



# Synapse

## GXG150/160

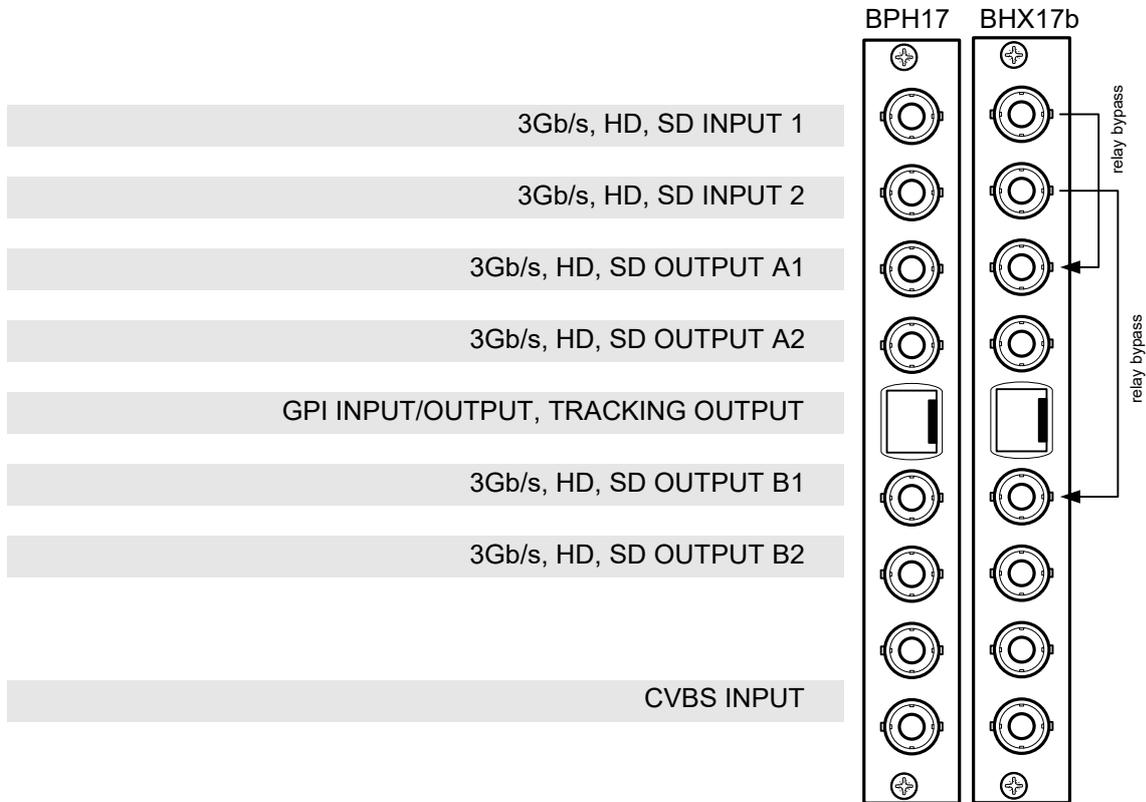
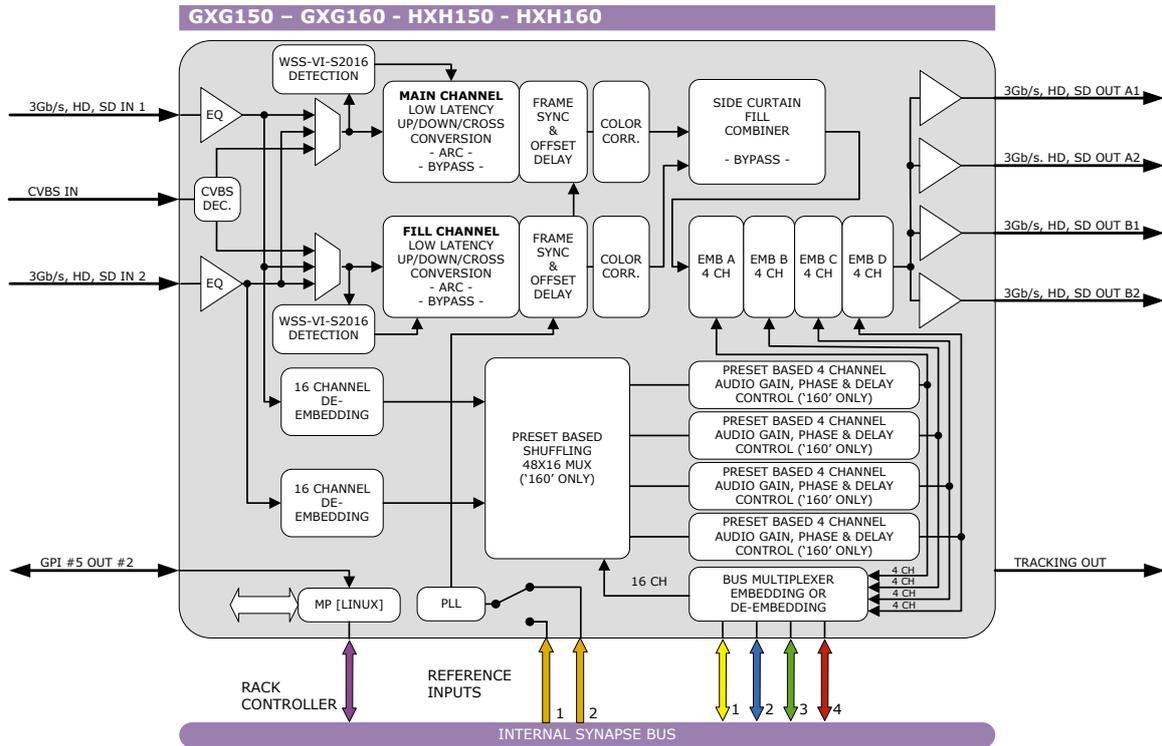
**3Gb/s, HD, SD up/down/cross converter/synchronizer with side curtain processor and optional audio shuffler**

A Synapse® product



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Block schematic & I/O panel



## Features

The GXG150/160 are *low latency* up, down, cross converters with 16 channel audio transparency. The powerful audio matrix multiplexer can transport audio from the embedded domain to the Synapse bus and vice versa. The GXG160 adds a full audio shuffler and audio proc-amp with gain and phase control.

The **GXG150/160** is compatible with 270Mb/s, 1.5Gb/s and **3Gb/s** for full 1080p/50 or 1080p/59.94 use.

- 3 inputs: 2 SDI and 1 composite.
- Configurable output function (Straight, Crosses, A only or B only)
- Low latency conversion process (as low as 1 field in controlled timing environment)
- Compatible with the following input and output formats (auto selecting). One standard can be chosen for both outputs simultaneously:
 

▪ 1080p/59.94 (2GU only)	▪ 720p/59.94
▪ 1080p/50 (2GU only)	▪ 720p/50
▪ 1080i/59.94	▪ 720p/23.98
▪ 1080i/50	▪ SD525
▪ 1080p/23.98	▪ SD625
▪ 1080psf/23.98	
- Two individual conversion paths. The inputs can be different standards SD or HD and unlocked to the single output format.
- Frame sync with output phase control in Frames, Lines and pixels with respect to reference. Delay setting are stored per output format for a constant latency operation.
- 30 frames (1080i/p), 60 frames (720p) or 125 frames (SD) delay offset per channel
- ARC modes contain:
 

▪ Anamorphic	▪ LBox-14:9
▪ Center Cut	▪ PBox-4:3
▪ V-Zoom	▪ PBox-14:9
▪ LBox-16:9	▪ Variable H and V (50—200%)
- 16 Free individual programmable presets banks for:
  - Up/down/cross converter ARC A and B
  - Transparent ARC A and B
  - VI/WSS/S2016 insertion A and B
  - Embedder shuffling/Gain/Phase (-110 only)
- 5 GPI inputs assignable to various preset banks
- ARC triggers by VI, WSS, WSSext and S2016 (AFD)
- Individual color corrector (RGB and total gain, RGB and total black) for video path A and B
- Transparent for 16 channels of embedded audio, 8 per output for straight and cross mode, 16 channels per output for other modes.
- Embedded domain cross input audio shuffling, gain and phase control (GXG160 only)
- Embedding and de-embedding through synapse bus
- Video proc-amp (Y and C control)
- Hue control for NTSC inputs
- Locks to Tri-level, Bi-level or SDI input
- Timecode cross conversion
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

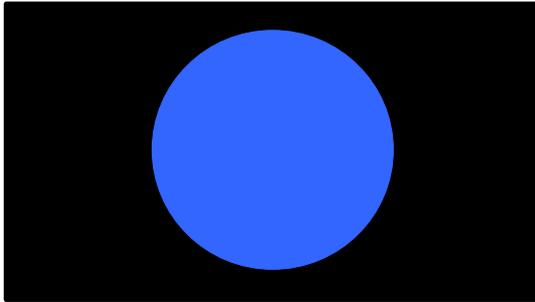
Complementary cards:

- DAC20, DAC24, DAS24, DIO48, ADC20, ADC24, DIO24

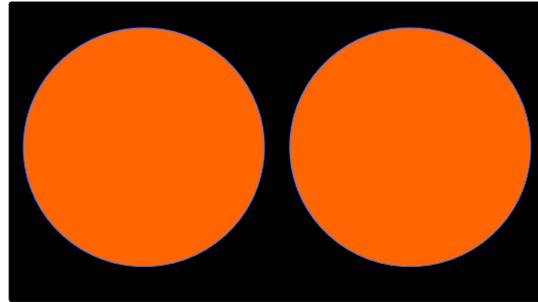
## Output configurations explained

The output stage of the GXG150/160 can be configured in multiple ways. In the straight and crossed mode the card acts a dual channel device with the same feature set as the 2XG100/110. The audio transparency is then reduced to 8 channel (2 groups) per video output. In A or B only the card is full 16 channel transparent. The additional side curtain, mix and side by side mode are explained below.

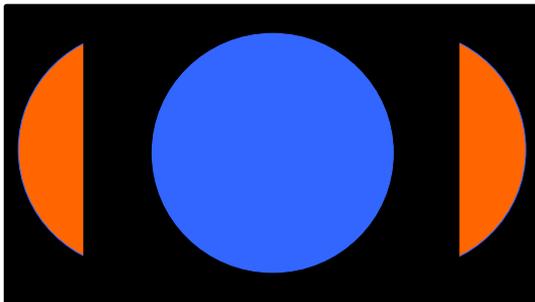
*INPUT 1*



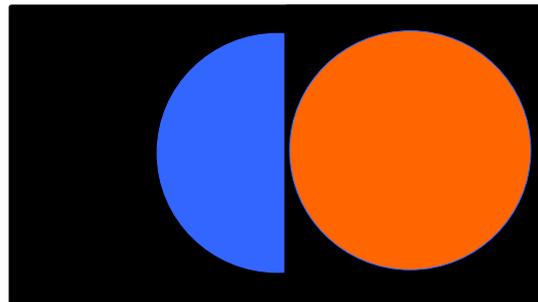
*INPUT 2*



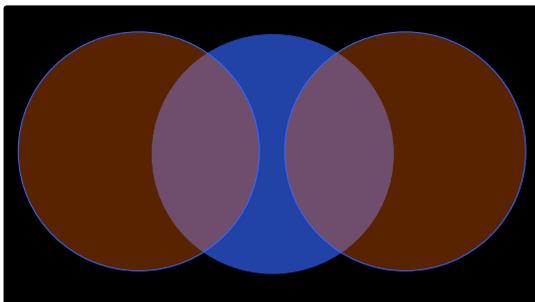
*SIDE CURTAIN 1*



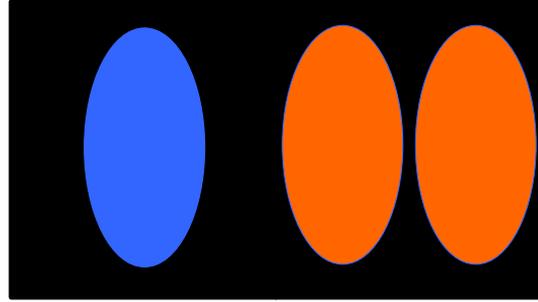
*SIDE CURTAIN 2*



*MIX*



*SIDE BY SIDE (3D)*



## Conversion abilities

The GXG150/160 cards are able to convert the following video formats:

CONVERSION		Output										
		1080psf23.97	1080p23.97	1080p50	1080p59.94	1080i59.94	1080i50	720p59.94	720p50	720p23.98	480i59.94(525)	576i50(625)
SDI Input	1080psf23.97	x	x		x	x		x		x	x	
	1080p23.97		x		x	x		x		x	x	
	1080p50			x			x		x			x
	1080p59.94	x	x		x	x		x		x	x	
	1080i59.94	x	x		x	x		x		x	x	
	1080i50			x			x		x			x
	720p59.94	x	x		x	x		x			x	
	720p50			x			x		x			x
	720p23.98	x	x		x	x		x		x	x	
	480i59.94(525)	x	x			x		x		x	x	
576i50(625)			x			x		x			x	
CVBS	480i59.94(NTSC)	x	x			x		x		x	x	
	576i50(PAL)			x			x		x			x

## Applications

- Truck input up down cross converter/synchronizer
- Infra structure up/down/cross conversion
- Up conversion with side-fill/curtain input
- Stereoscopic 3D transmission scaler
- Camera side by side equalization.

## Ordering information

### Module:

- **GXG150-I/O:** 3Gb/s, HD, SD-SDI up/down/cross converter with side curtain
- **GXG160-I/O:** 3Gb/s, HD, SD-SDI up/down/cross converter with audio shuffler proc-amp with side curtain

### Standard I/O:

- **BPH17-PANEL:** I/O-panel for GXG150/160 with RJ45 GPI/O

### Relay bypass I/O:

- **BHX17b-PANEL:** I/O-panel for GXG150/160 with RJ45 GPI/O with relay bypass

## Specifications

### Serial Video Input

<b>Standard</b>	SD,HD and 3Gb/s SDI: SMPTE 292M, SMPTE 259M, SMPTE424
<b>Number of Inputs</b>	2
<b>Connector</b>	BNC
<b>Equalization</b>	Typical maximum equalized length of Belden 1694A cable: 90m at 2.97Gb/s, 120m at 1.485Gb/s, and 250m at 270Mb/s
<b>Return Loss</b>	> 15dB up to 1.5GHz

### CVBS Video Input

<b>Standard</b>	PAL (ITU624-4), NTSC (SMPTE 170M)
<b>Encoding</b>	12 bits
<b>Number of Inputs</b>	1
<b>Impedance</b>	75 Ohms
<b>Return Loss</b>	> 35dB up to 10MHz
<b>Frequency Response</b>	< ±0.25dB (100KHz to 4.2MHz)
<b>Differential Gain</b>	< ±0.5% typical
<b>Differential Phase</b>	< ±0.2° typical
<b>Noise Floor</b>	< -57dB RMS (black video, 15KHz to 5MHz)
<b>C/L Gain</b>	< ±0.5%
<b>C/L Delay</b>	< ±9ns
<b>Minimum Delay</b>	1 field

### Serial Video Output

<b>Number of Outputs</b>	4
<b>Connector</b>	BNC
<b>Signal Level</b>	800mV nominal
<b>DC Offset</b>	0V ±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.) > 10dB up to 3GHz (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 600 mVp-p nominal, 75 Ohms terminated through loop
<b>Bi-level</b>	PAL Black Burst ITU624-4/SMPTE318, Composite NTSC SMPTE 170M 1Vp-p nominal, 75 Ohms terminated through loop

### Miscellaneous

<b>Weight</b>	Approx. 450g
<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>	<17 Watts