MP3 L1L2 Decoder (v1.10.002) on C64x+

FEATURES

- **eXpressDSP™ Algorithm Interface Standard (XDAIS) compliant**
- **eXpressDSP Digital Media (XDM) interface compliant**
- **Validated on the DM644x EVM**
- **ISO/IEC 11172-3 Layer 1 and Layer 2 compliant streams supported**
- **Bit rates of 32 to 448 kbps for Layer 1 and 32 to 384 kbps for Layer 2 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.**
- **ISO/IEC 11172-3 (MPEG1 audio) standard for Layer 1 and Layer 2**
- **Free format streams not supported.**

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 forth.

PRODUCT PREVIEW

Performance Summary

This section describes performance of the MP3 L1L2 decoder.

Table 1. Configuration Table

CONFIGURATION	ID
Layer1, Layer2 Support	MP3_DEC_001

Table 2. Cycles Information(1) - Profiled on DM644x EVM with Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)(2)		
	TEST DESCRIPTION	AVERAGE	PEAK
MP3_DEC_001	fl11.mp3, 44.1kHz - 192 kbps	14.87	15.79
	fl2.mp3, 44.1kHz - 384 kbps	16.91	18.57

(1) Profiling is done by thrashing cache after decoding each frame for Layer 1 and Layer2.
(2) Measured with program memory, stack, and I/O buffers in external memory and with cache configuation 32K-byte L1P cache, 16K-byte L1D cache, 64K-byte L2 cache.

Table 3. Memory Statistics

CONFIGURATION ID	MEMORY STATISTICS(1)				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL	EXTERNAL	STACK	
MP3_DEC_001	27.82	Not used	32.09	2	61.91

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

Table 4. Internal Data Memory Division

CONFIGURATION ID	DATA MEMORY - INTERNAL(1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
MP3_DEC_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 Division

CONFIGURATION ID	DATA MEMORY - EXTERNAL(1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
MP3_DEC_001	13.21	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 = 2512 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 Decoder User's Guide* (literature number SPRUEJ1)

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
MP3	MPEG1 Layer3
MPEG	Moving Pictures Expert Group
PCM	Pulse code modulation
VBR	Variable bit rate
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

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