Part I

Digital SLR Must-Know Info

Gain an understanding of your camera's image sensor, shutter, LCD monitor, camera settings, memory cards, custom functions and what you see versus what your camera sees. You'll be in the know after reading this chapter.

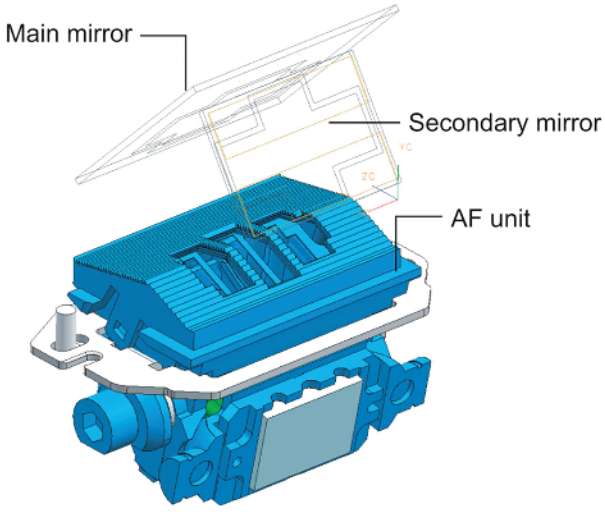
Data Contacts and Mirror

Your lens and camera "talk" to each other – communicating f-stop, focal length, focus and exposure information – via the electrical contacts on the lens mount and camera mount.

Keep these contacts clean and avoid touching them to keep the communication channels open. If you get a focus, f-stop or other error messages on your LCD monitor, try cleaning the contacts with a micro-fiber cloth (available at camera and eyeglass stores).

When it comes to the mirror, never touch it with anything. You can use a low-volume photo blower (available at camera stores) to remove dust from the mirror, which does not show up in your pictures but does appear in your viewfinder. However, never use compressed air, because it contains propellants that may stain and ruin your mirror. If you do get hard-to-remove marks on the mirror, it's best to have it professionally cleaned.

Illustration: courtesy Canon USA.

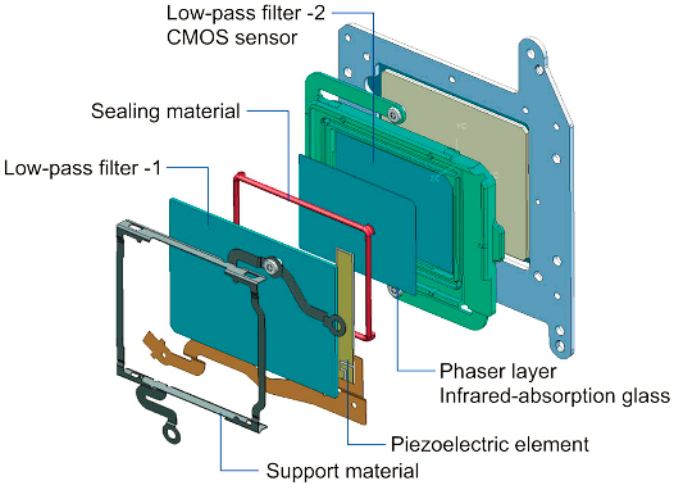


Auto Focus vs. Manual Focus

In most cases, your auto-focus camera can focus faster than you can. Auto-focus units use contrast in the scene to set the focus. In low light and low contrast situations, you may need to switch to manual focus because the AF system will "hunt" for perfect focus. You'll also want to switch to manual focus when shooting through a chain link fence, through leaves and branches and when shooting through glass, as I did to capture this rainy day scene in a small, roadside town outside of Mexico City.

On some entry-level digital SLRs, some auto-focus lenses will not auto focus properly, so you will need to focus manually. In addition, some brands of tele-converters may prevent auto focusing when used on entry-level digital SLRs. Off-brand lenses and tele-converters also may affect auto-focusing function, accuracy and speed.

Illustration: courtesy Canon USA.

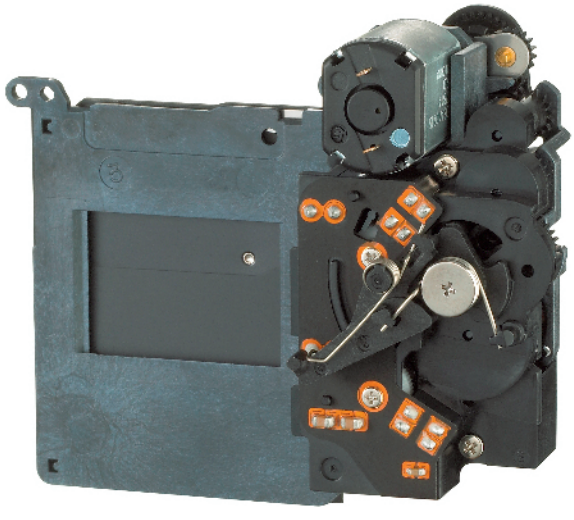


Be Sensitive to Your Image Sensor

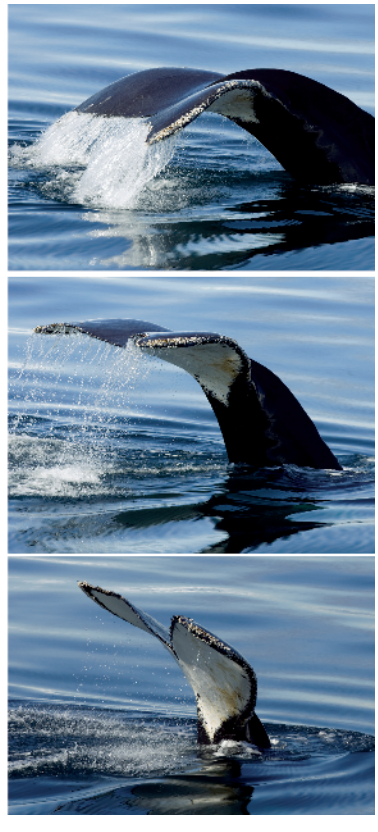
Later in this section I talk about different size image sensors and their advantages and disadvantages. For now, I just want to give you a look at the image sensor setup so you're not afraid to clean the sensor to prevent black specks and blobs from appearing on your images. You see, when you clean the sensor, you are not really cleaning the sensor, but rather the low-pass filter that covers and protects it. The specks are shadows caused by dust and other particles appearing on the filter. When you clean this filter, be sure to use only products designed specifically for photo sensor cleaning, and follow the instructions very, very carefully.

When I shoot in dusty conditions, such as when I was photographing the sand dunes in Namibia, I clean my sensor every night. Better safe than sorry is my motto.

Illustration: courtesy Canon USA.



Shutter



A Shutter's "Mileage"

Would you buy a used car without knowing the mileage? Of course not.

When it comes to buying a used camera, it's also important to know its "mileage"; that is, the number of shutter activations. And if you are buying a new camera and plan to take a ton of pictures, it's important to know the estimated "mileage" (again in shutter activations). For example, Canon's EOS 40D has an estimated number of shutter activations of about 100,000. That may sound like more images than you'll ever take, but a sports photographer could take that many pictures in a year – or less. Higher-end digital SLR cameras have more durable shutters. The shutter in my Canon EOS 1D Mark III, which I used to photograph this series of whale tail photographs in Antarctica, has a life expediency of about 300,000 activations.

Before you head out on the road with a new or used camera, check its mileage. Some cameras offer counters. For those that don't, you have to rely on the previous owner's honesty. And speaking of honesty, "driving conditions," or what kind of use the previous owner put the camera through, are also a factor when considering purchasing a used digital SLR.

Don't panic if you plan to shoot hundreds of thousands of pictures. Shutter replacements cost between $250 and $500, which is not bad when you own a high-end digital SLR that cost more than $5,000.

Illustration: courtesy Canon USA.

Your Eyes vs. Your Camera's "Eye"

Our eyes are incredible light sensitive devices. We can see a dynamic range of about 11 f-stops. That's why in a scene like this Mongolian landscape, I could see into the shadows and the highlights in the bright clouds were not washed out.

Our digital cameras can see about five or six f-stops. Therefore, it's our job as photographers to produce images that look like the scenes we see – or look like we want them to look.

The key is to realize that what we see with our eyes is not what the camera sees with its "eye." Learning how to see the contrast range of a scene – and knowing how to compress it with accessories like diffusers, reflectors, filters and flash units, and how to control light in the digital darkroom – will make us better photographers.

In addition, seeing the light will help keep us from being disappointed when what we see in real life is not what we see on our camera's LCD monitor – perhaps saving us from deleting "outtakes" that can be turned into "keepers."

Brightness Values and the +/– Exposure Compensation Control

Here are two pictures I took during Carnevale in Venice. One person is wearing a black costume and one is wearing a white costume.

Get this. With my camera set on any of the automatic exposure modes and the exposure compensation set at zero, the picture of the person wearing the black costume would have come out too light, and the picture of the person wearing the white costume would have come out too dark. Here's why.

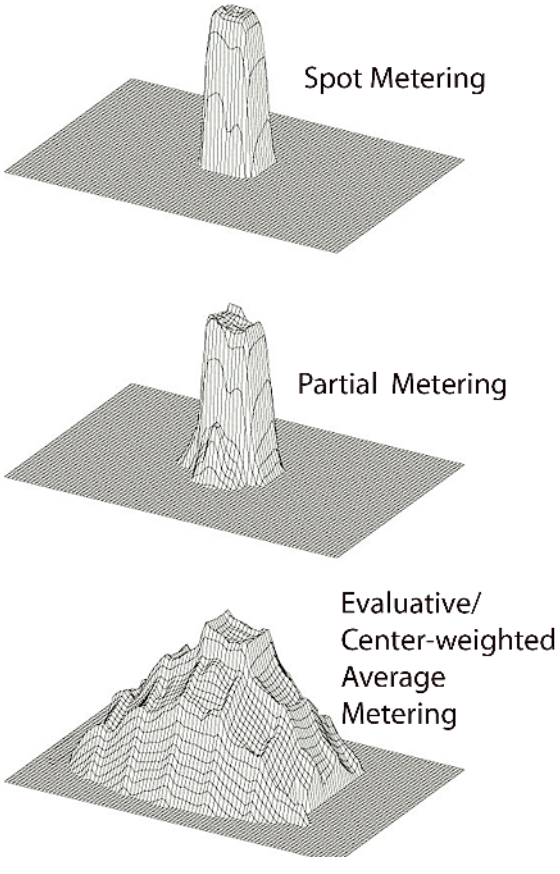
In the photograph of the person wearing the dark costume, all that black would have fooled the camera's meter into thinking that the scene was darker than it was, therefore increasing the exposure to a point where the image would have been slightly overexposed. The same thing would have happened when photographing any very dark subject – say the dark bark of a tree.

Likewise, in the photograph of the person wearing the white costume, all that white would have fooled the camera's meter into thinking that the scene was brighter than it was, therefore decreasing the exposure to a point where the image would have been slightly underexposed. The same thing would have happened when shooting at the beach on a bright, sunny day or when shooting in the snow.

Now I know it will sound backward, but what you need to do is this: When photographing very light subjects, set your exposure compensation at +1 (as a starting point); when photographing very dark subjects, set your exposure compensation at – 1 (again as a starting point).

If you are not sure about the exposure, bracket your exposures, and then take additional pictures over and under the recommended exposure setting.

Once again, learning how to see the light is the key to getting a good in-camera exposure.



Control What Your Exposure Meter "Sees"

Here's another important thing to think about when comes to seeing the light: You can control what your camera's meter "sees."

Basically, digital SLR cameras, and even some digital compact cameras, have three metering modes: spot metering, which measures the center spot of the viewfinder; partial metering, which measures the central area of the frame; and evaluative/center-weighted average metering, which measures most of the frame but puts the emphasis on the center part of the image.

For my monk photograph, I chose the partial metering mode because the monk was surrounded by a large, dark area – which would have fooled the camera's meter into overexposing the monk had I chosen the evaluative/center-weighted average metering mode.

Check out the metering patterns on this page and keep them in mind when you are composing your pictures. Choosing the correct metering mode could make the difference between a right-on exposure and a poor exposure.

Illustration: courtesy Canon USA.

LCD Monitor Info

When I teach a photography workshop, one of the first points I stress is the importance of checking the histogram (a graph that shows the distribution of the light values in an image) on the camera's LCD monitor. The idea is to check to see if the shadows are blocked up (indicated by a spike on the left side of the histogram) and if the highlights are overexposed (indicated by a spike on the right side of the histogram). I talk about the importance of checking the overexposure warning on the camera's LCD monitor, which blinks to show overexposed areas.

I also point out the importance of shooting RAW files, which are more forgiving when it comes to exposure than JPEG files, which toss away information during the compression process. In fact, on some of my workshops, I wear my "RAW Rules" t-shirt. There's more to come on shooting RAW files on the following pages.

But here's the thing. The histogram and the overexposure warning on the camera's LCD monitor are not for the RAW file of an image. Rather, they are the displays for a JPEG of that file – because a JPEG is easier to display and that's what you see on the LCD, not the RAW file you just captured.

So why check the display when you are shooting RAW files? Well, that histogram is still a pretty good indication of what you're getting. Just keep in mind that with your RAW file, you can rescue up to one f-stop of overexposed areas later in the digital darkroom.

By the way, if you are new to histograms, I included the histogram for this picture that I took in Venice to show you one example of a good histogram – no spikes at the left or right ends of the "mountain range."

Customize Your Camera

Most digital SLRs, even low-end models, offer what's called Custom Functions. Custom Functions, accessed through a Custom Function menu, let you customize your camera's settings, including fine-tuning automatic exposure compensation, turning on/off long exposure noise reduction, linking the metering system to the spot focusing point, adjusting auto focus sensitivity, selecting the auto focus point, and a host of other adjustments. The more sophisticated the camera, the more Custom Functions you have at your fingertips.

One of the more popular Custom Functions, especially among sports and wildlife photographers, is the ability to use one button to set the focus (usually the AF button on the back of the camera), and to use only the shutter release button to take the picture – as I did for this picture of a butterfly I took at Butterfly World in Coconut Creek, Florida. The benefit is that you can start/stop focus with your thumb, without accidentally taking a picture, and then press the shutter release button at the precise moment of action with your index finger to take the picture.

Play around with Custom Functions and see how they can not only help you take better pictures, but also how they can help you have more fun with your camera.

Cooling Off and Warming Up Images

Earlier in this chapter I touched upon capturing good color in your images. Here is another feature, found on mid-range and high-end digital cameras, that lets you get great color and even fine-tune color. It's a Custom Function called Color Temperature, and it lets you set the precise color temperature (my EOS 1Ds Mark III lets me choose from 2500K to 10000K) for a scene, and even offers White Balance Color Correction, which basically lets you apply a digital color conversion/ compensating filter in-camera.

Historical Note: The symbol K is used on the Kelvin scale and is a thermodynamic (absolute) temperature where absolute zero is zero (0 K.)

In this trio of photographs, the top picture was taken with no Color Temperature adjustment and with the White Balance set on Automatic. For the middle image, I set the Color Temperature to 2500K, cooling off the image. For the bottom image I set the Color Temperature to 10000K, warming up the image.

Sure, you can create the same effect in the digital darkroom using Color Temperature, Color Balance and Photo Filters adjustments, but it's fun to try to create different kinds of in-camera effects – and sometimes essential if you are shooting commercially.

sRGB vs. Adobe RGB and RAW vs. sRAW

I am a nut about capturing color. Great color! In fact, when I am out on location, as I was when I photographed this Masai woman in Kenya, I look for color – and try my hardest to get good color in-camera.

One way to ensure the best color images is to set your camera to the Adobe RGB (not a custom function) color space. When you set your camera to the other color option, sRGB, you are choosing a smaller color space, one with fewer colors.

There is an easy way to remember why sRGB has few colors: The "s" in sRGB stands for "smaller" color space.

That said, you may not notice the difference in the two color spaces unless you are doing commercial work or making super big prints of scenes with a super wide color and contrast range.

Let's talk RAW. Some cameras offer both a RAW mode and an sRAW mode. When you shoot in the sRAW mode, your file is much smaller than a RAW file, meaning that there is less information in the file. For example, on my Canon EOS 1D Mark III, a RAW file is 10.1 megapixels, compared to the 2.5 megapixel sRAW file.

For me, RAW is the only way to go, because I want the maximum image quality to make the maximum size print.

Get It All in Focus

Check out this landscape photograph I took in Turkey. Everything in the scene is in sharp focus, from the blades of grass in the foreground to the distant background.

One way to get a tack sharp shot is to use your digital SLR's mirror lockup feature, which locks up the mirror to reduce camera shake created when you press the shutter release button. Here's the technique. Set your camera on a tripod and compose and focus the scene, lock up the mirror (see your camera manual) and then use the camera's self-timer or a cable release to take the shot.

Not all digital SLRs have a mirror lockup feature.

On some cameras, you can set mirror lockup so that the mirror stays up for additional exposures. On most cameras, however, the mirror returns to its normal position after each picture is taken.

Mirror lockup can also be effective in getting sharp shots when using telephoto lenses and macro lenses, because both types of lenses tend to exaggerate camera shake, which can cause blurry pictures.

F-stop Info

When I first became interested in photography in 1975, there was a popular expression about how to get a good, extremely sharp picture with great depth-of-field: "f/22 and be there." The idea was that if you set your lens at f/22 and have a good subject, you'd have a good chance of getting a good shot with the maximum amount of depth-of-field.

With digital SLRs, shooting at f/22 may not always be the best idea because pictures may look a bit soft. Here's the "tech talk" from my friend Rudy Winston of Canon. "What happens is this: The aperture blades have the potential to deflect and bend light as it passes by them and scatter it as it heads toward the digital image sensor. At fairly wide aperture settings, the vast majority of the light rays entering through the aperture are unaffected – only those on the outermost peripheries are impacted by the aperture blades. The wide opening means that nearly all the transmitted light continues on its way, sharply focused by the lens."

I hardly ever take a picture at f/22, choosing f/11 as my smallest f-stop, as I did here when photographing the interior of this church in Peru.

When it comes to choosing an f-stop, you basically want to choose a wide f-stop (f/2.8, f/4.5) for shallow depth-of-field, and a small f-stop (f/8, f/11) for greater depth-of-field. Note that at the same f-stop setting, you'll get more depth-of-field from the same shooting position when using a wide-angle lens than you will when using a telephoto lens.

Internal Filter Flare

It's a good idea to remove any lens filter when shooting into the sun, because the reflection of the sun can bounce off the front element of the lens onto the filter and create a ghost image. Usually, the ghost image appears on the opposite side of the frame from where the sun is positioned. You can erase a ghost image using the Clone Stamp tool in Photoshop, but here's another idea.

When you compose the picture, don't crop as tight as you normally would. Rather, leave some extra room around the main subject. That way, the ghost image may appear outside the final frame – away from the main subject. When you crop the image, you'll also crop out the ghost image, which is what I did here for this picture I took of a shipwreck off the coast of Namibia.

When Pixels Bloom

Here is a fact about digital SLRs. Knowing it will keep you from freaking out when you are looking at a big enlargement of a scene (on your monitor or in a print) where very bright and dark areas meet.In this photograph of a neon sign, the light from the sign is spilling over to the dark areas in the scene. That's normal.

On a digital image sensor, where very dark and very light areas meet, the light from bright areas can spill over from the bright pixels to the dark pixels, creating a halo around those dark areas. In digital photography terms, this is called blooming.

You can't see the blooming effect (different than the light-spilling-over effect) in this picture because it's small on this page. When viewing an image like this on your monitor, you may not see the effect either, especially when the image is viewed below 50 or so percent magnification. If you think there is a chance of blooming in a picture, the first thing you should do is enlarge your picture to at least 200 percent on your camera's LCD screen. Also keep in mind that when you increase the contrast and sharpness of the image, you increase the blooming effect.

Memory Card Info

This photograph of some prayer wheels, which I took in the Royal Kingdom of Bhutan, is packed with details. It got me thinking about a memory card experiment you should try.

Format your memory card. Compose a scene with lots of detail – trees and grass and foliage in a landscape, or a headshot of a person with a beard. Take five exposures with your ISO set at 400. Now check your camera to see how many exposures you have remaining. Note that number.

Now, format your memory card again. This time, compose a scene with few details – say a sky with clouds or a baby's face. Take five exposures with your ISO set at 100. Now, check to see how many exposures you have remaining.

As you'll see, you'll have more remaining exposures after your few details/low ISO settings. That's because the amount of information contained within a file affects its size, and files with more detail and more digital noise (which you get at higher ISO settings) are larger than files with fewer details and less noise.

Something else you should know about memory cards: Always format them in-camera and not with your computer. In-camera formatting sets up the memory card for that particular camera.

Full-Frame Image Sensor Advantage

Digital SLRs basically come in two flavors: full-frame, which means the image sensor is the same size as a 35mm film frame (24x36mm); and less than full-frame size, which means that the image sensor is smaller than a 35mm film frame.

Full-frame sensors capture more pixels than smaller sensors, so you get more detail, which is important when you're interested in making large prints. The big difference between full-frame and less than full-frame sensors is that SLR lenses "behave" as they would on a 35mm film camera. Thus you'll capture more of a particular scene taking an identical shot with a full-frame sensor, versus a less than full-frame sensor. For example, if you put a 15mm full-frame fisheye lens on a full-frame image sensor camera, as I did for this photograph that I took in Antarctica, you get the full-frame effect. On a less than-full frame camera, you would simply get a wide-angle view.

Less than full-frame image sensor cameras have different degrees of image magnification, usually 1.3x, 1.5x or 1.6x. So, my 15mm lens on a camera with a 1.3x image magnification acts like a 19.5mm lens in the angle of view that it has. The perspective and depth-of-field is the same as it would be for a 15mm lens.

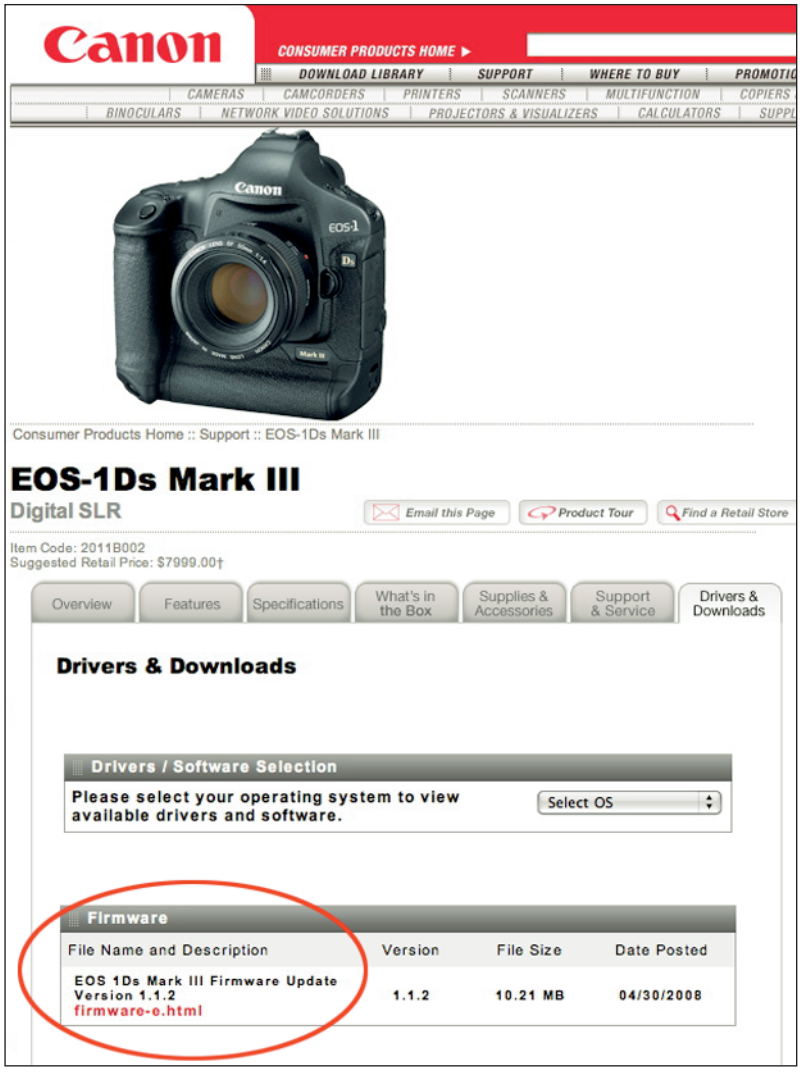
There is a plus side to using a less than full-frame image sensor camera, and that's when it comes to sports and wildlife photography. For example, a 100-400mm lens on a camera with a 1.3x image magnification acts like a 130mm to 520mm lens – getting you theoretically "closer" to the subject. In actuality it just changes the angle of view to that of a longer lens.

When I am shooting, I use my 17-40mm wide-angle zoom on my full-frame sensor camera (Canon EOS 1Ds Mark III), and I use 70-200mm or 100-400mm telephoto zoom on my 1.3x sensor camera (Canon EOS 1D Mark III).

Keep in mind that all sensors are not created equal. Some cameras offer on-sensor noise reduction, which is an advantage when shooting in low light and during long exposures. How the image is processed is also important. Entry-level cameras may not have the same type of sophisticated image processor as top-of-the-line cameras.

Firmware Updates

Your digital SLR comes with built-in firmware that sets the performance of many of the camera's functions, such as auto focusing and metering. From time to time, camera manufacturers update the firmware, optimizing the performance of their cameras. You can easily download the firmware from the camera manufacturer's Web site to your camera via the cable that comes with your camera, but not all digital SLRs do it the same way. Be sure to check your camera manual or manufacturer's Web site for details on downloading and installing firmware updates.



All digital SLR owners should check the manufacturer's Web site from time to time for notification about these updates. They are important. In fact, even camera manufacturers make mistakes, and some of those mistakes can be corrected with a quick fix with firmware updates.

On a side note, also check the Web site for updates to your ink jet printer's software. New drivers are introduced from time to time that will make your printer perform at its best.

Camera Care

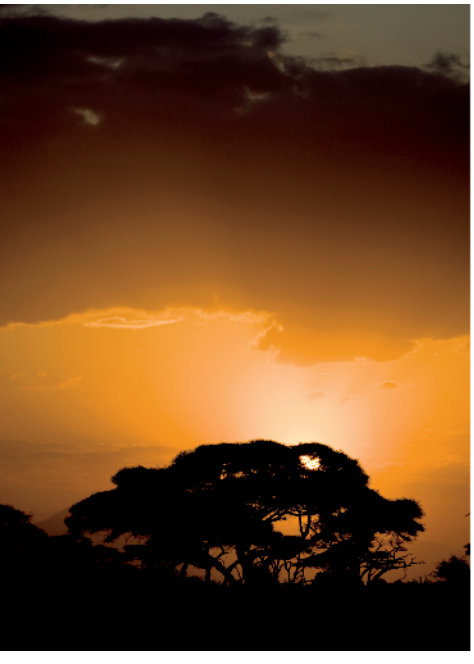
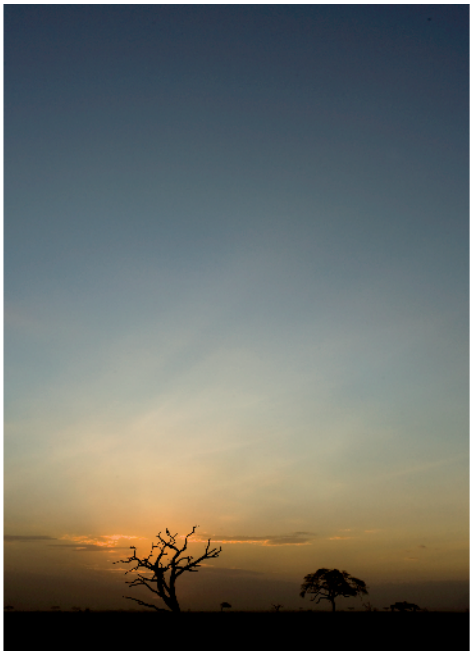
Your digital camera is a precision piece of equipment, and it should be handled with tender loving care. To ensure years of use (even though an updated model will probably be introduced every 18 months and sometimes more frequently), here are some things to remember.

Never leave your camera around anything with a strong magnetic field, such as a television set, loudspeakers at a rock concert, or an electrical motor. Keeping clear of antennas that emit strong radio signals is a good idea, too. Strong magnetic fields and radio signals can damage image data.

Magnetic fields can also damage memory cards, as can static electricity. Contrary to rumors, however, airport X-rays don't damage digital cameras or memory cards.

High heat and severe cold can cause a camera to malfunction. At very low temperatures, the LCD panels may not work, and you can run out of battery power quickly.

Finally, test your camera from time to time to make sure it's working properly. To do this, take a few test shots and process them in your digital darkroom.


Check Out Your Camera's Software

I am sure many of you use Adobe Photoshop, Photoshop Elements, Adobe Lightroom or Apple Aperture to manage and enhance your images. That's cool! I do the same thing, because I have to know what's going on the world of digital imaging.

But here's a suggestion. Check out the software that comes with your camera (Canon's is called DPP, or Digital Photo Professional). It has many of the same features of Photoshop, Aperture and Lightroom. The difference? It's often free!

My experience has shown that the camera-dedicated software is slower than Photoshop or Aperture; the camera manufacturers say that it takes time to process the file to its full capacity. I have seen results that have illustrated that claim, especially when it comes to reducing noise.

What's more, some camera-manufacturer software makes it easy to remove dust spots from a series of images, which is what I did for this trio of sunset photos. In the software program, you identify the dust spot in one image, tell the software where the spot is located, and at the click of a mouse, all the spots in a series of pictures are removed.

Take the time to check out the software that comes with your camera, and you'll see that you have a new tool to enhance and manage your images – again, usually for free.

Recovering "Lost" Files

Imagine traveling halfway around the world (as I did to get this shot of a Huli Wigman in Papau New Guinea), getting great shots, inserting your memory card into your card reader and then not seeing an icon for the card on your desktop – or seeing the icon, opening the folder and then not seeing any of your great pictures.

If that happens, don't freak out! Some files get corrupted for a variety of reasons and can't be read – but they may still be accessible. Or, there could be a communication error between a card reader, cable and your computer. What's more, even if a card is accidentally erased, chances are the pictures are still there, if the card is not formatted.

Most memory cards come with CDs that contain a software program that helps you rescue "lost" files. You can also download recovery programs from the memory card manufacturer's Web site.

Two independent recovery programs I have found are CardRaider (http://www.ecamm.com/mac/cardraider) and Data Rescue (http://www.datarescue.com/photorescue). Check out their sites, and don't leave home without some sort of data recovery program. It will help you recover from a nervous breakdown when you think you have lost some once-in-a-lifetime shots.

Cameras Don't Take Pictures, People Do

Here's something really important you should know about your camera: It does not take pictures, you do!

On my workshops and in my presentations, I ask the question, "It all starts with the camera, right?" But then I say, "I was only kidding! It all starts with the idea we have in our mind."

Sure, it's important to know what your camera can and can't do, and it's important to know all the camera's settings so that you can basically be on autopilot when you are shooting – much like a jazz musician is when he or she is improvising. But it's even more important to convey your ideas with pictures. My idea for this picture, which I took during Carnevale in Venice, Italy, was to show the interaction between the two subjects. My idea was to picture them in a romantic setting, which is why I positioned them in the shade in a secluded courtyard.

Speaking of ideas, there is no such thing as a bad idea in photography. Here is a photography joke that illustrates that point: One out of focus picture is a mistake, but 20 out of focus pictures is a style.

The Camera Looks Both Ways

Here is something that may surprise you. Your camera looks both ways; in picturing the subject, you are also picturing a part of yourself. I know this is not a tech tip, but as with my "Cameras Don't Take Pictures, People Do" tip, it's important.

When photographing a person, keep in mind that the mood, the energy, the feeling and the emotion you project will be reflected in the subject. Another way to put this is that you are a mirror; pictures you take are a reflection of both you and your subject. Check out these two shots, one of a girl I photographed in Little Five Points in Atlanta, Georgia; and one of a Buddhist monk I photographed in Cambodia. I don't have to tell you how I was feeling when I took each picture.