

## Between Blue and Green

### It's a Keyable World

Speaker notes for Tony Quinsee-Jover

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As with my talk on Colour Correcting, I shall not here be talking about how to use the DS keyers, I shall assume that you all know the basics of how to use all of the DS native keyers. We'll be briefly looking at the operation of two of the most popular 3<sup>rd</sup> Party keyers; Primatte and Keylight, and we'll look at some of the 'tricks of the trade' which you can employ to help give realism to your keys, and to help pull a better key in the first place. All of the presets I refer to are included to get you started.

A book that I thoroughly recommend, and which covers many of the aspects I shall mention in this talk in far more depth than I can is "The Art And Science Of Digital Compositing" by Ron Brinkman. ISBN: 0-12-133960-2. Again, this book is widely available from Amazon and others.

### **Primatte**

Here's how to get a good key using Primatte:

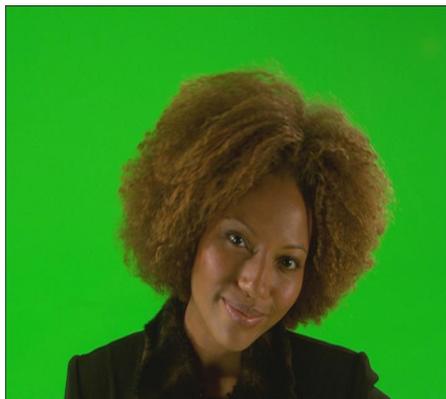
1. Apply the keyer in your preferred way
2. Look at your image's background (blue or green) – this is important with any keyer, but particularly important for Primatte and Keylight.
3. **Key Background.** Select a small range of pixels that are away from the colour or any shadow areas that you might want to use in the final composite. If you want a shadow, there's no point in telling Primatte to key that colour out. Basically, this usually means that you should select a relatively bright area of the background.
4. Primatte doesn't have an "Export Alpha" button, so switch on the viewer alpha to see your results. Select Alpha Full.
5. **Clean background noise.** Select "Clean BG Noise"
6. Select any areas of the background (zero alpha) which show speckles of noise – it might help to up your monitor's brightness when doing this. Be careful not to get too close to wispy hair or any areas that have, for instance, smoke. Don't try to eliminate absolutely every pixel, particularly if they are showing pretty dark alpha – they won't show in the final composite and trying to get rid of them will result in a very hard edged matte
7. **Clean foreground noise.** Select "Clean FG Noise"
8. Select any areas of the foreground (solid alpha) which show speckles of noise – again, it might help to up your monitor's brightness when doing this. Once again, it's probably unnecessary to eliminate absolutely every slightly dark pixel.
9. Return your monitor to RGB view, showing you your composite.
10. **Remove spill (simple).** Select "Spill sponge"
11. Select any pixels around the edge of the image that are showing spill from the background. As you do so, the spill will have its colour replaced. Do this as many times as necessary on bluish or greenish pixels, but don't go too far down this road if it isn't working

– the Fine Tuning step, which we'll do later, gives a more sophisticated and subtle result.

12. **Remove spill (advanced).** Select “Fine Tuning”
13. Zoom into an area showing spilled edges and select the **pixels** that are showing the spill. Don't select a big splodgy area that includes hair and everything, it's the colour of the pixels that we're interested in here.
14. Use the Fine Tuning sliders to remove the last of the spill. Moving the slider to the right removes more background colour from the sampled pixels, and moving it to the left will remove less of the background colour and push the pixel back to its original colour. The Colour Chip lets you monitor the new colour of the pixel in real time.
15. Repeat 13 & 14 for any remaining spill areas.
16. **Restoring detail and softness.** If your matte has now lost some softness where there should be smoke, or detail where there should be hair, use the “Make FG Transparent” or “Restore Detail” menus to correct the image. In other words, you'd use these buttons to bring smoke or reflections back into the image.
17. **Final operations.** If you can now see some transparent areas in the foreground matte, you can use the “Matte Sponge” control to clean up the mask whilst retaining the spill suppression settings you made above. Alternatively, you can use the Medium Poly. (Trans.) slider. Moving it slightly to the left will move that colour region to 100% foreground; again, retaining the spill suppression.
18. Read the Primatte Manual for an in-depth look at how it works.

## Keylight

1. Arguably the easiest keyer on the market, start, as with Primatte and most keyers by analyzing the background colour.
2. Avoiding reflections, wispy hair and smoke, select a region of background as a colour sample. This should ideally be an area of background that has relatively low saturation but is still brighter than any shadows that you wish to keep.
3. With a good, well-lit source clip (like we see lots of those!) that might be all you need to do, however we'll assume you live in the real world, and look at how to get a good key on a difficult image. Thanks to John Heiser for this example.



For this image, I selected an area near the top right corner.

4. Select “Screen Matte” to see the matte you have achieved so far. Now select “Status” to see how bad it **really** is! “Status” shows an exaggerated view of the quality of the generated matte.



Screen Matte



Status for the same matte

5. Increase “Screen Strength” to get a more transparent background. As with all adjustments with all keyers, it’s best to slightly under do this operation so as to avoid hard edges.



This was achieved with Screen strength increased to just 115.

6. Adjust the “Screen Balance” to suit your image. Screen Balance will subtly affect which pixels Keylight chooses for background and which for foreground – adjust it and you’ll see. A rule of thumb says that for Blue Screens the setting should be around 95% and for Green Screens around 50%, but adjust to suit your image.
7. “Despill Bias” is used to restore the foreground colour when Keylight has removed too much background (blue or green) from your image.
8. “Negative Alpha Bias” is used to fix poor Screen Colours – for instance if there is a lot of the foreground colour in the background and the foreground is therefore becoming transparent, Negative Bias can help to differentiate between the two. To use Alpha Bias separate from Despill Bias you must un-gang the controls.
9. “Positive Bias” is the exact opposite of Negative Bias. It is used where Keylight has removed **insufficient** background from an image – for instance around wispy, transparent hair.

10. Take a look at this composite (ignore the 'unlicensed' dots!):



You'll note a pink fringing around the top of the talent's hair. It is generally caused by a non-linearity in the foreground colouring – something which is hardly unusual. As I understand it from Bruno, this is a function of how Keylight works – it's adding the inverse of green to transparent areas as a despill, and this operation is thrown by a non-linearity in the foreground image.

Primatte does the same. It is a problem with many keyers, although it's easier to get rid of with Primatte. The solution with Keylight is to start again, and pick a less-saturated area of green screen background. This will mean that Keylight will then add less saturation to the transparent areas. You could also make a soft outside matte, a grown edge matte, and lots of other really cool stuff... but I have some very cool new presets put together by the team in Montreal which I'll be showing you later which address not only this problem but other problems that you didn't even know you had 😊

#### **Multiple Keys for a single image.**

With poorly lit source material there are many occasions where you will need to use, say, one key for the talent's body, another for the shoes, another for the hair, and **still** have to rotoscope parts of the image. The following images were keyed with extreme difficulty using 4 Blue-Green keyers and multiple Colour Correctors. I managed to achieve a passable key from this setup, but still had to touch up each frame to clean up holes appearing in shoes etc.

## KeyBlurEdge



This homemade preset is an adaptation of a concept described by Brinkman in his book. It makes an edge matte that overlaps the composite and the background, blurs that edge slightly and then composites the result on top. This

gives a slightly soft edge where the composites join. This is **not** the same as blurring the edge of the matte – which just gives a soft edged overlay. What it does instead is subtly 'join together' the background and foreground. It doesn't work on every key but is quick to try out.

## Dilate



Does exactly what it says on the tin.

Dilates the matte for those times you really really need a soft edged dilated matte.

### DilateAlaCombustion



Another Dilate preset, but this time replicating the way Combustion dilates a matte.

The Alpha curve of a CC node is adjusted to achieve this result.

### Erode



Erode is, well, a preset to erode your matte.

### ErodeAlaCombustion



As with the second Dilate preset above, this is another erode preset which replicates the way Combustion erodes a matte.

## Lum-O-Comp



A clever little preset courtesy of Shailendra, which morphs the background over the foreground, to give the illusion of the foreground reflecting the background luminance/chrominance. The transparency of the morphed background is infinitely adjustable, and the subject (foreground) itself provides its own

luminance range for the Overlay effect nested in the tree. This can help to put composites into context – for instance when outdoors, in a metro station, beside a fire at night, in a bus, etc.

To use it, select the Lum Map Warp and edit (and animate, if necessary) the outline shape around the foreground element (or the part of the foreground you want to affect). This is a perfect occasion to use the "reconnect viewer" feature.

You may also need to edit and animate the source shape (the big rectangle). Usually, if the foreground moves around, it's a good thing to move the source rectangle as well, otherwise the foreground will always "reflect" the same part of the image, which will look unnatural.

Adjust the correspondence points so that the warped image remains "aligned". (That is, that highlights coming from the left are still on the left in the warped image, the top at the top etc.)

Adjust the blur value so that everything looks natural. In some scenes, if the blur value is not large enough, the foreground will look like some sort of movie screen reflecting a film.

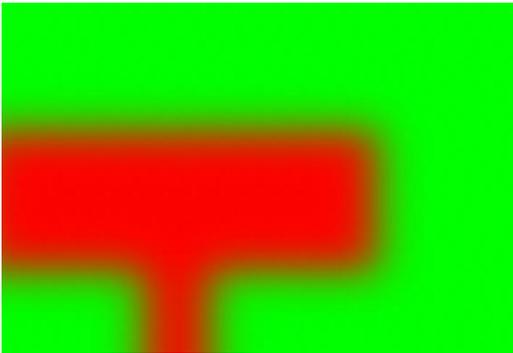
Adjust the mix value. 0% is the unaffected foreground and 100% is the foreground reflecting the background values. Depending on the scene, you may want very little effect or really punch it.

This effect will work the best if the foreground subject was filmed under a well-balanced, rather soft white light.

## Now for some clever stuff.....

The following three presets all use the concept of "Uncompositing" an image to recover the original foreground hue. These presets were made by the team in Montreal (they're much too clever for me) and they will be available in this or possibly a slightly modified form in the forthcoming v7.5 release which is imminently in beta. They will help in many occasions where you may have problems keying an image, and specifically with the "Pink Halo" effect that we saw with chroma keying earlier.

### A little background....



In image regions where the foreground is semi-transparent, motion blurred or antialiased, the blending of the foreground and background colors will cause a hue shift in the resulting pixel. For example, semi-transparent red against green will produce an olive hue in the semitransparent red region, as in this example.



If a matte is extracted from this image without correcting for the hue shift, a composite against a new background will use the wrong foreground hue (olive instead of red in this example) and the resulting composite will obviously therefore look wrong due to the unnatural hue shift in those regions.

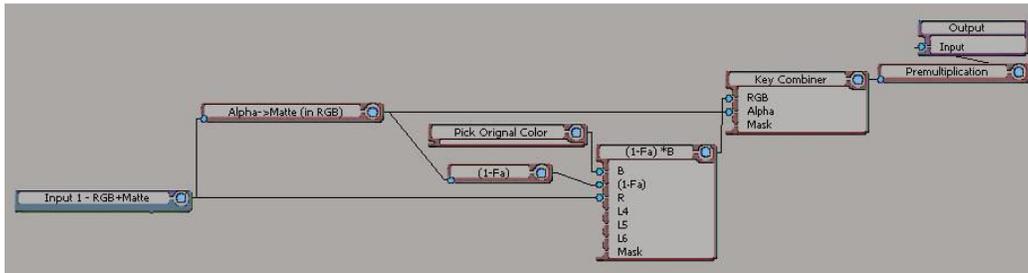


To solve this, we can use the technique of Un-compositing the image to recover the original foreground color.

When re-compositing the recovered foreground against a new color, the resulting image will have a more natural blended hue in the semi-transparent regions. You can see how in this example, the red values

uncomposited from the green background, and then re-composited with a new background now provide a much better result in the semi-transparent regions.

## Un-Premultiply from Color



This preset can be used as filter on the timeline and in the FX tree. As shown here, the effect expects the original image as an RGBA image, but obviously it could be used in a tree with a separate matte feed with slight adjustment.

To perform the UnComposite operation, you specify the original color used as image's background, using the Pick Original Color control. Various mathematical operations are then applied to the image to effectively "UnComposite" it.

This effect is useful in those situations where images and their corresponding mattes are generated from applications such as Photoshop or After Effects that have options such as "Premultiply with Color". We've seen many times on the DS Forum where users are supplied with a Matte and a Fill that has been premultiplied against white, and it can never composite correctly without first being UnPremultiplied..

## Spill Subtract

Not to be confused with *Spill suppression*, this preset can be used as a filter on the timeline or in the FX tree.

It is exactly the same effect as the Un-PremultiplyFromColor preset above and is used in exactly the same manner.

Firstly, key the image by whatever means (Blue-Green keyer or whatever), then apply this preset. The input image is assumed to carry the matte in the alpha channel and the original image colors in the RGB channels. It is assumed to be unpremultiplied (which is the default case with the DS Keyers if the Force Premultiplied option is not chosen), and to have no color channel manipulation done by any other spill correction or spill replacement techniques. As above, the preset works by having the user choose the original key (background) color from the Original Color controls in the preset.

## Un-composite from Background



This preset is used where you have a premultiplied image on a non-solid background as per this example. It can only be used in the FX tree.

The effect requires an image that has the colors to be uncomposited in the RGB channels, the corresponding Matte in the Alpha channel (extracted from rotokeying or keying), and a clean plate of the

original background. The effect works by the user simply making the appropriate connections to the effect



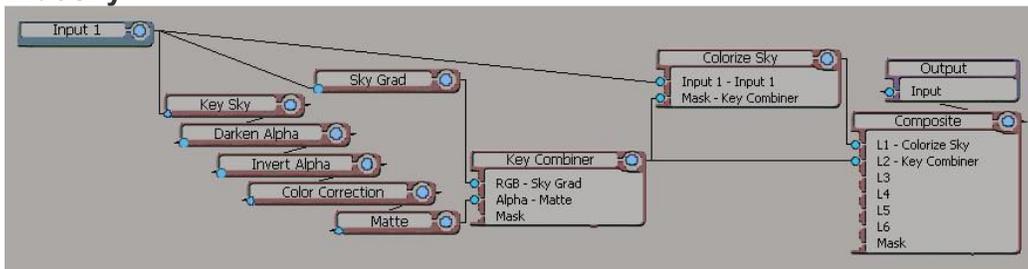
The pretty nasty result obtained when not using the UncompWithBackground effect



The "correct" result achieved by using the UncompWithBackground effect

This effect is especially useful in cases where the original background is not of a uniform color. If a clean plate of the original background image is available then it can then be used to achieve unpremultiplication or spill subtraction from the spatially varying background.

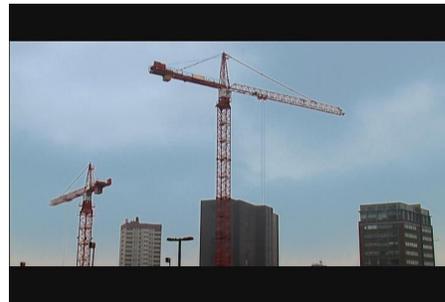
## BlueSky



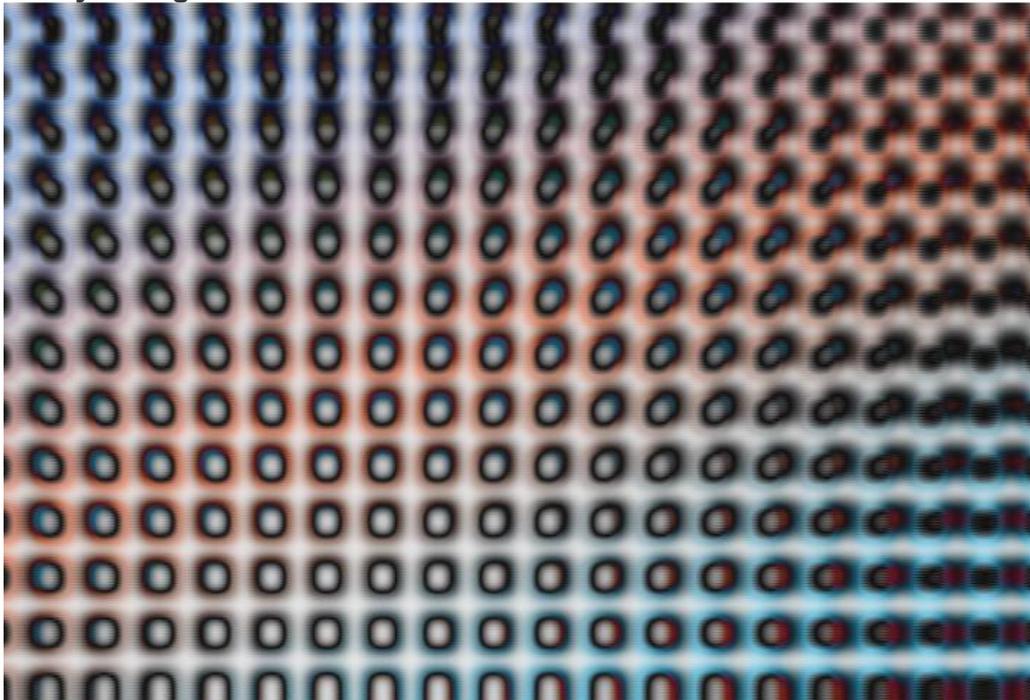
This preset will usually manage pull out some semblance of a blue sky (with white clouds) from the most burned-out images. By the time you get this document I will probably have replaced the three nodes "Darken Alpha, Invert Alpha, Color Correction" with a single CC node.

So, here's how it works. The KeySky node is a luma keyer, adjusted to exaggerate the small amount of detail that generally exists even in a burned out sky. The Darken Alpha node reduces the matte to shades of grey. Invert alpha does what it says, then CC brightens that matte. The matte node softens the alpha channel, because it will have a fair bit of noise in it. This alpha passes through the key combiner to become a mask input for the Colorize Sky node - a CC with hue pushed towards blue/cyan. A blue Sky Grad generator is also available to fade in if required. The result is blue sky where the sky should be, and white-ish clouds where clouds should be.

Here's a before and after:



### Funky Background



Just because we can! It's a fun place to start. All you do is apply the FunkyBGonXHatch preset to a generated X-Hatch (Test Patterns) and play around with it.