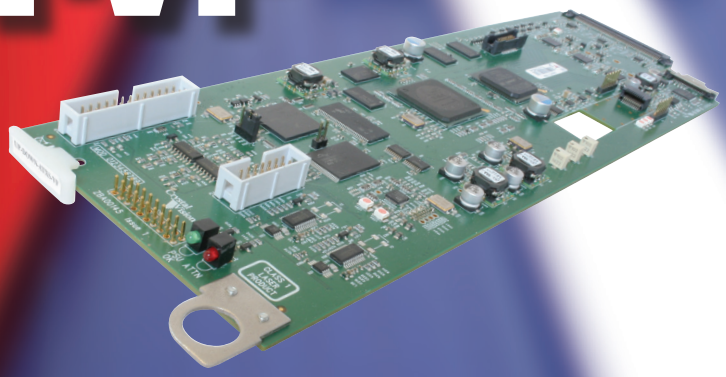
Crystal Vision

Vision SYSTEM

UP-DOWN-VF

Up/down/cross converters



The UP-DOWN-VF range allows flexible up, down and cross conversions between 3Gb/s, HD and SD sources, gives the output picture quality that broadcasters standardise on, and can perform two different conversions at the same time – providing configurable dual outputs and perfect for studios and playout areas that need to operate in HD and SD simultaneously.

Available in four different versions to suit all applications, the UP-DOWN-VF range offers a wide range of features including integrated fibre I/O connectivity, relay bypass protection, four group audio handling, audio routing, two downstream video synchronisers, video and audio delays, AFD insertion and reading, timecode conversion and transport of teletext and closed captions.

The UP-DOWN-VF range gives you more video outputs than Crystal Vision has offered before, while the two synchronising versions – which give you timed signals in two formats – take advantage of the dual syncs distributed from the Vision frame, resulting in easier wiring and the option of a backup reference.

With up to 20 cards fitting in the Vision 3 frame, the UP-DOWN-VF range saves you rack space and can be housed alongside any other interface or IP cards from the Vision range.

Which one do you need?	UP-DOWN-A-VF	UP-DOWN-ATX-VF	UP-DOWN-AS-VF	UP-DOWN-ATXS-VF
Four group embedded audio handling	●	●	●	●
Audio routing		●		●
Synchronisers (and tracking audio delay)			●	●
AFD insertion and reading		●		●
Timecode conversion		●		●
Teletext and closed captions transport		●		●

- **Up/down/cross converter for 3Gb/s, HD and SD sources, available in four versions**
- **Exceptional output picture quality: includes motion adaptive video de-interlacing, adjustable detail enhancement, noise reduction, acclaimed proprietary down conversion, horizontal and vertical low pass filtering, four vertical filter characteristics and RGB and YUV lift and gain**
- **Can perform two different conversions simultaneously and provide dual outputs: easy to output co-timed HD and SD copies of a feed at the same time**
- **Feature rich: four group embedded audio handling, audio routing, two framestore synchronisers, video and audio delays, sophisticated Dolby E handling, aspect ratio conversion, AFD insertion and reading, signal reporting, timecode conversion and transport of teletext and closed captions**
- **Optional integrated fibre input/output connectivity (with VR14 rear module) means you won't be limited by cable lengths**
- **Prevent signal loss: relay bypass protection on power failure or card removal for extra peace of mind (with VR03 rear module)**
- **Get peace of mind by knowing the status of your signal: easily monitor a large number of video and audio alarms**
- **Flexible remote control and monitoring using frame integrated control panel, VisionPanel remote control panel, SBB-4 smart button box, ASCII and JSON protocols, SNMP and the web browser-based VisionWeb Control**
- **Save rack space: 96mm x 325mm card allows up to 20 UP-DOWN-VF in 3U**

WHICH CONVERSIONS CAN THEY DO?

A | ATX | AS | ATXS

Up conversions	Down conversions	Cross conversions	
SD to 720p	720p to SD	720p to 1080i	1080i to 1080p
SD to 1080i	1080i to SD	720p to 1080p	1080p to 1080i
SD to 1080p	1080p to SD	1080i to 720p	1080p to 720p

PICTURE PROCESSING WHEN UP AND CROSS CONVERTING

A | ATX | AS | ATXS

The UP-DOWN-VF range wins side-by-side evaluations on the quality of its up conversion.

A good up converter will create an HD picture that is as good as the original SD picture. That is all that can be achieved – and it often isn't. Many up converters will create an HD signal that looks significantly worse than the original SD material. Pictures containing horizontal movement and a high level of detail are common in many television applications and require careful processing. High quality de-interlacing is the key to good up conversion. UP-DOWN-VF's up and cross conversion uses motion adaptive video de-interlacing, which maximises the picture's vertical resolution while choosing the best processing method based on the video content. The vertical resolution of the picture is doubled by considering both fields, and even if the picture has moved during the time delay between the two fields, UP-DOWN-VF's movement detection allows it to use the full vertical resolution available – therefore preserving the detail.

Adjustable detail enhancement and noise reduction are also available. Up converting will give an apparently softer picture and therefore adjustable detail enhancement allows the image to be sharpened without ringing, with the options of using either the Fine detail enhancement to apply sharpening to the entire image, or the Edge enhancement to apply sharpening only to object edges. Noise reduction ensures that MPEG encoders do not waste unnecessary bandwidth on detail that is not really part of the picture.

PICTURE PROCESSING WHEN DOWN CONVERTING

A | ATX | AS | ATXS

Crystal Vision down conversion has been tested by many of the world's largest broadcasters and then selected because of the quality of the conversion.

A High Definition picture with a lot of detail is surprisingly difficult to down convert well. This process is helped by a good de-interlacer, but is dependent on the quality of the horizontal and vertical filters. Ideally you want a perfect filter that will keep everything that can be shown in the Standard Definition bandwidth and remove everything that cannot. If the filter is less than perfect you get a soft picture (some of the picture unnecessarily removed) and aliasing (frequencies that are out of band for SD, creating false imaging).

The UP-DOWN-VF range features Crystal Vision's acclaimed proprietary down conversion, which avoids aliasing while retaining picture sharpness thanks to the sophisticated two dimensional filtering.

Enhanced motion adaptive video de-interlacing can remove 'jaggies' on near horizontal lines, such as the lines on a tennis court or football ground, while horizontal and vertical low pass filtering can reduce the flickering of a slow vertical pan on shots with significant detail.

Four vertical filter characteristics (sharpest, sharp, soft and softest) are additionally available for those who want to optimise the performance for their material when down converting.

EASY TO MAINTAIN COLOUR FIDELITY

A | ATX | AS | ATXS

For further picture improvements there is a video proc-amp, with RGB and YUV lift and gain controls allowing independent digital image adjustments in both the RGB and YUV domains to help maintain colour fidelity.

PERFORM TWO CONVERSIONS AT THE SAME TIME (AND GET DUAL OUTPUTS)

A | ATX | AS | ATXS

The UP-DOWN-VF range 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.

This makes them the perfect up/down/cross converter for the installations that work in multiple definitions: it allows them to simultaneously create HD and SD copies of a feed from this one card and so easily fulfil their requirement to offer both HD and SD programming.

UP-DOWN-VF gives dual outputs, with two output groups – 1 and 2. Each output group can be individually selected as either SD or 3G/HD, making it possible to configure both outputs as SD, both outputs as 3G/HD (720p, 1080i or 1080p), or one output as 3G/HD with the other as SD. If Outputs 1 and 2 are both selected as 3G or HD, then the outputs will be identical. Providing up to three copies of each output also reduces the need for additional distribution amplifiers in the system.

One of UP-DOWN-VF's particularly 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 you won't need to change your wiring.

Individual controls allow you to correctly time the outputs into your HD and SD systems. It's easy for the signals to all have the same timing if required: each output can either be converted from the input or given a matching delay.

USE THEM WITH FOUR AUDIO GROUPS

A | ATX | AS | ATXS

The UP-DOWN-VF range can be used with up to four audio groups – making them ideal as your main signal path up/down/cross converter if you're working with embedded audio. They will de-embed the four groups and convert them to the appropriate format before re-embedding them.

On the UP-DOWN-AS-VF and UP-DOWN-ATXS-VF versions, a matching audio delay can be added to match the video conversion and so co-time the video and audio.

Dolby E data will be automatically detected and processed appropriately.

DEAL WITH ANY ASPECT RATIO CONVERSION REQUIREMENTS

A | ATX | AS | ATXS

The UP-DOWN-VF range has the ability to deal with any aspect ratio conversion requirements when up and down converting.

A multitude of different aspect ratio conversions are available, meaning that UP-DOWN-VF can deal with any conceivable misshaped image that comes in, allowing you to quickly put anything on air that you get from anywhere in any condition. (See the specification for full list of conversions.) Each of the standard aspect ratios can be individually adjusted away from the default values to create customised versions by using independent sets of size, position and crop controls.

UP-DOWN-VF also ensures the picture is the right shape at all times by coping with both analogue and digital SD blanking widths – which prevents an HD signal having black lines down the side when up converting, and prevents SD signals from losing the sides of the picture when down converting.

All versions can be used as an SD to SD aspect ratio converter if required – useful for those who need to change the aspect ratio of their Standard Definition sources and prefer to buy an up converter (rather than a dedicated ARC) as a long-term purchase.

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF can be used as an HD to HD aspect ratio converter for when the HD input and output formats are identical. This is useful for anyone with signals that were up converted using the wrong aspect ratio, resulting in an HD image that is too squashed, stretched or cropped. UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF additionally offer AFD code activated aspect ratio conversion. (See the next section.)

AUTOMATICALLY CHOOSE THE CORRECT ASPECT RATIO

ATX | ATXS

HD programmes are often made of a mixture of true High Definition sources and SD-originated sources that have been up converted, and the AFD data in the signal gives information about which areas of the screen contain a picture and which areas have black 'padding'.

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF can automatically select the appropriate output aspect ratio according to the SMPTE 2016 AFD data, Video index or WSS embedded in the input video. The effect of the AFD data varies depending on the conversion being done, with three auto modes available: Auto 16:9, Auto 4:3 and Auto Adaptive. (See the specification for full information.)

They can also be used to provide picture format information to downstream equipment, by inserting SMPTE 2016 AFD data, Video index and WSS into the video output – either manually or by following the incoming AFD.

SYNCHRONISE AND CONVERT AT THE SAME TIME

AS | ATXS

UP-DOWN-AS-VF and UP-DOWN-ATXS-VF include signal timing functionality.

To keep the output valid at all times, UP-DOWN-AS-VF and UP-DOWN-ATXS-VF have two synchronisers downstream of the converter – one in the 3G/HD path and one in the SD path – which means that they give a continuous stable output in the two required formats even when the input standard changes. Whatever format or timing the signal arrives with, you'll get timed signals in two desired formats to use in your system.

There are two operational modes: synchroniser and delay line.

In synchroniser mode UP-DOWN-AS-VF and UP-DOWN-ATXS-VF take their timing from the selected reference and will automatically synchronise sources that are up to a frame apart, fixing any incorrect frame rates plus any delays. There are two references connected via the Vision frame, and ten options for the reference selection: if the reference and video frame rate become incompatible, the card will attempt to use the other listed reference source and if that is not compatible, lock to the input video. (See the specification for full details of the options available). Cross-locking allows a 3Gb/s, HD or SD input to be referenced to either HD tri-level syncs or SD Black and Burst, providing they share the same frame rate. Audio signals can optionally be made to track this dynamic video delay to maintain lip-sync.

Delay mode takes its timing from the video input; the synchroniser is bypassed and just the bulk delays are active (see next section for delay details). Delay mode is activated either manually by selecting the Video>Freerun option or automatically if the selected references fail.

UP-DOWN-AS-VF and UP-DOWN-ATXS-VF will synchronise video containing Dolby E, linear audio or both – allowing a mixture of Dolby E and linear AES within the same audio group. They separate the Dolby E and linear audio and synchronise both types in the appropriate way before re-embedding the audio. They will also auto-correct timing errors with the guardband, aligning it correctly with the output video switching point.

Automatic freeze is available when input fails through loss of signal. You can choose to show the last good frame or alternatively a black or blue screen or 100% colour bars.

EASY TO MATCH THE TIMING OF ALL YOUR SIGNALS: UP-DOWN-AS-VF AND UP-DOWN-ATXS-VF

AS | ATXS

UP-DOWN-AS-VF and UP-DOWN-ATXS-VF provide a flexible range of video and audio delays to help match all your signals and ensure Dolby E alignment. Some of these delays are of fixed length, while others are dynamic.

For the video...

In synchroniser mode the synchroniser delay automatically adjusts over a range 0 to 1 frame to provide the desired video output timing. It is easy to compensate for mistimed sources elsewhere in the system: the output timing can be fully adjusted with respect to the reference using three time-based controls: 0 - 40ms adjustable in 0.1ms steps, 0 - 100us adjustable in 1us steps and 0 - 1us adjustable in 5ns steps. Each supported video format can have independent timing adjustments, to allow an offset between the two output paths if required. Up to three frames of video delay (adjustable in whole frame steps) can be used to match big video delays in the system, with this delay global to all outputs and output formats.

In delay mode the video delay can be adjusted using the one, two or three frames of video delay (global to all outputs and output formats) plus the three time-based controls (0 - 40ms, 0 - 100us and 0 - 1us) which allow independent timing adjustments for each supported video format.

In both modes, ticking the Dolby E align box will add a further 0.5 frames of delay to the video to ensure correct Dolby E alignment.

For the audio...

An internal tracking audio delay tracks the video delay, running the audio fast or slow to ensure the video and audio stay correctly timed and to avoid lip-sync errors. There are two tracking audio delays: one for the linear audio and the other for Dolby E.

All audio will be set to the same delay as the video; ticking the Dolby E align box will ensure that the Dolby E guardband is correctly aligned in the outgoing video and will add an extra 0.5 frames of delay to the linear AES to ensure it matches the video delay.

A fixed audio delay for Dolby E of zero, one, two or three frames is available to match the equivalent video delay.

Up to 120ms of audio delay (adjustable in 1ms steps) can be added on top of the tracking to compensate the linear AES for any audio delays introduced by other equipment.

EASY TO MATCH THE TIMING OF ALL YOUR SIGNALS: UP-DOWN-A-VF AND UP-DOWN-ATX-VF

A | ATX

On top of the minimum delay of one frame, a variable video delay of up to one frame allows UP-DOWN-A-VF and UP-DOWN-ATX-VF to compensate for video delays generated by other equipment. There are three time-based controls to adjust the output timing: 0 - 40ms (adjustable in 0.1ms steps), 0 - 100us (adjustable in 1us steps) and 0 - 1us (adjustable in 5ns steps), with independent timing adjustments for each supported video format.

RESAMPLE YOUR AUDIO

AS | ATXS

UP-DOWN-AS-VF and UP-DOWN-ATXS-VF's audio resampling ensures a smooth matching of the audio and video delay, and you can use the eight audio resamplers on the channel pairs to avoid clicks and pops in the audio should the video drop a frame. Any embedded audio channels can be selected to bypass the resamplers, with Dolby E automatically bypassing them.

ROUTE YOUR AUDIO

ATX | ATXS

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF provide audio routing by stereo channel pair. The 8 x 8 stereo router allows the order of the embedded audio to be shuffled between all four groups and means you can select which of the

audio groups are embedded in the output stream – useful for those working with one group of audio in SD and two groups in HD. Stereo pairs can also be muted.

FLAG UP FAULTY SIGNALS

A | ATX | AS | ATXS

The UP-DOWN-VF range has video and audio signal probe functionality making them useful for flagging up faulty signals, especially in multi-channel applications.

They can monitor a wide range of parameters including video format and presence, references present and incompatible (UP-DOWN-AS-VF and UP-DOWN-ATXS-VF only), video black, video frozen, audio present, audio silent and Dolby E present, with the cards able to provide warnings of any problems via SNMP traps.

Video frozen and video black can be delayed before an alarm is asserted to prevent false alarming during brief video pauses. All audio parameters can be delayed before an alarm is asserted to prevent false alarming during quiet audio periods.

TIMECODE PASSING

A | ATX | AS | ATXS

All versions can pass Ancillary Timecode from the input to the output and use the ATC data to get the interlace phasing correct when down converting from 1080p or 720p.

TIMECODE CONVERSION

ATX | ATXS

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF can provide conversion of timecode.

When up converting they 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 they can take in timecode as ATC ancillary data and generate a DVITC analogue timecode waveform on the SD output.

DEALING WITH SUBTITLES AND TELETEXT

ATX | ATXS

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF can carry teletext and subtitle information across different definitions. They support both OP-47 and SMPTE 2031 which are ways of transporting teletext data in HD or 3Gb/s video.

When up converting they will take the teletext data out of the analogue-style 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 analogue waveforms on 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 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.

DEALING WITH CLOSED CAPTIONS

ATX | ATXS

UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF include the ability to transport closed captions, which provide additional or interpretive information to viewers who wish to access it – such as subtitles, audio description or an alternative language.

When down converting 59.94Hz video, they can take the closed caption data from CEA-708 and output the corresponding CEA-608 waveform, while 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.

FIBRE CONNECTIVITY – ON THE CARD

A | ATX | AS | ATXS

If you need to up and down convert signals from beyond your local equipment bay, it's easy to give the UP-DOWN-VF range integrated fibre connectivity. Just order either the FIP-VF fibre input option, FOP-VF fibre output option or FIO-VF fibre input and output option.

Designed for SMPTE 297-2006 short-haul applications, the FIP-VF is used to receive an optical input and the FOP-VF to transmit an optical output using a Class 1 laser. The FIO-VF can do both – giving you simultaneous fibre input and output.

With a FIP-VF or FIO-VF fitted you can select your video input source to be taken either from the input BNC or the optical input.

Having the fibre integral to the board reduces the need to use up additional rack space for separate fibre optic transmitters and receivers – as well as saving you money.

The UP-DOWN-VF range can also support a CWDM laser if required.

CHOOSE YOUR CONTROL

A | ATX | AS | ATXS

The remote control and monitoring options for the UP-DOWN-VF range include an integrated control panel on the Vision 3 frame, the VisionPanel remote control panel, the SBB-4 smart button box, our ASCII and JSON protocols, SNMP and the VisionWeb web browser control.

See the REMOTE CONTROL section of the Specification for the extensive list of features that can be controlled and monitored.

SAVE RACK SPACE – AND PROTECT YOUR OUTPUT

A | ATX | AS | ATXS

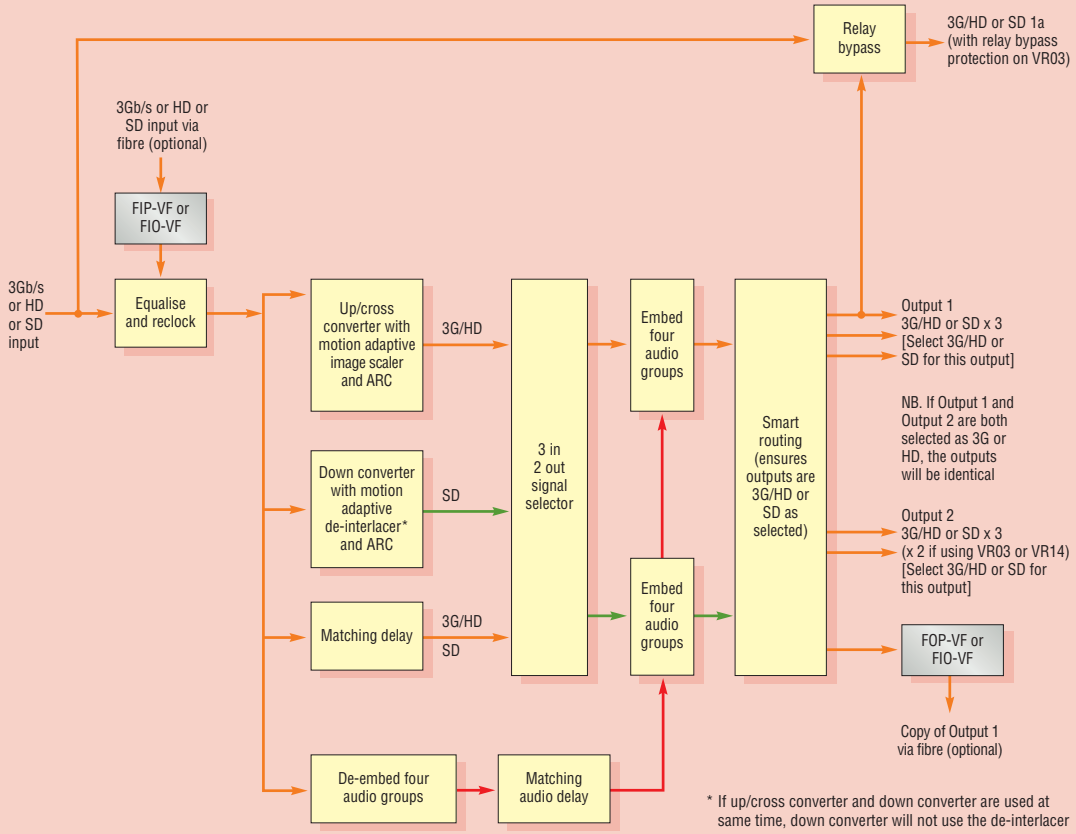
Fitting in the standard Vision frames (currently available in 3U size), the UP-DOWN-VF range are space-saving 96mm x 325mm cards that sit in one frame slot – allowing up to 20 up and down converters in 3U.

The UP-DOWN-VF range can be used with three different single slot frame rear modules to access the inputs and outputs. The default rear module is the VR01 which provides three feeds of each output. Giving three feeds of the first output and two feeds of the second, the VR03 rear module includes relay bypass protection on power failure or board removal, giving the system an extra layer of security and preventing signal loss – most useful for those using the first output bank to distribute multiple unchanged copies of the input. The single slot VR14 is designed for those using a fibre input or output option (the FIP-VF, FOP-VF and FIO-VF). It provides two feeds of Output 1 and three feeds of Output 2, along with a copy of Output 1 on fibre when using the FOP-VF or FIO-VF fibre options.

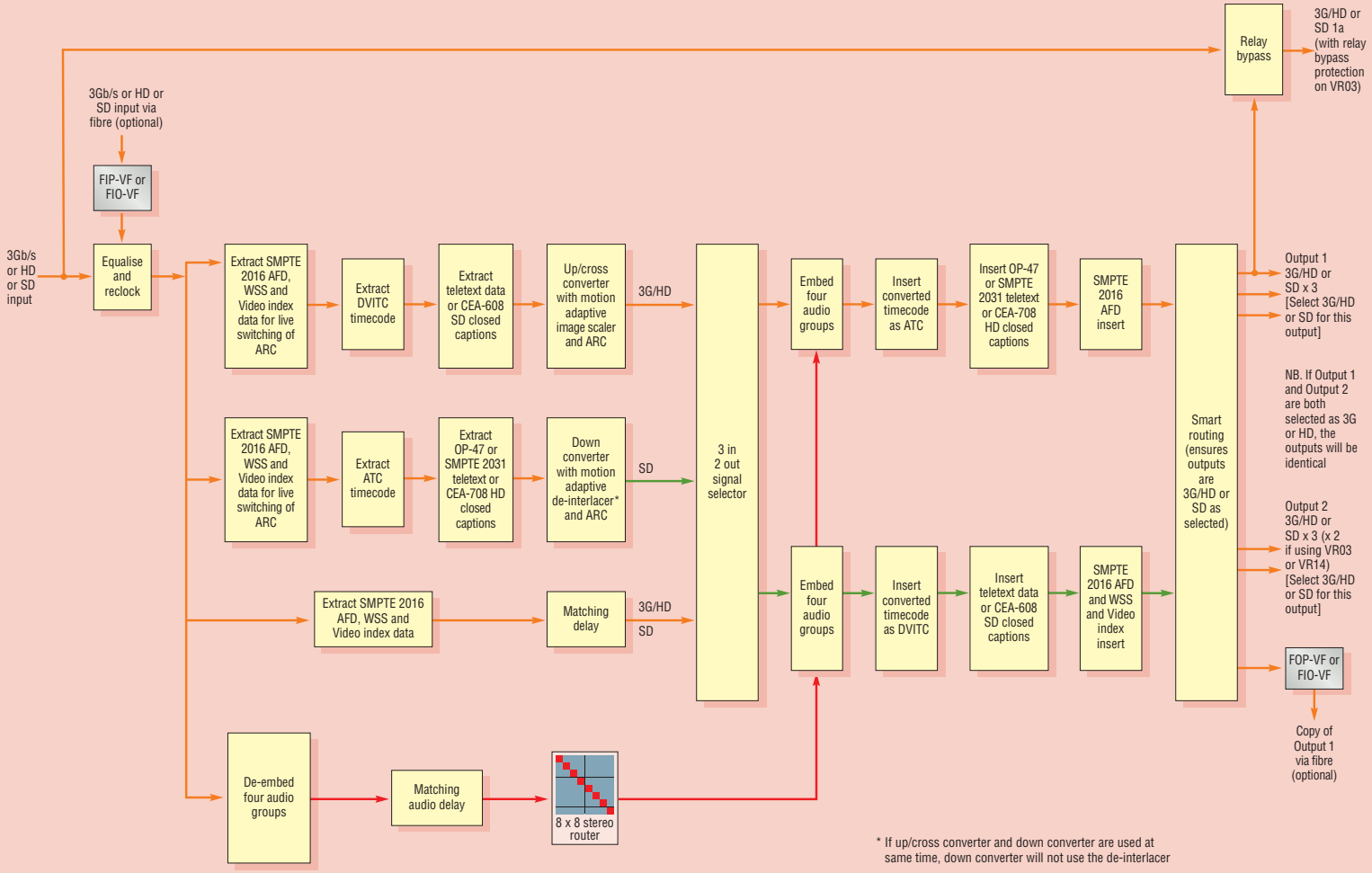
CHOOSING THE RIGHT UP-DOWN-VF FOR YOU

	UP-DOWN-A-VF	UP-DOWN-ATX-VF	UP-DOWN-AS-VF	UP-DOWN-ATXS-VF
Up converts (SD to 720p, SD to 1080i, SD to 1080p – all at 50Hz and 59.94Hz)	●	●	●	●
Cross converts (720p to 1080i, 720p to 1080p, 1080i to 720p, 1080i to 1080p, 1080p to 1080i, 1080p to 720p – all at 50Hz and 59.94Hz)	●	●	●	●
Down converts (720p to SD, 1080i to SD, 1080p to SD – all at 50Hz and 59.94Hz)	●	●	●	●
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 two different conversions at same time	●	●	●	●
Two framestore synchronisers			●	●
Uses analogue reference distributed from frame			●	●
Automatic freeze			●	●
Video delays	40ms additional user delay	40ms additional user delay	1, 2 or 3 frames plus 40ms additional user delay	1, 2 or 3 frames plus 40ms additional user delay
Handles four audio groups	●	●	●	●
Linear AES tracking audio delay			●	●
Dolby E alignment delay (uses processing delay where possible to provide +/- 0.5 frame delay relative to video when aligning Dolby E guardband)			●	●
Audio delays (on top of tracking)			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 resampling of linear AES			●	●
Aspect ratio conversion when up converting	●	●	●	●
Aspect ratio conversion when down converting	●	●	●	●
HD to HD aspect ratio conversion when input/output format identical		●		●
SD to SD aspect ratio conversion	●	●	●	●
Flexible aspect ratio adjustments (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		●		●
Motion adaptive video de-interlacing	●	●	●	●
Four vertical filter characteristics	●	●	●	●
Video proc-amp (RGB and YUV lift and gain controls)	●	●	●	●
Video proc-amp when HD input/output format identical		●		●
Timecode handling	Passes	Passes and converts between ATC and DVITC	Passes	Passes and converts between ATC and DVITC
Teletext handling (OP-47, SMPTE 2031)		●		●
Closed captions transport (CEA-608 and CEA-708)		●		●
Relay bypass protection (VR03 option)	●	●	●	●
Fibre I/O (VR14 option)	●	●	●	●
Rear module used	VR01, VR03 and VR14	VR01, VR03 and VR14	VR01, VR03 and VR14	VR01, VR03 and VR14

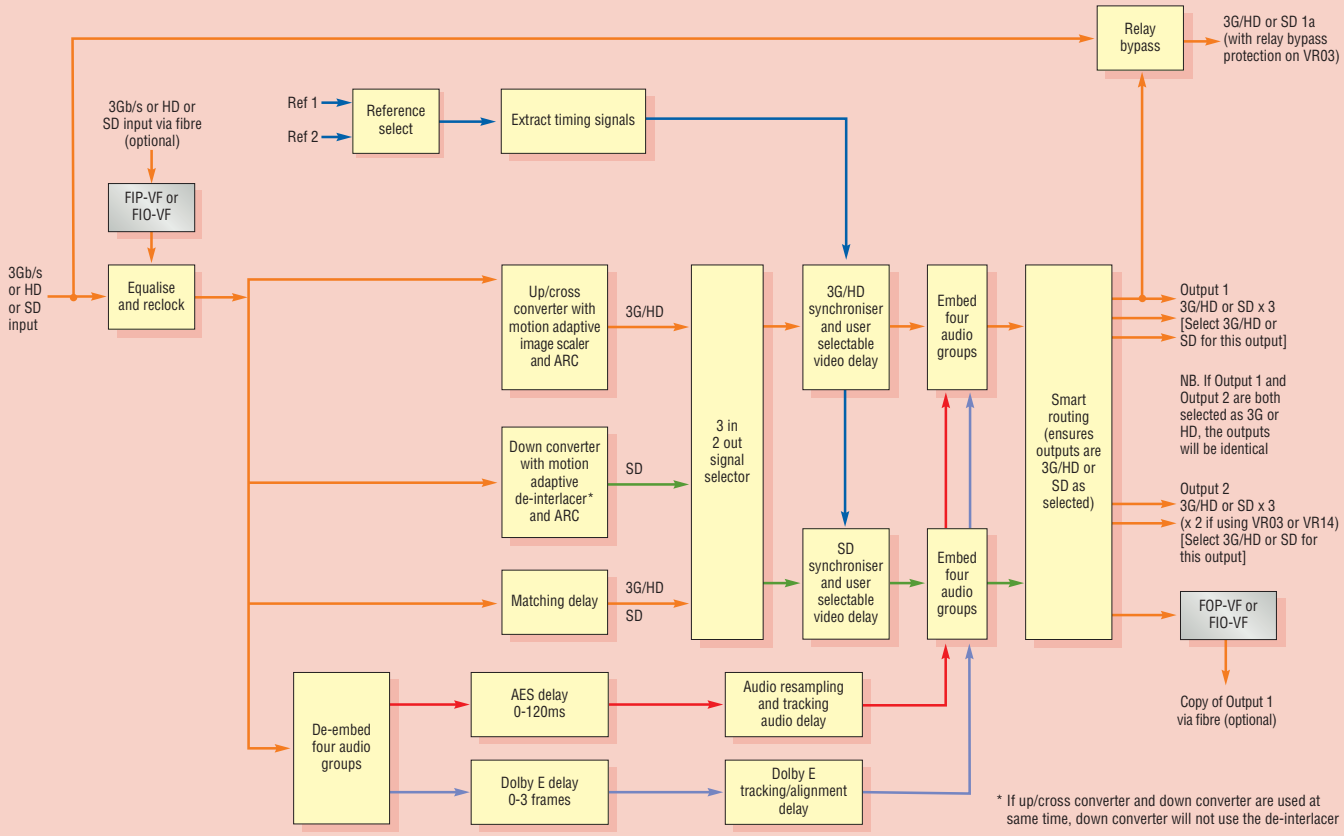
UP-DOWN-A-VF



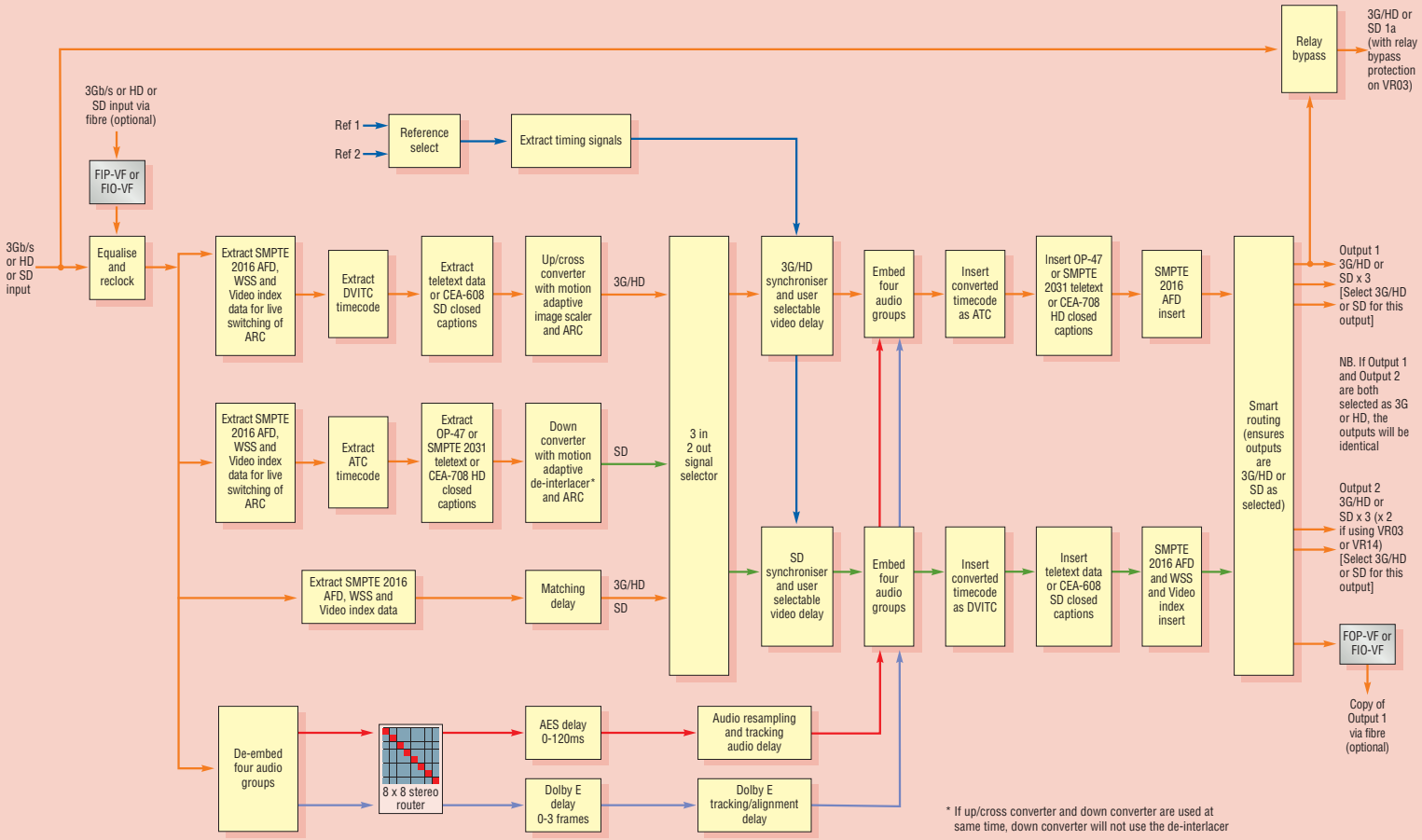
UP-DOWN-ATX-VF



UP-DOWN-AS-VF

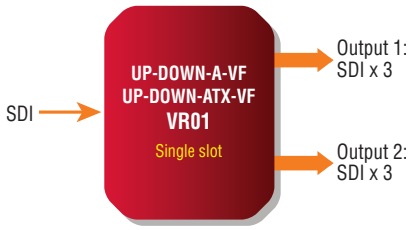


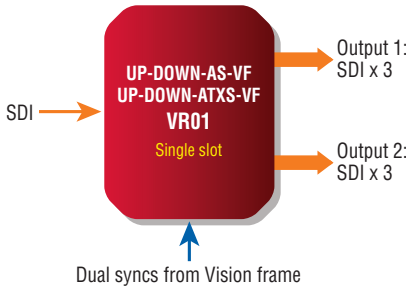
UP-DOWN-ATXS-VF

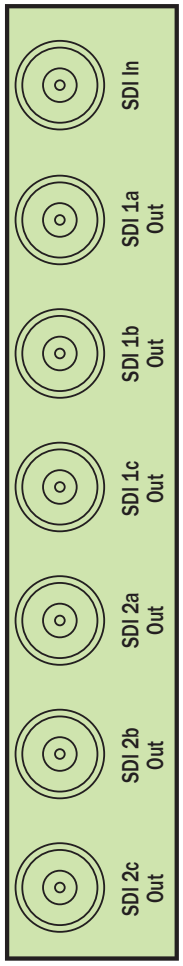


REAR MODULE CONNECTIONS

For general applications:

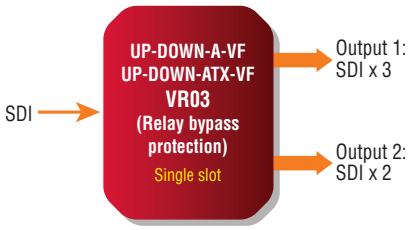


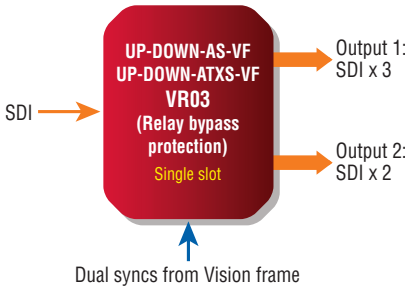


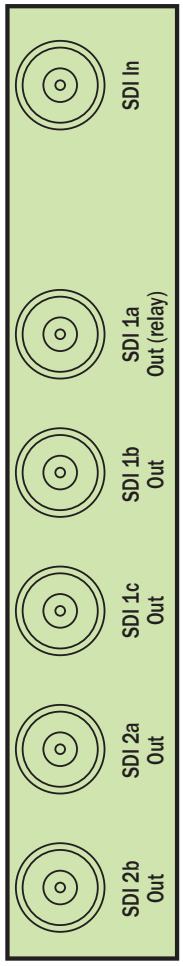


VR01

For relay bypass applications:

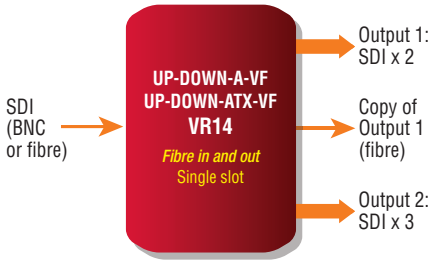




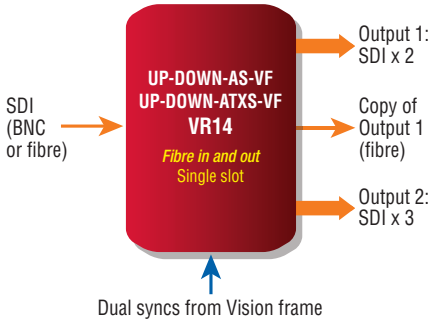


VR03

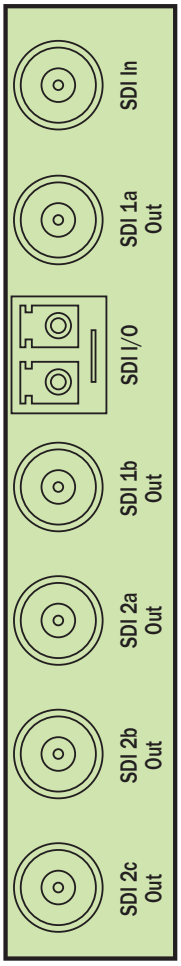
For fibre input/output applications:



NB. Select FIP-VF option for fibre in, FOP-VF option for fibre out and FIO-VF option for fibre in and out



NB. Select FIP-VF option for fibre in, FOP-VF option for fibre out and FIO-VF option for fibre in and out



VR14

NB. The term UP-DOWN-VF is generally used to refer to all versions

MECHANICAL

Standard Vision card 96mm x 303mm (96mm x 325mm including finger pull)

Weight: 180g

Power consumption: 13 Watts (UP-DOWN-VF); 0.6 Watts (FIP-VF and FOP-VF); 1 Watt (FIO-VF)

INPUT TO OUTPUT 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

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

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

VIDEO INPUT

One 3Gb/s, HD or SD input with reclocking

When using FIP-VF or FIO-VF fibre input options allows selection between one optical and one electrical input

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A

3Gb/s cable equalisation up to 100m with Belden 1694A or equivalent

HD cable equalisation up to 125m with Belden 1694A or equivalent (approx. 100m with Belden 8281)

SD cable equalisation up to 160m Belden 8281 or equivalent

Automatic de-embedding to SMPTE 272 or SMPTE 299-1 (only level A for 1080p)

INTEGRATED FIBRE OPTIONS

UP-DOWN-VF can be given integrated fibre connectivity by fitting the FIP-VF fibre input option, FOP-VF fibre output option or FIO-VF fibre input and output option. The chosen option should be fitted at the factory

To access the optical inputs or outputs a VR14 frame rear module must be used

FIP-VF, FOP-VF and FIO-VF meet the SMPTE 297-2006 short-haul specification, allowing operation with single-mode and multi-mode fibre

Connector type: LC

FIP-VF or FIO-VF input:

Optical wavelength: 1260-1620nm

Input level maximum: -1dBm

Input level minimum: Typical -20dBm (-18dBm 3Gb/s pathological)

FOP-VF or FIO-VF output:

Optical power: Max 0.0dBm, min -5.0dBm

Fibre pigtail: Single-mode 9/125uM

Optical wavelength: 1290-1330nm (1310 typical)

Extinction ratio: 7.5dB

Laser safety classification: Class 1 FDA and IEC60825-1 Laser Safety compliant

Loss of input will automatically disable the laser output. The output can also be manually enabled and disabled

CWDM laser can be fitted on request. The 18 output wavelengths defined by the ITU are 1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591 and 1611nm. For CWDM, order the FOP-CWDM-VF and specify the wavelength required

VIDEO OUTPUTS

UP-DOWN-VF can perform two different conversions at the same time, making it easy to create HD and SD copies of a feed. Each output will either be converted from the input or given a matching delay to ensure they remain consistently timed, with further timing adjustments available

There are two output groups, 1 and 2. The user can select whether an output group will be either SD or 3G/HD. The output groups can be configured as either:

- 1=SD and 2=SD
- 1=3G/HD and 2=3G/HD
- 1=SD and 2=3G/HD
- 1=3G/HD and 2=SD

If High Definition is selected for any group, the HD format control will determine the output format (720p, 1080i or 1080p). If Output 1 and Output 2 are both selected as 3G/HD, the outputs will be identical

Once set the output selection will remain true, irrespective of any change in the input standard

Using single slot VR01 rear module: Two co-timed outputs, with three feeds of Output 1 and three feeds of Output 2

Using single slot VR03 rear module: Two co-timed outputs, with three feeds of Output 1 and two feeds of Output 2. The VR03 provides relay bypass protection to help maintain programme output. An electromechanical relay switch needs power to hold the switch in one state and will revert to the other state (card bypass) on loss of power. It prevents signal loss by mechanically connecting the input to the first feed of Output 1 on complete frame power failure or card removal

Using single slot VR14:

- With FIP-VF fibre input option: Two co-timed outputs, with two feeds of Output 1 and three feeds of Output 2
- With FOP-VF fibre output option: Two co-timed outputs, with two feeds of Output 1 and three feeds of Output 2, along with a copy of Output 1 on fibre
- With FIO-VF fibre input and output option: Two co-timed outputs, with two feeds of Output 1 and three feeds of Output 2, along with a copy of Output 1 on fibre

Serial output: 270Mb/s or 1.5Gb/s or 3Gb/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 (only level A for 1080p)

UP-DOWN-A-VF and UP-DOWN-ATX-VF: On loss of input the output can be user selected as black, blue or no output

UP-DOWN-AS-VF and UP-DOWN-ATXS-VF: Automatic freeze is available when input fails through loss of signal. The user can specify to show the last good frame or alternatively a black or blue screen or 100% colour bars (with or without an initial delay of three seconds)

PICTURE PROCESSING WHEN UP AND CROSS CONVERTING

Pixel based motion adaptive de-interlacing means that UP-DOWN-VF will automatically choose the best processing method based on the video content. In video containing significant movement the output picture will look natural and smooth

Adjustable detail enhancement allows the user to sharpen the edges in the image, reducing the perceived softness of an up converted image. Fine detail enhancement applies sharpening to the entire image, while the Edge enhancement applies sharpening only to object edges

Noise reduction is available and can be used to ensure that MPEG encoders do not waste unnecessary bandwidth on detail that is not really part of the picture

Video proc-amp for picture optimisation, with adjustment for the video gain, black level and independent RGB and YUV gains

PICTURE PROCESSING WHEN DOWN CONVERTING

UP-DOWN-VF uses Crystal Vision's proprietary down conversion, which avoids aliasing while retaining picture sharpness thanks to the sophisticated two dimensional filtering

Enhanced motion adaptive compensation de-interlacing can remove 'jaggies' on near horizontal lines

Horizontal and vertical low pass filtering can reduce the flickering of a slow vertical pan on shots with significant detail

When down converting the performance can be further optimised by choosing one of four alternative vertical filter characteristics (sharpest, sharp, soft, softest)

Video proc-amp for picture optimisation, with adjustment for the video gain, black level and independent RGB and YUV gains

BYPASS MODE

To maintain the best picture quality UP-DOWN-VF will automatically enter a bypass mode when the input is the same as the selected output standard, bypassing the major processing blocks and adding a matching delay

ASPECT RATIO CONVERSION

The following aspect ratio conversions are available when up converting from SD to HD or 3Gb/s:

For 16:9 SD systems: 16:9 Anamorphic, 16:9 to 4:3 Letterbox with centre cut, 14:9 to 4:3 Letterbox compromise and 16:9 to 4:3 Letterbox

For 4:3 SD systems: 4:3 to 16:9 Pillarbox, 4:3 to 14:9 Pillarbox compromise and 4:3 to 16:9 Full Screen

The following aspect ratio conversions are available when down converting from 3Gb/s or HD to SD:

For 16:9 SD systems: 16:9 Anamorphic, 4:3 to 16:9 Pillarbox, 4:3 to 14:9 Pillarbox compromise and 4:3 to 16:9 Full Screen

For 4:3 SD systems: 16:9 to 4:3 Letterbox, 16:9 to 14:9 Letterbox compromise and 16:9 to 4:3 Full Screen with centre cut

The following aspect ratio conversions are available for SD to SD sources:

For 16:9 SD systems: 16:9 Anamorphic, 4:3 to 16:9 Pillarbox, 4:3 to 14:9 Pillarbox compromise and 4:3 to 16:9 Full Screen

For 4:3 SD systems: 16:9 to 4:3 Letterbox, 16:9 to 14:9 Letterbox compromise and 16:9 to 4:3 Full Screen with centre cut

The following aspect ratio conversions are available for HD to HD or 3Gb/s to 3Gb/s sources when

continued overleaf...

the input and output format is identical (on UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF only):

Anamorphic, 4:3 to 16:9 - 16:9 Full Screen, 4:3 to 16:9 - 14:9 Pillarbox (undersized by about 4% and for 720p50, 720p59.94 and 1080i50 only – other formats will use 4:3 Pillarbox), 4:3 to 16:9 - 4:3 Pillarbox, 16:9 Stretch - 16:9 Full Screen, 16:9 Stretch - 14:9 Letterbox and 16:9 Stretch - 16:9 Letterbox (720p50, 720p59.94, 1080i50 and 1080p50 only – other formats will use 14:9 Letterbox)

The standard aspect ratios can be adjusted from their default values by using independent sets of size, position and crop controls (except when using the HD to HD or 3Gb/s to 3Gb/s ARC):

Vertical and horizontal picture size adjustment: continuous adjustment of approximately +/- 25% of nominal image size

Vertical and horizontal picture position adjust +/- 50%

Vertical and horizontal picture crop adjust +/- 100% of picture size

Copes with both analogue and digital SD blanking widths. When analogue blanking width is selected, the Anamorphic conversion uses 702 pixels of SD (rather than 720 pixels) to create the 1920 pixels of 1080i or 1080p, and all other aspect ratios are adjusted by a similar amount

ACTIVE FORMAT DESCRIPTION, VIDEO INDEX AND WIDESCREEN SIGNALLING (UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF)

Can use the SMPTE 2016 AFD, WSS or Video index data embedded in the input video to automatically select the output aspect ratio. Aspect ratio can be changed live on air

If more than one type of AFD data is present, the priority order is SMPTE 2016, then Video index, then WSS

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

Response to WSS and SMPTE 2016/Video index AFD codes:

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 conversion 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 conversion 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 conversion 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 conversion 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 conversion and the output AFD will follow the input value

VIDEO DELAYS (UP-DOWN-A-VF AND UP-DOWN-ATX-VF)

Delay through board: Minimum delay of one video frame

Maximum delay of two video frames

On top of the minimum delay, a variable video delay of up to one frame allows it to compensate for video delays generated by other equipment. There are three time-based controls to adjust the output timing: 0 - 40ms adjustable in 0.1ms steps, 0 - 100us adjustable in 1us steps and 0 - 1us adjustable in 5ns steps. Independent timing adjustments for each supported video format

VIDEO TIMING ADJUSTMENTS AND DELAYS (UP-DOWN-AS-VF AND UP-DOWN-ATXS-VF)

Delay through board: Minimum delay of one video frame

Maximum delay of five video frames in both synchroniser and delay modes

There are two synchronisers downstream of the converter, one in the 3G/HD path and one in the SD path

Two tri-level syncs or analogue Black and Burst references (Reference 1 and Reference 2), connected via the Vision frame

3Gb/s, HD or SD source can use either type of reference. When cross-locking it is necessary for both the video input and reference to share the same frame rate

There are ten options for the reference selection, selectable via VisionWeb. The hierarchy runs from left to right: if the reference and video frame rate become incompatible, the card will attempt to use the other listed reference source and if that is not compatible, lock to the input video:

- Ref1>Ref2>Video>Freerun: Will attempt to use Reference 1 initially, then Reference 2, then video, then will freerun
- Ref1>Video>Freerun: Will attempt to use Reference 1 initially, then video, then will freerun
- Ref1>Ref2>Freerun: Will attempt to use Reference 1 initially, then Reference 2, then will freerun
- Ref1>Freerun: Will attempt to use Reference 1 initially, then will freerun
- Ref2>Ref1>Video>Freerun: Will attempt to use Reference 2 initially, then Reference 1, then video, then will freerun
- Ref2>Video>Freerun: Will attempt to use Reference 2 initially, then video, then will freerun
- Ref2>Ref1>Freerun: Will attempt to use Reference 2 initially, then Reference 1, then will freerun
- Ref2>Freerun: Will attempt to use Reference 2 initially, then will freerun
- Video>Freerun: Will attempt to use video initially, then will freerun
- Freerun: Will freerun

When Auto relock enable is selected, the card will automatically relock when a lost reference is restored. Selecting Force lock (with Auto relock disabled) will force the synchroniser to relock after a reference is restored, and can be activated at a non-critical time to avoid video disturbance

In synchroniser mode UP-DOWN-AS-VF/UP-DOWN-ATXS-VF takes its timing from the selected reference and will automatically synchronise sources that are up to a frame apart

In synchroniser mode the output timing can be fully adjusted with respect to the reference using three time-based controls: 0 - 40ms adjustable in 0.1ms steps, 0 - 100us adjustable in 1us steps and 0 - 1us adjustable in 5ns steps. Independent timing adjustments for each supported video format, to allow an offset between the two output paths if required

In synchroniser mode one, two or three frames of video delay can be used to match big video delays in the system. This delay is global to all outputs/output formats

In delay mode timing is derived from the 3Gb/s, HD or SD input. Delay mode is activated either manually by selecting the Video>Freerun option or automatically if the selected references fail

In delay mode the video delay can be adjusted using the one, two or three frames of video delay (global to all outputs/output formats) plus the three time-based controls (0 - 40ms in 0.1ms steps, 0 - 100us in 1us steps and 0 - 1us in 5ns steps) which allow independent timing adjustments for each supported video format

With Dolby E align selected, 0.5 frames of delay will be added to the video to ensure Dolby E alignment

EMBEDDED AUDIO PASSING

De-embeds and re-embeds all four audio groups

Dolby E data will be automatically detected and processed appropriately

Bypass: Audio bypassed in HANC space, with the same delay as the video

AUDIO RESAMPLING (UP-DOWN-AS-VF AND UP-DOWN-ATXS-VF)

Linear AES can be resampled in channel pairs using eight audio resamplers

DOLBY E HANDLING (UP-DOWN-AS-VF AND UP-DOWN-ATXS-VF)

Allows a mixture of Dolby E and linear AES within the same audio group, separating the Dolby E and linear audio and synchronising both types in the appropriate way before re-embedding the audio

Can auto-correct timing errors with the guardband. Dolby E will be delayed by the same amount as the video, except for any change required to align it correctly with the output video switching point

AUDIO TIMING ADJUSTMENTS (UP-DOWN-AS-VF AND UP-DOWN-ATXS-VF)

Audio is routed through a tracking audio delay (TAD). It tracks the video delay, running the audio fast or slow to ensure the video and linear audio stay correctly timed and to avoid lip-sync errors. There are two tracking audio delays: one for the linear audio and the other for Dolby E

The linear audio TAD will have the same value as the video synchroniser delay. The linear AES will track the extra 0.5 frames of video delay if

Dolby E align has been selected to ensure it is delayed by the same amount as the video

An additional adjustable audio delay up to 120ms on each stereo pair of linear AES will compensate for any small delay between the incoming video and audio signals. Delay is applied to all the audio channels and is adjustable in 1ms steps

Dolby E will be delayed by the synchroniser delay plus 0 to 0.5 frames as required to align it correctly with the video

A fixed audio delay for Dolby E of zero, one, two or three frames is available to match the equivalent video delay

AUDIO ROUTING (UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF)

An 8 x 8 stereo router allows the order of the embedded audio to be shuffled between all four groups

It is possible to select which audio groups are embedded in the output stream

There are two 8 x 8 routers available, one for if the output is Standard Definition and the second for if the output is High Definition

Stereo pairs can be muted

AUDIO SILENCE

An audio level check is performed. The audio silence level setting can be selected from -48dBFS, -54dBFS, -60dBFS, -66dBFS, -72dBFS, -78dBFS, -84dBFS and -90dBFS. If the audio signal level falls below the selected level for a period of time from 2 to 120 seconds, then an alarm is triggered. The audio on the channels must be continuously silent for the full period – a single non-silent sample restarts the delay period

TIMECODE TRANSPORT

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 from 1080p or 720p to an interlaced output

TIMECODE CONVERSION (UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF)

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 a DVITC analogue timecode waveform on its SD output

TELETEXT AND SUBTITLES HANDLING (UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF)

Supports both OP-47 (defined by Free TV Australia and covering the carriage of System B teletext) and SMPTE 2031

When up converting, will take the teletext data (System B to ITU-R BT 653-3) out of the analogue coded signal and put the same data in the OP-47 or SMPTE 2031 data stream it creates. An HD output can only contain SMPTE 2031 or OP-47, not both

When down converting can take teletext data out of OP-47 or SMPTE 2031 packets and encode it as analogue waveforms on an SD output

If going from HD to HD, it 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 CAPTIONS HANDLING (UP-DOWN-ATX-VF and UP-DOWN-ATX-VF)

When down converting 59.94Hz video, can take the closed caption data from CEA-708 and output the corresponding CEA-608 waveform

When up converting will decode the CEA-608 waveform and insert the data into the appropriate section of CEA-708 on the 3G/HD output

LED INDICATION OF:

Power okay

PRESETS

The current card settings can be saved in one of 16 locations to be recalled as required

Presets can be backed up and restored using the Vision frame

REMOTE CONTROL

Software:

VisionWeb Control is available via the web server on the frame and allows control and monitoring using a standard web browser on a computer, tablet or phone

SNMP monitoring and control available as standard

Control using ASCII and JSON protocols

Hardware:

Control from integrated control panel on Vision 3 frame

Control from VisionPanel 3U remote panel

SBB-4 smart button box connects to the frame via Ethernet and provides four programmable LCD switches (which are configured for each order). The SBB-4 uses information from VisionWeb for settings. Uses Power over Ethernet so must be used with PoE enabled switch

Checks can be performed on video and audio parameters (see below), with warnings of any problems provided via SNMP traps. The video black and video frozen parameters can be delayed by up to 40 seconds before an alarm is asserted to prevent false alarming during brief video pauses. The audio parameters can be delayed by up to 120 seconds before an alarm is asserted to prevent false alarming during quiet audio periods

Remote control of:

All versions: Video output 1 format (SD or HD), video output 2 format (SD or HD), video output HD format (720p, 1080i or 1080p), lock output to ATC input, video format to delay, video delay setting, what to show on video input loss, fixed aspect ratio settings for SD to HD, HD to SD and SD to SD (including bypass, SD analogue line length and WSS line blank options), custom aspect ratio (size and position), custom crop, noise reduction (detail and edge), vertical filters, RGB proc-amp, YUV proc-amp, video black time delay, video frozen time delay, audio silence indication time delay and threshold, laser input or output enable, presets save and recall and card defaults

Additional controls on UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF: Fixed aspect ratio settings for HD to HD (including bypass), HD output AFD setting and manual code, SD output AFD setting and manual code, SD output WSS setting, SD output Video index setting, ANC data line insert (for 625 and 525), HD DTVCC insertion, ATC insertion, HD teletext enable (OP-47, SMPTE 2031 or disabled) and line (9, 10, 11 or 12), input VITC: line select (auto, manual, disable), 525 lines and 625 lines and input teletext: line select (auto, Field 1, Field 2, Fields 1 and 2), Field 1 line and Field 2 line

Additional controls on UP-DOWN-AS-VF and UP-DOWN-ATXS-VF: Reference source, auto relock enable and force relock, Reference 1 type, Reference 2 type, test pattern and test pattern format, HD audio router, SD audio router, mute audio channel pairs, embed audio groups into HD output, embed audio groups into SD output, audio bypass, PCM audio delay, Dolby E delay, Dolby E align and audio channel pairs resampling

Remote monitoring of:

All versions:

Video present
Video input format
Video black
Video frozen
Video output 1 format
Video output 2 format
Video output aspect ratio
Input group 1 present
Input group 2 present
Input group 3 present
Input group 4 present
Output 1 group 1 present
Output 1 group 2 present
Output 1 group 3 present
Output 1 group 4 present
Output 2 group 1 present
Output 2 group 2 present
Output 2 group 3 present
Output 2 group 4 present
Input audio silence group 1 channels 1 and 2
Input audio silence group 1 channels 3 and 4
Input audio silence group 2 channels 5 and 6
Input audio silence group 2 channels 7 and 8
Input audio silence group 3 channels 9 and 10
Input audio silence group3 channels 11 and 12
Input audio silence group 4 channels 13 and 14
Input audio silence group 4 channels 15 and 16
All audio silent
Input ATC present
Current delay in lines and pixels for the selected format
SD ARC mode enabled
ARC values not default
De-interlaced down converter active

With fibre input option fitted:

Received power (-25dBm to 0dBm in 1dBm steps)
Optical input power level (Overload, High, Good, Low or Too low)

With fibre output option fitted:

Laser level (laser is producing low output power and should be replaced)
Laser bias (laser bias current above threshold indicating imminent failure)

Additional monitoring on UP-DOWN-ATX-VF and UP-DOWN-ATXS-VF:

HD ARC mode enabled
Input AFD
ANC status
Input VITC present
Input ATC present
SD insertion disabled
Input teletext present

Additional monitoring on UP-DOWN-AS-VF and UP-DOWN-ATXS-VF:

Reference 1 present
Reference 1 format
Reference 1 incompatible
Reference 2 present
Reference 2 format
Reference 2 incompatible
Active reference source
Audio bypass on output 1
Audio bypass on output 2
Dolby E on group 1 channels 1 and 2
Dolby E on group 1 channels 3 and 4
Dolby E on group 2 channels 5 and 6
Dolby E on group 2 channels 7 and 8
Dolby E on group 3 channels 9 and 10
Dolby E on group 3 channels 11 and 12
Dolby E on group 4 channels 13 and 14
Dolby E on group 4 channels 15 and 16

ORDERING INFORMATION

UP-DOWN-A-VF	Up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling
UP-DOWN-ATX-VF	Up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and routing, AFD insertion and reading, timecode conversion and transport of teletext and closed captions
UP-DOWN-AS-VF	Synchronising up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling
UP-DOWN-ATXS-VF	Synchronising up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and routing, AFD insertion and reading, timecode conversion and transport of teletext and closed captions
FIP-VF	Fibre input option for UP-DOWN-VF cards
FOP-VF	Fibre output option for UP-DOWN-VF cards. For CWDM laser options, contact Crystal Vision
FIO-VF	Fibre input and output option for UP-DOWN-VF cards
Vision 3	3U frame with integrated control panel and smart CPU for up to 20 Crystal Vision cards from the Vision range
VR01	Single slot frame rear module. Allows 20 UP-DOWN-VF cards in 3U. Gives access to one 3Gb/s, HD or SD input and two co-timed outputs (configurable as 3G/HD or SD), with three feeds of Output 1 and three feeds of Output 2
VR03	Single slot frame rear module. Allows 20 UP-DOWN-VF cards in 3U. Provides relay bypass protection of the input. Gives access to one 3Gb/s, HD or SD input and two co-timed outputs (configurable as 3G/HD or SD), with three feeds of Output 1 and two feeds of Output 2
VR14	Single slot frame rear module. Allows 20 UP-DOWN-VF cards in 3U. Designed for applications using fibre inputs and/or outputs. **When using FIP-VF fibre input**, allows you to select between one fibre and one electrical 3Gb/s, HD or SD input, and gives access to two co-timed outputs (configurable as 3G/HD or SD), with two feeds of Output 1 and three feeds of Output 2. **When using FOP-VF fibre output**, gives access to one 3Gb/s, HD or SD input and two co-timed outputs (configurable as 3G/HD or SD), with two feeds of Output 1 and three feeds of Output 2, along with one copy of Output 1 on fibre. **When using FIO-VF fibre input and output**, allows you to select between one fibre and one electrical 3Gb/s, HD or SD input, and gives access to two co-timed outputs (configurable as 3G/HD or SD), with two feeds of Output 1 and three feeds of Output 2, along with one copy of Output 1 on fibre
VisionPanel	3U Ethernet remote control panel with touch screen
SBB-4	Smart button box with four programmable LCD switches. It is powered by PoE (Power over Ethernet) and therefore needs to be connected to a PoE enabled switch
VisionWeb Control	VisionWeb web browser control included within frame software
SNMP	SNMP monitoring and control included in frame

Crystal Vision

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