FLI10610H, FLI10620H

Single-chip TV solutions

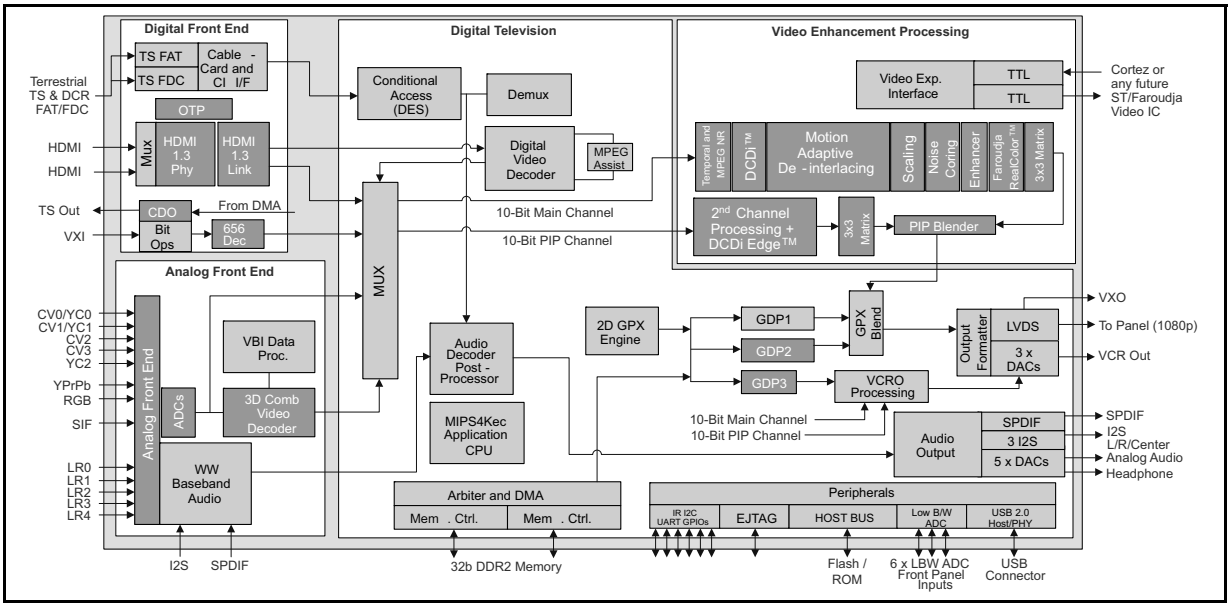
Data brief

Features

- MPEG2 MP@HL, MP@ML decode
- Video eXpansion Interface (VXI) that enables glueless interface to STMicroelectronics family of processors for Picture-in-Picture (PIP) support, customer-unique video processing, or step up TV products
- On-chip analog signal processing with integrated analog video and audio decoder
- Multi-format digital and analog audio decoder and post-processor
- Glueless interface to CableCARD™/common interface connectors
- True 10-bit Faroudja DCDi Cinema® format processing, including next generation advanced color and contrast controls and noise coring
- Faroudja TrueLife™ video enhancer
- Faroudja RealColor® processing
- Integrated dual MUX HDMI 1.3/HDCP link and PHY
- Wide color gamut support
- USB 2.0 host link and PHY
- Integrated 250 MIPS 32-bit MIPS 4Kec™ system processor
- Support for leading operating systems including Linux®
- Secure boot using unique chip ID
- 333 MHz 32-bit or 400 MHz 16-bit unified DDR2 (16 to 256 MB) memory interface
- Integrated EJTAG and JTAG ports for debugging
- NAND/NOR/SPI Flash support
- Package: 633-pin PBGA

Applications

- Mainstream and high-performance DTVs
- Multi-region single footprint for ATSC/DVB/DTMB



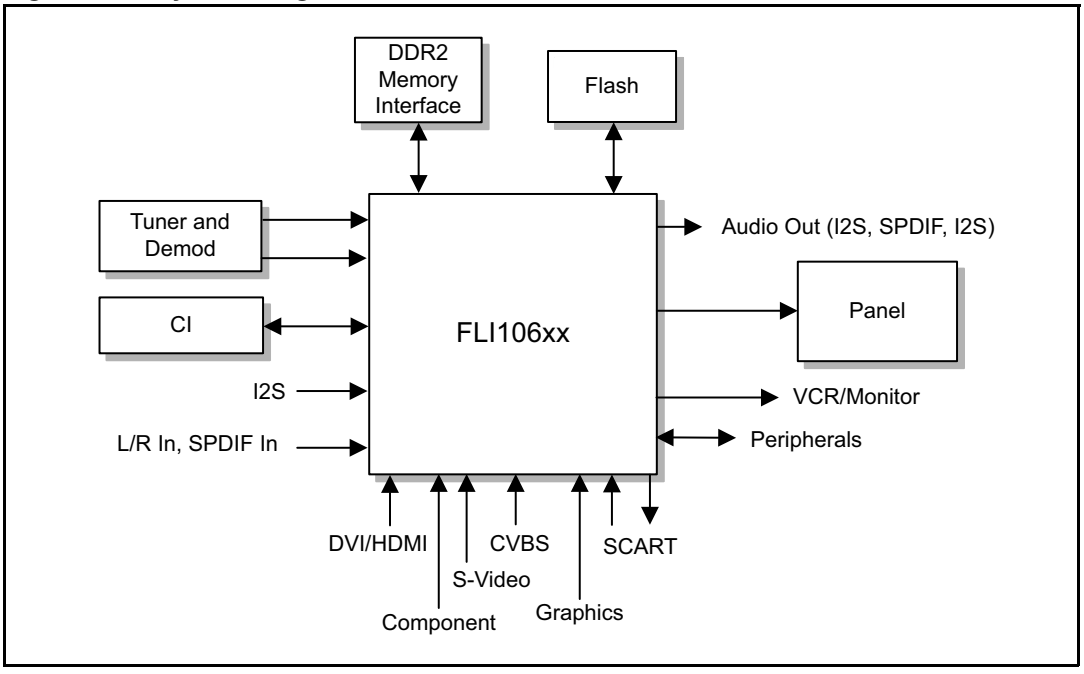
1 Description

The FLI106xx series of ICs are single-chip TV solutions for products requiring superior 10-bit video quality in the analog and/or digital TV for ATSC, DVB, DTMB, NTSC, and PAL markets. They include a single-channel HD MPEG2 decoder and a secondary PIP channel, flexible analog front-end with an integrated Faroudja 3D video decoder, high-performance industry standard 32-bit MIPS 4Kec processor (250 MIPS), multi-standard analog audio decoder, digital audio decoder and post processor, three programmable Multimedia Processing Engines (MPEs), advanced 2D graphics engine, integrated HDMI 1.3/DVI receivers with integrated HDCP support, and a unified DDR memory controller.

The FLI106xx series of chips also include a very flexible and unique Video eXpansion Interface (VXI) providing glueless connectivity to STMicroelectronic's video processors, or a customer's proprietary video processor. All areas of video processing in the FLI106xx series is 10-bit for enhanced video quality of the Main and PIP channels and is the first integrated DTV controller to showcase Faroudja RealColor.

All family members include next generation Faroudja DCDi Cinema video format conversion, video enhancement, and noise reduction. The level of video quality that was previously only seen on exclusive Faroudja Home Theater Systems is now available in a single-chip solution.

Figure 1. System diagram



2 Benefits

- Complete single-chip DTV solution with field-proven analog and digital video decoder
- Superior video quality with 10-bit Faroudja video processing technologies
- Complete turnkey reference design for DVB-T, ATSC, DTMB and available with source code for quick time-to-market
- Multi-standard worldwide analog and digital audio decoder with post-processor
- Full HD capability up to 1080p in/out
- Integration of CableCARD controller, panel transmitter, POR circuitry, LBADC and GPIOs for LED and keypad, PWMs, IR receiver, UARTs, audio DACs and audio post-processing, video encoder and video DACs, USB 2.0 host, and NAND Flash interface to reduce the system BOM cost
- Direct support for interfacing with LCD, DLP, and plasma panels
- Interface to STi710x devices for H.264 support

3 Feature attributes

- Maximum output resolution
  - FLI10610H (Douglas-Plus): WSXGA+,
  - FLI10620H (Douglas-Advanced): 1080p
- Transport demultiplexer
  - Supports MPEG2 MP@ML, MP@HL (ISO13818-1) transport stream
  - De-multiplexes and PID filters ATSC and DVB transport streams
- Audio decoder and post-processor
  - Class A certified Dolby Digital (AC3) decode including emergency broadcast
  - Also supports the decode of MPEG1 Layer I/II, MPEG2 Layer II, and MP3
  - Capable of supporting Dolby® Prologic, SRS TruSurround XT™, equalizer, audio delay insertion, bass redirection, and others
- MPEG video decoder
  - Single MPEG2 MP@HL (ISO13818-2) video decoding as constrained by ATSC and DVB standards
  - Error detection and concealment at all levels, including slice and macroblock
  - Capable of decoding MPEG1 (ISO11172-2), JPEG, and other emerging video compression standards
- Accelerated 2D graphics subsystem
  - Up to 32 bit-per-pixel aRGB with 256 levels of alpha blending or 8 bpp LUT
  - Supports color conversion and monochrome to color expansion
  - Two hardware graphic planes with scaling support for UI, MHEG-5, MHP, & subtitles
- Peripherals connectivity
  - Video eXpansion Interface—one 16-bit 4:2:2 YCbCr interface output and one 24-bit TTL digital video input port
  - Interface to STi710x devices for H.264 support
  - Configurable LVDS/TTL panel interface port (up to 1080p)
  - Integrated USB 2.0 host link and PHY, UARTs, master and slave 2-wire interfaces, IR receiver, PWMs, and multiple GPIOs
  - Flexible host bus interface that enables NOR and NAND Flash support
  - Analog Sound IF (SIF), analog stereo, I2S and SPDIF audio inputs; five integrated audio DACs, SPDIF, and I2S audio outputs
  - Integrated NTSC/PAL video encoder and four 10-bit video DACs
  - Direct CableCARD/CI interface
- Integrated 3D video decoder
  - Faroudja IntelliComb™ technology
  - 3D adaptive comb filter for luma-chroma separation
  - Composite, S-Video, and Component (including High Definition) video input
  - Supports all broadcast TV video standards—NTSC (North America and Japan), PAL (I, B, G, H, M, D, N), SECAM (D, K, L, B, G)
  - Rovi™ and VCR trick mode support

- Picture-in-Picture (PIP)
  - Programmable 10-bit PIP channel through horizontal and vertical coefficients
  - DCDi Edge® processing for second channel window
- VBI signal processing
  - Multi-standard digital VBI dataslicer
  - WST Teletext FastText page support access
  - V-chip, VPS, Closed Captioning, XDS, CGMS, and WSS decode
  - CC and digital Teletext VBI re-insertion
- Memory interface
  - Unified Memory Architecture with memory size from 16 MB to 256 MB
  - x16 400 MHz or x32 333 MHz DDR2 DRAM support
- Integrated HDMI 1.3/DVI 1.0 capture and 2 to 1 HDMI MUX
  - Dual MUX with HDMI 1.3/DVI input ports (link and PHY)
  - 1080p HDMI capture support and integrated HDCP 1.3 key storage
  - xvYCC, deep color, and wide gamut support
- Flexible digital and analog capture
  - Direct connection from tuner or connector to analog input pin
  - Three dedicated RGB pins for high speed VGA performance
  - One dedicated SIF input and one shared SIF input (from video inputs)
  - 16 additional reconfigurable analog video inputs of which one can be SIF input
  - Full SCART support including RGB fast blank
  - Supports quadruple 10-bit ADCs for better SNR with one ADC dedicated for SIF
- Faroudja DCDI Cinema format conversion
  - Low angle de-interlacing processing
  - Per pixel Motion Adaptive De-interlacing (MADi) up to 1080i format
  - Format conversion for resolutions up to 1080p
  - Panoramic and anamorphic non-linear scaling
  - Adaptive media display processing for 3:2 and 2:2 video content
  - Adaptive 3D noise reduction and noise coring
  - Media noise reduction for MPEG inputs
- Faroudja TrueLife video enhancer
  - Non-linear chroma and luma enhancement
  - High performance programmable sharpening filters with noise coring
  - Removal of DVD Chroma Upsampling Error (CUE) introduced by some DVDs
- Advanced Color Management (ACM)
  - ACM with overlapping regions allows flexible flesh-tone compensation, blue stretch, color regions detection, and other image enhancements
  - Faroudja RealColor provides flexible programming, polar coordinate representation, and independent six-axis color control
  - Advanced Contrast Control delivers smoother, more realistic gradients and ensures that full dynamic range is used in video content
  - Patented QuickMatch technology produces uniform color responses for different panels using flexible and programmable techniques

4 Ordering information

Table 1. Order codes

Part number	Description
FLI10610H/HM-BE	633-pin PBGA
FLI10620H/HM-BE	633-pin PBGA

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
25-Sep-2008	1	Initial release.
8-Oct-2008	2	Added references to H.264 with STi710x devices
10-Mar-2009	3	Changed 205 MHz input capture to FLI10636H only
20-Mar-2012	4	Removed references to FLI10636H

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