

## MP3 L1L2L3 Decoder (v01.31.01) on C64x+

### FEATURES

- eXpressDSP™ Digital Media (XDM 1.0 IAUDDEC1) interface compliant
- Validated on the DM644x EVM
- 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
- Outputs 16-bit raw pulse code modulation (PCM) samples. 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)
- 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
- Free format streams are not supported
- This codec can be used on any of TI's C64x+ based platforms such as DM644x, DM648, DM643x, DM646x, OMAP35xx and their derivatives.

### DESCRIPTION

MP3 is one of the most popular audio compression standards across wide spectrum of application ranging from portable player, cell phones, music system, internet, and so on.



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## Performance Summary

This section describes performance of the MP3 L1L2L3 decoder on DM644x EVM.

**Table 1. Configuration Table**

CONFIGURATION	ID
Layer1, Layer2, Layer3 Support	MP3_DEC_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) <sup>(1) (2)</sup>		
	TEST DESCRIPTION	AVERAGE	PEAK
MP3_DEC_001	MJ44khz128kbps.mp3, 44 kHz – 128 kbps	18.42	24.17
	fl11.mp3, 44.1 kHz – 192 kbps	14.23	15.37
	fl2.mp3, 44.1 kHz – 384 kbps	16.19	19.36

- (1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration 32 K-byte L1P cache, 16 K-byte L1D cache, 64 K-byte L2 cache.  
(2) Average and peak MCPS measurements can vary by +/-5%.

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

CONFIGURATION ID	MEMORY STATISTICS <sup>(1)</sup>				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL	STACK	
MP3_DEC_001	57.84	Not used	34.68	2	94.52

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

**Table 4. Internal Data Memory Split-Up**

CONFIGURATION ID	DATA MEMORY - INTERNAL <sup>(1)</sup>			INSTANCE <sup>(2)</sup>
	SHARED		SCRATCH	
	CONSTANTS	SCRATCH		
MP3_DEC_001	Not used	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 <sup>(1)</sup>		
	SHARED		INSTANCE <sup>(2)</sup>
	CONSTANTS	SCRATCH	
MP3_DEC_001	15.8	6.75	12.13

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

## Notes

- I/O buffers:
  - Input buffer size = 2880 bytes
  - Output buffer size = 4608 bytes
- Total data memory for N *nonpre-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 11172-3:1993, 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 13818-3:1998, Information Technology -- Generic Coding of Moving Pictures and Associated Audio Information -- Part 3: Audio
- *MP3 L1L2L3 Decoder on C64x+ User's Guide* (literature number: SPRUED0G)

## 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
CBR	Constant Bit-Rate
EVM	Evaluation Module
kbps	Kilo Bits Per Second
kHz	Kilohertz
MPEG	Moving Picture Experts Group
MP3	MPEG1 Layer 3
PCM	Pulse Code Modulation
VBR	Variable Bit-Rate
XDM	eXpressDSP Digital Media

## Revision History

This datasheet revision history highlights the changes made to SPRS339F codec specific datasheet to make it SPRS339G.

**Table 6. Revision History of MP3 L1L2L3 Decoder on C64x+**

SECTION	ADDITIONS/MODIFICATIONS/DELETIONS
Global Changes	There are no changes in data sheet for this release

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