

digital keying modular
interface audio
converters analogue video

FRX204

Dual fibre optic to SDI receiver

USER MANUAL



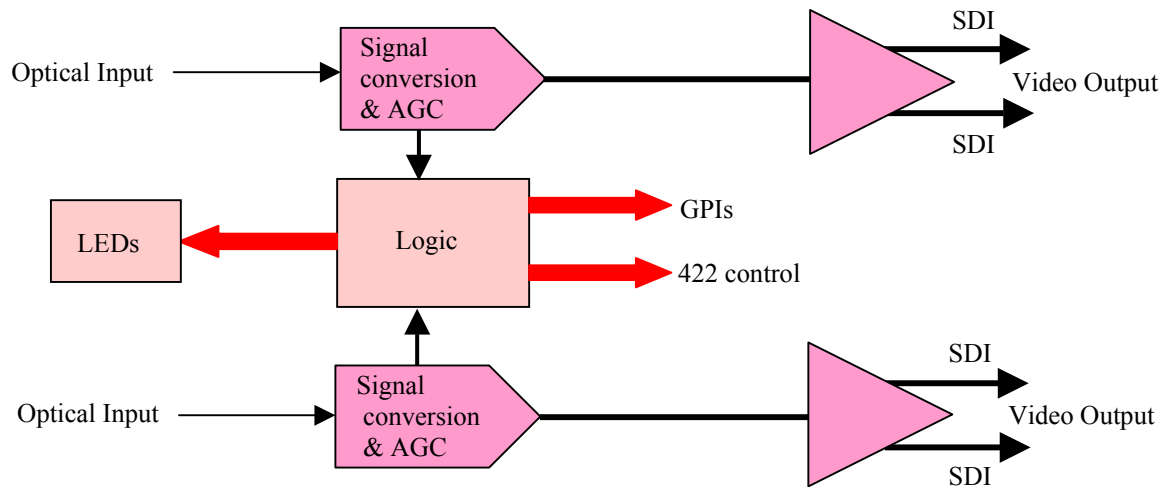
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1 Introduction

The FRX204 is a dual re-clocking optical serial digital video receiver and distribution amplifier with up to two outputs per channel.

The universal connection system allows a mixture of Crystal Vision modules in the frame. The modules plug in the front and the rear connectors plug in the rear. Depending on frame design, a hinged or removable front panel reveals LED indication of input and PSU status when opened.



FRX204 dual re-clocking optical SDI distribution amplifier

The RM28 single slot rear connector provides two serial digital outputs per channel with up to 24 modules in 4U of rack space.

The range of Crystal Vision optical boards has been designed to work in conjunction with the Indigo 4 frames, or Issue 2 Indigo 1, 2 or DT frames. The board may be plugged into any of the PCB slots, the only proviso being where it needs to be placed below a standard definition board. The rules governing frame configuration are explained in the installation chapter.

The Indigo frames have been designed to accept any selection of boards from our range of standard definition, High Definition, audio and optical products. The high packing density allows up to six modules in 1U, up to 12 modules in 2U and up to 24 modules in 4U.

The main features of the FRX204 are as follows:

- Dual 1-in 2-out optical to SDI distribution amplifier
- LED optical input presence indication.

2 Card edge operation

The front edge of the FRX204 card provides power rail monitoring and signal status.



FRX204 front edge view

LED	Location/colour	Meaning when lit
Optical Input A	Green	There is a modulated optical input present on input A.
Optical Input B	Green	There is a modulated optical input present on input B.
PSU	Green	Power supply voltage present.

Note. The optical input detectors will only detect an optical input that is modulated so a steady state optical source may still be present even if the Input present indicators are not illuminated.



Note. Caution must be taken when removing the FRX204 card if an optical signal is present due to the possible damaging nature of high intensity light.

Although Crystal Vision optical products contain class 1 devices which are designed to be unable to cause personal injury, you are advised not to look directly into a vacant optical slot to avoid damage to the eyesight in case a piece of third party laser transmitting equipment could be remotely connected to the Crystal Vision equipment.

3 Hardware installation

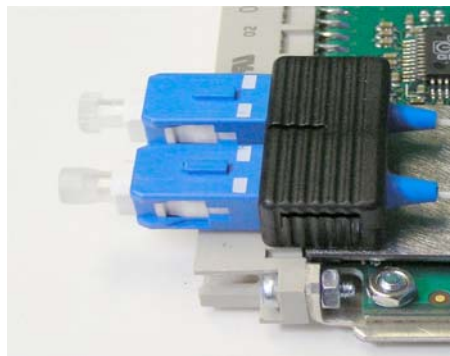
The Crystal Vision optical boards have been designed to work in conjunction with the Indigo 4 frames, or Issue 2 Indigo 1, 2 or DT frames. All modules can be plugged in and removed while the frame is powered without damage.

Links and settings

The FRX204 optical receiver does not contain any user adjustable controls. Potentiometers P1 and P2, Jumper links PL2 and PL3 are factory set and require no further adjustment.

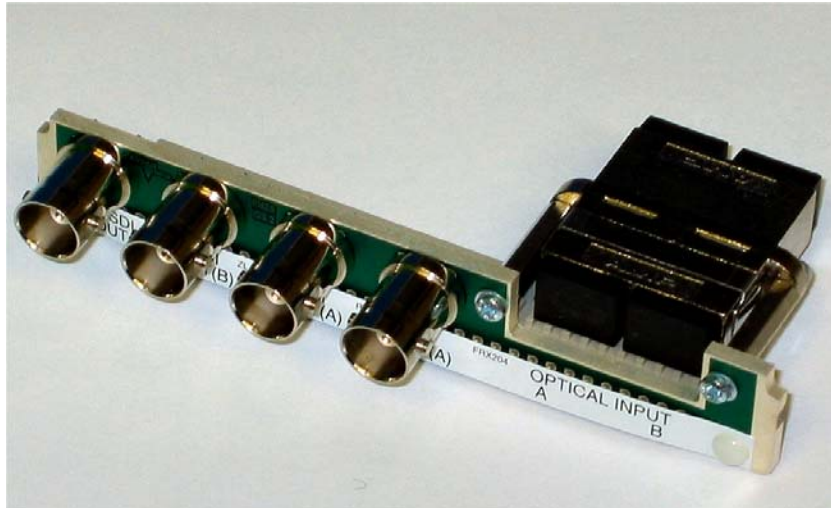
Handling

Due to its fragile nature, fibre optic equipment must be handled with care. Sharp blows or snagging the fibre pigtailed will fracture the internal glass filament and destroy its light carrying ability. A degraded performance will also result if a build-up of dust and dirt film on the connector ferrules is allowed to occur. It is strongly recommended that the supplied dust caps are in place whenever the receiver card or rear module are de-mounted for any reason.



PCB connectors with the dust caps fitted

The RM28 rear module is also fitted with dust caps on both sides of the optical connector. The pair of dust caps that are internal to the frame must be removed before the rear module is fitted. The external pair can then be removed when the fibre tails are connected. It is also recommended that dust caps should be re-fitted if the fibre tails are to be removed for any length of time. Should the FRX204 be removed for a while it is recommended that the rear module should also be removed and stored with the dust caps in place.



RM28 rear module with dust caps fitted to both sides of the optical connector

3.1 Universal rear connectors

When using the RM28 single height rear connector, the 4U Indigo 4 frame will house up to 24 modules and three power supplies, the 2U Indigo 2 frame will house up to 12 modules and dual power supplies, the 1U Indigo 1 frame will house six modules and a single power supply. The desk top box will not currently accept the Crystal Vision optical modules.

The Indigo frames have hinged front panels giving access to the PSU and all modules. The universal frame wiring system allows any of the interface range of modules to be fitted in ⁽¹⁾ any position with the use of removable rear module.

⁽¹⁾ Due to height restraints, there are restrictions when mixing optical modules with other crystal vision modules.


Loading restrictions

The FRX204 can be loaded into any slot position of compatible frames but due to its extra height it is not possible to place cards from the Crystal Vision standard definition or audio range directly above it in certain positions. HD cards do not share this restriction.

Frame type			
Indigo 4		Optical module	Optical module
		Optical module	Optical module
		Optical module	Optical module
Indigo 2		Optical module	Optical module
		Optical module	Optical module
Indigo 1		Optical module	Optical module

Optical cards loaded in these slots will not allow standard definition or audio card to be fitted above

Rear module connections, RM28

RM28 fits in all frames	Description
	<p>RM28</p> <ul style="list-style-type: none"> • 24 modules in 4U, 12 modules in 2U & six in 1U • All frame slots can be used

BNC	I/O assignment
Optical Input (B)	Optical serial digital video input (B)
Optical Input (A)	Optical serial digital video input (A)
SDI OUT(A)	Channel A SDI output
SDI OUT(A)	Channel A SDI output
SDI OUT(B)	Channel B SDI Output
SDI OUT(B)	Channel B SDI Output

3.2 General purpose interface

The external GPI control lines 'a' to 'f' at the frame remote connectors is provided to allow remote control and/or remote status indication. The FRX204 has four GPI output lines assigned for status reporting.

GPI Connections

	OPEN	CONNECT TO GROUND
'a'	Optical input present on input A	No optical input present on input A
'b'	Optical input present on input B	No optical input present on input A
'c'	Valid SDI video signal on input A	Optical input on input A not valid video
'd'	Valid SDI video signal on input A	Optical input on input A not valid video
'e'	Not assigned	Not assigned
'f'	Not assigned	Not assigned

GPI lines are pulled up to +5V through 6k8 Ohm, 270 Ohm series resistor so they can drive an LED directly. If the series resistor is shorted out, the GPI output can drive a bulb at +45V 100mA max.

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)
		'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 and Remote 4 are 26-way high density D-Type male plugs. 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. 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. 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.

4 Using the active front panel

4.1 Module selected

This operational guide assumes that the panel has been set up according to the panel set up procedure described in the Crystal Vision Control Panel manual.

Note: It is **ESSENTIAL** that the panel set up procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up, the two-line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. All eight control panel key LED's will illuminate.



The Crystal Vision control panel start up display

'Control Panel' then briefly replaces the version number display.



If the control panel firmware has been updated for Statesman control (version 1.5.0 or higher), Statesman Mode will be entered and the message, 'Press CAL to Exit' will be displayed and the CAL LED will light.



Statesman mode is entered by default

To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

The control panel will display the name of the card that first responds to the polling request together with its location number.

The location number consists of the frame number plus the card position in the frame.

Navigating the display

The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available / enters panel set up when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode / enters panel diagnostics mode when held down during power up / updates the display
- Asterisk – enters board rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the home menu
- ENTER – accepts current selection
- Upward arrow – used to move up the menu structure / enters lock panel menu from the Device menu
- Rotary control – shaft encoder used to select options or variable data

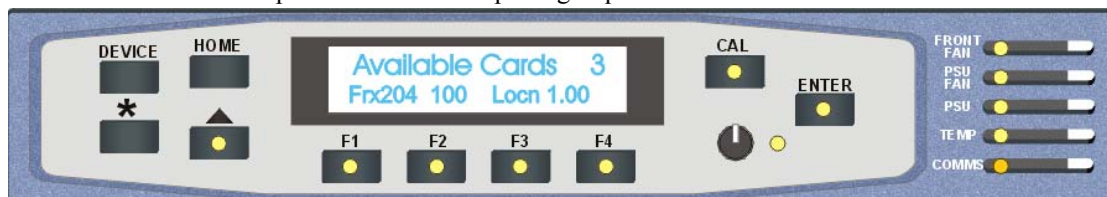
Menu numbering scheme

This manual uses a simple menu numbering convention based on the sequence of keys required to reach each menu from the top level home menu. For example, menu 1.1.2 is reached from the home menu by pressing F1, then F2. Menu 1.2.3 is reached by pressing F2 and then F3.

Note: Please refer to the Crystal Vision Control Panel manual for details of the Panel Setup, Lock Panel and Diagnostic menus.

Selecting FRX204

To select a particular card in a frame, press the DEVICE key to go to the Device menu. The top line of the display will show 'Available Cards X', where X is the number of cards that have responded so far to the polling request.



The available cards menu

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

In the example above, the card displayed is located in the first frame in slot number 1.

When the desired card is selected press the ENTER key to access that card's HOME menu.

The message shows that a FRX204 has been selected with the version of software on the module as V1.00.



The FRX204 home menu

Display Updating

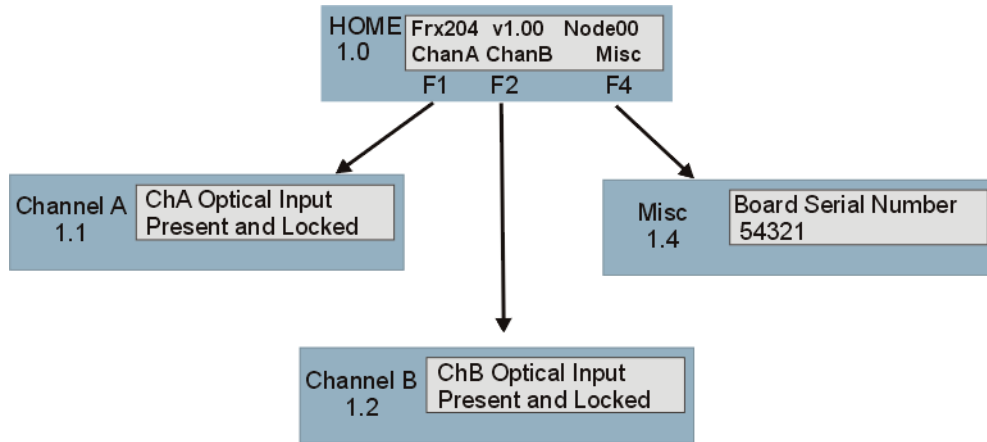
The values displayed on an active front panel are only updated as the FRX204 card is polled. Therefore the display may take a few seconds to update after a change in status.

The FRX204 menu structure

The main top-level menu is obtained by pressing the F1 HOME menu. Menu keys are illuminated when active and when further menus are available. There are three menu selections available:

- Chan A – press F1
- Chan B – press F2
- Misc – press F4

The following chart shows the available FRX204 menus. The actual menus available may vary slightly as software is updated.



The FRX204 menu tree

Note: Function keys LEDs are illuminated when active.

Configuration menu structure	Description
	Channel A is receiving an optical input that contains valid SDI video information. (Channel B similar)
	Channel A has no optical input or the optical input does not contain valid SDI video information. (Channel B similar)

Optical Input Status

The FRX204 will display the presence of an optical input whether or not the input contains usable information. This can be important for maintenance purposes as it indicates if a fibre channel connected to the rear of the frame is active.

Optical Input Present and Locked

If the active fibre channel contains a valid SDI signal the FRX204 will un-mute and output a valid SDI waveform stream.

Both Channel A and Channel B are independent in operation of each other.

Optical Input Missing or Poor

An optical input may be present but it contains no SDI video information, or is not of sufficient quality for the FRX204’s relockers to lock to.

5 Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC.

The main Statesman application communicates with each module in a frame that is fitted with an active front panel. This panel can be with or without a LCD display. Statesman will not normally be able to detect modules used in a frame with only a passive front panel unless it is part of an active/passive combination.

5.1 Installing Statesman

Minimum pre-requisites:

- A PC running Windows 98, NT4 with SP 5 or higher Windows 2000 or Windows XP
- A parallel port dongle supplied with the Statesman software package
- An RS422 serial connection from the host PC to the Indigo frame control input or to Remote 2 connector on an FR1AV or FR2AV Crystal Vision frame with at least one FRX204 module and/or other Statesman compatible module
- An active control panel **MUST** be fitted to the frame with version 1.63 or above firmware – if it is an Indigo frame the firmware must be V1.04 or above
- An optional RS422 to RS232 converter if the PC has no RS422 ports

Installing Statesman

- Refer to the readme and/or help file on the CD before proceeding
- To view all application windows, set graphics resolution to at least 1024 x 768
- Remove any previous version of the Statesman software using the Add/Remove Programs application in the Windows Control Panel
- Ensure that the Statesman dongle is fitted to the parallel port of the host PC
- Insert the Statesman CD and the installation should start immediately – if it does not, run the setup.exe file on the CD
- Obey any installation program prompts and restart the PC when prompted

Running Statesman for the first time

The Statesman PC Control System may be run from the Crystal Vision programs folder via the Start menu or by double clicking on the Crystal Vision.exe file in the installed program directory.

When the program runs it will require licence information and an administrator name and password. It will also need to know which computer port is being used to connect to a Crystal Vision frame(s).

Note: For further details of Statesman configuration please refer to the Statesman manual.

5.2 Statesman operation

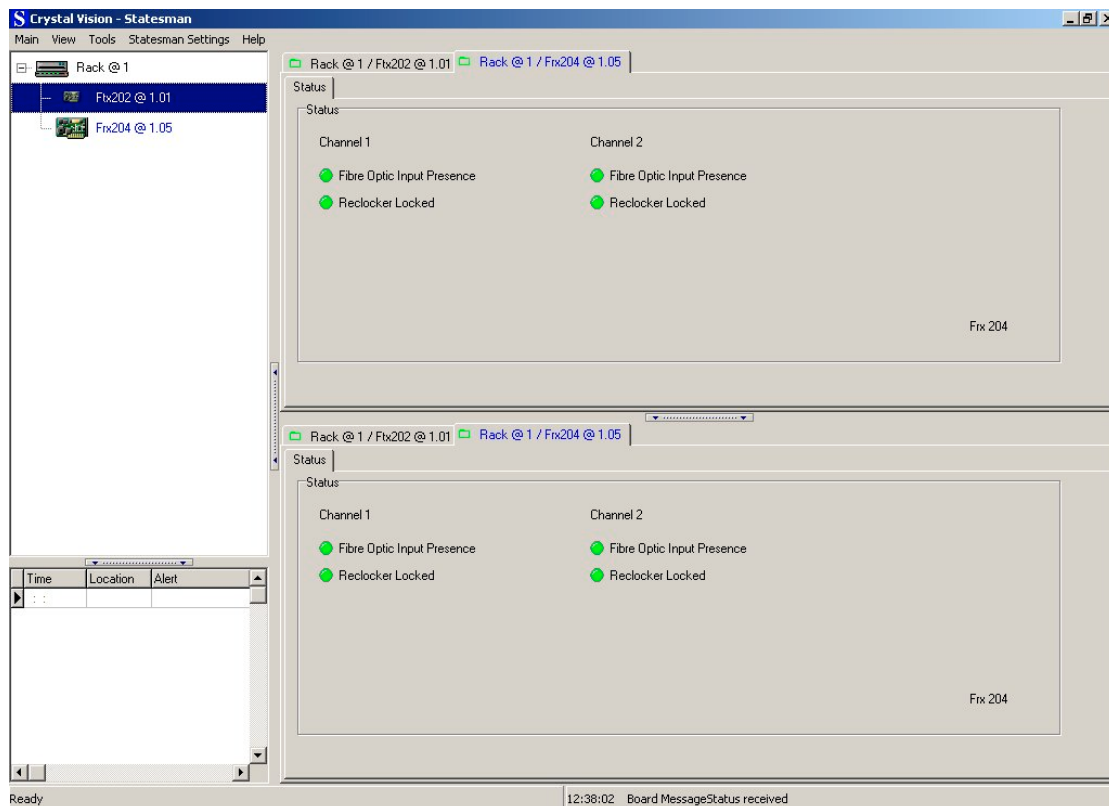
Once Statesman is configured it should automatically detect any Statesman compatible modules in the connected frame or frames and display them in the main application left hand explorer-style window.

Open any frame by clicking on the + sign or by double clicking on a frame. Installed modules should be shown with module icons. Frame and module icons can be named as desired by right clicking or using the edit menu and choosing rename.

To aid user recognition of module and frame status quickly, the following colour and size coding is used:

- A module is shown present by full colour and absent by greyed colour
- A module is shown open by large icon size and closed by small icon
- A module is the source of an active alarm if red and not alarmed if green

Double clicking on a module will enable the display of the main application menus.



Statesman main application window

The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower plane or drag the button to vary the size of the panes.

Note: For further details of Statesman configuration and operation please refer to the Statesman manual.

Status

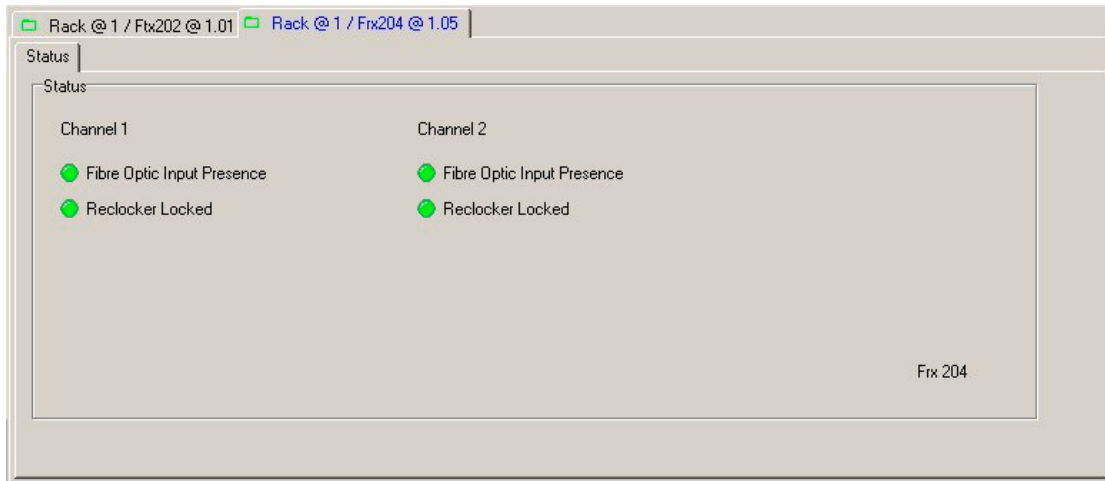
The Status tab provides access to the following:

Channel A

- Optical input present
- Optical input contains valid SDI video

Channel B

- Optical input present
- Optical input contains valid SDI video



Status monitoring

Channel Status

Status indication is as follows:

Input Status	Description
Optical Input Present	Green when input detected. Red when no input detected.
Reclocker Locked	Indicates that the optical input contains a valid SDI signal.

6 Problem solving

Basic fault finding guide

The Power OK LED's 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.

Optical inputs are present but no video output

Check that the optical signal contains valid serial digital video.

The video output is low quality

Check that the maximum cable length has not been exceeded for both the optical input and video output .

Check that the optical connectors have not become contaminated.

Re-setting the card

If required, the card may be reset by simply removing the frame power and re-applying it after a few seconds or by removing the card from the frame and then re-inserting it.

It is safe to re-insert the card whilst the frame is powered

7 Specification

General

Dimensions	100mm x 266mm module with DIN 41612 connector
Weight	200g
Power consumption	3 W

Inputs

	2 x Video SDI serial digital 270Mb/s to SMPTE 297M-1997 on optical carrier.
Optical wavelength	1200-1600nm, 1300 nominal
Connector type	SC
Input level maximum	-3dBm
Input level minimum	-22dBm
Fibre	Singlemode/multimode

Outputs

Number and type:	4 re-clocked
	Each will drive >250m Belden 8281 or equivalent

Status monitoring

LED display	Front of card edge visual monitoring with LED indicators to indicate: PSU rail present, optical input present
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Ordering information

FRX204	Dual reclocking optical serial digital video receiver and distribution amplifier with up to two outputs per channel.
Indigo 4	4U frame without active control panel for up to 24 modules
Indigo 2	2U frame without active control panel for up to 12 modules
Indigo 1	1U frame without active control panel for up to 6 modules
Indigo 2A	2U frame with active control panel for up to 12 modules
Indigo 1A	1U frame with active control panel for up to 6 modules
Indigo 4S	Statesman enabled only 4U frame for up to 24 modules
Indigo 2S	Statesman enabled only 2U frame for up to 12 modules
Indigo 1S	Statesman enabled only 1U frame for up to 6 modules
RM28	Single slot rear module with 2 x SC fibre optic connectors and 4 BNCs