FLI8538

Single-chip enhanced LCD TV controller
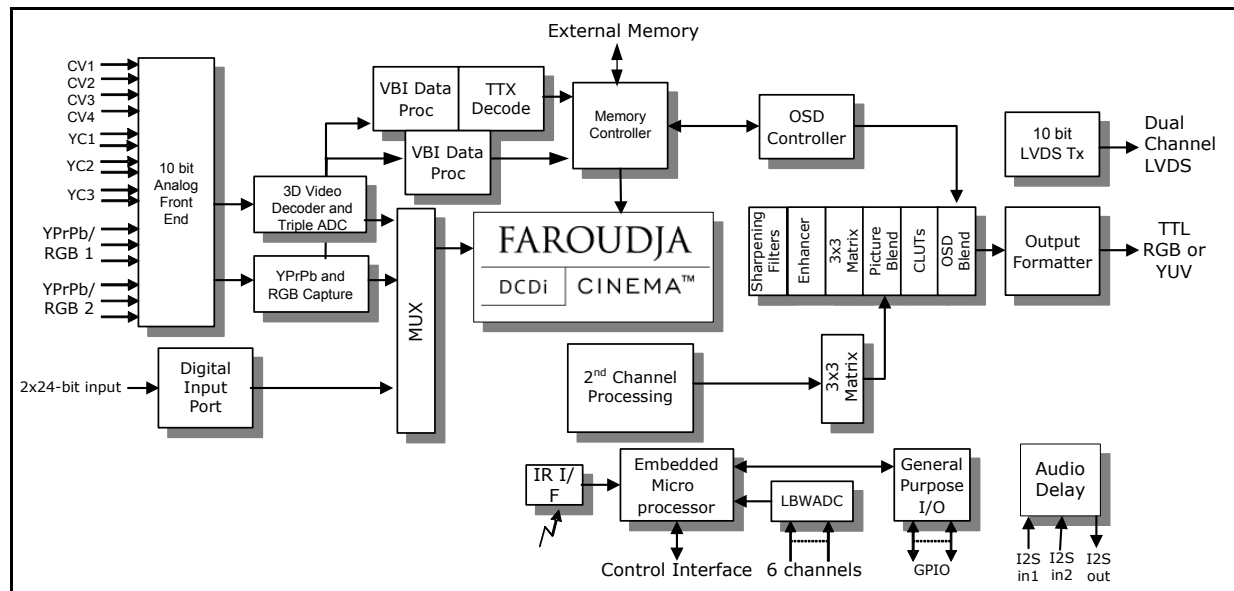
Features

- 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

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1 Description

The FLI8538 offers high integration for advanced applications of Picture-in-Picture (PIP) and Picture-by-Picture (PBP) with an integrated video decoder and a 3D comb filter. The FLI8538 can power up to 1080p displays with the proven DCDi Cinema technology.
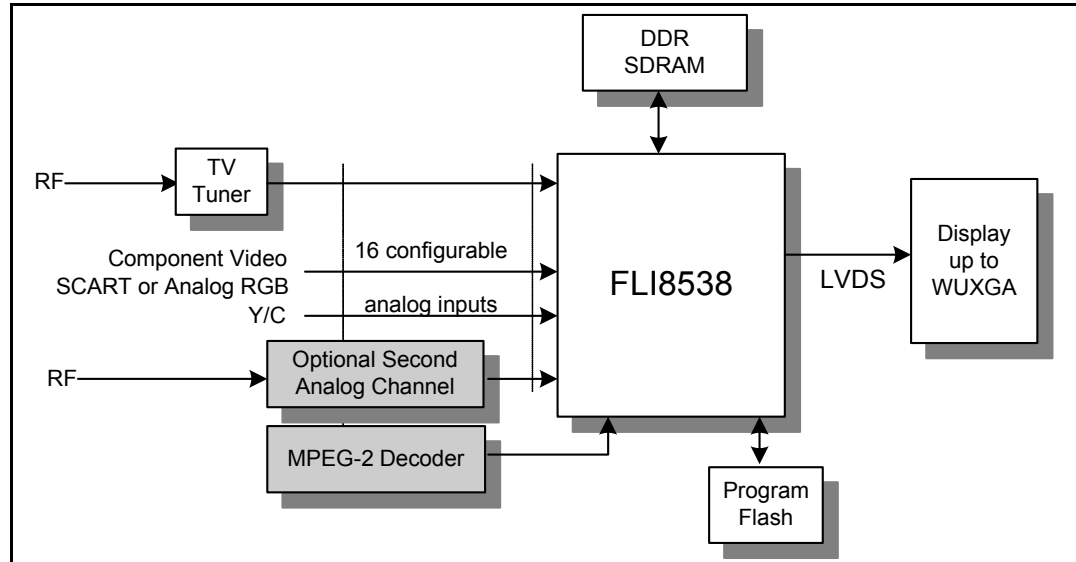
Special performance features such as the Faroudja DCDi Cinema video format converter, 10-bit performance in the device, and the Advanced Color Management (3D) provide exceptional video quality. The video quality level that was exclusive to Faroudja® Home Theater Systems is now available in a single-chip solution.

The FLI8538 also 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 FLI8538, for a single LCD TV chassis, is able to support worldwide standards. The only requirements for regional variations are connectors and firmware changes.

The integrated VBI dataslicer and decoder eliminates the need for external components resulting in significant cost reduction. The FLI8538 supports many worldwide VBI standards for applications of Teletext, Closed Captioning, V-Chip, and other VBI services.

The FLI8538 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 FLI8538 utilizes the common Cortez family firmware for easy migration when moving 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
- 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 VBI frame freeze
  - 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 main channel horizontal and vertical 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 graphics background
  - Side-by-side window support
  - PIP zoom support
- Output formats
  - Dual-channel and 30-bit TTL output
  - Dual-channel 10-bit LVDS transmitters for direct connection to LCD modules
  - 30-bit LVDS output available
  - 1080p panel support
- Other features
  - Integrated infrared decoder
  - Integrated low bandwidth ADC with 6 input channels
  - 4 integrated PWM outputs for LCD backlight control
  - Integrated I2S audio delay to exact audio and video synchronization
  - I2S channel MUX to support two I2S inputs
  - DDR1 440 MHz memory supported
  - Memory size is flexible up to 512 Mb
  - Reduces LCD's video smearing artifacts

3 Ordering information

Table 1. Order codes

Part number	Description
FLI8538-LF-BE	416-ball PBGA

4 Revision history

Table 2.   Document revision history

Date	Revision	Changes
17-Oct-2008	1	Initial release.

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