VCODEC-H264-D4
Quad Channel H.264 Codec for PC/104-Plus

The VCODEC-H264-D4 is a quad channel H.264 Codec on a single PC/104-Plus form factor. The VCODEC-H264-D4 provides a powerful and flexible solution for capturing and compressing up to 4 analog video inputs at full size and at frame rate to the H.264 digital video standard.

The VCODEC-H264-D4 not only provides H.264 compression but can also simultaneously decompress and replay recordings from storage to display.

The VCODEC-H264-D4 allows high quality real-time video and audio capture and compression from NTSC/PAL video sources to disk and simultaneously provides an additional path for uncompressed video for on-screen preview or optional downstream video analytics. The high performance H.264 video data compression and efficient bus utilisation allow up to four VCODEC-H264-D4 cards to be fitted in a PC/104-Plus system with spare band-width for other collaborating peripherals.

PRELIMINARY INFORMATION (Rev A.01)
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Advanced Micro Peripherals Ltd
Cambridge, CB6 2HY, England
Tel (+44) 1353 659500
Tel (+44) 1353 659600
sales@ampltd.com
http://www.ampltd.com

Advanced Micro Peripherals Inc
New York, NY10001, USA
Tel (+1) 212 951 7205
Tel (+1) 212 951 7206
sales@amp-usa.com
http://www.amp-usa.com
Simultaneous H.264 and M-JPEG encoding

The VCODEC-H264-D4 is supported by a set of well-documented comprehensive SDKs that minimize development risk and shorten time-to-market for applications in video streaming, recording, or routing. The SDKs are available on popular embedded operating systems such as Windows, Linux, and QNX.

Applications

- Solid-State Digital Video Server
- Vehicle-based Video Codec
- Law Enforcement
- Crime Scene Recording
- Remote Video Surveillance
- Multi-camera Security Application
- Asset Monitoring
- Traffic Monitoring and Control
- Video Acquisition and Analytics
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Features

Real-time 4 x full size H.264 Encode at full frame rate
Real-time 4 x Motion-JPEG Encode at full frame rate
H.264 Decode/Playback
Text Overlay: Time, Date stamp etc
RS-485 Serial Port for Camera PTZ Control
Video Preview and playback to system VGA or to PAL/NTSC
4 x mono audio input channels
Up to 4 VCODEC-H264-D4 cards per system
Drivers for WinXP-E, Linux, QNX
**H.264 Video Recording**
The VCODEC-H264-D4 supports recording of up to four video inputs each as a single H.264 file. The resulting H.264 file can be played back by the VCODEC-H264-D4 or appropriate hardware/software decoders.

**I/P Frame Encoding**
The VCODEC-H264-D4 supports encoding of both I and P frames. Encoding of only I frames is also supported. The VCODEC-H264-D4 supports any number of P-frames between successive I-frames.

**Encoding Bit Rate Control**
The VCODEC-H264-D4 provides flexible bit rate control by providing two modes: Variable Bit Rate (VBR) and Constant Bit Rate (CBR).

**Variable Bit Rate (VBR)**
For VBR mode the picture quality is fixed according to a Quantisation value of between 1 and 20. The bit rate varies automatically in reaction to the incoming video to maintain the set quality. VBR is appropriate for storage applications.

**Constant Bit Rate (CBR)**
In CBR mode, the average bit rate is fixed and the picture quality is adjusted on a frame-by-frame basis to maintain the preset average bit rate. CBR is of particular benefit where video needs to be streamed over a fixed-bandwidth link.

**M-JPEG Video Recording**
In addition to the 4 x full size, full frame rate encode operations the VCODEC-H264-D4 can also support simultaneous motion-JPEG encoding of each channel at the same size and frame rate as the H.264 encoding. This is useful for application requiring storage and network streaming.

**Motion Detection and Event Triggers**
The VCODEC-H264-D4 supports automatic motion detection. Motion detection parameters such as regions of interest and frame difference threshold can be configured under software control.

Using the motion-detection feature the VCODEC-H264-D4 can be operated in a baby-sitting mode where recording is committed to disk only when scene motion event is detected, to make most efficient use of disk storage. Software for the VCODEC-H264-D4 allows recording of pre-triger, on-trigger and post-trigger events.

**Uncompressed Video Preview**
The VCODEC-H264-D4 provides a secondary video path allowing the video being recorded to be streamed across the PC/104-Plus bus to the host system’s VGA buffer for video previewing. The Preview output can also be used to view an alternate video source while recording other inputs. The Preview information is also available as a composite PAL/NTSC output suitable for driving a PAL/NTSC or RS-170 display device.
The uncompressed video, in RGB or YUV format, is available to downstream processes and may be used in further image processing applications.

**OSD Video Overlay**

The VCODEC-H264-D4 has a bit-mapped graphic overlay feature which allows text and graphics to be overlaid on incoming video prior to recording. This a useful feature for applying real-time annotation and labelling to Preview and H264 recordings.

Video source information such as camera reference, location, time and date stamp, etc can be overlaid on both preview and recordings.

**H.264 Decode and Playback**

The VCODEC-H264-D4 supports decoding and playback of H.264 files from storage to the host system’s display screen. Maximum image size of decoded video is 704 x 480 (NTSC) or 704 x 576 (PAL). Audio data which is part of the original recording is also decoded and played back in synchronisation with the video. In addition to playback to the system’s VGA device, the VCODEC-H264-D4 provides a composite PAL/NTSC playback output suitable for directly driving a PAL/NTSC or RS-170 display device.
Quad Channel H.264 Codec for PC/104-Plus

Technical Specification

PC/104-Plus Bus Interface
Compliant with PCI Rev 2.1
132MBytes/sec bandwidth at 33.33 MHz bus speed
Live H.264 capture to memory or disk
Concurrent H264 Capture and live preview

Analog Video Input
Up to 4 concurrent composite PAL or NTSC video input channels
Four 10-bit Analog-to-Digital converters
Anti-aliasing filters on inputs

Video Input Formats
Standard CCIR601-NTSC, CCIR-PAL
NTSC-M, NTSC-N, NTSC-J, NTSC (4.43), RS-170

Video Input Adjustments
Contrast (or luma gain) adjustable from 0 - 200% of original
Saturation (or chroma gain) adjustable from 0 - 200% of original
Hue (or chroma phase) adjustable from –180° to +180°
Brightness (or luma level) can be adjusted from –25 to +25 IRE
Software adjustable Sharpness, Gamma and noise suppression

Audio Input
4x mono input
Provides Audio/Video Synchronisation

Video Encoding
ITU-T H.264 (ISO/IEC 14496-10, Baseline profile, level 3)
M-JPEG Video Encoding
4 channel NTSC 4CIF (704 x 480) at 30fps
4 channel PAL 4CIF (704 x 576) at 25fps
Supports I and P Frame Compression
Supports Variable Bit Rate (VBR)
Supports Constant Bit Rate (CBR)

Audio Encoding
G.723 Audio Codec

Video Decoding / Playback
Real-time H.264 Video Decoding
ITU-T H.264 (ISO/IEC 14496-10, Baseline profile, level 3)
Playback to Composite PAL/NTSC output

Uncompressed Video Path
Real-time Preview to host VGA display
Preview to Composite PAL/NTSC output
Optional uncompressed RGB/YUV for downstream applications

Motion Detection
330 (NTSC) or 396 (PAL) detection blocks
Masking of areas not required for motion detection
Adjustable sensitivity

System Requirements
x86 PC-Compatible PC/104-Plus Computer
PCI or AGP Display (if Video Preview to host is required)
Spare REQ/GNT on PC/104-Plus Bus
3.3V signalling PC/104-Plus bus

Miscellaneous
Single +5V supply
Operating temp 0°C to 60°C
Operating temp –40°C to +85°C (extended temp option)
Standard 3.6 x 3.8in PC/104-Plus form factor

Software Drivers
Drivers for WindowsXP, Linux, QNX
Sample video recording application in C/C++ source code

Related Products
VCH264D4-VTelemetry Low Latency Video Telemetry SDK
VCH264D4-VStream RTSP Video Streaming SDK

Ordering Information
VCODEC-H264-D4 H.264 Video Codec (0 to 60°C)
VCODEC-H264-D4-Ext H.264 Video Codec (-40°C to +85°C)

Advanced Micro Peripherals Ltd
Cambridge, CB6 2HY, England
Tel (+44) 1353 659500
Tel (+44) 1353 659600
sales@ampltd.com
http://www.ampltd.com

Advanced Micro Peripherals Inc
New York, NY10001, USA
Tel (+1) 212 951 7205
Tel (+1) 212 951 7206
sales@amp-usa.com
http://www.amp-usa.com

Distributor: NeoMore 23 rue des Poiriers F-78370 PLAISiR FRANCE +33 1 30 64 15 81 www.neomore.com