



STM32 audio engine – WMA decoder library

Data brief

Features

- WMA v9.1
- Bit-rates from 5 to 384 kbps
- Sampling rates from 8 to 48 kHz
- PCM (Pulse Code Modulation) output
- Solution optimized for STM32
- WMA decoder with built-in equalizer
- Audio utilities:
 - Channel mixer utility (for volume and mute control)
 - Standalone 5-band parametric equalizer utility
 - Loudness control utility
- Object codes, accessed by the user application through an extensive API in C
- Full documentation included, demo software available
- Demo project available for IAR EWARM, Keil MDK-ARM and Raisonance RIDE

Description

STMicroelectronics STM32 Audio Engine is a set of software libraries allowing customers to build audio applications with high-quality and professional results.

The popular WMA format is part of the formats a professional application should support to ensure the best musical experience.

Therefore, the WMA decoder library is a must. It removes the need for an external WMA decoding component. Moreover, unlike many open-source solutions, it was written specifically for STM32, and is therefore highly optimized, leaving room for other application tasks to run concurrently with the audio decoding.

In addition, it comes with a set of impressive additions such as a channel mixer, a standalone 5-band parametric equalizer and loudness control to provide a complete plug-and-play solution for STM32 customers.

The WMA decoder library is available for all STM32 family members.

1 Functional description

1.1 WMA background

The popular WMA, short for Windows Media Audio, is a format allowing to store digital audio using lossy compression algorithms. It was patented by Microsoft.

1.2 Royalties and part numbers

Some royalties are due to the patent owner on final products. Therefore, customers using the software provided by ST must pay the royalties on each of their products using it. To ensure this is clear for customers, a notice must be signed. Please contact your local ST sales representative.

1.3 Operating principle

The delivered package contains four libraries, one per main feature:

- WMA decoder
- Channel mixer
- Equalizer
- Loudness control

While the WMA decoder is using a “Pull” mechanism, in which the decoding function calls a callback function to retrieve the data, the three other libraries use a “Push” mechanism, thus accepting one input buffer (or several) and generating an output buffer at the time of a call.

Figure 1. WMA decoder flow, in “Pull” mode: callback way

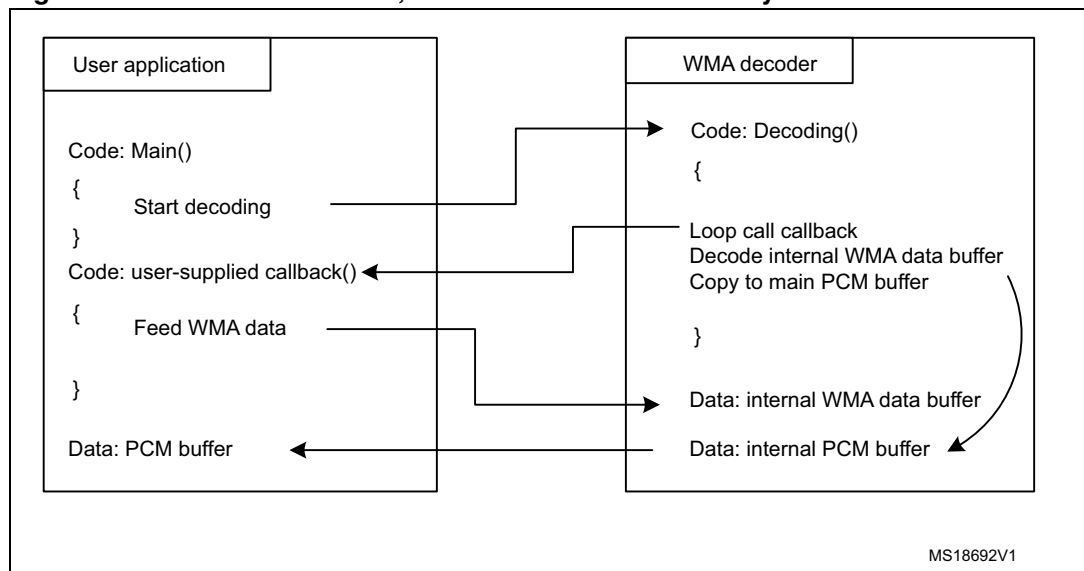
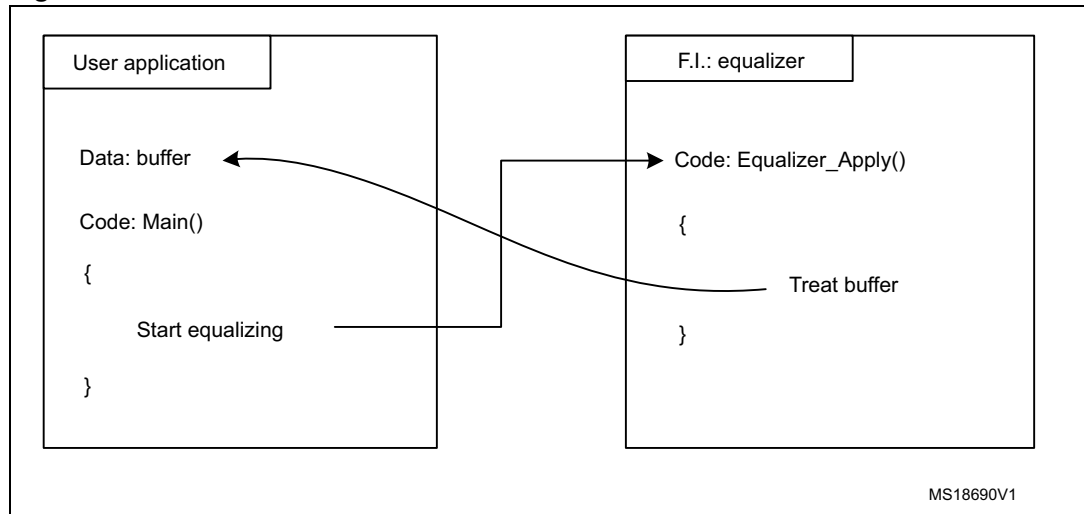


Figure 2. “Push” mode: no callback



The developer is then free to use PCM buffers as needed by his application - streaming them out to I²S, for instance.

Table 1. Performance and memory size

STM32 audio engine	Average MIPS	Peak MIPS ⁽¹⁾	Flash memory size in bytes		RAM size in bytes
			Code	Constant	
WMA decoder	21	24	21154	23816	36076
Channel mixer	2.9	2.9	584	0	16
Parametric equalizer	19	22 ⁽²⁾	1560	124	300
Loudness control	5.3	5.5	1992	1256	632

1. Worst-case MIPS estimated for 320 kbps 48 KHz stereo audio, using STM32 with 0 wait-state flash access.
2. Worst-case MIPS estimated for 5-band peaking.

2 Ordering information

For any further information, or to order the product, please contact your nearest ST sales office.

3 Revision history

Table 2. Document revision history

Date	Revision	Changes
18-Apr-2011	1	Initial release.

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