

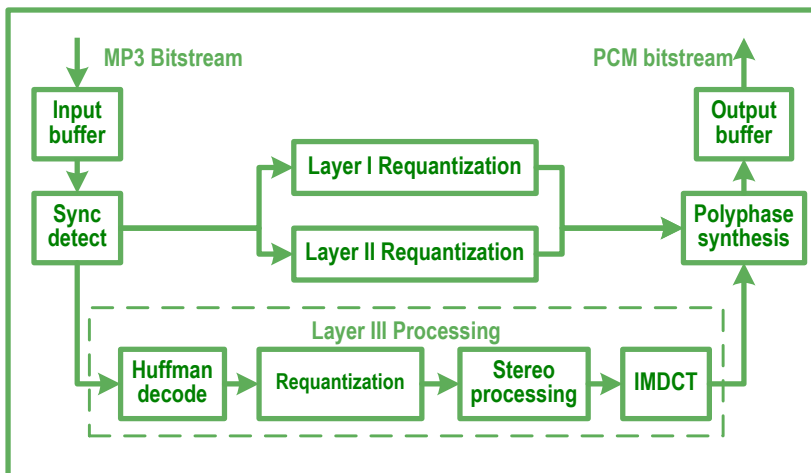
SPiRiT MP3 Decoder

MP3, also known as MPEG-1/MPEG-2 Audio Layer 3, is a popular digital audio encoding and lossy compression format standardized by Moving Picture Experts Group (MPEG). Three layers (layer 1, 2, 3) are supported based on the complexity, compression and quality. Layer 3 offers the highest compression for a given audio fidelity.

MPEG-2 Audio standard adds two extensions to MPEG-1:

- forward and backwards compatible coding of multichannel signals
- addition of lower sampling frequencies of 16 kHz, 22.05 kHz and 24 kHz to the sampling frequencies supported by MPEG-1.

SPiRiT MP3 Decoder supports MPEG 1, 2 Audio Layers I, II and III standards and their low bit rate extension MPEG 2.5. Smart algorithmic solutions allow decreasing CPU load and memory footprint. Carefully optimized ARM9E version fully utilizes the ARM DSP instruction set extension, achieving 25% more efficiency as compared with dual-MAC 16-bit DSPs and performing real-time audio decoding at just 7.5* MHz clock speed.



Features

- Low CPU load (as little as 7.5* MHz)
- Low memory requirements (12.3 Kb RAM + 24-27 Kb ROM)
- Fully compliant to the MPEG-1 and MPEG-2 layers I, II and III standards and their low bit rate extension MPEG 2.5
- All MP3 features supported, including VBR
- Decoding accuracy almost the same as for floating-point version
- Extremely high robustness to damaged MP3 bit streams
- Simple API
- TI C5xx version is eXpressDSP compliant. Code is reentrant, supports multithreading and dynamic memory allocation. At the same time allows direct (non-eXpressDSP) interface to enable static memory allocation

*Average CPU load for 48 kHz stereo measured on ARM9E simulator with 0-WS

Benefits

- Highly optimized code
- Ideal for resource constrained applications
- Easy integration and fast time-to-market
- High sound quality and wide dynamic range
- Allows to save several hours of SoC battery life

Key Features

- Only 7.5* MHz CPU load
- Small memory footprint
- High Decoding accuracy
- All MP3 features are supported
- Simple API
- Fully compliant to the ISO MPEG standard

Applications

- Portable media players
- Mobile phones
- Internet appliances
- Audio streaming
- Digital radio
- Set-top boxes
- Car electronics

Availability

• ARM	Now
• Cortex-M3	Now
• TI C5xx	Now
• AudioDE	Now
• Nios II	Now
• Tensilica HiFi2	Now
• TI OMAP3	Call
• MIPS	Call

Specifications

The MP3 (MPEG layer 3) audio decoder supports ISO/IEC 11172-3 MPEG-1 and ISO/IEC 13818-3 MPEG-2 formats, Layers 1, 2 and 3, VBR and Free-Format streams, mono or stereo input streams as well as MPEG-2.5 low bit rate extension.

By default, decoder output format is signed PCM 16-bit stereo. In order to configure program output to conform other PCM settings the decoder stores 32-bit samples in the output buffer.

Resource Requirements

PLATFORM	ARM7	ARM9	ARM9E	ARM11
Average MIPS*	19.5	17.5	8	7.5
Peak MIPS**	25	22	10	9.5
Program Memory, KB	16.5	19.7	15	16.5
Constant Memory, KB	7.5	7.2	6.6	7.5
Persistent Memory, KB	12.1	12.3	12.1	12.1
Scratch, KB	0	0	0	0
Stack, KB	0.5	0.5	0.5	0.5

PLATFORM	Tensilica HFi2	Cortex-M3	Nios II	TI C55xx
Average MIPS*	5.7	23	18	12.0
Peak MIPS**	8	28	22	13
Program Memory, KB	19.9	13.7	16	11.4
Constant Memory, KB	15	7.6	6.8	7.5
Persistent Memory, KB	20.1	12.3	13.3	12.3
Scratch, KB	0	0	0	0
Stack, KB	1	0.5	0.5	0.5

PLATFORM	AudioDE Revision 2
Average MIPS*	5
Peak MIPS**	5.5
Program Memory, KB	27
Y Memory, KB	15
X Memory, KB	12

* Average MIPS are specified for 44.1 kHz at 128 Kbps

** Peak MIPS are specified for 48 kHz at 320 Kbps
 MIPS are measured using simulator with 0-WS

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