FLI30336

Single-chip enhanced LCD TV controller
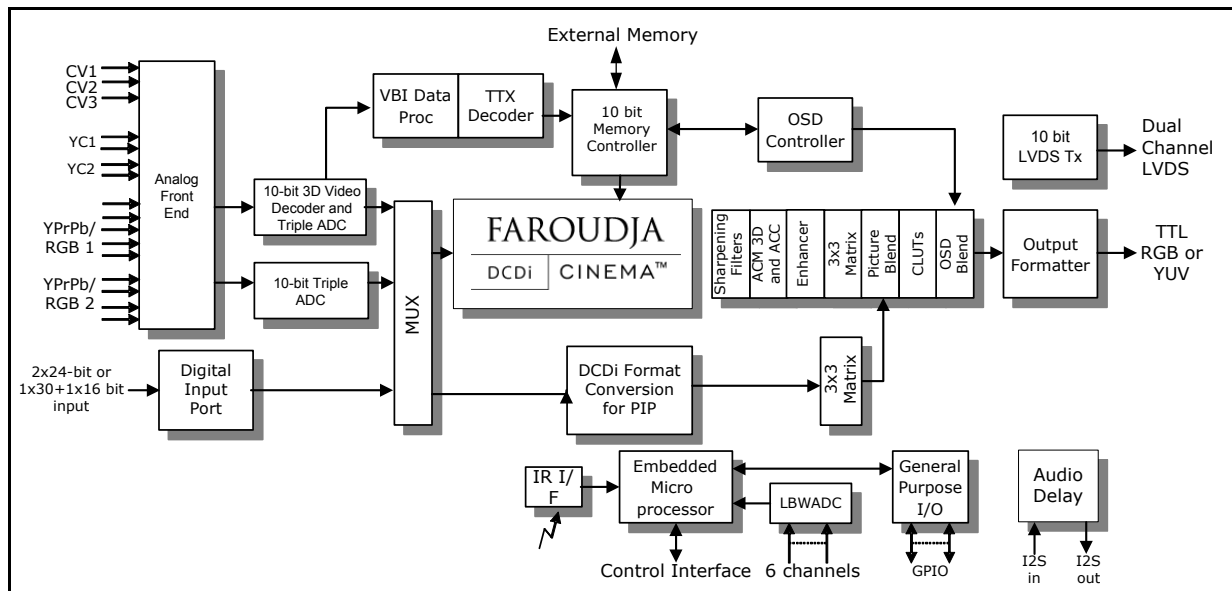
Data Brief

Features

■ Integrated 3D video decoder

■ Flexible digital capture up to 165 MHz and analog capture up to 162 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 FLI30336 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 FLI30336 can power up to 1080p/WUXGA displays with the proven Faroudja DCDi Cinema branded technology.
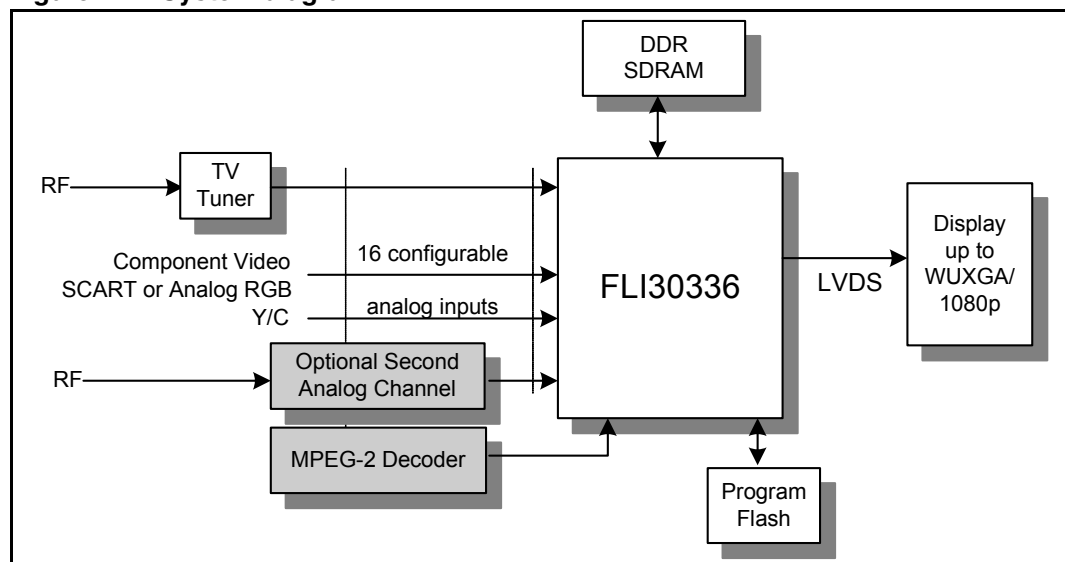
Special performance features such as the Faroudja DCDi Cinema video format converter, 10-bit performance in the device, and the Advanced Color Management (ACM-3D) provide exceptional video quality. This exclusive level of video quality technology only seen on Faroudja Home Theater Systems is now available in a single-chip solution.

The FLI30336 also comprises an integrated Analog Front-End (AFE) that includes triple ADCs and an integrated cross-point switch. The flexible AFE ensures simple PCB design with direct connections to TV tuners and input video connectors. In essence, the FLI30336 is the only device needed for a single LCD TV chassis supporting worldwide standards. For regional variations, only connector and firmware changes are required.

The integrated VBI dataslicer and decoder remove the need for external components resulting in significant cost reduction. The FLI30336 supports many worldwide VBI standards for applications of Teletext, Closed Captioning, V-Chip, and other VBI services.

The FLI30336 can be used in digital TV solutions requiring Faroudja DCDi Cinema video performance levels. An embedded microprocessor and a versatile OSD in a single device will facilitate rapid development of a reliable and attractive product. The FLI30336 utilizes the common Cortez family firmware for easy and effortless migration 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
  - Supports analog RGB/YUV capture up to 162 MHz and digital input capture up to 165 MHz
  - 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 a 8-bit bi-directional media port
- Integrated 3D video decoder
  - Faroudja IntelliComb™ technology
  - 3D adaptive comb filters 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)
  - Supports playback video standards—NTSC443 and PAL-60
  - Macrovision™ and VCR trick mode support
- VBI signal processing
  - Multi-standard digital VBI dataslicer
  - WST FastText page support access with > 2048 page cache
  - Supports WST level 2.5
  - V-chip, VPS, Closed Captioning, XDS, CGMS, and WSS decoder
  - Supports VBI frame freeze
- 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
  - Special 2:2 and 3:3 film mode for improved film processing
  - Adaptive 3D/TNR noise reduction
  - Media noise reduction for MPEG inputs
- 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

- ● Faroudja TrueLife video enhancer
    - – High performance and programmable sharpening filters with noise coring
    - – Programmable main channel horizontal and vertical filter coefficients
    - – Non-linear chroma and luma enhancement
    - – Removal of the DVD Chroma Upsampling Error (CUE) introduced by some DVD sources
- ● 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)
    - – Programmable PIP channel horizontal and vertical filter coefficients
    - – Supports high performance programmable sharpening filters with noise coring
    - – Video PIP over full screen graphics and video backgrounds
    - – Supports graphics and video PIP (CVBS/S-Video/Component ED/HD) over full screen video background (CVBS/S-Video)
    - – Side-by-side window support
    - – PIP zoom support
    - – DCDi Edge® processing for second channel window
- ● Output formats
    - – Dual-channel 8-bit wide TTL output
    - – Dual-channel 10-bit LVDS transmitters for direct connection to LCD modules
    - – 30-bit single-wide TTL output; 24-bit 4:2:2 YUV TTL output—12 bits per color 1080p panel support
    - – 120 Hz WXGA panel support using FRC and Black Frame Insertion (BFI) technique
- ● 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 input streams
    - – Supports DDR1-500 memory devices and 512 Mb
    - – Reduce LCD video smearing artifacts
    - – Advanced bitmapped OSD controller

3 Ordering information

Table 1. Order codes

Part number	Description
FLI30336-AC	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
03-Nov-2008	1	Initial release.

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