
# Q-Down-A-AFD

## Broadcast down converter and distribution amplifier for embedded audio with Active Format Descriptor

# USER MANUAL

Crystal Vision

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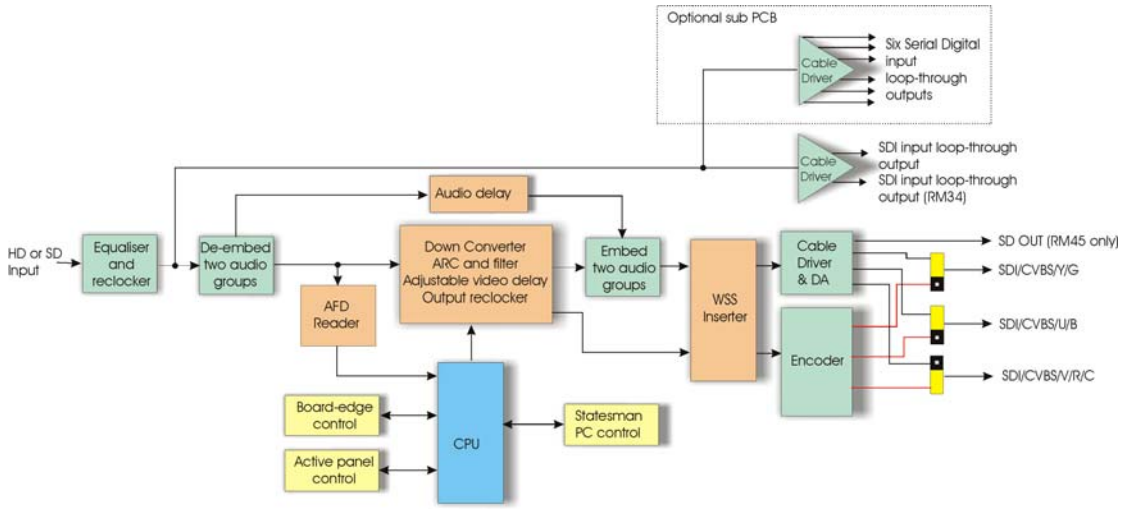
| Revision 1. | Updated Auxiliary data section in Specifications table, page 41 | 30/10/08 |
| Revision 2. | Selectable processing delay added, Software level 2.30 | 24/03/09 |

# 1 Introduction

The Q-Down-A-AFD is a broadcast down converter and distribution amplifier that can auto aspect ratio switch using Active Format Descriptor (AFD) and insert wide screen signalling information on both analogue and SD digital outputs. Two groups of embedded audio can also be passed to the digital outputs after the correct delay has been applied. The video delay can be selected from minimum, fixed or one frame. With a full screen HD input the short processing delay is 16 SD lines. Q-Down-A-AFD also additionally provides a variable video delay of up to one frame in SD, adjustable in one line steps. Audio is automatically delayed to suit the video delay. A useful signal probe function will monitor the incoming video and report should a fault arise such as video absent, black or frozen, audio missing or silent. Two reclocked input loop-throughs (eight with the optional sub PCB fitted) are available along with three Standard Definition link selectable SDI/analogue outputs. The analogue outputs can be selected to give CVBS, YC, YUV or RGB. The output frame rate at all times will be the same as the input frame rate.




*Q-Down-A-AFD converter*

The main features 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 Wide Screen Signal insertion in both analogue and digital outputs
- Two input loop-throughs or six with an addition sub PCB (Q-Down183-A-AFD)
- Link selectable output formats - Standard Definition, analogue and digital
- Passes two groups of embedded audio, with delay matched to video
- One SD frame in lines of adjustable video delay
- Signal probe function

Q-Down-A-AFD is a 100mm x 266mm module, which fits in all standard frames and can be integrated with any board from the company's full product range. Extended loop throughs are available using a double-decker extender board (Q-Down183-A-AFD).

## *Audio*

When down converting from HD to SD the first two numbered audio groups will be de-embedded and re-embedded onto the output, so if the input has groups 1, 2, 3 and 4 present, only groups 1 and 2 will be processed and presented on the output. Likewise if only groups 2 and 3 are present on the input these will appear as groups 2 and 3 on the output.

This will also be true when an SD input is connected to the Q-Down-A-AFD unless the reclocker is set to bypass mode. When bypass is selected all input groups will appear in their respective positions on the output.

## *Delay*

There are three delay settings available, minimum (processing delay), fixed (52 SD lines) and frame. A further full frame of delay can also be added between the input and output video, variable in one output line steps. This delay is in addition to any minimum processing delays through the Q-Down-A-AFD. Note, the user delay control is made inoperative when frame delay is selected.

Q-Down-A-AFD's processing delay is determined by several factors such as input format, aspect ratio selection and reclocker status. With a High Definition input the processing delay will be 16 SD lines with a full screen output. Selecting Letterbox will increase this delay to 52 SD lines. For a Standard Definition input the minimum processing delay will be as little as 1µs with the reclocker bypassed, fixed and frame will remain 52 SD line and one frame respectively.

## *Signal probe*

Q-Down-A-AFD has a signal probe functionality making it useful for signal monitoring and flagging up faults should they occur. The status indications available are video not present, video frozen, video black, audio not present and audio silence (<-56dBu). Fault reporting can be via the two GPI outputs or Statesman alarm logging.

## *Aspect ratio*

There are three manual aspect ratio settings available, Anamorphic (no conversion) will allow the input video to be mapped directly to the display device, this mode will be correct for a 16:9 widescreen display. 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. 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.

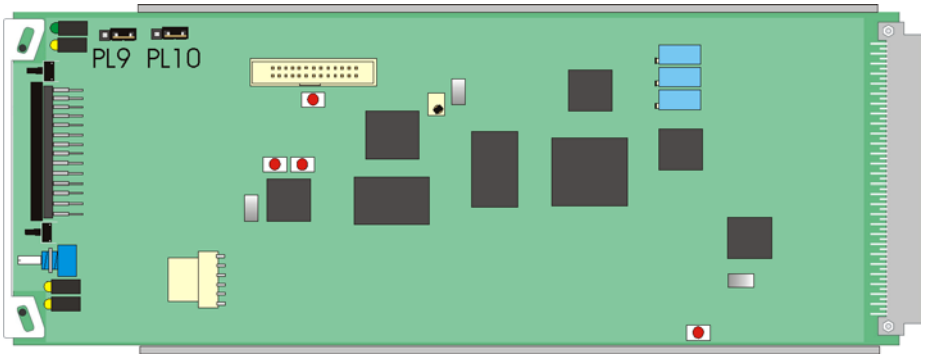
## *AFD and WSS*

Q-Down-A-AFD will select its output aspect ratio according to the AFD data embedded in the input video and insert WSS information onto both its analogue and serial digital outputs when 625-line. WSS data is not inserted into a 525-line output. The WSS information can either be inserted manually or set to automatically follow the incoming AFD data.

# 2 Hardware installation

## 2.1 Module configuration

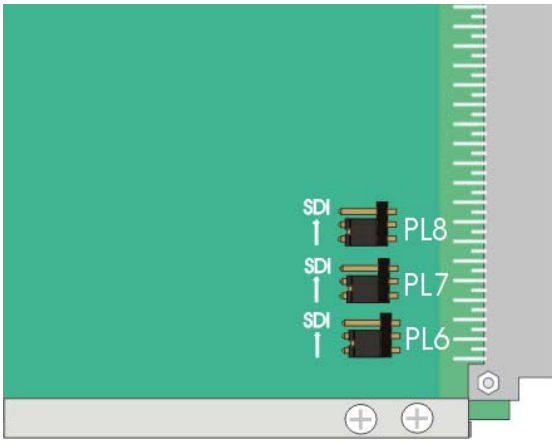
There are five user settable links on the Q-Down-A-AFD. These are - PL9 and PL10 on the PCB top side and PL6, 7 and 8 on the bottom side. The PL9 and PL10 are used for selective NTSC pedestal and Betacam levels. PL6, 7 and 8 are used to select between analogue and serial digital outputs.




*Q-Down-A-AFD 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 four potentiometers have been factory set and should not require further adjustments.




*Q-Down-A-AFD bottom side*

## Link configurations

PCB top side

| Link | Function | Towards front 1-2 | Towards rear 2-3 |
|---|---|---|---|
| PL9 | Betacam | Betacam levels | Normal levels |
| PL10 | Pedestal (NTSC) | Pedestal applied (NTSC M) | No pedestal applied (NTSC J) |

PCB bottom side

| Link | Towards board edge 1-2 | Away from board edge 2-3 |
|---|---|---|
| PL6 | CVBS / Y / G output | Standard Definition serial digital output |
| PL7 | CVBS / U / B / YC-Y output | Standard Definition serial digital output |
| PL8 | CVBS / V / R / YC-C output | 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 LEDs

These LEDs are included for diagnostic purposes and are not visible from the front of the frame.

| LED | Illuminated | Not Illuminated |
|---|---|---|
| LED3 | Input present | |
| LED4 | Board configuring | Board configured |
| LED5 | Data | |
| LED6 | Link | |

## 2.2 Rear modules and signal I/O

The 4U Indigo 4 frame will house up to 24 single height modules with up to three power supplies. The 2U Indigo 2 frame will house up to 12 single height modules and dual power supplies. The 1U Indigo 1 frame 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 RM34

The RM34 being a single height module will allow maximum packing density with the maximum number of outputs available.

| RM34 rear module connector | Description |
|---|---|
|  | **RM34**<br>• 24 Q-Down-A-AFD modules per Indigo 4 frame<br>• 12 per Indigo 2 frame<br>• Six per Indigo 1 frame<br>• 2 per Indigo DT<br>• All frame slots can be used |

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

### Rear module connections with RM45

The RM45 is similar to the RM34 but an input loop-through has been replaced by a further SD output giving up to four available.

| RM45 rear module connector | Description |
|---|---|
|  | **RM45**<br>• 24 Q-Down-A-AFD modules per Indigo 4 frame<br>• 12 per Indigo 2 frame<br>• Six per Indigo 1 frame<br>• 2 per Indigo DT<br>• All frame slots can be used |

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

**Note:** The Q-Down183-A-AFD with seven/eight input loop-throughs requires two RM34 or an RM45 plus RM34 rear module, thus requiring two frame slots compared to the Q-Down123-A. The upper RM34 position will supply the six extended loop-though connections.

## 2.3 General Purpose Interface (GPI)

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 | | | 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 bit4** | | |
| **4** | **'d'** | **Recall preset bit 8** | | |
| **5** | **'e'** | **Input missing, Video frozen/Black, Audio silence/missing** | Selected Alarms asserted after set delay (Input missing immediate) | No alarm |
| **6** | **'f'** | **Input missing, Video frozen/Black, Audio silence/missing** | Selected Alarms asserted after set delay (Input missing immediate) | No alarm |

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.

| GPI Preset | Bit 8 | Bit 4 | Bit 2 | Bit 1 | GPI Preset | Bit 8 | Bit 4 | Bit 2 | Bit 1 |
|---|---|---|---|---|---|---|---|---|---|
| **1** | 0 | 0 | 0 | 0 | **9** | 1 | 0 | 0 | 0 |
| **2** | 0 | 0 | 0 | 1 | **10** | 1 | 0 | 0 | 1 |
| **3** | 0 | 0 | 1 | 0 | **11** | 1 | 0 | 1 | 0 |
| **4** | 0 | 0 | 1 | 1 | **12** | 1 | 0 | 1 | 1 |
| **5** | 0 | 1 | 0 | 0 | **13** | 1 | 1 | 0 | 0 |
| **6** | 0 | 1 | 0 | 1 | **14** | 1 | 1 | 0 | 1 |
| **7** | 0 | 1 | 1 | 0 | **15** | 1 | 1 | 1 | 0 |
| **8** | 0 | 1 | 1 | 1 | **16** | 1 | 1 | 1 | 1 |

## 4U frame GPI connections

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

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

*Table shows pin number (remote number)*

**Note:** Remote 1, Remote 3, Remote 5 and Remote 7 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, Remote 4, Remote 6 and Remote 8 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 and Remote 6.

**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. Remotes 5-8 are similarly protected.

## 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)*

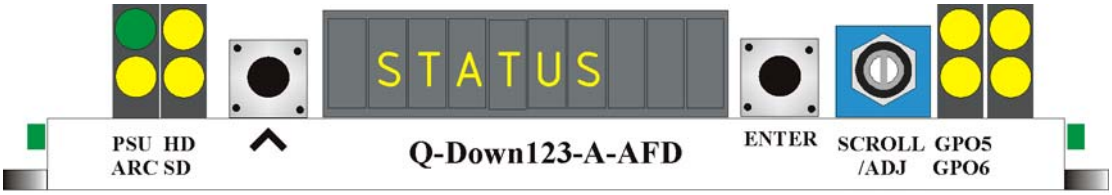
**Note:** Remote 1: 26-way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

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.

# 3 Card edge operation

## 3.1 Card edge controls




*Q-Down-A-AFD board edge*

## 3.2 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 |

## 3.3 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.

## 3.4 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 | |

## 3.5 Navigating card edge menus

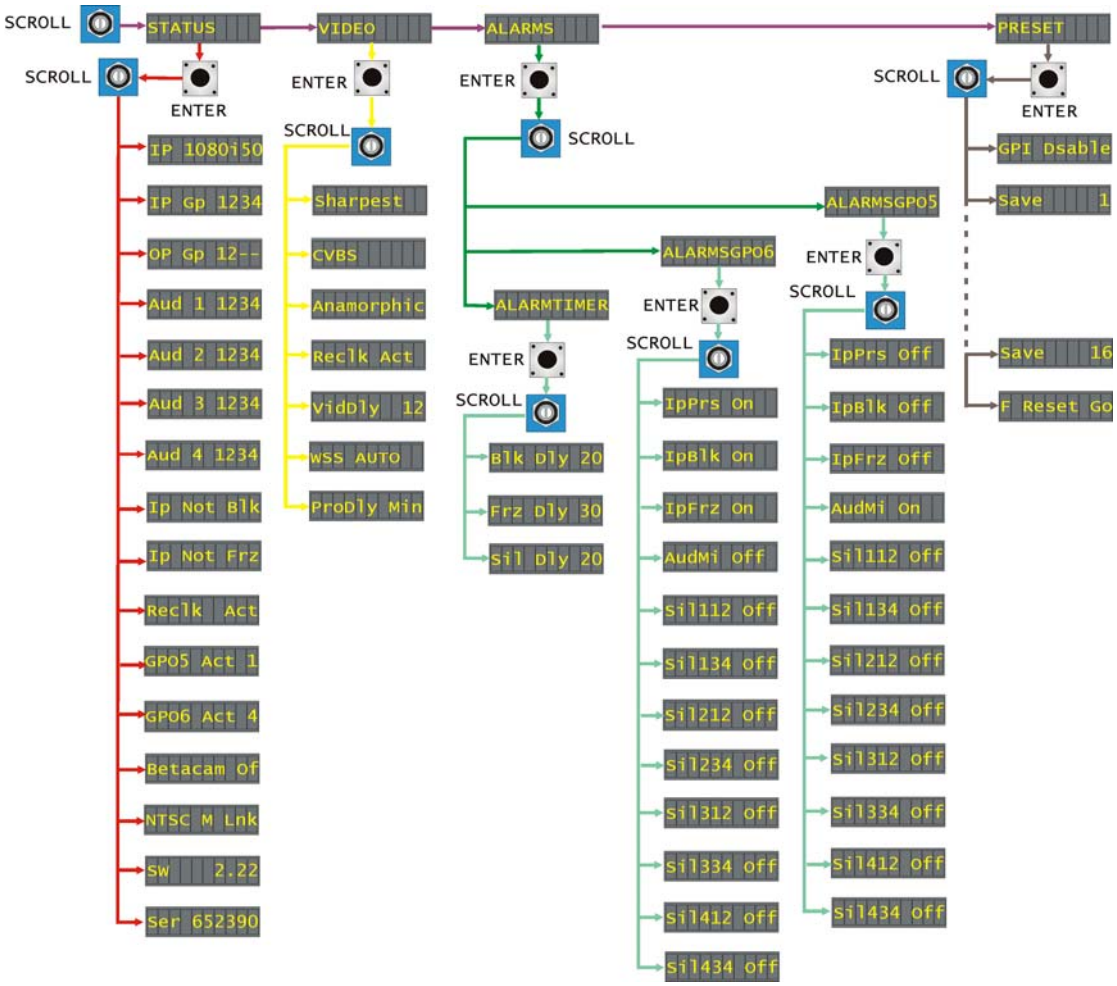
To access the card edge menu system proceed as follows:

- 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 will flash slowly to indicate that a change has been made and requires confirmation
- 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.

# 3.6 Card edge configuration

## Menu tree




*Q-Down-A-AFD Board edge menu structure*

**Tip:** To reach the top menu push the ^ button repeatedly until a top menu is reached. Rotate the SCROLL control anti-clockwise until the STATUS menu appears.

## Status menu

From the STATUS top menu press ENTER then SCROLL to access the status menu options.

| Menu | | Comment |
|---|---|---|
| STATUS | | |
| IP 1080i50 | Input/Output line Standard | The Input video line standard is shown. ***IP 625i 50,IP 525i 59,IP 720p 50/59, IP 1080i50/59, No Input Not known*** |
| IP Gp 1234 | Embedded audio groups present on input | Groups containing audio data present on the input video. ***1234*** groups contain audio. '-' no audio present. |
| OP Gp 12-- | Output audio groups present | Groups containing audio data present on the output video. ***1234*** groups contain audio. '-' no audio present. |
| Aud 1 1234 | Input audio groups 1-4 | Input audio channel status ***1234*** channels active. ***s*** channel silent. |
| Aud 4 1234 | | |
| Ip Not Blk | Input video status (Black) | Status of the input video. ***Ip Not Blk, Ip Black.*** |
| Ip Not Frz | Input video status (Frozen) | Status of the input video. ***Ip Not Frz, Ip Frozen.*** |
| Reclk Act | Output reclocker status | Status of the output reclocker. ***Reclck Act, Reclck Byp, Reclck N/A.*** |
| GPO5 Act 1 | GPO5 status | GPO5 status, The last digit indicates the active alarm priority. One being of highest priority and 8 lowest. ***GPO5 Off, GPO5 Act 1…8*** |
| GPO6 Act 4 | GPO6 Status | GPO6 status, The last digit indicates the active alarm priority. One being of highest priority and 8 lowest. ***GPO6 Off, GPO6 Act 1…8*** |
| Betacam Of | Link PL9 position | Position of PL9. Selects Betacam video levels, Active on NTSC YUV only. ***Betacam Off, Betcam On.*** |
| NTSC M Lnk | Link PL10 position | Position of PL10. Select 7.5 IRE pedestal. Active on NTSC only. ***NTSC M Lnk, NTSC J Lnk.*** |
| SW 2.22 | Software version fitted | The version number of the currently installed software. |
| Ser 652390 | PCB serial number | The electronically stored PCB serial number. This should correspond with the serial number label affixed to the PCB connector. |

**Note:** Alarm priority is numbered 1-12 with input missing being the highest and channel silence Group 4 being the lowest. A low priority alarm will be masked by a higher priority alarm.

## Video menu

From the STATUS top menu press ENTER then SCROLL to access the video menu options.

| Menu | Comment |
|---|---|
| VIDEO | |
| sharpest — Vertical bandwidth filter | Rotate the Scroll/Adj. control to show filter selected. Press ENTER and rotate Scroll/Adj. to make a new selection. Press ENTER to select. ***Softest, Soft, Sharp, Sharpest.*** |
| CVBS — Analogue output format | Rotate the Scroll/Adj. control to show output format selected. Press ENTER and rotate Scroll/Adj. to make a new selection. Press ENTER to select. ***CVBS, YUV, RGB, YC.*** |
| Anamorphic — Output aspect ratio selection control | Rotate the Scroll/Adj. control to show the aspect ratio selected. Press ENTER and rotate Scroll/Adj. to make a new selection. Press ENTER to select. ***Anamorphic*** (no conversion), ***Letter Box, Centre Cut, Auto 16x9, Auto 4x3, Auto Adapt***. |
| Reclk Act — Output reclocker bypass control | Rotate the Scroll/Adj. control to show output reclocker control. Press ENTER and rotate Scroll/Adj. to make a new selection. Press ENTER to select. ***Reclk Act, Reclk Byp, Reclk N/A.*** |
| VidDly 12 — Video delay in SD lines | Rotate the Scroll/Adj. control to show the delay in lines menu. Press ENTER and rotate Adj. to set the delay in lines. ***1-625 SD lines.*** |
| WSS AUTO — Wide screen signalling control menu | Rotate the Scroll/Adj. control to show the wide screen signalling insertion menu. Press ENTER and rotate Adj. to set WSS option. ***WSS Auto,WSS 4:9 FF, WSS 16:9FF, WSS 16:9LB, WSS Off, WSS Pass, .*** |
| ProDly Min — Processing deley control menu | Rotate the Scroll/Adj. control to show the processing delay menu. Press ENTER and rotate Adj. to set delay option. ***Minimum, Fixed, Frame .*** |

### Vertical Filters

Q-Down-A-AFD uses sophisticated two dimensional filtering to achieve a reliable artefact-free conversion. Four selectable levels of filtering from sharpest through sharp and soft to softest allow Q-Down-A-AFD's performance to be optimised for the material being down converted.

### Output Aspect Ratio

There are three fixed aspect ratios: anamorphic which will map the input picture directly to the native aspect ratio of the viewing display with the resulting distortion associated with this. Output WSS will be full format 16:9. 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 and set the output WSS to 16:9 centre. 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 with output WSS set to full format 4:3.

There are three further selections which are associated with the AFD reader and will automatically set the output WSS when Wide Screen Signalling is set to auto.

Selecting Auto 16:9 will for all AFD input codes will give an anamorphic aspect ratio conversion and for a 625-line output, WSS will be set to full format 16:9. 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 box 16:9 centre. 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 will for any full frame input 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 > 16:9 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) | Centre cut (full format 4:3) | No change, as previous |
| **4** | Letterbox>16:9 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | No change, as previous |

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

## Output reclocker

An integral part of Q-Down-A-AFD's down converter is an output reclocker. This reclocker has the benefit of making output jitter independent of the input jitter but at the expense of through-board delay, approximately 3.8µS from input to output. In certain circumstances this small delay could be unacceptable so there is a provision to bypass the reclocker block and reduce the through-board delay to its minimum of 1µS.

**Note:** Reclocker bypass is only available in SD-SD mode. When the reclocker is bypassed the output jitter will be a function of the input jitter.

## Adjustable Delay

Video delay is adjustable from 0 to 1 frame in 1 line steps of the output i.e. SD lines. Any delay added will be in addition to the processing delay through the board which will vary depending on input format and ARC configuration. See the Introduction chapter for a full explanation.

**Note:** The maximum adjustable delay in NTSC 525-line is one frame. Displayed values greater than 525 lines will produce the maximum delay of 525 lines only.

## Wide Screen Signalling

Output wide screen 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 |

## Processing Delay

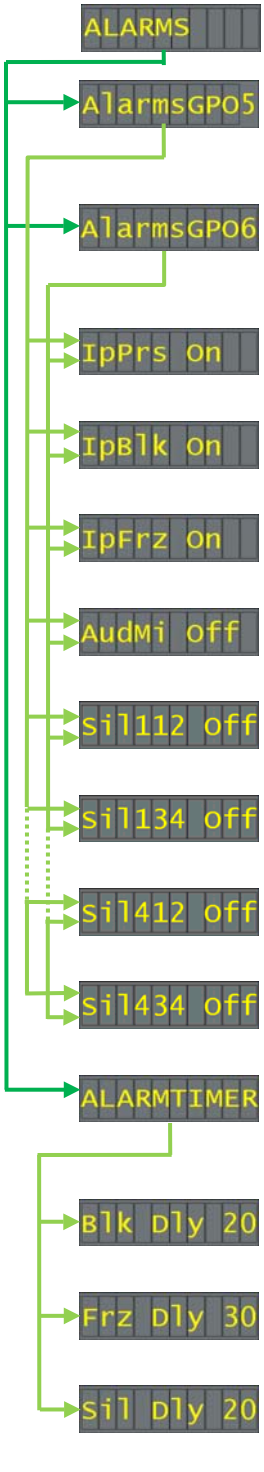
There are three user selectable video processing delays. These are minimum delay, fixed delay and frame delay. The minimum video delay will depend on the aspect ratio setting. Conversions that contain no vertical processing such as anamorphic or centre cut will have a minimum delay of 16 output lines whereas letter box sees a minimum delay of 52 output lines. This is in addition to any user set variable delay. The fixed setting makes the delay 52 output lines for all situations.

For a Standard Definition input the minimum processing delay will be as little as 1µs with the reclocker bypassed, fixed and frame will remain 52 SD line and one frame respectively.

**Note:** Selecting frame delay fixes the input to output delay to one frame (SD) and disables the variable control.

## Alarms menu

From the STATUS top menu press ENTER then SCROLL to access the alarms menu options.



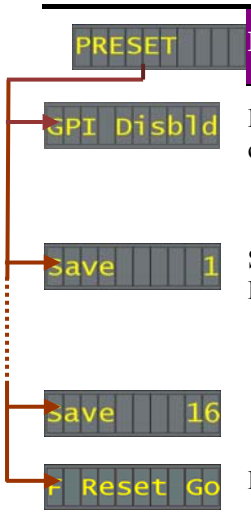

| Menu | Comment |
|---|---|
| GPI5 alarm configuration | Rotate the Scroll/Adj. control to show AlarmsGPO5 selected. Press ENTER and rotate Scroll/Adj. to access the alarm option. Press ENTER to select. |
| GPI6 alarm configuration | Rotate the Scroll/Adj. control to show AlarmsGPO6 selected. Press ENTER and rotate Scroll/Adj. to access the alarm option. Press ENTER to select. |
| Input Present | Rotate the Scroll/Adj. control to set input present alarm ON or OFF. Press ENTER to select. |
| Input Black | Rotate the Scroll/Adj. control to set input black alarm ON or OFF. Press ENTER to select. |
| Input Frozen | Rotate the Scroll/Adj. control to set input frozen alarm ON or OFF. Press ENTER to select. |
| Audio missing | Rotate the Scroll/Adj. control to set audio missing alarm ON or OFF. Press ENTER to select. |
| Group l channel 1-2 silent | Rotate the Scroll/Adj. control to set silence on group 1 channels 1-2 alarm ON or OFF. Press ENTER to select. |
| Group l channel 3-4 silent | Rotate the Scroll/Adj. control to set silence on group 1 channels 3-4 alarm ON or OFF. Press ENTER to select. |
| Group 4 channel 1-2 silent | Rotate the Scroll/Adj. control to set silence on group 4 channels 1-2 alarm ON or OFF. Press ENTER to select. |
| Group 4 channel 4-3 silent | Rotate the Scroll/Adj. control to set silence on group 4 channels 3-4 alarm ON or OFF. Press ENTER to select. |
| Alarm delay time menu | Rotate the Scroll/Adj. control to show the alarms delay time menus. Press ENTER and rotate Scroll/Adj. to make a selection. Press ENTER to select. |
| Picture black delay interval | Rotate the Scroll/Adj. control to set delay interval in seconds. Press ENTER to select. ***(0-20 seconds)*** |
| Picture frozen delay interval | Rotate the Scroll/Adj. control to set delay interval in seconds. Press ENTER to select. ***(0-20 seconds)*** |
| Audio channel silence delay interval | Rotate the Scroll/Adj. control to set delay interval in seconds. Press ENTER to select. ***(0-120 seconds)*** |

**Note:** GPO5 and GPO6 menus are identical.

**Note:** With delay controls set to their minimum there will remain a small delay to prevent false triggering.

## Preset menu and factory reset

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




| Menu | Comment |
|---|---|
| Enable GPI control of presets | Selecting ENABLE allows the recall of previously saved user configurations via GPI inputs 0-3. |
| Save and recall Presets 1-16 | Rotate the Scroll/Adj. control to show Preset Menu selected.<br>Press ENTER and rotate Scroll/Adj. to select preset location.<br>Press ENTER to select and rotate Scroll/Adj. to select Recall or Save Recall.<br>Press ENTER to action. |
| Factory Reset | Rotate the Scroll/Adj. control to show the Factory reset menu.<br>Press ENTER to action. |

**Note:** Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.

**Note:** Factory reset will erase all user stored presets

| Parameter | Default value |
|---|---|
| **Analogue output** | CVBS |
| **Vertical bandwidth** | Soft |
| **Wide Screen Signalling** | Auto |
| **Aspect ratio** | Anamorphic |
| **Bypass without reclocking** | unchecked |
| **Delay** | 0 |
| **GPO alarms** | unchecked |
| **Alarm delay video black** | 1 |
| **Alarm delay video frozen** | 1 |
| **Alarm delay audio silence** | 10 seconds |
| **Presets** | Set to Preset 1 and all contents erased |
| **GPI Enable** | Not enabled |

# 4 Using the front control panel

## 4.1 Module selected

This operational guide assumes that the panel has been set up according to the panel setup procedure described in the Crystal Vision Control Panel manual.

**Note:** It is **ESSENTIAL** that the panel set up procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up all eight control panel keys LEDs will illuminate briefly. Once the panel has completed its power up and configuration sequence the panel will enter Statesman mode and the massage 'Press Cal to Exit' will be displayed.


*Statesman mode is entered by default*

To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

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.

### Navigating the display

The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available / enters panel set up when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode / enters Panel Diagnostics mode when held down during power up / updates the display
- Asterisk – enters board rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the Home menu
- ENTER – accept current selection
- Upward arrow – used to move up the menu structure / enter lock panel menu from the Device menu

- Rotary control – shaft encoder used to select options or variable data

**Note:** Please refer to the Crystal Vision Control Panel manual for details of the Panel Setup, Lock Panel and Diagnostic menus.

### Selecting a Q-Down-A-AFD

To select a particular card in a frame, press the DEVICE key to go to the Device menu.

**Note:** There may be a delay whilst the frame is interrogated during which time the 'No cards Found' could be displayed.

The top line of the display will show 'Available Cards X', where X is the number of cards that have responded so far to the polling request.


*The available cards menu*

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

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 message shows that a Q-Down-A-AFD has been selected.


*The Q-Down-A-AFD home menu*

## Updating the display

The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or other remote control, the text displayed on the active front panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

## 4.2 The Q-Down-A-AFD active panel menu structure

At any time the main top-level menu (Home) is obtained by pressing the HOME key. From the Home menu further selections can be made. Active function keys are indicated by illuminated, integrated LEDs.

The main top-level menus for the Q-Down-A-AFD are obtained by pressing the F1- F4 keys from the Home menu. Menu keys are illuminated when active and when further menus are available.

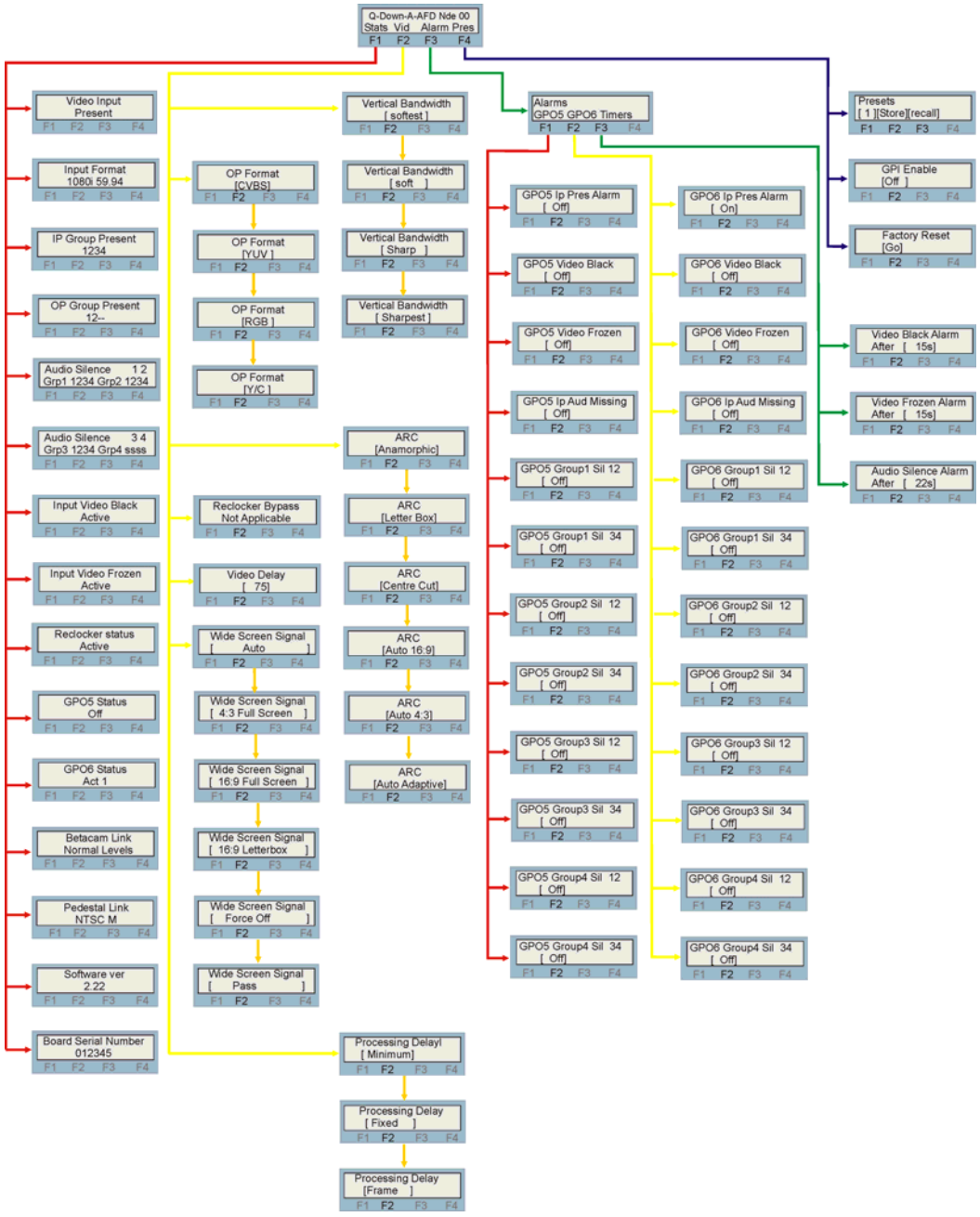
The top-level menus are:

- Status – Press F1
- Vid (filter and output selection, aspect ratio control and video delay) – Press F2
- Alarm (frozen, black and silence controls, delay timer) – Press F3
- Presets (User presets and factory reset) – Press F4

When a sub menu has been selected, further options may be obtained by using the Shaft control to scroll through them. Once the desired option has been located a selection or value change can be made by either toggling the appropriate function key or by selecting and using the shaft control to alter a numerical value. A configuration change or value will be activated as the shaft control is rotated or function button is toggled. The variable being adjusted will appear in brackets. If the variable updates in real time it will be contained within square brackets [letter box] or if the change requires to be accepted angular brackets will be used <CVBS>. Pressing Enter will fix the new value.

The following chart shows the available Q-Down-A-AFD menus. The actual menus available may vary slightly as software is updated.

## Active control panel menus

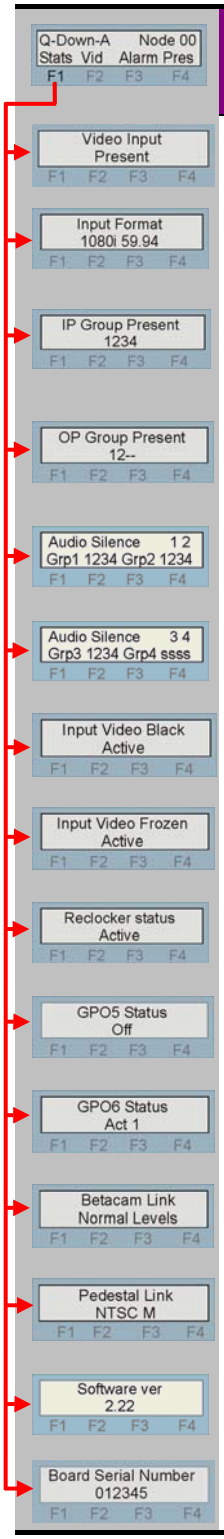



**Note:** Function key LEDs are illuminated when active.

## The Status menu

Pressing button F1 from the Home menu will enter the Status menu. This menu is traversed by rotating the shaft control. No changes can be made from this menu as it is read only.

**Note:** Not all status information will be updated in real time. If necessary press the * button to cause the display to update.

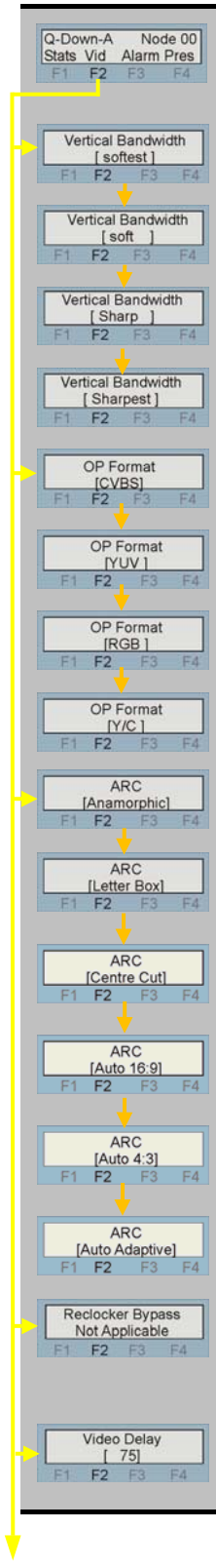



| Menu | Description |
|---|---|
| Input present | Video input ***Present, Missing.*** |
| Input format | Rotate the shaft control to view the input format.<br>***635i 50,525i 59.94, 720p 50, 720p 59.94, 1080i 50, 1080i 59.94.*** |
| Audio groups present at the input | Rotate the shaft control to view the embedded audio groups present on the input video.<br>Groups = ***1,2,3,4 or –*** not present |
| Audio groups re-embedded at the output | Rotate the shaft control to view the embedded audio groups present on the output video.<br>Groups = **1,2,3,4 or –** not present |
| Audio groups 1 & 2 channel status | Rotate the shaft control to view the first group channel status.<br>***1234*** channels containing audio. '***s***' channel silent. |
| Audio groups 3 & 4 channel status | Rotate the shaft control to view the second group channel status.<br>***1234*** channels containing audio. '***s***' channel silent |
| Input video status (Black) | Rotate the shaft control to view the input video status.<br>***Active, Black.*** |
| Input video status (Frozen) | Rotate the shaft control to view the input video status.<br>***Active, Frozen.*** |
| Video reclocker status | Rotate the shaft control to view the video reclocker status.<br>***Active, Bypassed.*** |
| GPI5 output status | Rotate the shaft control to view GPO5 alarm status.<br>***Off, Act 1..12.*** The final digit indicates the alarm priority level. |
| GPI6 output status | Rotate the shaft control to view GPO6 alarm status.<br>***Off, Act 1..12.*** The final digit indicates the alarm priority level. |
| PCB link PL9 position | The betacam link PL9 is set to apply betacam levels to the component output. ***Beta Levels, Normal Levels.*** |
| PCB link PL10 position | The pedestal link PL10 is set to apply setup to 525-line outputs.<br>***NTSC M, NTSC J.*** |
| Software version | Fitted software level. |
| PCB serial number | Electronically stored board serial number. |

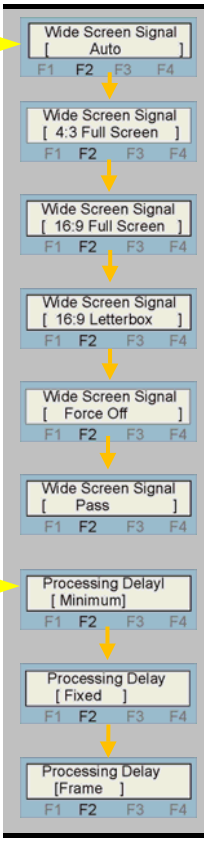
**Note:** Alarm priority is numbered 1-12 with input missing being the highest and group 4 channel silent being the lowest. A low priority alarm will be masked by a higher priority alarm.

## The video menu

Press F2 from the Home menu and rotate the shaft control to view the Video Configuration menus.




| Menu | Description |
|---|---|
| Vertical filter (HD input only) | Press F2 from the Home menu and rotate the shaft control to view the vertical filter selected. Press F2 and rotate the shaft control to view the filter selection. ***Softest, Soft, Sharp, Sharpest.*** **Note:** The filter selection changes in real time. |
| Analogue video output format | Press F2 from the Home menu and rotate the shaft control to view the analogue video output format selected. Press F2 and rotate the shaft control to view the format selection. ***CVBS, YUV, RGB, YC.*** **Note:** The output format selection changes in real time. |
| Aspect ratio (HD input only) | Press F2 from the Home menu and rotate the shaft control to view the aspect ratio selected. Press F2 and rotate the shaft control to view the aspect ratio selection. ***Anamorphic, Letterbox, Centre Cut, Auto 16:9, Auto 4:3, Auto Adaptive.*** **Note:** The output format selection changes in real time. |
| Video Reclocker bypass (SD input only) | Press F2 from the Home menu and rotate the shaft control to view the video reclocker bypass control. Press F2 and rotate the shaft control to make selection. ***On, Off, Not Applicable*** (HD input)**.** |
| Video delay | Press F2 from the Home menu and rotate the shaft control to view the video delay. Press F2 and rotate the shaft control to adjust. ***1-625 lines*** (output), ***Not Applicable*** (SD with reclocker bypassed). |

| | | |
|---|---|---|
|  | Aspect ratio (PAL input only) | Press F2 from the Home menu and rotate the shaft control to view the Wide Screen Signal menu. Press F2 and rotate the shaft control to view the WSS selection. ***Auto, 4:3 Full Screen, 16:9 Full Screen, 16:9 Letterbox, Force Off, Pass.*** |
| | Processing Delay | Press F2 from the Home menu and rotate the shaft control to view the Processing delay menu. Press F2 and rotate the shaft control to view the selection. ***Minimum, Fixed, Frame.*** |

## Vertical Filters

Q-Down-A-AFD uses sophisticated two dimensional filtering to achieve a reliable artefact-free conversion. Four selectable levels of filtering from sharpest through sharp and soft to softest allow Q-Down-A-AFD's performance to be optimised for the material being down converted.

## Output Aspect Ratio

There are three fixed aspect ratios: anamorphic which will map the input picture directly to the native aspect ratio of the viewing display with the resulting distortion associated with this. Output WSS will be full format 16:9. 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 and set the output WSS to 16:9 centre. 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 with output WSS set to full format 4:3.

The three further selections are associated with the AFD reader and will automatically set the output WSS when Wide Screen 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 full format 16:9. 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 box 16:9 centre. 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 > 16:9 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) | Centre cut (full format 4:3) | No change, as previous |
| **4** | Letterbox>16:9 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | No change, as previous |

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

## Output reclocker

An integral part of Q-Down-A-AFD's down converter is an output reclocker. This reclocker has the benefit of making output jitter independent of the input jitter but at the expense of through-board delay, approximately 3.8µS from input to output. In certain circumstances this small delay could be unacceptable so there is a provision to bypass the reclocker block and reduce the through-board delay to its minimum of 1µS.

**Note:** Reclocker bypass is only available in SD-SD mode. When the reclocker is bypassed the output jitter will be a function of the input jitter.

## Adjustable Delay

Video delay is adjustable from 0 to 1 frame in 1 line steps of the output i.e. SD lines. Any delay added will be in addition to the processing delay through the board which will vary depending on input format and ARC configuration. See the Introduction chapter for a full explanation.

**Note:** The maximum adjustable delay in NTSC 525-line is one frame. Displayed values greater than 525 lines will produce the maximum delay of 525 lines only.

### Wide Screen Signalling

Output wide screen 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 |

### Processing Delay

There are three user selectable video processing delays. These are minimum delay, fixed delay and frame delay. The minimum video delay will depend on the aspect ratio setting. Conversions that contain no vertical processing such as anamorphic or centre cut will have a minimum delay of 16 output lines whereas letter box sees a minimum delay of 52 output lines. This is in addition to any user set variable delay. The fixed setting makes the delay 52 output lines for all situations.

For a Standard Definition input the minimum processing delay will be as little as 1µs with the reclocker bypassed, fixed and frame will remain 52 SD line and one frame respectively.

**Note:** Selecting frame delay fixes the input to output delay to one frame (SD) and disables the variable control.

## The alarm menu

Press F3 from the Home menu and rotate the shaft control to view the Alarm Configuration menus.

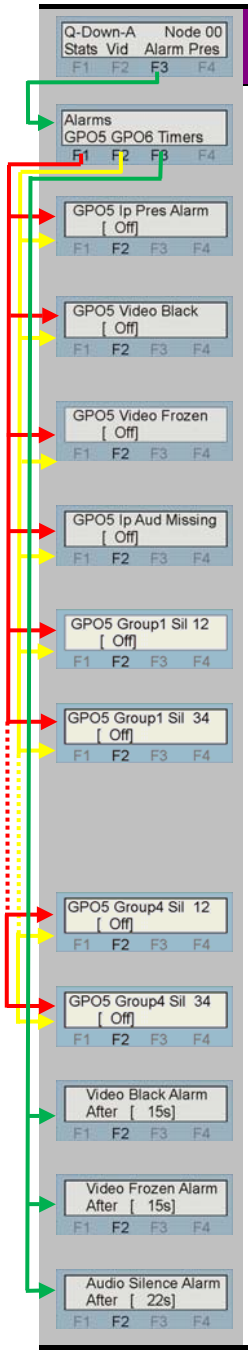
The Alarm menu consists of three sections - GPO5, GPO6 and Timers. The GPO5 and GPO6 menus are identical, allowing any two of the monitored parameters to be selected to trigger the chosen GPO out on actuation. See Chapter 2.3 – ‘Installation general purpose interface’ for the GPO connection information.

It is also possible to assign more than one alarm parameter to a single GPO output.

The eight alarm conditions have been assigned a level of priority, input missing being the highest priority and will assert an alarm immediately. The seven subsequent conditions descend in order of priority with audio channel 7-8 silence given the lowest. All but input present can be assigned a delay time 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.




| Menu | Description |
|---|---|
| Alarms menu | Press F3 from the home menu to enter the alarms menu. Press F1 to access the GPO5 sub menu. Press F2 to access the GPO6 sub menu and press F3 to access the alarm delay controls. |
| Input present alarm | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Input video black | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Input video frozen | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Audio on input missing | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Group l channel 1-2 silent | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Group l channel 3-4 silent | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Group 2….. Group 3….. | |
| Group 4 channel 1-2 silent | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Group 4 channel 3-4 silent | Press F2 to select and rotate the shaft control to select. ***On, Off.*** |
| Video black delay setting | Press F2 to select and rotate the shaft control to set the delay time. ***0-20sec.*** |
| Video frozen delay setting | Press F2 to select and rotate the shaft control to set the delay time. ***0-20sec.*** |
| Audio silence delay setting | Press F2 to select and rotate the shaft control to set the delay time. ***0-120sec.*** |

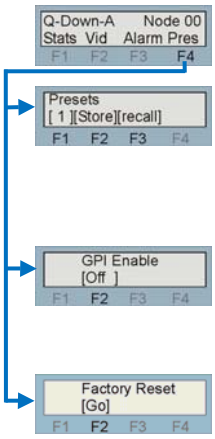
**Note:** Pressing CAL whilst setting a delay interval will return the time to 0 sec.

**Note:** GPO5 and GPO6 menus are identical.

## Preset menu and factory reset

Up to sixteen setups may be stored for the board and recalled either from the board control, active front panel, Statesman or through the use of external GPIs. Presets store the board setup data including operating mode and option card status. If at any time a sub-PCB is changed for a different type, i.e. from an input type to output type, any previously saved preset configurations will become invalid. The presets are numbered 1-16.

See Chapter 2.3 – 'Installation general purpose interface' for the GPI connection information.




| Menu | Comment |
|---|---|
| Save and recall Presets 1-16 | To save a user configuration from the active control panel.<br>Press F1 and rotate the shaft control to find the required preset location.<br>Press F3 the save the current board set up.<br>Press F4 to recall a previously save board set up. |
| Enable GPI control of presets | Selecting Enable allows the recall of previously saved user configurations via GPI inputs 0-3.<br>To enable GPI control press F2 rotate the shaft control to toggle between On and Off. Press ENTER to select. |
| Factory reset | Rotate the shaft control to show factory reset.<br>Press F2 to select and press ENTER to confirm. |

**Note:** Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.

**Note:** Factory reset will erase all user stored presets

| Parameter | Default value |
|---|---|
| **Analogue output** | CVBS |
| **Vertical bandwidth** | Soft |
| **Wide Screen Signalling** | Auto |
| **Aspect ratio** | Anamorphic |
| **Bypass without reclocking** | unchecked |
| **Delay** | 0 |
| **GPO alarms** | unchecked |
| **Alarm delay video black** | 1 |
| **Alarm delay video frozen** | 1 |
| **Alarm delay audio silence** | 10 seconds |
| **Presets** | Set to Preset 1 and all contents erased |
| **GPI Enable** | Not enabled |

# Statesman

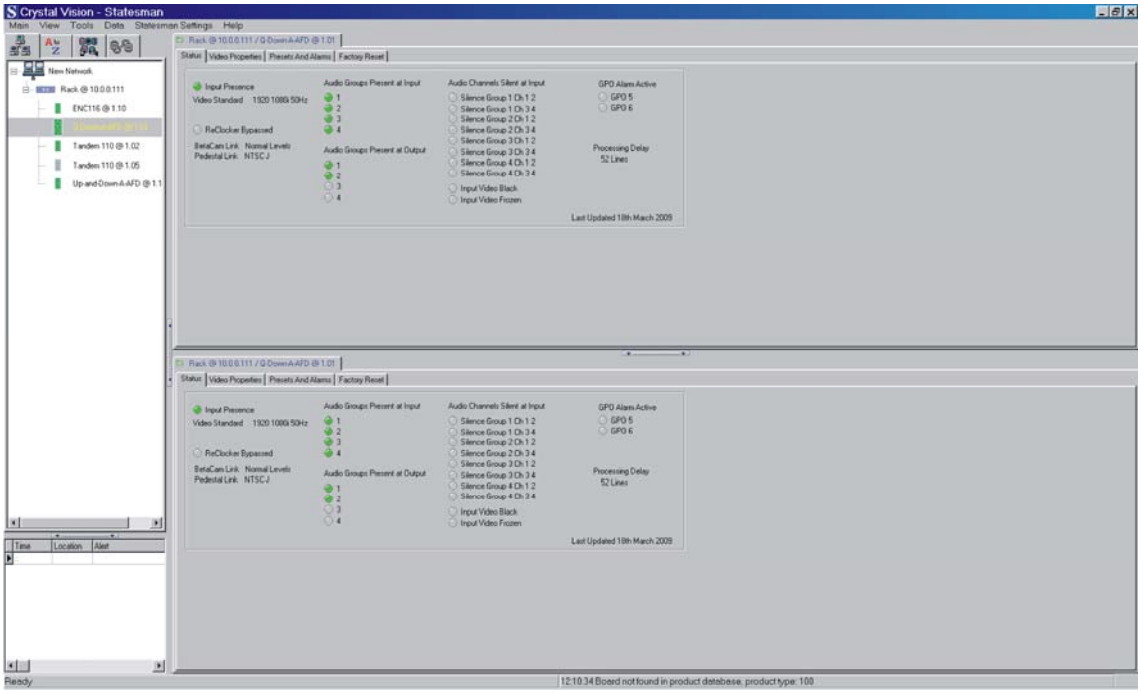
## 4.3 Statesman operation

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC. Statesman provides a user friendly means of configuring and operating 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 or active control panel. An active panel or REMIND remote control panel must be fitted to allow Statesman control.

## 4.4 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*

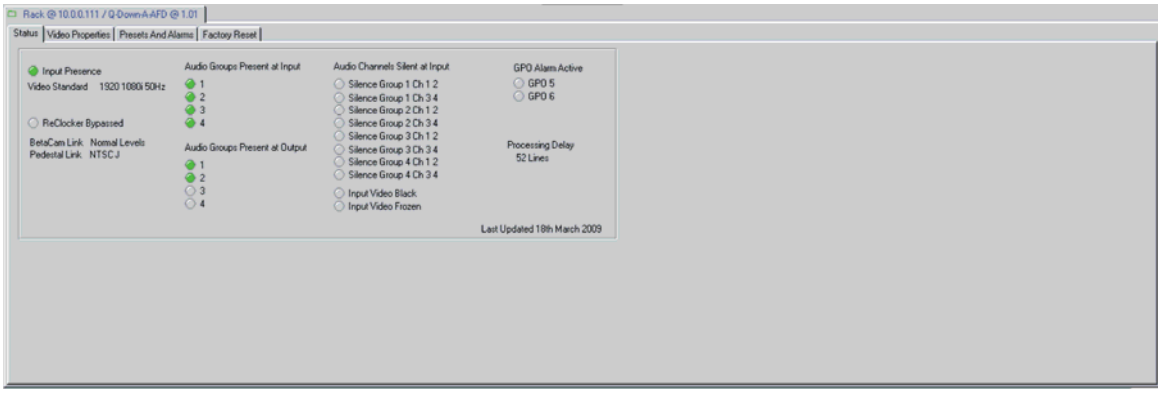
The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower pane or drag the button to vary the size of the panes.

**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.

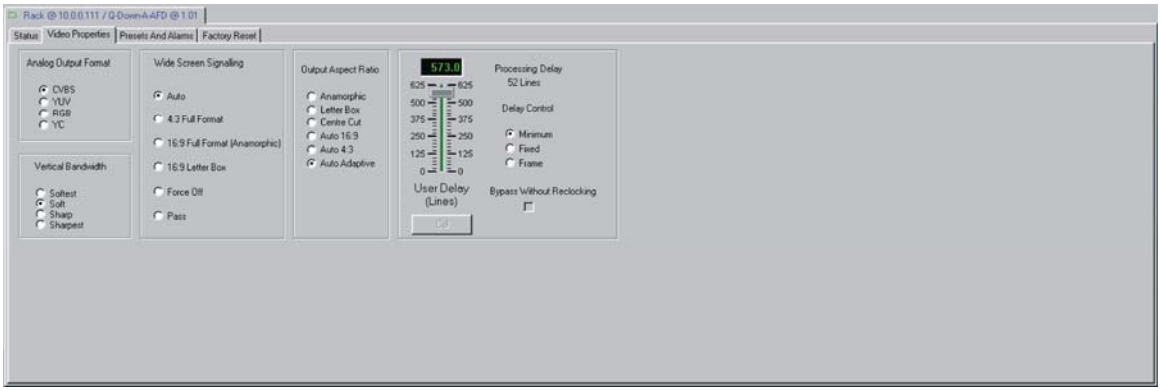
Text is used where more information is required than can be inferred by a simple LED such as video standards and board link positions.




*Status monitoring*

## Video properties

The video properties tab is divided into five group boxes containing the major board configuration controls.




*Video properties and status monitoring*

### Analogue video output format

The analogue output format is selected by checking the appropriate radio button. See the installation chapter for rear module connection details.

**Note:** The final output configuration will depend on the settings of links PL6, 7 and 8.

## 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.

## Output reclocker

An integral part of Q-Down-A-AFD's down converter is an output reclocker. This reclocker has the benefit of making output jitter independent of the input jitter but at the expense of through-board delay, approximately 3.8µS from input to output. In certain circumstances this small delay could be unacceptable so there is a provision to bypass the reclocker block and reduce the through-board delay to its minimum of 1µS.

**Note:** Reclocker bypass is only available in SD-SD mode. When the reclocker is bypassed the output jitter will be a function of the input jitter.

## Wide Screen Signalling

Output wide screen 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 |

## Output aspect ratio

There are three fixed aspect ratios; anamorphic which will map the input picture directly to the native aspect ratio of the viewing display with the resulting distortion associated with this. Output WSS will be full format 16:9. 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 and set the output WSS to 16:9 centre. 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 with output WSS set to full format 4:3.

The three further selections are associated with the AFD reader and will automatically set the output WSS when Wide Screen 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 full format 16:9. 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 box 16:9 centre. 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 > 16:9 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) | Centre cut (full format 4:3) | No change, as previous |
| **4** | Letterbox>16:9 | Anamorphic (full format 16:9) | Centre cut (full format 4:3) | No change, as previous |

**Note:** Wide Screen 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.

## Adjustable video delay

Video delay is adjustable from 0 to 1 frame in 1 line steps of the output i.e. SD lines. Any delay added will be in addition to the processing delay through the board which will vary depending on input format and ARC configuration. See the Introduction chapter for a full explanation.

**Note:** The maximum adjustable delay in NTSC 525-line is one frame. Displayed values greater than 525 lines will produce the maximum delay of 525 lines only.

## Processing Delay

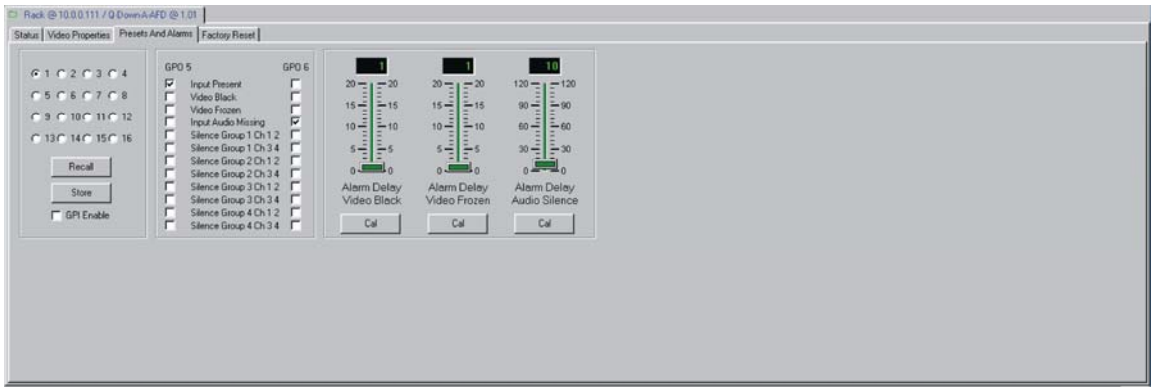
There are three user selectable video processing delays. These are minimum delay, fixed delay and frame delay. The minimum video delay will depend on the aspect ratio setting. Conversions that contain no vertical processing such as anamorphic or centre cut will have a minimum delay of 16 output lines whereas letter box sees a minimum delay of 52

output lines. This is in addition to any user set variable delay. The fixed setting makes the delay 52 output lines for all situations.

For a Standard Definition input the minimum processing delay will be as little as 1µs with the reclocker bypassed, fixed and frame will remain 52 SD line and one frame respectively.

**Note:** Selecting frame delay fixes the input to output delay to one frame (SD) and disables the variable control.

## Presets and Alarms




*Presets and alarms*

### Saving and recalling presets

The current board settings (i.e. routing and delay) can be saved in one of 16 locations to be recalled as desired. Therefore 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.

### Using the GPI alarm outputs

There are two GPI outputs reserved for alarm indication – GPO5 and GPO6, which may have assigned to them any of the eight video and audio alarms. An alarm is enabled when its associated check box is ticked. Any number of alarms may be flagged.

The twelve alarm conditions have been assigned a level of priority, input missing being the highest priority, and will assert an alarm immediately. The seven subsequent conditions descend in order of priority with audio group 4 channel 3-4 silence given the lowest. All but input present 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 GPO 5 and GPO6 status is also provided.

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

### 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 the default values.

## Factory reset

Performing a factory reset is a quick and simple way of returning all settings to their default value.

*Factory reset*

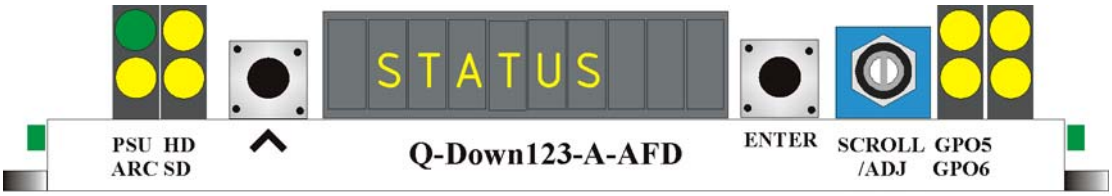
**Note:** Factory reset will erase all user stored presets

| Parameter | Default value |
|---|---|
| **Analogue output** | CVBS |
| **Vertical bandwidth** | Soft |
| **Wide Screen Signalling** | Auto |
| **Aspect ratio** | Anamorphic |
| **Bypass without reclocking** | unchecked |
| **Delay** | 0 |
| **GPO alarms** | unchecked |
| **Alarm delay video black** | 1 |
| **Alarm delay video frozen** | 1 |
| **Alarm delay audio silence** | 10 seconds |
| **Presets** | Set to Preset 1 and all contents erased |
| **GPI Enable** | Not enabled |

# 5 Trouble shooting

## Card edge monitoring

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




*Q-Down-A-AFD 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 Statesman if available.

## Basic fault finding guide

**The Power OK LEDs are not illuminated**

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

**There is no video output**

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

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

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

**The video output exhibits jitter**

Check that the input SDI stability is within normal limits

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

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

Check any active control panel cabling

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

If necessary re-set the card

**Re-setting the card**

If required, the card may be reset by removing the card from the rack and then re-inserting it

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

# 6 Specification

## General

| | |
|---|---|
| Dimensions | 100mm x 266mm module with DIN 41612 connector |
| Weight | 180g |
| Power consumption | 10 W – Q-Down123-A-AFD; 12.5 W – Q-Down183-A-AFD |

## Inputs

| | |
|---|---|
| Video | HD or SD SDI 270Mb/s or 1.485Gb/s serial digital compliant to EBU 3267-E, SMPTE 259M and SMPTE 292M |
| | HD. Up to 140m with Belden 1694 or equivalent (Belden 8281 or equivalent up to 100m) |
| | SD (270Mb/s) >250 metres Belden 8281 or equivalent |
| Input formats | 625/50, 525/59.94, 720p50, 720p59.94, 1080i50, 1080i59.94 |

## Outputs

| | |
|---|---|
| RM34 | The Q-Down123-A-AFD has two input loop-throughs and three video outputs. |
| RM34 + RM34 | The Q-Down183-A-AFD has eight input loop-throughs and three video outputs. The video outputs can be a selection of analogue or SDI. The final configuration will depend on the selected rear module. |
| RM45 | The Q-Down123-A-AFD has one input loop-through, one SD and three video outputs. |
| RM45 + RM34 | The Q-Down183-A-AFD has seven input loop-throughs, one SD and three video outputs. The video outputs can be a selection of analogue or SDI. The final configuration will depend on the selected rear module. |
| Serial digital | Three or four reclocked SDI outputs 270Mb/s or SMPTE 259M |
| Jitter | Typically SDI 0.2UI @ 1kHz |
| Processing delay | Minimum 16 lines, fixed 52 lines, one frame selectable. |
| Component: | YUV and GBR 1 Volt ± 2% into 75ohm. Sync on G, B & R |
| | (Betacam levels selectable) |
| Composite: | 1V ± 2% with sync into 75ohm |
| 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. |
| | 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 |
| | Chrominance: +/- 0.4dB to 2.5 MHz |
| Noise: | < -67dB weighted luminance or chrominance |
| Differential gain: | < 2% typ |
| Differential phase: | ± 1° typ |

## Processing

| | |
|---|---|
| Input | Active Format Descriptor SMPTE 2016 |
| Output | Wide Screen Signalling ETSI EN 200 294 |

## Status monitoring

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

## GPI inputs

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

## GPI outputs

| | |
|---|---|
| Number and type: | 2 x GPI outputs, selectable from loss of input, video black and frozen, audio missing and audio channel silence. |

## Input fail output

| | |
|---|---|
| Type: | Blue |