
MPEG4 Simple Profile Decoder (v1.11) on C64x+

FEATURES

- eXpressDSP™ Multimedia (XDM 0.9 IVIDDEC) interface compliant
- Validated on the DM648/TNETV2685 EVM
- MPEG4 visual simple profile level 0, 1, 2, 3, 4A, and 5 supported
- H.263 baseline profile level 10, 20, 30, and 45 supported
- Post-processing filter, de-blocking, and de-ringing supported
- Spatial and temporal error concealment supported
- Contains optimized I and P flow to decode frames up to D1 (720 x 576) resolution @ 30 frames per second (fps)
- Outputs are available in YUV 420 planar and

422 interleaved little endian formats

- Display width feature supported

DESCRIPTION

MPEG4 is a popular video algorithm defined by MPEG (Motion Picture Expert Group) for video conferencing applications. The input to the decoder can be MPEG4 or H.263 encoded bit stream. The output of the decoder is a YUV sequence, which can be of format 420 planar and 422 interleaved.

PRODUCT PREVIEW



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Performance Summary

This section describes performance of the MPEG4 simple profile decoder on DM648/TNETV2685 EVM.

Table 1. Configuration Table

CONFIGURATION	ID
MPEG4 visual simple profile levels 0, 1, 2, 3, 4A, and 5; H.263 baseline profile level 10, 20, 30, and 45	MPEG4_DEC_001

Table 2. Cycles Information - Profiled on DM648/TNETV2685 EVM With Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND) ⁽¹⁾		
	TEST DESCRIPTION	AVERAGE ⁽²⁾	PEAK ⁽³⁾
MPEG4_DEC_001	akiyo_qcif10_q1.yuv, MPEG4, YUV420, QCIF @ 1 mbps	56	64
	cif_high_256kbps_100f_fixedqp20_nofilter.yuv, MPEG4, YUV420, CIF @ 256 kbps	52	71
	foreman_vga_dp0.yuv, MPEG4, YUV420, VGA @ 3 mbps	125	146
	hp_720x480.yuv, MPEG4, YUV420, D1 @ 10 mbps	178	210
	akiyo.qcif.yuv, H263, YUV420 , QCIF @ 122 kbps	23	25
	akiyo.cif.890 kbps.yuv, H263, YUV420, CIF @ 890 kbps	75	81

(1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration: 32 K-bytes L1P cache, 32 K-bytes L1D cache, 64 K-bytes L2D RAM, and 256 K-bytes L2 cache.

(2) Based on average number of cycles per frame computed for all resolutions @ 30 fps.

(3) Based on worst case cycles per frame computed for all resolutions @ 30 fps.

Table 3. Cycles Information - Profiled on DM648/TNETV2685 EVM With Code Generation Tools Version 6.0.8 for foreman_vga_dp0.m4v, MPEG4 (YUV420, VGA @ 3 mbps)

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND) ⁽¹⁾		
	TEST DESCRIPTION	AVERAGE ⁽²⁾	PEAK ⁽³⁾
MPEG4_DEC_001	With De-blocking enabled	246	268
	With De-ringing enabled	271	292
	With De-blocking and de-ringing enabled	326	349

(1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration: 32 K-bytes L1P cache, 32 K-bytes L1D cache, 64 K-bytes L2D RAM, and 256 K-bytes L2 cache.

(2) Based on average number of cycles per frame computed for all resolutions @ 30 fps.

(3) Based on worst case cycles per frame computed for all resolutions @ 30 fps.

Table 4. Memory Statistics - Generated with Code Generation Tools Version 6.0.8

CONFIGURATION ID	MEMORY STATISTICS ⁽¹⁾				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL ⁽²⁾	EXTERNAL	STACK	
MPEG4_DEC_001(QCIF)	143	61	572	8	817
MPEG4_DEC_001(CIF)	143	61	1470	8	1715
MPEG4_DEC_001(VGA)	143	61	3775	8	4020
MPEG4_DEC_001(D1)	143	61	4954	8	5199

(1) All memory requirements are expressed in kilobytes (1 K-byte = 1024 bytes) and there could be a variation of approximately 1-2% in values.

(2) Internal memory is placed in L2D RAM.

Table 5. Internal Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY – INTERNAL ⁽¹⁾		INSTANCE ⁽²⁾
	SHARED		
	CONSTANTS	SCRATCH	
MPEG4_DEC_001	0	61	0

- (1) Internal memory refers to L2D RAM. All memory requirements are expressed in kilobytes and there could be a variation of approximately 1-2% in values.
- (2) I/O buffers not included. Some of the instance memory buffers could be scratch.

Table 6. Co-Processor(s) Memory Statistics

CONFIGURATION ID	SEQ DATA MEMORY	SEQ PROG MEMORY	IMX WORKING MEM	IMX IMG BUF	IMX CMD MEM
MPEG4_DEC_001	0	0	0	0	0

Note:

The decoder does not use co-processors and hence, all the values are zero.

Notes

- Evaluation version performance values may be higher than the values specified in the performance table.
- I/O buffers:
 - Input buffer size = 405 K-bytes (D1, one YUV422 interleaved frame)
 - Output buffer size = 810 K-bytes (for decoding one D1 frame)
- Memory Configuration
 - L1P : 32 K-bytes program cache
 - L1D : 32 K-bytes data cache
 - L2 : 256 K-bytes cache
 - L2DRAM : 64 K-bytes
- The algorithm uses 4 QDMA channels each requiring up to a maximum of 6 linked transfers. The algorithm uses DMAN3 interface for logical allocation of these channels.
- 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

- MPEG4 standard specified by Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG (ISO_IEC_14496-2_2001)
- H.263 Standard (ITU-T Series H 02/98)
- *MPEG4 Simple Profile Decoder on C64x+ User's Guide* (literature number SPRUF69)

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
CIF	Common Intermediate Format
D1	720 x 480 Resolution
DMA	Direct Memory Access
DMAN3	DMA Manager
EVM	Evaluation Module
NTSC	National Television Standards Committee
QCIF	Quarter Common Intermediate Format
QDMA	Quick Direct Memory Access
QVGA	Quarter Video Graphics Array
SQCIF	Sub Quarter Common Intermediate Format
VGA	Video Graphics Array
XDM	eXpressDSP Digital Media

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