



Synapse

GSU100/110

HSU100/110

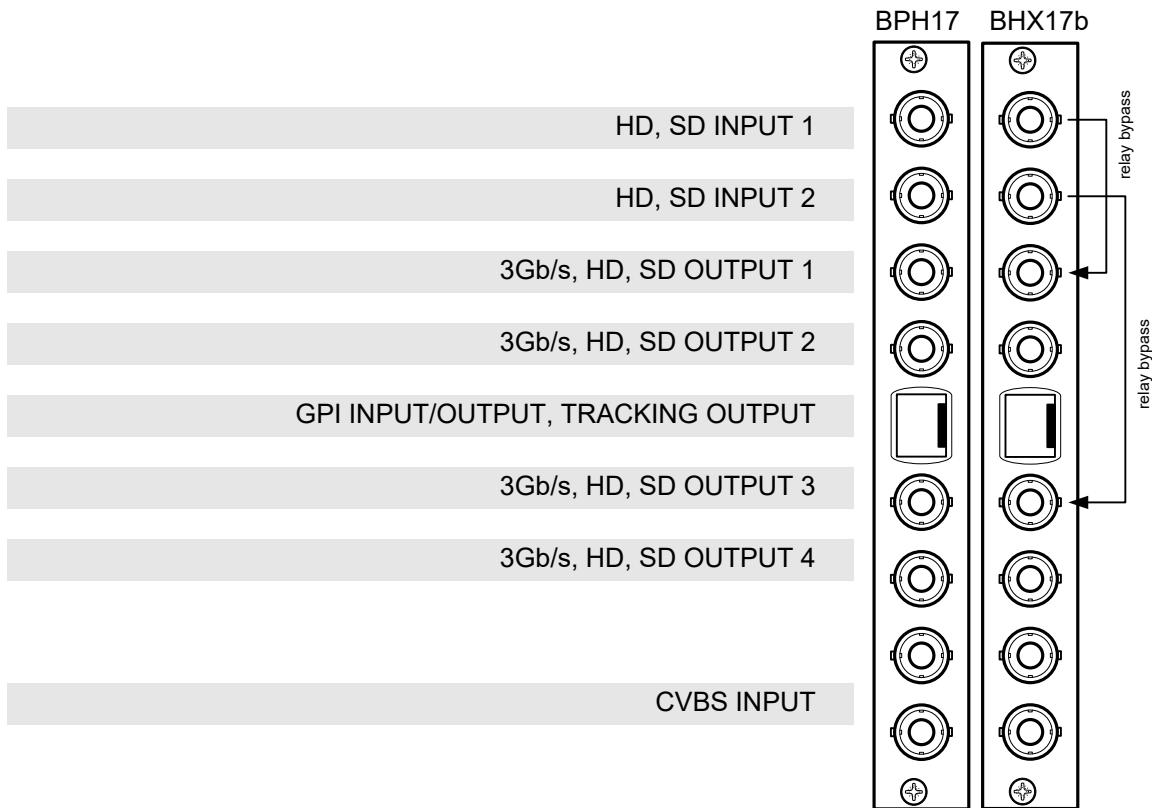
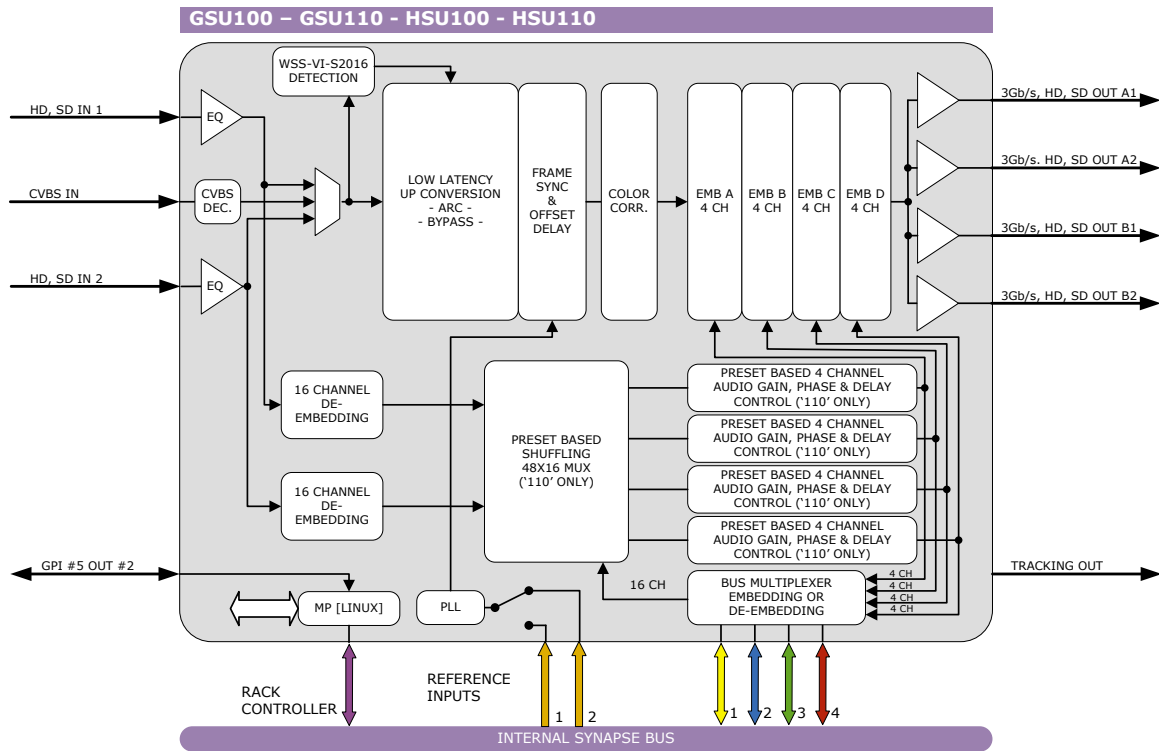
3Gb/s, HD, SD up converter/synchronizer with optional audio shuffler

A Synapse® product



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Block schematic & I/O panel



Features

The GSU100/110 and HSU100/110 are *low latency* up-converters with 16 channel audio transparency. The powerful matrix multiplexer can feed audio from the embedded domain into the Synapse bus to an ADD-ON card like the DIO48. This matrix multiplexer also allows for audio to be inserted from the ADD-ON bus into the embedded domain of the GSU100/110 or HSU100/110.

The GSU110 or HSU110 add a full audio shuffler and audio proc-amp with gain and phase control.

The GSU100/110 is compatible with 270Mb/s, 1.5Gb/s and 3Gb/s for full 1080p/50 or 1080p/59.94 use. The HSU100/110 are 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.
- 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)
- Transparent for 16 channels of embedded audio
- Individual color corrector (RGB and total gain, RGB and total black)
- Embedded domain cross input audio shuffling, gain and phase control (GSU/HSU110 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
- WST to OP47 cross conversion
- Timecode cross conversion
- Auxiliary timecode input, allowing for 2 separate timecodes
- CC-608 to CC-708 conversion
- 6 Line Vertical Ancillary Blanking transparency in transparent mode
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

Complementary cards:

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

Conversion abilities

The G-HSU100/110 can handle the following conversions:

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

* = GSU models only

Applications

- Truck input up converter/synchronizer
- Infra structure up/down/cross conversion

Ordering information

Module:

- **GSU100:** 3Gb/s, HD, SD-SDI up converter
- **GSU110:** 3Gb/s, HD, SD-SDI up converter with audio shuffler proc-amp
- **HSU100:** HD, SD-SDI up converter*
- **HSU110:** HD, SD-SDI up converter with audio shuffler proc-amp*

Standard I/O:

- **BPH17_GSUxxx:** I/O-panel for G-HSU100/110

Relay bypass I/O:

- **BHX17b_GSUxxx:** I/O-panel for G-HSU100/110

Specifications

Serial Video Input

Standard	SD,HD and 3Gb/s SDI: SMPTE 292M, SMPTE 259M, SMPTE424
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)
Encoding	12 bits
Number of Inputs	1
Impedance	75 Ohms
Return Loss	> 35dB up to 10MHz
Frequency Response	< ± 0.25 dB (100KHz to 4.2MHz)
Differential Gain	< ± 0.5 % typical
Differential Phase	< ± 0.2 ° typical
Noise Floor	< -57dB RMS (black video, 15KHz to 5MHz)
C/L Gain	< ± 0.5 %
C/L Delay	< ± 9 ns
Minimum Delay	3 lines

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