- **eXpressDSP™ Algorithm Interface Standard (XDAIS) compliant**
- **eXpressDSP Digital Media (XDM) Interface compliant**
- **Validated on the DRA446 EVM**
- **MPEG-2 main-profile-at-high-level (MP@HL) feature of the ISO/IEC 13818-2 standard supported**
- **ISO/IEC 13818-4 conformance standard, based on Inverse Discrete Cosine Transform (IDCT) compliant**
- **YUV 420 planar and YUV 422 interleaved output formats supported**
- **Interlaced and progressive decoding supported**
- **Only elementary video stream input formats supported**
- **MPEG-1 Constrained Parameters Bit-streams (CPB) supported**
- **Bottom field reordering in case of non-progressive sequences where bottom field is sent ahead of top field for frame pictures supported**
- **Trick play and reverse play supported**
- **DisplayWidth feature supported**
- **Streams which are non-multiples of 16 supported**
- **Feature XDM_PARSE_HEADER supported. It allows parsing of only the headers, skipping the picture data decoding.**

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description

MPEG2 video standard specifies the decompression and coded representation for entertainment-quality digital video. This codec has been built and tested on DRA446 EVM with XDS560 JTAG emulator, Code Composer Studio version 3.2.40.12, and code generation tools version 6.0.8.

summary of performance

Table 1. Configuration Table

CONFIGURATION	ID
MP@ high level features. YUV 4:2:0 planar output, Default Memory	MPEG2_DEC_001

Table 2. Profiled on DRA446 EVM with Code Generation Tools Version 6.0.8

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGA CYCLES PER SEC)[1]		
	TEST DESCRIPTION	AVERAGE	PEAK[2]
MPEG2_DEC_001	stefan250.m2v, 352 X 288 @ 4 mbps	49.89	57.61
	TM5_football_4.0M.bs.mpg, 704 X 480 @ 4 mbps	138.63	179.62
	gi_stream.m2v, 720 X 480 @ 14.987 mbps	178.75	199.35

[1] Measured with program memory, stack, and I/O buffers in external memory and with cache configuration 16K-bytes L1D cache and 64K-bytes L2 cache.
[2] Peak values are calculated assuming that the most demanding frame is repeated 30 times in the sequence, rather than finding the most demanding 30 frames sequence in the bit stream.

Note: With input encoded stream in the big-endian format, byte swap inside the library is going to cost [(bitrate/8) * 3] cycles/second. For 4 mbps stream it will translate to 3.932 MHz.

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

CONFIGURATION ID	MEMORY STATISTICS[5]				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL[6]	EXTERNAL[7]	STACK	
MPEG2_DEC_001 (352 X 288)	110.00	39.00	674.82	4.00	827.82
MPEG2_DEC_001 (704 X 480)	110.00	39.00	2111.82	4.00	2264.82
MPEG2_DEC_001 (720 X 480)	110.00	39.00	2158.32	4.00	2311.32

[5] All memory requirements are expressed in kilobytes (1K-byte = 1024 bytes).
[6] Internal memory is placed in L1D RAM.
[7] Includes frame buffers for 1080I resolution.

Table 4. Internal Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL[8]		
	SHARED		INSTANCE
	CONSTANTS	SCRATCH	
MPEG2_DEC_001	0.00	39.00	0.00

[8] All memory requirements are expressed in kilobytes.

Table 5. Co-Processor(s) Memory Statistics

CONFIGURATION ID	SEQ DATA MEMORY	SEQ PROG MEMORY	IMX WORKING MEM	IMX IMG BUF	IMX CMD MEM
MPEG2_DEC_001	0	0	0	0	0

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

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notes

- Evaluation version performance may be off by up to 30 MHz.
- Does not use internal memory for persistent buffers. Relieves algorithm from preserving persistent memory in task switch scenario.
- No constants are on internal memory.
- Display buffer for YUV422 interleaved format = 4050K-bytes for HDTV_1080I format (1920X1080)
- Input buffer to algorithm is assumed to have at least one encoded frame data.
- Memory Configuration:
  - L1P: 32K-bytes program cache
  - L1D: 64K-bytes data memory and 16K-bytes data cache
  - L2: 64K-bytes cache
- The algorithm uses 4 QDMA channels totaling 32 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

- ISO/IEC 11172-2:1993 Information technology -- Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbits/s -- Part 2: Video (MPEG-1 video standard).
- ISO/IEC 13818-2:2000 Information technology -- Generic coding of moving pictures and associated audio information: Video (MPEG-2 video standard)
- MPEG2 Main Profile Decoder on C64x+ User Guide

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

CPB	Constrained Parameters Bit-streams
DMA	Direct Memory Access
DMAN3	DMA Manager
EVM	Evaluation Module
IDCT	Inverse Discrete Cosine Transform
MCPS	Mega Cycles Per Second
MPEG	Motion Picture Expert Group
QDMA	Quick Direct Memory Access
XDAIS	eXpressDSP Algorithm Interface Standard
XDM	eXpressDSP Digital Media

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