

Low-cost set-top box decoder for H.264 and Microsoft VC1

Data Brief

Features

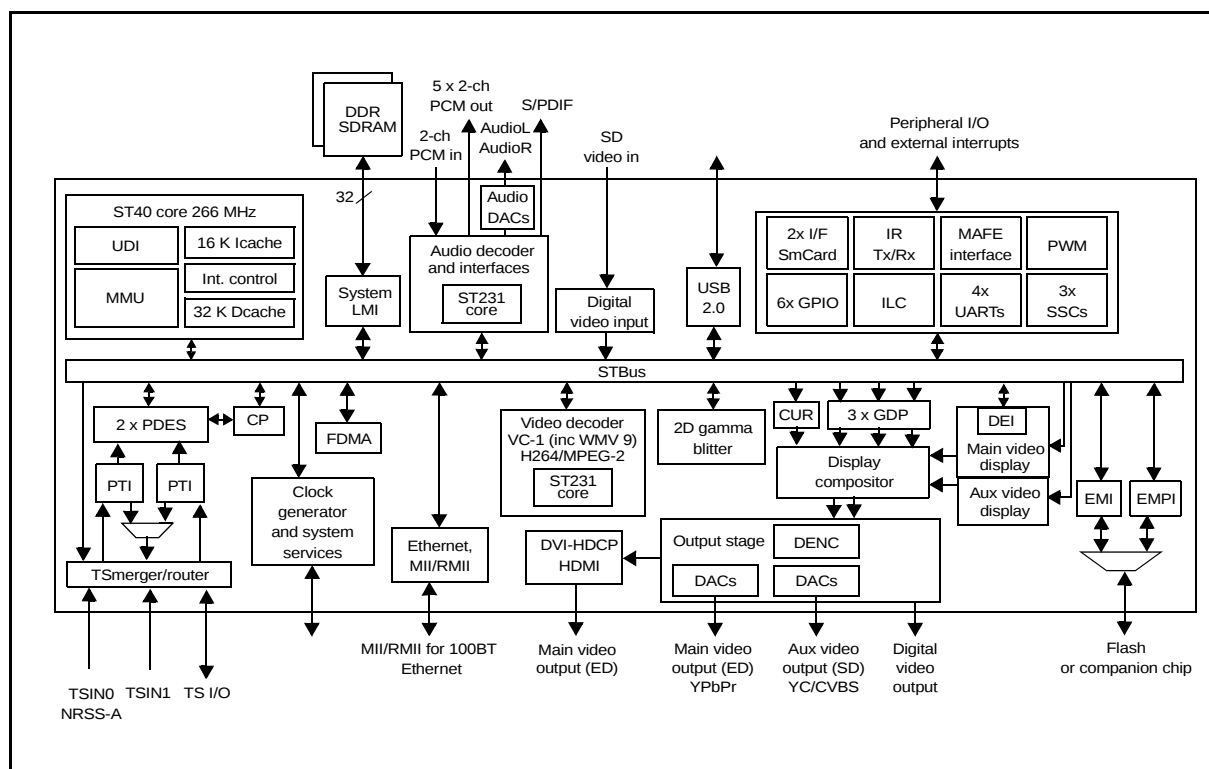
- Single-chip, video decoder including
 - Linux®, Windows® CE and OS21 compatible ST40 CPU core: 266 MHz
 - Transport filtering and descrambling
 - Video decoder: VC-1 (including WMV 9), H.264 (MPEG-4 part 10) and MPEG-2
 - SVP compliant
 - Windows Media™ DRM support
 - ST40 32-bit superscaler RISC CPU

■ 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

Description

The STi5202 is a new generation, set-top box/DVD decoder chip, and provides very high performance for low-cost systems. STi5202 includes both VC1 and H.264 video decoders for new, low bit rate applications.



1 Typical applications

Figure 1. Low-cost satellite set-top box

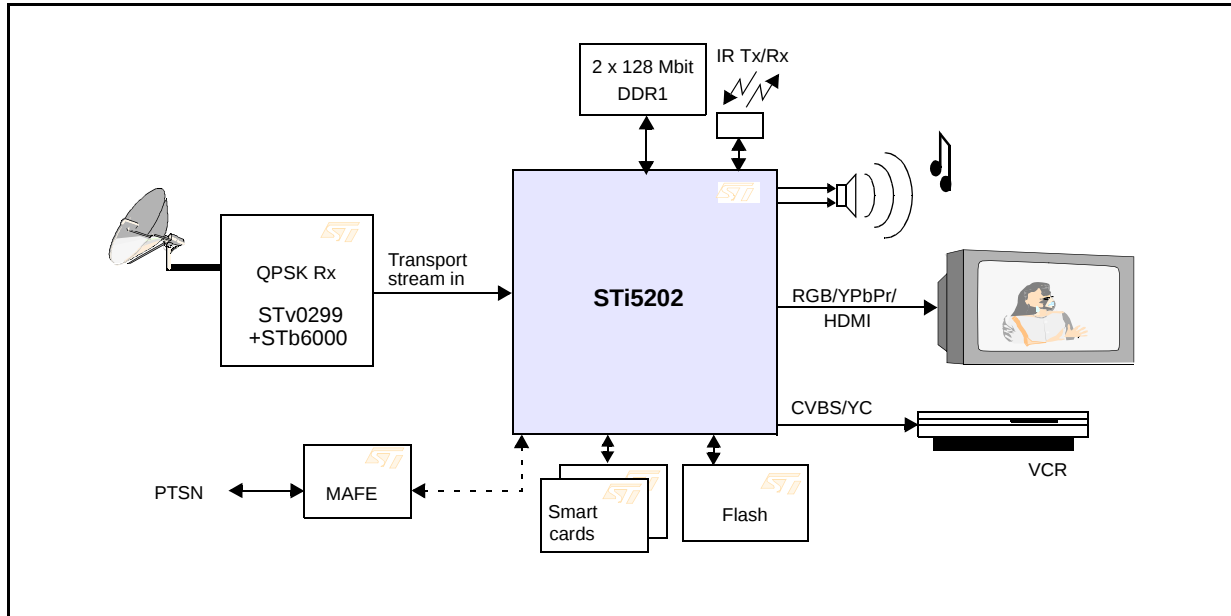


Figure 2. Low-cost cable set-top box with return channel

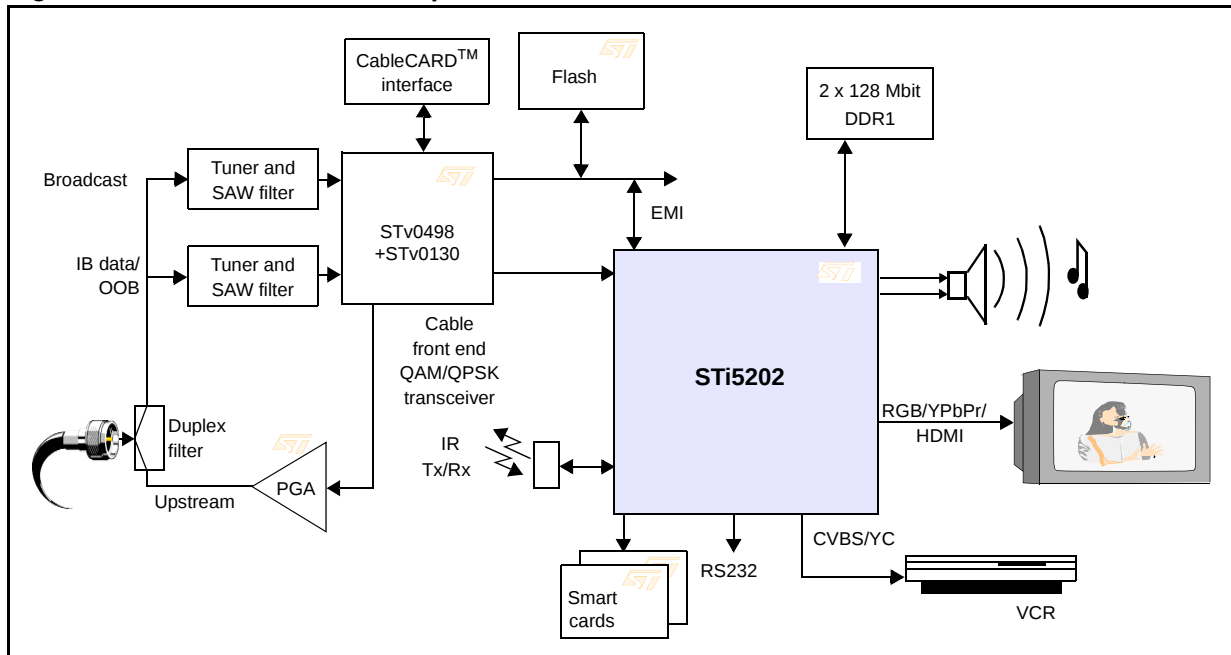


Figure 3. Low-cost dual satellite and terrestrial set-top box with HDD and DVD

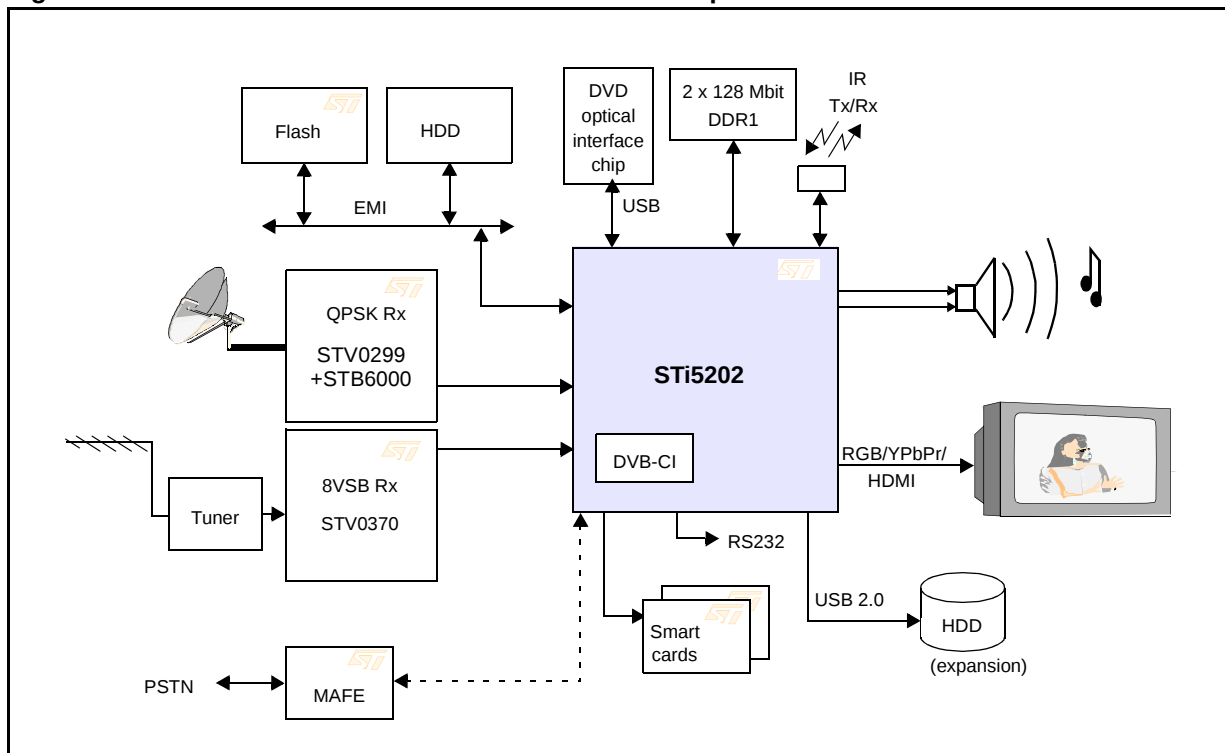
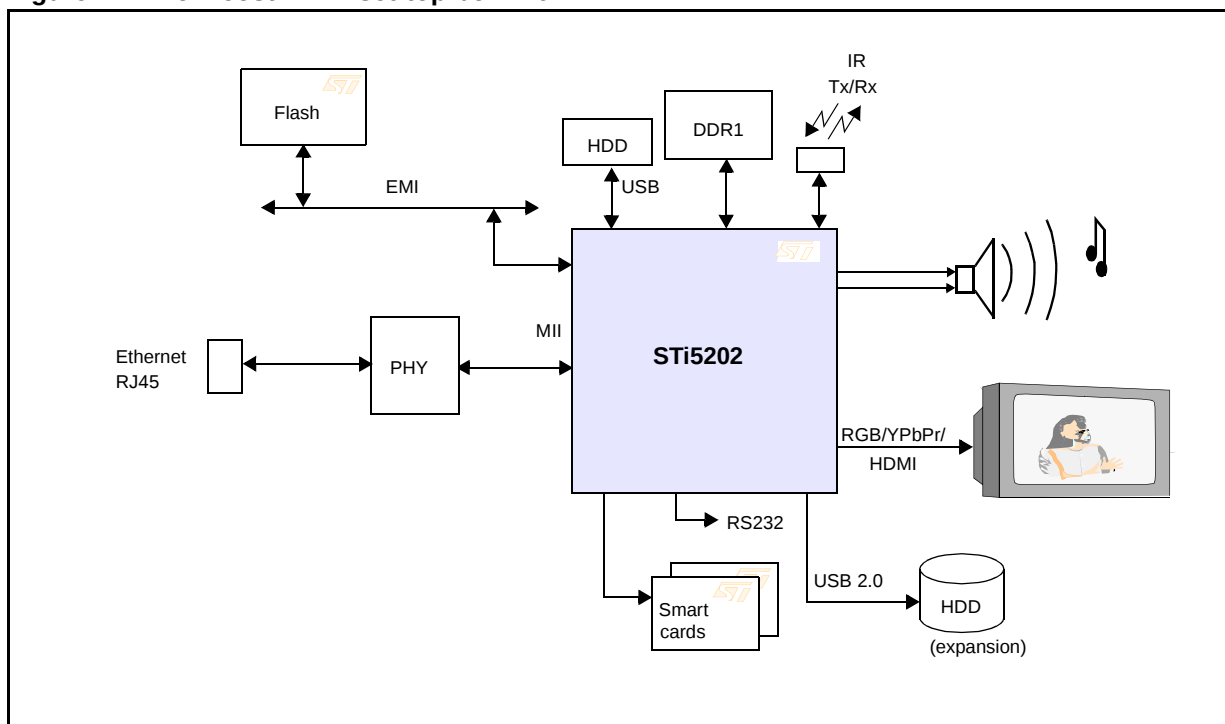


Figure 4. Low-cost IP-TV set-top box with HDD



1.1 Detailed features

The STi5202 is a single-chip, standard-definition video decoder including:

- Flexible audio decoder
- Windows Media™ DRM support
- Microsoft® VC-1, WMA9 and H.264 MPEG2 support
- Linux®, Windows® CE and OS21 compatible ST40 CPU core: 266 MHz
- Transport filtering and descrambling
- SVP compliant
- Graphics engine and dual display: standard and enhanced definition

The STi5202 also features the following embedded interfaces:

- USB 2.0 host controller/PHY interface
- DVI/HDMI™ output (optional)
- Low-cost modem
- 100BT ethernet controller with integrated MAC and MII/RMII interface for external PHY

The processor subsystem uses the ST40 32-bit superscaler RISC CPU and includes:

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

The transport subsystem includes:

- TS merger/router
 - Merging of 3 external transport streams (2 serial/parallel inputs, 1 bidirectional interface)
 - Transport streams from memory support
 - NRSS-A module interface
- 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

The video/graphics subsystem includes:

- Microsoft WMV 9/VC-1 MP@ML and AP@L1/H.264(MPEG-4 part 10) main and high profile level 3/MPEG-2 MP@ML video decoder
 - Advanced error concealment and trick mode support
 - Dual SD decoding
- SD digital video input
- Displays
 - One ED display multi format capable (480p/576p, 480i/576i)
 - analog ED 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 enhanced definition output
 - Independent 2-channel mixer for SD output
 - 3 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, 480i, 576i, 576p outputs
 - DTCP-IP
 - AWG-based DCS analog copy protection

The audio subsystem includes:

- 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

Available interfaces include:

- External memory interface (EMI)
 - 16-bit interface supporting ROM, flash, SFlash, SRAM, peripherals
 - Access in 5 banks
 - High speed synchronous mode for interconnecting two STi5202 devices
- External microprocessor interface (EMPI)
 - 32-bit MPX satellite, target-only interface
 - Synchronous operation at MPX clock speed, capable of 100 MHz
- Local memory interface (LMI)
 - Interface (1 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
- 100BT ethernet controller, MAC and MII/RMII

On-chip peripherals:

- 4 ASCs (UARTs) with Tx and Rx FIFOs, two of which can be used in smartcard interfaces
- 2 smartcard interfaces and clock generators (improved to reduce external circuitry)
- 3 SSCs for I²C/SPI master slaves interfaces
- Serial communications interface (SCIF)
- 2 PWM outputs
- Teletext serializer and DMA module
- 6 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

Services:

- JTAG/TAP interface, ST40 toolset support, ST231 toolset support

Package:

- 27 x 27 FPBGA, 620 balls.

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
19-Oct-2007	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.

© 2007 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