

STM32Cube function pack for IoT tracker node with Sigfox™ connectivity, Bluetooth connectivity and sensors

Application	FP-ATR-SIGFOX1
Middleware	Sigfox Library GNSS Library Bluetooth Library
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-S2868A1 (Connect) X-NUCLEO-IKS01A2 (Sense) X-NUCLEO-S2868A2 (Connect) X-NUCLEO-IKS01A3 (Sense) X-NUCLEO-S2915A1 (Connect) X-NUCLEO-GNSS1A1 (Sense) X-NUCLEO-IDB05A1 (Connect)
	STM32 Nucleo development board



Features

- Complete firmware to connect an IoT node to a Sigfox network, sending environmental sensor and GNSS positioning data
- Drivers for the **S2-LP** high performance ultra-low power RF transceiver
- Wake-up, tilt and orientation detection by the on-board accelerometer
- Middleware library supporting Sigfox connectivity from the **X-CUBE-SFXS2LP1** software package and Bluetooth connectivity from the **X-CUBE-BLE1** software package
- GNSS geolocation and low-energy device geolocation service provided by the Sigfox infrastructure
- Compatible with ST Asset Tracking client application supporting firmware setting via Bluetooth connectivity
- Sample implementation available for **X-NUCLEO-S2868A1** or **X-NUCLEO-S2868A2** and **X-NUCLEO-S2915A1**, **X-NUCLEO-IDB05A1**, **X-NUCLEO-IKS01A2** or **X-NUCLEO-IKS01A3** and **X-NUCLEO-GNSS1A1** expansion boards connected to **NUCLEO-L073RZ** and **NUCLEO-L476RG** development boards
- Easy portability across different MCU families, thanks to **STM32Cube**
- Free, user-friendly license terms

Description

FP-ATR-SIGFOX1 is an **STM32Cube** function pack which lets you read data from environmental and GNSS sensors and send collected data via Sigfox connectivity.

Message sending is triggered via user button, timer event, threshold crossing events on environmental values or movement detection by the on-board accelerometer.

Thresholds can be set using the ST Asset Tracking app and transmitted to the firmware by Bluetooth connectivity.

The package implements low power profiles and related transitions to ensure long battery autonomy.

This software, together with the suggested combination of STM32 and ST devices, is intended particularly to develop asset tracking applications. In addition to GNSS geolocation, low-energy device geolocation is provided by the Sigfox infrastructure.

The software runs on the STM32 microcontroller and includes drivers for the **S2-LP** ultra-low power RF transceiver, the Bluetooth Low Energy module, the motion, environmental and GNSS sensors.

Product summary	
STM32Cube function pack for IoT tracker node with Sigfox™ connectivity and sensors	FP-ATR-SIGFOX1
Sub-1 GHz 868/915 MHz RF expansion board based on S2-LP radio for STM32 Nucleo	X-NUCLEO-S2868A1/X-NUCLEO-S2868A2/X-NUCLEO-S2915A1
Bluetooth low energy expansion board based on SPBTLE-RF module for STM32 Nucleo	X-NUCLEO-IDB05A1
Motion MEMS and environmental sensor expansion board	X-NUCLEO-IKS01A2/X-NUCLEO-IKS01A3
Ultra-low power, high performance, sub-1GHz transceiver	S2-LP
STM32Nucleo-64 development board with STM32L073RZ/STM32L476RG MCU	NUCLEO-L073RZ/NUCLEO-L476RG

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

1.3 How does this function pack complement STM32Cube?

This software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. It extends [STM32Cube](#) by providing a board support package (BSP) for the Sigfox and Bluetooth communication, the environmental and motion MEMS sensor expansion board.

The drivers abstract low-level details of the hardware and allow the middleware components and applications to leverage Sigfox communication and to access sensor data in a hardware-independent manner.

Revision history

Table 1. Document revision history

Date	Version	Changes
24-Oct-2018	1	Initial release.
14-May-2019	2	Updated cover page image, features and description.
18-Jul-2019	3	Added X-NUCLEO-IKS01A3 expansion board compatibility information.
07-Feb-2020	4	Updated cover page image, features, description and product summary table. Added X-NUCLEO-GNSS1A1, X-NUCLEO-S2868A2 and X-NUCLEO-S2915A1 expansion board compatibility information.

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