AADA416M

Analogue audio distribution amplifier

USER MANUAL

Crystal Vision

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INTRODUCTION

The AADA416M is a versatile analogue audio distribution amplifier. There are 4 separate audio distribution amplifiers with one input and four outputs. The audio distribution amplifiers are named Audio 1 to Audio 4. Links on the AADA416M board allows the user to configure Audio 1 to Audio 4 to be any of the following arrangements.

a. 4 channels each channel is 1-in, 4-out.
b. 3 channels two channels 1-in, 4-out, and the other channel 1-in, 8-out
c. 2 channels both channels 1-in, 8-out.
d. 2 channels one channel 1-in, 4-out the other channel 1-in, 12-out
e. 1 channel one channel 1-in, 16-out

Audio 1 to Audio 4 inputs and outputs are electronically balanced. Each has a multiturn preset pot for audio gain adjustments. An audio silence detector and overvoltage detector with LED warning indication is provided for each audio channel. The silence detector has 16 different user adjustable time settings . Two 3.5mm stereo jacks are provided for local audio monitoring by a headphone set.

It is very compact with 12 modules fitting in a 2U frame providing up to 48 1-in, 4-out, distribution amplifiers.

The unit plugs into the front of the rack frame, and the universal connection system allows a mixture of Crystal Vision modules in the 2U frame.

The hinged front panel of the case reveals LED indication of audio silence and overvoltage status and controls for gain and silence time settings. General-Purpose Interface lines also remotely indicate audio silence/overvoltage status.

SPECIFICATION

Mechanical

Dimensions	100mm x 266mm module with DIN 41612 connector. Indication at end of board with access from hinged front panel.
Weight	175g

Electrical

Inputs	4 analogue, electrically balanced, high impedance.
Outputs	16.analogue, electrically balanced, 66 ohm impedance.
Power Consumption	3.8W

ANALOGUE SIGNAL INPUT and OUTPUT

Gain adjustment	± 6dB (multiturn gain pot)
	± 12dB (link settings and multiturn gain pot)
Maximum signal level	+28dBu (Input and Output)
Frequency Response	± 0.05dB 20Hz to 20kHz.
Signal to Noise ratio	>112dB , 0dB gain, 0dBFS = +24dBu
	>106dB , 0dB gain, 0dBFS = +18dBu
	(20Hz to 20kHz)
Total Harmonic Distortion + Noise	
	Less than 0.003% at 1kHz, 24dBu in and 0dB gain
Common Mode Rejection	> 74 dB (20Hz to 20kHz)
Channel to Channel cross talk	< -100dB, 10kHz

MONITORING AUDIO OUTPUTS

Quantity	2 Stereo (4 Mono)
Connector	3.5mm stereo jack socket
Output level	OdBFS = + 10dBu

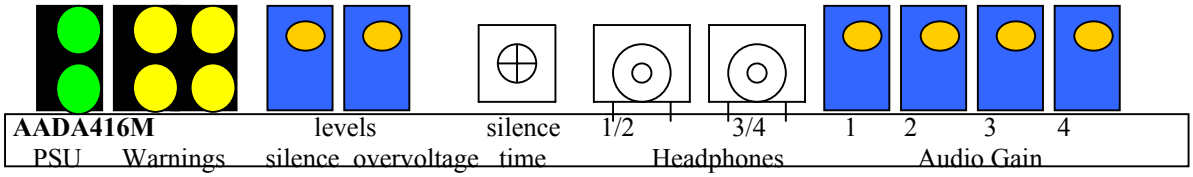
DETECTOR LIMITS

Quantity of Silence detectors	4 (one per audio channel)
Silence level	-18 dBu to –42 dBu at output –adjustable at front (factory set to -30dBu)
	Adjustable at front
Silence duration limit	1 second to 120 seconds in 15 steps of 8 seconds
Quantity of Overvoltage detectors	4 (one per audio channel)

Overvoltage level	+6dBu to +28dBu at output - adjustable from front (factory set to +28dBu)
GPI lines	
Inputs	2 (D-type on FR2AV 2U frame)
Outputs	4 (D-type on FR2AV 2U frame)

USER ADJUSTMENTS

CARD EDGE VIEW



LED INDICATION

Warning	Yellow (top left)	Audio 1 channel Overvoltage(LED bright)/Silence(LED dim)
Warning	Yellow (bottom left)	Audio 2 channel Overvoltage(LED bright)/Silence(LED dim)
Warning	Yellow (top right)	Audio 3 channel Overvoltage(LED bright)/Silence(LED dim)
Warning	Yellow (bottom left)	Audio 4 channel Overvoltage(LED bright)/Silence(LED dim)
PSU	Green (top)	+/- 5V power supply OK
PSU	Green (bottom)	+/- 18Vpower supply OK.

Note JL9 with jumper in
1-2 position will inhibit the LED indication of Overvoltage
2-3 position will allow LED 1 to 4 to indicate both Overvoltage and Silence warnings (factory default position)

Gain

Gain is continuously variable ± 6.0dB for each channel using the 4 AUDIO GAIN controls. The AADA416M is supplied with a factory-set gain of 0dB.

Overvoltage detection level

Overvoltage detection level is adjustable from the front of the board. Turning the pot fully clockwise will set the overvoltage limit to +28dBu. Any peak audio signals which exceed the overvoltage limit will illuminate the corresponding LED for a minimum of 1 second.

Silence detection level

Silence detection level 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.

Silence time setting

A 16 position switch at the front of the board labelled silence time, determines the time duration to detect that an audio signal is continuously below the silence detection level limit. Each of the 4 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. If these times are exceeded the LED for that channel will illuminate and stay illuminated until the audio signal level is greater than the silence level. If this occurs the LED will turn off.

MONITORING OUTPUT

Two 3.5mm jacks labelled MON 1 and MON 2 are provided for listening to audio signals
Note in MON 1 position the tip of the 3.5mm jack is audio 2 and the ring is audio 1. and in MON 2 position the tip of the 3.5mm jack is audio 4 and the ring is audio 3

JUMPER SETTINGS

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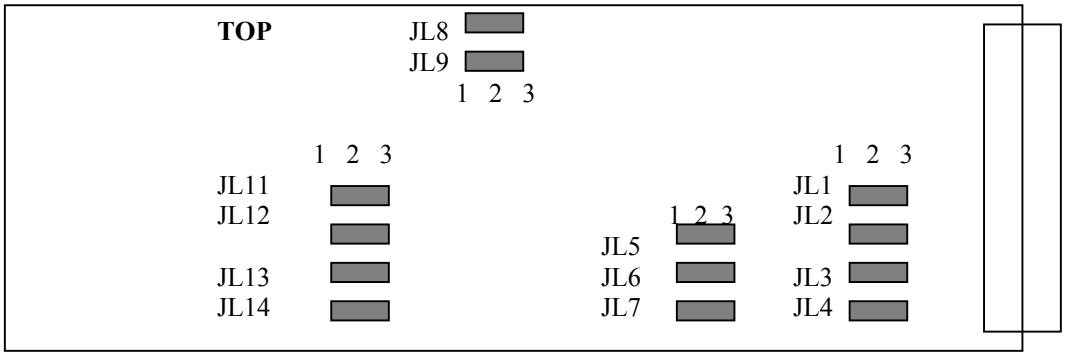


JL9 see note above
JL8 not used (factory set to position 2-3)
Setting Input and Output levels

JL11 to JL14 – Input signal level select (factory set to position 2-3)

	Jumper position	DFS Input level	Channel Number
JL11	1-2	18dBu	Audio 1
	2-3	24dBu or 28dBu	
JL12	1-2	18dBu	Audio 2
	2-3	24dBu or 28dBu	
JL13	1-2	18dBu	Audio 3
	2-3	24dBu or 28dBu	
JL14	1-2	18dBu	Audio 4
	2-3	24dBu or 28dBu	

DFS = Digital Full Scale
Note moving the jumper links JL11 to JL14 from 1-2 position to 2-3 position will reduce the audio gain by 6dB for Audio 1 to 4 respectively.

JL1 to JL4 – Output signal level select (factory set to position 2-3)

	Jumper position	DFS Input level	Channel Number
JL1	1-2	18dBu	Audio 1
	2-3	24dBu or 28dBu	
JL2	1-2	18dBu	Audio 2
	2-3	24dBu or 28dBu	
JL3	1-2	18dBu	Audio 3
	2-3	24dBu or 28dBu	
JL4	1-2	18dBu	Audio 4
	2-3	24dBu or 28dBu	

DFS = Digital Full Scale
Note moving the jumper links JL1 to JL4 from 1-2 position to 2-3 position will increase the audio gain by 6dB for Audio 1 to 4 respectively.

Linking Channels together
JL5 , JL6 and JL7

Links on the AADA416M board allows the user to configure Audio 1 to Audio 4 to be any of the following arrangements.

a. 4 channels- Audio 1 to Audio 4, each channel is 1-in, 4-out
b. 3 channels- Two channels are 1-in, 4-out, and the other channel is1-in, 8-out
c. 2 channels -Both channels are 1-in, 8-out
d. 2 channels -One channel is 1-in, 4-out, the other channel is 1-in, 12-out
e. 1 channel- One channel. This is 1-in, 16-out

configuration	JL5	JL6	JL7	Comments
a	unlink	unlink	unlink	4 separate audio channels.
b	unlink	unlink	link	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 Only Audio 1,2 and 3 inputs are used.
c	link	unlink	link	Audio 2 outputs same as Audio 1 outputs and uses Audio 1 input. Audio 2 gain pot is out of circuit. LED 2 conveys the same information as LED 1 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 Only Audio 1 and 3 inputs are used
d	unlink	link	link	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 Only Audio 1 and 2 inputs are used
e	link	link	link	Only Audio 1 input is used Audio 2,3 &4 outputs same as Audio 1outputs Audio 2,3 &4 gain pots are out of circuit. LED 2,3 & 4 convey the same information as LED 1

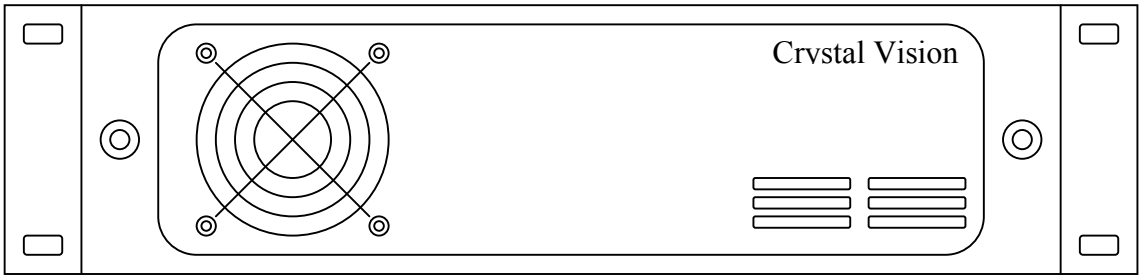
Note link is jumper in 1-2 position unlink is jumper in 2-3 position

INSTALLATION INFORMATION

FR2AV 2U FRAME FOR 12 MODULES

FR1AV 1U FRAME FOR 6 MODULES

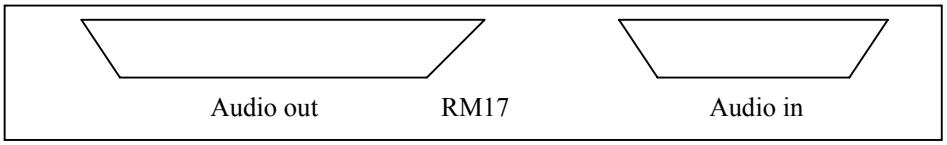
DTBAV 1U FRAME FOR 2 MODULES



The 2U FR2AV frame will house up to 12 modules and dual power supplies.
The 1U FR1AV frame will house 6 modules and a single power supply.
The DTBAV 1U high Desk Top Box has built-in power supply and will house up to 2 modules.
On the FR2AV and FR1AV frames a hinged front panel gives access to the PSU and all modules. The DTBAV 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.
The modules can be plugged in and removed while the frame is powered without damage.
Each AADA416M card has an associated rear connector module RM17. Each RM17 is a single slot high, so that up to 12 such modules, in any mix could be fitted onto an FR2AV frame so it can hold up to 12 AADA416 cards. Other Crystal Vision RM and Interface cards can be mixed in any quantity with AADAA416 cards, up to a maximum of 12 cards, providing the other cards do not exceed the power rating of the PSU chosen (normally 150 watts).

RM17 CONNECTIONS

Rear Connector Module



There are 4 separate (mono) audio distribution amplifiers with one input and four outputs. The audio distribution amplifiers are named Audio 1 to Audio 4.
When two stereo channels are used then
Stereo1 channel would use Audio1 for left signal (L1)and Audio 2 for right signal (R1)
Stereo2 channel would use Audio3 for left signal (L2)and Audio 4 for right signal (R2)

Audio In connector 15 way D-type socket (cable has plug on it)

Pin number	Function	Comments
1	IP-1LO	Low for signal pair
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	Low for signal pair
7		No connection
8		
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	Low for signal pair
15	IP-4LO	Low for signal pair

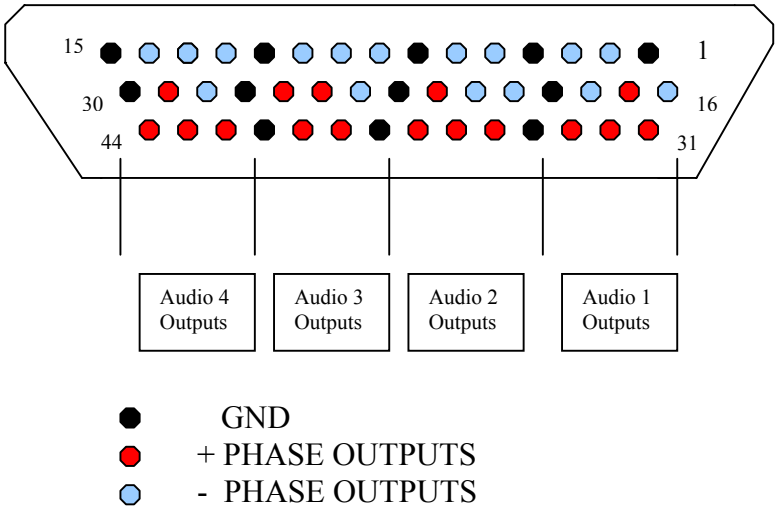
Audio Out connector 44 way High Density D-Type socket (cable has plug on it)

1	GND	
2	OP1-	Audio 1
3	OP1-	Audio 1
4	GND	
5	OP2-	Audio 2
6	OP2-	Audio 2
7	GND	
8	OP3-	Audio 3
9	OP3-	Audio 3
10	OP3-	Audio 3
11	GND	
12	OP4-	Audio 4
13	OP4-	Audio 4
14	OP4-	Audio 4
15	GND	
16	OP1-	Audio 1
17	OP1+	Audio 1
18	OP1-	Audio 1
19	GND	
20	OP2-	Audio 2
21	OP2-	Audio 2
22	OP2+	Audio 2
23	GND	
24	OP3-	Audio 3
25	OP3+	Audio 3
26	OP3+	Audio 3
27	GND	
28	OP4-	Audio 4
29	OP4+	Audio 4
30	GND	
31	OP1+	Audio 1
32	OP1+	Audio 1
33	OP1+	Audio 1
34	GND	
35	OP2+	Audio 2
36	OP2+	Audio 2
37	OP2+	Audio 2
38	GND	
39	OP3+	Audio 3
40	OP3+	Audio 3
41	GND	
42	OP4+	Audio 4
43	OP4+	Audio 4
44	OP4+	Audio 4

Suggested wiring table for AADA416 44 way D-type

output number	polarity	pin number	
1	+	17	Audio 1
	-	2	
2	+	31	
	-	16	
3	+	32	
	-	18	
4	+	33	
	-	3	
5	+	35	Audio 2
	-	20	
6	+	36	
	-	21	
7	+	22	
	-	5	
8	+	37	
	-	6	
9	+	39	Audio 3
	-	24	
10	+	25	
	-	8	
11	+	40	
	-	9	
12	+	26	
	-	10	
13	+	42	Audio 4
	-	12	
14	+	43	
	-	28	
15	+	29	
	-	13	
16	+	44	
	-	14	
Grounds		1, 4 ,7 ,11 ,15 ,19 ,23 ,27 ,30 ,34 ,38 ,41	

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



UNBALANCED AUDIO OUTPUTS

The RM17 can be wired to produce up to 16 unbalanced audio outputs .
The signal connections should be made on the +PHASE OUTPUTS only. The –PHASE OUTPUTS are left **UNCONNECTED** .Do not connect the –PHASE OUTPUTS to GND.
It should be noted that the audio output levels for unbalanced is 6dB lower in level than that of a balanced arrangement for the same gain pot setting.

GENERAL PURPOSE INTERFACE

GPI outputs 1 to 4 (labelled 'a' to 'd' below) use switch-closure to indicate AADA416M status. When closed-circuit, the GPI line is connected to Frame Ground. As supplied, each GPI output has a 330 ohm resister 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 resister to +5V.

GPI	Closed-circuit (Ground)	Open-circuit
'a'	Audio 1 silence/ov warning	Audio 1 silence/ov is OK
'b'	Audio 2 silence/ov warning	Audio 2 silence/ov is OK
'c'	Audio 3 silence/ov warning	Audio 3 silence/ov is OK
'd'	Audio 4 silence/ov warning	Audio 4 silence/ov is OK
'e' (input)	GPI 'a' to 'd' ov indication is inhibited	GPI 'a' to 'd' indicates ov 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 ov warning(depends on 'e' input)

ov = overvoltage limit exceeded

FR2AV, FR1AV & DTBAV GPI CONNECTIONS

Each slot has an associated set of connections on the frame rear-panel remote connectors. The tables below show the GPI connections described above.

FR2AV GPI CONNECTIONS

Remote 1 and **Remote 3**: 26 way high density D-type **sockets**.
+5V @ 500mA is pin 1. Frame ground is pin 2.
Remote 2 and **Remote 4**: 26 way high density D-type **plugs**.
+5V @ 500mA is Remote 2 pin 15. Frame ground is pin 6.
Table shows Pin number (Remote number)

Slot no.	'a' pin no.	'b' pin no.	'c' pin no.	'd' pin no.	'e' pin no.	'f' pin no.
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)

FR1AV GPI CONNECTIONS

Remote 1: 26 way high density D-type **socket**.

+5V @ 500mA is pin 1. Frame ground is pin 2.
Remote 2: 26 way high density D-type **plug**.
+5V @ 500mA is pin 15. Frame ground is pin 6.
Table shows Pin number (Remote number)

Slot no.	'a' pin no.	'b' pin no.	'c' pin no.	'd' pin no.	'e' pin no.	'f' pin no.
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)

DTBAV GPI CONNECTIONS
Remote 15 way D-type **socket**.
Frame ground is pin 15.

Table shows Pin number

Slot no.	'a' pin no.	'b' pin no.	'c' pin no.	'd' pin no.	'e' pin no.	'f' pin no.
1	1	2	3	4	5	6
2	9	10	11	12	13	14