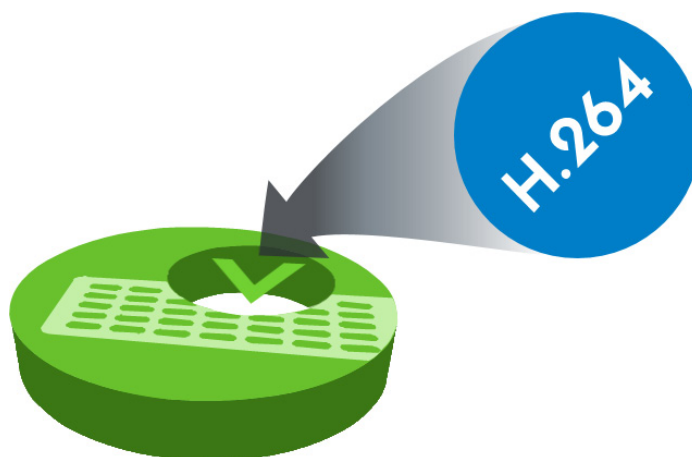




datasheet

Virtuoso  
Media Function

nevion



## Neveion Virtuoso

# H.264/AVC Encoding and Decoding

**The Virtuoso H.264/AVC Media Function provides high quality 10-bit 4:2:2 encoding and decoding with low end-to-end system latency for contribution applications.**

**Neveion Virtuoso can run multiple instances of the H.264/AVC Media Function on a single platform for high-density applications.**

The H.264/AVC compression requires a dedicated Virtuoso Accelerator, which supports SD/HD/3G-SDI input, and either encoding or decoding with H.264/AVC or MPEG-2. The fully standards-compliant output Transport Stream can be transmitted over ASI or IP. The ability to support encoding or decoding on the same Accelerator increases flexibility in deployment of new services and gives a very tight and compact offering for outside broadcast production applications (sports, news and other live events) and managed media services.

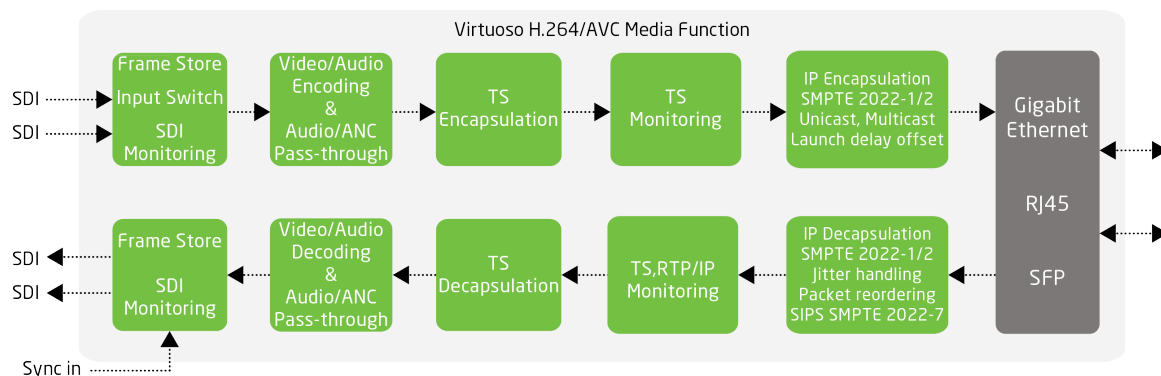
The Neveion Virtuoso H.264/AVC Media Function, combined with Neveion's advanced protection mechanisms, enables broadcasters to utilize cost-efficient IP links for the real-time transport of professional media with low bandwidth utilization, combined with extremely high quality and availability.

### Applications

- Professional broadcast contribution
- Outside broadcast live sports & event contribution
- Studio-to-studio media exchange
- Managed video services over IP

### Key features

- Multi-channel H.264/AVC encoder and/or decoder
- Support for SD, HD and 3G-SDI with multi-link synchronization (for UHD-1/4K applications)
- Best in class video quality with 4:2:2 10-bit H.264/AVC compression up to 80 Mbit/s per channel
- 16-channel audio compression or pass-through with full audio routing matrix built-in
- Integrated frame synchronizer on decoder
- Supports FEC, SIPS / SMPTE 2022-7 and Launch Delay Offset (LDO) IP protection mechanism
- 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
- Thumbnails for input/output confidence monitoring
- Software license approach ensures easy and future-proof upgrade path
- User-friendly web GUI for monitoring & control



## H.264/AVC encoding & decoding

Video is encoded using H.264/AVC with native 10-bit resolution and 4:2:2 chroma sampling, up to Hi422P profile and 80 Mbit/s video elementary stream bitrate. Typical bandwidth usage for HD range from 10 Mbit/s to 50 Mbit/s depending on content and quality requirements and expectations.

## Multi-channel flexible deployment

Each H.264/AVC Media Function can be licensed for encoding or decoding. In fact, an H.264/AVC Media Function can be licensed for both feature sets, so that it can adapt to changing requirements in different broadcast productions.

## Transparent audio/data handling

The H.264/AVC Media Function supports transmission of 8 stereo pairs of embedded audio with a full audio routing matrix built-in. Handling of audio, whether it's linear PCM or pre-compressed audio, is fully transparent when using SMPT 302 audio pass-through. For applications where bandwidth is limited, options for audio compression are available, either using MPEG-1 Layer 2 (MPEG audio) or MPEG-4 AAC-LC.

Line-by-line transparent ancillary data transport is supported using SMPT 2038.

## 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. The encoder supports SDI input switching with built-in frame store for clean changeover on loss of input.

## 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.

## Protection and reliability

H.264/AVC encoding and decoding can be combined with Forward Error Correction (FEC), Seamless IP Protection Switching (SIPS) compliant to SMPT 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 SMPT 2022-7.

## Launch Delay Offset (LDO)

Encoders can send multiple IP output streams (unicast and/or multicast). 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).

## Video formats

|        |   |
|--------|---|
| SD-SDI | SMPTE-259-C<br>625i25, 525i29.97                    |
| HD-SDI | SMPTE-292<br>720p50, 720p59.94, 1080i25, 1080i29.97 |
| 3G-SDI | SMPTE 424 (Level A/B)<br>1080p50, 1080p59.94        |

## Video compression

|                    |  |
|--------------------|--|
| Video codec        | MPEG-4 AVC (ISO/IEC 14496-10), ITU H.264   |
| Profile@Level      | SD: MP@L3.2, HP@L3.2, Hi10P@L3.2, Hi422P@L3.2, HD: MP@L4.1, HP@L4.1, Hi10P@L4.1, Hi422P@L4.1 |
| Chroma sampling    | 4:2:0, 4:2:2   |
| Bit depth          | 8-bit, 10-bit  |
| Bitrates supported | 256 Kbps to 80 Mbps  |
| Video codec        | MPEG-2 (ISO/IEC 13818-2), ITU H.262  |
| Profile@Level      | SD: MP@ML, MP@HL, HP@ML, HP@HL<br>HD: MP@HL, HP@HL H422P@HL                                  |
| Chroma sampling    | 4:2:0, 4:2:2   |
| Bit depth          | 8-bit  |
| Bitrates supported | 512 Kbps to 80 Mbps  |

## Audio and ancillary data formats

|                |   |
|----------------|---|
| Audio formats  | SD - SMPTE 272 and HD - SMPTE 299M<br>8 x AES3 stereo channel pairs                                 |
| Ancillary data | Generic ANC data transport (SMPTE 2038)<br>Closed captioning, AFD, WSS, Time Code, Teletext (OP-47) |

## Audio formats

|                    |   |
|--------------------|---|
| Audio passthrough  | AES3 passthrough (SMPTE 302) 16/20/24-bit   |
| Audio compression  | MPEG-1 Layer II: 64 Kbps - 384 Kbps (2.0)<br>AAC-LC: 32 Kbps - 384 Kbps (2.0)<br>AAC-LC: 96 Kbps - 640 Kbps (5.1) |
| Sampling supported | 48 KHz at 20 or 24 bit per sample   |
| Channels           | Stereo 2.0, dual mono, 5.1  |
| Audio/video sync   | ±2 ms   |

## MPEG-2 Transport Stream

|                     |   |
|---------------------|---|
| DVB-ASI             | ETSI EN 50083-9, Annex B, 188 bytes/pkt   |
| TS over IP          | SMPTE 2022-2 RTP/UDP/IP (CBR)   |
| Input TS bitrate    | Encoder: 2.5 Mbps to 213 Mbps (SPTS/MPTS)<br>TS gateway: up to 800 Mbit/s (max 80 TS) |
| Output TS bitrate   | Encoder: 2.5 Mbps to 128 Mbps (SPTS)<br>TS gateway: up to 800 Mbit/s (max 80 TS)      |
| Program information | Encoder output: PAT, PMT, SDTa, NIT   |

## 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             | Forward error correction for TS over IP (compliant to SMPTE 2022-1 FEC)                            |
| 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)               |

## Content protection

|                |  |
|----------------|--|
| AES Encryption | DVB-CISSA 128 bit Encryption. Up to 50 Mbps per channel. |
|----------------|--|

## Monitoring

|  |
|--|
| ETSI TR 101 290 Priority 1 alarms (option for Pri 2 and 3) |
| Thumbnails for confidence monitoring                       |
| Detailed alarm log with 100,000 entries                    |

## H.264/AVC Accelerator hardware

|                   |   |
|-------------------|---|
| Number of ports   | 4xSDI/ASI inputs/outputs<br>1x ASI output or SYNC input |
| Connector type    | Female BNC (75 Ohm)                                     |
| Sync input format | Analog bi-level (black burst) or tri-level              |
| Power consumption | Maximum 35W   |





# 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

---

### The Americas

ussales@nevion.com +1 (805) 247-8560

### Asia Pacific

asiasales@nevion.com +65 6872 9361

### Europe and Africa

sales@nevion.com +47 33 48 99 99

### Middle East

middle-east@nevion.com +971 (0)4 3901018

### UK

uksales@nevion.com +44 118 9735831

**nevion.com**