AAC Low Complexity Encoder (v1.20) on C64x+

FEATURES

- **eXpressDSP™ Digital Media (XDM 1.0 IAUDENC1) compliant**
- **16-bit and 32-bit input PCM samples supported. In case of 32-bit PCM, it considers the most significant 16-bits as internal inputs**
- **Constant Bit Rate (CBR) encoding and Variable Bit Rate (VBR) encoding supported**
- **8 kHz to 96 kHz input sampling frequencies supported**
- **Only AAC-LC output format supported**
- **Mono, stereo, and dual mono input file supportd**
- **Bit-rates based on sampling frequency and number of channels supported**
- **Audio Data Interchange Format (ADIF), Audio Data Transport Stream (ADTS), and raw output format supported**
- **ISO/IEC 14496-3 (MPEG4 AAC) and ISO/IEC 13818-7 (MPEG 2-AAC) standards compliant**
- **Validated on DM644x EVM with Code Composer Studio version 3.2.37.12 and Code Generation Tools version 6.0.8**
- **This codec can be used on any of TI's C64x+ based platforms such as DM644x, DM648, DM643x, DM646x, OMAP35xx and their derivatives**

DESCRIPTION

AAC is one of the most popular audio compression standards across wide spectrum of application ranging from portable player, cell phones, music systems, internet, and so on. AAC Encoder is validated on DM644x EVM with Code Composer Studio version 3.2.37.12 and Code Generation Tools version 6.0.8.

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Performance Summary

This section describes the performance of AAC Low Complexity Encoder on DM644x EVM.

Table 1. Configuration Table

CONFIGURATION	ID
AAC_LC	AACLC_ENC_001

Table 2. Cycles Information - Profiled on DM644x EVM with Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)(1)(2)		
	TEST DESCRIPTION	AVERAGE	PEAK (3)
AACLC_ENC_001	44 kHz – 128 kbps	30.12	37.5

(1) Profiling is done by thrashing cache after encoding each frame of AAC.
(2) Average and peak MCPS measurements can vary by +/-5%.
(3) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration 32K-bytes L1P cache, 16K-bytes L1D cache, and 64K-bytes L2 cache.

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	
AACLC_ENC_001	116.4	Not used	85.9	5.5	207.8

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

Table 4. Internal Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - INTERNAL (1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
AACLC_ENC _001	Not used	Not used	Not used

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

Table 5. External Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - EXTERNAL (1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
AACLC_ENC _001	22.6	8.5	54.8

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

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Notes

- I/O buffers:
  - Input buffer size = 1024 samples per channel
  - Output buffer size = 1536 bytes
- Total data memory for N non pre-emptive instances = Constants + Run-time Tables + Scratch + N * (Instance + I/O buffers + Stack)
- Total data memory for N pre-emptive instances = Constants + Run-time Tables + N * (Instance + I/O buffers + Stack + Scratch)

References

- ISO/IEC IS 14496-3 Information Technology -- Coding of Moving Pictures and Associated Audio for Digital Storage Media at up to about 1.5 Mbps -- Part 3: Audio
- ISO/IEC IS 13818-7 Information Technology -- Generic Coding of Moving Pictures and Associated Audio Information -- Part 7 Advanced Audio Coding
- *AAC Low Complexity Encoder on C64x+ User's Guide* (literature number:SPRUEI4A)

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
CBR	Constant Bit-rate
EVM	Evaluation Module
Kbps	Kilo bits per second
KHz	Kilo Hertz
LC	Low Complexity
MPEG	Moving Picture Experts Group
PCM	Pulse Code Modulation
VBR	Variable Bit-rate
XDM	eXpressDSP Digital Media

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Revision History

This datasheet revision history highlights the changes made to the SPRS364 codec specific datasheet to make it SPRS364A.

Table 6. Revision History for AAC Low Complexity Encoder (v1.20) on C64x+

SECTION	ADDITIONS/MODIFICATIONS/DELETIONS
Section 1	Supported Features: • Removed XDIAS compliance • Updated XDM version • Added list of platforms supported by this codec
Table 2	Cycles Information: • Modified average and peak values • Added note explaining variation of average and peak MCPS measurements
Table 3	Memory Statistics: • Modified program and external memory
Table 5	External Data Memory Split-Up: • Modified constant value

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