

## [The Inner Workings of Digital Cameras](#)

Digital cameras have now fully completed their coup of the camera industry. If you recently got one yourself, it can be useful to have a bit more understanding of how they work. Simply put, digital cameras contain a lens or series of lenses that allow light passing through them to focus on a sensor, rather than traditional film. The sensor then transfers the image data to the core electronics of the camera, where it is organized and converted into binary forms of data. Thus it can more easily be stored onto reusable memory units for later viewing by a computer.

The most common digital camera sensor is a charge-coupled device, or CCD, but some models use a complementary metal oxide semiconductor (CMOS). In either case, light beams are converted to electrical charges, which are then transferred to the core electronic section, and eventually onto the storage media.

During the conversion, the light is filtered into the three primary colors, which are combinable to create a full spectrum light. Better quality digital cameras use three separate sensors to do this. Each sensor contains a filter of a different color, allowing it to read just the light that matches.

Aperture and shutter speed are the mechanisms used to control the amount of light that reaches the sensor. In most digital cameras the aperture setting is automatic, but some cameras also allow manual control. Professional photographers and enthusiasts prefer this option. The shutter, on the other hand, is set electronically.

Lenses for digital cameras come in four varieties: digital-zoom lenses; fixed-zoom lenses; replaceable lens systems; and fixed-focus. Fixed lenses, both zoom and fixed focus, tend to be found in the cheaper cameras. Optical zoom lenses can have both wide angle and telephoto options. Digital zoom lenses don't actually zoom a piece of glass, but rather take pixels from the central part of the image, and enlarge them. This appears to be a zoom, but if you look closely, you will notice that they are more grainy or fuzzy images than you get without invoking the zoom option.

An LCD screen is included on most digital cameras to view the image. These screens are usually rather small, being constrained to the size of the camera. Thus the image needs to be transferred to a computer for better viewing or printing. The overall quality of the image depends primarily upon the resolution of a digital camera. The higher the resolution, measured in megapixels, the better the image quality.

Resolution also plays a role in the quality and size of the printed photographs. A cell phone camera or other low quality camera with a one megapixel resolution will produce images that are really only good for emailing or web pages, not printing. With a 2-megapixel camera, the images are good for printing at 4x6 inch sizes or so, while a 4-megapixel camera can be detailed enough to produce good prints at 16x20 inch size. With prices falling continually, if you love photos and hope to make some enlargements, you are best to only consider cameras above 6-megapixels.

In the early days of digital cameras, images were stored on fixed memory locations built into the device. When it came time to transfer images, you needed a cable to attach to your computer. Today, removable memory storage is the way to go, as the flexibility and convenience of the camera is enhanced. And reusable memory means you can enhance the amount of data you can comfortably keep with the camera -- more pictures and higher resolution pictures. Removable memory is stored on various devices such as CompactFlash cards, SmartMedia cards, and other memory sticks. Some cameras use small hard drivers, called microdrives, or burnable DVDs. No matter what you choose, having a digital camera is fun, and frees you from the costs of film.

### About the Author

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