Snell Advanced Media

# User Guide

# Plug-ins

# Information and Notices

## Copyright and Disclaimer



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### Customer Support

For details of our Regional Customer Support Offices please visit the SAM web site and navigate to Support/Customer Support Contacts.

https://s-a-m.com/support/247-support/

Customers with a support contract should call their personalized number, which can be found in their contract, and be ready to provide their contract number and details.

## Conventions Used

### Text

| | |
|---|---|
| <Text> | indicates a specific key press on the QWERTY keyboard. |
| NN/nn | indicates a value entered on a numeric keypad. |
| **Text/text** | indicates either an application menu function or a Windows/SAM installation/system setting. |

### Symbols

**See: Reference to items in other documents.**

**Notes: System, software and workflow points to consider and remember.**

**Tips: Useful hints and advice when undertaking tasks.**

# Contents



# 1. Quantel Plug-ins

## 1.1 Anaglyph

### 1.1.1 Description

The Anaglyph plug-in allows stereo 3D clips to be combined to produce a preview version in Anaglyph form, where the left eye views the red component of the left hand image (left channel) and the right eye view the blue-green (cyan) components from the right hand image (right channel). When the resultant clip is viewed using red-cyan glasses, the stereoscopic 3D effect can be seen.

### 1.1.2 Using Anaglyph

The clip on the timeline must be the left channel and the right channel clip must be dropped from the clips bin onto the blue **right_channel** box. Its title displays in the blue box to the right of this box.


The **r**, **g** and **b** boxes at the left of the menu control the colour components from the left channel that are used in the Anaglyph. The r box is normally enabled. The green **x** and **y** boxes allow a horizontal and vertical offset to be applied to the left channel image.

The **r**, **g** and **b** boxes at the right of the menu control the colour components from the right channel that are used in the Anaglyph. The **g** and **b** boxes are normally enabled. The green **x** and **y** boxes allow a horizontal and vertical offset to be applied to the right channel image.

The **on** boxes can be used to toggle the offsets on and off to compare against the original clips.

The areas in the left and right images that are coincident appear to be at the surface of the screen. The **x** and **y** offset values can be adjusted to achieve this. In the example image the right-hand edge of the car's windscreen (windshield) is set to be at the surface of the screen and this places the front of the car in front of the screen and places the rear of the car behind the screen.

## 1.2 Blend

### 1.2.1 Description

The Blend plug-in allows two different clips to be combined together in different proportions using different mathematical modes. The main clip (on the timeline) can be combined with a second input from the clips bin and the blend can be controlled by an alpha channel or key clip.

### 1.2.2 Using Blend

The second clip must be dragged from the clips bin and dropped on the **Second_Input** blue box. Its title displays in the blue box to the right of this box.

To use a clip as an alpha channel drag it from the clips bin and drop it on the **Alpha_Input** blue box. Its title displays in the blue box to the right of this box. The **hide** box, when selected, disables the alpha input. The **Show** box, when selected, displays on screen the clip being used for the alpha channel.

The blue scroll box next to the **image** box controls the type of combination to be used for the blend:

| | |
|---|---|
| **Normal** | Displays only the main clip. |
| **Additive** | Adds the luminance content above black of both clips together directly without any luminance or colour scaling. This can produce over-bright and over-saturated colour. |
| **Subtractive** | Subtracts the content of the second clip from the main clip. This produces a darkening of the resultant image. |
| **XOR** | The second clip becomes a blend of chrominance and luminance between itself and the main clip, except for areas of common chrominance, then the blend in these areas tends towards black according to the associated combined luminance values. |
| **Average** | Directly adds the two clips together then re-scales the luminance and colour levels. This mode is effectively a dissolve between the two clips. |
| **Multiply** | Multiplies the colour value of the main clip by the colour of the second clip. This produces an over-saturated but darker resultant image. |
| **Screen** | Similar to **Additive** but is a less intense effect and has the effect of projecting both images on a screen at the same time. |
| **Darken** | Selects the darkest parts of both clips and combines them to produce a darkened result. |
| **Lighten** | Selects the lightest parts of both clips and combines them to produce a lightened result. |
| **Difference** | Subtracts the colour value of the second clip from the main clip. The differences between the clips display. |
| **Negation** | Produces a negative effect. |
| **Exclusion** | Similar to **Difference** but the resultant image has less saturation and contrast. |

| | |
|---|---|
| **Overlay** | The lighter areas of the second clip lighten the corresponding areas of the main clip, and darker areas of the second clip darken the main clip. |
| **Hard Light** | Similar to **Overlay** but with increased contrast and saturation. |
| **Soft Light** | This mode is similar to **Overlay** but has decreased saturation with the effect of a diffused spotlight. |
| **Colour Dodge** | This mode brightens highlights and increases overall saturation. |
| **Colour Burn** | This darkens the image and increases contrast. |

The value in the green **Mix** box sets the proportion of the clips that combine.

1.00 = all main clip
0.00 = all second clip

## 1.3 Blur

### 1.3.1 Description

This plug-in allows a keyframeable blur to be applied to the image.

### 1.3.2 Adjust the Blur

The value in the green **size** box controls the amount of blur that is applied to the image. A value of 5 is a good starting point.

The **R** box, when enabled, applies the selected blur to the red channel of the video.

The **G** box, when enabled, applies the selected blur to the green channel of the video.

The **B** box, when enabled, applies the selected blur to the blue channel of the video.

The **A** box, when enabled, applies the selected blur to the edges of the alpha channel (key).

The **normal_blur** and **radial_blur** boxes determine the type of blur to be applied. When using **radial_blur** the **X centre** and **Y centre** boxes that display determine the point about which the blur occurs. Place the cursor on the image at the desired X, Y starting point.

The **step size** box determines the angle between each blur region.

## 1.4 Crash Zoom

### 1.4.1 Description

This plug-in produces a circular aperture, through which part of the background image is seen undistorted and surrounded by a blurred image resembling a fast zoom.

### 1.4.2 Adjust the Crash Zoom Parameters

The size and position of the aperture is defined by drawing a red circle on the image on the desktop. To define this aperture, manually position the cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size then release pressure. To resize and reposition the aperture use the green numeric boxes as described below:

The value in the green **X Cord** box defines the horizontal centre position for the aperture. A value of 0 places the centre on the left edge of the image.

The value in the green **Y Cord** box defines the vertical centre position for the aperture. A value of 0 places the centre on the top edge of the image.

The value in the green **Radius** box defines the ring size of the interference pattern.

The value in the green **Rotate** box sets a rotation of the video around the centre position of the aperture.

The value in the green **ZoomSpeed** box defines the rate of zoom that is applied to the image as it moves away from the circular aperture.

The blue scroll box (displaying **CrashZoom**, **RadialZoom** or **ShowBackground**) modifies the effect of the zoom crash.

With **CrashZoom** selected a linear zoom is applied to the background image.

With **RadialZoom** selected a radial zoom is applied to the background image.

With **ShowBackground** selected the unprocessed background image displays.

## 1.5 Directional Blur

### 1.5.1 Description

This plug-in allows a directional blur, and a colour filter to be applied to the background image.

### 1.5.2 Adjust the Blur Parameters

The following parameters of the blur can be adjusted using the green numeric boxes in the menu:

The **BlurRed** box applies the blur to the red video channel.

The **BlurGreen** box applies the blur to the green video channel.

The **BlurBlue** box applies the blur to the blue video channel.

The value in the green **DegreeDirection** box defines the angle at which the blur is applied to the background image.

0 = horizontal blur left to right

90 = vertical blur top to bottom

180 = horizontal blur right to left

270 = vertical blur bottom to top.

The value in the green **PixelToBlur** box defines the amount of blur to apply to the background image. The larger the value in this box the more blur that is applied.

The values in the green **XCrop** and **YCrop** boxes are used to crop the edges of the clip to discard any unwanted edge detail. This can be used to remove black edges from the picture where it is over-blanked.

## 1.6 Dissolve

### 1.6.1 Description

This simple transition-type plug-in allows two clips to be mixed together.

The first clip must be selected on the timeline. The second clip can then be dragged from the clips bin and dropped on the blue Clip2 box and its title displays in the blue box to the right of this box.

### 1.6.2 Adjust the Merge

The value in the green Opacity box controls the mix of the two clip images:

0 = 100% clip 1 + 0% clip 2
0.5 = 50% clip 1 + 50% clip 2
1 = 0% clip 1 + 100% clip 2

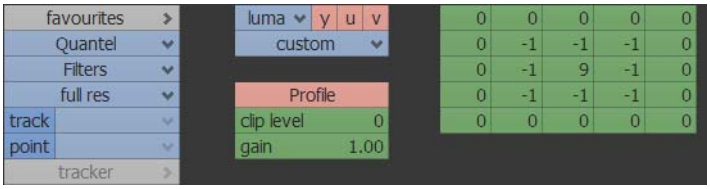
These values can be keyframed to mix between the two clips.

## 1.7 Filters

### 1.7.1 Description

The Filters plug-in provides basic image enhancement tools such as Crispen (aperture correction), USM (unsharp masking), edge detection, blurring and the application of a custom filter matrix.




### 1.7.2 Using Filters

The blue scroll box displaying **rgb** or **luma** is used to select the colour space to be processed by the filter. The blue scroll box displaying **enhance**, **extract**, **blur** or **custom** is used to select the type of filter to apply to the whole image:

The **enhance** function crisps the image using 3 × 3, 5 × 5, 7 × 7 or 9 × 9 filter arrays. Each of these has a **mild**, **medium** or **strong** weighting to allow the required effect to be selected. Larger filters take longer processing time than smaller ones.

The **extract** function allows the edge detail within the image to be detected to create an embossed effect. The different settings affect the size of the filter array and the effective direction detected edges are displayed in the resultant image.

The **blur** function allow the image to be blurred using a number of different filters. These are 3 × 3 average, 5 × 5 average, 9 × 9 cross, thin star, h blur and v blur.

The **custom** function allows the image to be filtered using a 5 × 5 filter array that can have each of the 25 areas set differently, if required.

The **Profile** function allows unsharp masking to be applied to the image. This applies sharpening to the luminance levels above a specified level (to avoid sharpening noise) but does not sharpen any areas of the image that were sharp to start with.

The **clip level** value sets the threshold level on the luminance where sharpening starts. The minimum value is 0 and the maximum is 10. Set this to avoid any sharpening of noise or grain in the image.

The **zoom** function is used to view areas of the image where noise may occur.

The **gain** value controls how much of the luminance sharpening is applied to the resultant image. The minimum value is 0 and the maximum is 2.

## 1.8 Glass Tile

### 1.8.1 Description

This plug-in gives the effect of mirror tiles with each mirror displaying its own reflection of the background image through rectangular or hexagonal tiles.

### 1.8.2 Adjust the Glass Tile Parameters

When the **Square** box is enabled, the following parameters can be adjusted:

The value in the green **Width** box defines the width of the tiles.

The value in the green **Height** box defines the height of the tiles.

When the **Hex** box is enabled, the following parameters can be adjusted:

The value in the green **HexRadius** box defines the size of the tiles.

The value in the green **HexDegree** box defines the rotation of the tiles. A value of 0 represents no rotation. Only the tiles themselves are rotated, not the image.

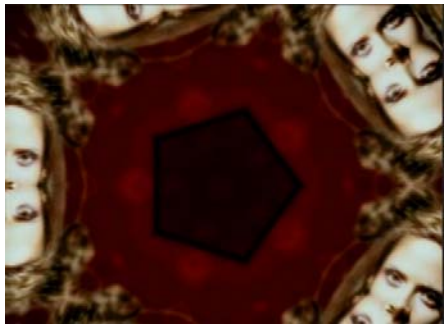
The **RatioX** and **RatioY** boxes define the scale of the image shown on the tiles. A value of 1 means that the image displays at normal size. A value of 2 means that the image displays at half size. A value of less than 1 gives a mosaic tile effect. The **XCrop** and **YCrop** boxes are used to crop the edges of clip 2 to discard any unwanted edge detail. This can be used to remove black edges from the picture where it is over-blanked.

## 1.9 Kaleidoscope

### 1.9.1 Description

This plug-in allows a keyframeable kaleidoscopic effect to be applied to the clip.



### 1.9.2 Select the Mirror Arrangement

A blue scroll box (displaying **Single**, **Square**, **Triangle**, **Quad**, **Pentagon**, **Hexagon**, **Heptagon** or **Octagon**) allows the selection of different arrangements of mirrors thus producing different shapes.

### 1.9.3 Adjust the Kaleidoscope

Different aspects of the kaleidoscope can be adjusted using the numeric boxes. The interaction of these boxes is difficult to predict therefore to achieved the desired result it is best to adjust each value in small increments:

The value in the green **X Cord** box moves the original image horizontally beneath the mirrors of the kaleidoscope. This allows the kaleidoscope to be positioned at the desired part of the image. The **X Cord** and **Y Cord** values can be defined by placing the cursor on the image area, pressing and then dragging the red marker to the required place on the image.

The value in the green **Y Cord** box moves the original image vertically beneath the mirrors of the kaleidoscope. This allows the kaleidoscope to be positioned at the desired part of the image.

The value in the green **SourceAngle** box rotates the original image beneath the mirrors of the kaleidoscope.

The value in the green **RotationAngle** box rotates the result of the kaleidoscope over the background image.

The value in the **size** box determines the distance between the mirrors of the kaleidoscope. The larger the size the fewer the number of mirrors to reflect the image.

The value in the **zoom** box adjusts the background image towards and away from the mirrors of the kaleidoscope. A value greater than 1 moves the image away from the mirrors (making it appear smaller), and a value of less than 1 moves the image towards the mirror (making it appear larger). A value of 0 effectively places the background image on the mirror plane resulting in no reflection.

The value in the green **X Cord** box applies a horizontal shift to the mirrors of the kaleidoscope.

The value in the green **Y Cord** box applies a vertical shift to the mirrors of the kaleidoscope.

The **XCrop** and **YCrop** boxes are used to crop the edges of the clip to discard any unwanted edge detail. This can be used to remove black edges from the picture where it is over-blanked.

The **Original Background** box, when selected, disables the effect allowing the original picture to be seen.

The blue scroll box (displaying **Smear**, **Reflection** or **Black**) controls what is placed in the gaps between the images if the **X Cord** and **Y Cord** values move the image into blanking:

If **Smear** is selected, the areas of the resultant image that do not contain any original image information are filled with information interpolated from the areas with valid image information.

If **Reflection** is selected, the areas of the resultant image that do not contain any original image information are filled with reflections from the valid areas.

If **Black** is selected, the areas of the resultant image that do not contain any original information are filled with black.

**The XCrop and YCrop settings should be used if the image is overblanked, to ensure that the Smear and Reflection functions use image information other than black.**

## 1.10 Lens Flare

### 1.10.1 Description

This plug-in allows a lens flare to be applied to the background clip.

The lens flare consists of three components: the Main Flare, the Rays emanating from the main flare and the Secondary Flares. Each of these components can be adjusted separately. The blue scroll box next to **PacketOption** allows different styles of lens flare to be selected from the list of options.

### 1.10.2 Main Flare Adjustments

The **MFlare** box, when selected, allows the following parameters on the main flare to be adjusted:

The value in the **X Cord** box defines the horizontal position for the main flare, the rays and the relative positions of the secondary flares.

The value in the green **Y Cord** box defines the vertical position for the main flare, the rays and the relative positions of the secondary flares.

The value in the green **Opacity** box allows the opacity of the lens flare to be adjusted. A value of 1 displays the flare at full brightness and a value of 0 makes the flare totally transparent, i.e. no longer visible.

The value in the green **Flare Radius** box defines the size of the main flare ring.

**As the horizontal position value is changed the rays and secondary flares move to reposition themselves in line with the main flare.**

### 1.10.3 Secondary Flare Adjustments

The **SFlare** box, when selected, allows the following parameters on the secondary flares to be adjusted:

The blue scroll box displaying **Round**, **Triangle**, **Square**, **Pentagon**, **Hexagon** or **Octagon** defines the shape of the lens flare.

The value in the green **SFlare** degree box defines the angle of rotation applied to the polygons.

The value in the green **ConcentricX** box defines the horizontal positioning of the secondary flares relative to the main flare.

The value in the green **ConcentricY** box defines the vertical positioning of the secondary flares relative to the main flare.

### 1.10.4 Main Flare Ray Adjustments

The **Ray** box, when selected, allows the following parameters on the main flare ray to be adjusted:

The value in the green **Ray Spikes** box defines the number of rays displayed.

The value in the green **Ray Thickness** box defines the thickness of the rays on the main flare.

The value in the green **Ray Rotation** box defines the angle of the rays on the main flare.

The value green **Ray Radius** box defines the size of the rays on the main flare.

## 1.11 Magic Crystal

### 1.11.1 Description

This plug-in produces a crystal ball effect that contains a bright star-like (or supernova) light and casts a shadow behind. The crystal ball also magnifies the image behind it.

### 1.11.2 Define the Magic Crystal Area

The size and position of the filter area is defined by drawing a red circle on the image on the desktop. This circle can be drawn manually or using green numeric boxes in the menu.

To define the filter area manually, position the pen cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size then release.

Press anywhere within the red circle bounding the crystal ball to display two markers on the screen. The blue marker is used to position the crystal ball. The red marker is used to position the supernova. Press on a marker and drag it to the required position.

To resize and reposition the area to be processed, use the green numeric boxes to set the following:

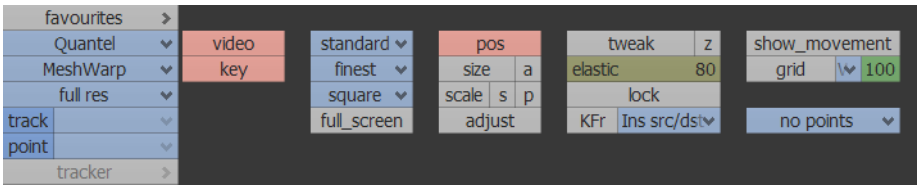
| | |
|---|---|
| **Crystal X** | the horizontal centre position of the circular filter area. |
| **Crystal Y** | the vertical centre position of the circular filter area. |
| **Crystal Radius** | the size of the circular filter area. |
| **Power** | the intensity of the light. |
| **NovaX** | the horizontal position of the supernova. |
| **NovaY** | the vertical position of the supernova. |
| **NovaRadius** | the size of the supernova. |
| **Hue** | the colour of the light produced by the supernova. |
| **RedFilter** | used to filter the light produced by the supernova. This allows the red component of the light to be increased or reduced. |
| **GreenFilter** | used to filter the light produced by the supernova. This allows the green component of the light to be increased or reduced. |
| **BlueFilter** | used to filter the light produced by the supernova. This allows the blue component of the light to be increased or reduced. |
| **SpokeNum** | the number of rays of light emanating from the supernova. |
| **ShadowPosX** | the horizontal position of the circular shadow cast behind the crystal ball. |
| **ShadowPosY** | the vertical position of the circular shadow cast behind the crystal ball. |
| **ShadowSize** | the size of the circular shadow cast behind the crystal ball. |
| **XCrop / YCrop** | used to protect the edges of clip from the effects of the nova and crops the nova as it enters the protected area. |

## 1.12 MeshWarp

### 1.12.1 Description

This plug-in allows keyframeable flat image warps (i.e. affecting the x and y positions of pixels within the image) to be applied to the current layer (video channel, key channel or both). A warp can be applied to the whole image or to a rectangular part of the image using a grid. The grid can be distorted by repositioning grid points and a corresponding warp is applied to the pixels of the image.




The plug-in does not support overlapped image areas, out of sequence grid points or grid points outside the edges of the grid rectangle.

### 1.12.2 The Warp Grid

The points on the grid (shown as coloured crosses) are adjusted by dragging the cursor on the screen.

Red crosses are locked and cannot be moved, green crosses can be moved and yellow crosses indicate that the point has been adjusted. Cyan crosses indicate the last tweaked points on the grid.

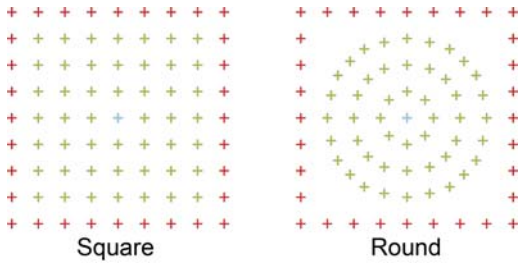
The grid position, size, scale and individual grid points can be adjusted throughout the clip to produce a dynamic warping effect.

The grid itself is controlled by the following boxes:

The top blue scroll box can be set to **std** (standard) allowing different grid resolutions to be selected from the scroll box immediately below (**coarsest** = 5 × 5, **coarse** = 7 × 7, **medium** = 9 × 9, **fine** = 15 × 15 and **finest** = 17 × 17), or can be set to **cust** (custom) whereby different x and y resolutions up to 17 × 17 points can be defined in the two boxes immediately below.

The bottom blue scroll box displaying **square** or **round** affects the distribution of points within the grid.

**square** distributes the points in rows and columns and **round** distributes the points in rings about the central point.




The **full screen** box, when selected, expands the grid to the full size of the image (an area equivalent to 1920 × 1080).

The **pos** (position) box, when enabled, allows the whole grid to be positioned over the desired area of the image using the cursor.

The **size** box, when enabled, allows the maximum area affected by the warp to be adjusted vertical and horizontal by moving the cursor vertically or horizontally on the screen. Selecting the a box maintains the aspect ratio of the grid when resizing. The red crosses that define the

perimeter of the rectangular area restrict any warp effect to within this area. These points on the perimeter cannot be unlocked. The number of grid points stays the same regardless of the **size** settings. The size of the grid crosses change in proportion to the size of the grid.

The **scale** function can be used to apply the same grid points to a smaller area of the image. The **scale** box, when enabled, allows the size of the grid to be adjusted within the area defined by the **size** function by moving the cursor vertically or horizontally on the screen. This changes the overall scale of the active grid points within the grid without affecting the size limits of the grid.

The **s** (slip) box to the right of the scale box, when selected, allow the resized area of the grid to be repositioned without affecting the edges of the grid. The p (perimeter) box when selected allows the edges of the grid to be adjusted. When both the s and the p boxes are enabled, the edges of the grid can be moved without affecting the selected area.

**It is possible for the grid to overlap the edge of the image. This can be used to affect the edges of the image (including a key channel).**

### 1.12.3 Adjust and Tweak Grid Points

The **adjust** box, when selected, allows the position of a grid point (green) to be moved to match a specific point on the image without producing a warp. This offset box allows specific points on the image to be aligned with specific points on the grid and can be used with locked points to protect a specific part of the image while a warp occurs about the protected area. Points that have been adjusted are shown in yellow. When **tweak** is selected the underlying image is affected accordingly.

The **tweak** box, when selected, allows individual grid points (that are green) to be repositioned. When an individual point is moved it affects the points about it (unless they are locked). The affect each point has on its neighbours decreases the further they are away from each other in the grid.

The **tweak** and **z** boxes, when selected together, allow the content of the image beneath the selected grid point to be expanded or shrunk by moving the cursor on screen. This does not affect the shape of the image in 3D space. If the centre point of the grid is adjusted this creates a magnifying glass lens effect when zoomed in, or a vanishing point when zoomed out.

The value in the **elastic** green numeric box controls the affect each grid point can have on its neighbours. A value of 5 only affects the selected point itself and a value of 200 affects all the points in the grid. The grid points closest to the selected one are affected more than those furthest away.

The **lock** box, when selected, allows individual grid points to be locked in their current position within the overall grid. When a point is locked (shown red), moving a point adjacent to the locked point does not affect its position. Reselecting a red point (other than those on the edges of the rectangle) unlocks the point.

### 1.12.4 Grid Keyframe Controls

Keyframes can be inserted, and removed, by selecting the appropriate function from the blue scroll box next to **KFr**.

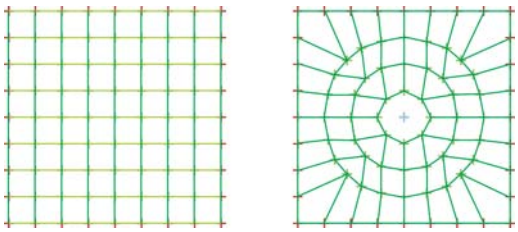
| | |
|---|---|
| **Ins src/dst** | inserts both a source keyframe and a destination keyframe at the current timeline cursor position without affecting any keyframe before or after it on the timeline. This type of keyframe insertion should be used to avoid the image tearing. |
| **Ins src** | inserts a source keyframe at the current timeline cursor position without affecting any keyframe before or after it on the timeline. |
| **Ins dst** | inserts a destination keyframe at the current timeline cursor position without affecting any keyframe before or after it on the timeline. |
| **Clear** | removes the keyframe at the current timeline cursor position without affecting any other keyframes before or after it on the timeline. |

**Use the delete - keyframe - all at the top left of the menu area to clear all keyframes on the timeline. Grid settings (including size, scale, position and all keyframes) can be reset by selecting reset - all, also at the top left of the menu area.**

### 1.12.5 Change the Grid Display

The **show movement** box, when enabled, displays the displacement of each grid point with respect to its normal position. This is shown as yellow lines connected to each grid point.

The **grid** box, when selected, displays grid lines linking each grid point to show the relationship between each point.



The colour of the grid can be selected from the blue scroll box: **R** (red), **G** (green), **B** (blue), **C** (cyan), **M** (magenta), **Y** (yellow), **Bk** (black) or **Wh** (white). The green numeric box controls the opacity of the grid.

The blue scroll box (displaying **no points**) allows a single tracking path to be selected and applied to the centre point of the grid so that the grid can track a specific point on the image. The track takes control of any positional movement of the overall grid but allows movement within the grid itself to continue.

## 1.13 Mosaic

### 1.13.1 Description

This plug-in allows the pixels that form the image to be grouped together as a mosaic of coloured tiles.

### 1.13.2 Adjust the Tile Size

The size of the mosaic tile displayed on screen is determined by the values in the green numeric boxes that display when the **single/both** boxes are selected.

The green **Pixel Size** box, which is available when **single** is selected, allows both the width and height of the tiles to be changed together. A value of 1 in this box returns the clip/image to normal.

The green **Pixel Width** and **Pixel Height** boxes, which are available when the **both** box is selected, allows the width and height of the tiles to be adjusted independently. A value of 1 in both boxes returns the clip/image to normal.

## 1.14 Nova

### 1.14.1 Description

This plug-in produces a bright star-like (or supernova) light that can be repositioned and coloured as required.

### 1.14.2 Define Nova Size and Position

The size and position of the supernova is defined by drawing a red circle on the image on the desktop. This circle can be drawn manually or using green numeric boxes in the menu.

To define the size and position of the supernova manually place the cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size then release. The defined area should then display the supernova.

To resize and reposition the supernova use the green numeric boxes as described below:

The **X Cord** box defines the horizontal position of the supernova.

The **Y Cord** box defines the vertical position of the supernova.

The **Radius** box defines the size of the supernova.

The **Rays** box defines the number of rays of light emanating from the supernova.

The **Rotate** box is used to rotate the nova.

### 1.14.3 Control the Nova Colour

The colour of the nova is controlled by the selection in the blue scroll box (displaying **Use Filter**, **Own Pic** or **Colour Map**).

If **Use Filter** is selected the colour of the nova is defined by the following numeric boxes:

**RedFilter** is used to filter the light produced by the supernova. This allows the red component of the light to be increased or reduced.

**GreenFilter** is used to filter the light produced by the supernova. This allows the green component of the light to be increased or reduced.

**BlueFilter** is used to filter the light produced by the supernova. This allows the blue component of the light to be increased or reduced.

**Random Hue** determines the level of random colour that displays in the nova. Larger values increasing the range of colours.

If **Own Pic** is selected the colour of the nova matches the colour of the background image itself at that point. If the nova position changes, the colour changes correspondingly to match the background.

If **Colour Map** is selected the colour of the nova matches the colour of a second clip at that point. If the nova position changes, the colour changes to match that of the second clip at that point.

To add a second clip (control clip - for example a copy of the first clip) drag a clip from the clips bin and drop it on the blue **ControlInputClip** box. Its title displays in the blue box to the right.

The **ViewCtrlClip** box, when selected, displays the control clip and allows the placement and sizing of the nova over the control clip.

## 1.15 Ripple

### 1.15.1 Description

This plug-in allows the background clip to be distorted by circular ripples emanating from a centre point on the image. The size, position and depth of the ripples can be adjusted, and a light source applied, to achieve the desired effect. A second clip image can also be mixed into the ripples to produce different effects.

### 1.15.2 Adjust the Ripple Parameters

The size and position of the area to be covered with ripples is defined by drawing a red circle on the image on the desktop. To define this area position the cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size.

To resize and reposition the area covered by the ripples change the settings in the green numeric boxes. The functions of the boxes are as follows:

| | |
|---|---|
| **Wave X** | the horizontal position for the centre of the ring of ripples. A value of 0 places the centre on the left edge of the image. |
| **Wave Y** | the vertical position for the centre of the ring of ripples. A value of 0 places the centre on the top edge of the image. |
| **Inner Radius** | defines how close to the centre the ripples start. A value of 0 starts the ripples at the centre and larger values move the first ripple away from the centre. |
| **Outer Radius** | defines how far from the centre the ripples spread. This value must be larger than the Inner Radius value. This value can be keyframed to make the outer extent of the ripples move from the centre to edge of the image. |
| **Amplitude** | the height of the ripples and therefore the amount of displacement to be applied to the background image as the ripples move. |
| **WaveLength** | the distance between each ripple. Small values make the ripple close together and large values make the ripples further apart. |
| **RedFilter** | used to colour the light source. This allows the red component of the light to be increased or decreased. |
| **GreenFilter** | used to colour the light source. This allows the green component of the light to be increased or decreased. |
| **BlueFilter** | used to colour the light source. This allows the blue component of the light to be increased or decreased. |
| **Phase** | defines where the peaks of the ripples display on the image. This value can be keyframed from 0 to 360 to make the ripples move out from the centre. |
| **Fade out** | when enabled, allows the image from clip 2 to be fadedout towards the outer edge of the ripple area. This also reduces the amplitude of the ripples as they move further away from the centre. |
| **Light X** | the horizontal position for the centre point of the light source. A value of 0 places the centre of the light source on the left edge of the image. |

| | |
|---|---|
| **Light Y** | the vertical position for the centre point of the light source. A value of 0 places the centre of the light source on the top edge of the image. |
| **LightSize** | the brightness of the light source. A value of 0 turns of the light source. |
| **Merge** | when enabled, allows the image from clip 2 to be merged into the background image wherever there are ripples. |

### 1.15.3 Use Keyframes to Move the Ripples

To simulate a stone being dropped into a pond use keyframes to change the parameters as follows.


At the first keyframe (i.e. where the stone hits the water):

Set the **Inner Radius** value to match the size of the stone, for example 20.

Set the **Outer Radius** value to match the **Inner Radius** value.

Set the value in the **Amplitude** box to a large value, for example 20, to make tall ripples at the point of impact.

Set the value in the **Wavelength** box to a small value, for example 5, to make the ripples close together at the point of impact.

Set the value in the **Phase** box to 0.

At the last keyframe (i.e. where the ripples reach the edge of the image):

Increase the **Inner Radius** value. For example to 50.

Increase the **Outer Radius** value so that it covers the whole image, for example 500.

Reduce the **Amplitude** value to reduce the height of the ripples, for example 5.

Increase the **Wavelength** value. For example, a value of 20 to make the ripples spread further apart as they move away from the centre.

Set the value in the **Phase** box to 360 so that the ripples appear to move outwards.

## 1.16 Trail 1

### 1.16.1 Description

This plug-in applies a ‘ghosting’ effect to the background image where multiple copies of the images (with diminishing intensity) display over the original.

### 1.16.2 Adjust the Trail Parameters

The following parameters within this plug-in can be adjusted using the numeric values:

The value in the green **Repeat** box defines the number of times the image is repeated.

The value in the green **Repeat Angle** box defines the angle of rotation of each repeated image. A value of 90 rotates each image by 90º.

The value in the green **Repeat Zoom** box defines the increase in magnification of each subsequent image. Values between 0 and 2 give the best results.

The value in the green **Repeat Fade** ratio (source blend ratio) box defines the intensity of each subsequent image. Values between 0 and 2 give the best results.

The values in the green **XCrop** and **YCrop** boxes are used to crop the edges of the repeated clip so that any unwanted edge detail can be discarded. This can be used to remove black edges from the picture where it is over-blanked.

Select the **Repeat_Smear** box to tile (add copies of the image in both x and y axis to fill the display) the resultant Trail. This is generally only visible if the trail is smaller than the original, or at an angle revealing blank space.

## 1.17 Transition

### 1.17.1 Description

This transition plug-in allows the foreground picture to be distorted by a collection of filters as part of the transition to the background image. The effects include bubble, lens and bulge that are applied to a defined circular area of the picture.

The first clip must be selected on the timeline. The second clip can then be dragged from the clips bin and dropped on the blue Clip2 box. Its title displays in the blue box to the right of this box.

### 1.17.2 Select the Warp Type

The type of warp to be applied to the image can be chosen from the blue scroll box which provides the following choices:

| | |
|---|---|
| **bubble** | This gives the effect of a single bubble with the image of clip 2 reflected in it. |
| **pack** | This gives the effect of multiple bubbles joined together. |
| **bulge** | This makes the image bulge where the circular filter is positioned. |
| **burn** | This gives the effect of a burn on the image where the circular filter is positioned. |
| **tunnel** | This provides a tunnel effect by wrapping the image of clip 2 around the inside of a tube. |
| **lens** | This gives the effect of a magnifying glass where the circular filter is positioned. |
| **cone** | This wraps the image of clip 2 into a conical shape. |

### 1.17.3 Define the Filter Area

The area to be filtered using one of the warp types is defined by drawing a red circle on the image on the desktop. This circle can be drawn manually or using green numeric boxes in the menu.

To define the area manually position the cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size. The defined area displays the area processed with the selected filter.

To resize and reposition the area to be processed using the green numeric boxes as described below:

The **X Cord** box defines the horizontal position for the centre of the circle. A value of 0 represents the left edge of the image.

The **Y Cord** box defines the vertical position for the centre of the circle. A value of 0 represents the top edge of the image.

The **Radius** box defines the size of the circle. This value can be keyframed to make the transition between the clip 1 and clip 2. A value of 0 displays clip 1 and a value in excess of 150 (dependent on video format) displays clip 2.

The **X Crop** and **Y Crop** boxes are used to crop the edges of clip 2 so that any unwanted edge detail can be discarded. This can be used to remove black edges from the picture where it is over-blanked.

### 1.17.4 View Clips

The **Show_Result** box, when enabled, displays the result of filtering process of clip 2 over clip 1 on the desktop.

The **Show_Clip1** box, when enabled, displays the unprocessed image of clip 1 (selected layer) on the desktop.

The **Show_Clip2** box, when enabled, displays the unprocessed image of clip 2 on the desktop.

## 1.18 Water Distortion

### 1.18.1 Description

This plug-in allows the background clip to be distorted by the luminance level of the control clip. This produces a water-like distortion of the background.

Background Clip Control Clip Result Clip

In this example the background clip (the eye) is modified by the luminance level of the control clip (the girl).

Drag the control clip from the clips bin and drop it on the blue **Control Input Clip** box in the menu area.

### 1.18.2 Adjust the Distortion

The effect of the control clip on the background clip is determined by the following boxes. A value of 0 in all of these boxes turns off the effect.

The value in the green **Max Brightness** box determines the how much of the control clip shows through the background clip. A good starting value for this is 20.

The value in the green **X Distort** box determines the amount of horizontal distortion in the background clip that is caused by the luminance level of the control clip. A good starting value for this is 10.

The value in the green **Y Distort** box determines the amount of vertical distortion in the background clip that is caused by the luminance level of the control clip. A good starting value for this is 10.

The blue scroll list (displaying **Sharp**, **Soft** or **Softer**) is used to apply different softening to the water effect.

## 1.19 Wave

### 1.19.1 Description

This plug-in provides three different wave-like effects that can be applied to the background image.

### 1.19.2 Adjust the Wave Parameters

The blue scroll box in the menu area allows one of the following wave styles to be chosen:

The **Directional Wave** style allows the image to be modified with a wave in a direction defined by the Angle value.

The **Sea Water** style allows the image to be modified with a sea water style pattern.

The **Costr** style contains both horizontal and vertical patterning, as shown in the example.

The green numeric boxes in the menu control the following parameters:

The **Y Begin** box defines the vertical start position for the wave pattern.

The **Y End** box defines the vertical stop position for the wave pattern.

The **XBegin** box defines the horizontal start position for the wave pattern.

The **XEnd** box defines the horizontal stop position for the wave pattern.

The **Phase** box determines where in the sinusoidal wave the pattern starts.

The **Amplitude** box determines the wave height of the wave pattern.

The **Wavelength** box defines the distance between the waves in the wave pattern.

The **Angle** box defines the direction that the wave moves:

0 = horizontal left to right
90 = vertical top to bottom
180 = horizontal right to left
270 = vertical bottom to top

## 1.20 Whirl Pinch

### 1.20.1 Description

This plug-in distorts the background image with a whirlpool or vortex effect. The circular area of the whirl can be placed anywhere on the image and at any size.

### 1.20.2 Adjust the Whirl Parameters

The size and position of the aperture for the whirl is defined by drawing a red circle on the image. To define this aperture manually position the cursor on the image at the centre of the circle to be drawn. Press down and drag out the red circle to the desired size.

The green numeric boxes in the menu control the following parameters:

The **Centre X** box defines the horizontal position for the centre of the whirl. A value of 0 places the centre of the whirl on the left edge of the image.

The **Centre Y** box defines the vertical position for the centre of the whirl. A value of 0 places the centre of the whirl on the top edge of the image.

The **Radius** box defines the overall size of the whirl.

The **PinchAmount** box defines how much of the image is used to calculate the pinch amount.

The **Angle** box defines the amount of twist that is applied to the image. A value of 360 rotate the centre part of the image through 360 degrees with respect to the outside edge of the whirl.

The **XCrop** and **YCrop** boxes are used to crop the edges to discard any unwanted edge detail. This can be used to remove black edges from the picture where it is over-blanked.

## 1.21 Wind

### 1.21.1 Description

This plug-in gives the effect of wind eroding the image.

### 1.21.2 Adjust the Wind Parameters

The following wind parameters can be adjusted using the green menu boxes:

The **Angle** box determines the direction in which the wind is blowing:

0 = from left to right

90 = from top to bottom

180 = from right to left

270 = vertical bottom to top

The **Threshold** box sets the luminance level of the image at which the wind starts eroding the image.

The **Strength** box defines the strength of the wind and therefore the distance that eroded particles move.

**By using increasing and decreasing values of Threshold and Strength at different keyframes it is possible to give the appearance of gusting wind.**

# 2. Primatte Plug-in

## 2.1 Overview

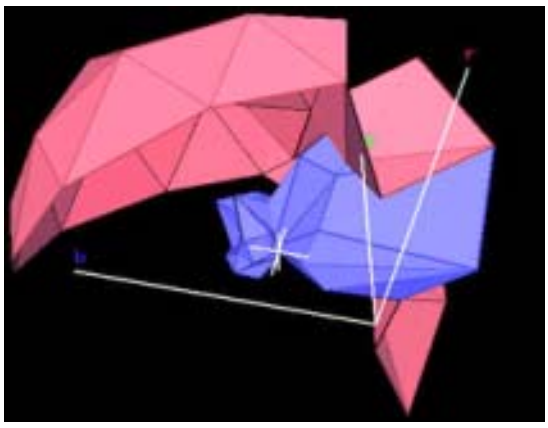
### 2.1.1 General

The Primatte plug-in is a Software Keyer plug-in. Use the Primatte Software Keyer plug-in to key out areas of a specific colour (usually blue or green screen) in the current layer, a ‘foreground’ image or clip.

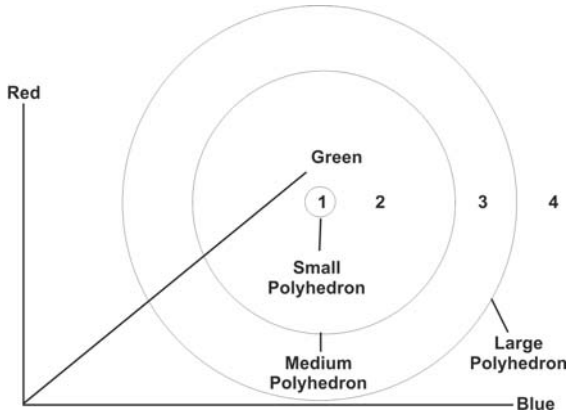
### 2.1.2 The Primatte Algorithm

#### 2.1.2.1 How Primatte Works

The Primatte chroma key algorithm is a sophisticated method of colour space segmentation that can be easily explained to help achieve maximum effectiveness with the tool. Basically, Primatte segments all the colours in the foreground image into one of four separate categories. The result is a ‘spill suppressed’ foreground image and a matte which is used to apply the modified foreground to a suitable background. Primatte works in 3D RGB colour space.

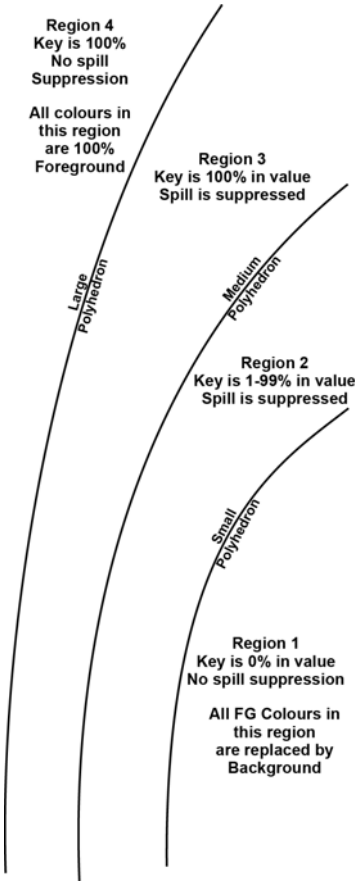


By operating the Primatte interface, three concentric, multi-faceted polyhedrons are created. These can be pictured as three globes (polyhedrons) one within the other, which all share a common centre point.



The creation of these polyhedrons separates all possible foreground colours into one of four regions; inside the small polyhedron (1), between the small and medium polyhedrons (2), between the medium and the large polyhedrons (3) and outside the large polyhedron (4).




Region 1 - contains all of the foreground image colours that are considered 100% background. These are the green or blue or whatever colours that were used as the backing (key) colour of the foreground image.

Region 2 - contains all the foreground colours that are at the edges of the foreground object(s), in glass, glass reflections, shadows, sheets of water and other transparent and semi-transparent colour regions. These colour regions also have spill suppression applied to them to remove colour spill from the backing screen.

Region 3 - contains all the foreground image colours that are 100% foreground but have spill suppression applied to them to remove colour spill from the backing screen. Otherwise they are 100% solid foreground colours.

Region 4 - contains all the 100% foreground image colours that are not modified from the original foreground image. There is no spill suppression applied to these colours.

In the first step when using Primatte (**Select BG Colour**), the backing (key) colour on the original foreground image is sampled. The sample is usually taken from a ‘medium shaded’ area near the foreground object. By ‘medium shaded’ area, it is meant that if green is the backing colour and the green area of the foreground image has many shades of green ranging from very pale green to almost black, choose a shade of green in between these extreme ranges. If good results are not obtained using this sample, reset Primatte and take another sample using a slightly darker or lighter shade of green. The first sample of Primatte often determines the final result as the centre point of all three polyhedrons is created based on this first sample.

A single pixel may be selected or a range of pixels (rectangular sample). If a range of pixels is taken, the sample is averaged to get a single colour sample. This single pixel or averaged colour sample then becomes the centre of the small polyhedron. A few other shades around that colour are included in the original small polyhedron.

It is recommended that a single pixel be selected as the first sample to give an idea where the centre point of the polyhedrons is located. If a rectangular sample is made, the average colour that becomes the centre point may not be obvious. To get an idea how this sample affects the algorithm, reset the Primatte plug-in, go to the Matte View (‘key’ box on) and press around on the green or blue screen area while in the **Select BG Colour** operation mode. The results of the initial settings of the polyhedrons can be seen immediately.

After making a sample of the backing screen (key) colour in the first step, the result is a small golf ball-shaped polyhedron.

The second step is to clean up the backing colour area by adding additional shades of green or blue to the small polyhedron. This second step (**Clean BG Noise**) is usually executed while viewing the black and white matte (key) view.

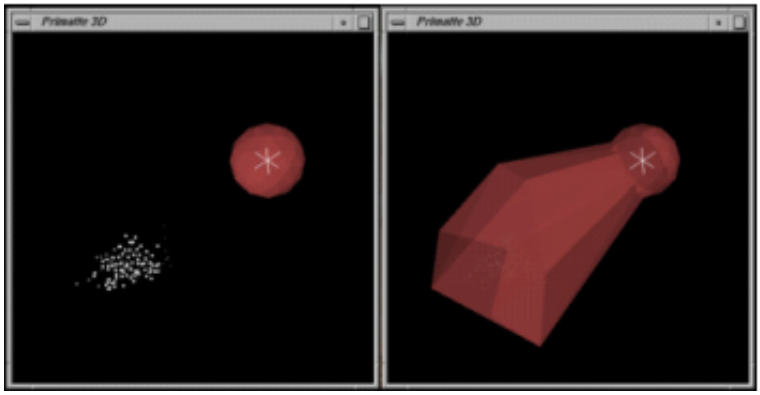
a) before background noise removal

b) after background noise removal

While in the **Clean BG Noise** sampling mode, sample the white milky regions as shown in a) in the previous diagram. As these regions are sampled, they turn to black as shown in b) in the previous diagram.

These new shades of green or blue (the white milky areas in the matte view) are added to the small polyhedron.

The following diagram on the left shows the new pixels sampled (white dots) in relation to the small polyhedron, and the diagram on the right shows how the small polyhedron extends outward to encompass the newly sampled colours into the small polyhedron.



The advantage of this technique is that the polyhedron distorts to enclose only the shades of blue or green that are in the backing screen. Other shades of blue or green around these colours are left undisturbed in the foreground. Other chroma keyers expand from a golf ball-sized shape to a baseball to a basketball to a beach ball. Since they expand in all directions, many shades of colour are relegated to 100% background making it hard to get good edges around the foreground objects.

Now that the small polyhedron has been created, medium and large polyhedrons must be shaped. A default medium and large polyhedron are both automatically created and are then modified based on the other Primatte operations. The third Primatte step (**Clean FG Noise**) is used to sample and eliminate grey areas in the 100% foreground area of the image.

a) before foreground noise removal

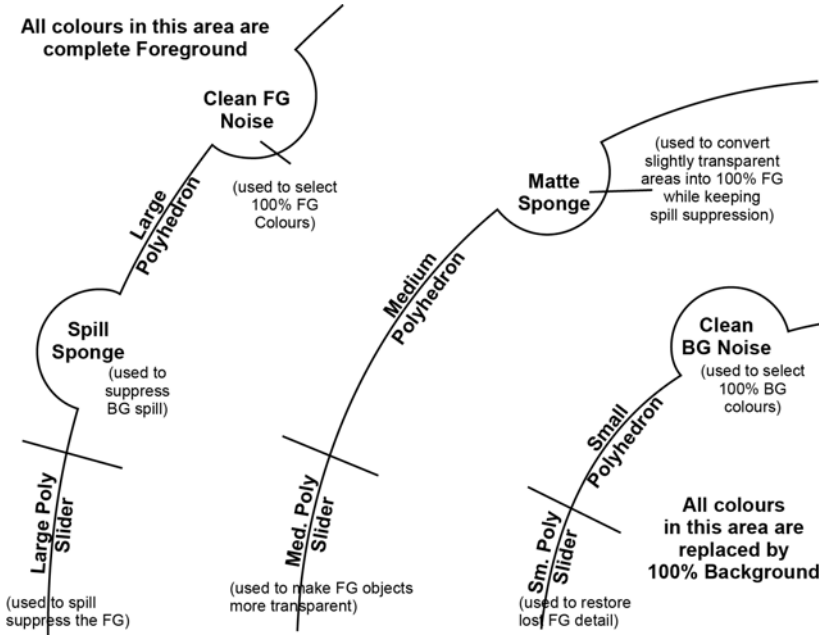
b) after foreground noise removal

Make several samples on the dark, greyish areas on the foreground object until it is solid white in colour. Primatte is shaping the large polyhedron with each colour region that is sampled. Take care to not sample too close to the edges of the foreground object. Getting too close to the foreground object's edges results in hard edges around the foreground object. Primatte uses these samples to modify and shape the polyhedrons to the desired shape. At this point, the matte or key has been created and allows the foreground objects to be composited into a new background image.

When changing the display mode from black and white matte view (**key** box on) to colour composite view (**video** box on), there is usually 'colour spill' on the edges (and sometimes the centre) of the foreground objects. When on the edges of the foreground object, this spill comes from where the edges of the foreground object blended into the backing colour. If it is on the centre of the foreground object, it usually results from reflected colour from the backing screen. The next Primatte step, either **Spill Sponge**, **Fine Tuning** or **Spill -**, can now be used to eliminate this spill colour.

The following diagram shows what the various tools in Primatte do to the Polyhedrons when they are used.




The **Spill Sponge** bulges the large polyhedron in the colour region specified. A colour region is specified by pressing on the image in a particular area with spill present. For example, when sampling the cheek of a foreground person, Primatte goes to the section of the large polyhedron closest to that particular flesh tone and bulges the polyhedron there. As a result, the flesh tones move from outside the large polyhedron to in between the medium and large polyhedrons. This is Region 3 and is 100% foreground with spill suppression. As a result of the suppression, the spill is removed from that cheek colour and all other shades of that colour on the foreground. Continue to sample areas of the image where spill exists and each sample removes spill from another colour region.

When all spill has been removed, as a final step, go back to the matte view (key box on) and ensure that grey, transparent areas have not appeared in the foreground area. If there are any, select the **Matte Sponge** operation mode and re-sample the grey pixels until they have all turned white again.

The **Matte Sponge** and **Spill Sponge** tools bulge or dent the polyhedrons a preselected amount. If the desired results are not achieved or the results are too extreme for the image, a manual method can be applied. Choose the **Fine Tuning** sliders, select a colour region of interest and then move the appropriate slider to get the desired results.

To remove spill, select a region of the composite image with spill on it. Move the **LPolyspill** (large polyhedron) slider to the right a little - the large polyhedron bulges and the spill is removed. Move it a little more if necessary. Moving this slider to the right removes spill (moves the colours from outside the large polyhedron to between the medium and large polyhedrons), and moving it to the left dents the large polyhedron and moves that colour region to outside the large polyhedron.

If a foreground object shadow is sampled and then the **MPoly-matte** (medium polyhedron) slider is moved to the right, the shadow becomes more transparent. This is useful for matching composited shadows to shadows on the plate photography. It can also be used to make clouds or smoke more transparent.

If some foreground detail disappears during the composite, select where the detail was and move the **SPoly-detail** (small polyhedron) slider to the left. This dents the small polyhedron in that colour region and releases the detail pixels from the small polyhedron into the visible region between the small and medium polyhedrons.

The **Spill Sponge** and **Matte Sponge** tools are ‘shortcut tools’ that automatically move the sliders a preselected amount as a timesaving step. Other ‘shortcut tools’ include the **Make FG Transparent** tool and the **Restore Detail** tool.

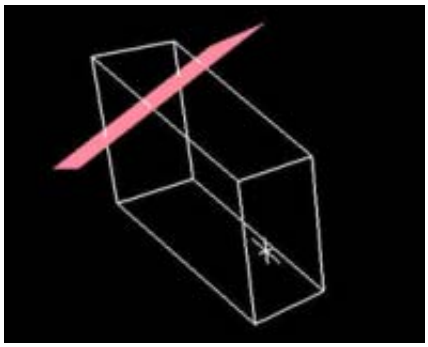
These ‘shortcut tools’ are one-step operations where sampling a colour region of interest performs a precalculated operation. Most operations using Primatte only require these tools, but manual operation of the sliders is an option, if required.

The **Spill -** tool bulges the large polyhedron a small amount incrementally in the colour region that is sampled and the **Spill +** tool dents it a small amount with each press. The **Matte -** and **Matte +** tools do the same to the medium polyhedron and the **Detail -** and **Detail +** do it to the small polyhedron.

#### 2.1.2.2 How Primatte RT Works

Primatte RT is the simplest algorithm and, therefore, the fastest. It uses only a single planar surface to separate the 3D RGB colour space and, as a result, does not have the ability to separate out the foreground from the backing screen as carefully as the Primatte algorithm. Like the Primatte RT+ algorithm, Primatte RT might not work well with less saturated backing screen colours and it too does not support the **Complement** colour spill suppression method (which is the spill suppression method that delivers the best detail). For a well-lit and photographed image or clip, this algorithm produces good results and render very quickly.

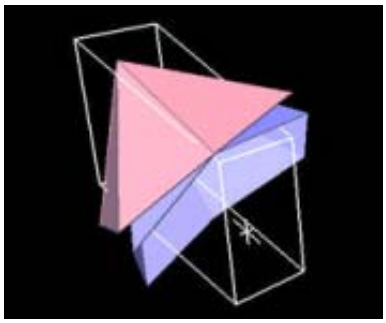
The diagram shows a visual representation of the Primatte RT algorithm after an image has been processed.



#### 2.1.2.3 How Primatte RT+ Works

The Primatte RT+ algorithm differs from the Primatte algorithm in that it has a six surface colour separator instead of the 127-faceted polyhedrons. This makes the Primatte RT+ algorithm much simpler and, therefore, faster to calculate. The results and performance of Primatte RT+ falls in between the Primatte and Primatte RT options. Where the Primatte RT+ algorithm might not work well is with less saturated backing screen colours, and it also does not support the **Complement** colour spill suppression method (which is the spill suppression method that delivers the best detail). For a well-lit and photographed image or clip, this algorithm produces good results and renders quickly.

The diagram shows a visual representation of the Primatte RT+ algorithm after an image has been processed.

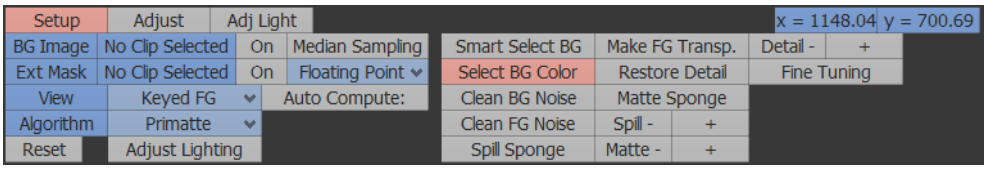


## 2.2 Using the Plug-in

The Primatte software plug-in directly uses the processing power of the CPU and therefore the performance of the plug-in is limited by the processor power that is available.

When the Primatte key plug-in is selected, the menu area displays keying menus while the desktop provides a visual representation of the keying process being performed at the current frame position in the clip.




During plug-in operation, the composite displays on the screen when the video (**v**) box, at the top right of the menu area, is on. When the key (**k**) box is on, the matte (alpha channel) generated by the keyer plug-in displays.

**Use the undo and redo boxes to the lower left of the menus to undo and redo each step as the plug-in settings are adjusted.**

**Screen shots in this chapter show a blue screen image, and the term ‘blue screen’ is used throughout. However, the foreground image could just as easily utilize another key colour, for example, ‘green screen’.**

The left half of the Primatte menu, containing the Configuration Boxes is always visible. The right half of the Primatte menu displays different functions according to which of the **Setup**, **Adjust** or **Adj Light** boxes is currently selected.

### 2.2.1 Configuration Boxes

These boxes are generally used to configure Primatte before starting the actual keying process.

#### 2.2.1.1 Background Image

Use the **BG Image** box to select a background image. Open the Clips Bin, then drag and drop the desired background clip or image from the clips bin to the adjacent box labelled **No Clip Selected**. Enable the **On** box next to this to enable the background image.

This box often remains unused in its default state, as the layering capability within the **MLT FX** application is used to composite the keyed foreground clip over one or more background layers. Therefore, if the **BG Image** box is used, the Primatte plug-in composites the current foreground layer over a single background image or clip. Otherwise, the **MLT FX** application composites the Primatte plug-in’s result (with key channel) over the other background layers in the clip.

#### 2.2.1.2 External Mask

Use the **Ext Mask** box to select a garbage matte (external mask). Open the Clips Bin, then drag and drop the desired external mask clip or image from the clips bin to the adjacent box labelled **No Clip Selected**. Enable the **On** box next to this to enable the external mask. When enabled, white pixels in the external mask remove (i.e. cut out) pixels from the foreground image, whereas black pixels in the external mask leave the foreground intact (and grey pixels attenuate the foreground based on their brightness).

#### 2.2.1.3 View

The **View** box controls what Primatte displays as its render result. The default is **Keyed FG**, which is normally used when compositing multiple clip layers with a Primatte-keyed foreground layer over them. The other options are useful for previewing when adjusting the key, and to help see what Primatte is doing as it operates.

**Keyed FG**

Displays Primatte's final result, as a processed foreground image with spill suppression in the RGB channels, displayed when the video (**v**) box is on, and a Primatte-generated key in the alpha channel, displayed when the key (**k**) box is on. Use when compositing Primatte's result over other clip layers.

**Composite**

Use only when a background clip or image has been assigned using the **BG Image** box. Displays the foreground image composited over the assigned background, as rendered by Primatte.

**Matte**

The key channel generated by Primatte. This is identical to the alpha channel when using the **Keyed FG** view. Use this view when picking colours and refining the result, for example, when using the **Clean BG Noise** and **Clean FG Noise** tools.

**Proc FG**

Displays the processed foreground as generated by Primatte, with spill suppression applied. This is identical to the RGB channels when using the **Keyed FG** view. This view shows the foreground against a black background usually with a lot of false colouring or noisy pixels around it.

The noisy pixels are generated to maintain the fine hair or thin foreground detail, and have spill suppression applied, which cancels out blue or green spill that might appear around the edges of the keyed foreground.

Because the matte (key) values around the noisy pixels are very small and are multiplied against the noise, the end result is highly desirable (the noise values are very transparent and composite well against the background).

**FG**

Displays the original foreground image, which is useful for reference when previewing.

**BG**

Displays the original background image assigned using the **BG Image** box (this box is usually unused when doing multi-layer composites).

**Ext Matte**

Displays the external matte image assigned using the **Ext Matte** box (this is useful for reference during previewing).

**Defocus Source**

Displays the foreground with Grain Removal applied (this is useful for reference during previewing).

**Status**

Displays a colour-coded image showing how the keyed foreground has changed from the original foreground. This is helpful for troubleshooting difficult keys. Each pixel in this view is colour-coded as follows:

Black = keyed foreground is 100% transparent.
White = keyed foreground is 100% opaque, RGB same as original.
Yellow = keyed foreground is 100% opaque, RGB differs from original.
Blue = semi-transparent areas of keyed foreground.

**Adj Light FG**

Displays the foreground, with **Adjust Lighting** applied to areas of backing colour (for example, areas of blue screen).

**Adj Light BG**

Displays the extrapolated backing screen generated by **Adjust Lighting** processing. This is then applied to the original foreground to generate the **Adj Light FG**.

**Hybrid Matte**

Displays the shrunken matte used for Hybrid Rendering (this is applied to the foreground areas with original colours).

#### 2.2.1.4 Algorithm

The Primatte Software plug-in offers two alternate, faster algorithms (Primatte **RT** and Primatte **RT+**) that can be chosen for faster rendering results at the expense of precision. The algorithm choices are further described below, with **Primatte** being the default with highest precision:

**Primatte** the default **Primatte** algorithm delivers the best results and supports both the **Solid Colour** and the **Complement** colour spill suppression methods. It is the algorithm that uses three multi-faceted polyhedrons to separate the 3D RGB colour space. It is also the default algorithm mode and, because it is processor intensive, it may take the longest to render.

**RT** RT is the simplest algorithm and therefore, the fastest. It uses only a single planar surface to separate the 3D RGB colour space and, as a result, does not have the ability to separate out the foreground from the backing screen as carefully as the **Primatte** algorithm. Disadvantages of the **RT** algorithm are that it does not work well with less saturated backing screen colours and it does not support the **Complement** colour spill suppression method.

**RT+** RT+ lies between the other two options. It uses a six planar surface colour separation algorithm and delivers results in between the other two in both quality and performance. Disadvantages of the **RT+** algorithm are that it does not work well with less saturated backing screen colours and it does not support the **Complement** colour spill suppression method.

#### 2.2.1.5 Reset Parameters

Press the **Reset** box to reset all Primatte parameters to their default state and to restore the current (target) layer to its original un-keyed foreground contents (with blue or green screen visible).

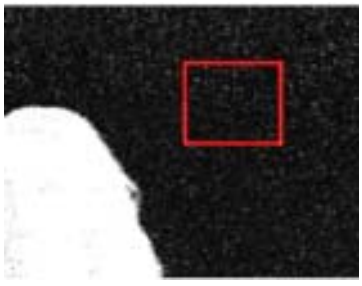
#### 2.2.1.6 Adjust Lighting

This box is used to toggle the lighting adjustments on or off.

To configure the lighting adjustments, see “Adjust Lighting” on page 52.

#### 2.2.1.7 Median Sampling

The Median picking feature is useful to filter noisy pixels when sampling and picking operations. For example, with a noisy image, pick a region to sample, and normally all the pixels in that region are used for the processing. To improve this, optionally set Primatte to apply a 3 × 3 median filter on the sampled input pixels prior to performing the sampling operation. Select the **Median Sampling** box to enable this.



#### 2.2.1.8 Floating Point

By default, the Primatte library does all internal calculations using floating point resolution. Floating point precision is faster and can produce higher quality images.

If required, select **16 Bit** from the blue scroll box so that internal calculations are made in integer mode using 16-bits per RGB component.

#### 2.2.1.9 Auto Compute

Using the **Auto Compute** box can make the keying operation much easier. Press this box as a first step and it automatically senses the backing screen colour, eliminating it and deleting some of the foreground and background noise that is normally cleaned up using **Clean BG Noise** and **Clean FG Noise** of the Primatte operation. If good results are obtained with **Auto Compute**, proceed immediately with spill removal (using **Spill Sponge**, **Spill +/-**, etc.).

When the **Auto Compute** box is selected, two related number boxes display. These two controls are used to fine tune the results of **Auto Compute** (the composite updates each time either value is adjusted):

**FG** This number box controls clean up of noise in the foreground. Positive values have a stronger effect on foreground noise, while negative values have a milder effect on foreground noise.

**BG** This number box controls clean up of noise in the background. Positive values have a stronger effect on background noise, while negative values have a milder effect on background noise.

### 2.2.2 Setup

When the **Setup** box is selected, the key mode selection boxes display in the right half of the Primatte menu. The basic functionality of the Primatte keyer plug-in is based around these mode selection boxes and the image area of the desktop. Only one of the mode selection boxes can be active, and this determines how the plug-in operates when colours are selected on the image.

These different modes represent the different steps to be taken to produce a high quality composite image.

#### 2.2.2.1 Smart Select Background

Enable the **Smart Select BG** box, then pick the key colour from the image area. Once done, the composite, with keyed foreground based on the colours selected displays. Ensure that the video (**v**) box is selected so that the composite is visible, and that the proper **View** is selected.

When selecting colours, position the cursor in the key colour of the image area near the foreground objects and sample the targeted background colour.

Hold down and drag within the image area to select and average the key colour, or make a single pixel selection to sample a single colour.

When the cursor is released, the compositing process starts. If the foreground shot was made under ideal lighting conditions, then 90-95% of the composite is accomplished in this one step.

If the cursor is dragged on the key colour area (for example, blue screen), Primatte averages the multi-pixel sample to get a single colour to adjust to. Sometimes Primatte works best when only a single pixel is sampled instead of a range of pixels. The colour selected at this point in the procedure is critical to the operation of the plug-in from this point forward.

Smart select is optimised for blue or green backing screens. If using other colour backing screens use **Select BG Colour**. See “Select Background Colour” on page 44.

**If problems are encountered later in the process after having selected a range of key colour shades, try Smart Select BG again with a single dark key colour pixel or single light key colour pixel.**

**If the foreground image has a shadow in it that is required in the composite, do not select any of the darker pixels in the shadow, and the shadow stays with the rest of the keyed foreground image.**

#### 2.2.2.2 Select Background Colour

The **Select BG Colour** box works in the same manner as **Smart Select BG**, and although the Smart Select Background method is preferred, **Select BG Colour** is useful when using backing screens that are colours other than blue or green.

The differences between smart select background and select background colour are:

| | |
|---|---|
| **Select BG Color** | Uses the traditional Primatte method of taking the sampled backing screen colour, projecting a line in the opposite direction on the hue wheel and generating artificial pixels that may represent the foreground object. Then, using the artificially generated foreground pixels, internally does the clean foreground noise operation and creates the shape of the middle and outer polyhedrons. It then renders the composite using the generated polyhedrons. |
| **Smart Select BG** | Gets the sampled backing screen colour and then analyses the original foreground image and determines the foreground areas using a foreground detection routine. Then, internally, using the newly determined foreground areas, performs the clean foreground noise operation and determines a more desirable shape for the middle and outer polyhedrons. It then renders the composite using the generated polyhedrons. |

#### 2.2.2.3 Clean Foreground and Background

The second and third steps in using the Primatte plug-in require the key (matte) to display in the image area. Switch the **View** box to **Matte** to display the key signal generated by Primatte.

Press the **Clean BG Noise** box. If **View** is set to **Matte**, the image area displays the current key. If there are any white regions in the dark ‘blue screen’ area, it is noise and is to be removed. Move the cursor into these areas and sample these ‘white noise’ regions. Repeat this procedure as often as necessary to clear the noise from the background areas. Sometimes increasing the brightness of the monitor or changing the screen gamma allows noise, that is otherwise invisible, to be seen.

a) before background noise removal

b) after background noise removal

**When clearing noise from around loose flying hair or any background or foreground transitional area, be careful not to select any areas near the edge of the hair. Leave a little noise around the hair, as this can be cleaned up later using the Fine Tuning tool.**

**Most pixels displayed as a dark colour close to black in a key image become transparent and virtually allow the background to be the final output in that area. Consequently, there is no need to eliminate all subtle noise in the ‘blue screen’ portions of the image. In particular, if an attempt is made to meticulously remove noise around the foreground object, a smooth composite image is often difficult to generate.**

If there are darker or grey regions in the middle of the mostly white foreground object (i.e. if the key is not 100% in some portions of the targeted foreground) select Clean FG Noise mode.

Use the same techniques as with the Clean BG Noise mode, but this time, sample the darker pixels in the foreground area until that area is as white as possible. Avoid the edges of the foreground object.

a) before foreground noise removal

b) after foreground noise removal

#### 2.2.2.4 Remove Colour Spill

The previous steps are necessary to create a clean matte (key). With this key, the foreground can be composited onto any background image. However, if there is ‘spill’ on the foreground object from light that was reflected off the original background, a final operation is necessary to remove that background spill to get a more natural looking composite.

a) before spill removal

b) after spill removal

There are two ways to remove the spill colour in Primatte. The simple method is to select **Spill Sponge** mode (ensure the video (**v**) box is on, and the **View** box is set so the composite displays) and then sample the spill areas away. By just positioning the cursor over a blueish pixel on the foreground object and selecting it, the blue is removed and replaced by a more natural colour. A region of pixels containing spill can also be selected by pressing and dragging in the area.

**This operation works on foreground ‘colour regions’. In the previous image, the hair fringes and the insides of the arms are sampled.**

After these steps, there may still be some blue fringing on areas around the hair or a blue tinge to the face or clothing caused by light reflecting from the physical chroma key background.

See “Spill Process” on page 50 for details of further processes used to refine the key.

#### 2.2.2.5 Make Foreground Transparent

When this mode is selected, the opaque foreground colour region sampled in the image window becomes slightly translucent. This operation is useful for making foreground objects visible that are otherwise completely covered with smoke or clouds. To use this mode, select the **Make FG Transp.** box then drag on the image and release to select the desired colour region of interest in the foreground to make transparent.

#### 2.2.2.6 Restore Detail

With this mode selected, the completely transparent background region sampled in the image window becomes translucent. This operation is useful for restoring lost hair details or thin wisps of smoke etc. It shrinks the small polyhedron slightly. To use this mode, select the **Restore Detail** box, then drag on the image and release to select the colour region of interest to make translucent.

#### 2.2.2.7 Spill Sampling Tools

Using the **Spill +** and **Spill -** modes, gradually remove or recover the spill intensity on the foreground object by sampling the referenced colour region repeatedly. The conventional **Spill Sponge** tool removes the spill component in a single action at one level and does not allow sampling of the same pixel a second time.


Even if only a small amount of spill needs to be removed, the **Spill Sponge** removes a preset amount without allowing any finer adjustment.

#### 2.2.2.8 Matte Sampling Tools

The **Matte +** and **Matte -** modes are used to thicken or attenuate the matte information. If a thinner shadow is required on a foreground object, use the **Matte -** mode as many times as necessary to make it more transparent. Alternatively, use the **Matte +** mode to make the matte thicker in that colour region.


#### 2.2.2.9 Detail Sampling Tools

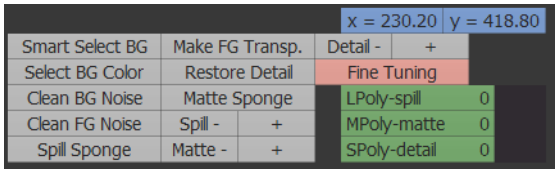
The **Detail +** and **Detail -** modes are a refined version of **Clean BG Noise** and **Restore Detail**. For example, if there is some dilute noise in the backing area but it is not to be removed completely because it affects some fine detail in a different area, use **Detail -**. This attenuates the noise gradually as multiple samples are made on the pixel. Stop the sampling when important fine details start to disappear.

### 2.2.2.10 Fine Tune the Composite

If the spilled colour was not totally removed, use a fine-tuning operation for more subtle and sophisticated removal of the spilled background colour.

Select **Fine Tuning** mode, then using the cursor, sample a small range of the pixels exhibiting colour spill to remove. After sampling, three fine-tuning numeric boxes display: **LPoly-spill**, **MPoly-matte**, and **SPoly-detail**. Primatte displays the selected colour in a colour swatch box (to the right of the numeric boxes).




For most images, the **LPoly-spill** function (which affects the Large Polyhedron) is all that is required to remove any remaining colour spill. Cursor movement on the **LPoly-spill** control performs a colour adjustment of the sampled colour against the background. The more to the right the cursor is dragged, the less of the key colour component (or spill) is included. The more to the left the cursor is dragged, the closer the colour component of the selected region is to the original foreground image.

If moving the control all the way to the right does not achieve the desired result, resample the colour on the monitor image and again move the **LPoly-spill** control to the right. These operations are additive and can be repeated as necessary to get the desired results.

**When using the LPoly-spill control in Fine Tuning mode to remove spill, spill colours are replaced based on the setting of the Spill Process list box (to Complement, Solid Replace, or Defocus Replace).**

**It is better to make several small adjustments to the spill areas than a single large one.**

The two other **Fine Tuning** number boxes are used in the same way for different key adjustments.

The **SPoly-detail** function controls the matte softness for the colour that is closest to the background colour. For example, recover lost rarefied smoke in the foreground by selecting **Fine Tuning** operational mode, sample an area of the image where the smoke just starts to disappear and move the **SPoly-detail** control to the left.

**The SPoly-detail control shrinks the small polyhedron and releases pixels that were close to the background colour. The SPoly-detail control is useful for restoring foreground image pixels that were lost in the original sample because they were so similar to the background colour.**

The **MPoly-matte** function controls the matte softness for the colour that is closest to the foreground colour. For example, if there is thick and opaque smoke in the foreground, make it semi-transparent by moving the **MPoly-matte** control to the right after selecting the pixels in the **Fine Tuning** mode.

**The MPoly-matte control affects the Medium Polyhedron and adjusts the transparency of the matte against the sampled colour. The more to the right this control is moved, the more transparent the foreground object becomes in the selected colour region.**

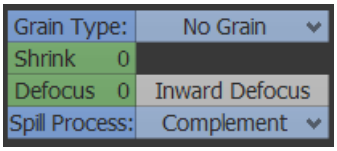
**If the foreground image changed colour dramatically during the fine-tuning process, recover the original colour by re-sampling an area of the off-colour foreground image and moving the LPoly-spill control slightly to the left. This may introduce some spill back into that colour region. Again, use the LPoly-spill control to suppress the spill, but make smaller adjustments this time.**

If these final 'spill suppression' operations have changed the final compositing results, return to earlier operations to clean up the matte. If the Composite view looks good, but a 100% foreground area has become slightly transparent, clean those transparent areas up by using the **Matte Sponge** function.

After selecting **Matte Sponge**, press on the transparent pixels (grey on the white foreground object when viewing the key), and they become 100% foreground (or white). All of the spill-suppression information remains intact during this operation. Alternatively, using the matte view, select **Fine Tuning**, then select those transparent areas in the image and move the **MPoly-matte** control slightly to the left. This moves that colour region from 0-99% foreground with spill suppression to 100% foreground with spill suppression and solves the problem.

### 2.2.3 Adjust

When the **Adjust** box is selected, the right half of the Primatte menu changes, providing different functions.



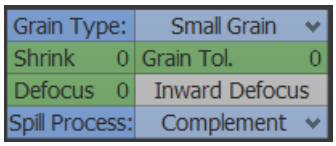

#### 2.2.3.1 Grain Type

The Grain tools are used when a foreground image is highly compromised by film grain. As a result of such grain, when backing screen noise is completely removed, the edges of the foreground object often become harsh and jagged leading to a poor key. These tools were created to assist compositing artists with grainy images.

These tools are off by default, when the Grain Type list box is set to No Grain. To enable grain removal, set the Grain Type scroll box to one of the following values:

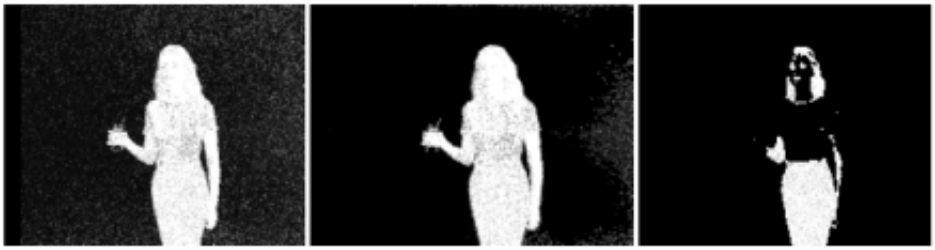
| | |
|---|---|
| **Small Grain** | With **Small Grain** selected, the average colour of a small area around the pixel is sampled. This is used when the grain is very dense. |
| **Medium Grain** | With **Medium Grain** selected, the average colour of a medium-sized area around the pixel is sampled. This is used when the grain is less dense. |
| **Large Grain** | With **Large Grain** selected, the average colour of a larger area around the pixel is sampled. This is used when the grain is very loose. |

Set a tolerance value in the **Grain Tol:** box.



The larger the grain size, the larger the resulting reduction in grain. However, if the grain size is too large then it may result in loss of edge and foreground areas. The grain tolerance is very sensitive so it is advisable to use small values otherwise it can cause unexpected results.



Grain Tol: 5
(Too little)

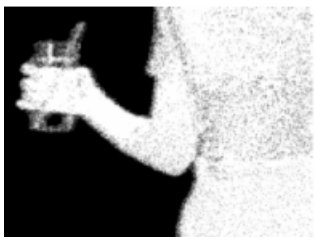
Grain Tol: 20
(Good)

Grain Tol: 50
(Too much)

The Grain tools assist when there is a lot of noise in the foreground image that makes producing a good extraction difficult.

For example, doing too much ‘clean background’ (**Clean BG Noise**) sampling to reduce the noise in the background adversely affects the edges, and detail is lost.

In this case, use the Grain tools to clean the background but still preserving the fine edges. Set the **Grain Type** and **Grain Tol.** controls, then use the **Clean BG Noise** tool to remove grey areas from the background.



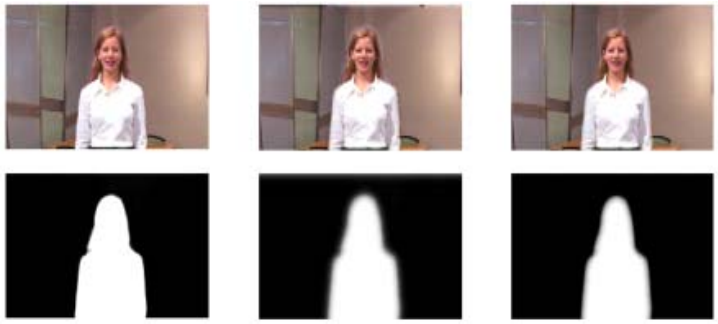
#### 2.2.3.2 Shrink

Shrink determines the degree of background penetration into the foreground around the silhouette of the foreground object. The effect is likened to 'shrinking' the matte (key).

**When using this feature, foreground details like wisps of hair and smoothness of motion blur may be adversely affected. Set it to 0 for optimum results with such details.**

#### 2.2.3.3 Defocus

This tool is used to soften a hard-edge that might sometime occur after keying out the background. Moving this number box in a positive direction determines the defocusing level being applied to the matte (key). The direction of the blur is modified using the **Inward Defocus** box.



Normal | Conventional Defocus | Inward Defocus

#### 2.2.3.4 Inward Defocus

A method of defocusing the matte where the softening is only applied inwardly, toward the centre of the foreground subject. The default Primatte defocus feature affects the matte edges in both directions (inward and outward) and sometimes introduces a halo artefact around the foreground object's edge in the composite view. This can be most evident when using the Complement Spill Process mode. With the **Inward Defocus** box on, the matte defocus functions only in the inward direction of the foreground subject (toward the centre of the white area). The final result is that it removes small and dark noise in the backing area without picking them up again in the **Clean BG Noise** mode. This sometimes results in softer, cleaner edges on the foreground objects and no halo effect around the foreground object.

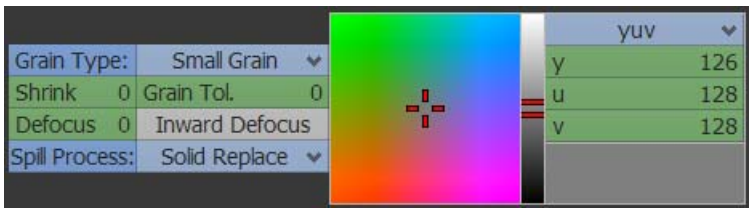
#### 2.2.3.5 Spill Process

The Spill Process can be set to **Complement**, **Solid Replace**, or **Defocus Replace** by selecting the required setting from the blue scroll box. Complement is the default setting for Spill Process.

When **Complement** is selected Primatte replaces colour spill with the background colour's complementary colour. For a spill (key) colour of blue, this is a yellowish colour.

When **Solid Replace** is selected from the **Spill Process:** scroll box, it replaces colour spill with a solid colour, selected in the Palette menu. The default replacement colour in this mode is grey (R128, G128, B128). When Solid Replace mode is selected, the Palette menu displays to the right of the Spill Process boxes, allowing selection of a colour other than grey.



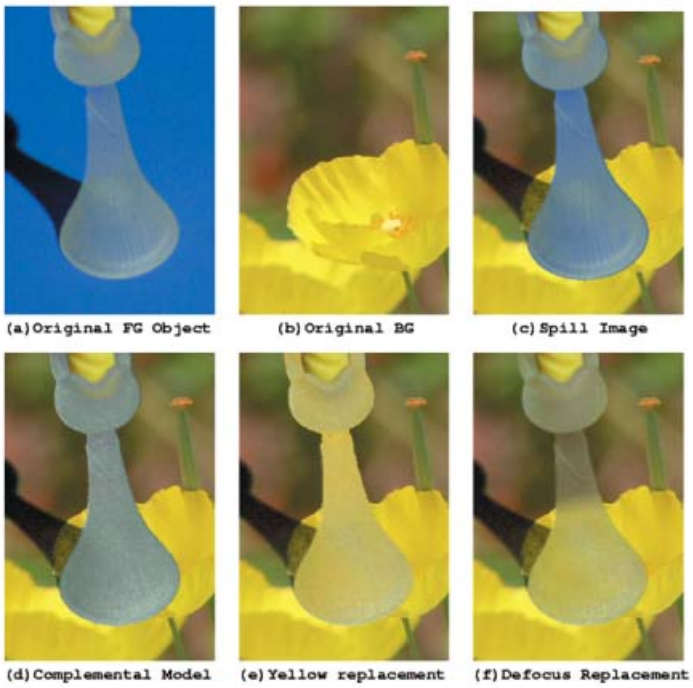

For example, if the foreground object was a person wearing a red shirt and removing the blue spill from the shirt is difficult, use this feature and select a colour close to the red shirt colour to replace the spill. This sometimes results in a better edge around the foreground object.

The Palette menu allows the selection of and displays the current **Solid Replace** colour. By default the colour is grey (R128, G128, B128). Press on an area of the colour wheel to select a colour (other than the complement) to use when replacing colour spill.

The greyscale value is controlled from the sliding bar (to the right of the colour wheel).

When **Defocus Replacement** is selected from the **Spill Process**: scroll box, it uses a defocused copy of the background image to determine the spill replacement colours instead of a solid palette colour or just the complement colour. This mode can result in good colour tone on the foreground object even with a high contrast background. In the following example, spill can even be removed from frosted glass using this feature and still retain the translucency.

The **Defocus Replacement** mode sometimes results in the fine edge detail of the foreground objects getting lost. Subtle changes must also be made to the key if the size of the foreground image is changed against the background. The background/foreground alignment changes, and the applied colour tone from the defocused image may not match the new alignment.




Blue suppression of a frosted glass object

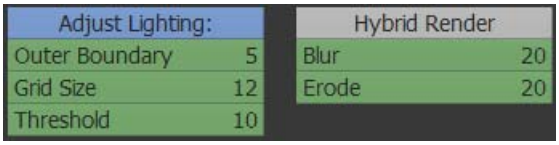
 

### 2.2.4 Adjust Lighting

Adjust Lighting is an optional feature that automatically improves the lighting of the foreground to account for poor actual lighting. For example, images which have many different hues of blue because the lighting was not well controlled. Essentially a new “adjusted light” foreground is generated which is used in further Primatte processing. This makes the traditional Primatte keying algorithm produce superior results. The implementation uses an algorithm that generates a grid to analyse which parts of the image are considered true blue/green screen or foreground. A simulated blue/green colour is generated.

The Adjust Lighting algorithm uses a set of samples in the image that it establishes on a regular grid pattern. The algorithm determines if they are classified as a pure blue/green background sample, or a simulated background sample or a foreground sample. The simulated case is generated based on the neighbourhood grid samples.

Press the **Adj Light** box to open the menu.




The default values in the green numeric boxes are usually fine. However, the values may be changed to make more precise changes.

| | |
|---|---|
| **Outer Boundary** | Noisy or black pixels can often be found on the boundary. To avoid these from polluting the results of the adjust lighting operation, set a boundary that is ignored for the processing. The default is 5. |
| **Grid Size** | Increase this value to add more precision in the Adjust Lighting process. The default is 12. |
| **Threshold** | This is the threshold used in the Adjust Lighting algorithm to determine if a grid pixel should be treated as a pure blue/green background sample, or a simulated background sample or a foreground sample. The default is 10. |

The changes made here are only visible when the **Adjust Lighting** configuration box is selected. See “Adjust Lighting” on page 52.

In the “View” button, there are modes to view the intermediate results used by Adjust Lighting. See “View” on page 39.

The following images show an example of how Adjust Lighting improves chroma key results.

Original Foreground

Keyed Image

Keyed Image with Adjust Light Enabled

#### 2.2.4.1 Hybrid Rendering

A common problem inherent with blue/green screen matting is encountered where a colour in the foreground object is very close to the backing screen colour.

To have a nice smooth edge a compromise is needed, and, as a result, this example ends up with a bluish shirt that is bleached and semi-transparent. To maintain the original blue of the cloth, results in a rough and bluish edge on other areas of the foreground object. Even though the shirt colour is slightly different from the backing colour, the edge of the foreground object frequently includes almost same colour because the edge pixels are a mixture of the backing colour and the foreground object.

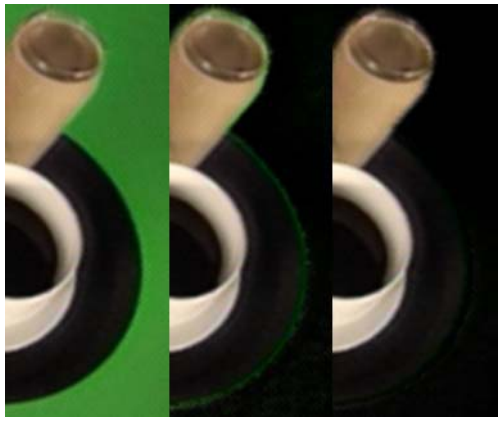
Hybrid Rendering mode internally prepares both settings and combines the better portion from each result.

Press the **Hybrid Render** box to enable Hybrid Rendering. A second press disables this box.

Below the **Hybrid Render** button, there are two green numeric boxes for adjust the matte used for hybrid rendering. The **Blur** box adjusts the blur applied to the hybrid matte, while the **Erode** box adjusts the amount the hybrid matte is shrunk.

The **View** configuration button, can be set to **Hybrid matte** to view the matte used.

The following example shows the original (left), result (centre), and result with Hybrid Rendering (right):



### 2.2.5 Render the Whole Clip

When the desired composite has been achieved, the whole clip needs to be processed before it can be used elsewhere. Press the **Render** box to start the rendering process. When complete, the resulting composite can be saved to the Clips bin.

**See the MLT FX User Guide for further details on rendering.**