Techwell

TW9905

NTSC/PAL/SECAM Analog to Digital Video Decoder with Analog YPbPr Component Input

Overview

Techwell's TW9905 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 TW9905 analog front-end is equipped with three separate analog channels that enable it to accept all three possible analog video signal standards: composite, S-video or YPbPr component video. It is possible to connect up to six composite 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 three 9-bit analog-to-digital converters (ADCs) convert inputs into digital signals for processing.

The TW9905 uses proprietary adaptive 4H comb filter for chroma and luma separation to achieve high video quality. The image enhancement uses nonlinear methods to enhance picture sharpness with little overshoot.

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 accurately scale down the image with minimum phase error. It can be programmed to scale-down the output picture to an arbitrary ratio with cropping.

The TW9905 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.

Techwell's TW9905
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 six composite video inputs
  - Five composite, one S-video or one YPbPr component input
  - Four composite, two S-Video or two YPbPr component inputs
  - Four composite, one S-Video and one YPbPr component input
- Three 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

Video processing

- Adaptive 4H comb filter Y/C separation for the best image quality
- PAL delay line for color phase error correction
- Image enhancement with 2D peaking and CTI
- Digital sub-carrier PLL for accurate color decoding
- Digital Horizontal PLL and advanced synchronization processing for non-standard video signals
- Programmable hue, brightness, saturation, contrast, sharpness, Gamma control, and noise suppression
- 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
- VBI slicer supporting worldwide industrial standard data services
- VBI data pass through, raw ADC data for Intercast[TM]

Miscellaneous

- Two wire MPU serial bus interface
- Power-down mode
- Typical power consumption 0.5W
- 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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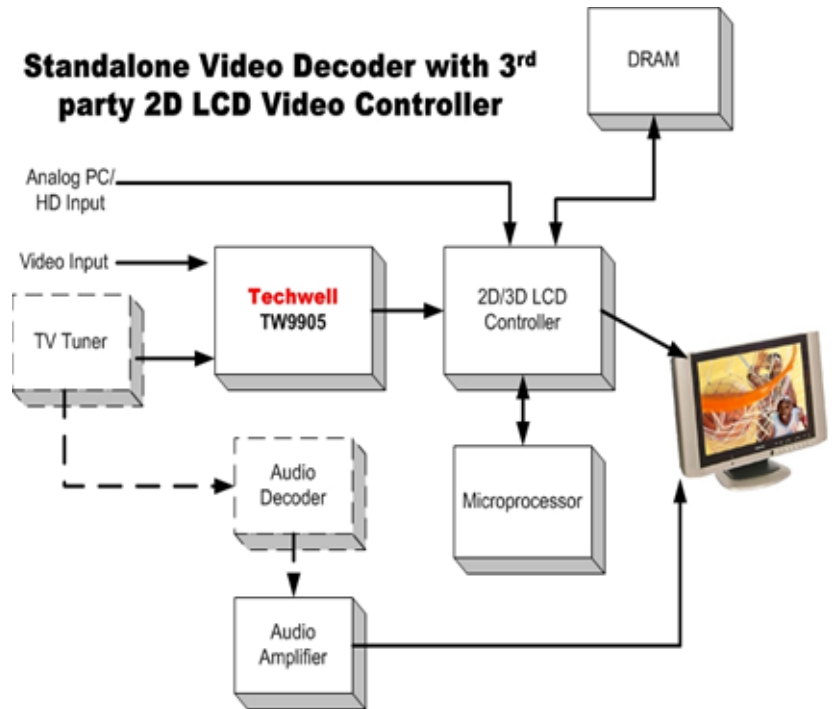
Introduction

Techwell's TW9905 is a high quality NTSC, PAL, and SECAM video decoder plus YPbPr component inputs designed for multimedia applications.

TW9905 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 three 9-bit high speed ADCs.

For composite inputs, an adaptive comb filter and luma/chroma processing produce exceptionally high quality pictures using proprietary techniques.

A high quality internal scaling engine offers arbitrarily filtered down scaling of the output picture. A built-in versatile VBI slicer and VBI data pass-through capability support common data services.

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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