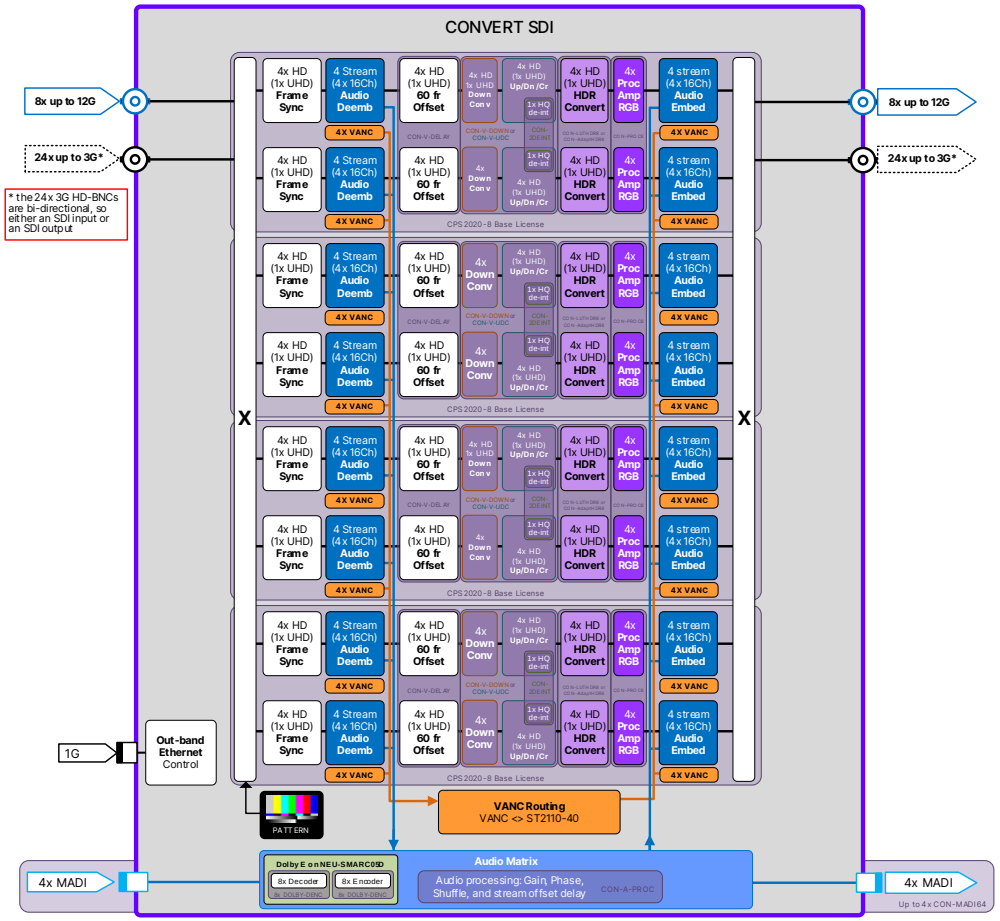
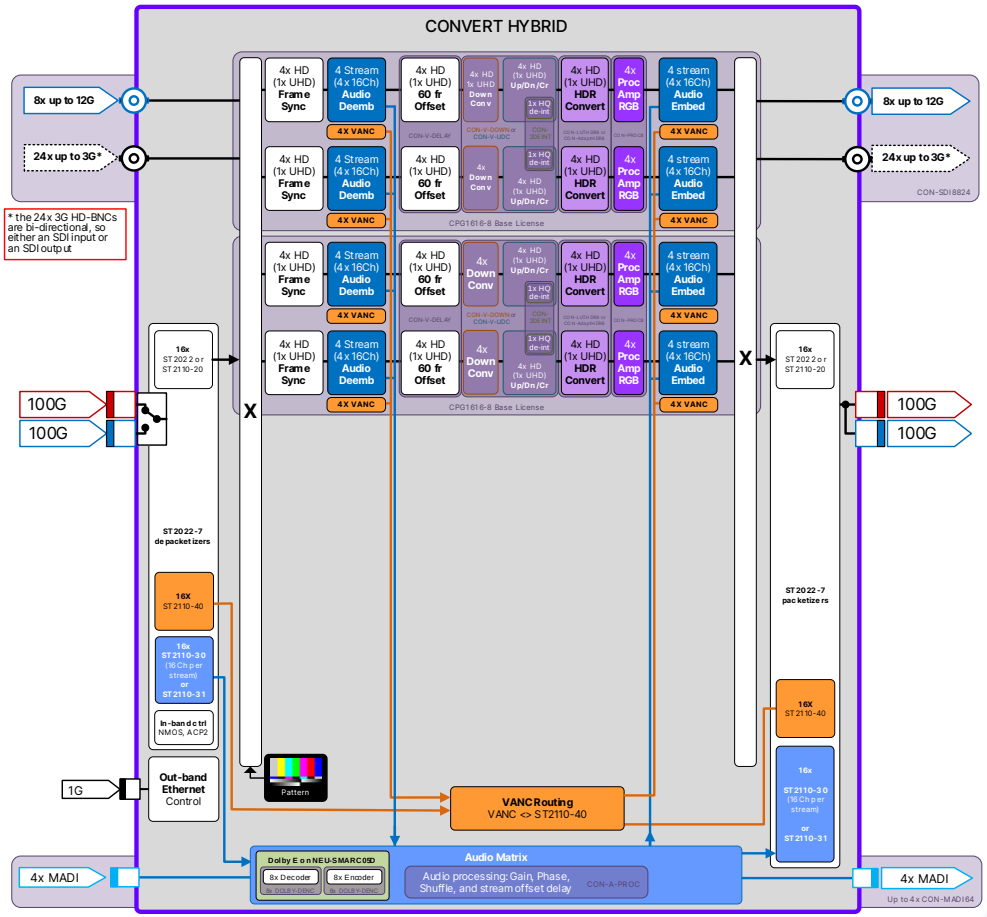
Neuron

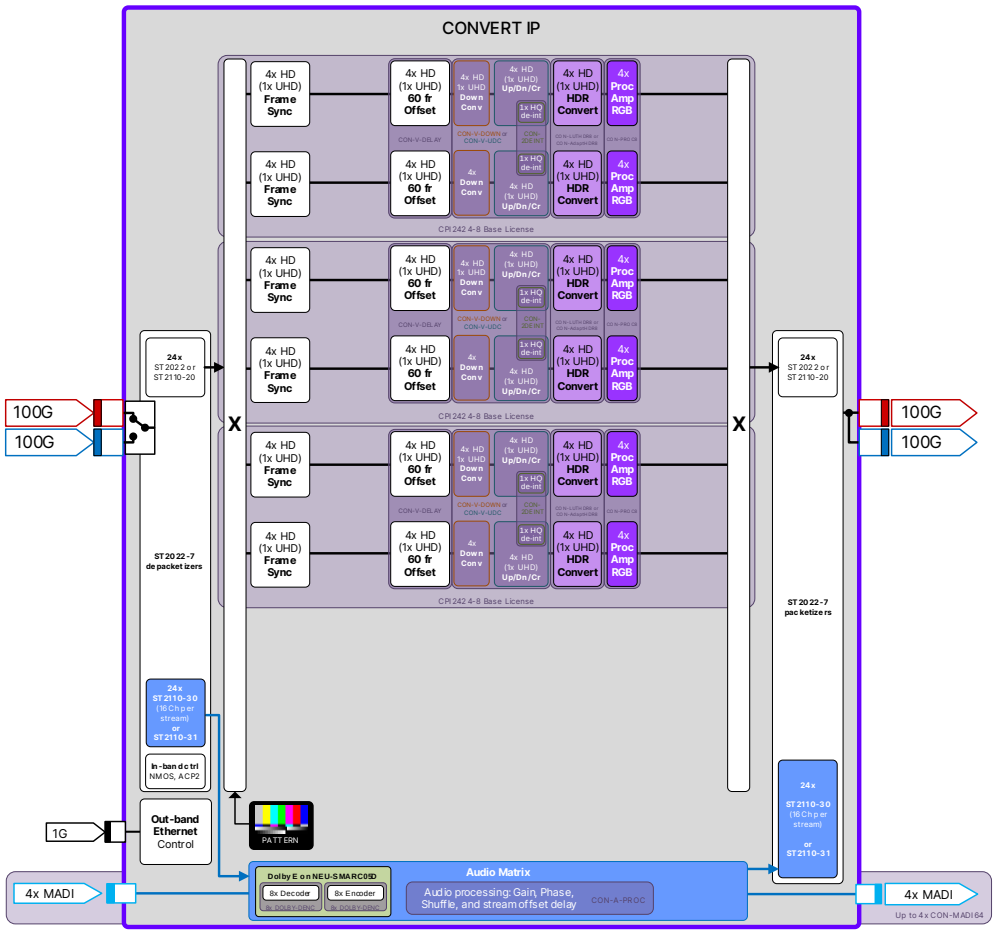
CONVERT

IP gateway, bridge, synchronizer and format converter for IP, SDI and hybrid baseband video and audio

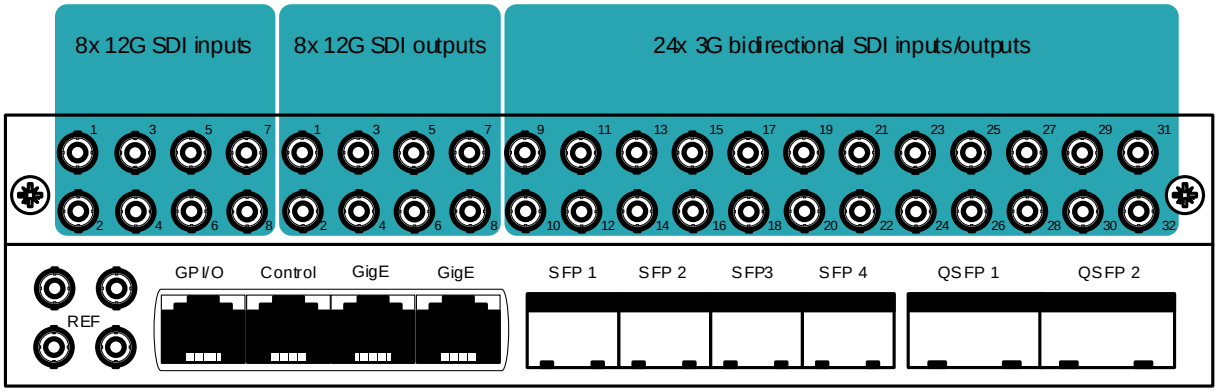
Block schematics of the configurations






CONVERT IP
4x HD (1x UHD) Frame Sync
4x HD (1x UHD) 60 fr Offset
4x HD 1x UHD Down Conv
4x HD (1x UHD) Up/Dn/Cr
1x HQ de-int
4x HD (1x UHD) HDR Convert
4x Proc Amp RGB
CONV-V-DELAY
CONV-V-DOWN or CONV-V-UDC
CONV-2DEINT
CONV-LUTH1886 or CONV-AdaptH1886
CONV-PRO CR
CPI242 4-8 Base License
24x ST2022 or ST2110-20
100G
100G
X
ST2022-7 de packetizers
ST2022-7 packetizers
24x ST2110-30 (16Ch per stream) or ST2110-31
In-band ctrl NMOS, ACP2
Out-band Ethernet Control
1G
PATTERN
Dolby E on NEU-SMARC05D
8x Decoder
8x Encoder
8x DOLBY-DENC
Audio Matrix
Audio processing: Gain, Phase, Shuffle, and stream offset delay
CON-A-PROC
4x MADI
Up to 4x CON-MADI64

I/O Panel

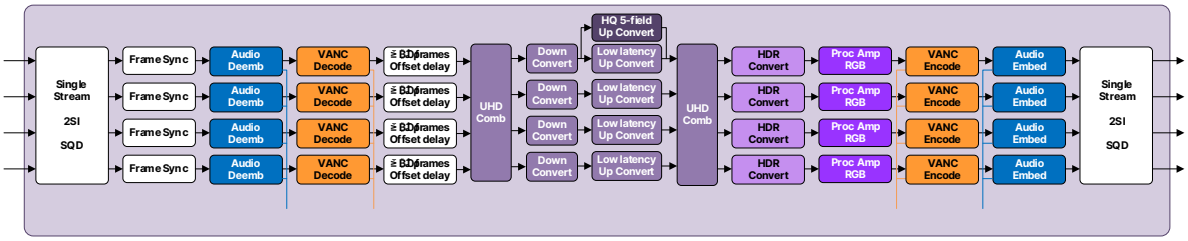


I/O of configurations

	SDI Inputs[1]	IP Inputs[1]	SDI Outputs[1]	IP outputs[1]
Convert Hybrid	16	16[2]	16	16[2]
Convert IP	0	24[2]	0	24[2]
Convert SDI	20	0	20	0

[1]) amount of FHD (1080p50/59.94) channels
[2]) Redundant -7 streams

Video Processing paths



Depending on the configuration (SDI, IP or Hybrid) the CONVERT can have up to 8 of these UHD processing paths. Depending on the active licenses, these processing paths include framesyncs, audio and VANC de-embedders, video offset delay (optional), up/down/cross converters (optional), a high quality deinterlacer (optional), UHD remapping, HDR converters (optional), color correcting proc amps (optional), VANC and audio embedders and audio gain/phase/delay functionality (optional).

Audio Processing

The audio matrix below the video processing paths allows audio shuffling of:

- The individual audio channels coming from the audio de-embedders
- The individual audio channels from the ST2110-30 inputs (each containing up to 16 audio channels)
- The individual audio channels from the optional MADI inputs
- The individual audio channels from the Dolby E decoders (required Dolby enc/dec licenses)
- The audio coming from the Dolby E encoders (required Dolby enc/dec licenses)

With the audio processing license activated, these audio channels can also be individually gained and phased and the streams can be delayed.

Features

CONVERT is a multi-channel video and audio processor developed for low-latency and high-bandwidth IP and/or SDI-based infrastructures. Depending on the version and active base-licenses, CONVERT is capable of processing up to 32 Full HD signals, or up to 8x UHD signals, and transport them over redundant (-7) IP streams or SDI I/O.

The CONVERT can perform many video and audio processing functions. Depending on the active licenses it can perform framesyncing, audio and VANC de-embedding, video offset delay (optional), up/down/cross conversion (optional) with high quality deinterlacing (optional), UHD remapping, HDR convertion (optional), color correcting proc amps (optional), VANC and audio embedding and audio gain/phase/delay functionality (optional). Combining four FHD paths will offer UHD processing. Virtually any baseband signal can be processed, from SD to UHD.

When a CONVERT is expanded with the optional SDI I/O module, 40 HD-BNC SDI connectors are added to allow easy integration of IP into existing SDI baseband operations, simultaneously acting as bridge.

Optionally Convert offers additional audio I/O with 4x MADI licenses (MADI SFPs not included) and up to 8 Dolby E encoders and 8 Dolby E decoders, licensable per decoder and encoder. The Dolby E encoding and decoding licenses require the SMARC expansion module to be installed on the processing board.

- Standards supported: UHD-SDI (12G single wire or four-wire in 4 Quadrants or 2SI), 3G-SDI level A, HD-SDI, ST2022-6/7 and ST2110-20/30/31/40.
- Up to 24 IP video, audio and ancillary data talkers and listeners with the **Convert IP** configuration, and Up to 16 IP video, audio and ancillary data listeners and talkers with the **Convert Hybrid** configuration
- Up to 16 channels of bridging SDI to/from Ethernet with the Convert Hybrid configuration (requires SDI expansion board)
- 8x frame-sync to local clock on external ref (B&B or ST2059) **per base-license**
- **Either** 8x FHD / 2x UHD down conversion **or** 8x FHD / 2x UHD up/down/cross conversion with 2x high quality 5-field de-interlacers **per base-license**
- 8x HDR conversion, (Dynamic or LUT based) **per base-license**
- 2x UHD remapping (SQD from/to 2SI, 4 wire from/to 1 wire) **per base-license**
- 8x 16 channel audio de-embedding **per base-license**
- 8x 16 channel audio embedding **per base-license**
- 8x Proc-amp for RGB, YCrCb and RGB-Black gains and black and white clip **per base-license**
- Individual audio channel gain/phase and audio stream offset delay
- Mono channel audio matrix
- Up to 4x64 channels MADI IO
- Up to 8 Dolby E encoders and 8 Dolby E decoders
- Clean switch and fast switch capabilities between all inputs (IP and/or SDI)
- Clean switch between incoming SDI and IP signals
- Each SDI or IP input can be used as a back-up signal for an SDI or IP output
- Redundant IP signals in and out (double stream or ST2022-7)
- Transparency of VANC data to ST2110-40 in SDI capable configurations
- PTP Network timing with slave functionality on the Ethernet ports, compliant with SMPTE ST2059-2 External black burst inputs
- Audio synchronization
- 2x Analog bi-level reference out
- Multicast and unicast selectable per streams
- Selectable VLAN and priority per stream
- Compatible protocols: ACPv2, DNS, IGMPv2, IGMPv3, LLDP, HDCP, SDP, NMOS IS04, NMOS IS-05, 802.1as, ST2059-1/2, ST2022-6/7, ST2110-20/30/31/40

Applications

- Multi-channel real-time audio and video processing and conversion
- Universal SDI ↔ IP bridge for IP-based infrastructures networks (requires SDI expansion board)
- Point to point (back-to-back) applications for direct replacement of CWDM systems (with optional SDI I/O board)
- SDI router replacement; Router unit for distributed routing over an IP network with clean switching
- Outputs at shader position. Ultra-fast clean switching.
- Enabling local or remote productions over private or commercial networks
- Network attached processor

Ordering information

Hardware options:

- **NEU-BASE-BOARD:** Neuron base processing board. Requires at least one of the base licenses listed below (no mix per board)
- **NEU-SDI40-BOARD:** Neuron SDI IO expansion board with 8x 12G in, 8x 12G out and 24 3G bidirectional IO on HD BNC. Requires NEU-BASE-BOARD
- **NEU-SMARC-05D:** Neuron SMARC A5 CPU module for Dolby Encoding/Decoding. Requires NEU-BASE-BOARD

Software options:

CONVERT HYBRID Base license (SDI and IP I/O)	
CPG1616-8-GO	**Base license** for **Convert Hybrid** Processing/gateway for 8x FHD or 2x UHD. Includes embedding, de-embedding, Frame Sync and IP I/O. **SDI I/O requires NEU-SDI40-BOARD and CON-SDI8824-GO**. Max. **2** of these base licenses per processing board (no mix with other base licenses on one processing board)
CONVERT HYBRID Optional licenses	
CON-SDI8824-GO	Activation license for NEU-SDI40-BOARD.
CON-V-DELAY-GO	Additional video offset delay of up to 60 frames for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-V-DOWN-GO	Down conversion license for 8x FHD or 2x UHD, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-EUDC per base license)
CON-V-UDC-GO	Up/down/cross conversion license for 8x FHD or 2x UHD including 8x low latency deinterlacers, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-UDC per base license)
CON-V-2DEINT-GO	2x high quality 5 field deinterlacers, requires 1x CON-V-UDC. Max 1 per **base license.**
CON-AdaptHDR8-GO	Adaptive HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive **or** 2x LUT-based HDR per processing board)
CON-LUTHDR8-GO	LUT based HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive or 2x LUT-based HDR per processing board)
CON-PROC8-GO	Proc-amp and RGB color correction license for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-A-PROC-GO	Audio Processing license for Gain/phase/delay/shuffle. Max. 1 per **processing board**
CON-MADI64-GO	Convert MADI I/O license. 64 bi-directional channels. **Requires MSA SFP (not included)**. Max. 4 per **processing board**
CON-DOLBY-DENC-GO	Convert Dolby E encoder/decoder license. **Requires NEU-SMARC-05D**. Max. 16 per **processing board** (8 encoders and 8 decoders)

CONVERT SDI Base license (SDI I/O)	
CPS2020-8-GO	**Base license** for **Convert SDI** Processing/gateway for 8x FHD or 2x UHD. Includes embedding, de-embedding and Frame Sync. **Requires NEU-SDI40-BOARD** (CON-SDI8824-GO activation license is uncluded). Max. **4** of these base licenses per processing board (no mix with other base licenses on one processing board)
CONVERT SDI Optional licenses	
CON-V-DELAY-GO	Additional video offset delay of up to 60 frames for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-V-DOWN-GO	Down conversion license for 8x FHD or 2x UHD, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-EUDC per base license)
CON-V-UDC-GO	Up/down/cross conversion license for 8x FHD or 2x UHD including 8x low latency deinterlacers, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-UDC per base license)
CON-V-2DEINT-GO	2x high quality 5 field deinterlacers, requires 1x CON-V-UDC. Max 1 per **base license.**
CON-AdaptHDR8-GO	Adaptive HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive **or** 2x LUT-based HDR per processing board)
CON-LUTHDR8-GO	LUT based HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive or 2x LUT-based HDR per processing board)
CON-PROC8-GO	Proc-amp and RGB color correction license for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-A-PROC-GO	Audio Processing license for Gain/phase/delay/shuffle. Max. 1 per **processing board**
CON-MADI64-GO	Convert MADI I/O license. 64 bi-directional channels. **Requires MSA SFP (not included)**. Max. 4 per **processing board**
CON-DOLBY-DENC-GO	Convert Dolby E encoder/decoder license. **Requires NEU-SMARC-05D**. Max. 16 per **processing board** (8 encoders and 8 decoders)
CONVERT IP Base license (IP I/O)	
CPI2424-8-GO	**Base license** for **Convert IP** Processing/gateway for 8x FHD or 2x UHD. Includes embedding, de-embedding, Frame Sync and IP I/O. Max. **3** of these base licenses per processing board (no mix with other base licenses on one processing board)
CONVERT IP Optional licenses	
CON-V-DELAY-GO	Additional video offset delay of up to 60 frames for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-V-DOWN-GO	Down conversion license for 8x FHD or 2x UHD, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-EUDC per base license)
CON-V-UDC-GO	Up/down/cross conversion license for 8x FHD or 2x UHD including 8x low latency deinterlacers, Max. 1 per **base license** (but choose either CON-V-DOWN or CON-V-UDC per base license)
CON-V-2DEINT-GO	2x high quality 5 field deinterlacers, requires 1x CON-V-UDC. Max 1 per **base license.**
CON-AdaptHDR8-GO	**[FUTURE]** Adaptive HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive **or** 2x LUT-based HDR per processing board)
CON-LUTHDR8-GO	LUT based HDR↔SDR and HDR↔HDR conversion license for 8x FHD or 2x UHD. Max. 1 per **base license** (but choose either 2x Adaptive or 2x LUT-based HDR per processing board)
CON-PROC8-GO	Proc-amp and RGB color correction license for 8x FHD or 2x UHD. Max. 1 per **base license.**
CON-A-PROC-GO	Audio Processing license for Gain/phase/delay/shuffle. Max. 1 per **processing board**
CON-MADI64-GO	Convert MADI I/O license. 64 bi-directional channels. **Requires MSA SFP (not included)**. Max. 4 per **processing board**
CON-DOLBY-DENC-GO	Convert Dolby E encoder/decoder license. **Requires NEU-SMARC-05D**. Max. 16 per **processing board** (8 encoders and 8 decoders)

Specifications

Reference I/O

Connector Type	Micro BNC (HD BNC)
Number of inputs	1
Number of outputs	2, Loop input or analog reference out
Termination	75 Ohms when not looped
Bi-Level	PAL/NTSC Black Burst ITU624

Gigabit Ethernet

Connector Type	RJ45
Number	1
Standards	10/100/1000 Base-T
Protocols streaming	AES67, ST2059
Protocol control	ACPv2
Cable	Shielded twisted pair

QSFP Cages

Number of cages	2
Standards	QSFP28, 100GbE
Protocols	ST2022-6, ST2110, AES67, ST2059

SFP Cages

Number of cages	4
Standards	MSA
Protocols	MADI

Serial video inputs (optional)

Standard	SMPTE ST 2082, HD-SDI ST292, ST296 ST274,3G-SDI ST424 (Level A) ST425-1
Number of Inputs	8
Connector type	Micro BNC (HD BNC)
Signal Level	800mV
DC Offset	0V±0.5V
Overshoot	Within 10% of signal level
Return Loss	>15dB up to 1.5GHz, >10dB up to 3GHz

Serial video outputs (optional)

Standard	SMPTE ST 2082, HD-SDI ST292/ST296/ST274, 3G-SDI ST424 (Level A)/ST425-1
Number of Inputs	8
Connector type	Micro BNC (HD BNC)
Signal Level	800mV
DC Offset	0V±0.5V
Overshoot	Within 10% of signal level
Return Loss	>15dB up to 1.5GHz, >10dB up to 3GHz

Serial video bi-directional connections (optional)

Standard	HD-SDI ST292/ST296/ST274 3G-SDI ST424 (Level A)/ST425-1
Number of Inputs	24
Connector type	Micro BNC (HD BNC)
Signal Level	800mV
DC Offset	0V±0.5V
Overshoot	Within 10% of signal level
Return Loss	>15dB up to 1.5GHz, >10dB up to 3GHz

Miscellaneous

Weight	Approx. 2050gr
Operating temp.	0°C to +40°C
Dimensions	400 x 193 x 42mm (LxWxD)

Electrical

Voltage	+12V nominal (tolerance:-1V/+0.5V)
Power	100-120Watts