

*Synapse*

DIO24

**4 Channel Audio Sample Rate Converter  
Tracking delay ADD-ON card**



*Synapse*

## TECHNICAL MANUAL

DIO24

**4 Channel Audio Sample Rate Converter  
Tracking delay ADD-ON card**



Lange Wagenstraat 55

NL-5126 BB Gilze

The Netherlands

Phone: +31 161 850 450

Fax: +31 161 850 499

E-mail: [Info@axon.tv](mailto:Info@axon.tv)

Web: [www.axon.tv](http://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.

**Copyright © 2001 – 2006 AXON Digital Design B.V.**

Date created: 05-02-02

Date last revised: 11-11-06

**Axon, the Axon logo and Synapse are trademarks of Axon Digital Design B.V.**

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 DIO24  
**FC** 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.

# Table of Contents

<b>Chapter 1</b>	<b>Introduction to Synapse</b>	<b>3</b>
	An introduction to Synapse	3
	Local Control Panel	3
	Remote Control Capabilities	3
<b>Chapter 2</b>	<b>Unpacking and Placement</b>	<b>4</b>
	Unpacking	4
	Placing the card	4
<b>Chapter 3</b>	<b>A Quick Start</b>	<b>5</b>
	When powering-up	5
	Default settings	5
	Changing parameters and settings	5
	Front Panel Control	5
	Example of changing parameter using Front Panel control	5
	Synapse Setup Software	7
	Menu Structure Example	7
<b>Chapter 4</b>	<b>The DIO24 cards</b>	<b>8</b>
	Introduction	8
	Key Features	8
<b>Chapter 5</b>	<b>Settings Menu</b>	<b>10</b>
<b>Chapter 6</b>	<b>Status Menu</b>	<b>14</b>
<b>Chapter 7</b>	<b>Events</b>	<b>15</b>
<b>Chapter 8</b>	<b>LED Indication</b>	<b>18</b>
<b>Chapter 9</b>	<b>Setup Examples</b>	<b>19</b>
<b>Chapter 10</b>	<b>Block Schematic</b>	<b>21</b>
<b>Chapter 11</b>	<b>Connector panel</b>	<b>22</b>

# 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](http://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 SET-UP” SOFTWARE WILL INCREASE SYSTEM FLEXIBILITY OF ONE OR MORE SYNAPSE FRAMES**

Although not required to Setup 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.

REMARK: On power up all LEDs will light for a few seconds, this is the time it takes to initialise the card.

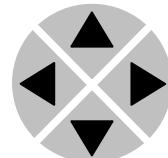
### 3 A Quick Start

**Power-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 DIO24 acts a sample rate converter, converting asynchronous AES/EBU audio.

**Changing settings and parameters** The front panel controls or the Synapse Set-Up 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.

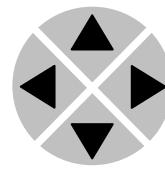
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

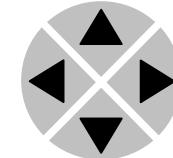
RRC18 [Select Card]  
>S01=SFS10



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

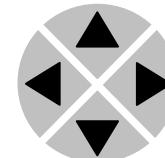


Pressing the ► selects the menu item shown, in this example Settings.

(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 it current setting is Auto.

SFS10 [Settings]  
>SDI-Format=Auto

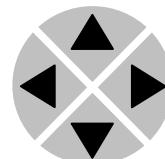


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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.

## Synapse Setup Software

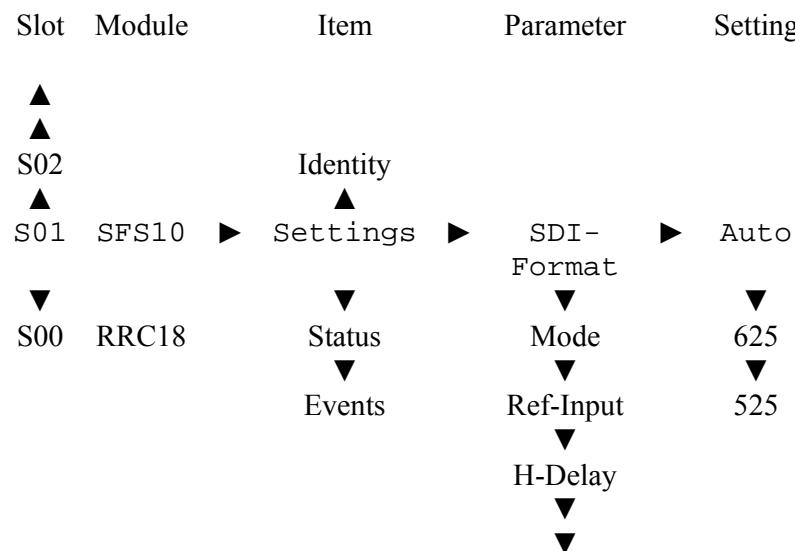
Synapse Setup Software can be used to change the settings of Synapse modules from a PC, either locally or remotely. The software enables communication based on TCP/IP between the Setup PC and Synapse frames/modules.

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 form 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



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

## 4 The DIO24 Card

### Introduction

The AXON DIO24 is a multi function product. Its basic function is the conversion of asynchronous AES/EBU digital audio into synchronous AES/EBU utilizing the on-board sample rate converter. The DIO24 has a tracking audio delay, with a delay offset possibility of up to 1300ms, and it can perform the Synapse ADD-ON function.

In ADD-ON mode the card acts as a digital audio input board that feeds a master card positioned one slot left of the ADD-ON card. For example the DIO24 acts as a digital audio embedder when used with the Axon ASV10 or SFS11.

The manipulated audio data that enters the Synapse bus to a master card is identical to the data present on the local AES/EBU outputs. The AES/EBU in and outputs are available on 75 Ohm BNC or 110 Ohm screw terminals. This choice is made with the choice of back panel. The BPL02 has 75 Ohm AES/EBU in and outputs. The BPL03 has 75 Ohm AES/EBU inputs and 110 Ohm AES/EBU outputs and the BPL04 has 110 Ohm AES/EBU in and outputs.

The user has control over channel selection/swapping, gain and phase control of all 4 audio channels.

### Key Features

The Key features of the DIO24 are as follows:

### Performance

The DIO24 has high quality sample rate converters that are capable of sampling up to 96kHz. The SRC (sample rate conversion) based digital audio inputs can handle sample rates from 32k to 96k.

### ADD-ON Functionality

As described in the introduction the DIO24 can be used as an ADD-ON card for embedding digital audio. Examples of Master cards that are capable of embedding are ASV08, ASV10, ASC10, SFS11, SFS21, and the SEB20. The SEB20 is an audio embedder but can add an extra set of 4 audio channels when used with the DIO24 without the need to cascade serial digital video equipment.

In ADD-ON mode the DIO24 receives a clock from the master card. This audio clock is locked to the video on the master card. An extra VCXO based PLL removes any jitter that might be induced in the video environment.

The DIO24 also acts as a loop card for an additional ADD-ON card. The block schematic illustrates this with the colored arrows. The yellow arrow is the output of the DIO24. The red, blue and green arrows provide a loop for adjacent ADD-ON cards.

### Back planes

The DIO24 can be used with the BPL02, BPL03 and BPL04 backplanes.

## **Miscellaneous**

The DIO24 cards fit into the Axon SFR04 & SFR18 rack.

LED's on the front of the board indicate the presence of an Audio Input signal, Connection & Processor Errors.

The DIO24 can be controlled by Axon Synapse set-up software.

## 5 Settings Menu

### Introduction

The settings menu displays the current state of each setting within the DIO24 and enables the item to be changed or adjusted.

Settings can be changed using the front panel of the Synapse frame (SFR18 or SFR04) or Synapse Setup software.

Please refer to chapter 3 for information on the Synapse front panel control and Synapse Setup software.

### Out-Ch\_1

The DIO24 has four digital audio inputs. This menu item provides the choice to route any of the inputs to any of the outputs.

The AES/EBU outputs are defined as Out-Ch\_1 to Out-Ch\_4. Out-Ch\_1 is the left channel of AES/EBU 1 and Out-Ch\_2 is the right channel of AES/EBU 1. Left and right of AES/EBU 2 are channel 3 and 4 respectively.

Here we also use channel 1 to 4 to designate left1, right1, left2 and right2. So the input selection possibilities are Aes\_1\_L, Aes\_1\_R, Aes\_2\_R and Aes\_2\_L.

The setting Out-Ch\_1 designates an input to output channel 1 as described above. The Setting of Out-Ch\_1 are AES\_1\_R, AES\_1\_L, AES\_2\_R, AES\_2\_L. The default setting is AES\_1\_L.

### Out-Ch\_2

The setting Out-Ch\_2 designates an input to output channel 2 as described above (Out-Ch\_1). The Setting of Out-Ch\_2 are AES\_1\_R, AES\_1\_L, AES\_2\_R, AES\_2\_L. The default setting is AES\_1\_R.

### Out-Ch\_3

The setting Out-Ch\_3 designates an input to output channel 3 as described above (Out-Ch\_1). The Setting of Out-Ch\_3 are AES\_1\_R, AES\_1\_L, AES\_2\_R, AES\_2\_L. The default setting is AES\_2\_L.

### Out-Ch\_4

The setting Out-Ch\_4 designates an input to output channel 4 as described above (Out-Ch\_1). The Setting of Out-Ch\_4 are AES\_1\_R, AES\_1\_L, AES\_2\_R, AES\_2\_L. The default setting is AES\_2\_R.

<b>SRC</b>	The AES/EBU inputs are connected to a Sample Rate Converter. This enables the input to use audio sample rates that are non-synchronous to video. For Non PCM audio data the SRC can be bypassed and the data is inserted in the card transparently (Trans).  The settings of SRC are On and Trans. The default setting is On.
<b>Ref-Input</b>	The output frequency of the DIO24 can be free running from a local oscillator or locked to different sources.  The setting of Ref-Input are as follows; NO_ref set the DIO24 in to free running mode. Add_on enables the DIO24 to be locked to the master card located one position to the right in the SFR18/04 . Wordclk1 and Wordclk2 is used when a 48k wordclock is connected to the central genlock input of the SFR18/04. Genlock1 and Genlock2 is used when a video Black& Burst is connected to the central genlock input of the SFR18/04. The default setting of Ref-Input is NO_ref.
<b>Smplrate</b>	The frequency that is used to clock the output of the Sample Rate converter can be set to 48 kHz or 96 kHz. This will be the output sample rate of the AES/EBU signal and the signal entering the ADD-On bus.  The settings of Smplrate are 48kHz and 96kHz. The default setting is 48kHz.
<b>Masterfade</b>	Masterfade provides a signal prior to the event to ramp down and then ramp up the audio to mask any audio irregularities.  The settings of Masterfade are On and Off. The default setting is Off.
<b>Gain-Ch_1</b>	The settings menu item Gain-Ch_1 controls the output gain of channel 1, the left channel of the first AES/EBU output. Gain-Ch_1 has an adjustment range between -999.0dB and +12.0dB. When Gain-Ch_1 is set to lower then -60dB the output level is silenced and automatically set to -999dB. When set to 0dB the output level is equal to the input level. The default setting of Gain-Ch_1 is 0dB.

<b>Gain-Ch_2</b>	The settings menu item Gain-Ch_2 controls the output gain of channel 2, the right channel of the first AES/EBU output. Gain-Ch_2 has an adjustment range between -999.0dB and +12.0dB. When Gain-Ch_2 is set to lower than -60dB the output level is silenced and automatically set to -999dB. When set to 0dB the output level is equal to the input level. The default setting of Gain-Ch_2 is 0dB.
<b>Gain-Ch_3</b>	The settings menu item Gain-Ch_3 controls the output gain of channel 3, the left channel of the second AES/EBU output. Gain-Ch_3 has an adjustment range between -999.0dB and +12.0dB. When Gain-Ch_3 is set to lower than -60dB the output level is silenced and automatically set to -999dB. When set to 0dB the output level is equal to the input level. The default setting of Gain-Ch_3 is 0dB.
<b>Gain-Ch_4</b>	The settings menu item Gain-Ch_4 controls the output gain of channel 4, the right channel of the second AES/EBU output. Gain-Ch_4 has an adjustment range between -999.0dB and +12.0dB. When Gain-Ch_4 is set to lower than -60dB the output level is silenced and automatically set to -999dB. When set to 0dB the output level is equal to the input level. The default setting of Gain-Ch_4 is 0dB.
<b>Phase-Ch_1</b>	The phase of channel 1 can be adjusted using the setting menu item Phase-Ch_1. The settings of Phase-Ch_1 are 0 deg (degrees) and 180 deg. The default setting of Phase-Ch_1 is 0 deg.
<b>Phase-Ch_2</b>	The phase of channel 2 can be adjusted using the setting menu item Phase-Ch_2. The settings of Phase-Ch_2 are 0 deg (degrees) and 180 deg. The default setting of Phase-Ch_2 is 0 deg.
<b>Phase-Ch_3</b>	The phase of channel 3 can be adjusted using the setting menu item Phase-Ch_3. The settings of Phase-Ch_3 are 0 deg (degrees) and 180 deg. The default setting of Phase-Ch_3 is 0 deg.
<b>Phase-Ch_4</b>	The phase of channel 4 can be adjusted using the setting menu item Phase-Ch_4. The settings of Phase-Ch_4 are 0 deg (degrees) and 180 deg. The default setting of Phase-Ch_4 is 0 deg.

## **Tracking**

The DIO24 can be used as a tracking audio delay. The tracking input must be connected to a tracking output of a Frame synchronizer, for example the SFS11.

The setting **Tracking** has 3 modes, they are as follows;

**Off:** No tracking.

**Fast:** Fast tracking and handling of frame drops enabling instantaneous synchronization of audio.

**Smooth:** Slow correction of frame drops enabling gradual synchronization of audio.

The default setting of **Tracking** is **Off**.

## **Delay-Ch\_1/2**

In addition to the tracking function the DIO24 can add an offset delay to the audio signal of channel 1 and 2. This delay can be used to compensate for other static video propagation delays for example a direct audio feed that is combined with a satellite video feed.

**Delay-Ch\_1 / 2** can be adjusted within the range 0ms to 650ms in 1 ms increments when the sample rate is set to 96kHz or 1300ms at 48kHz. The default setting of **Delay** is 0ms.

## **Delay-Ch\_3/4**

In addition to the tracking function the DIO24 can add an offset delay to the audio signal of channel 3 and 4. This delay can be used to compensate for other static video propagation delays for example a direct audio feed that is combined with a satellite video feed.

**Delay-Ch\_3 / 4** can be adjusted within the range 0ms to 650ms in 1 ms increments when the sample rate is set to 96kHz or 1300ms at 48kHz. The default setting of **Delay** is 0ms.

## 6 Status Menu

<b>Introduction</b>	The status menu indicates the current status of each item listed below.
<b>Audio-Ch_1</b>	The status item Audio-Ch_1 indicates the condition of the AES/EBU audio signal at the input of channel 1. Audio-Ch_1 indicates if the input signal is OK, Clipped or NA (not available).
<b>Audio-Ch_2</b>	The status item Audio-Ch_2 indicates the condition of the AES/EBU audio signal at the input of channel 2. Audio-Ch_2 indicates if the input signal is OK, Clipped or NA (not available).
<b>Audio-Ch_3</b>	The status item Audio-Ch_3 indicates the condition of the AES/EBU audio signal at the input of channel 3. Audio-Ch_3 indicates if the input signal is OK, Clipped or NA (not available).
<b>Audio-Ch_4</b>	The status item Audio-Ch_4 indicates the condition of the AES/EBU audio signal at the input of channel 4. Audio-Ch_4 indicates if the input signal is OK, Clipped or NA (not available).
<b>Audio-Lock</b>	This status item indicates a valid lock signal is applied to Addon, Wordclk1, Wordclk2, Genlock1, Genlock2. When the unit is not able to lock to any of the above items, Free will be indicated.
<b>Master-Mute</b>	Master-Mute is used when the card is in ADD-On mode, it indicates a mute pulse being inserted from a master card. The status item will indicate On or Off.

## 7 Events Menu

<b>Introduction</b>	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.
<b>What is the Goal of an event?</b>	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.
<b>DIO24 Events</b>	The events reported by the DIO24 are as follows;
<b>Announcements</b>	Announcements is not an event. This item is only used for switching the announcement of status changes on/off. 0=off, other =on
<b>Input_1</b>	Input_1 reports the loss of the audio at the input of channel 1 and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Input_2</b>	Input_2 reports the loss of the audio at the input of channel 2 and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Input_3</b>	Input_3 reports the loss of the audio at the input of channel 3 and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Input_4</b>	Input_2 reports the loss of the audio at the input of channel 2 and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>Reference</b>	Reference 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.

<b>Audio-Data</b>	Audio-Data reports the audio signal being clipped at 0dB and can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
<b>What information is available in an event?</b>	<p>The message consists of the following items:</p> <ol style="list-style-type: none"> <li>1) A message string to show what has happened in text, for example: "INP LOSS", "REF LOSS", "INP RETURN".</li> <li>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.</li> <li>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.</li> <li>4) A slot number of the source of this event.</li> </ol>
<b>The Message String</b>	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.
<b>The Tag</b>	<p>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.</p> <p>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<sub>hex</sub>) (e.g. 129 (81<sub>hex</sub>) for Return of Input).</p>
<b>Defining Tags</b>	The tags defined for the DIO24 are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcing of report and control values
Input_1..4	01 <sub>hex</sub> =INP_LOSS	81 <sub>hex</sub> =INP_RETURN	primary input lost or returned
Reference	02 <sub>hex</sub> =REF_LOSS	82 <sub>hex</sub> =REF_RETURN	reference lost or returned
Audio-Data	05 <sub>hex</sub> =AUDIO_ERROR	85 <sub>hex</sub> =AUDIO_OK	Audio data error

**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

<b>Error LED</b>	The error LED indicates an error if the internal logic of the DIO24 card is not configured correctly or has a hardware failure.
<b>Input LED</b>	This LED indicated the presence of a valid AES/EBU signal on the input. The presence of an analogue audio signal is not indicated
<b>Reference LED</b>	This LED indicates the presence of a valid reference signal and that the DIO24 is locked.
<b>Data Error LED</b>	This led indicates two different types of errors: - Audio signal 1, 2, 3 or 4 of the local outputs are clipped.
<b>Connection LED</b>	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 Setup Examples

### Stand-Alone Mode

A basic audio SRC.

This example shows how 4 channels of digital audio can be routed to the AES/EBU output channels 1 and 2 locked to a Black & Burst Genlock.

#### DIO24 Settings-Menu

```
Out_Ch_1:    AES_1_L
Out_Ch_2:    AES_1_R
Out_Ch_3:    AES_2_L
Out_Ch_4:    AES_2_R
SRC:        On
Smplrate:   48kHz
Ref_inp:    Genlock1
```

### ADD-ON Mode

Insert 4 extra analog audio channels into an adjacent (left) Master card with built-in ADD-ON embedder the SEB20 for example.

This example shows how 8 channels of digital audio can be inserted into the serial digital video signal using an SEB20 and a DIO24.

The local AES/EBU channels, 1/2 and 3/4 are inserted into group 1. The other four digital audio channels come from the DIO24 card that has to be inserted right next to the SEB20 card in the SFR18 frame. The four digital channels of the DIO24 are routed to the embedder block Emb\_B of the SEB20 and can be found in the setting menu Emb\_B1/2 and Emb\_B3/4 as AddOn\_A1/2 and AddOn\_A3/4. Others settings in the Settings-menu don not effect the functionality of this example and are not shown.

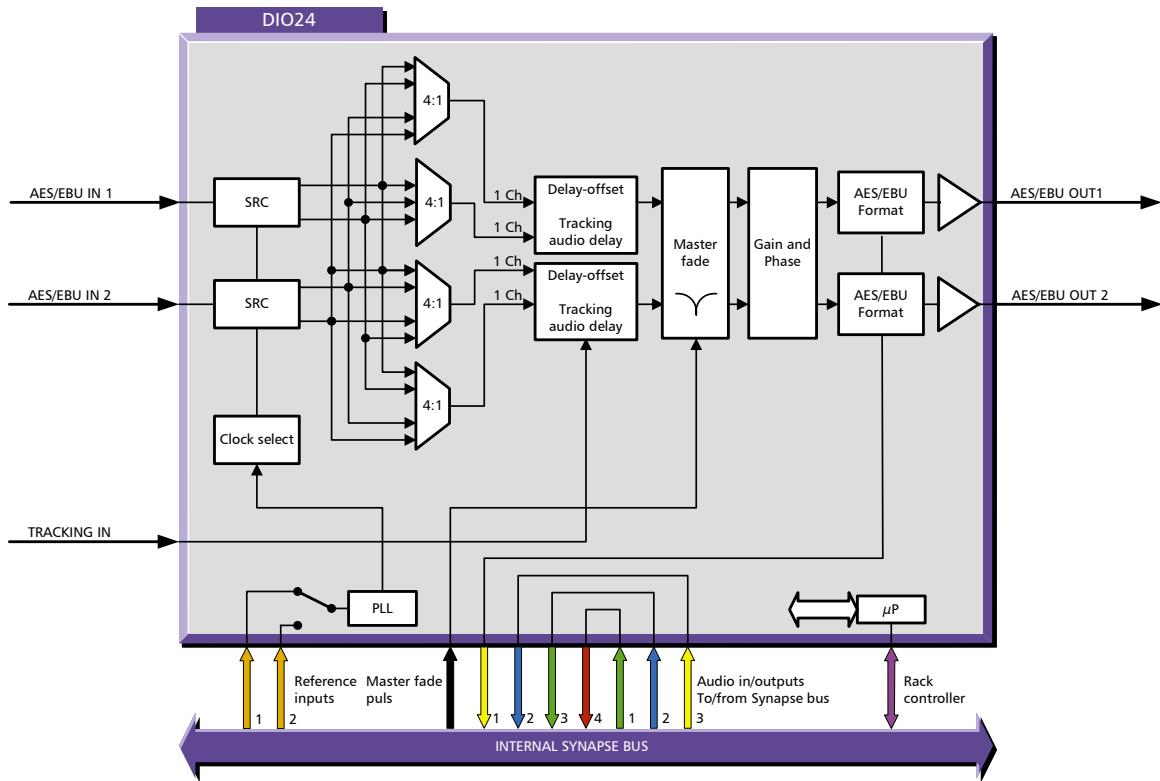
#### SEB20 Settings-Menu

```
Emb-Mode:    Overwrite
Emb-A-Sel:   Group_1
Emb-B-Sel:   Group_2
Emb-A1/2:    AES1 / 2
Emb-A3/4:    AES3 / 4
Emb-B1/2:    AddOn_A1 / 2
Emb-B3/4:    AddOn_A3 / 4
SRC:        On
```

DIO24 Settings-Menu

Out\_Ch\_1: AES\_1\_L  
Out\_Ch\_2: AES\_1\_R  
Out\_Ch\_3: AES\_2\_L  
Out\_Ch\_4: AES\_2\_R  
SRC: On  
Smplrate 48kHz  
Ref\_inp Add-on

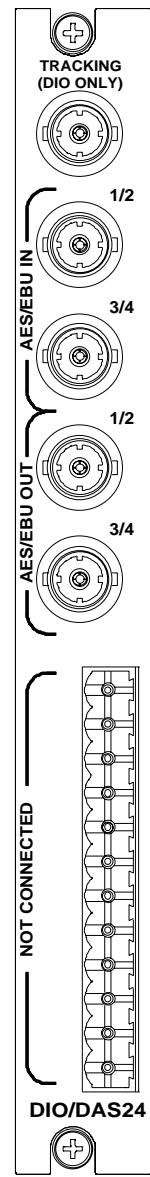
## 10 Block Schematic



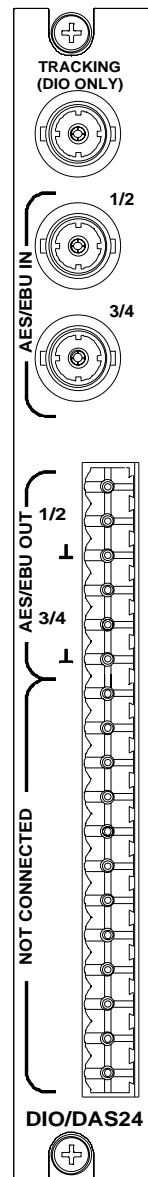
## 11 Connector Panel

The DIO24 can be used with the following backplanes: BPL02, BPL03 and BPL04:

BPL02



BPL03



BPL04

