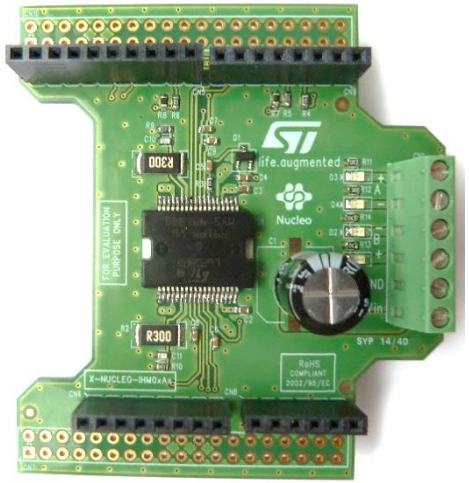
Quick start guide

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



Version 1.0 (August 14, 2015)

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Overview

1 Introduction to the STM32 Open Development Environment

2 STM32 Nucleo bipolar stepper motor driver expansion board
- Hardware overview
- Software overview

3 Documents & related resources

4 Setup & demo examples

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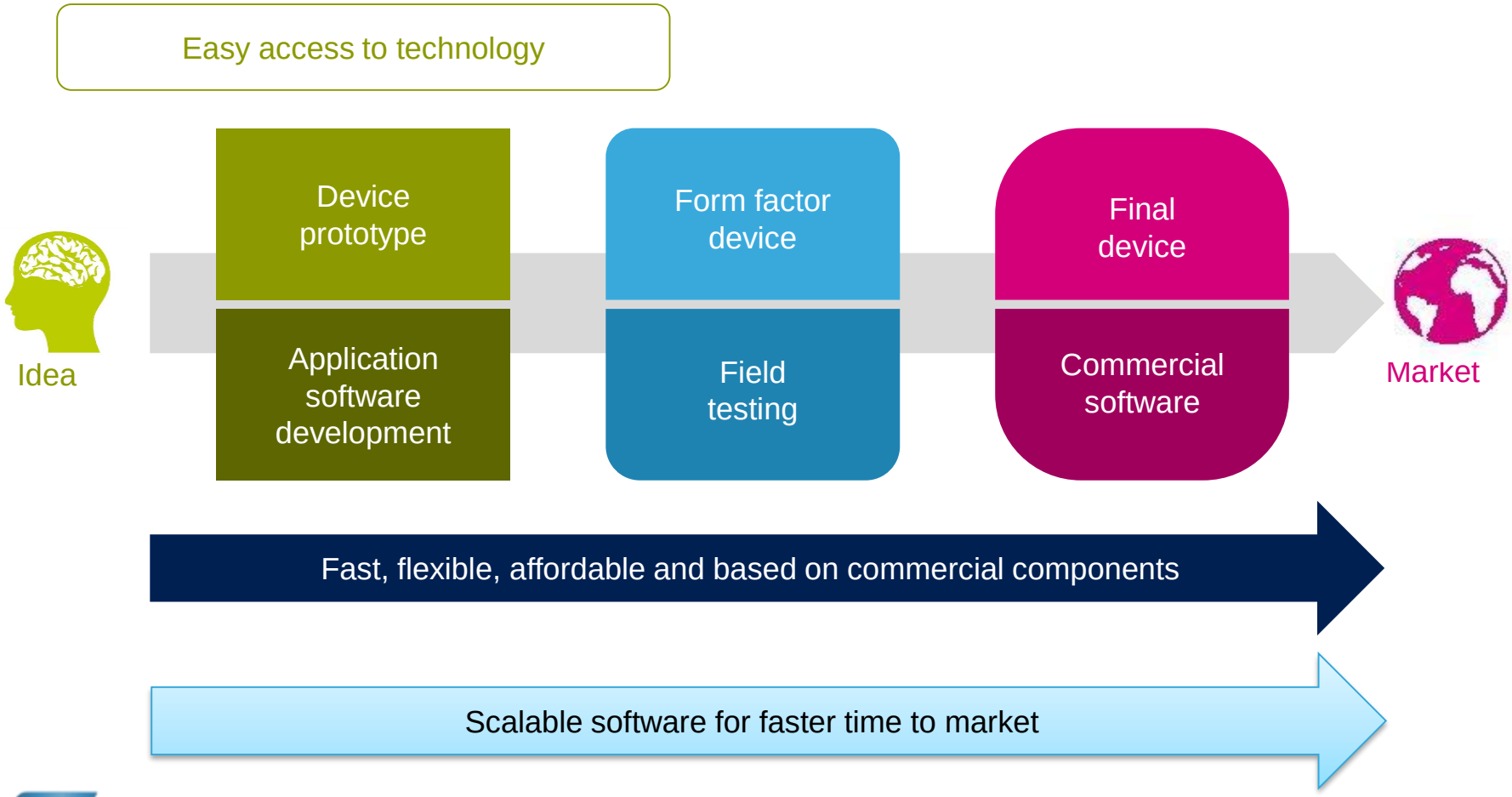
STM32 Open Development Environment

Lowering the barriers for “developers”



STM32 Open Development Environment

The STM32 Open Development Environment consists of a set of **modular developer boards** and a **software environment** designed around the **STM32 microcontroller** family

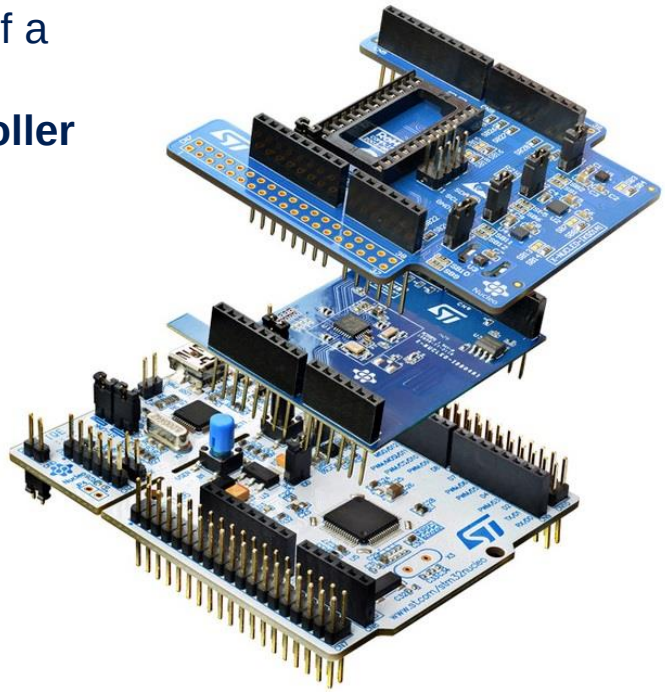
STM32 Nucleo development boards

STM32Cube development software

STM32 Nucleo expansion boards

STM32Cube expansion software

Compatibility with multiple development environments



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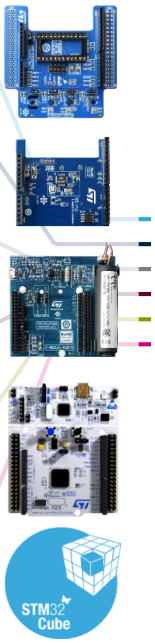
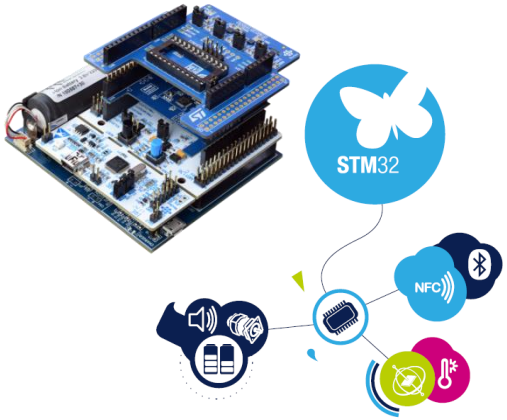
STM32 Open Development Environment

Building block approach

The building blocks		Your need	Our answer
Accelerometer, gyroscope Inertial modules, magnetometer Pressure, temperature, humidity, UV Proximity, microphone	Sense	COLLECT	
Bluetooth LE, Sub-GHz radio NFC, Wi-Fi, GNSS	Connect	TRANSMIT	
Audio amplifier Touch controller Operation Amplifier	Translate	ACCESS	
Bipolar stepper motor driver DC & BLDC motor driver	Move / Actuate	CREATE	
Energy management & battery	Power	POWER	
General-purpose microcontrollers Secure microcontrollers	Process	PROCESS	
	Software		



STM32 Open
Development Environment



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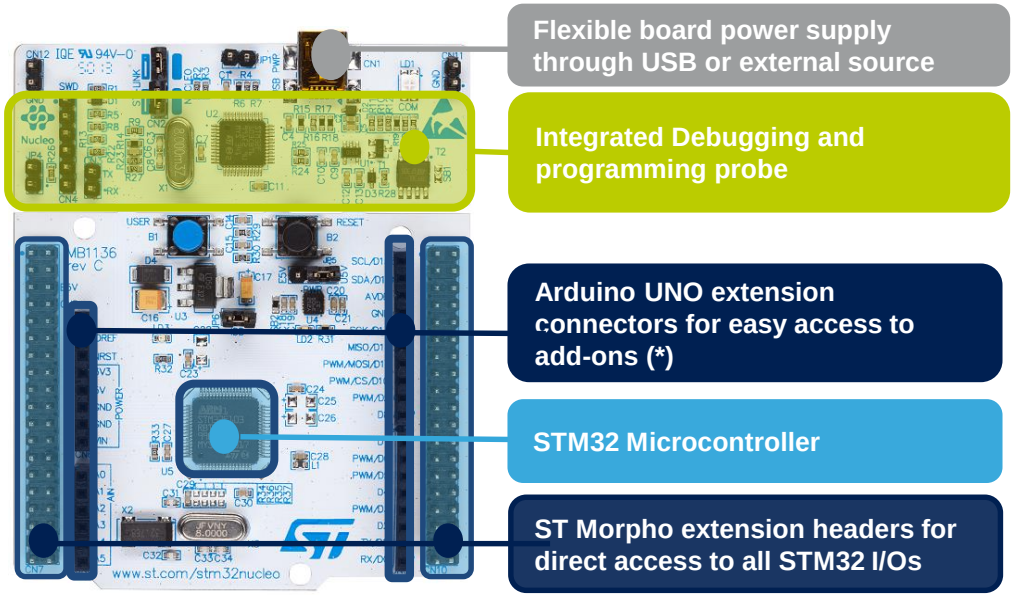
STM32 Nucleo Development Board

- Based on ST's 32-bit ARM® Cortex®-M STM32 microprocessors
  - Development board with 1 MCU and hardware to program/debug
- Two connectors for companion chip boards
- For all STM32 families



STM32 L0 | STM32 L1 | STM32 F0 | STM32 F1 | STM32 F2 | STM32 F3 | STM32 F4 | STM32 F7

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

(*) Thanks to its electrical compatibility, it can be used as a shield for Arduino UNO R3 or similar.

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Bipolar stepper motor driver expansion board

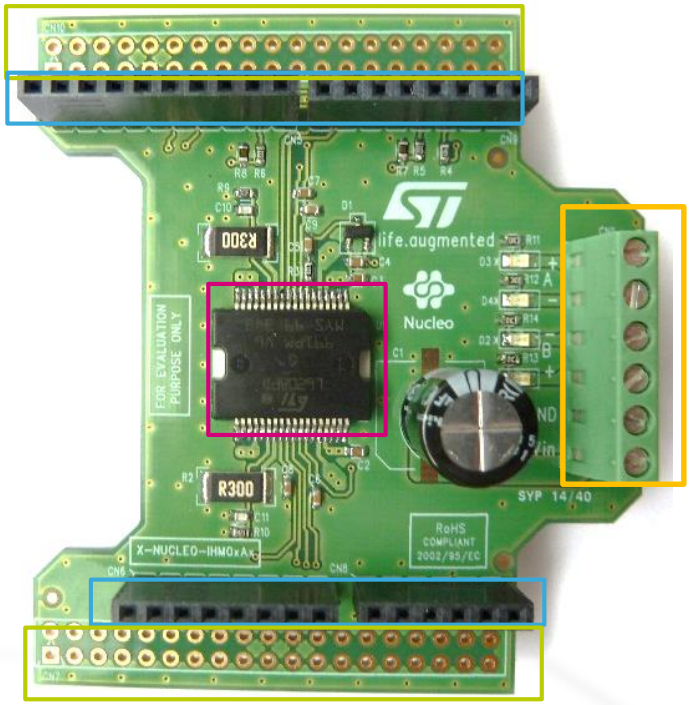
Hardware overview

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



L6208PD
Arduino UNO R3 connector
Supply and motor connector
ST Morpho connector**

Order code: X-NUCLEO-IHM05A1

Latest info available at
X-NUCLEO-IHM05A1

(*) Not mounted

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Bipolar stepper motor driver expansion board

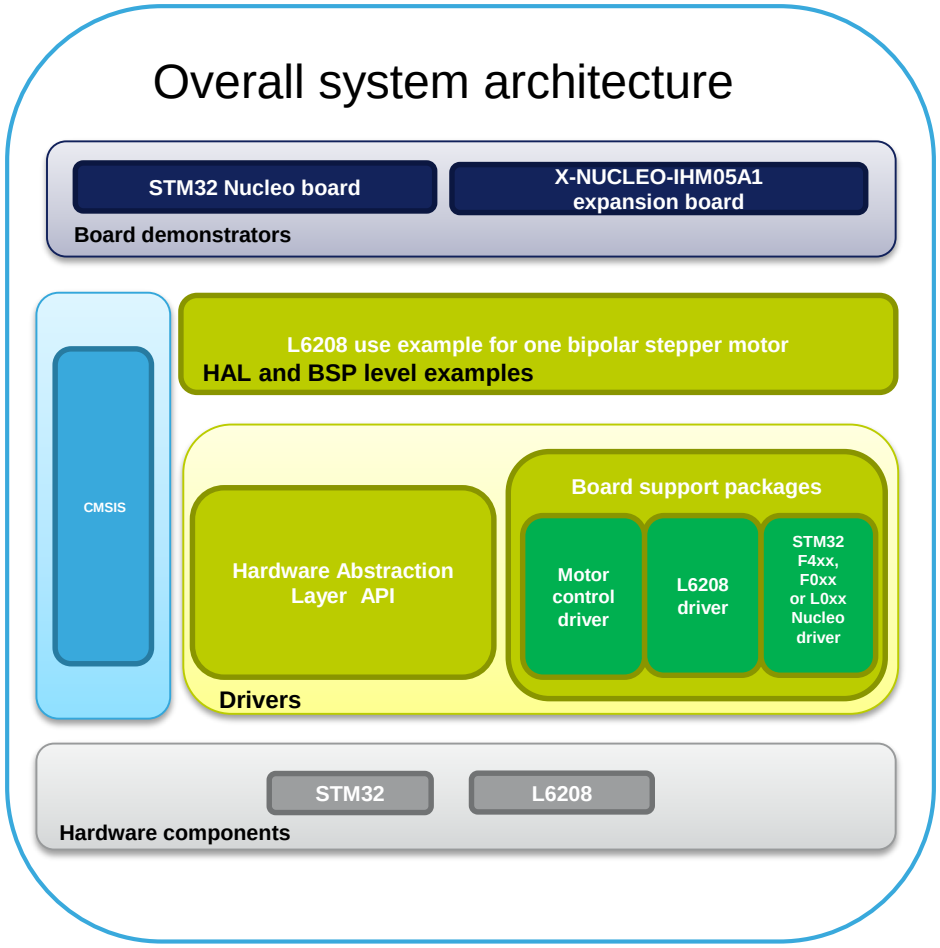
Software overview

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.



Latest software available at **X-CUBE-SPN5**

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Documents & related design resources

All documents are available in the Design Resources tab of the Bipolar stepper motor driver expansion board webpage

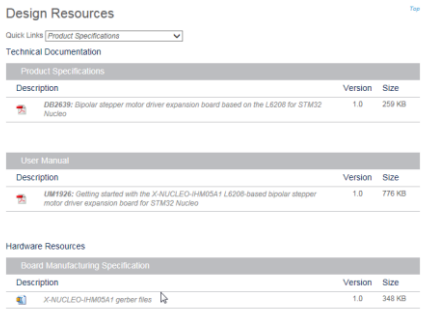
X-NUCLEO-IHM05A1: Product webpage (Link)

- Gerber files, BOM, and schematics
- **DB2639:** Bipolar stepper motor driver expansion board based on the L6208 for STM32 Nucleo – **Data brief**
- **UM1926:** Getting started with the X-NUCLEO-IHM05A1 bipolar stepper motor driver expansion board based on L6208 for STM32 Nucleo – **User manual**

X-CUBE-SPN5: Product webpage (Link)

- **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



X-NUCLEO-IHM05A1
Product webpage
Design Resources tab

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Hardware prerequisites

- STM32 Nucleo board
  (NUCLEO-F401RE, NUCLEO-F030R8 or NUCLEO-L053R8)
- One X-NUCLEO-IHM05A1 expansion board
- One bipolar stepper motor
- An external DC power supply with two electric cables (*)
- An USB cable type A to mini-B

(*) Power stage supply voltage from 8 V to 50 V

Software prerequisites

- A windows PC with one of the supported development toolchains:
  - KEIL: MDK-ARM
  - IAR: EWARM
  - GCC-based IDEs (Atollic TrueStudio…)
- The X-CUBE-SPN5 firmware library (Link)
- ST-LINK/V2-1 USB driver (Link)
- ST-LINK/V2-1 firmware upgrade (Link)

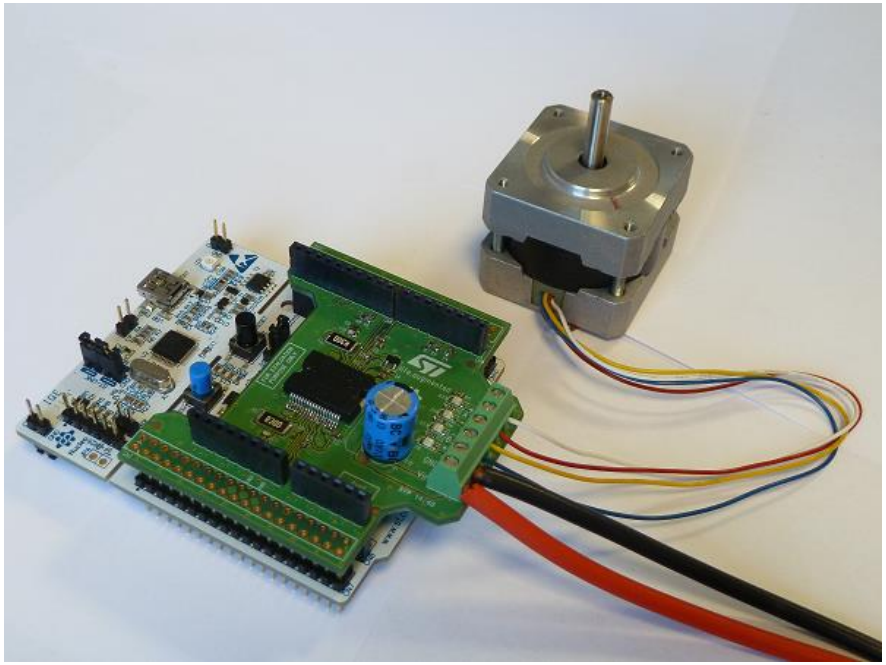
Start coding in just a few minutes with X-CUBE-SPN5

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

1. When using a Nucleo STM32F030, pin 4 of CN5 connector must be shorted to pin 4 of CN9 connector through the R19 resistor.

2. Stack the X-NUCLEO-IHM05A1 on the STM32 Nucleo board through the Arduino UNO R3 connector and connect the 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.



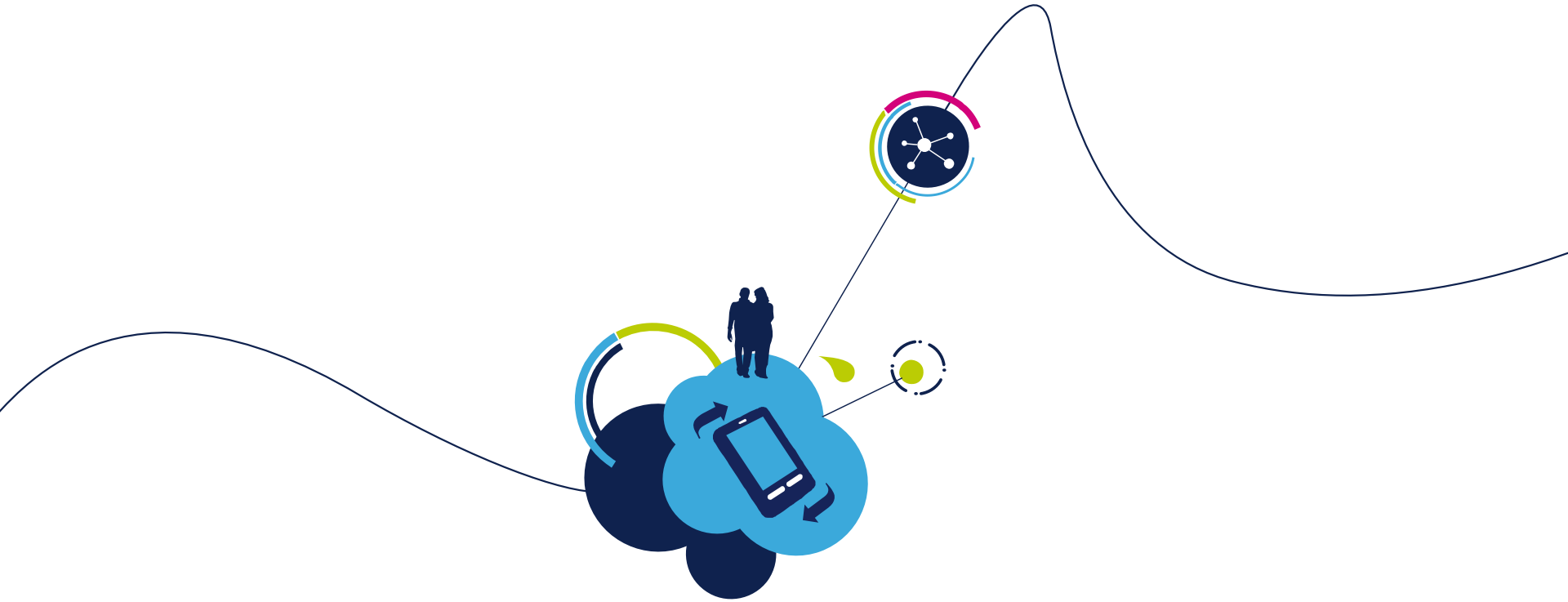
Start coding in just a few minutes with X-CUBE-SPN5

4. Depending on the STM32 Nucleo board, from the examples folder (**\stm32_cube\Projects\Multi\Examples\MotionControl\IHM03A1_ExampleFor1Motor**) open the software project from:
   - **\YourToolChainName\STM32F401RE-Nucleo** for Nucleo **STM32F401RE**
   - **\YourToolChainName\STM32F030R8-Nucleo** for Nucleo **STM32F030R8**
   - **\YourToolChainName\STM32L053R8-Nucleo** for Nucleo **STM32L053R8**

5. Open the file: **stm32_cube\Drivers\BSP\Components\L6208\L6208_target_config.h.** and modify the parameters according your target configuration.

6. Build the project and download it into the STM32 memory.

7. Run the example. The motor automatically starts. (See main.c file for the detailed demo sequence.)



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