A DIGITAL PRIMER:

SELECTING THE DIGITAL CAMERA

By Kathy Eyster

Perhaps you've been impressed by prints made from a friend's digital camera. Or maybe you're lured by the prospect of not having to pay for film and processing. Whatever the reason, you've decided to take the plunge into direct digital capture of your photographs. Sorting through the plethora of digital camera models can be overwhelming. In the rest of this article, I describe the most important features to consider when comparing digital cameras so you can make the best selection for your needs.

There are two styles of 35mm-equivalent digital cameras. The first are *digital SLRs*. These look and operate much like traditional film SLRs, having the familiar apertures, shutter speeds and metering modes as well as the ability to use interchangeable lenses. If you already own a film camera system for which there is a digital SLR model, this is a natural choice. Hybrid digital SLRs come with a built-in zoom lens but otherwise work like an SLR. The second style I call *compact digital cameras*. These look similar to "point and shoot" film cameras with a zoom lens. More expensive models include the ability to set shutter speed and aperture just like their SLR counterparts.

Before you start looking at specific cameras, decide how you plan to use the photographs. If you intend to make 8x10 inch or larger prints of your images on your own photo inkjet or dye sub printer, you need a camera with more capacity than if your purpose is solely to make product photos for your web site. Knowing how you intend to use your photos provides you with a guide to the essential characteristic of your digital camera, its maximum resolution. *Resolution* describes the size of file a digital camera can record. The bigger the file, the larger and better quality image you can print. Higher resolution also gives you more leeway to crop your original photo and still have sufficient information for a good print.

Digital camera manufacturers describe resolution in one of two ways. The first specifies the file size the camera can record in *megapixels* (millions of pixels, the "dots" that make up a digital image). Four to six megapixels are sufficient for good 8x10 inch and larger prints. Manufacturers also talk about resolution by listing the *dimensions* of the image in pixels. The larger the dimensions, the bigger the print you can produce. Digital cameras capable of capturing images at 2240x1680 pixels or more produce a file big enough for acceptable 8x10 inch and larger prints.

The second feature to consider is which file formats the digital camera uses to save images. These formats affect both the quality and the size of the images you can capture. Most digital cameras save photos in *JPG* (or JPEG) format; the camera electronically compresses portions of the picture where the color is the same in order to make a smaller file. This allows more pictures to fit on a memory card, but the process can result in some loss of quality. Other digital cameras have an option for *TIFF* format. This method does not compress any information and saves pictures as much larger files so fewer fit on a memory card. Since no information is lost through compression, TIFF files offer improved quality over JPG files.

In a few digital camera models, a *RAW* format is available. RAW files are not compressed so they are larger than JPG images. The information captured in RAW mode is saved directly from the digital sensor, without processing by the camera's built-in program. This makes the file smaller than a TIFF version. However, to use the RAW file, you must first convert it using a special program that comes with the camera. RAW format gives you the greatest control over your photos because you can make adjustments to exposure, color balance and other settings after capturing the image. So RAW format potentially provides the best quality at a medium file size, though you must do some extra work before you can view the image in programs such as Photoshop. (Note: Adobe has announced an addition to Photoshop that can read RAW files from many digital cameras. Visit www.adobe.com for more information and see George DeWolfe's article on RAW, page 46, this issue.)

Once you know what size and quality of image a digital camera can capture, it's time to consider the features that allow you to record the photograph. If you choose a camera with a built-in zoom, evaluate the model's *optical zoom* range and disregard any references to digital or combined zoom. "Optical zoom" is the range of focal lengths based on the physical design of the lens itself. "Digital zoom" electronically magnifies a portion of the picture and interpolates ("makes up") data to create the enlarged view. In most cases, this process does not produce a sharp image. So ignore any references to digital zoom specifications and concentrate on the optical description when choosing your digital camera.

The built-in lenses of digital cameras are very short because most digital sensors are smaller than a 35mm film frame. So zoom ranges are listed as 35mm-equivalent focal lengths, e.g. "7–21mm *f*2–2.8 lens, 38–115 35mm equivalent." Due to the small sensor and short focal length lenses, digital cameras are limited in their ability to capture a wide-angle view. To make up for this, *accessory lenses* are available that provide increased wide-angle, telephoto and even macro capacity. If a greater range at either end of the focal length scale is important to you, investigate whether the camera can accept such accessories by using filter threads or a special adapter. If you opt for a digital SLR with interchangeable lens capability, your typical wide-angle lens becomes a normal lens and your telephoto gets a built-in teleconverter. Look for the *multipli-*

cation factor of the particular digital SLR you're considering (usually 1.5X to 1.7X) and use this to see how your lens focal lengths would change. For example, a 20mm lens on a digital SLR with a 1.6 multiplication factor becomes a 32mm equivalent lens.

If you are considering a compact digital camera, you may not have the ability to manually focus the lens. Manual focus may be a selection of preset distances (e.g., 1, 3, 5, 10 meters and infinity) rather than visual focusing by turning a ring on the lens. True *manual focus* can be an asset for close-up photography while the ability to fix focus at infinity helps prevent autofocus "seeking" and consequent battery drain.

To see through the lens, select a model that has an o*ptical or electronic viewfinder,* not just an LCD monitor. In bright light information on LCD monitors can be next to impossible to see. An LCD monitor that can be angled helps reduce glare and improve the visibility of the menus for changing camera settings. A rotating or swiveling LCD monitor gives you greater flexibility when shooting close-ups or at odd angles. LCD monitors are the biggest drain on your digital camera's power resources, so having an optical viewfinder enables you to extend the life of your batteries.

Accurate exposure is just as vital to quality digital capture as it is to film. So look for a model with a variety of *exposure modes*, including program, aperture and shutter priority, and manual. Be aware that the *range of shutter speeds and f-stops* a compact digital camera provides in manual mode may be very limited. A choice of *metering modes* is also advantageous, especially a *spot meter* to make precise reflective readings from important portions of the scene.

Though digital cameras don't have film per se, they do offer the option to select different ISO equivalents to give you more control over image quality. Review the *manual ISO settings* available. Lower speeds improve quality the same way slow film does, by reducing "noise" (the digital equivalent of film grain). Higher speeds (digital fast film) are useful if you often shoot under low light conditions, but picture quality is generally lower than with slower ISO settings. A *noise reduction system,* either automatic or manual, for high ISO settings and/or long exposures helps improve quality in these cases.

Another feature unique to digital cameras is white balance, the equivalent of using color correction filters or different types of film to compensate for the color temperature of the light source. Most digital cameras have automatic white balance along with a variety of presets for natural and artificial light. Once again, having the option to manually select a specific setting, say for incandescent lighting or an overcast day, gives you more control over how your image is recorded. A *manual or custom white balance* setting allows you to program the camera for a specialized color balance adjustment in mixed lighting situations.

Some digital cameras (particularly compact models) have a noticeable shutter lag compared to film cameras. If you like to shoot action, look for a *burst mode or continuous shooting mode* (the equivalent of a motor drive). Check the maximum number of frames per second as well as how many images the camera can save in its internal memory (buffer) before it must pause to record them to the memory card. Sometimes setting burst mode automatically reduces the size (and potentially the quality) of your images so more can be stored in the buffer before saving.

Most digital cameras come equipped with a small built-in *flash*. While not very powerful, it is useful for fill flash outdoors. If you do a lot of flash photography, a model with a hot shoe and/or flash synchro connection for an external flash is a bonus. Also look for a *flash exposure compensation* feature (usually a menu choice) to adjust the flash output. Finally, digital cameras that associate the controls you use most frequently (exposure compensation, flash, white balance, resolution, ISO) with *buttons* on the camera body are faster and easier to use than those requiring you to navigate menus to change settings.

In lieu of film, a digital camera stores photographs on *memory cards*. A variety of shapes have been invented with an eye to providing a small package with lots of storage. All of them are reliable, though they vary in their maximum capacity. Compact Flash memory cards and IBM microdrives currently top the list in this respect. Some cards write (save) images faster than others. This can be an advantage if you are working with a large megapixel camera and saving TIFF files. However, check to see whether the camera can actually make use of the memory card's faster speed. If it can't, you're spending extra without gaining improved performance. Regardless of the type of memory card included with your digital camera, plan to purchase a couple larger capacity cards up front. The larger card is like a longer roll of film; you can take more images before the card is full.

Digital cameras rely on electrical power for every aspect of picture taking, so they use up batteries much faster than electronic film cameras. Therefore, it is advantageous to purchase a model that can use *rechargeable batteries*. Find out whether the camera uses nickel-metal hydride (NiMH) or lithium rechargeables or whether it requires a proprietary battery made by the manufacturer. A camera that comes with a battery charger is a plus. And models that accept battery packs (as do most digital SLRs) can give you virtually unlimited shooting time. In any case, invest in two sets of rechargeables so you always have spare power.

Now that you know some features to consider when shopping for a digital camera, where do you find more information? Most manufacturers display technical information about their digital cameras on their web sites and you can visit sites like www.dpreview.com and www.stevesdigicams.com to compare features on specific models. It's also important to actually handle the camera. Visit a store where you can try the controls to see how easy they are to use, and check the owner's manual for available features. Armed with this information, you can be well prepared to select a digital camera that will meet your needs. ■

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