

# Crystal Vision

## SAFE SWITCH 3G

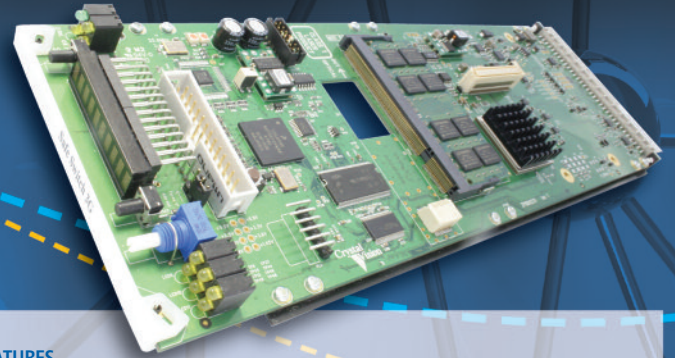
### 3G/HD/SD clean and intelligent 2 x 2 switch

Safe Switch 3G is the way to guarantee a clean switch – and protect your output.

It provides clean and intelligent 2 x 2 switching between two 3Gb/s, HD or SD sources containing up to four groups of embedded audio, with the full framestore synchroniser on each input allowing it to correct for *any* timing difference (big or small) between the two inputs – resulting in no disruption to the output picture when a switch takes place.

Ideal for planned maintenance switches to manually re-route a good signal around broken equipment, it can also be used as an intelligent emergency transmission switch by engineers who do not want to restrict themselves to timed inputs, with the option of selecting from 16 different fault conditions to automatically trigger the switch.

With the ability to deal with any type of timing issues, Safe Switch 3G gives you a clean switch that can survive even the most catastrophic failure. It can even lose the reference signal and not affect the output. Your viewers will never know there's a problem.



#### THE MAIN FEATURES

- Clean and intelligent 2 x 2 switch, available in two versions (as Safe Switch 3G and Safe Switch-L 3G)
- Switch any source: works with 3Gb/s, HD and SD
- Switch it manually: ideal for planned maintenance switches to manually re-route a good signal around broken equipment
- Switch it automatically: can be used as intelligent emergency transmission switch
- Get no disruption to the output picture when a switch takes place: a full framestore synchroniser on each input means it can correct for any timing difference between the two inputs
- Get the functionality of three products on one board: replaces a switch and two synchronisers (saving you money and rack space)
- Use any existing timing signals with cross-locking: 3Gb/s, HD or SD inputs can be referenced to either HD tri-level syncs or SD Black and Burst analogue reference
- No problem if you lose your reference: will change its timing smoothly between the reference and the inputs, keeping the output valid at all times
- Compensate for mistimed sources elsewhere in the system: with full vertical and horizontal timing adjustment (0-1 frame)
- Select from 16 different fault conditions to automatically trigger a switch, and monitor any number of parameters in any combination – will work to most significant fault when deciding which input to select
- Fault conditions are input missing, input video standard incorrect, EDH missing, EDH full field error, EDH active picture error, line CRC error, audio group 1 missing, audio group 2 missing, audio group 3 missing, audio group 4 missing, active video black, active video frozen (including processed frozen picture detection) and audio silence on any channel in a selected group
- Avoid false alarming: set a time period of between two and 120 seconds before the video black, video frozen and audio silence parameters trigger a switch
- Choose how to switch back: either reselect the main feed automatically (after your chosen time period) or by user intervention
- Discover faults that need fixing: set up two fault indications with their own list of chosen parameters and get very flexible monitoring
- Choose your preferred input using a 2 x 2 routing grid – symmetrical switch with no pre-assigned main and secondary feeds
- Optional integrated fibre output connectivity means you won't be limited by cable lengths
- Prevent signal loss: relay bypass protection on power failure or board removal for extra peace of mind
- Save rack space: 100mm x 266mm module allows 12 Safe Switch 3G in 2U (24 in 4U, six in 1U and two in desk top box), while the 'double decker' 100mm x 266mm module allows six Safe Switch-L 3G in 2U (12 in 4U, three in 1U and one in desk top box)
- Flexible control and monitoring options: select from board edge, front and remote panels, SNMP, GPIs and PC software
- Exceptional GPIs functionality: six or 12 bi-directional GPIs can be configured as either GPI inputs or GPI outputs

## WHY DO YOU NEED A SAFE SWITCH?

Continuity of service is vital and it's crucial you don't go off air. This is why Safe Switch 3G is ideal for use on the final output stage of a transmission system, before the signal gets to the MPEG encoder.

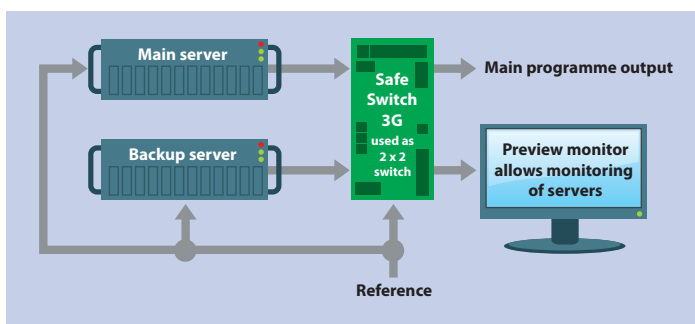
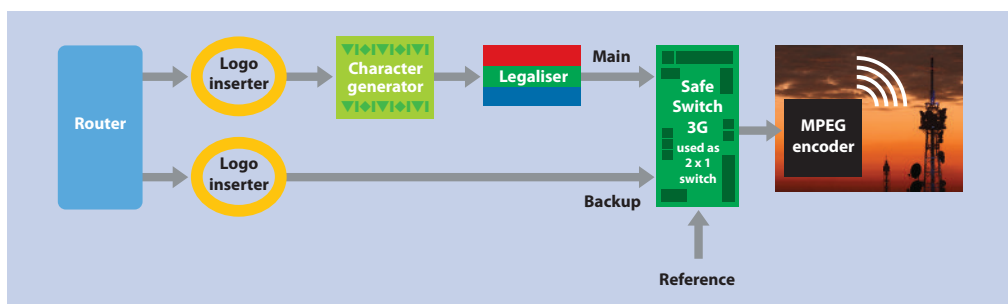
Typically the main programme path goes through various 'boxes' before going into a 2 x 1 switch. The second input of the switch is fed the backup signal – often the same material but gone a more simplified route.

If something goes wrong on the main programme path you can switch to backup, but the issue is that there will be a delay because the backup has gone through less 'boxes'.

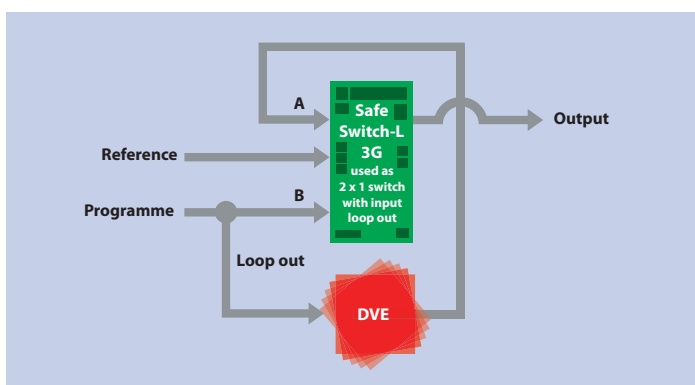
This time difference between the main and backup signals upsets the MPEG encoder. With the MPEG encoder only transmitting differences between one frame and the next, the consequence of a sudden jump in timing is that the excessive information generated by the disrupted stream causes the MPEG encoder to reach its bandwidth limit and fall over. One frame glitch on the input to the MPEG encoder could lead to up to 15 frames of corrupted video coming out of it.

To balance the delays between the main and backup feeds you could of course use three boards – a switch and two synchronisers – but Crystal Vision saves you space and money by doing it all on one board: Safe Switch 3G.

Safe Switch 3G is a 2 x 2 switch and you could use the second output to feed a backup redundant MPEG encoder, or your second output could go a completely different route to the transmitter after the MPEG encoder – such as via a microwave link, with the other feed going via fibre.



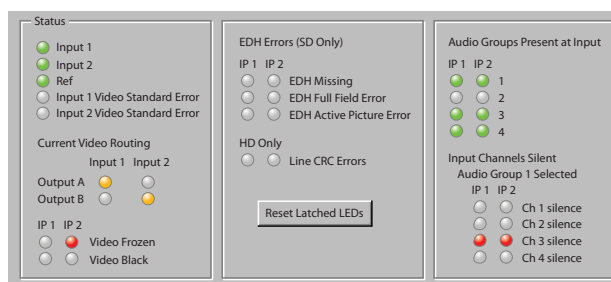
Another application could be to switch between the main and backup of a server system. Here the second output could be fed to a preview monitor for monitoring the servers.



You could also use the Safe Switch-L 3G with its input loop-throughs to dynamically bypass an individual piece of equipment – such as a DVE that you don't want to be in your signal path all the time.

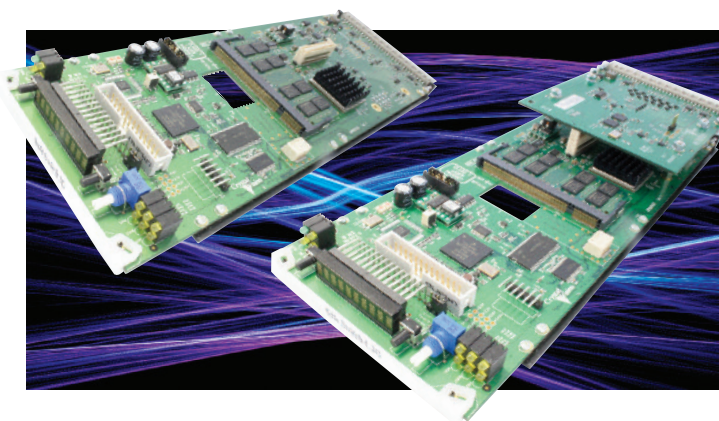
Sometimes you need to switch to backup in non-emergency situations – when one of the 'boxes' in the chain needs fixing or updating and you want to ignore the path that the box is in.

For all these applications Safe Switch 3G will provide the most robust solution possible.



See the status of your inputs and outputs at a glance

## TWO VERSIONS



Safe Switch 3G is available in two versions to suit differing requirements.

The Safe Switch 3G version is a single slot module which provides the two inputs, two feeds of output A, one feed of output B and an analogue reference connection. It can also include fibre output connectivity when used with an appropriate frame rear module.

Safe Switch-L 3G is the 'double decker' version which additionally provides a second feed of output B (potentially saving you a distribution

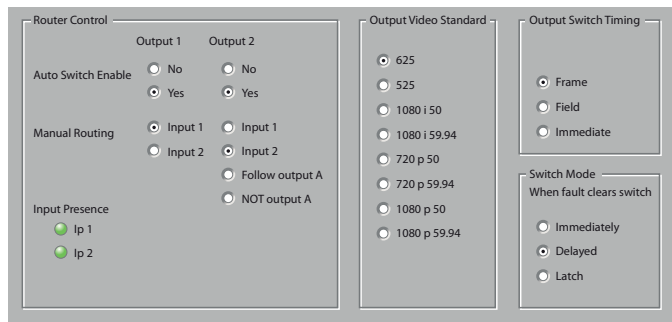
amplifier in your system), input and reference loop-throughs, and extra GPI connections. The input loop-throughs make it easy to monitor that the source has successfully reached the Safe Switch-L 3G, while the reference loop-through allows you to loop the analogue reference through a number of boards in a single frame – saving a DA and making cabling easy.

Have a look at the comparison chart to help you decide which version you need.

## SWITCH IT MANUALLY OR AUTOMATICALLY

Safe Switch 3G can either be switched manually or automatically – making it equally suited to planned maintenance switches or emergency transmission applications.

Manual switching takes place according to the setting of the switch timing control. Automatic switching will occur at the switching point given in SMPTE RP168:2009 when the switch timing is set to 'Field' or 'Frame', or immediately if triggered by the input missing or input video standard fault conditions.



Set up your switching options

There's no underlying preference for either input. Being a symmetrical switch means you can select your preferred input by means of a 2 x 2 routing grid, rather than having pre-assigned main and secondary feeds.

Each of the two inputs can be switched to either or both of the two outputs, with up to two relocked feeds of each switched signal available.

There are lots of switching options available. For example, Output B can be configured to be the opposite of Output A, making B a preview that will always show what will be transmitted on a change of switch allowing you to easily swap to a good secondary feed. Output B can be requested to be the same as Output A – like a 2 x 1 switch with more outputs.

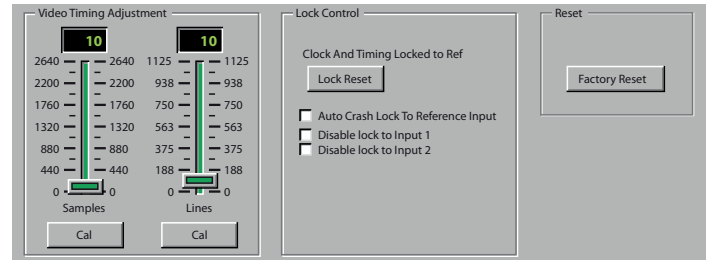
## HOW TO GET A REALLY CLEAN SWITCH

With Safe Switch 3G you never have to worry about a difference in timing between your main and backup feeds – you are always going to get a clean and seamless switch.

The synchroniser in each input stream will ensure that both inputs to the switch are correctly timed to the external analogue reference so that there is no disruption during a switch. Safe Switch 3G synchronises sources between 0 and 1 frame. The synchronisers act as a self-adjusting delay, allowing a clean transition between the two channels even if their relative timing has slipped.

It is easy to compensate for mistimed sources elsewhere in the system by adjusting the output timing relative to the reference through an entire frame using horizontal and vertical settings.

Cross-locking allows a 3Gb/s, HD or SD input to be referenced to either HD tri-level syncs or SD Black and Burst – allowing the convenient use of any existing timing signals.



Compensate for mistimed sources elsewhere in the system

## LOSS OF REFERENCE PROTECTION

Loss of reference protection – where Safe Switch 3G will change its timing smoothly between the reference and the inputs, keeping the output valid at all times – is an unusual and technically-advanced feature which further extends the board's primary purpose of protecting the output from any disruption.

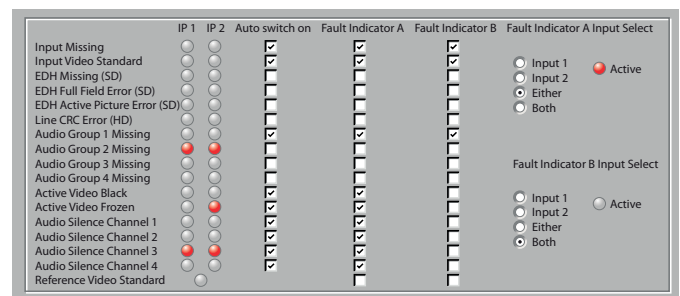
In normal operation the output timing is derived from the reference. If the reference is lost, Safe Switch 3G will switch to input 1 or (if not available or subsequently lost) input 2 as an alternative clock source, changing to the same sample/line/frame rate as the input without disrupting the output video. If the signal input is genlocked to the reference the output will be unchanged, while if not locked to the reference the output data rate will change smoothly, slowly drifting relative to the reference and remaining in spec at all times.

If the reference returns, the board will gently drift from the input source to line up with the reference over a period of time – again without disrupting the output signal.

## INTELLIGENT AUTOMATIC SWITCHING – SELECT FROM 16 FAULT CONDITIONS

Safe Switch 3G constantly checks both of the inputs so that the output of the switch always remains proper and valid.

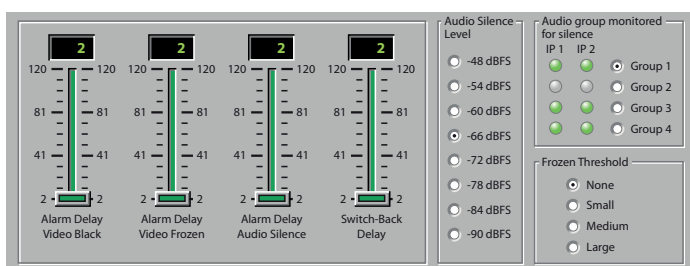
It can be set to automatically switch away from the user-selected input if it does not meet the set requirements. It extracts information about various parts of the video signal to decide which of the two inputs is better, based on the engineer's selection of which faults are significant.



Select from 16 video and audio parameters to auto-trigger a switch

The 16 video and audio parameters which can be selected to perform a switch, and which are listed in order of priority, are input missing, input video standard incorrect, EDH missing, EDH full field error, EDH active picture error, line CRC error, audio group 1 missing, audio group 2 missing, audio group 3 missing, audio group 4 missing, active video black, active video frozen (including processed frozen picture detection) and audio silence on any channel in a selected group. Audio silence level settings can be selected from -48dBFS, -54dBFS, -60dBFS, -66dBFS, -72dBFS, -78dBFS, -84dBFS and -90dBFS. With some processes – such as video compression or converting to analogue and back – introducing small changes frame-to-frame even if the input picture is frozen, the processed frozen picture detection feature allows Safe Switch 3G to intelligently distinguish between this noise and real changes in the picture content – and so correctly flag up an error condition and auto switch.

Further flexibility comes from the option to set a time period of between two and 120 seconds before the video black, video frozen and audio silence parameters trigger a switch.



Prevent false alarming: set a delay before a switch is triggered

Safe Switch 3G will switch away from an error on the user-selected input only if the other input is free of that fault. If both inputs have different alarms, it will use the most significant alarm to decide which feed to select. It works down the list, checking everything that has been chosen by the engineer as being of interest. As long as it does not find an error on the selected input without a corresponding error on the non-selected input, it stays with the selected input. If it finds such an error it switches to the other input.

Following a switch it can either reselect the main feed automatically (with the option to set a time period for which the signal must be good before switching back) or by user intervention.

Safe Switch 3G will additionally report the reference video standard.

## EASY TO MONITOR FOR ANY FAULTS

In addition to the automatic switching, two fault indications can also be set and assigned to GPIs if desired, allowing very flexible monitoring.

These fault indications are very useful, whatever type of switching you are doing. If Safe Switch 3G is set to manual switching, the fault indications will tell you that you should switch. If Safe Switch 3G is set to auto switching, the fault indications will inform you of the faults that need fixing – otherwise the board could just switch without you knowing why.

The fault indications each have their own list of chosen parameters which can be different from the auto switch selection. Each fault indication can be assigned to a specific input, to either input, or to only become active if both inputs show a selected fault. For example, you could monitor for audio silence on your main channel and get a separate indication if both channels freeze.

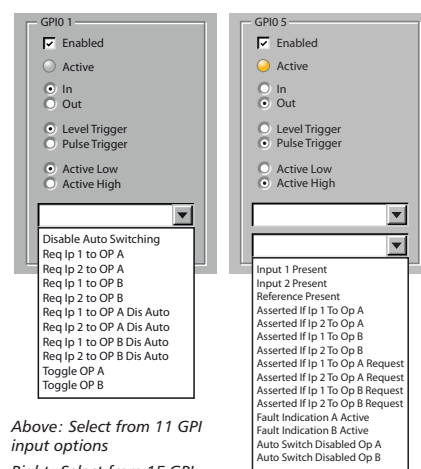
## FIBRE OUTPUT CONNECTIVITY – ON THE BOARD

It's easy to give Safe Switch 3G integrated fibre output connectivity by ordering the FOP fibre output option – and still only use a single frame slot. Perfect if you're using the switch as the last point on the output of a studio and need to send the signal over a long distance to the central router or station transmission output.

Designed for SMPTE 297-2006 short-haul applications the FOP uses a Class I laser and transmits an optical output. Having the fibre output integral to the board reduces the need to use up additional rack space for separate fibre optic transmitters – as well as saving you money.

## CHOOSE YOUR CONTROL – WITH THE MOST FLEXIBLE GPIs

The Statesman PC control software can be used to either ignore or create an alarm on any of the features that Safe Switch 3G can measure. Up to eight Statesman menu tabs provide status information, configuration of the switching characteristics, video timing adjustments, selection of the auto switch criteria, alarm monitoring and configuration of the GPIs.



Above: Select from 11 GPI input options

Right: Select from 15 GPI output options

Safe Switch 3G has exceptional GPIs flexibility – ideal for GPI-focused broadcasters who want to have direct control of the board. The six GPIs on the Safe Switch 3G and 12 GPIs on the Safe Switch-L 3G are all bi-directional, allowing them to be configured as either GPI inputs or GPI outputs and so giving you real flexibility when setting up buttons and lights for GPI control and monitoring of alarm conditions. (See the SPECIFICATION on page six for full list of GPI configuration options.) On the Safe Switch-L 3G all 12 GPIs are available via the 26-way high density D-Type on the rear module, as well as the rear of the frame.

Other control options include board edge switches, an active front panel on the frame, a remote control panel and SNMP.

## FRAMES, REAR MODULES – AND RELAY BYPASS PROTECTION

Safe Switch 3G and Safe Switch-L 3G are both space-saving 100mm x 266mm modules which can be housed alongside any other products in the standard Crystal Vision frames – available in 4U, 2U, 1U and desk top box sizes. Up to 12 Safe Switch 3G modules or six of the 'double decker' Safe Switch-L 3G can fit in a 2U frame.

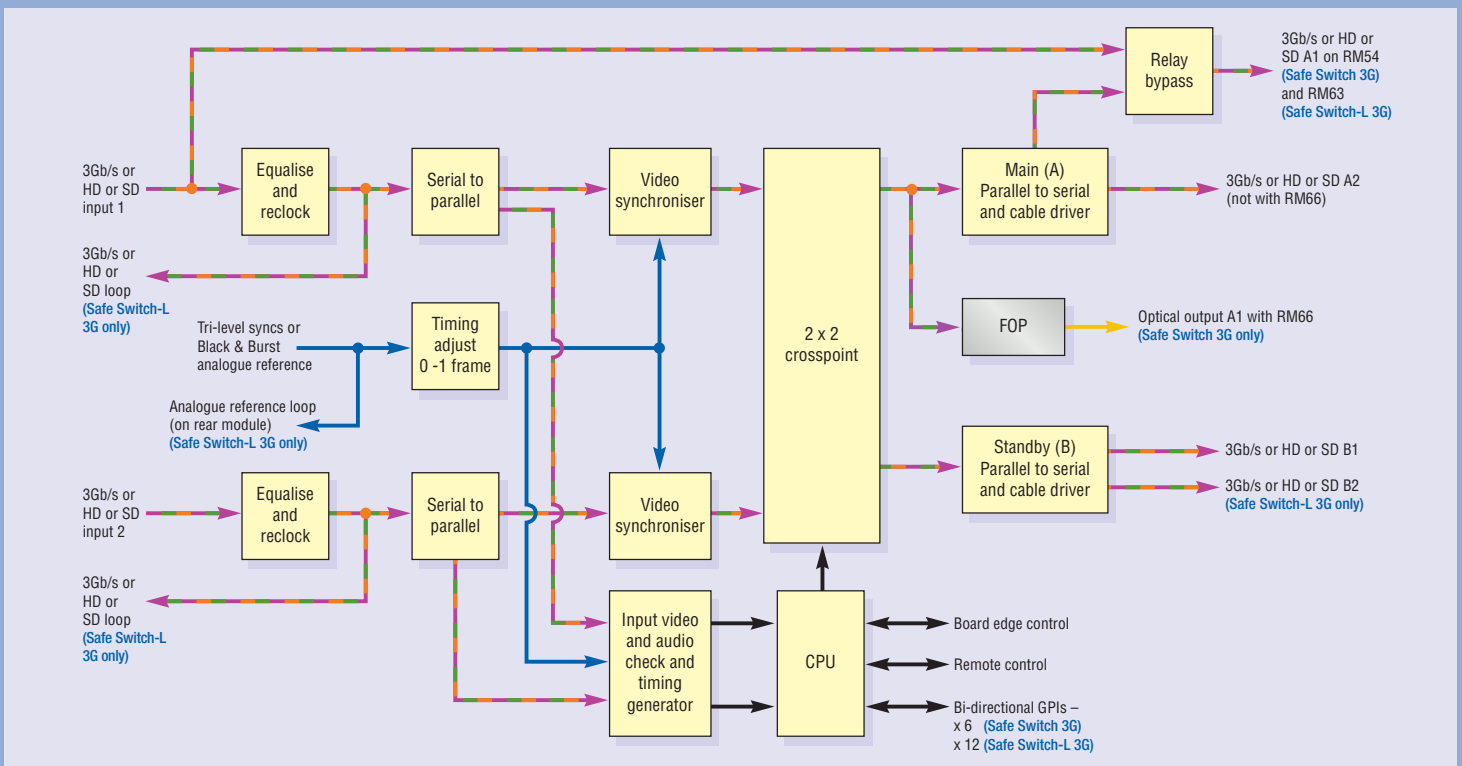
To access the inputs and outputs, Safe Switch 3G is used with either the RM54 frame rear module for standard applications or the RM66 for fibre output applications, while Safe Switch-L 3G is used with the RM63.

The RM54 and RM63 rear modules include relay bypass protection on power failure or board removal, giving the system an extra layer of security and preventing signal loss.

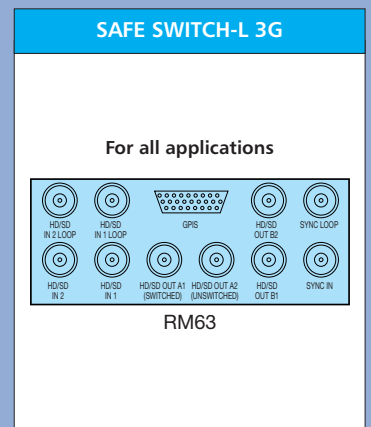
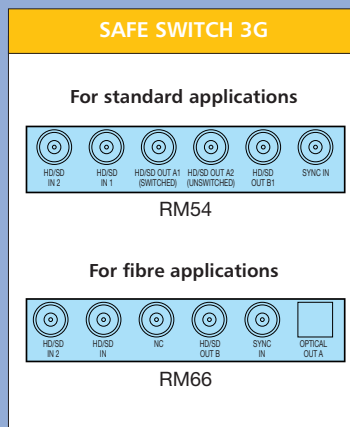
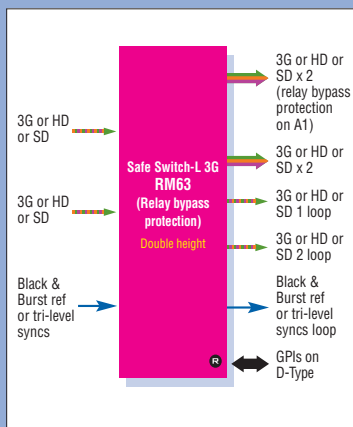
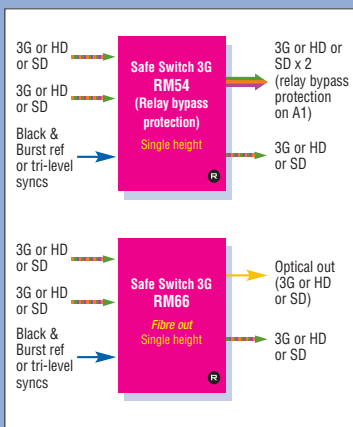
## WHICH SAFE SWITCH DO YOU NEED?

FEATURE	SAFE SWITCH 3G	SAFE SWITCH-L 3G
Input formats	625, 525, 720p50, 720p59.94, 1080i50, 1080i59.94, 1080p50 and 1080p59.94	625, 525, 720p50, 720p59.94, 1080i50, 1080i59.94, 1080p50 and 1080p59.94
Number of inputs	2	2
Input loop-throughs		2
Feeds of main output signal	2 with RM54 and 1 (optical) with RM66	2
Feeds of standby output signal	1	2
Reference loop-through		●
Integrated fibre output connectivity	●	
Automatic and manual switching	●	●
Full framestore synchroniser on each input for disruption-free output	●	●
Loss of reference protection	●	●
Output timing adjustments	●	●
16 fault parameters to auto-trigger switch	●	●
Two configurable fault indicators	●	●
Relay bypass protection	● (with RM54)	●
Number of bi-directional GPIs	6	12
Rear modules used	RM54 or RM66	RM63
Boards in 2U	12	6

## THE INPUTS AND OUTPUTS



## REAR MODULE CONNECTIONS



## SPECIFICATION

### MECHANICAL

Safe Switch 3G: Standard Crystal Vision module 266mm x 100mm

Safe Switch-L 3G: 'Double decker' Crystal Vision module 266mm x 100mm (uses two frame slots)

Weight: 180g (Safe Switch 3G); 250g (Safe Switch-L 3G)

Power consumption: 11.9 Watts (Safe Switch 3G); 16.4 Watts (Safe Switch-L 3G)

### VIDEO INPUTS

Two 3Gb/s, HD or SD inputs

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to EBU 3267-E, SMPTE 259M, SMPTE 292M and SMPTE 424M

The video formats supported are 625, 525, 720p50, 720p59.94, 1080i50, 1080i59.94, 1080p50 and 1080p59.94

3Gb/s cable equalisation up to 80m using Belden 1694A. HD cable equalisation up to 140m with Belden 1694A or equivalent (approx. 100m with Belden 8281). SD cable equalisation >200m Belden 8281 or equivalent

Input return loss: -15dB for 50MHz to 1.5GHz and -10dB for 1.5GHz to 3GHz

Auto 50/59.94 and video format selection

Symmetrical switch which allows the user to select the 'preferred' input by means of a 2 x 2 routing grid. The input selected manually will be connected to the output unless it has a higher priority user-indicated error than the unselected input.

### VIDEO OUTPUTS

Safe Switch 3G: Two independent ports with two feeds of the main output and one feed of the standby output using RM54 frame rear module, or one optical feed of the main output and one electrical feed of the standby output using RM66 Safe Switch-L 3G: Two independent ports with two feeds of the main output and two feeds of the standby output using RM63 rear module

Safe Switch-L 3G: One equalised and relocked loop-through of each input

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to EBU 3267-E, SMPTE 259M, SMPTE 292M and SMPTE 424M.

Output follows the input format

Output B can be requested to be the same as Output A

Output B can be requested to be the opposite of Output A, making B a preview

### INTEGRATED FIBRE OUTPUT OPTION (SAFE SWITCH 3G ONLY)

Safe Switch 3G can be given integrated fibre output connectivity by fitting the FOP fibre output option. The FOP should be fitted at the factory

To access the optical output an RM66 frame rear module must be used

When fitted with a FOP, Safe Switch 3G can be housed in any frame slot position but due to its extra height it is not possible to place Standard Definition or audio boards directly above it when the Safe Switch 3G is in even numbered slot positions. 3Gb/s and HD boards do not share this restriction

FOP meets the SMPTE 297-2006 short-haul specification, allowing operation with single-mode and multi-mode fibre

Connector type: SC/PC

Optical power: Max -0.0dBm, min -5.0dBm (typical -2.0dBm or 630uW)

Fibre pigtail: Single-mode 8/125uM

Optical wavelength: 1290-1330nm (1310 typical)

Extinction ratio: 7.5dB

Laser safety classification: Class 1 (EN 60825), Class 1 (21CFR1040.10)

### RELAY BYPASS PROTECTION

The RM54 and RM63 frame rear modules provide relay bypass protection. An electromechanical relay switch needs power to hold the switch in one state and will revert to the other state (board bypass) on loss of power. It prevents signal loss by mechanically connecting the switch's main input to its main output 1 on complete frame power failure or board removal

### ANALOGUE REFERENCE

Tri-level syncs or analogue Black and Burst or video

3Gb/s, HD or SD source can use either type of reference

When cross-locking it is necessary for both the video input and reference to share the same frame rate

Amplitude of syncs 150mV to 600mV

Link on PCB selects 75 ohm termination or high impedance

Safe Switch-L 3G: Reference rear module loop-through available on RM63 – loop does not need Safe Switch-L 3G to be fitted as rear module has the passive circuitry required

### TIMING ADJUSTMENTS

The framestore synchroniser in each input stream will ensure that both inputs to the switch are correctly timed to the external analogue reference so that there is no disruption during a switch

The synchronisers are intended to allow for inputs that are frequency-locked to the reference even if they are not co-timed

The synchronisation will occur solely at the start of frame point (the SAV of the switching line)

Safe Switch 3G will automatically synchronise sources between 0 and 1 frame

The timing can be fully adjusted using horizontal and vertical settings. Increasing the vertical setting will delay the output relative to the reference in increments of one line. Increasing the horizontal setting will increase this delay in increments of approx. 74ns for SD, 13.5ns for HD and 6.7ns for 3G. The output timing can be adjusted through an entire frame relative to the reference

### LOSS OF REFERENCE PROTECTION

With loss of reference protection, Safe Switch 3G will change its timing smoothly between the reference and the inputs, keeping the output valid at all times

In normal operation the output timing is derived from the reference

If the reference is lost, Safe Switch 3G will switch to input 1 or (if not available or subsequently lost) input 2 as an alternative clock source, changing to the same sample/line/frame rate as the input without disrupting the output video. If the signal input is genlocked to the reference, the output will be unchanged. If not locked to the reference, the output data rate will change smoothly, slowly drifting relative to the reference and remaining in spec at all times. To avoid disruption the output timing is not changed to match the signal input

If the reference returns, the board will gently drift from the input source to line up with the reference over a period of time without disrupting the output signal

If neither input 1 nor 2 can be relied upon, the 'crash lock to reference when reapplied' control allows Safe Switch 3G to hard lock to the reference when it is present. If neither input 1 nor 2 is available as an alternative reference source, Safe Switch 3G will freerun on loss of reference. If the reference is then reapplied, Safe Switch 3G will stay in freerun mode until a hard lock to reference occurs

### DELAY THROUGH BOARD

The minimum delay through the board is approximately 2500 samples, roughly 1 line in HD/3G and 3 lines in SD. The actual delay on any signal path will depend on the respective input/output timing and the delay/timing control values

### SWITCHING

Safe Switch 3G can be switched manually or automatically. Manual switching takes place either immediately or at the switching point described below, according to the setting of the switch timing control

Automatic switching will occur at the switching point given in SMPTE RP168:2009 when the switch timing is set to 'Field' or 'Frame', or immediately if triggered by the input missing or input video standard fault conditions

Safe Switch 3G will not switch away from the user-selected source if it detects that the secondary source contains an error with equal or higher priority rating than the error detected on the user-selected source

Safe Switch 3G can be set to switch back automatically or by user intervention

Automatically: the board will switch back if the original input returns to a valid state. A programmable delay of between two and 120 seconds can be added to ensure the previously faulty input remains good for the selected time period

User intervention: if the board auto switches away from a faulty input it will stay on the new selection until the routing is changed by the user, or the new input becomes faulty

### SIGNAL CHECKS

Safe Switch 3G performs checks on the following parameters (listed in order of priority) which can trigger an automatic switch or activate the GPI outputs, with the user able to select a number of parameters in any combination:

- Input missing: Based on correctly positioned valid sync words in the data stream. If a valid input is not present then an alarm will be raised
- Input video standard incorrect: If a specific video standard is selected, then an input of a different standard will be treated as an error condition
- EDH missing (SD only): No EDH packets
- EDH Full Field error (SD only): Received EDH value does not match the data
- EDH Active Picture error (SD only): Received EDH value does not match the data
- Line CRC error (3G/HD only): Received CRC value does not match the data
- Audio group 1 missing: If embedded audio group 1 is missing, an alarm is triggered
- Audio group 2 missing: If embedded audio group 2 is missing, an alarm is triggered
- Audio group 3 missing: If embedded audio group 3 is missing, an alarm is triggered
- Audio group 4 missing: If embedded audio group 4 is missing, an alarm is triggered
- Active video black: If all the luma samples within the active picture area are less than 13mV from nominal black value then an alarm will be triggered. The period of time for which the picture must remain black can be set from 2 to 120 seconds. The entire active picture must be continuously black for the full period – a single non-black sample restarts the delay period
- Active video frozen: An active picture checksum is calculated, and if it remains unchanged then the video is considered to be frozen and an alarm condition will be set. The period of time for which the picture must remain frozen can be set from 2 to 120 seconds. The entire active picture must be continuously frozen for the full period – a single non-frozen frame restarts the delay period. An adjustable

threshold allows detection of frozen images that have passed through analogue links, or processing that introduces small frame-to-frame variations

- Audio silence (channels 1, 2, 3 or 4): A separate audio level check is performed for each of the four channels in the selected group. The audio silence level setting can be selected from -48dBFS, -54dBFS, -60dBFS, -66dBFS, -72dBFS, -78dBFS, -84dBFS and -90dBFS. If the audio signal level falls below the selected level for a period of time from 2 to 120 seconds, then an alarm is triggered. All four channels share the same silence time setting. The audio on the channels must be continuously silent for the full period – a single non-silent sample restarts the delay period

Safe Switch 3G will also check the reference video standard

### FAULT CONDITIONS

Two fault indications – Fault Indicator A and Fault Indicator B – can also be set and assigned to Statesman LEDs or GPIs

The fault indications each have their own list of chosen parameters which can be different from the auto switch selection (see SIGNAL CHECKS section for list of parameters). Each fault indication can be assigned to a specific input, to either input, or to only become active if both inputs show a selected fault (select from input 1, input 2, either or both)

### LED INDICATION OF:

Power supplies okay

Reference valid

Input 1 standard HD or SD, or Input 1 missing (two LEDs)

Input 2 standard HD or SD, or Input 2 missing (two LEDs)

Output A source routing

Output B source routing

### GPI INPUT LEVELS

Active pull to ground, pulled up to 5V through 4700 ohm

### GPI OUTPUT LEVELS

Electrically: Open collector transistors 30V, 270 ohm current limit resistors. Pulled up to 5V through 4700 ohm

### GPI INPUTS AND OUTPUTS

Safe Switch 3G: Six bi-directional GPIs (available through the frame GPI connectors)

Safe Switch-L 3G: 12 bi-directional GPIs (available through the frame GPI connections for the two slots and also on the top board D-Type connection)

GPIs are software selectable as either inputs or outputs as required. The polarity of the GPI (active high or low) and pulse or level operation can also be configured for each individual GPI. An output configured for pulse operation will produce a pulse each time the corresponding status value changes state

Controls are provided to allow the following GPI functions, which can be allocated to any GPI connection:

### GPI used as input:

Disables auto switching on selected output

Sets manual routing selection as input 1 to output A

Sets manual routing selection as input 2 to output A

Sets manual routing selection as input 1 to output B

Sets manual routing selection as input 2 to output B

Forces input 1 to output A and disables auto switching on output A

Forces input 2 to output A and disables auto switching on output A

Forces input 1 to output B and disables auto switching on output B

Forces input 2 to output B and disables auto switching on output B

Changes output A to the other input

Changes output B to the other input

### GPI used as output:

Asserted if input 1 present

Asserted if input 2 present

Asserted if reference present

Asserted if output A routed to input 1

Asserted if output A routed to input 2

Asserted if output B routed to input 1

Asserted if output B routed to input 2

Asserted if output A selected to input 1 (even if routed to input 2 by auto-switch or force)

Asserted if output A selected to input 2 (even if routed to input 1 by auto-switch or force)

Asserted if output B selected to input 1 (even if routed to input 2 by auto-switch or force)

Asserted if output B selected to input 2 (even if routed to input 1 by auto-switch or force)

Asserted if fault indication A is active

Asserted if fault indication B is active

Asserted if auto switching is disabled on output A

Asserted if auto switching is disabled on output B

### LOCAL CONTROL

Intuitive board edge interface with two select buttons, shaft encoder and ten character alphanumeric display

### REMOTE CONTROL

RS422/485

19200 baud, 8 bits, 1 stop no parity

Control from frame active front panel and remote panel

Statesman allows control and status monitoring from any PC on a network. Statesman can be configured to ignore or create an alarm on any of the switching criteria by ticking the appropriate check boxes

SNMP monitoring and control available as a frame option

## ORDERING INFORMATION

Safe Switch 3G	3G/HD/SD clean and intelligent 2 x 2 switch
Safe Switch-L 3G	3G/HD/SD clean and intelligent 2 x 2 switch, with additional outputs and GPIs
FOP	Fibre output option for Safe Switch 3G motherboard providing integrated fibre output connectivity
Indigo 4	4U frame with passive front panel for up to 24 Crystal Vision modules
Indigo 4SE	4U frame with passive front panel fitted with Statesman CPU for up to 24 Crystal Vision modules
Indigo 2	2U frame with passive front panel for up to 12 Crystal Vision modules
Indigo 2AE	2U frame with active front panel for up to 12 Crystal Vision modules
Indigo 2SE	2U frame with passive front panel fitted with Statesman CPU for up to 12 Crystal Vision modules
Indigo 1	1U frame with passive front panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1-DP
Indigo 1AE	1U frame with active front panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1AE-DP
Indigo 1SE	1U frame with passive front panel fitted with Statesman CPU for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1SE-DP
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTSE	Desk top box with passive front panel fitted with Statesman CPU for up to two Crystal Vision modules
RM54	Single slot frame rear module used for Safe Switch 3G. Allows maximum number of boards in frame (24 in 4U, 12 in 2U, six in 1U, two in desk top box). Provides relay bypass protection. Gives access to two 3Gb/s, HD or SD inputs with two outputs of the main signal and one output of the standby
RM63	Two slot frame rear module used for Safe Switch-L 3G. Allows 12 boards in 4U, six in 2U, three in 1U and one in desk top box. Provides relay bypass protection. Gives access to two 3Gb/s, HD or SD inputs with two outputs of the main signal, two outputs of the standby, input and reference loop-throughs and GPI connections
RM66	Single slot frame rear module used for Safe Switch 3G. Allows maximum number of boards in frame (24 in 4U, 12 in 2U, six in 1U, two in desk top box). Designed for applications using fibre output. Gives access to two 3Gb/s, HD or SD inputs with one optical output of the main signal and one electrical output of the standby
REMIND	19" remote control panel
REMIND-E	19" Ethernet remote control panel
Statesman	PC Control System
SNMP	SNMP monitoring and control

Performance and features are subject to change. Figures given are typical measured values. SAFESWITCH3G1011