



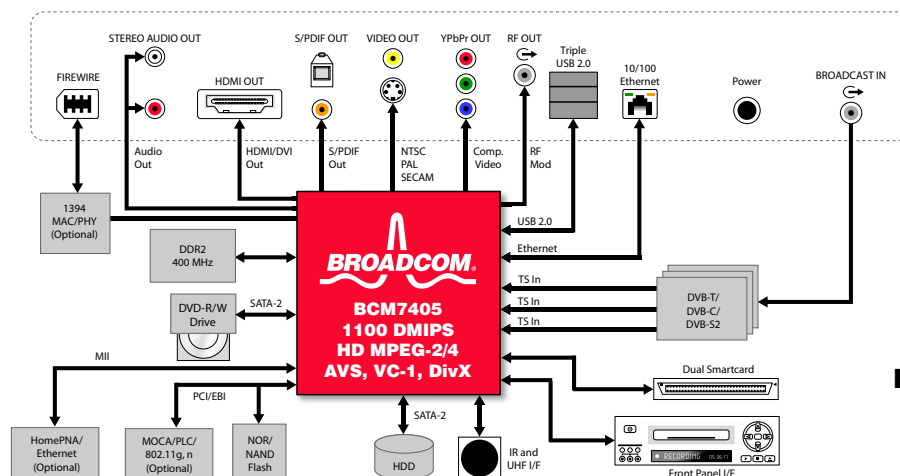
MULTI-FORMAT HD DIGITAL VIDEO/AUDIO SOC FOR SATELLITE, IP, AND CABLE DVR SET-TOP BOX, WITH WATCH-AND-RECORD DVR

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
 - MPEG still image decode
 - SD MPEG-4 P2 SP/ASP
 - HD DivX 3.11/4.11/5.x/6x/Home Theater
- **Advanced audio processor supporting the following:**
 - AAC LC, AAC LC+SBR Level 2, AAC+ Level 2, AAC-HE
 - Dolby[®] Digital, Dolby Digital Plus
 - MPEG I 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
 - One I²S input port and one I²S output port, plus S/PDIF output
- **High-performance 2D-effects graphic engine**
 - Studio-quality text and graphics at HD resolution
 - Supports multiple layers and windows
- **Digital noise and contour reduction (DNR/DCR)**
 - Reduces artifacts such as block/mosquito noise
- **Picture-in-picture**
 - Supports simultaneous HD+SD display
- **Mosaic Mode**
 - Supports up to 16 video decode/display for video-rich navigation
- **Motion-adaptive deinterlacer with reverse 3:2/2:2 pulldown**
- **OpenCable[™] ready with on-chip MPOD support**

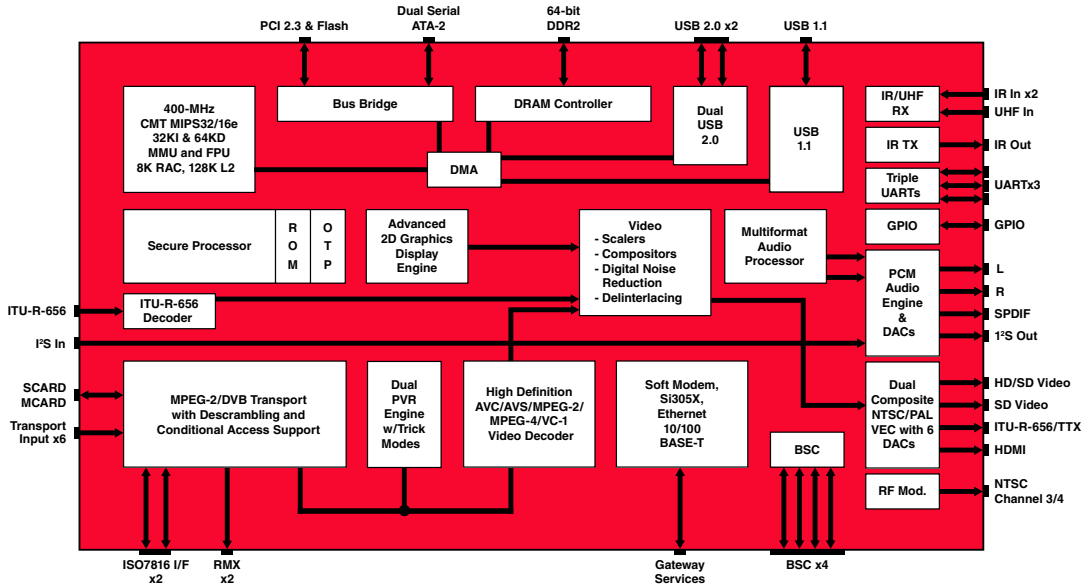
FEATURES (CONT.)

- **400-MHz Dual-Core CMT MIPS32[®]/16e class processor**
- **64-bit DDR2 DRAM controller**
- **Dual SATA-2 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 1 and 2
 - Component, S-Video, and composite via six on-chip V-DACs
 - 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 1.1**
- **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 controller with host transceiver**
 - Additional host/client USB 2.0 controller/transceiver
- **Dual Ethernet MACs with integrated single PHY and MII**
- **UHF remote control receiver**
- **Dual SmartCard support**



**BCM7405-Based
HD Set-Top Box
with PVR**

OVERVIEW



BCM7405 Block Diagram

The BCM7405 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 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 400-Mhz DDR2 memory controller, and a peripheral control unit that provides a variety of set-top box control functions. Integrated in 65-nm technology, it 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 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and two internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine (RAVE), PCR processing, message filter, and output via the high-speed transport or remux module. 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/CPM/DTCP copy protection algorithms/standards. The BCM7405 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 BCM7405 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 3.11/4.11/5.x and MPEG-4 Part 2 Simple profile and Advanced Simple profile at Level 5 are additionally supported.

The BCM7405 has an advanced audio processor capable of decoding a wide range of digital audio formats. This audio decoder also supports a number of popular transcoding operations such as AAC to DTS 5.1 or AC3+ to AC3.

The BCM7405's video and graphics processing features significantly improved scaling and blending performance, enabling real-time video-like graphics 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.

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