

Synapse

ASM08

**Analog to Digital A/V converter with
Composite or component input capability**

Synapse

TECHNICAL MANUAL

ASM08

**Analog to Digital A/V converter with
Composite or component input capability**



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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 ASM08</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:</p> <p>(1) This device may cause harmful interference, and</p> <p>(2) This device must accept any interference received, including interference that may cause undesired operation.</p>
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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 rackcontroller 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/RRS04/RRS18) manual. The method of connection to a computer using Ethernet is described in the RRC manual.



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

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

2 Unpacking and Placement

Unpacking

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

Placing the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR04 or 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.

Default settings

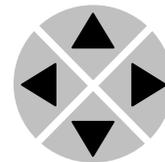
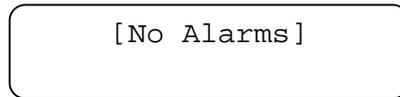
In its default condition, the ASM08 will act as an analog to digital converter..

Changing parameters and settings

The front panel controls or Synapse Cortex can be used to change settings. An overview of the settings can be found in chapter 4, 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.

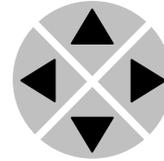
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

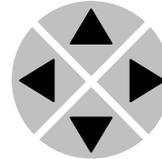
```
RRC18 [Select Card]
>S01=SFS10
```



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]
```



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.

4 The ASM08 Card

Introduction

The ASM08 is an audio and video analog to digital converter. It accepts both component and composite analog video together with 4 channels of analog audio.

The ASM08 is the counter part of the SAM08

Features

- 12-bit video A/D conversion and decoding
- 20-bit audio A/D conversion and processing
- Auto detecting of PAL, NTSC or SECAM with correct reference input selection (SFR18 only)
- Automatic input gain adjustment
- Video Proc amp
- Noise reduction
- Hue adjustment
- Decoder Y-shaping and Y-peaking adjustment
- Adjustable analog audio reference levels of +15, +18 and +24dBu for 0 dBFS
- Adjustable audio gain +12 db to -60 dB
- Adjustable audio phase 0 deg or 180 deg
- Individual selection local analog audio input or ADD-ON audio input
- Second group embedding through ADD-ON card
- VI and WSS insertion
- EDH insertion
- 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
- Optional 1 CVBS output (replacing 1 SDI output) on I/O panel

5 Settings Menu

Introduction The settings menu displays the current state of each setting within the ASM08 and enables the item to be changed or adjusted.

Settings can be changed using the front panel of the Synapse frame (SFR18, SFR08 or SFR04) or Cortex.

Input-Sel The ASM08 accepts a range of inputs: composite (CVBS), Y_Pr_Pb and YC. Input-Sel selects the Active Picture content from the selected source.

The settings of Input-Sel are;

Composite: Composite input.

YC : SVHS Style Input

Y_Pr_Pb : Component input

The default setting of Input-Sel is Composite.

Standard_Dig This item controls the detection of the input standard. The settings of Standard_Dig are Auto detection, 625 or 525. The default setting is Auto. Having detected or set a standard, the ASM08 automatically utilises the settings in the menus 625-Stndrd or 525-Stndrd.

Standard_Ana Standard_Ana sets either the PAL, NTSC and SECAM standards. An Auto detection function is also available. These are the possible settings:

- Auto
- NTSC-J
- NTSC-M
- PAL-60
- NTSC-443
- PAL-BGHID
- PAL-N
- PAL-M
- PAL-M-setup
- PALcmbN
- PALcmbN-setup
- SECAM
- SECAM-setup

The default setting is Auto.

Auto_NTSC	<p>Within the <code>Standard_Ana</code>, <code>Auto_NTSC</code> determines whether <code>NTSC_J</code> or <code>NTSC_M</code> is selected.</p> <p>The default setting is <code>NTSC_M</code>.</p>
Auto_PAL	<p>Within the <code>Standard_Ana</code>, <code>Auto_PAL</code> determines whether <code>PAL-BGHI</code> or <code>PAL_N</code> is selected.</p> <p>The default setting is <code>PAL-BGHI</code>.</p>
Input-Gain	<p>Input-gain determines whether the gain for the composite and <code>Y_Pr_Pb</code> is <code>fixed</code>, <code>variable</code> or <code>auto</code>. In <code>fixed</code> mode the input stage is static and expects a compliant input signal with the correct amplitude. In <code>auto</code> mode an AGC stage is enabled and the voltage is adjusted automatically, depending on the sync amplitude. If the sync is less than 300mV, the video input signal will be amplified with the amount specified as the 300mV sync amplitude. If the sync amplitude is too high the opposite occurs. In <code>variable</code> mode the input signal is manually adjustable.</p> <p>The default setting is <code>auto</code>.</p>
Var-Gain	<p>This is the adjustment menu for the <code>Variable</code> mode as mentioned above. The adjustable range is from <code>0.26x</code> ('x' as in 'multiply') to <code>1.99x</code>. The default setting is <code>1x</code>.</p>
Y-Gain	<p><code>Y-Gain</code> controls the luminance gain of the built-in processing amplifier. The control range is between <code>0%</code> and <code>199.8%</code>.</p> <p>The default setting is <code>100%</code>.</p>
C-Gain	<p><code>C-Gain</code> controls the Chroma gain of the built-in processing amplifier. The control range is between <code>0%</code> and <code>199.8%</code>. The default setting is <code>100%</code>.</p>
Y-Black	<p>This item controls the Luminance black level adjustment between <code>-128BIT</code> and <code>127BIT</code></p> <p>The default setting is <code>0BIT</code>.</p>
C-Black	<p>This item controls the Colour black level black level adjustment. Between <code>-128bit</code> and <code>127 bit</code>.</p> <p>The default setting is <code>0 bit</code></p>

DNR	<p>DNR is the Dynamic Noise Reduction.</p> <p>On will activate this setting; OFF will turn it off.</p> <p>The default setting is ON.</p>
Hue	<p>The selectable NTSC hue range is from –180 to +180 degrees.</p> <p>The default setting is 0.</p>
Y shaping	<p>Y shaping allows you to select a range of filters.</p> <p>AWN auto wide notch: this is an auto detect filter that detects the video standard, and samples the quality of the signal. In accordance with that sample, a wide notch around the subcarrier frequency filter is selected.</p> <p>ANN auto narrow notch: this is an auto detect filter that detects the video standard, and samples the quality of the signal. In accordance with that sample, a narrow notch around subcarrier frequency filter is selected.</p> <p>S1..S18 These are lowpass filters from 2 MHz (S1) to 8 MHz (S18).</p> <p>NN1..3 NTSC Narrow notch filters for the NTSC subcarrier.</p> <p>NW1..3 NTSC Wide notch filters for the NTSC subcarrier.</p> <p>PN 1..3 PAL Narrow notch filters for the PAL subcarrier.</p> <p>PW1..2 PAL Wide notch filters for the PAL subcarrier.</p> <p>The default setting is ANN.</p>
Y peaking	<p>Y-Peaking: this filter is to compensate the luma signal around the subcarrier frequency notation in dB.</p> <p>Selectable values , + 4.5, +1.25, 0, -1.25, -1.75, -3.dB.</p> <p>The default setting is 0dB.</p>
Ana_inp_level	<p>The setting Ana_inp_level will give a full-scale input on all four channels. The available settings are 15dBu, 18dBu and 24 dBu.</p> <p>The default setting is 24dBu.</p>
Phase-Ch_1	<p>The phase of channel 1 can be adjusted with the Phase-Ch1 menu setting item. The setting Phase-Ch_1 can be either 0 deg (degrees) or180 deg.</p> <p>The default setting of PhaseCh1 is 0 deg.</p>

Phase-Ch_2	<p>The phase of channel 2 can be adjusted with the Phase-Ch2 menu setting item. The setting Phase-Ch_2 can be either 0 deg(degrees) and 180 deg.</p> <p>The default setting of PhaseCh2 is 0 deg.</p>
Phase-Ch_3	<p>The phase of channel 3 can be adjusted with the Phase-Ch3 menu setting item. The setting Phase-Ch_3 can be either 0 deg (degrees) and 180 deg.</p> <p>The default setting of PhaseCh3 is 0 deg.</p>
Phase-Ch_4	<p>The phase of channel 4 can be adjusted with the Phase-Ch4 menu setting item. The setting Phase-Ch_4 can be either 0 deg (degrees) and 180 deg.</p> <p>The default setting of PhaseCh4 is 0 deg.</p>
Gain-Ch_1	<p>The menu setting item Gain-Ch_1 controls the output gain of channel 1. Gain-Ch1 has an adjustment range from –60dB to +12dB. When Gain-Ch_1 is set to 0dB, the output level is equal to the input level. Below –60dB, a setting of –999dB is automatically entered and a mute is activated.</p> <p>The default setting of Gain-Ch_1 is 0 dB.</p>
Gain-Ch_2	<p>The menu setting item Gain-Ch_2 controls the output gain of channel 2. Gain-Ch2has an adjustment range from –60dB to +12dB. When Gain-Ch_2 is set to 0dB, the output level is equal to the input level. Below –60dB, a setting of –999dB is automatically entered and a mute is activated.</p> <p>The default setting of Gain-Ch_2is 0 dB.</p>
Gain-Ch_3	<p>The menu setting item Gain-Ch_3 controls the output gain of channel 3. Gain-Ch3 has an adjustment range from –60dB to +12dB. When Gain-Ch_3 is set to 0dB, the output level is equal to the input level. Below –60dB, a setting of –999dB is automatically entered and a mute is activated.</p> <p>The default setting of Gain-Ch_3is 0 dB.</p>
Gain-Ch_4	<p>The menu setting item Gain-Ch_4 controls the output gain of channel 4. Gain-Ch4 has an adjustment range from –60dB to +12dB. When Gain-Ch_4 is set to 0dB, the output level is equal to the input level. Below –60dB, a setting of –999dB is automatically entered and a mute is activated.</p> <p>The default setting of Gain-Ch_4 is 0dB.</p>

Ana-Ch1	<p>Ana-Ch1 selects to what embedded channels or AES/EBU output channel, input channel_1 is routed. Channels can be routed to every output channel, even when it is already in use. Ana_Inp1 , Ana_Inp2, Ana_Inp3 and Ana_Inp4 can be selected.</p> <p>The default setting is Ana_Inp1.</p>
Ana-Ch2	<p>Ana-Ch2 selects to what embedded channels or AES/EBU output channel, input channel_1 is routed. Channels can be routed to every output channel, even when it is already in use. Ana_Inp1 , Ana_Inp2, Ana_Inp3 and Ana_Inp4 can be selected.</p> <p>The default setting is Ana_Inp2.</p>
Ana-Ch3	<p>Ana-Ch3 selects to what embedded channels or AES/EBU output channel, input channel_1 is routed. Channels can be routed to every output channel, even when it is already in use. Ana_Inp1 , Ana_Inp2, Ana_Inp3 and Ana_Inp4 can be selected.</p> <p>The default setting is Ana_Inp3.</p>
Ana-Ch4	<p>Ana-Ch4 selects to what embedded channels or AES/EBU output channel, input channel_1 is routed. Channels can be routed to every output channel, even when it is already in use. Ana_Inp1 , Ana_Inp2, Ana_Inp3 and Ana_Inp4 can be selected.</p> <p>The default setting is Ana_Inp4.</p>
Emb-B	<p>Emb-B determines which ADD-on card is selected.</p> <p>A, being the first card on the right, or B, the second card on the right of card A.</p> <p>To activate the second card, it is required to place both cards.</p> <p>The default setting is Add_On A.</p>
Emb-A-Sel	<p>Emb-A-Sel determines which of the four available audio groups on the Synapse bus will be embedded into the SDI stream by embedder A of the ASM08. The settings of Emb-A-Sel are Off, Group_1, Group_2, Group_3, Group_4.</p> <p>The default setting is Group_1.</p>
Emb-B-Sel	<p>Emb-B-Sel determines which of the four available audio groups on the Synapse bus will be embedded into the SDI stream by the embedder_B of the ASM08. The settings of Emb-B-Sel are Off, Group_1, Group_2, Group_3, Group_4.</p> <p>The default setting is Group_2.</p>

Blank-V-ANC	<p>This item allows blanking of the vertical ancillary data. All data is removed in the vertical interval.</p> <p>OFF means that the data is passed, ON means that the data is removed.</p> <p>The default setting is OFF.</p>
EDH-Gen	<p>This setting allows the user to switch the built in EDH generator on/off. The EDH generator inserts EDH (SDI Error Detection Handling) into the output signal.</p> <p>The possible settings of EDH-Gen are On and Off.</p> <p>The default setting is On.</p>
VI-Insert	<p>The Video Line Index insertion menu enables the generation of Video Index information. Video Index is used to trigger cascaded equipment that processes wide screen manipulation such as aspect ratio converters. 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 VLI-Data 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.</p> <p>Off means that there is no added VLI information.</p> <p>The default setting is Off.</p>
WSS-insert	<p>The WSS insertion menu selects the WSS mode. OFF, Standard, Extended and Blank can be set. The WSS extended is a special mode that uses the physical structure of WSS but with a VI like data setting.</p> <p>The default setting is Off.</p>
WSS-Ext-ins	<p>WSS-Ext-ins sets the WSS extended format. The setting can be within the range. 4:3_0, 4:3_1, 4:3_2, etc to 16:9_0, 16:9_1, 16:9_2 etc.</p> <p>The default setting is 4:3_0</p>
WSS-Std-ins	<p>The WSS standard has 16 levels, 8 for video and 8 for 8 film. Selection is made between #1_vid...#8_vid, or 1_flm to 8_flm.</p> <p>The default setting is 1_vid</p>

6 Status Menu

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

ANA-Input This status item indicates the presence of a valid analog video signal at the input. Possible statuses are:

- NTSC-MJ
- NTSC-443
- PAL-M
- PAL-60
- PAL-BGHID
- SECAM
- PAL-cmbN
- SECAM-525
- FIXED
- NA (not available)

Format-Det 625-Lines and 525-Lines standards can be detected as the valid input signal format, 625/50 and 525/60 are recognised as valid inputs.

**Ana-Audio-1 ~
Ana-Audio-4** These statuses indicate the status of the analog audio inputs 1 till 4. Statuses can be NA (not available), Present or Clipped.

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 ASM08 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_analog	Input_analog can be selected between 0 .. 255. 0= no event, 1..255 are the priority settings. If set to 0, no events will be generated. If the input is lost a priority event will be generated.
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 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 ASM08 are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcing of report and control values
Input_CVBS	01 _{hex} =INP_LOSS	81 _{hex} =INP_RETURN	Analog input 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.

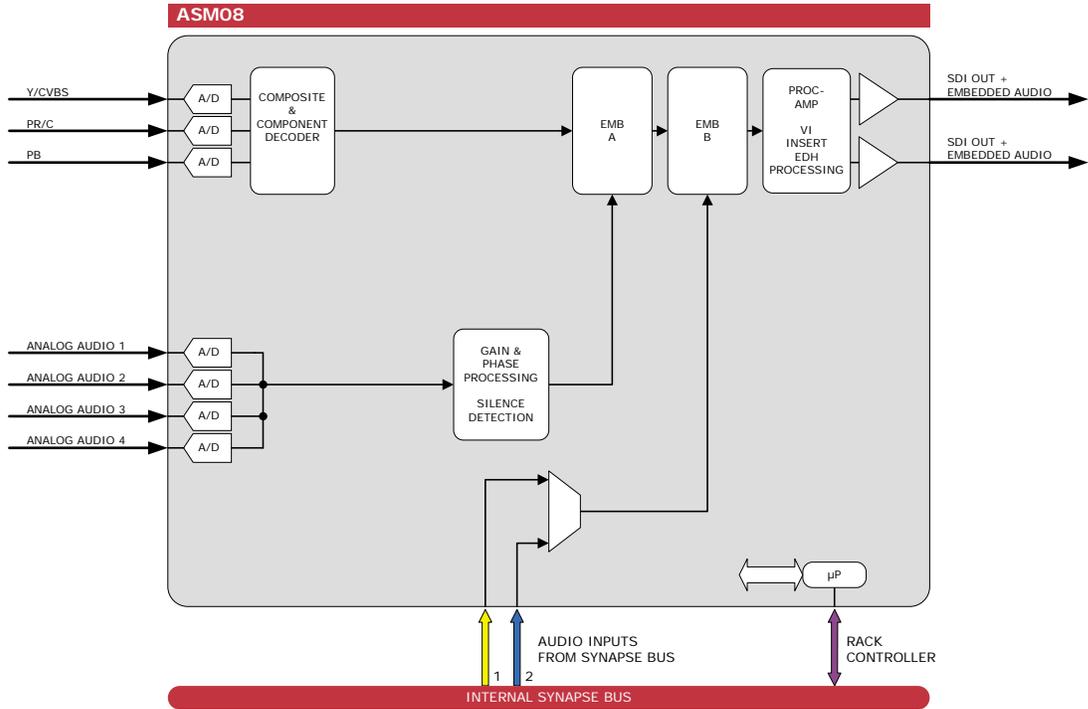
The Address

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

8 LED Indication

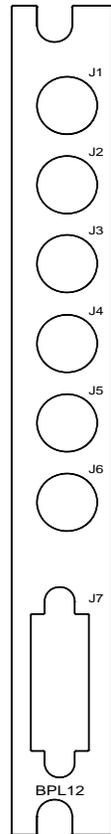
Error LED	The error LED indicates an error if the internal logic of the ASM08 card is not configured correctly or if it has a hardware failure.
Input LED	This LED indicated the presence of a valid video signal on the inputs.
DATA ERROR LED	This led indicates three different types of errors: <ul style="list-style-type: none">- Audio signal 1, 2, 3 or 4 of the local output is clipped- ANC Error- EHD 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 Panel

The ASM08 can be used with the following backplane: BPL12,
Fiber backpanels: BPL12T_FC/PC, BPL12T_SC,
BPL12R_FC/PC and BPL12R_SC



J1 = Not connected

J2 = SDI OUTPUT 1

J3 = SDI OUTPUT 2

J4 = Y / CVBS

J5 = C/Pr

J6 = Pb

J7 = see next page

It is possible to order a Breakout cable

Product number ADD9420260001

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

J7

When used with
Breakout cable

Function	Pin#	Description	Pair-number	Color
Not used	10		1	White
Not used	1		1	Black
Not used	19		1	Blue
Not used	11		2	White
Not used	2		2	Black
Not used	20		2	Blue
Analog_input_1	12	Analog_positive	3	White
Analog_input_1	3	GND	3	Black
Analog_input_1	21	Analog_negative	3	Blue
Analog_input_2	13	Analog_positive	4	White
Analog_input_2	4	GND	4	Black
Analog_input_2	22	Analog_negative	4	Blue
Analog_input_3	14	Analog_positive	5	White
Analog_input_3	5	GND	5	Black
Analog_input_3	23	Analog_negative	5	Blue
Analog_input_4	15	Analog_positive	6	White
Analog_input_4	6	GND	6	Black
Analog_input_4	24	Analog_negative	6	Blue
Not used	18		9	Blue

Asymmetric audio pinning

When you want to input asymmetric audio, you have to connect the ground to the analog_negative pin.