Digital Darkroom Workflow – The Final Steps

by Jim Craner

Your image has been captured, and optimized to perfection, and archived for safe keeping. All that work is brought to fruition when the image is prepared for display. Whether the image is destined for a web page, a slide show, or display as a fine-art print – the last few steps are critical to success.

In my April 20, 2005 presentation for the digital group, I will illustrate image resizing and sharpening using Adobe Photoshop™, and discuss some important variations appropriate to different types of images and common forms of output. Jumping directly to the end of the workflow begs the obvious question, so let me start with a review of the steps needed to first optimize your image. The workflow described below applies, for the most part, to all versions of Photoshop including Elements™.

Photoshop Workflow	**Notes**
Capture the image either in-camera or as a scan.	Usually a TIF, JPG, or proprietary RAW file.
Open the image in Photoshop and crop as needed.	Eliminates pixels that do not need to be considered in remaining steps.
Optional. Perform a 'light' sharpening on a copy of the base image layer.	Use very low **Radius** and **Threshold** settings. **Amount** is set high – typically around 300. Sharpening may be done in-camera.
Take care of any cloning that is needed to correct image defects – dust, blemishes, etc.	Do this on an adjustment layer.
Create any selections that will be needed for later image optimization.	Selections are saved in Photoshop as part of the image file for later use.
Create and modify adjustment layers for Layers, Curves, Color Balance, etc., as needed	A **Hue/Saturaton/Brightness** adjustment layer is also typically used.
Perform dodging and burning on an adjustment layer as need to further expand tonal range.	Layer is set to Overlay mode, and filled with 50% grey. The **Paintbrush Tool** is used.
Save the image will all layers intact as a .PSD file.	This becomes the archival 'master' image file from which all output is produced.

(Note: In PS Elements, some of the above steps can only be performed on an image layer.)

When you are ready to output an image from your digital master file start Photoshop, open the file, and resume the workflow with imaging resizing and sharpening.

Photoshop Workflow (Cont'd)	**Notes**
Make a copy of the open image by selecting **Image>Duplicate**, and close the master file.	Protects against inadvertently saving a working image over the master image file.
Flatten the copy of the image.	Creates a single image layer containing the results of all adjustments.
Render the image in its final size and resolution by selecting **Image>Size** and completing the options in the dialogue box.	Prior to this step, but **AFTER** flattening, 16 bit images may be converted to 8 bits (PS 8.0 only) with no loss in quality.
Sharpen using **Filter>Sharpen>Unsharp Mask**.	Leave Preview at 100%, Typical settings are Amount=100-115, Radius=0.7-1.0, and Threshold=1-2, but these vary with the image.

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Photoshop Workflow (Cont'd)	**Notes**
Output the image as appropriate. Usually to the printer, or to a file as a JPG.	Typically the working image is not saved.

The Mysteries of Sharpening

Digital images, whether scans or captures, appear alarmingly unsharp at first glance. This is almost entirely due to anomalies in sensor design, and the fact that digital images are not continuous tone images as are their film counterparts. Rather, edges (lines) running through digital images are 'jagged' and therefore do not appear as distinct.

I say 'appear unsharp' because sharpness is in some respects a matter of perception. Images captured on Kodak's Tri-X film often just looked sharper than the same image captured on Kodak's Panatomic-X film – everything else being equal. This was for the most part a matter of the larger grain structure, and tonal curve characteristics inherent in Tri-X. In reality – when photographs of resolution charts were examined – the two films were equally good at resolving detail.

Images with distinct and 'contrasty' boundaries between tonalities appear sharper. In fact the apparently contradictory name, **'Unsharp Mask'**, given to the PS filter used to sharpen images derives its name from a very old darkroom technique. Two slightly out of register negatives of the same image are sandwiched together in order to make the edges in the image appear 'thicker' and more distinct. This technique makes the print appear sharper although in reality both the negatives from which the image is made are essentially identical.

The first thing to understand about the use of the **'Filter>Sharpen>Unsharp Mask'** technique in PS is that it **will not** correct an image that is out of focus or blurred due to camera or subject movement. You will simply end up with an out-of-focus image that has more contrast between different adjacent tonal areas! The Unsharp Mask filter increases sharpness by increasing the contrast between adjoining areas of tonality – in other words at the edges. To use the Unsharp Mask filter with confidence, it is important to understand the singular effect of each control, as well as the way the controls interact to produce the end result. PS calls these controls **Threshold**, **Radius**, and **Amount**. Here's what each control does:

Control	**Use**
Threshold (0-255)	Tells PS how much difference in tone must exist between adjacent areas before that boundary will be considered an 'edge'. A setting of 0 means almost no difference need exist, while higher settings indicate that more difference must exist. Typically this control is set low (0-3) although higher settings can be useful.
Radius (0-250)	The most important control. Radius tells PS over how wide an 'edge' area contrast should be increased. The higher the setting, therefore, the 'thicker' the edge. Typical settings range from 0.3-1.7. Excessively high settings can result in unpleasing 'haloing' effects
Amount (0-500)	Tells PS how much to increase the contrast. Typical settings are 75-115.

I will demonstrate in detail, and discuss, the use of these controls using two images that require very different sharpening approaches.

In general terms here is how to apply these controls to a 'typical' image – one that needs an approximately equal amount of sharpening to all areas of the image. In the overall digital workflow, final sharpening is applied to a flattened version of your master .PSD file, which has

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already been sized appropriately for its use. You may wish to fill the screen with the image before launching the filter.

Launch the **Filter>Sharpen>Unsharp Mask** dialogue from the Filter Menu. It is always preferable to use the Unsharp Mask filter rather than the 'Sharpen', 'Sharpen More', or 'Sharpen Edges' options. In reality the same technique is being applied to the image, however PS is making important decisions about the settings for the three controls – judgments better made by the photographer. Check to insure that the preview window is set to 100%, which means that the image in the windows is being viewed close to actual output size. Leave the preview window at, or very close, to 100% for this procedure.

PS will load the last-used values for the three controls and the effects will appear in the preview window. By placing the cursor (which will appear as a 'hand') in the preview window and clicking, the effects of the current settings will be toggled on/off. By clicking and holding inside the preview window the image can be 'dragged' around and a different area exposed for preview. An alternative way to expose a different area in the preview window is to move the cursor (which will change to a rectangle) over the main view of the image and click on the new area you want to preview.

Begin with initial settings of perhaps Amount=50, Threshold=1, and Radius at the lowest setting allowed. The exact settings for Threshold and Amount are not critical, but keep Radius set low at the start. Using the slider, slowly increase Radius to about 1.0 and watch the effect in the preview window. Resist the impulse to watch the image in the main view window. While the changes are appearing in both places, the only generally reliable view of the changes will be in the preview window (at 100%). Move the Radius setting through a range of perhaps 0.3 to 1.5 and note the results. Take care not to set the Radius too high, as the image can quickly turn garish, with distracting halos, color/tone shifts, and excessive contrast distorting the image. When a pleasing radius setting has been achieved, adjust Amount until the amount of edge contrast change is appropriate to the image. Finally, the overall effect may be moderated, or toned down, slightly by increasing the Threshold setting; however you will likely reach a point of diminishing returns at values higher than 10-15. Finally, click OK to apply the changes permanently to the image.

Learning to use the Unsharp Mask controls with confidence will enhance your understanding of alternative sharpening methods, as well as such specialized PS Plug-Ins as Nik Sharpener™. Proper use of the Unsharp Mask filter will restore the inherent sharpness hidden in digital images (scans and captures). Prints from your master image files will rival, or exceed, the sharpness of the traditional prints from even the best film captures.

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