

## REMOVING DIGITAL NOISE

Digital noise is a common problem when taking photographs in dark lighting conditions particularly when using a digital camera, but can also occur when a scanner is used resulting in red, green and blue dots (pixels) appearing throughout the darker areas of an image. The problem is often referred to as “channel noise”, “colour aliasing” or “high ISO noise”. As usual there are several ways you can tackle this in PhotoShop but the problem can often be minimised by using one of the following methods.

### Method 1: Using LAB Mode

1. Open the image that has digital noise (coloured ‘dots’ in darker areas of a photo)
2. Zoom to 100%
3. From the **Image** menu, choose **Mode > Lab Color**
4. Open the Channels palette from the Windows menu, if not already displayed on screen or click the Channels tab when nested with the Layers and Paths palette
5. With the Channels palette selected the image will look the same on screen but the Channels palette will have four channels, Lab, Lightness and an ‘a’ and ‘b’ channel
6. Click the [ a ] channel to select it (green and red data)
7. With the [ a ] channel selected go to the Filter menu and choose **Filter > Blur > Gaussian blur**
8. Check that the Gaussian blur preview option is ticked and then adjust the Radius setting until the dots more or less disappear, then click OK
9. Now in the Channels palette select the [ b ] channel (blue and yellow data)
10. You can either press Ctrl+F to apply the last filter automatically, including the exact last settings used or from the Filter menu choose Filter > Blur > Gaussian blur and adjust the Radius setting until the coloured dots more or less disappear
11. You are affecting the colour information of the image, the Lightness channel retains the detail
12. Under the Image menu choose Mode > RGB to return your image to RGB mode
13. The coloured dots should be less obvious and more acceptable because the colour channels have been blurred and helps to reduce the affect of the multi-coloured dots

### Method 2: Using Gaussian blur filter and the Fade option

1. Open the image affected by Digital Noise (red, green and blue dots)
2. Choose **Filter > Blur > Gaussian blur** from the Filter menu
3. The Gaussian blur dialog box is displayed on screen, check the Preview option is ticked
4. Initially drag the Radius slider to the far left 0.1
5. Then increase the Radius until the coloured dots or aliased colour is sufficiently blurred so the coloured dots appear to merge into the image – you will find it better to use the keyboard cursor movement up and down arrows to give finer control
6. Click **OK**
7. Immediately go to the **Edit** menu (don’t do anything else or the Fade option will not be available to you)
8. From the Edit menu choose **Edit > Fade > Gaussian blur**
9. When the Fade dialog box is displayed change the **Mode** option to **Color**
10. This is an ideal technique to use as an Action or as a Batch Action when you have a lot of images that has the same digital noise problem

### **Method 3: Using Gaussian blur on the Blue Channel to help control Digital Noise**

Remove digital noise by using the Gaussian blur filter on the Blue channel:

The blue channel is generally where most digital noise occurs. By blurring the blue layer you often find that the digital noise will be minimised. Because all three channels are in pin register the Red and Green channels retain the sharpness of the image. Blurring the Blue channel simply removes the noise from this channel only, the process smoothes out the noisy pixels within the Blue channel and blends them together.

1. Open the image with the problem noise
2. Zoom your image to 100% and centre over an area of noise so it can be seen easily
3. Activate the Channels palette by clicking its tab
4. Click the Blue channel layer so it's selected, the main image will turn mono
5. From the Filter menu select Filter > Blur > Gaussian Blur
6. Move the mouse point inside the view window and move so the noise can be seen or simply click on the main image where noise happens to be most prominent
7. Set the Radius slider to the far left and then use the UP arrow key
8. Go as high as necessary until the blue channel is very blurred e.g. 2 pixels or more
9. Don't worry about it damaging the image
10. Move back to the Channel palette and click the composite RGB channel at the top of the Channel palette
11. The main image should now return to normal and hopefully the noise significantly reduced
12. The Red and Green channels will remain sharp and therefore ensure the image does not appear blurry even though you blurred the blue layer

#### **Note:**

This technique can be used on images that do not exhibit excessive or apparent digital noise. It will often improve the image by adding extra crispness to the image because of inherent noise present in the BLUE channel of an RGB image. An image can be severely affected by digital noise while other times its presence is so subtle you can be excused for not thinking it present. By using any of the above procedures the affect of digital noise can be minimised to an acceptable level.

### **Factors that can affect or exaggerate production of digital noise.**

We generally attribute the generation of digital noise to the digital camera or scanner. But we can sometimes introduce or exaggerate digital noise during image editing. For example when image contrast is increased. So extra care should be taken to avoid this and in particular when using sharpening techniques. The USM (Unsharp mask) filter will often cause digital noise to become more pronounced. First apply any of the suggested techniques to minimise noise before sharpening the image. As an alternative use the High Pass filter to provide image sharpening. This is a much less harmful way of providing image sharpening. First copy the active image layer and then apply the High Pass filter to the copy layer (Filter > Other > High Pass). Adjust the High Pass Radius slider as necessary. In more severe cases of digital noise you may still notice some digital noise is present after using the High Pass filter (Soft light or Overlay blend mode). Try running the Median filter on the active High Pass layer. Filter > Noise > Median and use a Radius setting of between 1 and 3 this sometimes can improve things.

## Method 4: Using filters and a layer mask

It's possible to reduce the appearance of digital colour and luminance noise by using various techniques. This procedure makes use of the Gaussian blur and Median filter, Colour blend mode and a layer mask. By using a layer mask it is possible to further control where the affect is applied which can help to retain image detail where appropriate and at the same time reduce the most severe digital noise present in the image.

1. Copy the image layer and work on the copy layer, name the layer if you wish
2. The first task is to blur the digital noise so choose Filter > Blur > Gaussian blur
3. Adjust the Radius slider until you find the lowest setting that blends the noise into the surrounding image
4. The image will look blurry but this will be rectified on the next step
5. With the blurred copy layer still selected choose 'Color' from the layer blend mode drop-down menu
6. The Color blend mode prevents the Gaussian blur filter to affect the image luminance or brightness values which contain most of the image detail
7. Filters can only be applied to one layer so we need to create a combined or composite layer
8. Make sure only layers you want included are visible and have the eye icons displayed
9. Hold down Shift+Ctrl+Alt+N then release only the 'N' (the 'N' key creates a new blank layer)
10. Now keep the Shift+Ctrl+Alt keys held down and press the 'E' key (Shift+Ctrl+Alt+E). Pressing the 'E' key, with all modifier keys held down will merge all visible layers onto the new blank layer
11. Now we can attempt to reduce the digital noise without making the image look blurry
12. Choose Filter > Noise > Median and adjust the Radius slider until you find the lowest setting needed that blends the noise into the surrounding area while retaining edge detail
13. To provide a balance between image detail and noise reduction drag the new layer Opacity slider. This may result in going as low as 15% to 30%, just experiment and stop when it looks good
14. On some images it may be necessary to control exactly where the affect is actually applied on the image we can do this by using a layer mask
15. With the new layer still selected click the Layer mask icon found at the bottom of the layer palette, it's the second icon from the left with a circle on a grey background
16. A rectangular box filled with white is displayed next to the layer thumbnail
17. From the Toolbox select Black as your Foreground colour and choose a large soft edged brush of suitable size
18. Now move into the image window and paint on the image to bring back import detail or texture in areas where noise wasn't a problem and remove the affects of the blur