TicoXS

IP-cores & SDK

The lightweight low latency image coding standard

Standardized as JPEG XS (ISO/IEC 21122), the new revolutionary coding standard can be applied in every application for which a perfect image quality, a microsecond latency, with low power and efficient video bandwidth are crucial.

TicoXS is the intoPIX JPEG XS solution for AV over IP, live broadcast production, TVs and mobile devices, AR/VR systems, gaming, automotive (ADAS), wireless systems, cloud & software video applications or digital cinema workflows.

Designed as a solution for (replacing) uncompressed image and video in many devices and applications, it outperforms all popular video codecs offering the world's best lightweight low-latency coding capabilities:

- **PERFECT IMAGE QUALITY FOR BOTH HUMAN & MACHINE VISION**
  - Extensive bit depth support up to 16bit.
  - No degradation over multiple generations of encoding.
  - Fully transparent to uncompressed quality down to 3bpp (= 10:1 for 444 10bit).
  - Visually lossless down to 1.5bpp on media & natural video content (= 20:1 for 444 10bit).
- **BETTER PIXELS WITH COST SAVINGS, BETTER CONNECTIVITY**
  - For storage and connectivity within a device or within a complete workflow or ecosystem.
  - It enables users to perfectly handle much more pixels (HD, 4K, 8K,...), higher bit depth, higher frame rates, at the cost of baseband HD or even lower.
- **LOW COMPLEXITY in ASIC, FPGA, CPU, GPU**
  - Cross-platform capable, JPEG XS offers various levels of parallelism to scale easily. It is the only international coding standard designed with such revolutionary approach.
  - Extremely small in ASIC & FPGA (low logic & low memory).
  - Highly parallelizable for CPU & GPU.
- **MICROSECOND LATENCY & LOW POWER**
  - Compared to other popular and high complexity codecs, JPEG XS offers microsecond-latency thanks to an innovative line-by-line processing. JPEG XS is also extremely low power. The technology does not need any external memory, it just requires few internal SRAMs to operate.
- **OPTIONAL FLAWLESS IMAGING PROFILE**
  - Quality beyond the operating range of JPEG XS, 20:1 for KVMs, desktop and AVoIP. Discover our new TicoXS FIP.

Where can TicoXS be implemented?

Wherever you need it as hardware IP-core or software!

TV & mobile devices | **VR/AR HMD** | **Wireless 60GHz/5G/Wifi-6** | **Wired AV over IP** | **ADAS Iot** | **Cloud processing & storage** | **Chip-to-chip Chip-to-memory**

- Support more pixels (high resolution, bit depth, frame rates, more streams) using existing systems & infrastructures.
- Reduce your internal video bandwidth (and power!) or cost-effectively increase your video buffer and storage capacity.
- Reduce your bandwidth for real-time wired or wireless transmission without affecting the latency and quality.
- Build an efficient hardware & software based ecosystem without using expensive and power consuming processing, bandwidth, latency and storage capacity.

intoPIX

Specifications and implementations

		TicoXS ENCODER & DECODER IP-cores & SDKs
IMAGE/VIDEO	Color format	RGB, YCbCr, Monochrome
	Color subsampling	4:4:4, 4:2:2, 4:2:0, 4:0:0 (Monochrome)
	Bit depth	8 / 10 / 12 / 14 / 16 bits per component
	Resolution	Any up to 8192 x 4320 pixels (Even more on request)
	Frame rates	Any (depending on IP-core or FastTicoXS Developer SDK configuration)
CODING	Compliancy	JPEG XS standard (ISO/IEC 21122-1 – High/Main / MLS12 profiles) for TicoXS + additional options (such as the Flawless Imaging Profile
	Quality Rate control Latency	Full transparency to uncompressed, down to 3bpp (according to ISO flicker test), Visually lossless down to 1bpp, depending on type of content Line-based latency CBR (constant bit rate) operation - Adjustable down to 36:1 (1bpp)
	Proxy mode	Embedded downscaler in decoder available (decode 1/4, 1/16 proxies)

		TicoXS IP-cores	FastTicoXS SDK
IMPLEMENTATION	Platform	FPGA: Xilinx, Intel & Lattice ASIC like TSMC 12, 16, 28, 40 nm	GPU: Cuda (Nvidia) & OpenCL (Intel, AMD) CPU: x86-64 (Intel, AMD), ARM 64 OS: Windows, Linux, macOS
	Low complexity & fast processing	Small footprint / Low memory (No external DDR) Various configurations	Highly parallelized GPU SDK processing Intel compatible CPU SDK (SSE 4.1 or newer)
	Real-time operation	Latency selectable from 2 lines to 15 lines	Latency selectable from 30 lines to 1 frame/field
	Add-on	IPX-SDI-MAP-TX/-RX : XS over SDI IPX-RTP-TX/RX : XS over RTP/2110-22 IPX-MPEG2-TS : XS over TS	FFmpeg patch Nvidia Rivermax integration intoPIX Titanium SDK

IP-core typical configurations

	VIDEO FORMATS							
REFERENCE IP-CORES	Max resolution	Max FPS	Color sampling	Bit depth	XILINX	intel	LATTICE	ASIC
IPX-TICO-XS-HD-60-444-12 Enc or Dec	1920 x 1080	60	4:2:2 4:4:4	8, 10, 12	✓	✓	✓	✓
IPX-TICO-XS-UHD4K-60-444-12 Enc or Dec	4096 x 2160	60	4:2:2 4:4:4	8, 10, 12	✓	✓	✓	✓
IPX-TICO-XS-UHD8K-60-444-12 Enc or Dec	7680 x 4320	60	4:2:2 4:4:4	8, 10, 12	✓	✓		✓

CONTACT INTOPIX FOR YOUR CUSTOM IP-CORE & SDK CONFIGURATION

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