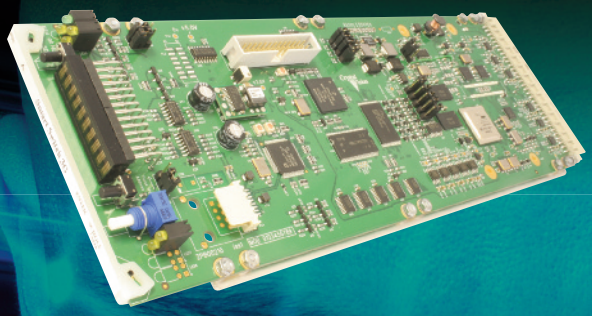
Crystal Vision

SMART 3G SWITCH



3G/HD/SD intelligent 2 x 2 switch

Smart Switch 3G is ideal for securing the video output in systems that demand high reliability. It provides intelligent 2 x 2 switching to a backup signal source by monitoring two 3Gb/s, HD or SD video inputs with up to four groups of embedded audio, and switching between the sources if a specified fault condition arises – no matter how subtle the fault.

Smart Switch 3G 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. It features an unrivalled number of switching criteria, with the monitoring of 20 video and audio parameters on both the primary and standby inputs – and with any number of these parameters able to be selected. Smart Switch 3G is used with the VisionWeb web browser control or Statesman Lite PC software to select the switching criteria. One GPI can be configured using VisionWeb or Statesman Lite to show an alarm condition for any individual or group of error conditions.

The parameters which can be selected to create an alarm and perform a switch, and which are listed in order of priority, are input missing, input video standard incorrect, video frozen, video black, various EDH errors (SD only), line CRC error (HD only), audio group 1 missing, audio group 2 missing, audio group 3 missing, audio group 4 missing and silence on a specific audio channel. There are also four special 'combined conditions' parameters which only flag an error if all the conditions are met simultaneously. Further flexibility comes from the option to set a time period of between 2 and 60 seconds before the video black, video frozen and audio silence parameters trigger a switch.

Smart Switch 3G will switch away from an error on the main input only if the backup is free of that fault, while should the main and standby inputs have different alarms set Smart Switch 3G will work to the most significant feature to decide which feed to select. 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.

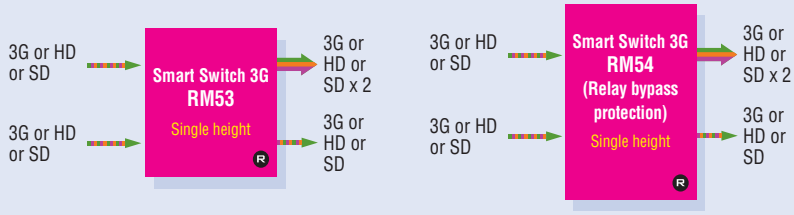
Smart Switch 3G can also be switched manually, either immediately or in the vertical blanking period to enable a cleaner switch, with it taking timing information from input 2 to determine the correct time to switch.

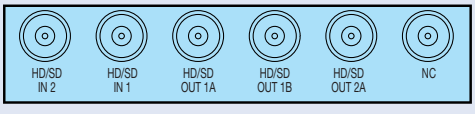
Smart Switch 3G combines intelligence with space-saving benefits, with this 100mm x 266mm module fitting in Crystal Vision's standard frames which allows easy integration with any other products from the range. The inputs and outputs are accessed by using the RM53 and RM54 frame rear modules, which give two outputs of the main signal and one output of the standby. The RM54 includes relay bypass protection for the main feed on power failure or board removal, giving your system that extra layer of security and preventing signal loss. Control can be from board edge switches, an integrated front panel on the AE frames, the VisionPanel remote control panel, GPIs, SNMP, the Statesman Lite PC software and the VisionWeb web browser control.

If you need immediate reaction to large system signal problems or you want peace of mind for your unmanned automatic playout facility, Smart Switch 3G is a product you can trust to keep you on air.

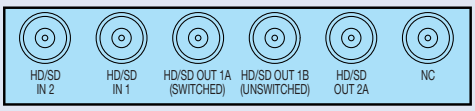
- Intelligent 2 x 2 switch which works with 3Gb/s, HD and SD
- Monitors two video inputs with up to four groups of embedded audio – can switch between sources if specified fault condition arises (and standby is free of that fault)
- Select from 20 different parameters to trigger a switch, and choose to monitor any number of parameters in any combination
- Will work to the most significant feature to decide which input to select, with error priority rating
- Relay bypass protection available on RM54 rear module for that extra peace of mind
- Space-saving: 100mm x 266mm module allows 12 Smart Switch 3G in 2U (six in 1U and two in desk top box)
- Flexible control and monitoring options, including board edge, front and remote panels, SNMP, GPIs, PC software or web browser

REAR MODULE CONNECTIONS

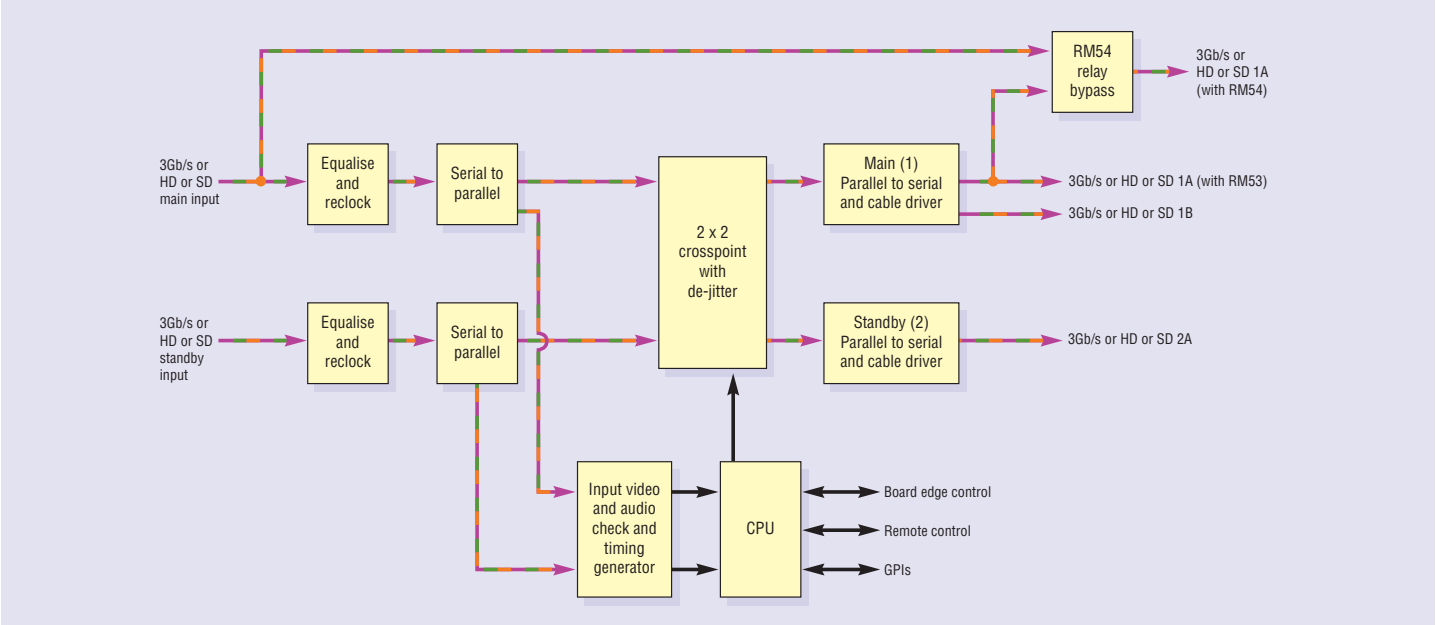




RM53



RM54



SPECIFICATION

MECHANICAL
Standard Crystal Vision module 266mm x 100mm
Weight: 155g
Power consumption: 11 Watts

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, 720p60, 1080i50, 1080i59.94, 1080i60, 1080p50, 1080p59.94 and 1080p60
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 >250m Belden 8281 or equivalent
Input return loss: -15dB for 50MHz to 1.5GHz
Auto 50/59.94/60Hz and video format selection

VIDEO OUTPUTS
Two independent ports with two outputs of the main input and one output of the standby using RM53 and RM54 frame rear modules
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.
The RM54 frame rear module provides 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 Smart Switch 3G's main input to its main output 1 on complete frame power failure or board removal

DELAY THROUGH BOARD
10us max

SIGNAL CHECKS
Smart Switch 3G performs checks on the following parameters (listed in order of priority) which can trigger an automatic switch or activate the GPI output, 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 (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 60 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 60 seconds. The entire active picture must be continuously frozen for the full period – a single non-frozen frame restarts the delay period
* 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. If the audio signal level falls below -56dBFs for a period of time from 2 to 60 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
* Active video black AND channel 1 silent AND channel 2 silent: A logical combination of conditions, which only flag an error if all the conditions are met simultaneously
* Active video black AND channel 3 silent AND channel 4 silent: Only flags an error if all the conditions are met simultaneously
* Active video frozen AND channel 1 silent AND channel 2 silent: Only flags an error if all the conditions are met simultaneously
* Active video frozen AND channel 3 silent AND channel 4 silent: Only flags an error if all the conditions are met simultaneously

SWITCHING
The switch timing can be either immediate or timed and will apply to both outputs
Timed switching as defined in SMPTE RP168-2002 or immediate switching if primary input is faulty and standby is free of that fault. 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
A timed switch will occur in the correct time period according to the reference input (input 2 if valid)
Smart 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 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 an invalid input it will stay on the new selection until the routing is changed by the user, or the new input becomes invalid

LED INDICATION OF:
Power supplies
Configuration progress
Input 1 valid
Input 2 valid
Main output source
Aux output source

GPI INPUT LEVELS
Active pull to ground, pulled up to +5V through 4700 ohm

GPI OUTPUT LEVELS
Electrically: Open collector transistors 48V, 270 ohm current limit resistors. Pulled up to +5V through 6800 ohm

GPI INPUTS
Five GPI inputs
Used to control input selection/routing, plus tally out
GPI control allows for direct connection to lamps and switches or to an automation system

GPI OUTPUTS
One GPI output
Will be asserted whenever a monitored error is encountered on either of the inputs
Can be configured to show an alarm condition for any individual or group of error conditions by ticking check boxes on VisionWeb or Statesman Lite

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

REMOTE CONTROL
Control from integrated control panel on AE frames and remote panel
Statesman Lite allows control from any PC on a network
VisionWeb Control is available via the web server on the frame and allows operation using a standard web browser on a PC or tablet
SNMP monitoring and control available as a frame option

ORDERING INFORMATION

Smart Switch 3G	3G/HD/SD intelligent 2 x 2 routing switch
Indigo 2AE	2U frame with active front panel featuring smart CPU and integrated control panel for up to 12 Crystal Vision modules
Indigo 2SE	2U frame with active front panel featuring smart CPU for up to 12 Crystal Vision modules
Indigo 1AE	1U frame with active front panel featuring smart CPU and integrated control panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1AE-DP
Indigo 1SE	1U frame with active front panel featuring smart 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 active front panel featuring smart CPU for up to two Crystal Vision modules
RM53	Single slot frame rear module. Allows maximum number of Smart Switch 3G in frame (12 in 2U, six in 1U, two in desk top box). Gives access to two 3Gb/s, HD or SD inputs (main and standby) with two outputs of the main signal and one output of the standby
RM54	Allows maximum number of Smart Switch 3G in frame (12 in 2U, six in 1U, two in desk top box). Provides relay bypass protection of the input. Gives access to two 3Gb/s, HD or SD inputs (main and standby) with two outputs of the main signal and one output of the standby
VisionPanel	3U Ethernet remote control panel with touch screen
VisionWeb Control	VisionWeb web browser control included within frame software
Statesman Lite	PC Control System
SNMP	SNMP monitoring and control

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