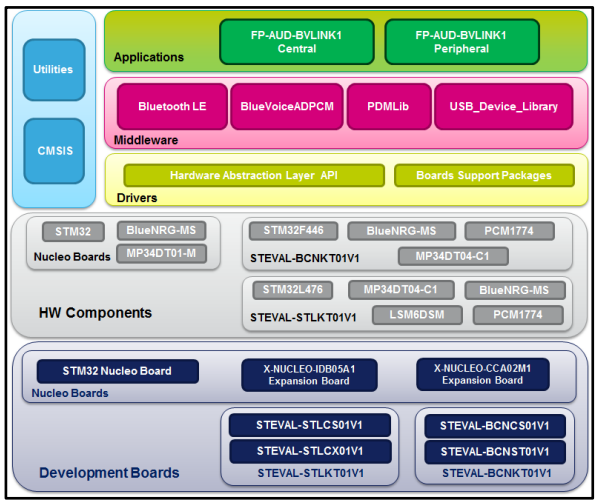
FP-AUD-BVLINK1

STM32 ODE function pack for half-duplex voice streaming over Bluetooth low energy

Data brief



Features

- BlueVoiceADPCM, half-duplex voice-over-Bluetooth low energy communication profile
- Very low power Bluetooth low energy single-mode network processor, compliant with Bluetooth specification 4.1
- Complete middleware to build applications using digital MEMS microphones (MP34DT01-M or MP34DT04-C1)
- Digital audio signal acquisition and processing
- Audio input class USB driver to allow a device to be recognized as a standard USB microphone
- Easy portability across different MCU families thanks to STM32Cube
- Free, user-friendly license terms
- Sample implementation available for board X-NUCLEO-IDB05A1 plus X-NUCLEO-CCA02M1 connected to a NUCLEO-F401RE, NUCLEO-L476RG or NUCLEO-L053R8 board
- Sample implementation available for SensorTile (STEVAL-STLKT01V1) and BlueCoin (STEVAL-BCNKT01V1)
- Compatibility with ST BlueMS app (v3.0.0 or higher), available for Android™ and iOS™

Description

FP-AUD-BVLINK1 is an STM32 ODE function pack that performs voice streaming over Bluetooth low energy in a half-duplex configuration. The application runs on the STM32 Nucleo and includes drivers and middleware for Bluetooth low energy (BlueNRG-MS) and MP34DT01-M or MP34DT04-C1 digital MEMS microphones.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers. The software comes with sample implementations of the drivers for X-NUCLEO-IDB05A1 plus X-NUCLEO-CCA02M1, when connected to a NUCLEO-F401RE, NUCLEO-L476RG or NUCLEO-L053R8 board.

FP-AUD-BVLINK1 is also compatible with SensorTile (STEVAL-STLKT01V1) and BlueCoin (STEVAL-BCNKT01V1).

STM32 Open Development Environment

What can you do with STM32 ODE Function Packs?

The STM32 ODE Function Packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards, and STM32Cube and X-CUBE software, to create function examples, embodying some of the most common use cases, for each application area.

These software Function Packs are designed to exploit as much as possible the underlying STM32 ODE hardware and software components to best fit the requirements of final users' applications.

Moreover, Function Packs may include additional libraries and frameworks not present the original X-CUBE packages, thus enabling new functionalities and creating a real and usable system for developers.

What is STM32Cube?

STMCube™ is designed by STMicroelectronics to reduce development effort, time and cost across the entire 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

How does this STM32 ODE function pack 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 BlueNRG-MS, MP34DT01-M MEMS microphone expansion boards, SensorTile and BlueCoin; middleware components for audio acquisition, communication with other Bluetooth LE devices, USB streaming of recorded signals and a dedicated profile for half-duplex speech transmission over BLE (BlueVoiceADPCM library).

The BlueVoiceADPCM profile defines a BLE service including one characteristic for audio transmission and one for synchronization. In a half-duplex system, both sides of the communication (central and peripheral) can act as servers of information. Periodic notifications containing compressed audio data are sent from one server to one client depending on the selected channel: central to peripheral or peripheral to central. BlueVoiceADPCM middleware is responsible for audio encoding and periodic data transmission on the server side and for decoding of received voice data on the client side.

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

The drivers abstract low-level hardware details and allow the middleware components and applications to access the devices in a hardware-independent fashion. The software implements low power optimizations to allow system power consumption of just a few microamperes.

The package includes a sample application that developers can use to start experimenting with the code. It enables acquisition, compression and transmission over Bluetooth low energy of voice data from the module acting as the transmitter to the one acting as the

receiver. The receiver is responsible for audio decompression and USB streaming of audio data to a PC. Any freeware or commercial audio recording software can be used to interface with the system.

The Peripheral module can also stream audio to an Android™ or iOS™ device running the ST BlueMS app v3.0.0 or higher.

Revision history

Table 1: Document revision history

Date	Version	Changes
19-Jun-2017	1	Initial release.

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