EDITING AND STORING IMAGES

Erik Kissa, EPSA

MONITOR: CALIBRATION

Q.; Describe the equipment required to calibrate computer color displays.
A.: Calibration of the monitor is the first step to consistent color accuracy. A calibrated monitor ensures that the colors of the output (prints, images on the web, slides, saved images) resemble closely the colors seen on the monitor. The color of the monitor and the other devices cannot be exactly the same because each device or medium has its own gamut and color characteristics. Calibration of the monitor makes the colors consistent and predictable, at the very least.

The Photoshop and its Elements include a program for visual calibration of the monitor. The problem with visual calibration is the accommodation of the eye to different lighting conditions. Calibration with a colorimeter or a spectrophotometer does not depend on the perception of the human eye. Popular colorimeters are the Color Vision Spyder and the Z-Rite Monaco Optix .. The colorimeters are not expensive. The street price of the Spyder2 is $149. and of the Monaco Optix-XR $219. A spectrophotometer, a more precise instrument for demanding work, is more expensive. The Gretag Macbeth Eye One XT spectrophotometer costs $2270.

Q.: Please explain the procedure for calibrating computer displays.
A.: The calibration procedure is straightforward but certain precautions must be taken.
The light in the room can affect the calibration and the editing of images later on. A direct light should not fall on the screen. The room should be darkened but not totally dark. The light entering the room from the windows has to be limited with drapes or blinds. The color of the room should be a light neutral color because the light reflected from the walls can affect the color on the screen.

Connect the colorimeter to a USB port of the computer. The USB port provides the colorimeter with power and enables communication with the computer. Allow the CRT monitor to warm up for at least one hour and the colorimeter for at least five minutes. A flat panel LCD screen may be ready in less than half an hour (at least in 15 min).
Disable the screen saver. If the monitor display is interrupted during calibration, the calibration procedure has to be started again from the beginning.

Open the calibration program. The software guides you through the calibration process, step by step, with clear instructions. The guidelines on the screen are is easier to follow than the written description of the calibration process. The whole procedure takes about 20 min.
The calibration procedure consists of two steps: the adjustment of the monitor and the measuring of color patches on the screen by the colorimeter to create a color profile. (The profile is a file that defines the color characteristics of the monitor). The details of the calibration procedure are different for various colorimeters. The procedure described here is for the Spyder 2 software I use.
The first step uses the controls of the monitor to adjust the brightness, the contrast, the white point (Color temperature), and the black and white luminance.

Set the white level. The brightness of the monitor should adequate for comfortable viewing without loosing highlight details in the array of blocks shown on the screen.
Set the black level to the lowest level at which you are able to distinguish four separate blocks shown on the screen without a loss of shadow detail.
Identify the color controls of the monitor. Most monitors have Kelvin point settings. The standard color temperature for viewing is either 5000K(color corrected studio) or 6500 K (normal daylight).
Place the colorimeter on the screen. Attach the colorimeter to the screen of the CRT monitor with suction cups. (The LCD screens should be handled carefully to avoid scratching of the surface. When calibrating a flat LCD panel, cover the suction cups with the attachment supplied with the colorimeter.)
The colorimeter will read the black, red, green, blue, and gray sample shown on the screen.
Remove the colorimeter.
The calibration of the monitor is now complete. The custom profile created is stored as the default profile.
The calibration must be repeated regularly because monitors age. The colors and brightness drift over time and need to be recalibrated. The calibration software will notify on the screen when time has come to calibrate the monitor again.

Q. Is it correct that laptop display screens are difficult to calibrate?
A.: The LCD screens of laptops are difficult to calibrate indeed. The LCD panels of most laptops have a limited view angle and a slight shift of the viewing direction changes the color and brightness. The higher end laptops have better LCD screens than the inexpensive laptops but the color accuracy is still not sufficient for final editing. The better laptops are not only more expensive but heavier as well. This limits the use of the laptop in the field where portability is the main reason for using a laptop.

Q.: I scanned and printed a gray card to test the color management of my system. The results were inconclusive because of metamerism. What can I do about it?
A.: Metamerism has been a problem with inkjet prints from the very beginning of the digital age.(Metamerism is the condition of a print, or a colored object in general, which exhibits a different hue under different illumination). Manufacturers have made significant efforts to eliminate metamerism of ink jet papers but the color shift is still there. One can live with metamerism by anticipating the light source used to view the prints. As a compromise, metamerism can be reduced by adjusting the color of the print to a hue in the middle of the metameric extremes.

MONITOR: SCREEN RESOLUTION

Q.: A low screen resolution throws pixels away. A higher screen resolution gives a sharper image for editing fine details of images. Do you agree?
A.: A low screen resolution does not throw pixels away. A high screen resolution does not make more pixels. The number of pixels in an image is independent of the screen resolution.

The term “screen resolution” indicates the total number of pixels in each direction of the screen. As an example, the numbers of 800 x 600 mean that 800 pixels correspond to the width of the screen and 600 pixels to the height. The screen resolution affects only the display on the monitor screen and has nothing to do with the resolution and sharpness of the print. The number of pixels, accessed by clicking image> resize image, does not change when increasing the screen resolution from 800 x 600 to 1152x864 screen resolution.

The sharpness of the display on the screen is given by the image resolution, expressed by pixels per inch (ppi). The image resolution is the ratio of the screen resolution to the screen size. An 800x600 screen resolution is a 58 ppi on a 19” monitor and 54 ppi on a 21” monitor. Larger monitors need a higher screen resolution. A 1024x768 screen resolution is 69 ppi on a 21” monitor. A higher screen resolution has the advantages that the display on the screen is sharper and more items can be viewed on the screen.

However, a high screen resolution has a downside as well. When the screen resolution is increased, the items displayed on the screen become smaller. The view of the image can be magnified but all of the tools, icons and thumbnails remain small and are more difficult to see. On a 19”monitor the length of a thumbnail displayed by Windows XP is 40mm (1.5”) at the 800x600 screen resolution but only 27 mm (1“) at the 1152x864 screen resolution. The view of the image on the screen decreases because more pixels can be fitted per inch of the screen.

. . I have written an equation for the width, L, of the image displayed on the monitor screen:

$$L = P\ W\ M/R$$

P is the width of the image in pixels, W is the width of the monitor screen in inches, M is the magnification of the view (as a fraction of one, instead of the percent), and R is the width of the screen resolution in pixels. For a given image P and W are constant. Hence, the width of the picture displayed, L, given in inches is inversely proportional to R, the screen resolution, and proportional to the magnification of the view, M.

As an example, my image “Marshland” which I scanned at 4000 ppi, has a 55.3 MB file and a pixel count of 5308 x 3552 ppi. The image size is 33.7 x 22.5 mm (1.327 x 0.888 inches) at the 0.125 magnification.

$$L = 5308 \times 13.75 \times 0.125 / 800 = 11.4 \text{ (inches)}$$

In summary, when the screen resolution is increased, all items shown on the screen become sharper but smaller. When the screen resolution is decreased, the display becomes larger, albeit less sharp. Which screen resolution is the best, depends on the size of the screen, and is a personal preference. The screen resolution affects only the display on the screen and does not affect the sharpness of the print. The screen resolution can be easily changed by clicking on Properties>Settings and moving the slider.

When sufficient space is available for two monitors, one of the monitors can be used for the image and the second one for tools and palettes. This simplifies the selection of the suitable screen resolution.

EDITING SOFTWARE

Q.: I will edit photographs and buy the Photoshop CS2 software. I am a beginner. Should I take a course to learn how to use the Photoshop?
A.: It is always good to learn something but if time and money are important, a hands-on step by step learning process is more effective. The problem with learning the complete Photoshop at once is that you may forget some of the procedures before you need them.

I suggest an easier learning curve beginning with the Photoshop Elements. The Elements 3.0 and 4.0 have three parts: the Organizer for getting photos, the Quick Fix, and the Standard Editor. (Note: the Elements 4.0, unlike the earlier versions, does not have an equivalent for the Mac users.) Send your photographs from your digital camera or memory card reader to the Organizer. Open a photo in the Quick Fix and adjust lighting, color, and saturation. You can crop an image, if needed. Everything on the screen is self-explanatory. You will be editing your photos while somebody is taking the first lesson of the Photoshop course.

After awhile you will need more control and start using the Standard Editor. If you do not mind silly humor, the "Dummy" book will help you. A more useful book is the well illustrated Adobe Photoshop Elements 4.0, by Philip Andrews. Members of your Camera Club will help you too.

The most important tools in the Elements, including the Levels, Hue and Saturation, Shadows and Highlights, are the same as in the full Photoshop. You will have twenty tools the Photoshop CS2 does not have but eventually you will miss the Curves and Color Balance adjustments of the CS2. As I wrote last month, the Hidden Power of Elements book has these and many other tools available for $ 39.95. For about 100 dollars of total expense you will have the essential firepower of the Photoshop CS2 costing $600, and have saved the cost of a Photoshop course.

You may never need the Photoshop CS2 but if you get heavily involved in graphics and publishing, it is easy to switch to the Photoshop CS2. The main challenge is to find where the tools are hidden and this is not difficult. The Adobe Photoshop CS2 User Guide and other books can guide you. The Adobe Photoshop CS2 Visual Encyclopedia has the tools listed in alphabetical order. Your experience with the Photoshop Elements will help you to understand the details of the Photoshop and to tackle the intricate techniques of the graphic artists. You may decide to become a Photoshop expert and feel a need to take an advanced course. The course will be more beneficial now than at the beginning.

Q.: How can I make a contact sheet of my photos?
A.: The term contact sheet originates from photography with film when negatives were placed on a light sensitive paper and a contact print was made. To make a digital contact print is easy. In the Photoshop CS2 and its earlier versions, as well as in the Photoshop Elements 1.0 and 2.0, open Files>Automate> Contact Sheet II. Click on Browse and select the folder for the contact sheet. Choose the paper size (8x10 is the default size) and resolution (300 ppi for high quality). Select the color, the Across First option, and enter the number of columns and rows. Choose Auto-Spacing and Use Filename as Caption. Do not select the Rotate for Best Fit, otherwise your verticals will be shown

horizontally. Click on OK and the contact sheet is ready to print. I print my contact sheets on Epson Photo Quality Ink Jet paper.

Photoshop Elements 3.0 and 4.0 have a different procedure. Open the Organizer and click on Print. On the screen find Select Type of Print and choose Contact Sheet from the drop-down menu. Select the number of columns. Click on Add, on the left lower corner. Select photos in the Organizer and click on Add Selected Photos. The contact sheet is now ready to print.

Q.: I edit my images with the Adobe Photoshop Elements but miss the Curves adjustment. Does the Version 4 of the Elements have the Curves tool?
A.: No, the Photoshop Elements 4 does not have Curves but a plug in software can remedy this shortcoming.

A book entitled "The Hidden Power of Photoshop Elements 3" by Richard Lynch comes with a CD for installation in the Elements. The book is available in bookstores ($ 39.99). The tools on the CD include Curves, the very useful Color Balance, Channels, Masking, Enhanced Sharpening, Color Separations, and many others. The software can be downloaded free from www.hiddenelements.com but the book (355 pages) is very helpful and informative, even for photographers who have the full Photoshop.

The CD for the Elements 3 does not open in Photoshop Elements 4. A new version of the book for the Photoshop Elements 4 is expected to be available in February.

Q.: Is the sRGB color mode available in the Adobe Phoptoshop Elements and Adobe Photoshop Elements 3?
A.: Go to Edit> Color Settings. Choose Limited Color Management for sRGB, for display on the monitor and Web surfing. Choose Full Color Management for RGB, a wider color gamut for printing.

STORAGE OF IMAGES

Q.: If all images have been erased by the delete function, is it still necessary to format the memory card?
A.: Deleting images by the delete function may leave residual data which may corrupt the card. Formatting removes any residues and assures that the card is clean.

Q.: What size memory card should I buy?
A.: The capacity of the card should be sufficient for most one day photo shoots. The card can be easily changed if more images must be stored. The advantage of having a card for about 80 images, instead of a very large card, is safety. A memory card can be corrupted, lost or damaged and if a smaller card fails, the number or images lost is smaller. According to an old wisdom, all eggs should not be placed into one basket.

More important than a huge capacity is the read/write speed of the memory card to keep up with the fast buffers of modern digital cameras. The write speed of the 80x card is 12 MB/s. Most digital SLR cameras use CompactFlash cards.

Q.: How much faster is the USB 2.0 port than the USB 1.1 port?

A.: The USB 2.0 port (Universal Serial Bus) is about 40 times faster than the USB 1.1 port. A USB 1.1 connection can transfer up to 12 Mb per s (1.5 MB per s) data whereas the USB 2.0 connection can move 480 Mb per s (60 MB per s). The high speed facilitates printing and is absolutely necessary for transferring data to an external hard drive. New computers come with USB 2.0 ports and new printers and scanners have USB 2.0 capability.

The FireWire 400 (IEEE-1394) is about as fast as the USB 2.0. The FireWire 800 is twice as fast but is currently available only for Mac computer.

Q.: What is the best way to store digitally acquired photographic images?

A.: The archival storage of digital image is still an incompletely solved problem. A second hard drive is probably the most convenient storage medium but hard drives can crash and any magnetic file deteriorates with time. The optical storage on a CD-R has lost its initial appeal because the disk may become unreadable. The longevity of the images stored on a CD-R disk has been unpredictable, some CD-R disks have failed unexpectedly in a few weeks. High quality CD-R disks now available are claimed to be resistant to optical or mechanical failure (The Delkin's Archival Gold and the Maxell CD-R PRO). If these disks live up to their longevity claims, the software for reading the disk may not be available ten years from now. Remember the 5.25 " and the 3.5" floppy disks. A DVD will probably replace the CD-R because of its higher capacity but a DVD is still a developing medium.

Q.: How to protect data in the computer?

A.: An absolutely safe storage system does not exist. All storage devices deteriorate gradually and may fail completely but for different reasons. All magnetic storage devises are sensitive to a strong electric field which fortunately does not affect optical storage advices. Both the power line and the phone line should have a surge projector. Unfortunately, a strong electric field created by a lighting rod near the house can wipe out all of the magnetic information, the data on a hard disk and on a memory card. The optical information on CDs and DVDs can survive the electronic onslaught but may become eventually unreadable for unrelated reasons. Consequently, the images should be saved on a magnetic as well as on an optical device.

The data on the hard disk is usually protected in the computer by another hard drive which mirrors the data on the main drive. The principal of the strategy is that if one hard drive fails, the other one will save the data. However, if the operating system fails, the data on both drives become nonaccessible. Hence it is better to use an external hard drive which can be connected to another computer. The Maxtor 300GB external hard drive is very convenient to use, the data transfer takes only minutes.

The gold Delkin and MAM-A CDs contain phthalocyanine dyes which are more stable than the azo dyes on cheaper CDs. Some Delkin gold CDs are made scratch resistant as well. They have been durable so far.

A DVD can hold six or seven times more information than a CD and is therefore an attractive storage medium. A DVD records the information with smaller pits packed closer together and is therefore more vulnerable to physical damage than a CD. Another problem is the readability of DVDs. Several systems exist already and it is not known where the future will go. I have recorded my images on MAM-A gold DVD-R disks

using a multisystem DVD burner on my new computer. I can read the DVDs on my new computer but not on my other computer three years old. This brings up the main problem of digital storage – will the data be accessible in the future?

Monochrome silver prints of my ancestors are over a hundred years old and have not faded noticeably. It seems that black-and white silver based prints and Kodachrome slides are the only proven archival storage media.

Q.: The longevity of digital images is doubtful. Is there a sure way to save digital images for many years to come?

A.: Your concern with the archival storage of digital images is well founded. Hard disks may crash, images on a CD or DVD may become unreadable because the disk may fail, the hardware or software for reading the disk may not be available, and the file format of the image may not be supported by the new systems. Fortunately, digital images can be archived reliably by converting them to film. This sounds like retrograde procedure, but what are the alternatives?

A photo lab with a film recorder can convert digital images stored on a CD to color slides. The photo lab I use charges $ 3.50 for a Fuji 100F transparency which can be expected to last at least twenty years, if properly stored. Unlike the breakdown of a CD, the fading of film is not abrupt but gradual. The lifetime of a transparency can be extended by copying.

Q.: My digital files are growing rapidly and I need a system for retrieval of images. What are the options?

A.: Digital photography has created a flood of files for two reasons. Firstly, photographers shoot more images because the cost of film is no longer a limiting factor. Secondly, each image may be stored in several formats and various stages of editing: a RAW file from the camera, the converted RAW file, and the edited image. Some photographers save several versions of the edited image. The image may be saved in the Photoshop PDS format or as a TIFF file.

Several file management programs are available for organizing files of digital images: the Adobe browser, the ACDSee 7, the iView MediaPro 2.6, the Canto Cumulus, the Extensis Portfolio, the Fotoware FotoSation Pro, and others. Trial versions are available at www.acdsystems.com , www.iview-multimedia.com, www.canto.com, www.extensis.com, and www.fotoware.com.

The Adobe browser can find a tagged image everywhere on the hard drive or on a CD. The tags are keywords added to the images. The more specific the search, the more keywords will be needed to describe the image to be selected. The search can be speeded by limiting the time span (the timeline) or the number or folders (categories) searched.

I organize my images in folders and subfolders and burn a CD when the content of a subfolder has reached the capacity of a CD. The images on a CD belong to the same category and the title as well as the contact sheet of the CD helps to find an image even without the help of the Adobe browser. If the catalog of images on the hard drive is lost, each CD becomes an independent source of images. Mixing unrelated images on a CD complicates file management.

The most important rule for organizing images is quite simple – do not create a file management problem by storing images you will never need. Before saving an image, ask the question – why am I doing this? Is the image useful for stock photography, exhibitions, contests, sales to a client, or is it valuable for some other reason. Does the image have an archival value?

File management starts with reducing the number of images. Not only inferior images are deleted but good images as well. Of five technically faultless but similar images, three must go to make space for the best image.