

JPEG 2000

PRISTINE BOARDS

**In short,
the PRISTINE board is ideal
to meet and discover
JPEG 2000 applications.**

The **PRISTINE** board achieves **top level picture quality** suitable for audiovisual and imaging applications.

PRISTINE accelerates JPEG 2000 encoding and decoding. The embedded intoPIX technology enables both Mathematically and Visually Lossless compression providing ultimate picture quality.

PRISTINE offers **unprecedented connectivity** to file based data and video signals. It displays 8 lanes PCI-Express and an optional 3G-SD panel including four 3G-SDI inputs and four 3G-SDI outputs.

PRISTINE supports a wide range of image resolutions from **CIF, SD, HD and up to 4K.**

Combining several PRISTINES enables higher performances like **4K in 3D.**

PRISTINE is available in several versions. Each can easily be reconfigured either as encoder or decoder.

SDK & Libraries

- Flexible SDK
- IP Streaming Library [RTP]

PRISTINE 2

- HD 60i
- 2K-DCI 24p
- HD & 2K-DCI in 3D
- HD 60i x 2 channels
- HD 60p

PRISTINE 4

- HD 60i x 4 channels
- HD 60p x 2 channels
- 2K-DCI 24p x 4 channels
- 4K-DCI & QuadHD real-time
- 4K-3D using two PRISTINES

IDEAL FOR

- JPEG 2000 technology assessment
- Digital Cinema Production
- Lossless Archiving and Storage
- Digital Libraries
- Aerospace and Geospace imaging
- Document & Medical imaging
- Ultra HD experimentation



Technical Specifications

<p>I/O interfaces</p>	<p>PCI-Express 8-Lanes:</p> <ul style="list-style-type: none"> • 8-Lanes (GEN 1) • Full Duplex <hr/> <p>SDI Panel (Option):</p> <ul style="list-style-type: none"> • 4 inputs and 4 outputs • 3G-SDI (SMPTE 424M), HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M-C) • Size: Half-height, half-width of a 19" Rack Unit. <hr/> <p>Supported Video Formats</p> <table border="1"> <thead> <tr> <th>Resolution</th> <th>Color Sampling</th> <th>Frame Rates</th> </tr> </thead> <tbody> <tr> <td>SD: PAL/NTSC 720p: 1280 x 720 HD: 1920 x 1080</td> <td>YCbCr 4:2:2 10bits</td> <td>24p, 24p/1.001, 25p, 30p, 30p/1.001 50i, 60i, 60i/1.001 60p, 60p/1.001</td> </tr> <tr> <td>2K: 2048 x 1080 (DCI compliant)</td> <td>XYZ/RGB/YCbCr 4:4:4 12 bits</td> <td>24p, 48p</td> </tr> <tr> <td>4K: 4096 x 2160 (DCI compliant)</td> <td>XYZ/RGB/YCbCr 4:4:4 12 bits</td> <td>24p</td> </tr> <tr> <td>QuadHD: 3840 x 2160</td> <td>YCbCr 4:2:2 10bits</td> <td>24p, 24p/1.001, 25p, 30p, 30p/1.001 50i, 60i, 60i/1.001</td> </tr> </tbody> </table>	Resolution	Color Sampling	Frame Rates	SD: PAL/NTSC 720p: 1280 x 720 HD: 1920 x 1080	YCbCr 4:2:2 10bits	24p, 24p/1.001, 25p, 30p, 30p/1.001 50i, 60i, 60i/1.001 60p, 60p/1.001	2K: 2048 x 1080 (DCI compliant)	XYZ/RGB/YCbCr 4:4:4 12 bits	24p, 48p	4K: 4096 x 2160 (DCI compliant)	XYZ/RGB/YCbCr 4:4:4 12 bits	24p	QuadHD: 3840 x 2160	YCbCr 4:2:2 10bits	24p, 24p/1.001, 25p, 30p, 30p/1.001 50i, 60i, 60i/1.001
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<p>JPEG 2000 Encoding/Decoding</p>	<p>Image features</p> <ul style="list-style-type: none"> • Bit depth: 8, 10, 12 • Color Sampling: 4:2:2, 4:4:4 • Interlaced, progressive • RGB XYZ and YCbCr • Resolutions: SD, HD, QuadHD, 2K, 2K+, 4K, 4K+, ... (PRISTINE version dependent) • Frame Rate (PRISTINE version dependent) <hr/> <p>JPEG 2000 (ISO 15444-1)</p> <ul style="list-style-type: none"> • Wavelet transforms: 5/3 and 9/7 • Decomposition levels: up to 6 levels • Quality layer: 1 layer • DCI compliant for 2K and 4K resolutions • Tiling: Single tile (multiple tiles capable only for encoding large images from file) • Progression Order: CPRL • Code Block size: 32 x 32 <hr/> <p>Quality and Bit Rate Control</p> <ul style="list-style-type: none"> • Variable bit rate (VBR) : variable overall bit rate for a selectable constant quality • Capped VBR: 9/7 wavelet filter – Constant quality but variable bit rate is capped at a given maximum limit. • Visually Lossless VBR: 9/7 wavelet filter - Constant Visual Quality - No artifact visually noticeable – 8:1 compression • Nearly Mathematically Lossless NMLS : 5/3 wavelet reversible transform with a maximum bit rate applied - 3:1 to 5:1 compression • True Mathematically Lossless (MLS) : 5/3 wavelet reversible transform - no max bit rate – bit to bit lossless compression – 2:1 compression 															
<p>Audio</p>	<ul style="list-style-type: none"> • SDI embedded audio: SMPTE 299M • Uncompressed, synchronized • Up to 16 channels (AES3, 48 or 96 KHz, 24 bits) 															
<p>User interfaces</p>	<ul style="list-style-type: none"> • Extensive command line for batch operations • Graphical user interface for assessment 															
<p>Time Code</p>	<ul style="list-style-type: none"> • Extraction of the Time Code from the VANC 															
<p>OS</p>	<ul style="list-style-type: none"> • Windows 7, Vista, XP and Linux • MAC OS X (preliminary) • 32 and 64 bits 															
<p>Dimensions</p>	<p>Half length/Full height PCI-E form factor</p>															

Software Development Kit

The board is delivered with an intuitive command line interface for batch operations as well as a simple graphical user interface.

To help exploit the full versatility of the PRISTINE board in your own applications, an intuitive SDK is available offering the following functionalities:

- **Board control:** API (C/C++), multiple board management, work flow management.
- **I/O Data path set up:** Audio&metadata, JPEG 2000 codestream.
- **Processing set up:**
 - Board configuration as Encoding or Decoding.
 - Quality bitrate control.
 - Rescaling using the wavelet filters(PRISTINE 4 only).
 - Up-conversion from HD to QuadHD or from or 2K to 4K.
 - Down-conversion from QuadHD to HD or from 4K to 2K.

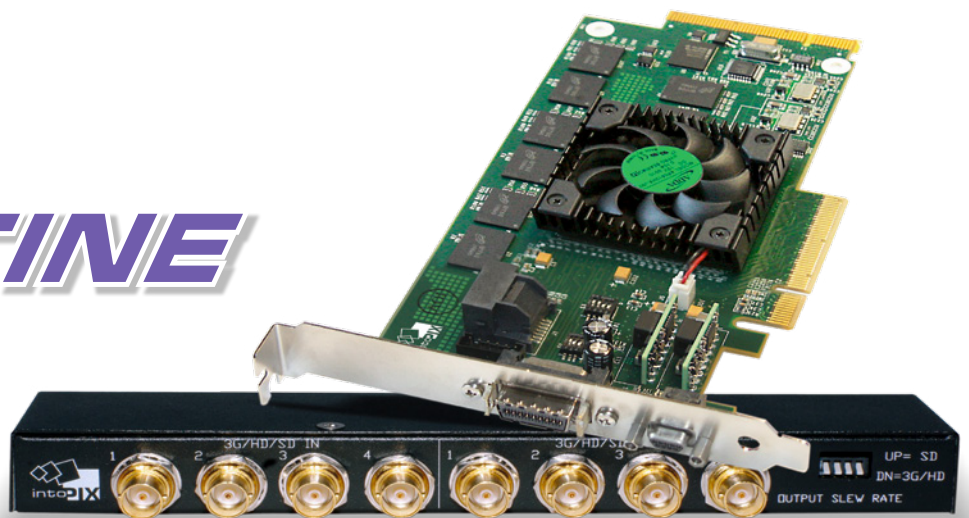
IP Streaming Software Library (RTP)

intoPIX proposes an efficient software library and some reference codes for real time streaming of JPEG 2000 codestream and audio data over internet. It supports high image quality and resolution up to HD, HD-3D and 4K.

3G-SDI panel

The size of the panel is half-width and half-height of a 19 inches Rack Unit. 4 different panels can thus be placed in a single RU. Panels are connected to the PRISTINE through 1m long Infiniband™ cable. All 4 inputs and 4 outputs are 3G-SDI and support also HD-SDI and SD-SDI. The Pristine provides power to the panel.

PRISTINE



Ordering information

PRISTINE video boards

- PRISTINE 2** JPEG 2000 Encoding/Decoding board for up to HD and 2K pictures
- PRISTINE 4** JPEG 2000 Encoding/Decoding board for up to QuadHD and 4K pictures
- PRISTINE 3G-SDI panel** 3G-SDI video interface for PRISTINE 2 and PRISTINE 4 boards

PRISTINE software

- PRISTINE SDK** Software development kit (SDK), application programming interface (API), reference code and usage examples for PRISTINE boards
- IP Streaming Library** Software library and reference code for the Encoding/Decoding 4K streaming system over IP Network

PRISTINE Hosting System

- JPEG 2000 system** PC platform ready to receive a PRISTINE 2 or PRISTINE 4 board



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