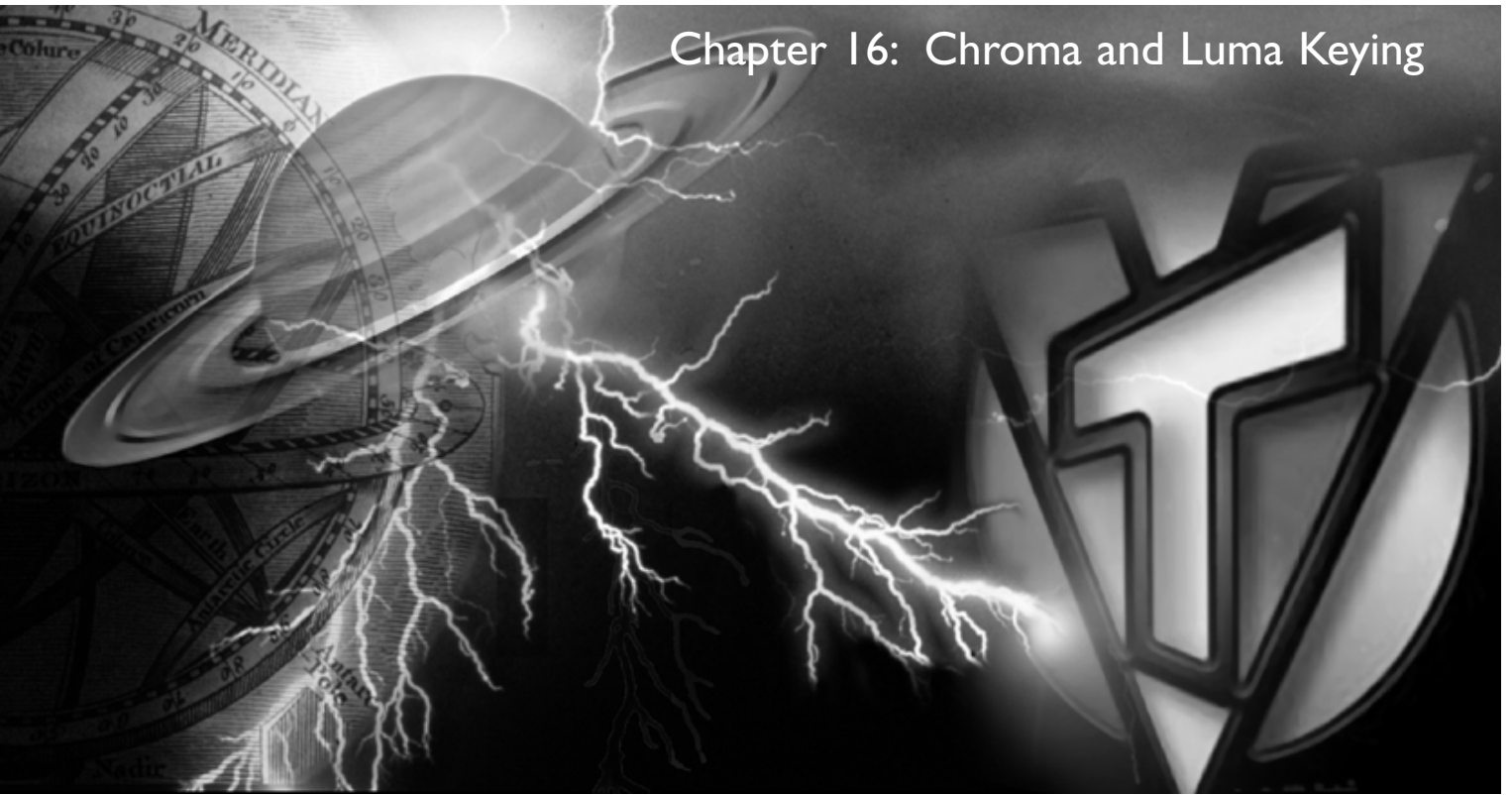


Chapter 16: Chroma and Luma Keying



Chapter Sixteen: Chroma and Luma Keying

NewTek has revolutionized the process of complex superimposing with our chroma/luminance keyers. You can bring the magic of Hollywood into your productions—keying helps you make nearly any idea come to life. Keying in Video Toaster [2] comprises three different approaches: luma keying, chroma keying, and the Cross Keyer. This chapter explains the options for working with these three keying approaches.

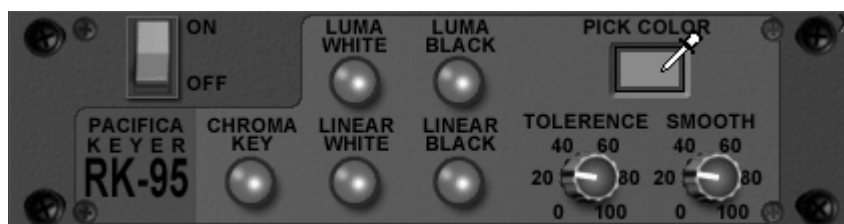


Figure 16.1. Pacifica Keyer with luma and chroma keying options.

LUMA KEYING

In luma keying, you remove areas of one video based on brightness values so that you can see a second video through the areas you removed. It's like punching keyholes through the first video so that you can see the second. Luma keying is usually used for titles that are on a copy stand against a black card; you key out the black so that you can overlay the title onto background video.



HINT

Luma keying is also the poor man's chroma keying. You can get similar results to chroma keying by using a plain white sheet as the background.

CHROMA KEYING

In chroma keying, you remove areas of one video based on color so that you can see a second video through the colored areas you removed. In video and film, the foreground video is usually shot in front of a blue or a green screen. For example, when you see a weather forecaster on television, that person is actually standing in front of a blue or green screen. The blue or green is keyed out and viewers see a graphic of a weather map, which is the background video.



HINT

In the past, blue was typically used for keying because that color is found less often in nature. Recently, green screen has become more common. Keep in mind that when you use a blue/green screen, it can bounce light and tint the person or object in front of it. To reduce this problem, have the talent stand farther from the key wall, to avoid the spill. Another trick is to backlight the talent with amber-gelled lights, which reduce the blue or green color spill on their hair and shoulders.

Cross Keyer

After you learn about luma and chroma keying, you will be introduced to the Cross Keyer. The Cross Keyer is an advanced chroma keyer; it lets you key out a complicated background by choosing specific colors without affecting the rest of the image. The intuitive user interface of the Cross Keyer widens your key color choices beyond solid background colors.

PACIFICA RK95 KEYER INTERFACE

LUMA WHITE AND LUMA BLACK

Luma White keeps the bright information in your image and keys out the darkest areas of the image. Thus, you replace the darkest areas of your image with your background video.



Figure 16.2. Left: Black and white footage; Middle: Main in; Right: Output using Luma White

Luma Black does the opposite of Luma White: you keep the dark information in your image and key out the brightest areas of the image. You replace the lightest areas with the background video.



Figure 16.3. Left: Black and white footage; Middle: Main in; Right: Output using Luma Black



Figure 16.4. Pacifica Keyer luma keying options.

Luma keying is especially good for CG titling, or you can use it with black and white images to create custom transitions and special effects.

When you work with the luma keyers, you're not limited to just the extremes of black or white. You can choose a color and use the luminance value of the color to set a threshold for keying.

For example, you can choose a yellow with a luminance value of 200 and use **Luma White**, to key out all other pixels with the same luminance value and every pixel with values above 200. If you switch to chroma keying with that same pixel value chosen, the keyer then uses to the color value for the pixel, in this case yellow, to key out only pixels of the same yellow color.

LINEAR KEYING

You can use a linear key to remove a complex background and when you want to make realistic keys for elements like shadows that are semi-transparent, and would look odd with hard edges.

LINEAR LUMA

Linear White keeps the light areas of your foreground image, and uses a linear gradient to key out the dark information. The darkest areas of the foreground image are keyed out completely. Other dark areas are keyed out along a scale so that you get smooth areas where the background video blends with the gradient.

Linear Black keeps the dark areas of your foreground image and uses a linear gradient to key out the light areas. The brightest areas of the foreground image are keyed out completely. Other light areas are keyed out along a scale so that you get smooth areas where the background video blends with the gradient.

As with Luma +/-, you are not limited to black and white values. You can choose a color to set a threshold luminance value. The action works the same way.

For example, you can choose the yellow pixel with a luminance value of 200 again. If you choose **Linear Black**, you key out all pixels with the same luminance value. Pixels with values above 200 are keyed out along a scale so that you get smooth areas where the background video blends with the gradient.

CHROMA KEY

Chroma Key is your tool for chroma keying. You use the **Pick Color** tile to choose a color from your video. Areas of the image that use your chosen color are keyed out so that your background video shows through. This is the technique that is used with blue or green screens.



Figure 16.6. Left: greenscreen footage; Middle: Main in; Right: Keyed output



HINT

You want to use high-quality imagery when you work with a chroma key because the quality affects how easily you can 'pull' a key, and make the background look realistic. A live component camera input is the best source for keying, followed by a taped SDI or component image. Because of compression artifacts, it may be very difficult to pull a good key from a DV tape.

Pick Color

Use the **Pick Color** tile to select the color you will use as your key color. This is the base color that you will use to mask out your foreground footage. Usually, you use blue or green.



Figure 16.7. The Pick Color tile to choose the value of a key color in video.

The easiest approach to using **Pick Color**, and the one you'll probably use most, is to right-click on the tile and then hold the mouse button while you drag the mouse to your video footage in ToasterVision. However, you can also choose or specify a color from the Color Picker panel.

To pick a color with the eyedropper tool

- 1 Using the right mouse button, click on the **Pick Color** tile and drag the mouse. The cursor becomes an eyedropper.
- 2 Drag the mouse over your video in ToasterVision.
- 3 Place the eyedropper over your desired color.
- 4 Release the mouse button to choose your color. Your chosen color appears in the **Pick Color** tile.

To pick a color from the Color Picker panel

- 1 Click on the **Pick Color** tile; the Color Picker panel appears.
- 2 Choose a color from the palette of swatches, define a color by entering numeric values, or choose a color from the color spectrum. You can use the eyedropper to choose a color from your desktop.

For more information about working with the Color Picker panel, see Chapter Thirteen: The Color Picker.

TOLERANCE

Tolerance specifies the range of luminance values to include when you key. How similar a luminance value must be is determined by the tolerance setting. A low tolerance setting permits only values that are near the value of the Luma key you choose. For example, if you use **Luma +** to key out black, which has a value of 0, a **Tolerance** setting of 5 will include pixels in your image with values up to 5. As you increase the **Tolerance** setting, you include more luminance values.

However if you used a color pixel to set a threshold value, **Tolerance** would work a little differently. For example, you choose a yellow pixel with a luminance value of 200. If you set **Tolerance** to 5, then you accept pixels with luminance values between 195 and 205.



Figure 16.8. Tolerance and Smooth options on the Pacifica Keyer.

A lower **Tolerance** setting in chroma keying permits only colors that are similar in value to your base key color. How similar the color must be is determined by the **Tolerance** setting. If you set a value of 1, then the color can be different from the base color by only one number. For example, if your base color was **RGB** 150, 150, 150 then a **Tolerance** of 1 includes only colors with values of 149 or 151 for any of the RGB components. Higher tolerance values permit more color variance between the base color and the included colors.

SMOOTH

You can smooth the edges of your foreground so that you do not see the sharp edges that are tell-tale signs of keying. The **Smooth** operation produces a blurring effect, which increases and becomes more blurred as you add more smoothing. Low values offer you a nice professional edge, while high values can give an interesting aura or dream effect.



NOTE

Smoothness helps get rid of the blue glow often caused by light reflecting off of a blue screen. However, as you increase smoothness, people in your video can become more transparent. Smoothing should be increased by fine increments.

VIDEO 101: BLUE SCREENS

When you watch movies or television shows with special effects like someone losing a limb or unlikely suspension in mid-air, they used a blue screen.

To give the impression of a lost limb, the actor may wear a blue garment over it. For example, if they

lost a hand, they'd wear a blue glove.

When someone runs along the air, or jumps up ridiculously high and kicks at an opponent, the stunts are performed on a wire before a blue screen. The blue screen gets keyed out to let the action happen over another background. Many Hollywood special effects are created with blue screen techniques.

To use Smooth and Tolerance for the best results in keying

- 1 Set **Smooth** and **Tolerance** to 0 before you begin keying.
- 2 Choose the color or value that you want to key out. All pixels with the exact same value will become transparent in your video.
- 3 Increase **Tolerance** to include a wider range of values. As you increase **Tolerance**, you'll see nearby areas become transparent.
- 4 After you've adjusted **Tolerance** to your liking, increase **Smooth** to clean up the edges of your image. Remember that smoothing is a fine adjustment, so increase it little by little.

KEYING AND CG

Normally, you use luma keying with the Character Generator. The default background for CG is black, and by using Luma White, you can simply key out the background. If you use the Luma Black, you can build special effects where you apply video within CG characters or graphics.

CONTEXT MENU

The keyer includes the standard context menu options that were discussed in Chapter Three. You also find different skins for the keyer in the context menu, and options for storing presets.

PRESETS

The keyer has four user presets in the context menu. You can store and recall keying settings without entering a name or path. The settings are stored until you replace them with something else. You can shut down Video Toaster, return later, and still access the presets.

To store a preset

- 1 Choose your keying settings.
- 2 Right-click on the Pacifica Keyer and choose **Store 1** from the menu.

When you adjust the keyer and you want to open previous settings, you can easily recall the preset that you stored.

To recall a preset

- Right-click on the keyer and choose **Recall 1** from the menu.

CROSS KEYER

The Cross Keyer looks similar to a vectorscope: you use a color wheel to determine the areas of the image you want to key out. You can choose colors from the color wheel in real-time; you can apply paint and then clear it and see the effect immediately, as you work. The Cross Keyer lets you choose different colors in your video so that you can key out many areas with precision.

The CrossKeyer lets you switch between skins by clicking on the **S** at the top left of the panel. You can choose from Normal and Funky skins, as shown in Figures 16.9 and 16.10.

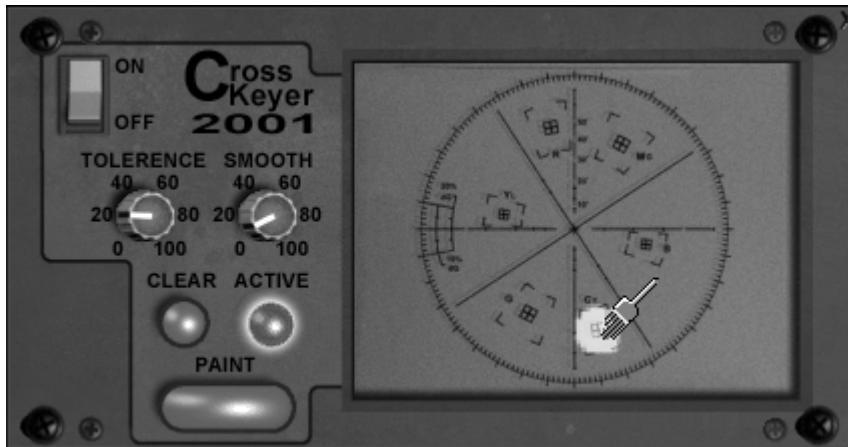


Figure 16.9. Cross Keyer with the Normal skin.

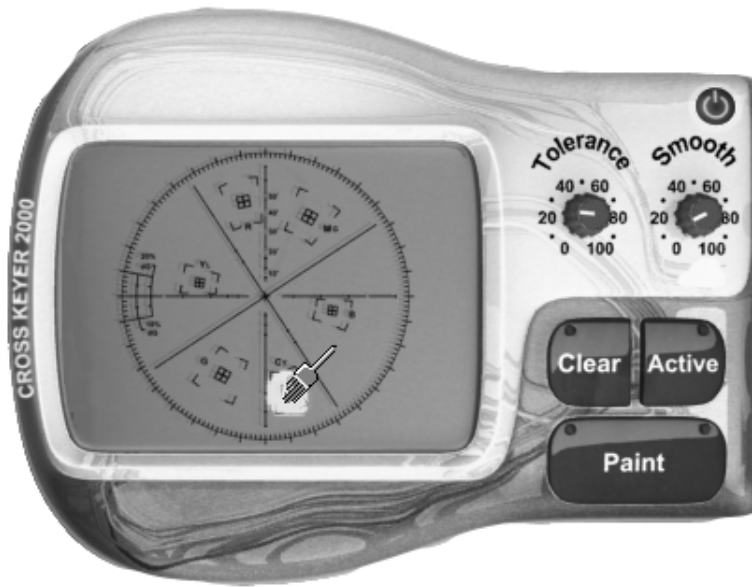


Figure 16.10. Cross Keyer with the Funky skin.

CONTEXT MENU AND PRESETS

The Cross Keyer offers the same options in the context menu as the Pacifica keyer. See the discussion on the context menu and presets earlier in the chapter.

WORKING WITH THE CROSS KEYSER

Choose the **Paint** button and drag the brush over the area of the image that you want to key out. When you hold down the mouse button, you choose colors until you release the mouse button again.

Select Cross Keyer Colors

You can click once to choose a specific pixel, or hold the mouse and drag to choose as you move. When you release the mouse button you keep any colors that you've already chosen, so you can click, go to another part of the screen, and then click again to choose more colors. You'll see the colors key out of the video in real-time as you select them. Press the SPACEBAR to stop painting all together.

As long as the **Paint** button is active, you can add more colors to the Cross Keyer. To deactivate the **Paint** button, just click on it again. When it's active, the two lights on the button illuminate.

Deselect Cross Keyer Colors

To deselect colors that you've already chosen, hold the **SHIFT** key while you drag in the area of the screen that you now do not want to be keyed. You'll see the colors return to the video in real-time as you select them.

Footage for the Cross Keyer

You set up footage for the CrossKeyer just as you do for the Pacifica RK95 Keyer. You need foreground video with areas that you want to key out and background video that you want to peek through keyed areas. On the Switcher, the foreground video sits on the **Preview** bus and the background video sits on the **Main** bus. To see keying in action, ToasterVision must use **PGM Out** mode.

TOLERANCE

The **Tolerance** option adjusts the color range you want to key. The process is the same for the Cross Keyer as it is for the Pacifica RK95 Keyer. You choose your colors first, or in this case you **Paint** out your colors, and then you set values for **Tolerance**. Low values will allow only pixels with similar values to be keyed, while higher values extend tolerance to a wider range of pixels

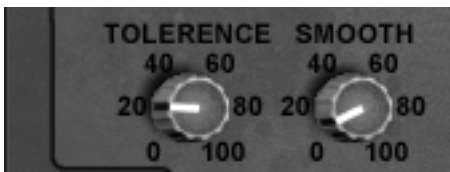


Figure 16.11. Cross Keyer knobs for Tolerance and Smooth.

SMOOTH

You can smooth the edges of your foreground so that you do not see the sharp edges that are tell-tale signs of keying. The process is the same for the Cross Keyer as it is for the Pacifica RK95 Keyer. The blurring effect produced by the **Smooth** operation increases as you add more smoothing. Low values offer you a nice professional appearance, while high values can give an interesting aura or dream effect to your images.

TASK: KEYING

PACIFICA KEYER TASK

When you perform live switching, you can use keying to great advantage and create some divine effects. However, you may want to do some practice runs before you begin recording. You can see the effects of keying in real-time on a ToasterVision monitor. Keying is applied to the video that is on the Preview bus of the Switcher, so that the video on the Main bus is the background image that shows through.

To use the keyer, you need source video for the foreground and background scenes. Use blue or green screen footage for your foreground scene. You can easily make this kind of footage by placing someone in front of a wall painted blue or green. The background scene can be anything at all. For this exercise, use the green screen footage, DOGCU2.AVI, in the CONTENT folder and MIAMINITE.RTV for background.

- 1 Place your two sources on the Switcher. Place the blue/green screen footage, DOGCU2.avi, on the **Preview** bus, and place the background footage, MIAMINITE.RTV on the **Main** bus.
- 2 Activate a ToasterVision monitor so that you can see the changes you will make. Choose **PGM Out** mode for ToasterVision.
- 3 Open the Pacifica RK95 Keyer. Set **Smooth** and **Tolerance** to 0 before you begin keying.
- 4 Choose the **Linear Chroma** option, then click on **Pick Color** and hold the mouse button while you drag the eyedropper over the green background of DOGCU2.AVI. Release the mouse button to choose the color.
- 5 Set **Tolerance** to low values (until any halo affect from the key color is gone).
- 6 Set **Smooth** to low values.

Keying occurs immediately on the Switcher. You can see the background of the green screen footage disappear as soon as you choose the screen color. If you choose another source for the **Preview** bus, keying ends.

CROSS KEYER TASK

As with chroma keying, you need source video for the foreground and background scenes. When you use the Cross Keyer, you don't need special footage, you can use a foreground image with any color, though it will be easier if the image has large areas of color that you want to key out.

- 1** Place your two sources on the Switcher. Place the foreground footage on the **Preview** bus, and place the background footage on the **Main** bus.
- 2** Activate a ToasterVision monitor so that you can see your changes. Choose **PGM Out** mode for ToasterVision.
- 3** Open the Cross Keyer. Set **Smooth** and **Tolerance** to 0 before you begin keying.
- 4** In your foreground scene, choose the colors that you want to key out. Click on the **Paint** button in the Cross Keyer and drag the paintbrush over a color to choose it.
- 5** Click in other areas of the video to choose more colors. If you choose colors that you don't want, hold **SHIFT** and click on the unwanted colors.
- 6** Hit the **SPACEBAR** to stop painting and choosing colors.
- 7** Increase **Tolerance** to include a wider range of values. As you increase tolerance, you'll see nearby areas become transparent.
- 8** After you've adjusted **Tolerance** to your liking, increase **Smooth** little by little to clean up the edges of your image.

Keying occurs immediately on the Switcher. You can see the background of the Preview footage disappear as soon as you begin painting. If you choose another source for the Preview bus, keying ends.