

Bluetooth low energy software expansion for STM32Cube

Application	Applications
Middleware	BLE Low Power Manager
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-IDB05A1 (Connect)
	STM32 Nucleo development board

Features

- Complete middleware to build Bluetooth low energy applications using [BlueNRG-MS](#) device
- Easy portability across different MCU families, thanks to STM32Cube
- Numerous examples to aid understanding:
 - Support for Standard Profiles (Peripheral and Central)
 - Support for Apple Notification Center Service (ANCS)
- Package compatible with [STM32CubeMX](#), can be downloaded from and installed directly into STM32CubeMX
- Free, user-friendly license terms



Description

The [X-CUBE-BLE1](#) expansion software package for STM32Cube runs on the STM32 and includes drivers for [BlueNRG-MS](#) Bluetooth low energy device.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers.

The software comes with sample implementations of the drivers running on the [X-NUCLEO-IDB05A1](#), when connected to a [NUCLEO-L053R8](#), [NUCLEO-L476RG](#), [NUCLEO-F401RE](#) or [NUCLEO-F411RE](#) board.

Product summary	
Bluetooth low energy software expansion for STM32Cube	X-CUBE-BLE1
Bluetooth low energy expansion board based on SPBTLE-RF module for STM32 Nucleo	X-NUCLEO-IDB05A1
Bluetooth low energy network processor supporting Bluetooth 4.2 core specification	BLUENRG-MS
STM32 Nucleo-64 development board with STM32F401RE/ STM32F411RE/ STM32L053R8/ STM32L476RG MCU	NUCLEO-F401RE/ NUCLEO-F411RE/ NUCLEO-L053R8/ NUCLEO-L476RG

1 Detailed description

1.1 What is STM32Cube?

STM32Cube™ is an STMicroelectronics initiative that helps you reduce development effort, time and cost. STM32Cube covers the STM32 portfolio.

STM32Cube version 1.x includes:

- STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.
- A comprehensive embedded software platform specific to each series (such as the STM32CubeF4 for the STM32F4 series), which includes:
 - the STM32Cube HAL embedded abstraction-layer software, ensuring maximized portability across the STM32 portfolio
 - a consistent set of middleware components such as RTOS, USB, TCP/IP and graphics
 - all embedded software utilities with a full set of examples

1.2 How does this software complement STM32Cube?

The proposed software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends [STM32Cube](#) by providing a board support package (BSP) for the [BlueNRG-MS](#) expansion board and some middleware components for communication with other Bluetooth LE devices.

BlueNRG-MS is a very low power Bluetooth low energy (BLE) single-mode network processor, compliant with Bluetooth specifications core 4.0/4.1.

The drivers abstract low-level details of the hardware and allow the middleware components and applications to access the BlueNRG-MS device in a hardware-independent fashion.

The software implements low power optimizations to allow system power consumption of a few micro-amps.

The package includes different sample applications and provides support for many standard profiles and for Apple Notification Center Service (ANCS).

Slave profiles (peripheral role):

- Alert Notification Service
- Blood Pressure Service
- Find Me Target
- Glucose Service
- Health Thermometer Service
- Heart Rate Service
- Human Interface Device Service (not supported by [NUCLEO-L053R8](#))
- Proximity Reporter
- Time Server

Master profiles (central role):

- Alert Notification Client
- Blood Pressure Collector
- Find Me Locator
- Glucose Collector
- Health Thermometer Collector
- Heart Rate Collector
- Time Client

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).

Revision history

Table 1. Document revision history

Date	Rev	Changes
19-Nov-2014	1	First release.
26-Jan-2015	2	Modified the document title, Features and Description on the cover page. Added the Detailed description section.
30-Jun-2015	3	Updated overall system architecture on the cover page.
16-Nov-2015	4	Updated cover page image and description.
26-Jan-2017	5	Updated cover page Features and Detailed description.
14-Feb-2017	6	Updated Detailed description .
20-Dec-2018	7	Updated cover page image, features and description. Added product summary table on the cover page. Updated Section 1.2 How does this software complement STM32Cube? .

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