USER MANUAL

Indigo SYSTEM

CoolFlow

VDA210M HD

Analogue video distribution amplifier

Crystal Vision

Contents

Revision 1.   Note on equalisation added, page 12. Specifications amended. 15/01/09
Revision 2.   Specification table amended.   20/11/09
Revision 3.   Specification table amended.   09/06/10

1 Introduction

The VDA210M HD is a 2-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 VDA210M HD may be used with the RM01 single slot rear connector, the RM02 quadruple slot rear connector and the RM15 and RM18 double slot rear connectors. A single slot rear connector provides five equalised outputs. An additional 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.

VDA210M HD is a very compact board with 24 modules fitting in a 4U frame when a single slot rear connector is used.
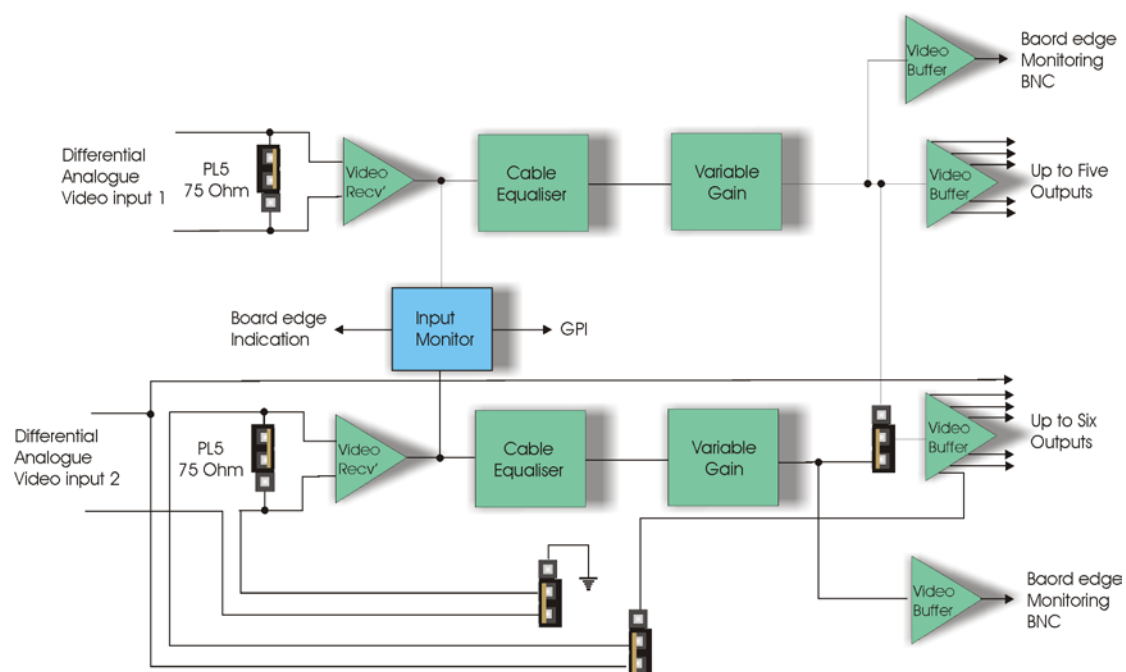
VDA210M HD analogue video DA

The VDA210M HD can be configured in one of two ways:

- 2 channels - channel 1 is 1-in 6-out; channel 2 is 1-in 5-out
- 1 channel - channel 1 is 1-in 11-out

The VDA210M HD has LED and GPI indication of input presence/failure.

The main features are as follows:

- Dual 1-in 6/5-out or single 1-in 11-out video distribution amplifier

- Continuously variable equalisation for up to 300 metres of coaxial cable.

- GPI/LED input presence indication

- Card edge control

Note: Only the RM18 rear connector allows access to all 6 outputs of channel 1 (or all 11 outputs in single channel mode).

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 VDA210M 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 VDA210M HD may be used with the RM01 and single slot rear connector for up to 24 modules, the RM02 quadruple slot rear connectors for up to 8 modules and the RM15 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 with the dual channel VDA210M HD. It also shows the connections for the VDA210M HD in VDA110M HD mode.
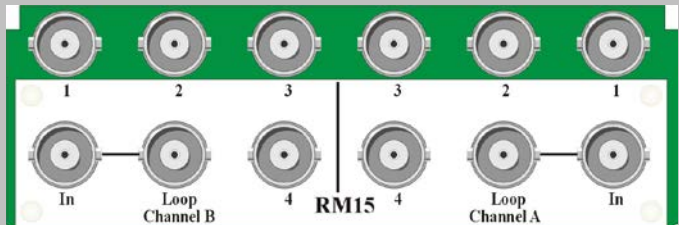
Connector	No of Slots	No of Cards *	Loop-through	VDA110M HD mode	VDA210M HD	Differential inputs
RM01	1	1	No	1 in 5 out	2 in 2 x 2 out	No
RM09	1	1	1	1 in 4 out	Not used	Yes
RM15	2	1	2	Not used	2 in 2 x 4 out	Yes
RM16	2	1	1	1 in 10 out	Not used	1st input only
RM18	2	1	No	1 in 11 out	2 in 5 out / 6 out	No
RM02	4	3	No	1 in 8 out	2 in 3 out / 4 out	1st input only
RM10	4	3	1	1 in 7 out	Not used	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.
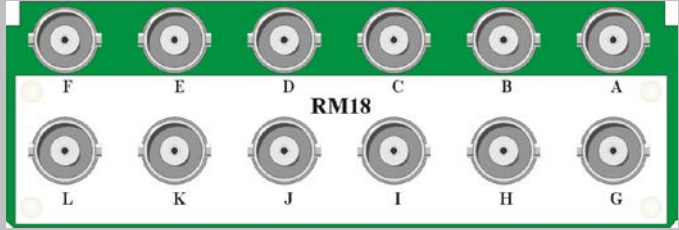
Rear module connections with RM01

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	Single-channel configuration	Dual-channel configuration
IN Ch A	Input	Input 1
OUT 1 Ch A	Output	Output 1
OUT 2 Ch A	Output	Output 1
OUT 1 Ch B	Output	Output 2
OUT 2 Ch B	Output	Output 2
IN Ch B	Output	Input 2

Rear module connections with RM15

RM15 fits in all frames	Description
	RM15 • 12 modules in 4U, 6 in 2U, 3 in 1U & 1 in a DTB • 1 module per rear connector • Card fits in upper slot • No card fits in lower slot

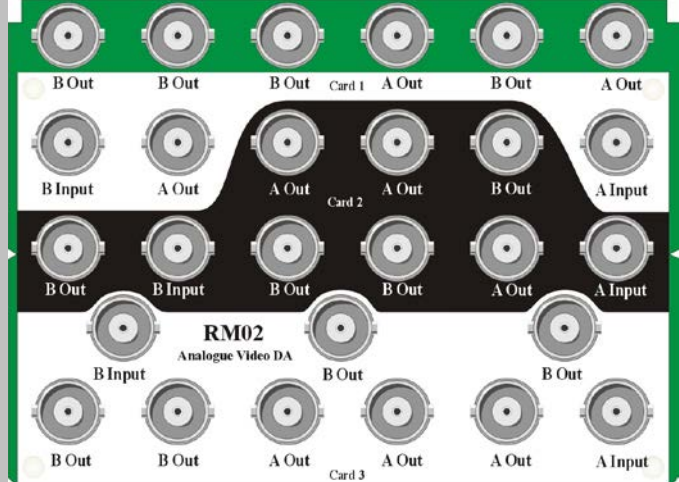| BNC	Single-channel configuration	Dual-channel configuration
Channel A In	Input 1	Input 1
Channel A Loop	Input 1 Loop-Through	Input 1 Loop-Through
Channel A 1	Output 1	Output 1
Channel A 2	Output 1	Output 1
Channel A 3	Output 1	Output 1
Channel A 4	Output 1	Output 1
Channel B In	Output 1	Input 2
Channel B Loop	No connection – see note	Input 2 Loop-Through
Channel B 1	Output 1	Output 2
Channel B 2	Output 1	Output 2
Channel B 3	Output 1	Output 2
Channel B 4	Output 1	Output 2

Notes: Do not make a connection to both Channel B In and B Loop in single mode, as this will double terminate that output.

Rear module connections with RM18

RM18 fits in all frames	Description
	RM18 • 12 modules in 4U, 6 in 2U, 3 in 1U & 1 in a DTB • 1 module per rear connector • Card fits in upper slot • No card fits in lower slot

BNC	Single-channel configuration	Dual-channel configuration
A	Output	Output 1
B	Input	Input 1
C	Output	Output 1
D	Output	Output 2
E	Output	Input 2
F	Output	Output 2
G	Output	Output 2
H	Output	Output 2
I	Output	Output 1
J	Output	Output 2
K	Output	Output 1
L	Output	Output 1

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	Single-channel configuration	Dual-channel configuration
A input	Input	Input 1
B input	Output	Input 2
A out	Output	Output 1
B out	Output	Output 2

2.2 Module configuration

The VDA210M HD is equipped with on-board jumper links for input termination and input/output channel configuration.

VDA210M HD showing termination jumper PL2

Changing the input termination

Move jumper PL2 (Ch1) and/or PL5 (Ch2) to the appropriate position to set the input termination to either 75Ω or high-impedance loop-through.

Input 1 termination

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

Input 2 termination

PL 5 position	Termination
Loop-through position (top)	High-impedance
75R position (bottom)	Terminated 75 Ω

Changing the channel mode

In dual-channel (standard) configuration, the VDA210M HD is configured as 2 inputs. In single-channel configuration, the VDA210M HD is configured as Input 1 only, Input 2 is not used.

Mode	PL3 position	PL4 position	PL6 position
Dual channel	Bottom position	Top position	Towards front
Single channel	Top position	Bottom position	Towards rear

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-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 1 status**	Input present	Input absent
2	**'b'**	**Input 2 status**	Input present	Input absent
3-6	**'c-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		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	Upper	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	Lower	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 VDA210M HD card provides power rail monitoring, signal status and gain/equalisation adjustments. There is no provision for remote control.
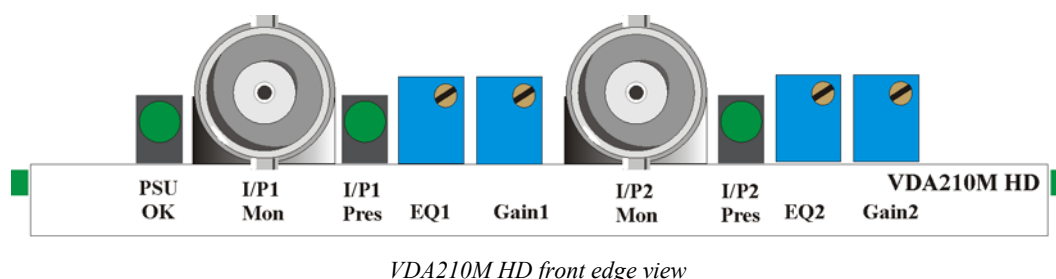
VDA210M HD front edge view

LED	Location/colour	Meaning when lit
PSU OK	Green	On board power supplies ok
I/P Present 1	Green	Valid signal present
I/P Present 2	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 optimized 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 $>\pm$ 3.0dB using the GAIN control. The VDA210M HD is supplied with a factory-set gain of 0dB.

Video monitoring

A monitoring output for both inputs are provided by the board edge BNC connectors .

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
- Changing output 2 input source – single (1 x 10) or dual (2 x 5) channel operation

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.
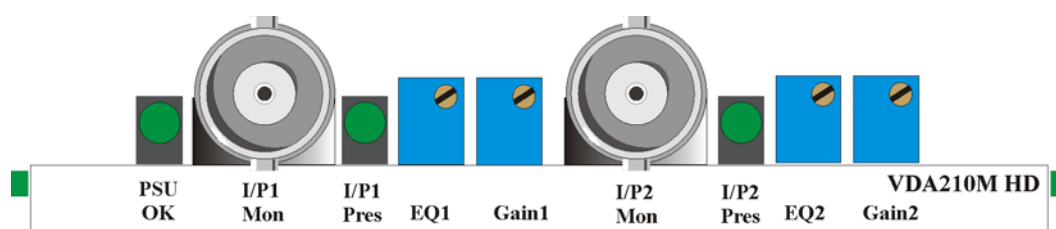
VDA210M HD front edge view

LED	Location/colour	Meaning when lit
PSU OK	Green	On board power supplies ok
I/P Present 1	Green	Valid signal present
I/P Present 2	Green	Valid signal present

Video monitoring test point

Monitoring output BNCs are 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

Input 2 does not work

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

Check that the input source set for the second set of BNC outputs is set for Input 2 - dual channel mode (2 x 5)

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	Two analogue inputs. Input loop-through available with selected rear modules

Outputs

Number and type:	11 (maximum) cable-equalised analogue

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:	$< 0.4^o$ at 5MHz
Differential gain:	< 0.2% at 5MHz
Signal to noise ratio:	Greater than 70dB weighted

GPI lines

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

Status monitoring

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