

Test your display profile

Two techniques to evaluate your display

This tutorial will test how well your display behaves after calibration and profiling.

An imperfect “score” on either is by no means a reason to be overly alarmed. Both tests give you an idea of the weakness in the calibration and profile, and in most cases, there’s not much you can do besides redoing the calibration with different settings.

In some cases, no calibration adjustments can alter the behavior of the display to the degree you’d like, or the 8-bit video system and color lookup table will simply be the best you can achieve. If you’re getting good soft proofs—that is, screen to print matches—you’re in good shape.

These tests, which should be performed in a darkened room with no ambient light or reflections hitting your display screen, will show the limitations of the video/display system and the resulting profile. My monitor is the gold standard in display accuracy at this time, the Sony Artisan. I’ll provide some feedback on how the results pictured might vary from yours. The first test was created by color geek extraordinaire Bruce Fraser.

The accuracy of black

1. Create a new RGB Adobe Photoshop document. The size isn’t critical, but try to make the horizontal about 1,200 pixels. We want the document to fill most of the display area when viewed in Photoshop at 100 percent. The color space of the document isn’t important.

2. Choose Edit>Fill. In the Fill dialog, select Use: Black; Blending Mode: Normal; Opacity=100%, as seen in as seen in Figure 1.

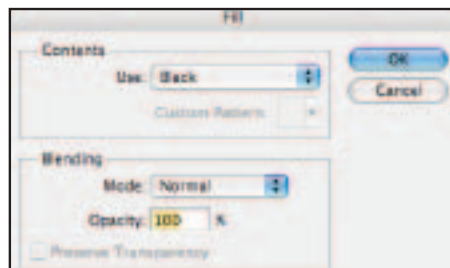


Figure 1: The Fill command should be configured as seen here.

3. Choose Image>Mode>Assign Profile. Select your display profile from the list. This ensures that Photoshop will send the numbers in the document directly to screen, which will aid in evaluating the display profile.

4. Select the rectangle Marquee from the Photoshop toolbar or simply press the M key. Make sure that in the option bar the Feather is set to zero and that the Style pop-up menu is set to Normal.

5. Make a rectangular selection in the document. It can be just about any size,



Figure 2: The document with a rectangle marquee selection. In the Document Profile indicator, note that I’ve assigned my display profile to the image.

but try to encompass about 50 percent of the document in the center as in Figure 2. We’ll need see the areas both inside and outside of this marquee, so don’t make it too large or too tiny.

6. Hide the marching ants by selecting View>Show>None, or holding down cmd/ctrl-H.

7. Now we want to fill the entire display with this black document, so we need to go into full screen mode. The easiest way to do it is to tap on the F key twice. We also need to hide the tool bar and palettes; press the tab key to hide them. We don’t want to see the rulers, either. Dismiss them with click cmd/ctrl-R or choose View>Rulers.

8. At this point, the screen should be filled with *only black*. Now call up the Curves dialog with the key command cmd/ctrl-M, and drag it to a corner so we’ll be able to see the effect of the hidden rectangle marquee.

9. We want the Curves dialog to be set as in Figure 3, where the bottom left corner of the curve is showing the dark (black) range of the curve. If yours doesn’t match, click on the double arrows in the center and bottom of the Curves dialog. Carefully select the point on the curve in the bottom left corner. The Input and Output fields should unlock and show a value of zero in both. If not, enter a value of zero in each field.

10. Now we’ll move up the black curve point by one numeric value at a time. Simply tap the up arrow key on your keyboard once. The Output value will

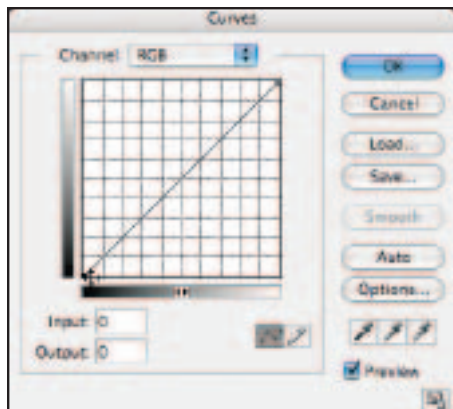


Figure 3: In the Curves dialog, the gradient should be running as pictured, so that black is indicated by the curve point in the lower left corner of the dialog. Here I have clicked on the black curve point at the very bottom of the dialog, and the Input and Output data entry fields are editable.

change from zero to 1. Tap on the arrow key until you can see the separation from the rectangle marquee—but just barely.

You may need to tap the up arrow key several times.

Ideally, the separation will have a value between zero and 1. I can see this on the Artisan, but most displays will have to be set at a higher value; 4 to 6 isn't unusual. This shows the accuracy of black and the ability of the calibration and profile to distinguish the subtle differences between zero and 1. If you think about it, a square with 1 is lighter than a square with 0. If you are trying to precisely set very dark values in Photoshop, it's hard to do it when you can't see them.

11. Keep hitting the up arrow slowly once you see the separation. Next we'll examine how neutral each step is. Each step should reflect the same difference in density from the last, and each progressively gray step should be neutral. It's not uncom-

mon to see a gray square go from neutral to slightly green, to slightly magenta, and back again in a few clicks. Tapping faster on the arrow key might make it easier to see this effect. The image pictured here is an RGB file in which each of the 256 steps from black (0) to white (255) is numerically neutral, and each should appear that way. On the best of the calibrated display systems, each step will be neutral.

Display artifacts

The next test is easy. It allows you to see how well the color lookup table handles the mere 8 bits of data we have at our disposal.

1. Make a new document (cmd/ctrl N).
2. Set the Preset: 1,024x768 pixels
3. Set the Color Mode: RGB Color, 8 bit
4. Set the Background Contents: White

5. Set the Color Profile to Adobe RGB (1998), as in Figure 4. Click the OK button.



Figure 4: Set the Photoshop new document dialog like this.

6. Now select the Gradient tool (hold down the G key). Figure 5 shows the Option bar in Photoshop after selecting the Gradient Picker flyout menu. Click on the gradient flyout menu and select Reset Gradients so you have the necessary gradient palette. When prompted to "Replace current gradients with the default Gradients?", click OK.

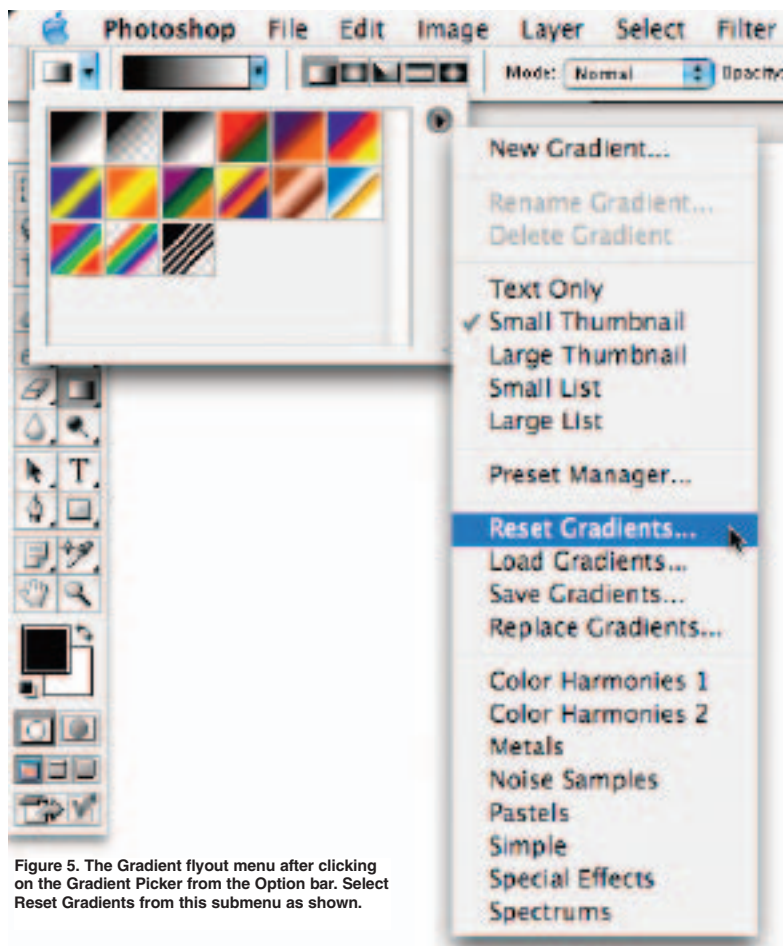


Figure 5. The Gradient flyout menu after clicking on the Gradient Picker from the Option bar. Select Reset Gradients from this submenu as shown.

7. On the Option bar, click on the Gradient palette popup menu and pick Black, White (the third gradient from the left on the top of the palette, as seen in Figure 6). When you move the cursor over each gradient, its name appears in the tool tips.



Figure 6: Select the Gradient named Black, White. When you drag your cursor over a gradient, tool tips will display

8. In the Option bar, set the Gradient type to Linear (the first icon in the group).



Figure 7: Click on the Linear Gradient icon.

The Mode pop-up menu should be set to Normal, and Opacity=100%, as in Figure 7.

9. Hold down the shift key and click and drag horizontally from the far left to the far right corner of the document to produce the black-to-white gradient as seen in Figure 8. The shift key gives you a nice straight gradient from side to side.

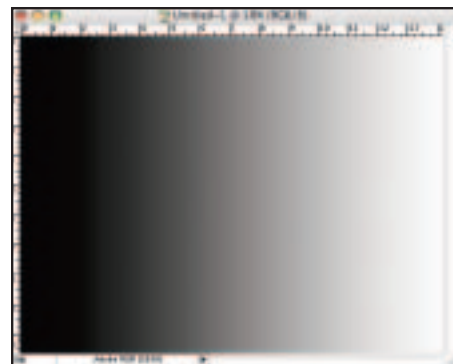


Figure 8: The black to white gradient should look like this.

10. Choose Image>Mode>Assign Profile. Select your display profile from the list.

11. Be sure you're viewing at 100 percent (double-click on the Zoom tool or use the key command, cmd/ctr-0 [zero]).

Examine the smoothness of the gradient. In a perfect world, there would be no banding in this gradient. If you do see banding, it's the result of the 8-bit video subsystem and the color lookup table. A Photoshop gradient should appear perfectly smooth because there's no banding in the document. Rarely will you see a perfectly smooth gradient unless you're using a great display system like the Barco Artisan or Eizo with a 10-bit LUT. When you do see banding, it's useful to know whether or not it's in the file. On an Artisan, you can be assured that any banding is in the file itself, and not an artifact of the display system.

Also examine the gradient to see if it appears to be neutral from black to white. It is not uncommon to see color shifts from neutral to slightly green, to slightly magenta, as you might have noticed in the first test. Ideally, this gradient will look neutral from end to end. □