

# AADA-STM-1

Dual stereo to mono audio  
distribution amplifier



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Revision 1. Block diagram amended, page 2                      20-02-12  
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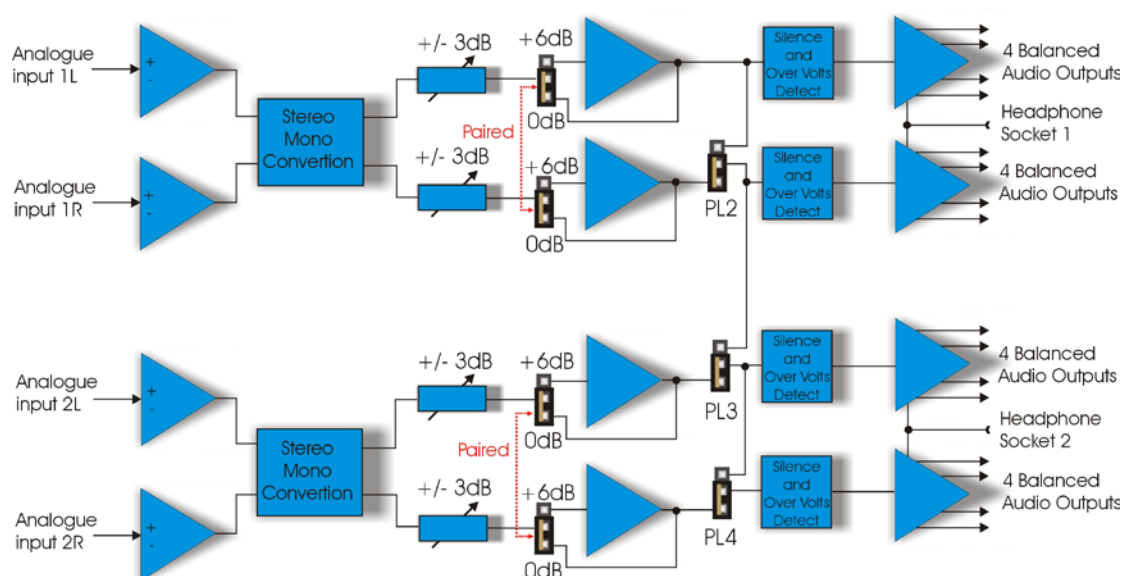
# 1 Introduction

The AADA-STM-1 is a dual stereo to mono audio distribution amplifier with individually balanced floating outputs. It has card edge control and can be configured in a variety of input/output configurations. There are four separate audio distribution amplifiers each with an electronically balanced input and four floating outputs. Onboard links allow the module to be configured in any of the following modes:

- 2 channels - channels 1 and 2 are 1-in 8-out
- 2 channels - channel 1 is 1-in 12-out, channel 2 is 1-in 4-out
- 1 channel - channel 1 is 1-in 16-out

It is very compact in design and depending upon frame selection, allows up to 48 1-in, 8-out distribution amplifiers in a single frame.

Audio gain is adjustable to suit operating levels of 18dBu and \*24/28dBu with the provision of on-board movable jumper links. Continuous variable control of level is available from the card-edge for each output group.



*AADA-STM-1 quad distribution amplifier*

**Note:** \*The maximum input signal level is +28dBu and the maximum output level is +25dBu.

Each channel has an audio silence detector with common adjustable settings.

The silence detect delay is selectable from around 2 seconds to 120 seconds in 15 eight second steps. Its default value is 1-2 seconds.

The silence threshold level can be adjusted from -18dBu to -42dBu and its default value is -30dBu.

Each channel also has an overvoltage detector that can be adjusted from +6dBu to +25dBu, by a common OV control. The default value is +25dBu.

The AADA-STM-1 has LED indication of audio silence and overvoltage status for each channel. General purpose interface lines are also provided to indicate audio silence/overvoltage status.

Two 3.5mm jacks are provided for local audio monitoring using headphones.

The main features are as follows:

- Dual stereo to mono conversion audio distribution amplifier with three configuration modes
- \*Suitable for level-matching international operating levels of +18/+24/+28dBu to European levels (+18/+24dBu)
- Per channel silence detection with global adjustment of the threshold level and delay
- Per channel overvoltage detector with global adjustable of the threshold level
- Electronically balanced inputs and outputs
- Headphone monitoring for all channels
- GPI silence/overvoltage indication
- Card edge control

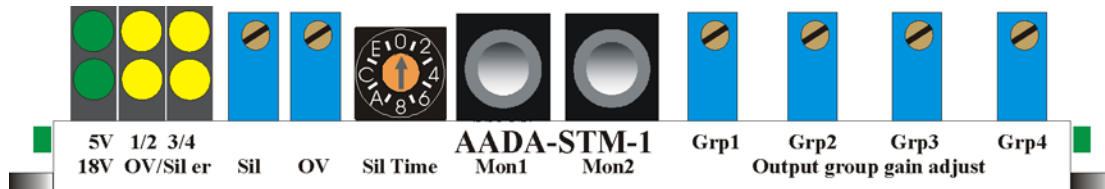
The AADA-STM-1 is a 100mm x 266mm module, which fits in all standard Crystal Vision frames and can be integrated with any boards from the company's full product range. It uses the RM17 and RM37 single height rear connectors.

**Note:** \*The maximum input signal level is +28dBu and the maximum output level is +25dBu.

## 2 Card edge operation

Once the start-up initialisation procedure is complete, the AADA-STM-1 can be controlled or configured from the card edge controls.

The front card-edge provides power rail monitoring, channel gain adjustment, silence threshold, silence time, overvoltage level and two analogue audio monitoring outputs.



*AADA-STM-1 front edge view*

### LED INDICATION

| LED                   | Action     | Meaning                    |
|-----------------------|------------|----------------------------|
| Yellow (top left)     | LED bright | Output Group 1 Overvoltage |
|                       | LED dim    | Output Group 1 Silence     |
| Yellow (bottom left)  | LED bright | Output Group 2 Overvoltage |
|                       | LED dim    | Output Group 2 Silence     |
| Yellow (top right)    | LED bright | Output Group 3 Overvoltage |
|                       | LED dim    | Output Group 3 Silence     |
| Yellow (bottom right) | LED bright | Output Group 4 Overvoltage |
|                       | LED dim    | Output Group 4 Silence     |
| Green (top)           | LED on     | + 5V power supply OK       |
| Green (bottom)        | LED on     | +/- 18V power supply OK    |

*LED indicators*

### Overvoltage detection level

Overvoltage detection level, labelled **OV** is adjustable from the front of the board. Turning the potentiometer fully clockwise will set the overvoltage limit to +25dBu. The potentiometer range is from 6dBu to 25dBu.

Any peak audio signals, which exceed the overvoltage limit, will illuminate the corresponding LED brightly. It will remain lit for at least one second after the peak audio signal has dropped below the overvoltage limit.

**Note:** LED indication of overvoltage may be inhibited by a board link. GPI overvoltage warning (and silence warning) can be inhibited using GPI inputs. Please see the Configuration section in the Installation chapter for more details.

## Silence detection

A channel is only considered to be silent if its audio level remains below a certain threshold level for longer than a given time (detection delay).

### *Silence detection level*

Silence detection level labelled **Sil** is adjustable from the front of the board. It is factory set to an output level of  $-30\text{dBu}$ . Audio signals above this level (and below the overvoltage level) will produce no illumination of the corresponding LED.

The potentiometer range is from  $-42\text{dBu}$  to  $-18\text{dBu}$

### *Silence detection delay*

A 16 position switch at the front of the board labelled **Sil Time**, determines the time duration to detect that an audio signal is continuously below the silence detection level limit. Although there is only one **Sil Time** setting, each of the four channels is timed individually.

Position 0 is a time of 1 to 2 seconds, position 1 is approximately 8 seconds, and for position steps of 2 to 9 and A to F add on another 8 seconds for each step giving a maximum time of 120 seconds for position F.

| Sil time setting | Silence delay in seconds | Sil time setting | Silence delay in seconds |
|------------------|--------------------------|------------------|--------------------------|
| 0                | 1 to 2                   | 8                | 64                       |
| 1                | 8                        | 9                | 72                       |
| 2                | 16                       | A                | 80                       |
| 3                | 24                       | B                | 88                       |
| 4                | 32                       | C                | 96                       |
| 5                | 40                       | D                | 104                      |
| 6                | 48                       | E                | 112                      |
| 7                | 56                       | F                | 120                      |

If these times are exceeded the LED for that channel will illuminate dimly and stay illuminated dimly until the audio signal level is greater than the silence level. If this occurs without any overload, the LED will turn off.

**Note:** GPI silence warning (and overvoltage warning) can be inhibited using GPI inputs. Please see the Configuration section in the Installation chapter for more details.

## Gain

Gain is continuously variable  $\pm 3.0\text{dB}$  for each output group using the four Gain Adjust controls. The AADA-STM-1 is supplied with a factory-set gain of  $0\text{dB}$ . The maximum operating level may be adjusted for either  $+18\text{dBu}$  or  $+24/+*28\text{dBu}$  using on-board links as explained in the configuration section of the Installation chapter.

**Note:** \*The maximum input signal level is  $+28\text{dBu}$  and the maximum output level is  $+25\text{dBu}$ .

## 3 Hardware installation

The AADA-STM-1 quad distribution amplifier fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

### 3.1 Rear module signal I/O

The AADA-STM-1 is used with the RM17 and RM37 single slot rear connectors in all Crystal Vision frames. The 4U Indigo frame will house up to 24 modules and four power supplies. The 2U Indigo frame will house up to 12 modules and dual power supplies. The 1U Indigo frame will house 6 modules and a single power supply. And the 1U desk top box has a built-in power supply and will house up to 2 modules.

On the 1U, 2U and 4U frames a hinged front panel gives access to the PSU and all modules. The desk top box has a removable front. The universal frame wiring system allows any of the interface range of modules to be fitted in any position with the use of removable rear modules.

**Note:** Stereo 1 channel uses left signal (L1) and for right signal (R1).  
Stereo 2 channel uses left signal (L2) and for right signal (R2).  
In 2-in, 2x8-out mode, it is worth noting that headphone monitor 1 stereo 1 (mono) on both channels, and headphone monitor 2 has stereo 2 on both channels.

#### RM17 rear module connections

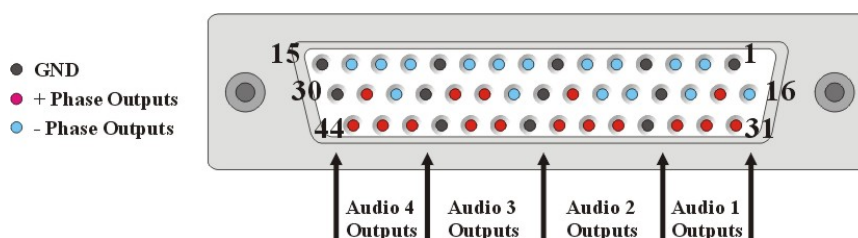
| RM17 fits in all frames   | Description   |
|---|---|
|  <p>The diagram shows the RM17 rear module connector with two 15-pin D-type connectors. The left connector is labeled 'Audio Out' and the right is 'Audio In'. The module is labeled 'RM17'.</p> | <b>RM17 (ZLA00099 artwork)</b> <ul style="list-style-type: none"> <li>• 24 modules per 4U frame, 12 per 2U frame, 6 per 1U frame &amp; 2 per desk top box</li> <li>• All frame slots can be used</li> </ul> |

*Audio in - 15 pin D-Type connector (cable has plug on it)*

| Pin number | Function      | Comments               |
|------------|---------------|------------------------|
| 1          | IP-1LO        | Screen for input 1     |
| 2          | IP-L1+        | } Stereo 1 Left input  |
| 3          | IP-L1-        |                        |
| 4          | IP-L2+        | } Stereo 2 Left input  |
| 5          | IP-L2-        |                        |
| 6          | IP-2LO        | Screen for input 1     |
| 7          | N/C           | No connection          |
| 8          | N/C           |                        |
| 9          | IP-R1+        | } Stereo 1 Right input |
| 10         | IP-R1-        |                        |
| 11         | IP-R2+        | } Stereo 2 Right input |
| 12         | IP-R2-        |                        |
| 13         | GND (Chassis) |                        |
| 14         | IP-3LO        | Screen for input 2     |
| 15         | IP-4LO        | Screen for input 2     |

Audio out - 44 pin high density D-Type connector (cable has plug on it)

| Pin | Signal | Desc              | Pin | Signal | Desc              | Pin | Signal | Desc              |
|-----|--------|-------------------|-----|--------|-------------------|-----|--------|-------------------|
| 1   | GND    |                   | 16  | OP1B-  | Audio Out Group 1 | 31  | OP1A+  | Audio Out Group 1 |
| 2   | OP1A-  | Audio Out group 1 | 17  | OP1B+  | Audio Out Group 1 | 32  | OP1C+  | Audio Out Group 1 |
| 3   | OP1D-  | Audio Out Group 1 | 18  | OP1C-  | Audio Out Group 1 | 33  | OP1D+  | Audio Out Group 1 |
| 4   | GND    |                   | 19  | GND    |                   | 34  | GND    |                   |
| 5   | OP2B-  | Audio Out Group 2 | 20  | OP2A-  | Audio Out Group 2 | 35  | OP2A+  | Audio Out Group 2 |
| 6   | OP2C-  | Audio Out Group 2 | 21  | OP2D-  | Audio Out Group 2 | 36  | OP2B+  | Audio Out Group 2 |
| 7   | GND    |                   | 22  | OP2C+  | Audio Out Group 2 | 37  | OP2D+  | Audio Out Group 2 |
| 8   | OP3A-  | Audio Out Group 3 | 23  | GND    |                   | 38  | GND    |                   |
| 9   | OP3D-  | Audio Out Group 3 | 24  | OP3C-  | Audio Out Group 3 | 39  | OP3A+  | Audio Out Group 3 |
| 10  | OP3B-  | Audio Out Group 3 | 25  | OP3C+  | Audio Out Group 3 | 40  | OP3B+  | Audio Out Group 3 |
| 11  | GND    |                   | 26  | OP3D+  | Audio Out Group 3 | 41  | GND    |                   |
| 12  | OP4C-  | Audio Out Group 4 | 27  | GND    |                   | 42  | OP4A+  | Audio Out Group 4 |
| 13  | OP4D-  | Audio Out Group 4 | 28  | OP4A-  | Audio Out Group 4 | 43  | OP4C+  | Audio Out Group 4 |
| 14  | OP4B-  | Audio Out Group 4 | 29  | OP4B+  | Audio Out Group 4 | 44  | OP4D+  | Audio Out Group 4 |
| 15  | GND    |                   | 30  | GND    |                   |     |        |                   |



Arrangement of audio outputs and GND pins on 44 way D-Type Connector

### RM37 rear module connections

Note: Pin numbers refer to the plug numbering scheme

| RM37 fits in all frames | Description   |
|-------------------------|---|
|                         | <p><b>RM37</b></p> <ul style="list-style-type: none"> <li>• 24 modules per 4U frame, 12 per 2U frame, 6 per 1U frame &amp; 2 per desk top box</li> <li>• All frame slots can be used</li> </ul> |



*Audio In*

| Pin number | Function | Comments               |
|------------|----------|------------------------|
| a1         | IP-L1+   | } Stereo 1 Left input  |
| a2         | IP-L1-   |                        |
| a3         | Input_LO | Screen for input 1     |
| a4         | IP-R1+   | } Stereo 1 Right input |
| a5         | IP-R1-   |                        |
| a6         | Input_LO | Screen for input 1     |
| a7         | NC       | No connection          |
| a8         | GND      |                        |
| c1         | IP-L2+   | } Stereo 2 Left input  |
| c2         | IP-L2-   |                        |
| c3         | Input_LO | Screen for input 2     |
| c4         | IP-R2-   | } Stereo 2 Right input |
| c5         | IP-R2+   |                        |
| c6         | Input_LO | Screen for input 2     |
| c7         | NC       | No connection          |
| c8         | GND      |                        |

*Audio Out*

| Pin | Signal | Description | Pin | Signal | Description |
|-----|--------|-------------|-----|--------|-------------|
| a9  | OP1A+  | Audio 1     | c9  | OP1B-  | Audio 1     |
| a10 | OP1A-  |             | c10 | OP1B+  |             |
| a11 | GND    |             | c11 | GND    |             |
| a12 | OP1C-  | Audio 1     | c12 | OP1D-  | Audio 1     |
| a13 | OP1C+  |             | c13 | OP1D+  |             |
| a14 | GND    |             | c14 | GND    |             |
| a15 | OP2A-  | Audio 2     | c15 | OP2B-  | Audio 2     |
| a16 | OP2A+  |             | c16 | OP2B+  |             |
| a17 | GND    |             | c17 | GND    |             |
| a18 | OP2C+  | Audio 2     | c18 | OP2D-  | Audio 2     |
| a19 | OP2C-  |             | c19 | OP2D+  |             |
| a20 | GND    |             | c20 | GND    |             |
| a21 | OP3A+  | Audio 3     | c21 | OP3B+  | Audio 3     |
| a22 | OP3A-  |             | c22 | OP3B-  |             |
| a23 | GND    |             | c23 | GND    |             |
| a24 | OP3C-  | Audio 3     | c24 | OP3D-  | Audio 3     |
| a25 | OP3C+  |             | c25 | OP3D+  |             |
| a26 | GND    |             | c26 | GND    |             |
| a27 | OP4A+  | Audio 4     | c27 | OP4B+  | Audio 4     |
| a28 | OP4A-  |             | c28 | OP4B-  |             |
| a29 | GND    |             | c29 | GND    |             |
| a30 | OP4C-  | Audio 4     | c30 | OP4D-  | Audio 4     |
| a31 | OP4C+  |             | c31 | OP4D+  |             |
| a32 | NC     |             | c32 | NC     |             |

## 3.2 Using unbalanced audio

As the AADA-STM-1 outputs are floating, it is possible to obtain up to 16 unbalanced audio outputs by wiring the RM17 or RM37 in the correct manner.

An unbalanced output may be obtained by using either the +ve or –ve phase of the audio signal pair. To produce the required unbalanced output the unused phase of the signal pair must then be connected to the signal ground.

**Note:** Beware to avoid clipping as connecting one phase to ground increases the level on the other phase by +6dB.

To avoid damage to driver outputs, do not connect both phases to ground.

## 3.3 General purpose interface

GPI outputs ‘a’ to ‘d’ use switch-closure to indicate AADA-STM-1 status. When closed-circuit, the GPI line is connected to Frame Ground.

As supplied, each GPI output has a 330 Ohm resistor in series with its output. This allows for an external LED connected to a dc supply voltage of +5V. GPI inputs ‘e’ and ‘f’ have a pull up 10k Ohm resistor to +5V.

GPI lines ‘e’ and ‘f’ control the overvoltage and silence warning GPI outputs.

*GPI status:*

| GPI         | Closed-circuit (Ground)                            | Open-circuit  |
|-------------|--|---|
| ‘a’         | Output Group 1 silence/overvoltage warning         | Output Group 1 silence/overvoltage is OK  |
| ‘b’         | Output Group 2 silence/overvoltage warning         | Output Group 2 silence/overvoltage is OK  |
| ‘c’         | Output Group 3 silence/overvoltage warning         | Output Group 3 silence/overvoltage is OK  |
| ‘d’         | Output Group 4 silence/overvoltage warning         | Output Group 4 silence/overvoltage is OK  |
| ‘e’ (input) | GPI ‘a’ to ‘d’ overvoltage indication is inhibited | GPI ‘a’ to ‘d’ indicates overvoltage warning and silence warning (depends on ‘f’ input) |
| ‘f’ (input) | GPI ‘a’ to ‘d’ silence indication is inhibited     | GPI ‘a’ to ‘d’ indicates silence warning and overvoltage warning (depends on ‘e’ input) |

## 4U frame GPI Connections

GPI lines 'a' to 'f' of each card connect to one of eight rear remote connectors as follows:

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|----------|---------|---------|---------|---------|---------|---------|
| 1        | 8 (1)   | 9 (1)   | 18 (1)  | 26 (1)  | 19 (2)  | 20 (2)  |
| 2        | 7 (1)   | 16 (1)  | 17 (1)  | 25 (1)  | 10 (2)  | 11 (2)  |
| 3        | 8 (3)   | 9 (3)   | 18 (3)  | 26 (3)  | 19 (4)  | 20 (4)  |
| 4        | 7 (3)   | 16 (3)  | 17 (3)  | 25 (3)  | 10 (4)  | 11 (4)  |
| 5        | 5 (1)   | 6 (1)   | 15 (1)  | 24 (1)  | 1 (2)   | 2 (2)   |
| 6        | 4 (1)   | 14 (1)  | 13 (1)  | 23 (1)  | 3 (2)   | 4 (2)   |
| 7        | 5 (3)   | 6 (3)   | 15 (3)  | 24 (3)  | 1 (4)   | 2 (4)   |
| 8        | 4 (3)   | 14 (3)  | 13 (3)  | 23 (3)  | 3 (4)   | 4 (4)   |
| 9        | 3 (1)   | 12 (1)  | 22 (1)  | 21 (1)  | 12 (2)  | 13 (2)  |
| 10       | 10 (1)  | 11 (1)  | 19 (1)  | 20 (1)  | 21 (2)  | 22 (2)  |
| 11       | 3 (3)   | 12 (3)  | 22 (3)  | 21 (3)  | 12 (4)  | 13 (4)  |
| 12       | 10 (3)  | 11 (3)  | 19 (3)  | 20 (3)  | 21 (4)  | 22 (4)  |
| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
| 1        | 8 (5)   | 9 (5)   | 18 (5)  | 26 (5)  | 19 (6)  | 20 (6)  |
| 2        | 7 (5)   | 16 (5)  | 17 (5)  | 25 (5)  | 10 (6)  | 11 (6)  |
| 3        | 8 (7)   | 9 (7)   | 18 (7)  | 26 (7)  | 19 (8)  | 20 (8)  |
| 4        | 7 (7)   | 16 (7)  | 17 (7)  | 25 (7)  | 10 (8)  | 11 (8)  |
| 5        | 5 (5)   | 6 (5)   | 15 (5)  | 24 (5)  | 1 (6)   | 2 (6)   |
| 6        | 4 (5)   | 14 (5)  | 13 (5)  | 23 (5)  | 3 (6)   | 4 (6)   |
| 7        | 5 (7)   | 6 (7)   | 15 (7)  | 24 (7)  | 1 (8)   | 2 (8)   |
| 8        | 4 (7)   | 14 (7)  | 13 (7)  | 23 (7)  | 3 (8)   | 4 (8)   |
| 9        | 3 (5)   | 12 (5)  | 22 (5)  | 21 (5)  | 12 (6)  | 13 (6)  |
| 10       | 10 (5)  | 11 (5)  | 19 (5)  | 20 (5)  | 21 (6)  | 22 (6)  |
| 11       | 3 (7)   | 12 (7)  | 22 (7)  | 21 (7)  | 12 (8)  | 13 (8)  |
| 12       | 10 (7)  | 11 (7)  | 19 (7)  | 20 (7)  | 21 (8)  | 22 (8)  |

**Note:** Remote 1, Remote 3, Remote 5 and Remote 7 are 26 way high density 'D' type female sockets and frame ground is pin 2 and +5V @500mA is pin 1 in each case.  
Remote 2 and Remote 4 are 26 way high density 'D' type male plugs and frame ground is pin 6 and +5V @500mA is pin 15 in each case.

## 2U frame GPI Connections

GPI lines 'a' to 'f' of each card connect to one of four rear remote connectors as follows:

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|----------|---------|---------|---------|---------|---------|---------|
| 1        | 8 (1)   | 9 (1)   | 18 (1)  | 26 (1)  | 19 (2)  | 20 (2)  |
| 2        | 7 (1)   | 16 (1)  | 17 (1)  | 25 (1)  | 10 (2)  | 11 (2)  |
| 3        | 8 (3)   | 9 (3)   | 18 (3)  | 26 (3)  | 19 (4)  | 20 (4)  |
| 4        | 7 (3)   | 16 (3)  | 17 (3)  | 25 (3)  | 10 (4)  | 11 (4)  |
| 5        | 5 (1)   | 6 (1)   | 15 (1)  | 24 (1)  | 1 (2)   | 2 (2)   |
| 6        | 4 (1)   | 14 (1)  | 13 (1)  | 23 (1)  | 3 (2)   | 4 (2)   |
| 7        | 5 (3)   | 6 (3)   | 15 (3)  | 24 (3)  | 1 (4)   | 2 (4)   |
| 8        | 4 (3)   | 14 (3)  | 13 (3)  | 23 (3)  | 3 (4)   | 4 (4)   |
| 9        | 3 (1)   | 12 (1)  | 22 (1)  | 21 (1)  | 12 (2)  | 13 (2)  |
| 10       | 10 (1)  | 11 (1)  | 19 (1)  | 20 (1)  | 21 (2)  | 22 (2)  |
| 11       | 3 (3)   | 12 (3)  | 22 (3)  | 21 (3)  | 12 (4)  | 13 (4)  |
| 12       | 10 (3)  | 11 (3)  | 19 (3)  | 20 (3)  | 21 (4)  | 22 (4)  |

*Table shows Pin number (Remote number)*

**Note:** Remote 1 and Remote 3 are 26 way high density 'D' type female sockets and frame ground is pin 2 and +5V @500mA is pin 1 in each case.  
Remote 2 and Remote 4 are 26 way high density 'D' type male plugs and frame ground is pin 6 and +5V @500mA is pin 15 in each case.

## 1U frame GPI connections

GPI lines 'a' to 'f' of each card connect to one of two rear remote connectors as follows:

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|----------|---------|---------|---------|---------|---------|---------|
| 1        | 8 (1)   | 9 (1)   | 18 (1)  | 26 (1)  | 19 (2)  | 20 (2)  |
| 2        | 7 (1)   | 16 (1)  | 17 (1)  | 25 (1)  | 10 (2)  | 11 (2)  |
| 3        | 5 (1)   | 6 (1)   | 15 (1)  | 24 (1)  | 1 (2)   | 2 (2)   |
| 4        | 4 (1)   | 14 (1)  | 13 (1)  | 23 (1)  | 3 (2)   | 4 (2)   |
| 5        | 3 (1)   | 12 (1)  | 22 (1)  | 21 (1)  | 12 (2)  | 13 (2)  |
| 6        | 10 (1)  | 11 (1)  | 19 (1)  | 20 (1)  | 21 (2)  | 22 (2)  |

*Table shows Pin number (Remote number)*

**Note:** Remote 1: 26 way high density D-type socket. Frame ground is pin 2 and +5V @500mA is pin 1.  
Remote 2: 26 way high density D-type plug. Frame ground is pin 6 and +5V @500mA is pin 15.

## Indigo DT desk top box GPI connections

GPI lines 'a' to 'f' of each card connect to the rear remote connector as follows:

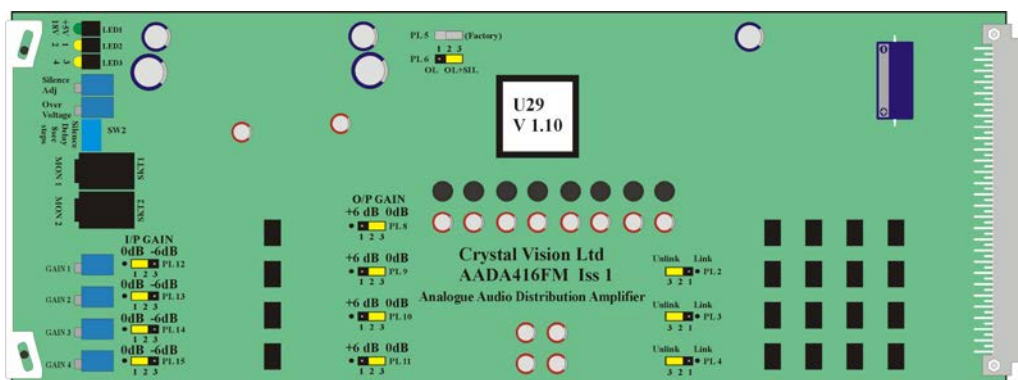
| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|----------|---------|---------|---------|---------|---------|---------|
| 1        | 8 (1)   | 9 (1)   | 18 (1)  | 26 (1)  | 19 (2)  | 20 (2)  |
| 2        | 7 (1)   | 16 (1)  | 17 (1)  | 25 (1)  | 10 (2)  | 11 (2)  |

**Note:** Remote 1: 26 way high density D-type socket. Frame ground is pin 2 and +5V @500mA is pin 1.  
Remote 2: 26 way high density D-type plug. Frame ground is pin 6 and +5V @500mA is pin 15.

## 3.4 Configuration

The AADA-STM-1 is equipped with on-board jumper links for different maximum operating levels. This enables the module to be matched to both +18dBu and \*+24/+28dBu.

There are also two jumper links, PL3 and PL4 provided to link audio channels together to provide a variety of input/output configurations.



*AADA-STM-1 showing configuration jumpers*

**Note:** \*The maximum input signal level is +28dBu and the maximum possible output level is +25dBu.

**Note:** No shorting links are fitted to P12-15 and the shorting link fitted to PL2 is to remain in position 2-3










## Linking audio channels together

Links PL3 and PL4 on the AADA-STM-1 board allow audio channels to be configured in any of the following modes.

- 2 channels – each channel is 1-in 8-out
- 2 channels – channel 1 is 1-in 12-out; channel 2 is 1-in 4-out
- 1 channel – channel 1 is 1-in 16-out

The table on this page shows the jumper positions required for each mode and the implications for LEDs and gain adjust controls.

The link settings required for each mode are as follows:

| Mode                            | PL2    | PL3    | PL4    | Unlink  | Link | Comments   |
|---------------------------------|--------|--------|--------|---|------|--|
| <b>2 Channel</b><br>1>8<br>2>8  | unlink | unlink | unlink | Unlink  | Link | Two separate audio channels.   |
|                                 |        |        |        |  | PL.2 | Stereo 1 – output audio groups 1-2.  |
|                                 |        |        |        |  | PL.3 | Stereo 2 – output audio groups 3-4.  |
|                                 |        |        |        |  | PL.4 | LED 2 conveys the same information as LED 1.<br>LED 4 conveys the same information as LED 3.     |
| <b>2 Channel</b><br>1>12<br>2>4 | unlink | link   | unlink | Unlink  | Link | Two separate audio channels  |
|                                 |        |        |        |  | PL.2 | Stereo 1 – output audio groups 1-2-3.  |
|                                 |        |        |        |  | PL.3 | Stereo 2 – output audio group 4.   |
|                                 |        |        |        |  | PL.4 | Output audio 3 gain pot is out of circuit.<br>LED 3 conveys the same information as LED 1 and 2. |
| <b>1 Channel</b><br>1>16        | link   | link   | link   | Unlink  | Link | Only Stereo 1 input is used.   |
|                                 |        |        |        |  | PL.2 | Audio 2,3 & 4 outputs same as Audio 1 outputs.   |
|                                 |        |        |        |  | PL.3 | Output audio 3 & 4 gain pots are out of circuit.   |
|                                 |        |        |        |  | PL.4 | LED 2, 3 & 4 convey the same information as LED 1.   |

**Note:** Link corresponds to jumper in 1-2 position (nearest edge connector)  
Unlink corresponds to jumper in 2-3 position (furthest from edge connector)

## Matching different operating levels

The maximum operating level may be adjusted for either +18dBu or +24dBu using on-board links PL8-11 (output gain).

The following table shows the jumper links used for each channel and their default positions for unity gain with +24dBu in and +24dBu out.

### Default +24dBu input/output settings

|                | Output gain link position |
|----------------|---------------------------|
| <b>Audio 1</b> | PL8: 2-3 (0dB gain)       |
| <b>Audio 2</b> | PL9: 2-3 (0dB gain)       |
| <b>Audio 3</b> | PL10: 2-3 (0dB gain)      |
| <b>Audio 4</b> | PL11: 2-3 (0dB gain)      |

The following table shows the input/output levels for a range of typical operating levels and the required settings for the input and output jumpers and variable gain adjust controls:

### Changing input/output levels

|                     | I/P level | O/P level | Output gain link        | Gain adjust |
|---------------------|-----------|-----------|-------------------------|-------------|
| <b>Audio Levels</b> | +24dBu    | +24dBu    | PL8-11: 2-3 (0dB gain)  | 0           |
|                     | +18dBu    | +18dBu    | PL8-11: 2-3 (0dB gain)  | 0           |
|                     | +18dBu    | +24dBu    | PL8-11: 1-2 (+6dB gain) | 0           |

**Note:** Moving the jumper links PL8 to PL11 from 2-3 position to 1-2 position will increase the audio (output) gain by 6dB for output audio groups 1 to 4 respectively.  
The maximum input signal level is +28dBu and the maximum possible output level is +25dBu.

## Overvoltage LED inhibit

To inhibit LED indication of overvoltage, set PL6 in position 1-2. For both silence and overvoltage indication set PL6 in position 2-3. To enable or inhibit the GPI warnings of overvoltage and silence detection see section 3.3 – ‘General purpose interface’.

## Using the monitoring output

Two 3.5mm jacks labelled MON 1 and MON 2 are provided to monitor the output of the distribution amplifier after any gain or channel combining settings.

The signal is scaled down so that the headphone sockets produces +6dBu for +24dBu at the distribution amplifier output.

For MON 1 the tip of the 3.5mm jack is output audio group 2 and the ring is output audio group 1 and for MON 2 the tip of the 3.5mm jack is output audio group 4 and the ring is output audio group 3.

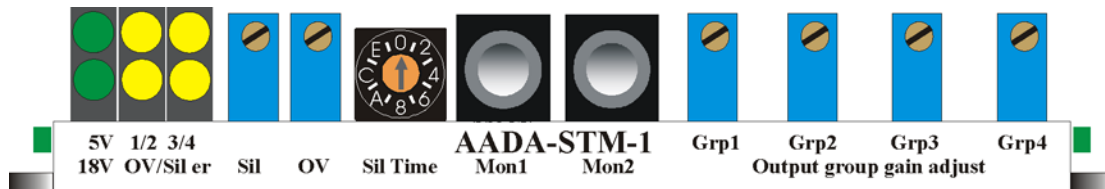
## Other board links

Jumper, PL5, should always be in position 2-3.

Jumpers 12-15 have no jumpers fitted.

## 4 Trouble shooting

The front edge of the card provides useful power rail monitoring, in addition to card edge controls and two headphone monitoring outputs.



*ADA-STM-1 front edge view*

The bottom green LED indicates good +/- 18 Volt power rails when lit and the upper green LED indicates a good +5 Volt rail when lit.

The yellow LEDs illuminate to indicate either an output overvoltage error or channel silence error. The top left-hand yellow LED is for output group 1, the lower left-hand yellow LED is for output group 2. Similarly, the top right-hand yellow LED is for output group 3 and the bottom right-hand yellow LED is for output group 4.

Overvoltage LED indication may be inhibited by changing the position of a jumper link, as explained in the configuration section of the Installation chapter.

The headphone outputs are a useful way of checking the presence and quality of audio at the output of the quad amplifier after all the gain adjustments and channel combining.

**Caution:** Take care when using headphone monitoring that high signal levels are not present.

### Basic fault finding guide

#### The Power OK LEDs are not illuminated

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

Check that the card is seated correctly in the frame

#### There is no audio output

Check that valid audio inputs are present and that any cabling is intact

Check that the inputs and output(s) used are valid for the combining link positions in use

Check that the output gain jumper links are fitted correctly

#### The gain range is not as expected

The gain range and maximum output level are dependent on the position of the jumper links as explained in the Installation chapter

Check that the output gain jumper links are fitted correctly

#### The card no longer responds to card edge control

Check that the card is seated correctly and that the Power OK LEDs are lit. If necessary re-set the card

#### Is it safe to ground either the positive or negative audio output for unbalanced operation?

Yes. This is safe. Beware to avoid output clipping when using unbalanced output connections. This is because connecting one phase to ground increases the level on the other phase by +6dB

To avoid damage to driver outputs, do not connect both phases to ground

#### Re-setting the card

If required, the card may be reset by simply removing the card from the rack and then re-inserting

It is safe to re-insert the card whilst the rack is powered



## 5 Specification

### General

Dimensions: 100mm x 266mm module with DIN 41612 connector  
Weight: 175g  
Power consumption: 8 W nominal, 12 W max

### Audio inputs

Number and type: 4 mono, electronically balanced high impedance input (>20k $\Omega$ )  
Maximum input level: +28dBu  
Factory set default: 0dBFS = + 24dBu

### Audio outputs

Number and type: 16 (4 per group), electronically balanced  
Impedance: 100 Ohms  
Factory set default: 0dBFS = +24dBu  
Max output level: +25dBu  
Loading: Maximum of only 4 outputs (1 per group) into 600 Ohms  
Maximum of 16 outputs into >10k Ohms

### Gain adjustment

Continuous adjustment:  $\pm 3$ dB (multiturn gain pot)  
Link adjustment: +6dB, 0dB, (onboard link settings)  
Total Gain adjustment: -3 + 12dB

### Performance

Signal to noise ratio: >106dB , 0dB gain, 0dBFS = +24dBu  
>104dB , 0dB gain, 0dBFS = +18dBu  
Frequency response:  $\pm 0.05$ dB 20Hz to 20kHz.  
Total Harmonic Distortion + Noise: <0.003% at 1kHz, +18dBu/+24dBu  
Common Mode Rejection: > 74 dB (20Hz to 20kHz)  
Inter-channel cross talk: < -94dB 10kHz

### Monitoring audio

Number and type: 2 Stereo (4 Mono) via two 3.5mm stereo jack sockets  
Output level: 0dBFS + +10dBu

### Silence detectors

Silence level: -18 dBu to -42 dBu at output – adjustable at card edge (factory set to -30dBu)

Number: 4 (one per output audio group)

Duration limit: 1 second to 120 seconds in 15 steps of 8 seconds

### Overvoltage detectors

Number: 4 (one per output audio group)

Detect level: +6dBu to +25dBu at output - adjustable at card edge (factory set to +25dBu)

### GPI lines

Inputs: 2, active low, 10k Ohm pull-up resistors to +5v. Selects silence or overvoltage or both indications on GPI outputs.

Outputs: 4, active low, 330 Ohm resistors in series with output to drive LEDs. Indicates silence/overvoltage status per channel.

### Status monitoring

LED display: Card edge monitoring with LEDs to indicate:  
PSU rails present  
Overvoltage/Silence per channel