Image File Types

JPEG

The **JPEG** (Joint Photographic Experts Group) format, pronounced "jay-peg," is by far the most popular format for display of photographic images on the Web. The term "JPEG" is often used to describe the JFIF file format (JPEG File Interchange Format).

TIFF

TIFF (Tag Image File Format), pronounced "tiff," was originally developed by Aldus Corporation to save images created by scanners, frame grabbers, and photo editing programs. This format has been widely accepted and widely supported as an image transfer format not tied to specific scanners, printers, or computer display hardware. TIFF is also a popular format for desktop publishing applications. There are several variations of the format, called **extensions**, so you may have occasional problems opening one from another source. Some versions are compressed using the LZW or other lossless methods. TIFF files support up to 24-bit colors.

CCD RAW (.CRW)

When an image sensor captures data for an image, some cameras allow you to save the raw, unprocessed data in a format called **CCD RAW (.CRW)**. This data contains everything captured by the camera. Instead of being processed in the camera, where computing power and work space is limited, the raw data can be processed into a final image on a powerful desktop computer. The increased power and work space can make a significant difference in the results. In addition, you can save the raw data and process it with other software or in different ways. When the raw data is processed in the computer into a JPEG or other image, it's a "one size fits all" form of processing and the RAW data is discarded. In the final file, not only has some of the original data been changed, some has also been deleted.

Photoshop (.PSD)

When working on images in Photoshop, there are many features, such as layers, that serve a purpose only when editing. For this reason, Photoshop

has its own native format you use to save file while working on them. This format saves everything you've done to the image so you can just reopen the file and continue working. When finished, you usually save the image in another, more common format such as TIF, JPEG, or BMP.

PICT (.PIC)

The **PICT** format, pronounced "pick," was introduced along with MacDraw software for the Macintosh. It has since become a Macintosh standard.

BMP (.BMP)

BMP, pronounced a letter at a time "B-M-P," files use a Windows bitmap format. These images are stored in a device-independent bitmap (DIB) format that allows Windows to display the bitmap on any type of display device. The term "device independent" means that the bitmap specifies pixel color in a form independent of the method used by a display to represent

PNG (.PNG)

PNG (Portable Network Graphics), pronounced "ping," was developed to replace the aging GIF format and is supported by both Microsoft Internet Explorer and Netscape Navigator. PNG, like GIF is a lossless format, but it has some features that the GIF format doesn't. These include 254 levels of transparency (GIF supports only one), more control over image brightness, and support for more than 48 bits per pixel. (GIF supports 8 for 256 colors). PNG also supports progressive rendering, as interlaced GIFs do, and tends to compress better than a GIF. The format has never caught on and remains a curiosity on the Web.

EPS (.EPS)

EPS (Encapsulated PostScript) files, pronounced a letter at a time "E-P-S," use a format developed by Adobe for PostScript printers. These files generally have two parts. The first is a text description that tells a PostScript printer how to output the image. The second is an optionally bit-mapped PICT image for on-screen previews. Once an image has been saved in the EPS format, you can import it into other programs and scale and crop it. However, its contents are often no longer editable except by a few programs such as Adobe Illustrator. For this reason, these files are generally created at

the end of the process when they are about to be incorporated into a printed publication.

GIFs (.GIF)

GIF (Graphics Interchange Format) format images, pronounced "jiff," are widely used on the Web but mostly for line art, not for photographic images. This format stores up to 256 colors from an image in a table called a **palette**. Since images have millions of colors, a program such as Photoshop selects the best ones to represent the whole when you save the image in this format. When displayed, each pixel in the image is then displayed as one of the colors from the table, much like painting by numbers.

There are two versions of GIF in use on the Web; the original GIF 87a and a newer GIF 89a. Both versions can use interlacing; storing images using four passes instead of one. Normally, when an image is displayed in a browser, it is transmitted a row at a time starting at the top row and filling in down the page. When saved as an interlaced GIF, it is first sent at its full size but with a very low resolution. This allows a person to get some idea of all of the contents of the image file before it is completely transmitted. As more pixels are sent in the next three passes the image fills in and eventually reaches its full resolution. The newer GIF 89a version adds some additional capabilities that include the following:

*   Image backgrounds can be made **transparent**. To do so, you specify which color in the table is to be transparent. When viewed with a Web browser, the browser replaces every pixel in the image that is this color with a pixel from the web page's background. This allows the background to show through the image in those areas. You have to choose the transparent color carefully. If you select one that occurs anywhere in the image besides the background, your image will appear to have "holes" in it.

*   Images can be **animated**. By rapidly "flipping" through a series of images, objects can be animated much as a movie simulates motion using a series of still images. This works best with line drawings but can also be done with photographs. Depending on bandwidth, the animation may not work the first time. However, once it's stored in cache and replayed, it will work fine.

GIF images are limited to a maximum of 256 colors. These colors, stored in a table, index, or palette, are often referred to as **indexed colors**. When you convert a photograph to GIF format, most graphics programs will allow you to dither it. This replaces lost colors with patterns of those available in the palette. Dithering improves the appearance of the image, but it also increases the size of the file. AlthoughGIF photographs often look OK on-screen, they suffer if compared side-by-side with images saved in JPEG and other formats. The GIF format is best used for line art such as cartoons, graphs, schematics, logos, and text that have a limited number of colors and distinct boundaries between color regions. GIF images are compressed using a "lossless" form of compression called LZW (Lempel-Ziv-Welch). The amount of compression achieved depends on the frequency of color changes in each pixel row. This is because when two or more pixels in a row have the same color, they are recorded as a single block. Hence, a picture of horizontal stripes will compress more than one of vertical stripes, because the horizontal lines would be each stored as a single block. Photographs with large areas of identical colors such as skies, snow, clouds, and so on, will compress more than images with lots of colors and patterns. To save a 24 bit image as a GIF, you must reduce the bit depth down to 8 bits. To reduce file sizes in GIFformat, you can further reduce the number of colors in the image. This is difficult with most photographs, but not with line art. For example, if your image has 16 or fewer colors, you can convert it to a 4-bit (16-color) palette. Most graphics programs will allow you to do this. Even with photographs you can sometimes reduce the image to fewer colors than actually exist without noticeable loss. The discarded colors are those that are seldom-used or transitional colors between more frequent colors. When working with grayscale images, GIF works as well as JPEG because almost all programs use 8-bits (256 colors) for gray scale images.