

Bluetooth low energy software expansion for STM32Cube

Application	Applications
Middleware	BLE
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-BNRG2A1 (Connect)
	STM32 Nucleo development board



Features

- Complete middleware to build Bluetooth® low energy applications using BlueNRG-2 and BlueNRG-2N devices
- Easy portability across different MCU families, thanks to STM32Cube
- Numerous examples to aid comprehension of Bluetooth connectivity applications
- Package compatible with STM32CubeMX, can be downloaded from and installed directly into STM32CubeMX
- Free, user-friendly license terms

Description

The X-CUBE-BLE2 expansion software package for STM32Cube runs on the STM32 and includes drivers for BlueNRG-2 and BlueNRG-2N Bluetooth® low energy devices.

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-BNRG2A1 when connected to a NUCLEO-L476RG board.

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

Product summary	
Bluetooth® low energy software expansion for STM32Cube	X-CUBE-BLE2
Bluetooth Low Energy expansion board based on the BLUENRG-M2SP module for STM32 Nucleo	X-NUCLEO-BNRG2A1
Bluetooth® Low Energy wireless system-on-chip	BlueNRG-2
Bluetooth® low energy network processor	BlueNRG-2N
STM32 Nucleo-64 development board with STM32L476RG MCU	NUCLEO-L476RG
Applications	Connectivity Mobility services Sensing Smart farming Virtual - Augmented Reality

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 **BlueNRG-M2SP** module expansion board and some middleware components for communication with other Bluetooth LE devices.

BlueNRG-2 is a very low power Bluetooth low energy (BLE) single-mode wireless processor, while **BlueNRG-2N** is a BLE network processor, and both are compliant with Bluetooth specifications core 5.0.

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

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

The package includes different sample applications and 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	Revision	Changes
12-Dec-2019	1	First release.
09-Jul-2020	2	Added references to BlueNRG-2N device.
17-Apr-2023	3	Added reference to GitHub.

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