NOTE: This Technical Note has been underlined retired. Please see the Technical Notes page for current documentation.

Technical Note TE20
The Appearance of Text

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This technical note describes why text doesn't always look the way you expect depending on the environment you are in.

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Introduction

There are a number of Macintosh text editing applications where layout is critical. Unfortunately, text on a newer machine sometimes prints differently than text on a 64K ROM Macintosh. Let's examine some differences you should expect and why.

The differences we will consider here are only differences in the layout of text lines (line layout), not differences in the appearance of fonts or the differences between different printers. Differences in line layout may affect the position of line, paragraph and page breaks. The four variables that can affect line layout are fonts, the printer driver, the font manager mode, and ROMs.

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Fonts

Every font on a Macintosh contains its own table of widths which tells QuickDraw how wide characters are on the screen. For every style point size there is a separate table which may contain widths that vary from face to face and from point size to point size. Character widths can vary between point sizes of characters even in the same face. In other words, fonts on the screen are not necessarily linearly scalable.

Non-linearity is not normally a problem since most fonts are designed to be as close to linear as possible. A font face in 6 point has very nearly the same scaled widths of the same font face in 24 point (plus or minus round-off or truncation differences). QuickDraw, however, requires only one face of any particular font to be in the System file to use it in any point size. If only a 10 point face actually exists, QuickDraw may scale that face to 9, 18, 24 (or whatever point size) by performing a linear scale of the 10 point face.

This can cause problems. Suppose a document is created on one Macintosh containing a font that only exists in that System file in one point size, say 9 point. The document is then taken to another Macintosh with a System file containing that same font but only in 24 point. The document may, in fact, appear differently on the two screens, and when it is printed, will have line breaks (and thus paragraph and page breaks) occurring in different places simply because of the differences in character widths that exist between the 9 point and 24 point faces.

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The Printer Driver

Even when the printer you are using has a much higher resolution than what the screen can show, printer drivers

perform line layout to match the screen layout as closely as possible.

The line layout performed by printer drivers is limited to single lines of text and does not change line break positions within multiple lines. The driver supplies metric information to the application about the page size and printable area to allow the application to determine the best place to make line and page breaks.

Printer driver line layout does affect word spacing, character spacing and even word positioning within a line. This may affect the overall appearance of text, particularly when font substitutions are made or various forms of page or text scaling are involved. But print drivers NEVER change line, paragraph or page break positions from what the application or screen specified. This means that where line breaks appear on the screen, they will always appear in the same place on the printer regardless of how the line layout may affect the appearance within the line.

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Operating System and ROMs

In this context, operating system refers to the ROM trap routines which handle fonts and QuickDraw. Changes have occurred between the ROMs in the handling of fonts. Fonts in the 64K ROMs contain width tables (as described above) which are limited to integer values. Several new tables, however, have been added to fonts for the newer ROMs. The newer ROMs add an optional global width table containing fractional or fixed point decimal values. In addition, there is another optional table containing fractional values which can be scaled for the entire range of point sizes for any one face. There is also an optional table which provides for the addition (or removal) of width to a font when its style is changed to another value such as bold, outline or condensed. It is also possible, under the 128K ROMs, to add fonts to the system with inherent style properties containing their own width tables that produce different character widths from derived style widths.

One or all of the above tables may or may not be invoked depending on, first, their presence, and second, the mode of the operating system. The Font Manager in the newer ROMs allows the application to arbitrarily operate in either the fractional mode or integer mode (determined, in most cases, by the setting of `FractEnable`) as it chooses, with the default being integer. There is one case where fractional widths will be used if they exist even though fractional mode is disabled. When `FScaleDisable` is used fractional widths are always used if they exist regardless of the setting of `FractEnable`.

Differences in line layout (and thus line breaks) may be affected by any combination of the presence or absence of the optional tables, and the operating mode, either fractional or integer, of the application. Any of the combinations can produce different results from the original ROMs (and from each other).

The integer mode on the newer ROMs is very similar to, but not exactly the same as, the original 64K ROMs. When fonts with the optional tables present are used on Macintoshes with 64K ROMs, they continue to work in the old way with the integer widths. However, on newer ROMs, even in the integer mode, there may be variations in line width from what is seen on the old ROMs. In the plain text style there is very little if any difference (except if the global width table is present), but as various type styles are selected, line widths may vary more between ROMs.

Variations in the above options, by far, account for the greatest variation in the appearance of lines when a document is transported between one Macintosh and another. Line breaks may change position when documents created on one system (say a Macintosh) are moved to another system (like a Macintosh Plus). Variations are more pronounced as the number and sizes of various type styles increase within a document.

In all cases, however, a printer driver will produce exactly the same line breaks as appear on the screen with any given system combination.

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References

The Printing Manager

The Font Manager

M.PR.LaserWriterOpt

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