ST-7104

Advanced HD decoder for iDTV

Data brief

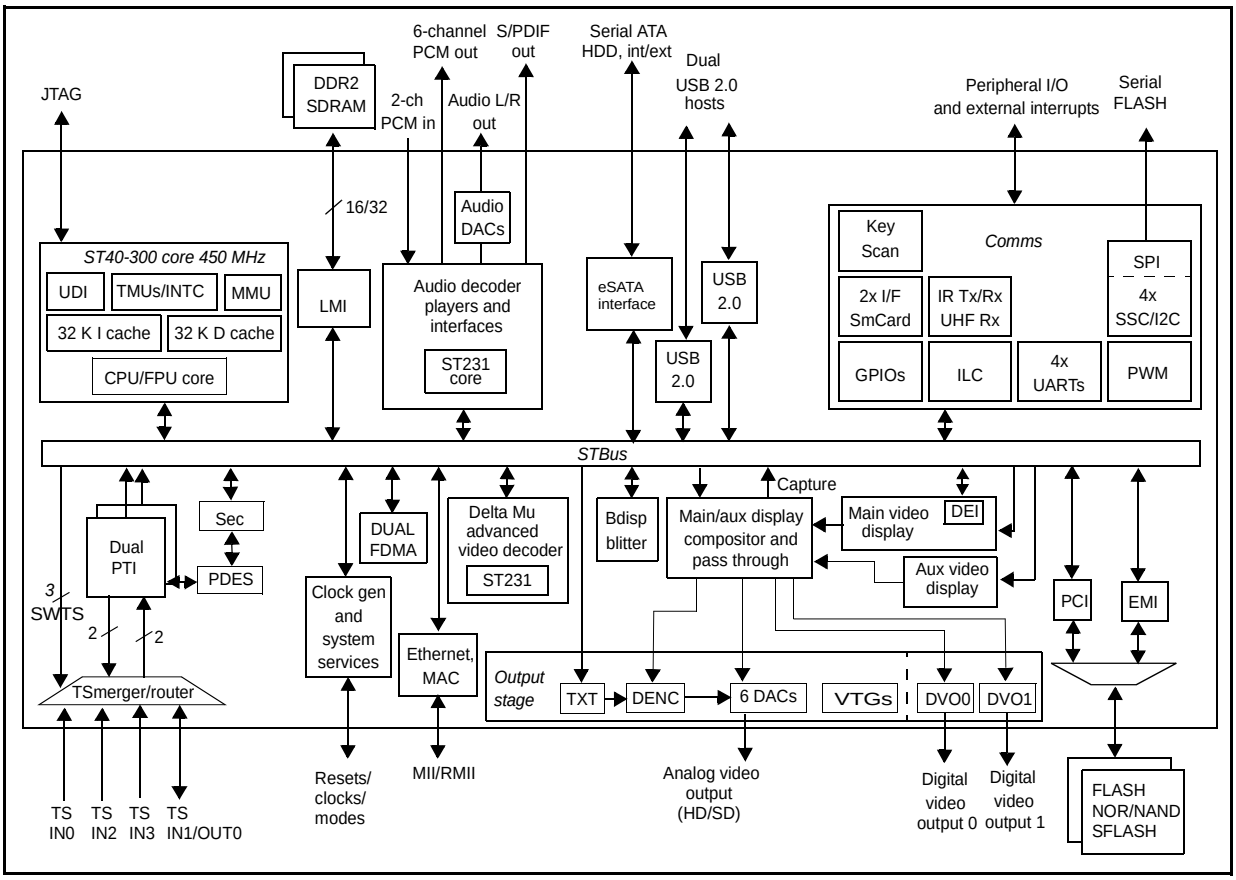
Features

- 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 iDTVs which utilize advanced HD decoding (H264/VC-1/MPEG2), and which conform to DVB, SCTE, ATSC, ARIB, CEA, ITU and OpenCable specifications.



For further information contact your local STMicroelectronics sales office. www.st.com

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:

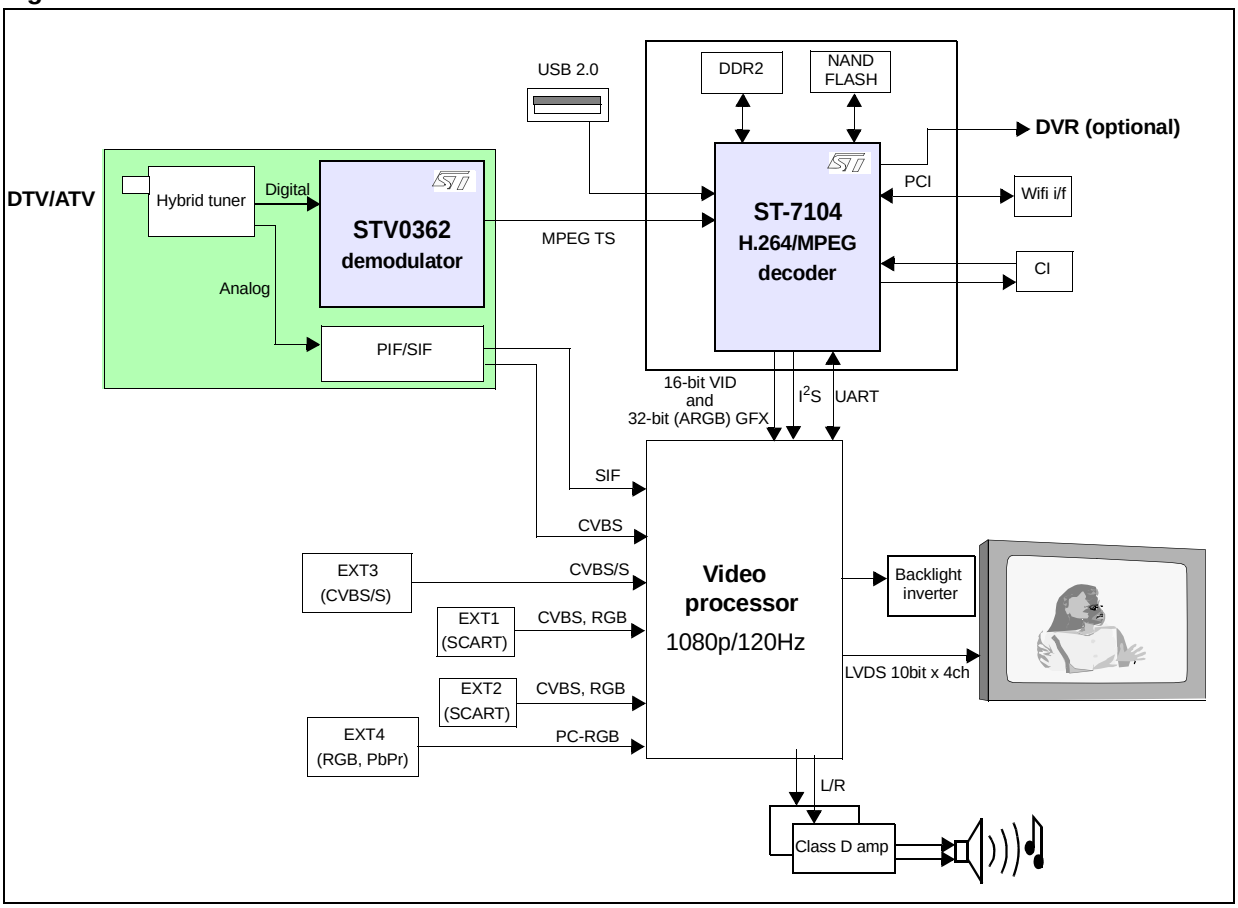
- Integrates in a single IC, Multi-stream transport demux, CPU, A/V decode, Video processing, Graphics and Display, peripherals, Audio/Video DACs, Digital A/V outputs, e-SATA port, dual USB ports and Ethernet MAC/MII
- High performance CPUs for applications (ST40) and audio/video decoding (2 x ST231)
  - 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.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com