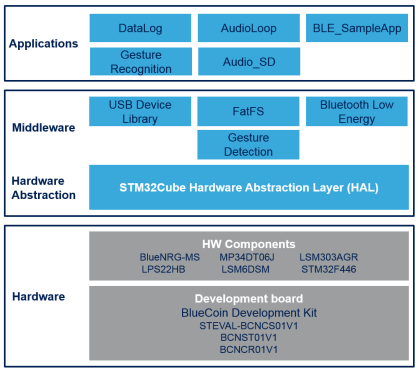
STSW-BCNKT01

Data brief

Embedded software samples for BlueCoin: data streaming via USB and BLE, logging on SD card, gesture recognition, audio acquisition via USB and on SD card, and playback



Features

- Complete firmware suite to build applications on BlueCoin development kit using:
  - STM32F446 high-performance microcontroller
  - motion sensors
  - microphone array
  - pressure sensor
  - temperature sensor
  - proximity sensors
- Based on STM32Cube, the consistent and complete embedded software for STM32 that maximizes portability between all STM32 series and frees the user from dependency issues
- An Audio_SD application which allows saving the audio captured by the on-board microphone on SD card as a common .wav file
- A DataLog application which allows the real-time transmission of all sensor data to a PC via serial port or to save/log sensor data to file on an SD card
- An AudioLoop application which sends audio signals acquired by the microphones to USB (Audio IN Class) and to an on-board DAC via I²S interface
- A Gesture Recognition application to configure Time-of-Flight ranging sensors and gesture detection middleware.
- A BLE_SampleApp which provides an example of Bluetooth low energy configuration
- A third party FAT file system middleware for small embedded systems
- Freely available in source code from www.st.com

Product summary	
Embedded software samples for BlueCoin	STSW-BCNKT01
BlueCoin Starter kit	STEVAL-BCNKT01V1
BLE network processor supporting Bluetooth 4.2 core specification	BlueNRG-MS
e-Compass with 3D digital linear acceleration sensor and 3D digital magnetic sensor	LSM303AGR
Ultra-compact piezoresistive absolute pressure sensor, 260-1260 hPa, digital output barometer, full-mold, holed LGA package (HLGA)	LPS22HB
iNEMO 6DoF inertial measurement unit	LSM6DSM

Description

The STSW-BCNKT01 firmware package for BlueCoin Starter kit provides sample projects for the development of custom applications.

Built on STM32Cube software technology, it includes all the low level drivers to manage the on-board devices and system-level interfaces.

The package comes with the Audio_SD, DataLog, AudioLoop, BLE_SampleApp and Gesture Recognition applications.

The Audio_SD application allows saving the audio captured by the on-board microphones on SD card as a common .wav file.

The DataLog application features sensor raw data streaming via USB (Virtual COM Port class) and sensor data storage on SD card.

The BLE_SampleApp provides a sample Bluetooth low energy configuration that enables BlueCoin to stream environmental sensor data; it is compatible with the STBLESensor app available for Android and iOS.

The Gesture Recognition application exploits the Time-of-Flight ranging sensors to detect the distance of a target object, and some simple gestures such as directional swipe and tap.

1 Detailed description

1.1 What is STM32Cube?

STMCube™ 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

1.1.1 How does this software complement STM32Cube?

The proposed 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 BlueCoin Kit boards (STEVAL-BCNKT01V1).

Interaction with all the on-board sensors is guaranteed through the abstract low-level drivers that allow developers to communicate with them in a hardware-independent fashion. The package includes a data logger application you can use to start experimenting with the code. This application provides a tool for acquiring data from different kinds of sensors. The varying nature of the acquired data represents an opportunity to implement a wide variety of algorithms.

The USB device audio class in the middleware provides standard multichannel USB microphone device recognition. Any freeware or commercial audio recording software may be used to record and save the audio stream.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
14-Jun-2017	1	Initial release.
05-Mar-2019	2	Updated all content to reflect firmware V2.0.0 release.

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