STi7101

Low-cost HDTV set-top box decoder for H.264

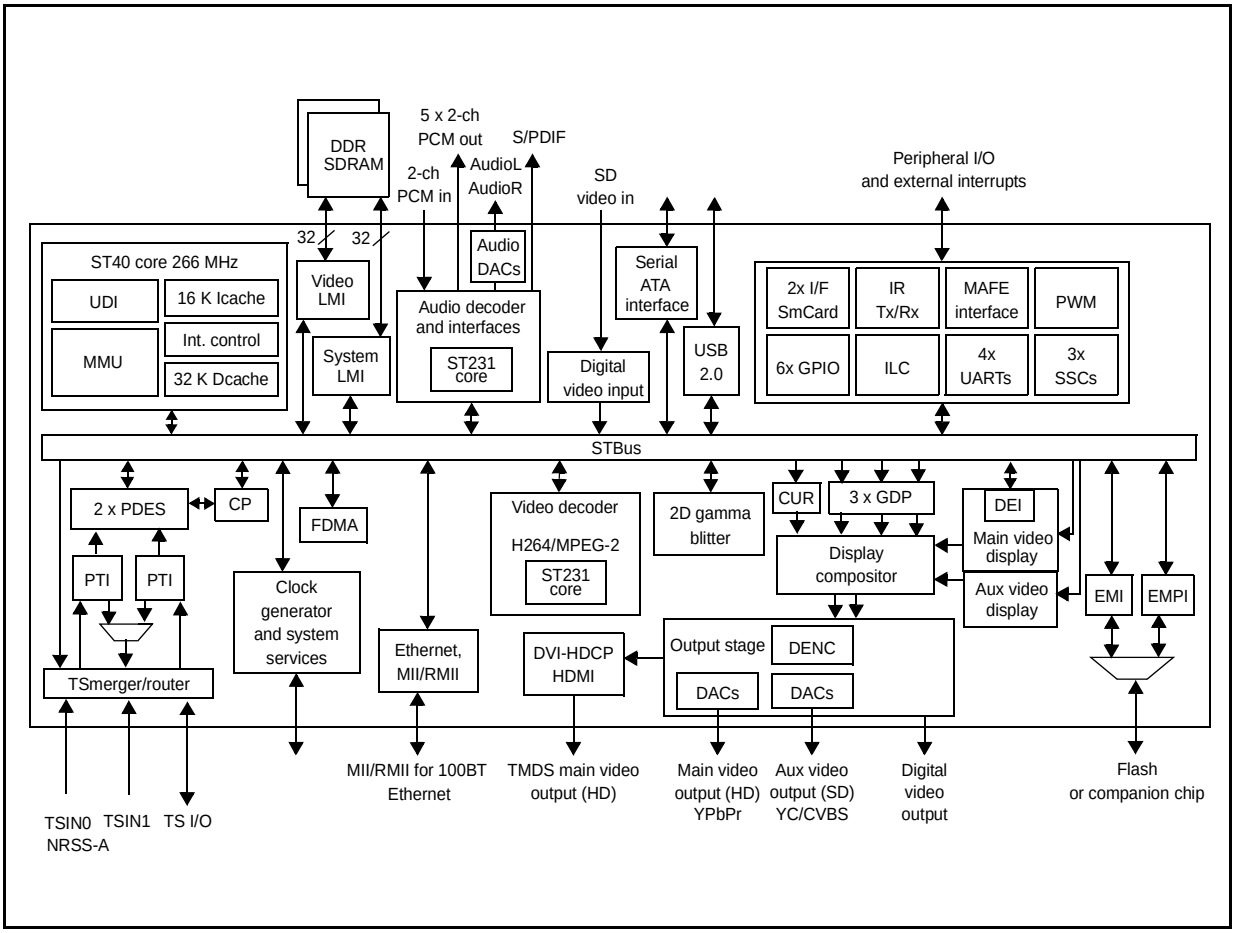
Data Brief

Features

- H.264 support
- Linux®, Windows® CE and OS21 compatible ST40 CPU core: 266 MHz
- Transport filtering and descrambling
- Video decoder: H.264 (MPEG-4 part 10) and MPEG-2
- SVP compliant
- Windows Media™ DRM support

Description

The STi7101 is a new generation, high-definition set-top box / DVD decoder chip, that provides very high performance for low-cost HD systems. The STi7101 includes both MPEG2 and H.264 video decoders.



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

1 Full feature list

- H.264 support
- Linux®, Windows® CE and OS21 compatible ST40 CPU core: 266 MHz
- Transport filtering and descrambling
- Video decoder: H.264 (MPEG-4 part 10) and MPEG-2
- SVP compliant
- Windows Media™ DRM support
- Graphics engine and dual display: standard and high-definition
- Audio decoder: including Windows Media™ Audio 9 (WMA-9) and WMA-9 Pro
- DVD data retrieval and decryption

1.1 Embedded interfaces

- USB 2.0 host controller/PHY interface
- DVI/HDMI™ output
- Digital audio and video auxiliary inputs
- Low-cost modem
- 100BT Ethernet controller with integrated MAC and MII/RMII interface for external PHY
- Serial ATA (SATA)

1.2 Processor subsystem

- ST40 32-bit superscaler RISC CPU
  - 266 MHz, 2-way set associative 16 Kbyte ICache, 32 Kbyte DCache, MMU
  - Five-stage pipeline, delayed branch support
  - Floating point unit, matrix operation support
  - Debug port, interrupt controller

1.3 Transport subsystem

- TS merger/router
  - Two serial/parallel inputs
  - One bidirectional interface
  - Merging of three external transport streams
  - Transport streams from memory support
  - NRSS-A module interface
  - TS routing for DVB-CI and CableCARD™ modules

- Programmable transport interfaces (PTIs)
  - Two programmable transport interfaces
  - Two transport stream demultiplexers: DVB, DIRECTV®, ATSC, ARIB, OpenCable, DCII
  - Integrated DES, AES, DVB and Multi2 descramblers
  - NDS random access scrambled stream protocol (RASP) compliant
  - NDS ICAM CA
  - Support for VGS, Passage and DVS042 residue handling

1.4 Video/graphics subsystem

- H.264(MPEG-4 part 10) main and high profile level 4.1/MPEG-2 MP@HL video decoder
  - Advanced error concealment and trick mode support
  - Dual MPEG-2 MP@HL decode
- SD digital video input
- Displays
  - One HD display multi format capable (1080I, 720P, 480P/576P, 480I/576I)
    - Analog HD output RGB or YPbPr
    - HDMI encoded output
  - One standard-definition display: Analog SD output: YPbPr or YC and CVBS
- Gamma 2D graphics processor
  - Triple-source, 2D gamma blitter engine
  - Alpha blending and logical operations
  - Color space and format conversion
  - Fast color fill
  - Arbitrary resizing with high quality filters
  - Acceleration of direct drawing by CPU
- Gamma compositor and video processor
  - 7-channel mixer for high definition output
  - Independent 2-channel mixer for SD output
  - Three graphic display planes
  - High quality video scaler
  - Motion and detail adaptive deinterlacer
  - Linear resizing and format conversions
  - Horizontal and vertical filtering
- Copy protection
  - HDMI/HDCP copy protection hardware
  - SVP compliant
  - Macrovision® copy protection for 480I, 480P, 576I, 576P outputs
  - DTCP-IP
  - AWG-based DCS analog copy protection

1.5 Audio subsystem

- Digital audio decoder
  - Support for all the most popular audio standards including WMA-9, WMA-9 Pro, MPEG-1 layer I/II, MPEG-2 layer II, MPEG-2 AAC, MPEG-4 AAC LC 2-channel/5.1 channel, MPEG-4 AAC+SBR 2-channel/5.1 channel, Dolby® Digital EX, Pro Logic® II, MLP™ and DTS®
  - PCM mixing with internal or external source, and sample rate conversion
  - 6- to 2-channel downmixing
  - PCM audio input
  - Independent, multichannel, PCM output, S/PDIF output and analog output
- Stereo 24-bit audio DAC for analog output
- IEC958/IEC1937 digital audio output interface (S/PDIF)
- CSS/CPxM copy protection hardware

1.6 Interfaces

- External memory interface (EMI)
  - 16-bit interface supporting ROM, Flash, SFlash, SRAM, peripherals
  - Access in five banks
  - High speed synchronous mode for interconnecting two STi7101 devices
- External microprocessor interface (EMPI)
  - 32-bit MPX satellite, target-only interface
  - Synchronous operation at MPX clock speed, capable of 100 MHz
- Dual local memory interface (LMI)
  - Dual interface (2 x 32-bit) for DDR1 200-MHz (DDR400) memories, supports 128-, 256-, 512-Mbit, and 1-Gbit devices
- USB 2.0 host controller/PHY interface
- Serial ATA hard-disk drive support
  - Record and playback with trick modes
  - Pause and time shifting, watch and record
- 100BT Ethernet controller, MAC and MII/RMII
- On-chip peripherals
  - Four ASCs (UARTs) with Tx and Rx FIFOS, two of which can be used in smartcard interfaces
  - Two smartcard interfaces and clock generators (improved to reduce external circuitry)
  - Three SSCs for I²C/SPI master slaves interfaces
  - Serial communications interface (SCIF)
  - Two PWM outputs
  - Teletext serializer and DMA module
  - Six banks of general purpose I/O, 3.3 V tolerant
  - SiLabs line-side (DAA) interface
  - Modem analog front end (MAFE) interface

- Infrared transmitter/receiver supporting RC5, RC6 and RECS80 codes
- UHF remote receiver input interface
- Interrupt level controller and external interrupts, 3.3 V tolerant
- Low power/RTC/watchdog controller
- Integrated VCXO
- DiSEqC 2.0 interface
- PWM capture/compare functions
- Flexible multi-channel DMA (FDMA)

1.7 Services and package

- JTAG/TAP interface, ST40 toolset support, ST231 toolset support
- Package: 35 x 35 PBGA, 580 + 100 balls (ECOPACK® package).

2 Applications overview

Figure 1. Low-cost satellite HD set-top box

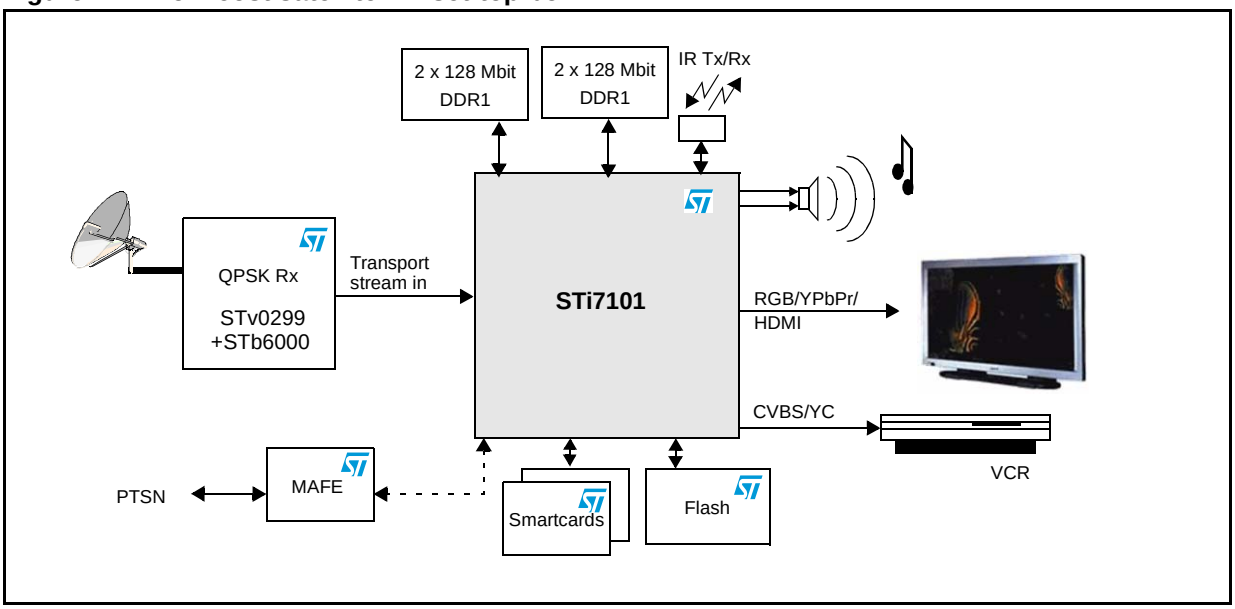


Figure 2. Low-cost cable HD set-top box with return channel

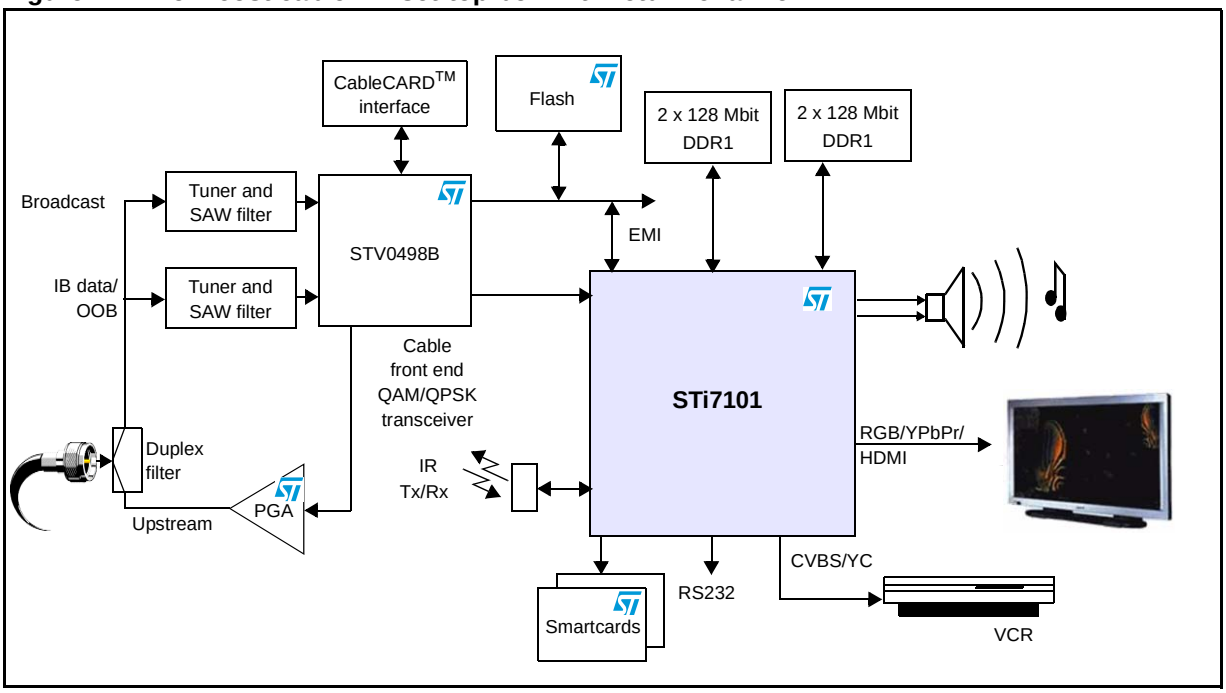


Figure 3. Low-cost dual satellite and terrestrial HD set-top box with HDD and DVD

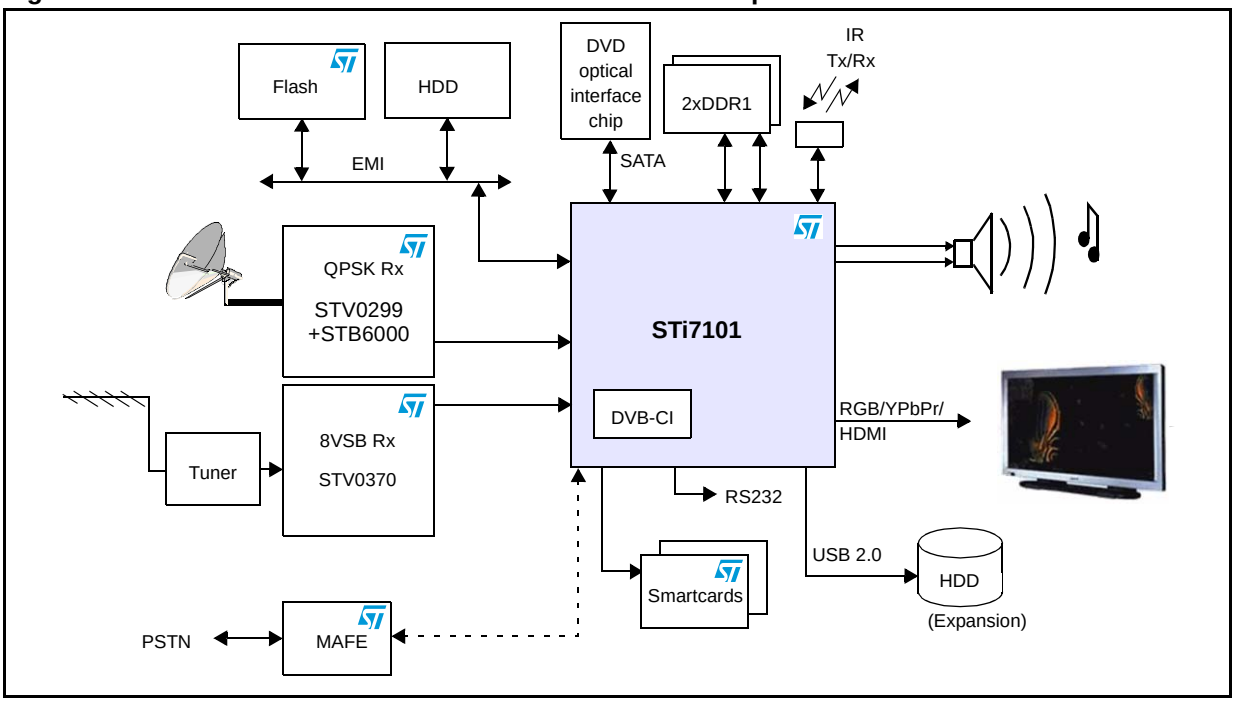
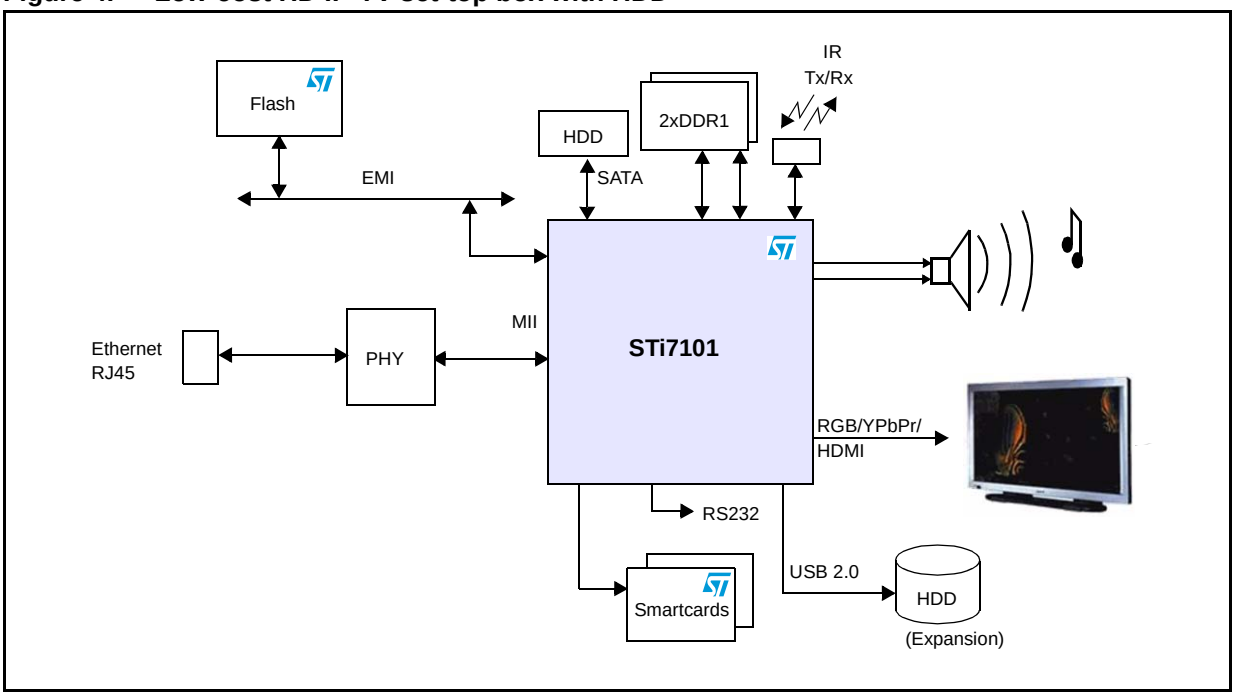


Figure 4. Low-cost HD IP-TV set-top box with HDD



3 Revision history

Table 1. Document revision history

Date	Revision	Changes
02-Sep-2008	1	Initial release
11-Sept-2008	2	Change on package

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.

© 2008 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 - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com