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Media Gateways

NX4600

Media Gateway

The NX4600 is Nevion's latest generation media transport and compression platform, offering simultaneous H.264/AVC encoding and decoding in a compact 1RU form factor.

The NX4600 is an H.264/AVC encoder, decoder and TS media gateway all built into one.

Up to four baseband SDI video signals can be encoded using H.264/AVC or MPEG-2 compression and transported over ASI and IP. The possibility to combine encoding, decoding and TS over IP transport in the same unit 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 Media Gateway includes Nevion's trademark advanced protection mechanisms that enable real-time transport of professional media over IP networks with extremely high availability. The NX4600 offers built-in aggregation of TS over IP streams on one or multiple GbE ports.

It's our goal to offer products that are reliable and easy to use. Therefore, the NX4600 offers an intuitive and dynamic web interface that offers built-in monitoring which helps anticipate and correct any issues with input signals or networks should they arise

Applications

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

Key features

- Multi-channel H.264/AVC encoder and/or decoder and/or TS gateway with IP & ASI interfaces
- Combine up to 4 channels of encoding and/or decoding in the same 1RU unit
- Software license approach ensures easy and future-proof upgrade path
- Best in class video quality with 4:2:2 10-bit H.264/AVC compression up to 80 Mbit/s
- 16-channel audio compression or pass-through with full audio routing matrix built-in
- Built-in TS monitoring (ETSI TR 101 290 Priority 1) of encoder output and decoder input, with option for Pri 2 monitoring including PCR validation
- TS over IP adaptation
- Alarm-based TS redundancy switching
- Standards-compliant IP transport with SMPTE 2022-1/2 FEC and SMPTE 2022-7 SIPS
- Integrated frame synchronizer on decoder
- User-friendly web GUI for monitoring & control
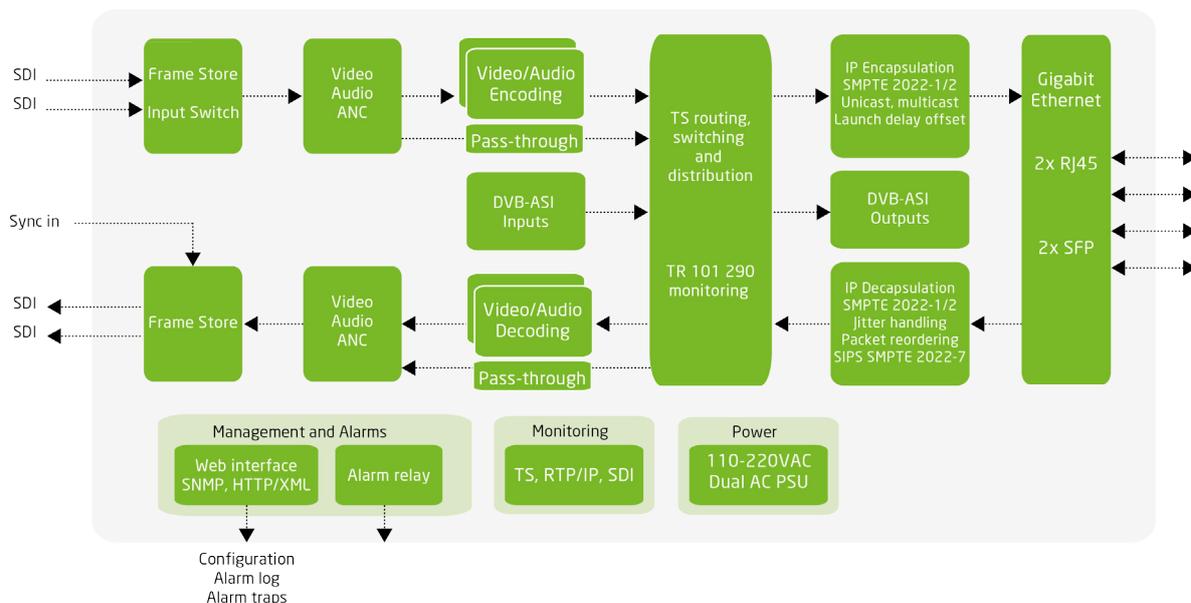
Flexible compression & transport

The NX4600 Media Gateway provides advanced processing, compression and networking capabilities. There are four (4) expansion slots for ASI or H.264/AVC codec modules, which gives a high level of flexibility in terms of deploying encoding and decoding capabilities in a small form factor.

Software licensed codec

The NX4600 can be deployed with up to 4 codec modules per unit, each of which can be software licensed for encoding or decoding. In fact, a codec module can be licensed for both feature sets, so that it can adapt to changing requirements in different broadcast productions.

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.

Transparent audio/data handling

The NX4600 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 SMPTE 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 SMPTE 2038.

Built-in gateway functionality

The NX4600 is capable of doing TSoIP adaptation, alarm-based TS redundancy switching and IP aggregation addding another layer of functionality. All codec modules can use the same GigE ports for TS over IP input and output, thereby reducing the number of ports needed on network access switches.

Robust operation with frame sync

The NX4600 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, FEC and highly efficient error concealment. The encoder has built-in SDI input switching. The decoder has a built-in frame synchronizer with analog/digital sync inputs

Seamless IP protection switching (SIPS

Transmitting the same RTP/IP stream across dual fully diverse network links enables recievers/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 SMPTE 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 (~10 ms outages).
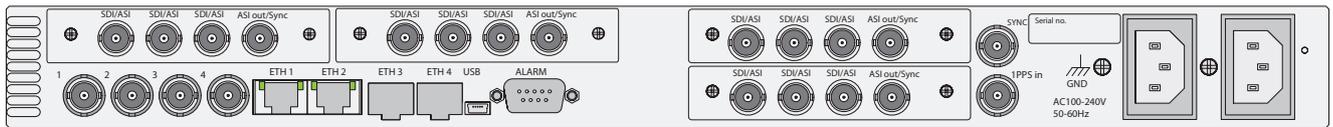
Codec modules (up to 4 per unit)

Number of channels	1 Encoder or 1 Decoder (licenses required)
Number of ports	3 x SDI/ASI inputs/outputs 1x ASI output or SYNC input
Connector	Female BNC (75 Ohm)
Sync input format	Analog bi-level (black burst) or tri-level

Video input/output interfaces

SD-SDI	SMPTE-259-C 625i25, 525i29.97
HD-SDI	SMPTE-292 720p50, 720p59.94, 1080i25, 1080i29.97
3G-SDI	SMPTE 424 1080p50, 1080p59.94
DVB-ASI	ETSI EN 50083-9, Annex B, 188 bytes/pkt

Video compression formats

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

Audio and ancillary data formats

Audio formats	SD - SMPTE 272 and HD - SMPTE 299M 8 x AES3 stereo channel pairs
Ancillary data	Generic ANC data transport (SMPTE 2038) 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) 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

MPEG-2 Transport Stream

TS monitoring	ETSI TR 101 290 Priority 1 alarms (option for Pri 2)
Input TS bitrate	Encoder: 2.5 Mbps to 213 Mbps (SPTS/MPTS) TS gateway: up to 800 Mbit/s (max 80 TS)
Output TS bitrate	Encoder: 2.5 Mbps to 128 Mbps (SPTS) TS gateway: up to 800 Mbit/s (max 80 TS
TS Switching	Up to 50 Alarm-based TS redundancy switches, each with 4 inputs. Up to 400 Mbps output
Program information	Encoder output: PAT, PMT, SDTa, NIT.

ASI interfaces (base unit)

Number of ports	4x DVB-ASI ports (input or output)
DVB-ASI	ETSI EN 50083-9, Annex B, 188 bytes/pkt
Connector	Female BNC (75 Ohm)

IP/Ethernet network interfaces (base unit)

Number of ports	4 x Gigabit Ethernet ports
Connector type	2 x 100/1000Base-T, RJ-45, 2 x 1000Base-X / 10GBase-X SFP+
Interface type	Gigabit Ethernet, 802.3ab (el), 802.3z (optical) Fast Ethernet (FE) IEEE 802.3u, Ethernet 802.3i
Protocols	RTP, UDP, IP, ICMP, ARP, IGMPv2/v3, Diffserv/ TOS, 802.1Q (VLAN tag), 802.1P (VLAN priority)
IP output	Unicast and/or Multicast (ASM or SSM) Multiple output steam copies (smallcast) Option for IP stream launch delay offset (LDO)
TS over IP	SMPTE ST 2022-2:2007 - CBR TS/RTP/UDP/IP IP unicast and/or multicast
Forward Error Correction	SMPTE ST 2022-1:2007 - with support for extended matrx sizes (L*D < 1024, e.g. 250x4)
IP protection switching	SMPTE ST 2022-7:2013

Control and management

Interface type	Single or dual Ethernet ports (RJ-45 or SFP). For specifications refer to 'Ethernet network interfaces'.
Features	Out-of-band or in-band device configuration through HTTP/WEB interface, control and monitoring through HTTP/XML or SNMP
Protocols	HTTP, XML, SNMP v2c
Alarm relay	9-pin D-SUB
Maintenance port	USB (Mini B)

Front panel LED indicators

Power	Power on (Green)
Alarm	Alarm status (Clear on OK, Red on critical alarm)

Physical and environmental characteristics

Physical dimensions	1RU 19" rack-mount chassis WxDxH = 420 x 400 x 44.5mm
Power configuration	Dual load-sharing power supplies
Input Voltage	100-240V AC +/- 10%, 50/60 Hz,
Power consumption	Up to 200W for fully populated chassis
Cooling	Temperature-controlled fans
Airflow	Front to rear side
Operating temperature	0˚C to 50˚C
Storage temperature	-20˚C to 70˚C
Relative humidity	5% to 95% (non condensing)
Compliance	CE: 73/23/EEC (Low voltage equipment), CE: 89/336/EEC (Electromagnetic compatibility) Safety: IEC60950 and EN60950, EMC: EN55022, EN55024, EN6100-3-2 CSA: designed for CSA approval

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Media Gateways

Used by major broadcasters, telcos and other media organizations across the globe, Nevion's Media Gateways are an award winning line of compact, powerful and cost-effective encoders/decoders and media transport devices designed for real-time contribution and distribution of broadcast quality video and audio over IP networks.

Based on industry standards, Nevion's Media Gateways handle a variety of formats, including:

- Video: SD/HD/3G-SDI uncompressed over IP, ASI over IP, JPEG 2000 (J2K) or H.264/AVC
- Audio: MADI multi-channel audio over IP, analog or digital AES audio over IP
- Data: Network aggregation of IP data traffic

All of Nevion's Media Gateways have been designed to be easy to manage. The products have web-interfaces that make it possible to configure and monitor them from a variety of devices. The Media Gateways can also be managed and monitored via VideoIPath, Nevion's media network management system.

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