Part Number: SAA7115AHL/V1,557

General Description:

The SAA7115 is a video capture device for applications ranging from small screen products such as digital set-top boxes and personal video recording applications to large screen devices like LCD projectors that benefit from its improved comb filter performance and 10-bit video output capabilities.

It combines a two channel analog pre-processing circuit and a high performance scaler. The pre-processing circuit includes source selection, an anti-aliasing filter and an analog to digital converter, an automatic clamp and gain control, two clock generation circuits and a digital multi-standard decoder containing two-dimensional chrominance/luminance separation using an improved adaptive comb filter. The high performance scaler features variable horizontal and vertical up and down scaling and a Brightness Contrast Saturation (BCS) control circuit. Based on the principle of line-locked clock decoding, the decoder is able to decode PAL, SECAM and NTSC signals into ITU-601 compatible color component values.

It accepts CVBS or S-Video (Y-C) analog inputs from TV or VCR sources, including weak and distorted signals. The expansion port (X-port) for digital video (bi-directional half duplex, D1 compatible) can be used either to output unscaled video using 10-bit or 8-bit dithered resolution or to connect to other external digital video sources for reuse of the SAA7115's scaler features. An enhanced image port (I-port) supports 8(16)-bit wide output data with auxiliary reference data for interfacing to VGA controllers, set-top box applications, etc. It is also possible to output video in Square Pixel formats accompanied by a square pixel clock of the appropriate frequency.

The SAA7115 can capture the serially coded data in the vertical blanking interval (VBI-data) of several broadcast standards. It also incorporates also a frame locked audio clock generation. This ensures that there is always the same number of audio samples associated with a frame or set of fields. This prevents the loss of synchronization between video and audio, during capture or playback. Furthermore the second analog onboard PLL optionally can be used to enhance this audio clock to a low jitter frame locked audio clock. All the functions of the SAA7115 can be controlled via I^2C-bus.

Features:

Video acquisition

- Six analog inputs, internal analog source selectors (e.g.: 6 x CVBS or (2 x YC and 2 CVBS) or (1 x YC and 4xCVBS))
- Two built in analog anti-alias filters

- Two improved 9-bit CMOS analog-to-digital converters
- Fully programmable static gain or automatic gain control (AGC) for the selected CVBS or Y/C channel
- Automatic Clamp Control (ACC) for CVBS, Y and C
- Switchable white peak control
- Requires only one crystal (32.11 MHz or 24.576 MHz) for all standards
- Independent gain and offset - adjustment for raw data path
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Comb filter video decoder

- Digital PLL for Synchronization and Clock Generation from all Standards and Non Standard Video Sources e.g. consumer grade VTR
- Automatic detection of 50/60Hz field frequency, and automatic recognition of all common broadcast standards
- Enhanced Horizontal and vertical Sync Detection
- Luminance and chrominance signal processing
- Improved 2/4-line comb filter for two-dimensional chrominance/luminance-separation operating with adaptive comb filter parameters.
- Independent Brightness Contrast Saturation (BCS)
- User programmable sharpness control
- Detection of copy protected input signals and level according to Macrovision standard
- Automatic TV/VCR detection
- 10 bit wide video output at comb filter video decoder
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Video Scaler

- Horizontal and vertical down-scaling and up-scaling to randomly sized windows
- Horizontal and vertical scaling range: variable zoom to 1/64 (icon)
- Vertical scaling with linear phase interpolation and accumulating filter for anti-aliasing (6-bit phase accuracy)
- Conversion to square pixel format
- Generation of a video output stream with improved synchronization grid at the I-Port
- Two independent programming sets for scaler part
- Fieldwise switching between decoder and expansion port (X-port) input
- Brightness, contrast and saturation controls for scaled outputs