

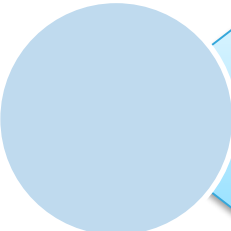
Quick Start Guide

Three-phase brushless DC motor driver expansion board based on L6230 for STM32 Nucleo (X-NUCLEO-IHM07M1)

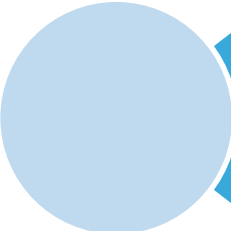


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X-NUCLEO-IHM07M1: Three-phase brushless DC motor driver expansion board
Hardware and Software overview



Setup & Demo Examples
Documents & Related Resources



STM32 Open Development Environment: Overview

Three-phase brushless DC motor driver expansion board

Hardware Overview

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X-NUCLEO-IHM07M1 Hardware Description

- The X-NUCLEO-IHM07M1 is a three-phase brushless DC motor driver expansion board based on L6230 for STM32 Nucleo. It provides an affordable and easy-to-use solution for driving three-phase brushless DC motor in your STM32 Nucleo project. It is compatible with the ST morpho connector and supports the addition of other boards which can be stacked with a single STM32 Nucleo board. The user can also mount the Arduino UNO R3 connector
- **Main features**
 - Nominal operating voltage range: 8 V - 48 V DC
 - Maximum output peak current: 2.8 A
 - Thermal measuring and overheating protection
 - 3-Shunt and 1-Shunt configurable jumpers for motor current sensing
 - Hall / Encoder motor sensor connector and circuit

Key Products on board

L6230

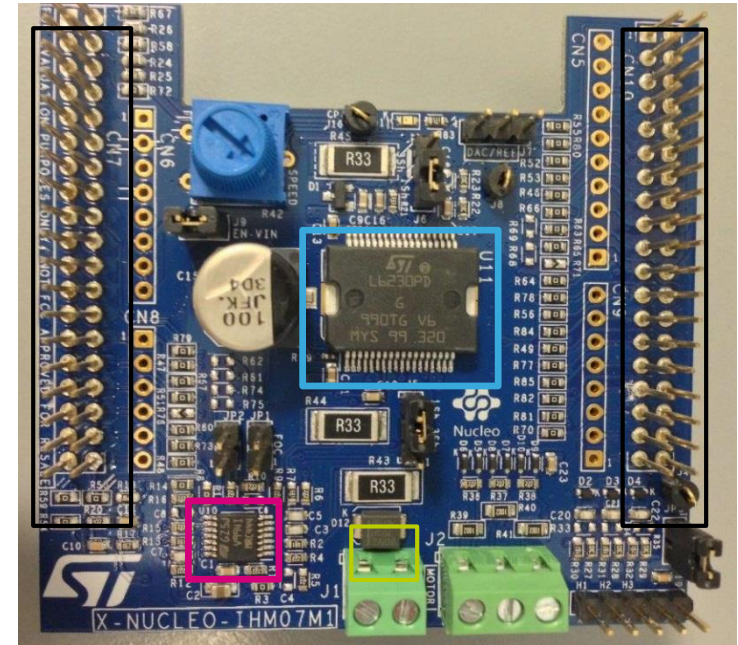
DMOS driver for three-phase brushless DC motor

TSV994

Rail to rail input / output high merit factor op-amps

BAT30

Small signal Schotky diodes, 30V, 0.3A



- ☐ L6230PD
- ☐ TSV994IPT
- ☐ BAT30KFILM
- ☐ ST morpho connectors

Latest info available at www.st.com
X-NUCLEO-IHM07M1

Three-phase brushless DC motor driver expansion board

Software Overview

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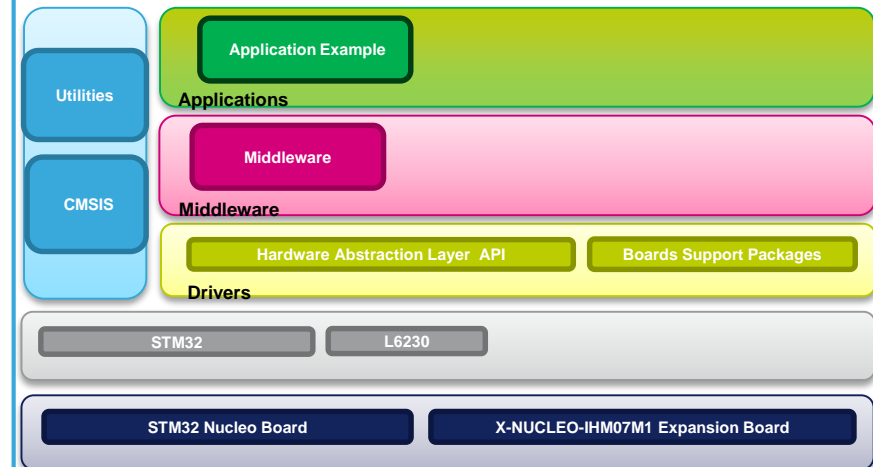
X-CUBE-SPN7 Software Description

- The X-CUBE-SPN7 is an expansion software package for STM32Cube. The software runs on the STM32 and includes drivers that recognize, initialize and send application commands to L6230 device.
- It is compatible with the NUCLEO-F030R8, the NUCLEO-F103RB, the NUCLEO-F302R8 or the NUCLEO-F401RE when connected to one or more X-NUCLEO-IHM07M1 expansion boards.

Key features

- Complete middleware to build Motor Control applications based on three-phase BLDC motor.
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

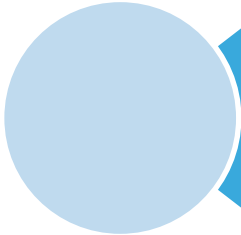
Overall Software Architecture



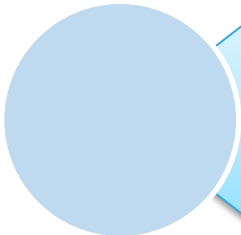
Latest info available at www.st.com
X-CUBE-SPN7

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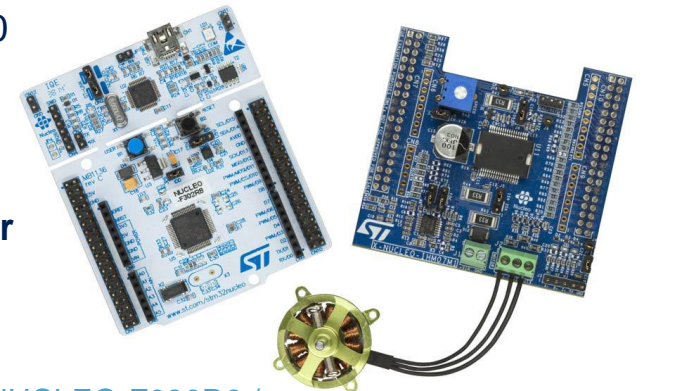
STM32 Open Development Environment: Overview

Setup & Demo Examples

HW prerequisites

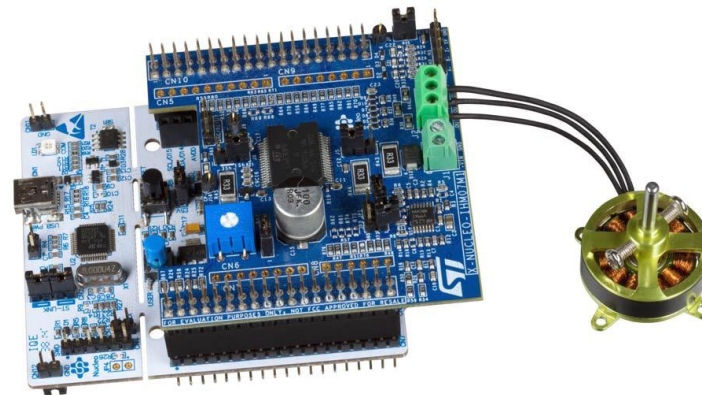
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- 1x Three-phase Motor driver expansion board based on L6230 (**X-NUCLEO-IHM07M1**)
- 1x STM32 Nucleo development board (**NUCLEO-F030R8, NUCLEO-F103RB, NUCLEO-F302R8 or NUCLEO-F401RE**)
- 1x external DC power supply with two electric cables (*)
- 1x low voltage three-phase BLDC motor
- 1x Laptop/PC with MS Windows 7 or 8
- 1x mini USB cable



NUCLEO-F030R8 /
NUCLEO-F103RB /
NUCLEO-F302R8 /
NUCLEO-F401RE

X-NUCLEO-IHM07M1



Low voltage motor:
Three-phase BLDC
motor, BR2804-1700
kV or equivalent

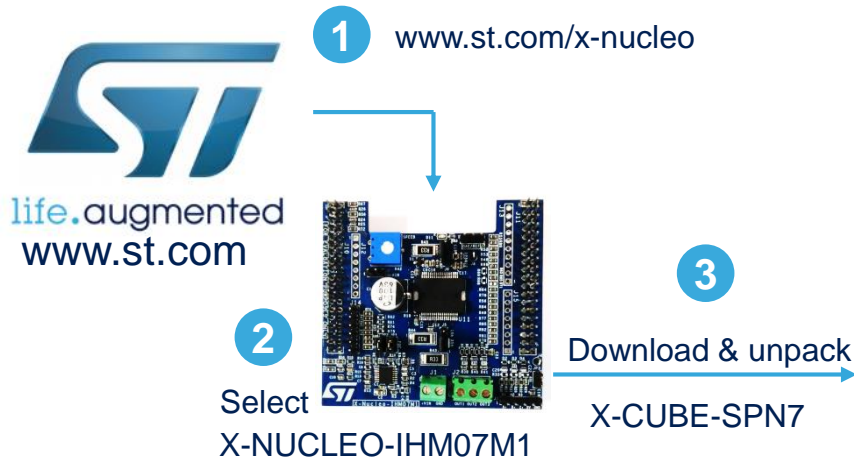
Complete evaluation platform: NUCLEO +
X-NUCLEO-IHM07M1 + LV Motor

- **STSW-LINK008:** ST-LINK/V2-1 USB driver
- **STSW-LINK007:** ST-LINK/V2-1 firmware upgrade
- **X-CUBE-SPN7**
 - copy the .zip file content into a folder on your PC. The package will contain source code example (Keil, IAR, System Workbench) based on **NUCLEO-F030R8, NUCLEO-F103RB, NUCLEO-F302R8 or NUCLEO-F401RE.**

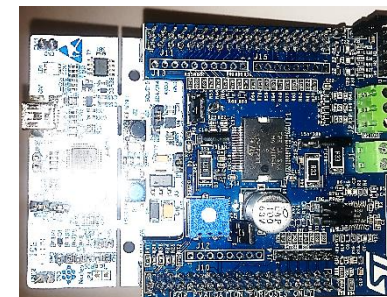
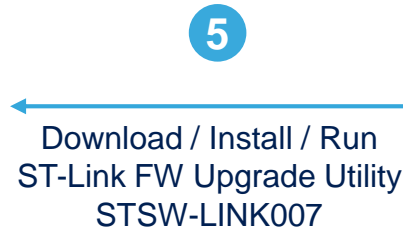
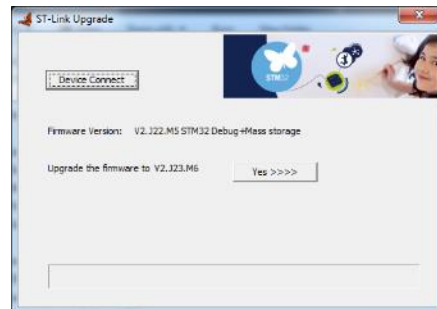
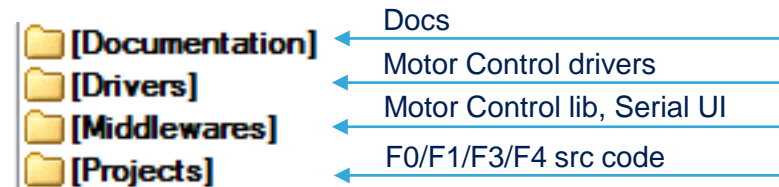
X-CUBE-SPN7 in 8 steps

Use of X-CUBE-SPN7 with pre-compiled .BIN FW file

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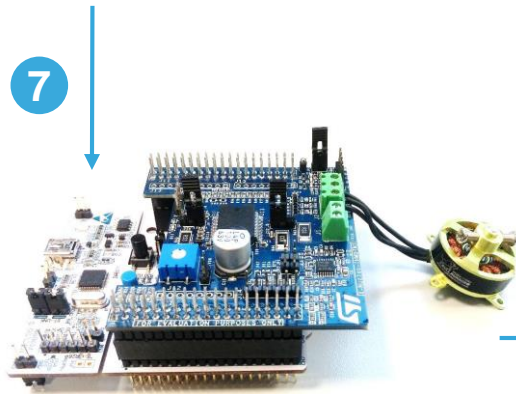
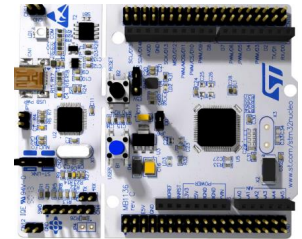
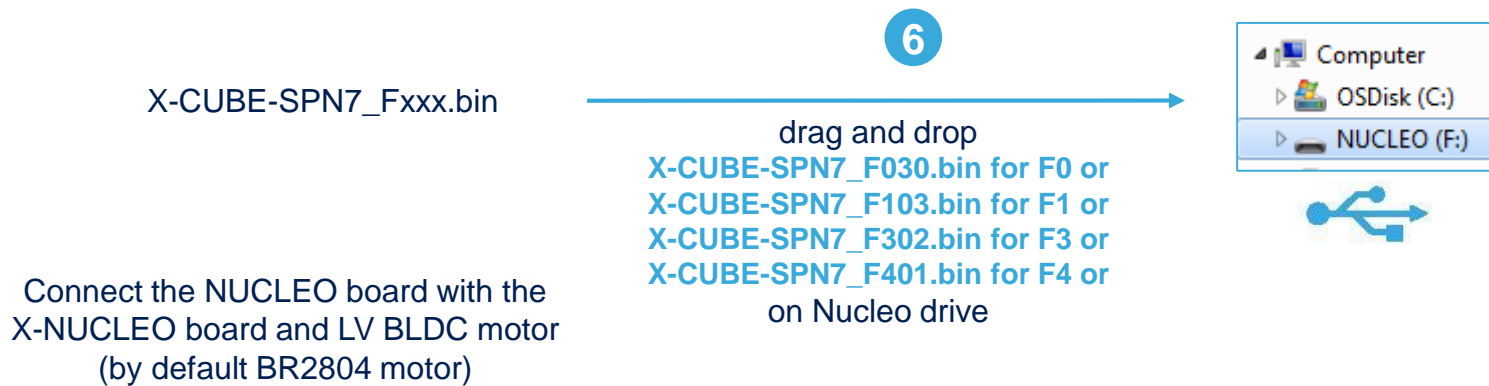
X-CUBE-SPN7 package main structure



Use of X-CUBE-SPN7 with pre-compiled .BIN FW file

X-CUBE-SPN7 for NUCLEO-F030 or NUCLEO-F103, NUCLEO-F302 or NUCLEO-F401

\\STM32CubeExpansion_SPN7_V1.0.0\Projects\Multi\Examples\MotorControl\Binary\STM32F030R8-Nucleo
\\STM32CubeExpansion_SPN7_V1.0.0\Projects\Multi\Examples\MotorControl\Binary\STM32F103RB-Nucleo
\\STM32CubeExpansion_SPN7_V1.0.0\Projects\Multi\Examples\MotorControl\Binary\STM32F302R8-Nucleo
\\STM32CubeExpansion_SPN7_V1.0.0\Projects\Multi\Examples\MotorControl\Binary\STM32F401RE-Nucleo

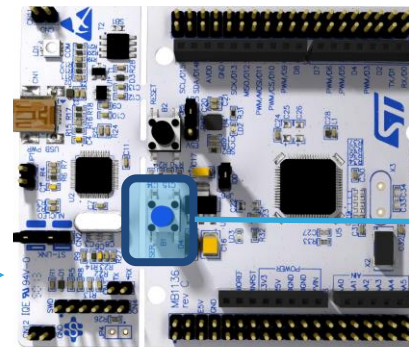


Connect the NUCLEO board with the
X-NUCLEO board and LV BLDC motor
(by default BR2804 motor)

Nucleo + X-NUCLEO-IHM07M1 + LV
Motor

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Push the blue
button
and motor RUN



Button

X-CUBE-SPN7 for code developers

Compile the FW using one of supported IDE

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X-CUBE-SPN7 for NUCLEO-F030 or NUCLEO-F103, NUCLEO-F302 or NUCLEO-F401



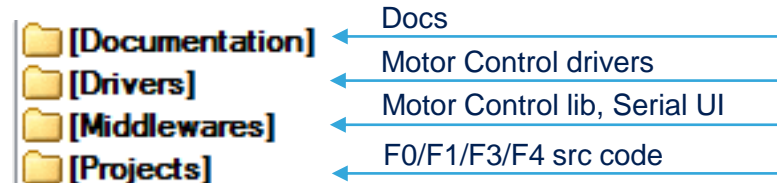
1 www.st.com/x-nucleo

2 Select
X-NUCLEO-IHM07M1



3 Download & unpack
X-CUBE-SPN7

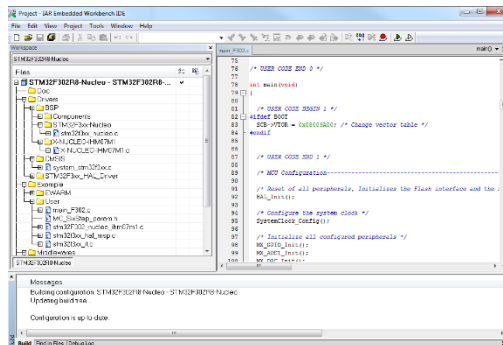
X-CUBE-SPN7 package main structure



Open the IDE workspace for
Nucleo board selected

4

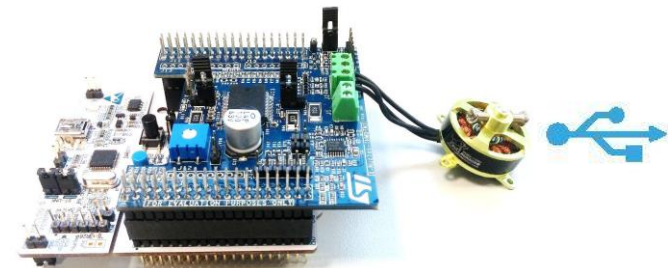
\\STM32CubeExpansion_SPN7_V1.0.0\\Projects\\Multi\\Examples\\MotorControl\\EWARM\\STM32FXXXRX-Nucleo



IAR IDE vers. 7.20



Flash and Run the project



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

X-NUCLEO-IHM07M1:

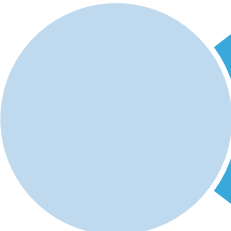
- **Gerber files, BOM, Schematic**
- **DB2665:** Three-phase brushless DC motor driver expansion board based on L6230 for STM32 Nucleo – **Data Brief**
- **UM1943:** Getting started with the X-NUCLEO-IHM07M1; three-phase brushless DC motor driver expansion board based on L6230 for STM32 Nucleo – **User Manual**

X-CUBE-SPN7:

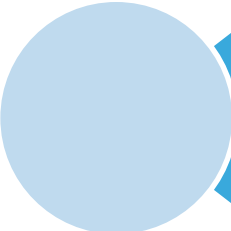
- **DB2667:** Three-phase brushless DC motor driver software expansion for STM32Cube – **Data Brief**
- **UM1946:** Getting started with the X-CUBE-SPN7; three-phase DC motor Driver software expansion for STM32Cube – **User Manual**
- **Software setup file**

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X-NUCLEO-IHM07M1: Three-phase brushless DC motor driver expansion board
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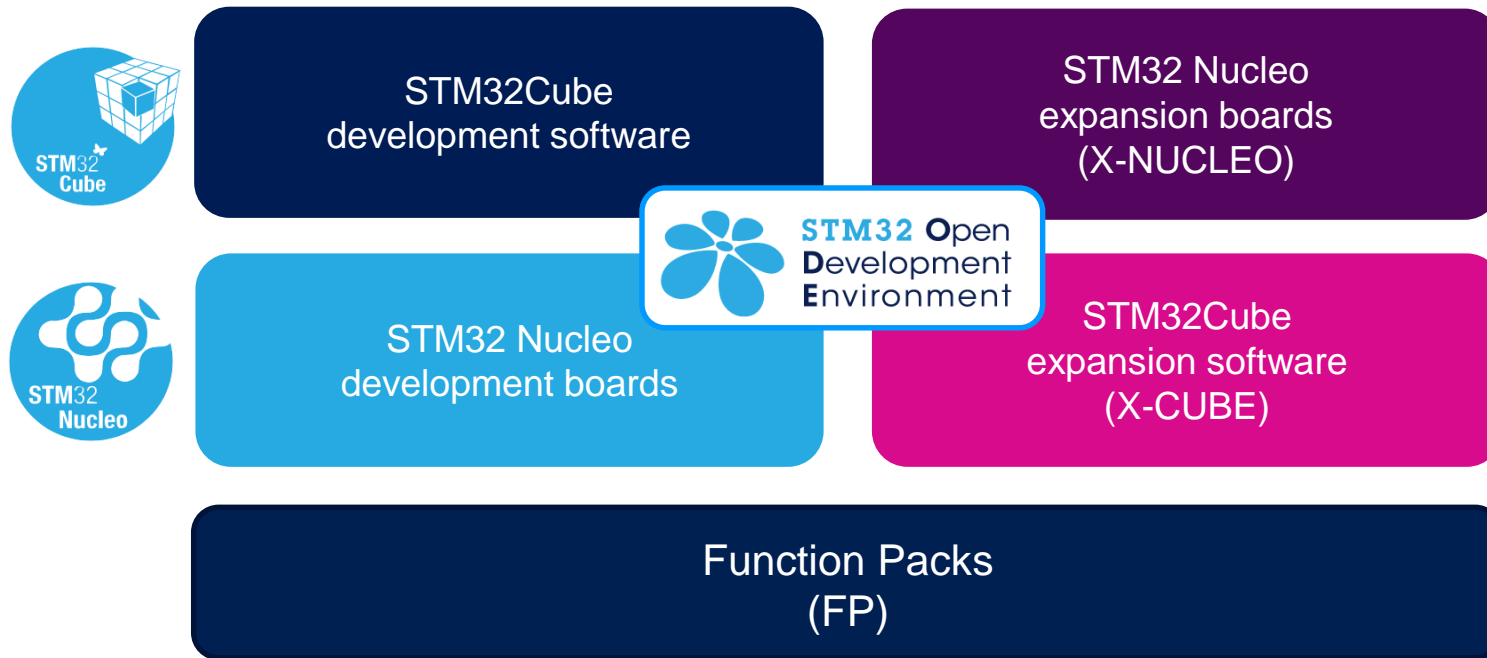
STM32 Open Development Environment: Overview

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.

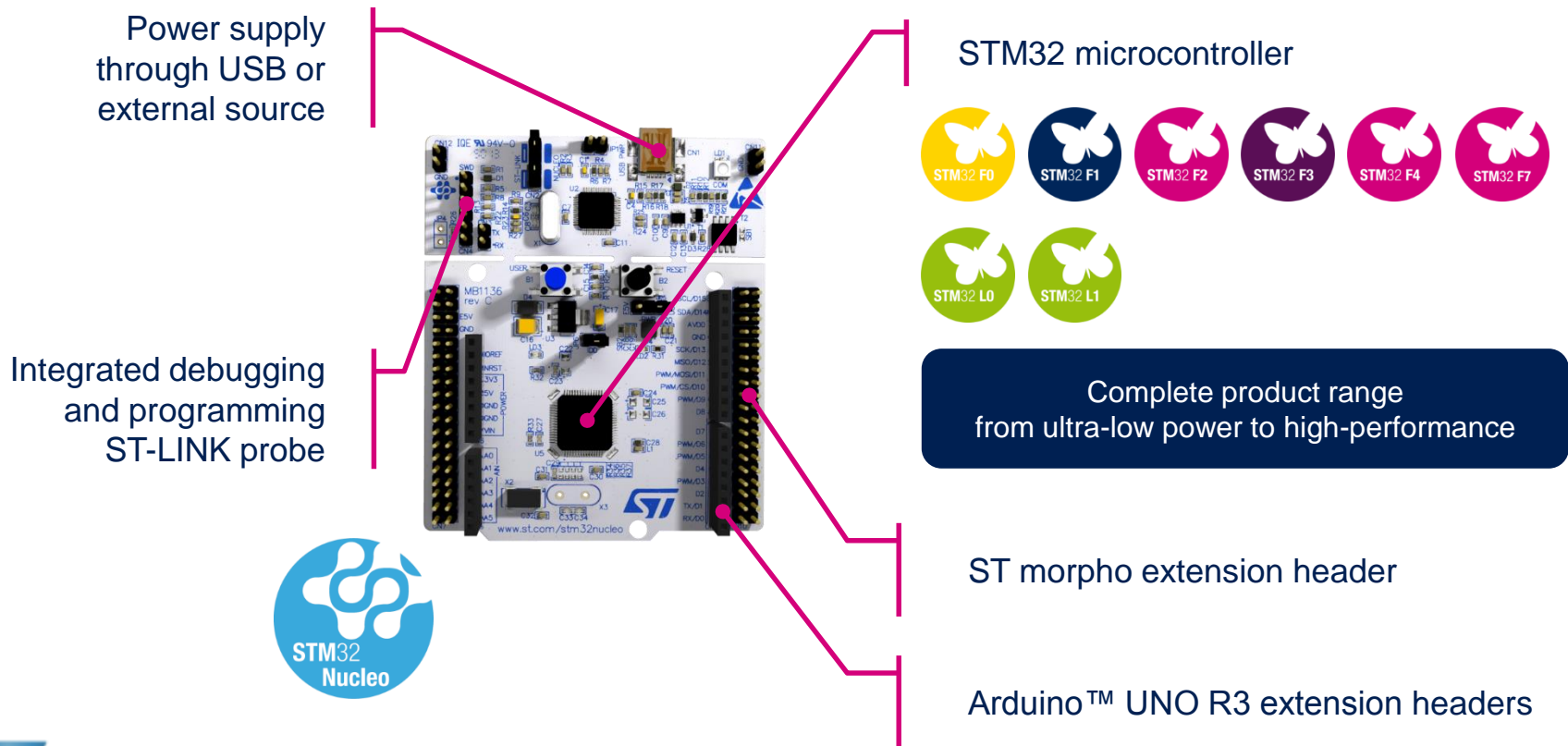


www.st.com/stm32ode

STM32 Nucleo Development Boards (NUCLEO)

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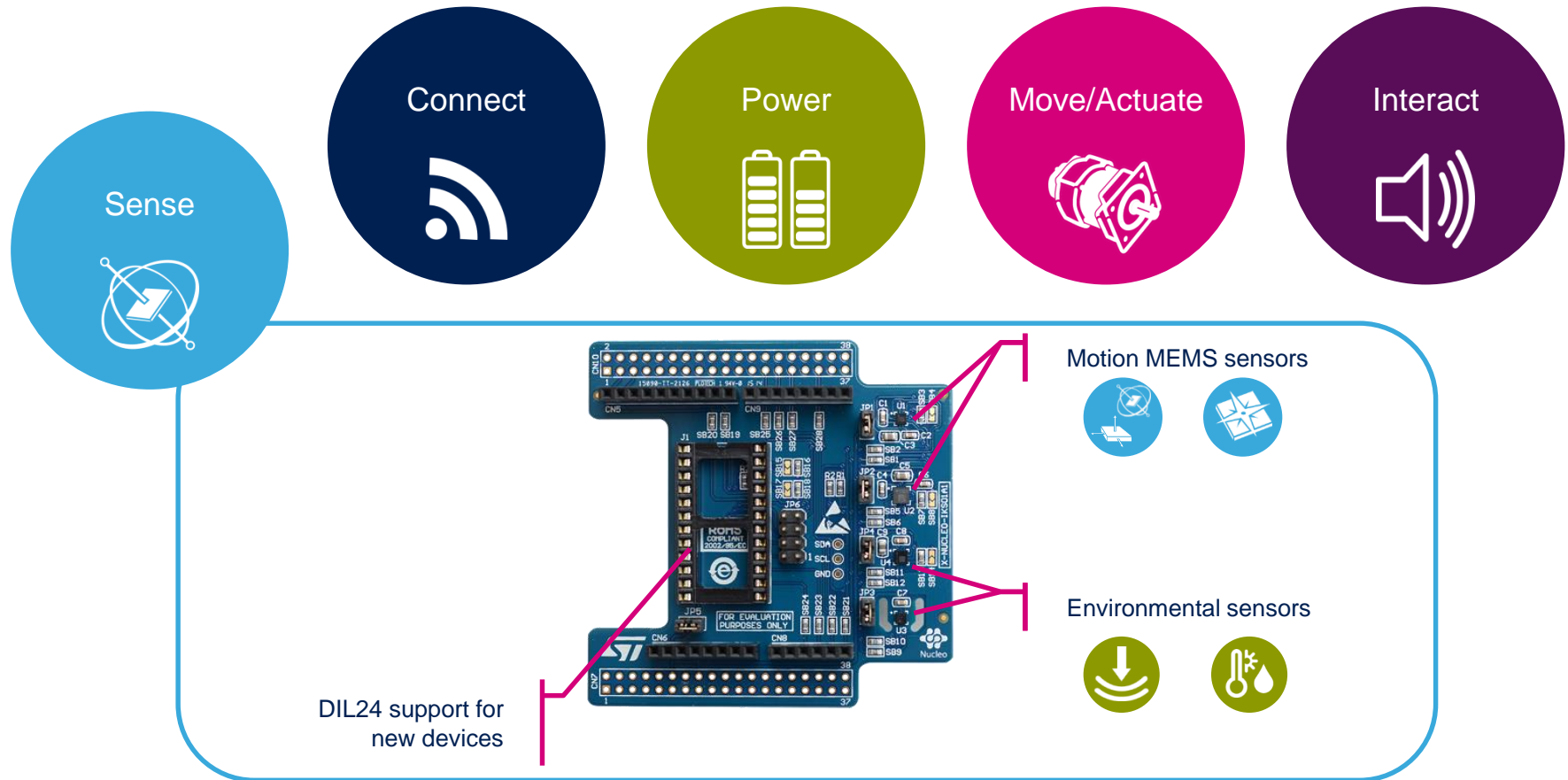
- A comprehensive range of affordable development boards for all the STM32 microcontroller series, with unlimited unified expansion capabilities and integrated debugger/programmer functionality.



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.



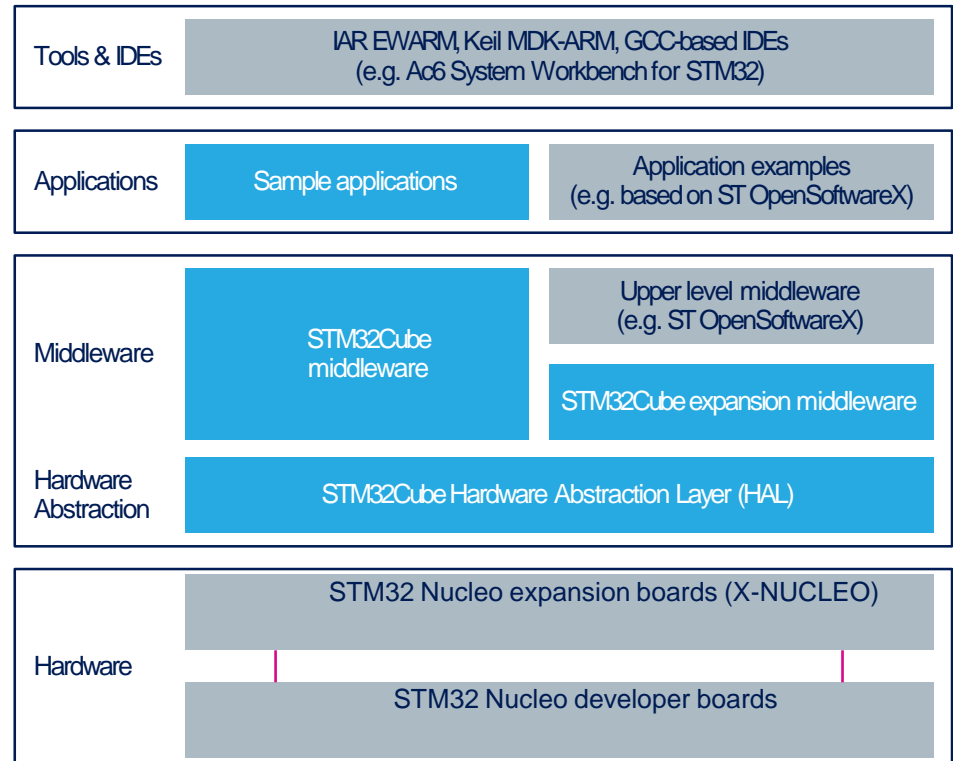
Example of STM32 expansion board (X-NUCLEO-1KS01A1)

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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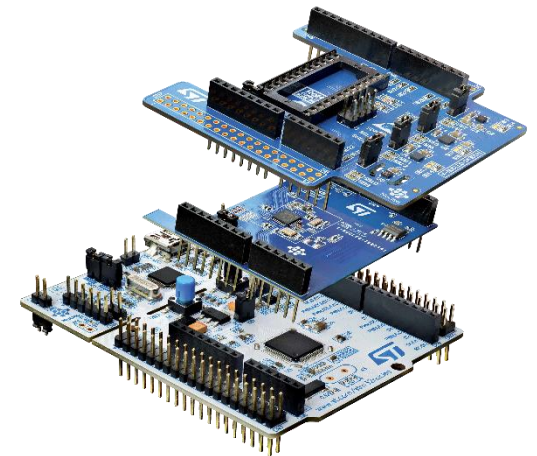
The building blocks

Your need

Our answer



 **STM32 Open Development Environment**



www.st.com/stm32code