



GRB100 HRB100

3Gb/s, HD, SD dual SDI in embedded domain shuffler
and re-embedder with S2020 metadata insertion

Installation and Operation manual





Synapse

TECHNICAL MANUAL

GRB100
HRB100



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- 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.
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- 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.
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- NEVER operate this product in an explosive atmosphere.

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

Axon Digital Design
GRB100
HRB100



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 to obtain the latest information on our new products and updates.

Local Control Panel

The local control panel gives access to all adjustable parameters and provides status information for any of the cards in the Synapse frame, including the Synapse rack controller. The local control panel is also used to back-up and restore card settings. Please refer to the RRC18, RRC10, RRC04, RRS18 and RRS04 manuals for a detailed description of the local control panel, the way to set-up remote control over IP and for frame related settings and status information.

Remote Control Capabilities

The remote control options are explained in the rack controller (RRC18/RRC10/RRC04/RRS18/RRS04) manual. The method of connection to a computer using Ethernet is described in the RRC/RRS manual.



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

Although not required to use Cortex with a Synapse frame, you are strongly advised to use a remote personal computer or laptop PC with Axon 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

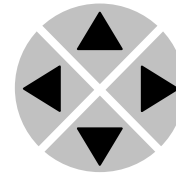
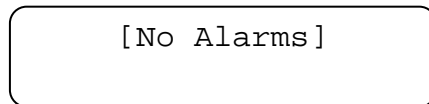
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

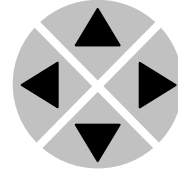
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

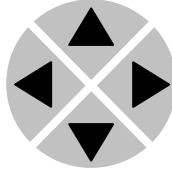
```
RRC18 [Select Card]
>S01=SFS10
```



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 it current setting is Auto.

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

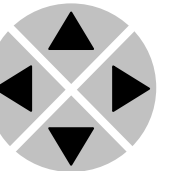


Pressing the ► selects the settings item shown, in this example SDI-Format .

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

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

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



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

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



**Axon Cortex
Software**

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

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

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

**Menu Structure
Example**

Slot	Module	Item	Parameter	Setting
▲				
▲				
S02		Identity		
▲		▲		
S01	SFS10	▶ Set- tings	▶ Standard_dig	▶ Auto
▼		▼	▼	▼
S00	RRC18	Status	Mode	625
		▼	▼	▼
		Events	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

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

4 The GRB100 Card

Introduction

The GRB100 is a 64x16 channel shuffler - re-embedder. The source audio channels used for embedding into the output SDI can be derived from 2 individual 3Gb/s HD or SD inputs and from the 32 channels that are available in the quad speed multiplexing audio ADD-ON bus.

One of the nice features of this card is that the output embeds 16 channels and that the source for these audio can be derived from both SDI input 1 (that normally also carries the video) and from SDI input 2. Input two can be connected to a second SDI source that is just used for carrying audio. (the two SDI streams need to be clock locked)

The HRB100 can be future upgraded to GRB100. This allows for staged implementation of HD infrastructures and spread the cost over multiple budget years.

Features

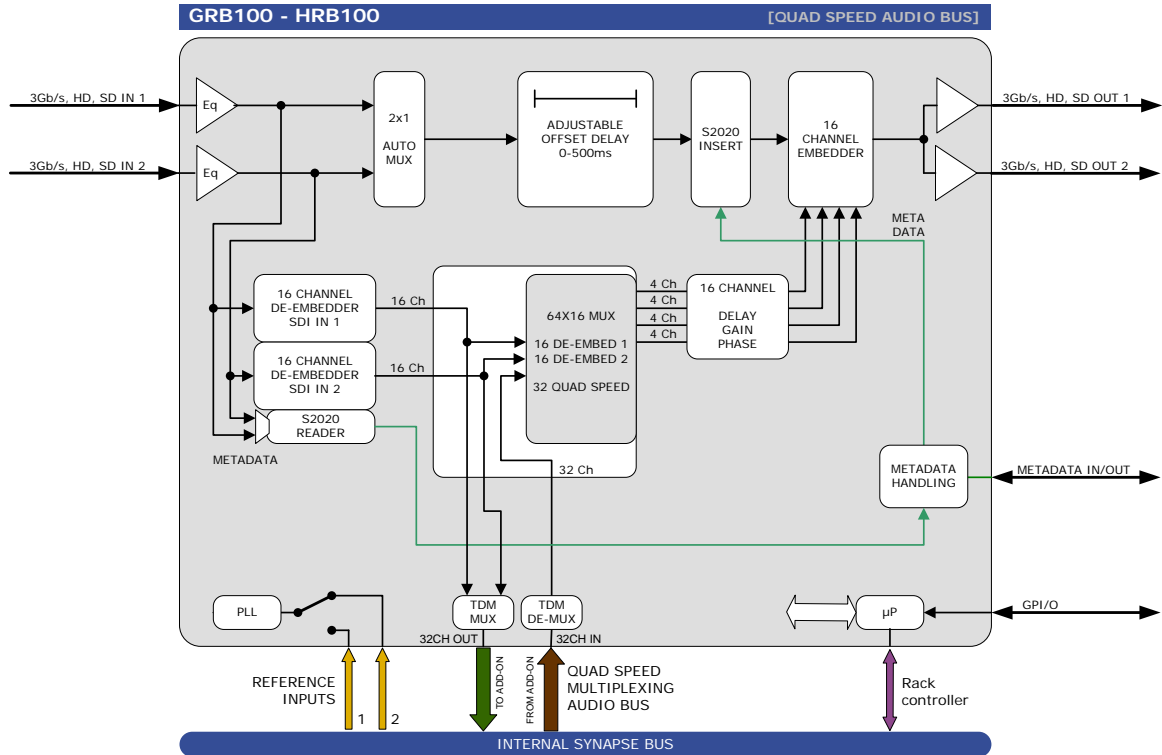
- 2 SDI inputs (with auto switch on carrier loss, and switch back function)
- 2 SDI outputs
- Compatible with the following input formats (auto selecting) (1080p only for GXX):
 - 1080p59.94
 - 1080p50
 - 1080i59.94
 - 1080i50
 - 1080p29.97
 - 1080p25
 - 1080p23.98
 - 720p59.94
 - 720p50
 - SD525
 - SD625
- Single VIDEO delay adjustable between 0 and 500ms
- Two SDI inputs can source the audio de-embedder when sources are clock locked (not phase locked*)
- De-embedding of all 32 channels from SDI 1 and SDI 2 to the Synapse bus
- 32 extra inputs through the Synapse quad speed bus
- 7 presets that configure all embedding channels. controlled by GPI or ACP (Cortex)
- S2020 metadata reading and insertion from an external source
- Metadata-shuffler (can also be used as metadata-generator)
- Append and overwrite modes
- Audio level and phase control
- Audio offset delay up to 5000 ms
- Transparent for ATC time code RP188, RP196, RP215
- 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 (BHX18D)

* (In dual mode, or 2-SDI mode the sources need to be running on the same clock, the phase is not critical)

Applications

- Embedded domain shuffling and swapping (from second SDI input)
- Master card for high end audio processing such as performed in the DLAx

Block schematic



Quad speed bus layout

The GRB/HRB100 puts all audio on the quad speed audio bus by default in the following way:

Addon bus channel	Source
1 till 16	SDI1 de-embedder outputs 1 till 16
17 till 32	SDI2 de-embedder outputs 1 till 16

5 Settings Menu

Introduction The settings menu displays the current state of each GRB-HRB100 setting and allows you to change or adjust it. Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or with Cortex. Also the SCP08 control can be used. Please refer to chapter 3 for information on the Synapse front panel control and Cortex.

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

SYSTEM SETTINGS

Inp_Select With this item you can decide which of the 2 inputs is used and how the card will switch between the 2 inputs. Choices are:

- Auto: The card chooses input 1 if there is a source. If there is no input 1, the card will automatically switch to input 2.
- SDI-1: only input 1 is used (disables detection of input 2)
- SDI-2: only input 2 is used (disables detection of input 1)

Switch-Back With Inp_Select set to Auto, the card will automatically switch to the other input when the first input was lost. With Switch-Back set to On, the card will switch back to the first input if this it is back up again. Set to Off the card will keep using the other input even if the first input is back up again.

Lock-Mode Lock-Mode determines whether the card is locked to input 1 (SDI1), input 2 (SDI2) or to the reference (Ref1 or Ref2).
Can also be set to Auto-SDI, in which case SDI1 has priority. When SDI1 is not present, locking will switch to SDI2. When the signal is back again at SDI1, lock will switch back to SDI1 (The locked-to status item, in the status menu, shows which SDI channel the card is locked to).
By default this setting is is set to SDI1.

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

Phaser1-Offset Sets the offset of the auto phaser of input 1 (see block schematic) between 0 and 4124px. Default is 0px.

Phaser2-Offset Sets the offset of the auto phaser of input 2 (see block schematic) between 0 and 4124px. Default is 0px.

DELAY

F-delay_1 F-Delay_1 sets the amount of delayed Frames of the input. The available range is from 0 to 125 fields (dependant on the I/O). Default is 0F.

V-delay_1 V-Delay_1 setting allows adjustment of the vertical phase of the output signal of the input with respect to the selected reference input.

The V-Delay setting gives a delay in addition to the reference timing. For example: if the V-Delay is set to 10 TV HD lines, the output signal will be delayed by reference timing + 10 TV HD lines. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 1124 lines (dependent on I/O format). The default setting is 0ln.

H-delay_1 The H-Delay_1 setting allows adjustment of the Horizontal phase of the output signal of the input with respect to the selected reference input.

The H-Delay setting gives a delay in addition to the reference timing. For example: if the H-Delay is set to 10 pixels, the output signal will be delayed by reference timing + 10 pixels. The signal is delayed (advanced) with respect to the phase of the reference signal. The available range is from 0 to a maximum of 4124 pixels (dependent on I/O format). The default setting is 0px.

Delay-Status With this setting you switch on or off the delay status detection in the status menu. Default is Off.

PRESET

Control With this setting you decide whether the presets are controlled manually (using cortex of the front controls of the frame), or by use of the GPI inputs.

GPI-Ctrl The GRB-HRB100 has several physical GPI contacts to control the card's presets (if presets are set to be GPI controlled)

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

Non-Latch: Non-latching GPI mode. When a contact is closed all the time (level triggered). Refer to the following table for examples of possible preset triggers:

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 I/O. Default is GPIO.

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.

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`.

#Preset_Name Sets/displays the name of the currently displayed preset.

EMBEDDING

#Emb-Mode With `Emb-Mode` you select how the audio in all groups 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_A_Sel ~
#Emb_D_Sel**

With these settings you select in to which audio group (= 4 audio channels) of the outputs you want embedders A to D to embed the forwarded audio channels coming from the audio inputs/add-on bus. Can be group1, group2, group3 or group4. You can also choose to not use the forwarded audio channels for anything by setting this item to off. By default Emb_A_Sel till Emb_D_Sel are set to respectively Group1 till Group 4.

EMB AUDIO OUT

**#SourceEmb-A1 ~
#SourceEmb-A4**

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

- SDI1: Audio comes from SDI input 1 (embedded audio)
- SDI2: Audio comes from SDI input 2 (embedded audio)
- AddOn01/16: Audio comes from addon channels 1 to 16
- AddOn17/32: Audio comes from addon channels 17 to 32

**#Emb-A1 ~
#EmbA4**

With this setting you decide which audio channel of the above selected source is used for embedder A, respectively channel 1 till 4. Can be any of the available 16 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:

- SDI1: Audio comes from SDI input 1 (embedded audio)
- SDI2: Audio comes from SDI input 2 (embedded audio)
- AddOn01/16: Audio comes from addon channels 1 to 16
- AddOn17/32: Audio comes from addon channels 17 to 32

**#Emb-B1 ~
#EmbB4**

With this setting you decide which audio channel of the above selected source is used for embedder B, respectively channel 1 till 4. Can be any of the available 16 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:

- SDI1: Audio comes from SDI input 1 (embedded audio)
- SDI2: Audio comes from SDI input 2 (embedded audio)
- AddOn01/16: Audio comes from addon channels 1 to 16
- AddOn17/32: Audio comes from addon channels 17 to 32

#Emb-C1 ~ #EmbC4 With this setting you decide which audio channel of the above selected source is used for embedder C, respectively channel 1 till 4. Can be any of the available 16 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:

- SDI1: Audio comes from SDI input 1 (embedded audio)
- SDI2: Audio comes from SDI input 2 (embedded audio)
- AddOn01/16: Audio comes from addon channels 1 to 16
- AddOn17/32: Audio comes from addon channels 17 to 32

#Emb-D1 ~ #EmbD4 With this setting you decide which audio channel of the above selected source is used for embedder D, respectively channel 1 till 4. Can be any of the available 16 channels or set to `off`.

EmbA1_Gain ~ EmbD4_Gain Adjusts the gain for the corresponding incoming audio channel between -60 and 12dB. Everything below -60dB (indicated as -999 dB) means the audio will be muted.

EmbA1_Phase ~ EmbD4_Phase Adjusts the audio phase of the corresponding individual audio channel to 0 deg or 180 deg.

#EmbA1_Delay ~ #EmbD4_Delay Adjusts the delay of the corresponding audio channel between 0 and 5000ms. These settings are part of the main preset.

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 are changed. These smooth transitions are triggered by a change in Gain settings or a Preset change. With this setting you can manually set this fade time between 100ms and 10.000ms. The default is 500ms.

Audio-Phase

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

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

AudioStatusBits

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

Silence-Level

With this setting you set a loudness threshold for the silence detection. Can be set between -100 and -20 dBFS. When the audio goes below this value, a silence alert is triggered.

S2020-DE-EMB

Extract_Line

With this item you set a line between line 0 and line 1125 from where you want to extract the metadata from the input when *S2020-Source* is set to *Rail1* or *Rail2*. By default set to line 0, in which case the S2020 is in auto-mode.

Extract_Ass_Ch

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).

S2020-EMBEDDER

S2020-Emb

With this setting you decide whether you want to *overwrite* or to *switch off* metadata (S2020) inserting.

Insert_Line

With this setting you set a line to which the S2020 data should be inserted. Can be set between line 1 and line 1125. Default is line 9.

Insert_Method	There are 2 methods to insert S2020 (refer to the S2020 SMPTE document). Can be set to Method A or Method B. Default is B.
Insert_Ass_Ch	With this setting you select one of the 8 channel pairs (Ch1 / 2 till Ch15 / 16) to which the metadata should be associated. Can also be set to None (which is also a valid value of the metadata item).

METADATA

Meta-Source	With this setting you set the source where dolby metadata is coming from. SDI1, SDI2 or local metadata input (RJ45).
MetaLoss	With this setting you select a preset to which the card should switch whenever the metadata input (selected with Meta-Source) is lost. Can be any of the 16 metadata presets. Can also be set to off, in which case the card will not switch presets when the metadata input is lost.
MetaDet	With this setting you select a preset to which the card should switch whenever the metadata input (selected with Meta-Source) is detected. Can be any of the 16 metadata presets. Can also be set to off, in which case the card will not switch presets when the metadata input is detected.
Metadata_Preset	Here you select which Metadata preset you want to activate. Editing the preset will be live.
#MD_Preset_Name	To ease remembering which preset is used for what cases, you can name your active preset with this setting (maximum of 16 characters).

#Program_Config

The program config metadata describes the type of audio that is inside the bitstream to which this program is assigned. Can be one of the following values:

- 5.1+2
- 7.1
- 5.1
- 4x2
- 2+2

Can also be set to `Ext_Meta`, in which case the `program_config` data will be taken from the external metadata program (default).

If the metadata-shuffler should work as a standalone metadata generator, this setting should be assigned to a program.

When set to `Ext_Meta` and there's no external metadata present, the metadata shuffler output is muted.

#Frame_Rate

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`).

#MD_Prog_1

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. Can also be set to use the metadata from the external metadata input (`Ext`). Default is set A.

#MD_Prog_2

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. Can also be set to use the metadata from the external metadata input (`Ext`). Default is set B.

#MD_Prog_3

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. Can also be set to use the metadata from the external metadata input (`Ext`). 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. Can also be set to use the metadata from the external metadata input (`Ext`). Default is set D.

METADATA PROG

#Metadata_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.

Note: 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, 5.1ch or 7.1ch. This is only used as a mnemonic.

#Program_Txt

You can describe the program in your own words in this field. Can be a string of maximum 16 characters.

#AC3Datarate

This item indicates the bitrate of the AC3 stream. Can be any of the following (all in kbps):

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

Can also be set to Ext_Meta, which will use the datarate metadata settings from an external program.

#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).

<p>#D_Srnd</p>	<p>Dolby Surround. Determines when a Dolby Digital decoding product also contains a Dolby Pro Logic decoder, whether the two-channel encoded bitstream 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.</p> <ul style="list-style-type: none"> ▪ 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. <p>You can also choose to use the metadata settings in the external program (Ext_meta). Default is Ext_meta.</p>
<p>#LFE</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 enable or disable. You can also choose to use the metadata settings in the external program (Ext_meta).</p> <p>Default setting is enable.</p>
<p>#Dialogue_Src</p>	<p>This item lets you select which metadata source to use to set the dialogue level. Choices are between external program (Ext_Meta) or manually set dialogue level via the card's own metadata settings (Int_Meta). Default is Ext_Meta.</p>
<p>#Dialogue_Lev</p>	<p>Dialogue level sets the average loudness of a dialogue in a presentation. The range is from -31dB to -1dB. This item will only influence the output if #Dialogue_src is set to Int_Meta. The default setting is -27dB.</p>
<p>#Language_Src</p>	<p>This items lets you select which metadata source to use to set the language code. Choices are between external program (Ext_Meta) or manually set dialogue level via the card's own metadata settings (Int_Meta). Default is Ext_Meta.</p>
<p>#LanguageCode</p>	<p>This metadata item describes the language used in the audio program. Can be any of the 127 language codes (refer to Dolby which code is used for which language). This item will only influence the output if #Language_src is set to Int_Meta. The default setting is 0.</p>

#ProdMixLvl_Src	This items lets you select which metadata source to use to set the audio production mixing level parameter. Choices are between external program (<code>Ext_Meta</code>) or manually set mixing level via the card's own metadata settings (<code>Int_Meta</code>). Default is <code>Ext_Meta</code> .
#ProdMixLvl	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 <code>#Prod_Mix_LvlSrc</code> is set to <code>Int_Meta</code> . The default setting is 0.
#ProdRoomType	The Room Type parameter describes the equalization used during the final mixing session at the studio or on the dubbing stage. A <code>Large</code> room is a dubbing stage with the industry standard X-curve equalization; a <code>Small</code> 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 <code>Not Indicated</code> or set to use the metadata settings in the external program (<code>Ext_meta</code>).
#AC3Copyright	AC3 copyright bit. Here you set the copyright bit to either <code>Yes</code> or <code>No</code> . You can also choose to use the metadata settings in the external program (<code>Ext_meta</code>).
#AC3OrigBitstr	AC3 original bitstream. Here you set whether the incoming signal is of the original master bitrate (<code>yes</code>) or if it has been converted before (<code>no</code>). You can also choose to use the metadata settings in the external program (<code>Ext_meta</code>).

#Pref_Dwnmx

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.

#Lt/Rt_C_dwnmx

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.

#Lt/Rt_S_dwnmx

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.

#Lo/Ro_C_dwnmx

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.

This setting will automatically change the C_dwnmx metadata setting (which can not be set separately anymore) according to the following table:

Lo/Ro C dwnmx:	Sets C_dwnmx automatically to:
+3.0dB	-3.0dB
+1.5dB	-3.0dB
0.0dB	-3.0dB
-1.5dB	-3.0dB
-3.0dB	-3.0dB
-4.5dB	-4.5dB
-6.0dB	-6.0dB

#Lo/Ro_S_dwnmx

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.

This setting will automatically change the S_dwnmx metadata setting (which can not be set separately anymore) according to the following table:

Lo/Ro S_dwnmx:	Sets S_dwnmx automatically to:
-1.5dB	-3.0dB
-3.0dB	-3.0dB
-4.5dB	-6.0dB
-6.0dB	-6.0dB
-999dB	-999dB

#Dolby_Srnd_EX

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.

#D_HeadPhone

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.

#ADConvType

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.

#DC_filter	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.
#Lowpass_Filter	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.
#LFE_Filter	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.
#Srnd_Ph_Shift	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.

#RFPreEmph

This parameter is designed to protect against over modulation when a decoded Dolby Digital bitstream is RF modulated. When enabled, the Dolby Digital encoder includes pre-emphasis in its calculations for RF Mode compression. The parameter has no effect when decoding using Line mode compression. Except in rare cases, this parameter should be disabled. Can be set to enabled, disabled or to Ext_Mode (default).

#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.

6 Status Menu

Introduction	The status menu indicates the current status of each item listed below.
SDI-Input_1	<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">▪ 1080p60▪ 1080p50▪ 1080i60▪ 1080i50▪ 1080p30▪ 1080p25▪ 1080p24▪ 1035i60▪ 720p60▪ 720p50▪ SD525▪ SD625▪ NA
SDI-Input_2	This status item indicates the presence and format of a valid signal in input 2. This is displayed as listed under SDI-Input1.
SDI-Freq_1	Indicates the frequency of SDI input 1. Can be 1:1, 1:1.001 or NA.
SDI-Freq_2	Indicates the frequency of SDI input 2. Can be 1:1, 1:1.001 or NA.
CRC-Stat_1	Displays if there are CRC errors on input 1.
CRC-Stat_2	Displays if there are CRC errors on input 2.

Ref-Format	Displays the reference format. Can be one of the following: <ul style="list-style-type: none"> ■ NA ■ NTSC/480i ■ PAL/576i ■ 480p ■ 576p ■ 720p ■ 1080i ■ 1080p
Locked-To	Displays to what the card is locked: Ref, SDI1, SDI2 or Not Locked.
Active-Out1	Indicates what the current source is of output 1, can be SDI1 or SDI2.
Active-Out2	Indicates what the current source is of output 2, can be SDI1 or SDI2.
IO-Delay_1	This indicates the delay of the input compared to the output. Displayed in ms.
GPI	Indicates the current GPI value
ANC-In1-Stat	Shows the status of the ancillary data in SDI input 1. Can be NA, OK or error.
ANC-In2-Stat	Shows the status of the ancillary data in SDI input 2. Can be NA, OK or error.
GrpInUse-In1	Displays which groups are in use in input 1. 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.
GrpInUse_In2	Displays which groups are in use in input 2. 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.
ATC -Stat	Indicates any ATC errors. can be NA (not available), Present or Error.

Grp-Ins

SDI1DemFrmt01/02 ~ SDI1DemFrmt15/16

Indicates the status of the audio groups on the addon bus. Can be Error or OK.

Displays the format of the corresponding de-embedded audio of input 1. Can be one of the following:

- NA
- PCM
- Null
- AC-3
- TimeStmp
- MPEG-1
- MPEG-2
- SMPTE-KLV
- Dolby E
- Caption data
- UserDef
- Rsvd

SDI2DemFrmt01/02 ~ SDI2DemFrmt15/16

Displays the format of the corresponding de-embedded audio of input 2. Can be one of the formats listed under SDI1DemFrmt01/12.

AddOnFrmt01/02 ~ AddOnFrmt31/32

Displays the format of the corresponding addon bus channels. Can be one of the formats listed under SDI1DemFrmt01/12.

EmbStatOutA1 ~ EmbStatOutD4

Display the status of the individual audio channels of the embedder output. Can be OK, Silence, Clipped or NA (not available)

EmbFrmtOutA1/2 ~ EmbFrmtOutD3/4

Displays the format of the corresponding audio channels of the embedder output. Can be one of the following formats:

- NA
- PCM
- Null
- AC-3
- TimeStmp
- MPEG-1
- MPEG-2
- SMPTE-KLV
- Dolby E
- Caption data
- UserDef
- Rsvd

SDI 1S2020Stat	This item indicates the status of the S2020 (embedded metadata) signal on input 1. Can be OK, Error or NA (not available)
SDI 1S2020Prog	<p>This status indicates the program config as present in the S2020 signal of SDI1. Can be one of the following values:</p> <ul style="list-style-type: none"> ■ 5.1+2 ■ 4+4 ■ 4x2 ■ 8x1 ■ 5.1 ■ 3x2 ■ 4 ■ 2+2 ■ 2+1+1 ■ 4x1 ■ 2+2 ■ 7.1 ■ Other ■ NA
SDI 2S2020Stat	This item indicates the status of the S2020 (embedded metadata) signal on input 2. Can be OK, Error or NA (not available)
SDI 2S2020Prog	This status indicates the program config as present in the S2020 signal of SDI2. Can be one of the values listed under SDI1S2020Prog.
LocMetaStat	Indicates the status of the metadata input on the backpanel. Can be Ok, NA or Error.
LocMetaProg	This status indicates the program config as present in metadata input on the backpanel. Can be one of the values listed under SDI1S2020Prog.
MD_ProgramConfig	This status indicates the program config as present on the metadata preset selected with MetaDet. Can be one of the values listed under SDI1S2020Prog.
MD FrameRate	Indicates the value of the frame rate metadata parameter.
MD PitchShift	Indicates the pitch shift of the metadata.

MD ProgramText	Displays the program's text field (set with #Program_txt).
MD AC3Datarate	Indicates the value of the AC3 bitrate metadata parameter.
MD Bitstream	Indicates the value of the bitstream mode metadata parameter.
MD ChannelMode	Indicates the value of the channel mode metadata parameter.
MD CenterMixLvl	Indicates the value of the Center downmix level metadata parameter.
MD SrndMixLvl	Indicates the value of the surround downmix level metadata parameter.
MD D_Surnd	Indicates the value of the Dolby surround metadata parameter.
MD LFE	Indicates the value of the LFE channel metadata parameter.
MD Dialog Lvl	Indicates the value of the dialogue level metadata parameter.
MD LanguageCode	Indicates the value of the language code metadata parameter.
MD AudioProdInfo	Indicates the value of the audio production info metadata parameter.
MD ProdMixLvl	Indicates the value of the audio production mix level metadata parameter.
MD ProdRoomType	Indicates the value of the audio production room type metadata parameter.
MD AC3Copyright	Indicates the value of the AC3 copyright metadata parameter.
MD AC3OrigBitstr	Indicates the value of the AC3 original bitstream metadata parameter.
MD Pref. Dwnmx	Indicates the value of the preferred downmix metadata parameter.

MD Lt/RtCDwnmx	Indicates the value of the Lt/Rt center downmix metadata parameter.
MD Lt/RtSDwnmx	Indicates the value of the Lt/Rt surround downmix metadata parameter.
MD Lo/RoCDwnmx	Indicates the value of the Lo/Ro center downmix metadata parameter.
MD Lo/RoSDwnmx	Indicates the value of the Lo/Ro surround downmix metadata parameter.
MD D_Srnd Ex	Indicates the value of the Dolby surround EX metadata parameter.
MD D_HeadPhone	Indicates the value of the Dolby headphone metadata parameter.
MD ADConvType	Indicates the value of the A/D conversion type metadata parameter
MD DC Filter	Indicates the value of the DC filter metadata parameter.
MD Lowpass Fil	Indicates the value of the Low pass filter metadata parameter.
MD LFE Filter	Indicates the value of the LFE filter metadata parameter.
MD Sur PhShift	Indicates the value of the surround phase shift metadata.
MD Sur3d Att	Indicates the value of the surround 3dB attenuate metadata.
MD RFPreEmph	Indicates the value of the RF pre emphasis metadata parameter.
MD RF Mode	Indicates the value of the RF mode metadata parameter.
MD Line Mode	Indicates the value of the line mode metadata parameter
FPGA-Stat	Displays the status of the FPGA chip. Can be error or OK.

7 Events Menu

Introduction	An event is a special message that is generated on the card asynchronously. This means that it is not the response to a request to the card, but a spontaneous message.
What is the Goal of an event?	The goal of events is to inform the environment about a changing condition on the card. A message may be broadcast to mark the change in status. The message is volatile and cannot be retrieved from the system after it has been broadcast. There are several means by which the message can be filtered.
Events	The events reported by the card are as follows;
Announcements	Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on
Input_A	Input_A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Input_B	Input_B can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Ref-Status	Reference can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
What information is available in an event?	<p>The message consists of the following items;</p> <ol style="list-style-type: none"> 1) A message string to show what has happened in text, for example: "INP_LOSS", "REF_LOSS", "INP_RETURN". 2) A tag that also shows what happens, but with a predefined number: e.g. 1 (= loss of input), 2 (= loss of reference), 129(= 1+128 = return of input). For a list of these predefined tags see the table on the next page. 3) A priority that marks the importance of an event. This value is defined by the user and can have any value between 1 and 255, or 0 when disabled. 4) A slot number of the source of this event.
The Message String	The message string is defined in the card and is therefore fixed. It may be used in controlling software like Synapse Set-up to show the event.

The Tag The tag is also defined in the card. The tag has a fixed meaning. When controlling or monitoring software should make decisions based on events, it is easier to use the tag instead of interpreting a string. The first implementation is the tag controlled switch in the GPI16.

In cases where the event marks a change to fault status (e.g. 1 for Loss of Input) the complement is marked by the tag increased by 128 (80_{hex}) (e.g. 129 (81_{hex}) for Return of Input).

Defining Tags The tags defined for the card are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcement of report and control values
Input_A	01 _{hex} =INPA_LOSS	81 _{hex} =INPA_RETURN	input A lost or returned
Input_B	02 _{hex} =INPB_LOSS	82 _{hex} = INPB_RETURN	input B lost or returned
Reference	03 _{hex} =REF_LOSS	83 _{hex} =REF_RETURN	reference lost or returned

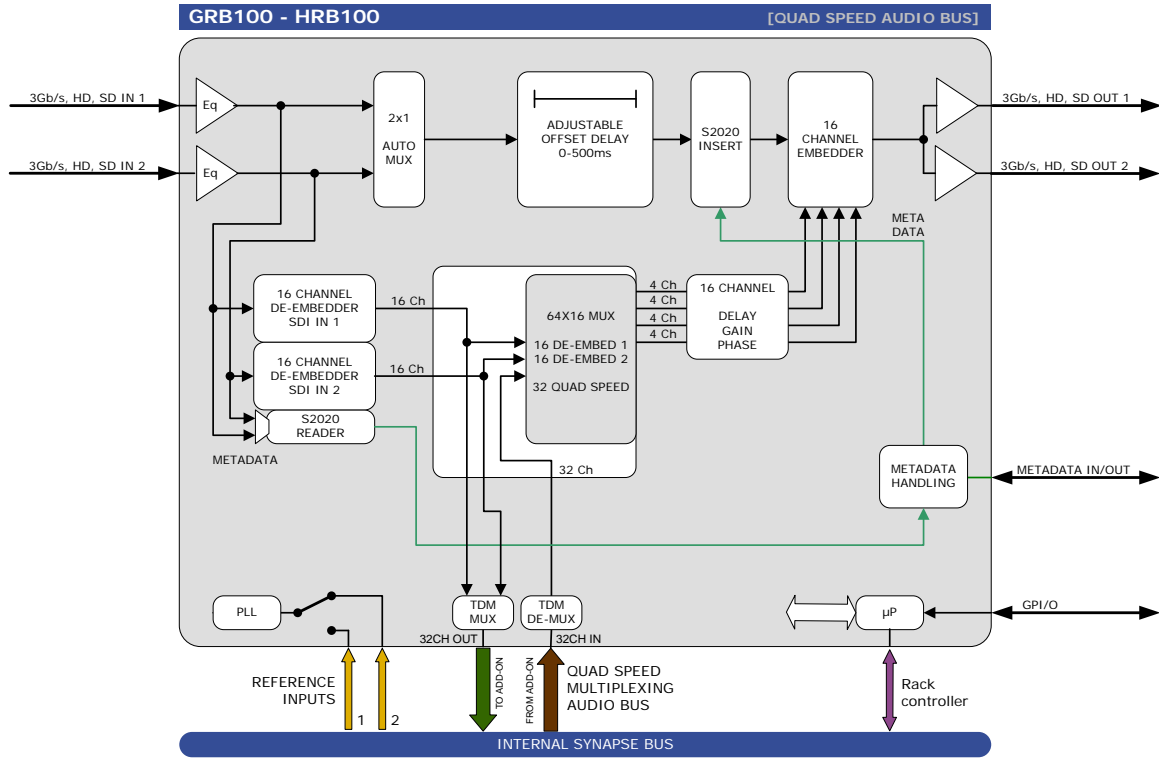
The Priority The priority is a user-defined value. The higher the priority of the alarm, the higher this value. Setting the priority to Zero disables the announcement of this alarm. Alarms with priorities equal or higher than the Error Threshold setting of the RRC will cause the error LED on the Synapse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

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

8 LED Indication

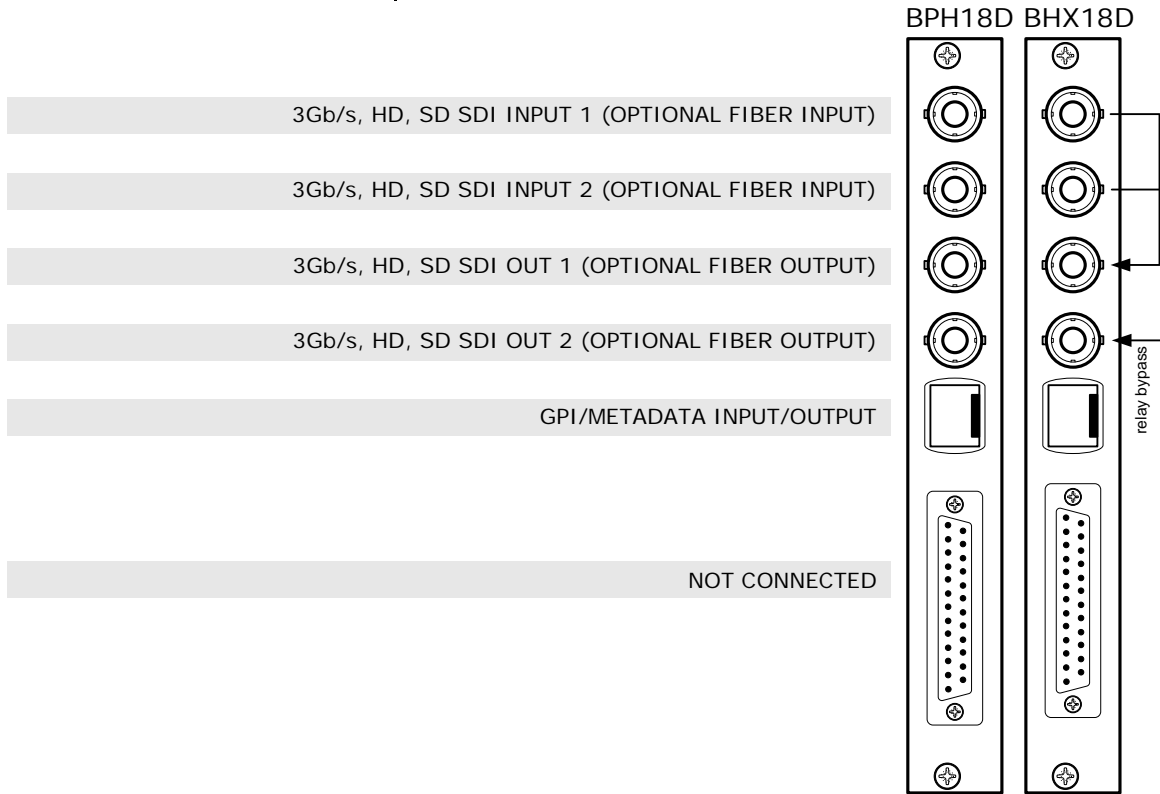
Error LED	The error LED indicates an error if the internal logic of the GRB-HRB100card is not configured correctly or has a hardware failure.
Input_A LED	This LED indicated the presence of a valid SDI video signal on input A.
Input_B LED	This LED indicated the presence of a valid SDI video signal on input B.
ANC Data LED	Indicates the presence of embedded audio within the input signal.
Reference LED	Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).
Data Error LED	This LED indicates a CRC error.
Connection LED	This LED illuminates after the card has initialized. The LED lights for 0.5 seconds every time a connection is made to the card.
Error LED	The error LED indicates an error if the internal logic of the card is not configured correctly or has a hardware failure.

9 Block Schematic



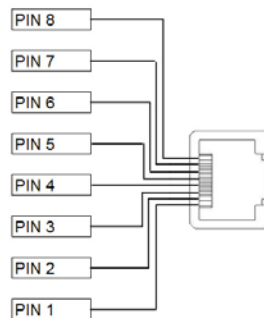
10 Connector Panels

The GRB-HRB100 can be used with the BPH18, the BPH18D or the bypass relay equivalents. The following table displays the pinout of these backpanels in combination with the card.



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

GPI pinning



Pin	Function
1	Ground
2	GPI 1
3	GPI 2
4	GPI 3
5	GPI 4 / TXA(+)
6	GPI 5 / TXB(-)
7	GPI 6 / RXA(+)
8	GPI 7 / RXB(-)



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