BROADCOM.
Connecting everything®

BCM7413 PRODUCT Brief



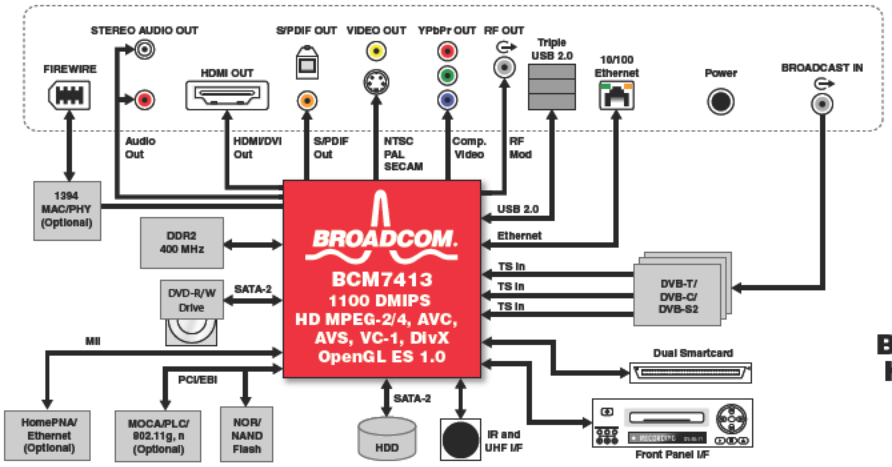
MULTIFORMAT HD DIGITAL VIDEO/AUDIO SOC FOR SATELLITE, IP, AND CABLE DVR SET-TOP BOX, WITH WATCH-AND-RECORD DVR AND OPENGL ES 1.0 3D GRAPHICS

FEATURES

- **Advanced multi-format decoder supporting the following:**
  - HD/SD H.264/AVC Main and High Profile to Level 4.1 (HD), Level 3.1 (SD)
  - HD/SD AVS Jizhun Profile Levels 2.0, 4.0, and 6.0 (720p and 1080i for HDTV)
  - VC-1 Advanced Profile @ Level 3, Simple and Main Profile
  - HD/SD MPEG-2 Main Profile at Main and High levels
  - SD MPEG-4 P2 SP/ASP
  - HD DivX® 3.11/4/5/6
- **Advanced audio processor supporting the following:**
  - AAC LC, AAC LC+SBR Level 2, AAC+ Level 2, AAC-HE
  - Dolby® Digital, Dolby Digital Plus
  - MPEG-1 layers 1, 2, and 3 (MP3)
  - Windows Media®and Windows Media Pro audio
  - One pair of on-chip stereo high-fidelity audio DACs
  - 3D SRS audio support
- **High-performance 2D-effects graphic engine**
  - Studio-quality text and graphics at HD resolution
  - Supports multiple layers and windows
- **OpenGL ES 1.0 3D Graphics Engine**
  - For high performance UIs and Mosaic-rich browsing
- **Digital noise and contour reduction (DNR/DCR)**
  - Reduces artifacts such as block/mosquito noise
- **Picture-in-picture supports simultaneous HD+SD display**
- **Mosaic Mode: 16 video decode/display for video-rich navigation**
- **Motion-adaptive deinterlacer with reverse 3:2/2:2 pull-down**
- **OpenCable™ ready with on-chip MPOD support**

FEATURES (CONT.)

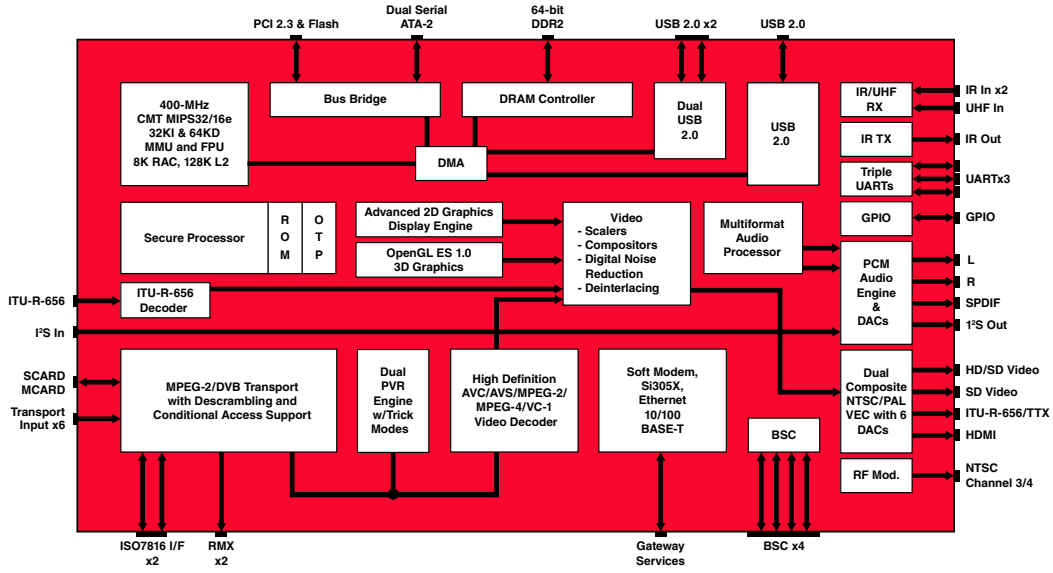
- **400-MHz Dual-Core CMT MIPS32®/16e class processor**
- **64-bit DDR2 800-MHz DRAM controller**
- **Dual SATA-II interfaces for DVR and DVD applications**
- **HD analog video encoder with simultaneous SD outputs**
  - NTSC-M/J, PAL-BDGHIN/M/Nc, SECAM analog outputs
  - 480i/480p/576i/576p/720p/1080i output formats
  - Component RGB/YPrPb HD/HD-DVO outputs
  - Macrovision® 7.1/NICAM support
  - SCART
  - VBI encoders for CC/TTX with NABTS/CGMSA/WSS/ Gemstar®, AMOL I/II standards and dedicated TTX sideband
  - RF modulator with BTSC encoder
  - ITU-R-656 input and output ports
- **HDMI 1.3/DVI 1.0 Mac and PHY with HDCP 1.2**
- **Broadcom security processor**
- **AES/1DES/3DES/CSS/CPRM/DTCP copy protection**
- **MPEG-2/DIRECTV®/DVB/ARIB data transport demux with 1DES/3DES/DVB/Multi2/AES descramblers**
- **V.92-capable soft modem with integrated SiLab Si305x system side device**
- **Dual USB 2.0 host controllers with host transceivers**
  - Additional host/client USB 2.0 controller/transceiver
- **Dual Ethernet MACs with integrated single PHY and MII**
- **Integrated SLC/MLC NAND Flash Controller**
- **UHF remote control receiver**
- **Dual Smart Card support**



BCM7413-Based HD Set-Top Box with PVR

BROADCOM.

OVERVIEW



BCM7413 Block Diagram

The BCM7413 is a high-performance, high definition (HD) satellite, cable, and IP set-top box DVR System-on-Chip solution. It combines a fast 1100-DMIPS MIPS32/MIPS16e™-class CPU, high-speed 2D and 3D graphics processing, including video scaling and motion adaptive deinterlacing, a very flexible data transport processor, an MPEG-4/VC-1/ MPEG-2/AVS-compliant video decoder, a programmable audio decoder, six video DACs, stereo high-fidelity audio DACs, dual Fast Ethernet ports (one with integrated PHY), triple USB 2.0, a PCI 2.3/Expansion Bus, a high-speed DDR2 800-MHz memory controller, and a peripheral control unit that provides a variety of set-top box control functions. Integrated in 65 nm technology, the BCM7413 offers one of the highest levels of single-chip system performance available for STB applications.

The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 255 PIDs via 255 PID channels in up to six independent external transport stream inputs and five internal playback channels. All 255 PID channels can be used by the record, audio, and video interface engine (RAVE) and PCR processing. The data transport supports up to 128 PID channels for message or generic PES processing and storage in up to 128 external DRAM message buffers. The data transport module can be configured to support eight record channels for PVR functionality and six A/V channels to interface to audio and video decoders.

The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for AES/1DES/3DES/CSS/CPRM/CPPM/DTCP copy protection algorithms/standards. The BCM7413 features the Broadcom Secure Processor (BSP), providing secure key generation, management, and protection. The BSP also supports downloadable security.

A new video decoder is featured in the BCM7413 that is capable of simultaneous decode of an HD and SD stream with picture-in-picture display. Other Mosaic or tiled stream combinations can also be supported for an enhanced video-rich navigation user experience. DivX 3.11/4/5/6 and MPEG-4 Part 2 Simple Profile and Advanced Simple Profile at Level 5 are additionally supported.

The BCM7413 has an advanced audio processor capable of decoding a wide range of digital audio formats, including a number of popular transcoding operations such as AAC to DTS 5.1 or AC3+ to AC3.

The BCM7413's video and graphics processing features significantly improved scaling and blending performance, enabling real-time video-like graphics effects and high-quality user interfaces supporting OpenGL ES 1.0 3D graphics and video presentation effects to be implemented. Digital contour reduction improves the video quality of low-bit-rate AVC/AVS video. An ITU-R-656 output port is also provided with a teletext sideband.

The 1100-DMIPS MIPS32™ CPU has been designed to maximize overall system performance and has significantly improved cache performance over previous-generation devices. The CPU subsystem also includes a Floating Point Unit.

Integrated peripherals include three UARTS, dual ISO7816 SmartCard interfaces, counter/timers, GPIO ports, a LED/keypad controller, IR receivers, an IR blaster, a UHF remote control receiver, an integrated soft modem system side device, and serial controllers. A non-SATA version (the BCM7414) is also available; contact your Broadcom salesperson for details.

Broadcom®, the pulse logo, **Connecting everything**®, and the Connecting everything logo are among the trademarks of Broadcom Corporation and/or its affiliates in the United States, certain other countries and/or the EU. Any other trademarks or trade names mentioned are the property of their respective owners.

Connecting everything®

BROADCOM CORPORATION
5300 California Avenue
Irvine, California 92617

© 2008 by BROADCOM CORPORATION. All rights reserved.

7413-PB00-R 12/11/08

Phone: 949-926-5000
Fax: 949-926-5203
E-mail: info@broadcom.com
Web: www.broadcom.com