



Technical Documentation

MP3 OVERVIEW

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Notes

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List of References

L1_AS048-1	MP3 – Technical Requirement Document
L1_AS046	MP3 – Preliminary Study

1 Introduction

This document describes the software architecture of the L1 part of the MP3 feature.

2 MP3 solution block scheme

Following block scheme gives an overview of TI Chipset MP3 solution:

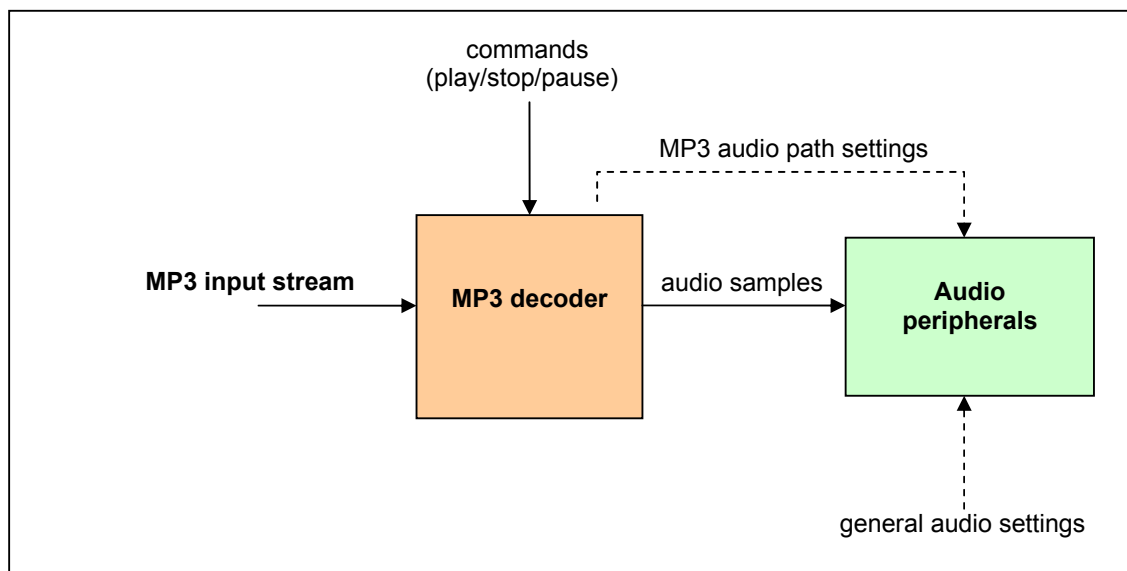


Figure 2.1: MP3 architecture overview

MP3 decoder output is an audio stream with following specifications:

- ☐ 16-bit format
- ☐ Stereo (if MP3 file is monophonic, on-the-fly conversion is performed by the DSP)
- ☐ Sampling rate depends on the MP3 file
- ☐ Length of buffers depends on the sampling rate of the MP3 file

The MP3 decoder is in charge of setting the audio peripherals (Syren/C-port/DMA) so that the output audio samples are sent to the correct analog base band audio path. Some user audio settings that are more generic (volume, FIR, audio path: headset/handfree/handset) are directly managed by upper layer Audio Service.

3 General architecture

The scheme below shows the MP3 solution general architecture:

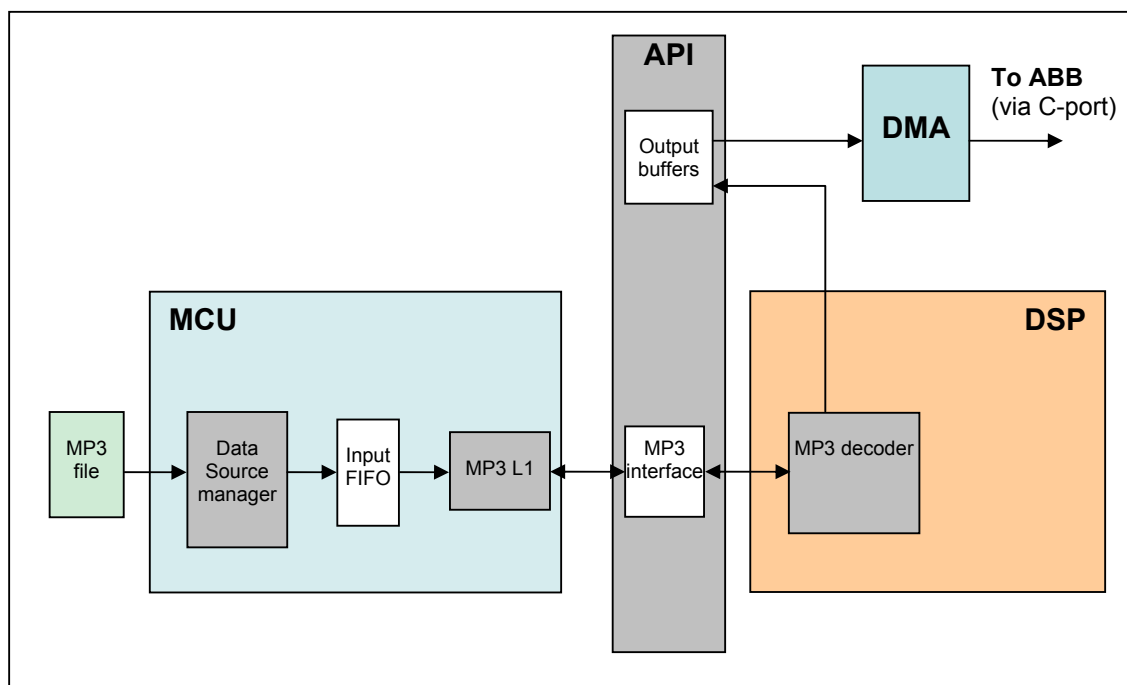


Figure 3.1: MP3 L1 architecture

On MCU side:

- ❑ The data source manager is in charge of the input stream management: it permits to adapt any stream to the implemented MP3 input which is a FIFO buffer.
- ❑ The MP3 L1 copies part of its input FIFO buffer to the API memory as requested by the DSP in the MP3 interface.

On DSP side:

The MP3 module decodes the MP3 frames contained in its input buffer. A decoded frame will generate a few milliseconds of sound, and will always have the same size in bytes. So the exact duration of this frame depends on the frequency rate of the MP3 file. It varies from 24 to 36 milliseconds. The decoder writes directly to a ping-pong output buffer that is sent to the ABB via DMA and C-port.

4 MCU/DSP communication

- ❑ The DSP is in charge of all MP3 decoding. However, since a MP3 file consists in a very large amount of data, the DSP can only have access to small chunks of MP3 data. The MP3 file can only be accessed by the MCU, and the MCU sends small chunks of MP3 data to the DSP when needed.
- ❑ The communication mechanism between the DSP and the MCU to allow the exchange of data is a synchronous one and works with interrupts. When the DSP needs data, it sends an interrupt to the MCU, with information to specify where the data must be stored, and how much is needed. After the specified buffer has been filled, the DSP gets notified by an interrupt from the MCU.
- ❑ Events like pause, resume, stop, are also sent from the MCU to the DSP via this interface mechanism. Since the process must always stay synchronous, when the MCU wants to forwards such an event, it must wait for an interrupt from the DSP to send it.

5 MCU architecture

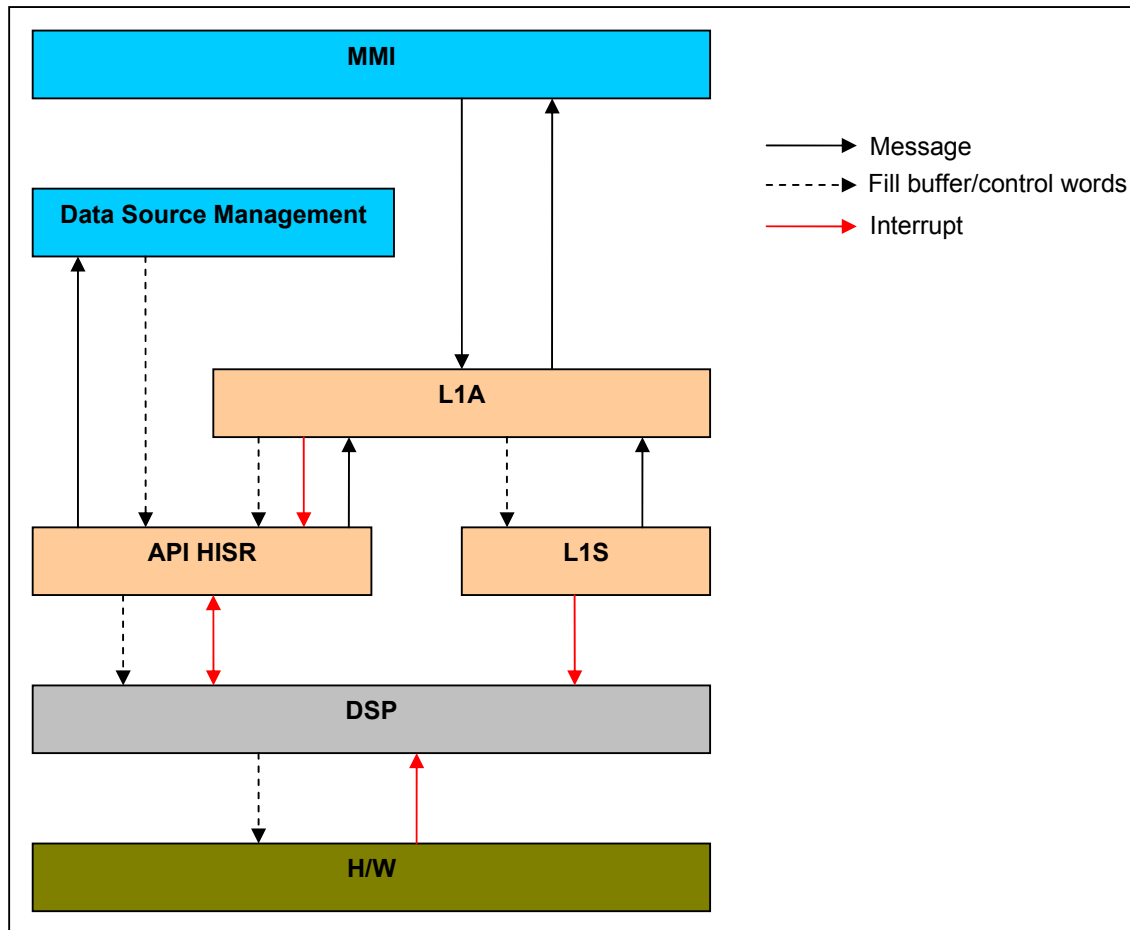


Figure 5.1: flow diagram

Role of each layer:

MMI	Control over the MP3 play: while file is to be played, start playing, stop playing, pause playing, resume playing, change position in file.
Data Source Management	Fills a buffer with MP3 data. Receives notification from L1 when a buffer is freed.
L1A	receives and handles command from MMI: activates and updates API HISR accordingly.
L1S	Configure audio peripherals and initialize DSP background task for MP3.
API HISR	Communicates synchronously with the DSP. Fills DSP buffer.
DSP	Decodes MP3 frames. Decoding is synchronized with output frequency rate using the DMA interrupt.
H/W	composed of DMA, C-Port and ABB. The DMA sends data to the ABB via the C-Port. Whenever a buffer is played, notification is sent to the DSP as an interrupt. The buffer for DMA being double buffered, the DSP has the time of the next buffer to be played to fill a new buffer.