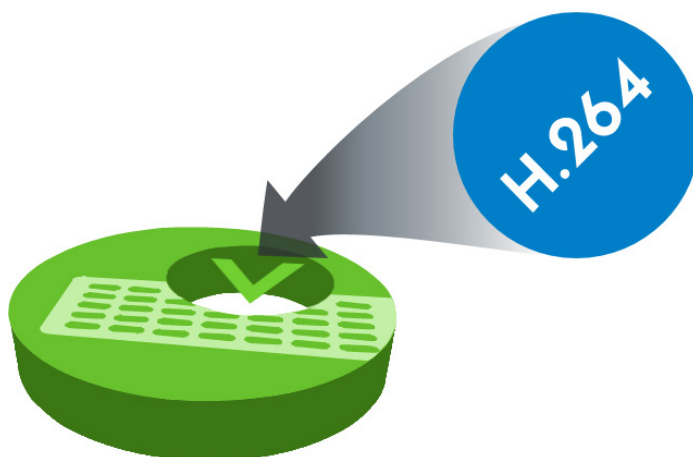




datasheet

Virtuoso
Media Function

nevision



Nevision 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.

Nevision 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.

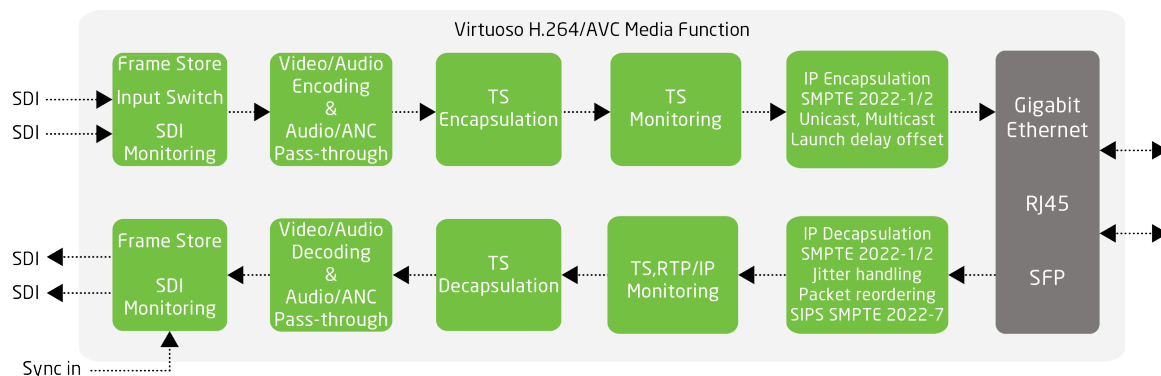
The Nevision Virtuoso H.264/AVC Media Function, combined with Nevision's advanced protection mechanisms, enables broadcasters to utilize cost-efficient IP links for the real-time transport of professional media with low bandwidth utilization, combined with extremely high quality and availability.

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 slow motion 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
- BISS-1 de/scrambling
- 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 a 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).

Content protection with BISS-1 scrambling and descrambling.

Seamless IP protection switching

Transmitting the same RTP/IP stream across dual, fully diverse network links enables receivers/decoders to utilize SMPT 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.

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 ST 259-C 625i25, 525i29.97
HD-SDI	SMPTE ST 292/ST 296/ST 274 1280 x 720p: 50/59.94 1920 x 1080i: 25/29.97
3G-SDI	SMPTE 424 (Level A/B)/ST 274 1920 x 1080p: 50/59.94

Video compression

Video codec	MPEG-4 AVC (ISO/IEC 14496-10), ITU H.264
Profile@Level	SD: MP@L3.2, HiP@L3.2, Hi10P@L3.2, Hi422P@L3.2, HD: MP@L4.1, HiP@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 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
Latency modes	Encoding: 150 ms or 650 ms Decoding: 100 ms or 300 ms

Audio and ancillary data formats

Audio formats	SD - SMPTE 272 and HD - SMPTE 299M 8 x AES3 stereo channel pairs
Audio pass-through	AES3 pass-through (SMPTE 302) 16/20/24-bit
Audio compression	MPEG-1 Layer II: 64 Kbps - 384 Kbps (2.0) AAC-LC: 32 Kbps - 384 Kbps (2.0) 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
Ancillary data	Generic ANC data transport (SMPTE 2038) Closed captioning, AFD, WSS, Time Code, Teletext (OP-47)

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	Decoder: 2.5 Mbps to 213 Mbps (SPTS/MPTS)
Output TS bitrate	Encoder: 2.5 Mbps to 128 Mbps (SPTS)
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	Compliant to SMPTE 2022-1/2
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)
Integrated frame store and retransmission for robust operation	
IP jitter compensation for robust operation in the presence of IP transport impairments	
Test image transmission on sync loss for link preservation	

Content protection

BISS-1	Scrambling up to 80 Mbps per encoder. Descrambling up to 100Mbps aggregated TS bandwidth per Virtuoso appliance
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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

Accelerator requirement

Accelerator	H.264/AVC Accelerator
Description	Single channel H.264/AVC low latency contribution Media Accelerator (HW module). Additional licenses required for H.264/AVC and MPEG-2 encoding/decoding profiles.
Product codes	VIRTUOSO-HW-H264-X1 (24205)
Connectors	Four (4) Female BNC (75 Ohm) Three (3) SDI/ASI inputs/outputs One (1) SYNC input or ASI output
SDI support	SD-SDI, HD-SDI, 3G-SDI
ASI support	DVB-ASI ETSI EN 50083-9, Annex B, 188 B/pkt
Sync input format	Analog bi-level (black burst) or tri-level
Power consumption	Maximum 28W

Neveion Virtuoso

Ordering Options

VIRTUOSO-HW-H264-X1	Single channel H.264/AVC low latency contribution Media Accelerator (HW module). Additional licenses required for encoding/decoding profiles. 3 SDI/ASI interfaces (75 Ohm BNC), 1 sync input (BB).
VIRTUOSO-SW-H264-DEC-HD-420-8B	License option for H.264/AVC HD/SD 4:2:0 8-bit video decoding, M1L2/AAC-LC/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-H264-DEC-HD-422-8B	License option for H.264/AVC HD/SD 4:2:2/4:2:0 8-bit video decoding, M1L2/AAC-LC/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-H264-DEC-HD-422-10B	License option for H.264/AVC HD/SD 4:2:2/4:2:0 8/10-bit video decoding, M1L2/AAC-LC/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-H264-ENC-HD-420-8B	License option for H.264/AVC HD/SD 4:2:0 8-bit video encoding, M1L2/AAC-LC/SMPTE302 pass-through audio (16 ch).
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VIRTUOSO-SW-H264-ENC-HD-422-10B	License option for H.264/AVC HD/SD 4:2:2/4:2:0 8/10-bit video encoding, M1L2/AAC-LC/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-MPEG2-DEC-HD-422	License option for MPEG-2 HD/SD 4:2:2/4:2:0 video decoding, M1L2/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-MPEG2-ENC-HD-422	License option for MPEG-2 HD/SD 4:2:2/4:2:0 video encoding, M1L2/SMPTE302 pass-through audio (16 ch).
VIRTUOSO-SW-UNC-HD-MONI	License option enabling advanced monitoring features for SD/HD uncompressed video/audio, including black/ freeze frame and audio silence detection. Licensed per service.
VIRTUOSO-SW-TS-ADVMONI	License option enabling advanced TS monitoring according to ETSI TR 101 290 Priority 2 alarms (e.g. PCR accuracy/overall jitter) and Pri 3 DVB-SI and ATSC A/78. Licensed per service.
VIRTUOSO-SW-TS-PROT1	License option enabling IP protection features for one (1) TS input or output service, including SMPTE 2022-7, Launch Delay Offset (LDO) (license needed in both sender and receiver) and SMPTE 2022-1 Forward Error Correction (FEC) for TS over IP (license needed in both sender and receiver).
VIRTUOSO-SW-TS-BISS1	License option enabling BISS descrambling of one (1) service. Supports BISS-1 with multi-key handling on decoder (per service/PID configuration), up to a maximum of 100 Mbps per unit. Licensed per TS service. Maximum 4 per unit.

CONTACT INFORMATION

Europe

sales@neveion.com +47 22 88 97 50

Asia Pacific

asiasales@neveion.com +65 66 78 65 81

The Americas

ussales@neveion.com +1 (805) 247 8560

Middle East and Africa

middle-east@neveion.com +971 (0) 4 390 1018

UK

uksales@neveion.com +44 118 973 5831

neveion.com

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