

Sensor software expansion for STM32Cube

Applications & demonstrations	X-CUBE-ISPU application	
Middleware	Place for future libraries	
Hardware Abstraction	Hardware Abstraction Layer API	Board Support Package
Hardware	MEMS sensors	STM32F4/L4 series
	X-NUCLEO-IKS01A3 X-NUCLEO-IKS02A1	



Features

- Templates and examples for ISPU sensors software development
- Sample algorithms to show the functionality of ISPU sensors
- Complete software to build applications using the following sensors:
 - ISPU sensors: [ISM330IS](#) and [LSM6DSO16IS](#) via a DIL24 interface
 - temperature and humidity sensor: [HTS221](#) for [X-NUCLEO-IKS01A3](#)
 - pressure sensor: [LPS22HH](#) for [X-NUCLEO-IKS01A3](#)
 - temperature sensor: [STTS751](#) for [X-NUCLEO-IKS01A3](#)
 - motion sensors: [LIS2MDL](#) for [X-NUCLEO-IKS01A3](#) and [IIS2MDC](#) for [X-NUCLEO-IKS02A1](#)
- Sample application to transmit real-time sensor data to a PC
- Compatible with the [Unicleo-GUI](#) graphical user interface to configure the devices and display sensor data
- Sample implementation available on the [X-NUCLEO-IKS01A3/X-NUCLEO-IKS02A1](#) boards connected to a [NUCLEO-F401RE/NUCLEO-L476RG](#) development board
- Package compatible with [STM32CubeMX](#), can be downloaded from and installed directly into [STM32CubeMX](#)
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Free, user-friendly license terms

Description

The [X-CUBE-ISPU](#) expansion software package for [STM32Cube](#) runs on the STM32. It includes drivers that recognize the sensors and collect temperature, humidity, pressure, motion, and ISPU data.

The expansion is built on [STM32Cube](#) software technology to ease portability across different STM32 microcontrollers. The software comes with a sample implementation of the drivers running on the [X-NUCLEO-IKS01A3/X-NUCLEO-IKS02A1](#) expansion boards connected to a featured [STM32 Nucleo](#) development board.

The software is also available on GitHub, where the users can signal bugs and propose new ideas through [\[Issues\]](#) and [\[Pull requests\]](#) tabs.

The software provides sample applications for communication with the PC [Unicleo-GUI](#) graphical user interface.

The software also provides template and example code for the ISPU, and binary libraries with sample code for integration in the ISPU.

Product summary	
Sensor software expansion for STM32Cube	X-CUBE-ISPU
Motion MEMS and environmental sensor expansion board for STM32 Nucleo	X-NUCLEO-IKS01A3/X-NUCLEO-IKS02A1
STM32 Nucleo-64 development board with STM32F401RE/STM32L476RG MCU	NUCLEO-F401RE/NUCLEO-L476RG
Applications	Industrial Sensors

1 Detailed description

1.1 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- [STM32CubeMX](#) configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- [STM32CubeIDE](#) integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- [STM32CubeProgrammer](#) programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools ([STM32CubeMonRF](#), [STM32CubeMonUCPD](#), [STM32CubeMonPwr](#)) to help developers customize their applications in real-time
- [STM32Cube MCU and MPU packages](#) specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- [STM32Cube expansion packages](#) for application-oriented solutions.

1.2 How does this software complement STM32Cube?

This software is based on the STM32CubeHAL hardware abstraction layer for the STM32 microcontroller.

The package extends [STM32Cube](#) by providing a board support package (BSP) for the sensor expansion board. The drivers abstract the hardware low-level details and allow the applications to access sensor data in a hardware-independent manner.

The package includes several sample applications that the developer can use to start experimenting with the code. A sample application has been developed to enable sensor data logging on a PC. A Windows PC utility ([Unicleo-GUI](#)) is available on www.st.com to allow the developer to choose among the various sensors available on the expansion board and set the appropriate delay/interval among consecutive data points.

Sensor data can be logged to a file selected by the user.

The package is compatible with [STM32CubeMX](#). It can be downloaded from and installed directly into [STM32CubeMX](#), as detailed in UM1718 (freely available on www.st.com).

1.3 How does this software enable development for the ISPU?

This package includes templates and ready-to-use examples to run on the ISPU. These can be used either as they are to start using the ISPU right away or as a starting point to develop new and custom solutions.

A set of sample algorithms is also provided in the form of binary libraries with sample code for the integration in the ISPU.

The package also includes a README file that provides all the necessary instructions to set up the development environment on the user PC.

Revision history

Table 1. Document revision history

Date	Revision	Changes
01-Aug-2022	1	Initial release.

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