microMPEG4

4-Channel MPEG4 Codec on miniPCI type III

Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS

The microMPEG4 is a 4-channel MPEG4 Codec on a single type-IIIB MiniPCI module. It is a high-performance but low-power device for real-time capture and compression of up to four concurrent video inputs to MPEG4 standard.

Low power,

MPEG4

Codec.

Smaller than a

credit-card.

The microMPEG4 utilises 32bit PCI architecture to allow high-quality real-time video and audio capture and compression of up to four concurrent PAL or NTSC video sources to disk while at the same time providing an additional path for incoming video to be previewed on the host screen.

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EMBEDDED-PC PC/104 MODULES

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In addition to MPEG4 compression, the microMPEG4 can decompress and play back recordings from storage to display.

The microMPEG4 is supported by a suite of drivers for Windows 2000/XP, Linux and QNX.

Records up to four concurrent PAL/NTSC channels

Applications

Solid-State Digital Video Recorder

Vehicle-based Video Codec

Intranet/Internet Video Streaming

Remote Video Surveillance

Multi-camera Security

Traffic Monitoring and Control

Video Acquisition and Analysis

Video Archiving

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Text and graphics overlay on preview and recording

Features

MPEG4 Encode, Decode and Play Back

Text Overlay including time and date stamp

1 x D1 MPEG4 Encode at full frame rate

4 x D1 MPEG4 Encode at 1/4 full frame rate

4 x CIF MPEG4 Encode at full frame rate

Real-Time Video Preview to system VGA, PAL/ NTSC

Drivers for Windows 2000/XP-E, Linux, QNX

Compact Type IIIB MiniPCI Module

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Video Recording Modes

microMPEG4 supports two main modes of video recording: Split Video Stream and Combined Video Stream.

Split Video Stream

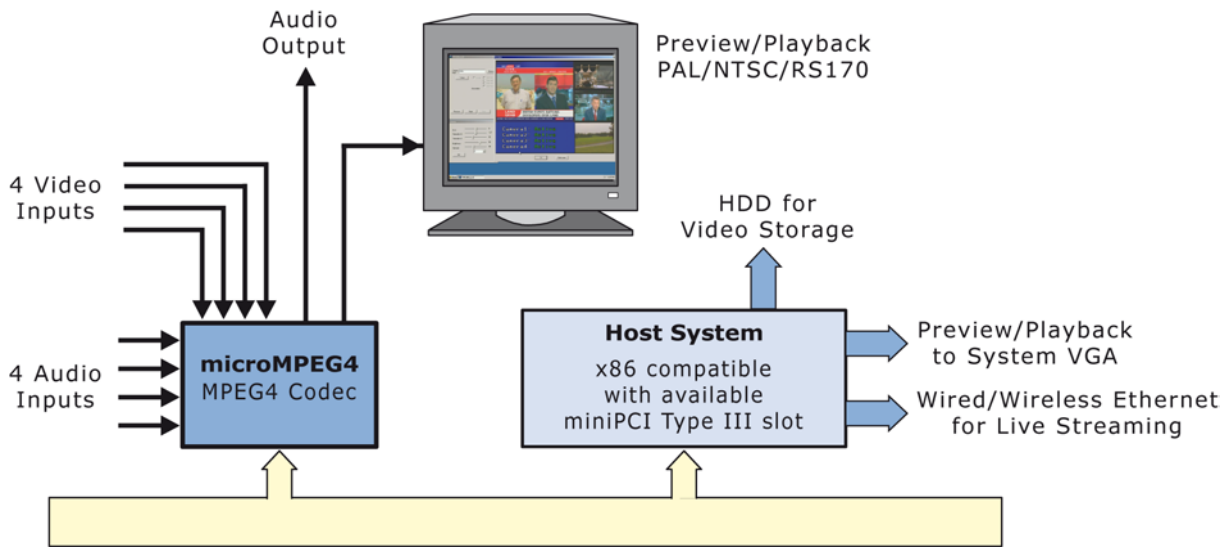
In the Split Video Stream (SVS) mode the multiple channels being previewed are captured and recorded as separate files or streams. The microMPEG4 will output four files - one per channel. These streams are independent and can subsequently be played back as totally independent MPEG4 streams by appropriate hardware/software decoders or through the playback feature of the microMPEG4.

The SVS mode supports 2 sub modes:

- 4 x CIF size MPEG4 each at full frame rate;
- 4 x D1 size MPEG4 each at lower frame rate

When set for 4 x CIF, the 4 inputs can be concurrently recorded each at full frame rate. Each channel is first decimated to quarter screen size prior to encoding. This results in sizes of 352x240 for NTSC and 352x288 for PAL.

The 4 x D1 sub-mode allows 4 inputs to be recorded each at full D1 size with input at less than full frame rate. 4 full



MPEG4 Record and Playback System

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D1 size (up to 720x480 for NTSC and 720x576 for PAL) video is recorded in this mode.

In the Split Video Stream mode, encoding parameters (such as bit rate and motion detection) can be set separately and independently for each video source.

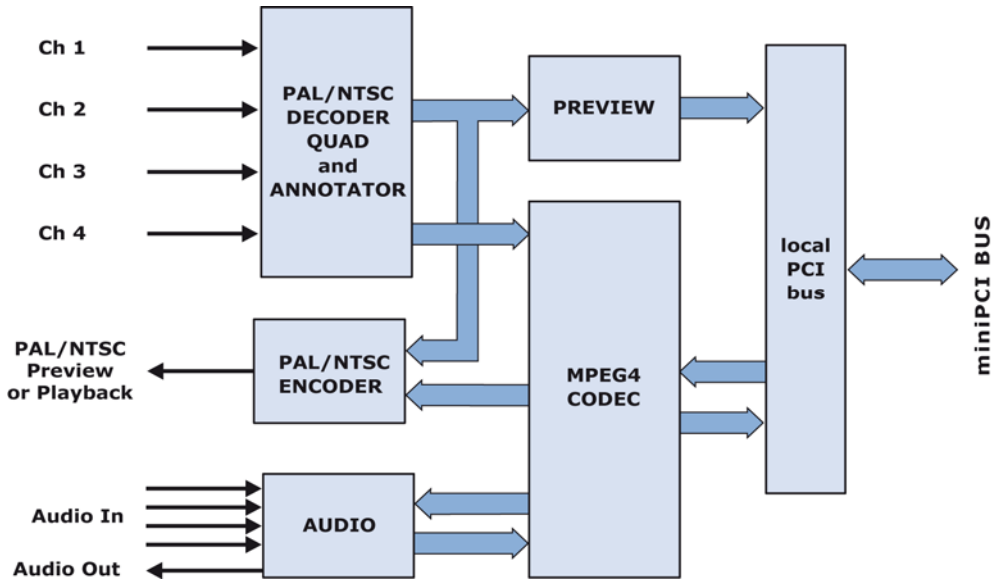
Combined Video Stream

When set for Combine Video Stream (CVS), the four video channels being previewed are recorded as a single MPEG4 file as if they were coming from a single video source. There is no separation and the resulting MPEG4 file can subsequently be played back as single MPEG4 stream by the microMPEG4 or appropriate hardware/ software decoders.

Video Setting

The microMPEG4 supports PAL and NTSC video input. The required standard is software selectable.

In applications where recording space is restricted the microMPEG4 provides additional flexibility by supporting a range of capture frame rates at or below the standard video rates (30/25fps NTSC/PAL). For NTSC, the Frame Rate can be set to 30, 15, 7.5, 3.75, etc down to 0.9375 fps. For PAL, the supported frame rates include 25, 12.5, 6.25, etc



microMPEG4 Block Diagram

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down to 0.7813 fps. The lower frames rates in each case are derived by successive division by 2.

I/P Frame Encoding

The microMPEG4 supports encoding of both I and P frames. Encoding of only I frames is also supported. The supported I intervals are 2, 4, 8, 16 up to 256 with the default being 64.

Encoding Bit Rate Control

The microMPEG4 provides flexible bit rate control by providing three modes including Variable Bit Rate (VBR), Constant Bit Rate (CBR) and Hybrid Bit Rate (HBR)

Variable Bit Rate (VBR)

For VBR, the Quantisation value can be set from 1 to 31 with 10 as the default. In VBR the picture quality is fixed with fixed quantisation value and 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 automatically adjusted by the microMPEG4 on a frame-by-frame basis to maintain the pre-set average bit rate. CBR is of particular benefit where video needs to be streamed over a fixed-bandwidth link.

Hybrid Bit Rate (HBR)

HBR is a combination of VBR and CBR in which the microMPEG4 dynamically adjusts the bit rate between preset maximum and minimum values.

Motion Detection and Event Triggers

The microMPEG4 supports automatic motion detection on a per channel basis. Motion detection parameters such as frame difference threshold and number of frames can be set independently per video channel.

Using the motion-detection feature, the microMPEG4 can be operated in a babysitting 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 allows recording of pre-trigger, on-trigger and post-trigger events.

Video Preview

The microMPEG4 provides a secondary video path allowing the video being recorded to be streamed to host systems

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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 RS170 display device.

OSD Video Text Overlay

The microMPEG4 has a bit-mapped graphic overlay feature which allows text and graphics to be overlaid on incoming video prior to recording. This is a useful feature for applying real-time annotation and labelling to Preview and MPEG4 recordings.

The microMPEG4 provides various layers of overlay such as character/ bitmap, box overlay and mouse pointer which can be overlaid on Preview and Record paths independently.

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

MPEG4 Decode and Playback

The microMPEG4 supports decoding and playback of MPEG4 files from storage to the host system's display screen. Maximum image size of decoded video is 720x480 (NTSC) or 720x576 for 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 display VGA device, the microMPEG4 also provides a composite PAL/NTSC playback output suitable for directly driving a PAL/NTSC or RS170 display device.

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MiniPCI Bus Interface

Type III miniPCI
132MBytes/sec bandwidth at 33.33 MHz bus speed
Live multi-stream MPEG4capture to memory or disk
Concurrent MPEG4 Capture and live preview

Analogue Video Input

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

Video Input Formats

Standard CCIR601-NTSC, CCIR-PAL
NTSC-M, NTSC-Japan
PAL-B, PAL-D, PAL-G, PAL-H, PAL-I, PAL-M, PAL-N

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 0 - 255 steps

Audio Input

Voice quality mono or microphone sound input per channel (1Vrms)
Provides audio/video synchronisation
Supports ADPCM PCM at 32KBits/sec per channel
64Kbps muLaw

Video Encoding

Real-time MPEG4 Video Encoding
ISO/IEC 14496-2, MPEG4 ASP at Level 5
1 channel NTSC full D1 (720 x 480) at 30fps
4 channels NTSC CIF (352 x 240) at 120fps
1 channel PAL full D1 (720 x 576) at 25fps
4 channels PAL CIF (352 x 288) at 100fps
4 channels PAL/NTSC full D1 at reduced frame rates
Supports I, P and B Frame Compression
Supports Variable Bit Rate (VBR)
Supports Constant Bit Rate (CBR)
Support Hybrid Bit rate (HBR)

Video Decoding / Playback

Real-time MPEG4 Video Decoding
ISO/IEC 14496-2, MPEG4 ASP at Level 5
Playback to Composite PAL/NTSC output

Uncompressed Video Path

Real-time Preview to host VGA display
Preview to Composite PAL/NTSC output

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Motion Detection

1350 (NTSC) or 1620 (PAL) detection blocks
Masking of areas not required for motion detection
Adjustable sensitivity

Text/Graphics overlay

Overlay of computer-generated bitmap on live video
Overlay of Truetype font text
720 x 576 bit map overlay buffer
64 colours per overlay pixel
Programmable Overlay / Blend attribute per pixel
Programmable 25%, 50%, 75% Alpha Blending

System Requirements

x86 PC-Compatible Host Computer with spare miniPCI type III slot
PCI/AGP Display (if Video Preview to host is required)

Miscellaneous

Operating temperature 0˚C to 60˚C
Extended temperature –40˚C to +85˚C (option)
MiniPCI typeIIIB form factor

Software Drivers

Drivers for Windows-NT/2000/XP, Linux, QNX
Sample video recording application in C/C++ source code

Related Products

MP4MPCI-VTelemetry	Low Latency Video Telemetry SDK
MP4MPCI-VSteam	RTSP Video Streaming SDK

Ordering Information

MicroMPEG4	MPEG4 Video Codec (0 to 60˚C)
MicroMPEG4-Ext	MPEG4 Video Codec (-40˚C to +85˚C)

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