Crystal Vision

SAFIRE 3

3G/HD/SD chroma keyer

Why do broadcasters choose the Safire 3 real-time chroma keyer?

Broadcast engineers select it for its affordable high picture quality, ease-of-use and long list of features – including built-in colour correction and video delay. Working with 3Gb/s, HD and SD video sources, Safire 3 is ideal for any live virtual production – from studio to sport.

You can set up an impressive chroma key automatically using multi-point sampling, or you can manually adjust the picture using any of the fine-tuning tools available – from lighting compensation to noise reduction filters. These adjustments can be made using a choice of control options – from touch screen control panel to web browser.

Safire 3 is a module that fits in Crystal Vision's Indigo frames, saving you rack space by allowing up to 12 chroma keyers (or other modules) in 2U.

Virtual studios · News · Weather · Sports
Chat shows · Game shows · Current affairs
Election broadcasts · Drama · Film

3Gb/s · High Definition · Standard Definition

WHY SHOULD I CHOOSE SAFIRE 3?

Easy to set up with multi-point sampling

Need a quick and easy setup with the best possible settings? Sample the average brightness and hue of one, five or 12 sample points on the backdrop to set the range of colours to key on

Masks

Don't have a perfect backdrop? Use the internal masks to remove unwanted areas

Lighting compensation

Uneven lighting? Get a uniform key signal across the image by using lighting compensation to boost the key

Key Shrink

Camera feed causing unwanted outlines? You can shrink the edge by up to a pixel and remove these outlines

Freeze the input

Presenter unable to keep still? No problem – freeze the input and spend as long as you need tweaking the settings

Deal with noise or camera ringing

Got a problem with picture noise or camera ringing? Easy to reduce using the Ring Suppression, Noise Reduction and Edge Softening filters

Deal with difficult colours

Is your presenter wearing clothes similar to the backdrop colour? Sample the chrominance of either one or four points on the presenter to set the colours *not* to key on

Use the fine-tuning tools to improve the picture and get a solid key

Like having lots of settings to adjust? All the tools you need to enhance the colour sensitivity, improve the chroma key luminance and reduce the chroma key amplitude

Shadow Density

Need to make shadows appear or disappear? Use the Shadow Density control to increase or reduce the appearance of shadows

Timing adjustments

Virtual set graphics getting to the chroma keyer after the camera feed? Delay the Foreground signal with up to ten frames of video delay adjustment on each input – plus use the frame synchronisers for easy system timing

Add virtual objects, logos and sports graphics

Need to add virtual objects to your studio, or insert graphics on to a sporting surface? Use the flexible External Key to force part of the Background to appear in front of the Foreground subject, to linear key logos, or to restrict the chroma keying to the area that contains sports graphics

Use transparent and reflective objects

Does your virtual set include glass or smoke? You can still create an effective key: linear chroma keying allows the final picture to be a mixture of both Foreground and Background

Get a natural-looking composite picture

Do your Foreground and Background not look right together? Match the look of the Foreground to the Background by using the Foreground colour corrector, Background video adjustments and colour spill processing

Choice of control

Like to control your chroma keyer in a particular way? Choose from a variety of methods, including touch screen control panel and a web browser running on any device

Simulated picture

UNDERSTANDING CHROMA KEYING

Chroma keying is used to combine a virtual object (Background) with a real image (Foreground) by replacing a real colour (usually blue or green) with a virtual input.

In a typical chroma key the Foreground subject is shot against a well lit uniformly coloured backdrop. A Suppressed Foreground signal is produced in which the backdrop colour is removed and the signal is used to create a key to remove an area from the Background video that is identical in size to the Foreground subject. The Suppressed Foreground is inserted into the backdrop 'hole', then masks can be added to remove any unwanted Foreground or Background and any fine-tuning can be applied.

WHY USE A DEDICATED HARDWARE CHROMA KEYER?

Hardware chroma keyers produce better and more reliable results for live virtual productions.

PCs do not have enough processing power to deal with the live technical challenges faced by broadcast engineers, such as variations in lighting or colour spill.

Foreground

Suppressed Foreground

For productions involving multiple cameras, using a separate hardware chroma keyer on each camera lets the operator see all the keyed composites before selecting them. Even the largest vision mixers do not have this flexibility. If any adjustments are wanted for one of these cameras, the adjustments can be made while that camera is not selected. It also makes it easier for different cameras to have different settings. A dedicated hardware chroma keyer also includes extra processing not found on vision mixers. Finally, a dedicated control panel makes it quick and easy to make small adjustments to the chroma keyer during the course of a live programme – such as when the presenter moves around, or as the camera pans to a different part of the studio where the lighting is darker or brighter.

CHROMA KEYING USING SAFIRE 3

Safire 3's chroma keying uses an extremely sophisticated algorithm to determine how the key is derived, giving excellent results with minimal sensitivity to camera noise.

Safire 3 can key on any colour, including sporting surfaces such as grass. Best results are obtained from intense colours (with high chrominance) that do not occur in the Foreground subject.

Linear chroma keying avoids the hard switch associated with non-linear keying and allows areas of the final picture to be a mixture of both Foreground and Background, permitting the use of transparent and reflective objects (such as spectacles, a glass of water and smoke) and resulting in more convincing edges. Safire 3 features both additive and multiplicative keying to suit all types of situations. Additive keying relies on careful attention to the lighting of the Foreground, but should result in more convincing edges, shadows and transparent objects.

Keys can be faded to show the Background input only, while a final fade to black is available on both the main and auxiliary outputs.

SETTING UP IS EASY

Safire 3 makes it easy to quickly set up a chroma key, using cursor-based multi-point sampling to automatically get the optimum chroma key values – which are suitable for most applications.

This samples the average brightness and hue of either one, five or 12 sample points on the backdrop to set the range of colours to key on. Safire 3 can also sample the chrominance at either one or four points on the Foreground object (person) to set areas where no chroma keying is required. Usually the more samples chosen, the more accurate the result – while with perfect lighting only one sample might be necessary. Samples are optionally visible on the main or auxiliary outputs and can be repositioned.

The input can be frozen to make setup even easier – meaning your presenter doesn't have to stay still while you are making adjustments.

Background

Composite picture

PERFECTING THE PICTURE

Safire 3's multi-point sampling will automatically generate a realistic chroma key which is suitable for most applications. An extensive range of fine-tuning tools are additionally available to optimise the picture in more challenging conditions.

You can eliminate key noise and chroma key transparencies by using the Maximum Clip and Minimum Clip controls to adjust the key gain, the key Hue and Saturation controls to tune the backdrop key colour, and the key Acceptance control to increase or reduce the range of colour variation around the key colour.

You can manage colour spill by using the Foreground Hue, Acceptance and Suppression controls to determine the range and amount of colour spill to be removed. The Foreground Balance and Foreground Tint controls help compensate for any Foreground colours being desaturated as a result of spill removal. Remaining colour spill can be removed with the FG Colour Compensate controls.

Chroma Key Removal allows areas of black, grey and white to have the chroma key amplitude reduced for realistic shadows and a solid key. This is useful where colour spill from the backdrop on to Foreground objects is causing unwanted keying of the Background.

LIGHTING COMPENSATION

Good lighting is essential for good chroma keying. Safire 3 has adjustments to help you achieve a uniform key signal across the image using two-dimensional lighting compensation for uneven illumination of the backdrop.

The lighting distribution of a spotlight is a bright centre that fades away to the edges in a circular pattern, and the Background key produced will reflect that lighting distribution. Safire 3's lighting compensation makes it possible to minimise the effects of this lighting edge fade. For linear lighting problems, each edge can be adjusted. A radial gradient can also be applied to the chroma key gain. Lighting compensation can be automatically set by enabling the Auto Lighting feature during the multi-point sampling.

REDUCE NOISE OR CAMERA RINGING

There are three filters available. Safire 3 needs to upsample the 4:2:2 input video to the 4:4:4 colour space for the chroma key extraction, and the Ring Suppression filter can sharpen or soften the filtering of this process and reduce any ringing introduced by the camera.

The Noise Reduction filter will reduce the noise on the chroma key signal while maintaining fine edge detail.

Finally, the Edge Softening filter smoothes any jagged edges caused by high levels of key gain, reducing the noise on the chroma key signal and softening the edges of the key in both horizontal and vertical directions.

ENHANCING EDGES

With Safire 3's additive processing, there should not normally be a requirement to shrink the key – good lighting and a camera that does not add artificial sharpness will give the best keying results. However, if one of these is compromised, Key shrink is a useful tool to reduce artificial borders between the camera feed and background. Key shrink is user adjustable in 0.001 pixel steps from 0 to 1 pixel.

Edge Processing applies adjustable non-linear processing to the key edge which may also help remove any hard outlines around the key.

COLOUR ADJUSTMENTS – INCLUDING FOREGROUND COLOUR CORRECTION

A natural-looking composite picture can be created by matching the look of the Foreground to the Background. This is possible by using independent lift, gain and chroma adjustments on both the Foreground and Background, as well as an active Foreground colour corrector which provides lift and gain adjustments on the individual red, green and blue channels.

Spill is the effect where the backdrop colour appears on the Foreground objects, usually by reflection off skin or clothes. This is removed in the chroma keying process but the absence of reflected colour can make Foreground objects appear unnatural when chroma keyed over a different colour background. The Re-spill tool is therefore available to add a selected colour tint to Foreground objects, replacing the residual backdrop colour for a more natural-looking final picture.

MAKE SHADOWS APPEAR – OR DISAPPEAR!

The Shadow Density control can be used to increase or reduce the appearance of shadows. It can be used to remove any shadows that have been cast on to Background graphics by uneven lighting, something often required in news-type applications. For other virtual set applications, Shadow Density can be used to increase the shadows to make the composite image look more real – ideal for full length shots where shadows would be naturally cast on to the floor.

GET BUILT-IN VIDEO DELAY

Up to ten frames of video delay adjustment – adjustable in one frame steps – is available on each input, ideal for offsetting the delay caused by the graphics generators or for matching any other big system delays.

On the other hand, when you want as little delay as possible, you can select short delay mode. Normally the noise reduction filtering is done both horizontally and vertically for optimum results; if you prefer a short delay of less than two lines in your system you can opt for horizontal-only processing.

CORRECT ANY TIMING ERRORS

Any timing errors will be automatically corrected by the frame synchroniser on each input – synchronising sources up to one frame apart for easy system timing. Reference timing can be selected to come from the Foreground, Background or Key input or from SD Black and Burst or HD tri-level syncs.

APPLYING MASKS AND LAYERS

Safire 3 offers two internal rectangular masks (Foreground and Background) and an External Key which can be used to overrule the keying process. These masks include adjustable edge softness which is useful for blending between masked and unmasked areas for a more natural-looking edge.

It's not always possible to have a perfect backdrop for your chroma key, but this isn't a problem with Safire 3. Unwanted areas of the Foreground can easily be removed by forcing the Background with a Foreground mask. Similarly wanted areas of the Foreground can be forced with a Background mask. Used either together or independently, the Background and Foreground masks can be turned on or off, inverted and adjusted in position and size.

The flexible External Key should be used when a customised non-rectangular or moving shape is required and can force areas to be either Foreground or Background under the control of a key generated by a graphics system. It can force part of the Background to appear in front of the Foreground in the area of the supplied External Key – allowing a presenter to go behind a virtual desk, for example. It also allows Safire 3 to be used as a linear keyer and for sports graphics applications.

USE SAFIRE 3 AS A LINEAR KEYER

Safire 3 can double as a linear keyer – keying captions, logos, scoreboards and other graphics over a video source. You can linear key either by using the key signal on the External Key input, or by turning on the Self Key where it creates the key based on the luminance of the Foreground signal.

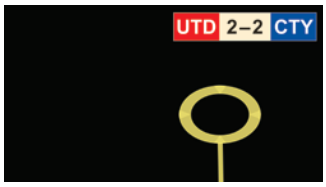
PERFECT FOR SPORTS GRAPHICS

Safire 3 is ideal for sports graphics keying in a diverse range of applications, from keying logos on to a pitch to virtual advertising.

A typical sports graphics application may be where players walk over a sponsor's logo which is made to appear as if painted on the grass. Here the External Key is used to restrict the chroma keying to the area that contains the sports graphics: the chroma key will only occur in the grey area determined by the External Key input, with the camera feed (Foreground signal) forced everywhere else.

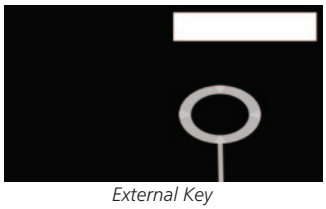
Another scenario could be where you need to chroma key a logo on to a pitch and at the same time linear key a graphic (such as a clock or scoreboard) on to the video, forcing this graphic on top of everything else. This is achieved on Safire 3 by using the External Key and External Mask functions together to apply a chroma key and linear key simultaneously. Safire 3 uses the peak white area on the External Key input to force the Background and linear key the clock or scoreboard, and uses the grey area to allow chroma keying.

Graphics can be keyed on to any sporting surface, not just grass – for example, snow keying can be achieved using a basic Luma Key.



Background

Foreground



External Key

Composite picture using different levels

SELECT YOUR AUDIO

Safire 3 is easy to use in a system with embedded audio: the audio to be output with the final video can be selected from either the camera feed, the Background graphics or the External Key input. Alternatively all ancillary data including embedded audio can be blanked.

SAVE RACK SPACE – AND PROTECT YOUR OUTPUT

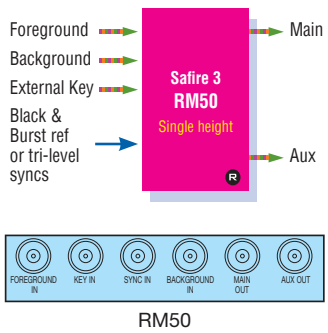
Safire 3 is a space-saving 100mm x 266mm module housed in Crystal Vision's Indigo frames, which are available in three different sizes to suit all applications. 12 chroma keyers or other boards will fit in 2U, six in 1U and two in a desk top box.

With Safire 3 the Foreground, Background and External Key inputs and one main output and one auxiliary output are accessed by using either the RM50 or RM73 frame rear modules. With both main and auxiliary outputs available you can easily monitor each stage of the keying process, looking at the various internal signals individually and making any changes.

The RM73 rear module can provide relay bypass protection of the Background on power failure or board malfunction or removal – most useful for virtual studio applications such as weather. Relay bypass protection allows you to maintain programme output while maintenance is completed: it prevents signal loss by mechanically connecting the Background input to the main output whenever the supply to the rear module is interrupted.

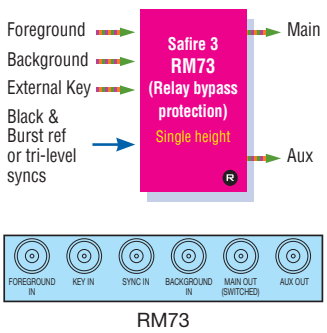
REAR MODULE CONNECTIONS

For standard applications



RM50

For relay bypass protection applications



RM73

CONTROLLING YOUR CHROMA KEYER

Safire 3 is designed for those seeking the easiest workflow. How would you like to control it?

VisionPanel is a stylish 3U control panel able to operate up to 16 Indigo frames containing Safire 3 chroma keyers (or other Crystal Vision products) over an Ethernet network, with the large, intuitive eight inch touch screen and physical controls making it ideal for live use. VisionPanel features eight hard buttons – F1 to F8. The four buttons on the left allow you to select which Safire 3 you want to control, with up to eight chroma keyers directly selectable by using these four buttons in combination with the Shift (F5) button. Should your system contain more than eight chroma keyers, you can easily select additional boards to control using the Device menu on the touch screen. The four buttons on the right are Shift (F5), Presets/Outputs/Chroma Key Enable (F6), Gain and Spill/Key Status (F7) and Back/Home (F8). F6 will jump directly into the Outputs and Presets menu, allowing you to quickly monitor your incoming and outgoing signals or recall or store a preset. When F6 is pressed with Shift (F5) also held down, it will toggle the chroma key on and off. Holding down F7 will immediately access the Gain and Spill menu. When F7 is pressed with Shift (F5) also held down, it will access the Key Status menu. F8 will take you back through your previous menus; with Shift (F5) held down, it will instead take you to Safire 3's home screen, where all the top level menu options are available. Soft buttons on the touch screen are used in conjunction with physical knobs to access the various intuitive setup menus, which allow the key processing, masks and engineering settings to be configured with ease. VisionPanel can sit on a desk stand, be fitted into a desk or be rack mounted using the included rack mount kit.

VisionWeb Control allows Safire 3 to be operated from a web browser running on any device which is connected to the same network – from PC to tablet. To access the control menus, simply type the IP address of the frame into the web browser (with Internet Explorer 10 or above, Microsoft Edge, Google Chrome, Mozilla Firefox or Apple Safari recommended) – it's an enjoyable and free-of-charge way to control your Safire 3.

Alternatively there is **GPI control**, featuring five GPI inputs for preset recall (with up to 40 presets available, of which 32 can be recalled via GPI) and one GPI input dedicated to fading keys up and down. The key can be switched on and off from GPI, allowing an automation system to simply control the key without needing complex protocols or controls.

Control is also available from **SNMP** or by using our **ASCII** or **JSON protocols**.

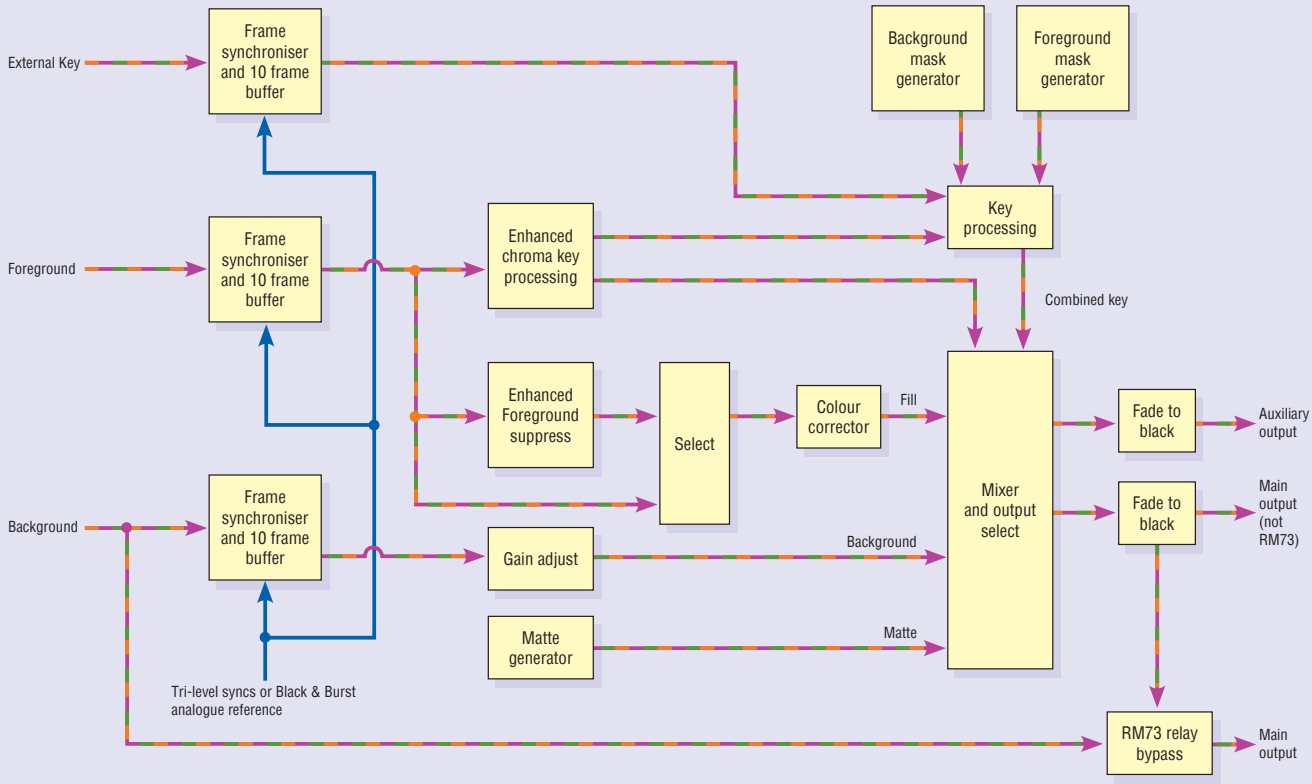
CHOICE OF CONTROL...

VisionPanel

SNMP

VisionWeb Control

THE INPUTS AND OUTPUTS



SPECIFICATION

MECHANICAL
Standard Crystal Vision module 266mm x 100mm
Weight: 200g
Power consumption: 12 Watts

VIDEO INPUTS
Three 3Gb/s, HD or SD inputs (Foreground, Background and Key)
270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Works with the following video standards: 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30, 1080p50, 1080p59.94, 1080p60, 1080PsF23.98, 1080PsF24, 1080PsF25, 1080PsF29.97, 1080PsF30, 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080i60, 2048x1080p23.98*, 2048x1080p24*, 2048x1080p25*, 2048x1080p29.97*, 2048x1080p30*, 2048x1080PsF23.98*, 2048x1080PsF24*, 2048x1080PsF25*, 2048x1080PsF29.97*, 2048x1080PsF30*, 625i and 525i (*= YUV 4:2:2 10 bit)
3Gb/s cable equalisation up to 75m using Belden 1694A. HD cable equalisation up to 100m with Belden 1694A or equivalent. SD cable equalisation >200m Belden 8281 or equivalent
Input return loss: -15dB for 50MHz to 1.5GHz

VIDEO OUTPUTS
One main output and one auxiliary output accessed by using RM50 and RM73 rear modules. Relay bypass protection of Background with RM73
270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Output frame rate same as input frame rate
Both main and auxiliary outputs can be used to show Output Video, Output Key, Foreground Input, Background Input, Key Input, Keyed Foreground, Keyed Background, Foreground Matte and Background Matte

DELAY THROUGH BOARD
Figures quoted here refer to short delay mode:
SD: 85us min
HD: 18us min
3Gb/s: 10us min
Maximum delay of ten frames user adjustable delay, plus up to a frame of synchroniser delay
Short delay mode can be enabled and gives a system delay of less than two lines. If short delay mode is selected, the noise reduction filtering will be horizontal only

TIMING ADJUSTMENTS
Reference timing can be selected to come from Foreground, Background or Key input or from SD Black and Burst or HD tri-level syncs. 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
A frame synchroniser on each input will automatically synchronise sources up to one frame apart in timing for automatic correction of any timing errors
Amplitude of syncs 150mV to 600mV
Link on PCB selects 75 ohm termination or high impedance
Up to ten frames of video delay adjustable in one frame steps allows compensation for any big system delays

CHROMA KEY AUTO-SETUP
Cursor-based auto-setup uses multi-point sampling to generate the optimum default settings and is suitable for most applications
It samples the backdrop colour at one, five or 12 points. It will take the average brightness and hue of the points to calculate the initial setup, automatically setting the parameters for the Chroma Key Gain (Max Clip), Chroma Key Colour (Hue), Foreground Suppression (Hue and Suppression) and Chroma Saturation
It can also sample the chrominance of the Foreground object (person) at either one or four points and will adjust the Chroma Key Gain Min Clip parameter to ensure that the key signal is reduced to zero at these points
The Safety Margin control can be used to apply more gain and Foreground Suppression to the chroma key signal when calculating the auto-setup parameters
The Freeze Input control allows the Foreground input to be frozen during the multi-point sampling, useful when the Foreground object is a moving person

CHROMA KEY ADJUSTMENTS
Chroma Key Gain: Minimum Clip sets the key value below which the Foreground will be fully opaque. Any chroma key values below this are taken to zero and the Background is not keyed on. Maximum Clip sets the key value above which the Foreground will be fully transparent. As the Minimum Clip and Maximum Clip get closer together, the gain applied to the chroma key signal increases resulting in a stronger key signal
Chroma Key Colour: Hue sets the RGB value of the backdrop colour to be used for generating the key. Acceptance Angle widens or narrows the range of colours around the hue value considered to be within the backdrop colour
Foreground Suppression: This removes the backdrop colour from the Foreground video signal. The option to have a slight variation from the keying colour can be useful for colour spill and colour edge effects. Hue sets the RGB value of the backdrop colour to be suppressed from the Foreground. Acceptance Angle widens or narrows the range of colours around the hue value to be suppressed. Suppression sets the amount of suppression applied
Chroma Key Control: Enable turns the chroma keying on and off. When Suppress Foreground is enabled, the processed Foreground is used. Additive keying produces best results for semi-transparent objects and shadows
Keyed Background is combined with Foreground or Suppressed Foreground

CHROMA KEY FINE-TUNING TOOLS
Chroma Key Removal: Areas of black, grey and white can have the chroma key amplitude reduced for realistic shadows and a solid key
Key Edge Enhance: Key Shrink allows the key size to be reduced by an adjustable amount. Used to remove any hard outlines around the key as a result of ringing or spill present in the Foreground signal. Edge Processing applies adjustable non-linear processing to the key edge which may also help remove any hard outlines around the key
Shadow Density: Used to enhance or remove the appearance of Foreground shadows
Lighting compensation: Two-dimensional compensation for uneven illumination of the backdrop will achieve a uniform key signal across the image. For linear lighting problems, each edge can be adjusted. A radial gradient can also be applied to the chroma key gain. Lighting compensation can be automatically set by enabling the Auto Lighting feature during the multi-point sampling
Balance and Tints: Foreground Balance allows the application of non-symmetrical Foreground Suppression about the Hue value. Foreground Tints reduces Foreground Suppression where there is not much colour. On auto-setup the incoming Foreground video is adjusted such that the selected colour is 100% saturated before the chroma key is derived and this value can be adjusted using the Key Saturation control
FG Colour Compensate: The Pre-Key RGB Lift controls lift the individual red, green and blue components of the Foreground signal before suppression by +/- 20% to help compensate for any colour loss resulting from high levels of spill suppression
Chroma Key Filters: Safire 3 needs to upsample the 4:2:2 input video to 4:4:4 colour space for the chroma key extraction and the Ring Suppression filter can sharpen or soften the filtering of this process and reduce any ringing introduced by the camera. The Noise Reduction filter will reduce the noise on the chroma key signal. The Edge Softening filter will reduce the noise on the chroma key signal and soften the edges of the key in both horizontal and vertical directions (horizontal only when in short delay mode)
Colour Adjustments: Independent Foreground and Background lift, gain and chroma adjustments, plus full RGB lift and gain colour corrector active on the Foreground input after key colour extraction so as not to affect backdrop colour. Optional Foreground re-spill will throw a new spill colour back on to the suppressed Foreground in situations requiring a false spill effect for a more natural composite picture

FADES
Fade keys control can be used to fade all enabled keys (Chroma, External, Self) to show the Background input only
Fade to black active on main and auxiliary outputs

EXTERNAL KEY AND EXTERNAL MASK
External Key and External Mask can be combined with the chroma key to force areas of Foreground or Background. This can be used for sports graphics applications. External Key mode can also be used by itself for linear keying applications. Controls here include:
External Key: On/Off, Invert, Max Clip and Min Clip, Multiplicative/Additive mode
External Mask: On/Off, Invert, Max Clip and Min Clip, Multiplicative/Additive mode

SELF KEY (LUMINANCE KEY)
With Chroma and External Key modes disabled, Self Key mode can be used which uses the luminance value in the Foreground to key over the Background
Adjustable Key Max, Key Min, Self Key (On/Off, Invert, Max Clip and Min Clip) and Multiplicative/Additive mode

INTERNAL MASK GENERATOR
Two internal masks (Foreground and Background) can be applied to mask out areas of foreground or background. Controls here include:
Foreground and Background masks: On/Off, Invert, Window Adjust (horizontal and vertical position, horizontal and vertical size)
The internally generated Foreground and Background masks have edge softness controls to prevent hard edge on mask

INTERNAL MATTE GENERATOR
In all key modes the Foreground and Background source can be replaced with black or an internal matte generator with adjustable colour

MIX
Mix between Foreground and Background by pressing the Fade Keys auto transition button when no keys are enabled

EMBEDDED AUDIO
Embedded audio is taken from any chosen input, allowing selection of audio from either the camera feed, the background graphics or the External Key input to output with the final video
All ancillary data including embedded audio can be blanked

PRESETS
The current board settings can be saved in one of 40 locations to be recalled as required

GPI INPUT LEVELS
Active: pull to ground, pulled up to +5V through 10 kohm

GPI INPUTS
Six GPI inputs
Five are used for preset recall and one for fading keys up and down

LOCAL CONTROL
Board edge interface with two select buttons and shaft encoder

REMOTE CONTROL
VisionPanel touch screen control panel operates up to 16 frames containing Safire 3 modules over an Ethernet 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
Control using ASCII and JSON protocols

ORDERING INFORMATION

Safire 3	3G/HD/SD real-time chroma keyer
Indigo 2AE	2U frame with smart CPU and integrated control panel for up to 12 Crystal Vision modules
Indigo 2SE	2U frame with smart CPU for up to 12 Crystal Vision modules
Indigo 1AE	1U frame with 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 smart CPU for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1SE-DP
Indigo DTSE	Desk top box with smart CPU for up to two Crystal Vision modules
RM50	Single slot frame rear module. Allows 12 Safire 3 in 2U, six in 1U and two in desk top box. Gives access to Foreground, Background, External Key and analogue reference inputs, one main output and one auxiliary output
RM73	Single slot frame rear module. Allows 12 Safire 3 in 2U, six in 1U and two in desk top box. Provides relay bypass protection of the Background. Gives access to Foreground, Background, External Key and analogue reference inputs, one main output and one auxiliary output
VisionPanel	3U Ethernet control panel with touch screen
VisionWeb Control	VisionWeb web browser control included within frame software
SNMP	SNMP monitoring and control

Performance and features are subject to change. Figures given are typical measured values. SAFIRE30219

Crystal Vision

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