Process 2010 Image processing

Camera Raw 6 for Photoshop CS5 saw the introduction of the concept of Process Versions. This was because changes made to the underlying demosaic processing, coupled with improvements made to the noise reduction and sharpening meant separating out the new method of processing (Process 2010) from the old (Process 2003). In Camera Raw 7 and later, we have a new Process 2012 process version, which is what I have focussed on in the book. Because Process 2003 and Process 2010 are still accessible in this latest version of Camera Raw I have included everything that I wrote about the changes introduced with Process 2010 within this separate PDF.

Basic panel tone adjustment controls

The Basic panel tone adjustment controls (Figure 1) allow you to make further adjustments to the highlight and shadow clipping points as well as the overall tone balance and brightness. You can adjust these sliders manually, plus you can click on the Auto button to auto-set the Exposure, Recovery, Blacks, Brightness and Contrast settings.

Exposure

The Exposure slider is used to set the overall brightness, so that the photograph looks 'correctly exposed'. You can use the Exposure slider to visually assess how brightly exposed you want the picture to be and use this as your primary tool for adjusting the image brightness. If you hold down the alt key as you drag the Exposure slider this shows you a threshold preview which indicates where there might be highlight clipping, or you can rely on the highlight clipping indicator shown in Figure 3 to tell you which highlights are about to be clipped.

Recovery

You don't have to worry too much about setting the Exposure too bright or clipping the highlights, because the Recovery slider can be used to restore some of the detail which at first may appear lost. The Recovery slider cleverly utilizes the highlight detail in whichever channels contain the best recorded highlight detail and uses this to boost the detail in the weakest highlight channel. There are limits as to how far you can push a Recovery adjustment, but you may be able to recover as much as a stop or more of overexposure. Camera Raw can sometimes use extra tricks such as ignoring digital gain values used to create higher ISO captures. If you hold down the all key as you drag the Recovery slider you will also get to see a Threshold mode preview, which can often make it easier to determine the optimum setting here.

Blacks

The Blacks slider is used to clip the shadow point and here again I find it useful to hold down the alt key to obtain a threshold mode preview to help determine the point where the shadows just start to clip. The main thing is to set the Black slider so that the shadows just begin to clip, though try not to set lower than 2 or 3 if you can help it.

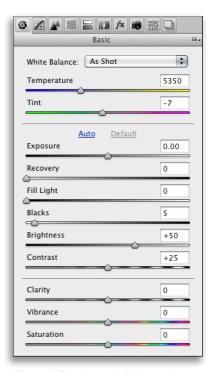


Figure 1 This shows the Basic panel controls when using Process 2003 and Process 2010.

Fill Light

The Fill Light kind of matches the behavior of the Shadow amount slider in the Shadow/Highlight image adjustment. If you drag the Fill Light slider to the right this adds more lightness to the dark tone areas and lightens the darkest shadow areas. However, if you overdo this adjustment it may knock back the contrast too much and you'll end up with an artificial looking result such as can be seen in the Figure 2 example.

Suggested order for the basic adjustments

The first step should be to set the Exposure to get the overall image brightness looking right, taking care not to introduce too much highlight clipping. If necessary, use the Recovery slider to restore any important detail that may be clipped in the highlight areas. Next, use the Blacks slider to set the shadow clipping, followed by the Fill Light slider should you need to reveal more detail in the shadow areas. The Brightness and Contrast sliders should be used last to fine-tune the image after you have adjusted these four sliders first.



Figure 2 Be careful when setting the Fill Light. Shown here is an extreme example of a solarization type effect that can occur if you apply too much Fill Light. If you upgrade to Process version 2010, you will notice how Recovery and Fill Light have been much improved to prevent this kind of thing happening. As a result of this you may need to revisit the Recovery and Fill Light settings after upgrading.

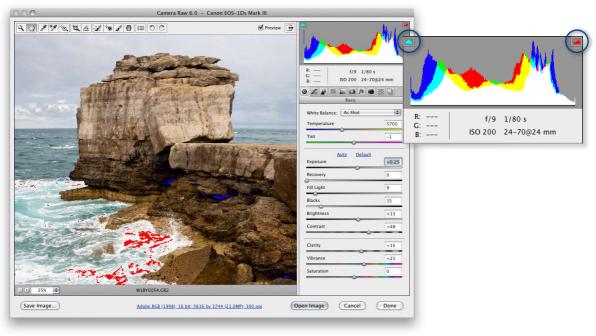


Figure 3 If you click on the clipping indicators in the Histogram panel you will see a colored overlay in the preview image that indicates any shadow and highlight clipping.

Basic image adjustment procedure



1 This shows a raw image as viewed in the Camera Raw dialog, using the default settings in the Basic panel. One way to quickly optimize an image is to click on the Auto button. If you then want to reset all the settings you can do so by double-clicking on the individual sliders, or by clicking on the Default button.



2 In this example I adjusted the Exposure to make the photograph look lighter to achieve what looked like the best visual brightness. You don't have to worry about blowing out the highlight detail because you can always use the Recovery slider to restore any highlight detail that may be clipped (but without destroying the exposure effect).



3 The next step was to optimize the shadows. I used the Blacks slider to set the clipping point for the shadow detail and after that I used the Fill Light slider to lighten the darker areas of the photograph. Note that as you adjust the Recovery and Blacks sliders, you can hold down the **alt** key as you drag to see a threshold view of the image, which can help you determine how far to drag to set the correct amount of clipping.



4 Lastly, I used the Brightness and Contrast sliders to fine-tune the tonal balance of the photograph.

Preserving the highlight detail

As you apply basic adjustments in Camera Raw, you want to make the brightest parts of the photo go to white so the highlights are not too dull. At the same time though, you will want to ensure that important highlight detail is always preserved. This means taking care not to clip the highlights too much, since this might otherwise result in important highlight detail being lost when you come to make a print. You therefore need to bear in mind the following guidelines when deciding how the highlights should be clipped.

Where you should set the highlight clipping point is really dependent on the nature of the image. In most cases you can adjust the Exposure and Recovery sliders so that the highlights just begin to clip and not worry about losing any important highlight detail. If the picture you are editing contains a lot of delicate highlight information then you will want to be careful when setting the highlights so that the brightest whites in the photo are not too close to the point where the highlights get clipped. The reason for this is all down to what happens when you ultimately send a photo to a desktop printer or convert an image to CMYK and send it to the press to be printed. Most photo inkjet printers are guite good at reproducing highlight detail at the top end of the print scale, but at some point you will find that the highest pixel values do not equate to a printable tone on paper. Basically, the printer may not be able to produce a dot that is light enough to print successfully. Some inkjet printers use light colored inks such as a light gray, light magenta and light cyan to compliment the regular black, gray, cyan, magenta, yellow ink set and these printers are better at reproducing feint highlight detail. CMYK press printing is a whole other matter. Printing presses will vary of course, but there is a similar problem where a halftone dot may be too small for any ink to adhere to the paper. In each of the above cases there is an upper threshold limit where the highlight values won't print. So, when you are adjusting the Exposure and Recovery sliders, it is important to examine the image and ask yourself if the highlight detail matters or not. Some pictures may contain subtle highlight detail (such as in Figure 4), where it is essential to make sure the important highlight tones don't get clipped. Other images may look like the example over the page in Figure 5. Here, the light reflecting off a shiny metal surface creates bright, specular highlights and the last thing you need to concern yourself with is

White backgrounds

When creating studio shots with a white background, you usually do want the white to reproduce as a pure white. If you try to achieve this with the lighting then you need to make sure you balance the lighting ratios perfectly so that the background values are clipped as pure white and the important highlight detail in the subject matter is not clipped. If time and budget allow, I find it is best not to over blow the white background exposure too much at the capture stage. One can always force the background tones to white when editing the image in Photoshop.

preserving the highlight detail. I would say that most images contain at least a few specular highlights and it is only where you have a photo like the one shown below, where you have to pay particular attention to making sure the brightest highlights don't get clipped.

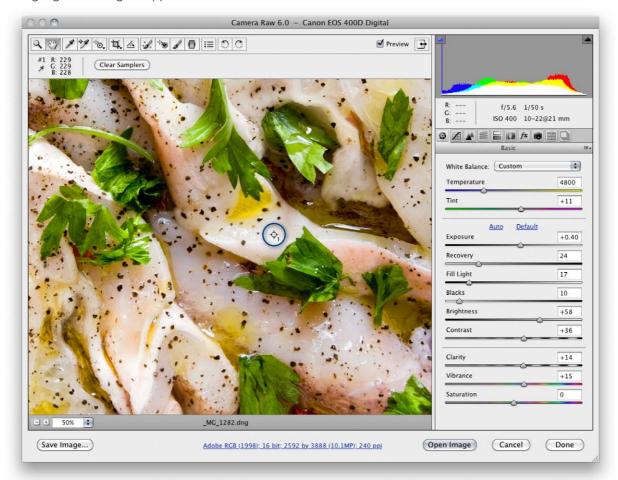


Figure 4 In this example it was important to preserve the delicate highlight tones in the fish steaks. To be absolutely sure that I didn't risk making the highlight detail areas too bright, I placed a color sampler (circled) over an area that contained important highlight detail. This allowed me to check that the RGB highlight value did not go too high. In this case I knew that with a pixel reading of 229,229,228, the highlight tones in this part of the picture would print fine using almost any print device.

When to clip the highlights

As I say, you have to be careful when judging where to set the highlight point. If you clip too much then you risk losing important highlight detail. However, what if the image contains bright specular highlights, such as highlight reflections on shiny metal objects? The Figure 5 image has specular highlights which contain no detail. It is therefore safe to clip these highlights, because if you were to clip them too conservatively you would end up with dull highlights in your prints. In this case the aim is for the shiny reflections to print to paper white. So when adjusting the Exposure slider for a subject like this, you would use the Exposure slider first to visually decide how bright to make the photo and not be afraid to let the specular highlights blow out to white.

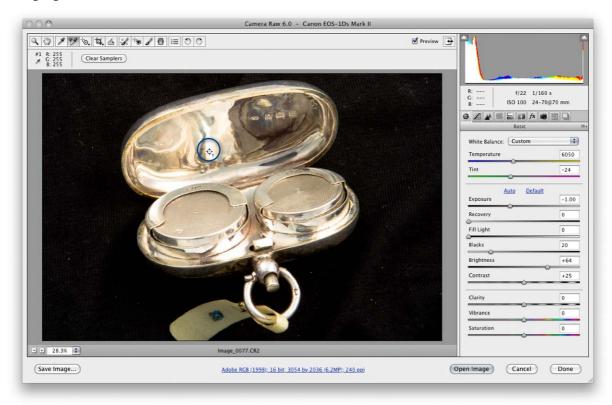


Figure 5 The highlights in this photograph contain no detail, so there is no point in trying to preserve detail in the shiny areas as this would needlessly limit the contrast. One can safely afford to clip the highlights in this image without losing important image detail and as you can see here, the color sampler over the shiny reflection (circled) measures a highlight value of 255,255,255. Images like this usually need no Recovery adjustment.

How to clip the shadows

Setting the Black clipping point is, by comparison, much easier to decide. Put aside for now any concerns you might have about matching the black clipping point to the printing device, I'll explain how that works over the next two pages. Blacks slider adjustments are simply about deciding where you want the shadows to clip. The default setting is 5 and this will usually be about right for most images. You may want to ease the clipping off to around 2 or 3 on some images, but it is inadvisable to take the setting all the way down to zero. Some photos such as the one shown below in Figure 6 can actually benefit from a heavy black clipping so that the dark areas print to a solid black.

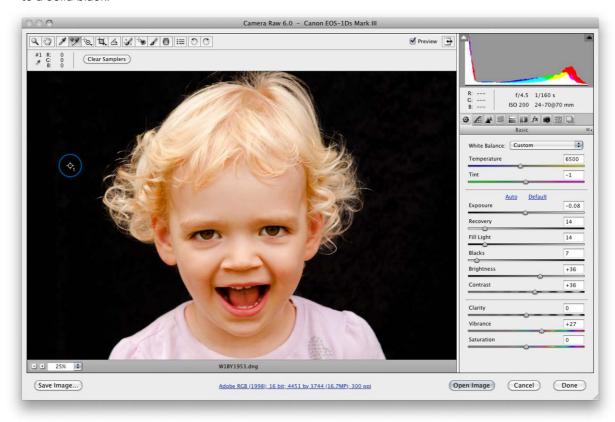


Figure 6 In this picture of my daughter, Angelica, you can see that the blacks in this photo are well and truly clipped. This is because I deliberately wanted to force any shadow detail in the backdrop to a solid black. As you can see, the color sampler over the backdrop in this picture (circled) showed an RGB reading of 0,0,0.

Brightness

There is sometimes a confusion between when to use Brightness and when to use Exposure to adjust an image. To the newcomer they both appear to be doing the same thing, but there is in fact an important difference between the way these two adjustments work.

The Exposure slider is essentially a white clipping point tool that is used to set the highlight clipping point. As you move the slider left or right the image appears to get brighter or darker, but what the Exposure slider adjustment is actually doing is deciding where to set the highlight clipping and smoothly maps all the other tones from the midtones down to the shadows relative to this point.

The Brightness slider is different. It is a midtone correction tool that behaves much like the gamma (middle input levels) slider in the Photoshop Levels dialog and can also be used to make a photo appear relatively lighter or darker. The difference here is that the Brightness slider adjusts the image tones by compressing one end of the tonal scale as it expands the other. In this respect, the Brightness control should be regarded as a more brutal image adjustment than the Exposure slider, which is why you are always advised to use Exposure first to get the brightness right, use Recovery to compensate for any undesirable clipping and then use the Brightness slider to fine-tune the photo's brightness.

Figure 7 illustrates how these adjustments affect the Histogram. In the top histogram view, the Exposure adjustment sets the highlight clipping point and evenly expands or compresses all the tones that are darker than this. The middle histogram shows how if you make a positive, lightening Brightness adjustment, the brighter tone levels are compressed, while the darker tones tone levels are expanded. Conversely, if you apply a negative, darkening Brightness adjustment, the highlight levels are expanded and the shadow tones become more compressed.

Figure 8 clearly illustrates the practical consequences of applying an Exposure-led adjustment versus Brightness. In the top image you will notice that where I only used the Brightness slider to lighten the image there is less contrast in the flower petals and therefore less detail. This is because the highlight levels have become compressed and this has resulted in flatter contrast in the midtone/highlight areas. None of this is to suggest that you shouldn't use Brightness. Far from it. Although compressing and expanding the levels is a

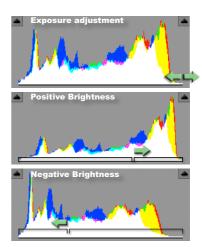


Figure 7 The top histogram shows how the Exposure slider adjusts the Highlight clipping so that the midtones and shadows adjust smoothly relative to this point. The Brightness slider adjusts the brightness by shifting the levels between the set shadow and highlight points. The middle histogram shows the effect of a positive Brightness adjustment and the bottom histogram shows the effect of a negative Brightness adjustment.

Negative Exposure

A negative Exposure adjustment can be used to help recover highlight detail that would otherwise have been clipped. If an image initially appears over-exposed, it is best to use the Exposure slider first to find the best exposure, use the Recovery slider to fine-tune detail recovery in the highlights and use the Brightness slider last to fine-tune the image brightness.

destructive process, this is just an inevitable part of the digital image editing process. The main point to learn from all this is to use the Exposure slider first to 'expose' the image to obtain the best brightness and use the Brightness slider as a secondary adjustment to 'fine-tune' the brightness.

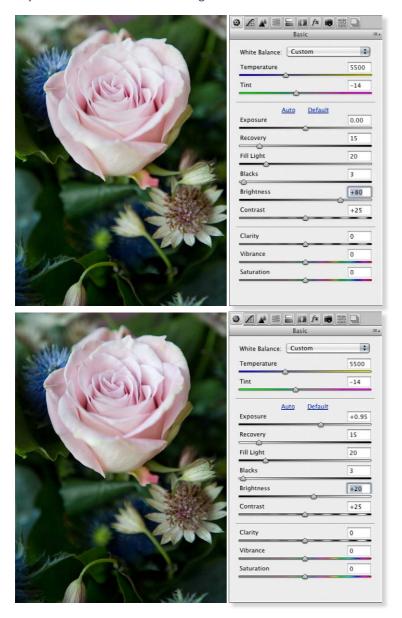


Figure 8 Superficially these two close-up views look the same. In the top version I used the Brightness slider only to adjust the image brightness. In the lower one I used the Exposure slider first to set the highlight point clipping and brightness and then used the Brightness slider to fine-tune the brightness. You should be able to see more highlight contrast and detail in this version.

Contrast

The Contrast slider applies a non-linear contrast type adjustment. In Photoshop terms it is equivalent to applying an 'S' shape curve to the image. But unlike the Contrast slider in the legacy version of Photoshop's Brightness/Contrast image adjustment, the Camera Raw Contrast slider never forces the levels to clip at either end of the tonal scale and is completely safe to use. A positive contrast adjustment creates a steeper 'S' shape type curve which therefore increases the image contrast, while a negative Contrast adjustment flattens the curve to create an inverse 'S' shaped curve that flattens the contrast. Figure 9 shows a simulation of how the Contrast adjustment would look if it were applied as a Curve adjustment to a Photoshop image. Note that the curve shape is also affected by the Brightness amount and the curves shown here represent the contrast curve shape for when Brightness is at its default (+50) setting.

One of the things that tends to confuses some people is the fact that there is a Contrast adjustment in the Basic panel as well as a separate Tone Curve panel for adjusting the contrast and how these appear to perform the same function. But think of it this way: it is already quite common for people to apply a contrast adjustment when they initially edit an image and then add a second contrast adjustment later to fine-tune the first adjustment. There are basically three ways you can edit the contrast in Camera Raw and all of them are equally valid. You might decide the Basic panel Contrast slider is all that you need: just make a simple slider move and you are done. Or, you might choose not to use the Contrast slider at all and use just the Tone Curve to adjust the contrast. Alternatively, you might use the Contrast slider when applying an initial set of basic panel adjustments to get the contrast looking close to what looks right and then use the Tone Curve panel to tweak the contrast further because you like the fine-tune control you get with the Tone Curve sliders. The important thing to understand here is that when you work with Camera Raw, it does not matter that you are applying a Tone Curve contrast adjustment on top of a Basic panel Contrast slider adjustment. When the image is finally output as a JPEG, TIFF or PSD, all the adjustments you add to the image are eventually applied as a single adjustment.

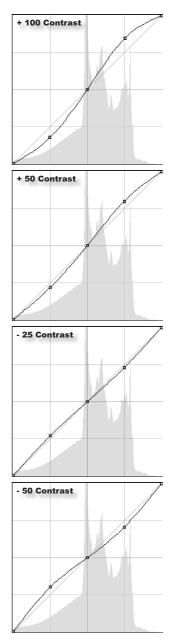


Figure 9 The curve shapes shown here approximate the curve shape that is applied by Camera Raw when you adjust the Contrast slider in the Basic panel.

Localized adjustments

We now come to the adjustment brush and graduated filter tools, which can be used to apply localized edits to photos in Camera Raw. As with the spot removal and red eye removal tools, you can revise these edits as many times as you like without having to render an interim pixel version of the raw master. Not only that, these are more than just dodge and burn tools. There are a total of seven adjustment effects to choose from, not to mention an Auto Mask option.

Adjustment brush

When you select the adjustment brush tool (K) the tool options shown in Figure 10 will appear in the panel section on the right with the 'New' button selected (you can also use the K key to toggle between the Adjustment Brush panel and the main Camera Raw panel controls). Below this are the sliders you use to configure the adjustment brush settings before you apply a new set of brush strokes.

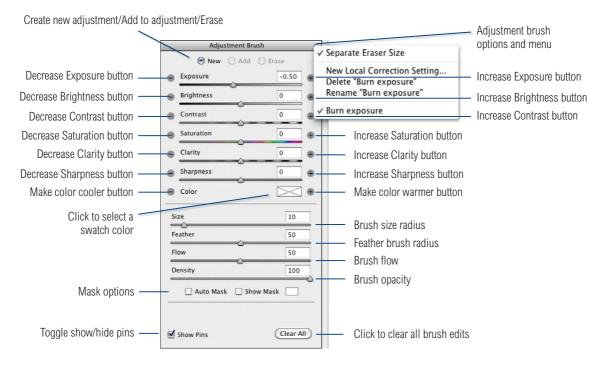


Figure 10 The Adjustment brush options.

Initial Adjustment brush options

To apply a brush adjustment, click on the new brush button at the top of the panel and then select the effect options you wish to apply by using either the plus or minus buttons or the sliders. For example, clicking on the Exposure plus button increases the exposure setting to +0.50 and clicking on the negative button sets it to-0.50 (these are your basic dodge and burn settings). The effect buttons therefore make it fairly easy for you to quickly create the kind of effect you are after. Remember, you can only select one effect setting at a time using the buttons, but if you use the slider controls you can fine-tune the adjustment brush effect settings and combine multiple effects in a single setting.

Brush settings

Below this are the brush settings. The Size slider adjusts the brush radius, plus you can use the keys to make the brush smaller or larger. It is also possible to resize a brush on-screen. If you hold down the ctrl key (Mac) or use a rightmouse click (Mac and PC), you can drag to resize the cursor before you start using it to retouch the image. The Feather slider adjusts the softness of the brush and you can also use the Shift 1 keys to make the brush edge softer and Shift 1 to make the brush harder. Note that these settings are reflected in the cursor shape shown in Figure 11. The Flow slider is a bit like an airbrush control. If you select a low Flow setting, you can apply a series of brush strokes that successively build to create a stronger effect. As you brush back and forth with the brush, you will notice how the paint effect gains opacity, and if you are using a pressure-sensitive tablet such as a Wacom™, the Flow of the brush strokes is automatically linked to the pen pressure that you apply. The Density slider determines the maximum opacity for the brush. This means that if you have the brush set to 100% Density, the flow of the brush strokes can build to a maximum density of 100%. If on the other hand you reduce the Density, this limits the maximum brush opacity to a lower opacity value. For example, if you lower the Density and paint over an area that was previously painted at a density of 100%, you can paint with the adjustment brush to reduce the opacity in these areas and if you reduce the Density to 0%, the adjustment brush acts like an eraser tool.

Hiding and showing brush edits

You can use the Preview button in the Camera Raw dialog to toggle showing and hiding all Adjustment brush edits.



Figure 11 The outer edge of the adjustment brush cursor represents the overall size of the brush, while the inner circle represents the softness (feathering) of the brush relative to the overall brush size.

Adding a new brush effect

We are now ready to start painting. When you click on the image preview, a pin marker is added and the Adjustment Brush panel shows that it is now in 'Add' mode (Figure 12). As you start adding successive brush strokes, these are collectively associated with this marker and will continue to be so, until you click on the 'New' button and click to create a new pin marker with a new set of brush strokes. The pin markers therefore provide a tag for identifying groups of brush strokes. You just click on a pin marker whenever you want to add or remove brush strokes, or need to re-edit the brush settings that were applied previously. If you want to hide the markers you can do so by clicking on the Show Pins box to toggle showing/hiding the pins, or use the



Figure 12 In this example I added several pin markers, which represent different groups of brush strokes. The one at the top was used to darken the sky and the one that is currently active was used to lighten the park sign with a positive Exposure value.

Editing brush adjustments

To edit a series of brush strokes, just click on an existing pin marker to select it (a black dot appears in the center of the pin). This takes you into the 'Add' mode, where you can add more brush strokes or edit the current brush settings. For example, in step 2 (on the following page), I might have wanted to drag the Exposure slider to darken the selected brush group more. You might also want to erase portions of a brush group, which you can do by clicking on the Erase button at the top of the Adjustment Brush panel, where you can independently edit the brush settings for the eraser mode (except for the Density slider which is locked at zero). Alternatively, you can hold down the alt key to temporarily access the adjustment brush in eraser mode. When you are done editing, click on the New button to return to the New adjustment mode, where you can now click on the image to add a new pin marker and a new set of brush strokes.

Previewing the brush stroke areas

If you click on the 'Show Mask' option, you'll see a temporary overlay view of the painted regions (Figure 13). The color overlay represents the areas that have been painted and can also be seen as you roll the cursor over a pin marker.

Undoing and erasing brush strokes

As you work with the Adjustment brush, you can undo a brush stroke or series of strokes using the undo command (\(\mathbb{H}\)\(\mathbb{Z}\)
[Mac], \(\epsilon trl\)\(\mathbb{Z}\) [PC]).

Previewing the mask more clearly

Sometimes it is useful to initially adjust the settings to apply a stronger effect than is desired. This lets you judge the effectiveness of your masking more clearly. You can then reduce the effect settings to reach the desired strength for the brush strokes.

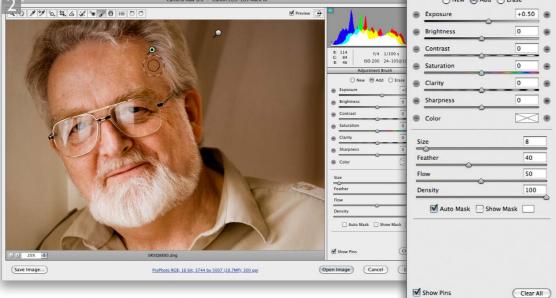
Resetting the sliders

Double-clicking a slider name resets it to zero, or to its default value.



Figure 13 In this screen view, the 'Show Mask' option is checked and you can see an overlay mask for the selected brush group. Click on the swatch next to it if you wish to choose a different color for the overlay display.





2 I then added further brush groups. In this step I added a new brush group to lighten Rod's forehead.

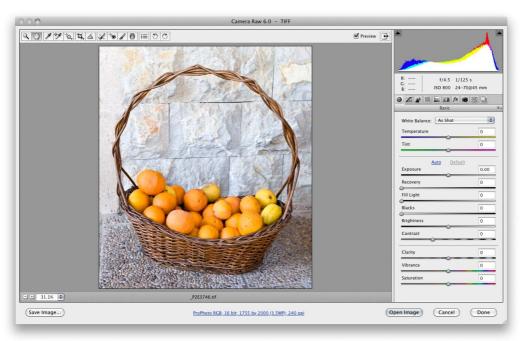
Photograph: © Jeff Schewe

Auto masking

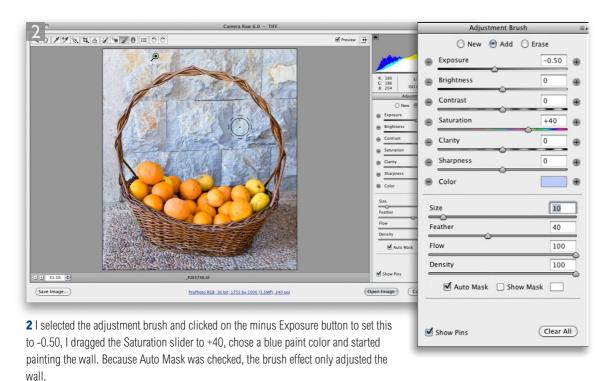
At the bottom of the Adjustment Brush panel is the Auto Mask option and when this is switched on it cleverly masks the image at the same time as you paint. It does this by analyzing the colors in the image where you first click and then proceeds to apply the effect only to those areas with the same matching tone and color (Figure 14). It does this on a contiguous selection basis. For example, in the steps shown here, I dragged with the adjustment brush in auto mask mode around the outside of the basket handle to darken the outer area and then dragged separately on the inside of the basket handle to include this in the auto mask brush group. While the Auto Mask can do a great job at auto selecting the areas you want to paint, at extremes it can lead to ugly 'dissolved pixel' edges. This doesn't happen with every photo, but it's something to be aware of. The other thing to watch out for is a slow-down in brush performance. As you add extra brush stroke groups, the Camera Raw processing takes a knock anyway, but it gets even worse when you apply a lot of auto mask brushing. It is therefore a good idea to restrict the number of adjustment groups to a minimum.



Figure 14 Quite often, all you need to do is to click on an area of a picture with the color you wish to target and drag the adjustment brush in auto mask mode to quickly adjust areas of the picture that share the same tone and color.



1 This shows the original photograph of a basket of oranges against a stone wall, shown here with just the Basic panel corrections applied.





Graduated Filter tool

Everything that has been described so far with regards to working with the adjustment brush more or less applies to working with the graduated filter (Figure 15), which allows you to add linear graduated adjustments. To use the graduated filter tool, click in the photo to set the start point (the point with the maximum effect strength), drag the mouse to define the spread of the graduated filter, and release to set the minimum effect strength point. There is no midtone control with which you can offset a Graduated Filter effect and there are no Graduated Filter options other than 'linear'.

Graduated filter effects are indicated by green and red pin markers. The green dashed line represents the point of maximum effect strength and the red dashed line represents the point of minimum effect strength. The dashed line between the two points indicates the spread of the filter and you can change the width by dragging the outer pins further apart and move the position of the gradient by clicking and dragging the central line.

Toggle the main panel controls

You can use the **G** key to toggle between the Graduated Filter panel and the main Camera Raw panel controls.

Resetting the sliders

As with the adjustment brush options, double-clicking a slider name resets it to zero, or to its default value.

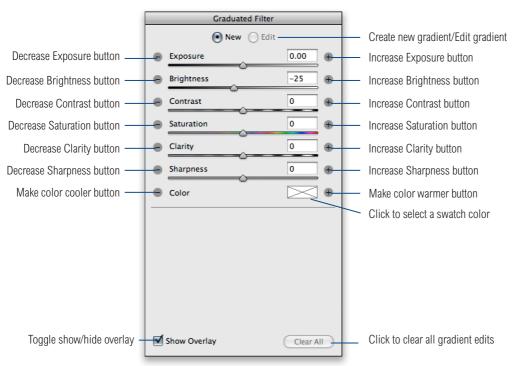
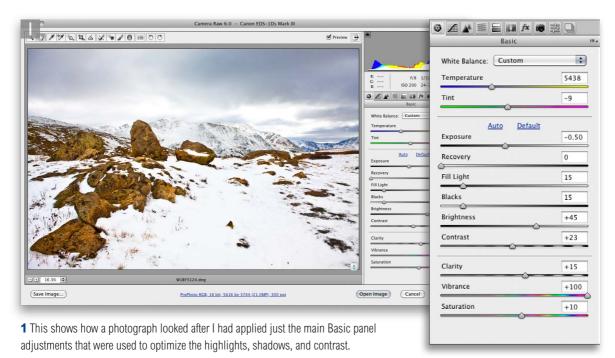


Figure 15 The graduated filter tool options.

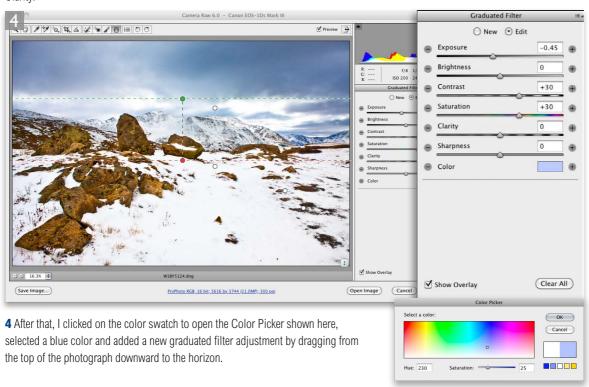




filter tool from the middle of the sky downward to darken the top third of the picture.



 $\bf 3$ I then decided to strengthen this graduated filter effect by decreasing the Exposure setting to -0.45 and added more Contrast along with more Saturation and more Clarity.



Angled gradients

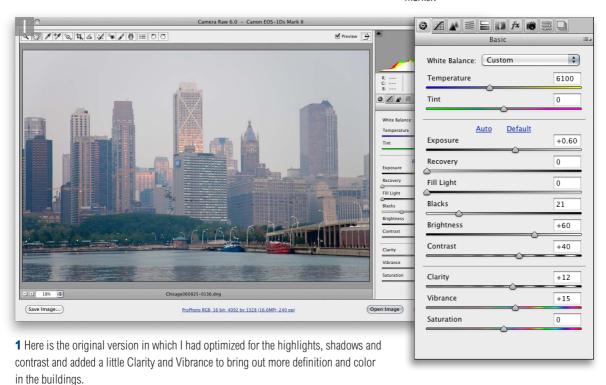
As you drag with the graduated filter you can do so at any angle you like and edit the angle afterwards. For example, if you click on a pin marker to select it (as shown in Figure 16), you can drag the marker, rotating it around the other marker point and if you hold down the *Shift* key you can constrain the angle of rotation to 45° increments.

Adding clarity and contrast

In the final example shown here, I wanted to show a further series of steps using the graduated filter, but this time I wanted to demonstrate how to add contrast and clarity to an image. The photo blow shot early one morning in Chicago at sunrise, but I never really managed to get the dramatic colors that I was after. This was mainly because of the early morning misty sky. I later realized this picture could benefit from some added contrast in the softer parts of the image and this was an ideal opportunity to work with the graduated filter tool.

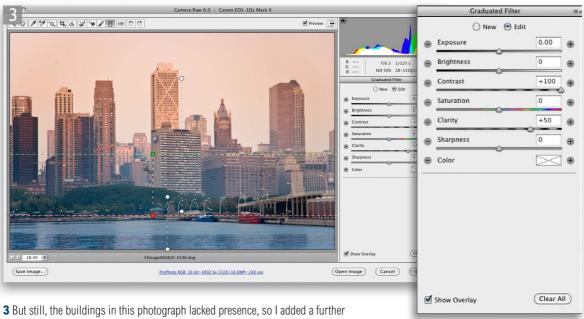


Figure 16 This shows a graduated filter being rotated, where the red pin marker is being dragged and rotated around the green marker.





2 I then selected the graduated filter tool and added two color effect gradients: a light blue gradient over the water plus a warm colored gradient to add some warmth to the sky.



3 But still, the buildings in this photograph lacked presence, so I added a further gradient in which I combined a +100 Contrast effect with +50 clarity and dragged from the middle of the picture down to the water line.