Benefits of Supporting the Adobe Type Manager Software API

Adobe Developer Relations

Technical Note #5070

6 July 1998

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Benefits of Supporting the Adobe Type Manager Software API

1 Introduction

Adobe Type Manager® (ATM®) software was the first software to give personal computer users clear, accurate font scaling, using the same font for both screen display and for printing. The result was a better correspondence between screen and printer output, and that has had a significant effect on the way users work and the quality of the documents they are able to produce.

For the many users who have ATM, text imaging of Type 1 fonts works transparently—without the need for any assistance from the application. However, many applications can benefit by the extra functionality offered by ATM’s Applications Program Interface (API). In some cases, ATM’s API offers features that correspond to standard system calls available in the Macintosh or Windows® system for TrueType fonts. In other cases, the API calls go beyond the standard functions and can offer additional benefits. The library files for using the ATM API are available to developers who join the Adobe Developers Association.

This document addresses these questions in two parts. It explains the general benefits of ATM and PostScript Type 1 fonts as they affect end users, and it gives an overview of the ATM API functions and explains how they can be used to enhance and differentiate a developer’s product.

2 What is ATM?

ATM is a software font rasterizer. Rasterization is the process of converting an outline font into a pattern of dots for imaging on a raster device such as a monitor or laser printer.

When ATM is installed and active, it intercepts an application’s standard text calls to the operating system. If the font is not a Type 1 font, control is returned to the operating system which processes the request in the normal manner as though ATM were not there. If it is a Type 1 font, ATM either renders the bitmaps directly to the screen, or hands them to the device driver.
Figure 1 shows a diagram of an application’s calls for text imaging, with and without ATM being present in the system.

**Figure 1**  *System text calls with and without ATM*

ATM allows the same outline font to be used for both screen display and printing, which allows a more precise correspondence between what is seen on the screen and imaged on the printer. It creates screen bitmaps directly from the outline font, thus avoiding the jagged characters associated with the traditional method of bitmap scaling.

The value of ATM is that it provides, for screen display, most of the powerful font imaging capability that is available in PostScript® printers. ATM also allows the printing of Type 1 fonts to a wide variety of non-PostScript printers; it rasterizes the outline fonts and automatically downloads the resulting bitmaps to the printer. Figure 1 also shows that the application can call ATM directly, which is described in more detail in section 4, “The Application Programming Interface (API) for ATM Software.”

### 3 User Benefits of ATM Software and Type 1 Fonts

If ATM and Type 1 merely duplicated the system’s font scaling mechanism, there would be no reason to invest effort in supporting them. But there are a number of ways, listed below, in which applications can use the ATM API to offer significant value to users. It is these strengths that make ATM and Type 1 fonts a solid foundation on which applications can build greater features through using the ATM API.
• Access to the greatest number of fonts and diverse character sets. More fonts are available in the Type 1 format than in any other format. More than 100,000 Type 1 fonts have been developed by more than 200 type foundries and font vendors. Adobe’s own type library of over 2000 fonts, includes virtually all industry standard typefaces. These fonts are either licensed from the world’s major type foundries or have been designed by Adobe’s own award winning design team.

Also, all fonts in the Adobe Type Library bear the industry standard trademarked font names, which greatly aid the user in the identification and selection of fonts. It also assures users they are getting the authentic, classic typefaces rather than one of the many poor imitations currently available.

• Faster, higher quality printing to PostScript printers. PostScript printers are the industry standard for network cross-platform printing. They also offer the widest variety of options for output resolutions, color, throughput and duty cycle, fax, and other features. Type 1 is the native PostScript font format. Also, an extension of the Type 1 format, the CID-keyed font format, is the most efficient and flexible format for printing large and complex fonts for languages such as Chinese, Japanese, and Korean, which typically require thousands of characters for each font.

The performance for printing Type 1 fonts to printers that do not support the PostScript language, is roughly equivalent to that for TrueType fonts, although this varies slightly depending on the printer. Use of TrueType fonts for PostScript language printing works well with a few printers that have an embedded TrueType interpreter, but the majority of TrueType fonts must be converted to a PostScript language format in order to print. This approach takes extra time and may result in diminished quality.

• Cross-platform capability. With the growing use of networks and mixed computing environments, the portability of documents for communication among the various systems is frequently a problem. Traditionally, each operating system has its own character sets, encodings, and conventions for font naming. These variations in font standards are probably the single greatest barrier to document portability.

For display purposes, ATM provides consistent rendering for both the Macintosh and Windows systems. PostScript printers provide the rest of the solution: their device and platform-independent print architecture can accept print jobs from any host system. The standard PostScript language character set is a superset of those needed for most operating systems. Fonts can be easily re-encoded to match the particular set and ordering needed for a particular environment.

• ATM Deluxe software. ATM 4.0 Deluxe provides users with complete font management services, as well as a number of additional features.
In addition, ATM can perform font substitution when the user’s font is not embedded in a document, and the font is listed in the ATM database, as well as for a number of TrueType fonts. ATM is able to mimic the general style, slant, weight and character widths of the fonts, which means that all line and page breaks are maintained as well as the general look-and-feel of the document’s design.

• **Adobe Acrobat software compatibility.** Acrobat software allows users to share documents across the Macintosh, Windows, DOS®, and many UNIX® systems, while retaining the full complexity of fonts, layout, color, and images as created in the authoring application. The resulting document can be viewed, navigated, and printed using the free Acrobat Reader viewing application in any of the supported environments.

Although TrueType fonts can be used in Acrobat software documents, the best results are achieved by using fonts in the Type 1 format. The font substitution feature of Acrobat can be used for TrueType fonts with standard character sets, but TrueType fonts with non-standard characters or symbols must be converted to a Type 1 font (with some inevitable loss of quality).

• **Service bureau compatibility.** One of the greatest advantages of a device independent printing language and font format like the PostScript language and Type 1 is that documents and fonts can be imaged on a wide variety of output devices, including high resolution imagesetters. Most Service Bureaus use and support fonts from the Adobe Type Library, and many will only accept jobs which use Type 1 fonts.

• **Multiple master fonts** provide for the greatest flexibility and highest legibility possible with digital type. Multiple master fonts include two or more typeface designs in a single font, and allow the user to generate a wide range of intermediate designs through interpolation. The fonts may be varied in terms of the weight, width, or other style characteristics of the typeface. Figure 2 shows an example from the Myriad® multiple master font which demonstrates how both the weight and width can be varied.

**Figure 2** Example of the weight and width variations possible with a single multiple master font

For more information on the multiple master font format, see Technical Specification #5015, *The Type 1 Font Format Supplement*. 
4 The Application Programming Interface (API) for ATM Software

In most cases, an application’s standard text calls to Windows GDI or Macintosh QuickDraw routines are intercepted by ATM, and the display or printing of a Type 1 font occurs transparently. This makes most of the benefits of using ATM available to the user without any help being required from the application. However, the list below explains a number of ways in which applications can use the ATM API to offer extra functionality.

Note An asterisk following the title (*) indicates a function not available with other font formats.

• Rotating, scaling, and skewing fonts. Type 1 fonts may be rotated, scaled, and skewed to create dramatic effects for headline type. These capabilities are essential for all drawing, presentation, charting, and many page layout applications. These API calls make the powerful graphics imaging model inherent in the PostScript interpreter available for screen imaging. Also, the same API is available across all supported platforms. Figure 3 shows an example of using skewed text for a business application, where the text appears to be seen in perspective.

Figure 3 Example of skewed text for use in business graphics

• Obtaining character bounding box data. A character bounding box is the imaginary rectangle surrounding the extremities of the black area of an imaged character or text. This data is useful when trying to create things such as a drop cap (a large initial letter at the beginning of a paragraph which extends several lines deep into the paragraph), or for any application which requires accurate placement of text relative to other graphic objects.

• Obtaining character outlines. ATM can return the outline description for characters in a font. Once the outline is obtained, the character shapes can be manipulated as graphics, and ATM can fill the resulting outlines. This
means the application can create many special effects such as outlined characters, drop shadows, anti-aliasing, or characters filled with a decorative pattern. These effects are essential for drawing, paint, or presentation applications. The extracted outlines can also be used for fax or video applications, where the flexibility and variety of outline fonts are usually not available.

- **Filling outlines of arbitrary graphic shapes.** Once character outlines have been obtained and manipulated, ATM can be asked to fill (rasterize) those outlines so they may be displayed or printed. Also, arbitrary graphic shapes, created or imported by the user, may be rasterized, making it unnecessary for the application to perform that function.

- **Fine control of text rendering.** A number of calls allow control of text rendering, such as whether the outline or bitmap font is given priority for display or printing. Also, in the Windows environment, ATM adjusts text slightly to correct for the text justification of some applications; more advanced applications might want to use a call that returns text that has not been adjusted for this purpose.

- **Adding and removing fonts** (Windows only). This set of calls allows a font utility or installer application to dynamically install and remove fonts from the user’s system.

- **Obtaining PostScript font names(*)**. Using the API, applications can pass a system-specific font name and receive the PostScript **FontName**. This name provides a means for creating font references in documents which are independent of the usual operating system–specific font menu name. The advantage is that the resulting documents are more portable. Applications which operate in more than one operating system should use the PostScript **FontName** for all font references in documents.

- **Multiple master fonts(*)**. Although multiple master fonts work transparently with most software, with a little extra work an application can offer enhanced capabilities to users.

In addition to the wide range of capabilities that multiple master fonts offer to graphic designers and publishers, multiple master fonts can be an advantage for business applications as well as for any application that supports the printing of text. An example of a business application would be a spreadsheet software program that adjusts the widths of a multiple master font to make a spreadsheet fit in a given area. The application makes the calculation, and then uses the API to create the required font and install it in the user’s system.

For any application supporting the printing of text, multiple master fonts with an *Optical Scale* capability can offer users unprecedented quality and legibility of text. The design and spacing of a font can be adjusted to be
optically correct for the size at which it is imaged. For example, a 6-point font used in footnotes or in a table can greatly benefit from this feature; an example of the style adjustments are shown in Figure 4. Although users can generate the appropriate fonts on their own, support from the application, using the appropriate ATM API calls, can significantly improve the ease-of-use of this capability, and even make its operation transparent to the user.

**Figure 4** Multiple master font with an Optical Size axis: design differences for the 6- and 72-point size masters

The ATM API allows an application to identify multiple master fonts, interpret what capabilities they have (which can vary from font to font), and offer a user interface for creating new style variations.

- **Font substitution.** Users often open documents only to find they do not have the same fonts installed in their system as those used by the creator of the document. ATM software solves this problem by using a special multiple master font to match the weight and width of all missing fonts. Applications can detect the presence of ATM Deluxe and use the API to pass the name of any of over 2000 fonts in the Adobe Type Library (as well as for a number of TrueType fonts) to perform font substitution for both display and printing. The resulting fonts mimic the style, weight, widths, and other visual characteristics of the missing fonts, and the document retains the exact line and page breaks as the original.

### 4.1 Getting Started Using the API for ATM Software

Using the ATM API is relatively simple: getting started involves calling the Adobe Developers Association (addresses are on the front cover of this document) to obtain a diskette containing the necessary header files (.h files), the glue code (.c and .lib files), and the documentation for either the Macintosh or Windows versions of the software. The relevant documents which explain the API calls are:
Technical Note #5071, *ATM Software: Technical Tips for the Macintosh*

Technical Note #5072, *Adobe Type Manager Software API: Macintosh*

Technical Note #5073, *Adobe Type Manager Software API: Windows*

Technical Note #5074, *Adobe Type Manager Software API with Multiple Master Fonts: Macintosh*

And the following document describes guidelines for applications to follow to enable the maximum amount of font support for users:

Technical Note #5137, *Adobe Type Manager and Macintosh Application Compatibility Issues*

In addition, the following Technical Notes discuss related font support issues:

Technical Specification #5015, *The Type 1 Font Format Supplement.* This document contains all updates to the Type 1 format since the publication of the book *The Adobe Type 1 Font Format* by Addison Wesley. The current supplement contains the specification of the multiple master extensions to the Type 1 format.

Technical Note #5075, *Supporting Fonts in the PostScript Language Environment.* This document gives an overview of font issues which should be considered by developers.

Technical Note #5040, *Supporting downloadable Fonts in the PostScript Language Environment.* This document discusses the technical details and formats of downloadable fonts.

**Summary**

Adobe was the pioneer in adapting digital type to the desktop, and followed with other innovations including ATM, multiple master font technology, font substitution, and Acrobat software. No matter what operating system vendors offer for their particular environment, Adobe will continue to offer innovations that work transparently in whatever system the user chooses. Developers who need advanced font functionality, or who are interested in cross-platform capabilities, can benefit greatly by supporting ATM and Type 1 fonts.
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