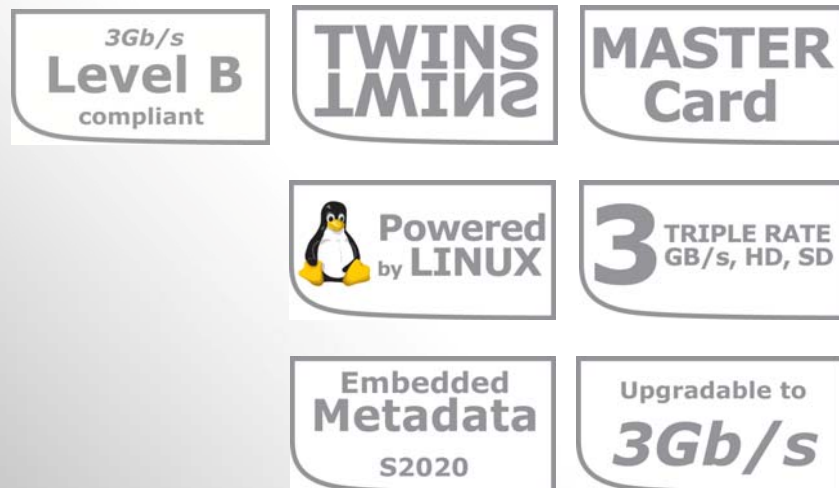




GEB500/550
HEB500/550
GEB900/950/990
HEB900/950/990

3Gb/s, HD, SD 4, 8 or 16 channel enhanced audio embedder with 'TWINS' dual channel function

Installation and Operation manual





Synapse

TECHNICAL MANUAL

GEB500/550/900/950/990

HEB500/550/900/950/990



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WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE

- ALWAYS disconnect your entire system from the AC mains before cleaning any component. The product frame (SFR18 or SFR04) must be terminated with three-conductor AC mains power cord that includes an earth ground connection. To prevent shock hazard, all three connections must always be used.
- NEVER use flammable or combustible chemicals for cleaning components.
- NEVER operate this product if any cover is removed.
- NEVER wet the inside of this product with any liquid.
- NEVER pour or spill liquids directly onto this unit.
- NEVER block airflow through ventilation slots.
- NEVER bypass any fuse.
- NEVER replace any fuse with a value or type other than those specified.
- NEVER attempt to repair this product. If a problem occurs, contact your local Axon distributor.
- NEVER expose this product to extremely high or low temperatures.
- NEVER operate this product in an explosive atmosphere.

Warranty: Axon warrants their products according to the warranty policy as described in the general terms. That means that Axon Digital Design BV can only warrant the products as long as the serial numbers are not removed.

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Date created: 03-12-2009
Date last revised: 21-08-2012

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This product complies with the requirements of the product family standards for audio, video, audio-visual entertainment lighting control apparatus for professional use as mentioned below.



EN60950	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

Axon Digital Design
GEB500/550/900/950/990
HEB500/550/900/950/990



FOR HOME OR OFFICE USE

This device complies with part 15 of the FCC Rules
Operation is subject to the following two conditions:
(1) This device may cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Table of Contents

Introduction to Synapse	5
An Introduction to Synapse	5
Local Control Panel	5
Remote Control Capabilities	5
Unpacking and Placement	6
Unpacking	6
Placing the card	6
A Quick Start	7
When Powering-up	7
Changing settings and parameters	7
Front Panel Control	7
Example of changing parameters using front panel control	8
Axon Cortex Software	9
Menu Structure Example	9
The GEB990/950/900/550/500	10
Introduction	10
Features	10
Applications	11
Block schematic	11
Settings Menu	12
Introduction	12
Inp_Select	12
Switch-Back	12
Lock-Mode	12
Out-Frmt	12
Phaser1-Offset	12
Phaser2-Offset	12
F-delay1	13
V-delay1	13
H-delay1	13
F-delay2	13
V-delay2	13
H-delay2	14
Delay-Status	14
Control	14
GPI-Ctrl	14
ExtMode	14
Active-Preset	14
Edit-Preset	14
PrstEditView	15
#Preset_Name	15
#Emb-AB-Mode	15
#Emb-CD-Mode	15
#Emb_A_Sel ~ #Emb_D_Sel	15
#SourceEmb-A1 ~ #SourceEmb-A4	15
#Emb-A1 ~ #EmbA4	16
#SourceEmb-B1 ~ #SourceEmb-B4	16
#Emb-B1 ~ #EmbB4	16
#SourceEmb-C1 ~ #SourceEmb-C4	16
#Emb-C1 ~ #EmbC4	16
#SourceEmb-D1 ~ #SourceEmb-D4	16
#Emb-D1 ~ #EmbD4	17
#LocGainInA1 ~ #LocGainInA4	17
#LocGainInA5 ~ #LocGainInA8	17
#LocGainInB1 ~ #LocGainInB4	17
#LocGainInB5 ~ #LocGainInB8	17
#LocPhaseInA1 ~ #LocPhaseInA4	17
#LocPhaseInA5 ~ #LocPhaseInA8	17
#LocPhaseInB1 ~ #LocPhaseInB4	17
#LocPhaseInB5 ~ #LocPhaseInB8	17
#LocDelayInA1 ~ #LocDelayInA4	18
#LocDelayInA5 ~ #LocDelayInA8	18
#LocDelayInB1 ~ #LocDelayInB4	18
#LocDelayInB5 ~ #LocDelayInB8	18
SRC_AES-A1/2 ~ SRC_AES-A7/8	18

SRC_AES-B1/2 ~ SRC_AES-B7/8	18
NonPCM-Bypass	18
OdBFS-IN	18
Fade-Time	19
Audio-Phase	19
AudioStatusBits	19
Silence-Time	19
Silence-Level	19
S2020-Emb-AB	20
S2020-Emb-CD	20
Insert_Line	20
Insert_Method	20
Insert_Ass_Ch	20
Status Menu	21
Introduction	21
SDI-Input_1	21
SDI-Input_2	21
SDI-Map_1	21
SDI-Map_2	21
SDI-Freq_1	21
SDI-Freq_2	21
CRC-Stat_1	21
CRC-Stat_2	21
Ref-Format	22
Locked-To	22
Active-Out1	22
Active-Out2	22
GrpInUse_AB	22
GrpInUse_CD	22
LocStatInA1 ~ LocStatInA8	22
LocStatInB1 ~ LocStatInB8	22
LocFrmtInA1/2 ~ LocFrmtInA7/8	23
LocFrmtInB1/2 ~ LocFrmtInB7/8	23
AddOnStatInA1 ~ AddOnStatInD4	23
AddOnFrmtInA1 ~ AddOnFrmtInD4	23
Ext_Metadata	23
Progr_Config	23
FPGA-Stat	24
DM-A_Type	24
DM-A_Status	24
DM-B_Type	24
DM-B_Status	24
Events Menu	25
Introduction	25
What is the Goal of an event?	25
Events	25
Announcements	25
Input_1	25
Input_2	25
CRC-Status_1	25
CRC-Status_2	25
Ref-Status	25
Silence_LocInA1 ~ Silence_LocInA8	25
What information is available in an event?	26
The Message String	26
The Tag	26
Defining Tags	26
The Priority	27
The Address	27
LED Indication	28
Error LED	28
Input_1 LED	28
Input_2 LED	28
ANC Data_1 LED	28
ANC Data_2 LED	28
Reference LED	28
Data Error_1 LED	28
Data Error_2 LED	28
Connection LED	28
Error LED	28
DM_Pres_A	28
DM_Pres_B	28

DM_Error_A	28
DM_Error_B	28
Block Schematic	29
Connector Panels	30
GPI pinning	30
D-sub pinning	31
GNU Public License version 2	32

1 Introduction to Synapse

An Introduction to Synapse

Synapse is a modular system designed for the broadcast industry. High density, intuitive operation and high quality processing are key features of this system. Synapse offers a full range of converters and processing modules. Please visit the AXON Digital Design Website at www.axon.tv to obtain the latest information on our new products and updates.

Local Control Panel

The local control panel gives access to all adjustable parameters and provides status information for any of the cards in the Synapse frame, including the Synapse rack controller. The local control panel is also used to back-up and restore card settings. Please refer to the RRC18, RRC10, RRC04, RRS18 and RRS04 manuals for a detailed description of the local control panel, the way to set-up remote control over IP and for frame related settings and status information.

Remote Control Capabilities

The remote control options are explained in the rack controller (RRC18/RRC10/RRC04/RRS18/RRS04) manual. The method of connection to a computer using Ethernet is described in the RRC/RRS manual.



CHECK-OUT: “AXON CORTEX” SOFTWARE WILL INCREASE SYSTEM FLEXIBILITY OF ONE OR MORE SYNAPSE FRAMES

Although not required to use Cortex with a Synapse frame, you are strongly advised to use a remote personal computer or laptop PC with Axon Cortex installed, as this increases the ease of use and understanding of the modules.

2 Unpacking and Placement

Unpacking

The Axon Synapse card must be unpacked in an anti-static environment. Care must be taken NOT to touch components on the card – always handle the card carefully by the edges. The card must be stored and shipped in anti-static packaging. Ensuring that these precautions are followed will prevent premature failure from components mounted on the board.

Placing the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR04 and SFR08 frame. Locate the two guide slots to be used, slide in the mounted circuit board, and push it firmly to locate the connectors.

Correct insertion of card is essential as a card that is not located properly may show valid indicators, but does not function correctly.

NOTE: On power up all LED's will light for a few seconds, this is the time it takes to initialise the card.

3 A Quick Start

When Powering-up

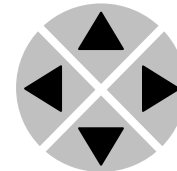
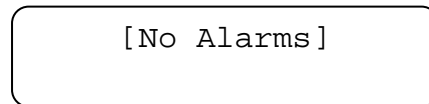
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of the inputs.

Changing settings and parameters

The front panel controls or the Axon Cortex can be used to change settings. An overview of the settings can be found in chapter 5, 6 and 7 of this manual.

Front Panel Control

Front Panel Display and Cursor



Settings are displayed and changed as follows;

Use the cursor 'arrows' on the front panel to select the menu and parameter to be displayed and/or changed.

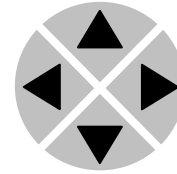
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

NOTE: Whilst editing a setting, pressing ► twice will reset the value to its default.

**Example of
changing
parameters using
front panel control**

With the display as shown below

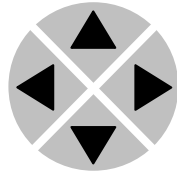
```
RRC18 [Select Card]  
>S01=SFS10
```



Pressing the ► selects the SFS10 in frame slot 01.

The display changes to indicate that the SFS10 has been selected. In this example the Settings menu item is indicated.

```
SFS10 [Select Menu]  
>Settings
```



Pressing the ► selects the menu item shown, in this example Settings.

(Pressing ▲ or ▼ will change to a different menu eg Status , Events).

The display changes to indicate that the SFS10 Settings menu item SDI-Format has been selected and shows that its current setting is Auto.

```
SFS10 [Settings]  
>SDI-Format=Auto
```



Pressing the ► selects the settings item shown, in this example SDI-Format.

(Pressing ▲ or ▼ will change to a different setting, eg Mode , H-Delay).

The display changes to indicate that the SFS10 Edit Setting menu item SDI-Format has been selected.

```
SFS10 Edit Setting]  
SDI-Format>Auto
```



To edit the setting of the menu item press ▲ or ▼.

All menu items can be monitored and/or changed in this way. Changing a setting has an immediate effect.



Axon Cortex Software

Axon Cortex can be used to change the settings of Synapse modules from a PC, either locally or remotely. The software enables communication based on TCP/IP between the Setup PC and Synapse frames/modules.

Each Synapse frame is addressed through its rack controller's unique IP address, giving access to each module, its menus and adjustment items. Axon Cortex has access to data contained within the Synapse module and displays it on a GUI. The software has an intuitive structure following that of the module that it is controlling.

For operation of Axon Cortex, please refer to the Cortex help files.

Menu Structure Example

Slot	Module	Item	Parameter	Setting
▲				
▲				
S02		Identity		
▲		▲		
S01	SFS10	▶ Set-tings	▶ Standard_dig	▶ Auto
▼		▼	▼	▼
S00	RRC18	Status	Mode	625
		▼	▼	▼
		Events	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

NOTE: Further information about Front Panel Control and Axon Cortex can be obtained from the RRC and RRS operational manuals and the Cortex help files.

4 The GEB990/950/900/550/500

Introduction

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.

Features

- 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):

▪ 1080p59.94	▪ 1080p23.98
▪ 1080p50	▪ 1035i59.94
▪ 1080i59.94	▪ 720p/59.94
▪ 1080i50	▪ 720p50
▪ 1080p29.97	▪ SD525
▪ 1080p25	▪ SD625
- Dual offset audio delay adjustable between 0 and 500ms
- Dual (TWINS) or single channel SDI mode when sources are clock locked (not phase locked*)
- 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 192kHz sampling via the built in Sample Rate Converters.
- Auto SRC-off for bit stream sources like Dolby E
- 8 extra AES/EBU inputs through the Synapse bus
- 2 (2x1) SDI + embedded audio outputs
- 7 presets that configure all 16 input channels at once. controlled by GPI or ACP (Cortex)

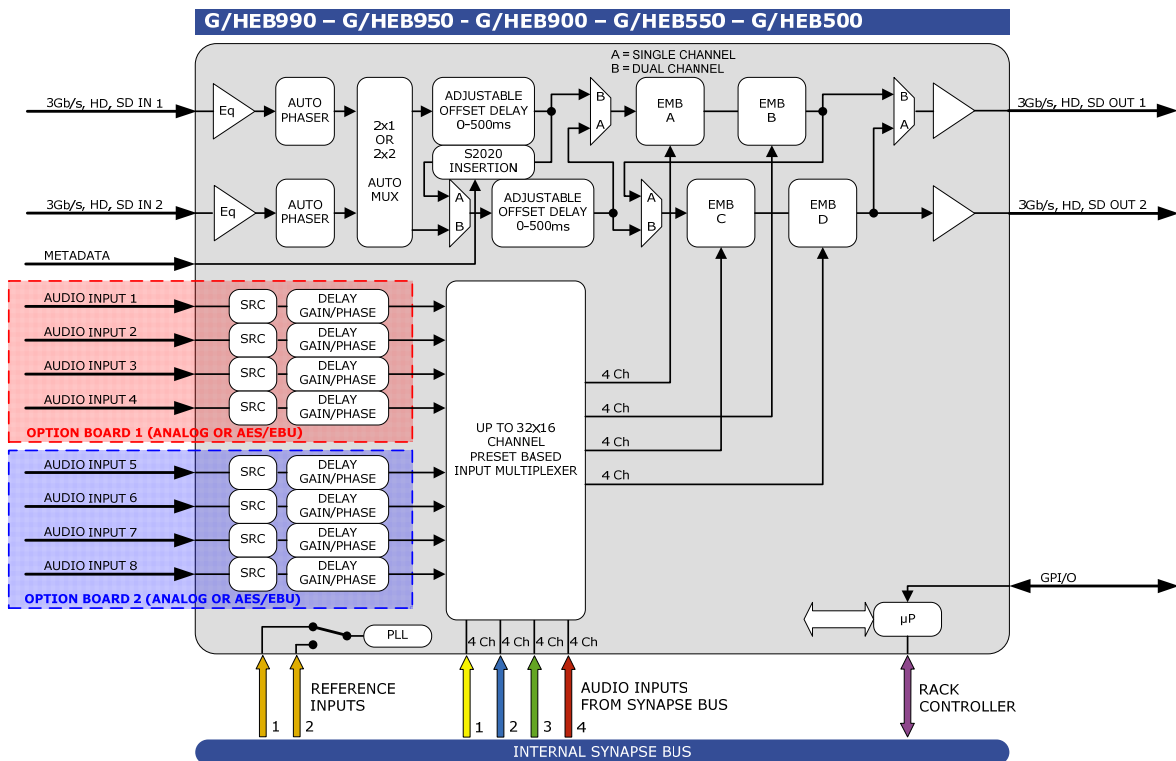
Applications

- 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
- 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 sources need to be running on the same clock, the phase is not critical)

- 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 SD, HD and 3Gb/s SDI video streams.
- Copied audio embedding into two 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.

Block schematic



5 Settings Menu

Introduction

The settings menu displays the current state of each GEB-HEB setting and allows you to change or adjust it. Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or with Cortex. Also the SCP08 control can be used. Please refer to chapter 3 for information on the Synapse front panel control and Cortex.

Note: All items preceded with a #-sign are part of the presets.

VIDEO

Inp_Select

With this item you can decide which of the 2 inputs is used and how the card will switch between the 2 inputs. Choices are:

- **Auto:** The card chooses input 1 if there is a source. If there is no input 1, the card will automatically switch to input 2.
- **TWINS:** The card will process both input 1 as well as input 2 as separate processed circuits.
- **SDI-1:** only input 1 is used (Detection of SDI2 is disabled)
- **SDI-2:** only input 2 is used (Detection of SDI1 is disabled)

Switch-Back

With **Inp_Select** set to **Auto**, the card will automatically switch to the other input when the first input was lost. With **Switch-Back** set to **On**, the card will switch back to the first input if this is back up again. Set to **Off** the card will keep using the other input even if the first input is back up again.

Lock-Mode

Lock-Mode determines whether the card is locked to input 1 (SDI1), input 2 (SDI2) or to the reference (Ref1 or Ref2). Can also be set to **Auto-SDI**, automatically selecting the currently active SDI input to lock to. By default it is set to **SDI1**.

Out-Frmt

With this setting you select what the output format will be. Please note that this is not a video conversion setting. This setting is only used to correctly set the delay. Default is **Auto**.

Phaser1-Offset

Sets the offset of the auto phaser of input 1 (see block schematic) between 0 and 4124px. Default is 0px.

Phaser2-Offset

Sets the offset of the auto phaser of input 2 (see block schematic) between 0 and 4124px. Default is 0px.

DELAY

F-delay1	<p>F-Delay1 sets the amount of delayed Frames for output 1. The available range is from 0 to 125 fields (dependant on the I/O). Default is 0F.</p>
V-delay1	<p>V-Delay1 setting allows adjustment of the vertical phase of the output signal for output 1 with respect to the selected reference input.</p> <p>The V-Delay setting gives a delay in addition to the reference timing. For example: if the V-Delay is set to 10 TV HD lines, the output signal will be delayed by reference timing + 10 TV HD lines. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 1124 lines (dependant on I/O format). The default setting is 0ln.</p>
H-delay1	<p>The H-Delay1 setting allows adjustment of the Horizontal phase of the output signal for output 1 with respect to the selected reference input.</p> <p>The H-Delay setting gives a delay in addition to the reference timing. For example: if the H-Delay is set to 10 pixels, the output signal will be delayed by reference timing + 10 pixels. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 4124 pixels (dependant on I/O format). The default setting is 0px.</p>
F-delay2	<p>F-Delay2 sets the amount of delayed Frames for output 2. The available range is from 0 to 125 fields (dependant on the I/O). Default is 0F.</p>
V-delay2	<p>V-Delay2 setting allows adjustment of the vertical phase of the output signal for output 2 with respect to the selected reference input.</p> <p>The V-Delay setting gives a delay in addition to the reference timing. For example: if the V-Delay is set to 10 TV HD lines, the output signal will be delayed by reference timing + 10 TV HD lines. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 1124 lines (dependant on I/O format). The default setting is 0ln.</p>

H-delay2 The H-Delay2 setting allows adjustment of the Horizontal phase of the output signal for output 2 with respect to the selected reference input.

The H-Delay setting gives a delay in addition to the reference timing. For example: if the H-Delay is set to 10 pixels, the output signal will be delayed by reference timing + 10 pixels. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 4124 pixels (dependant on I/O format). The default setting is 0px.

Delay-Status With this setting you switch on or off the delay status detection in the status menu. Default is Off.

PRESET

Control With this setting you decide whether the presets are controlled manually (using cortex of the front controls of the frame), or by use of the GPI inputs.

GPI -Ctrl The GEB/HEB500/550/900/950/990 has several physical GPI contacts to control the card's presets (if presets are set to be GPI controlled)

Latch: Latching GPI mode. When a contact is closed momentarily (edge triggered).

Non-Latch: Non-latching GPI mode. When a contact is closed all the time (level triggered).

ExtMode With this item you set the purpose of pins 5 till 8 of the RJ45 connector on the backpanel. The pupose can be either additional GPIO contacts (resulting in 7 GPI contacts instead of 3) or to use those pins for a dolby metadata input. Default is GPIO.

Active-Preset With this item you can manually change the currently active preset . Can be any preset between 1 and 7. By default it is set to 1. All menu settings that are preceded with a '#'-prefix are part of the preset.

Edit-Preset Here you can select which of the 7 selectable presets you want to edit. Changing this will not change the active preset, unless the currently active preset is the same you are going to edit. All menu settings that are preceded with a '#'-prefix are part of the preset.

PrstEditView

With this setting set to `Follow Active`, the edit preset settings will follow the active preset when the active preset is changed. This to avoid confusion when changing the active. Set to `Independent` the edit preset will not automatically follow active preset changes. By default set to `Follow Active`.

#Preset_Name

Sets/displays the name of the currently displayed preset.

EMBEDDING

#Emb-AB-Mode

With `Emb-AB-Mode` you select how the audio in groups A and B should be embedded into the video: `overwrite` the existing audio, or `Append`. Can also be set to `off` (switching off embedding for groups A and B entirely). Default is `overwrite`.

#Emb-CD-Mode

With `Emb-CD-Mode` you select how the audio in groups C and D should be embedded into the video: `overwrite` the existing audio, or `Append`. Can also be set to `off` (switching off embedding for groups C and D entirely). Default is `overwrite`.

Note: When the card is operating in single mode, this setting is automatically set to `append`.

#Emb_A_Sel ~ #Emb_D_Sel

With these setting you select in to which audio group (= 4 audio channels) of the outputs you want embedders A to D to embed the forwarded audio channels coming from the audio inputs/add-on bus. Can be `group1`, `group2`, `group3` or `group4`. You can also choose to not use the forwarded audio channels for anything by setting this item to `off`. By default it is set to `Group1`.

AUDIO IN

#SourceEmb-A1 ~ #SourceEmb-A4

With these settings you can select where the corresponding audio channels (channel A1 till channel A4) of embedder A are coming from:

- `LocalA`: Audio comes from audio inputs 1 till 4
- `LocalB`: Audio comes from audio inputs 5 till 8 (only available in the GEB/HEB 550/950/990 models)
- `AddOnA`: Audio comes from addon bus group A
- `AddOnB`: Audio comes from addon bus group B
- `AddOnC`: Audio comes from addon bus group C
- `AddOnD`: Audio comes from addon bus group D

#Emb-A1 ~ #EmbA4	With this setting you decide which audio channel of the above selected source is used for embedder A channels 1 till 4. Can be any of the available channels or set to <code>off</code> .
#SourceEmb-B1 ~ #SourceEmb-B4	With these settings you can select where the corresponding audio channels (channel B1 till channel B4) of embedder B are coming from: <ul style="list-style-type: none">■ LocalA: Audio comes from audio inputs 1 till 4■ LocalB: Audio comes from audio inputs 5 till 8 (only available in the GEB/HEB 550/950/990 models)■ AddOnA: Audio comes from addon bus group A■ AddOnB: Audio comes from addon bus group B■ AddOnC: Audio comes from addon bus group C■ AddOnD: Audio comes from addon bus group D
#Emb-B1 ~ #EmbB4	With this setting you decide which audio channel of the above selected source is used for embedder B channel 1 till 4. Can be any of the available channels or set to <code>off</code> .
#SourceEmb-C1 ~ #SourceEmb-C4	With these settings you can select where the corresponding audio channels (channel C1 till channel C4) of embedder C are coming from: <ul style="list-style-type: none">■ LocalA: Audio comes from audio inputs 1 till 4■ LocalB: Audio comes from audio inputs 5 till 8 (only available in the GEB/HEB 550/950/990 models)■ AddOnA: Audio comes from addon bus group A■ AddOnB: Audio comes from addon bus group B■ AddOnC: Audio comes from addon bus group C■ AddOnD: Audio comes from addon bus group D
#Emb-C1 ~ #EmbC4	With this setting you decide which audio channel of the above selected source is used for embedder C channel 1 till 4. Can be any of the available channels or set to <code>off</code> .
#SourceEmb-D1 ~ #SourceEmb-D4	With these settings you can select where the corresponding audio channels (channel D1 till channel D4) of embedder D are coming from: <ul style="list-style-type: none">■ LocalA: Audio comes from audio inputs 1 till 4■ LocalB: Audio comes from audio inputs 5 till 8 (only available in the GEB/HEB 550/950/990 models)■ AddOnA: Audio comes from addon bus group A■ AddOnB: Audio comes from addon bus group B■ AddOnC: Audio comes from addon bus group C■ AddOnD: Audio comes from addon bus group D

#Emb-D1 ~ #EmbD4	With this setting you decide which audio channel of the above selected source is used for embedder D channel 1 till 4. Can be any of the available channels or set to <code>off</code> .
#LocGainInA1 ~ #LocGainInA4	Adjusts the gain for the corresponding incoming audio input (Analog inputs 1 till 4 in case of the 500/550 models; AES/EBU inputs 1 and 2 in case of the 900/950/990 models) between -144 and 12dB. -144dB means the audio will be muted.
#LocGainInA5 ~ #LocGainInA8	Only available in GEB/HEB 900/950/990 models. Adjusts the gain for the corresponding incoming audio input (AES/EBU inputs 3 and 4 in case of de 900/990 models) between -144 and 12dB. -144dB means the audio will be muted.
#LocGainInB1 ~ #LocGainInB4	Only available in GEB/HEB 550/950/990 models. Adjusts the gain for the corresponding incoming audio input (Analog inputs 5 till 8 in case of the 550 model; analog inputs 1 till 4 in case of the 950 model; AES/EBU inputs 5 and 6 in case of the 990 model) between -144 and 12dB. -144dB means the audio will be muted.
#LocGainInB5 ~ #LocGainInB8	Only available in GEB/HEB 990 models. Adjusts the gain for the corresponding incoming audio input (AES/EBU inputs 7 and 8) between -144 and 12dB. -144dB means the audio will be muted.
#LocPhaseInA1 ~ #LocPhaseInA4	Adjusts the audio phase of the corresponding individual input (Analog inputs 1 till 4 in case of the 500/550 models, AES/EBU inputs 1 and 2 in case of the 900/950/990 models) to 0 deg or 180 deg.
#LocPhaseInA5 ~ #LocPhaseInA8	Only available in GEB/HEB 900/950/990 models. Adjusts the audio phase of the corresponding individual input (AES/EBU inputs 3 and 4) to 0 deg or 180 deg.
#LocPhaseInB1 ~ #LocPhaseInB4	Only available in GEB/HEB 550/950/990 models. Adjusts the audio phase of the corresponding individual input (Analog inputs 5 till 8 in case of the 550 model; analog inputs 1 till 4 in case of the 950 model; AES/EBU inputs 5 and 6 in case of the 990 model) to 0 deg or 180 deg.
#LocPhaseInB5 ~ #LocPhaseInB8	Only available in GEB/HEB 990 models. Adjusts the audio phase of the corresponding individual input (AES/EBU inputs 7 and 8) to 0 deg or 180 deg.

#LocDelayInA1 ~ #LocDelayInA4 Adjusts the delay of the corresponding audio channel (Analog inputs 1 till 4 in case of the 500/550 models, AES/EBU inputs 1 and 2 in case of the 900/950/990 models) between 0 and 5000ms.

#LocDelayInA5 ~ #LocDelayInA8 Only available in GEB/HEB 900/950/990 models. Adjusts the delay of the corresponding audio (AES/EBU inputs 3 and 4) between 0 and 5000ms.

#LocDelayInB1 ~ #LocDelayInB4 Only available in GEB/HEB 550/950/990 models. Adjusts the delay of the corresponding audio channel (Analog inputs 5 till 8 in case of the 550 model; analog inputs 1 till 4 in case of the 950 model; AES/EBU inputs 5 and 6 in case of the 990 model) between 0 and 5000ms.

#LocDelayInB5 ~ #LocDelayInB8 Only available in GEB/HEB 990 models. Adjusts the delay of the corresponding audio channel (AES/EBU input 7 and 8) between 0 and 5000ms.

MISC

SRC_AES-A1/2 ~ SRC_AES-A7/8 Only available in GEB/HEB 900/950/990 models. These settings adjust the sample rate converter of AES/EBU inputs 1 till 4. Can be set to *Transparent* (no sample rate conversion), *On* (always converting) or *Auto* (automatically switch it to transparent in case dolby is detected).

SRC_AES-B1/2 ~ SRC_AES-B7/8 only available for the GEB/HEB990 models. These settings adjust the sample rate converter of AES/EBU inputs 5 till 8. Can be set to *Transparent* (no sample rate conversion), *On* (always converting) or *Auto* (automatically switch it to transparent in case dolby is detected).

NonPCM-Bypass With this setting you can switch to bypass audio processing for all non-PCM audio *on* or *off*.

OdBFS-IN The setting *0dBfs-In* sets the analog audio level that gives a full-scale digital input. The available settings are +12 dBu, +15dBu, +18dBu and 24dBu.

<p>Fade-Time</p>	<p>Fade/time is locked to 2 parameters: channel-switch and gain-change. It is used as the fade-in/out time of the channel-switch of embedded/local-audio channels. The old channel will be fade-out and the new channel will be fade in according to the time chosen with fade-time. Fade-Time is also used for smooth transitions when gain-values or presets are changed. These smooth transitions are triggered by a change in gain settings or a Preset change. With this setting you can manually set this fade time between 100ms and 10.000ms. The default is 500ms.</p>
<p>Audio-Phase</p>	<p>If this setting is set to <i>Align</i>, the card ensures audio-phase alignment between multiple audio channels and audio groups, which is necessary for multi-channel (surround) purposes. If errors in the signal-chain occur the de-embedder blocks reset synchronously to maintain audio-phase-alignment.</p> <p>If this setting is set to <i>Off</i>, the card <i>eats-all</i> audio including errors. Even if there are DBN/ANC/ECC or channel-sequence errors, the de-embedder will pass them. Be aware that audio-phase-alignment between multiple audio channels and audio groups can not be maintained if this setting is set to <i>Off</i>.</p> <p>Note: This setting can be helpful to solve problems in the field using equipment which doesn't follow the standards correctly.</p>
<p>AudioStatusBits</p>	<p>With this setting you select whether the audio status bits should be Transparent (same status bit on the outputs as on the inputs) or to overwrite them with new status bits.</p>
<p>Silence-Time</p>	<p>If the audio contains silence, it can be reported (in Cortex and SNMP). This setting allows you to determine how many seconds it takes before the card reports the silence by the audio status items. This setting can be set in a range from 1 sec to 60 sec. The default setting is 10sec.</p>
<p>Silence-Level</p>	<p>Silence-level determines the value that triggers a silence alarm. The silence threshold can be set between -100 and -20 dBFS. Default is -60 dBFS .</p>

METADATA

S2020-Emb-AB	With this setting you decide whether you want to overwrite or to switch off metadata (S2020) inserting for embedders A and B.
S2020-Emb-CD	With this setting you decide whether you want to overwrite or to switch off metadata (S2020) inserting for embedders C and D
Insert_Line	With this setting you set a line to which the S2020 data should be inserted. Can be set between line 1 and line 1125. Default is line 9.
Insert_Method	There's 2 methods to insert S2020 (refer to the S2020 SMTPE document). Can be set to Method A or Method B. Default is B.
Insert_Ass_Ch	With this setting you select one of the 8 channel pairs (Ch1 / 2 till Ch15 / 16) to which the metadata should be associated. Can also be set to None (which is also a valid value of the metadata item).

6 Status Menu

Introduction	The status menu indicates the current status of each item listed below.
SDI-Input_1	<p>This status item indicates the presence and format of a valid signal in input 1. This is displayed as:</p> <ul style="list-style-type: none"> ▪ 1080P60 ▪ 1080p50 ▪ 1080i60 ▪ 1080i50 ▪ 1080p30 ▪ 1080p25 ▪ 1080p24 ▪ 1035i60 ▪ 720p60 ▪ 720p50 ▪ SD525 ▪ SD625 ▪ NA
SDI-Input_2	This status item indicates the presence and format of a valid signal in input 2. This is displayed as listed under SDI-Input1.
SDI-Map_1	Displays whether the 3Gb/s input on input 1 is mapped as Level A or Level B. If the input is not 3Gb/s (1080p50 or 1080p60) this item indicates NA.
SDI-Map_2	Displays whether the 3Gb/s input on input 2 is mapped as Level A or Level B. If the input is not 3Gb/s (1080p50 or 1080p60) this item indicates NA.
SDI-Freq_1	Indicates the frequency of SDI input 1. Can be 1:1, 1:1.001 or NA.
SDI-Freq_2	Indicates the frequency of SDI input 2. Can be 1:1, 1:1.001 or NA.
CRC-Stat_1	Displays if there are CRC errors on input 1.
CRC-Stat_2	Displays if there are CRC errors on input 2.

Ref-Format	<p>Displays the reference format. Can be one of the following:</p> <ul style="list-style-type: none"> ■ NA ■ NTSC/480i ■ PAL/576i ■ 480p ■ 576p ■ 720p ■ 1080i ■ 1080p
Locked-To	<p>Displays to what the card is locked: Ref, SDI1, SDI2 or Not Locked.</p>
Active-Out1	<p>Indicates what the current source is of output 1, can be SDI1 or SDI2.</p>
Active-Out2	<p>Indicates what the current source is of output 2, can be SDI1 or SDI2.</p>
GrpInUse_AB	<p>Displays which groups are in use of embedders A and B combined. Displayed as for instance 1_3_ when groups 1 and 3 contain audio and for instance _234 when groups 2, 3 and 4 contain audio.</p>
GrpInUse_CD	<p>Displays which groups are in use of embedders C and D combined. Displayed as for instance 1_3_ when groups 1 and 3 contain audio and for instance _234 when groups 2, 3 and 4 contain audio.</p>
LocStatInA1 ~ LocStatInA8	<p>Display the status of the individual audio channels of inputs 1 till 4. Can be OK, NA, Silence or Clipped (meaning the audio is clipping)</p>
LocStatInB1 ~ LocStatInB8	<p>Display the status of the individual audio channels of inputs 5 till 8. Can be OK, NA, Silence or Clipped (meaning the audio is clipping). This is only available for the GEB/HEB950/990 models.</p>

**LocFrmtInA1/2 ~
LocFrmtInA7/8**

Display the input format of channels A1/2 till A7/8 (500/550 models only go to until channels A3/4). Can be one of the following:

- NA
- PCM
- Null
- AC-3
- TimeStmp
- MPEG-1
- MPEG-2
- SMPTE-KLV
- Dolby E
- Caption data
- UserDef
- Rsvd

**LocFrmtInB1/2 ~
LocFrmtInB7/8**

Display the input format of channels B1/2 till B7/8 (550 models only got until channel B3/4). This is only available for the GEB/HEB 550/990 models. Can be one of the formats listed under LocFrmtInA1/2.

**AddOnStatInA1 ~
AddOnStatInD4**

Display the status of each individual add-on buss audio channel. Can be OK, NA or Clipped (meaning the audio is clipping).

**AddOnFrmtInA1 ~
AddOnFrmtInD4**

Display the format of each individual add-on buss audio channel. Can be one of the formats listed under LocFrmtInA1/2.

Ext_Metadata

Detects whether or not metadata is present on the Metadata input of the backpanel. Can be Present, NA or Error.

Progr_Config

This status indicates the program config as present on the current metadata input. Can be one of the following values:

- 5.1+2
- 5.1+1+1
- 4+4
- 4x2
- 8x1
- 5.1
- 3x2
- 6x1
- 2+2
- 7.1
- Other
- NA

FPGA-Stat	Displays the status of the onboard FPGA. Can be either OK or Error.
DM-A_Type	Displays which type of input or output board is currently detected on circuit A. Can be Digital input or output, Analog input or output or NA. For the GEB/HEB900/990 this should always be Digital input.
DM-A_Status	Indicates the status of I/O board A, can be OK, NA or Error.
DM-B_Type	Displays which type of input or output board is currently detected on circuit B. Can be Digital input or output, Analog input or output or NA. For the GEB/HEB990 this should always be Digital input. For the GEB/HEB900 this should always be NA.
DM-B_Status	Indicates the status of I/O board B, can be OK, NA or Error.

7 Events Menu

Introduction	An event is a special message that is generated on the card asynchronously. This means that it is not the response to a request to the card, but a spontaneous message.
What is the Goal of an event?	The goal of events is to inform the environment about a changing condition on the card. A message may be broadcast to mark the change in status. The message is volatile and cannot be retrieved from the system after it has been broadcast. There are several means by which the message can be filtered.
Events	The events reported by the card are as follows;
Announcements	Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on
Input_1	Input_1 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Input_2	Input_2 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
CRC-Status_1	CRC-Status_1 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
CRC-Status_2	CRC-Status_2 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Ref-Status	Reference can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Silence_LocInA1 ~ Silence_LocInA8	Silence_LocInA1 to A8 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

What information is available in an event?

The message consists of the following items;

- 1) A message string to show what has happened in text, for example: “INP_LOSS”, “REF_LOSS”, “INP_RETURN”.
- 2) A tag that also shows what happens, but with a predefined number: e.g. 1 (= loss of input), 2 (= loss of reference), 129(= 1+128 = return of input). For a list of these predefined tags see the table on the next page.
- 3) A priority that marks the importance of an event. This value is defined by the user and can have any value between 1 and 255, or 0 when disabled.
- 4) A slot number of the source of this event.

The Message String

The message string is defined in the card and is therefore fixed. It may be used in controlling software like Synapse Set-up to show the event.

The Tag

The tag is also defined in the card. The tag has a fixed meaning. When controlling or monitoring software should make decisions based on events, it is easier to use the tag instead of interpreting a string. The first implementation is the tag controlled switch in the GPI16.

In cases where the event marks a change to fault status (e.g. 1 for Loss of Input) the complement is marked by the tag increased by 128 (80_{hex}) (e.g. 129 (81_{hex}) for Return of Input).

Defining Tags

The tags defined for the card are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcement of report and control values
Input1	01 _{hex} =INP1_LOSS	81 _{hex} =INP1_RETURN	input 1 lost or returned
Input2	12 _{hex} =INP2_LOSS	92 _{hex} = INP2_RETURN	input 2 lost or returned
CRC-Status1	03 _{hex} =CRC1_ERROR	83 _{hex} =CRC1_OK	CRC on input 1 error or OK
CRC-Status2	43 _{hex} =CRC2_ERROR	C3 _{hex} =CRC2_OK	CRC on input 2 error or OK
Reference	02 _{hex} =REF_LOSS	82 _{hex} =REF_RETURN	reference lost or returned
Silence_LocInA1	05 _{hex} =LOC_A1_SILENCE	85 _{hex} =LOC_A1_OK	Audio channel A1 silence or OK
Silence_LocInA2	05 _{hex} =LOC_A2_SILENCE	85 _{hex} =LOC_A2_OK	Audio channel A2 silence or OK
Silence_LocInA3	05 _{hex} =LOC_A3_SILENCE	85 _{hex} =LOC_A3_OK	Audio channel A3 silence or OK
Silence_LocInA4	05 _{hex} =LOC_A4_SILENCE	85 _{hex} =LOC_A4_OK	Audio channel A4 silence or OK
Silence_LocInA5	05 _{hex} =LOC_A5_SILENCE	85 _{hex} =LOC_A5_OK	Audio channel A5 silence or OK
Silence_LocInA6	05 _{hex} =LOC_A6_SILENCE	85 _{hex} =LOC_A6_OK	Audio channel A6 silence or OK
Silence_LocInA7	05 _{hex} =LOC_A7_SILENCE	85 _{hex} =LOC_A7_OK	Audio channel A7 silence or OK
Silence_LocInA8	05 _{hex} =LOC_A8_SILENCE	85 _{hex} =LOC_A8_OK	Audio channel A8 silence or OK

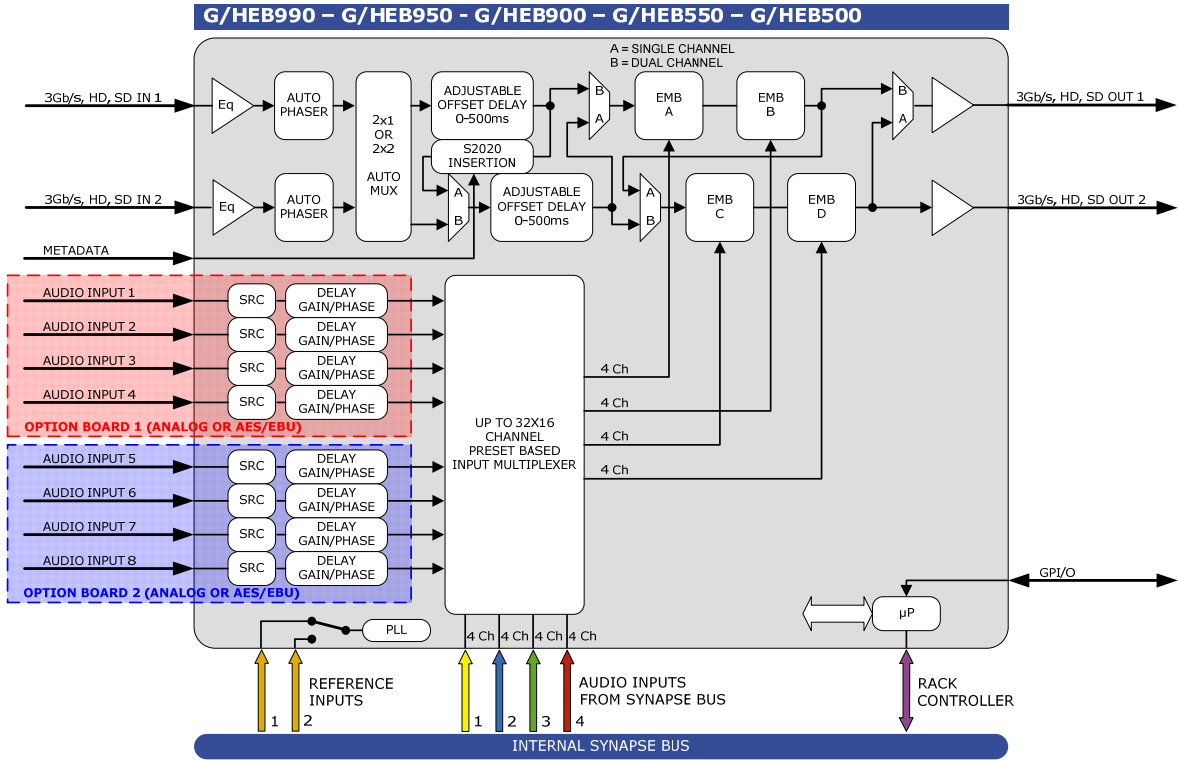


The Priority	The priority is a user-defined value. The higher the priority of the alarm, the higher this value. Setting the priority to Zero disables the announcement of this alarm. Alarms with priorities equal or higher than the Error Threshold setting of the RRC will cause the error LED on the Synapse rack front panel to light.
The Address	Together with the message string or the tag, the slot number or address of the card is relevant to be able to assign the event to a certain card.

8 LED Indication

Error LED	The error LED indicates an error if the internal logic of the GEB/HEB 500/550/900/950/990 card is not configured correctly or has a hardware failure.
Input_1 LED	This LED indicated the presence of a valid SDI video signal on input 1.
Input_2 LED	This LED indicated the presence of a valid SDI video signal on input 2.
ANC Data_1 LED	Indicates the presence of embedded audio within input 1.
ANC Data_2 LED	Indicates the presence of embedded audio within input 2.
Reference LED	Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).
Data Error_1 LED	This LED indicates a CRC error in input 1.
Data Error_2 LED	This LED indicates a CRC error in input 2.
Connection LED	This LED illuminates after the card has initialized. The LED lights for 0.5 seconds every time a connection is made to the card.
Error LED	The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.
DM_Pres_A	This LED illuminates when a I/O board is present on position A
DM_Pres_B	This LED illuminates when a I/O board is present on position B
DM_Error_A	Indicates an error on the I/O board on position A
DM_Error_B	Indicates an error on the I/O board on position B

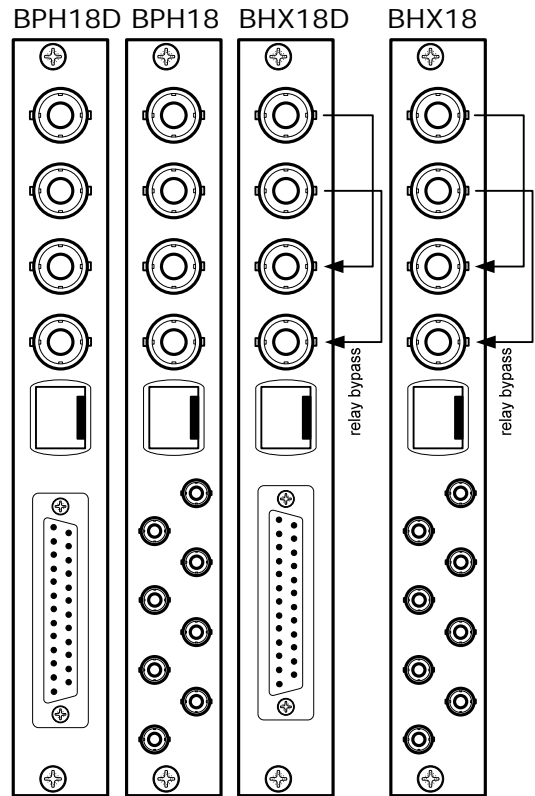
9 Block Schematic



10 Connector Panels

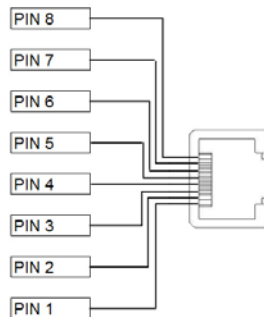
The GEB/HEB 500/550/900/950/990 can be used with the BPH18 or the BHX18b and the relay bypass equivalents. The following table displays the pinout of these backpanels in combination with the card.

- 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/OR METADATA INPUT/OUTPUT
- AES/EBU OR ANALOG AUDIO INPUTS



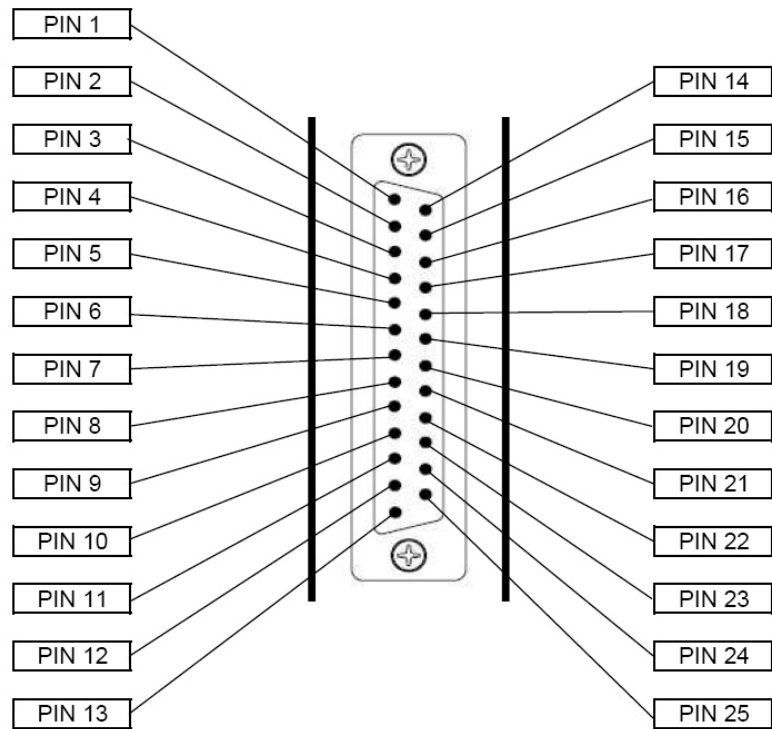
!Unused inputs and outputs must be terminated with the correct impedance!

GPI pinning



Pin	Function
1	Ground
2	GPI 1
3	GPI 2
4	GPI 3
5	GPI 4 / TXA(+)
6	GPI 5 / TXB(-)
7	GPI 6 / RXA(+)
8	GPI 7 / RXB(-)

D-sub pinning



Pin	G/HEB500	G/HEB550	G/HEB900	G/HEB950	G/HEB990
1	A1neg IN	A1neg IN	D1neg IN	D1neg IN	D1neg IN
2	A1pos IN	A1pos IN	D1pos IN	D1pos IN	D1pos IN
3	GND	GND	GND	GND	GND
4	A3neg IN	A3neg IN	D3neg IN	D3neg IN	D3neg IN
5	A3pos IN	A3pos IN	D3pos IN	D3pos IN	D3pos IN
6	GND	GND	GND	GND	GND
7	Not used	A5neg IN	Not used	A1neg IN	D5neg IN
8	Not used	A5pos IN	Not used	A1pos IN	D5pos IN
9	GND	GND	GND	GND	GND
10	Not used	A7neg IN	Not used	A3neg IN	D7neg IN
11	Not used	A7pos IN	Not used	A3pos IN	D7pos IN
12	GND	GND	GND	GND	GND
13	Not used	Not used	Not used	Not used	Not used
14	GND	GND	GND	GND	GND
15	A2neg IN	A2neg IN	D2neg IN	D2neg IN	D2neg IN
16	A2pos IN	A2pos IN	D2pos IN	D2pos IN	D2pos IN
17	GND	GND	GND	GND	GND
18	A4neg IN	A4neg IN	D4neg IN	D4neg IN	D4neg IN
19	A4pos IN	A4pos IN	D4pos IN	D4pos IN	D4pos IN
20	GND	GND	GND	GND	GND
21	Not used	A6neg IN	Not used	A2neg IN	D6neg IN
22	Not used	A6pos IN	Not used	A2pos IN	D6pos IN
23	GND	GND	GND	GND	GND
24	Not used	A8neg IN	Not used	A4neg IN	D8neg IN
25	Not used	A8pos IN	Not used	A4pos IN	D8pos IN



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