Topic 017

Chroma lighting basics

Chroma-Key Basics

The techniques for merging two video tracks into one fall roughly into three categories. Transparency allows one track to show through another at selected pixels. Blending combines the color information in each pixel mathematically to create a range of effects. Masking uses specific pixels (usually black and white) to either hide or display the underlying video. Chroma-key (also known as CSO or color separation overlay) is a type of transparency where a selected color or range of colors is set to transparent. Since computer video is based on three colors‹red, green, and blue‹and since human skin tones always contain some degree of red, the two most common key colors used for such transparency are green and blue. A related technique, luminance key, uses the brightness to set transparency, matting out pixels above or below a specified level), but this technique is trickier given the usual range of intensities in a typical video.

Blue vs. Green

Of the two standard chroma-key colors, blue is probably used most often even though green is perhaps a better choice. As it turns out, blue is a more popular fashion choice than green, so subjects are less likely to have green clothing conflicts. Moreover, daylight contains high amounts of blue. Whichever color you use, be sure that your subject does not contain that color. Stripes and prominent patterns also create chroma-key problems; stick with monotones, earthtones.

Chroma-key blue and green are quite specific colors, determined to be the best for most situations. You can purchase screens, paper, and paint in these standard colors. If you use other blues or greens, most video editing software will have a bluescreen or greenscreen option that should work fine.

Lighting

The secret to successful chroma-key work is not in the software but in the lighting. The background screen should be uniformly lighted with a high intensity indirect light. You want a low contrast ratio in the background. View the subject and background separately to see if there is a suitable contrast in light levels.

Use a low light behind the subject aimed up at the subject. This creates a halo effect (a whitish rim of light around the subject¹s outline) that makes later editing easier; there are specific white and black matte effects in most video editing software to eliminate the halo (or shadow) separately from the chroma-key effect. Watch out for overexposed areas on the side of the subject. Strain hairs can be a chroma-key nightmare, so tie back hair, use hair spray, etc. to minimize this problem.

Be prepared to move the lighting to various positions till you get the right effect. Use white walls, screens, poster board, umbrellas, etc. to bounce light onto the background. Once you have the subject lighted properly (no unwanted shadows), then recheck the background to see if the foreground lighting has inadvertently creating any new shadows.

Position and Camera

The greater the physical separation between the subject and the background the better. Position the camera at least ten feet in front of the subject. These distances will allow the camera to focus on the subject and blur the background; lower dept of field is an advantage in this situation. Ideally use a camera with manual settings and zebra stripes (for identifying overexposed areas; don't trust the viewfinder of LCD screen when it comes to color or intensity). The zebra stripes will indicate problem spots as well as the general evenness of your lighting setup. Raise or lower the f-stop to eliminate any zebra lines. The better the camera the better the color separation and the more successful your chroma-key effects will be. Be sure to set the white balance.

Use the camera in a fixed position for chroma-key work. Level it carefully. Use a remote control to avoid any camera movement. Use a 90-degree angle to the screen so distances to all parts of the screen are the same. Vary more than 15 degrees from this position and you may have chroma-key problems.

Use a medium close-up shot. Extreme close-ups too easily show flaws. When shooting a person, level the camera lens with the nose and establish clear focus on the eyes. Shoot a few shots of the screen only at the beginning and end of each shot. These frames can be used in the "Difference Matte" technique, a backup method that compares a video to the empty screen matte and adds transparency where the two match.

How to light a Chroma key screen

Lighting is very important in photography, and this is especially true for Chroma key work. It can be quite challenging. Here are three basic rules:

- Make sure the Chroma key screen is lit evenly across. No hot spots or shadows.
- Be careful that your model does not cast shadows on the Chroma key screen. She should be 6 to 10 feet in front of the screen and lit separately.
- Set up two lights, one from each side, and both a good distance from the screen. This will avoid getting a bright 'hot' spot in the center of the lit area.

Some guidelines for lighting a Chroma key screen

Other than our three suggestions above, there are no hard rules for lighting a chromakey shoot. The correct lighting depends upon how much room you have, what equipment you have, and what subject you are shooting. For instance, for little league shots, two umbrellas in front of the subject are adequate for consistent but flat lighting. For senior portraits, you might want a three-light setup to create moody or artistic lighting.

Light on background

You can light the background with separate lights if the background is too dark, since you don’t want the background blending into the subject’s shadow areas. However, you need to be careful

about over-lighting and increasing the amount of spill. If you do light the background, you should plan on having the subject posed 8 to 10 ft away.

In most cases, avoid lighting the background. The more light on the background, the more spill you will potentially have. In most cases a couple softboxes and umbrellas do the trick nicely for lighting the subject and background. However, this strategy may not be feasible for large areas. If you are moving around and shooting from all angles then you may need to light the background.

Hair or back light

A hair or back light can give definition to the edges of the head. This can make it easier to separate the hair and reduce color spill on the shoulders. You usually want the background to be about a stop darker than your subject.

Be careful of lighting too bright as this can add a glow to the hair which looks fake when you remove the background. In general, we don't recommend a back light. Too much risk of turning it into a big green light that is giving a green cast to your subject.

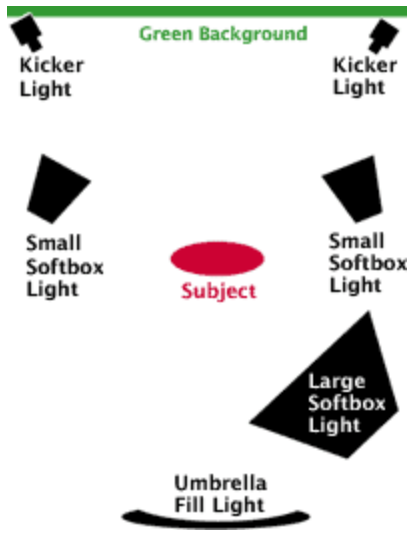
Light on floor

You can use a light on the floor pointing upwards to help minimize color spill on the legs and arms. If you're doing a full length shot, you can use a floor light pointing down to help eliminate shadows on the floor. Caution: This will result in more light bouncing off of the chromakey floor onto your subject's legs.

Magenta back light

If you're getting a lot of green spill on the shoulders and arms, it's also possible to use a magenta back light. This is sort of a last resort. It can help, but it's tricky to use, as you don't want to give everything a magenta cast. Giving your subject magenta shoulders instead of green ones won't help you out much.

Diagram of a Chroma key lighting setup



Another experienced photographer, **Neal Martin**, sent us this diagram of the lighting arrangement he uses for his chromakey work.

Neal says, "I photograph with a six light setup, in studio and location. Without getting into distance and power setups (which is dependent upon the background I've selected), basic things never change in photography. If you want it to look right, then photograph it right.

"Primatte is a wonderful plugin, but it will not correct a bad portrait session. You can't expect to stand your subject in front of a green screen and let Primatte take care of everything else.

"Your thinking has to change a bit. You need to look at the lighting on the background that has been chosen, then light the subject the same way such as light angle and contrast range. My dance magazine image was taken using this exact light setup."