

Advanced HD decoder for iDTV

Data brief

Features

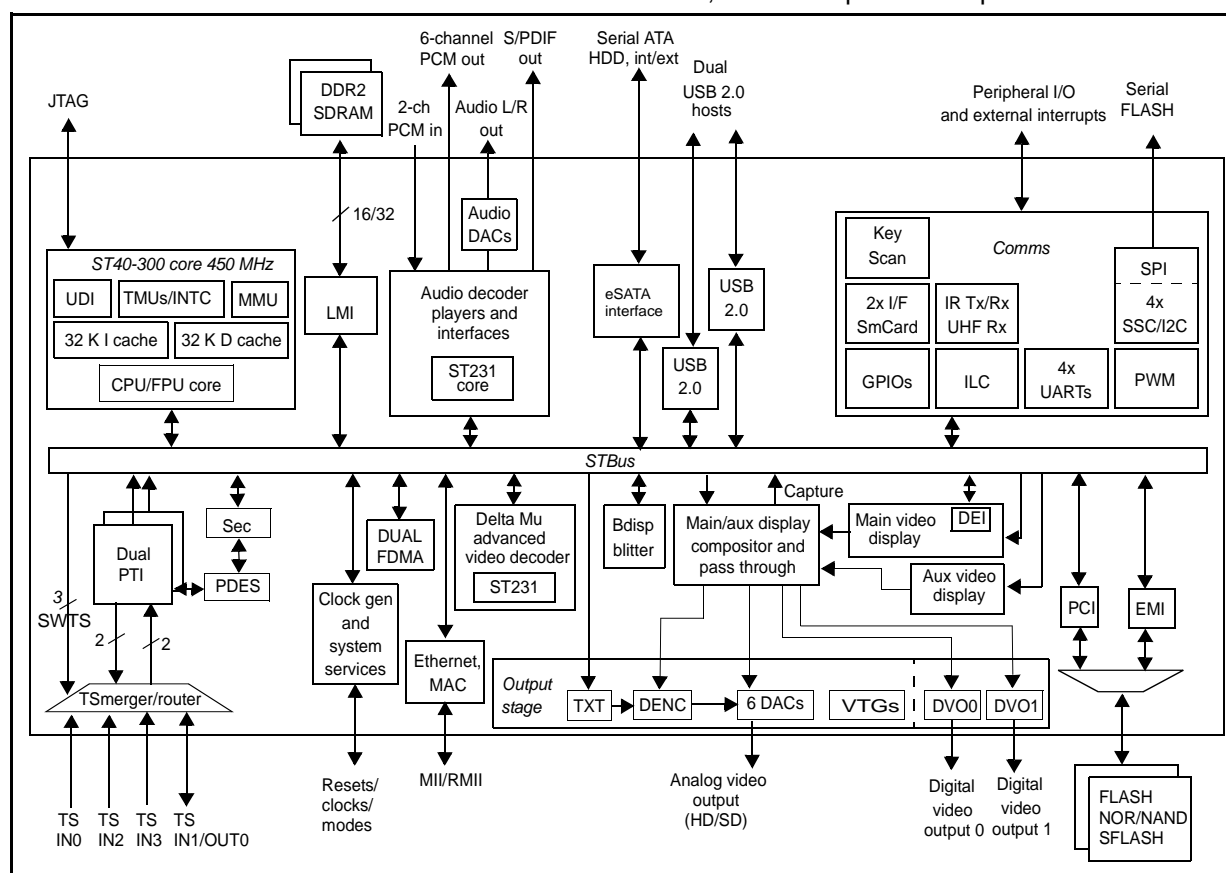
- Advanced high definition video decoding (H264/VC-1/MPEG2)
- Advanced standard definition video decoding (H264/VC-1/MPEG2/AVS)
- Advanced multi-channel audio decoding (MPEG 1, 2, MP 3, DD/DD+, AAC/AAC+, and WMA9/WMA9pro)
- Linux, Windows CE, and OS21 compatible ST40 applications CPU (450 MHz)
- 32-bit DDR1/DDR2 compatible local memory interface
- Multi-stream, DVR capable transport stream processing

- Extensive connectivity (dual USB hosts, e-SATA, Ethernet MAC/MII/RMII, and PCI)
- Separate digital video and graphics outputs

Description

The ST-7104 uses state of the art process technology to provide a cost effective, fully featured HD AVC decoder IC. It is a highly integrated system-on-chip suitable for low-cost add-on module for iDTV manufacturers.

The ST-7104 is targeted at the latest CE manufacturer requirements for iTVs which utilize advanced HD decoding (H264/VC-1/MPEG2), and which conform to DVB, SCTE, ATSC, ARIB, CEA, ITU and OpenCable specifications.



1 **Description**

The ST-7104 offers current users of ST's growing family of advanced decoding ICs enhancements in performance and features, whilst reducing cost and time-to-market for the next generation deployments.

2 Main features

The ST-7104 has the following features:

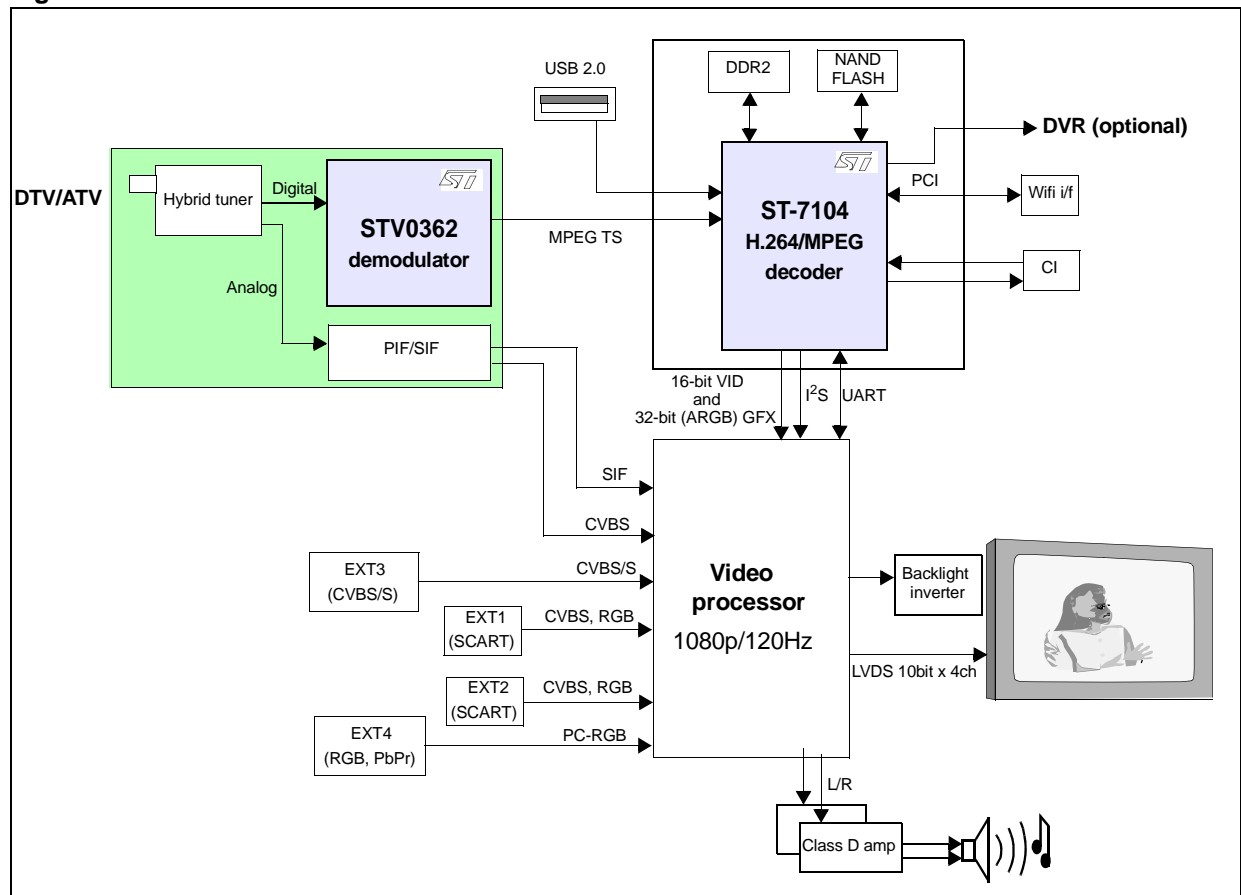
- Integrates in a single IC, Multi-stream transport demux, CPU, A/V decode, Video processing, Graphics and Display, peripherals, Audio/Video DACs, Digital A/V outputs, e-SATA port, dual USB ports and Ethernet MAC/MII
- High performance CPUs for applications (ST40) and audio/video decoding (2 x ST231)
 - ST40-300, dual-issue, applications CPU, 32KI, 32KD caches:
Target speed > 450 MHz delivering > 800 DMIPs
- Single 32-bit DDR1/DDR2 Local Memory Interface (LMI), up to 400 MHz
- Latest generation “Delta” Video Decoder with ST231 programmable CPU core:
 - MPEG2, H264, VC-1/WM9, HD or SD Advanced Video Decoding
 - AVS SD decoding
 - Provides flexibility to support other codecs (DivX, XviD, H263 encode/decode)
 - HD and SD decoding or dual SD Decoding, PIP & Mosaic capable
 - Real-time transcoding of MPEG2 SD to H264 SIF
- Advanced de-blocking of decoded MPEG2 SD sources based on ST’s DSE (Digital Source Enhancer) Technology with 2D Analysis window and Texture Adaptive Filter
- ST231 CPU based Audio Decoder. MPEG1 I/II, MP3, Dolby Digital/DD+, MPEG4 AAC/AAC+ multi-channel audio decoding. Concurrent audio description decoding. DD+ and AAC+ transcoding
- Main and Aux Video display pipelines:
 - Main: high quality H & V reformatting/resizing with sample rate conversion/filtering. Motion adaptive spatial and temporal de-interlacing for 480p/576p and 1080p60 progressive output
 - Aux: high quality H & V reformatting/resizing with sample rate conversion/filtering
- Three independent graphics planes with H&V resize, CLUT and anti-flicker filtering
- Link list based 2D graphics blitter. Up to 200 Mpixels/sec with destination alpha blending. Capable of 3D user interface effects.
- Independent Main and Aux display compositions (Video/Graphics mixing)
- Pass-through display for graphics, main video or aux video output concurrently with main and aux compositions
- HD display capture and down-conversion for concurrent HD and SD output of the main composition
- 16-bit Digital Video Output for main display composition (HD/ED/SD formats up to 1080p60)
- Second 32-bit (ARGB) Digital Video Output for pass through display or main/aux display compositions (HD/ED/SD formats up to 1080p60)
- Macrovision copy protection support
- PAL/NTSC/SECAM Digital encoder
- Six 10-bit DACs for component/composite analog video output (HD/ED/SD formats up to 1080i)
- Integrated Stereo Audio DAC
- Six-channel Audio PCM Output Interface

- Stereo Audio PCM Input Interface
- Independent SPDIF output
- Quadruple external TS inputs, triple internal TS from memory
- Dual DVB-CI+ (HD/SD profiles) modules supported
- Multi-stream transport stream de-multiplexing, 333 Mbits/sec, Quadruple tuner DVR capable
- DVB/DES/AES/Multi-2/ICAM descrambling
- Dual USB 2.0 host interfaces both with PHY
- Integrated 10/100 Ethernet MAC/MII/RMII, Wake on LAN, 75 MHz (300 Mbits/sec) capable
- 16-bit External Memory and Peripheral Interface (EMI) - up to five banks
- Interfacing to, and boot from, NOR or NAND FLASH
- Interfacing to, and boot from, serial FLASH
- 32-bit, 66 MHz, PCI Interface, shared on EMI with access interleaving possible
- DVR supported, with HDD attachment through e-SATA, EIDE (PIO mode) or USB
- Dual Multi-channel Flexible DMA Controllers
- Peripherals
 - Two Smartcard interfaces
 - four UARTs
 - four SSC/I2C
 - GPIO banks with alternate functions
 - IR Tx/Rx
 - UHF Rx/SCD
 - PWM
 - ILC
 - 4 x 4 key matrix scanner
- Package
 - FPBGA 27 x 27mm
 - 620 balls
 - 7R32x32
 - Pitch 0.8 mm
 - Ball 0.5 mm.

3 Applications overview

The ST-7104 includes in a single IC, multi-stream transport de-multiplexing and descrambling, an ST40 applications CPU, advanced audio/video decoding, video processing, graphics and display composition, peripherals, audio/video DACs, Digital audio/video outputs, two Host USB ports, an e-SATA HDD port, and Ethernet MAC MII/RMII.

Figure 1. iDTV add-on module



4 Revision history

Table 1. Document revision history

Date	Revision	Changes
10-Jun-2009	1	Initial release.

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