VDA110M HD

Analogue video distribution amplifier

Crystal Vision

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Revision 1.	Note on equalisation added, page 11. Specifications amended.	15/01/09
Revision 2.	Specification amended.	20/11/09
Revision 3.	Specification amended.	09/06/10
Revision 4	Specifications amended.	30/06/10

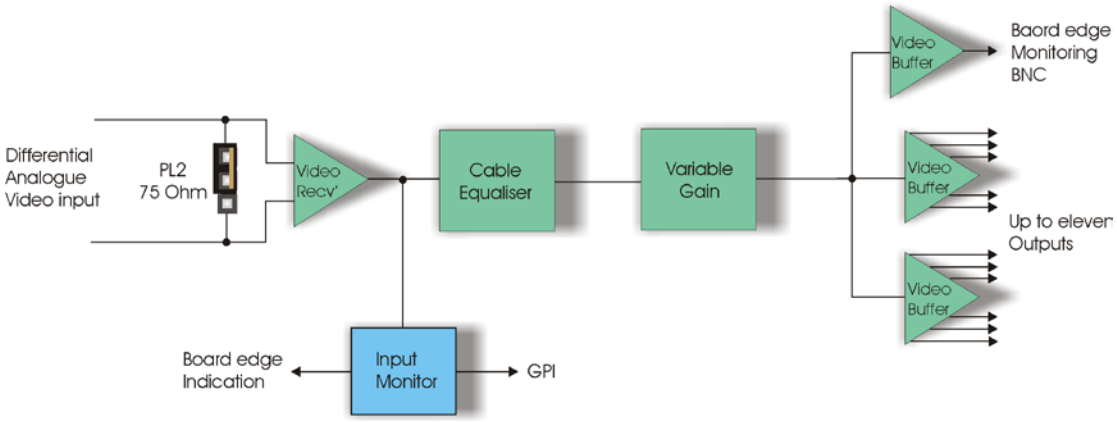
1 Introduction

The VDA110M HD is a 1-in, 11-out distribution amplifier with continuously variable gain and equalisation for up to 300 metres of coaxial cable for use with both Standard and High Definition composite signals.

The VDA110M HD may be used with the RM01 and RM09 single slot rear connector, the RM02 and RM10 quadruple slot rear connector and the RM16 and RM18 double slot rear connectors. A single slot rear connector provides five equalised outputs. Five or six extra outputs and an input loop-through are available with alternative frame rear modules.

Input termination is link selectable and passive loop-through is independent of the amplifier. The module may be removed without losing the looped-through source.

VDA110M HD is a very compact board, with 24 modules fitting in a 4U frame when a single slot rear connector is used.



VDA110M HD analogue video DA

The VDA110M HD has LED and GPI indication of input presence/failure.

The main features are as follows:

- 1 in 11 out video distribution amplifier (use RM18 for 11 outputs)
- Continuously variable equalisation for up to 300 metres of coaxial cable.
- GPI/LED input presence indication
- SD/HD composite capable
- Card edge control

The unit plugs into the front of the rack frame, and the universal connection system allows a mixture of Crystal Vision modules in the frame. The hinged front panel of the case reveals LED indication of input status and controls for cable equalisation and gain.

2 Hardware installation

The VDA110M HD single channel video distribution amplifier fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

2.1 Universal rear connectors

When used with a single height rear connector, the 4U Indigo frame will house up to 24 modules and three power supplies, 2U Indigo frame will house up to 12 modules and two power supplies, the 1U Indigo frame will house 6 modules and a single or dual power supply. The 1U desktop box has a built-in power supply and will house up to 2 modules with a single height rear connector.

The 4U, 2U and 1U frames have a hinged front panel, which gives access to the PSU and all modules. The desktop 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.

There are six types of rear connector available that provide system flexibility by allowing a mix between total I/O access and module packing density.

The VDA110M HD may be used with the RM01 and RM09 single slot rear connector for up to 24 modules, the RM02 and RM10 quadruple slot rear connectors for up to 8 modules and the RM16 and RM18 double slot rear connectors for up to 12 modules in a 4U frame.

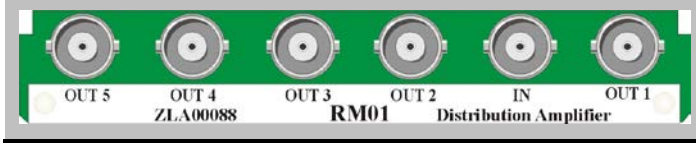
Note: The 1U Indigo frame and desk top box will not accept either the quad height RM02 or RM10.

The following table summarises the rear connectors available and their recommended use.

Connector	No of Slots	No of Cards *	Loop-through	VDA110M HD	Differential inputs
RM01	1	1	No	1 in 5 out	No
RM09	1	1	1	1 in 4 out	Yes
RM16	2	1	1	1 in 10 out	Yes
RM18	2	1	No	1 in 11 out	No
RM02	4	3	No	1 in 8 out	Yes
RM10	4	3	1	1 in 7 out	Yes

Notes: *Table shows no of cards per rear connector.
Passive loop-through is independent of the amplifier; the module may be removed without losing the looped-through source.

Rear module connections with RM01

RM01 fits in all frames	Description
	**RM01** • 24 modules in 4U, 12 in 2U, 6 in 1U & 2 in a DTB • All frame slots can be used

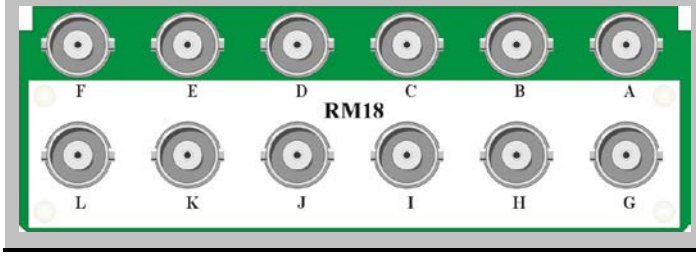
BNC	Signal assignment
IN	Input.
OUT 1	Output
OUT 2	Output
OUT 3	Output
OUT 4	Output
OUT 5	Output

Rear module connections with RM09

RM09 fits in all frames	Description
	**RM09** • 24 modules in 4U, 12 in 2U, 6 in 1U & 2 in a DTB • All frame slots can be used

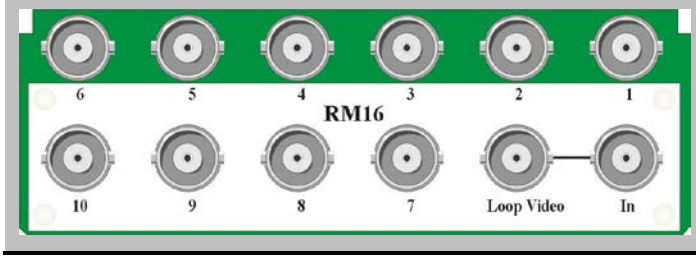
BNC	Signal assignment
IN	Input.
LOOP IN	Input loop through
OUT 1	Output
OUT 2	Output
OUT 3	Output
OUT 4	Output

Rear module connections with RM18

RM18 fits in all frames	Description
	**RM18 (eleven outputs)** • 12 modules per 4U frame, 6 per 2U frame, 3 per 1U frame, 1 per DTB • 1 module per rear connector • Card fits in upper slot • No card fits in lower slot

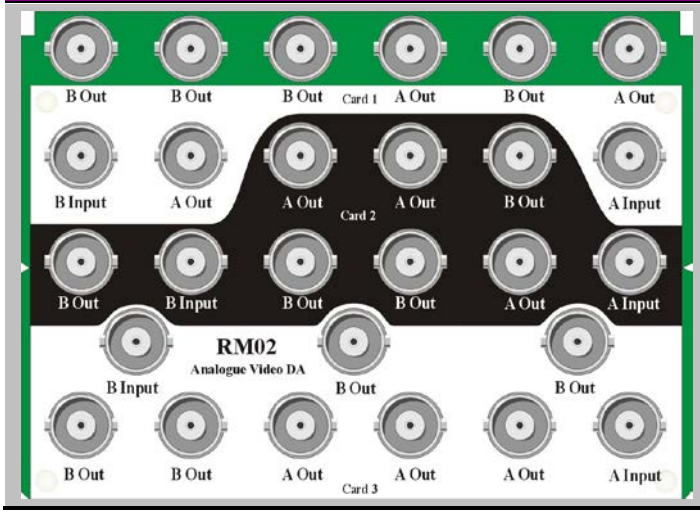
BNC	Signal
A	Output
B	Input
C	Output
D	Output
E	Output
F	Output
G	Output
H	Output
I	Output
J	Output
K	Output
L	Output

Rear module connections with RM16

RM16 fits in all frames	Description
	**RM16** • 12 modules per 4U frame, 6 per 2U frame, 3 per 1U frame, 1 per DTB • 1 module per rear connector • Card fits in upper slot • No card fits in lower slot

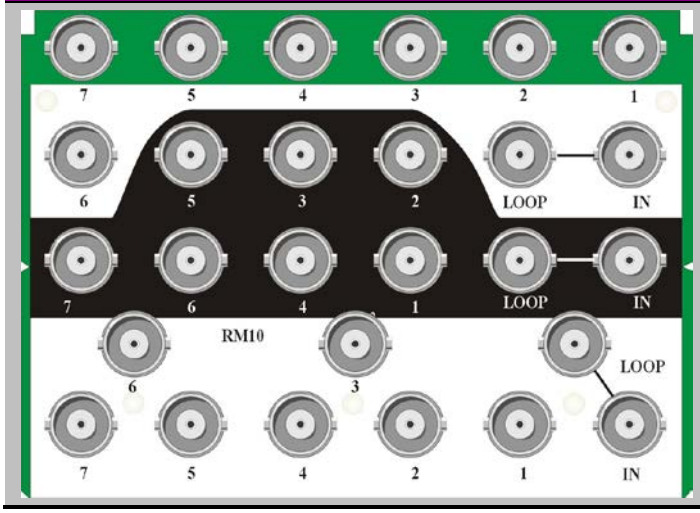
BNC	Signal
In	Input
Loop Video	Loop Video
1	Output
2	Output
3	Output
4	Output
5	Output
6	Output
7	Output
8	Output
9	Output
10	Output

Rear module connections with RM02

RM02 fits in Indigo 2 and Indigo 4 frames	Description
	**RM02** • 12 modules per 4U frame • 9 modules per 2U frame • 3 modules per rear connector • Card 1 fits in slots 1, 5 and 9 • Card 2 fits in slots 2, 6 and 10 • Card 3 fits in slots 4, 8 and 12 • No card fits in 3, 7 or 11

BNC	Signal
A Input	Input
B Input	Output
A Output	Output
B Output	Output

Rear module connections with RM10

RM10 fits in Indigo 2 and Indigo 4 frames	Description
	**RM10** • 9 modules per 2U frame • 3 modules per rear connector • Card 1 fits in slots 1, 5 and 9 • Card 2 fits in slots 2, 6 and 10 • Card 3 fits in slots 4, 8 and 12 • No card fits in 3, 7 or 11

BNC	Signal
IN	Input
LOOP	Input loop-through
1	Output
2	Output
3	Output
4	Output
5	Output
6	Output
7	Output

2.2 Module configuration

The VDA110M HD is equipped with an on-board jumper link to change input termination.

VDA110M HD showing termination jumper PL2

Changing the input termination

Move jumper PL2 to the appropriate position to set the input termination to either 75Ω or high impedance loop-through.

Input termination

PL 2 position	Termination
Loop-through position (top)	High impedance
75R position (bottom)	Terminated 75 Ω

Note: Other adjustments on the card should normally be left in the factory default positions.

2.3 General purpose interface

Each frame slot has up to six connections ‘a’ to ‘f’ for GPI control and monitoring. These connections are available at the rear of the frame on the 26-way D-type remote connectors.

GPI			Low (<1V)	High (+5V)
1	‘a’	Input status	Input present	Input absent
2-6	‘b-f’	Not used		

As supplied, each GPI output has a 220Ω resistor in series with its output. This allows for an external LED to be driven, connected to a DC voltage of +5V.

GPI input connections have 10kΩ pull-up resistors to the internal chassis +5V.

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	Upper	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	Lower	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)

Table shows pin number (Remote number)

Note: Remote 1, Remote 3, Remote 5 and Remote 7 are 26 way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2, Remote 4, Remote 6 and Remote 8 are 26 way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2 and Remote 6.

The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A. Remotes 5-8 are similarly protected.

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. 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 in each case and +5V @500mA is pin 15 on Remote 2.

The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A.

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 female socket. Frame ground is pin 2 and +5V @500mA is pin 1.
Remote 2: 26 way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15
The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

Indigo DT desk top box GPI connections

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

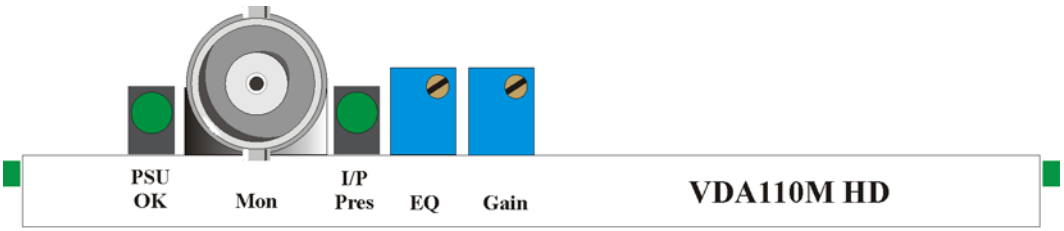
Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)

Table shows pin number (remote number)

Note: Remote 1: 26 way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.
Remote 2: 26 way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15
The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

3 Card edge operation

The front edge of the VDA110M HD card provides power rail monitoring, signal status and gain/equalisation adjustments. There is no provision for remote control.



VDA110M HD front edge view

LED	Location/colour	Meaning when lit
PSU OK	Green	On board power supplies ok
I/P Present	Green	Valid signal present

Adjusting cable equalisation

Cable equalisation is continuously variable from 0m to 300m using the EQ control.

Note: The cable equalisation has been optimised for 0-6Mhz operation. It will be less effective at frequencies up to 30Mhz.

Adjusting input gain

Gain is continuously variable. The adjustment range is >± 3.0dB using the GAIN control. The VDA110M HD is supplied with a factory-set gain of 0dB.

Video monitoring

A monitoring output is provided by the board edge BNC connector.

On-board jumper link settings

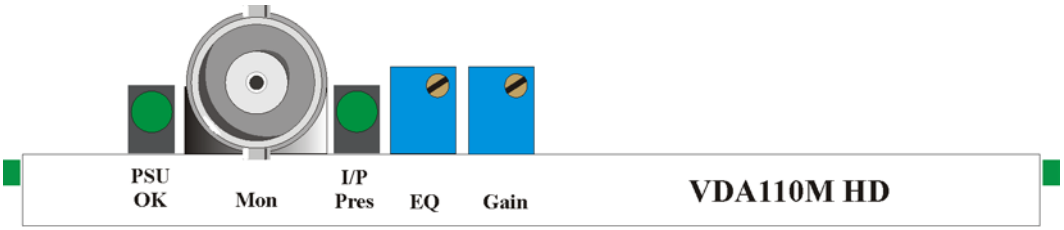
Please refer to Section 2.2 Module Configuration to set the following options when using card edge control:

- Changing the input termination – 75Ω or high impedance loop-through

4 Trouble shooting

Card edge monitoring

The front edge of the card provides useful power rail and video monitoring in addition to card-edge controls and status LEDs.



VDA110M HD front edge view

LED	Location/colour	Meaning when lit
PSU OK	Green	On board power supplies ok
I/P Present	Green	Valid signal present

Video monitoring test point

A monitoring output BNC is provided at the board edge.

Fault finding guide

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 video output

Check that a valid video input is present and that any cabling is intact

The video output is low quality

Check that the cable equalisation is correct for the input cable and that the maximum length has not been exceeded

5 Specification

General

Dimensions	100mm x 266 mm module with DIN 41612 connector
Weight	140g
Power consumption	1.4 W

Inputs

Video	1 analogue. Input loop-through available with selected rear modules
	Input return loss >40db up to 5Mhz

Outputs

Number and type:	11 (maximum) cable-equalised analogue
	Output return loss >40db up to 10Mhz

Gain adjustment

Continuous adjustment:	Greater than ± 3.0dB

Cable Equalisation

Continuous adjustment:	0 to 300m Belden 8281 or equivalent

Performance

Frequency response:	± 0.05dB 0 to 6MHz. ± 0.2dB 6 to 10MHz. ± 1.5dB 10 to 30MHz.
Differential phase:	< 0.2° at 5MHz
Differential gain:	< 0.2% at 5MHz
Signal to noise ratio:	Greater than 70dB

GPI lines

Outputs:	1 (D-type on frame)
	Input presence/absent

Status monitoring

LED display	Front of card edge visual monitoring with LED indicators to indicate:
	PSU rails present
	Input present