

## Graphic File Formats

There are dozens of graphic file formats—some are unique to particular programs such as Photoshop, Illustrator or Freehand. Not all programs will open all graphic file formats. For example, Photoshop can't open WMF files and HyperStudio can't open PNG files.

You need to understand some basic concepts and terminology about graphic files for digital imaging to make sense and to make good choices when you are working with images on a computer. The list below represents the vast majority of file types encountered.

<b>BMP</b>	Bitmap files were originated by Microsoft and are used for almost any type of graphic.
<b>EPS</b>	Encapsulated PostScript file format was developed by Adobe. These files can contain not only image information but text, printing and font information as well.
<b>GIF</b>	<p>Graphic Interchange Format was created by CompuServe in the 1980s. These files are extremely small due to a <i>lossless compression</i> scheme. Since they are a very old file format, they have a low <i>bit depth</i>, 8-bit, limiting them to 256 colours—this is often referred to as <i>indexed colour</i> mode.</p> <p>One advantage of the GIF format is that one colour can be transparent—allowing the background upon which the graphic is placed to show. That is one reason this format is one of the two most popular formats for the web. These files can be <i>interlaced</i> and simple animations can be created with them.</p> <p>The GIF format works best for images with large areas of solid colour like clipart, cartoons and text. Photographs saved in GIF format often appear grainy and pixilated.</p>

<b>JPG/JPEG</b>	<p>Joint Photographic Experts Group graphics are one of the two most popular formats used on the web. This format is not good for images with large areas of solid colour but is ideal for photographs and images with shadow effects, subtle colour changes or gradations.</p> <p>It is a <i>compressed</i> file format and uses a <i>lossy compression</i> technique. JPG files are 24-bit graphics (displaying 16.7 million colours) and can be displayed <i>progressively</i>. These files are quite small.</p>
<b>PIC/PICT/PCX/PCT</b>	<p>These are common designations for “picture” format but actually these formats are not the same. The PCX format was used extensively during the MS-DOS era and lots of those images can still be found. The PICT format was created by Apple and is still used a lot on that platform.</p>
<b>PNG</b>	<p>Portable Network Graphic is a <i>lossless compressed</i> file format meant to replace GIF as it can be used with most of the newer web browsers. It is a <i>16-bit</i> graphic and can have several colours designated as transparent. It has a <i>progressive</i> display option and is suitable for most types of images including photographs, clipart, text and drawings.</p>
<b>PSD</b>	<p>This is the file format that Photoshop uses and it cannot be opened by very many non-Adobe applications. Typically, users will save their graphic as a Photoshop file if they plan on doing further editing, then save a copy of the graphic in a format that other applications can read such as TIF, JPG, PNG or GIF.</p>
<b>TIF/TIFF</b>	<p>Tagged Interchange File Format is a widely used and read format. Many applications can import TIF files—they are extremely flexible and can be used in many situations. They are typically not compressed and are suitable for a wide range of source images—ranging from full colour photos to clipart to drawings.</p>

	These files are high resolution and have a correspondingly large file size. This is an excellent format for archiving your <i>master images</i> . They produce much higher quality print outs than GIF or JPG files.
<b>WMF</b>	Windows Metafile Format was created by Microsoft for use with their Office applications. In fact, much of Microsoft Office Clipart on the PC is in WMF format. Very few non-Microsoft applications can open WMF graphics directly.
<b>WPG</b>	WordPerfect Graphic is a format created by WordPerfect for use with its word processing software. Many programs can open these files.

Your intended use determines the best file format for your digitized image. If you intend to print the image, you need a high quality file such as a TIF. If you intend to put the image on a web site, consider using GIF or JPG. If it's for a multimedia project, it's helpful to know what file formats can and can't be read by the software you intend to use. Some software read just about every file format while others read only a few.

Regardless of your intended use, if you plan on editing your image, even cropping, you want to have a file format that either uses no compression or lossless compression. A file format that uses lossy compression throws out data each time you save it. So, if you scan a picture and save it in a lossy compressed file format, you throw away valuable data about the image. Then if you open the image, crop it and save it, you throw away more data. If you then open the cropped image again and add text to it before saving it a third time, you throw away even more data. Every edit you make reduces the amount of data in the image and thereby degrades the image quality. So, which common file format uses a lossy compression and may not be suitable for your image? JPG of course!

## Graphics Terminology

<b>Bit</b>	The smallest unit of information a computer understands, 0 or 1.
<b>Bit Depth</b>	how many bits the image uses to create Colour <ul style="list-style-type: none"><li>• 1-bit refers to an image with 2 Colours</li><li>• 4-bit refers to an image with up to 16 Colours</li><li>• 8-bit refers to an image with up to 256 Colours</li><li>• 16-bit refers to an image with up to 32,768 Colours</li><li>• 24-bit refers to an image with up to 16,777,216 Colours</li></ul>
<b>Compression</b>	Graphic files are large and disk space was often at a premium in the past so programmers created compression techniques to make graphic files smaller in size. Compression techniques fall into two major categories, lossless and lossy.
<b>Indexed Colour Mode</b>	A graphics mode with a limited number of Colours—256 to be specific, thus making this mode 8 bit. GIFs are indexed Colour mode graphics.
<b>Interlaced</b>	A graphic technique in which an image is saved by using four passes over the graphic. Each pass contains the information for certain lines of the image so the result is an image that builds as the computer loads it into memory. At first the image is hazy but it becomes clearer as each of the passes is decoded.
<b>Lossless</b>	A graphic compression technique that codes for redundant information in the image and thus reduces the size of the file. The original image can be regained, as no data is lost; it's just transformed.
<b>Lossy</b>	A graphic compression technique that discards data from an image. That data can never be regained; image quality degrades each time it is edited and saved.
<b>Master Images</b>	The original, unedited digital image. This image is usually high resolution and in an uncompressed format. It saves a lot of time and effort to keep a master image for everything instead of digging for the original image to rescan after you've ruined the scanned image.
<b>Progressive</b>	A graphic technique in which an image is divided into a series of scans that are displayed sequentially and gradually improve the quality of the image. This allows the viewer to quickly view a graphic on the web.