

MPEG4000WA

MPEG-2/4 Codec with Watermark Authentication



The MPEG4000WA is a 4-channel MPEG Codec on a single PC/104-Plus form factor. The MPEG4000WA provides a powerful and flexible solution for capturing and compressing up to four concurrent analog video inputs to MPEG-4, MPEG-2 and M-JPEG standards. On-board Watermark Authentication provides additional support for evidential recording and law enforcement applications.



The MPEG4000WA not only provides MPEG-2/4 compression but can also decompress and replay recordings from storage to display. It allows high quality real-time video and audio capture and compression from 1, 2 or 4 concurrent PAL/NTSC video sources to disk and simultaneously provides an additional path for uncompressed video for on-

MPEG-4, MPEG-2
and M-JPEG
recording
of
4 PAL/NTSC
channels

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THE EMBEDDED VIDEO EXPERTS

screen Preview or optional downstream video analytics. The high performance MPEG-2/4 video data compression and reduced bus utilization allows up to four MPEG4000WA cards to be fitted in a PC/104-Plus system to provide up to 16 concurrent video streams to disk.



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

128-bit HMAC

Watermark

Authentication

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Features

MPEG-2, MPEG-4, M-JPEG Encode

128-bit HMAC Watermark Authentication

1 x D1 size MPEG Encode at full frame rate

4 x D1 size MPEG Encode at 1/4 frame rate

4 x CIF size MPEG Encode at full frame rate

MPEG-2/4 Decode/Playback

Text Overlay: Time, Date stamp etc

Video Preview to system VGA, PAL/NTSC

Up to 4 MPEG4000WA cards per system

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

Text and graphics
overlay on
preview and
recording

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Video Recording Modes

MPEG4000WA supports two main modes of video recording: Split Video Stream and Combined Video Stream.

Split Video Stream

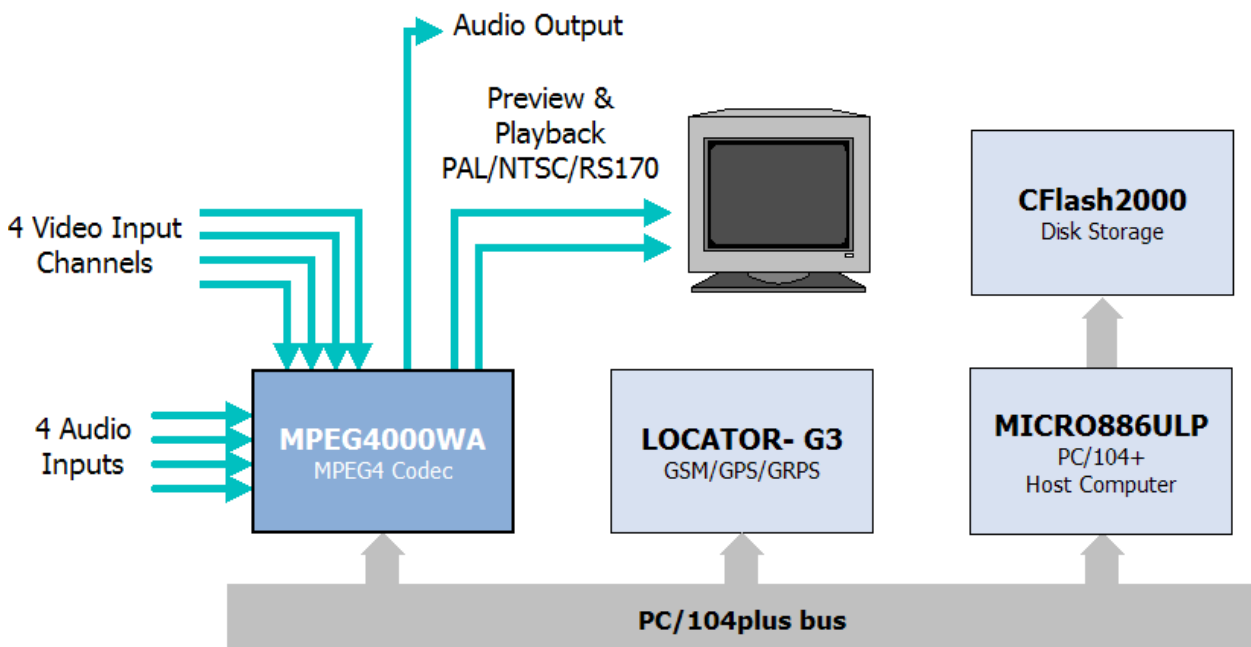
In the Split Video Stream (SVS) mode the multiple channels being previewed are captured and recorded as separate files or streams. Thus the MPEG4000WA would output four files - one per channel. These streams are independent and can subsequently be played back as separate MPEG streams by appropriate hardware/software

decoders or through the Playback feature of the MPEG4000WA.

The SVS mode supports 2 sub modes:

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

When set to 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 352 x 240 for NTSC and 352 x 288 for PAL.



Mobile MPEG-2/4 Record and Playback System

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 D1 size (720 x 480 for NTSC and 720 x 576 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 independently for each video source.

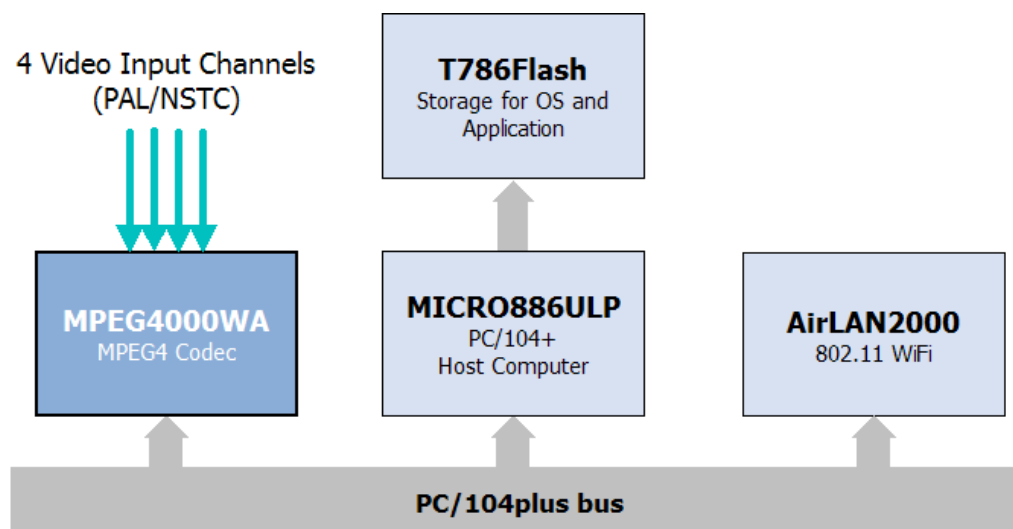
Combined Video Stream

When set for Combined Video Stream (CVS) the four video channels being previewed are recorded as a single MPEG-4 file. There is no separation

and the resulting MPEG-4 file can be played as a single MPEG-4 stream by appropriate hardware/software decoders.

Watermark Authentication

The MPEG4000WA features a patented watermark algorithm for the authentication of recordings. Invisible watermarks are generated using 128-bit HMAC and are embedded in the recording. With this secure watermark any subsequent spatial or temporal tampering with the recording can be detected.



Wireless Video Telemetry System



I/P Frame Encoding

The MPEG4000WA supports encoding of both I and P frames. Encoding of only I frames is also supported.

Encoding Bit Rate Control

The MPEG4000WA provides flexible bit rate control by providing two modes: Variable Bit Rate (VBR) and Constant Bit Rate (CBR).

Variable Bit Rate (VBR)

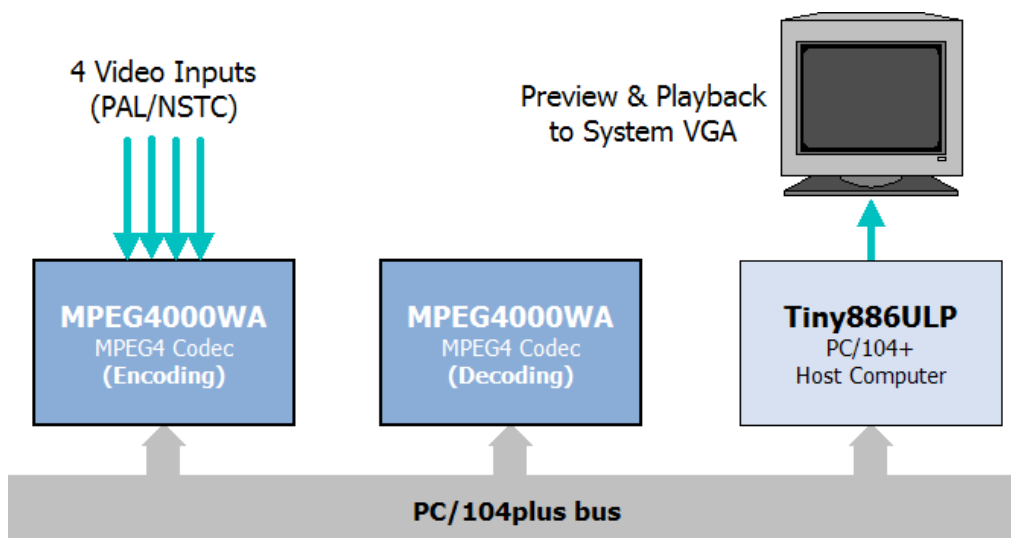
For VBR mode the picture quality is fixed according to a Quantization value of between 1 and 31. The bit rate varies in reaction to the incoming video to maintain the set quality. VBR is appropriate for storage applications.

Constant Bit Rate (CBR)

In CBR mode, the average bit rate is fixed and the picture quality is automatically adjusted by the MPEG4000WA 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.

Motion Detection and Event Triggers

The MPEG4000WA supports automatic motion detection on each channel on a per channel basis. Motion detection parameters such as frame difference threshold and number of frames can be set independently for each channel.



Full Duplex Video Recording System



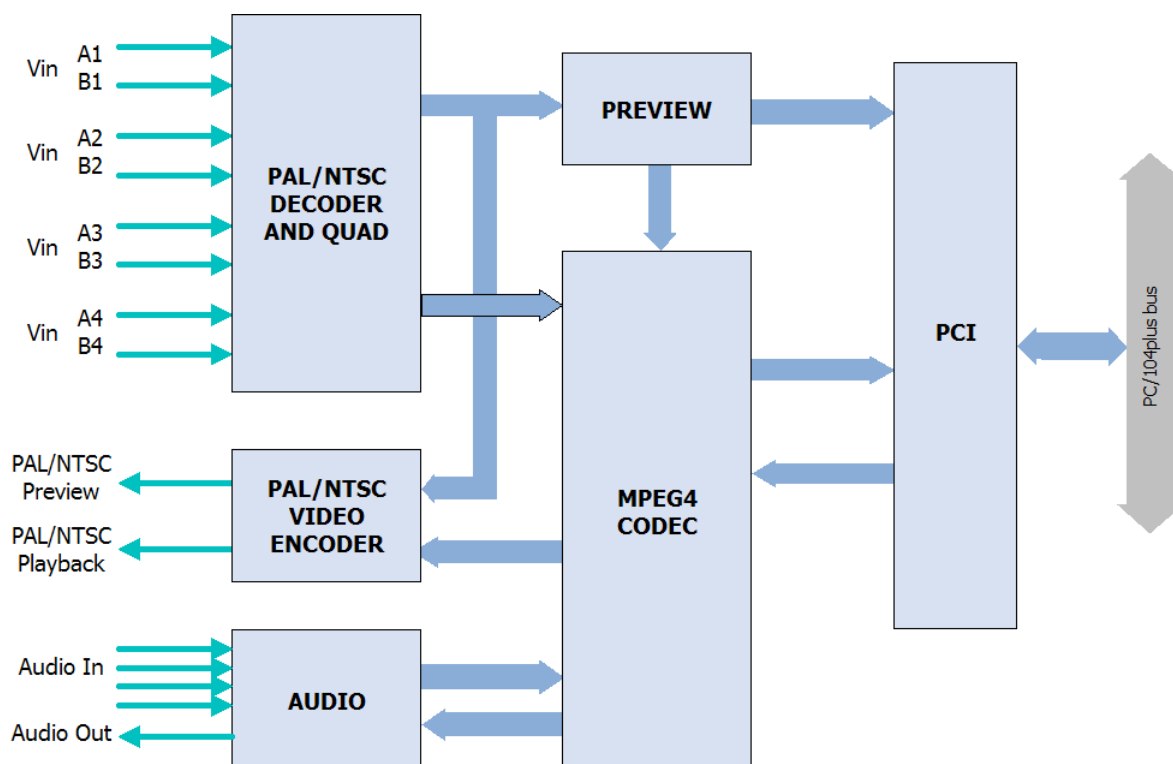
Using the motion-detection feature the MPEG4000WA can be operated in a baby-sitting mode where recording is committed to disk only when scene motion event is detected, to make most efficient use of disk storage.

Software for the MPEG4000WA allows recording of pre-trigger, on-trigger and post-trigger events.

Uncompressed Video Preview

The MPEG4000WA 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



MPEG4000WA Block Diagram

information is also available as a composite PAL/NTSC output suitable for driving a PAL/NTSC or RS170 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 Text Overlay

The MPEG4000WA 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 MPEG-4 recordings.

The MPEG4000WA 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.

MPEG-2/4 Decode and Playback

The MPEG4000WA supports decoding and playback of MPEG-2 and MPEG-4 files from storage to the host system's

display screen. Maximum image size of decoded video is 720 x 480 (NTSC) or 720 x 576 (PAL). Audio data which is part of the original recording is also decoded and played back in synchronization with the video. In addition to playback to the system's VGA device, the MPEG4000WA provides a composite PAL/NTSC playback output suitable for directly driving a PAL/NTSC or RS170 display device.



PC/104-Plus Bus Interface

- Compliant with PCI Rev 2.1
- 132MBytes/sec bandwidth at 33.33 MHz bus speed
- Live multi-stream MPEG-2/4 capture to memory or disk
- Concurrent MPEG-2/4 Capture and live preview

Analog Video Input

- Up to 4 concurrent composite PAL or NTSC video input channels
- Two input video multiplexer per Channel (up to 8 cameras)
- Four 10-bit Analog-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 value
- Saturation (or chroma gain) adjustable from 0 - 200% of original value
- 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 Synchronization
- Supports ADPCM PCM at 32KBits/sec per channel
- MPEG1 Audio Layer2 (MP2) encoding

Video Encoding

- MPEG-4 Video Encoding (ISO/IEC 14496-2, MPEG-4 ASP at Level 5)
- MPEG-2 Video Encoding (ISO/IEC 13812-2, Main profile, Main Level)
- M-JPEG Video Encoding
- 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)

Video Decoding / Playback

- Real-time MPEG-4 Video Decoding
- ISO/IEC 14496-2, MPEG-4 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
- Optional uncompressed RGB/YUV for downstream applications



Motion Detection

1350 (NTSC) or 1620 (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 at less than 1.75A
 Operating temp 0 °C to 60 °C or -40 °C to +85 °C (extended temp option)
 Standard 3.6 x 3.8in PC/104-Plus form factor

Software Drivers

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

Related Products

MP4WA-VTelemetry Low Latency Video Telemetry SDK
 MP4WA-VSteam RTSP Video Streaming SDK

Ordering Information

MPEG4000WA MPEG-4 Video Codec (0 to 60 °C)
 MPEG4000WA-Ext MPEG-4 Video Codec (-40 °C to +85 °C)

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