



Configuring Photoshop

By Martin Evening

In order to get the best performance out of Photoshop, you need to ensure that your computer system has been optimized for image editing work. When I first began writing the 'Photoshop for Photographers' series of books, it was always necessary to guide readers on how to buy the most suitable computer for Photoshop work and what hardware specifications to look for. These days I would say that almost any computer you buy is now capable of running Photoshop and can be upgraded later to run Photoshop faster. The main thing is to ensure that you have as much RAM memory as possible installed in your machine and fast disk access. This chapter addresses all the other key issues you need to take into consideration.

What you will need

Below is a guide to the minimum system requirements for Macintosh and Windows system computers. The main thing to point out here is that Photoshop is now only available by subscription, either as the single Photoshop product, the photography plan which includes Lightroom, or by subscribing fully to the Creative Cloud—in which case you'll be able to access all Adobe Creative Cloud products.

Macintosh

The latest Photoshop can only be run on the latest multicore Intel-based Macs with 64-bit support running macOS 10.12.0 or later. The minimum RAM requirement is 2 GB (8 GB RAM or more is recommended). Photoshop itself requires an estimated 2 GB of free hard disk space to install the program. You will also need a computer display with at least a 1024 x 768 display (1280 x 800 recommended) driven by a 16-bit (or greater) graphics card with OpenGL 3.3 and at least 1GB video RAM (2GB of dedicated VRAM is recommended for large, high-resolution monitors, such as 4K- and 5K-resolution displays). All the current range of Apple Macintosh computers are capable of meeting the minimum requirements, although with some of the older Mac Pro computers you may need to upgrade the video graphics card.

Windows

The latest Photoshop can only be run on Intel Core 2 or AMD Athlon 64 or later processor; 2GHz or faster processor with 64-bit support, running Windows 7 with Service Pack 1 or Windows 10 (version 1703 or later). The minimum RAM requirement is 2 GB (8 GB or more is recommended) and Photoshop requires an estimated 2 GB of free hard disk space to install the 64-bit version of the program. You will also need a computer display with a 1024 x 768 display (1280 x 800 recommended), driven by a 16-bit (or greater) graphics card with at least 1 GB video RAM (2 GB is recommended for large, high-resolution displays, such as 4K- and 5K-resolution monitors) and an OpenGL 3.3 capable system. Almost any new PC system you buy should have no trouble meeting the minimum requirements.

64-bit processing support

64-bit processing is now the new standard for the latest computer hardware. The key benefit of this is it lets you take advantage of having more than 4GB of RAM memory installed in your computer. This has the potential to boost the speed for some operations, like the time it takes to open large documents.

The ideal computer setup

Your computer working environment is important. Even if space is limited there is much you can do to make your work area an efficient place to work in. Figure 1 shows a basic computer setup, which although a few years old now, I still use today as a basic backup Photoshop work station.

Firstly, you will note the walls in the office are painted neutral gray using paint I was able to get from a local hardware store. When dried and measured with a spectrophotometer, I found this paint color to be almost perfectly neutral in color. The under shelf lighting uses cool fluorescent strips that bounce off behind the displays to avoid any light hitting the screens directly. I usually have the light level turned down quite low, in order to maximize the monitor viewing contrast. Here, you can see that I had a 30", NEC LCD display hooked up to a desktop computer. Shown here also is a Wacom graphics pad and pen to work with as an input device and also an external hard drive for backing up data. Plus there is a UPS power bank to protect against power surges or cut-outs.



Figure 1 This shows an ideal basic Photoshop setup.

As your requirements grow you will probably need to have more external drives and, if you can afford it, I highly recommend working with two large displays side by side. It is also important to choose an operator chair that is comfortable to sit in for long periods of time. Ideally you want a chair that has arm rests and adjustable seating positions so that your wrists can rest comfortably on the table top. The computer display monitor should be adjusted so that it is level with your line of sight, or slightly lower.

Once you start building an imaging workstation, you will soon end up with lots of electrical devices. While these in themselves may not consume a huge amount of power, do take care not to have too many power leads trailing from a single power point. To prevent damage or loss of data from a sudden power cut I suggest you place an uninterruptible power supply unit (UPS) between your computer and the mains source. These devices can also smooth out any voltage spikes or surges in the electricity supply (see “Protecting the power supply” on page 19). In Figure 1 the computer and display are both connected to a power supply unit on the right.

Choosing a display

The display is one of the most important components in your computer setup. It is what you will spend all your time looking at as you work in Photoshop and you really don't want to economize by buying a cheap one that is unsuited for graphics use. The only types you can buy these days are liquid crystal displays (LCDs), which range in size from the small screens used on laptop computers to big 30" desktop models. An LCD display contains a translucent film of fixed-size liquid crystal elements that individually filter the color of a backlit, fluorescent or LED light source. Therefore, the only hardware adjustment you can usually make is to adjust the brightness of the display.

Because LCDs are digital devices they tend to produce a more consistent color output, but they do still need to be calibrated and profiled of course. Once profiled though, the display's performance should remain fairly consistent over a long period of time. On the other hand, with some displays there may be some variance in the image appearance depending on the angle from which you view it, which means the color output of an LCD may only appear correct when the display is viewed front on. This very much depends on the design of the LCD display unit and the worst examples of this can be seen with ultra-thin laptop screens. However, the evenness of output from high quality desktop LCD screens is certainly a lot more consistent these days.

There are two competing technologies for LCD screen displays. For gaming it is best to use a Twisted Nematics (TN) type display, as these offer fast redraw speeds. For image editing it is best to use the slower In Plane Switching (IPS), type display which offers greater consistency of color over a wider viewing angle.

The higher grade LCD displays do feature relatively good viewing angle consistency, are not too far off from providing a neutral color at a D65 white balance, and won't fluctuate much in performance. As with everything else in life, you get what you pay for.

Photoshop is able to support 30-bit displays (10-bits per channel) for improved bit-depth viewing, provided that the monitor hardware, the graphic card and operating system, all support 30-bit. If so, Photoshop can render the video data into 30-bit buffers. The latest Windows operating systems are capable of supporting this fully. It is also now an option available to Macintosh users using the latest compatible macOS. To enable, you need to check the advanced GPU preferences. This enables 30-bit video support for Photoshop and Camera Raw.

Video cards

The graphics card in your computer is what drives the display. It processes all the pixel information and converts it to draw the color image that's seen on the display. An accelerated graphics card can let you to do several things. It can allow you to run your display at higher screen resolutions, hold more image display view data in memory and can use the display profile information to finely adjust the color appearance. When more of the off-screen image data can be held in video memory the image scrolling is enhanced and this generally provides faster display refreshes. In the old days, computers would be sold with a limited amount of video memory and if you were lucky you could just about manage to run a small display in millions of colors. These days a computer is likely to be equipped with a good, high performance graphics card that is easily capable of meeting all your needs. A modern video card will typically have at least 1 GB of dedicated memory, which will be enough to satisfy the minimum requirements for Photoshop. However, with the advent of the latest video graphics support for Photoshop and Camera Raw, it is now worth considering a video card that can offer faster processing via the graphics processor to support the internal computer's central processor.

OpenGL and OpenCL

The graphics processor unit (GPU) can often fit more processing into its schedule due to its very high clockspeed. When allowed, it can

give up some of its available cycles to help out the central processor unit (CPU) and provide additional processing power. The first implementation of this was OpenGL, where OpenGL enabled cards could share certain graphics tasks (such as zoom and flick panning), thereby freeing up the CPU. Meanwhile, OpenCL does not confine itself to graphics, but can help with any computer-intensive task. Naturally, applications must be written specifically to take advantage of what OpenCL can provide in terms of faster Photoshop processing. If you want to take full advantage of such GPU support, it might be necessary to purchase a new video card. At the time of writing there is a long list of video cards capable of providing faster graphics support in Photoshop for macOS and Windows. Adobe do list the GPU cards that are recommended for Photoshop use, but it is difficult though to point to any one group of cards and say “these are best”. This is because the GPU performance in Photoshop is down to not just the card, but also the computer platform and operating system used as well. Check the Adobe Help site to find out which video cards are designated as being compatible for Photoshop use.

Adding a second display

To run a second display you may need to buy an additional video graphics card that will provide a second video port. You’ll then be able to contain all the Photoshop panels on the second screen and keep the main display area clear of clutter.

High density displays

Photoshop provides HiDPI Retina support for Macintosh users as well as compatible PC devices. This development makes Photoshop more responsive and supports pinch and zoom actions.

Essentially, a high density display has twice the usual density of pixels. This gives the user the option of doubling the pixel resolution of the display, but at the expense of everything appearing tiny on the screen (especially user interface designs). However, you can configure the display scaling to whatever suits you best.

With Photoshop images are displayed at the native pixel resolution of the display device where one Photoshop image pixel is displayed using one high density display pixel. At the same time, the user interface is effectively doubled in size and the user interface and icons designed to appear nice and smooth at higher resolutions.

There are implications too for web design layouts, which may require dual resolutions for people visiting a website where a Retina, or high density display is detected. This might be of importance to photographers who wish their portfolio pages to be viewed as optimally as possible.

Display calibration and profiling

We now need to focus on what is the most important aspect of any Photoshop system: getting the display to show your images in Photoshop correctly and ensure that the display colors can be relied

upon to match the print output. This basic advice should be self-evident, because when we work in Photoshop we all want our images to be consistent from session to session and match in appearance when viewed on another user's system.

The initial calibration process should get your display close to an idealized state. The next step is to build a display profile that describes how well the display actually performs after it has been calibrated, which at a minimum describes the white point and chosen gamma. The more advanced LCD displays such as the Eizo ColorEdge and NEC Spectraview do provide hardware calibration for a more consistent and standardized output, but the only adjustment you can make on most LCD displays is to adjust the brightness. Some may allow you to adjust the RGB colors, but these controls are best left alone.

Calibration hardware

Let's now look at the practical steps for calibrating your display. First, get rid of any distracting background colors or patterns on the computer desktop. Consider choosing a neutral color theme for your operating system. On a PC, go to Control Panels ⇒ Appearance & Personalization ⇒ Window Color and Appearance. I suggest you choose the Graphite theme and adjust the Color Intensity slider as desired (Figure 2).

The only reliable way to calibrate and profile your display is to use a hardware calibration system. Some displays, such as the LaCie range can be bought with a bundled hardware calibrator, but there are many other types of stand-alone calibration packages to consider. The ColorVision Spyder4 series are affordable and sold with the software needed to perform a display calibration. More expensive is the basICColor Discus (though much recommended by some experts). Colorimeter devices can only be used to measure the output from a display. Unlike the more expensive spectrophotometers, you can't use them to measure print targets, but when it comes to profiling a display they are just as good.

The X-Rite product range includes emissive spectrophotometers that can measure all types of displays and build printer profiles too when used in conjunction with X-Rite, or other calibration software (see Figure 3). For example, the ColorMunki Photo is an integrated calibration/profiling device that can work with everything, including LCD projectors. If all you are interested in is calibrating and profiling a computer display there is no great advantage in choosing a spectrophotometer over the more economically priced colorimeter devices. Whatever you do, I certainly advise you to include a calibrator/software package with any display purchase.

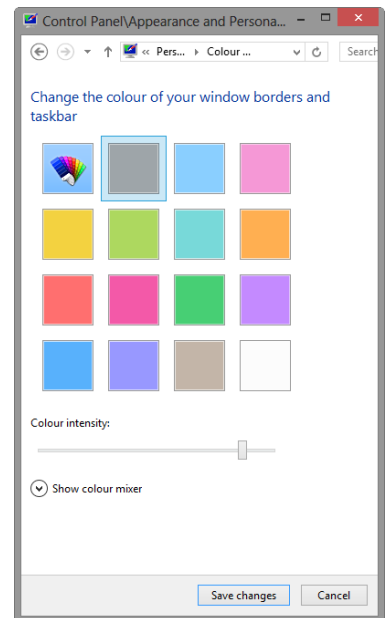


Figure 2 The operating system Appearance options for Windows.



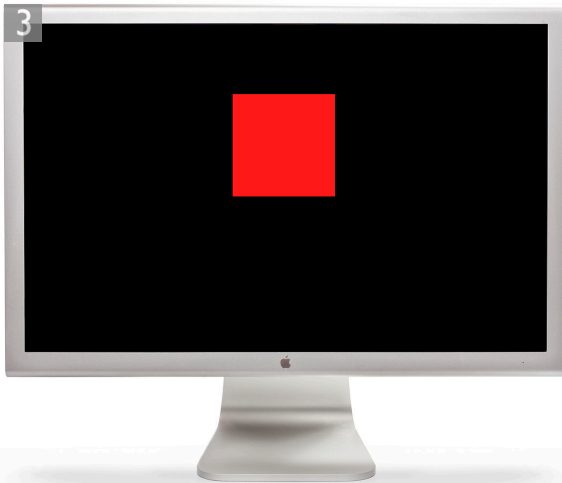
Figure 3 At work I use an X-Rite i1 Pro 2 spectrophotometer to calibrate and build an ICC profile for my displays.



1 An uncalibrated and unprofiled display cannot be relied on to provide an accurate indication of how colors should look. Many displays default to using an over-bright luminance setting



2 The calibration process simply aims to optimize the display for brightness and get the luminance within a desired range.



3 The profiling process takes into account the target white balance and gamma. The profiling process also measures how a broad range of colors are reproduced on the display. These will appear one at a time, ready to be measured by the device.



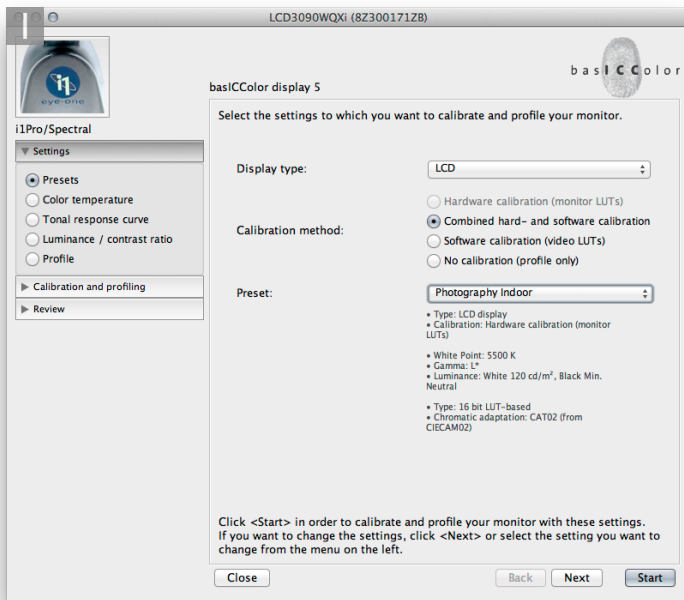
4 To create a profile of this kind you need a suitable colorimeter device plus appropriate software. There are a number of devices that can be used to do this, such as the i1 Display Pro from X-Rite. Once calibrated and profiled, you will have a computer display that can be relied upon when assessing how your colors will reproduce in print.

The calibration/profiling procedure

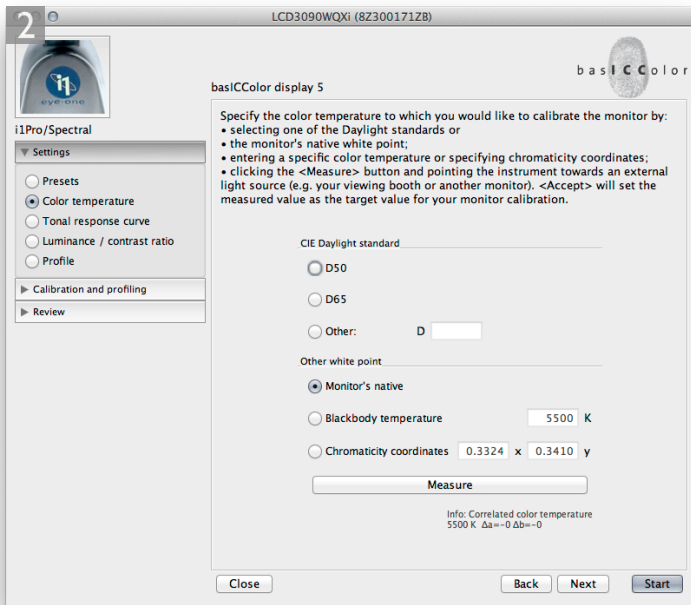
Over the next few pages I have shown how to use the basIColor software with an X-Rite i1 calibration device.

When you click on the Start button (see Step 5), the software will start flashing a series of colors on the screen, while the calibration device measures these. Once completed this will generate a new profile, ready for use as the new display profile, replacing the previous one. You might also want to set a reminder for when the next monitor profile should be made. With LCD displays, regular calibration is not quite so critical and it will probably be enough for you to profile the display once a month. Also, do you really need to hang on to your old display profiles? I recommend that you purge the Colorsync Profiles folder on your system of older display profiles to avoid confusion. All you really need is one good, up-to-date profile for each display.

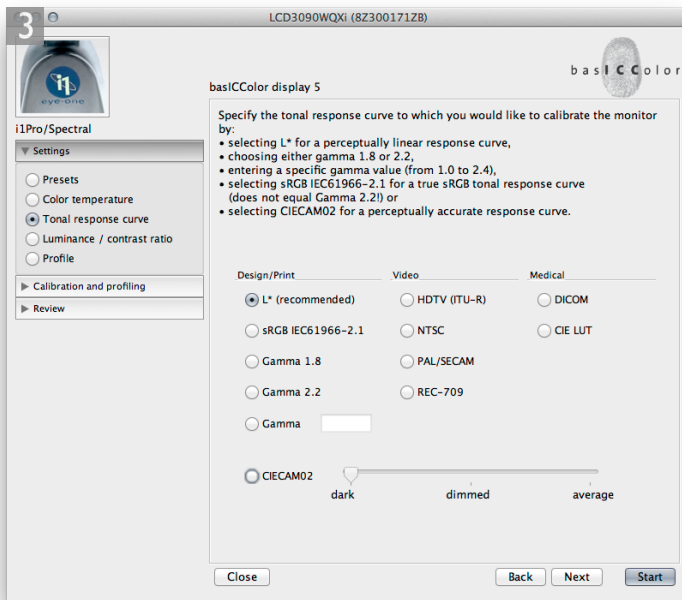
Other calibration software packages will differ of course, but the basic principles should be similar to other software programs. Also, check out the special offer from Colourmanagement.net at the back of the Photoshop for Photographers book, who are a distributor for basIColor.



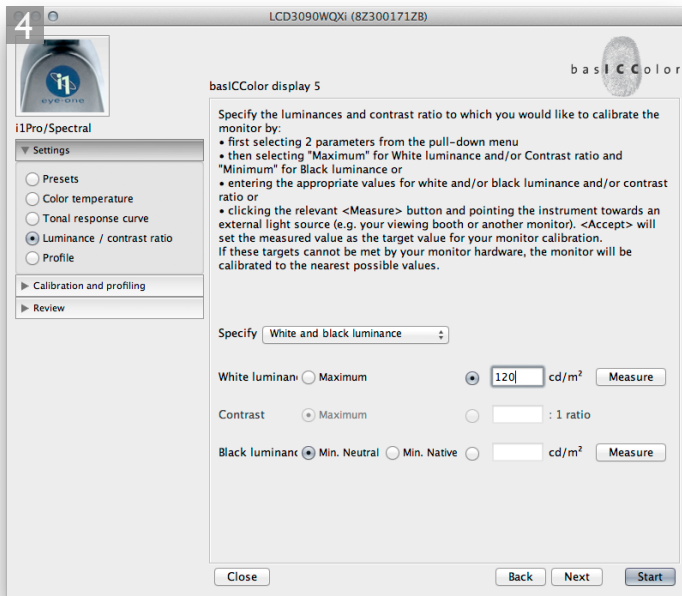
1 This first screen asks you to establish which type of display you wish to calibrate and profile. With this particular software you can click the 'Express' button to create a suitable display calibration, or click 'Next' to configure the settings manually.



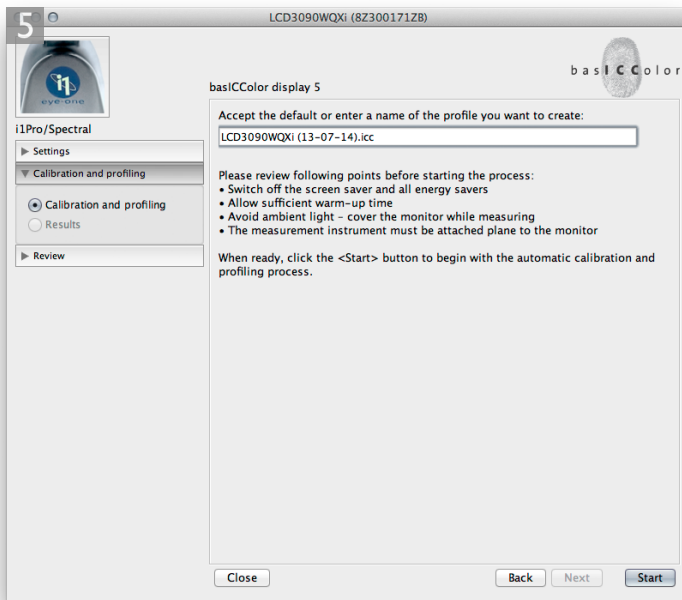
2 To begin with I set the white point to 'Monitor's Native'. You could choose a target setting such as D65, but native is usually best for an LCD display.



3 Next, I set the target gamma to L* (as recommended by the basICColor software). In some cases you might want to select 'Gamma 2.2', or 'Native Gamma (if available). iMac displays are probably better off being calibrated using gamma 2.2.



4 In the Luminance section I set the Maximum luminance to 120 candelas per m². You might want to opt for a setting of 140 CD/m² if working in a bright room environment.



5 Having named the profile, I clicked the Start button. The software then measured a sequence of colors flashed up on the display and from this built an ICC profile. This would be automatically saved to the correct system folder and picked up by the system and referenced by Photoshop's color management system.

White point

The white point information tells the video card how to display a pure white on the screen so that it matches a specific color temperature. Unlike the old CRT displays, it is not possible to physically adjust the white point of an LCD screen. For this reason, it can often be better to select the native white point option when calibrating an LCD display (as shown in Step 2 on page 10), rather than calibrate to a prescribed white point value. Remember that all colors are seen relative to what is perceived to be the whitest white in a scene and the eye naturally compensates from the white point seen on the display to the white point used by an alternative viewing light source.

There is a lot of seemingly conflicting advice out there on how to set the white point in a calibration setup. In the days when CRT displays were popular there was a choice to be made between a 5000K and a 6500K white point for print work. My advice then was to use 6500K, since most CRT displays would run naturally at a white point of 6500K, although some people regarded 5000K as being the correct value to use for CMYK proofing work. In reality though, the whites on your display will appear more yellow at this setting, especially when working with

Eyeball calibration

Another option is to use a non-device calibration method, such as the Display Calibration Assistant that is part of the Mac OS X operating system. This is better than doing nothing, but is still no substitute for proper hardware calibration and profiling. If you don't invest in a calibration/measuring device, your only other option is to load a canned profile for the display and keep your fingers crossed. This approach is better than doing nothing but rarely all that successful, so I would still urge you to consider buying a proper calibration device and software package.

ambient daylight coming into the room. 6500K may be cooler than the assumed 5000K standard, but 6500K has proved to be much better for image editing viewing. These days, most LCD displays have a native color temperature that is around 6000–7000K and it is also considered OK to choose the native white point when calibrating and profiling an LCD display, especially if the native white point is fairly close to a 6000K or 6500K target.

The main thing to remember here is that your eyes adjust quite naturally to the white point color of any display, in the same way as your eyes constantly adjust to the fluctuations in color temperature of everyday lighting conditions. Therefore, your eyes will judge all colors relative to the color of the whitest white, so the apparent disparity of using a white point for the display that is not exactly the same as that of a calibrated viewing lightbox is not something you should worry about. As I say, when it comes to comparing colors, your eyes will naturally adapt as they move from the screen to a viewing lightbox.

Gamma

The gamma setting tells the video card how much to adjust the midtone levels compensation. You sometimes have just three options to choose from here: 1.8, 2.2 or Native Gamma. Quite often you are told that PC users should use 2.2 gamma and Macintosh users should use 1.8 gamma. But 2.2 can be considered the ideal gamma setting to use regardless of the system you use. If you like you can build a correct display profile using a 1.8 gamma option, but 2.2 is closer to the native gamma of most displays. In fact, you'll often be recommended to select the 'Native Gamma' option at this point. If you choose 'native' you can create a satisfactory display profile without forcing the video card to stretch the display levels any more than is necessary. However, when using the basIColor software you can select the L* option. The technical reason why this is recommended is because L* uses the luminance tone axis as prescribed in the Lab color space – it's better because it more closely matches human perception and provides a more linear gray axis.

Note that the gamma you choose when creating a display profile does not affect how light or dark an image will be displayed in Photoshop. This is because the display profile gamma only affects how the midtone levels are distributed. But the gamma setting will affect the appearance in other non ICC-savvy programs. Whether you use a Mac or PC computer, you should ideally choose the Native gamma, Gamma 2.2, or L* (as shown in the following steps). It is also important to allow the display to warm up first for around 5 minutes or so after being just switched on or woken up from sleep.

Luminance

You need to make sure that the brightness of the LCD display is within an acceptable luminance range. The target luminance will vary according to which type of display you are using. A typical modern LCD display will have a luminance of 250 candelas per m² or more at its maximum luminance setting, which is way too bright for image editing work in subdued office lighting conditions. A target of around 120–140 candelas per m² is ideal for a desktop LCD display. For laptop computers, the ideal luminance to aim for is around 100–110 CD/m².

It's important to note that as displays get older they tend to lose brightness, which is one of the reasons why you'll need to use a calibration device to recalibrate the display from time to time. There may also come a point where the display becomes so dim that it can no longer be successfully calibrated or considered reliable enough for Photoshop image editing.

Profiling summary

Let me summarize why you should pay special attention to how your images are displayed in Photoshop and why good color management is essential.

These days the only real option is to buy a good quality LCD display that is designed for graphic use. Once you have chosen a good display you need to consider how you are going to calibrate and profile it. This is crucial and if done right it means you can trust the colors you see on the display when determining what the print output will look like. In the long run you are going to save yourself an awful lot of time and frustration if you calibrate and profile the display properly right from the start. Not so long ago, the price of a large display plus a decent video card would have cost a small fortune and display calibrators were considered specialist items. These days, a basic display calibration and profiling device can cost about the same as the purchase of a couple of external hard drives, so I would urge anyone setting up a computer system for Photoshop to put a display calibrator and accompanying software package high on their spending list.

All the display calibrator products I have tested automatically place the generated display profile in the correct system folder so that you are ready to start working straight away in Photoshop with your display properly calibrated and with the knowledge that Photoshop automatically knows how to read the profile you have just created.

Is the display too bright?

These days, some LCD displays can be way too bright for digital imaging work. Brand new LCD displays do lose their brightness after a 100 hours or so of use, which may make them more usable. However, some of the new glossy displays appear to be incapable of revealing detail in the extreme highlight range. The thing is, these types of displays may look great for playing video games and watching TV, but they are not ideal for image editing work.

Color management settings

One of the very first things you should do after installing Photoshop is to adjust the color management settings. The default Photoshop Color Settings are configured using a general setting for the region you live in, which will be: North America, Europe or Japan. If you are using Photoshop for design work or photography, you will want to change this to a regional 'prepress' setting. Go to the Edit menu and select Color Settings, which opens the dialog shown in Figure 4. Next, go to the Settings menu and select one of the prepress settings. The individual prepress settings only differ in the default RGB to CMYK conversions that are used, and these will depend on the geographical area you are working in. If you live and work in the US, choose North America Prepress 2 and you will mostly be fine with that setting. Please note that choosing a prepress setting changes the RGB working space from sRGB to Adobe RGB. This is a good thing if you intend editing RGB photographs in Photoshop (although I would personally

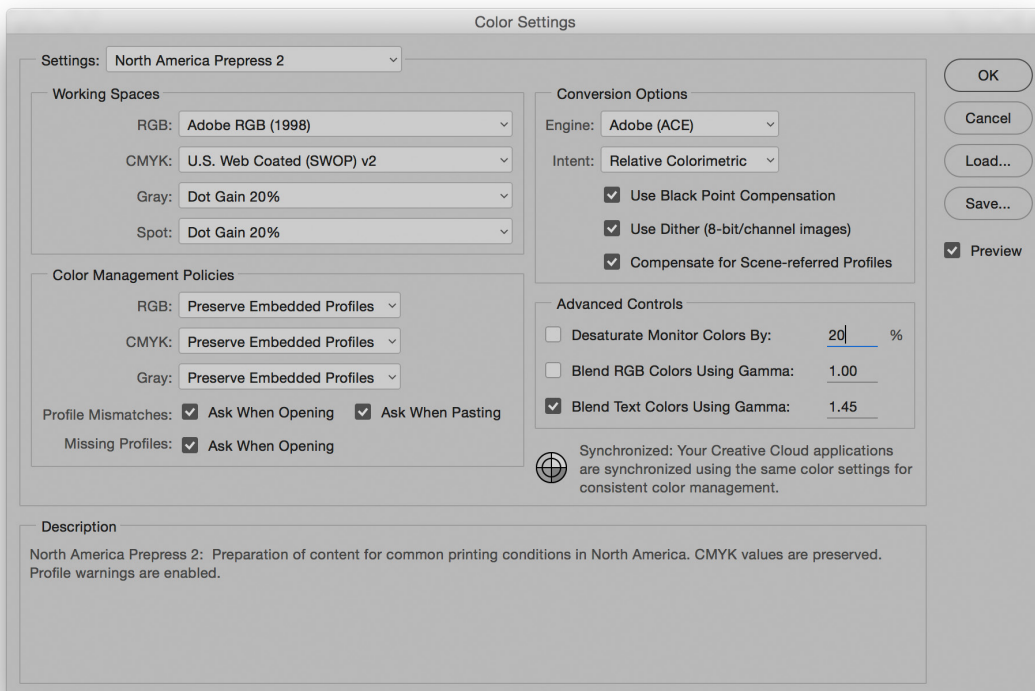


Figure 4 The Photoshop Color Settings. All the Photoshop color settings can be managed from within this single dialog (**⌘ Shift K** [Mac] **ctrl Shift K** [PC]) and shared with other Creative Suite applications (see Figure 5).

recommend using ProPhoto RGB). The prepress settings also adjust the policy settings so as to preserve embedded profiles and alert you whenever there is a profile mismatch. I would also suggest you turn off the 'Ask When Opening' option in the Profile Mismatches section. This minimizes the number of times you are shown the profile mismatch warning dialog when working with image files that are in different color spaces. When you customize the color settings presets in this way, the preset menu will say 'Custom.' I suggest that you then save and name this preset so that these settings are easy to access in future.

Once this is done, the Color Settings will remain set until you change them. After that, all you need to worry about is making sure that the calibration and profile for your display are kept up-to-date. If you follow these recommended steps you won't need to worry too much more about the ins and outs of Photoshop color management until you are ready to. If you would like to learn more about the color management in Photoshop please refer to the Color Management chapter in the book. Color management does not have to be intimidatingly complex and nor does it have to be expensive. So the question is, do you want good color or simply OK color? Or, to put it another way, can you afford not to?

Color managing the print output

This leaves the question of how to profile the print output? Getting custom profiles built for your printer is a good idea, and it is a topic that I have covered in some detail in the Color Management chapter (as well as the PDF on the book website). However, calibrating and building a profile for your display is by far the most important first step in the whole color management process. Get this right and the canned profiles that came with your printer should work just fine. Follow these instructions and you should get a much closer match between what you see on the display and what you see coming out of your printer, although without doubt, a custom print profile will help you get even better results.

Synchronizing the Color Settings

If you are using other programs that are part of the Adobe Creative Suite, such as Illustrator and InDesign, it is a good idea to keep the Color settings synchronized across all of these programs (see Figure 5). Once you have selected a desired color setting in Photoshop, I suggest you open Bridge and synchronize the Color Settings there too. This ensures that the same color settings are used throughout all the other programs in the Creative Suite.

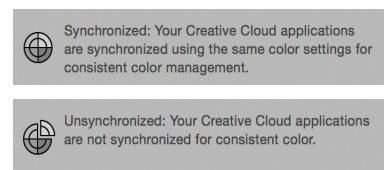


Figure 5 The pie chart icon in the Color Settings dialog tells you if the Color Settings have been synchronized across the Creative Suite or not.

Chip speed

Microchip processing speed is expressed in GigaHertz, but speed also depends on the chip type. So speed comparisons in terms of the number of megahertz are only valid between chips of the same series. Many of the latest computers are enabled with multiple processors, although having extra cores is mainly beneficial when running certain types of filter operations. Another crucial factor is the bus speed, which refers to the speed of data transfer from RAM memory to the CPU (the central processing unit, i.e. the chip). CPU performance can be restricted by slow system bus speeds, so faster is definitely better, especially for Photoshop work when processing large chunks of data. Photoshop can now take advantage of OpenGL (and now OpenCL) enabled video cards to speed up some aspects of Photoshop's image processing.



Figure 6 Wacom™ pad and pen.

Extras

Devices such as a graphics tablet, external hard drive and other peripheral devices can be connected using one of the following interfaces. USB is now a universal interface connection for Mac and PC. The USB 3 interface is really fast and you can have up to 127 USB devices linked to a single computer. Apple also has, in conjunction with Intel, a proprietary interface called Thunderbolt, which offers data transfer speeds of up to 20 Gbits/s and can be used to transfer data for both hard drives and displays. When coupled with OpenCL and OpenGL, it provides overall increased performance. Overall, USB 3 is the more universal and offers suitably fast data speeds for Photoshop work when reading and writing files to a disk.

Graphics tablets

I highly recommend you get a digitizing graphics tablet like the one shown in Figure 6. A pressure sensitive tablet device can make drawing work easier, and can be used alongside the mouse as an input device. Bigger is not necessarily better though. Some people like using the A4 sized tablets, while others find it easier to work with an A5 or A6 tablet. You don't have to move the pen around so much with smaller pads and these are therefore easier to use for painting and drawing. Once you have experienced working with a pen, drawing with the mouse is like wearing boxing gloves! The latest Wacom range now features a cordless mouse with switchable pens. The Wacom Cintiq™ device is a combination of LCD monitor and digitizing pen pad. I don't know if it is the best way of working with photographs, but there are certainly those who reckon it makes painting and drawing a more fluid experience.

Backing up your image data

The Mac and PC operating systems encourage you to place all your image files in the users 'Pictures' or 'My Pictures' folder. This might work fine if all you are shooting are JPEG snaps, but it is unlikely to suffice once you start capturing lots of raw images. So your first consideration should be to store your image files on hard drives that have plenty enough capacity to anticipate your image storage needs for at least the next few years. The next thing you need to consider is how accessible is your image data? Suppose a power supply unit failure or some other glitch prevented you from turning on the computer? For this reason I find it is helpful to store important image data on drives that can easily be accessed, or removed. One solution is to store your data on separate internal hard drives where the drive caddies can easily be swapped over to the internal bay of another computer, or bay enclosure. Or, you can store the data on external hard drive units that can simply be plugged into another computer.

The next thing is to implement a backup strategy for your images and other important data files. For each main hard drive you should have at least one matching sized external hard drive that you can regularly back up the data to. These hard drives should be kept somewhere safe so that in case of a fire or theft you have access to recently backed up versions of all your essential data. Another suggestion is to have two external backup drives for each main drive. That way you can swap over the backup drives and continually have a secondary backup version stored permanently off-site, or kept in a fire proof safe.

During Photoshop's lifetime we have seen many different storage systems come and go: floppy disks, Syquests, Magneto Optical... the list goes on. Although you can still obtain devices that are capable of reading these media formats, the question is, for how long? What will you do in the future if a specific hardware device fails to work? CD/DVD media has provided a reasonably consistent means of storage and for the last 20 years nearly all computers have been able to read CD and DVD discs. However, for all the advantages of DVD (and now Blu-ray), how many people are still bothering to archive this way? For example, how long will the media discs themselves last? It is estimated that aluminium and gold CD discs could last up to 30 years, or longer, if stored carefully in the right conditions such as at the right temperature and away from direct sunlight, while DVD discs that use vegetable dyes may have a shorter life-span. I wouldn't bet on DVD or Blu-ray media providing a long-term archive solution. The one advantage write once media has over hard drive storage is that your data is protected from the prospect of a virus attack. If a virus were to infect your computer and damage your data files, a backup procedure might simply copy the damage over to the backup disks.

Cloud storage

Cloud computing, including cloud storage, is becoming more widely used these days. Most photographers tend to have storage requirements that run to at least several gigabytes and cloud storage is something that is often thought of as both pricey and slow. However, with plans to deliver broadband speeds at ever higher rates, we should see this becoming more of a realistic proposition for professional users.

Photoshop now includes the ability to save files as cloud documents, which is a topic I discuss in the main book. Adobe also provide cloud storage as part of the Lightroom CC package, whereby Lightroom photos can be accessed and shared via the cloud.

Protecting the power supply

It is inevitable that you will at some point suffer an interruption to the power supply. There is at least an option to enable background saving, which can mitigate the worst consequence of a power failure: the loss of everything you have just been working on. Even so, it is not a good idea to let the computer be affected by a sudden loss of power or power surge. I therefore suggest you purchase a suitable Uninterruptible Power Supply Unit (UPS). You need to make sure that the unit you buy can handle the power demands of at least the main computer, display and powered hard drives. In my office I have my main computer setup powered via an APC Back-UPS ES-700 unit.

Vampire power

Have you ever stopped to think how much electric power your computer workstation consumes, and of that how much is wasted? The statistics are quite alarming. Countries around the world have come up with different statistics, but it is estimated that between 7% and 13% of residential power is consumed by household appliances being left on standby mode. Of course, some of those items, such as security alarm systems, have to be left on standby mode full-time. In a typical office it is possible to accumulate a large number of electrical items, especially all the power bricks that are used to power individual hard drives and other computer accessories. It's a real problem and one that I have only partially managed to resolve by copying the data from a lot of my external drives onto bigger, single drive units and connecting all the lesser-used appliances to a switchable power strip.

Photoshop preferences

The Photoshop preferences are located in the Edit menu in Windows and the Photoshop menu in Mac OS X and these let you customize the various Photoshop functions. A new preference file is generated each time you exit Photoshop and deleting or removing this file will force Photoshop to reset all of its preference settings. The preference file is stored along with other program settings in the system level Preferences folder: Users/Username/Library/Preferences folder (Mac) or C:\Users\Username\AppData\Roaming\Adobe\Adobe Photoshop\Adobe Photoshop Settings folder (PC). If you are unable to locate the users folder this may be because the most current Mac and PC systems opt to hide the inner workings, such as user system folders. On the Macintosh operating system, in the Finder, hold down the **alt** key and mouse down on the Go menu. This reveals the user's Library folder. Once found, it's a good idea to create a shortcut for future use. On Windows, go to the Control Panel and choose 'Appearance and Personalization.' In the following dialog go to 'Folder Options' and click on 'Show hidden files and folders.' This will offer options that lets you determine which items remain hidden.

Resetting the preferences

Once you have configured your preferences and got everything set up just the way you want and ensure these Preferences are applied, quit and restart Photoshop. This forces Photoshop to save these preferences as it updates the preference file. I suggest you then make a duplicate of the Photoshop preference file and store it somewhere safe. Having ready access to a clean preference file can speed up the resetting of the Photoshop settings should the working preference file become corrupted.

If you hold down **⌘ ⇧ Shift** (Mac), **ctrl alt Shift** (PC) during startup cycle, this pops a dialog box that allows you to delete the current Photoshop preference file. This is useful if you are having problems with Photoshop's performance and you reckon the current preference file is the cause of the trouble.

General preferences

When you open the preferences you will first be shown the General preferences (Figure 7). I suggest you leave the Color Picker set to Adobe (unless you have a strong attachment to the system Color Picker). Photoshop has a HUD (Heads Up Display) Color Picker with options for selecting new colors when working with the eyedropper or paint tools (Figure 8).

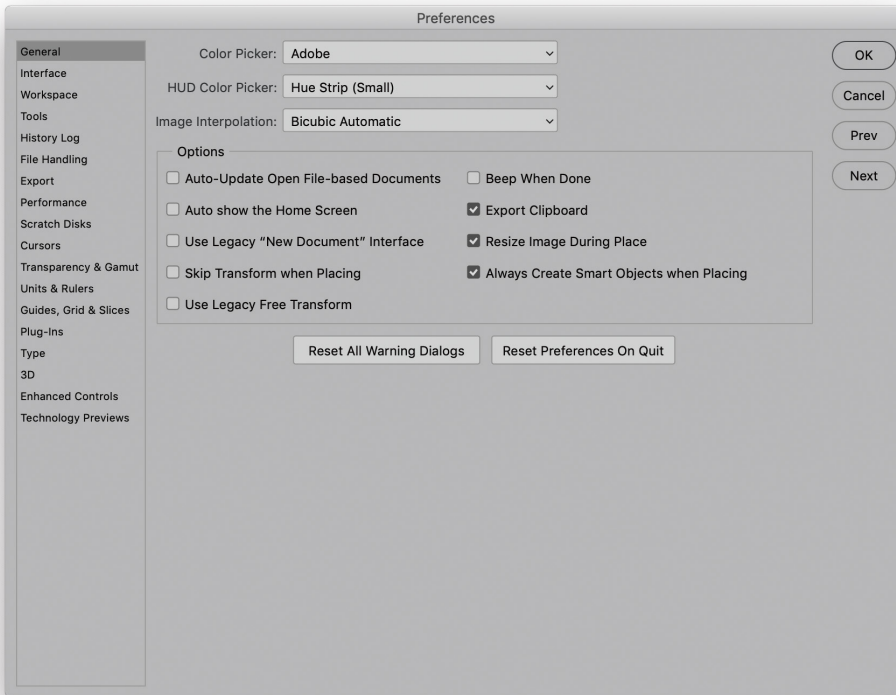


Figure 7 The General preferences dialog.

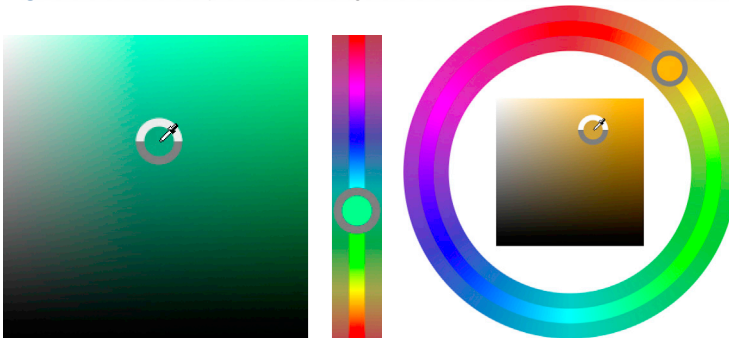





Figure 8 The Heads Up Display Color Picker. The two main heads up display options are the Hue Strip (middle) and the Hue wheel (right).

When any paint or fill tool is selected, you can hold down the   **ctrl** keys (Mac), or hold down the  **Shift** keys and right-click (PC), to open the Heads Up Display Color Picker. These are available in different sizes from the HUD Color Picker menu. Note that the HUD Color Picker is only accessible when the Graphics Processor Settings are enabled (see page 53). The default now in the Image Interpolation menu is Bicubic Automatic. If you need to override this setting you can always do so via the Image ⇨ Image Size dialog.

In the main Options section, 'Auto-Update Open Documents' can be used if you know you are likely to share files that are open in Photoshop but have been updated by another application. This used to be important when ImageReady was provided as a separate Web editing program to accompany Photoshop, but has less relevance now and can be left switched off.

Uncheck 'Auto show the Home Screen' if you wish to keep this hidden. Checking 'Use Legacy "new Document" Interface' can be used to disable the new style New Document dialog and revert to the old one. Check 'Skip Transform when Placing' if you don't need to see the Transform bounding box to adjust the placed image scaling and check 'Use Legacy Transform' if you prefer to use the old style transform user interface.

Only check the 'Beep When Done' box if you want Photoshop to signal a sound alert each time a task is completed. If you need to be able to paste the Photoshop clipboard contents to another program after you exit Photoshop then leave the 'Export Clipboard' box checked. Otherwise, I suggest you switch this off. When the 'Resize Image During Place' preference item is checked, if you use File ⇨ Place... to place a photo in a document that is smaller than the placed image, the placed file is placed in a bounding box scaled to the dimensions of the target image. 'Always Create Smart Objects when Placing' allows you to drag a Photoshop compatible file directly from the Finder/Explorer or from Bridge to place it as a new layer in an open document.

You will often come across warning dialogs in Photoshop that contain a 'Don't Warn Me Again' checkbox. If you have at some stage clicked in these boxes to prevent a warning dialog appearing again you can undo this by clicking on the 'Reset All Warning Dialogs' button in the General preferences. If you click on the 'Reset Preferences on Quit' button this will pop a dialog warning this will reset all preferences. It is a useful option if you are confused and want to reset everything to the default settings again.

Interface preferences

The Interface preferences are shown in Figure 9. The Photoshop interface can be customized, allowing you to choose from one of four different panel brightness settings. These range from a light gray theme that is not too different from the old ‘classic’ Photoshop interface, to three progressively darker themes. This is something that I discuss in the following section, where I point out how important it is to change the default interface settings in order to establish a suitable interface brightness and canvas color for photo editing work. Next to this is the Highlight Color menu where you can choose between the Default gray (Figure 10) and Blue Highlight Color option (Figure 11).

The outer canvas areas can be customized by selecting alternative colors from the Color menus. You can also adjust the border, which can be shown as a drop shadow, thin black line, or with the border style set to ‘None’.

Color Theme Easter egg

If you **Shift+alt**-click the Color Theme swatches you can temporarily make these display as bread icons!

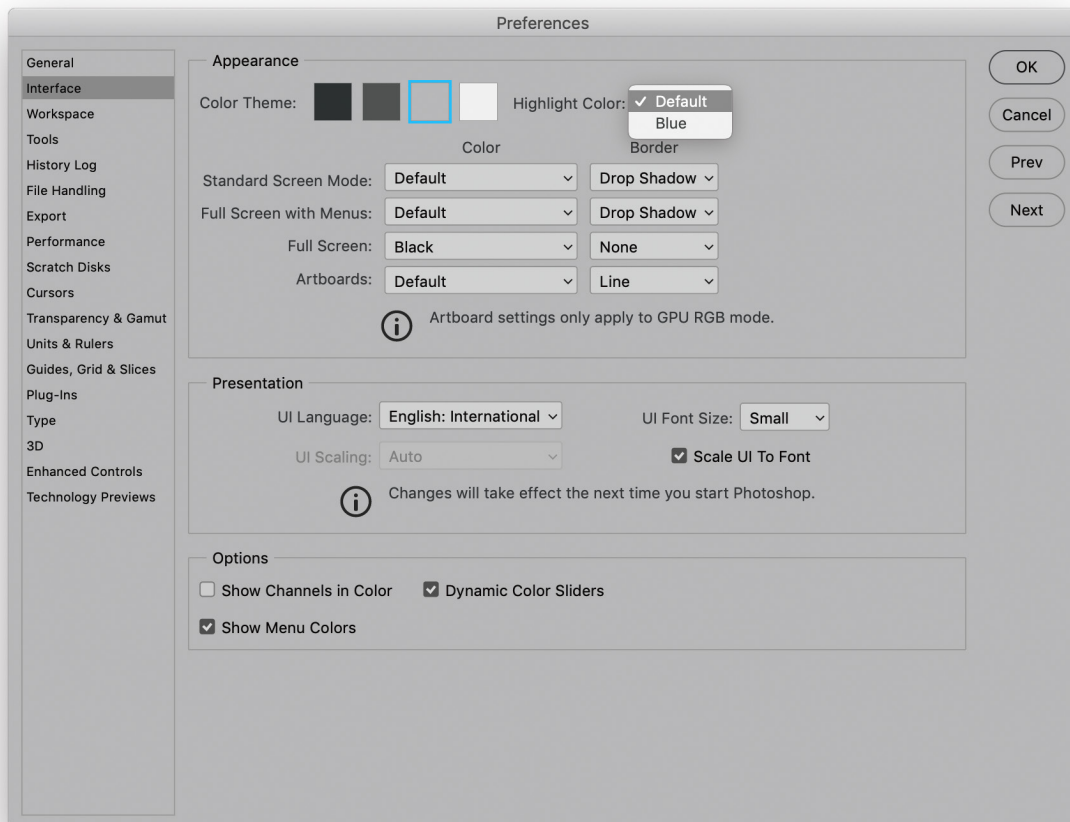


Figure 9 Interface preferences.

Presentation settings

The Presentation section lets you choose an alternative UI language (if available) and UI Font size. The default UI Font size setting is 'Small' (10pt), which some users may find plenty big enough. However, more and more people are these days using large, high resolution LCD displays, which are only really designed to operate at their best when using the finest resolution setting. This can be great for viewing photographs, but the downside is that the application menu items are getting smaller and smaller. Therefore, the UI Font Size menu lets you customize the size of the smaller font menu items in Photoshop so that you don't have to strain your eyes to read them. For example, when using a large LCD screen, the Medium (11pt) or Large (12pt) font size option can make it easier to read the smaller font menu items from a distance.

The UI scaling menu is enabled if a high pixel density display is detected. This allows you to control how the Photoshop user interface is displayed on such devices. It should also be pointed out here that the font size is now consistent between the Mac and Windows platforms.

Options section

The 'Show Channels in Color' option is a somewhat redundant feature as it does not really help you visualize the channels any better. If anything it is a distraction and best left unchecked. Photoshop allows you to create custom menu settings and use colors to highlight favorite menu items, but this particular feature can be disabled by unchecking the 'Show Menu Colors' option. The 'Dynamic Color Sliders' option ensures that the colors change in the Color panel as you drag the sliders, which I suggest you keep checked.

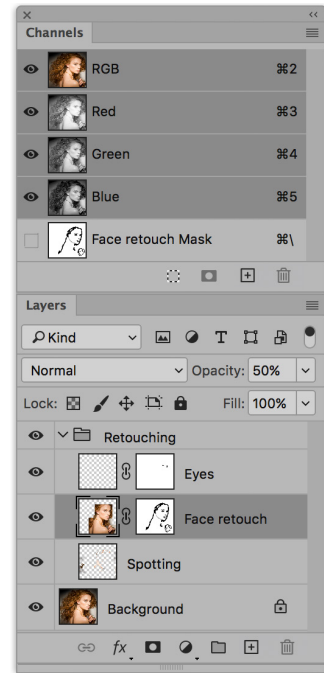


Figure 10 The Default Highlight color.

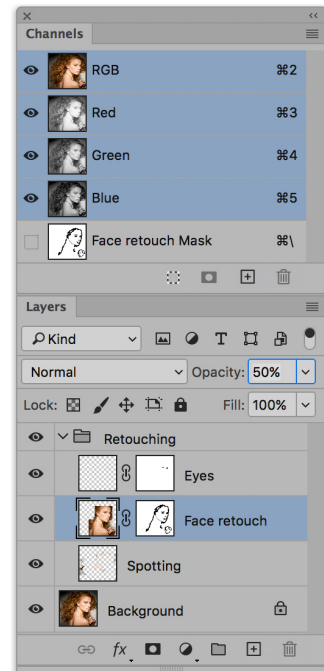


Figure 11 The Blue Highlight Color option.

User interface brightness

Photoshop CS6 saw the introduction of a new interface design, which offered newly-designed panels and icons and also four color themes with different levels of brightness. You can adjust the program's appearance via the Interface preferences shown in Figure 9 (and again in Figure 16). With macOS 10.13 and newer, Photoshop displays a dark title bar for floating document windows when the user interface brightness is set to one of the two dark settings.

Having the ability to adjust the brightness of the interface has to be a good thing. But, having said that, you do need to decide carefully which setting is right for the kind of work you do. By default, Photoshop uses a dark color theme and Figure 12 shows an example of how the Layers and Histogram Photoshop panels look when this is selected. Now, dark themes can look quite nice when they are implemented well. For example, in my view the Lightroom interface is a good example of a dark user interface design. But the thing to be aware of here is that the dark default setting in Photoshop isn't particularly easy to read, especially if you are working on a large display where the panel lettering can appear quite small (more of which later). More importantly, the default canvas color is linked to the interface brightness setting. In the case of the dark default, it's almost completely black and this can certainly lead to problems when editing photographic images because how we perceive tone and color is very much dependent on what surrounds the image.

To show you what I mean, take a look at the photograph in Figure 13. Do you think it looks OK? Now compare this with the Figure 14 version. Does it still look the same when viewed against white? Actually, I adjusted these two versions of the photograph separately using a Curves adjustment to obtain what I thought looked like the best-looking result, first against the black background and then against white. You can see a comparison of these two versions, both displayed against a neutral gray background (Figure 15). The black canvas background edited version is on the left and the white canvas background version is on the right. Do they still look the same to you? As you can see, although these image views each looked fine when viewed against a black or white background, when you compare them side by side, you can see that the canvas color choice has made quite a difference to how the image is perceived when making those all-important tone adjustments. This highlights the fact that the canvas color can greatly affect the edit decisions we make.

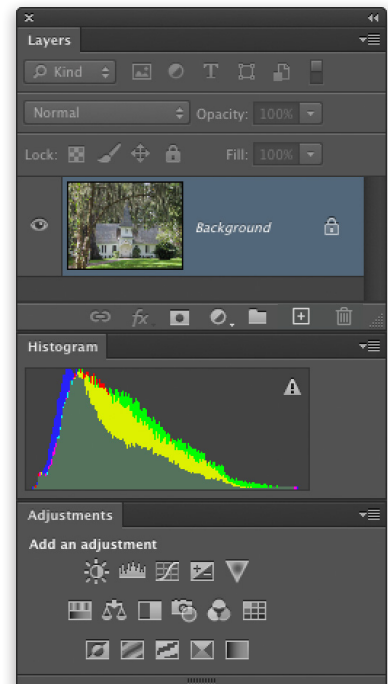


Figure 12 This shows an example of how the Photoshop panels look when the default UI setting is selected.

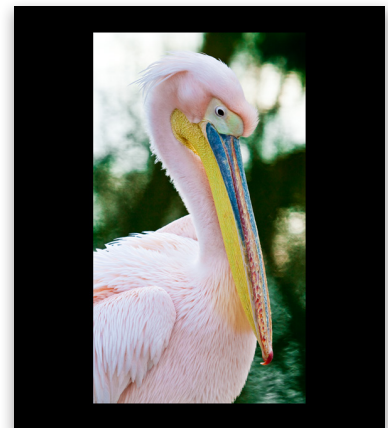


Figure 13 This shows an image that was curves adjusted while viewed against a black canvas color.

What you have to understand here is that Photoshop is a program that's used by a wide variety of customers. For example, those who work with video will find a dark interface works well for them. This is because the work they produce is intended to be viewed in dark surroundings. Photographers on the other hand will primarily be interested in the way their photographs will look when printed, which is most likely to be against a paper white background.

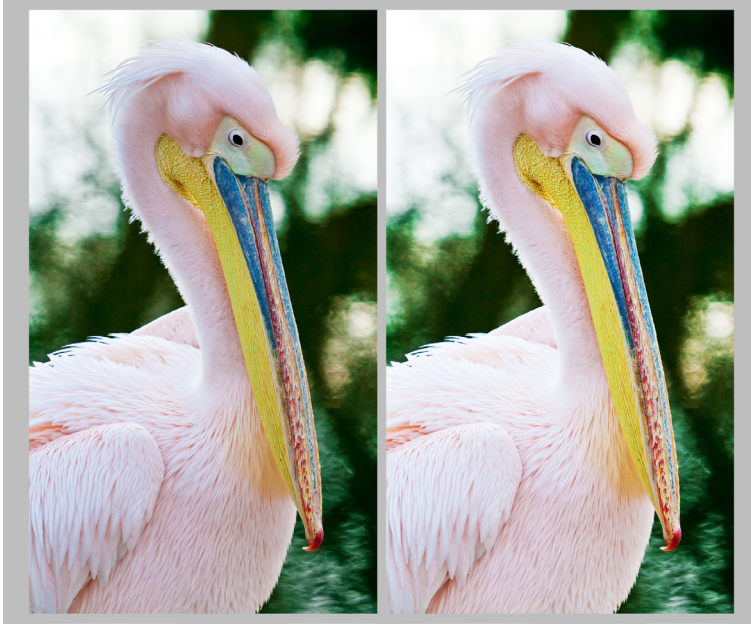


Figure 15 Here, you see how the image views shown in Figure 14 and Figure 15 looked when compared alongside each other using the 'Light Gray' canvas color. Black is on the left and white is on the right.

Regardless of whichever interface theme you think looks nicest, I strongly recommend you customize the Photoshop canvas color to make it suitable for photo editing work. To do this, choose Photoshop ⇨ Preferences ⇨ Interface... (Mac), or Edit ⇨ Preferences ⇨ Interface... (PC). This opens the dialog shown in Figure 16, where, if you go to the Standard Screen, Full Screen with Menus and Full Screen options you can click on the pop-up menu and choose an appropriate canvas color. If you would like to match the previous Photoshop canvas color, I suggest you choose the Light Gray option. Do this for each menu and click OK.

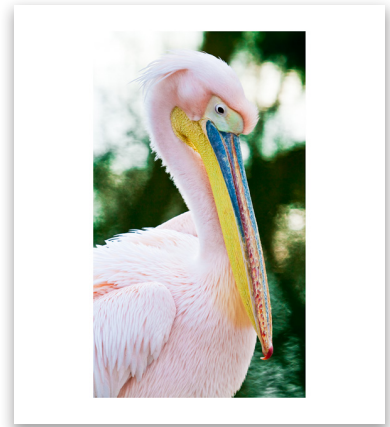


Figure 14 This shows the same image shown in Figure 13, but curves adjusted while viewed against a white canvas.

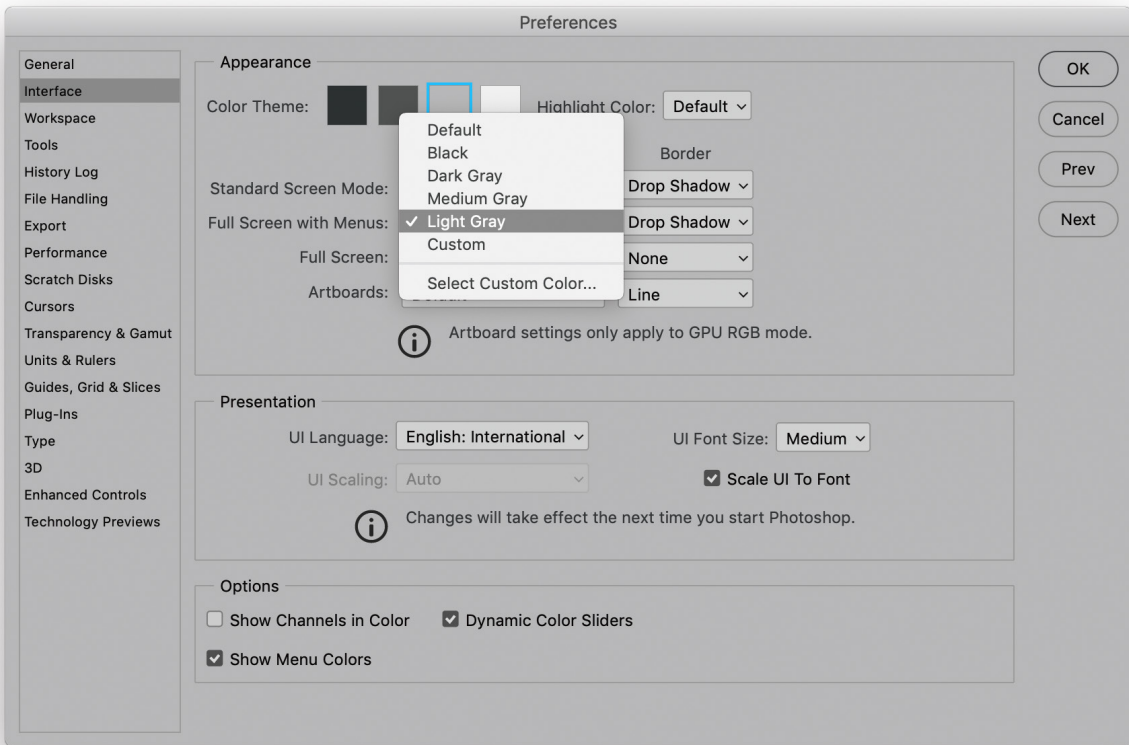


Figure 16 This shows the Photoshop Interface preferences, where you will want to edit the canvas color and set this to 'Light Gray'.

The other thing to consider is the legibility of the interface. Figure 17 shows a quick comparison of the different interface brightness settings. If you compare the Photoshop panel design with that used in CS5, you'll notice that the separation between the panels is less distinct and the panel lettering doesn't stand out so well. This isn't helped by the 'dark wash' effect as you select darker themes. The top row in Figure 15 shows examples of the four main brightness themes in Photoshop ranging from the lightest to the darkest. In the bottom row, the bottom left example shows how these same panels looked when viewed in Photoshop CS5. Next to this I selected the second darkest theme from the top row and captured this using the default small UI font size, next to it the medium UI font size and lastly, the large UI font size.

It seems to me that the lack of tone contrast in the overall interface tends to make the panels blend together. However, there are things you can do to further tweak the interface. You can adjust the UI font size (see Figure 16), although any changes you make here won't take place

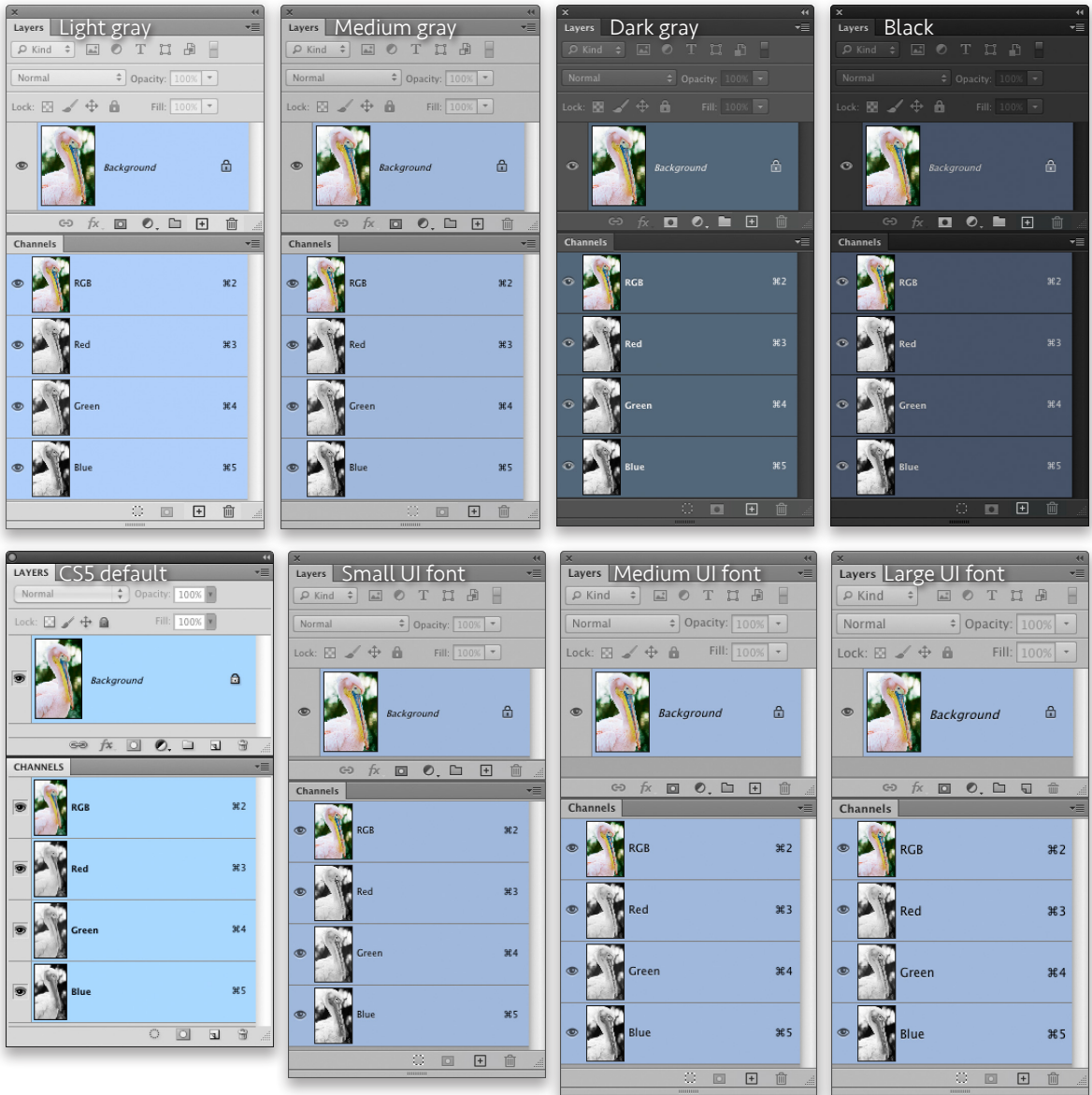


Figure 17 This shows a comparison of the different interface options.

until you relaunch Photoshop. As you can see in Figure 17, increasing the font size marginally increases the overall size of the panels, but certainly makes the lettering stand out more clearly. Throughout the book I mainly captured the screen shots using the medium light gray theme with a medium UI font size. I chose this combination to ensure the screen shots remained legible. I know from experience that dark UI screen shots can be notoriously difficult to reproduce well in print.

Workspace preferences

The Workspace preferences are shown below in Figure 18. In the Options section. The ‘Auto-Collapse Iconic Panels’ option allows you to open panels from icon mode and auto-collapse them back to icon mode again as soon as you start editing an image, while ‘Auto Show Hidden Panels’ reveals hidden panels on rollover.

When the ‘Open Documents as Tabs’ option is checked, new documents will open as tabbed documents, docked to a single document window in the Photoshop workspace. Uncheck this if you prefer the floating document window opening behavior.

When the ‘Enable Floating Document Windows Docking’ option is checked, you can drag one window to another as a tabbed document. Check Large Tabs to make the panel tabs bigger. This can be useful if working with a touch display, making the tabs more accessible.

Align UI option

Windows 10 users who are using a device paired with a stylus can access a ‘Align UI According to OS Settings’ option. This can be used to avoid having contextual UI items such as popup menus show up under your hand while you are drawing directly on the display. The OS settings can be accessed via the Ink & Stylus system preferences.

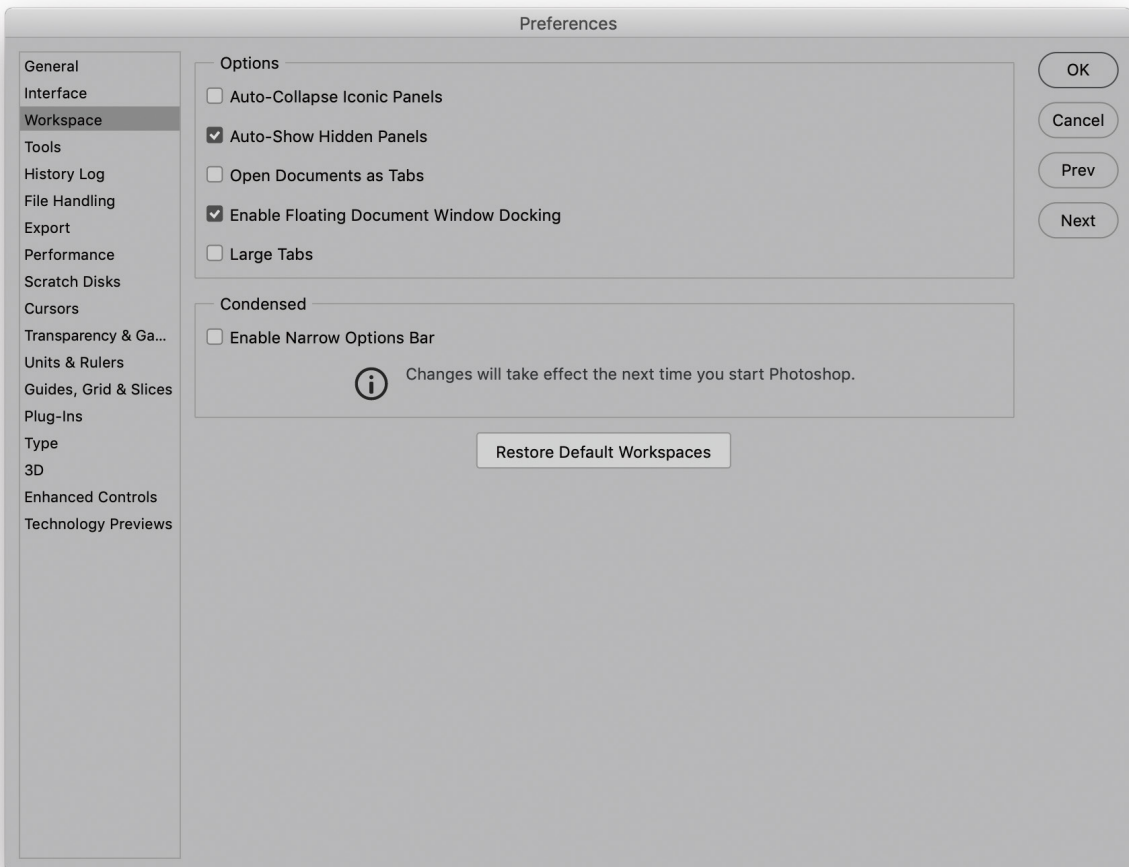


Figure 18 The Workspace preferences.

The 'Enable Narrow Options Bar' option is disabled by default (Figure 19). If you choose to enable and restart Photoshop, all check boxes and radio buttons in the Options bar will instead be displayed using Widgets (see Figure 20). The reason for this is to make the Options bar more visible for users who are working with localized versions of Photoshop on smaller displays.



Figure 19 The standard Options bar.

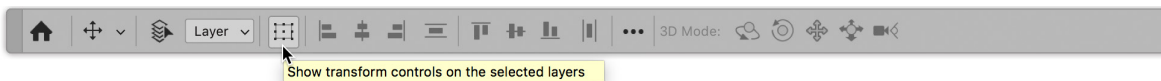


Figure 20 The Narrow Options bar. In this example, the 'Show Transform Controls' check box has been replaced by a widget. You can roll the mouse over to see a helpful reminder.

Tools preferences

The Tools preferences are shown in Figure 21. When 'Show Tool Tips' is checked a tool tips box will appear for a few seconds after you roll

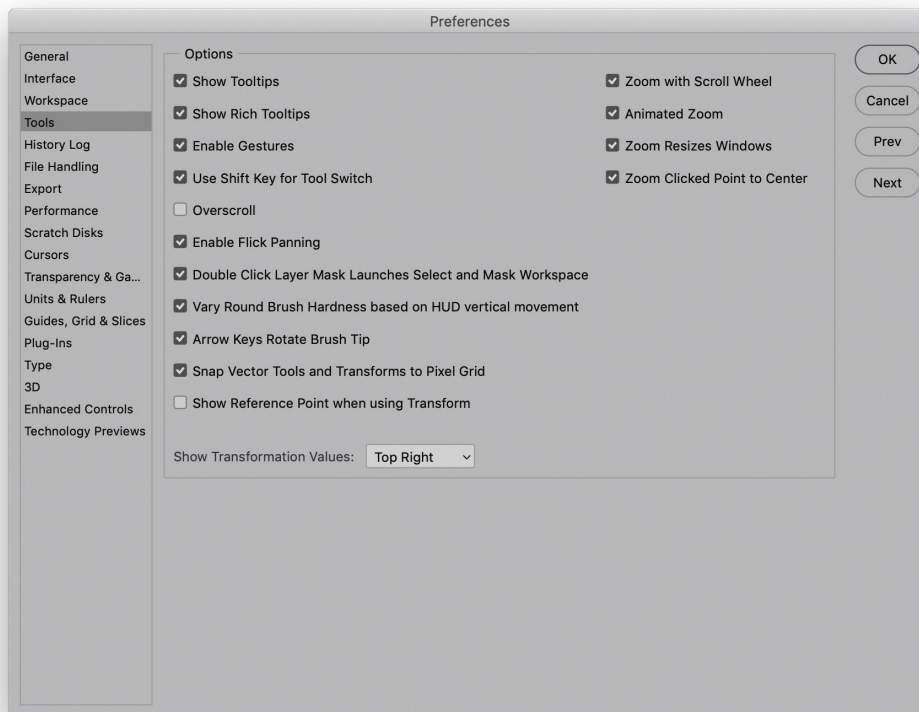


Figure 21 The Tools preferences.

over various items in the Photoshop interface. Tool tips are an excellent learning tool, but they can become irritating after a while, so you can use this checkbox to turn them on or off as desired.

If the 'Use Rich Tool Tips' option is also checked, this lets new users explore Photoshop without having to leave the program (see Figure 22). The Rich Tool tips show animated content that helps explain the function of each selected tool.

The 'Enable Gestures' option is relevant if you are using a laptop computer or have a trackpad device connected to your computer. One of the things you can do with a trackpad is to set it up to respond to specific finger gestures. But this can be both a good or a bad thing: some users have found it rather distracting when carrying out Photoshop work and prefer to switch this option off.

The 'Use Shift Key for Tool Switch' option answers the needs of those users who wish to disable using the **Shift** key modifier for switching tools in the Tools panel with repeated keystrokes.

If the 'Overscroll' option is enabled it means that when you are working in a regular document window, you now have the ability to overscroll the image to reveal the outer canvas area. Otherwise you can only do this while in one of the full screen view modes.

The 'Enable Flick panning' option is discussed in Chapter 1 in the book. This again is dependent on OpenGL being enabled for this option to take effect.

Checking 'Double Click Layer Mask Launches Select and Mask Workspace' provides another option to switch to the Select and Mask workspace. I cover this in detail in Chapter 8 of the book.

The 'Vary Round Brush Hardness on HUD Vertical Movement' determines what happens when you have a painting tool selected and you hold down the **ctrl alt** keys (Mac), or the **alt** key and right-click (PC) and drag. When this option is checked, dragging up or down varies the round brush hardness. When it is deselected, dragging up or down varies the brush opacity instead.

Selecting 'Arrow Keys Rotate Brush Tip' lets you use keyboard arrow keys to increase or decrease a brush tip angle.

'Snap Vector Tools and Transforms to Pixel Grid' does just what it says. 'Show Reference Point when using Transform' is now deselected by default, but can be re-enabled here in the preferences, or via the Tool Options bar.

'Show Transformational Values' refers to the heads up display you will have seen in the book screen shots for things like the marquee tools. Use this menu to disable, or change the position of the transform values relative to the cursor position.

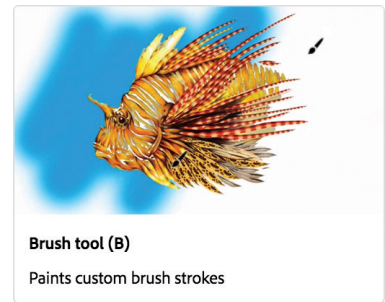


Figure 22 An example of a Rich Tool tip.

The ‘Zoom with Scroll Wheel’ option lets you zoom in and out using the scroll wheel on a mouse, Or your two-finger gestures on a Trackpad. When this option is selected, holding down the **Shift** key makes the zoom operate quicker. Instead of selecting this option you can also hold down the **alt** key to temporarily access the zoom wheel behavior. Note that if you do check the ‘Zoom with Scroll Wheel’ option, this may also affect track pad gestures. For example, Mac computers make no differentiation between a mouse scroll wheel movement and a two-finger motion gesture on a track pad. It may therefore be preferable to uncheck this if using the track pad for more straightforward navigation around an image, where inadvertent zooming would be annoying.

The ‘Animated Zoom’ option is another OpenGL only option, which is intended to provide smoother transitions on screen when using the **⌘ -** (Mac), **ctrl -** (PC), or **⌘ +** (Mac), **ctrl +** (PC) keys to zoom in or out. Also, check the ‘Zoom Resizes Windows’ option if you want the image window to shrink to fit whenever you use a keyboard zoom shortcut such as **⌘ -** (Mac,) **ctrl -** (PC) or **⌘ +** (Mac), **ctrl +** (PC).

When the ‘Zoom Clicked to Center’ option is checked, the image zooms in centered around the point where you click, and the best way to understand the distinction between having this option on or off is to see what happens when you click to zoom in on the corner of a photo. When checked, the corner point of the photo will keep recentering as you zoom in.

Touch interactions on Windows

Windows OS computers that feature touch screens such as the Microsoft Surface™ 3 and Surface™ Pro 3 computers are supported by Photoshop. Work has been done to enhance the touch interaction on the canvas. Along with the existing two-finger gestures for manipulating the canvas view transformation, gestures have been added for moving back and forth through the document history states, and for cycling between the three screen modes. The existing gestures plus new ones are listed in Figure 23.

Modifier keys palette

Windows touch devices will also benefit from a Modifier Keys palette that lets you quickly access the **Shift**, **ctrl** and **alt** keyboard modifiers. This palette is available from the Window menu and by default docks to the left of the Toolbar panel (although you can dock it anywhere you like).

Gestures	
Two-Finger Pan	The canvas view may be panned by moving two fingers in any direction on the canvas without changing the distance between them or the angle of the line connecting them.
Two-Finger Pan and Zoom	The canvas view may be panned and zoomed by moving two fingers toward or away from each other.
Two-Finger Pan and Rotate	The canvas may be panned and rotated by rotating two fingers around the center of the line connecting them.
Two-Finger Free Transform	To apply a free transform, rotate two fingers around the center of the line connecting them while simultaneously moving them nearer to or further from each other.
	Following on from the above, place two fingers on the tablet surface and keep them motionless for a moment. The canvas view may then be freely panned, zoomed or rotated.
Two-Finger Reset or Restore View	Double-tap two fingers on the tablet surface to reset view to an unrotated transform that nearly fills the document canvas. Double-tap with two fingers again to restore the view to its previous state.
Two-Finger Step Back in History (Undo)	To go back one step in the history, move two fingers rapidly from right to left.
Two-Finger Step Forward in History (Redo)	To go forward one step in the history, move two fingers rapidly from left to right.
Three-Finger History Scrub	To move in a continuous fashion through the entire history, move three fingers right or left on the tablet surface.
Five-Finger Cycle Screen Mode	Tap once with five fingers to cycle through the three application display screen modes (including the full screen mode).

Figure 23 A summary of gestures available when working with a Windows touch screen-enabled computer.

History Log preferences

The History Log preferences are shown in Figure 24. A history log is useful if you wish to keep track of everything that has been done to an image and the History Log options let you save the history log directly in the image file metadata, to a saved text file stored in a pre-configured folder location, or both. Edit log items can be recorded in three modes. ‘Sessions Only’ records which files are opened and closed and when. The ‘Concise’ mode records an abbreviated list of which tools or commands were applied (also recording times). Both these modes can provide basic feedback that could be useful in a studio environment to monitor the time spent on a particular project and help calculate billing. The ‘Detailed’ mode records everything, such as the coordinates used to make a crop. This mode can be useful, for example, in forensic work.

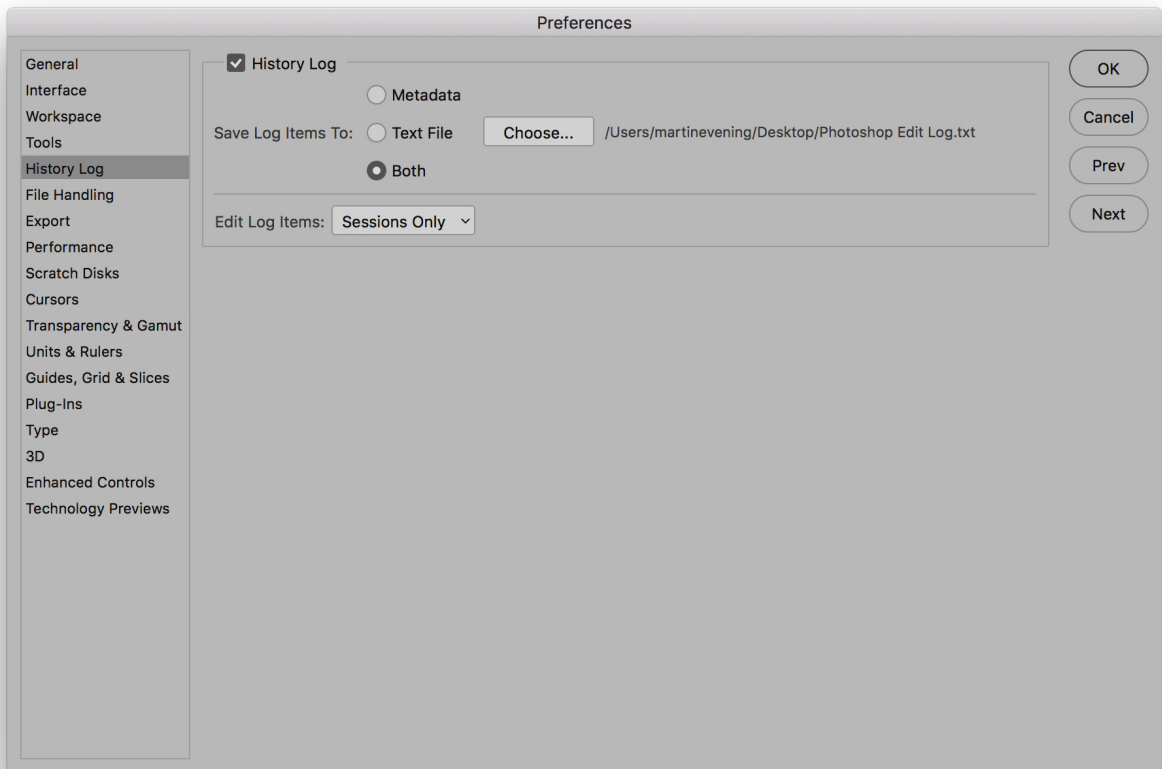


Figure 24 The History Log preferences.

File Handling preferences

The File Handling preferences are shown in Figure 25. You will normally want to include image previews when you save a file. It is certainly useful to have image thumbnail previews that are viewable in the system dialog boxes although the Bridge program is capable of generating large thumbnails regardless of whether a preview is present or not. Appending a file with a file extension is handy for knowing which format a document was saved in and absolutely necessary when saving JPEG and GIF web graphics that need to be recognized in an HTML page. If you are exporting for the Web, you may want to check the 'Use Lower Case' option for appending files. However, instances of where servers trip up on upper case naming are fairly rare these days. The 'Save As to Original Folder' option is useful if you want this to be the default option. It makes sure that you are always able to save new versions of an image to the same folder as the original file came from. If this option is left unchecked, Photoshop shows you the last used folder location when you choose File ⇨ Save As...

Economical web saves

There are times though when you don't need previews. Web graphic files should be uploaded as small as possible without a thumbnail or platform-specific header information. If you use Save for Web, this removes the previews and keeps the output files compact in size.

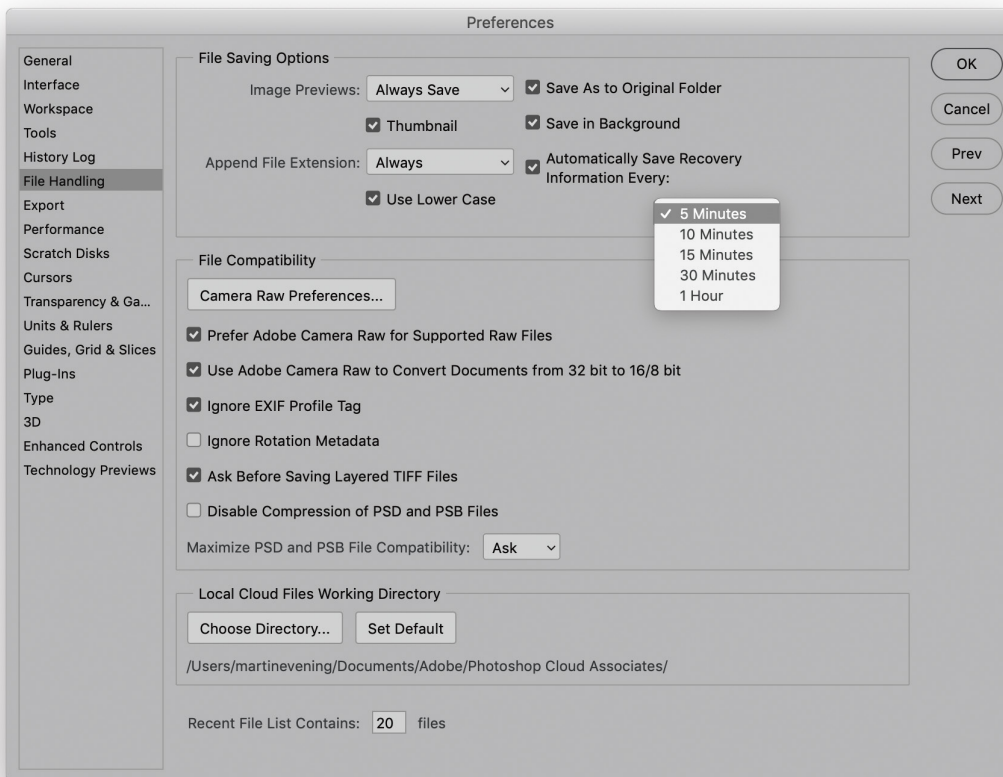


Figure 25 The File Handling preferences.

'Save in Background' is an auto-recovery option that is switched on by default. When checked, Photoshop auto-saves the documents you are working on to a special location using the PSD file format (this is so everything you might add to a file is always included when auto-saving). Should you suffer a crash, the next time you open Photoshop you'll be given the opportunity to rescue any lost work. Also included below is an 'Automatically Save Recovery Information' option, where you can specify how regularly you would like Photoshop to update the recovery file.

Camera Raw preferences

The Camera Raw preferences can be accessed via the Photoshop/Bridge menu (Mac), or Edit menu (PC). Within Camera Raw you can click on the preferences button (⚙️), or use **⌘ K** (Mac), **ctrl K** (PC) to open the Camera Raw preferences. Furthermore, there is also a Camera Raw Preferences... button in Photoshop's File Handling preferences.

In the General preferences (Figure 26), the Edit panel behavior can be set to the default Single panel mode, where selecting one panel auto-closes all the others, while the Responsive mode allows multiple panels to be opened until the height is longer than your screen and closes the one used longest ago. The Multi panel mode allows all panels to be expanded at once. In single-panel and multi modes you can temporarily switch modes. For example, if you are in Single panel mode you can **⌘** (Mac) **ctrl** (PC) click on a panel header to open two or more panels simultaneously. Or, if you are in Multi panel mode you can **⌘** (Mac) **ctrl** (PC) click on a panel header to collapse all panels.

As just mentioned, there is an option to use Lightroom style zoom and pan behavior. The Use legacy undo shortcuts lets you choose between the new style undo where **⌘ Z** (Mac) **ctrl Z** (PC) applies progressive undos, compared to a toggle action with the legacy undo. You also have the option to enable/disable the contextual menu hints on hover for the Filmstrip. These include the three dots contextual menu, the save image button and Synchronize settings button (if more than one photo is selected).

XMP sidecar files

Camera Raw edit settings are written as XMP metadata. This data is stored in the central Camera Raw database on the computer and also written to the files directly. In the case of JPEG, TIFF and DNG files, these file formats allow the XMP metadata to be written to the XMP space in the file header. However, in the case of proprietary raw file formats such as CR2 and NEF, it would be unsafe to write XMP metadata to an undocumented file format. To get around this, Camera Raw writes the XMP metadata to XMP sidecar files that accompany the image in the same folder and stay with the file when you move it from one location to another via Bridge.

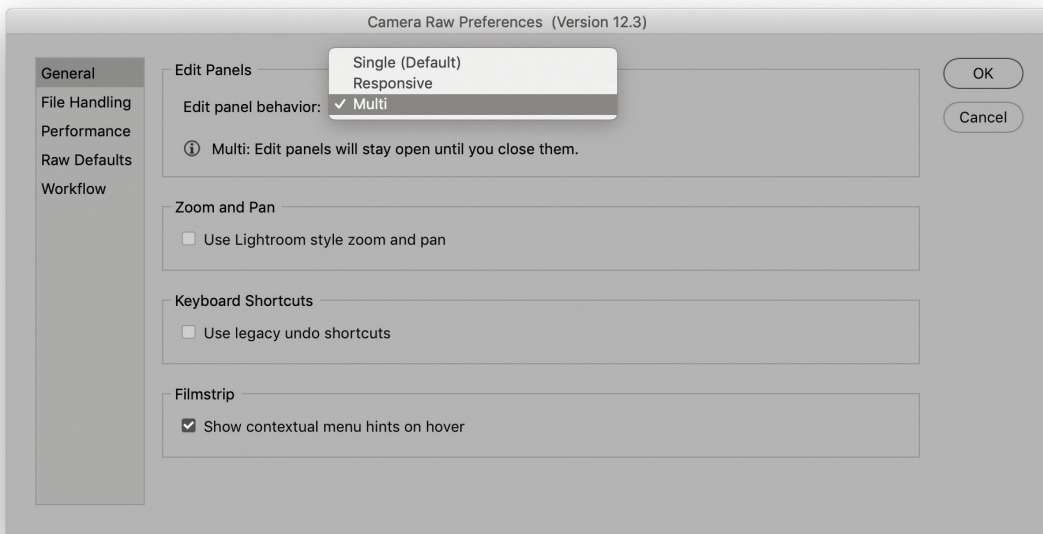


Figure 26 Camera Raw General preferences.

File handling preferences

The Camera Raw File Handling preferences are shown in Figure 27. Camera Raw and Lightroom both embed the XMP metadata in the XMP header space of a DNG file. Therefore, there should be no need to use sidecar files to read and write XMP metadata when sharing files between these two programs. Be aware some third-party programs may create sidecar files for DNG files. If ‘Ignore sidecar “xmp” files’ is checked, Camera Raw will not be sidetracked by sidecar files that might accompany a DNG file and cause a metadata conflict.

However, there are times where it may be useful to read the XMP metadata from DNG sidecar files. When working from a hire studio I’ll have a computer in the studio with all the captured files as standard raws and a shuttle disk to take to the office at my house from which I can copy everything to the main computer there. If I make any further ratings edits on this main machine, the XMP metadata is automatically updated as I do so. It then only takes a few seconds to copy just the updated XMP files across to the backup disk, replacing the old ones. Back at the studio I can again copy the most recently modified XMP files back to the main computer (overwriting the old XMP files). The photos in Bridge will then appear updated. If in the meantime the files on the studio computer happen to have been converted to DNG, it’s important that the ‘Embed XMP in DNG’ option is now checked, otherwise the imported xmp files will simply be ignored.

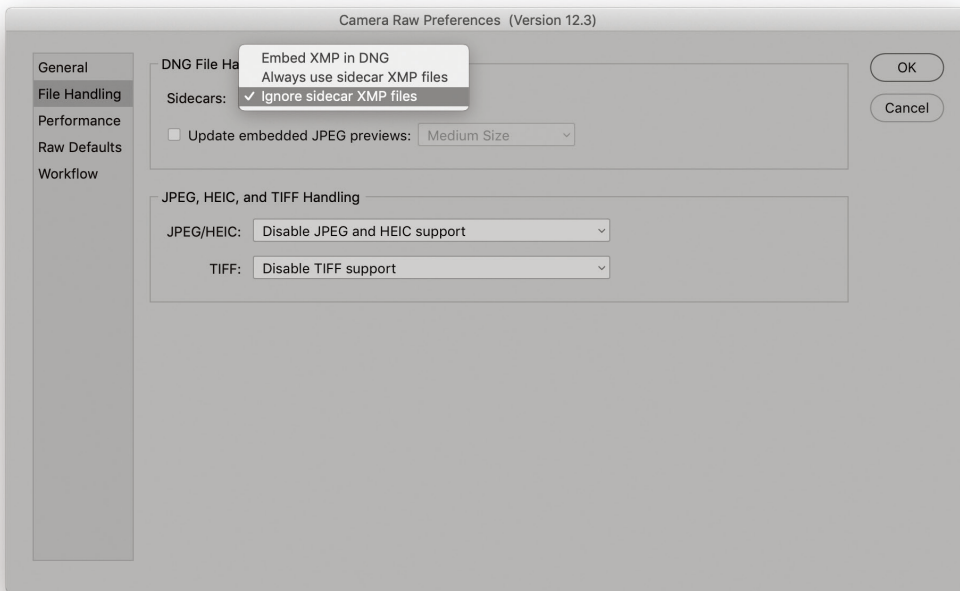




Figure 27 Camera Raw File Handling preferences.

DNG files have embedded previews that represent how the image looks with the currently applied Camera Raw settings. When ‘Update embedded JPEG previews’ is checked, this forces the previews in all DNG files to be continually updated based on the current Camera Raw settings, overriding previously embedded previews. While DNG is a safe format for the archiving of raw data, other DNG compatible programs, not made by Adobe, or that use an earlier version of Camera Raw, will not always be able to read the Camera Raw settings that have been applied using the latest version of Camera Raw or Lightroom. Embedding updated previews allows you to share DNG files with other programs and have the photo previews appear correctly even though they won’t be able to edit the photos unless they are using Adobe software.

JPEG and TIFF handling

If ‘Disable JPEG (or TIFF) support’ is selected, all JPEG (or TIFF) files will always open in Photoshop directly. If ‘Automatically open all supported JPEGs (or TIFFs)’ is selected, this causes all supported JPEGs and TIFFs to always open via Camera Raw. However, if ‘Automatically open JPEGs (or TIFFs) with settings’ is selected, Photoshop will only open a JPEG or TIFF via Camera Raw if it has previously been edited via Camera Raw. When this option is selected you have the option in Bridge to use a double-click to open a JPEG directly into Photoshop, or use  **R** (Mac),  **R** (PC) to force JPEGs to open via Camera Raw. But when you edit the Camera Raw settings for that JPEG, the next time you use a double-click to open, it will default to opening via Camera Raw.

Performance Preferences

When ‘Use Graphics Processor’ is set to Auto in the Performance preferences (Figure 28), Camera Raw can make use of the Graphics Processing Unit (GPU) to speed up interactive image editing. This will be particularly helpful if you are using a high-resolution display. The ‘Use Graphics Processor’ option is normally set to Auto by default, providing your installed video card meets requirements. The Custom option lets you independently enable for improved display performance, and also enabling for image processing with Version 5 or later.

With the ‘Use Graphics Processor’ option enabled, panning and zooming are nice and fluid. If you open a large image and choose to zoom to a 100% view or higher, you’ll notice how quickly you can scroll from one corner of the image to another and Texture slider adjustments will also be smoother. Without GPU support the Camera Raw preview performance will be like earlier versions and you’ll notice

by comparison how the scrolling tends to be slow and jerky. If you look at what is happening more closely with GPU acceleration you'll notice how the on-screen image initially loads a standard preview resolution image before rendering a full resolution preview. Also, when you are viewing an image close-up, Camera Raw pre-emptively loads and renders parts of the image that are just outside the current visible area. By doing so, Camera Raw is able to provide a smoother scrolling experience and as you adjust the sliders the preview response will appear less jerky.

There is though a trade-off when implementing the GPU path. The main benefit is that it makes the interactive image editing faster, although at the same time there is more setup overhead required to accomplish this. Therefore, even though you may have GPU processing enabled, there may still be a slight delay when skimming through a bunch of raw images in Camera Raw. You'll also see more of a performance boost with some types of Camera Raw edits than others.

Camera Raw cache

When photos are rendered using the Camera Raw engine, they go through an early stage initial rendering and Camera Raw builds full, high quality previews direct from the master image data. In the case of raw files, the early stage processing includes the decoding and decompression of the raw data as well as the linearization and demosaic processing. All this has to take place first before getting to the stage that

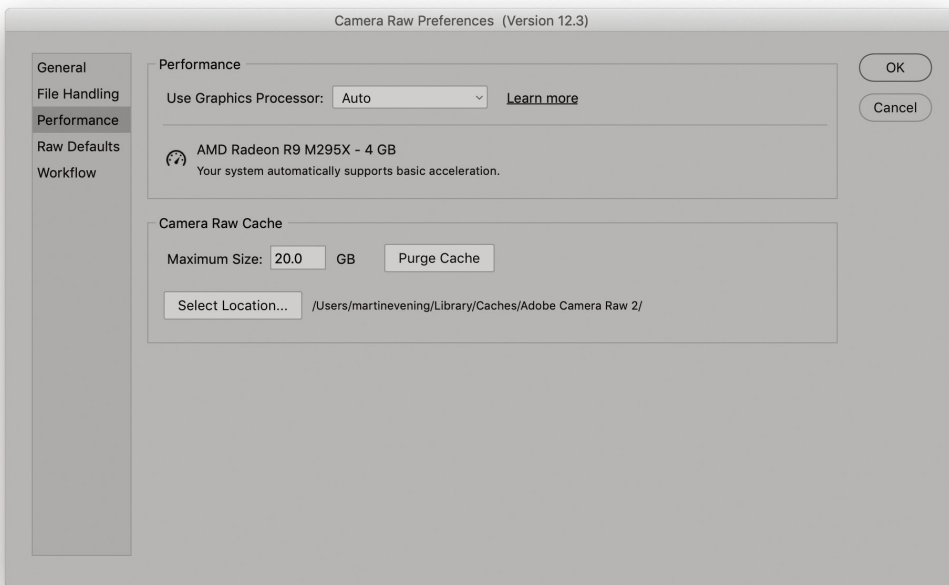


Figure 28 Camera Raw Performance preferences.

allows the user to adjust things like the Basic panel adjustments. The Camera Raw cache is therefore used to store the unchanging, early stage raw processing data that is used to generate the Camera Raw previews so that this step can be skipped the next time you view that image and thereby renders the photo quicker in the Camera Raw dialog. The 1 GB default setting is rather conservative. If you have enough free hard disk space available, you may want to increase the size limit for the cache, plus you can choose a new location to store the central preview cache data. By increasing the Camera Raw cache size, more image data can be held in the cache. This results in swifter Camera Raw preview generation when you reopen these photos. The cache can also be utilized by Lightroom as the cache data is shared between both programs. Because the cache files are compressed, you can cache a lot more files within the limit you set in the Camera Raw preferences.

Graphics card compatibility

The GPU performance boost will only be available for certain types of video cards (OpenGL 3.3 upwards). If the card you are using is compatible, the video card name will appear in the Performance section of the Camera Raw preferences. If it's not, Camera Raw shows an error message. You'll also need to make sure your video drivers are up to date. On the Mac system, video drivers are updated whenever you carry out an operating system update, but on Windows the operating system is not always as accurate and may tell you that the outdated drivers you have installed are just fine. In these instances, PC users may need to download a dedicated video driver update utility.

Camera Raw can currently use only a single GPU. So if your computer has more than one video card this won't offer any improvement (although the performance boost from using just one should be significant). You don't necessarily have to have the fastest card to get optimum performance, as a solid, mid-range card can be just as effective as a high-end one.

Raw Defaults preferences

The Raw Defaults preferences are shown in Figure 29. This replaces the previous Save New Camera Raw Defaults command and allows you to apply, and more easily manage, the Camera Raw defaults that you wish to apply for specific cameras.

In the main Raw Defaults Master menu you can choose Adobe Default. This universally applies standard Adobe default (zero) settings to all new files that you import and open via Camera Raw. Or, you can select Camera Settings. This reads any special 'camera look' settings that have been applied in-camera and selects a matching camera

GPU and secondary displays

It should also be noted that the GPU acceleration described here only applies to processing carried out on the main display. Those users with multiple displays should be aware that performance on secondary displays will be unchanged regardless of whether they have the 'Use Graphics Processor' option enabled or not.

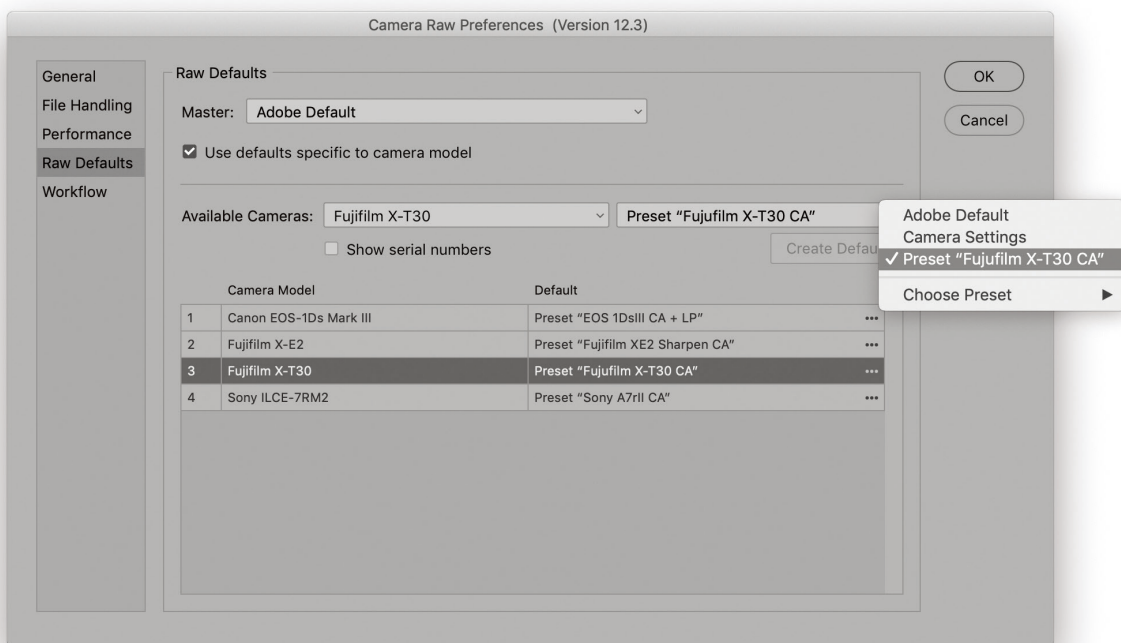


Figure 29 Camera Raw Raw Defaults preferences.

profile to apply when opening via Camera Raw. For example, with the Fujifilm cameras I shoot with it is possible to select a variety of camera looks from the camera menu, such as ASTIA/Soft. Camera Raw has a corresponding camera matching profile of the same name that can match the Fujifilm camera look as close as possible.

When Use defaults specific to camera model is checked you can select a pre-created preset to match specific cameras and apply to all new photos opened via Camera Raw. Where you may have two or more cameras that are the same, there is an additional option to 'Show serial numbers' and create separate defaults for each camera body.

To apply custom defaults, open photos from the range of cameras you wish to set defaults for. Select the model you wish to apply a raw default to from the Available Cameras list and choose a default policy from the menu list on the right. Either, Adobe Default, Camera Settings, or a custom preset. Remember that you will need to have created such presets beforehand. In this way you can establish the raw defaults to apply to all new raw photos on a per-camera basis.

The Raw Defaults preferences can be used to cleverly set up Camera Raw to apply appropriate default settings for any camera. The main thing to watch out for is that you don't include too many Camera Raw adjustments (such as the Color Mixer panel settings) when selecting

a preset. For example, in Figure 30 you can see how I selected just the Detail panel sharpening setting plus the Optics Chromatic Aberration setting when saving a preset to be selected as a camera-specific default. In this case I did not want to include the Lens profile Correction because the lenses use with this particular camera have built-in lens profile corrections. If I wanted, I could include a specific profile. To match the previous behavior, where one could automatically apply auto adjustments, when creating a new preset you can always include one of the Auto Settings options at the bottom of the New Preset dialog.

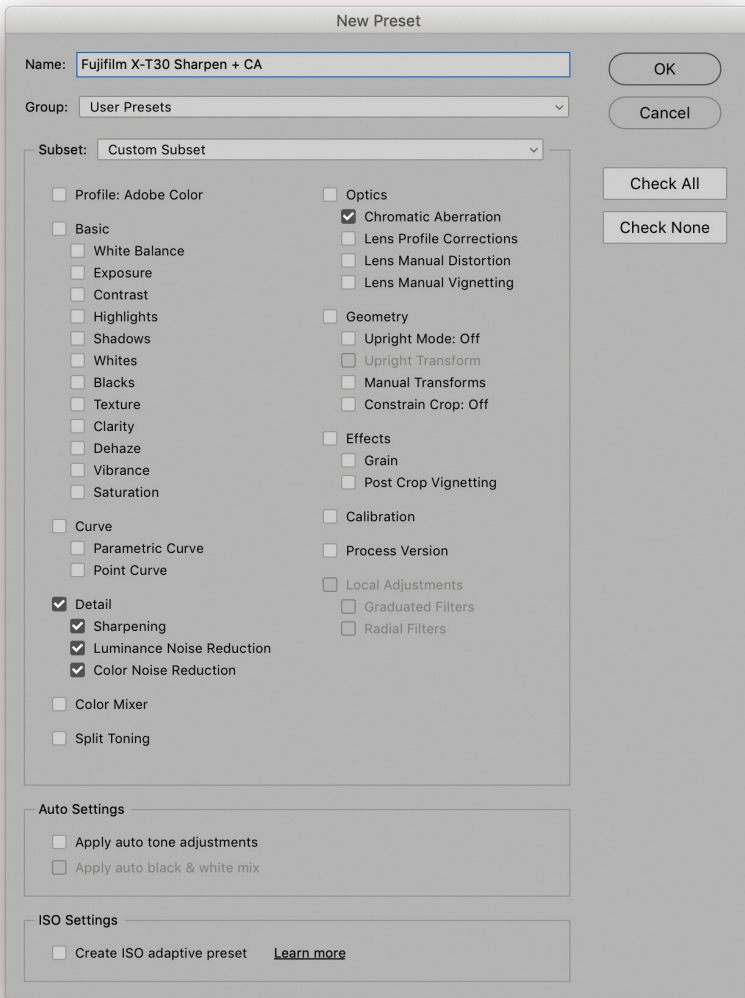


Figure 30 The Camera Raw New Preset dialog.

Workflow preferences

Clicking on the hyperlink text at the bottom of the Camera Raw dialog opens the Workflow preferences (Figure 31). This determines how files are saved or opened in Photoshop. The Color Space options allow you to choose any available profile space as the output space. This includes printer profiles, CMYK profiles, or the Lab space even. Normally you would want this to match the RGB workspace setting you have established in the Photoshop color settings. Setting the bit depth to 16-bits per channel ensures the maximum number of levels are preserved when the image is opened in Photoshop.

The Image Sizing options can be used to set the pixel dimensions (or percentage) and resolution for the saved/opened images. Below that is the Output Sharpening section, where you can choose to sharpen the rendered image(s) for print or screen output. These options are relevant if you are producing a file to go directly to print or for website use. If you intend carrying out any type of further retouching then leave this disabled. Lastly, you can choose to 'Open in Photoshop as Smart Objects'.

Saving Output options presets

The Workflow preferences can be saved as presets. These let you quickly switch between different Workflow preference settings. They can also be accessed by right mouse-clicking the Workflow preferences hypertext link via the main Camera Raw dialog.

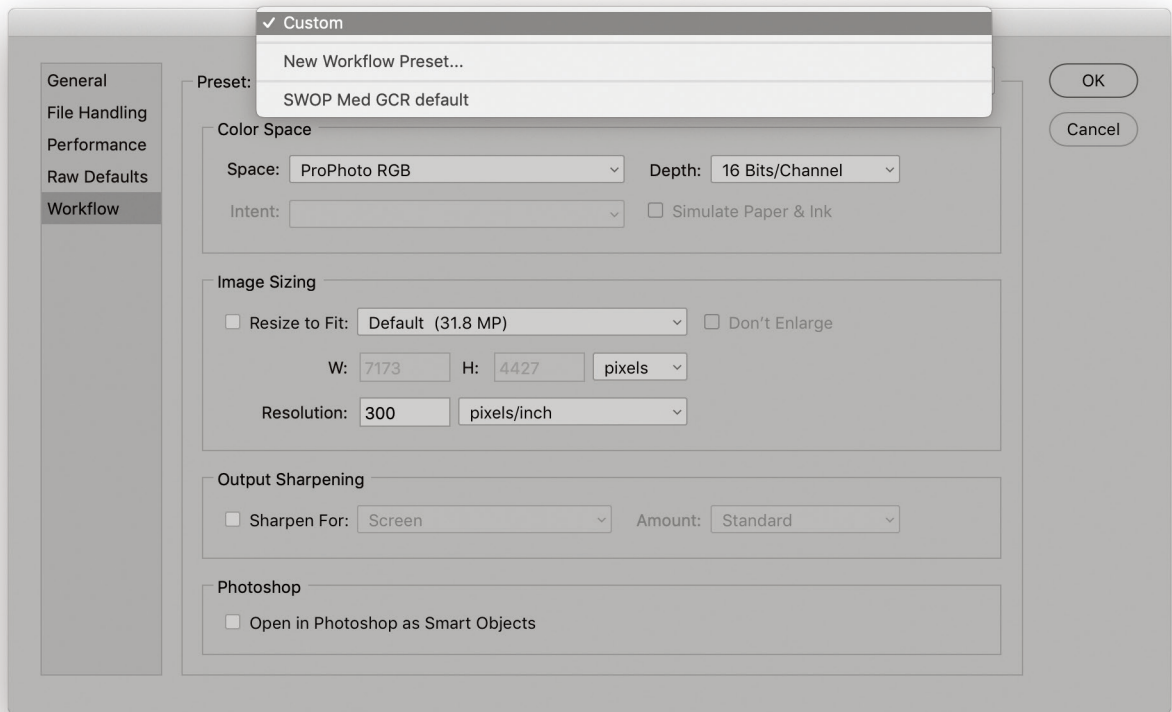


Figure 31 The Camera Raw Workflow preferences showing the Preset menu.

File handling preferences: File compatibility

Back in the main Photoshop File Handling preferences dialog, the ‘Prefer Adobe Camera Raw for Supported Raw Files option’ always launches Adobe Camera Raw as your favored raw processor when opening a proprietary raw file. Below this is ‘Use Adobe Camera Raw to convert documents from 32 bit to 16/8 bit’. This allows you to elect opening Camera Raw as a filter (and use the Version 5 Basic tone controls to tone edit) when you choose to convert from 32-bit to 16 or 8-bits per channel.

Some cameras may embed an sRGB profile tag in the EXIF metadata of a JPEG capture file (where the profile used isn’t a correct sRGB profile anyway). If you check the ‘Ignore EXIF Profile Tag’ option, Photoshop ignores this particular part of the metadata and reads from the (correct) embedded profile data instead. The ‘Ignore Rotation Metadata’ option lets you ignore any rotation settings applied via Camera Raw and will open such files without any rotation.

Saving layered TIFF files

A TIFF format file saved in Photoshop 6.0 or later can contain all types of Photoshop layer information and a flattened composite is always saved within a TIFF. If you then place a layered TIFF image in a page layout, only the flattened composite will be read by the program when the page is finally converted to print. Some people argue that there are specific instances where a layered TIFF might trip up a print production workflow, so it might be safer to never save layers in a TIFF, but you know, there are a large number of Photoshop users who successfully use layered TIFFs when saving master images. My advice is not to be put off including layers. When the ‘Ask Before Saving Layered TIFF Files’ option is checked, Photoshop presents you with an option to either flatten or preserve the layers when saving a layered image as a TIFF. If this is unchecked, then the layer information is saved regardless and you’ll see no warning dialog.

Photoshop (PSD) file compatibility

Standard Photoshop PSD files created in Photoshop won’t be 100% compatible if they might be read by someone who is using an earlier version of Photoshop. Setting the Maximize PSD and PSB Compatibility to ‘Always’ allows you to do the same thing as when saving a flattened composite with a TIFF. This option ensures that a flattened version of the image is always included with the saved Photoshop file and the safe option is to keep this checked. For example, if you include an externally linked Smart Object layer, the Photoshop

file will not be interpreted correctly when read by earlier versions of Photoshop unless you maximize the compatibility of the saved PSD. In these circumstances if Photoshop is unable to interpret an image it will present an alert dialog. This will warn that certain elements cannot be read and offer the option to discard these and continue, or to read the composite image data. Discarding the unreadable data allows another user to open your image, but when opened it will be missing all the elements you added and most likely look very different from the file you intended that person to receive. If on the other hand they click the 'Read Composite Data' button *and a composite was saved*, the image will open using a flattened composite layer which looks the same as the image you created and saved. If no composite was created, they will just see a white picture and a multi-language message explaining that no composite data was available.

Maximizing PSD compatibility lets images load quicker in Bridge. Another crucial factor is that Lightroom is only able to read layered PSD files that have this option turned on. If there is no saved composite, Lightroom won't be able to import it.

If you set the preference here to 'Ask', Photoshop will display a "Don't show this message again" message in the Maximize Compatibility warning dialog, which will appear after you choose to save an image using the PSD file format (See Figure 32). If the Maximize Compatibility option is checked, the default from now on will be to 'Always' maximize compatibility. If the option is unchecked, it will be set to 'Never' from now on.



Figure 32 The Photoshop Format Options dialog.

Layered PSD files in a DTP layout

Adobe InDesign lets you place Photoshop format (PSD) files in a page layout, but if you do so, the Maximize Backwards Compatibility option must be checked in the File Handling preferences (in order to generate a flattened composite). If you use layered TIFF, PSD (or Photoshop PDF) files in your page layout workflow, you can modify

the layers in Photoshop and the page design image preview will immediately be updated. This way you don't run the risk of losing synchronization between the master image that is used to make the Photoshop edits and a flattened version of the same image that is used solely for placing in the layout. If you want to 'round trip' your images this way, TIFF is the more universally recognized file format. The downside is that you may end up with bloated files and these can significantly increase the file transmission times. It so happens that nearly all the image files used in the production of this book have been placed as layered TIFF RGB files, which allows me to edit them easily in Photoshop. Keeping the files as layered RGBs works fine at the text editing stage, but the final TIFF files that are used to go to press are all flattened CMYK TIFFs.

Disable compression

You can choose to 'Disable Compression of PSD and PSB files'. These file formats normally include a lossless form of compression which helps keep the saved file size down. Disabling this won't improve the image quality, but may reduce the time it takes to save and will only affect 16-bit or 32-bit images. Having said that, efforts have been made to optimize the read/write times for PSD and PSB files.

Local Cloud Files Working Directory

If you are working with cloud documents in Photoshop these are automatically saved to the cloud from where they can be accessible via another computer sharing the same account, or via Photoshop for iPad. But as an interim step these files get saved to the folder specified here in the File Handling preferences.

Recent File list

The Recent File list refers to the number of image document locations that are remembered in the Photoshop File ⇒ Open Recent submenu. You might want to set this to the maximum limit allowed which is now 100.

Export preferences

The Export preferences dialog is shown in Figure 33. These settings link to the Export options behavior. The Quick Export Format section affects what happens when you choose File ⇨ Export ⇨ Quick Export as... Use the menu here to select the file format you want to use when carrying out a quick export. So for example, if PNG is selected (as shown in Figure 33), the Save for Web submenu will say 'Quick Export as PNG', and there is an option next to this in the Export preferences to include transparency or not, or save as a smaller, 8-bit version.

The Quick Export Location section lets you determine where the exported files should be saved to. If 'Ask where to export each time' is selected, you'll see a system navigation services dialog appear each time, asking where you would like to save the exported file to. Alternatively, you can choose 'Export files to an assets folder next to the current document'. When selected, this automatically creates an assets folder alongside the master image (wherever it is located) and saves the exported file(s) there. The Metadata section can be used to determine what metadata is saved: either None, or Copyright and Contact Info. In the Color Space section I advise you select the Convert to sRGB option, which also includes an embedded profile when creating a quick export.

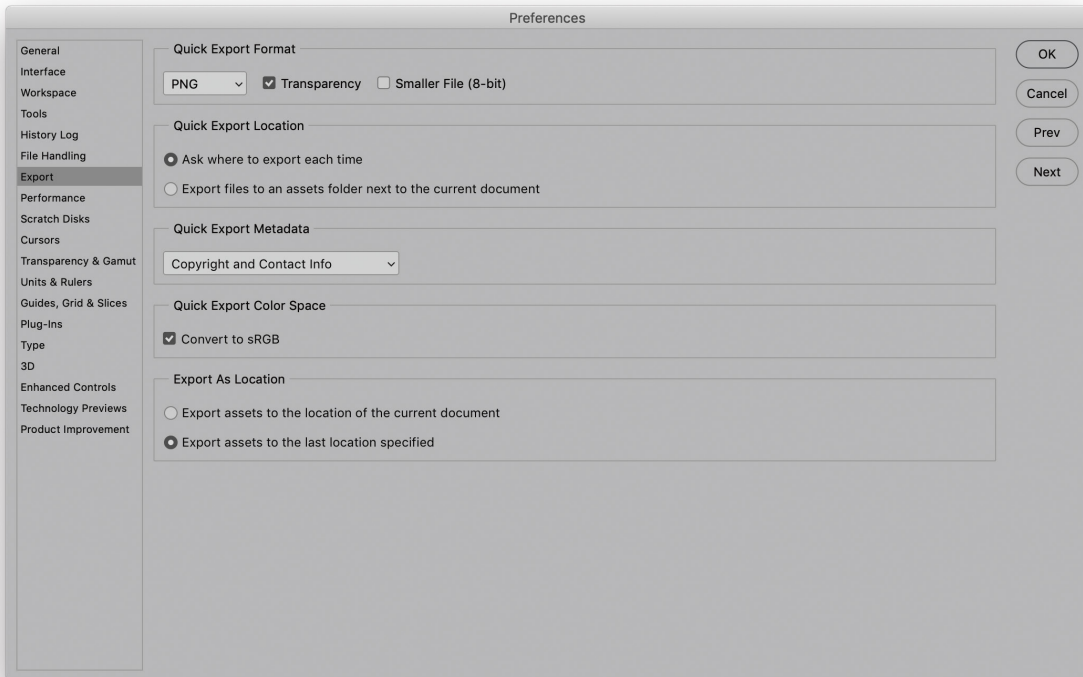


Figure 33 The Export preferences dialog.

Performance preferences

The Performance preferences section (Figure 34) can be used to configure Photoshop to run more efficiently on your computer.

Memory usage

The memory usage can be set using a sliding percentage scale and you will notice how Photoshop provides a hint as to what the ideal range should be for your particular computer. The amount of RAM memory you have installed determines how efficiently you can work in Photoshop. Each time you launch Photoshop a certain amount of RAM memory is set aside for use by the program. How much depends on the amount that is set in the Memory Usage section, expressed as a percentage of the total amount of RAM that is available for Photoshop to use. The figure you see in the Memory Usage section is just the RAM that's reserved for Photoshop (although the RAM you set aside

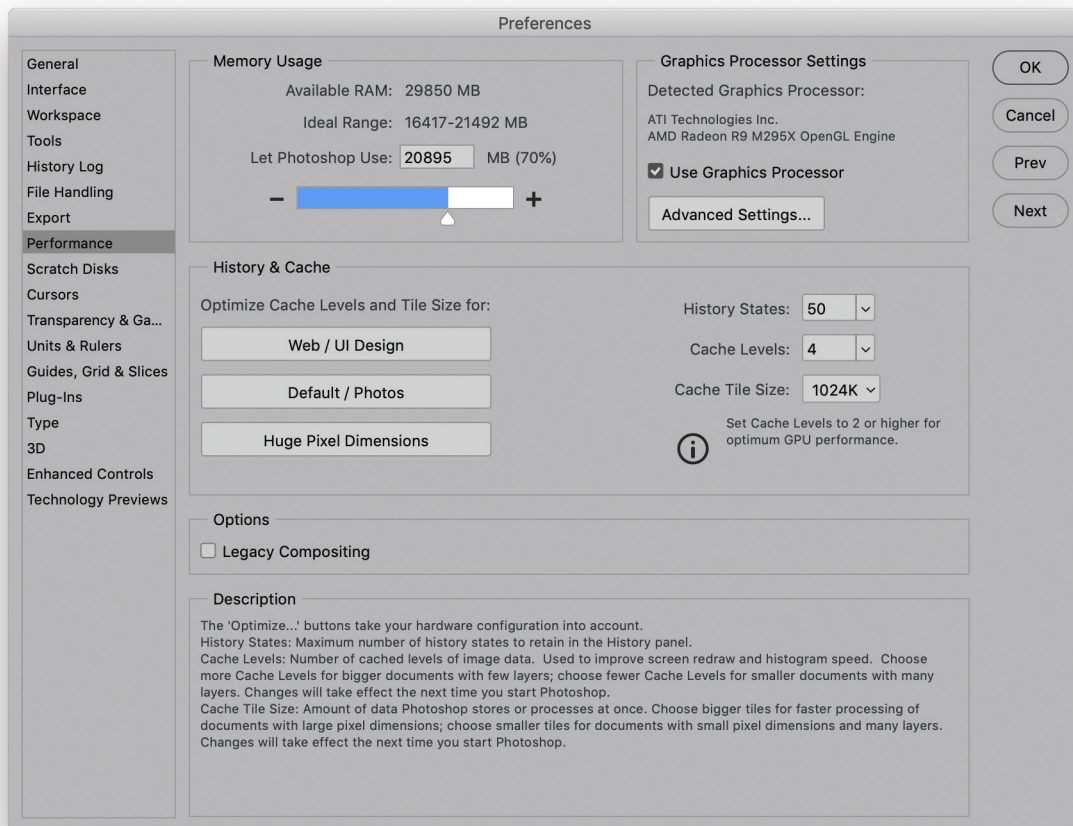


Figure 34 The Performance preferences.

for Photoshop can be shared by other applications when it is not actively being used by Photoshop). Adobe recommend you allocate a minimum of 1 GB RAM memory, which means that if you allow an additional 200 MB of RAM for the operating system, you will need to have at least 2 GB of RAM installed. If you also take into account the requirements of other programs and the likelihood that newer operating systems may need even more memory, it is safer to suggest you actually need a minimum of 4 GB RAM memory in total. Don't forget that you will also need to allow some RAM memory to run Adobe Bridge at the same time as Photoshop. But in any case, most computers sold these days come with at least 4 GB of RAM.

The Memory Usage section therefore provides a guide for the ideal RAM setting for your computer and indicates what the ideal range should be. On a Windows system the default setting is 50% of the total available RAM and on a Mac it is 70%. If the memory is set too high Photoshop may end up competing with the operating system for memory and this can slow performance, although as I mentioned earlier, the memory assigned to Photoshop is freed up whenever Photoshop is not running. You can always try allocating 5% above the recommended upper limit, relaunch Photoshop and closely observe the efficiency status bar or Info panel Efficiency readout (Figure 35). Anything less than 100% indicates that Photoshop is running short of physical memory and having to make use of the scratch disk space. If you allocate too high a percentage, this can compromise Photoshop's efficiency. So the trick is to find the optimum percentage before you see a drop in performance.

64-bit RAM limits

The amount of RAM that is available to Photoshop is obviously dependent on the total amount of RAM memory that's installed on your computer. Providing you have the latest 64-bit enabled hardware and a 64-bit computer operating system, you can install or run Photoshop. The main advantage 64-bit brings is increased RAM memory access beyond the 4 GB physical limit. In terms of speed you won't necessarily find a 64-bit version of Photoshop to be that much faster than it would have been on an old 32-bit machine, except for when you are working with very large files or carrying out memory-intensive operations.

RAM memory upgrades

Most PCs and Macs use DIMMs (Dual In-line Memory Modules). The specific RAM memory chips may vary for each type of computer, so check carefully with the vendor that you are buying the right type for your particular machine. RAM memory used to cost a small fortune,

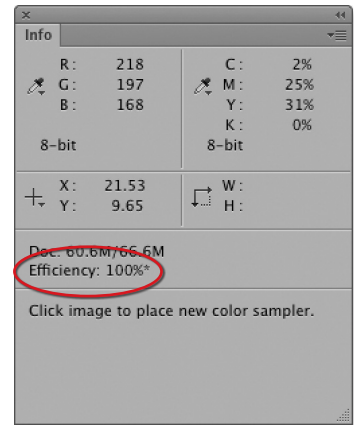


Figure 35 You can monitor how efficiently Photoshop is running by getting the Info panel options to display an Efficiency readout. If the efficiency reading drops below 100% this means that Photoshop is having to rely on the designated scratch disk as a virtual memory source.

but these days the price of RAM is almost inconsequential. If you have four RAM slots on your machine, you should easily be able to install 4 × 4 GB RAM or 4 × 8 GB RAM memory chips, which will give you 16 or 32 GB of installed RAM. A good suggestion is to install an absolute minimum of 1 GB of RAM per processing core on your computer, while the ideal balance is more like 2 GB of RAM per core. If you aim for 4 GB of RAM per core, you will see significant benefits with certain memory-intensive filter operations. For all other types of operations the speed benefits are not quite so dramatic.

History & Cache

In the History & Cache section the default number of History States is 50. You can set this to any number you like from 1–1000, but remember that the number of histories you choose will have a bearing on the scratch disk usage.

The Cache Level settings affect the speed of the screen redraws. Whenever you are working with a large image, Photoshop uses a pyramid type structure of lower resolution cached versions of the full resolution picture. Each cached image is a quarter scale version of the previous cache level and is temporarily stored in memory to provide speedier screen previews. Basically, if you are viewing a large image on screen in ‘Fit to screen’ display mode, Photoshop uses a cache level that is closest to the fit to screen resolution to provide a screen refresh view of any edit changes you make at this viewing scale. The cached screen previews can therefore provide you with faster screen redraws and larger images can benefit from using a higher cache level, since a higher setting provides faster screen redraws, but at the expense of sacrificing the quality of the preview. This is because a lower resolution cache preview is not as accurate as when viewing an image at an ‘actual pixels’ view.

The optimization buttons can help you set the Cache Levels to an appropriate value. If you mostly work on small images such as Web design layouts, which are small in pixel dimension size, but may contain lots of complex layers, you’ll gain better performance by clicking the ‘Web/UI Design’ button to set the Cache Levels to 2. If you mostly work with large images, but not quite so many layers, you can click on the ‘Huge Pixel Dimensions’ button to set the Cache Levels to 6, although you may wish to override this and set the cache levels even higher than this. Photoshop analyzes the images you typically edit and after the first 5 launches auto-sets the Cache setting based on the images you recently had opened in Photoshop. Therefore, if you happen to have worked on a series of photos that were unusually large or untypically small, you may want to check the Performance preferences to see if the cache setting needs to be reset.

The Cache Tile Size can be adjusted according to what is the most appropriate setting for the type of work you do. The Cache Tile Size can be set anywhere from 128K–1024K, and tests suggest the optimum settings to choose from are 128K/1024K for the newer Intel processors and 132K/1028K for AMD processors. For image editing work with large photo-sized documents where throughput, i.e. image size, is more of a consideration, it is better to choose a larger Cache Tile Size here.

Cache tile size and batch processes

There are certain types of Photoshop operations (such as a Radial Blur filter) that can make heavy demands on the computer hardware, utilizing nearly all of your processors. If you raise the cache tile size in the Performance preferences to 1024K or 1028K this means the data to be processed is divided into bigger chunks and this in turn can make a big improvement to batch processing times. The optimum choice of tile size here will depend on whether you are using an Intel or AMD processor.

Cache pyramid structure

If you have the Use Graphics Processor option switched off, or your video card is not compatible, you may sometimes notice how layered Photoshop images are not always displayed with complete accuracy at anything other than the 100% magnification. For example, if you have added a pixel layer that has a sharp edge, you might see a line appear along the edges when it is viewed at smaller viewing percentages. This is simply the image cache speeding up the display preview at the expense of accuracy. If you have to work on an image (without the graphics processor enabled) at a less than 100% magnification, then do make sure the magnification is a wholly divisible number of 100%. In other words, it is better to work at 50%, 25% or 12.5% magnification, rather than at 66% or 33%. Note also that the number of cache levels will affect the structure of a TIFF file when the ‘Save Image Pyramid’ option is selected.

Graphics Processor settings

The Graphics Processor Settings section lets you enable the graphics processor if your video card allows it and manage the settings. As I mentioned earlier, OpenGL/OpenCL enabled video cards are able to offload processor-intensive activity from the CPU to the video card's GPU (Graphics Processing Unit). Such a card will also use its own onboard RAM to lessen the burden on the CPU and this can result in faster overall video and specific processing performance. Photoshop is able to detect the graphics card used by your computer and whether it has a built-in Graphics Processor Unit (GPU) capability. If so, you can then check the 'Use Graphics Processor' option to make full use of the graphics processor memory on the card. This preference setting affects images opened in Photoshop on a per-window document basis.

The main advantages of enabling the graphics processor are: smooth views when using odd number viewing percentages, smooth image rotation, flick panning, smooth animated zooms, the bird's-eye view zoom-out feature, Puppet Warp, applying transforms plus a pixel grid display at view magnifications greater than 500%. In Photoshop CS6 and later, 16-bit and 32-bit images should also redraw faster when viewed at a 50% magnification or lower. And, where cards are OpenCL enabled, this can improve performance when using the Blur Gallery filters in Photoshop.

If you click on the Advanced Settings... button this opens the Advanced Graphics Processor Settings dialog shown in Figure 36,

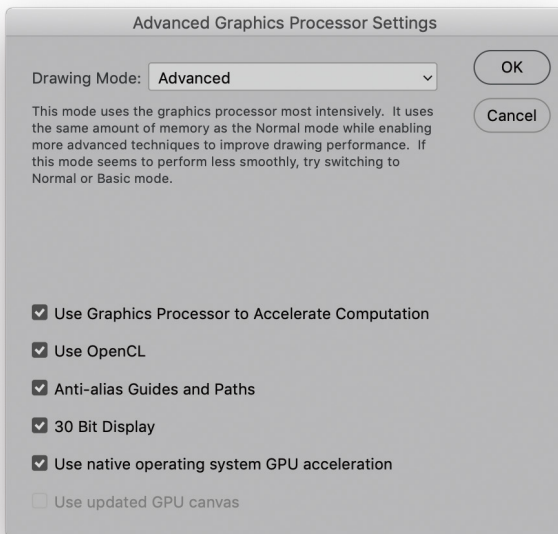


Figure 36 The Advanced Graphics Processor Settings dialog.

where you will want to check ‘Use Graphics Processor to Accelerate Computation’ option. There are three Drawing Mode levels: Basic, Normal and Advanced. The Advanced option aims to give you the maximum benefit from the graphics processing, but if the screen redraws appear to work less smoothly than desired you can select the Normal or Basic modes instead. Checking the Anti-alias Guides and Paths option can help improve the visibility of pen paths and guides. Mac users working with the latest iMacs and Mac Pro computers running macOS 10.12 or later can enable 30-bit display support. The ‘Use native operating system GPU acceleration’ option enables use of macOS Metal and Windows DirectX 12 as appropriate. So far this can be used to accelerate the Oil Paint Filter, but more items in Photoshop may benefit in the future. If the option appears grayed out it means your system’s GPU doesn’t meet the GPU model or driver version requirements.

Mercury graphics support

There is expanded Mercury Graphics Engine support in Photoshop. This allows Photoshop to upsample images via the Image Size dialog, up to 15 times faster than earlier versions of Photoshop, though this does depend on the file size and video card used. This graphics performance boost helps speed up things like the Blur Gallery filter effects and the Focus Mask feature.

Legacy compositing

For many years Photoshop has relied on the internal UMERGE compositing engine to manage all the data crunching when drawing layered files on screen. We are now seeing a move towards the newer Composite Core engine which is a rewrite of the old code and designed to better utilize resources, such as from your graphics processor. Already, you should see faster performance when selecting any of the following blend modes: Screen, Darken, Multiply, Lighten, Overlay, Hard Light, Soft Light, or Difference. Currently, the two engines are being used side-by-side. My expectation is that eventually all compositing work will be done using Composite Core. Should you feel necessary you can choose to disable and select Legacy Compositing from the Performance preferences.

Scratch Disks preferences

Photoshop can utilize the free hard disk space that's allocated in the Performance preferences (Figure 37) as an extension of RAM memory. Photoshop always makes the most efficient use of the real RAM memory and tries to keep as much RAM as possible free for memory-intensive calculations. Low-level data like the 'last saved' version of the image is stored in the scratch disk memory giving priority to the current version and last undo versions being held in RAM. Normally, Photoshop uses all the available free RAM as buffer memory in which to perform real-time calculations and mirrors the RAM memory contents on the scratch disk. Photoshop does this whenever there is a convenient opportunity to do so. For example, after you open a new image you may notice some disk activity as Photoshop writes from the RAM memory buffer to the scratch disk. Photoshop then continually looks for ways to economize the use of RAM memory, writing to the hard disk in the background whenever there are periods of inactivity. Scratch disk data is also compressed when it is not in use (unless an optional plug-in extension that prevents this has been loaded at startup). The Scratch Disk preferences (Figure 37) can be used to check which volumes are used as scratch disks. You can highlight a particular disk, then use the arrows to move it up or down the scratch disk priority list.

Restart to activate preferences

The Scratch Disk preference settings in the Scratch Disk preferences only come into effect after a restart.

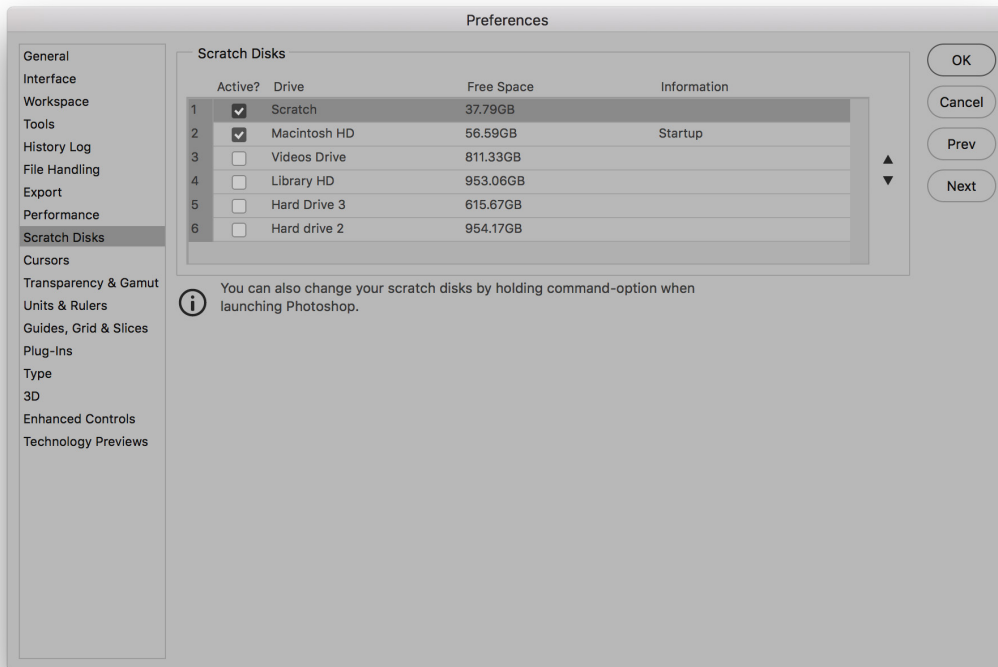


Figure 37 The Scratch Disk preferences.

When you launch Photoshop it checks to see how much hard disk space is free for scratch disk usage and if for any reason you have less scratch disk space than RAM memory space, the RAM memory will be restricted by the amount of scratch disk space that is available. When Photoshop exhausts its reserves of RAM memory, it is forced to use the extra space on the scratch disk as a source of virtual memory and this is where you may start to see a slowdown in efficiency. When the Efficiency indicator (Figure 35) drops below 100% this means that the RAM buffer is full and Photoshop is now relying exclusively on the hard disk scratch disk space as a memory reserve. This is because the Photoshop calculations are limited to the read/write speeds of the primary scratch disk, followed by the secondary disk, and so on. Should you experience a temporary slowdown in performance you might want to purge Photoshop of any excess data that's temporarily held in memory. To do this, choose Edit ⇒ Purge and select Undo, Clipboard, Histories or All.

The primary scratch disk should ideally be one that is separate to the disk that's running the operating system and Photoshop. It is no good partitioning the main disk volume and designating an empty partition as the scratch disk, because the disk drive head will simply be switching back and forth between different sectors of the same disk as it tries to do the job of running the computer system and provide scratch disk space. For optimal image editing, you ideally want the scratch disk to be a fast, separate disk volume with a minimum of 20–40 GB of free space and as free as possible of any disk fragmentation. Having said that, with the latest SSD drives there are no moving parts. They are also very fast compared with normal hard drives and it is possible to partition a main SSD hard drive, allocating a portion of this as a scratch disk. If you hold down the **⌘** **⌘** (Mac), **ctrl alt** (PC) keys during startup, this opens the dialog shown in Figure 38, allowing you to set the preferred scratch disk at launch.

Scratch disk performance

With all this reliance on the scratch disk (or multiple scratch disks) to read/write data from the RAM memory buffer, the hard disk performance of the scratch disk plays an important role in maintaining Photoshop efficiency. There is provision in Photoshop for as many as four scratch disks. Each individual scratch file created by Photoshop can be a maximum of 2 GB and Photoshop can keep writing scratch files to a scratch disk volume until it becomes full. When the primary scratch disk runs out of room to accommodate all the scratch files during a Photoshop session, it then starts writing scratch files to the secondary scratch disk, and so on. This makes for more efficient and faster disk

Move don't copy

To copy selections and layers between documents, use the drag and drop method with the Move tool. This saves on memory usage and also preserves the current clipboard contents.

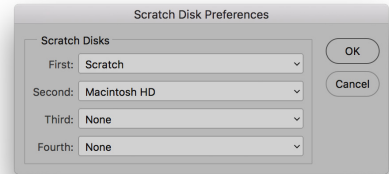


Figure 38 The Startup Scratch Disk Preferences dialog.

usage. Let's now look at the important factors that affect the speed of the scratch disk.

Scratch disk usage and history

The scratch disk usage will vary according to how many history states you have set in the History and Cache section and also how you use Photoshop. Generally speaking, Photoshop stores a version of each history state, but it does not always store a complete version of the image for each history state. The History feature only needs to save the changes made in each image tile. So if you carry out a series of brush strokes, the history only stores changes made to the altered image tiles. For this reason, although the scratch disk usage increases as you add more history steps, in practice the usage does not increase in such large chunks, unless you were to perform a large series of global changes.

Interface connection

Most modern Macs and PCs have IDE, ATA or SATA drives as standard. A fast internal hard disk is adequate for getting started, but for better performance, you should really install a second internal or external hard drive and have this dedicated as the primary scratch disk (make this the number one scratch disk in the Performance preferences). Your computer will most likely have the choice of a USB and/or Thunderbolt for linking external devices. Both offer fast connection speeds. With USB or Thunderbolt you can hot swap a drive between one computer and another. This is particularly useful when you wish to shuttle very large files around quickly.

Hard drive speed

Most desktop computers use internal drives which run at 7200 rpm and you can easily find spare internal drives that run at this speed or faster. Laptop computers usually have slower hard drives fitted as standard (typically 5400 rpm). It may therefore be worth checking if you can select a faster speed hard drive as a build-to-order option. These days SSD drives are more likely to be offered as standard, and are much faster than regular hard drives. These have no moving parts and you can therefore partition a single SSD drive to use one partition as a scratch disk. Some computers can also be configured using fusion drives that are a hybrid of standard hard drive and SSD drive technology.

RAID setups

RAID stands for Redundant Array of Independent Disks, and a simple way to explain RAID is that it allows you to treat multiple drives as a single drive volume to provide either increased data integrity, capacity, transfer rates or fault-tolerance compared with a single volume. How it does this depends on the RAID level you choose. You need a minimum of two disks to configure a RAID system and most off-the-shelf RAID solutions are sold as a bay dock that can accommodate two or more drives with a built-in RAID controller. A RAID disk can be connected via internal SATA or using a fast external interface connection.

RAID 0 (striping)

A RAID 0 setup is suitable for use as a Photoshop scratch disk. With a RAID 0 setup, two or more drives are striped together to create a single large volume drive. For example, if two 2 TB drives are striped using a RAID 0 setup you will end up with a single 4 TB volume. RAID 0 is useful where you require fast hard drive access speeds, because the drive access speed increases proportionally to the number of drives that are added. Therefore, if you have a 2 x 2 TB drive RAID 0 system, the hard drive access speed should theoretically be two times that of a single 4 TB drive. A RAID 0 setup can offer faster speeds, but will be less reliable, because if one drive fails, all the stored data is lost on the combined volume, which is why I recommend this configuration mainly for scratch usage.

RAID 1 (mirroring)

A RAID 1 setup stores duplicate data across two drives. This means that if you have, say, two 2 TB drives configured in a RAID 1 setup, the data on one drive is mirrored on the other and the total drive capacity will be equal to that of a single drive (in this case, 2 TB). RAID 1 systems are used as a way to protect against sudden drive failure since if one drive fails, a mirror copy of that data can immediately be accessed from the other drive and if you replace the defunct drive with a new one, the RAID 1 system rebuilds a copy of the data on the new drive. A RAID 1 setup offers greater security but the downside is that RAID 1 read/write speeds are slower. This is because the RAID 1 system has to constantly back up the data between one drive and the other.

Internal RAID

You can fit an internal RAID system with a do-it-yourself kit consisting of two internally mounted drives and a RAID controller card. This should not be too challenging to install yourself, but if you are in any doubt about whether you are capable of doing this then you should get a qualified computer specialist to install such a system in your computer. The advantage of an internal RAID is that it is always there whenever you turn the computer on and is an economical solution compared with buying an external RAID drive setup. Most PC tower computer systems should have plenty of free hard drive bays, which will make it fairly easy for you to install internal RAID. An internal RAID setup will definitely speed up the time it takes Photoshop to read and write data to the scratch disk. However, if you have more hard drives running simultaneously this will mean more power consumption, which in turn can generate extra heat and possibly more noise too. Be warned that this heat may cause problems for the cooling system in your computer and put extra strain on the internal power supply unit.

External RAID

External RAID hard drive units (Figure 39) are not overly expensive and you can easily buy a ready assembled bay dock with a couple of drives and a built-in RAID controller that can be configured for RAID 0. The speed will be governed not just by the number of drives making up the RAID but also by the speed of the cable connection. Most RAID systems these days will connect to the computer via a fast interface connection. For example, the latest Macs now rely on Thunderbolt, where the interface is suitably fast for a high speed RAID setup.

Software RAIDs

It used to be the case that software-created RAIDs such as the one included with the macOS Disk Utilities program were a lot slower than a dedicated system. True, the read/write speeds from a software RAID will still be somewhat slower than a true dedicated RAID system since a software RAID will be stealing some of your computer processor cycles, but these days the speed loss is not as bad as it used to be. For example, a software-driven internal striped RAID 0 can bring about a 45% increase in disk access speed. Overall I recommend that if you do choose to go down the internal RAID route, you use a dedicated device with a RAID controller.



Figure 39 A RAID system drive setup contains two or more drives linked together that can provide either faster disk access or more secure data backup.

Cursors preferences

We now come to the Cursors preferences (Figure 41). The painting cursors can be displayed as a painting tool icon, a precise crosshair or with the default setting, which shows an outline of the brush shape at its 'most opaque' size in relation to the image magnification. When the Normal brush tip is selected, the brush cursor size represents the boundary of the brush shape up to where the brush opacity is 50% or denser in opacity. You can also choose to display a Full Size brush tip, indicating the entire outer edge reach of a soft edged brush. This represents the complete brush area size and it is debatable whether this improves the appearance of the painting cursors or not (Figure 40). The 'Show Crosshair in Brush Tip' option displays a crosshair inside the brush size cursor. Or, you can choose to only show the crosshair. The 'Show Brush Leash While Smoothing' option helps when increasing the Smoothing setting to help indicate where you are dragging. In the Other Cursors section, the Standard option represents all the other tools using a standard tool icon. I suggest you change this to the Precise setting, because this will make it easier for you to target the placement of certain tools such as the Crop tool or Clone stamp.

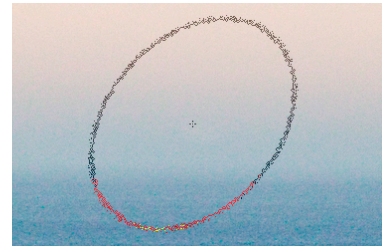


Figure 40 This is an example of the brush cursor using the Full Size Brush Tip mode with Show Crosshair in Brush Tip.

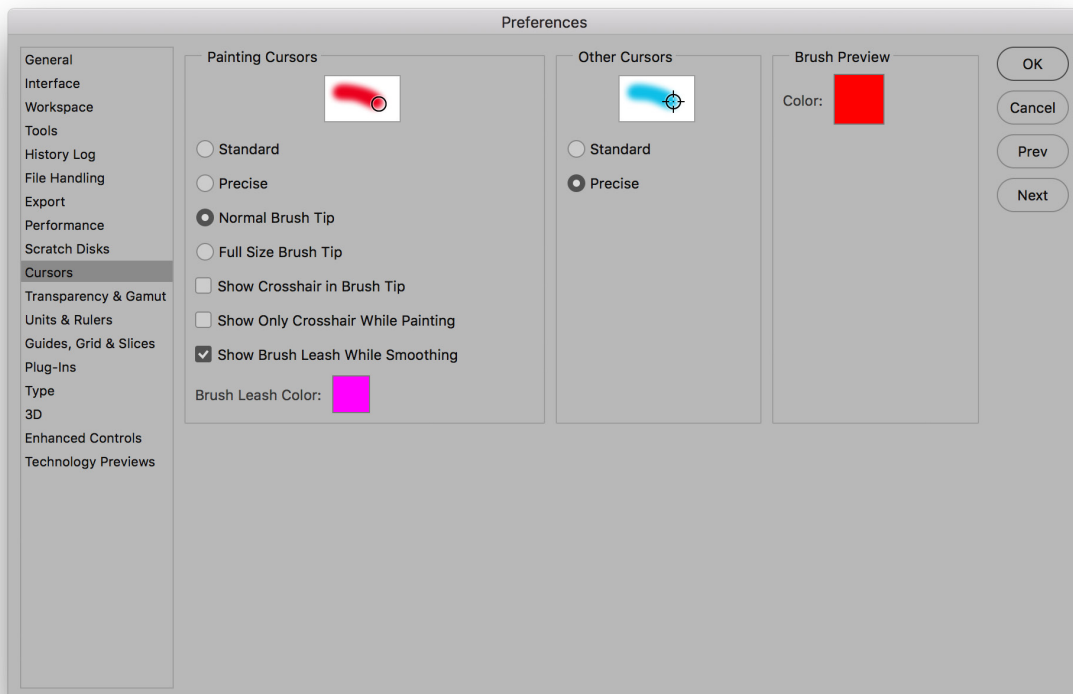


Figure 41 The Display & Cursors preferences.

The **Caps Lock** key can be used to toggle the cursor display. When the Standard paint cursor is selected, the **Caps Lock** toggles between a Standard and Precise cursor view. When the Precise or a brush size paint cursor option is selected, the **Caps Lock** toggles between a Precise and a brush size cursor view. When the Standard cursor mode is selected for all other cursors, the **Caps Lock** toggles between the Standard and Precise cursor views.

Transparency & Gamut preferences

The Transparency & Gamut preferences (Figure 42) let you configure how the transparent areas in an image are represented on the screen. If a layer contains transparency and is viewed on its own with the background layer visibility switched off, the transparent areas are normally shown as a checkerboard pattern. The Transparency Settings let you decide how the checkerboard grid size and colors are displayed. You have a choice of Transparency display settings: None, Small, Medium or Large grid pattern, and a choice of different grid colors. If you go to the preferences shown here you can select different grid sizes and colors, but you can also select None. When this is selected the transparent areas are displayed as solid white.

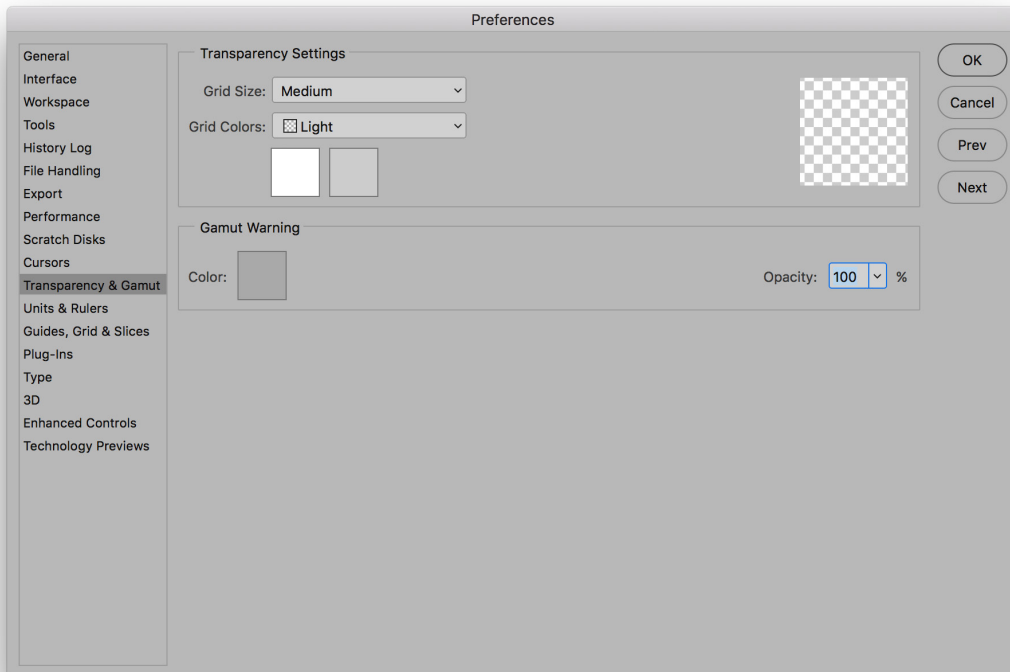


Figure 42 The Transparency & Gamut preferences.

Color Picker gamut warning

The gamut warning can be switched on via the View menu (**⌘ Shift Y** [Mac], **ctrl Shift Y** [PC]) and uses whatever color has been set in the Transparency & Gamut preferences. The gamut warning alerts you to any colors that will be out of gamut after a conversion is made from, say, RGB to CMYK, or whichever color space is currently loaded in the View ⇨ Proof Setup menu. The default overlay color is a neutral gray at 100% opacity, but I suggest reducing the opacity to make the gamut warning appear as a semi-transparent overlay. So, if you are working on an image in RGB mode and you choose View ⇨ Gamut Warning, Photoshop highlights these out-of-gamut colors with a color overlay. The gamut warning is, in my view, a rather crude instrument for determining whether colors are in gamut or not, since a color that is only slightly out of gamut will be highlighted as strongly as a color that is hugely out of gamut. A good quality graphics display coupled with a custom proof setup view mode is a much more reliable guide. Note that if you have the Photoshop Color Picker dialog open, you can choose View ⇨ Gamut Warning to apply a gamut warning overlay to the Color Picker colors (see Figure 43).

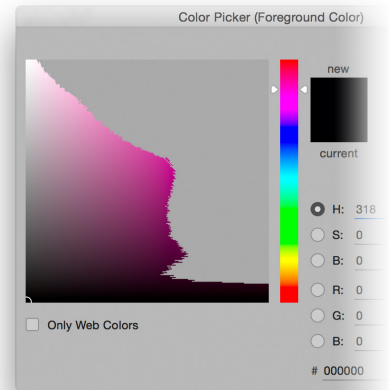


Figure 43 This shows the Photoshop Color Picker with a gamut warning applied.

Units & Rulers preferences

The Units & Rulers preferences are shown in Figure 44. Here, you can set the Ruler measurements (inches or centimeters, etc.). The percentage setting is ideal for recording actions that you wish to apply proportionally at any image size. As well as using the preferences options shown here, the measurement units can also be changed via the Info panel submenu or by **ctrl** (Mac), right mouse-clicking (PC) on a ruler to open the context menu (you can also double-click the ruler bar as a shortcut for opening the Units & Rulers preferences).

The New Document Preset Resolutions section lets you decide what the default pixel resolution should be for print output or screen display work whenever you select a preset from the File ⇒ New Document dialog. The Screen Resolution has typically always been 72 ppi. But there is no real significance to the resolution that is set here if an image is only destined to appear in a Web page design. Web browser programs are only concerned with the physical number of pixels an image has and the resolution setting actually has no relevance. The Print Resolution setting is more useful as this does have an important bearing on what size an image will eventually print.

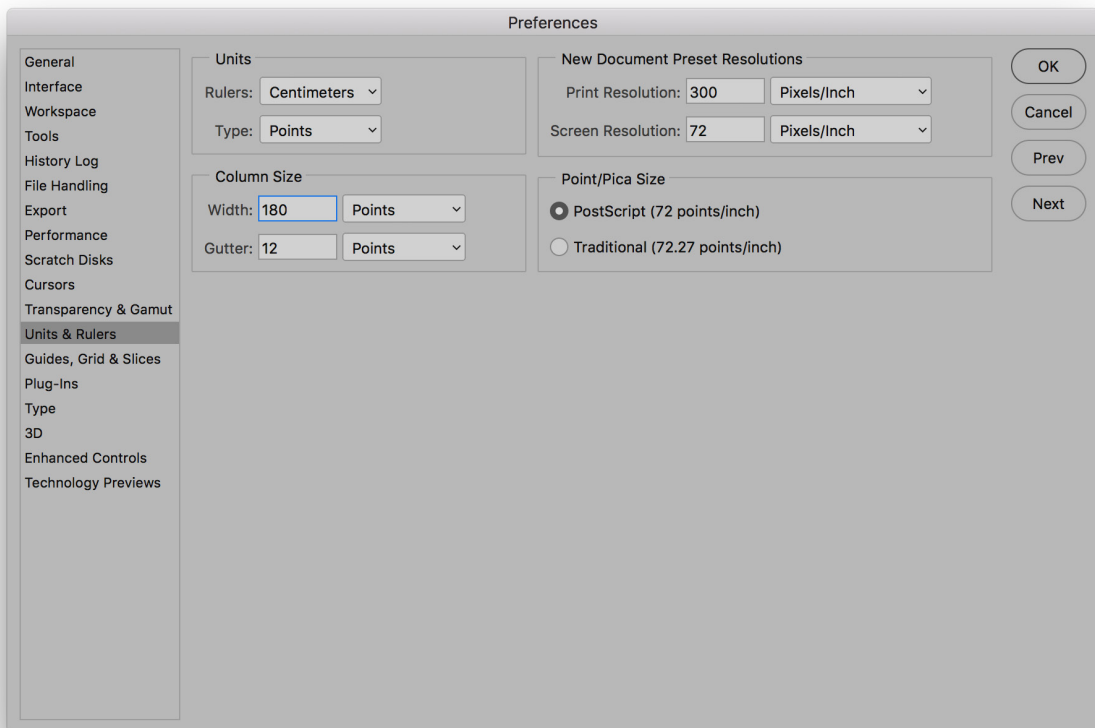


Figure 44 The Units & Rulers preferences.

Guides, Grid & Slices preferences

The Guides, Grid & Slices preferences are shown in Figure 45. These let you choose the colors to use for the Guides, Smart Guides, Grid, Slices, Path and Controls. Both Grid and Guides can be displayed as solid or dashed lines, with the added option of dotted lines for the Grid. The number of Grid subdivisions can be adjusted to suit whatever project you are working on and the Slice options include a Line Color style and whether the Slice Numbers are displayed or not.

The Path section can be used to adjust the default path color and thickness. However, it is easier to just click on the Gear wheel icon on the Pen tool Options bar to edit these preference options.

The Controls Color option can be used to determine the color of the boundary box for Transforms and also when using the Frame tool. It may be useful to be able to alter the color sometimes to aid visibility when working on a particular project.

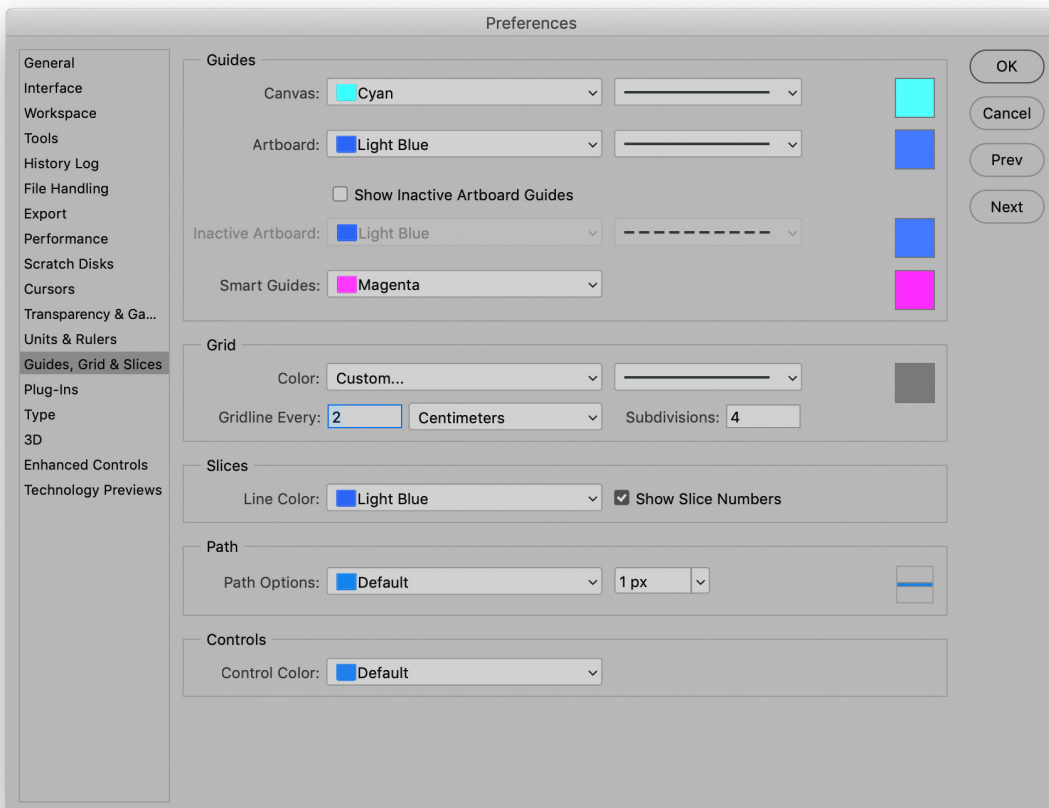


Figure 45 The Guides, Grid & Slices preferences.

Smart Guides in Photoshop

Smart Guides are enabled by default in Photoshop and you will notice how reference guides appear that call out the distance between the current selected object and a referenced object. This distance is calculated based on the distance between the object bounding box rectangles, rather than measuring between the text baselines, or individual path points of a vector shape (see Figure 46). As you move an object, Measurement Guides visually indicate the spacing between the selected object and its immediate neighbors. To disable Smart Guides go to the View menu, select Show ⇨ Smart Guides and check to turn off.

Smart Guides modifier key behavior

If you hold down the **alt** key as you drag to duplicate a layer or text layer using the move tool, or duplicate a vector shape using one of the path selection tools the reference measurement guides will show the distance between the duplicate object and the original (see Figure 47 and Figure 48).



Figure 46 If you rely on Smart Guides to measure the distance between two objects it is calculated based on the distance between the object and the bounding box object. In this case it will be the distance measured between the outer bounds of the text bounding boxes.

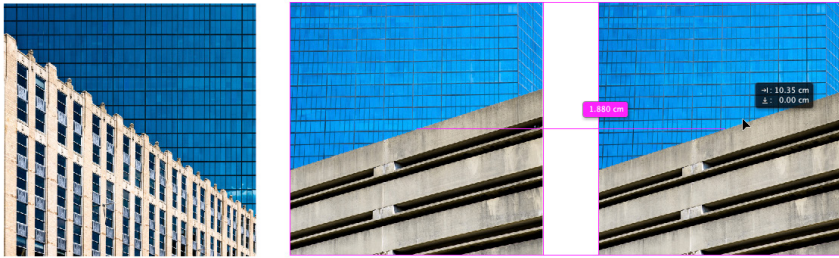


Figure 47 In this example, I held down the **alt** key as I dragged the selected Layer 1 layer. This made a duplicate of the layer and a Smart Guide appeared to indicate the distance apart for this and the original layer.

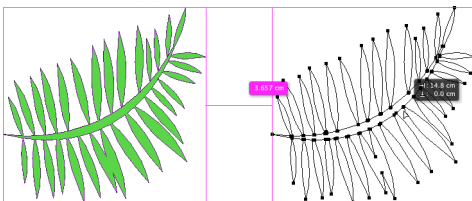
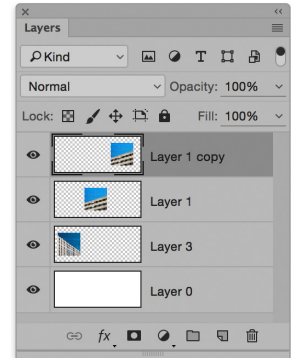


Figure 48 In this example I created a vector shape layer and held down the **alt** key as I dragged to create a duplicate of the shape. The Smart Guide indicated the distance moved from the original by the duplicate.

If you select a layer and hold down the **⌘** key (Mac) **ctrl** key (PC) as you hover the cursor over another layer this will show the Measurement Guides (see Figure 49 and Figure 50). You can then use the keyboard arrow keys to nudge the selected layer as you do this. In the Figure 44 example I held down the **⌘** key (Mac) **ctrl** key (PC) as I hovered the cursor over the image. The Smart Guides in this instance indicate the distances relative to the current selected object. Here it indicated the distances relative to the document bounds. If I rolled over one of the other layers it would indicate the distances relative to the selected object.

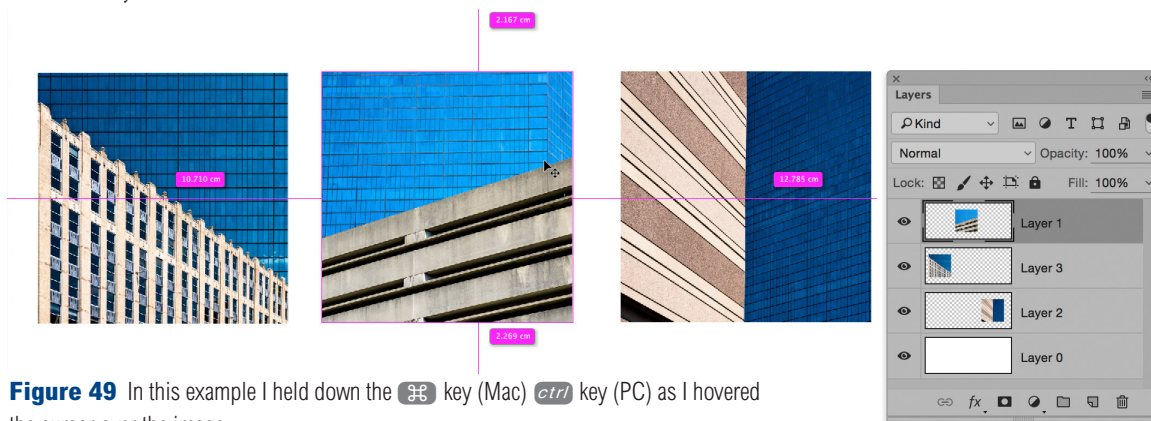


Figure 49 In this example I held down the **⌘** key (Mac) **ctrl** key (PC) as I hovered the cursor over the image.

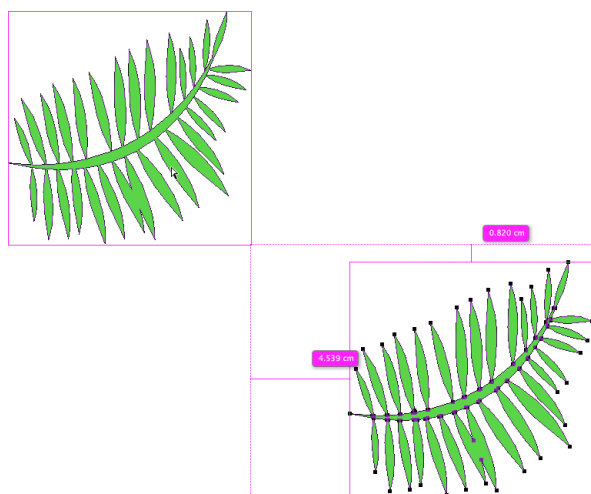


Figure 50 In this example I had duplicated a vector shape and held down the **⌘** key (Mac) **ctrl** key (PC) as I hovered the cursor over the image. This indicated the gap distance between the bounding boxes of the two objects.’.

Matched Spacing

When you move an object, such as a layer, Measurement Guides will visually indicate the spacing between this layer and other layers where the spacing matches. These Measurement Guides will suddenly pop up as you move the layer (or other object) just within range of the same measured distance as the other objects (see Figure 51 below).

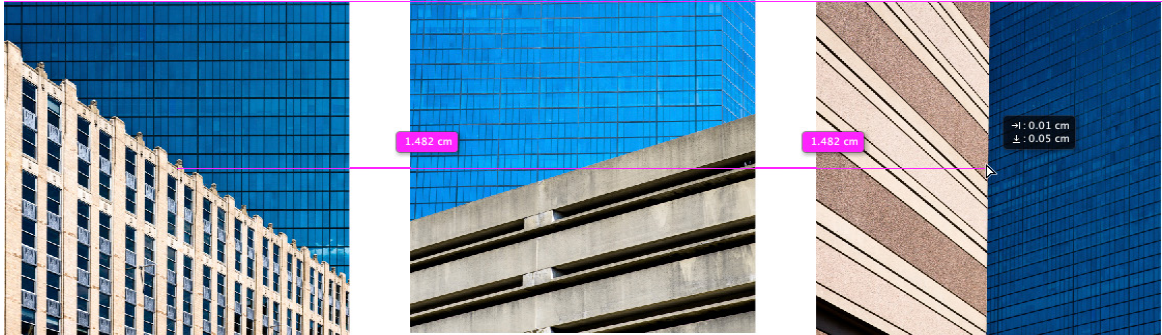


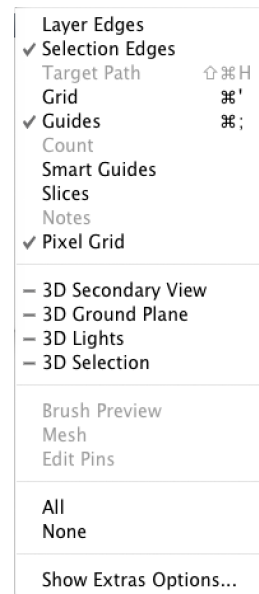
Figure 51 As you move an object closely within range of a similar measured distance to two or more other objects, you will see matched spacing Measurement Guides appear as shown here.

Show menu options

The View ⇨ Show menu options (Figure 52) allows you to choose which Guides, Grid, or Slices items will be visible.



Figure 52 The Smart Guides option is useful as a visual aid for aligning layer elements. The Smart Guides (shown here in pink) will flash on and off to indicate when a layer element is aligned to other layers in the image.



Plug-ins preferences

The Plug-ins preferences are shown in Figure 53. When the Generator feature is enabled in Photoshop you can use layer naming to automatically generate and update image assets on-the-fly as you edit a document. To enable this, check the 'Enable Generator' box. Be aware though that when this option is enabled, it can slow down Photoshop performance, so you are advised to use the Plug-ins preferences to manage its use.

Adobe have created apps for devices that allow you to interact with Photoshop via a tablet or mobile phone. One such example is the Adobe Nav app that is kind of like a Configurator panel that works on devices. To enable, check the 'Enable Remote Connections' option. Having done that, enter a service name and password. You can also access the Plug-ins preferences by going to the Edit menu and choosing Remote Connections... Once you have done this launch the app on your device and login using the same service name and password.

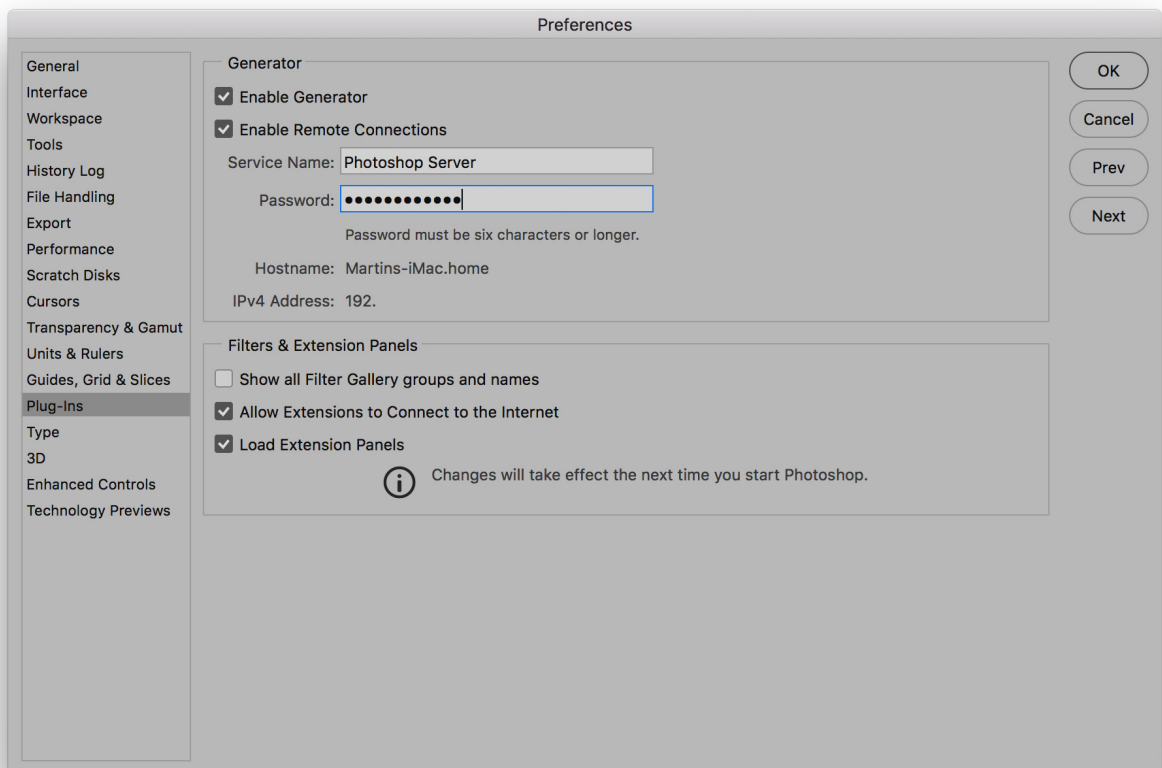


Figure 53 The Plug-ins preferences.

Filters & Extension panels

In the Filters & Extensions Panels section the ‘Show all Filter Gallery groups and names’ option is left switched off. When checked, this lets you see the full range of non-GPU effects filters. I suspect most photographers will be happy to leave this option disabled.

Photoshop can install what are known as extensions panels. If the ‘Load Extensions Panels’ option is checked this loads the installed panels on start-up. Furthermore, if the ‘Allow Extensions to Connect to the Internet’ option is checked, this allows such panels to connect over the Internet, allowing them to access new content plus any important panel updates. This is obviously essential for those extensions panels that need to be connected online in order for them to work. It should be pointed out here that the extension panels Adobe shipped initially all used Flash, which Photoshop no longer supports, so these have currently been discontinued. The fact that this preference remains available suggests some may be revived at some point. So far the Adobe Color Themes panel (formerly Kuler), has made a return to Photoshop.

Third-party Plug-ins

There used to be an option to select the location of an additional plug-ins folder. You’ll notice that this has now been removed, mainly because its presence tended to lead to more problems than it was worth. This could sometimes lead to program instability and crashes that could result from pointing to such a plug-ins folder.

The Adobe Photoshop Application Plug-ins folder is now used for placing third-party plug-ins, extension panels, or any optional plug-ins that have been distributed outside the full installer. This means you can now more easily disable loading all the plug-ins that are in the Plug-ins folder on a per session basis. To do this hold down the **Shift** key at launch. This will show a message asking if you would like to skip loading optional and third-party plug-ins.

Type preferences

The Type preferences are shown in Figure 54 and are mainly of importance to graphics users rather than photographers. We could all do with smart quotes I guess, but the smart quotes referred to here is a preference for whether the text tool uses vertical quotation marks or rounded ones that are inverted at the beginning and end of a sentence. The ‘Enable Missing Glyph Protection’ option switches on automatic font substitution for any missing glyph fonts (those swirly graphic font characters). The ‘Show Font Names in English’ option will be of more significance to non-English language users, as it gives them the option

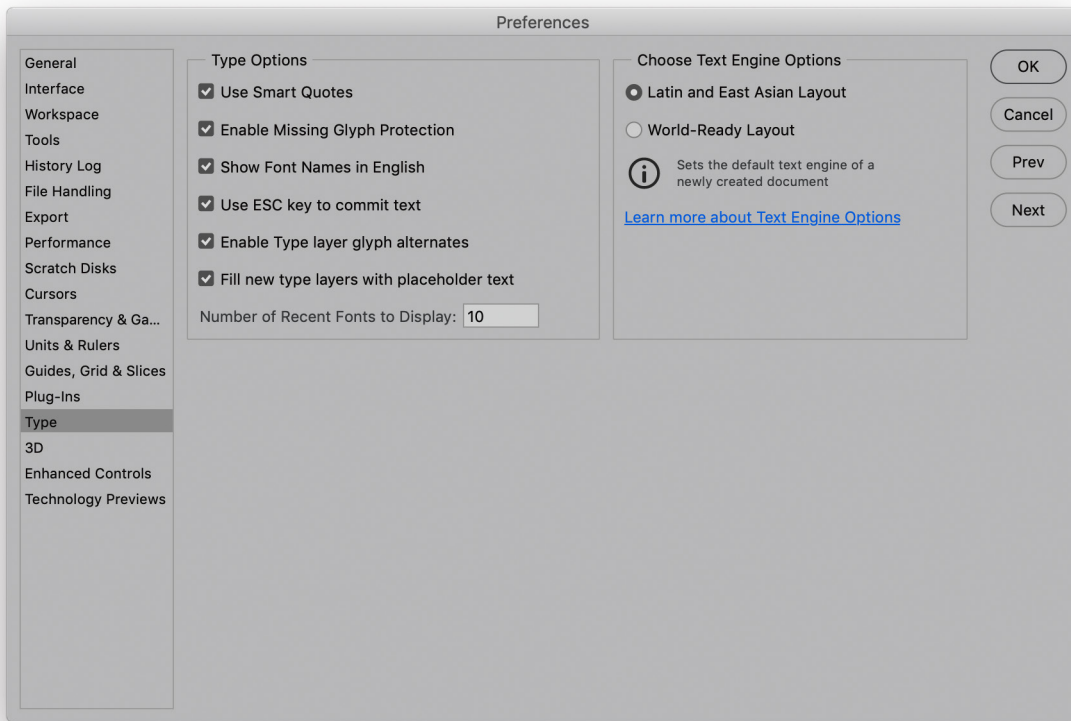


Figure 54 The Type preferences.

to display the font names in English, as an alternative to their own native language. You will notice that in Photoshop the font list uses a WYSIWYG menu listing (Figure 55). The ‘Use Esc key to commit text’ preference adds another way to commit text you have entered to a type box and then exit the type box. The ‘Fill new type layers with placeholder text’ preference auto fills using *Lorem ipsum* improper Latin text.

The Text Engine Options are between Latin and East Asian or World-Ready layout. The latter includes support for Indic, Middle Eastern and South East Asian languages.

Type tool initialization

When you select the Type tool for the first time during a Photoshop session, there will be a brief pause in which Photoshop initializes the type tool engine. If the Type tool was selected when you last closed Photoshop, the initialization will happen during the start-up cycle.

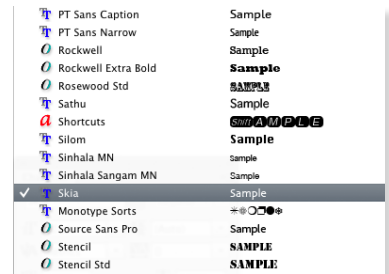


Figure 55 The WYSIWYG font list menu.

Enhanced Control preferences (Mac)

The Enhanced Controls Preferences (Figure 56) contain a single option to ‘Show Touch Bar property adjustments’. When this is enabled, Mac users with a Touch Bar display, such as on the latest MacBook Pro computers, will see an on-screen display like the one shown in Figure 57 below when making adjustments, such as clicking on the slider to adjust the Hardness setting for a paint tool in Photoshop.

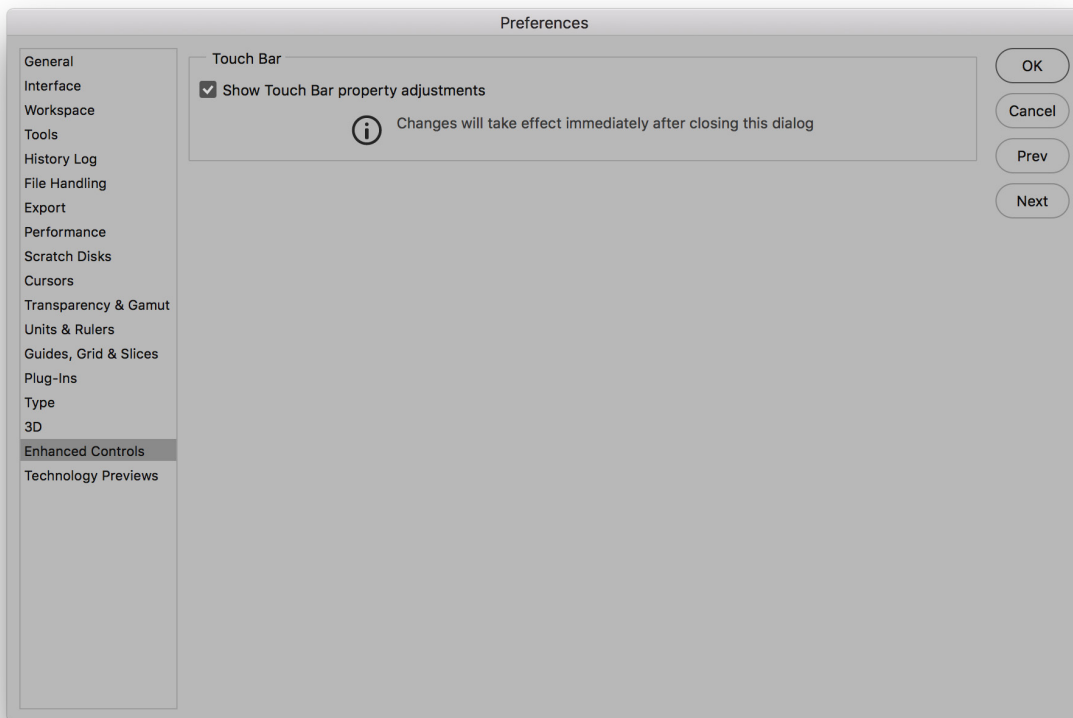


Figure 56 The Enhanced Controls preferences.

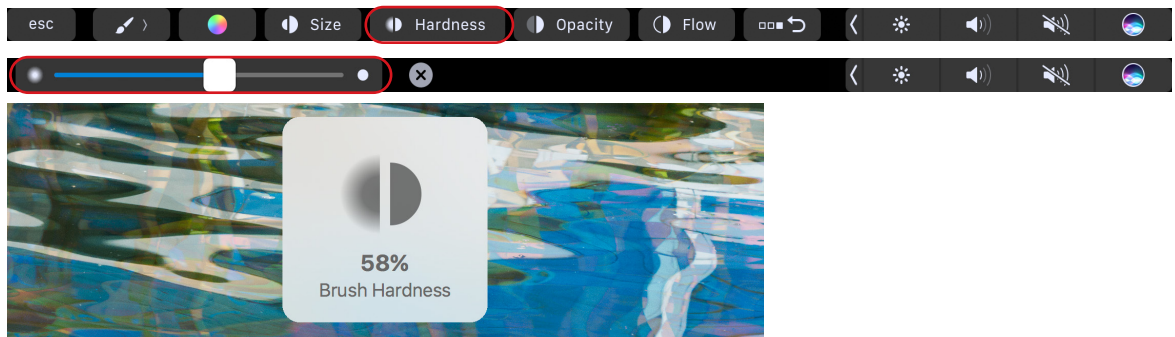


Figure 57 The Mac Touchbar and on-screen display during mid-adjustment.

Technology Previews preferences

The Technology Previews preferences section (Figure 58) is where users can try out new features before they are officially released. In this current release there is an ‘Enable Preserve Details 2.0 Upscale’ item. I discussed this in Chapter 4 of the book demonstrating how with this option checked you can achieve even better interpolation results when using the Preserve Details interpolation option in the Image Size dialog.

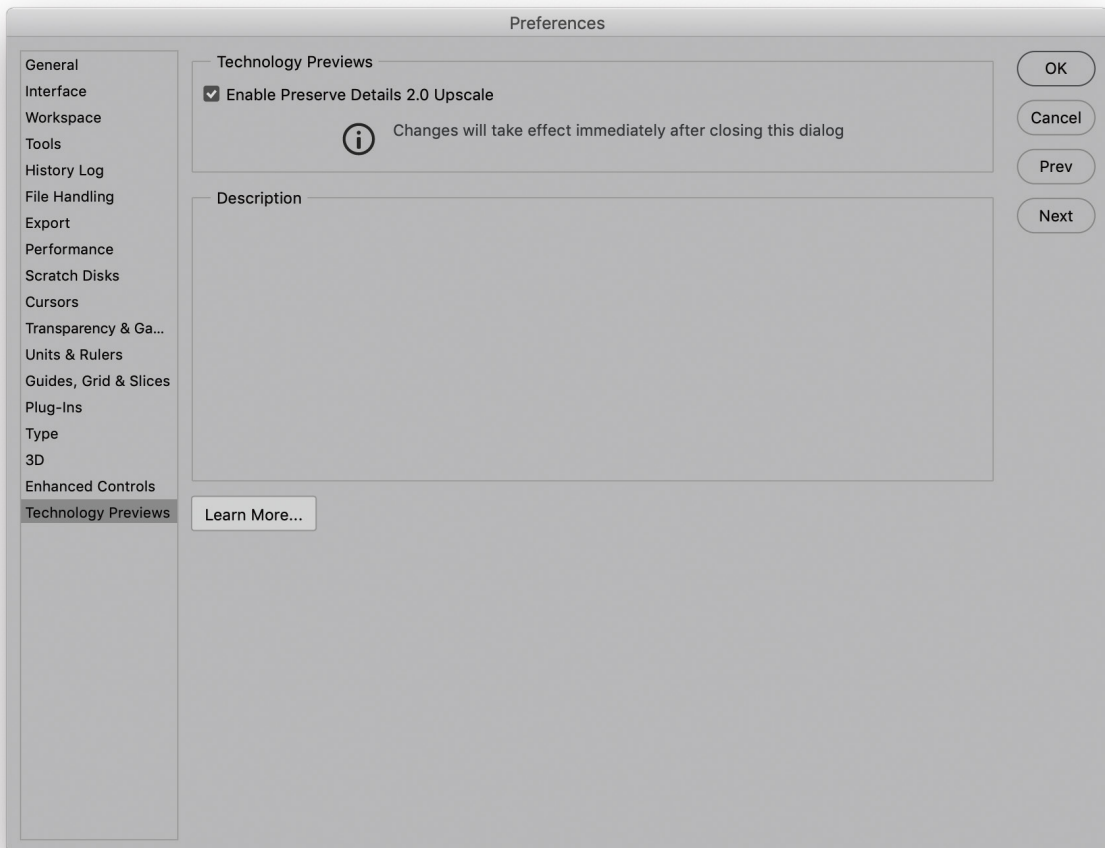


Figure 58 The Technology Previews preferences.

Product Improvement

Lastly, there is a Product Improvement preferences section (Figure 59). Checking the participation box at the top means you consent to allow Adobe to collect data about your Photoshop usage. This is purely voluntary. Participation can help Adobe refine and improve Photoshop, especially with the requirement for large data sets when working on features that require machine learning.

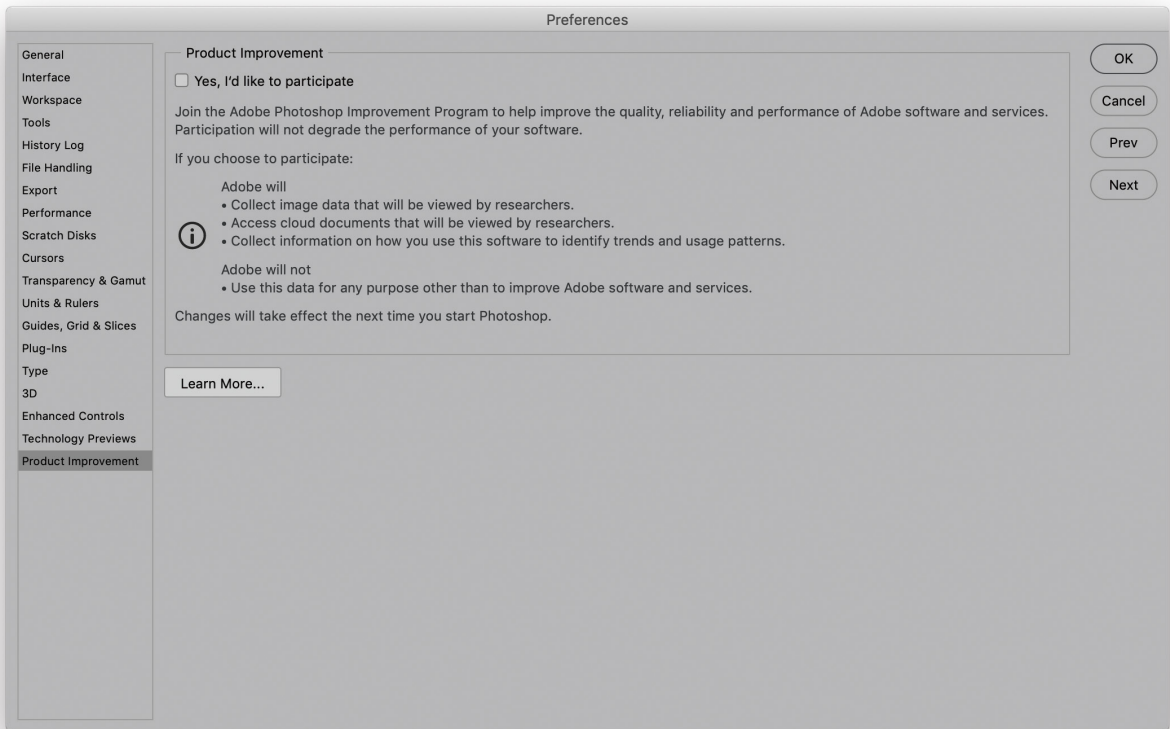
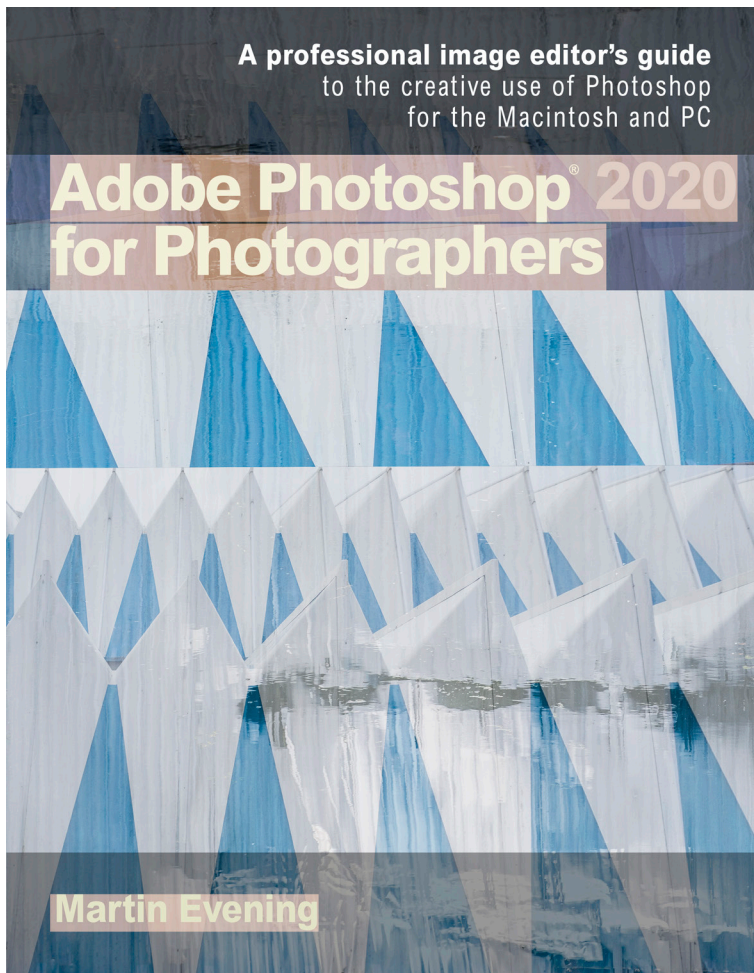


Figure 59 The Product Improvement preferences.

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By *Martin Evening*



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