MPEG4AAC LD Decoder (v1.00) on C64x+

FEATURES

- **eXpressDSP™ Digital Media (XDM 1.0 IAUDDEC1) interface compliant**
- **MPEG4 AAC Low Delay (LD) object type implementations supported**
- **Decoding of mono and stereo streams supported**
- **RAW data input format supported**
- **LATM/LOAS input format, encoded with 14496-3 compliant encoders supported**
- **Sampling frequency 22050, 24000, 32000, 44100 and 48000 supported as per ISO/IEC 14496-3 standard**
- **Bit-rate range of 24kbps – 128kbps per channel supported**
- **480 samples and 512 samples per frame supported**
- **Maximum bit-rate based on the sampling frequency supported as per standard**
- **Validated on the DM6446 EVM**
- **This codec also supports C6455, DRA446, DM648, DM6437, DM644x, DM6467, OMAP2530, and OMAP3530 platforms**

DESCRIPTION

Advance Audio Coding (AAC) is an audio data compression format. This coding technique uses a perceptual filter bank, a sophisticated masking model, noise-shaping techniques, and channel coupling. It provides best quality at lower bit-rates.

Low Delay Advanced Audio Coding (AAC-LD) is the high-quality low-delay audio coding standard within MPEG-4. It features an algorithmic delay of only 20 ms and offers good compression ratios and high sound quality for all types of audio signals including speech, music, and atmospheric sounds.

MPEG-4 AAC-LD is designed to combine the advantages of perceptual audio coding with the low delay necessary for bi-directional communication. The codec was developed by Fraunhofer IIS and is derived from MPEG-4 Low Complexity Advanced Audio Coding (AAC-LC). It is validated on DM6446 EVM with Code Composer Studio version 3.3.38 and Code Generation tools version 6.0.7.

PRODUCT PREVIEW

Performance Summary

This section describes the performance of the MPEG4AAC LD Decoder on DM6446 EVM.

Table 1. Configuration Table

CONFIGURATION	ID
MPEG4 AAC LD Decoder	MPEG4_AACLD_001

Table 2. Cycles Information – Profiled on DM6446 EVM with Code Generation Tools Version 6.0.7

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)(1)(2)		
	TEST DESCRIPTION	AVERAGE(3)	PEAK(3)
MPEG4_AACLD_001	wooden_toys_2_b256_r0_t3_x1_y1_f480.ass, sampling rate:48kHz	14.5	16.2

(1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration 32K-bytes L1P cache, 16 K-bytes L1D cache, 64K-bytes L2 cache.
(2) Average and peak MCPS measurements can vary by +/-5%.
(3) L1 and L2 Cache Invalidation done for every frame.
Measured average MIPS for peak test vector which has 1007 frames.
Measured with frame size= 480 samples.

Table 3. Memory Statistics - Generated with Code Generation Tools Version 6.0.7

CONFIGURATION ID	MEMORY STATISTICS(1)				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL	EXTERNAL	STACK	
MPEG4_AACLD_001	66.82	0	34.04	0.77	101.63

(1) All memory requirements are expressed in kilobytes (1K-byte= 1024 bytes).

Table 4. External Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - EXTERNAL(1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
MPEG4_AACLD_001	18.36	7.41	8.27

(1) All memory requirements are expressed in kilobytes.
(2) Does not include I/O buffers.

PRODUCT PREVIEW

Notes

- The above profile values were observed with following macros defined:
  - #define SAMPLES_PER_FRAME (512)
  - #define USE_512_TABLES
  - #define USE_480_TABLES
  - #define MPEG4_ENABLE
  - #define ER_ENABLE
  - #define ERAACLD_ENABLE
  - #define CONCEALMENT_ENABLE
  - #define USE_PNS
  - #define IGNORE_BUFFER_FULLNESS
  - #define AACLD_TII_DEC_MAX_CHANNELS 2
- I/O Buffers:
  - Input buffer size = 2048 bytes (should be a power of 2)
  - Output buffer size = 2048 bytes for 16-bit audio sample size, 2 channel output (stereo)
- Total data memory for N non-pre-emptive instances = Constants + Runtime Tables + Scratch + N*(Instance + I/O buffers + Stack)
- Total data memory for N pre-emptive instances = Constants + Runtime Tables + N*(Instance + I/O buffers + Stack + Scratch)

References

- ISO/IEC 14496-3:2005-12-01 Information technology -- Coding of audio-visual objects -- Part 3: Audio
- ISO/IEC 14496-4:2004-12-15 Information technology — Coding of audio-visual objects —Part 4:Conformance testing
- *MPEG4AAC LD Decoder on C64x+ User's Guide* (literature number: SPRUGE7)

Glossary

TERM	DESCRIPTION
Constants	Elements that go into .const memory section
Scratch	Memory space that can be reused across different instances of the algorithm
Shared	Sum of Constants and Scratch
Instance	Persistent-memory that contains persistent information - allocated for each instance of the algorithm

Acronyms

ACRONYM	DESCRIPTION
AAC	Advanced Audio Coding
AAC-LD	Low Delay Advanced Audio Coding
EVM	Evaluation Module
IEC	International Electro-technical Commission
ISO	International Organization for Standardization
LATM	Low-overhead MPEG-4 Audio Transport Multiplex
LOAS	Low Overhead Audio Stream
MPEG4	Moving Pictures Experts Group-4
XDM	eXpressDSP Multimedia

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