- **eXpressDSP™ Digital Media (XDM 1.0**
IAUDDEC1) interface compliant

- **Supports both COFF and ELF ABI**

- **ISO/IEC 11172-3 Layer 1, Layer 2, and Layer 3 compliant streams supported.**

- **Variable Bit Rate (VBR) and Constant Bit Rate (CBR) modes supported. The VBR encoding provides a higher overall sound quality with smaller file size.**

- **Bit rates of 32 to 448 kbps for Layer 1, 32 to 384 kbps for Layer 2, and 8 to 320 kbps for Layer 3 supported.**

- **Mono, stereo and dual channel input streams supported.**

- **16-bit and 24-bit raw Pulse Code Modulation (PCM) samples are supported. If two channels of audio data are produced, the output can be either in interleaved or block format.**

- **Layer 1 and Layer 2 decoder is compliant with the following standards.**

  - ISO/IEC 11172-3 (MPEG 1) (48 KHz, 44.1 KHz, and 32 KHz)

  - ISO/IEC 13818-3 (MPEG 2) (24 KHz, 22.05 KHz, and 16 KHz)

- **Layer 3 decoder is compliant with the following standards:**

  - ISO/IEC 11172-3 (MPEG 1) (48 KHz, 44.1 KHz, and 32 KHz)

  - ISO/IEC 13818-3 (MPEG 2) (24 KHz, 22.05 KHz, and 16 KHz)

  - MPEG 2.5 extension (12 KHz, 11.025 KHz, and 8 KHz) sampling rates

- **Does not support free format streams**

- **Validated on DM8148 EVM with Code Composer Studio version 4.2.0.10018 and code generation tools version 7.2.2**

- **This codec can be used on any of TI's C64x+ and C674x based platforms such as DM8148, DM644x, DM648, DM643x, DM646x, OMAP35xx, DM816x, DM814x , OMAP-L1x and their derivatives**

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TEXAS INSTRUMENTS

Description

MP3 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 forth.

TEXAS INSTRUMENTS

Summary of performance

This section describes performance of the MP3 L1L2L3 decoder on DM8148 EVM

Table 1.   Configuration Table

CONFIGURATION	ID
Layer1, Layer2, Layer3, 16bit PCM, COFF	MP3_DEC_001
Layer1, Layer2, Layer3, 16bit PCM, ELF	MP3_DEC_002

Table 2.   Cycles Information[1] – Profiled on DM8148 EVM with Code Generation Tools Version 7.2.2

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGA CYCLES PER SEC)[2]		
	TEST DESCRIPTION	AVERAGE	PEAK
MP3_DEC_001	MJ44khz128kbps.mp3, 44Khz – 128 kbps, Layer3	6.77	9.78
	Test24.mpg, 16KHz-96Kbps, Layer2	3.29	3.71
	fl11.mp3, 44.1Khz – 192 kbps, Layer2	8.78	9.71
	fl2.mp3, 44.1Khz – 384 kbps, Layer1	8.22	11.95
MP3_DEC_002	MJ44khz128kbps.mp3, 44Khz – 128 kbps, Layer3	6.73	9.65
	Test24.mpg, 16KHz-96Kbps, Layer2	3.22	3.64
	fl11.mp3, 44.1Khz – 192 kbps, Layer2	8.65	9.57
	fl2.mp3, 44.1Khz – 384 kbps, Layer1	7.76	12.32

[1] All the performance numbers are measured with COFF library, performance numbers may change +/-2% for ELF library
[2] Measured with program memory, stack, and I/O buffers in external memory(DDR2) and with cache configuration 32K-byte L1P cache,
  32K-byte L1D cache, 64K-byte L2 cache
3.Average and peak MCPS measurements can vary by +/-5% depending on CPU and DDR clock

Table 3.   Memory Statistics - Generated with Code Generation Tools Version 7.2.2

CONFIGURATION ID	MEMORY STATISTICS[3]				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL	STACK	
MP3_DEC_001 MP3_DEC_002	59.18	Not used	34.90	2	94.08

[3] All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes)
Program memory numbers were measured with COFF library, program memory for ELF library may change by +/-2%. Data memory requirements remain same for both COFF and ELF libraries.

Table 4.   Internal Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL[4]		
	SHARED		INSTANCE[5]
	CONSTANTS	SCRATCH	
MP3_DEC _001 MP3_DEC _002	Not used	Not used	Not used

[4] All memory requirements are expressed in kilobytes
[5] Does not include I/O buffers

Table 5.   External Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – EXTERNAL[6]		
	SHARED		INSTANCE[7]
	CONSTANTS	SCRATCH	
MP3_DEC _001 MP3_DEC _002	15.79	6.75	12.36

[6] All memory requirements are expressed in kilobytes
[7] Does not include I/O buffers

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TEXAS INSTRUMENTS

Notes

- I/O buffers:
    - Input buffer size = 2880 bytes
    - Output buffer size = 9216 bytes
- 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 IS 11172-3 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 13818-3 Information Technology -- Generic Coding of Moving Pictures and Associated Audio Information -- Part 3: Audio
- *MP3 L1L2L3 Decoder on C64x+/C674X User's Guide* (literature number: SPRUH75)

Glossary

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

CBR	Constant Bit Rate
EVM	Evaluation Module
Kbps	Kilo bits per second
KHz	Kilo Hertz
MP3	MPEG1 Layer 3
MPEG	Moving Pictures Experts Group
PCM	Pulse Code Modulation
VBR	Variable Bit Rate
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

PRODUCT PREVIEW

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