FLI32652H

Single-chip enhanced TV controller

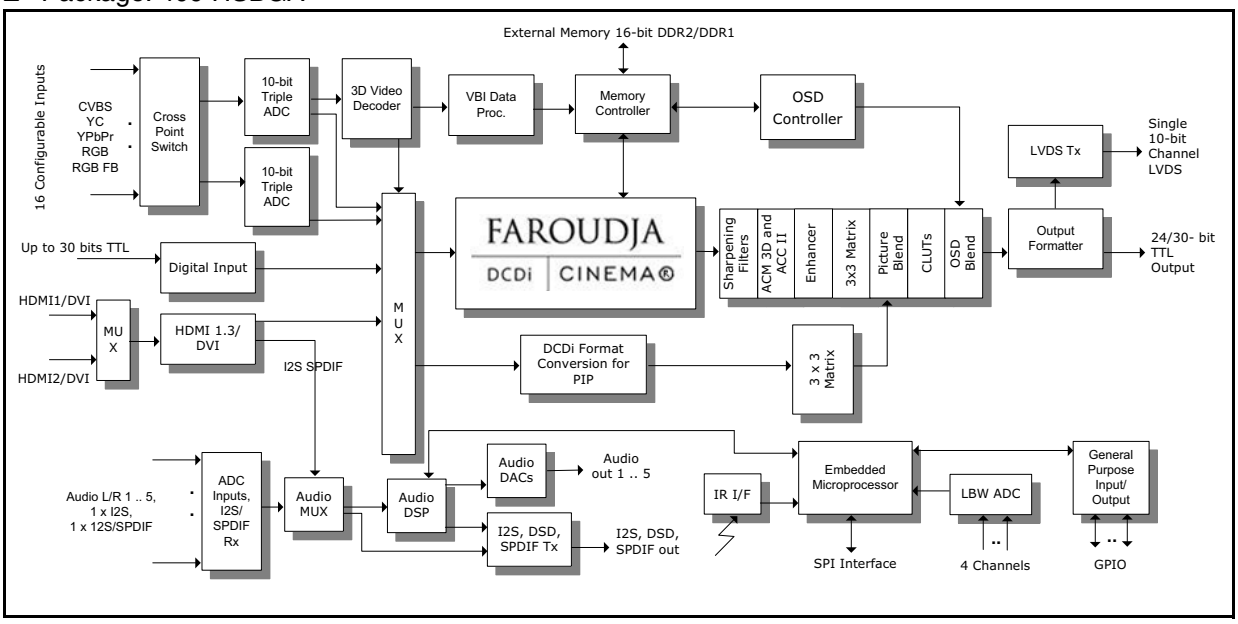
Data Brief

Features

- Dual 10-bit triple ADCs with capture up to 165 MHz
- Integrated 3D video decoder
- Flexible digital and analog capture up to 165 MHz
- Integrated HDMI 1.3
- VBI slicer including WST version 2.5 support
- Next generation true 10-bit Faroudja DCDi Cinema® Format processing
- DDR2/DDR1 memory interface 16 bits wide
- Faroudja® TrueLife™ video enhancer
- Advanced Picture-in-Picture (PIP) features capabilities
- Faroudja Real Color® processing
- Embedded 10-bit single-channel LVDS for WXGA panel support
- Multi-standard digital and analog audio decoder and post-processor
- Package: 409 HSBGA

Applications

- LCD and PDP TV
- DLP®, LCD, and LCOS front and rear projection



1 Description

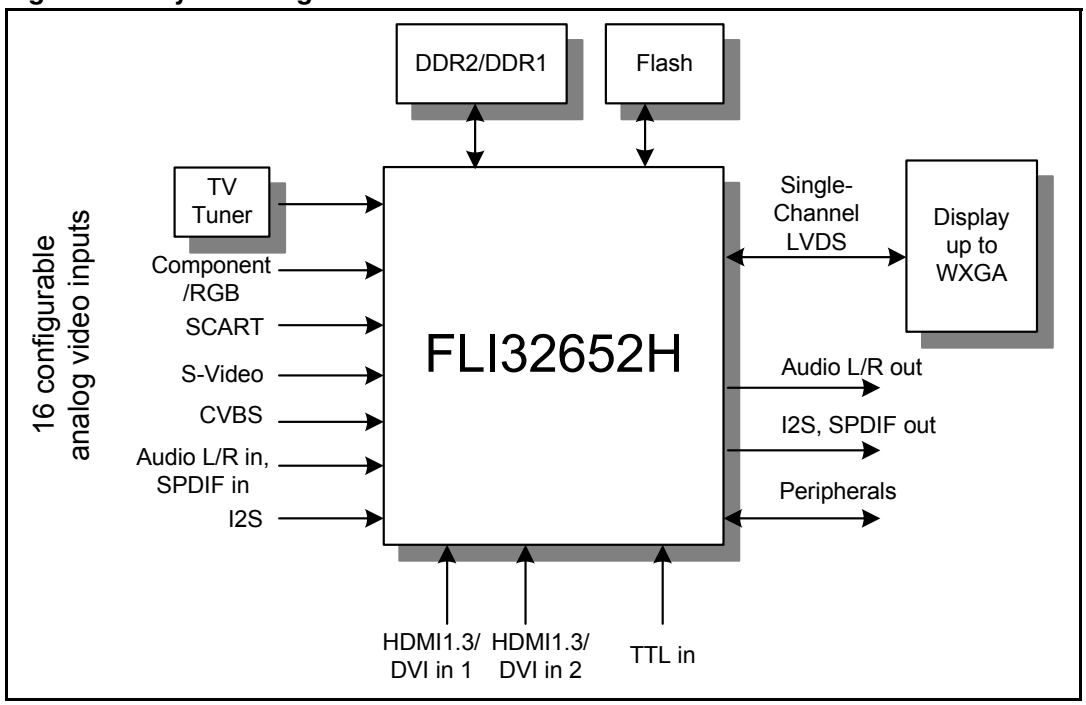
The FLI32652H is an innovative System-on-Chip (SoC) controller designed for flat panel display TVs, LCD TVs, and other emerging digital display applications.

The FLI32652H handles video and computer graphics inputs in virtually any format and resolution. The output port delivers unparalleled image quality and supports display resolutions up to WXGA. Its rich feature set, high level of integration. Its sophisticated technologies for color management, scaling, video processing, and audio processing make the FLI32652H the ideal solution for a high-quality, cost-effective, integrated TV solution.

The FLI32652H IC offers a high integration SoC solution for advanced analog TV dual-channel applications (e.g. PIP) and for TV products that require superior video and audio quality with extensive feature sets. The FLI32652H includes a flexible analog and digital front-end with a wide range of integrated components for different application needs as well as state-of-the-art dual channel video processing based on renowned Faroudja technologies.

The FLI32652H is the only device needed for a complete LCD TV solution chassis supporting worldwide video and audio standards where exceptional quality is required. For regional variations, only connector and firmware changes are needed.

Figure 1. System diagram



2 Benefits

- Complete SoC solution with exceptional video and audio quality
- Superior video quality with Faroudja DCDi Cinema video processing technology
- Exclusive level of video quality technology previously seen on Faroudja Home Theater Systems now available in a single-chip solution
- Multi-standard worldwide analog/digital audio decoder and post-processor
- Integrated HDMI 1.3/DVI 1.0 with integrated HDCP key
- 1080p-in capture support and output resolutions up to WXGA
- Additional integration of low power monitor circuit, UARTs, LBADC, 3D-VD, and VBI dataslicers

3 Feature attributes

- Flexible digital and analog capture
  - 16 configurable analog inputs
  - Integrated dual 10-bit triple ADCs with capture up to 165 MHz
  - Full SCART support including RGB Fast Blank
  - 2 CVBS out support
  - 4:4:4/4:2:2/CCIR656/601 30/24/16/8-bit digital input port
- Integrated HDMI 1.3/DVI 1.0 capture
  - Integrated HDMI 1.3/DVI 1.0 with 2 input ports
  - 1080p HDMI capture support
  - Integrated HDCP 1.3 key storage
  - xvYCC support based on IEC61966-2-4 color standard
  - Deep color and wide camut support:
    12-bit HDMI input at YCC 4:4:4
- Integrated 3D video decoder
  - Supports all broadcast TV Video standards—NTSC (North America and Japan), PAL (I, B, G, H, M, D, N), and SECAM (D, K, L, B, G)
  - Single 3D adaptive comb filter for luma–chroma separation for NTSC (North America and Japan) and PAL (I, B, G, H, M, D, N)
  - Supports composite, S-Video, and component SD and HD video input signals
  - Supports NTSC443 and PAL-60 playback video standards
  - Macrovision™ and VCR trick mode support
- Video signal processing
  - Multi-standard digital VBI dataslicer
  - WST Level 2.5 (>2K pages) and FastText page support access
  - V-chip, VPS, Closed Captioning, XDS, CGMS, and WSS decoder
- Faroudja Real Color
  - Advanced Color Management with overlapping regions allows for flexible flesh-tone compensation, Blue Stretch, color regions detection, and other image enhancements
  - Faroudja Real Color 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
  - Integrated noise filter to eliminate contrast noise
- Faroudja TrueLife video enhancer
  - High performance programmable sharpening filters with noise coring
  - Programmable main channel horizontal and vertical filter coefficients
  - Non-linear chroma and luma enhancement
- Faroudja DCDi Cinema format conversion
  - Low angle de-interlacing processing
  - Per pixel Motion Adaptive De-interlacing (MADi) up to 1080i format

  - Format conversion up to WXGA resolutions
  - Adaptive 3D/TNR noise reduction
- Picture-in-Picture (PIP)
  - Programmable PIP channel horizontal and vertical filter coefficients
  - Flexible PIP, PBP, and POP support capability (video, graphics)
  - DCDi Edge processing for second channel window
- Integrated audio processing
  - Five stereo (L/R) analog inputs, 1 mono (MIC) input
  - Additional and separate audio inputs for HDMI, I2S, SIF, and SPDIF
  - Outputs include five analog DACs, SPDIF, I2S, DSD, and 2 line outs (L/R)
  - Worldwide multi-standards audio support
  - Integrated I2S audio delay for exact audio and video synchronization
  - Supports 5.1 analog/digital output stream (left, center, right, LS, RS + LFE)
  - Supports separate digital streams (3.1 and stereo) for multi-PIP applications
- DDR2/DDR1 memory controller
  - DDR2/DDR1 memory I/F support
  - Supports 16-bit memory I/F 1x16, 2x16
- On-Chip Microcontroller and OSD controller
  - Integrated x186 based microprocessor with rich function library
  - General Purpose Inputs/Outputs (GPIOs) available for managing system devices (keypad, backlight, NVRAM, etc.)
  - 2-wire serial master bus interface for external device control
  - Integrated I/R decoder and 4-channel low bandwidth ADC
  - Advanced bit-mapped OSD controller
  - Advanced low power stand-by mode with separate microprocessor controller and <30 mW at the chip
  - Integrated low power monitor on isolated power rails
- Outputs
  - Single-channel 18/24/30-bit LVDS transmitters for direct connection to LCD modules
  - Single-channel 24/30-bit TTL output

4 Ordering information

Table 1. Order codes

Part number	Description
FLI32652H-AE	409-ball HSBGA
FLI32652H-BG	409-ball HSBGA

In order to meet environmental requirements, ST offers this device in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
07-Nov-2008	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.

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