combining the expansion board and the STM32 Nucleo board:
 - Order code: **P-NUCLEO-6180X1**
 - X-NUCLEO-6180XA1 expansion board and NUCLEO-F401RE full features board
 - Order code: **P-NUCLEO-6180X2**
 - X-NUCLEO-6180XA1 expansion board and NUCLEO-L053R8 ultra low power board



Proximity, gesture and ambient light sensor expansion board

Software Overview

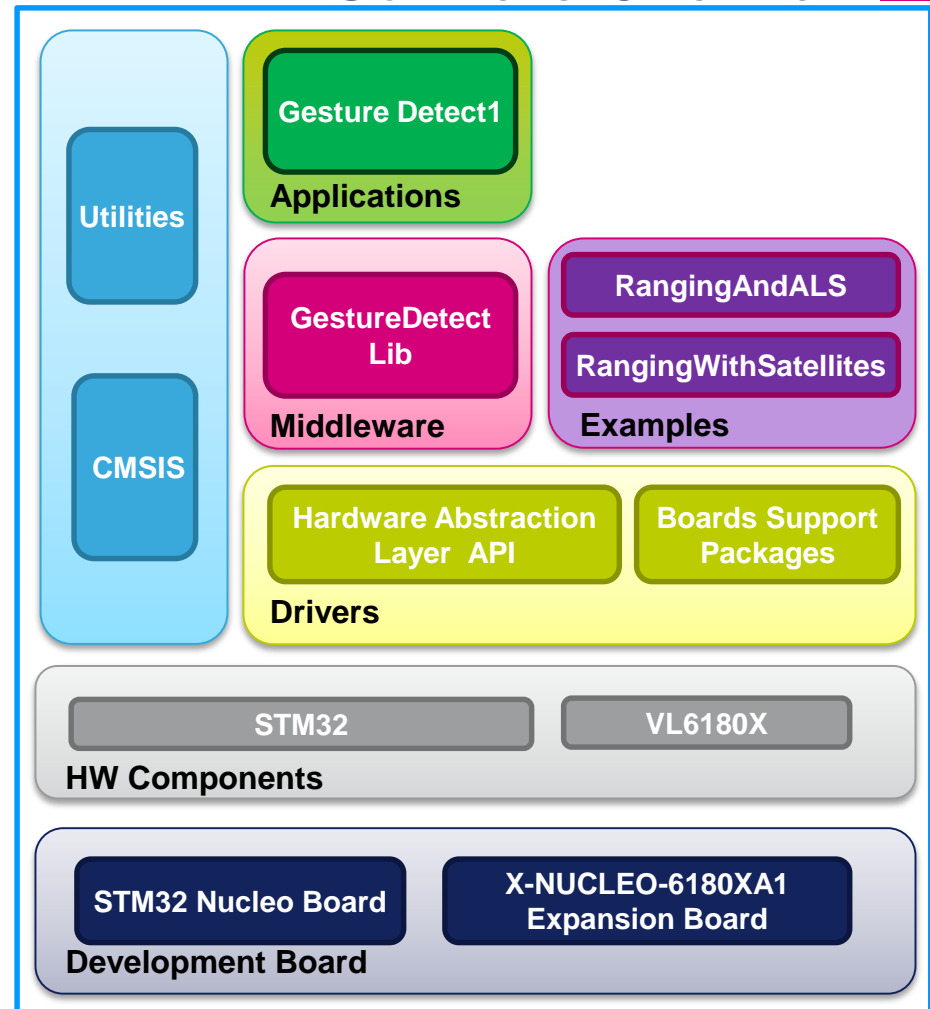
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X-CUBE-6180XA1 Software Description

- The X-CUBE-6180XA1 software package is an expansion for STM32Cube, associated with the X-NUCLEO-6180XA1 expansion board for STM32. The source code of this package is based on STM32Cube to ease portability and code sharing across different STM32 MCU families. Implementation examples are available for the STM32 Nucleo Proximity, gesture and ambient light sensor expansion board (X-NUCLEO-6180XA1) plugged on top of an STM32 Nucleo development board (NUCLEO-F401RE or NUCLEO-L053R8 or NUCLEO-L476RG).

Key features

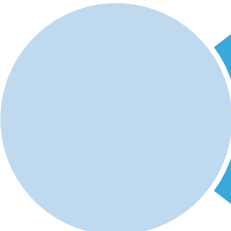
- Driver layer (VL6180X API) for complete management of the VL6180X proximity & ambient light sensor (ALS) integrated in the X-NUCLEO-6180XA1 expansion board.
- Easy portability across different MCU families, thanks to STM32Cube.
- Free, user-friendly license terms.
- Example code for ranging and ALS measurement.
- Example code for ranging with multiple VL6180X sensors. Up to 4x VL6180X devices can be controlled using the X-NUCLEO-6180XA1 expansion board equipped with 3x satellites (VL6180X-SATEL).
- Example code of gesture recognition



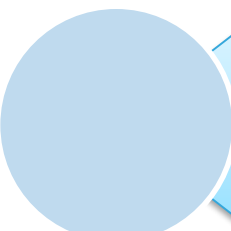
Latest info available at www.st.com
X-CUBE-6180XA1

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X-NUCLEO-6180XA1: Proximity, gesture and ambient light sensor expansion board
Hardware and Software overview



Setup & Demo Examples
Documents & Related Resources



STM32 Open Development Environment: Overview

Setup & Demo Examples

HW prerequisites

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- 1x STM32 Nucleo proximity, gesture and ambient light expansion board (**X-NUCLEO-6180XA1**).



- 1x STM32 Nucleo development board (**NUCLEO-F401RE** or **NUCLEO-L053R8** or **NUCLEO-L476RG**)



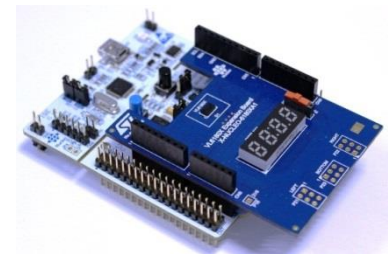
- If user has no STM32 Nucleo development board, it is possible to order a Nucleo pack.

- **P-NUCLEO-6180X1**

- X-NUCLEO-6180XA1 expansion board and NUCLEO-F401RE full features board

- **P-NUCLEO-6180X2**

- X-NUCLEO-6180XA1 expansion board and NUCLEO-L053R8 ultra low power board



- If user has to develop a VL6180X multi-sensor application, VL6180X-SATEL boards can be ordered



Setup & Demo Examples

SW prerequisites

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- **STSW-LINK009:** ST-LINKV2-1 USB driver
- **STSW-LINK007:** ST-LINKV2-1 firmware upgrade
- **X-CUBE-6180XA1:** P-NUCLEO-6180X1 and P-NUCLEO-6180X2 software expansion for STM32Cube
- **STSW-IMG004:** P-NUCLEO-6180X1 and P-NUCLEO-6180X2 graphical interface on Windows Vista, 7 and 8

Proximity and ambient light sensor expansion board

Start coding in just a few minutes with X-CUBE-6180XA1

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1 Go to www.st.com/x-nucleo



2 Select
X-NUCLEO-6180XA1



3

Download & unpack
X-CUBE-6180XA1

X-CUBE-6180XA1 package

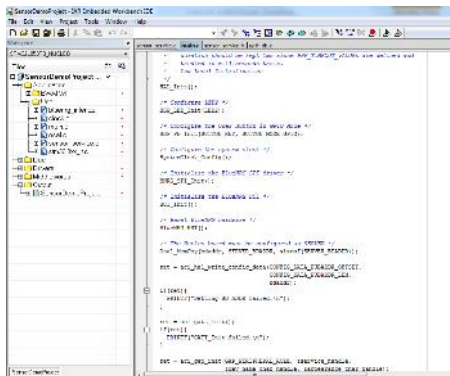
_htmresc	Generic Nucleo & package docs
Documentation	VL6180X API driver
Drivers	Gesture recognition library
Middlewares	VL6180X examples projects
Projects	
Release_Notes.html	

4

Download & install STM32
Nucleo [ST-LINK/V2-1 USB driver](#)

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Modify, build application

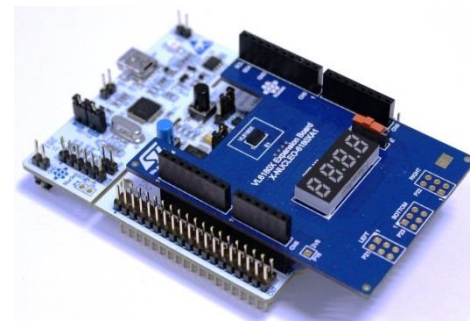


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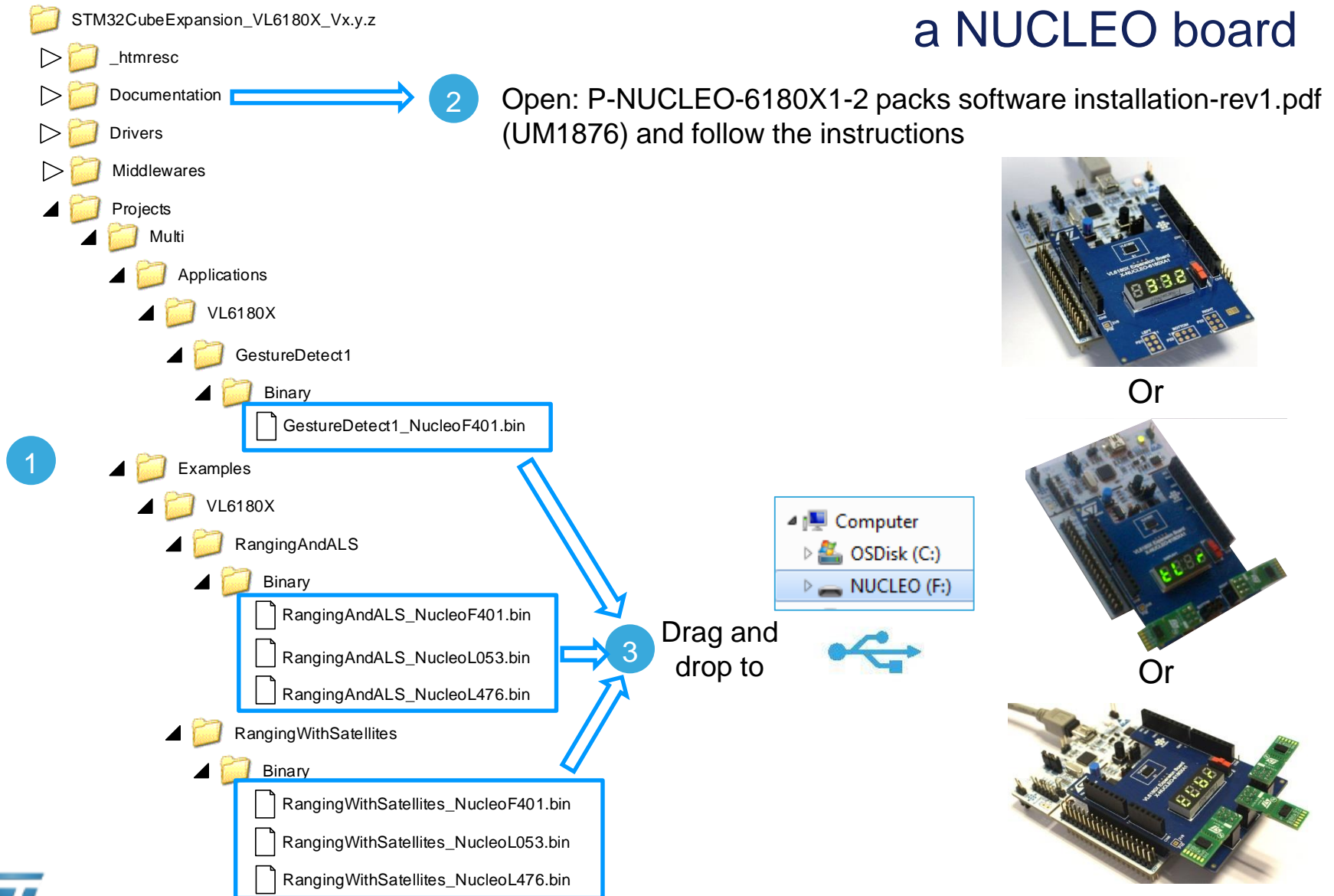
Open project example
RangingAndAls or RangingWithSatellites
Or GestureDetect1



Proximity, gesture and ambient light sensor expansion board

Evaluate using X-CUBE-6180XA1 and a NUCLEO board

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All documents are available in the **DESIGN** tab of the related products webpage

X-NUCLEO-6180XA1:

- **BOM and schematic included in UM1852**
- **DB2473:** proximity and ambient light sensor expansion board on VL6180X for STM32 Nucleo – **data brief**
- **AN4663:** VL6180X expansion boards - Description of version 1 and version 2 – **application note**
- **UM1852:** proximity and ambient light sensor expansion board based on VL6180X for STM32 Nucleo – **user manual**

X-CUBE-6180XA1:

- **DB2563:** proximity, gesture, ambient light sensor expansion for STM32Cube – **data brief**
- **UM1876:** Getting started with VL6180X proximity, gesture, ambient light sensor software expansion for STM32Cube – **user manual**
- **Software setup file**

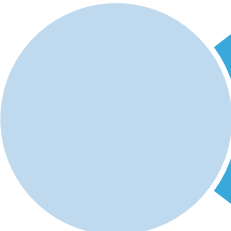
STSW-IMG004:

- **DB2562:** P-NUCLEO-6180X1 and P-NUCLEO-6180X2 packs PC graphical user interface (GUI) – **data brief**
- **Software setup file**

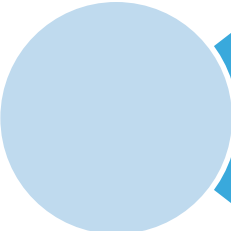
Consult www.st.com for the complete list

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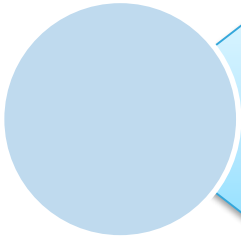
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X-NUCLEO-6180XA1: Proximity, gesture and ambient light sensor expansion board
Hardware and Software overview



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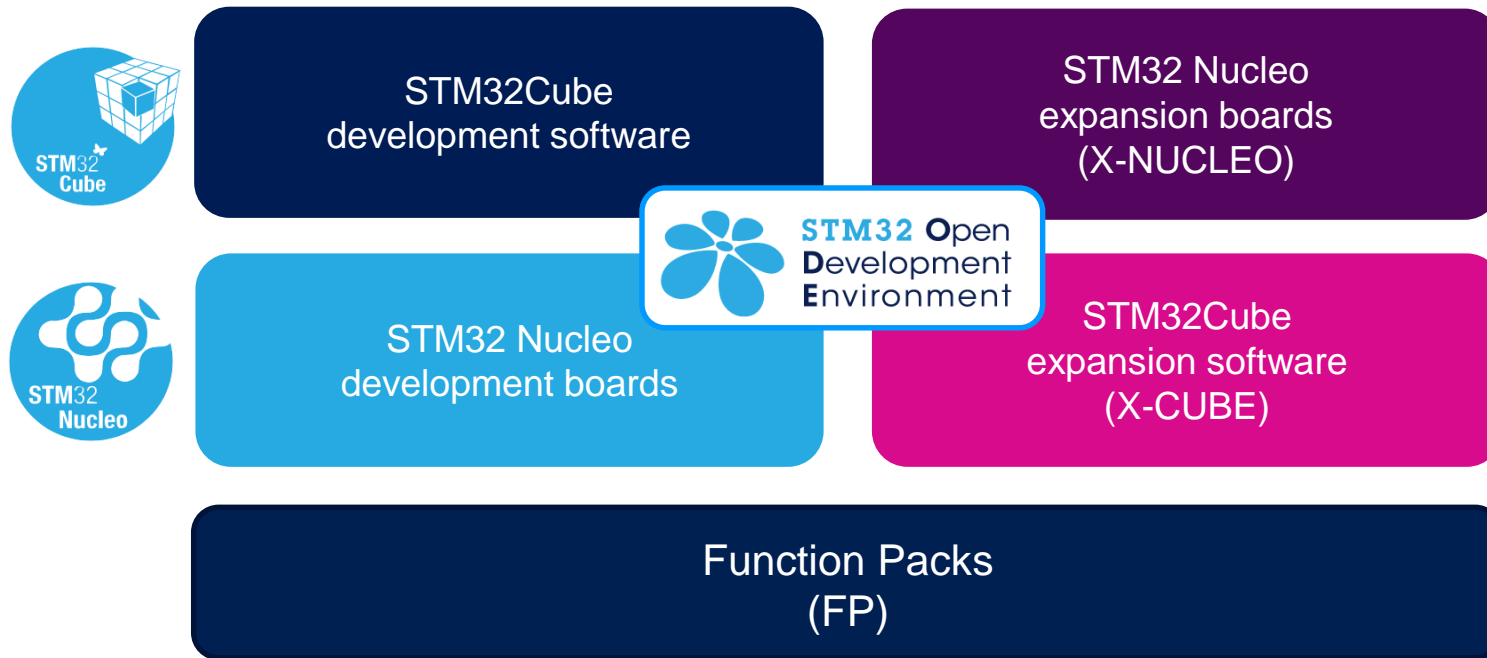
STM32 Open Development Environment: Overview

STM32 Open Development Environment

Fast, affordable Prototyping and Development

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- The STM32 Open Development Environment (ODE) consists of a set of stackable boards and a modular open SW environment designed around the STM32 microcontroller family.

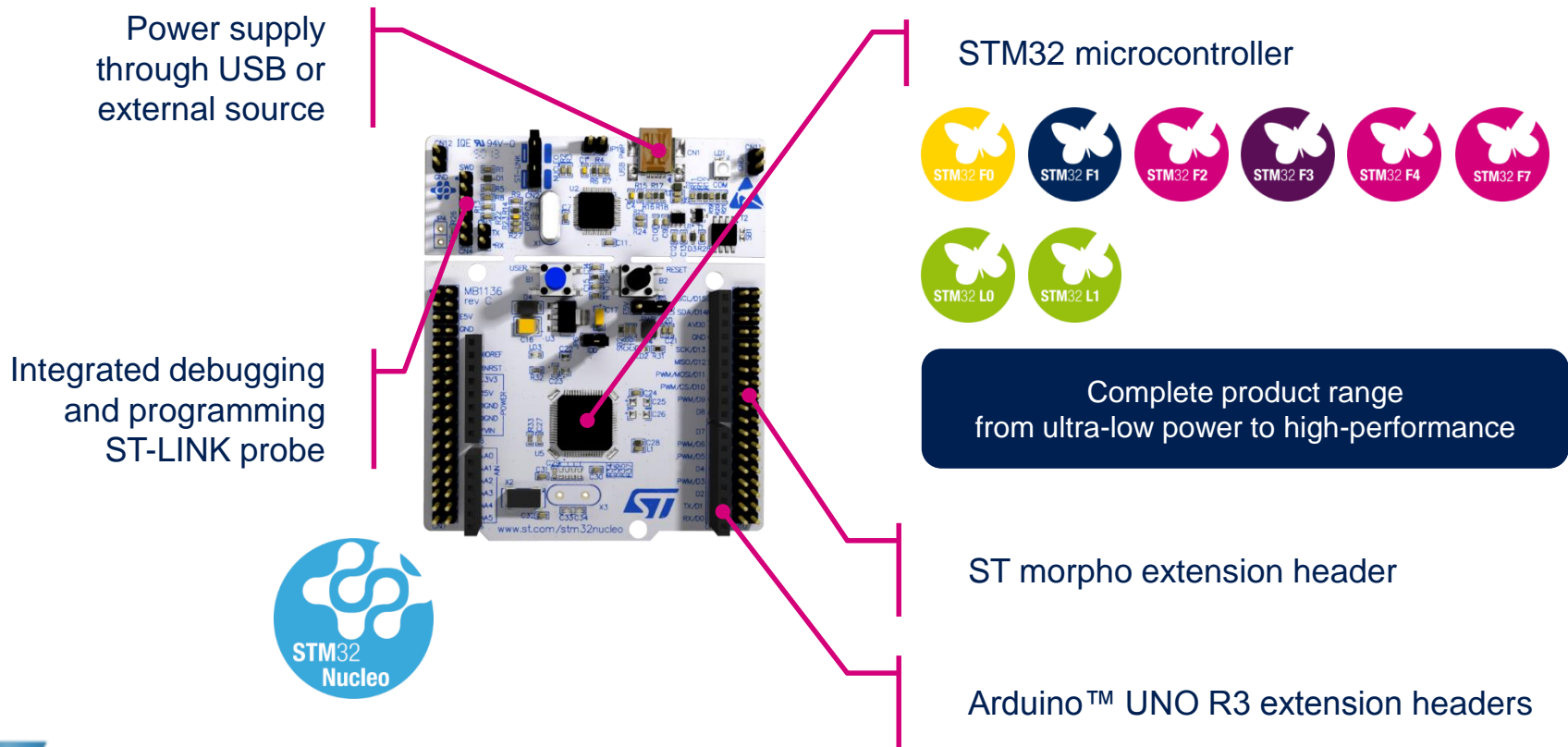


www.st.com/stm32ode

STM32 Nucleo Development Boards (NUCLEO)

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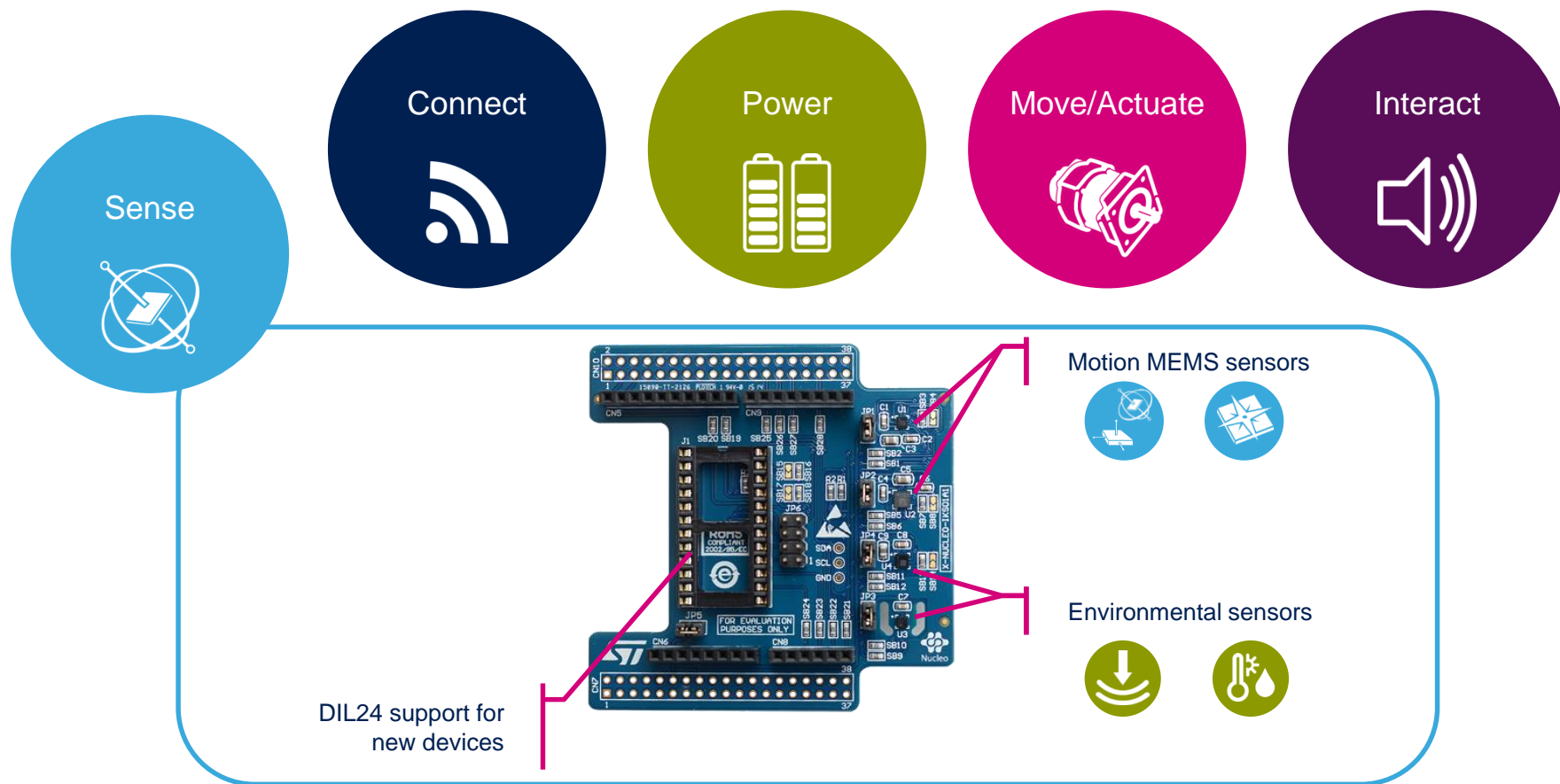
- A comprehensive range of affordable development boards for all the STM32 microcontroller series, with unlimited unified expansion capabilities and integrated debugger/programmer functionality.



STM32 Nucleo Expansion Boards (X-NUCLEO)

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- Boards with additional functionality that can be plugged directly on top of the STM32 Nucleo development board directly or stacked on another expansion board.



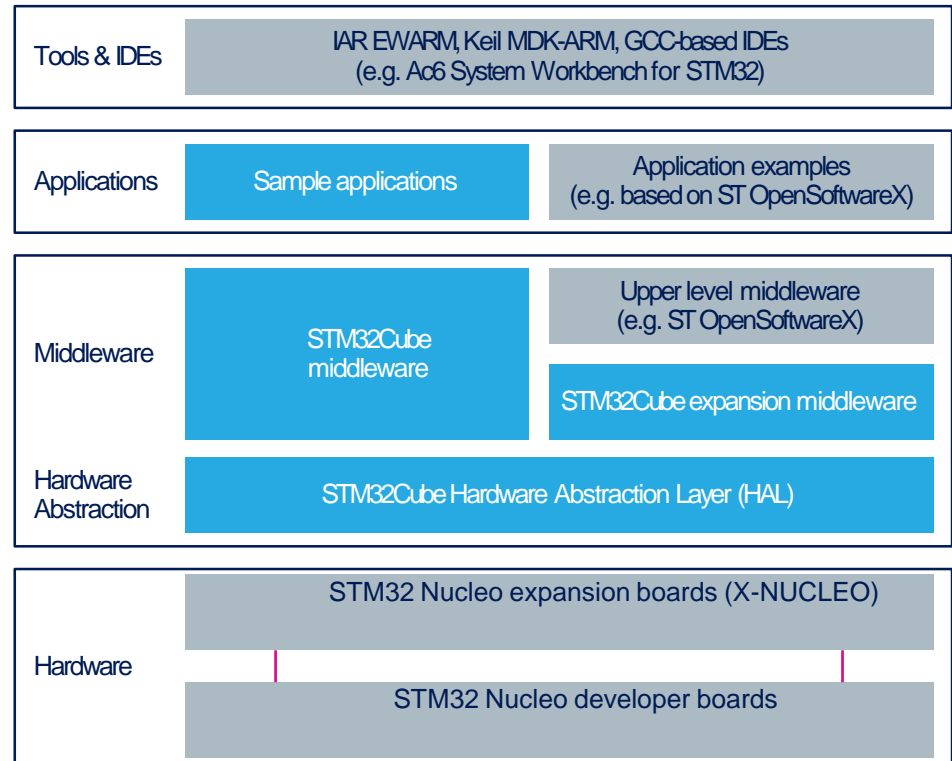
Example of STM32 expansion board (X-NUCLEO-IKS01A1)

STM32 Open Development Environment

Software components

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- **STM32Cube software (CUBE)** - A set of free tools and embedded software bricks to enable fast and easy development on the STM32, including a Hardware Abstraction Layer and middleware bricks.
- **STM32Cube expansion software (X-CUBE)** - Expansion software provided free for use with the STM32 Nucleo expansion board and fully compatible with the STM32Cube software framework. It provides abstracted access to expansion board functionality through high-level APIs and sample applications.



- **Compatibility with multiple Development Environments** - The STM32 Open Development Environment is compatible with a number of IDEs including IAR EWARM, Keil MDK, and GCC-based environments. Users can choose from three IDEs from leading vendors, which are free of charge and deployed in close cooperation with ST. These include Eclipse-based IDEs such as Ac6 System Workbench for STM32 and the MDK-ARM environment.

STM32 Open Development Environment

Building block approach

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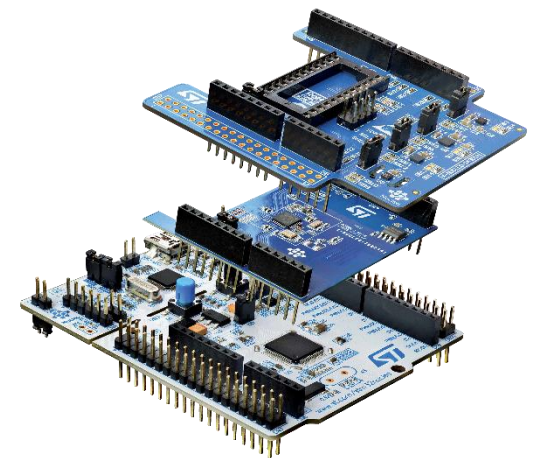
The building blocks

Your need

Our answer



 **STM32 Open Development Environment**



www.st.com/stm32code