

Synapse

ASC12

Component (near CCIR501) or RGB to SDI
converter

Installation and Operation manual



Committed.

[®] **AXON**



Synapse

TECHNICAL MANUAL

ASC12



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WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE

- ALWAYS disconnect your entire system from the AC mains before cleaning any component. The product frame (SFR18 or SFR04) must be terminated with three-conductor AC mains power cord that includes an earth ground connection. To prevent shock hazard, all three connections must always be used.
- NEVER use flammable or combustible chemicals for cleaning components.
- NEVER operate this product if any cover is removed.
- NEVER wet the inside of this product with any liquid.
- NEVER pour or spill liquids directly onto this unit.
- NEVER block airflow through ventilation slots.
- NEVER bypass any fuse.
- NEVER replace any fuse with a value or type other than those specified.
- NEVER attempt to repair this product. If a problem occurs, contact your local Axon distributor.
- NEVER expose this product to extremely high or low temperatures.
- NEVER operate this product in an explosive atmosphere.

Warranty: Axon warrants their products according to the warranty policy as described in the general terms. That means that Axon Digital Design BV can only warrant the products as long as the serial numbers are not removed.

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This product complies with the requirements of the product family standards for audio, video, audio-visual entertainment lighting control apparatus for professional use as mentioned below.

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

<p>Axon Digital Design ASC12</p> <p> Tested To Comply With FCC Standards</p> <p>FOR HOME OR OFFICE USE</p>	<p>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.</p>
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Table of Contents

Introduction to Synapse	4
An Introduction to Synapse	4
Local Control Panel	4
Remote Control Capabilities	4
Unpacking and Placement	5
Unpacking	5
Placing the card	5
A Quick Start	6
When Powering-up	6
Changing settings and parameters	6
Front Panel Control	6
Example of changing parameters using front panel control	7
Synapse Cortex Software	8
Menu Structure Example	8
The ASC12 Card	9
Introduction	9
Features	9
Applications	9
Block schematic	10
Settings Menu	11
Introduction	11
Input-Sel	11
GRB Settings	11
Sync-Input	11
Fine-H-Delay	11
YPrPb-YC SET	11
DNR	11
Betacam_level	11
AGC	11
FRAME SYNC	12
Ref-Input	12
Mode	12
Freeze	12
Frz-Mode	12
Input-Loss	12
H-Delay	13
Fine-H-Delay	13
V-Delay	13
DIGITAL PROC	13
Y-Gain	13
C-Gain	14
Y-Black	14
C-Black	14
Emb-A-Sel	14
Emb-B-Sel	14
Blank-V-ANC	14
EDH-Gen	14
VI-insert	14
Status Menu	15
Introduction	15
ANA-Input	15
Reference	15
Format-Det	15
Audio-CH_A1	15
Audio-CH_A2	15
Audio-CH_A3	15
Audio-CH_A4	15
Audio-CH_B1	15
Audio-CH_B2	15
Audio-CH_B3	15
Audio-CH_B4	15

Events Menu	16
Introduction	16
What is the Goal of an event?	16
Events	16
Announcements	16
Ref-Status	16
Input_ANA	16
What information is available in an event?	16
The Message String	16
The Tag	17
Defining Tags	17
The Priority	17
The Address	17
LED Indication	18
Error LED	18
Reference LED	18
Data Error LED	18
Connection LED	18
Block Schematic	19
Connector Panels	20

1 Introduction to Synapse

An Introduction to Synapse

Synapse is a modular system designed for the broadcast industry. High density, intuitive operation and high quality processing are key features of this system. Synapse offers a full range of converters and processing modules. Please visit the AXON Digital Design Website at www.axon.tv to obtain the latest information on our new products and updates.

Local Control Panel

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

Remote Control Capabilities

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



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

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

2 Unpacking and Placement

Unpacking

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

Placing the card

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

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

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

NOTE: Please check appendix 1 before connecting any backpanel!

3 A Quick Start

When Powering-up

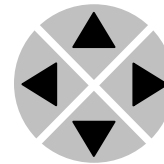
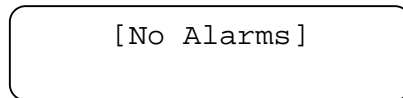
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

Changing settings and parameters

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

Front Panel Control

Front Panel Display and Cursor



Settings are displayed and changed as follows;

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

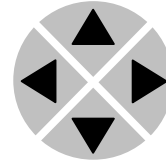
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

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

With the display as shown below

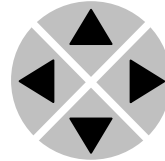
```
RRC18 [Select Card]  
>S01=SFS10
```



Pressing the ► selects the SFS10 in frame slot 01.

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

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

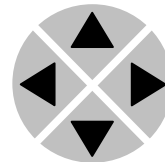


Pressing the ► selects the menu item shown, in this example Settings.

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

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

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

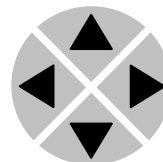


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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.



Synapse Cortex Software

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

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

For operation of Synapse Cortex, please refer to the Cortex manual.

Menu Structure Example

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 Synapse Cortex can be obtained from the RRC and RRS operational manuals and the Cortex help files.

4 The ASC12 Card

Introduction

The ASC12 is the ideal solution for component video or RGB to SDI conversion. It features near CCIR601 input filtering for benchmark flat frequency response and uses 12-bit A/D conversion and processing, to obtain high quality 10-bit operation. Digital 12-bit feedback clamps with noise filtering provides accurate clamping of the input signals. The unit has an industry leading jitter performance, resulting in a high degree of output signal stability. The ASC12 accepts analog component signals in YCrCb format or RGB format. Betacam level selection allows the level of the component color difference signal to be set in accordance with Betacam levels and EBU/SMPTE levels.

The module has the unique ADD-ON embedding function by adding a Synapse A/D converter or AES/EBU input card that allows 2 group embedding. Four SDI outputs are available with embedded audio, reducing the need for distribution amplifiers and external embedders.

Features

- 12-bit A/D
- Reference on Y/G
- Compatible with Betacam and EBU levels
- 2 group embedding with ADD-ON card
- Auto format detection
- VI insertion
- EDH insertion
- Compatible with fiber connector panels
- Frame synchronization
- Video Proc amp
- Locks to bi-level sync
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18
- Optional 1 fiber input (replacing 1 SDI input) or 1 fiber output (replacing 1 SDI output) on I/O panel
- Optional 1 CVBS output (replacing 1 SDI output) on I/O panel

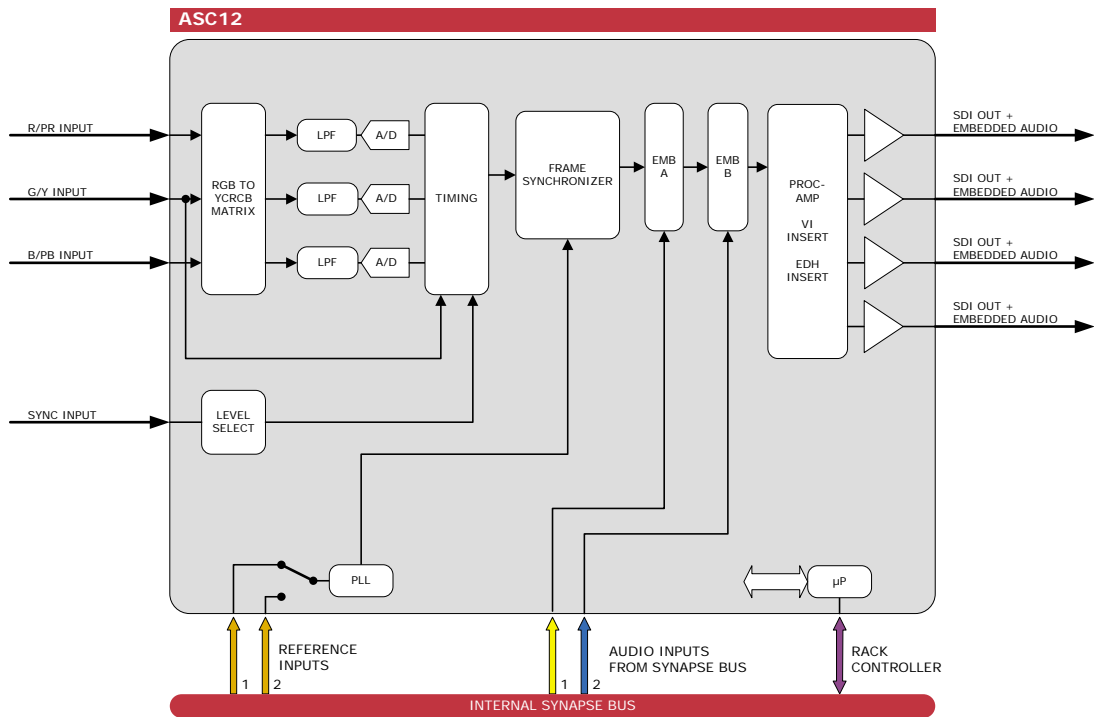
Complementary cards:

- ADC20, ADC24, ADL24, DIO24, DIO48, DLA44, DLA43

Applications

- Analog camera A/D converter
- Analog VTR A/D converter

Block schematic



5 Settings Menu

Introduction	The settings menu displays the current state of each ASC12 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.
Input-Sel	The <code>Input-Sel</code> setting of the ASC12 selects between the input format. The ASC12 accepts component signal in three formats, YCbCr, YC or RGB. The default setting is RGB.
GRB Settings	
Sync-Input	An RGB signal can be synchronized to the Green input channel (<code>Sync_on_G</code>), to an external 300mV reference signal (<code>Ext_300mV</code>), or to an external 600mV reference signal (<code>Ext_600mV</code>). Default is <code>Sync_on_G</code> .
Fine-H-Delay	This option provides a fine sub pixel Horizontal Phase delay with 1/12 sample intervals (12 steps within one pixel). You can adjust it between 0/12 and 255/12. Default is 0/12smp.
YPrPb-YC SET	
DNR	Switches on or off dynamic noise reduction. Default is on.
Betacam_level	<p><code>Betacam_level</code> allows selection of level settings for the component color difference (B-Y & R-Y) signals. The setting can be set to either On or Off.</p> <p>When set to On, the color difference signals are set to Betacam levels. When set to Off, the color difference signals are set to EBU/SMPTE levels. The default setting is Off.</p>
AGC	Switches automatic gain control on or off. Default is off.

FRAME SYNC	
Ref-Input	<p>This setting allows the user to determine which reference input and what type of signal is used to lock the ASC12.</p> <p>1: selects input 1 which is the uppermost input of on the rack controller connection panel at the rear of the SFR18 or SFR08.</p> <p>2: selects input 2 which is the lower input on the rack controller of the SFR18 or SFR08 (not available in the SFR04).</p> <p>Auto: Automatically detects where a valid reference is found and selects that input.</p>
Mode	<p>Synchronize and Delay mode can be selected within the Mode menu. In Synchronize mode, the Autophaser/Line synchroniser is active. In Delay mode a reference is not required, the output timing is derived from the analog input signal, if used otherwise timing is derived from the sdi input signal. The default setting is Synchronize.</p> <p>Synchronizing Mode: When Mode is set to Synchronize and the card is locked to a reference, the card is in synchronizing mode. (NOTE that it is referred to the output signal so it takes the H-V-delay into account)</p> <p>Delay Mode: When Mode is set to Delay, the card is in Delay Mode. The H-Delay and V-Delay settings give the delay, addition to the processing time of the card.</p>
Freeze	<p>Freeze enables the capture of one Video Frame when it is set to On. Freeze can be set On or Off. The default setting is Off.</p>
Frz-Mode	<p>Frz-mode gives the choice of storing a complete Video Frame or Field (double written) for the above Freeze Menu and the external freeze input. The settings of Frz-mode are Field and Frame. The default setting is Field.</p>
Input-Loss	<p>With this setting you can set what should be displayed on the event of a input loss. Can be set to the following:</p> <p>Freeze: enables the capture of the last video information when the input signal was lost.</p> <p>Black: in case of a lost of input the output is black</p> <p>Green: in case of a lost of input the output is green.</p> <p>Cont_Ana_Inp: Continues analog input (none of the above but always shows the analog input)</p>

H-Delay

The H-Delay setting allows adjustment of the horizontal phase of the output signal with respect to the selected reference input.

The H-Delay setting gives a delay in addition to the reference timing. For example, if H-Delay is set to 10 samples, the output signal will be delayed by the reference timing + 10 samples of 37ns, therefore the delay = Ref timing+ 37ns x10. The signal is delayed (advanced) with respect to the phase of the reference signal.

In 625/50 the adjustment range of H-Delay is 0-1727 samples, 0..64 μ s (one PAL TV line).

In 525/60 the adjustment range of H-Delay is 0-1715 samples, 0..63.556 μ s (one NTSC TV line).

The default setting is 0 samples.

Note: Please refer to the above description of Ref input for synchronization and timing information.

Fine-H-Delay

Fine-H-Delay provides a fine sub pixel Horizontal Phase delay. Fine-H-Delay is set at 1/12 sample intervals. The range of Fine-H-Delay is 1/12smp to 15/12smp.

The default setting is 0.

V-Delay

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

The V-Delay setting gives a delay in addition to the reference timing. For example, if V-Delay is set to 10 TV lines, the output signal will be delayed by the reference timing + 10 TV lines. The signal is delayed (advanced) with respect to the phase of the reference signal.

In 625/50 the adjustment range of V-Delay is 0-624 lines (one TV frame).

In 525/60 the adjustment range is 0-524 lines (one TV frame).

The default setting is 0 lines.

Note: Please refer to the above description of Ref input for synchronization and timing information.

DIGITAL PROC**Y-Gain**

Y-Gain controls the Luminance gain of the built-in processing amplifier. The control range is between 0% and 199.80%. The default setting is 100%.

C-Gain	C-Gain controls the Colour Difference gain of the built-in processing amplifier for the C channel. The control range is between 0% and 199.80%. The default setting is 100%.
Y-Black	This item controls the Luminance black level adjustment between -128.....+127bits The black level can be adjusted by +/- 100mV(analog video). The default setting is 0.
C-Black	This item controls the Colour Difference (C) black level adjustment.
Emb-A-Sel	Emb-A-Sel determines which of the four groups of audio available on the Synapse bus will be embedded by embedder A of the ASC12 into the SDI stream. The settings of Emb-A-Sel are Off, Group_1, Group_2, Group_3, Group_4. The default setting is Off.
Emb-B-Sel	Emb-B-Sel determines which of the four groups of audio available on the Synapse bus will be embedded by embedder B of the ASC12 into the SDI stream. The settings of Emb-B-Sel are Off, Group_1, Group_2, Group_3, Group_4. The default setting is Off.
Blank-V-ANC	Blank-V-ANC blanks ancillary data in the SDI stream. This item can be set On or Off. The default setting is Off.
EDH-Gen	This setting allows the user to switch the built in EDH generator On or Off. The EDH generator inserts EDH (SDI Error Detection Handling) into the output signal. The default setting of EDN-Gen is On.
VI-insert	Video Line Index data insertion recognises 16 different modes. These modes are divided into 2 groups, 4:3 and 16:9, each group having 8 sub-categories numbered 0-7. Valid VI-Insert ranges are 4:3_0, 4:3_1, 4:3_2, etc., to 16:9_0, 16:9_1, 16:9_2 etc. The default setting is 4:3_0.

6 Status Menu

Introduction	The status menu indicates the current status of each item listed below.
ANA-Input	This indicates if there is an analog input or not (OK or N/A)
Reference	This status item recognises a valid reference input on the chosen reference input. Reference indicates if a reference input is NA (not available) or Present.
Format-Det	625 and 525 standards can be detected as the valid input signal format, 625/50 and 525/60 are recognised as valid inputs.
Audio-CH_A1	Audio-CH_A1 displays the status of audio channel A1. The status can be NA (not available) or Ok.
Audio-CH_A2	Audio-CH_A2 displays the status of audio channel A2. The status can be NA (not available) or Ok.
Audio-CH_A3	Audio-CH_A3 displays the status of audio channel A3. The status can be NA (not available) or Ok.
Audio-CH_A4	Audio-CH_A4 displays the status of audio channel A4. The status can be NA (not available) or Ok.
Audio-CH_B1	Audio-CH_B1 displays the status of audio channel B1. The status can be NA (not available) or Ok.
Audio-CH_B2	Audio-CH_B2 displays the status of audio channel B2. The status can be NA (not available) or Ok.
Audio-CH_B3	Audio-CH_B3 displays the status of audio channel B3. The status can be NA (not available) or Ok.
Audio-CH_B4	Audio-CH_B4 displays the status of audio channel B4. The status can be NA (not available) 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 2HU110 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
Ref-Status	Ref-Status can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the reference is lost an Event will be generated at the priority.
Input_ANA	Input_ANA can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If the analog input is lost an Event will be generated at the priority.
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_ANA	01 _{hex} =INP_LOSS	81 _{hex} =INP_RETURN	Analog input lost or returned
Ref-Status	02 _{hex} =REF_LOSS	82 _{hex} =REF_RETURN	input B 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.

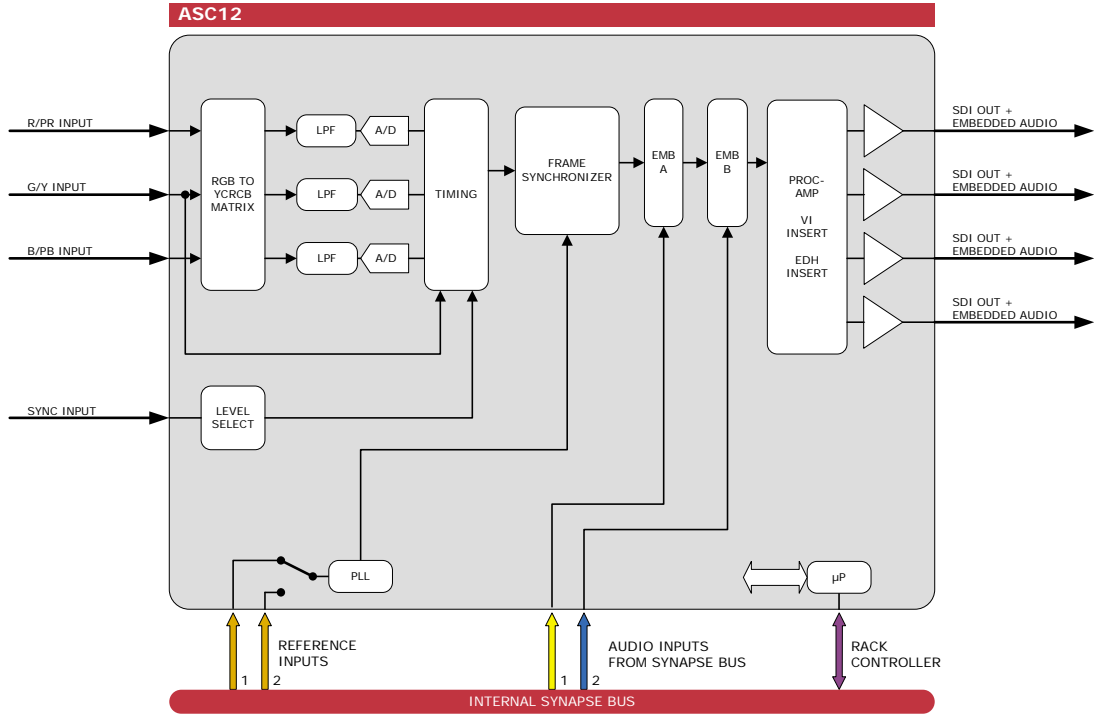
The Address

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

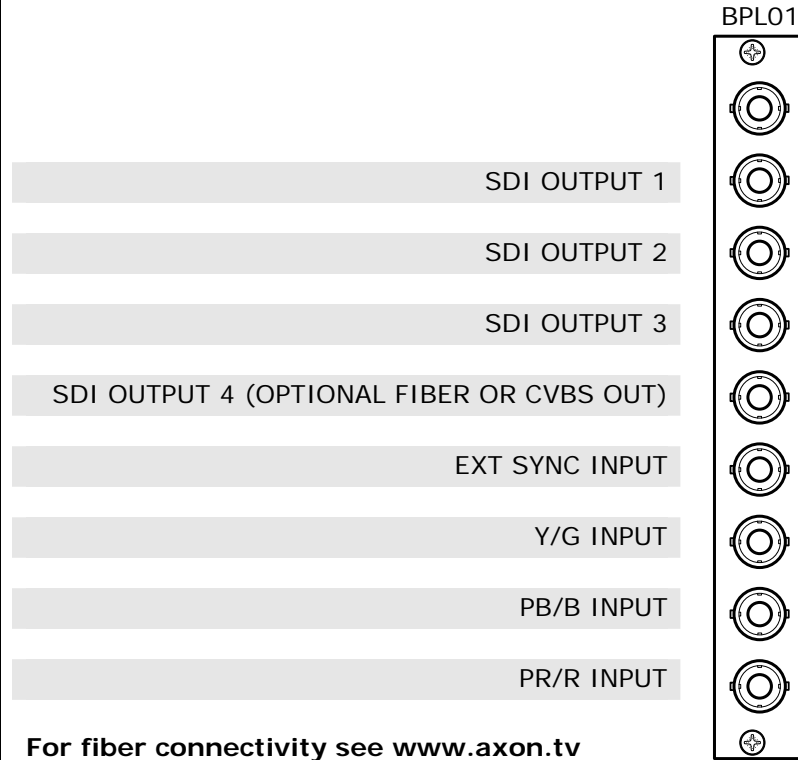
Error LED	The error LED indicates an error if the internal logic of the ASC12 card is not configured correctly or has a hardware failure.
Reference LED	Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).
Data Error LED	This LED indicates a CRC 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.

9 Block Schematic



10 Connector Panels

The ASC12 can be used with the BPL01. The following table displays the pinout of this backpanel in combination with the card.



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