
KEYLIGHT
BY THE FOUNDRY

Keylight User Guide

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Contents

Introduction

Welcome to this User Guide for Keylight on Avid DS.

Keylight is an industry-proven blue and green screen keyer. The core algorithm was developed by the Computer Film Company and has been further developed and ported to Avid DS by The Foundry.

We hope you enjoy using Keylight.

About this User Guide

Use the Quick Key chapter to see how a simple key is pulled using Keylight. The Basic Keying Chapter goes over the most common parameters you'll need to pull a variety of keys. The Advanced Keying Chapter explains how to tackle more difficult keys.

System Requirements

Keylight plugs into Avid DS. No requirements above and beyond those for the installation of Avid DS v10 are necessary.

Installation

You should install Keylight on your Avid DS Workstations and any Avid DS RP Stations that require Keylight.

1. Check that the system date on your computer matches the current calendar date.
2. Download and unzip Keylight for Avid DS v10 from our web site.
3. Double-click on the Setup.exe icon in the download files.

4. Follow the instructions on the screen. Please read the Software License Agreement displayed during installation. It is this software license that governs your use of our software. By installing and using this software you agree to its terms and conditions.

Keylight will now be installed but not licensed.

Licensing

If you don't have a valid license key, a warning will be displayed and the finished render will have coloured dots scattered over it.

The license key is a sequence of numbers and letters, stored in a plain text file, that unlocks Keylight. License keys can be created for a particular computer enabling the plug-in to run only on that computer. These are called node locked licenses. We also supply floating licenses that will unlock Keylight on any networked computer connected to a machine running the Foundry license server.

Tools to install license keys, manage floating licenses, and diagnose license problems can be downloaded from our web site, http://www.thefoundry.co.uk/licensing.

Other Foundry Products

The Foundry is a leading developer of plug-in visual effects for film and video post production. Its products include Nuke, Furnace, Tinder, Tinderbox, Keylight, and Ocula and run on a variety of compositing platforms. For the full list of products and supported platforms, see our web site at http://www.thefoundry.co.uk.

Nuke is an Academy Award® winning compositor. It has been used to create extraordinary images on scores of feature films including *The Dark Knight*, *The Golden Compass*, *Iron Man*, *Transformers*, *King Kong*, and *Pirates of the Caribbean: At World's End.*

Furnace is a collection of film tools. Many of the algorithms utilise motion estimation technology to speed up common compositing tasks. Plug-ins include wire removal, rig removal, steadiness, deflicker, degrain and regrain, retiming, and texture tools.

Tinder and Tinderbox are collections of image processing effects including blurs, distortion effects, background generators, colour tools, wipes, matte tools, painterly effects, lens flares, and much more.

Ocula is a collection of tools that solve common problems with stereoscopic imagery, improve productivity in post production, and ultimately help to deliver a more rewarding 3D-stereo viewing experience.

Visit The Foundry's web site at http://www.thefoundry.co.uk for further details.

About CFC

The Computer Film Company (CFC) pioneered the field of digital film compositing and today operates a state of the art film effects facility in London. The company has always invested in research, and maintains the kind of edge that has twice been honoured with Technical Achievement Awards from the Academy of Motion Picture Arts and Sciences.

Visit Framestore's web site at http://www.framestore-

cfc.com for further details.

Getting Started

Introduction

Keylight was first developed by The Computer Film Company to help with difficult keys in feature films. Over the years, Keylight has been refined in production on hundreds of films to make keying quicker and easier while providing a depth to the tools that will tackle even the most challenging shots.

Notation

When we refer to blue screens throughout the text we mean, of course, blue or green screens.

Quick Key

Keylight is available from the Effects panel in the Keylight folder. Consider this shot from The Saint, pictures courtesy of CFC and Paramount British Pictures Ltd.

Figure 1. Blue Screen.

Figure 1 is the blue screen foreground that should be

composited over the background shown in Figure 2.

Figure 2. Background.

If you want to have a go of this shot, you can! The images can be downloaded from our web site and this quick key is also covered in the Tutorial Chapter. See "Tutorial 1: Simple Key" on page 47.

Throughout this user guide we assume a good understanding of Avid DS. To perform this quick key, do the following:

1. Download the Saint images from our web site www.the-foundry.co.uk. These are single frames called SaintFG.tif and SaintBG.tif
2. Import the SaintFG.tif and SaintBG.tif images and drag them onto the timeline. Put the SaintFG clip on the V1

video track and the SaintBG clip on the B1 background track as shown in Figure 3.

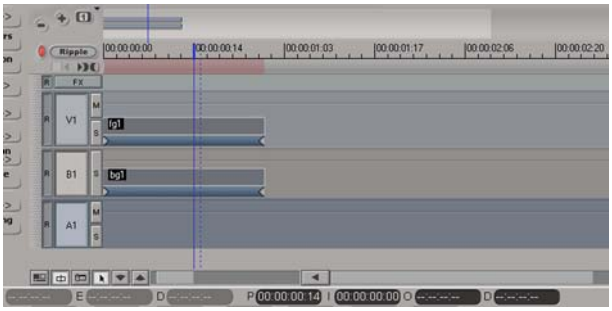

Figure 3. Screen Shot showing clips on the timeline.

3. Select the blue screen clip (SaintFG.tif) in the timeline and apply Keylight using a right mouse click and select Add Clip Effect. See Figure 4.

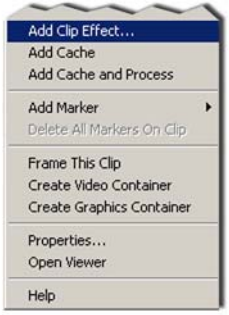

Figure 4. Add Clip Effect to apply Keylight.

4. Select the Keylight 2.2 folder from the Load Preset dialog and load the Keylight2 preset. The Keylight effects dialog

panel will appear showing the Keylight property page. An example is shown in Figure 5.

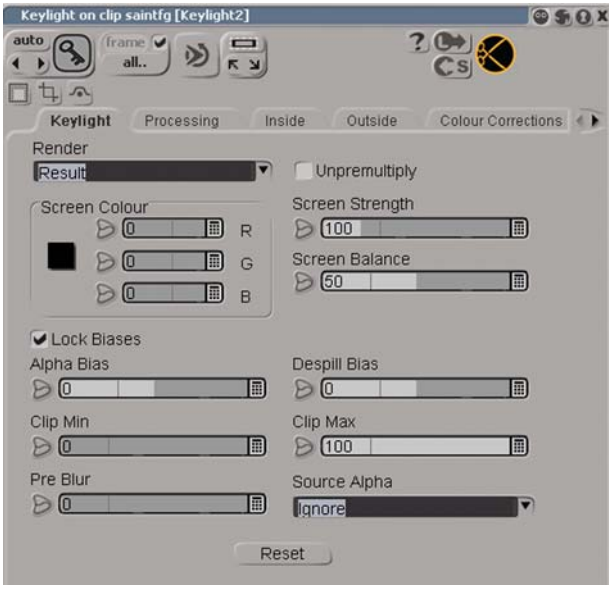

Figure 5. Keylight PPG

5. Before doing anything else you should select the screen colour. In this case it is the blue screen through the car

windows. Click and drag a small rectangle on the blue screen.

Figure 6. Pick the blue from the back windscreen.

A good place to pick is the blue from the back windscreen as this has no reflections. Picking this blue will key the back windscreen perfectly leaving reflections in the side window. See Figure 6.

6. That's it. In many cases, this is all you will need to do to perform a key, since selecting the screen colour creates a matte and despills the foreground. The final composite is shown in Figure 7.

Figure 7. Final composite.

There are a couple of extra steps that can be taken to fine tune this key and these are discussed in "Tutorial 2: Fine Tuning a Key" on page 52.

Picking the screen colour may be enough for a lot of keys, but there are many more tools within Keylight that can be used to tackle more complicated shots. These are described in later chapters.

Basic Keying

The following section describes the parameters you need to do basic keying. This will give you enough to tackle most simple keys. A discussion of advanced parameters to fine tune keys and tackle complex keys can be found in the next chapter.

Screen Colour

The Screen Colour is probably the most important parameter and you should always pick the screen colour before doing anything else. It should be set to the colour of the green or blue curtain behind the foreground object. From the Keylight PPG pick the screen colour directly from the window. Setting the Screen Colour will create a matte - the Screen Matte - and despill the foreground. In some cases this is enough to get a decent key. For more information on Screen Colour see page 21.

Figure 8 shows a well lit blue screen behind an actor.

Figure 8. Blue Screen.

You should note that repeatedly picking the Screen Colour will override any previous selections. It will not add to

previous selections and key more of the image with each click. To key more of the image, if the foreground is showing through the background, you need to use the Screen Strength parameter.

Render

After picking the Screen Colour it's useful to be able to view the key in different ways. You can do this using the Render drop-down menu, shown here in Figure 9.

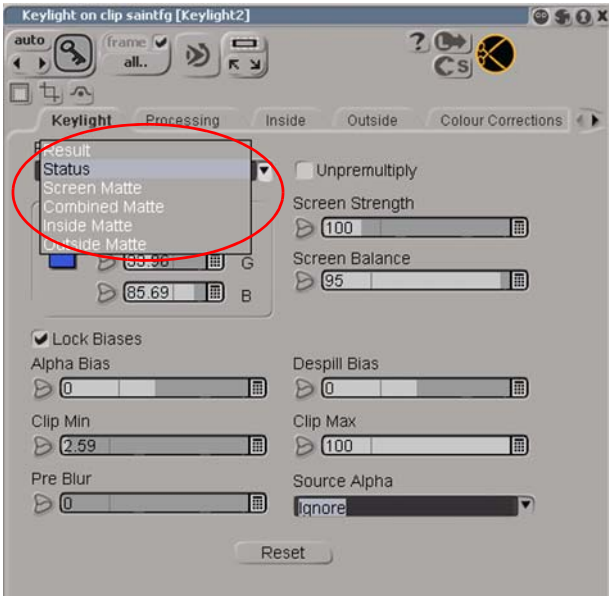

Figure 9. Render menu.

The options you'll use the most are:

- **Screen Matte** - this renders the matte created by picking the screen colour.

- **Status** - this renders an exaggerated view of the mattes so that minor problems are shown clearly.
- **Result** - this renders the foreground composited over the background using all mattes, spill and colour corrections.

Status

The Status is one of the options in the Render menu and shows an exaggerated view of the key so that you can make a more informed decision when refining the composite.

Figure 10. Green Screen.

Figure 11. Status.

Figure 11 shows the Status display after the screen colour has been picked from the image shown in Figure 10. Three colours are displayed. Black pixels show areas that will be pure background in the final composite. White pixels show areas that will be pure foreground. Mid-grey pixels will be a blend of foreground and background pixels in the final composite. You need grey pixels around the edge of the foreground to get a good key at the foreground edge. However, if there are grey pixels where there should be pure background, you should try to remove these with the Screen Strength, Clip Min or Outside Matte. If you have grey pixels where there should be pure foreground this tells you that parts of the background will show through here and you will

need to firm up the foreground with Clip Max or an Inside Matte.

Pixels that are a blend between the foreground and background are shown in just one shade of grey. This is done to highlight potential problems with the key. These grey pixels may represent a foreground/background blend of 50/50 or 99/1. No distinction is made as to this ratio.

You may occasionally see other colours in the Status and these are covered on page 31 in the Advanced Keying Chapter.

Screen Strength

The Screen Strength controls how much of the screen colour is removed to make the screen matte. Increasing this value will key more. Figure 12 shows the Status after picking the Screen Colour. You can clearly see that parts of the background are grey where they should be black. When composited you may see faint pixels from the foreground where you should be seeing pure background. Increasing the Screen Strength will fix this, as shown in Figure 13, but increasing it too much will destroy your good work.

Figure 12. Status View after picking the Screen Colour.

Figure 13. Status showing the increase in Screen Strength.

Like many keying parameters, it's a balance - not too much, not too little. Increasing the Screen Strength too much will lead to the background showing through the foreground and edge detail will be destroyed. Figure 15 on page 19 shows this quite well. Note the steering wheel is black when it should be white. If you look at the composite you will see the background showing through here. Also, some of the fine hair detail on the actor, visible in Figure 14, has been eroded in Figure 15.

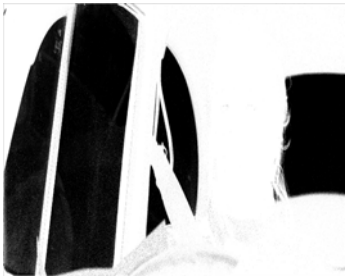

Figure 14. Screen Strength = 105 giving a good Screen Matte.

Figure 15. Screen Strength = 150 giving background show through and over eroded edges.

Despill Bias

Although the foreground is despilled automatically, you may find the need to pull out a little more of the screen colour after picking from the image. You can do this with the Despill Bias control. Just increase the parameter until the blue

disappears. However, if you increase too much the foreground will become transparent.

Figure 16. Exaggerated blue spill.

Figure 17. Despill Bias used to remove the blue spill.

There are ways to fix that and these are covered in the next chapter. See "Biasing" on page 24.

Advanced Keying

The following section describes the parameters you need to fine tune keys and get the most out of Keylight. Basic parameters covered in the previous chapter may also be covered here in more detail.

Screen Colour

The screen colour represents the colour of the pure blue (or green) screen. The first thing you should do when pulling a key is pick the Screen Colour. This colour has a primary component, blue or green, and that has a saturation. Once the screen colour has been picked, Keylight analyses all the pixels in the image and compares the saturation of the primary component in each of these pixels with the corresponding saturation of the screen colour, setting the alpha and modifying the colour accordingly.

Background Pixel

If the saturation of the pixel in the image is as strong, or greater than the screen colour, then it'll be a pixel from the blue screen background, and that pixel will be set to

completely transparent and black. See Figure 18.

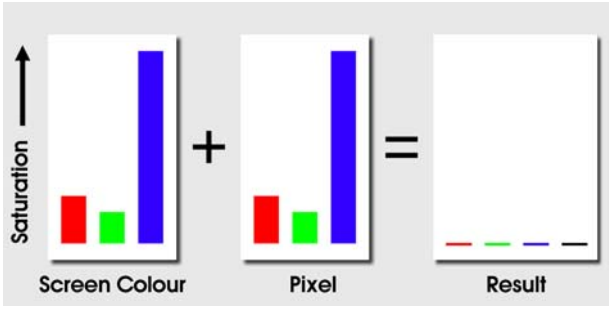

Figure 18. Blue screen pixel set alpha to zero.

Edge Pixel If the saturation of the pixel is less than the screen colour, then it'll be the edge of the foreground object, and we subtract some of the screen colour from the pixel (despilling) and set the image to semi-opaque. See Figure 19.

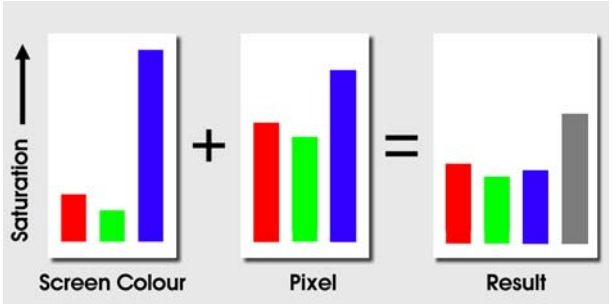

Figure 19. Edge pixel gives partial alpha.

Foreground Pixel If the primary component in the pixel is not the same as the primary component of the screen colour we have a

foreground pixel, and the alpha is set to completely opaque. The pixel colour is not modified. See Figure 20.

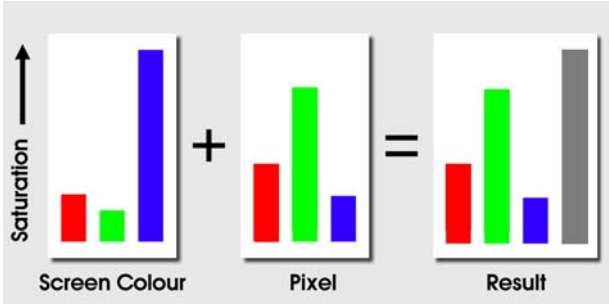

Figure 20. Foreground pixel gives full alpha.

Screen Balance

Saturation is measured by comparing the intensity of the primary component against a weighted average of the two other components. This is where the **Screen Balance** control comes in. A balance of 100% means that the saturation will be measured against the smallest of the other two components in the screen colour.

A balance of 0% means that the saturation will be measured against the larger of the other two components. A balance of 50% will measure the saturation from the average of the other two components.

The appropriate balance point for each image sequence you key will be different depending on the colours in that image. Generally speaking, blue screens tend to work best with a balance of around 95% and green screens with a balance of around 50%. If the key is not working too well with these settings, try setting the balance to about 5%, 50% and 95% and see what works best.

Biasing

What's biasing all about? Biasing in Keylight was originally developed for a shot in the motion picture "Executive Decision". The foreground consisted of reddish browns, but a combination of factors led to the 'green screen' being lit so that its primary component was actually slightly red.

Figure 21. Is this the worst green screen you've ever seen?

So what happens when we pick the screen colour? Well because the screen was 'red', as is the foreground, our pilot ends up being keyed out as shown in Figure 22.

Figure 22. Default key showing the transparency of the foreground.

Not a great result, I'm sure you'll agree, and much pressure

was applied to the lowly programmers to get around the problem.

A work around to this is to manually colour correct the image so that the background is properly green, pull the key from this corrected image, then 'un-correct' the result of that so that the foreground colours match the original. A corrected image would look something like the one shown in Figure 23. The green screen is now strongly green and distinct from the foreground colours. Notice also the red cast on the pilots mask has been removed and turned into a neutral grey.

Figure 23. Colour corrected image that would give a better key.

This is effectively how the Keylight developers got around the problem. They introduced the concept of a 'bias' colour, which is a colour cast that is removed from the source image and screen colour, then a key is pulled from this modified image, then the colour cast is put back. In essence this automates the 'work around' described above, however it is done in a way that does not slow Keylight down at all. For our Executive Decision shot, an appropriate colour is the red cast on the pilot's mask in the source footage. Setting our bias to this now gives us the far better result as shown in Figure 24.

In this situation, the **Despill Bias** can help. By decreasing this value slightly, you scale down the red component in the screen colour and the image. This flips the screen colour of the shot from red to green, leaving the pilot predominantly red. Figure 24 shows the new composite.

Figure 24. Result of dropping the Despill Bias to -17.

Keylight has now keyed this image correctly. We have effectively instructed Keylight to see "less red" in both the screen colour and the foreground.

The Bias Colours in everyday use

It also turns out that the bias colour is actually useful for situations without strong casts, typically where there is some colour spill around the edge of keys. By setting the biases to the main colour that occurs near the edge of the foreground (typically flesh tones or hair tones), you allow Keylight to better discriminate between foreground and background.

Why are there two Bias Colours?

Remember that Keylight does two things, calculates a transparency and removes the screen colour from the

foreground. By default one bias value, the 'Alpha Bias', is used for both operations. This works fine in most situations, for example, the Executive Decision shot above.

However, sometimes you can select a bias that gives a great alpha, but performs a poor despill, and another bias that gives a great despill, but a poor alpha. Consider the blue screen from the TV series Merlin, courtesy of CFC Framestore shown below in Figure 25.

We pick the strong blue of the background without choosing an alpha bias, and end up with the lovely alpha shown in Figure 26, but the despill resulting from this key is poor as shown in Figure 27 on page 28.

Figure 25. Merlin blue screen.

Figure 26. Nice Alpha.

Increasing the alpha bias will give us a better despill, but this destroys our nice alpha. The way around this is to turn off the 'Lock Biases', which gives you a separate bias factor to use solely for despill calculations. If you then set the 'Despill Bias' to be 25, you will keep the nice alpha, and get a good

despill as well (Figure 28).

Figure 27. Poor despill.

Figure 28. Final Key, Using Separate Despill and Alpha Biases.

Render

After picking the Screen Colour it's useful to be able to view the key in different ways. You can do this using the Render drop-down menu, shown here in Figure 29.

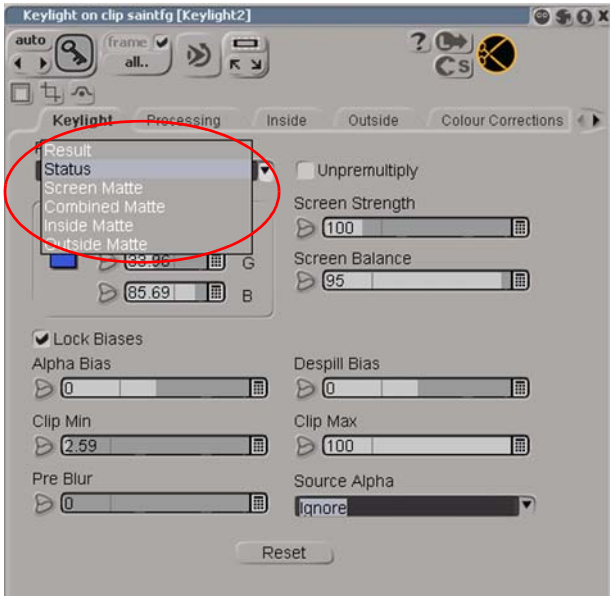

Figure 29. Render menu.

Here's the complete list of options and what they do.

- **Result –** renders the foreground composited over the image on the background track. This image is premultiplied. In other words, the RGB values of pixels have been multiplied by their corresponding alpha channel values.
- **Status –** displays an exaggerated view of the key so you can make a more informed decision on how to improve the result. See "Status" on page 30.

- **Screen Matte –** displays the matte created as a result of picking the screen colour.
- **Combined Matte –** displays all the screen matte, inside and outside mattes and any Source Alpha added together. The combined matte is used to composite the foreground over the background layer.
- **Inside Matte –** displays the matte that firms up the foreground.
- **Outside Matte –** displays the matte that cleans up the background.

Unpremultiply

Use this switch to set the premultiplication of the RGB channels in the output image. If turned off, the RGB values will be multiplied by the alpha channel, thus transparent areas are always black, and semi-transparent areas are dark. If turned on, the RGB values of the output image will be not multiplied by the alpha, thus semi-transparent pixels will have full brightness in the RGB channels.

If colour correcting the image after the Keylight node you should switch on Unpremultiply.

Status

The Status is one of the options in the Render menu and shows an exaggerated view of the key so that you can make

a more informed decision when fine tuning the composite.

Figure 30. Green Screen.

Figure 31. Status.

Figure 31 shows the Status after the screen colour has been picked from the image shown in Figure 30 on page 31. Three colours are displayed. Black pixels represent pure background in the final composite. White pixels are pure foreground and grey pixels are a blend of the foreground and background pixels. The grey is just one colour to highlight any areas that are not pure foreground or background. Grey pixels do not mean the key is poor – the final composite may be fine.

You may occasionally see other colours in the Status.

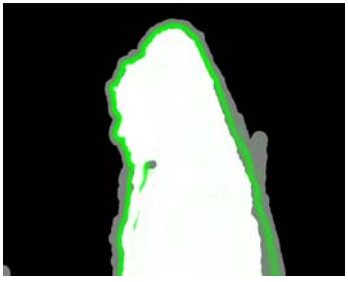

Figure 32. Status showing processing of the Screen Matte.

Figure 33. Result showing Screen Matte Replace Colour.

Figure 32 shows black, white, grey and green pixels. The

green pixels are a warning. They show you the parts of the Screen Matte that have changed through processing the matte (clipped, softened or eroded). These areas have had the correct amount of spill removed, but the alpha has subsequently changed and the composite may no longer look right. This can be corrected using the Replace Colour to put back colour in these areas. Figure 33 on page 31 is an extreme example to illustrate the point. The Replace Colour has been set to pure red and you can see that this mirrors the green pixels in the Status.

Similarly you may see blue pixels in the Status.

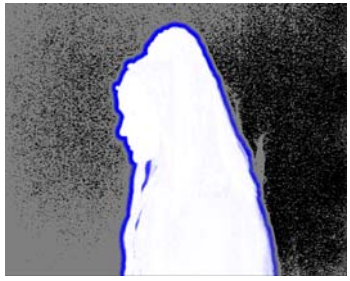

Figure 34. Status showing how the Inside Mask will affect the foreground.

Figure 35. Final Result showing the Inside Mask Replace Colour.

These represent processed pixels in the Inside Matte that affect the despill of the foreground. The Replace Colour in the Inside PPG will be used to modify these pixels. Another extreme example is shown in Figure 35. The Replace Colour is set to pure yellow and the Replace Method is Hard Colour.

You may also see dark red pixels which indicate areas where an outside matte has been used to reduce the transparency of the image.

Screen Matte

The Screen Matte (Figure 37) is the result of pulling the blue or the green from the image (Figure 36) and making those regions transparent.

Figure 36. Green screen.

Figure 37. Screen Matte.

Once you have done this you will want to firm up the foreground (make it more white) and clean up the background (make it more black). This can be done by processing the Screen Matte using the Clip Min and Max parameters on the main Keylight PPG or the more extensive parameters on the Processing PGG.

Pre Blur This blurs the source image before pulling the key. It does not blur the screen matte that is created after the key is pulled. This process can improve the key from very grainy blue or green screens.

Source Alpha If your blue screen material has an embedded alpha channel, setting the Source Alpha to "Use As Inside" will add this matte to any internal inside matte. Figure 38 shows a Screen Matte that needs improving. The embedded alpha in the source clip is a rotospline around the inside of the woman.

Figure 39 shows how this source alpha used as the inside matte has improved the screen matte.

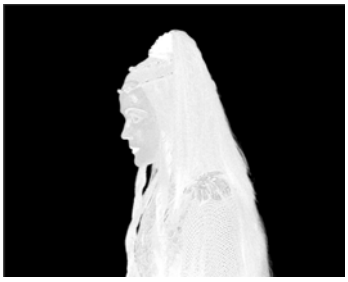

Figure 38. Screen Matte.

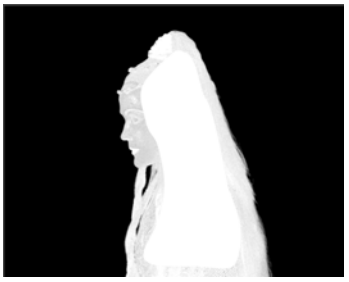

Figure 39. Combined Matte.

Clip Levels

The clip levels are adjusted using two parameters – Clip Min and Clip Max. Any alpha value at or below Clip Min will be set to zero and any alpha value at or above Clip Max will be set to 100. Figure 40 shows the original alpha of an image and Figure 41 on page 34 shows the result of clipping it.

Figure 40. Clip Min = 0.

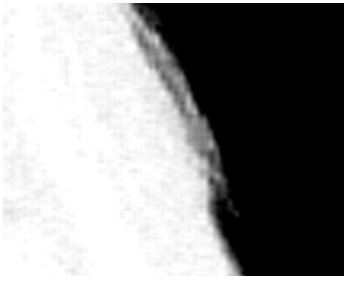

Figure 41. Clip Min = 50.

Notice how the grey areas in the black background have been reduced and that the grey edges have hardened up considerably. When compositing, the Clip Min control can be used to improve the background image if parts of the

foreground are showing through. The Clip Max control on the other hand can be used to firm up the centre of the matte, making it less transparent to the background.

Note *You need to be really careful if you chose to use Clip Min and Clip Max that you don't destroy the edges on your foreground. It is possible to use Clip Rollback to compensate for this.*

Clip Rollback

Pulling a Screen Matte (Figure 42) will typically produce lots of transparency (grey) in the matte at the edges. This is good since this is what you need to key hair well. You may also get transparency in the foreground as shown in Figure 43. This is bad as your subject will appear slightly see-through, and this should be corrected. You can do this with an inside matte, or you can use the Clip Max parameter to turn these grey pixels white. This cleans up the foreground (Figure 44) but it will also destroy the edge detail you want to keep.

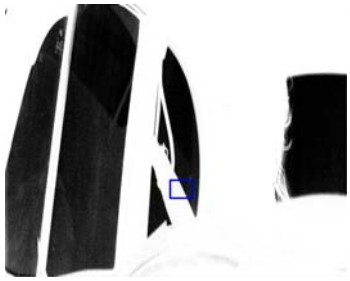

Figure 42. Screen matte highlighting the close up view as shown in Figure 43.

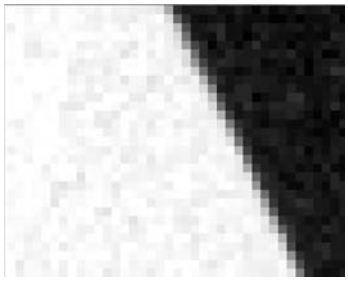

Figure 43. Close up screen matte showing unwanted (grey) transparency in the (white) foreground.

This is where Clip Rollback comes in. This is used to put back the edges to restore the detail that was lost. A rather exaggerated clip rollback is shown in Figure 45 to illustrate

the point.

Figure 44. Clip White has been used to remove the unwanted grey pixels in the white matte.

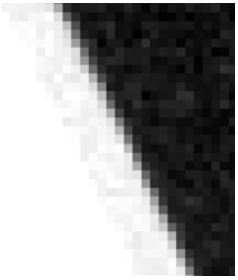

Figure 45. Clip Rollback has been used to reduce the unwanted erosion of the edge.

Grow & Shrink

This control should not normally be used as eroding the edges can produce a very poor key. However, this parameter allows you to grow (if greater than zero) or shrink (if less than zero) the alpha in the Screen Matte. These controls are sub-pixel accurate.

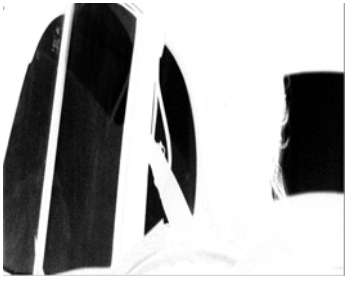

Figure 46. Screen Matte.

Figure 47. Eroded Matte.

Despot

This controls how much to simplify the matte. It coagulates similar regions so that, for example, black specks in the

white matte can be absorbed by the surrounding white areas. Decreasing the Despot will remove isolated spots of black in the white matte. Increasing Despot will remove isolated spots of white in the background up to that size.

Figure 48. Eroded matte.

Figure 49. Despot.

Colour Replacement

Remember that Keylight does two things – it removes the screen colour to despill the image and generates an alpha (Screen Matte) to composite the foreground over the background layer.

If you then process the Screen Matte, for example, by eroding the matte or changing the clip levels, Keylight will be removing the wrong amount of screen colour from the pixels whose transparency have now changed. The **Replace Method** instructs Keylight how to deal with such pixels. The Status will display which pixels use a replace method. Those pixels who use a replace method because the Screen Matte processing tools modified the transparency will be green, whilst those pixels whose transparency was modified by the inside matte will be blue. See the Status on page 31.

There are four options to the Replace Method, these are:

1. **None** – the despilled image is left untouched if the alpha is modified.
2. **Source** – the image will have a corresponding amount of the original pixel (screen colour and all) reintroduced/ removed if the alpha is changed.
3. **Hard Colour** – the despilled image has a corresponding amount of the replace colour added for any increase in alpha.
4. **Soft Colour** – the despilled image has a corresponding amount of the replace colour added for any increase in alpha, however, it attempts to modulate the luminance of the resulting pixel so that it matches the original pixel. This will give a more subtle result than the Hard Colour option.

Inside & Outside Mattes

If you can't adequately improve the Screen Matte using the Clip Levels, you can pull another matte to identify the pixels you definitely want to be foreground or background. The Inside Matte makes the foreground less transparent and the Outside Matte is used to clean up the background that might have bits of the foreground showing through.

Figure 50. Green Screen.

Figure 51. Status after pulling the Screen Colour.

These mattes should normally be softened and eroded to blend into the Screen Matte and not interfere with the foreground edges.

Figure 52. Outside Matte.

Figure 53. Status showing clean background with Outside Matte.

Inside and Outside mattes are picked using a different technique to the Screen Matte. To create an inside matte for example, select the Inside PPG. It helps when first picking the foreground to switch the Render menu to show the Combined Matte. Now click and drag parts of the foreground to add those pixels to the matte we're creating. Switch Render back to show the Inside Matte. Each time you pick from the foreground you *add* to the selections you have made.

Colour Differentiation

This determines how closely the matte can tell colours apart. If set to coarse then selected colours that are quite different will be lumped together to form the matte. Setting the Colour Differentiation to fine will require more picking of colours to

gather in the same colour range and produce a similar matte.

Figure 54. Coarse.

Figure 55. Fine.

In Figure 54 and Figure 55 the outside matte has been picked once and then the Colour Differentiation set to Coarse then Fine. See how the matte differs.

Inside/Outside Masks

If used in the tree, Keylight can have externally generated Inside and Outside masks fed into it.

Note *This option will only show up when Keylight is used in a tree.*

This option, available in the Inside/Outside Mask Property page, is used to control how these masks are handled. They can be *ignored*, or you can use *luminance* or use *alpha* as the source of the external mask.

Note *If you do use an externally generated mask, it is added to any inside/outside mask generated within Keylight.*

Cropping

Figure 56 on page 41 shows a lighting rig on the left side of the green screen. You can use the cropping controls on the Cropping PPG to quickly remove objects like this. View the result, switch on Blank Cropped Region and simply increase the Crop Left parameter until the rig is removed. If you

prefer you can use the on-screen cropping tools to do the same. You will see the image displayed in Figure 57.

Figure 56. Lighting rig on the left.

Figure 57. Lighting rig removed with cropping tools.

The outside mask forces that part of the image to be in the background thus keying it out.

Keylight requires access to source pixels that lie off the edge of the source image. The cropping controls provide access to all the controls required for specifying how pixels are treated at these edges and where they appear. The built-in crop controls are also useful for removing unwanted lighting rigs.

Display Cropped Source - switch this on to show the effect of the cropping on the source image.

Blank Cropped Region - switch on to cut away the cropped region. This is a good way to remove lighting rigs.

Left, Right, Top, Bottom - use these controls to set the crop positions. Lines will be overlaid in the display enabling you to set the various positions by eye.

Note *The position of the crop lines can be changed by clicking and dragging them directly on the screen.*

X Y Edge Method – determines the behaviour of the image at the left and right crop boundaries. Four edge methods are supplied:

- **Colour –** fills the area between the crop line and the edge with the Crop Colour.
- **Reflect –** reflects pixels about the current crop line. In other words, it copies pixels from the other side of the current crop line into the area between the current crop line and the screen edge.
- **Repeat –** copies pixels on the crop boundary to the screen edge.
- **Wrap –** copies pixels from the area between the opposite crop line and its screen edge to the area between the current crop line and its screen edge.

Note *Horizontal and vertical crop boundaries can have different edge methods, Cropping is often used to remove unwanted pixels at the edge of an image. If a video clip is digitized badly you may get black edges left and right. These can be easily removed by moving the vertical crops and setting the edge method to Reflect.*

Crop Colour – sets the fill colour used when the edge method is set to Colour.

Colour Correction

The Colour Correction parameters allow you to modify the foreground colours in your composite. In particular, reflected blues and greens from the screen can be suppressed.

Brightness – the brightness equates to the overall luminance of the image. Increase this value to make the image lighter and decrease this value to make it darker.

Contrast – the contrast is the ratio of brightest tones to the

darkest. Increase this value for a contrasty image and decrease it to wash it out.

Saturation – this control will increase or decrease the colour saturation of the image, making colours more or less intense.

Suppression

Suppression – this controls colour suppression in the image. You can choose to remove a specific primary, either Red, Green, Blue or their complements, Cyan, Magenta or Yellow. For green screens you may find it helpful to suppress green.

Suppression Amount – determines how strongly you want to reduce the indicated component.

Suppression Balance – determines what to reduce the suppressed component to. If set to 0%, it will be the smallest of the other two components, if set to 100% it will be the largest of the other two components. Otherwise, it will be to a balanced average.

Colour Balancing

These controls are used to alter the hue of the image. Choose a hue and saturation (either via the sliders or the colour balance wheel) to shift the entire colour balance of the image.

Edge Correction

The Edge Correction parameters allow you to colour correct edges to seat the composite into the background. To see the areas considered an edge that you will be affecting, switch on the Show Edges toggle.

Enable Edge Correction – use this option to separately colour correct edges of the image independently from the overall colour correction.

Show Edges – switch this on to display the matte that will show where the colour correction will be applied.

Grow – this will grow the region considered to be the edge by this amount (in pixels).

Blur – this will soften the region considered to be the edge by this amount (in pixels).

Hardness – this determines how strongly to blend between the edge correction and the main correction.

Brightness – this control brightens the region considered to be the edge.

Contrast – this control increases/decreases the contrast on the region considered to be the edge.

Saturation – these controls determine how much to scale the saturation of the image.

Suppression

Suppression – choose to completely remove a specific primary, either Red, Yellow, Green, Blue or their components, Cyan, Magenta or Yellow.

Suppression Amount – determines how strongly you want to reduce the indicated component.

Suppression Balance – determines what to reduce the suppressed component to. If set to 0%, it will be the smallest

of the other two components, if set to 100% it will be the largest of the other two components. Otherwise, it will be to a balanced average.

Colour Balancing These controls are used to alter the colour balance of the image edges. Choose a hue and saturation (either via the sliders or the colour balance wheel) to shift the entire colour balance of the image.

Tutorial

Introduction

We have included four tutorials with examples images that you can use to practice Keylight.

- Tutorial 1: Simple Key
- Tutorial 2: Fine Tuning a Key
- Tutorial 3: Extreme Blue Spill
- Tutorial 4: A Red Green Screen
- Tutorial 5: Inside Mattes
- Tutorial 6: Garbage Masks

Example Images

The tutorial images referred to in this chapter can be downloaded from our web site www.thefoundry.co.uk

From the home page click on the Downloads link then Avid DS and scroll down for the tutorial images.

Tutorial 1: Simple Key

Using the blue screen clip from The Saint, you will composite the actor over the background. You will learn how to:

- Apply Keylight to a layer.
- Pick the Screen Colour.
- View the Final Result.

The clips you will need for this task are called SaintFG.tif and SaintBG.tif, pictures courtesy of CFC and Paramount British Pictures Ltd for the film The Saint. You should import them

into Avid DS and drag them into the timeline so that the blue screen of Elizabeth Shue is layered over the road.

Figure 58. Blue Screen - SaintFG.tif

Figure 58 is the blue screen foreground that should be composited over the background shown in Figure 59.

Figure 59. Background - SaintBG.tif

1. Download the Saint images from our web site www.the-foundry.co.uk. These are single frames called SaintFG.tif and SaintBG.tif
2. Import the SaintFG.tif and SaintBG.tif images and drag them onto the timeline. Put the SaintFG clip on the V1

video track and the SaintBG clip on the B1 background track as shown in Figure 60.

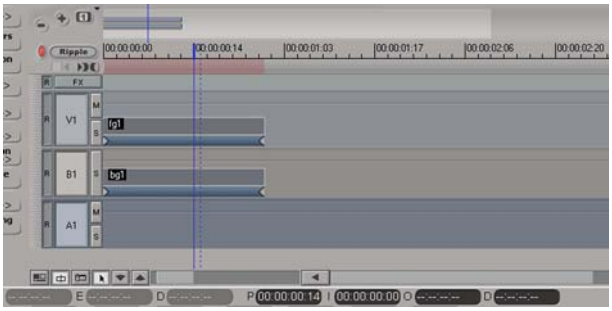

Figure 60. Screen Shot showing clips on the timeline.

3. Select the blue screen clip (SaintFG.tif) in the timeline and apply Keylight using a right mouse click and select Add Clip Effect. See Figure 61.

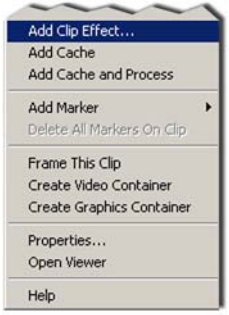

Figure 61. Add Clip Effect to apply Keylight.

4. Select the Keylight 2.0 folder from the Load Preset dialog and load the Keylight 2 preset. The Keylight effects dialog

panel will appear showing the Keylight property page. An example is shown in Figure 62.

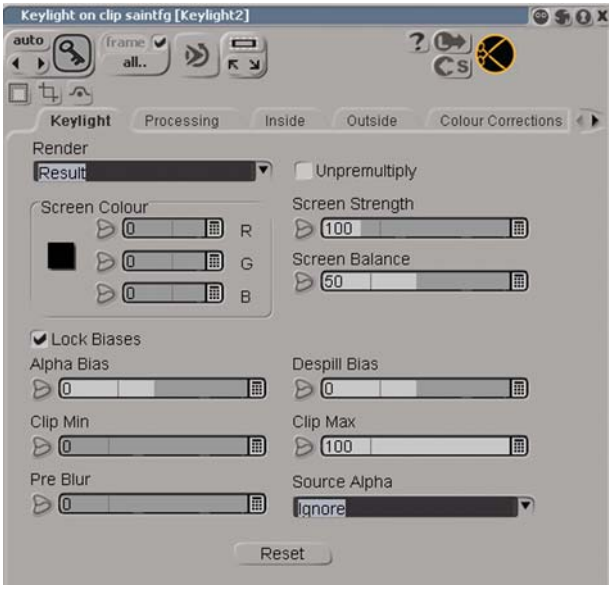

Figure 62. Keylight PPG

5. Before doing anything else you should select the screen colour. In this case it is the blue screen through the car windows. Click and drag a small rectangle on the blue screen.

Figure 63. Pick the blue from the back windscreen.

A good place to pick is the blue from the back windscreen as this has no reflections. Picking this blue will key the back windscreen perfectly leaving reflections in the side window. See Figure 63.

6. That's it. In many cases this is all you will need to do to perform a key, since selecting the screen colour creates a matte and despills the foreground. The final composite is shown in Figure 64.

Figure 64. Final composite.

There are a couple of extra steps that can be taken to fine tune this key and these are discussed in "Tutorial 2: Fine Tuning a Key" on page 52.

Tutorial 2: Fine Tuning a Key

Using the images from the film The Saint, you will learn how to fine tune the key pulled in Tutorial 1. You will learn how to:

- Use Status to judge the quality of the key.
- Use the Screen Strength to improve the background.
- Use the Despill Bias to remove more blue spill.

1. Drag the SaintFG.tif and SaintBG.tif pictures onto the timeline. Apply Keylight to the blue screen layer. Pick the Screen Colour by clicking and dragging a rectangular area on the blue screen in the composition window.

Note *These steps were covered in greater detail in the previous chapter.*

2. Before we do anything else we need to look at the quality of the key so far. On first inspection, the composite looks pretty good, but it's hard to judge. To see any potential problems more clearly, switch the Render control to Status as shown in Figure 65.

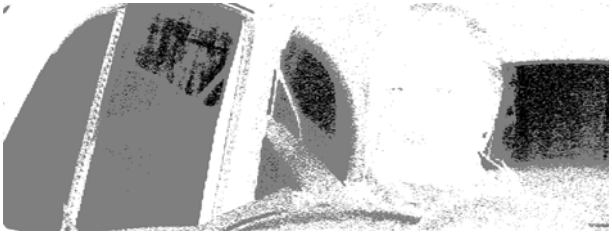

Figure 65. Status showing grey pixels in the background.

Here we can see that the windscreens are a mixture of black and grey pixels. The black pixels tell us that pure background will be seen here in the final composite. The grey pixels tell us that there will be a mix of foreground and background pixels. What we want is a clean background showing through the windows, but with some reflections in the side window preserved. In other words we need mostly black pixels with a few grey ones.

3. Figure 66 on page 53 shows the Status view that we're aiming for. The background has been cleaned up and we still have some reflections in the side window. To get this you should increase the Screen Strength from 100 to 106.

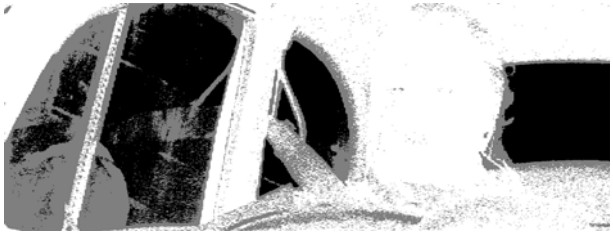

Figure 66. Improved background with Screen Strength.

4. Finally, if you look closely at the composite you will see a tiny amount of blue spill on the woman's hand and in her hair. This was from reflected light from the blue screen. By increasing the Despill Bias to 18 we can remove it. Use the Comparison Buffer to see the difference.

Figure 67. Final Composite

Tutorial 3: Extreme Blue Spill

This is a really interesting clip from the film Merlin. The results with Keylight are certainly not perfect, indeed it is unlikely that you will ever end up with a truly realistic looking shot. However, there are some interesting things to observe. You will learn how to:

- Reduce the blue spill using Screen Balance and Despill Bias.
- Improve the foreground opacity using Alpha Bias.

1. Load the MerlinBlueFG.tif (Figure 68) and MerlinBlueBG.tif clips and apply Keylight.

Figure 68. A tricky blue screen.

2. Pick the Screen Colour.

Figure 69. Serious blue spill.

Pick some pure blue pixels away from the hair.

3. Increase the Screen Strength from 100 to 105. This will clean up a little of the background. Look at the Status to see the difference.
4. Alter the Screen Balance from 95 to 0 as shown in Figure 70. This step is a bit subjective, but improves the blue spill.

Figure 70. Adjust the Screen Balance

5. Now let's try and get rid of that blue spill. Increase the Despill Bias to 40. When you do this the image and the screen colour will have the blue component scaled up before the key is pulled so that more blue is removed. You will have noticed that the foreground has gone quite transparent. This can be compensated for by dropping the

Alpha Bias. Un check the gang button and try setting it to 30.

Figure 71. Despill and Alpha Bias.

6. You will notice that Miranda Richardson's face now has a number of highlights, due to the transparency, that we should fix. The best way to do this is by pulling an inside matte. Set the Softness to 20 and Shrink to -5.
7. The final composite is shown in Figure 72.

Figure 72. Final Composite.

Tutorial 4: A Red Green Screen

Using the images from the film Executive Decision, you will learn how to pull a key from a poor green screen using the Despill Bias control. You will learn how to:

- Pick the Screen Colour.
- Drop the Screen Bias.
- Produce a final composite.

The images you will need for this tutorial are called ExecFG.tif and ExecBG.tif

1. Load the pictures ExecFG.tif (Figure 73) and ExecBG.tif. Apply Keylight. The foreground image is actually a green

Figure 73. Poor Green Screen.

   screen shot although it doesn't look it. If you analyse the pixels it's slightly more red than green. To key this we'll have to fool Keylight.

2. Pick the Screen Colour. You should go for the slightly darker green patch to the left of the pilot. Although feel free to experiment picking different parts of the green

screen. The initial selection gives the result shown in Figure 74.

Figure 74. Default key.

3. To fix this we need to tell Keylight to scale down the red component to make the green the most dominant so that it keys correctly. To do this decrease the Despill Bias to -20. The result is shown in Figure 75.

Figure 75. Decrease the Despill Bias.

4. If you look closely, the background and foreground needs cleaning up. Figure 76 shows the Status. We will use the

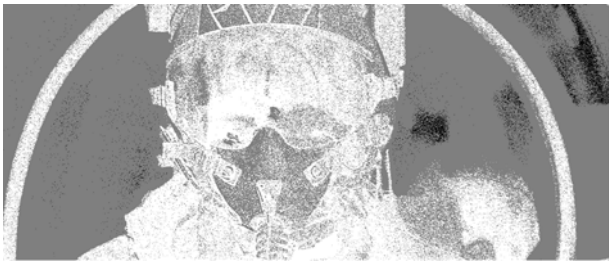

Figure 76. Status.

Screen Matte tools to make the cockpit windows black and the pilot white.

5. Increase Clip Min to 20 to remove some of the foreground showing through the background. Decrease Clip Max to 70 to improve the opacity of the foreground. Increase Screen Softness to 1 and set Despot to -2.

Figure 77. Composite.

6. Use the Screen Matte Replace Method to pull some of the original image through the composite. This improves the

apparent graininess in the foreground. Figure 78 shows the differences.

Figure 78. Close up view. The left image has Replace Method set to Source. The right image has Replace Method set to None.

Tutorial 5: Inside Mattes

Using the blue screen test card image you will learn how to:

- Process the Screen Matte.
- Use Colour Differentiation to pick a very specific inside matte.
- Use the Replace Method to put back keyed out colours.

The clips you will need for this task are called TestCard.tif and ColourGrid.tif

1. Load the pictures TestCard.tif (Figure 79) and Colour-Grid.tif and put them into the timeline layering the blue

Figure 79. Test Card.

   screen over the colour grid.

2. Apply Keylight to the blue screen layer and pick the blue from the image. Keylight will create a matte and despill

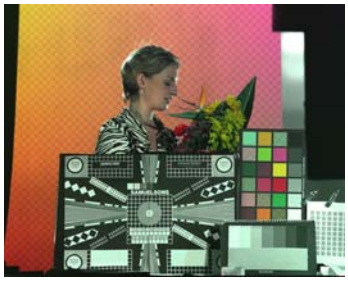

Figure 80. Basic Key.

the foreground as shown in Figure 80.

3. You will have noticed in Figure 81 the background could

Figure 81. Status.

do with cleaning up. Figure 81 showing the Status clearly shows this. This can be fixed by processing the Screen Matte.

4. Increase the Screen Strength to 110. This cleans up some of the background as shown in Figure 82.

Figure 82. Screen Strength.

5. Sections 5 to 7 will cover the changes to the Screen Matte that will improve the key. In the Processing PPG, decrease the Clip Max from 100 to 70. This will improve

Figure 83. Clip Max.

the foreground as shown in Figure 83. However, you will notice in the composite that the edges have become a little hard. We can fix this using the Clip Rollback and Screen Softness.

6. Increase the Clip Rollback to 3 and the Screen Softness to

Figure 84. Clip Rollback.

1. It's also worth trying to improve the key around the spiky flowers with a sub-pixel erode of the edge. Change Screen Grow/Shrink to -0.5.

7. To remove the foreground spots set Despot to -2. The

Figure 85. Despot.

result is shown in Figure 85. The grey squares in the foreground, where the colour swatches are located, tell us that the background will show through here The green pixels are a warning. They are showing us the parts of the Screen Matte that we have changed due to processing the matte in steps 5 to 7. These areas have had the correct amount of spill removed, but the alpha has subsequently

changed and the composite may no longer look right. We can correct this with the replace colour.

8. The composite is shown in Figure 86. You will see that the colours of the colour swatches have been altered by the Keylight algorithm. This can be fixed with an inside matte and replace colour.

Figure 86. Composite.

9. From the Inside PPG pull a key of the foreground. You're

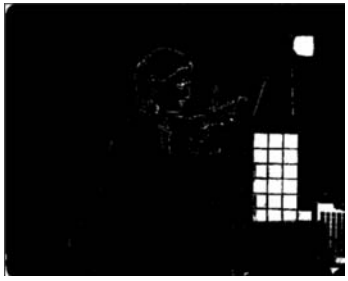

Figure 87. Inside Matte.

trying to pull a very specific key of just the colour swatches. So set the Colour Differentiation to fine and pick carefully. If you get it wrong use the Pick Remove to put the black back. You should end up with the matte looking something like Figure 87. Now make sure the

Replace Method is set to Source so we pull back the original colours using this inside matte.

10. That's it! Make sure Enable Inside is switched on and look at the composite. You will see that the swatch colours are now correct.

Figure 88. Final Composite.

Tutorial 6: Garbage Masks

Using the green screen merlin image you will learn how to:

- Use Keylight in a graphics container.
- Apply a garbage mask to remove a lighting rig.

The clips you will need for this task are called MerlinGreen.tif and Curtain.tif

1. Load the pictures MerlinGreen.tif (Figure 89) and Curtain.tif (Figure 90) into Avid DS.

Figure 89. Green screen with lighting rig.

Figure 90. Background picture.

2. Drag the green screen Merlin clip onto the timeline and create a composite container.

3. Construct a tree (Figure 91) that pipes the Merlin image into Keylight 2 and then into an Output node. Layer the green screen merlin over the red curtain.

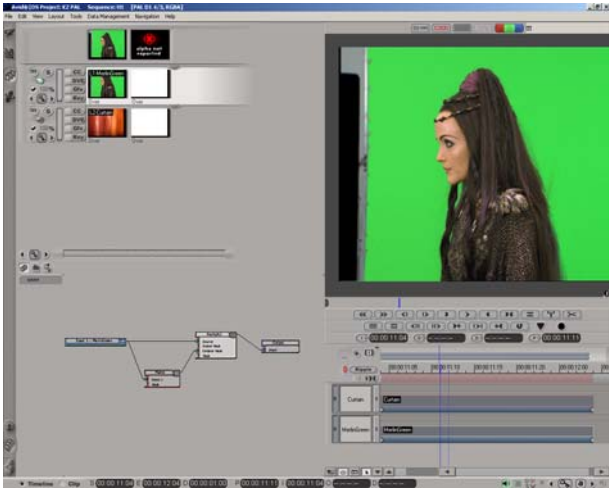

Figure 91. Screen Shot showing tree.

4. Add a Matte node and pipe the output into the Outside Mask input of Keylight 2. Edit the Matte shape to garbage out the lighting rig.

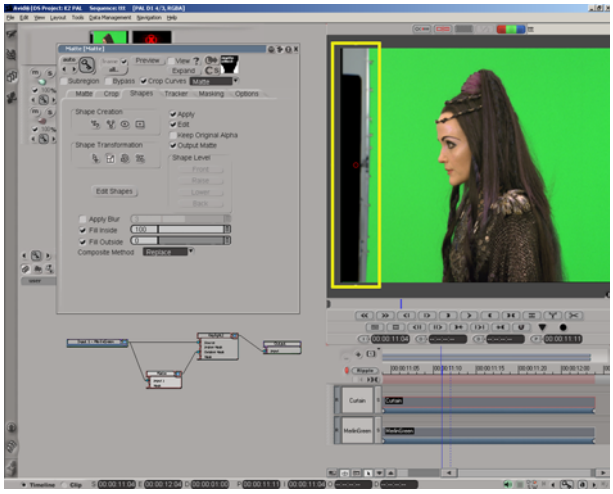

Figure 92. Screen Shot showing yellow garbage shape from a Matte node.

5. In Keylight, pick the green screen colour.

6. In the Outside PPG set the Outside Mask to Use Luminance to remove the lighting rig as shown in Figure 94. That's it!

Figure 93. Green Screen.

Figure 94. Composite with lighting rig removed.

APPENDIX A

Release Notes

This appendix describes the requirements, new features, improvements over previous versions, fixed bugs and known bugs and workarounds in Keylight.

Keylight 2.2v4

This release fixes one bug.

Release Date

20 November 2009

Requirements

1. Avid DS 10.2.x.
2. Foundry FLEXlm Tools (FFT) (5.0v1 or later) for floating license support.

New Features

There are no new features in this release.

Improvements

There are no improvements in this release.

Bug Fixes

BUG ID 9445 - Keylight crashed Avid DS when rendering with 16-bit precision.

Known Bugs and Workarounds

There are no known bugs.

Keylight 2.2v3

This release fixes one bug.

Release Date

4 November 2009

Requirements

1. Avid DS 10.2.x.
2. Foundry FLEXlm Tools (FFT) (5.0v1 or later) for floating license support.

New Features

There are no new features in this release.

Improvements

There are no improvements in this release.

Bug Fixes

BUG ID 9423 – Wrong version number in Help page in Keylight 2.2v2. The correct version can be viewed in Windows by clicking **Start** > **Settings** > **Control Panel** and opening **Add/Remove Software**.

Known Bugs and Workarounds

There are no known bugs.

Keylight 2.2v2

This release introduces one improvement.

Release Date

9 October 2009

Requirements

1. Avid DS 10.2.x.
2. Foundry FLEXlm Tools (FFT) (5.0v1 or later) for floating license support.

New Features

There are no new features in this release.

Improvements

The Keylight plug-in has been rebuilt with the release SDK for Avid DS 10.2.

Bug Fixes

- BUG ID 765 - Edge Correction softness parameter was broken.
- BUG ID 7015 - Outside mask softness parameter was broken.
- BUG ID 7290 - 64-bit installers are now default to DS 10.2 and not DS 10.0.
- BUG ID 8567 - Copyright dates are now correct.

Known Bugs and Workarounds

There are no known bugs.

Keylight 2.2v1

This is a maintenance release to support Avid DS v10

Release Date

October 2008

Requirements

1. Avid DS v10
2. Foundry FLEXlm Tools (FFT) (4.0v8 or later) for floating license support.

New Features

There are no new features.

Improvements

1. The Keylight pulldown menu on the Inside PPG has changed to "Add to Inside", "Remove from Inside" and "Reset Inside".
2. The Keylight pulldown menu on the Outside PPG has changed to "Add to Outside", "Remove from Outside" and "Reset Outside".

Fixed Bugs

1. EULA - BUG ID 6051 - the end user license agreement has been updated in the installer.
2. Debug - BUG ID 6056 - option panel reported the plug-ins as debug, even though they were not. This has been fixed.
3. Icons - BUG ID 6055 - old product icons have been updated.
4. FLEXlm - BUG ID 5085 - the C:\Program Files\The Foundry\FLEXlm directory was not created on installation of the software. This has been fixed.
5. RPDS - BUG ID 705 - a previous version was not looking in the correct license directory. This has been fixed.

Known Bugs & Workarounds

The ability to undo parameter changes will occasionally fail. There is no workaround.

Keylight 2.1v1

This is a maintenance release to support 32 and 64 bit versions of Avid DS v8.0.

Release Date

November 2006

Requirements

1. Avid DS v8.0
2. Foundry FLEXlm Tools (FFT) (4.0v1 or later) for floating license support.

New Features

There are no new features.

Improvements

1. Support for 64 bit machines running Avid DS v8.0.
2. Support for keying 32 bit images.
3. FLEXlm licensing.

Fixed Bugs

There are no fixed bugs.

Known Bugs & Workarounds

The ability to undo parameter changes will occasionally fail. There is no workaround.

Keylight 2.0v1

This is a major new release with many new features and improvements.

Note *Keylight 2.0v1 for Avid|DS 7 supports 8bit colour space only.*

Release Date

November 2003 - Keylight 2.0v1 for DS 7

Requirements

Avid DS 4.0, 5.0, 6.0, 7.0 only. Foundry License Manager.

New Features

1. Simpler controls for the main matte. The Foreground Bias colour picker has been replaced by a simple slider and the Balance and Gain controls have been replaced by one Screen Balance slider.
2. Better quality main key - semi-keyed reflections are less pixelated.
3. The ability to use a different bias control for calculating the alpha and the despill has opened up the range of shots possible using Keylight.
4. New and improved matte processing tools - grow & shrink, despot, rollback and clip levels.
5. Colour Correction PPG has been added. Includes controls for brightness, contrast, saturation, colour balance and colour suppression.
6. Edge Correction PPG has been added with controls to colour correct and suppress colour spill at the edges.
7. Render controls now includes the ability to view the Combined Matte.
8. Colour Differentiation added to inside matte to control the ranges of colours used to generate the matte.

9. There is a new 'Outside Matte' tool which allows you to exclude arbitrary ranges of foreground colours when creating the matte.
10. Licensing. The product name for Keylight in the license string has changed from CFT (computer film tools) to Keylight.
11. Documentation. An Online Help button is now included on the Help PPG page that launches this PDF User Guide.
12. Opacity of the foreground has been removed.
13. Colourspace selection has been removed.

Improvements

1. The 'Hold Matte' is now replaced by the 'Inside Matte' which allows you to include arbitrary ranges of foreground colours when creating the matte.
2. The Screen Balance is now set automatically to 50 when picking green screens.

Fixed Bugs

1. BUG 253, 262. Keylight failed to render correctly when keying field material and eroding the main matte. Rendering artifacts were produced. This has been fixed in Keylight 2.0v1.
2. BUG 188. Blurring the main matte after pulling a key in Keylight 1.0 would give a pixelated result around the blurred edge. This bug has been fixed in Keylight 2.0v1.
3. BUG 214. The Src Alpha tooltip was incorrect on Keylight 1.0. This has been fixed in Keylight 2.0v1.

Known Bugs and Workarounds

1. The ability to undo parameter changes will occasionally fail. There is no workaround.

Keylight 1.0v8

This is a maintenance release to support Avid|DS 6.0.

Requirements

Avid DS 6.0 only. FlicServer 1.2, FlicView 1.0v4

New Features

1. An unpremultiply button has been added to Keylight to support changes made to DS 6.
2. Dongle. Keylight 1.0v8 for DS 6.0 can be licensed to the Dongle ID or the System ID (Physical Address). Previous versions of Keylight will only lock to the System ID of the machine.

Improvements

There are no improvements.

Fixed Bugs

There are no fixed bugs.

Known Bugs and Workarounds

There are no known bugs.

Keylight 1.0v7

This is a maintenance release to fix some bugs and support Keylight 1.0 on Avid|DS 5.0.

Requirements

Avid DS 3.0, 4.0, 4.01 or 5.0. Foundry License Server 1.2

New Features

1. Installation. The Keylight installer for Avid|DS 4 and above enables you to install the Foundry License Server software (version 1.2) on your machine at the same time as Keylight.
2. FlicView. This new licensing utility is shipped with all new releases of Tinder, Anvil and Keylight. Information about node

locked licenses and floating licenses on the network is displayed. Licenses can be verified and installed using FlicView without editing the license file directly. Information about the licenses on your machine can be saved and emailed to The Foundry to assist support calls. FlicView completely replaces the Install License and Show ID utilities shipped with previous versions.

Improvements

1. Licenses on Avid|DS Remote Processing Stations have been simplified. The license.flic file on the RP machine does not need to point to a specific machine. It can look on the local network for any valid machine serving licenses and use that. This requires Foundry License Server 1.2 to be installed.

Fixed Bugs

1. Hotfix license problems. If you installed Service Pack 6a followed by the Hotfix Security Rollup (Q299444i.exe) our ability to license our plug-ins would fail. (The Hotfix overwrote a dll we used which resulted in random System IDs being returned). Removing the Hotfix Security Rollup would fix the problem. However, Keylight 1.0v7 now licenses correctly to the System ID even with the Hotfix Security Rollup installed.
2. The check-boxes that indicate whether the sliders are ganged or not were not saved as part of the plug-in data. This has been fixed. Bug ID 187.

Known Bugs and Workarounds

There are no known bugs.

Keylight 1.0v5

This is a maintenance release for Avid DS 4.01

Requirements

Avid DS 4.0 and 4.01

New Features
There are no new features.

Improvements
There are no improvements to existing features.

Fixed Bugs
1. Installation. Keylight failed to detect DS 4.01 and no plug-ins were installed. This has been fixed and DS 4.01 will now be found if installed. However, if DS is not detected, Keylight will be installed to C:\Program Files\The Foundry anyway.
2. Displaying the System ID Number (Physical Address) using the Foundry utility "System ID" will return an incorrect number on Windows 2000. This has been fixed.

Known Bugs and Workarounds
There are no known bugs.

Keylight 1.0v4

This is a maintenance release for Avid DS 4.0

Requirements
Avid DS 4.0 only.

New Features
1. Keylight now supports RPS (remote rendering).

Improvements
1. The documentation has been tidied up into an on-line PDF book format.
2. The orange "unlicensed" dots have been replaced by coloured dots.

Fixed Bugs

There are no fixed bugs.

Known Bugs and Workarounds

1. Displaying the System ID Number (Physical Address) using the Foundry utility "System ID" will return an incorrect number on Windows 2000. To display this number correctly use ipconfig / all from a command shell.

Keylight 1.0v3

This is a maintenance release that fixes a bug.

Requirements

SOFTIMAGE DS 3.0 only.

New Features

There are no new features.

Improvements

There are no improvements over Keylight 1.0v2

Fixed Bugs

1. Cache Recovery. Keylight failed to recover cache after undoing a parameter change. This has been fixed. For example, when you render using Keylight in DS it puts the processed frames into a cache. If you then change a parameter in Keylight the cache is marked invalid, but if you then undo the change, DS should be able to unmark the invalid cache. This failed to work in previous versions of Keylight, but has been fixed in this release.

Known Bugs and Workarounds

There are no known bugs.-

Keylight 1.0v2

Requirements
SOFTIMAGE DS 2.0, 2.1 or 3.0

New Features
1. Replace Blue Under Hold. Blue spill in the Composite can be reduced by replacing those blue pixels with another colour more in keeping with the background colour. This colour is usually the Replace Colour, but can be pixels from the foreground. If Replace Blue Under Hold is switched on, the Replace Colour is used. If switched off, the foreground pixels are used.

Improvements
No improvements over Keylight 1.0v1

Fixed Bugs
No fixed bugs.

Known Bugs and Workarounds
There are no known bugs.

Keylight 1.0v1

Requirements
SOFTIMAGE|DS 2.0 or 2.1

New Features
Keylight - a radically different compositing tool that accurately models the interaction of blue or green light with the foreground elements and replaces it with light from the new background. With this approach, blue/green spill removal becomes an intrinsic part of the process, providing a much more natural look with less tedious trial and error. Keylight is simple and quick to use, and is particularly powerful in dealing with reflections, semi-transparent areas and hair.

Improvements

This section will describe improvements to existing features in later versions.

Fixed Bugs

This section will describe fixed bugs in later versions.

Known Bugs and Workarounds

There are no known bugs.

Appendix B

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