Reindeer Graphics® Optipix 3.0

User's Manual

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Installation

Upgrading from Optipix 2

If you are upgrading from Optipix 2, you will need to delete the old plug-ins before installing Optipix 3. The plug-ins will be in a folder labelled Optipix 2 inside the Photoshop plug-ins folder. Delete this folder, and confirm that the plug-ins are no longer being recognized by Photoshop by quitting and relaunching the application and verifying that the Optipix menu is not present.

If you did not install Optipix 2 in the default location on the PC, you may not have a folder labelled 'Optipix 2'. You should be able to find the old Optipix plug-ins by searching for files of type *.8bf. The Optipix plug-ins will have modification dates that are similar, and thus will be easy to locate.

Macintosh Users

1. Run the **Optipix 3 Installer** program to install the plug-ins. This will ask you to locate the folder in which to place the plug-in files. Normally this will be the plug-in folder belonging to Photoshop. Locate the folder in which to place the files and click OK. The installer will do the rest. Note that you can install the plug-ins in a temporary location and then drag them to the final location later, but you cannot install them on one machine and subsequently copy them to another computer.

2. The **Digital Fine Print workflow** on the CD is a single .pdf (Adobe Acrobat) file. If you do not already have Acrobat Reader installed on your computer, you can run the Acrobat Reader Installer provided on the Photoshop CD. Acrobat Reader is also available on the web at <http://www.adobe.com>.

3. An action file, called "**Optipix 3 Actions.atn**" is also on the CD in the "Actions" folder. It contains several actions that illustrate examples of some of the plug-ins. There is also an action file for the Digital Fine Print Workflow, called "**16 bit Layer Workflow.atn**" that follows some of the steps recommended by George DeWolfe.

4. An **introductory book** on Digital Imaging called "Photoshop for Digital Photographers" is also included on the CD in .pdf format.

5. The **user's guide** called "Optipix3Guide.pdf" is on the CD as a single .pdf file.

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Windows (PC Users)

1. Run the **Optipix 3 Installer.exe** program to install the plug-ins. During installation on Windows NT/2K/XP it is necessary to have administrator privileges to write to the C: drive. (If you do not have administrator privileges normally, see the note below). The installer will ask you to locate the folder in which to place the plug-in files. Normally this will be the plug-in folder belonging to Photoshop (the default location, depending on your operating system and version of Photoshop, is C:\Program Files\Adobe\Photoshop CS\Plug-Ins) or whatever other host program you are using. Some programs allow you to select any folder location (e.g., Photoshop using the *Edit* > *Preferences* menu). Locate the folder in which to place the files and click OK. The installer will do the rest. Note that you can install the plug-ins in a temporary location and then drag them to the final location later, but you cannot install them on one machine and subsequently copy them to another computer. Note that it is very helpful to create a new folder (e.g. named Optipix3) inside your usual plug-in folder and then direct the installer to place the plug-in files inside it.

2. The **Digital Fine Print tutorial** on the CD is a single .pdf (Adobe Acrobat) file. If you do not already have Acrobat Reader installed on your computer, you can run the Acrobat Reader Installer provided on the Photoshop CD. Acrobat Reader is also available on the web at <http://www.adobe.com>.

3. An action file, called "**Optipix 3 Actions.ATN**" is also on the CD in the "Actions" folder. It contains several actions that illustrate examples of some of the plug-ins. There is also an action file for the Digital Fine Print Workflow, called "**16 bit Layer Workflow.ATN**" that follows some of the steps recommended by George DeWolfe.

4. An **introductory book** on Digital Imaging called "Photoshop for Digital Photographers" is also included on the CD in .pdf format.

5. The **user's guide** called "Optipix3Guide.pdf" is on the CD as a single .pdf file.

Windows NT/2K/XP-Server Note: You may have difficulty running the software without administrator-level privileges. If you do not have administrator privileges, you will need to specify a path for Optipix to use for its temporary files in the Preferences... plug-in. This will need to be done by an administrator.

Entering Your Serial Number

In Photoshop, either create a new image or load an image. Then under the Filter menu look for OPTIPIX and the bottom item "Preferences…". Select this function and enter your 10-digit serial number. Then click on the OK button. The entry field is not case sensitive and the hyphens are optional.

On a PC, it may be necessary to have Administrator Privileges to successfully enter your serial number.

See also the description of the Preferences plug-in, below.

Working in 16-bits Per Channel Mode

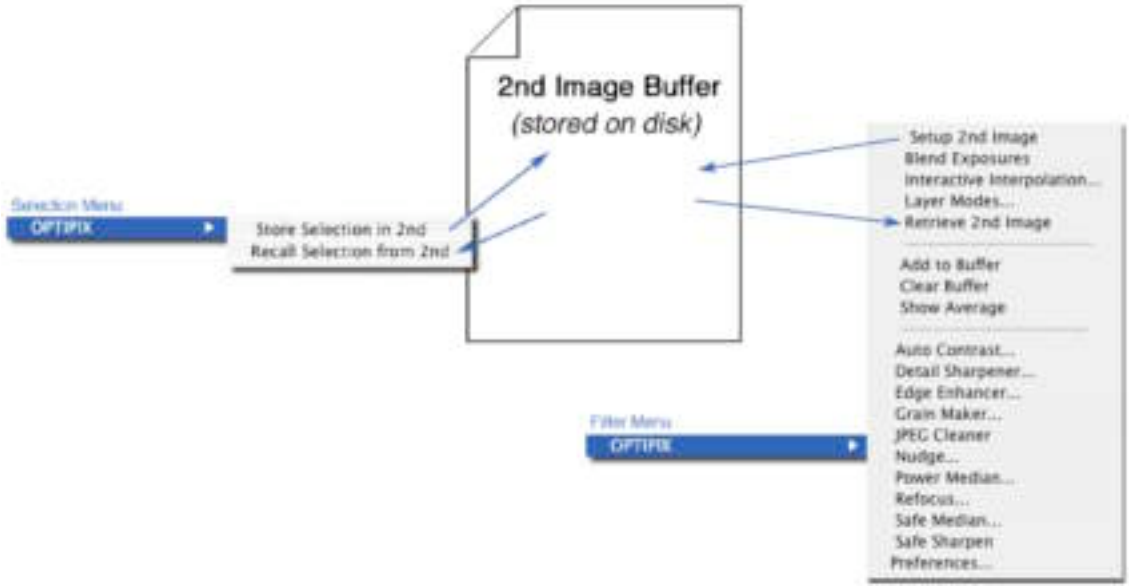
Optipix is designed to work in both 8-bits and 16-bits per channel. Our goal was to make the tools to provide a useful 16-bit workflow.

For instance, with the Selection menu plug-ins (Store Selection in 2nd and Recall Selection from 2nd) it is possible to easily transfer a selection from an 8-bit image to a 16-bit image without needing to create extra channels. It is also easy to create a selection based upon the luminance of the current image. These are common tasks that are not easily accomplished in Photoshop.

We have also provided tools for high precision alignment of two images, including sub-pixel alignment. Please see the section on Layer Modes, below. The Layer Modes plug-in emulates all of Photoshop's transfer modes in 16 bits. This is useful if you are not using Photoshop CS.

About the 2nd Image Buffer

The plug-ins Layer Modes, Interactive Interpolation, and Blend Exposures require two images rather than the usual Photoshop functions that only requires one. In order to accomplish this with Optipix, there is a 2nd Image Buffer (much like a calculator memory) that can store an image:



So, for Blend Exposures, you would use the following sequence of operations:

1- First *select* the underexposed image
2- With that image, invoke *Filter* > *OPTIPIX* > *Setup 2nd Image*
3- Now *select* the overexposed image
4- Finally, invoke *Filter* > *OPTIPIX* > *Blend Exposures*

In that example, the underexposed image was stored in the 2nd Image Buffer. And it will remain in the buffer until it is replaced. That image is actually saved on disk, and will remain there even if Photoshop is quit.

Layer Modes works in the same way:

1- First *select* the image that you want underneath
2- With that image, invoke *Filter > OPTIPIX > Setup 2nd Image*
3- Now, *select* the image you want on top
4- Finally invoke *Filter > OPTIPIX > Layer Modes*

The other two plug-ins that use the 2nd Image Buffer are under the selection menu. So, if you invoke *Select > OPTIPIX > Store Selection In 2nd*, the current selection (a grayscale image) will be stored in the 2nd Image Buffer. You can then select another image and then invoke *Select > OPTIPIX > Recall Selection From 2nd* to recall that selection.

Any image can be stored in the 2nd Image Buffer and recalled as a selection. White (255) is considered fully selected and Black (0) is considered deselected. If a color image is stored, Optipix uses the luminance to compute the selection. Since Photoshop's selections are 8-bit images, Optipix will convert the luminance to 8-bits when making the selection. This will not change the image in the image buffer.

Example: feathering the selection with the blur tool:

1- With the existing selection, invoke *Select > OPTIPIX > Store Selection in 2nd*
2- Make a *new* image (8-bit) with the same dimensions as the current image
3- Invoke *Filter > OPTIPIX > Retrieve 2nd Image*
4- Invoke *Filter > Blur > Gaussian Blur* (or any other editing you like)
5- Invoke *Filter > OPTIPIX > Setup 2nd Image*
6- *Close* this window without changes
7- Invoke *Select > OPTIPIX > Recall Selection from 2nd*

At step #4, above, you effectively have the QuickMask from the original image. This example illustrates that the selection is just another image.

Note, the selection boundary lines (marching ants) are drawn around everything that is 128 or brighter when there is a selection.

About the Averaging Buffer

The three Optipix plug-ins Clear Buffer, Add To Buffer, and Show Average, all use a very high precision (14 bytes, or 112 bits, per pixel) disk file to accumulate the average of the images or selections that are placed in it. This buffer can accommodate up to 32767 images or image fragments. It can also accommodate a mixture of 8-bit and 16-bit images. (Internally, we promote every image to 16-bit RGB before adding it into the buffer.)

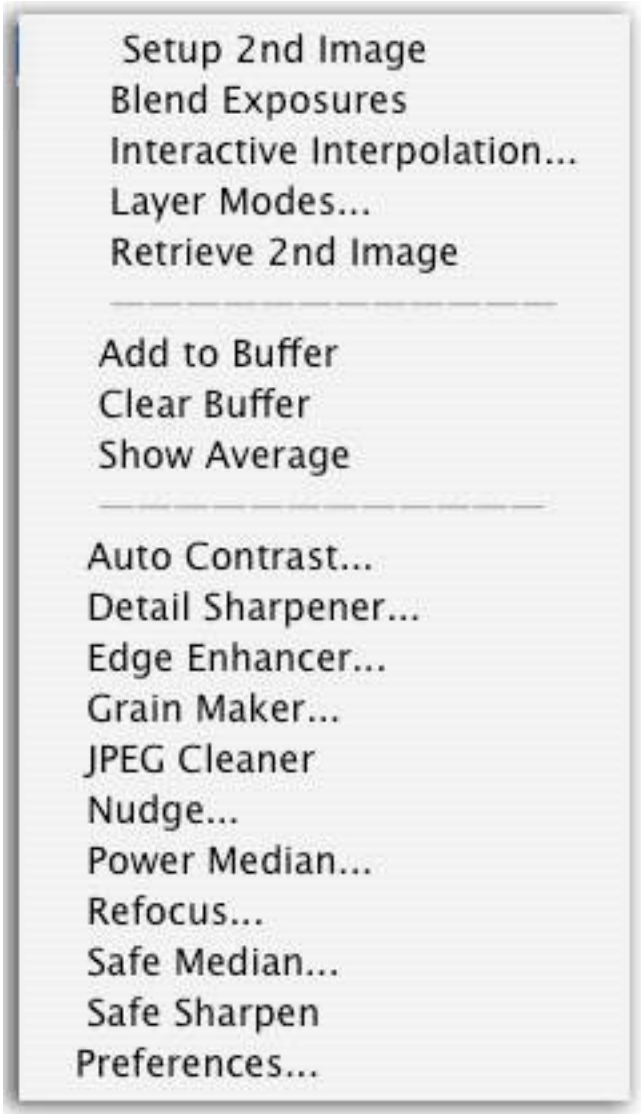
For best results, you will probably want to use Show Average with a 16-bit image at the same size as the original images.

Since you can also add selections of images together, this buffer can also be used for compositing different selections from multiple images.

Using Optipix

Optipix uses two submenus, the first under the **Filter** menu, and the second under the **Select** menu.

Filter submenu



Setup 2nd Image

This function stores the current image (or selection) in the 2nd Image Buffer on disk. It is grouped with Blend Exposures, Interactive Interpolation, Layer Modes, and Retrieve 2nd Image because these functions all use the same buffer.

See the section above on the 2nd Image Buffer for more details.

Blend Exposures

Merge Images to improve overall contrast and detail, without halos

The Blend Exposures plug-in uses two aligned images that have different exposures to create a new image with greater detail in the range from highlight to shadow that either of the two original images. The example below shows the improvements this can make in the resulting image.

The ideal combination for this procedure consists of two digital camera images, one overexposed to get detail in the shadows and one underexposed to get detail in the highlights. If the images are taken on a tripod in rapid succession (using the auto-bracketing function on most digital cameras) they will be perfectly aligned and no post-exposure alignment is necessary. In some cases, guaranteed alignment is not possible. Optipix includes a plug-in that is useful for correcting the alignment of two exposures. For instructions on aligning two images, see Layer Modes, below.

The procedure for using the Blend Exposures plug-in is as follows:

1- *Open* both exposures in Photoshop and select the underexposed image as the active photograph
2- Invoke *Filter > OPTIPIX > Setup 2nd Image*
3- *Select* the overexposed image
4- Invoke *Filter > OPTIPIX > Blend Exposures*
5- Invoke *Image > Duplicate*
6- *Rename* the image and *save* to disk

This method not only works well for digital camera images, but also for scanned slides and negatives. Scan the negative twice, once for overexposure and once for underexposure, and apply the above routine.

Another useful trick is to convert both images to 16 bits per channel (if they weren't already) after step #1. Portions of the images that are in the middle range between the highlights and shadows will be blended and noise/grain will be reduced. This is a good time to adjust the gamma or curves in the image, before eventually coming back to 8 bits.

Note: Image order doesn't matter; you can place either *the overexposed or the underexposed image in the 2nd Image Buffer.*

In the above image, there is nice detail in the clouds, but the shadows make the detail in the stonework difficult to see.

Notice in this image that the clouds have no detail, but the detail in the stonework is very sharp.

The above image is the result of blending the overexposed and underexposed images. Now it is possible to see the detail from the clouds and the stonework at the same time. However, we're still not using the complete dynamic range of the image. If we follow this step with Auto Contrast, we get a very pretty result.

This last image is the result of applying Auto Contrast with a linear setting to the blended image. While the change here is subtle, the image now uses the full dynamic range available.

Blending a bracketed series

With the example above, we just blended two images together. It is possible to blend as many images as you want. With just two images, we blended A and B (A&B). If we wanted to blend A, B and C, there is no way to do (A&B&C), but we can do (A&B)&C or A&(B&C).

(A&B)&C means blend A with B first, then take the result of that and blend with C.

You will get the best results for three images from (A&B)&(B&C) which provides additional weight on the middle B exposure.

Four exposures (A..D) works best as (A&B)&(C&D), that is: blend A and B, blend C and D, and then blend the result of them together.

Five exposures works well either with ((A&B)&C)&(D&E) or (A&B)&(C&(D&E)).

Six exposures works with ((A&B)&C)&(D&(E&F)).

And so on. This process is called “rolling in,” since you roll the exposures to the center from lightest and darkest, and can be generalized to any number of exposures. The idea is to minimize the brightness gap between images that are being blended, so starting at the ends of the sequence and meeting in the middle generates really good results. As a nice side effect, the noise is reduced significantly.

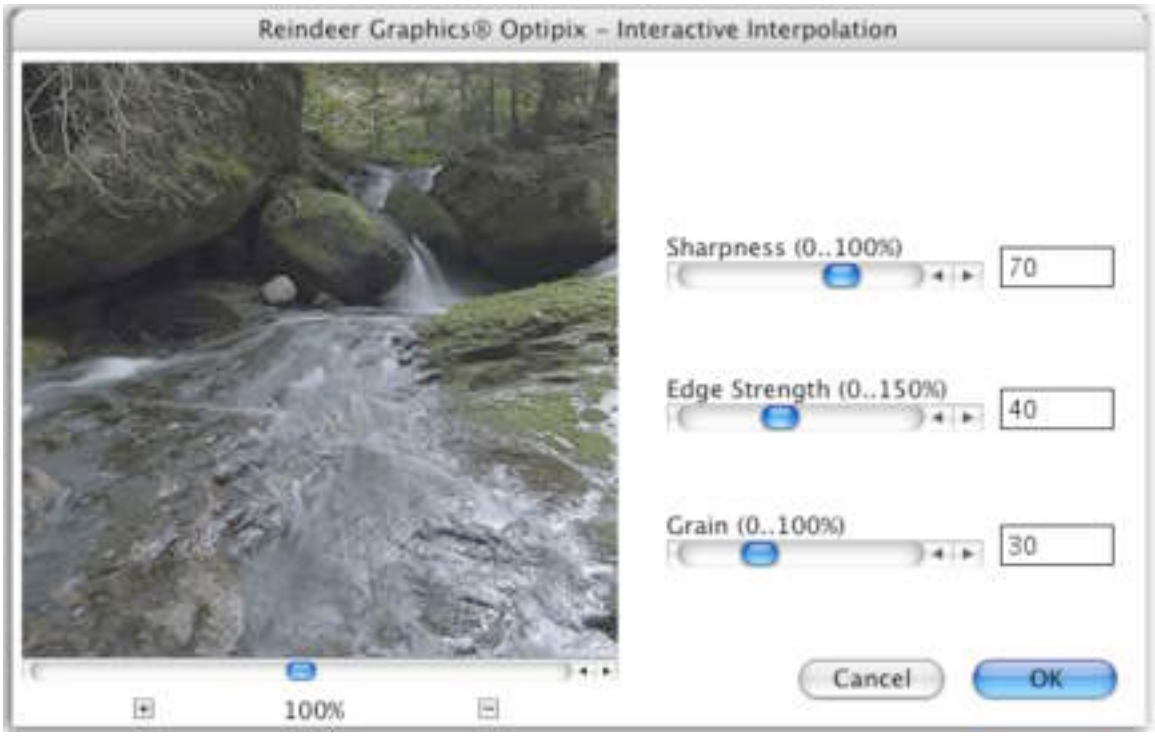
You don’t have to do it this way. If you really wanted to emphasize the dark detail, you could do (((A&B)&C)&D)&E)&F which would blend in the F (our dark image) last.

After the blend is complete, you will probably want to use Auto Contrast, levels, or curves. Because of the resulting image quality, however, you should use a really small tail clip, say 0.001% to minimize the amount of highlight and shadow detail that will be removed.

When blending images in such a fashion, it is critical to make sure the images are in 16 bit mode, even if the images themselves originated as 8 bit. This will provide plenty of “head-room” in which to place the extra dynamic range you’re creating. At this point, you’ll have a High Dynamic Range (HDR) image, and you’ll want to treat it as such. The Reduce Dynamic Range action is on the CD (in the Optipix 3 Actions.atn file) so you can print it or reduce it to 8 bits for a webpage.

Interactive Interpolation...

Interactive Interpolation is a better means to add resolution to your images for the purposes of enlargement. The bicubic method used by Photoshop when you select *Image > Image Size* and adjust the resolution of your image often leaves artefacts that are visually undesirable in the final print and can soften the image to unacceptable levels. Interactive Interpolation allows you to adjust the final output of the image in a preview before interpolating the whole image.



The Interactive Interpolation dialog is shown above. The sharpness slider allows you to determine for your individual image the level of crispness you want. The edge strength slider allows you to preferentially enhance the edges within the image. Edge fuzziness is a common defect that interpolation can cause, and this slider will allow you to add back some edge strength in order to correct it. The last slider lets you add edge grain. This is a technique that adds a bit of noise to the edges in order to break up any blockiness from the interpolation and to help make the regions on each side of the boundary visually distinct.

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To use Interactive Interpolation on an image, you must first select *Filter > OPTIPIX > Setup 2nd Image* to place the image you want to enlarge (or reduce) in the 2nd Image buffer. Then, you can resize the image using *Image > Image Size* to whatever dimensions you desire or you can create a new image with the appropriate dimensions. Interactive Interpolation will expand or reduce the image in the 2nd Image buffer to match the window that is active when you run the plug-in. This makes it easy to both enlarge to a specific resolution, dimension, or by a known percentage using Photoshop's built in tools to select the image size. It is usually a good idea to make sure the window that will receive the interpolated image is in 16 bit mode, even if your original is not.

Warning: Interpolating JPEG compressed images will often enhance the blocky JPEG artefacts, yielding an inferior result.

It is always best, when trying to shoot a picture that will be enlarged, to shoot RAW or lossless TIFF. If you must interpolate a JPEG, try using JPEG Cleaner before interpolating.

Once you have the destination window at the desired size, select *Filter > OPTIPIX > Interactive Interpolation...* and adjust the sliders until you are pleased with the result. Click OK to apply your interpolation parameters to the whole image.

Note that if you have a selection present in an image, the interpolation uses the dimensions of the selection rather than those of the image. If the selection is not rectangular, the interpolation uses the dimensions of the bounding box around the selection, but only writes the new values into the selected pixels, even though the preview shows the interpolation for the full rectangular area.

Layer Modes…

This plug-in attempts to address both the image alignment problem (a big deal for Blend Exposures, and most other blending modes in Photoshop), and also provides sub-pixel alignment between two images in both 8 and 16 bit per channel modes, which is lacking in Photoshop.

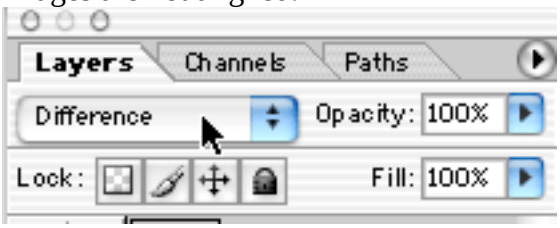
Image Alignment

In order to perform image blending and image averaging, it is important that the two (or more) images are aligned. There is a simple method for aligning 8 bit images using layers. Optipix 2 has a new method for aligning 16 bit images. We will walk through both methods here.

Aligning 8 bit images

The traditional method:

1- *Paste* the second image on top of the first image as a layer
2- *Change the display blending mode* to "Difference" *and slide the layer around* until everything looks right. You will see "ghosting" artifacts when the two images are not aligned.



The Layers Palette

3- Change the *display blending mode back to "Normal*."
4- *Crop the window* to keep only the overlapping part of both images.

This method works just great, but suffers from two problems: 1) you cannot do it in 16 bits-per-channel mode in Photoshop 7 or earlier, and 2) there is no way to get sub pixel alignment.

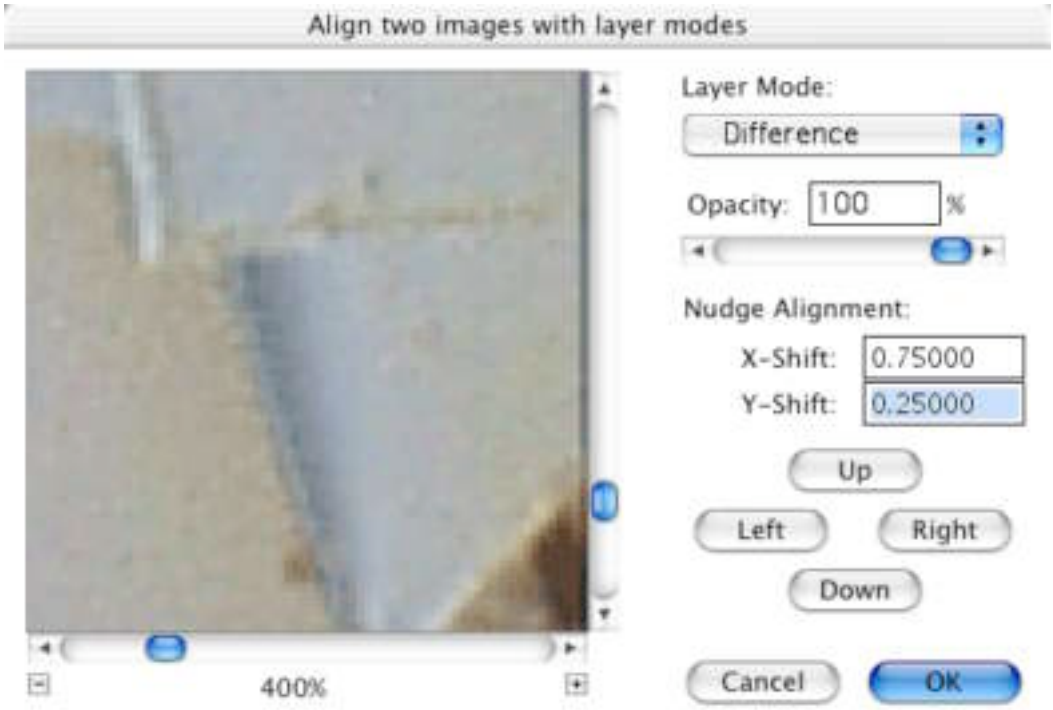
Layer Modes provides a solution for both of those.

Aligning 16 bit images, sub pixel alignment

One of the frustrating things about early versions of Photoshop (as well as other image programs) are their inability to handle layer compositing effects for 16 bit images. Reducing the image to 8 bits per channel allows you to work more easily with these images, at the cost of most of your image's dynamic range. This is extremely frustrating for people who need layers for aligning two images, or for simple processing, as opposed to graphics designers, who use layers to hold individual elements of a composition.

Optipix solves this problem by providing Layer Modes, a plug-in that works around this issue by providing all of Photoshop's layer compositing modes (as well as some new ones of our own) using our 2nd Image Buffer.

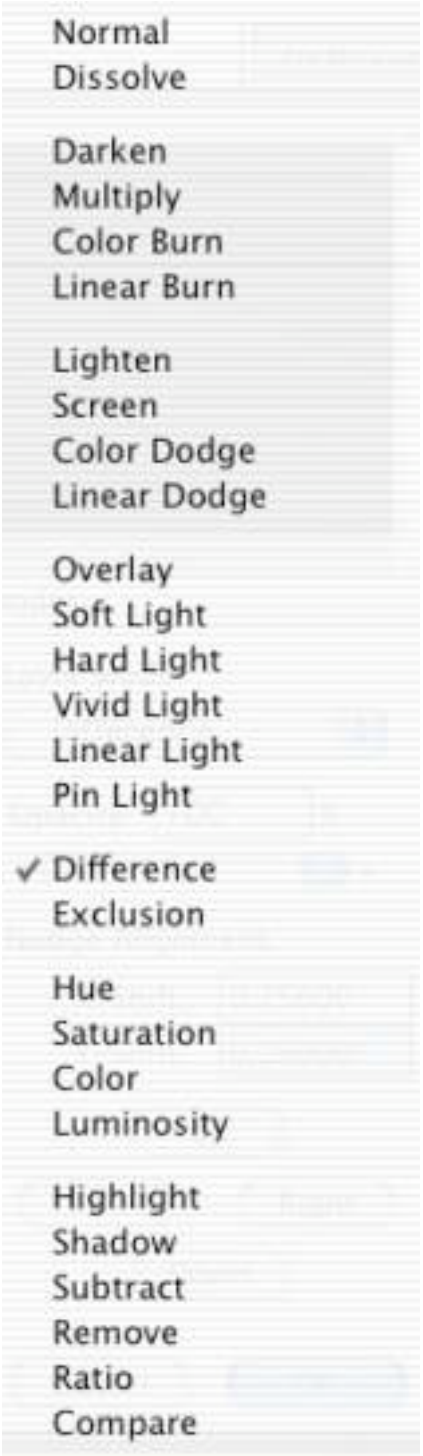
Using it is quite straightforward. *Select* the image you wish to be the "underlying" or "bottom" image, and use *Filter > OPTIPIX > Setup 2nd Image* to store it in the image buffer. Then *select* the image to be applied and choose *Filter > OPTIPIX > Layer Modes* to begin the work. A common use for this plug-in would be to align two 16 bit images, so let's look at how we'd do that.



Notice that the pop-up menu in the upper right shows that the plug-in is currently in Difference mode. At this point, you can use the arrow keys to nudge the image around, use the buttons in the lower right to nudge the image, or enter an offset in the boxes above the nudge buttons. In Difference mode, once the image is aligned, the result image shown in the proxy will be all black, or as close to black as possible.

The proxy has a zoom control underneath it. This zoom control, in addition to allowing you to close in on a particular portion of the image, changes the step size of the nudge. If you wish to move the image by fractional pixels, zoom in closer. At 200%, the nudge controls will move the image around by a half pixel. At 400%, it will shift the image by a quarter pixel. This allows you to zoom in and make fine corrections to the alignment of the two images.

Once you've aligned the images, you'll want to switch to one of the other modes, either Normal or whatever final mode you find useful. The menu shown to the right lists the available modes.



One of the uses of this plug-in is to align two images for using the Blend Exposures plug-in. In this case, once you have the images aligned, use Normal mode with 100% opacity to save the changes, then immediately choose *Filter > OPTIPIX > Blend Exposures*. Since the image buffer already contains the image you want to blend with the current image, the plug-in will give you the blended result without the artifacts that appear due to misalignment.

*Note to Macintosh users: The arrow keys will also work in this dialog for nudging the top image. This functionality does **not** work on the PC at this time.*

New Blending Modes

In addition to the usual blending modes from Photoshop, we've added a few more:

1- **Highlight**: This keeps the brighter of the pixels between the two images. It is useful for removing shadows from a pair of exposures where the light source moved – Take two pictures with the lights in different locations leaving the camera position the same, then use this to remove the dark areas that are not common to both images. This also has the effect of superimposing the highlighted regions of the two images.

2- **Shadow**: This keeps the darker of the pixels between the two images. It is excellent for removing highlights on an object if the light is moved between the two shots.

3- **Subtract**: This is the mathematical difference between two images instead of the absolute difference. It is easy to do embossing by aligning an image with itself and nudging the top image.

4- **Remove**: This subtracts the luminance of the bottom image from the top image, leaving color alone. Theoretically you could use this to take a picture of a blank sheet of paper to correct brightness differences across an area. – Take a picture of an object. Leaving the lighting unchanged, take a picture of a blank sheet of paper in the place of the object. This "background" or blank can then be removed from the first image solving problems with dark corners, etc.

5- **Ratio**: This is the ratio of the two images. It works better than subtract for cameras with gamma correction.

6- **Compare**: This is similar to remove, but uses a ratio of the luminance instead of just subtracting the luminance and should work better for gamma adjusted cameras. (This is a more perceptually uniform mode.)

It's easy enough for us to add more modes if reasonable uses can be established for them. Let us know what you think. <optipix@reindeergraphics.com>

Retrieve 2nd Image

As its name suggests, this will retrieve the contents of the 2nd Image Buffer and bring them back into the current image. This is included in Optipix for two uses:

1- Complex actions can temporarily store an image here and retrieve it later during the course of processing. By judicious use of this and the clipboard, it is possible to retain the previous image during batch operations. Some of these tricks are especially useful with Blend Exposure and a bracketed series of images.

2- Any selection that is stored in the 2nd Image Buffer can be retrieved, edited, replaced, and/or stored.

Add to Buffer

This will add the current selection (or if there is no selection, the current image) to the averaging buffer. It is possible to add a mixture of 8-bit and 16-bit images (color as well as grayscale) into the buffer.

It is also possible to add different parts of different images together to eliminate transients. If a person were walking through your shot, you could take multiple pictures and just add to the buffer the portions in which that person was not present.

Then, by taking the average, below, you could isolate the person by using the difference of the "background" image and one that has the person present.

Clear Buffer

This will clear out the averaging buffer so you can start over. If you are writing an action, it is important to use the Clear Buffer plug-in before starting to use Add to Buffer, in order to ensure that there is no stale data.

Show Average

This will show the current average (which can consist of up to 32767 images or selections of images). That average will be rendered to fit in the current window. You will get best results if that window is the same size as the source images and if that window is 16-bits per channel.

You can invoke Show Average as many times as you want without affecting the buffer. Further, the buffer contents are stored on disk, and will persist after Photoshop has quit.

Averaging multiple images to reduce noise in your images

Sometimes, two images are not enough to get the range of contrast you'd like to see. You might, for example, have an exposure bracket sequence and want to see the average of the entire sequence. You could also have two or more digital camera images taken with the same exposure, but have camera noise in them.

In any such cases, the procedure for averaging the images is as follows:

1- *Open* all the images you want to average
2- *Filter > OPTIPIX > Clear Buffer*
3- For each image:
    - *Filter > OPTIPIX > Add to Buffer*
4- *Image > Duplicate*
5- *Filter > OPTIPIX > Show Average*
6- *Rename* and *save* the new image

This works by creating an empty buffer and adding each image into the buffer. When you finally select "Show Average," a high quality image is generated in the current window. If you had decided to change the images to 16 bits per channel, the result would also be 16 bits per channel. This lets you create a high quality digital image from a series of lower quality images.

This series of three images shows the same scene at varying levels of exposure. We can add these to the buffer as described above and average them, yielding the following image

This process works with up to 32767 images and both 8 and 16 bits per channel, including a mixture of both. It can even be used to "average" a series of video frames using Adobe Premiere.

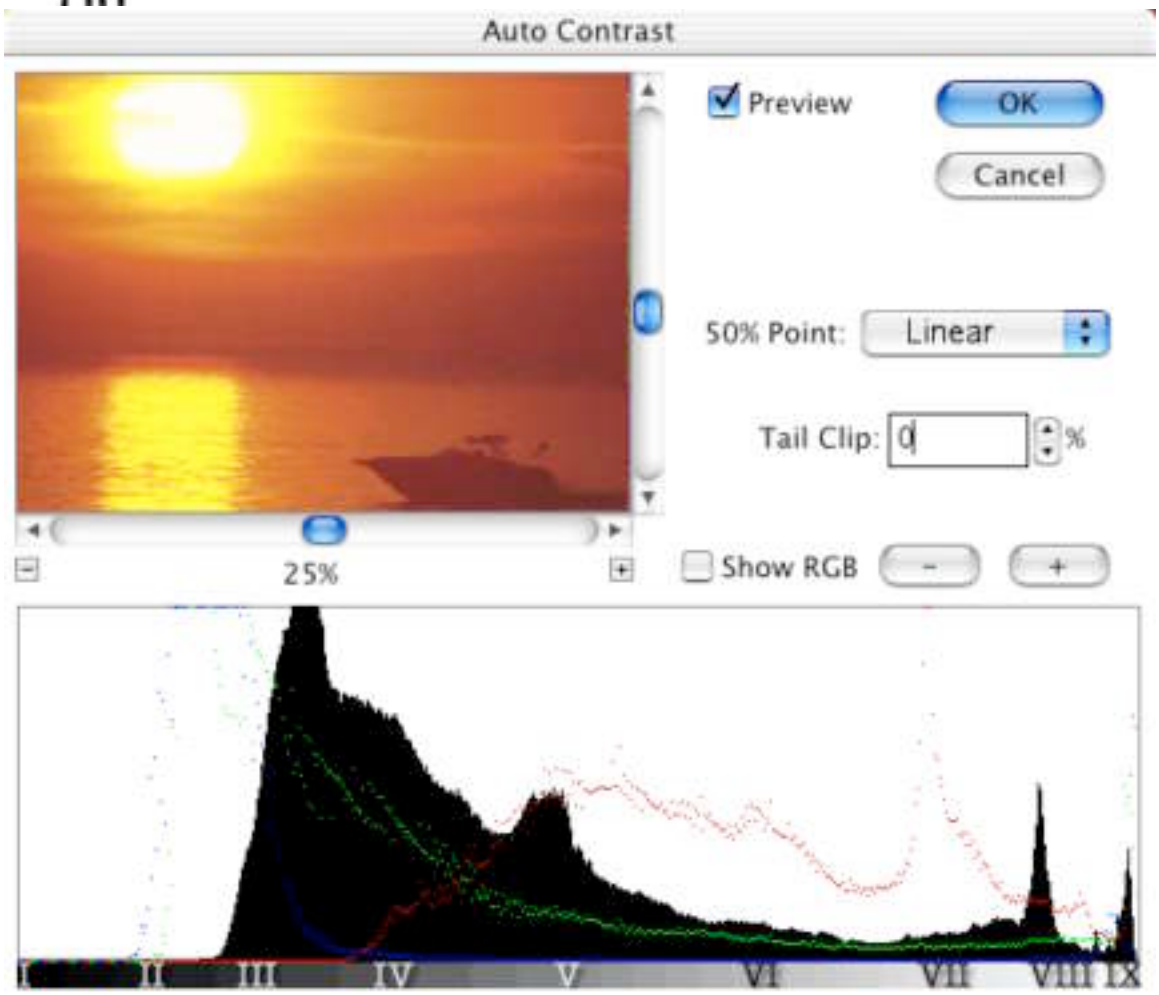
You can also use this technique to increase the effective bit depth of the image. Averaging multiple frames has the effect of reducing the noise in the image. For digital cameras, where the blue channel of an image is especially noisy due to the type of sensors that are used, this often yields dramatic improvements in image quality for any images that must undergo a great deal of post-processing.

Note: Averaging is NOT the same as Blend Exposures. It performs a simple numerical average of the images or fragments that were added to the buffer. Blend Exposures is much more concerned with the reliability of the colors in the highlights and shadows and is often a better choice for bracketing, unless you have a lot of exposures.

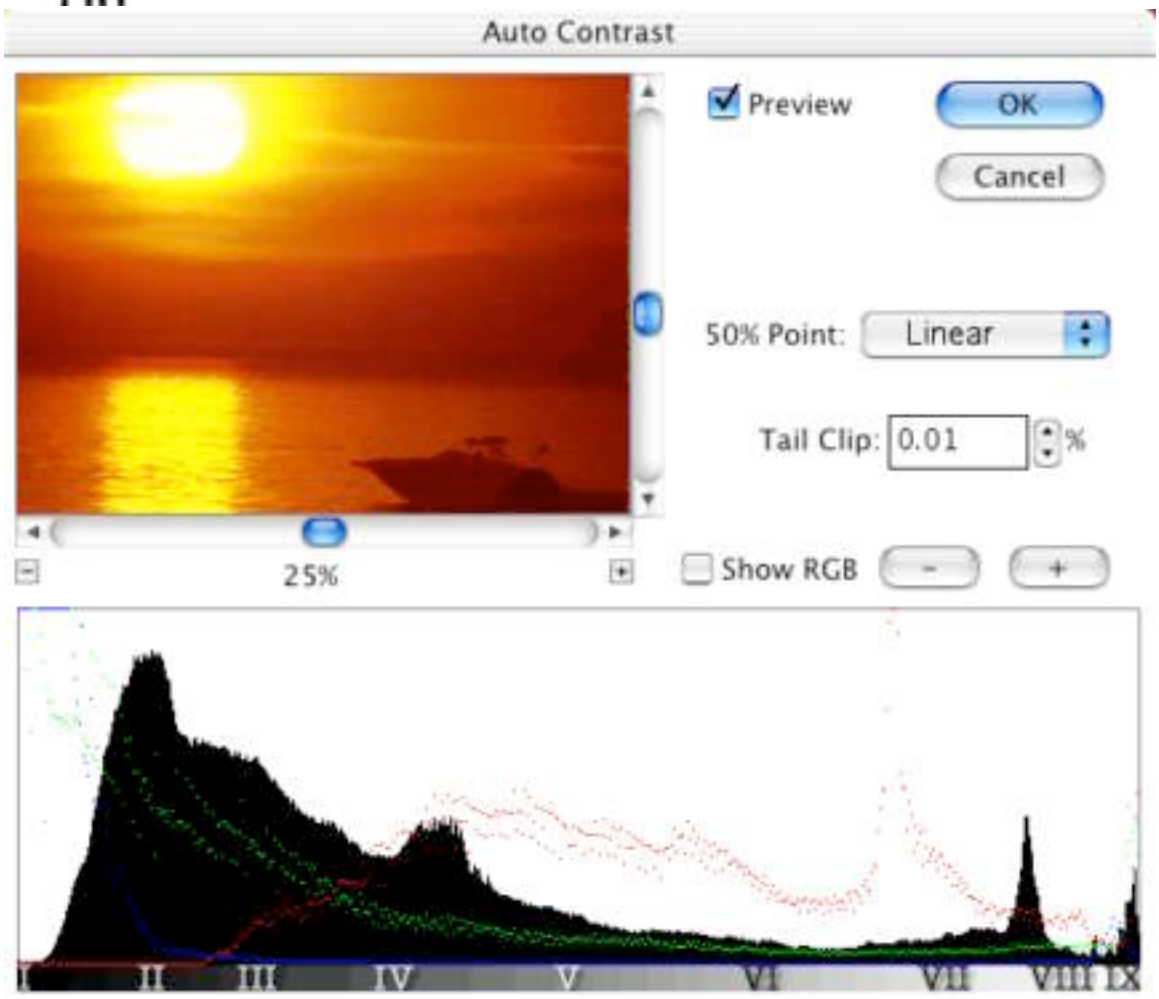
Auto Contrast…

Auto Contrast is a "mini-enhancer" that works in both 8 bit and 16 bit modes. Auto Contrast enhances underexposed or overexposed images optimally without affecting image color. Auto Contrast is also good for the final contrast tweak for a well-corrected and adjusted image that has a full tonal scale.

Optipix 2 has added some exciting new features to the Auto Contrast tool. First, there is a new double wide histogram. This gives you more detail when you examine the histograms of 16-bit images. In the standard Photoshop 8-bit histogram, this detail is lost. We've also added tools that are excellent for working with high dynamic range images, such as what you would get from a camera raw output, or a result from our Blend Exposures plug-in.

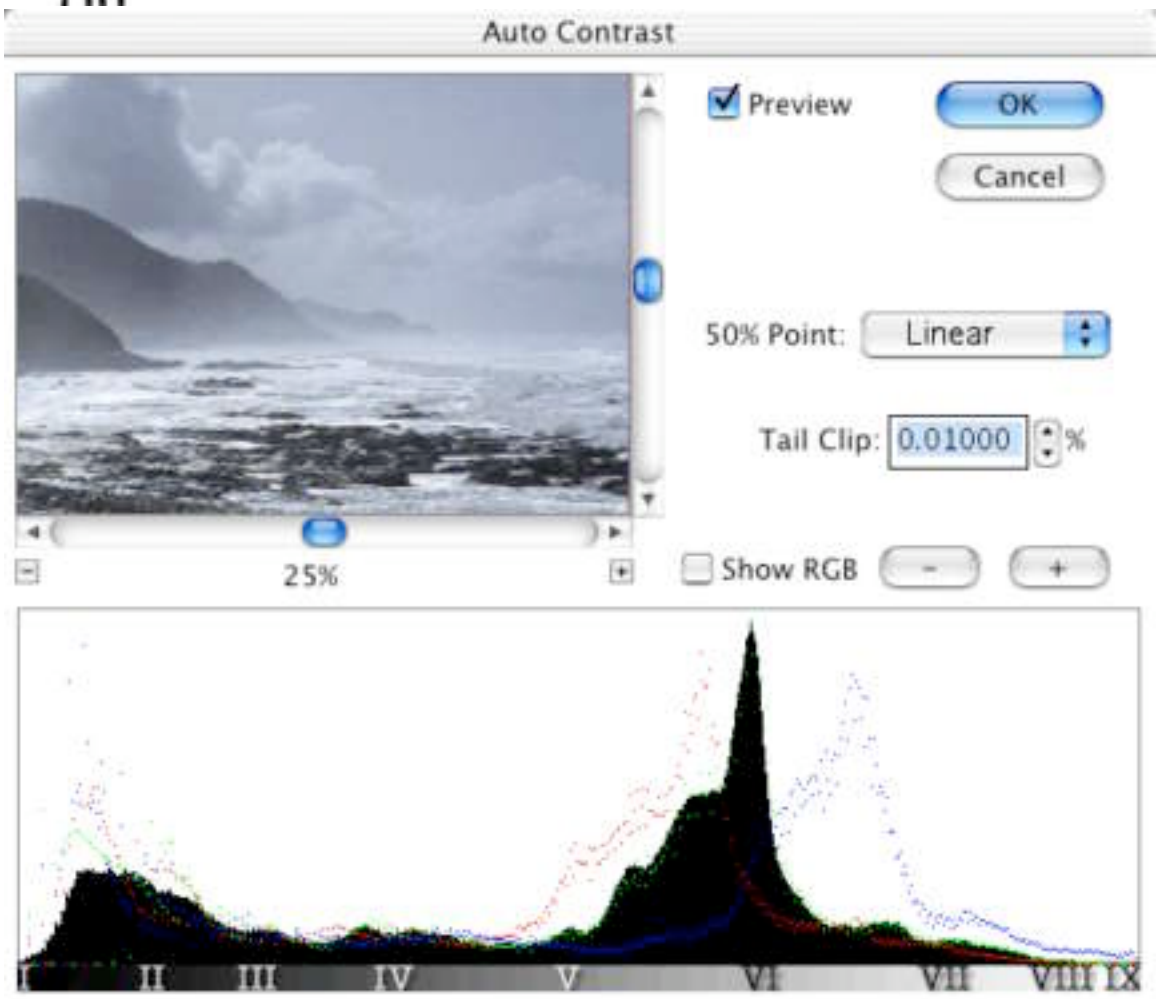


In the above screenshot, you see that tail clipping is off, and the contrast mode set to Linear so that you can see the entire histogram without modification. The Preview window contains the original image and has zoom controls to allow you to put a region of interest in the viewer, or to back out and see the whole image. Currently, the image is displaying at 25%.



We've set the tail clipping to 0.01% in this image. The histogram now stretches to the full output range. The white point and black point have moved in just a little bit. This has made the colors in this image a bit darker and richer.

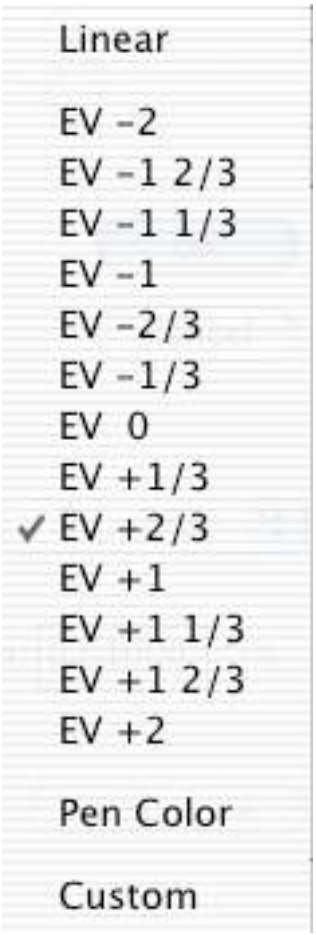
We'll move on to another image now to show you the other features that have been built into the new Optipix Auto Contrast.



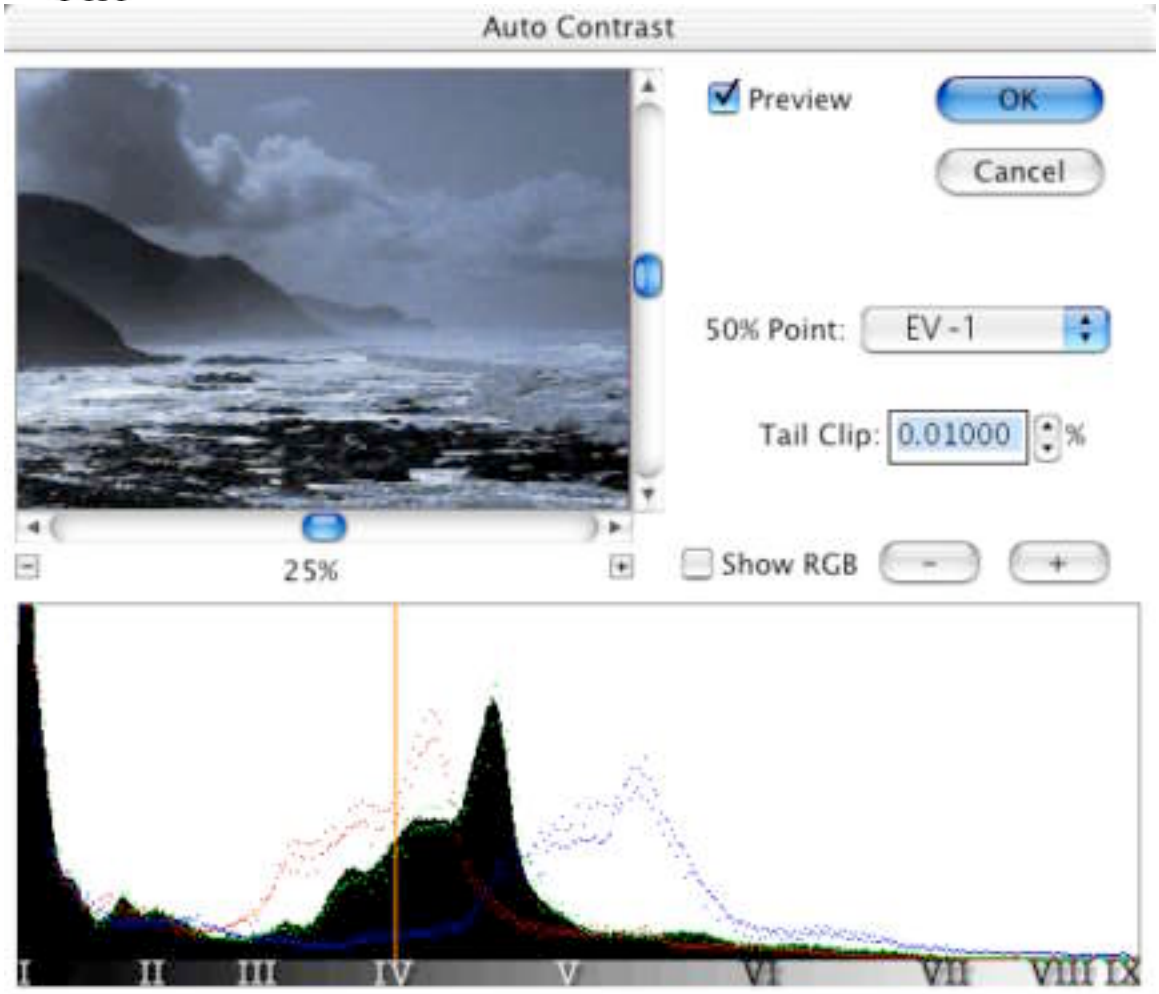
Another image showing the Linear mode and a 0.01% tail clip.

The pop-up menu in the upper right of the dialog, and the line of Roman numerals along the bottom represent a powerful feature of Optipix. Photographers know and use the Zone System, which was largely developed by Ansel Adams. The Zone System is taught in most professional photography schools, yet is sadly ignored by most digital photography tools.

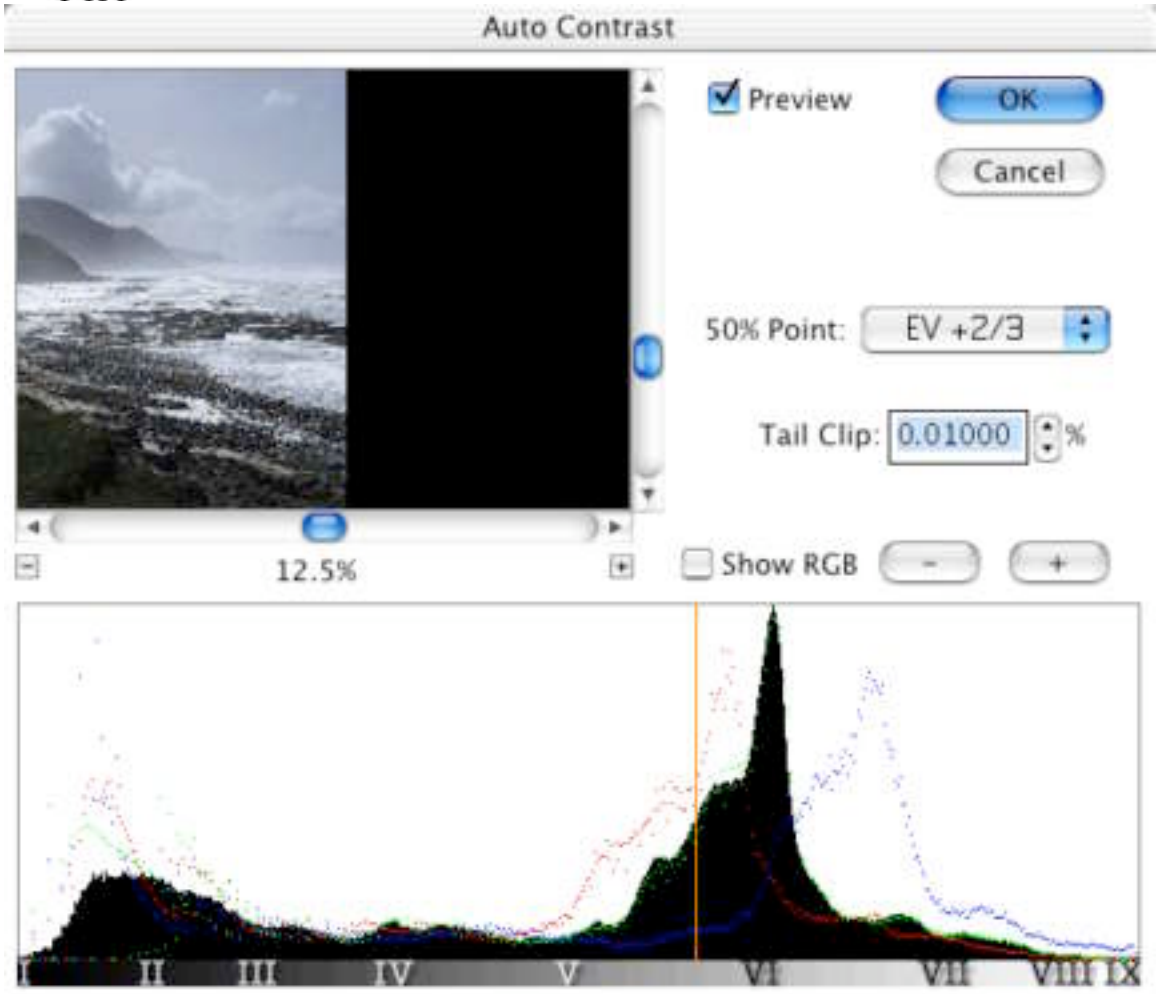
With this new Auto Contrast plug-in, you can use the Zone System as a guide for adjusting the gamma of your image. Clicking one of the nine Zone symbols along the histogram will place the 50% point of the image in that Zone. (The 50% point is where half the pixels are lighter and half are darker than that brightness.) The pop-up menu, shown to the right, provides the same functionality in terms of an Exposure Value (EV) adjustment.



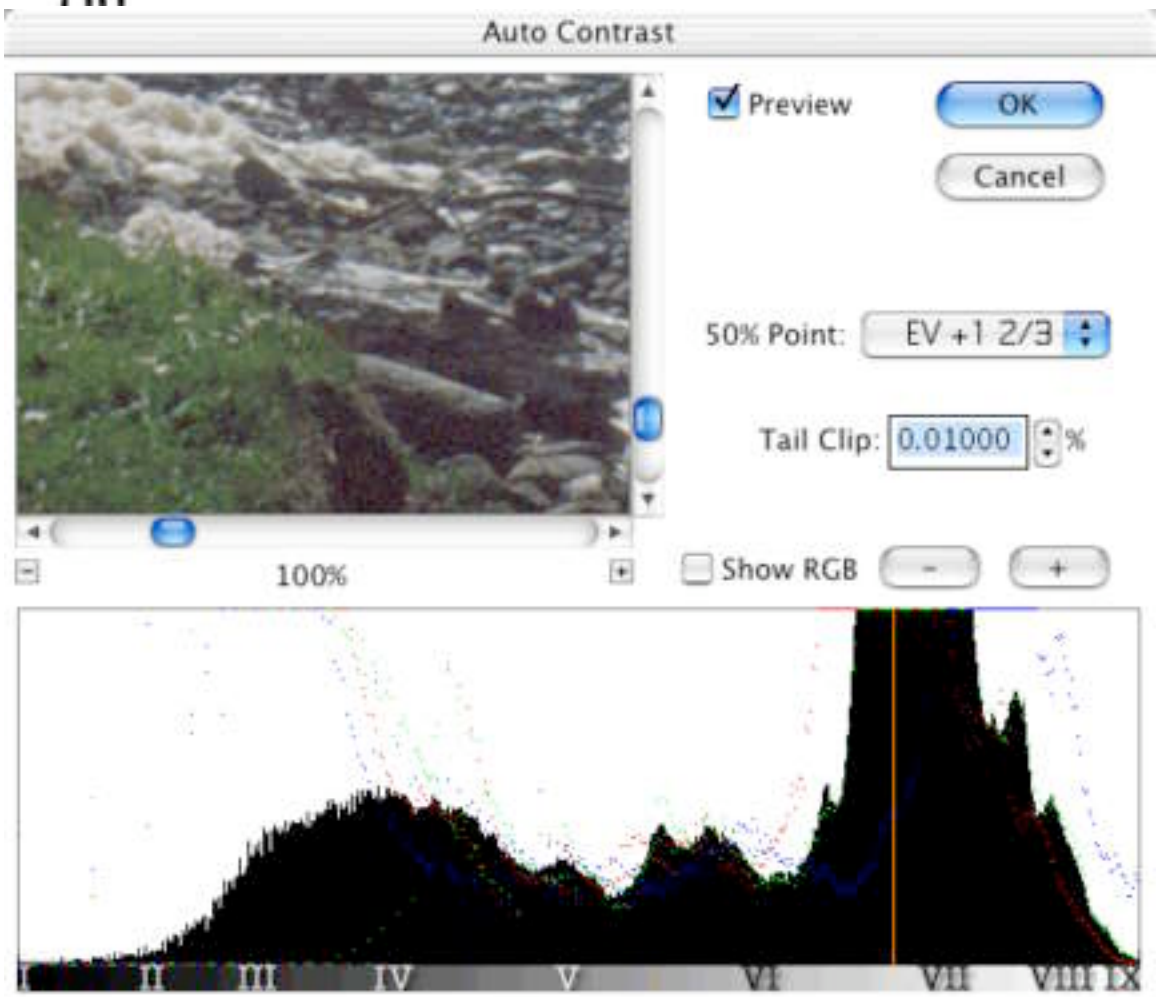
As you can see, there are several EV modes, including a Pen Color mode, which sets the 50% point to be at the brightness of the foreground color. This is useful for when you've chosen a particular color with Photoshop's eyedropper tool. There is also a Custom mode, that allows you to set the 50% point to any arbitrary histogram value. Click anywhere in the histogram and the 50% point will jump to that position.



Here, we've selected **EV -1** from the pop-up menu. The 50% point has been placed in *Zone IV*, which corresponds to the EV setting. The histogram has shifted to the left, compressing the dynamic range in the shadows and expanding the highlights.



In this screenshot, we've zoomed out to show the full image, which sits left most in the preview. We've also selected **EV +2/3** from the pop-up menu. This has pushed the pixels a little to the bright side, giving a slightly lighter image.



And now, we've zoomed in on the grass at the base of the cliff, and pushed the EV compensation up a little more. Note that both the grass and the rocks have plenty of detail even at this level of adjustment. The histogram shows that even with this much compensation, there is still useful detail in the dark end of the histogram. We've been able to take a better look at the histogram by zooming in on the histogram values, which is what the plus and minus buttons in the center right of the dialog control.

These tools allow you to effectively adjust contrast in the high dynamic range images that are increasingly becoming part of the modern digital photography workflow. Optipix 2 Auto Contrast allows you to easily use the Zone System to guide your adjustment, and like all Optipix plug-ins, it is completely scriptable using Photoshop's Actions engine.

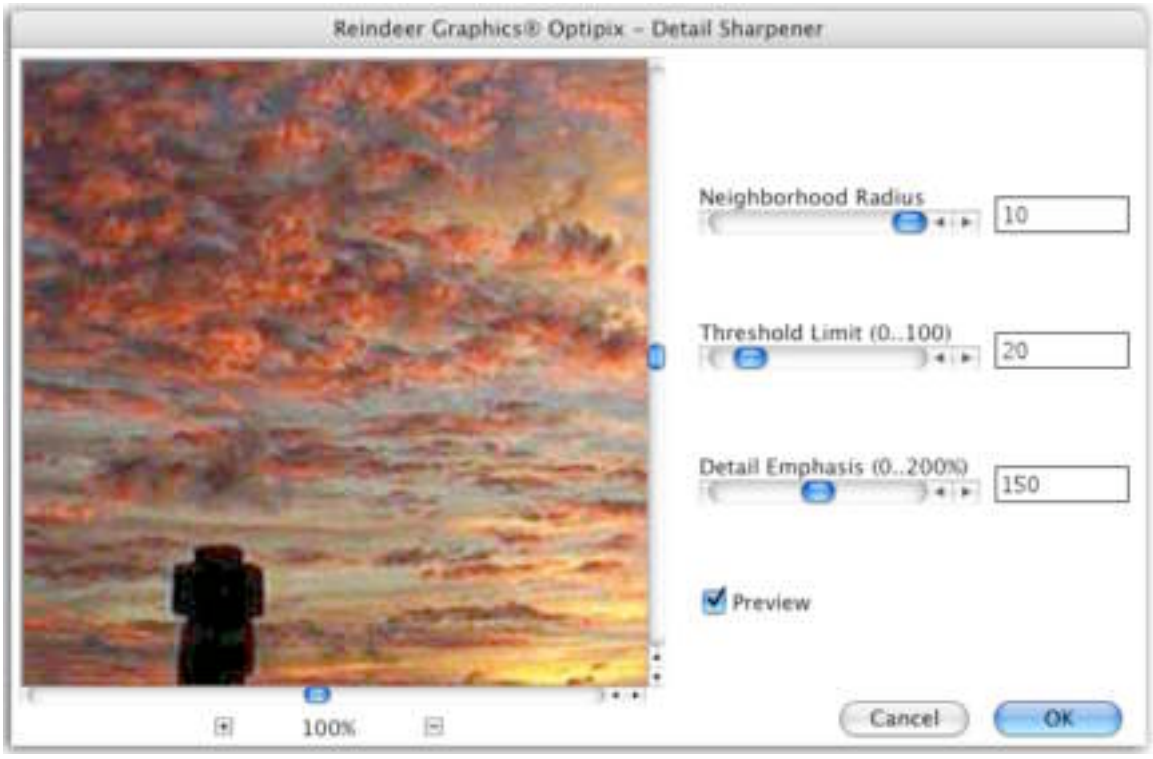
Detail Sharpener…

Most sharpening filters enhance any "detail" that exists in the image. Unfortunately for people who are interested in just textures and correcting slight blurring, this also includes edges and noise. Once noise is eliminated, many people turn to filters like Unsharp Mask to sharpen their pictures (or the Optipix Edge Enhancer, which sharpens edges without enhancing noise). Unfortunately, if edges aren't what you're interested in, then Unsharp Mask is not terribly effective. It is also quite common to see "over sharpening" of the edges while trying to enhance fine detail. This is typically seen as a halo around the edges.

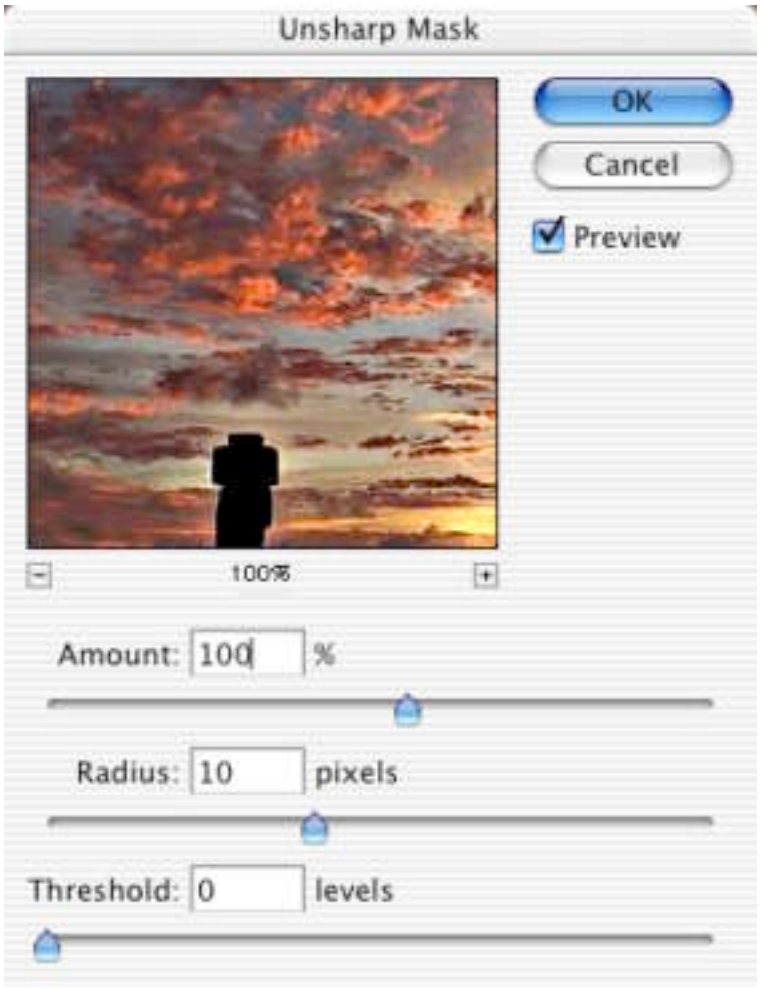
Optipix 3 provides Detail Sharpener to address these needs. Detail Sharpener brings out these fine details, without over sharpening edges.

The Detail Sharpener dialog, shown below, has three controls: the neighborhood radius slider, which controls the maximum size of the detail you wish to enhance, the color tolerance slider, which controls how much color shift is permitted for it to still be considered "detail", and the detail emphasis slider, which controls the strength of the sharpening. The dialog above has some good initial value to work with: 10, 20, 100%. When applied, the results look like this:

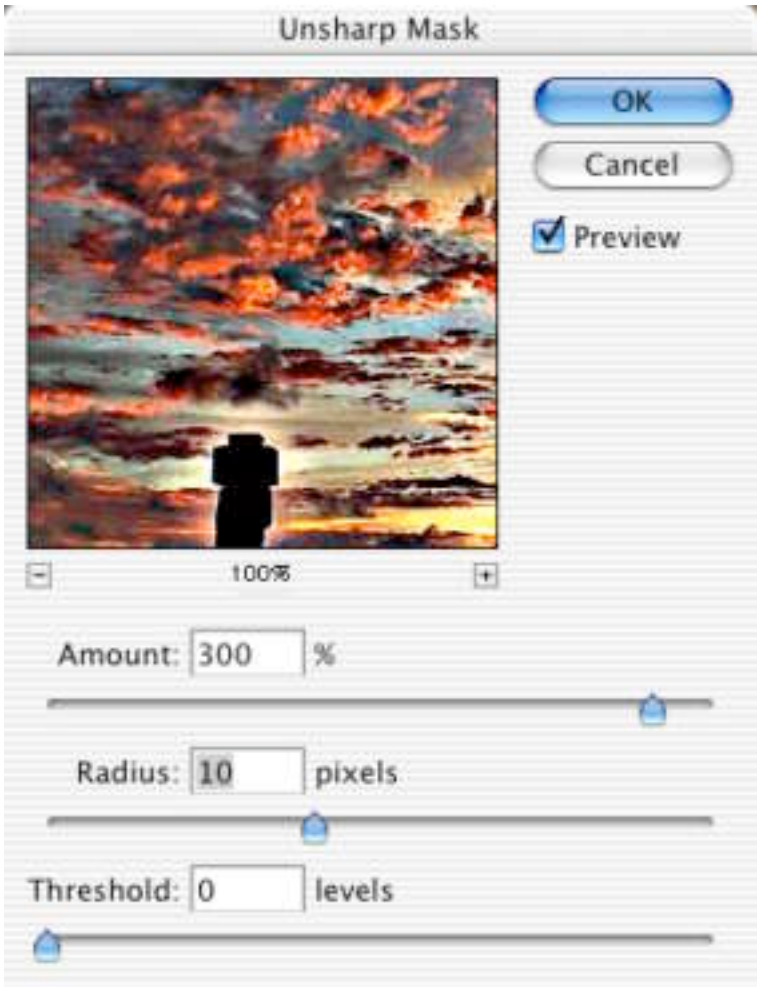
Note that the detail in the clouds has been brought out, adding depth to the image, especially in the brighter areas, and the shadow detail in the stone have also been enhanced. The differences are fairly subtle here, and depending on the quality of your display, may not be visible. We can bump the detail emphasis up a little bit to give a sharper image that will demonstrate not only the type of detail that is enhanced, but also to show how well the plug-in behaves at extreme settings.



Now, the detail has become almost *too* sharp, and the enhancer has found the JPEG artifacts and enhanced them slightly as well, but sharp edges still have not acquired any haloing. Let's compare this to Photoshop's built-in Unsharp Mask with similar settings (100%, radius 10, threshold 0).



Notice that while the Unsharp has sharpened the detail, it has also brightened the reds and darkened the blues, in addition to adding the whitish halo around the stone in the lower left. This effect becomes greatly pronounced when you use settings as extreme as we used on the Detail Sharpener above.



Now the halo around the stone post is quite prominent, and you can see the haloing around the edges of the clouds now as well. A fade will reduce these halos, but not remove them, at the cost of losing some of the sharpness that was added. We have found that over sharpening with Detail Sharpener and then fading produces good results.

Using Detail Sharpener to compress dynamic range

The problem with blending multiple images to create High Dynamic Range (HDR) images is that printers, even high-quality photographic printers, cannot represent very much dynamic range. Naïvely throwing away that depth, such as by converting from 16 to 8 bits in the Photoshop *Image > Mode* menu, will usually give very poor results. We want to reduce the tonal range while preserving the important details. Detail Enhancer will allow you to do just that.

Included on the Optipix CD is an action called "Reduce Dynamic Range." This action uses the Detail Sharpener tool to enhance shadow and highlight detail, but at the same time reduce the overall tonal range. In the images below, the dark portion of the river and the shaded areas on the far side of the canyon lack detail before the Reduce Dynamic Range action is used.

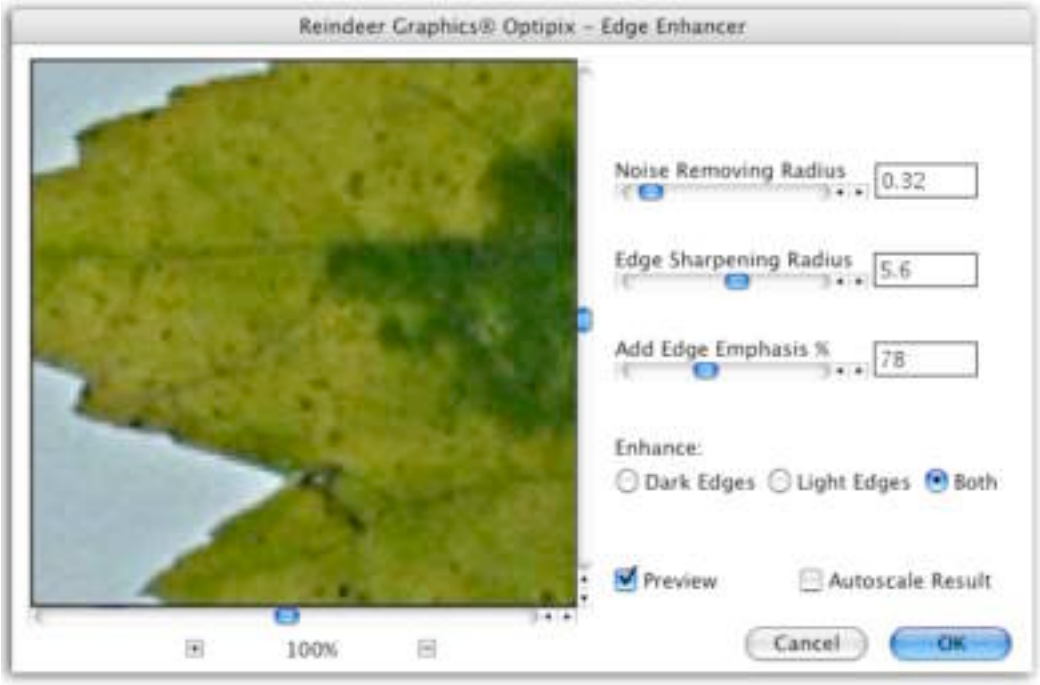
Once the action is run on the image, you see that the detail in these shadowed areas in enhanced. The overall dynamic range of the image has been reduced, however, and this picture can be run through a high-quality printer without significant loss of detail. Feel free to try out and modify the settings of the action on the CD, and use it in your own workflow.

Before dynamic range reduction (left) and after reduction (right).

Edge Enhancer…

Edge Enhancer is a powerful plug-in that is used to both reduce noise and enhance edges. If you don't try to reduce the noise first, it will get enhanced along with the edges!

The dialog for the plug-in looks like this:



We'll use the sliders one at a time, starting with "Noise Removing Radius"

1- With "Noise Removing Radius," start it out at 0.00 and slowly slide it toward the right. As the values start to increase, the grain in the image will start to disappear. The point at which the noise is essentially gone, but the edges are still there is a good place to leave it. With a digital camera, this point is somewhere around 0.2 – 0.4, but with a film scanner at 2700 dpi, it is somewhere around 1.0 – 1.4.

2- With "Edge Sharpening Radius," pick a value that is bigger than the width in pixels of the edges that you care about. Typically, 2.5 – 7.5 is a good range.

3- Now, we decide how much of the resulting image will be edges and how much will be the tonal value that we like. Values for "Add Edge Emphasis %" indicate how much of the edge is added back to the tonal values of the image. Good numbers for this range from 70% to 120%.

4- The radio buttons at the bottom of the dialog indicate which type of edges you want to enhance: bright, dark, or both. You can try different selections to determine which gives you a better resulting image.

After the Edge Enhancer runs, it performs a linear Auto Contrast step if the Autoscale checkbox is selected.

Before edge enhancement

After edge enhancement

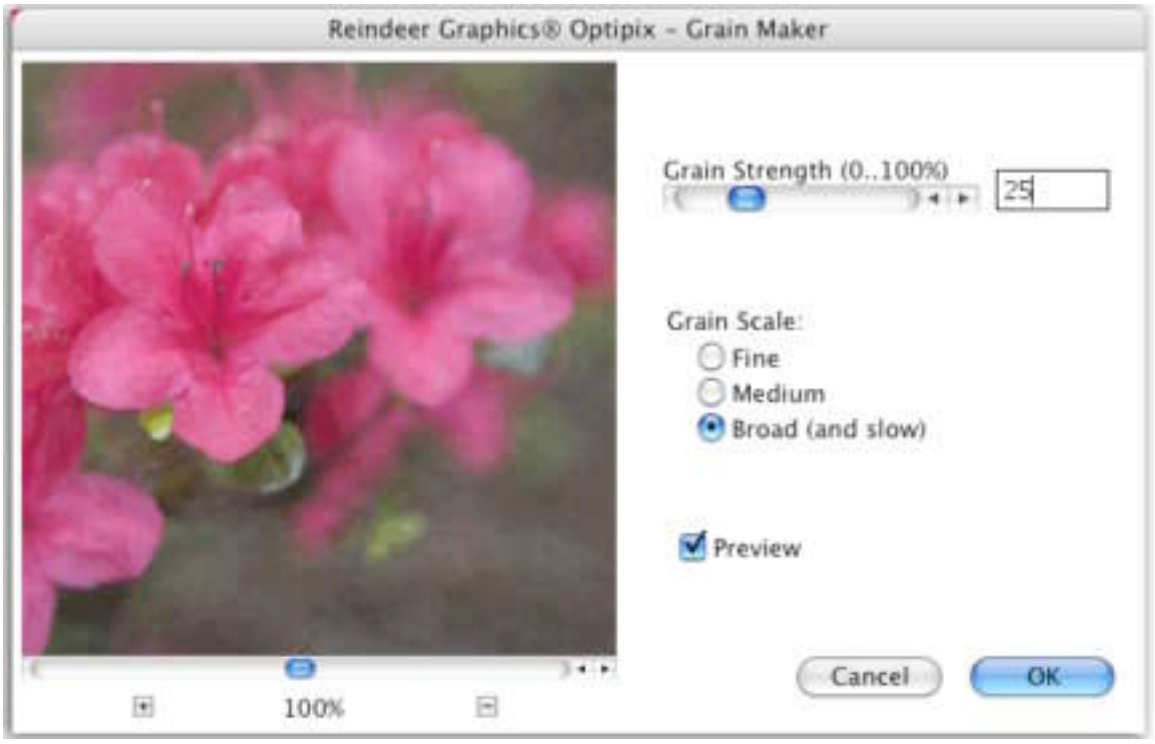
The leaf image above was processed with Edge Enhancer sliders set to noise removal 0.48, sharpen 8.6, edge emphasis 85%. Much more of the detail in the image is now visible, but the noise from the original image has not been amplified.

How does Edge Enhancer work?

The Edge Enhancer uses a technique called Difference of Gaussians. This technique is quite similar to the common darkroom technique of unsharp masking. This is where a slightly out-of-focus negative can be used to create a mask that smoothes out variations in brightness in the final print except where edges were present. If you set the Smoothing Sigma slider to 0, so that noise in the original image isn't smoothed out, and edge control to “Both Edges,” the action of the Edge Enhancer plug-in is virtually identical to an unsharp masking procedure in the darkroom.

Grain Maker...

Grain Maker is a simple tool that creates texture in your image. Just running it on a picture you have taken, however, is probably not what you want to do. Rather, Grain Maker works best applied using a selection or mask. Many times, you want to use a little bit of noise to make a large, flat feature interesting. Grain Maker's output is designed to look much like film grain and thus gives texture to those flat regions without jarring the eye. Another use of Grain Maker is to apply texture to edges, in order to make them stand out. A small amount of noise along the edge can often make the different regions appear more visually distinct.



To apply the grain only to a certain edge, use the selection tools in Photoshop and Optipix to select the edges you want. You may want to use the texture from Grain Maker to help hide a seam from stitching or compositing two images. You may also want to select a boundary between two bright colors in order to enhance it. After you have the selection you want, run the Grain Maker tool (*Filter* > *OPTIPIX* > *Grain Maker*). Adjust the Grain Strength until you are happy with the amount of noise that's been added. The

Grain Scale tool lets you pick the scale of the texture; how broad the patterns are. If you are applying texture to a large area, you will probably want to use the “Broad” setting. If you are only applying it to very small areas around edges, “Fine” or “Medium” should be sufficient. Be aware that selecting “Broad” grain requires a great deal of processor speed in order to maintain satisfactory performance. If you machine is lower end, the dialog may lag. In that case, turn off the Preview checkbox until you are happy with the region framed in the preview proxy, then turn the Preview checkbox back on.

JPEG Cleaner...

JPEG Cleaner is simple, effective method for reducing the characteristic ‘block’ artefacts that the JPEG compression process leaves in your images. Many ‘point-and-shoot’ cameras do not have a RAW or TIFF output setting, but any intensive processing of these images, such as the Optipix Refocus or Interactive Interpolation tools, can exacerbate the JPEG effect to the point of visual undesirability.

Running JPEG Cleaner as a first step before processing will usually reduce these artefacts to the point where further processing is possible. If the JPEG quality is low, then it may be necessary to run JPEG Cleaner twice to adequately remove the artefacts.

If the image does not contain significant block artefacts from JPEG compression, the plug-in will not modify it and will report this fact.

The plug-in works by automatically locating the 8x8 pixel block boundaries in the image, and then processing the pixel values adjacent to those boundaries to make the abrupt steps less visible. For users who wish to use their own processing routines on those edges, the “Select JPEG Tile Boundaries” plug-in under the selection menu can be used to locate the edges, and place a selection around them that can be used to limit the application of whatever algorithm is then employed.

This portion of an image shows the characteristic 8 x 8 tiles that the JPEG compression algorithm introduces. This image was compressed using the “Low” quality setting in Photoshop. After running JPEG Cleaner twice, the same portion of the image looks like this.

Nudge…

Nudge allows you to move your 8 and 16 bit images in sub-pixel increments in order to perfectly align two exposures of the same scene. In comparison, the built-in Photoshop function only works in whole pixel increments.

Nudge can be used on the entire image, a layer, or a selection. The Nudge dialog will ask you for positive or negative values to shift the image in the X and Y directions. A positive value in the X direction will cause a move to the right, while a negative value will cause a move to the left. A positive value in the Y direction will cause a move downwards, while a negative value will cause a move upwards.

It is best to move the image in multiples of 1/3 (0.333) pixels. Each successive nudge will blur the image slightly.

You may find it convenient to create four Photoshop actions that move the image 1/3 of a pixel in each of the four directions. You can the assign function keys to these actions giving you the ability to perform Nudge easily from the keyboard.

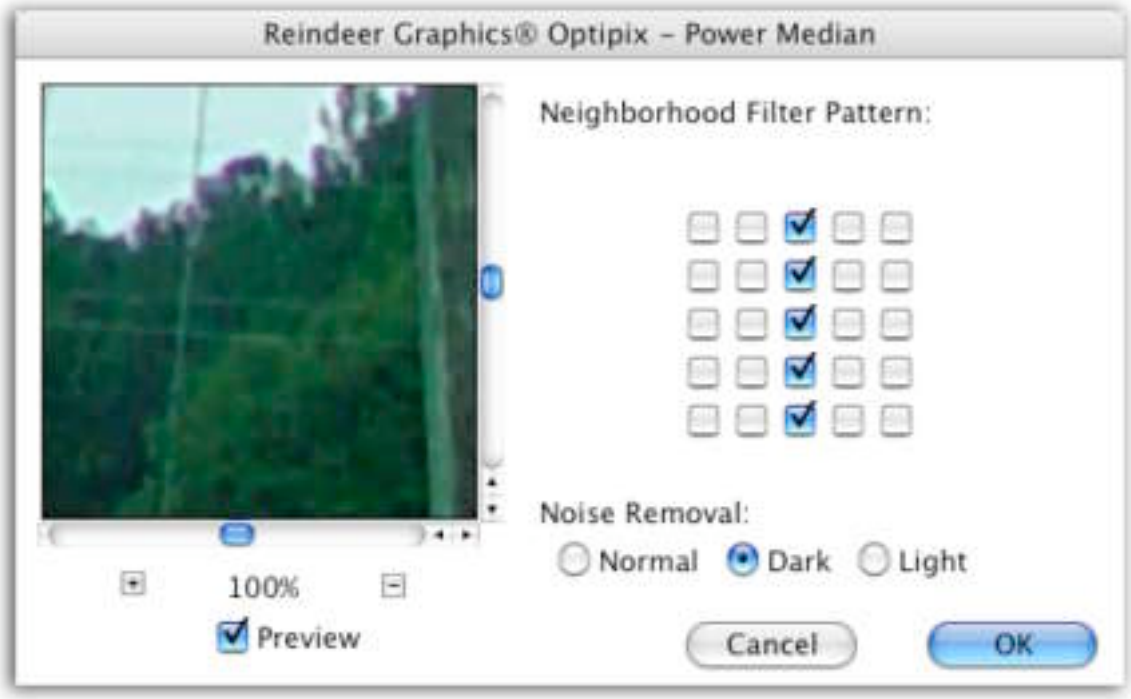
A more powerful version of this is included in the **Layer Modes** plug-in where you can align one image to another using this same sub-pixel precision. We've left the Nudge plug-in available for our users who have recorded actions using Nudge.

Power Median…

Power Median was designed to be a power user's dream filter. For the typical median, you choose a circular neighborhood of a particular radius. Power Median lets you choose any arbitrary neighborhood you want within a 5 x 5 square, including noncontiguous regions. *(Photoshop's median is square.)*

This degree of customization lets you remove noise with a particular shape or orientation. Some examples of things that are good candidates for Power Median are scratches, power lines, and elongated specular highlights.

When choosing a neighborhood, you must understand what you want to remove. If you are trying to remove horizontal scratches or horizontal features such as power lines, for example, the neighborhood you need to choose will be vertical.



A neighborhood suitable for removing horizontal scratches or power lines.

Let's take this example further. We have the original image, a shot of an interstate highway, here. The image has several problems with it, including some focus issues, but the problem we are concerned with is the power lines.

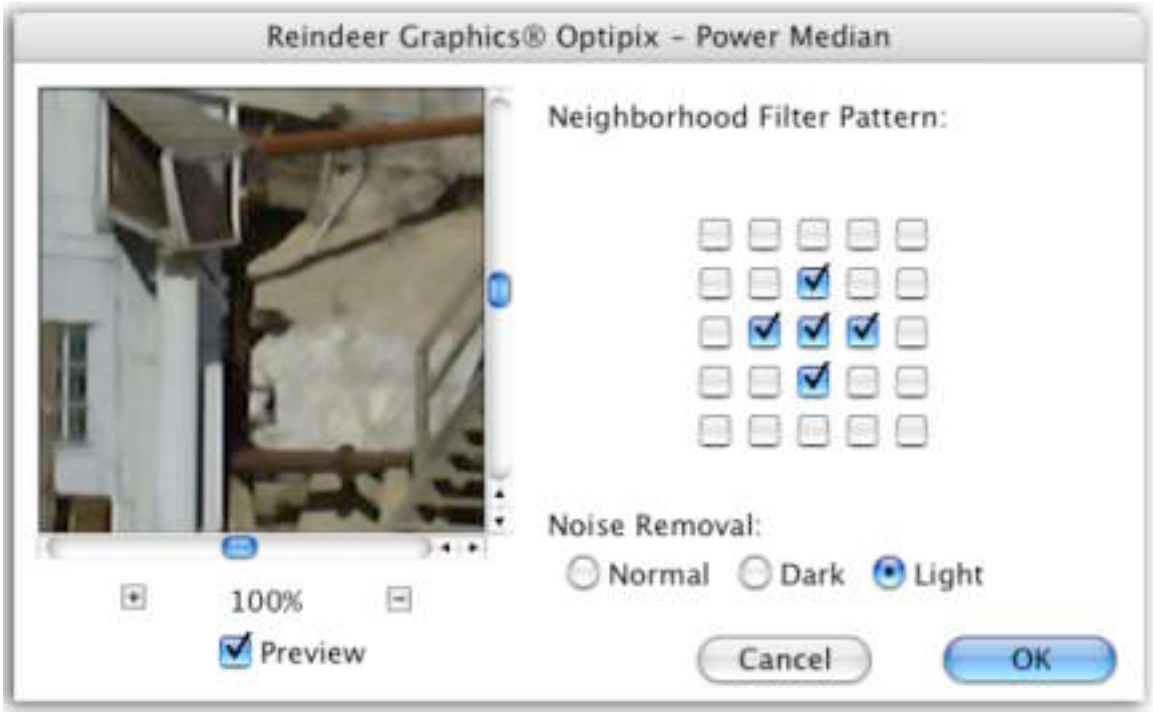
Now, we don't mind the support cables - they're part of the foreground and thus of interest. But the roughly horizontal power lines must go. So we select the sky region with the magic wand, and perform the power median operation with the neighborhood as shown above. Also note that since the line is darker than the background, we're choosing Remove Dark, rather than Normal.

We see at this point the lines against the sky are removed. With a little more work, the power lines against the trees may also be removed in a similar fashion, only using Remove Light, since the lines are light on a dark background.

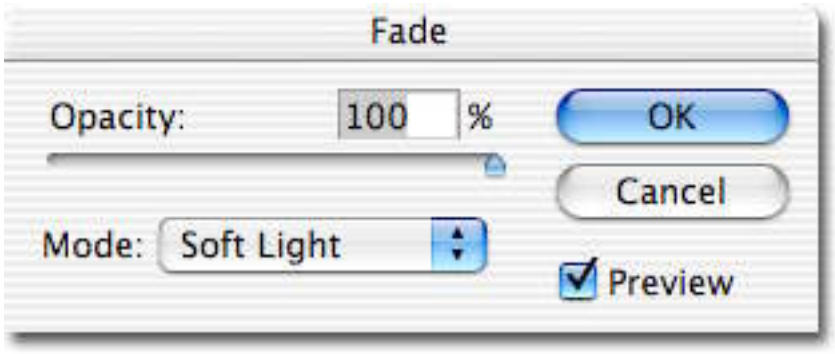
Let's take a look at less-obvious example:

In this image, the lighting is very flat, leading to a feeling of a lack of depth. We want to increase contrast, without losing detail. Using a blur or a median will destroy the details in the corrugated metal and the wood grain on the cistern in the foreground.

Instead, lets use the following Power Median neighborhood:



The cross shape removes the harshness of the vertical and horizontal lines and highlights in the image. Setting it to remove light noise leaves the shadows alone. Once the image is processed like this, we fade the filter using soft light.



The resulting image has much greater depth and warmth to it. The harshness of the image has been reduced.

Refocus...

The Refocus tool is a powerful technique that removes blur from your images. It is the same type of technique that NASA scientists used to correct the images from the Hubble Space Telescope before they were able to replace the optics themselves. While to the eye, Refocus appears to sharpen the image, it is important to note that Refocus is not a sharpening tool, like Edge Enhancer or Detail Sharpener, but rather a blur remover.

Note: Refocus should always be one of the first things you do to an image after bringing in to Photoshop. Other processing methods can destroy the information that Refocus needs to optimally process your image.

There are many sources of blurring in images. Cameras with auto-focus can sometimes have their sensors fooled by the scene. The interpolation that digital cameras must do to merge the red, green, and blue color information (also called mosaicking) can cause a blur. Even rotating a scene in Photoshop can cause blurring, if you don't rotate by a multiple of 90 degrees. Refocus will remove or reduce the effects of blurring without any of the side effects of sharpening.

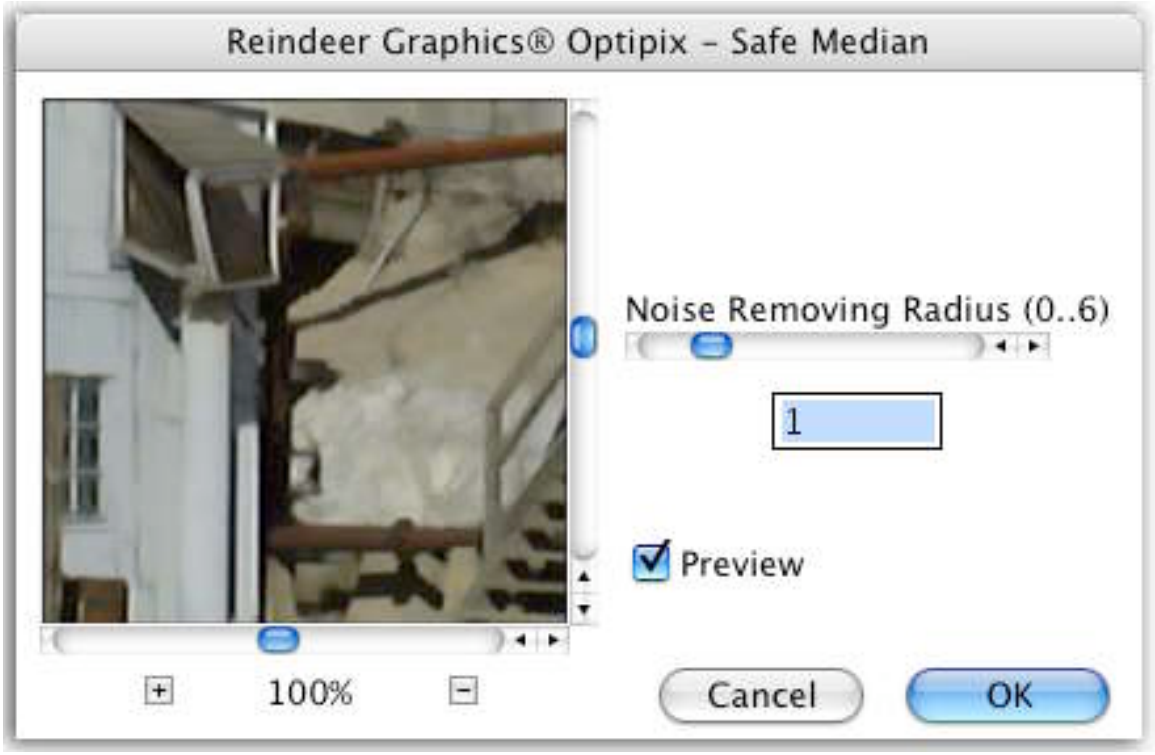
The Refocus dialog consists of a preview and two sliders. The sliders control the radius of the blur you wish to remove, and the threshold for noise removal. The key to finding an appropriate setting for Refocus is choosing the noise removal level properly. A technique that works well is to set the radius and noise level at roughly the same points along their slider bars, and then to walk the noise downward until just before the characteristic 'ringing' artefacts appear in the image. This represents the optimum point for the noise reduction slider, as setting its value too high will reduce the effect of the blur removal. The autoscale checkbox should only be checked if image histogram was clipped before applying refocus.

If you are having trouble finding good settings to use for an image, try starting with a blur radius of 0.5 and a noise threshold of 0.5. Slowly increase the blur radius until the image looks right, or until the ringing artefacts begin to appear. If you see the artefacts before finding a good value for the radius, increase the noise threshold and try again. For most images that only need a small bit of blur removal to fix the effects of the camera or of processing, the optimum blur radius will be between 0.3 and 1.

Safe Median…

Safe Median is not a typical noise remover. Unlike the built-in median in Photoshop, Safe Median preserves corners, even through multiple applications of the filter. This means that the fine detail in your image will survive Safe Median in better shape, giving you a cleaner, crisper image. This makes Safe Median an excellent choice for performing grain removal as well noise removal. Safe Median is also color-preserving.

The Safe Median dialog looks like this:



The slider controls the radius of the neighborhood, and thus the degree of noise removal. The Safe Median plug-in can be applied multiple times for higher levels of noise removal. It is often better to apply the filter with a smaller radius multiple times than to use a larger radius once.

This segment of a digital camera image illustrates a good use of the Safe Median filter:

This image shows a lot of noise around the boundary between the sky and the rocks in the foreground, including a nasty bright spot between two of the rock peaks. We'd like to make that better. Running a radius 1 median over the image doesn't quite take care of all the noise, especially that bright spot. However, increasing the radius of the median to 2 results in an image that's too blurry. Even fading the median leaves a loss of detail, resulting the following image.

Photoshop’s median filter has removed the noise at the expense of some of the fine detail in the rock boundaries. There are other methods of repairing this, typically involving layers. We'd like something that is less aggressive. Let's take a look at what Safe Median does to this image.

With Safe Median, the noise is gone, including the nasty bright spot, but the detail of the rocks is preserved.

For another example, let's look at the following segment of an image:

You'll notice the speckle noise in the mirrored lens. This detracts from the quality of the image. A high-quality print of this would show these sunglasses as having 'dust' on them. We'd like to remove it. Using a median filter is problematic in this case, as it tends to remove the detail from around the boundary between the frame of the sunglasses and the lens. While it is certainly possible to mask the lens and apply a normal median, this is extra work. It also tends to smear the specular highlight on the lens.

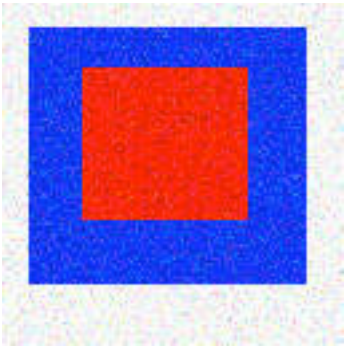
Safe Median can be applied to the whole image, without masking. It preserves that detail, both of the lens boundary and the specular highlight, while removing the 'dust' that we want to be gone. After application of Safe Median, the image looks like this:

Safe Median is, unfortunately, designed for a faster class of processors than the rest of the Optipix package. If you do not have a top end machine, you will find that Safe Median is a little slow.

As a rule of thumb, Safe Median is an excellent grain remover. It attempts to preserve as much structured detail as possible while removing isolated blobs. An example, below, illustrates how this works.

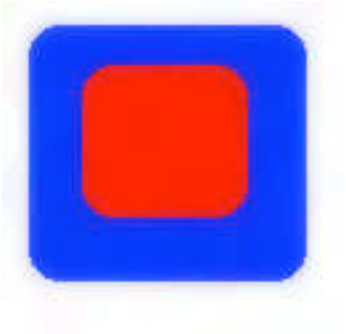
Safe Median Example

To illustrate the corner-preserving nature of the Safe Median process, lets look at the following image:



We have two crisp, brightly colored squares here, with some color noise added. This is actually a pretty nasty image; the noise is somewhat extreme. Now, looking at this image, we know we want to use a median, to preserve the nice sharp edges which a Gaussian blur would destroy.

We therefore apply the Photoshop median filter. The results are disappointing, as the corners have been rounded off.



Test Image, after Photoshop's median filter, at radius 6

Let's instead apply our Safe Median filter.

Test image, after Safe Median, at radius 6

You can see that the Safe Median did an equivalent job at removing the color noise in the image, but also preserved the corners of both squares.

Safe Sharpen

This plug-in does something a little different than most sharpening techniques. It attempts to preserve or even fix color information while enhancing edges. As a side-effect it also enhances noise, but generally not color noise. The "blue noise" that is so typical in a digital image is reduced while the edges in the image are enhanced.

You could also call it *color-safe sharpen*, and it works on both 8 and 16 bit images. The built-in sharpen filter in Photoshop tends to amplify color noise.

200% image detail, before Safe Sharpen

200% image detail, after Safe Sharpen

It is generally a good idea to follow this step with some kind of noise remover, such as a Gaussian Blur or Optipix Safe Median. Optipix Edge Enhancer is also a good choice.

Preferences…

With Optipix 3, it is necessary to enter a serial number to use the software. We've added a plug-in for that purpose at the bottom of the Optipix menu:

In order to use any of the plug-ins under the Filter menu, you must have an image open. Because Optipix plug-ins only work in RGB or Grayscale (and both 8 and 16 bits) you must have either an RGB or Grayscale image open. Create one with *File > New* or to open one from disk. Then, invoke *Filter > OPTIPIX > Preferences…*

The Macintosh version of Optipix has no other preferences. The Windows version of the Preferences dialog, however, allows you to specify the location of Optipix's temporary files. This allows the package to be used in situations where the current user does not have administrative privileges. For more details on how to set this, please see the Installation section.

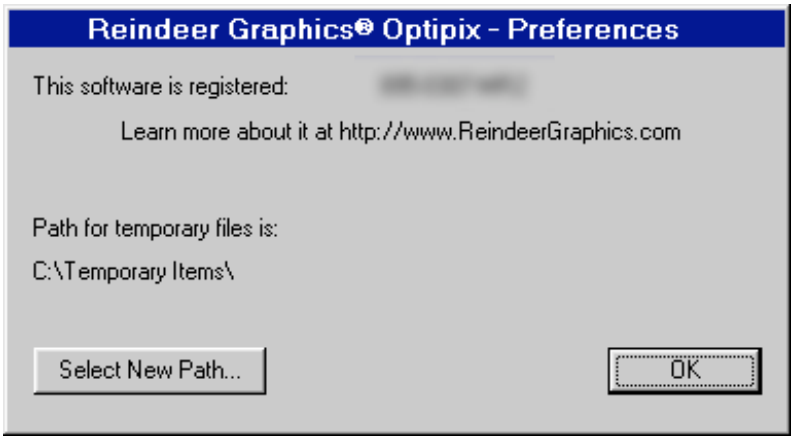
If you have not registered the Optipix software, a dialog like this will appear:

Enter your 10-digit serial number in this dialog and click on the Register button.

If you do not have a serial number, you may purchase one by contacting Reindeer Graphics at the address above. Remember to record the "A" number in the dialog.

Note: PC Users may need administrator privileges to register their software.

On the PC, once the software is registered, you will see a dialog that looks like this:

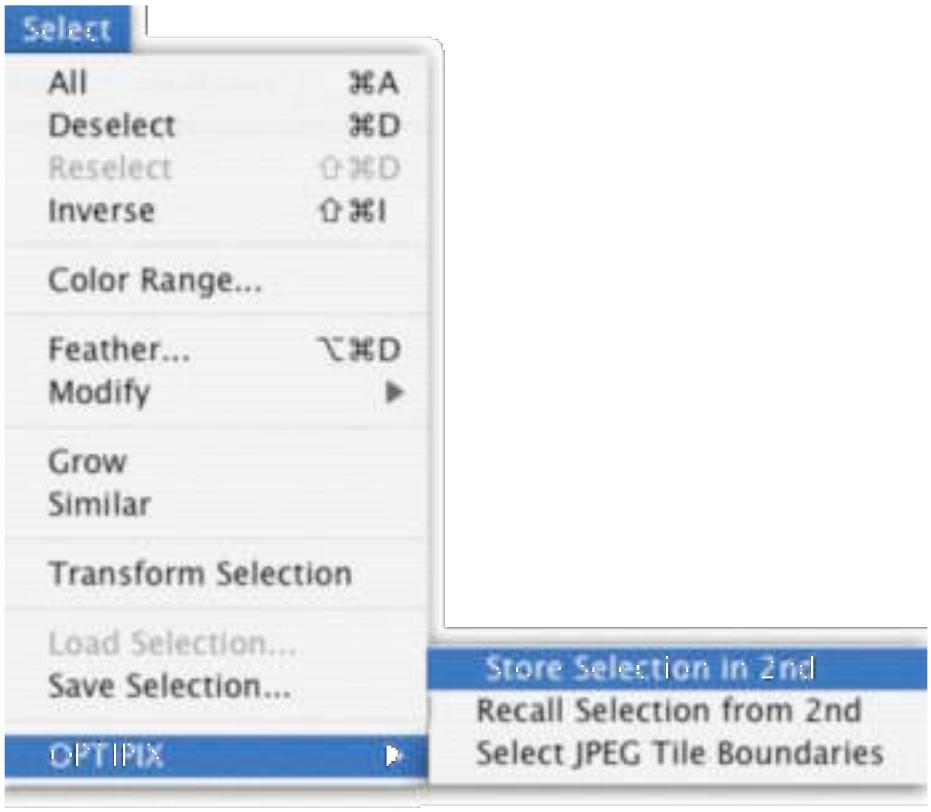


If you need to relocate Optipix's temporary files so that the software will work without administrator privileges, you will need to choose an alternate location here. You will need administrator privileges to relocate Optipix's temporary files, but once the change is made, Optipix will function normally without administrator privileges.

Selection submenu

Optipix 3 includes a tool designed to improve your 16-bit workflow. The Optipix Store/Recall Selection tools work just like the 2nd Image buffer tools that you are familiar with, except they work on the selection of an image. The Quick Mask in Photoshop CS can slow down or block your workflow. It is somewhat cumbersome to move the selection from one image to a second image, requiring that the selection be saved in a channel, and that channel then be loaded into the selection in the new image. The Optipix Store/Recall Selection tools make this operation simple and scriptable.

New to Optipix 3 is a different kind of selection tool. Select JPEG Tile Boundaries finds the “blocks” that the JPEG compression algorithm leaves in your image, and then selects their edges. This, coupled with our JPEG Cleaner plug-in, allows you to do powerful, customized repair jobs to JPEG images.



Store Selection in 2nd

This places the current selection into the 2nd Image Buffer for later retrieval. The Selection tools buffer is identical to the buffer used for the Setup/Retrieve 2nd Image tools. This allows you to treat any image as a selection and vice-versa. It also means that storing a selection after storing an image will overwrite the image in the buffer.

Recall Selection from 2nd

This retrieves the image from the 2nd Image Buffer and creates a selection from it. The effect of this is identical to transferring an 8 bit image to the Quick Mask, except that it works in 16 bits or in mixed bit depths.

One of the most useful features of the Store/Recall Selection tools is the ability to quickly transfer a selection from one image to another without having to save and load a channel. Invoke *Select > Store Selection in 2nd*, *switch* to the new image, and invoke *Select > Recall Selection from 2nd*. This is very useful when working with a bracketed sequence of 16 bit or camera raw images. The Optipix tools makes incorporating this technique into an action to automate your 16-bit workflow easy. There are no dialogs to deal with, nor any complex settings to twiddle.

Many people have lamented the lack of a 16 bit magic wand in Photoshop 7. You can use the Optipix 2 Selection tools to approximate this technique in the following fashion.

1- *Duplicate* your 16 bit image
2- *Use Image > Mode > 8 bits* per channel to demote the image to 8 bit
3- Use the *magic wand tool* on your image to make a selection
4- Use *Select > OPTIPIX > Store Selection in 2n*d to save the selection
5- *Select* the 16 bit original of the image
6- Use *Select > OPTIPIX > Recall Selection from 2nd* to bring the selection into the 16 bit image.

Steps 1 and 2 plus choosing the magic wand tool would make a very useful action. Steps 4, 5, and 6 would make another good action, although actions cannot reliably choose particular images. The best way to work around this is to only work with two images, so the order of the images is clear.

Another useful workflow in Photoshop that is not available for versions earlier than Photoshop CS is Command-Option-Shift-~ (Mac) or Control-Alt-Shift-~ (Windows). This places the luminance channel into the selection, and selects all the pixels brighter than 50% grey. (Katrin Eismann, author of *Photoshop Restoration and Retouching*, refers to this as "The Claw" because of the hand position required.) This technique is a quick, simple way to select a reasonable approximation of the foreground and highlights. If you wished to do this on 16 bit images in Photoshop 7, it would require a great deal of work to accomplish the same effect. Here is the workflow with Optipix 3:

1- *Open* a 16 bit image
2- Use *Filters* > *OPTIPIX* > *Setup 2nd Image* to place the image in the buffer.
3- Use *Select* > *OPTIPIX* > *Recall Selection From 2nd* to select everything with luminance higher than 128

Steps 2 and 3 could be made an action with a keystroke assigned to it. This will make it just as easy to access as the Photoshop keyboard shortcut.

Select JPEG Tile Boundaries

This selection tool allows you to select the boundaries of the 8 x 8 JPEG tiles. While Optipix provides a simple tool for reducing the visibility of these tiles in the JPEG Cleaner tool, there may be times that you wish to do your own processing and enhancement to the edges of the tiles.

Select JPEG Tile Boundaries will find the edges of the JPEG tiles even if the image has been cropped after JPEG compression, or even if the JPEG has been converted to GIF, PNG, TIFF or other lossless format. JPEG Cleaner will try to find the tile boundaries in any image. If the image has never been JPEG compressed, the plug-in may find false boundaries. It is important to note that this plug-in will not detect whether or not an image has been compressed using JPEG – it simply assumes that your image has been compressed and attempts to find the damage. If the plug-in cannot find boundaries, it will warn you that the image does not appear to be JPEG compressed.

An example of how one might use this selection plug-in would be if you found that JPEG Cleaner made the tile boundaries too smooth. An example workflow for putting some texture back into the lanes would be as follows.

1. *Select > OPTIPIX > Select JPEG Tile Boundaries*
2. *Select > OPTIPIX > Store Selection*
3. Deselect all
4. *Filters > OPTIPIX > JPEG Cleaner*
5. *Select > OPTIPIX > Recall Selection*
6. Enter QuickMask mode
7. Run a Gaussian blur with radius 1 over the QuickMask
8. Exit QuickMask
9. Use *Filters > OPTIPIX > Grain Maker...* with broad grain and a strength of between 40-60%

This workflow uses several Optipix plug-ins to accomplish the goal. We first select the tile boundaries and then tuck the selection away for later use. Since JPEG Cleaner will make it difficult or impossible for the selection plug-in to find the boundaries, we need to do that first. We then deselect the image and run JPEG Cleaner to remove the tile boundaries. Now, we noticed the first time we did this that the result seemed too smooth. So, we recall the selected tile boundaries, and enter QuickMask mode. By running a

small Gaussian over the QuickMask, we feather the edges of the selection. Returning to normal mode, we use Grain Maker to add some texture. This texture is masked by the QuickMask that we generated with Select JPEG Tile Boundaries and the Gaussian blur, which limits the texture to only the smooth regions, but feathered outwards to avoid unsightly seams.

It is important to note that this whole sequence is completely automatable, and if desired, can be recorded as an action and invoked by a keystroke.

Photoshop Actions

Reindeer Graphics® Optipix is designed to take full advantage of the capabilities of Photoshop. Actions are one such capability. An action is a sequence of steps that can be played back as if you had done them yourself. Many kinds of operations (other than painting, erasing, and using the lasso tool) can be recorded in an action. Actions are grouped into "Sets" that can be saved to disk, sent to other people, and reloaded. Actions can also be assigned to function keys for easy access.

Much of the power of Photoshop comes from Actions, since they allow you to cut the amount of time it takes to do repetitive tasks. You might, for example, spend time enhancing one image from a roll of film, then record that sequence of steps as an Action that can be applied to every other image in the roll. Since Optipix allows you to record the values you've entered manually in the Action, you don't have to enter them again for each successive image.

Optipix Actions

The Optipix CD contains two action sets for your use. The first, called **Optipix 3 Actions.atn**, contains three useful prerecorded actions that we have found useful. The second action set is called **16 bit Layer Workflow.atn**. This file contains an action written by George DeWolfe to accompany his Digital Fine Print Workflow, which is also included on the Optipix CD.

To load an action set into Photoshop, simply double-click on the file in either the Finder or Windows Explorer. Once you have done so, the action set and its included actions will appear in the Actions palette.

Optimize Image

This workflow is one that we use extensively in-house in order to add depth and contrast to images from most consumer and prosumer cameras that shoot uncompressed files (TIFF or Raw). It uses a very slight Refocus to remove some of the softness inherent in the digital process (typically from the interpolation done in the camera's sensor). We then apply this to the original using soft light, use Detail Sharpener at fairly conservative

settings, and finish with Auto Contrast. This workflow showcases the capabilities of Optipix in addition to providing an excellent 'one-click' enhancement routine for most well-shot digital images.

Portrait Enhancement

This action is a similar style of workflow to the Optimize Image action. It tends to enhance images that lack contrast overall, without enhancing fine grain and texture. The Portrait Enhancement action uses Refocus in a similar manner to Optimize Image, but uses a different layer technique and avoids the Detail Sharpener step. It is useful and instructive to run both actions on the same image and observe the differences.

Reduce Dynamic Range

This action will compress the intensity range of the image yet preserve and enhance the detail in the image. This is a very useful step for preparing a High Dynamic Range (HDR) image to being printed. It is also helpful for enhancing fine details.

The idea behind this action comes from a paper by Frédo Durand and Julie Dorsey at MIT entitled *Fast Bilateral Filtering for the Display of High-Dynamic-Range Images*, which they presented at Siggraph in 2002. While Detail Sharpener does not use a bilateral filter, it does use their notion of a separate detail image and intensity image (called a tone map). Once these are separate, it is possible to compress the tone map and add the detail image back to it. Instead, we created a plug-in that would enhance the detail image directly. Thus, by making the image 16-bits, compressing the range of the tone map, and enhancing the detail image, we effectively accomplish the same thing.

Feel free to play with the settings in the action. If you have comments or discover new ways to compress HDR images, please contact us at <optipix@reindeergraphics.com>.

Blend Two Images

This action will take the current image and the previous image and combine them using the Blend Exposures plug-in. When it is finished, it duplicates the blended result so that you can revert the original image. This is one example of what can be done with Blend

Exposures in an action. You will want to experiment and see how best to record actions to fit into your own workflow.

Nudge

In the file Optipix 3 Actions.atn, there are four recorded actions to nudge the image around in 1/3 of a pixel increments. These are very simple actions and not terribly useful in the Actions palette by themselves; however, by assigning function keys to each of the four actions, you can quickly and easily move a picture around using subpixel increments.

Creating your own actions

If you are a photographer who works with a large number of images, actions can be an invaluable part of your daily workflow. By recording common sequences of steps that you frequently use, you can use Actions palette and Photoshop's batch processing capabilities (*File* > *Automate* > *Batch...*) to streamline the processing of a large number of images. There are many excellent tutorials on the Internet on the use of Photoshop's Batch plug-in and Photoshop Actions specifically. Optipix is designed to be easily integrated into any automated workflow you might require.

Actions can be created quite easily by recording a series of steps. Here is a walkthrough of the procedure.

1- *Windows* > *Actions*. This brings up the Actions palette.

2- In the Action palette, select the *menu triangle* at the top right of the pane.

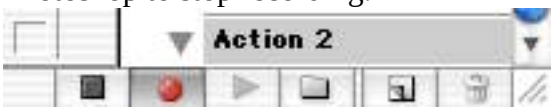
3- Invoke the item "*New Action*" from the menu

4- A dialog will appear asking for the name of the new action you're about to create.

You *can pick the name of your action*, the set, or group of actions, to which you want it to belong, and which, if any, function key you'd like to assign to it.

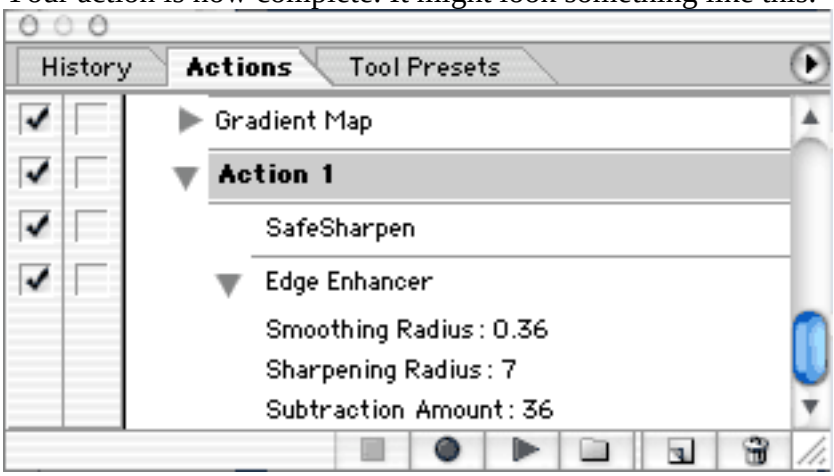
5- Click the "*Record*" button on the dialog and your next sequence of operations will be recorded as an action

6- When you've finished with the sequence of operations, you have to tell Photoshop to stop recording.



Click the *Stop Recording* button, which is the button with the black square on it located at the left of the line of controls. In order, the other buttons are the Record button, the Play button, the New Set button, the New Action button and finally, the Delete button.

7- Your action is now complete. It might look something like this:



This particular action is useful for enhancing grainy digital images.

8- After you've finished recording, you can drag the Action items around to rearrange their order, drag some items to the trashcan icon to delete them, or turn recording back on to add more steps. To do these things, use the buttons at the bottom of the Actions palette.

9- Finally, you can play back your action by selecting it and pressing the *Play* button or by pressing its assigned function key if it has one. You can run your Action on a single image or in Batch mode on a folder full of images or even on each frame of an Adobe Premier movie.

There are many more things you can do with Photoshop Actions than we've mentioned here. Look in the Photoshop manual for more tricks and examples.

Note: The recorded action in step #7 consists of a Safe Sharpen step followed by an Edge Enhancer step. Notice that the parameters for Edge Enhancer were recorded as well. When you play the action, it will use the recorded values instead of asking you to select new values in a dialog. This will allow you find an optimum setting for a group of pictures and automatically process them.

Reindeer Graphics® Optipix 3.0

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Also note, we have an online forum that can be reached from our main webpage. Feel free to contact us online that way as well.

