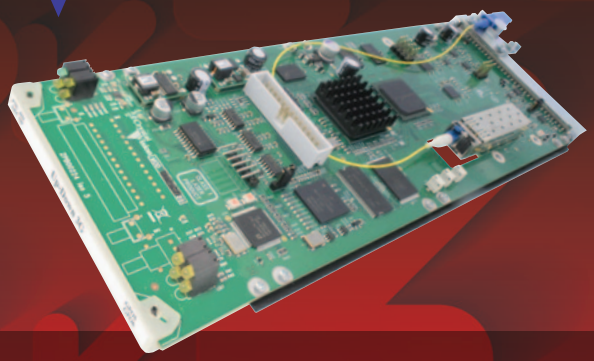
Crystal Vision

UP-DOWN 3G

Up/down/cross converters



With Up-Down 3G, it's all about the picture quality.

Up-Down 3G 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 nine different versions to suit all applications, Up-Down 3G offers a wide range of features including integrated fibre I/O connectivity, four group audio handling, audio routing, video and audio delays, AFD insertion and reading, timecode conversion and transport of teletext and closed captions. The four synchronising versions will provide a continuous stable output to keep the MPEG encoder happy and give you timed signals in two formats.

- Up/down/cross converter for 3Gb/s, HD and SD sources, available in nine 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
- Choose the version that has the features you need: four group embedded audio handling, audio routing, two framestore synchronisers, video and audio delays, sophisticated Dolby E handing, aspect ratio conversion, AFD insertion and reading, signal reporting, timecode conversion and transport of teletext and closed captions
- Optional integrated fibre input/output connectivity means you won't be limited by cable lengths
- Space-saving: 100mm x 266mm module allows 12 Up-Down 3G in 2U (six in 1U and two in desk top box), or six Up-Down 3G in 2U if a DA6 top board is fitted (three in 1U and one in desk top box)
- Flexible control, including web browser software

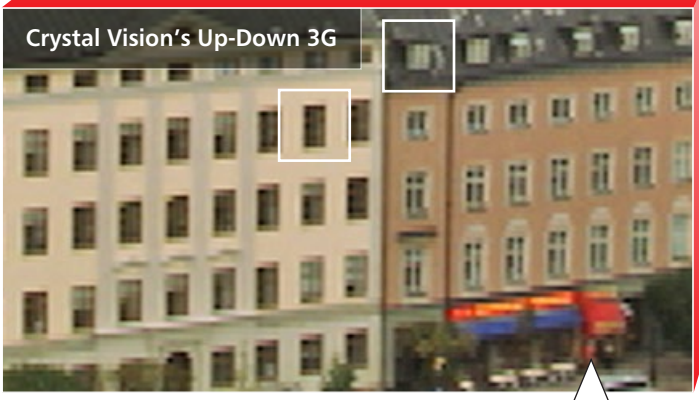
Which one do you need?

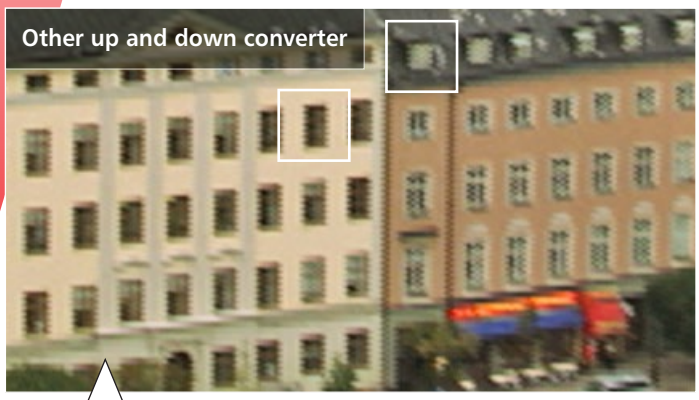
Up-Down 3G BASIC MODEL							
Up-Down-A 3G	audio						
Up-Down-AFD 3G	audio	AFD					
Up-Down-AT 3G	audio	AFD	audio routing	timecode conversion			
Up-Down-ATX 3G	audio	AFD	audio routing	timecode conversion	teletext transport	closed captions transport	
Up-Down-AS 3G	synchronisers	audio					
Up-Down-AFDS 3G	synchronisers	audio	AFD				
Up-Down-ATS 3G	synchronisers	audio	AFD	audio routing	timecode conversion		
Up-Down-ATXS 3G	synchronisers	audio	AFD	audio routing	timecode conversion	teletext transport	closed captions transport

UP CONVERSION

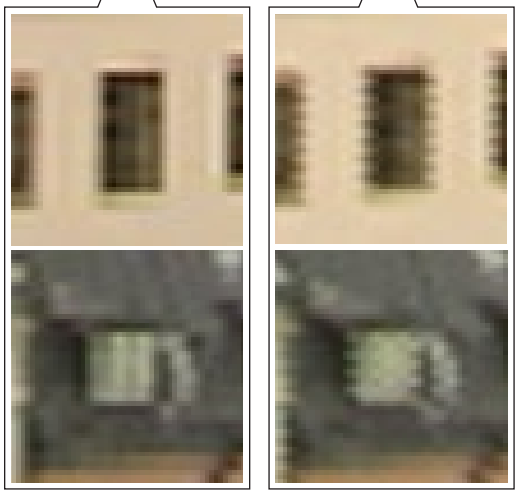
A good up converter will create an HD picture that is as good as the original SD picture. That is all that can be achieved – and it often isn't. Many up converters will create an HD signal that looks significantly worse than the original SD material – as we will demonstrate here.

These two pictures show a section of an up converted image (625i50 to 1080i50) from a Crystal Vision Up-Down 3G and from a lower cost but very widely-sold up converter. The picture is a grab from a video clip with the camera panning over a town.





The horizontal movement in the picture and the level of detail are common in many television applications (especially sport) and they require careful processing. In particular it is essential to have a good de-interlacer: high quality de-interlacing is the key to good up conversion. The vertical resolution of the picture is doubled by considering both fields, but the picture may have moved during the time delay between the two fields. The movement detection in the Up-Down 3G allows it to use the full vertical resolution available. The other up converter has processed the movement poorly and has created 'jaggies', which have been expanded in the up conversion process.



Up-Down 3G *Other*

Look at...

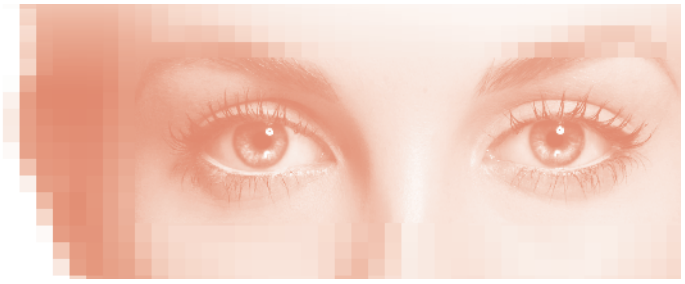
The vertical edges of windows in the white building – the Crystal Vision up converter does not create false 'jaggies'.

The windows at the top of the dark building – the Crystal Vision up converter preserves the detail.

DOWN CONVERTER LOOK LIKE?

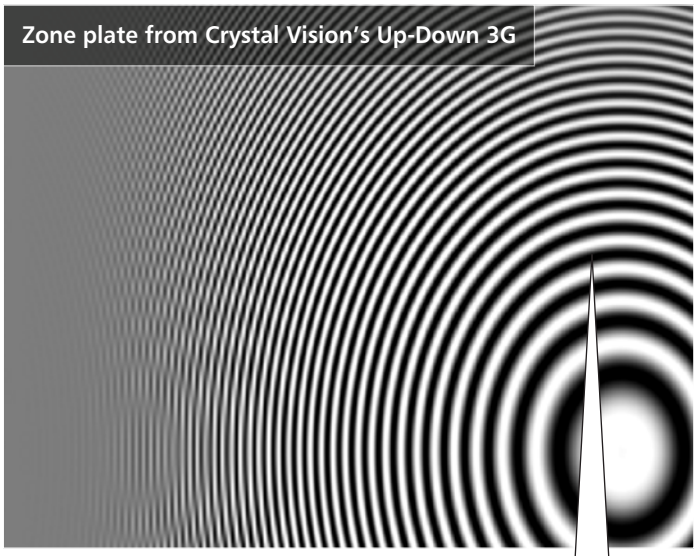
DOWN CONVERSION

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).

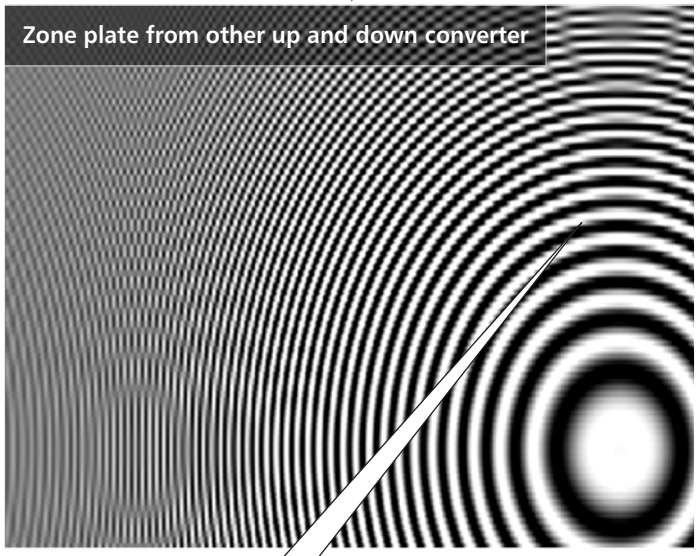


The other down converter suffers from aliasing because the filters are not sharp enough. This is particularly noticeable with moving pictures as there are 'sparkles' of unwanted false detail that come and go.

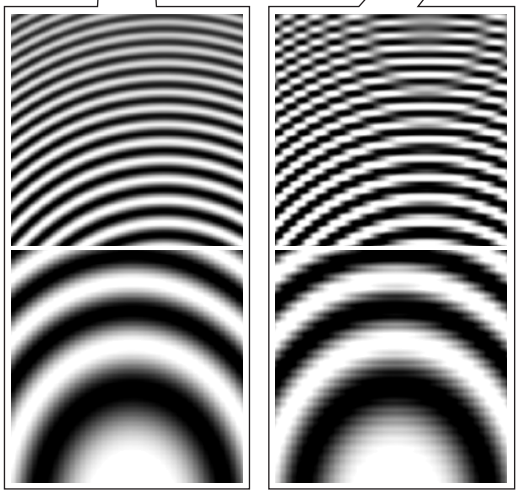
Zone plate from Crystal Vision's Up-Down 3G



Zone plate from other up and down converter



As it is not so easy to see the aliasing problem in a still image, we are showing the zone plates of the two down converters. It can be seen that there are less rogue circles in the Crystal Vision down converter and, in practice, aliasing effects will not be seen with moving pictures. The Up-Down 3G also avoids 'jaggies' in the circles, partly due to the quality of the de-interlacer. One large US broadcaster carried out a down conversion test and found the Crystal Vision product to be both the highest quality and the lowest cost of those it was considering – this broadcaster is now one of Crystal Vision's largest customers.



Up-Down 3G *Other*

Look at...

Extra rogue circles. The lack of extra circles on the Up-Down 3G output gives evidence that the down converter will avoid flashing in moving pictures. By comparison, the other down converter has extra circles that contribute to its poor output with moving pictures.

Top of the circles. The Up-Down 3G's down converter has an excellent de-interlacer that ensures a lack of 'jaggies'.

CHOOSING THE RIGHT UP-DOWN 3G FOR YOU

FEATURES	Up-Down 3G	Up-Down-A 3G	Up-Down-AFD 3G	Up-Down-AT 3G	Up-Down-ATX 3G	Up-Down-AS 3G	Up-Down-AFDS 3G	Up-Down-ATS 3G	Up-Down-ATXS 3G
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	1080p, 720p, 1080i, 625i, 525i	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)	2 feeds of Output A and 3 feeds of Output B	2 feeds of Output A and 3 feeds of Output B	2 feeds of Output A and 3 feeds of Output B	2 feeds of Output A and 3 feeds of Output B	2 feeds of Output A and 3 feeds of Output B	2 feeds of Output A and 2 feeds of Output B	2 feeds of Output A and 2 feeds of Output B	2 feeds of Output A and 2 feeds of Output B	2 feeds of Output A and 2 feeds of Output B
Optional 6 reclocked input loop-throughs (with DA6 fitted)	●	●	●	●	●	●	●	●	●
Perform two different conversions at same time	●	●	●	●	●	●	●	●	●
Two framestore synchronisers						●	●	●	●
Analogue reference (SD Black & Burst or HD tri-level syncs)						●	●	●	●
Automatic freeze						●	●	●	●
Video delays	1 frame plus 16 lines additional user delay	1 frame plus 16 lines additional user delay	1 frame plus 16 lines additional user delay	1 frame plus 16 lines additional user delay	1 frame plus 16 lines additional user delay	1, 2 or 3 frames additional user delay	1, 2 or 3 frames additional user delay	1, 2 or 3 frames additional user delay	1, 2 or 3 frames additional user delay
Handles four audio groups		●	●	●	●	●	●	●	●
Linear AES tracking audio delay (with user control of tracking speed to trade off frequency change and settling time)						●	●	●	●
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	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 of stereo pairs				●	●			●	●
Audio resampling of linear AES						●	●	●	●
Aspect ratio conversion when up and down converting (see SPECIFICATION for full list of conversions)	●	●	●	●	●	●	●	●	●
HD to HD aspect ratio conversion when input/output format identical (see SPECIFICATION for full list of conversions)				●	●			●	●
SD to SD aspect ratio conversion (see SPECIFICATION for full list of conversions)	●	●	●	●	●	●	●	●	●
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			●	●	●		●	●	●
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	Passes	Passes and converts between ATC and DVITC	Passes and converts between ATC and DVITC	Passes	Passes	Passes and converts between ATC and DVITC	Passes and converts between ATC and DVITC
Teletext transport (OP-47, SMPTE 2031)					●				●
Closed captions transport (CEA-608 and CEA-708)					●				●
Fibre I/O	●	●	●	●	●	●	●	●	●
Frame slots used	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)	1 (2 if DA6 fitted)

THE PICTURE QUALITY AND FEATURES THAT WIN EVALUATIONS

UP A AFD AT ATX AS AFDS ATS ATXS

Providing flexible up, down and cross conversions between 3Gb/s, HD and SD sources, the Up-Down 3G range is aimed at broadcast engineers that demand the highest quality conversion.

The combination of project-winning output picture quality and configurable dual outputs makes Up-Down 3G a very special up/down/cross converter – that also delivers value for money.

There are nine up/down/cross converters available – whether you want a basic video-only model like Up-Down 3G or a converter with *all* the features like Up-Down-ATXS 3G. Use the symbols to see which converters have the features you need.

WHICH CONVERSIONS CAN THEY DO?

UP A AFD AT ATX AS AFDS ATS ATXS

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

Cross conversions	
720p to 1080i	1080i to 1080p
720p to 1080p	1080p to 1080i
1080i to 720p	1080p to 720p

PICTURE PROCESSING WHEN UP AND CROSS CONVERTING

UP A AFD AT ATX AS AFDS ATS ATXS

Up-Down 3G wins side-by-side evaluations on the quality of its up conversion – with the quality so good that it has been specified by some broadcasters as their mandatory up converter.

The 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. 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

UP A AFD AT ATX AS AFDS ATS 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.

Up-Down 3G 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

UP A AFD AT ATX AS AFDS ATS 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.

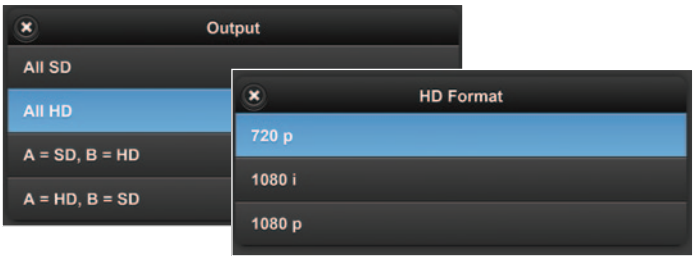
PERFORM TWO CONVERSIONS AT THE SAME TIME (AND GET DUAL OUTPUTS)

UP A AFD AT ATX AS AFDS ATS ATXS

Up-Down 3G can perform two conversions at the same time, with two separate converters on the board: one is used for the up and cross conversion, with the other used for the down conversion.

This makes it 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 board and so easily fulfil their requirement to offer both HD and SD programming.

Up-Down 3G gives dual outputs, with two output groups – A and B. 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 A and B are both selected as 3G or HD, then the outputs will be identical. Providing two copies of Output A and three copies of Output B also reduces the need for additional distribution amplifiers in the system.

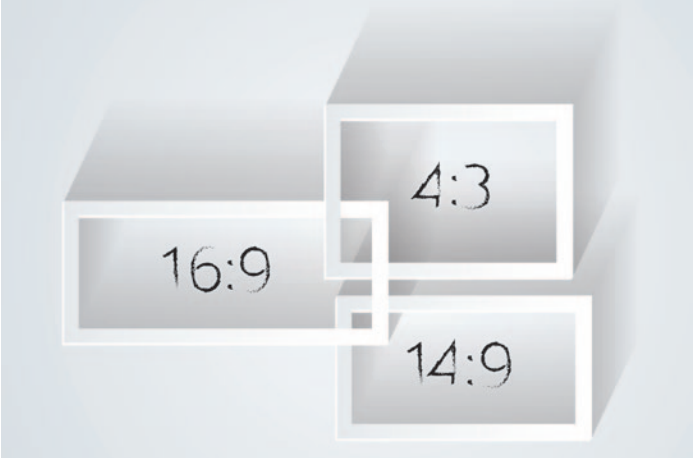


One of Up-Down 3G's particularly powerful features is that it will constantly put out HD and SD on the same pins regardless of the input, thanks to its smart routing. Once set, the output selection will remain true irrespective of any change in the input format – which means you won't need to change 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.

DEAL WITH ANY ASPECT RATIO CONVERSION REQUIREMENTS

UP A AFD AT ATX AS AFDS ATS ATXS



The Up-Down 3G 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 3G 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 3G 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-AT 3G, Up-Down-ATX 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G 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-AFD 3G, Up-Down-AT 3G, Up-Down-ATX 3G, Up-Down-AFDS 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G additionally offer AFD code activated aspect ratio conversion. (See the next section.)

AUTOMATICALLY CHOOSE THE CORRECT ASPECT RATIO

AFD AT ATX AFDS ATS 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'.

The six AFD-capable versions of Up-Down 3G 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.

USE THEM WITH FOUR AUDIO GROUPS

A AFD AT ATX AS AFDS ATS ATXS

All versions except Up-Down 3G 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. 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.

SYNCHRONISE AND CONVERT AT THE SAME TIME

AS AFDS ATS ATXS

To keep the output valid at all times the four 'S' versions 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, perfect for feeding an MPEG encoder which requires a constant stable video input. 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 they take their timing from the external analogue reference and will automatically synchronise sources that are up to one frame apart, fixing any incorrect frame rates plus any delays. Audio signals can optionally be made to track this dynamic video delay to maintain lip-sync. The ability to cross-lock allows them to conveniently use any existing timing signals, with a 3Gb/s, HD or SD input referenced to either HD tri-level syncs or SD Black and Burst. Delay mode takes its timing from the video input; the synchroniser is bypassed and just the bulk delays are active. The delay is adjustable in samples, lines and whole frame steps.

They 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

AS AFDS ATS ATXS

The four 'S' versions 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...

The synchroniser delay automatically adjusts over a range of 0 to 1 frames to provide the desired video output timing. It is easy to compensate for mistimed sources elsewhere in the system: the Line and pixel delay will delay the video with respect to the reference through an entire frame and is independently adjustable on each synchroniser.

A switchable 1, 2 or 3 frames video delay – adjustable in whole frame steps – can match any big system delays and bring the video and audio timing back into alignment.

For the audio...

An internal tracking audio delay optionally 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 Line and pixel delay as the video, with the Dolby E guardband correctly aligned in the outgoing video.

A fixed audio delay for Dolby E of 0, 1, 2 or 3 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.

RESAMPLE YOUR AUDIO

AS AFDS ATS ATXS

Audio resampling ensures a smooth matching of the audio and video delay, with 16 audio resamplers available to prevent 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.

ROUTING YOUR AUDIO

AT ATX ATS ATXS

The Up-Down-AT 3G, Up-Down-ATX 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G provide audio routing by stereo channel. 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

UP A AFD AT ATX AS AFDS ATS ATXS

The Up-Down 3G range has video and audio signal probe functionality making it useful for flagging up faulty signals, especially in multi-channel applications. Up-Down 3G can be set to provide warnings of any problems via SNMP traps.

The video status indications are input missing, video black, video frozen and input incompatible – plus reference missing on the synchronising versions. Video frozen and video black can be delayed before an alarm is asserted to prevent false alarming during brief video pauses.

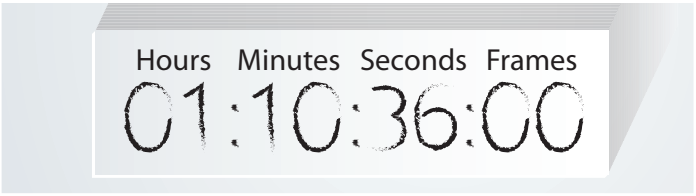
The audio status indications (available on all versions except Up-Down 3G) are audio missing and audio silent, which can be delayed before an alarm is asserted to prevent false alarming during quiet audio periods. The four synchronising versions additionally include indication of Dolby E presence.

DEALING WITH TIMECODE

AT ATX ATS ATXS

All versions of Up-Down 3G 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.

The Up-Down-AT 3G, Up-Down-ATX 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G can all additionally 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 TELETEXT AND SUBTITLES

ATX ATXS

Up-Down-ATX 3G and Up-Down-ATXS 3G 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

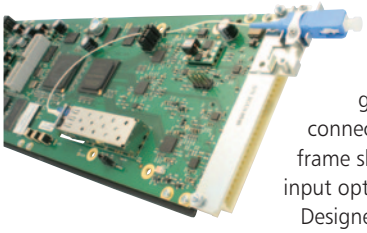
ATX ATXS

Up-Down-ATX 3G and Up-Down-ATXS 3G 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 BOARD

UP A AFD AT ATX AS AFDS ATS ATXS



If you need to up and down convert signals from beyond your local equipment bay, it's easy to give Up-Down 3G integrated fibre connectivity – and still only use a single frame slot. Just order either the FIP fibre input option or FOP fibre output option.

Designed for SMPTE 297-2006 short-haul applications, the FIP is used to receive an optical input and the FOP to transmit an optical output using a Class I laser. With a FIP 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.

Up-Down 3G can also support a CWDM laser if required.

SAVE RACK SPACE

UP A AFD AT ATX AS AFDS ATS ATXS

Up-Down 3G is a space-saving 100mm x 266mm module which is housed in the Indigo frames – available in 2U, 1U and desk top box sizes – and with up to 12 boards fitting in 2U.

The inputs and outputs are accessed by using the RM41 or RM57 frame rear modules, with the RM57 designed for fibre applications.

By fitting a DA6 top board which gives six reclocked feeds of the input, Up-Down 3G becomes a 'double decker' board – taking up two frame slots and requiring an RM34 to be used with the RM41 or RM57 to create a double height rear module.

EASY AND FLEXIBLE CONTROL

UP A AFD AT ATX AS AFDS ATS ATXS

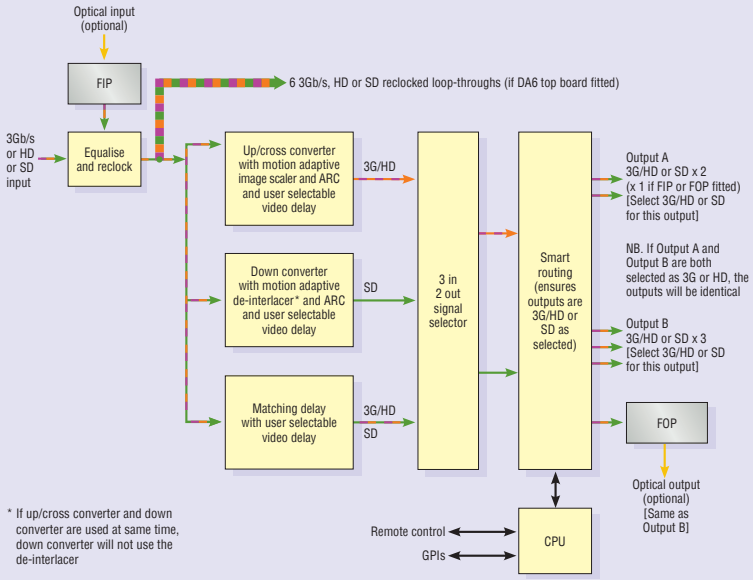
Up-Down 3G is very easy to operate, with control options including an integrated control panel on the AE frame, the VisionPanel remote control panel, the SBB-4 smart button box, GPIs, SNMP, our ASCII and JSON protocols, the Statesman Lite PC software and the VisionWeb web browser control.

VisionWeb

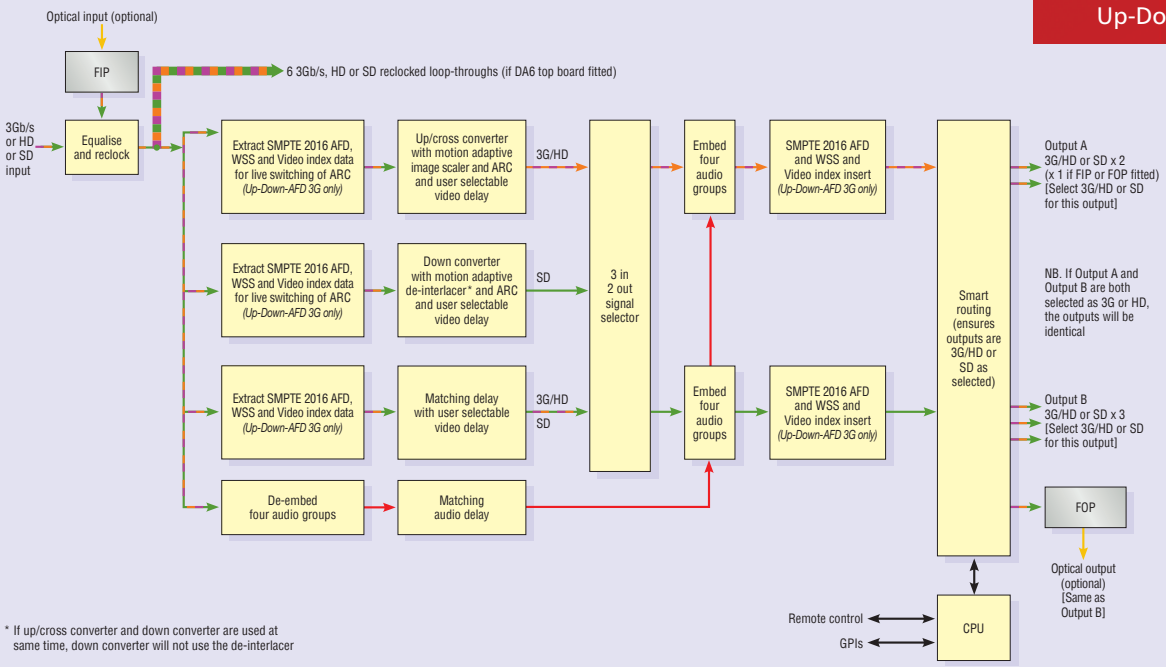
VisionWeb Control

THE INPUTS AND OUTPUTS

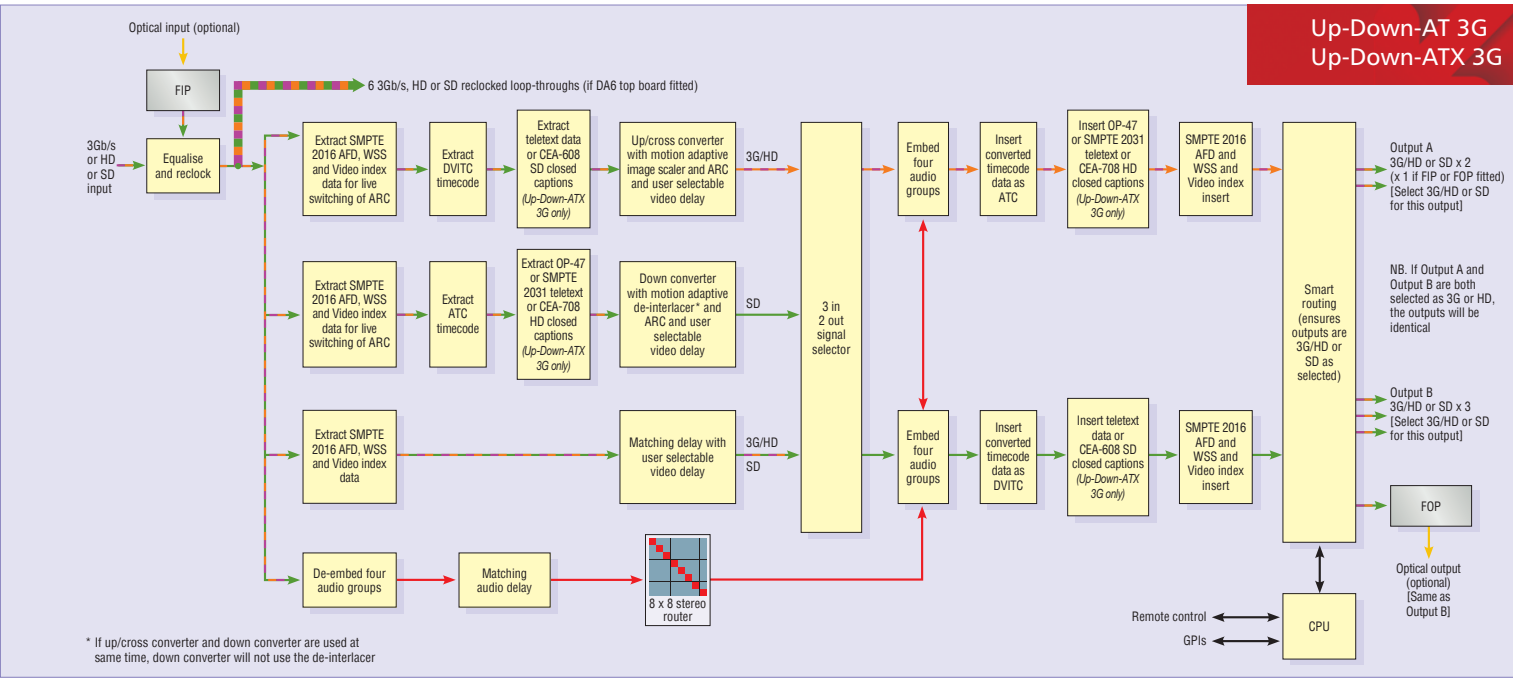
Up-Down 3G



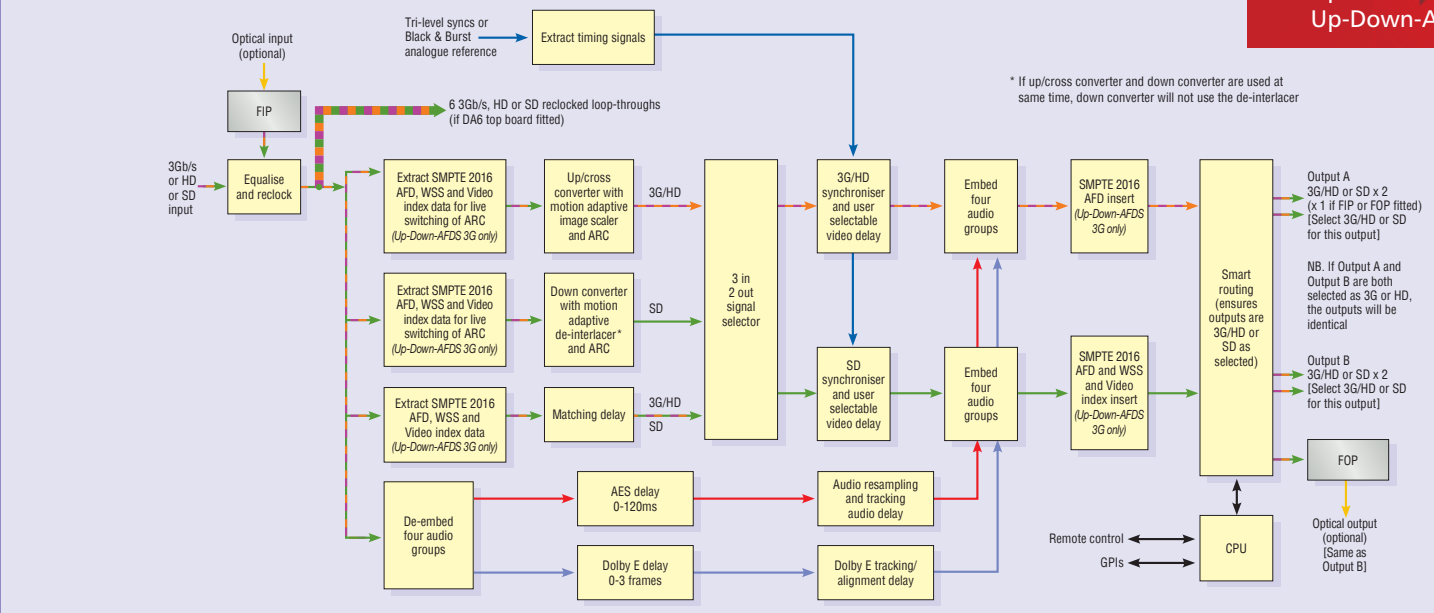
Up-Down-A 3G
Up-Down-AFD 3G



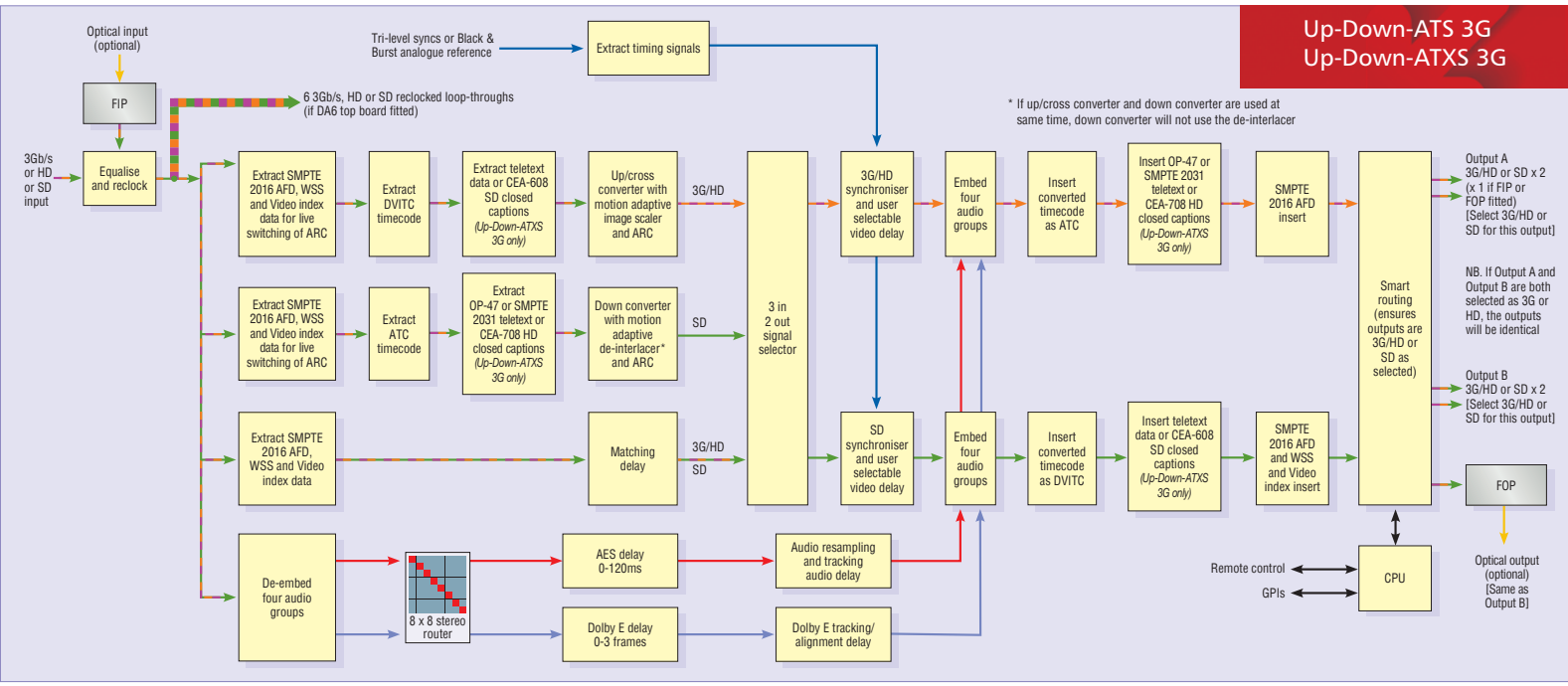
Up-Down-AT 3G
Up-Down-ATX 3G



Up-Down-AS 3G
Up-Down-AFDS 3G



Up-Down-ATS 3G
Up-Down-ATXS 3G

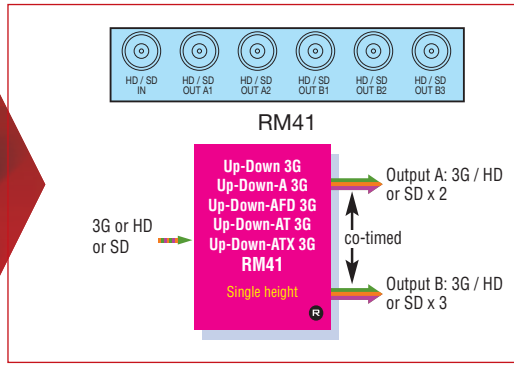


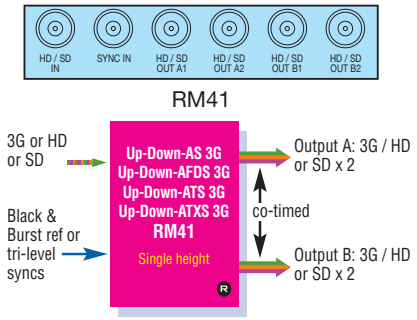
REAR MODULE CONNECTIONS

Up-Down 3G range

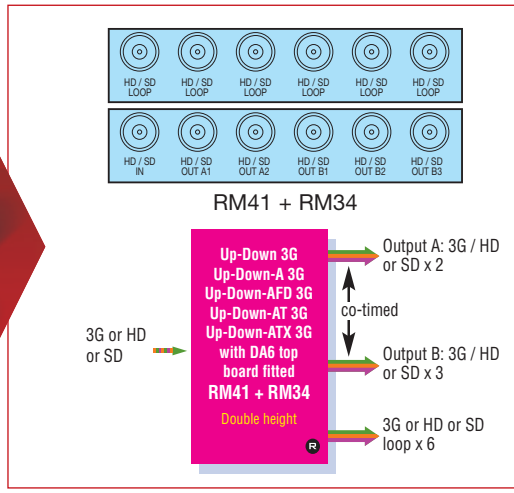
Up-Down-AS 3G range

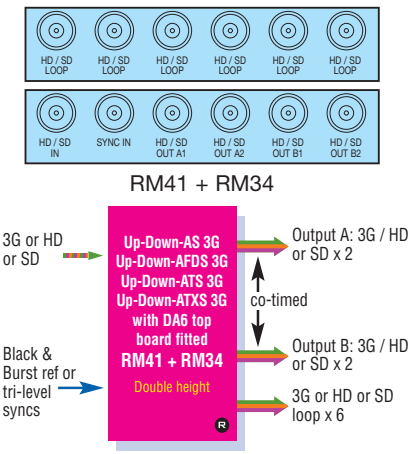
For standard applications



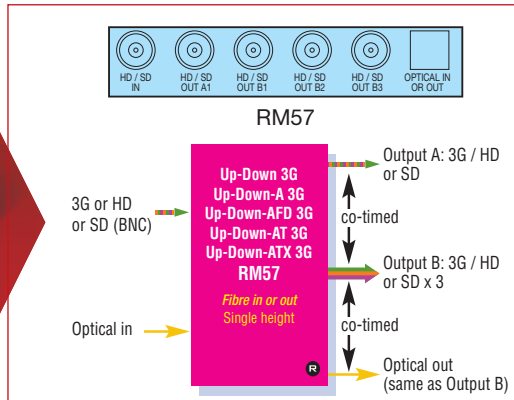


For applications when a DA6 top board is fitted

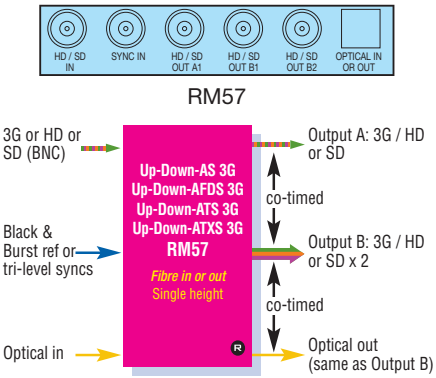




For fibre applications

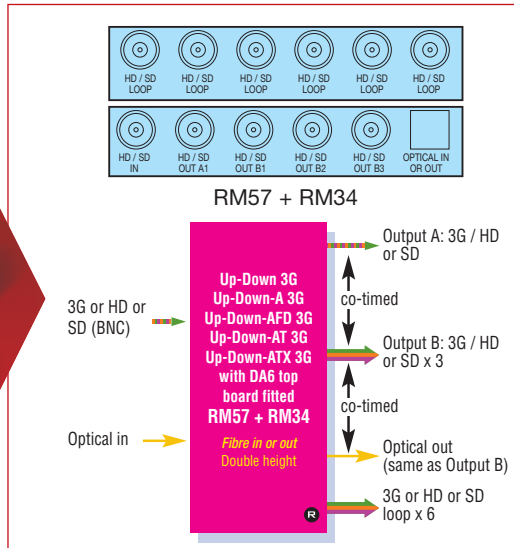


NB. Choose between fibre in or fibre out by selecting FIP or FOP fibre option

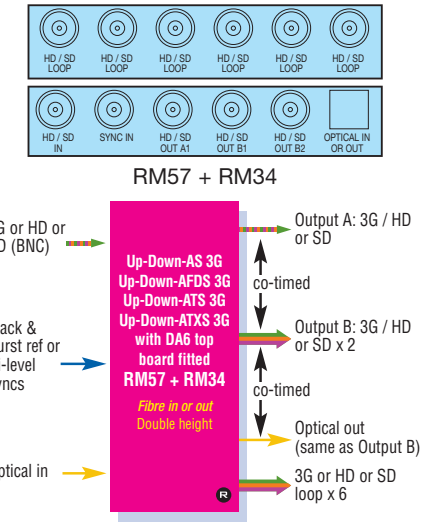


NB. Choose between fibre in or fibre out by selecting FIP or FOP fibre option

For fibre applications when a DA6 top board is fitted



NB. Choose between fibre in or fibre out by selecting FIP or FOP fibre option



NB. Choose between fibre in or fibre out by selecting FIP or FOP fibre option

NB. The term "Up-Down 3G" is generally used to refer to all versions

MECHANICAL

Standard Crystal Vision module 266mm x 100mm
With DA6 top board fitted: 'Double decker' module 266mm x 100mm (uses two frame slots)
Weight: 180g; 240g with DA6 fitted
Power consumption: 11.9 Watts; 3 Watts (DA6); 0.6 Watts (FIP and FOP)

INTEGRATED FIBRE OPTIONS

Up-Down 3G can be given integrated fibre connectivity by fitting either the FIP fibre input option or FOP fibre output option. The chosen option should be fitted at the factory
To access the optical inputs or outputs an RM57 frame rear module must be used
When fitted with a FIP or FOP, Up-Down 3G can be housed in any frame slot position but due to its extra height it is not possible to place most Standard Definition or audio boards directly above it when the Up-Down 3G is in even numbered slot positions. 3Gb/s and HD boards do not share this restriction. If a DA6 top board is also fitted, this positioning restriction does not apply
FIP and FOP meet the SMPTE 297-2006 short-haul specification, allowing operation with single-mode and multi-mode fibre
Connector type: SC/PC
FIP:
Optical wavelength: 1260-1620nm
Input level maximum: -1dBm
Input level minimum: Typical -20dBm (-18dBm 3Gb/s pathological)
FOP:
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
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 and specify the wavelength required

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 fibre input option 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 80m using Belden1694A. HD/SD cable equalisation up to 140m with Belden 1694A or equivalent (approx. 100m with Belden 8281)
Input return loss: -15dB for 50MHz to 1.5GHz
Automatic de-embedding to SMPTE 272 or SMPTE 299-1 (all versions except Up-Down 3G)

VIDEO OUTPUTS

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Up-Down 3G 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, A and B. The A-B matrix control allows the user to select whether an output group will be either SD or 3G/HD. The output groups can be configured as either:

- A=SD and B=SD
- A=3G/HD and B=3G/HD
- A=SD and B=3G/HD
- A=3G/HD and B=SD

If High Definition is selected for any group, the HD format control will determine the output format (720p, 1080i or 1080p). If Output A and Output B 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
Video outputs with Up-Down 3G, Up-Down-A 3G, Up-Down-AFD 3G, Up-Down-AT 3G and Up-Down-ATX 3G:
Using RM41 rear module: Two co-timed outputs, with two feeds of Output A and three feeds of Output B
Using RM57 rear module with FIP fibre input option: Two co-timed outputs, with one feed of Output A and three feeds of Output B (select between one fibre and one electrical input)
Using RM57 rear module with FOP fibre output option: Two co-timed outputs, with one feed of Output A and three feeds of Output B along with a copy of Output B on fibre

Video outputs with Up-Down-AS 3G, Up-Down-AFDS 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G:
Using RM41 rear module: Two co-timed outputs, with two feeds of Output A and two feeds of Output B
Using RM57 rear module with FIP fibre input option: Two co-timed outputs, with one feed of Output A and two feeds of Output B (select between one fibre and one electrical input)
Using RM57 rear module with FOP fibre output option: Two co-timed outputs, with one feed of Output A and two feeds of Output B along with a copy of Output B on fibre

If a DA6 top board is fitted, the Up-Down 3G will also output six reclocked loop-throughs of the 3Gb/s, HD or SD input. In this case Up-Down 3G will use two frame slots and the RM41 or RM57 rear modules need to be used with an RM34 to create a 'double height' rear module
Output frame rate same as input frame rate
Audio is embedded to SMPTE 272 or SMPTE 299-1 (all versions except Up-Down 3G)

PICTURE PROCESSING WHEN UP AND CROSS CONVERTING

Pixel based motion adaptive de-interlacing means that Up-Down 3G 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. When input and output formats are both identical HD, the video proc-amp is not available on Up-Down 3G, Up-Down-A 3G, Up-Down-AFD 3G, Up-Down-AS 3G and Up-Down-AFDS 3G

PICTURE PROCESSING WHEN DOWN CONVERTING

Up-Down 3G uses Crystal Vision's 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
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. When input and output formats are both identical HD, the video proc-amp is not available on Up-Down 3G, Up-Down-A 3G, Up-Down-AFD 3G, Up-Down-AS 3G and Up-Down-AFDS 3G

BYPASS MODE

To maintain the best picture quality the Up-Down 3G 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 the input and output format is identical (on Up-Down-AT 3G, Up-Down-ATX 3G, Up-Down-ATS 3G and Up-Down-ATXS 3G 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 (ALL VERSIONS EXCEPT UP-DOWN 3G, UP-DOWN-A 3G AND UP-DOWN-AS 3G)

The SMPTE 2016 AFD, WSS or Video index data embedded in the input video can be used 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 (ON UP-DOWN 3G, UP-DOWN-A 3G, UP-DOWN-AFD 3G, UP-DOWN-AT 3G AND UP-DOWN-ATX 3G)

Delay through board: Minimum delay of one video frame less 16 lines
SD and HD have independent timing adjustment to allow an offset between the two if required. On top of the minimum delay, a variable video delay of up to one frame plus 16 lines, adjustable in lines and pixels, allows it to compensate for video delays generated by other equipment (maximum delay is therefore two frames in total)

VIDEO TIMING ADJUSTMENTS AND DELAYS (ON UP-DOWN-AS 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G)

Delay through board: Minimum delay of one video frame
There are two synchronisers downstream of the converter, one in the 3G/HD path and one in the SD path – meaning Up-Down-AS 3G can give a stable output in two different formats even when the input standard changes
In synchroniser mode Up-Down-AS 3G takes its timing from the external analogue reference and will automatically synchronise sources that are up to a frame apart. Should the reference be removed, Up-Down-AS 3G will revert to delay mode
In delay mode timing is derived from the 3Gb/s, HD or SD input, with the video delay adjusted in samples, lines and whole frame steps up to a maximum of four video frames
In both synchroniser and delay modes the timing can be fully adjusted using horizontal and vertical settings, independently adjustable on each synchroniser to allow an offset between the two if required. Increasing the vertical setting will delay the output relative to the reference in increments of one line. Increasing the horizontal setting will increase this delay in increments of approx. 74ns for SD and 13.5ns for HD
Optional one frame (33.3ms or 40ms), two frames (66.7ms or 80ms) or three frames (100ms or 120ms) video delay allows compensation for Dolby E encoding and decoding, or can match other big video delays in the system

ANALOGUE REFERENCE (UP-DOWN-AS 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

Tri-level syncs or analogue Black and Burst or video 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
Amplitude of syncs 150mV to 600mV
Link on PCB selects 75 ohm termination or high impedance

FREEZE FUNCTIONS (UP-DOWN-AS 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

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)

EMBEDDED AUDIO PASSING (ALL VERSIONS EXCEPT UP-DOWN 3G)

De-embeds and re-embeds the first four numbered 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 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

Linear AES can be resampled using 16 audio resamplers

CONTINUED OVERLEAF...

DOLBY E HANDLING (UP-DOWN-AS 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

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 DELAY (UP-DOWN-A 3G, UP-DOWN-AFD 3G, UP-DOWN-AT 3G AND UP-DOWN-AFD 3G ONLY)

Audio is delayed by the same amount as the video

AUDIO TIMING ADJUSTMENTS (UP-DOWN-AS 3G, UP-DOWN-AFDS 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

Audio can be 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

The linear audio TAD will have the same value as the video synchroniser delay. A control sets the time the TAD takes to track fast or abrupt changes in video delay

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 0, 1, 2 or 3 frames is available to match the equivalent video delay

The audio is normally delayed by the same amount as the video but 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 either on or off for any given stereo pair

AUDIO ROUTING (UP-DOWN-AT 3G, UP-DOWN-ATX 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

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

VIDEO SIGNAL CHECKS

Checks can be performed on four video parameters, with warnings of any problems provided via SNMP traps

The video parameters are: input missing, video black, video frozen and input incompatible

The -AS, -AFDS, -ATS and -ATXS versions include an additional parameter: reference missing

The video black and video frozen parameters can be delayed before an alarm is asserted to prevent false alarming during brief video pauses

AUDIO SIGNAL CHECKS (ALL VERSIONS EXCEPT UP-DOWN 3G)

Checks can be performed on nine audio parameters, with warnings of any problems provided via SNMP traps

The audio parameters are: input audio missing, silence group 1 channels 1 and 2, silence group 1 channels 3 and 4, silence group 2 channels 1 and 2, silence group 2 channels 3 and 4, silence group 3 channels 1 and 2, silence group 3 channels 3 and 4, silence group 4 channels 1 and 2 and silence group 4 channels 3 and 4

Additional eight audio parameters on the -AS, -AFDS, -ATS and -ATXS versions are: Dolby E on input group 1 channels 1 and 2, Dolby E on input group 1 channels 3 and 4, Dolby E on input group 2 channels 1 and 2, Dolby E on input group 2 channels 3 and 4, Dolby E on input group 3 channels 1 and 2, Dolby E on input group 3 channels 3 and 4, Dolby E on input group 4 channels 1 and 2 and Dolby E on input group 4 channels 3 and 4

Missing and silent parameters can be delayed before an alarm is asserted to prevent false alarming during quiet audio periods

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-AT 3G, UP-DOWN-ATX 3G, UP-DOWN-ATS 3G AND UP-DOWN-ATXS 3G ONLY)

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 3G AND UP-DOWN-ATXS 3G ONLY)

Up-Down-ATX 3G and Up-Down-ATXS 3G support both OP-47 (defined by Free TV Australia and covering the carriage of System B teletext) and SMPTE 2031

When up converting, they 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 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 possible to specify which line in the VANC space is used to carry SMPTE 2031 or OP-47

CLOSED CAPTIONS HANDLING (UP-DOWN-ATX 3G AND UP-DOWN-ATXS 3G ONLY)

When down converting 59.94Hz video, Up-Down-ATX 3G and Up-Down-ATXS 3G 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

LED INDICATION OF:

Power supplies on board

SD input or input not present

HD input or input not present

ARC selected

GPI output 5 active

GPI output 6 active

PRESETS

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

GPI INPUT LEVELS

Active pull to ground, pulled up to +5V through 10 kohm

GPI OUTPUT LEVELS

Electrically: Open collector transistors 30V, 270 ohm current limit resistors. Pulled up to +5V through 6800 ohm

GPI INPUTS

Four GPI inputs can recall one of 16 presets

GPI OUTPUTS

Two GPI outputs. Selectable from loss of input, reference missing (synchronising versions only), video black and frozen, audio missing, audio channel silence, Dolby E presence (synchronising versions only) and input incompatible

REMOTE CONTROL

Software:

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

Statesman Lite allows control from any PC on a network

SNMP monitoring and control available as a frame option

Control using ASCII and JSON protocols

Hardware:

Control from integrated control panel on Indigo 1AE-DP 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

ORDERING INFORMATION

Up-Down 3G	Up/down/cross converter for 3Gb/s, HD and SD
Up-Down-A 3G	Up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling
Up-Down-AFD 3G	Up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and AFD insertion and reading
Up-Down-AT 3G	Up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and routing, AFD insertion and reading and timecode conversion
Up-Down-ATX 3G	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 3G	Synchronising up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling
Up-Down-AFDS 3G	Synchronising up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and AFD insertion and reading
Up-Down-ATS 3G	Synchronising up/down/cross converter for 3Gb/s, HD and SD with four group embedded audio handling and routing, AFD insertion and reading and timecode conversion
Up-Down-ATXS 3G	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	Fibre input option for Up-Down 3G motherboards
FOP	Fibre output option for Up-Down 3G motherboards. For CWDM laser options, contact Crystal Vision
Indigo 2SE	2U frame with active front panel featuring smart CPU for up to 12 Crystal Vision modules
Indigo 1AE-DP	1U frame with active front panel featuring smart CPU and integrated control panel for up to six Crystal Vision modules, with included power supply redundancy
Indigo 1SE-DP	1U frame with active front panel featuring smart CPU for up to six Crystal Vision modules, with included power supply redundancy
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTSE	Desk top box with active front panel featuring smart CPU for up to two Crystal Vision modules
RM41	Single slot frame rear module. Allows maximum number of Up-Down 3G in frame (12 in 2U, six in 1U, two in desk top box). 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 A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range)
RM41 + RM34	Two single slot frame rear modules used together for when DA6 top board is fitted. Allows six Up-Down 3G in 2U, three in 1U and one in desk top box. Gives access to one 3Gb/s, HD or SD input, six reclocked input loop-throughs and two co-timed outputs (configurable as 3G/HD or SD), with two feeds of Output A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range)
RM57	Single slot frame rear module. Allows maximum number of Up-Down 3G in frame (12 in 2U, six in 1U, two in desk top box). Designed for applications using fibre inputs or outputs. **When using 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 one feed of Output A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range). **When using fibre output**, gives access to one 3Gb/s, HD or SD input and two co-timed outputs (configurable as 3G/HD or SD), with one feed of Output A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range), along with one copy of Output B on fibre
RM57 + RM34	Two single slot frame rear modules used together for when DA6 top board is fitted. Allows six Up-Down 3G in 2U, three in 1U and one in desk top box. Designed for applications using fibre inputs or outputs. **When using fibre input**, allows you to select between one fibre and one electrical 3Gb/s, HD or SD input, and gives access to six reclocked input loop-throughs and two co-timed outputs (configurable as 3G/HD or SD), with one feed of Output A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range). **When using fibre output**, gives access to one 3Gb/s, HD or SD input, six reclocked input loop-throughs and two co-timed outputs (configurable as 3G/HD or SD), with one feed of Output A and three feeds of Output B (**two** feeds of B on the Up-Down-AS 3G range), along with one copy of Output B 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
Statesman Lite	PC Control System
SNMP	SNMP monitoring and control

Crystal Vision

Crystal Vision Ltd. Lion Technology Park, Station Road East, Whittlesford, Cambridge CB22 4WL, England.
Tel: +44 (0)1223 497049 E-mail: sales@crystalvision.tv @crystalvisionuk www.crystalvision.tv