

Ittiam MPEG2 Multichannel Decoder

MPEG2 Multichannel Decoder

MPEG2 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 and supports decoding of three layers. The decoder operates on a frame of 1152 samples (Layer 2) or 384 samples (Layer 1). It supports bit-rates from 8 to 1066 (Layer 2) and 32 to 1130 (Layer 1) kbps (depending on the sampling rate).

Features

- Decoding of MPEG-1 & 2 Layer 1, 2 bit-streams (stereo/multichannel).
- Decoder is Full Accuracy ISO/IEC 13818-3 audio decoder.
- Supports bit-rates
 - 32-384/8-1066 (MPEG1/MPEG2) kbps per channel for Layer2.
 - 32-448/32-1130 (MPEG1/MPEG2) kbps per channel for Layer1.
- Supports all sample rates from 16 kHz to 48 kHz.
- Supports free format bit-rate decoding
- Multichannel decoding up to 5 channels
- Mono/Stereo channels
- Low frequency enhancement (LFE) decoding
- Supports TI XDMI Interface.
- 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.

Decoder Validation

The MPEG2 multichannel decoder implementation has been tested for conformance against the MPEG2 Multichannel Test specification (as defined in the SO-13818-4 test specification). The decoder has also been tested for robustness against bitstream errors and quality based on listening tests.

Resource requirements on C64x Processor

Function	MCPS	Pgm	Tables	Static	Scratch
	Peak	ROM (kb)		RAM (kb)	
Decode	25.8	72.4	5.9	30.9	7.2

Note

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

MCPS indicate the CPU usage for processing Multichannel 5.1 1066kbps, 48 kHz worst case stream.

MCPS measurement on 0 wait-state memory access



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Details of C64x Resources required

CPU Loading

Description	Simulator		Hardware Configuration	
	MCPS	MCPS	MCPS	MCPS
	Ave	Peak	Ave	Peak
test13.mpg (Layer 2, 5.1 channel decode 1066kbps, 48kHz)	20.9	21.6	25.1	25.8
test22.mpg (Layer 1, 5 channel decode 768kbps, 44.1kHz)	16	17.21	20.5	23.9

Memory Usage

Program	Tables	Static	Scratch	Input	Output
72.4	5.9	30.9	7.2	4	11.25

Note:

- I/O Buffers
 - Input Buffer Size : 4kbytes
 - Output Buffer Size 11.25kbytes
- 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 decoding each frame.
- MCPS numbers on the hardware will vary with the I-Cache and D-Cache size and with the memory configuration/placement
- Both the layer 1 and layer 2 testvectors were taken from MPEG2 multichannel conformance test vectors
- 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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