1 Description

The ST-9150 provides a solution for operators to specify a range of low-cost, high performance HD TVs including low-cost Zappers, IP clients, Interactive TVs, DVR standalone and DVR server/home network capable TVs, and with content delivery possible using broadcast or broadband networks, or both (hybrid TVs). The ST-9150 keeps pace with the latest conditional access, DRM and trusted platform requirements of major operators worldwide by incorporating the latest generation of advanced security features.

The ST-9150 offers current users of STs 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-9150 is a new, advanced decoding SoC targeted at next generation HD TVs (cable, terrestrial, satellite, DSL, IP, and Hybrid), and has the following features:

- Integrates in a single IC, Multi-stream transport demux, CPU, A/V decode, Video processing, Graphics and Display, Advanced security, TV peripherals, Audio/Video DACs, Digital A/V outputs, HDMI, e-SATA port, dual USB ports and Ethernet MAC/MII/RMII
- 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 > 800DMIPs
- 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 and de-ringing 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
- HDMI interface with HDCP copy protection (HD/ED/SD formats up to 1080p60). HDMI interface is in full compliance with all features of v1.3a, excluding deep color, enhanced colorimetry (xvYCC, gamut metadata), and DST/DSD audio features.
- 16-bit Digital Video Output for main display composition (HD/ED/SD formats up to 1080p60)
- Second 24-bit Digital Video Output for pass through display or main/aux display compositions (HD/ED/SD formats up to 1080p60)
- Macrovision and Dwight Cavendish 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)
- SD/HD Digital Video Input port, 8- or 16-bit YCbCr
- 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
- CSS (DVD-video) and CPPM (DVD-audio) decryption is provided for the DVD stream.
- 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
- MPX Interface/protocol for high speed, glue-less, communications with STv0498 DOCSIS Cable FE
- DVR supported, with HDD attachment through e-SATA, EIDE (PIO mode) or USB
- Soft Modem support: integrated MAFE: integrated system side DAA (Si-Labs)
- Dual Multi-channel Flexible DMA Controllers
- TV Peripherals
  - Two Smart Card interfaces, four UARTs, four SSC/I2C, GPIO banks with alternate functions, IR Tx/Rx, UHF Rx/SCD, PWM, ILC, HDMI CEC, 4 x 4 key matrix scanner
- Advanced security - Secure control words, Code authentication, JTAG locking, Network/DVR copy protection, SVP, VGS, DTCP-IP, MS-DRM, MSTV
- Package - FPGBA 27 x 27mm, 620 balls, 7R32x32, Pitch 0.8 mm, Ball 0.5 mm.

3 Applications overview

Figure 1. Typical DVR cable TV with DOCSIS

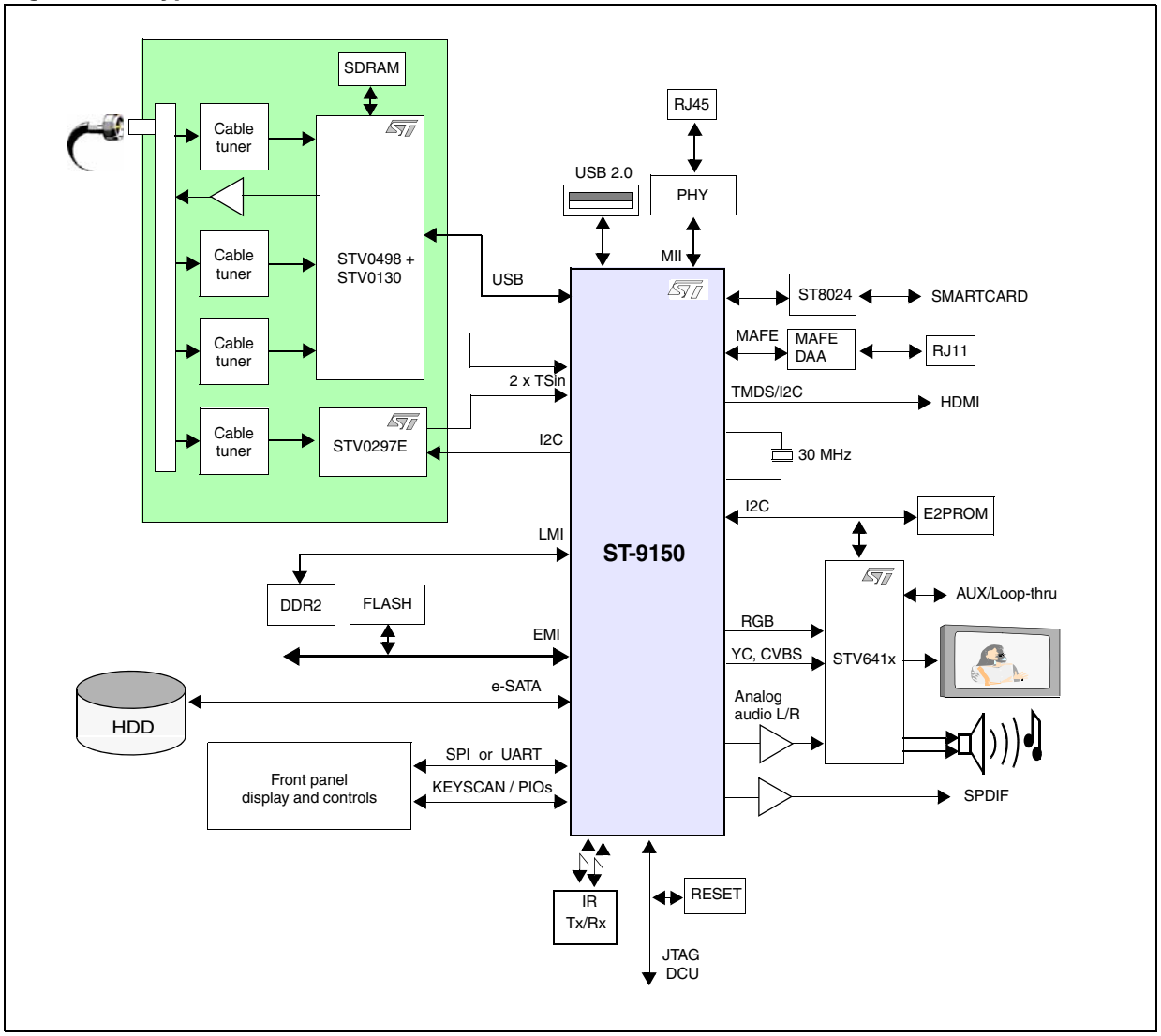


Figure 2. Low cost IP client HD TV (wired ethernet or WiFi connection)

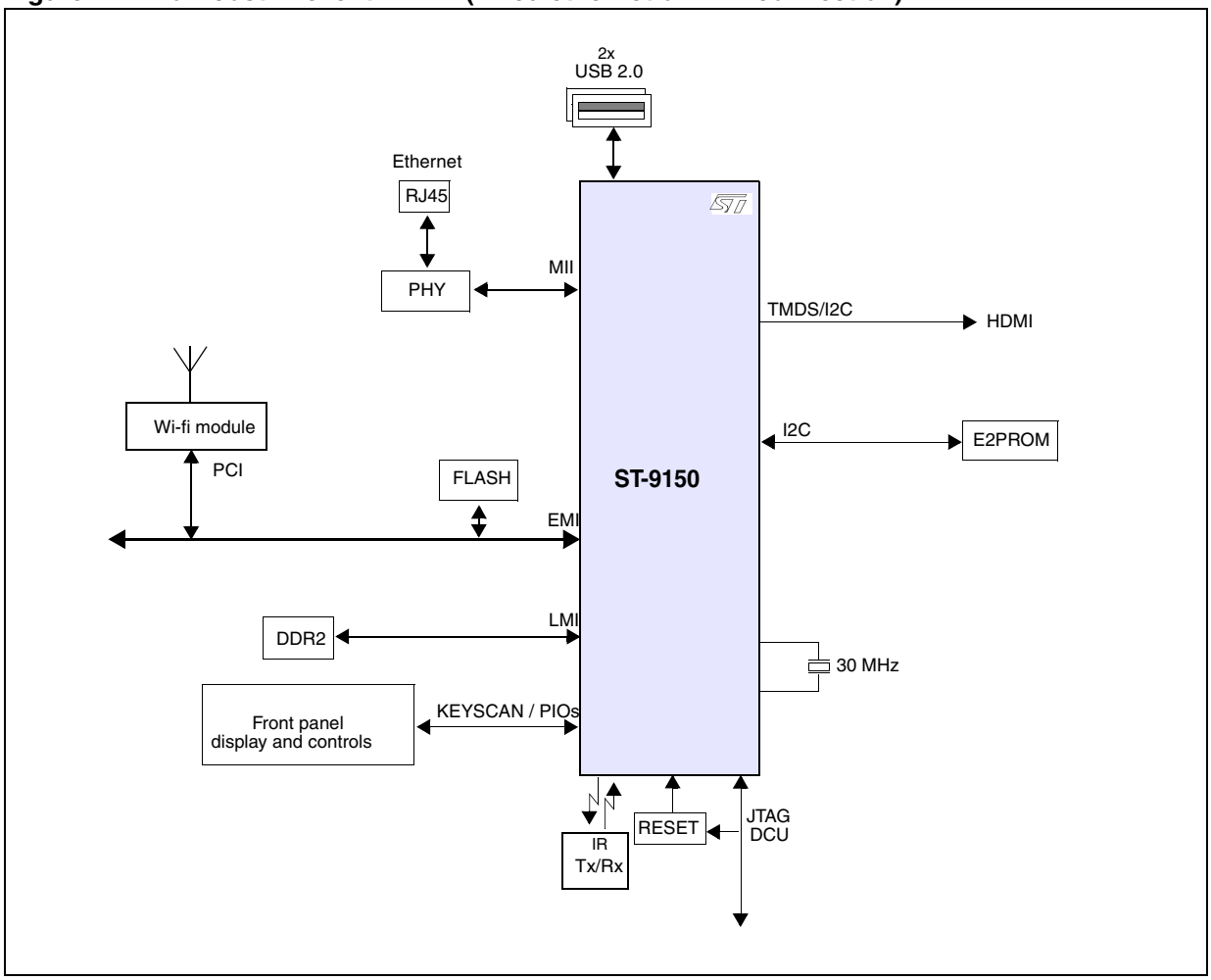


Figure 3. High definition DVR satellite TV

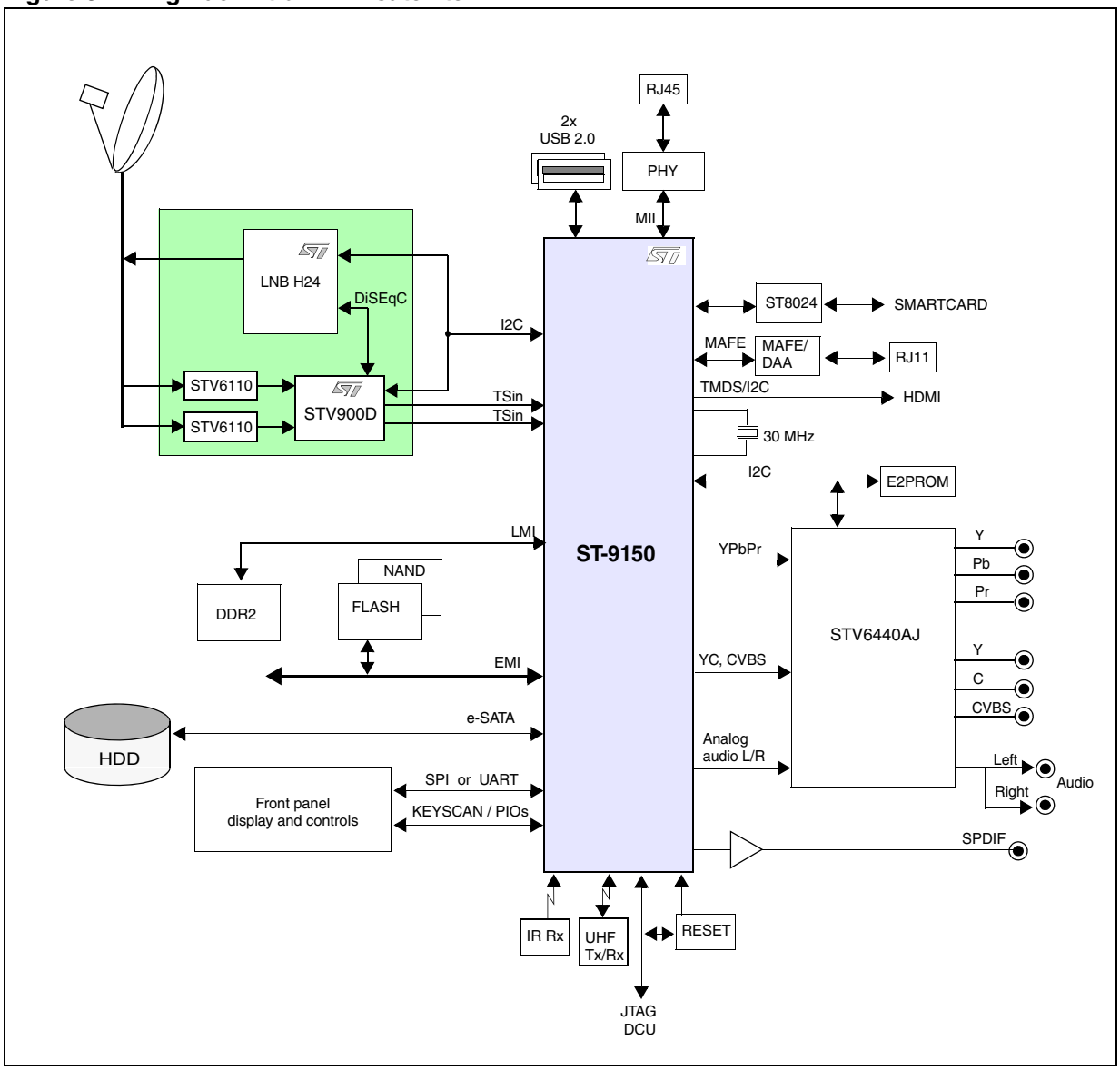
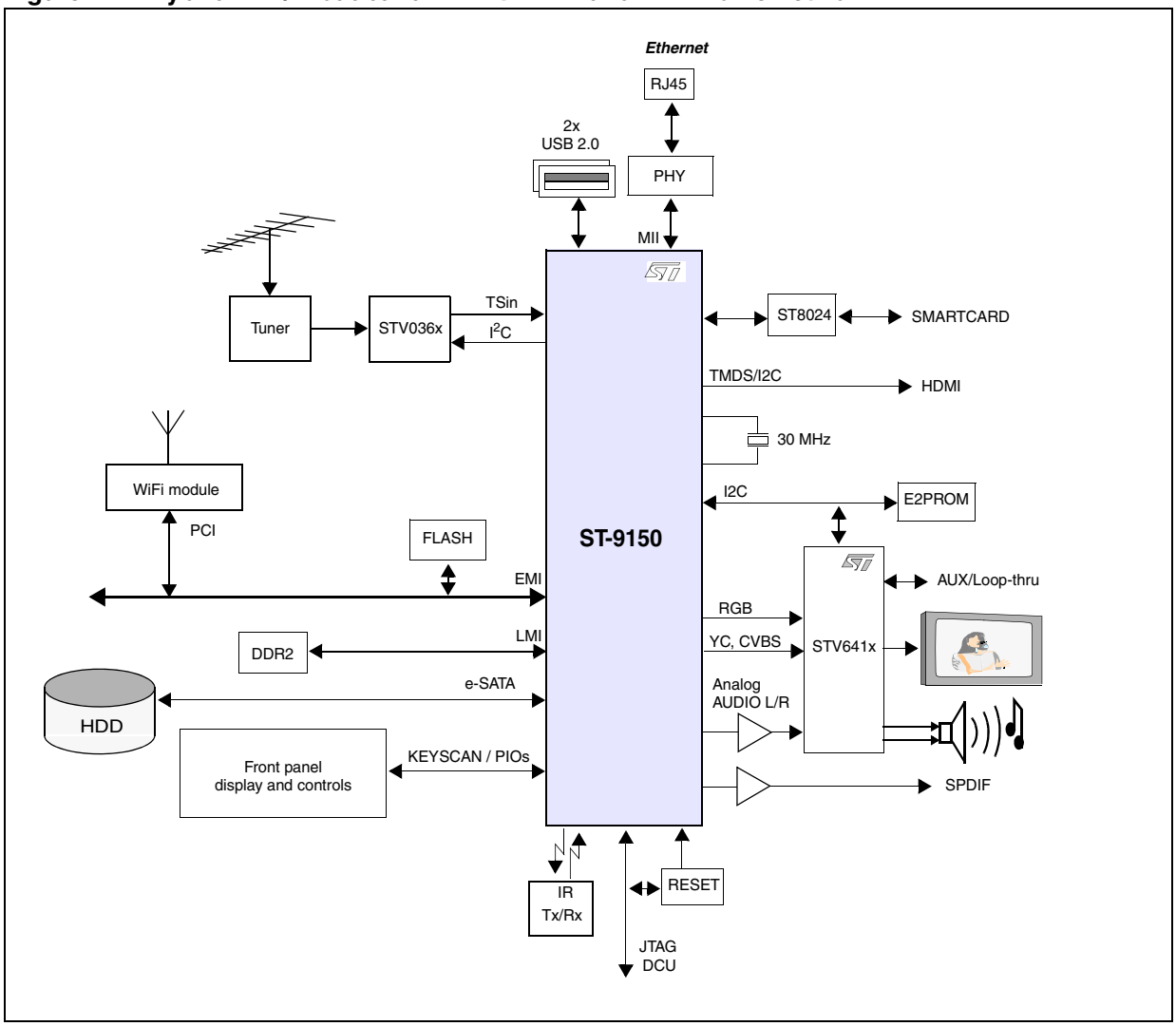


Figure 4. Hybrid DTT/Broadband TV with DVR and WiFi home network



4 Ordering information

Table 1. Ordering information

Order code	Packaging
ST-9150ZUB	FPBGA 27 x 27 mm

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
30-Nov-2009	1	Initial release.
14-Sep-2010	2	Removed reference to CPRM in Section 2.

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