

Multi Codec Hardware IP - 'EXODUS I'TM,

H.263, H.264 and MPEG-4 codec
VC-1 (WMV9) Decoder for Mobile Devices



Multi Codec Hardware IP - 'EXODUS I™,

H.263, H.264 and MPEG-4 codec VC-1(WMV9) Decoder for Mobile Applications

EXODUS I™ is high-performance multi-codec hardware IP - H.263, H.264 and MPEG-4 codec; and VC-1 (WMV9) decoder - which is optimized for use in mobile devices. EXODUS I™ delivers unprecedented VC-1 (WMV9) decoding performance, and integrates numerous advanced multimedia features such as a digital multimedia broadcasting interface and a portable multimedia player interface. It also supports rich media applications such as video telephony and Personal Media Player (PMP).

Standard Compliance

- H.263 baseline profile
- H.264 baseline profile
- MPEG-4 simple profile
- VC-1 (WMV9) main profile

Performance

- Memory Bandwidth
 - ✓ H.263 Encoder: D1 @ under 60MHz
 - ✓ H.263 Decoder: D1 @ under 50MHz
 - ✓ H.264 Encoder: D1 @ under 70MHz
 - ✓ H.264 Decoder: D1 @ under 65MHz
 - ✓ MPEG-4 Encoder: D1 @ under 65MHz
 - ✓ MPEG-4 Decoder: D1 @ under 50MHz
 - ✓ VC-1 Decoder: D1 @ under 60MHz

Key Features

- Real-time encoding or decoding up to D1 resolution
 - ✓ 720x576 @ 30fps
 - ✓ 720x480 @ 30fps
- High quality encoding with efficient motion estimation and mode decision
- Rate-distortion optimization
- Superior error detection and recovery
- Optimized low power consumption architecture
- Rate control (VBR, CBR)
- Supports interlace and progressive mode

Applications

- MobileTV applications
 - ✓ DVB-H, T-DMB, S-DMB, ISDB-T (1-Seg), OMA BCAST, MPH and more
- PMP, MP4 player, PVR
- 3.5G, 4G terminal devices
- Video Telephony

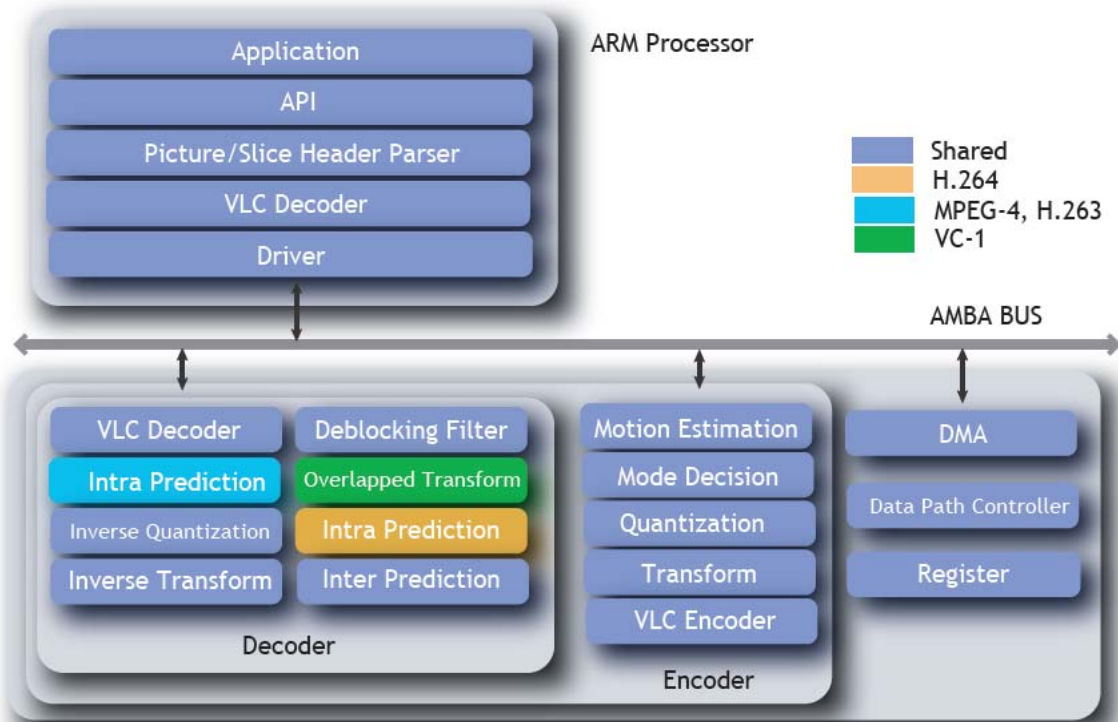
Technical Details

- Supports full H.263, H.264 and MPEG-4 encoder feature sets
 - ✓ Window size : ($\pm 64, \pm 32$)
 - ✓ Multiple block size motion estimation (16x16~4x4)
 - ✓ Half-pel (1/2 precision), Sub-pel (1/4 precision) motion estimation
 - ✓ 4x4/16x16 Intra prediction
 - ✓ Multiple block size transformation
- Supports full H.263, H.264, MPEG-4, and VC-1 decoder feature sets
 - ✓ Multiple block size motion compensation (16x16~4x4)
 - ✓ Half-pel (1/2 precision), Sub-pel (1/4 precision) motion compensation
 - ✓ Transform domain intra prediction
 - ✓ Spatial domain intra prediction
 - ✓ In-loop de-blocking filter
 - ✓ 4x4 block transform
 - ✓ Bi-linear and bi-cubic interpolation
 - ✓ Overlapped transform
- Dedicated DMA
 - ✓ Supports 1D/2D Access
 - ✓ Various burst mode
 - ✓ Event driven transfer
- Full sharing of resources
 - ✓ Dedicated DMA
 - ✓ Pipeline buffer and line buffer
 - ✓ Pipeline control
 - ✓ Register file of multi codec
 - ✓ Shared blocks of encoder and decoder

Specifications

EXODUS 1	Codec	Profile and Level	Resolution	Frame rate	Availability
	H.264 codec	Baseline profile @Level 3	Up to D1 (720x480, 720x576)	Up to 30 fps	Available
	MPEG-4 codec	Simple profile @ Level 3			
	H.263 codec	Baseline profile @ Level 40			
	VC-1 decoder	VC-1 main profile @ Medium Level			

Functional Block Diagram



U.S. Office
 Thin Multimedia, Inc.
 1731 Embarcadero Road, Suite 220
 Palo Alto, CA 94303-3339
 Phone: 650 856 2700 FAX: 650 856 2727
 www.thinmultimedia.com

Korea Office
 Thin Multimedia, Co., Ltd.
 59-4 Banpo-dong, Seocho-gu
 (Songwon Bldg, 3rd Fl.), Seoul, Korea
 Phone: +82 2 536 2840 FAX: +82 2 536 3601
 www.thinmultimedia.co.kr