

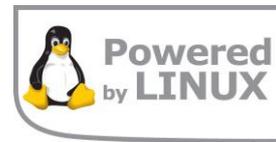


# GPD130

# HPD130

3Gb/s, HD, SD embedded domain PCM + AD to Dolby Digital (plus) encoder with audio shuffler and audio description processor

## Installation and Operation manual



Committed.





*Synapse*

**TECHNICAL MANUAL**

GPD130  
HPD130



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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.
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Date created: 03-11-2011  
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EN60950 Safety  
 EN55103-1: 1996 Emission  
 EN55103-2: 1996 Immunity

Axon Digital Design  
 GPD130  
 HPD130



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.

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# 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](http://www.axon.tv) to obtain the latest information on our new products and updates.

## Local Control Panel

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

## Remote Control Capabilities

The remote control options are explained in the rack controller manual. The method of connection to a computer using Ethernet is described in the ERC/ERS/RRC/RRS manual.



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

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

## 2 Unpacking and Placement

### Unpacking

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

### Placing the card

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

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

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

### 3 A Quick Start

#### When Powering-up

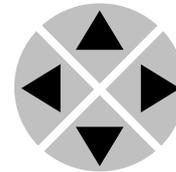
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

#### Changing settings and parameters

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

#### Front Panel Control

Front Panel Display and Cursor



Settings are displayed and changed as follows;

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

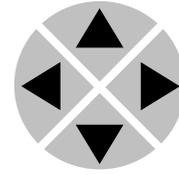
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

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

With the display as shown below

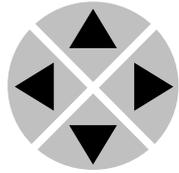
```
RRC18 [Select Card]
>S01=SFS10
```



Pressing the ► selects the SFS10 in frame slot 01.

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

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

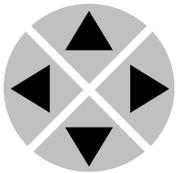


Pressing the ► selects the menu item shown, in this example Settings.

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

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

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

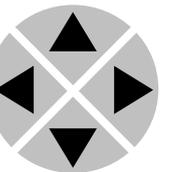


Pressing the ► selects the settings item shown, in this example SDI-Format.

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

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

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



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

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

## Axon Cortex Software

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

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

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

### Menu Structure Example

Slot	Module	Item	Parameter	Setting
▲				
▲				
S0□		Ident ity		
▲		▲		
S01	SFS10	▶ Set- tings	▶ Standard_dig	▶ Auto
▼		▼	▼	▼
S00	RRC18	Statu s	Mode	625
		▼	▼	▼
		Event s	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

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

## 4 The GPD/HPD130 card

### Introduction

The GPD130 and HPD130 are embedded domain PCM to Dolby Digital or Dolby Digital Plus encoders with fully routable Audio Description processor. This processor uses a stereo track as main program (input 1-2 of the AD processor) and mixes the AD track triggered by the mix enable track (input 3-4 of the AD processor).

The output of the AD processor can be routed to any of the Dolby digital encoder inputs or any of the normal PCM channels of the 16 channel embedder.

Simultaneous encoding of 5.1+2.0 or 4 individual stereo channels (languages) to 4 Dolby Digital (Plus) 2.0 streams is possible.

The new Quad Speed audio bus allows for implementation of ‘in between’ audio processing. This means that we can stream the decoded Dolby E audio to a Quad Speed Audio ADD-ON card like the DLA44 or DLA42, process this audio and send it back to the G/HPD130 for encoding into Dolby Digital or Dolby Digital plus.

The ADD-ON card does not need a connector panel and all audio routing is performed inside the Synapse frame by just placing these cards in adjacent slots.

The HPD130 can be future upgraded to GPD130. This allows for staged implementation of HD infrastructures and spread the cost over multiple budget years.

### Features

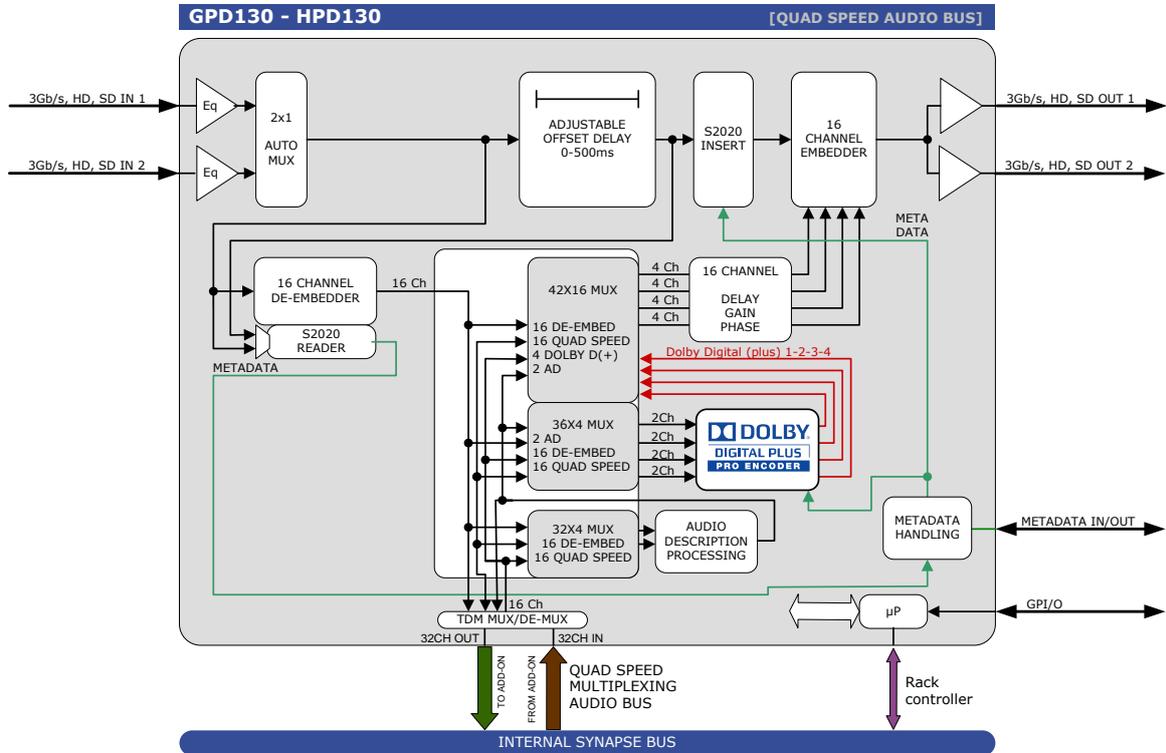
- Encoding of up to 4 times 2.0 Dolby Digital (Plus) outputs.
- Or 5.1 Dolby Digital (Plus) + 2.0 Dolby Digital (Plus)
- Dolby Pro Logic II encoding on the 2.0 channel
- Downmix of 5.1 to 2.0
- Embedded S2020 handling
- 2 SDI inputs (with auto switch on carrier loss, and switch back function)
- Compatible with the following input formats (auto selecting) (1080p only for GPD):
 

▪ 1080p/59.94	▪ 1080p/23.98
▪ 1080p/50	▪ 1080psf/23.98
▪ 1080i/59.94	▪ 720p/59.94
▪ 1080i/50	▪ 720p50
▪ 1080p/29.97	▪ SD525
▪ 1080p25	▪ SD625
- Offset video delay of up to 1000ms
- Quad Speed Audio ADD-ON bus for bidirectional audio processing
- 2 SDI + embedded audio outputs
- 7 presets that configure all 16 input channels at once. controlled by GPI or ACP (Cortex)
- Append and overwrite modes
- Audio level and phase control
- Audio offset delay up to 5000 ms
- Peak detection 0dBFS
- Transparent for ATC time code RP188, RP196, RP215
- Locks to Tri-level, Bi-level syncs or input
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)
- Optional 1 or 2 fiber inputs, 1 or 2 fiber outputs or a fiber in and output (replacing 1 SDI in and output) on the I/O panel
- Optional relay bypass (BHX18 or BHX18D)

## Applications

- 3Gb/s, HD and SD Dolby transcoding in transmission
- Preset based 16 channel audio/bitstream shuffling
- On the fly audio routing to two individual SD, HD and 3Gb/s SDI video streams.

## Block schematic



## 5 Settings Menu

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

### VIDEO

**Input-Select** With this setting you can select which SDI input you would like to use for Dolby processing. You can choose between SDI1 or SDI2. Can also be set to auto, which automatically chooses the valid SDI input (with SDI 1 as priority)

**Switch-Back** When Input-Select is set to Auto and SDI1 fails, the card will automatically switch to SDI2. When the setting Switch-Back is set to On, the selected input is set back to SDI1 when SDI1 is valid again. When set to off, it will remain on SDI2 until it is changed manually or when SDI2 fails.

**Lock-Mode** With this setting you select to what the card should lock itself to: SDI1, SDI2, ref1 or ref2. When set to ref1 or ref2 (meaning one of the frame's reference inputs), there will be no framesync autophaser active. Can also be set to Auto-SDI, which locks to the currently selected SDI input. Default is input 1.

**Out-Frmt** With Out-Frmt you can set what the output should be. This setting is only used for the delay options. This will not up/down/cross convert your input signal. Possible settings are:

- 1080i60, 1080i50
- 1080p30, 1080p25, 1080p24
- 720p60, 720p50
- SD525, SD625
- 1080p50, 1080p60 (GED only)
- Auto (default, automatically sets the input format as Out-Frmt)

**Phaser1-Offset**

The timing or offset of the autophaser of SDI Input 1 can be tuned with `Phaser1-Offset` (see block schematic) between 0 and 4124px. Default is 0px.

A correct function of the autophaser can be checked using status-items `Phaser1_H_Pos` and `Phaser1_Stat`. When `Phaser1_Stat` shows `Safe`, the autophaser is working in its `Safe-region`. When `Phaser1_Stat` shows `Warning` or `Critical`, the setting `Phaser1_Offset` can be used to tune the autophaser into its `Safe-region`.

The autophaser is enabled when the setting `Lock-Mode` is set to `Ref1` or `Ref2` and when a `Ref` is present, shown by the status-item `Ref-Format`.

**Phaser2-Offset**

The timing or offset of the autophaser of SDI Input 2 can be tuned with `Phaser2-Offset` (see block schematic) between 0 and 4124px. Default is 0px.

A correct function of the autophaser can be checked using status-items `Phaser2_H_Pos` and `Phaser2_Stat`. When `Phaser2_Stat` shows `Safe`, the autophaser is working in its `Safe-region`. When `Phaser2_Stat` shows `Warning` or `Critical`, the setting `Phaser2_Offset` can be used to tune the autophaser into its `Safe-region`.

The autophaser is enabled when the setting `Lock-Mode` is set to `Ref1` or `Ref2` and when a `Ref` is present, shown by the status-item `Ref-Format`.

**Phaser-status**

It is possible to display the function of the autophasers in the status menu of the card. This setting enables or disables the status-items: `Phaser1_H_Pos`, `Phaser2_H_Pos`, `Phaser1_Stat` and `Phaser2_Stat`. Default setting is `Off`.

**DELAY**

**Delay-Bypass**

You can bypass the delay block entirely by setting this to `on`. By default it is switched `off`.

**Delay-mode\_1**

With this setting you decide whether the card should apply delay by means of `time` in milliseconds (defined with `Time-Delay_1`) or to apply delay by means of frames, lines and pixels (`Fr-Ln-Px`). Default is `Fr-Ln-Px`.

<b>Time-Delay_1</b>	This setting is only used when Delay-mode_1 is set to Time. It defines the delay that should be applied to the video in milliseconds between 0 and 10000ms.
<b>F-delay_1</b>	F-Delay_1 sets the amount of delayed Frames. The available range is from 0 to 250 frames (dependent on the input format). When Out-Frmt is SD, the maximum is 250 frames, when it is 720p50/60 the maximum is 120 frames. All other HD formats can be delayed a maximum of 60 frames.
<b>V-delay_1</b>	<p>V-Delay_1 setting allows adjustment of the vertical phase of the output signal with respect to the selected reference input.</p> <p>The V-Delay_1 setting gives a delay in addition to the reference timing. For example: if the V-Delay_1 is set to 10 TV HD lines, the output signal will be delayed by reference timing + 10 TV HD lines. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 1124 lines (dependent on input format). The default setting is 0ln.</p>
<b>H-delay_1</b>	<p>The H-Delay_1 setting allows adjustment of the Horizontal phase of the output signal with respect to the selected reference input.</p> <p>The H-Delay_1 setting gives a delay in addition to the reference timing. For example: if the H-Delay_1 is set to 10 pixels, the output signal will be delayed by reference timing + 10 pixels. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 4124 pixels (dependant on input format). The default setting is 0px.</p>
<b>Delay-Status</b>	It is possible to display (in the status menu IODelay1) the processing time of the card in the status menu. This setting allows you to switch this function ON or OFF. Default setting is OFF

<b>PRESET</b>	
---------------	--

<b>Control</b>	<p>With this setting you decide whether you want to manually change the presets, change preset via the GPI contacts or change it by signal loss detection (see setting LossDetect). A combination of GPI contact overrides together with loss detection is also possible.</p> <p>GPI+LossDetect only works in non-latch mode. Default is manual.</p>
----------------	--

**GPI-Ctrl**

The GPD/HPD130 has several physical GPI contacts to control the card’s presets (if presets are set to be GPI controlled)

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

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

BCD: Binary GPI mode. GPI contacts work work viewed in the following table:

GPI 3	GPI 2	GPI 1	Activate preset
0	0	0	No change
0	0	1	Preset 1
0	1	0	Preset 2
0	1	1	Preset 3
1	0	0	Preset 4
1	0	1	Preset 5
1	1	0	Preset 6
1	1	1	Preset 7

**Ext-Mode**

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

**LossDetect**

With this setting you can set which source should be checked for the LossDetect function (see settings Control and MD-control). When the here-set-source is lost, the card will switch to the preset set with the Loss setting. When the source returns, the card will switch to the preset set with the Detect setting.

Sources which can be checked on are DolbyE, S2020-SDI, MD-LocalIn (local metadata input) or DolbyDigital (+). Default is DolbyE.

**Note:** Abovementioned Dolby sources are *detected* sources and are not necessarily supported by embedded Dolby encoders or decoders.

**Note:** If LossDetect is being used settings #Emb-Mode, #Emb\_A\_Sel ~ #Emb\_D\_Sel need to have the same values for both “loss” and “detect” presets to circumvent ‘reset’ of the embedders. This can result in Dolby and/or PCM CRC errors at the output of the embedders. If one of these values change a reset is needed to guarantee audio-phase-alignment for all embedder outputs!

**Loss**

Here you select to which of the 7 preset the card should switch in case the source set with LossDetect is lost. When set to off the card will not switch presets when a loss is detected. Default is off.

## Detect

Here you set a preset to which the card should switch in case a lost source (set with `LossDetect`) has returned. Besides the 7 presets, you can set it to `S2020-SDID`, `ProgramConfig`, `Previous` (previous active preset before the signal was lost) or `off` (don't switch presets when signal returns, default).

`S2020-SDID` switches the card to a predefined preset according to the value of the SDID:

- 00 (none) → Preset 8
- 01 (Ch01/02) → Preset 8
- 02 (Ch03/04) → Preset 9
- 03 (Ch05/06) → Preset 10
- 04 (Ch07/08) → Preset 11
- 05 (Ch09/10) → Preset 12
- 06 (Ch11/12) → Preset 13
- 07 (Ch13/14) → Preset 14
- 08 (Ch15/16) → Preset 14

`ProgramConfig` switches the card to a predefined preset according to the value of the metadata program configuration:

- 7.1 → Preset 8
- 5.1+2 → Preset 9
- 5.1 → Preset 10
- 4x2 → Preset 11
- 3x2 → Preset 12
- 2+2 → Preset 13
- Other → Preset 14

## LossDetect\_2

With this setting you can set which source should be checked for the `LossDetect_2` function. This second loss-detect function comes into effect when `LossDetect` functionality is enabled in the `Config` setting, a loss is detected according to the first loss-detect function (`LossDetect` setting) and the `LossDetect_2` function is enabled (i.e. not set to `off`).

When the here-set-source is lost, the card will switch to the preset set with the `Loss_2` setting. When the source returns, the card will switch to the preset set with the `Detect_2` setting.

Sources which can be checked on are `DolbyE`, `S2020-SDI,MD-LocalIn` (local metadata input) or `DolbyDigital(+)`. Default is `DolbyE`.

**Note:** Abovementioned Dolby sources are *detected* sources and are not necessarily supported by embedded Dolby encoders or decoders.

**Note:** If `LossDetect` is being used settings `#Emb-Mode`, `#Emb_A_Sel` ~ `#Emb_D_Sel` need to have the same values for both “loss” and “detect” presets to circumvent ‘reset’ of the embedders.

This can result in Dolby and/or PCM CRC errors at the output of the embedders. If one of these values change a reset is needed to guarantee audio-phase-alignment for all embedder outputs!

**Loss\_2** Here you select to which preset the card should switch when the LossDetect\_2 function is in effect and the source set in the LossDetect\_2 setting is lost. Can be presets 1 to 7 (Preset 1 ~ Preset 7) or off When set to off the card will not switch presets when a loss is detected. Default is off.

**Detect\_2** With this setting you select to which preset the card should switch when the LossDetect\_2 function is in effect and the source set in the LossDetect\_2 setting is detected. Besides the preset 1 to 7 (Preset 1 ~ Preset 7), you can set it to S2020-SDID, ProgramConfig, Previous (previous active preset before the signal was lost) or off (don't switch presets when signal returns, default).  
S2020-SDID and ProgramConfig switches the card to a predefined preset according to the value of the SDID and the value of the metadata program configuration, equal to what is explained at the Detect setting.

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

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

**#Preset\_Name** Sets/displays the name of the currently displayed preset.

**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.

## DOLBY DECODER

**SourceDecoder** Selects the source for Dolby format detection for the purpose of the loss / detect functionality. Can be SDI, Addon01/16 or Addon17/32.

**Note:** The GPD products do *not* contain a decoder. The naming of the option (Source' Decoder') is because of technical reasons.

## DecoderIn

Selects the channel for Dolby format detection for the purpose of the loss / detect functionality. Can be Ch01/02 to Ch15/16 .

**Note:** The HPD/GPD products do *not* contain a decoder. The naming of the option ('Decoder' In) is because of technical reasons.

## DOLBY ENCODER

### #SourceEncoder01

~

### #SourceEncoder08

The Dolby Digital encoder of the GPD/HPD130 has 8 inputs, because a Dolby Digital can contain up to 8 channels (for instance in a 7.1 situation). With these setting you can decide the source of the each individual input: SDI input, add-on bus channels 1/16, add-on bus channels 17/32, the output of the decoder (DecoderOut) or the output of the audio description processor (AudioDescrOut). Default is DecoderOut.

### #EncoderIn01 ~

### #EncoderIn08

Here you select a specific channel, out of the above selected input, which contains the corresponding part of the Dolby Digital bit stream. Ch\_1 till Ch\_16 can be chosen. Ch\_1 till Ch\_8 are default.

### #Enc\_MD\_Src

Here you select where the metadata for the Dolby Encoder should come from. Can be coming from the SDI input (SDI, default), from the Dolby E input (DecoderOut), from the I/O-panel RJ45 metadata input (Local), or from the card's internal metadata generator (ShufflerOut).

### #Enc\_config

With this setting you configure the encoder. The GED/HED130 supports multiple output formats. This always sets the maximum amount of channels (so metadata could change 5.1 to 2.0). Default setting is 5.1+2.

**Normal encoder settings:** The following Enc\_config settings are the normal settings. In the following table you see which settings have what outputs. **Note** that DD(+) means that the output is either Dolby Digital or Dolby Digital Plus, depending on what settings have been done at the Enc\_mode settings which are next in the menu.

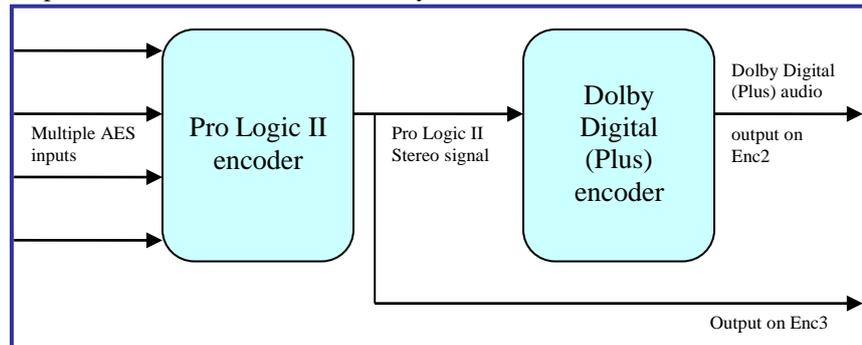
Setting	Encoder out 1	Encoder out 2	Encoder out 3	Encoder out 4
2	DD(+) 2.0 (ch1/2)	-	-	-
2+2	DD(+) 2.0 (ch1/2)	DD(+) 2.0 (ch3/4)	-	-
2+2+2	DD(+) 2.0 (ch1/2)	DD(+) 2.0 (ch3/4)	DD(+) 2.0 (ch5/6)	-
2+2+2+2	DD(+) 2.0 (ch1/2)	DD(+) 2.0 (ch3/4)	DD(+) 2.0 (ch5/6)	DD(+) 2.0 (ch7/8)
5.1	DD(+) 5.1 (ch1~6)	-	-	-
5.1+2	DD(+) 5.1 (ch1~6)	DD(+) 2.0 (ch7/8)	-	-

**Pro logic II settings:** The GED/HED130 is capable of encoding Pro Logic II signals. Pro Logic II is a multichannel sound source down mixed to a single stereo channel. The table and schematics on the following page display and explain the 2 possible Pro Logic II settings.

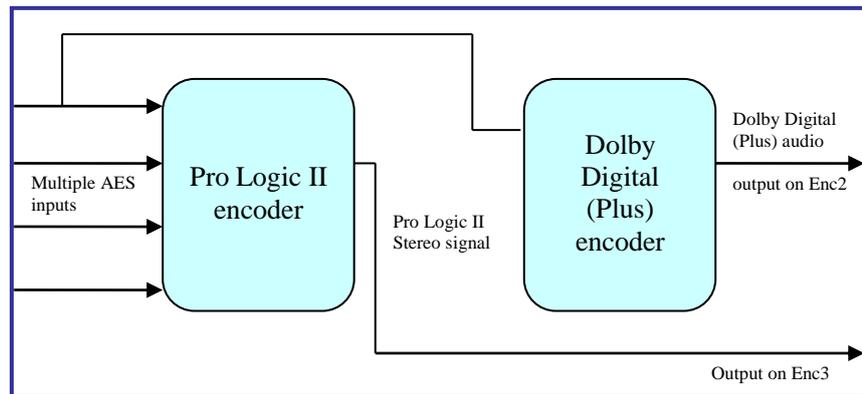
Setting	Encoder out 1	Encoder out 2	Encoder out 3	Encoder out 4
5.1+2+PL.0 <sup>(a)</sup>	DD(+) 5.1	PLII DD(+) 2.0	PL II	-
5.1+2+PL.1 <sup>(b)</sup>	DD(+) 5.1	DD(+) 2.0	PL II	-

(continues on the following page)

(a) = It is possible to embed a Pro Logic II encoded signal into a Dolby Digital (Plus) stream. This means that, out of a multichannel environment a Pro Logic II stereo signal is created. That stereo Pro Logic II signal is then passed on to the Dolby Digital (Plus) encoder to be embedded into a Dolby Digital (Plus) audio stream. With this setting you create 1 Pro Logic II DD(+) output on encoder out 2 and one normal stereo Pro Logic II output on encoder out 3. Schematically, this would look as follows:



(b) = This settings creates one normal stereo Pro Logic II output on encoder out 2 and one normal 2.0 DD(+) output on encoder out 3. This normal 2.0 DD(+) stream is encoded out of the AES inputs and is not a Pro Logic II audio stream. Schematically this looks as follows :

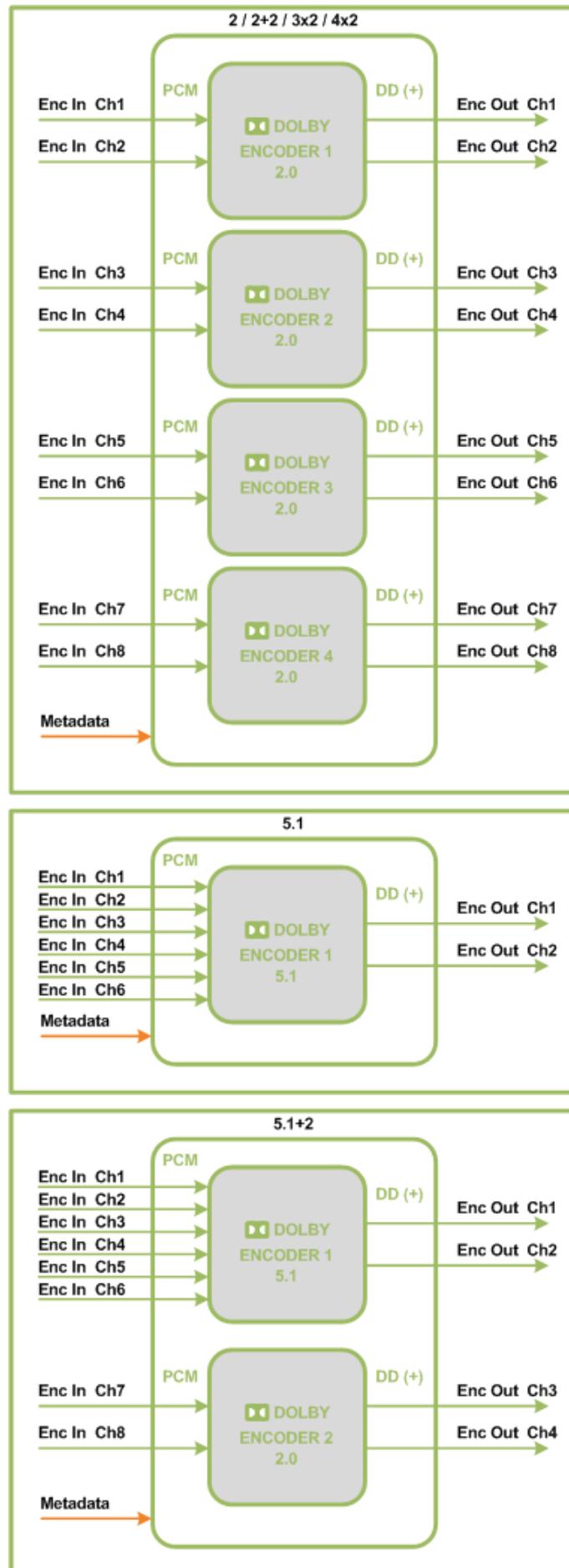


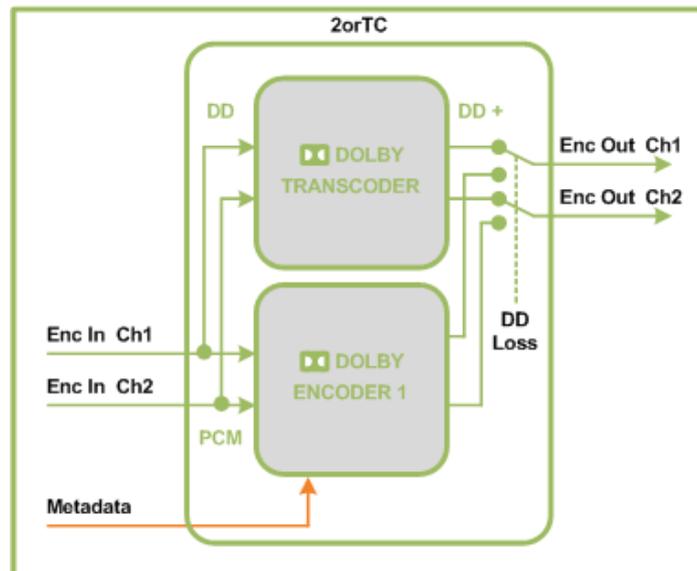
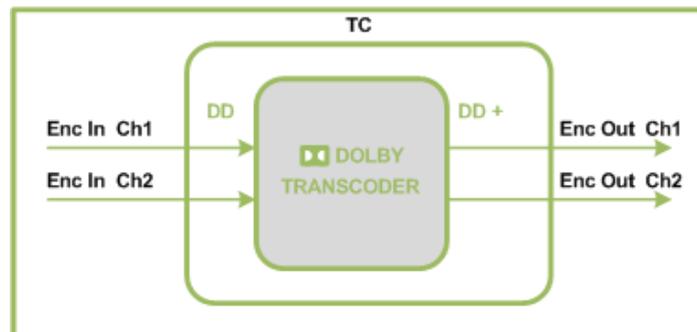
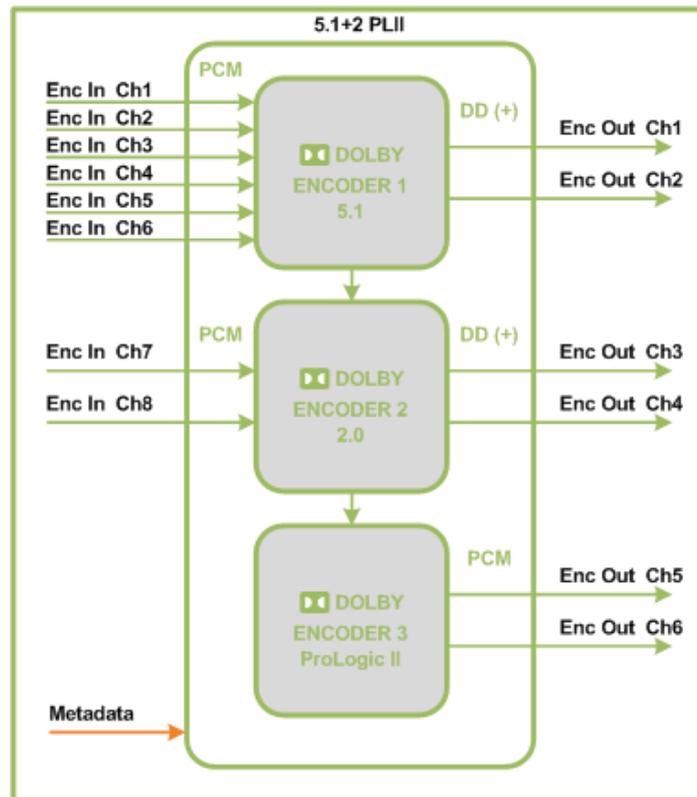
**Transcode settings:** The following Enc\_config settings are special settings when using a Dolby Digital input. This signal is converted to Dolby Digital Plus when using these settings. For example: when the setting 2 or TC is applied, the Dolby Digital input is transcoded to Dolby Digital Plus, but when the Dolby Digital input signal is lost, then the designated PCM inputs will be converted to a 2.0 DD(+) output automatically.

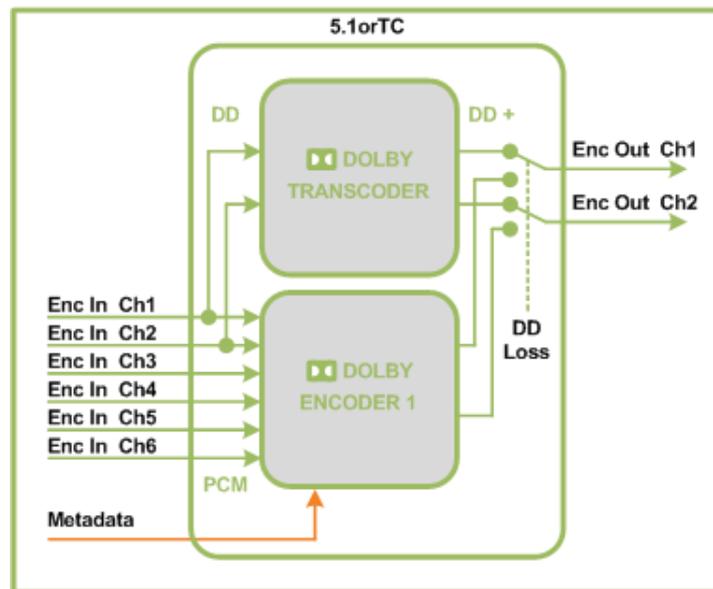
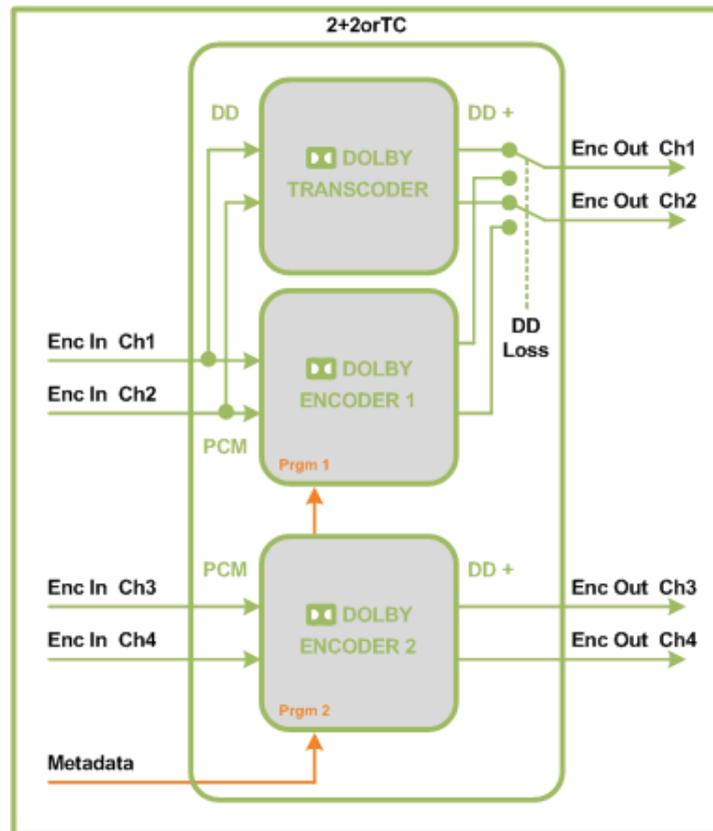
Setting	Encoder out 1	Encoder out 2	Encoder out 3	Encoder out 4
2 or TC	DD+2.0	-	-	-
2+2 or TC	DD+2.0	DD+2.0	-	-
5.1 or TC	DD+5.1	-	-	-
TC	DD+2.0	-	-	-

The schematics on the following page give visual representations of some of the #Enc\_config settings.

**#Enc\_config**  
(schematics)







**#Enc1\_mode ~  
#Enc4\_mode**

With this setting you can set the Dolby Digital mode in which each encoder should function. The following settings are possible:

- DDPlus\_Man = Dolby Digital Plus mode, with a manually set bitrate (refer to Enc1-DDPlus\_Man ~ Enc4-DDPlus\_Man to set the bitrate)
- DDPlus\_Auto192 = Dolby Digital Plus mode, automatically set to a bitrate of 192 kbps for 5.1 (3/2). When the output is changed to Dolby 2.0, it will automatically use a bitrate of 96 kbps.
- DDPlus\_Auto200 = Dolby Digital Plus mode, automatically set to a bitrate of 200 kbps for 5.1 (3/2). When the output is changed to Dolby 2.0, it will automatically use a bitrate of 96 kbps.
- DDPlus\_Auto224 = Dolby Digital Plus mode, automatically set to a bitrate of 224 kbps for 5.1 (3/2). When the output is changed to Dolby 2.0, it will automatically use a bitrate of 112 kbps.
- DDPlus\_Auto256 = Dolby Digital Plus mode, automatically set to a bitrate of 256 kbps for 5.1 (3/2). When the output is changed to Dolby 2.0, it will automatically use a bitrate of 128 kbps.
- DD\_Man = 5.1 (3/2) Dolby Digital, with a manually set bitrate (refer to Enc1-DD+\_Man ~ Enc4-DD+\_Man to set the bitrate)
- DD\_Auto384 = 5.1 (3/2) Dolby Digital mode, automatically set to a bitrate of 384 kbps. When the output is changed to Dolby 2.0, it will automatically use a bitrate of 192 kbps.
- DD\_Auto448 = 5.1 (3/2) Dolby Digital mode, automatically set to a bitrate of 448kbps. When the output is changed to Dolby 2.0, it will automatically use a bitrate of 256 kbps.

Default is DDPlus\_Man.

**#Enc1\_DD\_Man ~  
#Enc4\_DD\_Man**

This item manually sets the used audio bitrate of the Dolby Digital mode when the corresponding Enc\_mode is set to DD\_Man. Can be between 32kbps and 640kbps. The following table displays all the possible steps in between. Lowest bitrates cannot be selected in 3/2 (in other words: 5.1).

32 kbps	192 kbps
40 kbps	224 kbps
48 kbps	256 kbps
56 kbps	320 kbps
64 kbps	384 kbps
80 kbps	448 kbps
96 kbps	512 kbps
112 kbps	576 kbps
128 kbps	640 kbps
160 kbps	

Default is 384kbps.

**#Enc1\_DDplus\_Man**  
~  
**#Enc4\_DDplus\_Man**

This item manually sets the used audio bitrate of the Dolby Digital Plus mode when the corresponding Enc\_mode is set to DD+\_Man. Can be between 32kbps and 1532kbps. The following table displays all the possible steps in between. Lowest bitrates cannot be selected in 3/2 (in other words: 5.1). Default is 256kbps.

32 kbps	208 kbps	576 kbps
40 kbps	216 kbps	640 kbps
48 kbps	224 kbps	704 kbps
56 kbps	232 kbps	768 kbps
64 kbps	240 kbps	832 kbps
72 kbps	248 kbps	896 kbps
80 kbps	256 kbps	960 kbps
88 kbps	272 kbps	1024 kbps
96 kbps	288 kbps	1088 kbps
104 kbps	304 kbps	1152 kbps
112 kbps	320 kbps	1216 kbps
120 kbps	336 kbps	1280 kbps
128 kbps	352 kbps	1344 kbps
144 kbps	368 kbps	1408 kbps
160 kbps	384 kbps	1472 kbps
176 kbps	400 kbps	1532 kbps
192 kbps	448 kbps	
200 kbps	512 kbps	

## PROLOGIC CONTROL

**PL\_MD\_Src**

This item lets you select which metadata source you want to use for pro logic encoding, external (MD\_Enc1, using program 1) or internal (Int\_Meta, using the now following PL metadata settings). Default is MD\_Enc1.

**PL Downmix\_Type**

This metadata decides how the downmix should be processed: downmix the Lt/Rt channels, the Lo/Ro channels, Pro Logic II downmixing (PLII) or to use the data set in the external metadata source (MD\_Enc1). Default is PLII.

**PL Dialnorm**

This pro logic metadata item sets the dialogue norm to an average loudness of a dialogue in a presentation on or off. By default it is On.

**PL Center\_mix**

This setting indicates the level shift applied to the center channel when adding to the left and right outputs.

+3.0dB, +1.5dB, 0.0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB, -7.5dB, -9.2dB and -999dB (muted). Default is 0dB.

**PL Surround\_mix**

This setting indicates the level shift applied to the surround channels when adding to the left and right outputs.

+3.0dB, +1.5dB, 0.0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB, -7.5dB, -9.2dB and -999dB (muted). Default is 0dB.

**PL LFE\_En**

The status of the LFE Channel parameter indicates whether an LFE Channel (Low Frequency Effects channel) is present within the bitstream. Can be set to be enabled, disabled or Auto (in which case the data in MD\_Encl is followed). Default is Disables.

**PL LFE\_MixLevel**

This setting indicates the level shift applied to the LFE channel when adding to the left and right outputs. Can be set between -21dB and +10dB. Default is 7dB.

## AUDIO DESCRIPTION

The audio description block has 4 input and 4 outputs. The inputs are:

- ADProg1: The first actual program audio channel which will be mixed with the audio description.
- ADProg2: The second actual program audio channel which will be mixed with the audio description.
- AD: the audio description or voice-over audio channel
- ADControl: a non-audio signal, which contains Gain and Pan information about how to mix the audio description signal with audio description programs.

The following schematic displays how the audio description block works:



### AD-Loss

By default, program material is output to audio description output Ch1 and Ch2, while program material processed with audio description is on audio description output Ch3 and Ch4 (see above schematic).

If AD-Loss setting is set to off and the ADLoss input (see above schematic) loses its AD control signal, the AD and ADControl inputs are transparently routed to audio description outputs Ch3 and Ch4.

If AD-Loss is set to 1/2->3/4 and the ADControl input (see above schematic) loses its AD control signal, the program material present on the ADProg1 and ADProg2 inputs will also be copied to audio description outputs Ch3 and Ch4. This is the default setting.

If AD-Loss is set to 3/4->1/2 it works the same as 1/2->3/4 only in the opposite direction (Ch3 and Ch4 will be copied to Ch1 and Ch2).

If AD-Loss is set to Mute-1/2 and the ADControl input (see above schematic) loses its AD control signal, output channels 1 and 2 will be muted.

If AD-Loss is set to Mute-3/4 and the ADControl input (see above schematic) loses its AD control signal, output channels 3 and 4 will be muted.

<b>SourceADProg1</b>	Here you set the source of the ADProg1 input (see above schematic). Can be SDI (de-embedder output), DecoderOut (Dolby E decoder output), Addon01/16 (quadspeed add-on bus inputs 1 till 16) or Addon17/32 (quadspeed add-on bus inputs 17 till 32). Default is SDI.
<b>ADProg1</b>	Here you select one out of the 16 channels of the above selected source which will be your ADProg1 input. Can be set to off, in which case there will be no audio on ADProg1. Default is Ch_1.
<b>SourceADProg2</b>	Here you set the source of the ADProg2 input (see above schematic). Can be SDI (de-embedder output), DecoderOut (Dolby E decoder output), Addon01/16 (quadspeed add-on bus inputs 1 till 16) or Addon17/32 (quadspeed add-on bus inputs 17 till 32). Default is SDI.
<b>ADProg2</b>	Here you select one out of the 16 channels of the above selected source which will be your ADProg1 input. Can be set to off, in which case there will be no audio on ADProg1. Default is Ch_2.
<b>SourceAD</b>	Here you set the source of the AD input (see audio description block schematic). Can be SDI (de-embedder output), DecoderOut (Dolby E decoder output), Addon01/16 (quadspeed add-on bus inputs 1 till 16) or Addon17/32 (quadspeed add-on bus inputs 17 till 32). Default is SDI.
<b>AD</b>	Here you select one out of the 16 channels of the above selected source which will be your AD input. Can be set to off, in which case there will be no audio on ADProg1. Default is Off.
<b>SourceADControl</b>	Here you set the source of the ADControl input (see audio description block schematic). Can be SDI (de-embedder output), DecoderOut (Dolby E decoder output), Addon01/16 (quadspeed add-on bus inputs 1 till 16) or Addon17/32 (quadspeed add-on bus inputs 17 till 32). Default is SDI.
<b>ADControl</b>	Here you select one out of the 16 channels of the above selected source which will be your ADControl input. Can be set to off, in which case there will be no audio on ADProg1. Default is Off.
<b>ADProg1_Gain</b>	With this setting you can separately gain the ADProg1 input between -144dB and 12dB. Default is 0dB
<b>ADProg2_Gain</b>	With this setting you can separately gain the ADProg2 input between -144dB and 12dB. Default is 0dB

**AD\_Gain** With this setting you can separately gain the AD input between -144dB and 12dB. Default is 0dB

**ADProg1\_Delay** With this setting you can separately delay the ADProg1 input between 0ms and 5000ms. Default is 0ms.

**ADProg2\_Delay** With this setting you can separately delay the ADProg2 input between 0ms and 5000ms. Default is 0ms.

**AD\_Delay** With this setting you can separately delay the AD input between 0ms and 5000ms. Default is 0ms.

**ADControl\_Delay** With this setting you can separately delay the ADControl input between 0ms and 5000ms. Default is 0ms.

## EMBEDDING

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

**#Emb\_GrpSel** With this setting you select which audio groups of embedder 1 should be enabled for embedding audio into video output 1 and 2. The groups `group1`, `group2`, `group3` or `group4` can be separately set to be ON or OFF in the selection list. You can also choose to not enable any of the audio groups by setting this item to “\_\_\_\_\_”. By default it is set to “1234”, All groups active.

## EMB AUDIO OUT

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

- `SDI`: Audio comes from the SDI input
- `EncoderOut`: Audio comes from the Dolby encoder (8 ch)
- `AddOn01/16`: Audio comes from addon bus (first 16 ch)
- `AddOn17/32`: Audio comes from addon bus (second 16 ch)
- `AudioDescrOut`: Audio comes from audio description block

**#Emb-A1 ~ #Emb\_A4** With this setting you decide which audio channel out of the above selected source is used for embedder A channels 1 till 4. Can be any of the available 16 channels or set to `off`.

**#SourceEmb-B1 ~  
#SourceEmb-B4**

With these settings you can select where the corresponding audio channels (channel B1 till channel B4) of embedder B are coming from:

- SDI: Audio comes from the SDI input
- EncoderOut: Audio comes from the Dolby encoder (8 ch)
- AddOn01/16: Audio comes from addon bus (first 16 ch)
- AddOn17/32: Audio comes from addon bus (second 16 ch)
- AudioDescrOut: Audio comes from audio description block

**#Emb-B1 ~  
#Emb\_B4**

With this setting you decide which audio channel out of the above selected source is used for embedder B channels 1 till 4. Can be any of the available 16 channels or set to `off`.

**#SourceEmb-C1 ~  
#SourceEmb-C4**

With these settings you can select where the corresponding audio channels (channel C1 till channel C4) of embedder C are coming from:

- SDI: Audio comes from the SDI input
- EncoderOut: Audio comes from the Dolby encoder (8 ch)
- AddOn01/16: Audio comes from addon bus (first 16 ch)
- AddOn17/32: Audio comes from addon bus (second 16 ch)
- AudioDescrOut: Audio comes from audio description block

**#Emb-C1 ~  
#Emb\_C4**

With this setting you decide which audio channel out of the above selected source is used for embedder C channels 1 till 4. Can be any of the available 16 channels or set to `off`.

**#SourceEmb-D1 ~  
#SourceEmb-D4**

With these settings you can select where the corresponding audio channels (channel D1 till channel D4) of embedder D are coming from:

- SDI: Audio comes from the SDI input
- EncoderOut: Audio comes from the Dolby encoder (8 ch)
- AddOn01/16: Audio comes from addon bus (first 16 ch)
- AddOn17/32: Audio comes from addon bus (second 16 ch)
- AudioDescrOut: Audio comes from audio description block

**#Emb-D1 ~  
#Emb\_D4**

With this setting you decide which audio channel out of the above selected source is used for embedder D channels 1 till 4. Can be any of the available 16 channels or set to `off`.

**#EmbA1\_Gain ~  
#EmbD4\_Gain**

Adjusts the gain for the corresponding incoming audio input between -144 and 12dB. -144dB means the audio will be muted.

**#EmbA1\_Phase ~  
#EmbD4\_Phase**

Adjusts the audio phase of the corresponding individual input to 0 degrees or 180 degrees.

**#EmbA1\_Delay ~  
#EmbD4\_Delay**

Adjusts the delay of the corresponding audio channel between 0 and 5000ms.

**MISC**

**NonPCM-Bypass**

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

**Fade-Time**

Fade/time is locked to 2 parameters: channel-switch and gain-change. It is used as the fade-in/out time of the channel-switch of audio channels. The old channel will be fade-out and the new channel will be fade in according to the time chosen with fade-time. Fade-Time is also used for smooth transitions when gain-values or presets are changed. These smooth transitions are triggered by a change in Gain settings or a Preset change. With this setting you can manually set this fade time between 0ms and 10.000ms. The default is 400ms.

**Audio-Phase**

If this setting is set to *Align*, the card ensures audio-phase alignment between multiple audio channels and audio groups, which is necessary for multi-channel (surround) purposes. If errors in the signal-chain occur the de-embedder blocks reset synchronously to maintain audio-phase-alignment.

If this setting is set to *Off*, the card *eats-all* audio including errors. Even if there are DBN/ANC/ECC or channel-sequence errors, the de-embedder will pass them. Be aware that audio-phase-alignment between multiple audio channels and audio groups can not be maintained if this setting is set to *Off*.

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

**AudioStatusBits**

With this setting you select whether the audio status bits should be Transparent (same status bit on the outputs as on the inputs) or to overwrite them with new status bits.

**Silence-Level**

Here you set the threshold of the audio level when an audio signal will be reported as silent. Can be set between -100dBFS and -20dBFS. Default is -60dBFS.

**Silence-Time**

Here you can set the threshold in time when an audio signal will be reported as silent. Can be set between 1 and 255 seconds. Default is 10 seconds.

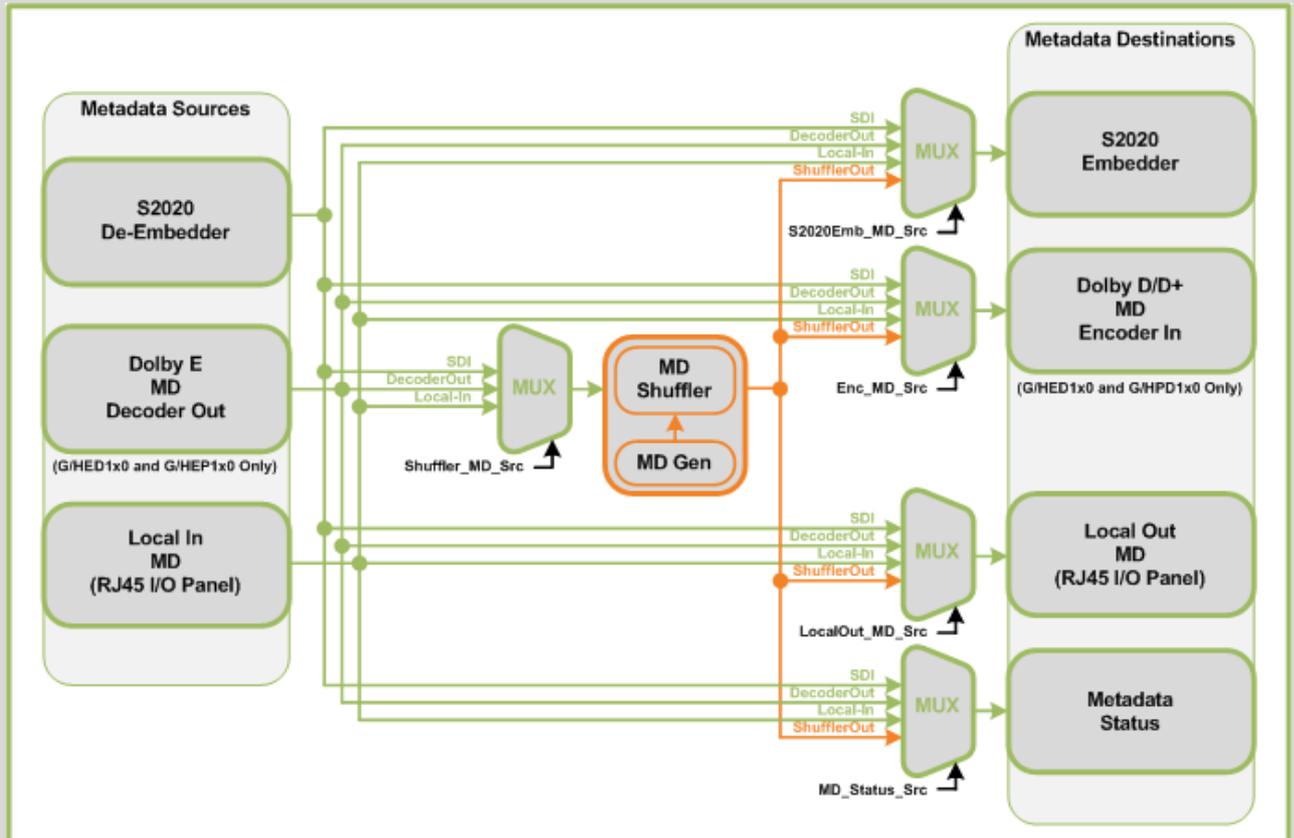
## S2020

<b>Extract_Line</b>	With this item you set a line between line 0 and line 1125 from where you want to extract the metadata from the input. By default set to line 0, which indicates Auto-Mode.
<b>Extract_Ass_Ch</b>	One attribute of the S2020 metadata is the association channel. The association channel is the channel to which the metadata is connected. You can select the S2020 metadata to be extracted from one of the possible associated channel pairs ranging from Ch01/02 to Ch15/16. Can also be set to None (in case there is no association set in the S2020 source or to Auto (in which case the S2020 is extracted from the first available associated channel).
<b>#S2020-Emb</b>	With this setting you decide whether you want to overwrite or to switch off metadata (S2020) inserting.
<b>#S2020Emb_MD_Src</b>	Here you set the metadata source of the S2020 embedder. Can be coming from the SDI input (SDI, default), from the Dolby E input (DecoderOut), from the I/O-panel RJ45 metadata input (Local), or from the card's internal metadata generator (ShufflerOut).
<b>Insert_Line</b>	With this setting you set a line to which the S2020 data should be inserted. Can be set between line 1 and line 1125. Default is line 9.
<b>Insert_Method</b>	There's 2 methods to insert S2020 (refer to the S2020 SMTPE document). Can be set to Method A or Method B. Default is B.
<b>Insert_Ass_Ch</b>	With this setting you select one of the 8 channel pairs (Ch1/2 till Ch15/16) to which the metadata should be associated. Can also be set to None (which is also a valid value of the metadata item).

## METADATA

For more information about Dolby Metadata, please read the metadata guide which you can find on the website of Dolby ([http://www.dolby.com/assets/pdf/tech\\_library/18\\_Metadata.Guide.pdf](http://www.dolby.com/assets/pdf/tech_library/18_Metadata.Guide.pdf))

The GED/HED100 has extensive metadata functionalities. The following schematics gives a visual overview on how the metadata is handled:



### #LocalOut\_MD\_Src

With this setting you decide which of the metadata sources you want to use as the metadata output on the I/O-panel in the above schematic. Can be the metadata from the SDI input (SDI, default), from the Dolby E input (DecoderOut), from the I/O-panel RJ45 metadata input (Local), or from the card's internal metadata generator (ShufflerOut).

### #Shuffler\_MD\_Src

With this setting you decide which of the metadata sources you want to use as input of the Metadata Generator/Metadata Shuffler block in the above schematic. You can select the SDI input, the Dolby decoder output (DecoderOut) or the Local metadata input. Default is SDI.

### MD-Control

With this setting you decide whether you want to manually change the Metadata presets, change MD presets via the GPI contacts or change it by metadata loss detection (see setting #MetaLoss). A combination of GPI contact overrides with metadata loss detection is also possible. GPI+LossDetect only works in non-latch mode. Default is manual.

## MD\_LossDetect

With this setting you can set a metadata source on which you want to perform metadata loss detection. Can be the metadata on the SDI input or the metadata on the local RJ45 input. Default is SDI. The actions taken when a metadata loss is detected by MD-LossDetect can be set with the settings MetaLoss and MetaDet.

## MetaLoss

With this setting you select to which metadata preset the card should switch in case the above metadata source is lost. Can be any metadata preset (MDPreset 1 ~ MDPreset 7). Can also be switched to off, in which case the preset will not be changed in case of a metadata loss (default).

## MetaDet

With this setting you select to which metadata preset the card should switch in case metadata is detected in the above selected source. Can be any metadata preset (MDPreset 1 ~ MDPreset 7).

Besides the 7 MDPresets, you can set it to S2020-SDID, ProgramConfig, Previous (previous active preset before the signal was lost) or off (don't switch presets when signal returns, default).

S2020-SDID switches the card to a predefined preset according to the value of the SDID:

- 00 (none) → MDPreset 8
- 01 (Ch01/02) → MDPreset 8
- 02 (Ch03/04) → MDPreset 9
- 03 (Ch05/06) → MDPreset 10
- 04 (Ch07/08) → MDPreset 11
- 05 (Ch09/10) → MDPreset 12
- 06 (Ch11/12) → MDPreset 13
- 07 (Ch13/14) → MDPreset 14
- 08 (Ch15/16) → MDPreset 14

ProgramConfig switches the card to a predefined preset according to the value of the metadata program configuration:

- 7.1 → MDPreset 8
- 5.1+2 → MDPreset 9
- 5.1 → MDPreset 10
- 4x2 → MDPreset 11
- 3x2 → MDPreset 12
- 2+2 → MDPreset 13
- Other → MDPreset 14

## MD-LossDetect\_2

You can set a second metadata loss detection on a different metadata input with this settings. It works the same as MD-LossDetect only the actions performed are defined with MetaLoss\_2 and MetaDet\_2. Default is Off.

## MetaLoss\_2

Same as MetaLoss, only for the source set with MD-LossDetect\_2.

<b>MetaDet_2</b>	Same as MetaDet, only for the source set with MD-LossDetect_2.
<b>Metadata_Preset</b>	Here you select which Metadata preset you want to activate. Editing the preset will be live.
<b>#MD_Preset_Name</b>	To ease remembering which preset is used for what cases, you can name your active preset with this setting (maximum of 16 characters).
<b>#ProgramConfig</b>	<p>This item sets the program configuration. Can be one of the following values:</p> <ul style="list-style-type: none"><li>■ 7.1</li><li>■ 5.1+2</li><li>■ 5.1</li><li>■ 4x2</li><li>■ 3x2</li><li>■ 2+2</li><li>■ Ext_Meta (use value as set in metadata source)</li></ul>
<b>#Frame_Rate</b>	With this you can set the metadata 'framerate' value. Can be 23.98, 24, 25, 29.97, 30, auto or set to use the setting in the external metadata input (Ext_meta).
<b>#MD_Prog_1</b>	Since a bitstream can contain up to 4 separate audio streams (for instance: when the program config is 4x2) you can have 4 separate metadata sets. With MD_Prog_1 you select which metadata set should be used for the first audio program. Can be any set from A to H. You can also choose to use the program as set in the metadata source (Ext_Meta), in which case the entire program is kept and no preset is used. Default is set A.
<b>#MD_Prog_2</b>	With MD_Prog_2 you select which metadata set should be used for the second audio program (if there is any). Can be any set from A to H. You can also choose to use the program as set in the metadata source (Ext_Meta), in which case the entire program is kept and no preset is used. Default is set B.
<b>#MD_Prog_3</b>	With MD_Prog_3 you select which metadata set should be used for the third audio program (if there is any). Can be any set from A to H. You can also choose to use the program as set in the metadata source (Ext_Meta), in which case the entire program is kept and no preset is used. Default is set C.

**#MD\_Prog\_4** With MD\_Prog\_4 you select which metadata set should be used for the fourth audio program (if there is any). Can be any set from A to H. You can also choose to use the program as set in the metadata source (Ext\_Meta), in which case the entire program is kept and no preset is used. Default is set D.

## METADATA PROG

**MD\_Prog\_set** With this item you can select which metadata set you want to adjust parameter setting of. Possible are A till H. Default is set to parameter set A. All following items preceded with ‘#’ are slaves of this set. Unless this setting is set to a currently in use metadata set, changing metadata settings will not have a direct effect on the output.

**#MD\_Prog\_Type** This metadata item describes the type of content inside the assigned audio program. Can be 1ch, 2ch, 4ch or 5.1ch. This is only used as a mnemonic.

**#ProgramText\_src** Source of the Program Text. Can be either user defined (Int\_Meta) or as set in the metadata source (Ext\_Meta).

**#ProgramText** Program Text. If #ProgramText\_src is set to Int\_Meta this value can be set by the user. If #ProgramText\_src is set to Ext\_Meta the value for this option is taken from the metadata source.

**#AC3Datarate** The data rate that should be used to encode the AC-3 bitstream. You can also choose to use the metadata settings in the external program (Ext\_meta, also default).

**#Bitstrm** Bitstream describes the audio service contained within the Dolby Digital. A complete audio program may consist of a main audio service (a complete mix of all program audio), an associated audio service comprising a complete mix, or one main service combined with an associated service. To form a complete audio program, it may be (but rarely is) necessary to decode both main service and an associated service using a maximum total bit rate of 512 kbps, Refer to the guide to use of the ATSC digital television standard, documentA/54 for further information. Although a detailed descriptions follows.

Bitsteam	Description
Complete	CM flags the bitstream as the Main Audio service for the program and all elements are present to form a complete audio program. Currently, this is the most common setting. The service may contain one (mono) to six (5.1) channels.

M&E	The bitstream is the main audio service for the program, minus a dialogue channel. The dialogue channel, if any, is intended to be carried by an associated dialogue service. Different dialogue services can be associated with a single ME service to support multiple channels.
Visual	This is typically a single channel program intended to provide a narrative description of the picture content to be decoded along with the main audio service. The visual service may also be a complete mix of all program channels, comprising up to six channels.
Hearing	This is typically a single channel program intended to convey audio that has been processed for increased intelligibility and decode along with the main audio service. The Hearing service may also be a complete mix of all program channels
Dialogue	This is typically a single program intended to provide a dialogue channel for a Main service. If the main service contains more than two channels, the dialogue is limited to only one channel. If the ME service is two channels, the Dialogue can be a stereo pair: the appreciate channels of each service are mixed tighter ( requires special decoders)
Commentary	This is typically a single channel program intended to convey additional commentary that can be optionally decoded along with the main audio service. This service differs from dialogue services because it contains an optional, rather than required, dialogue channel. The service may also be complete mix of all program channels, comprising up to six channels.
Emergency	This is a single channel service that is given priority in reproduction. When the E-service appears in the bitstream, it is given priority in the decoder and the main service is muted.
VO_Karaoke	This is a single channel service intended to be decoded and mixed to the center channel ( requires special decoders).
Ext_meta	Use the Bitstream metadata settings from an external program.

### #Ch\_Mode

This parameter instructs the encoder as to which inputs to use for this particular program: it tells the decoder what channels are present in this program so the decoder can deliver the audio to the correct speakers.

The setting is described as X/Y, where X is the number of front channels (left, Center, Right) and Y the number of rear (surround) channels.

Channel mode setting	Description
1/0 ( C )	Centre
2/0 (LR)	Left, Right

3/0 (LCR)	Left, Centre, Right
2/1 (LRS)	Left Right Surround
3/1 (LCRS)	Left Center Right Surround
2/2 (LRS1Sr)	Left Right Surround_Left Surround_right
3/2 (LCRS1Sr)	Left Center Right Surround_Left Surround_right
Ext_meta	Use the Channel mode metadata setting of the external program (Ext_meta).

### #CenterMixLvl

Center downmix Level. When the encoded audio has three front channels (L, C, R), but the consumer has only two front speakers (left and right), this parameter indicates the nominal downmix level for the Center channel with respect to the Left and Right channels. Dolby Digital decoders use this parameter during downmixing in Lo/Ro mode when extended BSI parameters are not active. 0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB are the possible settings. You can also choose to use the metadata settings in the external program (Ext\_meta, also default).

### #SrndMixLvl

Surround downmix level. When the encoded audio has one or more Surround channels, but the consumer does not have surround speakers, this parameter indicates the nominal downmix level for the Surround channel(s) with respect to the Left and Right front channels. Dolby Digital decoders use this parameter during downmixing in Lo/Ro mode when extended BSI parameters are not active.. 0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB are the possible settings. You can also choose to use the metadata settings in the external program (Ext\_meta, also default).

### #D\_Srnd

Dolby Surround. Determines when a Dolby Digital decoding product also contains a Dolby Pro Logic decoder, whether the two-channel encoded bistream contains a Dolby Surround (Lt/Rt) program that requires Pro Logic decoding. Decoders can use this flag to automatically switch on Pro-logic decoding as required.

- Not indic, Not Indicated
- Not Srnd, Not Dolby surround; the bitstream contains information that was not Dolby Surround encoded.
- Dolby Srnd, Dolby Surround; the bitstream contains information that was Dolby Surround encoded. After Dolby Digital decoding, the bitstream is pro logic decoded.

You can also choose to use the metadata settings in the external program (Ext\_meta). Default is Ext\_meta.

<p><b>#LFE</b></p>	<p>The status of the LFE Channel parameter indicates to a Dolby Digital encoder whether an LFE Channel is present within the bitstream. Channel mode determines whether the LFE Channel parameter can be set. You must have at least three channels in order to be able to add an LFE channel. Can be either <code>enable</code> or <code>disable</code>. You can also choose to use the metadata settings in the external program (<code>Ext_meta</code>).</p> <p>Default setting is <code>enable</code>.</p>
<p><b>#Dialogue_Src</b></p>	<p>Source of the Dialogue Level. Can be either user defined (<code>Int_Meta</code>) or as set in the metadata source (<code>Ext_Meta</code>).</p>
<p><b>#Dialogue_Lev</b></p>	<p><code>Dialogue_level</code> sets the average loudness of a dialogue in a presentation. The range is from <code>-31dB</code> to <code>-1dB</code>. This item will only influence the output if <code>#Dialogue_src</code> is set to <code>Int_Meta</code>. The default setting is <code>-27dB</code>.</p>
<p><b>#Language_Src</b></p>	<p>Source of the Language Code. Can be either user defined (<code>Int_Meta</code>) or as set in the metadata source (<code>Ext_Meta</code>).</p>
<p><b>#LanguageCode</b></p>	<p>Indicates the language of the audio service. This item will only influence the output if <code>#Language_src</code> is set to <code>Int_Meta</code>. Language codes can be found in <b>SMPTE RDD 6-2008</b> “<i>Description and Guide to the Use of the Dolby E Audio Metadata Serial Bitstream</i>”</p> <p><b>NOTE:</b> The ATSC Standard A52/B, Digital Audio Compression Standard (AC-3, E-AC-3), Revision B, 14 June 2005 no longer uses the language code parameter to indicate the program language. For ATSC DTV applications, the language code shall be set to “0” (not applicable)</p>
<p><b>#AudioProdInfo</b></p>	<p>This items lets you select wheter or not you want to use the production mixing level parameter or not. Choices are between <code>Enabled</code> or <code>Disabled</code>. Default is <code>Disabled</code>.</p>
<p><b>#ProdMixLvl_Src</b></p>	<p>Source of the production mixing level parameter. Can be either user defined (<code>Int_Meta</code>) or as set in the metadata source (<code>Ext_Meta</code>).</p>

<b>#ProdMixLvl</b>	The audio production mixing level parameter describes the peak sound pressure level (SPL) used during the final mixing session at the studio or on the dubbing stage. The parameter allows an amplifier to set its volume control such that the SPL in the replay environment matches that of the mixing room. This control operates in addition to the dialogue level control, and is best thought of as the final volume setting on the consumer's equipment. This value can be determined by measuring the SPL of pink noise at studio reference level and then adding the amount of digital headroom above that level. For example, if 85 dB equates to a reference level of -20 dBFS; the mixing level is 85 + 20, or 105 dB. Can be set to any value between 80 and 111 dB. This item will only influence the output if #Prod_Mix_LvlSrc is set to Int_Meta. The default setting is 0 .
<b>#ProdRoomType</b>	The Room Type parameter describes the equalization used during the final mixing session at the studio or on the dubbing stage. A Large room is a dubbing stage with the industry standard X-curve equalization; a Small room has flat equalization. This parameter allows an amplifier to be set to the same equalization as that heard in the final mixing environment. Can also be set to Not Indicated or set to use the metadata settings in the external program (Ext_meta).
<b>#AC3Copyright</b>	AC3 copyright bit. Here you set the copyright bit to either Yes or No. You can also choose to use the metadata settings in the external program (Ext_meta).
<b>#AC3OrigBitstr</b>	AC3 original bitstream. Here you set whether the incoming signal is of the original master bitrate (yes) or if it has been converted before (no). You can also choose to use the metadata settings in the external program (Ext_meta).
<b>#Pref_Dwnmx</b>	Preferred Down mix. This parameter allows the user to select either Lt/Rt or the Lo/Ro downmix in a consumer decoder that has stereo outputs. Consumer receivers are able to override this selection, but this parameter provides the opportunity for a 5.1 channel soundtrack to play in Lo/Ro mode without user intervention. This is especially useful on music material. NOT indicated, Lt/Rt and Lo/Ro are the possible mix types. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#Lt/Rt_C_dwnmx</b>	Lt/Rt Center Mix Level. This setting indicates the level shift applied to the center channel when adding to the left and right outputs when downmixing to an Lt/rt output. Its operation is similar to the surround downmix level in the Universal metadata. 0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.

<b>#Lt/Rt_S_dwnmx</b>	LtRt Surround Mix level. This setting indicates the level shift applied to the surround channels when downmixing to an Lt/Rt output. Its operation is similar to the surround downmix level in the universal metadata. -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#Lo/Ro_C_dwnmx</b>	Lo/Ro Center mix level. This setting indicates the level shift applied to the center channel when adding to the left and right outputs when downmixing to a Lo/Ro output. When Extended BSI parameters are active, this parameter is used and the Center Mix Level parameter in the universal parameters is not.+3dB, +1.5dB, 0dB, -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB. You can also choose to use the metadata settings in the external program (Ext_meta). Default is -3dB.
<b>#Lo/Ro_S_dwnmx</b>	Lo/Ro Surround Mix level. This setting indicates the level shift applied to the surround channels when downmixing to a Lo/Ro output. When extended BSI parameters are active, this parameter is used, and the surround mix level parameter in the universal parameters is not. -1.5dB, -3.0dB, -4.5dB, -6.0dB and -999dB. You can also choose to use the metadata settings in the external program (Ext_meta). Default is -3dB.
<b>#Dolby_Srnd_EX</b>	Surround EX. This setting is used to identify the encoded audio as surround EX encoded material. This parameter is only used if the encoded audio has two surround channels. An amplifier or receiver with Dolby Digital EX decoding can use this parameter as a flag to switch the decoding on or off automatically. The behavior is similar to the Dolby Surround Mode parameter. Not Indic., NotDolbySrnd, DolbySrnd. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#D_HeadPhone</b>	This metadata item indicates whether or not the program has been Dolby Headphone-encoded. This information is not used by the Dolby decoder, but may be used by other portions of the audio reproduction equipment. Can be set to Not Indicated, Headph (meaning: audio is Dolby Headphone encoded) or Not_Headph (meaning: audio is not Dolby Headphone encoded). You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#ADConvType</b>	This parameter allows audio that has passed through a particular A/D conversion stage to be marked as such, so that a decoder may apply the complementary D/A process. Can be set to Standard or HDCD. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.

<b>#DC_filter</b>	DC filter. This setting determines whether a DC blocking 3Hz highpass filter is applied to the main inputs channels of a Dolby Digital encoder prior encoding. This parameter is not carried to the consumer decoder. It is used to remove DC offsets in the program audio and would only be switched off in exceptional circumstances. On this function is active, OFF this function is not active. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#Lowpass_Filter</b>	Lowpass Filter. This setting determines whether a lowpass filter is applied to the main input channels of a Dolby Digital encoder to encode. This filter removes high frequent signals that are not encoded. At the suitable data rates this filter operates above 20 kHz. In all cases it prevents aliasing on decoding and is normally switched on. This parameter is not passed to the consumer decoder. On this function is active, OFF this function is not active. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#LFE_Filter</b>	LFE lowpass filter. This setting determines whether a 120Hz 8 order lowpass filter is applied to the LFEE channel input of a Dolby Digital encoder prior to encoding. It is ignored if the LFE channel is disabled. This parameter is not sent to the consumer decoder. The filter removes frequencies above 120Hz that would aliasing when decoded. This filter should only be switched off if the audio to be encoded is known to have no signal above 120 Hz. On this function is active, OFF this function is not active. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.
<b>#Srnd_Ph_Shift</b>	Surround Phase Shift. This setting takes care that the Dolby Digital encoder applies a 90-degree phase shift to the surround channels. This allows a Dolby Digital decoder create an Lt/Rt downmix simply. For most material the phase shift has a minimal impact when the Dolby Digital program 1 decoded to 5.1 channels, but provides an Lt/Rt output that can be Prologic decoded to L, C, R ,S if desired. However, for some phase-critical material (such as music) this phase shift is audible when listening in 5,1 channels. Likewise some material downmixes to a satisfactory Lt/Rt signal without needing this phase shift. It is therefore important to balance the needs of the 5.1 mix and the Lt/Rt downmix for each program. On this function is active, OFF this function is not active. You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.

### #Srnd\_3dB\_Atten

Surround 3dB attenuation. This setting determines whether the surround channels are attenuated 3 dB before encoding. The attenuation actually takes place inside the Dolby Digital encoder. It balances the signals levels between theatrical mixing rooms (dubbing stages) and consumer mixing rooms (dvd or tv studios) Consumer mixing rooms are calibrated so that all five main channels are at the same sound pressure level (SPL). For compatibility reasons with older film formats, theatrical mixing rooms calibrate the surround channels 3dB lower in SPL than the front channels. The consequence is that signal levels on tape are 3dB louder. Therefore, to convert to a consumer mix from theatrical calibration it is necessary to reduce the surround levels by 3dB. On = this function is active, OFF = this function is not active. You can also choose to use the metadata settings in the external program (Ext\_meta). Default is Ext\_meta.

### #RfMode

RfMode has the same options as Line, but each option is 11 dB more sensitive to avoid overloading the RF input of a television. None, Film stnd, Film light, Music stnd, Music light and speech. You can also choose to use the metadata settings in the external program (Ext\_meta). Default is Ext\_meta.

### #Line

Line sets the Dynamic range metadata of presets.

- NONE, no dynamic range compression is applied unless downmixing could cause overload, in which case protection dynamic range is automatically applied.
- Film stnd, Applies more compression to a subjectively loud film that requires dynamic range restriction.
- Film Light, Applies light compression to a subjectively quiet film that does not require dynamic range restriction.
- Music Stnd, Applies more compression to music that is not compressed and requires dynamic range restriction.
- Music light, Applies light compression to music that is already compressed and does not require excessive dynamic range restriction.
- Speech, Appropriate for programs with predominantly dialogue.

You can also choose to use the metadata settings in the external program (Ext\_meta). Default is Ext\_meta.

### MD\_Status\_Src

In the status menu the status of all the metadata parameters of one metadata set can be monitored. With this setting you select which metadata set you want to monitor. Can be the ShufflerOut, DecoderOut, Local or SDI. Refer to schematic in the Metadata header of the metadata settings for a visual explanation. Can also be switched to off, in which case there will be no status monitoring of metadata (default).

### MD\_Status\_Pgm

With this item you select which program out of the above selected metadata set you want to monitor. Can be 1 till 8. Default is 1.

**RestartCAT561**

With this setting you can reset the Dolby board (CAT561) without resetting the Synapse board. When switched to `reset` the setting will automatically go back to `No` Reset after the CAT board is restarted.

## 6 Status Menu

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

<b>Ref-Format</b>	<p>Displays the reference format. Can be one of the following:</p> <ul style="list-style-type: none"> <li>■ NA</li> <li>■ NTSC/480i</li> <li>■ PAL/576i</li> <li>■ 480p</li> <li>■ 576p</li> <li>■ 720p</li> <li>■ 1080i</li> <li>■ 1080p</li> </ul>
<b>Phaser1_H_Pos</b>	<p>This item shows the distance of SDI-Input1 to REF timing (write-read timing) of the autophaser. It is directly related to a correct function of the autophaser. When the SDI-Input1 to REF-timing is close, the function of the autophaser gets critical. The setting Phaser1-Offset can be used to tune the Phaser1_H_Pos.</p> <p>When Phaser-Status setting is set to Off, or when Lock Mode is set to SDI1, SDI2 or Auto-SDI, or when Lock-Mode is set to Ref1 or Ref2 and status-item Ref-Format shows NA, then Phaser1_H_Pos will show: 0px.</p>
<b>Phaser2_H_Pos</b>	<p>This item shows the distance of SDI-Input2 to REF timing (write-read timing) of the autophaser. It is directly related to a correct function of the autophaser. When the SDI-Input2 to REF-timing is close, the function of the autophaser gets critical. The setting Phaser2-Offset can be used to tune the Phaser2_H_Pos.</p> <p>When Phaser-Status setting is set to Off, or when Lock Mode is set to SDI1, SDI2 or Auto-SDI, or when Lock-Mode is set to Ref1 or Ref2 and status-item Ref-Format shows NA, then Phaser2_H_Pos will show: 0px.</p>
<b>Phaser1_Stat</b>	<p>This item shows the status of the autophaser. It uses the value shown in Phaser1_H_Pos to calculate 3 working regions for the autophaser: Safe, Warning and Critical.</p> <p>Safe: Phaser1_H_Pos shows a value &gt; 50px  Warning: Phaser1_H_Pos shows a value &gt; 20px and &lt; 50px  Critical: Phaser1_H_Pos shows a value &lt; 20px</p> <p>When Phaser-Status setting is set to Off, or when Lock Mode is set to SDI1, SDI2 or Auto-SDI, or when Lock-Mode is set to Ref1 or Ref2 and status-item Ref-Format shows NA, then Phaser1_Stat will show: NA.</p>

<b>Phaser2_Stat</b>	<p>This item shows the status of the autophaser. It uses the value shown in <code>Phaser2_H_Pos</code> to calculate 3 working regions for the autophaser: Safe, Warning and Critical.</p> <p>Safe: <code>Phaser2_H_Pos</code> shows a value &gt; 50px  Warning: <code>Phaser2_H_Pos</code> shows a value &gt; 20px and &lt; 50px  Critical: <code>Phaser2_H_Pos</code> shows a value &lt; 20px</p> <p>When <code>Phaser-Status</code> setting is set to Off, or when <code>Lock Mode</code> is set to SDI1, SDI2 or Auto-SDI, or when <code>Lock-Mode</code> is set to Ref1 or Ref2 and status-item <code>Ref-Format</code> shows NA, then <code>Phaser2_Stat</code> will show: NA.</p>
<b>SDI1-Ref_Offset</b>	<p>This item indicates the offset between SDI1 and the reference (if present).</p>
<b>SDI2-Ref_Offset</b>	<p>This item indicates the offset between SDI2 and the reference (if present).</p>
<b>Locked-To</b>	<p>Displays to what the card is locked: SDI1, SDI2, or Not Locked.</p>
<b>Active-Out1</b>	<p>Displays what the current active output is on SDI output 1. Can be SDI1 or SDI2</p>
<b>Active-Out2</b>	<p>Displays what the current active output is on SDI output 2. Can be SDI1 or SDI2</p>
<b>IO-Delay_1</b>	<p>Displays the I/O delay between the input and the output. Only indicated when <code>Delay-Status</code> is set to on.</p>
<b>GPI</b>	<p>Displays the currently active GPI value (1 to 7). 0 indicates there's no GPI input active.</p>
<b>ATC_Stat</b>	<p>Detects a present ATC timecode signal. When no ATC signal is detected, NA is indicated. When a invalid ATC signal is detected, this item indicates Error.</p>
<b>ANC_Stat</b>	<p>Shows the status of the ancillary data. Can be NA, OK or error.</p>

<b>GrpInUse</b>	Displays which groups are in use on the active input. Displayed as for instance 1_3_ when groups 1 and 3 contain audio and for instance _234 when groups 2, 3 and 4 contain audio.
<b>Enc1Latency ~ Enc4Latency</b>	With these status items you can monitor the latency of each individual encoder (displayed in milliseconds).
<b>EmbFrmtIn01/02 ~ EmbFrmtIn15/16</b>	Displays the format of the corresponding embedder input channels (source dependant from #SourceEmb setting). Same formats can be detected as displayed under DecInFrmt01/02.
<b>EmbSOF-EIn01/02 ~ EmbSOF-EIn15/16</b>	These items display in which line the first package of non PCM audio and data in the corresponding audio pair is detected.
<b>AddOnFrmtIn01/02 ~ AddOnFrmtIn31/32</b>	Displays the format of the corresponding addon input channels. Same formats can be detected as displayed under DecInFrmt01/02.
<b>EmbStatOutA1 ~ EmbStatOutD4</b>	Display the status of each individual embedder output channels. Can be OK, NA or Clipped (meaning the audio is clipping).
<b>EmbFrmtOutA1/2 ~ EmbFrmtOutD3/4</b>	Indicates the format of the outputs of the embedders. Can indicate the Same formats as displayed under DecInFrmt01/02.
<b>SDIS2020Stat</b>	This item indicates the status of the SDI S2020 metadata input. Can be OK, error or NA.
<b>S2020-Src_Method</b>	This status indicates the S2020 Mapping Method as present on the current SDI S2020 source. Can be NA (not available), Method A or Method B.
<b>S2020-Src_Ass_Ch</b>	Shows the S2020 SDID association channel. Can be None, NA (not available) or Ch01/02 ~ Ch15/16.

<b>SDIS2020Prog</b>	<p>This status indicates the program config as present on the current SDI S2020 source. Can be one of the following values:</p> <ul style="list-style-type: none"> <li>■ 5.1+2</li> <li>■ 5.1+1+1</li> <li>■ 4+4</li> <li>■ 4x2</li> <li>■ 8x1</li> <li>■ 5.1</li> <li>■ 3x2</li> <li>■ 6x1</li> <li>■ 2+2</li> <li>■ 7.1</li> <li>■ Other</li> <li>■ NA</li> </ul>
<b>LocMetaStat</b>	<p>This item indicates the status of the local metadata input (RJ45 backplane). Can be OK, error or NA.</p>
<b>LocMetaProg</b>	<p>Indicates the program config as present in the local metadata input. Refer to the SDIS2020Prog item for the list of possible values.</p>

The source of the following status items (preceded with ‘MD’ prefix) is dependent on the MD\_Status\_Src and MD\_Status\_pgm settings.

<b>MD_ProgramConfig</b>	<p>This status indicates the program config as present on the metadata preset selected with MetaDet. Can be one of the values listed under SDI1S2020Prog.</p>
<b>MD FrameRate</b>	<p>Indicates the value of the frame rate metadata parameter.</p>
<b>MD ProgramText</b>	<p>Displays the program’s text field (set with #Program_txt).</p>
<b>MD AC3Datarate</b>	<p>Indicates the value of the AC3 bitrate metadata parameter.</p>
<b>MD Bitstream</b>	<p>Indicates the value of the bitstream mode metadata parameter.</p>
<b>MD ChannelMode</b>	<p>Indicates the value of the channel mode metadata parameter.</p>
<b>MD CenterMixLvl</b>	<p>Indicates the value of the Center downmix level metadata parameter.</p>
<b>MD SrndMixLvl</b>	<p>Indicates the value of the surround downmix level metadata parameter.</p>
<b>MD D_Surnd</b>	<p>Indicates the value of the Dolby surround metadata parameter.</p>

<b>MD LFE</b>	Indicates the value of the LFE channel metadata parameter.
<b>MD Dialog Lvl</b>	Indicates the value of the dialogue level metadata parameter.
<b>MD LanguageCode</b>	Indicates the value of the language code metadata parameter.
<b>MD AudioProdInfo</b>	Indicates the value of the audio production info metadata parameter.
<b>MD ProdMixLvl</b>	Indicates the value of the audio production mix level metadata parameter.
<b>MD ProdRoomType</b>	Indicates the value of the audio production room type metadata parameter.
<b>MD AC3Copyright</b>	Indicates the value of the AC3 copyright metadata parameter.
<b>MD AC3OrigBitstr</b>	Indicates the value of the AC3 original bitstream metadata parameter.
<b>MD Pref. Dwnmx</b>	Indicates the value of the preferred downmix metadata parameter.
<b>MD Lt/RtCDwnmx</b>	Indicates the value of the Lt/Rt center downmix metadata parameter.
<b>MD Lt/RtSDwnmx</b>	Indicates the value of the Lt/Rt surround downmix metadata parameter.
<b>MD Lo/RoCDwnmx</b>	Indicates the value of the Lo/Ro center downmix metadata parameter.
<b>MD Lo/RoSDwnmx</b>	Indicates the value of the Lo/Ro surround downmix metadata parameter.
<b>MD D_Srnd Ex</b>	Indicates the value of the Dolby surround EX metadata parameter.
<b>MD D_HeadPhone</b>	Indicates the value of the Dolby headphone metadata parameter.
<b>MD ADConvType</b>	Indicates the value of the A/D conversion type metadata parameter.
<b>MD DC Filter</b>	Indicates the value of the DC filter metadata parameter.



<b>MD Lowpass Fil</b>	Indicates the value of the Low pass filter metadata parameter.
<b>MD LFE Filter</b>	Indicates the value of the LFE filter metadata parameter.
<b>MD Sur PhShift</b>	Indicates the value of the surround phase shift metadata.
<b>MD Sur3d Att</b>	Indicates the value of the surround 3dB attenuate metadata.
<b>MD RFPreEmph</b>	Indicates the value of the RF pre emphasis metadata parameter.
<b>MD RF Mode</b>	Indicates the value of the RF mode metadata parameter.
<b>MD Line Mode</b>	Indicates the value of the line mode metadata parameter.
<b>FPGA-Stat</b>	Displays the status of the FPGA chip. Can be error or OK.
<b>DM-D_Type</b>	Displays which type of input or output board is currently detected on circuit D. Can be CAT561 Dec, CAT561 Enc or CAT561 EPD. For the GED/HED100 this should always be the CAT561 EPD.
<b>DM-D_Status</b>	Indicates the status of I/O board A, can be OK, NA or Error.

## 7 Events Menu

<b>Introduction</b>	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.
<b>What is the Goal of an event?</b>	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.
<b>Events</b>	The events reported by the card are as follows;
<b>Announcements</b>	Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on
<b>Input_A</b>	Input_A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Input_B</b>	Input_B can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>CRC-Status1</b>	CRC-status1 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>CRC-Status2</b>	CRC-status2 can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Ref-Status</b>	Reference can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Lock-Status</b>	Lock status can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>DolbyLoss-Status</b>	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<sub>hex</sub>) (e.g. 129 (81<sub>hex</sub>) for Return of Input).

**Defining Tags**

The tags defined for the card are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcement of report and control values
Input_A	01 <sub>hex</sub> =INPA_LOSS	81 <sub>hex</sub> =INPA_RETURN	input A lost or returned
Input_B	12 <sub>hex</sub> =INPB_LOSS	92 <sub>hex</sub> = INPB_RETURN	input B lost or returned
CRC-Status1	03 <sub>hex</sub> =CRC1_ERROR	83 <sub>hex</sub> =CRC1_OK	CRC1 error or OK
CRC-Status2	43 <sub>hex</sub> =CRC2_ERROR	c3 <sub>hex</sub> =CRC2_OK	CRC2 error or OK
Ref-Stats	02 <sub>hex</sub> =REF_LOSS	82 <sub>hex</sub> =REF_RETURN	Reference lost or returned
Lock-Status	11 <sub>hex</sub> =INP_NO_LOCK	91 <sub>hex</sub> =INP_LOCK	Input not locked or input locked
DolbyLoss-Status	05 <sub>hex</sub> =DOLBY_LOSS	85 <sub>hex</sub> =DOLBY_RETURN	Dolby 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.

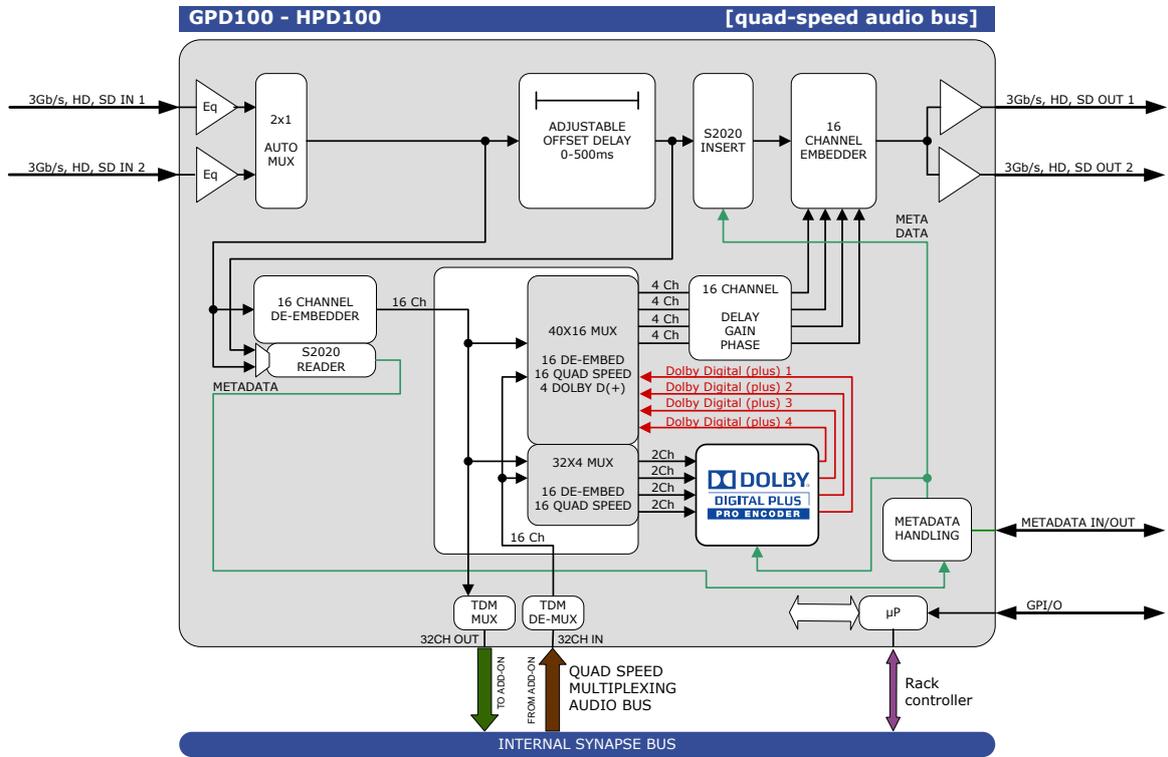
**The Address**

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

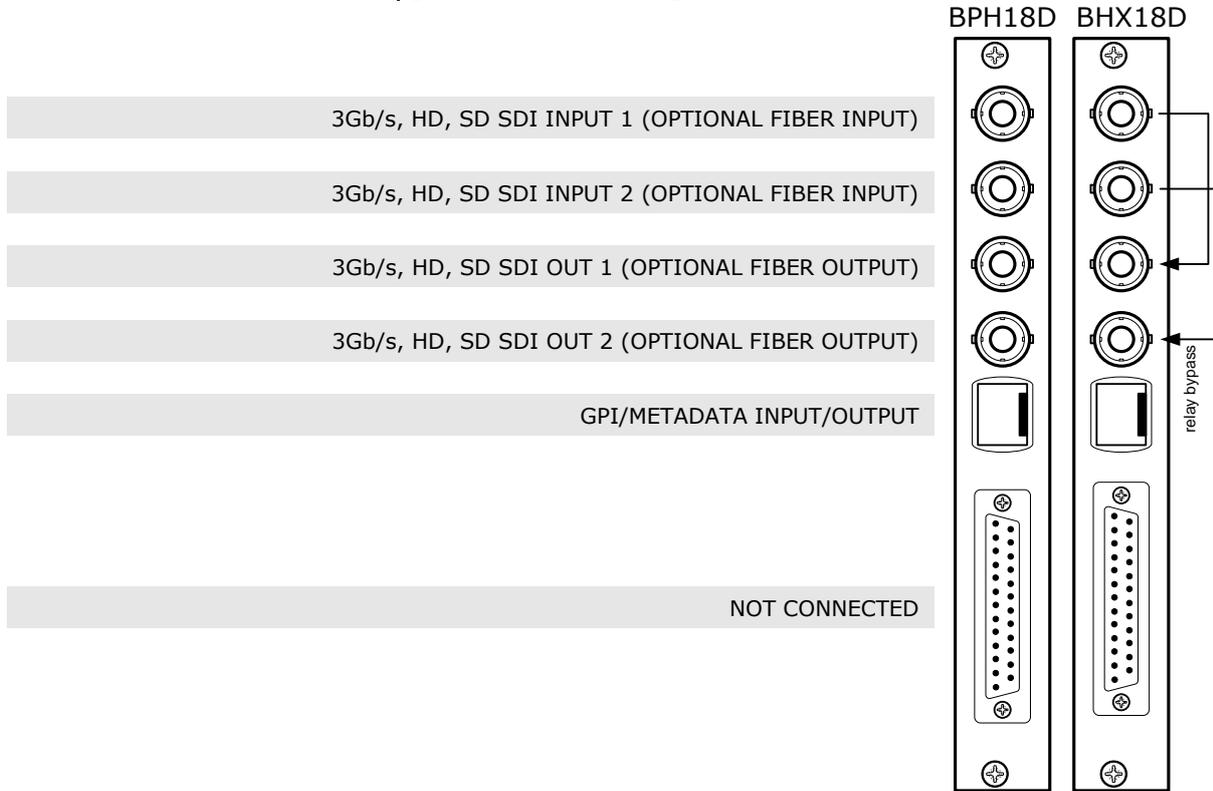
<b>Error LED</b>	The error LED indicates an error if the internal logic of the GPD/HPD130card is not configured correctly or has a hardware failure.
<b>Input_1 LED</b>	This LED indicated the presence of a valid SDI video signal on input 1.
<b>Input_2 LED</b>	This LED indicated the presence of a valid SDI video signal on input 2.
<b>ANC Data_1 LED</b>	Indicates the presence of embedded audio within input 1.
<b>ANC Data_2 LED</b>	Indicates the presence of embedded audio within input 2.
<b>Reference LED</b>	Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).
<b>Data Error_1 LED</b>	This LED indicates a CRC error on input 1.
<b>Data Error_2 LED</b>	This LED indicates a CRC error on input 2.
<b>Connection LED</b>	This LED illuminates after the card has initialized. The LED lights for 0.5 seconds every time a connection is made to the card.
<b>Error LED</b>	The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.
<b>DM_1 Pres</b>	Indicates if an I/O board is detected on position 1
<b>DM_2 Pres</b>	Indicates if an I/O board is detected on position 2
<b>DM_1 Error</b>	Indicates if there is an error on I/O board 1
<b>DM_2 Error</b>	Indicates if there is an error on I/O board 2

# 9 Block Schematic



## 10 Connector Panels

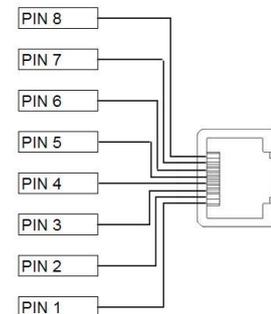
The GPD/HPD130 can be used with the BPH18, the BHX18D or the bypass relay equivalents. The following table displays the pinout of these backpanels in combination with the card.



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

### GPI pinning

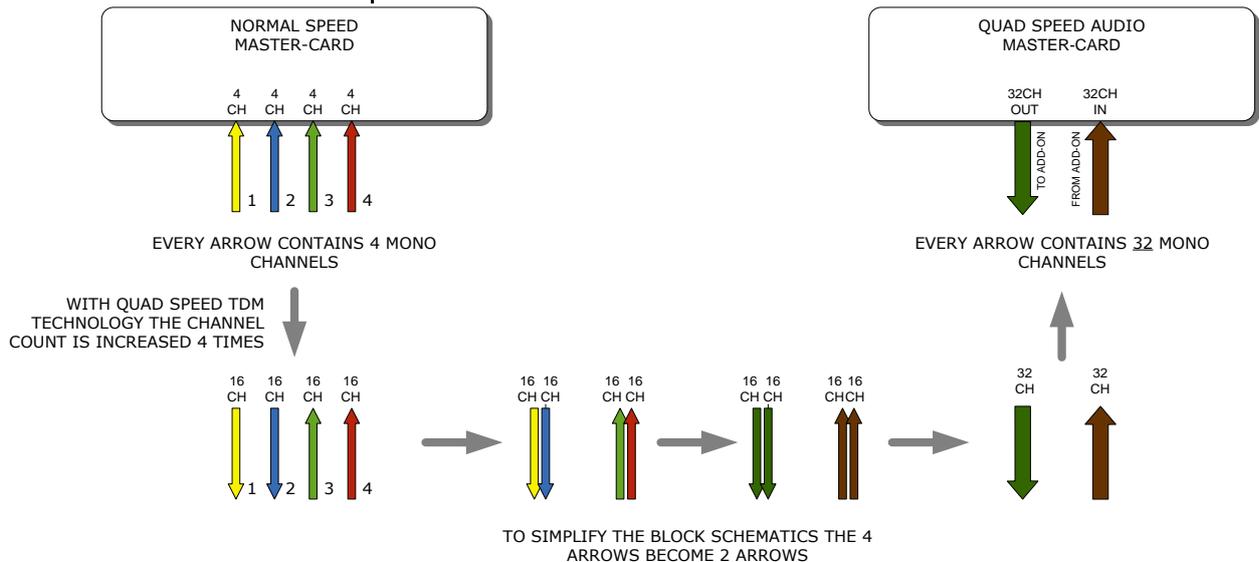
Pin	Function
1	Ground
2	GPI 1
3	GPI 2
4	GPI 3
5	TXA asynchronous data out + / GPI 4
6	TXB asynchronous data out - / GPI 5
7	RXA asynchronous data in + / GPI 6
8	RXB asynchronous data in - / GPI 7



## Appendix 1: Quad speed bus explained

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

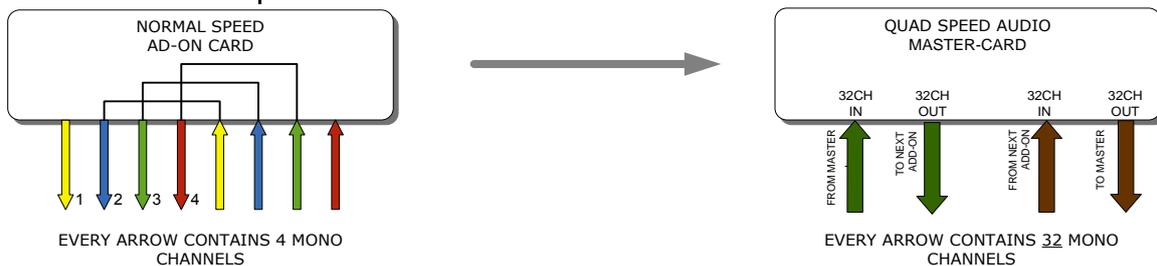
Some MASTER-CARD's will have two modes and some MASTER-CARD's will only have the Quad Speed mode [where the logical ADD-ON cards are only available in Quad Speed mode]:

***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:

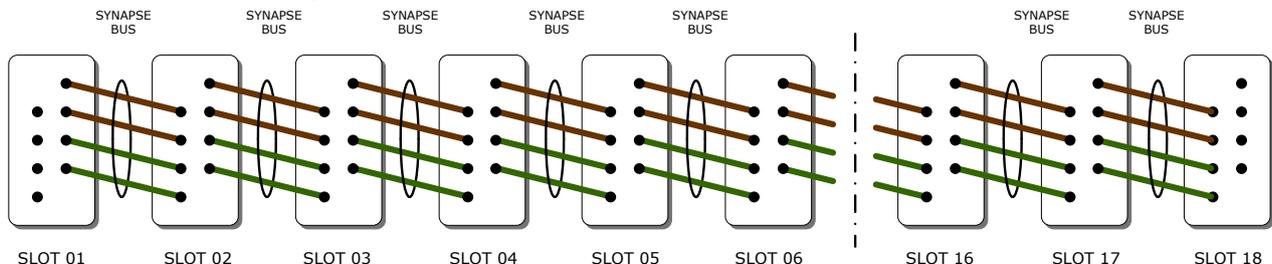
- Up to 32 channels output from the master card with looping to up to 3 ADD-ON cards
  - The ADD-ON card just picks the channels it wants to process
  - Some ADD-ON cards will have the possibility to re-inject processed audio onto the next ADD-ON card
- Up to 32 channels input on the master card
  - 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.

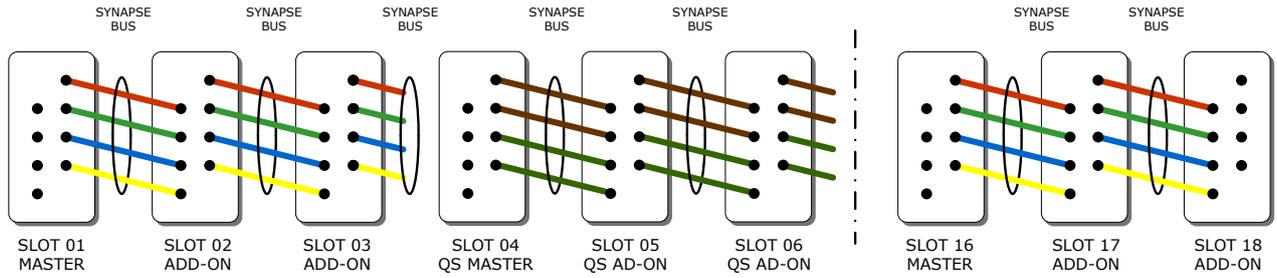
Cascading of Quad Speed cards works identical to normal add-on cards. Every connection in the example below transports 16 mono audio channels (= 32 channels per color). It shows the inter slot connections ‘in quad Speed mode’ as part of the frame bus PCB.



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.*

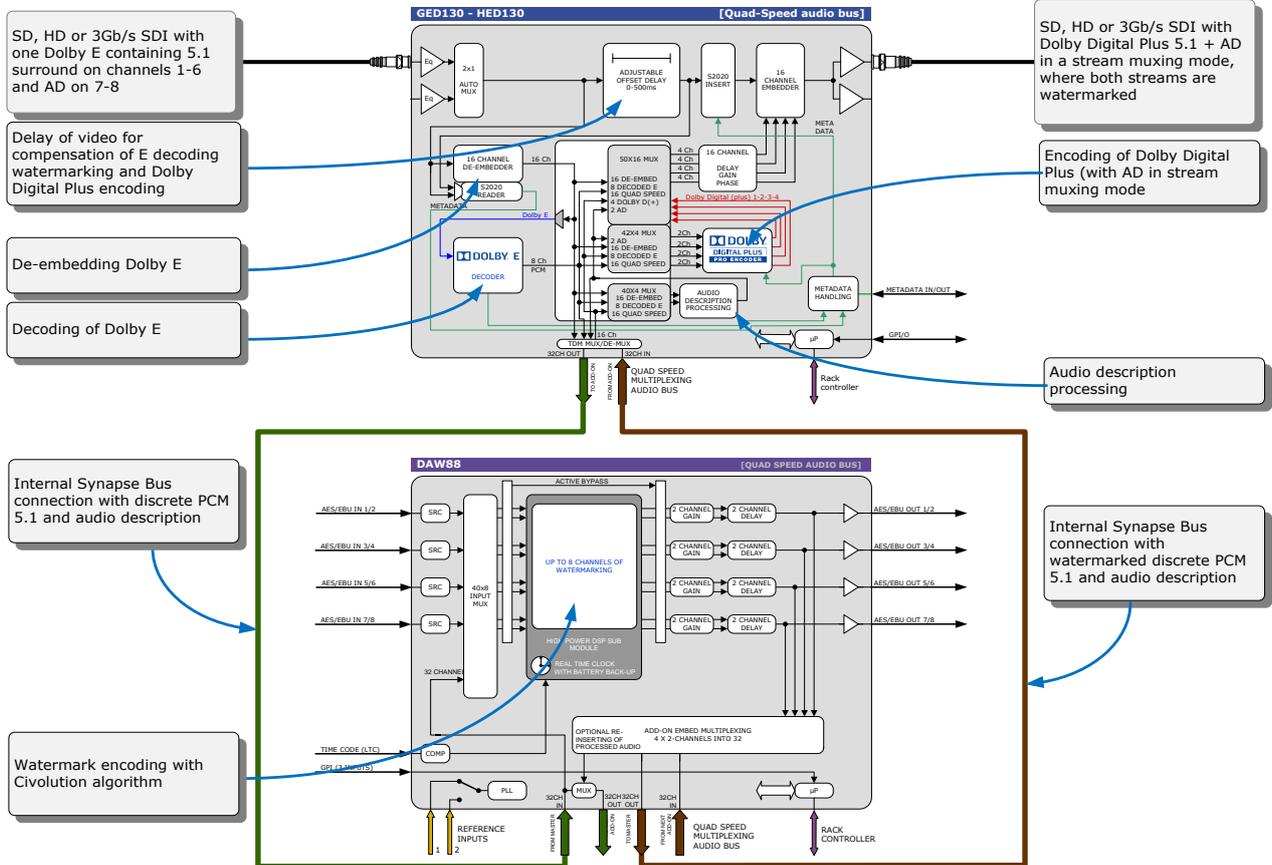
You can mix normal speed Master-Cards with Quad Speed MASTER-Cards in one frame as the MASTER-CARD breaks the connection to the left hand card. All cards to the right of the master must be in the same mode as the master.



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

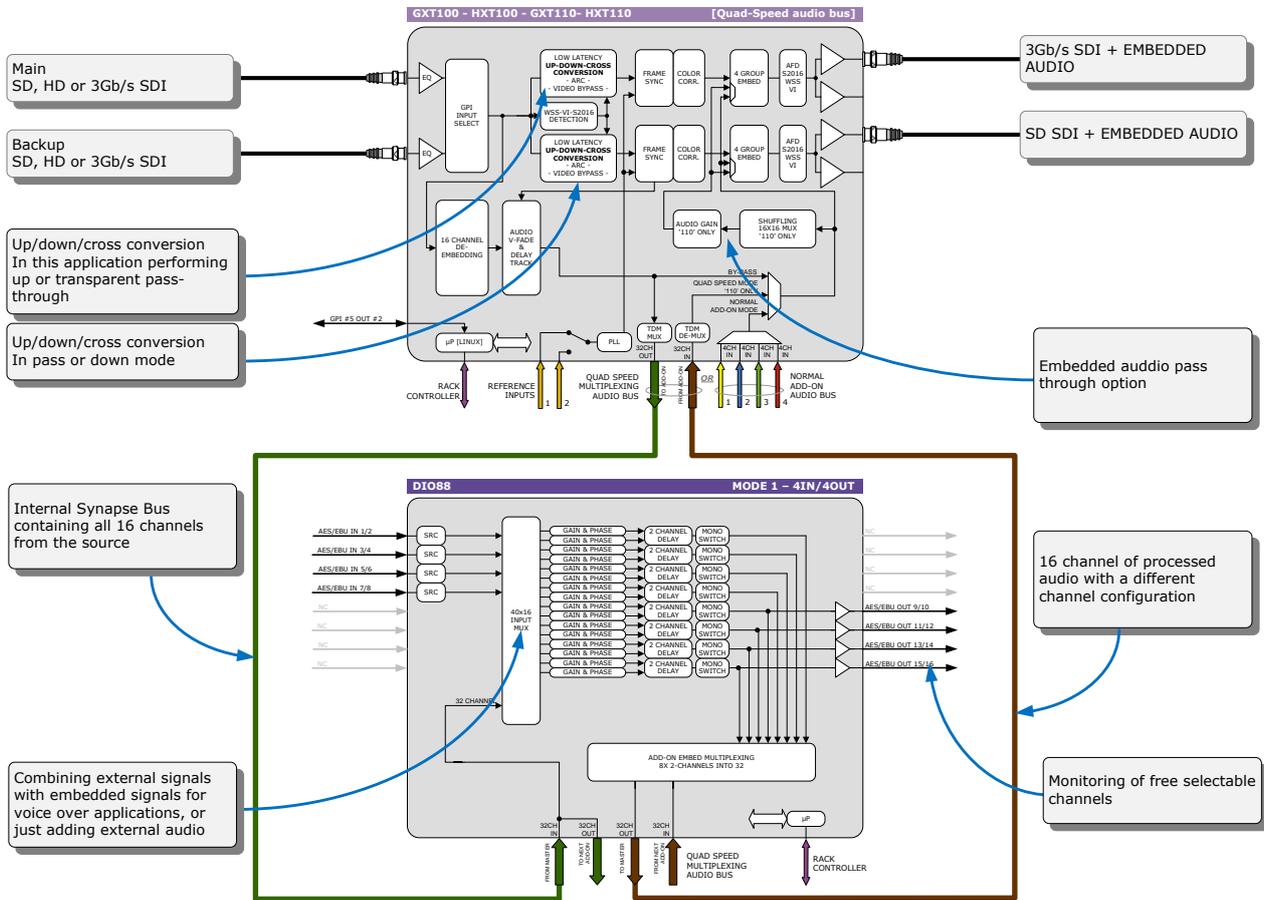
**Some examples**

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.



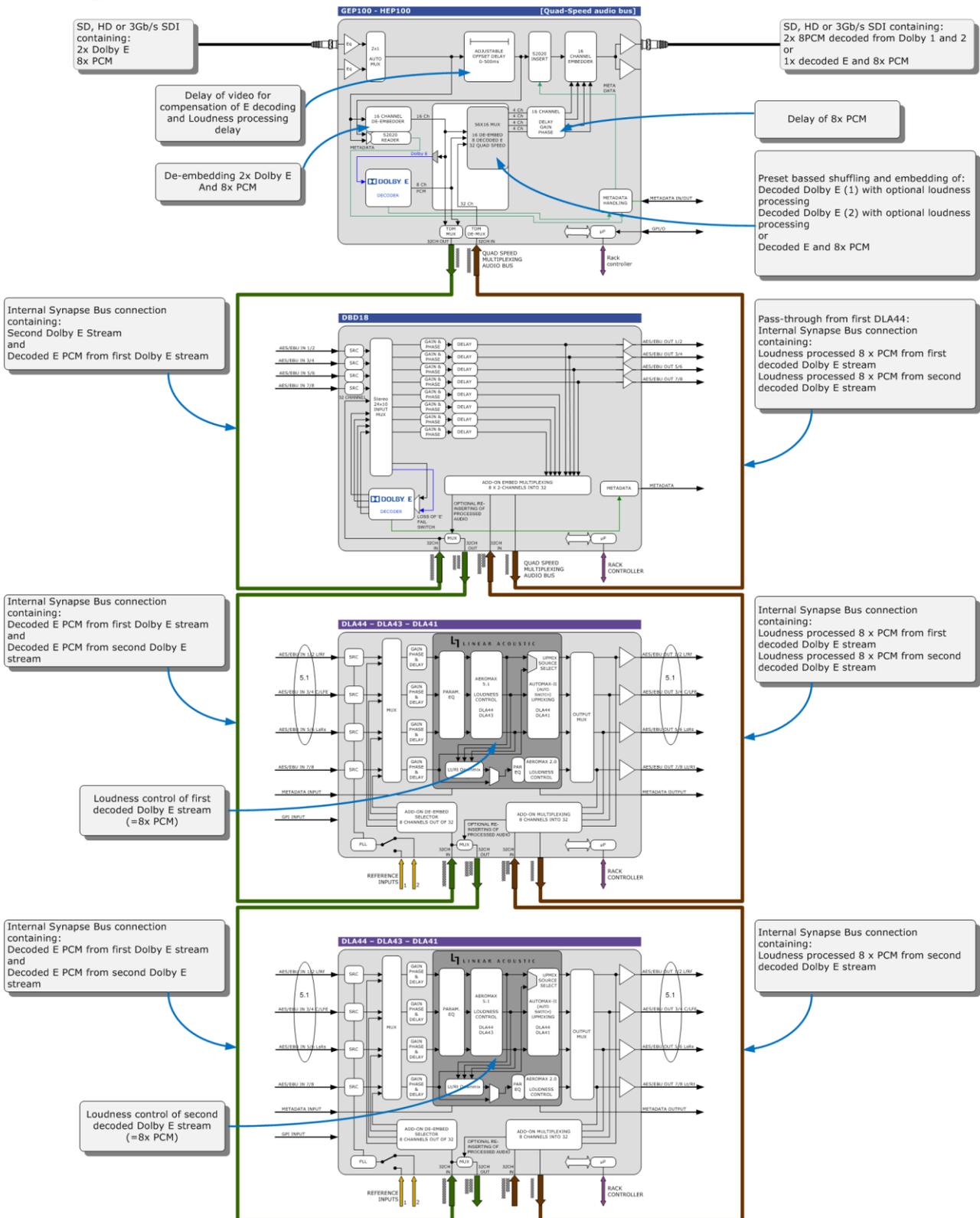
Embedded domain Dolby E to Dolby Digital Plus with Watermarking. The only connection to the outside world are two BNC cables.

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





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