

MPEG4AAC High Efficiency Decoder (v1.23) on C64x+

FEATURES

- eXpressDSP™ Digital Media (XDM 0.9 IAUDDC) compliant
- MPEG4 AAC Low Complexity (LC) object type implementations supported
- MPEG2 AAC Low Complexity (LC) object type implementations supported
- MPEG4 AAC High Efficiency (HE) object type implementations supported
- ARIB and ISO/IEC 13818-8 standard downmixing for multichannel streams 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
- High quality AAC HE decode as per ISO/IEC 14496-3: AMENDMENT 1 supported
- Sampling frequency range of 8 kHz – 96 kHz as per ISO/IEC 14496-3 standard supported
- Maximum bit-rate based on sampling

frequency supported as per the standard

- Validated on the 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 C64x+ platforms like DM6446, DM6437, DRA446, DM6467, DM648, OMAP2430, OMAP3430 and OMAP3530

DESCRIPTION

Advanced 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 DM644x EVM with code composer studio version 3.2.37.12 and code generation tools version 6.0.8.

PRODUCT PREVIEW



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

eXpressDSP is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.

Performance Summary

This section describes the performance of MPEG4AAC High Efficiency Decoder on C64x+ (on DM644x).

Table 1. Configuration Table

CONFIGURATION	ID
MPEG4 AAC HE, High quality	MPEG4_AAC_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⁾		
	TEST DESCRIPTION	AVERAGE	PEAK
MPEG4_AAC_001	LC-mj_48khz_128000.aac	20.17	23.77
	LTP- miami_44_adif.aac	29.02	38.12
	HEHQ-MJ_STEREO1_44kHz_64.aac	38.42	42.21
	PS-ps_mj_44kHz_32000.aac	51.72	53.65
	sbr_cm_48_5.1.aac	94.95	99.15

- (1) 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.
L1 and L2 cache invalidation done for every frame.
Measured with Optimal Function Placement Order (see Appendix A in User Guide)
Measured with frame size=1024 samples for LC Profile.
Measured with frame size=2048 samples for HEHQ 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 for maximum 2 channels	152.96	0.00	209.8	5	367.64
MPEG4_AAC_001 for maximum 6 channels	152.96	0.00	271.6	5	429.44

- (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⁾			INSTANCE ⁽²⁾
	SHARED			
	CONSTANTS	SCRATCH		
MPEG4_AAC_001 for maximum 2 channels	66	71.4	72.4	
MPEG4_AAC_001 for maximum 6 channels	66	87.4	118.2	

- (1) All memory requirements are expressed in kilobytes (1K-byte = 1024 bytes).
(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)
- ISO/IEC 14496-3:2001/AMENDMENT 1 Bandwidth extension (MPEG4 AAC-HE standards document)
- *MPEG4AAC High Efficiency Decoder on C64x+ User's Guide* (literature number SPRUED8D)

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/Abbreviation	Description
ADTS	Audio Data Transport Stream
ADIF	Audio Data Interchange Format
AAC	Advanced Audio Coding
AAC-HE	High Efficiency Advanced Audio Coding
DV-EVM	Digital Video Evaluation Module
ISO	International Organization for Standardization
IEC	International Electro-technical Commission
MPEG4	Moving Pictures Experts Group-4
XDM	expressDSP Digital Media

Revision History

This datasheet revision history highlights the technical changes made to the SPRS369C codec specific data manual to make it SPRS369D.

Table 5. Revision History of MPEG4AAC HE Decoder on C64x+

SECTION	ADDITIONS/MODIFICATIONS/DELETIONS
Global Change	<ul style="list-style-type: none">• Changed version number to 1.23

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright 2008, Texas Instruments Incorporated