

# Ittiam MP3 Decoder

## MP3 Decoder

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 and supports decoding of three layers. The decoder operates on a frame of 1152 samples (Layers 2 and 3) or 384 samples (Layer 1). It supports bit-rates from 8 to 320 (Layer 3), 8 to 384 (Layer 2) and 32 to 448 (Layer 1) kbps (depending on the sampling rate).

## Features

- Decoding of MPEG-1 & 2 Layer 1, 2, 3 bit-streams.
- Decoder is Full Accuracy ISO/IEC 11172-3 and ISO-13818-3 audio decoder (excluding Multi-channel streams).
- Supports bit-rates
  - 32-320/8-160 (MPEG1/MPEG2) kbps for Layer3.
  - 32-384/8-160 (MPEG1/MPEG2) kbps for Layer2.
  - 32-448/32-256 (MPEG1/MPEG2) kbps for Layer1.
- Supports all sample rates from 16 kHz to 48 kHz.
- Supports free format bit-rate decoding for Layer3.
- Mono/Stereo channels and Joint stereo.
- 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.

## Decoder Validation

The MP3 decoder implementation is fully complaint to MP3 Test specification as defined in the ISO-11172-4 and ISO-13818-4 (excluding Multi-channel streams). The decoder has also been tested for robustness with erroneous bit-streams and quality validation has been done by means of listening tests.

## Resource requirements on ARM9E Processor

Function	MCPS	Pgm	Tables	Static	Scratch
	Peak	ROM (kb)		RAM (kb)	
Decode	13.7	25.0	10.35	12.5	7

## Note

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

MCPS indicate the CPU usage for processing Stereo/128 Kbps/44.1 KHz.

MCPS measurement on 0 wait- state memory access

**Details of ARM9E Resources required**
**CPU Loading**

CPU	Simulator		Hardware	
	Ave MCPS	Peak MCPS	Ave MCPS	Peak MCPS
Layer 3 decode 128kbps, 44.1kHz	13.1	13.7	20.2	23.2
Layer 3 decode 320kbps, 48kHz	17.1	17.6	25.9	28.0

**Memory Usage**

Program	Tables	Static	Scratch	Stack	Input	Output
25.0	10.35	12.5	7.0	<1	2	4.5

**Memory Breakup**

Tables				Static		Scratch
1.675	2.615	4.55	1.48	0.4	12.1	7.0

**Note:**

- Memory numbers are in KB (Kilobytes)
- I/O Buffer size for single input/output buffers
- Performance numbers on Simulator generated with ARM RVDS Tools version 2.1 *with 0-wait state memory access and without Cache*
- Hardware performance generated on a ARM9E processor with 16kB of I-Cache and 8kB of D-Cache
- Hardware performance generated under Linux 2.6 , using the ARM-GCC 3.4.3 Compiler
- MCPS numbers on the hardware will vary with the I-Cache and D-Cache size and with the memory configuration/place

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