



# Neuron

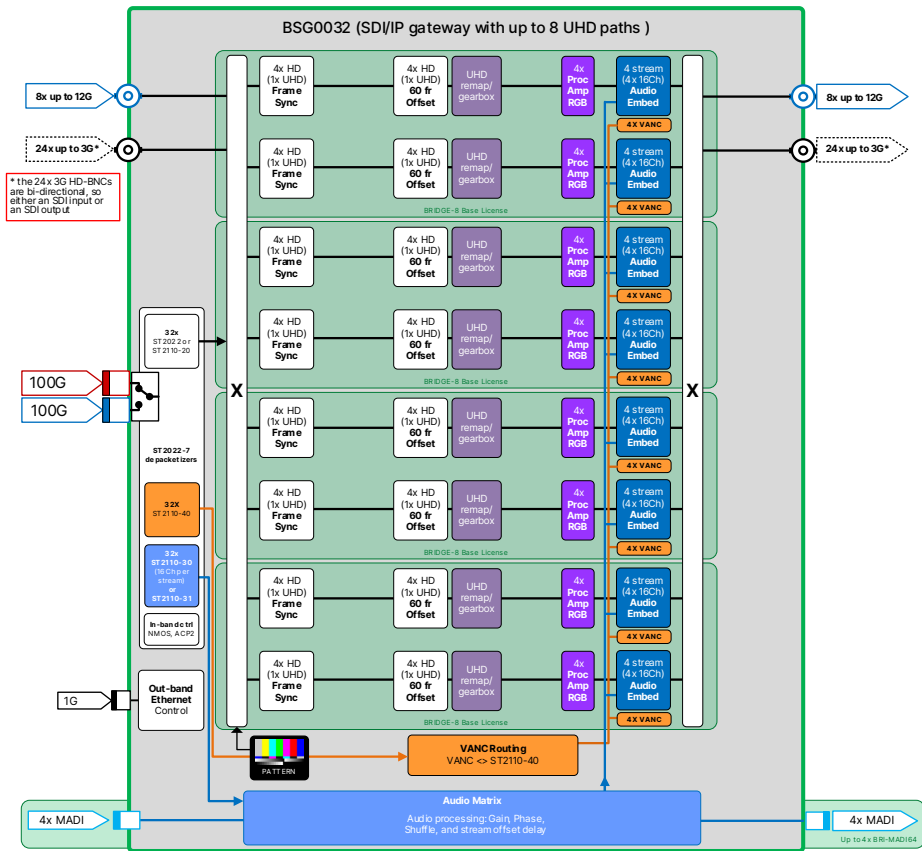
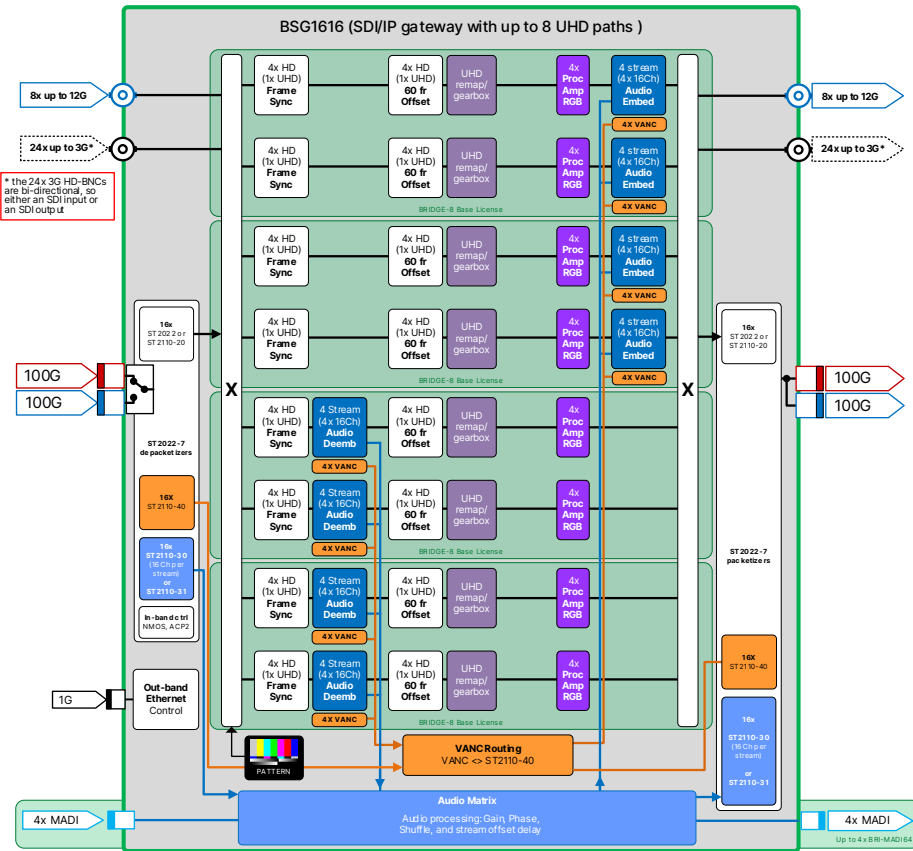
## BRIDGE

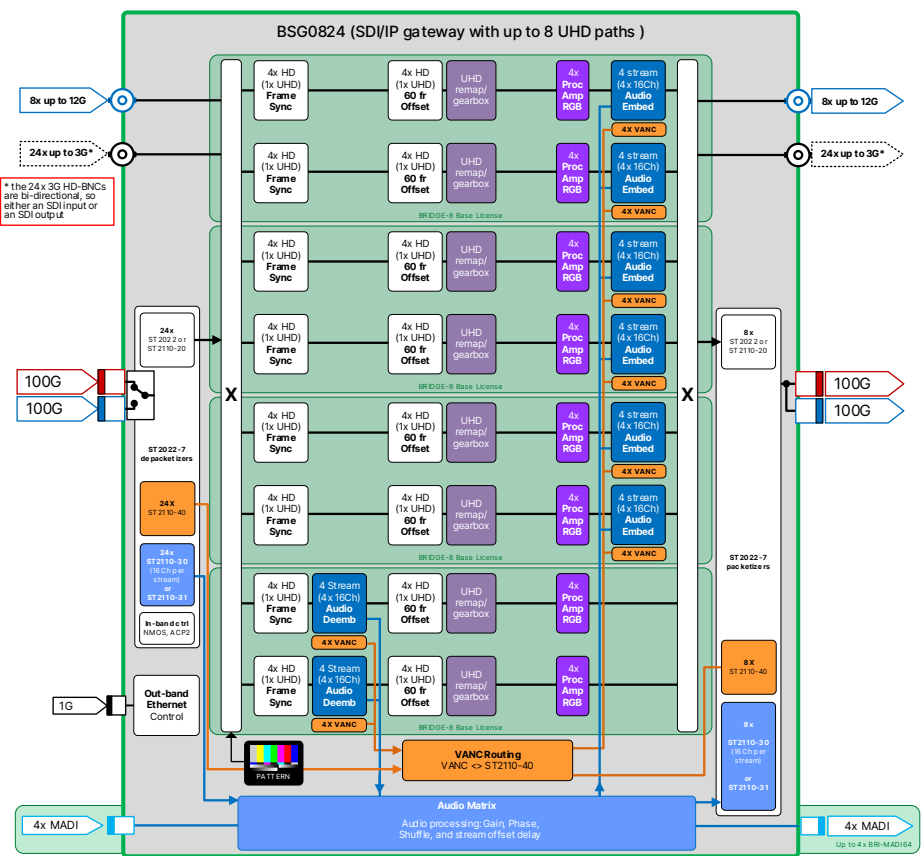
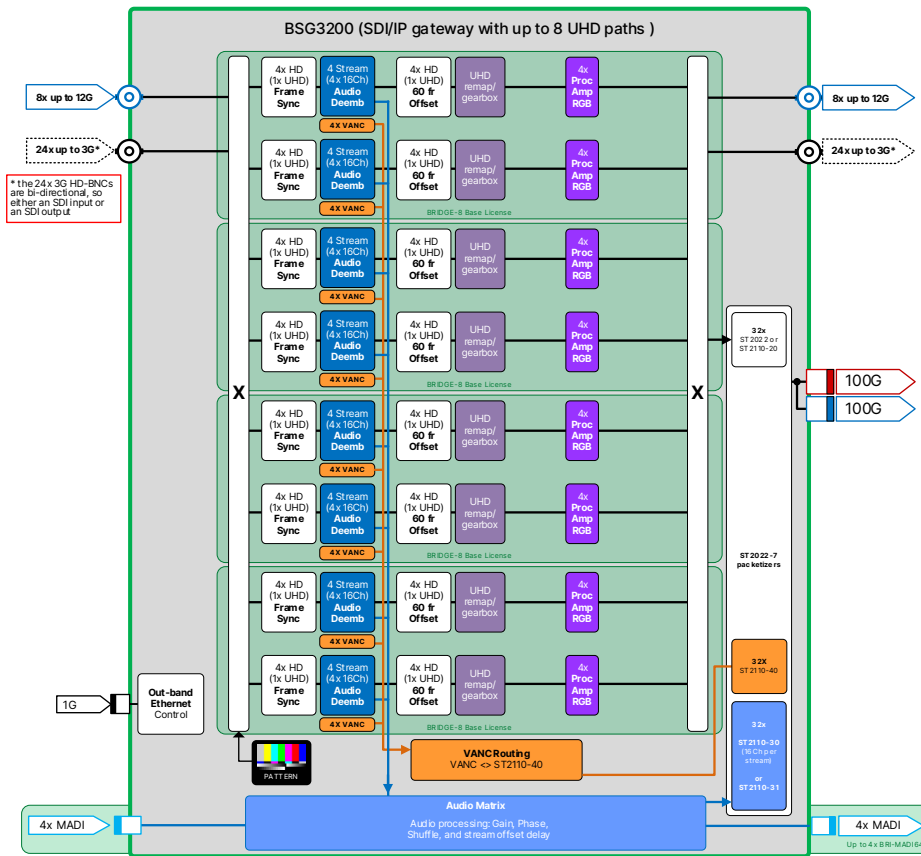
**IP gateway, bridge and synchronizer for IP, SDI and hybrid baseband video and audio**

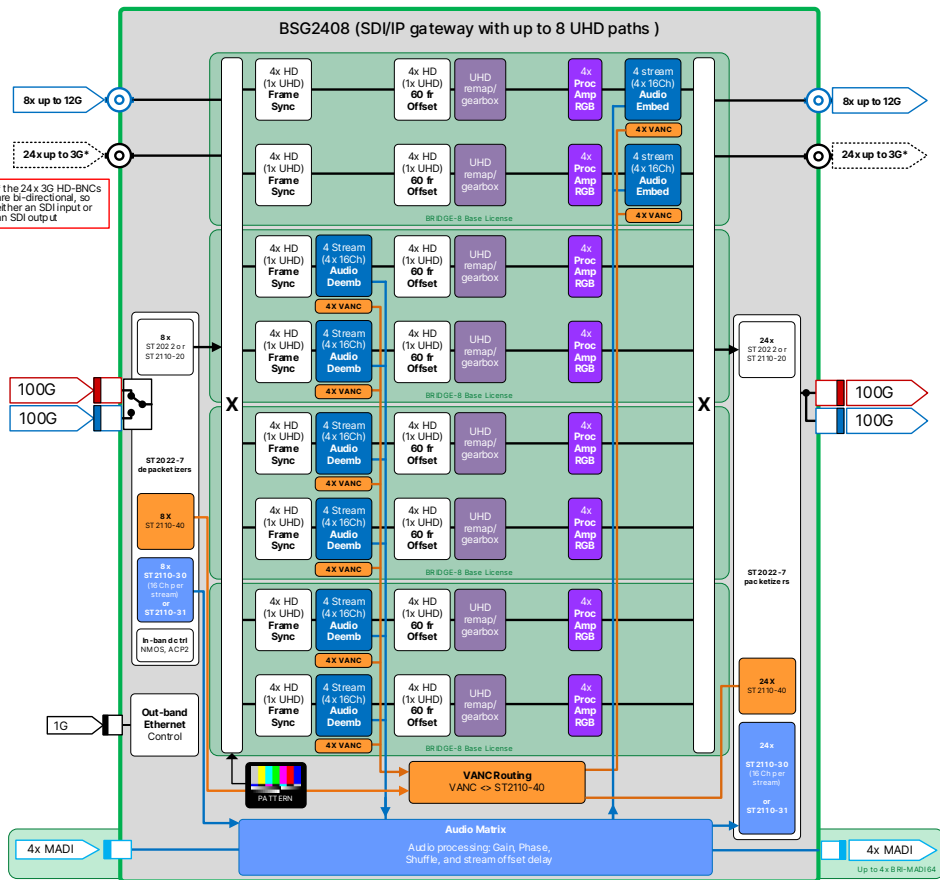


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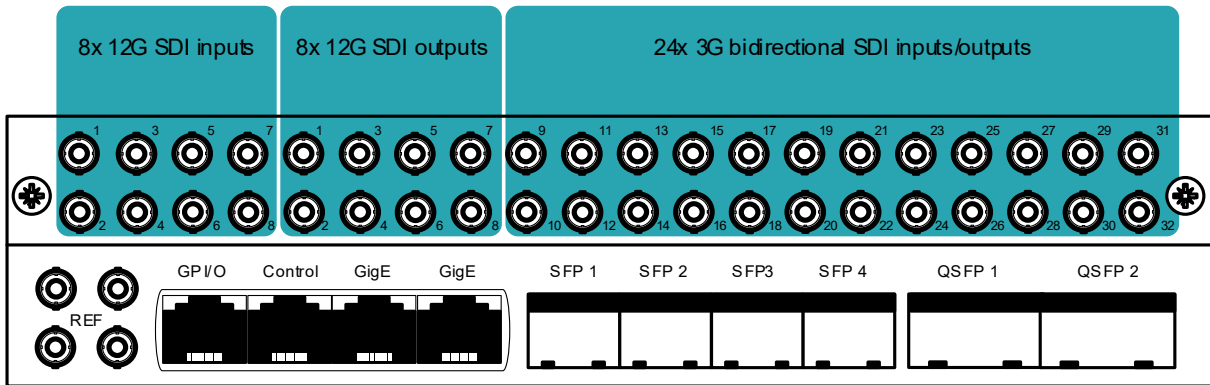
# Block schematics of configurations







## I/O Panel



BRIDGE offers up to 32 x 1080p (= 8 x 2160p) processing paths in various configurations. Depending on the chosen configuration, some paths will include de-embedding and some will include embedding. All paths include frame synchronization and delay, audio gain/phase/delay processing, and color-correcting proc amps.

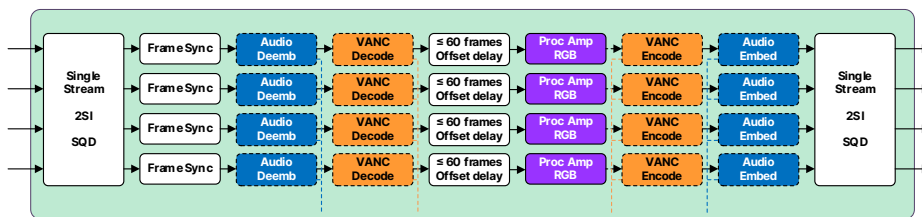
## I/O of configurations

	SDI Inputs <sup>1</sup>	IP Inputs <sup>1</sup>	SDI Outputs <sup>1</sup>	IP outputs <sup>1</sup>
<b>BSG3200</b>	32	0	0	32 <sup>2</sup>
<b>BSG2408</b>	24	8 <sup>2</sup>	8	24 <sup>2</sup>
<b>BSG1616</b>	16	16 <sup>2</sup>	16	16 <sup>2</sup>
<b>BSG0824</b>	8	24 <sup>2</sup>	24	8 <sup>2</sup>
<b>BSG0032</b>	0	32 <sup>2</sup>	32	0

<sup>1</sup>) amount of FHD (1080p50/59.94) channels

<sup>2</sup>) Redundant -7 streams

## Video Processing paths



The BRIDGE can have up to 8 of these UHD processing paths. Depending on the configuration, these processing paths include framesyncs, audio and VANC de-embedders (on the SDI to IP paths), video offset delay, VANC and audio embedders (on the IP to SDI paths), color correcting proc amps, audio gain/phase/delay functionality and UHD remapping.

## Audio Processing

The audio matrix below the 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

These audio channels can also be individually gained and phased and the streams can be delayed.

## Features

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The BRIDGE is a SDI ↔ IP gateway developed for low-latency Live IP infrastructures. Supporting all modern encapsulation standards like ST2022 and ST2110, a Neuron BRIDGE card can process up to 32 x 1080p feeds (or up to 8x 2160p feeds) to and from SDI and IP via redundant 100GbE network interfaces. The various available configurations enable bridging in either direction in groups of 8 FHD (= 2 UHD) processing paths.

A Neuron BRIDGE can process up to 32 channels of video and multiple channels of audio in half a rack unit (since a single 1RU Neuron chassis can house 2 BRIDGE cards). Repackaging ST2022-6/7 to and from 2110-20/30 is also possible. Each video channel is capable of frame-synchronizing, color correcting, de-embedding or embedding and audio gain/phase/delay. Combining four signal paths will offer UHD handling, including remapping/gearboxing 4-wire SQD or SI to 1-wire SI or the other way around.

BRIDGE can optionally be equipped with the SDI expansion module, which supports up to 40 x SDI I/O via HD-BNC connectors. The SDI board activation license is always included.

- Supports asynchronous SDI 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)
- UHD remapping (gearboxing) of single wire to four-wire SQD/2SI and vice versa
- Up to 32 IP video I/O streams, 32 IP audio I/O streams and 32 IP anc data I/O streams
- Up to 32 channels of bridging SDI to/from IP (requires optional SDI expansion board)
- Up to 32 channel frame-sync to local clock on external ref (B&B or ST2059)
- Up to 32 channels video offset delay of up to 60 frames
- Up to 32 times 16 channel audio de-embedding or embedding
- Up to 32 times Proc-amp for RGB, YCrCb and RGB-Black gains and black and white clip
- Audio gain/phase and stream offset delay
- Up to 4x64 channels MAD I/O (optional)
- Mono channel audio matrix (De-embedded audio, ST2110-30 inputs and optional MAD I/O inputs), Controllable via SW-P-08 protocol
- Dual QSFP28 100Gb/s single-MAC
- Transparency of VANC data to ST2110-40 in SDI and vice versa with possibility to shuffle streams
- PTP Network timing with slave functionality on the Ethernet ports, compliant with SMPTE ST2059-2 (BMCA)
- External black burst inputs
- Possibility to output 2x Analog bi-level reference locked to PTP
- Redundant IP streams in and out (double stream or ST2022-7 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, ST2110-20/30/31/40

## Applications

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- Universal SDI ↔ IP bridge for IP-based infrastructures (requires SDI expansion board)
- Translating ST2022 to ST2110 streams and vice versa
- Conversion of MAD I/O to/from IP streams
- Remapping/gearboxing UHD signals
- Point to point (back-to-back) applications for direct replacement of CWDM systems (requires optional SDI expansion board)
- System 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
- Video frame synchronization
- Color correction and processing amplification
- Audio embedding and de-embedding

## 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.

### Software options:

- **BRIDGE-8-GO: Base License for Bridge** for 8x FHD or 2x UHD. Includes embedding, de-embedding, Proc amp, Audio Gain/Phase/Delay/Shuffle, Frame Sync, video delay and IP and SDI I/O. **Requires NEU-SDI40-BOARD** (SDI activation license is included). **Max. 4 of these base licenses per processing board (mixing configurations or base licenses on one board is not possible).**
  - Default configuration: BSG1616
  - Other available configurations: BSG0032, BSG0824, BSG2408, BSG3200
- **BRI-MADI64-GO: Bridge MADI I/O license.** 64 bi-directional channels. **Requires MSA SFP (not included).** **Max. 4 per processing board**

## 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 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