

Single-chip enhanced LCD TV controller with HDMI

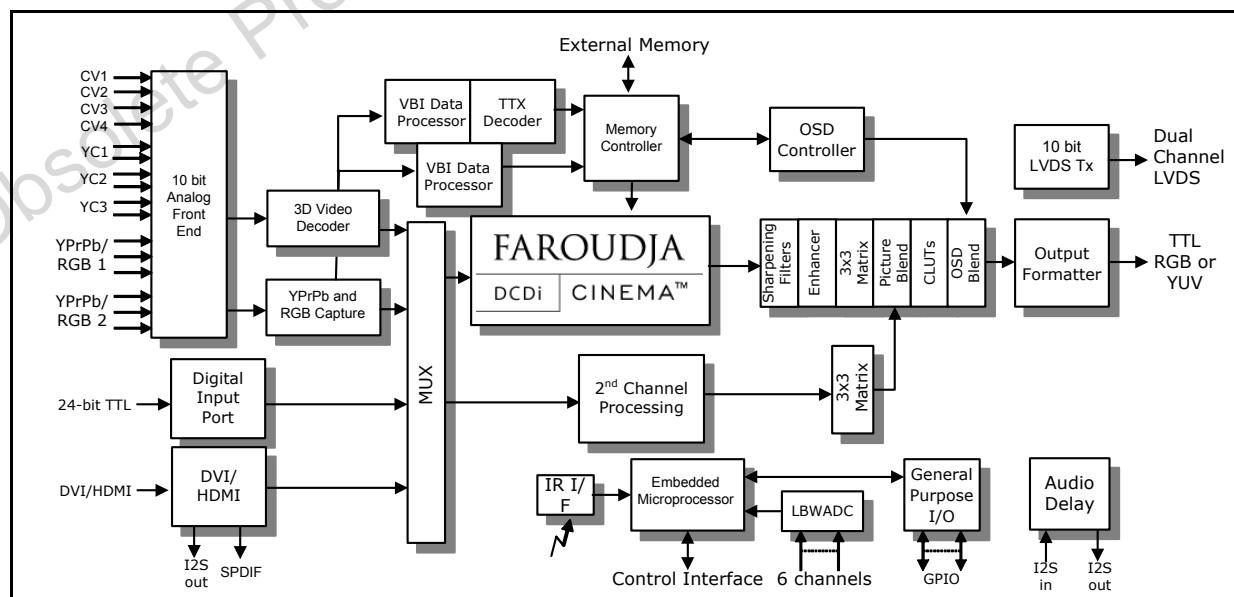
Data Brief

Features

- Integrated HDMI input
- Integrated 3D video decoder
- Flexible digital and analog capture up to 150 MHz
- VBI signal processing including WST version 2.5 support
- Flexible DDR memory interface
- Faroudja® TrueLife™ video enhancer
- Advanced Picture-in-Picture (PIP) features
- Advanced Color Management (ACM-3D) and Adaptive Contrast Control (ACC)
- On-chip microprocessor
- Advanced bitmapped OSD controller
- LCD overdrive
- Embedded 10-bit dual-channel LVDS for 1080p and WUXGA panel support
- Package: 416 PBGA

Applications

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



1 Description

The FLI8548H offers high integration for advanced applications of Picture-in-Picture (PIP) and Picture-by-Picture (PBP) with an integrated video decoder, a 3D comb filter, and an HDMI receiver. Additionally, the FLI8548H can power up to 1080p displays with the proven DCDi Cinema technology.

Special performance features such as the Faroudja DCDi Cinema video format converter, 10-bit performance in the device, and the upgraded Advanced Color Management (ACM-3D) provide exceptional video quality. This video quality level that was exclusive to Faroudja Home Theater Systems is now available in a single-chip solution.

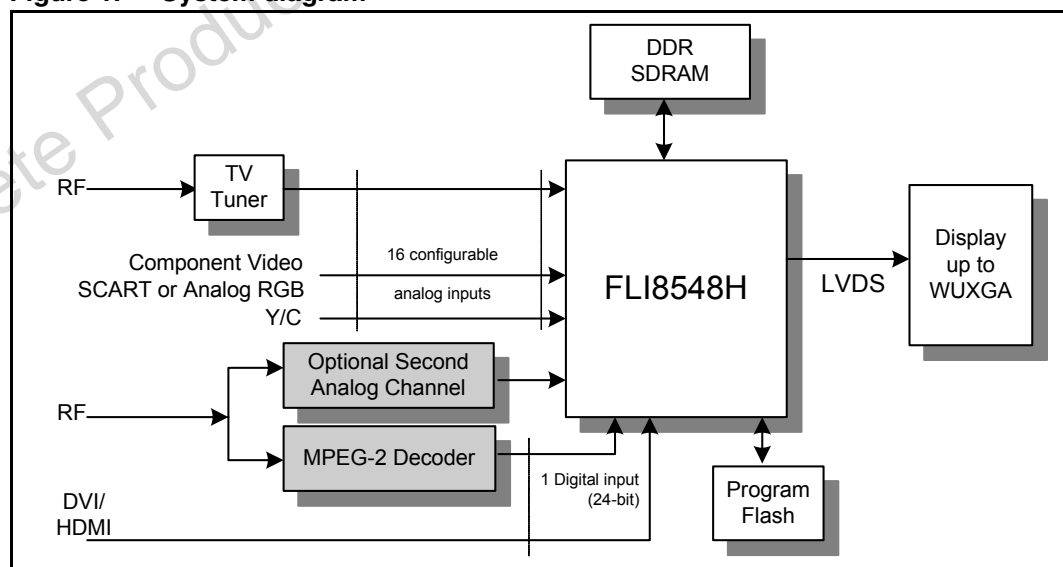
The FLI8548H comprises an integrated Analog Front-End (AFE) that includes triple ADCs and a cross-point switch. The flexible AFE ensures simple PCB design with direct connections to TV tuners and input video connectors. Thus, the FLI8548H, for a single LCD TV chassis, is able to support worldwide standards. Regional variation requirements are reduced to connectors and firmware changes.

The integrated VBI dataslicer and decoder eliminate the need for external components resulting in significant cost reduction. The FLI8548H supports many worldwide VBI standards for applications of Teletext, Closed Captioning, V-Chip, and other VBI services.

The FLI8548H can also be used as part of a digital TV solution that requires the proven Faroudja DCDi Cinema video performance.

An embedded microprocessor and a versatile OSD in a single device will facilitate rapid development of a reliable and attractive product. The FLI8548H utilizes the common Cortex family firmware making migration easy and effortless across different hardware platforms within this family.

Figure 1. System diagram



2 Feature attributes

- Flexible digital and analog capture
 - 16 configurable analog inputs
 - Direct connection from tuner or connector to analog input pin
 - Integrated anti-aliasing filter
 - RGB capture up to 135 MHz and YUV capture up to 150 MHz
 - Full SCART support including RGB fast blank
 - 4:4:4/4:2:2/CCIR656/601 8/16/24-bit digital input port
 - Simple connection to JPEG and MPEG processors with a 8-bit bi-directional media port
 - Supports triple 10-bit ADCs for better SNR
 - HDMI input port supports up to 1080p digital video input
 - Integrated DVI 1.0 input supported
- Integrated 3D video decoder and 10-bit ADC
 - Faroudja IntelliComb™ technology
 - 3D adaptive comb filter for luma–chroma separation
 - Supports Composite, S-Video, and Component (including High Definition) video input signals
 - 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)
 - Macrovision® and VCR trick mode support
- VBI signal processing
 - Multi-standard digital VBI dataslicer
 - WST Teletext FastText page support access > 2048 page cache
 - Supports WST level 2.5 and freeze frame
 - V-chip, VPS, Closed Captioning, XDS, CGMS, and WSS decode
- 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 WUXGA resolutions
 - Panoramic and anamorphic non-linear scaling
 - Adaptive media display processing for 3:2 and 2:2 video content
 - Adaptive 3D noise reduction
 - Media noise reduction for MPEG inputs
 - Supports 2.2 film mode processing
- On-chip microprocessor
 - Integrated x186-based microprocessor with rich function library
 - General Purpose Inputs/Outputs (GPIOs) available for managing system devices (keypad, backlight, NVRAM, etc.)
 - Advanced power control for low power stand-by mode
 - 2-wire serial master bus interface for external device control

- Advanced bitmapped OSD controller
 - 16 true color bitmap tiles with 1, 2, 4, and 8 bits per pixel
 - Horizontal and vertical stretch of OSD menus
 - Blinking, transparency, and blending
 - Character font scaling
- Faroudja TrueLife video enhancer
 - High performance and programmable sharpening filters with noise coring
 - Non-linear chroma and luma enhancement
 - Removal of the DVD Chroma Upsampling Error (CUE)
 - Programmable horizontal filter coefficients
- Advanced Color Management (ACM-3D)
 - ACM-3D allows flexible flesh-tone compensation, blue stretch, and other image enhancements
 - ACM-3D provides flexible programming, polar coordinate representation, and six-axis color control
 - ACC ensures full dynamic range is used in video content
- Picture-in-Picture (PIP)
 - Dynamic scaling for advanced PIP transitions
 - Video PIP over full screen graphics and video backgrounds
 - Graphics PIP over full screen video background
 - Side-by-side window support
 - PIP zoom support
 - Multi-PIP
- Output formats
 - Dual-channel and 30-bit TTL output
 - Dual-channel LVDS transmitters for direct connection to LCD modules
 - 24-bit 4:4:4 YUV TTL output 10—bpc
 - 30-bit LVDS output available
 - 1080p and WUXGA panel support
- Other features
 - Integrated infrared decoder
 - Integrated low bandwidth ADC with 6 input channels
 - 4 integrated PWM outputs (e.g. LCD backlight control)
 - Integrated I2S audio delay for exact audio and video synchronization
 - I2S channel MUX to support two I2S input streams
 - Passes audio out through I2S/SPDIF output
 - DDR1 440 memory supported for 1x16, 2x16, 1x32
 - Memory size is flexible up to 512 Mb
 - Reduces LCD video smearing artifacts

3 Ordering information

Table 1. Order codes

Part number	Description
FLI8548H-LF-BE	416-ball PBGA

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.

4 Revision history

Table 2. Document revision history

Date	Revision	Changes
18-Sep-2008	1	Initial release.

Obsolete Product(s) - Obsolete Product(s)

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