



Synapse

2GU100/110

2HU100/110

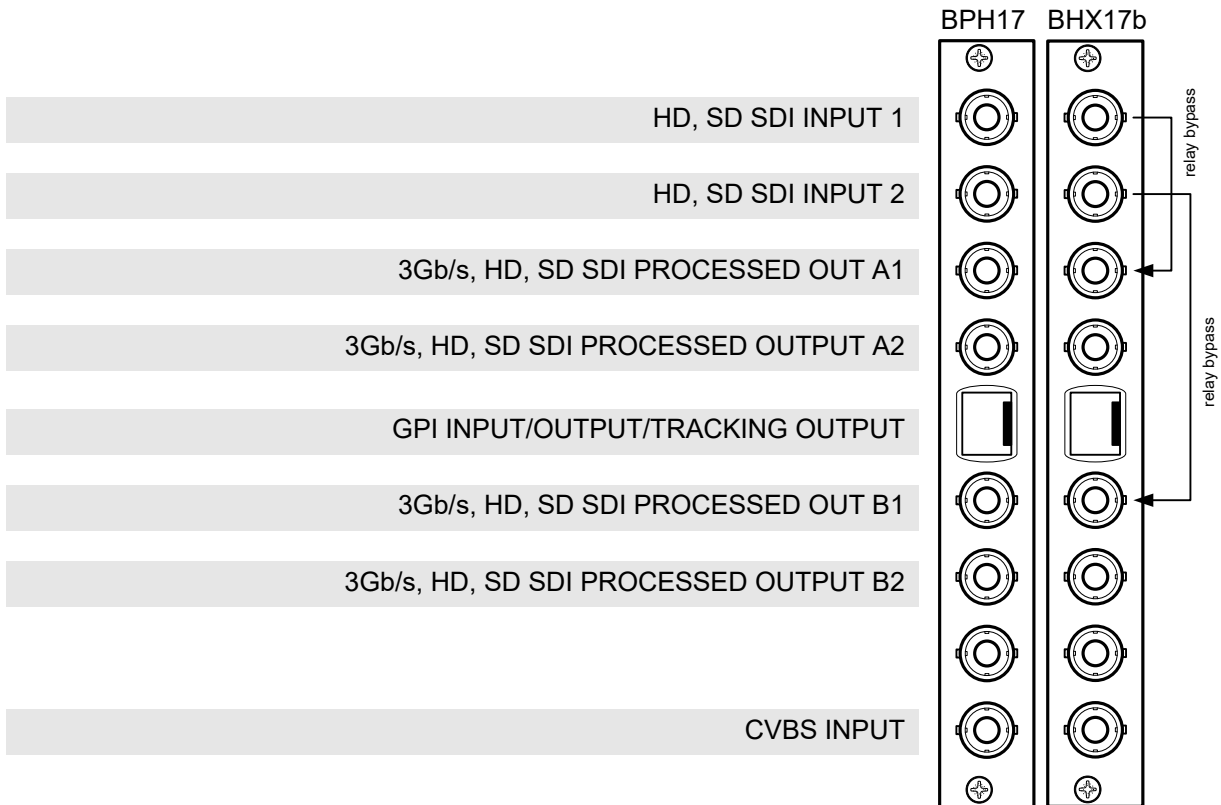
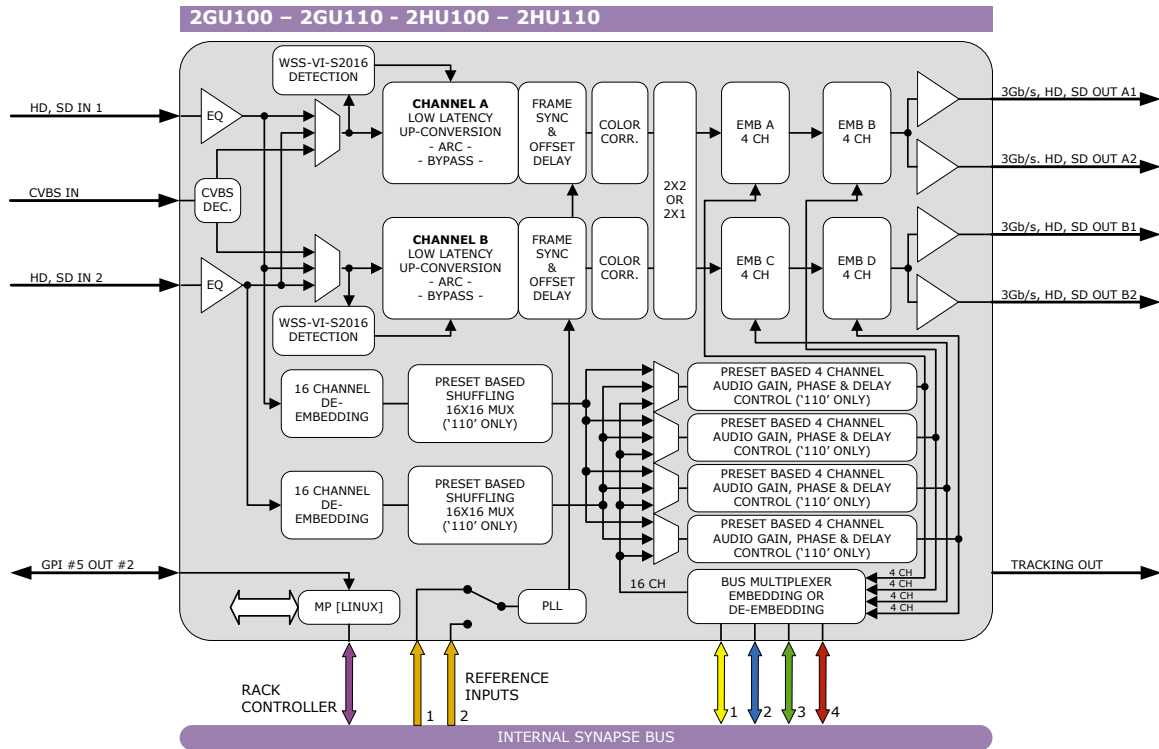
Dual channel 3 Gb/s, HD up-converter with color corrector and optional cross input audio shuffler

A Synapse® product



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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 **2GU**100/110 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)	○ 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 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

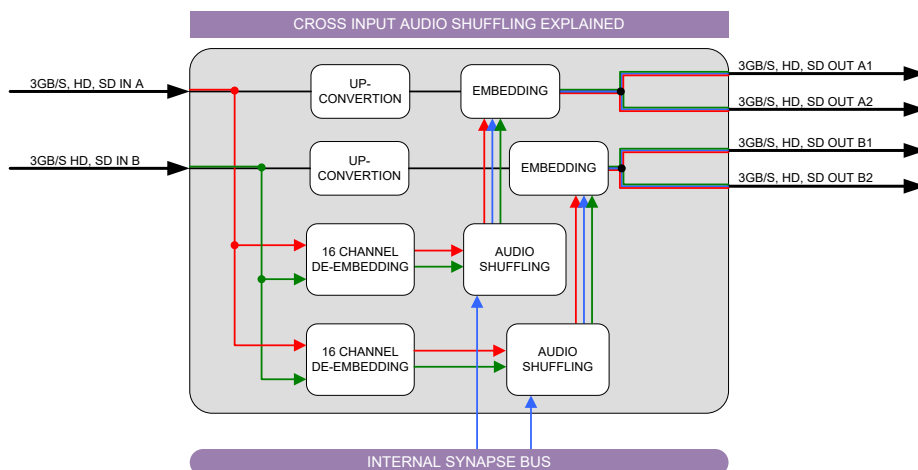
* = 2GU models only

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

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

Specifications

Serial video input

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

CVBS video input

Standard	PAL (ITU624-4), NTSC (SMPTE 170M)
Number of inputs	1
Impedance	75 Ohms
Return loss	> 35dB up to 10MHz
Frequency response	< ± 0.25 dB (100KHz to 4.2MHz)
Differential gain	< $\pm 0.5\%$ typical
Differential phase	< $\pm 0.2^\circ$ typical
Noise floor	< -57dB RMS (black video, 15KHz to 5MHz)
Minimum delay	1 field

Serial video output

Number of outputs	4
Connector	BNC
Signal level	800mV nominal
DC offset	0V ± 0.5 V
Rise/Fall time	135ps nominal
Overshoot	< 10% of amplitude
Return loss	> 15dB up to 1.5GHz (typ) > 10dB up to 3GHz (typ)
Wideband jitter	< 0.2UI

Reference Input through RRC

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

Miscellaneous

Weight	Approx. 450g
Operating temperature	0 °C to +40 °C
Dimensions	137 x 296 x 20 mm (HxWxD)

Electrical

Voltage	+24V to +30V
Power	<17 Watts