FLI8638

## Single-chip advanced LCD TV controller

Data Brief

Features

- True 10-bit processing
- Integrated 3D video decoder
- Flexible digital and analog capture up to 165 MHz UXGA
- Two triple ADCs
- Video on graphics support
- Next generation 10-bit Faroudja DCDi Cinema® format conversion
- VBI signal processing including WST version 1.5 support
- Flexible DDR memory interface with 10-bit video processing
- Faroudja® TrueLife™ video enhancer

- Advanced Color Management (ACM) 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
- Flagship multifunction LCD monitors

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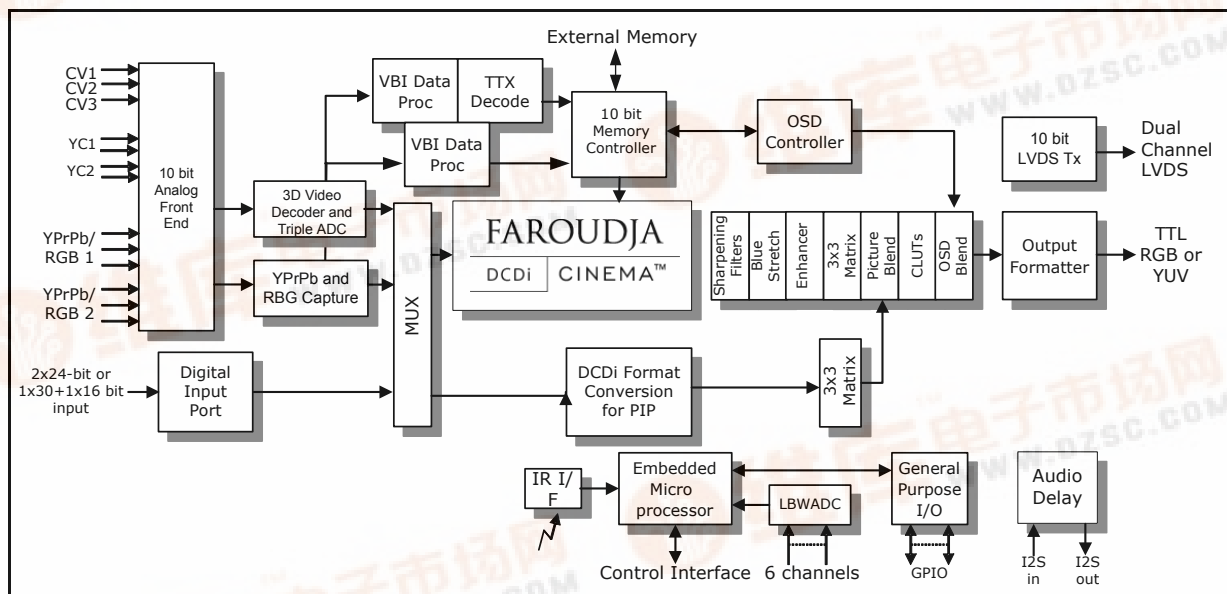
1 Description

The FLI8638 offers high integration for advanced applications of Picture-in-Picture (PIP) and Picture-by-Picture (PBP). Two triple ADCs and an integrated video decoder with 3D comb filters complemented by true 10-bit performance provide the highest quality picture for a two-channel application.

Special performance features such as the Faroudja DCDi Cinema video format converter, blue stretch, DDR memory with a read-write picture capacity data of 10 bits per pixel, and the most flexible picture sharpening system in one device provide unparalleled performance. The video quality level that was exclusive to Faroudja Home Theater Systems is now available in a single-chip solution.

The FLI8638 also comprises an integrated Analog Front-End (AFE) that includes two 10-bit ADCs, an integrated analog multiplexer, and a Faroudja Intellicomb™ 3D video decoder. The flexible AFE ensures simple PCB design with direct connections to TV tuners and input video connectors. Thus, the FLI8638, for a single LCD TV chassis, is able to support worldwide standards. For regional variations, only a connector and firmware change are required.

The integrated VBI dataslicer and decoder remove the need for external components resulting in significant cost reduction. The FLI8638 supports many worldwide VBI standards for applications of Teletext, Closed Captioning, V-Chip, and other VBI services.

An embedded microprocessor and a versatile OSD in a single device will facilitate rapid development of a reliable and attractive product. The FLI8638 utilizes the common Cortez family firmware making migration easy and effortless across different hardware platforms within this family.

Figure 1.   System diagram
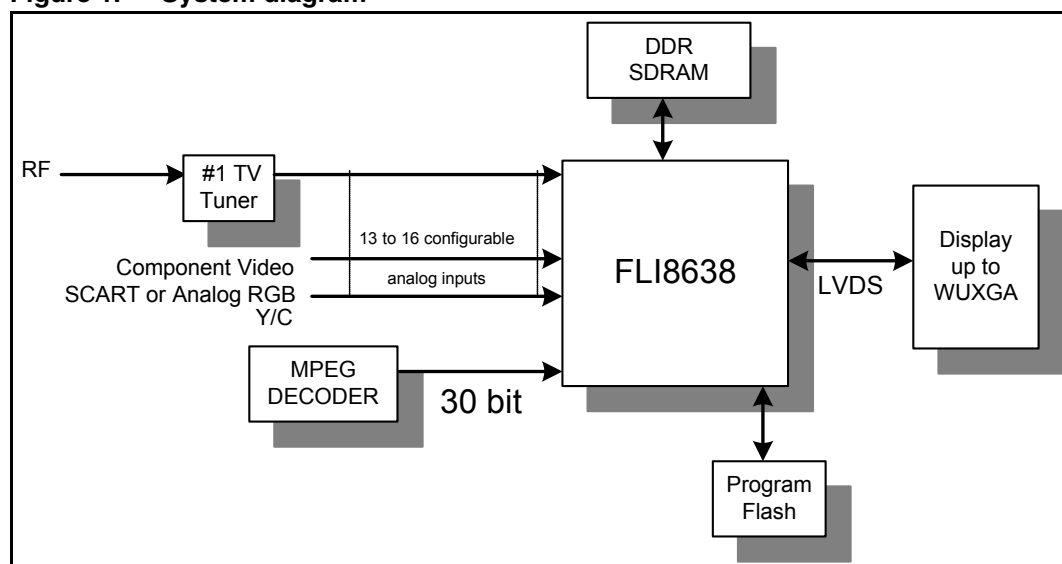
2   Feature attributes

- Flexible digital and analog capture
  - 13 to 16 configurable analog inputs
  - Integrated anti-aliasing filters
  - RGB or YUV capture up to 150 MHz with 10-bit resolution; 165 MHz with 8-bit resolution
  - Full SCART support including RGB fast blank
  - 4:4:4/4:2:2/CCIR656/601 8/16/24/30-bit digital input port
  - Simple connection to JPEG and MPEG processors with an 8-bit bi-directional media port
  - Two triple ADCs for two channels of analog capture
- Integrated 3D video decoder
  - 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
  - Support for WST level 1.5
  - V-chip, VPS, Closed Captioning, XDS, CGMS, and WSS decoder
- 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
- 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

- Faroudja advanced video enhancment
  - High performance and programmable sharpening filters with noise coring
  - Non-linear chroma and luma enhancement
  - Removal of the DVD Chroma Upsampling Error (CUE)
  - Blue stretch
  - Next generation MPEG noise reduction
- Advanced Color Management (ACM-II)
  - 10-bit ACM-II provides flesh-tone compensation and image enhancement
  - 10-bit 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
  - DCDi Edge® processing for second channel window
  - Video on graphics/YPbPr support
- Output formats
  - Dual-channel and 30-bit TTL output
  - Dual-channel 10-bit LVDS transmitters for direct connection to LCD modules
  - 24-bit 4:2:2 YUV TTL output – 12 bpc
  - Supports WUXGA and 1080p
- 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
  - DDR400, DDR450, and DDR466 memory speeds supported
  - Memory size is flexible up to 512 Mb
  - Reduces LCD video smearing artifacts
  - Two integrated UARTs

3 Ordering information

Table 1. Order codes

Part number	Description
FLI8638-LF-BC	416-ball PBGA

4 Revision history

Table 2. **Document revision history**

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

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*.

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