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MPEG4cPCI

4-Channel MPEG4 Video Encoder for CompactPCI

Advanced Micro Peripherals
THE EMBEDDED VIDEO EXPERTS

The MPEG4cPCI is a 4-channel MPEG4 Codec on a 3U CompactPCI form factor. It provides high performance capture and compression of up to four concurrent analogue video inputs to MPEG4 at full resolution and full frame rates.



The MPEG4cPCI not only provides MPEG4 compression but can also decompress and play back recordings from storage to display.

Utilizing the 32-bit PCI architecture, the MPEG4cPCI allows 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 allowing incoming video to be previewed on the host screen.

Fullsize,

full framerate

MPEG4 encoding

of up to four

channels

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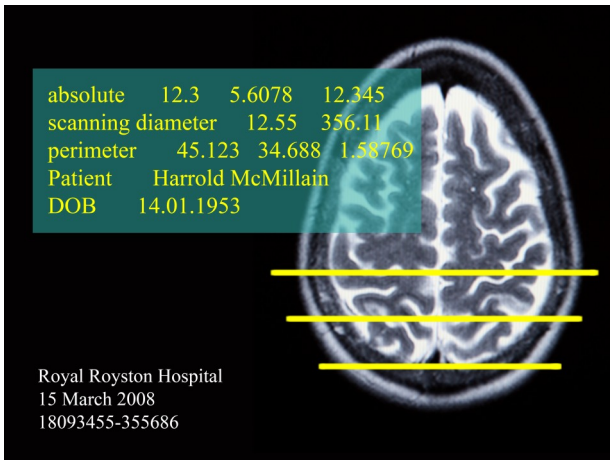
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MPEG4cPCI

4-Channel MPEG4 Video Encoder for CompactPCI

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The high performance MPEG4 video data compression and reduced bus utilisation allows multiple MPEG4cPCI cards to be fitted in a CompactPCI system for multi-channel video recording and streaming applications. The MPEG4cPCI is supported by a suite of drivers for Windows-NT/2000/XP, Linux, QNX.



Text and Graphics overlay

Applications

Medical Archiving

Multi-Camera Security

Vehicle-based Video Codec

Remote Video Surveillance

Video Acquisition and Analysis

Traffic Monitoring and Control

Solid-state Digital Video Recorder

Intranet/Internet Video Streaming

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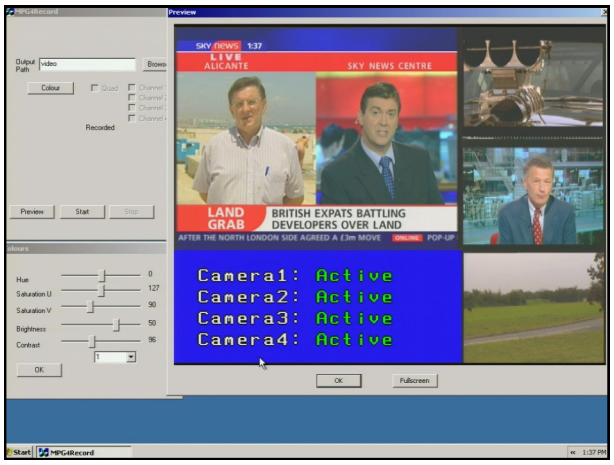
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MPEG4cPCI

4-Channel MPEG4 Video Encoder for CompactPCI

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Simultaneous Preview and Playback

Motion Detection with independent parameters on all channels

Features

MPEG4 Decode/Playback

3U CompactPCI form factor

Multiple MPEG4cPCI cards per system

4 Asynchronous Live NTSC/PAL Inputs

Video Preview to System VGA, PAL/NTSC

Drivers for Win-NT/2000/XP-E, Linux, QNX

4 x D1 size MPEG4 Encode at Full Frame Rate

Motion Detection and Event-Triggered Recording

Text and Graphics Overlay, eg time and date stamp

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Multiple Video Stream Recording

The MPEG4cPCI allows four inputs channels to be concurrently recorded, each at full frame rate and full frame resolution (up to 720x480 for NTSC and 720x576 for PAL). Encoding parameters (such as bit rate and motion detection) and analogue video adjustments (hue, contrast, brightness, etc) can be set separately and independently for each video source.

The four channels can be simultaneously previewed on the host screen with each channel appearing at full frame rate and 1/4 size.

The four channels are captured and recorded as separate files or streams. 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 MPEG4cPCI.

Video Setting

The MPEG4cPCI supports PAL or NTSC video input. The required standard is software selectable. In applications where recording space is restricted the MPEG4cPCI provides additional flexibility by supporting a range of capture frame rates at or below the standard video rate of 30fps for NTSC and 25fps for 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 are 25, 12.5, 6.25, etc down to 0.7813 fps. The lower frames rates in each case are derived by successive division by 2.

I/P Frame Encoding

The MPEG4cPCI supports encoding of both I and P frames. I frame only encoding is also supported. The supported I intervals are 2, 4, 8, 16 up to 256 with 64 as the default.

Encoding Bit Rate Control

The MPEG4cPCI offers 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. The picture quality is fixed by the 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.

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Constant Bit Rate (CBR)
In CBR Mode, the average bit rate is fixed and the picture quality is automatically adjusted by the MPEG4cPCI on a frame-byframe basis to maintain the pre-set average bit rate. CBR is of particular benefit where video needs to be streamed over a fixedbandwidth link.

Hybrid Bit Rate (HBR)
HBR is a combination of VBR and CBR in which the MPEG4cPCI dynamically adjusts the bit rate between preset maximum and minimum values.

Motion Detection and Event Triggers
The MPEG4cPCI 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 MPEG4cPCI 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 MPEG4cPCI allows recording of pre-trigger, on-trigger and post-trigger events.



MPEG4cPCI

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Video Preview

The MPEG4cPCI provides a secondary video path which allows the video being recorded to be streamed 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 RS170 display device.

OSD Video Text Overlay

The MPEG4cPCI 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 MPEG4 recordings. The MPEG4cPCI 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 can be overlaid on both preview and recordings.

MPEG4 Decode and Playback

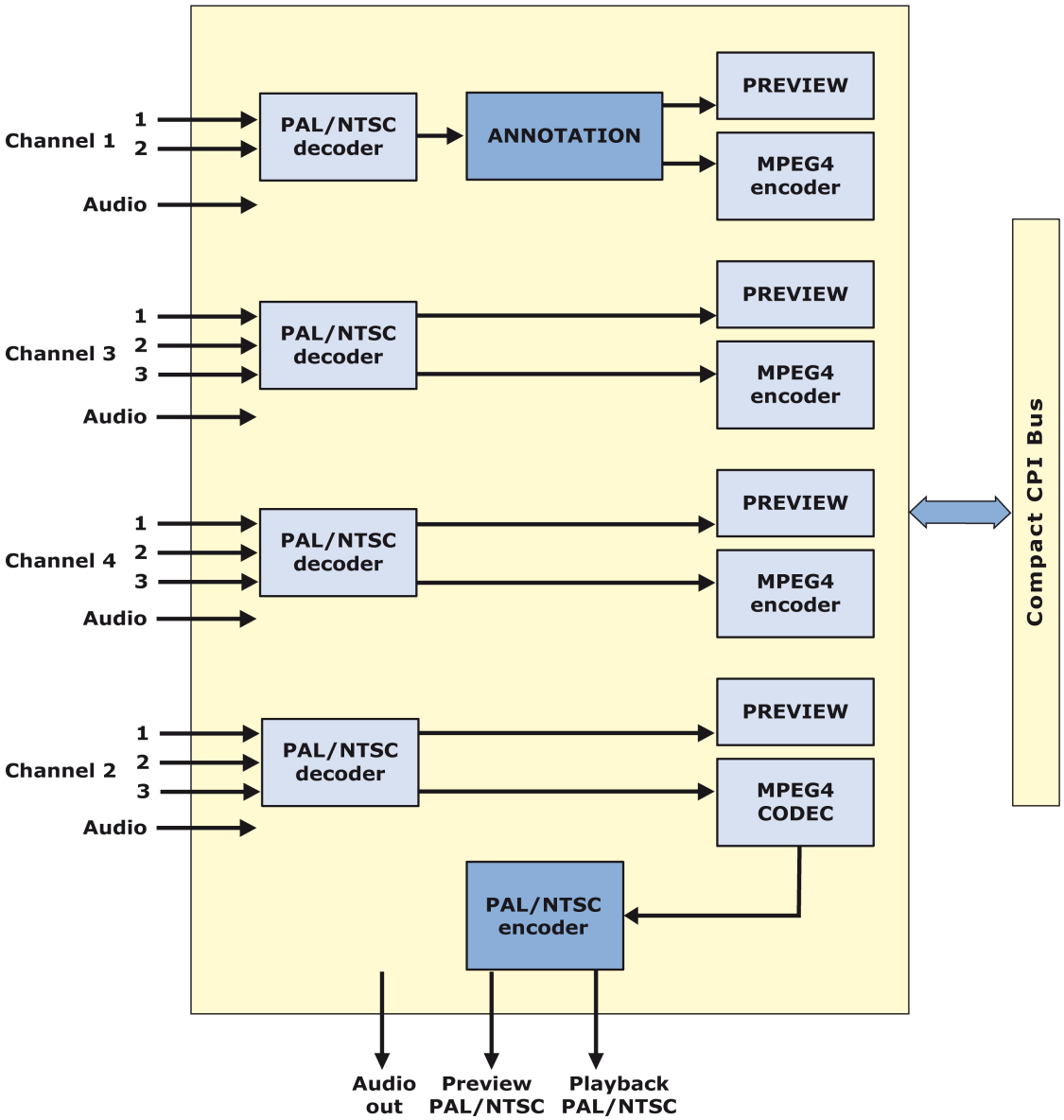
The MPEG4cPCI supports decoding and playback of MPEG4 files from storage to the host system's display screen. The maximum image size of decoded video is 720x480 (NTSC) or 720x576 for PAL. Audio data which is part of the original recording is also decoded and played back in synchronisation with the video. In addition to playback to the system VGA device, the MPEG4cPCI provides a composite PAL/NTSC playback output suitable for directly driving a PAL/NTSC or RS170 display device.

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MPEG4cPCI Block Diagram

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CompactPCI Bus Interface

PICMG-2.0 Rev 2.1
32-bit bus width, 33.33 MHz bus speed
Live multi-stream MPEG4 D1 capture to memory or disk
Concurrent MPEG4 capture and live preview

Analogue Video Input

4 independent composite PAL or NTSC video input channels
410-bit flash CMOS 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
4 channels NTSC full D1 (720 x 480) at 30fps
4 channels PAL full D1 (720 x 576) at 25fps
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
1 Channel Playback to host VGA or Composite PAL/NTSC output

Uncompressed Video Path

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

Motion Detection

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

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Text/Graphics overlay

4 colour character/bitmap overlay on primary channel
4 level alpha-blending
16 font, 128 glyph memory
675 (NTSC) or 810 (PAL) graphics blocks

System Requirements

x86 PC-Compatible CompactPCI Host Computer
PCI/AGP Display (if Video Preview to host is required)
3.3V and 5V from CompactPCI backplane

Miscellaneous

Operating temperature 0˚C to 60˚C
Extended temperature –40˚C to +85˚C (option)
Standard 3U CompactPCI form factor
Optional 6U CompactPCI faceplate and mounting

Software

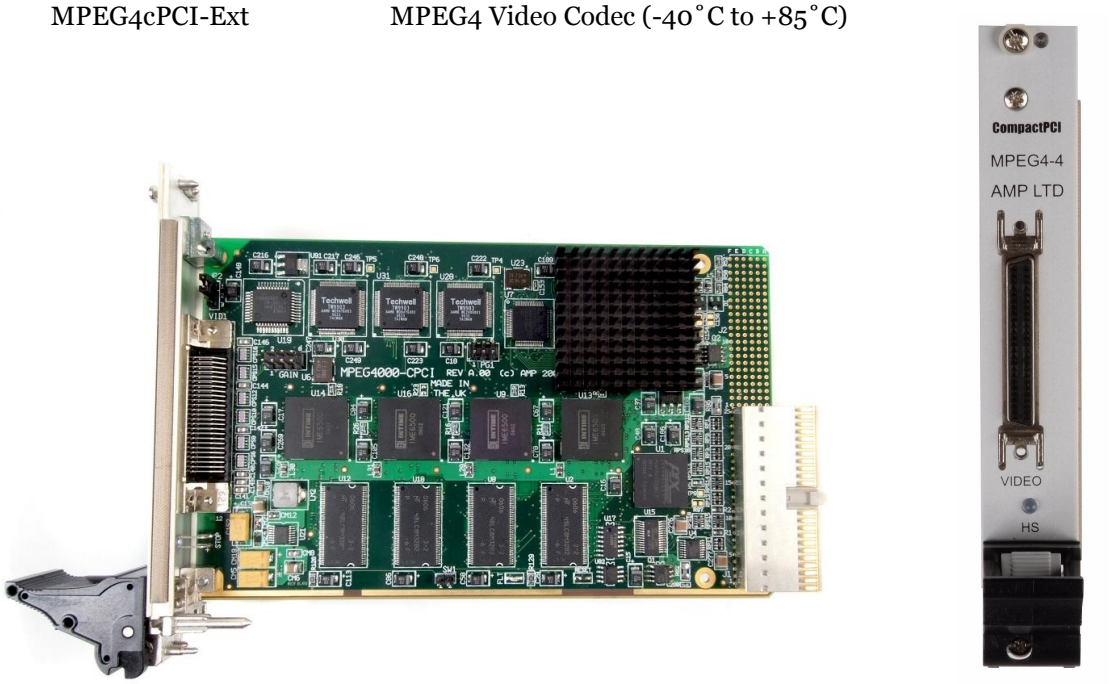
Drivers for Windows-NT/2000/XP, Linux, QNX
Sample video recording application in C/C++ source code

Related Products

MP4CPCI-VTelemetry	Low Latency Video Telemetry SDK
MP4CPCI-VSteam	RTSP Video Streaming SDK

Ordering Information

MPEG4cPCI	MPEG4 Video Codec (0 to 60˚C)
MPEG4cPCI-Ext	MPEG4 Video Codec (-40˚C to +85˚C)



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