

SDI-IP UHD/HD ST 2110

Nevion Virtuoso

SDI-IP UHD/HD ST 2110

Nevion Virtuoso's SDI-IP UHD/HD Media Function offers a powerful set of video and audio adaptation and processing functions for use in live IP production applications, supporting 12G-SDI and ST 2110 on 25GbE.

The SDI-IP-H25 software media function supports dual channel adaptation between SDI and ST 2110 for UHD 12G-SDI and HD 3G/HD-SDI signals, with built-in frame synchronization and flexible audio routing/shuffling, gain and delay processing.

A single media function instance running on an HBR25 card in Virtuoso MI supports two SDI-IP or IP-SDI conversions, enabling high density SDI-IP UHD adaptation for up to 16 channels in Virtuoso MI and 12 channels in Virtuoso RE..

The versatility, performance and low latency of the SDI-IP media function makes it ideal for live broadcast and media production applications.

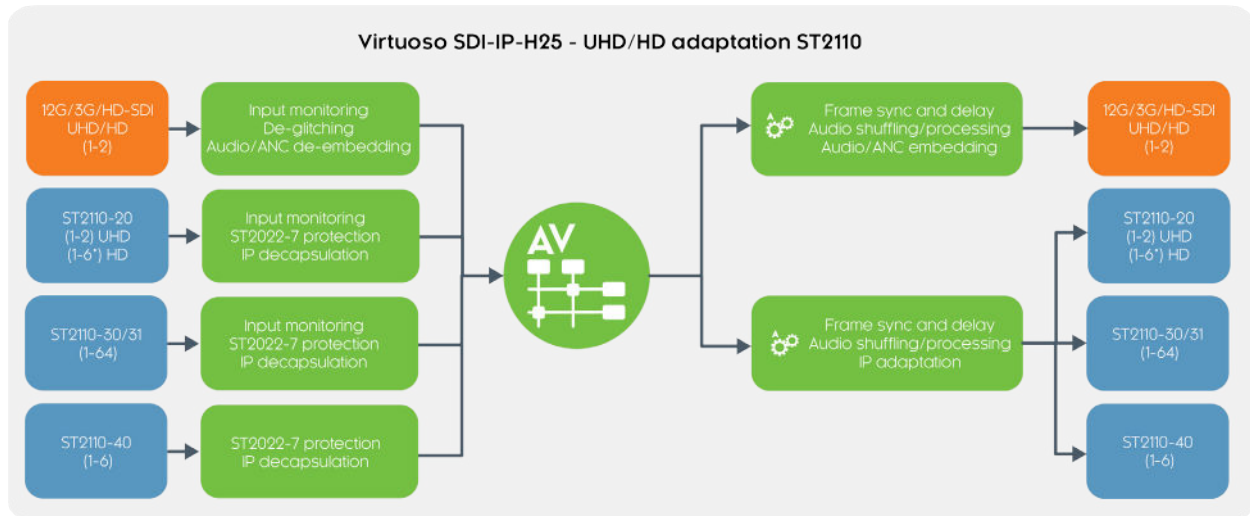
The SDI-IP UHD/HD media function can be combined with other Virtuoso media functions such as Up/Down/Cross conversion, 3D-LUT colour conversion and processing, MAD1 and AES3 audio adaptation, audio processing and mixing, or JPEG XS encoding and decoding.

Applications

- Live production
- IP facility infrastructure
- Distributed production

Key features

- Flexible SDI and IP video/audio connectivity
 - 12G/3G/HD-SDI optical and electrical via SFPs
 - Uncompressed video/audio over IP/25GE
 - SMPTE ST 2110-10/20/21/30/31/40
 - Dual channel SDI-IP, or dual channel IP-SDI
- PTP timing and sync (IEEE 1588v2, SMPTE ST 2059)
- Video/Audio processing
 - Video/audio frame synchronization
 - Audio embedding/de-embedding
 - Audio routing, shuffling, delay and gain
 - Video HDR/SDR signaling, routing and delay
 - Clean video switching (MBB, BBM)
- Stream protection
 - SMPTE ST 2022-7 for all RTP media input flows
- Monitoring and control
 - Thumbnails of input and output video
 - Advanced video monitoring option
 - HTML5 user interface for configuration
 - NMOS IS-04/05/08 and REST API control



SDI-IP UHD/HD adaptation

Nevion Virtuoso SDI-IP UHD/HD media function inherently acts as a frame synchronizer with legacy SDI and IP video and audio interfaces, supporting any-to-any conversion, audio de-embedding and embedding, video and audio routing/shuffling, delay, and gain control. These features make Nevion Virtuoso ideal for processing audio and video signals in IP-based broadcast facility infrastructure, and for IP remote and distributed production applications.

Flexible interfacing via IP/25GE

The media function is available for the HBR25 accelerator card in the Virtuoso MI and supports dual 25GE interfaces via SFP28 ports, supporting Nevion or 3rd party SFPs.

PTP timing and sync

Precision Timing Protocol (PTP) provides accurate synchronization for IP video and audio, using IEEE 1588v2 or SMPTE 2059-2 profiles. Locking to PTP/TAI ensures fully synchronous operation across any network and any distance. PTP redundancy is supported with automatic bumpless PTP failover switching.

Audio and video processing

The media function provides de-embedding of audio from SDI and ST 2110-30/31 IP audio inputs. Audio channels can be routed to any output, embedded in SDI or sent out on IP as SMPTE 2110/AES67.

Audio delay can be adjusted on a channel-by-channel basis, up to 10 seconds. Audio level/gain can also be adjusted on a per-channel basis.

Test image transmission

The media function can transmit an internally generated color bar or custom test image with configurable text overlays and moving patterns, to allow efficient testing of links prior to a live production.

Network redundancy with ST 2022-7

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 (SIPS), 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. Support for ST 2022-7 requires the protection license.

Video formats

HD-SDI	SMPTE ST 292/ST 296/ST 274 1280 x 720p: 50/59.94/60 Hz 1920 x 1080i: 25/29.97/30 Hz 2048 x 1080P: 23.98/24/25/29.97/30
3G-SDI	SMPTE ST 424 (Level A)/ST 274 1920 x 1080p: 25/50/59.94/60 Hz 2048 x 1080p: 47.95/48
12G-SDI	SMPTE ST 2082-1/10 (Mode 1), SMPTE ST 2036-1 3840 x 2160p: 50/59.94/60 Hz 4096 x 2160p: 47.95/48/50/59.94/60
IP media interface	SMPTE ST 2110-20/21 (NL & NG sender, W receiver)

SDI Interfaces

SDI interfaces	2 inputs, 2 outputs or 1 bidirectional Video SFP with options for: - Dual channel SDI RX (input) - Dual channel SDI TX (output) - Single channel SDI RX + SDI TX (bidirectional)
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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)
Legalize / clip	Yes
Frame sync	Yes
Minimum latency	Less than 5 ms (without ref sync)
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 color Custom test image (JPG/PNG) Configurable text overlay Moving box/bar

Audio processing

- De-embedding audio channels from SDI and IP audio inputs
- Embedding audio channels to SDI and IP audio outputs
- Fully flexible internal audio routing and shuffling
- Audio delay adjustment - up to 10 seconds per channel
- Audio level/gain control - per mono channel
- Audio test tone generator with configurable frequency and level

Video and audio over IP transport

Video over IP	SMPTE ST 2110-20 video in RTP/UDP/IP SMPTE ST 2110-21 (NL/NG sender, W receiver) HD: Up to 6-channel IP to IP video/audio/Anc (5-channel for 1080p59)
Audio over IP	SMPTE ST 2110-30 PCM audio (Level A+B) SMPTE ST 2110-31 AES3 over IP (Level A+B) AES67 compliant (1 to 8 ch per stream) Up to 64 IP audio input and output flows 1-16 audio channels per stream
Ancillary over IP	SMPTE ST 2110-40 Ancillary Data over IP Up to 6 IP input and output flows
NMOS support.	SDP (Session Description Protocol) IS-04 Discovery and Registration IS-05 Device Connection Management IS-08 Audio Channel mapping BCP-002-01 Grouping NMOS Resources BCP-003-01 Security for NMOS APIs
Network interface	2x 25GE

Audio and ancillary data formats

Embedded audio	16 channels (8 stereo pairs) Linear PCM 24-bit audio (48kHz) AES3 non-PCM audio 32-bit pass-through
Ancillary data	Pass-through SDI to/from SMPTE ST 2110-40. Single stream per SDI input/output.

Protection

Link redundancy	Hitless/seamless switching for all RTP flows compliant to SMPTE ST 2022-7:2019 ST2110-20: class A or C (WBUF license). ST2110-30/31: class C
Clean switching	Break-before-make switching (1-2 frames additional latency) Make-before-break switching
Input switching	8x video input switches supporting SDI and/ or Video IP inputs (ST 2110-20) 64x audio input switches supporting IP audio inputs (AES67, ST2110-30/31) Manual or automatic switching based on alarm status and severity

Timing and synchronization

Sync input format	PTP (IEEE 1588v2:2008) Analog BB/TLS via Virtuoso appliance
PTP profile support	PTP default and media profile SMPTE 2059-2 PTP profile
PTP redundancy	Internal PTP failover in Virtuoso MI
Media timing	SMPTE ST 2059-1, SMPTE ST 2110-10 SDI video timing based on SMPTE ST 2059-1
RTP timestamp	Generated based on PTP/ST2110

Monitoring

Thumbnails of video input and output
Video freeze and black frame detection (licensed)
Video template monitoring (video format)
Audio template monitoring (presence, peak and silence)
RESTful API and SNMP for all status and configuration parameters

Media Server Appliance support

Please refer to Nevion Virtuoso Platform datasheet for details.

Virtuoso MI	Supported in version 1.6 or higher.
Virtuoso RE	Supported in version 1.0.8 or higher

Accelerator requirement

Accelerator	HBR 25G Media Accelerator
Description	Multi-channel high bitrate Media Accelerator (HW module). 2x25G SFP ports. Additional licenses required for use with media adaptation/compression/ processing/ monitoring functions.
Product codes	VIRTUOSO-HW-HBR25-SFP3 (24645)
SFP configuration	Port 1: Video SFP (See SDI Interfaces) Port 2: 25GE (25GBase-LR/SR) Port 3: 25GE (25GBase-LR/SR)
Video SFP support	Non-MSA 270 Mb/s to 12 Gb/s HD-SDI, 3G-SDI, 12G-SDI Optical and electrical variants
Sync input format	PTP (IEEE 1588v2:2008, SMPTE ST2059-2)
Power consumption	Maximum 45W



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