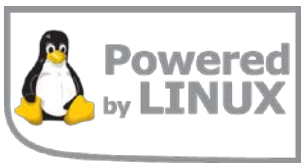
Synapse

GDK150/200
HDK150/200

3Gb/s and HD keyer, mixer with dual 2D DVE

Installation and Operation manual



Committed.

AXON

AXON

Synapse

TECHNICAL MANUAL

G/HDK150/200

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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: 26-01-2009
Date last revised: 23-11-2010

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 G/HDK150-200 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 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 Synapse 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 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.

Default settings

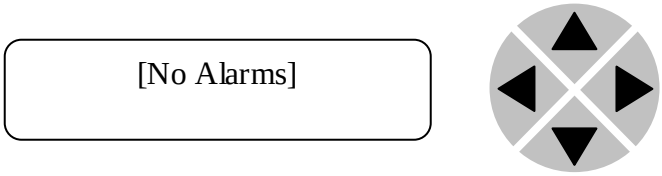
In its default condition the HDK100 acts as a back-up switcher with only the carrier detector active.

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.

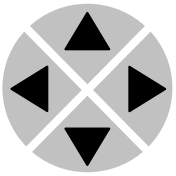
Press ►	To go forward through the menu structure.
Press ◄	To go back through the menu structure.
Press ▲	To move up within a menu or increase the value of a parameter.
Press ▼	To move down through a menu or decrease the value of a parameter.

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.

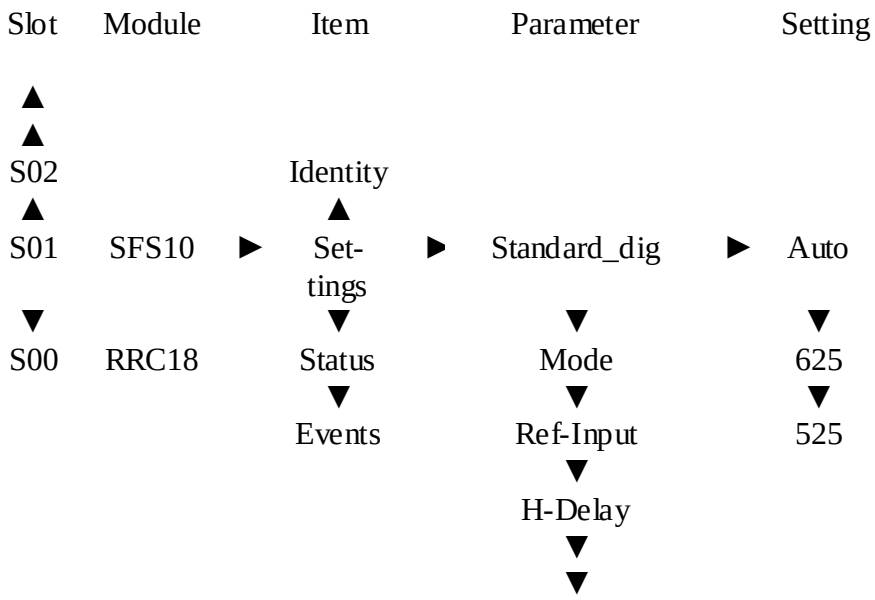
Axon Cortex Software

Axon Cortex 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



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 G/HDK150/200 Card

Introduction

The GDK150/200 and HDK150/200 are advanced keyer platforms for use in transmission applications. Especially where a full master control unit is overkill these cards can be a cost and space saving alternative. These units have 4 triple rate (all SD, HD, 3Gb/s capable) inputs: 2 background inputs, 1 fill input and 1 key input. It also has 4 triple rate outputs: 2 program outputs and 2 preview outputs.
Depending on the connector panel you have either Ethernet (for easy and fast card upgrading) or GPI control (over RJ45).

The GDK150/200 and HDK150/200 are not designed for external 3rd party control protocols. The units can be used with GPI's, and Cortex 'soft' control panels. Of course is 3rd party control via ACP possible.

Features

The following is a summary of the features the GDK-HDK200 offers:

- 2 selectable background inputs
- Key or Fill input
- Self key
- 2x 2D DVE (in 200)
- Advanced routing capabilities for flexible program/production applications
- Mix engine with speed and transition adjustments
- Adjustable slice level and transparency
- Preview output with transition preview, for content verification prior to go on air
- Transparent for 16 channels of embedded audio
- Transparent for Time Code data
- Quad speed Synapse audio bus for enhanced external audio applications
- Compatible with:
  - 270 Mb/s (SMPTE 259M) 50 and 59.94Hz
  - 1485 Mb/s (SMPTE 292M) 50 and 59.94Hz (HDK/GDK only)
  - 2970 Mb/s (SMPTE 424M) =3Gb/s 50 and 59.94Hz (GDK only)
- Locks to Tri-level or Bi-level syncs

Depending on the connector panel you have either Ethernet or GPI control.

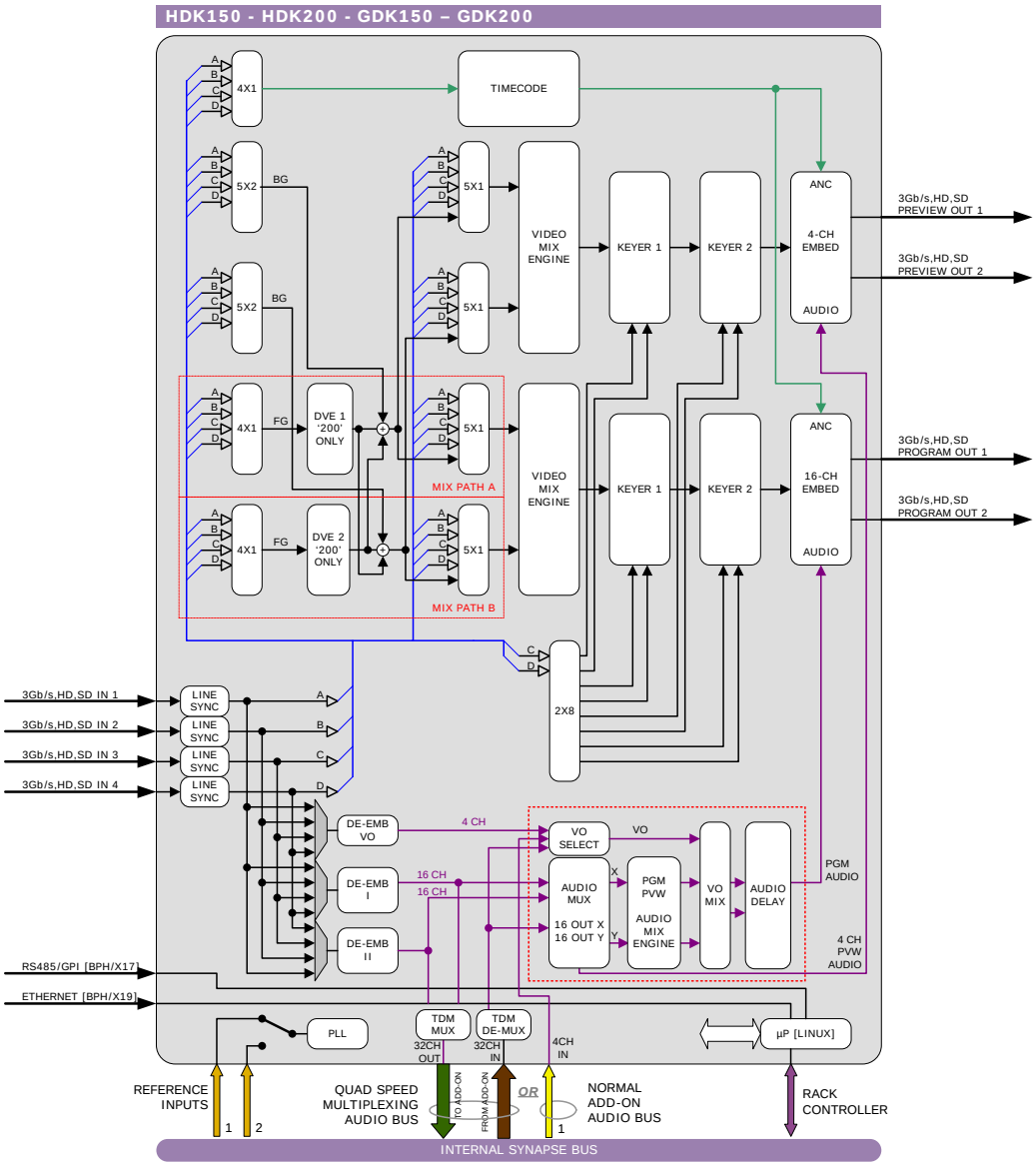
- GPI with BPH17 or BHX17b
- Ethernet with BPH19 or BHX19

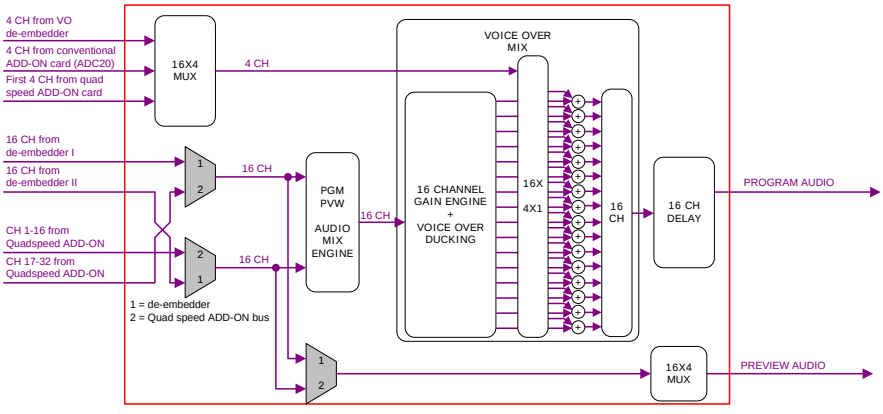
Applications

The GDK/HDK200 can be used as:

- an entry level program output processor for basic program channels.
- a production (3Gb/s) mixer/2D-DVE for life applications like sports events

Block schematic

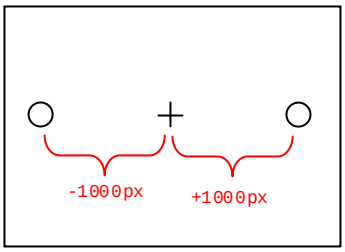




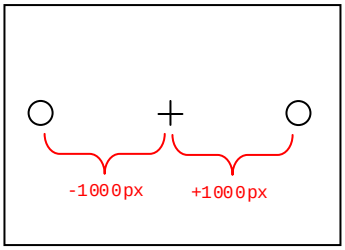
Important notice about input specifications

The G/HDK150/200 does not have a frame synchroniser built in. Therefore it is up to the system engineer to synchronize the inputs before feeding them to the keyer card. All inputs have to fall within the following specifications:

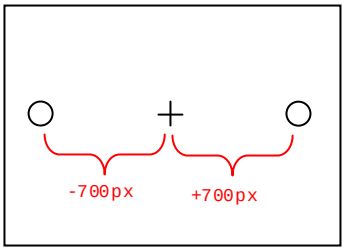
1080p:
1000 pixels (6.756 µs) in front or behind of the reference (which is fed to the G/HDK card via the rack controller).



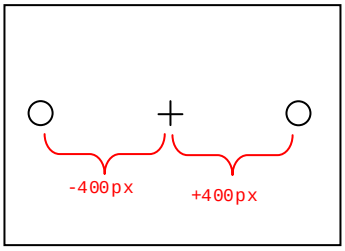
1080i:
1000 pixels (13.5 µs) in front or behind of the reference (which is fed to the G/HDK card via the rack controller).



720p:
700 pixels (9.42 µs) in front or behind of the reference (which is fed to the G/HDK card via the rack controller).



SD:
400 pixels (29.62 µs) in front or behind of the reference (which is fed to the G/HDK card via the rack controller).



Important notice about output delays

The keyer card adds a bit of delay to the outputs in comparison to the inputs. These are the measured delays per format:

1080p:
Not measured.

1080i:
2 lines delayed, ±11,89 µs

720p:
3 lines delayed, ±8,46 µs

SD:
1 line delayed, ±23,9 µs

5 Settings Menu

Introduction

The settings menu displays the current state of each G/HDK150/200 setting and allows you to change or adjust it.

Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 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.

CONTROL

Inp_Format

With `Inp-Format` you can set what the input format is. Possible settings are:

- `1080p60`, `1080p50` (GDK150/200 only)
- `1080i60`, `1080i50`
- `720p60`, `720p50`
- `SD525`, `SD625`

Default setting for this item is `Auto`

Lock-Mode

With this setting you select to what the card should lock to: `input1`, `ref1`, `ref2`. 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.

Note: Please be aware that the GDK/HDK150-200 does not have a built in frame-synchronizer. This means that all inputs should already be locked to the lock-source (ref1, ref2 or input1). This should be accurate within the values stated on page 12 under the paragraph 'Important notice about input specifications'.

Ref-Type

The G/HDK150/200 is able to lock on to a HD sync 600mV nominal TRI-level as described in the SMPTE 274M and 296m spec. A SD sync 300 mV nominal BI-level sync can also be used. `Ref-Type` sets the type of reference to `TRI-level` or `BI-level`.

The default setting is `Bi-level`

Add-On-Mode

With this setting you can set the Synapse Add-on bus mode to Quad speed audio (`Quad_audio`) or to `Normal` mode. Default is `Quad_Audio`. For a detailed description of the quad speed audio mode, refer to appendix 2.

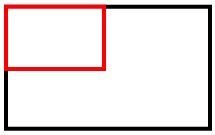
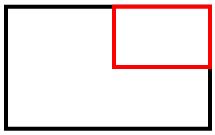
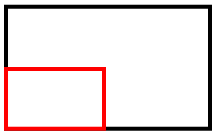
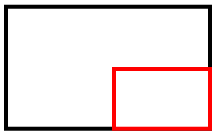
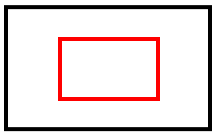
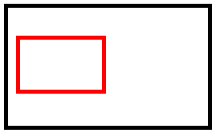
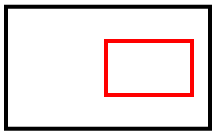
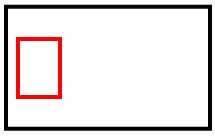
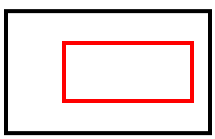
Output 4	The G/HDK150/200 has a fourth SDI output which can be user defined in what the output is. You can choose to make this a third `Program` output, a second `Preview` output. By default it is set to `Program`.
AAFilter	Anti-Aliasing Filter. Limits the bandwidth of the inputs, on order to prevent aliasing. Can be set to `Normal` (Anti-aliasing is applied, although some sharpness is maintained), `Soft` (Anti-aliasing is applied, resulting in a softened image) or `Off` (no anti-aliasing is applied). By default is it switched `off`.
	DVE
DVE-Mode-Ctrl	With this item you select how the `DVE-Mode` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.
DVE-Mode	With this setting you set the card in 2 DVE mode (`Mode-2DVE`, only available in the HDK200) or 1 DVE mode (`Mode-DVE`), which is the default setting.
Outlines	Switches `on` or `off` the outline around the DVE. Default is `off`.
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`.
DVE1-Preset-Ctrl	With this item you select how the `DVE1-Active-Prst` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

DVE1-Active-Prst	With this item you can change the currently active preset of DVE1. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with a '#'-prefix are part of this preset. The contents of the presets are shared with both DVE's, for example: DVE1 set to preset 2 will have the same menu settings as when DVE2 is set to preset 2.
DVE-Edit-Prst	Here you can select which of the 16 selectable presets you want to edit. The content of the presets are shared with both DVE's, for example: DVE1 set to preset 2 will have the same menu settings as when DVE2 is set to preset 2. Changing this setting 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.
DVE1-Next-Preset	With this setting you select which of the 16 presets will be the next active one for DVE1. This is used when DVE transition is selected.
DVE1-Inp	This setting selects which input should be used for DVE1: `SDI1`, `SDI2`, `SDI3` or `SDI4`. Default is `SDI1`.
DVE2-Preset-Ctrl	With this item you select how the `DVE2-Active-Prst` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.
DVE2-Preset	With this item you can change the currently active preset of DVE2. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with a '#'-prefix are part of the preset. The contents of the presets are shared with both DVE's, for example: DVE1 set to preset 2 will have the same menu settings as when DVE2 is set to preset 2.
DVE2-Next-Preset	With this setting you select which of the 16 presets will be the next active one for DVE2. This is used when DVE2 transition is selected.
DVE2-Inp	This setting selects which input should be used for DVE2: `SDI1`, `SDI2`, `SDI3` or `SDI4`. Default is `SDI1`.

#DVE-Window

These settings overwrite the DVE start and stop settings to predefined position on screen.

These are the possible predefined positions:

Full	
Top-Left	
Top-Right	
Bottom-Left	
Bottom-Right	
Center	
Dual-Left (for 2DVE mode)	
Dual-Right (for 2DVE mode)	
Cut-Left	
Cut-Right	
Manual	Uses manual settings to define the DVE window.

#In-DVE-HStart	With this setting you set a horizontal position, in percentages of the entire video width, where the picture should start for the input of the DVE. Refer to appendix 1 for more details.
#In-DVE-HStop	With this setting you set a horizontal position, in percentages of the entire video width, where the picture should stop for the input of the DVE. Refer to appendix 1 for more details.
#In-DVE-VStart	With this setting you set a vertical position, in percentages of the entire video height, where the picture should start for the input of the DVE. Refer to appendix 1 for more details.
#In-DVE-VStop	With this setting you set a vertical position in percentages, in percentages of the entire video height, where the picture should stop for the input of the DVE. Refer to appendix 1 for more details.
#Out-DVE-HStart	With this setting you set a horizontal position, in percentages of the entire video width, where the picture should start for the destination of the DVE. Refer to appendix 1 for more details.
#Out-DVE-HStop	With this setting you set a horizontal position, in percentages of the entire video width, where the picture should stop for the destination of the DVE. Refer to appendix 1 for more details.
#Out-DVE-VStart	With this setting you set a vertical position, in percentages of the entire video height, where the picture should start for the destination of the DVE. Refer to appendix 1 for more details.
#Out-DVE-VStop	With this setting you set a vertical position, in percentages of the entire video height, where the picture should stop for the destination of the DVE. Refer to appendix 1 for more details.
Background-DVE1	Here you select which input contains the background image for DVE1. Can be `SDI1`, `SDI2`, `SDI3` or `SDI4`. Default is `SDI1`.
Background-DVE2	Here you select which input contains the background image for DVE2 Can be `SDI1`, `SDI2`, `SDI3` or `SDI4`. Default is `SDI1`.

	MIXER OPTIONS
Prgm-Mix-In1	With this setting you select which source you want to use as first picture of the program mix (visible on Program Output 1 and Program Output 2). Can be `SDI-1`, `SDI-2`, `SDI-3`, `SDI-4`, `DVE1` or `DVE2`. Default is `SDI-1`.
Prgm-Mix2-Ctrl	With this item you select how the `Pgrm-Mix-In2` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.
Prgm-Mix-In2	With this setting you select which source you want to use as second picture of the program mix (visible on Program Output 1 and Program Output 2). Can be `SDI-1`, `SDI-2`, `SDI-3`, `SDI-4`, `DVE1` or `DVE2`. Default is `SDI-1`.
Prev-Mix-In1	With this setting you select which source you want to use as first picture of the preview mix (visible on Preview Output 1 and Preview Output 2). Can be `SDI-1`, `SDI-2`, `SDI-3`, `SDI-4`, `DVE1` or `DVE2`. Default is `SDI-1`.
Prev-Mix2-Ctrl	With this item you select how the `Prev-Mix-In2` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.
Prev-Mix-In2	With this setting you select which source you want to use as second picture of the program mix (visible on Preview Output 1 and Preview Output 2). Can be `SDI-1`, `SDI-2`, `SDI-3`, `SDI-4`, `DVE1` or `DVE2`. Default is `SDI-1`.
Prgm-Take-Ctrl	With this item you select how the `Trans-Take-Pgrm` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Trans-Take-Prgm

This is the take for the program mix. Switching it to `on` will trigger the program transition to start.

Prev-Take-Ctrl

With this item you select how the `Trans-Take-Prev` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`.

The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Trans-Take-Prev

This is the take for the program mix. Switching it to `on` will trigger the program transition to start.

Trans_Type

Here you select the transition type for the mix you are triggering (both program and preview). Possible transition types are:

- `Cut-out_Cut-in` (default)
- `Cut-out_Fade-in`
- `Fade-out_Cut-in`
- `Fade-out_Fade-in`
- `Cross_fade`
- `Wipe_LR`
- `DVE-Trans`

Wipe-Ctrl

With this item you set how you want the `Wipe_LR` transition (`Trans_Type`) to be. Can be `auto`, in which case it will be a wipe from the utmost left to the utmost right. Can also be set to `manual` in which case the following settings are used (`Wipe-Pos-Prgm` and `Wipe-Pos-Prev`).

Wipe-Pos-Prgm

With this setting you set the manual position of the wipe in the program output. This is only used when `Wipe-Ctrl` is set to manual.

Wipe-Pos-Prgm

With this setting you set the manual position of the wipe in the preview output. This is only used when `Wipe-Ctrl` is set to manual.

Audio_Type

With this setting you select an audio transition type for the mix you are triggering (both program and preview). Possible audio transition types are:

- `Fade-out_Fade-in` (default)
- `Cross_fade`
- `No_Fade`

Audio_A	Selects the source of the audio for the start of the mix. Can be SDI or Add-on. Default is SDI
Audio_B	Selects the source of the audio for the end of the mix. Can be SDI or Add-on. Default is SDI
Trans_Speed	With this setting you select a level of speed for the transition. This works in a preset way. You can define the exact speed of the possible settings (`slow`, `medium` or `fast`) with the following settings.
Trans-Fast	This defines the speed of the `Fast` setting for the `Trans_Speed` menu item. Can be any value between 1 and 400 frames. Default is 50 frames.
Trans-Medium	This defines the speed of the `Medium` setting for the `Trans_Speed` menu item. Can be any value between 1 and 400 frames. Default is 100 frames.
Trans-Slow	This defines the speed of the `Slow` setting for the `Trans_Speed` menu item. Can be any value between 1 and 400 frames. Default is 200 frames.
	KEYER OPTIONS
Keyer	With this setting you decide how you want the keyer to work. Choices are: ▪ `Key_input`: Use the key as inserted on the key-input. ▪ `Self_key`: Key using the signal from the fill input, without making use of a key-input (hard keying). ▪ `Key_invert`: Use the key as inserted on the key-input, but inverted. ▪ `Forces_shape`: This mode will only fade down the background with the corresponding key level and will insert the fill signal without changing this at all
Pgrm-Key1-Ctrl	With this item you select how the `Prgm-Key1` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`. The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Prgm-Key1

This item sets key1 `on` or `off` for the program outputs. Set to `GPI` will enable the program keyer 1 to be switched on or off by GPI-0 closures (refer to chapter 10: GPI pinning). Default is `On`.

Prgm-Key1-Fill

With this item you select an input which should function as the fill input for program key 1. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-1.

Prgm-Key1-Key

With this item you select an input which should function as the key input for program key 1. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-1.

Prgm-Key1-In

With this setting you can select how long the fade in of program-key1 should be when triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

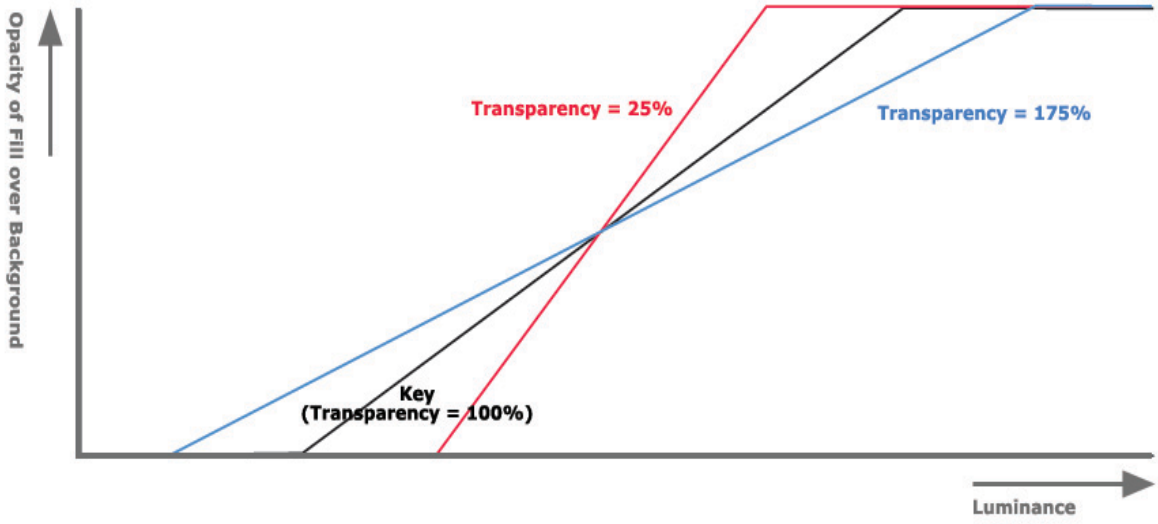
Prgm-Key1-Out

With this setting you can select how long the fade out of program-key1 should be when a new key2 is triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prgrm-Key1-Transp

With this setting you can increase or decrease the transparency of the fill image of program key 1. Can be set between 0% and 199%. Default is 100%. The following graph shows how the transparency setting modifies the key

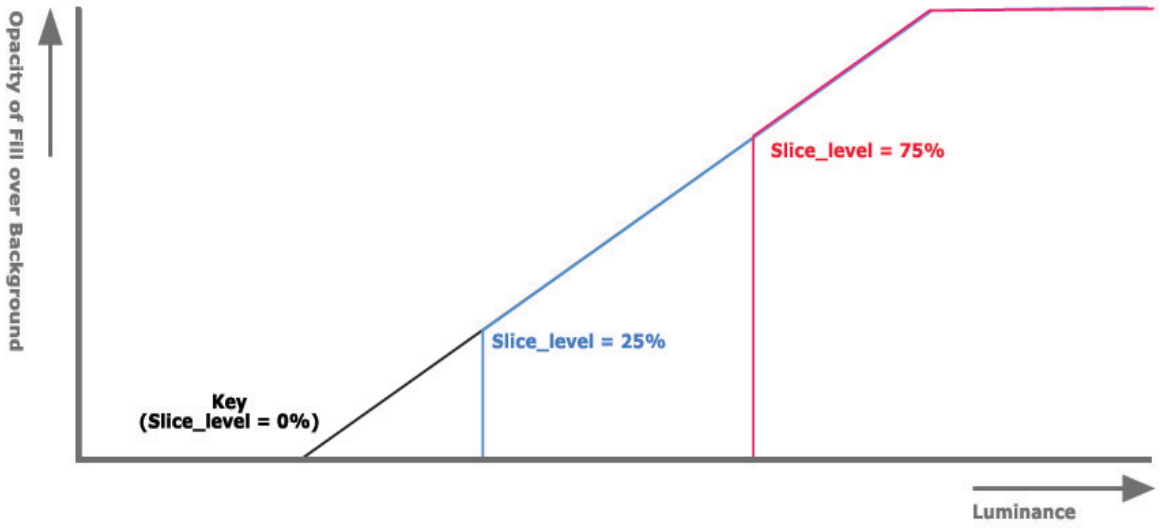
Transparency setting visualised:



Prgm-Key1-Slice

With this setting you set a point in percentage in program key 1 where the fill input should be cut off entirely. The default for this setting is 0%. The following graph shows how this setting modifies the key (with `Keyer` set to `Key_input`).

Slice_level setting visualised:



Pgrm-Key2-Ctrl

With this item you select how the `Prgm-Key2` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`.

The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Prgm-Key2

This item sets key2 `on` or `off` for the program outputs. Set to `GPI` will enable the program keyer 2 to be switched on or off by GPI-0 closures (refer to chapter 10: GPI pinning). Default is `On`.

Prgm-Key2-Fill

With this item you select an input which should function as the fill input for program key 2. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-2.

Prgm-Key2-Key

With this item you select an input which should function as the key input for program key 2. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-2.

Prgm-Key2-In

With this setting you can select how long the fade in of program-key 2 should be when triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prgm-Key2-Out

With this setting you can select how long the fade out of program-key 2 should be when a new key 2 is triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prgm-Key2-Transp

With this setting you can increase or decrease the transparency of the fill image of program key 2. Can be set between 0% and 199%. Default is 100%. The graph in `Prgm-key1-Transp` shows how the transparency setting modifies the key

Prgm-Key2-Slice

With this setting you set a point in percentage in program key 2 where the fill input should be cut off entirely. The default for this setting is 0%. The graph in `Prgm-key1-slice` shows how this setting modifies the key (with `Keyer` set to `Key_input`).

Prev-Key1-Ctrl

With this item you select how the `Prev-Key1` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`.

The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Prev-Key1

This item sets key1 `on` or `off` for the preview outputs. Set to `GPI` will enable the preview keyer 1 to be switched on or off by GPI-0 closures (refer to chapter 10: GPI pinning). Default is `On`.

Prev-Key1-Fill

With this item you select an input which should function as the fill input for preview key 1. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-1.

Prev-Key1-Key

With this item you select an input which should function as the key input for preview key 1. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-1.

Prev-Key1-In

With this setting you can select how long the fade in of preview-key 1 should be when triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prev-Key1-Out

With this setting you can select how long the fade out of preview-key 1 should be when a new preview key 1 is triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prev-Key1-Transp

With this setting you can increase or decrease the transparency of the fill image of preview key 1. Can be set between 0% and 199%. Default is 100%. The graph in `Prgm-key1-Transp` shows how the transparency setting modifies the key

Prev-Key1-Slice

With this setting you set a point in percentage in preview key 1 where the fill input should be cut off entirely. The default for this setting is 0%. The graph in `Prgm-key1-slice` shows how this setting modifies the key (with `Keyer` set to `Key_input`).

Prev-Key2-Ctrl

With this item you select how the `Prev-Key2` setting is controlled: Manually (`manual`) or via GPI-triggers (`GPI-A`, `GPI-B` or `GPI-C`). By default it is set to `Manual`.

The GPI pools (GPI-A, GPI-B and GPI-C) are defined with the settings under the header `GPI-MODE`. Refer to appendix 3 for a detailed description of the GPI pool functionality.

Prev-Key2

This item sets key2 `on` or `off` for the preview outputs. Set to `GPI` will enable the preview keyer 2 to be switched on or off by GPI-0 closures (refer to chapter 10: GPI pinning). Default is `On`.

Prev-Key2-Fill

With this item you select an input which should function as the fill input for preview key 2. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-1.

Prev-Key2-Key

With this item you select an input which should function as the key input for preview key 2. Can be SDI-1, SDI-2, SDI-3 or SDI4. Default is SDI-2.

Prev-Key2-In

With this setting you can select how long the fade in of preview-key 2 should be when triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prev-Key2-Out

With this setting you can select how long the fade out of preview-key 2 should be when a new key 2 is triggered. This can be between 0 frames and 200 frames. Default is 0 frames.

Prev-Key2-Transp

With this setting you can increase or decrease the transparency of the fill image of preview key 2. Can be set between 0% and 199%. Default is 100%. The graph in `Prgm-key1-Transp` shows how the transparency setting modifies the key

Prev-Key2-Slice	With this setting you set a point in percentage in preview key 2 where the fill input should be cut off entirely. The default for this setting is 0%. The graph in `Prgm-key1-slice` shows how this setting modifies the key (with `Keyer` set to `Key_input`).
	EMBEDDER
Emb-Prgm-A ~ Emb-Prgm-D	With this setting you can disable the embedding on the corresponding program audio group by setting it to `off`.
Emb-Prev-A	For the preview audio groups you can only embed group A. This can be switched off by setting this to `off`.
	DE-EMBEDDER
Demb1-Source	In the block schematic you'll see that there are 2 de-embedders. With this setting you select what the source for de-embedder 1 should be. Can be `Demb-SDI1`, `Demb-SDI2`, `Demb-SDI3` or `Demb-SDI4`. Can also be set to follow, in which case this setting will automatically follow the active fill-input. Default is `Demb-SDI1`.
Demb2-Source	With this setting you select what the source for de-embedder 2 should be. Can be `Demb-SDI1`, `Demb-SDI2`, `Demb-SDI3` or `Demb-SDI4`. Can also be set to follow, in which case this setting will automatically follow the active fill-input. Default is `Demb-SDI2`.
Audio_VO	With this setting you select the source of the voice-over audio. Can be `Add-On` or `SDI`. When set to `SDI`, you can select a specific SDI source with the next setting. Set to `Add-on` will automatically set ***the first 4 channels*** on the add-on bus as voice-over. Default is `SDI`.
DembVO_Source	With this setting you select what the source for the voice-over de-embedder should be. Can be `Demb-SDI1`, `Demb-SDI2`, `Demb-SDI3` or `Demb-SDI4`. Default is `Demb-SDI1`.

DembVO_Ch1 ~ DembVO_Ch4	You can have a total of 4 channels as voice-over. When `Audio_VO` is set to `SDI` you can select a specific channel with the `DembVO_Source` to be your Voice-over channels. With these settings you select which specific channels will be ch1, ch2, ch3 and ch4 of your voice-over audio. Default are channels 1 till 4.
Phase-Rst	If this setting is set to *On*, 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.
Audio_Delay	Here you can delay all audio between 0ms and 1300ms. Default is 0ms.
	PREVIEW AUDIO
Prev-Audio-Src	With this setting you set an audio source for the preview output. The preview output can contain audio from `Demb1`, `Demb2`, `Addon01/16` or `Addon17/32`. Default is `Demb1`.
Audio-Sel	The preview output can contain 4 channels of audio. With this setting you select which 4 channels of the selected source (set with Prev-Audio-Src) must be embedded in the preview output. Can be `Ch1..4`, `Ch5..8`, `Ch9..12` or `Ch13..16`. Default is `Ch1..4`.
	AUDIO PROC AMP
Gain-1 ~ Gain-16	These items allow you to gain the audio for each individual output channel in a range from –60dB to 12 dB in steps of 0.25 dB. –999dB mutes this channel. Default is 0dB.
Vo-Duck	When the voice-over audio is switched on, the audio channels are "ducked" by this setting's value (between -60dB and +12dB).

Vo-Sel-1 ~ Vo-Sel-16

With these settings you select which channels are the voice-over channels. Possible selection is between channels 1 and 4, or switched off (meaning the corresponding audio channel does not contain voice-over audio).

GPI Mode

Contact1 ~ Contact7

These settings refer to the contacts of the RJ45 GPI connector, ***only*** if the BPH17 is used. In this card it is possible to make the 7 available GPI contacts part of a GPI pool that can control the various functions in the card separately (all `Xx_Ctrl` items of the menu). With these items you can select which pool the corresponding GPI contact is part of and in what way it should trigger. You can also choose not to use the corresponding contact at all by setting it to `Off`. Possible settings are:

- `A`: part of the GPI-A pool, non-latch. When the contact is closed all the time (level triggered).
- `B`: part of the GPI-B pool, non-latch. When the contact is closed all the time (level triggered).
- `C`: part of the GPI-C pool, non-latch. When the contact is closed all the time (level triggered).
- `Latch_A`: part of the GPI-A pool, latching. When the contact is closed momentarily (edge triggered). No take required.
- `Latch_B`: part of the GPI-B pool, latching. When the contact is closed momentarily (edge triggered). No take required
- `Latch_C`: part of the GPI-B pool, latching. When the contact is closed momentarily (edge triggered). No take required
- `Prio_A`: part of the GPI-A pool, working in a priority manner (highest closed GPI of the pool is activated)
- `Prio_B`: part of GPI-B pool, working in a priority manner (highest closed GPI of the pool is activated)
- `Prio_C`: part of GPI-C pool, working in a priority manner (highest closed GPI of the pool is activated)
- `Take_A`: part of GPI-A pool, used to take the set values.
- `Take_B`: part of GPI-B pool, used to take the set values.
- `Take_C`: part of GPI-C pool, used to take the set values.

Please refer to ‘Appendix 3: 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

sInp2

This status item indicates the presence and format of a valid signal in input 2. This is displayed as listed under `sInp1`.

sInp3

This status item indicates the presence and format of a valid signal in input 3. This is displayed as listed under `sInp1`.

sInp4

This status item indicates the presence and format of a valid signal in input 4. This is displayed as listed under `sInp1`.

AudioA-Present

This item displays the present audio groups on input A. This is displayed as '`____`' when no audio is available and as '`1234`' when all audio groups are present. '`1_3_`' for instance displays that there's audio available in groups 1 and 3.

AudioB-Present

This item displays the present audio groups on input B. This is displayed as '`____`' when no audio is available and as '`1234`' when all audio groups are present. '`1_3_`' for instance displays that there's audio available in groups 1 and 3.

GPI	This item displayes the currently active GPI value.
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
Ref	This status item indicates if there is a valid reference `Present` or not (NA).
	NETWORK 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 HDK100 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

Input1

Input1 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

Input2

Input2 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

Input3

Input3 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.

Input4

Input4 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
Input1	01_{hex}=INP1_LOSS	81_{hex}=INP1_RETURN	input 1 lost or returned
Input2	02_{hex}=INP2_LOSS	82_{hex}= INP2_RETURN	input 2 lost or returned
Input3	03_{hex}=INP3_LOSS	83_{hex}= INP3_RETURN	input 3 lost or returned
Input4	04_{hex}=INP4_LOSS	84_{hex}= INP4_RETURN	input 4 lost or returned
Reference	05_{hex}=REF_LOSS	85_{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.

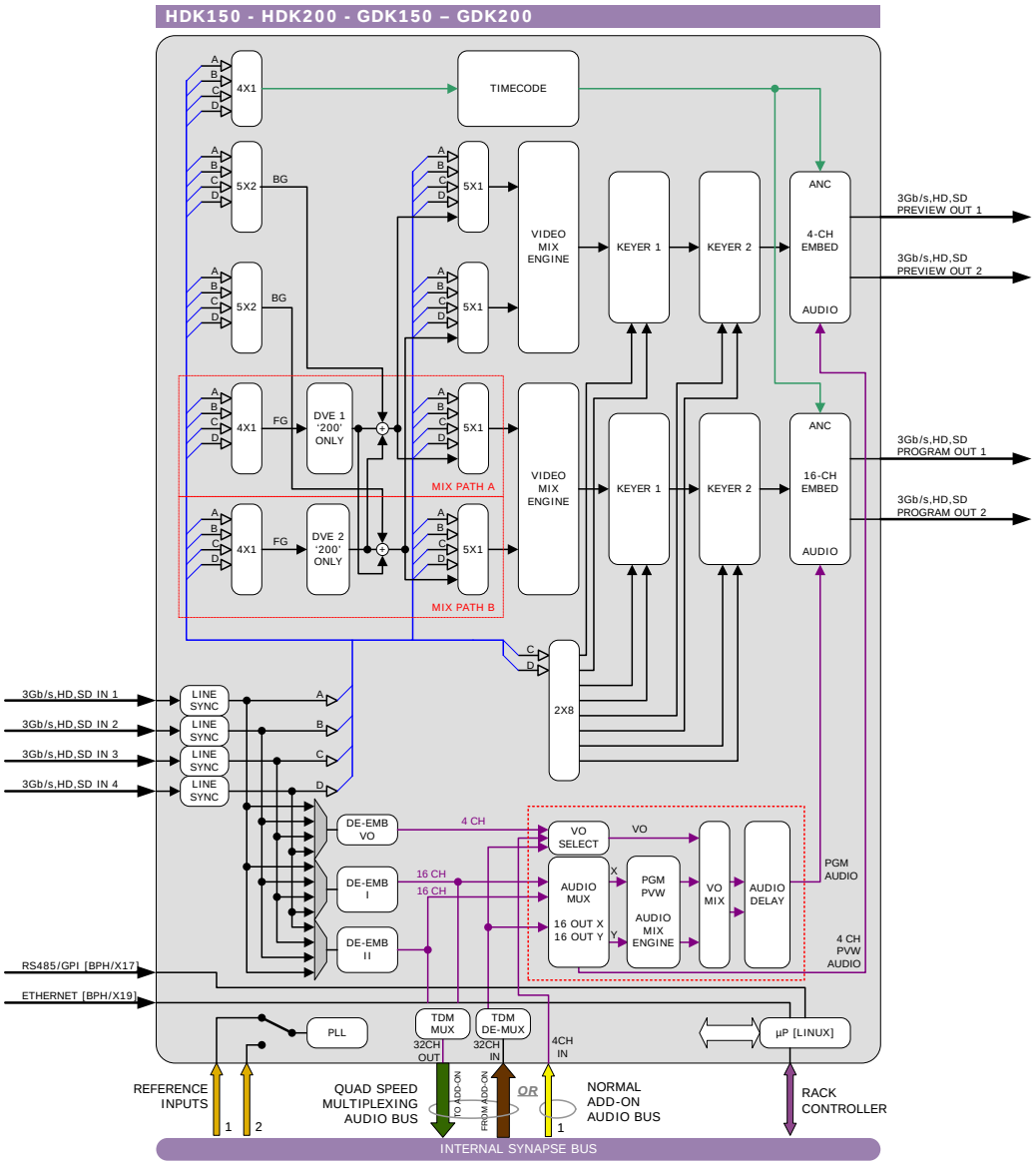
The Address

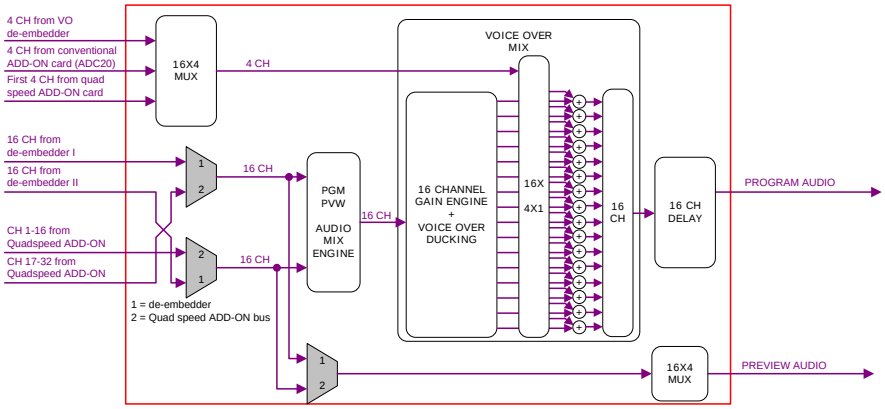
Together with the message string or the tag, the slot number or address of the card is relevant to be able to assign the event to a certain card.

8 LED Indication

Error LED	The error LED indicates an error if the internal logic of the HDK100 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.
Input_3 LED	This LED indicated the presence of a valid SDI video signal on input 3.
Input_4 LED	This LED indicated the presence of a valid SDI video signal on input 4.
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.

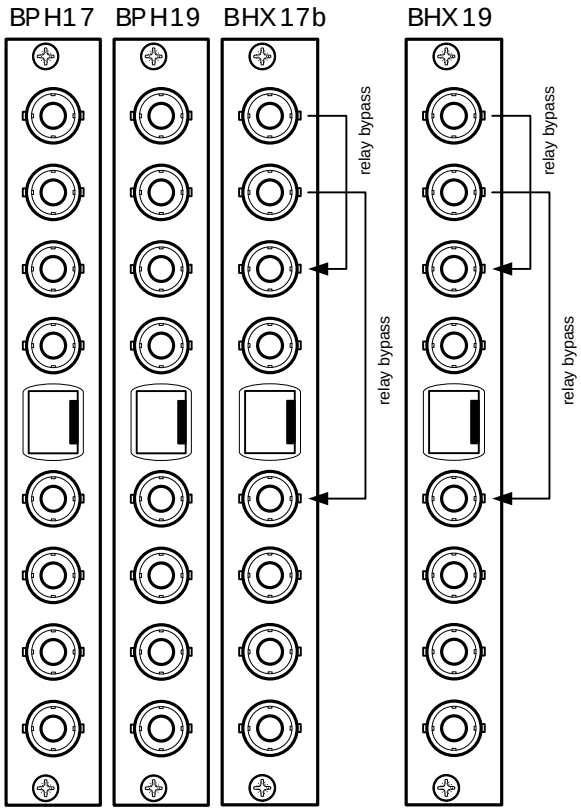
9 Block Schematic





10 Connector Panels

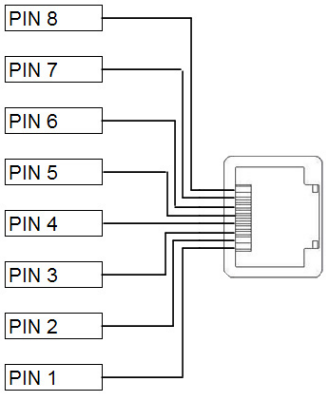
The GDK-HDK150/200 can be used with the BPH17 or the BPH19 and their relay bypass equivallents. The following table displays the pin-out of these backpanels in combination with the keyer card.



3Gb/s, HD, SD INPUT 1
3Gb/s, HD, SD INPUT 2
3Gb/s, HD, SD PROGRAM OUTPUT 1
3Gb/s, HD, SD PROGRAM OUTPUT 2
GPI INPUT (BPH17) ETHERNET (BPH19)
3Gb/s, HD, SD PREVIEW OUTPUT 1
3Gb/s, HD, SD PREVIEW OUTPUT 2
3Gb/s, HD, SD INPUT 3
3Gb/s, HD, SD INPUT 4

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

GPI pinning (BPH17 only)

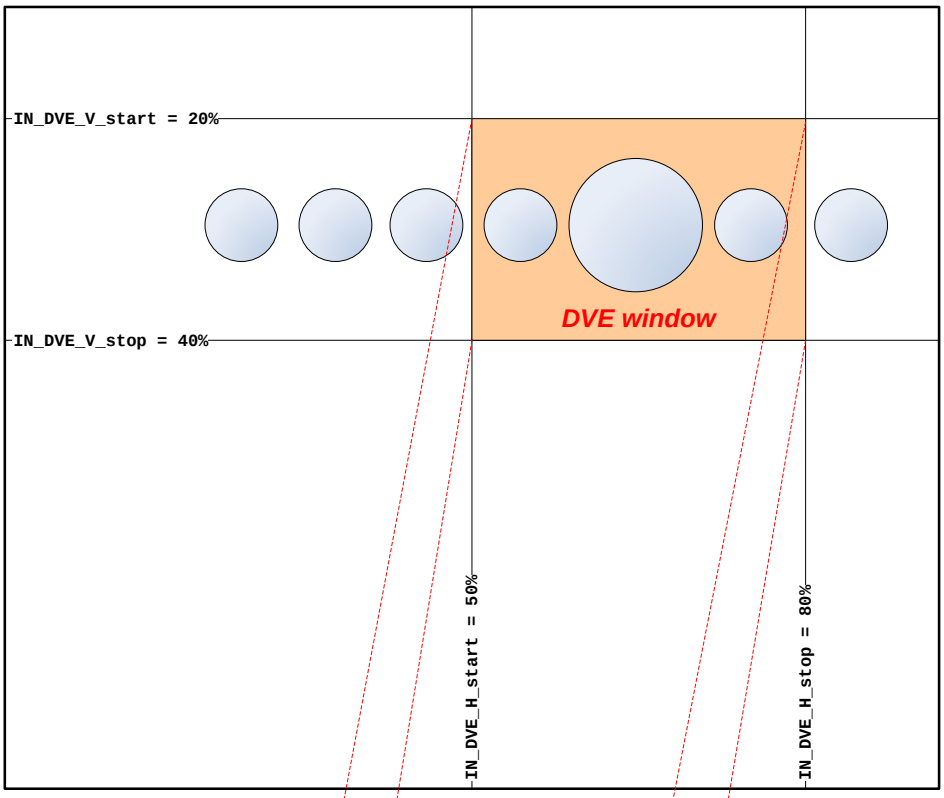


PIN 1	GPI 0
PIN 2	GPI 1
PIN 3	GPI 2
PIN 4	GPI 3
PIN 5	GPI 4
PIN 6	GPI 5
PIN 7	GPI 6
PIN 8	GND

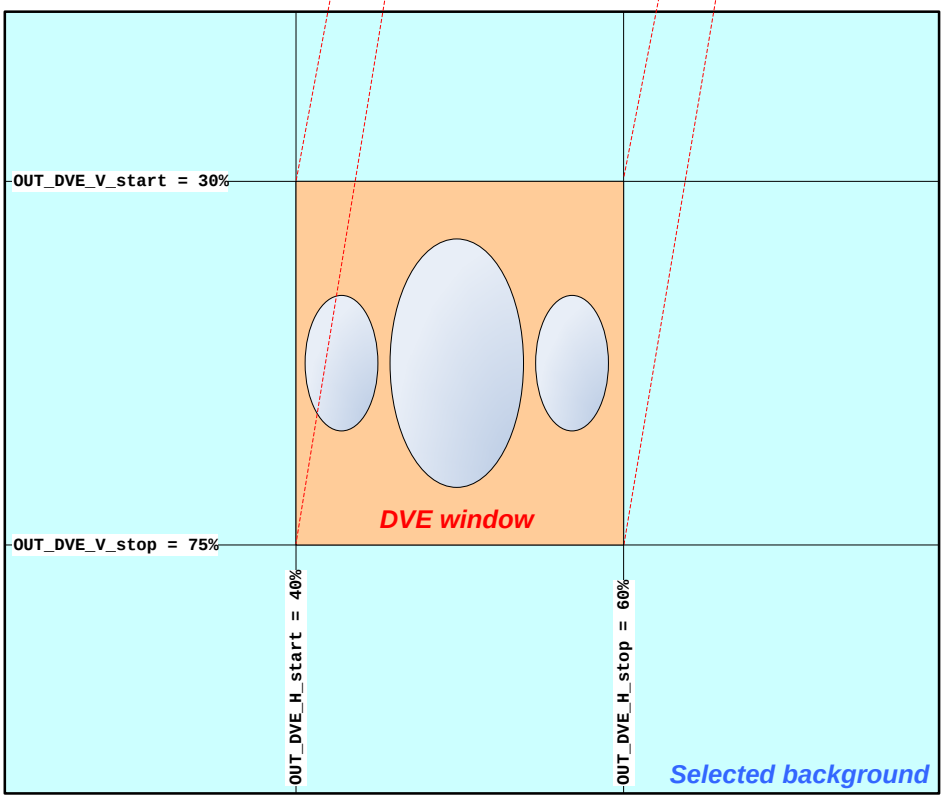
Appendix 1 DVE settings visualised

The settings regarding the DVE settings can be visualized as follows:

SDI input:



Prgrm or Prev output:

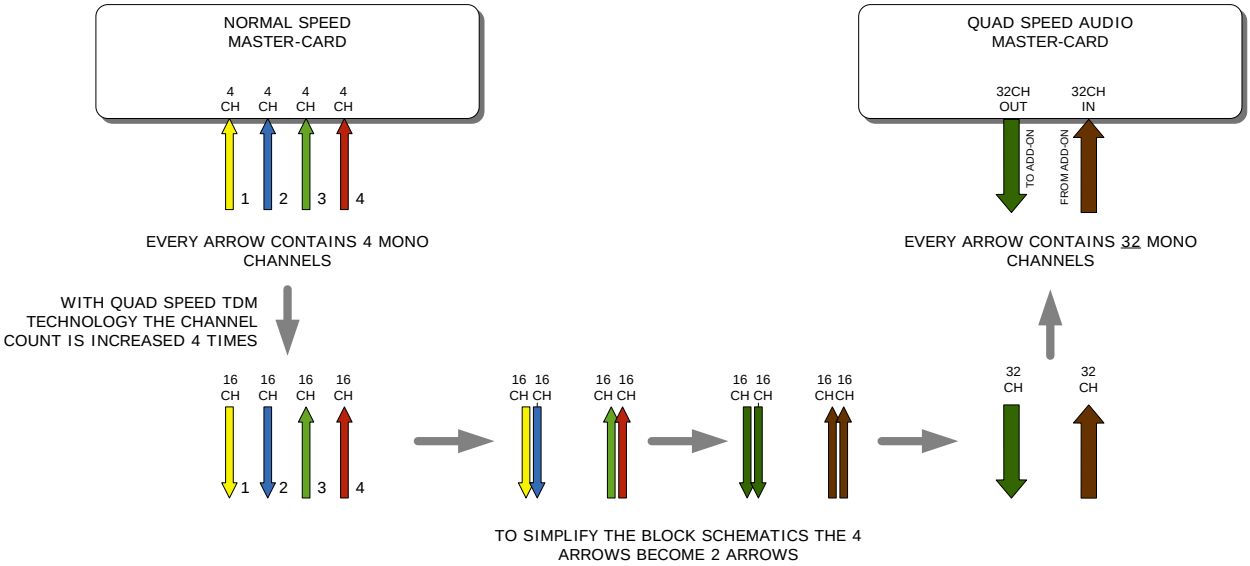


Appendix 2 Quad speed ADD-ON bus

Scope

The internal audio ADD-ON bus needed an upgrade for some applications. We wanted more channels (32 per video stream seem possible in the near future). And we want the bus to be bidirectional, so 32 channels in and 32 channels out at the same time.

The new interface needed to be compatible with all existing hardware (frames) and in the implementation of the master card it sometimes needed to be backward compatible with the original ADD-ON bus.



So the MASTER-CARD is now firmware enhanced to run 32 channels in either direction (64 channels total) instead of 16 channels in one direction

Features

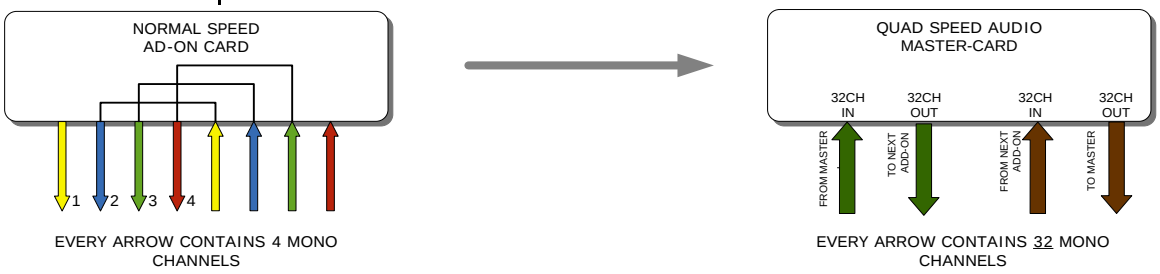
Some MASTER-CARD's will have two modes and some MASTER-CARD's will only have the Quad Speed mode [where the logical ADD-ON cards are only available in Quad Speed mode:

Dual mode MASTER-CARD's have a menu item to select the appropriate mode are. If a mode is selected all ADD-ON cards to that Master need to be in the same mode.

The following features and rules will apply:

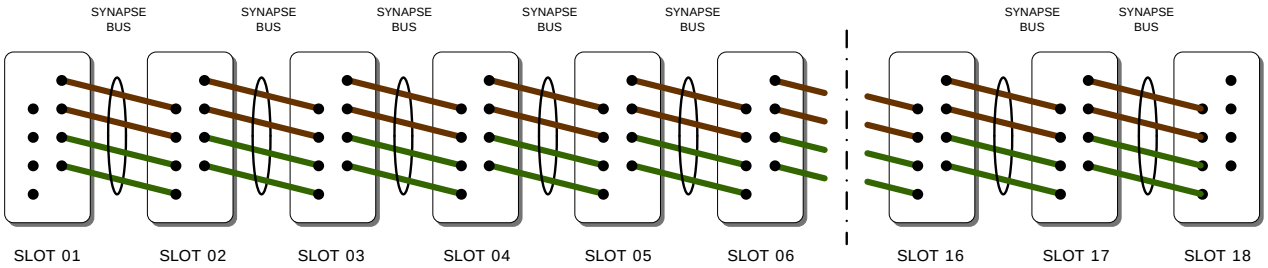
- Up to 32 channels output from the master card with looping to up to 3 ADD-ON cards
  - The ADD-ON card just picks the channels it wants to process
  - Some ADD-ON cards will have the possibility to re-inject processed audio onto the next ADD-ON card
- Up to 32 channels input on the master card
  - If the master card can handle less than 32 channels, the lowest channel numbers will be used, as the ADD-ON card will always generate 32 channels (where some channels can be empty or silent)
- Channel shuffling is done in the ADD-ON card
  - The Master Card has only one setting to enable the quad speed audio bus

- Every Quad-Speed ADD-ON card takes 32 channels from the 'right hand ADD-ON card' and adds (or overwrites) the local processed channels.
  - This can be done for any of the channels that are processed in the ADD-ON card
- Some Master Cards are switchable between normal and quad-speed bus
- Channel designations on the block schematics:
  - Channel 1-32 (or less) are injected into the dark green large arrow from Master Card to ADD-ON card and looped on to the next ADD-ON card via the dark green arrow
  - The ADD-ON card injects up to 32 channels into the brown large arrow
  - An ADD-ON card will also actively loop extra processed channels into the next ADD-ON card, and finally into the Master Card
- The cross looping of the original design is now a straight loop
- The quad speed bus can also work in one direction
  - You can use a Quad Speed audio bus to de-embed audio from the master and present on the ADD-ON card as AES/EBU, Bitstream (like Dolby) or analog audio
  - If applicable the ADD-ON card can also be used as in injection point of physical audio streams



The ADD-ON cards also provide a looping function from one ADD-ON to the next ADD-ON card. This is however a more intelligent looping with optional re-insertion and multiplexing of signals.

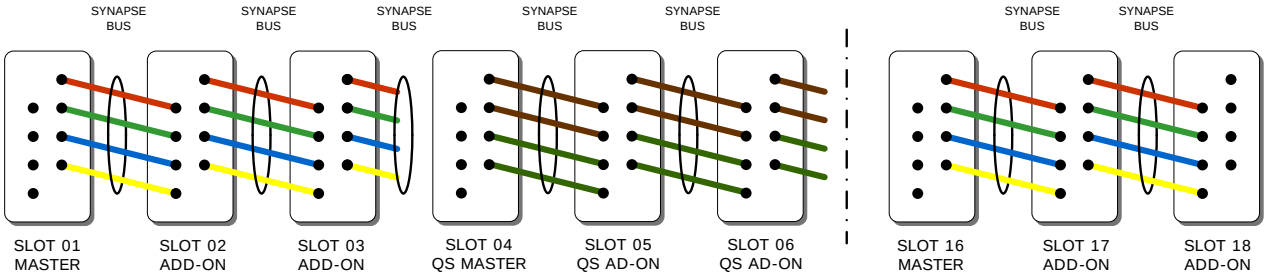
Cascading of Quad Speed cards works identical to normal add-on cards. Every connection in the example below transports 16 mono audio channels (= 32 channels per color). It shows the inter slot connections 'in quad Speed mode' as part of the frame bus PCB.



The system makes use of the same passive copper traces on the internal bus PCB as normal add-on bus cards.

The maximum amount of ADD-ON cards in Quad Speed mode is 3. These 3 ADD-ON cards will run all on the same clock in the same phase as the MASTER-CARD. This guarantees that audio channels that are processed in different ADD-ON cards will still operate in the same phase, something very important when processing multiple discrete surround channels.

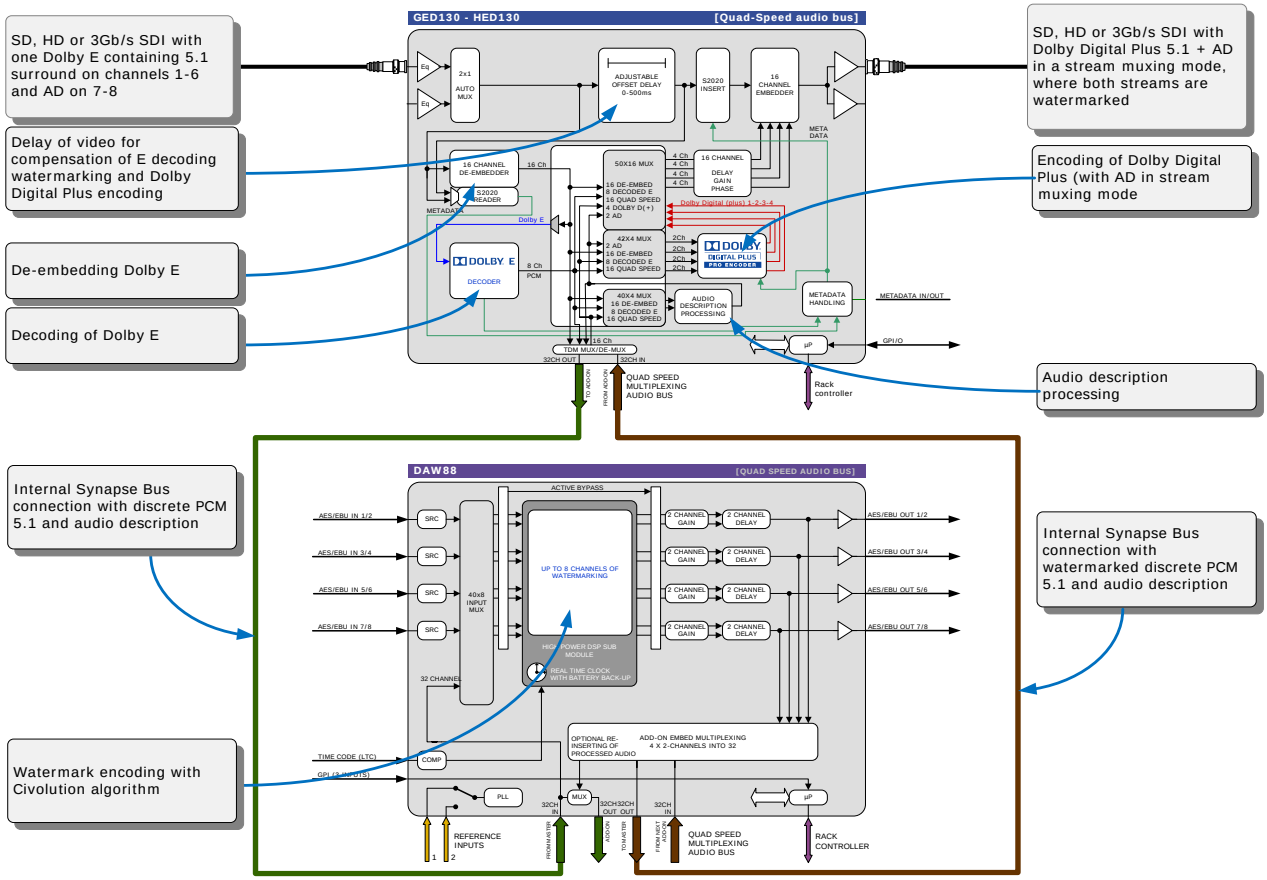
You can mix normal speed Master-Cards with Quad Speed MASTER-Cards in one frame as the MASTER-CARD breaks the connection to the left hand card. All cards to the right of the master must be in the same mode as the master.



Mixing normal ADD-ON with Quad Speed ADD-ON combo's in one frame is allowed

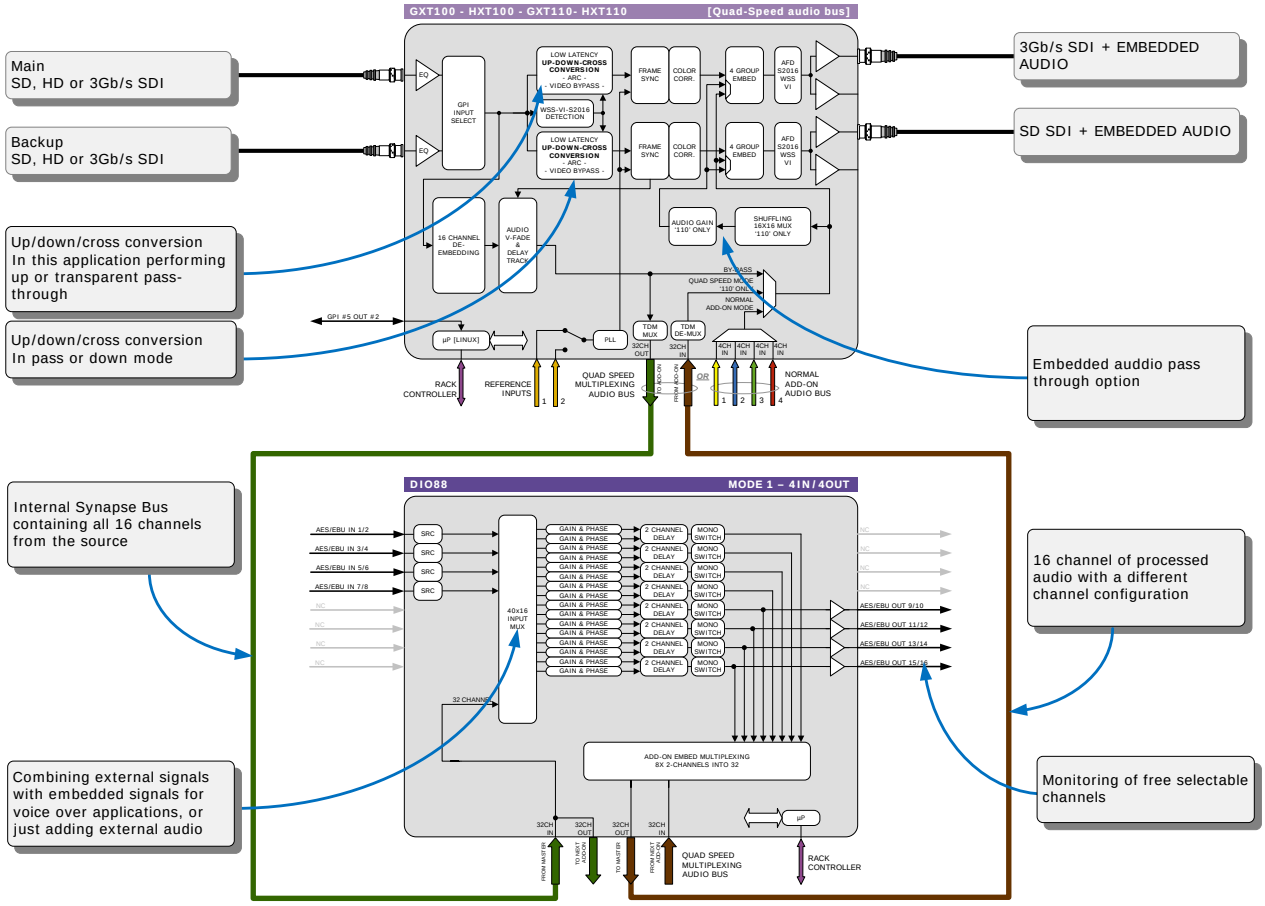
Some examples

This is an Example where we combine a MASTER-CARD that performs embedded domain Dolby E to Dolby Digital Plus encoding. Between the E-decoding and Dolby Digital Plus encoding we want to watermark the left, right and center channel of a the decoded discrete 5.1 surround channels and watermark a PCM channel used as a voice over for audio description.



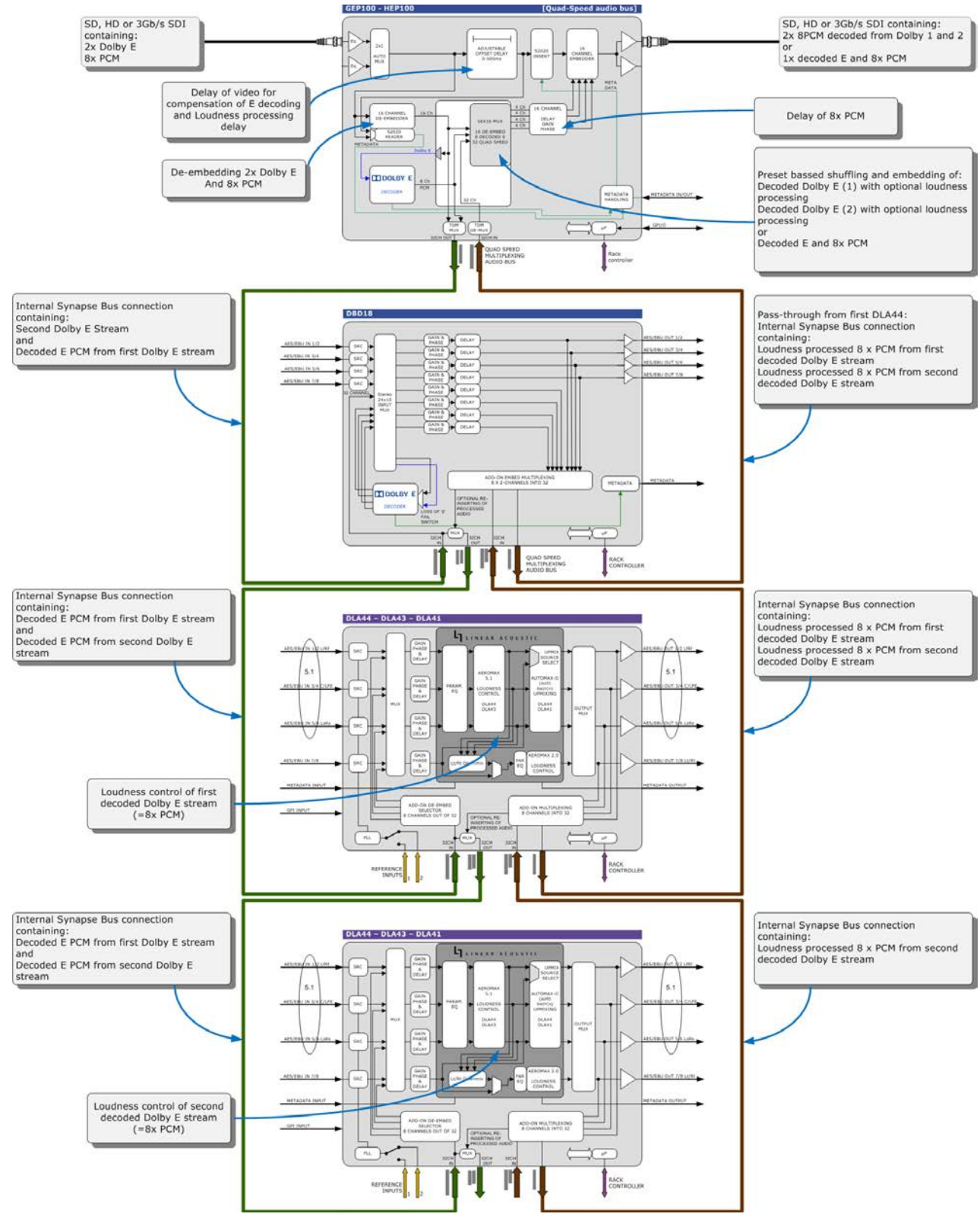
Embedded domain Dolby E to Dolby Digital Plus with Watermarking. The only connection to the outside world are two BNC cables.

Another example of the Quad-Speed audio ADD-ON bus shows a transmission application where a dual up/down/cross output card is connected to a DIO88 in a setup where the embedded audio combined with external audio and a convenient PCM monitoring is available.



In the following example (next page) you will see a 4 card application that performs a massive amount of processing divided over 1 MASTER-CARD and 3 ADD-ON cards. This is a typical 'ingest' configuration and is used where the infrastructure does not use Dolby E (two in this example) but PCM+s2020. The input is a SD, HD or 3Gb/s SDI containing 2 Dolby E streams and 8 mono PCM streams. The output is the same SDI stream but with a selection of 16 channels selected out 8 original PCM channels and 16 PCM channels that are decoded from the Dolby E streams. The combo performs the following processing:

- De-embedding of 8x PCM and 2x Dolby E
- Decoding of two independent Dolby E streams
- Loudness processing of up to 16 channels sourced by any of the 8x PCM or decoded Dolby E streams
- Upmixing of a 2.0 to 5.1 if a Dolby E stream is not available
- Physical monitoring of all processed PCM streams
- Preset based shuffling of all source channels into 16 channels with the appropriate offset delays
- S2020 metadata insertion sourced from the E decoders, embedded s2020, generated presets or an external feed
- Video delay to compensate for audio propagation delay
- Embedding of up to 16 channels


GEP100 - HEP100
[Quad-Speed audio bus]
SD, HD or 3Gb/s SDI containing:
2x Dolby E
8x PCM
Delay of video for compensation of E decoding and Loudness processing delay
De-embedding 2x Dolby E And 8x PCM
SD, HD or 3Gb/s SDI containing:
2x 8PCM decoded from Dolby 1 and 2
or
1x decoded E and 8x PCM
Delay of 8x PCM
Preset bassed shuffling and embedding of:
Decoded Dolby E (1) with optional loudness processing
Decoded Dolby E (2) with optional loudness processing
or
Decoded E and 8x PCM
DOLBY E
DECODER
QUAD SPEED MULTIPLEXING AUDIO BUS
Rack controller
Internal Synapse Bus connection containing:
Second Dolby E Stream
and
Decoded E PCM from first Dolby E stream
DBD18
Pass-through from first DLA44:
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from first decoded Dolby E stream
Loudness processed 8 x PCM from second decoded Dolby E stream
RACK CONTROLLER
Internal Synapse Bus connection containing:
Decoded E PCM from first Dolby E stream
and
Decoded E PCM from second Dolby E stream
DLA44 – DLA43 – DLA41
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from first decoded Dolby E stream
Loudness processed 8 x PCM from second decoded Dolby E stream
Loudness control of first decoded Dolby E stream (=8x PCM)
Internal Synapse Bus connection containing:
Decoded E PCM from first Dolby E stream
and
Decoded E PCM from second Dolby E stream
Internal Synapse Bus connection containing:
Loudness processed 8 x PCM from second decoded Dolby E stream
Loudness control of second decoded Dolby E stream (=8x PCM)

Appendix 3 GPI's explained

GPI pools

This card has 7 GPI contacts when used in combination with BPH17. Since there are several functions you can control by using GPI's, you can add each individual GPI contact to certain GPI pools. Each pool can then be assigned to control specific settings.

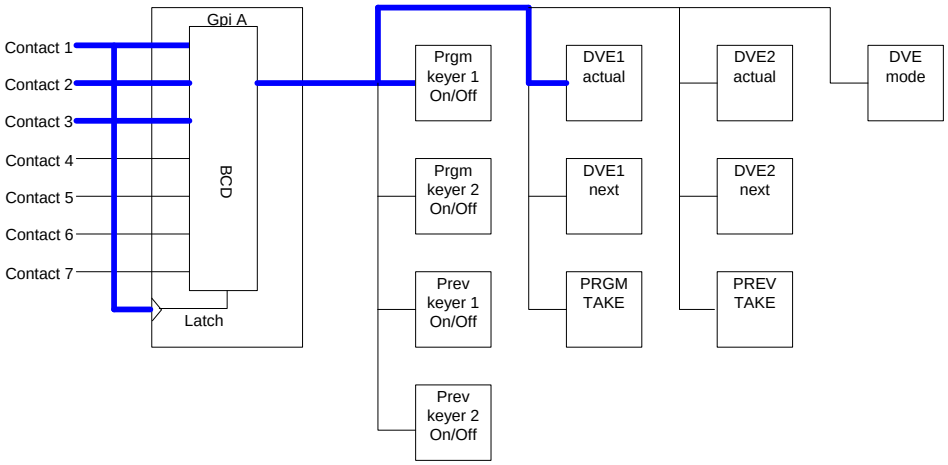
binary mode or priority mode

In the `Contact1` till `Contact7` 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 work in a latch, non-latch or priority mode.

Example GPI pool A

The following schematic explains the GPI settings more clearly. In the example you see how a GPI-A pool functions when the settings are set to these values:

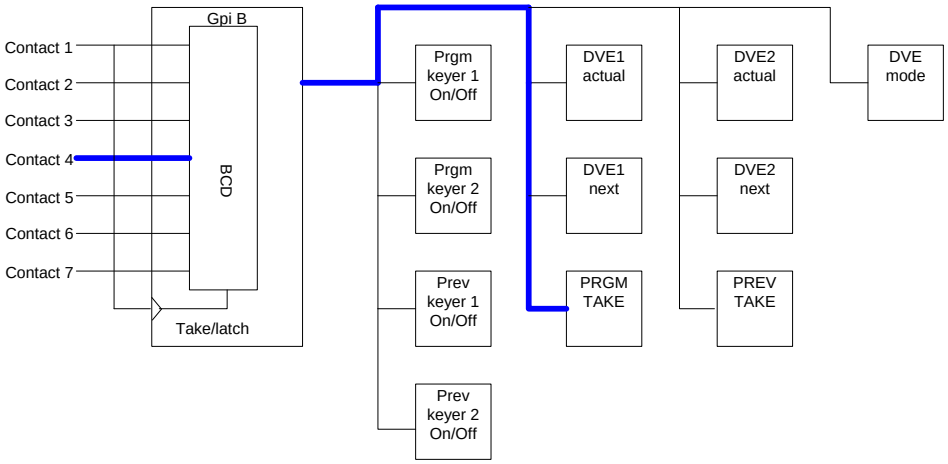
```
Contact 1 = latch A
Contact 2 = latch A
Contact 3 = latch A
Actual DVE1 = GPI-A
Prgm_keyer_1 = GPI-A
```



Example GPI pool B

The following schematic explains the GPI settings more clearly. In the example you see how a GPI-B pool functions when the settings are set to these values:

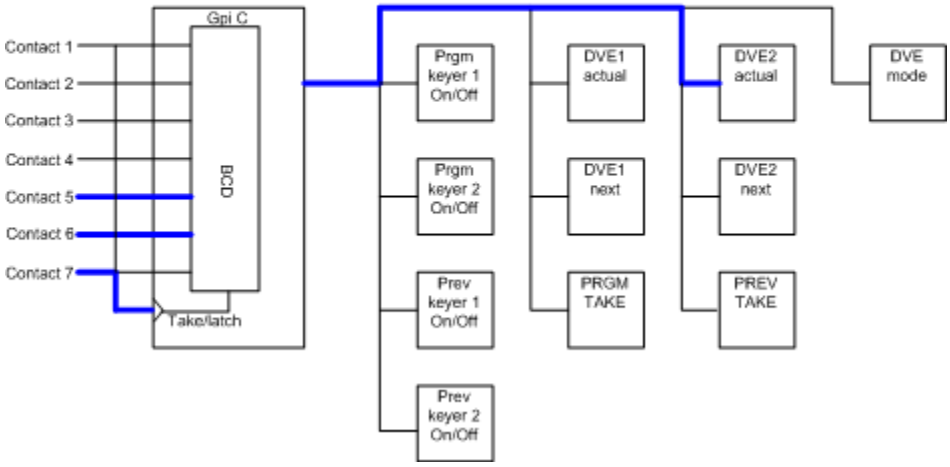
```
Contact 4 = B
PRGMtake= GPI-B
```



Example GPI pool C

The following schematic explains the GPI settings more clearly. In the example you see how a GPI-C pool functions when the settings are set to these values:

```
Contact 5 = C
Contact 6 = C
Contact 7 = takeC
DVE2-actual= GPI-C
```



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