



Ittiam WMV9 MP Encoder (Non Low Delay) (v1.00.00.001) on DM644x

FEATURES

- eXpressDSP™ Algorithm Interface Standard (XDAIS) Compliant
- eXpressDSP™ Multimedia Interface (XDM) Compliant
- Encodes streams compliant with WMV9 Main Profile decoders and with VC1 Main Profile decoders
- Supports a search range of 64x32
- Supports resolutions up to D1
- Supports YUV422i as raw video input formats
- Supports Non Low Delay Rate Control to generate a CBR stream (suitable for recording applications)
- Supports in loop filter to improve the compression efficiency and perceptual quality at low bit-rates
- Image coprocessors used (Accelerated Version)
- Re-entrant multi channel implementation

- Compliant with TI IDMA3 interfaces and TI ACPY3 callbacks
- Unsupported Features
 - Variable transform type selection
 - B frames
 - Quarter pixel motion estimation
 - 420 chroma format

DESCRIPTION

The WMV9 standard, published by Microsoft™, is a video compression (coding) standard supporting a wide range of entertainment and streaming applications. The standard allows you to select different tool sets for encoding by specifying different profiles and levels.

This data sheet describes the features and performance of the Ittiam WMV9 MP Encoder on TI's DM644x platform. Performance data was taken using a DM644x DV-EVM processor.

Product Support

This product was developed and is supported by Ittiam Systems (P) Ltd. For product support, contact:

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Validation

The encoder has been validated by running it on the DM644x platform and measuring the resource usage during this process.

Performance Summary

This section describes the performance of the Ittiam WMV9 MP Encoder. Performance summary data generated using CCS 3.2.39.5 using a DM644x DV-EVM processor.

Table 1. Configuration Table

CONFIGURATION	ID
WMV9 MP Encoder – Intra Frame rate of 30 with de-blocking disabled	WMV9MP_ENC_001
WMV9 MP Encoder – Intra frame rate of 30 with de-blocking enabled	WMV9MP_ENC_002

Table 2. Cycles Information - Profiled on a DM644x DV-EVM With Code Generation Tools v 6.0.13

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND) ⁽¹⁾		
	TEST DESCRIPTION	AVERAGE	PEAK
WMV9MP_ENC_001	Progressive encoding, foreman D-1 NTSC (720x480) @ 3mbps & 30 fps	420	430
WMV9MP_ENC_001	Progressive encoding, foreman CIF (352x288) @ 768 kbps & 30 fps	183	190
WMV9MP_ENC_002	Progressive encoding, foreman D-1 NTSC (720x480) @ 3 mbps & 30 fps	445	455

(1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration: 16KB L1P Cache, 16KB L1D Cache, and 32KB L2 Cache.

Table 3. Memory Statistics - Generated with Code Generation Tools v 6.0.13

CONFIGURATION ID	MEMORY STATISTICS ⁽¹⁾				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL	EXTERNAL	STACK	
WMV9MP_ENC_001	277	64	4974	10	5325
WMV9MP_ENC_002	277	64	4974	10	5325

(1) All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes) and there could be a variation of around 1-2% in numbers.

Table 4. Internal Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - INTERNAL ⁽¹⁾		
	SHARED		INSTANCE ⁽²⁾
	CONSTANTS	SCRATCH	
WMV9MP_ENC_001	0	64 (L1D)	0
WMV9MP_ENC_002	0	64 (L1D)	0

(1) Internal memory refers to L1D RAM. All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes) and there could be a variation of around 1-2% in numbers.

(2) I/O buffers not included. Some of the instance memory buffers could be scratch.

Table 5. External Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - EXTERNAL ⁽¹⁾		
	SHARED		INSTANCE ⁽²⁾
	CONSTANTS	SCRATCH	
WMV9MP_ENC_001	31	195	4748
WMV9MP_ENC_002	31	195	4748

(1) All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes) and there could be a variation of around 1-2% in numbers.

(2) Does not include I/O Buffers.

Table 6. Co Processor(s) Memory Statistics⁽¹⁾

CONFIGURATION ID	SEQ DATA MEMORY	SEQ PROG MEMORY	IMX WORKING MEM	IMX IMG BUF	IMX CMD MEM
WMV9MP_ENC_001	1	4	32	16	8
WMV9MP_ENC_002	1	4	32	16	8

(1) The encoder treats these memories as scratch.

Notes

- I/O Buffers
 - Input Buffer Size = 810 Kbytes
 - Output Buffer Size = 384 Kbytes
- 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)
- Stack also includes stack and sysstack
- Memory configuration
 - L1P : 16kB Cache + 16 kB Program memory
 - L1D: 16kB Cache + 64 kB Data memory
 - L2: 32kB Cache + 32kB SRAM
- DMA resources needed
 - 4 channels of QDMA
 - 4 channels of EDMA
 - 12 PARAM Sets

References

- SMPTE 421M-2006; VC1 compressed video bit-stream standard and decoding process

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
DV-EVM	Digital Video Evaluation Module
SMPTE	Society of Motion Picture and Television Engineers
VC1	Video Codec 1
WMV9	Windows Media Video 9

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