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Viewing PostScript on a Macintosh

This note concerns the viewing and printing of PostScript on a Macintosh. The note contains an Introduction to PostScript, information about Printing PostScript on a Mac,a section concerning Viewing and printing PostScript on a Mac, and an introduction to Encapsulated PostScript (EPS).

1 Introduction to PostScript

PostScript is a programming language specialized to produce images with type and drawn elements. It is possible to encode a continuous-tone image into a PostScript file, but TIFF is better suited to that purpose. A PostScript file is independent of the resolution of the output device: the interpreter in a particular device produces an image appropriate for that device.

A PostScript file generally contains only characters from the 96-character ASCII set, and accommodates any line-end convention (UNIX, MS-DOS and Mac) so it is relatively easy to move PostScript files through networks and across e-mail links.

Since PostScript includes a complete programming language, it is generally not possible to convert a PostScript file into some other format – either an object-oriented format like PICT or WMF, or a bitmapped format like GIF or TIFF – without using a full PostScript language interpreter. A few restricted, specialized dialects of PostScript – such as the Adobe Illustrator file format [4] – can be translated without a full interpreter.

PostScript was invented by Adobe Systems, Inc. The specification of the PostScript language [1] and the PostScript font format [2] have been made public by Adobe, and several PostScript "clones" are commercially available. However, the name *PostScript* is a trademark that belongs to Adobe, and the copyright to the *PostScript Language Reference Manual* is the property of Adobe.

A large effort within a community computer programmers has resulted in a free interpreter called GhostScript. That group takes as their motto, "Implementation is the sincerest form of flattery."

2 Printing PostScript on a Mac

Most models of the Apple LaserWriter series or printers have built-in PostScript interpreters. A Macintosh computer that is attached to a PostScript-equipped LaserWriter, either directly or through an AppleTalk network, can print PostScript files.

A Macintosh ordinarily generates PostScript "on the fly", often from QuickDraw. To print a pre–existing PostScript file you need a program that bypasses the Mac's printer driver and downloads the PostScript file to the printer. You can use Apple's *LaserWriter Utility*, part of Apple's system software. Adobe distributes a comparable program called *Downloader*. You can also use Rich Siegel's popular and well-respected freeware program *Drop•PS*.

The Mac itself has no native capability to interpret a PostScript program and produce an image. If you have a printer without PostScript capability and but you have access to PostScript files – from the Internet, for example – you will have to go to a certain amount of trouble to print the images. You will also have to go to some trouble to view the images without printing them.

Most UNIX workstation vendors have licenced the *Display PostScript System* (DPS) from Adobe. Workstations from those vendors can display PostScript directly.

3 Viewing and printing PostScript on a Mac

The GhostScript system and its viewer GhostView work well MS-DOS, Windows, UNIX and OS/2 systems. A version of GhostScript is available for the Macintosh and In theory GhostScript can be used to view and print PostScript files on a Mac. However, GhostScript for the Macintosh is difficult to install, difficult to use, and not very robust. It fails on many PostScript files. I cannot recommend it. A new port is promised "soon", so it's worth watching GhostScript developments.

I use a highly reliable method that uses commercial Adobe software. My method has two passes. First, I use the Adobe Acrobat Distiller application to interpret the PostScript code and generate a Portable Document Format (PDF) file. Then I use Adobe's Acrobat Reader to view the resulting PDF. The method is highly reliable. Both the Distiller and the Reader are commercial-grade software. The Acrobat system has the capability to substitute fonts that were used in the original document but are not available at the viewing Mac. This is accomplished through a limited edition of SuperATM, which is included in the Reader distribution. Acrobat Reader can also be used to print, either to a PostScript printer or to a non-PostScript (QuickDraw) printer.

Although the Acrobat Reader is freely available from Adobe, Acrobat Distiller is commercial software. It is available as a self-contained product, and is a component of certain versions of Adobe Acrobat Pro. The Distiller is bundled with Adobe Illustrator version 5.5; that is how I obtained mine.

For the moment, Adobe is the sole source of PDF technology. Adobe has published the specifications of the PDF file format [3], so we can anticipate PDF becoming available from other vendors.

4 Encapsulated PostScript (EPS)

This section concerns a dialect of PostScript called Encapsulated PostScript (EPS), which is used extensively in graphic and desktop publishing applications. EPS is standardized by Adobe [5].

A PostScript file may produce no image at all, an image on one page or images on many pages. Encapsulated PostScript (EPS) is a dialect of PostScript where a single EPS file produces exactly one image. In addition to being restricted to one image, an EPS file contains information about the extent of the image on the page – the *bounding box* of the image. This information is included at the head of the EPS file as PostScript comments that are ignored by a PostScript interpreter but are recognized by applications and system software. The comments conform to *document structuring conventions* (DSC) [6]. Also, the PostScript program in an EPS file has certain restrictions.

Although an EPS file contains all of the PostScript instructions to draw a page, it does not necessarily end with the *showpage* operator that is required by a printer to print the page. Also, the image that is drawn may be outside the imaging area of a particular printer. An Apple LaserWriter cannot print closer than 1/4 inch to the edge of a page, but a very small EPS image might fit entirely in the non-printable margin. In fact it is common for an EPS image to have its origin at PostScript coordinates (0, 0), at the extreme corner of the page, which is cropped on a regular LaserWriter. So an EPS file might print properly when send to a PostScript printer, but it might not. The safest way to print an EPS file is to import it into an EPS-capable application, then print from that application.

An EPS file may optionally include, within the file, a bitmapped preview image. There are no fewer than four versions of EPS preview images: PICT, Windows Metafile (WMF), TIFF and ASCII. The fourth variant is denoted EPSI ("EPS interchange"). A particular application might recognize one, two, three or four of these formats. Counting the case of no preview, there are five variants.

Within each variant, the preview may be black and white (one bit) or color (eight-bit). The standard allows full-color (32-bit) preview images, but applications rarely implement this option.

All EPS-capable applications on a Macintosh recognize the PICT variant, where the preview image is stored as a PICT resource (ID=256) within the EPS file. Resources are a unique feature of the Mac file system, and the PICT format is Macintosh-specific. Transferring a Mac EPSF file with a PICT preview to another platform results in the loss of the preview image. Although the importing application will display the file as a grey rectangle, the EPS will print correctly.

The WMF variant of EPSF is ubiquitous In MS-DOS and Windows systems; the TIFF variant is less common. In both of these formats the preview image is coded in binary form as part of the file. In both cases the binary content must be stripped out before transfer to a Macintosh or to a PostScript interpreter.

In the EPSI format, the preview image is encoded into PostScript comments at the head of the data portion of the file. This format has a preview, contains no Mac resource and is free of non-PostScript binary data. You would expect the EPSI format to provides a preview image that is usable on every platform. Regrettably, very few applications – and virtually no Mac applications – recognize the EPSI variant. Although Adobe invented the EPSI format, even popular and well-respected Adobe applications such as Photoshop and Illustrator do not implement EPSI! So in practice EPSI is nearly useless. The notable exception is FrameMaker, where the EPSI format is implemented on UNIX, Mac and Windows.

To summarize, printing EPS files takes special measures, and it is very difficult to transport EPS from one platform to another.

5 References

[1] *PostScript language reference manual, Second Edition* ("The Big Red Book"). Adobe Systems Incorporated, 1990. Addison-Wesley, Reading, MA. ISBN 0-201-18127-4.

[2] *Adobe type 1 font format* ("The Black Book"). Adobe Systems Incorporated, 1990. Addison-Wesley, Reading, MA. ISBN 0-201-57044-0.

[3] *Portable Document Format Reference Manual*. Adobe Systems Incorporated, 1993. Addison-Wesley, Reading, MA. ISBN 0-201-62628-4.

[4] *Adobe Illustrator File Format Specification, Version 3.0* (Draft, 28 October 1992), Adobe Technical Note LPS5007, available as <ftp://ftp.adobe.com/pub/adobe/DeveloperSupport/TechNotes/5007AI_Spec_v3.0_Draft.pdf>.

[5] *Encapsulated PostScript File Format Specification, Version 3.0* (1 May 1992), Adobe Technical Note LPS5002, available as <ftp://ftp.adobe.com/pub/adobe/DeveloperSupport/TechNotes/5002.EPSF_Spec_v3.0.pdf>, also published as Appendix H in *PostScript language reference manual, Second Edition*, [1] above.

[6] "Document Structuring Conventions – Version 3.0", Adobe Technical Note LPS5002, available as <ftp://ftp.adobe.com/pub/adobe/DeveloperSupport/TechNotes/5001.DSC_Spec_v3.0.ps>, also published as Appendix G in *PostScript language reference manual, Second Edition*, [1] above.