

Synapse

HCC05

HD/SD SDI YC and RGB color corrector

Installation and Operation manual

SynLite

HD
High definition

Committed.

[®] **AXON**



Synapse

TECHNICAL MANUAL

HCC05



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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

Axon Digital Design
HCC05



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 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

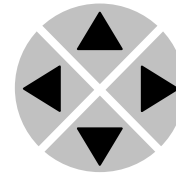
On powering up the Synapse frame, the card set will use basic data and default initialisation settings. All LED's will light during this process. After initialisation, several LED's will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of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

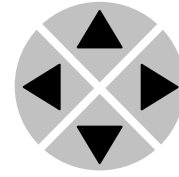
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

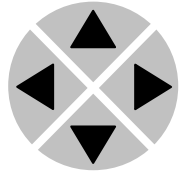
RRC18 [Select Card]
>S01=SFS10



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 its current setting is Auto.

SFS10 [Settings]
>SDI-Format=Auto

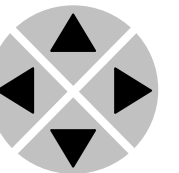


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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
▲				
▲				
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 HCC05 Card

Introduction

The HCC05 is an HD SDI color corrector with black level adjustment and built in color bar and sweep generator. The card has 2 processed outputs and 1 reclocked output and allows you to adjust individual or combined RGB gain and black levels and YCbCr gain and black levels. The card includes a ProcAmp and an OSD ident inserter.

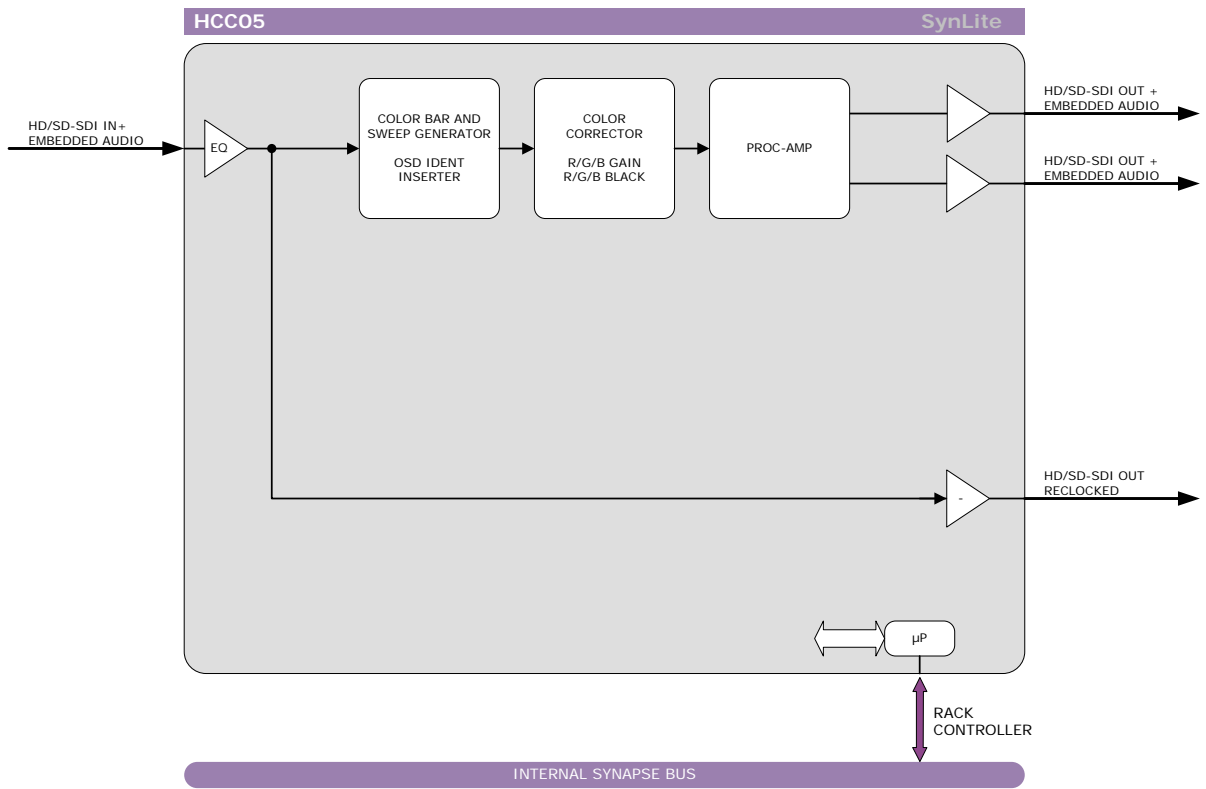
Features

- HD-SDI and SD-SDI compatible
- Formats:
 - 1080i/50/60
 - 1035i/60
 - 720p/50/60/
- 1080p(sf)/24/25/30
- Two processed outputs
- One reclocked output
- Built-in ProcAmp
 - Y, Cb and Cr Gain control
 - Y, Cb and Cr black control
- Color correcting:
 - R, G and B gain control
 - R, G and B black level control
 - RGB total gain
 - Black total gain
 - Chroma gain
- Test pattern (color bar/sweep)
- OSD ident label with maximum 10 characters (for set-up purposes)
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)
- Optional 1 fiber input (replacing 1 SDI input) or 1 fiber output (replacing 1 SDI output) on I/O panel

Applications

- Generic ProcAmp color corrector
- In-video screen color correction for studio screens
- Low cost camera source color correction

Block schematic



5 Settings Menu

Introduction The settings menu displays the current state of each HCC05 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

SDI -Format The format menu item selects the input video standard.

- AUTO: the unit recognize format is presented at the input and automatically sets that format. It will take more time for the card to lock. (default)
- 1080i-60/50
- 1080p-30/25/24
- 1035i-60,
- 720p-60/50
- SD525
- SD625

Y-Gain Y-Gain controls the Luminance gain of the built-in processing amplifier. The control range is between 0% and 199.8%. The default setting of Y-Gain is 100%.

Cb-Gain Cb-Gain controls the blue colour difference gain of the built-in processing amplifier. The control range is between 0% and 199.8%. The default setting of Cb-Gain is 100%.

Cr-Gain Cr-Gain controls the red colour difference gain of the built-in processing amplifier. The control range is between 0% and 199.8%. The default setting of Cb-Gain is 100%.

C-Gain C-Gain controls the total Chroma gain. The control range is between 0% and 199.8% in steps of 0.20%. The default setting of C-Gain is 100%.

R-Gain R-Gain controls the RED gain. The control range is between 0% and 150% in steps of 0.20%. The default setting of R-Gain is 100%.

G-Gain	G-Gain controls the GREEN gain. The control range is between 0% and 150% in steps of 0.20%. The default setting of G-Gain is 100%.
B-Gain	B-Gain controls the BLUE gain. The control range is between 0% and 150% in steps of 0.20%. The default setting of B-Gain is 100%.
RGB-Gain	RGB-Gain controls the total red-green-blue gain. The control range is between 0% and 150% in steps of 0.20%. The default setting of RGB-Gain is 100%.
Y-Black	This item controls the Luminance black level adjustment between -128 and +127 (10 bit digital value). The black level can be aligned by +/- 100mV (analog video). 64 (10 bit digital value) represents the nominal black level value for all digital video standards
Cb-Black	This item controls the blue colour difference (Cb) black level adjustment.
Cr-Black	This item controls the red colour difference (Cr) black level adjustment.
Black	Black controls the total RGBB Black gain. The control range is between -128 bit and 127 bit in steps of 1 bit. The default setting of Black is 0 bit.
R-Black	R_Black controls the Red-Black. The control range is between -128 bits and 127 bits in steps of 1 bit. The default setting of R-Black is 0 bit.
G-Black	G_Black controls the Green-Black. The control range is between -128bits and 127 bits in steps of 1 bit. The default setting of G-Black is 0 bit.
B-Black	B-Black controls the Blue-Black. The control range is between -128 bits and 127 bits in steps of 1 bit. The default setting of B-Black is 0 bit.
Pattern	The HCC05 also includes a test pattern generator. There are two test patterns, namely Colorbar and Sweep. Can also be set to Off. The default setting is off

OSD-Enable	<p>The HCC05 has the option to display an on-screen text at a fixed position (left corner) in the HD_output:</p> <ul style="list-style-type: none">▪ Off: nothing is displayed (default).▪ Transp: the OSD is displayed transparent.▪ Masked: the OSD is displayed in a black box.▪ Blink-Transp: OSD is displayed blinking transparent▪ Blink-Masked: OSD is displayed blinking in a black box
OSD_text	<p>This is the field where you can enter the OSD text with a maximum of ten characters.</p>
Delay-Status	<p>In the status menu it is possible to display the processing time of the HCC05 (IO_delay item). This setting enables you to switch this function on or off. Default setting is off.</p>
S2016_AFD	<p>With this setting you can insert an Active Format Description (AFD) into the signal if the output is HD. You can insert any AFD value between AFD_0 and AFD_15 or switch this option Off. Default value is Off.</p>

6 Status Menu

Introduction The status menu indicates the current status of each item listed below.

SDI-Input This status item indicates the presence and format of a valid HD/SD serial on the input.

This is displayed as:

- 1080i/60/50
- 1080p/30/25/24
- 1035i/60
- 720p/60/50/30/25/24
- SD525
- SD625

NA is used when no valid input signal is available or if the selected format doesn't match the input signal.

ANC-Stat Gives the status of the ancillary data on the input. Can be OK, Error or NA.

CRC-stat Gives the status of the incoming HD/SDI signal CRC. Error, Luma_CRC or Chroma_CRC are possible.

IO_delay IO-Delay displays the processing time of the card in milli seconds (ms). It is necessary to enable this function in the settings menu under Delay status.

S2016_AFD-Det Indicates the current detected Active Format Description (AFD) on the input. Can be any value between AFD_1 and AFD16 or NA if no AFD is detected.

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 HCC05 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	Input can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
CRC-Status	EDH status 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 Cortex 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	01 _{hex} =INP_LOSS	81 _{hex} =INP_RETURN	primary input lost or returned
CRC-Status	03 _{hex} =CRC_ERROR	83 _{hex} =CRC_OK	CRC error occurred

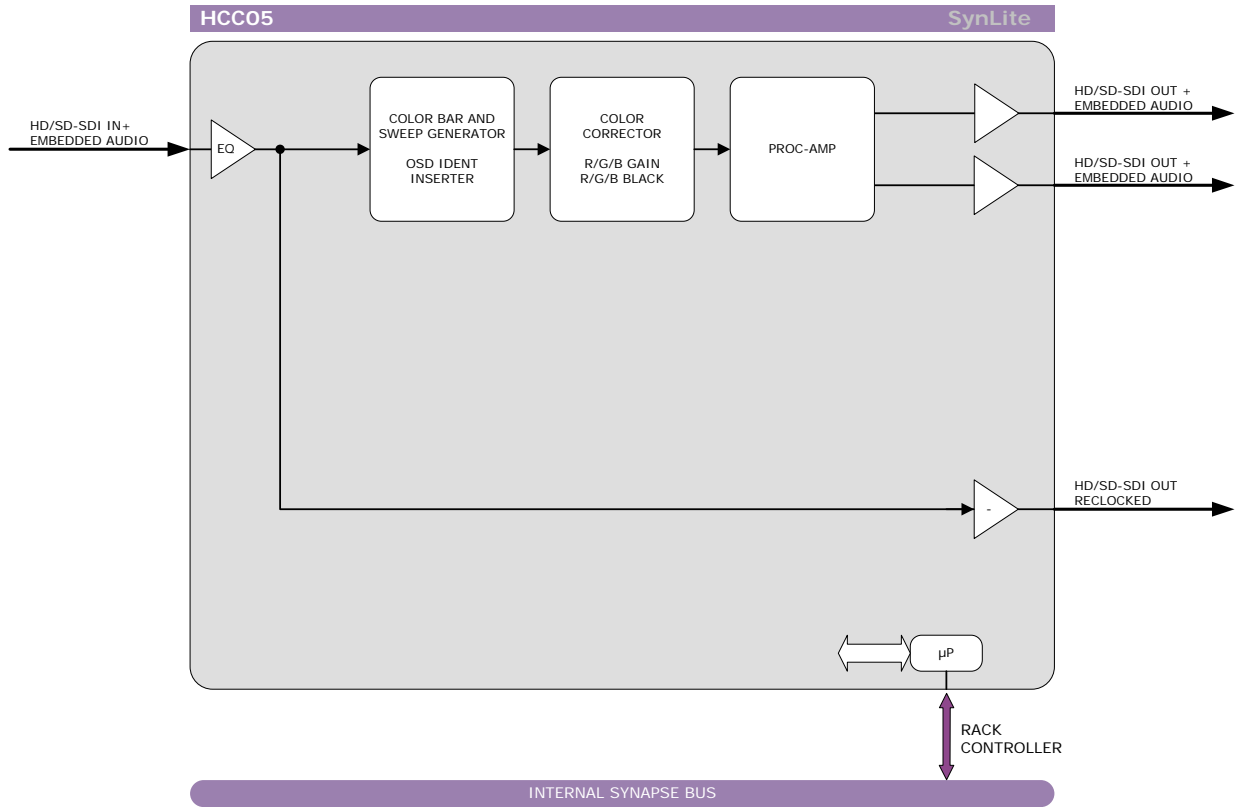
The Priority The priority is a user-defined value. The higher the priority of the alarm, the higher this value. Setting the priority to Zero disables the announcement of this alarm. Alarms with priorities equal or higher than the Error Threshold setting of the RRC will cause the error LED on the Synapse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

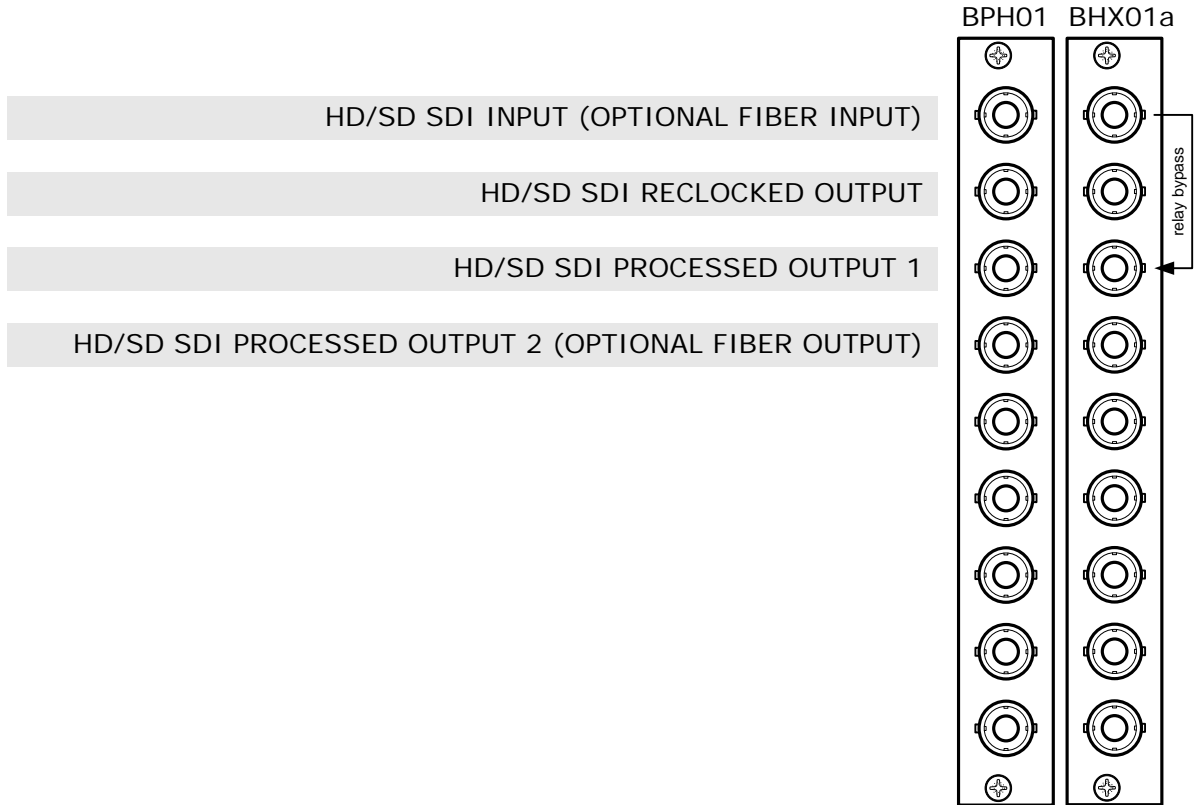
Error LED	The error LED indicates an error if the internal logic of the HCC05 card is not configured correctly or has a hardware failure.
Input LED	This LED indicated the presence of a valid SDI video signal on the input.
Reference LED	Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2).
Data Error LED	This LED indicate two different types of error: <ul style="list-style-type: none">- ANC (embedded audio) checksum error.- EDH error
Connection LED	This LED illuminates after the card has initialised. The LED lights for 0.5 seconds every time a connection is made to the card.

9 Block Schematic



10 Connector Panels

The HCC05 can be used with the BPH01 and BHX01. The following table displays the pinout of these backpanels.



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