



## GXG400 - GXG410

**High End 4k (UHD), 3Gb/s, HD, SD up/down/cross converter and synchronizer with optional audio shuffler**

**A Synapse® product**

*Synapse*

**MASTER  
Card**

**3** TRIPLE RATE  
Gb/s, HD, SD

**4K  
ULTRAHD**  
3840 x 2160

**AFD ready**  
S2016

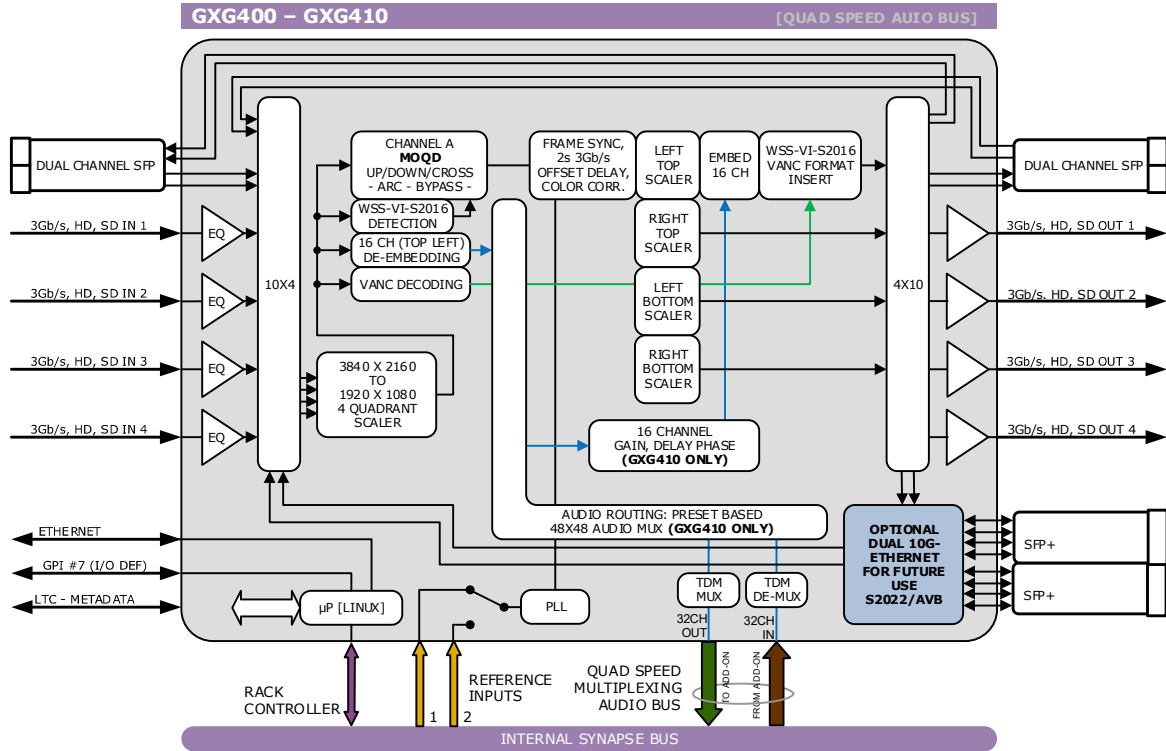
**SFP Flexible I/O**

**SFP+**  
10Gb/s Ethernet

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Block schematic & I/O panel



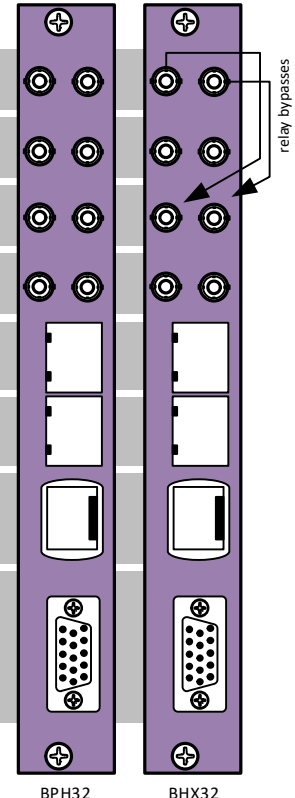
3Gb/s, HD, SD SDI INPUT 1	3Gb/s, HD, SD SDI INPUT 2
3Gb/s, HD, SD SDI INPUT 3	3Gb/s, HD, SD SDI INPUT 4
3Gb/s, HD, SD SDI OUTPUT 1	3Gb/s, HD, SD SDI OUTPUT 2
3Gb/s, HD, SD SDI OUTPUT 3	3Gb/s, HD, SD SDI OUTPUT 4

INPUT/OUTPUT SFP-1 (DUAL CHANNEL)

INPUT/OUTPUT SFP-2 (DUAL CHANNEL)

ETHER NET

GPI I/O, LTC, METADATA



## Features

The GXG400/410 is a HIGH END up/down/cross converter. Based on Axon's **Motion Optimized Quality De-interlacer (MOQD)**, and extensively computer optimized scaling and filter algorithms the new 400 series of up/down/cross converters ensure the absolute best quality video conversion from any standard to any standard within the same framerate. The card allows you to simulcast any output standard in any format from any source standard.

The embedded audio is carried over to the SD, HD or 3Gb/s domain. The appropriate aspect ratio can be applied by control of VI, WSS and GPI inputs by use of 16 presets per output that can store the aspect ratio conversions.

Also included is a 4K 4 wire interface. The GXG400 and GXG410 can up and down convert to and from 4k (3840x2160)

Beside a high quality up/down/cross converter these cards also have very powerful cross-input audio shufflers and proc-amps (410 only). Any of the 64 audio source channels (16 from SDI 1, and 32 from the quad speed audio bus) can be routed to any of the 48 output channels (16 to SDI output 1 and 32 to the quad seed audio bus)

- Industry highest quality de-interlacing algorithm using Axon's MOQD
- 4 SDI inputs
- Up to 4 optional extra inputs/outputs by use of 2 SFP cages (fiber or copper, CVBS and HDMI)
- 10Gb/s Ethernet connection for future use of Ethernet based video like AVB
- Medium latency conversion process (2 frames)
- Compatible with the following input (auto selecting) and output formats (only one output standard can be chosen for both outputs simultaneously)
  - 1080p/59.94
  - 1080p/50
  - 1080i/59.94
  - 1080i/50
  - 1080p/29.97
  - 1080p/25
  - 720p/59.94
  - 720p/50
  - SD525
  - SD625
  - 3840x2160/50 UHD
  - 3840x2160/59.94 UHD
- 3Gb/s signals level A and level B compatible (also 4k I/O)
- Frame sync with auto-phaser and control in Frames, Lines and pixels with respect to reference. Delay setting are stored per output format for a constant latency operation.
  - 100 Frames delay offset (per channel) for all 1080 formats
  - 200 Frames delay offset (per channel) for all 720 standards
  - 400 Frames delay offset (per channel) for all SD standards
- All ARC modes contain Anamorphic, Center Cut, V-Zoom, LBox-16:9, LBox-14:9, PBox-4:3, PBox-14:9 and Variable H and V (50-200%)
- 16 free individual programmable preset banks with settings for:
  - Down conversion
  - Up conversion
  - Cross Conversion
  - Transparent pass through (with ARC function)
  - Simultaneous VI, WSS and AFD (S2016) insertion
  - Embedder shuffling, gain and phase (any to any (in 410 only)
  - audio delay setting
- Multiple GPI inputs/outputs with predefined modes:
  - Mode 1 = 16 (4 bit) preset choice + take and 3 GPI outputs)
  - Mode 2 = 8 presets by single GPI trigger
  - Mode 3 = TBD
  - Mode 4 = TBD
- ARC triggers by VI, WSS, WSS-ext and S2016 (AFD)
- Transparent for 16 channels of embedded audio per video channel
- Embedded domain 64x64 routing to and from the individual in/outputs and Quad Speed Audio Bus (410 only)
- Quad Speed Embedding and de-embedding through synapse bus
- Video proc-amp (Y and C control)
- Color corrector (RGB and total gain, RGB and total black)
- Hue control for 59.94 SDI inputs

- Locks to Tri-level, Bi-level or SDI input 1 or 2
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

Complementary cards:

- DIO88, DLA44/43/42/41, DAW77/88/99, DSF66, DDP24/94, DBD28 or any future Quad Speed Bus ADD-ON card

## Conversion capabilities

CONVERSION		Output														
		2160p59.94	2160p50	1080p59.94	1080p50	1080p29.97	1080p25	1080i59.94	1080i50	720p59.94	720p50	720p29.97	720p25	480i59.94(525)	576i50(625)	
HDMI Input	SDII Input	2160p59.94			x	x		x		x*		x*		x*		
		2160p50				x	x		x		x*		x*		x*	
		1080p59.94	x		x		x		x		x		x		x	
		1080p50		x		x		x		x		x		x		
		1080p29.97	x		x		x		x		x		x		x	
		1080p25		x		x		x		x		x		x		
		1080i59.94	x		x		x		x		x		x		x	
		1080i50		x		x		x		x		x		x		x
		720p59.94	x		x		x		x		x		x		x	
		720p50		x		x		x		x		x		x		x
		720p29.97	x		x		x		x		x		x		x	
		720p25		x		x		x		x		x		x		x
		480i59.94(525)	x		x		x		x		x		x		x	
		576i50(625)		x		x		x		x		x		x		x
CVBS	480i59.94(NTSC)	x		x		x		x		x		x		x		
	576i50(PAL)		x		x		x		x		x		x		x	

\*= future release (2<sup>nd</sup> half 2016)

## Applications

- High End Truck dual input frame synchronizer and anything to anything converter
- High End Infrastructure up/down/cross conversion
- High End transmission up/cross conversion
- UHD (4k) up and down conversion from and to any supported video standard in the same frequency

## Ordering information

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**Module:**

- **GXG410:** High End 3Gb/s, HD, SD-SDI up/down/cross converter with full audio shuffling
- **GXG400:** High End 3Gb/s, HD, SD-SDI up/down/cross converter

**Standard I/O:**

- **BPH32\_GXG410:** I/O panel for GXG410

**Relay bypass I/O:**

- **BHX32\_GXG410:** I/O panel for GXG410 with relay bypass

**Fiber outputs:**

- **Standard video SFP**

**Fiber inputs:**

- **Standard video SFP**

## Specifications

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### Serial video input

<b>Standard</b>	SD,HD and 3Gb/s SDI: SMPTE 292M, SMPTE 259M, SMPTE424
<b>Number of inputs</b>	4 (+ up to 4 via SFP cage)
<b>Connector</b>	DIN 1.0/2.3
<b>Equalization</b>	Typical maximum equalized length of Belden 1694A cable: 60m at 2.97Gb/s, 100m at 1.485Gb/s, and 250m at 270Mb/s
<b>Return loss</b>	> 15dB up to 1.5GHz

### Serial video output

<b>Number of outputs</b>	4 (+ up to 4 via SFP cage)
<b>Connector</b>	DIN 1.0/2.3
<b>Signal level</b>	800mV nominal
<b>DC offset</b>	0V $\pm$ 0.5V
<b>Rise/Fall time</b>	135ps nominal
<b>Overshoot</b>	< 10% of amplitude
<b>Return loss</b>	> 15dB up to 1.5GHz (typ)
<b>Wideband jitter</b>	< 0.2UI

### Reference Input through RRC

<b>Number of Inputs</b>	2 on SFR18, 2 on SFR08 and 1 on SFR04
<b>Tri-level</b>	SMPTE274M, SMPTE296M
<b>Bi-level</b>	600 mVp-p nominal, 75 Ohms terminated through loop PAL Black Burst ITU624-4/SMPTE318, Composite NTSC SMPTE 170M 1Vp-p nominal, 75 Ohms terminated through loop

### Miscellaneous

<b>Weight</b>	Approx. 550g
<b>Operating temperature</b>	0 °C to +40 °C
<b>Dimensions</b>	137 x 296 x 20 mm (HxWxD)

### Electrical

<b>Voltage</b>	+24V to +30V
<b>Power</b>	<TBD Watts