Synapse

GRF050/090/500/550 /590/900/950/990 HRF050/090/500/550 /590/900/950/990

3Gb/s, HD, SD audio embedder with embedded domain audio shuffler and framesync

Installation and Operation manual

AXON
THE HEART OF BROADCAST

AXON

Synapse

TECHNICAL MANUAL

GRF050/090/500/550/590/900/950/990
HRF050/090/500/550/590/900/950/990

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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.

Date created: 09-01-2014
Date last revised: 13-01-2014

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.

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

Axon Digital Design GRF050~990 HRF050~990 FC Tested To Comply With FCC Standards 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

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 rack controler 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 manual. The method of connection to a computer using Ethernet is also described in the ERC/ERS/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 Synapse Cotrtex 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

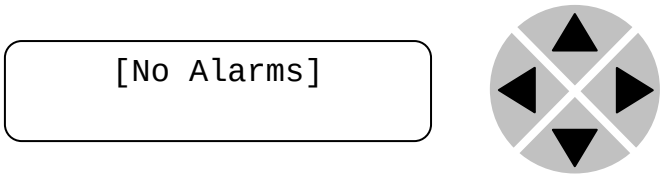
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

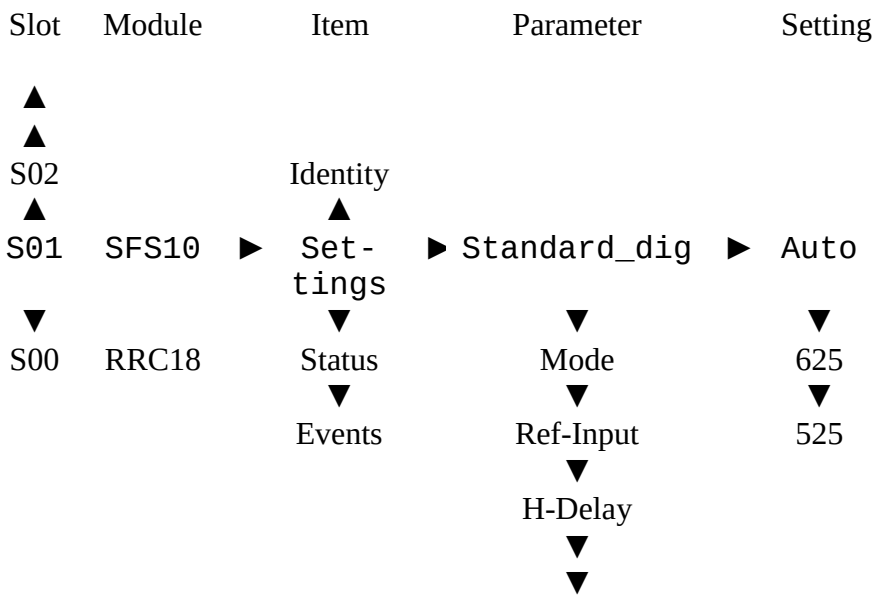
Axon Cortex Software

Axon Cortex Software 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 downloading Axon Cortex, please refer to our website: www.axon.tv. For instruction about how to use Axon Cortex, please check the Axon Cortex help files for details (press F1 in any window)

Menu Structure Example



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

4 The GRF and HRF Card

Introduction

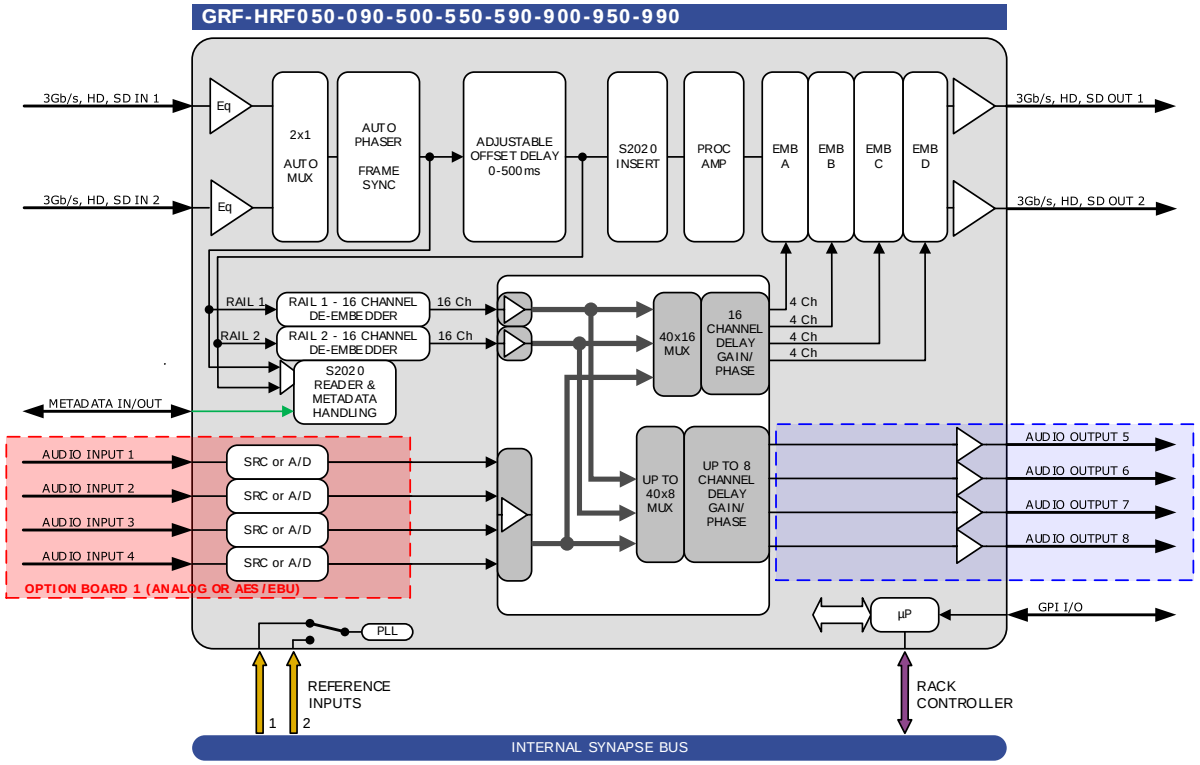
The GRFxxx and HRFxxx are re-embedders with analog or digital audio in-outputs and a built-in framesync. Re-embedding of available embedded sources is also included (shuffling).
The HRFxxx can be future upgraded to GRFxxx. This allows for staged implementation of HD infrastructures and spread the cost over multiple budget years.

Features

- 2 SDI inputs (with auto switch on carrier loss, and switch back function)
- 2 SDI outputs (2x1 function)
- Compatible with the following input formats (auto selecting) (1080p only for GXX):
  - 1080p/59.94
  - 1080p/50
  - 1080i/59.94
  - 1080i/50
  - 1080p/29.97
  - 1080p25
  - 1080p23.98
  - 1035i/59.94
  - 720p/59.94
  - 720p50
  - SD525
  - SD625
- Offset video delay adjustable between 0 and 500ms
- Fame 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
- Up to 4 analog audio or digital audio in and/or outputs which can be used with balanced and unbalanced systems via the BPH18D and BPH18 respectively (unbalanced outputs have a -6dB gain mismatch).
- 7 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 60 sec)
- Video Proc-Amp with Y, Cr, Cb controls for level and black
- 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 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)

Applications

Ingest embedding of digital or analog audio with shuffle function from asynchronous sources


GRF-HRF050-090-500-550-590-900-950-990
3Gb/s, HD, SD IN 1
3Gb/s, HD, SD IN 2
Eq
Eq
2x1
AUTO
MUX
AUTO
PHASER
FRAME
SYNC
ADJUSTABLE
OFFSET DELAY
0-500ms
S2020
INSERT
PROC
AMP
EMB
A
EMB
B
EMB
C
EMB
D
3Gb/s, HD, SD OUT 1
3Gb/s, HD, SD OUT 2
RAIL 1
RAIL 2
RAIL 1 - 16 CHANNEL
DE-EMBEDDER
RAIL 2 - 16 CHANNEL
DE-EMBEDDER
16 Ch
16 Ch
S2020
READER &
METADATA
HANDLING
METADATA IN/OUT
40x16
MUX
16
CHANNEL
DELAY
GAIN/
PHASE
4 Ch
4 Ch
4 Ch
4 Ch
AUDIO INPUT 1
AUDIO INPUT 2
AUDIO INPUT 3
AUDIO INPUT 4
SRC or A/D
SRC or A/D
SRC or A/D
SRC or A/D
OPTION BOARD 1 (ANALOG OR AES/EBU)
UP TO
40x8
MUX
UP TO 8
CHANNEL
DELAY
GAIN/
PHASE
AUDIO OUTPUT 5
AUDIO OUTPUT 6
AUDIO OUTPUT 7
AUDIO OUTPUT 8
µP
GPI I/O
PLL
REFERENCE
INPUTS
1
2
RACK
CONTROLLER
INTERNAL SYNAPSE BUS

5 Settings Menu

Introduction

The settings menu displays the current state of each GRB-HAF900 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.

IO-Ctrl

This card has separate presets for the frame synchronizer and output. With this item you select how the the frame synchronizer delay presets are controlled: Manually (`manual`) or by SDI format (`Auto-Format`). By default it is set to `Manual`.

Out-Frmt_Act

With this item you can manually change the currently active frame synchronizer settings. This can be done for every SDI video format.

Out-Frmt_Edit

Here you can select which of the format selectable frame synchronizer settings 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.

VIDEO

Input-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.
- `SDI-1`: only input 1 is used
- `SDI-2`: only input 2 is used

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 it 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`.

Line-Lock	In the line data, a line number is interwoven. The line number can be locked to the reference. `On` indicates that it is active. `Off` indicates that it is not active. The default setting is `off`. This function is de-activated for SD formats.
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`.
	SYNCHRONIZE
Input_Loss	This setting sets what the reaction should be in case of a input loss. Can be one of the following: ■ `Freeze`: sets the last correct video frame or field as output ■ `Black`: sets the output to black ■ `Grey`: sets the output to grey ■ `Green`: sets the output to green
Freeze_Mode	When `Input_Loss` is set to freeze, this setting decides whether the last `frame` or the last `field` is shown.
P60-P50_Sync	With this setting you can choose to synchronize each `one frame` or each `two frames`. Default is `One Frame`. The two-frame-synchronize mode only works for 720p60, 720p50, 1080p50 and 1080p60 standards.
#F-delay_1	`F-Delay_1` sets the amount of delayed Frames. The available range is from 0 to 125 frames (dependant on the I/O). Default is `0F`.
#V-delay_1	`V-Delay_1` setting allows adjustment of the vertical phase of the output signal with respect to the selected reference input. 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`.

#H-delay_1	The `H-Delay_1` setting allows adjustment of the Horizontal phase of the output signal 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`.
	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 GRF/HRFxxx 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). Refer to the following table for examples of possible preset triggers:
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`.
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`.
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.

#Preset_Name	Sets/displays the name of the currently displayed preset.
	DELAY
#Delay-Bypass	With this setting you can bypass `F-delay_2`, `V-delay_2` and `H-delay_2`. These are additional video delays on top of `F-delay_1`, `V-delay_1` and `H-delay_1`.
#F-delay_2	`F-Delay_2` sets the amount of delayed Frames (in addition to `F-delay_1`). The available range is from 0 to 125 frames (dependent on the I/O). Default is `0F`.
#V-delay_2	`V-Delay_2` setting allows adjustment of the vertical phase of the output signal (in addition to `V-delay_1`) with respect to the selected reference input. 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`.
#H-delay_2	The `H-Delay_2` setting allows adjustment of the Horizontal phase of the output signal (in addition to `H-delay_1`) 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	It is possible to display (in the status menu `IODelay-1` and `IODelay-2`) the processing time of the card in the status menu. This setting allows you to switch this function `ON` or `OFF`. Default setting is `OFF`
Gain	`Gain` controls the total YCbCr gain. The control range is between `0%` and `199.8%`. The default setting of `Gain` is `100%`.

Y-Gain

`Y-Gain` controls the Luminance gain of the built-in processing amplifier. The control range is between `0%` and `199.8%`. The default setting of `Y-Gain` is `100%`.

Cb-Gain

`Cb-Gain` controls the blue colour difference gain of the built-in processing amplifier. The control range is between `0%` and `199.8%`. The default setting of `Cb-Gain` is `100%`.

Cr-Gain

`Cr-Gain` controls the red colour difference gain of the built-in processing amplifier. The control range is between `0%` and `199.8%`. The default setting of `Cb-Gain` is `100%`.

Black

`Black` controls the total YCbCr Black gain. The control range is between `–128 bit and 127 bit` in steps of `1 bit.` The default setting of `Black` is `0 bit.`

Y-Black

This item controls the Luminance black level adjustment between -128 and +127 (10 bit digital value). The black level can be aligned by +/– 100mV (analog video). 64 (10 bit digital value) represents the nominal black level value for all digital video standards

Cb-Black

This item controls the blue colour difference (Cb) black level adjustment between -128 and +127 (10 bit digital value).

Cr-Black

This item controls the red colour difference (Cr) black level adjustment between -128 and +127 (10 bit digital value).

DE-EMBEDDING

#Rail1

The audio on rail 1 (see block schematic) can be forwarded to the (de)embedding blocks before (`pre-delay`) or after (`post-delay`) the video-delay processing blocks. For the GRF/HRF this is fixed to `pre-delay`.

#Rail2

The audio on rail 2 (see block schematic) can also be forwarded to the (de)embedding blocks before (`pre-delay`) or after (`post-delay`) the video-delay processing blocks. For the GRF/HRF this is fixed to `post-delay`.

	EMBEDDING
#Emb-Mode	With `Emb- Mode` you select how the audio should be embedded into the video: `overwrite` the existing audio, or `Append`. Can also be set to `off` (switching off embedding for groups A, B, C and D entirely). Default is `overwrite`.
#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`.
	EMB AUDIO OUT
#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 ■ `Rail1`: Audio comes from rail 1 (see blockschematic) ■ `Rail2`: Audio comes from rail 2 (see blockschematic)
#Emb-A1 ~ #EmbA4	With this setting you decide which audio channel of the above selected source is used for embedder A, respectively channel 1 till 4. Can be any of the available 16 de-embedded channels (or 4 channels when set to `localA` on a GRF/HRF500, or 8 channels when set to `localA` on a GRF/HRF900) or set to `off`.
#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: ■ `LocalA`: Audio comes from audio inputs 1 till 4 ■ `Rail1`: Audio comes from rail 1 (see blockschematic) ■ `Rail2`: Audio comes from rail 2 (see blockschematic)
#Emb-B1 ~ #EmbB4	With this setting you decide which audio channel of the above selected source is used for embedder B, respectively channel 1 till 4. Can be any of the available 16 de-embedded channels (or 4 channels when set to `localA` on a GRF/HRF5x0, or 8 channels when set to `localA` on a GRF/HRF9x0) or set to `off`.

#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: ■ `LocalA`: Audio comes from audio inputs 1 till 4 ■ `Rail1`: Audio comes from rail 1 (see blockschematic) ■ `Rail2`: Audio comes from rail 2 (see blockschematic)
#Emb-C1 ~ #EmbC4	With this setting you decide which audio channel of the above selected source is used for embedder C, respectively channel 1 till 4. Can be any of the available 16 de-embedded channels (or 4 channels when set to `localA` on a GRF/HRF5x0, or 8 channels when set to `localA` on a GRF/HRF9x0) or set to `off`.
#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: ■ `LocalA`: Audio comes from audio inputs 1 till 4 ■ `Rail1`: Audio comes from rail 1 (see blockschematic) ■ `Rail2`: Audio comes from rail 2 (see blockschematic)
#Emb-D1 ~ #EmbD4	With this setting you decide which audio channel of the above selected source is used for embedder D, respectively channel 1 till 4. Can be any of the available 16 de-embedded channels (or 4 channels when set to `localA` on a GRF/HRF5x0, or 8 channels when set to `localA` on a GRF/HRF9x0) or set to `off`.
#EmbA1_Gain ~ #EmbD4_Gain	Adjusts the gain for the corresponding incoming audio channel between -60 and 12dB. Everything below -60dB (indicated as -999 dB) means the audio will be muted.
#EmbA1_Phase ~ #EmbD4_Phase	Adjusts the audio phase of the corresponding individual audio channel to 0 deg or 180 deg.
#EmbA1_Delay ~ #EmbD4_Delay	Adjusts the delay of the corresponding audio channel between 0 and 5000ms.
	LOCAL AUDIO OUT
#SourceLocB1~ #SourceLocB8	With these settings you can select where the corresponding audio channels (channel C1 till channel C4) of embedder C are coming from: ■ `LocalA`: Audio comes from audio inputs 1 till 4 ■ `Rail1`: Audio comes from rail 1 (see blockschematic) ■ `Rail2`: Audio comes from rail 2 (see blockschematic)

#LocOutB1 ~ #LocOutB8	With this setting you decide which audio channel of the above selected source is used for embedder C, respectively channel 1 till 4. Can be any of the available 16 de-embedded channels (or 4 channels when set to `localA` on a GRF/HRF5x0, or 8 channels when set to `localA` on a GRF/HRF9x0) or set to `off`.
#LocGainOutB1 ~ #LocGainOutB8	Adjusts the gain for the corresponding incoming audio channel between -60 and 12dB. Everything below -60dB (indicated as -999 dB) means the audio will be muted.
#LocPhaseOutB1 ~ #LocPhaseOutB8	Adjusts the audio phase of the corresponding individual audio channel to 0 deg or 180 deg.
#LocDelayOutB1 ~ #LocDelayOutB8	Adjusts the delay of the corresponding audio channel between 0 and 5000ms.
	MISC
SRC_AES-A1/2 ~ SRC_AES-A7/8	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 on or transparent if Dolby is detected).
NonPCM-Bypass	With this setting you can switch the bypass for all non-PCM audio `on` or `off`.
Fade-Time	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 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 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`.

Audio-Phase	If this setting is set to *Align*, 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. If this setting is set to *Off*, the card *eats-all* 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 *Off*. **Note:** This setting can be helpful to solve problems in the field using equipment which doesn't follow the standards correctly.
AudioStatusBits	With this setting you select whether the audio status bits should be `Transparant` (same status bit on the outputs as on the inputs) or to `overwrite` them with new status bits.
Silence_time	`Silence-time` sets the time before an alarm is given in case of silence in the selected embedded audio channels. The selectable time is from 1 till 60 sec. The default setting is `10 sec`.
Silence_level	`Silence-level` determines the level of silence. This can be set in a range from –100dBFS to –20dBFS. The default setting is `–60 dBFS`.
	METADATA
S2020-Emb	With this setting you decide whether you want to `overwrite` or to switch `off` metadata (S2020) inserting for all embedders.
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

This status item indicates the presence and format of a valid signal in input 1. This is displayed as:

- `1080p60`
- `1080p50`
- `1080i60`
- `1080i50`
- `1080p30`
- `1080p25`
- `1080p24`
- `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-Freq_1

Inidcates the frequency of SDI input 1. Can be `1:1`, `1:1.001` or `NA`.

SDI-Freq_2

Inidcates 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.

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.

Ref-Format	Displays the reference format. Can be one of the following: ■ NA ■ NTSC/480i ■ PAL/576i ■ 480p ■ 576p ■ 720p ■ 1080i ■ 1080p
Locked-To	Displays to what the card is locked: Ref, SDI1, SDI2 or Not Locked.
Active-Out1	Indicates what the current source is of output 1, can be SDI1 or SDI2.
Active-Out2	Indicates what the current source is of output 2, can be SDI1 or SDI2.
SwitchLn	Displays what line is detected the switchline. Can be any line between 0 and 1125
SwitchLn_Len	Displays the length of the detected switchline in pixels.
SwitchLn_Pos	Displays the position on the detected switchline where the switch occurred (in pixels). Only works on blanked switchlines.
IO-Delay_1	Displays the total delay in ms of output 1. can be a value between 0ms and 5000ms.
IO-Delay_2	Displays the total delay in ms of output 2. can be a value between 0ms and 5000ms.
GPI	Indicates the current GPI value
ATC-Stat	Indicates any ATC errors in all embedders. Can be NA (not available), Present or Error.
ANC_Stat	Shows the status of the ancillary data. Can be NA, OK or error.

GrpInUse

Displays which groups are in use in the chosen SDI input. 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.

Grp-Ins

Indicates the status of the audio group A, B, C and D on the add-on bus. Can be Error or OK.

LocStatInA1 ~ LocStatInA8

Display the status of the individual audio inputs. A1 till A4 represent AES/EBU inputs 1 and 2 in case of the 900 models and analog inputs 1 till 4 in case of the 500 models. A5 till A8 represent AES/EBU inputs 3 and 4 in case of the 900 models. In the 500 models A5 till A8 are not available). Can be `OK`, `Silence`, `Clipped` or `NA` (not available)

LocFrmtInA1/2 ~ LocFrmtInA7/8

Display the format of AES/EBU channels 1/2 till 7/8 of inputs 1 till 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`

EmbStatOutA1 ~ EmbStatOutD4

This items indicate the status of each individual embedder audio channel output. Can be `Silence`, `Clipped`, `OK` or `NA` (not available)

EmbFrmtOutA1/2 ~ EmbFrmtOutD3/4

Display the format of each individual the embedder output pairs. Can be the same formats as listed under `LocFrmtIn`.

LocStatOutB1~ LocStatOutB8

This items indicate the status of each individual local audio channel output. Can be `Silence`, `Clipped`, `OK` or `NA` (not available)

LocFrmtOutB1/2~ LocFrmtOutB7/8

Display the format of each individual the local audio output pairs. Can be the same formats as listed under `LocFrmtIn`.

LocMetaStat

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

LocMetaProg

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 FPGA chip. Can be error or OK.

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 GRF/HRF9x0 this should for instance always be Digital input.

DM-A_Status

Inidcates 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 GRF/HRFx90 this should always be Digital output.

DM-B_Status

Inidcates 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_A

Input_A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

Input_B

Input_B can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

CRC-Status1

CRC-status1 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

CRC-Status2

CRC-status2 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.

Lock-Status

Lock status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

Silence_LocInA1~ Silence_LocInA8

Silence_LocInA1~8 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

What information

The message consists of the following items;

is available in an event?

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
Input_A	01_{hex}=INPA_LOSS	81_{hex}=INPA_RETURN	input A lost or returned
Input_B	02_{hex}=INPB_LOSS	82_{hex}= INPB_RETURN	input B lost or returned
CRC-Status1	03_{hex}=CRC1_ERROR	83_{hex}=CRC1_OK	CRC1 error or OK
CRC-Status2	43_{hex}=CRC2_ERROR	$C3_{hex}$=CRC2_OK	CRC2 error or OK
Reference	03_{hex}=REF_LOSS	83_{hex}=REF_RETURN	Reference lost or returned
Lock-Status	11_{hex}=INP_NO_LOCK	91_{hex}=INP_LOCK	Input not locked or input locked
Silence_LocInA1	05_{hex}=LOC_A1_SILENCE	85_{hex}=LOC_A1_OK	Local audioinput A1 Silence or Ok
Silence_LocInA2	05_{hex}=LOC_A2_SILENCE	85_{hex}=LOC_A2_OK	Local audioinput A2 Silence or Ok
Silence_LocInA3	05_{hex}=LOC_A3_SILENCE	85_{hex}=LOC_A3_OK	Local audioinput A3 Silence or Ok
Silence_LocInA4	05_{hex}=LOC_A4_SILENCE	85_{hex}=LOC_A4_OK	Local audioinput A4 Silence or Ok
Silence_LocInA5	05_{hex}=LOC_A5_SILENCE	85_{hex}=LOC_A5_OK	Local audioinput A5 Silence or Ok
Silence_LocInA6	05_{hex}=LOC_A6_SILENCE	85_{hex}=LOC_A6_OK	Local audioinput A6 Silence or Ok
Silence_LocInA7	05_{hex}=LOC_A7_SILENCE	85_{hex}=LOC_A7_OK	Local audioinput A7 Silence or Ok
Silence_LocInA8	05_{hex}=LOC_A8_SILENCE	85_{hex}=LOC_A8_OK	Local audioinput 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.

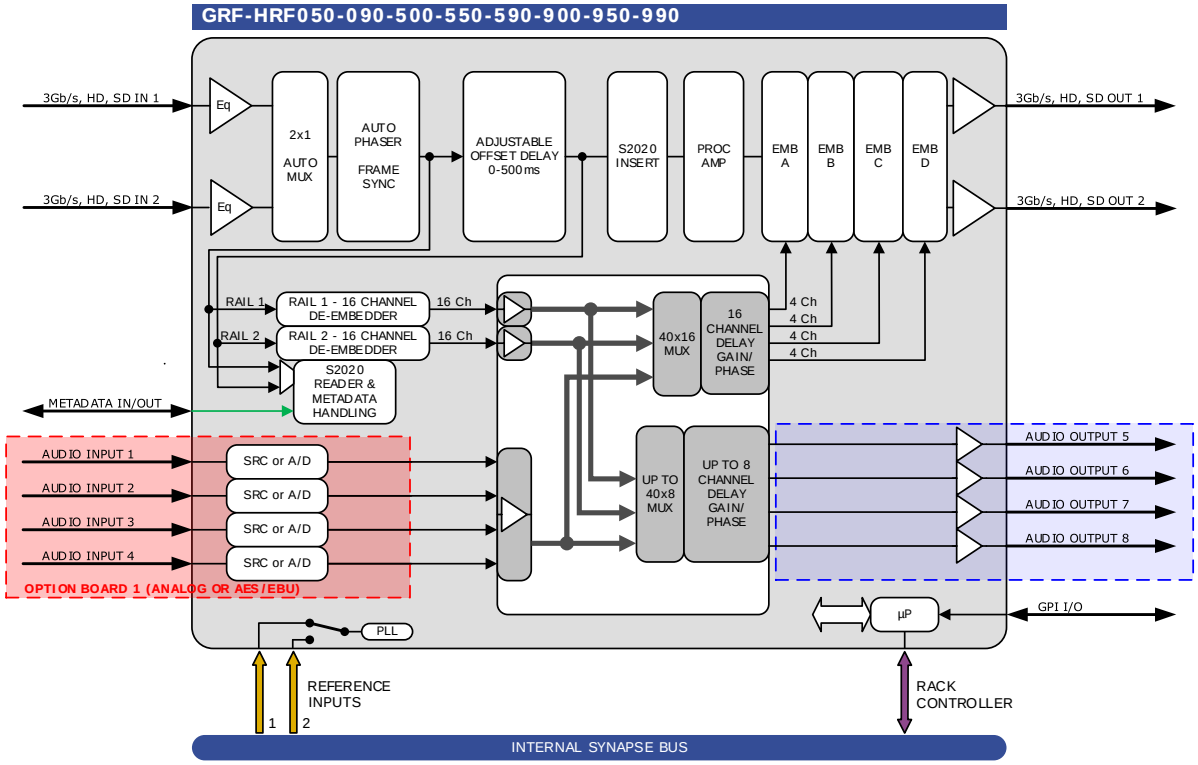
The Address

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

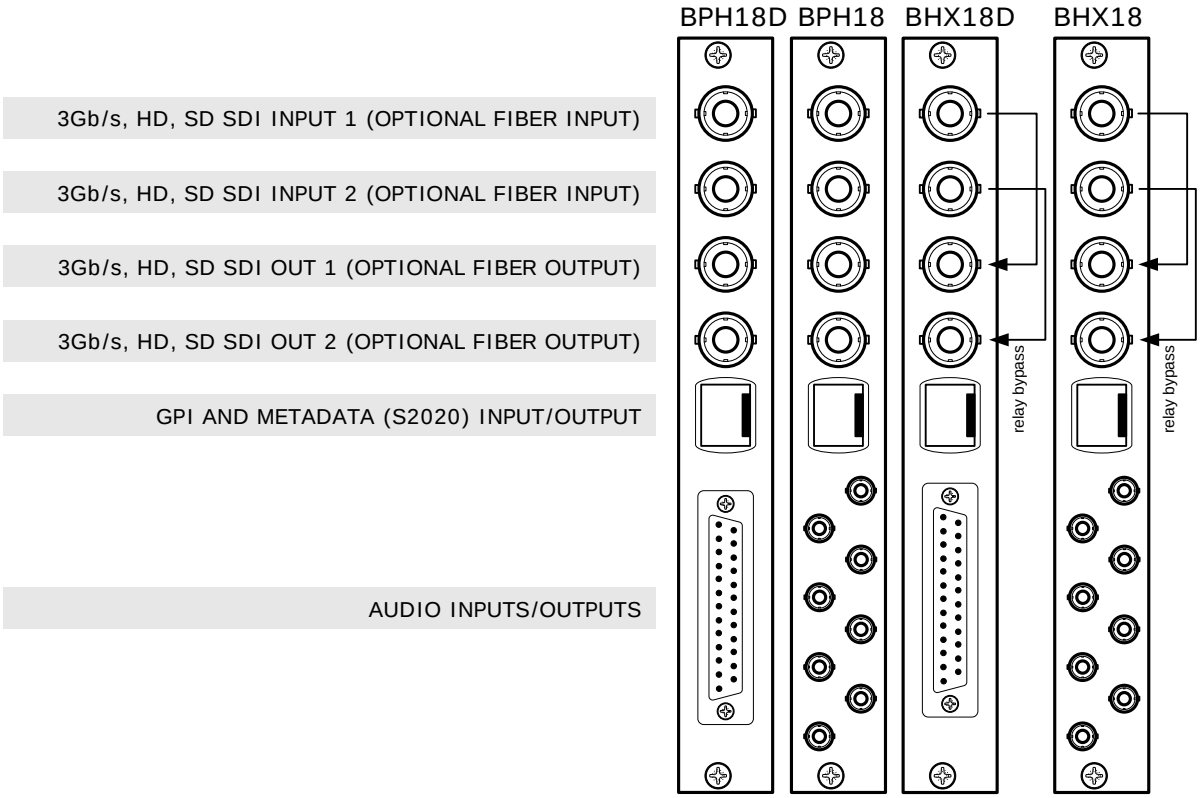
Error LED	The error LED indicates an error if the internal logic of the GRF/HRF-xx0 card is not configured correctly or has a hardware failure.
Input_1 LED	This LED indicated the presence of a valid SDI video signal on input 1.
Input_2 LED	This LED indicated the presence of a valid SDI video signal on input 2.
ANC Data 1 LED	Indicates the presence of embedded audio within input signal 1.
ANC Data 2 LED	Indicates the presence of embedded audio within input signal 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 on input 1.
Data Error 2 LED	This LED indicates a CRC error on 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 1	Indicates the presence of an I/O board in circuit A.
DM pres 2	Indicates the presence of an I/O board in circuit B.
DM Error 1	Indicates an error on the I/O board in circuit A.
DM Error 2	Indicates an error on the I/O board in circuit B.

9 Block Schematic



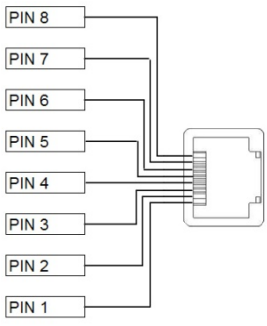
10 Connector Panels

The GRF-HRF can be used with the BPH18, the BHX18D or the bypass relay equivalents. The following table displays the pinout of these backpanels in combination with the card.



! 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(-)

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