microMPEG4-D4

Quad Channel MPEG-4 Codec for mini PCI

Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS

The microMPEG4-D4 is a quad channel MPEG-4 Codec on a single mini PCI form factor. The microMPEG4-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 microMPEG4-D4 not only provides MPEG-4 compression but can also simultaneously decompress and replay recordings from storage to display.

The microMPEG4-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 microMPEG4-D4 cards to be fitted in a mini PCI 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

PRELIMINARY INFORMATION (Rev A.02)
Subject to change without notification

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The microMPEG4-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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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 microMPEG4-D4 cards per system

Drivers for WinXP-E and Linux

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MPEG-4 Video Recording

The microMPEG4-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 microMPEG4-D4 or appropriate hardware/software decoders.

I/P Frame Encoding

The microMPEG4-D4 supports encoding of both I and P frames. Encoding of only I frames is also supported. The microMPEG4-D4 supports any number of P-frames between successive I-frames.

Encoding Bit Rate Control

The microMPEG4-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 microMPEG4-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 microMPEG4-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 microMPEG4-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 microMPEG4-D4 allows recording of pre-trigger, on-trigger and post-trigger events.

Uncompressed Video Preview

The microMPEG4-D4 provides a secondary video path allowing the video being recorded to be streamed across the mini PCI 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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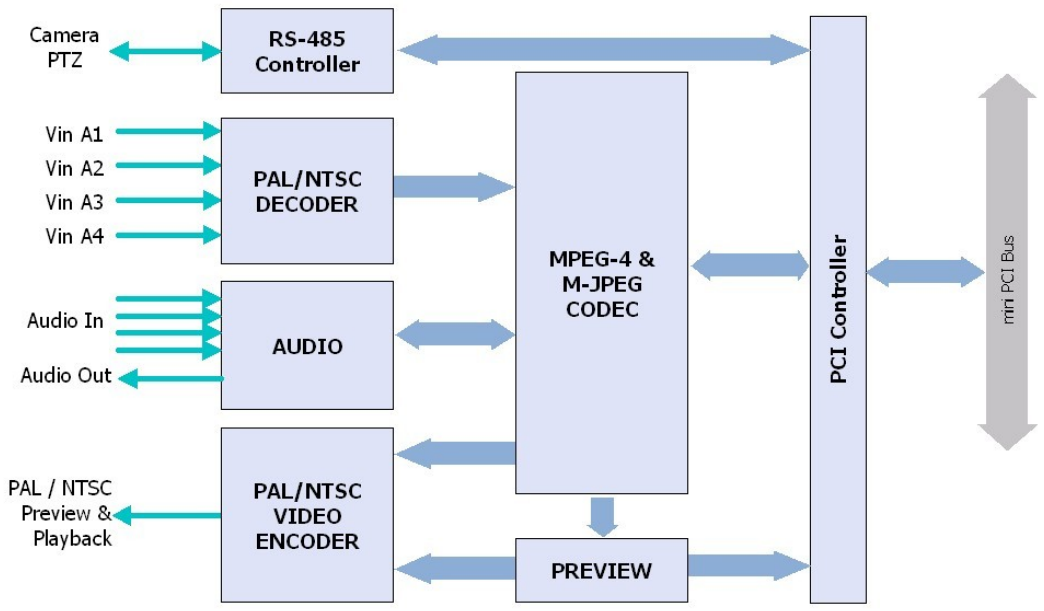
The uncompressed video, in RGB or YUV format, is available to downstream processes and may be used in further image processing applications.

OSD Video Overlay

The microMPEG4-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 microMPEG4-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 microMPEG4-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 microMPEG4-D4 provides an optional analog composite playback output suitable for directly driving a PAL/NTSC or RS-170 display device.



microMPEG4-D4 Block Diagram

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mini PCI Bus Interface

Type III miniPCI
132MBytes/sec bandwidth at 33.33 MHz bus speed
Live multi-stream 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
Preview to Composite PAL/NTSC output (optional)
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 Host Computer with spare miniPCI type III slot
PCI/AGP Display (if Video Preview to host is required)

Miscellaneous

Standard mini PCI form factor
Operating temp 0˚C to 60˚C
Operating temp –40˚C to +85˚C (extended temp option)

Software Drivers

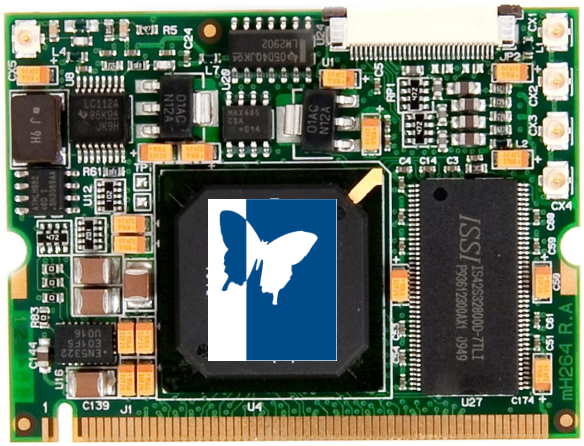
Drivers for WindowsXP and Linux
Sample video recording application in C/C++ source code

Related Products

microMP4D4-VStream	RTSP Video Streaming SDK

Ordering Information

microMPEG4-D4	MPEG-4 Video Codec (0 to 60˚C)
microMPEG4-D4-Ext	MPEG-4 Video Codec (-40˚C to +85˚C)



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