

Synapse

DAD08/09

Digital Audio Distribution Amplifier

Synapse

TECHNICAL MANUAL

DAD08 & DAD09

Digital Audio Distribution Amplifier



Lange Wagenstraat 55

NL-5126 BB Gilze

The Netherlands

Phone: +31 161 850 450

Fax: +31 161 850 499

E-mail: Info@axon.tv

Web: www.axon.tv



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
DAD0809

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 rack controller manuals (RRCxx, RRSxx, ERCxxx and ERSxxx) 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 manual. The method of connection to a computer using Ethernet is also described in the RRC/RRS/ERC/ERS 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 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.

REMARK: On power up all LEDs 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 LEDs will light during this process. After initialisation, several LEDs will remain lit – the exact number and configuration is dependant upon the number of inputs connected and the status of the inputs.

Default settings

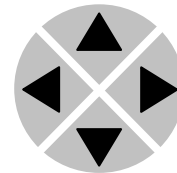
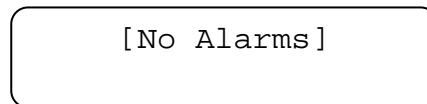
In the default condition, the DAD08 & DAD09 will act as a frame Digital Audio Distribution Amplifier.

Changing settings and parameters

The front panel controls or the Cortex Software 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.

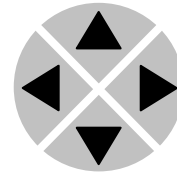
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

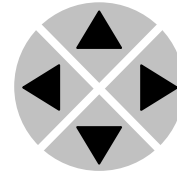
```
RRC18 [Select Card]
>S01=SFS10
```



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
```

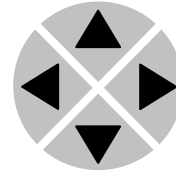


Pressing the ► selects the menu item shown, in this example Settings.

(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
```

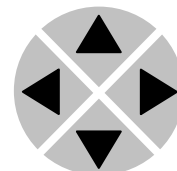


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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.

Cortex Software

Cortex 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. 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 more details about operating Cortex, please refer to the Cortex help-files (press F1)

Menu Structure Example

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

4 The DAD08/09 Card

Introduction	<p>The Axon DAD08 and DAD09 are Digital Audio Distribution Amplifiers that distribute a single input to eight outputs. The DAD08/09 accept AES/EBU or SPDIF (Consumer Interface Format) digital audio input that is then reclocked, buffered and distributed to the eight outputs. The DAD08 has transformer coupled balanced input and outputs, whereas the DAD09 has a transformer coupled balanced input and direct balanced outputs.</p> <p>Multiple regenerated independent low jitter outputs make the DAD08 and DAD09 ideal for the most demanding digital audio signal distribution requirements in both large and small audio and video facilities.</p>
Key Features	<p>The Key features of the DAD08 and DAD09 are as follows:</p>
Wide Range Of Sample Rates	<p>The DAD08 and DAD09 offer a wide range of sample rates. Sample rates from 24 to 96 kHz are decoded and cleanly regenerated. Standard sample rates of 32, 44.1, 48, 88.2 and 96 kHz are indicated.</p>
Signal Status Indication	<p>Signal status and error messages included in the audio data format are decoded and displayed.</p>
I/O Flexibility	<p>The DAD08 and DAD09 offer a wide range of input and output options depending on the choice of backplane, giving a high degree of system flexibility.</p> <p>Balanced Input: Both the DAD08 & DAD09 offer a transformer coupled balanced audio input when a backplane is used that supports the use of three-conductor connections e.g. BPL05.</p> <p>Balanced Output: The DAD08 offers transformer coupled balanced audio outputs, whereas the DAD09 offers direct balanced audio outputs when a backplane is used that supports the use of three-conductor connections e.g. BPL05</p> <p>Unbalanced Input: Both the DAD08 & DAD09 can be used with an unbalanced audio input when a backplane is used that supports the use of BNC connectors e.g. BPL01</p> <p>Unbalanced Output: Both the DAD08 & DAD09 can provide unbalanced audio outputs when a backplane is used that supports the use of BNC connectors e.g. BPL01</p> <p>Levels and connectors are optimized for use with balanced XLR 110 ohm cable or unbalanced BNC 75 ohm coaxial cable.</p>

The BPX01 can also be used. The BPX01 is a connector panel similar to the BPL01 with a back up facility to connect J1 with J4 in a card or power failure situation.

Also an all D-Sub version can be used. The BPL05D.

Fiber backplane with unbalanced In/Outputs: BPL01T_SC, BPL01T_FC/PC, BPL01R_SC, BPL01_FCPC

5 Settings Menu

Introduction

The settings menu displays the current state of each setting within the DAD08 and DAD09 and enables the item to be changed or adjusted. Settings can be changed using the front panel of the Synapse frame or Cortex software. Please refer to chapter 3 for information on the Synapse front panel control and Cortex software.

Validity-bit

This setting sets the validity bit in the AES audio stream. The validity bit is 0 if the audio sample word is suitable for conversion to an analog audio signal, and it is 1 if it is not. In other words: set it to valid (0) when audio is PCM. Set to invalid (1) when audio is data (for instance Dolby).

These are the possible settings:

- Valid: fixed validity bit set to 0
- Invalid: fixed validity bit to 1
- Auto: the validity bit is set to match the detected input (refer to status item Audio-Format)

6 Status Menu

Introduction

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

Error

The `Error` status item indicates the current condition of the audio being processed. The errors have a priority associated with their error code, with validity having the lowest priority and no lock having the highest priority. Since only one code can be displayed, the error with the highest priority that occurred since the last clearing will be visible.

This item can have the following status;

`No Error`: The digital audio signal has no errors.

`Validity Bit High`: Indicates that the validity bit for a previous sample was high since the last clearing of the error codes.

`CRC Error`: This error is indicated when the CRC value does not match the CRC byte of the channel status block or when a block boundary changes (as in removing samples while editing).

`Parity Error`: The parity error occurs when the incoming sub-frame does not have even parity as specified by the standards.

`Bi-phase Error`: The bi-phase coding error indicates a bi-phase coding violation occurred.

`No Lock`: This error message indicates that the PLL is not locked onto the incoming data stream.

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.
DAD08/09 Events	The events reported by the DAD08/09 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.
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 DAD08/09 are:

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

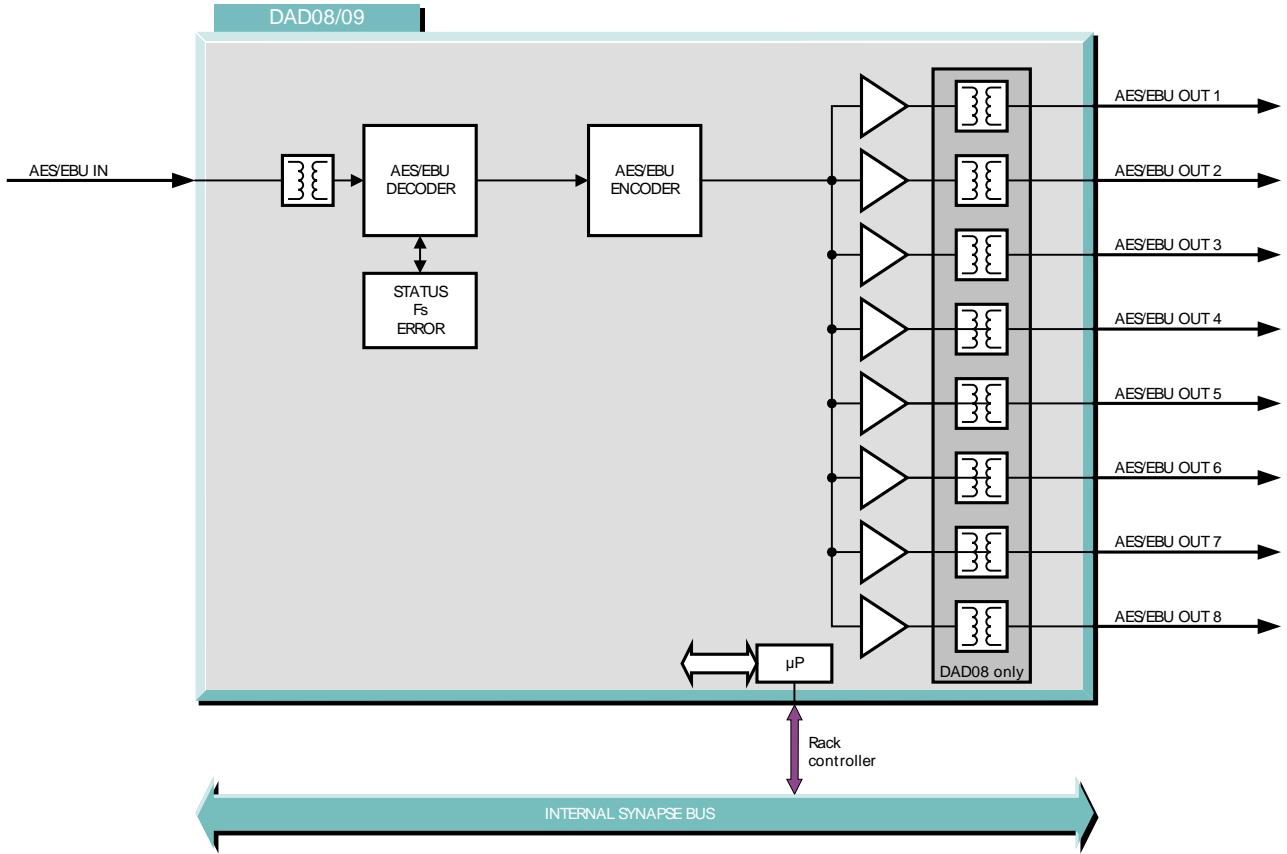
The Address

Together with the message string 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	Although mounted on the DAD08 and DAD09 cards, the Error LED is not used.
Input LED	This LED indicated the presence of a valid AES/EBU digital audio signal on the input.
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

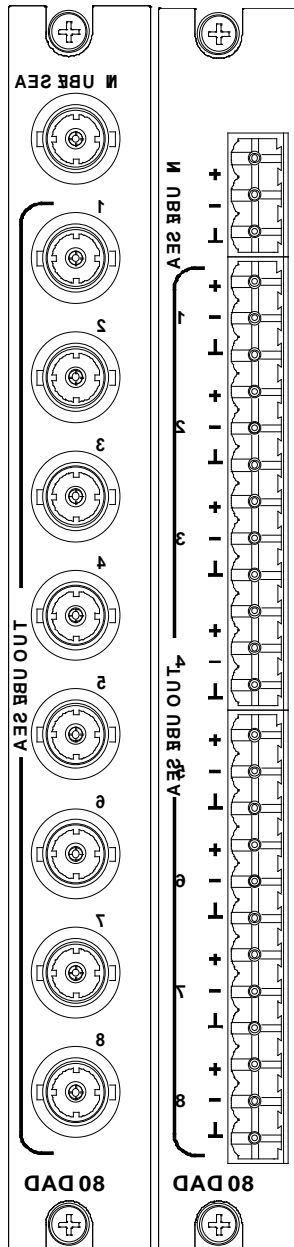


10 Connector Panel

The DAD08/09 can be used with the following backplanes:
BPL01 BPL05 and BPL05D

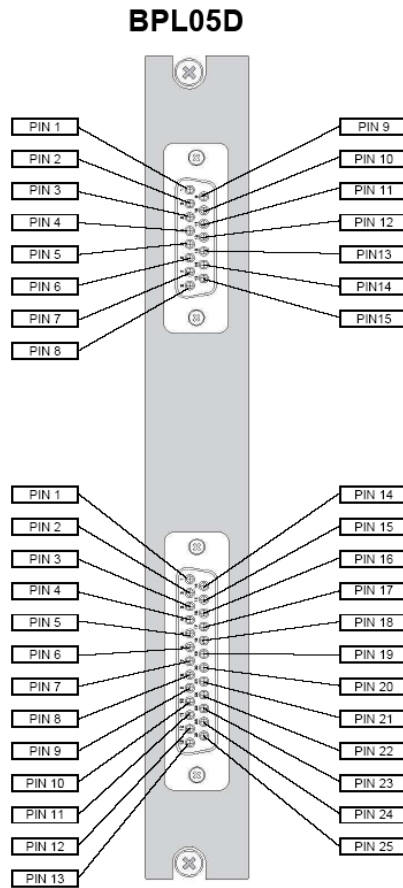
BPL01 BPL05 BPX01 BPL05D

Fiber: BPL01T_FC/PC, BPL01T_SC, BPL01R_FC/PC and
BPL01R_SC



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

BPL05D



15P D-SUB FEMALE

	DAD08	DAD09
PIN 1	AES/EBU IN	AES/EBU IN
PIN 2	AES/EBU IN	AES/EBU IN
PIN 3	NC	NC
PIN 4	NC	NC
PIN 5	NC	NC
PIN 6	NC	NC
PIN 7	NC	NC
PIN 8	NC	NC
PIN 9	GND	GND
PIN 10	NC	NC
PIN 11	NC	NC
PIN 12	NC	NC
PIN 13	NC	NC
PIN 14	NC	NC
PIN 15	NC	NC

25P D-SUB FEMALE

PIN 1	AES1+ OUT	AES1 - OUT
PIN 2	AES1- OUT	AES1+ OUT
PIN 3	GND	GND
PIN 4	AES3+ OUT	AES3 - OUT
PIN 5	AES3- OUT	AES3+ OUT
PIN 6	GND	GND
PIN 7	AES5+ OUT	AES5 - OUT
PIN 8	AES5- OUT	AES5+ OUT
PIN 9	GND	GND
PIN 10	AES7+ OUT	AES7 - OUT
PIN 11	AES7- OUT	AES7+ OUT
PIN 12	GND	GND
PIN 13	GND	GND
PIN 14	GND	GND
PIN 15	AES2- OUT	AES2+ OUT
PIN 16	AES2+ OUT	AES2 - OUT
PIN 17	GND	GND
PIN 18	AES4- OUT	AES4+ OUT
PIN 19	AES4+ OUT	AES4 - OUT
PIN 20	GND	GND
PIN 21	AES6- OUT	AES6+ OUT
PIN 22	AES6+ OUT	AES6 - OUT
PIN 23	GND	GND
PIN 24	AES8- OUT	AES8+ OUT
PIN 25	AES8+ OUT	AES8 - OUT