### X-CUBE-MEMSMIC1

**Data brief**

**Digital MEMS microphone acquisition and processing software expansion for STM32Cube**

**Features**

- Complete middleware to build applications using MEMS digital microphones (MP34DT06J)
- Easy portability across different MCU families thanks to STM32Cube
- Audio input class USB driver to allow the recognition of the device as a standard USB microphone and enable audio streaming
- PC-based streaming using third-party standard audio editors
- Free, user-friendly license terms
- Microphone acquisition sample implementation available on the X-NUCLEO-CCA02M1 or X-NUCLEO-CCA02M2 expansion board when connected to a P-NUCLEO-WB55, NUCLEO-F401RE, NUCLEO-L476RG or NUCLEO-F746ZG development board
- Advanced processing applications based on ST acoustic libraries for NUCLEO-F401RE, including AcousticBF (real time beamforming) sample and AcousticSL (real time sound source localization) sample

**Description**

X-CUBE-MEMSMIC1 is an expansion software package for STM32Cube. The software runs on the STM32 and includes drivers and middleware for audio data acquisition from MEMS digital microphones (MP34DT06J) and USB streaming of the recorded signals.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers and comes with examples showing X-NUCLEO-CCA02M1 or X-NUCLEO-CCA02M2 capabilities when connected to a P-NUCLEO-WB55, NUCLEO-F401RE, NUCLEO-L476RG or NUCLEO-F746ZG board.

**Product summary**

| Digital MEMS microphones acquisition and processing software expansion for STM32Cube | X-CUBE-MEMSMIC1 |
| MEMS audio sensor omnidirectional stereo digital microphone | MP34DT06J |
| Digital MEMS microphone expansion board based on MP34DT06J for STM32 Nucleo | X-NUCLEO-CCA02M2 |
| Applications | Remote Controls Sound Sensing Speakers |
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?

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 MEMS microphones expansion board and some middleware components for PDM to PCM conversion and USB communication with a PC.

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

The package also includes a sample application that developers can use to start experimenting with the code. The sample application was developed to enable device recognition as a standard multichannel USB microphone and audio streaming on a PC. For this purpose, a Windows PC utility is needed (not included in the package) in order to record and save the audio stream. Any freeware or commercial audio recording software can be used.
## Revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
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<tbody>
<tr>
<td>21-May-2015</td>
<td>1</td>
<td>Initial release.</td>
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</table>
| 27-Jan-2016 | 2       | Updated cover page Features  
Updated cover page Description                                           |
| 29-Jan-2016 | 3       | Updated cover page image                                                |
| 11-Jul-2016 | 4       | Updated cover page Features  
Updated cover page Description                                             |
| 09-May-2017 | 5       | Updated cover page image and features.                                   |
| 18-Apr-2018 | 6       | Updated cover image.  
Removed references to NUCLEO-F072RB and NUCLEO-L053R8 boards.           |
| 02-Dec-2019 | 8       | Updated cover page image and product summary table.  
Updated Section 1.1 What is STM32Cube?.  
Added MP34DT06J microphone and X-NUCLEO-CCA02M2 expansion board compatibility information. |