- **eXpressDSP Digital Media (XDM1.0) compliant**
- **Validated on DM6467 EVM**
- **Up to Level 5 features of the Advanced Simple Profile (ASP) supported**
- **Progressive and interlaced frame type picture decoding supported**
- **Multiple packet decoding supported**
- **Short video header (H.263) supported**
- **All AC/DC prediction supported**
- **4MV and UMV modes supported**
- **Motion compensation pixel accuracy up to Quarter-pel.**
- **Both MPEG4 and H.263 style quantization is supported**
- **Error Resilience(ER) tools (HEC and re-sync marker) up to CIF resolution supported**
- **Resolutions up to PAL D1 (720 x 576) and WVGA (864 x 480) supported**
- **A minimum resolution of 128 x 64 supported**
- **YUV420 semi-planar output format with Chroma interleaved for the frames supported**

Description

MPEG4 (from ISO/IEC) is a popular video coding algorithm enabling high quality multimedia services on a limited bandwidth network. MPEG4 standard defines several profiles and levels, which specify restrictions on the bit stream, and hence limits the capabilities needed to decode the bit-streams.

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Summary of Performance

This section describes the performance of Standalone MPEG4 Decoder tested on DM6467 EVM.

Table 1. Configuration Table

CONFIGURATION	ID
MPEG4 Advanced Simple Profile levels up to 5	MPEG4_DEC_002

Table 2. Cycles Information – Profiled on DM6467 EVM with Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGA-HERTZ, MHZ)						
	TEST DESCRIPTION	AVERAGE			PEAK		
		DSP (C64X+) MHZ NON-BLOCKING	DSP (C64X+) MHZ BLOCKING	FPS (DSP @ 600 MHZ)	DSP (C64X+) MHZ NON-BLOCKING	DSP (C64X+) MHZ BLOCKING	FPS (DSP @ 600 MHZ)
MPEG4_DEC_002	flower_352x288_100fr_SP_657Kbps.mp4 (CIF@30fps, SP, 657kbps)	21	43	376	22	47	348
	flower_352x288_100fr_ASP_656kbps.mp4 (CIF@30fps, ASP, 656kbps)	22	46	359	23	50	328
	foreman_p640x480_100fr_SP_4021kbps.mp4 (VGA@30fps , SP, 4mbps)	59	142	122	60	144	120
	foreman_p640x480_100fr_ASP_4021kbps.mp4 (VGA@30fps, ASP, 4mbps)	77	168	103	84	177	98
	football_720x480_100fr_SP_4534kbps.mp4 (D1@30fps, SP, 4.5mbps)	67	158.5	109	68	162	107
	football_720x480_100fr_ASP_4525kbps.mp4 (D1@ 30fps, ASP, 4.5 mbps)	85	186	94	97.5	207	85

Note:

1. For calculating FPS, frame level overhead (on DSP) is added to maximum of DSP and HDVICP loads. These are actual cycles as seen from host on DM6467 EVM and will be close to cycles seen on the final system (for average case).
2. These figures are with Cache enabled on C64x+ side.
3. They are measured in standalone mode without actual framework.

4. All numbers are based on numbers collected [both average and peak] at frame level processing @ 30fps.
5. The version of the code used to collect these numbers have the following features included:
   i. Interrupt mode of operation – one interrupt signal processing overhead perMB pair.
   ii. Resetting of vIMCOP and loading of code into ARM968 DTCM – once per frame.
6. Measured with program memory, stack, and I/O buffers in external memory with cache configuration : 32 KB L1P Program Cache, 32 KB L1D Data Cache and 64 KB L2 Cache. There could be a variation of approximately 1-2% in the values.

Table 3. External Memory Statistics (Host DSP)

CONFIGURATION ID	MEMORY STATISTICS(IN KB)						
	PROGRAM MEMORY	DATA MEMORY					TOTAL
		CONSTANT[3]	HEAP		STACK	DPB	
			PERSISTENT	SCRATCH			
MPEG4_DEC_002	67	10	762	60	32	2200	3131

[1]All these memory requirements are for DSP encoder library only. Program memory size includes DMA library also. They do not include any memory requirements from test application side. Stack, heap and code requirements for test-application are extra. Constant memory size includes code size of ARM968 since it forms constant table on DSP to enable code transfer from DSP to ARM968. All memory requirements are expressed in terms of kilobytes. There could be a variation of approximately 1-2% in the values. [2]The constant size is the sum of .cinit, .bss, and .const sections used by MPEG4 encoder library.
It includes the frame buffers.

Table 4. Internal Data Memory(L2) Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL(IN KB)		
	SHARED		INSTANCE
	CONSTANTS	SCRATCH	
MPEG4_DEC_002	NA	16	NA

Resource requirement:

- The entire HDVICP (0/1) is a video resource and uses 16K ITCM and 8K DTCM.
- 18 EDMA channels and 64 additional param entries are required.
- TC-3 is used for transferring data from DDR to L2

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References

- ISO/IEC 14496-2:2003(E), 'Information Technology – Coding Of Audio-Visual Objects – Part 2: Visual'
- User Guide for MPEG4 Advanced Simple Profile Decoder (literature number: SPRUFF9)

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

CIF	Common Intermediate Format
D1	720x480 or 720x576 resolutions in progressive scan
DMA	Direct Memory Access
DP	Data-Partition
DPB	Decoded Picture Buffer
EVM	Evaluation Module
QCIF	Quarter Common Intermediate Format
QVGA	Quarter Video Graphics Array
RVLC	Reversible Variable Length Coding
SQCIF	Sub Quarter Common Intermediate Format
TCM	Tightly Coupled Memory
UMV	Unrestricted Motion Vectors
VGA	Video Graphics Array
vIMCOP	Video and Imaging Co-processor sub-system.
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

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