Synapse

GDS100/110
HDS100/110

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

Installation and Operation manual

MASTER Card

3 TRIPLE RATE GB/s, HD, SD

Powered by LINUX

Committed.

AXON

Synapse

TECHNICAL MANUAL

GDS100/110
HDS100/110

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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: 09-07-2009
Date last revised: 15-12-2009

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 GDS100/110 HDS100/110 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 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:** "SYNAPSE 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.

NOTE: Please check appendix 1 before connecting any backpanel!

3 A Quick Start

When Powering-up

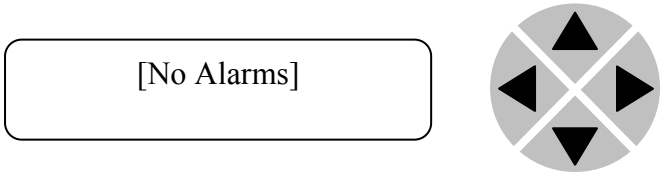
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

Changing settings and parameters

The front panel controls or the Synapse 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.

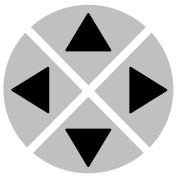
SFS10 [Select Menu]
>Settings

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.

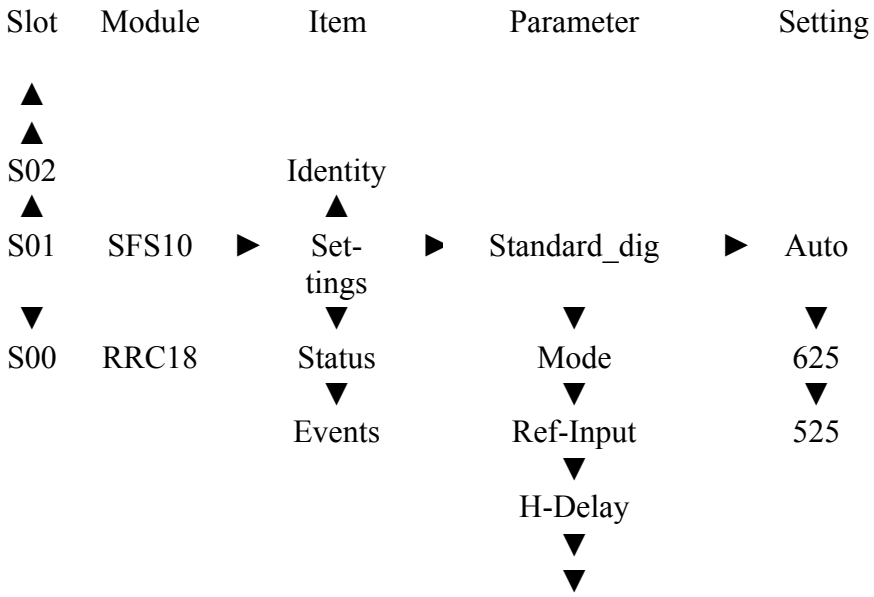
Synapse Cortex Software

Synapse 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. Synapse 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 Synapse Cortex, please refer to the Cortex manual.

Menu Structure Example



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

4 The GDS100/110 Card

Introduction

The GDS100/110 and HDS100/110 are *low latency* down converters with 16 channel audio transparency.

The GDS100/110 is compatible with 270Mb/s, 1.5Gb/s and 3Gb/s for full 1080p/50 or 1080p/59.94 use. The HDS100/110 are compatible with SD-SDI (270Mb/s) and HD-SDI (1.5Gb/s) and can be future upgraded to 3Gb/s compatibility

Features

- 2 SDI inputs
- Low latency conversion process (as low as 1 field in controlled timing environment)
- Compatible with the following input formats (auto selecting) (1080p only for GDS):
  - 1080p/59.94
  - 1080p/50
  - 1080i/59.94
  - 1080i/50
  - 1080p/29.97
  - 1080p25
  - 1080p24
  - 1035i/59.94
  - 720p/59.94
  - 720p50
  - 720p30
  - 720p25
  - 720p24
  - SD525
  - SD625
- Output standards
  - 1080p/59.94
  - 1080p/50
  - 1080i/59.94
  - 1080i/50
  - 1080p/29.97
  - 1080p25
  - 1080p24
  - 1035i/59.94
  - 720p/59.94
  - 720p50
  - 720p30
  - 720p25
  - 720p24
  - SD525
  - SD625
- Two individual conversion paths. The inputs can be different standards SD or HD and unlocked to the single output format.
- Frame sync with output phase control in Frames, Lines and pixels with respect to reference. Delay setting are stored per output format for a constant latency operation.
  - 60 Frames delay offset (per channel)
    - 1080i60:
    - 1080i50:
    - 1080p30:
    - 1080p25:
    - 1080p24:
    - 1035i60:

- 1080p60:
- 1080p50:
- 120 Frames delay offset (per channel)
  - 720p60
  - 720p50
  - 720p30
  - 720p25
  - 720p24
- 250 Frames delay offset (per channel)
  - SD525
  - SD625

- All ARC modes contain:
  - Anamorphic
  - Center Cut
  - V-Zoom
  - LBox-16:9
  - LBox-14:9
  - PBox-4:3
  - PBox-14:9
  - Variable H and V (50—200%)
- Free individual programmable presets banks for:
  - Down converter ARC 16-presets
  - VI insertion 16-presets
  - WSS insertion 16-presets
  - S2016 insertion 16-presets
  - Embedder shuffling/Gain/Phase 16-presets (110 only)
- 5 GPI inputs assignable to different preset banks
  - Input selection
  - Down conversion aspect ratio
  - Transparent aspect ratio (equal in-output)
  - Insertion of VI, WSS, AFD (S2016)
  - Audio shuffling, gain and phase (110 only)
- ARC triggers by VI, WSS, WSSext and S2016 (AFD)
- Color corrector
- Transparent for 16 channels of embedded audio
- Embedded domain ***cross input*** audio shuffling, gain and phase control (110 only)
- Embedding and de-embedding through synapse bus
- Video proc-amp (Y and C control)
- Color corrector (RGB and total gain, RGB and total black)
- Hue control for NTSC inputs
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

Conversion capabilities

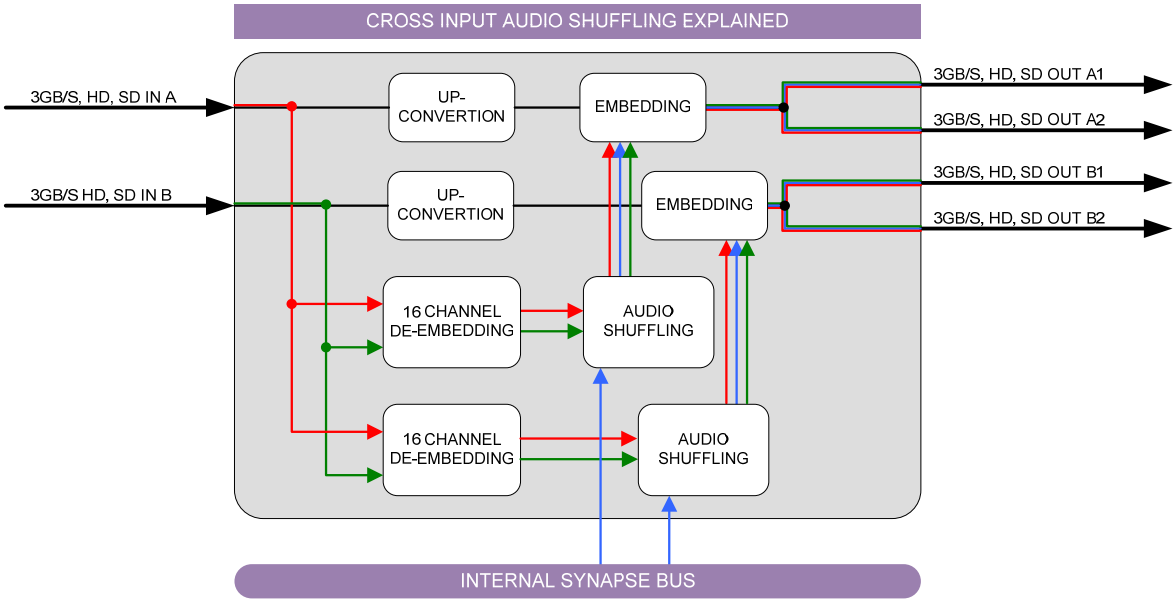
	CONVERSION	Output													
		1080p29.97	1080p25	1080p23.97	1035i59.97	1080p50*	1080p59.94*	1080i59.94	1080i50	720p59.94	720p50	720p29.97	720p25	720p23.98	480i59.94(525)	576i50(625)
Input	1080p29.97	x													x	
	1080p25		x													x
	1080p23.97			x											x	
	1035i59.97				x										x	
	1080p50*					x										x
	1080p59.94*						x								x	
	1080i59.94							x							x	
	1080i50								x							x
	720p59.94									x					x	
	720p50										x					x
	720p29.97											x			x	
	720p25												x			x
	720p23.98													x	x	
	480i59.94(525)														x	
	576i50(625)															x

Applications

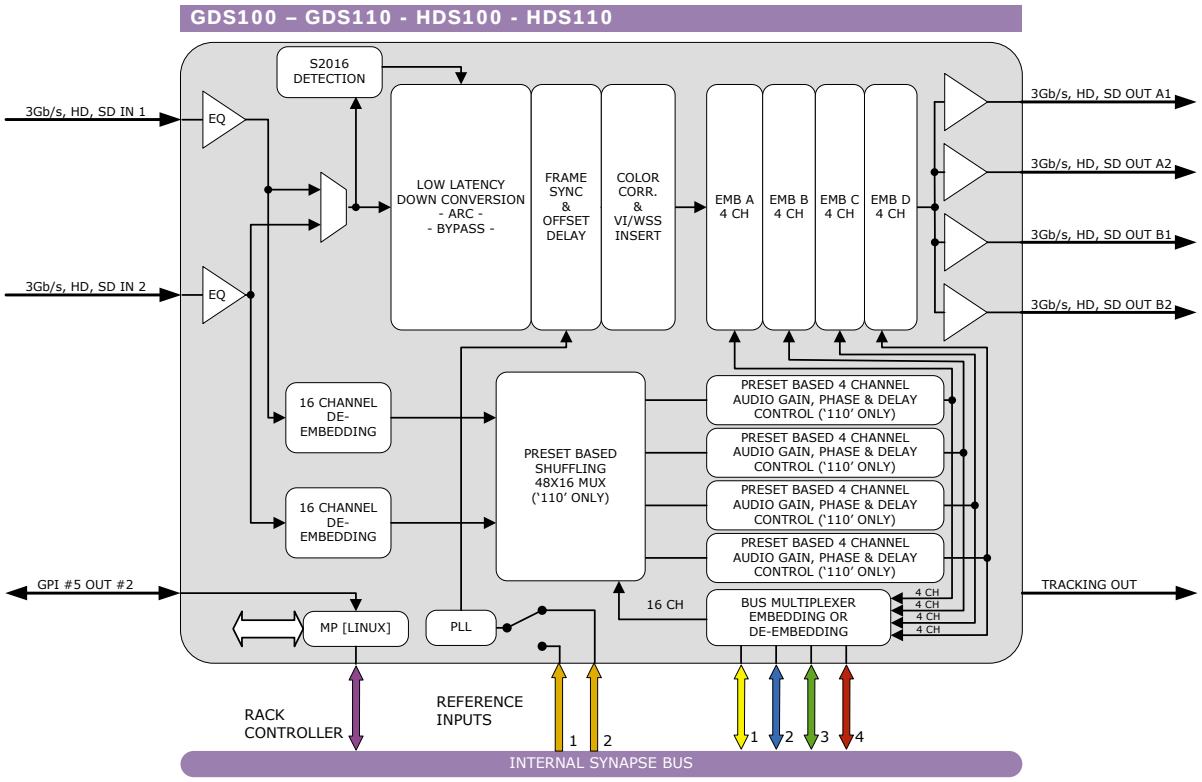
- Transmission output down conversion with backup input

GDS110 and HDS110 only:

- Combining embedded audio channels of 2 inputs into 1 (see image below)



Block schematic



5 Settings Menu

Introduction

The settings menu displays the current state of each GDS-HDS100/110 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.

SYSTEM SETTINGS

IO-Ctrl

This card has separate presets for the input and output settings under the '`SYSTEM SETTINGS`' header. With this item you select how the IO presets are controlled: Manually (`manual`) or via GPI-triggers (`GPI`, `GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`.

IO_Prst_Act

With this item you can manually change the currently active IO settings. Can be any preset between 1 and 8. By default it is set to 1. All menu settings that are preceded with a '# '-prefix under the '`SYSTEM SETTINGS`' header are part of the preset.

IO_Prst_Edit

Here you can select which of the 8 selectable IO 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. All menu settings that are preceded with a '# '-prefix under the '`SYSTEM SETTINGS`' header are part of the preset.

#Inp_SelA

With this item you can select which input you want to use for Channel A. Can be SDI`-1` (SDI input 1), `SDI-2` (SDI input 2) or `Analog` (CVBS in). You can also choose a `Zoneplate` or `Colorbar` as input. Can also be set to `Off` to switch off channel A entirely. The default for this setting is `SDI-1`.

#CVBS-frmt

With this item you can set the format of the CVBS input. Possible formats to select here are (default is `Auto`):

- `PAL-M`
- `PAL-N`
- `NTSC-M`
- `NTSC-4.43`
- `NTSC-J`
- `SECAM`
- `PAL-60`
- `PAL-BGHID`
- `Auto` (automatic detection and selection)

#Out-Frmt

With `Out-Frmt` you can set what the output should be of channel A as well as channel B. Possible settings are:

- `1080i60` (default), `1080i50`
- `1080p30`, `1080p25`, `1080p24`
- `1035i60`
- `720p60`, `720p50`
- `720p30`, `720p25`, `720p24`
- `SD525`, `SD625`

#F-delay

`F-Delay` sets the amount of delayed Frames. The available range is from 0 to 250 fields (dependant on the I/O). Default is `0F`. The preset master for this is `Out-Frmt`, hence the '#'-prefix.

#V-delay

V-Delay 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 1125 lines (dependant on I/O format). The default setting is `0ln`. The preset master for this is `Out-Frmt`, hence the '#'-prefix.

#H-delay

The H-Delay 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 5124 pixels (dependant on I/O format). The default setting is `0px`. The preset master for this is `Out-Frmt`, hence the '#'-prefix.

Delay-Status

It is possible to display (in the status menu `IODelayA` and `IODelayB`) 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`

Lock-Mode

`Lock-Mode` determines whether the card is locked to his `input` (input 1), to the reference (`Ref1` or `Ref2`) or `freerun` (not locked). By default it is set to `Ref1`. Can also be set to `RefAuto`.

When set to `RefAuto` the card chooses ref1 as its source. Whenever ref1 fails, it will switch to ref 2 (only for SFR08 and SFR18 frames and only when ref2 offers the same ref format as ref 1). When ref 1 is back up again, it will only automatically switch back to ref 1 when ref 2 fails.

Ref-Type

Sets the type of incoming reference. Can be either Bi-Level or `Tri-Level`. Default is `Bi-Level`.

PrstEditView

With this setting set to `Follow Active`, the edit preset settings (like for instance `UP_Prst_editA` and `UP_Prst_editB`) 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`.

PatternSpeed

Sets the speed of the test-pattern (see settings `Inp_SelA` and `Inp_SelB`) animation between 0 (still) and 15 (fast). Default is 1.

SD-AR-Det

This card can switch between presets on the changes of the aspect ratio. Aspect ratio information can be taken out of the `VI` (video index), `WSS` (widescreen signaling) or `WSS-extended` (extended form of widescreen signaling). With this setting you can select which of the above protocols should be used to detect aspect ratio changes. By default it is set to `VI`.

NoWSS/VI_prstA

With this setting you can set to which preset the card should jump channel A, when no WSS or VI information is found. Can be any preset between `1` and `16` or `Hold` (holds current active preset). By default it is set to `Hold`.

Dn_CtrlA

With this item you select how the presets for Channel A are controlled in down converter mode: Manually (`manual`), via GPI-triggers (`GPI`, `GPI-A`, `GPI-B` or `GPI-C`) or via changes of the HD Aspect Ratio (`S2016`). By default it is set to `Manual`.

Dn_Prst_actA

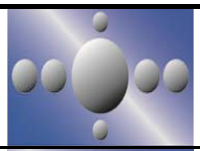
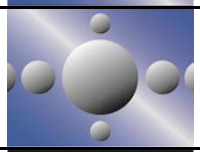
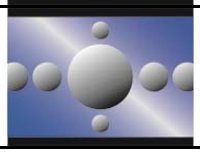
With this item you can manually change the currently active preset of channel A in down converter mode. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with a '`#Dn`'-prefix are part of the preset.

Dn_Prst_editA

Here you can select which of the 16 selectable presets you want to edit for Channel A in down converter mode. 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 '`#Dn`'-prefix are part of the preset.

#Dn_ArcA

With this item you set the Aspect Ratio of the output of channel A in down converter mode. Can be `Anamorphic`, `CenterCut`, `LBox-16:9`, `LBox-14:9` or `Variable` (custom set AR, set by H-scale and V-scale settings). The following table shows examples of the possible aspect ratios when the input source is 16:9.

Setting:	**Result on 4:3 screens:**
`Anamorphic`	
`CenterCut`	
`LBox-16:9`	
`LBox-14:9`	
`Anam-702`	Anamorphic scaling based on 702 active pixels instead of 720 pixels
`Variable`	Dependant on `Dn_H-scale` and `Dn_V-scale` settings.

# Dn_H-scaleA	The horizontal scaling of the TV picture of channel A in down converter mode is set using `#Dn_H-scaleA`. `#Dn_H-scaleA` can be set within the range of 50% to 200% of the input signal (only used when `#Dn_ArcA` is set to `variable`). Default value is 100%.
# Dn_V-scaleA	Sets the vertical scaling of the TV picture of channel A in down converter mode. Can be set within the range of 50% to 200% of the input signal (only used when `#Dn_ArcA` is set to `variable`). Default value is 100%.
# Dn_H-EnhA	With this item you can set the horizontal picture enhancement of channel A in down converter mode between 0 and 100%. By default set to 0%.
# Dn_ColorConvA	`ColorConvA` optimizes the color conversion of channel A in down converter mode. As the color coding of HD (709) and SD (601) are different, it is necessary to convert these when Channel A is up-converting. The best result is generated when the up-converter is active and the `709to601` setting is selected. It is also possible to switch the filter `off`. The default setting is `Off`.
	INSERTER This card can insert several data values in the VBI of the outputs. With the following settings you can choose what you want to insert.
S2016-Line	With this setting you select a line in the VBI to where the AFD (SMPTE 2016) data should be written. Lines 0 till 31 are selectable. By default it is set to line 17.
Timecode_Inp	With this card it is possible to copy the embedded timecode information of either input `SDI-1` or input `SDI-2` to the output. With this setting you select which input you want to use, or switch the timecode inserting `Off` (default).
VITC_Ln_In	With this setting you can select what line of the input you want to copy the VITC data from (only when input is SD). Can be any line between line 7 and line 22. Default is line 19.

VITC_Ln_Ctrl	Here you can choose whether you want to select the line, to where you want to copy the timecode data to, manually (`manual`) or use the information in the `ATC_DBB` package to select the lines (ATC_DBB package contains information about the line duplication as well). Default is `Manual`.
VITC_Ln_625	When `VITC_Ln_Ctrl` is set to `Manual`, with this setting you can select a line between 7 and 22 when the output is SD625. Default is line 19.
VITC_Ln_525	When `VITC_Ln_Ctrl` is set to `Manual`, with this setting you can select a line between 7 and 22 when the output is SD525. Default is line 10.
VITC_Ln_Dup	When set to `On`, the VITC line is duplicated to the above selected line + 2 lines.
Ins_CtrlA	With this item you select how the inserter presets for Channel A are controlled: Manually (`manual`), via GPI-triggers (`GPI`, `GPI-A`, `GPI-B` or `GPI-C`), via changes of the SD Aspect Ratio (`SD_AR`) or the HD aspect ratio (`S2016`) (AFD)). Default is `Manual`.
Ins_Prst_ActA	With this item you can manually change the currently active preset of channel A when in transparent mode. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with a '`#Ins`'-prefix are part of the preset.
Ins_Prst_EditA	Here you can select which of the 16 selectable presets you want to edit for Channel A when in a transparent mode. 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 '`#Ins`'-prefix are part of the preset.
#VI-InsertA	You can turn VI insertion `on` or `off` for channel A. Default is `Off`.
#VI-DataA	With the `#VI-InsertA` setting set to `on`, you can select VI values with this setting, which you want to be inserted in Channel A. possible are all VI values between `4:3_0` and `4:3_7` and the settings between `16:9_0` and `16:9_7`. Default is `4:3_0`.

#WSS-InsertA	You can choose which type of WSS data you want to insert in Channel A with this setting, or switch WSS insertion entirely `off` (default value). You can set it to `Standard` or `Extended`.
#WSS-StndA	With the `#WSS-InsertA` setting set to `Standard`, you can select WSS standard values with this setting, which you want to be inserted in Channel A. possible are all WSS values between `1_vid` and `8_vid` and the settings between `1_flm` and `8_flm`. Default is `1_vid`.
#WSS-ExtndA	With the `#VI-InsertA` setting set to `on`, you can select VI values with this setting, which you want to be inserted in Channel A. possible are all WSS values between `4:3_0` and `4:3_7` and the settings between `16:9_0` and `16:9_7`. Default is `4:3_0`.
#VI-DataA	With the `#WSS-InsertA` setting set to `extended`, you can select WSS extended values with this setting, which you want to be inserted in Channel A. possible are all VI settings between `4:3_0` and `4:3_7` and the settings between `16:9_0` and `16:9_7`. Default is `4:3_0`.
#S2016-InsertA	You can turn S2016 (AFD) insertion `on` or `off` for channel A. Default is `Off`.
#S2016-DataA	With the `#S2016-InsertA` setting set to `on`, you can select AFD values with this setting, which you want to be inserted in Channel A. possible are all AFD values between `AFD0` and `AFD15`.
#OP47-SDP-Emb_A	With this setting you set in which line the OP47 data should be inserted. Can be any line between line 8 and line 16. Can also be switched off (causing the OP47 data to not be inserted at all).
#CC_Ena_A	This setting sets the Closed Captioning transparency for channel A `On` or `Off`. Default is `Off.`
	VIDEO PROC
GainA	With this setting you control the overall gain of the video of channel A between 50 and 150%. Default is 100%.
R-GainA	`R-GainA` controls the Red gain of channel A. The control range is between 50% and 150%. The default setting is 100%.

G-GainA	G-GainA controls the Green gain of channel A. The control range is between 50% and 150%. The default setting is 100%.
B-GainA	B-GainA controls the Blue gain of channel A. The control range is between 50% and 150%. The default setting is 100%.
BlackA	BlackA controls the total R-G-B Black gain of channel A. The control range is between –128bit and 127bit. The default setting is 0bit.
R-BlackA	R-BlackA controls the Red-Black of channel A. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.
G-BlackA	G-BlackA controls the Green-Black of channel A. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.
B-BlackA	B-BlackA controls the Blue-Black of channel A. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.
CVBS-Hue	This item adjusts the HUE of the CVBS input. Can be set between -90 and +90 degrees. Default is 0 degrees.
	AUDIO PROC AMP
Audio_Ctrl	With this setting you select how the audio presets should be controlled. Can be either Manually (Manual), via GPI-triggers (GPI, GPI-A, GPI-B or GPI-C), via the SD aspect ratio (SD-AR) or via the HD aspect ratio (S2016).
Audio_Prst_act	With this item you can manually change the currently active audio preset. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with a '#Emb'-prefix are part of the preset.
Audio_Prst_Edit	Here you can select which of the 16 selectable audio 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 '#Emb'-prefix are part of the preset.

#Audio_Delay	With this item you can delay all audio between 0ms and 1000ms. Default is 0ms. This item is part of the audio presets.
Audio-Bus-IO	This setting can change the Audio bus order from the normal `1234` (=default) to `1324`. The 1324 order is of use to route the 1st group of audio from the 2nd input to the 2nd channel of a slave card (like the DIO48).
	EMBEDDER
#EmbA_Grp	With this setting you select in to which audio group (= 4 audio channels) of the outputs you want to embed the first 4 forwarded audio channels coming from the de-embedders/add-on bus. Can be `group1`, `group2`, `group3` or `group4`. You can also choose to not use these 4 audio channels for anything by setting this item to `off`. By default it is set to `Group1`.
#EmbA1_Inp ~ #EmbA4_Inp	With these settings you can select where the corresponding audio channels (channel A1 till channel A4) of the outputs are coming from. In this card you can choose to get the audio from the de-embedder of SDI input 1 (`Demb-SDI1`) or SDI input 2 (`Demb-SDI2`), the embedder of the active input (`Demb-Input`, dependant on the current active input), from the ADD-ON bus groups, or to mute the corresponding channel (set to `off`). Defaults here are `Off`. ***Note:*** With this card the ADD-ON bus can only be used to either embed audio or de-embed audio. When one of the `EmbXx_Inp` settings is set to embed from the ADD-ON bus, no audio will be de-embedded towards the bus anymore, not for any of the channels.
#EmbA1_Inp_Ch ~ #EmbA4_Inp_Ch	With these settings you can select which Channel of the selected input should be embedded to the corresponding output channel. Can be any channel between `Ch_1` and `Ch_16`. Defaults for A1 till A4 are respectively `Ch_1` till `Ch_4`.
#EmbB_Grp	With this setting you select in to which audio group (= 4 audio channels) of the outputs you want to embed the second 4 forwarded audio channels coming from the de-embedders/add-on bus. Can be `group1`, `group2`, `group3` or `group4`. You can also choose to not use these 4 audio channels for anything by setting this item to `off`. By default it is set to `Group2`.

#EmbB1_Inp ~ #EmbB4_Inp	With these settings you can select where the corresponding audio channels (channel B1 till channel B4) of the outputs are coming from. In this card you can choose to get the audio from the de-embedder of SDI input 1 (`Demb-SDI1`) or SDI input 2 (`Demb-SDI2`), the embedder of the active input (`Demb-Input`,dependant on the current active input), from the ADD-ON bus groups, or to mute the corresponding channel (set to `off`). Defaults here are `Off`. ***Note:*** With this card the ADD-ON bus can only be used to either embed audio or de-embed audio. When one of the `EmbXx_Inp` settings is set to embed from the ADD-ON bus, no audio will be de-embedded towards the bus anymore, not for any of the channels.
#EmbB1_Inp_Ch ~ #EmbB4_Inp_Ch	With these settings you can select which Channel of the selected input should be embedded to the corresponding output channel. Can be any channel between `Ch_1` and `Ch_16`. Defaults for B1 till B4 are respectively `Ch_5` till `Ch_8`.
#EmbC_Grp	With this setting you select in to which audio group (= 4 audio channels) of the outputs you want to embed the third group of 4 forwarded audio channels coming from the de-embedders/add-on bus. Can be `group1`, `group2`, `group3` or `group4`. You can also choose to not use these 4 audio channels for anything by setting this item to `off`. By default it is set to `Group2`.
#EmbC1_Inp ~ #EmbC4_Inp	With these settings you can select where the corresponding audio channels of the outputs are coming from. In this card you can choose to get the audio from the de-embedder of SDI input 1 (`Demb-SDI1`) or SDI input 2 (`Demb-SDI2`), the embedder of the active input (`Demb-Input`, dependant on the current active input), from the ADD-ON bus groups, or to mute the corresponding channel (set to `off`). Defaults here are `Off`. ***Note:*** With this card the ADD-ON bus can only be used to either embed audio or de-embed audio. When one of the `EmbXx_Inp` settings is set to embed from the ADD-ON bus, no audio will be de-embedded towards the bus anymore, not for any of the channels.
#EmbC1_Inp_Ch ~ #EmbC4_Inp_Ch	With these settings you can select which Channel of the selected input should be embedded to the corresponding output channel. Can be any channel between `Ch_1` and `Ch_16`. Defaults for C1 till C4 are respectively `Ch_9` till `Ch_12`.

#EmbD_Grp	With this setting you select in to which audio group (= 4 audio channels) of the outputs you want to embed the last 4 forwarded audio channels coming from the de-embedders/add-on bus. Can be `group1`, `group2`, `group3` or `group4`. You can also choose to not use these 4 audio channels for anything by setting this item to `off`. By default it is set to `Group2`.
#EmbD1_Inp ~ #EmbD4_Inp	With these settings you can select where the corresponding audio channels of outputs B are coming from. In this card you can choose to get the audio from the de-embedder of SDI input 1 (`Demb-SDI1`) or SDI input 2 (`Demb-SDI2`), the embedder of the active input (`Demb-Input`, dependant on the current active input), from the ADD-ON bus groups, or to mute the corresponding channel (set to `off`). Defaults here are `Off`. ***Note:*** With this card the ADD-ON bus can only be used to either embed audio or de-embed audio. When one of the `EmbXx_Inp` settings is set to embed from the ADD-ON bus, no audio will be de-embedded towards the bus anymore, not for any of the channels.
#EmbD1_Inp_Ch ~ #EmbD4_Inp_Ch	With these settings you can select which Channel of the selected input should be embedded to the corresponding output channel. Can be any channel between `Ch_1` and `Ch_16`. Defaults for C1 till C4 are respectively `Ch_13` till `Ch_16`.
#EmbA1_Gain ~ #EmbD4_Gain	Adjusts the gain for the corresponding audio channel between -60 and 12dB. Everything below -999 dB means the audio will be muted.
#EmbA1_Phase ~ #EmbD4_Phase	Adjusts the audio phase of the corresponding to 0 deg or 180 deg.

	GPI-CTRL
GPI-Ctrl	You can set the GPI to be triggered in a `latching` manner or in a `nonLatching` manner. Default for this is `Latch`.
GPI_1 ~ GPI_5	In this card it is possible to make the 5 available GPI triggers part of a GPI pool that can control the various functions in the card separately (all `Xx_Ctrl` items of the menu). With these item you can select which pool the corresponding GPI is part of and in what way it should trigger. You can also choose to not use the corresponding GPI at all by setting it to `Off`. Possible settings are: ▪ `GPI A`: part of GPI-A pool, triggered once Take A is closed. ▪ `GPI B`: part of GPI-B pool, triggered once Take B is closed. ▪ `Take A`: part of GPI-A pool, used to trigger GPI A. ▪ `Take B`: part of GPI-B pool, used to trigger GPI B. ▪ `GPI Prio A`: part of GPI-A pool, working in a priority manner (highest closed GPI of the pool is activated) ▪ `GPI Prio B`: : part of GPI-B pool, working in a priority manner (highest closed GPI of the pool is activated) ▪ `GPI Prio C`: part of GPI-C pool, working in a priority manner (highest closed GPI of the pool is activated) Please refer to 'Appendix 2: GPI's explained' for a more elaborate explanation of the GPI settings.
	NETWORK
IP_Conf0	With this setting you can let the card obtain an IP address automatically via DHCP, or appoint a manual set IP address. By default this setting is set to Manual.
mIP0	When IP_Conf0 is set to manual, you can type in the preferred IP address here. By default it is set to 172.16.1.2
mNM0	With IP_Conf0 set to manual, with this setting you can set a Netmask. Default is 255.255.0.0
mGW0	With IP_Conf0 set to manual, this setting let you set a Standard Gateway. Default is set to 172.16.0.1
NetwPrefix0	Here you can set the proper network prefix if required.

6 Status Menu

Introduction

The status menu indicates the current status of each item listed below.

sInp1

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
- 1035i60
- 720p60
- 720p50
- 720p30
- 720p25
- 720p24
- SD525
- SD625
- NA

sInp1_VI

Displays the detected VI value found in input1. This is displayed as follows:

- 4:3_0
- 4:3_1
- 4:3_2
- 4:3_3
- 4:3_4
- 4:3_5
- 4:3_6
- 4:3_7
- 16:9_0
- 16:9_1
- 16:9_2
- 16:9_3
- 16:9_4
- 16:9_5
- 16:9_6
- 16:9_7
- NA (no VI detected)

sInp1_WSS-Stnd

This status item displays the detected standard WSS value of input 1. this is displayed as follows:

- 1_vid
- 2_vid
- 3_vid
- 4_vid
- 5_vid
- 6_vid
- 7_vid
- 8_vid
- 1_flm
- 2_flm
- 3_flm
- 4_flm
- 5_flm
- 6_flm
- 7_flm
- 8_flm
- NA (no standard WSS detected)

sInp1_WSS-Extd

This item displays the detected extended WSS value of input 1. This is displayed as follows:

- 4:3_0
- 4:3_1
- 4:3_2
- 4:3_3
- 4:3_4
- 4:3_5
- 4:3_6
- 4:3_7
- 16:9_0
- 16:9_1
- 16:9_2
- 16:9_3
- 16:9_4
- 16:9_5
- 16:9_6
- 16:9_7
- NA (no WSS extended detected)

sInp1_S2016	This item displays the detected SMPTE 2016 (AFD) values of input 1. This is displayed as follows: ▪ AFD0 ▪ AFD1 ▪ AFD2 ▪ AFD3 ▪ AFD4 ▪ AFD5 ▪ AFD6 ▪ AFD7 ▪ AFD8 ▪ AFD9 ▪ AFD10 ▪ AFD11 ▪ AFD12 ▪ AFD13 ▪ AFD14 ▪ AFD15 ▪ NA (no S2016 detected)
sInp2	This status item indicates the presence and format of a valid signal in input 2. This is displayed as listed under sInp1.
sInp2_VI	Displays the detected VI value found in input2. This is displayed as listed under sInp1_VI.
sInp2_WSS-Stnd	Displays the detected WSS-standard value found in input2. This is displayed as listed under sInp1_WSS-Stnd.
sInp2_WSS-Extnd	Displays the detected WSS-extended value found in input2. This is displayed as listed under sInp1_WSS-ext.
sInp2_S2016	Displays the detected S2016 value found in input2. This is displayed as listed under sInp1_S2016.
sInp3_WSS-Stnd	Displays the detected WSS-standard value found in input3 (CVBS input). This is displayed as listed under sInp1_WSS-Stnd.
sInp3_WSS-Extnd	Displays the detected WSS-extended value found in input3 (CVBS input). This is displayed as listed under sInp1_WSS-ext.

sInpCVBS

This status item indicates the detected input format on the CVBS input. This is displayed as one of the following values:

- `NTSC-J`
- `NTSC-M`
- `NTSC-4.43`
- `PAL-BGHID`
- `PAL-N`
- `PAL-M`
- `PAL-60`
- `SECAM`
- `SECAM-525`
- `NA` (no input detected)

IODelayA

Displays the total delay in ms of outputs A1 and A2. can be a value between `0ms` and `5000ms`.

FunctionA

Displays the current function outputs A1 and A2. For the card it can only be `Up`, `Trans`, `TestPattern` or `NA`.

Ref

Displays whether a correct reference is found (`Present`) or not (`NA`)

GPI

Displays the currently closed GPI contacts. This is displayed as for instance 1_3_ when contacts 1 and 3 are closed and for instance _234 when contacts 2, 3 and 4 are closed.

GPIA

Displays the current value of GPI pool A

GPIB

Displays the current value of GPI pool B

GPIC

Displays the current value of GPI pool C

OP47-Det-A

Displays whether or not there's OP47 detected on channel A

WST-Det-A

Displays whether or not there's WST (teletext) detected on channel A

CC_Det_A

Displays whether or not there's Closed Captioning detected on channel A

	NET STATUS
IP_Addr0	This item displays the status of the IP address. It can be manual, DHCP asking, DHCP Leased or DHCP Infin.
MAC0	This item displays the MAC address of the card.
IP0	This item displays the current IP address of the card.
NM0	This item displays the current Netmask of the card.
GW0	This item displays the current Standard Gateway of the card.

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.

Ref-Status

Reference 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
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
Reference	03_{hex}=REF_LOSS	83_{hex}=REF_RETURN	reference lost or returned

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 card is not configured correctly or has a hardware failure.

Input_A LED

This LED indicated the presence of a valid SDI video signal on input A.

Input_B LED

This LED indicated the presence of a valid SDI video signal on input B.

ANC Data LED

Indicates the presence of embedded audio within the input signal.

Reference LED

Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).

Data Error LED

This LED indicates a CRC error.

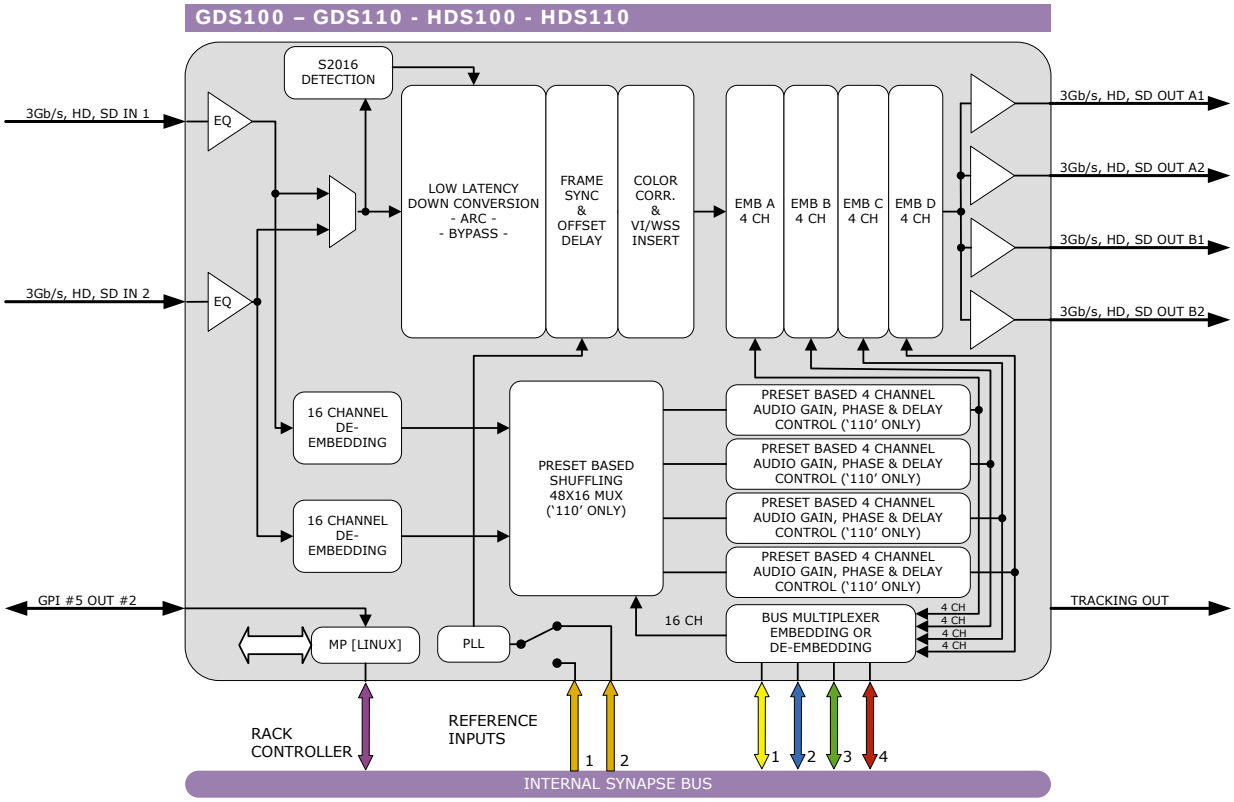
Connection LED

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

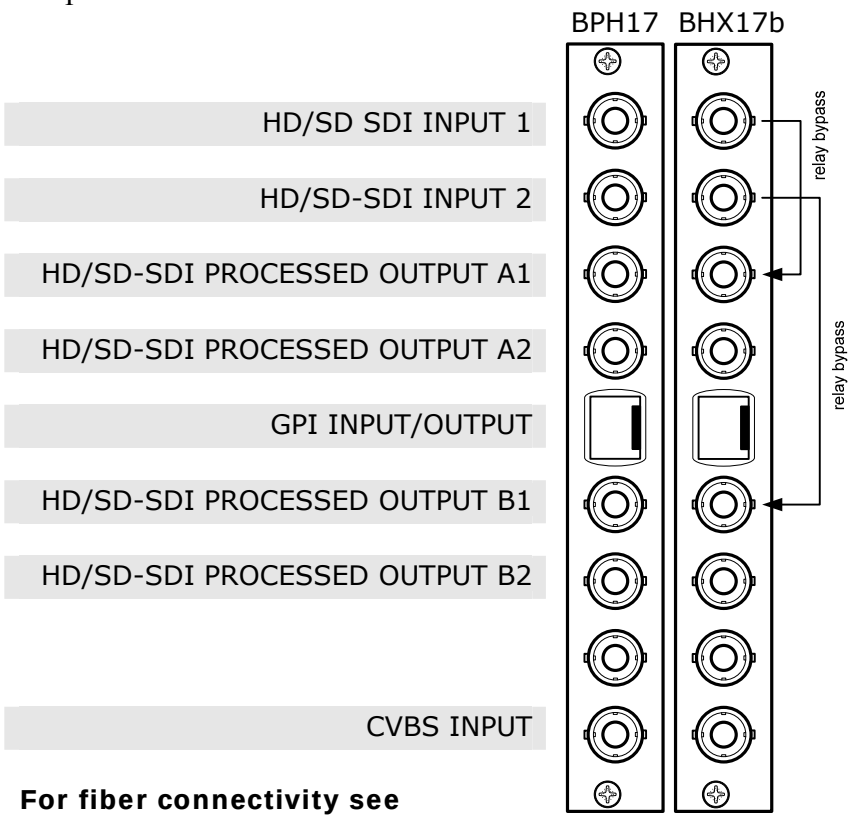
The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.

9 Block Schematic



10 Connector Panels

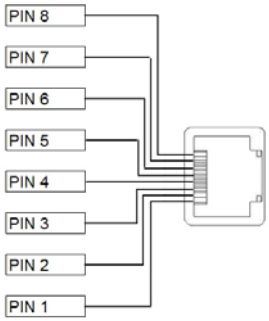
The GDS-HDS100/110 can be used with the BPH17 or the BHX17b. The following table displays the pinout of these backpanels in combination with the card.



For fiber connectivity see www.axon.tv

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

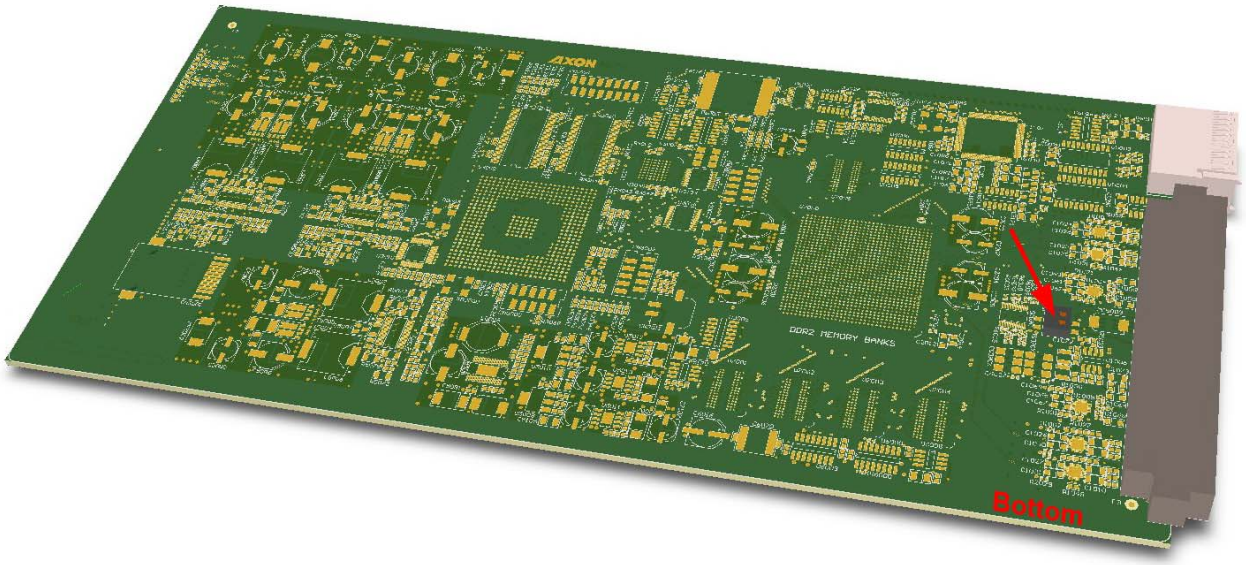
GPI pinning



Pin	Function
1	GPI in 1
2	GPI in 2
3	GPI in 3
4	GPI in 4
5	GPI in 5
6	GPI out 1
7	GPI out 2
8	Ground

Appendix 1 Card dip-switches for BHX/BPH configuration

There are dip-switches on the circuit board of the card itself. With these dip-switches you can change the power-voltages that is put on the backpanel. By default the switches are set to off, putting no power on the backpanel. The picture below displays where the switch is positioned on the card.



Using BHX17b

When using the backpanel with bypass relay (BHX17b), you must first set the **bottom-side** dip-switch to 'on'. This will pass 5 volt to the backpanel. If this is not done, the relays won't work at all.

Using BPH17 with fiber I/O

When using the backpanel with fiber I/O, you must first set the **top-side** dip-switch to 'on'. This will pass 30 volt to the backpanel. If this is not done, the relays won't work at all.

Appendix 2 GPI's explained

GPI pools

This card has 5 GPI contacts. Since there are several functions you can control by using GPI's (for instance: outmode and up/down/cross-presets and audio presets) you can add each individual GPI contact to certain GPI pools. Each pool can then be assigned to control a specific setting.

binary mode or priority mode

In the `GPI_1` till `GPI_5` settings you can appoint each GPI contact to one of the 3 available pools. The way these contacts act together depends on whether the pool works in binary or in priority mode.

Example 1

If we would like to control the up converter presets using Pool A (`Up_CtrlA` set to `GPI-A`) and the outmode setting using Pool B (`Out-mode-Ctrl` set to `GPI-B`). Both pools working in priority mode. We could do the following:

- Set `GPI_1` to `GPI Prio A`
- Set `GPI_2` to `GPI Prio A`
- Set `GPI_3` to `GPI Prio A`
- Set `GPI_4` to `GPI Prio A`
- Set `GPI_5` to `GPI Prio B`

Pool A now consists of GPI 1, GPI 2, GPI 3 and GPI 4 in a priority mode, controlling the Up converter preset. Pool B consists only of GPI 5 (also in a priority mode), controlling the Output mode setting.

Pool A now works as follows:

GPI_1 status	GPI_2 status	GPI_2 status	GPI_4 status	Set value
0	0	0	0	Up-conv Preset 1
1	0	0	0	Up-conv Preset 2
0	1	0	0	Up-conv Preset 3
0	0	1	0	Up-conv Preset 4
0	0	0	1	Up-conv Preset 5
0	1	1	0	Up-conv Preset **4** (because highest gets priority)
1	1	1	1	Up-conv Preset **5** (because highest gets priority)

Pool B now works as follows:

GPI_5 status	Set value
0	A out only
1	B out only

Example 2

Let's say we would like to control the up-converter presets using Pool A (`Up_CtrlA` set to `GPI-A`) in binary mode and the audio presets using Pool B (`Audio_Ctrl` set to `GPI-B`) in priority mode. We could do the following:

- Set `GPI_1` to `GPI-A`
- Set `GPI_2` to `GPI-A`
- Set `GPI_3` to `Take A`
- Set `GPI_4` to `GPI Prio B`
- Set `GPI_5` to `GPI Prio B`

Pool A now consists of GPI 1, GPI 2 and GPI 3 (as take), in a binary mode, controlling the Up converter preset. Pool B now consists of GPI 4 and GPI 5 in a priority mode, controlling the audio presets.

Pool A now works as follows:

GPI_1 status	GPI_2 status	Set value when GPI_3 (take) is closed
0	0	Up-conv Preset 1
1	0	Up-conv Preset 2
0	1	Up-conv Preset 3
1	1	Up-conv Preset 4

Pool B now works as follows:

GPI_4 status	GPI_5 status	Set value
0	0	Audio Preset 1
1	0	Audio Preset 2
0	1	Audio Preset 3
1	1	Audio Preset **3** (because highest gets priority)

Example 3

Let's say we would like to control the up-converter presets using Pool A (`Up_CtrlA` set to `GPI-A`) in priority mode, the audio presets using Pool B (`Audio_Ctrl` set to `GPI-B`) in priority mode, and Out mode control using Pool C (`Out-mode-Ctrl` set to `GPI-C`) also in prio mode. We could do the following settings:

- Set `GPI_1` to `GPI Prio A`
- Set `GPI_2` to `GPI Prio A`
- Set `GPI_3` to `GPI Prio B`
- Set `GPI_4` to `GPI Prio B`
- Set `GPI_5` to `GPI Prio C`

Pool A now consists of GPI 1 and GPI 2 in a priority mode, controlling the Up converter preset. Pool B now consists of GPI 3 and GPI 4 in a priority mode, controlling the audio presets. Pool C consists only of GPI 5 (also in priority mode)

Pool A now works as follows:

GPI_1 status	GPI_2 status	Set value
0	0	Up-conv Preset 1
1	0	Up-conv Preset 2
0	1	Up-conv Preset 3
1	1	Up-conv Preset **3** (because highest gets priority)

Pool B now works as follows:

GPI_3 status	GPI_4 status	Set value
0	0	Audio Preset 1
1	0	Audio Preset 2
0	1	Audio Preset 3
1	1	Audio Preset **3** (because highest gets priority)

Pool C now works as follows:

GPI_5 status	Set value
0	A out only
1	B out only

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