



- eXpressDSP™ Algorithm Interface Standard (XDAIS) compliant
  - eXpressDSP Digital Media (XDM) interface compliant
  - Validated on the DM6437 EVM
  - Baseline sequential mode with both interleaved and non-interleaved input format supported
  - Progressive mode supported
  - YUV 444, YUV 422, YUV 420, YUV 411, and Gray scale color sub-sampling formats supported
  - Maximum of three components supported
  - Maximum of three quantization tables supported
  - Maximum of four huffman tables each for AC and DC DCT coefficients supported
  - Arbitrary image size for sequential JPEG supported
  - 8-bit and 16-bit quantization tables supported
  - Resizing the output image by a factor of 1/2, 1/4, and 1/8 supported
  - On-the-fly resizing with respect to set maxHeight and maxWidth supported
  - YUV planar or YUV 422 interleaved output format supported
  - Frame level decoding of images for sequential mode and scan level decoding for progressive mode supported
  - All the data buffers and tables are placed in the external memory
  - Source images of 12-bits per sample not supported
- 
- JPEG File Interchange Format (JFIF) header skipped
  - Restart management for bit stream with Define Restart Interval Marker (DRI) and Restart Marker (RST) enabled

## description

JPEG is an international standard for color image compression. This standard is defined in the ISO 10918-1 JPEG Draft International Standard | CCITT Recommendation T.81. Supports baseline sequential mode with both interleaved and non-interleaved input format and also supports progressive mode.



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summary of performance

**Table 1. Configuration Table**

CONFIGURATION	ID
Baseline sequential decoder (4:2:0 input and 4:2:2 interleaved output) with no internal memory	JPEG_DEC_001

**Note:** This configuration does not require DMA resource

**Table 2. Cycles Information – Profiled on DM6437 EVM with Code Generation Tools Version 6.0.8**

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGA PIXELS PER SEC) <sup>1</sup>		
	TEST DESCRIPTION	AVERAGE <sup>2</sup>	PEAK <sup>3</sup>
JPEG_DEC_001	Measured with 10:1 compression ratio	44	None

<sup>1</sup> Measured with program memory, stack, and I/O buffers in external memory

<sup>2</sup> Measured for DM6437 EVM at 594 MHz with REMI0003.jpg

<sup>3</sup> Peak value is not calculated for this version of JPEG Decoder

**Note:** Default cache configuration (L1D cache: 16K-bytes, L2 cache: 128K-bytes, L1P cache: 32K-bytes).

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

CONFIGURATION ID	MEMORY STATISTICS <sup>4</sup>				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL <sup>5</sup>	STACK	
JPEG_DEC_001	54	0	37.18	8	99.18 <sup>6</sup>
JPEG_DEC_001 (720 x 480)	54	0	2062.18	8	2124.18
JPEG_DEC_001 (1280 * 1024)	54	0	7717.18	8	7779.18
JPEG_DEC_001 (1600x1200)	54	0	11287.18	8	11349.18
JPEG_DEC_001 (2048x1536)	54	0	18469.18	8	18531.18
JPEG_DEC_001 (2560x2048)	54	0	30757.18	8	30819.18

<sup>4</sup> All memory requirements are expressed in kilobytes (1K-byte = 1024 bytes).

<sup>6</sup> Applicable for Baseline Sequential Images

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

CONFIGURATION ID	DATA MEMORY – INTERNAL <sup>5</sup>		
	SHARED		INSTANCE <sup>6</sup>
	CONSTANTS	SCRATCH	
JPEG_DEC_001	0	0	0

<sup>5</sup> All memory requirements are expressed in kilobytes

<sup>6</sup> Does not include I/O buffer

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

CONFIGURATION ID	DATA MEMORY – EXTERNAL <sup>7</sup>		
	SHARED		INSTANCE <sup>8</sup>
	CONSTANTS	SCRATCH	
JPEG_DEC_001	0.18	7	30 <sup>9</sup>
JPEG_DEC_001 (720 x 480)	0.18	7	2055
JPEG_DEC_001 (1280 * 1024)	0.18	7	7710
JPEG_DEC_001 (1600x1200)	0.18	7	11280
JPEG_DEC_001 (2048x1536)	0.18	7	18462
JPEG_DEC_001 (2560x2048)	0.18	7	30750

<sup>7</sup> All memory requirements are expressed in kilobytes

<sup>8</sup> Does not include I/O buffer.

<sup>9</sup> Applicable for Baseline Sequential Images

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

CONFIGURATION ID	SEQ DATA MEMORY	SEQ PROG MEMORY	IMX WORKING MEM	IMX IMG BUF	IMX CMD MEM
JPEG_DEC_001	0	0	0	0	0

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



**notes**

- Total data memory for N non pre-emptive instances = Constants + Scratch + N\*(Instance + I/O buffers + Stack)

**references**

- ITU-CCITT recommendation T.81 (reproduction of ISO/IEC 10918-1)
- eXpressDSP Algorithm Interface Standard (TMS320 Algorithm Interface Standard)
- JPEG Decoder on C64x+ User Guide (literature number SPRUEY3)

**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**

CCS	Code Composer Studio
CCITT	Committee Consultative International Telephone and Telegraph
DCT	Discrete Cosine Transform
DRI	Define Restart Interval Marker
DSP	Digital Signal Processing
EVM	Evaluation Module
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JFIF	JPEG File Interchange Format
JPEG	Joint Photographic Experts Group
RST	Restart Marker
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

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