FLI32656H

Single-chip enhanced TV controller

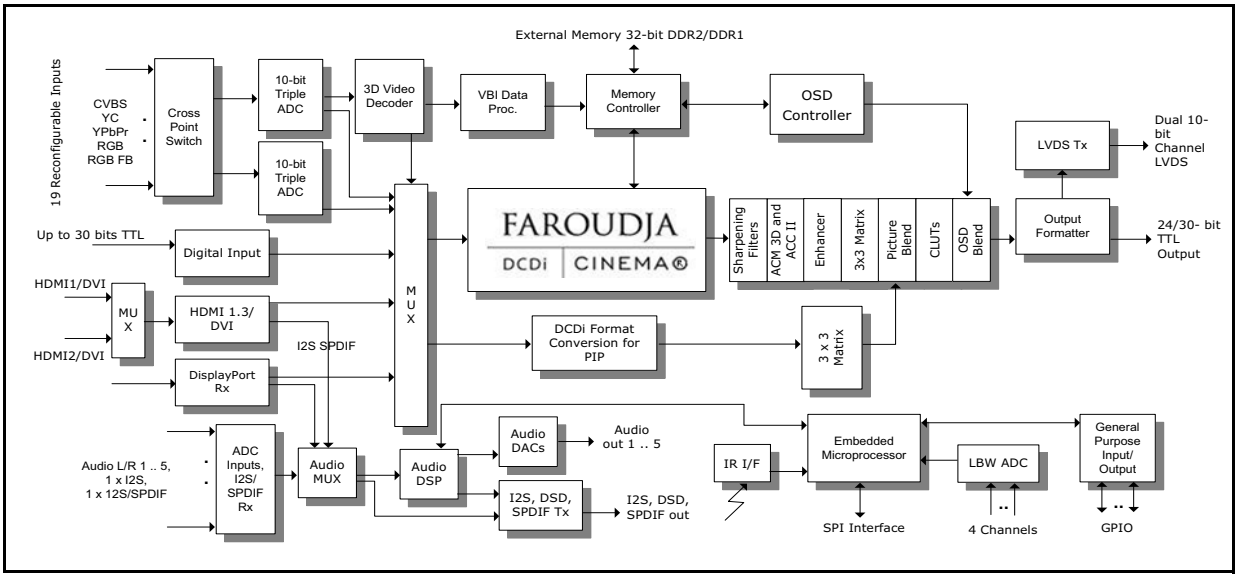
Data brief

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 receiver
- Integrated DisplayPort 1.1 compliant receiver
- VBI slicer including WST version 2.5 support
- Next generation true 10-bit Faroudja DCDi Cinema® format processing
- Flexible DDR2/DDR1 memory interface 32 bits wide
- Faroudja® TrueLife™ video enhancer
- Advanced Picture-in-Picture (PIP) features capabilities
- Faroudja RealColor® processing
- On-Chip Microprocessor
- Advanced bit-mapped OSD controller
- Embedded 10-bit dual-channel LVDS for 1080p 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

Genesis Microchip's FLI32656H is an innovative System-on-Chip (SoC) controller designed for flat panel display TVs, LCD TVs, and other emerging digital display applications.The FLI32656H handles video and computer graphics inputs in virtually any format and resolution. The output port delivers unparalleled image quality and supports display resolutions of up to 1080p.

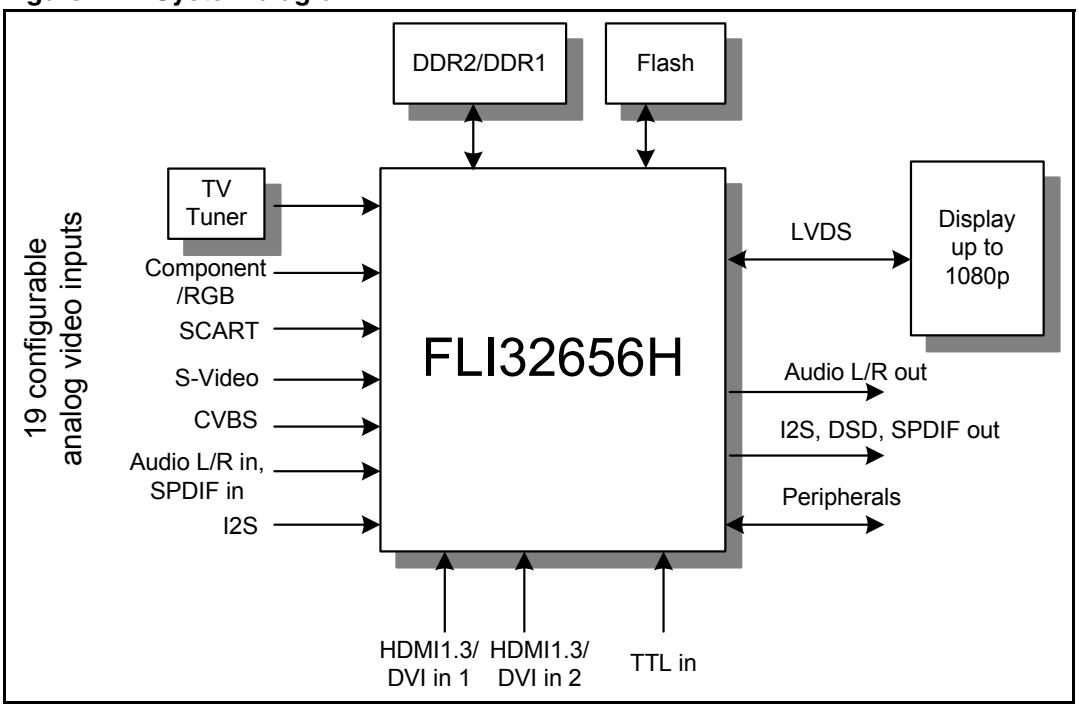
The FLI32656H provides added interconnectivity with its integrated DisplayPort receiver. The DisplayPort interface provides very high bandwidth compared to conventional digital interfaces, such as HDMI, DVI, and LVDS, at a lower cost.

The FLI32656H 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 FLI32656H 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 FLI32656H 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.

Its rich feature set, high level of integration, and sophisticated implemented technologies for color management, scaling, video processing, and audio processing make the FLI32656H the ideal solution for a high-quality, cost-effective, integrated TV solution.

Figure 1. System diagram



2 Benefits

- Complete SoC solution with exceptional video and audio quality
- Integrated DisplayPort (DP) 1.1receiver/HDMI 1.3 receiver/
  DVI 1.0 with integrated HDCP key
- Superior video quality with Faroudja DCDi Cinema video processing technology
- Multi-standard worldwide analog/digital audio decoder and post-processor
- Full HD capability up to 1080p in/out support
- Additional integration of full audio processing, low power monitor circuit, UARTs, LBADC, 3D-VD, VBI dataslicer, and more to reduce the system BOM costs

3 Feature attributes

- Flexible digital and analog capture
  - 19 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 receiver
  - Integrated HDMI 1.3 receiver with 2 input ports
  - 1080p HDMI capture support
  - Integrated HDCP 1.2 key storage (not supporting Enhanced Verificaiton Link and Advanced Cipher)
  - 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
- Integrated DisplayPort 1.1 receiver
  - Low cost interface with fewer signal lines, inexpensive cables and connectors, and low EMI
  - DisplayPort link comprising of 4 main lines and 1 auxiliary channel
  - 1080p capture 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 1080p 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
  - Flexible integrated DSP capable of integrating external audio algorithms post processing
  - 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 16/32-bit memory I/F 1x16, 2x16, 1x32, 2x32
- 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
  - Dual-channel/single-channel 18/24/30-bit LVDS transmitters for direct connection to LCD modules
  - Single-channel 24/30-bit TTL output
  - 120 Hz WXGA panel support

4 Ordering information

Table 1. Order codes

Part number	Description
FLI32656H-AE	409-ball HSBGA
FLI32656H-BG	409-ball HSBGA

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*.
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5 Revision history

Table 2. Document revision history

Date	Revision	Changes
07-Nov-2008	1	Initial release.
15-May-2009	2	Updated template and ECOPACK text. Updated features section to specify “receiver” when referring to integrated HMDI 1.3 feature. Changed HDCP version from 1.3 to 1.2 and added “not supporting Enhanced Verification Link and Advanced Cipher.” Added the word “integrated” to feature heading “DisplayPort 1.1 receiver”.

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