**Product Bulletin**

**MPEG4000XLP  4-Channel MPEG4 Encoder/Decoder for PC/104+**

**General Description**

The MPEG4000XLP is a 4-channel MPEG4 Codec on a single PC/104+ form factor. The MPEG4000XLP provides a low power and high performance solution for capturing and compressing up to 4 concurrent analogue video inputs to MPEG4 standard. The MPEG4000XLP not only provides MPEG4 compression but can also decompress and Playback recordings from storage to display. Utilising the 32-bit PCI architecture, the MPEG4000XLP allows high quality real-time video and audio capture and compression from 1, 2 or 4 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. The high performance MPEG4 video data compression and reduced bus utilisation allows up to four MPEG4000XLP cards to be fitted in a PC/104+ system to provide 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, QNX.

**Features**

- 4 Asynchronous Live NTSC/PAL Inputs
- 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
- MPEG4 Decode/Playback
- Text Overlay - Time and Date stamp
- Video Preview to system VGA, PAL/NTSC
- Up to 4 MPEG4000XLP cards per system
- Drivers for Win-NT/2000/XP-E, Linux, QNX
- Low Power rugged PC/104+ form factor

**Applications**

- Solid-State Digital Video Recorder
- Vehicle-based Video Codec
- Intranet/Internet Video Streaming
- Remote Video Surveillance
- Multi-camera Security Application
- Medical archiving
- Traffic Monitoring and Control
- Video Acquisition and Analysis

*Rev A.02 subject to change without notification*
Technical Specification

MPEG4000XLP 4-Channel MPEG4 Encoder/Decoder

PC104+ 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)
4 10-bit flash CMOS Analogue-to-Digital converters
Anti-aliasing filters on inputs

Video Input Formats
Standard CCIR601-NTSC, CCIR-PAL
NTSC-M, NTSC-Japan

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 –180deg to +180deg
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 at 32KBits/sec per channel
MPEG1 Audio Layer2 (MP2) Encoding

Video Encoding
Real-time MPEG4 Video Encoding
ISO/IEC 14496-2, MPEG4 ASP at Level5
1 channel NTSC full D1 (720x480) at 30fps
4 channels NTSC CIF (352x240) at 120fps
1 channel PAL full D1 (720x576) at 25fps
4 channels PAL CIF (352x288) at 100fps
4 channels PAL/TSC full D1 at reduced frame rates
Supports I, P and B Frame Compression
Supports Variable Bit Rate (VBR)
Supports Constant Bit Rate (CBR)
Hybrid Bit Rate (HBR)

Video Decoding/Playback
Real-time MPEG4 Video Decoding
ISO/IEC 14496-2, MPEG4 ASP at Level5
Playback to Composite PAL/NTSC Output

Video Preview
Real-time Preview to host display
Preview to Composite PAL/NTSC Output

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 of 0 to 60degC (Extended Temp option)
Standard 3.6 x 3.8in PC/104+ form factor

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

Related Products
MP4XLP-VTelemery Low Latency Video Telemetry SDK for MPEG4000XLP
MP4XLP-VStream RTSP Video Streaming SDK for MPEG4000XLP

Ordering Information
MPEG4000XLP MPEG4 Video Codec (0 to +60degC)
MPEG4000XLP-Ext MPEG4 Video Codec (-40 to +85degC)

ADVANCED MICRO PERIPHERALS Ltd Sedgeway Business Park, Cambridge CB6 2HY, England
Tel: +44 1353 659 500 Fax: +44 1353 659 600 Website: www.ampltd.com
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. Thus the MPEG4000XLP would 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—
1. 4 x CIF size MPEG4 each at full frame rate;
2. 4 x D1 size MPEG4 each at lower frame rate.

When set for 4xCIF, the 4 inputs can be concurrently recorded each at full frame. 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 4xD1 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 or 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 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 Quanti-sation 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 MPEG4000XLP on a frame-by-frame basis to maintain the pre-set average bit rate.

CBR is 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 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 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 MPEG4000XLP allows recording of pre-trigger, on-trigger and post-trigger events.
Operation Summary

MPEG4000XLP 4-Channel MPEG4 Encoder/Decoder

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 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 overlayed on incoming video prior to recording. This 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 overlayed 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.

Block Diagram
Example Applications

MPEG4000XLP  4-Channel MPEG4 Encoder/Decoder

Mobile MPEG4 Record and Playback System

Audio Output

4 Video Input Channels

Preview & Playback
PAL/NTSC/RS170

CFlash2000
Disk Storage

MICRO886ULP
PC/104+
Host Computer

PC/104+ BUS

Wireless Video Telemetry System

4 Video Input Channels
(PAL,NTSC)

T786Flash
Storage for OS and Application

MICRO886ULP
PC/104+
Host Computer

AirLAN2000
802.11 WiFi

PC/104+ BUS

Full Duplex MPEG4 Video Streaming System

4 Video Input Channels
(PAL,NTSC)

Preview & Playback
to SystemVGA

MPEG4000XLP
MPEG4 Codec
(Encoding)

MPEG4000XLP
MPEG4 Codec
(Decoding)

Tiny886ULP
PC/104+
Host Computer

PC/104+ BUS