Digital Signal Processor Video Codec Software

MPEG-4/H.263 Encoder Software Module

Supports StarCore SC3850-based DSPs (MSC815x and MSC825x)

Overview

The MPEG-4/H.263 encoder software module for the MSC815x and MSC825x multicore DSP families implements the Simple Profile (SP) of the MPEG-4 standard and the H.263v1 and H.263v2 (also known as H.263 p3) of the H.263 standard.

MPEG-4 is an ISO/IEC standard developed by Moving Pictures Experts Group (MPEG). MPEG-4 is used in many applications, including compression of AV data for Web (streaming media), CD distribution, voice (telephone, videophone) and broadcast.

The H.263 codec, developed by the ITU-T Video Coding Experts Group (VCEG), is a video compression standard originally designed as a low bitrate compressed format for videoconferencing

Key Features

- MPEG-4 SP/H.263 baseline/H.263 profile 3
- YUV 4:2:0 non-interleaved input
- Support for Intra(I) and Inter(P) frames
- CBR rate control
- Support for basic error resilience tools
- MPEG-4-specific features:
  - Short-header support
  - RFC 3016 RTP support
- H.263-specific features:
  - Support for H263 annexes I, J, K and T
  - Support for custom picture format (CPF)
  - RTP support: RFC 2190 for H263v1 and RFC 2429 for H263v2
- Complies with Freescale's SmartDSP API for video extensions
- Validated on MSC8156ADS

Performance Data

Table 1 lists the configurations used as benchmarks for the MPEG-4/H.263 encoder. The codec is configured for IPPP coding using the highest quality settings.

Table 1. Benchmark Test Configurations

Configuration	Test description	
	Name	Details
Cfg_1	QCIF_bowing	176 x 144, 15 fps, 300 frames, 64 Kbps
Cfg_2	CIF_mobile	352 x 288, 30 fps, 300 frames, 720 Kbps
Cfg_3	4CIF_ICE	704 x 576, 30 fps, 240 frames, 1 Mbps

The processing requirement of the software is measured in millions of cycles per second (MCPS). The table below summarizes the MCPS requirements and attained PSNR values for the set of configurations listed in Table 1. Performance is measured with L2 configured as 256 KB cache and 256 KB memory.

Table 2. Performance Benchmark Numbers

Performance for MPEG-4 Simple Profile

Configuration	Average MCPS	PSNR		
		Y	Cb	Cr
Cfg_1	14.6	39.13	43.57	43.93
Cfg_2	148.0	25.96	29.50	29.00
Cfg_3	340.7	37.54	43.42	43.57

Performance for H.263 Baseline Profile

Configuration	Average MCPS	PSNR		
		Y	Cb	Cr
Cfg_1	13.9	38.67	43.33	43.86
Cfg_2	140.5	25.14	28.95	28.39
Cfg_3	323.0	37.38	43.64	43.52

Memory Requirements

The MPEG-4/H.263 encoder memory requirements are summarized in Table 3.

Table 3. Memory Requirements

Memory	Type	QCIF: 176 x 144	CIF: 352 x 288	4CIF: 704 x 576
M2	Persistent	6,096	6,096	6,096
	Scratch	35,299	53,220	103,912
DDR	Persistent	109,872	368,688	1,342,512
	Scratch	170,016	170,016	235,552

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