Synapse

2AI48

Dual AES/EBU backup switcher
with integrity checking

Installation and Operation manual

TWINS

Committed.

®AXON

TECHNICAL MANUAL

2AI48

DUAL AES/EBU BACKUP SWITCHER WITH INTEGRITY CHECKING

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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.

CE	EN60950 Safety EN55103-1: 1996 Emission EN55103-2: 1996 Immunity

Axon Digital Design 2AI48 **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.

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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:** "SYNAPSE 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 Cotrtex 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 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 2AI48 acts as a back-up switcher with only the carrier detector active.

Changing settings and parameters

The front panel controls or the Synapse 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

[No Alarms]
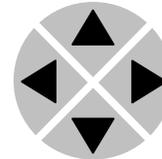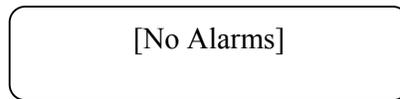
Settings are displayed and changed as follows;

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.

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With the display as shown below

RRC18 [Select Card]
>S01=SFS10
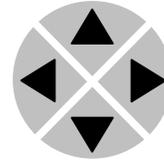
Pressing the ► selects the SFS10 in frame slot 01.

The display changes to indicate that the SFS10 has been selected. In this example the Settings menu item is indicated.

SFS10 [Select Menu]
>Settings
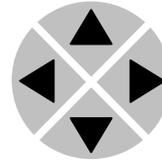
Pressing the ► selects the menu item shown, in this example Settings.

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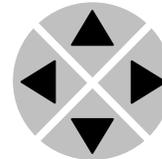
Pressing the ► selects the settings item shown, in this example SDI-Format.

(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]
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.

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Synapse Cortex Software

Synapse 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. Synapse 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 Synapse Cortex, please refer to the Cortex manual.

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 2AI48 Card

Introduction

The 2AI48 is a dual AES/EBU back-up switcher. It contains 2 completely individual paths with main and backup inputs. The unit can be triggered by our ACP control protocol or automatically by several input triggers.
These triggers are loss of input, audio silence, clipping and crc errors.

Features

- 2x1 or 2x2 function
- Automatic backup triggerd by:
  - Loss of input (carrier detect)
  - Silence with threshold and time adjustment
  - Audio Clip with time adjustment
  - CRC errors
- AES/EBU inputs with optional SRC (32 to 192kHz sampling)
- 48kHz sample clock locked to: B&B ref or word clock ref.
- 48kHz sample clock in free running mode
- Available with 110 Ohms (phoenix or sub-D) or 75 Ohms (BNC) AES/EBU in- and outputs
- Adjustable audio gain (in 0.25dB) and phase (0-180 deg)
- Adjustable audio delay offset up to 1300ms in 1ms increments
- Full control and status monitoring through the front panel of the SFR04/SFR08/SFR18 frame and the Ethernet port (ACP)

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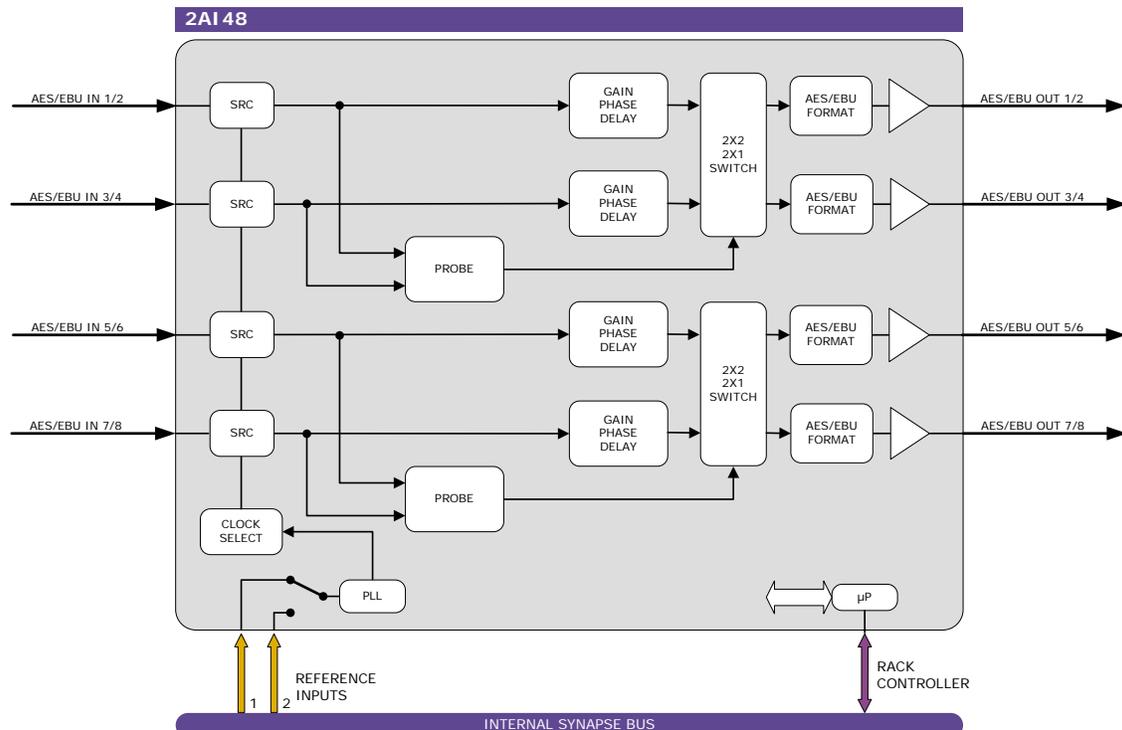
5   Settings Menu

Introduction

The settings menu displays the current state of each setting within the 2AI48 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.

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

SYSTEM SETTINGS

Ref-Input

The output frequency of the 2AI48 can be free running from a local oscillator or locked to different sources.

The setting of `Ref-Input` are as follows:

`NO_ref`: sets the card in to free running mode.

`Wordclk1` and `Wordclk2` are used when a 48k word clock is connected to the central genlock input of the SFR18/08/04 (the SFR04 only has one input).

`Genlock1` and `Genlock2` are used when a video Black& Burst is connected to the central genlock input of the SFR18/08/04 (the SFR04 only has one input).

SRC

This item controls the sample rate converters of all AES/EBU inputs. Can be set to `Trans` or `On`.

When set to `Trans`, the input sample rate will be transparent. The inputs have to be 48Khz for this.

When set to `On`, the sample rate converters are active. The card has to be locked to a reference for this.

CIRCUIT_1

Input-sel_1

`Input-Sel_1` determines which input is selected for the first circuit. In `Auto` mode the card acts as a backup-switcher, and all kind of integrity checks can be set as criteria to switch to the other channel. `Input 1/2` is the manual selection of AES/EBU input 1/2. `Input 3/4` is the manual selection of AES/EBU input 3/4. The default setting is `Auto`.

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Switch_back_1

Switch-Back can be set On, Off or set to Back_fail. The default setting is Off.

When Switch-Back is set to On, and a change over to the other input has occurred, the card will immediately switch back to the first input when the first input is OK again.

When Switch-Back is set to Off, and a change over to the other input has occurred. In this state the card will always stay on the backup input.

When Switch-Back is set to BackUp_Fail, inputs only switch when the backup signal fails.

Carrier_1

Carrier_1 allows the card to detect an AES/EBU carrier loss in (one of) the first 2 AES/EBU inputs and declares the signal unfit when a loss is detected in the selected input. What actions will follow depends on the Switch_back_1 and Input-sel_1 settings.

- Off: the functionality is switched off. The Carrier status item in the status menu will still monitor the carrier but the switch is not affected when a carrier fail occurs.

- 1/2: The card will declare the signal unfit if a carrier loss is detected in AES channels 1/2 only.

- 3/4: The card will declare the signal unfit if a carrier loss is detected in AES channels 3/4 only.

- 1/2 + 3/4: The card will declare the signal unfit if a carrier loss is detected in both inputs 1/2 and 3/4.

The default setting is 1/2 + 3/4.

CRC_1

CRC_1 allows the card to detect an AES/EBU CRC error on (one of) the first 2 AES/EBU inputs and declares the signal unfit when an error is detected in the selected input. CRC errors are only detected on the left audio channels (so channels 1 and 3). What actions will follow depends on the Switch_back_1 and Input-sel_1 settings.

- Off: the functionality is switched off. The CRC status item in the status menu will still monitor the CRC status but the switch is not affected when a carrier fail occurs.

- 1/2: The card will declare the signal unfit if a CRC error is detected in AES channels 1/2 only.

- 3/4: The card will declare the signal unfit if a CRC error is detected in AES channels 3/4 only.

- 1/2 + 3/4: The card will declare the signal unfit switch if a CRC error is detected in both inputs 1/2 and 3/4 and switch.

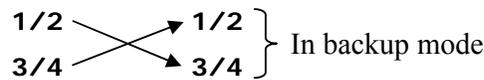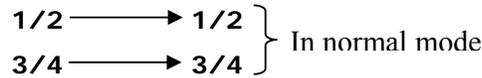The default setting is 1/2 + 3/4.

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Silence_1 | Silence_1 allows the card to detect an audio silence on (one of) the first 2 AES/EBU inputs and declares the signal unfit when a silence is detected in the selected input. What actions will follow depends on the Switch_back_1 and Input-sel_1 settings.

Off: the functionality is switched OFF. The silence status item in the status menu will still monitor the silence status but the switch is not affected when a carrier fail occurs.

1/2: The card will declare the signal unfit if a silence is detected in AES channels 1/2 only.

3/4: The card will declare the signal unfit if a silence is detected in AES channels 3/4 only.

1/2 + 3/4: The card will declare the signal unfit if a silence is detected in both inputs 1/2 and 3/4 and switch.

The default setting is 1/2 + 3/4.

Silence-Time_1 | Silence-Time_1 sets the duration of an audio silence before an alarm is given in case of silence in the selected AES/EBU audio channels of the first 2 AES/EBU inputs. The selectable time is between 1 and 254 sec. The default setting is 1 sec.

Silence-Level_1 | Silence-Level_1 determines the level of when the audio is considered as a silence for the first 2 AES/EBU inputs. This can be set in a range from 20dBFS till 100dBFS.

The default setting is 40dBFS.

Clip_1 | Clip_1 allows the card to detect an audio clip on (one of) the first 2 AES/EBU inputs and declares the signal unfit when a clip is detected in the selected input. What actions will follow depends on the Switch_back_1 and Input-sel_1 settings.

Off: the functionality is switched OFF. The audio clipping status item in the status menu will still monitor the clipping status but the switch is not affected when a carrier fail occurs.

1/2: The card will declare the signal unfit if an audio clip is detected in AES channels 1/2 only.

3/4: The card will declare the signal unfit if an audio clip is detected in AES channels 3/4 only.

1/2 + 3/4: The card will declare the signal unfit if an audio clip is detected in both inputs 1/2 and 3/4 and switch.
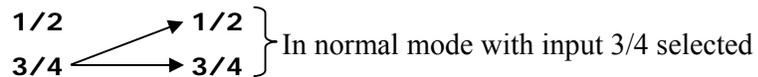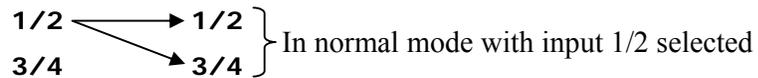
The default setting is 1/2 + 3/4.

Clip-Time_1

Clip-Time_1 sets the duration of an audio clip before an alarm is given in case of an audio clip in the selected audio channels of the first 2 AES/EBU inputs. The selectable time is between 20 and 1000 ms. The default setting is 20 ms (see appendix 1).

Out-Config_1

Output-Config_1 set to 2x2, configures the outputs as AES/EBU in 1/2 to AES/EBU out 1/2 and sets AES/EBU in 3/4 to AES/EBU out 3/4 when normal and sets input 1/2 to output 3/4 and input 3/4 to output 1/2 in backup mode. Schematically this would look as follows:

```
1/2 ————→ 1/2 ⎫
               ⎬ In normal mode
3/4 ————→ 3/4 ⎭
```

```
1/2  ⟍   ↗ 1/2 ⎫
       ✕        ⎬ In backup mode
3/4  ↗   ⟍ 3/4 ⎭
```

Output-Config_1 2x1 configures the selected input or backup (in switched mode) to both AES/EBU out 1/2 and AES/EBU out 3/4. Schematically this looks as follows:

```
1/2 ————→ 1/2 ⎫
       ⟍        ⎬ In normal mode with input 1/2 selected
3/4     ↘ 3/4 ⎭
```

```
1/2     ↗ 1/2 ⎫
       ↗        ⎬ In normal mode with input 3/4 selected
3/4 ————→ 3/4 ⎭
```

The default setting is 2x1.

CIRCUIT_2

Input-sel_2

Input-Sel_2 determines which input is selected for the second circuit. In Auto mode the card acts as a backup-switcher, and all kind of integrity checks can be set as criteria to switch to the other channel. Input 5/6 is the manual selection of AES/EBU input 5/6. Input 7/8 is the manual selection of AES/EBU input 7/8.

The default setting is Auto.

Switch_back_2

Switch-Back can be set On, Off or set to Back_fail. The default setting is Off.

When Switch-Back is set to On, and a change over to the backup input has occurred, the card will immediately switch back to the first input when the first input is OK again.

When Switch-Back is set to Off, and a change over to the other input has occurred. In this state the card will always stay on the backup input.

When Switch-Back is set to BackUp_Fail, inputs only switch back when the backup signal fails.

Carrier_2

Carrier_2 allows the card to detect an AES/EBU carrier loss in (one of) the third and fourth AES/EBU inputs and declares the signal unfit when a loss is detected in the selected input. What actions will follow depends on the Switch_back_2 and Input-sel_2 settings.

- Off: the functionality is switched off. The Carrier status item in the status menu will still monitor the carrier but the switch is not affected when a carrier fail occurs.

- 5/6: The card will declare the signal unfit if a carrier loss is detected in AES channels 5/6 only.

- 7/8: The card will declare the signal unfit if a carrier loss is detected in AES channels 7/8 only.

- 5/6 + 7/8: The card will declare the signal unfit if a carrier loss is detected in both inputs 5/6 and 7/8.

The default setting is 5/6 + 7/8.

CRC_2

CRC_2 allows the card to detect an AES/EBU CRC error on (one of) the third and fourth AES/EBU inputs and declares the signal unfit when an error is detected in the selected input. CRC errors are only detected on the left audio channels (so channels 5 and 7). What actions will follow depends on the Switch_back_2 and Input-sel_2 settings.

Off: the functionality is switched OFF. The CRC status item in the status menu will still monitor the CRC status but the switch is not affected when a carrier fail occurs.

5/6: The card will declare signal unfit if a CRC error is detected in AES channels 5/6 only.

7/8: The card will declare signal unfit if a CRC error is detected in AES channels 7/8 only.

5/6 + 7/8: The card will declare signal unfit if a CRC error is detected in both inputs 5/6 and 7/8 and switch.
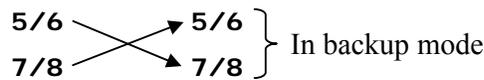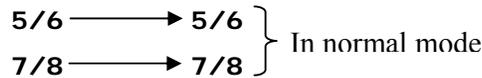
The default setting is 5/6 + 7/8.

Silence_2

Silence_2 allows the card to detect an audio silence on (one of) the first 2 AES/EBU inputs and declares the signal unfit when a silence is detected in the selected input. What actions will follow depends on the Switch_back_2 and Input-sel_2 settings.

Off: the functionality is switched off. The silence status item in the status menu will still monitor the silence status but the switch is not affected when a carrier fail occurs.

5/6: The card will declare signal unfit if a silence is detected in AES channels 5/6 only.

7/8: The card will declare signal unfit if a silence is detected in AES channels 7/8 only.

5/6 + 7/8: The card will declare signal unfit if a silence is detected in both inputs 5/6 and 7/8 and switch.

The default setting is 5/6 + 7/8.

Silence-Time_2

Silence-Time_2 sets the duration of an audio silence before an alarm is given in case of silence in the selected AES/EBU audio channels of the third and fourth AES/EBU inputs. The selectable time is between 1 and 254 sec. The default setting is 1 sec.

Silence-Level_2

Silence-Level_2 determines the level of when the audio is considered as a silence for the third and fourth AES/EBU inputs. This can be set in a range from 20dBFS till 100dBFS. The default setting is 40dBFS.

Clip_2

Clip_2 allows the card to detect an audio clip on (one of) the first 2 AES/EBU inputs and declares the signal unfit when a clip is detected in the selected input. What actions will follow depends on the Switch_back_2 and Input-sel_2 settings.

Off: the functionality is switched OFF. The audio clipping status item in the status menu will still monitor the clipping status but the switch is not affected when a carrier fail occurs.

5/6: The card will declare signal unfit if an audio clip is detected in AES channels 5/6 only.

7/8: The card will declare signal unfit if an audio clip is detected in AES channels 7/8 only.

5/6 + 7/8: The card will declare signal unfit if an audio clip is detected in both inputs 5/6 and 7/8 and switch.

The default setting is 5/6 + 7/8.

Clip-Time_2

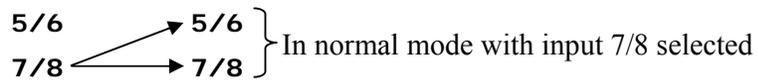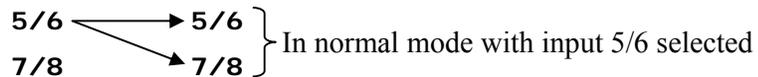Clip-Time_2 sets the duration of an audio clip before an alarm

is given in case of an audio clip in the selected audio channels of the third and fourth AES/EBU inputs. The selectable time is between 20 and 1000 ms. The default setting is 20 ms.

Out-Config_2

Output-Config_2 set to 2x2, configures the outputs as AES/EBU in 5/6 to AES/EBU out 5/6 and sets AES/EBU in 7/8 to AES/EBU out 7/8 when in normal mode and sets input 5/6 to output 7/8 and input 7/8 to output 5/6 in backup mode. Schematically this would look as follows:

```
5/6 ──────► 5/6  ⎫
                 ⎬ In normal mode
7/8 ──────► 7/8  ⎭
```

```
5/6 ──────► 5/6  ⎫
        ╳        ⎬ In backup mode
7/8 ──────► 7/8  ⎭
```

Output-Config_2 2x1 configures the selected input or backup (in switched mode) to both AES/EBU out 5/6 and AES/EBU out 7/8. Schematically this looks as follows:

```
5/6 ──────► 5/6  ⎫
        ╲        ⎬ In normal mode with input 5/6 selected
7/8        ► 7/8 ⎭
```

```
5/6        ► 5/6  ⎫
        ╱         ⎬ In normal mode with input 7/8 selected
7/8 ──────► 7/8   ⎭
```

The default setting is 2x1.

AUDIO-PROCESSING

Note: The audio processing menu items are in front of the switchers! So all audio processing is done on the input of the switch, not on the output (see block schematics).

Gain-1 ~ Gain-8

The menu items Gain-1 till Gain-8 control the audio gain of AES/EBU audio input channel 1 till channel 8. Gain-x has an adjustment range between –60.0dB and +12.0dB. When Gain-x is set to 0dB, the output level is equal to the input level. -999 is silence. The default is 0dB.

Phase-1 ~ Phase-8

The phase of AES/EBU input channels 1 till 8 can be adjusted

individually using the setting menu item `Phase-1` till `Phase-8`. The setting options are `0 deg` (degrees) and `180 deg`. Default is `0 deg`.

Delay_AES1/2 ~
Delay_AES7/8

You can adjust the delay of each AES/EBU audio input between 0ms and 1300ms. The default is 0ms.

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Status Menu

AES1/2-Carrier ~
AES7/8-Carrier

AES1/2-Carrier till AES7/8-Carrier statuses indicate if there is a valid AES/EBU signal present in the corresponding inputs. These statuses always monitored in this menu, despite whether detection is switched on or off.
OK if present
NA if no AES/EBU is detected.

AES1/2-Silence ~
AES7/8-Silence

AES1/2-Silence till AES7/8-Silence statuses indicate if there is a silence detected in the corresponding inputs. These statuses are always monitored in this menu, despite whether detection is switched on or off.
OK if no silence is detected
Silence if a silence is detected.

AES1/2-Clip ~
AES7/8-Clip

AES1/2-Clip till AES7/8-Clip statuses indicate if there is a clip detected in the corresponding inputs. These statuses are always monitored in this menu, despite whether detection is switched on or off.
OK if no clip is detected
Clip if a clip is detected.

AES1/2-CRC ~
AES7/8-CRC

AES1/2-CRC till AES7/8-CRC statuses indicate if there is a CRC error in the corresponding inputs. These statuses are always monitored in this menu, despite whether detection is switched on or off.
OK if no CRC error is detected
Clip if a CRC error is detected.

Genlock-status

Indicates the status of the reference input (gunlock or wordclock, dependant on the Ref-Input setting).
OK is a valid reference is present
NA if no valid reference is detected.

Switch_1

Displays what is currently the output of circuit 1. Can be either 1/2 or 3/4.

Switch_2

Displays what is currently the output of circuit 1. Can be either 5/6 or 7/8.

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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 2AI48 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

Audio Data

Audio Data can be selected between 0 .. 255. 0= no event, 1..255 are the priority setting. If set to 0 no events will be generated. If there is an audio data error an Event will be generated at the priority.

What information is available in an event?

The message consists of the following items;

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 2AI48 are:

Event Menu Item	Tag		Description
Announcements	0 or NA	0 or NA	Announcing of report and control values
Audio data	02_{hex}=AUDIO_ERROR	82_{hex}=AUDIO_OK	Audio data error or 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.
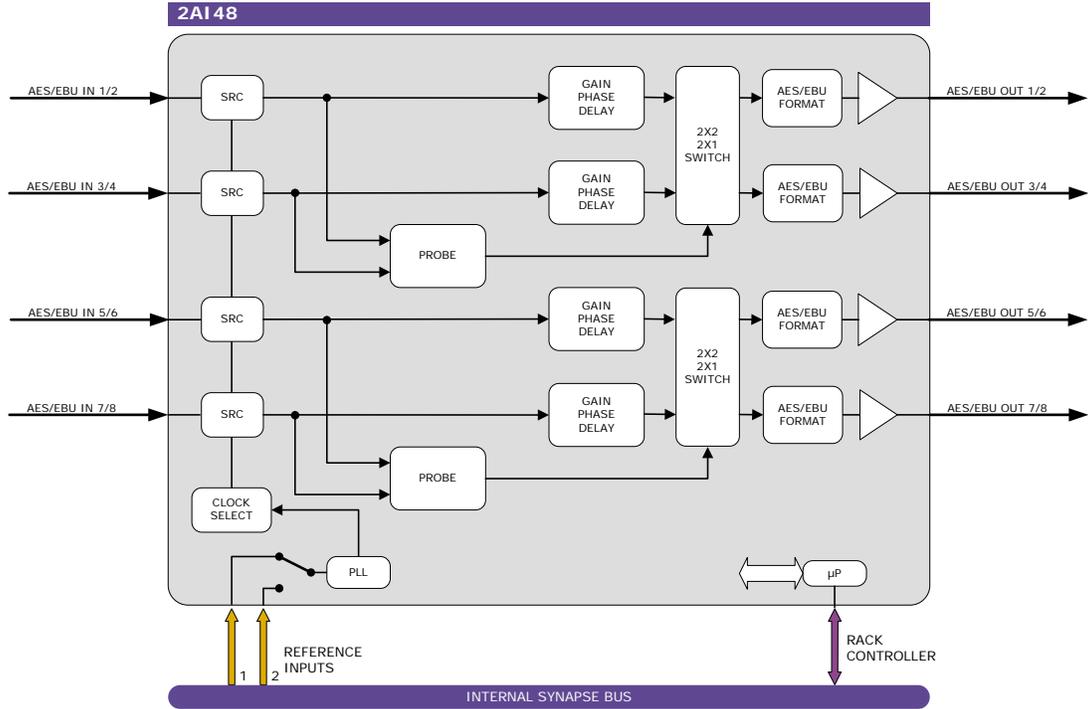
The Address

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.
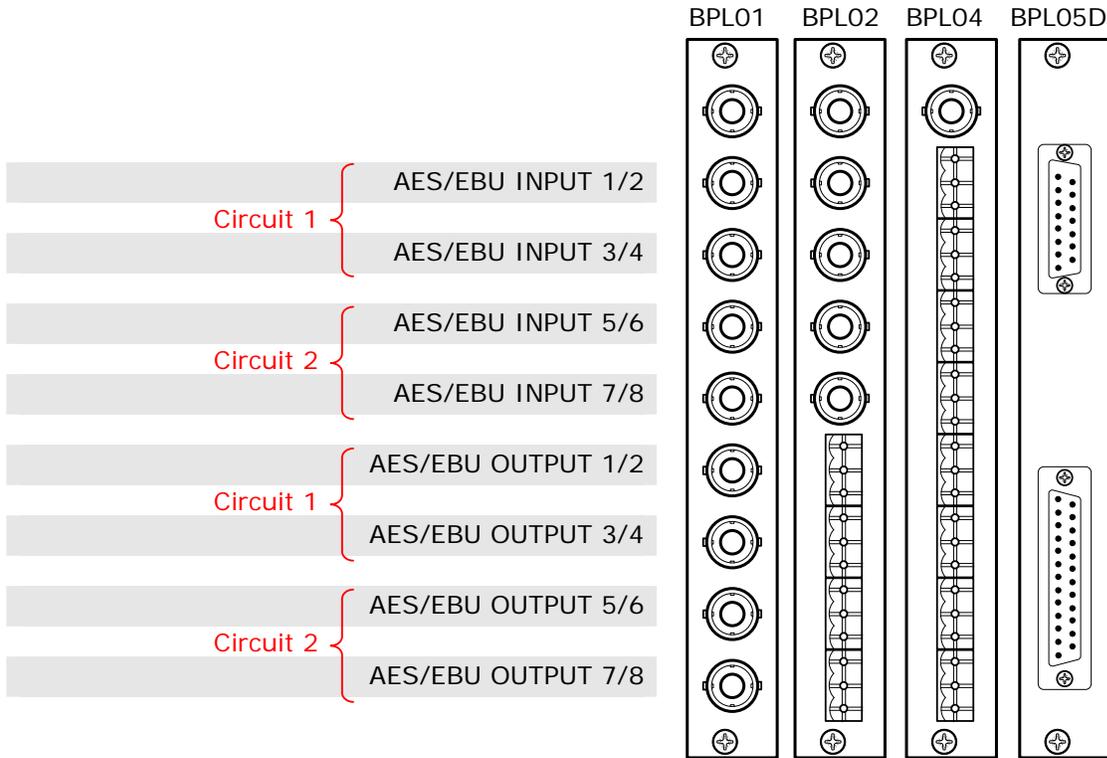
20

8 LED Indication

Error LED | The error LED indicates an error if the internal logic of the 2AI48 card is not configured correctly or has a hardware failure.

Input LED_1/2 | This LED indicated the presence of a valid AES/EBU carrier on input 1/2.

Input LED_3/4 | This LED indicated the presence of a valid AES/EBU carrier on input 3/4.

Input LED_5/6 | This LED indicated the presence of a valid AES/EBU carrier on input 5/6.

Input LED_7/8 | This LED indicated the presence of a valid AES/EBU carrier on input 7/8.

Reference LED | Indicated the presence of a valid reference signal on the selected reference input connector (ref-1 or ref-2). See section 5 Ref-Input. It only displays the genlock status, not the word clock status.

DATA ERROR LED | This led indicates the following Audio data errors: - Carrier loss on one of the inputs

- Silence on one of the inputs

- Clipping on one of the inputs

- CRC error on channels 1, 3, 5 or 7.

This LED will not light up when such errors occur when the corresponding detection for this certain channel is switched off in the menu.
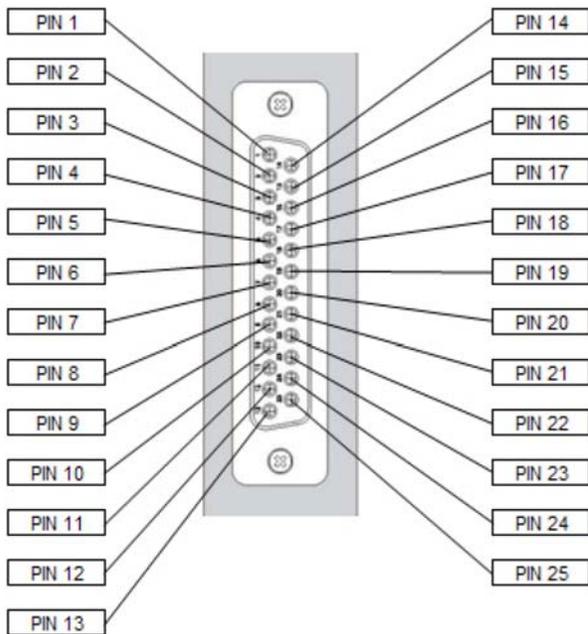
9 Block Schematic

10 Connector Panels

BPL01   BPL02   BPL04   BPL05D

AES/EBU INPUT 1/2	Circuit 1
AES/EBU INPUT 3/4	
AES/EBU INPUT 5/6	Circuit 2
AES/EBU INPUT 7/8	
AES/EBU OUTPUT 1/2	Circuit 1
AES/EBU OUTPUT 3/4	
AES/EBU OUTPUT 5/6	Circuit 2
AES/EBU OUTPUT 7/8	

With the BPL05D, only the bottom D-sub is used. Pinning for

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

Appendix 1 # Audio clipping detection

The 2AI48 has an advanced and practical way of detecting audio clips. Instead of detecting just one clip as actually being a clip we look at a default time span of 20ms (1 wave of a 50Hz signal) if audio clips occur. The following schematic displays 1 clip detect in a 50 Hz signal and a clip detect in a 200Hz signal:
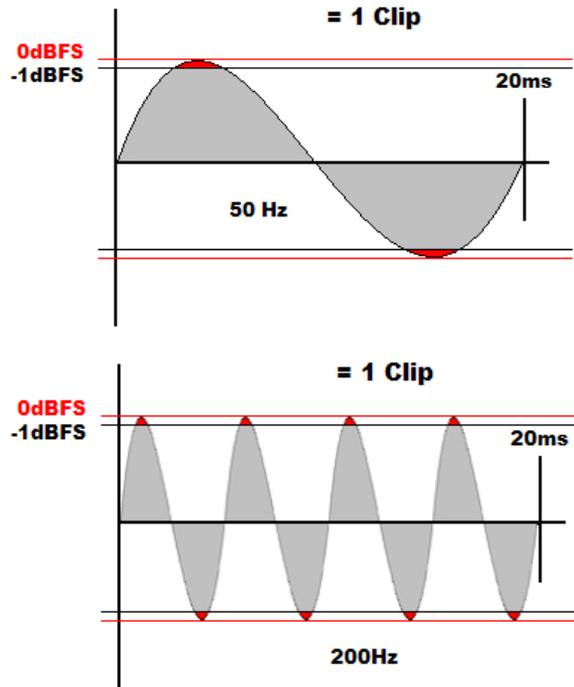
From this point on, the 2AI48 will monitor how long this clipping is maintained (so after the first 20ms). When the 2AI48 declares the signal as unfit depends on the `Clip-Time_1` and `Clip-Time_2` settings done in the settings menu.