Demon

De-embedding monitor

USER MANUAL

Crystal Vision

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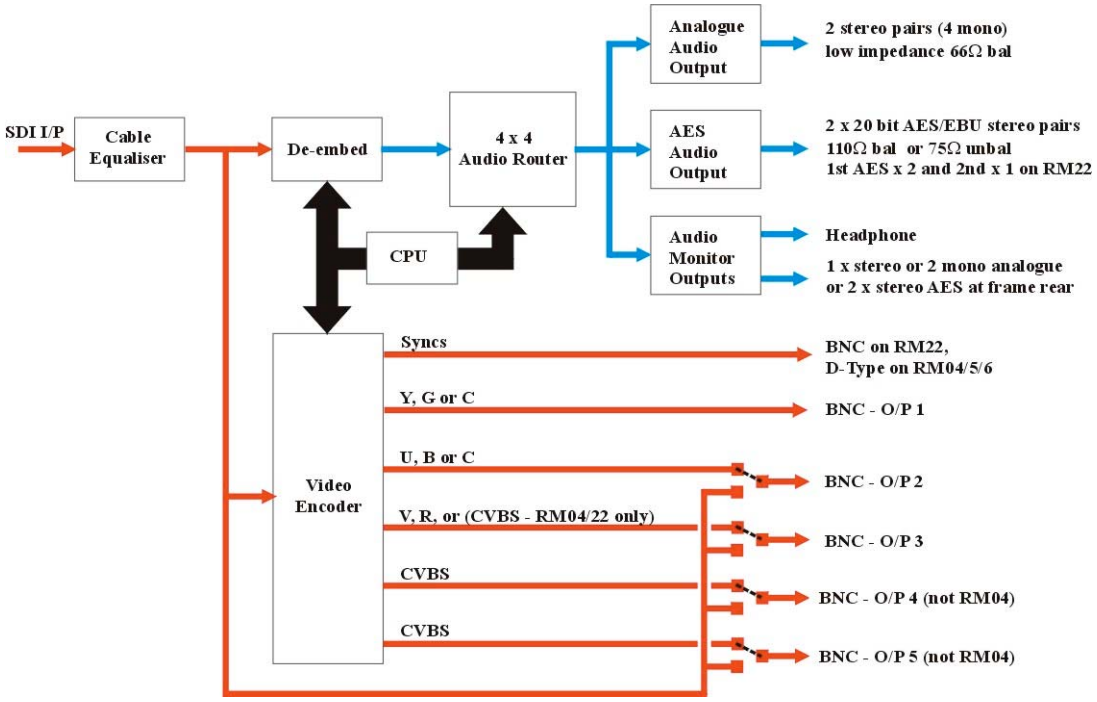
1 Introduction

Demon is a De-embedding Monitor designed for applications requiring the simultaneous monitoring of video and embedded audio.



Demon De-embedding Monitor

Demon can convert incoming SDI with embedded audio into combinations of component, composite, Y/C and SDI distribution, along with 20 bit AES and analogue audio.

The on-board 8-bit monitoring video encoder can be configured to produce a variety of video outputs. The four output formats available from the encoder are GBR with sync on G, YUV with sync on Y, S-video and composite in both 625 line 8 field sequence PAL and 525 line 4 field NTSC or a combination of these depending on Mode and rear module selection.

Analogue video outputs may also be substituted for up to four non-reclocked SDI loop-through outputs.

Any one of the four audio groups contained in the SDI stream can be de-embedded and the resulting four channels of audio can then be routed to any of the four outputs.

If an audio group is present that has only two embedded mono channels, then those two channels are replicated to form channels 1, 2, 3 & 4.

The output audio is available simultaneously as four mono (two stereo) balanced analogue and two balanced or unbalanced AES, depending on the rear module. Audio monitoring is available via the mini headphone socket located on the front board edge and from the frame rear module where it is configurable as either AES or analogue.

Sixteen presets allow you to store and recall parameters such as video output configurations, audio routing and audio group selection.

Demon uses the same sophisticated techniques employed in Tandem to protect and minimise the effects of cuts to untimed and asynchronous SDI, SDI corruption and TRS loss in the SDI signal.

The main features are as follows:

- SDI Audio/Video Monitoring Encoder
- Up to 5 simultaneous video outputs – RGB, YUV, Y/C, Composite and SDI depending on rear module and link selection.
- Automatic 525/625 input switching
- Sophisticated error handling of upstream input switching
- Simultaneous analogue and AES/EBU audio outputs from any one incoming embedded audio group
- Also accepts embedded inputs that consist of a single stereo (channel 1&2 are replicated on channel 3&4)
- 4 x 4 Audio Router to select any de-embedded channel to any output
- Dedicated headphone monitoring socket
- Flexible yet simple remote control and/or board edge control
- Sixteen presets recallable by GPIs and Demon control

Demon is a 100mm x 266mm module, which fits in the three standard frames and can be integrated with any boards from the company's full product range.

Demon can be used with the RM04, RM05, RM06 and RM22 frame rear modules, depending on the packing density and outputs required. SDI loop-through/analogue outputs are selected by movable links on the board.

Demon is particularly ideal for multi-channel broadcasters faced with many embedded feeds to monitor, or for applications needing to de-embed both analogue and digital audio at the same time. Demon can also be incorporated with a DTB-AV desk top box to drive a plasma or CRT display and active speakers for local audio de-embedding and extraction of analogue video.

Note: This manual covers Demon cards, issue numbers 2.14 up to and including issue 4.16.

Demon rear panel and output combinations

The video and analogue outputs available with the RM04, RM05, RM06 and RM22 rear panels are as follows:

RM04 output combinations

- analogue audio x 4 and 110 Ohm AES x 2 and YUV
- analogue audio x 4 and 110 Ohm AES x 2 and RGB
- analogue audio x 4 and 110 Ohm AES x 2 and Y/C and composite
- analogue audio x 4 and 110 Ohm AES x 2 and Y/C and SDI
- analogue audio x 4 and 110 Ohm AES x 2 and composite x 2 and SDI
- analogue audio x 4 and 110 Ohm AES x 2 and SDI x 2 and composite

RM05/RM06 output combinations

- analogue audio x 4 and 110 Ohm AES x 2 and YUV and SDI x 2
- analogue audio x 4 and 110 Ohm AES x 2 and YUV and composite x 2
- analogue audio x 4 and 110 Ohm AES x 2 and YUV and composite and SDI
- analogue audio x 4 and 110 Ohm AES x 2 and RGB and SDI x 2
- analogue audio x 4 and 110 Ohm AES x 2 and RGB and composite x 2
- analogue audio x 4 and 110 Ohm AES x 2 and RGB and composite and SDI
- analogue audio x 4 and 110 Ohm AES x 2 and Y/C and composite x 3
- analogue audio x 4 and 110 Ohm AES x 2 and Y/C and SDI x 2 and composite
- analogue audio x 4 and 110 Ohm AES x 2 and Y/C and composite x 2 and SDI
- analogue audio x 4 and 110 Ohm AES x 2 and composite x 3 and SDI x 2
- analogue audio x 4 and 110 Ohm AES x 2 and composite x 2 and SDI x 3
- analogue audio x 4 and 110 Ohm AES x 2 and composite and SDI x 4

RM22 output combinations

- analogue audio x 4 and 75 Ohm AES x 3 and YUV and SDI x 2
- analogue audio x 4 and 75 Ohm AES x 3 and YUV and composite x 2
- analogue audio x 4 and 75 Ohm AES x 3 and YUV and composite and SDI
- analogue audio x 4 and 75 Ohm AES x 3 and RGB and SDI x 2
- analogue audio x 4 and 75 Ohm AES x 3 and RGB and composite x 2
- analogue audio x 4 and 75 Ohm AES x 3 and RGB and composite and SDI
- analogue audio x 4 and 75 Ohm AES x 3 and Y/C and composite x 3
- analogue audio x 4 and 75 Ohm AES x 3 and Y/C and SDI x 2 and composite
- analogue audio x 4 and 75 Ohm AES x 3 and Y/C and composite x 2 and SDI
- analogue audio x 4 and 75 Ohm AES x 3 and composite x 4 and SDI
- analogue audio x 4 and 75 Ohm AES x 3 and composite x 3 and SDI x 2
- analogue audio x 4 and 75 Ohm AES x 3 and composite x 2 and SDI x 3

2 Installing Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC. Statesman provides a user friendly means of configuring and operating the Demon with the benefit of see-at-a-glance status monitoring. Most functions can be accessed from Statesman menus.

The main Statesman application communicates with each module in a frame through an active control panel. An active panel must be fitted to allow for Statesman control.

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 Remote 2 connector on an FR1AV or FR2AV Crystal Vision frame with at least one Demon module and/or other Statesman compatible module
- An active control panel MUST be fitted to the frame with version 1.50 or above firmware
- 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 crystalvision.exe file in the installed program directory.

When the program runs 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.

3 Statesman operation

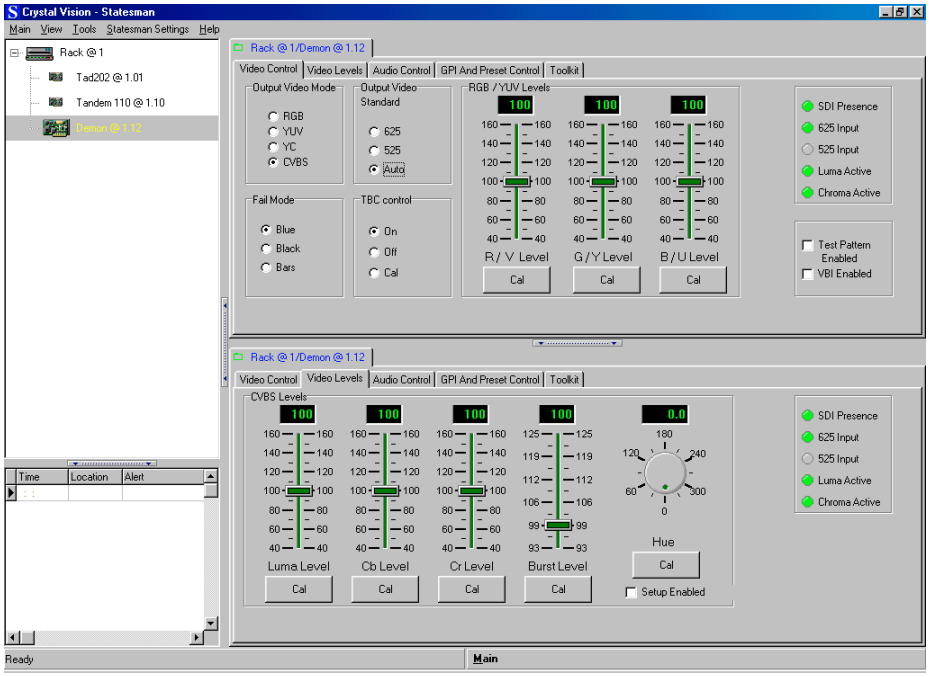
Once Statesman is configured it should automatically detect any statesman compatible modules in the connected frame or frames and display them in the main application left hand explorer-style window.

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 to display the main application menus.



Statesman main application window

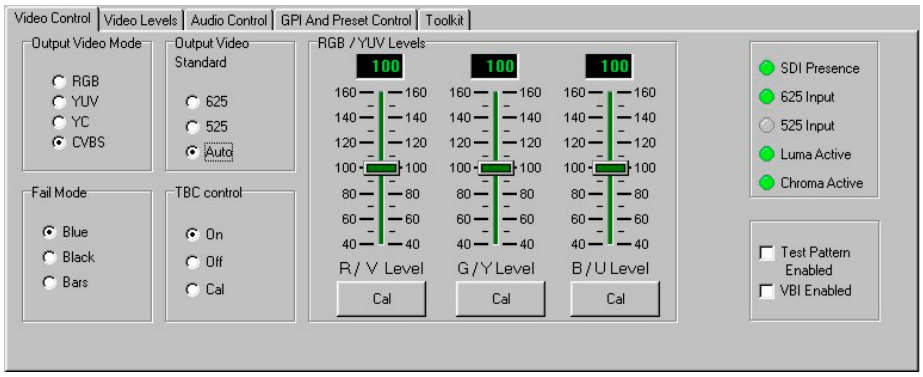
The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower plane or drag the button to vary the size of the panes.

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

3.1 Video control

The video control tab provides access to the following

- Output video mode / standard
- Fail mode
- TBC control
- RGB/YUV level adjustment
- Input status
- Test Pattern/VBI enable



Video control

Output video modes

The following video output modes are supported:

- CV - Composite video – all outputs are set to analogue composite video
- YC - Y/C output - main output set to YC, spare outputs set to composite
- YUV - main outputs set to YUV, spare outputs set to composite
- RGB - main output set to RGB with sync on G, spare outputs set to composite or SDI - a separate sync output is also available

Check the appropriate select circle to change the video mode.

Note: Some options are only available with specific rear connectors. There is a full listing of available outputs and their routing for each rear module option in the Installation chapter.

Output video standard

The following video output standards are supported:

- 625 - the output will display the input video if it is 625 lines
- 525 - the output will display the input video if it is 525 lines
- Auto - the output will display the input standard

Check the appropriate select circle to change the output standard.

Fail mode

In the event of the card losing its input signal the card can be forced to output in one of three fail modes. These are a blue raster, a black raster or the cards internal colour bars.

Check the required Fail Mode check circle to update the mode immediately. The Fail Mode selection may also be made during a loss of input.

If the input standard is 625 and the input changes to 525 or is missing the output will revert to the selected fail mode at 625 lines.

If the input standard is 525 lines and changes to 625 or is missing the output will revert to the selected fail mode at 525 lines.

If the input goes missing in auto mode the output will go into the selected fail mode at the last known working line standard.

Test pattern

Checking in the 'Test Pattern Enabled' check box will output standard colour bars. When the Demon card is in test pattern mode, output levels cannot be adjusted.

VBI enable

Checking in the 'VBI Enable ' check box will enable the VBI data to be passed to the composite outputs.

TBC control

With TBC ON, an internal 27MHz VCO controls all internal timing functions free of any jitter in the incoming SDI signal. When the TBC is OFF all timing is extracted from the SDI signal. During a loss of SDI input the internally generated 27Mhz replaces that extracted from the SDI input.

The CAL function calibrates the 27Mhz VCO oscillator to the incoming SDI. This helps to prevent corruption of the composite fail output due to incorrect sub-carrier frequencies. The calibration process requires a good SDI signal and takes about 5 seconds to complete. The TBC is turned off during calibration and this may cause a momentary loss of lock.

It is recommended to take Demon off-line before selecting CAL

Input Status

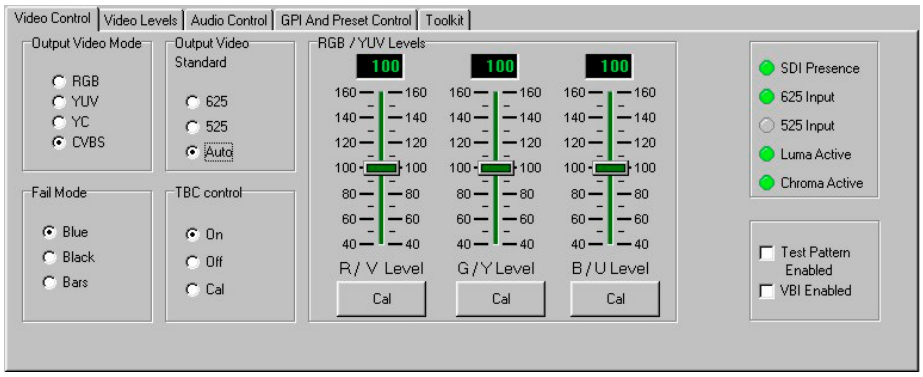
The group of five indicators on the Video Control tab (and repeated on the Video Level tab) show the status of the SDI input signal:

- SDI presence
- 625 / 525
- Luma / Chroma active

The relevant indicator will be illuminated green if appropriate.

Controlling component levels

The Video mode tab also provides access to three sliders for control of component levels (RGB and YUV).



RGB/YUV level controls

The RGB level control ranges and default values are as follows:

RGB controls	Min	Default	Max
RGB/YUV Gain	40	100	160

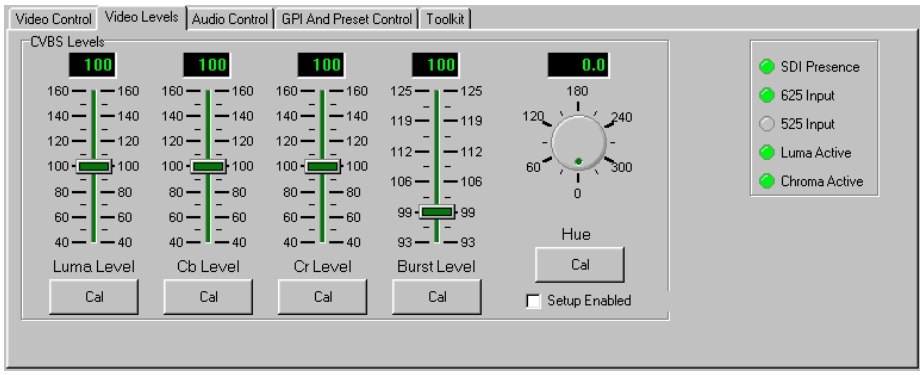
Default values can easily be entered by clicking on individual Cal buttons or by right clicking in the slider area and selecting 'Calibrate'.

To gang the RGB/YUV slider controls together to move them as one, left click on the slider chosen as the master with the SHIFT key held down and then, whilst continuing to hold the SHIFT key, left click on one or more further sliders to use as slaves.

To clear ganged controls and restored them to individual use, select ‘Clear Ganged Controls’ in the Tools menu. The control is only available when a module application is active and controls have been ganged.

Controlling CVBS video levels

The Video Levels tab provides access to four sliders for control of CVBS video levels, and burst level, and controls to vary Hue and Setup in NTSC.



CVBS and burst level controls

The CVBS and burst level control ranges and default values are as follows:

RGB controls	Min	Default	Max
Luma level	40	100	160
Cb Level	40	100	160
Cr Level	40	100	160
Burst Level	93	100	125

Default values can easily be entered by clicking on individual Cal buttons or by right clicking in the slider area and selecting 'Calibrate'.

To gang slider controls together to move them as one, left click on the slider chosen as the master with the SHIFT key held down and then, whilst continuing to hold the SHIFT key, left click on one or more further sliders to use as slaves.

To clear ganged controls and restored them to individual use, select ‘Clear Ganged Controls’ in the Tools menu. The control is only available when a module application is active and controls have been ganged.

NTSC controls

For NTSC outputs, the Hue and Setup controls will be active (they have no affect in 625).

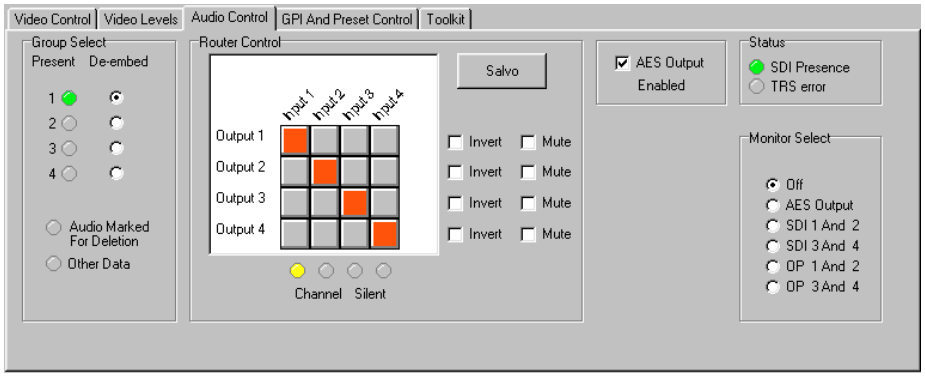
Setup enables or disables 7.5 IRE pedestal for 525 line NTSC and Hue alters the NTSC hue.

Input Status

The group of five indicators show the status of the SDI input signal (repeated on the Video Control tab).

3.2 Audio control

The Audio Control tab provides access to controls for group de-embed selection, audio shuffling (routing), audio inversion and muting, audio monitoring and SDI/TRS status.

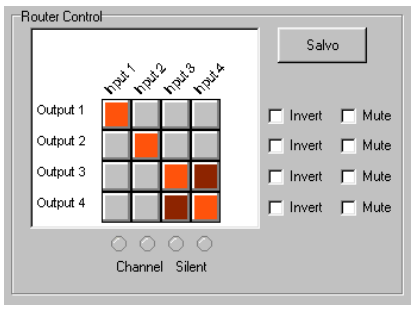


Audio controls

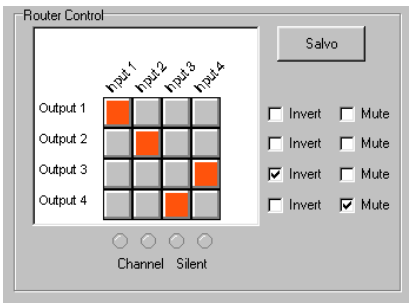
Group selection and audio routing

Select an incoming group embedded within the SDI data stream by checking one of the four available groups. An indicator adjacent to the group selector will illuminate green if embedded audio is present. Channel silence within the selected group is shown by a yellow 'Channel Silent' indicator for that channel.

The Router Control consists of a 4x4 grid. Sources are routed to destinations by clicking on the appropriate crosspoints for the desired input/output assignments and clicking Salvo. The selected crosspoints will turn brown, until Salvo is pressed.



Click on the new crosspoints



Click on Salvo to makes the changes

If necessary, click in the Invert or Mute boxes to invert the phase or silence selected channels. The changes are immediate. Salvo is not needed for Invert and/or Mute.

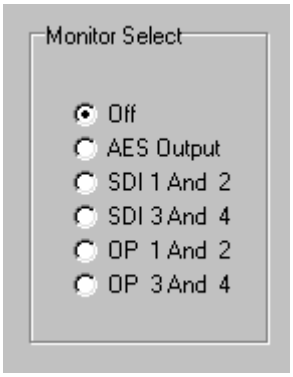
If the embedded audio contained audio marked for deletion or 'other data' (non-audio data), those indicators will illuminate yellow.

If the SDI signal is not present, the SDI presence indicator will illuminate red. If there is a TRS framing error, the TRS error indicator will illuminate red.

Note: It is not possible to select channels from different audio groups, but any of the channels from one group can be routed to one or more of the available outputs. Each output may be inverting or muted without affecting other outputs, even if the same channel is routed to more than one output.

Monitoring

Audio monitoring is available via the mini headphone socket located on the front board edge and from the frame rear module where it is configurable as either AES or analogue.



Audio monitor sources

Possible monitor settings are:

- Off - No output
- AES - De-embedded channels 1-4 as 2 stereo AES pairs
- SDI 1 and 2 - De-embed channels 1 & 2 as analogue outputs
- SDI 3 and 4 - De-embed channels 3 & 4 as analogue outputs
- Op 1 and 2 - Outputs 1 and 2 of the internal routing matrix as analogue outputs
- Op 3 and 4 - Output 3 and 4 of the internal routing matrix as analogue outputs

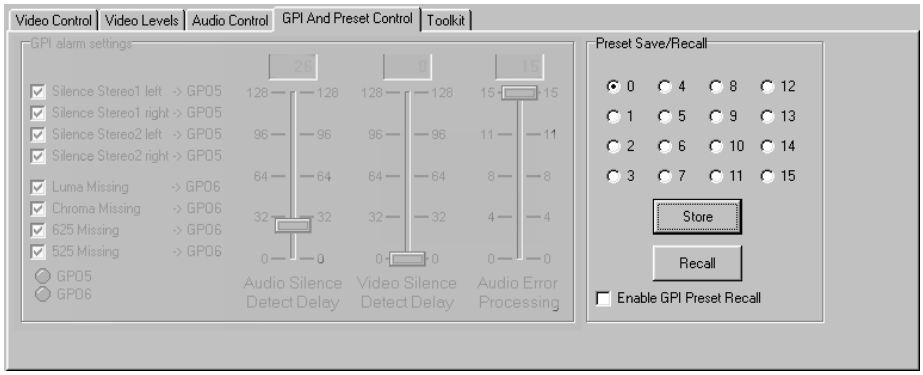
The headphone socket at the card edge follows the monitor bus setting except that if either Off or AES is selected, the headphones will output the last active selection.

Note: Analogue noise figures may be improved slightly, as a result of reduced cross talk in cabling, when AES outputs are muted (disabled).

3.3 Using presets

The preset menu is part of the GPI and Preset Control tab.

Presets allow up to 16 snap shot memories of the control state of the entire Demon module to be saved and recalled.



Presets Save and Recall on the right of the GPI and Presets Control tab

To store a Demon setup check a preset location (from 0 to 15) and click on Store.

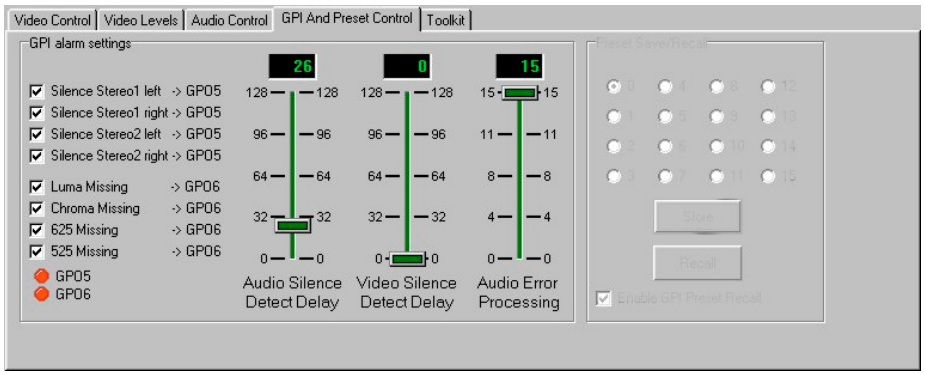
To recall a Demon setup check a previously saved preset location and click on Recall.

It is strongly recommended to uncheck the Enable GPI Preset recall, to prevent inadvertent GPI recall whilst using this menu.

3.4 Setting GPI options

The GPI control menu is part of the GPI and Preset Control tab.

GPIs allows external triggers to be sent when certain error conditions exist. Error conditions can be enabled (activate assigned GPI output) or disabled (assigned GPI output ignores error).



GPI alarm output settings on the left of the GPI and Presets Control tab

GPI error assignments

To enable an error to activate a GPI output, place a tick in the enable box.

The following error conditions are supported:

- Silence detect - if a period of silence on any selected audio channel exceeds the Audio Silence Detect Delay time a warning will be set on GPO5
- Luma absence detect - if the incoming SDI luminance is below 12.5% peak white for the Video Silence Detect Delay time a warning will be set on GPO6
- Chroma absence detect - if the incoming SDI chrominance is less than 12.5% saturation for the Video Silence Detect Delay time a warning will be set on GPO6
- 625 missing – if the input changes from 625 or is missing, a warning can be set on GPO6.
- 525 missing – if the input changes from 525 or is missing, a warning can be set on GPO6.

If the serial video stream disappears completely the Luma and Chroma warnings are immediate. The default delay times are 26 for audio silence and 0 for video silence (absence).

Audio error processing

This sets the amount of error processing applied to the audio present in the incoming SDI stream. The values are from 0 to 15 and are set with the right hand slider. The larger the value the more error processing is applied. The default value is 15.

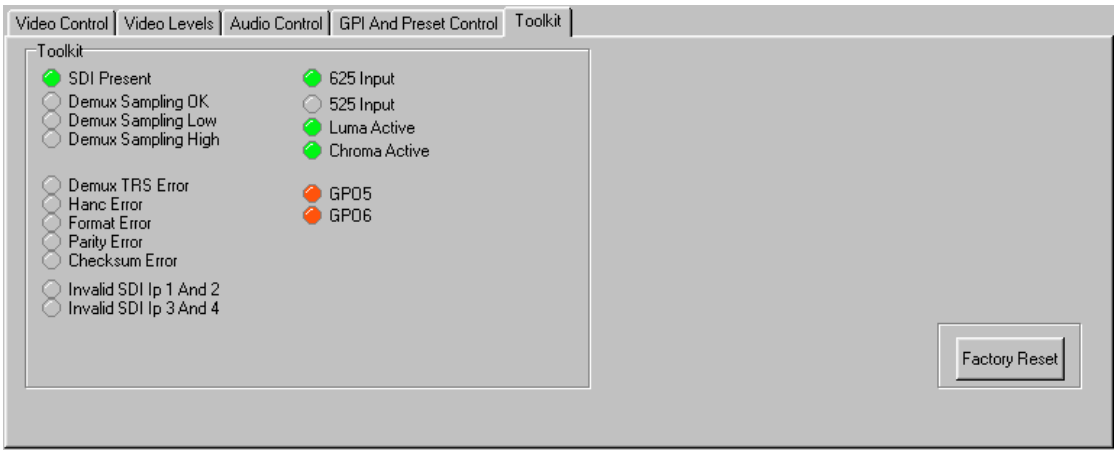
Changing default values

To change the settings for audio/video silence/absence detect-delay or audio error processing left-click on the appropriate slider and drag it up or down. To set the sliders to

their default values right click in the appropriate slider area and choose Calibrate. Default values from left to right are 26, 0 and 15.

3.5 Using the toolkit

The Toolkit is accessed from the Toolkit tab.



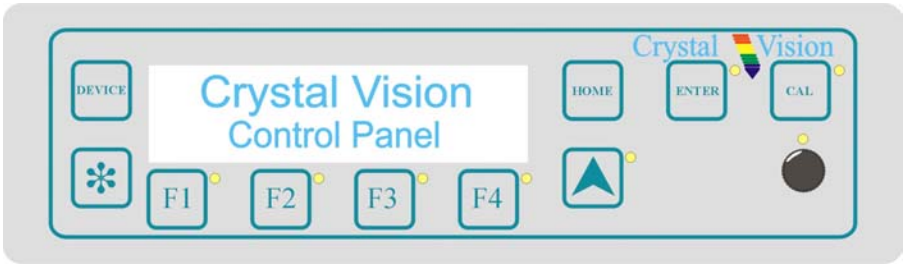
The Demon Toolkit

Error	Description
SDI Present	Green: SDI input detected, Red: No SDI input detected
Demux sampling OK	Green: de-embedded audio sample rate correct
Demux Sampling Low	Red: de-embedded audio sample rate too low
Demux Sampling High	Red: de-embedded audio sample rate too high
Demux TRS Error	Red: no TRS in incoming SDI or TRS wrong
Hanc Error	Red: no de-embedded audio or Hanc is wrong
Format error	No de-embedded audio or channel format incorrect
Parity Error	No de-embedded audio or parity is wrong
Checksum Error	No de-embedded audio or checksum wrong
Invalid SDI Ip 1 and 2	Data or non-linear audio present on one or both channels of pair 1
Invalid SDI Ip 3 and 4	Data or non-linear audio present on one or both channels of pair 2
625 Input	Green: Input is 625 line standard
525 Input	Green: Input is 525 line standard
Luma Active	Green: Luminance active in SDI input
Chroma Active	Green: Chrominance active in SDI input
GPO 5	GPO 5 asserted if red
GPO 6	GPO 6 asserted if red

Caution: High signal levels may be present if a channel has data or non-linear audio present

4 Using the active control panel

The Crystal Vision active control panel is available as an integral part of the FP2-LF front door for the FR2AV 2U frame, the FR1AV frame, and the DTBAV desktop box or as a remote panel. Only one control panel can be connected to any frame, although one panel can control two frames.



The Crystal Vision control panel

At power up, the two line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. Once the control panel is initialised, each module in a frame is polled. As each module completes its own initialisation it will respond with a node address. A node address is a unique number that defines a module's position in a frame.

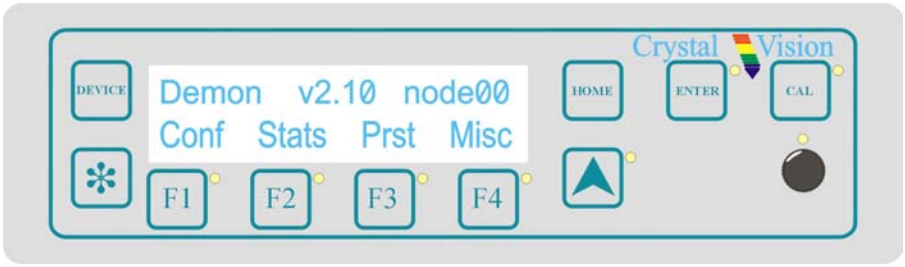
The control panel will display the name of the module that first responds to the polling request together with its node address.

Control panel showing available cards

To select a particular module in a frame, press the DEVICE key. The top line of the display will change to show 'Available Cards n', where n is the number of cards that have responded so far to the polling request. Rotating the shaft encoder will cause the bottom row of the display to cycle through the successfully polled cards by name and node number.

As some of the more complex modules may take longer to initialise the number of modules present may not settle at the final quantity until the display has polled round two or three times.

When the Demon module is selected press the ENTER key to access that module's HOME menu.



Demon home menu

Note: In the 2U frame the node address is calculated in one of two ways:
*slot number minus 1 – giving a range of 0 – 11 in frame #1, OR
*slot number plus fifteen – giving a range of 16 – 27 in frame #2
The two ranges are provided to allow one control panel to control two frames.
In the 1 U frame the address range is 0-5 OR 16-21.
Please refer to the frame manual for further information on node addresses.

4.1 Navigating the display

The control panel keys are assigned the following functions when controlling Demon:

- DEVICE – selects a card or module to control
- Asterisk – no function assigned
- F1 to F2 – soft keys, function assigned within each menu
- HOME – moves the display to the home menu
- ENTER – accepts device selection
- CAL – updates display
- Upward arrow – used to move up the menu structure
- Rotary control – shaft encoder used to select options or variable data

4.2 Updating the display

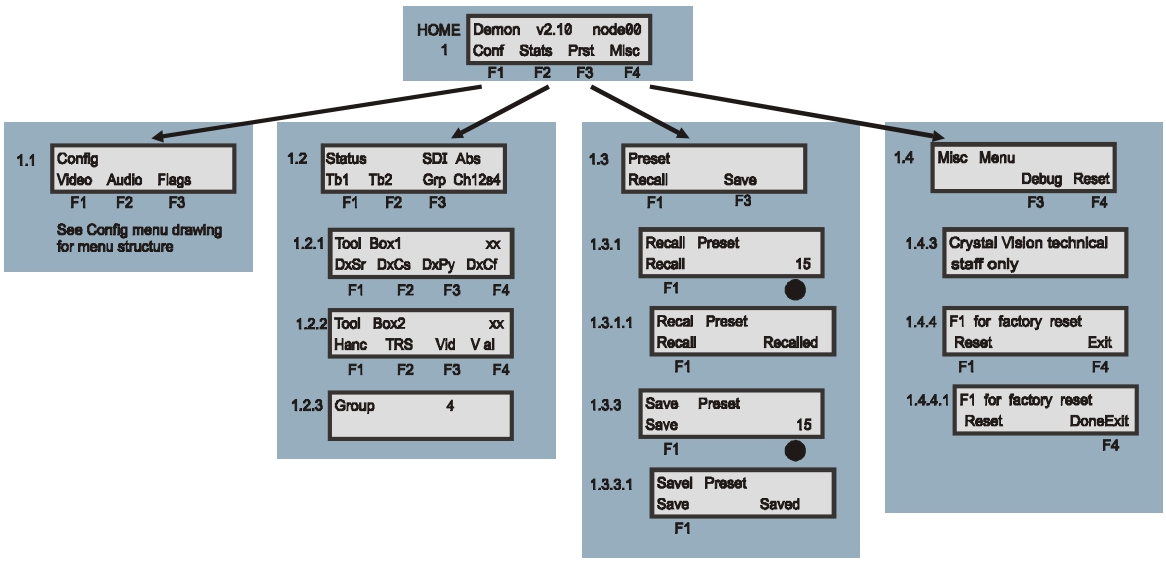
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or through automatic response to GPI signals, the text displayed on the active front panel will not be updated immediately. If necessary, use the CAL button to update the display.

4.3 The Demon active panel menu structure

The main top-level menus for the Demon module are obtained by pressing the F1, F2, F3 and F4 keys from that module's HOME menu. Menu keys are illuminated when active and when further menus are available. The four top-level menus are:

- Conf (Configure Video, Audio and Flags) – press F1
- Stats (Status) – press F2
- Prst (Save and Recall Presets) – press F3
- Misc (Miscellaneous: Debug and Reset) – press F4

The following chart shows the available menus.



The Demon menu tree

Note: Function keys and shaft encoder LEDs are illuminated when active.
Menus or function keys associated with the shaft encoder for changing assigned values are shown with a black circle.

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.

Shorthand codes

The following shorthand codes are used in Demon active control panel menus:

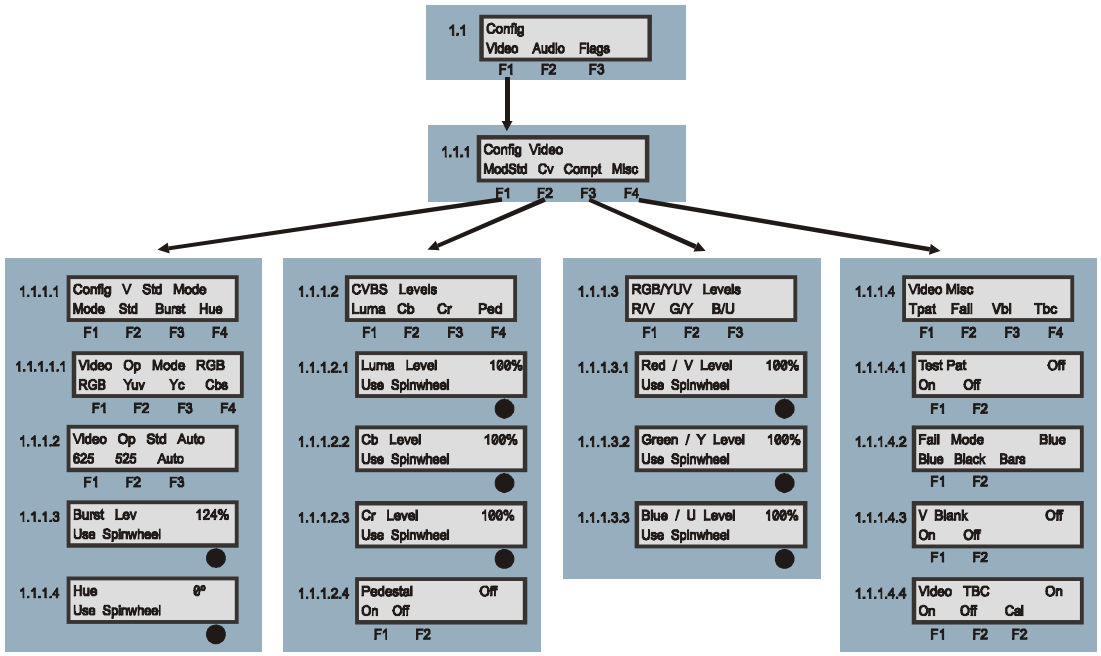
Menu code	Function description
SDI	Serial Digital Interface or serial component digital signal
Grp	Embedded audio group
M	Mute
/	Phase inversion
GPI	General Purpose Interface
s	Audio signal silent
ni	SDI input not present

4.4 Configuration menus

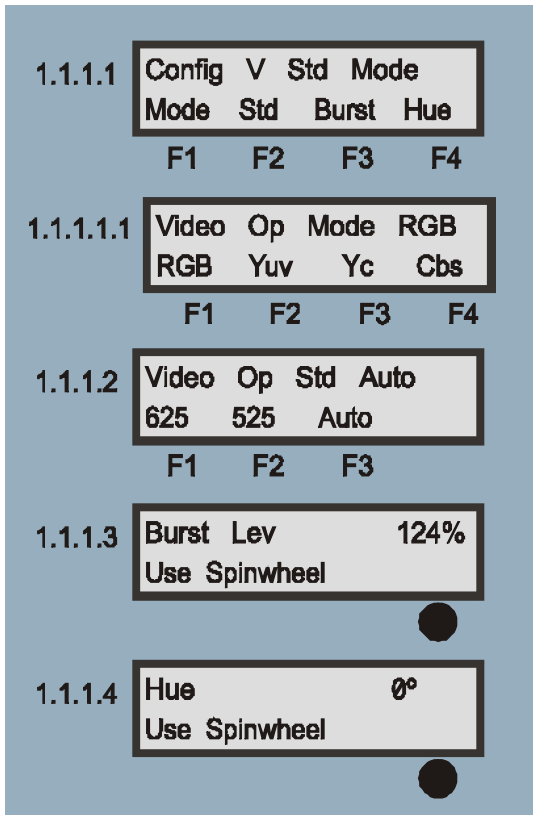
Pressing F1 from the home menu will bring up the top configure menu. The configure menu provides access to the following sub-menus:

- Video configuration
- Audio configuration
- GPI warning flag and flag masking

Video configuration



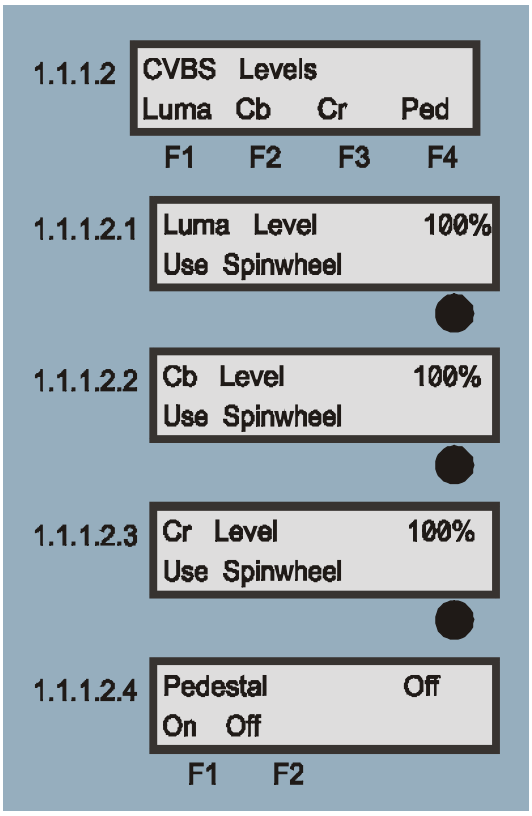
The Demon Video Configure menu tree

Configure video ModStd menu	Description
	Provides access to the following sub-menus: Output Mode Menu – press F1 Output Standard Menu – press F2 Burst Level Menu – press F3 Hue Menu – press F4 Set Demon output mode: RGB – press F1 Yuv – press F2 Yc – press F3 Cvbs – press F4 Set output standard: 625 – press F1 525 press F2 Auto – press F3 Set burst level: Rotate shaft encoder (Spinwheel) for burst level. Set NTSC hue: Rotate shaft encoder (Spinwheel) for hue in 525 or 525 Auto mode. The readout is in degrees with the nominal value set to 0.

Note: Parameter changes shown in the top line of the display are actioned immediately in these menus as soon as the shaft encoder or appropriate F key is used.

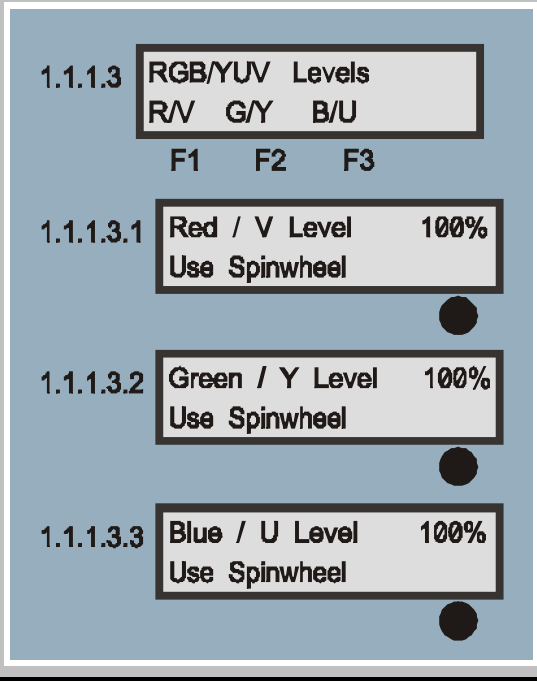
Mode change
Not all connections are available with some rear connector modules. See Installation chapter for details.

Configure Video Standard
In 625 mode the output will display the input video if it is 625 lines. If the input is 525 or missing the output will revert to the selected fail mode at 625 lines.
In 525 mode the output will display the input video if it is 525 lines. If the input is 625 or missing the output will revert to the selected fail mode at 525 lines.
In auto mode the output will display the input standard. If the input goes missing the output will go into the selected fail mode at the last known working line standard.

Configure video CVBS menu	Description
	Provides access to the following sub-menus: Luma level – press F1 Cb level – press F2 Cr level – press F3 Pedestal On/Off – press F4 Set luma or luminance level: Rotate shaft encoder (Spinwheel) for luma level. Set Cb or blue vector level: Rotate shaft encoder (Spinwheel) for Cb level. Set Cr or red vector level: Rotate shaft encoder (Spinwheel) for Cr level. Pedestal On/Off in 525 only: Press F1 for Pedestal On Press F2 for Pedestal Off

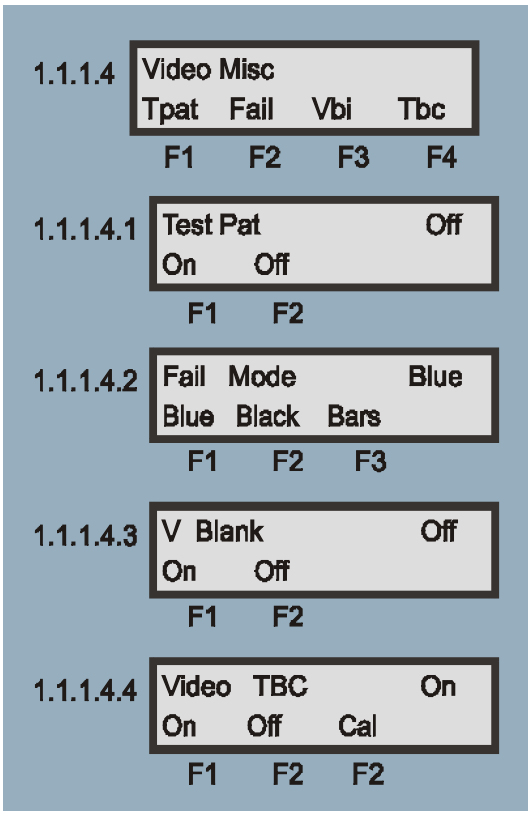
Note: Parameter changes shown in the top line of the display are actioned immediately in these menus as soon as the shaft encoder or appropriate F key is used.

Pedestal Menu
Pedestal is disabled on the NTSC outputs when either RGB or YUV modes are selected.

Configure component level menu	Description
	Provides access to the following sub-menus: Red/V level – press F1 Green/Luminance level – press F2 Blue/U level – press F3 Set Red / V level: Rotate shaft encoder (Spinwheel) for R/V level. Set Green/Y level: Rotate shaft encoder (Spinwheel) for G/Y level. Set Blue/U level: Rotate shaft encoder (Spinwheel) for G/B level.

Note: Parameter changes shown in the top line of the display are actioned immediately in these menus as soon as the shaft encoder is used.

RGB/YUV level change
Control of this menu is only available if the Output Mode is set to YUV or RGB.

Configure video miscellaneous menu	Description
	Provides access to the following sub-menus: Test Pattern Menu – press F1 Output Fail Menu – press F2 V Blank Menu – press F3 Video TBC Menu – press F4 Set Demon output mode: Select internal colour bar test signal – press F1 Select Demon SDI input – press F2 Select video output when input fails: blue screen – press F1 black screen – press F2 Colour bar test signal – press F3 Pass/block data in vertical blanking interval: Block data – press F1 Pass data – press F2 Set SDI re-clocking: Re-clocking On – press F1 Re-clocking Off – press F2 Calibrate VCO clock – press F3

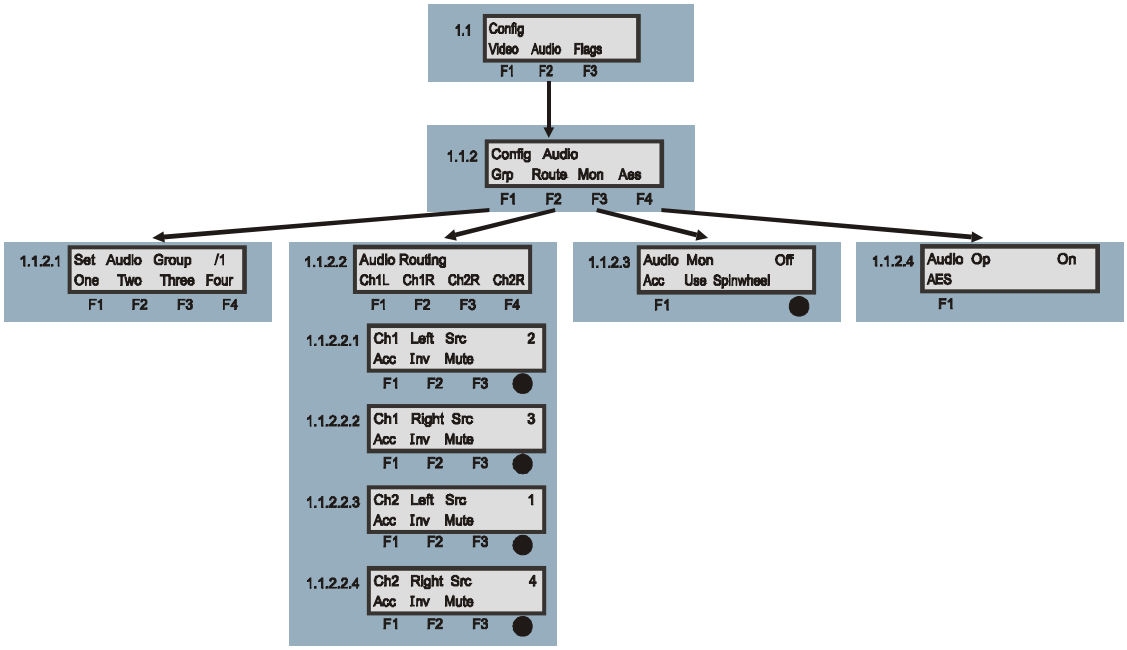
Note: Parameter changes shown in the top line of the display are actioned immediately in these menus as soon as the shaft encoder or appropriate F key is used.

Test Pattern Enable Menu
When the Demon card is in test pattern mode, output levels cannot be adjusted.

Fail Mode Menu
In the event of the card losing its input signal the card can be forced to output in one of three fail modes. These are a blue raster, a black raster or the cards internal colour bars. Any change in this menu will be updated immediately and a selection may also be made during a loss of input.

Video TBC Enable Menu
With TBC ON, an internal 27MHz VCO controls all internal timing functions free of any jitter in the incoming SDI signal. When the TBC is OFF all timing is extracted from the SDI signal. During a loss of SDI input the internally generated 27Mhz replaces that extracted from the SDI input.
The CAL function calibrates the 27Mhz VCO oscillator to the incoming SDI. This helps to prevent corruption of the composite fail output due to incorrect sub-carrier frequencies. The calibration process requires a good SDI signal and takes about 5 seconds to complete. The TBC is turned off during calibration and this may cause a momentary loss of lock. It is recommended to take Demon off-line before pressing CAL.

Audio configuration



The Demon Audio Configure menu tree

Audio configuration consists of the following steps:

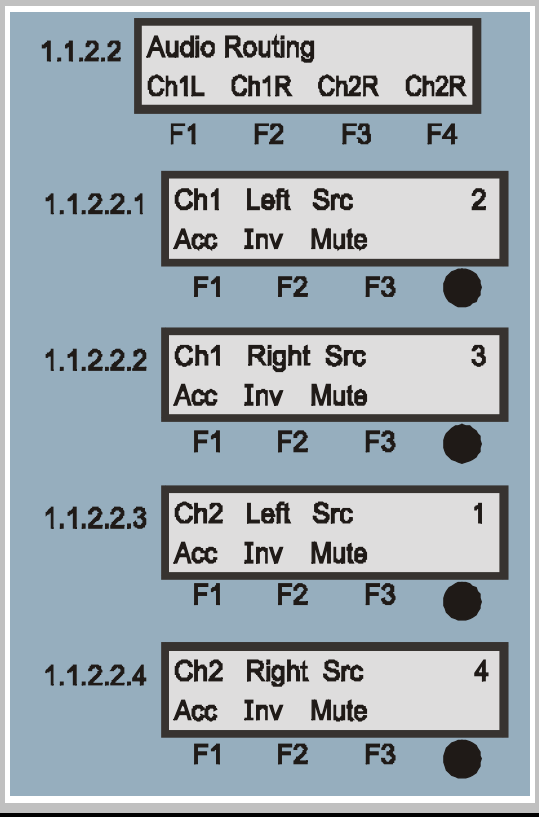
- Select a group from within the embedded audio stream of the incoming SDI signal
- Route some or all of the channels within that group to any of the available outputs

It is not possible to select channels from different audio groups, but any of the channels from one group can be routed to one or more of the available outputs. Each output may be inverting or muted without affecting other outputs, even if the same channel is routed to more than one output.

Configure audio – select group menu	Description
1.1.2.1 Set Audio Group /1 One Two Three Four F1 F2 F3 F4	Select one of four audio groups to de-embed from: Group 1 – press F1 Group 2 – press F2 Group 3 – press F3 Group 4 – press F4

Note: Parameter changes shown in the top line of the display are actioned immediately in these menus as soon as the appropriate F key is used.

An equal sign will be displayed if there is audio present in the selected group. If no embedded audio is present a forward slash '/' will be displayed

Configure audio routing menu	Description
	Access routing menus for Demon outputs: Ch1L output – press F1 Ch1R output – press F2 Ch2L output – press F3 Ch2R output – press F4 Shaft encoder selects input channel 1 to 4. Action channel change – press F1 Acc Key Invert output signal – press F2 Mute output signal – press F3 Shaft encoder selects input channel 1 to 4. Action channel change – press F1 Acc Key Invert output signal – press F2 Mute output signal – press F3 Shaft encoder selects input channel 1 to 4. Action channel change – press F1 Acc Key Invert output signal – press F2 Mute output signal – press F3 Shaft encoder selects input channel 1 to 4. Action channel change – press F1 Acc Key Invert output signal – press F2 Mute output signal – press F3

Note: Parameter changes shown in the top line of the display are actioned in these menus when the F1 Acc (accept) key is pressed.

Audio routing menu
If the signal is muted an M will appear on the panel display, if the signal is inverted a / will appear on the panel display. An input channel can be routed to any number of the 4 output channels.

Configure audio – monitoring menu	Description
	Shaft encoder (Spinwheel) selects Monitor setting. Accept assignment – press F1 Acc Key

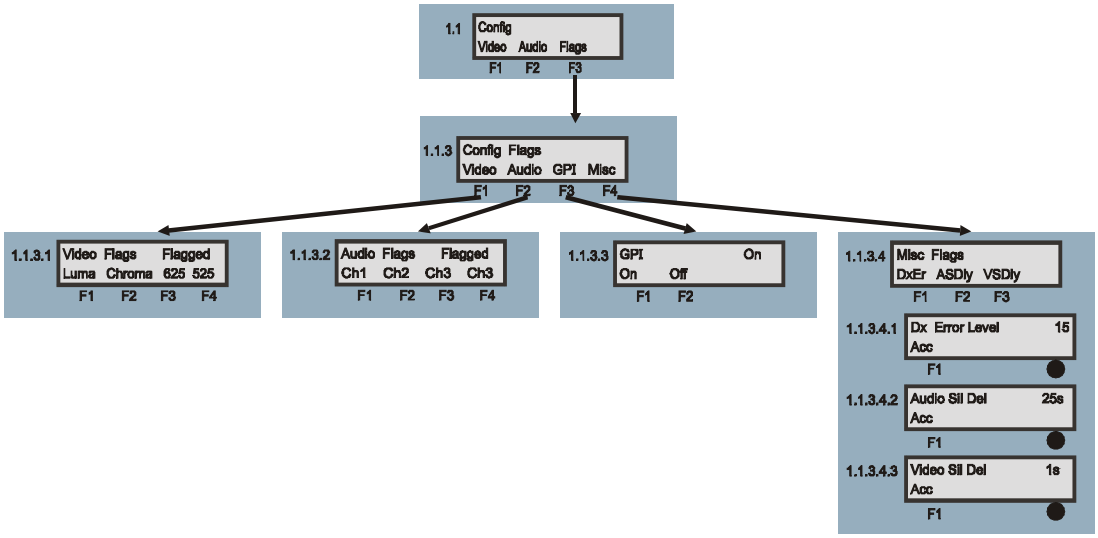
Note: Parameter change shown in the top line of the display is actioned in this menu when the F1 Acc (accept) key is pressed.

Possible monitor settings are:
Off - No output
AES - De-embedded channels 1-4 as 2 stereo AES pairs
SDI 1 and 2 - SDI channels 1 and 2 as analogue outputs
SDI 3 and 4 - SDI channels 3 and 4 as analogue outputs
Op 1 and 2 - Outputs 1 and 2 of the internal routing matrix as analogue outputs
Op 3 and 4 - Output 3 and 4 of the internal routing matrix as analogue outputs
The headphone socket at the card edge follows the monitor bus setting except that if either Off or AES is selected, the headphones will output the last active selection.

Configure audio – AES mute menu	Description
	Globally mute AES output: AES On/Off – press F1 Acc Key (toggle)

Note: Parameter change shown in the top line of the display is actioned as soon as the F1 key is used.
Analogue noise figures may be improved slightly, due to reduced cross-talk in cabling, when AES outputs are muted.

GPO warning flags configuration



The Demon GPI warning flags configuration menu tree

Configure Video Flags Menu

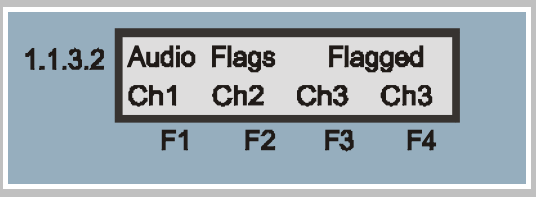
- Flags that will send an alarm on GPO6 if any or all of the following conditions are met:
- Luma Missing - if the input signal luminance falls to less than 12.5% a warning can be set via GPO6 if this error is flagged
- Chroma Missing - if the input signal chrominance falls below 12.5% saturation a warning can be set via GPO6 if this error is flagged.
- 625 Missing - if the input signal changes from a 625 standard i.e. it disappears or it changes to 525 a warning can be set via GPO6 if this error is flagged.
- 525 Missing - if the input signal changes from a 525 standard i.e. it disappears or it changes to 625 a warning can be set via GPO6 if this error is flagged.

Configure video flags menu	Description
1.1.3.1 Video Flags Flagged Luma Chroma 625 525 F1 F2 F3 F4	F1 toggles between flag and mask Luma low F2 toggles between flag and mask Chroma low F3 toggles between flag and mask 625 missing F4 toggles between flag and mask 525 missing

Note: Parameter change shown in the top line of the display is actioned as soon as the appropriate F key is used. The low luma and chroma flags will not be asserted until the video 'silence' time has elapsed.

Configure Audio Flags Menu

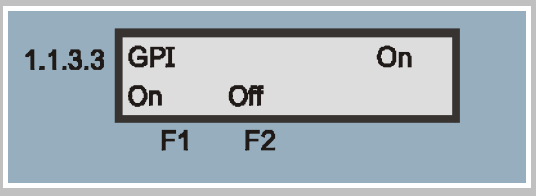
- Flags that will send an alarm on GPO5 if any or all of the following conditions are met:
- Ch1 Audio Missing - if the audio on channel 1 of the selected group goes silent then a warning can be set via GPO5 if this error is flagged.
- Ch2 Audio Missing - if the audio on channel 2 of the selected group goes silent then a warning can be set on GPO5 if this error is flagged.
- Ch3 Audio Missing - if the audio on channel 1 of the selected group goes silent then a warning can be set on GPO5 if this error is flagged.
- Ch4 Audio Missing - if the audio on channel 2 of the selected group goes silent then a warning can be set on GPO5 if this error is flagged.

Configure audio flags menu	Description
	F1 toggles between flag and mask Ch1 silence F2 toggles between flag and mask Ch2 silence F3 toggles between flag and mask Ch3 silence F4 toggles between flag and mask Ch4 silence

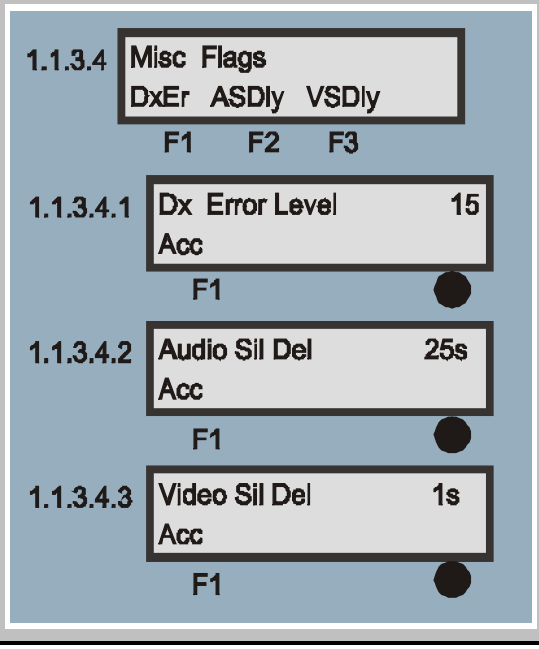
Note: Parameter change shown in the top line of the display is actioned as soon as the appropriate F key is used.

Enable/Disable GPI inputs

It is recommended to disable GPI inputs whenever Presets are being saved or recalled.

Configure GPIs menu	Description
	F1 enables GPIs F2 disables GPIs

Note: Parameter change shown in the top line of the display is actioned as soon as the appropriate F key is used.

Configure miscellaneous flags menu	Description
	Provides access to the following sub-menus: De-embed error level - press F1 Audio silence delay menu - press F2 Video 'silence' delay menu - press F3 Set de-embed error processing level: Rotate shaft encoder to adjust processing level Set Audio Silence Delay: Rotate shaft encoder to adjust delay before audio silence flag is asserted Set Video 'Silence' Delay: Rotate shaft encoder to adjust delay before video 'silence' flag is asserted

Notes: Parameter changes shown in the top line of the display are actioned in these menus when the F1 Acc (accept) key is pressed.

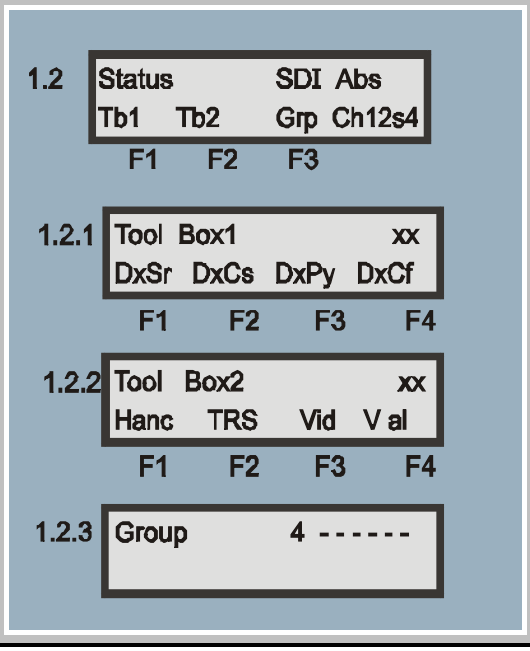
Audio De-embed Error Level Menu
Sets the amount of error processing applied to the audio present in the incoming SDI stream. The values are from 0 to 15 and are set with the shaft encoder. The larger the value the more error processing is applied.

Audio Silence Delay Menu
Sets the amount of time the incoming embedded audio signals must be silent before a silence alarm will be activated. The value can be changed with the shaft encoder between 1 and 129 seconds. The silence is flagged if the silence delay is exceeded and the relevant audio missing flag has been set.

Video ‘Silence’ Delay Menu
Sets the amount of time between a change in the status of the incoming SDI video and the sending of a warning message. The delay is set using the shaft encoder and can vary between 1 and 129 seconds. A warning will only be sent once the time has been exceeded and if the relevant flag has been set. If the serial video stream disappears the warning is immediate.
Video 'silence' is detected if either luma or chroma is missing.

4.5 Tool box and status menus

To access the status menu press F2 from the home menu.

Status menu	Description
	Top line: SDI Standard 625, 525 Abs(ent) Bottom line: Tool Box 1 Menu – press F1 Tool Box 2 Menu – press F2 Grp selected – press F3 Audio Channels 1 to 4, s if silent Tool Box 1: Sample rate status – press F1 (DxSr) Audio checksum – press F2 (DxCs) Audio data parity – press F3 (DxPy) Audio data channel format – press F4 (DxCf) Tool Box 2: Hanc status – press F1 TRS status – press F2 Vid status – press F3 (DxPy) De-embedded Audio validity – press F4 Shows group selected: 1, 2, 3 or 4 and groups present

Note:

Tool Box 1

Embedded audio sample rate
Lo - sample rate too low
Hi - audio sample rate too high.
Wi - audio sample rate varying excessively
Ok - good audio samples

Embedded audio check sum
Er - no embedded audio or checksum wrong
Ok - checksum OK

Embedded audio Parity
Er - no embedded audio or parity is wrong
Ok - parity OK

Embedded audio channel format
Er - no embedded audio or channel format incorrect
Ok - channel format OK

Tool Box 2

HANC status
Er - no embedded audio or Hanc is wrong
Ok – Hanc space OK

TRS status
Er - no TRS in incoming SDI or TRS wrong
Ok - TRS OK

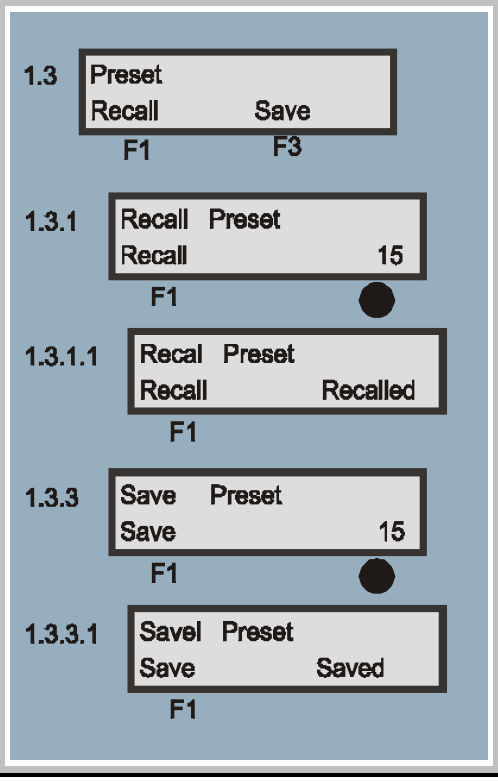
Video status of incoming SDI
xx - no Luma or Chroma
Lx - Luma but no Chroma detected
xC - Chroma but no Luma detected
LC - Luma and Chroma detected

Validity bits of de-embedded audio
VV - valid linear audio present on both output pairs
Vo - data or non-linear audio present on one or both channels of pair 2
oV - data or non-linear audio present on one or both channels of pair 1
oo - all four channels have data or non linear audio present

Caution: High signal levels may be present if a channel is non-valid.

4.6 Saving and recalling presets

To access the presets menu press F3 from the home menu.

Save/recall presets menu	Description
	Provides access to the following sub-menus: Recall presets – press F1 Save presets – press F3 Rotate shaft encoder to select preset Press F1 to recall current preset This display appears to confirm recall Use upward arrow or Home to exit Rotate shaft encoder to select preset Press F1 to save current configuration at the selected preset This display appears to confirm save Use upward arrow or Home to exit

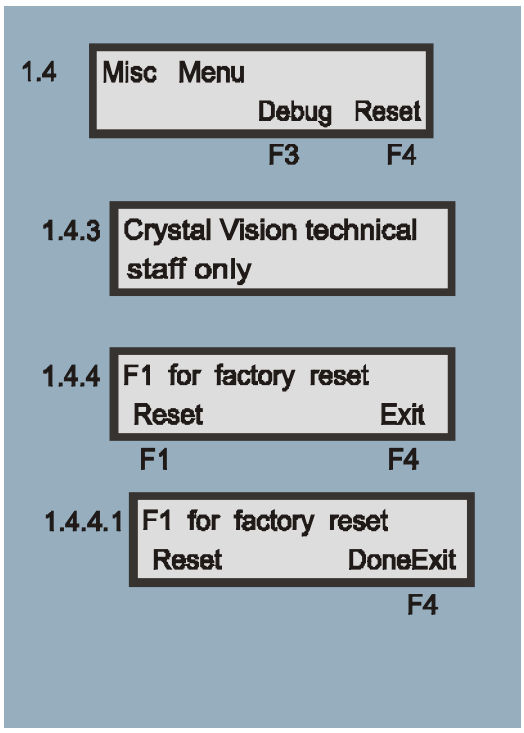
Note: Preset Recall/Save
It is recommended to disable GPIs when using the save or recall preset menu to prevent inadvertent GPI triggers from interfering with menu operation.
Presets will be assertable via the GPI inputs once GPI's have been enabled.

4.7 Misc (factory reset)

The Misc menu allows the user to access the factory-reset menu. To access the Misc menu press F4 from the home menu.

Factory reset menu.

The reset function allows the Demon card to be returned to its factory state. The values the card is restored to are given in appendix 1. All presets will also be restored to their default settings.

Miscellaneous (reset) menu	Description
	Provides access to the following sub-menus: Debug – press F1 Reset – press F3 No user functions Press F1 to apply factory reset or F4 to exit without applying a reset This display appears to confirm reset Use F4 to exit

Debug Menus

There are a number of debug menus available which are designed to help Crystal Vision technical support staff diagnose potential system problems associated with the inputs to the Demon Card. As such they are beyond the scope of this manual.

5 Card edge operation

Once the start-up initialisation procedure is complete, the Demon card can be controlled or configured from the card edge, the active control panel or the Statesman PC interface (future option). This chapter will concentrate on the card edge controls.

The front edge of the card provides power rail monitoring, menu selection, an analogue audio monitoring output, rotary set-up controls and a ten-digit visual status display.

Demon front edge view

The 8-way piano switch allows the operating modes, switching options and status options to be selected.

Lever	Function	Action
All UP	Status	General and audio control menus
1 Down	Data enter	Set DIP1 down then up to action a change
2 Down	Presets	Allows the selection of the 16 preset configurations
3 Down	Video	Video parameters
4 Down	Routing	Sets the routing of the audio outputs
5 Down	Service	No customer controls
6 Down	GPI	Error flag conditions
7 Down	Toolbox	SDI signal analyser
8 Down	Recall	Set lever 8 down then up to recall a pre-set previously selected in the Preset menu (lever 2)

8-Way piano switch menu functions

In general the Menu piano switch is used to select one of six main menus, whilst the SEL rotary hex switch selects sub-menus or internal variables. The ADJ shaft encoder is used to assign values to variables (such as video parameters or routing assignments).

Piano lever 1 is reserved to action a change and lever 8 is used to recall one of the 16 sets of customer storable configurations.

Changes made using the shaft encoder are generally not implemented immediately. The display will normally flash alternately between bright and dim to indicate that the displayed value may no longer be current when the ADJ shaft encoder is turned. To save a new value simply toggle MENU switch 1 down and then up again.

General status and audio group select

All Menu piano switches in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0	Home – SDI & Embedded audio status	SDI presence including number of channels of active embedded audio. Example: **SdiAud12s4** - good SDI with active audio on channels 1, 2 and 4 of selected group. Channel 3 is silent.
1	SDI presence	**Sdi pres, Sdi absent**
2	Input standard	**Video 625, Video 525**
3	Audio status	Number of active embedded audio channels Example: **AudAct1s34** - active audio on channels 1, 3 and 4 of selected group. Channel 2 is silent.
4	Group select	Rotate [ADJ] shaft encoder to select de-embed audio group. Menu lever 1 (press down then up) enables selected group. Example: **G r p S e l = 1**, **GrpSel / 1** (no audio detected)
5	Group status	The first four numbers show the groups with active audio. The next bit shows if any are marked for deletion. The final bit shows if any non-audio data has been inserted. Example: **S d i 1 2 3 4 d O** (d = marked for deletion, O = other data, '-' = no audio)
6	AES output enable	Rotate [ADJ] shaft encoder to turn AES output ON or OFF. Menu lever 1 (press down then up) saves setting. Example: **A e s O p O n**
7	Monitor Bus	Rotate [ADJ] shaft encoder to select Monitor function. The action is immediate. Off - No output on monitor bus AES - De-embed channels 1-4 as 2 stereo AES pairs. A1 and A2 - De-embed channels 1 & 2 as analogue outputs A3 and A4 - De-embed channels 3 & 4 as analogue outputs I1 and I2 - Outputs 1 & 2 of the internal routing matrix as analogue outputs I3 and I4 - Outputs 3 & 4 of the internal routing matrix as analogue outputs

Note: The headphone socket at the card edge follows the monitor bus setting except that if either Off or AES is selected, the headphones will output the last active selection.

SEL No.	Menu	Function and card edge display examples
8	Video mode	Rotate [ADJ] shaft encoder to select Video mode. Menu lever 1 (press down then up) saves setting. **CV** - Composite video – all outputs are set to analogue composite video **YC** - Y/C output - main output set to YC, spare outputs set to composite **YUV** - main outputs set to YUV, spare outputs set to composite **RGB** - main output set to be RGB with sync on G, spare outputs set to composite. A separate sync output is also available. Operating DIP1 enables the required mode. Example: **V i d O p C V** Some options are only available with specific rear connectors. There is a full listing of available outputs and their routing for each rear module option in the Installation chapter.
9	Audio silence delay	Allows the amount of time any audio input channel can remain silent before an alarm flag is raised to be determined. Rotate [ADJ] shaft encoder to set delay in 8-second steps starting at 1s and ending at 2 minutes. Menu lever 1 (press down then up) saves setting. Example: **S i l D l 1 s**
A	Video absence delay	Allows the setting of the amount of time active video can be absent from the SDI stream before an alarm is raised. Rotate [ADJ] shaft encoder to set delay in steps from 1s to 2 minutes in 8-second steps. Menu lever 1 (press down then up) saves setting. Example: **V i d D l 1 s**
B	GPI Enable/Disable	This menu is used to control the enabling or disabling of the GPI inputs. Rotate [ADJ] shaft encoder to select between Enable and Disable. Menu lever 1 (press down then up) saves setting. Example: **G p i D i s a b l** If the GPI's are enabled then the board, on asserting the GPI lines will be configured to any of the 16 Presets. The display will indicate which pre-set is being called.
C	Factory reset	Rotate [ADJ] shaft encoder to select YES or NO. Menu lever 1 (press down then up) implements choice. Example: **F a c t R e s N**
D	Audio error level	Rotate [ADJ] shaft encoder to set error processing applied to embedded audio signals. 0 is minimum error processing and 15 is maximum. Menu lever 1 (press down then up) saves setting. This control can hide or repair many types of errors in the embedded audio stream so preventing audio output disruption. However, "Tool-box" will still indicate their presence. Example: **E r r L e v 1 5**
E/F	Not Used	No function assigned.

Setting video parameters

Menu piano lever 3 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0	Video STD	Rotate [ADJ] shaft encoder to select 625, 525 or Auto. In Auto mode the output standard will follow that of the SDI input. Menu lever 1 (press down then up) saves setting. Example: **V S t d A u t o**
1	Pedestal	Enables or disables 7.5 IRE pedestal for 525 line NTSC. Rotate [ADJ] shaft encoder to select between present and not present. Menu lever 1 (press down then up) saves setting. Example: **P e d O n** Pedestal cannot be applied in 625 line PAL or if the standard has been set to 525 line RGB or 525 line YUV.
2	Hue	Rotate [ADJ] shaft encoder to select NTSC (525) hue angle. The action is immediate. No user adjustment in PAL (625) Example: **H u e 3 5 9**
3	Burst level	Rotate [ADJ] shaft encoder to select video burst level (93% to 124%). The value 100% is nominally 300mV of burst for PAL and 286mV for NTSC. The action is immediate. Example: **B u r s t 1 0 0%**
4	Luma level	Rotate [ADJ] shaft encoder to set Composite video Luma amplitude (38% to 161%). The default value of 100% is nominally 700mV of peak white Luma in PAL and 714mV in NTSC. The action is immediate. Example: **L u m a 1 0 0%**
5	Cb level	Rotate [ADJ] shaft encoder to set composite video blue-yellow vector (38% to 161%). The default value is 100%. The action is immediate. Example: **C b 1 0 0%**
6	Cr level	Rotate [ADJ] shaft encoder to set composite video red-green vector (38% to 161%). The default value is 100%. The action is immediate. Example: **C r 1 0 0%**
7	G/Y level	Rotate [ADJ] shaft encoder to set the Green or Y component amplitude (38% to 161%). When a Composite mode is selected the display will indicate **na** for not applicable. This value does not affect the Composite Luma amplitude. The value is nominally 700mV to peak white. The action is immediate. Example: **G / Y 1 0 0%**

SEL No.	Menu	Function and card edge display examples
8	B/U level	Rotate [ADJ] shaft encoder to set the Blue or U component amplitude (38% to 161%). When a Composite mode is selected the display will indicate na for not applicable. This value does not affect the Composite Cb amplitude. The value is nominally 700mV. The action is immediate. Example: **B / U 1 0 0%**
9	R/V level	Rotate [ADJ] shaft encoder to set the Red or V component amplitude (38% to 161%). When a Composite mode is selected the display will indicate na for not applicable. This value does not affect the Composite Cr amplitude. The value is nominally 700mV. The action is immediate. Example: **R / V 1 0 0%**
A	Test pattern	Rotate [ADJ] shaft encoder to select 100% EBU bars for 625 line standard and 75% EIA bars for 525 line standard. Menu lever 1 (press down then up) saves setting. If there is an SDI fail fault whilst a Test Pattern is selected, the video output will remain showing Test Pattern Bars. Example: **T p a t O n**
B	VBI enable	Passes vertical interval data to the composite outputs. Rotate [ADJ] shaft encoder to select VBI On or Off. Menu lever 1 (press down then up) saves setting. Example: **V B I O n**
C	Fail mode	Sets card output in the event of SDI input failure. Rotate [ADJ] shaft encoder to select a blue raster, a black raster or the cards internal colour bar pattern. Menu lever 1 (press down then up) saves selection. Example: **F a i l B l u e**
D	TBC mode	Rotate [ADJ] shaft encoder to switch on and off the internal TBC or select CAL. The Cal function manually calibrates the internal VCO clock (see Note). Menu lever 1 (press down then up) enables selection. Examples**: T B C C a l, TBC On, TBC Off**
E/F	Not Used	No function assigned.

Note: With TBC ON, an internal 27MHz VCO controls all internal timing functions free of any jitter in the incoming SDI signal. When the TBC is OFF all timing is extracted from the SDI signal. During a loss of SDI input the internally generated 27Mhz replaces that extracted from the SDI input.
The CAL function calibrates the 27Mhz VCO oscillator to the incoming SDI. This helps to prevent corruption of the composite fail output due to incorrect sub-carrier frequencies. The calibration process requires a good SDI signal and takes about 5 seconds to complete. The TBC is turned off during calibration and this may cause a momentary loss of lock. It is recommended to take Demon off-line before pressing CAL

Routing audio channels

Menu piano lever 4 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0	Output Channel 1 Left Routing	Selects one of the four input sources in the currently selected group to be routed to Channel 1 left output. Rotate [ADJ] shaft encoder to select input sources and options. Menu lever 1 (press down then up) saves setting. Example: **G p 1 1 > C h 1 L**
1	Output Channel 1 Right Routing	Selects one of the four input sources in the currently selected group to be routed to Channel 1 right output. Rotate [ADJ] shaft encoder to select input sources and options. Menu lever 1 (press down then up) saves setting. Example: **G p 1 2 > C h 1 R**
2	Output Channel 2 Left Routing	Selects one of the four input sources in the currently selected group to be routed to Channel 2 left output. Rotate [ADJ] shaft encoder to select input sources and options. Menu lever 1 (press down then up) saves setting. Example: **G p 1 3 > C h 2 L**
3	Output Channel 2 Right Routing	Selects one of the four input sources in the currently selected group to be routed to Channel 2 right output. Rotate [ADJ] shaft encoder to select input sources and options. Menu lever 1 (press down then up) saves setting. Example: **G p 1 4 > C h 2 R**
4 to F	Not Used	No function assigned

Note: The group being de-embedded is always indicated by the first three characters, i.e. Gp1, Gp2 etc. Any input source can be set to an output and be inverted (/) if required. It is also possible to mute (M) the output. It is possible to set the same source for any or all of the outputs if required. All four sources will always be from the same group as Demon is unable to de-embed from more than one group at a time.

Using GPI lines

Menu piano lever 6 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0	Channel 1 silence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 5. Menu lever 1 (press down then up) saves the setting. Example: **C h 1 s l flag**
1	Channel 2 silence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 5. Menu lever 1 (press down then up) saves the setting. Example: **C h 2 s l flag**
2	Channel 3 silence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 5. Menu lever 1 (press down then up) saves the setting. Example: **C h 3 s l flag**
3	Channel 4 silence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 5. Menu lever 1 (press down then up) saves the setting. Example: **C h 4 s l mask**
4	Luma absence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 6. Menu lever 1 (press down then up) saves the setting. Example: **L u m a s l flag**
5	Chroma absence detect	Rotate [ADJ] shaft encoder to flag or mask warning via GPO 6. Menu lever 1 (press down then up) saves the setting. Example: **C h r a s l flag**

Note: Silence detect allows the masking or flagging of any silence on Input channel 1 to 4 of the selected Group. If a period of silence that exceeds the period of time set by the Audio Silence Delay is detected and the flag is set, a warning will be set on GPO5.
Luma absence detect is used to flag or mask missing luminance in the incoming SDI. If the flag is set and luminance is below 12.5% peak white for a period of time set by the Video Absence Delay a warning will be set on GPO6.
Chroma absence detect is used to flag or mask missing Chrominance on the incoming SDI. If the flag is set and Chrominance is less than 12.5% saturation for a period of time set by Video Absence Delay a warning will be set on GPO6.
Video absence delay is set by SEL A (all Menu levers UP).

Menu piano lever 6 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
6	PAL input detect	To mask this warning use the [ADJ] shaft encoder to set the flag to mask. Menu lever 1 (press down then up) saves the setting. Example: **6 2 5 d e t m a s k**
7	NTSC input detect	To mask this warning use the [ADJ] shaft encoder to set the flag to mask. Menu lever 1 (press down then up) saves the setting. Example: **5 2 5 d e t m a s k**
8 to F	Not Used	No function assigned

Note: PAL input detect is used to flag or mask any change from a 625-line input standard. If the flag is set and the Input standard changes from 625, a warning will be set on GPO6.
NTSC input detect is used to flag or mask any change from a 525-line input standard. If the flag is set and the Input standard changes from 525, a warning will be set on GPO6.

Using presets

Menu piano lever 2 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0 to F	Preset	These menus allow the saving and recall of user presets. To save the current Demon setup as a preset proceed as follows: • Select the required pre-set 0 to 15 with the Select switch (SW 3) • Press Menu lever 1 down then up to save the preset To recall a preset proceed as follows: • Select the required pre-set 0 to 15 with the Select switch (SW 3) • Press Menu lever 8 down then up to recall the preset Example: **P 15**

Note: It is recommended to disable GPIs when using the save or recall preset menu to prevent inadvertent GPI triggers from interfering with menu operation.
Presets can be controlled via the GPI inputs once GPI's have been enabled.

Using the Tool-Box

Menu piano lever 7 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
0	Software issue	Displays current firmware fitted to the Demon card. Example: **D e m o n 4. 1 6**
1	Group status	The first five characters after '=' show the selected group and groups with active audio. The final bit shows if any non-audio data has been inserted. The bit before the last bit shows if any are marked for deletion. Example: A=2 1 2 - - d O Group 2 selected of 1&2 present. '-' = no active audio, d = marked for deletion, O = Other data detected in one or more audio groups.
2	Sample rate	Allows sample rate of the incoming SDI audio to be viewed. **Lo** - no audio seen on incoming SDI or sample rate too low **Hi** - incoming SDI audio sample rate too high **Wi** - incoming audio sample rate varying excessively **Ok** - good audio samples on incoming SDI **ni** – no SDI input Example: **D x S r O K**
3	Check sum	Allows check sum of the incoming SDI audio to be viewed. **Er** - no incoming SDI audio or checksum is wrong **Ok** - checksum of the incoming SDI audio is correctn **ni** – no SDI input Example: **D x C s O K**
4	Parity status	Allows the incoming audio Parity status to be viewed. **Er** - no incoming SDI audio or parity is wrong **Ok** - incoming SDI audio parity is correct **ni** – no SDI input Example: **D x P y O K**
5	Channel format	Allows the incoming audio channel format to be viewed. **Er** - no incoming SDI audio or channel format is incorrect **Ok** - incoming audio channel format is correct **ni** – no SDI input Example: **D x C F O K**
6	Hanc blanking	Allows the HANC space status of the incoming SDI audio to be viewed. **Er** - no incoming audio or less than 56 blank contiguous HANC space **Ok** - at least 56 blank contiguous HANC spaces in the incoming SDI signal **ni** – no SDI input Example: **H A N K O K**
7	TRS	Allows TRS status of the incoming SDI audio to be viewed. **Er** - no TRS on the incoming SDI or TRS is wrong **Ok** - TRS of the incoming SDI signal is OK **ni** – no SDI input Example: **T R S O K**

Menu piano lever 7 **DOWN**, all others in the **UP** position:-

SEL No.	Menu	Function and card edge display examples
8	Video status	Allows status of the incoming SDI video to be viewed. **xx** - Luma is below 12.5% peak white and Chroma is below 12.5% saturation **Lx** - Luma is above 12.5% peak white but Chroma is below 12.5% saturation **xC** - similarly Chroma is OK but Luma on the incoming SDI signal is low **LC** - Luma and Chroma levels OK **6** - 625 line standard signal is present **5** - 525 line standard signal is present **ni** – no SDI input Example: **V d 6 L C**
9	Validity bit	Allows the incoming audio validity bit to be viewed. **VV** - both outputs 1 - 2 and AES1 – 2 contain valid linear audio **Vo** - output 1 – 2 /AES1 contain valid linear audio (output 3 – 4/AES2 contain non-linear audio, possibly data) **oV** - output 1 – 2/AES1 contain non-linear audio, possibly data (output 3 – 4 /AES2 contain valid linear audio) **oo** - None of the outputs contain linear audio **ni** – no SDI input Example: **V b V V** **Caution: High signal levels may be present if a channel is non-valid.**
A to D	Output configuration links	Shows the configuration of any output links. **An** - output is set to be Analogue. **Sd** - output is set to be SDI loop-through Examples: **O p 2 L i n k A n, O p 3 L i n k A n, O p 4 L i n k A n, O p 5 L i n k A n**
E	Rear module type	Displays rear module type. **04** - RM04. 3 video outputs module. **06** - RM05, RM06 & RM22. 5 video outputs module. Example: **R M L i n k 0 4**
F	Not Used	No function assigned

Note: Service Menus All switches on SW2 up except lever 5.
There are a number of debug menus available, which are designed to help Crystal Vision technical support staff diagnose potential system problems associated with the inputs to the Demon Card. As such they are beyond the scope of this manual.

6 Hardware installation

Available rear connectors and output combinations

The available rear connectors are the RM04, RM05, RM06 and RM22. The combinations of audio and video outputs vary depending on the rear connector used.

All rear connectors all supply analogue audio and either 75 Ohm or 110 Ohm digital audio outputs as follows:

Audio output combinations	RM04	RM05/06	RM22
Analogue audio x 4	Y	Y	Y
110 Ohm AES x 2	Y	Y	N
75 Ohm AES x 3	N	N	Y

Video outputs may be configured for different combinations of analogue composite, analogue component and serial digital as follows:

Video output combinations	RM04	RM05/06	RM22
YUV	Y	Y	Y
RGB	Y	Y	Y
Y/C	Y	Y	Y
Composite	Y	Y	Y
Y/C and SDI	Y	Y	Y
Composite x 2 and SDI	Y	Y	Y
SDI x 2 and composite	Y	Y	Y
YUV and SDI x 2	N	Y	Y
YUV and composite x 2	N	Y	Y
YUV and composite and SDI	N	Y	Y
RGB and SDI x 2	N	Y	Y
RGB and composite x 2	N	Y	Y
RGB and composite and SDI	N	Y	Y
Y/C and composite x 3	N	Y	Y
Y/C and SDI x 2 and composite	N	Y	Y
Y/C and composite x 2 and SDI	N	Y	Y
Composite x 4 and SDI	N	N	Y
Composite x 3 and SDI x 2	N	Y	Y
Composite x 2 and SDI x 3	N	Y	Y
Composite and SDI x 4	N	Y	N

6.1 Rear modules and signal I/O

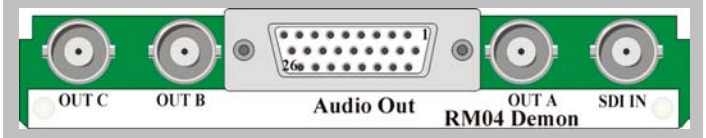
The Demon De-embedding Monitor single height module fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

FR2AV, FR1AV & DTBAV rear connectors

The FR2AV 2U frame takes up to 12 single height Crystal Vision modules, six single height modules will fit in the FR1AV 1U frame and 2 will fit in the DTB2AV 1U frame.

There are four types of rear connector available for the FR2AV frame. This provides system flexibility by allowing a mix between access to all connections and maximum module packing density.

Rear module connections with RM04:

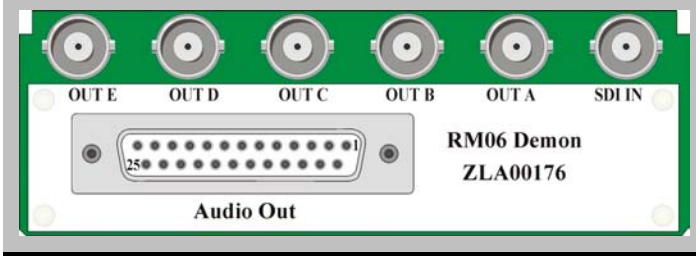
RM04 fits in FR2AV, FR1AV & DTBAV frames	Description
	**RM04 (ZLA00132 artwork)** • 12 modules per FR2AV, 6 per FR1AV & 2 per DTBAV frame • All frame slots can be used

	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 2)	B	U	C	- /SDI loop
OUT C (O/P 3)	R	V	CBVS1/SDI loop	CBVS1/SDI loop

RM04 Audio Out Hi Density 26 way D-Type Connector							
1	GND	**8**	Ch4 +	**15**	Sync	**22**	Mon L+
2	Ch1 +	**9**	GND	**16**	AES1-	**23**	GND
3	Ch1 -	**10**	AES2+	**17**	AES1+*	**24**	GND
4	Ch2 +	**11**	nc	**18**	Ch4 -	**25**	Mon R-
5	Ch2 -	**12**	AES2-	**19**	GND	**26**	Mon R+
6	Ch3 +	**13**	AES2+ *	**20**	GND		
7	Ch3 -	**14**	AES1+	**21**	Mon L-		

Note: * Only available with issue 4 and above Demon modules, n/c on issue 2 Demon modules.

Rear module connections with RM06:

RM06 fits in FR2AV, FR1AV & DTBAV frame	Description
	**RM06 (ZLA00176 artwork)** • 6 modules per FR2AV frame, 3 per FR1AV, 1 per DTBAV • 1 module per rear connector • 6 connections available • Card fits in upper slot • No card fits in lower slot

	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 2)	B	U	C	- /SDI loop
OUT C (O/P 4)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT D (O/P 3)	R	V	-/SDI loop	-/SDI loop
OUT E (O/P 5)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop

Audio Out 25 way D-Type Connector							
1	GPI1	**8**	Ch4+	**15**	GPI4	**22**	AES2+
2	GPI3	**9**	AES1+	**16**	GPO2	**23**	nc
3	GPO1	**10**	Sync	**17**	GND	**24**	AES2-
4	GND	**11**	AES1-	**18**	Ch1+	**25**	AES2+*
5	Ch2+	**12**	AES1+*	**19**	Ch1-		
6	Ch2-	**13**	GND	**20**	Ch3+		
7	Ch4-	**14**	GPI2	**21**	Ch3-		

Note: * Only available with issue 4 and above Demon modules, n/c on issue 2 Demon modules.

RM06 monitoring outputs

When a frame is fitted with the RM06, monitoring outputs are available via the GPI lines from the remote outputs. The RM06 is a dual height rear output module and the Demon is fitted in the top slot of the pair leaving the second lower slot vacant. The monitoring outputs use the GPI lines of this vacant slot.

GPI lines ‘a’ to ‘d’ provide monitoring outputs from vacant slot positions at the remote connector as follows (refer to the GPI section for pinout):

Slot nos.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
2,4,6,8,10,12	Mon L-	Mon L+	Mon R-	Mon R+	n/a	n/a

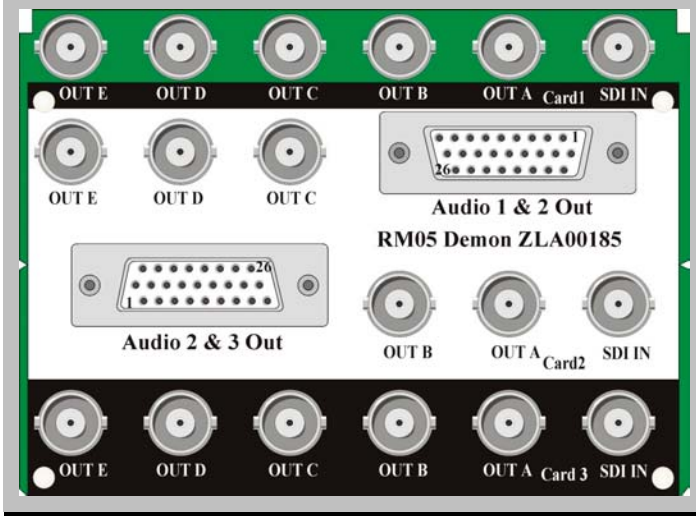
Rear module connections with RM22:

RM22 fits in FR2AV, FR1AV & DTBAV frame	Description
	**RM22 (ZLA00186 artwork)** • 6 modules per FR2AV frame, 3 per FR1AV, 1 per DTBAV • 1 module per rear connector • 10 connections available • Card fits in upper slot • No card fits in lower slot

	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 2)	B	U	C	- /SDI loop
OUT C (O/P 3)	R	V	-/SDI loop	-/SDI loop
OUT D (O/P 4)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT E (O/P 5)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
AES2	AES2	AES2	AES2	AES2
AES1B	AES1B	AES1B	AES1B	AES1B
AES1A	AES1A	AES1A	AES1A	AES1A
Sync Out	Sync Out	Sync Out	Sync Out	Sync Out

Audio Out 15-way D-Type Connector							
1	GND	**5**	Ch1+	**9**	MonR-	**13**	Ch2-
2	MonL-	**6**	Ch2+	**10**	MonR+	**14**	Ch4+
3	MonL+	**7**	Ch3+	**11**	GND	**15**	Ch4-
4	GND	**8**	Ch3-	**12**	Ch1-		

Rear module connections with RM05:

RM05 fits in FR2AV frame	Description
	**RM05 (ZLA00185 artwork)** • 9 modules per FR2AV frame • 3 modules per rear connector • 6 connections available • 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

With RM05 for card 1 (top slot)

Mode	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 2)	B	U	C	- /SDI loop
OUT C (O/P 4)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT D (O/P 5)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT E (O/P 3)	R	V	-/SDI loop	-/SDI loop

Audio 1 & 2 I/O 26 way Hi-Density D-Type Connector							
1	GND	**8**	Ch4+	**15**	Sync	**22**	
2	Ch1+	**9**	GND	**16**	AES1-	**23**	
3	Ch1-	**10**	AES2+	**17**	AES1+*	**24**	
4	Ch2+	**11**	nc	**18**	CH4-	**25**	
5	Ch2-	**12**	AES2-	**19**		**26**	
6	Ch3+	**13**	AES2+*	**20**			
7	Ch3-	**14**	AES1+	**21**			

Note: * Only available with issue 4 and above Demon modules, n/c on issue 2 Demon modules.

With RM05 for card 2 (second slot from top)

Mode	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 2)	B	U	C	- /SDI loop
OUT C (O/P 4)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT D (O/P 5)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT E (O/P 3)	R	V	-/SDI loop	-/SDI loop

Audio 1 & 2 I/O 26 way Hi-Density D-Type Connector					
1	**8**	**15**		**22**	Ch2-
2	**9**	**16**		**23**	Ch3+
3	**10**	**17**		**24**	Ch3-
4	**11**	**18**		**25**	Ch4+
5	**12**	**19**	Ch1+	**26**	Ch4-
6	**13**	**20**	Ch1-		
7	**14**	**21**	Ch2+		

Audio 2 & 3 I/O 26 way Hi-Density D-Type Connector					
1	**8**	**15**		**22**	n/c
2	**9**	**16**		**23**	AES 1-
3	**10**	**17**		**24**	AES1+*
4	**11**	**18**		**25**	AES 2-
5	**12**	**19**	AES 1+	**26**	AES2+*
6	**13**	**20**	Sync		
7	**14**	**21**	AES 2+		

Note: * Only available with issue 4 and above Demon modules, n/c on issue 2 Demon modules.

With RM05 for card 3 (Third slot from top)

Mode	RGB	YUV	YC	CBVS
SDI IN	SDI In	SDI In	SDI In	SDI In
OUT A (O/P 1)	G	Y	Y	CBVS2
OUT B (O/P 4)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT C (O/P 2)	B	U	C	- /SDI loop
OUT D (O/P 5)	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop	CBVS1/SDI loop
OUT E (O/P 3)	R	V	-/SDI loop	-/SDI loop

Audio 2 & 3 I/O 26 way Hi-Density D-Type Connector						
1	GND	**8**	Ch4+	**15**	Sync	**22**
2	Ch1+	**9**	GND	**16**	AES1-	**23**
3	Ch1-	**10**	AES2+	**17**	AES1+*	**24**
4	Ch2+	**11**	nc	**18**	CH4-	**25**
5	Ch2-	**12**	AES2-	**19**		**26**
6	Ch3+	**13**	AES2+*	**20**		
7	Ch3-	**14**	AES1+	**21**		

Note: * Only available with issue 4 and above Demon modules, n/c on issue 2 Demon modules.

For details of fitting rear connectors please refer to the appropriate frame manual.

6.2 GPI connections

With GPI control enabled, remote switches can be used to recall any of the 16 stored preset configurations. The GPI lines are normally pulled up on-board to +5V via 2k2 ohm resistor and can be used with closed-contact switches or +5V to +24V logic levels.

Each slot has an associated set of GPI connections for remote control and external status outputs on the frame rear-panel remote connectors. For convenience, GPI lines are associated with reference codes ‘a’ to ‘f’ in the connector pin-out tables for each frame.

The following table shows how the four GPI lines 'a' to 'd' are used as a four-bit binary code to select up to sixteen Demon presets.

GPI Functions	Op=open, Cl=closed (connect to ground)															
Pre-set	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
‘a’	Op	Cl	Op	Cl	Op	Cl	Op	Cl	Op	Cl	Op	Cl	Op	Cl	Op	Cl
‘b’	Op	Op	Cl	Cl	Op	Op	Cl	Cl	Op	Op	Cl	Cl	Op	Op	Cl	Cl
‘c’	Op	Op	Op	Op	Cl	Cl	Cl	Cl	Op	Op	Op	Op	Cl	Cl	Cl	Cl
'd'	Op	Op	Op	Op	Op	Op	Op	Op	Cl	Cl	Cl	Cl	Cl	Cl	Cl	Cl

Understanding binary coded GPI lines

The binary coded GPI lines are used in combination, rather than one at a time to obtain the 16 different values. The following table shows that only four decimal values are obtained when only one GPI line is grounded on its own.

GPI line	Value when low or grounded	Value when high or open circuit
GPI input 1 'a'	1	0
GPI input 2 'b'	2	0
GPI input 3 'c'	4	0
GPI input 4 'd'	8	0

Demon presets are numbered from 0 (zero) to 15 rather than 1 to 16. So to recall the fifth preset (labelled 4) the GPI lines need to assert a decimal value of 4. This only requires GPI line 'c' to be grounded with an external switch closure. However to recall the sixth preset (labelled 5), the decimal value five must be asserted. This will require both GPI lines 'a' and 'c' to be grounded at the same time. To recall preset 0, all four GPI lines should be open, for last preset (labelled 15) all GPI lines should be grounded.

The reason binary coding is used, is that it only requires four GPI lines to recall up to sixteen presets instead of sixteen separate lines.

Note: In binary systems each digit has two values 1 and 0. When four digits are used the maximum number of combinations is given by 4 to the power of 2, which is 16. If there had been 32 presets five GPI lines would be needed, since 5 to the power of 2 is 32.

FR2AV 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 and 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 and +5V @500mA is pin 15 in each case.

FR1AV 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.

DTB-AV 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	1	2	3	4	5	6
2	9	10	11	12	13	14

Note: Remote connector is 15 way normal density D-type socket. Frame ground is pin 15.

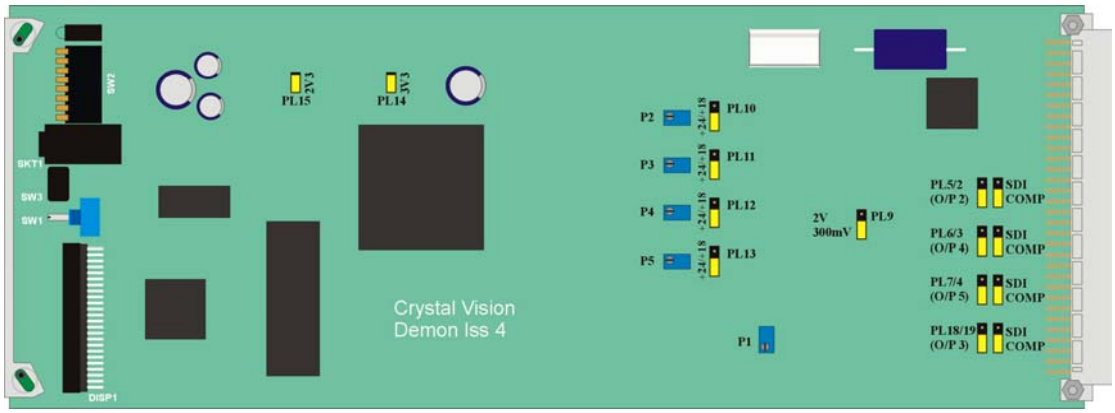
6.3 Using unbalanced audio

The Demon audio balanced outputs are NOT floating and should not be connected to ground. An unbalanced output may be obtained by using the +ve audio signal of an audio pair with the unbalanced return connected to ground.

On no account should a single-sided output be obtained by connecting the one of the balanced pairs to ground.

7 Demon configuration

Issue 4 boards and above autodetect the rear connector type in use. Earlier (Issue 2) boards require manual rear connector configuration and different link options as shown at the end of this section.



Demon board (Issue 4) showing configuration jumpers

Link positions

Link	Function	Top position	Bottom position
PL9	Video sync level	300mV p-p into 75Ω	2V p-p into 75Ω
***PL5/2**	O/P2 select	SDI loop-through	Analogue
***PL6/3**	O/P4 select	SDI loop-through	Analogue
***PL7/4**	O/P5 select	SDI loop-through	Analogue
***PL18/19**	O/P3 select	SDI loop-through	Analogue
PL10	Ch1 Gain	+18dBu	+24dBu
PL11	Ch2 Gain	+18dBu	+24dBu
PL12	Ch4 Gain	+18dBu	+24dBu
PL13	Ch3 Gain	+18dBu	+24dBu

Note: Ensure that Demon is unpowered when changing rear connectors as rear connector autodetect is only done on power-up.
*Links marked with an asterisk must be moved as pairs.

Changing sync level

The output sync can changed from the default of 300mV to 2V for component modes that require large syncs with board link PL9. Place PL9 in the upper position for 2V and the lower position for 300mV.

Selecting SDI/analogue outputs

On rear connectors that support O/P 2, O/P 3, O/P 4 or O/P 5, either SDI or analogue video can be selected for each output with link pairs as shown in the link position summary table above. Output 1 is always analogue and cannot be configured for SDI.

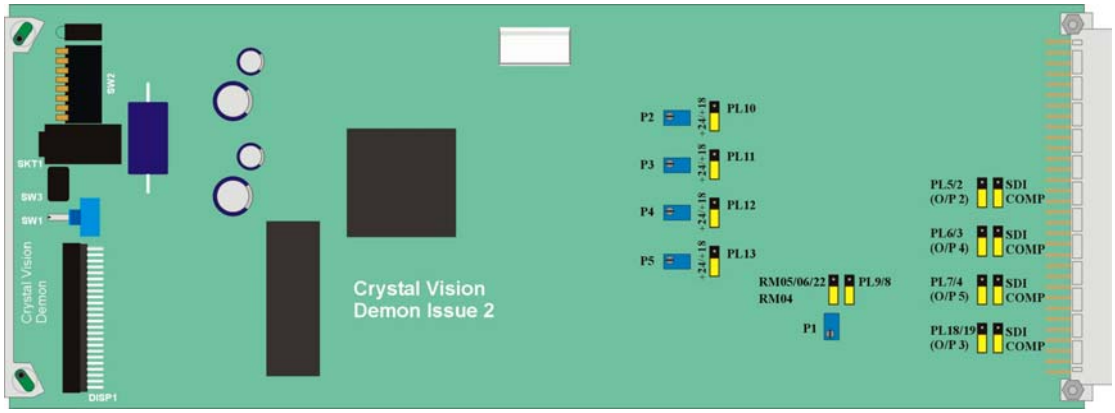
Adjusting analogue gains

The following gain adjustments are provided:

Variables	
P1	Analogue Video calibrate (factory set)
P2	Analogue Audio Channel 1 Gain (factory set for =18dBu)
P3	Analogue Audio Channel 2 Gain (factory set for =18dBu)
P4	Analogue Audio Channel 3 Gain (factory set for =18dBu)
P5	Analogue Audio Channel 4 Gain (factory set for =18dBu)

7.1 Configuring early (Issue 2) boards

This section is only for issue 2 boards, which do not autodetect the rear connector and have slightly different link settings and component layout.



Demon board (Issue 2) showing configuration jumpers

Link positions

Link	Function	Top position	Bottom position
***PL9/8**	Rear module	RM05/06/22	RM04
***PL5/2**	O/P2 select	SDI loop-through	Analogue
***PL6/3**	O/P4 select	SDI loop-through	Analogue
***PL7/4**	O/P5 select	SDI loop-through	Analogue
***PL18/19**	O/P3 select	SDI loop-through	Analogue
PL10	Ch1 Gain	+18dBu	+24dBu
PL11	Ch2 Gain	+18dBu	+24dBu
PL12	Ch4 Gain	+18dBu	+24dBu
PL13	Ch3 Gain	+18dBu	+24dBu

Note: Issue 2 boards do not autodetect the rear connector and link pair PL9/8 must be used to select the connector in use.
Sync level on issue 2 boards cannot be changed.
*Links marked with an asterisk must be moved as pairs.

Selecting SDI/analogue outputs

On rear connectors that support O/P 2, O/P 3, O/P 4 or O/P 5, either SDI or analogue video can be selected for each output with link pairs as shown in the link position summary table above. Output 1 is always analogue and cannot be configured for SDI.

Adjusting analogue gains

The following gain adjustments are provided:

Variables	
P1	Analogue Video calibrate (factory set)
P2	Analogue Audio Channel 1 Gain (factory set for =18dBu)
P3	Analogue Audio Channel 2 Gain (factory set for =18dBu)
P4*	Analogue Audio Channel 3 Gain (factory set for =18dBu)
P5*	Analogue Audio Channel 4 Gain (factory set for =18dBu)

Note: *Issue 2 boards from and including issue 2.14 have the adjust functions of gain adjusters P4 and P5 reversed. On these boards, P4 affects channel 4 and P5 affects channel 3.

8 Problem solving

The front edge of the card provides useful power rail monitoring, in addition to card-edge controls and a headphone monitoring output.

Demon front edge view

The top green LED indicates good +/- 18 Volt power rails when lit and the lower green LED indicates a good +5 Volt rail when lit.

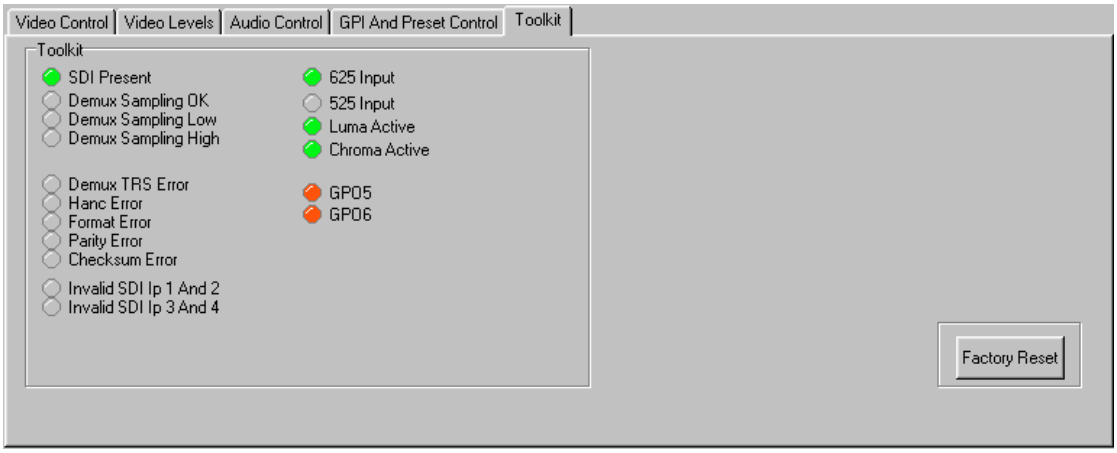
The headphone output is a useful way of the presence and quality of audio through the Demon module. Refer to the card edge section for details of its use.

There is also an AES and Analogue audio monitor output from the remote connector at the rear of the frame. Details of the pinout for these signals is in the Installation chapter.

Using the toolkit

A 'toolkit' of comprehensive monitoring and status data for the Demon card is available from each control interface used to operate the module.

The Statesman version of the Toolkit, which is accessed from the Toolkit tab, is repeated here.



The Demon Toolkit

The meaning of the errors that may be reported here are tabulated on the next page.

Toolkit status/error	Description
SDI Present	Green: SDI input detected, Red: No SDI input detected
Demux sampling OK	Green: de-embedded audio sample rate correct
Demux Sampling Low	Red: de-embedded audio sample rate too low
Demux Sampling High	Red: de-embedded audio sample rate too high
Demux TRS Error	Red: no TRS in incoming SDI or TRS wrong
Hanc Error	Red: no de-embedded audio or Hanc is wrong
Format error	No de-embedded audio or channel format incorrect
Parity Error	No de-embedded audio or parity is wrong
Checksum Error	No de-embedded audio or checksum wrong
Invalid SDI Ip 1 and 2	Data or non-linear audio present on one or both channels of pair 1
Invalid SDI Ip 3 and 4	Data or non-linear audio present on one or both channels of pair 2
625 Input	Green: Input is 625 line standard
525 Input	Green: Input is 525 line standard
Luma Active	Green: Luminance active in SDI input
Chroma Active	Green: Chrominance active in SDI input
GPO 5	GPO 5 asserted if red
GPO 6	GPO 6 asserted if red

Caution: High signal levels may be present if a channel has data or non-linear audio present

In the unlikely event that the card requires to be returned to the factory defaults, this may be accomplished by clicking on the Factory Reset button within the Statesman Toolkit tab.

If you are using a different interface to control your Demon, refer to the appropriate section for details of the Factory Reset procedure.

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

There is no video output

Check that a valid SDI is present and that any cabling is intact

The video output is SDI when an analogue video output is expected

Check that the link jumper settings are correct for the rear connector in use as explained in the Installation Chapter

The video output exhibits jitter

Check that the input SDI stability is within normal limits

If necessary perform a SDI VCO calibration as explained in the Operation Chapter

There is no audio output

Check that audio is present in the incoming SDI signal and that any cabling is intact

Check that the selected group contains valid audio

Check that the de-embedded audio is valid, active and is routed correctly

Check that the output channel has not been muted

The card no longer responds to card edge or front panel control

Check that the card is seated correctly and that the Power OK LEDs are lit

Check any active control panel cabling

Check if the control panel can control another card in the same rack

If necessary re-set the card or apply a factory reset as explained in the Operation Chapter

Can a Demon card be used with the same remote connector wiring for audio monitoring as a Tandem module?

Certain audio monitoring signals have been duplicated to enable this from issue 2.14 of the Demon PCB

Is it safe to ground either the positive or negative audio output for unbalanced operation?

No. This is unsafe. An unbalanced output may be obtained by using the +ve of an audio signal pair with the unbalanced return connected to ground.

Re-setting the card

It is possible to recall factory default settings from any control interface used to operated Demon – please refer to the appropriate section for your control interface.

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

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

9 Appendix 1 – factory defaults

Audio Values

Audio Group Selected = Audio Group 1.
Channel 1 Left Audio Output = Input Audio channel 1
Channel 1 Right Audio Output = Input Audio channel 2
Channel 2 Left Audio Output = Input Audio channel 3
Channel 2 Right Audio Output = Input Audio channel 4
Audio Monitor is set off
Analogue and AES outputs are set to On

Video Values

Default video standard is Auto
Default video output mode is CVBS
Pedestal is set off
Test Patterns are set off
Vertical Interval information is set off
Luma amplitude is set to nominal 700 mV
Cb amplitude is set to nominal 700 mV
Cr amplitude is set to nominal 700 mV
Video burst amplitude is set to a nominal 300 mV
Green or Y amplitude is set to a nominal 700 mV
Red or V amplitude is set to a nominal 700 mV
Blue or U amplitude is set to a nominal 700 mV
Hue is set to a nominal 0 degrees
Fail Mode is set to blue

Flag Values

Audio Silence delay is set to 25 seconds
All audio warning flags set on
Video Silence delay set to 1 second
Luma missing flag set on
Chroma missing flag set on
PAL / NTSC change flags set off
All input GPI lines are disabled.

10 Specification

General

Dimensions	100mm x 266 mm module with DIN 41612 connector
Weight	200g
Power consumption	6.5 W

Inputs

Video	1 x SDI 270Mbit to EBU 3267-E & SMPTE 259M
	Cable equalisation >200m Belden 8281 or equivalent
	Auto or Manual 625/525 line selection
	Automatic de-embedding of SMPTE or Sony format

Outputs

Number and type:	There is a maximum of 5 Video outputs, which can be a selection of both analogue and SDI. The final configuration will depend on the selected rear module.
Component:	YUV and GBR into 75ohm. Y and G 1 volt with sync. U, V & B, R 700mV +/-2%
Composite:	1 volt with sync into 75ohm

Component performance

Processing:	Video input is 8 bit processed for 10 bit output DACs
Frequency response:	Luminance: +/- 0.3dB to 5.5 MHz.
	Chrominance: +/- 0.4dB to 2.5 MHz
Noise:	<-60dB weighted luminance or Chrominance
Gain error:	< 1%

Composite performance

Processing:	Video input is 8 bit processed for 10 bit output DACs
Frequency response:	Luminance: +/- 0.3dB to 5 MHz
	Chrominance: +/- 0.4dB to 2.5 MHz
Noise:	<-54dB weighted luminance or Chrominance
Differential gain:	< 2% typ
Differential phase:	+/- 1° typ
VBI:	Conforms to standard digital decompression dimensions. Does not process digital input data for the active analogue video half lines.
	PAL, lines 6 to 22 and 318 to 335. NTSC lines 10 to 20 and 272 to 283.
Sync output:	300mV sync with no burst

Audio outputs

Number and type:	2 analogue stereo pairs or 4 mono channels. Low output impedance (66ohm) balanced. 2 x 20 bit AES/EBU stereo pairs 110ohm balanced or 75ohm unbalanced
Output level range:	0dBFS = +28dBu max. / 0dBFS = +12dBu min. Factory set default: 0dBFS = +18dBu or +24dBu by on board jumper link setting.

Audio performance

Signal to noise:	-82dBu / -100dBFS (+18dBu) rms. 22Hz to 22kHz typ
Total Harmonic Distortion:	0.005% THD+N rms. 22Hz to 22kHz typ
Interchannel Crosstalk:	-112dB at 1 kHz, -98dB at 20kHz, rms. typ

Audio monitoring

3.5mm jack	1 x miniature front mounting audio jack. Switch selected for individual stereo audio monitoring. 1 x stereo or 2 x mono analogue or 2 x stereo AES outputs from rear of frame.

Status monitoring

LED/Alphanumeric display	Front of card edge visual monitoring with alphanumeric and LED indicators to indicate: PSU rails present: LED SDI input: Alphanumeric display AES audio input: Alphanumeric display Audio silence: Alphanumeric display

GPI inputs

Number and type:	4 x GPI inputs allowing the recall of 15 Presets

GPI outputs

Number and type:	2 x GPI outputs, Loss of Video & Silence/Loss of Audio

Test patterns

Type:	PAL 100% EBU Colour bars NTSC 75% EIA Color bars

Input fail output

Type:	Selectable Blue, Black or Colour Bars.

Ordering information

Demon De-embedding Monitor	For simultaneous monitoring of video and embedded audio
FR2AV	2U frame for up to 12 modules
FR1AV	1U frame for up to 6 modules
DTBAV	1U Desk top box for up to 2 modules