

Ittiam MP3 Encoder

MP3 Encoder

MPEG-2 MP3 is a popular audio coding technique recommended by MPEG committee. MP3 refers to MPEG Audio Layer 3.

The codec handles audio signals sampled at the range of 16 kHz to 48 kHz. MPEG1 supports sampling frequencies 32 KHz, 44.1 KHz and 48 KHz. It generally operates on a frame of 1152 samples. MPEG2 supports the low sampling frequencies (LSFs) 16 KHz, 22.05 KHz and 24 KHz. It generally operates on a frame of 576 samples. It generates encoded bit streams at 16-320 kbps (depending on the sampling rate).

Features

Supported

- MPEG-2 Layer 3 Encoding
- Supports all sampling frequencies in the range of 16KHz to 48 kHz according to MPEG-1/2.
- Bit Rates 16-320 kbps
- Supports both Mono & stereo data
- C callable interface for encoder
- Re-entrant multi channel implementation
- Efficient Scratch memory management with reduced stack requirements
- Constant bit-rate (CBR)
- MS Stereo
- Tables are relocatable.
- XDMI API

Not Supported

- Intensity Stereo
- MPEG 2.5
- Variable bit-rate(VBR)
- Average bit-rate(ABR)

Encoder Validation

MPEG MP3 Encoder is an Informative standard. There is no standard measure or tool for evaluating the quality /fidelity of the encoder. The encoders produce complex artifacts, which is dependent on the source material. Taking these into consideration, the test bench for the audio coders includes the following types of test.

Features

- Bit Stream Compliance: Tests to ensure that the generated bit-stream is in conformance with the specification.
- Objective Quality Evaluation: Audio Quality test based on the ITU BS.1387 standard for objective audio quality evaluation.
- Subjective Quality Evaluation: Listening tests to evaluate the quality.
- Artifact Listening Tests: Listening tests to ensure that the encoder does not produce the artifacts.

Resource requirements on C64x Processor

CPU Load (MCPS)		Program Memory (Kbytes)	Data Memory (Kbytes)			
kbps	Peak		Table	Scratch	Stack	Persistent
MP3 Encode 128kbps	16.15	68.26	13.29	15	2.25	18.92

Note: Input/ Output buffers details are given in the next page.

MCPS indicate the CPU usage for processing Stereo 44.1 kHz at 128 kbps worst case stream.

MCPS measurement on 0 wait-state memory access



Kane Computing Ltd
 7 Theatre Court, London Road,
 Northwich, Cheshire, CW9 5HB, UK.
 Tel: +44(0)1606 351006
 Fax: +44(0)1606 351007/8
 Email: sales@kanecomputing.com
 Web: www.kanecomputing.co.uk

Details of C64x Resources required

CPU Loading

Description	Simulator		Hardware Configuration	
	MCPS	MCPS	MCPS	MCPS
	Ave	Peak	Ave	Peak
Layer 3 encode 128kbps, 44.1kHz	11.81	16.15	28.77	32.61
Layer 3 encode 192kbps, 44.1kHz	13.22	16.51	31.1	34.89
Layer 3 encode 320kbps, 44.1kHz	15.57	21.87	33.37	38.13

Memory Usage

Program	Tables	Static	Scratch	Input	Output
68.26	13.29	18.92	15	4.5	2

Note:

- I/O Buffers
 - Input Buffer Size : 4.5kbytes
 - Output Buffer Size 2kbytes
- Performance generated on CCS 2.20.18 with C64xx Cycle Accurate Simulator with 0 wait state memory access
- Hardware Configuration performance generated on a DM642 processor with all data and program memory sections placed in the external memory, with cache configuration of 16 kB L1 P Cache, 16 kB L1 D Cache & 64 kB L2 Cache, and cache thrashed after encoding each frame.
- MCPS numbers on the hardware will vary with the I-Cache and D-Cache size and with the memory configuration/placement
- 09. wav was used for the encoding.
- Program memory doesn't include the code size of the test bench and standard library functions
- Data memory should be aligned to desired byte-boundary to meet the performance/functionality requirement

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