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STMicroelectronics X-NUCLEO-LED12A1 LED Driver Expansion Board Based on LED1202 Device User Guide
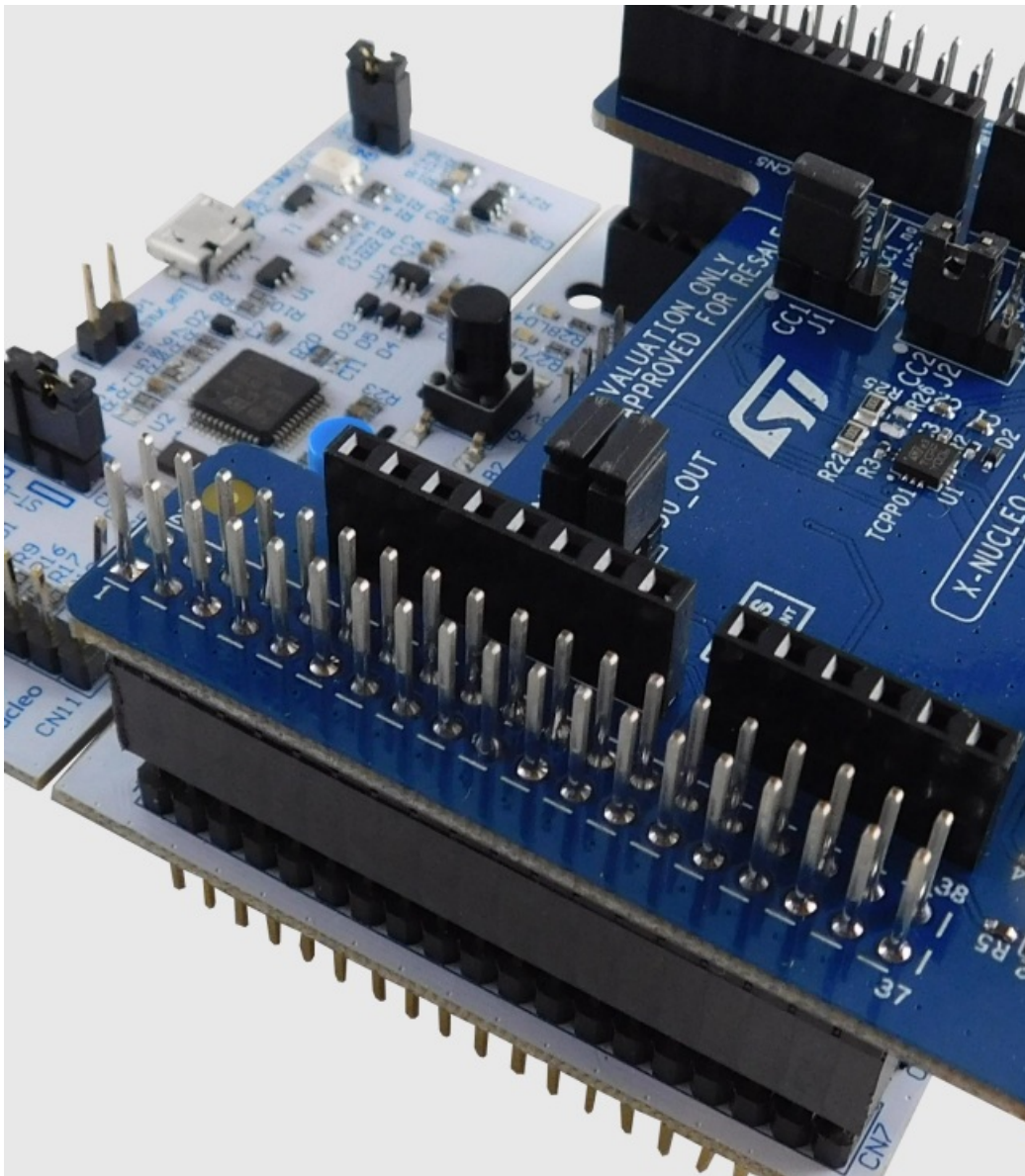
Contents

STMicroelectronics X-NUCLEO-LED12A1 LED Driver Expansion Board Based on LED1202 Device User Guide

Hardware Overview

X-NUCLEO-LED12A1 expansion board Hardware overview

Hardware Description

- The X-NUCLEO-LED12A1 is an STM32 Nucleo expansion board designed to provide an application for the 12 channels LED driver LED1202. It contains 4 LED1202, for a total of 48 LEDs driven independently. Two external connectors allow the customer to attach an external LED panel, up to 48 LEDs, and an external power supply for more current demand. The X-NUCLEO-LED12A1 is controlled using a single I2C bus. An additional IO pin is used for IRQ detection coming from the LED1202 IRQ line.
- Depending upon the end application, RGB or single color LEDs can be connected to the board. Separate brightness control is possible for each channel.
- It is compatible with the STM32 Nucleo development board family and with the Arduino UNO R3 connector layout.

Main Features:

- 4 LED1202 onboard that drive up to 48 LEDs channels
- The board is controlled using a single I2C bus
- External power connector to supply up to the max current demand
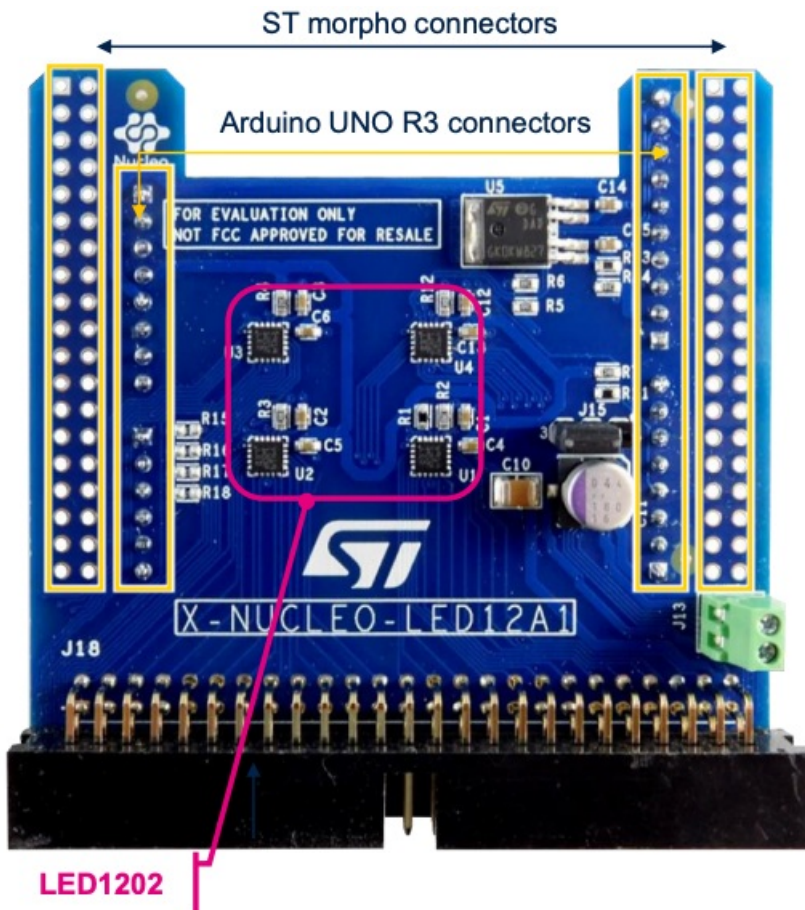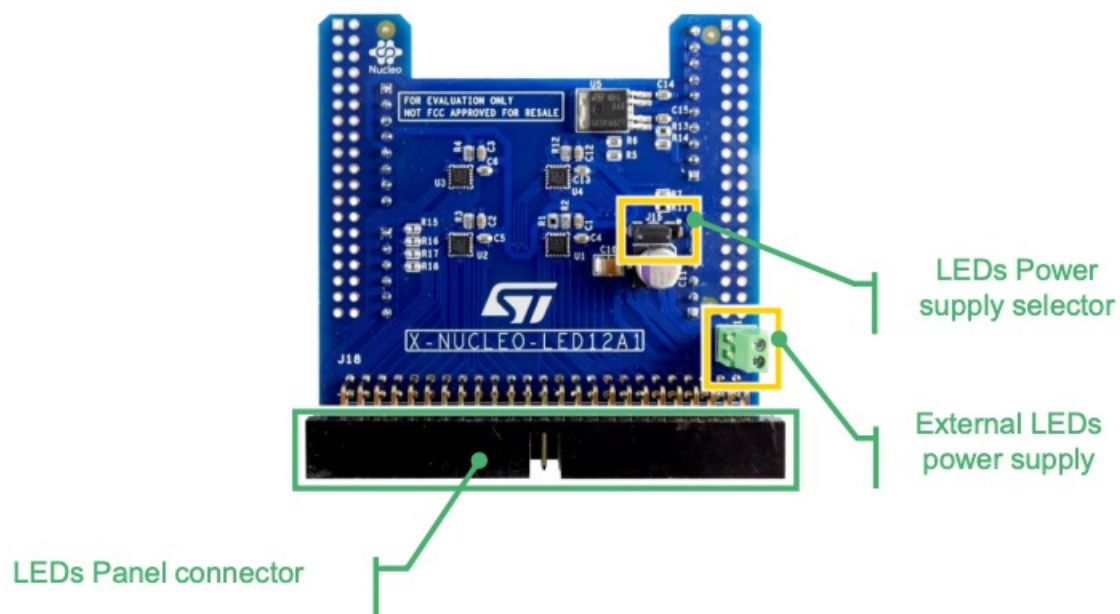
Key Products on the Nucleo expansion board:
LED1202
12-channel low quiescent current LED driver

Latest info available at **www.st.com**
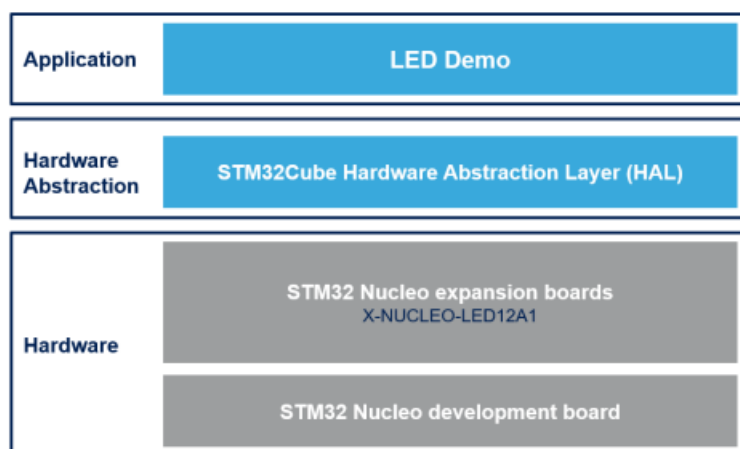**X-NUCLEO-LED12A1**

Top view

LEDs Power supply selector

External LEDs power supply

LEDs Panel connector

Bottom view

X-CUBE-LED12A1 software package SW architecture overview

Application	LED Demo
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-LED12A1
	STM32 Nucleo development board

Software Description:

The X-CUBE-LED12A1 expansion software package for STM32Cube runs on the STM32 and includes drivers that recognize the LED Driver IC LED1202. The X-CUBE-LED12A1 is built on STM32Cube software technology

to ease portability across different STM32 microcontrollers. It is compatible with NUCLEO-L073RZ, NUCLEO-L476RG or NUCLEO-F401RE STM32 Nucleo development boards.

Key Features:

- Sample application to run some light effect in StandAlone mode
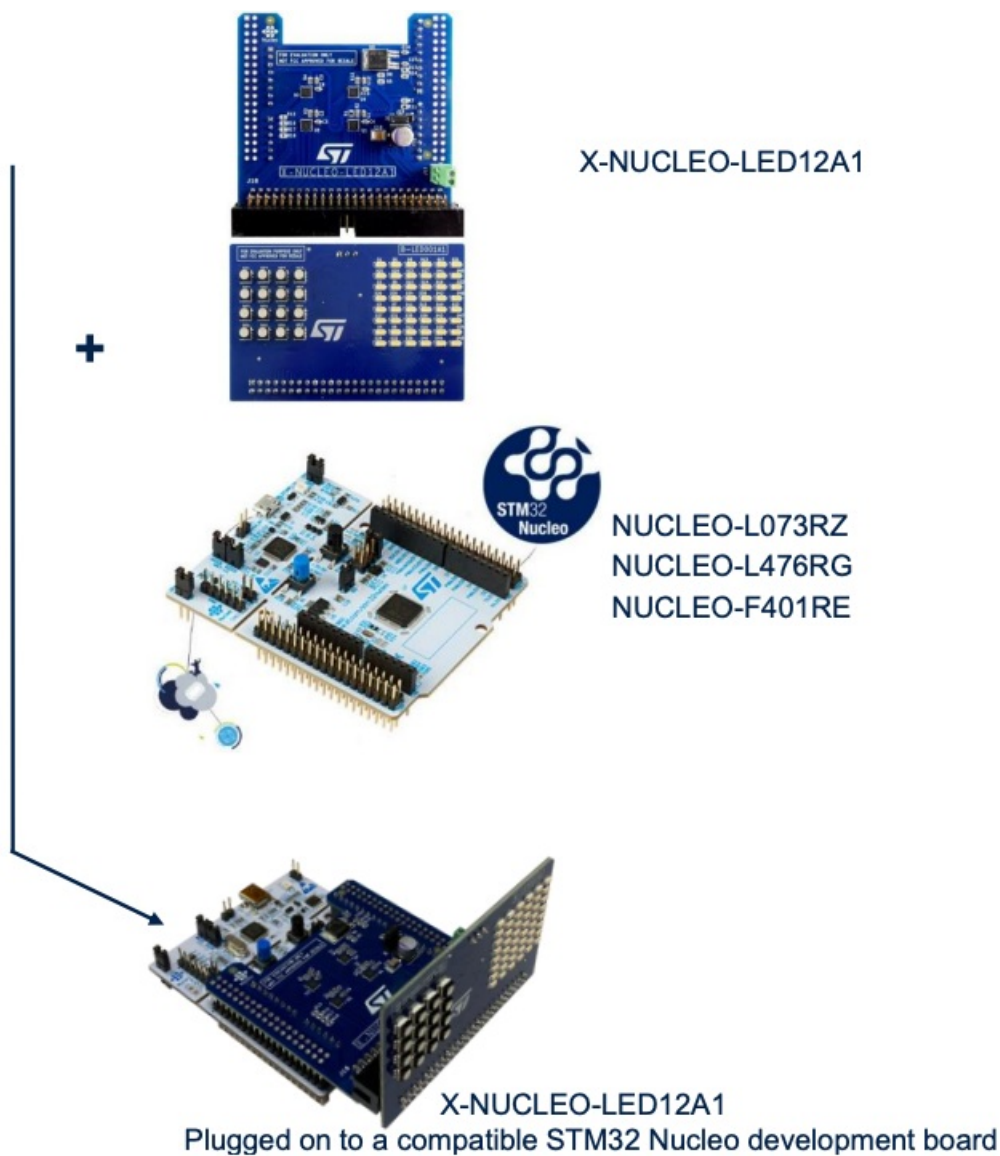- Sample application to interact with the STSW-LED1202GUI PC Software

Latest info available at **www.st.com**
X-CUBE-LED12A1

Setup & Demo Examples

Demo Example: Bill Of Material

HW pre-requisites

Plugged on to a compatible STM32 Nucleo development board

- 1x LED driver expansion board

  (**X-NUCLEO-LED12A1**)
- 1x STM32 Nucleo development board

(**NUCLEO-L073RZ or NUCLEO-L476RG or NUCLEO-F401RE**)

- 1x USB type A to mini-B cable
- 1x Laptop/PC with Windows 7, 8 or above

A to mini-B
USB Cable

Hardware setup

Jumpers' configuration

LEDs power configuration setting jumper J15

	J15
Powered by J13 connector	
Powered by Nucleo	

More details on pin configurations, power modes and capabilities are contained in the *UM2879*

Demo Example: software tools

SW pre-requisites

- **STM32CubeIDE**: All-in-one multi-OS software tool for programming STM32 products or
  STSW-LINK009: ST-LINK/V2-1 USB driver
- **X-CUBE-**LED12A1 : software package including the application examples for NUCLEO-L073RZ, NUCLEO-L476RG, NUCLEO-F401RE to be associated with the X-NUCLEO-LED12A1

**Demo Examples for different operating modes**

- X-NUCLEO-LED12A1 comes with 2 demo FW binaries, contained in the package X-CUBE-LED12A1
    - LED12A1_xx
    - LED12A1_xx_GUI
- Once the Nucleo board is plugged into the PC, an USB_STORAGE like device is detected.
- The FW binary can be programmed into the Nucleo board just by doing a drag&drop operation
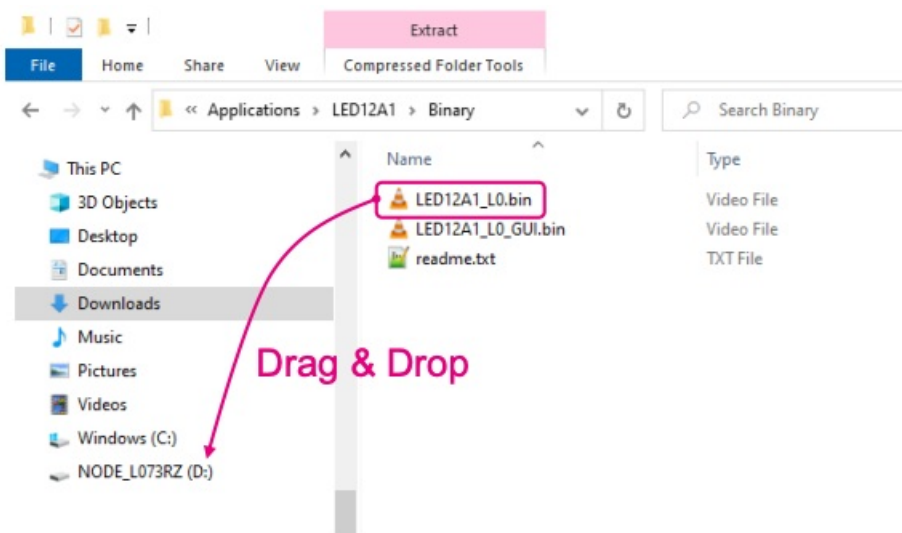
Interact with the STSW-LED1202GUI

- The Firmware LED12A1_L0/F0/F4_GUI allows the interaction of the X-NUCLEO-LED12A1 with a SW application running on PC.
- The SW app (STSW-LED1202GUI) is contained in the Utilities folder, inside the X-CUBE-LED12A1 package.
- For the usage of the STSW-LED1202GUI, please refer to the document at the webpage **https://www.st.com/en/embedded-software/stsw-led1202gui.html**
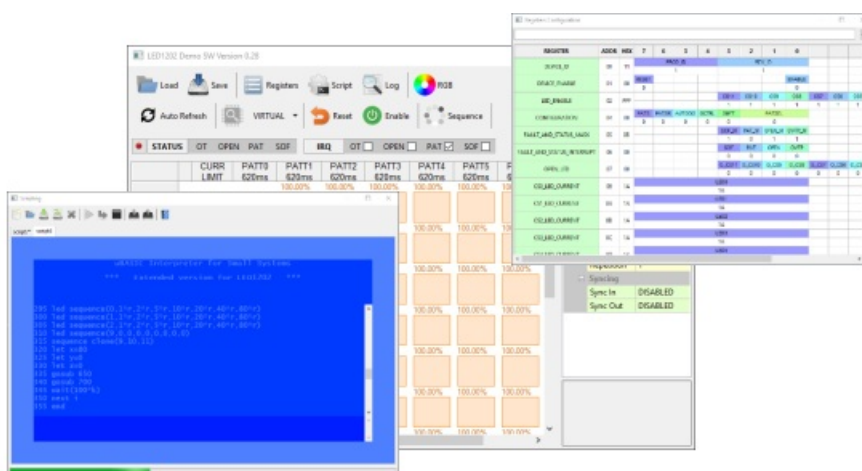
Documents & Related Resources

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

X-NUCLEO-LED12A1:

- **DB4498**: LED driver expansion board based on LED1202 device for STM32 Nucleo
- **UM2879**: Getting started with the X-NUCLEO-LED12A1 LED driver expansion board based on LED1202 and STM32 Nucleo
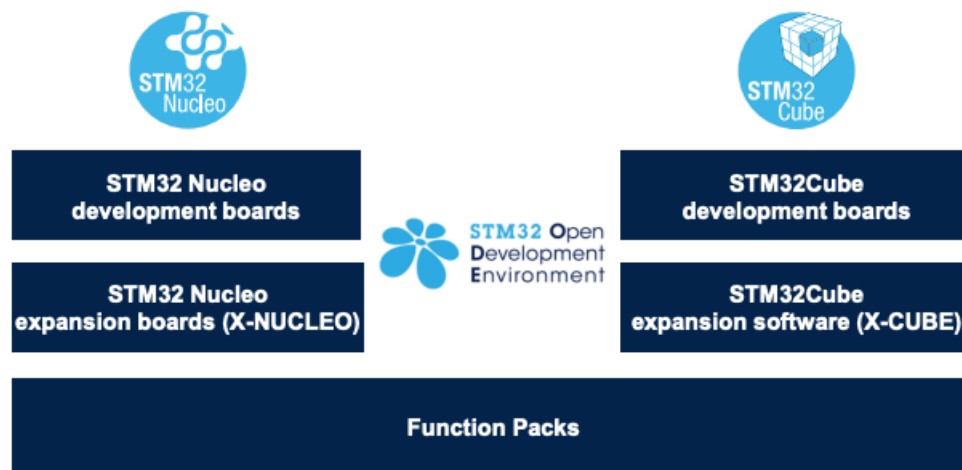- Schematics, Gerber files, BOM

X-CUBE-LED12A1:

- **DB4572**: LED driver software expansion for STM32Cube
- **UM2941**: Getting started with X-CUBE-LED12A1 LED driver software expansion for STM32Cube

Consult **www.st.com** for the complete list

STM32 Open Development Environment: Overview

STM32 ODE Ecosystem

FAST, AFFORDABLE PROTOTYPING AND DEVELOPMENT

The **STM32 Open Development Environment** (ODE) is an **open**, **flexible**, **easy** and **affordable** way to develop innovative devices and applications based on the STM32 32-bit microcontroller family combined with other state-of-the-art ST components connected via expansion boards. It enables fast prototyping with leading-edge components that can quickly be transformed into final designs.

The STM32 ODE includes the following five elements:

- **STM32 Nucleo development boards**. A comprehensive range of affordable development boards for all STM32 microcontroller series, with unlimited unified expansion capability, and with integrated debugger/programmer
- **STM32 Nucleo expansion boards**. Boards with additional functionality to add sensing, control, connectivity, power, audio or other functions as needed. The expansion boards are plugged on top of the STM32 Nucleo development boards. More complex functionalities can be achieved by stacking additional expansion boards
- **STM32Cube software**. A set of free-of-charge tools and embedded software bricks to enable fast and easy development on the STM32, including a Hardware Abstraction Layer, middleware and the STM32CubeMX PC-based configurator and code generator
- **STM32Cube expansion software**. Expansion software provided free of charge for use with STM32 Nucleo expansion boards, and compatible with the STM32Cube software framework
- **STM32Cube Function Packs**. Set of function examples for some of the most common application cases built by leveraging the modularity and interoperability of STM32 Nucleo development boards and expansions, with STM32Cube software and expansions.

The STM32 Open Development Environment is compatible with a number of IDEs including IAR EWARM, Keil

MDK, mbed and GCC-based environments.

STM32 Open Development Environment: all that you need
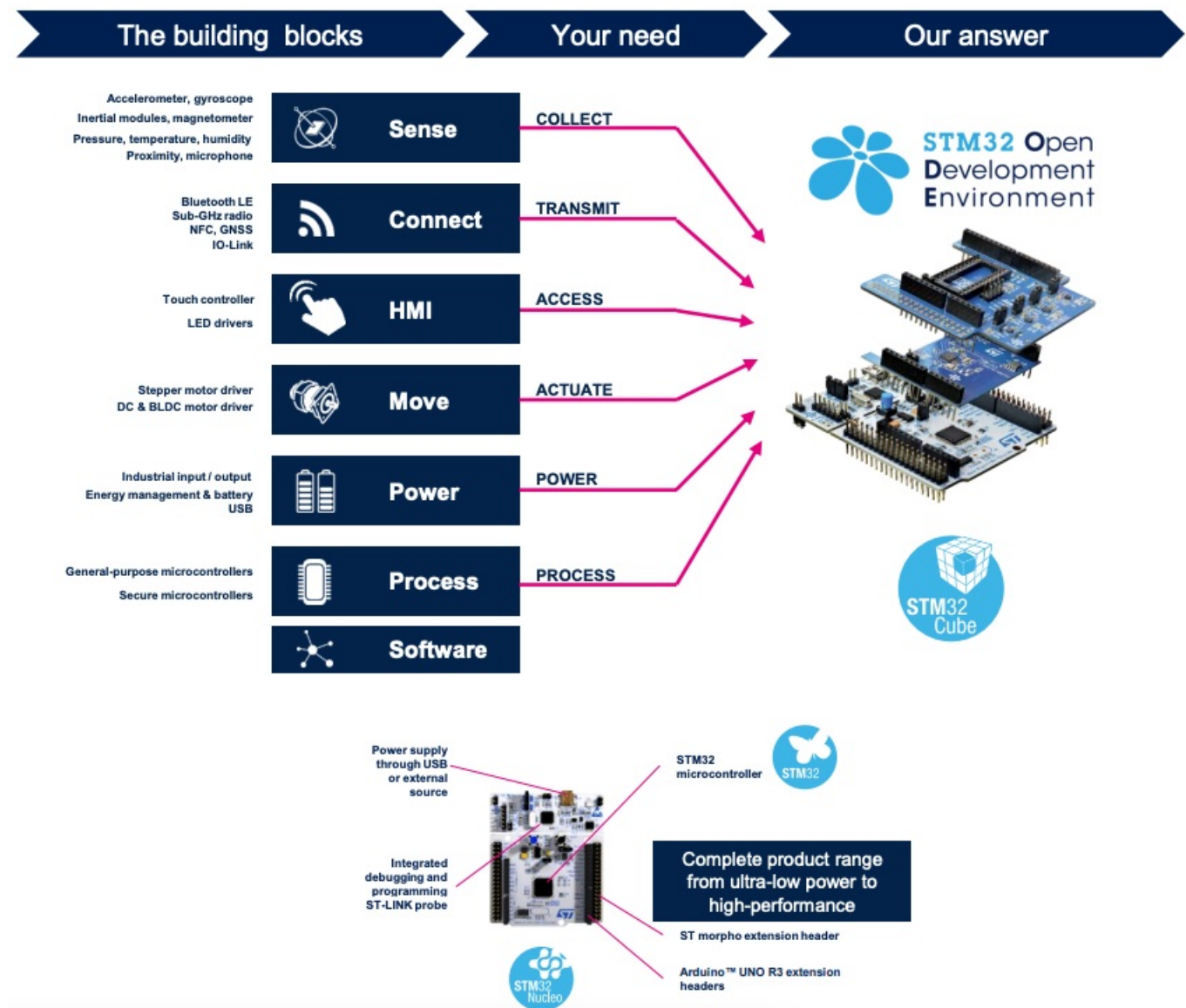
The combination of a broad range of expandable boards based on leading-edge commercial products and modular software, from driver to application level, enables fast prototyping of ideas that can be smoothly transformed into final designs.

To start your design:

- Choose the appropriate STM32 Nucleo development board (MCU) and expansion (X-NUCLEO) boards (sensors, connectivity, audio, motor control etc.) for the functionality you need
- Select your development environment (IAR EWARM, Keil MDK, and GCC-based IDEs) and use the free STM32Cube tools and software.
- Download all the necessary software to run the functionality on the selected STM32 Nucleo expansion boards.
- Compile your design and upload it to the STM32 Nucleo development board.
- Then start developing and testing your application.

Software developed on the STM32 Open Development Environment prototyping hardware can be directly used in an advanced prototyping board or in and end product design using the same commercial ST components, or

components from the same family as those found on the STM32 Nucleo boards.

Documents / Resources

	STMicroelectronics X-NUCLEO-LED12A1 LED Driver Expansion Board Based on LED1202 Device [pdf] User Guide
	X-NUCLEO-LED12A1, LED Driver Expansion Board Based on LED1202 Device, X-NUCLEO-LED12A1 LED Driver Expansion Board Based on LED1202 Device, Driver Expansion Board Based on LED1202 Device, Expansion Board Based on LED1202 Device, Board Based on LED1202 Device, Based on LED1202 Device, LED1202 Device

References

- STMicroelectronics: Our technology starts with you
- STM32 Open Development Environment - STMicroelectronics
- STM32CubeProg - STM32CubeProgrammer software for all STM32 - STMicroelectronics
- STSW-LINK009 - ST-LINK, ST-LINK/V2, ST-LINK/V2-1, STLINK-V3 USB driver signed for Windows7, Windows8, Windows10 - STMicroelectronics
- X-NUCLEO-USBPDM1 - USB Type-C™ Power Delivery SINK expansion board based on TCPP01-M12 for STM32 Nucleo - STMicroelectronics
- STM32 Nucleo Expansion Boards - STMicroelectronics
- STM32 Nucleo Development Boards (supports Arduino) - STMicroelectronics
- STM32 ODE Function Packs - STMicroelectronics
- STM32Cube Expansion Software - STMicroelectronics
- STM32Cube Development Software - STM32 Open Development Environment - STMicroelectronics
- STSW-LED1202GUI - GUI for LED1202 LED driver evaluation boards - STMicroelectronics

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