# Q-Down-AG 3G / Q-Down-ATG 3G

Short-delay broadcast down converters and distribution amplifiers

Crystal Vision

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|---|---|---|
| Revision 1 | Preset recall table amended, page 8. | 16/04/13 |
| Revision 2 | Combined AG and ATG manuals. Added VisionWeb info. Moved Statesman to Appendix. | 17/01/18 |
| Revision 3 | Added note about removal of card edge control in 2018. | 11/07/19 |

# 1 Introduction

**Q-Down-AG 3G** and **Q-Down-ATG 3G** (referred to as the Q-Down 3G range) are two down converters with a short processing delay and both SDI and analogue outputs, with the option of integrated fibre input or output connectivity for additional flexibility. Both models are identical with the single exception that the Q-Down-ATG 3G supports closed caption and timecode transport capability (ATC and D-VITC).

Both models can down convert 1080p 3Gb/s, 720p HD and 1080i HD at both 50Hz and 59.94Hz, with the down converter bypassed if the input is Standard Definition. The Q-Down 3G range offers extremely flexible outputs, providing both input loop-throughs and three down converted feeds. 1080p video can be converted to 1080i or 720p digital and analogue, or to 625i or 525i digital and analogue, while 720p and 1080i video can be converted to 625i or 525i digital and analogue. HD video outputs can be configured as mixtures of digital HD, RGB and YUV (with integrated tri-level syncs on the component outputs), while Standard Definition outputs can be configured as mixtures of SDI, composite, Y/C, YUV and RGB. The Q-Down 3G range additionally provides two reclocked loop-throughs of the 3Gb/s, HD or SD input, along with another six loop-throughs if a DA6 top board is fitted.

Using Crystal Vision's proprietary processing, the Q-Down 3G range provides a unique level of image quality – avoiding aliasing while retaining picture sharpness. The sophisticated two-dimensional filtering gives broadcast results without the complication of looking at multiple fields or movement detection – resulting in reliable, artefact-free conversion. Four vertical filter characteristics can additionally be used to optimise the performance for the material.

A short processing delay of just 16 lines eliminates the need to compensate audio or other signals for the video delay, keeping everything in sync and making the system design much simpler. There is also a fixed one frame delay and a user adjustable delay which sets the delay in pixels and lines to one frame of delay. With the one frame fixed delay set, the adjustable delay will allow delay setting of one frame plus one frame or minus one frame less 16 lines. This 16-line limit is imposed to prevent possible frame tearing at delays less than 16 lines.

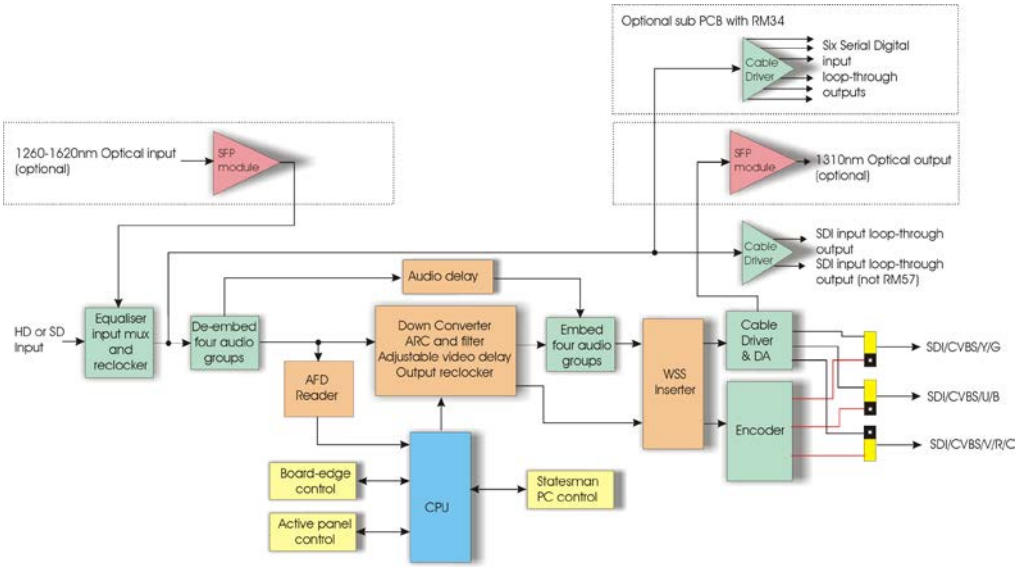
The Q-Down 3G range can be given fibre connectivity simply by fitting the FIP input or FOP output options, with the input fibre option most popular as the higher resolution input has less copper cable length capability. This allows the Q-Down 3G range to receive signals from beyond the local equipment bay, while still only occupying a single frame slot, thereby saving rack space.

The Q-Down 3G range includes the ability to deal with any 3Gb/s or HD to SD aspect ratio conversion requirements, with the option of selecting a 16:9 Anamorphic output for 16:9 SD systems and either a 16:9 to 4:3 Letterbox or 16:9 to 4:3 Full Screen with centre cut for 4:3 SD systems. With the Q-Down 3G range it is also possible to select the output aspect ratio according to the SMPTE 2016 AFD data embedded in the 3Gb/s or HD input video, and to insert WSS into the SD output, either manually or by automatically following the incoming AFD. Output picture position is fully adjustable with the ability to crop all four sides of the picture individually.

The Q-Down 3G range is ideal as the main signal path down converter for those working with embedded audio. It can pass four groups of embedded audio, de-embedding the four groups and converting them to the appropriate format before re-embedding them. Also included is signal probe functionality, making it useful for

flagging up faulty signals, especially in multi-channel applications. Amongst the status indications available are - video not present, video frozen, video black and both audio not present and audio silent on all four groups. The ***Q-Down-ATG 3G*** will transport timecode and closed captions with the ability to convert ATC to VITC when down converting. It is also possible to select the insertion lines adding to Q-Down-ATG 3G's flexibility.

The Q-Down 3G range is a space-saving 100mm x 266mm module, with up to 12 boards fitting in a 2U frame alongside the rest of the Crystal Vision Indigo product range. The inputs and outputs are accessed by using the RM41 and RM57 frame rear modules, with the RM34 rear module additionally used to access the optional top board outputs. Control options include VisionWeb web browser control software, VisionPanel remote control panel, SNMP or an active front panel on the frame. Card edge control was also available prior to 2018. The Q-Down 3G range is ideal for use in mixed 3Gb/s, HD and SD environments, or for any areas being converted to HD or 3G.




The main features for both ***Q-Down-AG 3G*** and ***Q-Down-ATG 3G*** are as follows:

- High quality down conversion with adjustable video delay
- Aspect ratio and vertical filter selection with a High Definition input
- Auto output aspect ratio selection using Active Format Descriptor (AFD)
- 625-line WSS insertion in both analogue and digital outputs
- Two input loop-throughs or eight with an addition sub PCB
- Link selectable output formats – SD/HD analogue and serial digital
- Passes four groups of embedded audio, with delay matched to video
- One fixed frame and one frame of adjustable video delay
- Signal probe function
- Optical input or optical output option

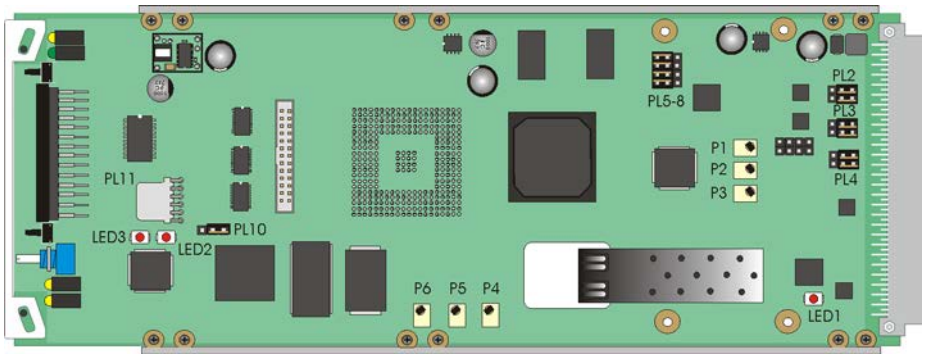
In addition to the above, the ***Q-Down-ATG 3G*** has the following additional feature:

- Closed-caption and timecode transport capability (ATC and D-VITC)

# 2 Hardware installation

## 2.1 Module configuration

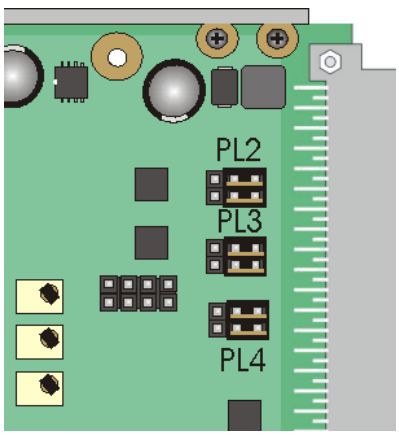
There are four user settable links on the Q-Down 3G range. These are – PL2, PL3, PL4 and PL10. Links PL2, PL3 and PL4 are used to select between analogue and serial digital outputs. PL10 sets the Q-Down 3G IP address to default (10.0.0.201) or to a user selected IP address.




*Q-Down 3G top side*

The surface-mounted LEDs on the top side of the PCB are not visible from the front of the frame and are included for diagnostic purposes only.

Note: The six potentiometers have been factory set and should not require further adjustments.




*SDI/analogue output selection links*

## Link configurations

| Link | Towards front of board | Towards rear of board |
|---|---|---|
| PL2 | CVBS / Y / G output | High/Standard Definition serial digital output |
| PL3 | CVBS / U / B / YC-Y output | High/Standard Definition serial digital output |
| PL4 | CVBS / V / R / YC-C output | High/Standard Definition serial digital output |

Note: Analogue video output formats are selected via the board edge or remotely. When the Y/C output format is selected the third output will give CVBS.

## Engineering link and LEDs

PL10 sets the Q-Down 3G range IP address to default (10.0.0.201) or to a user selected IP address. The LEDs LED1, LED2 and LED3 are included for diagnostic purposes and are not visible from the front of the frame.

| Link | Towards front of board | Towards the rear of board |
|---|---|---|
| PL10 | Default IP address 10.0.0.201 | Custom set IP address |

| LED | Illuminated | Not Illuminated |
|---|---|---|
| LED1 | Input equaliser locked to valid input | No input or invalid input |
| LED2 | Data | |
| LED3 | Link | |

## Potentiometers

These potentiometers have been factory set and should not require further adjustment.

| Potentiometer | Function |
|---|---|
| P1 | CVBS / Y / G output amplitude |
| P2 | U / B / YC-Y output amplitude |
| P3 | V / R / YC-C output amplitude |
| P4 | Standard Definition free-running frequency |
| P5 | High Definition 50Hz free-running frequency |
| P6 | High Definition 59.94Hz free-running frequency |

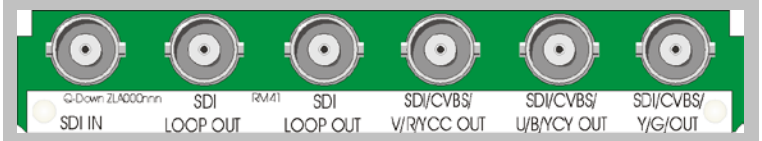
# 3 Rear modules and signal I/O

The 2U Indigo 2 frames will house up to 12 single height modules and dual power supplies. The 1U Indigo 1 frames will house six single height modules and a single or dual power supply. The Indigo DT desk top boxes have a built-in power supply and will house up to two single height modules. All modules can be plugged in and removed while the frame is powered without damage.

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

## Rear module connections with RM41

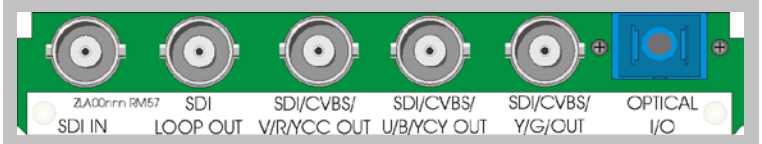
The RM41 being a single height module will allow maximum packing density with the maximum number of outputs available.

| RM41 rear module connector | Description |
|---|---|
|  | **RM41**<br>• 12 Q-Down 3G per Indigo 2 frame<br>• Six per Indigo 1 frame<br>• Two per Indigo DT<br>• All frame slots can be used |

| BNC | I/O assignment |
|---|---|
| **SDI/CVBS/Y/G OUT** | HD/SD SDI / CVBS, Y, G output (link PL2) |
| **SDI/CVBS/U/B/YCY OUT** | HD/SD SDI / CVBS, U, B, YC-Y output (link PL3) |
| **SDI/CVBS/V/R/YCC OUT** | HD/SD SDI / CVBS, V, R, YC-C output (link PL4) |
| **SDI LOOP OUT** | High Definition/Standard Definition serial digital input reclocked loop-through |
| **SDI LOOP OUT** | High Definition/Standard Definition serial digital input reclocked loop-through |
| **SDI IN** | High Definition/Standard Definition serial digital input |

## Rear module connections with RM57

The RM57 is a single height module used when the optical option is fitted.

| RM57 rear module connector | Description |
|---|---|
|  | **RM57**<br>• 12 Q-Down 3G per Indigo 2 frame<br>• Six per Indigo 1 frame<br>• Two per Indigo DT<br>• All frame slots can be used |

| BNC | I/O assignment |
|---|---|
| **OPTICAL I/O** | SC optical connector. Input or output depending on optical module fitted |
| **SDI/CVBS/Y/G OUT** | HD/SD SDI / CVBS, Y, G output (link PL2) |
| **SDI/CVBS/U/B/YCY OUT** | HD/SD SDI / CVBS, U, B, YC-Y output (link PL3) |
| **SDI/CVBS/V/R/YCC OUT** | HD/SD SDI / CVBS, V, R, YC-C output (link PL4) |
| **SDI LOOP OUT** | High Definition/Standard Definition serial digital input reclocked loop-through |
| **SDI IN** | High Definition/Standard Definition serial digital input |

Note: Ensure the internal dust-cap has been removed before mounting the RM57 into the frame.

# 4 General Purpose Interface

Each frame slot has up to six connections ‘a-f’ for GPI control and monitoring. These connections are available at the rear of the frame on the 26-way D-Type remote connectors. GPI 3 and GPI 4 can be set to be both inputs and outputs. When set to be inputs they allow the full selection of 16 user selectable presets. When GPI 3 and GPI 4 are set to be outputs the number of alarm output is increased to four. GPI 3 and GPI 4 are assigned from the board edge or remote device such as an active front panel, VisionWeb PC control and SNMP.

| GPI inputs | | | Low (<1V) | High (+5V) |
|---|---|---|---|---|
| 1 | ‘a’ | Recall preset bit 1 | See following table for user preset control | |
| 2 | ‘b’ | Recall preset bit 2 | | |
| 3 | ‘c’ | Recall preset bit 4 | | |
| 4 | ‘d’ | Recall preset bit 8 | | |

| GPI outputs | | | | |
|---|---|---|---|---|
| 3 | ‘c’ | Input missing/incompatible, Video frozen/Black, Audio silence/missing/Aspect ratio | Selected alarms asserted (after set delay if appropriate) | No alarm |
| 4 | ‘d’ | Input missing/incompatible, Video frozen/Black, Audio silence/missing/Aspect ratio | Selected alarms asserted (after set delay if appropriate) | No alarm |
| 5 | ‘e’ | Input missing/incompatible, Video frozen/Black, Audio silence/missing/Aspect ratio | Selected alarms asserted (after set delay if appropriate) | No alarm |
| 6 | ‘f’ | Input missing/incompatible, Video frozen/Black, Audio silence/missing/Aspect ratio | Selected alarms asserted (after set delay if appropriate) | No alarm |

Note: Input missing, input incompatible and aspect ratio will assert the select alarm immediately

As supplied, each GPI output has a 270Ω resistor in series with its output. This allows for an external LED to be driven, connected to a DC voltage of +5V.

Each General Purpose Input (GPI) is fitted with a 6800Ω resistor connected to the internal +5V.

The 16 user preset configurations can be recalled using binary notation.

| Preset | Bit 8 | Bit 4 | Bit 2 | Bit 1 | Preset | Bit 8 | Bit 4 | Bit 2 | Bit 1 |
|---|---|---|---|---|---|---|---|---|---|
| **1** | H | H | H | H | **9** | L | H | H | H |
| **2** | H | H | H | L | **10** | L | H | H | L |
| **3** | H | H | L | H | **11** | L | H | L | H |
| **4** | H | H | L | L | **12** | L | H | L | L |
| **5** | H | L | H | H | **13** | L | L | H | H |
| **6** | H | L | H | L | **14** | L | L | H | L |
| **7** | H | L | L | H | **15** | L | L | L | H |
| **8** | H | L | L | L | **16** | L | L | L | L |

## 2U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two of four rear remote connectors as follows:

| Slot no. | ‘a’ pin | ‘b’ pin | ‘c’ pin | ‘d’ pin | ‘e’ pin | ‘f’ pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |
| **3** | 8 (3) | 9 (3) | 18 (3) | 26 (3) | 19 (4) | 20 (4) |
| **4** | 7 (3) | 16 (3) | 17 (3) | 25 (3) | 10 (4) | 11 (4) |
| **5** | 5 (1) | 6 (1) | 15 (1) | 24 (1) | 1 (2) | 2 (2) |
| **6** | 4 (1) | 14 (1) | 13 (1) | 23 (1) | 3 (2) | 4 (2) |
| **7** | 5 (3) | 6 (3) | 15 (3) | 24 (3) | 1 (4) | 2 (4) |
| **8** | 4 (3) | 14 (3) | 13 (3) | 23 (3) | 3 (4) | 4 (4) |
| **9** | 3 (1) | 12 (1) | 22 (1) | 21 (1) | 12 (2) | 13 (2) |
| **10** | 10 (1) | 11 (1) | 19 (1) | 20 (1) | 21 (2) | 22 (2) |
| **11** | 3 (3) | 12 (3) | 22 (3) | 21 (3) | 12 (4) | 13 (4) |
| **12** | 10 (3) | 11 (3) | 19 (3) | 20 (3) | 21 (4) | 22 (4) |

*Table shows pin number (remote number)*

Note: Remote 1 and Remote 3 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2 and Remote 4 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2.

Note: The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A.

## 1U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two rear remote connectors as follows:

| Slot no. | ‘a’ pin | ‘b’ pin | ‘c’ pin | ‘d’ pin | ‘e’ pin | ‘f’ pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |
| **3** | 5 (1) | 6 (1) | 15 (1) | 24 (1) | 1 (2) | 2 (2) |
| **4** | 4 (1) | 14 (1) | 13 (1) | 23 (1) | 3 (2) | 4 (2) |
| **5** | 3 (1) | 12 (1) | 22 (1) | 21 (1) | 12 (2) | 13 (2) |
| **6** | 10 (1) | 11 (1) | 19 (1) | 20 (1) | 21 (2) | 22 (2) |

*Table shows pin number (remote number)*

Note: Remote 1: 26-way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

Note: The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

## Indigo DT desk top box GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two rear remote connectors as follows:

| Slot no. | ‘a’ pin | ‘b’ pin | ‘c’ pin | ‘d’ pin | ‘e’ pin | ‘f’ pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |

*Table shows pin number (remote number)*

Note: Remote 1: 26-way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

Note: The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

# 5 Aspect Ratio Correction

The Q-Down 3G range includes the ability to deal with any HD to SD aspect ratio conversion requirements. You can select a 16:9 Anamorphic output for 16:9 SD systems and either a 16:9 to 4:3 Letterbox, 16:9 to 4:3 Letterbox compromise, or 16:9 to 4:3 Full Screen with centre cut for 4:3 SD systems. The Q-Down 3G range will also allow you to customise the shape of your output picture. Each of the standard aspect ratios can be individually adjusted away from the default values to create customised versions by using four independent sets of size, position and crop controls.

The Q-Down 3G range ensures the picture is always the right shape by coping with both analogue and digital SD blanking widths – particularly useful for feeds that are up and down converted multiple times. When used with an Anamorphic conversion, the 'SD Analogue Line Length' option puts the active 1920 pixels from a 1080i or 1080p picture into 702 pixels of SD (rather than 720 pixels), with the rest of the pixels used to represent analogue blanking – which prevents the SD signal from losing the sides of the picture. All other aspect ratios are adjusted by a similar amount.

The Q-Down 3G range can automatically choose the appropriate aspect ratio according to the SMPTE 2016 AFD data embedded in the 3Gb/s or HD input video. HD programmes are often made of a mixture of true High Definition sources and SD-originated sources that have been up converted, and the SMPTE 2016 AFD code in the signal gives information about which areas of the screen contain a picture and which areas have black 'padding'. The down converter needs to read this signal and select the correct aspect ratio conversion to be used with the down conversion.

The Q-Down 3G range offers three options for the SD output: In **Auto 16:9 mode** the SD outputs can be set to be always 16:9 and in this case it will perform the down conversion without ever changing the aspect ratio; In **Auto 4:3 mode** the SD outputs can be set to be always 4:3, in which case it will down convert and perform either a Letterbox or centre cut, depending on the source material; In **Auto Adaptive mode,** if the HD input is 16:9 full frame the picture is down converted with no aspect ratio conversion and is output as 16:9 SD. If the SMPTE 2016 data indicates that the HD input is a 16:9 Pillarbox, however, a centre cut is performed and the output is 4:3 SD. Although it would normally be a requirement for an automatic system to label all the 3Gb/s or HD video images to show their format and control the down converter, with the Q-Down 3G range it is only necessary to label those that are not full frame 16:9 images.

When the input is not labelled the down converter uses its default assumption that an HD image is a full frame 16:9. It is therefore possible to have a powerful system with the majority of signals not containing SMPTE 2016 information.

## Fixed Aspect Ratios

There are four fixed aspect ratios which are - Anamorphic, 16:9 Letterbox, 14:9 Letterbox and Centre Cut. Anamorphic will map the input picture directly to the native aspect ratio of the viewing display along with the resulting distortion associated with this. Should it be necessary to view the output on a 4:3 display, setting the aspect ratio selection to Letterbox will give the correct picture dimensions by adding black bars to the top and bottom of the picture. Selecting 14:9 Letterbox will crop the picture to 87.5%, and depending on the aspect ratio of the display will either add black bars

to the top and bottom or both sides of the picture. There will be some loss of picture. Centre cut will show the central 75% of the 16:9 widescreen picture mapped to the full monitor height with the corresponding loss of the left and right picture edges.

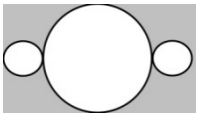
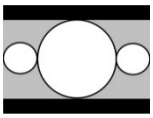
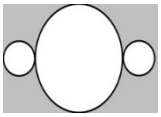
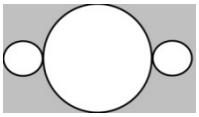
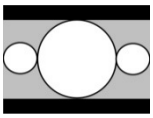
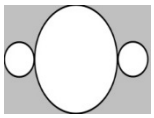
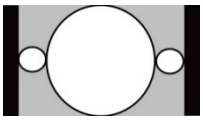
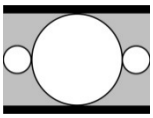
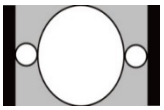
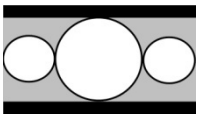
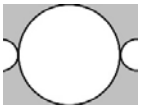
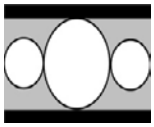
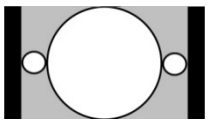
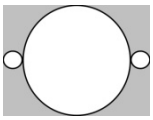
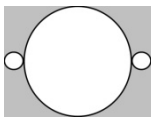
## Automatic Aspect Ratio Selection

There are three auto modes available. When any of these is selected the actual aspect ratio selected will depend on the input video AFD. The AFD reader will also automatically set the output WSS when Widescreen Signalling is set to auto. Selecting Auto 16:9 for all AFD input codes will give an anamorphic aspect ratio conversion and for a 625-line output, WSS will be set to 16:9 full frame. When set to Auto 4:3 the output aspect ratio and WSS data will depend on the input AFD. Undefined/reserved and full frame codes will produce a Letterbox aspect ratio with the output WSS set to 16:9 Letterbox. Pillarbox 4:3, Pillarbox 14:9 and Letterbox greater than 16:9 will give a centre cut conversion and set output WSS to full format 4:3. Selecting Auto Adaptive for any full frame input will give an anamorphic aspect ratio with WSS set to full frame 16:9. Pillarbox 4:3 will give a centre cut conversion and set output WSS to full format 4:3. Undefined/reserved, Pillarbox 14:9 and Letterbox greater than 16:9 will make no change so the previous conversion will remain. On power up the default conversion will be Anamorphic.

| Incoming AFD value | Explanation | Auto 16:9 Conversion (output WSS) | Auto 4:3 conversion (output WSS) | Auto adaptive Conversion (output WSS) |
|---|---|---|---|---|
| **0, 1, 5, 6, 7, 12** | Undefined/reserved | Anamorphic (full format 16:9) | Letterbox (box 16:9 centre) | No change, as previous |
| **2, 8, 10, 14, 15** | Full frame | Anamorphic (full format 16:9) | Letterbox (box 16:9 centre) | Anamorphic (full format 16:9) |
| **9, 13** | Pillarbox 4:3 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | Centre cut (full format 4:3) |
| **3, 11** | Pillarbox 14:9 | Anamorphic (full format 16:9) | Letterbox (box 14:9 centre) | No change, as previous |
| **4** | Letterbox >16:9 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | No change, as previous |

*Response to SMPTE 2016 AFD codes*

Note: Widescreen Signalling must be set to Auto for the output WSS to be automatically set by the incoming AFD data. These controls are disabled when the input is standard definition.

| SMPTE 2016 AFD Code | Explanation and 16:9 input image example | Auto 4:3 correction (output WSS) | Auto adaptive correction (output WSS) |
|---|---|---|---|
| **0, 1, 5, 6, 7, 12** |  Undefined/reserved |  Letterbox 16:9 into 4:3 |  Anamorphic |
| **2,8,10,14,15** |  Full frame 16:9 |  Letterbox 16:9 into 4:3 |  Anamorphic |
| **3,11** |  14:9 Pillarbox |  Letterbox 14:9 area into 4:3 |  Anamorphic |
| **4** |  Letterbox image with aspect ratio > 16:9. |  Centre cut into 4:3 |  Anamorphic |
| **9,13** |  4:3 Pillarbox in 16:9 frame. |  Centre cut-area |  Centre cut-out 4:3 area |

*Examples of Auto 4:3 and Auto Adaptive aspect ratio correction*

# 6 Output AFD and WSS

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

The ANC data packets containing the AFD information are inserted within the active line portion of the fourth line after the switching line in the vertical ancillary space line.

The 16 available codes are described in the following table

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

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

## 6.1 Widescreen Signalling

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

| Outgoing WWS codes | Explanation | Conversion |
|---|---|---|
| **0001** | full format 4:3 | Centre cut |
| **1000** | box 14:9 centre | Letterbox |
| **1101** | box 16:9 centre | Letterbox |
| **1110** | full format 16:9 | Anamorphic |

# 7 Timecode and Closed Caption

The ***Q-Down-ATG 3G*** can deal with both (ATC) ancillary data timecode (SMPTE 12M) and (D-VITC) vertical interval timecode (SMPTE 266M). ATC is particularly useful when down converting progressive High Definition video to an interlaced High Definition output. When outputting Standard Definition ***Q-Down-ATG 3G*** will also convert the ancillary timecode to vertical interval timecode. VITC code is always repeated on two adjacent video lines, one in each field. The line pairs used are also selectable to allow extra data to be encoded. If the ATC output is disabled, the AFD/ATC line number will still select the line number, on which AFD will appear for down-converted SD outputs. When using the ***Q-Down-ATG 3G*** to convert 1080p to 1080i output, the ATC and AFD are inserted in lines 9+571 and 11+547 respectively.

DTVCC, digital television closed caption (CEA-708), is down converted by ***Q-Down-ATG 3G*** to 525i closed caption (CEA-608) which would normally be inserted on to line 21. ***Q-Down-ATG 3G*** allows this closed caption information to be inserted on to any of line 12 to line 21. This includes extended data service (XDS).

When not down converting. all TC and CC control will be inactive.

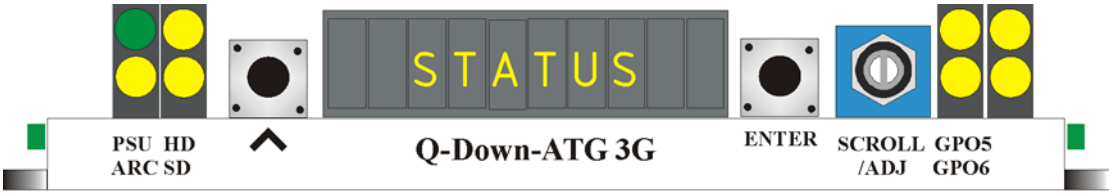
| 525 VITC lines | | |
|---|---|---|
| 10+12 (273+275) | 13+15 (276+278) | 16+18 (279+281) |
| 11+13 (274+276) | 14+16 (277+279) | 17+19 (280+282) |
| 12+14 (275+277) | 15+17 (278+280) | 18+20 (281+283) |

| 625 VITC lines | | |
|---|---|---|
| 6+8 (319+321) | 11+13 (326+328) | 16+18 (329+331) |
| 7+9 (320+322) | 12+14 (325+328) | 17+19 (330+332) |
| 8+10 (321+323) | 13+15 (326+328) | 18+20 (331+333) |
| 9+11 (322+324) | 14+16 (327+329) | 19+21 (332+334) |
| 10+12 (323+325) | 15+17 (328+330) | 20+22 (333+335) |

*VITC paired line numbers for both fields for 525 and 625 systems*

# 8 Control and status monitoring

## 8.1 Card edge controls




*Q-Down 3G range board edge (**Q-Down-ATG 3G** model shown)*

*Board edge control was removed from Q-Down-AG 3G and Q-Down-ATG 3G in 2018. Therefore the card edge control information detailed below is only relevant for older versions of the product.*

## 8.2 Card edge buttons

The two tactile push button switches allow the operator to navigate within the menu structure.

.

| Button | Function | Normal state Up, Action Down |
|---|---|---|
| ^ | Up Menu | Push to jump up a menu level or cancel a selection |
| **ENTER** | Select/Action | Push to select a menu and to action and confirm a change |

## 8.3 Card edge rotary control

The board edge rotary encoder is used to navigate through the menu categories and adjust parameter values.

| Control | Function |
|---|---|
| **SCROLL /ADJUST** | Rotate SCROLL to identify a menu category. In combination with the ENTER button select and ADJUST to change the current level or select a further option. |

Notes: The rotary control can access menus and parameter values by clockwise or anti-clockwise rotation.

# 8.4 Reading card edge LEDs

Card edge LEDs may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

Refer also to the trouble-shooting chapter for more help with solving problems and monitoring status information.

The following table summarises the card edge LED functions and colours:

| Name | LED Colour | Function when ON | Function when Off |
|---|---|---|---|
| **PSU** | Green | Good power supply (PSU) rails | One or more of the monitor supplies is out of specification |
| **ARC** | Yellow | Aspect ratio conversion selected | Full screen (anamorphic) selected |
| **HD** | Yellow | Video input standard is HD (High Definition) | Input not present |
| **SD** | Yellow | Video input standard is SD (Standard Definition) | |
| **GPO5** | Yellow | GPO5 active / low | GPO5 inactive / high |
| **GPO6** | Yellow | GPO6 active / low | GPO6 inactive / high |
| | Yellow | No function | |
| | Yellow | No function | |

# 8.5 Navigating card edge menus

To access the card edge menu system proceed as follows:

- Press the up-arrow [⌃] until a top menu category is reached
- Rotate the SCROLL control until the desired menu category is found
- Push ENTER to enter the sub menus of that category
- Rotate SCROLL to select a sub menu
- Push ENTER to select the desired function. Selection will be indicated by the text being displayed in ***italic*** text
- Rotate ADJUST to make the desired change to the selected parameter. The display brightness flashes slowly to indicate that a change has been made and requires confirmation
- When required push ENTER to action the change. The display will cease flashing
- Use the up-arrow [⌃] and SCROLL control to navigate to further menus

Note : The displayed menu brightness will flash slowly if confirmation of a change is required.

# 8.6 Using the front control panel

At power up, the LEDs of all eight control panel keys will illuminate briefly. Once the panel has completed its power up and configuration sequence the panel will enter its status mode and display the current software version and frame IP address.

*'Status' menu showing current software version and IP address*

## Selecting a Q-Down-AG 3G or Q-Down-ATG 3G

To continue with control panel operation or configuration, press the 'Device' key once. The control panel will display the name of the card that first responds to the polling request together with its location number. The location number consists of the frame number plus the card position in the frame. Rotate the Shaft control to poll through the available cards. Use the F2 soft key to toggle between the card's serial number and issue number with modification level.

*'Device' menu showing a Q-Down-AG 3G in slot 1.01*

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

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

*The Q-Down-AG 3G home menu*

Rotate the shaft control to scroll through the menu structure and press ENTER to select the sub-menus. Press HOME at any time to return to the home menu.

*Q-Down-AG 3G Video Status sub-menu*

Press ENTER to select the 'Signal Status' menu or SCROLL to display other sub-menus. See description of menu structure below for list of sub-menus.

## Control Panel keys overview

The functions assigned to the control panel keys are:

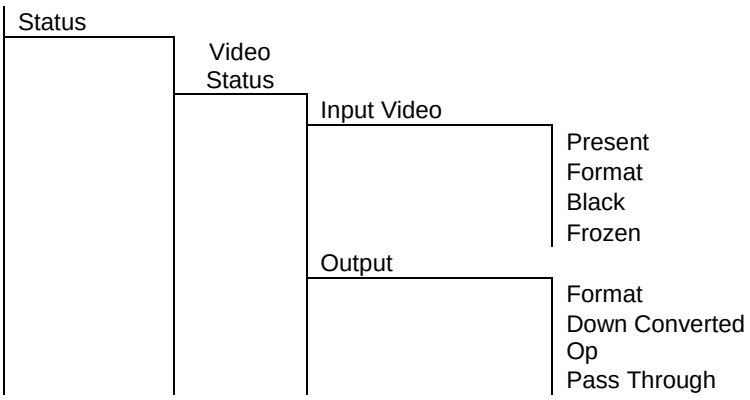
- DEVICE – enters 'device' menu to select a card or show available cards.
- ASTERISK (*) – selects 'network configuration' menu.
- F1 to F4 – soft keys not currently used by the Q-Down 3G range
- HOME – returns to top of the Q-Down 3G range menu structure.
- ENTER – accept current selection.
- Up arrow – used to move up through the menu structure.
- Rotary control – shaft encoder used to select sub-menus or variable data.

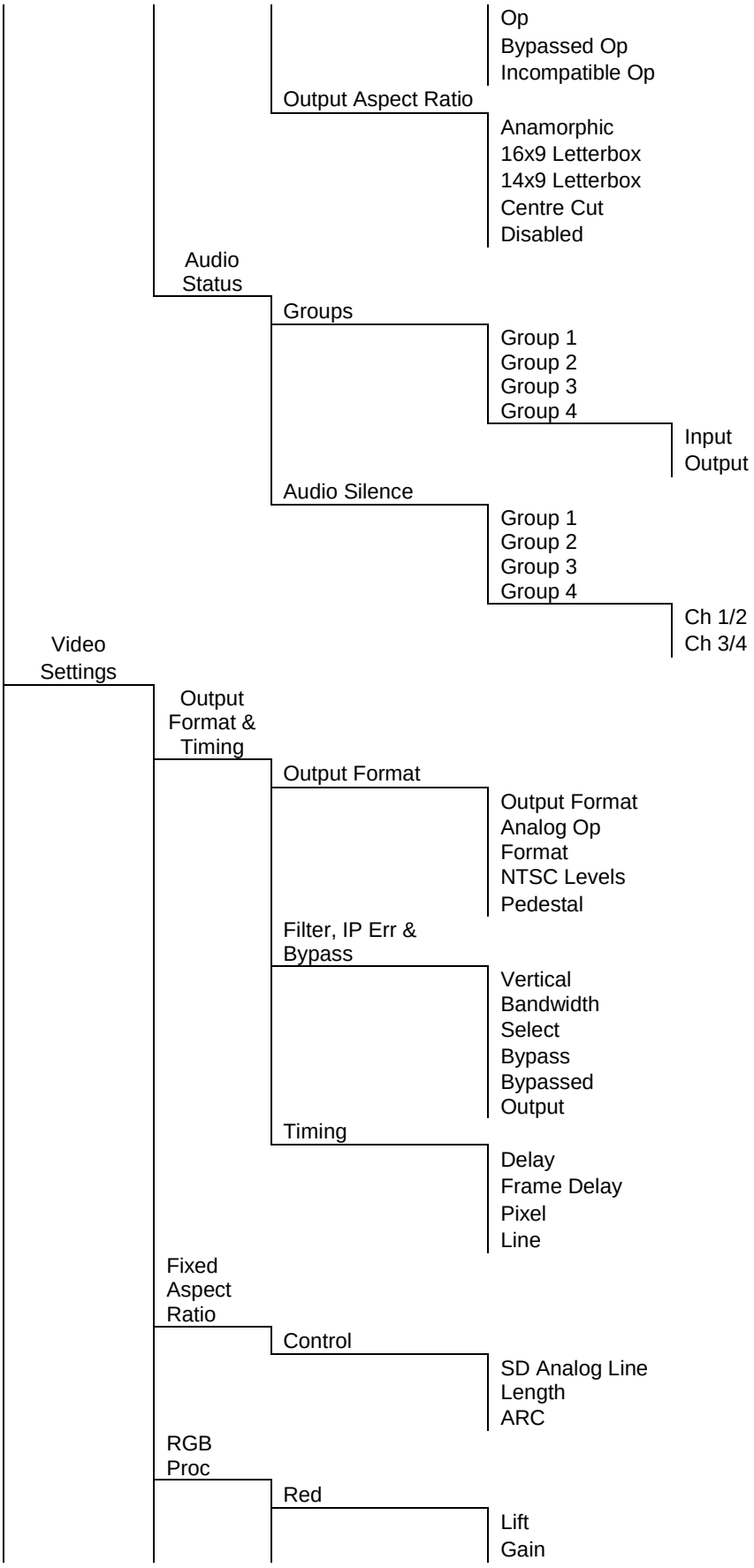
## Updating the display

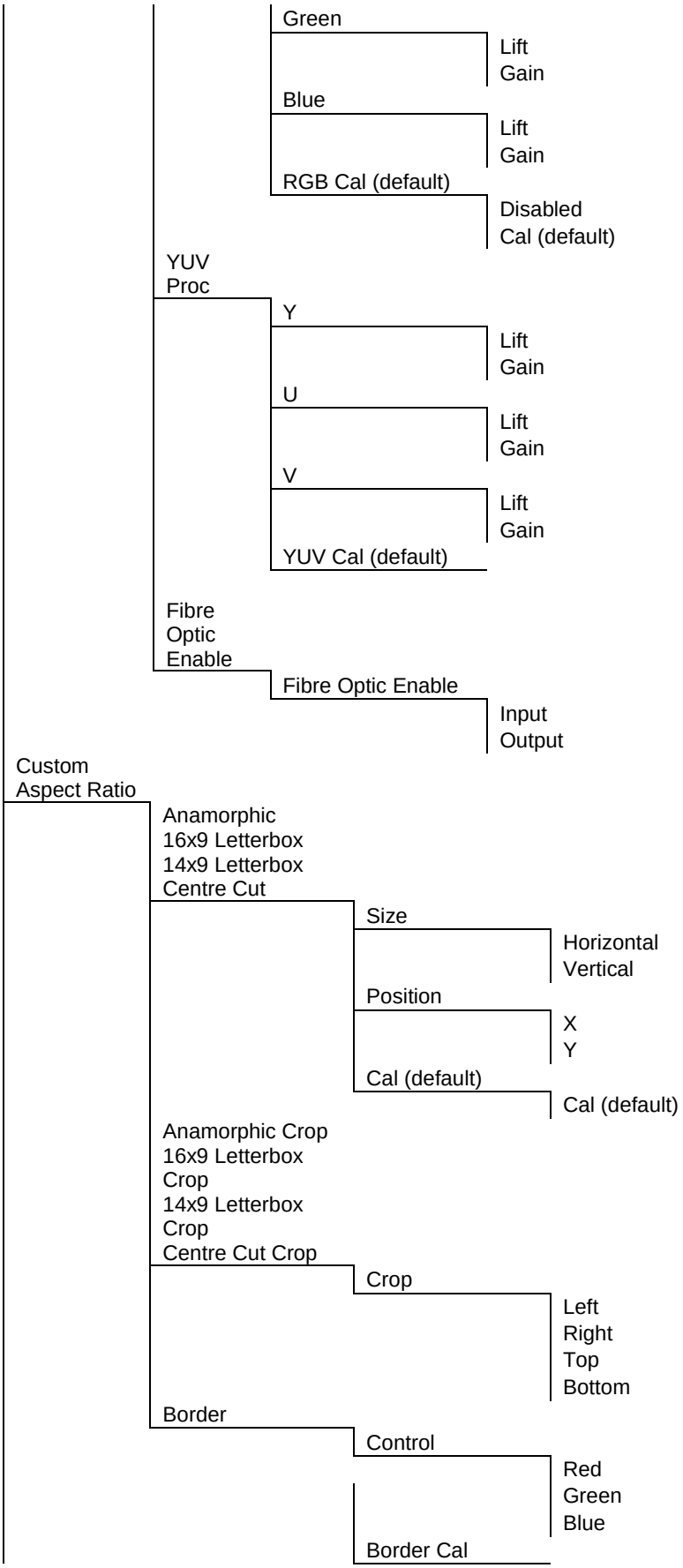
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

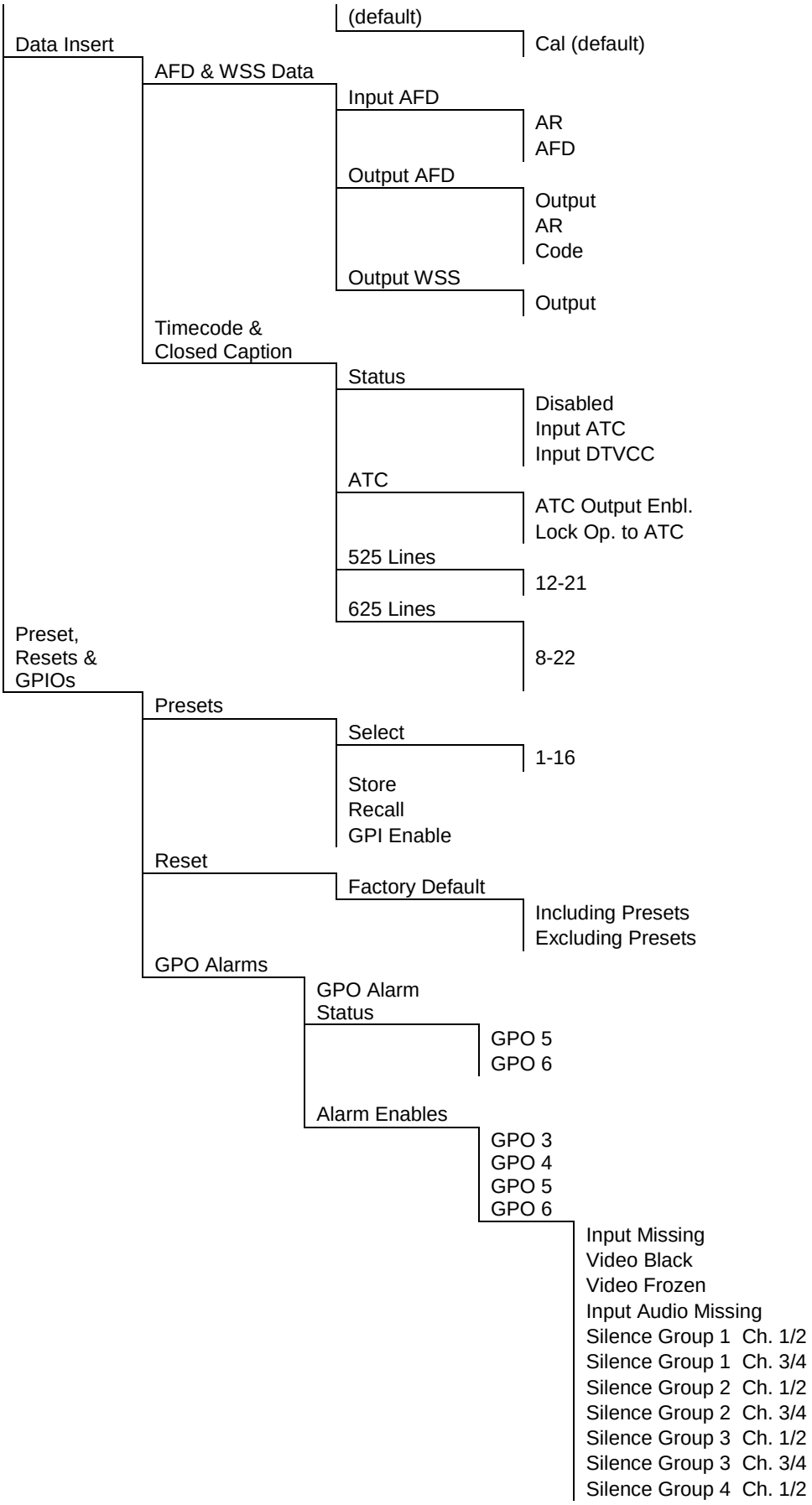
## Menu Tree

The basic menu structure for card edge, front panel access and VisionWeb is identical and consists of the following menus and sub-menus.




Op
Bypassed Op
Incompatible Op
Output Aspect Ratio
Anamorphic
16x9 Letterbox
14x9 Letterbox
Centre Cut
Disabled
Audio Status
Groups
Group 1
Group 2
Group 3
Group 4
Input
Output
Audio Silence
Group 1
Group 2
Group 3
Group 4
Ch 1/2
Ch 3/4
Video Settings
Output Format & Timing
Output Format
Output Format
Analog Op Format
NTSC Levels
Pedestal
Filter, IP Err & Bypass
Vertical
Bandwidth
Select
Bypass
Bypassed Output
Timing
Delay
Frame Delay
Pixel
Line
Fixed Aspect Ratio
Control
SD Analog Line Length
ARC
RGB Proc
Red
Lift
Gain


Green
Lift
Gain
Blue
Lift
Gain
RGB Cal (default)
Disabled
Cal (default)
YUV
Proc
Y
Lift
Gain
U
Lift
Gain
V
Lift
Gain
YUV Cal (default)
Fibre
Optic
Enable
Fibre Optic Enable
Input
Output
Custom
Aspect Ratio
Anamorphic
16x9 Letterbox
14x9 Letterbox
Centre Cut
Size
Horizontal
Vertical
Position
X
Y
Cal (default)
Cal (default)
Anamorphic Crop
16x9 Letterbox
Crop
14x9 Letterbox
Crop
Centre Cut Crop
Crop
Left
Right
Top
Bottom
Border
Control
Red
Green
Blue
Border Cal


Data Insert
(default)
Cal (default)
AFD & WSS Data
Input AFD
AR
AFD
Output AFD
Output
AR
Code
Output WSS
Output
Timecode &
Closed Caption
Status
Disabled
Input ATC
Input DTVCC
ATC
ATC Output Enbl.
Lock Op. to ATC
525 Lines
12-21
625 Lines
8-22
Preset,
Resets &
GPIOs
Presets
Select
1-16
Store
Recall
GPI Enable
Reset
Factory Default
Including Presets
Excluding Presets
GPO Alarms
GPO Alarm
Status
GPO 5
GPO 6
Alarm Enables
GPO 3
GPO 4
GPO 5
GPO 6
Input Missing
Video Black
Video Frozen
Input Audio Missing
Silence Group 1 Ch. 1/2
Silence Group 1 Ch. 3/4
Silence Group 2 Ch. 1/2
Silence Group 2 Ch. 3/4
Silence Group 3 Ch. 1/2
Silence Group 3 Ch. 3/4
Silence Group 4 Ch. 1/2

Silence Group 4 Ch. 3/4
Input Incompatible
Anamorphic
16x9 Letterbox
14x9 Letterbox
Centre Cut
Disabled

The above menu structure is the means to access the various Q-Down 3G range controls and status. A more detailed description is in section – 'Control Descriptions'.

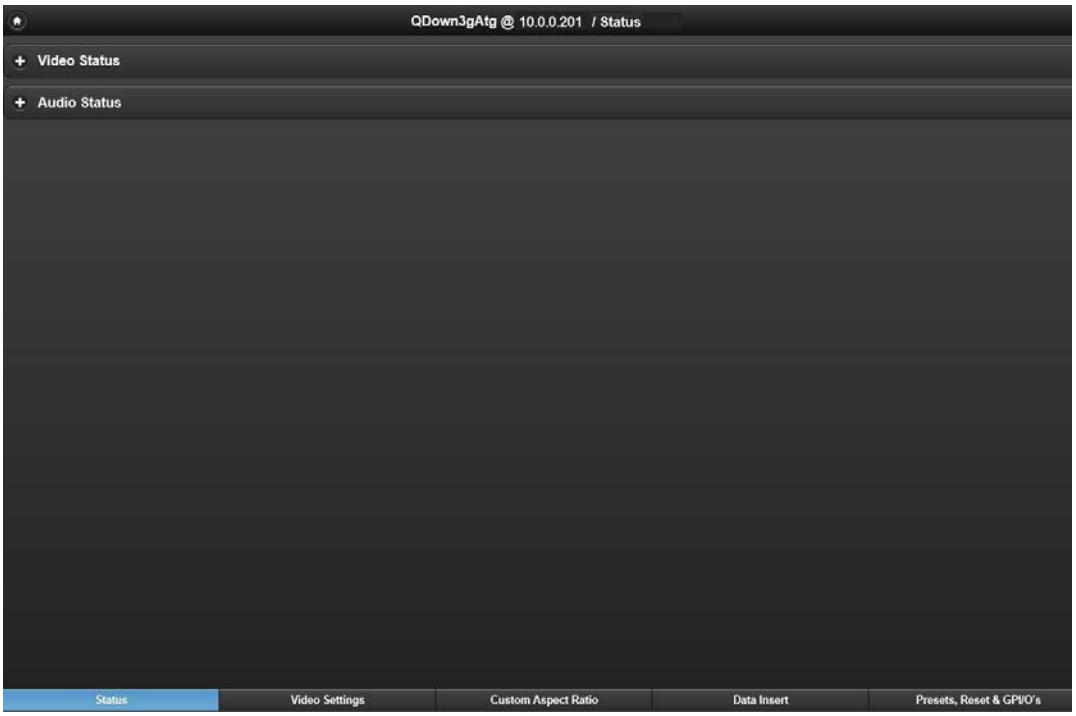
# 8.7 Controlling cards via VisionWeb

Crystal Vision cards use an XML file to create a control database that is used by the card's front-edge controller, the Indigo frame front panel controller and VisionWeb software. VisionWeb software offers a full range of controls with slider controls etc. similar to that available with the older Statesman PC software.

Accessing the Indigo Home page with a PC browser via the Ethernet connector of an Ethernet-enabled frame will display a list of the cards fitted (see Frame Manual for more details).

*Indigo home page*

The example above shows a Q-Down-AG 3G card fitted in slot one and the frame's power supply and status monitor in slots 13 and 14. Clicking on the ***Q-Down-AG 3G*** card will bring up the card's home page, for example:



# 9 Control Descriptions

The controls of the Q-Down 3G range are accessible from Crystal Vision's VisionWeb software, the front panel or the board edge. The description of controls used in this manual is based on VisionWeb but the path to locate controls via the front panel or board edge follows the same logic. For instance, in the VisionWeb GUI, a 'Frozen' control is located in the **'Input Video'** group of the **'Video Status'** sub-menu of the '**Status'** menu. To find the same control using the card edge or front panel follow the path **Status ->Video Status->Input Video** to the **Frozen** control.

VisionWeb GUI controls are accessed by menus at the bottom of the page which, when selected, offer sub-menus containing a number of controls. Some controls are simulated LEDs that are used to show status, others are check boxes, buttons or sliders which change various Q-Down 3G range settings.

The description of the menus are in the order shown in the GUI i.e.

**VIDEO STATUS, AUDIO STATUS, OUTPUT FORMAT & TIMING, FIXED ASPECT RATIO, RGB PROC, YUV PROC, FIBRE OPTIC ENABLE, ANAMORPHIC, ANAMORPHIC CROP, 16X9 LETTERBOX, 16X9 LETTERBOX CROP, 14X9 LETTERBOX, 14X9 LETTERBOX CROP, CENTRE CUT, CENTRE CUT CROP, BORDER, AFD & WSS DATA, TIMECODE & CLOSED CAPTION, PRESETS, RESETS, GPO ALARMS, ALARM DELAYS.**

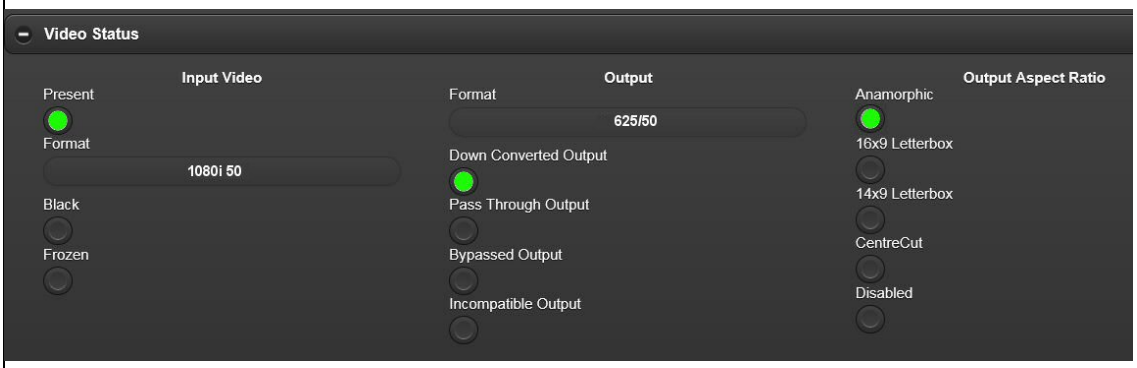
Note that the Anamorphic, 16x9 Letterbox, 14x9 Letterbox and Centre Cut menus are identical in controls and layout and are only described once, as are the associated 'crop' menus. Note also that the Timecode & Closed Caption menu is only available for the ***Q-Down-ATG 3G*** model.

Each menu is shown with a screen grab and description of each control's function. Some menus and some controls are specific to specific models only, in this case the model number(s) are indicated.

# 9.1 Video Status Menu

## Video Status

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



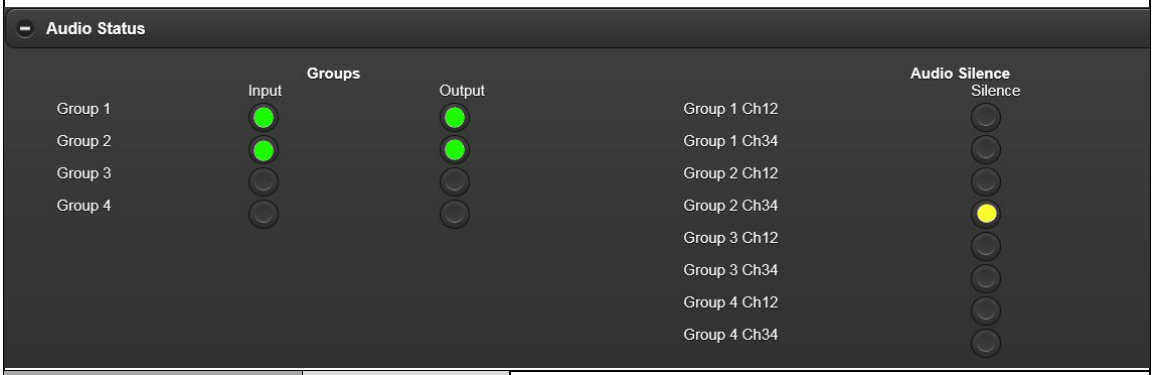

| | | |
|---|---|---|
| **Input Video** | **Present** | **On if a video input is present.** |
| | **Format** | **Displays the video standard of the input i.e. '1080i 50'.** |
| | **Black** | **On if the video input is at black level. Video black is defined as values in the range of 58 to 70 around digital black (+/- 5mV). If digital black is present for longer than the delay time set by the video black delay control, a video black error will be flagged.** |
| | **Frozen** | **On if the input video is frozen. A picture is considered frozen when a frame is identical to the previous frame. If this condition is met consistently for the period of time set by the video frozen delay control, a video frozen error will be flagged.** |
| **Output** | **Format** | **Displays the output video standard i.e. '625i 50Hz'.** |
| | **Down Converted Output** | **This LED will be illuminated when the Q-Down 3G range is down converting.** |
| | **Pass Through Output** | **Whenever the input format is the same as the selected output format this LED will be illuminated. When in this mode all aspect ratio controls will be disabled along with the vertical filtering. The analogue output selection remains active along with the analogue and digital RGB and YUV proc amps and the delay controls.** |
| | **Bypassed Output** | **This LED will be illuminated when the Q-Down** |

| | | |
|---|---|---|
| | | **3G range has been set to bypass by checking the Bypass box in the 'Output Format & Timing' menu. For the Q-Down 3G to enter bypass mode both the input and output selection must be the same otherwise the bypass command will be ignored. As it is not possible to select a 3G output, selecting bypass will also be ignored with a 3G input present. In bypass mode the analogue output selection remains active along with the analogue RGB and YUV proc-amps and the delay controls. The digital proc-amps will be disabled and the SDI delay through the Q-Down 3G range will be set to its minimum processing delay. (SD approximately 2uS delay and HD less than 1uS delay.)** |
| | **Incompatible Output** | **This LED will be on should the video input format and output format selection become incompatible, which would be the case if the input is a lower bit rate than the output selection.** |
| **Output Aspect Ratio** | **Anamorphic**<br>**16x9 Letterbox**<br>**14x9 Letterbox**<br>**Centre Cut** | **These LEDs indicate what aspect ratio correction is being performed. There are four fixed aspect ratios which are Anamorphic, 16:9 Letterbox, 14:9 Letterbox and centre cut. Anamorphic will map the input picture directly to the native aspect ratio of the viewing display along with the resulting distortion associated with this. Should it be necessary to view the output on a 4:3 display, setting the aspect ratio selection to Letterbox will give the correct picture dimensions by adding black bars to the top and bottom of the picture. Selecting 14:9 Letterbox will crop the picture to 87.5%, and depending on the aspect ratio of the display will either add black bars to the top and bottom or both sides of the picture. There will be some loss of picture. Centre cut will show the central 75% of the 16:9 widescreen picture mapped to the full monitor height with the corresponding loss of the left and right picture edges.** *See section 'Aspect Ratio Correction' for more details.* |
| | **Disabled** | **The ARC is disabled when in 'bypass' or 'pass-through' mode.** |

## 9.2 Audio Status Menu

### Audio Status

**Display status of embedded audio signals.**

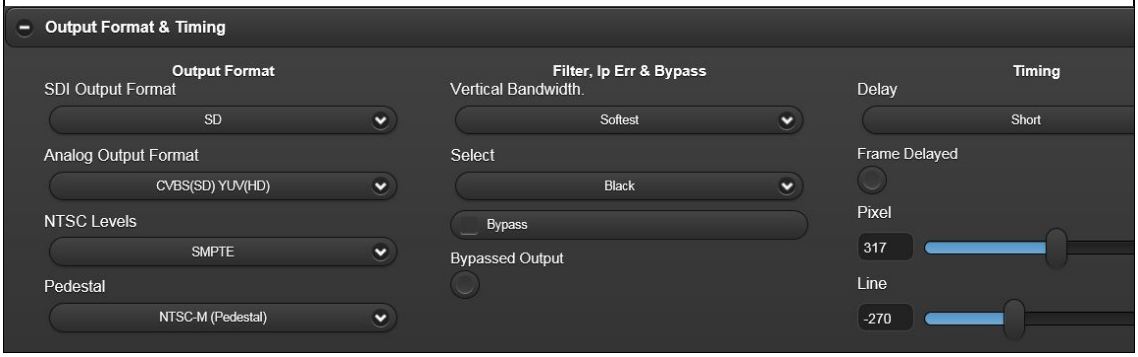


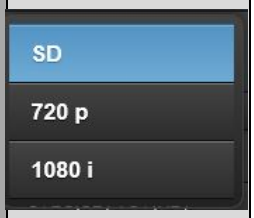
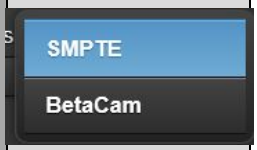
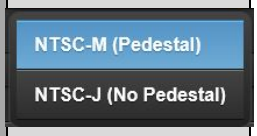

| | | |
|---|---|---|
| **Group 1-4** | **Input** | **On if embedded audio group is present in input video.** |
| | **Output** | **On if embedded audio group is present in the output video.** |
| **Group 1-4, Ch 12,34** | **Silence** | **On if any of the embedded audio channel pairs are silent.** |

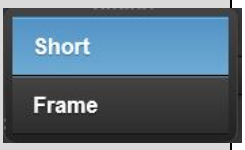
## 9.3 Video Settings Menu

### Output Format & Timing

**Select output SDI and analogue video formats.**



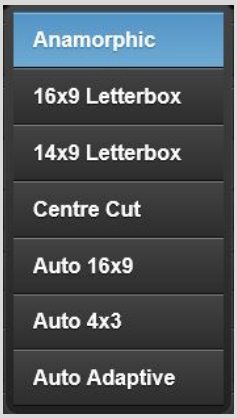
| | | |
|---|---|---|
| **Output Format** |  | **The output format can be selected from 1080i, 720p or SD. Although it is possible to select the output to be the same as the input format, apart from 1080p, setting the output to a higher format than the input will be flagged as incompatible and the output will be replaced with black, blue or muted as selected in the output incompatibility mode menu.** *The position of the on-board links PL2, PL3 and PL4 must be set to give either an SDI output or analogue output as required.* |
| **Analog Output Format** | | **As the Q-Down 3G range supports both Standard Definition and High Definition analogue output formats, the final analogue output presented will be determined by both the analogue output format selection and digital output format selection. Setting the output format to SD will allow the analogue output format to be selected from any of the available choices. If one of the High Definition output formats were to be selected, the analogue outputs would be limited to either HD YUV or RGB. The analogue video line rate will be the same as that of the input video.** *The position of the on-board links PL2, PL3 and PL4 must be set to give either an SDI output or analogue output as required.* |
| **NTSC Levels** |  | **Set the luminance, chrominance and sync levels to the correct values for either SMPTE/EBU N10 or Betacam standards.** |
| **Pedestal** |  | **Set black level offset for NTSC standard.** |
| **Vertical Bandwidth** | | **When down converting, the vertical bandwidth can be optimised for a given application by selecting the most appropriate vertical bandwidth filtering. There are four filters to select from, ranging from the highest (sharpest) to the lowest (softest).** |
| **Select** | | **Should the video input format and output format selection become incompatible, for example in the situation where the input is a lower bit rate than the output selection, the output can be set to go to black, blue or muted to no output.** |

| | | |
|---|---|---|
| **Bypass** | **Enabling the bypass control will set the Q-Down 3G range into bypass mode whenever the input and the selected output format are the same. In bypass mode the analogue output selection remains active along with the analogue RGB and YUV proc-amps and the delay controls. The digital proc-amps will be disabled and the SDI delay through the Q-Down 3G range will be set to its minimum processing delay. (SD approximately 2uS delay and HD less than 1uS delay.)** *Note that the Q-Down 3G range does not support a 3G output so bypass with a 3G input is not possible*. | |
| **Bypassed Output** | **On whenever the Q-Down 3G range is in 'bypass' mode.** | |
| **Delay** |  | **When short delay is selected the minimum delay available is 16 lines. This limit is imposed to prevent possible frame tearing at delays less than this minimum. If the delay is set to less than 16 lines one frame of delay will be automatically added to the output, so for delays of less than 16 lines the actual delay will be one frame plus the adjustable delay.** *Note that any negative delay dialled will be one frame less the negative delay.* **Selecting Frame Delay will add a fixed one frame delay between input and output. The variable delay slider controls will now allow an adjustment of +/- 1 frame in lines and pixels.** *Note that the maximum delay in lines for any output format is one frame. Any number of lines dialled greater than one frame will be ignored and return the maximum delay of one frame. Similarly the maximum delay in pixels cannot exceed one output line.* |
| **Frame Delayed** | **The Frame Delayed LED will illuminate whenever the one frame delay is added.** | |
| **Pixel/Line** | **The video delay controls are made up of two mode controls and two variable sliders giving +/- 1 line in pixels and +/- 1 frame in lines.** | |

# Fixed Aspect Ratio

**Set up output aspect ratio correction.**

| | |
|---|---|
| **SD Analog Line Length** | **Set the SD output line length to be equal to analogue video.** |

| | | |
|---|---|---|
| **ARC** |  | **Choose Aspect Ratio Correction for the output picture. There are four fixed aspect ratios which are Anamorphic, 16:9 Letterbox, 14:9 Letterbox and centre cut.**<br><br>**Selecting Auto 16:9 for all AFD input codes will give an Anamorphic aspect ratio conversion and for a 625-line output WSS will be set to 16:9 full frame.**<br><br>**When set to Auto 4:3 the output aspect ratio and WSS data will depend on the input AFD. Undefined/reserved and full frame codes will produce a Letterbox aspect ratio with the output WSS set to 16:9 Letterbox. Pillarbox 4:3, Pillarbox 14:9 and Letterbox greater than 16:9 will give a centre cut conversion and set output WSS to full format 4:3.**<br><br>**Selecting Auto Adaptive for any full frame input will give an Anamorphic aspect ratio with WSS set to full frame 16:9. Pillarbox 4:3 will give a centre cut conversion and set output WSS to full format 4:3. Undefined/reserved, Pillarbox 14:9 and Letterbox greater than16:9 will make no change so the previous conversion will remain. On power up the default conversion will be Anamorphic.**<br><br>*See section 'Aspect Ratio Correction' for more details.* |

# RGB Proc Amp

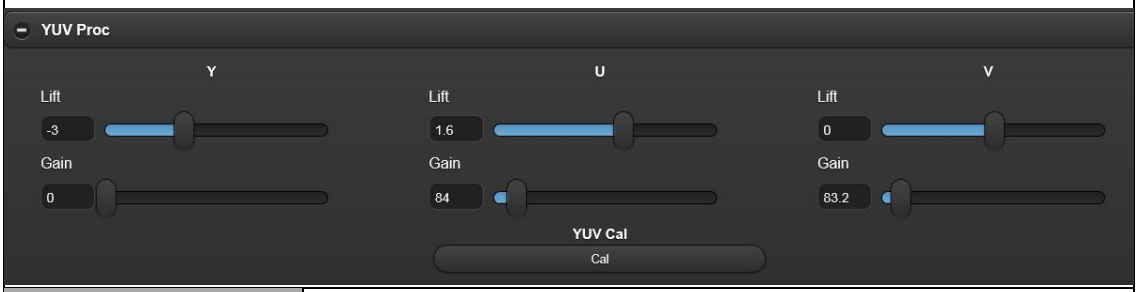
**Set up lift and gain of the output signal in the RGB domain.**

| | |
|---|---|
| **RGB Lift and Gain** | **The Q-Down 3G range's RGB lift and gain controls allow independent digital image adjustments in the RGB domain, essential for maintaining colour fidelity. In normal operation** |

| | |
|---|---|
| | **the RGB proc-amp is active simultaneously on both the digital and analogue outputs. Should the Q-Down 3G range be put into bypass mode the proc-amps will only affect the analogue output. The digital proc-amps will be disabled as shown by the Disabled status LED.** |
| **Disabled** | **On if the RGB Lift and Gain controls are disabled in 'Bypass' mode.** |
| **Cal (default)** | **Return the Lift and Gain controls to their default values of 0 lift and 100% gain.** |

## YUV Proc Amp

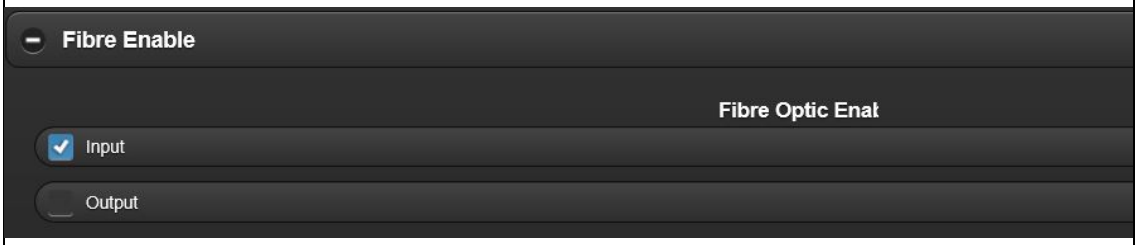
**Set up lift and gain of the output signal in the YUV domain.**




| | |
|---|---|
| **YUV Lift and Gain** | **The Q-Down 3G range's YUV lift and gain controls allow independent digital image adjustments in the YUV domain, essential for maintaining colour fidelity. In normal operation the YUV proc-amp is active simultaneously on both the digital and analogue outputs. Should the Q-Down 3G range be put into bypass mode the proc-amps will only affect the analogue output and the digital proc-amps will be disabled.** |
| **Cal (default)** | **Return the Lift and Gain controls to their default values of 0 lift and 100% gain.** |

## Fibre Optic Enable

**Select fibre optic I/O options.**

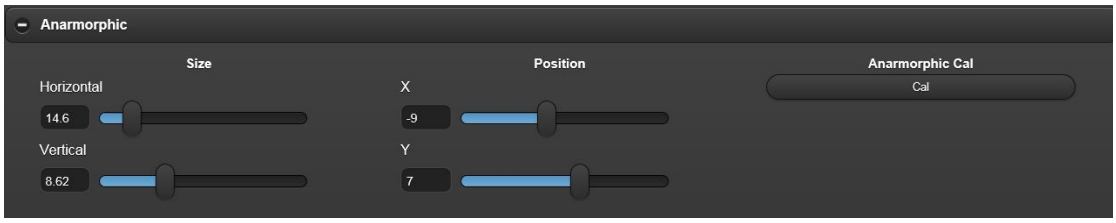



| | |
|---|---|
| **Input** | **The Q-Down 3G range has the option of either receiving an optical input or transmitting an optical output once the necessary optical equipment has been fitted. If the optical receiver module is fitted, the fibre Input enable will allow the video input to be selected between the input BNC and the optical input. The input loop-through will show whichever of the inputs are selected so with an optical input the input loop-through BNC will give a reclocked output of the optical input.** |
| **Output** | **With the fibre transmitter module fitted, the optical output can also be enabled or disabled. The output BNCs remain active when the optical output is both enabled and disabled.** |

# 9.4 Custom Aspect Ratio Menu

## Anamorphic, 16x9 Letterbox, 14x9 Letterbox, Centre Cut

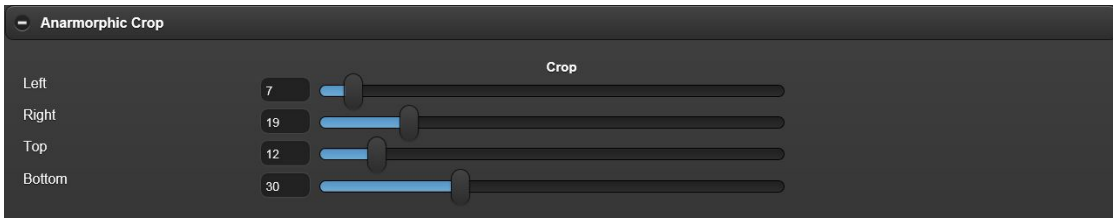
**Adjust size and position of the four fixed aspect ratios. (These controls are identical for all four fixed aspect ratios.)**




| | |
|---|---|
| **Horizontal, Vertical Size** | **These controls alter the output image size. These adjustments will be recalled whenever the fixed aspect ratio is re-selected.** |
| **X, Y Position** | **Adjust position of output image. These adjustments will be recalled whenever the fixed aspect ratio is re-selected.** |
| **Cal (default)** | **Return fixed aspect ratio to its default size and position.** |

## Anamorphic, 16x9 Letterbox, 14x9 Letterbox, Centre Cut - Crop

**Crop the output image. (These controls are identical for all four fixed aspect ratios.)**




| | |
|---|---|
| **Left/Right/Top/ Bottom** | **Crop the output image. These adjustments will be recalled whenever the fixed aspect ratio is re-selected.** |

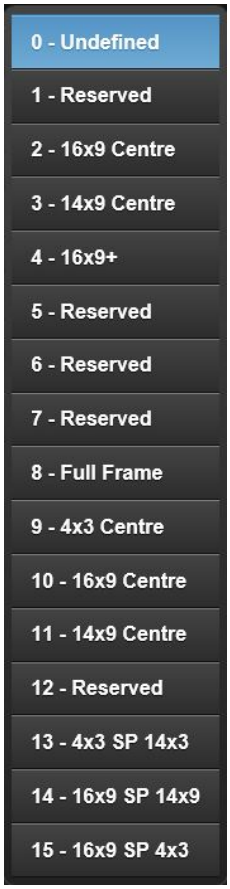
## Border

**Select the colour of the border around an aspect ratio corrected image.**

| | |
|---|---|
| **R,G,B** | **Select the colour, in the RGB domain, of the border that will appear around an image that no longer fills the screen due to aspect ratio correction and/or cropping. Set between black and peak white.** |
| **Cal (default)** | **Return the border colour to black.** |

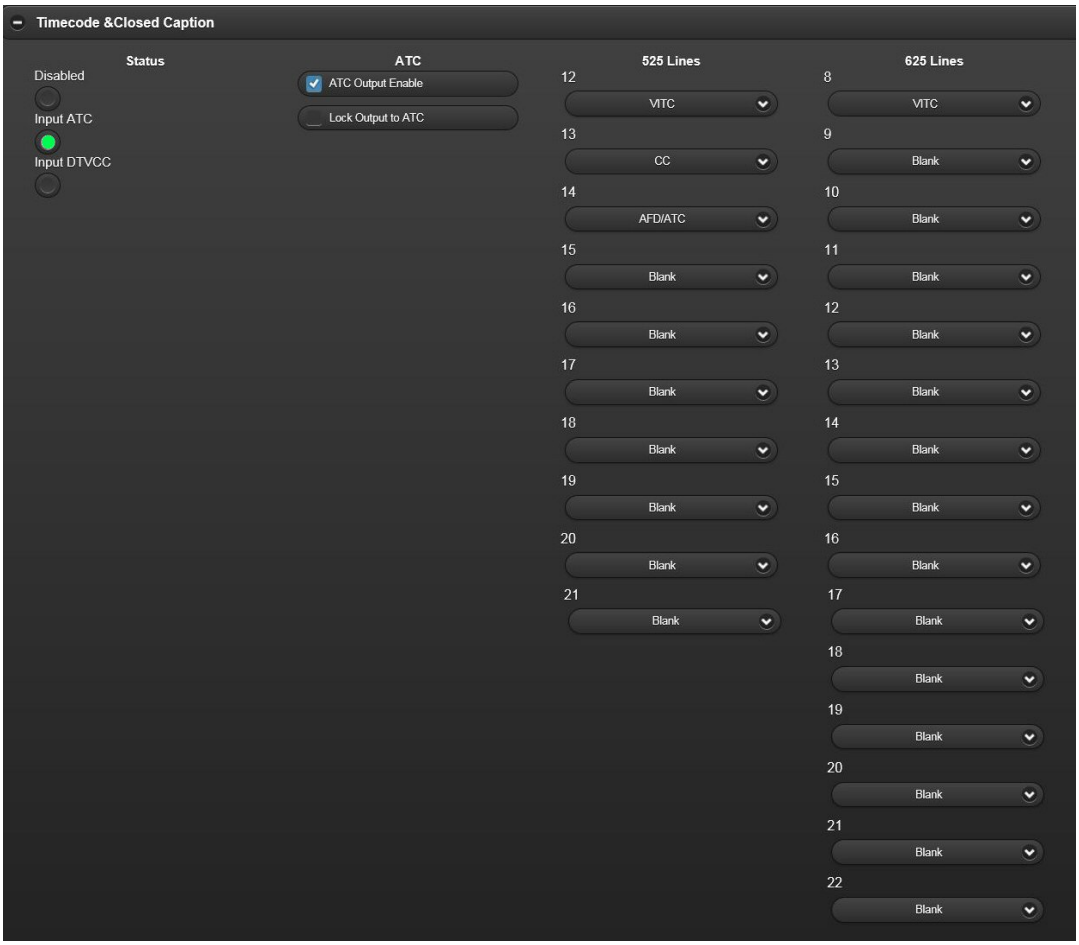
## 9.5 Data Insert Menu

| AFD & WSS Data | |
|---|---|
| **Select line numbers to output AFD/ATC, VITC and Closed Caption data.** | |
| | |
| **AR** | **Display incoming AFD aspect ratio descriptor. i.e. 16x9, 4x3.** |
| **AFD** | **Displays incoming AFD descriptor. i.e. 'undefined, full frame, 16x9 Centre' etc. (See section 'Output AFD and WSS for more information.)** |
| **AFD Output** | **Select mode control 'Auto' to automatically set the AFD output codes based on the output aspect ratio and incoming AFD codes. Select 'Pass' to use the incoming AFD code. Select 'Manual' to output the AFD code as selected below.** |
| **AFD AR** | **Select aspect ratio of entire image. For instance if the output is a 16x9 letterbox image within a 4x3 frame, select 4x3 for AR and AFD Code '10'.** |

| | | |
|---|---|---|
| **AFD Code** |  | **Code for active image area. See section 'Output AFD and WSS' for more information.** |
| **WSS Output** | | **Output widescreen signalling can be set to automatically follow the input AFD data or be manually selected. If WSS data should be present on the input video, this can either be passed to the output unchanged or substituted for a user selectable code. WSS data can also be set to be blanked. It is only possible to insert WSS information into a 625 output.** |

# Timecode & Closed Caption *(Q-Down-ATG 3G only)*

**Select line numbers to output AFD/ATC, VITC and Closed Caption data.**



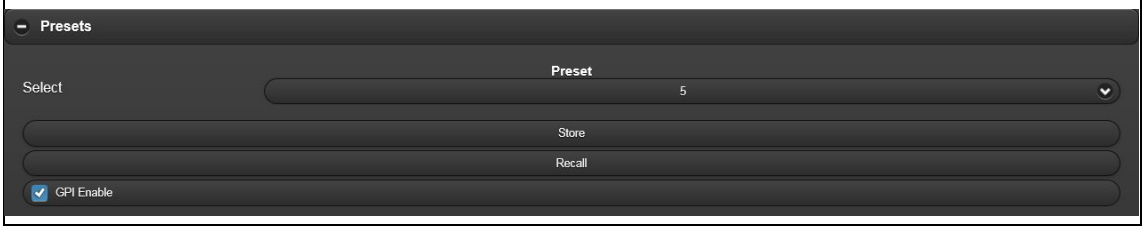

| | |
|---|---|
| **Disabled** | **The disabled LED will be illuminated when not down converting and Timecode and Closed Caption controls will be inactive.** |
| **Input ATC** | **On if Ancillary Timecode is detected.** |
| **Input DTVCC** | **On when DVTCC Closed Captions are detected in the VANC area.** |
| **Output ATC Enable** | **The Output ATC control, when enabled, will allow the translation of HD ancillary timecode to SD VITC when down converting. Line selection controls will allow the line or lines to be selected for reinsertion.** |
| **Lock Output to ATC** | **Select to use incoming ancillary data timecode to determine the field sequence when converting a High Definition progressive video input to an interlaced video output. This control is only active when a progressive video input is present.** |

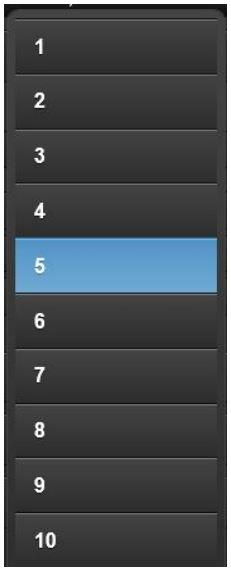
| | | |
|---|---|---|
| **Lines 625** | | **Select the lines into which data is inserted in the SD output stream when down converting. *Q-Down-ATG 3G* can deal with both ancillary data timecode (ATC) and vertical interval timecode (DVITC). When outputting Standard Definition, *Q-Down-ATG 3G* will also convert the ATC to vertical interval timecode (VITC) which is always repeated on two adjacent video lines, one in each field. When using *Q-Down-ATG 3G* to convert 1080p to 1080i output, the ATC and AFD are inserted in lines 9+571 and 11+547 respectively.** |
| **Lines 525** | | **As 625 above but with the addition of Closed Caption insertion. When down converting 59.94Hz video, *Q-Down-ATG 3G* takes the HD closed captions (to the CEA-708 standard) and extracts the data it needs to insert the corresponding SD closed captions (to CEA-608) into the SD output stream.** |

## 9.6 Presets, Reset & GPI/Os Menu

### Presets

**Up to 16 user-defined configurations may be stored and recalled either from VisionWeb or through the use of external GPIs. Presets store the board setup data including operating mode card status. The presets are numbered 1-16.**



| | | |
|---|---|---|
| **Select** |  | **Store or recall the Q-Down 3G range's configuration to one of 16 memory locations (only presets 1-10 shown).** |
| **Save** | **Select to save the current Q-Down 3G range configuration to the selected preset location. If the selected location contains previously saved setting information it will be overwritten by the new data.** | |
| **Recall** | **Select to recall a new configuration from one previously saved in the selected preset location. The recalling of previously stored presets can also be implemented externally via the GPI port.** | |
| **GPI Enable** | **Enable the recall of previously saved presets via the external GPI port. See Chapter "General Purpose Interface" for more information on GPIs.** | |

## Resets

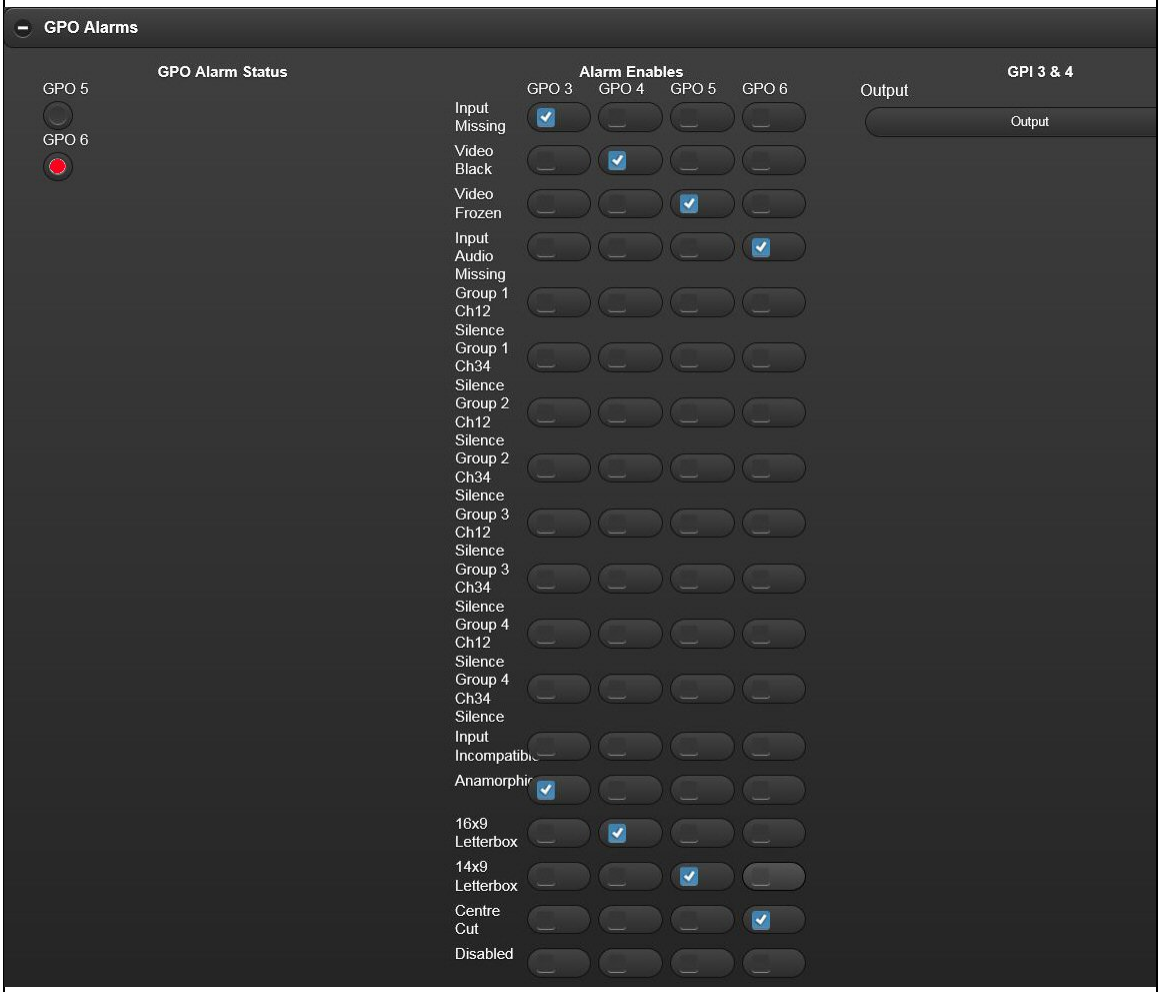
**Reset the board to its default settings**

| | |
|---|---|
| **Fact. Res Exc Preset** | **Reset the board to default settings but leave preset memories unaffected. (See Default Values table below).** |
| **Fact. Res Inc Preset** | **Reset the board to default settings and erase preset memories.** |

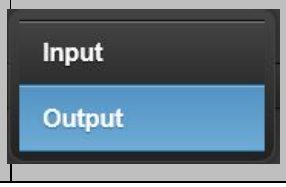
| Parameter | Default values |
|---|---|
| **Output Format** | SD |
| **Analogue output** | CVBS, SMPTE and NTSC-M |
| **Fibre Optic I/O** | Unchanged |
| **Aspect ratio** | Anamorphic |
| **Vertical bandwidth** | Sharp |
| **Output AFD** | Auto, 8-Full Frame |
| **Coded Frame** | 4:3 |
| **Wide Screen Signalling** | Auto |
| **H Size (all)** | 16 |
| **V Size (all)** | 9 |
| **Position and Crop** | 0 |
| **Border Hue** | 0 (Black) |
| **Proc-amp lift (all)** | 0 |
| **Proc-amp gain (all)** | 100 |
| **GPO alarms** | Unchecked |
| **TC & CC 525/625 line section** | 525-AFD/ATC line 12, VITC lines 14 &16, CC line 21.<br>625-AFD/ATC line 8, VITC lines 19 & 21. |
| **ATC Output Enable** | Unchecked |
| **Lock Output to ATC Input** | Unchecked |
| **Alarm delay video black** | 1 |
| **Alarm delay video frozen** | 1 |
| **Alarm delay audio silence** | 10 seconds |
| **Video delay** | Frame delay, Pixels 0, Lines 0 |
| **Bypass** | Unchecked |
| **Presets** | Set to Preset 1 and all contents erased |
| **GPI Enable** | Not enabled |

# GPO Alarms

**Set the conditions that trigger GPO alarms. There are up to four GPI outputs reserved for alarm indication – GPI 3 and GPI 4 which are selectable I/O, and GPI 5 and GPI 6. All four when configured as outputs may have assigned to them any of the 18 video and audio alarms.**

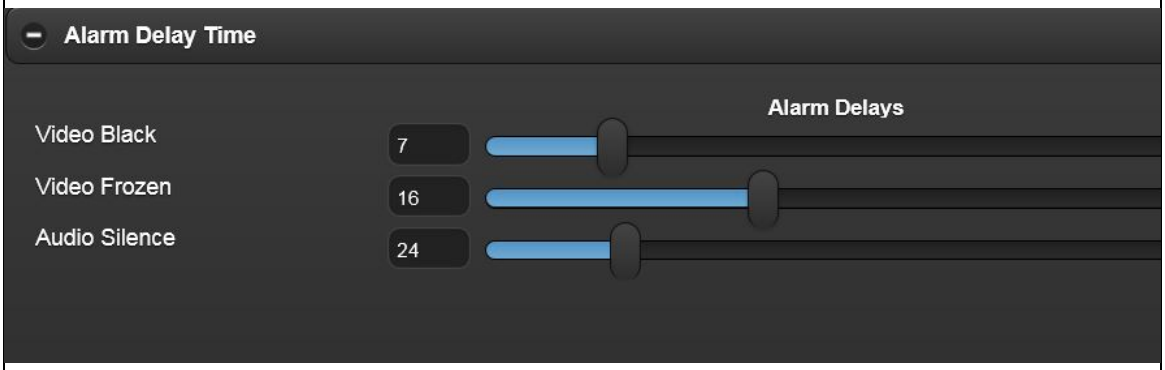



| | | |
|---|---|---|
| **GPO 5/6 Alarm Status** | **On when GPO 4 or GPO 5 selected alarm conditions have been met. Visual indication of GPI 5 and GPI 6 status is also provided on the board edge.** | |
| **Alarm Enables (select conditions to assert GPO 4&5 and GPO 3&4 when set as outputs)** | **Input Missing** | **Select to assert selected GPO if the video input is missing.** |
| | **Video Black/Frozen** | **Select to assert selected GPO if incoming video is at black level or frozen for the period set by the Alarm Delay menu.** |
| | **Group 1-4 Missing** | **Select to assert selected GPO if any of the embedded audio groups 1-4 are missing from the video input.** |

| | | |
|---|---|---|
| | **Group 1-4 Ch12/34 Silence** | **Select to assert selected GPO if any of the embedded audio channel pairs are silent for the period set by the Alarm Delay menu.** |
| | **Input Incompatible** | **Select to assert selected GPO if the video input is of a different standard to that selected for the output.** |
| | **Anamorphic** | **Select to assert selected GPO if the aspect ratio converter is set to 'Anamorphic' mode.** |
| | **16x9 Letterbox** | **Select to assert selected GPO if the aspect ratio converter is set to '16x9 Letterbox mode.** |
| | **14x9 Letterbox** | **Select to assert selected GPO if the aspect ratio converter is set to '14x9 Letterbox' mode.** |
| | **Centre Cut** | **Select to assert selected GPO if the aspect ratio converter is set to 'Centre Cut' mode.** |
| | **Disabled** | **Select to assert selected GPO if the ARC is disabled because Q-Down 3G is not down converting.** |
| **GPI 3 & 4** |  | **Select whether GPI 3 &4 are to be inputs or outputs. If selected as outputs then the above alarm enable conditions can be made to assert GPO 3 and 4 if active.** |

# Alarm Delays

**Set time that an alarm condition must be active before triggering an alarm.**




| | |
|---|---|
| **Video Black** | **Set the period between 0 to 20 seconds that the incoming video must be permanently at black level before asserting GPO alarms. With delay controls set to their minimum there will remain a small delay to prevent false triggering.** |
| **Video Frozen** | **Set the period between 0 to 20 seconds that the incoming video must be permanently frozen (still frame) before asserting GPO alarms.** |
| **Audio Silence** | **Set the period between 4 to 120 seconds that any embedded audio channel pair must be permanently silent (< -63dBFS) before asserting GPO alarms. To prevent false alarms during quiet passages there is a minimum delay period of approximately four seconds in which silence must be maintained before the delay timer is initiated.** |

# 10 Specification

## General

| | |
|---|---|
| Dimensions | 100mm x 266mm module with DIN 41612 connector. |
| Weight | 180g. |
| Power consumption | Q-Down 3G - 1 Watts.<br>DA6 - 3 Watts.<br>FIP - 0.6 Watts.<br>FOP - 0.6 Watts. |

## Inputs

| | |
|---|---|
| Video | HD or SD SDI 270Mb/s to 2.970Gb/s serial digital compliant to SMPTE 259M, SMPTE 292M and SMPTE 424M.<br>Cable equalisation:<br>3G (2.970Gb/s) – 80 metres, Belden 1694 or equivalent.<br>HD (1.485Gb/s) – 140 metres, Belden 1694 or equivalent.<br>SD (270Mb/s) >250 metres, Belden 8281 or equivalent. |
| Video standards supported | 1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625i/50, 525i/59.94.<br>Input format auto selected. |
| Return loss | 50MHz to 1.5GHz -15dB. |

## Outputs

| | |
|---|---|
| RM41 | The Q-Down 3G range has two input loop-throughs and configurable three video outputs. The video outputs can be a selection of analogue or SDI. |
| RM41 + RM34 | The Q-Down 3G range plus DA6 has eight input loop-throughs and three configurable video outputs. The video outputs can be a selection of analogue or SDI. |
| RM57 | The Q-Down 3G range with optical I/O has one optical input or optical output plus one input loop-through and three configurable video outputs. The video outputs can be a selection of analogue or SDI. |
| RM57 + RM34 | The Q-Down 3G range plus DA6 has one optical input or optical output plus seven input loop-throughs and three configurable video outputs. The video outputs can be a selection of analogue or SDI. |
| Serial digital | Three HD or SD SDI 270Mb/s to 1.5Gb/s serial digital outputs compliant to SMPTE 259M and SMPTE 292M. |
| Delay through board | Adjustable. Minimum delay 2uS. |
| Component: | SD/HD. YUV and RGB 1 Volt ± 2% into 75 ohm. Sync on G, B |

| | |
|---|---|
| | and R (Betacam levels selectable). |
| Composite: | SD only. 1V ± 2% with sync into 75 ohm |
| Auxiliary data | Passed. |

### Component performance

| | |
|---|---|
| Processing: | Video input is 10 bit processed for 12 bit output DACs. |
| Frequency response: | Luminance: +/- 0.3dB to 5.5 MHz.<br>Chrominance: +/- 0.4dB to 2.5 MHz. |
| Noise: | <-67dB weighted luminance or chrominance. |
| Gain error: | < 1%. |

### Composite performance

| | |
|---|---|
| Processing: | Video input is 10 bit processed for 12 bit output DACs. |
| Frequency response: | Luminance: +/- 0.3dB to 5 MHz.<br>Chrominance: +/- 0.4dB to 2.5 MHz. |
| Noise: | < -67dB weighted luminance or chrominance. |
| Differential gain: | < 2% typ. |
| Differential phase: | ± 1° typ. |

### Status monitoring

| | |
|---|---|
| LEDs | Front of card edge LED indicators to indicate:<br>PSU rails present.<br>SDI input HD/SD.<br>Aspect ratio selection.<br>Vertical filter / Output format selected. |

### GPI inputs

| | |
|---|---|
| Number and type: | Up to 4 x GPI inputs. Recall of presets. |

### GPI outputs

| | |
|---|---|
| Number and type: | Up to 4 x GPI outputs, selectable from loss of input, video black and frozen, audio missing, audio channel silence, input incompatible and aspect ratio. |

### Input fail output

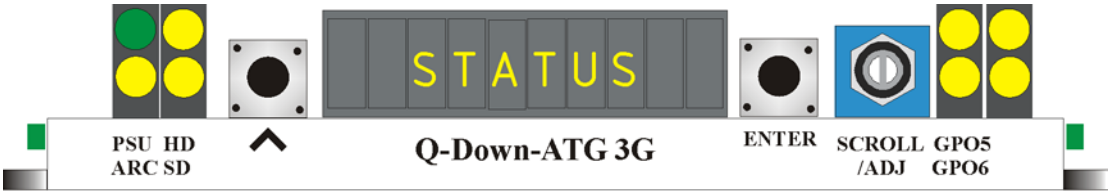
| | |
|---|---|
| Type: | Black, Blue, Mute. |

# 11 Troubleshooting

## Card edge monitoring

The front edge of the card provides useful power rail monitoring, input status, vertical filter and analogue output format.

*Board edge control was removed from Q-Down-AG 3G and Q-Down-ATG 3G in 2018. Therefore the card edge control information is only relevant for older versions of the product.*




*Q-Down-ATG 3G front edge view*

The following table summarises the card edge LED functions and colours:

| Name | LED Colour | Function when ON | Function when Off |
|---|---|---|---|
| **PSU** | Green | Good power supply (PSU) rails | One or more of the monitor supplies is out of specification |
| **ARC** | Yellow | Letterbox aspect ratio selected | Full screen (anamorphic) selected |
| **HD** | Yellow | Video input standard is HD (High Definition) | Input not present |
| **SD** | Yellow | Video input standard is SD (Standard Definition) | |
| **GPO5** | Yellow | GPO5 active / low | GPO5 inactive / high |
| **GPO6** | Yellow | GPO6 active / low | GPO6 inactive / high |
| | Yellow | No function | |
| | Yellow | No function | |

The card edge LEDs and 10-digit display may be used in conjunction with status information from any connected remote status panel display or from VisionWeb if available.

# 12 Appendix A

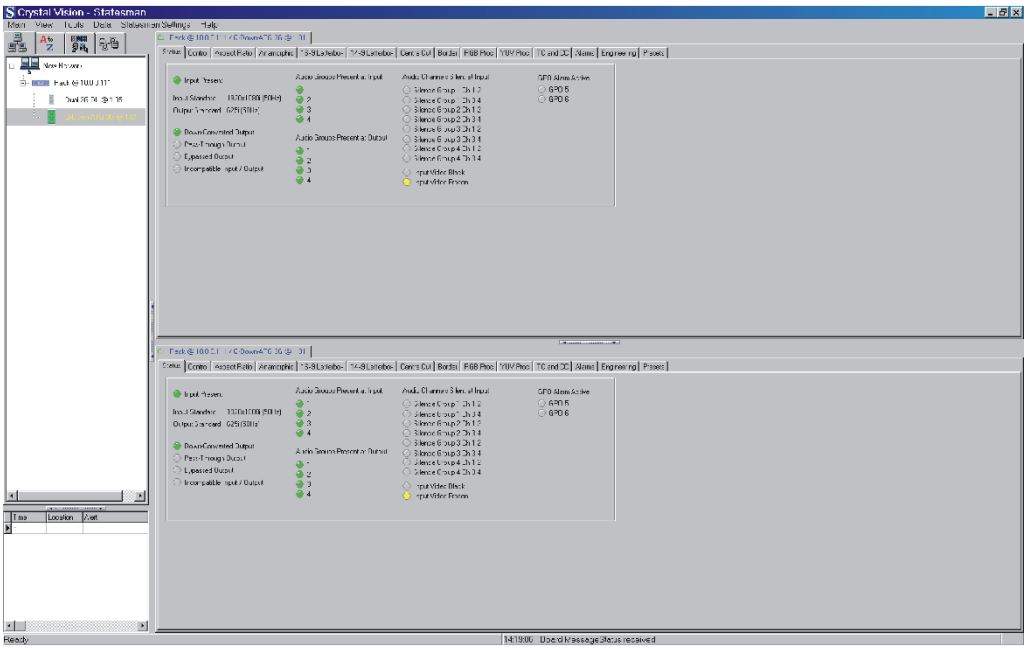
## Statesman

*In March 2015, Statesman control of the Q-Down 3G range was superseded by VisionWeb control. Statesman is no longer supported after this date, but information for existing users is included in this appendix. The following is an extract from a previous version of the Q-Down-ATG 3G manual:*

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via Ethernet control from a PC. Statesman provides a user friendly means of configuring and operating Crystal Vision modules with the benefit of "see-at-a-glance" status monitoring. The main Statesman application communicates with each module in a frame through a Statesman-capable front panel CPU or full active control panel. Either of these must be fitted to the frame to allow Statesman control.

## 12.1 Statesman operation

The initial view will show an Explorer style view of the connected frames and modules. Double clicking on a module will enable the display of the main application menus.




*Statesman main application window*

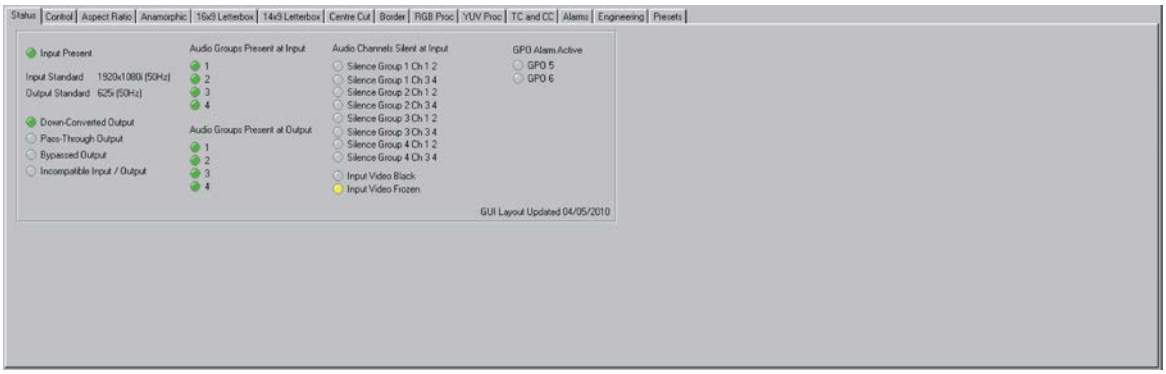
The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower pane or drag the button to vary the size of the panes.

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

# Status

The board status is shown using a mixture of simulated LEDs and text information. As a general rule a green LED shows a good condition such as input present or audio groups present. An amber LED will give a warning as with channel silence, video black or video frozen. If an LED turns red this is a fault condition so input present will turn red if the input should go away. The GPO alarms will also show red when active. A greyed LED will indicate an absence such as non-alarm or non-warning status.

Text is used where more information is required than can be inferred by a simple LED such as video standards.




*Status monitoring*

## Video status LEDs

### *Down-converted Output*

This LED will be illuminated when the Q-Down-ATG 3G is down converting.

### *Pass-Though Output*

Whenever the input format is the same as the selected output format this LED will be illuminated. When in bypass mode all aspect ratio controls will be disabled along with the vertical filtering. The analogue output selection remains active along with the analogue and digital RGB and YUV proc amps and the delay controls.

### *Bypassed Output*

This LED will be illuminated when the Q-Down-ATG 3G has been set to bypass by checking the Bypass box in the engineering section. For the Q-Down-ATG 3G to enter bypass mode both the input and output selection must be the same otherwise the bypass command will be ignored. As it's not possible to select a 3G output, selecting bypass will also be ignored with a 3G input present. In bypass mode the analogue output selection remains active along with the analogue RGB and YUV proc-amps and the delay controls. The digital proc-amps will be disabled and the SDI delay through the Q-Down-ATG 3G will be set to its minimum processing delay. (SD approximately 2□S delay and HD less than 1□S delay.)

# Control

The control tab is where the digital and analogue output formats are configured. The vertical bandwidth filtering is also selected here; the vertical bandwidth control is common to both the digital and analogue outputs.

Note: The position of the on-board links PL2, PL3 and PL4 must also be set to give either an SDI output or analogue output as required. See Module Configuration for link setting details.

*Video output format selection*

## Analogue video output format

As the Q-Down-ATG 3G supports both Standard Definition and High Definition analogue output formats, the final analogue output presented will be determined by both the Output Format and Analogue Output selections made. Setting the output format to SD (selected by checking the appropriate radio button as seen above) will allow the analogue output format to be selected from any of the available choices. If one of the High Definition output formats were to be selected, the analogue outputs would be limited to either YUV or RGB.

See the installation chapter for rear module connection details.

Optical I/O

The Q-Down-ATG 3G has the option of either receiving an optical input or transmitting an optical output once the necessary optical equipment has been fitted. If the optical receiver module is fitted the fibre optic I/O input enable will allow the video input to be selected between the input BNC and the optical input.

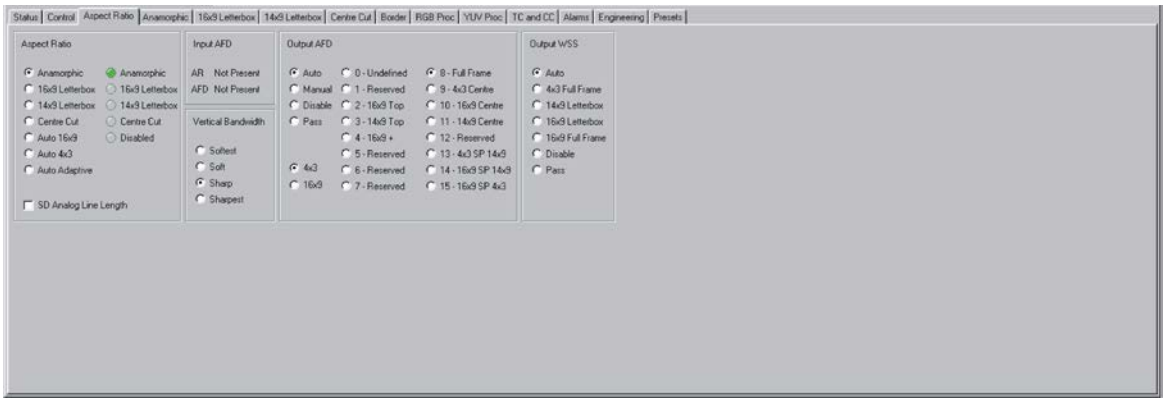
Note: The input loop-though will show whichever of the inputs are selected.

With the fibre transmitter fitted the optical output can also be enabled or disabled by checking or un-checking the output enable check box.

Note: The output BNCs remain active when the optical output is either enabled or disabled.

## Aspect ratio

This tab contains the output aspect ratio, active format descriptor (AFD) and output widescreen signalling (WSS) controls




*Output aspect ratio, Vertical bandwidth, AFD and WSS controls*

### Output aspect ratio

There are four fixed aspect ratios which are Anamorphic, 16:9 Letterbox, 14:9 Letterbox and centre cut. Anamorphic will map the input picture directly to the native aspect ratio of the viewing display along with the resulting distortion associated with this. Should it be necessary to view the output on a 4:3 display, setting the aspect ratio selection to Letterbox will give the correct picture dimensions by adding black bars to the top and bottom of the picture. Selecting 14:9 Letterbox will crop the picture to 87.5%, and depending on the aspect ratio of the display will either add black bars to the top and bottom or both sides of the picture. There will be some loss of picture. Centre cut will show the central 75% of the 16:9 widescreen picture mapped to the full monitor height with the corresponding loss of the left and right picture edges.

The LEDs beside the aspect ratio selector radio buttons will show the actual aspect ratio selected when any of the auto modes are selected. These three auto selections are also associated with the AFD reader and will automatically set the output WSS when Widescreen Signalling is set to auto.

Selecting Auto 16:9 for all AFD input codes will give an Anamorphic aspect ratio conversion and for a 625-line output WSS will be set to 16:9 full frame. When set to Auto 4:3 the output aspect ratio and WSS data will depend on the input AFD. Undefined/reserved and full frame codes will produce a Letterbox aspect ratio with the output WSS set to 16:9 Letterbox. Pillarbox 4:3, Pillarbox 14:9 and Letterbox greater than 16:9 will give a centre cut conversion and set output WSS to full format 4:3.

Selecting Auto Adaptive for any full frame input will give an Anamorphic aspect ratio with WSS set to full frame 16:9. Pillarbox 4:3 will give a centre cut conversion and set output WSS to full format 4:3. Undefined/reserved, Pillarbox 14:9 and Letterbox greater than16:9 will make no change so the previous conversion will remain. On power up the default conversion will be Anamorphic.

*Response to SMPTE 2016 AFD codes*

| Incoming AFD value | Explanation | Auto 16:9 Conversion (output WSS) | Auto 4:3 conversion (output WSS) | Auto adaptive Conversion (output WSS) |
|---|---|---|---|---|
| **0, 1, 5, 6, 7, 12** | Undefined/ reserved | Anamorphic (full format 16:9) | Letterbox (box 16:9 centre) | No change, as previous |
| **2, 8, 10, 14, 15** | Full frame | Anamorphic (full format 16:9) | Letterbox (box 16:9 centre) | Anamorphic (full format 16:9) |
| **9, 13** | Pillarbox 4:3 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | Centre cut (full format 4:3) |
| **3, 11** | Pillarbox 14:9 | Anamorphic (full format 16:9) | Letterbox (box 14:9 centre) | No change, as previous |
| **4** | Letterbox>16:9 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | No change, as previous |

Note: Widescreen Signalling must be set to Auto for the output WSS to be automatically set by the incoming AFD data.

Note: These controls have no function with a Standard Definition input.

## Output AFD

There are three sets of controls associated with Active Format Descriptor (AFD) - the inserter mode controls, entire image aspect ratio selector (coded frame) and the group of 16 AFD codes.

The ANC data packets containing the AFD information are inserted within the active line portion of the fourth line after the switching line in the vertical ancillary space line.

The 16 available codes are described in the following table

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

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

### Widescreen Signalling

Output widescreen signalling can be set to automatically follow the input AFD data or be manually selected. If WSS data should be present on the input video this can either be passed to the output unchanged or substituted for a user selectable code. WSS data can also be set to be blanked.

| Out going WWS codes | Explanation | Conversion |
|---|---|---|
| **0001** | full format 4:3 | Centre cut |
| **1101** | box 16:9 centre | Letterbox |
| **1110** | full format 16:9 | Anamorphic |

### Vertical bandwidth

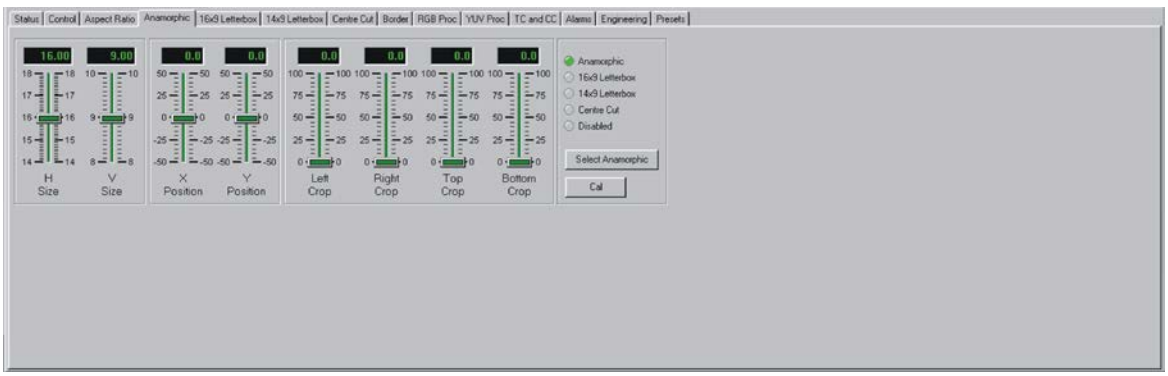
When down converting the vertical bandwidth can be optimised for a given application by selecting the most appropriate vertical bandwidth filtering. There are four filters to select from, ranging from the highest (sharpest) to the lowest (softest). Check the radio button to select the chosen filter characteristics.

## Aspect ratio control

There are four tabs, each associated with one of the four fixed aspect ratios - Anamorphic, 16:9 Letterbox, 14:9 Letterbox and Centre cut. Each of these four tabs when active allows the picture size to be adjusted and cropped, and the position on the screen varied.

Aspect ratio status information is given to the right of each set of controls. An illuminated LED indicates which aspect ratio selection is active, green being the opened tab and yellow a tab other than the open one. If a status LED is showing yellow, pressing Select will cause the open tab to become the selected aspect ratio. Should the disable LED be illuminated red, aspect ratio conversion is prohibited.

Pressing the Cal button will return all slider control to their default value.

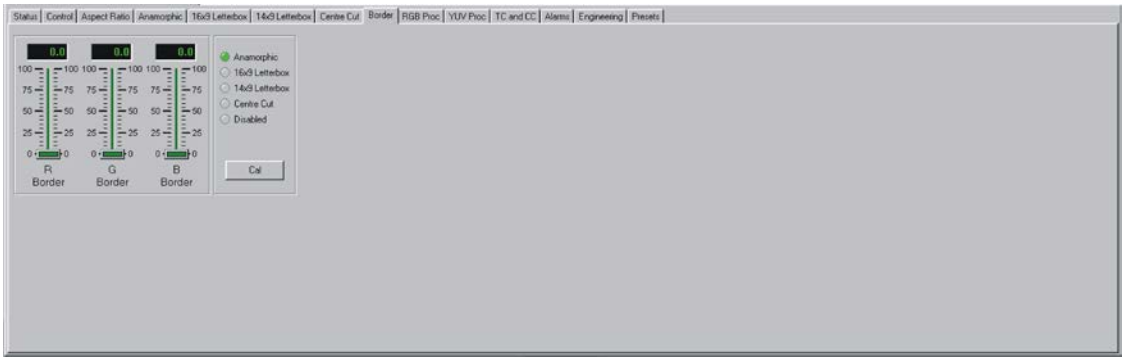


*Aspect ratio size, position and crop controls*

## Border hue control

These three controls allow the colour of any picture border present to be adjusted by varying its RGB component. Pressing Cal returns all three slider controls to zero giving a black border.

Aspect ratio selection status is also given.

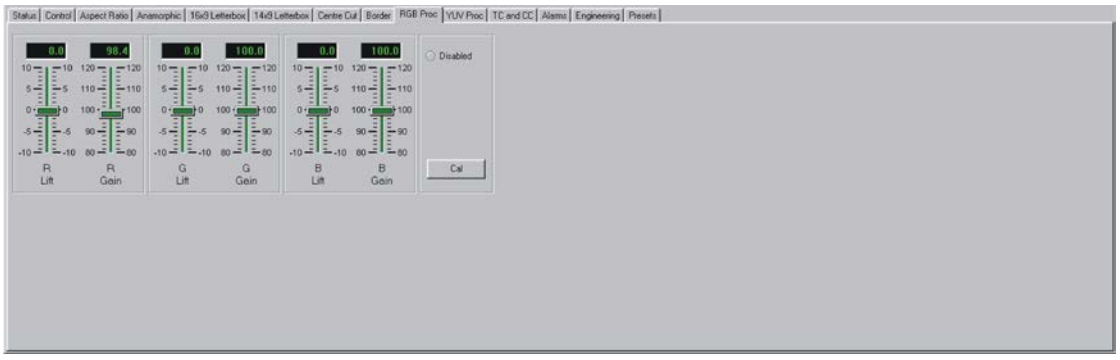


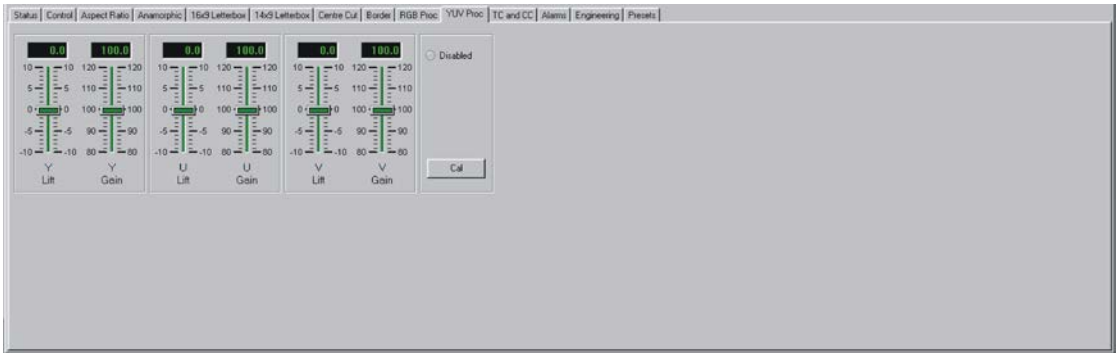

*Border hue controls*

## RGB and YUV lift and gain controls

Q-Down-ATG 3G's RGB and YUV lift and gain controls allow independent digital image adjustments in both the RGB and YUV domains, essential for maintaining colour fidelity.

In normal operation the RGB and YUV proc amps are active simultaneously on both the digital and analogue outputs. Should the Q-Down-ATG 3G be put into bypass mode the proc amps will only effect the analogue output. The digital proc amps will be disabled as shown by the Disabled status LED.

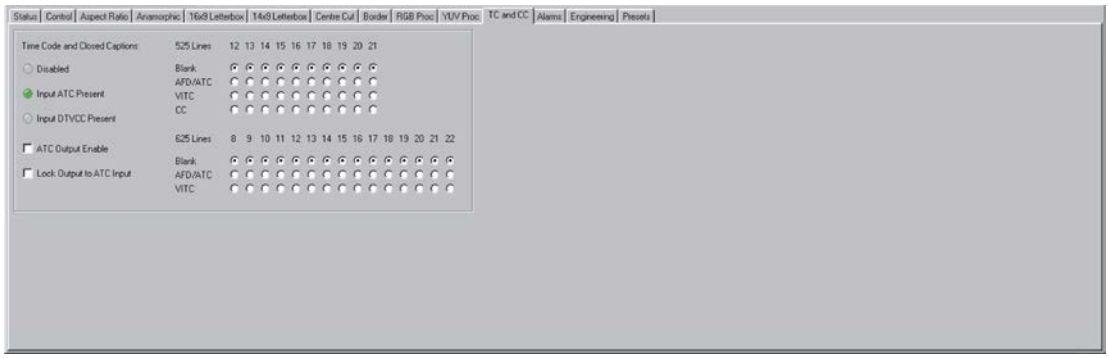





*RGB and YUV Proc amps*

## Timecode and closed caption

The timecode and closed caption tab contains the AFD/ATC, VITC and CC line select menu.




*GPI alarm configuration*

The Q-Down-ATG 3G can deal with both (ATC) ancillary data timecode (SMPTE 12M) and (D-VITC) vertical interval timecode (SMPTE 266M). ATC is particularly useful when down converting progressive High Definition video to an interlaced High Definition output. When outputting Standard Definition, Q-Down-ATG 3G will also convert the ancillary timecode to vertical interval timecode. VITC code is always repeated on two adjacent video lines, one in each field. The line pairs used are also selectable to allow extra data to be encoded. If the ATC output is disabled, the AFD/ATC line number will still select the line number, on which AFD will appear for down-converted SD outputs. When using the Q-Down-ATG 3G to convert 1080p to 1080i output, the ATC and AFD are inserted in lines 9+571 and 11+547 respectively.

DTVCC, digital television closed caption (CEA-708) is down converted by Q-Down-ATG 3G to 525i closed caption (CEA-608) which would normally be inserted onto line 21. Q-Down-ATG 3G allows this closed caption information to be inserted onto any of line 12 to line 21. This includes extended data service (XDS).

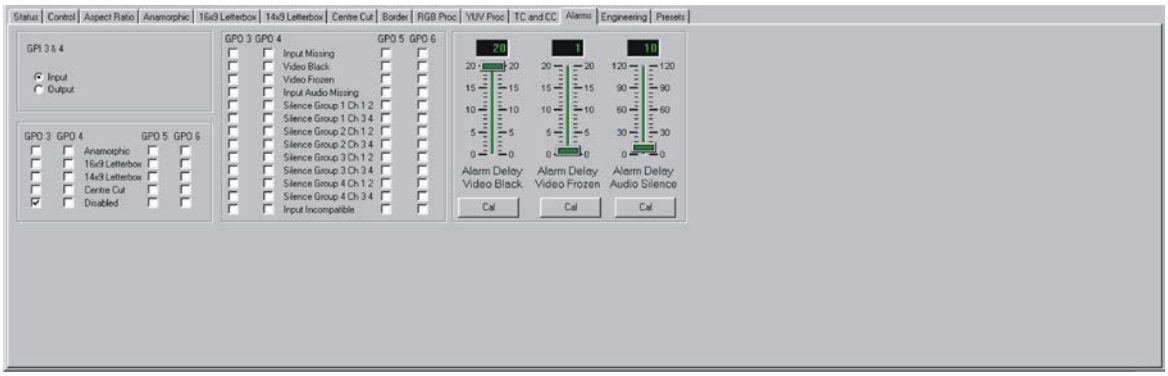
The disabled LED will be illuminated when not down converting and TC and CC control will be inactive.

Note : The ATC lock control is only active when a progressive video input is present. When disabled the field sequence of the interlaced output will free-run.

| 525 VITC lines | | |
|---|---|---|
| 10+12 (273+275) | 14+16 (277+279) | 18+20 (281+283) |
| 11+13 (274+276) | 15+17 (278+280) | 19+21 (282+284) |
| 12+14 (275+277) | 16+18 (279+281) | |
| 13+15 (276+278) | 17+19 (280+282) | |
| **625 VITC lines** | | |
| 6+8 (319+321) | 11+13 (326+328) | 16+18 (329+331) |
| 7+9 (320+322) | 12+14 (325+328) | 17+19 (330+332) |
| 8+10 (321+323) | 13+15 (326+328) | 18+20 (331+333) |
| 9+11 (322+324) | 14+16 (327+329) | 19+21 (332+334) |
| 10+12 (323+325) | 15+17 (328+330) | 20+22 (333+335) |

## Using the GPI alarm outputs

The alarms tab contains the GPI output alarm configuration menu and alarm delay controls.




*GPI alarm configuration*

There are up to four GPI outputs reserved for alarm indication – GPI3 and GPI4 which are selectable I/O, and GPI5 and GPI6, they may have assigned to them any of the 18 video and audio alarms. An alarm is enabled when its associated check box is ticked. Any number of alarms may be flagged.

The 18 alarm conditions have been assigned a level of priority, input missing being the highest priority, and will assert an alarm immediately. The twelve subsequent conditions descend in order of priority with input incompatible given the lowest. All but input present and input incompatible can also be assigned a delay timer to delay the time after which an alarm is asserted. This ability is especially useful to prevent false alarming during quiet periods in the audio or brief pauses in video program.

Where more than one alarm is flagged and an alarm condition is asserted, use the various status indicators to determine the exact cause

Visual indication of GPI5 and GPI6 status is provided in the status tab.

## Silence detect delay

The control slider sets the silence detect delay from 0 to 120 seconds for the amount of time a signal is allowed to remain below -56dB, with respect to Full Scale, before a silence error is flagged. To prevent false alarms during quiet passages there is a minimum delay period of approximately four seconds in which silence must be maintained before the delay timer is initiated.

Note : The minimum delay will become significant at short delay settings.

## Video frozen and black delay

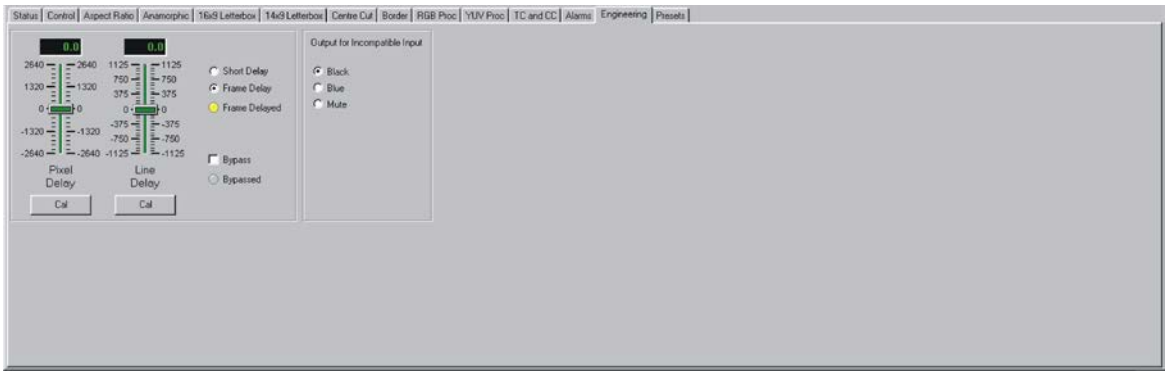
A picture is considered frozen when a frame is identical to the previous frame. If this condition is met consistently for the period of time set by the video frozen delay slider control, a video frozen error will be flagged.

Video black is defined as digital black. If digital black is present for longer than the delay time set by the video black delay slider control, a video black error will be flagged.

Note : Press the cal button at anytime to reset the timer delays to their default values.

## Engineering

Video delay and output error mode is configured in the engineering menu.




*Video delay, Bypass and Output error mode selection*

### Video delay

The video delay controls are made up of two mode controls and two variable sliders giving +/- 1 line in pixels and +/- 1 frame in lines.

#### *Short delay*

When short delay is selected the minimum delay available is 16 lines. This limit is imposed to prevent possible frame tearing at delays less than this minimum. If the delay is set to less than 16 lines one frame of delay will be automatically added to the output, so for delays of less than 16 lines the actual delay will be one frame plus the adjustable delay. The Frame Delayed LED will illuminate whenever the one frame delay is added.

Note : Any negative delay dialled will be one frame less the negative delay.

#### *Frame delay*

Selecting Frame Delay will add a fixed one frame delay between input and output. The variable delay slider controls will now allow an adjustment of +/- 1 frame in lines and pixels.

Note : The maximum delay in lines for any output format is 1 frame. Any number of lines dialled greater than 1 frame will be ignored and return the maximum delay of 1 frame. Similarly the maximum delay in pixels can not exceed 1 output line.

*Bypass*

Selecting Bypass Control will set the Q-Down-ATG 3G to bypass mode whenever the input and the selected output formats are the same. In bypass mode the analogue output selection remains active along with the analogue RGB and YUV proc amps and the delay controls. The digital proc amps will be disabled and the SDI delay through the Q-Down-ATG 3G will be set to its minimum processing delay. (SD approximately 2□S delay and HD less than 1□S delay). The Bypassed LED will illuminate when bypass mode is active.

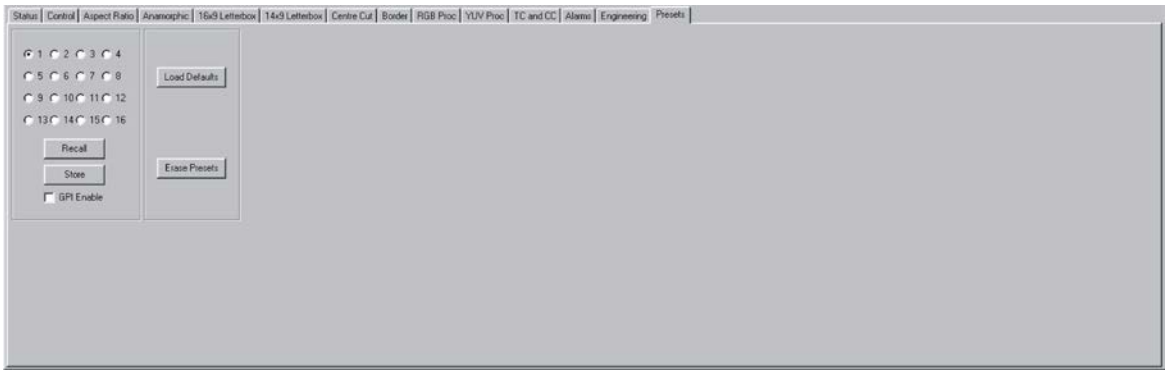
Note : Q-Down-ATG 3G does not support a 3G output so bypass with a 3G input is not possible.

### Output for incompatible input

Should the video input format and output format selection become incompatible, which would be the case if the input is a lower bit rate than the output selection, the output can be set to go to black, blue or muted to no output.

## Presets

Up to 16 user configurations may be stored and recalled via Statesman or recalled using the Q-Down-ATG 3Gs GPI inputs. The Preset tab also gives access to the factory reset controls.




*Presets and factory reset*

### Saving and recalling presets

The current board settings can be saved in one of 16 locations to be recalled as desired. This allows the user to store and recall up to 16 different configurations for later use.

To save the current settings, tick the selected preset location and click on Store. This will write the current settings into this location.

Note : If the selected location contains previously saved setting information it will be over- written by the new setting data.

To recall previously stored setting information, again tick the selected location and click Recall.

The recalling of previously stored presets can also be implemented externally via the GPI port. To sanction this facility, tick the GPI controls preset recall box.

See Section 2.3 for further discussion of GPIs and pinout details.

## Resets

The user has the choice of performing a total factory reset or a partial reset. Pushing the Erase Presets button will return all parameters to their factory default values and erase all user stored configuration presets. Selecting the Load Defaults option will perform the same reset to factory defaults values but will leave any user stored configurations unaffected.

Note: Factory reset will erase all user stored presets

| Parameter | Default value |
|---|---|
| **Output Format** | SD |
| **Analogue output** | CVBS, SMPTE and NJSC M |
| **Fibre Optic I/O** | Unchanged |
| **Aspect ratio** | Anamorphic |
| **Vertical bandwidth** | sharp |
| **Output AFD** | Auto, 8-Full Frame |
| **Coded Frame** | 4:3 |
| **Wide Screen Signalling** | Auto |
| **H Size (all)** | 16 |
| **V Size (all)** | 9 |
| **Position and Crop** | 0 |
| **Border Hue** | 0 (Black) |
| **Proc-amp lift (all)** | 0 |
| **Proc-amp gain (all)** | 100 |
| **GPO alarms** | unchecked |
| **TC & CC 525/625 line section** | 525-AFD/ATC line 12, VITC lines 14 &16, CC line 21.<br>625-AFD/ATC line 8, VITC lines 19 & 21. |
| **ATC Output Enable** | unchecked |
| **Lock Output to ATC Input** | unchecked |
| **Alarm delay video black** | 1 |
| **Alarm delay video frozen** | 1 |
| **Alarm delay audio silence** | 10 seconds |
| **Video delay** | Frame delay, Pixels 0, Lines 0 |
| **Bypass** | unchecked |
| **Presets** | Set to Preset 1 and all contents erased |
| **GPI Enable** | Not enabled |