ShARC

Horizontal aspect ratio converter

USER MANUAL

Crystal Vision

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ShARC102 \ ShARC204 Aspect Ratio Converter
USERS MANUAL

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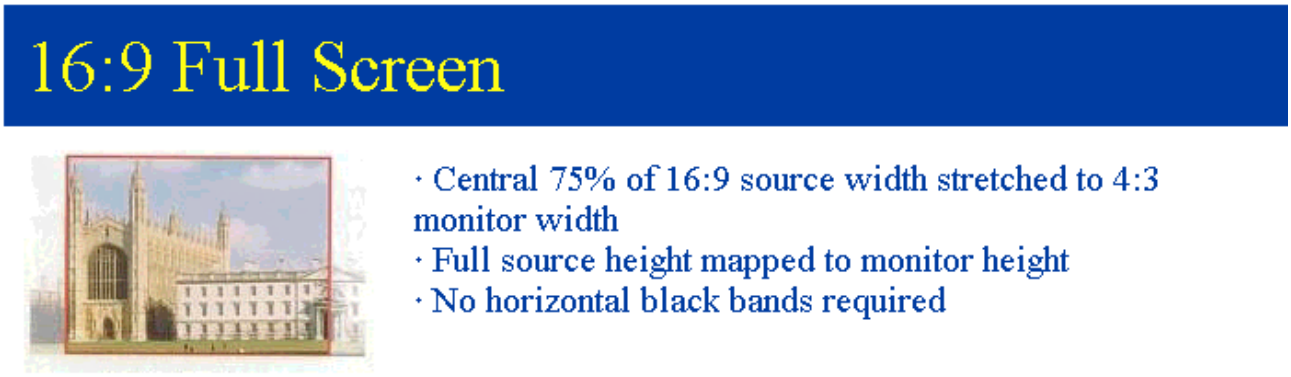
INTRODUCTION

The ShARC102 is a single channel, broadcast quality, 10 bit Serial Digital Video Aspect Ratio Converter. The ShARC204 is a dual 10 bit Serial Digital Video Aspect Ratio Converter permitting 24 independent channels in a 2U frame. The module can be controlled locally from the module front controls or via remote control. Remote control is possible using the Crystal Vision Active Remote Control Panel FP1 or FP2, RS422, RS232 or GPI.

ShARC performs just one popular conversion of stretching horizontally the central 75% of the input image.



Dedicating the image processing to this single conversion allows a higher quality output compared with multi-purpose ARCs. The result is low levels of aliasing and banding coupled with a wide frequency response. No vertical processing is employed so the propagation delay is minimised.

Two main operational modes are available: Convert mode and bypass mode.

625 or 525 line standard outputs are produced with automatic standard detection. EDH transmission can be added to the output. Digital Audio and 10-bit ancillary data is passed through unprocessed. There is a fixed propagation delay of 8μs between input data and output data even when bypass mode is selected.

The unit will plug into the front of the rack frame and the universal connection system will allow a mixture of Crystal Vision modules, without the use of extra rear panels, in both 1U and 2U frames.

The hinged front panel of the case reveals user control of the card and also LED indication of status. There is a 4 way piano switch to select modes of operation. A rotary switch on the board selects the remote control node address. Further configuration is possible using movable links.

SPECIFICATION

Mechanical

Dimensions	100mm x 266mm module with DIN 41612 connector. User adjustments and indication at end of board to allow access from hinged front panel.
Weight	210g

Electrical

Output	ShARC102 : 2 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M ShARC204 : 4 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M

Blanking

All data in the vertical and horizontal blanking interval is passed through unprocessed with full 10-bits. Therefore, the unit will pass through embedded audio and any ancillary data with an 8μs propagation delay.

VIEW OF BOARD FRONT

LED STATUS INDICATION

LED Colour	Label	Status When ON
Green	OnA	Active Front Panel communications online.
Yellow	TxA	ShARC transmitting to Active Front Panel.
Yellow	RxA	ShARC receiving from Active Front Panel.
Green	OnB	Reserved communications channel online.
Yellow	TxB	ShARC transmitting on reserved communications channel.
Yellow	RxB	ShARC receiving on reserved communications channel.
Green	GPI0	GPI Input 0 shorted to ground. Channel 1 Aspect Ratio Conversion on.
Green	GPI1	GPI Input 1 shorted to ground. Channel 2 Aspect Ratio Conversion on (ShARC204 only).
Green	GPI2	GPI Input 2 shorted to ground. No effect.
Green	GPI3	GPI Input 3 shorted to ground. No effect.
Green	GPI4	GPI Input 4 shorted to ground. No effect.
Green	GPI5	GPI Input 5 shorted to ground. No effect.
Green	CH1 Pres	Valid video input detected on Channel 1.
Green	CH2 Pres	Valid video input detected on Channel 2 (ShARC204 only).
Yellow	CH1 ARC	Aspect Ratio Conversion on for Channel 1
Yellow	CH2 ARC	Aspect Ratio Conversion on for Channel 2 (ShARC204 only).
Yellow	CH1 625	625 line input detected on Channel 1.
Yellow	CH1 525	525 line input detected on Channel 1.
Yellow	CH2 625	625 line input detected on Channel 2 (ShARC204 only).
Yellow	CH2 525	525 line input detected on Channel 2 (ShARC204 only).
Green	&	Heart Beat. When beating all processor functions are healthy.
Yellow	I/O	Input/Output programmable logic configured.
Yellow	CH1	Channel 1 programmable logic configured.
Yellow	CH2	Channel 2 programmable logic configured. (ShARC204 only)
Green	1.8V	1.8V Supply Voltage present.
Green	3.3V	3.3V Supply Voltage present.
Green	5V	5V Supply Voltage present.

OVERVIEW OF MODULE CONTROL

The following section explains how to operate the module in its various modes. Ensure the system is correctly installed. Each ShARC102 should have one input source and ShARC204 should have two input sources. The each channel main outputs should be viewed on picture monitors. At power-up, ShARC102 will take 30 seconds to configure and ShARC204 will take 60 seconds to configure. During this period the video output will be invalid.

There are three methods of controlling the parameters of the ShARC102 and ShARC204. These are presented below after the explanation of how to select the required method.

CONTROL METHOD SELECTION

DIL 1 and DIL 2 are used to select the method of control. The settings required for each method are shown below:

DIL 1	DIL 2	Control Method
Up	Up	GPI
Up	Down	Active Panel
Down	Up	None
Down	Down	Board Edge DIP Switches

Board Edge DIP Switches

When DIL 3 is set in the up position then Channel 1 is aspect ratio converting the input video. When DIL 3 is set in the down position then Channel 1 is in bypass mode and the input video is not converted.

For ShARC204 only, when DIL 4 is set in the up position then Channel 2 is aspect ratio converting the input video. When DIL 4 is set in the down position then Channel 2 is in bypass mode and the input video is not converted.

GPI

When GPI 0 is open circuit then Channel 1 is aspect ratio converting the input video. When GPI 0 is shorted to ground then Channel 1 is in bypass mode and the input video is not converted.

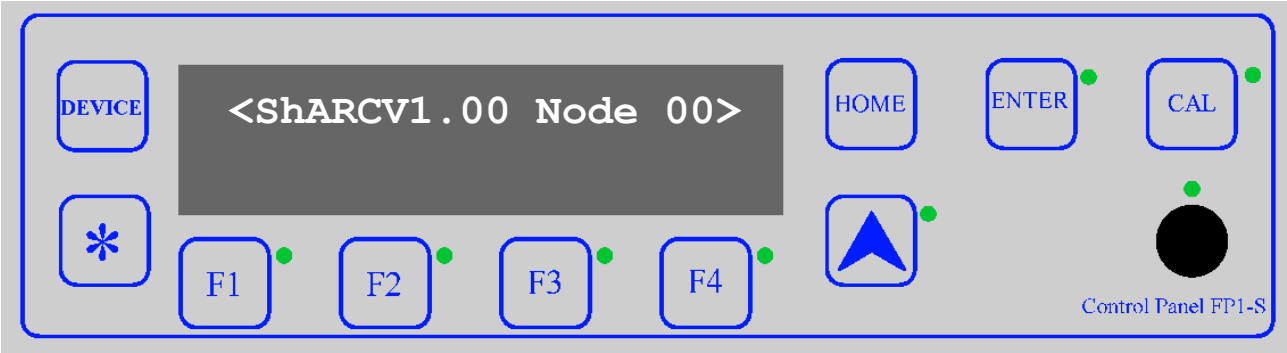
For ShARC204 only, When GPI 1 is open circuit then Channel 2 is aspect ratio converting the input video. When GPI 1 is shorted to ground then Channel 2 is in bypass mode and the input video is not converted.

Latching switches are required.

ACTIVE FRONT PANEL REMOTE CONTROL MODE

MODULE SELECTED

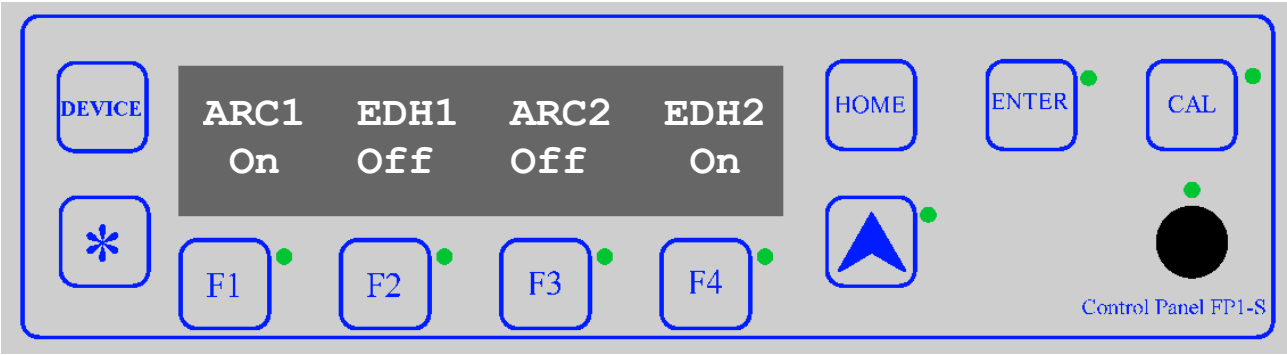
On selecting the required ShARC102 or ShARC204 from the selection menu of the front panel the following screen should be shown:



This message shows that an ShARC102 or ShARC204 has been selected with the version of software on the module as V1.00 and that node 0 is being used to address it. Depending on the software version and the node address used the output may differ from that shown above.

MAIN MENU

The main menu is access by pressing the ENTER key:



If F1 is pressed then aspect ratio conversion for Channel 1 can be turned on or off (bypass mode).

If F2 is pressed then EDH generation for Channel 1 can be turned on and off.

For ShARC204 only:

If F3 is pressed then aspect ratio conversion for Channel 2 can be turned on or off (bypass mode).

If F4 is pressed then EDH generation for Channel 2 can be turned on and off.

REMOTE CONTROL PROTOCOL

Baud Rate	19200
Parity	None
Data Bits	8
Stop Bits	1
Hand shaking	None

Please contact factory for remote protocol.

The NODE rotary switch SW2 selects one of 16 different remote protocol addresses for the board when used in Crystal Vision Frames FR1-6 and FR2-12. The NODE rotary switch SW2 should be left in the '0' position when used in an FR2-12AV frame. The remote protocol address will be read from the slot position the board is plugged into.

N.B. This is read only during power up.

GENERAL PURPOSE INTERFACE

Remote control of the aspect ratio conversion mode on each channel other than via the serial remote protocols is possible.

DIL 1 and DIL 2 need to be in the 'UP' position. Jumpers on J1 and J4 need to be moved on to GPI, although remote control via auxiliary RS422 is no longer possible. In this configuration a remote switch shorting to ground can be used to emulate the DIL 3 and DIL 4 switches. Pull-up resistors are already present.

REMOTE CONNECTIONS

<u>INPUTS</u>

GPI 0 – connection 'a'

Channel 1 Mode Control
OPEN – Channel 1 aspect ratio conversion on.
CONNECT TO GROUND – Channel 1 aspect ratio conversion off, bypass mode on.

GPI 1 – connection 'b'

Channel 2 Mode Control
OPEN – Channel 2 aspect ratio conversion on.
CONNECT TO GROUND – Channel 2 aspect ratio conversion off, bypass mode on.

GPI 2 – connection 'c'

Reserved for future use.

GPI 3 – connection 'd'

Reserved for future use.

OUTPUTS

GPI 4 – connection ‘e’

When jumpered to the ‘OUT’ position on PL7 this serves as an indication of mode for Channel 1. This line is +5V at 48mA out when Channel 1 is in aspect ratio convert mode and at 0V when Channel 1 is in bypass mode.

GPI 5 – connection ‘f’

For ShARC204 only. When jumpered to the ‘OUT’ position on PL7 this serves as an indication of mode for Channel 2. This line is +5V at 48mA out when Channel 2 is in aspect ratio convert mode and at 0V when Channel 2 is in bypass mode.

Each slot has an associated set of connections on a socket and on a plug. The letters in the table below refer to the connections described earlier in the manual.

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

FR1-6, FR2-12 & FR2-8 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.

FR1-6 FRAME GPI CONNECTIONS

Remote 1: 26 way high density D-type **socket**. Frame ground is pin 2.
Remote 2: 26 way high density D-type **plug**. 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)

FR2-12 FRAME GPI CONNECTIONS

Remote 1 and **Remote 3**: 26 way high density D-type **sockets**. Frame ground is pin 2.
Remote 2 and **Remote 4**: 26 way high density D-type **plugs**. 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)	19 (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)

FR2-8 FRAME GPI CONNECTIONS

Remote 1 and **Remote 2**: 26 way high density D-type **sockets**. Frame ground is pin 1.
PSU Relay connection on pin 10.
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)	17 (1)	18 (1)	25 (1)	26 (1)
2	6 (1)	7 (1)	15 (1)	16 (1)	23 (1)	24 (1)
3	8 (2)	9 (2)	17 (2)	18 (2)	25 (2)	26 (2)
4	6 (2)	7 (2)	15 (2)	16 (2)	23 (2)	24 (2)
5	4 (1)	5 (1)	13 (1)	14 (1)	21 (1)	22 (1)
6	2 (1)	3 (1)	11 (1)	12 (1)	19 (1)	20 (1)
7	4 (2)	5 (2)	13 (2)	14 (2)	21 (2)	22 (2)
8	2 (2)	3 (2)	11 (2)	12 (2)	19 (2)	20 (2)

DTB-2 FRAME GPI CONNECTIONS

Remote 15 way D-type **socket**.
Frame ground is pin 15.
Table shows Pin number

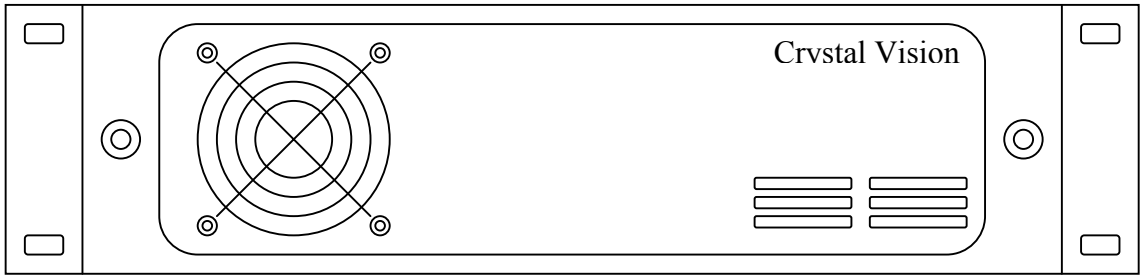
Slot no.	'a' pin no.	'b' pin no.	'c' pin no.	'd' pin no.	'e' pin no.	'f' pin no.
1	1	2	3	4	5	6
2	9	10	11	12	13	14

JUMPER LINKS

J9	Connect 3.3V power to programmable logic. **(Default)** Link to 3.3V ON to connect power. Link to 3.3V OFF to disconnect power.
J14	Selects method of CPU watchdog control. **(Default)** Link to WDOG for processor controlled watchdog. Link to A00 for any CPU activity control.
J8	Connect 1.8V power to programmable logic. **(Default)** Link to 1.8V ON to connect power. Link to 1.8V OFF to disconnect power.
J15	Selects a further 16 node addresses. **(Default)** With J15 open allows node switch SW2 to select nodes 0 to 15. J15 shorted allows node switch SW2 to select nodes 16 to 31.

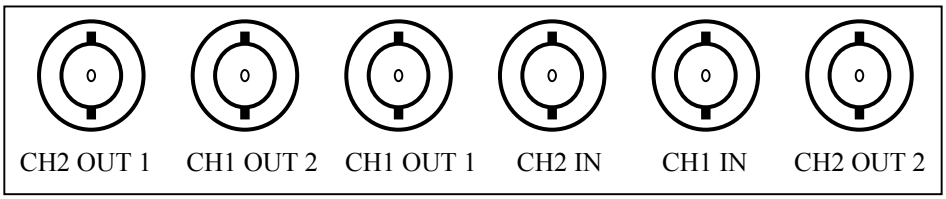
INSTALLATION INFORMATION

FR2AV 2U FRAME FOR 12 MODULES
FR1AV 1U FRAME FOR 6 MODULES
DTB2AV 1U FRAME FOR 2 MODULES



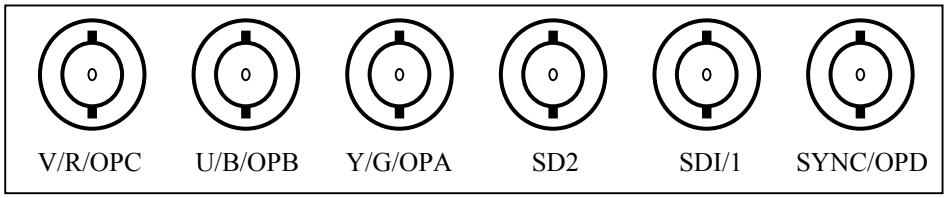
The 2U FR2AV frame will house up to 12 modules and dual power supplies. A hinged front panel gives access to the PSU and all modules. The universal frame wiring system allows any of the interface range of modules to be fitted in any position with the use of removable rear modules.
All modules can be plugged in and removed while the frame is powered without damage.

RM01 CONNECTIONS



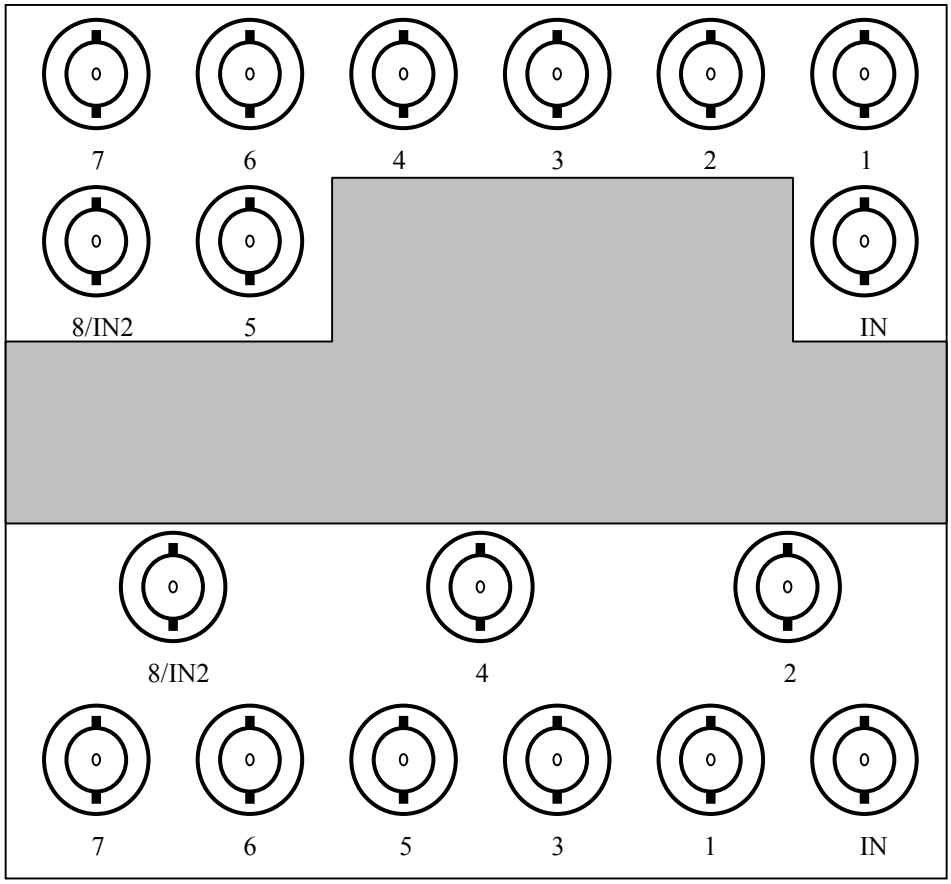
CH1 IN	Channel 1 Serial Digital Input
CH2 IN	Channel 2 Serial Digital Input (ShARC204 only)
CH1 OUT 1	Channel 1 Serial Digital Output 1
CH1 OUT 2	Channel 1 Serial Digital Output 2
CH2 OUT 1	Channel 2 Serial Digital Output 1 (ShARC204 only)
CH2 OUT 2	Channel 2 Serial Digital Output 2 (ShARC204 only)

With Generic Label



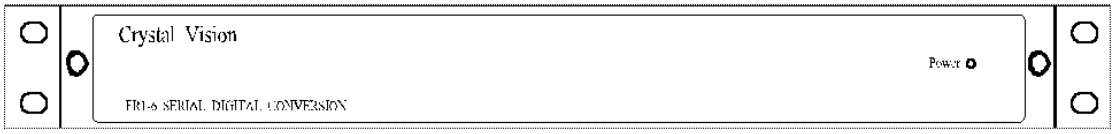
General Label Name (ZLA00073)	Description
SDI/1	Channel 1 Serial Digital Input
SD2	Channel 2 Serial Digital Input (ShARC204 only)
Y/G/OPA	Channel 1 Serial Digital Output 1
U/B/OPB	Channel 1 Serial Digital Output 2
V/R/OPC	Channel 2 Serial Digital Output 1 (ShARC204 only)
SYNC/OPD	Channel 2 Serial Digital Output 2 (ShARC204 only)

RM02 CONNECTIONS



General Label Name (ZLA00110)	Special Label Name (not available)	Description
IN	SDI CH1 IN	Channel 1 Serial Digital Input
1	SDI CH2 IN	Channel 2 Serial Digital Input
2	SDI CH1 OUT(1)	Channel 1 Serial Digital Output 1
3	Not Used	
4	SDI CH1 OUT(2)	Channel 1 Serial Digital Output 2
5	SDI CH2 OUT(1)	Channel 2 Serial Digital Output 1
6	Not Used	
7	Not Used	
8/IN2	SDI CH2 OUT(2)	Channel 2 Serial Digital Output 2

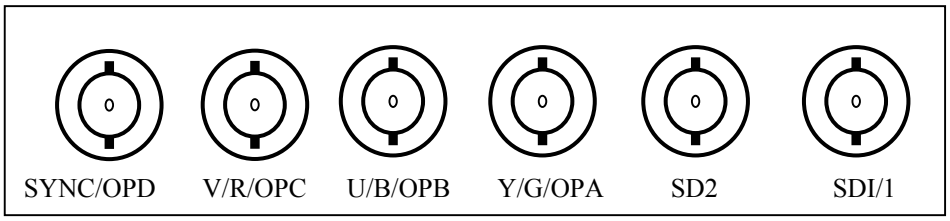
FR1-6 1U FRAME FOR 6 MODULES.
FR2-12 2U FRAME FOR 12 MODULES.
FR2-8 2U FRAME FOR 6 MODULES.
DTB-2 1U FRAME FOR 2 MODULES.



The 1U FR1-6 frame for 6 modules includes rear panel BNC connections and plug-in power supply. A hinged front panel gives access to the PSU and all modules. The universal frame wiring system allows any of the interface range of modules to be fitted in any position. The 2U FR2-12 frame houses up to 12 modules and dual power supplies. The 2U FR2-8 frame houses 8 modules each with extra rear panel BNC connections.

The modules can be plugged in and removed while the frame is powered without damage.

FR1-6, FR2-12 & DTB-2 REAR CONNECTIONS



FR1-6, FR2-12 & DTB-2 CONNECTIONS

SDI/1	Serial Digital input
SD2	Not Used
Y/G/OPA	Serial Digital output 1
U/B/OPB	Serial Digital output 2
V/R/OPC	Not Used
SYNC/OPD	Not Used

FR2-8 CONNECTIONS

SDI/1	Serial Digital input
SD2	Not Used
Y/G/OPA	Serial Digital output 1
Y/G/OPA(2)	Not Used
U/B/OPB	Serial Digital output 2
U/B/OPB(2)	Not Used
V/R/OPC	Not Used
V/R/OPC(2)	Not Used
SYNC/OPD	Not Used
SYNC/OPD(2)	Not Used