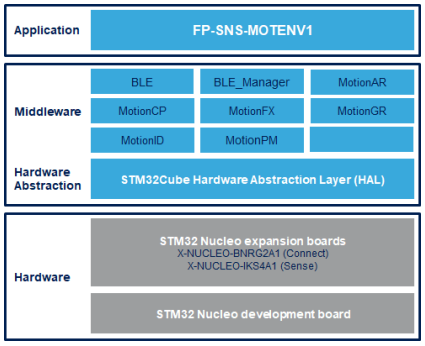
FP-SNS-MOTENV1

Data brief

STM32Cube function pack for IoT node with BLE connectivity and environmental and motion sensors



STM32 Open Development Environment

Features

- Complete firmware to develop an IoT node with BLE connectivity, environmental and motion sensors
- Middleware libraries for sensor data fusion and accelerometer-based real-time activity recognition, carry position, gesture recognition, motion intensity recognition and pedometer
- Compatible with STBLESensor applications for Android/iOS, to perform sensor data reading, motion algorithm features demo and firmware update (FOTA)
- Sample implementations available for the X-NUCLEO-IKS4A1 and X-NUCLEO-BNRG2A1 connected to a NUCLEO-U575ZI-Q or NUCLEO-F401RE or NUCLEO-L476RG or NUCLEO-L053R8 board
- Compatible with STM32CubeMX, can be downloaded from st.com and installed directly into STM32CubeMX
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

Product summary	
STM32Cube function pack for IoT node with BLE connectivity and environmental and motion sensors	FP-SNS-MOTENV1
Motion MEMS and environmental sensor expansion board	X-NUCLEO-IKS4A1
Bluetooth low energy expansion board based on the BlueNRG-M2SP module for STM32 Nucleo	X-NUCLEO-BNRG2A1
Applications	Heating Control/ Livestock Position and Health Monitoring/BLE Connected Nodes/Bluetooth Low Energy/ Environmental Sensing/Motion Sensing

Description

FP-SNS-MOTENV1 is an STM32Cube function pack, which lets you connect your IoT node to a smartphone via BLE and uses a suitable Android™ or iOS™ application, such as the STBLESensor app, to view real-time motion and environmental (such as temperature and relative humidity) sensor data.

This package also enables advanced functions such as the sensor data fusion and accelerometer-based real-time activity recognition, carry position, gesture recognition, motion intensity recognition, and real-time information about the number of steps and cadence which the user just performed with the device, that is, a cell phone.

Together with the suggested combination of STM32 and ST devices, it can be used to develop specific wearable and environmental applications, or smart things applications in general.

The software runs on the STM32 microcontroller and includes all the necessary drivers to recognize the devices on the STM32 Nucleo development board and expansion boards.

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

1 Detailed description

1.1 What can you do with STM32Cube function packs?

STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards together with STM32Cube and X-CUBE software to create function examples for some of the most common use cases of different application technologies.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible to best satisfy the requirements of final user applications.

Moreover, function packs may include additional libraries and frameworks that are not present in the original X-CUBE packages, thus enabling new functionalities allowing real and usable system for developers.

1.2 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.

1.2.1 How does this software complement STM32Cube?

This software is based on the STM32CubeHAL. It extends STM32Cube by providing a board support package (BSP) for the BlueNRG-2 network processor (embedded in the BlueNRG-M2SP module), sensor expansion board and middleware components for communication with other BLE devices and for sensor data fusion.

This package also contains motion sensor libraries useful for sensing applications based on BLE communication: MotionFX, MotionAR, MotionCP, MotionGR, MotionID, MotionPM.

Related links

Visit the X-CUBE-MEMS1 web page on www.st.com for further information on the motion sensor libraries

Revision history

Table 1. **Document revision history**

Date	Version	Changes
17-Feb-2016	1	Initial release.
13-Apr-2016	2	Updated cover page Features Added NUCLEO-L053R8 compatibility information
22-Jul-2016	3	Added STEVAL-STLKT01V1 compatibility information Added FOTA information Added reference to Gas Gauge for STEVAL-STLCS01V1
14-Dec-2016	4	Updated title, cover image, cover page Features and Description Added X-NUCLEO-IKS01A2 compatibility information
02-Mar-2017	5	Updated cover page Features and Description, and How does this software complement STM32Cube?
20-Jul-2017	6	Updated cover image, features, description and logo in cover page.
27-Oct-2017	7	Updated cover image, features, description and How does this software complement STM32Cube?
08-Mar-2018	8	Updated cover image. Added P-NUCLEO-IKA02A1 compatibility information.
04-Dec-2019	9	Updated cover page image, product summary table, features and description. Updated Section 1.2 What is STM32Cube?. Added X-NUCLEO-IKS01A3 expansion board compatibility information.
10-Jun-2020	10	Added X-NUCLEO-IDB05A2 compatibility information.
11-Nov-2021	11	Added X-NUCLEO-BNRG2A1 compatibility information. Removed references to P-NUCLEO-IKA02A1 and X-NUCLEO-IDB05A2.
13-Mar-2023	12	Added reference to GitHub.
08-Jun-2023	13	Updated features. Added reference to STM32CubeMX.
19-Mar-2024	14	Updated cover image, Featuers and product summary table.
01-Oct-2025	15	Updated Cover image, Featuers and Product summary.

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