



## How to do noise filtering and retain sharpness and detail

Our noise filter plugin includes median, despeckle, film grain and a modified low pass filtering (smoothing). In addition it has a soft focus filter and an intelligent mask for preserving details. It is designed to filter noise, but retain sharpness and details.

• Power Retouche **Photoshop** plugins are also for **Paint Shop Pro, Corel Draw, Illustrator, Fireworks** and other graphic software or photo software for photo editing, retouching and restoration (Mac & Win) see [list](#)



### Benefits of the plugin

#### Noise Filter plugin - Tutorial

- Subdue or remove unwanted variations in pixel values
- Remove blemishes from dust and scratches
- Level out the colored crystals in film-scans
- Smooth that sandpaper-like look in skin and other monochrome areas
- Yet retain sharpness and details

The Noise Filter filter plugin works with these image modes (Windows and Mac)...

**Mac:** 8 & 16 bit / channel: RGB, CMYK

**Win:** 8, 16 & 48 bit: RGB - 8 bit: CMYK

### Noise Filter controls

This is the Noise Filter plugins control panel at one third size. Click on the photo or the links to see the plug-in at full size.

The filter has four sets of controls:

1. Stray pixel removal
2. Noise filtering methods
3. Mask to preserve details
4. Brightness-range restricted noise filtering



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Example -



The Noise Filter plugin is ideal when you want to filter out noise or speckle, but don't want to lose the details.

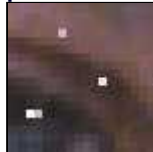
### What is image noise?

Hot pixels

Excessive variation

Film grain

Stray pixels or hot pixels



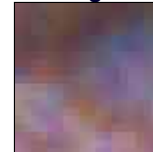
Hot pixels are stray bright pixels created by over-heated sensors in digital cameras or scanners. In particular in dark areas or in night shots with long exposure

Too much variation



Some variation is desirable, but when it becomes too strong, it dominates the impression and is called noise. Typical for all digital cameras and scanners

Film grain



The pigment-crystals in the film show when enlarging a scan of a regular 24x36 film.

Dust and scratches

Blemishes such as dust, scratches or hair are not always obvious until you start editing the image. Here's an example of how common Unsharp Mask will enhance noise. To the right you see a hair that accidentally entered the scan (left) and how unsharp mask exposes it (right). - PowerRetouche Sharpness Editor won't do that.



### Clean up stray pixels

Clean up

Level %

Checking **Clean up stray pixels** will remove stray pixels before any other processing is done.



The slider **Level %** sets the threshold for when a pixel should be considered stray and be removed. The higher, the more is included. Remember that this only deals with single isolated pixels that fall out.

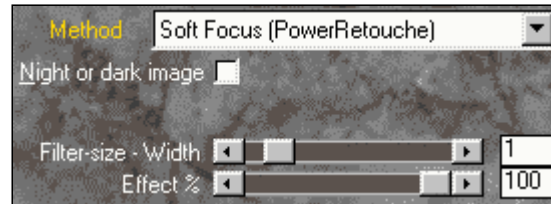
Hot pixels

A special kind of stray pixel noise is known as **hot pixels**. They appear in digital photographs taken at long exposure time and are caused by unwanted charge in the cameras sensors due to prolonged activity. Remove them with this clean up.

### Method control set

**The methods** The plugin filter offers five different methods to filter out noise.

- Soft Focus
- Film grain leveling
- Despeckle
- Median
- Smooth by average



**Night or dark image** Checking this will change the noise filtering algorithms. So you actually have ten, not five, different methods. When taking pictures of dark images, you need longer exposure times and that produces a different kind noise. Scanners also produce a different kind of noise when scanning dark images, especially when scanning dark blue. Try with and without the dark image option and choose what looks the best.

**Filter size width** This sets the size of the context against which the current pixel is judged. Increasing the size markedly slows down the filter.

The example is enlarged 800%. In this the noise is about two pixels wide, so a filter size of two would be optimal.



You can safely assume that random noise from scanners and digital cameras is only one, or max. two, pixels wide. Noise from film grains however will vary in size depending on the resolution of the scan.

Note that PowerRetouche's sliders ask for the size you can actually see the blemish has.

**Effect %** This is a very important filter control. It determines to which degree the filtering should be applied to the image.

### Preserve details mask

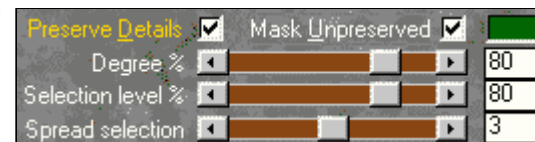
**Preserve details** This set of controls lets you isolate details so they won't be changed by the noise filtering.

**Mask unpreserved** **Mask unpreserved.** This is only an aid in setting the filter controls. We decided to draw the mask over what will be changed so it would be easier to see what will be preserved. You can change the color of the mask by clicking on the rectangle.



**Degree** **Degree** determines to what degree the details should be untouched by the filtering. It's nice to be able to apply some change, about 20%, so 80% is the default setting. The mask will be more or less transparent depending upon the degree of preservation. 100% is totally opaque.

**Selection level**



**Spread selection** **Selection level %** determines how much will be included as details.

**Spread selection**

**Spread selection %** determines how much around the detail should also be spared.

### Examples of the methods

#### Soft Focus

This is Power Retouche's own unique method. It retains sharpness while softening - in much the same way as traditional soft focus lens filters do. If you inspect the pixels before and after, you will find that pixel variations are preserved unlike in traditional median.

If you want to preserve richness of tonal variations, but need to reduce noise, choose this method. If on the other hand you need to cover up bad pixels like from hair or dust, patching (median) might serve you better.



Original photo with noise



Filter size 2, 100%



Filter size 2, 100%



Filter size 3, 70%

#### Film-grain leveling

This method is designed to remove the colored crystal specks from film grain without impairing neither sharpness nor grayscale values.



Original - enlarged 400%



Filtered once at size 5 - twice the grain size  
Effect 50%

Setting the filter size to the same pixel size as the grain will reduce the low-level color mosaic caused by film grains, but if you want to completely remove it you will have to set the size to the double (above we used size 5) so the plugin can span

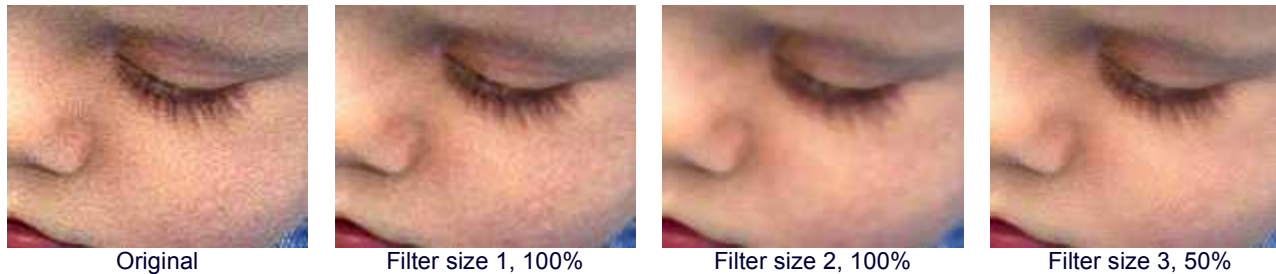
over several varicolored film-grains and better calculate the appropriate color they captured on the original film.

Images vary, but as a rule of thumb (with this method) it's better to have a large filter size with a low effect, than a small size at full effect. It is, however, time consuming.

**Despeckle**

This method preserves the color of the pixel as far as possible while altering its brilliance to fit in with the surrounding pixels. It is a completely different kind of despeckle from what is commonly known as such.

Be aware that some blurring is unavoidable since minute value-differences become even. However, the blurring should be less with our despeckle than with regular despeckle or median, smoothing, etc.. Also the preserve details mask will remedy the blurring. In the examples we have not used the preserve details mask.



**Median patching**

**Patching** (or "median") is to replace the blemish with a likely substitute taken from the surrounding pixels. This is the most common means of noise-elimination, and digital photo software normally offers the possibility of using median to remove noise. The problem with median is that it as a side effect filters out the subtle coloristic variations of the local hue and the image gets a watercolor-like and dead appearance.

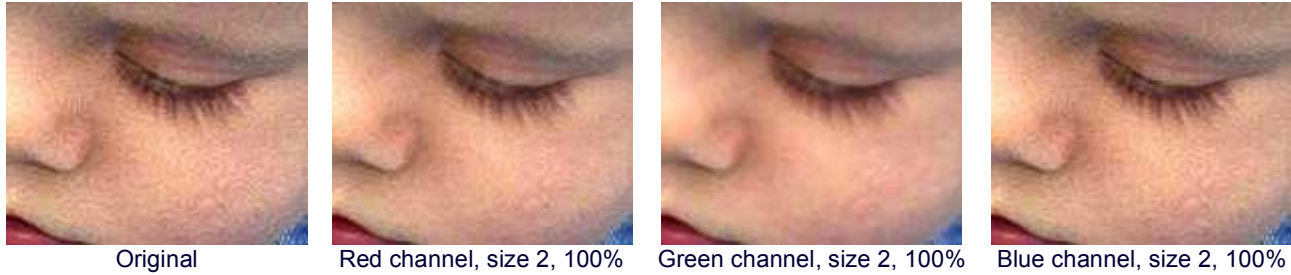
The example to the right has been median filtered on all three channels. Please compare to the examples below...



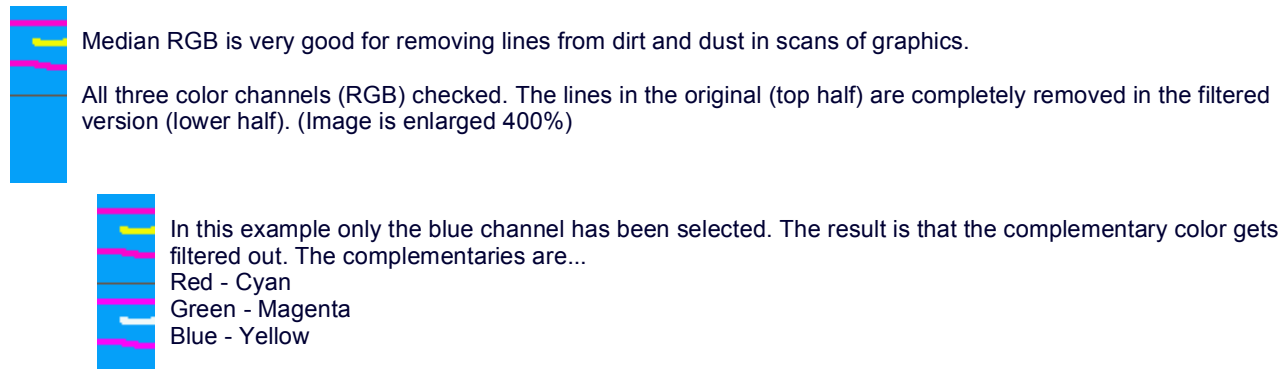
**Patch using**

Power Retouche lets you treat the three color-channels (red, green, blue) separately. Usually noise is mainly in one channel only (typically the green, but it varies), so by patching the noisy channel alone, you preserve far more coloristic variation. When working on selected channels you must set the filter size low to avoid creating other kinds of noise. For example filtering green only may actually create magenta noise along edges, so use it with caution.

When patching by median is selected, you will be presented with the following extra checkboxes: red, green and blue. The button "All" will check all three. In the windows versions you can check/uncheck the colors with Alt+R, Alt+G and Alt+B. Alt+A will select all.



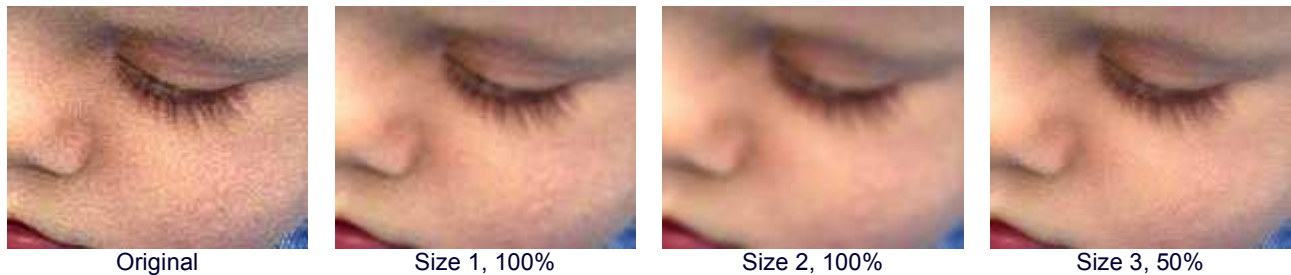
**Median with graphics**



**Smooth by average**

This method replaces the pixel with the average of all the pixels within the area covered by the filter size. It will produce a blurry image, but is actually not blur in an optical sense (defocus). However many photo editing applications call this smoothing operation "blur".

Use smoothing in conjunction with a target range - for example to smooth out noise in the darks.



**Preserve details combined with soft focus**

In this example we used the soft focus method together with the preserve details mask. These are the settings used...



This is the mask we used to spare the details



Original photo with noise



Noise filtered photo

### Use brightness-range

#### Brightness range controls

These controls are implemented in most of the Power Retouches.

**Dark limit** - only pixels lighter than this will be filtered.

**Light limit** - only pixels darker than this will be filtered.

**Target** - pixels at this value will be changed the most. How the rest are changed depends on the next slider,

**Softness** - If set to 0, all pixels within the limits will be equally filtered. As the slider rises, the effect fades out towards the limits.

**Mask out of range** - This is an aid in setting the sliders. It does not show on the filtered image.

#### Example...

Very often noise is only a pain to the eye in the mid tones. When that is the case, there is no need to filter the shadows also. In this example we set the target range as follows...

#### Brightness range combined with Despeckle

Dark limit = 70  
Light limit = 215  
Target = 155  
Softness = 100

To the right you can see how the mask spreads over the photo... We combined this with Despeckle at filter size 2.





Unfiltered photo with noise



Despeckle filtered photo

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