



## 2GU100/110 - 2HU100/110

Dual channel 3 Gb/s, HD up-converter with color corrector and optional cross input audio shuffler

A Synapse® product

The Synapse logo, which is the word "Synapse" written in a light blue, cursive script font with a slight shadow effect.

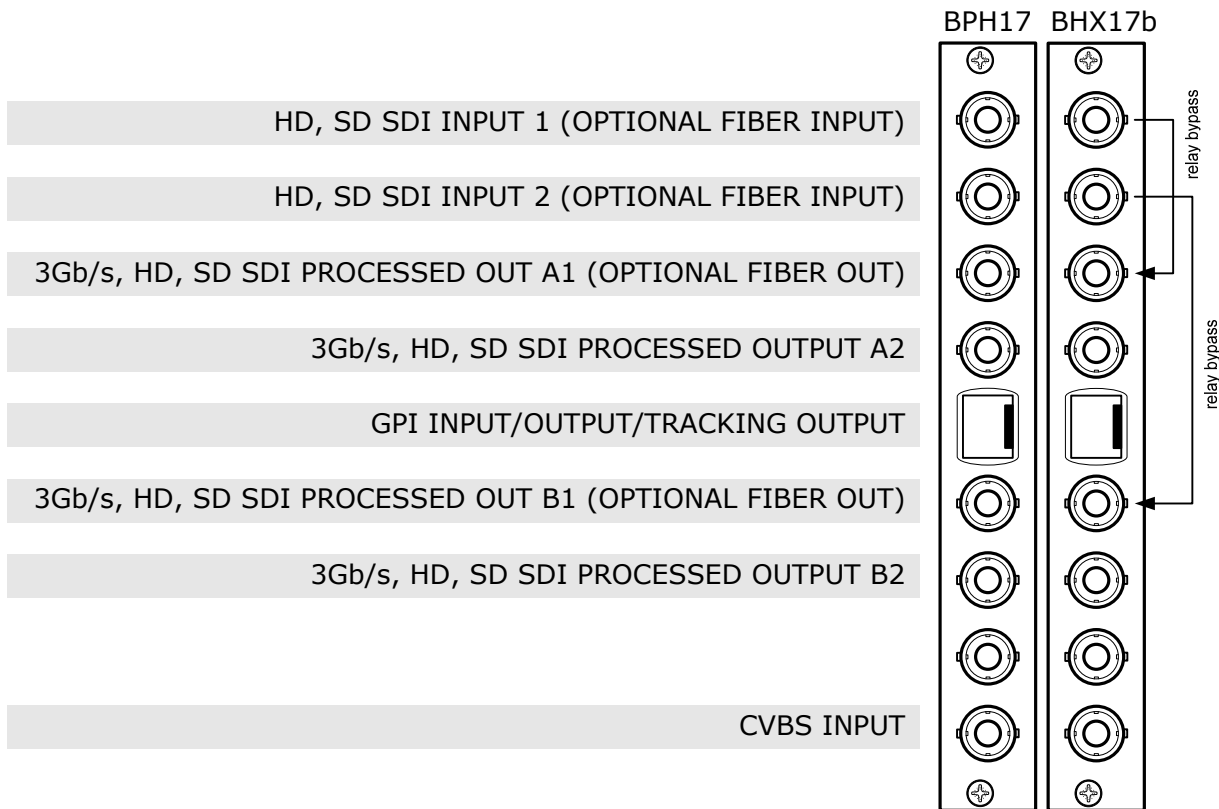
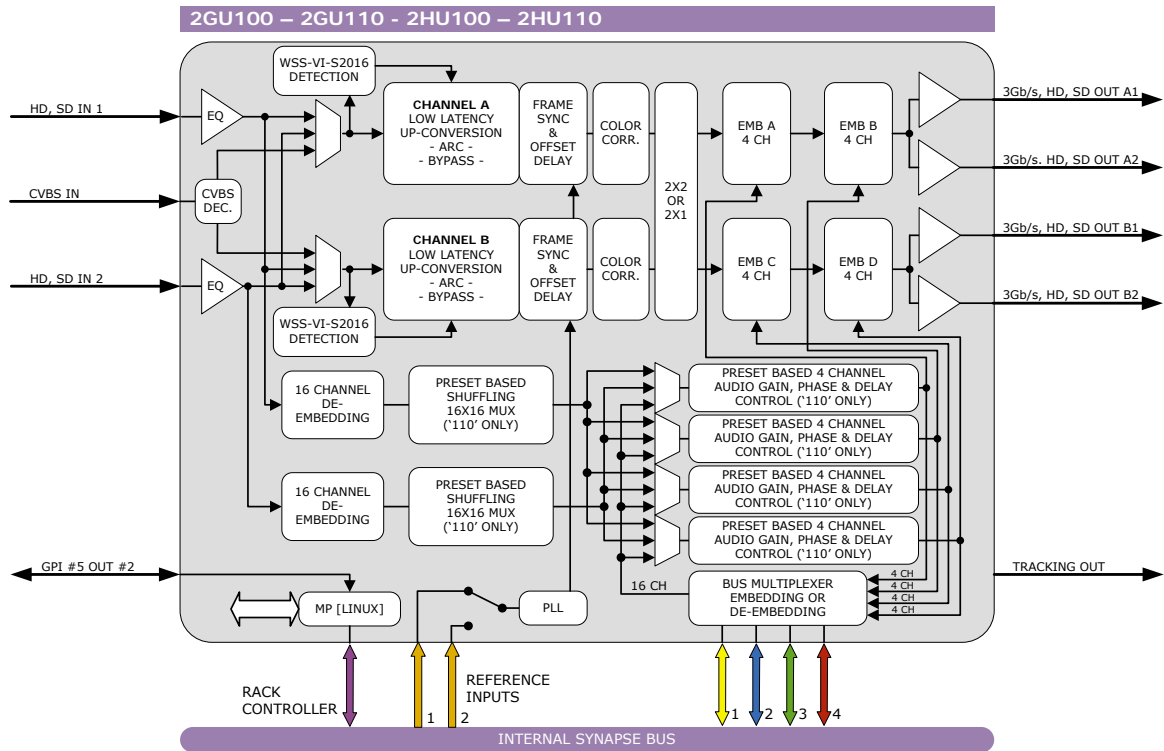


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Block schematic & I/O panel



## Features

The 2GU100/110 and 2HU100/110 are dual channel high-quality up converters. The optimized scaling and filter algorithms ensure crisp broadcast ready pictures from a native SD or HD source, by use of a 64 tap FIR filters. The cards allow you to simulcast 2 HD or 3Gb/s (2GU models only) signals from 2 native HD, SD or 1 CVBS and an SD infrastructure. The embedded audio is carried over to the HD or 3Gb/s domain. The appropriate aspect ratio can be applied by control of VI, WSS and GPI inputs by use of 8 presets per output that can store the aspect ratio conversions.

Beside a high quality up converter, the 2HU110 and 2GU110 are also very powerful cross-input audio shufflers and proc-amps. With the 110 models you can de-embed 2x 8 channels out of any of the 16 embedded audio channels of both HD/SD inputs and shuffle these channels. This means you can combine embedded audio channels from input 1 and embedded audio channels from input 2 in your 3Gb/s (2GU), HD, SD outputs. The embedded audio is carried over to the HD or 3Gb/s domain.

The **2GU100/110** is compatible with 270Mb/s, 1.5Gb/s and **3Gb/s** for full 1080p/50 or 1080p/59.94 use. The 2HU100/110 is compatible with SD SDI (270Mb/s) and HD-SDI (1.5Gb/s) and can be future upgraded to 3Gb/s compatibility

- 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)
  - 1080p/50 (2GU only)
  - 1080i/59.94
  - 1080i/50
  - 1080p/23.98
  - 1080psf/23.98
  - 720p/59.94
  - 720p/50
  - 720p/23.98
  - SD525
  - SD625
- 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
  - Center Cut
  - V-Zoom
  - LBox-16:9
  - LBox-14:9
  - PBox-4:3
  - PBox-14:9
  - Variable H and V (50—200%)
- 16 Free individual programmable presets banks for:
  - Up 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 8 channels of embedded audio per channel
- Embedded domain cross input audio shuffling, gain and phase control (-110 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 syncs and 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, DLA44, DLA43

## Conversion abilities

The 2GU100/110 can handle the following conversions (the 2HU100/110 can not handle the 1080p50 and 1080p59.94 output 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										
	1080p23.97		x									
	1080p50*			x								
	1080p59.94*				x							
	1080i59.94					x						
	1080i50						x					
	720p59.94							x				
	720p50								x			
	720p23.98									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

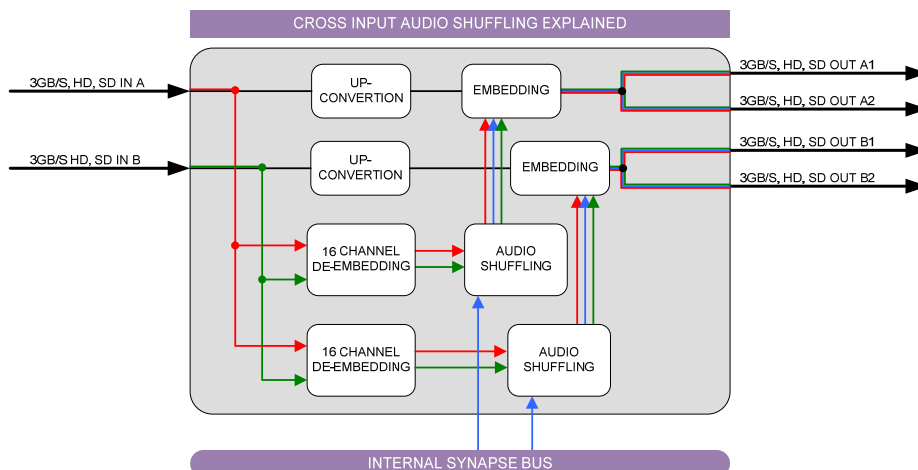
\* = 2GU models only

## Applications

- High quality low latency up-conversion (with zero motion artifacts) for 2 channels
- Free running fill-in camera positions up-conversion and synchronization

### 2HU110 and 2GU110 only:

- Combining embedded audio channels of 2 inputs into 1 (see image below)



## Ordering information

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**Module:**

- **2GU100:** Dual channel 3Gb/s up-converter with color corrector
- **2GU110:** Dual channel 3Gb/s up-converter with color corrector with cross input audio shuffler
- **2HU100:** Dual channel HD up-converter with color corrector\*
- **2HU110:** Dual channel HD up-converter with color corrector with cross input audio shuffler\*

**Standard I/O:**

- **BPH17\_2GUxxx:** I/O panel for 2GU-2HU100/110

**Relay bypass I/O:**

- **BHX17b\_2GUxxx:** I/O panel for 2GU-2HU100/110 with relay bypass

**Fiber outputs:**

- **BPH17T\_FC/PC\_2GUxxx:** I/O-panel for 2GU-2HU100/110 with two fiber transmitters on FC/PC
- **BPH17T\_SC\_2GUxxx:** I/O-panel for 2GU-2HU100/110 with two fiber transmitters on SC

**Fiber inputs:**

- **BPH17R\_FC/PC\_2GUxxx:** I/O-panel for 2GU-2HU100/110 with two fiber receivers on FC/PC
- **BPH17R\_SC\_2GUxxx:** I/O-panel for 2GU-2HU100/110 with two fiber receivers on SC

For other fiber options please contact AXON.

\* Upgradeable to 3Gb/s

## Specifications

### Serial video input

<b>Standard</b>	3Gb/s, HD and SD SDI:, SMPTE424, SMPTE 292M, SMPTE 259M
<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>Number of inputs</b>	1
<b>Impedance</b>	75 Ohms
<b>Return loss</b>	> 35dB up to 10MHz
<b>Frequency response</b>	< $\pm 0.25$ dB (100KHz to 4.2MHz)
<b>Differential gain</b>	< $\pm 0.5$ % typical
<b>Differential phase</b>	< $\pm 0.2^\circ$ typical
<b>Noise floor</b>	< -57dB RMS (black video, 15KHz to 5MHz)
<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 $\pm 0.5$ V
<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