

Synapse

HAC08

HD Monitoring D/A converter
(component output)

Synapse

TECHNICAL MANUAL

HAC08

HD monitoring D/A converter.
(component outputs)



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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 HAC08</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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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 and RRC04 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) manual. The method of connection to a computer using Ethernet is described in the RRC manual.



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

Although not required to set up a Synapse frame, you are strongly advised to use a remote personal computer or laptop PC with the Synapse Setup software 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.

Locating the card

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

3 A Quick Start

When Powering-up

On powering up the Synapse frame, the card set will use basic data and default initialisation settings.

Default settings

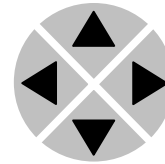
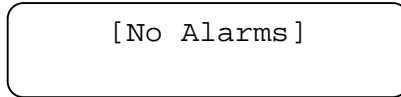
Refer to the menu structure for settings.

Changing settings and parameters

The front panel controls or the Synapse Setup Software 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.

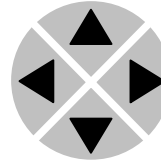
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

REMARK: 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

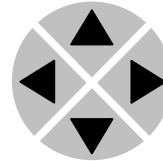
```
RRC18 [Select Card]
>S01=HAC08
```



Pressing the ► selects the HAC08 in frame slot 01.

The display changes to indicate that the HAC08 has been selected. In this example the Settings menu item is indicated.

```
HAC08 [Select Menu]
>Settings
```

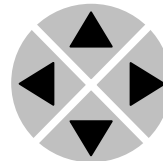


Pressing the ► selects the menu item shown, in this example Settings.

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

The display changes to indicate that the HAC08 Settings menu item SDI-Format has been selected and shows that its current setting is Auto.

```
HAC08 [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 HAC08 Edit Setting menu item SDI-Format has been selected.

```
HAC08[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 Setup Software

Synapse Setup Software 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. The Synapse SetUp software 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.

Having selected the desired Frame and Module from the GUI Synapse Network View, select the menu item that you wish to open. Opening the menu item gives a complete list of available properties with their associated Value.

For example to change a setting e.g. SDI-Format, select SDI-Format from the list of settings by 'double clicking' to open a dialogue box. The dialogue box allows parameters to be changed or set to default value. On completion close the dialogue box.

Menu Structure Example

Slot	Module	Item	Parameter	Setting
▲				
▲				
S02		Identity		
▲				
S01	HAC08	Settings	SDI-Format	Auto
▼				
S00	RRC18	Status	Mode	625
		▼		▼
		Events	Ref-Input	525
			▼	
			H-Delay	
			▼	
			▼	

REMARK Further information about Front Panel Control and Synapse Setup Software can be obtained from the RRC18 and RRC04 operational manuals.

4 The HAC08 Card

Introduction	The AXON HAC08 is a High Definition Monitoring D/A converter (component outputs)
Inputs and Outputs	The HAC08 is a single input, and component R-G-B or YPbPr output with H-Sync, V-Sync and Tri-level-Sync. 1- Reclocked output SD/HD-SDI
Supported input formats	The HAC08 supports SD-SDI and HD-SDI, for HD the formats: 1080I-59.94/50, 1035I-60, 1080P-30/25/24, 720P-59.94/50/30/25/24
SD SDI Compatible	The HAC08 is compatible with a range of Standard Definition SDI input signals.
Back planes	The HAC08 can be used with the BPH01 backplanes. And fiber optics backplane BPH01_R_SC, BPH01_R_FC/PC
Applications	SD/HD-SDI to analog CRT conversion and HD-SDI to tri-level sync conversion.
Miscellaneous	The HAC08 cards fit into the Axon SFR04 & SFR18 rack. LED's on the front of the board indicate the presence of an Input signal, Connection & Processor Errors. The HAC08 can be controlled by Axon Synapse set-up software.

5 Settings Menu

Introduction	<p>The settings menu displays the current state of each setting within the HAC08 and enables the item to be changed or adjusted.</p> <p>Settings can be changed using the front panel of the Synapse frame (SFR18 or SFR04) or Synapse Setup software.</p> <p>Please refer to chapter 3 for information on the Synapse front panel control and Synapse Setup software.</p>
Standard	<p>Standard determines the input format. The setting AUTO selects the standard automatically. It is also possible to select the following fixed standards: 1080i-60, 1080i-50, 1080p-30, 1080p-25, 1080p-24, 1035i-60, 720p-60, 720p-50, 720p-30, 720p-25, 720p-24 525i-60 and 525i-50.</p> <p>The default setting is AUTO</p>
ColorSpace	<p>Colorspace changes the format of the component output.</p> <p>GBR or YCbCr are the available formats.</p> <p>The default setting is GBR.</p>
SyncOnGBR	<p>SyncOnGBR enables that there is a SYNC provided on the G or Y component output. Set ON to enable or OFF to disable.</p> <p>The default setting is ON.</p>
Gain	<p>Gain, enables or disables the procamp. Select ON to enable, OFF to disable. When ON is selected, the available settings are R-G-B gain, Y-C gain, R-G-B gain active.</p> <p>The default setting is OFF.</p>
R-Gain	<p>R-Gain adjusts the level of the R or Cr component in a range from 50% to 150%.</p> <p>The default setting is 100%</p>
G-Gain	<p>G-Gain adjusts the level of the G or Y component in a range from 50% to 150%.</p> <p>The default setting is 100%</p>
B-Gain	<p>B-Gain adjusts the level of the B or Cb component in a range</p>

	<p>from 50% to 150%</p> <p>The default setting is 100%</p>
Y-Gain	<p>Y-Gain adjusts the Y component of the composite output. Y-Gain has an adjustment range of 50% to 150%.</p> <p>The default setting of Y-Gain is 100%.</p>
C-Gain	<p>C-Gain adjusts the level of the Chroma component (C) of all component outputs. It has a range from 50% to 150%.</p> <p>The default setting is 100% .</p>
R-Black	<p>R-Black adjusts the black level of the R or Cr component in a range from -128 bit to 127 bit.</p> <p>The default setting is 0 bit .</p>
G-Black	<p>G-Black adjusts the black level of the G or Y component in a range from -128 bit to 127 bit.</p> <p>The default setting is 0 bit .</p>
B-Black	<p>B-Black adjusts the black level of the B or Cb component in a range from -128 bit to 127 bit</p> <p>The default setting is 0 bit .</p>

6 Status Menu

Introduction The status menu indicates the current status of each item listed below. There are no defaults for status indicators. Status depends of input signals being present or not.

Input Input displays the format of the input. NA no input is present. Or as the input format.

CRC CRC Gives the status of the incoming HD-SDI.
OK
Error
Luma_CRC
Chroma_CRC

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.
HAC08 Events	The events reported by the HAC08 are as follows;
Announcements	<p>Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on.</p> <p>Beware: this does NOT influence the announcement from the cards within the frame or the announcing of the Frame Status object. Use the 'Settings' menu items 'Broadcasts' and 'Forwarding' for Announcement propagation on the network.</p>
Input	Input can be selected between 0..255, 0 is no event. 1..255 is the priority setting.
CRC	CRC can be selected between 0..255, 0 is 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 Setup 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 HAC08 are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcing of report and control values
Signal_Input	01 _{hex} =INP_LOOSED	81 _{hex} =INP_RETURN	SDI input loosed or returned
CRC	03 = CRC error	83 = CRC OK	

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.

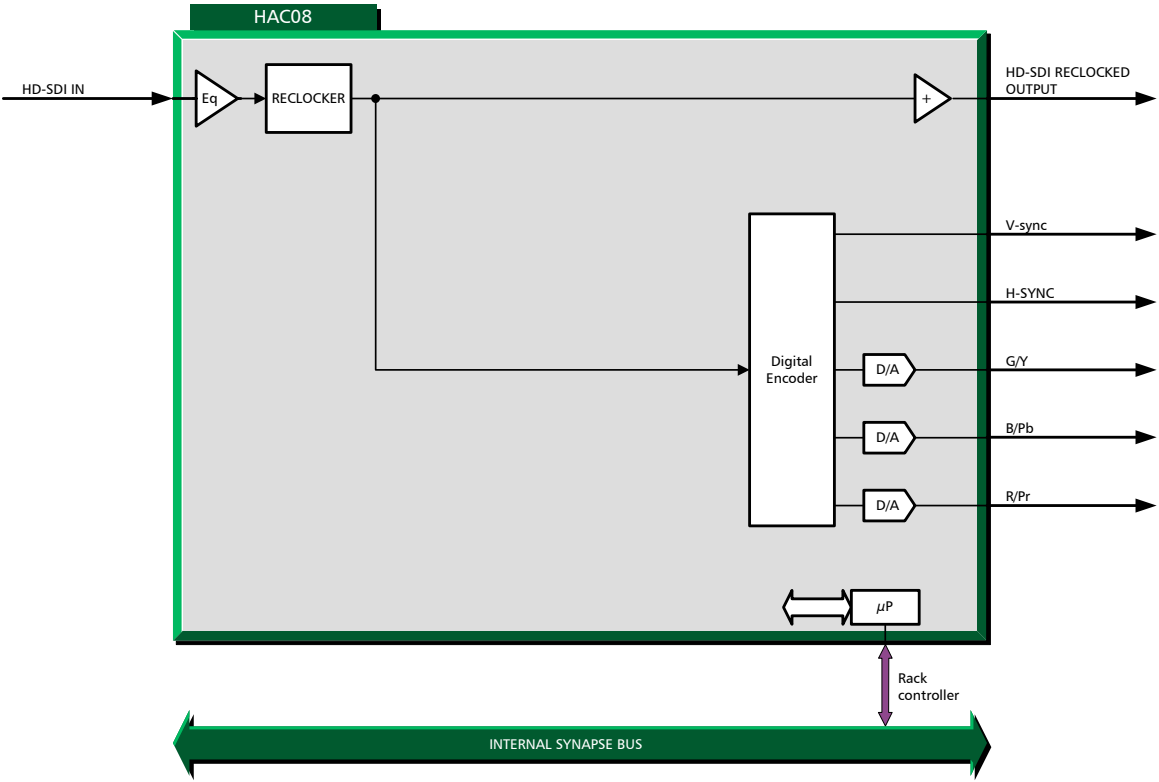
The Address

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

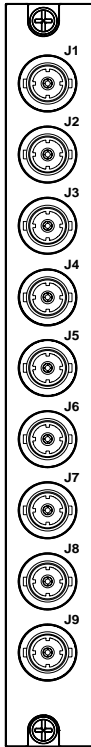
Error LED	The error LED indicates an error if the internal logic of the HDB10 card is not configured correctly or has a hardware failure.
Input LED	This LED indicated the presence of a valid SDI video signal on the input.
ANC Data LED	Not applicable.
Data Error LED	This LED indicates CRC errors.
Connection 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 Schematics



10 Connector Panel

The HAC08 can be used with the following backplane: BPH01.
 And fiber backplanes: BPH01R_SC and BPH01R_FC/PC



J1	SD/HD-SDI Input
J2	SD/HD-SDI Reclocked Output
J3	Not used
J4	Tri-level sync
J5	V-sync
J6	H-sync
J7	G/Y
J8	B/Pb
J9	R/Pr

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

Appendix 1 HD Formats

HD Formats

Sample freq. = 74.25 MHz	Tot. Pixels per line	Tot. Lines Per frame	Frame rate	Active samples per line	Active lines per frame	
1080i-60 *	2200	1125	30	1920	1080	2200 x 1125x 30x2= 1.485G
1080i-50	2640	1125	25	1920	1080	2640 x 1125x 25x2= 1.485G
1080p-30 *	2200	1125	30	1920	1080	2200 x 1125x 30x2= 1.485G
1080p-25	2640	1125	25	1920	1080	2640 x 1125x 25x2= 1.485G
1080p-24 *	2750	1125	24	1920	1080	2750 x 1125x 24x2= 1.485G
1035i-60	2200	1125	30	1920	1035	2200 x 1125x 30x2= 1.485G
720p-60 *	1650	750	60	1280	720	1650 x 750x 60x2= 1.485G
720p-50	1980	750	50	1280	720	1980 x 750x 50x2= 1.485G
720p-30 *	3300	750	30	1280	720	3300 x 750x 30x2= 1.485G
720p-25	3960	750	25	1280	720	3960 x 750x 25x2= 1.485G
720p-24 *	4125	750	24	1280	720	4125 x 750x 24x2= 1.485G

Sampling frequency	Frame rates		
74.25 MHz	60	30	24
74.25 x 1000/1001 MHz	59.94	29.97	23.98

Progressive Segmented Frame

A segmented frame system shall scan a frame as a first field that as a second field, in which the scan lines of each field have twice the vertical spatial sampling pitch of the frame.

Scanning lines in the second field shall be displaced vertically by the vertical sampling pitch, but the scanning time shall be the same temporally as that of scanning lines in the field.