

AVC/VC-1/MPEG HIGH-DEFINITION DECODER

FEATURES

- **Multi-standard video decoding support for:**
 - MPEG-2 MP@ML
 - MPEG-2 MP@HL
 - AVC HP@L3.0 for 480i
 - AVC HP@L3.2 720p
 - AVC HP@L4 1080i
 - AVC HP@L4.1 1080i for Blu-Ray and HD DVD
 - VC-1 SP@ML
 - VC-1 MP@ML
 - VC-1 AP@L3 1080i
- **Multi-standard audio decoding**
 - MPEG2 AAC-LC- Stereo and 5.1
 - MPEG4 AAC HE (High Quality)-Stereo (level 2) and 5.1 (level 4)
 - MPEG, LI LII, MP3 (MPEG1 layer 3)
 - Dolby® Digital Plus with transcode to Dolby Digital
- **HD-capable output interface**
 - BT.656
 - HD_DVI Interface for connection to BCM7038
- **Video post-processing with scaling, 3:2 pull-down, clipping, and padding**
- **HW Still Image Decoder (SID) supporting JPEG, PNG, MNG, GIF, RLE formats**

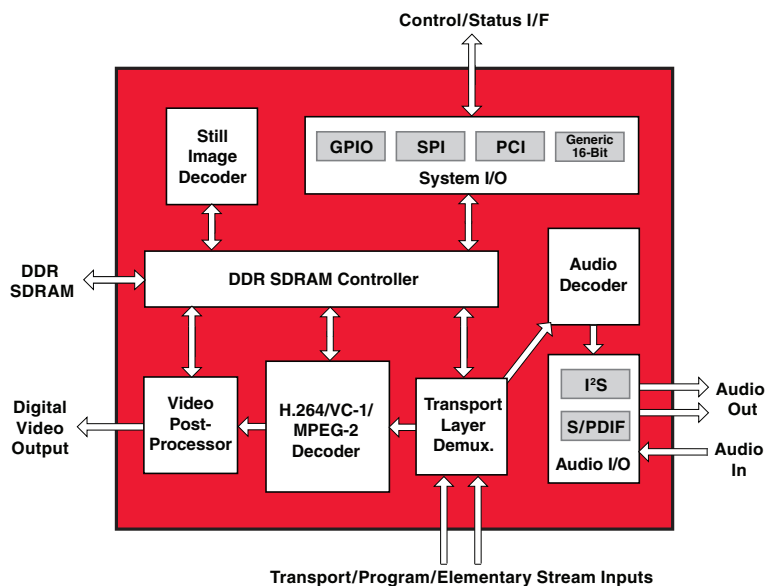
FUNCTIONAL COMPONENTS

- H.264/MPEG-4 part 10 decoder
- VC-1 Advanced, Simple, Main decoder
- MPEG-2 decoder
- Programmable audio decoder
- Transport demultiplexer
- Still Image Decoder (SID)
- HD-compatible digital video output port
- Multi-host control/status interface
- DDR SDRAM controller

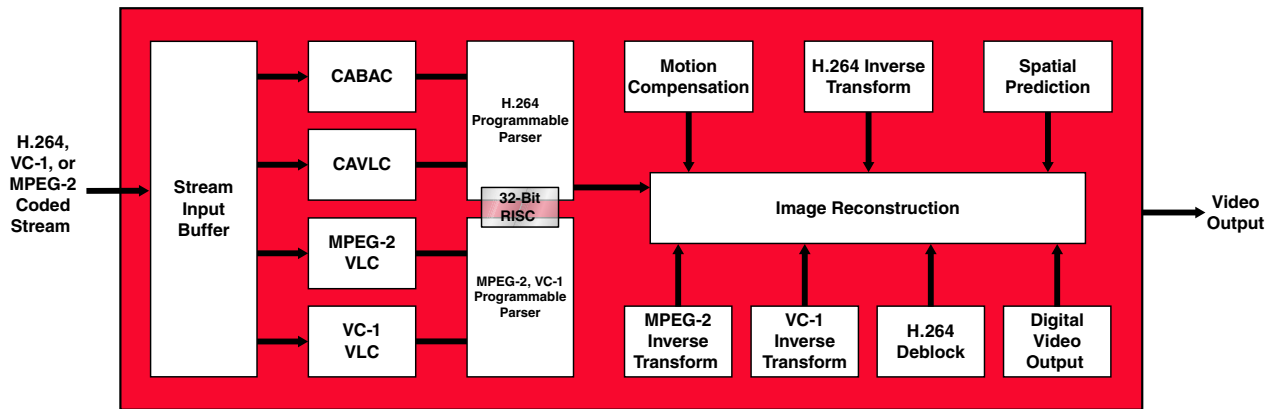
APPLICATIONS

- Digital cable, satellite, terrestrial, IP, and DSL set-tops
- HD-DVD and Blu-ray High-Definition DVD players
- DVR (playback)
- Portable multimedia players

BCM7412 Block Diagram



OVERVIEW



The BCM7412 Decoder

The BCM7412 introduces the advantages of the H.264 video compression algorithm to today's advanced consumer and broadcast applications. The BCM7412 is an AVC/VC-1/MPEG-2 decoder chip capable of full HD real-time decoding.

Broadcom's H.264 Compression Advantage™ architecture provides three times the compression power of MPEG-2. Systems incorporating the BCM7412 have superior image quality, improved system performance, and larger storage capacity with the reduced bit rates of H.264—also known as MPEG-4 Advanced Video Coding (AVC). The BCM7412 fully supports the MPEG-2 standard, so that compatibility with existing media can be maintained.

The BCM7412 supports both HD and SD formats (MPEG-2, H.264 or VC-1) in real time.

The H.264 Advantage

The H.264 coding standard incorporates innovations and techniques developed over decades of worldwide research into video compression. The algorithm produces results far superior to the preceding MPEG standards. H.264 derives much of its performance gain from complex motion estimation techniques, integration of an in-loop deblocking filter, and brand-new spatial prediction operations.

H.264 Support

- Complies with the ISO/IEC 14496-10 specification
- Decoder support for AVC High Profile streams up to level 4.1 with a 40 Mbps maximum encoded bit rate restriction
- I, B, and P slices
- CABAC and CAVLC entropy decoding
- Field/frame and picture adaptive decoding
- Macroblock adaptive field/frame decoding
- All intrablock and interblock sizes
- Resolutions supported: QCIF up to 1920 × 1088

MPEG-2 Support

The BCM7412 complies with the ISO/IEC 13818-2 specification and supports Main Profile up to high level at 125 Mbps.

VC-1 Support

The BCM7412 supports Advanced Profile VC-1 streams up to 40 Mbps, as well as Simple and Main, as defined in the proposed SMPTE specification.

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Transport/Program Stream Demultiplexer

The BCM7412 accepts transport or program streams depending on the preferred application, and parses the incoming video, audio, and private data for decoding. The BCM7412 monitors PCR information in the transport stream to adjust the frequency of an external VCXO oscillator.

Digital Video Output Port

The BCM7412 provides a configurable digital video output port for a glueless interface to the BCM7038 or to a variety of video DACs. The output may be configured for BT.656 and HD-DVI.

Still Image Decoder (SID)

The SID still-image decode accelerator operates autonomously, with its own general-purpose RISC processor that handles image headers, depacketization, and input/output DMA. It supports JPEG, PNG, MNG, GIF, RLE formats

System Control/Status Interface

The BCM7412 is intended for use as a peripheral system and requires a controlling agent to configure and monitor its operation. The following interfaces are supported:

- PCI 32-bit interface
- Generic 16-bit host interface
- SPI serial and GPIO interface

BCM7412 Specifications

Parameter	Value	Unit/Description
Logic supply	1.2	V
SDRAM I/O supply	2.6	V
I/O supply	3.3	V
Maximum power dissipation	2.5	W
Operating temperature	0 to 70	°C
Storage temperature	-30 to +125	°C

Package Information

Package type	336-pin	Ball grid array
Package size	27 × 27	mm



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