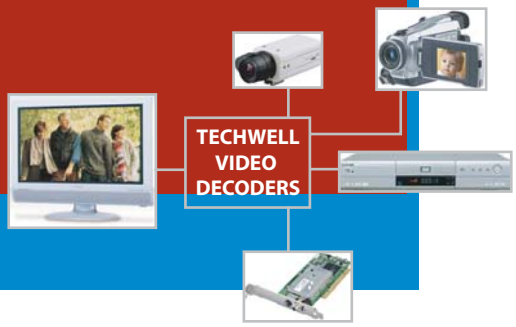
intersil Techwell™

NTSC/PAL/SECAM Video Decoder for Multimedia Applications



Features

TW9920

Multi-Standard Video Decoder and Encoder

Target Applications

- Digital Camcorder
- Portable Media Player (PMP)
- Mobile Phone and PDA

Video Decoder

- NTSC (M, 4.43) and PAL (B, D, G, H, I, M, N, N combination), PAL (60), SECAM support with automatic format detection
- Software selectable analog inputs allows any of the following combinations, e.g. 4 CVBS or (3 CVBS and 1 Y/C).
- Two 9-bit ADCs and analog clamping circuit.
- Fully programmable static gain or automatic gain control for the Y channel
- Programmable white peak control for the Y or CVBS channel
- 4-H adaptive comb filter Y/C separation
- 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 for synchronization processing and pixel sampling
- Advanced synchronization processing and sync detection for handling non-standard and weak signal
- Programmable hue, brightness, saturation, contrast, sharpness, and noise suppression
- Automatic color control and color killer
- Detection of level of copy protection according to Macrovision standard
- Programmable output cropping
- ITU-R 601 or ITU-R 656 compatible YCbCr(4:2:2) output format

The TW9920 is a multi-standard video decoder and encoder chip that is designed for multimedia applications. It uses the mixed-signal 2.5V CMOS technology to provide a low-power integrated solution.

The video encoder is used to encoder digital YcbCr input into analog CVBS or S-video output. With five built-in DACs, it can simultaneously support analog YcbCr output in addition to S-video output for various applications.

It can support both NTSC (60Hz) and PAL (50Hz) output. A stable crystal generated 27MHz clock is used for all necessary sub-carrier generation. It accepts ITU-R 656 compatible digital input externally. The video decoder decodes the analog CVBS or S-video signals into digital YcbCr for output.

It consists of analog front-end with input source selection, variable gain amplifier and analog-to-digital converters, Y/C separation circuit, multi-standard color decoder (PAL BGHI, PAL M, PAL N, combination PAL N, NTSC M, NTSC 4.43 and SECAM) and synchronization circuitry. The Y/C separation is done with highly adaptive 4H comb filter for reduced cross color and cross luminance.

The advanced synchronization processing circuitry can produce stable pictures for non-standard signal as well as weak signal. A video scaler is provided to arbitrarily scale down the output video. The output of the decoder is formatted to the ITU-R 656 compatible output.

It includes various control circuits like brightness, contrast, saturation, dynamic aperture correction for best video quality. A 2-wire serial MPU interface is used to simplify system integration. All the functions can be controlled through this interface.

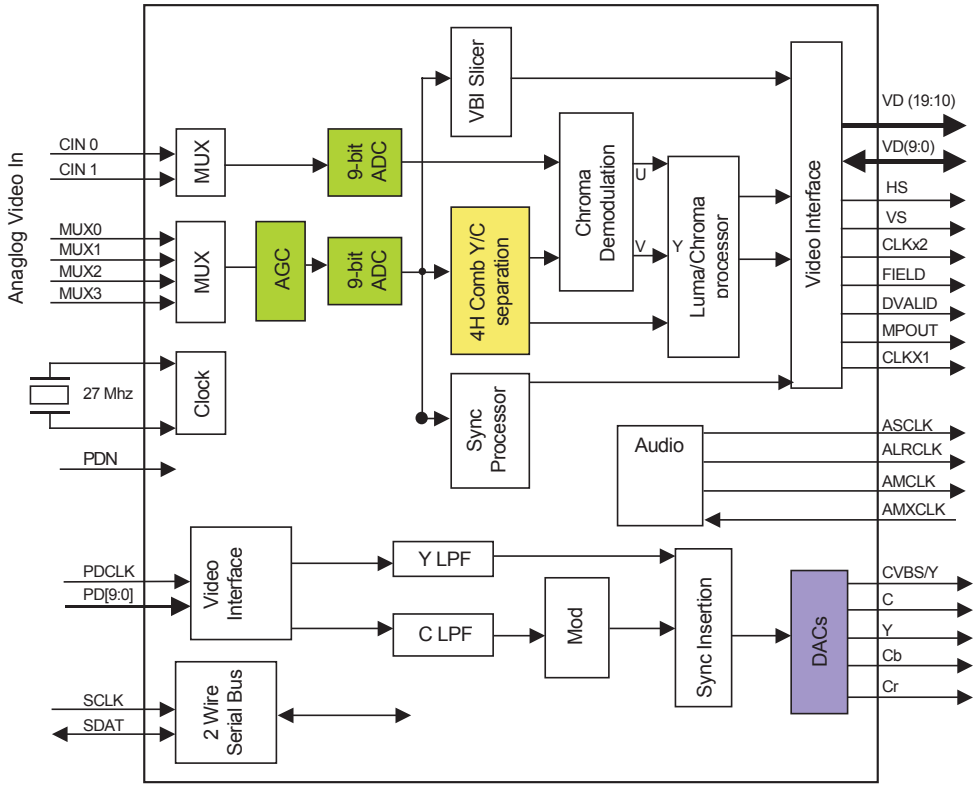
Video Scaler

- High quality horizontal filtered scaling with arbitrary scale down ratio
- Phase accuracy better than 1/32 pixel
- Selectable anti-alias filter
- Vertical down scaling by line dropping

TW9920

Multi-Standard Video Decoder and Encoder

TW9920 Block Diagram



Video Encoder

- Support NTSC/PAL and its sub-standard format output
- ITU-R 656 compatible video interface
- Luminance and chrominance filter
- Stable 27MHz crystal clock for subcarrier generation
- Five 10-bit Digital-to-Analog Converters at 27Mhz sample rate for generating CVBS or Y/C and YcbCr simultaneously

Miscellaneous

- Two wire MPU serial bus interface
- Power-down mode
- Field locked audio clock generation
- Typical power consumption TBD
- Single 27MHz crystal for all standards
- Supports 24.54MHz and 29.5MHz crystal for high resolution square pixel format decoding
- 3V tolerant I/O
- 2.5/3.3 V power supply
- 100 pn BGA package

About Techwell

Techwell designs and sells mixed signal semiconductor solutions for digital video applications. The company's products enable the conversion of analog video sources to digital form and facilitate the display, storage and transport of digital video, HDTV, and personal computer display information. Headquartered in San Jose, CA, Techwell currently has over 50 employees in the U.S., Korea, and Taiwan.

For more information on Techwell, please contact us at 1-408-435-3888

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