INSTALLATION AND OPERATION MANUAL

Synapse GXT100

Dual 3Gb/s, HD and SD input, frame synchronizer, up/down/cross converter, embedder and de-embedder

Version 1.00 | November 2021

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General Information

ALWAYS disconnect your entire system from the AC mains before cleaning any component. The product frame (SFR18, SFR08 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 EVS distributor.

NEVER expose this product to extremely high or low temperatures.

NEVER operate this product in an explosive atmosphere.

To reduce the risk of fire or electrical shock, do not expose this appliance to rain or moisture.

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

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.

Contents

ICONOGRAPHY

	Note		Tip		Warning

What's New?

In the Installation and Operation Manual the icon NEW ! has been added on the left margin to highlight information on updated features.

The changes linked to new features in version 1.00 of GXT100 are listed below.

SMPTE ST 352 Payload Identifier

- See section "Inserter" on page 26.

1. Introduction

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 EVS website at www.evs.com 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 / ERC108-118 / ERS108-118) manuals. The method for connecting to a computer using Ethernet is also described in the ERC/ERS/RRC/RRS manuals.

Cortex software will increase system flexibility of one or more Synapse frames.

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

2. Unpacking and Placement

Unpacking

The EVS 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 of 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 the card is essential, as a card that is not located properly may show valid indicators, but will not function correctly.

On power up, all LEDs will light up for a few seconds. This is the time it takes to initialize the card.

3. Quick Start

Powering Up

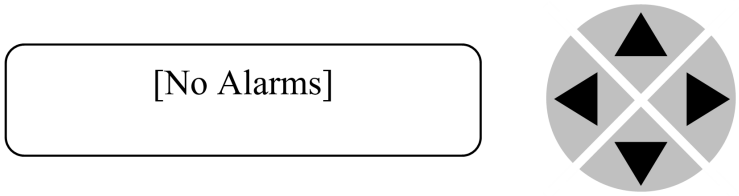
On powering up the Synapse frame, the card set will use basic data and default initialization settings. All LEDs will light up during this process. After initialization, several LEDs will remain lit – the exact number and configuration is dependent upon the number of inputs connected and the status of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

3.1. Changing Settings and Parameters

The front panel controls or Cortex can be used to change the settings. An overview of the settings can be found in later chapters of this manual. Please refer to "Settings Menu" on page 10, "Status Menu" on page 35 "Graphical User Interface" on page 1 and "Events Menu" on page 39.

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.

▶ Move forward through the menu structure.

◀ Go back through the menu structure.

▲ Move up within a menu, or increase the value of a parameter.

▼ Move down through a menu or decrease the value of a parameter.

When editing parameters, pressing ▶ twice will reset the value to its default setting.

How to Change Parameters Using the Front Panel Control

With the display as shown below:

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

Pressing ▶ 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, e.g. Status, Events).

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

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

Pressing the ▶ selects the Settings item shown, in this example SDI-Format.

(Pressing ▲ or ▼ will change to a different setting, e.g. 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.

Menu Structure Example

Slot	Module		Item		Parameter		Setting
▲							
▲							
S02			Identity				
▲			▲				
S01	SFS10	►	Settings	►	Standard dig	►	Auto
▼			▼		▼		▼
S00	RRC18		Status		Mode		625
			▼		▼		▼
			Events		Ref-Input		525
					▼		
					H-Delay		
					▼		
					▼		

3.2. Using Cortex with Synapse

EVS Cortex Software

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. 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 Cortex, please refer to the Cortex help files.

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

4. The GXT100 Card

Introduction

The GXT100 is a frame synchronizer and 16-channel embedder and de-embedder, combined with an ultra high-quality up/down/cross converter. The dual input capability can be used as an emergency bypass switch. The optimized scaling and filter algorithms ensure crisp broadcast-ready pictures from a native HD source, by use of 64-tap FIR filters. This card is designed as a transmission output module that enables simultaneous feeding of HD and SD (with embedded audio). Add-on cards can be used as audio in and output cards.

All products can be up- or down-graded with a software key.

Features

- 3Gb/s, HD, SD SDI input (auto-selecting)
- Low latency conversion process
  - Dual 3Gb/s, HD output
  - Dual SD output (simultaneous anam. widescreen and pan-scan)
- Up-conversion from 720p or 1080i to 1080p (equal frame-rate)
- Down conversion (including 1080p to SD-SDI)
- Cross conversion 720p to 1080i and vice-versa
- Dual input backup function
  - Automatic by input carrier detection
  - Manual by direct control (ACP)
  - GPI
- 2 Frame synchronizers for the 3Gb/s, HD and SD domain with individual output timing control
- Color correction in 3Gb/s, HD and SD domain (RGB and total gain, RGB and total black)
- H+V sharpness control in SD domain for crisp, down-converted picture quality
- 5 GPI inputs for ARC and Shuffle triggers
- Transparent for 16 channels of embedded audio both HD and SD paths
- Embedded domain audio shuffling
- Quad speed audio bus compatible (Please refer to "Quad Speed ADD-ON Bus")
- Embedding through Synapse bus
- De-embedding to Synapse bus with transparent input to output handling
- Video proc-amp (Y and C control)

- Compatible with:
  - 270 Mbit/s (SMPTE 259M) 50 and 59.94Hz
  - 1485 Mbit/s (SMPTE 292M) 50 and 59.94Hz
  - 2970 Mbit/s (SMPTE 424M) 50 and 59.94Hz
- AFD insertion in HD domain
- AFD, WSS, WSS-ext and VI insertion in SD domain
- I/O Delay measurement for both output domains
- Reporting of chosen input
- CRC status information for both inputs
- Locks to Bi-level, Tri-level syncs and SDI input
- OP47 to WST cross-conversion and vice-versa
- Timecode cross-conversion
- CC-608 to CC-708 conversion and vice-versa
- 6-Line Vertical Ancillary Blanking transparency in transparent mode
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)
- 16-channel embedder in both HD and SD domains
- Optional 2 fiber inputs (replacing 2 SDI inputs) or 2 fiber outputs (replacing 2 SDI outputs) on I/O panel.

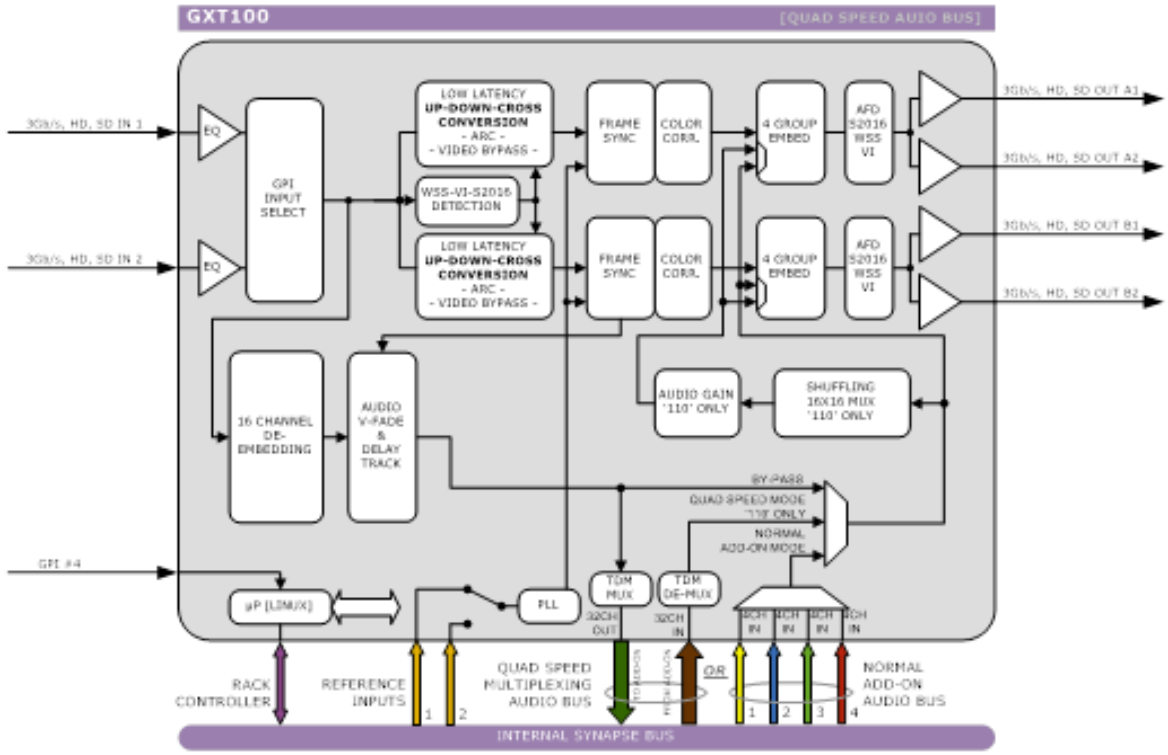
Conversion Capabilities

	CONVERSION	Output										
		1080psf23.97	1080p23.97	1080p50*	1080p59.94*	1080i59.94	1080i50	720p59.94	720p50	720p23.98	480i59.94(525)	576i50(625)
SDI Input	1080psf23.97	x	x		x			x		x	x	
	1080p23.97		x		x	x		x		x	x	
	1080p50*			x			x		x			x
	1080p59.94*	x	x		x	x		x		x	x	
	1080i59.94	x	x		x	x		x		x	x	
	1080i50			x			x		x			x
	720p59.94	x	x		x	x		x			x	
	720p50			x			x		x			x
	720p23.98	x	x		x	x		x		x	x	
	480i59.94(525)	x	x			x		x		x	x	
	576i50(625)			x			x		x			x

Applications

- OB van output card with 16-channel embedding (in combination with 2 x DIO48)
- 2 x 1 HD protection switch with SD monitoring output
- Dual domain (HD & SD) production down converter with individual timing adjustment.

Block Schematic



Important Notice about Closed Captions

Historically, closed captions were transmitted in NTSC line 21, in accordance with EIA-608. This allows two caption data bytes per field to be transmitted. With the introduction of HD and DTV, a new Closed Caption specification was created, EIA-708. This allows more data to be sent per field, for extended language, color support, PMT and EIT and timecode data.

The new DTV caption format cannot be translated back to EIA-608. However the EIA-708 may include EIA-608 data as "NTSC closed captions", for compatibility with old decoders.

This card only de-embeds the NTSC closed captions, not the DTV closed captions. It will not function with a DTV-only 708 closed-caption source.

5. Settings Menu

5.1. Introduction

The Settings menu displays the current state of each GXT100 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. The SCP08 control can also be used. Please refer to "Quick Start" on page 3 for information on the Synapse front panel control and Cortex.

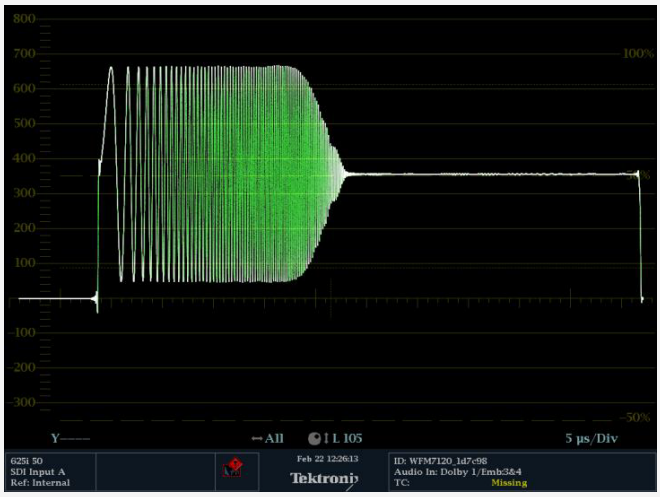
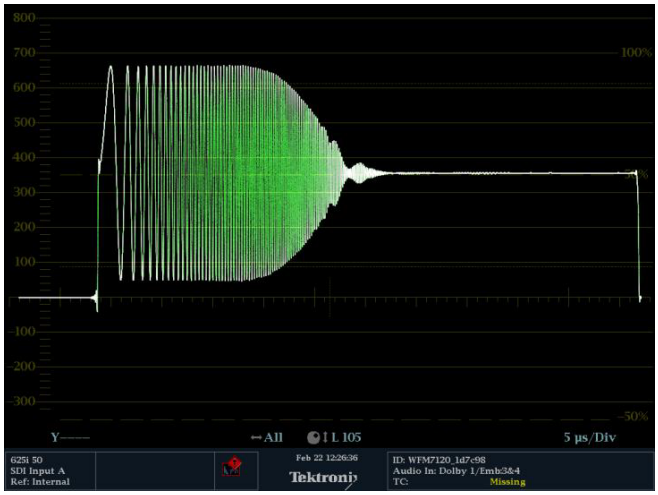
All items preceded with a # sign are part of the presets.

5.2. System Settings

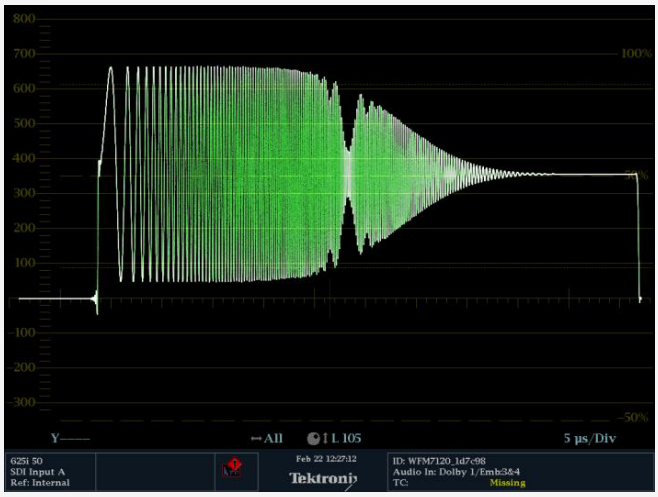
Setting	Description
IO-Ctrl	This card has separate presets for the input and output settings under the 'SYSTEM SETTINGS' header. With this item you select how the IO presets are controlled: manually (Manual), via GPI-triggers (GPI-A, GPI-B or GPI-C) or by the input format on input 1 (SDI1-format) or input 2 (SDI2-Format). 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 16. By default it is set to 1. All menu settings that are preceded by the # prefix under the 'SYSTEM SETTINGS' header are part of the preset.
IO_Prst_Edit	Here you can select which of the 16 selectable IO settings presets you want to edit. Changing this will not change the active preset, unless the currently active preset is the one you are going to edit. All menu settings that are preceded by the # prefix under the 'SYSTEM SETTINGS' header are part of the preset.
#Inp_sel	With this item you can select which input you want to use. Can be SDI-1 (SDI input 1) or SDI-2 (SDI input 2). You can also choose a Zoneplate or Colorbar as input. Set to Auto will automatically detect which SDI input holds a valid input. If both inputs have a correct input, SDI-1 will be chosen. The default for this setting is SDI-1.

#Out-FrmtA	With Out-Frmt you can set what the output should befor outputs A1 and A2. Possible settings are: • 1080i60 (default) • 1080i50 • 1080p60 • 1080p50 • 1080p30 • 1080p25 • 1080p24 • 1080p24sf • 720p60 • 720p50 • 720p30 • 720p25 • 720p24 • SD525 • SD625
#Output_Map_A	With this setting you can select the 3Gb/s mapping in case output A format is 1080p50 or 1080p60. Can be manually set to Level A or Level B.
#F_delayA	F-Delay sets the number of delayed Frames for outputs A1 and A2. The available range is from 0 to 250 fields (dependent on the I/O). Default is 0F.
#V_delayA	V-Delay setting allows adjustment of the vertical phase of the output signal for outputs A1 and A2 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 (dependent on I/O format). The default setting is 0ln.
#H_delayA	The H-Delay setting allows adjustment of the Horizontal phase of the output signal for outputs A1 and A2 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 (dependent on I/O format). The default setting is 0px.
Out-FrmtB	With Out-Frmt you can set what the output should be for outputs B1 and B2. Possible settings are: • 1080i60 (default) • 1080i50 • 1080p60 • 1080p50 • 1080p30 • 1080p25 • 1080p24sf • 720p60 • 720p50 • 720p30 • 720p25 • 720p24 • SD525 • SD625
#Output_Map_B	With this setting you can select the 3Gb/s mapping in case output B format is 1080p50 or 1080p60. Can be manually set to Level A or Level B.

#F_delayB	F-Delay sets the amount of delayed Frames for outputs B1 and B2. The available range is from 0 to 250 fields (dependent on the I/O). Default is 0F.
#V_delayB	The V-Delay setting allows adjustment of the vertical phase of the output signal for outputs B1 and B2 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 (dependent on the I/O format). The default setting is 0ln.
#H_delayB	The H-Delay setting allows adjustment of the Horizontal phase of the output signal for outputs A1 and A2 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 (dependent on I/O format). The default setting is 0px.
#Audio-PathA	With this setting you can set outputs A1 and A2 to use the processed audio path to get audio from, or to use the audio directly as it comes from the de-embedder or ADD-ON bus.
#Audio-PathB	With this setting you can set outputs B1 and B2 to use the processed audio path to get audio from, or to use the audio directly as it comes from the de-embedder or ADD-ON bus.

#LowPassFilt_A	Here you can set the horizontal and vertical video low-pass filter for channel A. These are the possible settings: • Off: the normal broadband filters will be used when the card is converting. A 64 taps brick wall type horizontal filter:  • H_only: a less steep filter with no aliasing Y and soft for C for less ringing effects:  • V_only: vertical filters will be active which “soften” the image and prevents “ring”-effects in down converted content. • H_And_V: same horizontal filter as described under H_Only will be active, together with the vertical filters described under V_only.

- H2_Only: less steep filter with aliasing and soft for C for less ringing, more sharpness but with aliasing:



- H2_And_V: same horizontal filter as described under H2_Only will be active, together with the vertical filters described under V_only.

This setting is only for Channel A. Default is Off.

This only works when down-converting.

When the card is in Transparent mode, the filters will be entirely bypassed.

#LowPassFilt_B	This sets the horizontal and vertical low-pass filter for channel B. Please refer to #LowPassFilt_A for an explanation of the possible settings.
#VANC_Trans	Switches on or off vertical ancillary data transparency. Only the six lines configured with the following settings are passed. VANC transparency is only processed when the input and the output formats are the same.
#VANC_Trans_Ln0 ~ #VANC_Trans_Ln5	Here you select what the first forwarded line should be. Can be any line between line 7 and line 41. The chosen line will be forwarded to the same output line (e.g. when selecting line 23 here, line 23 on the input will be forwarded to line 23 on the output).
#OP47-Demb_Ln	With this setting you select the line which the OP47 de-embedder de-embeds. Can be line 7 through 20. Setting this to First will select the first OP47 packet (per field) when it comes by and ignores all following packets. First is default for this setting.
Pos-Prst_Act	Selects the active preset to control the positions #H-Pos-A, #V-Pos-A, #H-Pos_B and #V-Pos-B. Here you can select which of the 8 selectable positioning settings presets you want to activate. Default setting is 1.
Pos-Prst_Edit	Edit preset control for the position controls #H-Pos-A, #V-Pos-A, #H-Pos_B and #V-Pos-B. Here you can select which of the 8 selectable positioning settings presets you want to edit. Default setting is 1.

#H-Pos-A	Controls the horizontal positioning offset in pixels for channel A. Only works correctly when zooming in, for instance when down-converting using Center-Cut aspect ratio conversion.
#V-Pos-A	Controls the vertical positioning offset in pixels for channel A. Only works correctly when zooming in, for instance when down-converting using Center-Cut aspect ratio conversion.
#H-Pos-B	Controls the horizontal positioning offset in pixels for channel B. Only works correctly when zooming in, for instance when down-converting using Center-Cut aspect ratio conversion.
#V-Pos-B	Controls the vertical positioning offset in pixels for channel B. Only works correctly when zooming in, for instance when down-converting using Center-Cut aspect ratio conversion.

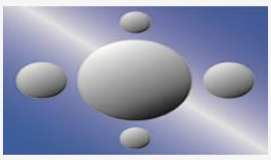
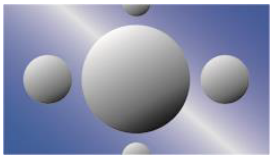
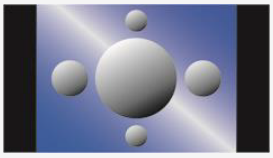
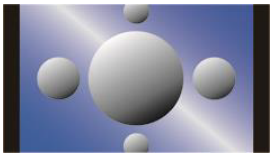
Delay-Status	It is possible to display (in the IODelayA and IODelayB) the processing time of the card in the Status menu. This setting allows you to switch this function On or Off (default).
Lock-Mode	Lock-Mode determines whether the card is locked to its input input 1), to the reference (Ref1 or Ref2) or freerun (not locked). Can also be set to RefAuto. By default it is set to Ref1. 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 (default) or Tri- Level.
Add-On-Mode	With this setting you select whether the Synpase add-on bus should work in quad-speed mode or in normal mode. Default is normal.
PrstEditView	With this setting set to Follow Active, the edit preset settings (e.g. UP_Prst_editA and UP_Prst_editB) will follow the active preset when the active preset is changed. This is to avoid confusion when changing the active preset. 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 outputs A1 and A2, 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.
NoWSS/VI_prstB	With this setting you can set to which preset the card should jump outputs B1 and B2, 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.
Input_Loss_A	Here you can set what the output of channel A should be when the input is lost. Can be Freeze, Colorbar, Zoneplate, Black, Greyor Green. The default setting is Freeze.
Input_Loss_B	Input_loss_B determines what the output of output B is in case of lost input. Same values as Input_Loss_A are possible.

5.3. Up-Conv

Setting	Description
Up_CtrlA	With this item you select how the presets for Channel A in up converter mode are controlled: manually (Manual), via GPI-triggers (GPI, GPI-A, GPI-B or GPI-C), or via changes of the SD (SD-AR) or HD (S2016) aspect ratio. By default it is set to Manual.
Up_Prst_ActA	With this item you can manually change the currently active preset of channel A in up converter mode. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with an '#Up' prefix are part of the preset.
UP_Prst_EditA	Here you can select which of the 16 selectable presets you want to edit for Channel A in up 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 an '#Up' prefix are part of the preset.

#Up_ArcA	With this item you set the Aspect Ratio of the output of channel A in up converter mode. Can be Anamorphic, V-Zoom, PBox-4:3, PBox-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 4:3.

Setting	Result on 16:19 screens:
Anamorphic	
V-Zoom	
PBox-4:3	
PBox-14:9	
Variable	Dependent on Up H-scale and Up V-scale settings.
Anam-702	Anamorphic scaling based on 702 active pixels, instead of 720 pixels

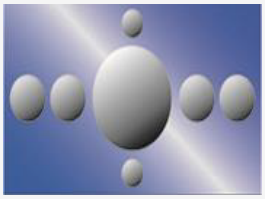
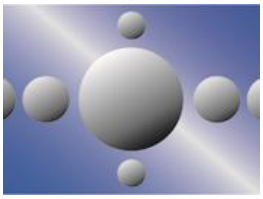
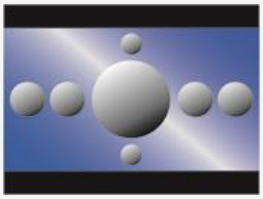
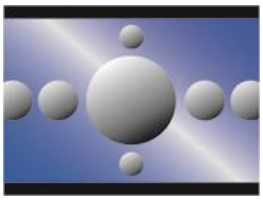
#Up_H-ScaleA	The horizontal scaling of the TV picture of channel A in up converter mode is set using #Up_H-scaleA. #Up_H-scaleA can be set within the range of 50% to 200% of the input signal (only used when #Up_ArcA is set to variable). Default value is 100%.
#Up_V-ScaleA	Sets the vertical scaling of the TV picture of channel A in up converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ArcA is set to variable). Default value is 100%.
#Up_H-EnhA	With this item you can set the horizontal picture enhancement of channel A in up converter mode between 0 and 100%. By default set to 0%.
#Up_ColorConvA	ColorConvA optimizes the color conversion for Channel A in up 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 601to709 setting is selected. It is also possible to switch the filter off. The default setting is **Off**.

Up_CtrlB	With this item you select how the presets for Channel B are controlled in up converter mode: Manually (manual), via GPI-triggers (GPI, GPI-A, GPI-B, GPI-C) or via changes of the SD Aspect Ratio (SD-AR). By default it is set to Manual.
Up_Prst_ActB	With this item you can manually change the currently active preset of channel B in up converter mode. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded with an '#Up' prefix are part of the preset.
Up_Prst_EditB	Here you can select which of the 16 selectable presets you want to edit for Channel B in up 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 an '#Up' prefix are part of the preset.
#Up_ArcB	With this item you set the Aspect Ratio of the output of channel B in up converter mode. Can be Anamorphic, V-Zoom, PBox-4:3, PBox-14:9. Anam-702 or Variable (custom set AR, set by H-scale and V-scale settings). The table in setting #Up_ ArcA shows examples of the possible aspect ratios when the input source is 4:3.
#Up_H-ScaleB	The horizontal scaling of the TV picture of channel B in up converter mode is set using #Up_H-scaleB. #Up_H-scaleB can be set within the range of 50% to 200% of the input signal (only used when #Up_ArcB is set to variable). Default value is 100%.
#Up_V-ScaleB	Sets the vertical scaling of the TV picture of channel B in up converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ ArcB is set to variable). Default value is 100%.
#Up_H-EnhB	With this item you can set the horizontal picture enhancement of channel B in up converter mode between 0 and 100%. By default set to 0%.
#Up_ColorConvB	ColorConvB optimizes the color conversion in up converter mode. As the color coding of HD (709) and SD (601) are different, it is necessary to convert these when Channel B is up-converting. The best result is generated when the up-converter is active and the 601to709 setting is selected. It is also possible to switch the filter off. The default setting is 601to709.

5.4. Down-Conv

Setting	Description
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 (default), 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-16:19	
LBox-14:19	
Variable	Dependent on Dn H-scale and Dn V-scale settings.
Anam-702	Anamorphic scaling based on 702 active pixels, instead of 720 pixels

#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%.

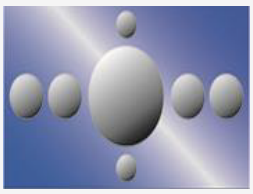
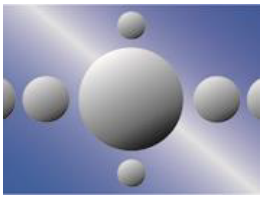
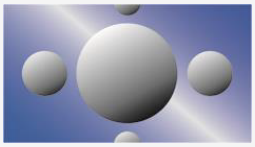
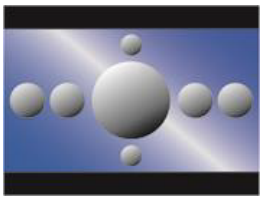
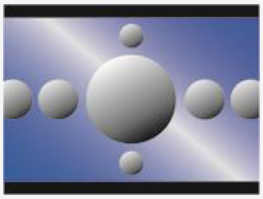
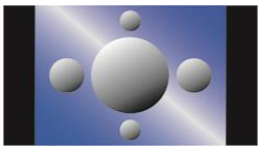
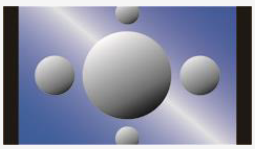
#Dn_V-ScaleA	Sets the vertical scaling of the TV picture of channel A in down converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Dn_ArcA is set to variable). Default value is 100%.
#Dn_H-EnhA	With this item you can set the horizontal picture enhancement of 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 **709to601**.
Dn_CtrlB	With this item you select how the presets for Channel B 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_ActB	With this item you can manually change the currently active preset of channel B 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_EditB	Here you can select which of the 16 selectable presets you want to edit for Channel B 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_ArcB	With this item you set the Aspect Ratio of the output of channel B in down converter mode. Can be Anamorphic, CenterCut, LBox-16:9, LBox-14:9, Anam-702 or Variable (custom set AR, set by H-scale and V-scale settings). The table in #Dn_ArcA shows examples of the possible aspect ratios when the input source is 16:9.
#Dn_H-ScaleB	The horizontal scaling of the TV picture of channel B in down converter mode is set using #Dn_H-scaleB. #Dn_H-scaleB 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-ScaleB	Sets the vertical scaling of the TV picture of channel B in down converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Dn_ArcB is set to variable). Default value is 100%.
#Dn_H-EnhB	With this item you can set the horizontal picture enhancement of channel B in down converter mode between 0 and 100%. By default set to 0%.
#Dn_ColorConvB	ColorConvB optimizes the color conversion of channel B in down converter mode. As the color coding of HD (709) and SD (601) are different, it is necessary to convert these when Channel B 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.

5.5. Cross-Conv

Setting	Description
Cr_CtrlA	With this item you select how the presets for Channel A are controlled in cross converter mode: manually (Manual), via GPI-triggers (GPI-A, GPI-B or GPI-C) or via changes of the HD Aspect Ratio (S2016). By default it is set to Manual.
Cr_Prst_ActA	With this item you can manually change the currently active preset of channel A in cross 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 '#Cr'-prefix are part of the preset.
Cr_Prst_EditA	Here you can select which of the 16 selectable presets you want to edit for Channel A in cross 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 '#Cr'-prefix are part of the preset.

#Cr_ArcA

With this item you set the Aspect Ratio of the output of channel A in cross converter mode. Can be Anamorphic, V-Zoom, CenterCut, LBox-16:9, LBox-14:9, PBox-4:3, PBox-14:9 or Variable (custom set AR, set by H-scale and V-scale settings). The following table shows the possible aspect ratios.

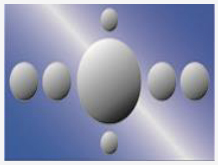
Setting	Result:	
Anamorphic		With 16:9 source on 4:3 screens
CenterCut		With 16:9 source on 4:3 screens
V-Zoom		With 4:3 source on 6:9 screens
LBox-16:9		With 16:9 source on 4:3 screens
LBox-14:9		With 16:9 source on 4:3 screens
PBox-4:3		With 4:3 source on 16:9 screens
PBox-14:9		With 4:3 source on 16:9 screens
Variable	Dependent on Cr H-scale and Cr V-scale settings.	

#Cr_H-ScaleA	The horizontal scaling of the TV picture of channel A in cross converter mode is set using #Cr_H-scaleA. #Cr_H-scaleA can be set within the range of 50% to 200% of the input signal (only used when #Cr_ArcA is set to variable). Default value is 100%.
#Cr_V-ScaleA	Sets the vertical scaling of the TV picture of channel A in cross converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ArcA is set to variable). Default value is 100%.
#Cr_H-EnhA	With this item you can set the horizontal picture enhancement of channel A in cross converter mode between 0 and 100%. By default set to 0%.
Cr_CtrlB	With this item you select how the presets for Channel B are controlled in cross converter mode: Manually (manual), via GPI-triggers (GPI, GPI-A, GPI-B or GPI-C), the SD aspect ratio (SD-AR) or via changes of the HD Aspect Ratio (S2016). By default it is set to Manual.
Cr_Prst_ActB	With this item you can manually change the currently active preset of channel B in cross 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 '#Cr'-prefix are part of the preset.
Cr_Prst_EditB	Here you can select which of the 16 selectable presets you want to edit for Channel B in cross 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 '#Cr'-prefix are part of the preset.
#Cr_ArcB	With this item you set the Aspect Ratio of the output of channel B in cross converter mode. Can be Anamorphic, V-Zoom, CenterCut, LBox-16:9, LBox-14:9, PBox-4:3, PBox-14:9 or Variable (custom set AR, set by H-scale and V-scale settings). The table under #Cr_ArcA shows examples of the possible aspect ratios.
#Cr_H-ScaleB	The horizontal scaling of the TV picture of channel B in cross converter mode is set using #Cr_H-scaleB. #Cr_H-scaleB can be set within the range of 50% to 200% of the input signal (only used when #Cr_ArcB is set to variable). Default value is 100%.
#Cr_V-ScaleB	Sets the vertical scaling of the TV picture of channel B in cross converter mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ArcB is set to variable). Default value is 100%.
#Cr_H-EnhB	With this item you can set the horizontal picture enhancement of channel B in cross converter mode between 0 and 100%. By default set to 0%.

5.6. Transparent

In Transparent mode (no conversion), the card is not transparent for horizontal and vertical blanking, except for audio.

Setting	Description
Tr_CtrlA	With this item you select how the presets for Channel A are controlled in Transparent mode: manually (Manual), via GPI-triggers (GPI-A, GPI-B or GPI-C) or via changes of the HD or SD aspect ratios (S2016 or SD_AR). By default it is set to Manual.
Tr_Prst_ActA	With this item you can manually change the currently active preset of channel A in Transparent mode. Can be any preset between 1 and 16. By default it is set to 1. All menu settings that are preceded by the #Tr prefix are part of the preset.
Tr_Prst_EditA	Here you can select which of the 16 selectable presets you want to edit for Channel A in Transparent mode. Changing this will not change the active preset, unless the currently active preset is the same as the one you are going to edit. All menu settings that are preceded by the #Tr prefix are part of the preset.
#Tr_ArcA	With this item you set the Aspect Ratio of the output of channel A in Transparent mode. Can be Anamorphic (default) or Variable (custom set AR, set by H-scale and V-scale settings). The following table shows examples of the possible aspect ratios.

Setting	Result	
Anamorphic		With 16:9 source on 4:3 screens
Variable	Dependent on Tr H-scale and Tr V-scale settings.	

#Tr_H-ScaleA	The horizontal scaling of the TV picture of channel A in Transparent mode is set using #Tr_H-scaleA. #Tr_H-scaleA can be set within the range of 50% to 200% of the input signal (only used when #Tr_ArcA is set to variable). Default value is 100%.
#Tr_V-ScaleA	Sets the vertical scaling of the TV picture of channel A in Transparent mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ ArcA is set to variable). Default value is 100%.
#Tr_H-EnhA	With this item you can set the horizontal picture enhancement of channel A in Transparent mode between 0 and 100%. By default set to 0%.
Tr_CtrlB	With this item you select how the presets for Channel B are controlled in Transparent 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.
Tr_Prst_ActB	With this item you can manually change the currently active preset of channel B 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 '#Tr'-prefix are part of the preset.

Tr_Prst_EditB	Here you can select which of the 16 selectable presets you want to edit for Channel B in 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 '#Tr'-prefix are part of the preset.
#Tr_ArcB	With this item you set the Aspect Ratio of the output of channel B in Transparent mode. Can be Anamorphic, V-Zoom, PBox-4:3, PBox-14:9 or Variable (custom set AR, set by H-scale and V-scale settings). The table under #Tr_ArcA shows examples of the possible aspect ratios.
#Tr_H-ScaleB	The horizontal scaling of the TV picture of channel B in Transparent mode is set using #Tr_H-scaleB. #Tr_H-scaleB can be set within the range of 50% to 200% of the input signal (only used when #Tr_ArcB is set to variable). Default value is 100%.
#Tr_V-ScaleB	Sets the vertical scaling of the TV picture of channel B in Transparent mode. Can be set within the range of 50% to 200% of the input signal (only used when #Up_ ArcB is set to variable). Default value is 100%.
#Tr_H-EnhB	With this item you can set the horizontal picture enhancement of channel B in Transparent mode between 0 and 100%. By default set to 0%.

5.7. 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.

NEW !

SMPTE ST 352 Video Payload Identifier

The SMPTE ST 352 Video Payload Identifier, also known as VPID, is transported within the ancillary data of an SDI stream. The ancillary packet is placed in the HANC space. This packet contains 4 bytes of data.

There are two versions of the standard. The first was published in 2011 and the second in 2013. The revision can be seen within the 4 bytes.

When the GXT100 is not processing the incoming VPID packets, they will be passed transparently. When it generates the packets, the GXT100 will output VPID packets using the 2013 standard.

Setting	Description
S352_Insert	S352_Insert enables the Video Payload Identifier insertion in the HANC space. It enables the user to insert or passthrough (On) the S352 Dynamic range and colorspace payload. When this menu item is set to On (default), it will generate a SMPTE ST352-2013 packet and overwrite the existing one (for both Luminance and Chrominance).When it is set to Off, it will pass the packet to the output as-is (only on Luminance).In HD 1080i for ATC-LTC transparency, the user may switch it Off to pass the ATC-LTC HANC packet on line 10.
Output-Matrix	This setting will only work if S352_Insert is set to On. It enables you to set the colorspace in REC709 (default) or REC2020. When set to either REC709 or REC2020, the S352 data is included in the s352 packet. (This does not change anything in the picture.)
HDR_Curve_Out	The dynamic range is the range of information between the lightest and darkest part of an image, also known as an image's luminosity. This setting enables you to set the dynamic range in standard dynamic range SDR (default), HLG, PQ or SLOG3. With all of these settings, the S352 data is included in the S352 packet. (This does not change anything in the picture.)
Bit_Depth_Out	Bit depth is the range of bits being used. This setting enables you to set the bit depth to Narrow (8bits) or Full (10bits). When set to either Narrow (default) or Full, it includes this data in the S352 packet. (This does not change anything in the picture.)
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_ins	Enables/disables the encoding or transcoding of the Timecode. Set to On will enable the following VITC settings to copy the timecode information from the input to the output. Set to Off will disable all embedded timecode data on the output. Default is On.
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 are controlled: Manually (manual), via GPI-triggers (GPI-A, GPI-B or GPI-C), via changes of the SD aspect ratio (SD_AR) or the HD aspect ratio (S2016). 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 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. possible are all VI values from 4:3_0 through 4:3_7 and the settings from 16:9_0 through 16:9_7. Default is 4:3_0.
#WSS-InsertA	You can choose which type of WSS data you want to insert with this setting, or switch WSS insertion entirely off (default value). You can set it to Standard or Extended.

With the #WSS-InsertA setting set to Extended, you can select WSS extended values from the #VI-DataA setting, which you want to be inserted. Possible VI settings are 4:3_0 through 4:3_7 and the settings 16:9_0 through 16:9_7. Default is 4:3_0.

#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. possible are all WSS values from 1_vid through 8_vid and the settings from 1_flm through 8_flm. Default is 1_vid.
#WSS-ExtndA	With the #VI-InsertA setting set to Extended, you can select VI values with this setting, which you want to be inserted. Possible WSS values are 4:3_0 through 4:3_7 and the settings 16:9_0 through 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. possible are all AFD values from AFD0 through 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.
Ins_CtrlB	With this item you select how the inserter presets for Channel A are controlled: Manually (manual), via GPI-triggers (GPI), via changes of the HD Aspect Ratio (VI, WSS, WSS-ext or S2016 (AFD)). Default is Manual.
Ins_Prst_ActB	With this item you can manually change the currently active preset of Channel B 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_EditB	Here you can select which of the 16 selectable presets you want to edit for Channel B 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-InsertB	You can turn VI insertion on or off for channel B. Default is Off.
#VI-DataB	With the #VI-InsertB setting set to on, you can select VI values with this setting, which you want to be inserted in Channel B. All VI values are possible from 4:3_0 through 4:3_7 and the settings from 16:9_0 through 16:9_7. Default is 4:3_0.
#WSS-InsertB	You can choose which type of WSS data you want to insert in Channel B with this setting, or switch WSS insertion entirely off (default value). You can set it to Standard or Extended.

With the #WSS-InsertB setting set to Extended, you can select WSS extended values from the #VI-DataB setting, which you want to be inserted in Channel B. All VI settings between 4:3_0 and 4:3_7 are possible and the settings between 16:9_0 and 16:9_7. Default is 4:3_0.

#WSS-StndB	With the #WSS-InsertB setting set to Standard, you can select WSS standard values with this setting, which you want to be inserted in Channel B. possible are all WSS values from 1_vid through 8_vid and the settings from 1_flm through 8_flm. Default is 1_vid.
#WSS-ExtndB	With the #VI-InsertB setting set to on, you can select VI values with this setting, which you want to be inserted in Channel B. 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.
#S2016-InsertB	You can turn S2016 (AFD) insertion on or off for Channel B. Default is Off.
#S2016-DataB	With the #S2016-InsertB setting set to on, you can select AFD values with this setting, which you want to be inserted in Channel B. possible are all AFD values from AFD0 through AFD15.
#OP47-SDP-Emb_B	With this setting you set in which line the OP47 data should be inserted in channel B. 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_B	This setting sets the Closed Captioning transparency for channel B On or Off. Default is Off.

5.8. Video-Proc

Setting	Description
GainA	With this setting you control the overall gain of the video between 50 and 150%. Default is 100%.
R-GainA	R-GainA controls the Red gain. The control range is between 50% and 150%. The default setting is 100%.
G-GainA	G-GainA controls the Green gain. The control range is between 50% and 150%. The default setting is 100%.
B-GainA	B-GainA controls the Blue gain. The control range is between 50% and 150%. The default setting is 100%.
GainB	With this setting you control the overall gain of the video of channel B between 50 and 150%. Default is 100%.
R-GainB	R-GainB controls the Red gain of channel B. The control range is between 50% and 150%. The default setting is 100%.
G-GainB	G-GainB controls the Green gain of channel B. The control range is between 50% and 150%. The default setting is 100%.
B-GainB	B-GainB controls the Blue gain of channel B The control range is between 50% and 150%. The default setting is 100%.

BlackA	BlackA controls the total R-G-B Black gain. The range is between –128bit and 127bit. The default setting is 0bit.
R-BlackA	R-BlackA controls the Red-Black. 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. 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. The control range is between –128bits and 127 bits in steps of 1 bit. The default setting is 0 bit.
BlackB	BlackB controls the total R-G-B Black gain of channel B. The control range is between –128bit and 127bit. The default setting is 0bit.
R-BlackB	R-BlackB controls the Red-Black of channel B. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.
G-BlackB	G-BlackB controls the Green-Black of channel B. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.
B-BlackB	B-BlackB controls the Blue-Black of channel B. The control range is between –128bits and 127 bits in steps of 1 bit The default setting is 0 bit.

5.9. Audio Proc Amp

Setting	Description
Audio-Phase	If this setting is set to Align, the card ensures audio-phase alignment between multiple audio channels and audio groups, which is necessary for multi-channel (surround) purposes. If errors in the signal-chain occur the de-embedder blocks reset synchronously to maintain audio-phase-alignment. If this setting is set to Off, the card eats-all audio including errors. Even if there are DBN/ANC/ECC or channel-sequence errors, the de-embedder will pass them. Be aware that audio-phase-alignment between multiple audio channels and audio groups can not be maintained if this setting is set to Off.

This setting can be helpful to solve problems in the field using equipment which doesn't follow the standards correctly.

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 by the #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 you have selected to edit the currently active preset. All menu settings that are preceded by the #Emb prefix are part of the preset.
#Direct-Audio	With this setting you choose whether the audio should come from the de-embedder (Demb-Input) or from the ADD-ON bus. Default is Demb-Input.

5.10. Embedder

Setting	Description
#EmbA_Grp	With this setting you select into 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, dependent on the current active input), from the ADD-ON bus groups, or to mute the corresponding channel (set to off). Defaults here are Off.
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.	
#EmbB_Grp	With this setting you select into 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.

#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, dependent 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.
#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, dependent 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.

5.11. GPI Mode

Setting	Description
Contact_1 ~ Contact_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 items you can select which pool the corresponding GPI is part of. 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. • **GPI C**: part of GPI-C pool, triggered once Take C is closed. Please refer to "GPIs Explained" for a more elaborate explanation of the GPI settings.
GPI_A-Mode ~ GPI_C-Mode	Selects the mode for the corresponding GPI pool. Possible settings are: • Prio: Each contact triggers another value, so values are one- hot encoded. • Prio_latched: This mode functions like Prio Mode, but the card latches the value. Each contact triggers another value, so values are one-hot encoded. Use this mode when using pushbuttons. • Binary: Values are coded in a binary fashion, with code “00000” coding for a starting value of 1, as can be seen in the GPI status items. Please refer to "GPIs Explained" for a more elaborate explanation of the GPI settings.
GPI_A-Take ~ GPI_C-Take	Selects a take contact for the corresponding GPI pool. Possible settings are: • Off: No take contact is defined, and values on the GPI contact are taken instantly. • Contact_1 ~ Contact_5: The selected contact is used as a Take command for the corresponding pool. Closing the selected contact results in the card latching the value provided on the selected contacts for that pool. Please refer to "Appendix 1: GPIs Explained" on page 45 for a more elaborate explanation of the GPI settings.
GPI-DebounceTime	This setting allows you to specify the permitted delay for valid signals on all GPIs (general purpose inputs). Values can be from 1ms through 40ms. default is 10ms.

5.12. Network

Setting	Description
IP_Conf0	With this setting you can either let the card obtain an IP address automatically via DHCP, or assign an IP address manually. By default this is set to DHCP.
mGW0	With IP_Conf0 set to manual, this setting lets you set a Standard Gateway. Default is set to 0.0.0.0.
mIP0	When IP_Conf0 is set to manual, you can enter the preferred IP address here. By default it is set to 0.0.0.0
mNM0	With IP_Conf0 set to manual, with this setting you can set a Netmask. Default is 0.0.0.0

6. Status Menu

6.1. Introduction

The Status menu provides information about the current status of each item listed below.

6.2. System Status

Item	Description
Active	This status item indicates which input is active on the outputs. Can be SDI-1 or SDI-2.
sInp1	This status item indicates the presence and format of a valid signal in input 1. This is displayed as: • 1080p60 • 1080p50 • 1080p30 • 1080p25 • 1080p24 • 720p60 • 720p50 • 720p30 • 720p25 • 720p24 • 1080i60 • 1080i50 • 1035i60 • SD625 • SD525 • NA
sInp1_VI	Displays the detected VI value found in 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 • NA (no VI detected) • 16:9_0 • 16:9_1 • 16:9_2 • 16:9_3 • 16:9_4 • 16:9_5 • 16:9_6 • 16:9_7

sInp1_WSS-Stnd	This status item displays the detected standard WSS value of input 1. This is displayed as follows: • 1_vid • 1_flm • 2_vid • 2_flm • 3_vid • 3_flm • 4_vid • 4_flm • 5_vid • 5_flm • 6_vid • 6_flm • 7_vid • 7_flm • 8_vid • 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 • 16:9_0 • 4:3_1 • 16:9_1 • 4:3_2 • 16:9_2 • 4:3_3 • 16:9_3 • 4:3_4 • 16:9_4 • 4:3_5 • 16:9_5 • 4:3_6 • 16:9_6 • 4:3_7 • 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 • AFD8 • AFD1 • AFD9 • AFD2 • AFD10 • AFD3 • AFD11 • AFD4 • AFD12 • AFD5 • AFD13 • AFD6 • AFD14 • AFD7 • AFD15 • NA (no S2016 detected)
sInp1_CRC_EDH	This item indicates CRC and EDH errors on input 1. Can be: • OK • Error • NA
sInp1_Map	This indicates the mapping of the 3Gb/s input 1 when the input format is 1080p50 or 1080p60. Can be Level A or Level B. When the input format is not 3Gb/s, this item indicates NA.

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 input 2. This is displayed as listed under sInp1_VI.
sInp2_WSS-Stnd	Displays the detected WSS-standard value found in input 2. This is displayed as listed under sInp1_WSS-Stnd.
sInp2_WSS-Extnd	Displays the detected WSS-extended value found in input 2. This is displayed as listed under sInp1_WSS-ext.
sInp2_s2016	Displays the detected S2016 value found in input 2. This is displayed as listed under sInp1_s2016.
sInp2_CRC_EDH	This item indicates CRC and EDH errors on input 2. Can be: • OK • Error • NA
sInp2-Map	Displays the mapping of the 3Gb/s input, if the format is 1080p50 or 1080p60 on input 2. Can be Level A or Level B. NA is indicated if the input is not 3Gb/s.
IODelayA	Displays the total delay in ms of outputs A1 and A2. Can be a value between 0ms and 5000 ms.
IODelayB	Displays the total delay in ms of outputs B1 and B2. can be a value between 0ms and 15000ms.
FunctionA	Displays the current function outputs A1 and A2. For the card it can only be Up, Down, Cross, Trans, TestPattern or NA.
FunctionB	Displays the current function outputs B1 and B2. For the card it can only be Up, Down, Cross, Trans, TestPattern or NA.
Ref	Displays whether a correct reference is found (Present) or not (NA).
Contact-Status	Displays the currently closed GPI contacts. This is displayed as for instance 10100 when contacts 1 and 3 are closed and for instance 01110 when contacts 2, 3 and 4 are closed.
GPI_A	Displays the current value of GPI pool A.
GPI_B	Displays the current value of GPI pool B.
GPI_C	Displays the current value of GPI pool C.
OP47-Det-A	Displays whether or not OP47 is detected on input A.
OP47-Det-B	Displays whether or not OP47 is detected on input A.
WST-Det-A	Displays if teletext/closed captions have been detected on input A.
WST-Det-B	Indicates if teletext/closed captions have been detected on input B.

CC_Det_A	Displays whether or not Closed Captioning has been detected on input A.
CC_Det_B	Displays whether or not Closed Captioning has been detected on input B.

6.3. Net Status

Item	Description
IP_Addr0	This item displays the status of the IP address. It can be manual, DHCP asking (default), 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.

The events reported by the GXT100 card are as follows:

Menu Item	Description
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.
Active_Out_A	Active output A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Active_Out_B	Active output B 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:

- A message string to show what has happened in text, for example: “INP_LOSS”, “REF_LOSS”, “INP_RETURN”.
- 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, please see the table below.
- 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.
- A slot number of the source of this event.

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.

Tags

The tag is also defined in the card. The tag has a fixed meaning. When controlling or monitoring software has to 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 an error status (e.g. 1 for Loss of Input), the complement is marked by the tag increased by 128 (80hex), (e.g. 129 (81hex) for Return of Input).

The tags defined for the GXT100 card are:

Event Menu Item	Tag		Description
Announcements	01_{hex}=Announcements on	81_{hex}=Announcements off	Announcement of report and control values
Input_A	01_{hex}=INP_A_LOSS	81_{hex}=INP_A_RETURN	Input A lost or returned
Input_B	41_{hex}=INP_B_LOSS	$c1_{hex}$= INP_B_RETURN	Input B lost or returned
Ref-Status	02_{hex}=REF_LOSS	82_{hex}=REF_RETURN	Reference lost or returned
Active_Out_A	19_{hex}=IN_B->OUT_A	99_{hex}= IN_A->OUT_A	Input B or input A on outputs A
Active_Out_B	$1a_{hex}$= IN_A->OUT_B	$9a_{hex}$=IN_B->OUT_B	Input A or input B on outputs B

Priority

The priority is a user-defined value. The higher the priority of the alarm, the higher this value will be. Setting the priority to Zero disables the announcement of this alarm. Alarms with priorities equal to or higher than the Error Threshold setting of the RRC will cause the error LED on the Synapse rack front panel to light up.

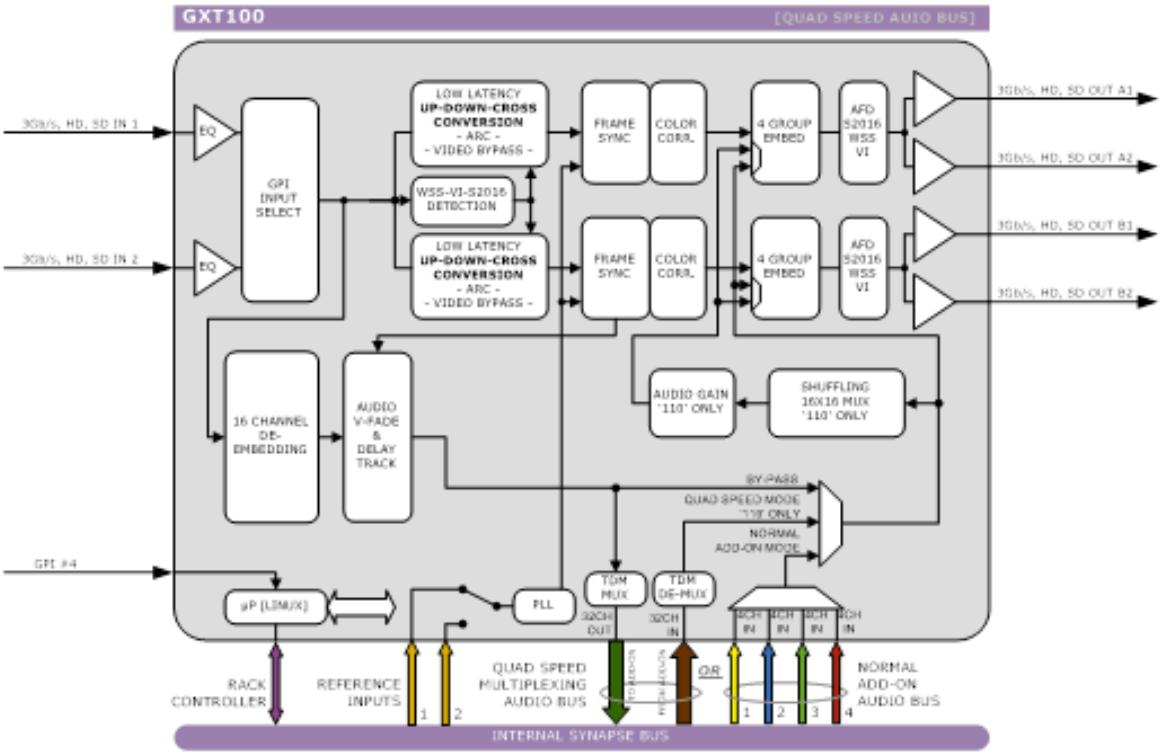
Card Address

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

Indicator	Description
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 LED	This LED indicates the presence of a valid SDI video signal on input A.
Input_B LED	This LED indicates 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	Indicates 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 lights up after the card has initialized. The LED lights up for 0.5 seconds every time a connection is made to the card.

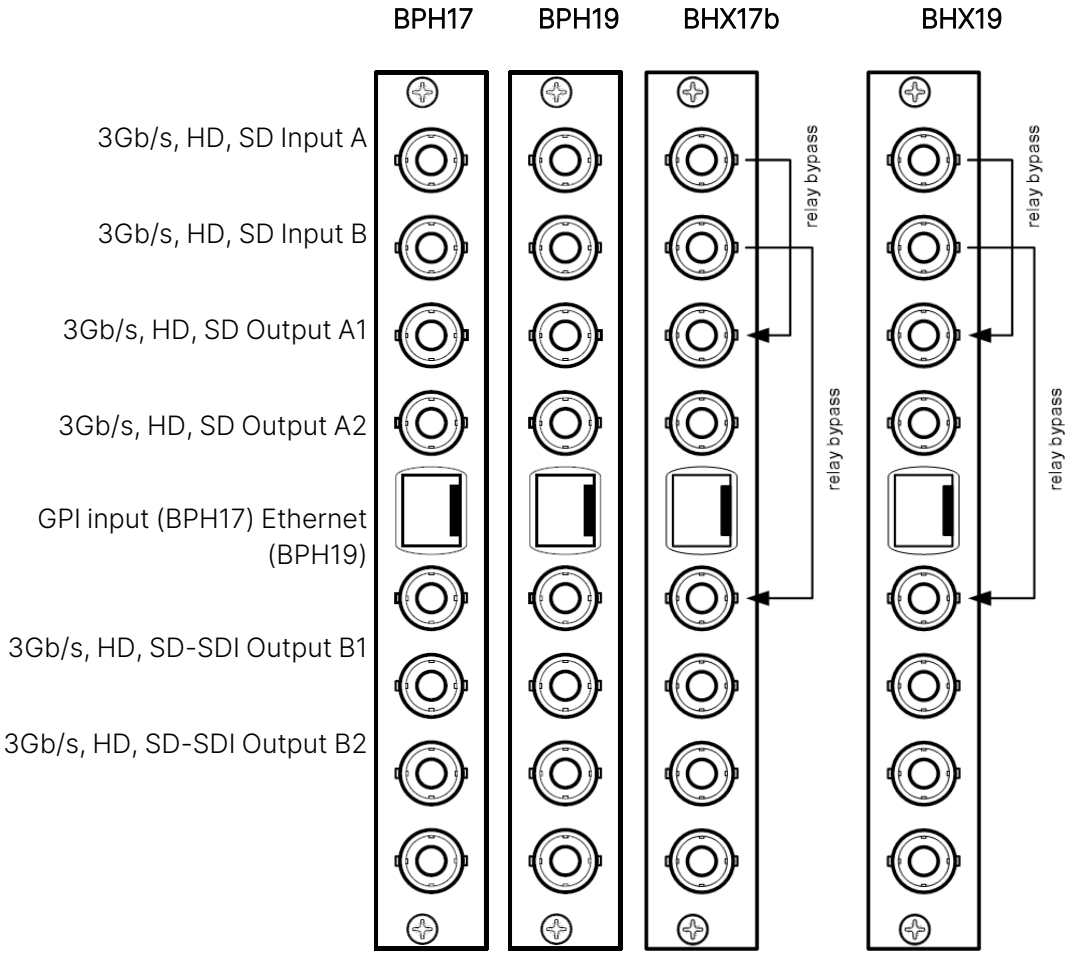
9. Block Schematic



10. Connector Panels

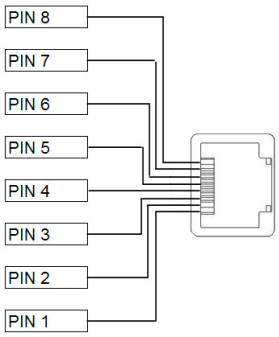
The GXT100 can be used with the BPH17, BPH19, BHX17b (with bypass relay) or BHX19.

The following diagrams show the pinout of the backpanels in combination with the card.



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

Appendices

Appendix 1: GPIs Explained

GPI Pools

This card has 5 GPI contacts. Since there are several functions you can control by using GPIs (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 through GPI_5 settings, you can assign 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 priority mode.

Example 1: Two Pools in Binary Mode

To control the up converter presets using Pool A (Up_CtrlA set to GPI-A) and the output mode setting using Pool B (Out-mode-Ctrl set to GPI-B), with both pools working in priority mode, the GPIs have to be set up as follows:

- 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 priority mode, controlling the Up converter preset. Pool B consists only of GPI 5 (also in priority mode), controlling the Output mode setting.

Pool A now works as follows:

GPI_1 Status	GPI_2 Status	GPI_3 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 takes priority)
1	1	1	1	Up-conv Preset 5 (because highest takes priority)

Pool B now works as follows:

GPI_5 Status	Set Value
0	A out only
1	B out only

Example 2: One Pool in Binary Mode and One in Priority Mode

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
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 takes priority)

Example 3: Two Pools in Priority Mode

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 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 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 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 takes 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 takes priority)

Pool C now works as follows:

GPI_5 Status	Set Value
0	A out only
1	B out only

Appendix 2: Quad Speed ADD-ON Bus

Scope

The internal audio ADD-ON bus needs an upgrade for certain applications. We want more channels (32 per video stream seems possible in the near future). And we want the bus to be bidirectional, i.e. 32 channels in and 32 channels out at the same time.

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

The master card has two modes:

- Normal ADD-ON mode, or
- Quad Speed audio ADD-ON mode.

These modes are selectable on the master card. If a mode is selected, all ADD-ON cards to that master need to be in the same mode.

You can mix master cards in one frame using the two different modes, but all cards to the right of the master must be in the same mode as the master. A new master breaks the chain and the master card ADD-ON mode can be selected again.

Features

The following features and rules apply:

- Up to 32 channels output from the master card, with looping to up to 3 ADD-ON cards

  The ADD-ON card chooses the channels it wants to process.
- Up to 32 channels input on the master card

  If the master card can handle less then 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.
- 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 large, dark green arrow from the master card to the ADD-ON card and looped onto the next ADD-ON card via the dark green arrow.

  The ADD-ON card injects up to 32 channels into the large brown 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.

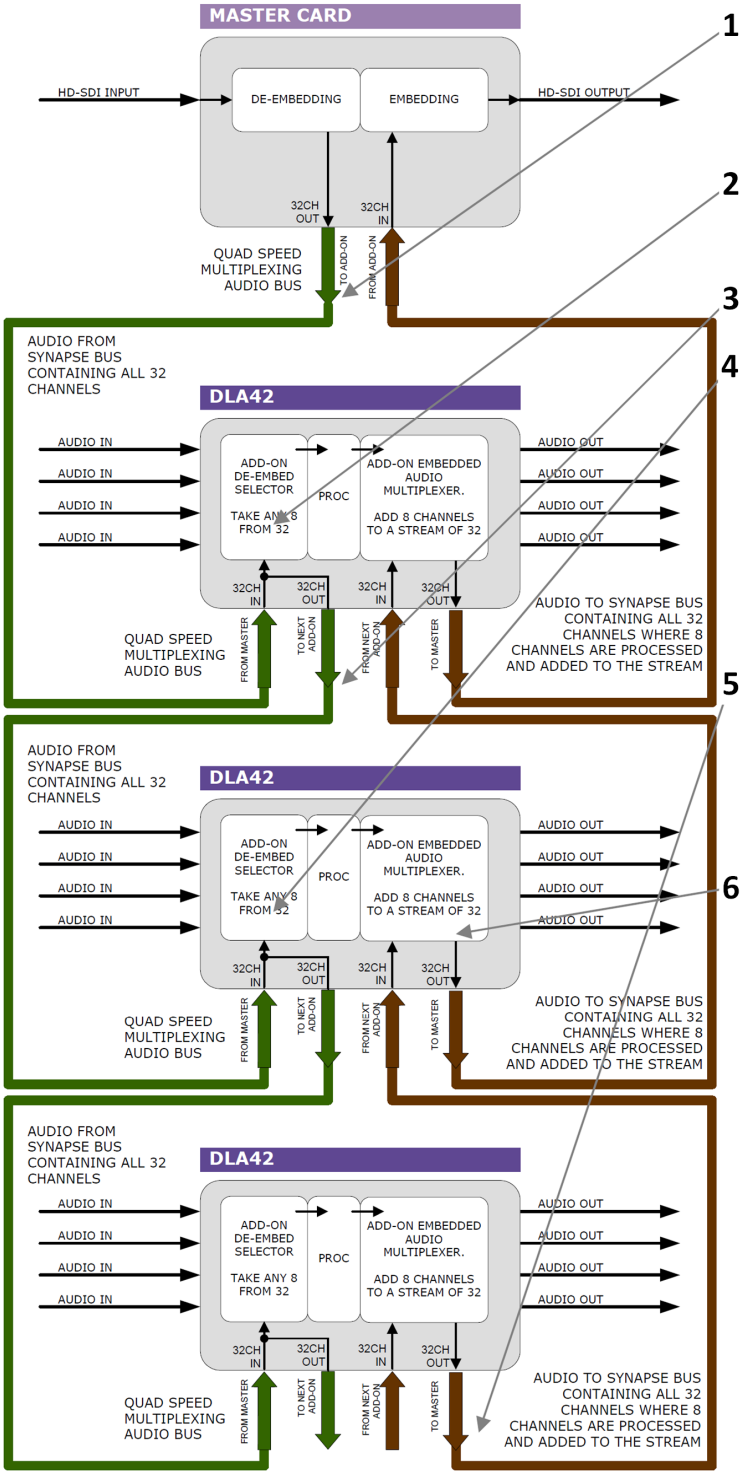
  If applicable, the ADD-ON card can also be used as in injection point of physical audio streams.

Example

The major difference between the new and old bus structure is the fact that it carries 4 times as many audio channels.

It is also bi-directional by design. So half of the original physical infrastructure moves audio from the master card to the ADD-ON cards, and the other half is used to put the audio back.

The following graphic shows how a typical quad speed bus chain works:



1. The audio from the master card (dark green arrow) contains up to 32 channels.
2. The first ADD-ON card can select any of the 32 channels for internal processing.
3. These channels are looped on to the next ADD-ON card.
4. The next ADD-ON card (sitting in the next n+1 slot) can also freely select any 8 from 32 channels. (The DLA42 can also take 3 channels from the ADD-ON bus and 5 channels from its physical input).

   This looping works up to 3 times.

5. The brown arrow is the return path and sends the (processed) audio back to the master card.

   This path is 32 channels wide and is clocked from the master card.

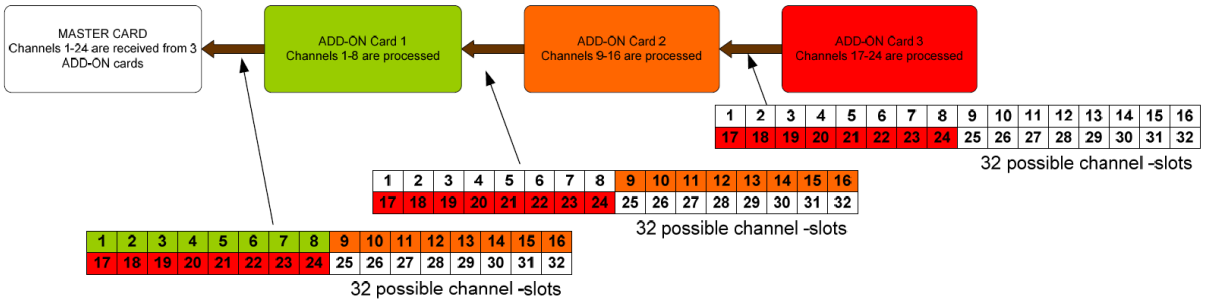
6. The ADD-ON card can for instance overwrite 8 of the 32 channels. These 32 channels are then transported to the next ADD-ON card, which overwrites another 8 channels.

Multiplexing

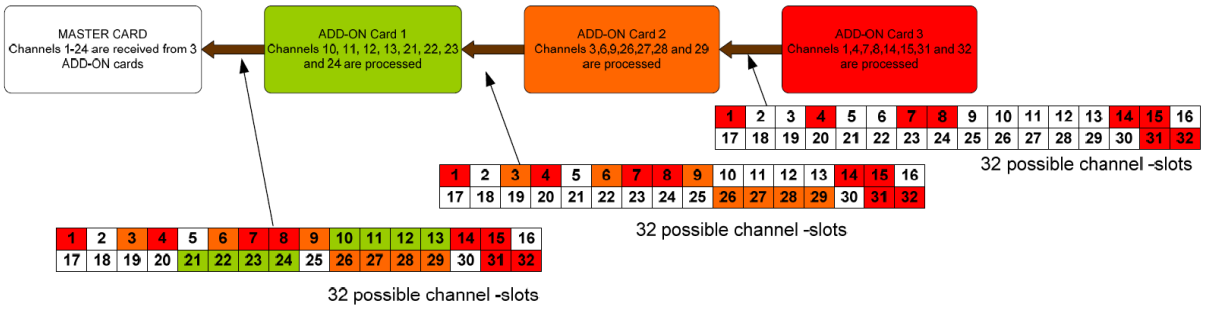
The injection of processed audio into the master card works differently to how you have been used to with the original audio ADD-ON bus. The large brown arrow will always carry 32 channels from ADD-ON to ADD-ON, or from ADD-ON to master card. Which actual channels are used or not is determined in the ADD-ON card.

In the example below, you can see a 4-Card system, with 1 master card and 3 Quad speed ADD-ON cards (the maximum). The last ADD-ON card (far right) processes 8 channels. They are inserted (a menu selection) in slots 17-24 from 32 channel slots. The second ADD-ON card also processes 8 channels, but they are inserted in slots 9-16 (of 32 slots). The first ADD-ON card inserts channels 1 to 8.

This method allows for overwriting slots that come from the right-hand master card. Channel-slots 25 to 32 are left empty in this example.



The above example shows a logical way of how the ADD-ON multiplexing could be performed. However, the insertion menu of for instance the DLA42 is much more flexible and enables any channel to be assigned to any of the 32 channel slots. The example below shows how this flexibility could be used.



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