

SDI-IP ST 2022

Nevion Virtuoso

SDI-IP ST 2022

Nevion Virtuoso's SDI-IP ST 2022 Media Function software is ideal for SDI over IP transport and also offers advanced IP audio/video processing capabilities.

The SDI-IP ST 2022 Media Function supports adaptation, synchronization and processing of uncompressed video and audio signals. The software supports conversion between baseband SDI and SMPTE ST 2022-6 IP, with flexible AES67 IP audio processing and routing, PTP/SMPTE 2059 frame synchronization and delay management.

Audio processing includes de-embedding of SDI/ST 2022-6 and AES67 IP audio inputs, flexible internal routing and embedding, as well as per-channel audio gain and delay control.

High availability is ensured with ST 2022-7 hitless/seamless IP protection switching, which is supported for all video and audio streams with no impact on audio channel input/output density.

The SDI-IP ST 2022 Media Function runs on the Virtuoso 10G High Bit Rate Media Accelerator and supports electrical and optical SDI interfaces via video SFPs and breakout cables, and IP video/audio via dual 10GE.

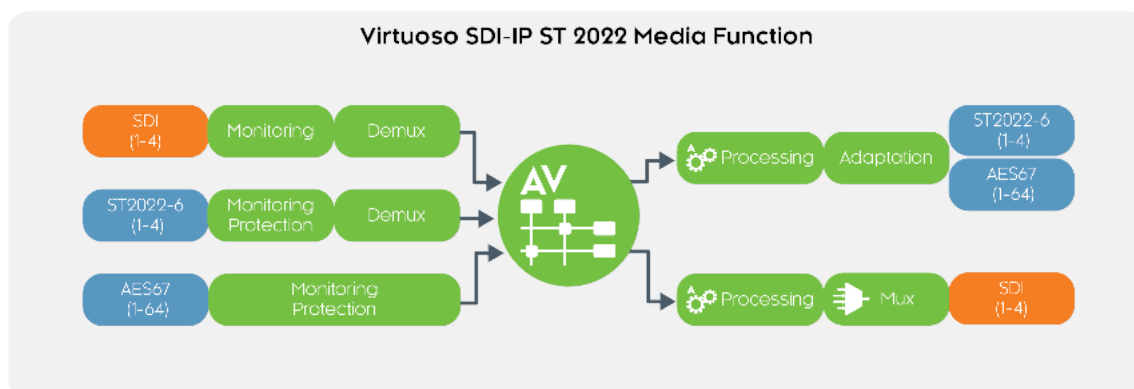
A single SDI-IP ST 2022 instance supports SDI-IP adaptation of up to 4 HD/3G signals in each direction, providing, for example, 32 inputs and 32 outputs HD/3G signals per 1RU in Virtuoso M1.

Applications

- SDI-IP transport and contribution
- Managed media networks
- IP in the facilities
- Video/Audio processing

Key features

- Multi-standard connectivity
 - 3G/HD/SD-SDI optical and electrical via SFPs
 - Uncompressed video/audio over IP/10GE
 - SMPTE ST 2022-6 and AES 67
- PTP timing and sync (IEEE 1588v2, SMPTE ST 2059)
- Video/Audio processing
 - Video/audio frame synchronization
 - Clean video switching (MBB, BBM)
 - Audio embedding/de-embedding
 - Audio routing, shuffling, delay and gain
 - Video routing and delay
- Stream protection
 - SMPTE ST 2022-7 for all RTP input flows
- Alarm based uncompressed input switching
- Monitoring
 - Thumbnails of input and output video
 - In-depth service monitoring incl. video freeze/black frame and audio silence detection



SDI over IP WAN transport

The SDI-IP ST 2022 media function is a simple and effective solution for SDI over IP transport over wide-area IP networks, supporting adaptive clock recovery and network redundancy with ST 2022-7 hitless/seamless switching and up to 150 ms path delay difference.

SDI-IP processing and frame sync

Taking advantage of the more powerful features the Nevion Virtuoso SDI-IP ST 2022 software inherently acts as a frame synchronizer with legacy SDI and IP video and audio interfaces, supporting audio de-embedding and embedding, video and audio routing/shuffling, delay and gain control.

These features are key for SDI-IP adaptation in IP facilities based on VSF TR-04 (SMPTE ST 2022-6 + AES67), as well as many IP remote and at-home production applications.

Audio and video processing

Nevion Virtuoso's SDI-IP ST 2022 Media Function provides de-embedding of audio from SDI and ST 2022-6 inputs. Audio channels can be routed to any output, embedded in SDI or sent out on IP as ST 2022-6 + 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. The SDI embedder supports automatic re-alignment of Dolby E audio coming from input SDI or SMPTE 2022-6 streams.

PTP or analog sync reference

PTP IEEE 1588v2 / SMPTE 2059 is supported via the 10GE ports on the Virtuoso HBR module. The Virtuoso MI/RE/FA has built-in timing/sync distribution and PTP redundancy/failover management. In non-PTP environments, analog BB/TLS inputs or SDI signals can be used as sync reference.

High density and flexibility

The SDI-IP ST 2022 Media Function running on a Virtuoso HBR accelerator supports up to 8 video input and 8 video outputs (4 SDI and 4 IP video) and up to 64 AES67 IP audio streams. Internally, there are 8 video frame synchronizers and fully flexible audio router.

For SDI-IP conversion applications, this means SDI-IP ST 2022 supports 4 input + 4 output channels per module, giving a density of 32 input + 32 output conversions in Virtuoso MI and 24 input + 24 output conversions in Virtuoso RE (both 1RU).

Reliability and IP protection

The software includes multiple features to ensure a robust operation and graceful degradation in the case of IP transport impairments, including robust IP buffering, re-ordering and ST 2022-7 transport protection. The software also supports alarm-based input switching between different SDI inputs.

Seamless IP protection switching

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. This functionality is supported in the SDI-IP ST 2022 Media Function for all RTP media streams, without impacting the density of e.g. IP audio inputs.

Test image transmission

The SDI-IP ST 2022 Media Function can transmit an internally generated color bars or custom test image with configurable text overlays and moving patterns, to allow efficient testing of links prior to a live production.

Video formats

SD-SDI	SMPTE ST 259-C 625i25, 525i2997
HD-SDI	SMPTE ST 292/ST 296/ST 274 1280 x 720p: 50/5994/60 1920 x 1080i: 25/2997/30 1920 x 1080p 23.98/24/25/2997/30 1920 x 1080PsF: 25/2997/30
3G-SDI	SMPTE 424 (Level A)/ST 274 1920 x 1080p: 50/5994/60

SDI interfaces

SDI interfaces	4 inputs and 4 outputs per accelerator Video SFP with options for: - Dual channel SDI RX (input) - Dual channel SDI TX (output) - Single channel SDI RX + SDI TX (bidirectional) Video breakout with options for: - Dual channel SDI RX + SDI TX (bidirectional) - Dual channel SDI RX with passive loop out All video interfaces support SD/HD/3G-SDI (see supported formats above)
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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	Fully transparent

Video and audio over IP transport

Video over IP	SMPTE ST 2022-6 SDI payload over RTP/IP SMPTE ST 2022-8 Timing in ST2110 Systems Up to 4 IP video inputs and 4 IP outputs
Audio over IP	AES67 (1 to 8 audio channels per stream) SMPTE ST 2110-30 Linear PCM audio over IP (Level A+B) SMPTE ST 2110-31 AES3 over IP (Level A+B) Up to 64 IP audio inputs and output streams
Discovery/Reg.	SDP (Session Description Protocol) NMOS IS-04/IS-05 (MI and RE only)
Network interface	2x 10GE

Protection

Link redundancy	Hitless/seamless switching for all RTP flows compliant to SMPTE ST 2022-7 Default max path A/B delay difference 10 ms License option WBUF increases this to 150 ms
Clean switching	Break-before-make clean switching (1-2 frames additional redundancy) Make-before-break switching
Input switching	8x video input switches. Up to 4 inputs (SDI or IP) per switch Audio input switches supporting IP audio inputs (AES67, ST 2110-30/31) Manual or automatic switching based on alarm status and severity

Audio / Video processing

De-embedding audio channels from SDI and IP audio inputs
Embedding audio channels to SDI and ST 2022-6 + AES67 output
Fully flexible internal audio routing and shuffling
Audio delay adjustment - up to 10 seconds per channel
Audio level/gain control - per mono channel
Automatic Dolby E realignment on SDI and ST 2022-6 output
Audio test tone generator with configurable frequency and level
Video delay adjustment - up to 10 frames per channel
Video frame synchronization

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 ST 2059-2 PTP profile
PTP redundancy	Internal PTP failover in Virtuoso MI/RE/FA
Media timing	SMPTE ST 2059-1, SMPTE ST 2110-10 SDI video timing based on SMPTE ST 2059-1 AES67 Link Offset configuration for audio

Monitoring

Thumbnails of video input and output
Video freeze and black frame detection
Audio template monitoring (presence, peak and silence)
Test image with customizable image, text overlay and moving box

Media Server Appliance support

Please refer to Nevision Virtuoso Platform datasheet for details.	
Virtuoso MI	Supported in version 1.2 or higher
Virtuoso RE	Supported in version 1.0.8 or higher
Virtuoso FA	Supported in version 2.8 or higher

Accelerator requirement

Accelerator	HBR10 Media Accelerator
Description	Multi-channel high bitrate Media Accelerator (HW module). 4x SFP+ ports that can accommodate a combination of 10GE SFP+ and video SFPs.
Product codes	VIRTUOSO-HW-HBR-SFP4 (24204)
SFP configuration	Port 1: SDI / Video SFP Port 2: SDI / Video SFP Port 3: 10GE (10GBase-R) Port 4: 10GE (10GBase-R)
Video SFP support	Non-MSA 270 Mb/s to 3 Gb/s SD-SDI, HD-SDI, 3G-SDI, Optical and electrical variants
Sync input format	PTP on 10GE (IEEE 1588v2:2008, SMPTE ST 2059)
Power consumption	Maximum 45W



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