

## 720p H.264 Base Profile Encoder (v01.20.02) on DM6467

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### FEATURES

- eXpressDSP™ Digital Media (XDM 1.0 IVIDENC1) compliant
- H.264 Baseline Profile for only progressive I and P frames supported
- Validated on DM6467 EVM
- YUV420 interleaved color sub-sampling (Y as a single plane and U and V components interleaved to form the second plane) formats supported
- Baseline Profile H.264 Encoder supported
- Limited Main Profile with CABAC method of entropy coding supported
- Limited High Profile with 8x8 transforms for Intra Macro Blocks supported
- Skip macro-blocks supported
- Only one motion vector per macro-block supported for resolutions D1 and above
- Four motion vectors supported for resolutions

less than D1

- Rate control at frame level supported
- Use of C64x+ and ARM968 of HDVICP0 supported
- DMA based framework supported
- Multiple slices at row boundaries supported

### DESCRIPTION

H.264 is the latest video compression standard from the ITU-T Video Coding Experts Group and the ISO/IEC Moving Picture Experts Group. This H.264 Encoder is validated on the DM6467 EVM with Code Composer Studio version 3.3.49 and code generation tools version 6.0.8.

**PRODUCT PREVIEW**



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## Performance Summary

This section describes the performance of the H264 Base Profile Encoder on DM6467 EVM.

**Table 1. Configuration Table**

CONFIGURATION	ID
H.264 Limited High Profile Encoder (One frame as a single slice with Low Power ME)	DM6467_BP_E_001
H.264 Limited High Profile Encoder (One row as one slice with Low Power ME)	DM6467_BP_E_002
H.264 Limited High Profile Encoder (One frame as a single slice with Hybrid ME)	DM6467_BP_E_003

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

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND) <sup>(1)</sup>		
	TEST DESCRIPTION <sup>(2)</sup>	AVERAGE NON-BLOCKING DSP CYCLES @594 MHZ <sup>(3)</sup>	AVERAGE BLOCKING DSP CYCLES @594 MHZ <sup>(3)</sup>
DM6467_BP_E_001	starwars17nvdK_720x480.yuv	124	179
	city_p1280x720_30fps_420pl_600fr.yuv	315	454
DM6467_BP_E_002	starwars17nvdK_720x480.yuv	132	182
	city_p1280x720_30fps_420pl_600fr.yuv	318	454
DM6467_BP_E_003	Bball_320x240	37	97

- (1) 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 32 KB L2 Cache. There could be a variation of approximately 1-2% in the values.  
(2) The Intra Period for the test vectors is 30 frames. That is, with one I-frame and 29 P-frames.  
(3) Based on average number of cycles per frame @ 30fps.

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

CONFIGURATION ID	MEMORY STATISTICS <sup>(1)</sup>				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL <sup>(2)</sup>	EXTERNAL <sup>(3)</sup>	STACK	
DM6467_BP_E_001	86	21	3439	10	3556

- (1) All memory requirements are expressed in kilobytes (1K-byte = 1024 bytes). There could be a variation of approximately 1-2% in the values.  
(2) Internal memory is placed in L2 SRAM.  
(3) Includes frame buffers for 720p resolution.

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

CONFIGURATION ID	DATA MEMORY - INTERNAL <sup>(1)</sup>		
	SHARED		INSTANCE
	CONSTANTS	SCRATCH	
DM6467_BP_E_001	0	21	0

- (1) All memory requirements are expressed in kilobytes. There could be a variation of approximately 1-2% in the values.

**Table 5. External Data Memory Split-Up**

CONFIGURATION ID	DATA MEMORY - EXTERNAL <sup>(1)</sup>		
	SHARED		INSTANCE
	CONSTANTS	SCRATCH	
DM6467_BP_E_001	111	77	3251

- (1) All memory requirements are expressed in kilobytes. There could be a variation of approximately 1-2% in the values.

## Notes

The performance values in [Table 2](#) is the result of the following configuration:

- The entire HDVICP is a video resource and uses 16K ITCM and 8K DTCM.
- Cache/SRAM configuration

**Table 6. Cache/SRAM Configuration**

	AVAILABLE	CACHE	SRAM
L1 p (Program Memory)	32K	32K	0K
L1d (Data Memory)	32K	32K	0K
L2	128K	32K	96K <sup>(1)</sup>

(1) For actual usage of L2 – SRAM, see [Table 4](#).

- DMA Configuration

**Table 7. DMA Configuration**

TC Q's	TC 0	TC 1	TC 2	TC 3	TOTAL	MAXIMUM
Usage	Writes to L2 SRAM	Writes to DDR/HDVICP	Not used	Writes to DDR/HDVICP	-	-
Priority <sup>(1)</sup>	2	2	-	2	-	-
EDMA channels	1	11	-	9	21	64
QDMA channels	0	0	-	0	0	8
Num PARAMS	4	40	-	27	71	512

(1) Lesser number of priority corresponds to higher TC priority. Default priority for all TCs is 2. When different TCs have same priority, the arbitration order is TC0 > TC1 > TC2 > TC3.

- Code placement

All the algorithm code are placed in external memory. The performance values in [Table 2](#) are sensitive to algorithm code placement. See the sample linker file provided in the test application setup for algorithm code placement.

## References

- ISO/IEC 14496-10:2005 Information technology -- Coding of audio-visual objects -- Part 10: Advanced Video Coding.
- *720p H.264 Base Profile Encoder on DM6467 User's Guide* (literature number: SPRUFD9C)

## 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
CIF	Common Intermediate Format
DMA	Direct Memory Access
DMAN3	DMA Manager
EVM	Evaluation Module
GOP	Group of Pictures
HDVICP	High Definition Video and Imaging Co-Processor

<b>ACRONYM</b>	<b>DESCRIPTION</b>
LPF	Loop Filter
MV	Motion Vector
QCIF	Quarter Common Intermediate Format
QDMA	Quick Direct Memory Access
QPI	Quarter Pel Interpolation
QVGA	Quarter Video Graphics Array
SQCIF	Sub Quarter Common Intermediate Format
UMV	Unrestricted Motion Vectors
VGA	Video Graphics Array
XDM	eXpressDSP Digital Media

## Revision History

This datasheet revision history highlights the changes made to the SPRS479B codec specific datasheet to make it SPRS479C.

### NOTE:

There are no changes in data sheet for this release.

**PRODUCT PREVIEW**

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Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
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