



# Neuron

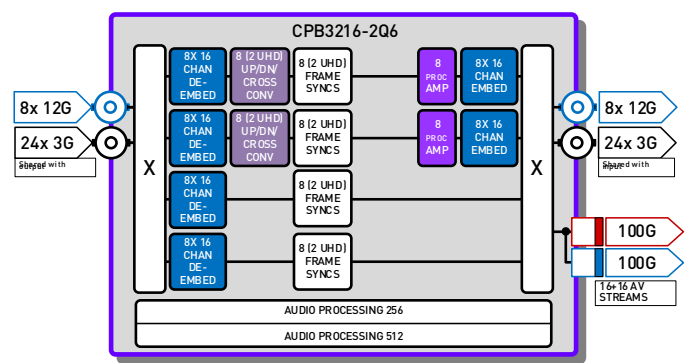
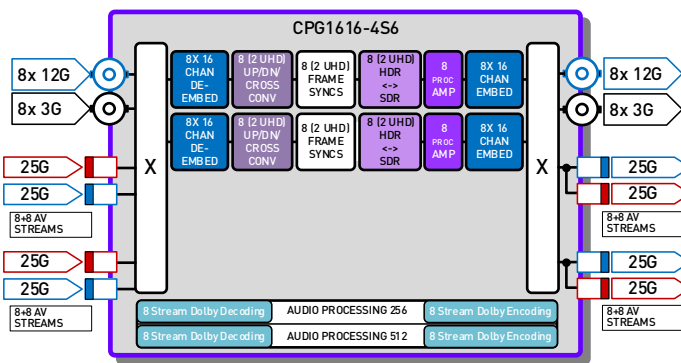
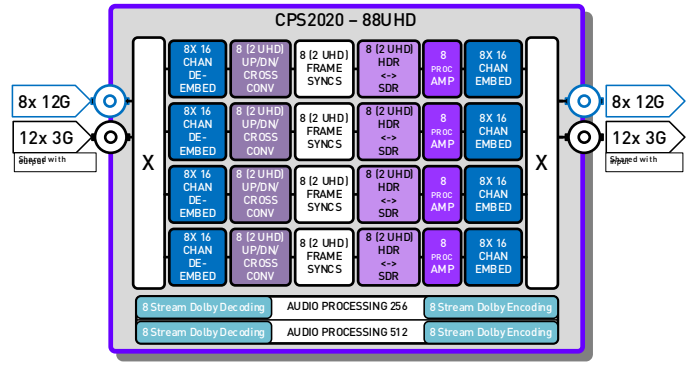
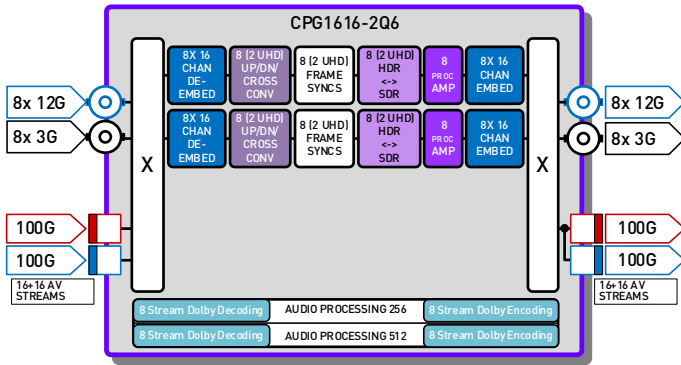
## CONVERT

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



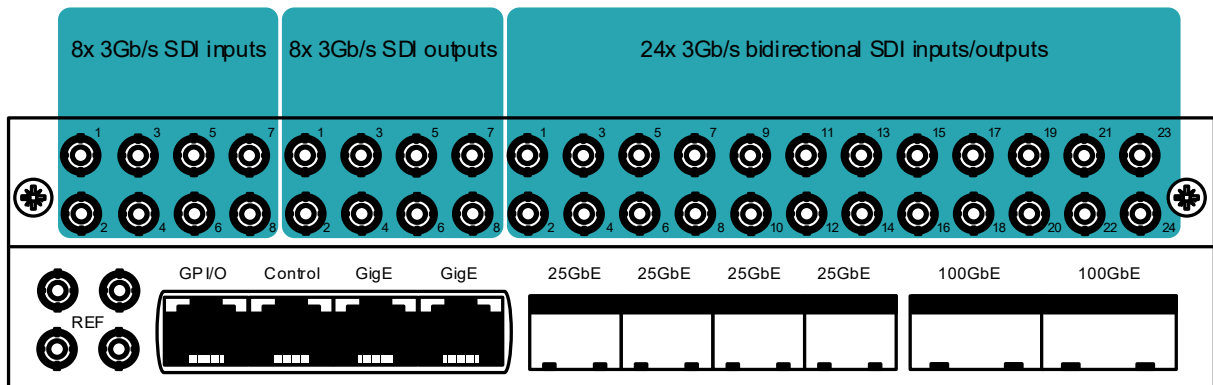
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Block schematics of configurations



# CONVERT

## I/O Panel



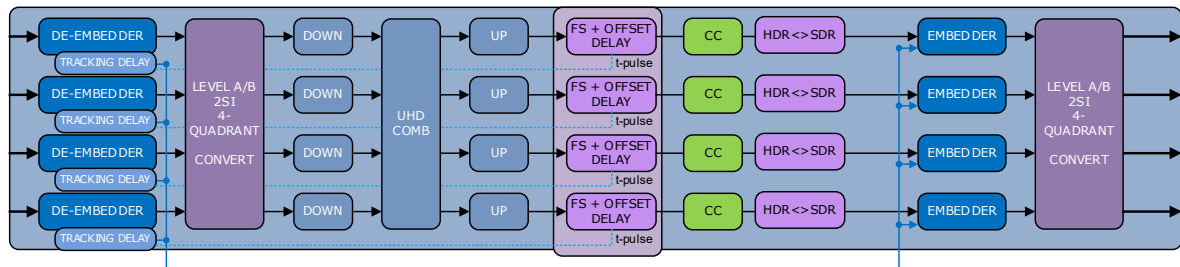
## I/O of configurations

	SDI Inputs <sup>1</sup>	IP Inputs <sup>1</sup>	SDI Outputs <sup>1</sup>	IP outputs <sup>1</sup>
CPG1616-2Q6	16	32 <sup>2</sup>	16	32 <sup>2</sup>
CPG1616-4S6	16	32 <sup>2</sup>	16	32 <sup>2</sup>
CPB3216-2Q6	32	0	16	64 <sup>2</sup>
CPS2020	20	0	20	0

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

<sup>2</sup>) Redundant streams

## Processing paths A - D



The CONVERT has up to 32 processing paths, depending on the configuration, which include audio de-embedding, framesync, up/dn/cr conversion, UHD remapping, HDR<-> conversion, Proc Amp, embedding and audio gain/phase/delay functionality.

## Features

The CONVERT is a multi-channel A/V-over-IP transceiver developed for use within low-latency and high-bandwidth Ethernet IP networks. Using the ST2110 and ST2022 encapsulation methods, the CONVERT is capable of processing up to 32x 3Gb/s signals and transport them over redundant Ethernet links or SDI I/O (optional).

The CONVERT can be utilized in many different ways. Each video channel is capable of frame-synchronizing, up/down/cross conversion, color correcting, UHD remapping, embedding, de-embedding and audio gain and phase. Grouping four signal paths will offer UHD handling up to 4 UHD channels. Virtually any signal can be processed with this unit from SD to UHD signals.

Optionally, the CONVERT can be enhanced with an SDI I/O module. This will add physical connectors and allows easy integration of video over IP networking with existing SDI baseband operations acting as bridge or gateway.

- Cost efficiency by integrating IT equipment and speed in a broadcast environment. Lowering cable cost and scalable systems.
- Standards supported: UHD-SDI (12G single wire or four-wire in 4 Quadrants or 2SI), 3G-SDI level A, HD-SDI, ST2022-6 and ST2110-20/30.
- 32 IP video listeners and 32 IP audio listeners
- Up to 16 channels of bridging SDI to/from Ethernet (requires SDI optional board)
- Up to 16 channel frame-sync to local clock on external ref (B&B or ST2059)
- Up to 16 channels of up/down/cross conversion (UHD requires 4 channels)
- UP to 4 channels UHD remapping (SQD from/to 2SI, 4 wire from/to 1 wire)
- Up to 16 times 16 channel audio de-embedding
- Up to 16 times 16 channel audio embedding
- Up to 16 times Proc-amp for RGB and RGB-Black gains
- 512 channels audio gain/phase and offset delay
- 512x512ch audio matrix (256ch deembedded audio + 256ch ST2110-30 I/O)
- Clean switch and fast switch capabilities between all inputs (IP and/or SDI)
- Several configurations of Ethernet links for maximum signal transport using both SFPs, quad 25 GbE Ethernet
- Clean switch between incoming SDI and IP signals
- QSFP+ or SFP+ cages, 4x 25GbE
- 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 (output port replication, ST2022-7 compliant)
- 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, ST2110-20/30

## Applications

- Universal SDI to Ethernet bridge in Ethernet networks (with Opt-I/O A)
- Point to point (back-to-back) applications for direct replacement of CWDM systems (with Opt-I/O A)
- 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
- All 4k 4 wire challenges
- Video frame synchronization
- Video Auto phasing
- Audio embedding and de-embedding
- 4 wire synchronization and alignment
- Up, down and cross conversion

## Ordering information

### Hardware options:

- **NBASE-BOARD:** Neuron base processing board
- **NSDI40-BOARD:** Neuron SDI IO board, with 8x 12G in, 8x 12G out and 24 bidirectional IO on HD BNC

### Software options:

- **Base configuration CONVERT**

CPG1616-8	CONVERT 8 channel (including embedding, de-embedding, FS) includes IP IO
CPG1616-16	CCONVERT 16 channel (including embedding, de-embedding, FS) includes IP IO

### Option to add SDI I/O

CON-SDI8824	SDI 32 channel - 8x UHD or 32x FHD - 8x 12G SDI in - 8x 12G SDI out and 24x FHD SDI bidirect, <b>requires NSDI40-BOARD</b>
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### Option to add up, down and cross conversion (please add ONE of below line items)

CON-UDC8	up/down/cross conversion channels 1-8 (2x UHD)
CON-UDC16	up/down/cross conversion channels 1-16 (4x UHD) <b>requires CPG1616-16</b>

### Option to add Static LUT based HDR<>SDR and HDR<>HDR conversion (please add ONE of below line items)

CON-StatHDR8	Static LUT based HDR<>SDR, HDR<>HDR conversion channels 1-8 (2x UHD)
CON-StatHDR16	Static LUT based HDR<>SDR, HDR<>HDR conversion channels 1-16 (4x UHD) <b>requires CPG1616-6</b>

### Option to add proc-amp and RGB color correction (please add ONE of below line items)

CON-PROC8	proc-amp and RGB color correction channels 1-8 (2x UHD)
CON-PROC16	proc-amp and RGB color correction channels 1-16 (4x UHD) <b>requires CPG1616-16</b>
Option to add audio shuffling, delay, gain and phase (please add ONE of below line items)	
CON-APR256	Audio Processing option for 256 channels Gain/phase/delay
CON-APR512	Audio Processing option for 512 channels Gain/phase/delay <b>required for CPG1616-16</b>

- **Base configuration CONVERT with IP out only**

CPB3216-8	Convert Processing/gateway 8 channel (including embedding, de-embedding, FS) includes IP
CPB3216-16	Convert Processing/gateway 16 channel (including embedding, de-embedding, FS) includes IP
CPB3216-24	Convert Processing/gateway 16 channel, bridge 8 channel (including embedding, de-embedding, FS) includes IP
CPB3216-32	Convert Processing/gateway 24 channel, bridge 16 channel (including embedding, de-embedding, FS) includes IP

### Option to add SDI I/O (please add ONE of below line items)

CON-SDI2206	SDI 8 channel - 2x UHD or 8x FHD - 2x 12G SDI in - 2x 12G SDI out and 6x FHD SDI bidirect, <b>requires Opt-SDI40</b>
CON-SDI4412	SDI 16 channel - 4x UHD or 16x FHD - 4x 12G SDI in - 4x 12G SDI out and 12x FHD SDI bidirect, <b>requires Opt-SDI40</b>
CON-SDI6618	SDI 24 channel - 6x UHD or 24x FHD - 6x 12G SDI in - 6x 12G SDI out and 18x FHD SDI bidirect, <b>requires Opt-SDI40</b>
CON-SDI8824	SDI 32 channel - 8x UHD or 32x FHD - 8x 12G SDI in - 8x 12G SDI out and 24x FHD SDI bidirect, <b>requires Opt-SDI40</b>

### Option to add up, down and cross conversion (please add ONE of below line items)

CON-UDC8	up/down/cross conversion channels 1-8 (2x UHD)
Opt-UDC16	up/down/cross conversion channels 1-16 (4x UHD) <b>requires CPB3216-16/24/32</b>

### Option to add proc-amp and RGB color correction (please add ONE of below line items)

CON-PROC8	proc-amp and RGB color correction channels 1-8 (2x UHD)
CON-PROC16	proc-amp and RGB color correction channels 1-16 (4x UHD) <b>requires CPB3216-16/24/32</b>

### Option to add audio shuffling, delay, gain and phase (please add ONE of below line items)

CON-APR256	Audio Processing option for 256 channels Gain/phase/delay
CON-APR512	Audio Processing option for 512 channels Gain/phase/delay

- **Base configuration CONVERT with SDI IO only**

CPS2020-8	Convert SDI only 8 channel (2x UHD or 8x FHD) embedding, de-embedding, FS (2x 12G SDI in, 2x 12G SDI out and 6x FHD SDI bidirect), <b>requires NSDI40-BOARD</b>
CPS2020-16	Convert SDI only 16 channel (4x UHD or 16x FHD) embedding, de-embedding, FS (4x 12G SDI in, 4x 12G SDI out and 12x FHD SDI bidirect), <b>requires NSDI40-BOARD</b>
CPS2020-24	Convert SDI only 24 channel (6x UHD or 20x FHD) embedding, de-embedding, FS (6x 12G SDI in, 6x 12G SDI out and 24x FHD SDI bidirect), <b>requires NSDI40-BOARD</b>
CPS2020-32	Convert SDI only 32 channel (8x UHD or 20x FHD) embedding, de-embedding, FS (8x 12G SDI in, 8x 12G SDI out and 24x FHD SDI bidirect), <b>requires NSDI40-BOARD</b>

**Option to add up, down and cross conversion (please add ONE of below line items)**

CON-UDC8	up/down/cross conversion channels 1-8 (2x UHD) <b>requires minimal CPS2020-8</b>
CON-UDC16	up/down/cross conversion channels 1-16 (4x UHD) <b>requires minimal CPS2020-16</b>
CON-UDC24	up/down/cross conversion channels 1-24 (6x UHD) <b>requires minimal CPS2020-24</b>
CON-UDC32	up/down/cross conversion channels 1-32 (8x UHD) <b>requires CPS2020-32</b>

**Option to add static LUT based HDR<>SDR and HDR<>HDR conversion (please add ONE of below line items)**

CON-StatHDR8	static LUT based HDR<>SDR HDR<>HDR conversion channels 1-8 (2x UHD) <b>requires minimal CPS2020-8</b>
CON-StatHDR16	static LUT based HDR<>SDR HDR<>HDR conversion channels 1-16 (4x UHD) <b>requires minimal CPS2020 16</b>
CON-StatHDR24	static LUT based HDR<>SDR HDR<>HDR conversion channels 1-24 (6x UHD) <b>requires minimal CPS2020 24</b>
CON-StatHDR32	static LUT based HDR<>SDR HDR<>HDR conversion channels 1-32 (8x UHD) <b>requires CPS2020 32</b>

**Option to add proc-amp and RGB color correction (please add ONE of below line items)**

CON-PROC8	proc-amp and RGB color correction channels 1-8 (2x UHD) <b>requires minimal CPS2020-8</b>
CON-PROC16	proc-amp and RGB color correction channels 1-16 (4x UHD) <b>requires minimal CPS2020 16</b>
CON-PROC24	proc-amp and RGB color correction channels 1-24 (6x UHD) <b>requires minimal CPS2020 24</b>
CON-PROC32	proc-amp and RGB color correction channels 1-32 (8x UHD) <b>requires CPS2020 32</b>

**Option to add audio shuffling, delay, gain and phase (please add ONE of below line items)**

CON-APR256	Audio Processing option for 256 channels Gain/phase/delay
CON-APR512	Audio Processing option for 512 channels Gain/phase/delay

## 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
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	2
Standards	SFP28, 10/25GbE
Protocols	ST2022-6, ST2110, AES67, ST2059

### Serial video inputs (optional)

Standard	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	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