



GRB990-950-590-550
HRB990-950-590-550

**3Gb/s, HD, SD digital or analog audio de-embedder,
re-embedder, embedded domain shuffler**

A Synapse ® product



Synapse

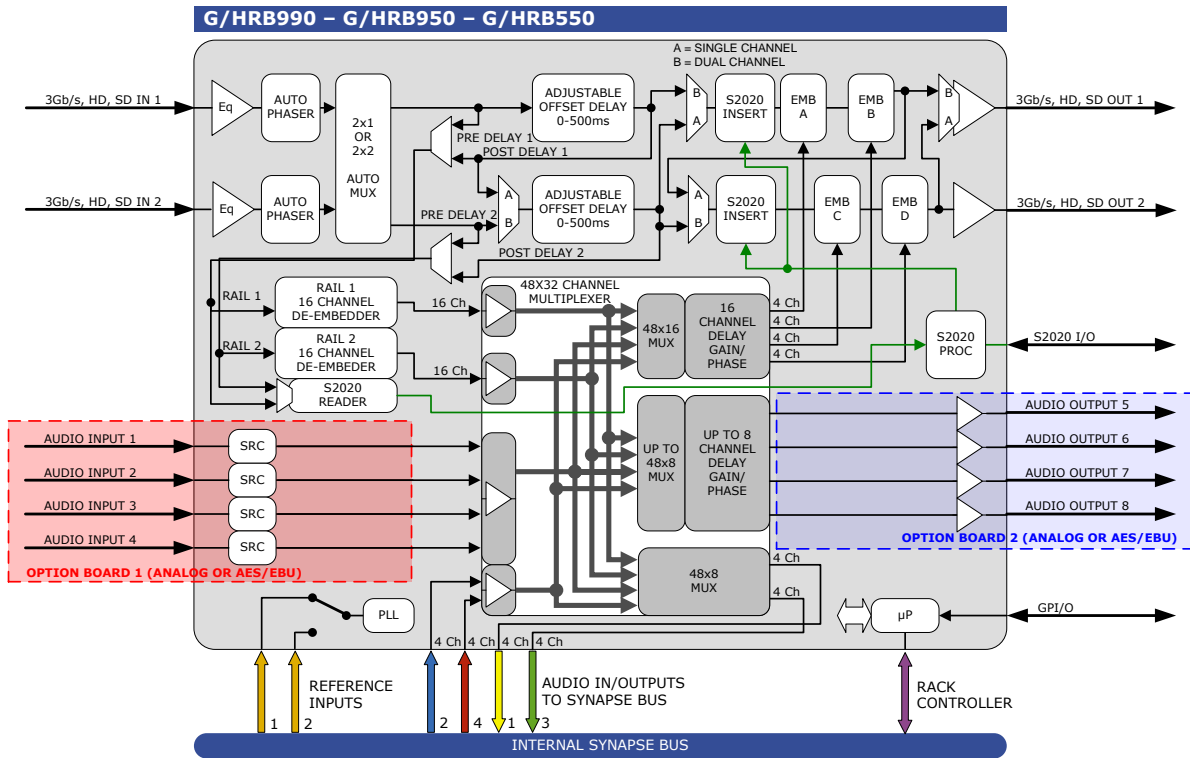


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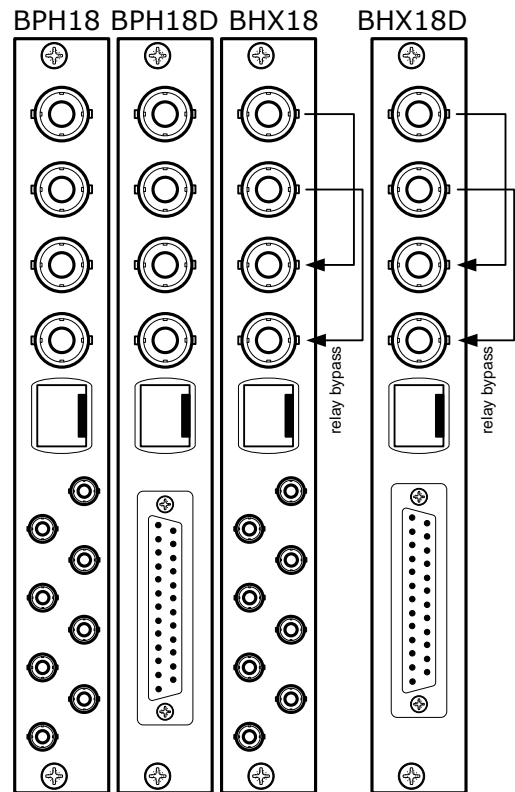
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Block schematic & I/O panel



- 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 and METADATA (S2020) INPUT/OUTPUT
- AES/EBU OR ANALOG INPUT 1
- AES/EBU OR ANALOG INPUT 2
- AES/EBU OR ANALOG INPUT 3
- AES/EBU OR ANALOG INPUT 4
- AES/EBU OR ANALOG OUTPUT 1
- AES/EBU OR ANALOG OUTPUT 2
- AES/EBU OR ANALOG OUTPUT 3
- AES/EBU OR ANALOG OUTPUT 4



Features

The G/HRB990-950-590-550 is a 48x32 channel re-embedder, with a 16 channel embedder (2x 8 channels in 2 individual SDI streams), 4 AES/EBU or analog outputs, and 4 AES channels to the Synapse ADD-ON bus.

The source audio channels can be derived from 2 x 16 channel embedded domain streams, 4 AES/EBU or analog physical audio inputs and 8 channels from the Synapse bus

The HRBxx0 can be future upgraded to GRBxx0. 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)
- 2 SDI outputs (2x1 or 2x2 function)
- Compatible with the following input formats (auto selecting) (1080p only for GXX):

▪ 1080p/59.94	▪ 1080p(sf)/23.98
▪ 1080p/50	▪ 1035i/59.94
▪ 1080i/59.94	▪ 720p/59.94
▪ 1080i/50	▪ 720p50
▪ 1080p/30	▪ SD525
▪ 1080p25	▪ SD625
- Dual offset VIDEO delay adjustable between 0 and 500ms
- Dual (TWINS*) or single channel SDI mode
- 4 AES/EBU inputs with sample rate converter (available with 110 Ohm and 75 Ohm inputs), or 4 analog inputs (available with balanced or unbalanced connectors).
- 4 AES/EBU outputs or 4 analog outputs.
- AES/EBU inputs accept synchronous streams like Dolby E and asynchronous up to 192kHz sampling via the built in Sample Rate Converters.
- Auto SRC-off for bitstream sources like Dolby E
- 4 extra AES/EBU inputs through the Synapse bus
- 8 presets that configure all I/O channels. controlled by GPI or ACP (Cortex)
- S2020 metadata insertion from an external source
- Append and overwrite modes
- Audio level and phase control
- Audio offset delay up to 5000 ms
- Peak detection 0dBFS
- Silence detection with threshold (-100 to -20dBFS) and time control (1 to 255 sec)
- 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

Complementary cards:

- DAC20, DAC24, DAS24, DIO48, ADC20, ADC24, DIO24, DLA44, DLA43

Applications

- Embedded domain shuffling with external (manipulated from internal) domain AES/EBU channels
- 3rd party audio processing from an embedded domain source

Input/Output 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
GRB990	4 AES/EBU inputs (8 channels)	4 AES/EBU outputs (8 channels)
HRB990	4 AES/EBU inputs (8 channels)	4 AES/EBU outputs (8 channels)
GRB950	4 AES/EBU inputs (8 channels)	4 analog outputs (4 channels)
HRB950	4 AES/EBU inputs (8 channels)	4 analog outputs (4 channels)
GRB550	4 analog inputs (4 channels)	4 analog outputs (4 channels)
HRB550	4 analog inputs (4 channels)	4 analog outputs (4 channels)
GRB590	4 analog inputs (4 channels)	4 AES/EBU outputs (8 channels)
HRB590	4 analog inputs (4 channels)	4 AES/EBU outputs (8 channels)

Ordering information

Module:

- **GRB990:** 3Gb/s, HD, SD digital audio re-embedder/shuffler
- **HRB990:** HD, SD digital audio re-embedder/shuffler
- **GRB950:** 3Gb/s, HD, SD digital audio re-embedder/shuffler with analog outputs
- **HRB950:** HD, SD digital audio re-embedder/shuffler with analog outputs
- **GRB550:** 3Gb/s, HD, SD analog audio re-embedder/shuffler
- **HRB550:** HD, SD analog audio re-embedder/shuffler

Standard I/O:

- **BPH18_xRBxxx:** I/O panel for GRBxxx/HRBxxx with unbalanced audio in and outputs
- **BPH18D_xRBxxx:** I/O panel for GRBxxx/HRBxxx with balanced audio in and outputs

Relay bypass I/O:

- **BHX18_xRBxxx:** relay I/O panel for GRBxxx/HRBxxx
- **BHX18D_xRBxxx:** relay I/O panel with DSub connector for GRBxxx/HRBxxx

Fiber outputs*:

- **BPH18T_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with one fiber transmitter
- **BPH18T2_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with two fiber transmitters
- **BPH18DT_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with one fiber transmitter
- **BPH18DT2_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with two fiber transmitters

Fiber inputs*:

- **BPH18R_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with one fiber receiver
- **BPH18R2_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with two fiber receiver
- **BPH18DR_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with one fiber receiver
- **BPH18DR2_FC/PC_xRBxxx:** I/O panel for GRBxxx/HRBxxx with two fiber receiver

Fiber inputs and outputs*:

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

AES/EBU Output

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 outputs	4 or 8
Sampling Rate	48 kHz Synchronous
Resolution	24 bits
Minimum Input/Output Delay	2 ms
Impedance	110 Ohms or 75 Ohms
Level	1V nom for Coax, 2V for balanced operation

Analog Audio Output

Connector	25 pins female sub-D (balanced) or DIN1.0/2.3 coax (unbalanced)
Number of outputs	4 or 8
D/A Resolution	24 bits
Minimum Input/Output Delay	2 ms
Impedance	100 Ohms balanced and unbalanced
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
Bi-level	600 mVp-p nominal, 75 Ohms terminated through loop 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