



Neuron

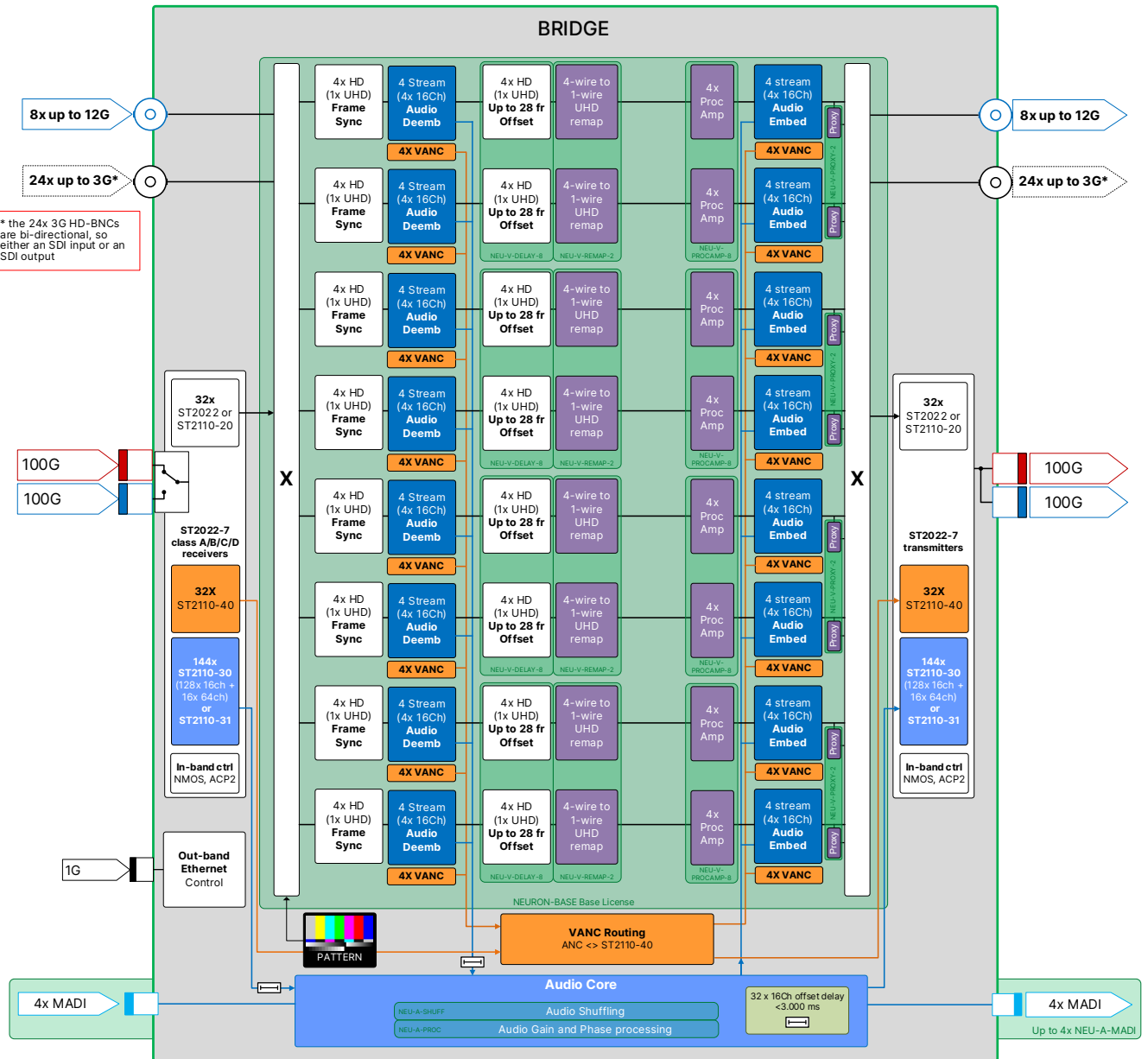
Bridge

IP gateway, bridge and synchronizer for IP and SDI-based video, audio and ancillary data

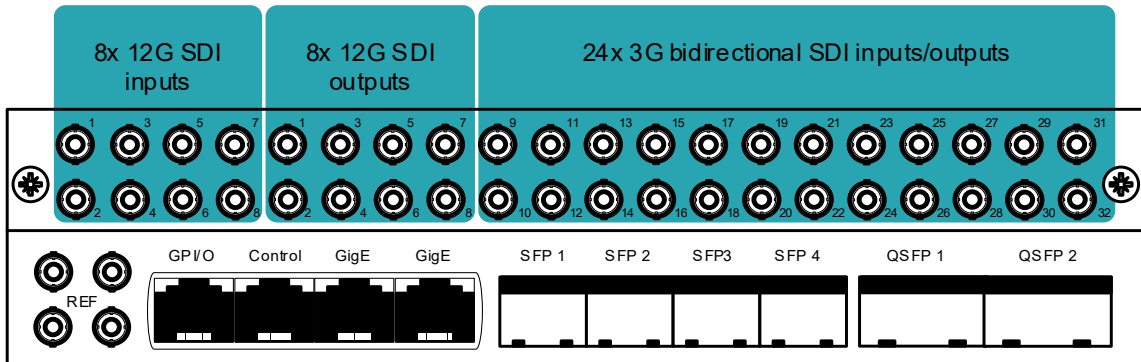


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Block schematic



I/O Panel

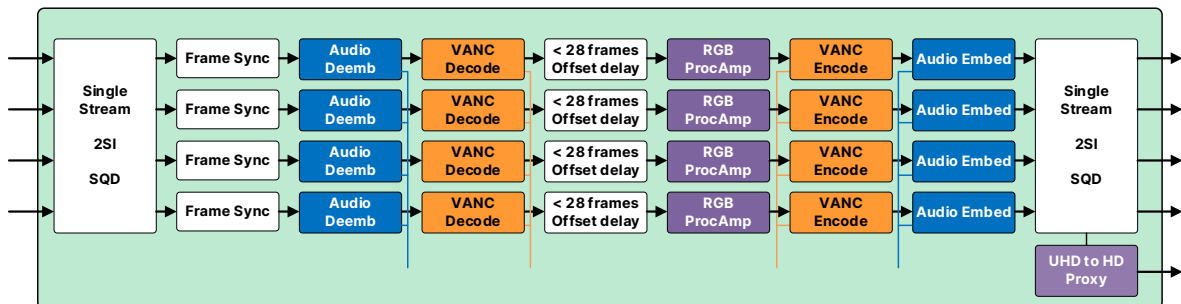


I/O capabilities

SDI inputs	ST2110-20 input streams ²	ST2110-30/31 input streams ²	SDI outputs	ST2110-20 output streams ²	ST2110-30/31 output streams ²
8x up to 12G or 32x up to 3G	8x up to 2160p or 32x up to 1080p	128x 16ch and 16x 64ch	8x up to 12G or 32x up to 3G	8x up to 2160p or 32x up to 1080p	128x 16ch and 16x 64ch

²) Redundant -7 class A/B/C/D compatible streams

Video Processing paths



A Neuron Bridge has 8 of these UHD processing paths. In total a Bridge can process up to 32x 1080p (= 8x 2160p). All paths include frame synchronization, audio embedding and audio deembedding. Video delay, UHD remapping, RGB ProcAmp/color correction, audio shuffling and audio gain/phase/delay processing capabilities can be added optionally. Also optional is that Bridge can generate downscaled 1080p “proxies” of each UHD stream (single stream/wire), to send to Neuron View without it having to use the capacity of 4 inputs.

Audio Core

The internal audio core has the following I/O

Audio Core Inputs	Audio Core Outputs
32x 16 channels from the deembedders	32x 16 channels to the embedders
128x 16 channels from ST2110-30 input streams	128x 16 channels to ST2110-30 output streams
16x 64 channels from ST2110-30 input streams	16x 64 channels to ST2110-30 output streams
4x 64 channels from MAD I inputs	4x 64 channels to MAD I outputs
32x 16 channels processed (delayed) audio	32x 16 channels to audio processor (delay)
4.352 channels in	4.352 channels out

Features

Bridge is an SDI ↔ IP gateway developed for low-latency live media infrastructures. Supporting all modern ST2022 and ST2110 encapsulation standards, a Neuron **Bridge** card can bridge up to 32 x 1080p SDI feeds (or up to 8x 2160p SDI feeds) to and from IP via redundant 100GbE network interfaces. Repacketizing ST2022-6 to ST2110-20/30 and vice versa is also possible. Since two of these boards fit in a 1RU Neuron frame, the total density of **Bridge** is 64 1080p feeds per rack unit.

Each processing path is capable of frame-synchronizing, de-embedding and embedding audio/ancillary data. Video delay, UHD remapping, RGB ProcAmp, audio shuffling and audio gain/phase/delay processing capabilities can be added optionally. Also optional is generating downscaled 1080p copies (proxies) of each UHD stream, to send to a Neuron Multiviewer without it having to use the capacity of 4 FHD inputs.

The extreme low carbon foot print of Neuron will lower your total cost of ownership, especially in 24/7/365 environments. With around 250W of electrical power for a 1RU frame with 2 Neuron **Bridge** processors, EVS offers one of the most power and space efficient network attached processors in the market.

Bridge can be equipped with the Neuron SDI expansion module, which supports up to 40 x SDI I/O via HD-BNC connectors.

- Supports asynchronous SDI and IP inputs
- Standards supported: UHD (single wire 2Si, 4 wire SQD/2Si), FHD Level-A, HD, SD SDI, ST2022 and ST2110 on 50Hz and 59.94Hz. (2160p, 1080p, 1080i and 720p)
- Up to 32 ST2110-20 (video) input and output streams
- Up to 32 ST2110-40 (ancillary data) input and output streams
- Up to 144 ST2110-30/31 (audio) input and output streams of which 128 are 16ch and 16 are 64ch
- Up to 32 channels of bridging SDI to/from IP (requires SDI expansion board)
- Up to 32 channel frame-sync to local clock on external ref (B&B or ST2059)
- Up to 32 times 16 channel audio de-embedding or embedding
- Transparency of VANC data to ST2110-40 in SDI and vice versa with possibility to shuffle streams
- All inputs can be mapped to any main or backup (auto switchover) input of the processing paths
- **Optional:** Up to 32 channels video offset delay of up to 28 frames (= 0.5 seconds of FHD/UHD and 1 second of 1080i/720p)
- **Optional:** UHD Remapping from 4-wire to 1-wire
- **Optional:** Up to 32 channels RGB ProcAmp / color correction
- **Optional:** Audio gain/phase and delay
- **Optional:** Up to 8 downscalers to generate 1080p copies (proxies for View) of each UHD stream
- **Optional:** Up to 4x 64 channels MADI IO
- **Optional:** Mono channel audio shuffling of up to 4.352 x 4.352 channels, controllable via SW-P-08
- Dual QSFP28 100Gb/s single-MAC
- PTP Network timing with slave functionality, compliant with SMPTE ST2059-2 (BMCA)
- External black burst inputs
- Possibility to output 2x Analog bi-level reference locked to PTP fully adjustable over a frame in pixel increments
- Redundant IP streams in and out (ST2022-7 class A/B/C/D compliant)
- Multicast and unicast, configurable per streams
- Automatic fan control
- Stream and Ethernet port redundancy
- Compatible protocols: ACPv2, DNS, IGMPv2, IGMPv3, LLDP, DHCP, SDP, NMOS IS04, NMOS IS05, 802.1as, ST2059-1/2, ST2022-6/7 class A/B/C/D, ST2110-20/30/31/40

Applications

- Universal SDI ↔ IP bridge for IP-based infrastructures
- Translating ST2022 to ST2110 streams and vice versa
- Conversion of MADI to/from IP or SDI streams
- Remapping/gearboxing UHD signals
- Point to point (back-to-back) applications for direct replacement of CWDM systems
- Distributed routing over an IP network with clean switching
- Video frame synchronization
- Audio embedding and de-embedding from SDI and/or ST2022-6

Default interface (Cerebrum)

Neuron **Bridge** can be configured and controlled with Cerebrum free of charge. This means you can add any number of Neurons to the System View of Cerebrum without requiring any licenses. In Cerebrum, **Bridge** can be configured using these easy-to-use and intuitive graphical user interfaces:

Ordering information

Hardware options:

- **NBASE-BOARD:** Neuron base processing board. Requires at least one base license listed below
- **NSDI40-BOARD:** Neuron SDI expansion board with 8x 12G in, 8x 12G out and 24 3G bidirectional IO on HD BNC. Requires NBASE-BOARD.

Software options:

- **NEURON-BASE-GO:** Base License for **Bridge**, **Convert**, **Compress** and **Protect** identities for up to 32x FHD or 8x UHD. Includes embedding, de-embedding, IP I/O and SDI I/O. Max. 1 base licenses per NBASE-BOARD.
- **NEU-V-REMAP-2-GO:** UHD remapping/gear boxing license for 2x UHD. Max. 4 per Bridge.
- **NEU-V-DELAY-8-GO:** License for additional video offset delay of up to 28 frames for 8x FHD or 2x UHD. Max. 4 per Bridge.
- **NEU-V-PROCAMP-8-GO:** Proc-amp and RGB color correction license for 8x FHD or 2x UHD. Max 4 per Bridge
- **NEU-V-PROXY-2-GO:** Video proxy license for 2x UHD to HD proxy generation. Downscals 2 UHD input streams to 1080p for use in Neuron View. Max. 4 per Bridge
- **NEU-A-MADI-GO:** MADI I/O license for 128 channels. Requires MSA SFP (not included). Max. 4 per Bridge
- **NEU-A-SHUFF-GO:** Audio Shuffling license. Enables audio shuffling on mono level for all available audio channels. Max. 1 per Bridge
- **NEU-A-PROC-GO:** Audio Processing license for gain, phase and delay. Max. 1 per Bridge

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	3 (2 Future use)
Standards	10/100/1000 Base-T
Protocols streaming	
Protocol control	ACPv2
Cable	Shielded twisted pair

QSFP Cages

Number of cages	2
Standards	QSFP28, 100GbE
Protocols	ST2022-6/7 (Class A/B/C/D), ST2110, AES67, ST2059

SFP Cages

Number of cages	4
Standards	MADI
Protocols	MSA

Serial video inputs (optional)

Standard	UHD ST2082, 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	UHD ST2082, 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	100-200Watts