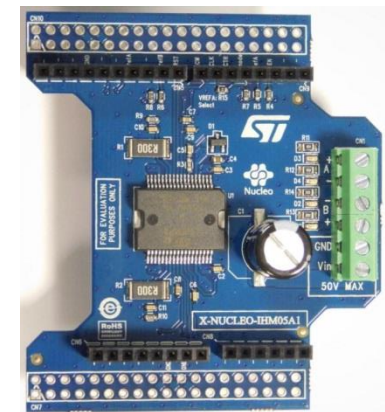


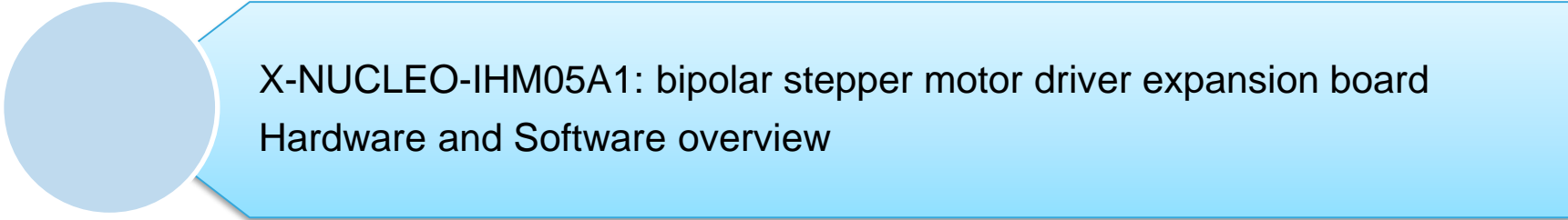
Quick Start Guide

Bipolar stepper motor driver expansion board based on L6208 for STM32 Nucleo (X-NUCLEO-IHM05A1)




Quick Start Guide Contents

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X-NUCLEO-IHM05A1: bipolar stepper motor driver expansion board
Hardware and Software overview



Setup & Demo Examples
Documents & Related Resources



STM32 Open Development Environment: Overview

Bipolar stepper motor driver expansion board

Hardware overview

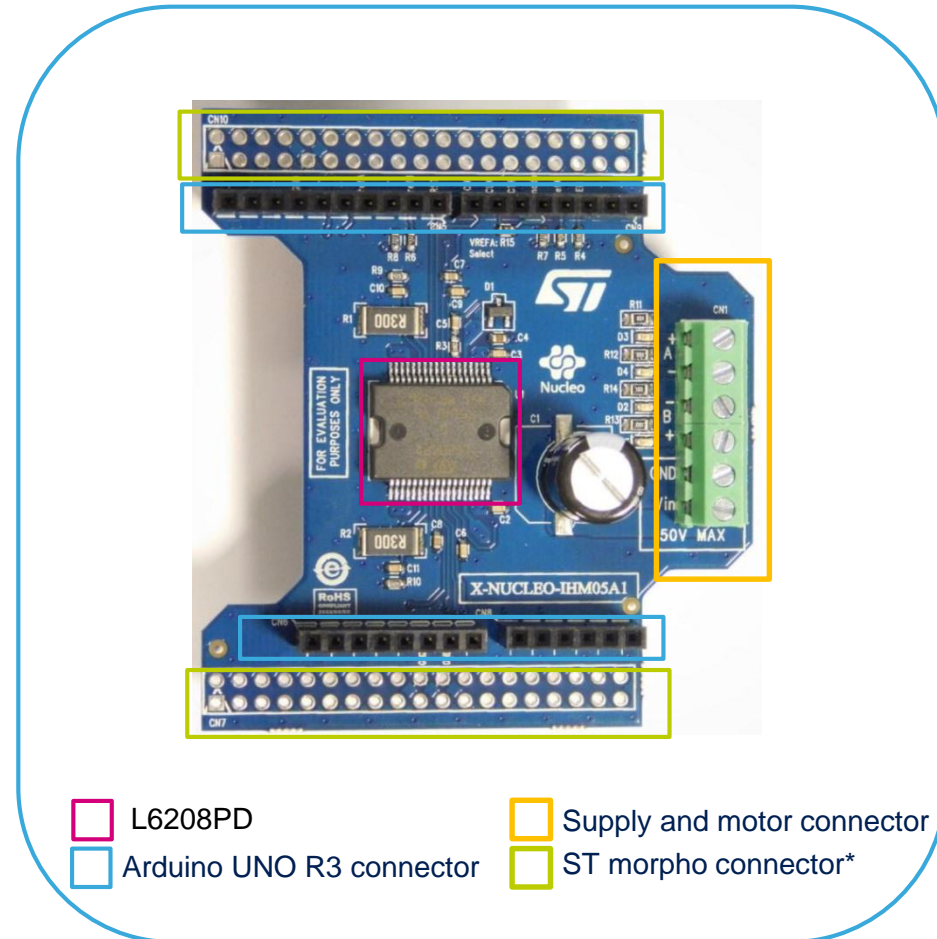
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X-NUCLEO-IHM05A1 Hardware Description

- The X-NUCLEO-IHM05A1 is a bipolar stepper motor driver expansion board based on the L6208 for STM32 Nucleo.
- It provides an affordable and easy-to-use solution for driving bipolar stepper motors in your STM32 Nucleo project.
- The X-NUCLEO-IHM05A1 is compatible with the Arduino UNO R3 connector, and supports the addition of other shielded boards with a single STM32 Nucleo board.

Key Products on board

L6208
DMOS driver for bipolar stepper motors



Latest info available at www.st.com
X-NUCLEO-IHM05A1

Bipolar stepper motor driver expansion board

Software overview

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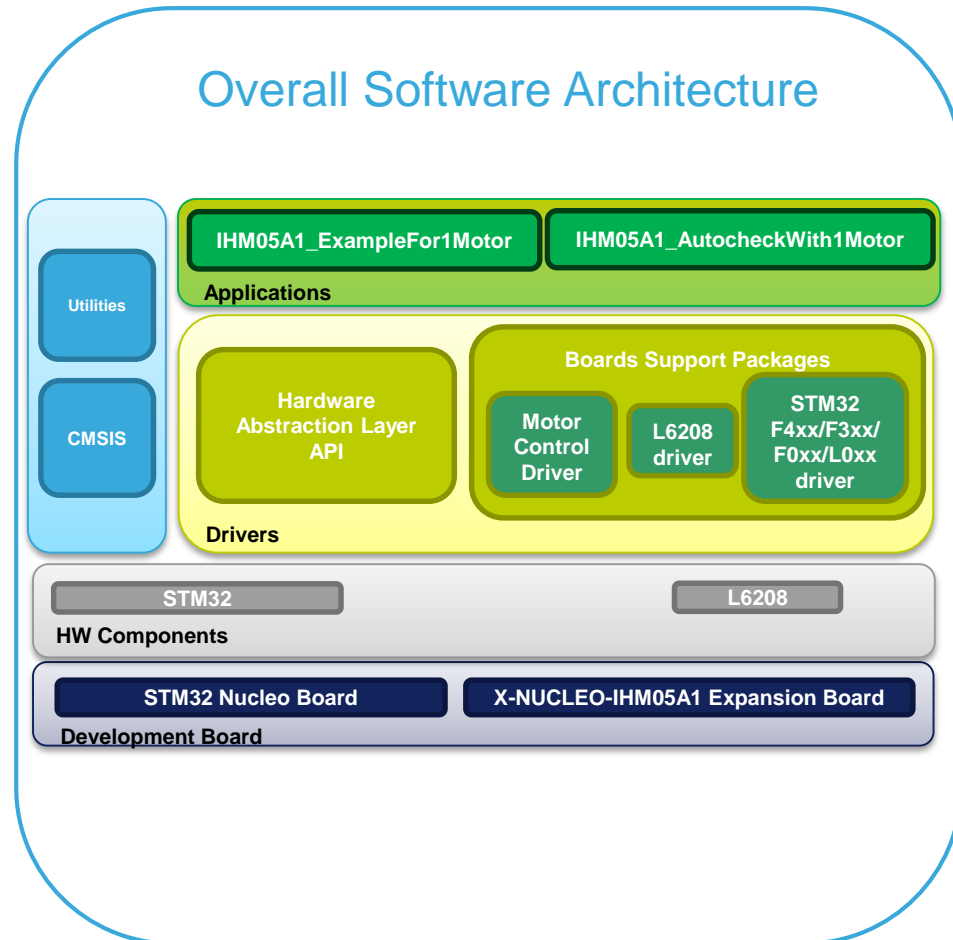
X-CUBE-SPN5 software description

- This software running on STM32 completely manages the L6208 for micro-stepping control of stepper motors. It is built on top of STM32Cube software technology that eases portability across different STM32 microcontrollers.

Key features

- Driver layer for a complete management of the L6208 (driver for bipolar stepper motor) which is integrated on the X-NUCLEO-IHM05A1 expansion board
- Example to control one bipolar stepper motor.
- Easy portability across different MCU families thanks to STM32Cube.
- Free, user-friendly license terms.

Overall Software Architecture



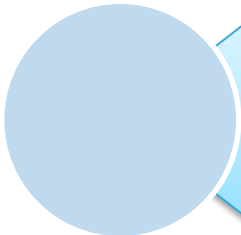
Latest info available at www.st.com
X-CUBE-SPN5

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X-NUCLEO-IHM05A1: bipolar stepper motor driver expansion board
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STM32 Open Development Environment: Overview

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Hardware prerequisites

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- 1x STM32 Nucleo development board
(NUCLEO-F401RE or NUCLEO-F334R8 or NUCLEO-F030R8 or NUCLEO-L053R8)
- 1x Bipolar stepper motor driver expansion board
(X-NUCLEO-IHM05A1)
- 1x Bipolar stepper motor
- 1x Laptop/PC with MS Windows 7 or 8
- 1x External DC power supply with two electric cables (*)
- 1x USB type A to mini-B USB cable



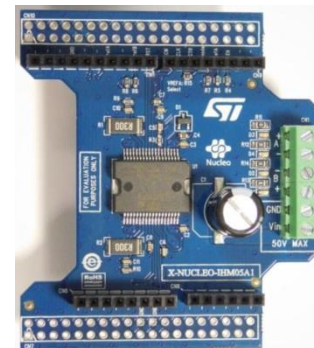
NUCLEO-F401RE
NUCLEO-F334R8
NUCLEO-F030R8
NUCLEO-L053R8



Mini USB Cable



Bipolar stepper motor



X-NUCLEO-IHM05A1

Setup & demo examples

Software prerequisites

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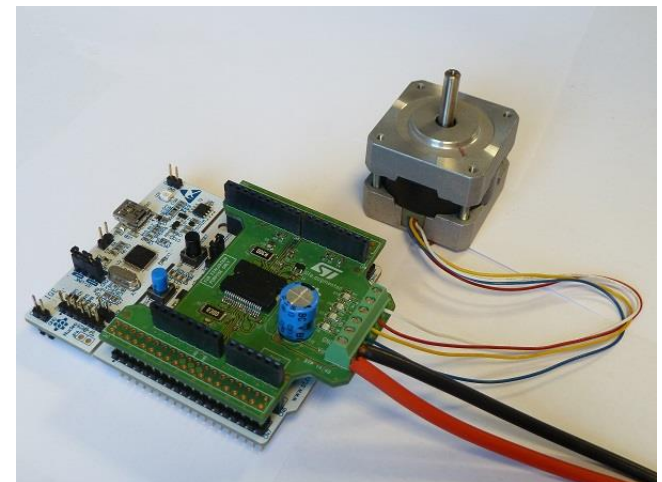
- **STSW-LINK008:** ST-LINK/V2-1 USB driver
- **STSW-LINK007:** ST-LINK/V2-1 firmware upgrade
- A Windows PC with one of the supported development toolchains:
 - KEIL: MDK-ARM
 - IAR: EWARM
 - GCC-based IDE: System Workbench for STM32
- **X-CUBE-SPN5:** firmware

Bipolar stepper motor driver expansion board

Start coding in just a few minutes with X-CUBE-SPN5

Driving one stepper motor with X-NUCLEO-IHM05A1 and X-CUBE-SPN5

- 1 When using a NUCLEO-F030R8, pin 4 of CN5 connector must be shorted to pin 4 of CN9 connector through the R15 resistor. Otherwise R15 resistor can be removed to free pin4 of CN5 connector.
- 2 Stack the X-NUCLEO-IHM05A1 on the STM32 Nucleo board through the Arduino UNO R3 connector and connect the stepper motor to the power outputs (A+/- and B+/-) and the power supply (Vin\Gnd) to the CN1 connector.
- 3 Connect the STM32 Nucleo board to the PC through the USB cable.



Bipolar stepper motor driver expansion board

Start coding in just a few minutes with X-CUBE-SPN5

- 4 Depending on your STM32 Nucleo board, from the examples folder (`stm32_cube\Projects\Multi\Examples\MotionControl\NHM05A1_ExampleFor1Motor`) open the software project from:
 - `\YourToolChainName\STM32F401RE-Nucleo` for Nucleo based on **STM32F401**
 - `\YourToolChainName\STM32F334R8-Nucleo` for Nucleo based on **STM32F334**
 - `\YourToolChainName\STM32F030R8-Nucleo` for Nucleo based on **STM32F030**
 - `\YourToolChainName\STM32L053R8-Nucleo` for Nucleo based on **STM32L053**
- 5 Open the file: `stm32_cube\Drivers\BSP\Components\I6208\I6208_target_config.h`. and modify the parameters according to your target configuration,
Or open the file `stm32_cube\Projects\Multi\Examples\MotionControl\NHM05A1_ExampleFor1Motor\Src\main.c` and modify the `initDeviceParameters` as well as the call to `BSP_MotorControl_Init` with the address of this variable.
- 6 Build the project and download it into the STM32 memory.
- 7 Run the example. The motor automatically starts (see `main.c` for a detailed demo sequence).

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

X-NUCLEO-IHM05A1:

- Gerber files, BOM, and schematics
- **DB2639:** Bipolar stepper motor driver expansion board based on L6208 for STM32 Nucleo – **Data brief**
- **UM1926:** Getting started with bipolar stepper motor driver expansion board based on L6208 for STM32 Nucleo – **User manual**

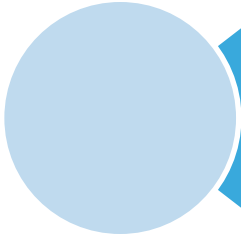
X-CUBE-SPN5:

- **DB2640:** Bipolar stepper motor driver software expansion for STM32Cube – **Data brief**
- **UM1927:** Getting started with the X-CUBE-SPN5 bipolar stepper motor driver software expansion for STM32Cube – **User manual**
- Software setup file

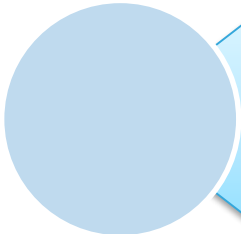
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X-NUCLEO-IHM05A1: bipolar stepper motor driver expansion board
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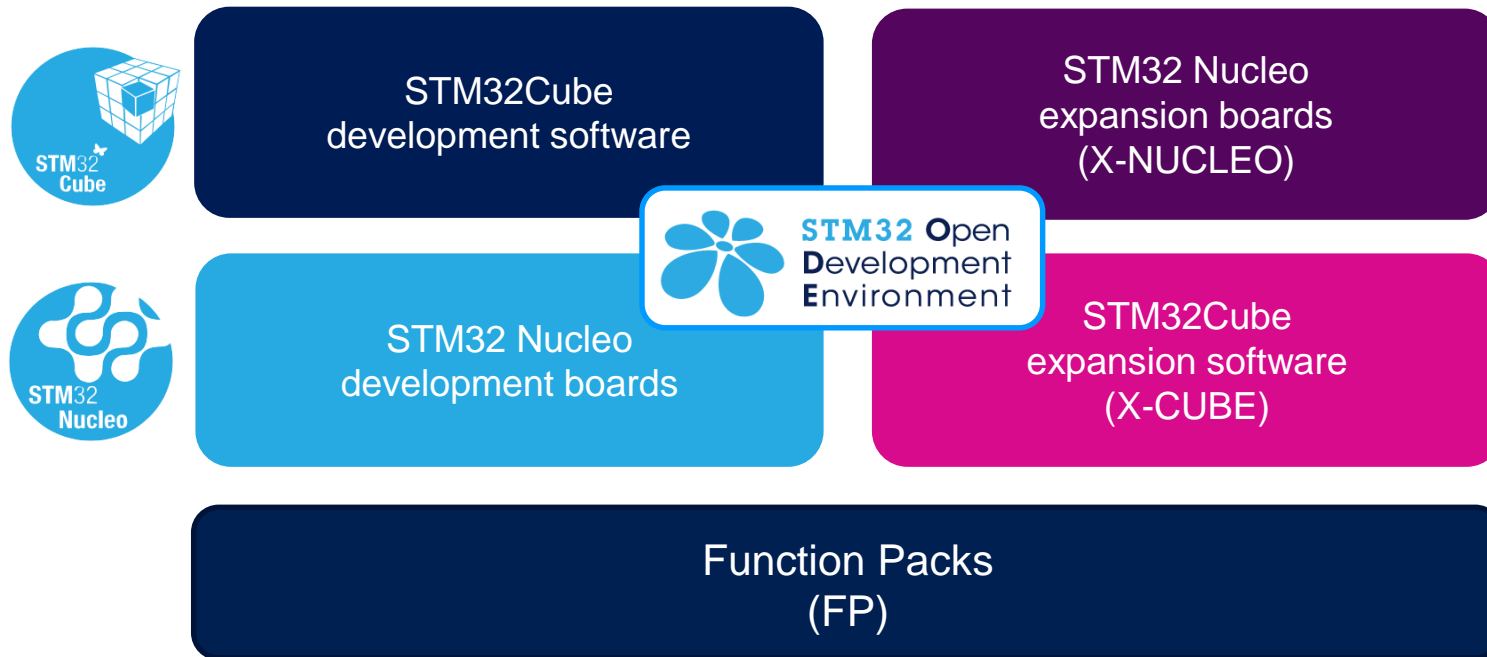


STM32 Open Development Environment: Overview

STM32 Open Development Environment

Fast, affordable Prototyping and Development

- 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.

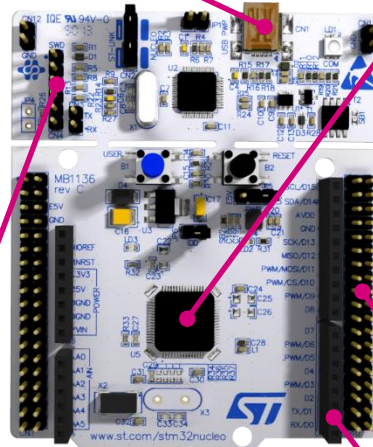


Development Boards (NUCLEO)

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

Power supply through USB or external source

Integrated debugging and programming ST-LINK probe



STM32 microcontroller



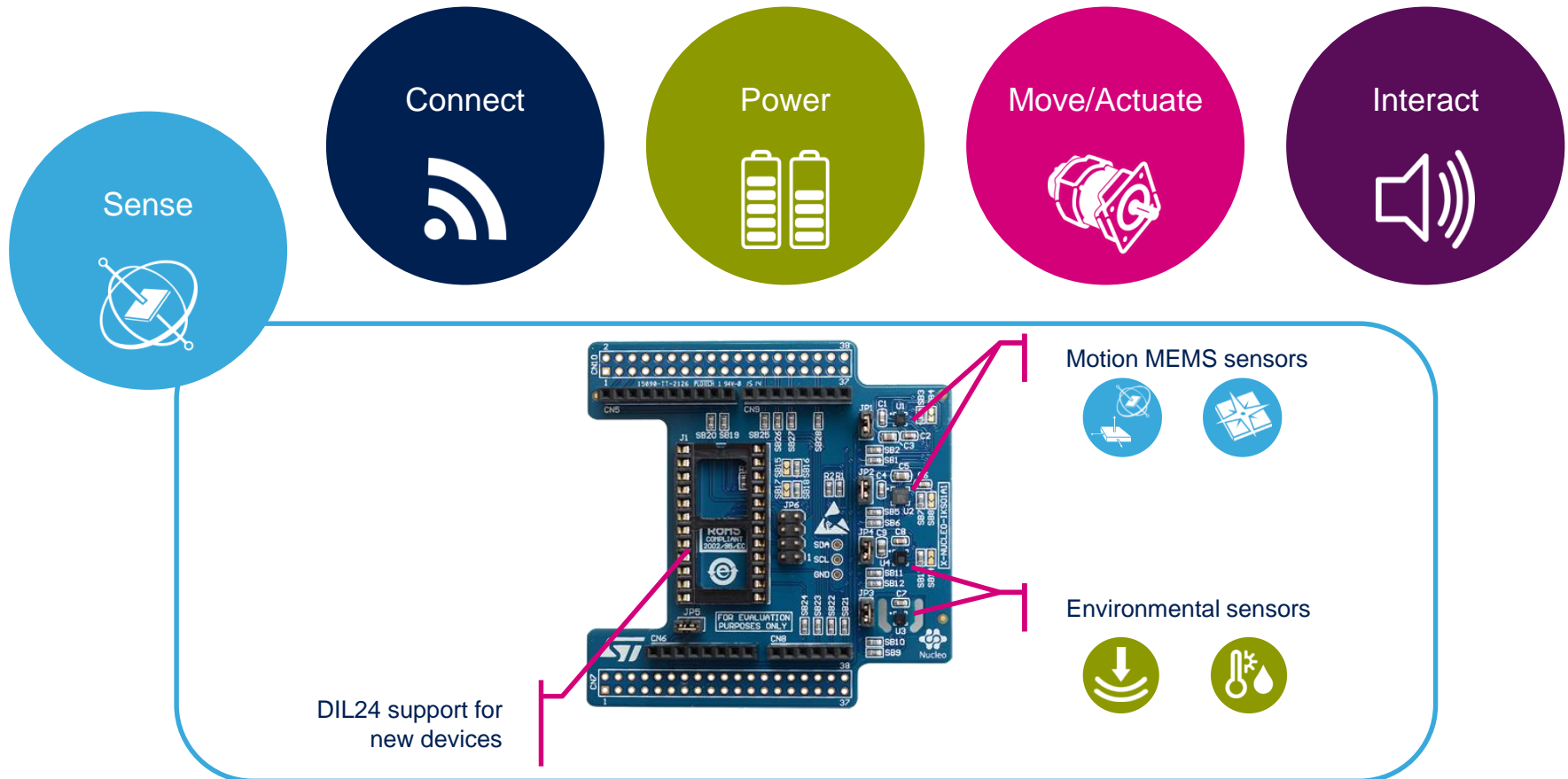
Complete product range from ultra-low power to high-performance

ST morpho extension header

Arduino™ UNO R3 extension headers

Expansion Boards (X-NUCLEO)

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



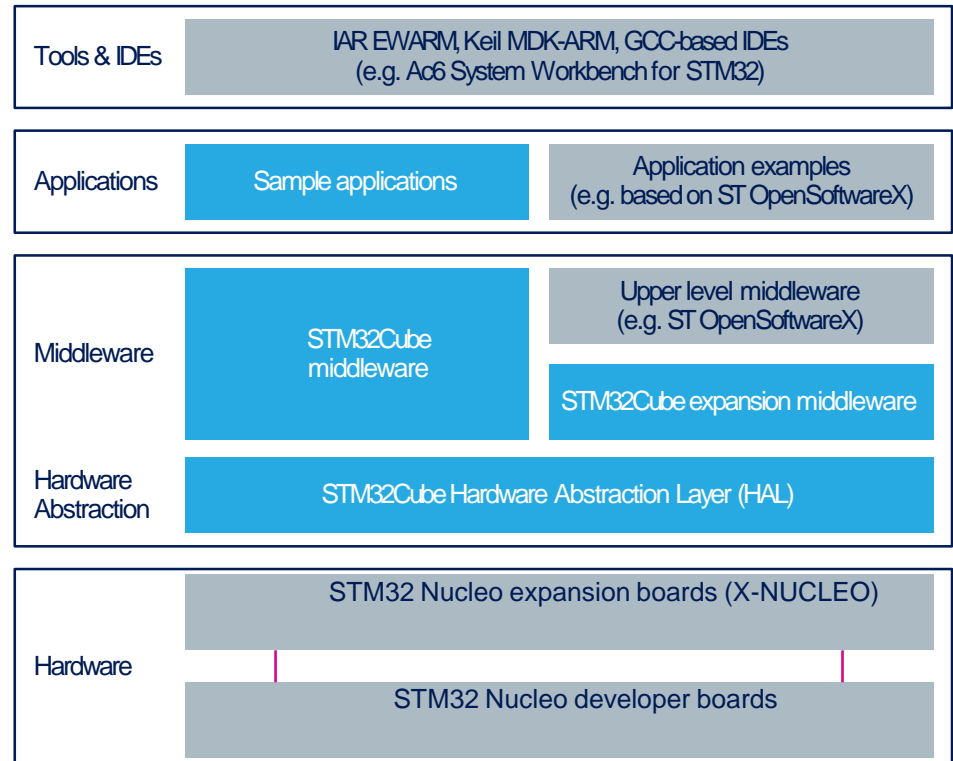
Example of STM32 expansion board (X-NUCLEO-IKS01A1)

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.



OPEN LICENSE MODELS: STM32Cube software and sample applications are covered by a mix of fully open source BSD license and ST licenses with very permissive terms.

www.st.com/stm32cube

www.st.com/x-cube

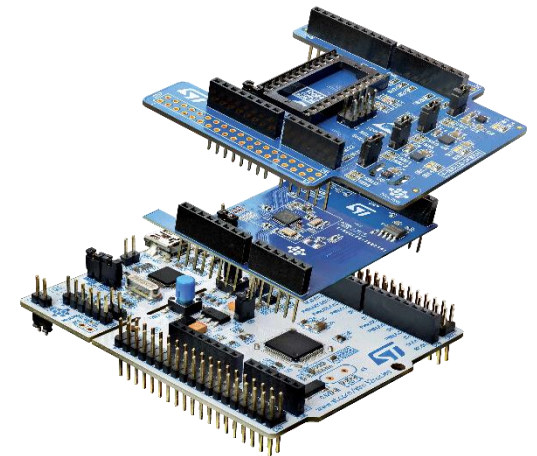
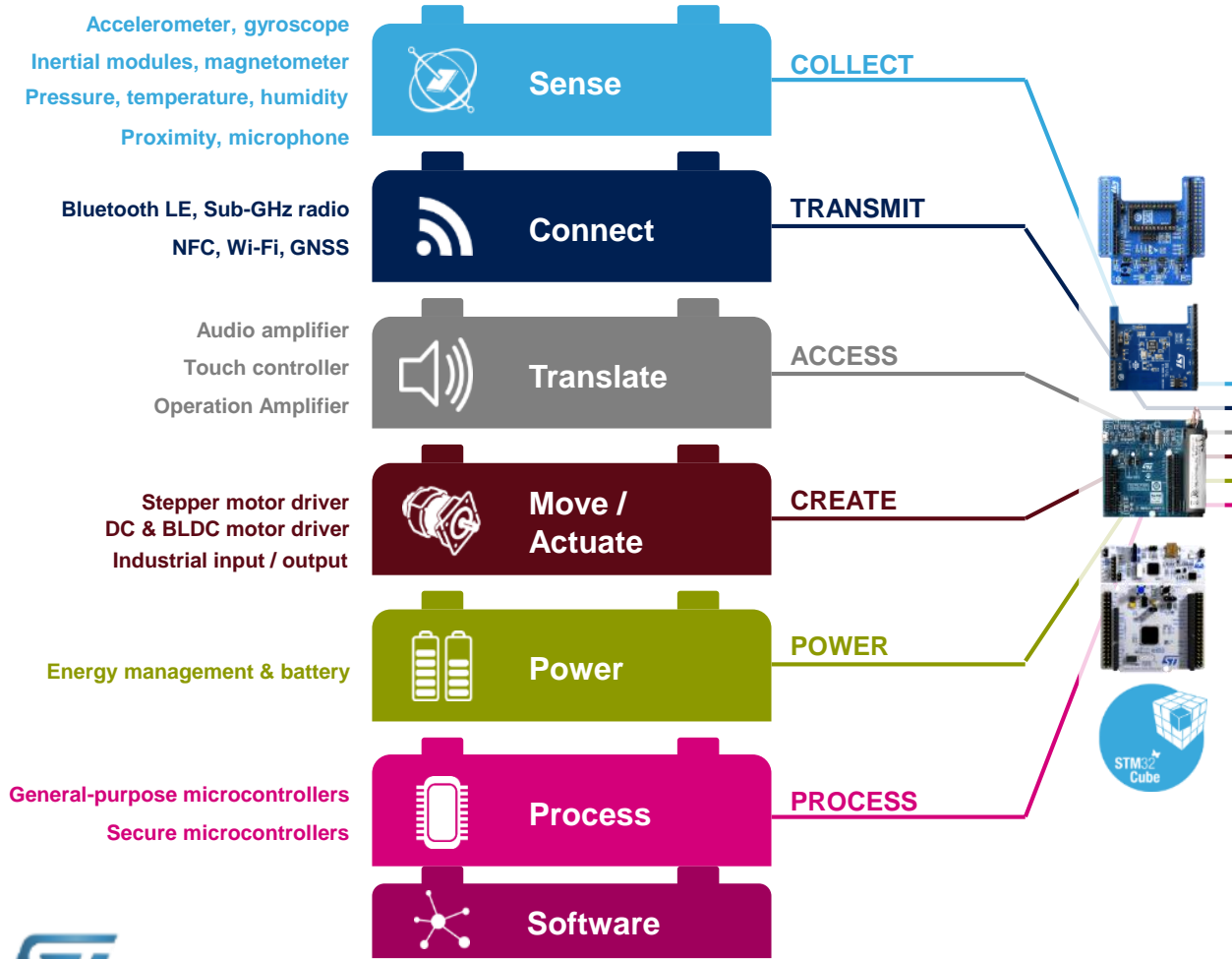
STM32 Open Development Environment

Building block approach

The building blocks

Your need

Our answer



www.st.com/stm32code