MPEG4000-D4

Quad Channel MPEG-4 Codec for PC/104-*Plus*

Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS

The MPEG4000-D4 is a quad channel MPEG-4 Codec on a single PC/104-*Plus* form factor. The MPEG4000-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 MPEG-4 digital video standard.

The MPEG4000-D4 not only provides MPEG-4 compression but can also simultaneously decompress and replay recordings from storage to display.

The MPEG4000-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 MPEG-4 video data compression and efficient bus utilization allow up to four MPEG4000-D4 cards to be fitted in a PC/104-*Plus* system with spare band-width for other collaborating peripherals.

Real-time 4 x full-size, full frame rate MPEG-4 encode of PAL/NTSC/RS-170

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The MPEG4000-D4 is support 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 and Linux.

Simultaneous

MPEG-4

and

M-JPEG

encoding

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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PC/104

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Text and graphics

overlay

Camera PTZ

control

Features

Real-time 4 x full size MPEG-4 Encode at full frame rate

MPEG-4 Decode/Playback

Fast Text Overlay on Recording for Time/Date stamp etc

Optional Real-time 4 x Motion-JPEG Encode at full frame rate

Optional RS-485 Serial Port for Camera PTZ Control

Optional Full bit-mapped graphics overlay on analog preview output

4 x mono audio input channels

Up to 4 MPEG4000-D4 cards per system

Drivers for WinXP-E and Linux

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MPEG-4 Video Recording

The MPEG4000-D4 supports recording of up to four video inputs each as a single MPEG-4 file. The resulting MPEG-4 file can be played back by the MPEG4000-D4 or appropriate hardware/ software decoders.

I/P Frame Encoding

The MPEG4000-D4 supports encoding of both I and P frames. Encoding of only I frames is also supported. The MPEG4000-D4 supports any number of P-frames between successive I-frames.

Encoding Bit Rate Control

The MPEG4000-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 (Optional)

In addition to the 4 x full size, full frame rate encode operations the MPEG4000-D4 can also support simultaneous motion-JPEG encoding of each channel at the same size and frame rate as the MPEG-4 encoding. This is useful for application requiring storage and network streaming.

Motion Detection and Event Triggers

The MPEG4000-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 MPEG4000-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 MPEG4000-D4 allows recording of pre-trigger, on-trigger and post-trigger events.

Uncompressed Video Preview

The MPEG4000-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 analog output (optional) suitable for driving a PAL/NTSC or RS-170 display device.

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The uncompressed video, in RGB or YUV format, is available to downstream processes and may be used in further image processing applications.
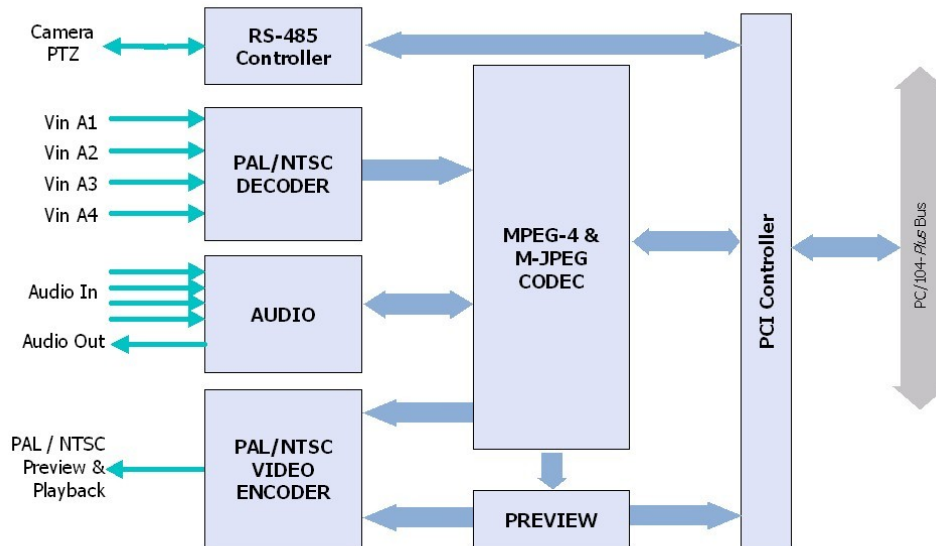
OSD Video Overlay

The MPEG4000-D4 provides a number of options for adding overlay information to the incoming video. This is a useful feature for applying real-time annotation and labelling to Preview and MPEG-4 recordings. The MPEG4000 -D4 provides fast text based overlay for the encoding / recording video path and a more comprehensive full bit mapped graphics (with alpha blending) for the optional analog preview output - useful for implementing complex menu and navigation controls. There is currently no overlay capability on the VGA preview path. .

MPEG-4 Decode and Playback

The MPEG4000-D4 supports decoding and playback of MPEG-4 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 MPEG4000-D4 provides an optional analog composite playback output suitable for directly driving a PAL/NTSC or RS-170 display device.

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MPEG4000-D4 Block Diagram

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Technical Specification

PC/104-*Plus* Bus Interface

Compliant with PCI Rev 2.1
132MBytes/sec bandwidth at 33.33 MHz bus speed
Live MPEG-4 capture to memory or disk
Concurrent MPEG-4 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
PAL-B,G,N, PAL-D, PAL-H, PAL-I, PAL-M, PAL-NC, PAL-60

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

ISO/IEC 14496-2, MPEG-4 SOP at Level 3
M-JPEG Video Encoding (optional)
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 MPEG-4 Video Decoding
Playback to Composite PAL/NTSC output (optional)

Uncompressed Video Path

Real-time Preview to host VGA display
Optional 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)
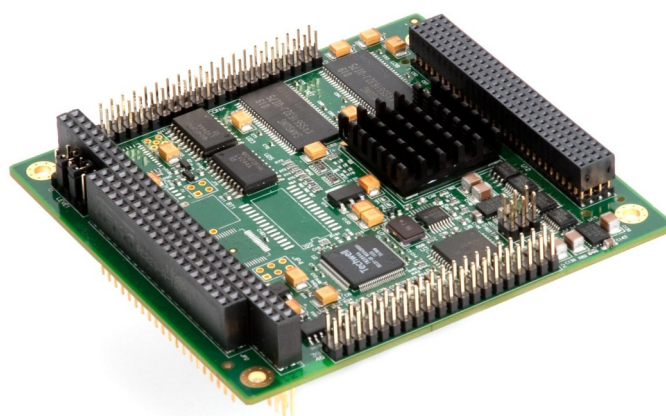Standard 3.6 x 3.8in PC/104-*Plus* form factor

Software Drivers

Drivers for WindowsXP and Linux
Sample video recording application in C/C++ source code

Related Products

MP4D4-VStream   RTSP Video Streaming SDK

Ordering Information

MPEG4000-D4   MPEG-4 Video Codec (0 to 60˚C)
MPEG4000-D4-Ext   MPEG-4 Video Codec (-40˚C to +85˚C)

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