USER MANUAL

Vision SYSTEM

UP-DOWN-VF

3G/HD/SD up/down/cross converters

Crystal Vision

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Revision 1	Updated weight, power consumption figure and SMPTE embedding/de-embedding standard in Specification. Updated Reference source GUI picture on Page 21. 0-42ms changed to 0-40ms on Page 64.	23/06/17

1 Introduction

The **UP-DOWN-VF** is a range of four up-down converters for use with 'Vision' rack frames from Crystal Vision that allow flexible up, down and cross conversions between 3Gb/s, HD and SD sources, provide an output picture of exceptional quality and include special features to allow studios to easily operate in HD and SD at the same time.

The UP-DOWN-VF range consists of the following models: ***UP-DOWN-A-VF, UP-DOWN-AS-VF, UP-DOWN-ATX-VF*** and ***UP-DOWN-ATXS-VF.***

The up conversions are SD to 720p, 1080i or 1080p. The cross conversions are: 720p to 1080i or 1080p; 1080i to 720p or 1080p; 1080p to 1080i or 720p. The down conversions are 1080p, 1080i or 720p to SD. UP-DOWN-VF's excellent picture quality is a result of motion adaptive video de-interlacing, which maximises the picture's vertical resolution while choosing the best processing method based on the video content.

UP-DOWN-VF can perform two conversions at the same time, with two separate converters on the card: one is used for the up and cross conversion, with the other used for the down conversion, which makes it the perfect up/down/cross converter for installations that work in multiple definitions, allowing simultaneously HD and SD copies of a feed from one card.

UP-DOWN-VF provides a maximum of three feeds of the main output and three feeds of the secondary output. The most common application is to have HD (720p, 1080i or 1080p) on one output and SD on the other, and the input as either SD or the same HD as the output. UP-DOWN-VF is useful for installations that work in both HD and SD because it allows them to easily create HD and SD copies of a feed and so fulfil their requirement to offer HD and SD programming simultaneously. One of UP-DOWN-VF's particularly powerful features is that it will always put out HD and SD in the same place on the same connector, regardless of the input – meaning you always know which output is going to be which and therefore don't need to change your wiring. Each output will either be converted from the input or be given a matching delay as required, with the matching delay allowing all the signals to have the same timing and enabling the use of common audio. UP-DOWN-VF can easily include integrated fibre connectivity by fitting the appropriate fibre input or output option.

Noise reduction with detail and edge enhancement can be applied when up converting, cross converting or down converting from 3G to 1.5G. Separate RGB and YUV proc-amps give lift and gain controls to look after your picture colour fidelity and faulty video signal problems provide warnings using SNMP traps. Status indications available (depending on model) are video present, video frozen, video black, reference present, reference format, audio present and audio silent for all four groups.

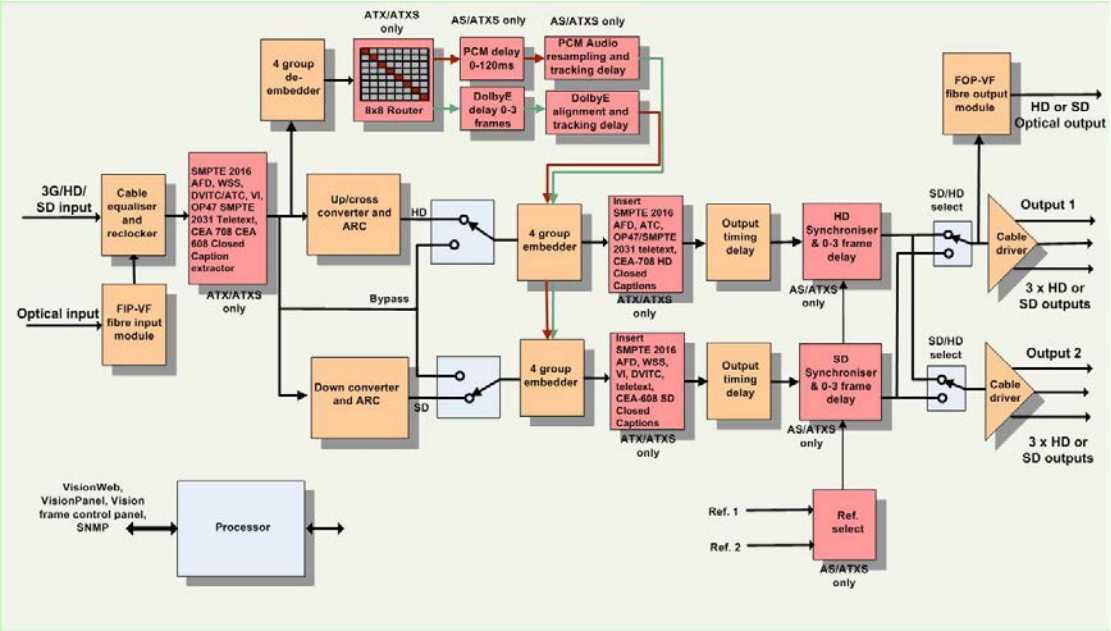
UP-DOWN-VF will look after any aspect ratio conversion requirements when up or down converting. All versions can be used as an SD to SD aspect ratio converter if required. UP-DOWN-VF models ATX and ATXS can be used as an HD to HD aspect ratio converter for when the HD input and output formats are identical. This can be useful to correct the aspect ratio of signals that were up converted using the wrong aspect ratio, resulting in an HD image that is too squashed, stretched or cropped.

UP-DOWN-VF models ATX and ATXS additionally offer AFD code activated aspect ratio conversion.

UP-DOWN-VF models AS and ATXS feature dual frame synchronisers which can synchronise the video outputs to one of the Vision frame's reference inputs. The synchronisers are downstream of the up/down conversion and so will keep the output valid regardless of the input standard.

UP-DOWN-VF is a space-saving 96mm x 325mm module which fits in the standard 'Vision' frames from Crystal Vision, with the inputs and outputs accessed by using either the **VR01**, **VR03** or **VR14** rear modules. Control is by the 'Vision' frame active front panel, remote 'VisionPanel' control panel, SNMP and the 'VisionWeb' PC software.

1.1 Block diagram



Functional block diagram of UP-DOWN-VF (blocks shown in pink are model dependent)

Input video is firstly cable equalised and reclocked. For UP-DOWN-VF models ATX and ATXS, the ancillary data used for AFD, WSS, VI, DVITC/ATC, Teletext and Closed Captioning is extracted for later use.

UP-DOWN-VF has two format converters, one for up and cross conversions and the other only for down conversions. Video is passed to both converters which both perform motion adaptive image scaling and aspect ratio correction. Both converters are bypassed with a matching delay. A switching block correctly routes either the converter output or delayed bypass to the appropriate path. UP-DOWN-VF models AS and ATX have two frame store synchronisers that time the outputs to one of the system reference signals, or can just be used as a fixed delay. An additional 0-3 frames of delay can be added here under user control to either match the Dolby E decoding delays or to compensate for other big delays in the system.

Embedded audio is extracted from the video signal, and for UP-DOWN-VF models ATX and ATXS, passed to 8 x 8 routers that allow any channel pair to be routed to any other channel pair before being re-embedded into the video stream. PCM signals are initially delayed by a user-controlled amount of up to 120ms and again, automatically, to match the video delay through the synchroniser, either by resampling or by sample drop/repeat. Dolby E signals are

initially delayed by up to three frames under user control and then further delayed to match the video delays through the synchroniser and to maintain correct alignment of the guardband.

After embedding, the combined video and audio stream can be delayed by up to 40ms in 10ns increments. This user setting will delay the signal with respect to the timing reference or, if no synchroniser is fitted, will provide an additional delay.

For UP-DOWN-VF models ATX and ATXS, after audio re-embedding, the original or modified ancillary data is re-inserted into the video stream. The inputs to the cable drivers are a switch that routes either the SD or HD signal according to what the user has selected for each output channel.

1.2 UP-DOWN-A-VF

The *UP-DOWN-A-VF* has the following features that are common to all models across the range:

- Simultaneous multiple high quality conversions with matched video delays.
- Motion-adaptive video de-interlacing.
- Outputs HD and SD simultaneously with independent user timing adjustments.
- Noise reduction with detail and edge enhancement.
- Aspect ratio conversion, customised picture size, position and cropping.
- Video proc-amp.
- Passes four groups of embedded audio, including Dolby E, with delay matched to video.
- Passes Ancillary timecode.
- Relay bypass protection with appropriate rear module.
- Optical input/output option with appropriate rear module.

UP-DOWN-A-VF is ideal for those working in synchronous embedded audio environments. It can pass four groups of audio, de-embedding the four groups and converting them to the appropriate format before re-embedding them. Audio will be delayed automatically to match any video delay. It also includes audio signal probe functionality making it useful for flagging up faulty signals, especially in multi-channel applications.

1.3 UP-DOWN-ATX-VF

The main features of the *UP-DOWN-ATX-VF* are the same as the *UP-DOWN-A-VF* but with the following major additional features:

- Automatic aspect ratio selection using SMPTE 2016 AFD data, WSS or Video Index.
- AFD, WSS and Video Indexing insertion.
- HD to HD aspect ratio conversion.
- Timecode conversion between HD Ancillary Timecode and SD DVITC.
- Audio shuffle of stereo pairs using the 8 x 8 stereo router.
- Transport and convert CEA-608 and CEA-708 closed caption data between standards.
- Carry teletext and subtitle information across different definitions - both SMPTE 2031 and OP-47 supported.

The *UP-DOWN-ATX-VF* supports SMPTE 2031 and OP-47 to carry teletext information across different definitions. When up converting teletext data can be taken out of the analogue coded signal and the same data put in the SMPTE 2031 or OP-47 data stream created; when down converting the teletext data can be taken out of SMPTE 2031 or OP-47

packets and be encoded as analogue waveforms on an SD output. UP-DOWN-ATX-VF can be used to convert between SMPTE 2031, OP-47 and teletext in any combination. It is also possible to specify which line in the VANC space is used to carry SMPTE 2031 or OP-47, an advantage given the increasingly crowded VANC space. Closed captions can also be transported across different definitions using its CEA-708 and CEA-608 extractors and inserters.

UP-DOWN-ATX-VF will look after any aspect ratio conversion requirements when up or down converting. *UP-DOWN-ATX-VF* can also be used to label a signal with SMPTE 2016 data by inserting one of 16 AFD codes to allow a following down converter to output the Standard Definition with an appropriate aspect ratio conversion.

A further feature is the inclusion of an 8 x 8 audio router in both the SD path and HD path to allow audio stereo pairs to be shuffled within and between the four embedded audio groups.

1.4 UP-DOWN-AS-VF

The main features of the *UP-DOWN-AS-VF* are the same as the *UP-DOWN-A-VF* but with the following major additional features:

- Two on-board downstream synchronisers (one in each path) to retime the output to a station reference.
- Independently adjustable video, audio and Dolby E delay.
- Audio resampling and Dolby E alignment.
- Synchronise video that contains both normal embedded audio and embedded Dolby E.

UP-DOWN-AS-VF is ideal for those working in non-synchronous embedded audio environments where the audio resamplers ensure a smooth matching of the audio and video delay, and the guardband of any embedded Dolby E will also be correctly aligned.

1.5 UP-DOWN-ATXS-VF

The main features of the *UP-DOWN-ATXS-VF* are the same as the *UP-DOWN-A-VF* but with the following major additional features:

- Two on-board downstream synchronisers (one in each path) to retime the output to a station reference.
- Independently adjustable video, audio and Dolby E delay.
- Audio resampling and Dolby E alignment.
- Synchronise video that contains both normal embedded audio and embedded Dolby E.
- Automatic aspect ratio selection using SMPTE 2016 AFD data, WSS or Video Index.
- AFD, WSS and Video Indexing insertion.
- HD to HD aspect ratio conversion.
- Timecode conversion between HD Ancillary Timecode and SD DVITC.
- Audio shuffle of stereo pairs using the 8 x 8 stereo router.
- Transport and convert CEA-608 and CEA-708 closed caption data between standards.
- Carry teletext and subtitle information across different definitions - both SMPTE 2031 and OP-47 supported.

The *UP-DOWN-ATXS-VF* supports SMPTE 2031 (as well as OP-47) to carry teletext information across different definitions. When up converting teletext data can be taken out of the analogue coded signal and the same data put in the SMPTE 2031 or OP-47 data stream created; when down converting the teletext data can be taken out of SMPTE 2031 or OP-47

packets and be encoded as analogue waveforms on an SD output. UP-DOWN-ATXS-VF can be used to convert between SMPTE 2031, OP-47 and teletext in any combination. It is also possible to specify which line in the VANC space is used to carry SMPTE 2031 or OP-47, an advantage given the increasingly crowded VANC space. Closed captions can also be transported across different definitions using its CEA-708 and CEA-608 extractors and inserters.

UP-DOWN-ATXS-VF will look after any aspect ratio conversion requirements when up or down converting. The *UP-DOWN-ATXS-VF* can also be used to label a signal with SMPTE 2016 data by inserting one of 16 AFD codes to allow a following down converter to output the Standard Definition with an appropriate aspect ratio conversion.

UP-DOWN-ATXS-VF ideal for those working in non-synchronous embedded audio environments where the audio resamplers ensure a smooth matching of the audio and video delay, and the guardband of any embedded Dolby E will also be correctly aligned.

A further feature is the inclusion of an 8 x 8 router in both the SD path and HD path to allow audio stereo pairs to be shuffled within and between the four embedded audio groups.

1.6 Features by model

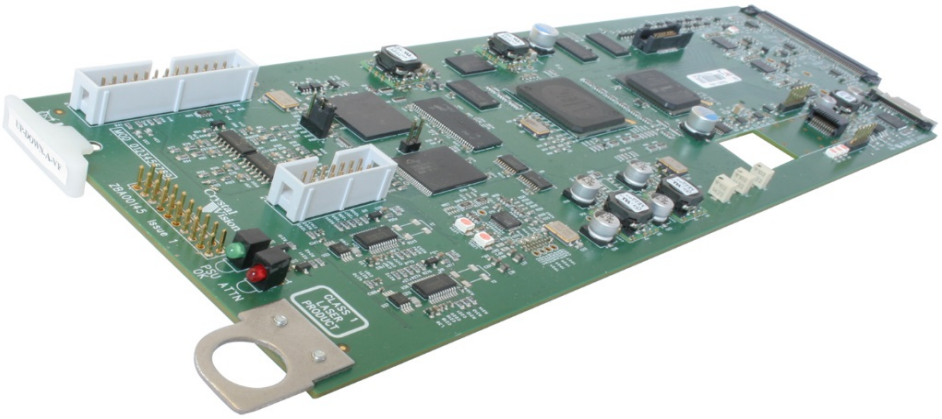
Features	A	ATX	AS	ATXS
Up converts (SD to 720p, SD to 1080i, SD to 1080p)	✔	✔	✔	✔
Cross converts (720p to 1080i, 720p to 1080p, 1080i to 720p, 1080i to 1080p, 1080p to 1080i, 1080p to 720p)	✔	✔	✔	✔
Down converts (720p to SD, 1080i to SD, 1080p to SD)	✔	✔	✔	✔
Input and output formats (50Hz and 59.94Hz)	1080p, 720p, 1080i, 625i, 525i	1080p, 720p, 1080i, 625i, 525i	1080p, 720p, 1080i, 625i, 525i	1080p, 720p, 1080i, 625i, 525i
Maximum video outputs (depends on rear module)	3 feeds of output 1 and 3 feeds of output 2	3 feeds of output 1 and 3 feeds of output 2	3 feeds of output 1 and 3 feeds of output 2	3 feeds of output 1 and 3 feeds of output 2
Perform 2 different conversions at same time	✔	✔	✔	✔
Two framestore synchronisers			✔	✔

Analogue reference (SD black-burst or HD tri-level syncs)			✔	✔
Automatic freeze			✔	✔
Video delays	40ms additional user delay	40ms additional user delay	1, 2, 3 frames + 40ms additional delay	1, 2, 3 frames + 40ms additional delay
Handles 4 audio groups	✔	✔	✔	✔
Linear AES tracking delay (with user control of tracking speed to trade off frequency change and settling time)			✔	✔
Dolby E alignment delay			✔	✔
Audio delays (in addition to tracking delays)			Linear AES: 0-120mS; Dolby E: 1, 2 or 3 frames fixed delay	Linear AES: 0-120mS; Dolby E: 1, 2 or 3 frames fixed delay
Audio routing in stereo pairs		✔		✔
Audio muting in stereo pairs		✔		✔
Audio resampling of linear AES			✔	✔
Aspect ratio conversion when up or down converting	✔	✔	✔	✔
HD to HD aspect ratio conversion when input/output format identical		✔		✔
SD to SD aspect ratio conversion	✔	✔	✔	✔

Flexible aspect ratio adjustment (size, position and crop controls)	✔	✔	✔	✔
AFD reading (uses SMPTE 2016 AFD, WSS or Video Index to automatically select the output aspect ratio)		✔		✔
AFD insertion of SMPTE 2016 AFD, WSS or Video Index for use by downstream equipment		✔		✔
Video Proc-amp (RGB and YUV lift and gain controls)	✔	✔	✔	✔
Video proc-amp when HD input/output format identical		✔		✔
Signal status reporting	✔	✔	✔	✔
Timecode handling	Passes	Passes and converts between ATC and DVITC	Passes	Passes and converts between ATC and DVITC
Teletext transport (OP-47, SMPTE 2031)		✔		✔
Closed caption transport (CEA-608, CEA 708)		✔		✔
Fibre I/O	✔	✔	✔	✔
Frame slots used	1	1	1	1

2 Hardware installation

All of the links and potentiometers on the card are factory set and should NOT be adjusted.



UP-DOWN-A-VF card

UP-DOWN-VF cards are only intended for use in the Crystal Vision ‘Vision’ frame range and not in older style frames such as ‘Indigo’.

The card should be inserted and removed from the Vision Frame by gently pushing or pulling the metal ring at the bottom of the card, being careful to ensure the card is inside the guide rails. Do not force the card if resistance is met as the card may not be correctly aligned with the rear connectors. The white tab at the top of the card is a label only and should not be pulled.

Ensure that the Vision Frame has the correct rear module fitted. Only the VR01, VR03 and VR14 rear modules offer the correct input/output functionality for this card.

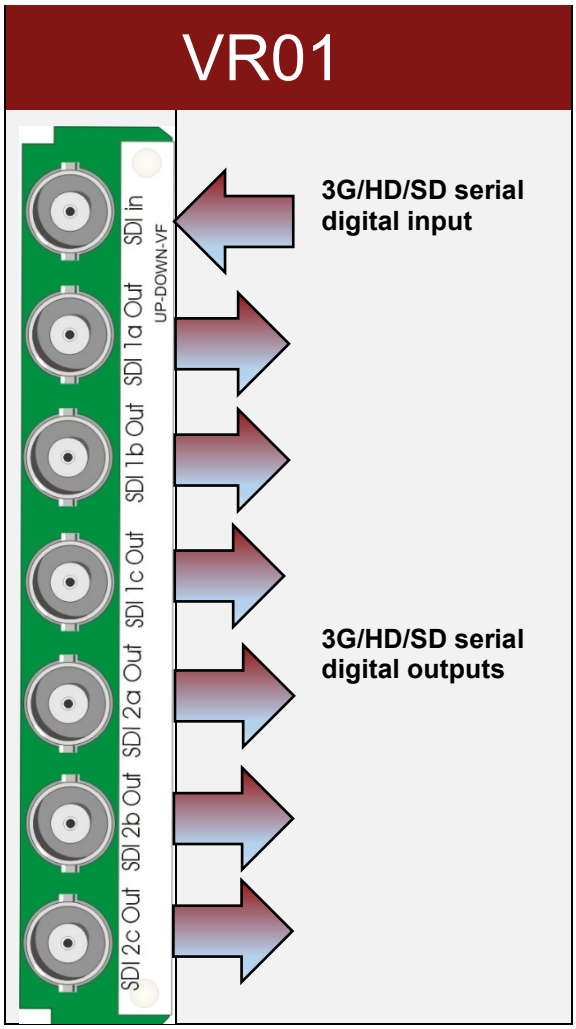
3 Rear modules and signal I/O

The Vision 3 frame will house up to 20 single height modules and dual power supplies or ten double height modules. All modules can be plugged in and removed while the frame is powered without damage.

Note: *For details of fitting rear connectors please refer to the appropriate Vision frame manual.*

The UP-DOWN-VF can support the following rear modules: **VR01**, **VR03**, and **VR14**.

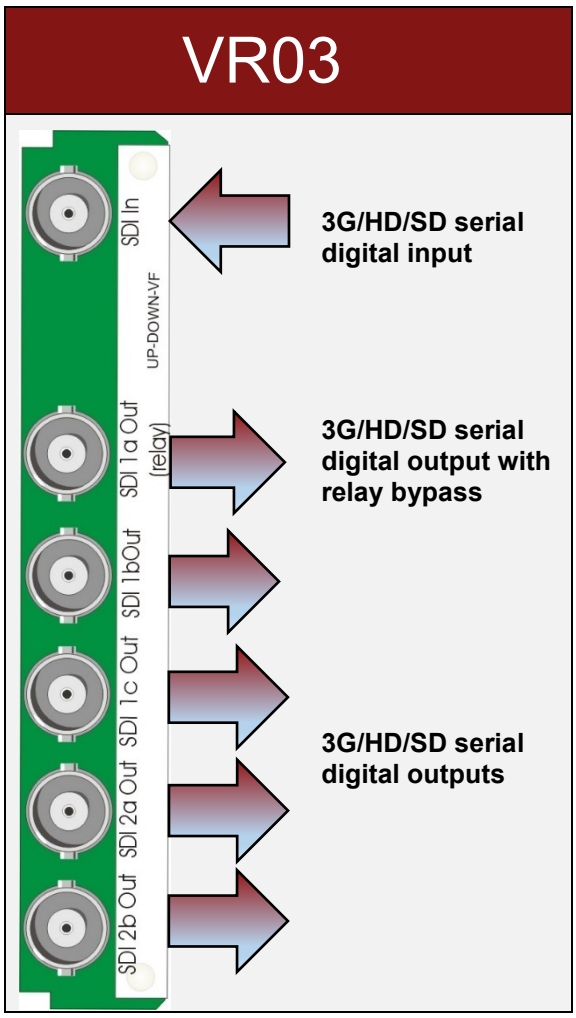
3.1 Rear module connections with VR01



The VR01 single height rear module allows maximum packing density with the maximum number of outputs available. One 3G/HD/SD serial digital video input plus a total of six 3G/HD/SD serial digital video outputs – three for output 1 and three for output 2.

Up to 20 VR01 rear modules can fit into a Vision 3 frame.

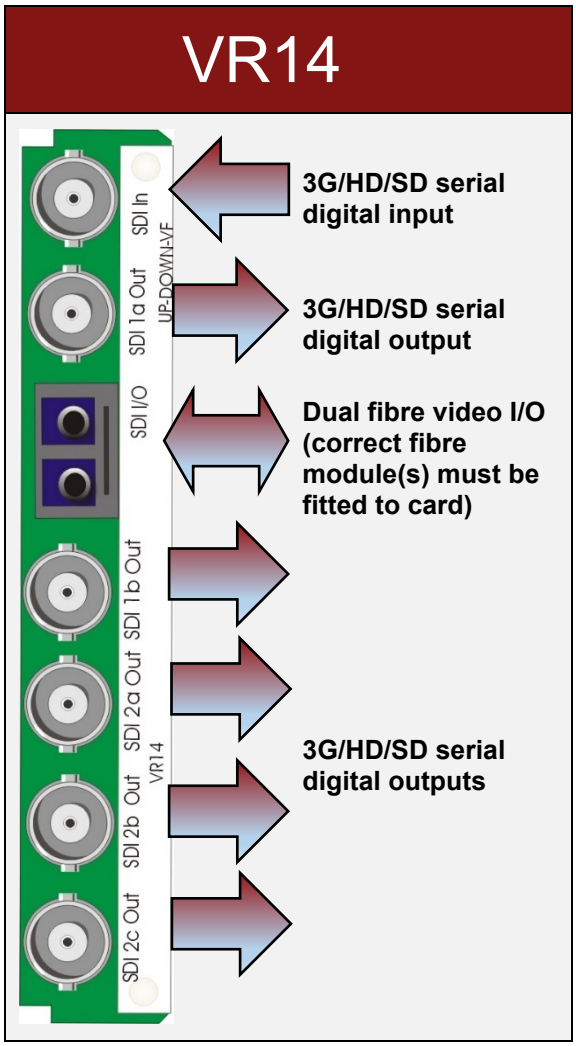
3.2 Rear module connections with VR03



The VR03 single height rear module has one 3G/HD/SD serial digital video input plus five 3G/HD/SD serial digital video outputs – three for output 1 and two for output 2, one of which is the relay bypass output which automatically switches to the input video if the card's power supply fails.

Up to 20 VR03 rear modules can fit into a Vision 3 frame.

3.3 Rear module connections with VR14



The VR14 single height rear module allows maximum packing density with the maximum number of outputs available. One 3G/HD/SD serial digital video input plus a total of six possible 3G/HD/SD serial digital video outputs – two for output 1, or three with the optional fibre output*, and three for output 2.

*The FOP-VF module must be fitted to the card for fibre optic video output. The optional FIP-VF module, if fitted, will provide alternative video input capability. For fibre optic video input and output the FIO-VF module must be fitted.

Up to 20 VR14 rear modules can fit into a Vision 3 frame.

4 Up, Down, Cross Conversion

All models of UP-DOWN-VF can perform the following conversions:

Up Conversions	Down Conversions	Cross Conversions
625/50 to 720p	720p50 to 625/50	720p50 to 1080i50
525/59.94 to 720p59.94	720p59.94 to 525/59.94	720p59.94 to 1080i59.94
625/50 to 1080i50	1080i50 to 625/50	720p50 to 1080p50
525/59.94 to 1080i59.94	1080i59.94 to 525/59.94	720p59.94 to 1080p59.94
625/50 to 1080p50	1080p50 to 625/50	1080i50 to 720p50
525/59.94 to 1080p59.94	1080p59.94 to 525/59.94	1080i59.94 to 720p59.94
		1080i50 to 1080p50
		1080i59.94 to 1080p59.94
		1080p50 to 1080i50
		1080p59.94 to 1080i59.94
		1080p50 to 720p50
		1080p59.94 to 720p59.94

UP-DOWN-VF can perform two conversions at the same time, with two separate converters on the card: one is used for the up or cross conversion, and the other used for down conversion. This allows simultaneously creation of HD and SD copies from a single feed from this one card.

UP-DOWN-VF gives dual outputs, with two output groups – 1 and 2. Each output group can be individually selected as either SD or HD, making it possible to configure both outputs as SD, both outputs as HD (720p, 1080i or 1080p), or one output as HD with the other as SD (see *Delay & output*).

One of UP-DOWN-VF's most powerful features is that it will constantly put out HD and SD on the same pins regardless of the input, thanks to its smart routing. Once set, the output selection will remain true irrespective of any change in the input format – which means wiring can remain unchanged.

UP-DOWN-VF will automatically select the correct conversion algorithm depending on the input format and selected output formats.

5 Control and Status monitoring

UP-DOWN-VF status and controls can be accessed most easily by 'VisionWeb' remote control PC software but also by VisionPanel, the Vision frame's front panel and SNMP.

5.1 Controlling cards via VisionWeb

Accessing the 'Vision' frame homepage with a PC browser via the Ethernet connector of a frame will display a list of the cards fitted. (See 'Vision' frame User Manual for more details.)

Typical VisionWeb home page

The example above shows an UP-DOWN-ATXS-VF card fitted in slot 2 and other Vision cards in slots 1, 3, 5 and 7. Clicking on the UP-DOWN-ATXS-VF card will bring up the card's home page, for example:

UP-DOWN-ATXS-VF Status page

5.2 Control Descriptions

Crystal Vision cards use an XML file to create a control database that is common to all controllers. Although the description of controls used in this manual is based on VisionWeb GUI screengrabs, the menu tree for VisionPanel and Vision frame front panel operation is the same, although the appearance and labelling of some controls may vary according to the available space. See *Menu Structure* for a more detailed menu tree.

VisionWeb GUI controls are accessed by tabs at the bottom of the page: **Status, Video, Audio, Data insert and Presets, default, alarms**. These tabs, when selected, offer menus containing several controls. Some controls are simulated LEDs that are used to show status, others are check boxes, buttons or sliders which change various UP-DOWN-VF settings.

What follows are VisionWeb menu screenshots with a description of each control's function.

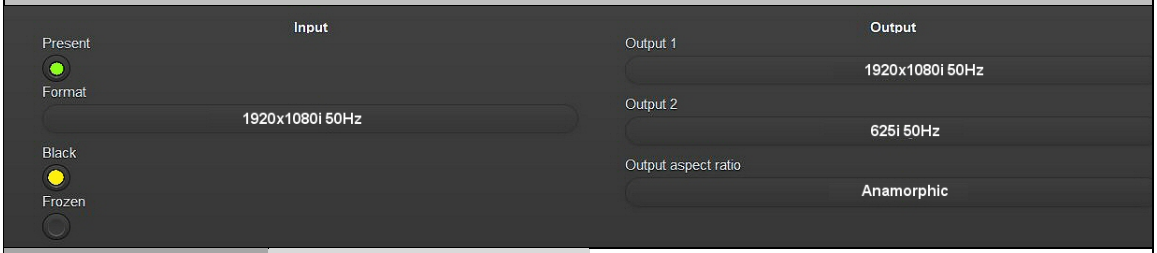
The description of the menus is in the order displayed in the VisionWeb GUI:

Video, Reference, Audio, Delay & output, Fixed aspect ratio, Custom aspect ratio, Custom crop, Noise & detail, RGB proc, YUV proc, Fibre enable, HD router, SD router, Audio delay, Audio resampling, AFD, WSS & VI, ANC Data line insert, ANC status, Timecode & teletext, Presets, Card defaults, Alarm delays.

5.3 Status Menu

Video

Display presence, standard and status of input and output video signals.

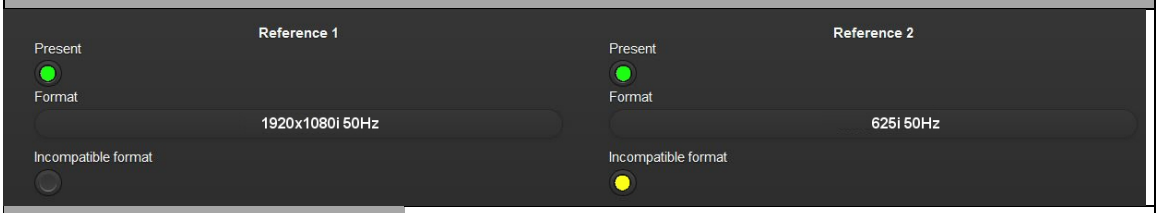


Input	**Present**	**On if input video present.**
	Format	**The Input video standard is shown. i.e. *525i 59.94Hz, 625i 50Hz, 1280x720p 50/59.94Hz, 1920x1080i50/59.94hz, 1920x1080p 50/59.94Hz, Missing, Unknown.***
	Black	**On if input video at constant black level.**
	Frozen	**On if input video frozen (still frame).**
Output	**Output 1/ Output 2**	**Displays selected standard of output 1 and 2 video. i.e. *525i 59.94Hz, 625i 50Hz, 1280x720p 50/59.94Hz, 1920x1080i50/59.94hz, 1920x1080p 50/59.94Hz, Missing,***

Output aspect ratio	**Displays selected output aspect ratio i.e. *Anamorphic, 16x9 full screen, 14x9 pillarbox, 4x3 pillarbox, 4x3 full screen, 14x9 letterbox, 16x9 letterbox.* This display indicates which aspect ratio correction is active and adjustable with the Custom Aspect Ratio controls.**

Reference

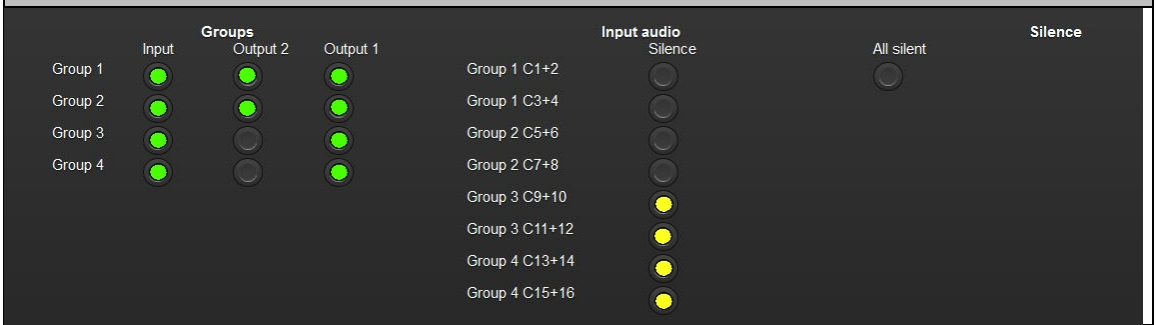
Displays status of reference signals.



Present	**On if a valid video reference signal is connected.**
Format	**Displays video standard of incoming reference i.e. *525i 59.94Hz, 625i 50Hz, 1280x720p 50/59.94Hz, 1920x1080i50/59.94hz, 1920x1080p 50/59.94Hz***
Incompatible format	**On if applied reference is incompatible with the input standard e.g. 59.94Hz reference but 50Hz video input.**

Audio

Display presence of embedded audio signals and indicate if silent.



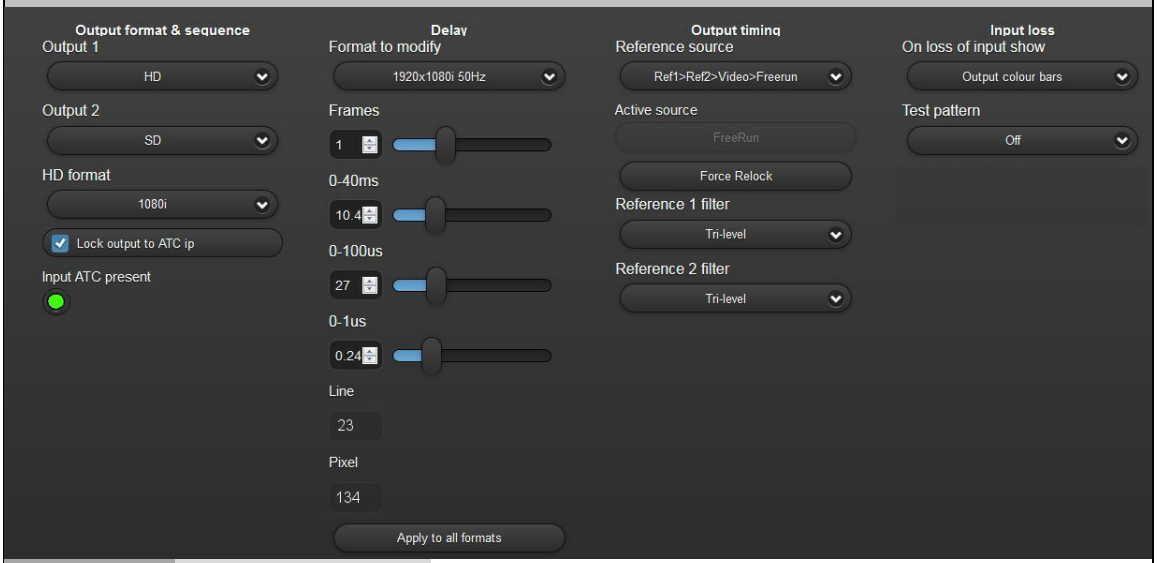
Group 1-4	**Input**	**On when the audio group is embedded into the video input.**
	Output 1/Output 2	**On when the audio group is embedded into video output 1 or 2.**

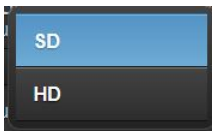
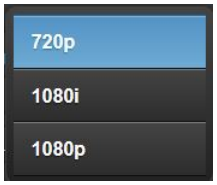
Input audio Silence	**Group 1-4 Channels 1/2 & 3/4**	**On if the sound level of the channel pair is consistently below the threshold set by the 'Audio silence level' control for the period set by the 'Audio silence' control. Both controls are in the *Alarm delays* menu.**
Silence	**All silent**	**On if the sound level of all the channels of all the groups is consistently below the threshold set by the 'Audio silence level' control' for the period set by the 'Audio silence (seconds) control. Both controls are in the *Alarm delays* menu.**

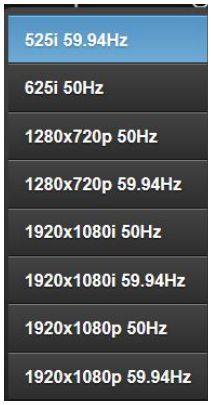
5.4 Video Menu

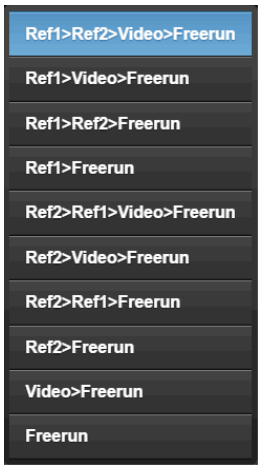
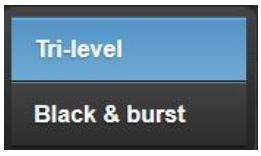
Delay & output

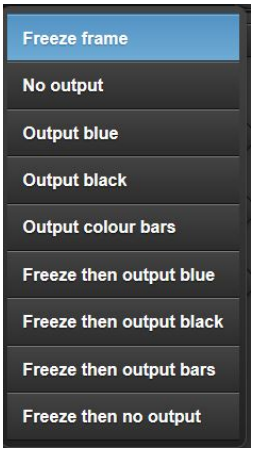
Select output formats, delay video and lock progressive field sequence to ATC.



Output format & sequence	**Output 1 Output 2**		**Select which output formats will be used for outputs 1 and 2. Once configured, the output format will remain true for all input formats.**
	HD Format		**Select which format to use for HD outputs.**

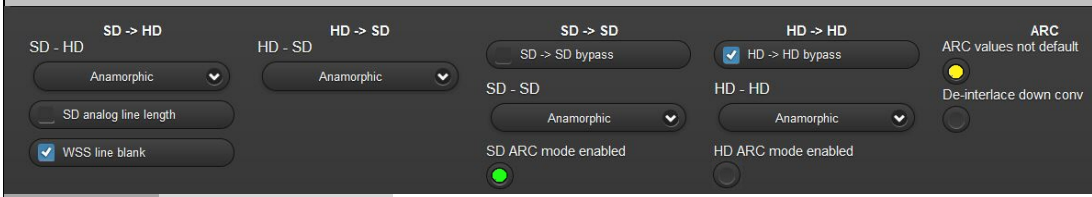
Delay	Lock output to ATC	Select to use incoming ancillary data timecode to determine the field sequence when converting a High Definition progressive video input to an interlaced video output. This control is only active when a progressive video input is present. When disabled the field sequence of the interlaced output will free-wheel.
	Input ATC present	On if ancillary audio timecode is detected.
	Format to modify	 Select which input standard the fixed delays should be applied to. Other input standards are unaffected. The four slider delay controls will change to reflect the values previously set for that format.
	Frames (AS & ATXS only)	Select to apply an additional 1, 2 or 3 frames of delay to the video or leave at 0 for no additional delay.
	0-40ms, 0-100us, 0-1us	For AS and ATXS models, if the timing reference source is Ref 1 or Ref 2, and with these controls set to zero the output will be aligned with the timing reference. The video can be delayed with respect to the reference by up to 40ms with these controls. For A and ATX models these delay controls can add an additional 40ms delay from input to output. Audio will be delayed by the same amount.
	Apply to all formats	The current delay values will apply to all input formats.
	Pixel/Line	These indicate the current delay displayed as lines and pixels for the selected format.

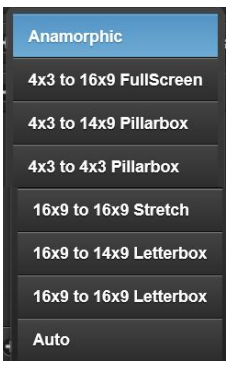
Output timing	**Reference source (AS & ATXS models only)**	 **Select the options for the synchroniser reference video. The hierarchy runs from left to right, so Ref1>Ref2>Video>Freerun will attempt to use Reference 1 initially and if that fails to use Reference 2 and so on. Once a valid reference is found, UP-DOWN-VF will continue to use that reference source until a manual relock (see 'Force relock control below). Should that reference fail then the next valid source in the list will be used. If the reference and video frame rate become incompatible, the card will attempt to use the other reference source and if that is not compatible, lock to the input video. With the video input selected as reference, the synchroniser is effectively disabled.**
	Active source (AS & ATX models only)	**The source being used as the synchroniser reference is displayed here i.e. 'Ref1, Ref2, Video or Freerun'.**
	Force relock (AS & ATX models only)	**Selecting this will force the synchroniser to relock after a reference is restored. When this control is operated, the card internal logic will start at the top of the currently selected list and move down it, picking the highest available timing reference source. As video output is disturbed during the relocking process, this control gives the user the opportunity to relock at a non-critical time.**
	Reference 1 /2 filter (AS & ATXS models only)	 **Select either analogue Black and Burst or tri-level syncs as the reference input type.**

Input loss	**On loss of input show**	 **In the event of the input signal missing, choose which picture to output. If a 'freeze then..' option is selected, the video output will freeze with the last good frame for three seconds before changing. The 'No output' option will also shut down the fibre optic output, if fitted.** ***Note that models A and ATX only have the following limited options:*** 
	Test pattern (AS & ATXS models only)	 **Select a test pattern output to replace the normal video output using the current input video standard or the last input standard detected if no input present.**

Fixed Aspect Ratio

Set aspect ratio conversion ratios for all conversion modes.



SD->HD	**SD-HD**	 **Select one of the aspect ratios for SD to HD conversion. See section 'Aspect Ratio Conversion' for details of each aspect ratio mode.** *Note: Only first four options 'Anamorphic…4x3 to 4x3 Pillarbox' are available with the UP-DOWN-A-VF.*

HD->SD	SD analog line length	**Select to set the SD output line length to be equal to analogue video.**
	WSS line blank	**Blank incoming WSS data.**
	HD-SD	 **Select one of the aspect ratios for HD to SD conversion. See section 'Aspect Ratio Conversion' for details of each aspect ratio mode.** *Note: Only first four options 'Anamorphic…16x9 to 16x9 Letterbox are available with the UP-DOWN-A-VF.*
	SD->SD bypass	**Select to bypass ARC in SD to SD mode whenever the input and the selected output format are both the same. In bypass mode the proc-amps will be disabled. AFD and WSS insertion will remain active.**
SD->SD	SD-SD	  **Select one of the aspect ratios for SD to SD conversion. See section 'Aspect Ratio Conversion' for details of each aspect ratio mode.** *Note: Only first seven options 'Anamorphic…16x9 to 16x9 Letterbox available with the UP-DOWN-A-VF.*
	SD ARC mode enabled	**On if the ARC is enabled in SD to SD mode i.e. active and not bypassed.**

HD->HD (ATX & ATXS only)	**HD->HD bypass**	**Select to bypass ARC in HD to HD mode whenever the input and the selected output format are both the same. In bypass mode the proc-amps will be disabled. AFD and WSS insertion will remain active.** *Note:* this option only available with the *UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF.*
ARC	**HD-HD**	 **Select one of the aspect ratios for HD to HD conversion. See** *Aspect Ratio Correction* **for details of each aspect ratio mode.** *Note:* These options only available with the *UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF and are functional when all output formats are the same as the input format.*
	HD ARC mode enabled	**On if the ARC is enabled in HD to HD mode i.e. active and not bypassed.** *Note:* This option only available with the *UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF and are functional when all output formats are the same as the input format.*
	ARC values not default	**On if the active ARC size or position has been adjusted and are no longer at their default values. See Custom Aspect Ratio controls.**
	De-interlace down conv	**On when output video has been de-interlaced following down conversion. If the up/cross converter is not being used, then a deinterlacer will automatically be switched into the path of its down converter. For 1080i inputs, this motion-adaptive and edge-adaptive deinterlacer will remove any intra-field aliasing components, before they are resampled by the down converter. HD > HD bypass (above) should also be selected (it is by default) to enable the deinterlacer.**

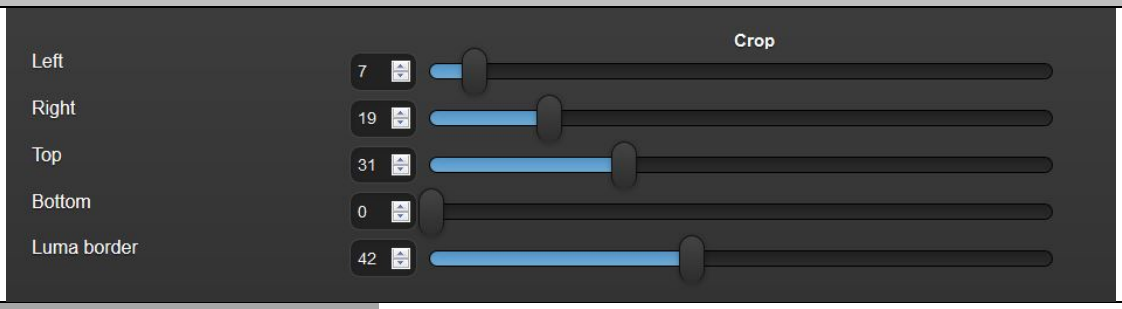
Custom Aspect Ratio

Adjust size and position of the currently active aspect ratio.

Size Horizontal/Vertical	**These controls alter the output image size. These adjustments will be recalled whenever the currently active aspect ratio is re-selected. The active aspect ratio is shown by the 'Output aspect ratio' indicator in the Status/Video menu.**
Position X/Y	**Adjust position of output image. These adjustments will be recalled whenever the currently active aspect ratio is re-selected.**

Custom crop

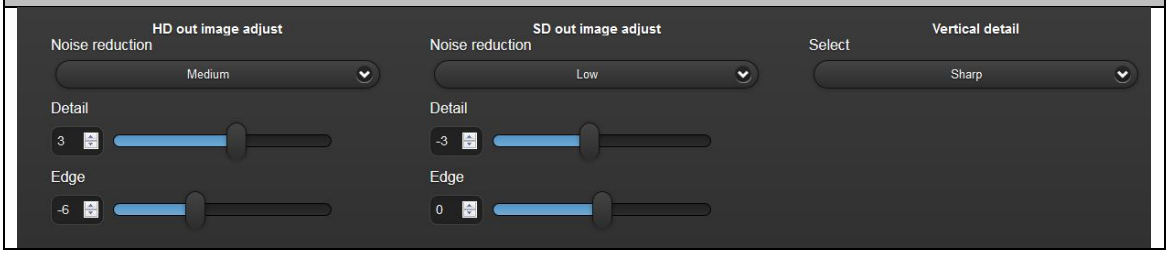
Crop the output image.



Crop Left/Right/Top/Bottom	**Crop the output image.**
Crop Luma border	**Adjust the size of the luma border surrounding aspect ratio corrected pictures that are smaller than the screen size.**

Noise & detail

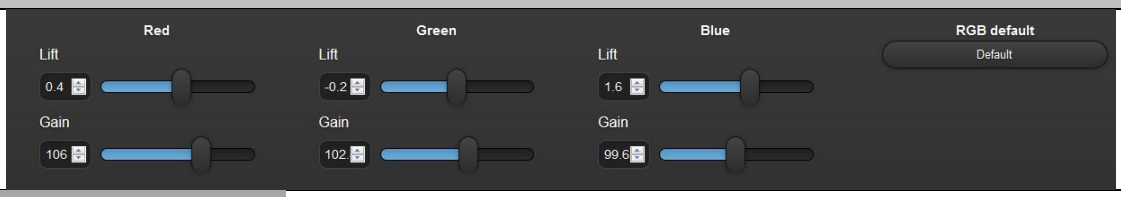
Select noise reduction and image enhancement options.



HD/SD out image adjust Noise reduction	 **Select amount of noise reduction for HD and SD outputs. *Note*: *Noise reduction, detail enhancement and edge enhancement can only be applied to the main converter; this imposes certain restrictions to the use of the noise reduction and enhancements controls. See section 'Noise & detail' for details of when these controls are operational.***
Detail	**Set amount of detail enhancement for HD and SD outputs. This control will sharpen the entire image. See note above for restrictions.**
Edge	**Set amount of edge enhancement for HD and SD outputs. This control applies sharpening to the object edges only and produces a sharpening effect without making noise more visible. See note above for restrictions.**
Vertical detail	 **When down converting to Standard Definition the vertical bandwidth can be optimised for a given application by selecting the most appropriate vertical bandwidth filtering. There are four filters to select from, ranging from the highest (sharpest) to the lowest (softest).**

RGB proc

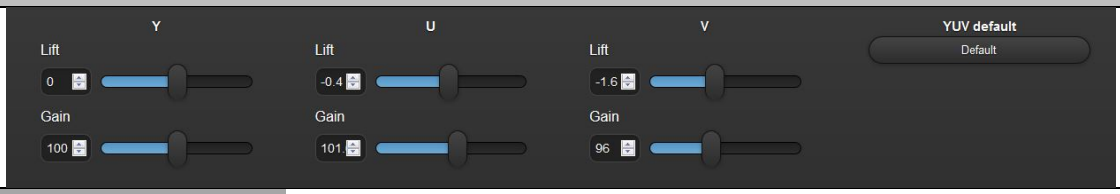
Control the lift and gain of the Red, Green and Blue components.



Lift	**Apply a positive or negative DC offset to the black level of the Red, Green and Blue components of the video path.**
Gain	**Apply 80% to 120% gain to the Red, Green and Blue components of the video path.**
RGB default	**Return Lift and Gain for all components to their calibrated values of 0 lift and 100% gain.**

YUV proc

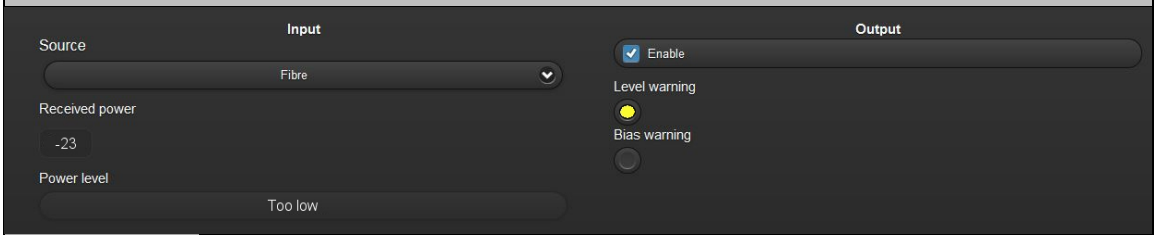
Control the lift and gain of the YUV components.



Lift	**Apply a positive or negative DC offset to the black level of the Y, U and V components of the video path**
Gain	**Apply 0 to 200% gain to the Y, U and V components of the video path.**
YUV default	**Return Lift and Gain for all components to their calibrated values of 0 lift and 100% gain.**

Fibre enable

Select optical or BNC as the video source. Enable fibre output and display laser fail warnings



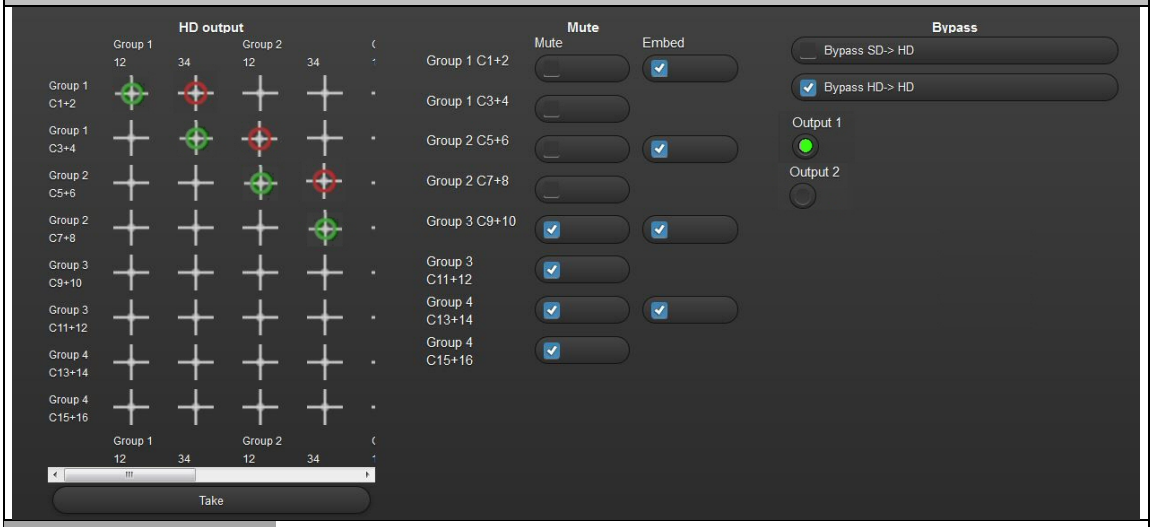
Source	 **Select fibre or BNC as the video input source. FIP-VF module must be fitted for fibre input.**
Received power	**Displays received optical power in dBm in the range -25 to 0dBm in 1 dBm steps.**

Power level	**Displays one of the following depending on the received power level: 'OVERLOAD', 'HIGH', 'GOOD', 'LOW', 'TOO LOW'. 'OVERLOAD' or 'HIGH' may cause the receiver to saturate with poor or no video output. In extreme cases the receiver may even be damaged – consider using an optical attenuator or a longer fibre cable. 'TOO LOW' or 'LOW' may be the result of dirty optical connectors – if in doubt, clean. Excessive fibre cable runs will also cause these warnings. Although transmission distances of up to 50km is possible with single mode fibre, this distance is dependent on minimal attenuation from junctions etc. Multi-mode fibre installations can expect considerably shorter transmission distances. Single-mode fibre, or any single-mode components should never be used downstream of multi-mode fibre.**
Enable	**Enable fibre optic output if FOP-VF or FIO-VF module fitted.**
Level warning	**On if the laser is producing low output power. This indicates that the laser has failed and should be replaced immediately.**
Bias warning	**On if the laser bias current has risen above a threshold which indicates imminent failure of the device. The laser should be replaced as soon as possible.**

5.5 Audio Settings Menu

HD router

Select audio embedding options for HD outputs. *(ATX/ATXS models only)*

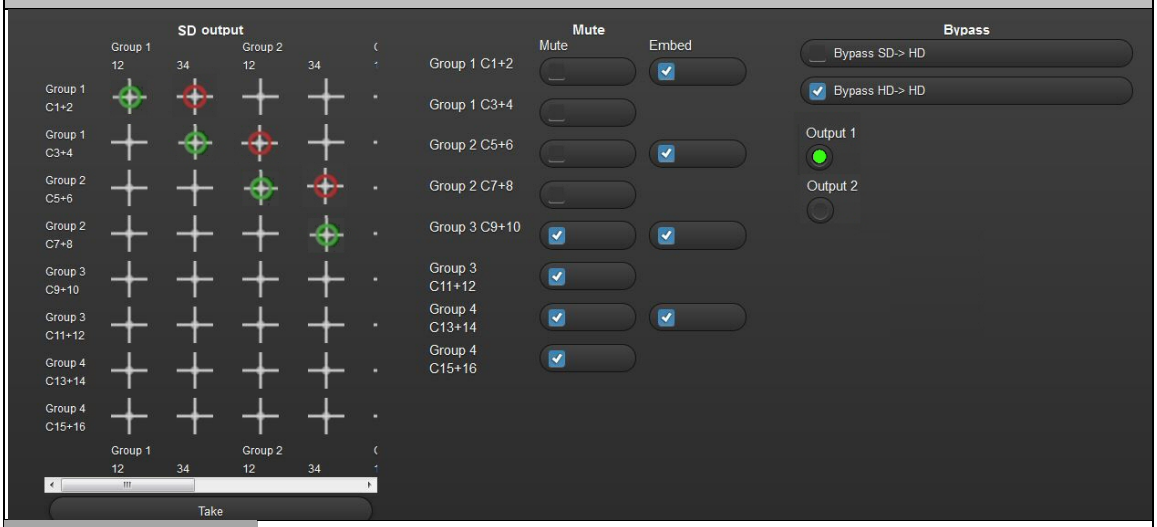


HD Output	**Select which embedded audio inputs are to be re-embedded at the output. Current selections are shown as green circles, pre-selected selections (red circles) are the crosspoints to be routed when the 'Take' button is pressed. The inputs shown along the top of the matrix are, or will be, routed to the embedded output channels shown on the left hand side (use the scroll bar at the bottom of the matrix to view all 16 inputs). Clicking on the intersection of the input and output will show a red circle which will change green when the 'Take' control is selected. All crosspoints can be pre-selected. The screen grab above shows de-embedded inputs Group 1 C3,4 and Group 2 C1->4 pre-selected to embedded channels Group 1 C1->4 and Group 2 C5,6. Embedded inputs can be routed to several outputs if required.**
Take	**Switch all pre-selected crosspoints in one go.**
Mute	**Mute the selected audio pairs.**
Embed	**Select to embed the audio group.**

Bypass SD->HD/ Bypass HD->HD	**The audio sent to an output can be set to bypass the routers under certain selected circumstances. These conditions can be set individually according to the output format so that if these conditions are met, the input embedded audio will appear on the output in the same positions as the input. If these conditions are not met, the audio will be placed according to the router. There are separate controls for both High Definition and Standard Definition.**
Output 1/2	**On if Output 1 or 2 is HD.**

SD router

Select audio embedding options for SD outputs. *(ATX/ATXS models only)*

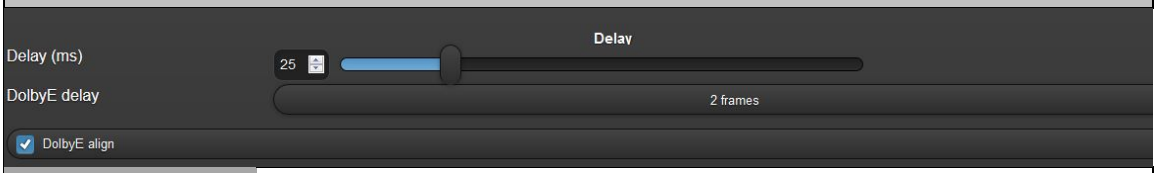


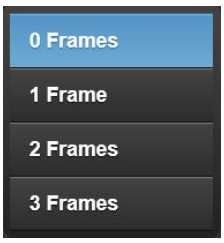
SD Output	**Select which embedded audio inputs are to be re-embedded at the output. Current selections are shown as green circles, pre-selected selections (red circles) are the crosspoints to be routed when the 'Take' button is pressed. The inputs shown along the top of the matrix are, or will be, routed to the embedded output channels shown on the left hand side (use the scroll bar at the bottom of the matrix to view all 16 inputs). Clicking on the intersection of the input and output will show a red circle which will change green when the 'Take' control is selected. All crosspoints can be pre-selected. The screen grab above shows de-embedded inputs Group 1 C3,4 and Group 2 C1->4 pre-selected to embedded channels Group 1 C1->4 and Group 2 C5,6. Embedded inputs can be routed to several outputs if required.**
Take	**Switch all pre-selected crosspoints in one go.**
Mute	**Mute the selected audio pairs.**

Embed	**Select to embed the audio group.**
Bypass HD->SD/ Bypass SD->SD	**The audio sent to an output can be set to bypass the routers under certain selected circumstances. These conditions can be set individually according to the output format so that if these conditions are met, the input embedded audio will appear on the output in the same positions as the input. If these conditions are not met, the audio will be placed according to the router. There are separate controls for both High Definition and Standard Definition.**
Output 1/2	**On if Output 1 or 2 is SD.**

Audio delay

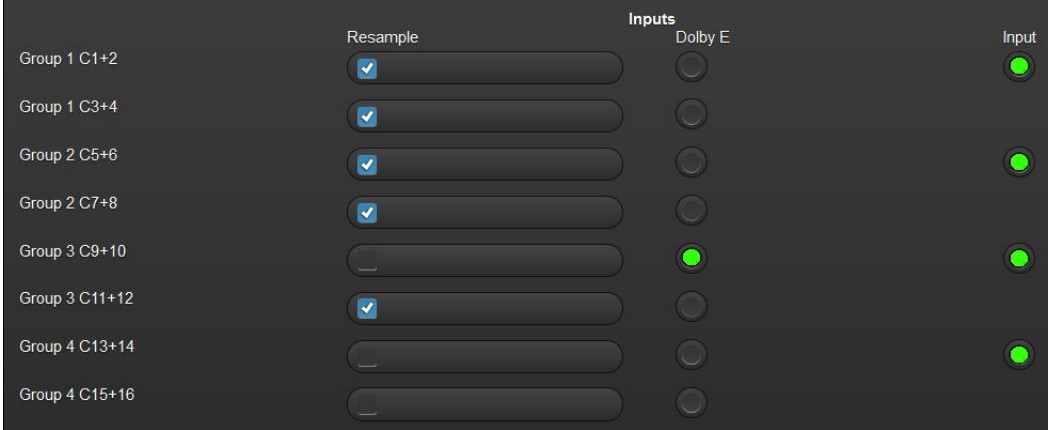
Select audio delay options. ***(AS/ATXS models only)***



Delay (ms)	**This control is used to delay PCM audio between 0 to 120mS with respect to the video and compensate for any small delay between the incoming video and audio signals.**
DolbyE delay	 **Delay Dolby E encoded signals by up to three frames in one frame increments.**
DolbyE align	**Enable Dolby E alignment to ensure correct positioning of the guardband. 'DolbyE align' mode will limit the minimum video delay to 0.5 frames.**

Audio resampling

Select audio tracking options. *(AS/ATXS models only)*



Resample	**This control affects how PCM audio data is manipulated to match the variable video delay through the synchroniser. When resampling is enabled, the audio is continuously resampled with a variable speed clock allowing seamless changes in audio delay. To minimise audible pitch changes, the maximum frequency distortion is limited to 0.8% which means a sudden 40ms change in video delay will require five seconds for the audio to catch up. If resampling is not enabled, audio samples will be passed unchanged through the signal path and, if the delay has to change, single audio samples will be dropped or repeated as required. This control has no effect on channels containing Dolby E which is automatically detected and bypasses the resample process.**
Dolby E	**On when an audio input pair is Dolby E encoded.**
Input	**On when an audio input group is detected.**

5.6 Data insert Menu

AFD

Select AFD output options for HD and SD outputs. *(ATX/ATXS models only)*

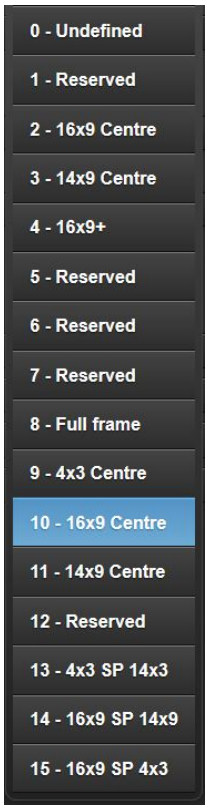
Input AFD

Displays incoming AFD descriptor. i.e. 'undefined, full frame,16:9 Centre' etc. (See *AFD, WSS and VI* for more information.)

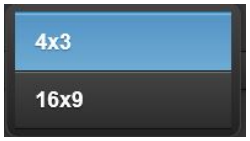
Output

For HD and SD outputs: Select mode control 'Auto' to automatically set the AFD output codes based on the output aspect ratio and incoming AFD codes (see *Auto modes & AFD*). Select 'Manual code' to use the code set by the 'Manual code' control, select 'Disable' to output no AFD code and select 'Pass – follow input AFD' to use the incoming AFD code.

Manual code

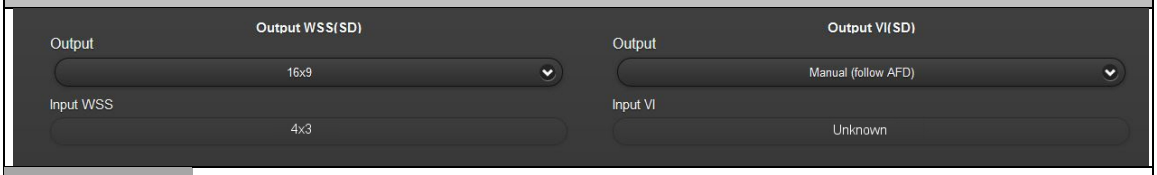


Code for active image area when 'Manual code' option is selected. See *AFD, WSS and VI* for more information.

Aspect ratio		**Indicate aspect ratio of entire image for SD output. For instance, if the output is a 16:9 letterbox image within a 4:3 frame, select 4x3 for aspect ratio and 'Manual code '10'.**

WSS & VI

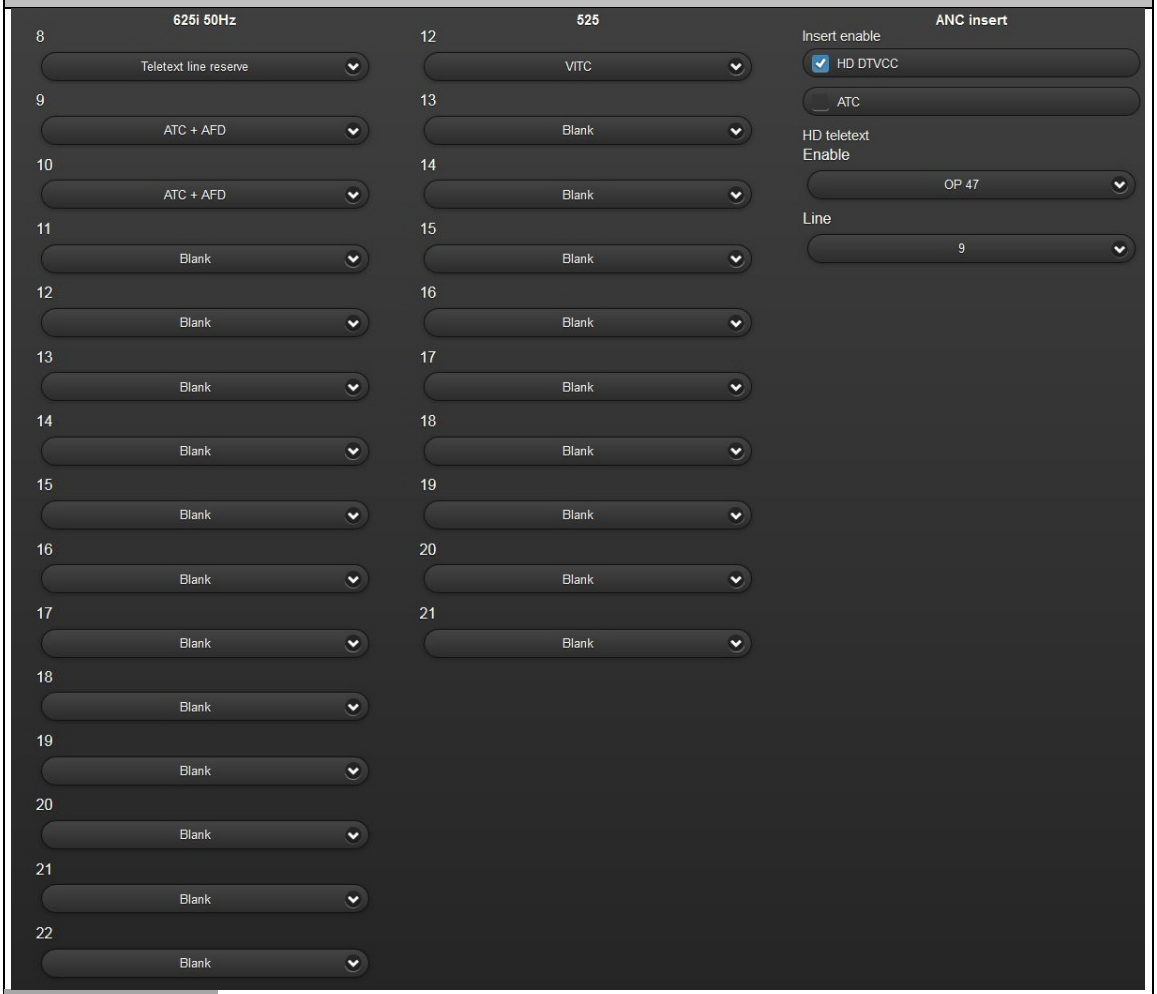
Select widescreen signalling options for 625 SD outputs. *(ATX/ATXS models only)*



Output WSS (SD)		**Select widescreen signalling output code. WSS signalling can be set to automatically follow the input AFD data (Auto) or be manually selected. If WSS data should be present on the input video, this can either be passed to the output unchanged (Pass) or substituted for a user selectable code. WSS data can also be set to be blanked. It is only possible to insert WSS information into a 625 output.**
Input WSS		**Display incoming WSS codes i.e. '4:3 Full, 14:9 Letterbox Centre' etc. See Section 'Output AFD, WSS and VI'.**
Output VI(SD)		**Video indexing can also be inserted into the output video for use by downstream equipment. Select 'Auto' to mirror the conversion setting; select 'Manual' to follow the output WSS settings above; select 'Disable' to insert blank VI data; select 'Pass' to route the input data to the output unchanged.**
Input VI		**Display incoming VI codes i.e. 'Reserved, Box 16:9 Top' etc. See Section 'Output AFD, WSS and VI'.**

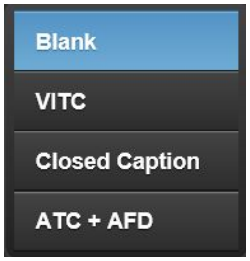
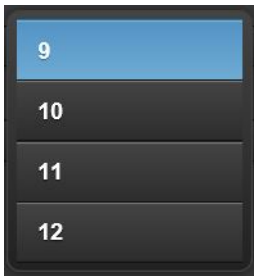
ANC Data line insert

Select line number and other options for ANC insertion. *(ATX/ATXS models only)*



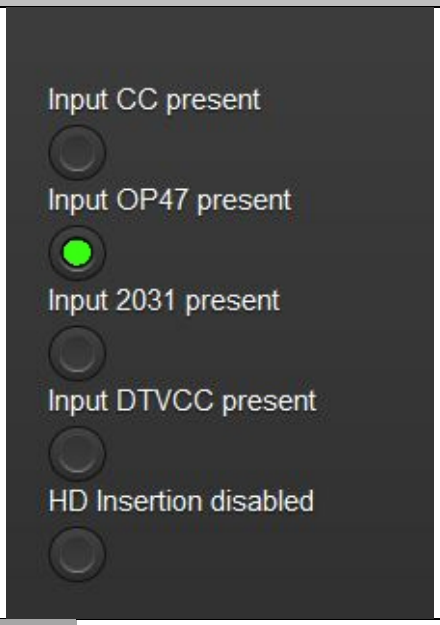
625i 50Hz lines 8-22

For each of the television lines 8-22, select the data to be inserted into 625-line SD. VITC code is always repeated on two adjacent video lines, one in each field. Select 'Teletext Line Reserve' to insert teletext or subtitle data when down converting from a HD source. The same line must be chosen for which they exist when encoded into the OP-47 data. Select 'ATC+AFD' to insert ancillary timecode and AFD. If the ATC output is disabled, the AFD+ATC line number will still select the line number on which AFD will appear for down converted SD outputs.

525 lines 12-21	 **For each of the television lines 12-21, select the data to be inserted into 525-line SD. Note: For 525 outputs, having both AFD and VI on line 14 is not possible. To get AFD on line 14, VI needs to be disabled. ATC, AFD and VITC are output on both fields.**
Insert enable DTVCC	**Enabling the DTVCC function will transport closed captions across definitions: when down converting CEA-708 closed caption data will be output as the corresponding CEA-608 closed caption data. When up converting the CEA-608 data will be inserted into the appropriate section of CEA-708. The 525-line line number can be selected using the 525 ANC line control for the reinsertion of the closed caption data in the output video waveform.**
Insert enable ATC	**The Output ATC control, when enabled, will allow the translation of HD ancillary timecode and SD VITC depending on whether up converting or down converting. The ANC line selection controls will allow the line or lines to be selected for reinsertion.**
HD Teletext Enable	 **When up converting from SD to HD, incoming teletext information can be inserted into the HD signal as OP-47 or SMPTE 2031 packets. Using the HD Teletext Line selection control (below) will set the line or lines in the HD output signal to carry this data.**
HD Teletext Line	 **Select the HD line number to insert decoded OP-47 or SMPTE 2031 teletext or subtitle data when up converting.**

ANC Status

Display status of ANC data space in HD inputs. ***(ATX/ATXS models only)***



Input CC/OP47/2031/DTVCC present	**On when Closed Caption, HD Teletext or DVTCC is detected in the VANC area.**
HD Insertion disabled	**On when ANC insertion into HD video is disabled. See** *ANC Data line insert*.

Timecode and Teletext

Select line numbers to read VITC and Teletext. *(ATX/ATXS models only)*

Input VITC (SD) Line Select

The Line Select control allows the SD input timecode (VITC) to be either automatically detected, the individual line to be manually selected or timecode extraction disabled. When manual mode is selected the line containing the VITC data can be selected using the 525/625 line selection control.

Input VITC (SD) Lines 525

In 525 line SD, VITC would normally be inserted into the vertical interval of a single TV line between line 12 and line 21 and then repeated two lines later. Timecode is inserted into the second field using the corresponding interlaced line number.

Select the first line of the Field 1 pair containing VITC. The corresponding lines from F2 will be automatically selected. So by selecting Line 12, for instance, the timecode reader will look for VITC on F1 lines 12 and 14 (repeated) and F2 lines 275 and 277.

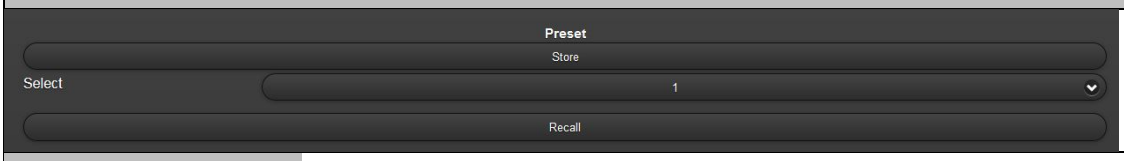
Input VITC (SD) Lines 625	 **In 625 line SD, VITC would normally be inserted into the vertical interval of a single TV line between line 8 and line 22 and then repeated two lines later. Timecode is inserted into the second field using the corresponding interlaced line number.** **Select the first line of the Field 1 pair containing VITC. The corresponding lines from F2 will be automatically selected. So by selecting Line 8, for instance, the timecode reader will look for VITC on F1 lines 8 and 10 (repeated) and F2 lines 321 and 323.**
Input VITC present	**On if VITC is detected in the selected lines.**
Input ATC present	**On if ancillary timecode is detected.**
SD Insertion disabled	**On if timecode insertion into SD outputs is disabled.**
Input Teletext (625) Line select	**In order to allow the maximum flexibility, control of the line selection for both field 1 and field 2 of the incoming 625 line Standard Definition video signal is given. This selection is under the control of the line mode selector. Selecting Field 1 or Field 2 will take any teletext data from whichever line has been selected and present it ready for reinsertion as digital data in the High Definition output. Selecting Field 1 and Field 2 will make a combination of the information from both lines of both fields. If Auto mode is selected all data on all lines of both fields will be combined and inserted into the High Definition output.** 

Field 1		**Select lines 6-22 as the Teletext source in Field 1.**
Field 2		**Select lines 318-335 as the Teletext source in F2.**
Input teletext present		**On if Teletext is detected on the selected lines.**

5.7 Presets, default & alarms

Presets

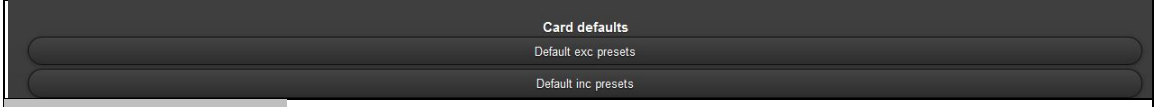
Up to 16 user-defined configurations may be stored and recalled. Presets store the card setup data including operating mode card status. The presets are numbered 1-16.



Select	 **Store or recall UP-DOWN-VF's configuration to one of 16 memory locations.**
Store	**Select to save the current UP-DOWN-VF configuration to the selected preset location.**
Recall	**Select to recall a new configuration from one previously saved in the selected preset location.**

Card defaults

Reset the card to its default settings.

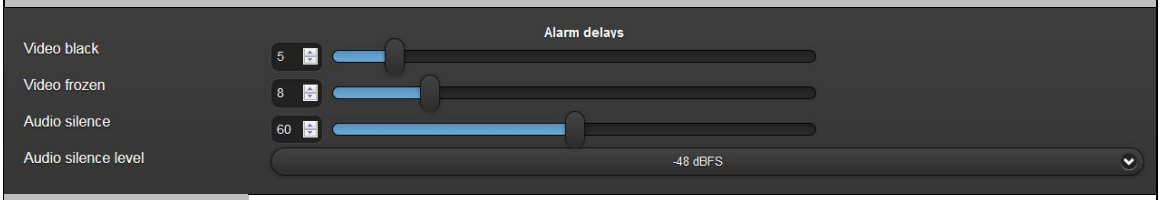


Default exc presets	**Reset the card to default settings but leave preset memories unaffected.**
Default inc presets	**Reset the card to default settings and erase preset memories.**

Parameter	Default value
HD Format	1080i
Output Format	All SD
Fibre Optic I/O	Unselected
Aspect ratio (all outputs)	Anamorphic
HD and SD ARC Bypass	Selected
Input WSS (625)	Unselected
Output AFD	Auto, 8-Full Frame 525 line 12 & 275, 625 line 8 & 321
Coded Frame	HD 16:9, SD 4:3
Widescreen Signalling	Auto
Video Indexing	Auto
Lock O/P to I/P ATC	Unlocked
H Size	100%
V Size	100%
Position and Crop	0
Proc-amp lift (all)	0
Proc-amp gain (all)	100
HD output timing	0
SD output timing	0
Noise & detail enhance	Off & 0,0
Vertical bandwidth	Soft
Alarm delay video black	1
Alarm delay video frozen	1
Alarm delay audio silence	10 seconds
Video delay	Frames 0, 0-40ms 0, 0-100us 0, 0-1us 0
Audio Bypass	All checked
Audio Mute	All unchecked
Output embedders	All checked
Input VITC (SD)	Auto, 525 line 14, 625 line 19
Output VITC (SD)	Disabled, 525 line 14&16, 625 line 19&21
Output ATC	Disabled, 525 line 12&275, 625 line 8&321
Teletext	Auto, Line 20, Line 333, Disabled
Presets	Set to Preset 1 and all contents erased
Audio silence level	-48dBS

Alarm delays

Set the time that an alarm condition should be present before indicating a fault. Set the audio level that indicates a 'silent' condition.



Video black, Video frozen, Audio silence	**Set the time in seconds that the alarm condition must be present before a fault indication. For an audio 'silence' fault, the audio level must be consistently below the threshold set by the 'Audio silence level' control (below) for the period set by the 'Audio silence' control.**
Audio silence level	 **Select the level that, below which, the audio is considered 'silent' from -90dBFS to -48dBFS.**

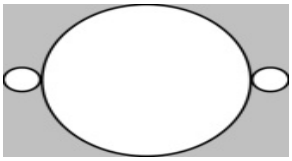
6 Aspect Ratio Correction

All UP-DOWN-VF models offer Aspect Ratio Correction (ARC) for the following input–output configurations: SD-SD, SD-HD, HD-SD. UP-DOWN-VF models *ATX and ATXS* also offer HD-HD aspect ratio correction when the input and output format are the same.

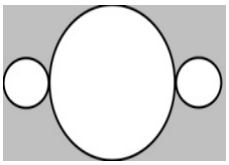
6.1 Why Aspect Ratio Correct?

There are two broadcast aspect ratios 4:3 and 16:9. An image correctly shaped for 4:3 will appear horizontally stretched on a 16:9 display. Similarly, a 16:9 image will appear vertically stretched on a 4:3 display. To correct these distortions requires either a part of the image or part of the display area to be lost.

For instance, a 4:3 image will be displayed on a 16:9 monitor would look like this:



And a 16:9 image would look like this on a 4:3 monitor:



UP-DOWN-VF aspect ratio correction manipulates the size and shape of the picture to offer the best trade-off between image distortion and loss of image at edges.

525 line SD sources should always have an aspect ratio of 4:3 whereas 625 line SD sources can be 4:3 or 16:9. All HD signals should have an aspect ratio of 16:9 although they may not have originated in that format as they may have been up converted from a 4:3 SD source. UP-DOWN-VF enables the aspect ratio of SD and HD sources to be corrected to the up or down converted output format.

Aspect ratio correction is independently controlled for all four modes of operation and is automatically applied to the active input-output configuration – as indicated by the 'Output Aspect Ratio' display in the Video Status menu. The active configuration is the one that is up or down converting i.e. an SD input converted to SD and HD will only be aspect ratio corrected on the up converted HD output. Similarly, an HD input converted to HD and SD will only be aspect ratio converted at the down converted SD output. If both outputs are set to either SD or HD then both outputs will be identically aspect ratio corrected.

6.2 Fixed Aspect Ratios

There are four selectable fixed aspect ratio types which are: Anamorphic, Letterbox (14:9, 16:9) Pillarbox (4:3, 14:9) and Stretch. Anamorphic correction will map the input picture directly to the native aspect ratio of the viewing display along with the resulting distortion associated with this. Should it be necessary to view the output on a 4:3 display, setting the aspect ratio selection to Letterbox will give the correct picture dimensions by adding black

bars to the top and bottom of the picture. 14:9 Letterbox will crop the picture to 87.5%, and depending on the aspect ratio of the display will either add black bars to the top and bottom or to both sides of the picture. There will be some loss of picture. Pillarbox will compress the picture to the centre part of the screen and add black bars to both sides. There may be a minimal picture loss depending on the selected video format. 'Stretch' is a specialist ratio requested by a major broadcaster to correct an input image that has been previously incorrectly aspect ratio corrected resulting in a vertically 'stretched' picture. Similarly, the aspect ratio corrections listed below for HD 4:3 inputs are specialist in nature, and unlikely to be encountered.

The table below lists all available fixed ARC ratios:

SD to HD	HD to SD	SD to SD	HD to HD
Anamorphic	Anamorphic	Anamorphic	Anamorphic
4:3 to 16:9 with Full Screen 16:9	4:3 to 16:9 with Full Screen 16:9	4:3 to 16:9 with Full Screen 16:9	4:3 to 16:9 with Full Screen 16:9
4:3 to 16:9 with 14:9 Pillarbox	4:3 to 16:9 with 14:9 Pillarbox	4:3 to 16:9 with 14:9 Pillarbox	4:3 to 16:9 with 14:9 Pillarbox
4:3 to 16:9 with 4:3 Pillarbox	4:3 to 16:9 with 4:3 Pillarbox	4:3 to 16:9 with 4:3 Pillarbox	4:3 to 16:9 with 4:3 Pillarbox
16:9 Stretch to Full Screen 16:9	16:9 to 4:3 with Full Screen 4:3	16:9 to 4:3 with Full Screen 4:3	16:9 stretch to Full Screen 16:9
16:9 Stretch to 14:9 Letterbox	16:9 to 4:3 with 14:9 Letterbox	16:9 to 4:3 with14:9 Letterbox	16:9 stretch to 14:9 Letterbox
16:9 Stretch to 16:9 Letterbox	16:9 to 4:3 with 16:9 Letterbox	16:9 to 4:3 with16:9 Letterbox	16:9 stretch to 16:9 Letterbox

***Note**: The boxes shaded grey are the only fixed aspect ratio corrections offered by the UP-DOWN-A-VF and UP-DOWN-AS-VF*

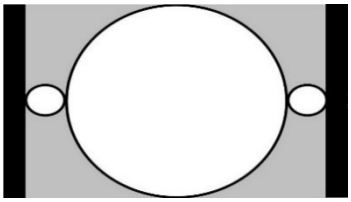
Anamorphic

All format conversions are capable of anamorphic aspect ratio correction which maps the image as though the ARC had been bypassed. Of course, the up/down conversion process may involve aspect ratio correction as the number and shape of pixels changes between formats (when converting from SD to 1080i, for example) but the image when viewed on the target display will appear distorted as if no aspect ratio correction was present.

6.3 SD to HD conversions

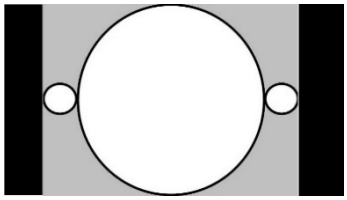
4:3 to 16:9 with Full Screen 16:9

With this correction, the 4:3 image is adjusted so that the image fills the 16:9 display. This results in picture detail at the top and bottom being lost:



4:3 to 16:9 with 14:9 Pillarbox

This compromise correction, shrinks the picture horizontally to minimise the loss of detail at the top and bottom. The resultant picture is a trade-off between distortion, picture loss and image size.

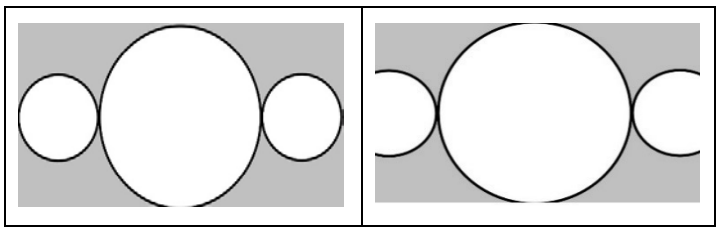


4:3 to 16:9 with 4:3 Pillarbox

This correction shrinks the image horizontally with black bands at the edges and will leave the resultant 16:9 image with an undistorted 4:3 picture.

16:9 Stretch to Full Screen 16:9

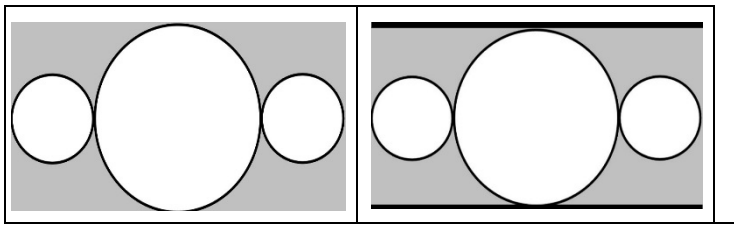
Correct a vertically ‘stretched’ 16:9 image to a correct 16:9 aspect ratio. Lose some detail from left and right edges of the picture.



16:9 ‘Stretched’ Input **16:9 Full Screen Output**

16:9 Stretch to 14:9 Letterbox

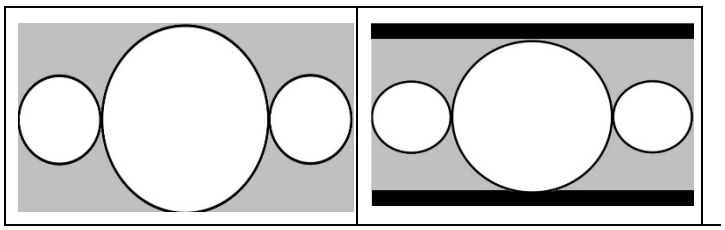
Correct a vertically ‘stretched’ image to 14:9 in a letterbox. This compromise correction shrinks the picture vertically to remove the loss of detail at the left and right hand edges. The resultant picture is a trade-off between distortion, picture loss and image size.



16:9 ‘Stretched’ Input **16:9 in 14:9 Letterbox output**

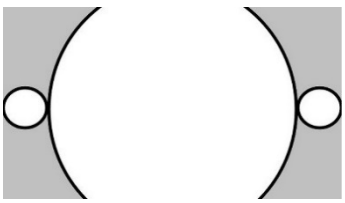
16:9 Stretch to 16:9 Letterbox

This corrects a vertically ‘stretched’ 16:9 image to a correct 16:9 aspect ratio. The image is shrunk vertically in a letterbox shape with black bands at the top and bottom.



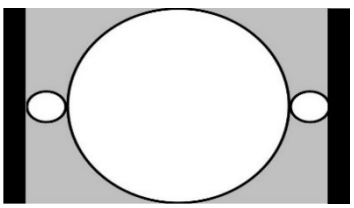
16:9 ‘Stretched’ Input **16:9 Letterbox output**

6.4 HD to SD conversions



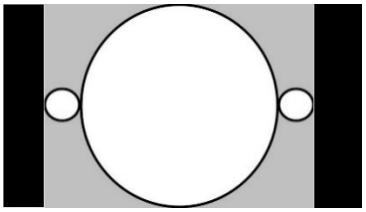
4:3 to 16:9 with Full Screen 16:9

This specialist ratio corrects a 4:3 HD image to produce a 16:9 picture with loss of detail at top and bottom.



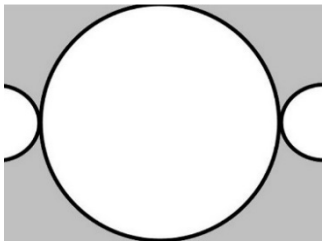
4:3 to 16:9 with 14:9 Pillarbox

This specialist ratio corrects a 4:3 HD image to produce a 16:9 compromise picture in a 14:9 Pillarbox shape with some distortion.



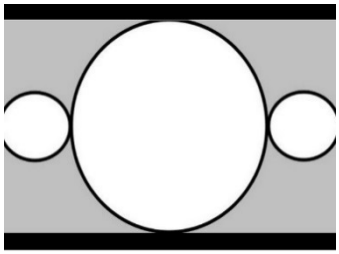
4:3 to 16:9 with 4:3 Pillarbox

This specialist ratio corrects a 4:3HD image to produce a 16:9 picture with no distortions in a 4:3 Pillarbox shape.



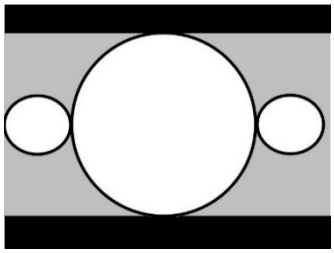
16:9 to 4:3 with Full Screen 4:3

This correction adjusts the image to fill the 4:3 screen with the result that picture detail at the left and right hand edges is lost.



16:9 to 4:3 with 14:9 Letterbox

Use this ratio to produce a compromise 4:3 picture in a 14:9 Letterbox shape. The resultant picture is a trade-off between distortion, picture loss and image size.



16:9 to 4:3 with 4:3 Letterbox

This correction ratio shrinks the image vertically to produce a 4:3 picture in a letterbox shape with no loss of detail or distortion.

6.5 Auto modes & AFD

There are three auto modes available – Auto 4x3, Auto 16x9 and Auto Adaptive – and when any of these is selected the actual aspect ratio selected will depend on the input video Active Format Description (AFD). UP-DOWN-VF models *ATX and ATXS* both feature an AFD reader. AFD is a standard set of codes that can be sent in the SDI video signal that carries information about their aspect ratio and active picture characteristics. It is used by television broadcasters to enable both 4:3 and 16:9 television sets to optimally present pictures transmitted in either format. It has also been used by broadcasters to dynamically control how down conversion equipment formats widescreen 16:9 pictures for 4:3 displays.

AFD codes provide information to the UP-DOWN-VF about where in the coded picture the active video is and also the 'protected area' which is the area that needs to be shown. Outside of the protected area, edges at the sides or the top can be removed without the viewer missing anything significant.

For UP-DOWN-VF ATX and ATXS models, the AFD reader will also automatically set the output WSS when Widescreen Signalling is set to auto.

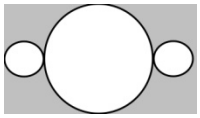
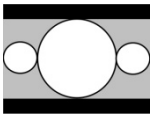
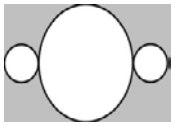
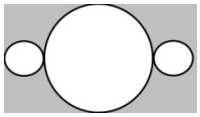
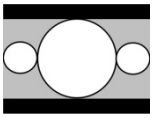
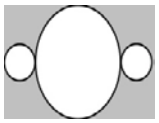
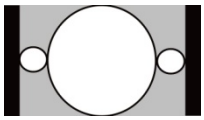
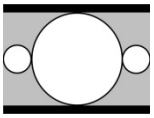
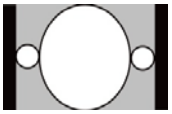
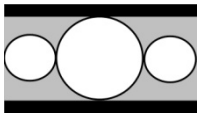
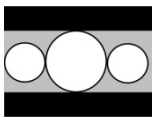
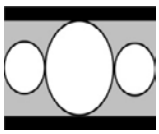
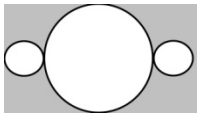
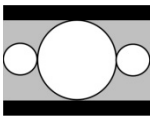
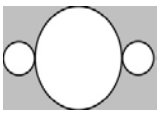
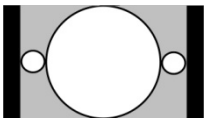
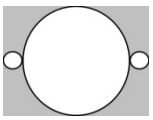
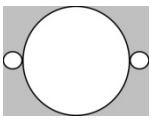
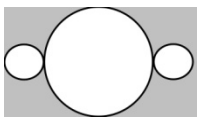
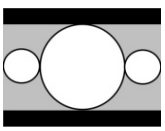
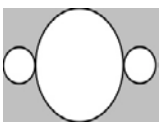
Widescreen signalling (WSS) is a digital stream embedded in the TV signal describing qualities of the broadcast, in particular the intended aspect ratio of the image. This can be used by a widescreen TV or other device to switch to the correct display mode.

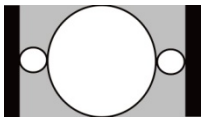
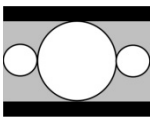
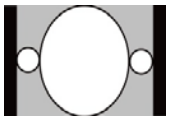
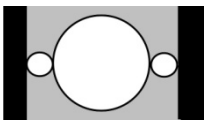
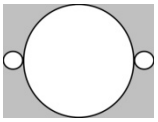
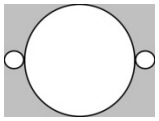
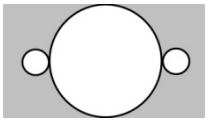
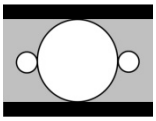
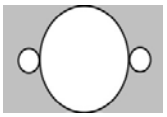
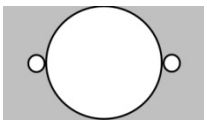
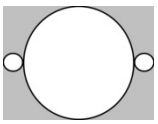
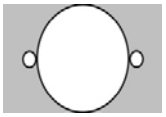
The effect of AFD varies depending on the conversion being done, with three auto modes. In these modes the conversion applied (and output AFD data) will depend on the input coded frame and AFD code, which may be presented as WSS, Video Index or SMPTE 2016.

Auto 16:9: The output coded frame is fixed at 16:9. If the input coded frame is 16:9, there will be an anamorphic correction and the output AFD will follow the input AFD. If the input coded frame is 4:3 then AFD codes for undefined/reserved, 14:9 and full frame inputs will produce a Pillarbox output. AFD codes for 16:9 Letterbox inputs will produce a conversion to a full frame output. **Auto 4:3:** The output coded frame is fixed at 4:3. If the input coded frame is 4:3, there will be an anamorphic correction and the output AFD will follow the input AFD. If the input coded frame is 16:9 then AFD codes for full frame and 14:9 inputs will produce a Letterbox output. AFD codes for a Pillarbox input will produce a correction to a full screen output. **Auto Adaptive:** If the input coded frame is 16:9, a 4:3 Pillarbox AFD will produce a 4:3 full frame output, with appropriate Video Index and/or WSS.

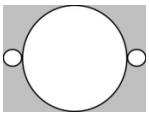
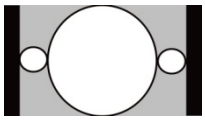
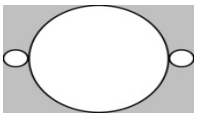
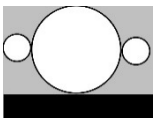
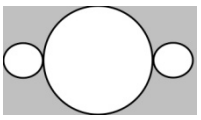
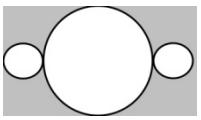
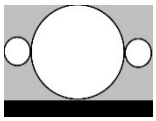
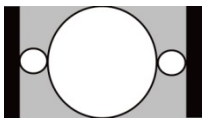
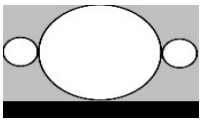
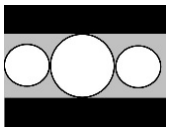
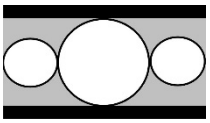
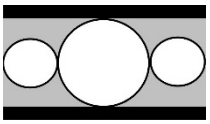
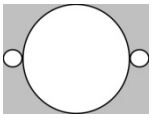
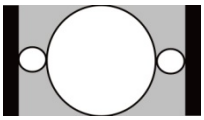
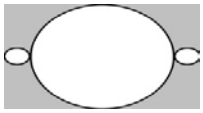
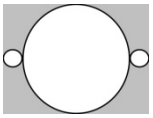
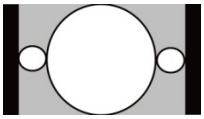
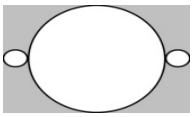
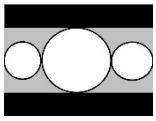
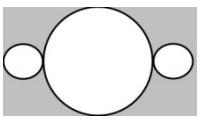
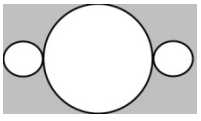
All other AFD values will cause an anamorphic correction and the output AFD will follow the input value. If the input coded frame is 4:3, a 16:9 Letterbox AFD will produce a 16:9 full frame output, with appropriate Video Index and/or WSS. All other AFD values will cause an anamorphic correction and the output AFD will follow the input value.

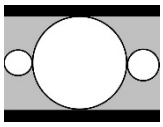
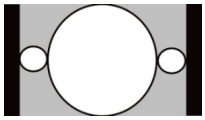
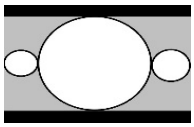
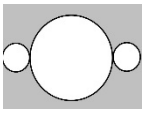
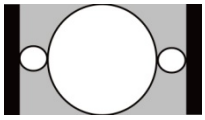
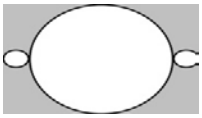
The following two tables illustrate auto aspect ratio correction from 16:9 sources and 4:3 sources with images showing input and output examples:

SMPTE 2016 AFD Code	16:9 input image example	Auto 4:3 correction (output WSS)	Auto adaptive correction (output WSS)
0, 1, 5, 6, 7, 12	 Undefined/reserved	 Letterbox 16:9 into 4:3	 Anamorphic
2	 Full frame 16:9	 Letterbox 16:9 into 4:3	 Anamorphic
3	 14:9 Pillarbox	 Letterbox 14:9 area into 4:3	 Anamorphic
4	 Letterbox image with aspect ratio > 16:9.	 Letterbox 16:9 into 4:3	 Anamorphic
8	 Full Frame 16:9 image	 Letterbox 16:9 into 4:3	 Anamorphic
9	 4:3 Pillarbox in 16:9 frame.	 Centre cut-area	 Centre cut-out 4:3 area
10	 Full frame 16:9 image (all areas protected)	 Letterbox 16:9 area into 4:3	 Anamorphic

11	 Pillarbox 14:9	 Letterbox 14:9 active area into 4:3	 Anamorphic
13	 4:3 with 'shoot and protect' 14:9 centre	 Centre cut-out 4:3 area	 Centre cut-out 4:3 area
14	 16:9 with 'shoot and protect' 14:9 centre.	 Letterbox 16:9 into 4:3	 Anamorphic
15	 16:9 with 'shoot and protect' 4:3 centre.	 Centre cut-out 4:3 from 16:9	 Anamorphic

Examples of Auto aspect ratio correction for 16:9 SD and HD signals

SMPTE 2016 AFD Code	4:3 input image example	Auto 16:9 correction	Auto adaptive correction (output WSS)
0, 1, 5, 6, 7, 12	 Undefined/reserved	 Pillarbox 4:3 into 16:9	 Anamorphic
2	 16:9 active picture (top aligned)	 Full frame conversion	 16:9 Full frame conversion
3	 14:9 active picture (top aligned)	 Pillarbox 14:9 into 16:9	 Anamorphic
4	 Letterbox image with aspect ratio >16:9	 Full frame conversion	 Full frame conversion
8	 Full Frame 4:3 image.	 Pillarbox 4:3 into 16:9	 Anamorphic
9	 4:3 Centred	 Pillarbox 4:3 into 16:9	 Anamorphic
10	 16:9 Letterbox in 4:3 frame	 Full frame conversion	 Full frame conversion

11	 14:9 Centred	 Pillarbox 14:9 into 16:9	 Anamorphic
13	 4:3 with 'shoot and protect' 14:9 centre	 Pillarbox 14:9 centre into 16:9	 Anamorphic

Examples of Auto aspect ratio correction for 4:3 SD signals

6.6 Aspect ratio size and position controls

Depending on the input format and selected output format there are up to seven fixed aspect ratios available. Each of these seven aspect ratios can be adjusted independently for picture size and position; the picture may also be cropped on all four edges. Once the controls are set they are automatically recalled whenever the particular aspect ratio is active.

6.7 HD to HD Aspect Ratio Correction

HD sources are normally always 16:9 but may not have been created in that aspect ratio and HD to HD aspect ratio correction allows for some adjustment of previous corrections. There are some limitations with HD to HD aspect ratio correction that the user should be aware of, namely:

- The conversions are only available on the UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF and are functional when all output formats are the same as the input format.
- The conversions are fixed, with the size, position and crop sliders having no effect.
- "4x3 to 14x9 Pillarbox" (4:3 to 16:9 in a 14:9 Pillarbox) is under-sized by about 4%.
- "4x3 to 14x9 Pillarbox" is only possible for the 720p50, 720p59.94 and 1080i50 formats. For other formats, a 4x3 Pillarbox is used.
- "16x9 to 16x9 Letterbox" (16:9 stretch to 16:9 Letterbox) is only possible for the 720p50, 720p59.94 and 1080i50 and 1080p50 formats. For other formats a 14x9 Letterbox is used.

7 Noise & detail

All UP-DOWN-VF models are able to detect and remove mosquito noise, a common compression artefact caused by MPEG decoders which is often exhibited as a cloud around the edges of text and computer generated graphics. Algorithms within UP-DOWN-VF detect areas where mosquito noise would be the most likely and then work to diminish the mosquito noise without blurring the edge of the text or graphics.

Fine Detail and Edge Enhancement is a video processing technology that increases the sharpness or detail of images. It is especially useful when Standard Definition video is scaled to fit high resolution displays. The controls allow the image to be either sharpened or softened as required.

7.1 Noise reduction

Noise reduction uses a combination of edge mapping and proximity mapping to produce a composite blend map to ensure noise reduction is only applied to the areas where noise is present without causing blurring of the edges. The different levels of noise reduction applied are achieved by varying the amount of clip and gain applied to the various mapping.

7.2 Edge detail and detail enhancement

UP-DOWN-VF's fine detail and edge enhancement uses a technique known as 'unsharp mask'. This is a superior method of enhancing images that does not introduce ringing. UP-DOWN-VF enhances images both horizontally and vertically.

Two types of enhancement are provided, one for fine detail and one for object edges. Fine detail enhancement applies sharpening to the entire image. Edge enhancement applies sharpening only to object edges.

Both detail enhancement and edge enhancement produce similar results, but there are subtle differences. Fine detail enhancement works best when the source is 'clean' and free from noise. Edge enhancement works well for less pristine sources. It produces a sharpening effect without making noise more visible.

To allow simultaneous dual conversions with UP-DOWN-VF, the internal architecture contains two independent aspect ratio converters with an invisible switching matrix. The main converter is able to up convert, cross convert or down convert. The secondary converter is used for down converting only. Noise reduction, detail enhancement and edge enhancement can only be applied to the main converter; this imposes certain restrictions to the use of the noise reduction and enhancements controls.

Input video standard	A-B Output formats	Conversion	Controls
SD	HD	Up	Active
	SD	Bypass	Not active
SD	SD	ARC conversion	Active
	SD	ARC conversion	Active
SD	HD	Up	Active
	HD	Up	Active
HD	HD	Up/Down/Cross	Active
	SD	Down	Not active
HD	HD	Up/Down/Cross	Active
	HD	Up/Down/Cross	Active
HD	SD	Down	Not active
	SD	Down	Not active

Noise reduction, detail enhancement and edge enhancement controls

7.3 Vertical bandwidth filter

When down converting to Standard Definition the vertical bandwidth can be optimised for a given application by selecting the most appropriate vertical bandwidth filtering. There are four filters to select from, ranging from the highest (sharpest) to the lowest (softest).

8 AFD, WSS and VI

UP-DOWN-VF models ATX and ATXS offer AFD insertion of SMPTE 2016 AFD, WSS or Video Index for use by downstream equipment.

8.1 Introduction

SMPTE 2016 AFD data can be inserted into the output video for use by downstream equipment – either manually or by automatically following the incoming AFD data. One of 16 AFD codes is embedded in an ANC data packet, which is carried in the vertical blanking. Widescreen signalling information can be inserted in 625 line SD outputs for use by downstream equipment. WSS can be inserted manually or be set to automatically follow the incoming AFD value and the conversion used. If WSS data is present on the input video this can either be passed to the output unchanged or substituted for a user selectable code. WSS data can also be set to be blanked. Video index can be inserted into the output video for use by downstream equipment. The Video index AFD value can be selected manually or automatically based on the incoming AFD value and the conversion used. Video index data can be set to be blanked or pass the input data to the output unchanged

8.2 AFD

There are three sets of controls associated with Active Format Descriptor (AFD). These are: the inserter mode control, entire image aspect ratio selector (coded frame) and the group of 16 AFD codes. These controls are repeated for both SD and HD.

The HD output will have the ANC data packets containing the AFD information inserted within the active line portion on the appropriate line.

The 16 available codes defined in SMPTE 2016 are described in the following table:

AFD code	Description	AFD code	Description
0	Undefined	8	Full Frame (as coded frame)
1	Reserved	9	4:3 Centre
2	16:9 Centre	10	16:9 Centre
3	14:9 Centre	11	14:9 Centre
4	16:9+	12	Reserved
5	Reserved	13	4:3 with shoot and protect 14:9 centre
6	Reserved	14	16:9 with shoot and protect 14:9 centre
7	Reserved	15	16:9 with shoot and protect 4:3 centre

Note: When inserting SMPTE 2016 data the inserter will blank any incoming SMPTE 2016 data.

8.3 Widescreen Signalling

Output widescreen signalling can be set to automatically follow the input AFD data or be manually selected. If WSS data should be present on the input video this can either be passed to the output unchanged or substituted for a user selected code. WSS data can also be set to be blanked. It is only possible to insert WSS information into a PAL output.

Outgoing WSS codes	Explanation	Conversion
0001	Full format 4:3	Centre cut
1000	Box 14:9 centre	Letterbox
1101	Box 16:9 centre	Letterbox
1110	Full format 16:9	Anamorphic

8.4 Video Indexing

SMPTE RP186 describes Video Index information coding for 525 and 625-line television systems. Video indexing, although not commonly used today, is still in use by some major broadcasters.

Video indexing can also be inserted into the output video for use by downstream equipment. Output video indexing is enabled by selecting the required output aspect ratio. Although in most applications the output selection will mirror the conversion setting the output video index control remains independent from the conversion setting, so that a user specified aspect ratio can have assigned the most appropriate ratio information. It is also possible to either insert blank video index data or pass the input data to the output unchanged.

The 4-bit AFD codes are identical to those for SMPTE 2016.

9 Troubleshooting

9.1 Card edge monitoring

The green LED on the front edge of the card provides power rail monitoring. The red LED currently has no function.

UP-DOWN-VF card edge

9.2 Basic fault finding guide

- **Power OK LED not illuminated:** Check that the frame PSU is functioning – refer to the Vision 3 frame manual for detailed information.
- **There are no video outputs:** Check that a valid SDI input is present and that any cabling is intact. Check the optical I/O configuration.
- **The video output exhibits jitter:** Check that the input SDI stability is within normal limits.
- **The card no longer responds to front panel control:** Check that the card is seated correctly and that the Power OK LED is lit. Check if the control panel can control another card in the same rack. If necessary reset the card.
- **Resetting the card:** If required, the card may be reset by removing the card from the rack and then re-inserting it. It is safe to re-insert the card whilst the rack is powered. Any previous configuration will be retained, use a factory reset to erase any configurations stored in the card.

10 Specification

General

Dimensions	96mm x 325mm module with DIN 41612 connector.
Weight	180g.
Power consumption	UP-DOWN-VF (all models) 13 Watts. FIP-VF - 0.6 Watts. FOP-VF - 0.6 Watts. FIO-VF - 1 Watt.

Inputs

Video	HD or SD SDI 270 Mb/s to 2.970 Gb/s serial digital compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A. Cable Equalisation: 3G (2.970Gb/s) – 100 metres, Belden 1694A or equivalent. HD (1.485Gb/s) – 125 metres, Belden 1694A or equivalent. SD (270Mb/s) – 160 metres, Belden 8281A or equivalent. Automatic de-embedding to SMPTE 272 or SMPTE 299-1. SC optical input.
Reference	Analogue Black and Burst or tri-level syncs via Vision frame's Reference Input BNCs (UP-DOWN-AS-VF & UP-DOWN-ATXS-VF models only).
Video standards supported	1080p 50/59.94, 1080i 50/59.94, 720p 50/59.94, 625/50, 525/59.94 - Input format auto selected.

Outputs

Video	Serial output: 270Mb/s to 2.970Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A. Output follows the input format. Audio is embedded to SMPTE 272 or SMPTE 299-1. LC optical output.

Rear Module I/O

VR01	One video input and six video outputs split into two groups: Output 1 – three outputs; Output 2 – three outputs. All on BNC connectors.
VR03	One video input and five video outputs split into two groups: Output 1 – three outputs including relay fail; Output 2 – two outputs. All on BNC connectors.

VR14	One BNC video input and five BNC video outputs split into two groups: Output 1 – two outputs on BNC; Output 2 – three outputs on BNC. Optional Optical I/O on dual LC connector (optical output driven from Output 1 group).

Delays

Minimum delay	All models = one frame.
Audio delay	Adjustable separate PCM audio delay of 0 to 120ms. Adjustable Dolby E delay of 0-3 frames.
Video delay	Adjustable zero to three frame video delay for AS and ATXS models which can be used to match other large system delays or compensate for audio delays from Dolby E decoding.
Additional delays	Up to 40ms audio and video delay as bulk delay or with respect to timing reference for AS and ATXS models. Different delays are possible for different formats.
Dolby E Alignment	Optional alignment of Dolby E guardband will set an additional video delay of 0.5 frames.

Audio

Audio Replace	For ATX and ATXS models only, routing of embedded input audio on a channel by channel basis of up to four output embedder groups.
Audio Processing	Mute by stereo pair. Synchroniser tracking: For AS and ATXS models, delays through the video synchroniser will be automatically matched for PCM audio by either sample drop and repeat or clock resampling. Resampling maximum frequency distortion limited to 0.8%. Dolby E signals are tracked by a variable delay and frame drop/repeat.

Conversions

Up conversions:

- 625/50 to 720p50
- 525/59.94 to 720p59.94
- 625/50 to 1080i50
- 525/59.94 to 1080i59.94
- 625/50 to 1080p50
- 525/59.94 to 1080p59.94

Cross conversions:

- 720p50 to 1080i50
- 720p59.94 to 1080i59.94
- 720p50 to 1080p50
- 720p59.94 to 1080p59.94
- 1080i50 to 720p50
- 1080i59.94 to 720p59.94
- 1080i50 to 1080p50
- 1080i59.94 to 1080p59.94
- 1080p50 to 1080i50
- 1080p59.94 to 1080i59.94
- 1080p50 to 720p50
- 1080p59.94 to 720p59.94

Down conversions:

- 720p50 to 625/50
- 720p59.94 to 525/59.94
- 1080i50 to 625/50
- 1080i59.94 to 525/59.94
- 1080p50 to 625/50
- 1080p59.94 to 525/59.94

Data insert

Teletext and sub-titles:	UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF support both OP-47 and SMPTE 2031. When up converting, they will take the teletext data (System B to ITU-R BT 653-3) out of the SD coded signal and put the same data in the OP-47 or SMPTE 2031 data stream they create. An HD output can only contain SMPTE 2031 or OP-47, not both. When down converting they can take teletext data out of OP-47 or SMPTE 2031 packets and encode it as an SD output. If going from HD to HD, they can be used to convert from SMPTE 2031 to OP-47 or vice versa. It is possible to specify which line in the VANC space is used to carry SMPTE 2031 or OP-47.
Closed caption:	When down converting 59.94Hz video, UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF can take the closed caption data from CEA-708 and output the corresponding CEA-608 waveform. When up converting they will decode the CEA-608 waveform and insert the data into the appropriate section of CEA-708 on the 3G/HD output.
Timecode:	Can pass Ancillary Timecode from the input to the output. The Ancillary Timecode can be used to get the interlace timing correct and maintain a correct field sequence when down converting. When up converting, can read Digital Vertical Interval Timecode (DVITC, SMPTE 266M-2002) on the SD input and translate it to Ancillary Timecode (ATC, SMPTE 12M-2-2008) on the HD output. When down converting, can take in timecode as ATC ancillary data and can generate DVITC.
AFD,WSS,VI:	SMPTE 2016 AFD, SMPTE RP186 WSS and ETSI EN 300 294 Video index data can be extracted and/or inserted.

Misc.

Auxiliary data	Auxiliary data passed.

Input fail output

Type:	User selectable between - No output, freeze frame, black, colour bars or blue. Not all models offer freeze or bars.

Test signal output

Type: AS and ATX models only: Colour bars, blue, black, freeze frame.

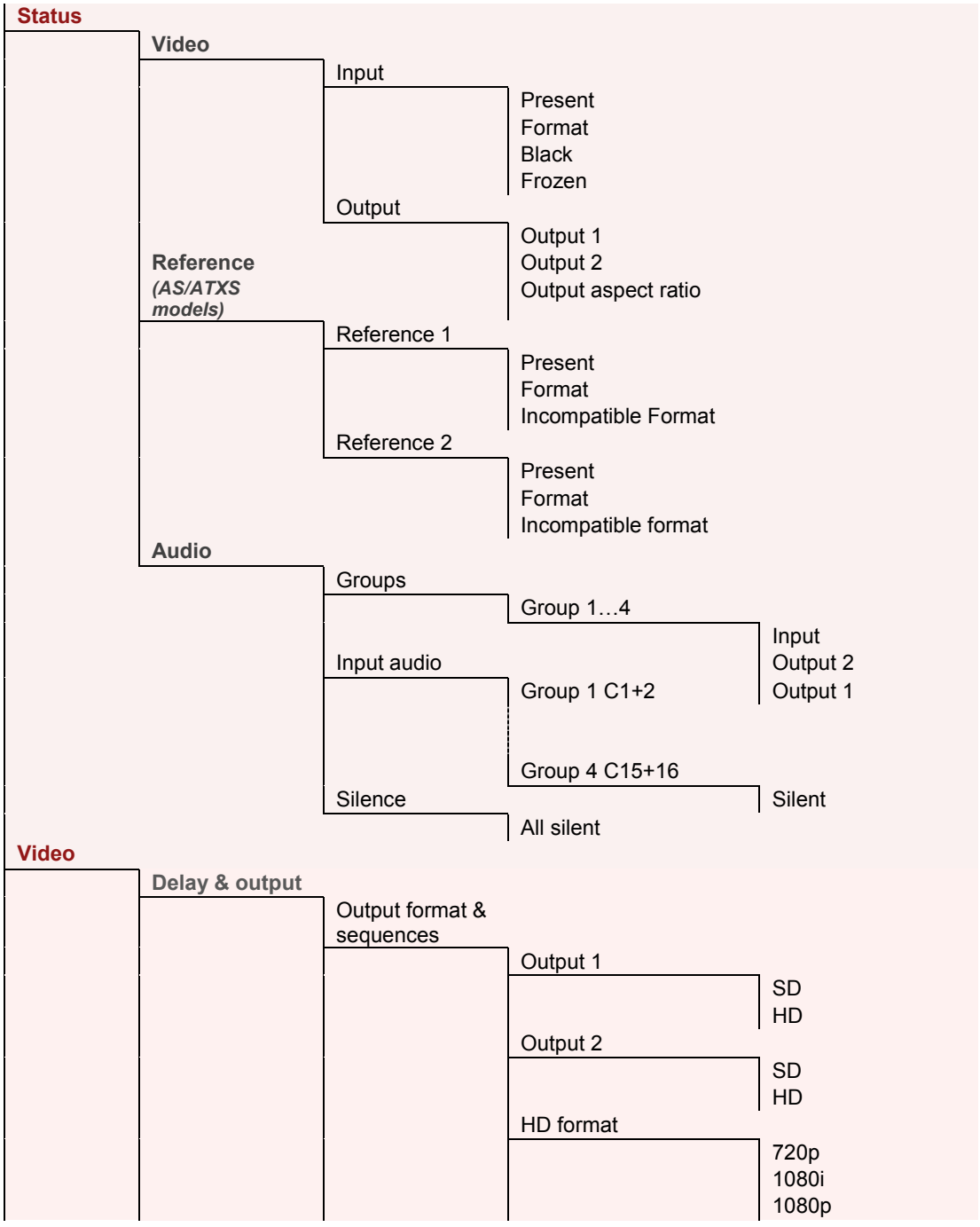
Control

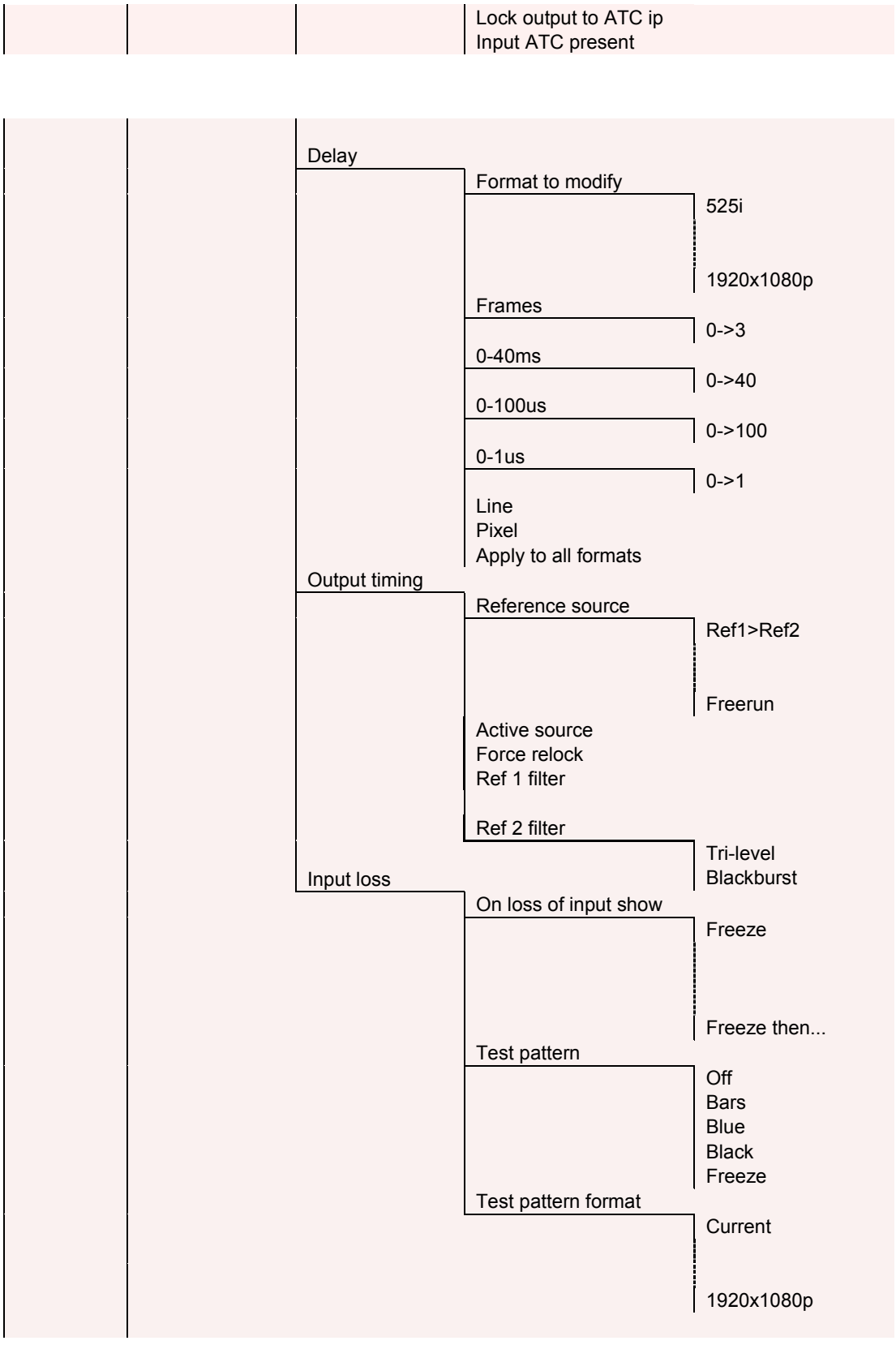
Remote: Monitor and control from 'Vision' frame front panel, VisionPanel remote panel and VisionWeb Control which is available via the web server on the frame and allows operation using a standard web browser on a computer, tablet or phone.
Complimentary SNMP control and monitoring via frame CPU and Ethernet connection.

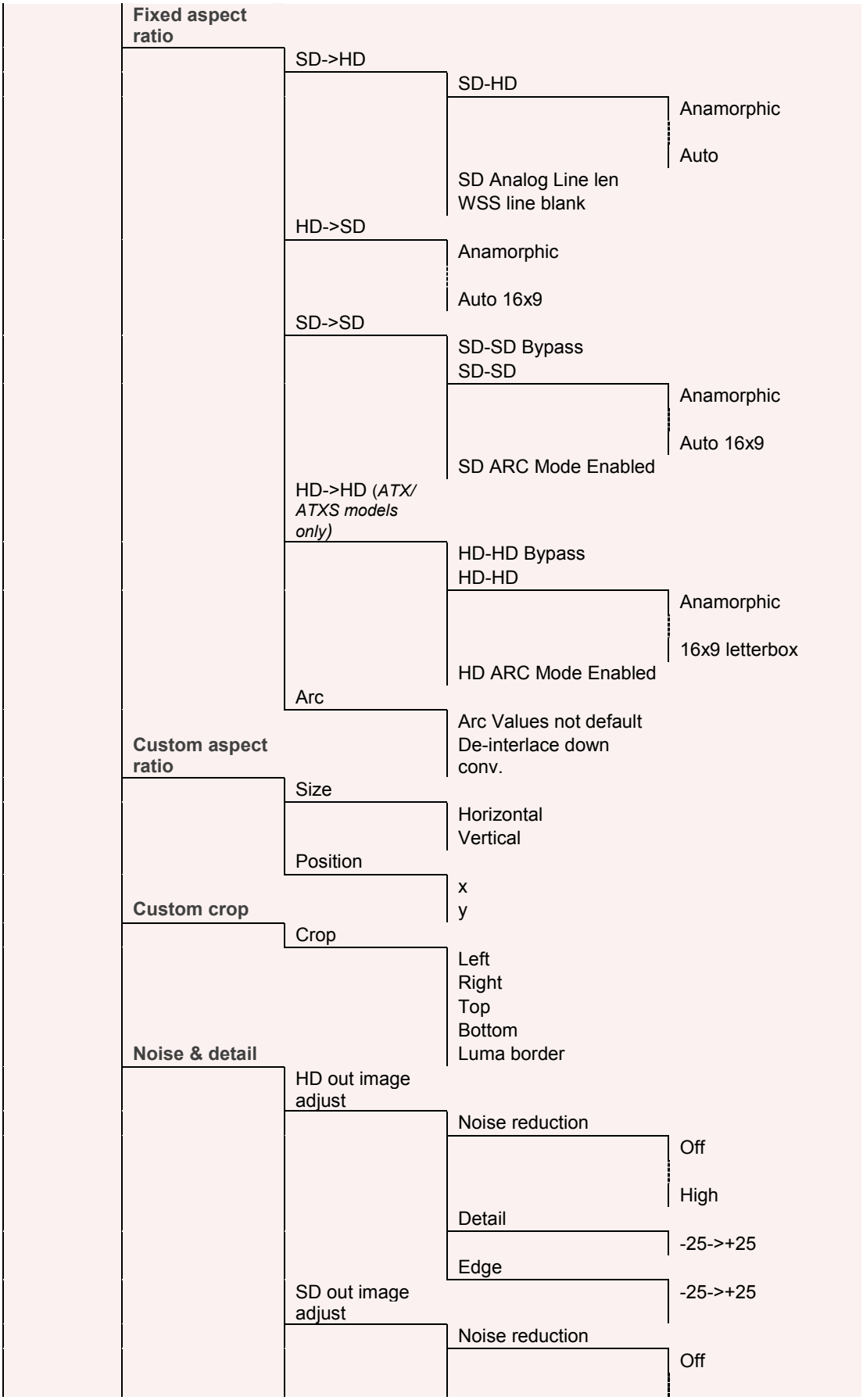
11 Appendix 1

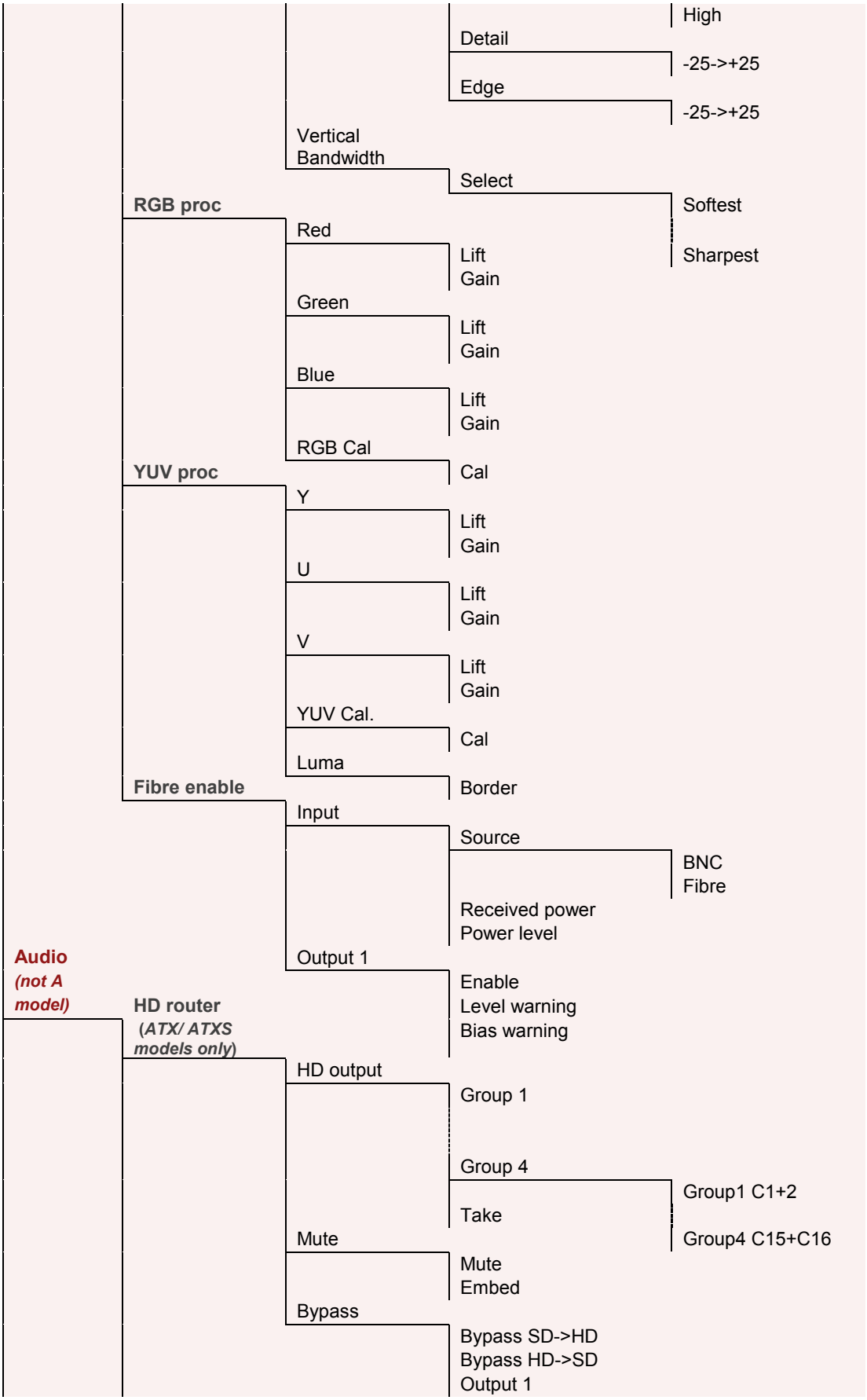
11.1 Menu Structure

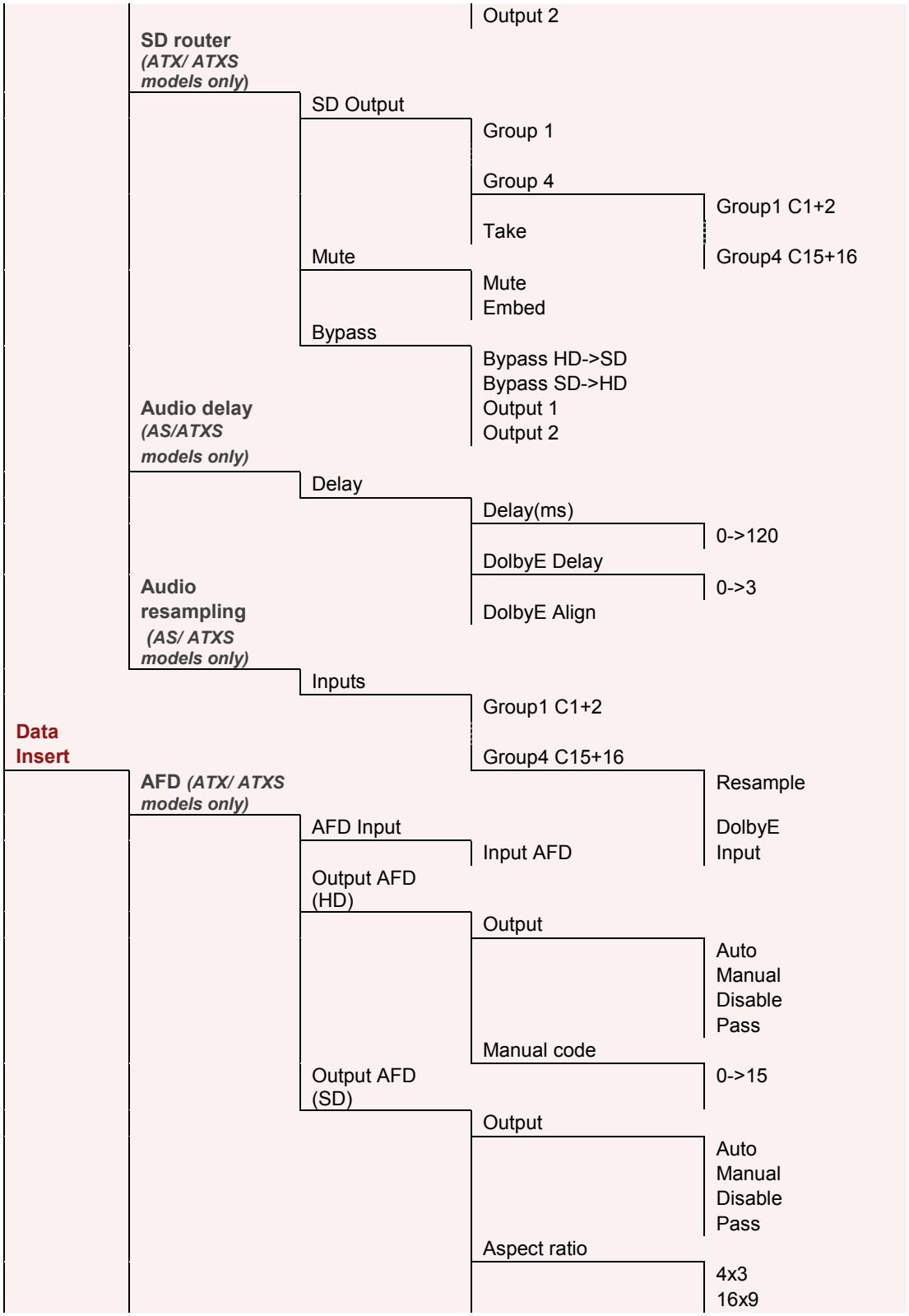
Operators of a 'Vision' frame active front panel can use the following tree to negotiate the UP-DOWN-VF menus. Items shown in red are tabs in VisionWeb and panels in VisionPanel, and items shown in grey are menus in both.

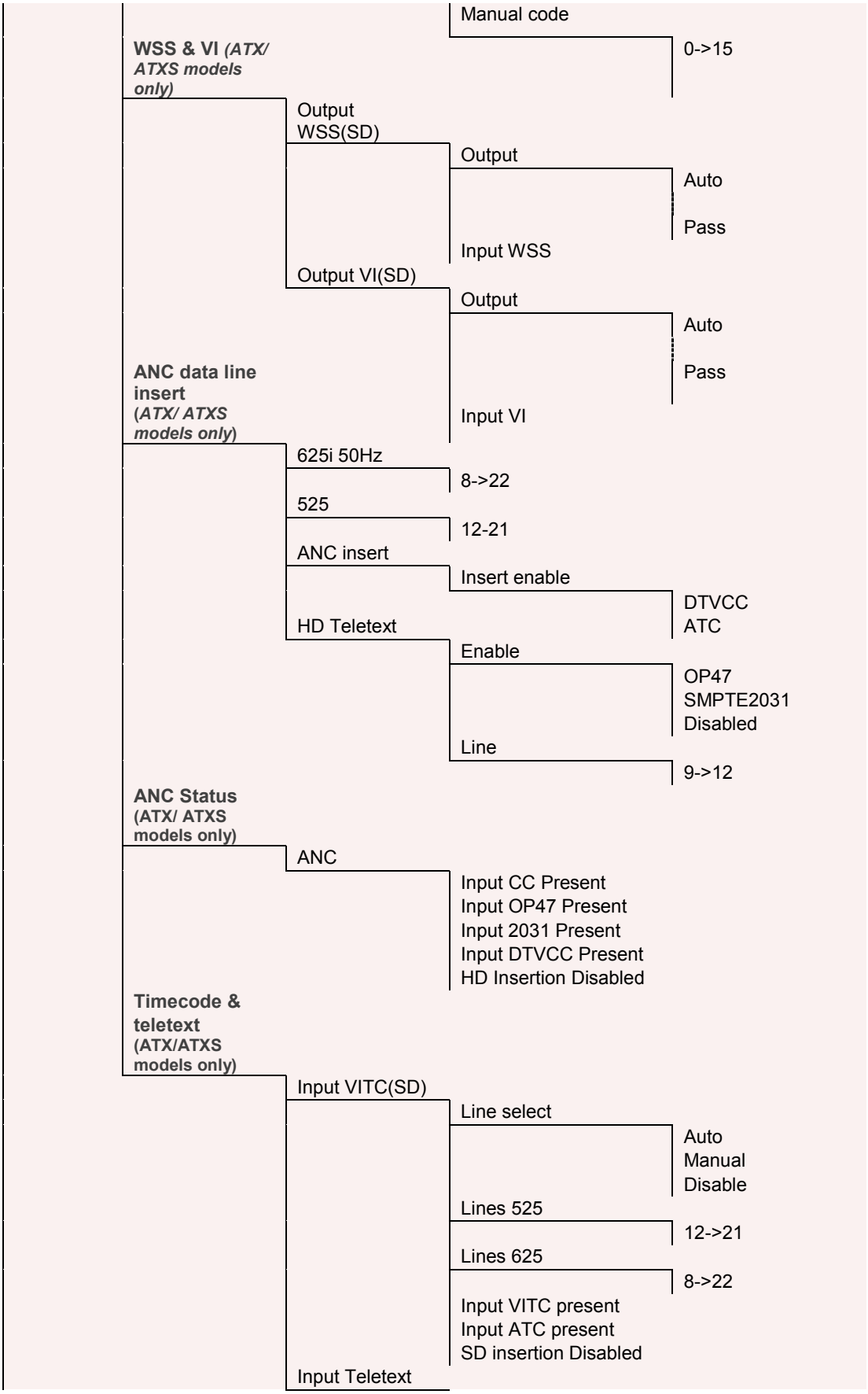


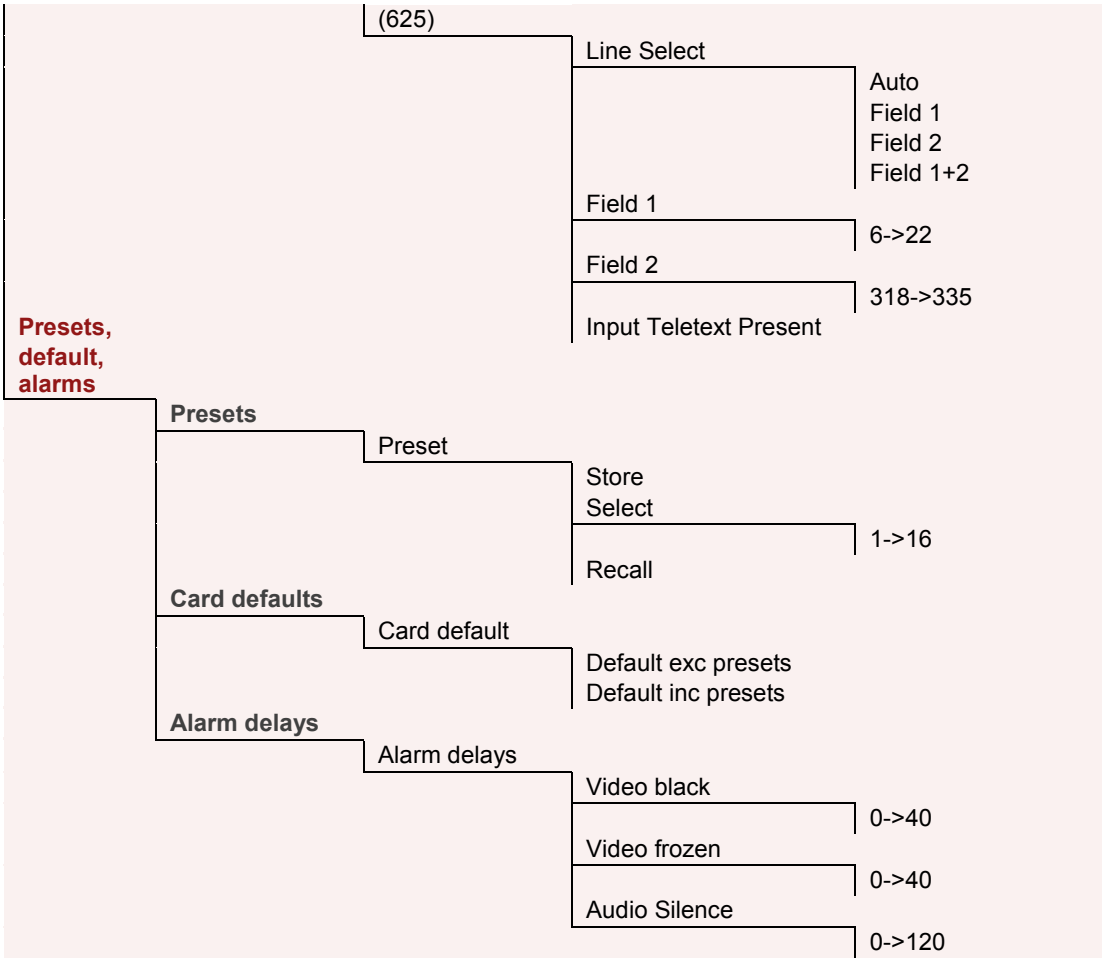

Lock output to ATC ip
Input ATC present
Delay
Format to modify
525i
1920x1080p
Frames
0->3
0-40ms
0->40
0-100us
0->100
0-1us
0->1
Line
Pixel
Apply to all formats
Output timing
Reference source
Ref1>Ref2
Freerun
Active source
Force relock
Ref 1 filter
Ref 2 filter
Tri-level
Blackburst
Input loss
On loss of input show
Freeze
Freeze then...
Test pattern
Off
Bars
Blue
Black
Freeze
Test pattern format
Current
1920x1080p


Fixed aspect ratio
SD->HD
SD-HD
Anamorphic
Auto
SD Analog Line len
WSS line blank
HD->SD
Anamorphic
Auto 16x9
SD->SD
SD-SD Bypass
SD-SD
Anamorphic
Auto 16x9
SD ARC Mode Enabled
HD->HD (ATX/ ATXS models only)
HD-HD Bypass
HD-HD
Anamorphic
16x9 letterbox
HD ARC Mode Enabled
Arc
Arc Values not default
De-interlace down conv.
Custom aspect ratio
Size
Horizontal
Vertical
Position
x
y
Custom crop
Crop
Left
Right
Top
Bottom
Luma border
Noise & detail
HD out image adjust
Noise reduction
Off
High
Detail
-25->+25
Edge
-25->+25
SD out image adjust
Noise reduction
Off


High
Detail
-25->+25
Edge
-25->+25
Vertical Bandwidth
Select
Softest
Sharpest
RGB proc
Red
Lift
Gain
Green
Lift
Gain
Blue
Lift
Gain
RGB Cal
Cal
YUV proc
Y
Lift
Gain
U
Lift
Gain
V
Lift
Gain
YUV Cal.
Cal
Luma
Border
Fibre enable
Input
Source
BNC
Fibre
Received power
Power level
Audio
(not A model)
Output 1
Enable
Level warning
Bias warning
HD router
(ATX/ ATXS models only)
HD output
Group 1
Group 4
Group1 C1+2
Take
Group4 C15+C16
Mute
Mute
Embed
Bypass
Bypass SD->HD
Bypass HD->SD
Output 1


Output 2
SD router (ATX/ ATXS models only)
SD Output
Group 1
Group 4
Group1 C1+2
Take
Group4 C15+16
Mute
Mute
Embed
Bypass
Bypass HD->SD
Bypass SD->HD
Output 1
Output 2
Audio delay (AS/ATXS models only)
Delay
Delay(ms)
0->120
DolbyE Delay
0->3
Audio resampling (AS/ ATXS models only)
DolbyE Align
Inputs
Group1 C1+2
Group4 C15+16
Data Insert
AFD (ATX/ ATXS models only)
Resample
AFD Input
DolbyE Input
Input AFD
Output AFD (HD)
Output
Auto
Manual
Disable
Pass
Manual code
Output AFD (SD)
0->15
Output
Auto
Manual
Disable
Pass
Aspect ratio
4x3
16x9


Manual code
0->15
WSS & VI (ATX/ ATXS models only)
Output WSS(SD)
Output
Auto
Pass
Input WSS
Output VI(SD)
Output
Auto
Pass
Input VI
ANC data line insert (ATX/ ATXS models only)
625i 50Hz
8->22
525
12-21
ANC insert
Insert enable
DTVCC
ATC
HD Teletext
Enable
OP47
SMPTE2031
Disabled
Line
9->12
ANC Status (ATX/ ATXS models only)
ANC
Input CC Present
Input OP47 Present
Input 2031 Present
Input DTVCC Present
HD Insertion Disabled
Timecode & teletext (ATX/ATXS models only)
Input VITC(SD)
Line select
Auto
Manual
Disable
Lines 525
12->21
Lines 625
8->22
Input VITC present
Input ATC present
SD insertion Disabled
Input Teletext


(625)
Line Select
Auto
Field 1
Field 2
Field 1+2
Field 1
6->22
Field 2
318->335
Input Teletext Present
Presets, default, alarms
Presets
Preset
Store
Select
1->16
Recall
Card defaults
Card default
Default exc presets
Default inc presets
Alarm delays
Alarm delays
Video black
0->40
Video frozen
0->40
Audio Silence
0->120