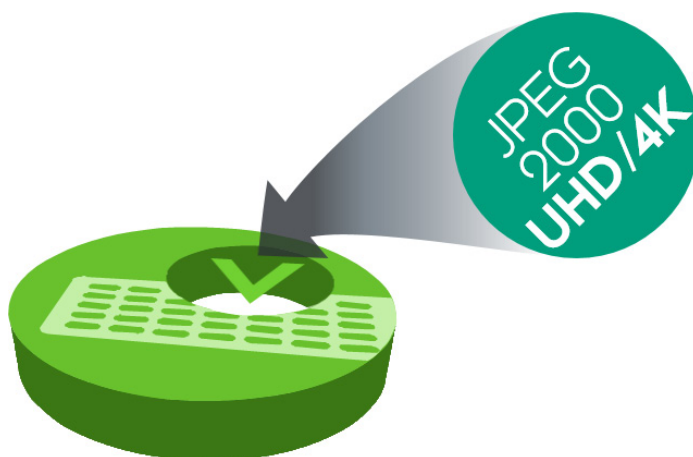




datasheet

Virtuoso  
Media Function

nevion



## Nevision Virtuoso

# JPEG 2000 UHD/4K Encoding and Decoding

**The Virtuoso JPEG 2000 UHD/4K Media Function provides visually lossless compressed transport of UHD signals with ultra-low latency over 1G/10G IP Ethernet.**

**Nevision Virtuoso can run multiple instances of the JPEG 2000 UHD/4K Media Function on a single platform with built-in network aggregation to 10G Ethernet**

The JPEG 2000 UHD/4K Media Function requires the HBR Accelerator, which supports 3G-SDI input, and either encoding or decoding of one UHD channel.

The Nevision Virtuoso's visually lossless JPEG 2000 UHD/4K Media Function, combined with Nevision's advanced protection mechanisms, enables broadcasters to utilize cost-efficient IP links for the real-time and high quality transport of professional media with low latency and bandwidth utilization.

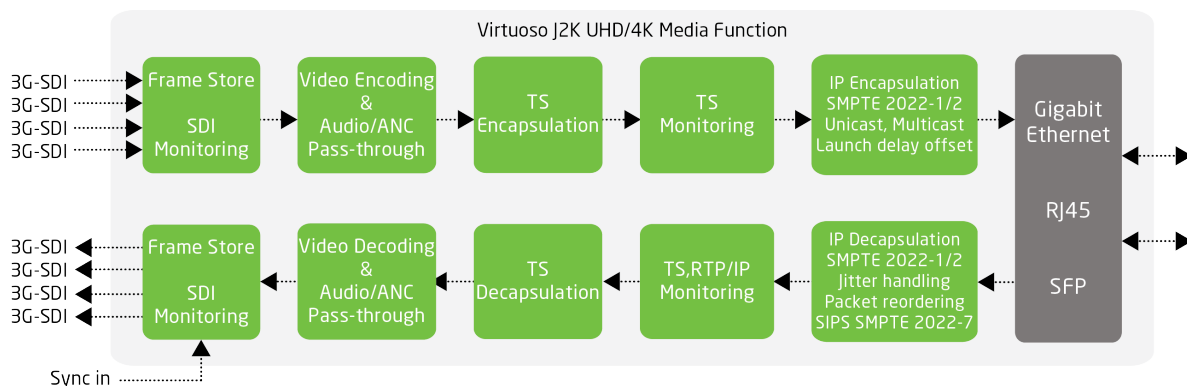
It also enables service providers to build cost-effective managed video services on IP-MPLS or Metro Ethernet circuits.

### Applications

- Professional broadcast contribution
- Live sports and event contribution
- Studio-to-studio media exchange
- Managed video services over IP

### Key features

- Visually lossless JPEG 2000 compression
- Multi-channel JPEG 2000 encoding or decoding
- Support for 3G-SDI signals as quadrant input
- Ultra low latency
- Integrated frame store and reference sync on decoder
- Supports FEC, SIPS / SMPTE 2022-7 and Launch Delay Offset (LDO) IP protection mechanism
- Highly efficient error correction and concealment
- User-friendly web GUI for monitoring and control
- Software license approach ensures easy and future-proof upgrade path
- Built-in TS monitoring (ETSI TR 101 290 Priority 1) of encoder output and decoder input, with option for Pri 2 and Pri 3 monitoring including PCR validation
- ETSI TR 101 290 Priority 1 alarms (option for Pri 2)
- Thumbnails for input/output confidence monitoring



## JPEG 2000 UHD/4K on Gigabit Ethernet

Each frame/field is encoded with 4:2:2 10-bit JPEG 2000 image compression, typically providing visually lossless video quality (VQ) at a compression ratio of 10:1, so using only 10% of the bandwidth required for uncompressed video. This means that 12 Gbps UHD/4K can be transported over Gigabit Ethernet. Further, JPEG 2000 has excellent properties in terms of being robust against multi-generation encoding/decoding, which provides improved quality headroom in production.

## Encoding or decoding

The JPEG 2000 UHD/4K Media Function runs on the High Bitrate Accelerator. The Media Function has 2 operational modes: single channel encoder or single channel decoder.

## Ultra Low Latency

The JPEG 2000 UHD/4K Media Function uses Ultra Low Latency (ULL) encoding which enables end-to-end system latency of less than 1 frame (20 ms for 50 Hz video, ~17 ms for 59.94 Hz video).

## Transparent audio & ancillary data

The JPEG 2000 UHD/4K Media Function supports transmission of up to 16 channels of embedded audio for HD and 3G-SDI. Handling of embedded audio, whether it's linear PCM or pre-compressed audio, is fully transparent. Similarly, handling of ancillary data such as closed captioning, active format description, time code and other metadata is fully transparent line-by-line.

## Robust operation with frame sync

The decoder includes a number of features to ensure robust operation and graceful degradation in the presence of IP transport impairments; buffering for IP jitter compensation, packet reordering, error

correction and highly efficient error concealment, and a built-in frame synchronizer with analog and digital sync inputs.

## Protection and reliability

JPEG 2000 encoding and decoding can be combined with Forward Error Correction (FEC), Seamless IP Protection Switching (SIPS) compliant to SMPTE 2022-7, as well as Launch Delay Offset (LDO).

## Seamless IP protection switching (SIPS)

Transmitting the same RTP/IP stream across dual, fully diverse network links, enables receivers/decoders to utilize Seamless IP Protection Switching (SIPS), which gives perfectly error-free transport even in the case of severe packet loss or link outages as long as a packet arrives on either of the two network links. SIPS is compliant to SMPTE 2022-7.

## Launch Delay Offset (LDO)

With the LDO license option, an RTP stream copy can be transmitted after a configurable delay on the sender, thereby enabling SIPS-based seamless switching and error free transport on single-ended network links that may suffer from short outages (e.g. 50 ms outages).

## Test image transmission

An encoder can be configured to transmit an internally generated test image at a configurable, constant bitrate, with configurable text overlays and moving patterns, to allow efficient testing of contribution links prior to a live event.

## Video Input formats

HD-SDI	SMPTE ST 292, SMPTE ST 274 1920 x 1080p: 23.98 / 24 / 25 / 29.97 / 30 Hz 4x signals per source (square division)
3G-SDI	SMPTE ST 424 (Level A), SMPTE ST 274 1920 x 1080p: 50 / 59.94 / 60 Hz 4x signals per source (square division)
UHD-SDI	SMPTE ST 425-5, SMPTE ST 2036-1 3840 x 2160p: 50 / 59.94 Hz / 60 Hz

## Video compression

Video compression	JPEG 2000 Part 1 (ISO/IEC 15444-1:2000)
Video format	YCbCr, 4:2:2, 10 bit per component
Colour space	ITU-R Rec BT.709 or BT.2020
Number of channels	1 channel of encoding (or decoding) per Accelerator
Encoding, bitrate	Up to 950 Mbit/s per channel
Video encapsulation	JPEG 2000 in TS over RTP/UDP/IP

## Audio and ancillary data

Embedded audio	Up to 8 AES3 stereo channel pairs / 4 AES groups (user selectable from one of the SDI inputs), 20 or 24-bit, transparent for linear PCM and non-PCM audio
Ancillary data	Time code (SMPTE 12M), Closed captioning (SMPTE 334-1), Active format description (AFD, SMPTE 2016-3), HDR metadata
Audio/video sync	+/- 2 ms

## MPEG-2 Transport Stream

Transport Stream	ETSI EN 50083-9, Annex B, 188 bytes/pkt
TS over IP	SMPTE 2022-2 RTP/UDP/IP (CBR)
TS bitrate	Up to 1 Gbit/s
Program information	Encoder output: PAT, PMT, SDTa, NIT
AES3 audio	SMPTE 302 pass-through (48 kHz, 20 or 24-bit)
Ancillary data	SMPTE 2038 pass-through

## IP transport and protection

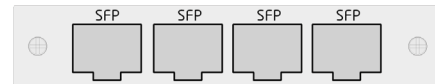
Protocols	RTP, UDP, IP, ICMP, ARP, IGMPv2/v3, Diffserv/TOS, 802.1Q (VLAN tag), 802.1P (VLAN priority), RIP-2
FEC	Compliant to SMPTE 2022-1/2
Extended FEC	Support for extended matrix size (L*D < 960, max sum 244, e.g. 240 x 4)
SMPTE ST 2022-7	Seamless IP protection Switching (SIPS) SMPTE ST 2022-7:2013
LDO	Launch delay offset for network redundancy using single path and SMPTE 2022-7 (SIPS)
Integrated frame store and refsyc for robust operation	
IP jitter compensation for robust operation in the presence of IP transport impairments	
Test image transmission on sync loss for link preservation	

## Monitoring

ETSI TR 101 290 Priority 1 alarms (option for Pri 2)
Thumbnails for confidence monitoring
Detailed alarm log with 100,000 entries

## High Bit Rate Accelerator

Number of ports	4
Connector type	SFP+ cages
Interface type	Network 10 Gigabit Ethernet (10GBase-R), Video SFPs (Non-MSA 270 Mb/s to 3 Gb/s)
Sync input format	PTP (IEEE 1588v2:2008) Analog black burst/tri-level available via sync distribution from Virtuoso server appliance
Power consumption	Maximum 45W



## Ordering Options



# Nevion Virtuoso

**Nevion Virtuoso is our latest generation of Media Node platform fulfilling the highest requirements of broadcasters and service providers. Virtuoso is designed to meet the challenges of an IP-based live production environment where the distinction between facilities and contribution is blurring, and where virtualization will play an increasing role, leading to faster time-to-production and greater cost-effectiveness.**

Nevion Virtuoso is a comprehensive, flexible and scalable platform for real-time adaptation, transport and processing of live media content (video, audio and data) that provides tools for broadcasters and service providers to implement and operate state of the art media production systems. IP adaption, compression, protection, monitoring and aggregation are functionalities provided by Nevion Virtuoso. As an example, the platform is ideal for processing high quality media streams in a reliable manner with very low latency over network infrastructures with very high or constrained bandwidth capacity.

## CONTACT INFORMATION

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