Ittiam AAC Decoder

AAC-LC

MPEG-2/4 AAC-LC (Advanced Audio Coding - Low Complexity version) is a popular audio coding technique recommended by MPEG committee. The codec handles audio signals sampled in the range of 8 kHz to 96 kHz. It operates on a frame of 1024 samples. The bit-rate can vary in the range from 8 to 576 kbps / channel (depending on the sampling rate). Low Complexity version of AAC provides good compromise between the codec complexity and the audio quality.

Features

Features supported:

- MPEG2 and MPEG4 AAC LC (Low complexity)
- Supports all sampling frequencies & bit rates for AAC only bit-streams.
- Channels: Mono/Stereo/Dual-Mono
- Robust against erroneous bit-streams
- Error concealment mechanism
- Tools Supported
    - o TNS (Temporal Noise Shaping),
    - o PNS (Perceptual Noise Shaping)
    - o Intensity Stereo & Mid/Side Stereo
- Bit-streams: ADIF, ADTS, GA Header
- Compliance: ISO/IEC 13818 - 4, 14496 – 4 (MPEG AAC and PNS Conformance)
- Optimized for low footprint & processing power.
- Supports a simple C callable API / TI XDM API
- Multi-channel reentrant software.
- 16 bit WAV Output format support

Features not supported:

- More than 2 channels of audio.
- SBR & PS decoding
- Channel Coupling
- DRC

Decoder Validation

The MPEG-4 AAC-LC decoder implementation has been validated using the latest conformance tool given by MPEG-4.The decoders are also tested for robustness against bit-stream errors and quality tests based on Objective and Subjective evaluation.

Resource requirements on ARM9E Processor

Decoder Mode	MCPS	Pgm	Tables	Static	Scratch
	Peak	ROM (kb)		RAM (kb)	
AAC-LC decoder	11.29	35.03	16.24	5.56 *	12.05

Note	The Data Memory mentioned in the above Table does not include Input/ Output buffers.
	MCPS measurement is with 0 wait-state memory access for 48 kHz, 128 kbps stream.

Details of ARM9E Resources required

CPU Loading

CPU	Simulator		Hardware	
Description	Ave MCPS	Peak MCPS	Ave MCPS	Peak MCPS
128 Kbps 48 kHz stereo	10.07	11.29	17.85	21.48
320 Kbps 48 kHz stereo, with TNS	12.74	19.8	21.40	28.77

Memory Usage

Program	Tables	Static	Scratch	Stack	Input	Output
35.03	16.24	5.56*	12.05	<1	1.5	4.0

Memory Breakup

Tables				Static		Scratch
2.59	7.32	6.31	4 bytes	0.45	2.53	12.05

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.*

- Hardware performance generated on a ARM9E processor with 16Kb of I-Cache and 8Kb of D-Cache

- Hardware performance generated under Linux2.6 , 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

- The peak MCPS given above for AAC-LC, are measured for "al05_48.adts" 128 Kbps 48 kHz stereo stream without TNS and for "al05_48_320.adts" 320 Kbps 48 kHz stereo stream with TNS.

- [*] Static memory increases by 8Kb if error concealment is enabled.

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