Smart Switch 3G

Intelligent 3G/HD/SD 2 x 2 switch

Crystal Vision

Crystal Vision Ltd., Lion Technology Park, Station Road East, Whittlesford, Cambridge, CB22 4WL, England.
Tel: +44(0) 1223 497049 Fax: +44(0) 1223 497059 sales@crystalvision.tv www.crystalvision.tv

Contents

Revision 1	Amended GPI table. Page 6	26/06/09
Revision 2	RM53 information added. Page 6	19/10/09
Revision 3	Connection table clarified. Page 6/SNMP re-added	30/10/09
Revision 4	Changing of Main and Aux to output 1 & 2	15/12/09
	Updated Statesman screenshots added	22/12/09
Revision 5	Input timing description amended. Page 4	05/01/10
Revision 6	Note added to GPI table. Page 7	03/03/10
Revision 7	RM54 picture and text amended. Page 6	10/01/11
Revision 8	Updated GPI controls added. Pages 7, 19, 30 & 37.	27/05/11
Revision 9	Board link information updated. Page 5	12/08/11
Revision 10	Updated GPI information. Page 7	18/10/13
	Updated Statesman screenshots added	

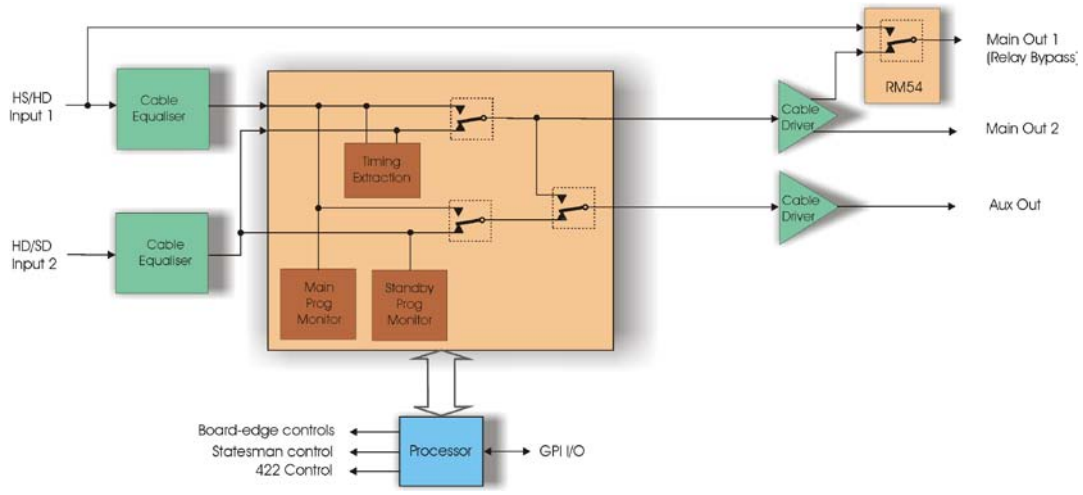
1 Introduction

The Smart Switch 3G is a HD/SD 2 x 2 intelligent switch that incorporates sophisticated monitoring of the two video inputs which can include embedded audio. As well as automatically switching between two sources Smart Switch 3G can also be controlled manually.

The auto switch function relies on an error priority rating to control the switch function. This gives the Smart Switch 3G the ability to appraise both sources and make its switching decision on the error rating attributed to both sources. This means that the Smart Switch 3G will not switch away from the primary source if it detects that the standby source contains an error with a higher priority rating than the error detected on the primary source.

Once a switch has occurred the option is then available to either reselect the primary source on removal of the error, delay before reselecting the primary source or latch in the switched state until reset manually.

Smart Switch 3G can monitor 20 parameters on both the primary and standby inputs. These 20 parameters are listed in order of priority from input missing to input frozen and channel 3-4 audio silent. Any of these parameters can be selected to create an alarm as well as perform a switch, although an auto switch can only occur away from the highest priority error.



The Smart Switch 3G card can be controlled by Statesman PC control software, active control panel such as the REMIND-E, or from its card edge controls. The main features of Smart Switch 3G are:

- Intelligent 2 x 2 switch which works with 3Gb/s, HD and SD
- Three reclocked outputs, two output 1s and one output 2. Output 1 with relay bypass
- Numerous switching options: input present, video black, video frozen, audio group present, audio silence and various EDH errors
- Board-edge, Statesman and GPI alarm indication
- Space-saving: 100mm x 266mm module allowing 12 Smart Switch 3G in 2U
- SNMP agent giving status and trap generation with suitable frame

Smart Switch 3G will take its timing information from the best of both inputs to determine the correct time to do a switch. If an input is absent the ability to manually control the input routing is disabled (unless the input missing test is overridden). How clean the switch is will depend on several factors such as if the standby signal is synchronous with the main programme or if the detected fault does not cause a disruption to the timing information such as audio silence or video black. Loss of input will cause a complete loss of timing information and will result in an immediate crash switch and will be likely to result in a brief picture disturbance.

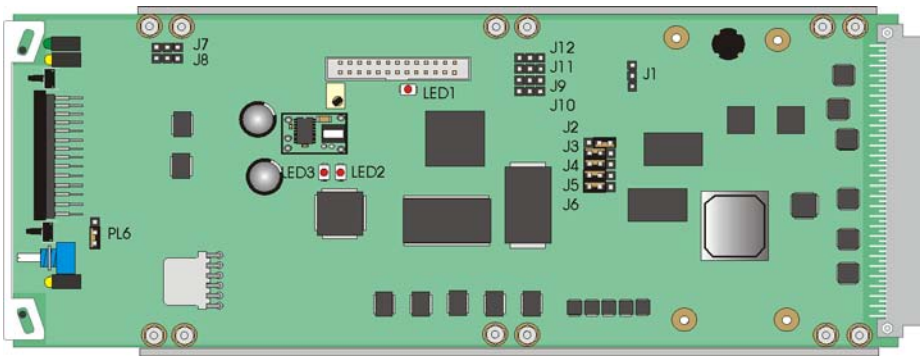
The Smart Switch 3G fits in Crystal Vision's four standard frames and can be integrated with any boards from the company's full product range. The RM53 and RM54 are the frame rear modules which in addition to the two SDI inputs main and standby, give a switched output, a fixed output and a user-selectable output that can show either inputs or a further main output. The RM54 also has relay bypass between its input 1 and output 1 which will automatically connect the programme on input 1 to the output in the unlikely event of a frame failure or should the Smart Switch 3G be removed for service.

Applications include immediate reaction to and indication of signal or transmission problems in large systems, especially in unmanned automatic playout facilities or as a simple signal probe.

2 Hardware installation

The Smart Switch 3G single height module is used with the RM53 and RM54 rear connectors, which will fit into all Crystal Vision rack frames. All modules can be connected or removed while the frame is powered, without damaging the board.

2.1 Module configuration



Smart Switch 3G

Link configuration and LEDs

There are 13 jumper links and three surface-mounted LEDs on the Smart Switch 3G. The surface-mounted LEDs are not visible from the front of the frame and are included for diagnostic purposes only.

	Comment					
J3-6	GPI control	←	422 comms	→	Ethernet comms	→
J9-12		na		na		na
J1	External reference input termination. 1-2 75R, 2-3 Hi Z					
J2	Leave in position 1-2 →					
J7 J8	Not used					
PL6	2-3 (lower) selected IP address. 1-2 (upper) forced IP address 10-0-0-201					
LED1	CPU configuration in progress					
LED2	Ethernet Data					
LED3	Ethernet Link					

Note: Links J1-12 have been factory set and should not require reconfiguring.

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 with either single or dual power supplies. The Indigo DT desk top box has a built-in power supply and will house up to two single height modules.

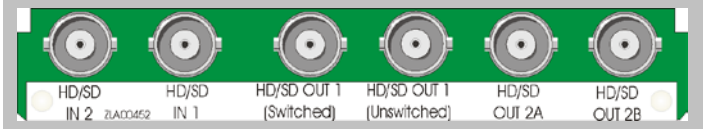
The two appropriate rear modules for the Smart Switch 3G are the RM53 and RM54. Both rear modules share the same connections. The RM54 has the added benefit of relay bypass between input 1 and output 1.

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

Rear module connections with RM53

RM53 fits in all frames	Description
	**RM53** • 24 Smart Switch 3G modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • Two per Indigo DT • All frame slots can be used

Rear module connections with RM54

RM54 fits in all frames	Description
	**RM54** • 24 Smart Switch 3G modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • Two per Indigo DT • All frame slots can be used

RM53 BNC	RM54 BNC	I/O assignment
HD/SD IN 2	**HD/SD IN 2**	Serial Digital input 2 (Aux or Standby Input)
HD/SD IN 1	**HD/SD IN 1**	Serial Digital input 1 (Main Programme Input)
HD/SD OUT 1A	**HD/SD OUT 1 (switched)**	Reclocked SDI output (Programme Out) with relay bypass protection (RM54 only)
HD/SD OUT 1B	**HD/SD OUT 1 (Unswitched)**	Reclocked SDI output (Programme Out) with no relay bypass protection
HD/SD OUT 2A	**HD/SD OUT 2A**	Reclocked SDI output (User selectable)
HD/SD OUT 2B	**HD/SD OUT 2B**	Reclocked SDI output, copy of 2A (User selectable)

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)	Notes
1	'a'	See configuration table		Held low for tally
2	'b'			Held low for tally
3	'c'	See configuration table		Held low for tally
4	'd'			Held low for tally
5	'e'	Alarm condition	Non-alarm	See alarm table
6	'f'			See alarm table

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.

The GPI inputs can be used to control input selection/routing and are configurable for either pulse or level trigged. They can also be used to give a tally of the selection/routing. When GPI control is selected to 'level' GPI = High (floating) selects Input 1 and GPI = Low (pulled to ground) selects Input 2.

The following GPI modes can be selected using Statesman, active front panel or board edge control:

Statesman label	Front panel/board edge label	Action
No control, tally only	No GPI Tally on b	No GPI control. Tally on GPI 'b' for Output 1 routing and 'd' for Output 2 routing
Level, 1 GPI	Level a Tally b	Level control on GPI 'a' for Output 1 routing and 'c' for Output 2 routing. Tally on GPI 'b' for Output 1 routing and 'd' for Output 2 routing
Pulse, 1 GPI	Edge a Tally b	Pulse (edge) control on GPI 'a' for Output 1 routing and 'c' for Output 2 routing. Tally on GPI 'b' for Output 1 routing and 'd' for Output 2 routing
Pulse, 2 GPI	Edge ab Tally ab	Pulse (edge) control on GPI 'a' & 'b' for Output 1 routing and 'c' & 'd' for Output 2 routing. Tally on 'a' & 'b' for Output 1 routing and 'c' & 'd' for Output 2 routing
Pulse, 2 GPI, no tally	Edge ab No Tally	Pulse (edge) control on GPI 'a' & 'b' for Output 1 routing and 'c' & 'd' for Output 2 routing. No tally
Pulse, 2 GPI, force	GPI Force	Pulse (edge) control on GPI 'a' & 'b' for Output 1 routing. Tally on 'a' & 'b' for Output 1 routing. GPI 'c' when held low enables "force" mode so that GPI 'a' & 'b' switch to other input, even if a fault condition exists. No GPI control or Tally for Output 2

Unless "force" mode is enabled, a GPI input switch will not occur if the input being switched to contains more significant error conditions than the current input. GPI 5 and 6 can be configured to show an alarm condition for any individual or group of error conditions. Certain reportable errors such as input missing will result in an immediate indication, whereas other lesser conditions must be present continuously for a period of time set by the user before an alarm is asserted. Where a group alarm has more than one preset time delay, an alarm will be asserted after the longest delay setting.

Reportable error conditions
Input missing
Input video different to expected
EDH Missing (SD formats only)
EDH Full Field Error (SD formats only)
EDH Active Picture Error (SD formats only)
Line CRC error (HD formats only)
Selected Audio group missing
Active Video Black for longer than set interval
Active Video Frozen for longer than set interval
Silence from any channel 1-4 of selected group for longer than set interval
Active video Black and Channel 1 silent and Channel 2 silent for longer than longest set interval
Active video Black and Channel 3 silent and Channel 4 silent for longer than longest set interval
Active video Frozen and Channel 1 silent and Channel 2 silent for longer than longest set interval
Active video Frozen and Channel 3 silent and Channel 4 silent for longer than longest set interval

4U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to one 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.
The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1amp. Remotes 5-8 are similarly protected.

2U frame GPI connections

GPI lines 'a' to 'f' of each card connect to one 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.
The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1amp.

1U frame GPI connections

GPI lines 'a' to 'f' of each card connect to one of 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.

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

Indigo DT desk top box GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to the rear remote connector 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.

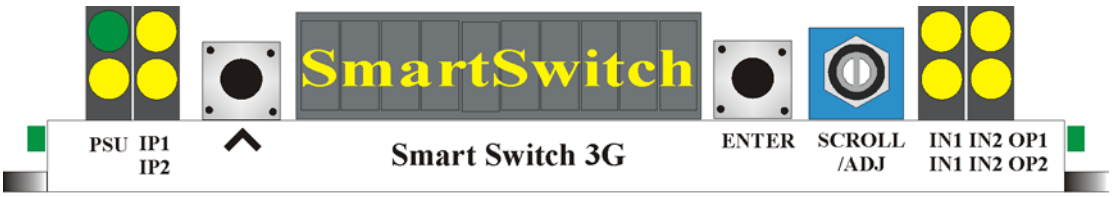
Remote 2: 26-way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15.

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

3 Card edge operation

The card front has a 10-digit display and push switches to navigate the control and status menus. LEDs are provided to give indication of power rail monitoring and the switch configuration.

3.1 Card edge controls



Smart Switch 3G card front edge view

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
IP 1	Yellow	Input 1 present	Input not present
IP 2	Yellow	Input 2 present	Input not present
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
	Yellow	Not currently supported	
IN1 OP1	Yellow	Output 1 showing input 1	
IN2 OP1	Yellow	Output 1 showing input 2	
IN1 OP2	Yellow	Output 2 showing input 1	
IN2 OP2	Yellow	Output 2 showing input 2	

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

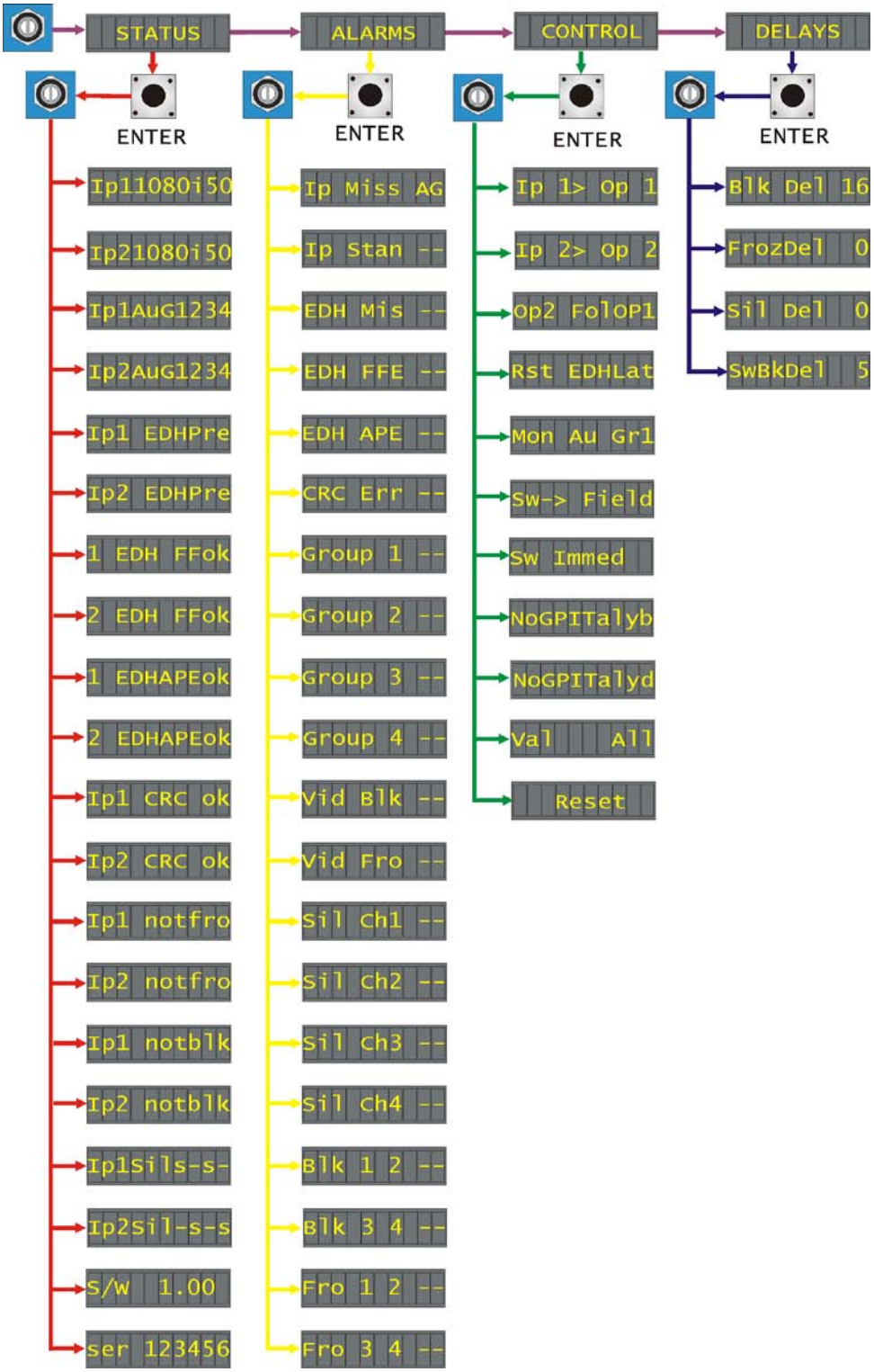
Push ENTER to action the change. The display will cease flashing

Use the up-arrow [⋀] and SCROLL control to navigate to further menus

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

3.6 Card edge configuration

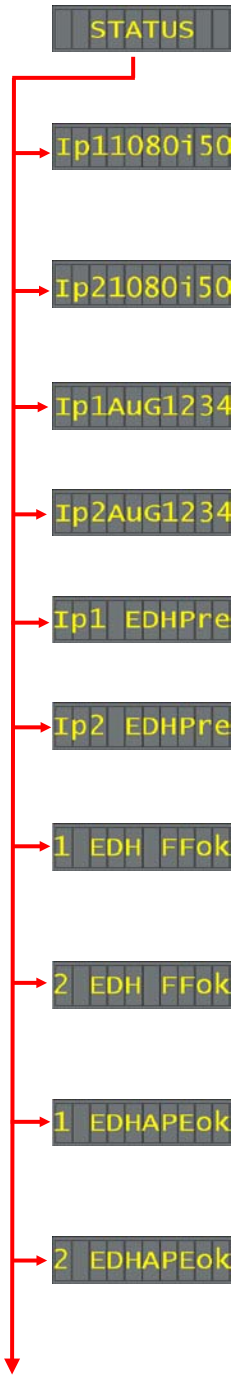
Menu tree



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 list. The following table lists in order all of the possible selections, the actual selection will depend on the input type. For a Standard Definition input the EDH messages will be displayed but not the CRC messages which are related to High Definition. Similarly with a High Definition input the CRC messages will be visible and the EDH messages will be hidden.



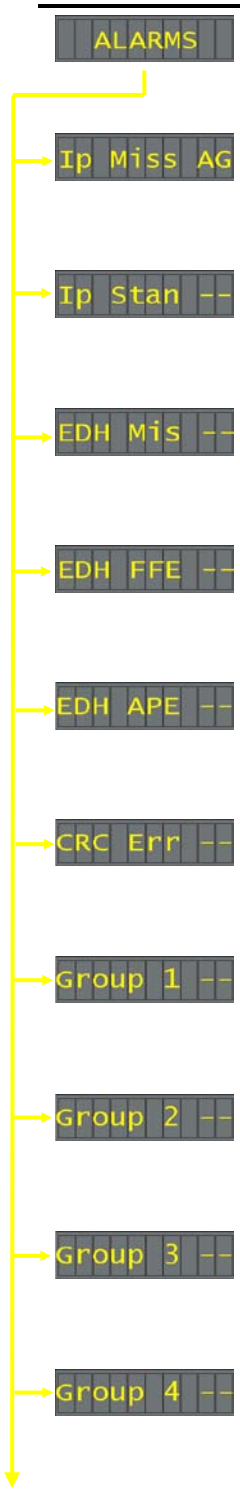
Menu	Comment
Input 1 video standard	The input 1 video standard is shown. ***1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525, Unknown, Missing.***
Input 2 video standard	The input 2 video standard is shown. ***1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525, Unknown, Missing.***
Input 1 audio groups present	Groups containing audio data present in the video on input 1. ***1234*** groups contain audio. **'-'** no audio present.
Input 2 audio groups present	Groups containing audio data present in the video on input 2. ***1234*** groups contain audio. **'-'** no audio present.
Input 1 EDH status (SD only)	The EDH status of input 1 is shown. ***Present, Missing, IP1 EDH NA.***
Input 2 EDH status (SD only)	The EDH status of input 2 is shown. ***Present, Missing, IP2 EDH NA.***
Input 1 EDH full field status (SD only)	The EDH full field status of input 1 is shown. ***Ok, Error, IP1EDHFFNA.***
Input 2 EDH full field status (SD only)	The EDH full field status of input 2 is shown. ***Ok, Error, IP2EDHFFNA.***
Input 1 EDH active picture status (SD only)	The EDH active picture status of input 1 is shown. ***Ok, Error, IP1EDHAPNA.***
Input 2 EDH active picture status (SD only)	The EDH active picture status of input 2 is shown. ***Ok, Error, IP2EDHFFNA.***

	Input 1 line CRC status (HD only)	Input 1 line CRC status is shown. ***Ok, Error, IP1 CRC NA***
	Input 2 line CRC status (HD only)	Input 2 line CRC status is shown. ***Ok, Error, IP2 CRC NA***
	Input 1 picture frozen status	Input 1 picture status. ***Not frozen, Frozen.***
	Input 2 picture frozen status	Input 2 picture status. ***Not frozen, Frozen.***
	Input 1 picture black status	Input 1 picture status. ***Not Black, Black.***
	Input 2 picture black status	Input 2 picture status. ***Not Black, Black.***
	Input 1 audio silence status	Input 1 selected group audio channels status. ***'-' audio present, 's' audio silent.***
	Input 2 audio silence status	Input 2 selected group audio channels status. ***'-' audio present, 's' audio silent.***
	Software version installed	The version number of the currently installed software.
	Electronically stored serial number	The electronically stored PCB serial number. This should correspond with the serial number label affixed to the PCB connector.

Notes: If any input is missing, all status displays related to that input will show 'input missing'.

Alarms menu

From the Status top menu rotate SCROLL to display the Alarms menu. Press ENTER to enter the Alarms menu and rotate SCROLL to show the available options. To select an option press ENTER; this will cause the display text to change from a normal font to an italic font showing the option has been selected. Each alarm has two settable selections that can be set. These are: set for switch (Auto switch) and set for alarm (GPI 6).



Menu	Comment
Input missing	Rotate the SCROLL/ADJ control to show Input Missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Selected input video standard	Rotate the SCROLL/ADJ control to show selected Input Standard. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
EDH present (SD only)	Rotate the SCROLL/ADJ control to show EDH missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
EDH full field error (SD only)	Rotate the SCROLL/ADJ control to show EDH full field error. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
EDH active picture error (SD only)	Rotate the SCROLL/ADJ control to show EDH active picture error. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Line CRC error (HD only)	Rotate the SCROLL/ADJ control to show Line CRC error. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Audio group 1 missing	Rotate the SCROLL/ADJ control to show Audio group 1 missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Audio group 2 missing	Rotate the SCROLL/ADJ control to show Audio group 2 missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Audio group 3 missing)	Rotate the SCROLL/ADJ control to show Audio group 3 missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
Audio group 4 missing	Rotate the SCROLL/ADJ control to show Audio group 4 missing. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***

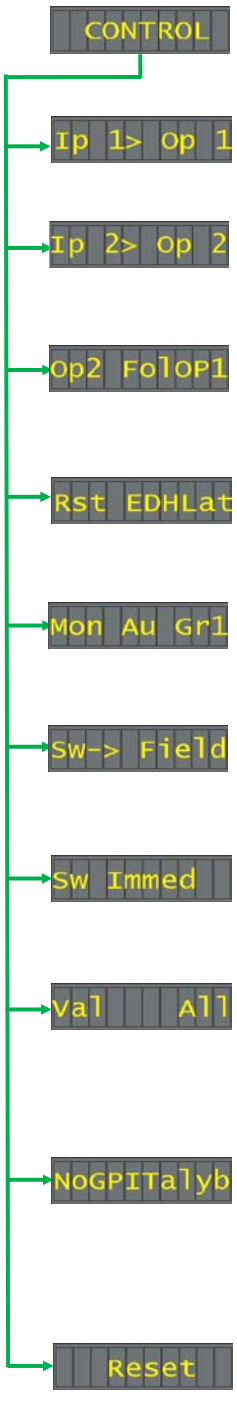
Crystal Vision		Card edge operation
	Video Black (timed)	Rotate the SCROLL/ADJ control to show Video black. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Video frozen (timed)	Rotate the SCROLL/ADJ control to show Video frozen. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Channel 1 of chosen audio group silent (timed)	Rotate the SCROLL/ADJ control to show Silence channel 1. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Channel 2 of chosen audio group silent (timed)	Rotate the SCROLL/ADJ control to show Silence channel 2. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Channel 3 of chosen audio group silent (timed)	Rotate the SCROLL/ADJ control to show Silence channel 3. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Channel 4 of chosen audio group silent (timed)	Rotate the SCROLL/ADJ control to show Silence channel 4. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Video black and channel 1 & 2 silent (timed)	Rotate the SCROLL/ADJ control to show Video black and channel 1-2 silent combination. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Video black and channel 3 & 4 silent (timed)	Rotate the SCROLL/ADJ control to show Video black and channel 3-4 silent combination. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Video frozen and channel 1 & 2 silent (timed)	Rotate the SCROLL/ADJ control to show Video frozen and channel 1-2 silent combination. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm.***
	Video frozen and channel 3 & 4 silent (timed)	Rotate the SCROLL/ADJ control to show Video frozen and channel 3-4 silent combination. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***'-' not selected. 'A' set for auto switch. 'G' set for alarm***

Notes: Video black, frozen and audio silence have individual delay controls. Combination alarms will be controlled by the individual delay that has been set to the longest time period.

Notes: All controls are common to both input 1 and input 2.

Control menu

From the Status top menu rotate SCROLL to display the CONTROL menu. Press ENTER to enter the Control menu and SCROLL to show the available options. To select an option press ENTER and rotate SCROLL to make a selection, press ENTER to fix the selection.



Menu	Comment
Output 1 selection	Rotate the SCROLL/ADJ control to show output 1 selection. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Input 1, Input 2.***
Output 2 selection	Rotate the SCROLL/ADJ control to show output 2 selection. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Input 1, Input 2.***
Output 2 routing	Rotate the SCROLL/ADJ control to show output 2 routing selection. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Not Follow OP1, Follow OP1***.
Reset EDH/CRC latch	Rotate the SCROLL/ADJ control to show Reset EDH/CRC Latch. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Reset, Reset Done***.
Audio group to be monitored	Rotate the SCROLL/ADJ control to show Monitor audio group. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Group 1, Group 2, Group 3, Group 4.***
Switching mode	Rotate the SCROLL/ADJ control to show Switching mode. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Frame, Field, Immediate.***
Switching characteristic	Rotate the SCROLL/ADJ control to show Switching characteristic. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Immediate, Delayed, Latch.***
Valid input standard selection	Rotate the SCROLL/ADJ control to show Valid input standard. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***All, 1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525.***
GPI control	Rotate the SCROLL/ADJ control to show Output A GPI control menu. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***No GPI control, tally on "b". Level on "a", tally on "b". Edge on "a", tally on "b". Edge on "a" & "b", tally on "a" & "b". Edge on "a" & "b", no tally, GPI Force***
Factory reset	Rotate the SCROLL/ADJ control to show Reset. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***Reset, Reset Done.***

Switch controls

Both outputs 1 and 2 can be routed individually to connect to either input 1 or input 2. Should an error occur on one of the outputs associated input, the output can be selected to route away from the faulty input to the remaining good input. The monitored error conditions are found in the Alarm menu.

Switching mode

The switching modes available are Frame, Field or Immediate. These switching modes are effective with either a manual switch or automatic switch. In Immediate mode the Smart Switch 3G will act immediately but this untimed 'crash' switch is likely to cause a picture disturbance. Selecting either Field or Frame under non-catastrophic error conditions will allow the Smart Switch 3G to switch away in a tidier manner, assuming that the two inputs are co-timed.

Switch back

Once a switch has taken place automatic switch back will be controlled by the switch back control. Immediate mode will allow the switch to return once the error has disappeared for a minimum of one frame. In certain circumstances this could result in the output flip-flopping between the two inputs erratically. To avoid this, the switching action can be either delayed or latched.

GPI configuration

The GPI inputs can be used to control input selection/routing and are configurable for either edge or level trigged. They can also be used to give a tally of the selection/routing. When GPI control is selected to 'level', GPI = High (floating) selects Input 1 and GPI = Low (pulled to ground) selects Input 2.

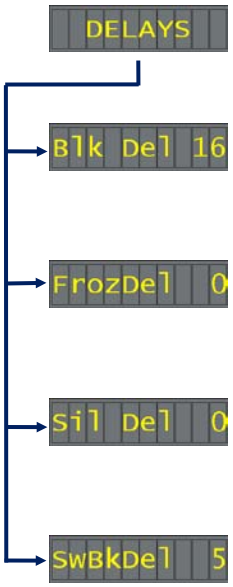
See page 7 for information on the GPI modes which can be selected.

Factory reset

Factory Reset	
Alarms	Ignore
Routing	Ip1>Op1, Ip2>Op2, Op2>Don't follow OP1
Audio Group Monitor	Group 1
Switch sync	Field
Switch back when clear	Immediate
Delays	2 seconds
Valid video format	All
GPI configuration	As set

Delay menu

From the Status top menu rotate SCROLL to display the Delay menu. Press ENTER to enter the Delay menu and rotate SCROLL to show the available options. To select an option press ENTER; this will cause the display text to change from a normal font to an italic font showing the option has been selected. Rotate SCROLL to set the required variable and press ENTER to fix the selection.



Menu	Comment
Video Black delay	Rotate the SCROLL/ADJ control to show Video Black delay. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***2-60 seconds.***
Video Frozen delay	Rotate the SCROLL/ADJ control to show Video Frozen delay. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***2-60 seconds.***
Audio Silence delay	Rotate the SCROLL/ADJ control to show Audio silence delay. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***2-60 seconds.***
Switching characteristic delay	Rotate the SCROLL/ADJ control to show Switch Back delay. Press ENTER and rotate SCROLL/ADJ to select. Press ENTER to select. ***2-60 seconds.***

4 Using the front control panel

4.1 Module selection

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 setup 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 Set up, Lock Panel and Diagnostic menus.

Selecting a Smart Switch 3G

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 Smart Switch 3G has been selected.

The Smart Switch 3G 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 Smart Switch 3G 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 Smart Switch 3G are obtained by pressing the F1-F4 keys from the Home menu. Menu keys are illuminated when active and when further menus are available.

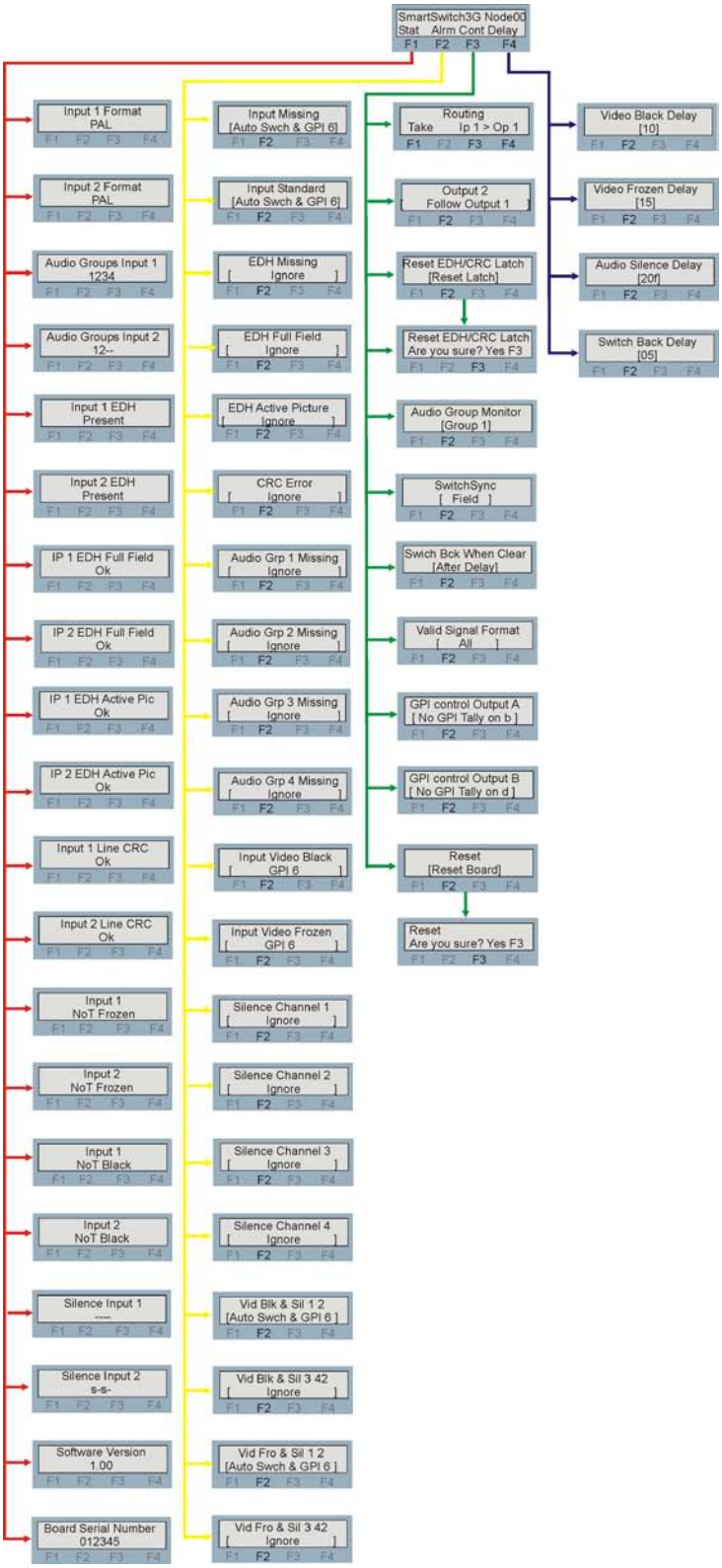
The top-level menus are:

- Status – Press F1
- Alarms (error detection and alarm selection) – Press F2
- Control (output config, audio monitoring and switch functions) – Press F3
- Delays (frozen, black and silence delay timers) – 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 [Field].

The following chart shows the available Smart Switch 3G menus. The actual menus available may vary slightly as software is updated.

Active control panel menus



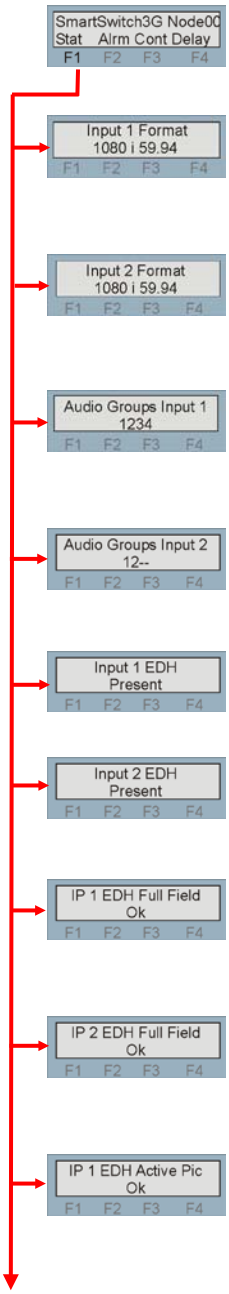
Note: Function key LEDs are illuminated when active.

The Status menu

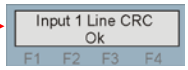
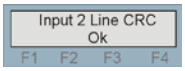
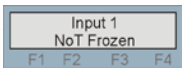
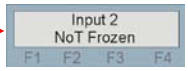
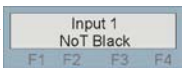
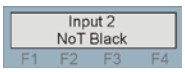
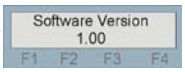
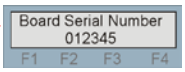
Pressing button F1 from the Home menu will enter the Status menu. This menu is traversed by rotating the shaft control. The following table lists in order all of the possible selections, the actual selection will depend on the input type. For a Standard Definition input the EDH messages will be displayed but not the CRC messages which are related to High Definition. Similarly with a High Definition input the CRC messages will be visible and the EDH messages will be hidden.

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 update the display information.



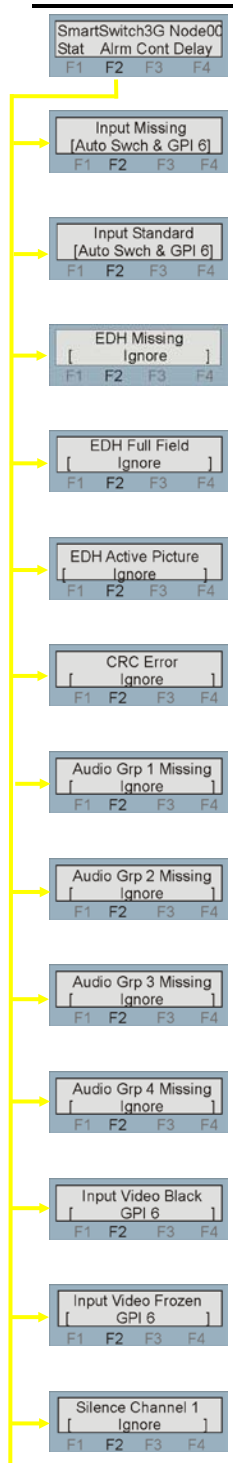
Menu	Comment
Input 1 video standard	Rotate the shaft control to view the input 1 video standard. ***1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525, Unknown, Missing.***
Input 2 video standard	Rotate the shaft control to view the input 2 video standard. ***1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525, Unknown, Missing.***
Input 1 audio groups present	Rotate the shaft control to view the groups containing audio data present in the video on input 1. ***1234*** groups contain audio. **'-'** no audio present.
Input 2 audio groups present	Rotate the shaft control to view the groups containing audio data present in the video on input 1. ***1234*** groups contain audio. **'-'** no audio present.
Input 1 EDH status (SD only)	Rotate the shaft control to view the EDH status of input 1. ***Present, Missing, N/A.***
Input 2 EDH status (SD only)	Rotate the shaft control to view the EDH status of input 2. ***Present, Missing, N/A.***
Input 1 EDH full field status (SD only)	Rotate the shaft control to view the EDH full field status of input 1. ***Ok, Error, N/A.***
Input 2 EDH full field status (SD only)	Rotate the shaft control to view the EDH full field status of input 2. ***Ok, Error, N/A.***
Input 1 EDH active picture status (SD only)	Rotate the shaft control to view the EDH active picture status of input 1. ***Ok, Error, N/A.***

	Input 2 EDH active picture status (SD only)	Rotate the shaft control to view the EDH active picture status of input 2. ***Ok, Error, N/A.***
	Input 1 line CRC status (HD only)	Rotate the shaft control to view input 1 line CRC status. ***Ok, Error, N/A.***
	Input 2 line CRC status (HD only)	Rotate the shaft control to view input 2 line CRC status. ***Ok, Error, N/A.***
	Input 1 picture frozen status	Rotate the shaft control to view input 1 picture status. ***Not frozen, Frozen.***
	Input 2 picture frozen status	Rotate the shaft control to view input 2 picture status. ***Not frozen, Frozen.***
	Input 1 picture black status	Rotate the shaft control to view input 1 picture status. ***Not Black, Black.***
	Input 2 picture black status	Rotate the shaft control to view input 2 picture status. ***Not Black, Black.***
	Input 1 audio silence status	Rotate the shaft control to view input 1 selected group audio channels status. ***'-' audio present, 's'*** audio silent**.**
	Input 2 audio silence status	Rotate the shaft control to view input 2 selected group audio channels status. ***'-' audio present, 's'*** audio silent**.**
	Software version installed	Rotate the shaft control to view the version number of the currently installed software.
	Electronically stored serial number	Rotate the shaft control to view the electronically stored PCB serial number. This should correspond with the serial number label affixed to the PCB connector.

Notes: If any input is missing all status displays related to that input will show 'input missing'.

The Alarms menu

Pressing button F2 from the Home menu will enter the Alarms menu. From this menu the auto switching and alarm reporting configurations are made. Each parameter can be set to one of four options, which are: ignore the error, auto switch away from the error, assert GPI 6 and both auto switch and assert GPI 6. All settings are made using the F2 button and shaft control.



Menu	Comment
Input missing	Rotate the shaft control to view input missing. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Input video standard	Rotate the shaft control to view input standard. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
EDH missing	Rotate the shaft control to view EDH missing. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
EDH full field error	Rotate the shaft control to view EDH full field error. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
EDH active picture error	Rotate the shaft control to view EDH active picture error. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Line CRC error	Rotate the shaft control to view line CRC error. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Audio group 1 missing	Rotate the shaft control to view Audio group 1 missing. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Audio group 2 missing	Rotate the shaft control to view Audio group 2 missing. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Audio group 3 missing	Rotate the shaft control to view Audio group 3 missing. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Audio group 4 missing	Rotate the shaft control to view Audio group 4 missing. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Input video black	Rotate the shaft control to view input video black. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Input video frozen	Rotate the shaft control to view input video frozen. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
Silence on channel 1	Rotate the shaft control to view Silence on channel 1 of the selected audio group. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***

	Silence on channel 2	Rotate the shaft control to view Silence on channel 2 of the selected audio group. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Silence on channel 3	Rotate the shaft control to view Silence on channel 3 of the selected audio group. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Silence on channel 4	Rotate the shaft control to view Silence on channel 4 of the selected audio group. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Input video black and silence on channels 1 & 2	Rotate the shaft control to view video black and channel 1 & 2 silent. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Input video black and silence on channels 3 & 4	Rotate the shaft control to view video black and channel 3 & 4 silent. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Input video frozen and silence on channels 1 & 2	Rotate the shaft control to view video frozen and channel 1 & 2 silent. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***
	Input video frozen and silence on channels 3 & 4	Rotate the shaft control to view video frozen and channel 3 & 4 silent. Press F2 to select. ***Ignore, Auto Switch, GPI 6, Auto Switch & GPI 6.***

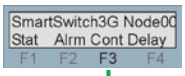
Notes: All controls are common to both input 1 and input 2.

Notes: If any input is missing all status displays related to that input will show ‘input missing’.

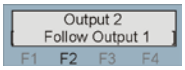
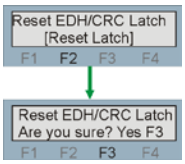
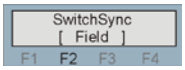
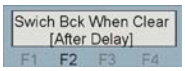
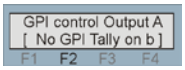
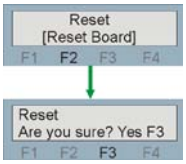
Notes: Video black, frozen and audio silence have individual delay controls. Combination alarms will be controlled by the individual delay that has been set to the longest time period.

The Control menu

Pressing button F3 from the Home menu will enter the Control menu. Signal routing, audio monitoring and switching configurations are found here. The valid signal format is also set here; this allows the Smart Switch 3G to determine if the presented video format is as expected, and to give an alarm flag should it differ. The Smart Switch 3G response to this flag can be configured in the Alarms menu. The Smart Switch 3G can also be reset to its factory defaults from this menu. Selecting factory reset will return all customer settable parameters to their default condition listed in the table at the end of the menu description.



Menu	Comment

	Input and Output 1 routing	Rotate the shaft control to view the video routing selection. F3: set the input routing. ***Ip1> Op1, Ip1>Op2, Ip2>Op1, Ip2>Op2.*** F4: set the output routing. ***Ip1> Op1, Ip1>Op2, Ip2>Op1, Ip2>Op2.*** F1: press to action routing selection.
	Output 2 routing	Rotate the shaft control to view the output 2 video routing. Press F2 to select. ***Follow Output 1, Don't follow Output 1.***
	Reset EDH/CRC latch	Rotate the shaft control to view reset. Press F2 to select. Press F3 to confirm.
	Audio group monitor selector	Rotate the shaft control to view the audio group monitor selection. Press F2 to select. ***Group 1, Group 2, Group 3, Group 4.***
	Auto switch configuration	Rotate the shaft control to view the switch synchronisation selection. Press F2 to select. ***Immediate, Field, Frame.***
	Switch back configuration	Rotate the shaft control to view the switch back when clear selection. Press F2 to select. ***Immediately, After Delay, Latch.***
	Valid video format selector	Rotate the shaft control to view the valid signal format selection. Press F2 to select. ***All, 1080p 50/59.94/60, 1080i 50/59.94/60, 720p 50/59.94/60, 625, 525.***
	GPI control	Rotate the shaft control to view the Output A GPI control selection. Press F2 to select. Rotate the shaft control to make selection. ***No GPI Tally on b, Level a Tally b, Edge a Tally b, Edge ab Tally ab, Edge ab NoTally, GPI Force.***
	Factory reset	Rotate the shaft control to view reset. Press F2 to select. Press F3 to confirm.

Switch controls

Both outputs 1 and 2 can be routed individually to connect to either input 1 or input 2. Should an error occur on one of the outputs associated input, the output can be selected to route away from the faulty input to the remaining good input. The monitored error conditions are found in the Alarm menu.

Switching mode

The switching modes available are Frame, Field or Immediate. These switching modes are effective with either a manual switch or automatic switch. In Immediate mode the Smart Switch 3G will act immediately but this untimed 'crash' switch is likely to cause a picture disturbance. Selecting either Field or Frame under non-catastrophic error conditions will allow the Smart Switch 3G to switch away in a tidier manner, assuming that the two inputs are co-timed.

Switch back

Once a switch has taken place, automatic switch back will be controlled by the switch back control. Immediate mode will allow the switch to return once the error has disappeared for at least one frame. In certain circumstances this could result in the output flip-flopping between the two inputs erratically. To avoid this, the switching action can be either delayed or latched.

GPI configuration

The GPI inputs can be used to control input selection/routing and are configurable for either edge or level trigged. They can also be used to give a tally of the selection/routing. When GPI control is selected to 'level', GPI = High (floating) selects Input 1 and GPI = Low (pulled to ground) selects Input 2.

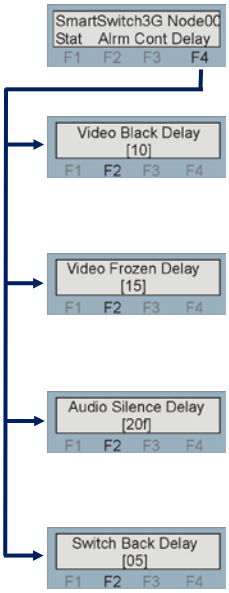
See page 7 for information on the GPI modes which can be selected.

Factory reset

Factory Reset	
Alarms	Ignore
Routing	Ip1>Op1, Ip2>Op2, Op2>Don't follow OP1
Audio Group Monitor	Group 1
Switch sync	Field
Switch back when clear	Immediate
Delays	2 seconds
Valid video format	All
GPI configuration	As set

The Delay menu

Pressing button F4 from the Home menu will enter the Delay menu where the switching and alarm delays can be set.



Menu	Comment
Input and Output 1 routing	Rotate the shaft control to view the video black delay control. Press F2 to select and rotate the shaft control to adjust. ***2-60 seconds***
Output 2 routing	Rotate the shaft control to view the video frozen delay control. Press F2 to select and rotate the shaft control to adjust. ***2-60 seconds***
Audio group monitor selector	Rotate the shaft control to view the audio silence delay control. Press F2 to select and rotate the shaft control to adjust. ***2-60 seconds***
Auto switch configuration	Rotate the shaft control to view the switch back delay control. Press F2 to select and rotate the shaft control to adjust. ***2-60 seconds***

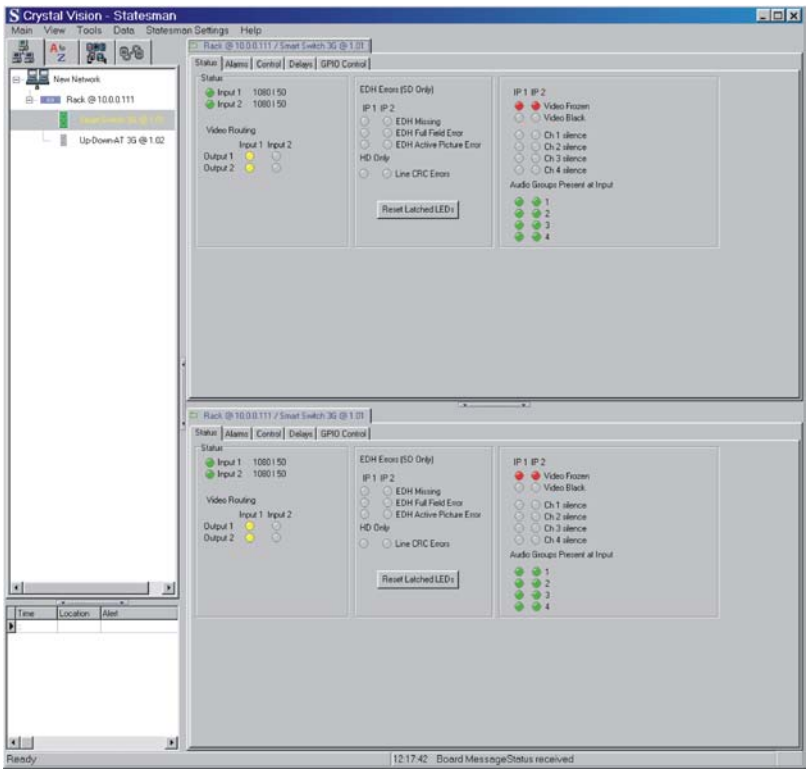
5 Statesman

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 an active control panel. Therefore an active panel must be fitted to allow for Statesman control.

5.1 Statesman operation

The initial screen 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.



The Statesman main application window

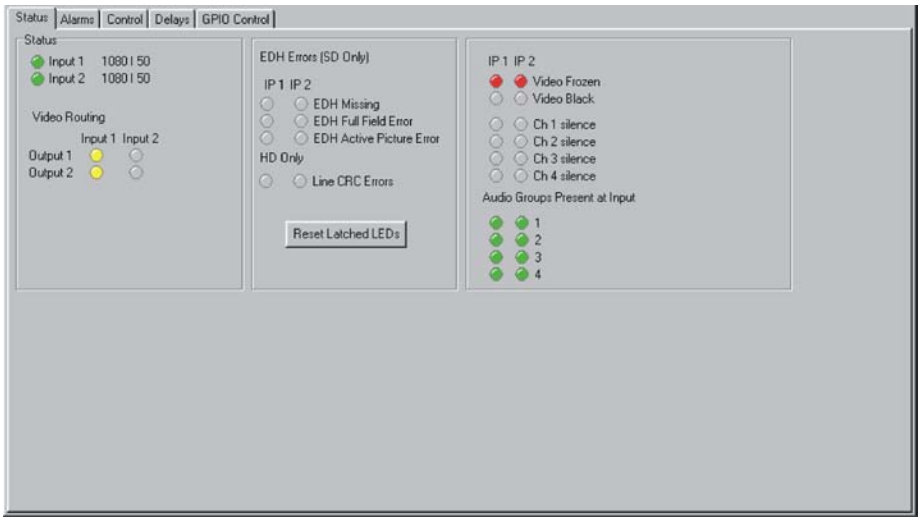
The menu display is repeated for convenience to allow dual-control display of modules with duplicate signal paths or to allow two functions to be viewed at the same time.

Smart Switch 3G has four Statesman menu tabs: one that provides status information, the second that allows configuration of the alarms and assigning the GPI output. The third tab is where the response to errors and monitoring functions are configured. The final tab is where the delays are set for Black, Frozen, Silence and switch back.

Status

The status pane is divided into three sections: Active audio groups and input status, EDH status and AV status.

Further status information is provided by the Statesman logging and alarms feature, which is described in more detail in the Statesman manual.



Smart Switch 3G Status menu

Input status and active audio groups

A quick view is given of the input format and routing. The Input Present indicators will illuminate green when a valid input is present or red if the input is missing. The video standard is automatically detected and is shown textually. The output routing is also given.

The four simulated LEDs show which audio groups are active within the serial digital video inputs on both input 1 and input 2.

EDH and CRC error status

For an SD input, EDH Missing, EDH Full Field Error and Active Picture Errors are monitored. Status is represented by LED indicators that change colour to show an error condition. EDH Full Field Error and Active Picture Error also have a latched indicator to show if a transitory error has occurred. If the Full Field Error rate exceeds ten errors per second the EDH Error Rate LED will also illuminate.

For an HD input the line CRC is monitored and any error will generate an alarm condition.

For an error in both EDH and CRC the relevant LEDs will latch to show an error has occurred. Any error indication can be cleared by pressing the Reset Latched LEDs button.

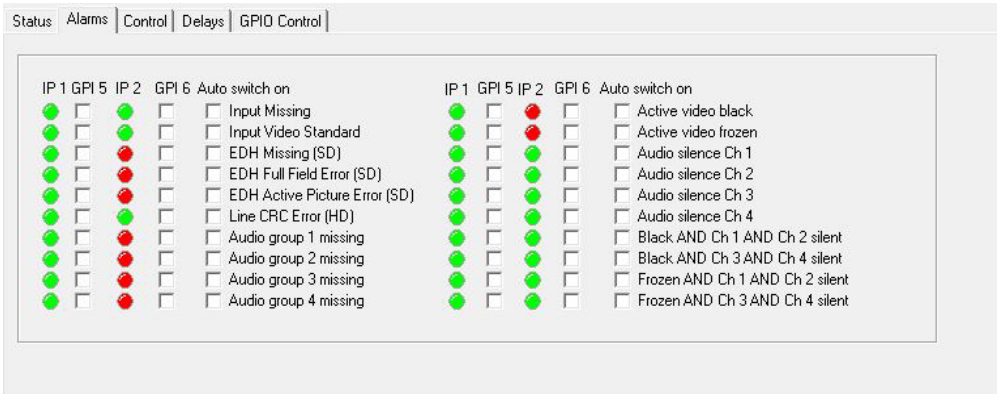
Audio/Video Signal status

If a black or frozen picture is present for longer than the set delay their respective LEDs will also be lit.

Channel silence for the selected group is also indicated by the silence LEDs illuminating yellow; again time before illumination will depend on the silence delay setting.

Alarms

The Alarms menu allows the configuring of the GPIs and Auto switch on for Input Missing, Video Black, Video Frozen and Audio Silence.



Auto Switch

The switching criteria are listed in order of priority – the highest priority being loss of input. Should an error occur in the main programme switching, the main programme output to the aux/standby input can only occur if any errors in the aux/standby input are of a lesser priority.

Ticking the appropriate check boxes configures the switching criteria. Any number of criteria may be selected by ticking multiple boxes.

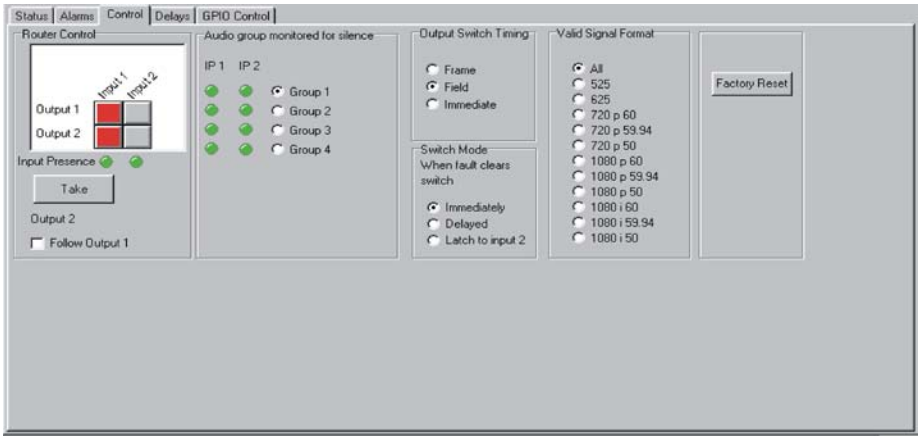
GPI Output Alarm Assignment

Smart Switch 3G has two assignable GPI outputs: GPI 5 for Input 1 and GPI 6 for Input 2. These GPIs will be asserted whenever a monitored error is encountered on the inputs.

GPI 5 and 6 are assigned by ticking the check box associated with each parameter. Any number of available parameters can be assigned to the GPI by ticking multiple check boxes.

Control

The Control menu is used to set the video signal routing, switching criteria and audio monitor. There is also a factory reset button which will return all user adjustable settings to their factory default condition.



Smart Switch 3G Control menu

Routing control

The 2 x 2 Router Control provides manual adjustment to the input/output assignment. The Take button confirms any change made to the routing. The routing to output 2 can be set to follow output 1 by selecting the Follow output 1 check box. If the routing is changed using an external method (e.g. GPI), the Router Control shows the last routing request made from Statesman in dark red.

Audio group monitor selector

The audio group to be monitored for silence is set by checking the selected radio button. The presence of an audio group within the input video is indicated by simulated LEDs. Both inputs have individual group present LEDs although the silence detectors are common to the same group within both inputs.

Switch controls

The switching mode is configured by adding a check mark to the appropriate switch panel radio button.

In Immediate mode Smart Switch 3G will act immediately on any error conditions that meet the switching criteria set up in the Alarms menu. An immediate switch will likely cause a picture disturbance as it will be an untimed crash switch. This would normally result from a loss of timing from say a loss of input.

Other selections are Field and Frame. Selecting either of these under non-catastrophic error conditions will allow the Smart Switch 3G to switch away from the main input in a more tidy manner, assuming the two inputs are co-timed.

Once Smart Switch 3G has switched away from the faulty input, setting the switch back to Immediate mode will allow it to return once the error has disappeared for a minimum of one frame. In certain circumstances this could result in the output flip-flopping between the main

programme input and aux/standby input erratically. To avoid this, the switching action can be either delayed or latched so that, once switched, the output will remain in the switched state until a timing period has expired (set by the switch back delay timer control or reset). Should the main input become error-free Smart Switch 3G will then automatically switch away from the aux/standby input unless in the latched condition. If the switch mode is set to latched, the output will remain showing the aux/standby source unless the routing configuration is returned to its original state. In the latched condition an error on the aux/standby source would also cause the Smart Switch 3G to auto switch assuming the main input is once again error-free.

Valid Signal Control

The Smart Switch 3G can be configured to switch on different input standards. Once the Valid Signal Formats have been selected by the user, any other standard present on input 1 can trigger an automatic switch to input 2 when “Auto Switch on Input Video Standard” is enabled.

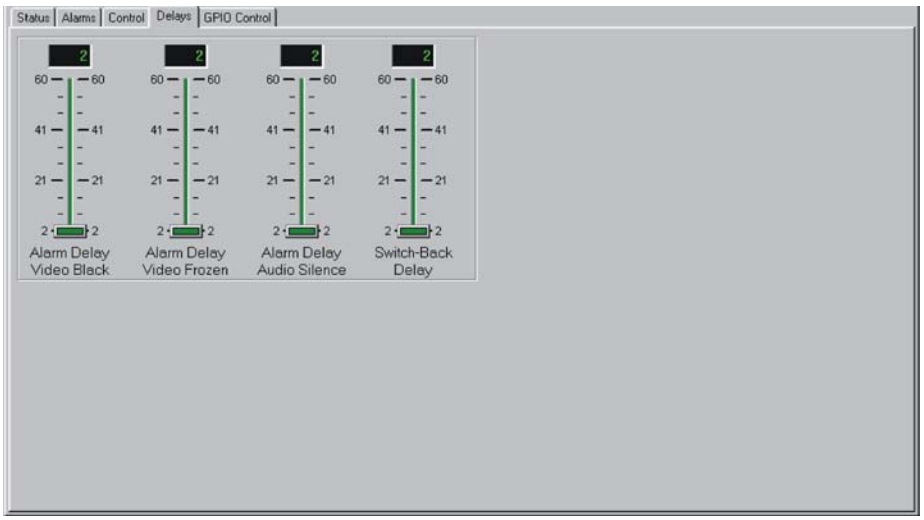
Factory reset

The Smart Switch 3G can also be reset to its factory defaults from this menu. Selecting factory reset will return all customer settable parameters to their default condition as listed in the following table.

Factory Reset	
Alarms	Ignore
Routing	Ip1>Op1, Ip2>Op2, Op2>Don’t follow OP1
Audio Group Monitor	Group 1
Switch sync	Field
Switch back when clear	Immediate
Delays	2 seconds
Valid video format	All
GPI configuration	As set

Delays

The Delay menu allows the setting of the video and audio switching delays.



Smart Switch 3G delays menu

Setting delay

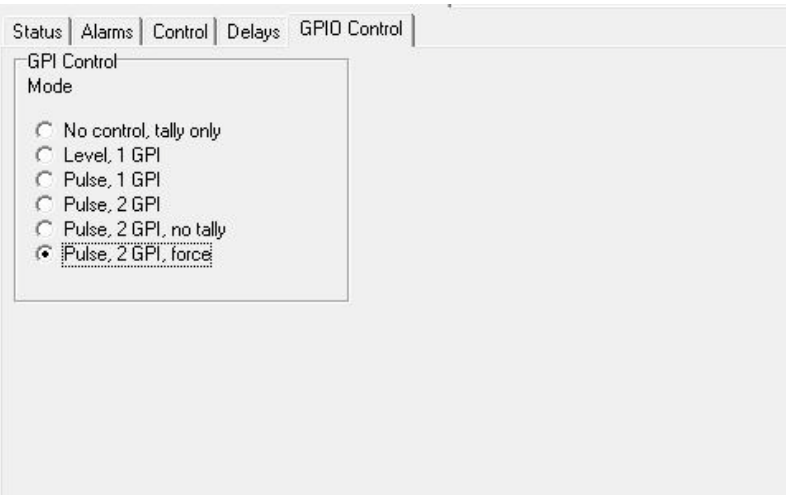
The four sliders labelled Alarm Delay Video Black, Alarm Delay Video Frozen, Alarm Delay Audio Silence and Switch-Back Delay may be adjusted to obtain a delay of 2 - 60 seconds.

The variable assigned is always shown in the top line of the slider display. It is not possible to assign a delay beyond the range indicated by the slider. If a value less than the minimum or greater than the maximum is assigned, the slider will automatically jump to the minimum or maximum value.

The delay controls may be set in several different ways. The slide can be clicked and dragged, the numerical display may be edited, or a click on a position on the scale will cause the slider to jump to the value associated with the position that was clicked.

GPI control

The GPI control tab allows the versatile GPI I/O to be configured for the required application. See section 2.3 for further information about GPIs.



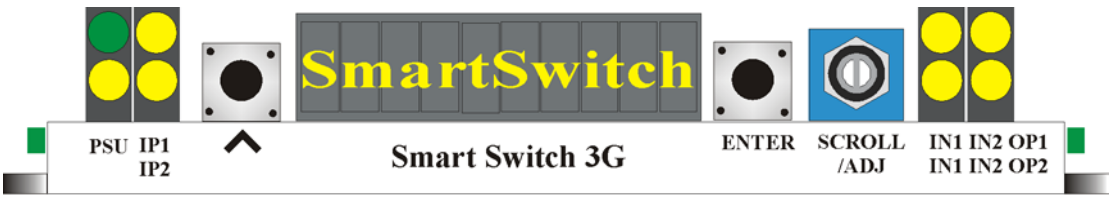
GPI configuration

The GPI inputs can be used to control input selection/routing and are configurable for either edge or level trigged. They can also be used to give a tally of the selection/routing. When GPI control is selected to 'level', GPI = High (floating) selects Input 1 and GPI = Low (pulled to ground) selects Input 2.

See page 7 for information on the GPI modes which can be selected.

6 Trouble shooting

The card edge may be used to perform simple trouble shooting. The Statesman PC control system can be used for more comprehensive trouble shooting.



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

Name	LED Colour	Function when ON	Function when Off
IP 1	Yellow	Input 1 present	Input not present
IP 2	Yellow	Input 2 present	Input not present
PSU	Green	Good power supply (PSU) rails	One or more of the monitor supplies is out of specification
	Yellow	Not currently supported	
IN1 OP1	Yellow	Output 1 showing input 1	
IN2 OP1	Yellow	Output 1 showing input 2	
IN1 OP2	Yellow	Output 2 showing input 1	
IN2 OP2	Yellow	Output 2 showing input 2	

Basic fault finding guide

The Power 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 is present and that any cabling is intact

The video output exhibits jitter

Check that the input signal stability is within normal limits and that the maximum cable length has not been exceeded

The card no longer responds to card edge or remote controller

Check that the card is seated correctly and that the Power OK LED is lit

Check any active control panel cabling

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

If necessary reset the card by simply removing it from the rack whilst powered and re-inserting it after a few seconds. It is safe to re-insert the card whilst the rack is powered

Check that the remote/local lever is correctly set for the mode of operation

7 Specification

General

Dimensions	100mm x 266mm module with DIN 41612 connector
Weight	155g
Power consumption	11 W

Inputs

Video	HD or SD SDI 270 Mb/s to 2.970 Gb/s serial digital compliant to EBU 3267-E, SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
	Cable equalisation:
	3G (2.970Gb/s) – 80 metres, Belden 1694 or equivalent
	HD (1.485Gb/s) – 140 metres, Belden 1694 or equivalent
	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, PAL, NTSC.

Outputs

Number and type:	Three (two of output 1 and one of output 2) HD or SD SDI 270 Mb/s to 2.970 Gb/s serial digital compliant to EBU 3267-E, SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Jitter	Meets the above SMPTE specs

Processing

Video	Monitoring for black, frozen, EDH and CRC error on both input 1 and input 2
Audio	Four channel silence monitors assignable to any single audio group on both inputs
GPIs	One output alarm is available which is user-configurable
	Five GPI inputs configurable for input selection/routing

Status and monitoring

Card edge visual monitoring, with 10 digit dot matrix display and LED indicators to indicate:

PSU rails present, inputs present and output routing