9D1 H.264 CODEC with 8-Channel A/V Decoder

TW5866

TW5866 is a H.264 CODEC solution with integrated 8-channel analog A/V decoders. TW5866 supports up to 9D1 of H.264 video encoding, 8D1 of H.264 video decoding, or 4D1 H.264 full duplex codec. In addition, TW5866 supports motion JPEG encoding and video preview through BT.656 interfaces and PCI interfaces. TW5866 can be used in low cost H.264 hardware compression PCI card to support either 8-channel with a single chip, or 16-channel with two chips. It can also work with two external TW2866 to support 16-CIF H.264 compression. TW5866 can also be used in embedded DVR applications as an AV front-end chip working with display mux capable SOCs.

TW5866 integrates 8 A/V decoders. It takes 8 CVBS analog inputs fed into eight internal high quality NTSC/PAL video decoders. In addition, it has 2 digital BT.656 / 1120 interfaces, running up to 108/148.5 MHz, capable of receiving up to 8 D1, 2 720P / 1080i / 1080p HD video sources. When used as D1 input, the digital interface takes multi-channel video signal from external video decoders, such as TW2866 / TW2867. This allows the TW5866 to support a total of 16 D1 video channels. All the SD / HD video streams are fed into H.264 encoder, MJPEG encoder for compression, and to PCI interface and digital 656 output interface for preview purposes. The H.264 decoded stream from the on-chip video decoder is fed through two BT.656 / 1120 playback interfaces to drive the external display processors. The BT.656 playback interfaces runs up to 108 MHz and is capable of delivering multi-channel byte-interleaving or field/frame interleaving format for total of 8 D1 playback channels.

TW5866 supports functions per channel, such as motion detection, night detection, and blind detection engine for channel alarm notification. It features triple scalers per channel for each of the H.264 encode, MJPEG, and PCI preview paths. Each of these scalers is independently configurable. TW5866 also features per channel OSDs and motion adaptive de-interlacer. TW5866 supports 8-channel of motion adaptive 2D de-interlacers and 2D noise reduction.

TW5866 integrates a H.264 baseline level 3 compliant encoder capable of performing up to either 9 D1 equivalent video encoding (225 fps for PAL and 270 fps for NTSC), 8 D1 decoding, 17 channel G.726 ADPCM hardware audio encoder with one channel for two way audio communication, and one channel ADPCM audio decoding. The H.264 video encoder supports dual-bitstream compression for both local storage and network streams. It also features a motion JPEG encoder for up to 25 frames per second shared among all video channels.

TW5866 provides PCI interface for external CPU control and bitstream upload. The PCI interface runs at 33 or 66 MHz The external CPU can access the internal meta-data associated with each H.264 channel for video analytic purposes.

Analog Video Decoder

- 8 CVBS analog inputs fed into 8 sets of video decoder accept all NTSC(M/N/4.43) / PAL (B/D/G/H/I/K/L/M/N/60) standards with auto detection
- Integrated video analog anti-aliasing filters and 10-bit CMOS ADCs for each video decoder
- High performance adaptive 4H comb filters for all NTSC/PAL standards
- IF compensation filter for improvement of color demodulation
- Color Transient Improvement (CTI)
- Automatic white peak control
- Programmable hue, saturation, contrast, brightness and sharpness
- Proprietary fast video locking system for non-real-time application
- Noise Reduction to remove impulse noise

Digital Input Ports

- BT.656
  - Two BT.656 ports at up to 108 MHz interfaced with 2 external TW2866s
  - Byte-interleaving supports 4 channels multiplexing with each channel of interlaced D1 at 60/50 fps
- BT.1120
  - Two BT.1120 ports to support external HD video sources of 720P / 1080i / 1080p format at 74.25 / 148.5 MHz
  - One cascade input supporting cascade of multiple TW5866 chips. This is pin shared with one playback port

Pre-processing

- Per channel triple high performance down scalers of each channel scale independently for H.264, JPEG and preview output
- Per channel motion detector with 16 X 12 cells
- Per channel night / blind detections
- Per channel noise reduction and de-interlacing to convert Interlaced video into progressive before compression
- Per channel OSD for information overlay
  - Single Box
  - 1-bit per pixel text
  - 2-bit per pixel text or mask
  - 12-bit per pixel bitmap

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.
1-888-INTERSIL or 1-888-468-3774 | Copyright Intersil Americas LLC 2013. All Rights Reserved
Intersil (and design) is a trademark owned by Intersil Corporation or one of its subsidiaries.
All other trademarks mentioned are the property of their respective owners.

Digital Preview Ports

- Two BT.656 ports provides preview raw video output to external display processors
- Byte-Interleaving interlaced D1 for each port at 27 / 54 / 108 MHz

Digital Playback Ports

- Playback video for external display chips
- Two BT.656 ports for multi-channel 8 D1 playback
  - BT.656 Byte-Interleaving at 27 / 54 / 108 MHz
  - BT.656 Frame / Field Interleaving w/ D1 / Quad CIF resolution at 27 / 54 / 108 MHz
- Two BT.1120 port for single channel 1440x960 / 1440x1152 / 720p / 1080i playback

H.264 Video Encoder

- H.264 baseline profile @ level 3 encoding
- Bit rate from 64 kbps up to 10 Mbps each channel
- Maximum 225 fps (PAL) or 270 fps (NTSC) H.264 encoding
- Full duplex codec with real-time 4 D1 / 16 CIF or non-real-time 8 D1 main stream encoding
- Real-time 4 CIF / 16 QCIF or non-real-time 16 CIF secondary stream encoding
- VBR / CBR controllable
- Configurable GOP interval
- Motion vector granularity at full pel, ½ pel, and ¼ pel
- Motion vector ranges [-256, +255.75]
- In-loop de-blocking filter
- CAVLC entropy coding

H.264 Video Decoder

- H.264 baseline decoder for decoding the bit-stream generated by TW5866 / TW5864 encoders
- Bit rate from 64 kbps up to 10 Mbps each channel
- Maximum 200 fps (PAL) or 240 fps (NTSC)
- Full duplex codec with Real-time 4 D1 or non-real-time 8 D1 stream decoding
- Playback control with normal play, fast forward, slow forward and fast reverse.

Video Analytic Interface

- Per MB type / motion meta-data information
- 16x12 cells motion detection information
- Accessible through PCI / Async Host Interface

Motion JPEG Encoder

- Maximum of 25 fps, shared among all channels
- Support picture sizes of D1, CIF, and half-D1

Analog Audio CODEC

- Integrated five audio ADCs and one audio DAC providing multi-channel audio mixed analog output
- Supports a standard I2S interface for multi-channel audio mux output to external audio playback processor, such as TW2880
- PCM 8/16-bit and u-Law/A-Law 8 -bit for audio word length
- Programmable audio sample rate that covers popular frequencies of 8/16/32/44.1/48kHz

Digital Audio CODEC

- Hardware G.726 ADPCM encoder / decoder
- Encodes maximum of 17 channels, with 1 channel for two way communication
- Decodes 1 channel of audio for playback
- RTC for AV sync

DDR2 Interface

- One 16-bit or two 8-bit external DDR2 SDRAM memories running at up to 333 MHz
- Total 256 MB up to 2 GB
- Auto refresh

Host Interface

- Configurable 32-bit asynchronous host interface / PCI interface
- PCI Interface runs as both initiator and target at 33/66MHz
- Preview video through PCI (33 MHz) supporting resolution such as:
  - 2 D1
  - 1 D1 + 4 CIF
  - 9 CIF
  - 16 QCIF
  - 1 D1 + 15 QCIF
- I^2C Interface for external Video Decoder chips configuration
- IRQs and GPIOs

System Clock

- Single 27 MHz external crystal clock input
- 3 built-in PLLs for internal clock generation

Package

- 416 BG

For additional products, see www.intersil.com/product_tree
Intersil products are manufactured, assembled and tested utilizing ISO9000 quality systems as noted in the quality certifications found at www.intersil.com/design/quality

Intersil products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.

For information regarding Intersil Corporation and its products, see www.intersil.com