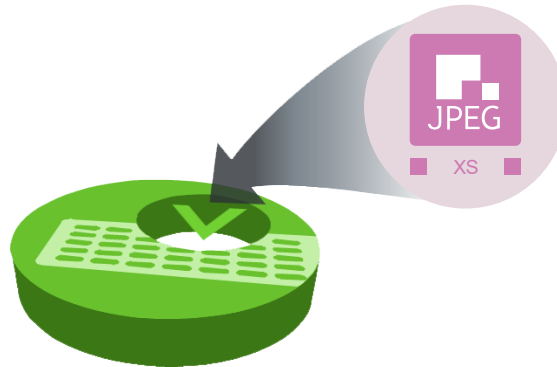




datasheet

Virtuoso
Media Function

nevision



Nevion Virtuoso

JPEG XS UHD/HD in TS over IP

Nevion Virtuoso's JPEG XS media functions offers multi-channel JPEG XS encoding or decoding for UHD and HD for wide-area broadcast contribution and other high quality media transport applications.

JPEG XS (ISO/IEC 21122) is a modern light-weight encoding standard for video that achieves pristine visually lossless output (both for one-time and multiple concatenated compression), at sub-millisecond latency, i.e. a fraction of a video frame.

The bandwidth required with JPEG XS is typically only 10-20% compared to uncompressed, which gives substantial network bandwidth savings. This makes JPEG XS extremely attractive for low latency real-time transport of HD and 4K/UHD video over campus, metro and wide-area networks.

The JPEG XS in TS encoder/decoder runs on the Virtuoso HBR accelerator cards, supporting electrical and optical SDI interfaces via video SFPs.

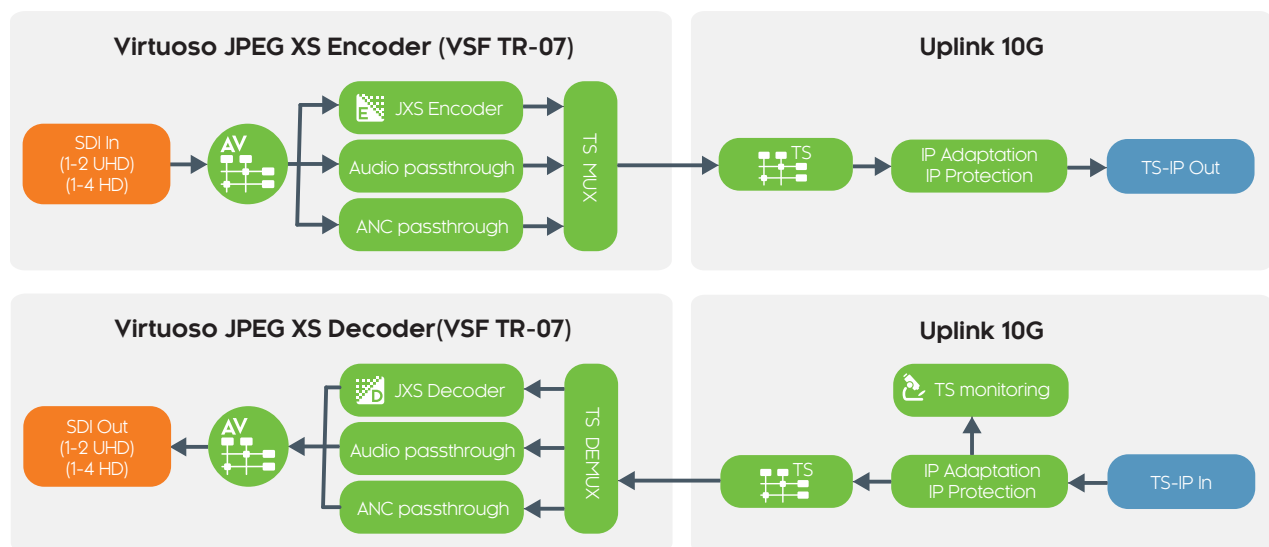
A single HBR card supports JPEG XS encoding or decoding of up to 4 HD or 2 UHD signals. The compressed JPEG XS in Transport Stream over IP signals are aggregated on an uplink module in Virtuoso for wide-area transport

Applications

- Broadcast contribution networks
- Service provider managed networks

Key features

- JPEG XS compression for video
 - Multi-channel UHD/HD encoding/decoding
 - Visually lossless compression
 - Ultra low sub-frame end-to-end latency
- Standards-based interfacing
 - JPEG XS in TS over IP (VSF TR-07)
 - HD/3G/12G-SDI (electrical or optical)
- Video/Audio processing
 - Transparent audio (16 channels, 24-bit)
 - Transparent ancillary data (up to 1 Mbits/s)
 - Audio shuffling, gain and delay option
 - Built-in frame synchronizer option
- Stream protection
 - SMPTE 2022-1/2 TS over IP with FEC
 - SMPTE 2022-7 Seamless/hitless protection
- Monitoring and control
 - Easy-to-use web user interface + REST API
 - Thumbnails of input and output video
 - Built-in TS and RTP/IP monitoring



High video quality and low latency

JPEG XS (ISO/IEC 21122) is a modern and light-weight encoding standard that achieves pristine visually lossless video quality with millisecond latency, i.e. a fraction of a video frame. In addition, JPEG XS is also highly robust to multiple concatenated compression cycles, which is common in live broadcast production and transport applications.

When to use JPEG XS in TS over IP

Nevion Virtuoso offers multi-channel JPEG XS UHD/HD encoding or decoding capabilities, with option of SDI or SMPTE 2110 uncompressed interfaces.

For WAN transport, there are two choices, essence-based SMPTE 2110-22/30/40 (VSF TR-08) or multiplexed Transport Stream over IP (VSF TR-07).

The sweet spot of JPEG XS in TS (VSF TR-07) is for media transport of multiplexed video and audio with built-in program timing and metadata information, simplifying hand-off between broadcasters and service providers, or different broadcaster locations. But no matter your preference, you will find that Virtuoso can adapt to all requirements.

High density and flexibility

The JPEG XS in TS media function supports encoding or decoding of up to 4 HD or 2 UHD channels. The Uplink 10G media function is used for TS over IP adaptation, IP protection and monitoring.

The max density of JPEG XS Transport Streams per Uplink in Virtuoso MI/RE, is 12 HD/3G or 6 UHD channels. This means the total encoding density in Virtuoso MI is maximum 24 HD/3G or 12 UHD.

A mix of encoding and decoding in the same Virtuoso is possible and is configured per HBR accelerator card. Similarly, HD and UHD can be combined and is configured per HBR card.

IP protection with FEC and ST2022-7

Standards-based Forward Error Correction is supported with SMPTE ST 2022-1 to detect and correct intermittent packet loss.

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

Audio processing

Audio processing includes de-embedding of SDI and IP audio inputs, flexible internal routing and output embedding, as well as per-channel audio gain and delay control (up to 10 sec per channel), as well as automatic re-alignment of Dolby E audio.

Built-in TS monitoring probe

Monitoring of signals at demarcation points between e.g., a broadcaster and a service provider, is key to quickly identify and resolve issues.

In Virtuoso, all ASI and IP Transport Stream inputs are monitored according to ETSI TR 101 290 Pri 1 alarm conditions. The advanced monitoring option adds Pri 2 alarms, PCR validation and jitter measurements, as well as PSI/SI table analysis.

Video formats

SDI media interface	HD-SDI SMPTE ST 292/ST 296/ST 274 3G-SDI SMPTE ST 424 (Level A)/ST 425-1 12G-SDI SMPTE ST 2082-10 (mode 1)/ ST 2036-1
Video formats	1280 x 720p: 50/59.94/60 Hz 1920 x 1080i: 25/29.97/30 Hz 1920 x 1080p: 23.98/24/25/29.97/30 Hz 1920 x 1080p 50/59.94/60 Hz 3840 x 2160p: 50/59.94/60 Hz

Video processing

Input/output video	YCbCr, 4:2:2, 10 bit per component
Colour formats	ITU-R BT.709 (HDTV) ITU-R BT.2020-2 (UHDTV) ITU-R BT.2100 HDR (HLG / PQ)
Legalization	Yes
Frame sync	Yes
Sync reference	Analog BB/TLS via Virtuoso appliance PTP via 10G on HBR card
Video delay	Yes, up to 10 frames additional delay
Test patterns	75% and 100% Bars, SMPTE RP 219, SMPTE EG 1 EIA RS-189-A, EBU TECH-3373 HDR/HLG Flat-field with configurable colour Custom test image (BMP/JPG/PNG) Configurable text overlay Moving box/bar

Video compression

Video compression	JPEG XS (ISO/IEC 21122) High Profile
Compression mode	Encoding or Decoding
Channel density	Up to 4 channels of HD Up to 2 channels of UHD
Bit rate	Maximum 4 bit per pixel (bpp) HD 1.5G: up to 295 Mbit/s HD 3G: up to 565 Mbit/s UHD 12G: up to 1550 Mbit/s

Audio and ancillary data

Embedded audio	16 channels (8 stereo pairs) Linear PCM 24-bit audio (48kHz) AES3 non-PCM audio pass-through ST302 transport in TS (2x AES3 per PID)
Ancillary data	Pass-through of ancillary data packets ST2038 transport in TS.

Audio / Video processing

De-embedding audio channels from SDI audio inputs
Embedding audio channels to SDI outputs
Audio routing/shuffling/processing on SDI embedder
Audio delay adjustment - up to 10 seconds per channel
Audio level/gain control - per mono channel
Automatic Dolby E realignment on SDI output
Video frame synchronization
Video delay adjustment - up to 10 frames per channel

Monitoring

Thumbnails of SDI video input and output
SDI video freeze and black frame detection (licensed)
Audio template monitoring: presence, peak and silence (licensed)

TS over IP input/output

TS over IP	SMPTE ST 2022-2 RTP/UDP/IP (CBR)
Number of streams	Up to 12 JXS/TS IP inputs/outputs per uplink
Throughput	Refer to release notes for details

TS over IP protection

Link protection	SMPTE ST 2022-7 Class C (High skew) Up to 450 ms path delay difference
Loss protection	SMPTE ST 2022-1 Forward Error Correction 1D Column only, 2D Column and Row Block and Non-block aligned matrix

Property	Values
L (Min, Max)	1, 254
D (Min, Max)	4, 32
LxD (Max)	1024
L+D (Max)	254

Input signal monitoring

RTP/IP monitoring	Bit rate per flow Packet/datagram rate per flow RTP stream continuity Packet delay variation (PDV/jitter) Packet inter-arrival time (IAT)
Basic TS monitoring	ETSI TR 101 290 Pri 1 alarms Listing of services and components Listing of PIDs with bit rates and counters Listing of PSI/SI tables TS and per PID bitrate alarms
Adv. TS monitoring	ETSI TR 101 290 Pri 1 and 2 alarms PCR validation and jitter measurements PSI/SI table decoding and analysis

Media Server Appliance support

Please refer to Nevion Virtuoso Platform datasheet for details.	
Virtuoso MI	Supported in version 1.8 or higher
Virtuoso RE	Supported in version 1.0 or higher

Accelerator requirement

Accelerator	HBR 10G Media Accelerator
Description	Multi-channel high bitrate Media Accelerator
Product codes	VIRTUOSO-HW-HBR-SFP4 (24204)
SFP configuration	Port 1: SDI / Video SFP Port 2: SDI / Video SFP Port 3: Not used Port 4: Not used
Video SFP support	Non-MSA 1.5 Gb/s to 12 Gb/s HD-SDI, 3G-SDI: max 2 in + 2 out 12G-SDI: max 1 in + 1 out per SFP port Optical and electrical variants
Power consumption	Maximum 45W

SDI interfaces

SDI interfaces	12G/3G/HD-SDI Video SFP with options for: - Dual channel SDI RX (input) - Dual channel SDI TX (output) - Single channel SDI RX + SDI TX (bidirectional) - Optical and electrical variants 3G/HD-SDI video breakout with options for: - Dual channel SDI RX + SDI TX - Dual channel SDI RX with passive loop out
----------------	--

Virtuoso MI with JPEG XS and UPLINK for TS over IP



UPLINK HBR card

ETH 1/10 GE ETH 1/10 GE ETH 1/10 GE ETH 1/10 GE

JPEG XS encoder

SDI 2 in SDI 2 in Not used Not used

JPEG XS decoder

SDI 2 out SDI 2 out Not used Not used

Ordering options

Virtuoso hardware

VIRTUOSO-HW-MI-MKII-AC2	25049	Virtuoso MI MkII 1RU 8-slot carrier-grade media node platform with redundant load-sharing hot-swap AC power supplies, and hot-swap fans. Redundant Element Managers, each with 100/1000Base-T control port (OS license included). BB/TLS sync in with loop out.
VIRTUOSO-HW-HBR-SFP4	24204	Virtuoso High Bit-Rate media accelerator card. 4x SFP+ ports that can accommodate a combination of 10GE/1GE, optical/electrical video/audio interfaces. Software media functions licensed separately.

Virtuoso software

VIR-MI-SW-XS-HD1	24751	License option enabling one (1) channel of JPEG XS HD encoding or decoding. Supports HD/3G television production formats.
VIR-MI-SW-XS-HD-FILM1	25022	License option enabling one (1) channel of JPEG XS HD encoding or decoding. Supports HD/3G television and 2K film production formats.
VIR-MI-SW-XS-HD4-UHD1	24878	License option enabling four (4) channels of JPEG XS HD encoding and/or decoding. Can also be used for 3x HD + 1x UHD.
VIR-MI-SW-XS-UHD1	24754	License option enabling one (1) channel of JPEG XS UHD encoding or decoding. Supports UHD television production formats.
VIR-MI-SW-XS-UHD-FILM1	25023	License option enabling one (1) channel of JPEG XS UHD encoding or decoding. Supports UHD television and 4K film production formats.
VIR-MI-SW-XS-MON1	24752	License option enabling advanced monitoring features for uncompressed video/audio. License for 1 video service and 16 audio channels.
VIR-MI-SW-TS-PROT1	24732	License option enabling IP protection features for one (1) TS input or output service, including ST2022-7 and ST2022-1FEC.
VIR-MI-SW-TS-ADVMON1	25066	License option enabling advanced TS monitoring for one (1) TS input. Enables ETSI TR 101 290 Priority 2 alarms (e.g. PCR accuracy/overall jitter), PCR analysis and PSI/SI Table analysis. Licensed per TS input.
VIRTUOSO-MAINT	24198	Virtuoso software maintenance fee. Provides access to all major and minor software updates.

Please contact sales for a full list of items covering Virtuoso MI and Virtuoso RE, video SFP and network SFP module options.

nevision

Copyright © Nevision, 2023, all rights reserved.

No part of this documentation may be reproduced in any form or by any means or be used to make any derivative work (including translation, transformation or adaptation) without explicit written consent of Nevision.

Nevision reserves the right to make changes without notice to equipment specification or design. The information provided in this document is for guidance purposes only and shall not form part of any contract.

nevision.com