PC MAGAZINE PRESENTS

THE ESSENTIAL BUYING GUIDE

Digital Cameras

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Digital Cameras

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Digital Cameras: The Essential Buying Guide

Shopping for a digital camera is stressful. Most stores carry a fraction of the 200-plus cameras on the market, and except at specialty stores, salespeople aren't much help. You can ask friends for recommendations, but even if they love their camera, it might be discontinued, given short product cycles. Don't throw up your hands and give up. A little information, some strategizing, and our reviews can make the process less traumatic.

Like PCs, cell phones, and cars, digital cameras come in many sizes, shapes, and configurations. And your buying decision is likewise one you'll have to live with for a while. So break the decision down into a series of factors, then compare cameras based on how well they meet your needs, factor by factor. To determine which camera is best for you, consider image quality, performance, ergonomics, and style, your level (current or hoped for) of photographic skills, and price.

The bottom line is money. When shopping for any luxury item, the best strategy is first to decide what you can pay. Decide on form factor, features, and the rest based on what you're actually likely to use. Then look for a camera that meets your budget.

Choices

We categorize digital cameras into compact, ultracompact, superzoom, enthusiast, and digital SLR, or D-SLR.

Compact cameras aren't the best, fastest, most stylish, smallest, or most flexible digital cameras. They take reasonable pictures and have reasonable feature sets. They generally also offer better performance, LCDs, and optics than the sexier, pricier ultracompacts.

Compacts lack the pro features and performance characteristics of higher-end cameras but fit into handbags or roomy pockets. This is by far the most popular camera category—particularly among bargain-conscious shooters and women—and it represents the best value for the average user.

Unless you need a higher-end or smaller camera, this is the type of camera you should consider first. Typical compacts offer great value for money. But not all compacts offer sensibility over luxury.

Ultracompacts are small enough to fit in your palm and stylish enough for any social milieu: They'll fit into tiny bags or suit jacket pockets without ruining their lines. They can be simple—or sophisticated high-megapixel powerhouses. Either way, performance, features, and image quality generally take a back seat to form factor and style. Ultracompacts are for those who want the coolest toys and a camera always on hand.

Enthusiast cameras are full-size models built on bigger budgets than compacts. They offer more precise controls, better lenses, and more features. Most important, they provide superior images, suitable for larger prints. They tend to have lenses that can zoom in closer, faster performance, histograms, exposure bracketing, high resolution, and manual controls for shutter speed, f-stop, and white balance. They're for users who don't want to spend the money on a D-SLR but still want versatility, quick and sure handling, and fast shooting.

Superzooms, which have 10X or greater optical zoom lenses, are a subset of enthusiast cameras. Their large lenses put them into the full-size category, but their prices tend to fall between those of compact and enthusiast models. While some superzooms have high-end features, their users often prefer automatic settings. Some correct for camera shake—which is greater the more you zoom in—via image stabilization.

D-SLRs are at the pinnacle of digital cameras, with true reflex through-the-lens viewfinders, interchangeable lenses, total control over exposure and color, and a host of accessories. Besides pro features and functions, D-SLRs yield performance similar to those of 35-mm film cameras. Most important, they also produce the best image quality of any type of digital camera. D-SLRs usually have fully automatic settings, but to get your money's worth, you'll have to be the kind of shutterbug who likes manual controls. D-SLR users include avid amateurs, pros, and those who need top-of-the-line equipment, regardless of cost.

The bottom line is money. When shopping for any luxury item, the best strategy is first to decide what you can pay. Decide on form factor, features, and the rest based on what you're actually likely to use. Then look for a camera that meets your budget. Examine our recommendations, pick one, try it in a store if you can, and shop around for the best deal.

Features

Megapixels make great sound bites, but optics and processing algorithms are also important. Indeed, just a few sensor manufacturers supply camera makers, so two cameras with the same MP rating may have the same sensor. And we've seen cameras produce better pictures than cameras in the same class with a higher MP count.

MP ratings are useful for determining how large you can print images—as well as how much you can crop images and still retain acceptable image quality. See "**Know Your Camera**"and "**More Than Just Megapixels**" for more on megapixels.

Image quality is a more useful measure. Most digital cameras produce good images, with color fidelity, sharpness, and dynamic range that will satisfy most users. We rate image capabilities by sharpness (the more lines of resolution a camera can distinguish, the better) and the percentage of transition pixels on a subject's edges (the fewer, the better). We also consider color reproduction and exposure accuracy. For more on image quality and how we measure it, see our explanation in "**Superzooms**".

If you plan to e-mail your pictures or print them on your ink jet using low-grade paper, you needn't be picky. Other criteria, such as price and size, may be more important. If you want razor-sharp, professionally finished 8-by-10 prints with colors that pop, then image quality is key.

To get top image quality, select from among cameras that we rate at 4 or 5 stars. We won't give a camera these scores if its pictures aren't good, no matter how cool it looks or what bells and whistles it has.

Digital cameras are getting faster, but they're still slower than film cameras. We test each camera's boot time (how quickly it can start up and be ready to shoot) and recycle time (how long it takes to shoot, process, and be ready for another shot). Long boot times are annoying, long recycle times more so. Make sure you can live with a camera's speeds. Try it out, or, if you can't, use a stopwatch to see what a 5-second recycle time really means.

Is the feature set right? Taking digital photos can be as simple as pointing the camera and pressing the shutter button. But digital cameras can also provide as much control over **exposure**, **color**, **dynamic range**, and so on as you want. Also consider extras like in-camera **red-eye removal** and **panorama** modes. In general, however, we'd pick a camera that takes better pictures over one with many features. You can always remove red-eye later, but you can't add in detail that a poor camera missed.

Ergonomics and **style** matter, too. When you try on shoes, you consider what they look like and how they feel. Apply similar criteria to each camera: How does it feel to hold? Is it too large or too heavy? Does a plastic body feel too flimsy? Are the controls sensibly placed? Are there too many or too few? Are the menus easy to navigate? The best menus explain features and settings and even give shooting advice. And don't forget vanity: Does the camera suit your style, or will it embarrass you?

pros & cons

PROS

- You'll never have to pay for film or processing again.
- It's like a Polaroid on steroids: You can see your captured shot immediately.
- From shooting the camera to posting on the Web to generating a print from your ink jet printer-the whole process takes only minutes.
- If you don't like the shot you just took, you can instantly erase it and shoot it again.
- Some digital cameras allow you to shoot videos or record and play MP3 sound clips, and some double as a Web camera.

CONS

- Digital cameras cost a lot more than comparable film cameras.
- Generally, image quality may not be as good and the size of the enlargements may be limited because of the digital camera's resolution.
- There's always a time delay from when you turn the camera on until it's ready, as well as from the instant you press the shutter and the picture is actually captured.
- Digital cameras eat batteries, so you'll always be buying or recharging them.
- It's difficult to see anything in the LCD viewfinder in bright sunlight.

THE TOP 10 BUYING TIPS

Zeroing in on the digital camera best suited to your needs can be difficult, especially with the complex array of features and functions available. Not to worry. These 10 buying tips will help you find a camera that fits your needs, budget, and shooting style.

1. Select a digital camera with a maximum resolution that meets your largest output you're likely to want. If you want to make 8-by-10 prints, we recommend a 4-megapixel model, though a 3MP camera will do the job. A good 8-megapixel camera can take you all the way up to 16-by-20 prints. If all you want is to take pictures for e-mail or the Web, even 2MP camera will suffice. And remember, megapixels correspond only to image size, not quality.

2. Make sure the camera has the right features for your needs, such as video recording, an optical zoom lens—perhaps even manual controls and a histogram. If you wear eyeglasses but like to take pictures without them, make sure that your camera has a focusable diopter, which lets you adjust the focus of the viewfinder so you can see your subject clearly.

3. Choose a model with a bright LCD so you can see it when shooting outdoors. And make sure the screen is large enough so you can easily compose and review your images on the camera.

4. When comparing costs, don't forget to calculate the

extras that may or may not be included, such as rechargeable batteries and a charger, , and a memory card with a high enough capacity to hold all your pictures until you can download them to a PC.

5. Nearly all digital cameras have a USB interface. For higher-megapixel models, try to find one that supports USB 2.0 so you can transfer large image files quickly.

6. When looking at digital cameras with a zoom lens, what counts is the optical zoom—not the digital zoom. Digital zoom is actually a software function that involves cropping and magnifying an image, resulting in a loss of image quality.

7. If you don't know an f-stop from a white balance, a digital camera that has lots of modes and manual settings will generally be overkill for your needs, as well as being higher in price and more difficult to use.

8. Look for a digital camera that comes with a pocket-size instruction manual instead of one on a CD-ROM. It's easier to consult when you're out shooting.

9. For small, young, or arthritic hands, look for a digital camera with a limited number of buttons, and make sure they're large and easy to access and press.

10. Test how fast the camera performs. You will probably be unhappy with any camera that takes more than 4 seconds to boot or more than 6 seconds between shots.

THE ABCS OF DIGITAL CAMERAS

Aperture An adjustable iris or opening through which light enters a camera's lens. The larger the aperture is, the greater the camera's photosensitivity. A smaller aperture, however, gives greater depth of field to a picture. The aperture setting is called the f-stop. A small aperture has a relatively high f-number, such as f8 or f11, and a larger aperture has a smaller number, such as f2.8. The aperture setting must be balanced against the shutter speed. The faster the shutter speed, the larger the aperture must be, and vice versa, to admit the right amount of light to the image sensor for proper exposure.

Compression A process that reduces the amount of data representing an image so that the file takes up less space in your camera, memory card, and computer. Compressing and saving an image actually takes less time than saving an uncompressed image. Smaller files are quicker to use for e-mail and on the Web. When a file is overcompressed, however, image quality can be seriously degraded.

Depth of field An indication of how much of a scene will be sharp and in focus. A greater depth of field implies an increased distance between well-focused background and foreground, with everything in between properly focused. A narrow depth of field concentrates its area of focus within a small range, based on the central subject's distance from the camera. For instance, if your subject is standing alone in a ballpark, using a narrow depth of field will make most of the ballpark look blurry; only the subject will be focused. A greater depth of field

might keep most of the ballpark in focus.

Image sensor The semiconductor chip in a digital camera that replaces film. It captures the light of a scene or subject, which it turns into electrical signals that the camera can understand and use. The camera in turn converts these signals to digital data that your computer can understand and use. The most common image sensor types are CCD (charge-coupled device) and CMOS (complementary metal-oxide semiconductor).

Interpolation A process that increases the image file size and can occur either in your camera or by computer software. Interpolation allows a picture to be magnified but does not improve image quality and can decrease sharpness. It is the opposite of compression.

LCD viewfinder A small electronic screen on the back of a digital camera that displays what the lens sees. You would use it to compose your picture, choose your settings, focus and frame an image in macro mode, and view just-shot photos.

Megapixel A measure of a digital camera's resolution. A one-megapixel rating means that the camera can capture up to 1 million pixels, or points of data.

Memory card A small, removable storage device that saves the images a digital camera captures. When it is full, you can swap one memory card for another and continue shooting. A card reader can be attached to your computer for opening and saving image files outside of your camera. Memory cards come in various densities, as do any other drives or storage devices. The most common types of memory cards are CompactFlash, SmartMedia, and Secure Data (SD), with Sony's Memory Stick a distant fourth. You must use the right type of card for your digital camera.

Pixel A point of data in a digital image; the word is short for picture element. A digital camera's resolution is a measure of the number of pixels it can capture on its image sensor.

Shutter speed A measure of how long a camera allows light to fall on the active image sensor (expressed as a fraction of a second). In traditional film cameras, there is a physical, mechanical shutter in the lens that opens and closes to regulate how long the film is exposed to light. Though many digital cameras have both electronic and mechanical shutters, inexpensive models rely solely on electronic shutters that turn off the photosensitivity of the image sensors.

Know Your Camera

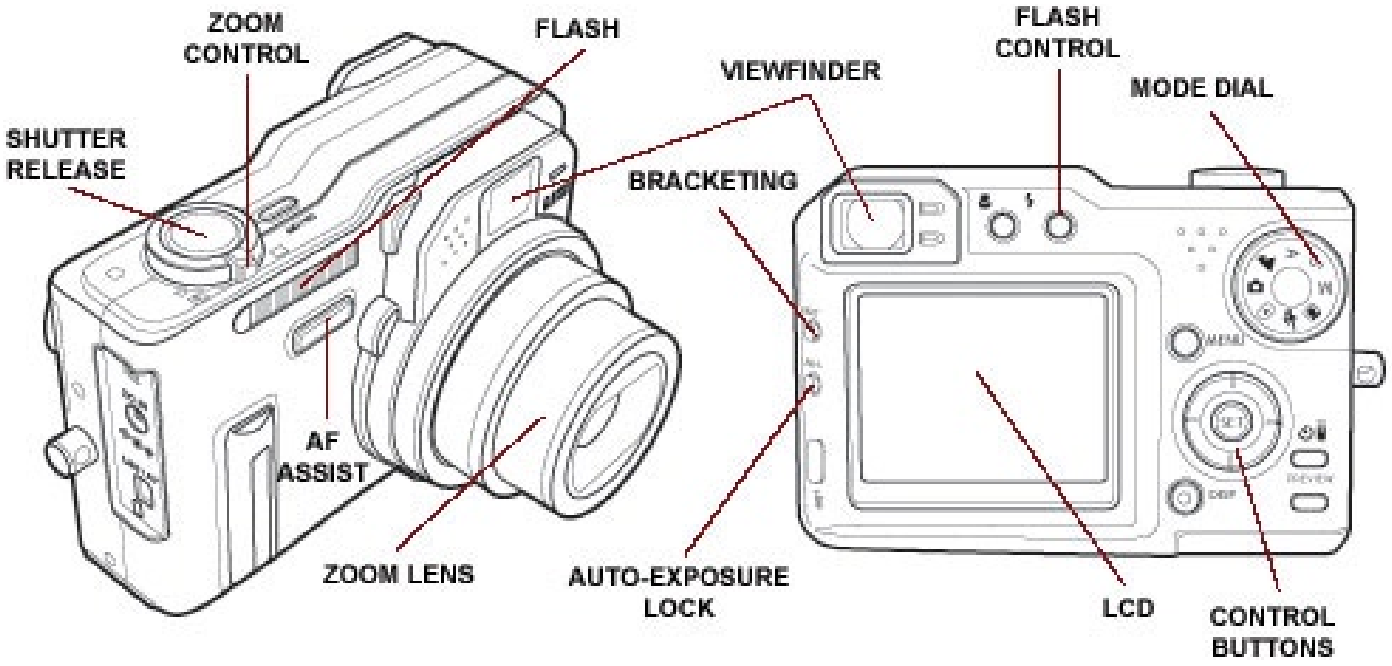
Based on excerpts from the PC Magazine Guide to Digital Photography by Daniel Grotta and Sally Wiener Grotta

Spot what you want to photograph, point your camera, and shoot. With nearly every digital camera on the market today, that's all you need to get a decent picture of almost anything on an evenly lit cloudy day. And if those are the only conditions in which you take pictures, read no further.

We're guessing that you want more than that, though. (For instance, unless you live in Seattle, every day may not be cloudy.) You want to know how to use your zoom to frame your pictures just right. You want to know how to set your camera so your masterpiece will be high-enough resolution to turn into a large framed print or just the right size to e-mail to friends. You should know how to control your flash so your subjects don't end up with red-eye, but they don't end up hidden in shadows or looking the other way either. And learn how to make everything you want to have in focus in focus and your subject properly exposed—no matter how difficult the lighting.

These are all reasons why you need to get to know your camera. It's true that for many shots, all you need to do is aim and click. But we want to make sure that you don't miss out on all the other things your camera is capable of doing. In the pages that follow, we'll help explain your camera's settings and the magic going on between the camera's optics and electronics.

So pick up your camera (or pick out a new one that's just right for you from the many reviewed in this ebook) and read on. Then get out there and start taking great pictures.



ZOOM

Most digital cameras have a zoom lens that lets you take in a wider view or get closer to the subject. Except for a few prosumer and semi-pro models that have manual zoom lenses, which you operate by twisting the lens barrel, most have motorized zooms that you control by pressing a lever, rocker switch, or buttons on the camera.

Zoom lenses are wonderful for bringing distant subjects in closer to you or for capturing a wider view that includes more of the subject in your picture. We tend to place more emphasis on cameras with zoom lenses that start from a true wide angle (equivalent to a 28 mm to 35 mm lens on a 35-mm film camera). You can always crop your images on a PC to get in closer, but you can't add data that was outside the image area after the fact.

You should be aware of two issues when using your zoom lens:

First, zooming will change image perspective. In other words, wide angle tends to push foreground and background areas and subjects further apart, and telephoto compresses them closer together. Perspective can add to or subtract from the quality, interest, and appeal of your photographs. When you want to get closer to the subject or include more in the picture, you should consider moving a few steps nearer or further away rather than relying solely on the zoom lens.

Second, your digital camera might boast a 9X or 24X zoom lens. But if you look at the fine print, you'll see that it's broken into two components: optical zoom and digital zoom. The only number that should concern you is the optical zoom (typically 3X or 4X, though some are as large as 12X), which relates to the physical construction of the lens. Digital zoom makes a small image appear larger using electronic tricks, but it actually reduces overall image quality. For optimal image quality, turn off your camera's digital zoom option.

RESOLUTION

So what about megapixels? Despite marketing hype, they are a measure of quantity not quality. Pixels are a measure of the number of photoreceptor sites on your camera's image sensor, which determines the amount of data that can be captured. That, in turn, defines how large a photo can be printed and how much you'll be able to see when you zoom in on details before the picture begins to blur or pixelate (break up into its component dots).

Choose the megapixel rating of your digital camera based on what you plan to do with your pictures. For the Web or e-mail, too much data is actually counterproductive, slowing down transmission without increasing image quality. If all you plan to do with your pictures is e-mail them or display them on the Web, anything more than 3MP is overkill. VGA or XVGA resolution can be adequate. A 2MP camera will probably capture more than enough data for the Web or e-mail, but such cameras have fewer features. You can, however, set any camera to take pictures at appropriate resolutions, for example for e-mailing.

While megapixels are not a measure of quality, it's generally true that the more pixels a camera can capture, the more expensive a camera is to build. Therefore, other higher-quality components may be included, which can result in a better image.

To see how megapixels correspond to image quality, see "**Choose Your Camera.**"

If you print your photos, this table is a general guideline for how large your output can be for each resolution:

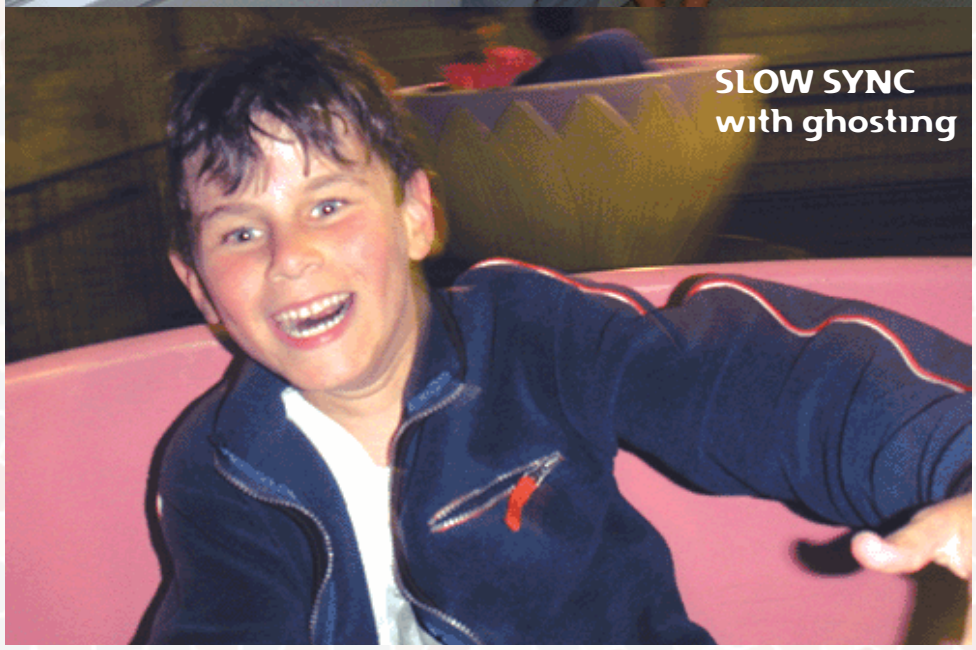
1.3MP	3.5" x 5" to 4" x 6"
2MP	4" x 6" to 5" x 7"
3MP	5" x 7" to 8" x 10"
4MP	8" x 10" to 8.5" x 11"
5MP	8.5" x 11" to 9" x 12"
6MP	9" x 12" to 11" x 14"
8MP	14" x 17" to 16" x 20"

FLASH

Most digital cameras have at least four different flash modes. Here are some common options.

Auto: This setting is designed to deliver the right amount of light automatically. If the camera senses there's enough ambient light, the flash won't fire.

Off: Auto mode may trigger the flash regardless of whether you want it. Using Off may be the only way to guarantee your built-in flash won't fire.



On or Fill: This setting forces the flash to fire, even under bright conditions. Fill flash is especially useful for backlit situations, where light does not fall directly on the subject, thereby creating unwanted shadows or underexposure.

Red-eye reduction: To prevent red eye, this setting flashes the strobe a number of times before taking a picture. Unfortunately, it doesn't always work and can be very annoying to your subjects.

Slow sync: Typically, using a flash will set the shutter to a fast speed—about 1/125 to 1/150 second—to eliminate ghost images. Slow sync, on the other hand, shoots at 1/10 to 1/2 second, producing an underexposed ghost image or blur. The flash then fires after the shutter has passed its zenith, capturing a sharp image with a sense of motion.

FOCUS

A picture in focus is sharp, crisp, and clear, with the details highly visible and cleanly delineated. Focus may be selective rather than universal, meaning only parts of an image are sharp (the areas you care about, we hope). When used judiciously, selective focus can be very effective, drawing your attention to the main subject.

Depending on which digital camera you have, it might offer several different focus options, or only auto-focus. But even if the only choice you have is auto-focus, you still can be the one

in charge, rather than relinquishing all photographic control to your camera.

Using auto-focus is a relatively easy matter. Point the camera directly at your subject, making certain that the area that you want to be in focus is in the middle of your viewfinder. Then press the shutter button down halfway and hold it. The lens will automatically focus on what you see in the middle of the viewfinder. As long as you hold the button in halfway, the auto-focus will remain locked on the same distance, allowing you to move the camera to compose your photograph. (Some cameras have an auto-focus lock button, which does the same thing.) Then slowly press the shutter button the rest of the way down when you're ready to snap the shot.

So how does your auto-focus determine what to focus on? Better digital cameras offer several options. Here are some of the focusing modes your digital camera may feature and some advice on how to use each of them.

Spot auto-focus: This mode uses a tiny spot (smaller than the usual center area) to determine the auto-focus point. It is especially useful when there is a very important small section of the subject (perhaps a piece of jewelry or your subject's eyes, which are the optimal focus point for most pictures of people) that you need in sharp focus.

Flex auto-focus: Also called area or sometimes zone auto-focus, this mode allows you to focus on areas other than the center of your frame. It displays a series of small boxes in various locations in the viewfinder. You can either let the camera select the proper focus point or, by using the four-way jog button, you can select the square closest to the subject or section that you want to be in sharp focus. Flex auto-focus is useful when you don't want to have to recompose the photo frequently, as you check the focus of an off-center subject.

Continuous auto-focus: In this mode, which is also known as tracking auto-focus, the lens refocuses continuously—there is no focus lock. Continuous auto-focus is especially useful when you are tracking a moving subject, such as a football player.

Predictive auto-focus: A handful of semi-pro and pro cameras let you select a predetermined focus point (such as the open gate on a fence or the finish line at a racetrack). When the subject reaches that point, the camera will automatically take a picture. Predictive auto-focus, which is best done with a tripod, can be an extremely effective way to get dramatic, razor-sharp action and sports shots.

To overcome auto-focus limitations in low-light settings, some digital cameras include an AF assist feature. This is a light, lamp, or signal that illuminates when you press the shutter button halfway down. The light may be infrared or white, or it may even be a laser beam or, in rare instances, sonar echo. Typically, the lamp is just bright enough to illuminate up to about 8 to 10 feet, which is enough to allow the auto-focus to do its job.

AF assist is a mixed blessing. It does work, so long as you aren't

trying to light up a subject farther than 10 feet away. But it's also obvious and obtrusive. Subjects and bystanders can see the lamp on most models, which makes them aware that you're taking photographs. It can be annoying, because to use AF assist properly, you may have to press that shutter halfway a number of times, framing your shots and lining up your subjects, before you actually take the picture. And when you do take the shot, the flash will fire. All this obvious preparation destroys candid moments, because your subjects are alerted to an imminent photograph.

Should you use an AF assist? Yes, if it's the only way you can get the photos you want; no, if you want to shoot natural candids. Fortunately, there's almost always a menu option for turning off this feature.

Many digital cameras have an option called manual focus, or MF. It's especially useful when autofocus won't lock in on the subject you want to shoot, or you wish to control depth of field by focusing the lens in between two areas or subjects.

EXPOSURE

With both film-based and digital cameras, light is the essence of photography. When light strikes film or an image sensor, it creates a photograph. Too much light and the picture is too bright, washing out the details; too little light and the image becomes dark or muddy. The trick is to capture just the right amount of light. The measure of the amount of light used to create a photo is called exposure.

Aperture and Shutter Speed

When light enters the camera through the lens, two mechanisms control the exposure: the aperture (the size of the hole through which the light passes) and the shutter speed (the length of time the shutter is open, allowing light to enter). The aperture is measured in f-stops—the f stands for factorable. A larger aperture allows more light through, while a smaller aperture allows less light.

Your choice of f-stop can significantly affect the composition of your photos. The aperture setting determines a photo's depth of field (how much of your scene is sharply in focus)—whether everything from near your lens to the far horizon is crystal clear, or everything other than the main subject is (softly or substantially) blurred. Or, of course, it can be any degree in between, depending on your settings.

Confusing matters somewhat, the smaller the aperture, the larger the f-stop number. Hence, f/16 actually represents a much smaller aperture than f/2. When you want everything in your picture to be in sharp focus, such as a beautiful landscape with a person in the foreground, use a small aperture (large f-stop number). When, on the other hand, you want your photo to focus only on something in the foreground, use a large aperture (small f-stop number). Similar to aperture settings, a slower shutter speed will allow more light to register onto the image

SLOW SYNC
with ghosting

sensor, while a shorter interval will allow less light in. The shutter speed is usually measured in fractions of a second or, when you are dealing with long exposures, full seconds.

Whereas f-stop affects the depth of field, shutter speed affects how action is handled. A fast shutter speed, such as 1/500 second or faster, will stop action. Picture a child running. The faster the shutter speed, the shorter the slice of time that the sensor is exposed to light. By contrast, a slow shutter speed will blur the action: A photo of a speeding car taken at a slow shutter speed will give you streaks of color across the frame, because the shutter was open longer and caught more of the motion of the object.

Exposure Modes

To determine the correct exposure, your digital camera uses sophisticated light meters. Simply turn on your camera, point the lens at your subject, and press the shutter button halfway down; the internal meter will then analyze the scene and either set or suggest the appropriate settings.

Most consumer digital cameras do this automatically, especially if you're in the default point-and-shoot mode. Higher-end cameras, however, have various metering modes that you can choose from, depending on how even the lighting conditions are. Why bother? Because more accurate light readings can lead directly to better exposures and superior images.

Still, you need to specify how your camera handles all this

metering information and determines the exposure settings when you shoot a photograph. There are four common modes for setting exposure, though many camera models don't offer all of them.

Auto mode is the one option that nearly every camera has. This typical point-and-shoot setting adjusts everything for you. You do, however, have more control than you might think. To ensure better exposure, don't just compose a shot and click. First, point your camera directly at the subject, then lock the focus and exposure (either by pressing and holding down the shutter button halfway or pressing the the AF lock button completely). Now recompose the shot and shoot. It's much simpler than it sounds.

Aperture priority mode lets you specify an f-stop, and the camera will automatically adjust the shutter speed to give you what it believes is the correct exposure. This is handy for when you want control over the depth of field.

Shutter priority lets you choose your shutter speed, and your camera will then adjust the f-stop accordingly. Use this mode when you want to control how the picture will handle movement or action, whether you want to create a streak behind a racing car or you simply want to minimize blurring from an unsteady hand.

Manual exposure hands total control over to the photographer. You set both the f-stop and shutter speed, though the camera will generally inform you if it thinks you have set it for an underexposed or overexposed image.

Exposure Compensation

If your images are underexposed (too dark) or overexposed (too bright), there are a variety of advanced settings that you can work with to improve your photos. One common technique is to adjust the exposure compensation. Commonly referred to as EV, exposure compensation changes the aperture or shutter speed to let in more or less light. Any time you suspect the camera meter isn't reading the scene correctly, try experimenting with various EV settings. Depending on your camera, you can do this using an EV button or from within one of the built-in menus.

Exposure compensation is usually represented by a scale that goes from +2 (or +3) to -2 (or -3) and that is divided in thirds. Some cameras, however, simply display the values without the scale. If you want to increase the amount of light in your photo, use a positive EV. If you want to decrease the amount of light in your photo, use a negative EV.

Bracketing

When taking an important photo, it isn't necessarily a good idea to rely solely on the recommended settings. Sometimes a slightly slower shutter speed or wider aperture will get you the effect you are looking for. When in doubt, a handy technique known as bracketing can add some insurance.

Bracketing is when you take a series of shots of the same

subject or scene using slightly different settings. For example, if the camera's meter says that the perfect exposure would be f/8 at 1/250 second, also shoot it at f/5.6 at 1/250 second as well as f/11 at 1/250 second. (Or keep the f-stop fixed and vary the shutter speed.) In other words, bracketing is simply taking one or more steps forward back from the recommended setting to make sure you really get the picture you are hoping for. You can then pick the image with the best results.

Many cameras now have auto-bracketing, which will automatically take a series of 3 or 5 photos at incremental settings. It's quite convenient and time-saving. What's more, in some of the more advanced digital cameras, you can auto-bracket not only exposure but also white balance and flash settings.

ISO Equivalency

The ISO equivalency will also alter the exposure. Traditionally, the ISO is a rating of film's sensitivity to light. To ease photographers' transition from analog to digital, the industry uses the same numbers for rating image sensors' sensitivity to light. And the various digital ISO equivalencies work like their film counterparts.

The lower the ISO value, the less sensitive the image sensor is to light. Therefore, in a low-light situation, you would need a greater ISO value. The trade-off is that with greater sensitivity comes more noise—digital photography's equivalent to grain. In extreme situations, the picture will be filled with artifacts that look like snow or dust.

When choosing an ISO setting, keep these points in mind.

- When you have plenty of light and you want very subtle, smooth gradations, use a low ISO number.
- For many situations, an ISO of 100 is a good compromise and is often the default value.
- For low-light situations or shooting active subjects (like athletes or fidgety kids), use a higher ISO, such as 400 or above.
- Remember that with a digital camera you can change the ISO setting for every picture you take.

Slow and Steady

Think your hands are rock steady? Think again. Just the natural act of breathing will cause your hand to move or shake enough to affect images shot with a slow shutter speed. The result will be a blurred image.

For the average person, any shutter speed slower than 1/60 second should be shot on a tripod. If you don't have a tripod handy, try bracing your camera on a table, tree, or other solid surface.

Also remember to s-q-u-e-e-z-e the shutter button slowly; don't press it rapidly. A light touch is far less likely to jolt the camera than a vigorous click. Since most cameras have a two-step

bulbs add their own unnatural orangish hues. Whether you are shooting under tungsten, fluorescent, halogen, daylight, or any other kind of light, each affects the color of your photography differently.

Digital cameras use white balance to help photographs maintain color consistency and produce the colors you expect. To attain proper white balance, a digital camera analyzes a scene and attempts to determine which areas should be truly white. The operating theory is that if there is, for instance, a 5 percent green shift in the white areas, the rest of the picture probably has too much green in the same percentages. So, subtracting 5 percent of green from the entire picture would remove any color shift.

While most users will be happy with a camera's automatic white balance settings, understanding and trying various white balance options can lead to even better pictures, especially in difficult lighting situations. These options are usually found in the camera's menu system, but are sometimes accessed using a button marked WB.

The settings will let you specify different lighting conditions, giving you greater control over the subtler colors and hues in your photos. Unfortunately, no standardized icons exist for the various options, so you should spend some time with your camera's manual and familiarize yourself with its options.

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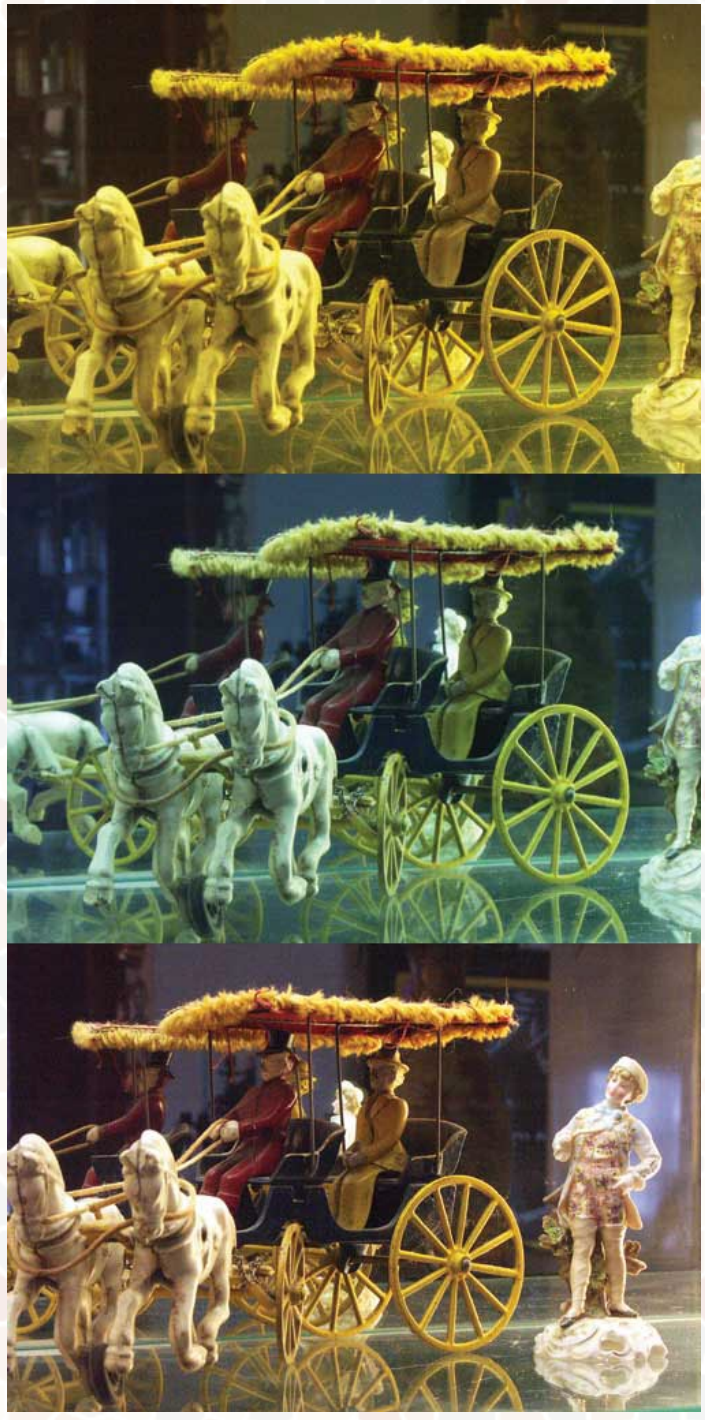
Advanced users may want to set the white balance manually. To do this, you'll need a white piece of paper or cardboard.

Place it in the middle of the scene, with all lights that will be used in the photo turned on. Zoom in on the paper, so it almost fills the frame. Then, select Manual from the white balance menu and, when prompted, take a picture of the white paper. This defines for the camera exactly what white should look like under the current lighting conditions. (Some cameras may have slightly different procedures for manual white balance.)



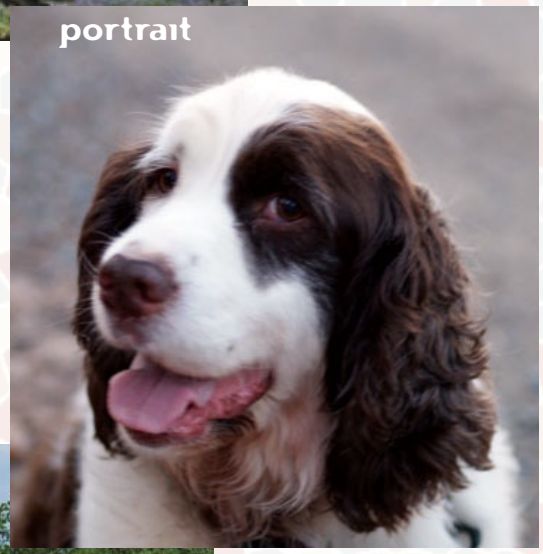
SCENE MODES

Most consumer and many prosumer digital cameras have scene modes—preset options that automatically choose the right exposure value, f-stop, and shutter speed, according to what you are photographing. They can be very useful. And while their names can vary widely from camera to camera, these are the most common modes.

- **Landscape** mode stops down the aperture to a small opening (high-number f-stop) to bring everything from foreground to background into sharp focus.
- **Portrait** mode creates a reduced depth-of-field effect in which the subject is in sharp focus while everything else (background and foreground) is blurred.
- **Action** mode (sports mode) sets your camera to a high shutter speed and continuous auto-focus to capture a fast-moving subject clearly.

Some scene modes use stored profiles to change the color settings, focusing modes, and other preferences, trying to match the intended photo to an idealized concept of that type of photo. For example, portrait mode may optimize color for more appealing flesh tones, while landscape mode might push colors toward the blues to make the sky, greenery, and lakes more dramatic.

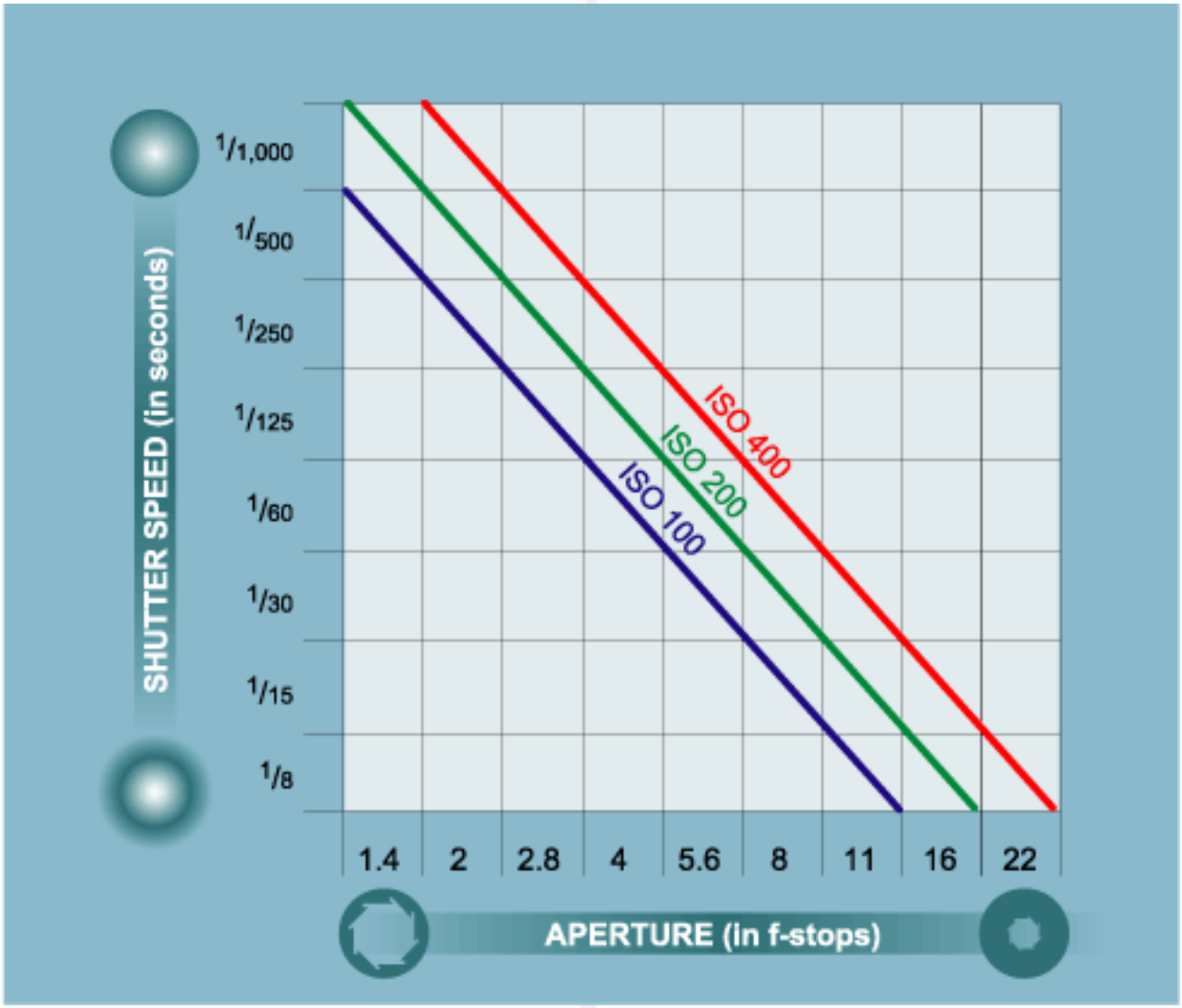

landscape


portrait

action

EXPOSURE BALANCE

Shutter speeds and f-stops are closely related, and choosing the right settings is a balancing act. Proper exposure requires that the right amount of light be let through. Because a smaller aperture lets less light through, you'll need a longer, slower shutter speed to compensate. Therefore, an adjustment in the aperture requires an equal and opposite change in the shutter speed. But a variety of combinations of f-stop and shutter speed will produce the same exposure. Given a scene that can be photographed with a perfect exposure using f/2.8 at 1/125 second, the same scene can have the same equivalent exposure at f/4 at 1/60 second, or f/2 at 1/250 second. Choosing the right combination is one of the ways that experienced photographers take artistic control of their pictures. Add to the mix your camera's ISO setting, which controls its sensitivity to light. If you double the ISO value, only half as much light needs to reach the image sensor. And your camera will make the appropriate adjustment to the shutter speed or aperture.



HISTOGRAMS

Most of the tools and commands discussed in this story are rooted in film-based photography. Histograms, on the other hand, are something that most photographers discovered when they started working with photo-editing software. Today, many digital cameras can analyze an image and display a histogram of the picture right in the LCD or in the electronic eye-level viewfinder. This is a graph that shows exactly how well the picture is exposed. Think of this as a statistical analysis of how many of the pixels (or points of data) in your image represent shadows, highlights, and midtones. If your picture is underexposed, the histogram will show that the image is too heavy in the shadows. Similarly, if it is overexposed, the graph will tilt toward the highlights and be weak in shadows. In the example above, the histogram shows that the photo is heavy in the shadows and highlights, with limited midtones. In contrast, the histogram in the picture on the right shows that the image has more midtones. While many cameras show the histogram when reviewing an image, some will actually display a histogram while you are composing a picture.

METERING MODES

Many cameras offer several choices of how they will analyze the scene to determine the appropriate exposure settings. Here are the most common metering choices.

Matrix Metering

The matrix-metering option reads several areas throughout the scene and averages their values to determine the proper exposure settings. Many (but not all) digital cameras use matrix metering as their default setting. When the lighting in a scene is somewhat even, and when no specific area needs greater attention than others, this is generally the best all-around mode.

Spot Metering

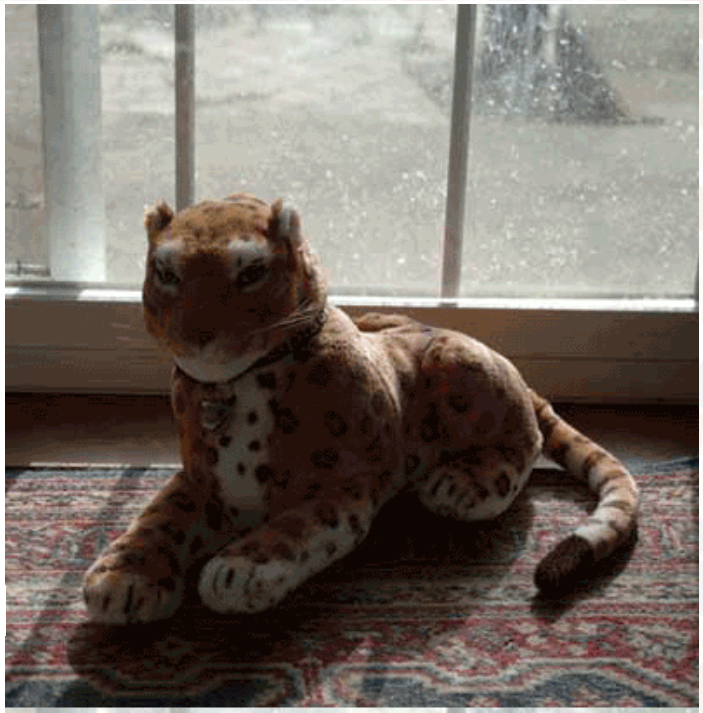
With the spot-metering method, your camera takes the exposure reading from a small section in the middle of your frame. This is often marked in the viewfinder by square brackets or a circle. You can use spot metering when you want to be sure that a specific area in your picture is properly exposed, such as a face that is backlit, as in the example given below.

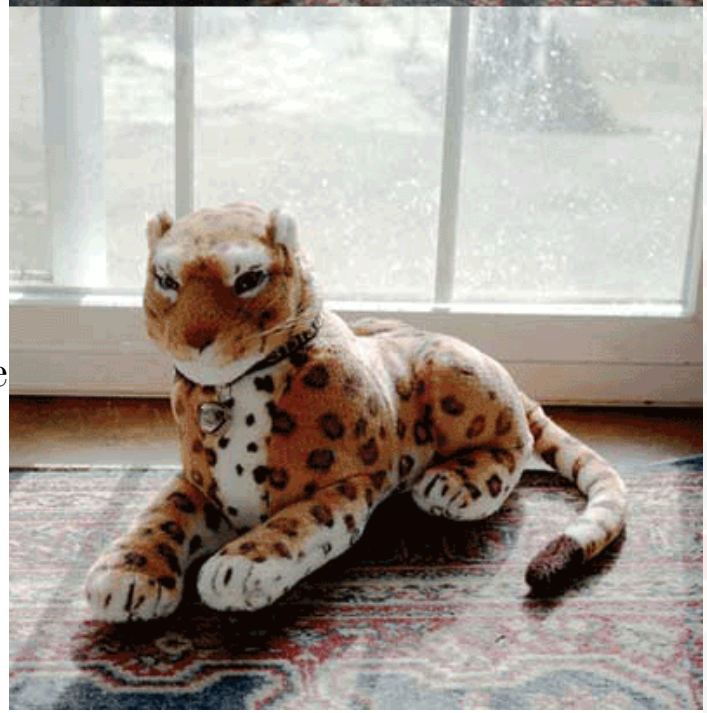
Center-Weighted Metering

This method reads the lighting conditions in the general area of the center of your frame, with input from the corners as well. A good compromise between matrix and spot, center-weighted is the preferred mode for portraits and other compositions in which the main subject fills a significant portion of the frame.

Custom Metering

Advanced cameras let you move around the center of the area you wish to meter to create your own weighting using the portion of the photo you are most concerned about having properly exposed.





EXPOSURE COMPENSATION SETTINGS

The exposure compensation settings can have a drastic effect on the way your image looks. In this series of photos, we shot the same subject under the same conditions, changing only the EV settings for each shot.

In the example above, for the left photo we used a negative EV setting. Shooting with an EV of -1, the result was a notably darker image than when taking the photograph with the standard settings.

The center photo in the example was taken with no exposure compensation. Using only the recommended settings, the image is fairly well balanced.

The image on the right in the example demonstrates a photo taken with a positive exposure balance. Notice that with an EV of +1, the image is much brighter and overexposed.

More Than Just Megapixels

Pushing the old adage that more is better, most manufacturers market their newest digital cameras by touting how many more megapixels they have than previous or competing models. By this logic, a 4MP digital camera can't possibly be as good as one with 5MP, and an 8MP unit has to be better than a 6MP model. Right?

Wrong. Megapixels are a measure of quantity (the amount of data captured), not quality. A digital camera's image quality is based not on a single component, but on an entire system. True, the heart of the system is the image sensor, with however many megapixels, but that's only part of the equation of how image quality is achieved. Here, we explore some of the other factors that go into producing high-quality digital photos.

Pixels

More pixels do not necessarily make a camera better, but their size is another matter. Pixels on an image sensor are like shallow buckets that catch photons of light, which the sensor then converts into an electrical charge (electrons). The bigger and deeper the pixels, the more photons they can capture, and the greater the pixel's ability to record detail in the shadows and highlights (dynamic range).

Most digital cameras use either CCD (charge-coupled device) or CMOS (complementary metal oxide semiconductor) image sensors. Larger sensors generally produce greater dynamic range, higher sensitivity, and better signal-to-noise ratio, primarily because they have room for bigger, more light-sensitive pixels. For example, among 5-megapixel models, the Olympus E-1's CCD is approximately 4.2 times as large as the Leica Digilux 2's CCD, and 6.3 times as big as the HP Photosmart 945's. This allows for correspondingly sized pixels: the Olympus's pixels are 6.8 microns wide, while the Leica's are 3.4 microns and the HP's are 2.8 microns. (Click **here** for information on an unusually designed image sensor.) A camera's lens is just as important to image quality as its image sensor. Depending on their design, lenses may have different resolving power and varied contrast and color characteristics. Generally, high-speed lenses (maximum apertures of f2 or larger) are better for available-light photography, but tend to lose more data near the picture's edge than slower lenses (f2.8 or below) when shot wide open.

Lens

Modern zoom lenses are every bit as good as fixed-focal-length lenses, but pictures shot at wide angles (28mm or 24mm equivalencies) have slightly more barrel distortion (where straight lines bow outward from the image center), while telephoto pictures (135mm-280mm) tend to produce the opposite, pincushion distortion. Extreme zooms (6X or greater) are heavier and harder to hold steady, which is why some better models come equipped with antishake technology.

The first digital-camera lens designs were taken from camcorders or film cameras. Some inexpensive models had plastic lenses, which frequently distorted colors and reduced the clarity and quality of light. Even the better models, which used optical glass, often produced vignetting (underexposure of image edges and corners), because light passed through the lens at oblique angles at the edges of the image sensor. (Light must strike image-sensor pixels head-on for the photons to be collected properly.)

Eventually, optical-glass manufacturers began building lenses specially designed for digital cameras. They made use of aspherical elements, low-dispersion glass, exotic color coatings, and other innovations. Some companies formed strategic alliances with distinguished lens manufacturers—Kodak with Schneider, Panasonic with Leica, and Sony with Zeiss—to add prestige and enhance lens quality. Cameras with brand-name lenses (or from camera companies with a history of superior lenses) almost always rate higher in our image quality tests.

With lenses, cleanliness is almost as critical as quality. Dust, fingerprints, or other surface impurities can significantly reduce image definition and integrity. Stray light can cause flare, chromatic aberrations, and other problems, so a proper lens shade is important.

Converter

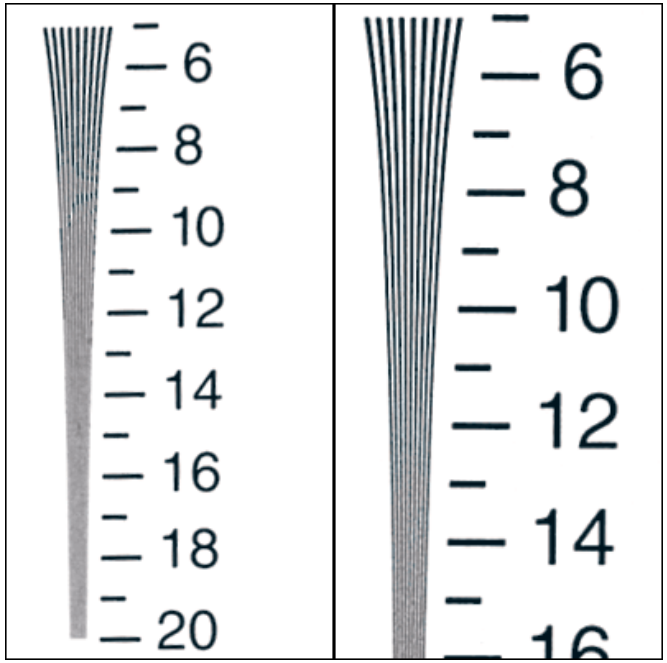
Though it might come as a surprise, all cameras—film, video, and digital—capture analog, not digital images. The CCD converts each pixel's charge into an analog signal of varying voltage, and then an internal analog-to-digital converter (**ADC**)

changes that signal into digital data (bytes). The better (and more expensive) the ADC, and the higher its bit rate (16-bit or 12-bit, as opposed to 8-bit or 10-bit), the smoother the transitions and the more details in highlight and shadow areas. While you can't (and shouldn't) select your camera based upon the type and bit depth of its ADC, cameras offering higher bit depths may produce richer images. (For more about the inner workings of image sensors, click **here**.)

File Format

How images are saved can directly affect picture quality. Most users prefer the **JPEG** file format, which is often the only format offered on consumer digital cameras. A good compromise among speed, image quality, and space savings, JPEG is a compressed format that actually throws away image data to shrink the file to a smaller size. Most digital cameras offer two or three levels of compression. Some inexpensive models typically offer 8:1 to 25:1 compression levels, while better cameras' compression levels range from 2.7:1 to 8:1. Cameras with lower compression ratios tend to have cleaner images.

After testing a number of digital cameras with the ability to save **RAW** files, we now shoot almost everything in RAW format when image quality is the most important factor. RAW saves all related image data with no in-camera processing, allowing photographers great latitude in how they want their pictures to appear.



The Secret Sauce

Some digital cameras score very well on all our low-level tests, indicating that the lens, image sensor, ADC, and other components are quite good, yet their photos aren't up to our expectations. The key factor is how the manufacturer's color and imaging scientists program the camera to interpret the data that defines the photo. These proprietary algorithms help determine how—and how good—the picture will look. This explains why cameras with the same lens and image sensor (which are often sold as part of a kit) may produce images that look quite different.

If you like the pictures that a camera produces, it's probably because you like the choices the designers made, and those choices will likely be made in most cameras from that manufacturer. When you find a camera brand whose images you like, you will probably do well to stay with it.

Your Photos

Taking digital photos has become part of our daily lives, and there's no better evidence of that than the massive number of cameras in pockets and purses, even in embedded cell phones. People enjoy the immediacy and accessibility of taking digital shots, as well as what they can do with them afterward on their home computers. Editing, manipulating, organizing, and printing are all easily within reach, giving you total control of the process.

No digital home is complete without a camera and the right suite of photo software. Here's how to equip yourself with the right tools.

Capture Your Photos

Choosing the right digital camera is the first step, and it requires some research. Before you start, figure out what kind of camera you want. Many compact cameras can take impressive pictures but lack the sex appeal of ultracompacts. The latter are small enough to fit in your shirt pocket but might not deliver top-notch performance. Superzooms have 10X or greater optical zoom lenses and are just below the enthusiast category, which comprises full-size models that offer more control than compacts. Digital SLRs are the highest-end cameras available, offering true reflex through-the-lens viewfinders, interchangeable lenses, and total control over your pictures.

Once you figure out what kind of camera you want, you'll be bombarded with numbers. Don't get too hung up on camera resolution; even midrange 3-megapixel (MP) models give you enough for an attractive 8-by-10 print; raise that to 4MP or 5MP if you want some room for cropping your photo before printing. A more pressing issue is a digital camera's lag time—the time lapse from when you press the shutter button to when the camera actually snaps the picture. Many cameras claim to have a lag time of less than a second, but you should test this in the store before buying.

Also of concern is start-up time—how much time a powered-down camera needs before it's ready to shoot. Again, this is something to try in the store, but anything from 1 to 5 seconds is normal. You should also ask how long you have to wait between shots. Many cameras now offer a burst mode, which lets you fire off two or three shots per second and store the pictures in the camera's buffer memory before writing them to your media card.

Manage Your Photos

No matter which camera you use to snap photos, you'll probably transfer the images to your PC to store, manage, and edit. Don't forget that Windows offers a lot of built-in photo-handling options. Microsoft Windows XP's AutoPlay feature, for example, automatically downloads pictures from a connected camera. You can then open that folder of images in

Windows Explorer and perform actions such as rotating image thumbnails, watching simple slide shows, creating layouts for printing multiple pictures on a single page, and ordering prints online from services like Ofoto and Shutterfly.

Over time you may acquire thousands of photos, and trying to find a certain image by rooting around in folders on your hard drive can be an exercise in futility; having a solid software solution for managing your collection is vital.

Image-organizing programs let you assign multiple keywords or tags to each image. These let you search your collection by keywords to find, for instance, all the photos that both your brother Rob and your sister Linda took during their trip to Vancouver—no matter where those pictures are scattered on your hard drive. Of course, as your photo collection swells, your hard drive fills; make sure you choose a program that lets you burn backup CDs or DVDs and keeps track of which images have already been backed up.

Edit Your Photos

Almost everywhere you look there are devices with image-editing capability, from cameras with built-in red-eye removal to photo printers featuring on-board image-enhancing functions. These fixes can be effective, but to make photos really look their best, you should turn to image-editing software.

Several midrange programs offer a slew of easy one-click commands for novices, without skimping on complex tools for more advanced users. For instance, all the major midrange programs have one-click sharpening functions for correcting focus by a predefined amount. But they also offer the powerful (if confusingly named) Unsharp Mask command, which gives you total control over the precise amount and scope of sharpening. Best of all, some programs let you apply image corrections as adjustment layers, giving you flexibility to adjust the amount of correction at a later date or cancel it altogether.

And if you find you frequently shoot sequences of similar photos, look for software offering batch processing. This function can be an invaluable time-saver, applying basic functions like resizing, renaming, and simple color correction to an entire group of images at once.

Print Your Photos

Dedicated photo printers that crank out prints at a maximum size of 4-by-6 inches are easy to recommend. Print quality can equal that of your local developer, and in some cases the cost is the same as well (29 cents per print). Portability is another big plus; many dedicated photo printers are battery operated and quite compact, so you wouldn't even think twice about taking one along on your next vacation.

If you need to make larger prints and also crank out the

occasional page of text, a desktop photo printer may be what you're looking for. Most photo printers use at least six colors of ink, usually two shades each of cyan and magenta, plus yellow and black. Ideally, each color is packaged in its own cartridge, meaning that you won't have to throw away a lot of magenta and yellow ink just because you've been printing tons of blue skies. And don't stress about a printer's claims of resolution and speed; practically every photo printer on the market has sufficient resolution. And print speed can be misleading, since vendors almost never test at the slow Best Quality mode you'll want to use for your prints.

Even if excellent photo output is your primary goal, all-in-one devices that also scan, copy, and fax can really let you have your cake and eat it too. Although photo output from one of these multifunction devices may not be quite at the same quality as a photo printer, some models are able to deliver excellent results.

Like dedicated photo printers, all-in-ones that emphasize photo printing may even include connections for printing directly from your digital camera or its removable media.

Share Your Photos

Back in the olden days, folks would return from vacation, drag the slide projector and screen out of the closet, and invite their friends over for a big-screen slide show of their trip. Now you can do this digitally. Just connect the bundled cable from your camera's video-out port to an RCA jack on your TV or VCR, switch to your camera's review mode, and let the slide show begin. And in case your camera isn't cooperating, you can use a media hub to stream photos on your PC to your TV wirelessly. Or, if you have a Media Center PC connected to your TV or a large display, you can present your photos as a slide show with just a few simple clicks.

For family and friends who live too far away to invite over for popcorn and a slide show, numerous online photo-sharing services offer unlimited space for housing your images. You can upload photos by simply dragging and dropping them into a downloadable software interface or into the Web page itself. From there you can have the service send e-mail to your friends inviting them to visit the Web site.

Many photo-organizing software programs offer other ways to share your images, making it easy to build your own Web gallery or create sophisticated slide shows on video CDs or DVDs, featuring music, narration, slick transitions, panning, and zooming.

Digital Camera Reviews

THE BEST FROM THE BEST

We've consolidated reviews of the best cameras produced in the last year by the three manufacturers whose models you gave the top overall ratings: Nikon, at 8.6; Canon, second by a hair at 8.5; and Panasonic, at 8.4.

One important note: If your critical determiner is ratings on specifics—ease of use, reliability, tech support, repair frequency, and recommendation likelihood—for all cameras (not just those made in the last year) or for classes of cameras, you'll have to refer to the survey result charts for All Cameras or Camera Classes. This is because the overall rating scores are not derived from the specific ratings, but are based on answers to the question, "Overall, how would you rate this digital camera?"

Novices might want to take a look at the Nikon Coolpix 4200, which hit the scene this year. It's a solid 4-megapixel shooter packed into a sleek brushed-aluminum case. The 3X-optical-zoom lens uses extra-low dispersion glass and you'll get satisfyingly sharp images. We awarded the Coolpix 4200 3.5 stars out of a possible 5.

The Nikon D70 swept up 5 stars and an Editors' Choice when we reviewed it on its own, and for good reason—this 6.1-megapixel digital SLR has nearly all the features a professional would want, fires off shots as fast as any film SLR, produces very good images, and won't make you pawn your mother's wedding ring.

Canon bestowed two especially worthy image-grabbers on us this year. The Canon EOS 20D was another 5-star Editors' Choice winner when we reviewed it individually, and it competes with the Nikon D70, although you'll pay more. If you have the money, though, this is the camera to get. You'll walk away with an ergonomically sculpted magnesium-alloy chassis holding an 8.2-megapixel powerhouse with convenient controls and an impressive array of features, including one that lets you set white-balance color temperature.

In testing the Canon Powershot S60 on its own, we found plenty to like, rewarding it with 4 stars and an Editors' Choice. This is a 5-megapixel shooter, on the large end of compact, that captures crisp images through a zoom lens with great wide-angle capabilities. You'll also find a cornucopia of features, giving you more control than a typical point-and-shoot offers.

If you'd rather snap quick shots than fiddle with controls, the Panasonic Lumix DMC-FX5 could be your ticket. This sleek, 3-star, point-and-shoot compact makes some compromises, but also has a Leica lens, image-stabilization, and a helpful, intelligent menu system.

As you can see, you have a good selection across a wide range of camera types from vendors you've told us you trust, so don't let the lack of a camera put a damper on your holidays. Our **Digital Camera Reader Satisfaction Survey***, along with these reviews, will help you easily find what you need to record your visual memories, and that's a reason to celebrate.*

SURVEY RESULTS: DIGITAL CAMERAS

▲▲ Signficantly better than average*
▲ Better than average**
▼ Worse than average**
▼▼ Significantly worse than average*

	OVERALL RATING[1]	POOR (1.0-2.4)	FAIR (2.5-4.4)	GOOD (4.5-6.4)	VERY GOOD (6.5-8.4)	EXCELLENT (8.5-10)	EASE OF USE	OVERALL RELIABILITY	TECHNICAL SUPPORT	PERCENTAGE NEEDING REPAIR	LIKELIHOOD OF RECOMMENDING
ALL DIGITAL CAMERAS											
Canon (1,351 responses)	8.3 ▲▲						8.1 ▲▲	8.7 ▲▲	7.1	4.1% ▲	8.7 ▲▲
Casio (96)	7.5						7.9	8.0	—	3.1%	7.5
Fujifilm (502)	7.4 ▼						7.8	8.0	—	7.6%	7.7 ▼
HP (343)	6.8 ▼▼						7.6 ▼	7.5 ▼▼	—	6.4%	7.3 ▼▼
Kodak (880)	7.4 ▼						8.1 ▲▲	8.0 ▼	5.9 ▼	5.2%	7.8
Konica Minolta (240)	7.8						7.9	8.3	—	7.9%	7.9
Nikon (692)	8.2 ▲▲						7.8	8.6 ▲▲	7.2	7.4%	8.6 ▲▲
Olympus (992)	7.9 ▲▲						7.6 ▼	8.3 ▲	6.4	4.4% ▲	8.2 ▲▲
Panasonic (86)	7.8						7.9	8.3	—	7.0%	7.9
Pentax (94)	8.0 ▲						8.1	8.4	—	4.3%	8.1
Sony (1,057)	7.9 ▲▲						8.0 ▲	8.4 ▲▲	6.5	4.0% ▲	8.4 ▲▲
Toshiba (66)	6.8 ▼▼						7.2 ▼	7.3 ▼	—	9.1%	6.4 ▼▼
AVERAGE	7.6						7.8	8.2	6.6	5.9%	7.9

RED denotes Readers' Choice. Except as noted, scores are on a scale of 1 to 10, where 10 is best. A dash indicates that we do not have enough survey data to give a score. * At least 2 confidence intervals from the average. ** 1 confidence interval from the average. [1]The "overall rating" score is based on answers to the question "Overall, how would you rate this digital camera?" It is not the average of the other scores.

Nikon Coolpix 4200

SPEC DATA
Price: $399.95 List
Type: Consumer
Megapixels: 4
Included Memory Amount: 12 MB
Included Memory: On Board
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 38
35-mm Equivalent (Telephoto): 114
Maximum Resolution: 2272 x 1704 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●◐○

The Nikon Coolpix 4200 is a sleek, solid 4-megapixel digital camera with a 3X optical zoom adjustable from 7.8 to 23.4 mm (38 to 114 mm, 35-mm equivalent) lens. It's a step up from the Nikon Coolpix 4100, as it offers faster overall performance, ED (extra-low dispersion) glass in the lens, and in-camera red-eye fix, as well as a brushed-aluminum body (the Coolpix 4100 is plastic). Its good looks and sharp pictures might satisfy novices and even a few enthusiasts, but its price and minor color-handling and exposure issues may turn off more serious photographers.

The camera is well designed and feels sturdy. It's slightly smaller and thinner than the Coolpix 4100, with a smallish 1.5inch LCD (compared with the 4100's 1.6 inches). The Trash, Menu, and Review buttons are awkwardly located under the LCD, making for slightly less convenient one-handed operation than its sibling allows. The four-way controller button (with Select in the middle) and zoom controls are within easy thumb reach. The top-mounted mode selector dial provides access to the camera's movie and still modes, setup, and 15 scene modes—four of which offer a scene-assist feature that lets you fine-tune your shots.

The Coolpix 4200 offers quite a few features for photography-savvy users, but it notably lacks full manual control and aperture and shutter-priority modes. Still, those who like to tinker with settings have access to nine white-balance options, selectable ISO settings, three metering options, three auto-focus choices, and three levels of JPEG compression. The camera produces still images at up to 2,272 by 1,704 pixels and 640-by-480 movies with sound at a disappointingly lim-ited 15 fps (until the memory fills up). Features we appreciate include in-camera red-eye fix, multiple continuous-shooting modes, lamp-assisted auto-focus, 12MB of internal memory (the camera also takes SD cards), an included rechargeable battery, and a charger.

On our lab tests, the Coolpix 4200 turned in a somewhat slow boot time of 4.27 seconds and a decent recycle time of 3.19 seconds. Our simulated-daylight test shot was sharp with good detail, though it was a bit soft toward the back of the subject area. The exposure was a bit dark, and we detected graininess in the shadows and a slight overall magenta cast. Our flash-invoked shot, however, was evenly illuminated and sharp, though the colors were a bit too cool. The resolution (1,225 lines average) and pixel transition (1.9 percent) results attest to our test images' excellent sharpness.

The Coolpix 4200 offers a wealth of handy features, though its lack of full manual control and aperture and shutter-priority modes make it more suited to casual shutterbugs. We just wish that its exposure and color accuracy were on a par with the excellent sharpness of its lens. In the end, the Kodak EasyShare LS743 is a better buy if you're looking for a high-quality point-and-shoot model.

Nikon D70

SPEC DATA
Price: $999.00 List
Type: D-SLR
Megapixels: 6.1
Media Format: None
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 27
35-mm Equivalent (Telephoto): 105
Maximum Resolution: 3008 x 2000 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●●

Last year, Canon created a stir with the Digital Rebel, the first digital SLR (D-SLR) for under $1,000 (including lens). Nikon's return of serve has tremendous heat on it. Instead of creating an amateur-oriented camera like the Rebel and competing directly on price, Nikon has produced a slightly more expensive D-SLR with the features, functions, versatility, and image quality to appeal to budget-minded professionals as well. In fact, not only is the 6.1-megapixel Nikon D70 more camera than the Rebel, it even bests our previous **Editors' Choice** in the category, the Olympus E-1.

The D70 body is solid, well designed, and (like the Rebel) made of high-impact plastic. The D70, however, is heavier and feels more substantial than the Rebel. Like the E-1, it has a nonslip hand grip but is smaller and more comfortable to hold. Also, the D70's fixed 1.8-inch LCD is brighter than the Rebel's.

The D70's menus are logical, intuitively organized and bright. While less option-heavy, they're friendlier than the E-1's, whose parameters and settings can be cryptic. Both have oversize control panels, jog switches, and mode dials, though the D70 has two independently operated (sometimes confusing) mode subdials, compared with the E-1's single dial. Scattered on both cameras are analog controls for a variety of functions.

Like the Rebel, the D70 sports both a built-in pop-up flash and an intelligent hot shoe; the Nikon, however, lacks a standard PC connector for studio strobe lights. (The E-1 doesn't have a built-in flash but has both a PC connector and a hot shoe.) The D70 offers flash compensation, and it's the fastest-syncing focal-plane shutter SLR available, with a top sync speed of {1/500} second (for crisp action shots and more flexibility when using fill flash). By contrast, the E-1 and Rebel sync at just {1/180} and {1/200} second, respectively, and the Rebel lacks flash compensation. All three save to Type I/II CompactFlash cards. Like the E-1, the D70 supports the USB 2.0 spec (though the E-1 supports FireWire, whereas the D70 doesn't). All three are powered by included long-life rechargeable lithium ion batteries.

The D70 incorporates a 6.24-megapixel Sony CCD, yielding a maximum resolution of 3,008 by 2,000 pixels. The E-1 was the first D-SLR to use Kodak's 5.5-megapixel 4/3 chip and has a top resolution of 2,560 by 1,920 pixels. The Rebel uses a 6.29MP CMOS, for a top resolution of 3,072 by 2,000 pixels. None has a movie mode. All three save images as RAW or JPEG files, though the E-1 can also save TIFFs.

The D70 offers almost all the features a professional might look for, including aperture and shutter priority, manual exposure, adjustable exposure bracketing, three metering and focusing modes, shutter speeds as high as {1/8,000} second, sRGB and

Adobe RGB color modes, and sharpening and color saturation controls. There's also a fast, responsive play-back mode with extensive metadata and histogram. The E-1 virtually matches the D70 feature for feature but adds more precise white-balance selection, electronic cleaning of the image sensor, and pixel mapping.

Nikon and Olympus each created a new series of digital lenses for these cameras. Autofocus with the D70's standard 18- to 70-mm, f/3.5 to f/4.5 zoom lens (35-mm equivalent: 27 to 105 mm) is very fast, and the lens is sharp and distortion-free. The E-1's 14- to 54-mm, f/2.8 to f/3.5 lens (35-mm equivalent: 28 to 108 mm) has approximately the same zoom ratio and area coverage, and is slightly faster. On the down side, it incorporates motorized focus-by-wire rather than the more precise mechanical manual focus.

Our tests show that the D70, with the bundle's 18- to 70-mm lens, has a horizontal resolution of 1,650 lines, a vertical resolution (higher numbers are better) of 1,750 lines, and horizontal and vertical pixel transitions of 2.4 percent and 1.8 percent, respectively (lower is better). The Rebel, with its 18- to 55-mm lens, scored 1,600 lines horizontal and vertical, with pixel transitions of 2.6 percent and 1.9 percent respectively. The E-1, with the matched 50-mm f/2.0 lens we used for testing, scored just 1,300 lines in both horizontal and vertical resolution, with horizontal and vertical pixel transitions of 2.7 percent and 2.0 percent, respectively.

Using the D70's default settings on our tests, image quality was very good. Our simulated daylight shot exhibited excellent details, especially in the shadows, but was somewhat underexposed, with a slight blue color shift. Our test flash shot was very sharp and evenly illuminated, with excellent color, if slightly underexposed. By contrast, the E-1's simulated daylight test shot was perfect. Keep in mind, however, that professional and prosumer cameras work best not on default settings but by using white balance and exposure controls and/or when shooting in RAW mode. The D70's image quality jumped to excellent when we took these routes.

The D70 handles and shoots as fast as any film SLR. It can click off JPEG images at a sustained 3 fps until you run out of memory. Better yet, it boots up in 0.4 seconds and has no shutter lag. The E-1 is no slouch either, capable of booting up in 1.7 seconds and shooting at 3 fps for 12 frames. But for sustained shooting and throughput, the D70 is far and away the fastest D-SLR under $3,000. Even after a recent price reduction, the $2,000 E-1 is far pricier than the D70. Given its stellar price/performance ratio, the Nikon D70 is our clear pick.

Canon EOS 20D

SPEC DATA
Price: $1,499.00 Direct
Type: D-SLR
Megapixels: 8.2
Media Format: CompactFlash
Battery Type Supported: Lithium Ion
Included Batteries: Yes
Maximum Resolution: 3504 x 2336 pixels
Interface: USB 2.0
Video Capture Ability: No
EDITOR RATING:

Canon and Nikon have long been head-to-head competitors in the SLR (single-lens reflex) camera market, and that fierce rivalry has carried over into the digital-SLR market as well. The $1,499 **Canon** EOS 20D body is Canon's latest counter to Nikon's best-selling $999 Nikon D70 body, which was an **Editors' Choice** winner in the digital SLR category (and Nikon's answer to Canon's $900 Digital Rebel). In addition to offering a higher resolution and better construction than the D70, the EOS 20D is a stellar performer capable of capturing spectacular images.

While the D70's body—like that of the Digital Rebel—is made of high-impact plastic, the EOS 20D, like its immediate predecessor, the EOS 10D, is built on a magnesium-alloy chassis. It's ergonomically sculpted, with a finger indent to the side of the shutter button, a thumb indent on the back of the camera, and lots of nonslip surfaces on the hand grip and the back. The camera has a rock-solid, sturdy feeling, with well-marked and conveniently clustered analog controls. Instead of the D70's front-and-back subdials, the EOS 20D has a subdial behind the shutter button, a select dial on the left side where the rewind knob would be on a film SLR camera, and Canon's signature circular quick-control dial on the back. It also sports a tiny nine-way joystick, for quickly moving the autofocus point or the white-balance shift, as well as for playback panning. Menus are bright, intuitive, well-organized, and legible, and the large, illuminated control panel and settings within the viewfinder window are quite visible and easy to read. One nice touch: Instead of having to depress and hold the analog buttons while

using them in conjunction with the subdial, joystick, or quick-control dial, users need only depress and release a button and then move another control within 6 seconds.

The EOS 20D comes with an impressive array of features and settings that help photographers fine-tune images at the capture point. Like the D70, it offers auto-exposure, aperture-priority, shutter-priority, manual, and six program modes, as well as the ability to adjust exposure, white balance, and flash bracketing and to set contrast, sharpness, saturation, and color-tone parameters. It also provides some options not available on the D70, such as the ability to shoot monochrome images (including black-and-white film filter-like effects) and set a precise white-balance color temperature. For safety's sake, the EOS 20D automatically shuts off whenever the memory card (it takes CompactFlash) door is inadvertently opened; the D70 doesn't. The EOS 20D also has nine autofocus points to the D70's seven, an ISO equivalency range of 100 to 3,200 (com-pared with 200 to 1,600 on the D70), and the ability to save RAW and JPEG images simultaneously at various resolutions and two compression levels (the D70 has a single RAW+JPEG setting and three JPEG compression levels).

The D70's 6-megapixel CCD produces a maximum resolution of 3,008 by 2,000 pixels; the EOS 20D's 8.2MP CMOS sensor yields a maximum resolution of 3,504 by 2,336 pixels. Both cameras have top shutter speeds of 1/8,000th of a second, although the D70 syncs with its built-in flash at 1/500th of a second. The EOS 20D can manage just half that. Nikon's $1,299 D70 camera kit comes with a solid, well-built DX digital series f/3.5 18- to 70-mm lens, which our tests show produces an impressive average resolution of 1,700 lines, and a very good average pixel-transition ratio of 2.09 percent. Canon's $1,599 EOS 20D camera kit comes with a somewhat flimsy, plastic-mount EF-S digital series f/3.5-5.6 18- to 55-mm lens—the same lens that comes with the Canon EOS Digital Rebel. We don't love the feel of this lens, but we can't deny that it scored well in tests; The camera's average resolution with it is a tremendous 1,800 lines, and its average pixel-transition ratio just edges out the D70, at 2.01 percent. Canon's beautifully crafted, fast-focusing EF 16-35mm f/2.8L USM lens is much better matched to the EOS 20D's abilities. When we shot with this lens, we got an average resolution of 1,825 lines and an amazing average pixel-transition ratio of 1.86 percent. But this lens costs as much as the 20D body—$1,499. The camera can accept any Canon EF or EF-S mount lenses.

Both cameras are fast. The D70 boots in 0.4 seconds, the EOS 20D in 0.2 seconds. The long-distance D70 can shoot JPEGs at 3 fps until the memory card fills up, while the short-sprinter EOS 20D clicks off 5.4 fps for up to 23 frames. Shutter lag on both models is practically nil. In contrast, the Digital Rebel boots in 2.6 seconds and its fastest burst mode is 14 frames in 10 seconds.

The image quality with the EOS 20D's default JPEG settings is very good to excellent. Our test simulated-daylight shot was well exposed and exhibited exceptional detail, though it slightly

clipped in the highlights. Our test flash shot was almost picture-perfect, with razor-sharp details, even illumination, accurate exposure, and great color. Like other digital SLRs, the EOS 20D shoots best in RAW mode or by using its extensive repertoire of exposure and color controls, which would easily eliminate the highlight clipping in our simulated-daylight shot.

Excellent construction and design, fast performance, and great image quality make the Canon EOS 20D the current top gun among digital SLRs under $3,000—and our current Editors' Choice in this category. We only wish that the kit came equipped with a better lens.

Canon PowerShot S60

SPEC DATA
Price: $499.00
Type: Compact
Megapixels: 4
Included Memory Amount: 32 MB
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 100
Maximum Resolution: 2592 x 1944 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

The Canon PowerShot S60 is Canon's replacement for the popular PowerShot S50. The new model is leaner and quicker and boasts longer battery life. The S60 is on the large end of compact (pocketable, if you have roomy pockets) and boxy, but its plain looks belie its rich feature set.

The S60 has an f/2.8 to f/5.3 3.6X zoom lens with great wide-angle capabilities. Its 5.8-mm to 20.7-mm range is equivalent to 28 mm to 100 mm in 35-mm photography terms, and it captures beautifully crisp images with its 5-megapixel sensor.

To get at the features, the S60 offers a bevy of buttons and controls. The top-mounted shooting-mode dial allows for several modes: fully auto, scene select, aperture or shutter priority, program, and fully manual modes. The S60's back-panel zoom rocker shares space with nine other buttons and a jog control. Given so many controls, it's surprising you still have to wade through complicated menus to access such common functions as burst mode (up to 2 fps, for up to eight shots).

Learning to navigate the S60 is worth the effort, however. You get ISO selection from 50 to 400 and an impressive nine white-balance choices, including one for "underwater" (Canon offers an optional underwater housing). The S60's Lamp Assist AF system is equally dexterous and includes focus bracketing. The flash provides first or second-curtain Slow Synch among its many modes for combining flash with available light. The S60's shutter speeds range from 15 seconds to a speedy 1/2000 seconds (up from the S50's 1/1500). It shoots at a maximum 2592-by-1944 resolution, and can capture images in uncompressed RAW format. Video capabilities were slim: 640 by 480 pixels at just 10 fps for just 30 seconds.

The 3.6X zoom operates smoothly, and we like the camera's 28-mm wide-angle ability. In macro range, you can shoot from as close as 2 inches, though with wide-angle distortion (as you'd expect). The camera's 1.8-inch TFT LCD panel wasn't particularly bright, and even when it was adjusted for daylight viewing, direct light washed it out more than we'd like.

In lab tests, the S60 clocked a boot-up time of 3.8 seconds and a quick recycle of 2.6 seconds. The S60 showed 1,300 resolvable lines and a transition pixel average of 2.45 percent—both very good numbers. Our daylight-simulated still life was sparkling: detailed and clear with honest colors and great exposure. The autoflash-invoked shot was clear, but the flash fell a little short of the subject matter on automatic setting, though the flash output can be adjusted.

So if you want a compact camera that offers more controls than a simple point-and-shoot, the Canon S60 is just the ticket.

Panasonic Lumix DMC-FX5

SPEC DATA
Price: $449.00
Type: Compact
Megapixels: 4
Included Memory Amount: 16 MB
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 105
Maximum Resolution: 2048 x 1536 pixels
Interface: USB 1.1
Video Capture Ability: Yes
EDITOR RATING: ●●●○○

The Panasonic Lumix DMC-FX5 is a stylish, sleek 4MP compact point-and-shoot camera. Though it has some notable features, such as a Leica lens and image stabilization technology, it's only an average performer and has some image-quality problems that hold it back. Kodak's EasyShare LS743, our current Editors' Choice among point-and-shoots, is a better camera for about the same money.

We like the DMC-FX5's elegant steel-body construction. The well-placed controls enable comfortable two-handed operation, and the four-way selector button (the burst-mode button is in the middle) and mode wheel provide a wealth of dedicated controls. The f/2.8 to f/4.9 5.8 mm to 17.4 mm (35 to 105-mm, 35-mm equivalent) 3X optical zoom lens operates smoothly via the zoom rocker on the shutter button, and it recedes fully into

the camera body. Shooting at 3X zoom won't require image stabilization the way superzooms do, but Panasonic's Mega O.I.S. (optical image stabilization) technology, which uses gyro-sensors and tiny motors to correct for handshake, will let you shoot at slower speeds without blur. This is especially helpful, since the camera's ISO settings only go up to 200.

The menu structure and display are helpful and intelligent. For example, when invoking manual white balance, you're instructed to "aim the camera at a white surface and press the shutter." The smallish 1.5-inch LCD is crisp and serviceable (except in strong sunlight) and we particularly like the intuitive, informative display.

The DMC-FX5 offers few preset scene modes and fewer options for custom configuration; it has no shutter or aperture-priority modes. The closest thing it has to a manual mode is EV compensation. Users can also specify ISO, auto bracketing, light metering, and filters. And we always appreciate real-time histograms, which this camera includes.

Panasonic's continuous-shooting mode lets you shoot up to five images at about 2.5 frames a second—speedy, though somewhat limited. (Panasonic claims seven in standard mode, but that wasn't our experience.) We found the 30-fps video to be exceptionally crisp and stable (optical stabilization helps), but it's limited to 320-by-240 resolution. The DMC-FX5 offers two levels of JPEG compression and five image sizes, up to 2,304-by-1,728.

Despite its Leica lens, the DMC-FX5 scored just 1,000 resolvable lines in our lab tests. While this is technically within the acceptable range for a 4MP sensor, it's at the low end, and the lowest of any 4MP camera we've tested. Pixel transition results were average but not great (2.6 percent horizontal, 3.1 percent vertical). Boot time was slow at 4.89 seconds, but recycle time was respectable at 2.5 seconds.

Our simulated-daylight shot showed adequate detail and good exposure, though colors were decidedly warm. When we invoked the flash, it blew out foreground whites and yellows slightly, giving them a posterized look, and we detected some noise in darker areas of the image. So while the DMC-FX5 has some notable features, it doesn't match the best in the 4MP point-and-shoot field.

OTHER TOP-RATED MODELS

Canon EOS Digital Rebel

Price: With lens, $999 list; without, $899. 6.3 megapixels.

The **Canon** EOS Digital Rebel is a fast and easy-to-use digital SLR, and the lens is surprisingly good considering its light weight and low price. Image quality is generally excellent, but our flash shots were often underexposed. The Rebel lacks a flash exposure compensation control, which we fixed by using an external flash. But this adds considerable cost and weight. **Full review.**

Casio Exilim Pro EX-P600

Price: $599.99 list. 6 megapixels.

Although a bit pricey, the **Casio** Exilim Pro EX-P600 compact camera is worthwhile. The solid image quality, versatile 4X zoom lens, and impressive design, LCD, and menus outweigh this camera's dark exposures and mediocre recycle times. With 25 scene modes, beginners will appreciate the on-screen help. And pros will like its focus bracketing and advanced modes—all easily accessible. Our daylight image was balanced, though slightly dark. Flash shots were well illuminated, if a bit cool. It boots in 3.03 seconds and recycles in 4 seconds. **Full review.**

Kodak EasyShare LS743 compact

Price: $299.95 list. 4 megapixels.

The **Kodak** EasyShare LS743 compact is a nifty little point-and-shoot. It has a 1.8-inch LCD that is sharp but doesn't automatically adjust when the scene is very dark or light. It can accommodate SD or MMC cards, and it comes with 16MB of built-in memory. The camera boots in 4 seconds and recycles in 1.5. Our daylight and flash test shots were crisp, with excellent detail and color, though slightly underexposed. **Full review.**

Leica Digilux 2

Price: $1,850 list. 5 megapixels.

You'll love the features of the **Leica** Digilux 2 enthusiast camera, including an anodized silver body, leather trim, well-placed shutter button, and smooth manual focus. It also offers fast shooting and an excellent 3X optical zoom lens. The bright, 2.5-inch LCD complements the high-resolution electronic viewfinder by displaying a magnified square. Our flash test shot was excellent, with accurate exposure, even illumination, and outstanding color. The daylight shot exhibited sharp detail and very good exposure. Sure, $1,850 is a little pricey, but those who want the best will understand. **Full Review.**

Olympus Camedia C-765 Ultra Zoom

Price: $450 street. 4 megapixels.

The **Olympus** Camedia C-765 Ultra Zoom is a superzoom camera that produces sharp images with its 10X zoom lens. Not to mention that the 1.8-inch LCD is extremely bright and crisp. With seven resolutions, the camera also offers support for TIFF files and four levels of JPEG compression. It captures 640-by-480 QuickTime video with audio, but at only 15 fps. Boot and recycle times were slow at 6.8 and 2.5 seconds, respectively. But when we took daylight still-life shot, the C765 showed realistic colors and even exposure. **Full Review.**

Sony Cyber-shot DSC-T1

Price: $500 street. 5.1 megapixels.

The **Sony** Cyber-shot DSC-T1 ultracompact camera is stunning. Although it does not have an optical viewfinder, its massive 2.5-inch LCD enables easy viewing. The camera offers 30-fps video, manual focus, eight program modes, and a histogram. In our testing, boot time was lightning fast at 1.6 seconds, but recycle time and burst mode were slow at just 3.6 and 4 seconds, respectively. Our test shots had a yellow cast. The daylight image was underexposed, but the flash image was well exposed. Despite its rated 5.1 megapixels (MP), the DSC-T1's resolution is more in line with a 4-MP model. Nevertheless, the DSC-T1 is designed for buyers who want the highest-resolution possible in a subcompact digital camera. **Full Review.**

POCKET-FRIENDLY CAMERAS

They're tiny, they're fashion statements for many users, and some of them also happen to be surprisingly good cameras: They're the ultracompacts. To make a camera small enough to fit in a shirt pocket, you've got to make compromises in image quality and features. But the better cameras in this class strike a good balance between form and function. We tested seven of the latest to see which have succeeded there.

Canon PowerShot SD20 Digital Elph

BOTTOM LINE: The Canon PowerShot SD20 Digital Elph is a sleek, attractive, and durable 5MP ultracompact that takes very good daylight pictures. Flash shots aren't as impressive, though, and there's no optical zoom. Still, this smaller-than-pocket-size beauty takes a lovely, high-resolution picture and offers lots of extra features for its size; it's a fine "companion" camera.

PROS: 5 megapixels in a tiny package; durable stainless-steel body; long, slim shape makes for easy handling and shooting; intuitive, simple-to-use controls; excellent dynamic range and accurate colors in daylight shots.

CONS: Slow boot time; no optical zoom or viewfinder; falloff in flash shots, with uneven illumination; some purple fringing.

SPEC DATA
Price: $349.00 List
Type: Ultracompact
Megapixels: 5
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 39
35-mm Equivalent (Telephoto): 39
Maximum Resolution: 2592 x 1944 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●◐○

Considering the 5-megapixel Canon PowerShot SD20 Digital Elph (available in silver, garnet, midnight blue, or gray) takes up less space than a pack of cigarettes, the trade-offs aren't particularly surprising. But many photographers may find a few of them to be deal breakers.

Out of the box, the SD20 is simple and intuitive to use. Its long, slim body is easy to hold, and you won't find yourself pressing buttons by accident. Functions beyond the absolute basics are accessible only through menus, but these are easily navigable.

The SD20's lens has a fixed focal length of 39 mm (35-mm equivalent), which will turn off users who insist on having optical zoom. When you turn off the camera, the lens retracts into the camera's body, and the built-in shutter closes automatically. Thankfully, the SD20 also has an autofocus assist beam for shooting in low light.

When you're ready to shoot, you'll notice that there's no optical viewfinder, so you must frame your shots with the small 1.5-inch LCD. Luckily, the screen is sharp and bright. Manual controls include white balance, ISO sensitivity, metering, and exposure compensation, though the camera offers only five scene modes. Other features include photo effects modes, a macro mode, and a dedicated Print/Share button. It also has a handy quick-shot feature, which lets you bypass the autofocus system by pressing the shutter button all the way down to snap pictures immediately. The SD20 can capture 640 by 480 movies with sound, but at a disappointing 10 fps. We do like that the camera comes with a 32MB SD card as well as a rechargeable lithium ion battery and charger.

In testing, the SD20's was a average performer: Its boot time of 2.5 seconds was near the middle of the pack, as was its recycle time of 3.5 seconds between flash shots. Its resolution was an excellent 1,425 lines, and its transition pixel ratio was significantly better than every other model in this roundup. In our simulated-daylight shots, we noted excellent dynamic range, though with minimal clipping in the shadows and some blue and purple fringing. Colors were accurate, with natural-looking saturation, and we saw good details in light and shadow—overall a very appealing picture. In our flash-invoked shot, there was falloff around the edges, with uneven and distracting illumination. Dynamic range was still good, though. We also saw significant blue and purple fringing, though the image was sharp.

Altogether, the Canon PowerShot SD20 Digital Elph is a sleek, attractive, and durable 5MP ultracompact that takes very attractive daylight pictures, though its lack of optical zoom and its uneven flash illumination may not satisfy more serious shooters.

Canon PowerShot SD300 Digital Elph

BOTTOM LINE: The Canon PowerShot SD300 Digital Elph takes great pictures, despite its tiny size. It's stylish, built like a very small tank, and fun to use.

PROS: Excellent daylight images and very good flash shots. Good menus. Tiny and tough,

CONS: Mediocre recycle times. Smallish LCD, Optical viewfinder placement could be better.

SPEC DATA
Price: $399.00 List
Type: Ultracompact
Megapixels: 4
Included Memory Amount: 16 MB
Included Memory: Media Card
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 105
Maximum Resolution: 2272 x 1704 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

The Canon PowerShot SD300 Digital Elph is only a 4MP camera with a 2 inch LCD in an ultracompact space increasingly dominated by 5MP contenders with 2.5 inch LCDs—but that's okay, because this tough, tiny camera punches well above its weight. Superb picture quality more than make up for its sluggish flash recycle times, making this our new Editors' Choice ultracompact camera.

Available in the same range of colors as its fixed focal-length cousin the SD20, the SD300 has a bigger LCD, at 2 inches, and adds a retractable f/2.8-f/4.9 5.8mm to 17.4mm (35mm to 105mm, 35mm equivalent) 3X optical zoom lens that retracts into the body of the camera when not in use. It also adds an optical viewfinder, though we wish this were placed to the side; placing it further in toward the center of the camera means that people with small noses will put them right on the LCD and

people with big noses will have trouble using the viewfinder at all. Still, most people frame shots with the LCD, and while this camera's display isn't the biggest, it's crisp and bright. The SD300 has the same menus as the SD20, which, while not quite up to the standards we observed in the Casio ultracompacts, are still very good. We also like the fact that it shoots 640x480 video at 30 FPS, something recently reviewed higher-end Canons, such as the PowerShot S70 and G6, do not.

Where the SD300 really excels, however, is in testing. It got a very respectable 1225 average lines of resolution (compare to the previous Editors' Choice, the 5MP Sony Cyber-shot DSC-T1, which only scored 1150 lines), which, while not as good as the 5MP Casio Exilim EX-Z55, is still impressive, and the best of the 4MP ultracompacts. Pixel transition was a fairly good 2.5%. It boots up quickly enough, at 1.8 seconds, second only to the Sony T1 among ultracompacts, but while it's fairly fast shot-to-shot without flash, it takes a full 5.5 sec-onds between flash exposures, which is quite slow.

Still, the images it takes that long to process are well worth any wait. The daylight shots show excellent colors and dynamic range, with good contrast and rich detail, from the shadows to the highlights. The flash shots aren't quite as outstanding, but still very appealing, with good exposure if somewhat uneven illumination. The contrast was excellent and the color hues were very good, though there were no true whites in the shot. The picture was very sharp, with good details.

The SD300 is a keeper; aside from a slow flash, there's not much to complain about. If you need a faster camera, try the Casio EX-Z55, but otherwise, this is our ultracompact of choice.

Casio Exilim EX-S100

BOTTOM LINE: The EX-S100 is an elegant camera that's a joy to shoot with. It's the first camera to use a ceramic lens element, which has enabled Casio to make it amazingly thin. We only wish that the camera's photo quality matched its impressive looks: Our test shots were disappointing, with focus, color, and exposure problems.

PROS: Small, sleek, and stylish; clear menu system with large type; lots of scene modes, with excellent text descriptions. Pan-focus mode lets you bypass autofocus for quicker shots; real-

time histogram helps you make sure you get the best exposure. Fast boot time.

CONS: Fuzzy photos, with unappealing color. Pricey for a 3.2MP camera and for the photo quality. No optical viewfinder.

SPEC DATA
Price: $399.99 List
Type: Ultracompact
Megapixels: 3.2
Included Memory Amount: 9.3 MB
Included Memory: On Board
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 36
35-mm Equivalent (Telephoto): 102
Maximum Resolution: 2048 x 1536 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●◐○○

The **Casio** Exilim EX-S100 is perhaps the most elegant camera in our roundup. It has an understated design in stainless steel, with just a few unobtrusive buttons. Further, Casio bills the EX-S100 as the world's smallest digital camera with an optical zoom lens; it's the size of a credit card and amazingly thin, thanks to its novel ceramic lens technology.

The f/4.0 to f/4.8, 36- to 102-mm (35-mm equivalent) 2.8X optical zoom lens is the first to include a transparent ceramic element. The material, called Lumicera—developed by Murata Manufacturing—has a higher refractive index than ordinary glass, and according to Casio, it is stronger and can be made with fewer defects, enabling better light transmission.

The EX-S100 has Casio's easily readable, large-type menus. Particularly nice for the novice is the Best Shot mode, which presents 23 preset scene modes with excellent sample photos and text descriptions, including some unusual ones like Whiteboard, Pre-shot, and Collection. There's also a feature that lets you choose a shot you've taken and save it as a preset shooting mode. The 2-inch LCD screen is reasonably bright, though a bit noisy. Movie mode is somewhat disappointing; videos are limited to 320-by-240 at 15 frames per second.

We like that the camera has a real-time histogram and a pan-focus mode, which lets you bypass the autofocus system to take quicker shots. The camera comes with a rechargeable lithium ion battery and charger. It uses Secure Digital media and includes 9.3MB of built-in memory but no media card.

In our simulated-daylight test shots, exposure was good, but midtones were a bit dark, and there was a strong (and unappealing) color shift toward orange. Focus was soft, with increased blurring toward the edges. Our flash shots were significantly overexposed, with washed-out colors and minor purple fringing, though illumination was even and hues were accurate. The flash shots showed the same lack of sharpness as the daylight ones but were not as blurry.

The EX-S100's pixel transition ratio of 3.9 percent—the worst in this roundup—likely contributed to our test shots' softness. Its

average resolution of 1,125 lines, however, is quite good for a 3.2MP camera. Its boot time of 1.8 seconds tied with the Canon PowerShot SD300's for fastest in this roundup, though its recycle time between flash shots was an unexceptional 3.3 seconds—good for the ultracompact class, but nothing to rave about.

The EX-S100 may satisfy extremely style-conscious casual shooters looking for an ultrathin camera that'll be a conversation starter at parties, but its image quality may disappoint more serious shutterbugs. If you like Casio's excellent menus but want a sharper lens, consider the slightly larger, 5MP Casio Exilim EX-Z55 for the same money.

Casio Exilim Zoom EX-Z55

BOTTOM LINE: The Z55 has the sharpest images we've seen in a camera this size, a big LCD, Casio's great menus and features, and reasonable speed. But the images produced by this camera don't quite measure up to those of of the Canon Powershot SD300.

PROS: Sharp, well exposed images. Tiny and lightweight, extended battery life, very good menu functions, and wide variety of preset shooting configurations.

CONS: LCD blacks out while image is processed. Images show fall off at the edges of the frame, flash shots unevenly illuminated.

SPEC DATA
Price: $399.99 List
Type: Ultracompact
Megapixels: 5
Included Memory Amount: 9.3 MB
Included Memory: On Board
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 105
Maximum Resolution: 2560 x 1920 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING:

The 5 MP **Casio** Exilim Zoom Ex-Z55 combines the best features of the 3-star Z40 with a dramatic upgrade in image quality, making this one of our favorite ultracompacts. The Canon Powershot SD300 edges it out of the Editors' Choice spot, but just by a hair.

This solid, easily pocketable camera manages to fit a in a ton of features that we like, including Casio's usual great (if crowed, due to the many features) menus, a 2.5 inch LCD that's reasonably bright and sharp, if not the best among the ultracompacts we've seen, an exceptionally long lasting lithium ion battery (it's said to get about 10% better battery life than even the that of the Z40, which we applauded), a real-time histogram, and many, many scene modes, including some very cool ones like coupling, which lets you take a picture of the same scene twice with two different people in the shot and then

combine the images (handy for taking a shot of yourself and a friend if there's no one else around to shoot for you). We also like the pan focus mode, which lets you take a reasonably well focused shot even when there isn't time to push the shutter button halfway down and wait for the autofocus. Fortunately you don't need this very often since shutter lag was reasonable even when we didn't pre-focus.

The camera has an f/2.6 to f/.4.8 5.8 mm to 17.4 mm (35mm to 105mm, 35 equivalent) 3x optical zoom lens that retracts into the body when not in use. Like the Panasonic DMC-FX7, the Z55's reasonable set of manual controls are somewhat crowded into the space remaining on the camera back given its large LCD. Unlike Panasonic, Casio has managed to make space for an optical viewfinder.

We found the camera reasonably fast; it boots up in a very respectable 2.1 seconds (only its stablemate, the Casio EX-S100 and the Canon PowerShot SD300 beat it in this roundup at 1.8 seconds each, though our former EC, the Sony Cybershot DSC-T1 still holds the ultracompact record, at 1.6 seconds). Its flash shot-to-flash shot time is also good for the ultracompact class, at 3.4 seconds. We don't, however, much like the fact that the LCD seems to be blacked out for a long chunk of this 3.4 seconds, which prevents you from framing the next shot. The Z55 scored quite well in our lab shots, getting a category-leading 1,475 average lines of resolution, and a very good 2.2% pixel transition score. The Z55's daylight test shots were pleasing overall, if not excellent, with good contrast and accurate hues, but we noted some falloff in the corners of the images and clipping in the highlights, as well some exaggerated edges probably caused by sharpening. The flash shot was a good solid image (if somewhat unevenly lit), but we'd like to see more highlights in the image and less fall-off around the edges.

The Z55 is a very good camera, and it scores better than any ultra-compact we've seen, in terms of numbers. The images themselves are another story; while they're good (and by far the best ultracompact images we've seen from Casio) they can't quite compare to those of the Canon Powershot SD300.

Fujifilm FinePix F440

BOTTOM LINE: The Fujifilm FinePix F440 is stylish, fun to use, and great for showing off at parties. But its square shape can make for awkward shooting, and the pictures you get are only adequate.

PROS: Bright LCD; 3.4X optical zoom; tiny, fun-to-use, attention-grabbing package; speedy recycle time.

CONS: Mediocre images. Square shape looks cool but isn't the easiest for holding and aiming; inadequate movie mode. Slow boot time.

SPEC DATA
Price: $349.00 List
Type: Ultracompact
Megapixels: 4.1
Included Memory Amount: 16 MB
Included Memory: Media Card
Media Format: xD-Picture Card
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 38
35-mm Equivalent (Telephoto): 130
Maximum Resolution: 2304 x 1728 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●◐○○

The 4.1-megapixel **Fujifilm** FinePix F440 is a decent camera wrapped in a small, square package. And—let's face it—it's cute, which can be an important factor for many buyers of ultracompact cameras.

When you turn the camera on, it emits a series of beeps—that sounds like R2-D2. Cool little blue lights come on, the powerful lens pops out, and you're ready to shoot—after 3.5 seconds, the longest shutter lag in this roundup. (On the other hand, recycle time between flash shots was the lowest: 2.7 seconds).

The camera just looks cool: People commented on it wherever we took it for real-world testing. Still, its unusual square shape can make it awkward to hold, and its images are only adequate. Unless you really love the look, you'd be better off spending the extra $50 on the Canon SD300.

The F440 has an f2.8 to f/5.5 38- to 130-mm (35-mm equivalent) 3.4X optical zoom lens—the longest zoom in this roundup, though we wish it started a bit wider than 38 mm. If your fingers are on the large side, you may find using the zoom control a little difficult; it's small and requires a delicate touch. The F440 has an optical viewfinder—not a given in a subcompact—or you can frame your shots on the 2-inch LCD.

The trade-off for the F440's other impressive features is that there are no real manual controls to speak of. This is strictly a point-and-shooter, which may frustrate some photographers. You can choose from three color modes: standard, chrome (vivid), or black-and-white, and from white-balance presets (there's no customizable white-balance option); and six scene modes—auto, manual, portrait, landscape, sports, night. Conversely, the simplicity of the menus and relatively few choices may be a plus or for those who want to use the F440 just for parties, family get-togethers, and the like.

The camera scored a mediocre 1,125 average lines of resolution—tying with the 3.2MP Casio Exilim EX-S100—and an acceptable pixel transition score, getting just 3 percent. The F440's picture quality is respectable, as is video quality (but note that the camera shoots only 60-second 320-by-240-pixel clips at just 10 fps).

In our daylight test shots, we saw a slight color shift toward orange, which looks artificial in some shots, though it can enhance skin tones. We noted decent exposure, contrast, and detail but also saw a certain amount of softness—about what we'd expect, given its pixel transition score. Our flash shots were dull and had significant clipping in the highlights—altogether less impressive pictures than the daylight shots. In real-world shooting, however, the pictures were better than we expected, given these test results.

Once you've finished shooting, you can connect the included dock to your PC, pop the F440 in, and download the shots; the camera also charges the included lithium ion batteries and can be used to show your pictures on a TV. You'll be ready to download in very short order unless you buy a larger memory card than the supplied 16MB XD card, which holds only about seven high-res pictures.

If auto settings don't bother you and you're looking for a fun party camera, the stylish, appealing F440 could be just the one for you. Otherwise, for $50 more, we'd recommend our Editors' Choice, the Canon PowerShot SD300.

Olympus Stylus Verve

BOTTOM LINE: The Olympus Stylus Verve is certainly one of the cooler-looking ultracompact digital cameras on the market today. And it's full of nice design touches, like a weather-resistant body, and a built-in lens cover that can't accidentally be pushed open. But unfortunately, the fact that it is available in six colors and will impress your style-conscious friends doesn't make up for its muddy, grainy pictures.

PROS: Cool design, available in different colors. Excellent selection of scene modes and sample images. Menu structure is easy to navigate. Weather-resistant body.

CONS: Zoom is only 2X. Images lack crispness and show significant noise. LCD is choppy when panning, no optical viewfinder. Movie mode is disappointing.

SPEC DATA
Price: $299.00 List
Type: Ultracompact
Megapixels: 4
Included Memory Amount: 16 MB
Included Memory: Media Card
Media Format: xD-Picture Card
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 70
Maximum Resolution: 2272 x 1704 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●◐○○

The **Olympus** Stylus Verve is certainly one of the cooler-looking ultracompact digital cameras on the market today. And it's full of nice design touches, like a weather-resistant body, and a built-in lens cover that can't accidentally be pushed open. But unfortunately, the fact that it's available in six colors and will impress your style-conscious friends doesn't make up for its muddy, grainy pictures.

This stylish, easy-to-use 4-megapixel camera has a 2X optical zoom (35 to 70 mm, 35-mm equivalent) lens and a sleek, well-constructed metal and plastic body (ours was a metallic silver color) with a unique shape. The battery, USB port, and memory card are all accessible behind a relatively sturdy plastic compartment door, though the compartment is cramped. The Verve is easy to grip and operate with one hand, and it won't overwhelm you with buttons. The mode dial is set into the body rather than sitting atop it, providing access to camera, movie, and playback modes. The other controls are well placed, providing enough room for most hands to hold the camera comfortably without inadvertently pressing a button. The 1.8-inch LCD is bright enough, though we prefer the larger screens of the competition—the 2.5 inch displays on the Casio EX-Z55 and Panasonic DMC-FX7, for example.

The tabbed menu structure takes very little time to master. As expected with this type of camera, there aren't a whole lot of manual controls, though you can change settings like white balance, metering, and EV compensation. The fun begins when you scroll through the 16 scene modes—including handy Behind

Glass and Candle modes—each of which is excellently illustrated with a sample image instead of just an icon. A 2-in-1 picture mode lets you shoot two images and combine them into one by placing them side by side. Movie mode is lackluster, limited to 320 by 240 at only 15 fps.

In testing, the Verve fell short of the competition. The boot time, while not terrible, was the slowest of the bunch at 2.7 seconds, and the recycle time between flash exposures was an abysmal 7.3 seconds—nearly three times as long as recycle for the Panasonic DMC-FX7. The LCD was also choppy when we panned the camera.

Sadly, the Verve's picture-taking capabilities don't live up to its good looks. With an average of 1,175 lines of resolution, overall image sharpness was good, but images lacked crispness due to an average pixel transition ratio of 3.2 percent and an overactive sharpening algorithm. Our daylight shot was slightly overexposed, with clipping and detail loss in the shadows; the image lacked true black. Colors were washed out, but the hues were accurate. The flash-invoked shot was significantly underexposed, with falloff around the edges. The sharpening algorithm seems to have been confused a bit, turning some of the details in our still life to mush. Overall, the picture was muddy and unappealing, with significant graininess.

We understand that in this class of camera, image quality sometimes takes a back seat to form factor, but we were still disappointed by the overall muddiness and lack of crispness of our pictures. We're not sure that this will deter buyers, however, because the Verve is one of the coolest-looking ultracompacts on the market. If you want something small and cool-looking that will impress your friends, this camera might be for you. But if you want something that's the same size (and costs only slightly more) yet offers superior image quality, go with the Canon PowerShot SD300.

Panasonic Lumix DMC-FX7

BOTTOM LINE: With ultracompact cameras, performance and optical compromises are inevitable. Still, we expected more from the Panasonic Lumix DMC-FX7. It's a beautiful camera packed with features, but it lacks the speed and image quality necessary to make it our top choice.

PROS: Beautifully crafted. Image stabilization feature is unique in such a small camera. Large 2.5-inch LCD.

CONS: Images were noisy and unremarkable. Too much shutter lag if you don't prefocus.

SPEC DATA
Price: $499.99 List
Type: Ultracompact
Megapixels: 5
Included Memory Amount: 16 MB
Included Memory: Media Card
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 105
Maximum Resolution: 2560 x 1920 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●○○

On paper, the ultracompact **Panasonic** Lumix DMC-FX7 seems like a winner. At $499, this 5-megapixel camera is a bit pricey for its class, but that's justified by its beautifully made metal body (available in silver or black), the Leica 3X optical zoom lens, built-in image stabilization, and huge 2.5-inch LCD.

Our test images were generally very good—in line with the camera's specs. Unfortunately, in the field, the DMC-FX7 just didn't stand up to its promise: We found it slow to react, and our photos tended to be noisy and unimpressive.

Size-wise, the DMC-FX7 falls in the middle of the current range of ultracompacts—slightly smaller but heavier than the Casio Exilim EX-Z55. Unlike the EX-Z55, the DMC-FX7 has no optical viewfinder, though the 2.5-inch LCD is so large that this shouldn't be a problem. The buttons are slightly cramped but intelligently laid out, though we found ourselves unintentionally changing camera settings while trying to find a place to rest our thumb. The top-mounted on/off switch looked like it would be easily tripped in our pockets by accident, but that happened only once. The camera uses the popular SD memory format.

Optical image stabilization helps the camera compensate for camera shake, so your pictures remain sharp even at fairly slow shutter speeds. This is coupled with a 35- to 105-mm (35-mm equivalent) f/2.8-f/5.0 Leica CD-Vario-Elmarit lens. The stabilization (controlled by a dedicated button) was hit or miss: It helped us capture sharp images that otherwise would have been fuzzy, but it wasn't consistent enough to rely on. You can tell the camera how slow to set the shutter speed before it starts bumping up the ISO from its default of 100.

Unfortunately, above ISO 100, our images became very noisy.

Like most ultracompacts, the DMC-FX7 doesn't offer much manual control, though it does provide nine scene modes. While you can't adjust aperture or shutter speed directly, you can set exposure compensation and automatic exposure bracketing. A Simple mode lets you display a reduced list of features, which can be good when you hand the camera off to a beginner. Video is at 30 fps, but at only 320-by-240. The DMC-FX7 also records audio but cannot play it back on-camera.

On our lab tests, the DMC-FX7 averaged 1,325 lines of resolution—reasonable for a 5MP camera—and its pixel transition score was a decent 2.4 percent. Our daylight test shots had a magenta-pinkish color shift, which might be intended to create more pleasing (although less accurate) skin tones. Dynamic range was excellent, but the photos lacked crispness. Our flash shot looked good, though there was a slight blue shift and significant noise. We noticed barrel distortion at wide angle, which is fairly common on cameras with such small lenses.

The DMC-FX7 took 3.9 seconds to boot, the slowest in this roundup. Recycle time with flash was a respectable 2.7 seconds. Unless we prefocused, however, there was too much shutter lag to capture the moment. And the LCD blanks out for too long after the shot—especially since there's no optical viewfinder as a backup.

With ultracompact cameras, performance and optical compromises are inevitable. Still, we expected more from the Panasonic DMC-FX7. It's a beautiful camera packed with features, but it lacks the speed and image quality necessary to make it our top choice.

LUCKY SEVENS: 7-MEGAPIXEL CAMERAS

If you wanted an enthusiast or compact camera with a bit higher resolution than 6 megapixels but didn't want to spend around $1,000 for an 8MP camera, you were out of luck—until the recent release of a slew of 7MP cameras. For just $500 to $700, there is now a wide range of cameras that can produce images of up to 3,072-by-2,304 pixels, suitable for making razor-sharp 11-by-17 prints—even after some cropping. In this batch we also include the Fujifilm Coolpix E550, which uses Fujifilm's own Super-CCD HR sensor, which is rated at 6MP and has a 12MP hardware interpolation mode that brings its images in line with those of the 7MP cameras.

Canon PowerShot G6

BOTTOM LINE: With a sleeker, more ergonomic shape, a powerful optical zoom, and a multitude of pro-level features, the Canon PowerShot G6 is a stride ahead of its predecessor, the PowerShot G5.

PROS: Excellent picture quality—images are well exposed and sharp, with great color reproduction; a rotating 2-inch LCD; easy-to-navigate menus for beginners; features advanced users will like too, such as the ability to shoot RAW files.

CONS: A little too easy to turn on accidentally; maximum of just 30 seconds for movie recording at just 10 FPS; doesn't use USB 2.0 for file transfers.

SPEC DATA

Price: $700.00 Street
Type: Enthusiast
Megapixels: 7.1
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: CompactFlash
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 140
Maximum Resolution: 3072 x 2304 pixels
Interface: USB 1.1
Video Capture Ability: Yes

EDITOR RATING: ●●●●○

Whether you're a point-and-click shooter who's starting to want more control with your photography or an already-converted enthusiast who doesn't want to lug around a digital SLR, the satin-aluminum **Canon** PowerShot G6 could satisfy on both counts. It's not cheap—at $700, it ties the other enthusiast model here, the Sony V3, for the most expensive of our 7MP cameras—but it's well worth the money, making it an Editors' Choice in the enthusiast category.

The G6 is a worthy successor to the popular PowerShot G5, with refinements that make it even more appealing. It has a 7.1-megapixel CCD (up from the G5's 5.0). The excellent LCD is now a full 2 inches; you can swivel it out, up, and down for more shooting versatility. The G6's body is more compact than the G5's, but the grip is larger, making it quite easy to hold. And the G6 has a fast f/2.0 to f/3.0, 7.2 to 28.8 mm (a 35-mm equivalent of 35 to 140 mm) 4X optical zoom lens.

Canon's manual for the G6 is comprehensive and easy to follow. But for documentation-averse shooters, the camera is easy to use, even right out of the box. The menus are simple to navigate, and the controls have clear-cut functions and are handily placed. A mode dial gives you the choice of 12 shooting options, and we especially appreciate the camera's two custom buttons, which let you define and store your own settings.

For more creative shooting, in-camera effects include black-and-white, sepia, vivid color and neutral color, and low sharpening (for softer pictures). You can use automatic white balance or one of six presets. And you have the option of saving shots (onto compact flash cards) in JPEG or RAW mode. RAW gives you nearly unlimited control of post processing; it's a great feature, and one we'd like to see in more cameras. We were disappointed that G6 can only shoot video (at a max of 640-by-480) in clips of 30 seconds, at just 10 frames per second (fps).

The Canon G6 performed well in our labs. It wasn't lightning fast, scoring a moderate 4.3-second boot time, and fairly good

2.7-second recycle time between flash shots. The camera really shone, however, in resolution tests, where it scored an impressive 1,650 lines of resolution—the best of the 7MP cameras. Its pixel transition scores were also excellent, averaging just 1.8 percent—tying the Fujifilm FinePix E550 (in 12MP mode) and the Canon PowerShot S70 for the best in this roundup.

These scores were reflected in the test shots the G6 turned in. On our simulated daylight test, picture quality was as crisp as we've seen. The exposure was also spot on, as was color, though we did see small amounts of noise in the shadows. On our flash test, the picture quality was almost as crisp, and still qualifies as excellent; illumination was very well balanced and exposure was very good. The colors were cool, however, and the yellows were the slightest bit off. We saw no noise to speak of in the flash shot.

With a sleeker, more ergonomic shape, a powerful optical zoom, and a multitude of pro-level features, the Canon PowerShot G6 is a stride ahead of its predecessor, the PowerShot G5 and a leader among this first batch of 7MP cameras.

Canon PowerShot S70

BOTTOM LINE: If you're looking for a solid camera that takes excellent photos, but don't want the heft or expense of a model like the Canon PowerShot G6, the compact PowerShot S70 is a very good choice.

PROS: Takes excellent photos. Very solidly built. Zoom lens starts at a true wide angle so you can get it all in. Can shoot in RAW format.

CONS: Mediocre video capabilities. Zoom isn't always precise.

SPEC DATA
Price: $600.00 Street
Type: Compact
Megapixels: 7.1
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: CompactFlash
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 100
Maximum Resolution: 3072 x 2304 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

Canon currently has a second 7.1MP camera in its stable, the compact PowerShot S70. In our labs, both the S70 and the PowerShot G6 produced very good results, and both are Ed-

itors' Choices. Deciding which one is right for you is a matter of deciding which class suits you better and which you can afford.

Like other cameras in **Canon**'s S series, such as the 5MP S60, the S70 looks like a typical compact camera, owing to the fact that it's not very tall. But it's a bit longer than the average compact camera; pick it up and you'll find there's real heft to the 10-ounce (with batteries), metal-bodied camera. You turn on the S70 by sliding the lens cover to the side, exposing the 3.6X zoom lens. Whereas the G6's 4X zoom lens starts at 35 mm (35-mm equivalent), the S70 begins at a true wide-angle 28 mm, which we prefer.

The G6's maximum aperture at its widest angle is f/2.0, one f-stop faster than the S70. And at full telephoto, the G6 is nearly two stops faster, making it better for low light and controlling depth of field. The zooms on both cameras tend to be a bit imprecise. Occasionally, after lifting our finger off the zoom lever, the lens would adjust a bit in the opposite direction to which we were zooming, which can be annoying.

The camera has a very readable 1.8-inch LCD, though it's slightly smaller than the G6's 2-inch screen and it doesn't swivel. If you don't like using the LCD, you'll appreciate the big optical viewfinders both cameras provide—an increasingly rare feature—though like most optical viewfinders, they're not especially precise, with notable barrel distortion.

While both cameras suffer from an overabundance of buttons, the S70's menu system is fairly easy to use once you

understand the logic, though we'd like to see more user-friendly on-screen explanations. Still, although the settings are very similar between the two cameras, we prefer the S70's controls, which put more commands under the Function button, making for quicker access.

The S70 provides five scene modes in addition to full auto and manual. Unfortunately, it comes up short in the video department—an area we're increasingly fond of. Like the G6, it takes videos at 640 by 480 but, like the G6, at only at 10 frames per second. Like most other digital still cameras, the S70 and G6 can't zoom while filming, but they also lock their focus, so make sure you're set to the proper distance for the scene you're shooting.

In our labs, the S70 didn't disappoint. Resolution averaged 1,550 lines, compared with 1,650 for the G6—both are excellent results, and the S70's transition pixel ratio was a very acceptable 1.8 percent. As with the G6, the S70's daylight test shots were very crisp, with well-defined details. Exposure was good, as were colors, though they ran a bit warm. The flash doesn't look big, but it provided strong, balanced illumination. Colors in our flash shot, however, tended to be slightly cool. Noise was acceptable, even at ISO 400. The camera is no speed demon, taking 4.6 seconds to boot up, but it required only 2.5 seconds between flash photos, which is reasonably good.

If you're looking for a solid camera that takes excellent photos but don't want to move up to the enthusiast-level G6, the compact S70 is a very good choice. When choosing your next camera, this one should be on your short list.

Casio Exilim Pro EX-P700

BOTTOM LINE: The Casio Exilim Pro EX-P700 is easy to use and is loaded with lots of useful, fun, and quirky features. It captures sharp color images, and gives users lots of bang for their buck, though its performance is comparatively slow.

PROS: Impressive daylight shots, broad features set, external flash connector, simple menu structure, slim profile, informative pop-up shooting tips, Best Shot Selector, included wireless remote.

CONS: Flash shots overexposed, slow performer, no RAW support, no focusable diopter, some buttons inconveniently placed, disappointing video mode.

SPEC DATA
Price: $599.99 List
Type: Compact
Megapixels: 7
Included Memory Amount: 8.9 MB
Included Memory: On Board
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 33
35-mm Equivalent (Telephoto): 132
Maximum Resolution: 3072 x 2304 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●◐○

The $599 **Casio** Exilim Pro EX-P700 has much to offer users who want lots of features and relatively good ease of use. And despite its poky performance and inconveniently scattered analog buttons, there's a lot under the hood to appeal to serious amateurs and point-and-shooters alike.

The all-metal, dark grey and nickel-trimmed EX-P700 is light, slim, and generally well built; despite its lack of an effective non-slip grip or surface and a flimsy plastic door concealing its ports, it's easy to hold and operate, even one-handed. The optical viewfinder is more accurate than those on many comparable cameras, but it lacks a focusable diopter, essential

for eyeglasses wearers. On the other hand, its 2-inch LCD is bright, and the text menus are highly readable and well organized. The select dial can be easily rotated by thumb, but many of the analog buttons require both hands to access. Oddly, several of the buttons are on the side, rather than the back of the camera, forcing the user to tilt the camera to read the abbreviations. While the camera has a PC connector for attaching an external strobe with bracket, it doesn't have a more convenient hot shoe.

Like its predecessor, the 6MP EX-P600, the EX-P700 has a Canon f/2.8 to f/4 4X optical zoom lens, which has slightly wider angle coverage 7.1 to 28.4 mm (equivalent to 33 to 132 mm in 35-mm) than most comparable cameras. It has virtually the same feature set as the EX-P600, including aperture and shutter priority, manual exposure mode, Best Shot Selector, and visual help cues that pop up when you press the Set button, as well as exposure, white balance, and focus bracketing. One feature we found disappointing is the camera's video mode: It can only shoot 320-by-240 video, though it can shoot until memory is full.

It does, however, have some nifty (but less critical) features, such as a world alarm clock with voice message capability, a self-timer that shoots three consecutive images and lets you select the best, and a month calendar that displays a thumbnail of the first shot taken on each date. On the LCD, users can select a variety of views, including grid lines and a real-time histogram, but the full EX Finder information display of concentric circles (it's reminiscent of a pilot's heads-up display), while visually intriguing, is confusing and hard to get used to. Some will never like it, but for those who do master it, it's a powerful tool.

The EX-P700 shoots JPEGs and TIFFs, but not the more versatile and higher-quality RAW format. Shutter lag is negligible, and boot time—3.1 seconds—is good, compared to our other 7MP contenders. When it comes to recycling with

flash and LCD enabled, however, this is the slowest of the bunch, at a dismal 4.6 seconds. And in burst mode it shoots only 5 frames at 3 frames per second, compared with the EX-P600's 6 frames at the same rate. Averaging 1,475 lines, the camera's resolution is excellent, and its average pixel transition ratio of 2.0 percent is quite good as well, though compared to the other 7MP sharpshooters, it's actually in the bottom half of the roundup.

The overall quality of our test daylight shot was very good to excellent, though it was very slightly underexposed, with a small loss of shadow detail. Detail was sharp, and colors were rich and accurate, with minor to negligible purple fringing. Our test flash shot, however, was very overexposed, washing out colors and clipping highlights.

The Casio Exilim Pro EX-P700, which will be widely available in January 2005, is easy to use and offers lots of useful, fun, and quirky features. It captures sharp, colorful images, and gives users a lot of bang for their buck, though its performance is comparatively slow.

Fujifilm FinePix E550

BOTTOM LINE: You won't miss shots with the 6MP FujiFilm FinePix E550, and you'll be very satisfied with the photos you create, which give the 7MP competition a run for its money. The camera starts quickly, focuses quickly and has very little shutter lag. The zoom lens starts wide enough for groups and landscapes. We just wish the flash had a little more oomph.

PROS: Fast at everything it does, at least when the flash is off. Takes very good pictures. Decent zoom range includes true wide angle. Controls intelligently laid out and easy to understand. Good-sized, easy to read LCD. Good video ability makes camera even more versatile. Light weight.

CONS: Underpowered flash can slow camera down, especially when shooting at telephoto. Can't zoom when shooting video. We wouldn't mind seeing a few more scene modes. Uses xD memory, which is more expensive and than other memory-card formats.

SPEC DATA
Price: $499.00 List
Type: Compact
Megapixels: 6.3
Included Memory Amount: 16 MB
Included Memory: Media Card
Media Format: xD-Picture Card
Battery Type Supported: AA
Included Batteries: Yes
35-mm Equivalent (Wide): 32.5
35-mm Equivalent (Telephoto): 130
Maximum Resolution: 4080 x 3040 pixels
Interface: USB 1.1
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

The Fujifilm FinePix E550 6.3MP compact boots as fast as any digital camera we've tested (aside from digital SLRs). Focus is quick and there's hardly any lag on the shutter release

or from shot to shot, as long as you're shooting without flash. The E550 uses Fujifilm's own SuperCCD HR sensor, which competes well with the spate of 7MP cameras recently released on the market, especially when shooting at the intelligently interpolated 12MP mode. We're quite enamored of the E550, which takes very good images with little fuss. And at $499, this camera is such a great deal that it's an Editors' Choice for compact cameras.

The E550 won't fit into a shirt pocket, but at 7.1 ounces (without batteries), it's not hefty either. The body is mostly plastic, but it has a metal front plate and a comfortable handgrip protrudes on the right. Buttons are few but well chosen and positioned, and we found it easy to compose and review our images indoors and out using the bright 2-inch LCD.

Press the Power button to the left of the shooting mode dial and the camera lens quickly appears from behind its protective cover. With the flash off you can be ready to shoot in 1.5 seconds, and (again, with the flash off) recycle time between shots is just 1.1 seconds. We like that the E550's zoom starts from a fairly wide 32.5 mm (in 35-mm film camera equivalence) rather than 35 mm or 38 mm as many similar cameras do, and it zooms all the way out to 130-mm telephoto, for a 4X total zoom. Our favorite lenses start even wider (compare to 28 mm on the Canon PowerShot S70 and 24 mm on the recently announced Nikon CoolPix 8400) but 32.5 mm will definitely do for most landscapes and group shots.

The E550 isn't teeming with special scene modes. It just has the basic four: portrait, landscape, sport, and night scene, but it does have all the options and manual controls that one would want in this type of camera—white balance, metering pattern, and auto-focus method.

The camera uses two double-A batteries (a pair of rechargeables and a charger are included) and xD memory cards. Fujifilm includes a 16MB card in the box, good for about ten 6MP pictures. xD is tiny, but while it's not difficult to find, it's not as popular as SD or Compact Flash memory and therefore tends to be more expensive.

To take flash photos, you have to pop up the E550's flash. This is handy if you like to shoot without flash, since you won't have to search for a button or menu item to disable it. We, however, suspect ulterior motives on Fujifilm's part. Pop up the flash and the camera is no longer a speed demon: It still takes just under 2 seconds to start up but 4.1 seconds to go from shot to shot while the flash charges. Switch to the camera's 12MP mode and the times are 1.8 and 4.9 seconds, respectively. The flash is also underpowered (it's especially weak when shooting at full telephoto), so Fujifilm bumps the camera's ISO up to 200 for most flash shots. This introduced some noise but not an objectionable amount. Our flash test images were evenly illuminated, though the whites were a little blown out and the image was somewhat cool.

Speaking of ISO, this was another area where the E550 impressed us with its speed. We shot plenty of images at ISO 400—ideal for shooting lower light settings without flash. While there was definitely noise in these pictures, we could live with it. The E550 can even go to ISO 800, though only at a maximum of 3MP.

We found ourselves shooting a lot of video with the E550 as well. The camera can record at 640 x 480 and 30 fps with audio, up to the capacity of the memory card. While not DV-camera quality, it was more than acceptable and you can't beat the convenience. Unfortunately, you can't zoom while recording.

The E550 did well on our benchmark tests at its 6MP setting, averaging 1,375 lines of resolution—not quite up to the standard set by the 7MP cameras that we've tested so far, though it's close to the Sony P150—and 2.2 percent transition pixels (which is good, but subpar for this roundup). When the camera is set at 12MP mode, which takes advantage of the SuperCCD's octagonal photodiodes, it's another story. The average lines of resolution jump to 1,550, which puts the camera in the middle of the 7MP pack, and transition pixels drop to an average of 1.8 percent, tying the Canon PowerShot G6 and PowerShot S70 for the lead in this roundup.

This handy little compact camera gives the 7MPs a run for their money; for this price, you'll be pleased with the pictures it takes—and the speed at which it can take them.

Olympus Camedia C-7000 Zoom

BOTTOM LINE: The C-7000 Zoom has the power of an enthusiast-class camera squeezed into a compact size. It's easy to operate for non-techies, but versatile and powerful enough for more demanding users.

PROS: Perfectly exposed daylights shots with great dynamic range and color; 5X optical zoom; movable autofocus target zone; shoots in RAW, TIFF, and JPEG formats; useful panorama guides; extended exposure bracketing; in-camera slide show special effects; built-in red eye removal.

CONS: Flash shots underexposed; flimsy battery/memory card door and plastic tripod socket; no focusable diopter; no

auxiliary flash capability; easy to cover sensor window with your finger.

SPEC DATA
Price: $600.00 Street
Type: Compact
Megapixels: 7.1
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: xD-Picture Card
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 38
35-mm Equivalent (Telephoto): 190
Maximum Resolution: 3072 x 2304 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

Cute and compact, with excellent handling characteristics and a sensible menu structure, the **Olympus** Camedia C-7000 Zoom offers a bevy of features, including a 5X optical zoom lens. While it lacks a few refinements, such as a focusable diopter, the 7.1MP C-7000 is a solid, fun camera that provides a very good mix of price, performance, ergonomics, and image quality. The PowerShot S70 just nudges it out of the running for an Editors' Choice in the compact category, but it's still a very good buy, especially if you prefer a long zoom.

Olympus's claim that its all-metal, silver-bodied C-7000 is the world's smallest 7MP camera with a 5X optical zoom lens is currently true, though the Pentax Optio 750Z is virtually identical in size and weight. We generally like the C-7000's ergonomics—recessed rear select dial, all buttons reachable with the right thumb, nonslip grip, manual pop-up flash, easy-to-open port covers, and a very bright, clear 2-inch LCD. On the negative side, the tripod screw socket is plastic (we prefer metal), the battery and memory card compartment door is flimsy and doesn't always close properly, and the optical viewfinder has no focusable diopter—unfortunate for eyeglasses wearers. And looking through the optical viewfinder with your right eye virtually guarantees your nose will touch the LCD.

The C-7000's most noteworthy feature is its 5X optical zoom f/2.8 to f/4.8 lens. At 7.8 to 39.5 mm (38 mm to 190 mm, 35-mm equivalent), the lens tends toward greater telephoto reach rather than true wide angle, which we'd prefer. It also sports a super-macro mode that focuses down to 0.8 inches, with extremely shallow depth of field. The C-7000 offers lots of advantages and options, like RAW and TIFF support, aperture and shutter priority, manual exposure, first-rate panorama guides, three- or five-shot exposure bracketing, 15 frame-per-second VGA movies limited only by memory, and 143 movable auto-focus points. We appreciate the camera's time-lapse photography abilities and automatic in-camera red-eye reduction. But unlike the Olympus Camedia C-8080 Zoom, the C-7000 lacks an auxiliary flash interface.

Shooting with the C-7000 is enjoyable. The camera is ready to take its first shot in a respectable if not blazing 3.1 seconds, and its recycle time averages 3 seconds. The menu is much easier to understand and navigate than other Olympus models we've seen. Having to open and close the pop-up flash manually is less irritating than you might think—it means that when you don't want it, you don't have to hunt for the button or setting that deactivates it.

Image quality is very good to excellent. At 1,550 lines, resolution was better than average for its class. Although its average pixel transition ratio of 2.2 percent, while quite acceptable, is subpar for this roundup. Our daylight test shot sparkled with life, with great dynamic range, lots of detail, very good-to-excellent color, nice contrast, and perfect exposure. The flash test shot was somewhat underexposed, but otherwise was also very appealing, with good dynamic range and nicely saturated color.

The C-7000 Zoom has enthusiast-class power squeezed into a compact size. It's easy to operate for non-techies, but versatile and powerful enough for demanding users.

Pentax Optio 750Z

BOTTOM LINE: A fun camera with lots of bells and whistles, the Pentax Optio 750Z, sadly, doesn't deliver top-quality images.

PROS: A very powerful and versatile camera with great menus; articulated LCD viewer, 5X zoom lens, focusable diopter on optical viewfinder, five bracketing modes; well-placed, easily accessible controls.

CONS: Problems with exposure and color reproduction. Slow bootup, no RAW mode, small LCD viewfinder, feels flimsy.

SPEC DATA

Price: $550.00 Street
Type: Compact
Megapixels: 7.1
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: Secure Digital
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 37.5

35-mm Equivalent (Telephoto): 187.5
Maximum Resolution: 3056 x 2296 pixels
Interface: USB 1.1
Video Capture Ability: Yes
EDITOR RATING: ●●●○○

The **Pentax** Optio 750Z is a powerhouse of a camera that includes virtually every important (and fun) function and feature imaginable. But though it's very easy to operate in both point-and-shoot and more advanced modes, the images the Optio 750Z produces don't measure up to others in this class when it comes to exposure and color reproduction.

With a black-trimmed, no-slip covering that looks like leather (but feels like rubber), and a selector dial that looks just like a film advance winder, the Optio 750Z has the outward appearance of a classic rangefinder film camera. It's certainly handsome to look at, but it somehow lacks the feel of a precision instrument. Part of the problem is that the bezel around the articulated LCD viewer is plastic, not metal, as is the tripod screw socket. Also, the camera feels lighter and less substantial than its looks might lead you to believe. On the other hand, all controls are quite accessible and well marked. We like the articulated LCD, which allows viewing from almost any angle or position without glare, but this advantage is slightly offset by its 1.8-inch size, as many of its competitors are 2 inches or better. We do like that the optical viewfinder comes with a focusable diopter, handy for those with eyeglasses.

Like the Olympus C-7000 Zoom, the Optio 750Z has a 5X (but f/2.8-f/4.6, compared with the Olympus' f/2.8-f/4.8) zoom lens, also without image stabilization and, at 7.8 to 39 mm (37.5 to 187.5 mm, 35-mm equivalent), skewed more towards telephoto than wide angle. What impresses us most about the Optio 750Z is how easy it is to operate. The menus are clear and concise, with most options always available, regardless of mode. In addition to the usual features (such as aperture and shutter priority, manual mode, panorama assist, voice recording, and VGA video at 30 FPS) this is the only camera in

its class to offer five different bracketing options (exposure, white balance, color saturation, sharpness, and contrast), 3D and double exposure capability, and a variety of built-in filter effects. We especially like that areas which will be under- or overexposed flash on the LCD (though its usefulness is somewhat reduced because of the small screen).

Other fun features include a world clock with three alarms, time-lapse capability, and the ability to use the camera as a precise spot meter. One of this camera's only notable omissions is an external flash connector or hot shoe.

More troubling, however, is this camera's start-up time. At 5.6 seconds, its boot time is the slowest in this roundup by an entire second, though recycling between shots is an unexciting (but reasonably good for this roundup) 2.5 seconds. More disappointing is image quality. The numbers we got on our resolution and pixel-transition tests (1,500 average lines of resolution and 2.0% pixel transition, respectively) are very good, but our daylight test shot is underexposed, with a strong magenta cast and no true whites. The flash test shot has a cyanic color cast and is even more underexposed. The images are sharp, but colors are muddy, details are lost in the shadows, and there are no true whites or highlights here.

So, while it's a fun camera with lots of bells and whistles, the Pentax Optio 750Z sadly doesn't deliver where it counts most—image quality.

Sony Cyber-shot DSC-P150

BOTTOM LINE: This camera is a good buy, but it's a disappointment compared to the earlier five megapixel DSC-P100, and it doesn't measure up to the other 7MP cameras on any measure except speed, which it wins hands down.

PROS: Small, stylish, and very speedy; takes crisp pictures; very good battery life; rich feature set.

CONS: Low resolution for a 7MP camera. Some purple fringing in flash shots. Images can show some graininess in shadows. LCD feels small for the money.

SPEC DATA
Price: $499.00 Street
Type: Compact
Megapixels: 7.2
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: Memory Stick Pro
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 38
35-mm Equivalent (Telephoto): 114
Maximum Resolution: 3072 x 2304 pixels
Interface: USB 2.0
Video Capture Ability: Yes
EDITOR RATING: ●●●○○

Given how much we liked Sony's 5-megapixel Cyber-shot DSC-P100, we were eager to get our hands on its 7MP successor, the Cyber-shot DSC-P150. We were disappointed, be-

cause on our lab tests the 7MP camera didn't perform much better than its predecessor when it came to resolution. It's a good camera, especially for the money, but the P100 will give you more bang for your buck. Otherwise, there are better 7MP cameras out there, such as the Canon PowerShot S70. And if you want speed, consider the 6MP Fujifilm FinePix E550.

The new DSC-P150, like the P100, has a Carl Zeiss Vario-Tessar 7.9- to 23.7-mm (35-mm equivalent: 38 to 114 mm) f/2.8-to-f/5.2 3X optical zoom lens, which retracts into the camera's body when powered down. It's also got a 1.8-inch LCD, which is as bright as the DSC-P100's and performs as well in direct sunlight. While we liked this LCD on the P100, we would have preferred to see a bigger LCD on this $500 camera.

The camera has the same body shape and controls as the P100, and it too is a pleasure to shoot and hold. It offers more scene modes (nine instead of six), spot and multipattern metering, and manual, aperture-priority, and shutter-priority modes. The P150 has slightly faster shutter speeds, ranging from 1/2000 second to 30 seconds (the P100 can shoot only as fast as 1/1000 second). It also has the same real-time semitransparent histogram that we liked in the P100. The menus are easily scannable, but finding a specific setting can be difficult if you don't happen to recall where it's located.

You can shoot JPEGs at seven resolution settings, ranging from 640-by-480 to 3,702-by-2,304. The camera also shoots impressive MPEG-VX video at up to 640-by-480 at 30 fps, until the media card is full. In burst mode, the P100 takes up to five maximum-quality shots at 1.1 fps—fewer shots at a much slower speed than the P100, which can take nine max-resolution shots at 1.6 fps. Granted, the P150's shots are larger and require more processing, but we would have liked to see the new camera keep pace with the old one.

In labs testing, the P150's results were mixed. Most notably, it scored 1,400 lines on our resolution tests. This is not much better than the P100's 1,250 lines, and it's the worst in this roundup, with the exception of the Fujifilm FinePix E550 set to 6MP, which trails by only 25 lines of resolution. We were more impressed with the P150's 1.9 percent average pixel-transition results, but this score is actually worse than the P100's 1.7 percent, though still second best in this roundup.

Both our still-life test shots were well exposed with a very crisp focus dead center, though the edges were considerably softer. The daylight test shot showed colors that were well reproduced if somewhat warm. We saw some noise (as we did with the P100), especially in the shadows, though the levels weren't too bad for a compact camera. Our flash test shot was very well and evenly illuminated, though colors ran a bit cool. The noise we noticed in the daylight shot remained, and, more worryingly, we saw some purple fringing in the perimeter of the picture, indicating some chromatic aberration in the lens.

We were much more pleased with the camera's performance tests. The P150 booted up in a smoking 1.7 seconds, and its recycle time between flash shots was a roundup-leading 1.7 seconds. While the P150 is a good camera (especially for the price), it doesn't quite measure up to the 7MP competition. Unless speed and cost are of paramount importance, we'd recommend spending $100 more on the Canon PowerShot S70, or $100 less on the P100.

Sony Cyber-shot Pro DSC-V3

BOTTOM LINE: The Sony Cyber-shot Pro DSC-V3 is a lot of camera for the money, but it may have difficulty producing top quality pictures without some tweaking in image-editing software.

PROS: Accepts Memory Stick and CompactFlash cards. Takes auxiliary "smart" strobe. Large and bright LCD. Takes pictures in total darkness. Smart battery readout.

CONS: Subpar pixel transition ratio means white outlines in high contrast areas. Daylight images are underexposed and shifted too far toward magenta. No focusable diopter and poor placement of optical viewfinder.

SPEC DATA
Price: $699.95 List
Type: Enthusiast
Megapixels: 7.2
Included Memory Amount: 32 MB
Included Memory: Media Card
Media Format: Memory Stick
Battery Type Supported: Lithium Ion
Included Batteries: Yes
35-mm Equivalent (Wide): 34
35-mm Equivalent (Telephoto): 136
Maximum Resolution: 3072 x 2304 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●○○

The Sony Cyber-shot Pro DSC-V3 is a solid, full-featured digital camera with a Zeiss f/2.8-to-f/5.4 34- to 136-mm (35 mm equivalent) 4X optical zoom lens and Sony's exclusive NightShot mode for viewing and shooting in total darkness. While on paper it might seem to satisfy the wants and needs of the most discerning serious amateur, the camera has a tendency to underexpose images, produce color shifts, and sometimes blur fine detail, reducing overall image quality.

There's a lot to admire in the all-black V3's design. On top of the camera, just above the automatic pop-up flash, is an intelligent hot shoe to accommodate external strobes. That's in addition to the PC flash connector on the side (which, like the other ports, is well protected by tight-fitting rubberized flaps) for hooking up studio lights.

All the controls are easily identifiable and well placed, though many buttons are small and may be difficult for large or arthritic fingers to push. On the battery grip and camera side is a sculpted nonslip covering, and a subdial is lined up directly behind the Select dial on top so they can be turned simultaneously. The V3 is powered by Sony's intelligent InfoLithium battery, which displays in minutes how much juice is left. The optical viewfinder doesn't have a focusable diopter for people who wear glasses, but this is offset by the large, bright 2.5-inch LCD.

Under the hood, the V3 is one of the few consumer digital cameras with 14-bit analog-to-digital conversion, which theoretically produces greater detail in the shadows and highlights. It has the same lens as its predecessor, the 5MP DSC-V1, but goes one better by offering RAW support. Other important advances include a longer burst mode (eight frames at 2.5 fps rather than five frames), the ability to shoot 640-by-480 video at a full 30 fps instead of 15 fps, and the option to save to either Sony's Memory Stick or Type I CompactFlash. Other features include noise reduction, aperture and shutter priority, and manual mode, as well as color, sharpness, and contrast controls.

Generally, the DSC-V3 is a fast shooter, capable of taking pictures at a sustained rate of one every two seconds. It's easy

to move the focus point for zeroing in on an off-center subject, and using the subdial for changing exposure settings is fast and convenient.

Where the camera loses some of its luster is image quality. Although it has great resolution—at 1,600 lines, it's the second-highest 7MP camera we've tested so far after the Canon PowerShot G6—its pixel-transition ratio averages dead last at 3.5 percent. This seemingly contradictory state was visible in our test images, in which rows of white pixels appeared along contrasty edges. As irritating as that is, however, it's much less significant than the notable underexposure and magenta color shift visible on our daylight test shot. While our flash shot was livelier, with better color reproduction and much more accurate exposure, we noted some clipping in the highlights, and the fine details in some objects were indistinct.

The Sony Cyber-shot Pro DSC-V3 is a lot of camera for the money, but it may have trouble producing top-quality pictures without some tweaking in image-editing software.

SUPER EIGHTS: 8-MEGAPIXEL CAMERAS

In June of last year, Sony announced the industry's first 8-megapixel CCD. It hasn't taken long for this powerhouse to show up in a host of cameras. For the prosumer shooter, 8MP images translate into crisp, razor-sharp 14-by-17 prints. Even better, fine details are maintained when you crop in on and blow up small sections of an image.

We tested five of the latest 8MP cameras, priced from $999 to $1,100. They share many features, including 3,264-by-2,448 maximum resolution, metal bodies, extended (but noninterchangeable) zoom lenses, electronic eye–level viewfinders, intelligent hot shoes for strobes, pop-up flashes, autofocus assist beams, and RAW file capabilities (RAW is a lossless file format that preserves images in an unprocessed state for later manipulation).

If image quality is your paramount concern and you have around $1,000 to spend on a camera, we still recommend a true digital SLR (such as the Canon Digital Rebel or Olympus E1). But for those who want the ease of a point-and-shoot but the image quality of a higher-end model, these new models might be just right.

Canon PowerShot Pro1

PROS: Powerful zoom lens; razor-sharp pictures; easy one-handed shooting

CONS: No antishake capability; manual focus is kludgy

BOTTOM LINE: The Canon PowerShot Pro1 is a solid entry that boasts a compact design and a nice set of features.

SPEC DATA
Price: $999.00 List
Type: Enthusiast
Megapixels: 8
Included Memory Amount: 64 MB
Media Format: CompactFlash
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 200
Maximum Resolution: 3264 x 2448 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING:

The Canon PowerShot Pro1 represents a big step forward versus the former top of the PowerShot line, the 5MP G5. The Pro1 is smaller, rounder, and more user friendly than the G5. This design, combined with the 8MP CCD and the new, more powerful zoom lens, give it the ability to take razor-sharp pictures—the sharpest on our resolution tests.

The Pro1's heft and sculpted body, coupled with convenient clusters of easy-to-operate controls, give it an all-business look and feel and allow easy one-handed shooting. On the camera's top is an oversize, very legible control panel. Directly behind is the select dial, which, in addition to the usual modes, offers two user-defined settings.

The Pro1's 2-inch LCD display is fully articulated for viewing from almost any position, but its eye-level electronic viewfinder isn't as detailed as that of the Konica Minolta DiMage A2. There's no antishake capability, and zooming the 7X zoom lens (a 28- to 200-mm equivalent) is power-assisted rather than mechanical (though you can control zoom speed by the speed with which you twist the zoom collar). Manual focus is kludgy: You must hold a button and turn the lens collar (so you can't zoom while manually focusing).

Though a bit crowded, the menus are extensive, legible, and intelligently organized. They can be displayed on either the LCD or the eye-level viewfinder. On playback, magnifying an image is as easy as turning the lens collar. The camera can record 640-by-480 video, but its top frame rate is only 15 fps for 30 seconds.

Although the Pro1 is no speed demon, its performance is good, and it shoots bursts of 2.5 images per second for up to six shots. Images are among the sharpest we've seen in this class, with excellent detail and supercrisp edges (which bodes well for enlargements). Our simulated daylight still life exhibited good exposure and accurate colors, but the flash shot was overexposed and too warm.

Still, the Canon PowerShot Pro1's combination of compact design, excellent ergonomics, relatively easy operation, and supersharp resolution add up to a first-class camera.

Konica Minolta DiMage A2

PROS: Exceptional functions; excellent handling characteristics

CONS: Performance is a mixed bag

BOTTOM LINE: The Konica Minolta DiMage A2 offers a good combination of quality, features, and performance.

SPEC DATA
Price: $1,100.00 Street
Type: Enthusiast
Megapixels: 8
Media Format: None
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 200
Maximum Resolution: 3264 x 2448 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

The Konica Minolta DiMage A2 offers exceptional functions and excellent handling characteristics. While it can't quite match the Olympus model's image quality, it outzooms the Olympus and is the only camera in our roundup that's equipped with antishake technology. These features make the DiMage A2 ideal for rock-solid handheld telephoto shots and worthy of an **Editors' Choice**.

The unit's oversize, sculpted grip makes for easy operation, even one-handed. Most controls are accessible to the right hand, with the remainder along the left side. By default, antishake is on, though it's easy to turn off when not required, such as when you're shooting in wide angle or with a tripod.

The DiMage A2 is the only camera here with a movable eye-level viewfinder. Its electronic viewfinder has the highest resolution in this roundup, and it's the only camera here that can switch

from the 1.8-inch LCD on the back of the unit to the eye-level viewfinder when it senses you've brought the camera up to your eye.

Manual focus is done via focus-by-wire rather than a mechanism like Sony's superior mechanical focus. But not only is the 7X zoom lens (28- to 200-mm equivalent) the only one we tested with an optical stabilizer (the CCD actually moves to offset camera motion), it's the only true apochromatic digital lens (corrected for all three primary colors) on the market.

This camera can shoot JPEG, RAW, and TIFF images; pros will appreciate its ability to save both RAW and JPEG files simultaneously. You can shoot 544-by-408 video clips up to 15 minutes long at 30 fps. Menus are bright, legible, and intuitive.

Performance is a mixed bag. While boot time is average, the DiMage A2 has the fastest click-to-click speed and a three-shot burst mode, at 2.7 images per second. Image quality and exposure are very good, though the colors in both of our still life shots tended to be slightly yellowish.

The DiMage A2 offers a good combination of quality, features, and performance.

Nikon CoolPix 8700

PROS: Small and light; excellent ergonomics

CONS: Not easy to operate

BOTTOM LINE: The CoolPix 8700 is a solid choice, especially for those who want up-close shots.

SPEC DATA
Price: $995.95 List
Type: Enthusiast
Megapixels: 8
Media Format: None
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 35
35-mm Equivalent (Telephoto): 280
Maximum Resolution: 3264 x 2448 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●◐○

The smallest and lightest camera in our roundup, the Nikon CoolPix 8700 offers the greatest optical zoom ratio and the most program modes. It's the only model with a best-shot selector—a feature that lets the camera take a series of shots, determine which is the best exposed, and discard the rest. But despite excellent ergonomics and novice assists, the CoolPix 8700 isn't easy to operate.

The CoolPix 8700 is a beautifully balanced camera that fits most hands perfectly. It's designed for easy two-handed operation, with clusters of controls along the side of the lens

and to the right of the LCD viewfinder.

The CoolPix 8700 has a fully articulated 1.8-inch LCD viewfinder that can swivel towards the shooter for self-portraits. The LCD viewfinder is bright, but in Setup mode the white-on-grey text can be hard to read. Settings displayed on the minuscule control panel can also be hard to read. But the 15 program modes are easy to set, and the best-shot selector helps ensure optimum image quality.

Nikon's 8X zoom lens (a 35- to 280-mm equivalent) favors extreme telephoto over wide angle—all the more reason why we wish it came equipped with image stabilization like the DiMage A2, so that zoomed-in shots at slow shutter speeds wouldn't be blurred. Unlike the Sony unit, which offers precise manual zoom and focus, the CoolPix 8700's motorized zoom works at one speed only, and its zone-type manual focus is awkward and difficult to use.

The CoolPix 8700 can save JPEG, RAW, and TIFF files. It can also record 640-by-480 videos at 30 fps, but with a maximum length of only 35 seconds. Shooting is a mixed bag. The camera handles well, and although it can shoot a five-shot burst mode at 2.5 images per second, its boot and recycle speeds are somewhat sluggish. Image quality is very good to excellent, with good flash illumination and simulated daylight exposure, and colors that are pleasing.

The CoolPix 8700 may not be the easiest camera in this roundup to operate (though its best-shot mode helps), but it's still a solid choice, especially for those who always find themselves wanting to zoom just a little bit closer.

Olympus C-8080 Wide Zoom

PROS: Excellent picture quality; good feature depth

CONS: Minor usability issues

BOTTOM LINE: The Olympus C-8080 Wide Zoom is a top choice for serious shooters.

SPEC DATA
Price: $1,000.00 Street
Type: Enthusiast
Megapixels: 8
Included Memory Amount: 32 MB
Media Format: xD-Picture Card
Battery Type Supported: Lithium Ion
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 140
Maximum Resolution: 3264 x 2448 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

This solid workhorse of a camera doesn't have the longest zoom, and its menus take some getting used to. But unless you need to zoom in closer, the time it'll take you to learn its ins and outs will be amply rewarded. Five-star image quality and an impressive set of features make the **Olympus** C-8080 Wide Zoom an **Editors' Choice**.

The C-8080 is designed to be operated with both hands for maximum stability, with lots of nonslip material on the body and lens barrel. The camera's bevy of analog controls are scattered but conveniently placed and well marked, and although the camera offers only five program modes, they're instantly available on the Select dial. Like the Konica Minolta unit, the C-8080's 1.8-inch LCD viewfinder isn't fully articulated, but it can be flipped 180 degrees along the back of the camera. One other complaint: To focus the camera manually you have to use the jog buttons. These work well, but ease of use takes a hit here.

In addition, its motorized 5X zoom lens (a 28- to 140-mm

equivalent) is activated by a lever above the shutter button. Zoom speed can't be altered. The C-8080 has dual media slots for CompactFlash and xD-Picture Cards. To protect the memory cards, an interlock stops activity when the media door is inadvertently opened.

Image files may be saved as JPEGs with three compression levels or as uncompressed RAW or TIFF files. Top video resolution is 640 by 480 pixels at 15 fps, until the memory card is filled. Although it has controls for adjusting hue and color saturation, the C-8080 is limited to sRGB, not multiple color spaces like the DiMage A2. The C-8080's menu structure is extensive and several levels deep, reflecting the camera's many options and features.

The C-8080 is a reasonably fast shooter, with quick bootup time and fair recycle time, though slow button and menu navigation may bog things down. It has a burst mode of five images at 1.6 images per second. You also get an impressive eight user-defined setups and the ability to assign a button for one frequent function.

Our flash still life had rich colors and great illumination, and the simulated daylight shot was well exposed, with good color. All the cameras in this roundup shot good images, but the C-8080's were noticeably better at its factory default settings.

Excellent picture quality, good depth of features, and a body built like a tank make the C-8080 a top choice for serious shooters.

Sony Cyber-shot DSC-F828

PROS: Easy to operate; fast; sharp images

CONS: Big and heavy; complicated command structure

BOTTOM LINE: The Sony Cyber-shot DSC-F828 is large but well-balanced

SPEC DATA
Price: $1,000.00 Street
Type: Enthusiast
Megapixels: 8
Media Format: None
Battery Type Supported: InfoLithium
35-mm Equivalent (Wide): 28
35-mm Equivalent (Telephoto): 200
Maximum Resolution: 3264 x 2448 pixels
Interface: USB
Video Capture Ability: Yes
EDITOR RATING: ●●●●○

The Sony Cyber-shot DSC-F828 was the first 8MP camera out of the gate last autumn, and it's the only one to use a four-color version of the Sony CCD. But the early version we tested (read the review here) didn't fare well on image-quality tests. Sony has since upgraded its firmware (available as a free download), so we gave it another look. Not only have sharpness and resolution dramatically improved, but the DSC-F828 has proved to be the easiest 8MP camera to operate.

The DSC-F828 is the biggest and heaviest camera in our roundup, with a huge 7X zoom lens (a 28- to 200-mm

equivalent) as large as the body itself. Rather than using an articulated LCD, the camera's lens/body can rotate 140 degrees. A well-balanced, two-handed camera, the DSC-F828 is the only one here with manual mechanical focus and zoom capability for more precise control. Also, its tripod screw socket is directly beneath the lens for easier, more accurate panoramas. At f2, it has the fastest lens in our roundup, for better available-light photography. In addition, the DSC-F828 is equipped with Sony's Nightshot and Nightframing, for viewing and shooting in total darkness.

Controls are scattered but well marked, and the short-throw four-way jog button is one of the best we've tried. In aperture or shutter priority mode, rotating the secondary select dial actually lightens or darkens the viewfinder, so users can preview how their selection affects depth of field.

DSC-F828 images can be saved as JPEGs, with two levels of compression, or as uncompressed RAW or TIFF files. It records 640-by-480 videos at 30 fps until memory fills. The DSC-F828's menus are simple, logical, and legible, using clear and unambiguous words and phrases. The command structure is complicated, however, and some modes will display only select menus, with additional options available only through analog controls.

With the fastest bootup, second-fastest click-to-click, and fast throughput, the DSC-F828 is peppy. Burst mode is seven shots in less than 3 seconds. Our test still-life photos are crisply defined, with superb sharpness. However, the flash shot was too warm and bright, while the simulated daylight shot was slightly underexposed, with a significant shift to cyan.

A fun camera for serious amateurs, the DSC-F828 produces sharp pictures, though not perfect color.

DIGITAL CAMERA FINDER

Compact: Fit in a handbag or roomy pocket • Reasonably good pictures • No pro features

Ultracompact: Very small, stylish & expensive • Optics, LCD & performance aren't as good as those of larger models • Simple or sophisticated

Enthusiast: Full size • Priced for more serious shooters • More precise controls, features & better lenses • Superior image quality

Superzoom: Subset of Enthusiast • 10X or greater zoom lens • Full size • Cheaper than most Enthusiast models • Some have high-end features

Digital SLRs: True reflex through-the-lens viewfinders, interchangeable lenses, pro features • Big & expensive • Suits professionals & perfectionists • Total control & the best digital image quality

By Price:

Less than $500

Less than $1,000

Less than $2,000

$2,000 & up

By Company:

Canon

Fuji

Kodak

Olympus

By Megapixels:

3 & above

4 & above

6 & above

8 & above