

Synapse

DAD26

Dual channel digital (AES/EBU) audio distribution amplifier with 2x2
and 2x1 functions.

Synapse

TECHNICAL MANUAL

DAD26

Dual channel digital (AES/EBU) audio distribution amplifier with 2x2 and 2x1 functions.



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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 EN55103-1: 1996 EN55103-2: 1996	Safety Emission Immunity
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<p style="text-align: center;">Axon Digital Design DAD26</p> <p style="text-align: center;">  Tested To Comply With FCC Standards </p> <p style="text-align: center;">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, 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) manuals. The method of connection to a computer using Ethernet is described in the RRC manual.



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

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

2 Unpacking and Placement

Unpacking

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

Placing the card

The Synapse card can be placed vertically in an SFR18 frame or horizontally in an SFR04 or SFR08 frame. Locate the two guide slots to be used, slide in the mounted circuit board, and push it firmly to locate the connectors.

Correct insertion of card is essential as a card that is not located properly may show valid indicators, but does not function correctly.

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

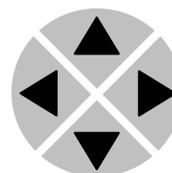
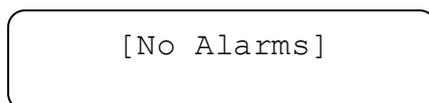
In the default condition, the DAD26 will act as a dual channel Digital Audio Distribution Amplifier.

Changing settings and parameters

The front panel controls or 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.

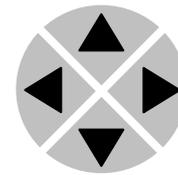
- Press ► To go forward through the menu structure.
- Press ◀ To go back through the menu structure.
- Press ▲ To move up within a menu or increase the value of a parameter.
- Press ▼ To move down through a menu or decrease the value of a parameter.

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

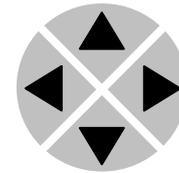
```
RRC18 [Select Card]
>S01=SFS10
```



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
```

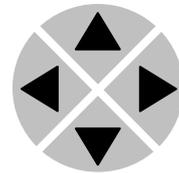


Pressing the ► selects the menu item shown, in this example Settings.

(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
```

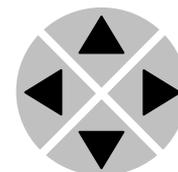


Pressing the ► selects the settings item shown, in this example SDI-Format.

(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 DAD26 Card

Introduction

The DAD26 is a dual channel digital audio distribution amplifier. It has 2 individual inputs and two times three outputs. All outputs can be assigned to a single input making the device a 1 to 6 DA. A (GPI controlled) switch can be used to enable a 2x2 or 2x1 switch function.

The DAD26 accepts AES/EBU or SPDIF (Consumer Interface Format) digital audio inputs that is then non reclocked, buffered and distributed to the dual 3 outputs. The DAD26 has transformer coupled, balanced inputs and outputs and can be used with unbalanced I/O via the BPL04 or BPL05D.

Multiple regenerated independent low jitter outputs make the DAD26 ideal for the most demanding digital audio signal distribution requirements in both large and small audio and video facilities. Balanced or unbalanced use is automatically selected by use of the appropriate connector panel.

Key Features

The Key features of the DAD26 are as follows:

- 2 Inputs
- 2 x 3 Outputs
- 2x1 or 2x2 function (GPI, Ethernet, automatic by signal detection)
- Transformer coupled input
- Transformer coupled outputs
- 32 to 192 kHz compatibility
- Signal present indication
- Sample frequency indication
- Compatible with 110 Ohm and 75 Ohm environments
- Full control and status monitoring through the front panel of the SFR04/18 frame and the Ethernet port (ACP)
- Compatible with fiber I/O panels

Wide Range of Sample Rates

The DAD26 offers 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.

Signal Status Indication

Signal status and error messages included in the audio data format are decoded and displayed.

5 Settings Menu

Introduction	The settings menu displays the current state of each setting within the DAD26 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.
Mode	With this setting you can set the card to work as a dual channel distribution amplifier (2-channel) using both inputs, or a single channel distribution amplifier (1-channel) using only one input. By default, the card functions in dual channel mode.
Input-Sel	<p>This setting sets the way the inputs are used. Set to <code>Normal</code>, the inputs are forwarded linearly, so in dual mode input A is forwarded to outputs A1 till A3 and input B is forwarded B1 till B3. In single mode, only input A is forwarded to all outputs.</p> <p>Set to <code>Crossed</code>, the inputs are forwarded in a crossed way, so in dual channel mode input A is forwarded to outputs B1 till B3 and input B is forwarded to outputs A1 till A3. In single channel mode, only input B is forwarded to all outputs.</p> <p>Set to <code>Auto</code>, in two channel mode nothing will change. Used in 1 channel mode, all the outputs will be assigned to the input which has as first a valid signal. By default, all outputs are assigned to input A. When both inputs have a signal and one is disconnected, automatically the other input is assigned to the outputs.</p> <p>Set to <code>Auto-GPI</code>, in this mode it is not possible to select an unused input via GPI. In default, input A is automatically forwarded to all outputs. If both inputs are used it is possible to select via GPI the input that must be forwarded to all outputs.</p> <p>Set to <code>GPI-Only</code>, the card can switch between crossed and normal via GPI's only.</p> <p>By default, this is set to <code>normal</code>.</p>
Switch-Back	Switch-back is only active in an automatic 1-Channel mode configuration.
GPI-Mode	Can be set to <code>Latching</code> or <code>Non_Latching</code> . <code>latching</code> when a contact is closed momentarily (edge triggered), <code>non_latching</code> when a contact is closed all the time (level triggered). The default setting is <code>Latching</code> .

Validity-bit

This setting set 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 to 0
- Invalid: fixed validity bit to 1
- Auto: the validity bit is set to match the detected input (refer to status items `Audio-mode-A` and `Audio-mode-B`). This is depenent on the `Mode` and `Input-Sel` settings.

|

6 Status Menu

Introduction	The status menu indicates the current status of each item listed below.
Input-A-stat	This item indicates if there is audio present on input A. Can be either <code>Present</code> or <code>NA</code> (not available).
SampleFreq-A	This indicates whether input A's sample frequency is lower or equal to 48kHz ($\leq 48\text{kHz}$) or higher or equal to 88.1kHz ($\geq 88.1\text{kHz}$)
Audio-Mode-A	This status item indicates whether the audio on input A is <code>Data</code> (for instance <code>Dolby</code>) or normal <code>PCM Audio</code> .
Input-B-stat	This item indicates if there is audio present on input B. Can be either <code>Present</code> or <code>NA</code> (not available).
SampleFreq-B	This indicates whether input B's sample frequency is lower or equal to 48kHz ($\leq 48\text{kHz}$) or higher or equal to 88.1kHz ($\geq 88.1\text{kHz}$)
Audio-Mode-B	This status item indicates whether the audio on input B is <code>Data</code> (for instance <code>Dolby</code>) or normal <code>PCM Audio</code> .
Output-A	This item indicates what input is being output by outputs A1 till A3. Can be either <code>input-A</code> or <code>input-B</code> .
Output-B	This item indicates what input is being output by outputs B1 till B3. Can be either <code>input-A</code> or <code>input-B</code> .

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.
DAD26 Events	The events reported by the DAD26 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-A	Input-A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Active_Out_A	Active_Out_A can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Input-B	Input-B can be selected between 0 .. 255. 0= no event, 1..255 is the priority setting.
Active_Out_B	Active_Out_B 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-A	01 _{hex} =INP_LOSS	81 _{hex} =INP_RETURN	Input A lost or returned
Input-B	41 _{ex} =INP_LOSS	C1 _{hex} =INP_RETURN	Input B lost or returned
Active_Out_A	19 _{hex} =OUTP_LOSS	99 _{hex} =OUTP_RETURN	Output A lost or returned
Active_Out_B	1A _{hex} =OUTP_LOSS	9A _{hex} =OUTP_RETURN	Output B 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.

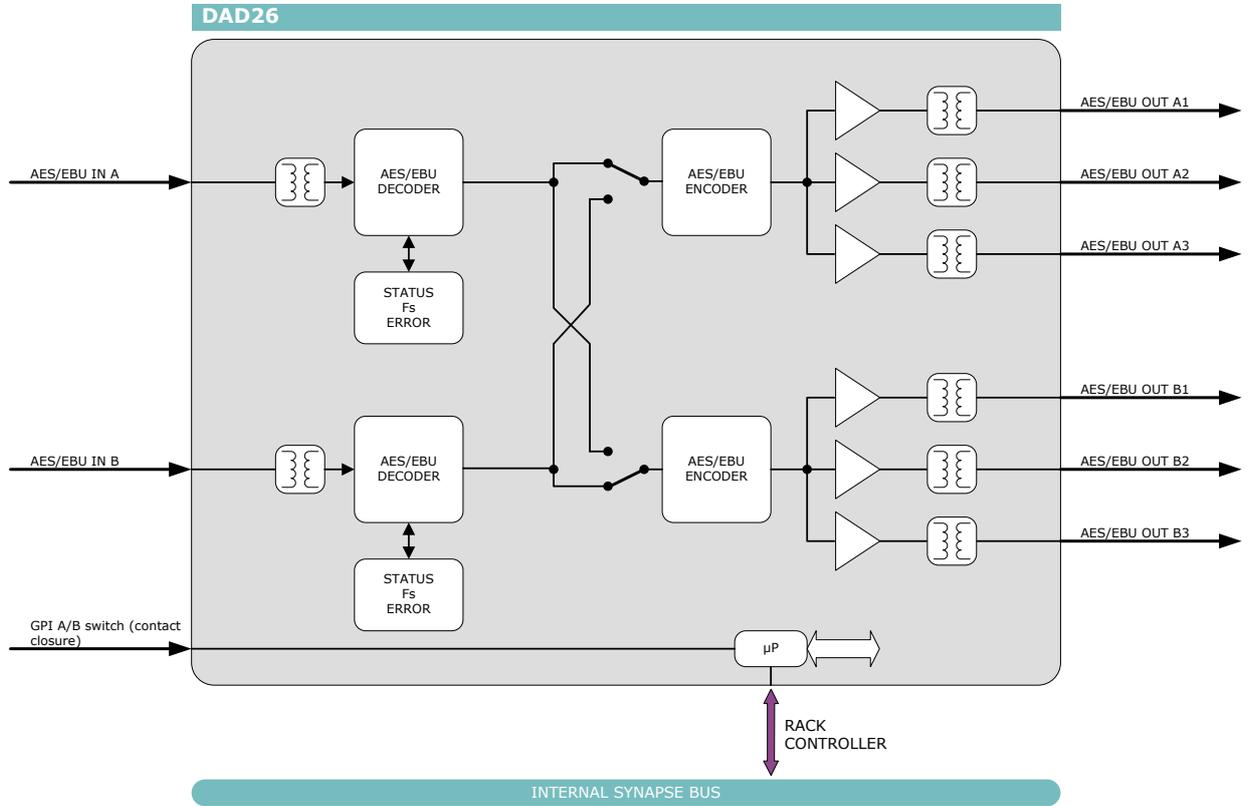
The Address

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

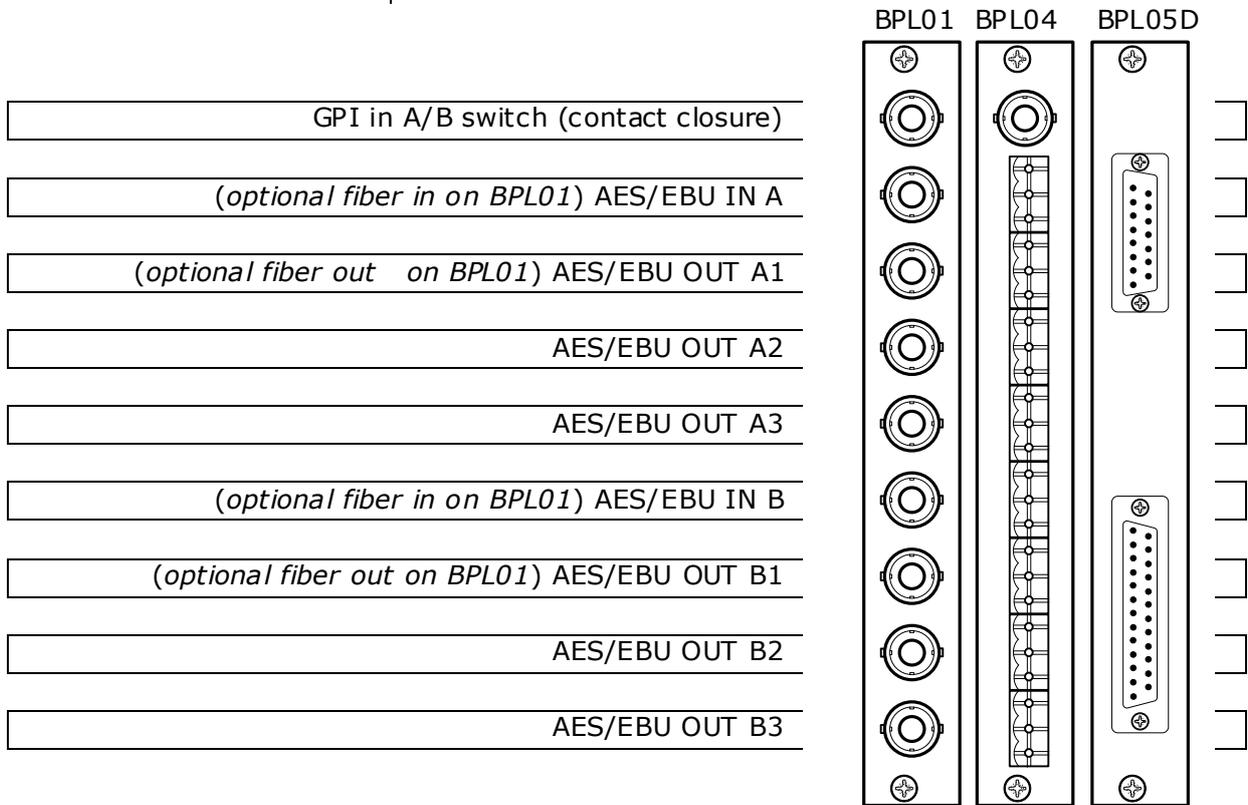
Error LED	Although mounted on the DAD26 cards, the Error LED is not used.
Input-A LED	This LED indicated the presence of a valid digital audio signal on input A.
Input-B LED	This LED indicated the presence of a valid digital audio signal on input B
Connection LED	This LED illuminates after the card has initialised. The LED lights for 0.5 seconds every time a connection is made to the card.

9 Block Schematic



10 Connector Panel

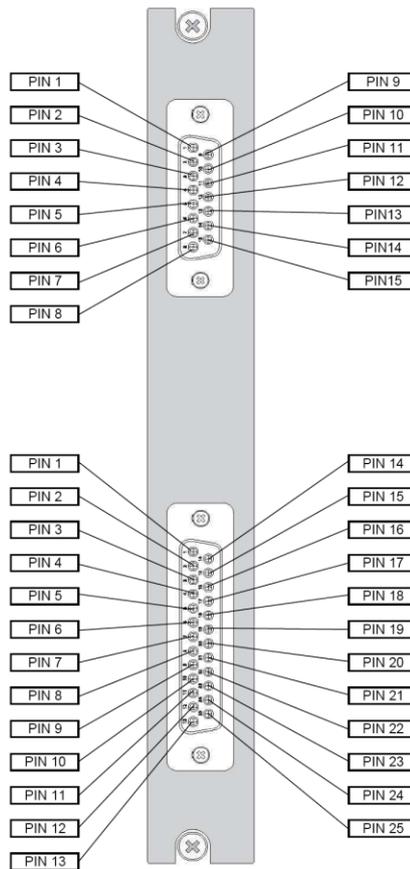
The DAD26 can be used with the following backplanes: BPL01
BPL04 and BPL05D



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

Connector pin description of the BPL05D:

BPL05D



15P D-SUB FEMALE

PIN 1	NC
PIN 2	NC
PIN 3	GPI I/O
PIN 4	NC
PIN 5	NC
PIN 6	NC
PIN 7	NC
PIN 8	NC
PIN 9	GND
PIN 10	NC
PIN 11	NC
PIN 12	NC
PIN 13	NC
PIN 14	NC
PIN 15	NC

25P D-SUB FEMALE

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