

Kodak's Image File Format Overview

Background

During the early years of computer graphics development and the race for dominance by both hardware and software manufacturers, many proprietary formats were designed. Every graphics program saved files in its proprietary -- or native -- format, and therefore, any file saved from a specific application and used exclusively by that application was -- and still is -- known as a native file.

Unfortunately, these native files weren't always readable by other applications ... especially when the native file was originated in a Mac-based application and the target application was PC-based or vice versa.

With greater demands for inter-application compatibility and cross-platform compatibility, many developers and manufacturers realized that survival was closely linked to meeting those demands.

Today, most major graphics applications can save and open both in their native formats and in a number of other formats that can be used to transfer images from one application to another or from one platform to another.

The TIFF File



TIFF -- or Tag Image File Format -- was developed by Aldus Corporation in 1986, specifically for saving images from scanners, frame grabbers, and paint/photo-retouching programs.

Today, it is probably the most versatile, reliable, and widely supported bit-mapped format. It is capable of describing bilevel, grayscale, palette-color, and full-color image data in several color spaces.

It includes a number of compression schemes and is not tied to specific scanners, printers, or computer display hardware.

The TIFF format does have several variations, however, which means that occasionally an application may have trouble opening a TIFF file created by another application or on a different platform.

The PICT File



The PICT format -- which is not an acronym -- is native to the Macintosh. It first appeared in 1984 with the introduction of MacDraw software. Since then, it has been used by many applications, especially when images are designed for screen previews. It is great for presentations, screen displays, and video work.

The PICT format can contain both bit-mapped and object-oriented graphics. It is a standard format for graphics that are cut or copied to the Clipboard and for drawings that will be output on raster printers.

The EPS File



EPS -- or Encapsulated PostScript -- files are the standard format for storing high-resolution PostScript illustrations. The EPS format -- which was introduced in the mid-'80s allows both Mac and Windows users to save bit-mapped screen representations of screen images. These previews, however, don't travel well across

platforms.

An EPS file generally has two parts: a PostScript (text) description that tells a PostScript printer how to output the resolution-independent image, and (optionally) a bit-mapped PICT image for on-screen previews.

A drawing saved in EPS format can be imported into other documents and scaled and cropped, but its contents are often no longer editable, even by the program that created it (Adobe Illustrator files are the exception).

The GIF File



GIF -- or Graphics Interchange Format -- files define a protocol intended for the on-line transmission and interchange of raster graphic data in a way that is independent of the hardware used in their creation or display.

The GIF format was developed in 1987 by CompuServe -- one of the world's most successful bulletin board services -- for compressing eight-bit images that could be telecommunicated through their service and exchanged among users.

The GIF file is defined in terms of blocks and sub-blocks which contain relevant parameters and data used in the reproduction of a graphic. A GIF data stream is a sequence of protocol blocks and sub-blocks representing a collection of graphics.

The JPEG File



JPEG is a standardized image compression mechanism. The name derives from the Joint Photographic Experts Group, the original name of the committee that wrote the standard. In reality, JPEG is not a file format, but rather a method of data encoding used to reduce the size of a data file. It is most commonly used within file formats such as JFIF and TIFF.

JPEG File Interchange Format (JFIF) is a minimal file format which enables JPEG bitstreams to be exchanged between a wide variety of platforms and applications. This minimal format does not include any of the advanced features found in the TIFF JPEG specification or any application specific file format.

JPEG is designed for compressing either full-color or grayscale images of natural, real-world scenes. It works well on photographs, naturalistic artwork, and similar material, but not so well on lettering or simple line art. It is also commonly used for on-line display/transmission; such as on web sites. A 24-bit image saved in JPEG format can be reduced to about one-twentieth of its original size.

The Photoshop File



A Photoshop file is the native file format for Adobe Photoshop. A file saved in this manner can only be opened and edited in Photoshop. However, the user has the option to save the file in a variety of other formats that are readable in both the Macintosh and PC

environment.

The major advantage of the Photoshop format becomes apparent when working on documents with layers. For example, a background can be created on one layer, then graphics can be added on a second layer, a drop-shadow on a third layer and text on yet another layer. Each layer is independent of the others and can be edited separately

without affecting the contents of the other layers. Photoshop supports the preservation of layer information, so that the layers can be preserved for additional editing.

The IVUE File



The IVUE file is a format developed by Live Picture, Inc. to work with its FITS (Functional Interpolating Transformation System) technology.

Image editing actions are stored mathematically in a FITS file, while the original pixel data is saved in the IVUE format. A new output file is created from the original IVUE image based on the FITS file in a single, final RIP process that avoids cumulative processing error.

The major advantage of the format is its ability to deal only with that portion of an image being edited, thereby greatly speeding screen display between edits.

A Day in the Life of a Common Image File User

While the number of computers in homes and small businesses has skyrocketed in recent years, the percentage of those computers used for digital imaging is extremely low.

If computer users were to be categorized with regard to their use of digital imaging, they would fall into three broad groups:

The Power Users could be defined as a small minority of imaging professionals and other highly-proficient computer users who have the knowledge, the high-powered hardware and the software required to deal with current imaging technology.

The Unsold Masses are that vast majority of computer users who haven't even tried to use pictures. They think of computers as tool for word processing and spreadsheets.

In between those two very disparate groups is a third which could be called the Frazzled Few. These are average users who have tried digital imaging only to be frustrated by a complex array of image formats, resolutions, slow performance, inconsistent color output and inadequate storage. A fraction of these people invest the time and money to become "Power Users," but most of them simply give up on digital imaging for the time being.

John is one of these people. He works at a small manufacturing company and does desktop publishing for a variety of departments, including sales, human resources, engineering and manufacturing. With their collective demands and short deadlines, he puts in a full day ... and then some.

Recently, the sales department asked if he could add some color images to a sell sheet he was preparing for them. The idea appealed to John, even though he knew it would mean more hours because he'd never explored digital imaging.

The first shock was the array of technical terms and buzz words such as aspect ratio, lines per inch, pixels per inch, dots per inch, color balance, saturation ... and on and on.

John decided to "wing" it. He bought a film scanner, hooked it up to his computer and started acquiring images for the sell sheet. First he had to decide what resolution to use. The sell sheet was going to be printed on a high-quality stock, sThat was the first problem. He found himself with an 18 megabyte file, and his system choked on it. He rebooted and reduced the resolution. Now he had a 4 MB file. That seemed more reasonable, so he proceeded to crop it and do a little enhancement in Photoshop.

Everytime the screen refreshed itself, it seemed to take forever. Of course, for imaging professionals with their high-powered graphics workstations this kind of work is

no problem, but for John -- with his Pentium 100 and 16 MB of RAM -- it becomes a real challenge. He called his computer supplier and asked what it would cost to upgrade to a system that could handle this kind of work. The answer he received was the second shock.

Then, to top it all off, one of the images he needed came from the Mac-based ad agency as a TIFF file. Now he had to figure out how to import the image at the right resolution and at the right size. For John, time was ticking away ... and total frustration was setting in.

The final shock came when John received an estimate from a local service bureau to outsource the job.

The bottom line? He'd blown the budget on the sell sheet project; he'd spent so much time on it that he'd missed deadlines for other departmental clients ... and he wasn't anxious to get involved in digital imaging again soon.

John had become one of the Frazzled Few.

Further Information on Graphic File Formats

More information on graphics file formats and closely related topics can be found in a variety of resources such as:

[Encyclopedia of Graphics File Formats](#), James D. Murray and William vanRyper (O'Reilly & Associates Inc. 1994)

File formats for Popular PC Software: A Programmer's Reference, Jeff Walden (John Wiley & Sons, Inc. 1986)

File Format Handbook, Allen G. Taylor (Microtrend Books 1992)

The File Format Handbook, Guenter Born (International Thomson Computer Press 1995)

Graphics File Formats, David C. Kay and John R. Levine (Windcrest Books/McGraw-Hill 1995)

Graphics File Formats: Reference and Guide, C. Wayne Brown and Barry J. Shepherd (Manning Publications 1994)

The Graphic File Toolkit: Converting and Using Graphic Files, Steve Rimmer (Addison-Wesley 1994)

High Resolution Graphics Display Systems, Jon Peddie (Windcrest Books/McGraw-Hill 1994)

Inside Windows File Formats, Tom Swan (Sams Publishing 1993)

[Internet File Formats](#), Tim Kientzle (The Coriolis Group 1995)

PC File Formats & Conversions, Ralf Kussmann (Abacus 1990)