

DIGITAL TV SYSTEM-ON-CHIP

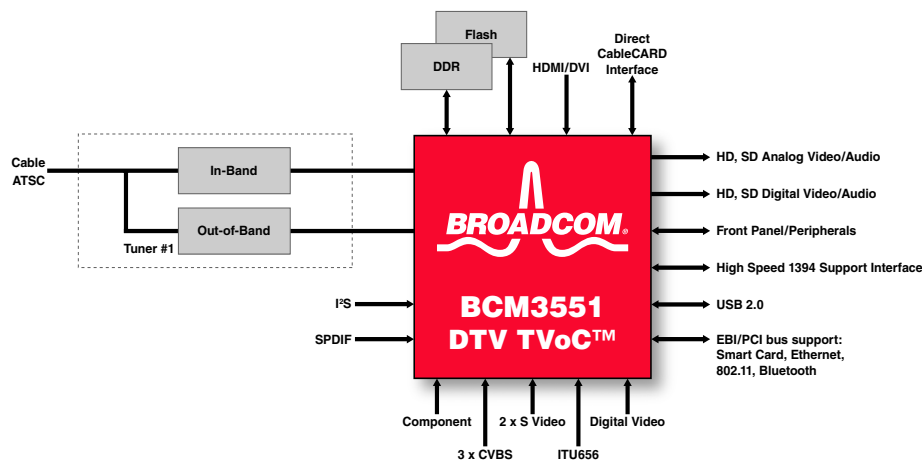
FEATURES

- **Complete Analog and Digital Television System-on-Chip**
- **ATSC and Digital Cable Ready Compatible**
 - ATSC, 4-1024 QAM and out-of-band receivers
 - Direct CableCARD™ interface
- **On-chip Analog Signal Processing**
 - 3D Y/C comb separation
 - On-chip IF demodulator
 - NTSC/PAL analog video decoder
 - Supports direct 480i, 480p, 720p, 1080i analog inputs
 - BTSC and A2 audio decoder
 - 10-bit analog video processing
- **Integrated Video Processing**
 - Picture Enhancement Processor (PEP™)
 - Independent color and luma adjustment blocks
 - Multiframe per pixel motion adaptive deinterlacing
- **Digital Video and Audio Capability**
 - ATSC-compliant, all-format MP@HL MPEG-2 HD Video decoder
 - Dolby digital and MPEG audio decoder
 - Digital video input/output supporting HD/SD and VESA formats
 - 10-bit digital video out
- **NTSC/PAL HD/SD Video Encoder**
- **Integrated Analog Circuitry**
 - On chip A/Ds for video, IF, and OOB signals
 - Four DACs for baseband video outputs
 - Dual channel audio DACs for L-R audio
- **High-Quality Graphics and Video Scaling capability**
- **Integrated HDMI/DVI Receiver with HDCP support**
- **USB 2.0**
- **On-chip 250-MHz 32-bit CPU**

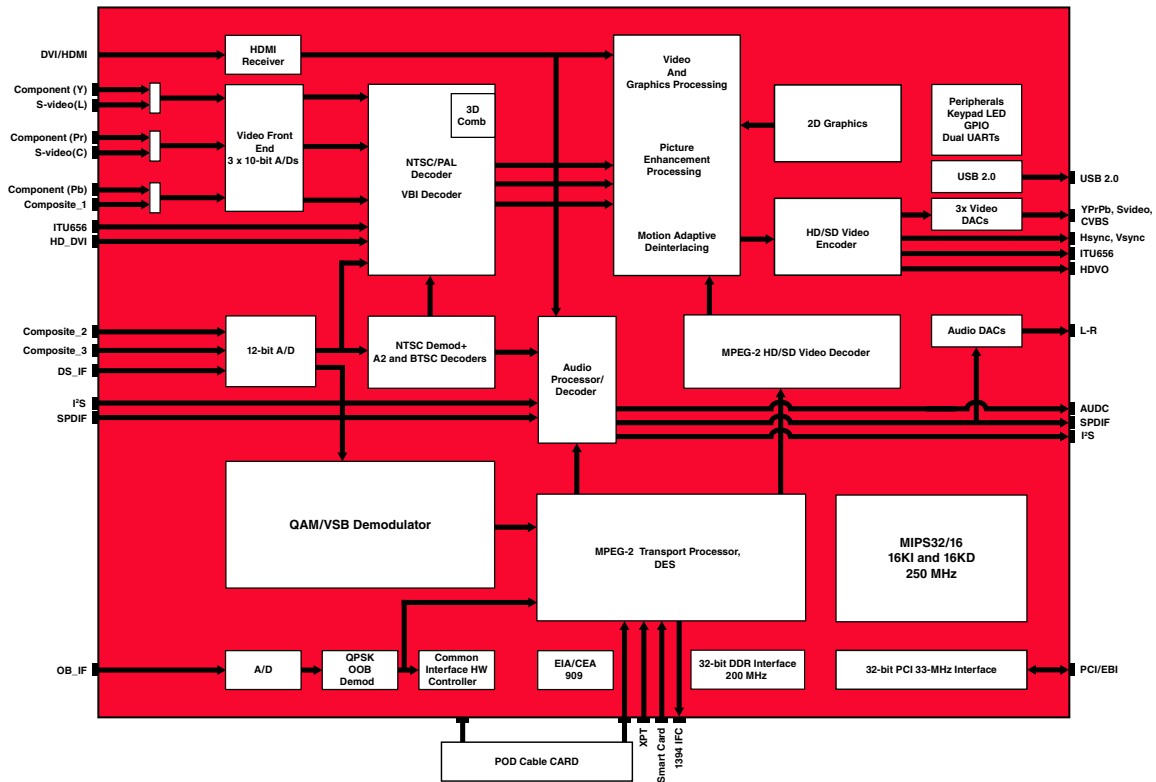
SUMMARY OF BENEFITS

- **Highly-integrated solution combining the functionality of a complete television on a single chip.**
- **Superior ATSC signal reception and demodulation under both static and dynamic multipath conditions.**
- **Integration of field proven QAM and out-of-band receivers.**
- **PEP advanced video signal processing provides an elevated viewing experience through edge and color enhancements.**
- **Motion adaptive per pixel deinterlacing produces superior display of interlaced video on progressive displays.**
- **3D/2D comb filter with per pixel adaptive motion detection delivers superior Y/C separation.**
- **High quality on-chip video scaling provides extensive non-linear conversion of 4:3 images for display on 16:9 televisions.**
- **On-chip support to convert all inputs (480i, 480p, 720p, 1080i) to all outputs (480i, 480p, 720p, 1080i) in both digital and analog formats.**
- **Advanced graphics engine provides rich user interface environment.**
- **Direct 10-bit digital video support for interfacing with LCD, Plasma, and DLP panels preserves signal integrity and image quality.**
- **Comprehensive integration of A/Ds and DACs supports direct audio/video inputs/outputs simplifying system design and cost.**
- **Full peripheral support eliminates need for additional components including, USB 2.0, LED/Keypad, smartcard, BSC/SPI master, IR receiver/blaster, PWM, and dual UARTs.**

BCM3551 System Block Diagram



OVERVIEW



BCM3551 Block Diagram

The BCM3551 combines a cable/terrestrial 4/1024-QAM and 8/16-VSB receiver, an out-of-band QPSK receiver, NTSC demodulator, DVI/HDMI receiver, a transport processor, a digital audio processor, a high-definition (HD) MPEG video decoder, 2D graphics processing, digital processing of analog video and audio, analog video digitizer and DAC functions, stereo high-fidelity audio DACs, a 250-MHz MIPS processor, and a peripheral control unit providing a variety of television control functions.

The cable/terrestrial receiver directly samples a tuner output with an A/D converter. It digitally resamples and demodulates the signal with recovered clock and carrier timing, filters and equalizes the data, and passes soft decisions to an ATSC A/53 and ITU-T J.83 Annex A/B/C compatible decoder. A CEA/EIA-909 smart antenna interface is included on chip.

The out-of-band receiver digitizes a SAW centered IF. It demodulates the signal with recovered clock and carrier timing, filters and equalizes the data and incorporates a DigiCipher® II/DAVIC-compatible FEC

decoder. The common hardware interface provides a direct interface to a POD/CableCard.

The BCM3551 has an MPEG-2 DVB compliant transport processor with advanced section filtering capability, DVB descrambler, MPEG-2 (MP@HL profile) video decoder, a BTSC audio decoder, a Dolby AC3/MPEG-2 layer 1, 2, audio decoder with SPDIF and a pair of analog outputs (L-R), a single NTSC/PAL/SECAM video encoder with optional Macrovision® output, and a NTSC analog video de-interlacer. The NTSC/PAL decoder is supported by motion adaptive de-interlacing and a 3D comb filter. The BCM3551 includes Broadcom's advanced 2D graphics processing. Two transport stream inputs, one ISO7816 smart card interface and a high speed interface supporting 1394 are included.

The BCM3551 incorporates a complete MIPS32™ based microprocessor subsystem including caches with bridging to memory and a local bus, where external peripherals can be attached. Integrated peripherals include USB 2.0, three UARTs, counter/timers, GPIO, keypad, LED, IR Tx/Rx, IR Keyboard, BSC, and SPI controllers.

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