

## WXGA MULTIFORMAT DECODER CONNECTED DIGITAL TV SYSTEM-ON-A-CHIP

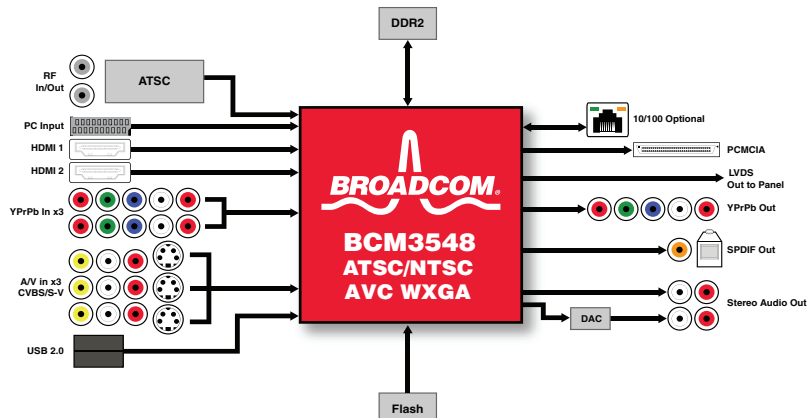
### FEATURES

- **Advanced multiformat decoder supporting the following:**
  - 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
  - VC-1 Advanced Profile @ Level 3, Simple and Main Profiles
  - HD/SD MPEG-2 Main Profile at Main and High levels
  - MPEG still image decode
  - HD DivX<sup>®</sup> 3.11/4.11/5.x/6x/Home Theater
- **3D/2D OpenGL<sup>®</sup> ES 1.0-compliant Graphics Core**
- **Integrated Video Processing:**
  - 3D Color management
  - Digital, analog, and mosquito noise reduction
  - 1080i motion adaptive deinterlacing with 3:2:2:2 pull-down
  - True 10-bit video carried through system
- **Dual HDMI 1.3a Receivers**
- **Extensive audio support:**
  - AAC+ Level 2, AAC-HE
  - Dolby<sup>®</sup> Digital, Dolby Digital Plus, Trusurround XT<sup>®</sup>
  - MPEG 1 layers 1, 2, and 3 (MP3)
  - Windows Media<sup>®</sup> and Windows Media Pro audio
  - Audio DACs, input switch and equalizer
- **Ethernet MAC and PHY**
- **NTSC/PAL decoder with a 3D/2D comb**
- **Direct PC input support up to 1600 x 1200 UXGA**
- **Integrated NTSC Demodulator, ATSC/QAM receivers, and dual-link LVDS transmitters**
- **Dual USB 2.0**
- **400-MHz Dual Core CMT MIPS32<sup>®</sup>/MIPS16e<sup>™</sup> class processor**

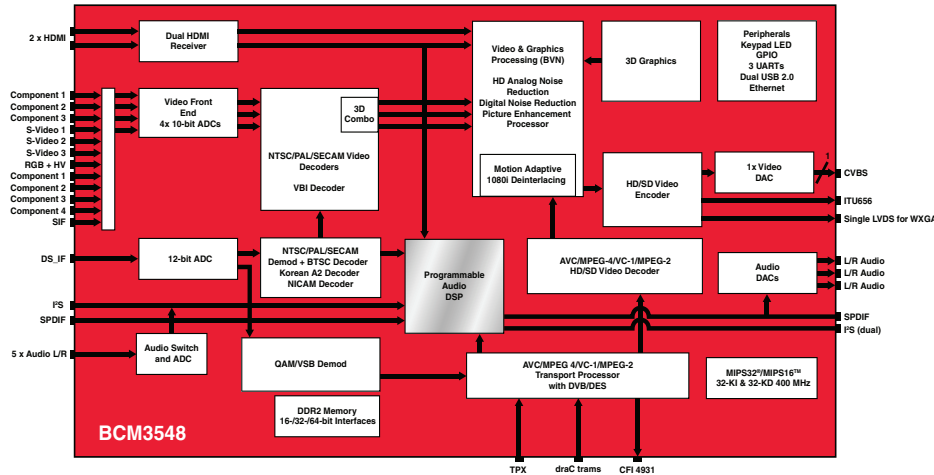
### SUMMARY OF BENEFITS

- **AVC support up to High Profile Level 4.1, which expands viewing of HD content from Networked or Broadband video servers.**
- **Ethernet connectivity enables the television to access home- and network-based photos, music, and videos.**
- **3D graphics provides a rich and product differentiating 10-ft user interface.**
- **WXGA support on a single chip.**
- **Dual 1.3a HDMI receivers provide connectivity to highest quality consumer electronic products including xvYCC, Deep Color, and on-chip HDCP Key Storage.**
- **Integrated dual-link LVDS transmitters provide direct connection with WXGA panels.**
- **3D color management system provides an elevated viewing experience through edge and color enhancements.**
- **Motion adaptive per pixel deinterlacing produces superior interlaced video.**
- **Direct PC input support with auto phase and mode detection reduces system design cost and complexity.**
- **3D comb filter with per pixel adaptive motion detection delivers excellent Y/C separation.**
- **Full 10-bit video support preserves signal integrity and image quality.**
- **Superior ATSC signal reception and demodulation under both static and dynamic multipath conditions.**
- **Comprehensive integration of ADCs and DACs supports direct audio/video inputs/outputs, simplifying system design and cost.**

### BCM3548 System Diagram



# OVERVIEW



**BCM3548 Block Diagram**

The BCM3548 is the next generation of System-on-a-Chip (SoC) Digital Television (DTV) products from Broadcom® with advanced video decoder, 3D/2D Graphics Core, Ethernet MAC and PHY, and 1080p60 input and WXGA output capability. These features, combined with a high level of integration and best-of-class picture quality, will revolutionize the consumer's DTV experience and enable TV manufacturers to reduce overall system cost (BOM) and improve picture quality, all with a single SoC.

The BCM3548 combines a cable/terrestrial 4/1024-QAM and 8/16-VSB receiver, NTSC demodulator, two DVI/HDMI receivers, a transport processor, and a digital audio processor. The BCM3548 performs digital processing of analog video and audio through the use of integrated analog video digitizer and DAC functions and stereo high-fidelity audio DACs. Also included is a 400-MHz dual-threaded MIPS processor and a peripheral control unit providing a variety of television control functions.

The BCM3548 includes integrated ATSC and QAM demodulators for off-the-air and cable-ready reception and an IF demodulator for NTSC reception. This reduces the overall cost of the external tuner module, resulting in cost savings for the customer. The BCM3548 also integrates four 10-bit ADCs with integrated front-end analog muxing that accept four CVBS inputs, three S-Video inputs, three component inputs, one PC input, and one Sound IF (SIF) input at the same time without the requirement for any off-chip muxing ICs. The BCM3548 offers two HDMI 1.3a receivers, a motion adaptive deinterlacer, HD Analog Noise Reduction, and an analog video decoder with 3D comb for NTSC.

The multiformat video decoder in the BCM3548 is capable of supporting high-definition AVC, VC-1, AVS, and ATSC MPEG-2 streams. AVC support is up to High Profile Level 4.1. New tools in the AVC Fidelity Range extensions are supported, including 8x8 transform and spatial prediction modes and adaptive quantization matrix. The video decoder also supports high-definition VC-1 (Advanced Profile Level 3, Main, and Simple Profiles), HD/SD AVS Jizhun Profile Levels 2.0, 4.0, and 6.0, and ATSC-compliant

MPEG-2, Main Profile at Main and High Levels. The BCM3548 has an advanced programmable audio processor capable of decoding a broad range of formats including Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ Level 2, AAC+ Level 4, WMA, and MPEG-1 Layers 1, 2, and 3 with simultaneous pass-through support.

The BCM3548 also supports 3D SRS Audio and includes an analog audio decoder for BTSC and A2 formats. BCM3548 also integrates an analog audio switch that accepts six stereo inputs. In addition, the SoC supports a SPDIF and I<sup>2</sup>S inputs. One SPDIF, two I<sup>2</sup>S, and three analog audio outputs are available.

The SoC family also has an integrated advanced Picture Enhancement Processor (PEP) to improve sharpening and to perform picture post-processing functions (e.g., autoflesh, green boost, black and blue stretch). The PEP engine is fully programmable and can be optimized by the TV manufacturer to meet their respective quality requirements. Also integrated is a video encoder for NTSC and an advanced 2D/3D graphics for OSD acceleration.

The BCM3548 supports direct PC inputs up to UXGA 1600x1200 formats with autophase and automode detection and supports dual LVDS outputs to support WXGA panels.

The BCM3548 integrates a 400-MHz 32-bit MIPS dual CPU with two 32-KB instruction caches and a combined 64-KB data cache with a 128-KB L2 cache, and 32-bit 800-/1066-MHz DDR2. The BCM3548 also supports an 8-bit external NAND Flash interface and an SPI Flash interface for booting. Integrated peripherals include two USB2.0 ports, three UARTs, controllers for SPI, BSC, keypad, LED, and IR Tx/Rx, and an Ethernet port with MAC and integrated PHY.

The BCM3548 is available in several package options: PIP and non-PIP, or MPEG-only and combined AVC/MPEG-2.

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3548-PB01-R 10/21/08

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