Techwell

TW9908
Multi-Standard Comb Filter Video Processor With RGB Mixing

Overview

Techwell's TW9908 is a high quality NTSC/PAL/SECAM video decoder that is designed for multimedia applications. It uses the mixed-signal 3.3V CMOS technology to provide a low-power integrated solution.

The TW9908 analog front-end is equipped with six separate low noise analog channels that enable it to accept various analog video input standard including Composite video, S-video, component video (YCrCb), and SCART RGB.

With the analog FB support, it also allows the mixing of composite or S-video input with YCrCb/RGB input. It is possible to connect up to four composite inputs or two S-video inputs or two YCrCb inputs or two SCART RGB inputs at one time and allow the software to switch between them.

The front-end contains all the necessary circuits to simplify the system design. AGC and clamping circuits, and six 9-bit analog-to-digital converters (ADCs) convert inputs into digital signals for processing.

The TW9908 uses proprietary adaptive comb filter for chroma and luma separation to achieve high video quality. The image enhancement includes two dimensional peaking control, noise reduction, and color transient improvement function.

The advanced synchronization processing can produce stable pictures for non-standard signal such as those produced by VCR during fast forward, rewind or pause.

The high quality scaler uses multi-tap poly-phase decimation filter to reduce aliasing effects. It can be programmed to scale-down the output picture to an arbitrary ratio with cropping.

The TW9908 supports flexible pixel interface. It outputs YCbCr (4:2:2) data stream over 8-bit or 16-bit data path. The output is VMI 1.4 compatible.

A 2-wire serial MPU interface is used to simplify system integration. All the functions can be controlled through this interface.

Techwell's TW9908
100-pin PQFP package

Features

Analog Video Decoder and Analog Component Input

- NTSC (M, 4.43) and PAL (B, D, G, H, I, M, N, N combination), PAL (60), SECAM with automatic format detection
- Advanced synchronization processing for VCR fast forward, backward, and pause mode
- Software selectable analog inputs allows any of the following combinations:
  - Up to four CVBS, two S-Video inputs, with one CVBS output
  - two RGB/YCrCb component inputs, two Fast Blank (FB) inputs
- Integrated 9-bit ADCs and analog clamping circuit
- Fully programmable static gain or automatic gain control for the Y or CVBS channel
- Programmable white peak control for the Y or CVBS channel
- High Quality mixing by Fast Blanking signal

Video processing

- Switchable Notch or 4H adaptive comb filter Y/C separation.
- PAL delay line for color phase error correction
- Image enhancement with programmable horizontal as well as vertical peaking.
- CTI and noise reduction circuitry
- Digital sub-carrier PLL for accurate color decoding
- Digital Horizontal PLL and advanced synchronization processing for non-standard video signals
- Separated tint, brightness, saturation, and contrast cnotrol for RGB/YCrCb and CVBS/S-video
- Automatic color control and color killer
- High quality horizontal and vertical filtered scaling with arbitrary scale down ratio
- Detection of level of copy protection according to Macrovision standard

Video Output

- Programmable output cropping
- VMI 1.4 compatible 8-bit or 16-bit pixel interface
- ITU-R 601 or ITU-R 656 compatible output YCbCr(4:2:2) output format
- Closed caption decoding and V-chip
- VBI data pass through, raw ADC data for software decoding

Miscellaneous

- Two wire MPU serial bus interface
- Power-down mode
- Typical power consumption 0.6W
- Single 27MHz crystal for all standards
- Supports 24.54MHz and 29.5MHz crystal for high resolution square pixel format
- 5V tolerant I/O
- 3.3 V power supply
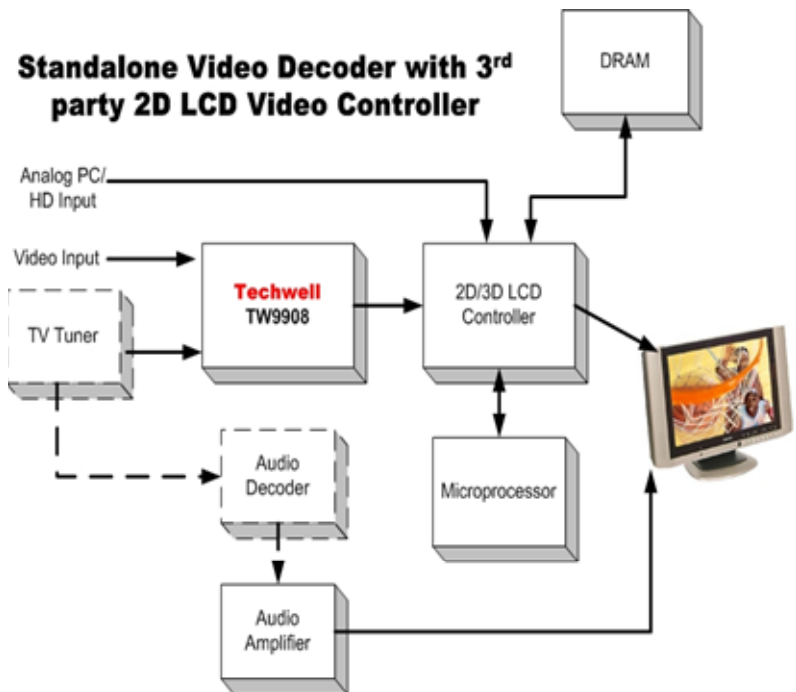- 100-pin PQFP package

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Multi-Standard Comb Filter Video Processor With RGB Mixing

Techwell's TW9908 is a high quality multi-standard comb filter video decoder plus RGB mixing and high quality down scaler designed for multimedia applications.

TW9908 uses the mixed-signal 3.3V CMOS technology to provide a low-cost and low-power integrated solution. Minimum external components are required due to its integrated analog front-end containing AGC, clamping, and 9-bit high speed ADCs.

A 4H adaptive comb filter and luma/chroma processing produce exceptionally high quality pictures. Its analog RGB/YCrCb input mixing capability and different input format support makes it a very versatile analog front-end for digital video application. A high quality internal scaling engine offers arbitrarily filtered down scaling of the output picture.

A built-in Closed-Caption decoder and VBI data pass-through support data applications such Closed-Captioning and V-chip.

Standalone Video Decoder with 3rd party 2D LCD Video Controller

Sample System Block Diagram for LCD TV/MFM

About Techwell Inc.

Techwell is a privately held fabless semiconductor company developing proprietary digital video decoding technology that converts a variety of analog video signals into standard digital video formats. As a core building block in any video display or video storage application, we have spent over 7 years perfecting our digital video decoder core to meet the strictest performance, robustness and feature requirements while maintaining a highly dense architecture to minimize die size and deliver the lowest cost solutions in the marketplace.

To leverage our video decoding technology, we supply a family of general-purpose video decoders that target high growth video display and video storage applications including Advanced LCD, Plasma and CRT TV, Recordable DVD & HDD players and Media Center PCs. In addition, we develop integrated application specific ICs for specialty markets including security surveillance, Car TV, Portable DVD and PC TV Capture Cards.

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