AADA416FM

Analogue Audio Distribution Amplifier

Crystal Vision

Crystal Vision Ltd., Lion Technology Park, Station Road East, Whittlesford, Cambridge, CB22 4WL, England.
Tel: +44(0) 1223 497049 Fax: +44(0) 1223 497059 sales@crystalvision.tv www.crystalvision.tv

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Revision 6	RM37 phasing amended (page 10)	25/11/09
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Revision 8	RM17 label information amended (page 7)	08/08/12

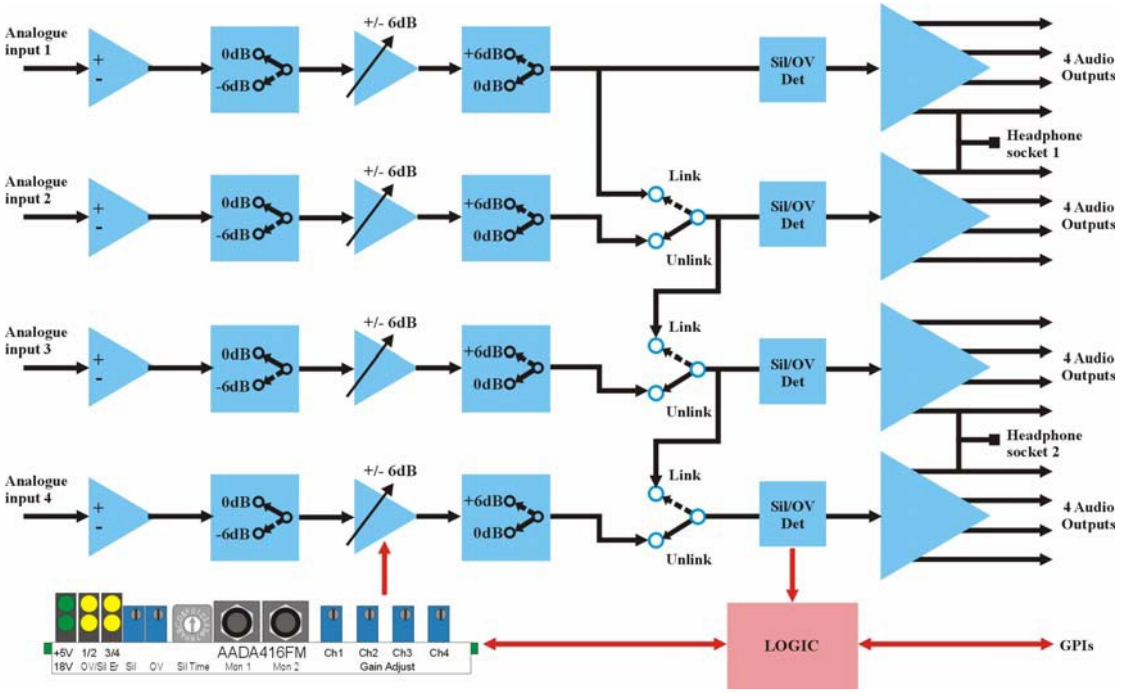
1 Introduction

The AADA416FM is a quad 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:

- 4 channels - each channel is 1-in 4-out
- 3 channels - channels 1 and 2 are 1-in 4-out; channel 3 is 1-in 8-out
- 2 channels - channels 1 and 3 are 1-in 8-out
- 2 channels - channel 1 is 1-in 4-out; channel 2 is 1-in 12-out
- 1 channel - channel 1 is 1-in 16-out

It is very compact in design and depending upon frame selection, allows up to 96 1-in, 4-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.



AADA416FM 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 AADA416FM 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:

- Quad audio distribution amplifier with five 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

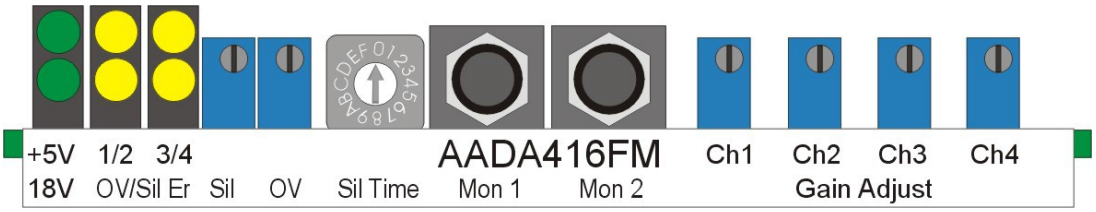
The AADA416FM is a 100mm x 266mm module, which fits in all standard Crystal Vision frames and can be integrated with any boards from the company's full product range. It uses the RM17 and RM37 single height rear connectors.

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 AADA416FM 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.



AADA416FM front edge view

LED INDICATION

LED	Action	Meaning
Yellow (top left)	LED bright LED dim	Audio 1 Overvoltage Audio 1 Silence
Yellow (bottom left)	LED bright LED dim	Audio 2 Overvoltage Audio 2 Silence
Yellow (top right)	LED bright LED dim	Audio 3 Overvoltage Audio 3 Silence
Yellow (bottom right)	LED bright LED dim	Audio 4 Overvoltage Audio 4 Silence
Green (top)	LED on	+ 5V power supply OK
Green (bottom)	LED on	+/- 18Vpower 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 –30dBu. Audio signals above this level (and below the overvoltage level) will produce no illumination of the corresponding LED.

The potentiometer range is from –42dBu to –18dBu

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 ± 6.0dB for each channel using the four Gain Adjust controls. The AADA416FM is supplied with a factory-set gain of 0dB. The maximum operating level may be adjusted for either +18dBu or +24/+*28dBu using on-board links as explained in the configuration section of the Installation chapter.

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

3 Hardware installation

The AADA416FM 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 AADA416FM 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 triple 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.

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.

RM17 rear module connections

RM17 fits in all frames	Description
	**RM17 (ZLA00099 artwork)** • 24 modules per 4U frame, 12 per 2U frame, 6 per 1U frame & 2 per desk top box • All frame slots can be used

For details of fitting rear connectors please refer to the appropriate frame manual.

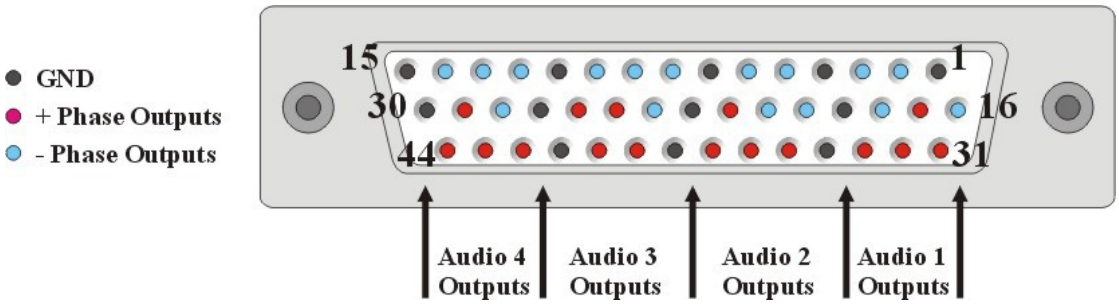
Audio in - 15 pin D-Type connector (cable has plug on it)

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

Note: Stereo 1 channel uses Audio 1 for left signal (L1) and Audio 2 for right signal (R1). Stereo 2 channel uses Audio 3 for left signal (L2) and Audio 4 for right signal (R2). In 2-in, 2x8-out mode, it is worth noting that headphone monitor 1 has audio 1 on both channels, and headphone monitor 2 has audio 3 on both channels.

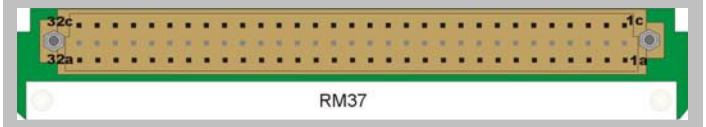
Audio out - 44 pin high density D-Type connector (cable has plug on it)

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



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

RM37 rear module connections

RM37 fits in all frames	Description
	**RM37** • 24 modules per 4U frame, 12 per 2U frame, 6 per 1U frame & 2 per desk top box • All frame slots can be used

For details of fitting rear connectors please refer to the appropriate frame manual.

Audio in

Pin number	Function	Comments
a1	IP-L1+	} Stereo 1 Left input (Audio 1)
a2	IP-L1-	
a3	Input_LO	Screen for input 1
a4	IP-R1+	} Stereo 1 Right input (Audio 2)
a5	IP-R1-	
a6	Input_LO	Screen for input 2
a7	NC	No connection
a8	GND	
c1	IP-L2+	} Stereo 2 Left input (Audio 3)
c2	IP-L2-	
c3	Input_LO	Screen for input 3
c4	IP-R2-	} Stereo 2 Right input (Audio 4)
c5	IP-R2+	
c6	Input_LO	Screen for input 4
c7	NC	No connection
c8	GND	

Note: Stereo 1 channel uses Audio 1 for left signal (L1) and Audio 2 for right signal (R1).
Stereo 2 channel uses Audio 3 for left signal (L2) and Audio 4 for right signal (R2).
In 2-in, 2x8-out mode, it is worth noting that headphone monitor 1 has audio 1 on both channels, and headphone monitor 2 has audio 3 on both channels.

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	

Note: Pin numbers refer to the plug numbering scheme.

3.2 Using unbalanced audio

As the AADA416FM 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: It is recommended to set the input gain to -6dB (using PL12-15) 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.

3.3 General purpose interface

GPI outputs ‘a’ to ‘d’ use switch-closure to indicate AADA416FM 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’	Audio 1 silence/overvoltage warning	Audio 1 silence/overvoltage is OK
‘b’	Audio 2 silence/overvoltage warning	Audio 2 silence/overvoltage is OK
‘c’	Audio 3 silence/overvoltage warning	Audio 3 silence/overvoltage is OK
‘d’	Audio 4 silence/overvoltage warning	Audio 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 Upper	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)
	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.

DTB-AV 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	1	2	3	4	5	6
2	9	10	11	12	13	14

Note: Remote connector is 15-way normal density D-type socket. Frame ground 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:

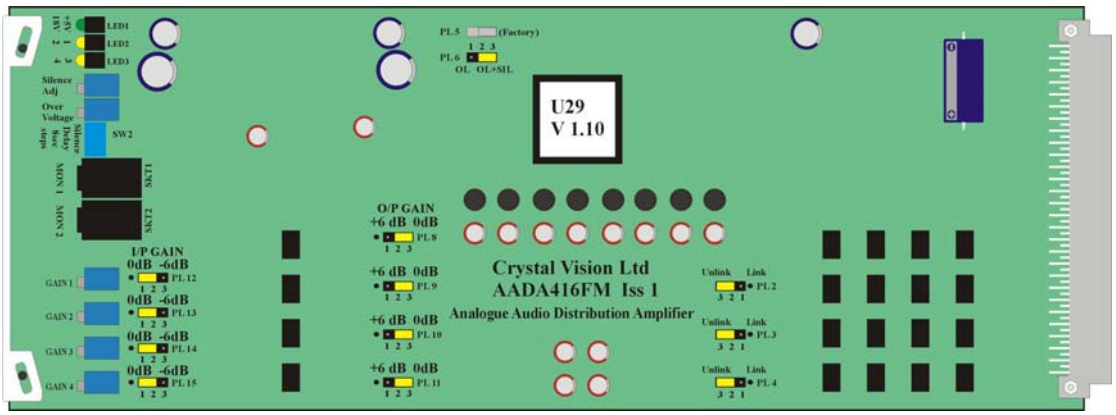
Slot no.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)

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 AADA416FM 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 three jumper links, PL2, PL3 and PL4 provided to link audio channels together to provide a variety of input/output configurations.



AADA416FM showing configuration jumpers

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

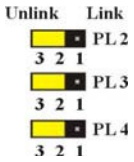
Linking audio channels together

Links PL2, PL3 and PL4 on the AADA416FM board allow audio channels 1 to 4 to be configured in any of the following modes.

-
- channels – each channel is 1-in 4-out
- channels – channels 1 and 2 are 1-in 4-out; channel 3 is 1-in 8-out
- channels – channels 1 and 3 are 1-in 8-out
- channels – channel 1 is 1-in 4-out; channel 2 is 1-in 12-out
- 1 channel – channel 1 is 1-in 16-out

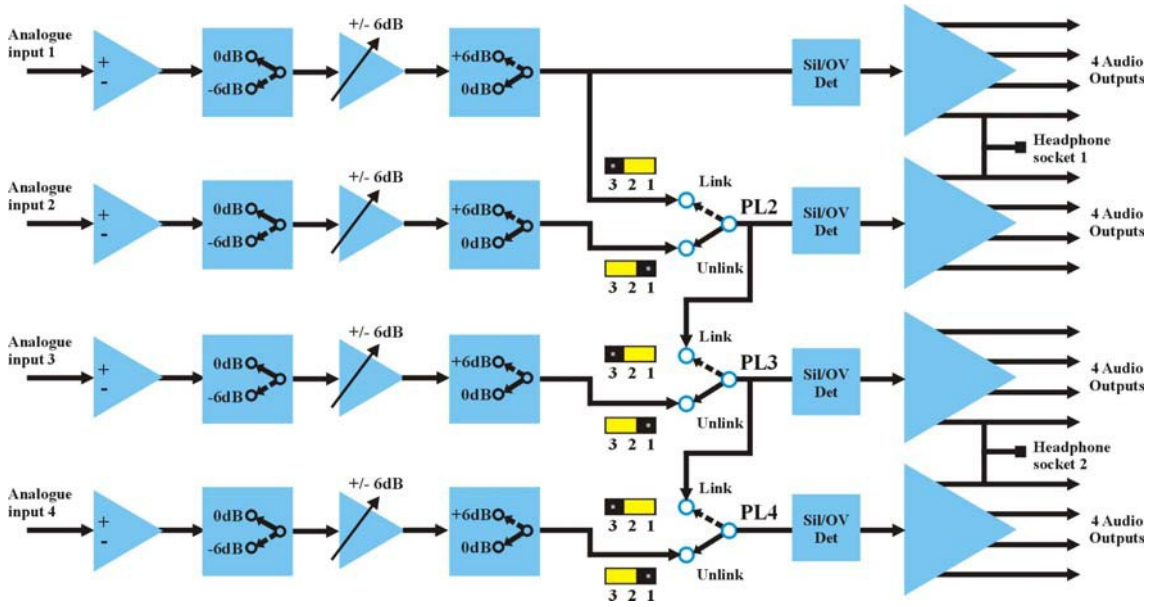
The table on the next page shows the jumper positions required for each mode and the implications for LEDs and gain adjust controls.

The link settings required for each mode are as follows:



Mode	PL2	PL3	PL4	Comments
4 Channel 1,2,3,4>4	unlink	unlink	unlink	4 separate audio channels.
3 Channel 1,2>4 3>8	unlink	unlink	link	Only Audio 1, 2 and 3 inputs are used. Audio 4 outputs same as Audio 3 outputs and uses Audio 3 input. Audio 4 gain pot is out of circuit. LED 4 conveys the same information as LED 3.
2 Channel 1,3>8	link	unlink	link	Only Audio 1 and 3 inputs are used. Audio 2 outputs same as Audio 1 outputs and uses Audio1 input. Audio 4 outputs same as Audio 3 outputs and uses Audio 3 input. Audio 2 and audio 4 gain pots are out of circuit. LED 2 conveys the same information as LED 1 and LED 4 conveys the same information as LED 3.
2 Channel 1>4 2>12	unlink	link	link	Only Audio 1 and 2 inputs are used. Audio 3 & 4 outputs same as Audio 2 outputs and uses Audio 2 input. Audio 3 & 4 gain pots are out of circuit. LED 3 & 4 convey the same information as LED 2.
1 Channel 1>16	link	link	link	Only Audio 1 input is used. Audio 2,3 &4 outputs same as Audio 1 outputs Audio 2, 3 & 4 gain pots are out of circuit. LED 2, 3 & 4 convey the same information as LED 1. LED 2, 3 & 4 convey the same information as LED 1.

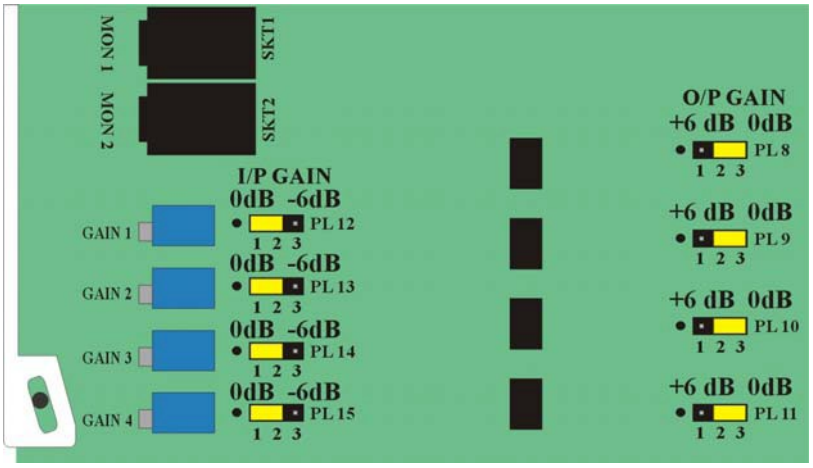
Note: Link corresponds to jumper in 1-2 position (nearest edge connector)
Unlink corresponds to jumper in 2-3 position (furthest from edge connector)



AADA416FM showing channel combining links

Matching different operating levels

The maximum operating level may be adjusted for either +18dBu or +24dBu using on-board links PL12-15 (input gain) and PL8-11 (output gain).



AADA416FM showing variable and jumper link gain controls

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

	Input gain link position	Output gain link position
Audio 1	PL12: 1-2 (0dB gain)	PL8: 2-3 (0dB gain)
Audio 2	PL13: 1-2 (0dB gain)	PL9: 2-3 (0dB gain)
Audio 3	PL14: 1-2 (0dB gain)	PL10: 2-3 (0dB gain)
Audio 4	PL15: 1-2 (0dB gain)	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	Input gain link	Output gain link	Gain adjust
Audio Levels	+24dBu	+24dBu	PL12-15: 1-2 (0dB gain)	PL8-11: 2-3 (0dB gain)	0
	+18dBu	+18dBu	PL12-15: 1-2 (0dB gain)	PL8-11: 2-3 (0dB gain)	0
	+18dBu	+24dBu	PL12-15: 1-2 (0dB gain)	PL8-11: 1-2 (+6dB gain)	0
	+24dBu	+18dBu	PL12-15: 2-3 (-6dB gain)	PL8-11: 2-3 (0dB gain)	0
	+28dBu	+24dBu	PL12-15: 2-3 (-6dB gain)	PL8-11: 2-3 (0dB gain)	+2dB
	+28dBu	+18dBu	PL12-15: 2-3 (-6dB gain)	PL8-11: 2-3 (0dB gain)	-4dB

Note: Moving only jumper links PL12 to PL15 from 1-2 position to 2-3 position will reduce the audio (input) gain by 6dB for Audio 1 to 4 respectively. Moving the jumper links PL8 to PL11 from 2-3 position to 1-2 position will increase the audio (output) gain by 6dB for Audio 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.

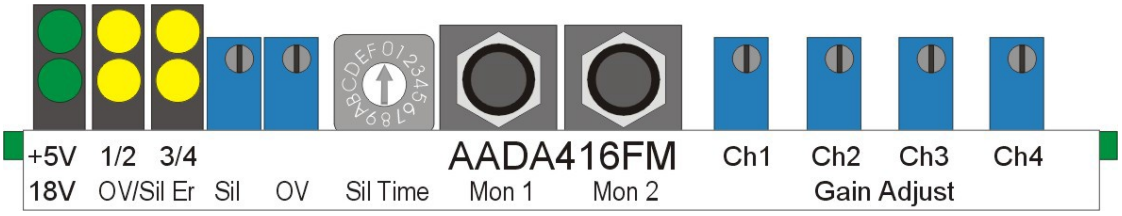
For MON 1 the tip of the 3.5mm jack is audio 2 and the ring is audio 1 and for MON 2 the tip of the 3.5mm jack is audio 4 and the ring is audio 3.

Other board links

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

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.



AADA416FM 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 channel 1, the lower left-hand yellow LED is for channel 2. Similarly, the top right-hand yellow LED is for channel 3 and the bottom right-hand yellow LED is for channel 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 which could damage hearing.

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 input/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 input/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. It is recommended to set the input gain to -6dB (using PL12-15) 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 rack power and re-applying power after a few seconds or by removing the card from the rack and then re-inserting the card

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 □)
	Maximum input level:	+28dBu
	Factory set default	0dBFS = + 24dBu
Audio outputs	Number and type:	16 (4 per channel), electronically balanced
	Impedance:	100 Ohms
	Factory set default:	0dBFS = +24dBu
	Max output level:	+25dBu
	Loading	Maximum of only 4 outputs (1 per channel) into 600 Ohms Maximum of 16 outputs into >10k Ohms
Gain adjustment	Continuous adjustment:	± 6dB (multiturn gain pot)
	Link adjustment:	+6dB, 0dB, -6dB (onboard link settings
	Total Gain adjustment:	± 12dB
Performance	Signal to noise ratio:	>106dB , 0dB gain, 0dBFS = +24dBu
		>104dB , 0dB gain, 0dBFS = +18dBu
	Frequency response:	± 0.05dB 20Hz to 20kHz
	Total Harmonic Distortion:	<0.003% at 1kHz, +18dBu/+24dBu
	Noise:	
	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 audio channel)
	Duration limit:	1 second to 120 seconds in 15 steps of 8 seconds
Overvoltage detectors	Number:	4 (one per audio channel)
	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