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Cleaning Digital Camera Noise

If you've shot with a digital camera in low light or using high ISO settings you've probably had problems with digital noise in your images. Or, you may have shot a scene that has shiny glass, jewelry or a complex weave of fabric that you see strange colored artifacts in. This noise or these artifacts can sometimes be so bad that it makes the image unusable.

The good news is that there are ways to clean and improve these images with off the shelf software or, just by using Photoshop tricks. This document will show you how to use Photoshop to "clean" these images. Keep in mind that this process is much more effective with CCD (Kodak 760, Kodak ProBack, Nikon cameras, Canon 1D) generated digital images rather than CMOS (Kodak 14n, Canon D60, Canon 1Ds) generated images. While this process can slightly improve CMOS images the results are not nearly as dramatic.

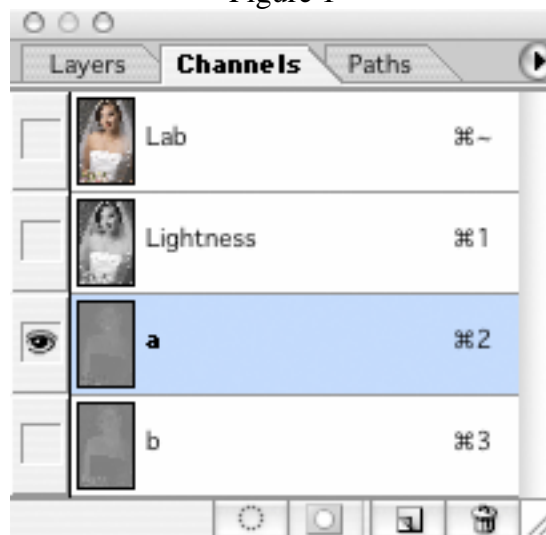
Let me first discuss how this works, because after reading the instructions you may be concerned that your images will become blurry or softer (they will not). The way we do this is by converting to Lab color (see the footnote at the end of this document) and "blurring" the A & B channels. This works well because LAB color separates the detail of an image, from the color. The detail is in the Lightness channel and the color is in the A & B channels. So, if we "blur" the color channels (correctly) we can almost "erase" the noise, while not altering the detail or sharpness of the image. This is a very cool thing.

Below is a step, by step description on how to do this in Photoshop. You can even create and record an action of these steps so that you can automate this process.

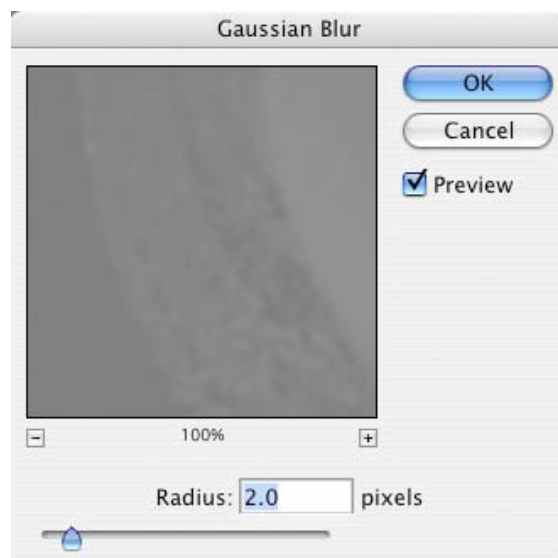
1. Open your image in Photoshop.
2. Convert the image to the Lab Color space. To do this, select the Image Menu...Mode...Lab Color.
3. If you do not see your "Channels" Palette on your desktop, select "Show Channels" from the View menu.

4. You will notice that for Lab color your channels will be separated into Lightness, A, & B. (see Figure 1) **Click on the A channel.** You'll notice your image will turn gray with hardly any detail. You'll also notice that you see blotchy "specs" in the image. This is the noise.

Figure 1



5. Go to Filter...Blur...Gaussian Blur. In the radius box enter 2 pixels. Click O.K. This runs the Gaussian blur filter 1 time.



6. Hit Cntrl F Key (Command F key on a Mac) 6 or 7 more times to rerun the Gaussian blur on the A Channel. The number of times you run this depends on the amount of noise in the image. If your image is very noisy, it may take several more times.
7. **Click the on the B channel** in the palette and run the same Blur 8 or 9 more times. The B channel is generally "noisier" than the A channel and will require a few more "Blurs".
8. At this point you can convert back to RGB color by selecting Image...Mode...RGB Color.

- Optional – I usually like to add a little saturation at this point because sometimes the blurring can de-saturate the image slightly. Go to image... adjust... hue/saturation, and slide the saturation slider until you reach the desired saturation level. I usually only add about between 5 and 10 pts.

That's it. If you want to see the results of your work zoom in on the image to about 200% in a noisy area. You can use the history palette to see how the image originally looked versus how it looks now. You should see a dramatically cleaner but just as sharp image. Figures 3 and 4 show an original image and "cleaned" image respectively. Look closely at the strands of hair where it curls (you may have to zoom in). You'll notice in Figure 3, the original image has several colored "specs" or noise. In Figure 4, the cleaned image, the noise is gone.

Figure 3. Original Image



Figure 4. "Cleaned Image"



Footnote: Some may say that you should not convert to Lab color and then back to RGB because with every conversion you do to an image you progressively degrade the image. Yes this is true, however the advantages gained by cleaning the noise far out way the very slight, and more than likely, not visible degradation of the image by the conversion.