

Ittiam Low Power MP3 Encoder

MP3 Encoder

MPEG-2 MP3 audio coding (also known as MPEG-2 BC) is a coding technique used on audio signals sampled in the range of 16 kilohertz (kHz) to 48 kHz. The standard is backward compatible with the MPEG-1 MP3. It supports bit-rates from 8 to 320 kbps (depending on the sampling rate).

Features

- Encoding of MPEG-1 & 2 Layer 3 bit-streams.
- Supports bit-rates 32-320/8-160 (MPEG1/MPEG2) kbps for Layer3.
- Supports all sample rates from 16 kHz to 48 kHz.
- Mono/Stereo channels.
- Supports a simple C callable/TI XDM API with flexible memory allocation scheme.
- Multi-channel reentrant software.
- The implementation has been tested on a variety bitstreams and audio files for robustness and quality.
- Optimized for low footprint and processing power.

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 ARM9E Processor

Function	MCPS	Pgm	Tables	Static	Scratch
	Peak	ROM (kb)		RAM (kb)	
Encode	19.6	18.08	5.1	7.75	6.96

Note The Data Memory mentioned in the above Table does not include Input/ Output buffers.

MCPS/MIPS indicate the CPU usage for processing Stereo/320 kbps/48 kHz.

MCPS measurement on 0 wait-state memory access

Details of ARM9E Resources required

CPU Loading

CPU	Simulator		Hardware	
Description	Ave MCPS	Peak MCPS	Ave MCPS	Peak MCPS
320 kbps, 48khz, stereo	13.4	19.6	21.2	33.0
128 kbps, 44.1khz, stereo	12.8	17.3	19.2	27.9

Memory Usage

Program	Tables	Static	Scratch	Stack	Input	Output
18.08	5.1	7.75	6.96	<1	4.5	2

Memory Break up

Tables				Static		Scratch
1.62	1.38	1.81	0.22	0.3	7.45	6.96

Note:

- Memory numbers are in KB (Kilobytes)
- Performance numbers on Simulator generated with ARM RVDS Tools version 2.1.
- Hardware performance generated on a ARM9E processor with 16 KB of I Cache and 8 KB of D-Cache
- Hardware performance generated under Linux 2.6, using the ARM-GCC 3.4.3 Compiler
- If Packetization switch is enabled, static memory size increases by 4.23 KB.
- MCPS numbers on the hardware will vary with the I-Cache and D-Cache size and with the memory configuration/place
- I/O Buffers mentioned above are for single input and output buffers

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