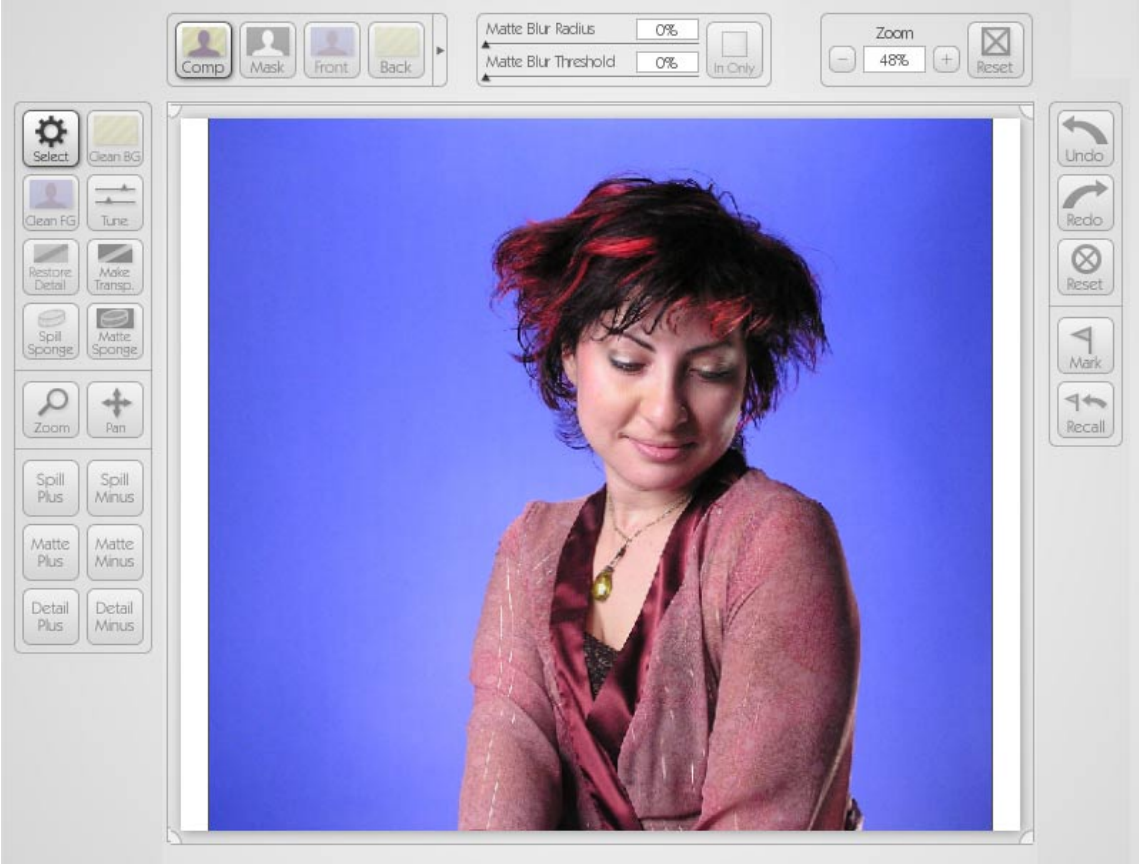
primatte chromakey 2.0



[from Digital Anarchy]

f/x tools for revolutionaries

[and Photron]

Photron

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overview of primatte

Primatte is a plug-in for Adobe Photoshop (and many image-editors that support Photoshop plug-ins). It has one main function: to remove solid colored backgrounds from an image and place the resulting foreground image into a different background.

We do this by removing the pixels of the designated color, and replacing that color with transparent pixels. Effectively, you are creating a very complex soft-edged mask.

Primatte is commonly used in motion picture and television post-production for the creation of special effects. Increasingly, chromakeying has become indispensable in graphic design and still photography.

compatible apps for primatte

Primatte is compatible with Adobe Photoshop, from version 5.0 through CS. It is also compatible with many Photoshop-compatible applications. The apps that we've tested are:

Photoshop Elements
JASC PaintPro
Corel Painter
ACD Systems' Canvas

proprietary notices

Primatte was developed by IMAGICA Corp., Tokyo, Japan
Primatte was authored by Yasushi Mishima of Imagica Corp., Tokyo, Japan
Primatte is a trademark of IMAGICA Corp., Tokyo, Japan
Primatte is sold and distributed by Photron USA, Inc.

primatte for other applications

The process of chromakey is present in many visual disciplines: photography, special effects, video production, and 2D compositing. Therefore, Primatte is available for most applications in each of these disciplines.

Digital Anarchy only develops and sells the Photoshop version of Primatte. If you are interested in Primatte for any software other than Photoshop or a Photoshop-compatible application, please go to the Photron website at www.photron.com for more details.

overview of chromakeying

The process that Primatte performs is called 'chromakeying'. Chromakey is the process of eliminating a single color from an image for the purpose of inserting a new background into that image. When you watch a movie or look at a photograph that has an unreal mix of images, you are usually looking at the illusion of chromakey.

To prepare for creating a chromakey, the principal subject is photographed against a background of a bright single color or a relatively narrow range of colors, usually blue or green. A digital tool is used to extract the background color by making it transparent. Chromakeying, therefore, allows a false background (such as a weather map or scenic view) to be inserted behind and around the subject.

Throughout this manual, we will refer to 'keying' or 'pulling a key', meaning the operation that selects a body of color for removal from an image.

so many terms!

The chromakey process is also called 'blue-screening' or 'green-screening', depending upon the color of the background you've placed behind your model.

When referring to the key created, the word 'mask' is used frequently and interchangeably. Mask is a term that refers to a location that's been isolated in a digital image and is commonly used in graphic design and digital photography.

Some Primatte tools also make use of the term 'matte', which is a term used often in video and compositing work. Matte usually refers to a mask that moves across the screen, outlining a person walking across screen, for instance, or a trail of smoke created by special effects software.

what is a mask?

A common definition of a 'mask' is an area of an image that is protected or 'masked' from editing. Another commonality is that a mask controls how different areas within an image are hidden and revealed.

In a Primatte mask, both definitions hold true. The pixels in a mask are made transparent, effectively leaving only the object that you want to place into a new background.

The term 'mask' should be familiar, because Photoshop employs mask technology for many of its functions. For instance, the Magic Wand, Lasso and Marquee tools all create a selection, which is really a mask that isolates part of an image as you apply filters or effects to the rest of it. Alpha Channels are masks that save these selections so they are permanent and reusable.

Still inside Photoshop proper, the Quick Mask mode lets you create and view a temporary mask for an image. A Layer Mask lets you obscure part or all of a layer or layer set. So does a Vector Mask, and between the two mask types, you can create soft and hard masking edges.

In Photoshop, masks are stored as 8-bit grayscale channels. Similarly, Primatte displays its mask as an 8-bit grayscale image.

foreground and background

Another concept that you'll find in working with Primatte is the idea of 'Foreground' versus 'Background'. Foreground refers to the object that is the chromakey subject; the person or object that is photographed against a single color screen. 'Foreground' also refers to the area of the Primatte mask that stays opaque, and thus, reveals the foreground subject. This portion of the mask can be represented with white pixels in the Primatte interface.

Background refers to the visual that will be composited behind and around the foreground object. This is typically an environment that would be difficult to photograph or film behind the subject, such as footage of a solar system or a Prehistoric scene that's built in a 3D application.

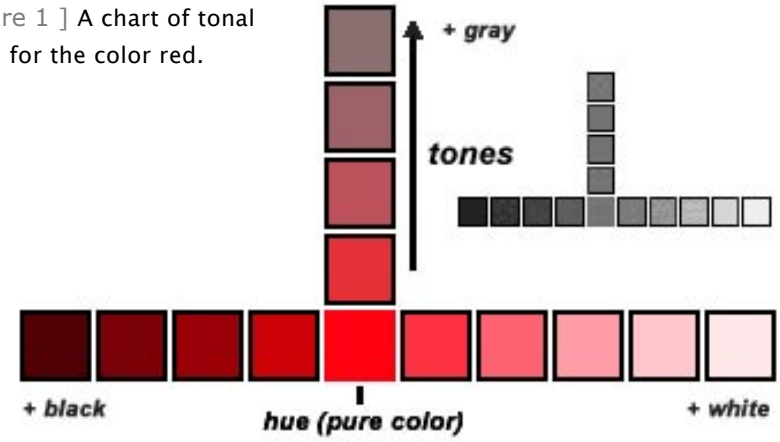
Background also refers to the area of the Primatte mask that becomes transparent, and thus, reveals the background environment. This portion of the mask is represented with black pixels in the Primatte interface.

behind the scenes in primatte

So what is actually happening inside Primatte when you tell it to separate the Foreground from Background? How does the plug-in determine where the mask edges should be? Where the blue screen ends and the object begins?

In Primatte, you will use tools to click on a tone. A 'tone' is a value of light or dark that is independent of its hue. [figure 1] Tonal value dominates our visual experience, contributes significantly to our perception of the space, and is the most basic visual stimulus. Tone is actually quite important in visual art and color theory – but that's another manual.

[figure 1] A chart of tonal range for the color red.



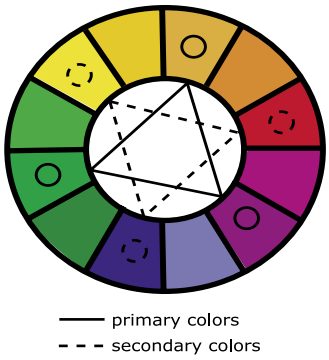
Primatte looks at a tone that you have clicked on, and finds a range of lightness relating to its color. Then Primatte finds that tone distributed throughout the entire image you've loaded in. The tool performs the correction it's built to do, like extracting a tone or eliminating a tone, on the entire image.

So, Primatte doesn't look at a particular area of the image, like a hand or an apple stem, that you have clicked on, or 'sampled'. At the end of this manual you can read about the Polyhedral Slicing Algorithm, which is Primatte's proprietary operation that separates all of the pixels in your Foreground image by creating a 3D RGB color space.

choosing a color screen

The main rule in using a chromakey tool is that the color used for the backing screen cannot be found in the foreground object.

Historically, blue is the most often used color. This is because blue is the complementary color to flesh tone. [figure 2] The most common color in chromakey situations is flesh tone, since people are most often the subject, so blue is the logical choice to avoid conflicts.



[figure 2] The color wheel. Complementary colors are found directly ACROSS from each other on this chart.

If a person is wearing a blue shirt or has blue eyes and he is photographed against a blue backing screen, the shirt or the eyes will seem to disappear when the blue background is removed. Whenever you see any special effects in movies where the actors are obviously shot against a computer generated background, you will notice they are NOT wearing either green or blue (which immediately tells you what color backing screen they were shot against).

Green is also rarely found in skin tones, so it is the second choice when using people as the foreground object. There is usually no specific advantage to using blue over green or green over blue. We suggest performing tests to determine which color delivers the best results for their specific application.

A unique feature of Primatte is that it works equally well with almost any color of backing screen. Using a saturated color is best; for instance, a rich blue will always work better than light blue or turquoise. White, black and gray are problematic backing screen colors because they are found in almost every foreground object.

installation and support

Following are instructions for installing Primatte on Windows or Macintosh. Please note that your installer is not cross-platform; it will either work on the PC or the Mac. Registration occurs upon purchase of Primatte. Therefore, no additional steps need to be taken to register the product.

windows installation

If you downloaded Primatte for Photoshop from the Digital Anarchy website, you will find a zipped file named in your download directory. Uncompress the .ZIP file into a temporary directory and then execute the Setup.exe file. The installer will ask you to:

1. Enter your serial number.
2. Navigate to your Photoshop Plugins directory.

The Plugins directory is in your Photoshop folder. The directory path is generally (but not necessarily) at C:/Program Files/Adobe/Photoshop/Plugins.

If you received a CD from Digital Anarchy, the install program is not compressed, and can be activated by double-clicking on it. Follow the instructions listed above.

macintosh installation

If you downloaded Primatte for Photoshop from the Digital Anarchy website, you will find a stuffed file in your download folder. Unstuff the .SIT file, and then double-click the installer. The installer will ask you to:

1. Select your operating system from the top-left popup.
2. Navigate to the Plugins folder in your Photoshop folder.
3. Enter your serial number.

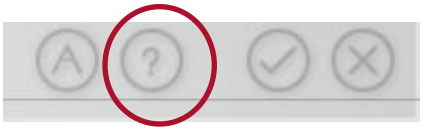
If you received a CD from Digital Anarchy, the install program is not compressed, and can be activated by double-clicking on it. Follow the instructions listed above.

using demo software

Primatte Chromakey 2.0 is fully functional in demo mode. However, your image will be watermarked both in the Primatte interface and within your Photoshop file.

support materials and file locations

On the Digital Anarchy website are support materials to help you get started. These include a manual in PDF format, tutorials in PDF and QuickTime formats, and sample graphics to get started with.



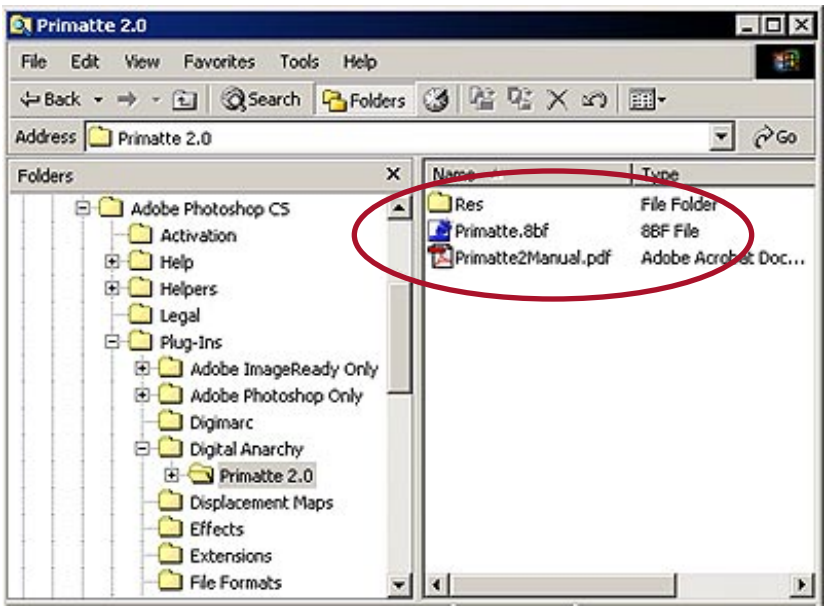
[figure] The Manual button will open, well, this manual.

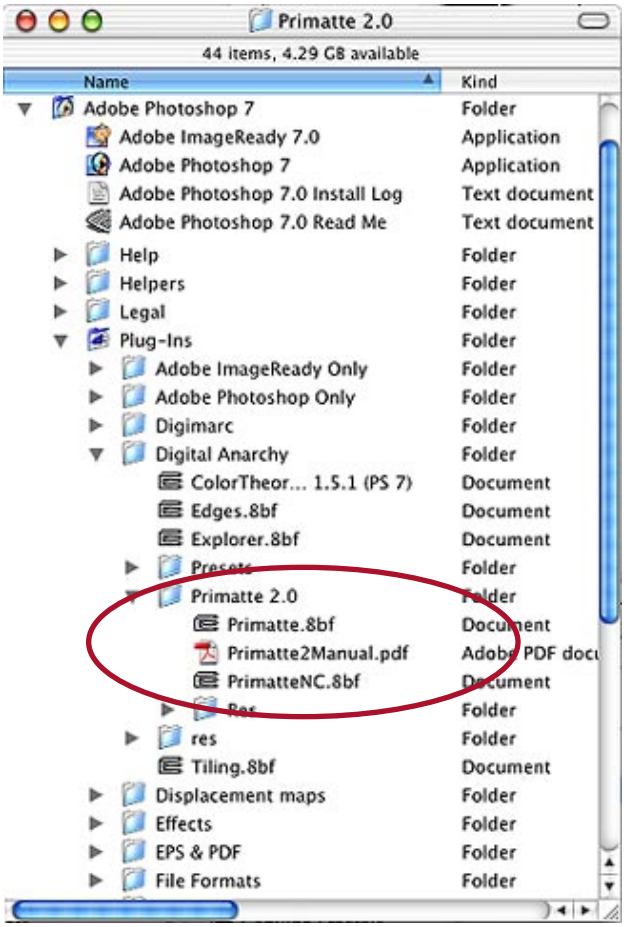
There is a Manual button at top right of the Primatte interface. This button will find and launch the Primatte PDF manual you are now reading if the following conditions are met:

1. This PDF file must be named 'Primatte2Manual.pdf'
2. This PDF file must sit in a specific location in your Photoshop folder. That path is created when Primatte is installed, and is the following: Photoshop\Plugins\Digital Anarchy\Primatte 2.0.

The runtime files for Primatte are also located in the Digital Anarchy\Primatte 2.0 folder.

[figure] The location of Primatte's support files on Windows (left and Macintosh (right).





manual notes

For this manual, we've photographed one model against a blue background, which is the most common backdrop used against flesh tones, and another model against green, which is the second most popular backdrop. We've also photographed objects, like coffee mugs and holiday ornaments, against blue and green screens.

terms we use

Throughout this documentation, we will refer to the color background in the example being worked on. If we're working with a subject shot against a blue background, all of our language will refer to blue. Similarly, if we've used a green screen, we'll refer to green when talking about color removal and color spill.

Keep in mind that Primatte can be used to mask out ANY color, like red or yellow or hot pink (our personal favorite) so if your photographic subject is different than ours, just mentally substitute that color. Of course, the backing screen color should be chosen to complement the colors in the foreground object. A red apple will need a green screen. A green apple might use a red screen.

To simplify our instructions, we will often generically refer to blue. 'Bluespill' is the standard term for unwanted color that seeps into an image, and 'bluescreen' is the standard reference to the solid color that your subject has been photographed against.

follow along with our files

You can follow along our tutorials and explanations using the graphics that we've provided. If you are working in demo mode, please go to the downloads section of www.digitalanarchy.com. If you have purchased Primatte, you will find an FTP link in the email that confirmed your purchase. The images are available as layered Photoshop files or as smaller files that each hold a single layer.

our shameless plug

The Background textural images were all created with another Digital Anarchy product, called Texture Anarchy. Texture Anarchy is a set of three plug-ins that generate seamless procedural textures in Photoshop. The plug-ins ship with tons of presets for naturalistic, organic, and pleasing textures, and have tons of features that allow you to edit and create new textures.

Check Texture Anarchy for Photoshop out at www.digitalanarchy.com, and download the free demo for Windows or Macintosh (OS X and 9).

[figure 3] One part of the Texture Anarchy interface. At right is an area for loading in texture presets and mutating or editing them. At left is a Lighting Editor that can change the coloration and depth of the texture you are mixing.

the really quickstart guide

Here is a down n' dirty overview of the Primatte interface and process. It's good for folks who are familiar with chromakey software, and just need to know where the functions they expect are hiding. Please refer to the more detailed Tutorial and the individual tools sections for more clarification.

If you are NOT familiar with chromakeying, please skip to the next section to read the extended version of our Primatte tutorial. Note that Primatte can extract a foreground from any solid color, but for simplification, we will refer to the background color as 'blue' and any color spill on the foreground object as 'bluespill'.

step 1

Select the Photoshop layer that contains the object to be masked. The bottom-most layer of that file will be used as the background. If there are no additional layers, the masked object will appear on a gray background until you exit the Primatte plug-in and go back to Photoshop. At that time, the gray will be replaced with transparency.

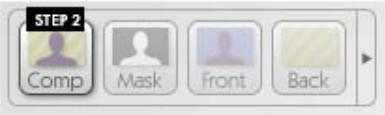
step 2

When you first start Primatte, you are in the default Select mode [figure 4] and are looking at the Composite view. [figure 5] To generate the initial mask, click in the area of the photo to be keyed out. This is usually a blue or green background.

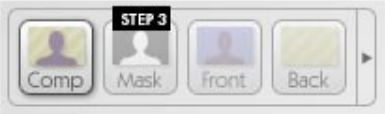
[figure 4]

step 3

Switch to Mask view to see the mask generated from this first step. [figure 6]



[figure 5]



[figure 6]

step 4

Click on the Clean BG button. [figure 7] Click on any areas in the background that are not completely black. This selects the colors to be made transparent. You want all the background pixels to to be black, which is equal to transparent.

[figure 7]

step 5

Click on the Clean FG button. [figure 8] Click in any areas of the foreground object that are not completely white. You want the object that is being masked to be completely white in the Mask view EXCEPT any areas that are meant to be transparent or partially transparent (like hair, shadows, glass). Stay away from the edges of the foreground object.

[figure 8]

step 6

Click on the Comp view button to show the composite of your masked object and whatever background is in the Photoshop file (if there is no background, the object will appear on a gray background).

You will now probably see your masked object with some blue spill on it, either because the blue from the background is showing through transparent areas (such as hair) or because light is bouncing off the blue background onto the object you're trying to mask.

step 7

Click on the Spill Sponge and click on the areas tinged with blue. [figure 9] The bluespill should be removed. The Spill Sponge may, however, remove TOO MUCH color. If too much color is removed, hit the Undo button and use the Spill Minus button instead.

[figure 9]

step 8

Now try using the Spill Minus button. [figure 10] This will remove a lot less of the blue than the Sponge. You may have to click multiple times to see an effect. If you go too far with Spill Minus, you can undo in one of two ways. Either click the Undo button or click the Spill Plus button, to back up as many steps as needed. After completing this step, you should have a pretty good chromakey composite.

[figure 10]

pulling a key tutorial

This section is an overview of how to work with Primatte. We suggest you refer to specific sections of the manual to learn more about the tools and concepts you'll be introduced to. Basically, you'll be setting down a sample point, then fine-tuning that sample point, then looking for blue-spill. These terms aren't familiar? Don't worry… they will be soon!

step 1 – select foreground layer

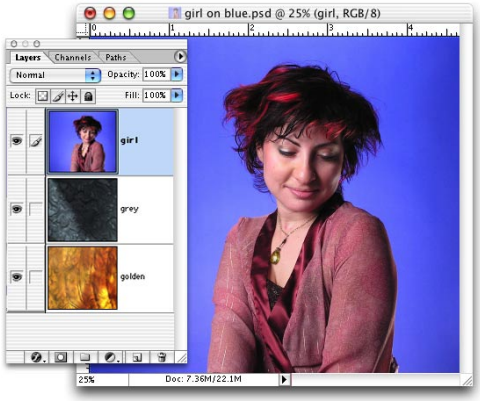
Start Photoshop (or your PS-compatible application) and open a image that you would like to chromakey using Primatte.

Primatte can work with multi-layer or single layer Photoshop files. Primatte creates a mask on the layer that is selected when you apply the plug-in. This is called your Foreground layer.

If you are working with a single layer document, then the correct layer is selected, because there is only one layer. If you're working with a multi-layered document, you need to select the layer that will be masked BEFORE you apply Primatte. This should be the layer with the backscreen color.

Primatte will use the bottommost layer in your Photoshop file as the background for your masked object to be viewed against. This is called your Background layer. This means you can work on your composite while viewing the intended background image. [figure 11]

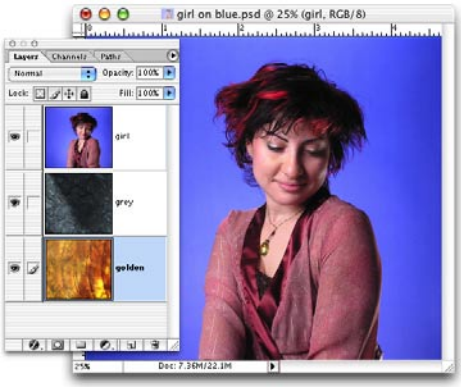
If there are no layers below the foreground layer, then the object will appear against a default gray background when masked out. [figure 12, next page] Alternately, Primatte can turn on a solid color of your choice as the Background.

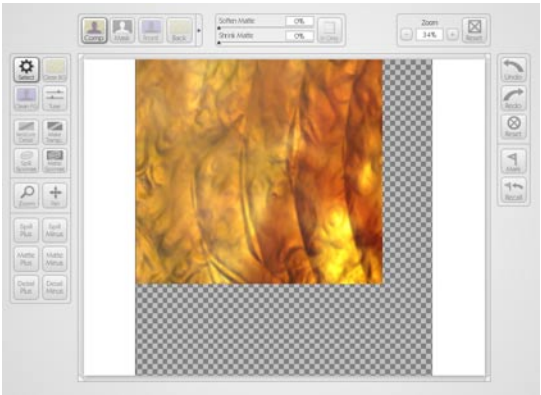


[figure 11] If you have multiple layers in your Photoshop files, you'll see the bottomost layer in the Primatte preview. The layer immediately behind the foreground object layer is NOT the one previewed in the Primatte composite.

[figure 12] When there are no background layers in your Photoshop file, Primatte generates a gray background for preview. The gray area represents transparent pixels that Primatte has created.

[figure 13] Here's what your file may look like in Primatte (left) Photoshop if you have the wrong layer selected n Photoshop (right).





step 2 – generate the initial mask

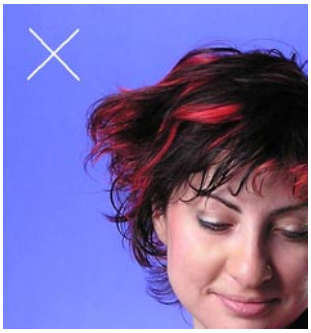
To apply Primatte, in the Photoshop pull-down menu, go to Filter> Digital Anarchy> Primatte. The Primatte interface window will appear.

The first step in using Primatte is setting the initial sample point for the mask to originate from. To do this, you'll use the Select operation. [figure 14]

[figure 14]

By default, the Select button should already be selected in the left-side row of Operation Mode tools. If not, please select it. With the Select tool active, click in the Image Window on the color you want to remove in the image area. You are telling Primatte what the backscreen color is. In the following example, this is a blue background.

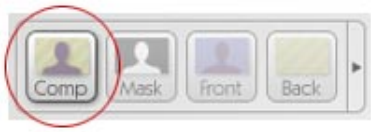
You should start with a pixel that is representative of the range of the color that you're going to key out. In our example, you might click on a blue pixel near the model's head, as that shade falls between the outer dark blue edges and the highlights at the center of the backdrop. [figure 15]



[figure 15] the initial sample point for our chromakey

Immediately after letting up on the mouse button, you will see that most of the blue color disappears and the model appears against a background. Primatte has keyed out most of the blue in just one click, and changed the blue pixels to transparent pixels. Remember, a Primatte mask is a physical location of pixels that are rendered transparent in order to visually isolate the desired object in an image.

You can see the mask that's been generated because, by default, you are in the Comp View mode. [figure 16] Comp view shows you the full composite that you are creating; that is, the object in the foreground (our female model) against however much of the background graphic (the gold texture behind her) is showing through. [figure 17]



[figure 16]

step 3 – view the mask

This mask, or 'key', is what will extract the picture of our model from the blue background. You can view a different representation of the mask by changing your View mode from Comp to Mask view. [figure 18]

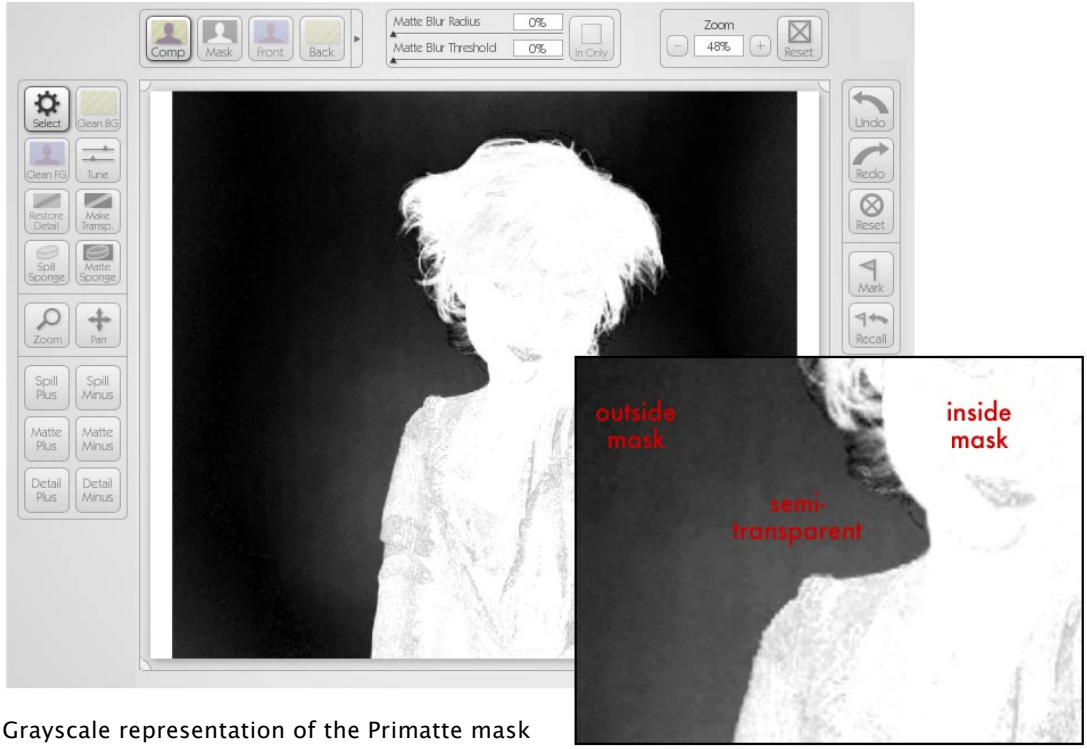
Click on the Mask View button above the image window. The image of our model is now represented by a grayscale map called the Mask view. Black represents the pixels that are part of the Background portion of the mask. White represents the pixels that are the Foreground of the mask.

Comp view shows you the full composite [figure 17]

[figure 18]

Shades of gray represent areas that are included in the mask at different levels of transparency. Dark gray indicates that semi-transparency is high, and most of the pixel is inside the mask. Lighter shades indicate that semi-transparency is low, and most of the pixel is not included in the mask. [figure 19]

You will probably notice that there are whitish pixels dappled through the mostly black area that used to be blue. We will remove most of these whitish pixels in the next step of Primatte.



Grayscale representation of the Primatte mask in Mask view [figure 19]

step 4 - remove the background noise

The next step in using Primatte is to make certain that all Background areas of the mask are transparent. Fully transparent areas show up as 100% black. Dark gray is semi-transparent, light gray is more opaque, and 100% white is fully opaque.

Any white regions in the dark bluescreen area are called 'noise.' Noise regions are shades of blue (or whatever color you've used) that did not get picked up on the first sample. To remove the noise, you'll switch from the default Select mode to a different Operation mode, Clean BG. [figure 20]

[figure 20]

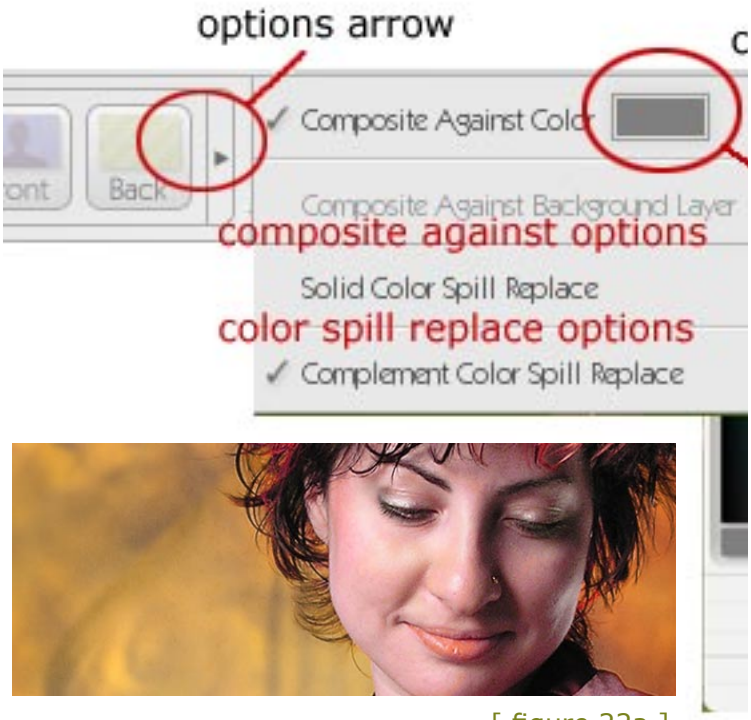
Before Background noise removal (left) and after removal (right). [figure 21]

You can fine-tune the mask Background by adding additional sample points. First, click on the Clean BG button to switch Operation modes. Then click and drag your cursor along the background noise, which are the dark areas of the grayscale representation.

A trail of white dots will display the path taken by the cursor. [figure 21] This is called a 'snail trail'. When you let up on the mouse button, Primatte will process the data and eliminate the whitish noise. Repeat this procedure as often as necessary to clear the noise from the background area.

WORK TIP

Increasing the brightness of your monitor or the screen gamma may allow you to see noise that would otherwise be invisible.



[figure 22a]

[figure 22b]

[figure 23]

Whoops – how did this happen? The wrong area was clicked into. For removing Background noise, the Clean BG button needs to be clicked along grayish areas that should turn to 100% black. In this case, we accidentally clicked along the white area of the model's shirt, which is part of the Foreground.

Remember: white = opaque, black = transparent. Any mistakes are easy enough to correct. Just click the Undo button to go back to an earlier step.

step 5 – remove the foreground noise

The next step in using Primatte is to make certain that all Foreground areas of the mask are opaque. You will do this with the Clean FG tool. [figure 24]

[figure 24]

You may notice dark regions in the middle of the mostly white foreground object. Opaque areas show up as 100% white. Dark regions are areas of the mask that are not fully opaque. This is fine for areas that need to be semi-transparent, like hair along the edge of a subject, or a glass vase.

As with removing background noise, you can fine-tune the Foreground by adding additional sample points. First, click on the Clean FG button to switch modes. Then move and click your cursor along the noise areas. Use the same techniques as for Clean BG Noise, but this time, sample the dark pixels in the foreground area until that area is as white as possible.

EDITING TIP

Like Step 4, if you try to remove all the noise in these steps, you may have difficulty pulling a good key. Leave difficult areas for the Spill Removal tools.

Before Foreground noise removal (left) and after removal (right). [figure 25]

Before the FG tool, the model's face and shirt have an orangish tone. [figure 25a] This is where the mask areas had significant semi-transparency, as evidenced by the mid-grays in Mask view. [figure 25b]

Her lips and the oval pattern on the shirt show a strong correction towards pink and flesh tones once the FG tool has been run. [figure 25c]

[figure 25a]

[figure 26]

Once again, in the above image, the wrong area was sampled. For removing Foreground noise, the Clean FG button needs to be clicked along grayish areas that should turn to 100% white. In this case, we accidentally clicked into the black background, which forced Primatte to calculate a wider range of grayscale values. Hit the Undo button to back out of this edit.

[figure 25b]

[figure 25c]

step 6 – check for bluespill

At this point, you have created a relatively clean 'key' of the image. You have separated the foreground object from the background, which has been converted into transparent pixels.

[figure 27]

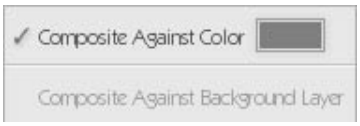
However, there may be `bluespill' on the foreground object. 'Spill' is a color tinge created by light that reflected off the backdrop color and onto the subject during your photo session. Blue is the most popular screen color used; thus, the generic term 'bluespill'. You need to remove this background spill to get a more natural looking composite.

To properly assess your bluespill situation, you'll want to go back to Comp view. [figure 27] You will see your masked object composited against a background, which will allow you to see any color issues.

[figure 28a]

[figure 28b]

By default, the background that previews is the bottommost layer of your Photoshop file [figure 28a] or a solid color background generated by Primatte. [figure 28b] You can set which displays as the default in the Composite option pop-up box next to the Back View button. [figure 29]



[figure 29]

The main aspect to notice about this picture is that while Primatte has successfully removed all of the blue pixels in one pass, there is a purple tinge to the model's red hair. This is caused by light reflecting from the blue screen onto the model. [figure 30]

The purple color can be called 'bluespill'. What bluespill is and how Primatte handles it is discussed in detail in the Bluespill sections later in this manual.

[figure 30]

[figure 31]

What you're really seeing is the subject against a transparent background. The transparency is expressed in the standard Photoshop fashion, as a checkerboard of pixels.

toggle your views

Reality check! It's a good idea to toggle between views of your composite. Don't get too comfortable staring at your mask from one perspective. There are often spill issues that are undetectable if you. You can also change your monitor brightness – yes, a hardware solution – to see if the image looks different.

This advice goes for both checking out your Foreground image for bluespill, as well as for looking at your mask as you're creating it. It's also important to look at your final result, after the key has been pulled AND corrected for bluespill.

If the Comp view looks good and you think you have a perfect composite, it is a good idea to go back and take a final look at the Mask view. Or vice versa. Your 'spill suppression' operations may have changed the final compositing results, which means you may have to return to earlier operations to clean up the matte.

toggle mask and comp views

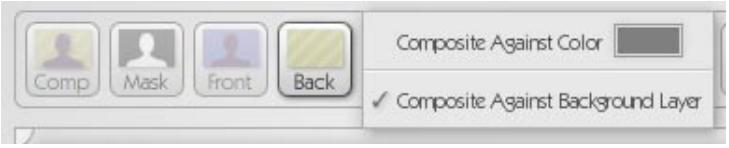
Toggling between the different View modes will help to determine if your composite is correct. The composite may look good in Comp view, but when you look at the mask in Matte view, there are obvious flaws. Similarly, it's great to work in Mask view for a clean view of the grayscale map, but often switching to Comp view will reveal problems.

[figure 22] It's always good to toggle your views when working on a mask. For instance, looking at this keyed Foreground object in Mask view (right) shows us something we may have missed in Comp view (left), that the brown Background texture is showing through the lettering. The gray in lettering indicates semi-transparency.

look at other backgrounds

You can also look at your Foreground object against other backgrounds to check out its mask. Composite Against will switch between a view of your mask against a solid colored background of your choice, to a custom background that you've created as a separate Photoshop layer. [figure 23]

This popup is accessible through an arrow next to the Back view button. it is important to users of Photoshop 6.0 and earlier, as those application versions do not support 'Composite Against Background', and therefore cannot load in Photoshop layers for preview.



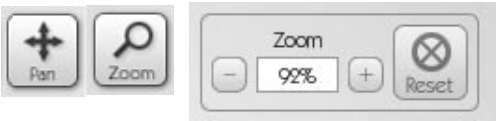
[figure 23]

In our mug example below, the background is a wooden texture created with Digital Anarchy's Texture Anarchy Explorer plug-in. [figure 24] Sometimes looking at your Foreground object against a solid color Background, especially one that contrasts in hue and tone, will allow the subtleties of bluespill to emerge.

[figure 24] The bright blue Background, which has a cool tone, contrasts with the warmer pink tones of the bluespill we want to remove. This makes it easier to see where to target correction, as compared to looking against the intended wood texture.

zoom and pan

It's also helpful to use the Zoom and Pan controls to review your image closer up. This is fairly obvious advice, but it warrants mention. It's easy to be complacent in looking at your Foreground/Background composite at the physical size that you intend to use that image, like working at scale for insertion in a catalogue.



[figure 25]

There are two ways to zoom into your image. Either scrub with the Zoom tool, or use the Zoom box to magnify to the next preset percentage. The Pan tool is a grabber hand that lets you pull around to different areas of the image. [figure 25]

[figure 26] Zooming in 300% allows us to see a flaw in the mask that may be overlooked otherwise. In this mug, we can more easily see a small blue area that is potentially overlooked at 100% view.

Incorporating these workflow suggestions, let's examine more examples of pulling keys and making masks.

pulling a difficult key

Let's examine another example of Primatte keying. This situation (and how to fix it) is less straightforward than our tutorial example of a dark-haired girl against a bluescreen.

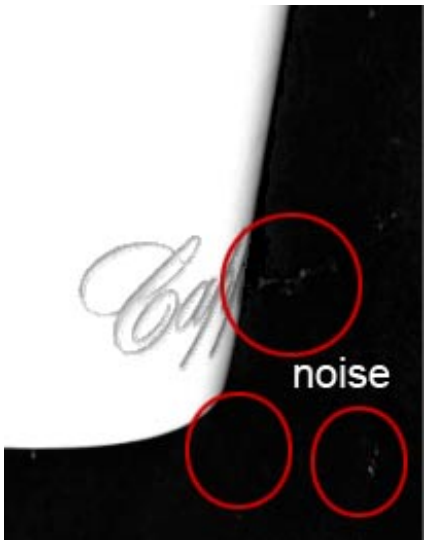
For this example, we've photographed a mug against a blue backdrop. The backdrop is not ideal, as it is blue photographic paper that was pulled back tauntly and clamped into place. This created a crease along the middle, which resulted in a noticeable difference in the tonal values of the bluescreen, making a more challenging environment to key out.

step 1

A mug photographed against an uneven blue background. (left) The final key. (right)

step 2

The beginning of a key pulled with theSelect tool. (left) Notice that there are still white and gray pixels, or white noise, along the Background area that we are going to eliminate. In particular, notice the scattered light pixels along the bottom right of the image (right). Those are often more difficult to eliminate than the more sweeping, dense noise.



step 3

Second step is the Clean Background operation. We've cleaned up some of the background noise with a few clicks along the top and bottom. It's not a very clean key, though, and very rough along the sides of the mug.

step 4

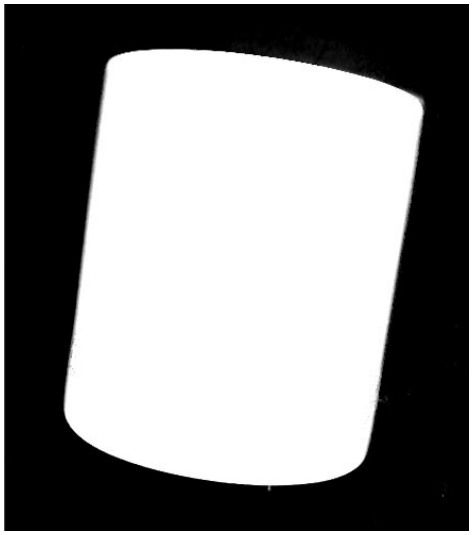
Clicking on each of the white pixels along the bottom right, we've gone too far with the Clean BG tool. Details from the opaque sides of the mug have been clipped to the extent that unwanted transparency has occured. We can correct this by hitting the Undo button a few times.

step 5

In this closeup view of the CleanBG operation, we can see the clipped pixels in the Foreground object. It's actually ok to leave in a tiny bit of white noise. Especially if those pixels are close to black, like a dark gray, they are virtually

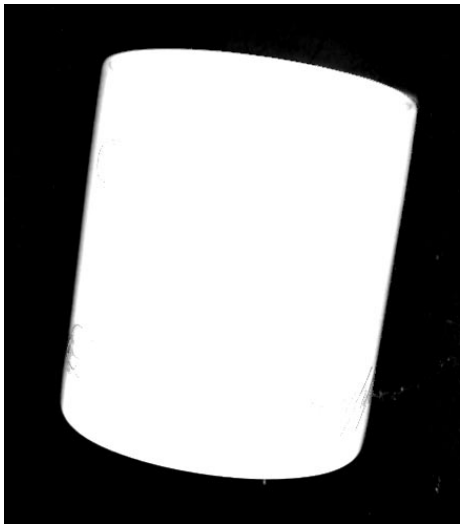
step 6

Third step is the Clean Foreground operation. It would be nice to eliminate more of the gray lettering from the interior edges of the mug.



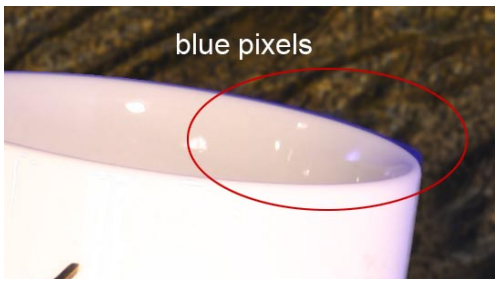
step 7

We've cleaned up the mug further with the Clean FG tool. In trying to get rid of all the gray noise, however, we've allowed in more of the blue background that we're trying to mask out.



step 8

Looking closer at the Clean FG overcorrection, notice the extra blue around the mug lip. This is not bluespill (color reflection from the photographic lighting), but unwanted chunks of the blue background showing through the mask.



step 9

Hitting the Undo button, we can go back to an earlier mask state, drop out the excess blue pixels, and correct further using the spill correction toolset.

Fact is, this mug shot (heh, get it?) is a really difficult mask for Primatte to pull successfully. The bluescreen background was a poor choice to use because it is so tonally uneven. The graphic is a good example of the process going wrong durng the photography session.

This graphic would greatly benefit from a garbage matte. A ‘garbage matte’ is a masking element that is created to help along the process of creating a much better mask. Please turn to the Garbage Matte section in this manual to find out about how garbage mattes can Work For You.

spill correction

There are numerous ways to remove spill color in Primatte, and we've outlined them all in the following section. As you learn these Spill Removal methods, keep in mind that you won't need to use ALL of them on an image. Faster is better until that method doesn't work! As you gain experience with Primatte, you'll develop ways to approach problem areas in material you use frequently.

what is bluespill

Bluespill is unwanted color that appears on your Foreground subject. This happens somewhat unavoidably during the photography session, and needs to be removed afterwards.

How does bluespill occur? Basically, light bounces off the background behind your photographic subject. This makes the background – your color screen – a light source in and of itself. That light throws a color on the subject.

If you threw a ball against the wall, the ball would bounce off and hit another wall. That's physics. In the process of light bouncing, the wall absorbs all the other colors besides itself, generally, then casts off its own color light. If the wall is blue, the wall absorbs all the other colors that are cast by the lights around it, and bounces back only blue.

Think about it this way: If you have a red gel over a light, the light shines red. This is because the gel absorbs all the other colors but red, and lets only the red through. The thought is often that you're coloring the light. In fact, you're actually removing light. It's more of a negative rather than a positive process. In fact, when you put a color filter over a light, that light gets dimmer as well as tinted because you're taking out other colors.

our two categories of bluespill

To explain Primatte's bluespill tools, we're going to place color spill into two unofficial categories.

One category is what we will term as 'transparency spill.' This is bluespill caused by issues in the transparency of a Foreground object. The spill happens from the light bouncing off the bluescreen, and that light illuminating parts of the subject that are exposed to the wall.

The other category is what most people would call 'true' bluespill. We'll call it 'bounce spill'. Bounce spill generally happens on opaque areas.

There are of course different techniques to deal with each of these bluespill situations. With 'bounce spill', you can generally just use the Spill Sponge. Literally, sop that stuff up with a sponge. It's often more challenging to get rid of 'transparent spill'. For instance, you may find yourself using the Tune sliders more often.

two methods for bluespill removal

There are two main strategies for removing spill from your Primatte key. We went over some methods more generally in our Quickstart Guide at the beginning of this manual. In this section, we'll talk about how each Spill tool works specifically, and look at examples of when that method of removing bluespill is handiest.

The Tools section of this manual goes over the Spill Removal tools that are not mentioned here. Those tools are often targeted for more specific situations and problems.

1- Spill Sponge

This one-click tool corrects bluespill quickly; is almost always the first tool you should try; and will usually fix simple problems. Advantages: quick spill removal, one-click operation. Disadvantages: only one adjust can be done for each color region, you can't adjust the amount of spill removal.

2- Tune Control sliders

Via the Tune tool, three sliders that are great for cleaning up large spill areas, and making sweeping yet subtle changes. Advantages: you can make large adjustment for major spill problems, lots of flexibility. Disadvantages: not as good for subtle spill, hard to return to a previous level of correction.

watch out for over-correction

As you correct the bluespill in your mask, you may notice a point of diminishing return. We will point out examples of overcorrection as we go through this Spill Removal section.

One problem to watch out for when doing fine adjustment work is 'artifacting'. An image artifact is any feature which appears in an image that is not present in the original imaged object. Pixels in your Foreground image will become discolored or too bright. Artifacting can occur throughout Photoshop, in particular when dealing with edges of a pixel-based object.

Another over-correction problem that can occur in Primatte is 'banding'. Banding is when previously smooth tonal values become clumped together. Certain shades reach a shade they can't go beyond, and they clip together, becoming one value. You may be familiar with banding through working with gradients in Photoshop or in particular, when importing a Photoshop gradient into another application.

When you see any of these problem areas arise, back off the editing you've done. If you're using a One-Click Shortcut tool, like the Spill Sponge, you may do this by using the Undo button, then find a different tool to complement the spill suppression you retain. If you're using a Repeatable tool like Spill Minus, you can click on its twin – in this example, the Spill Plus – and make incremental tweaks to go back towards a proper correction.

why are so many tools needed?

The spill correction tools, like all of Primatte's tools, look at a tone you are clicking on, then find that tone distributed throughout the entire image. So, you click on a pixel, or click-drag along a range of pixels, and Primatte looks at the tonal values you've indicated. Then the Primatte tool you've clicked with does the correction it's built to do.

The tools don't look at or work on an isolated area. You can think about this as if you were using Photoshop's Magic Wand tool, with a non-analogous option turned on. Or like working with Photoshop's Select> Similar command. Instead of simply selecting a range of color tones, however, Primatte actually performs an operation on these tones.

Because you need to get very specific with color choice, Primatte gives you multiple ways to approach designating a tone.

using the spill sponge

You can look at the Spill Sponge as a 'shortcut' tool. It works great for simple, fast correction, basically sopping up the unwanted color much like, well, a sponge soaks in liquid. The Spill Sponge often solves your spill problem immediately, which means you won't have to fool around with the other spill correction tools that we're about to explain!

[figure 37] The Spill Sponge is one of four One-Step Shortcut tools. Each works as a single-click correction. Spill Sponge is the one you'll use most often.

The Spill Sponge is also good for creating quickie low resolution pre-visualizations. For instance, you may want to see how your subject will look against a potential background, but you don't want to waste time creating a perfect mask.

how it works

Select the Spill Sponge button and sample away the spill areas. Position your cursor over a green pixel, click to select that pixel, and the green will be replaced by a more natural color. You are telling Primatte to recognize a hue as incorrect.

The aspect to understand about the Spill Sponge is that it is a one-click tool. Clicking a second time will simply override the correction that was created with the first click, as you are setting down a new sample point for Primatte to work from.

If the Spill Sponge doesn't correct your image with a first click, try clicking in a new area. It may be a matter of finding the correct sample point, and often this is a trial-and-error process.

Again, this tool is sort of like using Photoshop's Magic Wand, but with the Threshold setting turned way up. Of course, instead of simply selecting an area, the Sponge automatically performs a correction on the area it's targeted.

[figure 38] The Foreground subject before and after Primatte. We've used the Spill Sponge to clean up green spill.

Sampling the Spill Sponge

Spill Problem

Once a mask is created, the edges of the model's blonde hair have picked up a green reflection from the green backdrop. This is a common problem with flyaway hair, especially light blonde, and fixing it is one of Primatte's specialties.

Click Sponge

After the Spill Sponge. The green tinge been mostly corrected with a single click. We've left a little green in, though, because otherwise the Spill Sponge will overcorrect to red (see below). We can finish the spill correction with another tool.

Over Correct

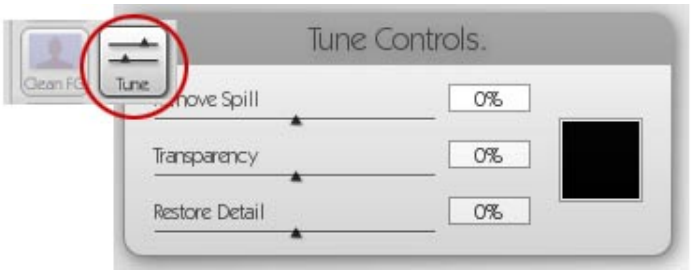
Here the Spill Sponge has over-corrected by adding too much red, which results in a pink tone. This may have happened because we sampled from an area that wasn't green enough. Or, it could be that the Spill Sponge tool was simply too strong for the small amount of spill present.

using the tune controls

The Spill Sponge is a very powerful and aggressive way of correcting spill. If the spilled color is not totally removed using the Spill Sponge procedure, or if the one-click spill correction made too much of a change, you can try a fine-tuning operation called, appropriately, the Tune Controls. The Tune tool is used for a more problematic matte.

Either undo the Spill Sponge first, or leave the results and add on improvement with the Tune sliders.

The Tune sliders are intended for large spill cleanup. These sliders are best at adjusting large areas, making sweeping yet subtle changes. You will generally use the Tune sliders for detail work.



[figure 39] There are three Fine-Tuning sliders, via the Tune tool. They are Remove Spill, Transparency, and Restore Detail. You will use the Remove Spill and Transparency sliders more than Restore Detail or the Color Box.

how they work

Select the Tune button under the Operation tools. A box with three sliders will appear. Zoom into a problem area by using the Zoom and Pan tools.

Now do this:

1. Click to sample a color region that has a unwanted color tinge – blue, for instance. You will see that color previewed in the Tune Color Chip. With the Color Chip loaded, you can choose any Tune Control slider to work with. Of course, you should know which one you're intending to use, but the point here is that it's active for any of the controls.

2. Drag a slider to affect the spill in the sampled region, and any tone that is similar throughout the Foreground image. When you pull a slider, the percentage that you are correcting to will appear in the numeric box briefly, showing you the percentage of correction. The number resets to 0% once you let go of the slider. This is simply the behavior of the tool.

3. Continue this process of click-drag-slide until you reach a point of diminishing return.

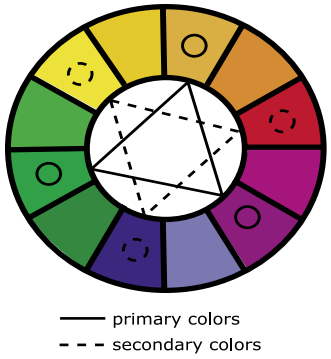
Since the Tune Controls are for control and precision in smaller adjustments, it's better to make several small samples than one large sample. Move the sliders interchangeably to experiment. Also, the Undo/Redo buttons are available to correct any undesired change.

remove spill slider

Remove Spill will add or subtract the amount of spill color. It looks at the color that is sampled, and finds its opposite on the traditional color wheel. [figure 40] Remove Spill then adds in that color, called a 'complementary color'.

Click and drag to sample a range of the spill pixels that you want to remove. Move the slider to the right to remove Background color from the sampled pixels. What's happening, actually, is Primatte adding in the converse, or complementary, color to the spill area. Be careful of oversaturating the color into bands or blocks of too-bright pixels.

If you overcorrect, move the slider to the left. The selected pixels will move toward the Foreground image's original color, which is the keyed color. This removes the complementary color that you've added, until Primatte brings you back to the spill you started from.



[figure 40] The traditional color wheel. Colors opposite each other on the wheel are called 'complementary colors'. Complementary pairs contrast because they share no common colors. If you click on medium bright green, the opposing or complemenatary color is medium red. If you click on deep blue, the complementary is medium orange.

SUMMARY

Go right to remove spill color. Go left to add the spill color back in.

example of good remove spill

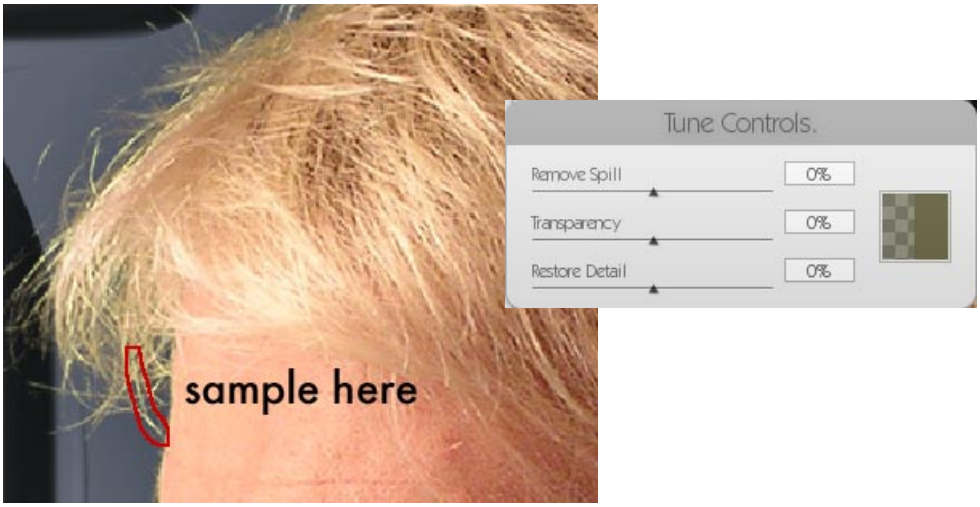
In the case of our blonde model, we want to get rid of the excess green spill around his problematic flyaway hair. This green is leftover from the Spill Sponge correction, which did a good (but not perfect) job.

Spill Problem

Here is the mask, with spill, that we're starting with. This model was shot against a green backdrop. Notice the green tinge at the edges of the hair that is not present in the body.

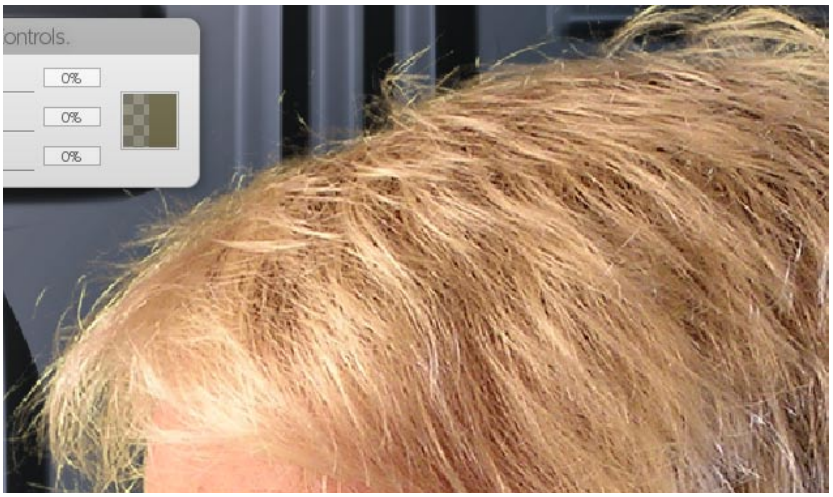
Sample Click

Open up the Tune Controls, then click in a tone that seems to represent the spill problem globally. Remember, you are not working on a particular physical location of an image. You are working with a designated tonal range. The Tune Color Chip will reflect the color that you have sampled.



Slide Once

The results of one pull of the Remove Spill slider to the right at 15%.



Slide Twice

The results of two more right-slides, each time to about 10%. Instead of making one massive correction of 35% to the right, we've done the correction incrememtally. This way, we can be watchful that the good areas stay corrected.

EDITING TIP

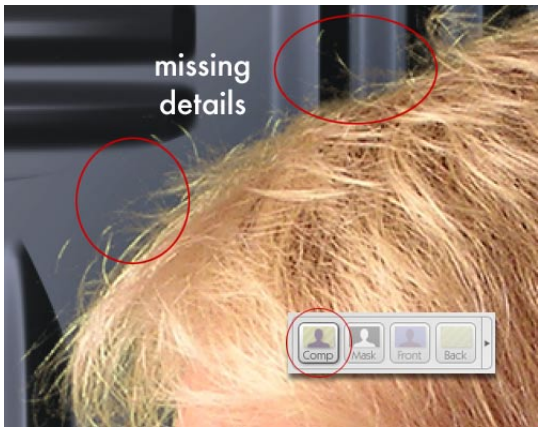
Remove Spill can go to a certain point and then it stops working. For instance, if you move the slider to the left to negate what you've removed, you'll add back in the tinge color until it's all added back in. You can't add in more than what the image started with.

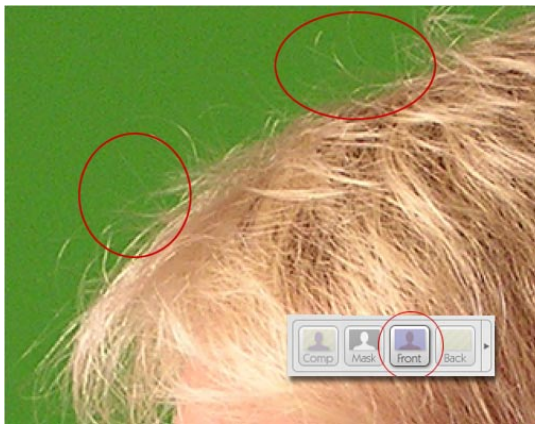
example of bad remove spill

You always need to be careful of over-correcting the bluespill. In the example below, we've used the Remove Spill Control incorrectly by trying to retrieve lost hair strands.

Spill Problem

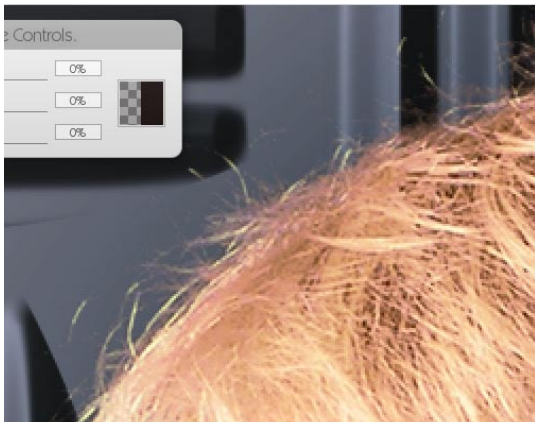
To begin with, we've toggled our view of the composite between Comp and Full view. This is a good way to see what detail is missing. Note that some strands of hair are clipped out by the mask (left), like the areas circled in the Full view (right).





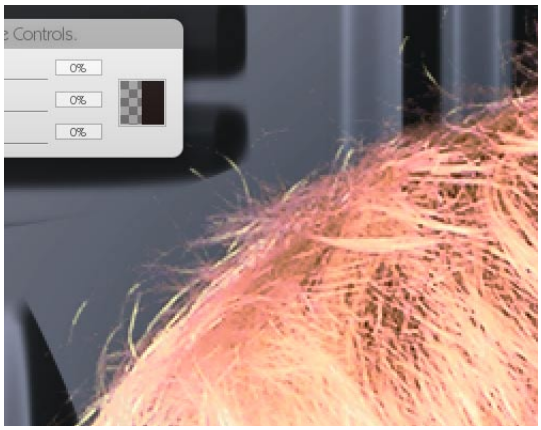
Slide Once

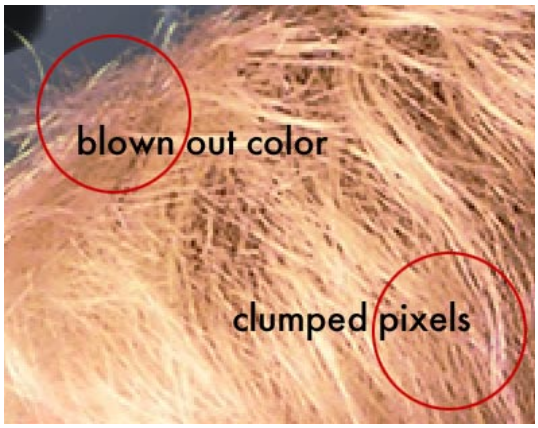
We want to retrieve the lost blond hair using a particular hair color as the sample point. Open up Tune Controls, click on the sample strand, and pull Remove Spill to the right. This reddens alike tones throughout the image (adds in the complementary color), which looks unnatural and bring back the hair color.



Slide Twice

In fact, if we keep clicking the Remove Spill slider without sampling again, Primatte continues to subtract the key color, and add in its complementary. We get horrible banding and clumping.



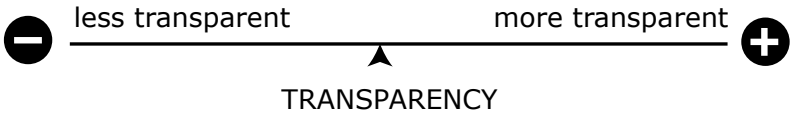


transparency slider

For most images, the Remove Spill slider is the only Tune Control that is required to remove any remaining bluespill. You can, however, use the other two sliders in a similar way for different key adjustments.

The Transparency slider controls the transparency of pixels directly at the edge of the mask. Essentially, it controls the softness of the color in the mask that is closest to the Foreground color. Move the slider to the right to increase transparency. Move the slider to the left to decrease transparency.

For example, if you have thick and opaque smoke in the foreground, you can make it semi-transparent by moving the Transparency slider to the right after selecting the pixels in the Tune mode.



SUMMARY

Go left to make opaque.
Go right to make more transparent.

WORK TIP

You only want to use the Transparency Control on areas that are supposed to be transparent. Don't use Transparency on opaque areas that you want to lighten up. This rule is true of all transparency tools in Primatte.

restore detail slider

You can look at Restore Detail as the 'detail' slider (surprise!). The Restore Detail slider controls the softness of the color in the mask that is closest to the Background color. Move the slider to the right to drop out detail. Move the slider to the left to bring back detail.

You'll generally use Restore Detail to bring back lost pixels, so you'll generally 'work to the right'. For example, you can recover lost smoke by clicking on the area of the image where the smoke just starts to disappear, and moving the Restore Detail slider to the left.

SUMMARY

Go left to remove detail.
Go right to add back detail.

example of good transparency / restore detail

In this example, we have photographed a mesh star perched on a glass vase. Both Foreground objects contain a great deal of transparency that needs to be preserved while removing the green background. We'll use both the Transparency and Restore Detail sliders to finish removing green spill.

The Task

The object before Primatte (left) and after spill correction (right).

The Problem

We were able to bring out the wire structure with the FG tool to a certain point, while maintaining the transparency of the mesh in between (left). But once we clicked around more, to bring out the recessed right side, the mesh transparency got wiped out (right). So, we hit Undo, selected the Tune tool, and opened up the Tune Controls.

MANUAL NOTE

You don't need to use Transparency and Restore Detail together.
We have simply combined their functions into one example.

Restore Detail

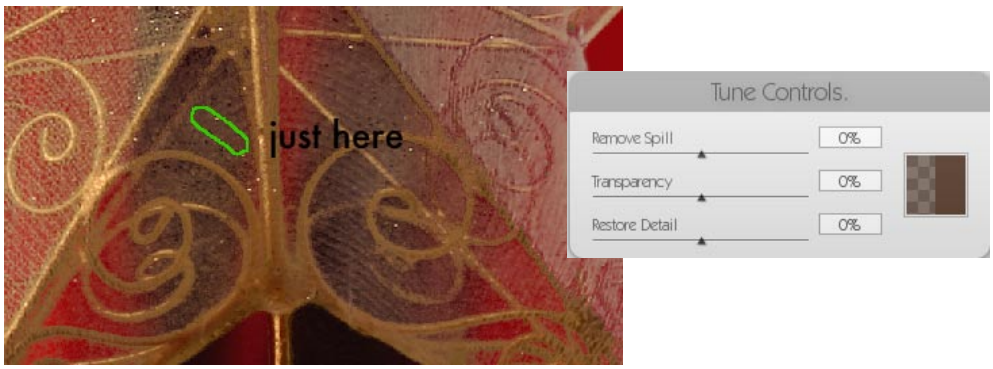
The sample color used for Restore Detail and the area we sampled from. We pulled the Restore Detail slider to the right, to add in detail, four times, each time about a 10% correction.

The Results

Before the Restore Detail Control (left). After the Restore Detail slider (right). The wire details have resurfaced, and in fact the translucency of the surrounding mesh has improved.

Transparency

Next, we pumped up the transparency a bit more in the mesh. With the Tune Controls still open, we sampled an appropriate color. Then we pulled the Transparency slider to the right twice, about 10% each time.

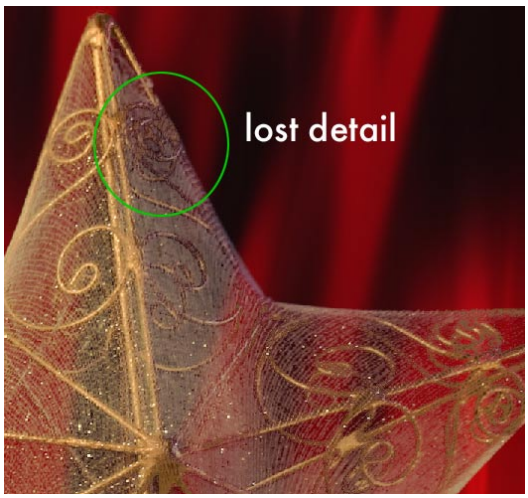


The Results

Before the Transparency Control (left). After the Transparency slider (right). The excess gold opacity has been removed from the mesh.

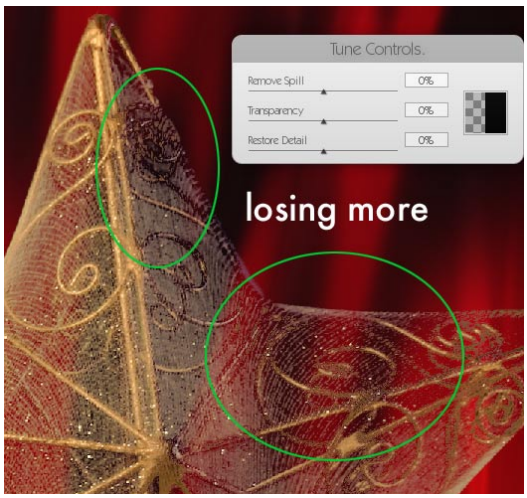
example of bad restore detail

Let's look at some of the lost detail in another area of the mesh star. We unsuccessfully try to correct it by bringing back the opaque metal wire along the top right side. The lesson learned here is that sometimes it takes a few tries to find the optimal area of an image to sample from.



The Problem

The wire detail seems bitten through in places, and dropped out in others.



The Results

We open up the Tune tool and click-sample along the lost wire, then pull the Restore Detail Control to the right. But, more detail gets lost. This is a bad sample area with which to approach the image.

using garbage mattes

The idea of making a garbage matte is not something invented for Primatte. Garbage mattes have existed for many years to speed along graphics applications, both for motion and stills, in many tasks that require sophisticated transformation of an object away from its original visual environment.

Primatte does a great job, but you can make it work better or at least faster with some pre-planning and pre-masking. These suggestions assume that you don't have a background with a perfectly flat backing screen with only one shade of blue.

what is a garbage matte

To explain what a garbage matte is, it's best to start off with why and when you create one. Sometimes your subject is properly keyed but there are undesired objects in the backdrop. For instance, the camera catches the brown wall peeping around the edge of a blue cloth draped as the color screen. Or, a harsh shadow appears beneath the object that's sitting on a covered table for the photograph. Use a garbage matte to mask out those elements.

In Primatte, a garbage matte is an area that has been masked out, but not as the final masking element. It is generally hastily created and often sloppy. It is used for a purpose, then discarded or incorporated into a more finalized mask.

The purpose of making a garbage mask for Primatte is to create as uniform a background color as possible. The fewer shades of a color, the easier that color is to key out.

creating a garbage matte

There are three ways to make a garbage matte for Primatte. In all methods, you make the garbage matte outside of Primatte, within Photoshop directly.

method 1–

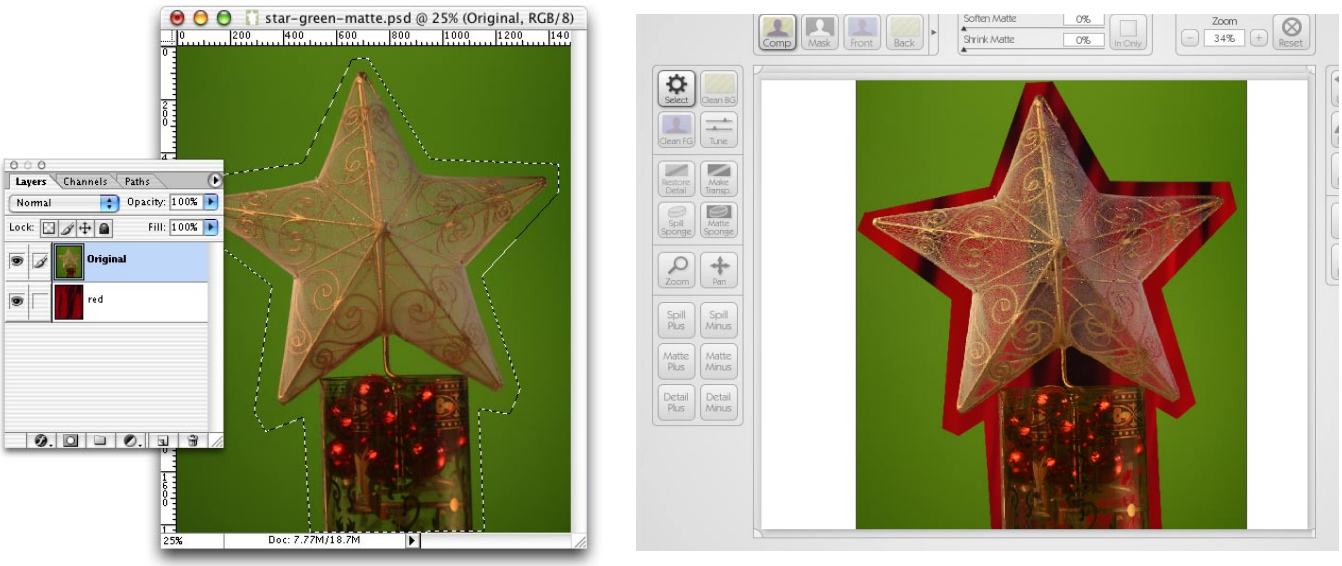
One method is to draw the matte with a bitmap painting tool, like the Paintbrush or Pencil. Draw directly on the photograph layer, or draw on a separate layer and flatten together before applying Primatte.

method 2–

A second method is to draw the matte with the Pen and Arrow vector tools. Flatten this layer with the photograph layer before applying Primatte.

method 3–

The third method is to make a selection around the area you want to block out. Use the Lasso or Marquee tool to block out the area that you want to include. Then apply Primatte. Your selection will convert, not into the starting point of a mask, but into a delineated area of your image that Primatte will work within. [figure 41]



[figure 41] We've created a selection with a sticky Lasso (left), then applied Primatte to recognize that selection as our work area (right).

example #1

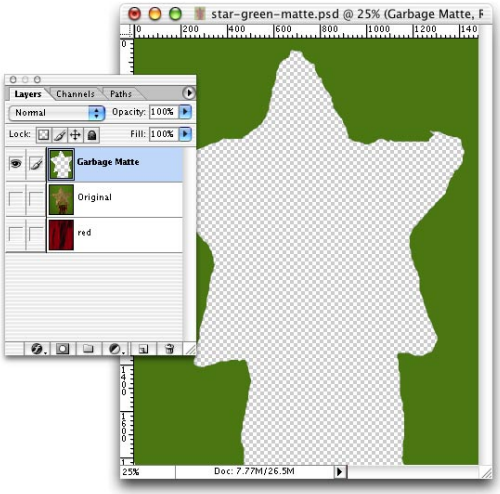
In this photograph of a mesh star and glass vase, pulling a key is particularly difficult. The darker and muddy areas of green which are around the corners of the backscreen are present inside the mesh area of the star. With transparent areas, the Foreground object color often interferes with the background.

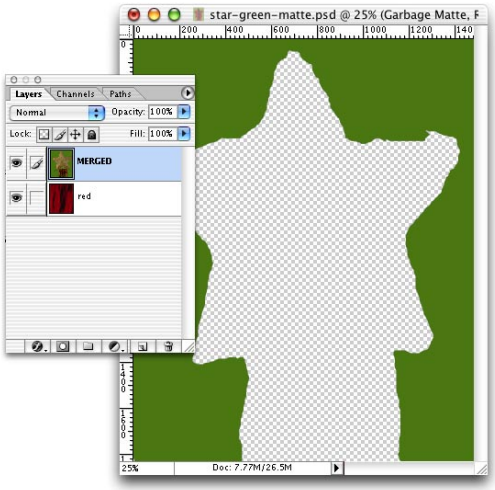
There's a distinct radial pattern in the greenscreen that goes from the center of the star outward. This means the background isn't completely flat color, which makes Primatte's job harder.

For this image, we want to make a garbage matte to flatten the shades of green into one more continuous tone. This makes the process of subtracting that green element much easier.

We created this garbage matte in Photoshop by using a thick Paintbrush. We started with a large wide brush for the outer area, and moved to a smaller nib to finish off the inside. Then we flattened that layer against the photograph layer. [figure 42]

Notice the uneven, drawn edges of the matte. [figure 43] The garbage matte didn't need to be precise or smooth, as its purpose is to just roughly block out an area for Primatte.





[figure 42] The original background (top) and a garbage matte overlaid (bottom).

[figure 43] We created the matte with a Paintbrush in Photoshop (left) then flattened the layers before applying Primatte (right).

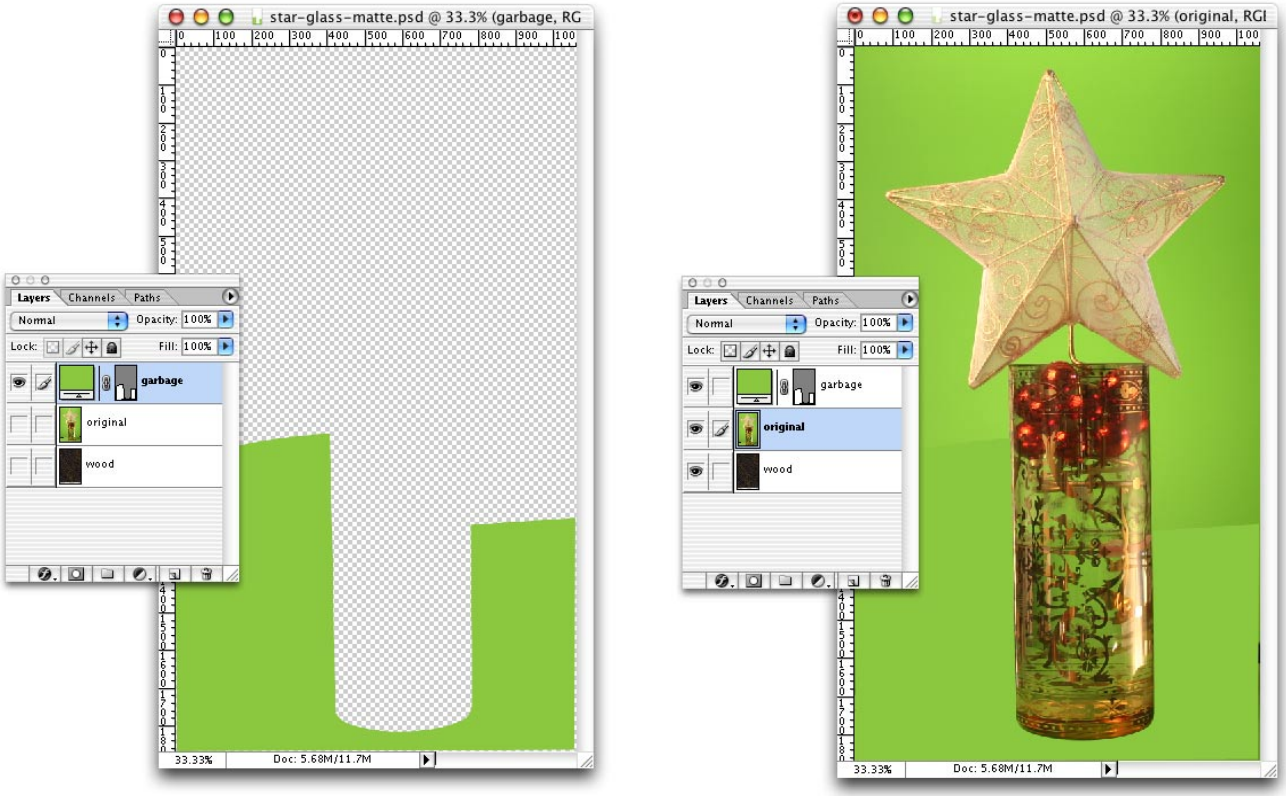
example #2

In another photograph of our star and vase, we had two specific problems to eliminate with a garbage matte. First, we had to matte out the chair holding up our screen.

The second, more difficult task was that we needed to get rid of a shadow at the base of the vase. in order to have a clean background to pull the Foreground object from. The shadow is directly underneath the glass, and blending to its edge. [figure 44]

The glass is fairly uniform in shape, and circular at bottom. For this object, drawing a Bezier path worked great to have a detailed edge around the glass. [figure 45] If the vase had a more jagged shape, we could have gone in with a bitmap drawing tool, like the Paintbrush.

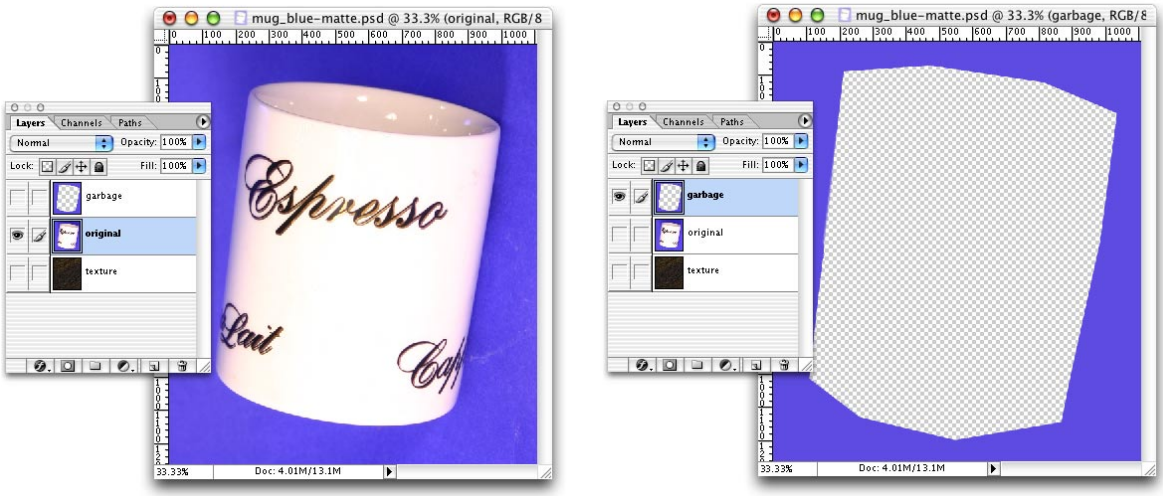
[figure 44]



[figure 45] The garbage matte created as a vector layer.

example #3

The blue backscreen in this graphic is a disaster. Its tones are completely uneven, making pulling a good mask almost impossible once inside Primatte. This is an example of when it is necessary, not simply helpful or time-saving, to create a garbage matte in Photoshop.



[figure 46] This blue backdrop would be extremely difficult to properly key in Primatte without a garbage matte in place.

in summary

There are two concepts to take away from our discussion of garbage mattes.

One, you should make Primatte's job as easy as possible, so the plug-in can pull the best key possible. Often times, that involves painting out the troublesome, unimportant areas of the back screen to reduce the number of colors (really, shades of that color), which is called in highbrow graphics circles working with a 'garbage matte'.

Two, you can make this garbage matte in many ways, and those methods depend upon the tools in Photoshop that you are comfortable with.

workflow tidbits

It is often difficult to find a rhythm with a new piece of software. Here are some tips for working more efficiently in Primatte. Most of this information is documentation of cool features, but a bit is just common sense.

saving settings between sessions

Primatte saves the mask settings between sessions. We define a 'session' as any time you close the Primatte interface. That could be loading up a new image immediately, or shutting down Photoshop until another day.

Primatte also saves mask settings between graphic files. However, the plug-in needs to find the same or similar tonal values in order to load back in those settings. If you open up another graphic with a similar blue background, Primatte will retain your last session's settings. If you create a key for a blue background and then load in an image with a green background, though, Primatte loses those mask settings.

If you don't want to use these retained settings, you can click the Reset button.

If you apply the Primatte mask, Undo that task in Photoshop, and then reopen Primatte, your mask will reappear. Your mask will reappear intact if you quit Photoshop, then reopen Photoshop and reopen Primatte. If you cancel the Primatte mask, however, when you reopen Primatte, that work does not reappear.

The Mark and Recall buttons do NOT work between multiple graphics. They only save mask settings for a particular graphic file.

using actions

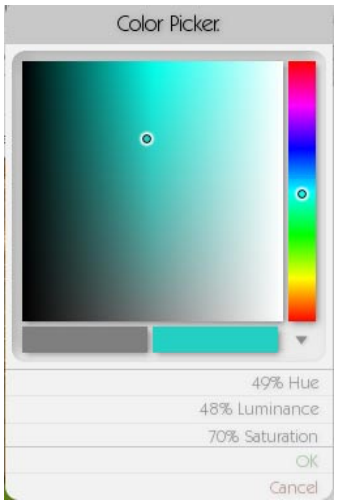
Primatte fully supports using Photoshop actions. This means you can batch process a series of similarly lit objects.

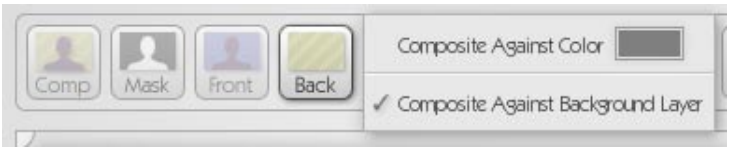
The action that you create retains parameter settings and applies it to another object. You are basically pulling settings from one Primatte mask and bringing them over as a preset.

Limitations of Photoshop 6.0 and Earlier

The Composite Against Original Layer is grayed out for Photoshop 6.0 and earlier. This means that you can't view your Foreground layer against a potential background that exists as another layer in your Photoshop file.

You'll need to view the mask against a solid color of your choice. By default, Composite Against Color is set up for gray. [figure 47]





[figure 47] Composite Against popup, and the Color Picker for choosing a solid background.

Try and Try Again

A humble piece of advice in working with Primatte is that its often difficult to nail the mask on your first try. You need to figure out what pixels to click on in order to make Primatte work the best. Primatte works fully by looking at the colors in your image.

In our star example below, we worked with an excessive amount of transparency, which meant pulling a key was tricky. We went through a few trial and errors sessions, figuring out which sampled pixels would maximixe the masking and spill removal tools. [figure 48]

From left to right, our experiment with this image improved upon finding an optimal sample area. [figure 48]

the primatte toolbox

Following is a rundown of the tools in Primatte. Some of these we've discussed already by explaining the primary ways to create a mask and fix any color spill. Other tools haven't been mentioned yet, as they are less often used or very situation-specific.

In explanation of Primatte's spill correction tools, we will often call out an alternate tool for the same purpose. This is because there are often two or three ways of achieving similar results, or at least approaching a problem with spill correction tools that have similar functions. One method or tool is simply more aggressive or more subtle than the other choices.

operation mode tools

These three tools are the three major steps in pulling a key in Primatte. These tools are used before bluespill correction is done. They can also be used after the bluespill correction, as your matte will shift during correction, and may need to be corrected slightly afterwards.

select

This tool is always the first step for the Primatte keying operation. When you first launch Primatte, by default you are in Select mode. If you don't press any buttons, and simply click into the Image Area, you are working in Select mode. Once you've clicked with the Select tool, you can click in the Image Area to set a pixel as the sample point.

Sample the key color within the image window to select that color for removal. Click and drag your mouse to remove the color. Do this multiple times to set down an initial mask.

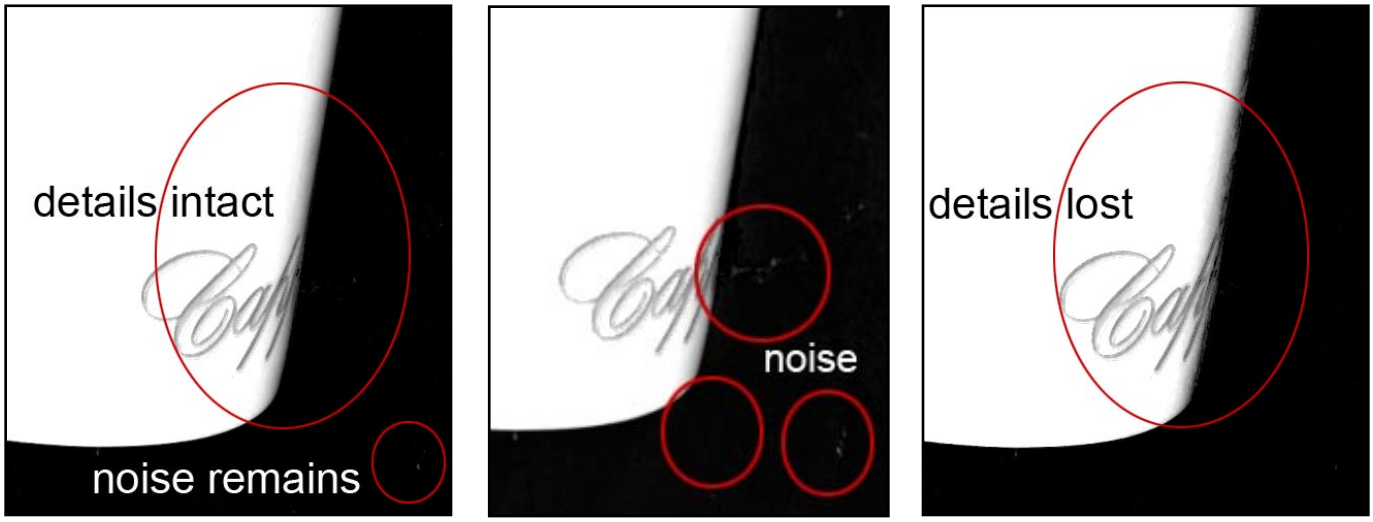
If you don't have a background layer in your Photoshop file, once you've applied the Select tool, a gray background will appear. This is the default Primatte color, and can be changed via the Composite Against popup. If you do have additional layers in your Photoshop file, you will see the bottommost layer.

clean bg

Cleans out background 'white' noise. These are white regions in the dark blue-screen area. This tool samples pixels on the image window known to be 100% background. White noisy areas in the 100% background region will become black.

Clean BG is usually the second step in using Primatte. Sometimes increasing the brightness of your monitor or the screen gamma allows you to see noise that would otherwise be invisible.

You do not need to remove every single white pixel to get good results. Most pixels that are displayed as a dark color close to black in a key image will become transparent. Consequently, there is no need to eliminate all noise in the bluescreen portions of the image. In particular, if an attempt is made to meticulously remove noise around the foreground object, a smooth composite image is often difficult to generate. [figure 39]



[figure 39] In Mask view: The background 'white noise' that's left over from Select mode (left). Overcorrection with the Clean BG tool eats away pixels from the opaque object (middle). Sometimes it's best to leave some Background noise at this stage, and try to correct with another tool (right).

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

clean fg

Cleans out foreground noise. This tool samples pixels on the image window known to be 100% foreground. The color of the sampled pixels will be registered by Primatte to be the same color as in the original foreground image. This will make dark gray areas in the 100% foreground region become white.

Clean FG is usually the third step in using Primatte.

[figure 40] In Front view, the mug we are keying out (left). In Mask view, before Clean FG (middle) and after the operation (right). The unwanted values have been eliminated inside the Foreground object.

one-click shortcut tools

There are four 'shortcut' tools that are great for simple, fast correction on your mask. Each tool is applicable with one click only. Additional clicks will have no effect on the bluespill, in that a second click will overwrite the effects of the first click, and so on.

The Spill Sponge (which you will use a lot) is for spill removal. The Matte Sponge removes small transparent areas in the final comp, while Make Transparent makes a selected color region more transparent. Restore Detail can restore small lost details such as wisps of hair.

Primatte's spill removal tools work on color regions. Samples should be made, for instance, on the light flesh tones or the dark flesh tones, light blonde or dark blonde hair color regions. Operating on each color region will remove spill from all similar colors in the foreground image.

spill sponge

This tool keys out the background color component in the sampled pixels (or spill) within the image window, and removes it from the color region selected. The Spill Sponge is the fastest way to remove color spill from a composite image, because it removes the spill component in a single action at a preset amount.

It can only be used once on an particular color, and the amount of spill suppression applied is not adjustable. If you click a second time, you are resampling and reapplying the tool, therefore, the results of the original click are overwritten.

Spill Sponge is often the fourth and final step in using Primatte, unless additional adjustments are necessary. For more accurate spill suppression, the Tune sliders or Spill Minus operation should follow or be used instead.

matte sponge

This tool is used for removing small transparent areas in the final composite. It brings the sampled color to 100% foreground, essentially, a one-click 'make opaque' button.

We recommend it when you think you have a good composite after spill removal, but need to get rid of a few stray transparent pixels. A great aspect of Matte Sponge is that all of the spill-suppression information will remain intact. If the sampled color is already keyed out and removed, Matte Sponge leaves that color suppressed.

Sometimes in the masking process, for instance, a 100% foreground area will become slightly transparent when removing spill. You can clean up those transparent areas by using the Matte Sponge button. Find those transparent pixels in Mask view. Click once with the Matte Sponge on the dark transparent pixels and they will become 100% foreground.

The Matte Plus tool will also work to solve this problem, or moving the Tune tool's Transparency slider to the left.

make transparent

This tool makes a selected color region more translucent. Use Make Transparent if in the editing process, you have darkened a transparent area, and want to make it transparent again. Make Transparent is a one-step operation, so clicking a second time will overwrite the effects of the first click.

For instance, if a shadow brought over from the foreground is too dark compared to the shadows in the background, the Make Transparent tool can lighten it up. This operation is also useful for the subtle tuning of foreground objects which are otherwise covered with smoke or clouds.

The Matte Minus tool will also work to solve this problem, or moving the Tune tool's Transparency slider to the right.

restore detail

This tool restores small lost details such as thin wisps of hair or smoke. Restore Detail is a single-click operation, so it can only be used one time on a color.

Restore Detail is like a large semi-opaque brush, for which the completely transparent Background region sampled becomes translucent to a preset amount. Let's say you click on a range of colors, go too far with an adjustment, and totally wipe out some details. Restore Detail may bring them back without wiping out other details that you want to retain.

Moving the Tune tool's Restore Detail slider to the right is a more detailed alternative.

the repeatable sampling tools

There are six tools in the Repeatable category, split into three pairs. Each pair has a Plus and a Minus tool. Unlike the One-Step Shortcut Tools, with Repeatables you click multiple times to interactively diminish or enhance their effects on the bluespill. Make a click, see how that affects your mask, then click again (and again) until you've reached your optimal correction.

The Repeatables are best used for small incremental changes or working on small areas of an image. They cover a small threshold of tonal values, in order to make fine adjustments. You can gradually remove or recover the spill intensity on the foreground object by sampling the color region repeatedly.

the spill sampling tools

The Spill Plus and Spill Minus tools are used to return or remove color spill. Spill Minus is used more frequently and flexibly than the rest of the Repeatable Sampling tools.

1- spill plus

The Spill Plus tool returns color spill to the sampled pixel color (and all colors like it).

Spill Plus can be used to move the sampled color more in the direction of the color in the original foreground image. It can also be used to nullify a Spill Minus step.

2- spill minus

The Spill Minus tool removes color spill from the sampled pixel color (and all colors like it).

If spill color remains, another click will remove more of the color spill. Continue using this tool until all color spill has been removed from the sampled color region.

Click into an area that has some color spill edges, and click on a pixel with some spill on it. Repeated clicking on the spill color will incrementally remove the spill. If too much spill is removed and the area being clicked on looks unnatural, click on the area using the Spill Plus tool to return the color region to a more natural appearance.

the matte sampling tools

The Matte Plus and Matte Minus tools are used to lessen or increase the density of the mask information.

1- matte plus

This tool makes the mask more opaque or more dense for the sampled pixel color (and all colors like it). If the matte is still too translucent or thin, another click using this operational mode tool will make the sampled color region even more opaque.

Matte Plus can be used to thicken smoke, or make a shadow darker and thicker to match shadows in the background imagery. It can only make these adjustments to the density of the color region on the original foreground image. It can also be used to nullify a Matte Minus step.

2- matte minus

This tool makes the matte more translucent or less dense for the sampled pixel color (and all colors like it). If the matte is still too opaque, additional clicks will make the sampled color region even more translucent.

Matte Minus can be used to thin out smoke. If you want a thinner shadow on a foreground object, you can use the Matte Minus mode to make that shadow more transparent.

Compared to the Make Transparent tool, the Matte Minus tool is a more flexible way to thin out a color region, because you can make multiple samples.

the detail sampling tools

The Detail Plus and Detail Minus tools can be looked at as refined versions of the Clean BG and Restore Detail tools. They make detail more or less visible.

1- detail plus

This tool makes Foreground detail more visible for the sampled pixel color (and all colors like it). Detail Plus is for restoring color regions that were moved into transparency, or to the 100% background region. If detail is still missing, additional clicks will make detail more visible.

Detail Plus can be used to restore lost smoke or wisps of hair. Sample where the smoke or hair just begins to disappear, and those objects may return to visibility. For example, use it when you see some dilute noise in the backing area but don't want to remove it completely because it may affect some fine detail in a different area. It will attenuate the noise gradually as multiple samples are made on the pixel.

You should stop the sampling when important, fine details start to disappear. The operation may start to bring in background noise if shooting conditions were not ideal when the foreground image was photographed.

2- detail minus

This tool makes the foreground detail less visible for the sampled pixel color (and all colors like it). If there is still too much detail, additional clicks will eliminate more.

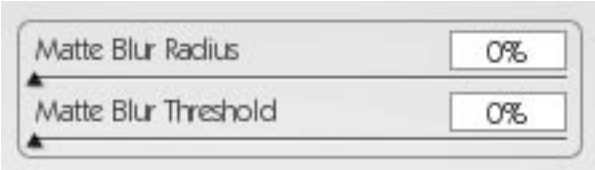
Detail Minus can be used to remove smoke or wisps of hair from your composite. Sample where the detail is visible and it will disappear. This is for moving color regions into the 100% background region. It can also be used to nullify a Detail Plus step.

the matte blur tools

Primate has two sliders called Matte Blur Radius and Matte Blur Threshold. These tools are designed as an 'after process' to get rid of artifacts and aliased edges on an otherwise good mask.

Remember, artifacts are any feature which appears in an image that is not present in the original imaged object, like pixels that become discolored or too bright, which may happen if you overcorrect the bluespill in your mask.

You may want to use the Matte Blur Radius and Matte Blur Threshold to give the mask a softer edge. This will soften up any hard, aliased edges. Use the Blur Tools only if needed after doing all other spill removal and suppression tasks.



1- matte blur radius

Matte Blur Radius is similar to doing a Photoshop Gaussian Blur on the mask. You could call it a 'Blur Matte' tool.

Radius is good for getting rid of sharp edges. It's uncommon to use more than 5-6% blur radius as the edge will become too soft.

2- matte blur threshold

This tool will work by itself without increasing the blur. It's designed to contract the matte. The Matte Blur Threshold slider doesn't do anything unless you have a blur. It doesn't shrink the matte so much as clamp the blur after applying.

If the maskhas a slight tinge (like one pixel), Threshold will get rid of that. In most masks you won't use more than a 5% blur, as the edge will become too soft.

If you use Matte Radius Blur also, then the Threshold option functions a bit differently. Use it for subtle tweaking after doing all you can without messing up the key itself. Threshold helps to mask out imperfections, but at too high a setting it may cause haloing.

fine tuning sliders

A common method of removing bluespill is the Tune tool's three fine tuning sliders. They are Remove Spill, Transparency, and Restore Detail. These sliders are best for adjusting large areas, making sweeping yet subtle changes. If you use the Fine Tune sliders for detail work, you will generally not use another spill correction tool.

The Tune button opens up a dialog box with three fine-tuning sliders. The color of the sampled pixel within the image window is registered as a reference color for fine tuning.

To perform the tuning operation, sample a color region on the image, select a Fine Tuning slider and move the slider to achieve the desired effect. The fine-tuning sliders are best for effecting sweeping, large area changes.

remove spill slider

After clicking the Tune tool and selecting a color region, this slider is used to remove spill from the registered color region.

The more to the right the slider moves, the more spill will be removed. The more to the left the slider moves, the closer the color component of the selected region will be to the color in the original foreground image. If moving the slider all the way to the right does not remove all the spill, sample a different color region and try again.

If your foreground image changed color dramatically during the fine tuning process, you can recover the original color by selecting an area of the off-color foreground image and moving the Remove Spill slider slightly to the left. This may introduce bluespill back into that color region. Again, use the Tune option to suppress the blue, but make smaller adjustments this time.

The result of moving the slider to the right can also be achieved with the Spill Minus tool.

transparency slider

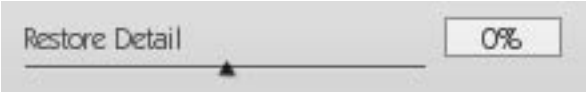
This slider can be used to make the matte more translucent in the registered color region.

Moving this slider to the right makes the registered color region more transparent. Moving the slider to the left makes the matte more opaque. If moving the slider all the way to the right does not make the color region translucent enough, re-sample the color region and again move the slider to the right.

These slider operations are additive. The result of moving the slider to the right can also be achieved with the Matte Minus mode.

restore detail slider

This slider can be used to restore lost detail. It is especially useful for restoring pixels that were lost because they were so similar to the background color.



After clicking the Tune tool and selecting a color region, moving this slider to the left makes the registered color region more visible. Moving the slider to the left makes the color region less visible. If moving the slider all the way to the left does not make the color region visible enough, re-sample the color region and again move the slider to the left.

The result of moving the slider to the left can also be achieved with the Detail Minus mode.

tune color chip

The Tune Color Chip will change as you select different colors in the image. This color chip represents the tonal value (that is, tone of a color) that you have click-selected in the Image Window.

When you choose a Tune Control to work with, this color sample is the value that the slider works from. The Color Chip will update as you adjust the slider. [figure 41]

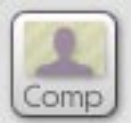
The Color Chip is available at any time for any of the Tune sliders. You do not pre-select which Tune Control you will operate before loading the Color Chip. After loading a color into the Chip well, you can then choose any of the three Tune Controls to use. You can change sliders while using the same loaded color; or, you can load in a new color, then switch to a different slider.

[figure 41] Before a tone is sampled (left). After a tone is sampled (right).

view mode tools

There are multiple ways to look at your mask within your Image Window. Being able to view the mask as a composite or as a grayscale representation is crucial to a successful clean mask. It's also helpful to toggle your Foreground image between keyed and original, for a comparative view of what details are retained.

comp view



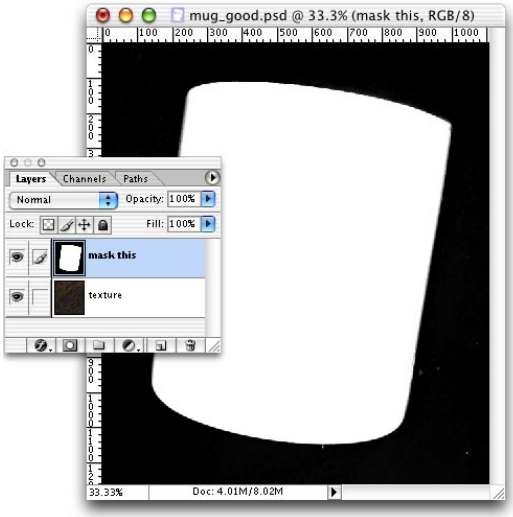
This mode changes the view in the Image Window to display the composited graphic of Foreground and Background. If a key has been pulled, then a composite of the Foreground with a background is displayed. The Background may be a layer in your Photoshop file, or a solid color generated by Primatte.

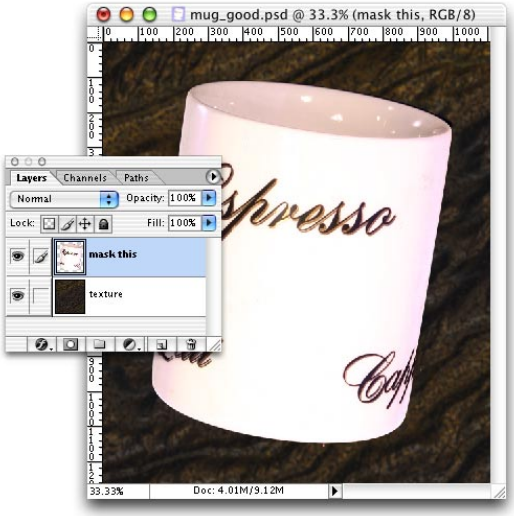
If a key has not been created, then the original graphic is displayed. This is typically a subject or object photographed against a blue or green background.

mask view

This mode changes the view in the Image Window to an 8-bit grayscale representation of the mask that's been created. White represents 100% opacity, which shows the Foreground object. Black represents 100% transparency, which

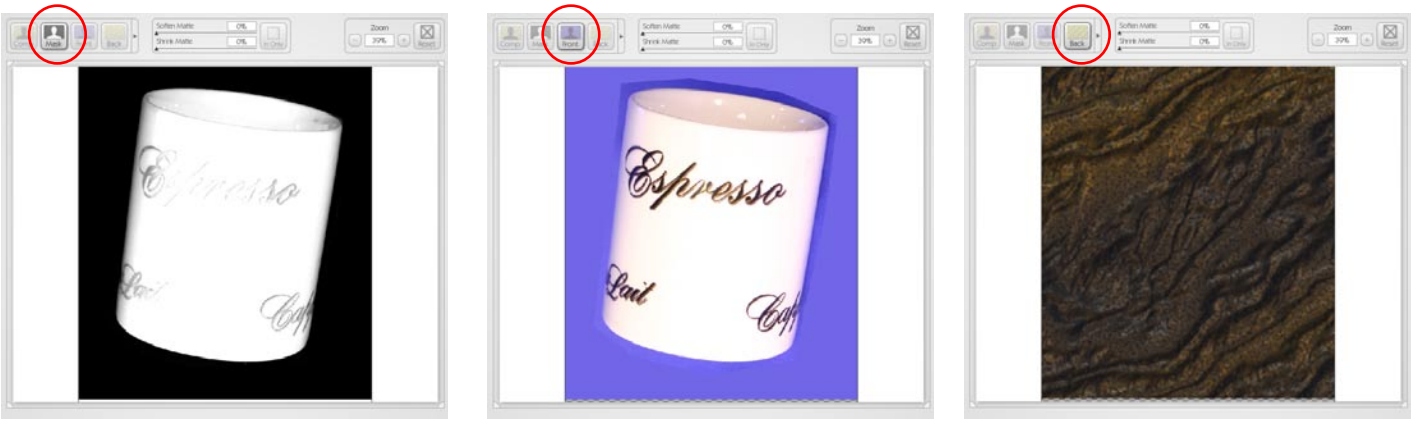
[figure 42, next page]
It's not a mistake. With Mask view selected and the Apply button clicked, this is the image that's rendered (left). You may have expected the typical transparent mask (right).





Most of the time when you render out your mask, you will click back on Composite mode. Sometimes, however, you may have need of a grayscale image that matches your footage. This is when you'd render out with Mask mode selected. If you apply Primatte (hit the Apply button) while in Mask mode, your image will render out as that grayscale representation.
[figure 42, previous page]

This is an advanced user feature that allows you to create a grayscale image for design or compositing effects. For example, use it as a layer mask in Photoshop to create a design effect. If you're working in video, you can bring this grayscale graphic into a compositing application like Adobe After Effects for use as a track matte, displacement map, or blur matte.



[figure 43] Three views of your images. Mask view is a grayscale representation of the opacity levels of a Primatte key (left). Front view shows the layer that you are masking, which is selected in your Photoshop file (middle). Back view shows the Background image, either another Photoshop layer or a solid color (right).

front view

This mode changes the view in the Image Window to the original Foreground image. Toggling back to this view is helpful when looking for lost detail, semi-transparent areas, or noise that needs to be removed.

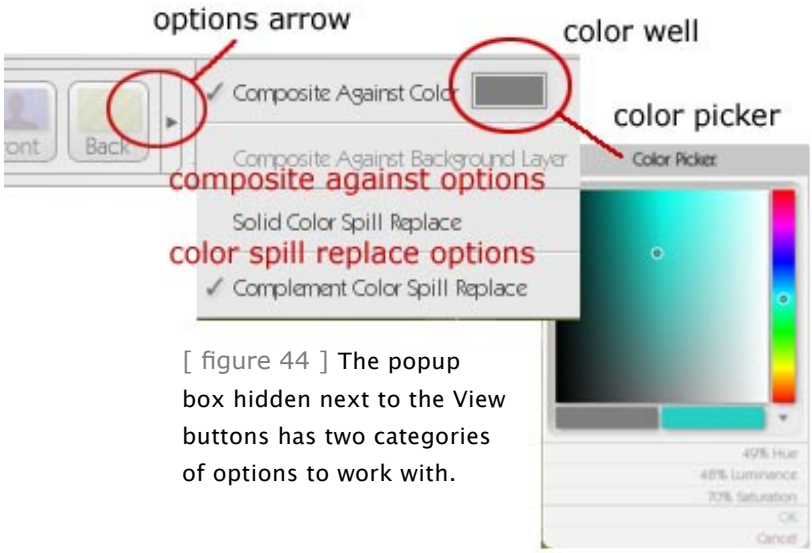
back view

This mode changes the view in the Image Window to the Background image. The background is either the bottommost layer in your Photoshop file, or a solid color that is generated by Primatte. It is often helpful to

options popup box

The popup box next to the Back View button contains two categories of options. The Back View button does not have any relationship to these options. One option in each category is always checkmarked. [figure 44]

These categories operate independently. However, they do share the color well that appears next to the topmost option.



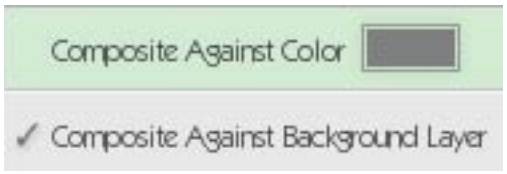
[figure 44] The popup box hidden next to the View buttons has two categories of options to work with.

composite mode options

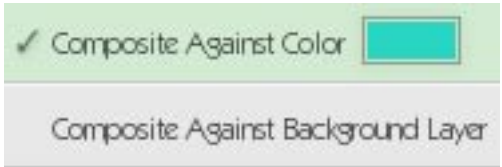
There are two Composite options that allow you to choose what type of background graphic shows through the Primatte mask in Comp view. Both are accessed via a popup box next to the Back View button.

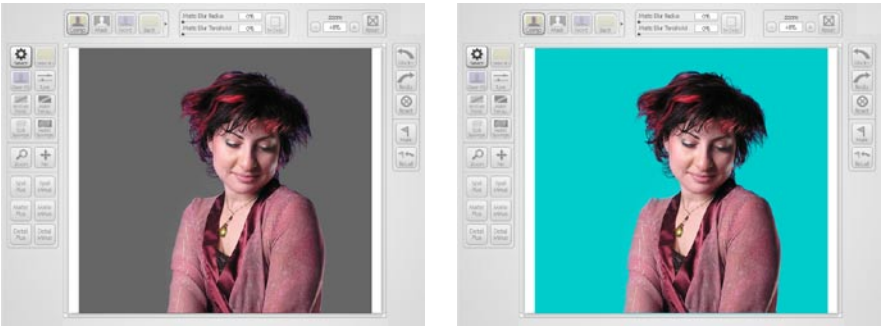
composite against color

You can choose a solid color to display as the Background through 'Composite Against Color'. By default, Composite Against Color is turned off in deference to the other popup option. Its color is initially set to medium gray.



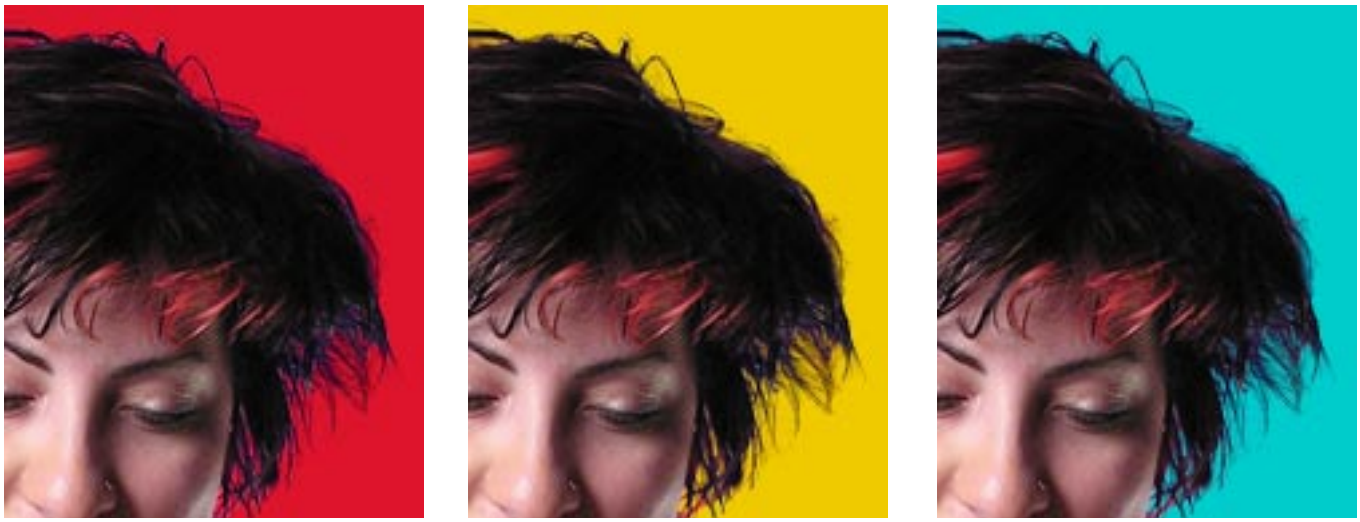
To change this color, simply click inside the color well to access a Color Picker that allows you to choose a different color background. When you click OK, the color well updates, as does the Primatte background color. [figure 46]





[figure 45] The default gray color (top) has been changed to a bright blue (bottom). With the color well adjusted, the Background graphic in Comp and Back views will change accordingly.

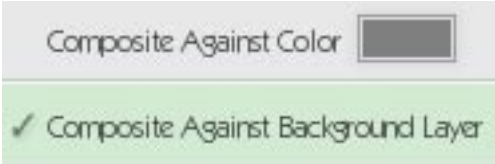
Working in Primatte against a solid color background is advantageous when you need a harsh contrast color to bring out the problems with your mask. For instance, you can see the purple color spill in our model's hair when she is against a red background. But the spill is less noticeable against a yellow background, and very difficult to see against turquoise. [figure 47]



[figure 47] Three different colors loaded into view through Composite Against Color. Each gives a different view of the purple tinge in our model's hair.

composite against background layer

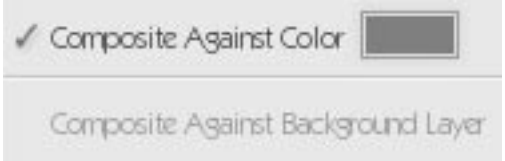
If you are working in Photoshop 6.5 or higher, you can choose the other Composite option. 'Composite Against Background Layer' lets you preview the bottommost layer in your Photoshop file. [figure 48a]



[figure 48a] In Photoshop 6.5 through Photoshop CS, you can preview another Photoshop layer in Comp and Back views.

This option is turned on by default; meaning, the Composite Against Color option is turned off initially.

If you are working in Photoshop 6.0 or earlier, the option for 'Composite Against Background Layer' is grayed out and unavailable. [figure 48b]



[figure 48b] In Photoshop 6.0 and earlier versions, you cannot preview a background Photoshop layer in Primatte.

The advantage of working with this option turned on (if available) is the ability to preview your composite-in-progress as it will look once Primatte is applied and the mask permanently created. [figure 49]

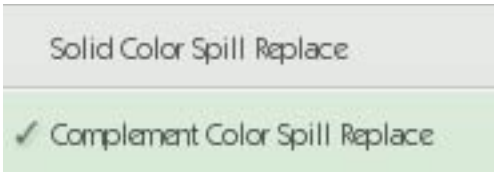
[figure 49] If you have multiple layers in your Photoshop files, the layer at the bottom of your file will preview when 'Composite Against Background Layer' is turned on. This option is great for determining any mask or spill problems while looking at the target image.

color spill replace options

There are two work options for spill replacement. Each mode recognizes spill in a different way, which affects the way Primatte's tools behave. Choose the mode that delivers the best result based on the conditions of your Foreground image.

complement color spill replace

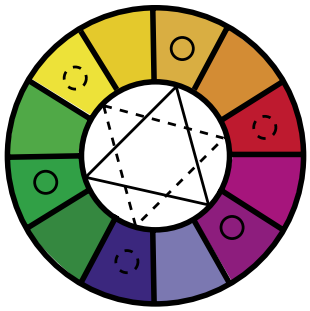
The mode selected by default is 'Complement Color Spill Replace'. This mode maintains fine foreground detail, and delivers the best quality results. [figure 50]



[figure 50] The default Complement option does not use the color well.

Complement Color Spill Replace retains this integrity by adding the complementary color to the spill color to remove small amounts of spill. [figure 51] For instance, to reduce green spill, this option adds in red.

If foreground spill is mild or at lest not a major problem, Complement is the mode to use. In fact, you will keep this mode selected for almost all of the images that you treat.

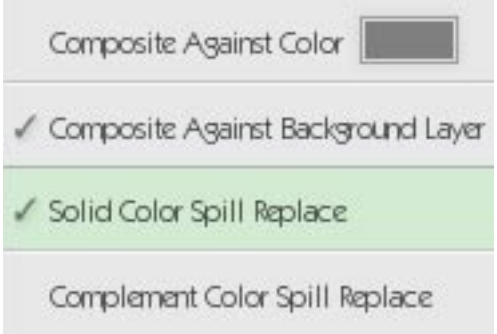


[figure 51] Complementary Color Spill Replace adds in the color opposite on the color wheel to the troublesome spill color.

solid color spill replace

'Solid Color Spill Replace' brings in a user-defined color to remove color spill, rather than looking to the complementary color. You choose this color through the Color Picker, which is accessible via a color well next to Composite Against Color. [figure 52]

By doing so, you can bring in a color that suites your needs. Perhaps this color matches the composited Background image. Or, you may choose a color that is prominent in the Foreground object in order to bring back lost details, as we have done in the example below. [figure 53]

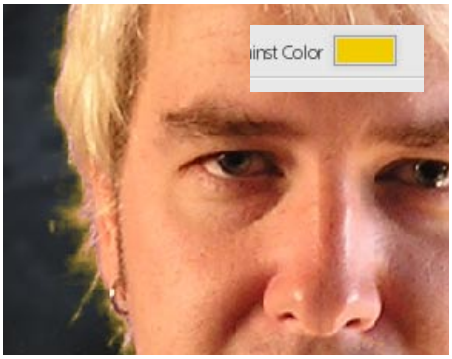


[figure 52] The Solid Color Spill Replace option uses the color well located above it.

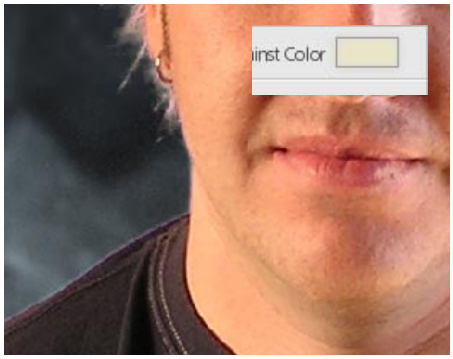
[figure 53a] The original image (left) and with a key pulled (middle, right). Pinkish bluespill remains along the model's blond hair. We are looking at spill correction set to the default Complement Color Spill Replace option.

[figure 53b] The Color Picker is accessed and the color well changed to beige, a color that fits the model's blond hair (left). With the Solid Color Spill Replace option, the pinkish color spill is minimized, though not completely eliminated. Hair details are slightly exaggerated due to the addition of a beige fringe tone.

Basically, use Solid Color Spill Replace under serious color spill conditions, when the default Complement mode together with spill removal tools doesn't solve the issue. The downside to Solid Spill is that fine details tend to be lost or slightly distorted, especially in high contrast areas. [figure 54]



[figure 54] Problems can arise when using Solid Color Spill Replace. A poor choice of color may add unwanted artifacts to a Foreground object, like the yellow tinge on our model's hair (left). Since a new color is added to all similar tones, an unnatural fringe can surround the object, as has happened along this model's shirt (right).



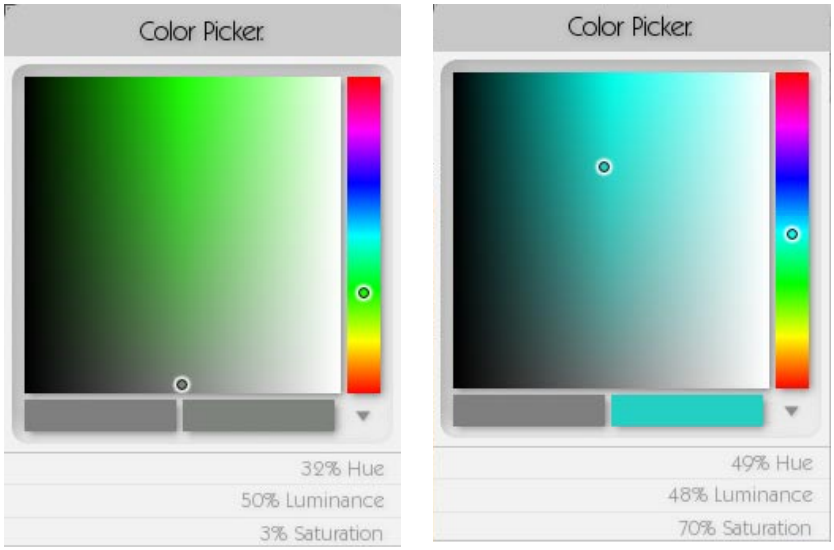
options color picker

The Color Picker allows you to define a new color for one of two purposes. Choose a new solid color Background for the 'Composite Against Color' option. Or, choose a spill fill color for the 'Solid Color Spill Replace' option.

In order to change a color, click in the color well inside the Options popup box. [figure 55] Choose a hue from the right-side spectrum. Choose a brightness value from the left-side gradient. [figure 56]

When you hit Apply, the newly defined color will appear within the popup, and will preview in Primatte's Comp and Back view modes.

[figure 55] Access the Color Picker through the Options color well.



[figure 56] The Color Picker opens up with a click of the color well (top). Choose your hue (left), then your tone (right) to define a new color.

navigation tools

There are multiple ways to move around your Image Window and interact with the editing process.

undo and redo

Cancels or reinstates the previous Primatte operation. Up to 2,000 levels of Undo/Redo are supported.

reset

Resets all of the Primatte key control data. This operation CANNOT be undone, so be careful using it!

mark and recall

Mark saves settings for later use. Recall brings back the last settings that were marked.

These tools only operate within a given work session. Once you have hit the Apply or Cancel button, the mask you've built in Primatte is either created or discarded. When you reapply Primatte, you can't retrieve Mark settings by hitting Recall.

See the Working Between Sessions section of this manual for more information about retaining your mask.

pan

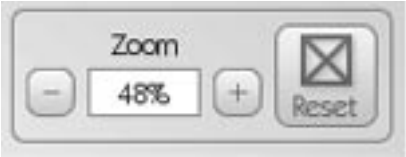
Moves a zoomed image around the Image Window. When an image is zoomed up, of course, you can't see the entire image.

zoom tool

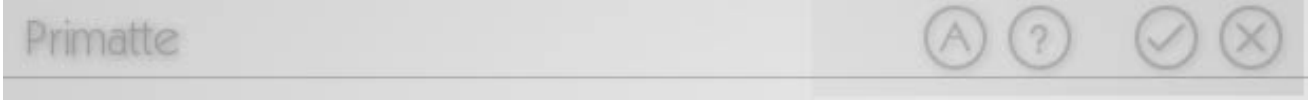
There are multiple ways to zoom in and out of your Image Window. The Zoom tool lets you magnify or demagnify by clicking in the Window and dragging your cursor to zoom in or out. Essentially, you are scrubbing the image to magnify it.

zoom box

The Zoom Box contains alternate ways to zoom in and out of the Image Window. Zoom Plus increases magnification of the Image Window. Zoom Minus decreases magnification in the Image Window.



In the Zoom Field, you can type in a custom Zoom magnification. You cannot save a custom magnification setting. Zoom Reset brings magnification back to 100%. This does not affect your mask in any way.



[figure 57] The full navigation bar along the top of the Priamtte interface. At left is the Prompt Area. When you choose a tool, you will see a brief explanation of its function in the Prompt Area.

Navigation Bar

about button

The About button accesses information about the team behind Primatte.

manual button

This button will call and open up the Primatte PDF manual you are now reading. It looks for a file called 'Primatte2Manual.pdf' that needs to sit in your Photoshop Plugins folder, along with the Primatte executable files.

See the Downloadable Support Materials section in this manual for more details.

apply button

The Apply button applies the mask you've created. The Primatte interface closes, and the mask renders in Photoshop.

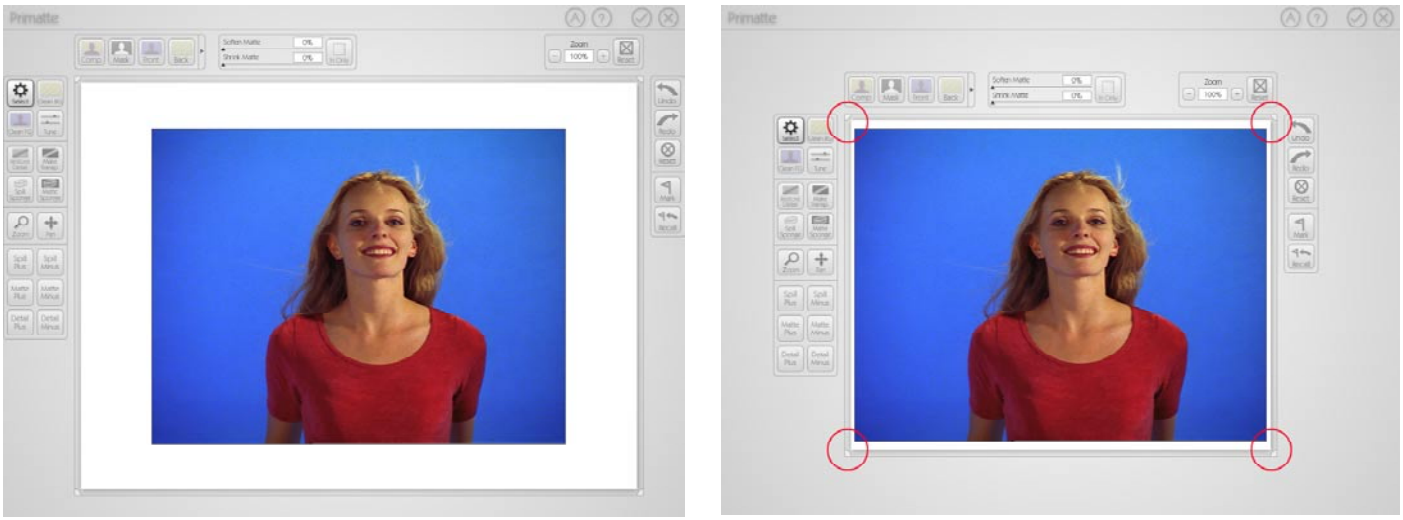
cancel button

The Cancel button takes you out of the Primatte interface and back into Photoshop. The mask that you've been editing is not saved or stored for later use if you hit Cancel.

the image window

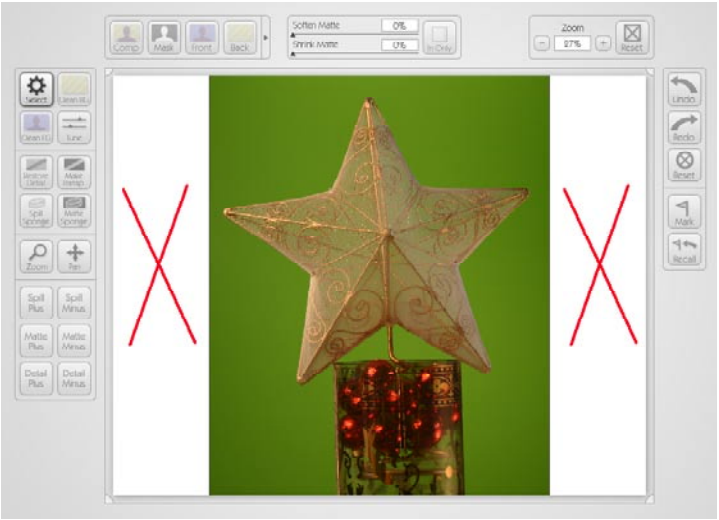
The Image Window is the viewing area of your file.

The viewable area is resizable by grabbing any of the four corners of the bounding box. This gives you more room to zoom and pan your image. Changing the viewable area does NOT create a new zoom level to the image, or enlarge the physical file it relates to. [figure 58]



[figure 58] The Image Window and its resize handles (top). When any handle is pulled, the viewable area is subject to change (bottom). This does not change the zoom level or physical size of the graphic you're working with.

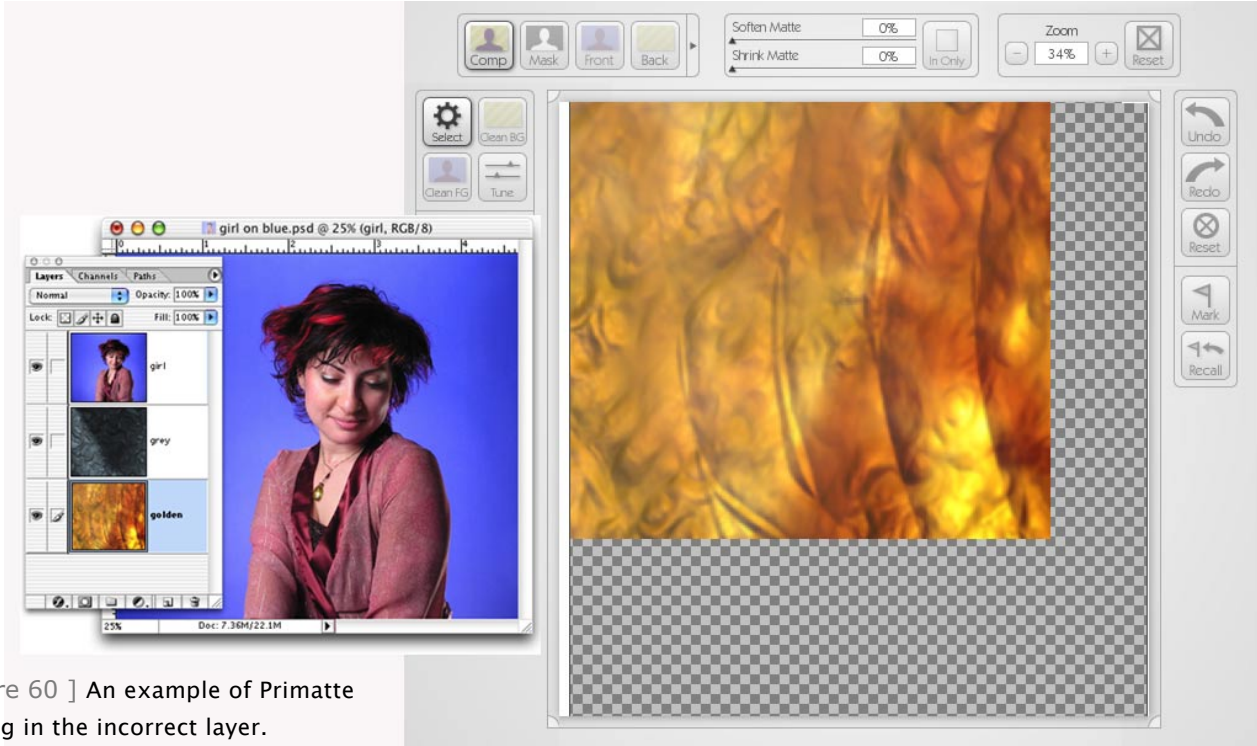
You may see white areas around your graphic in the Image Window. This is simply a blank space in the preview that has absolutely nothing to do with your graphic or mask. [figure 59]



[figure 59] If the graphic file you're working with is very horizontal, you will see a blank white area along each side.

The Image Window shows the layer in your Photoshop file that is selected. So, if you have accidentally selected a layer intended as the Background portion of your composite, you will see that layer, as in our example below. Primatte cannot automatically detect the layer that holds the bluescreen graphic. [figure 60]

See Step 1 of the Pulling a Key Tutorial for more information about working with layers.



[figure 60] An example of Primatte loading in the incorrect layer.

the primatte algorithm

When discussing the Primatte tools and their operation throughout this manual, we have refrained from using words like 'polyhedron' and 'bulging' or 'denting' into sections. While we could find some very humorous ways to explain what these terms refer to… they REALLY indicate the way Primate operates behind the scenes.

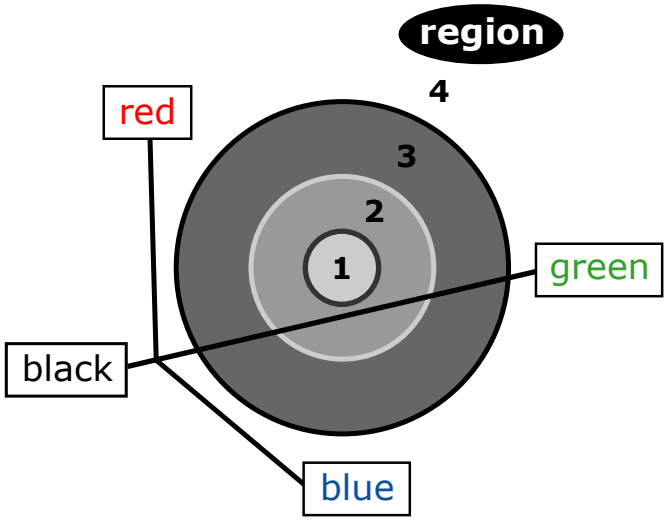
Ok, so how does Primatte work behind the scenes? Well, the heart of Primatte is its proprietary algorithm. To use Primatte most effectively, it helps to understand how this algorithm works. It is called the Polyhedral Slicing Algorithm, and it operates in 3D RGB Color Space. Huh?

the polyhedrons

Basically, Primatte separates all of the pixels in your Foreground image into one of four separate categories. It does this by creating a 3D RGB color space for the foreground image, and building three concentric polyhedrons, one within the other.

These polyhedrons separate all the colors in the foreground image into one of four areas.

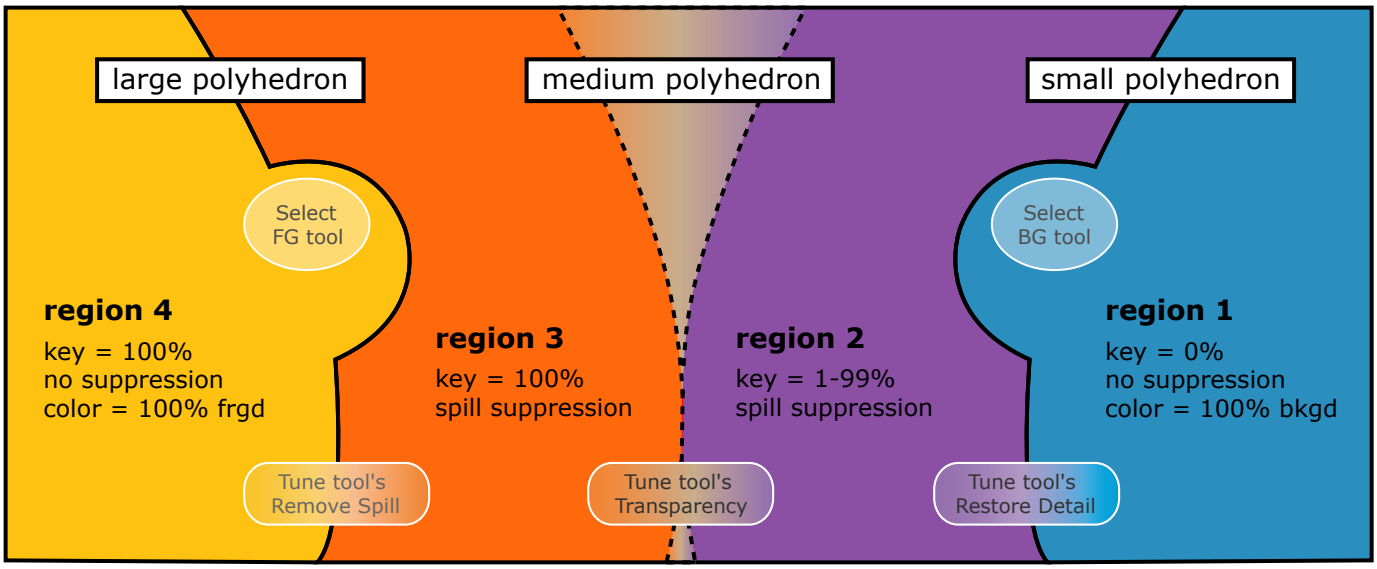
While we've depicted the polyhedrons as circular shapes in our diagram, [figure 61] in reality they are more like globes. Each globe is made up of 128 surfaces. These surfaces can be distorted into many different shapes to accommodate the color regions in each unique Foreground image.



[figure 61] The polyhedrons that form Primatte's 3D RBG olor space.

four regions

Looking at the four regions that are created by these polyhedrons, we can see that each region has a particular property. [figure 62]



[figure 62] The four regions created by Primatte's polyhedrons.

region 1 This region is the small polyhedron. It contains all of the pixels in the foreground image that are designated as 100% background. This means the foreground colors in the small polyhedron will be replaced completely with background pixels.

region 2 This is the region between the small polyhedron and the medium polyhedron. These foreground pixels are designated as the transition pixels between the foreground and the background. These pixels are where Primatte blends the original background pixels with the foreground. Foreground object edges, wisps of hair and smoke pixels are found in this region.

region 3 This region is between the medium and large polyhedrons. These pixels are 100% foreground, but have background 'spill suppression' applied to them. This category is for pixels at the center of the foreground object, where you want the bluespill suppressed but you don't want background pixels blended in.

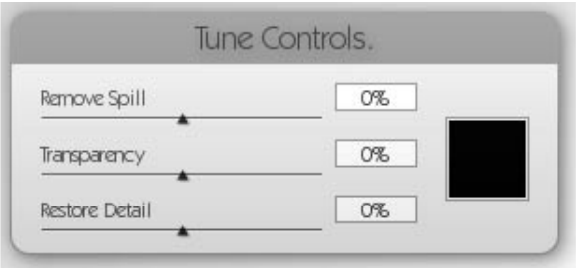
region 4 This region is reserved for 100% foreground pixels that are unchanged from the original image. All the foreground colors that are outside the large polyhedron are exactly as they were in the original foreground image.

how the heck does this relate to me?

All Primatte manipulations involve moving foreground pixels between these four categories. In reference to the Polyhedral Slicing Algorithm model, Bulge = add bluespill, Dent = remove bluespill. How do these polyhedrons relate to the tools you've learned in the rest of this manual? Following are some examples.

example: tune control sliders

When you're in the Tune Control sliders, the Remove Spill, Transparency, and Restore Detail sliders do not increase the entire circumference of the polyhedron. Instead, they just bulge or dent it in the particular color region that you registered prior to moving the sliders.



All colors in the foreground image are forced into one of the four categories we've mentioned. You can look at the Tune Controls as Large, Middle and Small Poly sliders.

For instance, you select a bluish pixel in the Tune Control and move the Remove Spill (Large Poly) slider to the right. What you are doing is actually bulging the large polyhedron and moving the registered color region from Category #1 to Category #2. This will leave the color region as 100% foreground, but suppresses the blue or green tinge. It will affect all similar colors, or tonal values, in the Foreground image.

example: restore detail tool

When you lose some smoke or hair detail, you can dent the small polyhedron using the Restore Detail or Detail Minus tools. These operations dent the small polyhedron in that area and releases the previously missing smoke or hair into the visible area between the small and medium polyhedron.

example: clean bg tool

When you are in the Clean BG mode, every time you designate a region of white noise, the small polyhedron enlarges slightly in that direction, encompasses those pixels, and makes them 100% background.

final thoughts

If you've read through this algorithm information and now have visions of overgrown polygons prancing obscenely through your head… don't worry about it. You can operate Primatte forever without understanding its technical backbone. This information is simply here for those inclined to learn it.