



GEB990-950-900-550-500
HEB990-950-900-550-500

**3Gb/s, HD, SD digital or analog audio embedder with
TWINS dual channel function**

A Synapse® product

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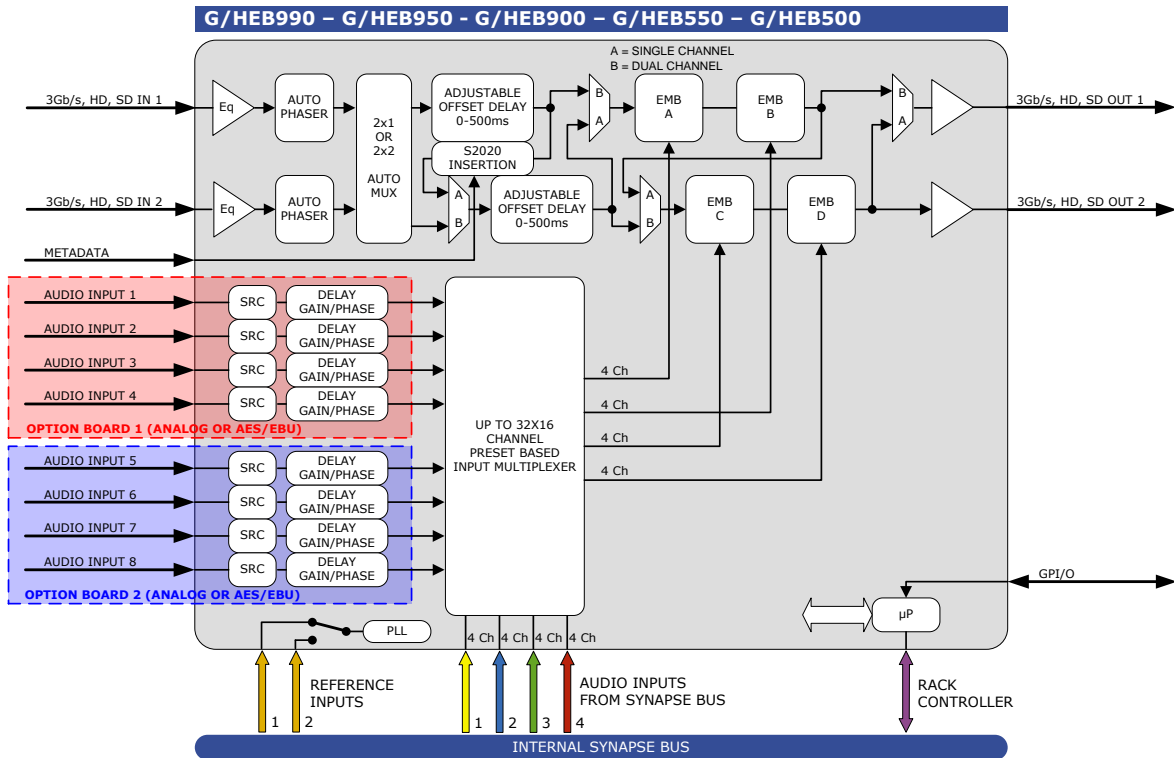


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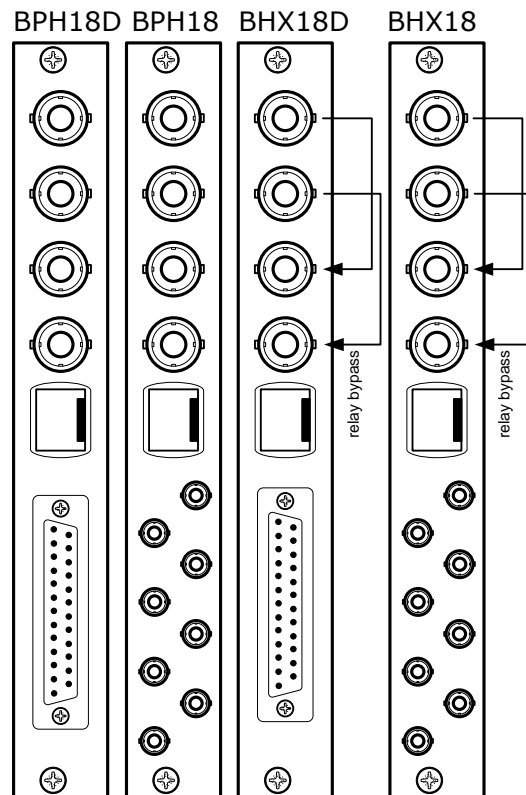
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Block schematic & I/O panel



- 3Gb/s, HD, SD SDI INPUT 1 (OPTIONAL FIBER INPUT)
- 3Gb/s, HD, SD SDI INPUT 2 (OPTIONAL FIBER INPUT)
- 3Gb/s, HD, SD SDI OUT 1 (OPTIONAL FIBER OUTPUT)
- 3Gb/s, HD, SD SDI OUT 2 (OPTIONAL FIBER OUTPUT)
- GPI INPUT/OUTPUT
- AES/EBU OR ANALOG AUDIO INPUTS



Features

The G-HEB990-950-900-550-500 is a 3GB/s SDI, HD SDI and SD SDI audio embedder. It is capable of inserting or appending free-running AES/EBU digital audio channels or analog audio channels. The card has 2 option input boards: 4 mono analog audio inputs (4ch total) per board, or 4 stereo AES/EBU inputs (8ch total) per board.

The core of these modules consists of four embedder-blocks Emb_A, Emb_B, Emb_C and Emb_D and 2 delay blocks. These blocks can be used in series for a single SDI 4 group embedder with up to 1 sec of video offset delay, or in parallel for 2 individual channels with each 2 group embedders and individual 500ms offset delay in a fully separate (clock lock*) channel TWINS function. Each block is capable of embedding 4 audio channels into one group, which gives a total of 16 audio channels into four (or 2x2) groups. The TWINS mode is a single command operation and controls 4 individual selection switches as can be seen in the block diagram.

In addition, four ADD-ON cards can be connected to create a routing matrix. The architecture of Emb_A to Emb_D blocks is identical. The local AES inputs can be controlled to adjust Phase, Gain and delay (on the fly).

Future upgrades are possible, like for instance the HEB900 can be future upgraded to HEB990, GEB900 or GEB990. This allows for staged implementation of HD infrastructures and spread the cost over multiple budget years.

- 2 SDI inputs (with auto switch on carrier loss, and switch back function)
- Compatible with the following input formats (auto selecting) (1080p only for GEB):

▪ 1080p/59.94	▪ 720p/59.94
▪ 1080p/50	▪ 720p50
▪ 1080i/59.94	▪ 720p30
▪ 1080i/50	▪ 720p25
▪ 1080p/30	▪ 720p24
▪ 1080p25	▪ SD525
▪ 1080p(sf)/23.98	▪ SD625
▪ 1035i/59.94	
- Dual offset audio delay adjustable between 0 and 5000ms
- Dual (TWINS*) or single channel SDI mode
- Up to 8 AES/EBU inputs with sample rate converter (available with 110 Ohm and 75 Ohm inputs)
- Up to 8 analog audio inputs (available with balanced or unbalanced connectors)
- AES/EBU inputs accept synchronous streams like Dolby E and asynchronous up to 96kHz sampling via the built in Sample Rate Converters.
- Auto SRC-off for bitstream sources like Dolby E
- 8 extra AES/EBU inputs through the Synapse bus
- 2 (2x1) SDI + embedded audio outputs
- 8 presets that configure all 16 input channels at once. controlled by GPI or ACP (Cortex)
- Append and overwrite modes
- Audio level and phase control
- Audio offset delay up to 5000 ms
- 16 extra audio channels (4 groups) with ADD-ON card for input multiplexing
- Peak detection 0 dBFS
- Silence detection with threshold (-100 to -20dBFS) and time control (1 to 255 sec)
- Transparent for ATC time code RP188, RP196, RP215
- Locks to Tri-level, Bi-level syncs or SDI input
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)
- Optional 1 or 2 fiber inputs, 1 or 2 fiber outputs or a fiber in and output (replacing 1 SDI in and output) on the I/O panel
- Optional relay bypass (BHX18 or BHX18D)

* In dual mode, or 2-SDI shuffle mode, the input signals need to be of the same SDI format

Applications

- 3Gb/s, HD and SD audio embedding
- Preset based 16 channel audio embedding
- High density studio embedding functions where minimal space is required (36 3Gb/s SDI embedders in 4RU)
- On the fly audio routing to two individual SD, HD and 3Gb/s SDI video streams.
- Copied audio embedding into two individual SD, HD and 3Gb/s SDI video streams
- Fiber I/O embedding with an optical and electrical switchable input and a simultaneous powered optical and electrical SDI output.

Complementary cards:

- ADC20, ADC24, DIO24, DIO48, DLA44, DLA43

Input options

This platform has 2 option boards which define the inputs of the card. Refer to the block schematic for the position of the option boards. These are the options:

Card model	Option board 1	Option board 2
GEB990	4 AES/EBU inputs (8 channels)	4 AES/EBU inputs (8 channels)
HEB990	4 AES/EBU inputs (8 channels)	4 AES/EBU inputs (8 channels)
GEB950	4 AES/EBU inputs (8 channels)	4 analog inputs (4 channels)
HEB950	4 AES/EBU inputs (8 channels)	4 analog inputs (4 channels)
GEB900	4 AES/EBU inputs (8 channels)	None
HEB900	4 AES/EBU inputs (8 channels)	None
GEB550	4 analog inputs (4 channels)	4 analog inputs (4 channels)
HEB550	4 analog inputs (4 channels)	4 analog inputs (4 channels)
GEB500	4 analog inputs (4 channels)	None
HEB500	4 analog inputs (4 channels)	None

Ordering information

Module:

- **GEB500:** 3Gb/s, HD, SD 4 channel analog audio dual SDI embedder with TWINS dual channel function
- **GEB550:** 3Gb/s, HD, SD 8 channel analog audio dual SDI embedder with TWINS dual channel function
- **GEB900:** 3Gb/s, HD, SD 8 channel digital audio dual SDI embedder with TWINS dual channel function
- **GEB950:** 3Gb/s, HD, SD 8 channel digital audio and 4 channel analog audio dual SDI embedder with TWINS dual channel function
- **GEB990:** 3Gb/s, HD, SD 16 channel digital dual SDI audio embedder with TWINS dual channel function
- **HEB500:** HD, SD 4 channel analog audio dual SDI embedder with TWINS dual channel function
- **HEB550:** HD, SD 8 channel analog audio dual SDI embedder with TWINS dual channel function
- **HEB900:** HD, SD 8 channel digital audio dual SDI embedder with TWINS dual channel function
- **HEB950:** HD, SD 8 channel digital audio and 4 channel analog audio dual SDI embedder with TWINS dual channel function
- **HEB990:** HD, SD 16 channel digital dual SDI audio embedder with TWINS dual channel function

Standard I/O:

- **BPH18_xEBxxx:** I/O panel for GEBxxx/HEBxxx with unbalanced audio inputs
- **BPH18D_xEBxxx:** I/O panel for GEBxxx/HEBxxx with balanced audio inputs

Relay bypass I/O:

- **BHX18_xEBxxx:** relay I/O panel for GEBxxx/HEBxxx with unbalanced audio inputs
- **BHX18D_xEBxxx:** relay I/O panel for GEBxxx/HEBxxx with balanced audio inputs

Fiber outputs*:

- **BPH18T_FC/PC_xEBxxx:** I/O panel for GEBxxx/HEBxxx with one fiber transmitter
- **BPH18T2_FC/PC_xEBxxx:** I/O panel for GEBxxx/HEBxxx with two fiber transmitters
- **BPH18DT_FC/PC_xEBxxx:** I/O panel with DSub for G/HEBxxx with one fiber transmitter
- **BPH18DT2_FC/PC_xEBxxx:** I/O panel with DSub for G/HEBxxx with two fiber transmitters

Fiber inputs*:

- **BPH18R_FC/PC_xEBxxx:** I/O panel for GEBxxx/HEBxxx with one fiber receiver
- **BPH18R2_FC/PC_xEBxxx:** I/O panel for GEBxxx/HEBxxx with two fiber receivers
- **BPH18DR_FC/PC_xEBxxx:** I/O panel with DSub for G/HEBxxx with one fiber receiver
- **BPH18DR2_FC/PC_xEBxxx:** I/O panel with DSub for G/HEBxxx with two fiber receivers

Fiber inputs and outputs*:

- **BPH18TR_FC/PC_xEBxxx:** I/O panel for G/HEBxxx with one fiber transmitter and one receiver
- **BPH18DTR_FC/PC_xEBxxx:** I/O panel for G/HEBxxx with one fiber transmitter and one receiver

* Ordering information fiber input and/or output modules:
 - In case of SC connector: replace FC/PC by SC.

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

Serial Video Output

Number of Outputs	2
Connector	BNC
Signal Level	800mV nominal
DC Offset	0V \pm 0.5V
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

AES/EBU Input

Connector	25 pins female sub-D (balanced) or DIN1.0/2.3 coax (unbalanced)
Standard	AES-1992 for balanced synchronous or asynchronous PCM/AES, SMPTE 276M for single ended synchronous or asynchronous PCM/AES
Number of Inputs	4 or 8
Sampling Rate	32 kHz to 96 kHz asynchronous 48 kHz Synchronous (SRC=off)
Resolution	24 bits
Minimum Input/Output Delay	2 ms
Impedance	110 Ohms or 75 Ohms
Level	0.2V to 1V nom for Coax, 2V to 7V for balanced operation

Analog Audio Input

Connector	25 pins female sub-D (balanced) or DIN1.0/2.3 coax (unbalanced)
Standard	High impedance 24 bit A/D converter
Number of Inputs	4 or 8
Resolution	24 bits
Minimum Input/Output Delay	2 ms
Impedance	10 kOhm
Level	Up to +24dBu for 0dBFS embedding, switchable to +18, +15 and +12dBu

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. 250g
Operating Temperature	0 °C to +50 °C
Dimensions	137 x 296 x 20 mm (HxLxD)

Electrical

Voltage	+24V to +30V
Power	<15 Watts