

# MPEG4000XLP

4-Channel MPEG4 Codec for PC/104plus



The MPEG4000XLP is a 4-channel MPEG4 Codec on a single PC/104plus form factor. It provides a low power and high performance solution for capturing and compressing up to 4 concurrent analogue video inputs to MPEG4 standard.



The MPEG4000XLP utilizes 32-bit PCI architecture to perform high quality real-time video and audio capture and compression from up to 4 concurrent PAL or NTSC video sources to disk whilst at the same time allowing incoming video to be previewed on the host screen.

In addition to providing MPEG4 compression the MPEG4000XLP can decompress and replay stored recordings, and text and graphic annotation can be alpha-blended with the incoming video.

Records up to  
four concurrent  
PAL/NTSC  
channels



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The high performance and reduced bus utilisation of the MPEG4000XLP allows up to four cards to be combined in a PC/104plus system to channel up to 16 concurrent video streams to disk or across a network.

The MPEG4000XLP is supported by a suite of drivers for Windows-NT/2000/XP, Linux and QNX.



## Applications

Medical Archiving

Vehicle-based Video Codec

Remote Video Surveillance

Video Acquisition and Analysis

Traffic Monitoring and Control

Solid-State Digital Video Recorder

Multi-Camera Security Application

Intranet/Internet Video Streaming

Low power

MPEG4

playback

to

PAL/NTSC

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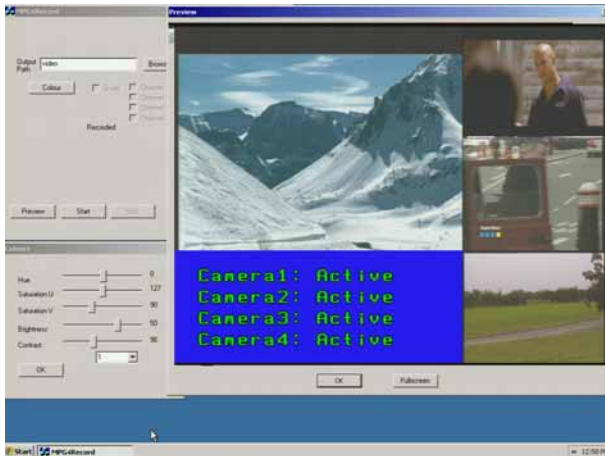
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## Simultaneous Preview & Playback

Text and graphics

overlay on

preview and

recording

## Features

MPEG4 Decode/Playback

4 Asynchronous Live NTSC/PAL Inputs

Up to 4 MPEG4000XLP cards per system

Video Preview to System VGA, PAL/NTSC

Low Power rugged PC/104plus Form Factor

1 x D1 size MPEG4 Encode at full frame rate

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

4 x CIF size MPEG4 Encode at full frame rate

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

Text and Graphics Overlay, eg time and date stamp

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## Operation Summary

### Video Recording Modes

MPEG4000XLP supports two main modes of video recording: Split Video Stream and Combined Video Stream.

### Split Video Stream

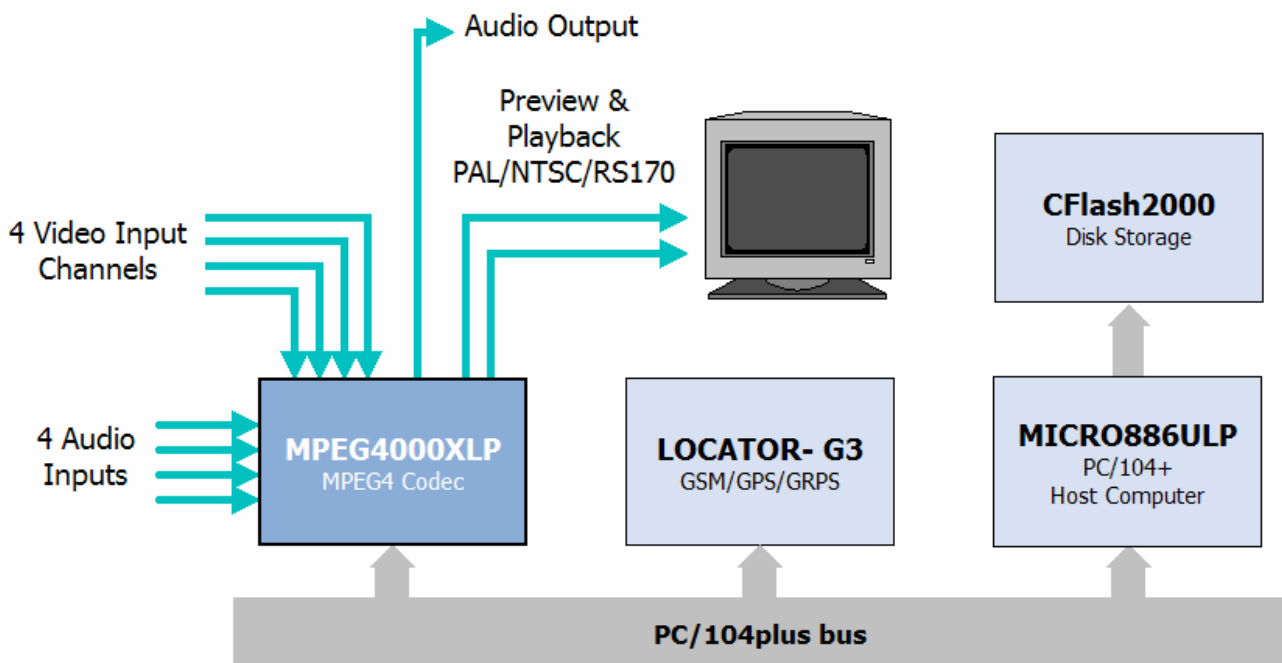
In the Split Video Stream (SVS) mode the multiple channels being previewed are captured and recorded as separate files or streams. The MPEG4000XLP will output four files - one per channel. These streams are independent and can subsequently be played back as totally independent MPEG4 streams by appropriate hardware/software decoders or through the playback

feature of the MPEG4000XLP.

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.



**Mobile MPEG4 Record and Playback System**

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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 (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

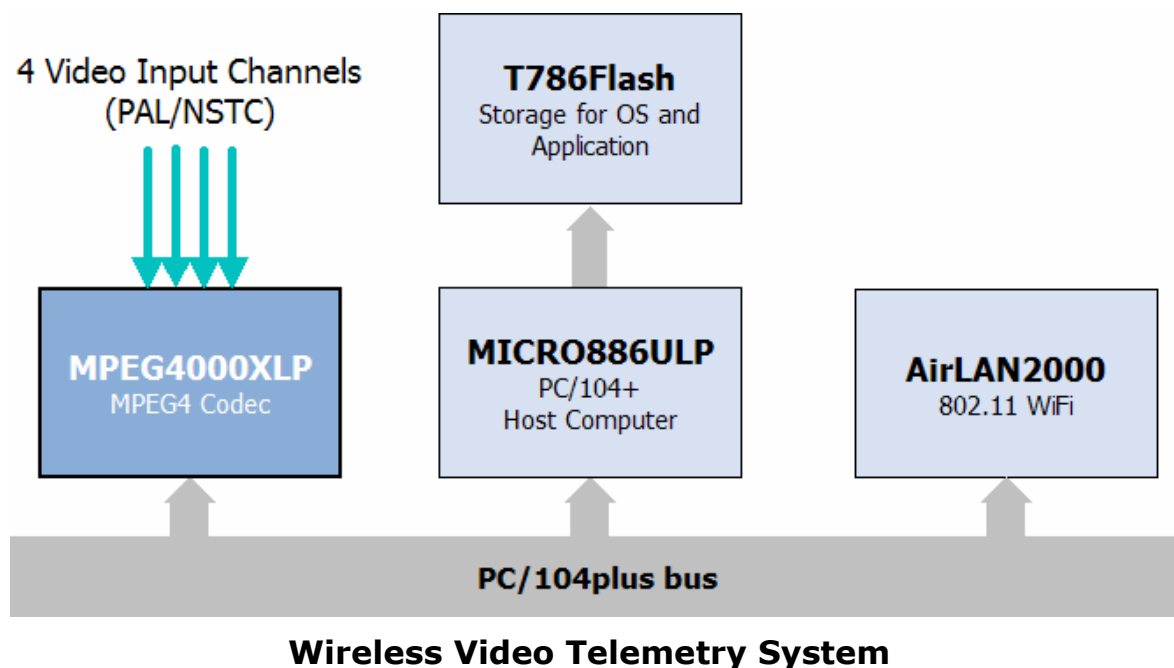
MPEG4 file as if they were coming from a single video source. There is no separation and the resulting MPEG4 file can subsequently be played back as single MPEG4 stream by the MPEG4000XLP or appropriate hardware/software decoders.

### Video Setting

The MPEG4000XLP supports PAL and NTSC video input. The required standard is software selectable.

In applications where recording space is restricted the MPEG4000XLP provides additional flexibility by supporting a range of capture frame

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

### I/P Frame Encoding

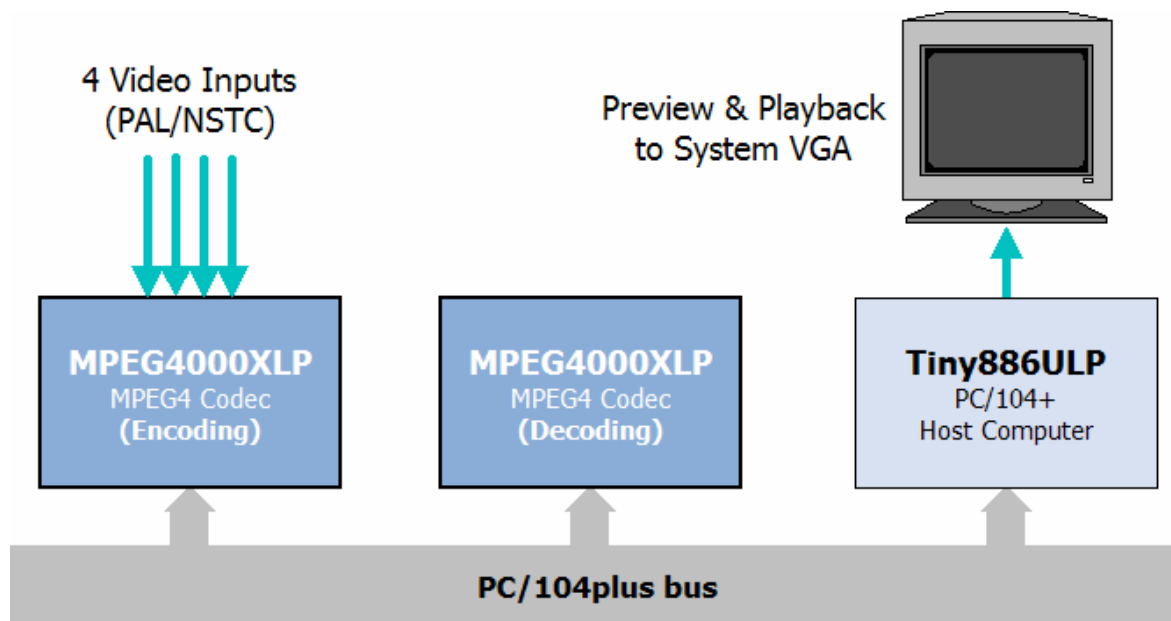
The MPEG4000XLP supports encoding of both I and P frames. Encoding of only I frames is also supported. The supported I intervals are 2, 4, 8, 16 up to 256 with the default being 64.

### Encoding Bit Rate Control

The MPEG4000XLP 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.



**Full Duplex Video Recording System**

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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 MPEG4000XLP on a frame-by-frame basis to maintain the pre-set average bit rate.

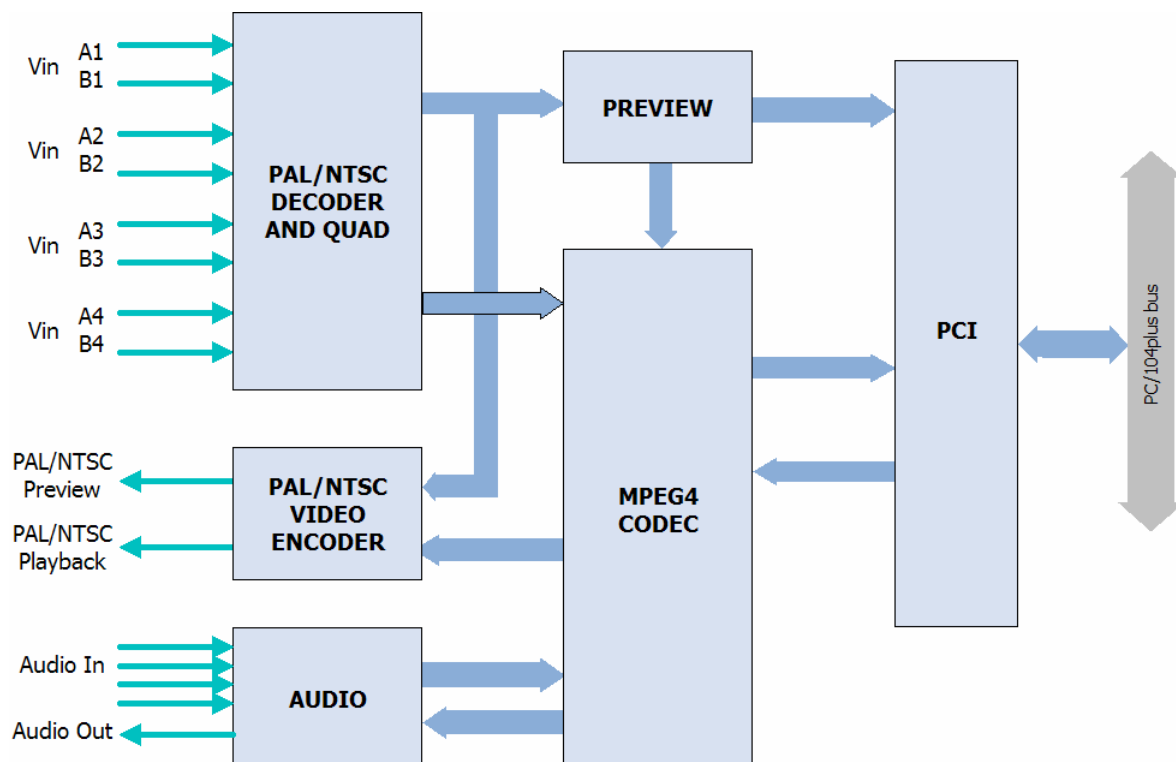
CBR is of particular benefit where video needs to be streamed over a fixed-bandwidth link.

## Hybrid Bit Rate (HBR)

HBR is a combination of VBR and CBR in which the MPEG4000XLP dynamically adjusts the bit rate between preset maximum and minimum values.

## Motion Detection and Event Triggers

The MPEG4000XLP supports automatic motion detection on a per channel basis. Motion detection parameters



**MPEG4000XLP Block Diagram**

such as frame difference threshold and number of frames can be set independently per video channel.

Using the motion-detection feature, the MPEG4000XLP 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 MPEG4000XLP allows recording of pre-trigger, on-trigger and post-trigger events.

### **Video Preview**

The MPEG4000XLP provides a secondary video path allowing the video being recorded to be streamed to host systems 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 MPEG4000XLP 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 MPEG4000XLP 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 MPEG4000XLP 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 MPEG4000XLP also provides a composite PAL/NTSC playback output suitable for directly driving a PAL/NTSC or RS170 display device.

### PC/104plus Bus Interface

- Compliant with PCI Rev 2.1
- 132MBytes/sec bandwidth at 33.33 MHz bus speed
- Live multi-stream MPEG4 capture to memory or disk
- Concurrent MPEG4 Capture and live preview

### Analogue 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 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 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 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

**Motion Detection**

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

**Text/Graphics overlay**

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

**System Requirements**

x86 PC-Compatible PC/104+ Computer  
 PCI or AGP Display (if Video Preview to host is required)  
 Spare REQ/GNT on PC/104+ Bus  
 3.3V or 5V signalling PC/104+ bus

**Miscellaneous**

Single +5V at less than 1.25A  
 Operating temp 0°C to 60°C or -40°C to +85°C (extended temp option)  
 Standard 3.6 x 3.8in PC/104plus form factor

**Software Drivers**

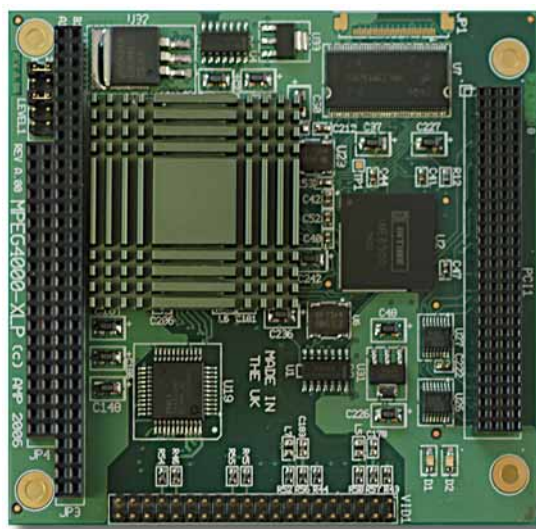
Drivers for Windows-NT/2000/XP, Linux, QNX  
 Sample video recording application in C/C++ source code

**Related Products**

MP4XLP-VTelemetry	Low Latency Video Telemetry SDK
MP4XLP-VSteam	RTSP Video Streaming SDK

**Ordering Information**

MPEG4000XLP	MPEG4 Video Codec (0 to 60°C)
MPEG4000XLP-Ext	MPEG4 Video Codec (-40°C to +85°C)

**MPEG4000XLP**