MPEG4 AAC LC Decoder on C64x+ (on DRA446)

FEATURES

- **eXpressDSP Digital Media (XDM) interface compliant**
- **MPEG4 AAC Low Complexity (LC) object type implementations supported**
- **MPEG2 AAC Low Complexity (LC) object type implementations supported**
- **Decoding of mono and stereo streams supported**
- **RAW data input format supported**
- **Audio Data Interchange Format (ADIF) and Audio Data Transport Stream (ADTS) input formats, encoded with ISO/IEC 13818-7 or 14496-3 compliant encoders supported**
- **Sampling frequency range of 8 kHz – 96 kHz supported as per ISO/IEC 14496-3 standard**
- **Maximum bit-rate based on the sampling frequency supported as per standard**
- **Validated on the DRA446 EVM**

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 the highest possible quality at smaller bit rates. It is validated on DRA446 EVM with Code Composer Studio version 3.2.40.12 and Code Generation tools version 6.0.8.

PRODUCT PREVIEW

Performance Summary

This section describes the performance of the MPEG4 AAC LC Decoder on C64x+ (on DRA446).

Table 1. Configuration Table

CONFIGURATION	ID
MPEG4 AAC LC	MPEG4_AAC_001

Table 2. Cycles Information – Profiled on DRA446 EVM with Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)(1)		
	TEST DESCRIPTION	AVERAGE	PEAK
MPEG4_AAC_001	LC - mj_48khz_576000.aac	27.39	31.15
MPEG4_AAC_001	LC - mj_48khz_128000.aac	20.14	23.99

(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. L1 and L2 cache invalidation is done for every frame. Measured with frame size= 1024 samples for LC Profile.

Table 3. Memory Statistics - Generated with Code Generation Tools Version 6.0.8

CONFIGURATION ID	MEMORY STATISTICS(1)				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL	EXTERNAL	STACK	
MPEG4_AAC_001	36	0.00	40.2	5.0	81.2

(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)(2)		
	SHARED		INSTANCE
	CONSTANTS	SCRATCH	
MPEG4_AAC_001	24	9	7.2

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

Notes

- I/O Buffers
  - Input buffer size = 1648 bytes
  - Output buffer size = 8192 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 13818-7:2003 Information technology – Generic Coding of moving pictures and associated audio information -- Part 7: Advanced Audio Coding (MPEG2 AAC standards document)
- ISO/IEC 14496-3:1999(E) Information technology -- Coding of audio-visual objects -- Part 3: Audio (MPEG4 AAC standards document)
- User Guide for MPEG4AAC Decoder on C64x+ (literature number SPRUF03A)

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
ADIF	Audio Data Interchange Format
ADTS	Audio Data Transport Stream
EVM	Evaluation Module
IEC	International Electro-Technical Commission
ISO	International Organization for Standardization
MPEG4	Moving Pictures Experts Group-4
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

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