

INTERSIL TECHWELL SECURITY SURVEILLANCE ICs

Intersil Techwell Security IC Overview,
Advanced Multi-Channel HD Controller,
Quad / Multiplexers, 4-in-1 NTSC/ PAL Video Decoders,
Multi-channel PCIe Video Capture IC,
Techwell Security Product Portfolio

intersil[™]



SIMPLY SMARTER™

Table of Contents

Intersil Techwell Security IC Overview 3

Advanced Multi-Channel HD Controller 4-5

Featured Products:
TW2880

Quad / Multiplexers 6-7

Featured Products:
TW2851

4-in-1 NTSC/PAL Video Decoders 8

Featured Products:
TW2866, TW2867

Multi-channel PCIe Video Capture IC 9-10

Featured Products:
TW6816, TW6868

Intersil Techwell Security Product Portfolio 11



About Intersil Techwell

Techwell, now part of Intersil, designs, markets and sells mixed signal integrated circuits for multiple video applications in the security surveillance and automotive infotainment markets. Intersil Techwell designs application specific products that enable the conversion of analog video signals to digital form and perform advanced digital video processing to facilitate the display, storage and transport of video content.

Intersil Techwell Worldwide Technical Support

Corporate Headquarters

Intersil Corporation Headquarters
1001 Murphy Ranch Road
Milpitas, CA 95035
TEL: (408) 432-8888
FAX: (408) 434-5351
1-888-INTERSIL
1-888-468-3774

China Sales

Darron Ma
dma01@intersil.com
Tel: 86-755-8294-5668
Fax: 86-755-8294-5607

Japan Sales

Hiro Ito
hiroito@intersil.com
Tel: +81-3-5488-TWLL (8955)
Fax: +81-3-5488-8957

Korea Sales

Jackie Lim
jackielim@intersil.com
Tel: 82-31-713-8480
Fax: 82-31-713-8481

Taiwan Sales

Darron Ma
dma01@intersil.com
Tel: 886-2-8751-0280
Fax: 886-2-8751-0206

North and South America Sales

Jonpaul S. Jandu
jjandu@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

EMEA Sales

Kenneth Grant
kgrant@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

India and Southeast Asia Sales

Nisarg Modi
nmodi@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

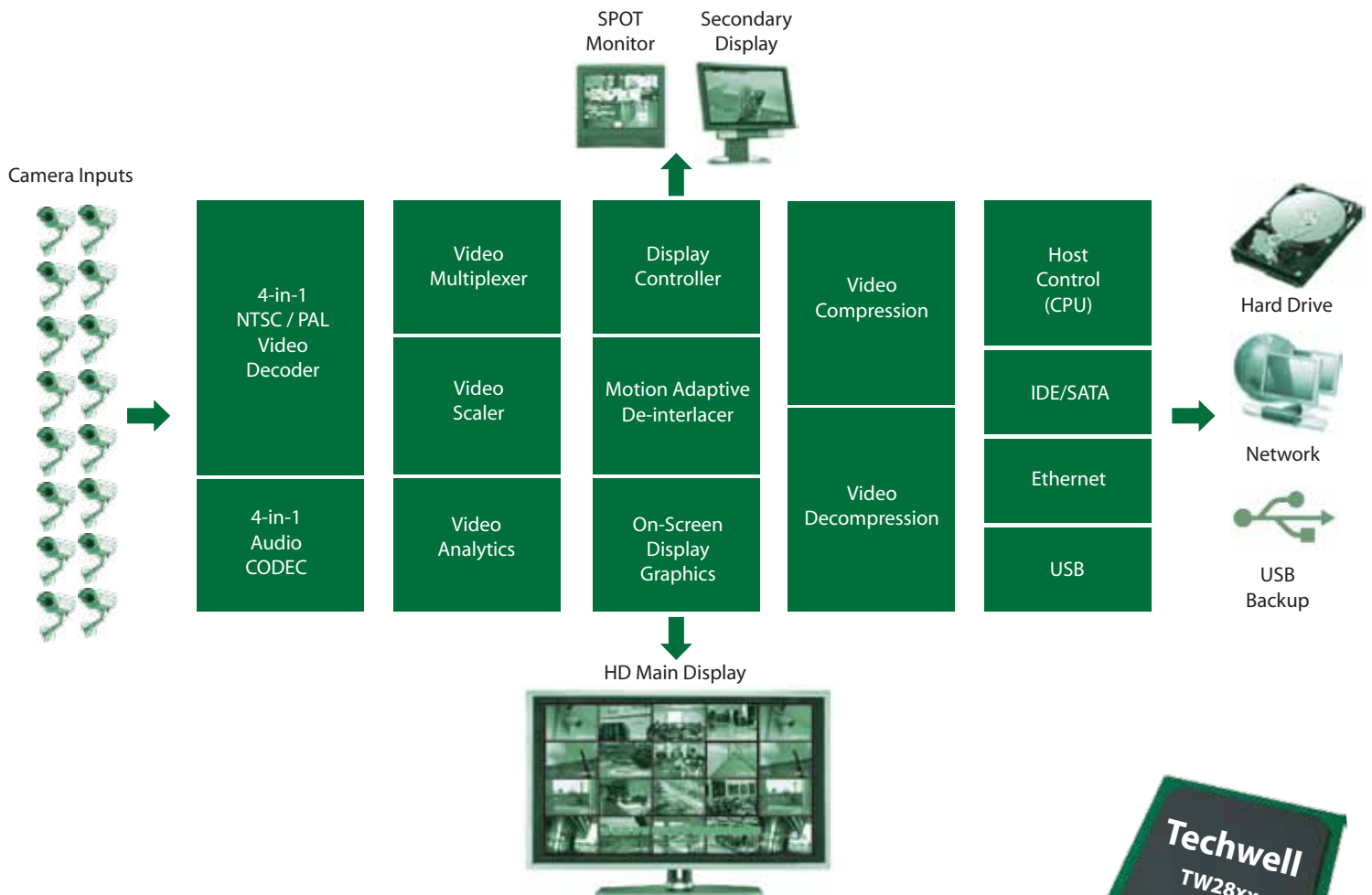
For all other regions, please contact:

Intersil Sales
sales@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

Intersil Techwell possesses one of the largest portfolios of video semiconductor solutions for the security surveillance industry. Leveraging our extensive video signal processing expertise and our deep surveillance system domain knowledge, Intersil Techwell is a pioneer in the security surveillance industry and unique in its ability to define and deliver IC products specifically for the Digital Video Recorder market.

Intersil Techwell's TW28xx Security Surveillance IC product line is defined by feature rich, highly integrated semiconductor solutions that incorporate many key functional blocks for a Digital Video Recorder, IP Streamer, Networked Video Recorder or PC Based DVR including analog video decoding, audio conversion, video multiplexing, display processing, and video compression. In addition, Techwell's security products embed a number of advanced technologies including comb filtering, motion detection and motion adaptive de-interlacing.

With Intersil Techwell's broad security product portfolio, system expertise, and local dedicated support, you can feel confident your next generation security solution will get to market on time, with advanced features and at a cost effective price.

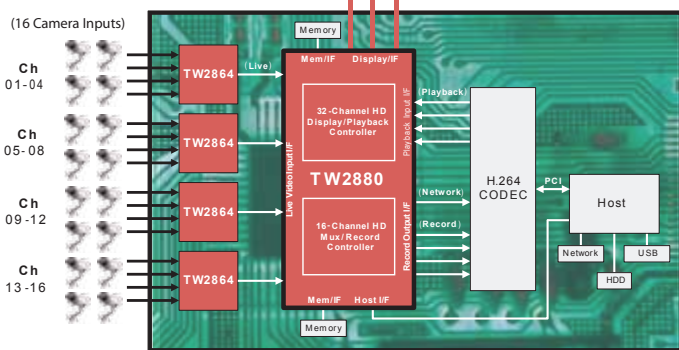


TW2880

Advanced Multi-Channel HD Display/Record/Playback Controller IC for Next Generation 16-Channel DVR Applications

The TW2880 is an advanced 16-channel video and graphic controller with HD 1080p display capability for security surveillance applications. The device includes a host of advanced features for 16-channel DVR applications. It is designed to accept 16 live video inputs and playback 16 pre-recorded inputs simultaneously. Incoming live and playback video can be multiplexed, scaled up or down, de-interlaced, and displayed on two separate monitors. The main display output can display up to 32 channels on an HD 1080p monitor via HDMI interface. The secondary display output supports VGA, S-video and CVBS. In addition, there are four analog SPOT outputs that can be used to monitor live camera inputs. For video record, the TW2880 supports 16-channel real time and non-real time recording with flexible frame rate and resolution over 27MHz, 54MHz and 108MHz clocks. The record output ports support BT.656 and BT.1120 data formats. Special record modes such as mixed frame and mixed field switching modes are also supported. Record output stream can be in both field or frame interleaved format. The playback input ports support BT.656 and BT.1120 data formats. Other key features of the TW2880 include triple 16-bit bitmap OSG windows, 4-color OSD, channel ID encoder/decoder, and motion detector.

HD 1080p Main Display
(Live/Playback Video + Map + Control Panel)



Advanced 16 - Channel DVR System



TW2880

Advanced Multi-Channel HD Display/Record/Playback Controller IC for Next Generation 16-Channel DVR Applications

Record

- Supports 16-channel real time CIF or D1 recording using 54MHz/108MHz clock
- Supports BT.656 and BT.1120 formats
- Record Resolutions: Full D1, Half D1 and CIF
- Programmable Frame Rates: 1 to 30 fps
- Flexible Record Output Functions
 - Real time and non-real time recording
 - Field switching and frame switching record modes
 - D1 and QUAD modes (Frame-based)
 - Half-D1 and CIF modes (Field-based)
 - Multi-mode recording on single record output stream
 - Mixed Frame Switching Mode
 - Mixed Field Switching Mode
- Embedded Motion Detection and Channel ID Encoder
- 3-Layer Graphic Overlay

Playback

- Supports 16-channel real time CIF or D1 playback
- Supports digital BT.656 and BT.1120 formats
- Supports HD 720p/1080i video via BT.1120 interface
- Built-in auto cropping and strobe with channel ID decoder

Other Features

- Dual SDRAM Memory Controllers
- 8/16-bit DMA Master Interface
- Supports external OSD via digital 24-bit RGB input
- 1.2V, 3.3V Supply

Display

- Displays up to 32 channels: 16 live channels and 16 playback channels
- Supports dual monitors: Main and Secondary
 - Main Display (up to HD 1080p)
 - HDMI, Analog RGB and Digital RGB Interface
 - Built-in Video Scaler and 2D/3D De-interlacer
 - 11-Layer Graphic Overlay with Triple 16-bit Bitmap OSG Windows
 - Secondary Display
 - Analog RGB or S-Video and CVBS Interface
 - 8-Layer Graphic Overlay with Dual 16-bit Bitmap OSG Windows
 - Digital BT.656 Output Option
- SPOT Display
 - Four CVBS Outputs
 - 4-Layer Graphic Overlay with 2-bit Bitmap OSG Window

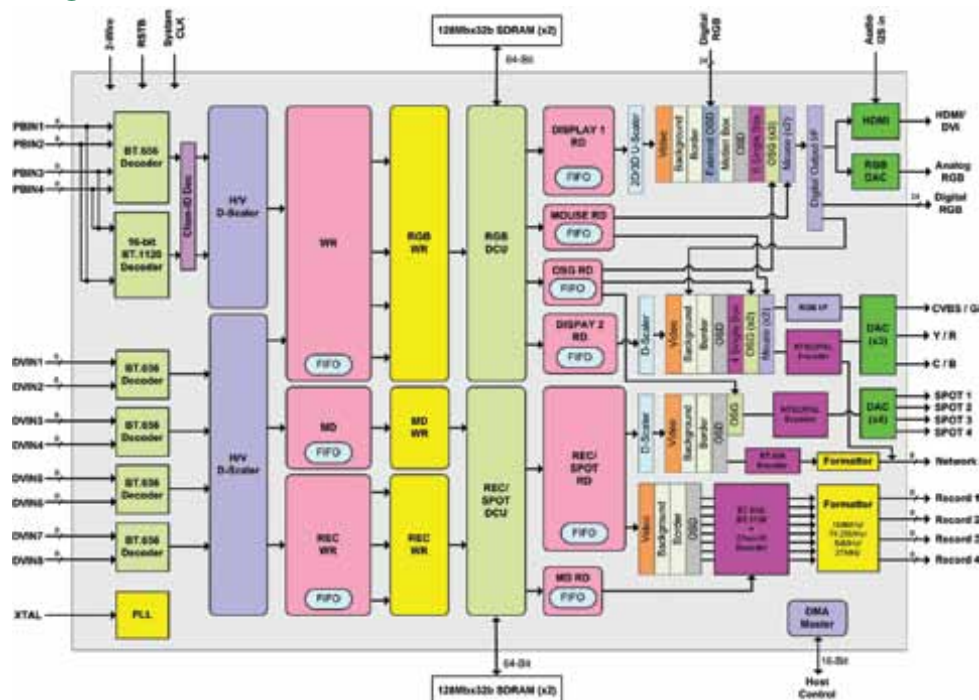
Network

- Supports standard digital BT.656 and multi-channel field and frame interleaved formats
- Supports 16-channel non-real time output using 27MHz /54MHz / 108MHz clock
- Supports 16-channel real time CIF output using 108MHz clock

Order Information

- Part Number: TW2880
- Package: 676-BGA, 27x27mm, 1.0mm Pitch

TW2880 Block Diagram



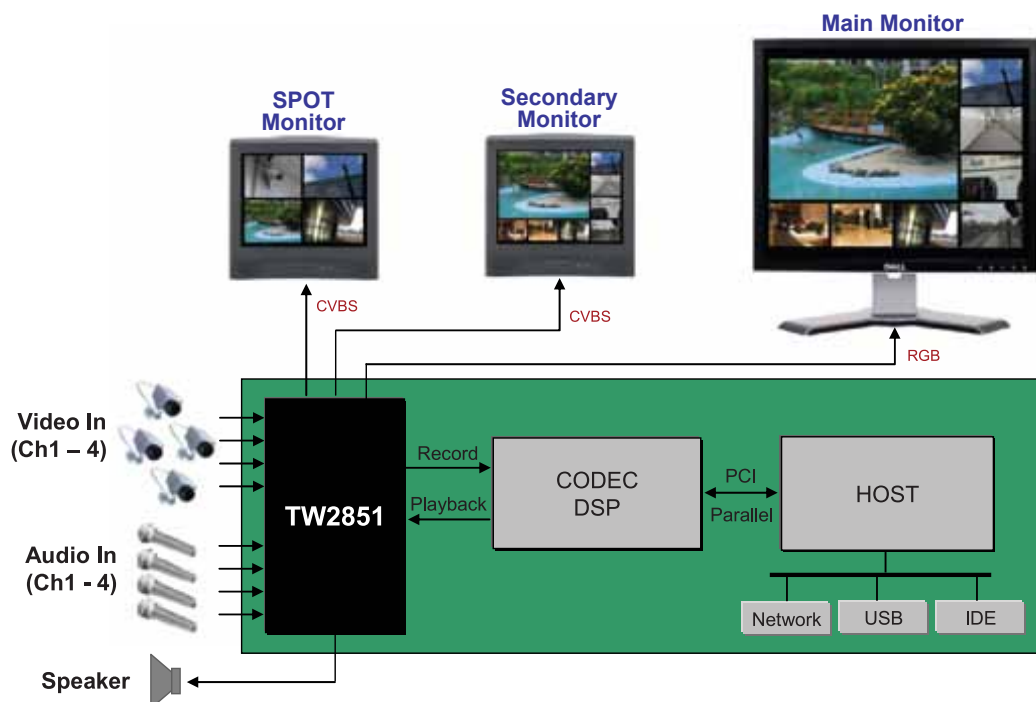
TW2851

Advanced 4-Channel A/V Decoder, MUX and Display Processor

The TW2851 is Intersil Techwell's 5th generation 4-channel A/V decoder, multiplexer and display processor IC for security surveillance applications. The device has four built-in NTSC/PAL video decoders with high-performance adaptive 4H comb filters, noise reduction algorithm, independent and flexible video scalars for the display and record paths and 16x12 matrix motion/blind/night detectors. The device includes advanced record and display multiplexer functions. The record multiplexer supports multi-channel frame-, field- and byte-interleaved video streams with a total frame rate of up to 120 frames per second. The channel ID and motion/blind/night detection information can be embedded in the video stream for record and playback purposes. The display multiplexer supports up to eight video windows of which the location and size of each window is configurable. The multiplexed output can be displayed via VGA/LVDS and CVBS interfaces. Also included is a SPOT multiplexer that can tile multiple live camera images and/or live record images on an analog output for displaying on SPOT monitor or time multiplex multiple camera images on a digital output for network function. The TW2851 has an audio CODEC which has four audio ADCs and one DAC. A built-in audio controller can generate digital outputs for recording/mixing and accept digital input for playback. Multiple TW2851 devices can be cascaded to support 8/12/16-channel applications. Up to 32 display windows can be displayed on the PC monitor or LCD panel. Other key features of the TW2851 includes 16-bit bitmap OSG, 2D-deinterlacer, 8-channel non-real time switching inputs, and flexible record and playback ports supporting BT.656, BT.601, BT.1120 and 24-bit RGB formats.

Target Applications

- 4/8/16-Channel Embedded DVR
- Mobile DVR System
- LCD DVR Combo System



TW2851

Advanced 4-Channel A/V Decoder, MUX and Display Processor

Record

- Supports 4D1 & 16CIF realtime recording using 54/108MHz clock
- Supports BT.656, BT.601 & BT.1120 formats.
- Record Resolutions: Full D1, Half D1 and CIF
- Programmable Frame Rates: 1 to 30 fps Flexible Record Output Functions
 - Real time & non-real time recording over 27/54/108MHz clock
 - Field and frame switching record modes supporting up to 120 frames per second
- Embedded Motion Detection & Channel ID Encoder
- 6-Layer Graphic Overlay with Independent 16-bit Bitmap OSG Window for Each Record
- Optional multiplexed digital video output for network function

Playback

- Flexible playback ports supporting BT.656, BT.601, BT.1120 & 24-bit RGB formats
- Supports up to 16-ch non-realtime playback
- Supports 4-ch D1 or 16-ch CIF realtime playback
- Auto cropping & strobe with channel ID decoder for multi-channel playback input

Other Features

- Integrated Audio Codec
- Single DDR SDRAM Memory Controller
- 8/16-bit Parallel Host Interface
- 8/12/16-channel Cascade Support
- 1.2V, 3.3V Supply
- Package: 352-PBGA, 27x27x2.23 mm

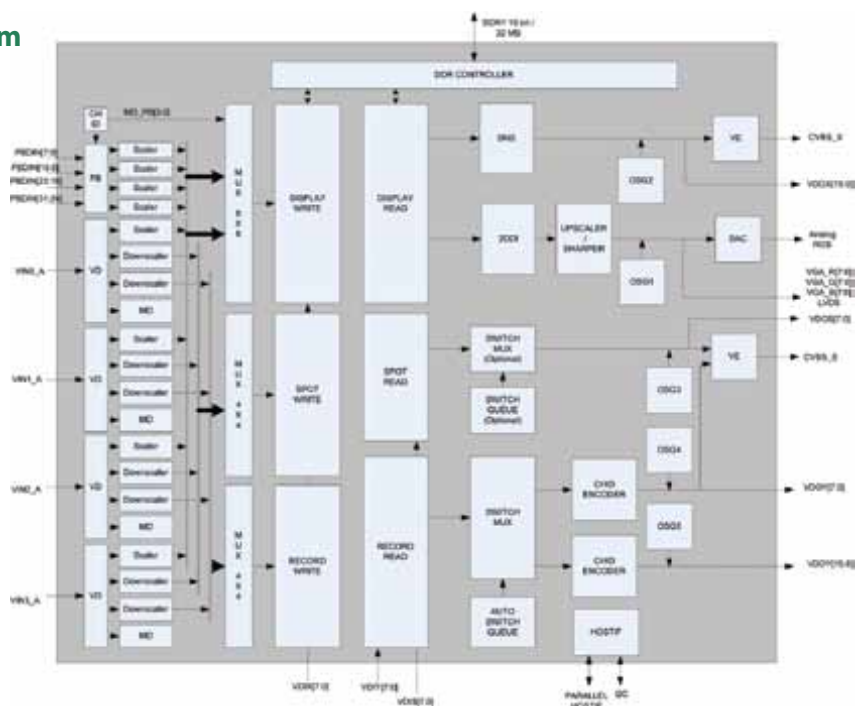
Analog Video Decoder

- Accepts all NTSC(M/N/4.43)/PAL(B/D/G/H/I/K/L/M/N/60) standards with auto detection
- 8 analog CVBS inputs for pseudo 8 channel support
- Integrated analog anti-aliasing filters & 10-bit ADCs
- High performance adaptive 4H comb filters for all NTSC/PAL standards
- Proprietary fast video locking system for non-realtime application
- Noise reduction algorithm to remove impulse noise
- Independent & flexible video scalars for display, record and SPOT path
- Four built-in 16x12 matrix motion/blind/night detectors

Display

- Displays up to 32 windows on PC monitor or LCD panel
 - H/V Scaling & Mirroring for Each Window
 - Live & Playback Video Tiling on Same Display
- Last field/frame image captured when video loss detected
- Live or strobe capture for pseudo 8-ch mode
- Supports dual monitors: Main & Secondary
 - Main Display (RGB/LVDS Interface)
 - Up to WXGA+ resolution
 - Built-in Video Scalar & 2D De-interlacer
 - Secondary Display (CVBS Interface)
 - Built-in Video Scalar & NTSC/PAL Encoder
- SPOT Display (CVBS Interface)
 - Displays up to 16 channels of live camera & live record images
 - 6-Layer Graphic Overlay including Dual 16-bit Bitmap OSG Layers

TW2851 Block Diagram



TW2866/TW2867

4-Channel Video Decoder and Audio Codec plus Video Encoder for Security Applications

The TW2866 is Intersil Techwell's second-generation 4-in-1 video decoder and audio codec plus video encoder for security surveillance applications. The device includes four high quality NTSC/PAL/SECAM video decoders that convert analog composite video signal to digital component YCbCr data. Each channel contains a 10-bit ADC and proprietary clamp/gain controller and utilizes 4H comb filter for separating luminance & chrominance to reduce cross noise artifacts. The TW2866 adopts image enhancement techniques such as IF compensation filter, CTI and programmable peaking. In addition, TW2866 includes one NTSC/PAL video encoder with two 10-bit DACs to support CVBS and YC output. The TW2866 also includes an audio codec which has five audio ADCs and one DAC. A built-in audio controller can generate digital outputs for recording/mixing and accepts digital input for playback. The TW2866 is pin-to-pin compatible to the TW2867. The difference between the two devices is that the TW2867 does not support NTSC/PAL video encoder function.

Video Decoder

- Accepts all NTSC(M/4.43) / PAL(B/D/G/H/I/K/L/M/N/60)/SECAM standards with auto detection
- Integrated four video analog anti-aliasing filters and 10-bit ADCs
- High performance adaptive 4H comb filters for all NTSC/PAL standards
- IF compensation filter for improvement of color demodulation
- Color Transient Improvement (CTI) and automatic white peak control
- Programmable hue, saturation, contrast, brightness and sharpness
- Proprietary fast video locking system for non-realtime application
- Supports the standard ITU-R BT.656 format or time multiplexed output with 54/108MHz.
- Provides simultaneous four channel Full D1 and CIF time-multiplexed outputs with 54MHz.

Video Encoder (TW2866 Only)

- NTSC/PAL Video Encoder
- CVBS and S-video Support

Audio Codec

- Integrated five audio ADCs and one audio DAC
- Provides multi-channel audio mixed analog output
- Supports I2S/DSP Master/Slave interface for record output and playback input.
- PCM 8/16 bit and u-Law/A-Law 8bit for audio word length
- Programmable audio sample rate that covers popular frequencies of 8/16/32/44.1/48kHz

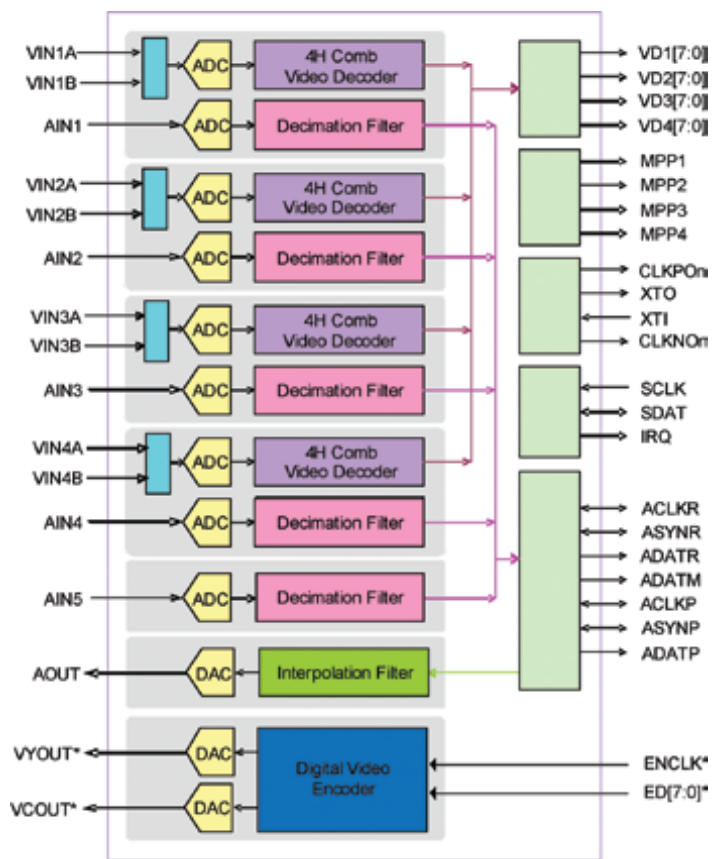
Other Features

- 2x/4x analog clock PLL for 108MHz clock output
- Supports a two-wire serial host interface
- 1.2V, 3.3V Supply
- Low power consumption

Order Information

- Part Number: TW2866/TW2867
- Package: 128-pin LQFP

TW2866/TW2867 Block Diagram



*Only applicable for TW2866

TW6815/TW6816

4-CH Audio/Video Decoders with 66MHz PCI Interface

The TW6815/6 is a highly integrated single-chip solution that supports multi-channel real time video and audio capture via PCI interface for PC DVR applications. It contains four high quality NTSC/PAL/SECAM video decoder that converts analog composite video signal to digital component YCbCr data, and utilizes an adaptive 4H comb filter for separating luminance and chrominance to reduce cross noise artifacts. TW6815/6 contains a high performance proprietary DMA controller that fully utilizes the PCI bandwidth, enabling it to transfer video and audio data at optimal throughput rate.

TW6815/6 has the versatility to support a wide variety of video applications, including decoding and transferring 4 channel real-time D1 video, and supporting multiple video display formats such as D1, half D1 and CIF. In addition, TW6816 can support up to 16 channel non real-time D1 video.

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 4 CVBS per one video ADC (TW6816 only)
- Four 10-bit ADCs and analog clamping circuit for CVBS input
- Fully programmable static gain or automatic gain control for the Y channel
- Programmable white peak control for 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, Gamma control, and noise suppression
- Automatic color control and color killer
- Detection of level of copy protection according to Macrovision standard
- Programmable output cropping

Video Scaler

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

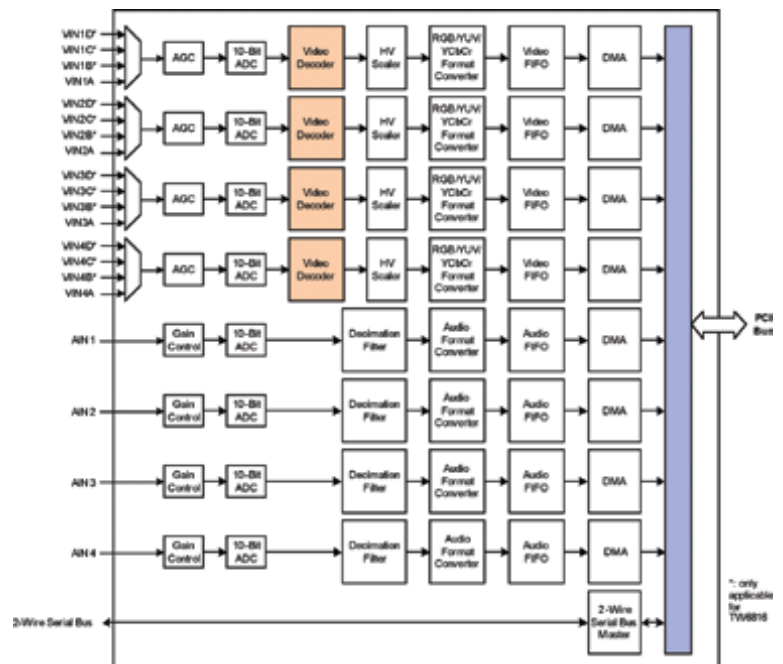
Audio Capture

- Four 10-bit ADC for analog audio digitizing
- Programmable Sampling rate

PCI

- 66MHz/33MHz PCI with M66EN interface
- PCI Rev. 2.2-3.0 compliant
- ACPI support
- Integrated Video/Audio DMA controller
- Support both selectable one real-time video and 4x switching non real-time video

TW6815/TW6816 Block Diagram



Order Information

Product	Real-Time		Non-Real-Time	
	Mode Support	Max. Channel	Mode Support	Max. Channel
TW6815	✓	4-CH D1/Half D1/CIF + 4-CH Audio		
TW6816		4-CH D1/Half D1/CIF + 4-CH Audio	✓	16-CH D1/Half D1/CIF + 4-CH Audio

TW6864/TW6868

Multi-Channel PCIe Video Capture IC with Built-in 4-Channel Video and Audio Decoder

The TW6864/8 is a highly integrated single-chip solution that supports multi-channel real time video and audio capture via PCIe x1 interface for PC DVR applications. It contains four high quality NTSC/PAL/SECAM video decoder that converts analog composite video signal to digital component YCbCr data, and utilizes an adaptive 4H comb filter for separating luminance and chrominance to reduce cross noise artifacts. TW6864/8 contains a high performance proprietary DMA controller that fully utilizes the PCIe x1 bandwidth, enabling it to transfer video and audio data at optimal throughput rate.

TW6864/8 has the versatility to support a wide variety of video applications, including decoding and transferring 4 channel real-time D1 video, or up to 16 channel non-real-time video simultaneously. It supports multiple video display formats such as D1, half D1 and CIF. By implementing Intersil Techwell's advanced proprietary video-switching technology, TW6864/8 possesses industry-leading video-locking speed in non-real-time switching mode. In addition, coupled with an external Intersil Techwell four-channel decoder, TW6868 can transfer up to 8 channels of real-time D1 video and 9 channels of audio output.

Key Features

- Internal 4-channel video decoder and audio ADC
- High quality proprietary fast video locking system for non-real time application
- PCI Express Base Specification 1.1 and 2.0 Compliant
- Supports multi-channel D1 video plus multi-channel audio simultaneously with Independent channel control
- Dynamic synchronization video processing; and multiple video format output support: Y422, Y420, IYUI/Y411, Y41P, RGB555 and RGB565
- Dual support for both Direct Show and Direct Draw

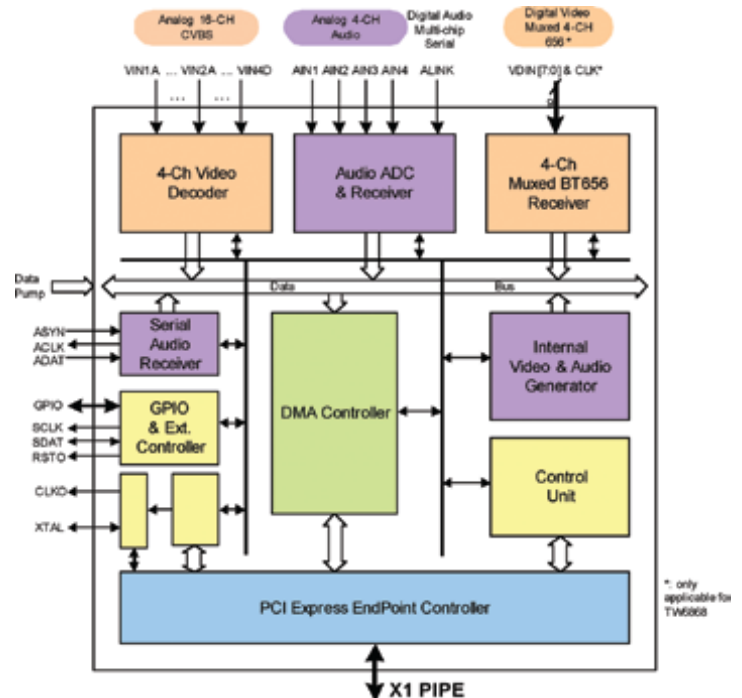
Video Decoder

- Accepts all NTSC(M/N/4.43) / PAL(B/D/G/H/I/ K/L/M/N/60) / SECAM standards with auto detection
- Integrated four video analog anti-alias filters and 10-bit CMOS ADCs
- IF compensation filter for improvement of color demodulation
- Color Transient Improvement (CTI)
- White peak AGC control
- Programmable hue, saturation, contrast, brightness and sharpness
- High performance adaptive 4H comb filters for all NTSC and PAL standards

Audio Capture

- Software selectable 4 channel analog sound inputs
- 10-bit ADC for analog sound digitizing, 8-/16-bits audio support
- Up to 16-bit I2S stereo digital input by I2S master
- Programmable sampling rate generation
- 4 single-channel audio output plus one channel mixed audio output

TW6864/TW6868 Block Diagram



Order Information

Product	Real-Time		Real-Time		Cascade-able
	Mode Support	Max. Channel	Mode Support	Max. Channel	
TW6864	✓	4-CH D1/Half D1/CIF + 5-CH Audio	✓	16-CH D1/Half D1/CIF + 5-CH Audio	✓
TW6868		8-CH D1/Half D1/CIF + 9-CH Audio		16-CH D1/Half D1/CIF + 9-CH Audio	

Intersil Techwell Security Product Portfolio

Quad Decoder

TW2804
TW2814
TW2815
TW2816
TW2864
TW2865
TW2866
TW2867

Quad Mux

TW2824
TW2834
TW2835
TW2836
TW2837

HD Mux

TW2880

PCI / PCIe Decoder

TW6802
TW6805
TW6815
TW6816
TW6864
TW6868

Single Channel Decoder

TW9900
TW9910
TW9920

CODEC

TW2700

Corporate Headquarters

Intersil Corporation Headquarters
1001 Murphy Ranch Road
Milpitas, CA 95035
TEL: (408) 432-8888
FAX: (408) 434-5351
1-888-INTERSIL
1-888-468-3774

China Sales

Darron Ma
dma01@intersil.com
Tel: 86-755-8294-5668
Fax: 86-755-8294-5607

Japan Sales

Hiro Ito
hiroito@intersil.com
Tel: +81-3-5488-TWLL (8955)
Fax: +81-3-5488-8957

Korea Sales

Jackie Lim
jackielim@intersil.com
Tel: 82-31-713-8480
Fax: 82-31-713-8481

Taiwan Sales

Darron Ma
dma01@intersil.com
Tel: 886-2-8751-0280
Fax: 866-2-8751-0206

North and South America Sales

Jonpaul S. Jandu
jjandu@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

EMEA Sales

Kenneth Grant
kgrant@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

India and Southeast Asia Sales

Nisarg Modi
nmodi@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

For all other regions, please contact:

Intersil Sales
sales@intersil.com
Tel: 1-408-435-3888
Fax: 1-408-435-0588

Q4 2010 Edition

LC-094.0 Printed in USA 9/10 © 2010 Intersil Americas Inc. All Rights Reserved. The following are trademarks of Intersil Americas Inc: Intersil and Intersil logo. All other trademarks are the property of the respective owners.



Disclaimer: The information in this document has been carefully reviewed and is believed to be accurate. Nonetheless, this document is subject to change without notice. Intersil assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the contained information, or to notify a person or organization of any updates. Intersil reserves the right to make changes, at any time, to improve reliability, function or design and to attempt to supply the best product possible.