

## 18. Key Effects Menu

The Keys menu contains all the effect types necessary to create keys (also called masks or alpha channels) from images. It also contains compositing functions, used to combine images, compositing them according to key channel information (composition of some sort is also a “side effect” of most of the DVE effects).

To create high quality mattes, the key generator functions provide a full set of parameters to adjust processing using the time editor. It is also possible to combine a collection of functions in a multilayering to create the desired key effect: key blurring, removal of color halos or color correction are typical processes applied as separate effect clips to the material. The ability to combine any number of simple “building blocks” to create a desired effect is, after all, one of the major strength of Jaleo.

### Creating a Key Effect

You can place a key effect in the reel by selecting the desired effect from the menu using the mouse.

If one or more clips are selected in the reel, an effect clip is created for each of them and placed on top of the bar in the reel. Its length will be exactly the same as the length of the underlying clip object. Its effect extent or scope will be set to comprise the clip the effect is “fitted” to.

If nothing is selected from the reel, the new clip will be placed at the current position of the Reel cursor (see “Cursors and Markers” on page 43) and it will have a length of one (1) second.

Effect length and scope (see “Effects Clip: Fx (Red-Orange)” on page 50) can be changed any time with the dragging operations described in the Reel reference manual: With the right and left mouse button the clip can be trimmed, while the effect scope can be dragged with the mouse left button to the extent desired.

### Effect Parameters

Effect parameters can be adjusted by opening the Time Editor window (see “The Time Editor” on page 85) and selecting the clip to be modified. Its parameters, if any, will be displayed as timecurves in the time editor window. For 3D effects and colors, special editors may be invoked from the timecurve editor window as well (see “3D View” on page 91 and “Color View” on page 96).

General information on the time editor and parameter mechanism can be found in section “Timecurves” on page 89.

Some key effects, for example “Pick Color” or “Pick Chroma” require a set of colors to be picked. For this purpose, the Pick Editor is used.

## Chapter Organization

The chapter proceeds with a general introduction to keying with Jaleo.

The remainder of this chapter then is organized as a separate manual page for each effect clip available. There is

- A short description of the effect
- A list of possible inputs, denoting if image or alpha information, or both are used to calculate the effect
- A description of the output in image and mask (alpha) channel
- A parameter description. There can be two types of parameters:
  - Global parameters are present once and control global effect operation
  - Track parameters can be present once for each input track. Many effects do not have any Track parameters.
- A comment section where applicable
- A reference to other related effects

## 18.1 Introduction To Key Functions

Most of the key functions in Jaleo work like a two pass function: First, all pixels are “classified” with respect to a certain key function, in effect determining the “backgroundness” of a pixel, thus producing a raw mask. Then the raw mask can be controlled in black level and contrast.

The classification function used to determine the “backgroundness” of a pixel makes all the difference between various types of keys. A few examples may help explain the operation.

### Luminance Key

A luminance key creates a mask based on luminance information. That is, brightness, equivalent to a black & white version of the image, is directly mapped to the mask level: The brighter the image, the brighter (more transparent) the mask.

A Luminance Key can be accomplished in Jaleo with the Key Color function.

### One Color Key

Imagine a case where a single color shall be removed from an image. In this case a possible classification would be: For all pixels of that given color, set the mask to 0. For all other pixels, set the mask to 1. Obviously, this is not very useful: Not even computer generated pictures typically contain color areas so pure that selection of a single precise color makes sense. However, it does give an example for a very simple nonlinear classification function.

### Color and Tolerance

To make the one color key more useful, one can introduce the concept of a color distance. A pixel that exactly matches the key color will have a mask value of 0, and key values will be higher the further the color is away from the selected color.

The reader may have noticed that this method reduces to a luminance key when the selected color is black - obviously, luminance is a good measure for color distance from black, and, taking this measure, white is the color further away than any.

If we select a color, we have to define the concept of color distance a little bit differently - there are many colors with the same luminance values, but they are obviously more or less different and thus more or less “distant” from each other.

In Jaleo, the Key Color function operates like this - and indeed, if it is operating as a luminance key this is just a special case with white selected as the key color.

### Pick List Keying

To do “Bluebox-keying”, i.e. to remove a blue or green colored background from an image, a single color pick with tolerance usually does not do the job: Due to lighting conditions or other image imperfections, a single color does not give good results. So we allow multiple colors or even color areas, typically close together, to be picked, and we take the color distance to the closest of these to determine the color distance for any given pixel.

In Jaleo, this type of key functions is available under the names “Pick Color” and “Pick Chroma”.

### **Functional Keys**

The classical chroma key is based on a pure mathematical model of background color separation to create a background mask from an image. Corresponding classification algorithms are implemented in Jaleo under the name “Fast Key Blue/Green”

### **Difference Keys**

Another foreground/background classification technique is based on creating a difference function between a clean background shot and a shot including a foreground object. Jaleo offers difference keys implemented separately and integrated into the Fast Key algorithms.

### **Classification Processing Using Clip and Gain**

After we have established a classification, i.e. we have produced a preliminary assignment of each pixel to a map value based on a classification function, there are often good reasons to modify this mapping.

A very good reason is for example all kind of imperfection in the source images. For example, a luminance key will never cut out a background completely, because no background can ever be totally black. So we would like to raise the black level, i.e. cut away the bottom dark grey levels and clip them to a nice clean black.

In Jaleo, this is done using the “Gain” parameter of almost all key functions. Independent of the function that created the initial mapping, by using gain it is possible to define a minimum classification level a pixel must have reached to make its way into the alpha signal. If its classification (for example luminance for the luminance key) is too low, it is discarded and the alpha is set to 0.

Another problem is that the result of the initial classification often contains too many grey levels. Grey levels are nice for an image, but as grey parts in an alpha mask mean semi-transparent areas of the image, this may not be desired. Frequently semi-transparency is not quite what we want - we want a nice clean mask, marking foreground areas as precisely as possible, without losing something on the edges. Or, to speak in terms of the mask, we want to designate as ‘opaque’ all the areas we can interpret as background for sure, but not more.

The Clip level of the keying functions helps do that - it forces the classification values to be a bit more specific when going to a mask level. The lower the clip level, the less levels are there for a pixel to choose from - eventually, with a level of 0, each pixel can only be black or white, with no in-between values allowed.

This makes very precise “hard-core” masks, but lowering the clip level too much will cause a loss of detail and may produce very jagged edges. So the clip level can be used to force almost-white mask areas to be solid white, just as the gain level can be used to force almost black areas to be black. Careful balancing of both parameters is thus one of the most important tricks of the trade.

As a general rule, first try to leave clip and gain at their default values and try to get a halfway acceptable raw mask with the classification parameters. Then adjust gain first, followed by clip, and then balance both to fine-tune your mask.

### Pick Editor Versus Monitor Versus Single Frame

For parameter adjustments, you should be aware that each possible display mode can have its advantages and disadvantages for key parameter adjustments.

- Use the Pick Editor for the Pick Color/Chroma keys and the Fast Key functions. Here, you can pick color sets, but you cannot see updates on the results of parameter changes.
- Use the monitor to see parameter changes. Normally, the monitor will operate on preview images that often are not appropriate for key adjustment. Set the monitor to “HighRes” mode (see “Monitor Pop Up Menu” on page 80) to operate on full resolution images. Note that this will slow down response on key adjustments, as now a full resolution frame needs to be processed for each parameter change.
- You can also use the Single Frame command from the monitor if you need to see the high resolution image only occasionally.

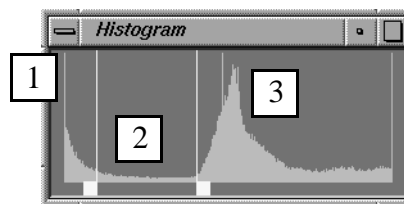
### The Histogram Tool

To assist you in balancing the clip and gain values, Jaleo provides a histogram view for all key effects with access to the pick editor. The histogram shows a graphic representation of the results of the pixel classification. As always, the exact meaning of the classification depends on the respective key effect.

- Always, on the x axis, i.e. in horizontal direction, we see the classification value, from 0 on the left to maximum on the right. What this classification value means, again, depends on the actual key function.
- Always, in the y axis, or the vertical direction, we see a representation of the number of pixels matching any given classification value. The higher the graph, the more matching pixels exist.

The following illustration shows a histogram of a “Pick Color” classification on the clip `Spray.ncip`. For a Pick Color effect, the classification value is the distance of a pixel from the color set picked in the pick editor. The illustration shows the histogram after picking a good rectangle on the blue background and adjusting gain and clip just superficially.

1. The area on the left shows many pixels rather close to the picked color set, i.e. with a low classification value. These are probably blue tones in the background not included in the pick set we chose. A close look at the pick editor would confirm this diagnosis - there are still background pixels we have not included in our color set.



2. There is an area with few matching pixels, actually captured by the two horizontal lines. The left line is the gain parameter. Everything to its left will be removed for sure from the generated key. The distance between the left and the right line is the clip parameter.

3. The big peak represents the foreground information, quite a distance away from the remaining background. The clip parameter should go as far to the right as possible, but not far enough to cut into the foreground signal.

**FIGURE 48. Histogram Interpretation**

Some typical properties of keys and keyable images can be identified here: The whole keying process is based on the ability to classify pixels in order to determine if they are part of the image background or foreground. Various classification mechanisms, as described above can be used. In the image of the histogram with a background pixel set picked, one can see the classification distance visually - to the right, a large peak of pixels, to the left another peak, and a valley inbetween.

- The left peak represents pixels quite close to the background classification; we can safely assume that they belong to the background and can be discarded.
- Pixels as far away as the right peak certainly represent a foreground area. These need to be maintained.
- The problem is the valley inbetween. A valley means that there are not many pixels in total involved, i.e the area on screen is probably small. But these are the really important pixels because they represent the transition area between foreground and background. Pixels to the left are more likely to be background than pixel to the right, but a clear assignment is difficult, in particular at the edges of the transition area.

A situation like the one above is quite common in the key generation process. It is now important to:

- Exclude as many background pixels as possible from the transition valley without affecting the foreground. This can, in this case, either be done by picking more background pixels, either in the image or mask display of the pick editor, or by dragging the gain line to the right (or, quite equivalent, raise the gain parameter in the time editor). By default, the gain value is 0, so that even pixels with rather low classification values (probably background pixels) are still in the transition valley. The histogram shows us if this is the case - with a background peak as big as this one would probably first pick some more colors, and after reducing the peak by some more picks, fine-tune by adjusting the gain parameter. The gain parameter should be as low as possible: if it is set too high, pixels important for a smooth transition, i.e. fine detail areas of the transition, can be lost.
- Lowering the clip distance as far as necessary to have all pixels that definitely belong to the foreground included in the resulting key. Raising it too much may introduce unwanted background shades in the image. Lowering it too much will cut off foreground detail.

After all the adjustments, the resulting key will be like this:

- All areas close enough to the classification, i.e. right of the gain setting in the histogram, will be set to 0% (transparent) in the generated mask
- All pixels between gain and the clip distance will have a value increasing linearly from the left (0%) to the right (100% - opaque).
- All pixels further away from the classification than the clip distance (i.e. the clip value plus the gain) will have a key set to 100%.

## **The Histogram Tool and Parameter Animation**

It is very important to notice that the histogram tool indeed is just a tool to simplify setup of Clip and Gain parameters of the currently selected key generator. As Clip and Gain, just like any effect parameters, can be animated, the histogram manipulations are applied at the current time as defined by the TimeEditor time slider. By default, the time slider typically will be set to 0, thus changing Clip and Gain at the first frame. If you, however, repositioned the time editor time slider, you may insert (or modify) values at any point in time. If a setup does not give the desired effect or you do not see the effect of changes you make in the monitor, please make sure that you do not edit a keyframe whose effect is not visible at the time you are monitoring.

## **Fast Key**

In case of the Fast Key functions, a slight exception applies: Here, the classification function does not give low values for the background but for the foreground. Adjusting gain and clip still has the same objective: Defining clear distinctions between foreground, transition area and background.

## **Mask Utilities**

Aside of the pure keying functions used to generate a mask, Jaleo provides a wide range of keying utilities to postprocess alpha channel information. The key utilities are collected in the Utilities submenu. Among other things, functions are included...

- ...to remove background halos (“Suppress Blue/Green”, see page 178),
- ...to grow and shrink the mask (“Size Shrink/Grow”, see page 179),
- ...to clean up key edges (“Edge Build”, see page 185) and
- ...to reconstruct clean background shots for difference keying (“Background Build”, see page 187).

## 18.2 Composite

### Description

Overlays two or more input layers using their alpha channels (key) to determine which parts of each layer are transparent. An image with an empty alpha channel (or no alpha channel at all) is entirely opaque (corresponding to an alpha of 100%), while an image is completely transparent wherever the alpha channel is set to 0%. For values inbetween, transparency increases linearly.

As an analogy for the function of the Composite effect, imagine you have images painted on cellophane or glass. You paint only the foreground and leave everything else transparent. You can now place an image (beach and blue sky) in the background layered with all your images painted on glass over of it. You will see through each layer wherever you did not paint anything.

Typically, when working with “real” video images, you will not have an alpha channel available - a video camera does not “paint on glass”, so to speak. Images created by computer graphics programs, in contrast, typically are generated with alpha information. In case you do not have a key channel, you can generate (or modify) alpha information artificially using the Key functions, or you can use any other clip layering as a key channel, using their luminance values as a degree of transparency.

To use normal images as alpha channels, use the function Key Color (see “Key Color (External Matte)” on page 167). For working with compositing effects, it is often useful to monitor input channels with a monitor in “show alpha” mode. In this mode (see “Show Alpha” on page 81), the monitor does not display the image channels of a clip, but the alpha channel information.

### Inputs

An unlimited number of inputs are possible

1. Background
  - Image only
2. Any number of foreground layers.
  - Image layers should have alpha channel - if there is no key information, you will only see the uppermost layer; as you can not see through it, this clearly is not very interesting as an effect

### Outputs

- Image: The output image channel consists of the background, with all the input channels layered on top of it. Compositing will be done bottom up, i.e. the layer directly under the effect will be used as the background and the system will proceed downwards from there.
- Mask: An empty (opaque) mask



**Parameters**

- **Mix:** This parameter allows you to fade in the foreground track. A value of 0 will make the foreground entirely invisible (transparent), while a value of 100 will make it entirely opaque.

**Comments**

Try to do composites with animated “textures” like Noise or Plasma from the FX menu. Using these or any combination of other clips including any imagery, you can easily create very interesting custom wipes. See the `Jaleotutorial` project examples for illustration.

Implicit compositing is also performed by functions such as the Difference Key and most of the DVEs.

**See Also**

“Color Difference Blue/Green”, see page 173

“DVE Effects Menu”, see page 189ff

## 18.3 Composite Shadow

### Description

The Composite Shadow effects creates a composite of a foreground on a background track similar to the normal composite effect (see Composite, page 164). Additionally, a shadow is created from the mask of the foreground and projected onto the background.

### Inputs

1. Background imagery
  - Image only
2. Foreground image; should have a mask or be animated and/or zoomed using a DVE for the effect to make sense.
  - Image and alpha

### Outputs

- Image: The composition of background, shadows and foreground.
- Mask: An empty (opaque) mask.

### Global Parameters

- Mix: This parameter allows to fade in the foreground track. A value of 0 will make the foreground entirely invisible (transparent), while a value of 100 will make it entirely opaque.
- ShiftX/Y: The shadow offset, i.e. the shadow displacement relative to the foreground object.
- Blur: The shadow softness.
- Int: The intensity of the shadow.

### Track Parameters

None.

### Comments

None.

### See Also

“Composite”, see page 164

## 18.4 Key Color (External Matte)

### Description

Generates a mask for an input layer by using color or luminance information either from the image itself or from a second image layer.

If used with one input layer, one can use time editor parameters to select a color to be made transparent, and also set a tolerance level. The default color is black, in effect providing a luminance key (i.e. a key based on brightness - the brighter a pixel, the less transparent it is). By selecting a different color, transparency will depend on color intensity.

Note: This function is *not* suitable as a chroma key. Use Pick Color, Pick Chroma, or the FastKey instead.

If used with two input layers, the Key Color effect generates keying information from the second layer and places the resulting key in the alpha channel of image layer one. This is a very quick way to combine an image with an external key channel. Just place the clip to be used for the image channels in the upper input layer and the desired key images in the lower layer. As the default parameters of the Key Color effect produce a luminance key, the result will in many cases be appropriate without any further adjustments.

### Inputs

1. Source for the color information of the output. If there is no second input layer, key information will also be generated from this layer.
  - Image only
2. If present, the image information of this layer is used to generate a key for layer 1. Using the default settings of the effect, luminance of the layer will be mapped to the alpha channel.
  - Image only

### Outputs

- Image: The image information of input layer 1
- Mask: A mask is generated either from input layer 1 or, if present, input layer 2.

### Global Parameters

- Red: Percentage of red component in the color to be keyed away.
  - Default for Red, Green and Blue is 0% (black).
- Green: Percentage of green component in the color to be keyed away.
  - Default for Red, Green and Blue is 0% (black).
- Blue: Percentage of blue component in the color to be keyed away.
  - Default for Red, Green and Blue is 0% (black).

- **Gain:** The minimal “colored luminance” level a pixel must have to make its way into the mask. See “Introduction To Key Functions” on page 159 for more information.  
Default: 0% / Maximum 100%
- **Clip:** Lowering clip raises mask contrast by compressing intermediate grey tones. See “Introduction To Key Functions” on page 159 for more information.  
- Default: 100% / Minimum 0%
- **Invert:** If equal to 1, an inverted mask will be created (complement mask)  
- Default (0) is a normal mask, 1 means inversion.

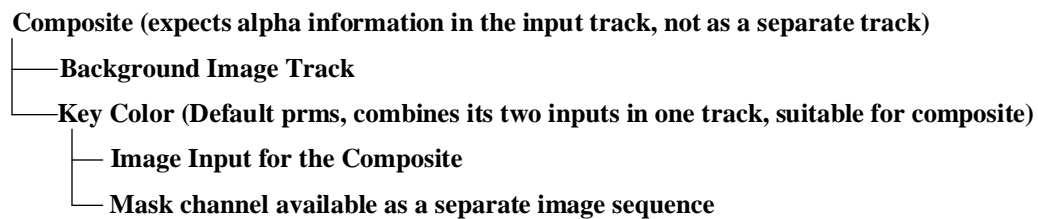
### Track Parameters

None.

### Comments

To set the key color, you can also use the color view of the time editor, which is probably much more comfortable than using the time curves.

As a key generator, Key Color is a very simple function. Although it can be used for “colored luminance” keys, its main application is probably to combine an image track with an external mask channel to make a composite possible (or any other effect that expects an input with alpha information in the same track.) This is a very typical setup:.



**FIGURE 49. Typical Key Color Application**

### See Also

“Introduction To Key Functions”, see page 159

“Luminance Key”, see page 159

## 18.5 Key Chroma

### Description

The Key Chroma function operates similar to the Key Color function. In contrast to the latter (which uses color distance from a single given color to classify pixels to foreground or background) the Key Chroma classification is based on a “color filter”-like approach, or a “weighted sum” of its color components. The weight (or filter) factors for the separate components are given as parameters.

Typically, the three color weight (or filter) factors for red, green and blue are used to suppress the influence on the key of two of the three components by setting their value to a negative percentage (a weight factor for red of -100% for example will effectively set the red channel to 0). By filtering out red and green colors and leaving the blue value at the default (positive 100%), one can for instance create a blue filter. As the result of the filtering goes to the key, this will key away the blue tones of the image.

### Inputs 1

1. The image track to be keyed.
  - Image only; if there is alpha on the input, it is replaced by the newly generated mask.

### Outputs

- Image: The image channels are piped through unmodified.
- Mask: The new mask, generated from the input’s image channels.

### Parameters

- Red / Green / Blue: Filter factor for red, green and blue. The default values filter out all red and almost all green, as suitable to mask blue tones.
- Gain: The minimal “filtered channel luminance” level a pixel must have to make its way to the mask. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 0% / Maximum 100%
- Clip: Lowering clip raises mask contrast by compressing intermediate grey tones. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 100% / Minimum 0%
- Invert: If equal to 1, an inverted mask will be created (complement mask)
  - Default (0) is a normal mask, 1 means inversion.

### Comments

When adjusting the mask generation, it is advisable to start with filter color selection. The default initial filter values for keying blue are, for example: Red -75%, Green -50% and Blue 100%. The recommended values for green are, for example: Red -50%, Green 100% and Blue -50%.

At the end, as usual, use Gain and Clip to fine tune the key.

**See Also**

“Introduction To Key Functions”, see page 159

## 18.6 Pick Color / Chroma

### Description

Creates a chroma key (in RGB or YUV mode, depending on the alternative selected) using a set of colors to be picked using the Pick Editor. Multiple picks that potentially can contain many color shades are possible; all color values picked in the process are considered for creating the effect. All areas of the image containing any of the picked colors are made transparent.

The keying classification used in Pick Color / Chroma is a color distance like in Key Color (see “Key Color (External Matte)” on page 167), but the color distance is measured from the closest of the colors found in the pick list. Using Gain and Clip as usual, small distances to the picked colors can be excluded from the key, and color areas close to the foreground signal can safely be included (see “Introduction To Key Functions” on page 159 for more information).

### Inputs

1. Source to process for generating a key
  - Image only, existing mask will be replaced by the generated one.

### Outputs

- Image: The image information is copied from the input layer
- Mask: Alpha information is generated from the image channel

### Global Parameters

- Use the pick editor to define the color set to be keyed away. You can select color areas by dragging a rectangle, and you can repeat/undo picking as often as necessary. Color sets picked subsequently are collected in a single set.
- Gain: The minimal classification level a pixel must have to make its way to the mask. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 0% / Maximum 100%
- Clip: Lowering clip raises mask contrast by compressing intermediate grey tones. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 100% / Minimum 0%
- Invert: If equal to 1, an inverted mask will be created (complement mask)
  - Default (0) is a normal mask, 1 means inversion.

### Track Parameters

None.

### Comments

There are two versions of this effect - one uses RGB color space (Pick Color) and one operates in YUV space (Pick Chroma - actually only the U and V components, i.e. the chrominance parts, are used to generate the key. Luminance is ignored). Aside of that, both

versions are identical in operation. While Pick Chroma is slightly faster than Pick Color, it is also a bit less precise due to the fact that it picks colors in a pure chroma space.

Note that using the “Invert” function you can also “protect” areas of the image from being affected by image processing operations. If you for example have a dancer with a violet costume and you want to apply a black & white effect to all but the costume, you can pick the costume color and invert the resulting mask before applying the black & white filter.

### **See Also**

“Introduction To Key Functions”, see page 159

“Pick Editor for Keying Effects”, see page 101

“Background Build”, see page 187



## 18.7 Color Difference Blue/Green

### Description

A difference key to remove blue/green backgrounds when a “clean” background shot is available. This function requires a shot in front of a blue or green background and a shot of the colored background *without* the foreground object. In many shooting situations, this can be provided easily and makes quality keys considerably easier.

The effect classifies pixels by calculating a color distance to the clean background shot.

This reference page describes the “blue” version of the effect, the differences for the “green” version are listed in the Comments section.

### Inputs

1. A background track to create a composite on.
  - Image only
2. The image track to be keyed, i.e. a foreground object moving in front of a blue/green background
  - Image only
3. The image track to be keyed, without the foreground object
  - Image only

### Outputs

- Image: A composite of the foreground object from input track 2 on the background given by input track 1. The composition mask is created using input track 3.
- Mask: An empty (opaque) mask

### Parameters

- Bal R/G: This parameter influences color balance of the initial mask generation. It will usually be left where it is by default, only in cases where the foreground shot includes practically exclusively red or green tones some adjustment may be helpful.
- Gain: The minimal classification level a pixel must have to make its way to the mask. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 0% / Maximum 100%
- Clip: Lowering clip raises mask contrast by compressing intermediate grey tones. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 100% / Minimum 0%
- Filter Mask: Blurs the initial mask, making it softer.
- Pass Blue: Removes blue spills and color halos by filtering the blue component of “blueish” pixels left by the initial mask creation. Do not use this parameter together with the following one (“SupBlue”).

- **SupBlue:** Similar to Pass Blue, but using a different algorithm. Both parameters should not be used together. Normally, Pass Blue provides better results.
- **Filter Shadow:** Blurs areas detected as shadows. Areas with very slight “blueness” deviations between clean shot and shot with foreground are interpreted as shadow and transparencies.
- **Decrease Shadow:** Decreases shadow effects.

### Comments

With Composite Blue or Composite Green you can obtain perfect inlays that will even respect shadows and semi transparent objects (smoke, water, glass, loose hair...); as long as the image and taping (or filming) quality are sufficient.

**Color Difference Green** has the same characteristics, parameters and behavior as Color Difference Blue, but is applied to those cases where a green background is used for the shots.

In this case, the Balance Red/Green parameter will become Balance Red/Blue; Pass Blue is substituted for Pass Green and Suppress Blue is substituted for Suppress Green.

As Color Difference keys are complex, yet of very good quality, it is worth to look a bit deeper in their operation. Actually, there are three operation phases involved:

1. A difference mask is created using inputs 2 and 3. This mask generation process can be influenced using the red/green balance parameter, and the generated raw mask can as always be post processed with Gain and Clip. Finally, the filter mask parameter allows you to blur the mask generated prior to composition.
2. Using either one of the Blue suppressing parameters, remaining blue tones in the keyed image can be removed. Selection of one of the algorithms provided depends on the actual material; typically the Pass Blue parameter will create the best results. Normally, it is not advisable to use both parameters at the same time. The effect of the algorithms in any case will be to lower the blue component of blueish pixels left in the image to a medium between the green and red components, changing their tone to greyish. Blueish pixels at this stage will only be left at the borders of foreground objects. A greyish tone in this position is much less annoying in a composite, especially when it is smoothly blended to the background by creating an appropriate mask.
3. A composite is created, using the foreground image channel (input 2) and the mask generated.

As long as shadow parameters are active (the default), mask generation involves a further step: Blue tones in the background that are just a very little bit different than the tones in the clean background plate, will be either interpreted as shadows or transparencies.

- Darker areas will be interpreted shadows
- Lighter areas will be interpreted transparencies.

The shadow parameters modify the appearance of the shadows and transparency in the composite. If you do not want shadow effects, raise the Decrease Shadow effect parameter.

**See Also**

“Introduction To Key Functions”, see page 159

“Background Build”, see page 187

## 18.8 Fast Key Blue/Green

### Description

A quick and easy, yet in many cases sufficiently good way to generate a chroma key. The fast key function creates an initial key automatically, but it needs a little help in finetuning and blue/green halo correction. (For more information on the use of “Suppress Blue/Green”, see page 178.)

Fast Key is available for blue and green backgrounds. There are no differences in parameter meaning.

The key generation used in the Fast Key algorithm classifies pixels depending on how much stronger the blue component is in comparison to other. There is one important difference between the Fast Key functions and the other key generators: Actually, classification values (see “Introduction To Key Functions”, page 159) are low whenever the blue/green color component of a pixel is low as well. In effect that means that the Fast Key functions classify the foreground rather than the background, which is quite the opposite to the other functions.

The Fast Key functions can optionally take a second input that should be a clean background shot without the foreground object. This can be used to improve key quality.

### Inputs

1. Source to process for generating a key
  - Image only, existing mask will be replaced by the generated one.
2. Optional clean background shot
  - Image only.

### Outputs

- Image: The image information is copied from the input layer
- Mask: Alpha information is generated from the image channel

### Parameters

- Gain: The minimal classification level a pixel must have to make its way to the foreground. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 0% / Maximum 100%
- Clip: Lowering clip raises mask contrast by compressing intermediate grey tones. See “Introduction To Key Functions” on page 159 for more information.
  - Default: 30% / Minimum 0%
- Invert: If equal to 1, an inverted mask will be created (complement mask)
  - Default (0) is a normal mask, 1 means inversion.

## **Comments**

The pick editor can be used for histogram adjustments to clip and gain.

Note that the operation of clip and gain are quite equivalent to the other mask generator functions. The difference, though, is that the classification (and herewith the histogram interpretation) of the Fast Key effects is exactly inverted: Here, the classification is relative to the foreground, and thus foreground pixels are located on the left side of the histogram, while the background pixels stretch to the right. Because of that, raising the gain parameter in this case increases the foreground area.

Remaining color halos can be easily removed using “Suppress Blue/Green”, see page 178.

## **See Also**

“Introduction To Key Functions”, see page 159

“Pick Editor for Keying Effects” on page 101

“Suppress Blue/Green”, see page 178

“Background Build”, see page 187

“Color Difference Blue/Green”, see page 173

## 18.9 Suppress Blue/Green

### Description

This effect suppresses blue/green shades by changing them to the closest color tone that does not appear blueish/greenish. It is used to remove blueish/greenish halos from blue-screen/greenscreen foreground objects for which a key has been produced using a key generator (typically Fast Key or Pick Color/Chroma).

### Inputs

1. Source to process
  - Image and, typically, a mask created by a Fast Key or Pick Color key generator.

### Outputs

- Image: The processed image channels
- Mask: Alpha information is passed through

### Parameters

Pass-B/Pass-G: The amount of suppression.

### Comments

Use the output of a Pick Color/Chroma or Fast Key as input for this effect.

### See Also

“Fast Key Blue/Green”, see page 176

## 18.10 Size Shrink/Grow

### Description

Shrinks (grows) the non-zero areas in the mask channel by a number of pixels. If the mask for example contained a circle with a radius of 50 pixels, after shrinking it by one pixel the radius would be only 49 pixels.

This effect is used to remove key artifacts at the edges of the key. Larger mask features will be reduced in size due to the shrinking process. This size reduction can be reverted for mask parts with very hard edges by applying Filter Maximum later. For masks with soft edges or artifacts, a Filter Maximum applied later will give the key the original size, but it will not be exactly the same key, as artifacts have been removed in the original shrinking process.

Another method of reducing artifacts in keys is provided by the Edge Build / EdgeFilter effects (see “Edge Build” on page 185).

### Inputs

1. A layer that should have valid mask information
  - Image and Mask

### Outputs

- Image: The image channels of the input are simply copied to the output
- Mask: The mask channel is shrunk and the result passed to the output

### Parameters

- Number of pixels to shrink/grow the mask

### Comments

None.

### See Also

“Edge Build”, see page 185

## 18.11 Show Key

### Description

Translates the mask channel of the input to an image channel (in effect producing a black and white image) and outputs it as an image channel.

### Inputs

1. A track that should have a mask channel for the effect to make sense.
  - Image and Mask

### Outputs

- Image: Contains the input's mask channel translated to a black and white image. If the input layer does not have a mask channel, an all-opaque (white) dummy mask is generated.
- Mask: An empty (opaque) mask

### Parameters

None.

### Comments

None.

### See Also

“Show Alpha”, see page 81



## 18.12 Clear Key

### Description

The clear key effect outputs only the image channels of the input layer, suppressing all mask information. This can be useful prior to regenerating a mask for a layer already having alpha information. Also many of the image processing effects do only operate on the parts of an image not masked. To apply such an effect to the whole image may require suppressing the mask first.

### Inputs

1. A layer with mask information for the effect to make sense.
  - Image and Mask

### Outputs

- Image: The image information of the input is simply copied to the output.
- Mask: An empty (opaque) mask. The content of the mask channel mask is suppressed.

### Parameters

None.

### Comments

None.

### See Also

None.

## 18.13 Blur Key

### Description

The Blur Key effect allows to blur the mask channel of the input separately.

This effect is a simplified version of the normal Blur effect.

### Inputs

1. A layer that should have a mask channel for the effect to make sense.
  - Image and Mask

### Outputs

- Image: The image channels are passed through unmodified.
- Mask: The mask channel is blurred and the result passed to the output

### Parameters

- Rad: Amount of blur, given as a filter radius.
  - Default 0 / Minimum 0 / No Maximum

### Comments

You will not need this effect very often. In most cases, the blurring functions built into the key generators, DVEs and other effect will provide better results. To create depth-of-field effects, see “Foreground Blur” on page 183.

### See Also

“Foreground Blur”, see page 183

“Blur”, see page 211

## 18.14 Foreground Blur

### Description

The Foreground Blur effect allows the user to blur the foreground, identified by a mask, independently from the background. This is especially useful for “depth of field” or “out-of-focus” effects. A normal key cannot be used for this as the masked foreground image will appear “contaminated” by the background color when used in a composite. If the original background was a bluescreen for example, a blue halo would appear.

To prevent this effect, the Foreground Blur function blurs the key using a normal blur. It then blurs the image, but on black instead of the original background color. The result of that is weighted with the blurred alpha, allowing for a clean composition on a new background.

### Inputs

1. A layer that should have a mask channel for the effect to make sense.
  - Image and Mask

### Outputs

- Image: The processed image channels
- Mask: The mask channel is blurred and the result passed to the output

### Parameters

- Rad: Amount of blur, given as a filter radius.
  - Default 0 / Minimum 0 / No Maximum

### Comments

Note that you must create a mask for the foreground first by applying any of the key generation functions. Foreground Blur does not generate a mask by itself.

To see the result, use the Composite effect to place the processed layer in front of a background. Without a composite, it is difficult to judge the effect - the view will be quite misleading.

### See Also

“Blur”, see page 211

## 18.15 Edge Filter

### Description

Edge Filter is a utility process to improve the quality of a keyed image by removing artifacts in the image channel along the key edge. Edge Filter operates on the image channels of the input and leaves the mask untouched.

Edge Filter is usually applied to the output of a key generation function like Fast Key or Pick Color/Chroma; that is, the edge filter effect is layered on top of one of these key generator effect clips. The effect is actually invisible or at least visibly unexpected unless the result is composited on a background.

Edge Filter works as follows: First, an internal working copy of the key signal of the input is made. This copy is then filtered using a special filter technique, in effect shrinking the mask. All colors of the image signal outside of the shrunken mask are now recomputed by assigning them the average color of all neighboring pixels under the mask.

Edge Filter is made obsolete in almost all situations by the new Edge Build effect that typically achieves better results with an improved algorithm (see “Edge Build” on page 185). Exceptions are cases in which a regulation of blend radius are absolutely needed.

### Inputs

1. Keyed input track
  - For the effect to make any sense, an alpha channel must be available.

### Outputs

- Image: The input image with blended colors under the very edge of the input mask.
- Mask: The input mask is piped through unmodified.

### Parameters

- RadC: Radius of maximum distance over that the color blend is applied, given in percentage of image width.
- RadA: Amount of shrinkage applied to the mask, given in percent of the image width.
- Ebgrt: The blend factor that is applied to the pixels outside the (filtered) mask area.

### Comments

We suggest that you set the RadA value to a fraction of the RadC value, between 1/2 and 1/10 of its value.

### See Also

“Edge Build”, see page 185

## 18.16 Edge Build

### Description

Edge Build is a utility process to improve the quality of a keyed image by removing artifacts in the image channel along the key edge. Edge build operates on the image channels of the input and leaves the mask untouched.

Edge Build is usually applied to the output of a key generation function like Fast Key or Pick Color/Chroma; that is, the edge build effect is layered on top of one of these key generator effect clips. The effect is actually invisible or at least visibly unexpected unless the result is composited on a background.

Edge build works as follows: First, an internal working copy of the key signal of the input is made. This copy is then shrunk one pixel. All colors of the image signal outside of the shrunk mask are now recomputed by assigning them the average color of all neighboring pixels that are covered by the shrunk mask.

### Inputs

1. Keyed input track
  - For the effect to make any sense, an alpha channel must be available.

### Outputs

- Image: The input image with blended colors under the very edge of the input mask.
- Mask: The input mask is piped through unmodified.

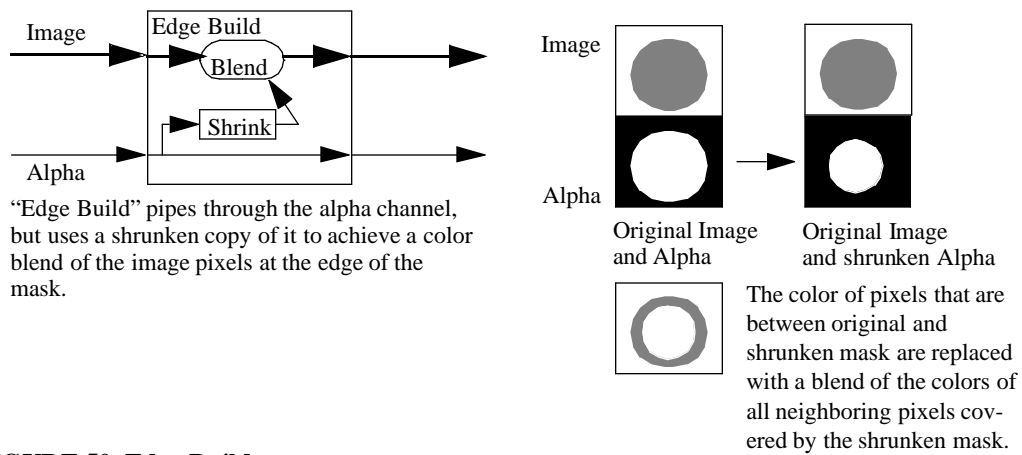
### Parameters

None.

### Comments

The results of an edge build process should always be composited on a background; without compositing, the result may be quite unexpected.

The Edge Build process can be visualized as follows:



**FIGURE 50. Edge Build**

### See Also

"Edge Filter", see page 184

## 18.17 Background Build

### Description

The Background Build function is a keying utility that can be used in conjunction with a Fast Key or Pick key generator effect and a color difference key to produce better keys with semitransparent and very fine image structures like hair:

If a background shot without foreground is available, the difference mask in many cases produces the best keys. Background Build can be used to reconstruct such a clean background shot artificially.

In effect, it uses a preliminary mask, either available from the start or created using any of the normal key generator functions (typically Fast Key or Pick Color/Chroma), to determine an average background color. This color is then used to “paint” over the foreground object, blending mask edges resulting from the preliminary key with the artificial color, covering the foreground. In other words, the color outside of the keyed area is “smeared” to the inside of the key.

The result is a background slate that, if used with a Color Difference key, will produce a better key than the initial preliminary keying approach.

### Inputs

### Outputs

- Image:
- Mask: An empty (opaque) mask

### Parameters

- Rad: Blurs the reconstructed color area to blend it smoothly into the original colors outside of the preliminary mask.
- Expand: Grows the preliminary mask area that is filled with the calculated average background color.

### Comments

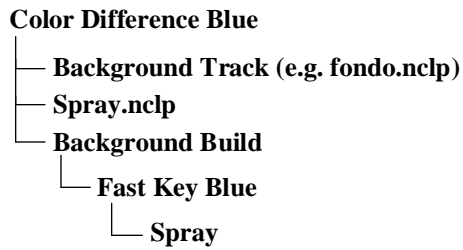
A key setup using the Background Build actually uses two intermediate products: A preliminary mask generated by a normal key function and the background build itself. Finally, the result of the background build will be used together with the original image clip as input to a color difference key. The intermediate processes need to be as carefully adjusted (including visual control over the intermediates) as the final result to produce a quality key; this is why the Background Build process has not been integrated as a parameter option in another key function.

Background Build effects have another advantage: They permit a difference key even when there is camera movement or zoom in the bluescreen shot, even if there is no motion control equipment to do the same movement or zoom for a clean background shot.

The default parameter set of the Background Build effect fills up the masked area of its input with an average color extracted from the non-masked areas.

When adjusting the Background Build, first adjust the Expand parameter so that the filled area covers all foreground in the image. Typically, very little expansion is needed if the preliminary key has been adjusted properly. Then use the Rad parameter to blend the fill color with its surrounding colors, so that a smooth color area results.

A typical setup for Background Build looks like this:



**FIGURE 51. Background Build setup**

### **See Also**

“Color Difference Blue/Green”, see page 173