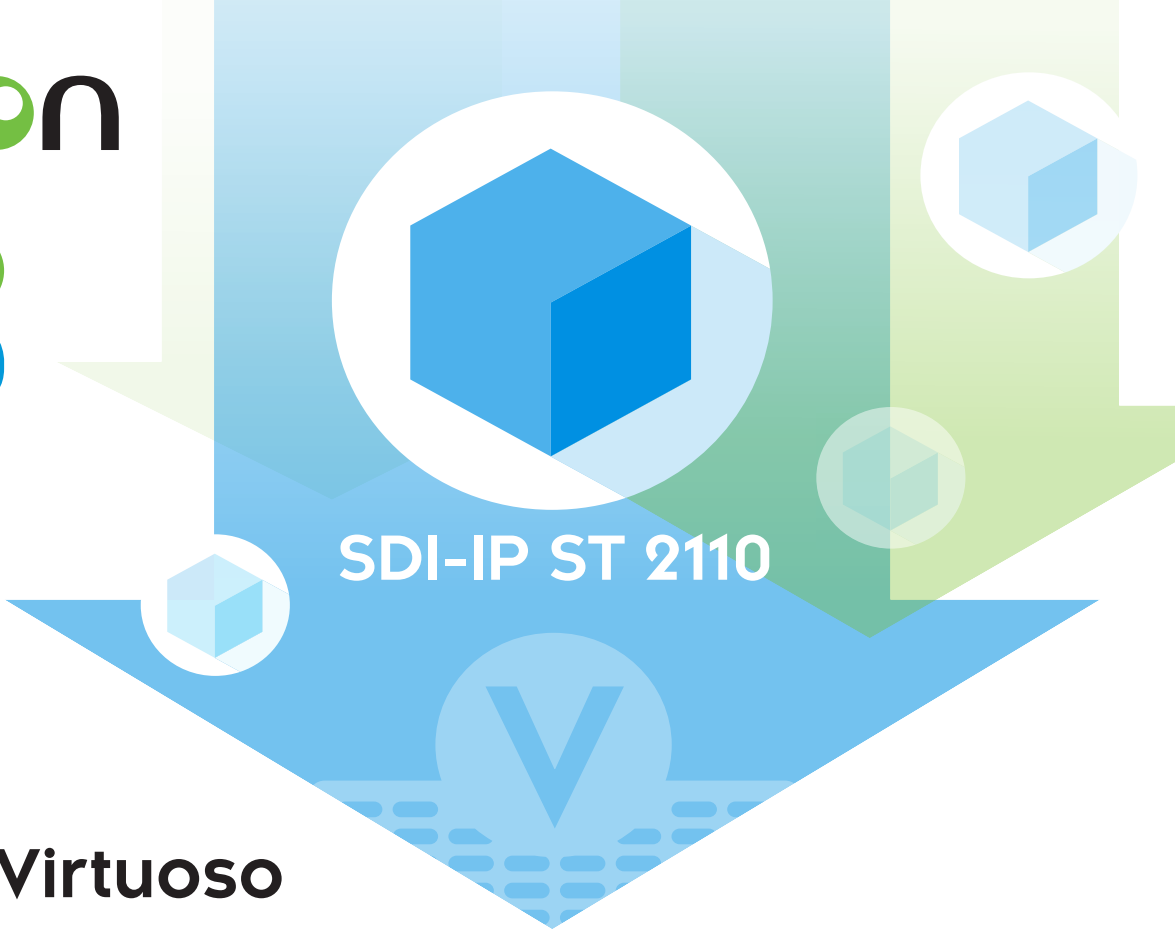
datasheet

Virtuoso
Media Function



Nevion Virtuoso

SDI-IP ST 2110

Nevion Virtuoso's SDI-IP ST 2110 Media Function offers a powerful set of video and audio adaptation and processing functions for use in live IP production applications.

The SDI-IP ST 2110 Media Function supports adaptation, synchronization and processing of uncompressed video and audio signals. The software supports any-to-any conversion between baseband SDI and SMPTE ST 2110 IP, with flexible audio processing and routing, PTP/SMPTE ST 2059 frame synchronization and delay management.

Audio processing includes de-embedding of SDI/ST 2110 and IP audio inputs, flexible internal routing and embedding, as well as per-channel audio gain and delay control.

High availability is ensured with SMPTE ST 2022-7 hitless/seamless IP protection switching, which is supported for all video and audio streams.

The SDI-IP ST 2110 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 2110 instance supports SDI-IP adaptation of up to 4x HD/3G signals (@1080p50) in each direction, providing, for example, 32 inputs and 32 outputs per 1RU in the 8 slot Virtuoso MI and 24 in each direction in the 6 slot Virtuoso RE.

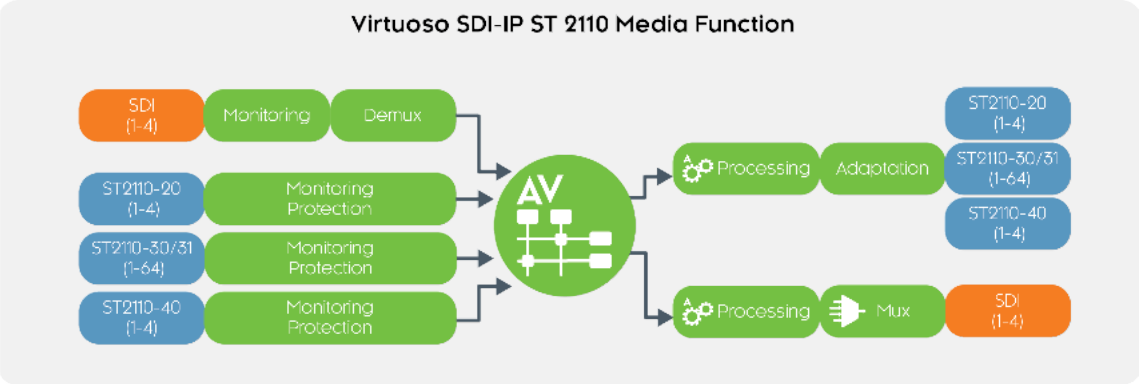
Applications

- IP in the facilities
- IP production infrastructure
- In-house/campus media networks
- 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 2110-10/20/21/30/31/40
- 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 routing and delay
  - Clean video switching (MBB, BBM)
- Stream protection
  - SMPTE ST 2022-7 for RTP media input flows
- Monitoring and control
  - Thumbnails of SDI input and output video
  - In-depth service monitoring incl. video freeze/black frame and audio silence detection
  - HTML5 user interface for configuration
  - NMOS IS-04/05/08 and REST API control

Nevion Virtuoso SDI-IP ST 2110 Media Function



SDI-IP conversion and frame sync

Nevion Virtuoso SDI-IP ST 2110 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 SDI-IP ST 2110 ideal for processing audio and video signals in IP-based broadcast facility infrastructure, and for IP remote and at-home production applications.

Flexible interfacing via 10GE/SFP

The SDI-IP ST 2110 Media Function runs on a 10G HBR accelerator in the Virtuoso MI/RE or FA appliances, and supports dual 10GE and SDI input/output signals via SFP ports, populated with optical/electrical video SFPs or Nevion video breakout cables.

Audio and video processing

Nevion Virtuoso's SDI-IP ST 2110 Media Function provides de-embedding of audio from SDI and ST 2110 inputs. Audio channels can be routed to any output, embedded in SDI or sent out on IP as SMPTE ST 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. The SDI embedder supports automatic re-alignment of Dolby E audio coming from input SDI or SMPTE ST 2110-31 IP streams.

PTP and analog sync reference

PTP IEEE 1588v2 / SMPTE 2059 is supported via the 10GE ports on the Virtuoso HBR module, while the Virtuoso MI/RE/FA servers have analog sync input ports and support both PTP time and sync distribution to all modules in the chassis. PTP redundancy is supported with automatic bumpless PTP failover switching. In non-PTP environments, SDI input signals can also be used as a sync reference for outputs.

High density and flexibility

The SDI-IP ST 2110 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 IP audio streams (ST 2110/AES67). Internally, there are 8 video frame synchronizers and fully flexible audio router.

For SDI-IP conversion applications, this means SDI-IP ST 2110 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 video 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 2110 Media Function for all RTP media streams, without impacting the density of e.g. IP audio inputs.

Test image transmission

The SDI-IP ST 2110 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.

Nevion Virtuoso SDI-IP ST 2110 Media Function

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Video formats

SD-SDI	SMPTE ST 259-C 625i25, 525i29.97
HD-SDI	SMPTE ST 292/ST 296/ST 274 1280 x 720p: 25/50/59.94/60 1920 x 1080p: 23.98/24/25/29.97/30 1920 x 1080i: 25/29.97/30 1920 x 1080PsF: 25/29.97/30
3G-SDI	SMPTE 424 (Level A)/ST 274 1920 x 1080p: 50/59.94/60 2048 x 1080p: 47.95/48

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)

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

Video and audio over IP transport

Video over IP	SMPTE ST 2110-20 Uncompressed Video SMPTE ST 2110-21 Narrow Sender (type N) and Wide Receiver (type W) Up to 4 IP inputs and 4 IP outputs per 10G interface: 1080p50 - 4 IP inputs and 4 IP outputs 1080p59.94 - 3 IP inputs and 3 IP outputs
Audio over IP	SMPTE ST 2110-30 Linear PCM audio over IP (Level A/B/C) SMPTE ST 2110-31 AES3 over IP (Level A/B/C) AES67 compliant (1 to 8 ch per stream) Up to 64 IP audio inputs and output flows 1-16 audio channels per stream NMOS IS-08 Channel mapping
Ancillary over IP	SMPTE ST 2110-40 Ancillary Data over IP Up to 4 IP input and output flows (1 stream per video)
Discovery/Reg.	SDP (Session Description Protocol) NMOS IS-04 Discovery and Registration NMOS IS-05 Connection Management
Network interface	2x 10GE

Protection

Link redundancy	Hitless/seamless switching for all RTP flows compliant to SMPTE ST 2022-7:2019 ST 2110-20: class A or C (WBUF license). ST 2110-30/31: class C
Clean switching	Break-before-make switching (1-2 frames additional latency) Make-before-break switching
Input switching	8x video input switches. Up to 4 inputs per switch, supporting SDI and/or Video IP inputs (ST 2110-20) 32x Audio input switches supporting IP audio inputs (AES67, ST2110-30/31) 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 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
Automatic Dolby E realignment on SDI output
Audio test tone generator with configurable frequency and level
Video frame synchronization
Video delay adjustment - up to 10 frames per channel

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 option, or Automatic A/V sync based on RTP timestamp

Monitoring

Thumbnails of SDI 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
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 1.2 or higher
Virtuoso RE	Supported in version 1.0.8 or higher
Virtuoso FA	Supported in version 2.9 or higher

Accelerator requirement

Accelerator	HBR Media Accelerator (HBR10)
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 ST2059)
Power consumption	Maximum 45W

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