MCUXSDKMAFMRN

Maestro Audio Framework for MCUXpresso SDK

Rev. 6 — 17 June 2024 **Release notes**

Document information

Information	Content
Keywords	Maestro Audio Framework, Maestro, MCUXSDKMAFMRN
Abstract	This document describes the release contents, features, and limitations of the Maestro Audio Framework for the MCUXpresso.

1 Introduction

This document describes the release contents, features, and limitations of the Maestro Audio Framework 1.7 for the MCUXpresso 2.15.000 release.

Maestro is an audio processing software framework for MCUs that provides audio device connectivity and playback functionality for many diverse media devices.

The framework contains various modules that abstract functionality and provides a standard programming interface for the application developer to use. Maestro provides functionality for common audio use cases and includes configuration options providing the flexibility required for customizing applications. The main supported features are:

- Full audio framework with a streamer that supports playback control and streaming or decoding of audio.
- Decoding of various audio formats supported for audio files stored on FAT32 formatted media.
- Various utilities to aid in debugging and profiling the system.

The platform uses the NXP OS abstraction (OSA) layer which allows it to run on any OS that supports the NXP OSA. Currently, the OSA contains abstraction for FreeRTOS.

The FreeRTOS abstraction is currently supported in Maestro Framework.

2 Development tools

The Maestro audio framework libraries are compiled and tested with the tools supported in the current MCUXpresso SDK.

3 Release contents

Table 1 lists the release contents for the IMXRT1060-EVKC board.

Table 1. Release contents

Deliverable	Location
Maestro libraries	middleware/maestro/libs/…
Header files for API usage	middleware/maestro/inc/… middleware/maestro/streamer/inc/…
Source codes	middleware/maestro/mcu-audio/... middleware/maestro/streamer/...
Documentation	middleware/maestro/docs/…
Demo applications	boards/evkcmimxrt1060/audio_examples/maestro_playback/… boards/evkcmimxrt1/audio_examples/maestro_record/… boards/evkcmimxrt1/audio_examples/maestro_usb_mic/… boards/evkcmimxrt1/audio_examples/maestro_usb_speaker/… boards/evkcmimxrt1/audio_examples/maestro_sync/…

4 Maestro audio framework release overview

The Maestro audio framework together with MCUXpresso SDK forms a framework for the development of audio processing software for NXP devices. The currently supported platform are: IMXRT1060-EVKC, IMXRT1170-EVKB, LPCXpresso55S69, and MCX-N5XX-EVK and RD-RW612-BGA.

- Maestro audio framework libraries for Arm Cortex-M7, ArmCortex-M33.
- Demo applications to show how to use different Maestro features.
- Getting started document showing how to integrate and start using Maestro audio framework.
- API Reference manual with detailed architectural information and APIs.

4.1 Maestro libraries

Maestro libraries are pre-compiled source code libraries that in conjunction, provide all the features described in this document. This framework is divided into multiple libraries to allow adding or removing specific functions to make a customized version of the Maestro audio framework for each application.

4.2 Demo applications

maestro_playback: A shell-based application that allows reading a file (mp3 or ogg opus) from SD card, audio file decode (if enabled, EAP post processing), and playback through line-out (speaker or headphones). It is located at: *<MCUXpressoSDK_install_dir>/boards/<board_name>/audio_examples/maestro_playback*.

maestro_record: A shell-based application that allows audio recording from an on-board microphone. There are three possibilities how to process the audio stream:

- playback through a line-out (headphones or speaker)
- store samples to a file on SD card
- perform VoiceSeeker pre-processing on the following platforms:
  - IMXRT1060-EVKC (with AUD-EXP-42448 addon board)
  - IMXRT1170-EVKB
  - RD-RW612-BGA
- perform voice recognition (VIT - wake word and voice command) - available on following platforms:
  - IMXRT1060-EVKC
  - IMXRT1170-EVKB
  - LPCXpresso55s69
  - MCX-N5XX-EVK
  - RD-RW612-BGA

It is located at: *<MCUXpressoSDK_install_dir>/boards/<board_name>/audio_examples/maestro_record*.

maestro_sync:

The maestro_sync application demonstrates the use of synchronous pipelines (TX and RX in this case) processing on the Arm Cortex core utilizing the Maestro Audio Framework library. This feature is useful for testing the latency of the pipeline or implementing algorithms requiring reference signals (like echo cancellation). The libraries available in this example (VoiceSeeker) are not featuring AEC (acoustic echo cancellation), but NXP is offering it in the premium version of the libraries. For more information, visit www.nxp.com/voiceseeker.

maestro_usb_mic: A shell-based application that allows recording audio data from the microphone and playback to the USB port as an audio 2.0 microphone device. It is located at: *<MCUXpressoSDK_install_dir>/boards/<board_name>/audio_examples/maestro_usb_mic*.

maestro_usb_speaker: A shell-based application that allows playing data from the USB port as an audio 2.0 speaker device. It is located at: *<MCUXpressoSDK_install_dir>/boards/<board_name>/audio_examples/maestro_usb_speaker*.

4.3 Getting started with Maestro

This document shows how to start using the framework. It gives detailed information on how to use the libraries and include files and how to create a first project to use this solution based on the reference demo application.

4.4 API Reference Manual

The Maestro audio framework API Reference Manual is a comprehensive document explaining the framework architecture and provides details of the functionality. It is delivered in form of an HTML page with cross-reference and search engine.

5 Known issues and limitations

This section lists the known issues, limitations, and/or workarounds.

5.1 Net source is not fully supported

Net source is not fully supported and tested. There is a known issue with AAC decoder; it cannot play using the net source.

6 Revision history

This table summarizes revisions to this document.

Table 2. Revision history

Revision Number	Date	Substantive changes
0	22 December 2020	Initial release
1	22 December 2021	Updated for Maestro 1.2
2	30 June 2022	Updated for Maestro 1.3
3	08 December 2022	Updated for Maestro 1.5
4	27 July 2023	Updated for Maestro 1.6
5	10 January 2024	Updated for Maestro 1.7
6	17 June 2024	Updated for MCUXpresso SDK 2.16.000

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